Tennessee Valley Authority, Post Office Box 2000, Decatur, Alabama 35609-2000

September 26, 2005

10 CFR 50.55a

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Mail Stop: OWFN P1-35
Washington, D.C. 20555-0001

Gentlemen:

In the Matter of)
Tennessee Valley Authority)

Docket No. 50-296

BROWNS FERRY NUCLEAR PLANT (BFN) - UNIT 3 - AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME) SECTION XI, INSERVICE INSPECTION (ISI) PROGRAM, SECOND TEN-YEAR INSPECTION INTERVAL - REQUESTS FOR RELIEF 3-ISI-7, REVISION 1, 3-ISI-12, AND 3-ISI-19 - RESPONSE TO NRC REQUEST FOR ADDITIONAL INFORMATION (TAC NOS. MC6314, MC6386, AND MC6387)

This letter provides the TVA response to an NRC request for additional information regarding BFN Unit 3, ASME Section XI Inservice Inspection (ISI) Program, requests for relief 3-ISI-7, Revision 1, 3-ISI-12, and 3-ISI-19. These requests for relief were submitted by TVA letter dated March 4, 2005 for NRC review and approval.

Request for relief 3-ISI-7, Revision 1, addressed ten (10) Reactor Pressure Vessel (RPV) nozzle-to-vessel full penetration welds and one (1) nozzle inner radius. The design configuration of the RPV nozzle-to-vessel and inner-radius welds precluded a 100 percent ultrasonic (UT) examination of the required volume for the full penetration welds of the nozzles.

Request for relief 3-ISI-12 addressed three Residual Heat Removal System, and one Reactor Water Cleanup System full penetration austenitic stainless steel piping welds. An ultrasonic examination was performed for these piping welds of the accessible areas, to the maximum extent practical, due to the configuration. Credit for the one-sided only ultrasonic examination provided 50 percent coverage because of a recently added requirement in 10 CFR 50.55a(b)(2)(xv)(A)(2), which

A047

states in part, "Where examination from both sides is not possible on austenitic welds, full coverage credit from a single side may be claimed only after completing a successful single sided Appendix VIII demonstration using flaws on the opposite side of the weld...." At this time, there is no Appendix VIII Program for single sided austenitic welds nor is one planned in the future; therefore, only 50 percent coverage can be claimed. Under the original ASME Section XI Code requirements [prior to 10 CFR 50.55a(b)(2)(xv)(A)(2)], UT coverage attained was essentially 100 percent.

Request for relief 3-ISI-19 addresses three reactor pressure vessel (RPV) longitudinal shell welds. These RPV shell welds did not receive essentially (i.e., greater than 90 percent) 100 percent coverage due to obstructions from other components.

The enclosure to this letter contains the specific NRC questions and the corresponding TVA response.

There are no new regulatory commitments in this letter. If you have any questions, please contact me at (256) 729-2636.

Sincerely,

William D. Crouch
Manager of Licensing
and Industry Affairs

cc: See Page 3

Enclosure
cc (Enclosure):
(Via NRC Electronic Distribution)

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ENCLOSURE

TENNESSEE VALLEY AUTHORITY
BROWNS FERRY NUCLEAR PLANT (BFN)
UNIT 3
AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME) SECTION XI,
INSERVICE INSPECTION (ISI) PROGRAM
(SECOND TEN-YEAR INSPECTION INTERVAL)

REQUEST FOR RELIEF 3-ISI-7, REVISION 1, 3-ISI-12, AND 3-ISI-19
RESPONSE TO NRC REQUEST FOR ADDITIONAL INFORMATION

This enclosure provides TVA's response to an NRC request for additional information regarding BFN Unit 3, ASME Section XI Inservice Inspection (ISI) Program, requests for relief 3-ISI-7, Revision 1, 3-ISI-12, and 3-ISI-19. These requests for relief were submitted by TVA letter dated March 4, 2005 for NRC review and approval.

Request for relief 3-ISI-7, Revision 1, addressed ten (10) Reactor Pressure Vessel (RPV) nozzle-to-vessel full penetration welds and one (1) nozzle inner radius.

Request for relief 3-ISI-12 addressed three Residual Heat Removal System, and one Reactor Water Cleanup System full penetration austenitic stainless steel piping welds.

Request for relief 3-ISI-19 addressed three reactor pressure vessel (RPV) longitudinal shell welds.

Listed below are the NRC specific questions and the corresponding TVA response.

1.0, Request for Relief 3-ISI-7, Revision 1

NRC Request 1.1

Typically, there can be significant changes between the design drawings and the as-built conditions of plant components. Clarify whether the design drawings represent as-built configurations. State whether the actual as-built dimensions and curvatures that exist on the surfaces, such as the inner radius and outside weld crowns, are accurately depicted on the submitted drawings. Include whether the outside surface weld crowns are ground flush in the blend radius regions, and if possible, provide a surface roughness finish value (in root mean square units), for the reactor pressure vessel (RPV) base metal and nozzle-to-vessel welds. How do the Browns Ferry Nuclear Plant (BFN), Unit 3, nozzle-to-vessel weld as-built configurations compare to conditions on the representative specimens used during the Electric Power Research Institution (EPRI) Performance Demonstration Initiative (PDI) qualification?

TVA Response to NRC Request 1.1

The design drawings represent the basic as-built configurations of the Unit 3 Reactor Pressure Vessel in the plant. The manufacturer design drawings depict specified dimensions (linear, angular, and radii dimensions), with tolerances specified. These dimensions were verified and documented during the manufacturing process of the vessel by the vendor. The design drawings also contained specific surface finish requirements for machined and welded surfaces. Machined surfaces require a 250 finish or better unless otherwise noted. All welds to be suitable for Non-Destructive Testing with all offsets blended to a 3:1 taper (minimum). The drawings specified minimum radius dimensions for the nozzle to shell weld. To obtain this, the welds were machined and ground flush with the vessel and into the radius blend of the nozzle on the outside of the vessel.

Note: The examinations performed during BFN Unit 3 Cycle 10 refueling outage (Spring 2002) were performed prior to the implementation of the "Final Rule" and did not use ASME Section XI, Appendix VIII qualification criteria (see Attachment A). Examination of Weld N10-IR was conducted using PDI qualified examination criteria. A comparison of the EPRI specimens versus the BFN Unit 3 N10-IR revealed the following:

- The smallest EPRI nozzle specimen has an inner radius dimension of 2.9" and an I.D. Bore dimension of 3.94".

- The BFN Unit 3 N10-IR has an inner radius dimension of 0.75 inches and an I.D. Bore dimension of 1.95 inches.

The qualified procedure utilized the alternative method described in Code Case N-552, with the conditions specified in Regulatory Guide 1.147, Revision 13, January 2004.

NRC Request 1.2

Describe the ultrasonic methods that were used, including wave propagation modes and angles of interrogation.

TVA Response to NRC Request 1.2

RPV NOZZLE TO SHELL WELD	NDE REPORT No.	CYCLE NUMBER	COVERAGE
N1B-NV	R-156	10	77%
N2A-NV	R-158	10	77%
N2C-NV	R-160	10	77%
N2E-NV	R-162	10	77%
N3A-NV	R-164	10	77%
N4A-NV	R-166	10	77%
N4F-NV	R-168	10	77%
N5B-NV	R-170	10	71%
N7-NV	R-125	10	70%
N9-NV	R-172	10	74%
N10-Inner Radius	R-188	11	90%

See Attachment A for the above listed Inspection Reports.

NRC Request 1.3

Submit cross-sectional sketches showing the completed ultrasonic examination volumes for each wave mode and angle used on the subject nozzles. Include in these sketches the required ASME Code examination volumes and state whether the sketches represent the entire circumferential length of the welds, or show limitations to these coverages for specific regions of the welds. Are there any as-built conditions that may impact the examination coverages? Using the sketches and coverages illustrated, describe how the coverage values shown in 3-ISI-7, Revision 1, Table 1 were generated.

TVA Response to NRC Request 1.3

See attached nondestructive examination reports (see table above for report number)

2.0, Request for Relief 3-ISI-12

NRC Request 2.1

Clearly state the base material type(s) and fabrication forms for each of the subject piping welds. For example, for Weld TRHR-3-191, clarify whether this is a statically cast or austenitic valve welded to a statically cast austenitic elbow, or a statically cast valve welded to a wrought elbow.

TVA Response to NRC Request 2.1

Listed below are the base material type(s) and fabrication forms for each of the subject piping welds listed in 3-ISI-12.

DRHR-3-19 - 20″ Tee 1.272" Nominal Wall to 20" Schedule 80 Pipe: Tee, SA-403, WP316NG, Wrought Austenitic S.S. Pipe, A358, GR304 CL I, Austenitic S.S. Electric Fusion Welded Austenitic, Chromium Nickel Alloy Steel (A240, TP304 S.S. Plate).

DRHR-3-21 - 20" Schedule 80 Elbow to 20" Valve 3-FCV-74-49: Valve, A351, CF8M, Austenitic S.S. Casting. Elbow, A403, WP304, Wrought Austenitic S.S. (Note: In TVA's March 2005 submittal this component was erroneously identified as an elbow to pipe weld rather than valve to elbow weld as stated above.)

TRHR-3-191 - 20" Valve 3-FCV-74-48 to 20" Schedule 80 Elbow: Valve, A351, CF8M, Austenitic S.S. Casting. Elbow, A234 WPB, Wrought C.S. Forging.

RWCU-3-007-G004 - 4" Schedule 80 Pipe to 4" Valve 3-CKV-69-629: Pipe, A333, Gr1, C.S. Seamless Pipe. Valve, A351, CF8M, Austenitic S.S. Casting.

NRC Request 2.2

Describe the ultrasonic methods that were used, including wave propagation modes and angles of interrogation.

TVA Response to NRC Request 2.2

An ultrasonic examination was performed on the piping welds to accessible areas to the maximum extent practical due to the configuration. Credit for the one-sided only ultrasonic examination provided 50 percent coverage because of a the requirement mandated in 10 CFR 50.55a(b)(2)(xv)(A)(2), which states:

> "Where examination from both sides is not possible on austenitic welds, full coverage credit from a single side may be claimed only after completing a successful single sided Appendix VIII demonstration using flaw on the opposite side of the weld." Therefore only 50percent coverage can be claimed. Additionally, there is no Appendix VIII Program for cast austenitic piping welds. Therefore, only 50 percent coverage can be claimed. Under the original ASME Section XI Code requirements UT coverage attained would have been essentially 100 percent.

DRHR-3-19: This weld was examined using a 45 degree shear wave, 0.5″, 1.5 MHz and a 60 degree refracted longitudinal wave, 2(10 x 18 mm), 2 MHz transducers. Examination was

performed from the pipe side of the weld across the weld crown. A 5% to 20% ID noise was maintained. There were no obstructions.

DRHR-3-21: This weld was examined using a 45 degree shear wave, 0.5", 1.5 MHz and a 60 degree refracted longitudinal wave, 2(10 x 18 mm), 2 MHz transducers. Examination was performed from the pipe side of the weld across the weld crown. A 5% to 20% ID noise was maintained. There were no obstructions.

TRHR-3-191: This weld was examined using a 45 degree shear wave, 0.5", 1.5 MHz, a 60 degree shear wave, 0.5", 1.5 MHz, a 45 degree refracted longitudinal wave, 2(10 x 18 mm) 2 MHz, a 45 degree refracted longitudinal wave, 2(15 x 25 mm) 2MhZ, and a 60 degree refracted longitudinal wave, 2(10 x 18 mm), 2 MHz, transducer. Examination was performed from the pipe side of the weld across the weld crown. A 5% to 20% ID noise was maintained. There were no obstructions.

RWCU-3-007-G004: This weld was examined using a 45 and 60 degree shear wave, 0.375", 2.25 MHz transducers. Examination was performed from the pipe side of the weld across the weld crown. A 5% to 20% ID noise was maintained. There were no obstructions.

NRC Request 2.3

Submit cross-sectional sketches showing the completed ultrasonic examination volumes for each wave mode and angle used on the subject piping welds. Include in these sketches the required ASME Code examination volume zones and state whether the sketches represent the entire circumferential length of the welds, or show limitations to these coverages for specific regions of the welds. Are there any as-built conditions that may impact the examination coverages, including outside surface weld crowns and surface finishes? If possible, provide a surface roughness finish value (in root mean square units) of the subject piping welds. How do the subject BFN Unit 3 piping weld as-built configurations compare to conditions on the representative specimens used during the EPRI PDI qualification?

TVA Response to NRC Request 2.3

COMPONENT WELD	REPORT NUMBER	CYCLE NUMBER	EXAMINATION COVERAGE
DRHR-3-19	R-086	11	50%
DRHR-3-21	R-140	10	50%
TRHR-3-191	R-189	11	50%
RWCU-3-007-G004	R-081	11	50%

See Attachment B for the above listed Inspection Reports.

The EPRI PDI specimens used for PDI qualifications have similar configurations (i.e., flush welds, single side access, and weld joint design) as the welds listed in request for relief 3-ISI-12.

NRC Request 2.4

The licensee has implemented a Risk-Informed Inservice Inspection (RI-ISI) program at BFN Unit 3. As such, only a limited number of Class 1 piping welds are being inspected, as opposed to the ASME Code requirement of 25 percent of all Class 1 piping welds. Discuss why the partial examinations performed on the subject welds provide an adequate basis to conclude that the targeted degradation mechanisms (intergranular stress corrosion cracking and thermal fatigue) would have been detected, if present, in these welds. Discuss other piping weld examinations in these systems that are also subject to the same degradation mechanisms, and why the limited examinations on the subject welds do not impair or undermine the intent of the RI-ISI program. State whether BFN Unit 3 will inspect additional piping welds (not presently being examined) to account for the limited examination volumes of the subject welds and ensure that an adequate level of susceptible material, as required by the RI-ISI program, is being examined.

TVA Response to NRC Request 2.4

TVA received a Safety Evaluation Report (SER) from the NRC dated February 11, 2000, "Browns Ferry Nuclear Plant Unit 3, ASME Code Relief for Risk-Informed Inservice Inspection of Piping Welds." This allowed TVA to utilize an alternate Risk-Informed Inservice Inspection (RI-ISI) Program for BFN Unit 3. This program was developed in general accordance with the Westinghouse Owners Group (WOG) Topical Report WCAP-14572, Revision 1-NPA, which was approved by the NRC staff.

Reference Westinghouse Electric Company, LLC, letter WOG-RIISI-01-014, dated December 19, 2001, Westinghouse Owner's Group Implementation Subgroup Interpretation WOG RI-ISI IN 01.

Reference the Westinghouse Owners Group (WOG) Topical Report WCAP-14572, Revision 1-NPA, "Westinghouse Owners Group Application Of Risk - Informed Methods To Piping Inservice Inspection Topical Report," Section 4.0, Inspection Program Requirements.

The referenced Westinghouse Interpretations state that when inservice or preservice ultrasonic examinations of a location required by ASME Section XI were previously performed in accordance with ASME Section XI and achieved greater than 90 percent coverage and are now performed in accordance with ASME Section XI and the additional requirements of the PDI and 10 CFR 50.55a for the RI-ISI program and achieve ≤ 90 percent

coverage, solely because 10 CFR 50.55a does not permit crediting far side examination coverage for single sided examinations of stainless steel material, that the amount of risk addressed by the examination remains the same for that location. As discussed in Westinghouse Owners Group (WOG) Topical Report WCAP-14572, Revision 1-NP-A, "Westinghouse Owners Group Application Of Risk-Informed Methods To Piping Inservice Inspection Topical Report," it should be noted that if a current examination is a partial examination and it continues to be a partial examination in the RI-ISI process, the amount of risk addressed by the examination remains the same.

In summary, since three of the subject welds previously received an ASME Section XI or augmented (NUREG 03013) inservice ultrasonic examination that received >90% coverage and one weld which only had a preservice examination that received >90% coverage and had a low failure importance, it is TVA's position that no change in risk resulted from these examination limitations. Therefore, additional examinations are not required. Request for relief 3-ISI-12 was submitted as recommended by item 4 on page 192 of WCAP-14572, Revision 1-NP-A which states "The coverage obtained, limitations encountered, alternative provisions, and an assessment of how the risk is being addressed should be documented. The information should be formally submitted as a relief request."

3.0, Request for Relief 3-ISI-19

NRC Request 3.1

It has been proposed by industry (the Boiling-Water Reactor (BWR) Vessel and Internals project), and approved by the U.S. Nuclear Regulatory Commission, that only the longitudinal welds are required to be volumetrically examined to maintain structural integrity of the RPV in a BWR. Relief was requested for 3 of the 15 longitudinal shell welds at BFN Unit 3. Request for Relief 3-ISI-19 states, "twelve of the fifteen welds received essentially (i.e., greater than 90 percent) 100 percent coverage." In addition, the actual examination coverage for the three welds included in 3-ISI-19 were listed as 90, 86, and 89 percent, respectively. For comparison purposes, please summarize the actual coverage(s) obtained on the remaining 12 longitudinal shell welds.

TVA Response to NRC Request 3.1

The examination coverage for all 15 of the longitudinal RPV welds is provided in the table below.

RPV VERTICAL WELD	REPORT No.	CYCLE No.	EXAMINATION COVERAGE
VIA	R-212A	11	90%
V1B	R-212B	11	86%
VIC	R-212C	11	89%
V2A	R-212D	11	100%
V2B	R-212E	11	100%
V2C	R-212F	11	100%
V3A	R-212G	11	100%
V3B	R-212H	11	100%
V3C	R-212I	11	100%
V4A	R-212L	11	100%
V4B	R-212J	11	100%
V4C	R-212K	11	100%
V5A	R-212O	11	97%
V5B	R-212P	11	100%
V5C	R-212Q	11	97%

NRC Request 3.2

Clearly state what the exact limitations encountered due to the obstructions on the vessel inner surface were. For instance, does insufficient clearance exist to accommodate the inspection tool. Describe the constraints that must be considered to perform an effective examination, and show (through sketches and descriptions) how the interferences preclude a full ASME Code Examination. Also, describe if it is possible to deal with these limitations by altering the inspection device.

TVA Response to NRC Request 3.2

The requested information was provided in TVA's letter dated March 5, 2005, page E2-5 and restated below.

The configuration of BFN Unit 3 RPV and vessel internals prevents essentially 100 percent examination coverage of the three RPV longitudinal shell welds (V-1-A, V-1-B, and V-1-C). The examinations were performed with automated ultrasonic equipment from the vessel inside surface utilizing the Advanced Inservice Reactor Inspection System 21 (AIRIS 21) device, and Enhanced Data Acquisition System-II (EDAS™-II) equipment. The V-1-A, V-1-B, and V-1-C longitudinal shell weld scans were obstructed by the jet pump restrainer bracket and jet pump diffuser and received 90, 86, and 89, percent coverage respectively. The outside surfaces of these three welds were inaccessible due to the concrete bio-shield wall. The UT examinations of the longitudinal shell welds were performed to the maximum extent practical for maximum coverage utilizing the state of the art equipment available at the time the examinations were performed. The UT examinations of the longitudinal shell welds

were performed with equipment, personnel, and procedures qualified to the Performance Demonstration Initiative (PDI) Program in accordance with the requirements of the 1995 Edition, 1996, Addenda of ASME Section XI, Division 1, Appendix VIII as mandated by 10 CFR 50.55a.

Attachment A

Inspection Reports For RPV Nozzle-To-Shell Welds Listed In The Table Below

RPV NOZZLE TO SHELL WELD	NDE REPORT No.	CYCLE NUMBER	COVERAGE
N1B-NV	R-156	10	77%
N2A-NV	R-158	10	77%
N2C-NV	R-160	10	77%
N2E-NV	R-162	10	77%
N3A-NV	R-164	10	77%
N4A-NV	R-166	10	77%
N4F-NV	R-168	10	77%
N5B-NV	R-170	10	71%
N7-NV	R-125	10	70%
N9-NV	R-172	10	74%
N10-Inner Radius	R-188	11	90%

Inspection Report R-156
Weld N1B-NV

TENNESSEE VALLEY AUTHORITY	EXAMINATION SUMMARY AND RESOLUTION SHEET	REPORT NUMBER: R156

PROJECT: BFN	UNIT: 3	CYCLE: 10		COMPONENT ID: N1B	
EXAMINATION METHOD				SYSTEM RPV	ISI DWG. NO. 3-ISI-0328-C
MT ☐	PT ☐	UT ☒	VT ☐	CODE CLASS: 1	CATEGORY: B-D
PROCEDURE: N_UT_9	REV:9	TC:02-06		COFIG.: Nozzle TO Vessel	
EXAMINER: MIKE KLEINJAN LEVEL: II	EXAMINER: DAVID KLEINJAN LEVEL: II			EXAMINER: N/A LEVEL: N/A	EXAMINER: N/A LEVEL: N/A

This report contains the data associated with the manual ultrasonic examination of code category B-D, Nozzle to Vessel welds. This examination report satisfies ASME section XI requirements for the Nozzle to shell weld..

Examination. Nozzle to Vessel weld N1B
Transverse coverage for the Nozzle to Vessel weld was supplemented by the inner radius examination.
(N1B-IR) See R157

0° was used on the weld crown and base material Vessel side

45° was used on the vessel side only scanning over the weld crown
45° Tangent to the weld was used on vessel side CW/CCW
45° Parallel to the weld was used on vessel side CW/CCW

60° was used on the vessel side only scanning over the weld crown
60° Tangent to the weld was used on vessel side CW/CCW
60° Parallel to the weld was used on vessel side CW/CCW

77% code coverage was obtained

This exam was performed with equipment, Procedures, and personnel qualified in accordance with ASME Section XI

No Recordable Indications

RESOLUTION BY:	REVIEWED BY:	ANII:
Mike Kleinjan		DATE: 4/18/02
LEVEL: II DATE: 4-4-02	LEVEL: II DATE: 4/4/02	PG. 1 OF 16

4/11/02

00002 Report Number
R156

Calculation of ASME code coverage
For section XI NDE Examination

N1B

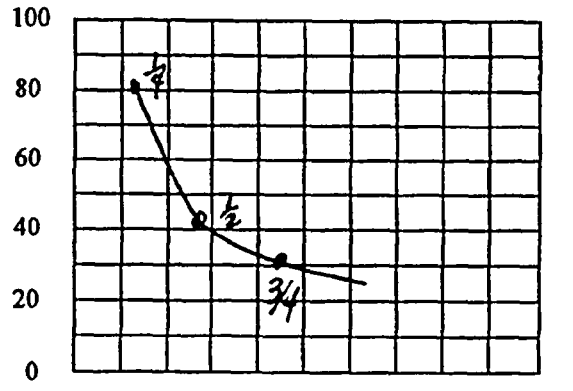
1) O degree (weld metal scan)	100%
2) 45 degree Transverse-scan from vessel side of weld	100%
3) 45 degree Transverse-scan from nozzle side of weld	0%
4) 60 degree Transverse-scan from vessel side of weld	100%
5) 60 degree Transverse-scan from nozzle side of weld	0%
6) 45 degree Parallel-scan CW direction	100% *
7) 45 degree Parallel-scan CCW direction	100% *
8) 60 degree Parallel-scan CW direction	100% *
9) 60 degree Parallel-scan CCW direction	100% *
The sum of all the percentage of scans	700%
Divided by the total # of scans	9
Percentage of examination Volume coverage	77%

* Transverse coverage includes coverage obtained during the inner radius examination.

HSBCT
7/18/00

TENNESSEE VALLEY AUTHORITY	DIGITAL ULTRASONIC CALIBRATION DATA SHEET	REPORT NUMBER: R156

PROJECT: BFN UNIT: 3 CYCLE: 10	CALIBRATION DATE: 3-29-02
PROC.: N-UT- 9 REV:9 TC:02-06	CALIBRATION BLOCK NO.: BF18 TEMP: 72.6'F
INSTR. MFG: STAVELEY DUE DATE: 8-05-02	SIMULATOR BLOCK NO: DB55079
MODEL/TYPE: SONIC-136 M & TE NO.: VH751	THERMOMTER S/N: 522352 DUE DATE: 5-17-02
TRANSDUCER MFG: Harisonic	COUPLANT SONOTRACE BATCH: 01141
S/N DB34198 SIZE: .75 FREQ: 2.25 MHz	EXAM TYPE: SHEAR☐ LONG☒ RL☐
CABLE TYPE: RG174 LENGTH: 120 inches	ANGLE VERIFICATION
	BLOCK TYPE: Rompus / S/N: DB~~35~~055079
DAC	NOMINAL ANGLE: 0 / ACTUAL ANGLE: N/A



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INSTRUMENT SETTINGS

REFLECTOR SCAN DIRECT.	NTCH	SDH	REFERENCE SENSITIVITY	MEMORY NUMBER
AXIAL	☐	☒	20.8 dB	1
CIRC	☐	☐	n/a dB	n/a

FREQ: 2.25 MHz	REJECT: off %
ANGLE: n/a deg	DAMPING: 500 ohms
DELAY: .499 msec	PULSER: 222
ZERO: n/a msec	FILTER: Filt 3
VELOCITY: .238 msec	REP RATE: 2KHZ
RANGE: 10 inches	TOF: ☒PEAK ☐ FLANK
DISPLAY MODE: PE	POWER: AC
DUAL: ☐ ON ☒ OFF	TCG: ☐ ON ☒ OFF

REF. REFLECTOR: 1" GAIN: 8 dB	CALIBRATION TIMES
AMPLITUDE: 80 % METAL PATH: 1"	INITIAL TIME: 9:00 FINAL TIME: 14:50

VERIFICATION TIMES	1) n/a	2) n/a	3) n/a	4) n/a	5) n/a	6) n/a	7) n/a	8) n/a	9) n/a

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

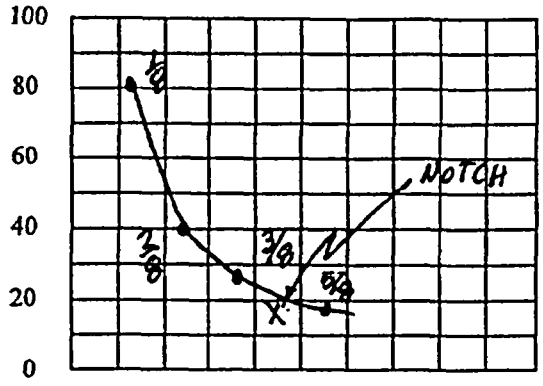
ATTENUATOR	GAIN	SET	-6 dB	-12 dB	SET	+12	SET	+6
	AMP	80%	32 TO 48	16 TO 24	20 %	64 TO 96	40%	64 TO 96
			40	20		80		80

COMMENTS:	WELDS/ITEMS EXAMINED:
	N1B Nozzle To Shell

EXAMINER:	EXAMINER:	REVIEWER:	ANII:
MIKE W. KLEINJAN	DAVID KLEINJAN		DATE: 4/18/02
LEVEL: II	LEVEL: II	LEVEL: III DATE: 4/4/02	PG.: ~~1 5 OF 1 15~~ 3 OF 15

TENNESSEE VALLEY AUTHORITY	DIGITAL ULTRASONIC CALIBRATION DATA SHEET	REPORT NUMBER: R156

PROJECT: BFN UNIT: 3 CYCLE: 10	CALIBRATION DATE: 3-29-02
PROC.: N-UT- 9 REV:9 TC:02-06	CALIBRATION BLOCK NO.: BF18 TEMP: 72.6'F
INSTR. MFG: STAVELEY DUE DATE: 8-05-02	SIMULATOR BLOCK NO: DB55079
MODEL/TYPE: SONIC-136 M & TE NO.: VH751	THERMOMTER S/N: 522352 DUE DATE: 5-17-02
TRANSDUCER MFG: Krauntkramer	COUPLANT SONOTRACE BATCH: 01141
S/N DB34843 SIZE: .5x1 FREQ: 2.25 MHz	EXAM TYPE: SHEAR☒ LONG☐ RL☐
CABLE TYPE: RG1743 LENGTH: 120 inches	**ANGLE VERIFICATION**
	BLOCK TYPE: IIW / S/N: DB55074
DAC	NOMINAL ANGLE: 45° / ACTUAL ANGLE: 46°



DISPLAY WIDTH: 10 inches

INSTRUMENT SETTINGS

REFLECTOR SCAN DIRECT.	NTCH	SDH	REFERENCE SENSITIVITY	MEMORY NUMBER
AXIAL	☐	☒	42.6 dB	2
CIRC	☐	☐	n/a dB	n/a

FREQ: 2.25 MHz	REJECT: off %
ANGLE: N/A deg	DAMPING: 500 ohms
DELAY: .830 msec	PULSER: 222
ZERO: N/A msec	FILTER: FITL 3
VELOCITY: .126 msec	REP RATE: 2KHZ
RANGE: 20 inches	TOF: ☒PEAK ☐ FLANK
DISPLAY MODE: PE	POWER: AC
DUAL: ☐ ON ☒ OFF	TCG: ☐ ON ☒ OFF

REF. REFLECTOR: 1"	GAIN: 33.6 dB
AMPLITUDE: 80 %	METAL PATH: 1"

CALIBRATION TIMES

INITIAL TIME: 9:00	FINAL TIME: 14:50

VERIFICATION TIMES	1) n/a	2) n/a	3) n/a	4) n/a	5) n/a	6) n/a	7) n/a	8) n/a	9) n/a

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	

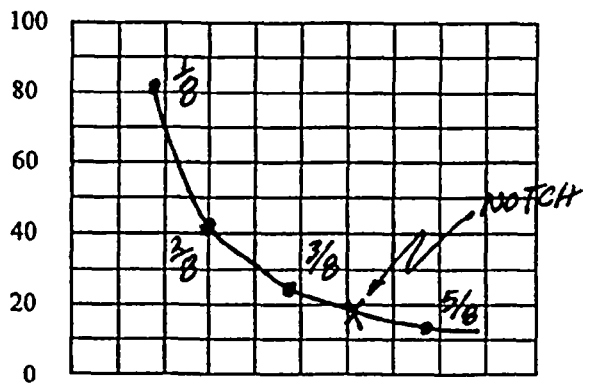
ATTENUATOR	GAIN	SET	-6 dB	-12 dB	SET	+12	SET	+6	
	AMP	80%	32 TO 48	16 TO 24	20 %	64 TO 96	40%	64 TO 96	
			40	20		80		80	

COMMENTS:	WELDS/ITEMS EXAMINED:
Delta difference between 3/8 to 5/8 on the clad side is 3 dB √	N1B Nozzle to Shell

EXAMINER:	EXAMINER:	REVIEWER:	ANII:
MIKE W. KLEINJAN	DAVID KLEINJAN		DATE: 4/18/02
LEVEL:II	LEVEL:II	LEVEL: III DATE: 4/4/02	PG.: ~~4 OF 15~~ 4 of 15

TENNESSEE VALLEY AUTHORITY	DIGITAL ULTRASONIC CALIBRATION DATA SHEET	REPORT NUMBER: R 156

PROJECT: BFN UNIT: 3 CYCLE: 10	CALIBRATION DATE: 3-29-02
PROC.: N-UT- 9 REV:9 TC:02-06	CALIBRATION BLOCK NO.: BF18 TEMP: 72.6°F
INSTR. MFG: STAVELEY DUE DATE: 8-05-02	SIMULATOR BLOCK NO: DB55079
MODEL/TYPE: SONIC-136 M & TE NO.: VH751	THERMOMTER S/N: 522352 DUE DATE: 5-17-02
TRANSDUCER MFG: Krauntkramer	COUPLANT SONOTRACE BATCH: 01141
S/N DB34154 SIZE: .5x1 FREQ: 2.25 MHz	EXAM TYPE: SHEAR☒ LONG☐ RL☐
CABLE TYPE: RG174 LENGTH: 120 inches	**ANGLE VERIFICATION**
	BLOCK TYPE: IIW / S/N: DB55074
DAC	NOMINAL ANGLE: 60 / ACTUAL ANGLE: 59



DISPLAY WIDTH: 10 inches

INSTRUMENT SETTINGS

REFLECTOR			REFERENCE SENSITIVITY		MEMORY NUMBER
SCAN DIRECT.	NTCH	SDH			
AXIAL	☐	☒	49	dB	3
CIRC	☐	☐	n/a	dB	n/a

FREQ:	2.25	MHz	REJECT:	off	%
ANGLE:	N/A	deg	DAMPING:	500	ohms
DELAY:	1.20	msec	PULSER:	222	
ZERO:	N/A	msec	FILTER:	FITL 3	
VELOCITY:	.123	msec	REP RATE:	2KHZ	
RANGE:	20	inches	TOF:	☒PEAK	☐ FLANK
DISPLAY MODE:	PE		POWER:	AC	
DUAL:	☐ ON	☒ OFF	TCG:	☐ ON	☒ OFF

REF. REFLECTOR: 1" GAIN: 36 dB	**CALIBRATION TIMES**
AMPLITUDE: 80 % METAL PATH: 1"	INITIAL TIME: 9:00 FINAL TIME: 14:50

VERIFICATION TIMES	1) n/a	2) n/a	3) n/a	4) n/a	5) n/a	6) n/a	7) n/a	8) n/a	9) n/a

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

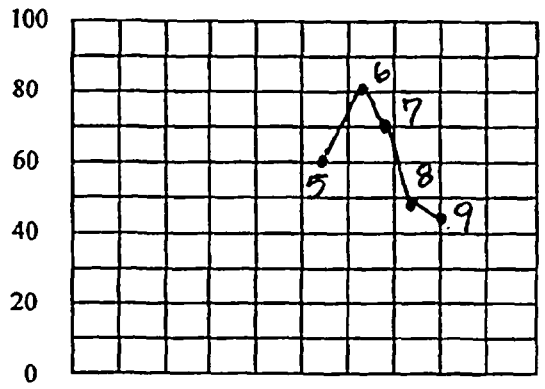
ATTENUATOR	GAIN	SET	-6 dB	-12 dB	SET	+12	SET	+6
	AMP	80%	32 TO 48	16 TO 24	20 %	64 TO 96	40%	64 TO 96
			40	20		80		80

COMMENTS:	WELDS/ITEMS EXAMINED:
DELTA dB DIFFERENCE IS 4.4 FROM THE 3/8 TO 5/8 ON THE CLAD SIDE	N1B Nozzle to Shell

EXAMINER:	EXAMINER:	REVIEWER:	ANII:
MIKE W. KLEINJAN	DAVID KLEINJAN		DATE:
LEVEL: II	LEVEL: II	LEVEL: III DATE: 4/4/02	PG.: ~~1-7 OF 1-15~~ 5 OF 15

TENNESSEE VALLEY AUTHORITY	DIGITAL ULTRASONIC CALIBRATION DATA SHEET	REPORT NUMBER: R156

PROJECT: BFN UNIT: 3 CYCLE: 10	CALIBRATION DATE: 03-29-02
PROC.: N-UT- 55 REV:9 DOTC:~~N/A~~ 28	CALIBRATION BLOCK NO.: BF-84-IR TEMP: 70.5'F
INSTR. MFG: STAVELEY DUE DATE: 08-11-02	SIMULATOR BLOCK NO: N/A
MODEL/TYPE: SONIC-137 M & TE NO.: VH-5473	THERMOMETER S/N: 522352 DUE DATE: 05-17-02
TRANSDUCER MFG: KRAUTKRAMER	COUPLANT SONOTRACE BATCH: 01141
S/N DB 35163 SIZE: 1.0" FREQ: 2.25 MHz	EXAM TYPE: SHEAR☐ LONG☐ RL☒
CABLE TYPE: RG 174 LENGTH: 120 inches	ANGLE VERIFICATION
	BLOCK TYPE: CS IIW S/N: DB 55074
DAC	NOMINAL ANGLE: 28 ACTUAL ANGLE: N/A



DISPLAY WIDTH: 20 inches

INSTRUMENT SETTINGS

REFLECTOR SCAN DIRECT.	NTCH	SDH	REFERENCE SENSITIVITY	MEMORY NUMBER
AXIAL	☒	☐	63.6 dB	20
CIRC	☐	☐	N/A dB	N/A

FREQ: 2.25 MHz	REJECT: OFF %
ANGLE: N/A deg	DAMPING: 200 ohms
DELAY: 1.66 msec	PULSER: 222
ZERO: N/A msec	FILTER: FILT 1
VELOCITY: 0.233 msec	REP RATE: 4 KHZ
RANGE: 20.0 inches	TOF: ☐PEAK ☒ FLANK
DISPLAY MODE: PE	POWER: AC
DUAL: ☐ ON ☒ OFF	TCG: ☐ ON ☒ OFF

REF. REFLECTOR: N/A GAIN: N/A dB	CALIBRATION TIMES
AMPLITUDE: N/A % METAL PATH: N/A"	INITIAL TIME: 0830 FINAL TIME: 1400

VERIFICATION TIMES	1)N/A	2)N/A	3)N/A	4)N/A	5)N/A	6)N/A	7)N/A	8)N/A	9)N/A

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	-12 dB	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:	WELDS/ITEMS EXAMINED:
	REACTOR PRESSURE VESSEL
	N1B-IR
	wedge ID D-14795-214 ✓

EXAMINER:	EXAMINER:	REVIEWER:	ANII:
DAVID KLEINJAN	MIKE KLEINJAN		DATE: 4/18/02
LEVEL: II	LEVEL: II	LEVEL: III DATE: 4/18/02	PG.: ~~4 of 4~~ ~~15~~ 6 OF 15 4/11/02

TENNESSEE VALLEY AUTHORITY	DIGITAL ULTRASONIC CALIBRATION DATA SHEET	REPORT NUMBER: R156

PROJECT: BFN UNIT: 3 CYCLE: 10 CALIBRATION DATE: 03-29-02

PROC.: N-UT- 55 REV:9 TC:~~N/A~~ CALIBRATION BLOCK NO.: BF-84-IR TEMP: 70.5°F

INSTR. MFG: STAVELEY DUE DATE: 08-11-02 SIMULATOR BLOCK NO: N/A

MODEL/TYPE: SONIC-137 M & TE NO.: VH-5473 THERMOMTER S/N: 522352 DUE DATE: 05-17-02

TRANSDUCER MFG: KRAUTKRAMER COUPLANT SONOTRACE BATCH: 01141

S/N DB 35164 SIZE: 1.0" FREQ: 2.25 MHz EXAM TYPE: SHEAR☐ LONG☐ RL☒

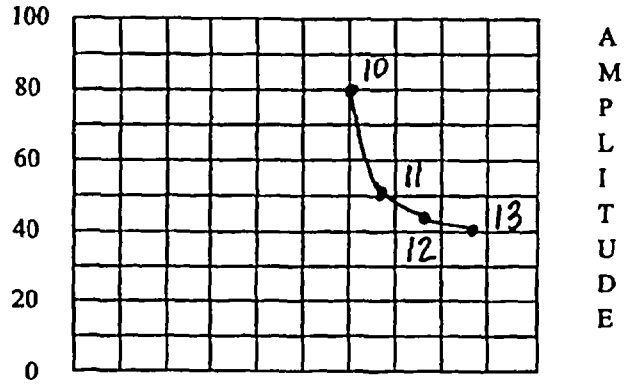
CABLE TYPE: RG 174 LENGTH: 120 inches

ANGLE VERIFICATION

BLOCK TYPE: CS IIW S/N: DB 55074

NOMINAL ANGLE: 32° ACTUAL ANGLE: N/A

DAC



DISPLAY WIDTH: 20 inches

INSTRUMENT SETTINGS

REFLECTOR			REFERENCE SENSITIVITY	MEMORY NUMBER
SCAN DIRECT.	NTCH	SDH		
AXIAL	☒	☐	63.8 dB	21
CIRC	☐	☐	N/A dB	N/A

FREQ: 2.25 MHz	REJECT: OFF %
ANGLE: N/A deg	DAMPING: 200 ohms
DELAY: 1.35 msec	PULSER: 222
ZERO: N/A msec	FILTER: FILT 1
VELOCITY: 0.235 msec	REP RATE: 4 KHZ
RANGE: 20.0 inches	TOF: ☐PEAK ☒ FLANK
DISPLAY MODE: PE	POWER: AC
DUAL: ☐ ON ☒ OFF	TCG: ☐ ON ☒ OFF

REF. REFLECTOR: N/A GAIN: N/A dB

AMPLITUDE: N/A % METAL PATH: N/A"

CALIBRATION TIMES

INITIAL TIME: 0940 FINAL TIME: 1410

VERIFICATION TIMES	1)N/A	2)N/A	3)N/A	4)N/A	5)N/A	6)N/A	7)N/A	8)N/A	9)N/A

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	-12 dB	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:	WELDS/ITEMS EXAMINED:
	REACTOR PRESSURE VESSEL
	N1B-IR
	wedge ID D-14795-250

EXAMINER:	EXAMINER:	REVIEWER:	ANII:
DAVID KLEINJAN	MIKE KLEINJAN		DATE: 4/18/02
LEVEL: II	LEVEL: II	LEVEL: III DATE: 4/4/02	PG.: ~~1 3 OF 1 15~~ 7 OF 15 4/11/02

TVA	MANUAL ULTRASONIC VESSEL EXAMINATION DATA SHEET	REPORT NO. R156

PROJECT: BFN UNIT: 3 WELD ID: N1B CONFIG.: NOZZLE COMPONENT: VESSEL

CAL. SHT. NO.: NA PROCEDURE: N-UT-9 REV.: 9 PCR.: ~~N/A~~ 02-06 ~~5/11/02~~ TEMP.: 89 PYRO.: 522352 ~~X~~

SCAN SENS.: ⊛ dB EXAM START: 11:15 3/28/02 EXAM END: 1310 EXAM ANGLE: 0°, 45°, 60

Lo LOCATION: TDC Wo LOCATION: ℄ OF WELD

IND NO.	20%			50%			100%			MAX. AMP.			20%			50%			100%		
	Mp1	W1	L1	Mp1	W1 ⊛	L1	Mp1	W1	L1	Mp	W	L	Mp2	W2	L2	Mp2	W2	L2	Mp2	W2	L2
28°	SCAN.	dB			69.8		SCANNING			#	10/11		BLEND RADIUS								
32°	SCAN	dB			69.6		SCANNING			#	10/11		BLEND RADIUS								
0°	SCAN	dB			34.8		SCANNING			#	9		ON weld and BASE MATERIAL								
45°	SCAN	dB			56.6		SCANNING			#	9		VESSEL SIDE ONLY								
45 T	SCAN	dB			56.6		SCANNING			#	10/11		cw/~~ccw~~								
45 TAN	SCAN	dB			56.6		SCANNING			#	10/11		cw/ccw								
60	SCAN	dB			63		SCANNING			#	9		VESSEL SIDE ONLY								
60 T	SCAN	dB			63		SCANNING			#	10/11		cw/~~ccw~~								
60 TAN	SCAN	dB			63		SCANNING			#	10/11		cw/~~ccw~~								
	NO RECORDABLE INDICATIONS																				

COMMENTS: * 28° AND 32° For The BLEND RADIUS. TRANSVERSE COVERAGE INCLUDES COVERAGE OBTAINED DURING THE INNER RADIUS EXAMINATIONS.
5TO10% NOISE LEVEL WAS OBSERVED

EXAMINER: Mike W Kyz LEVEL: II DATE: 3-29-02 REVIEWED BY: [signature] LEVEL: III DATE: 4/4/02

EXAMINER: D.R. Kyzer LEVEL: II DATE: 3-29-02 ANII: [signature] DATE: 4/18/02 PAGE 8 OF 15

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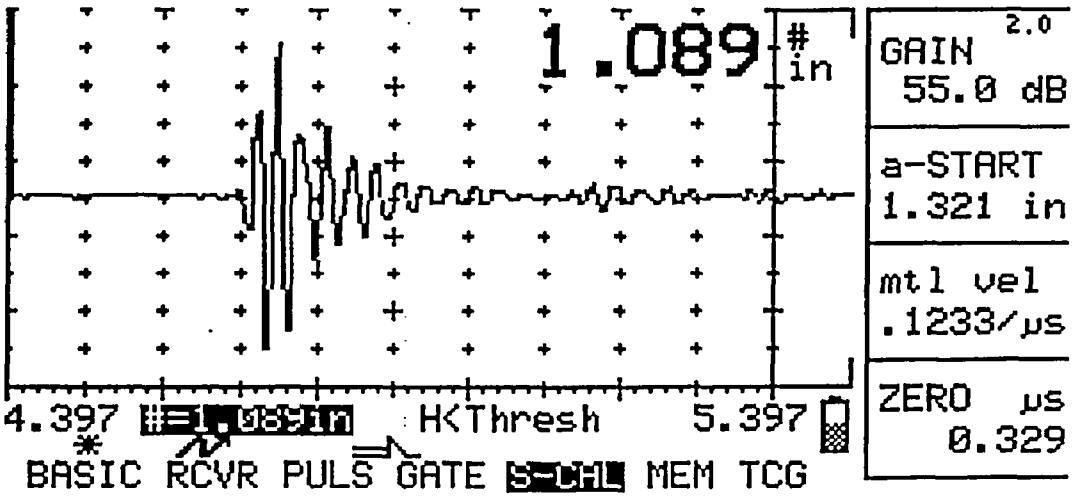
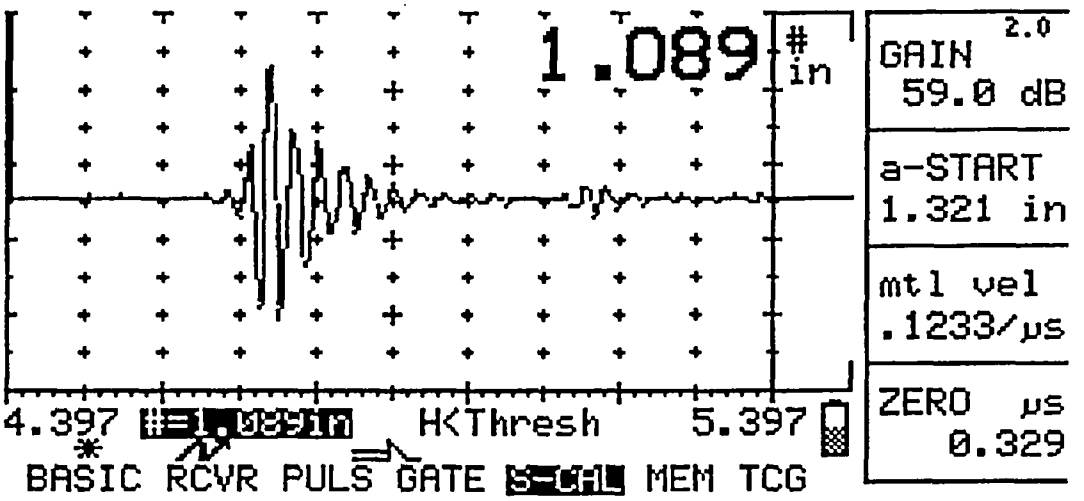
TVA 40094 (NP-1-89) 1-108-999-48

00009 Report Number R156

Nozzle Examination 45 °Waveforms



45° Pre Waveform



45° Post Waveform

HSBCT
4/18/02

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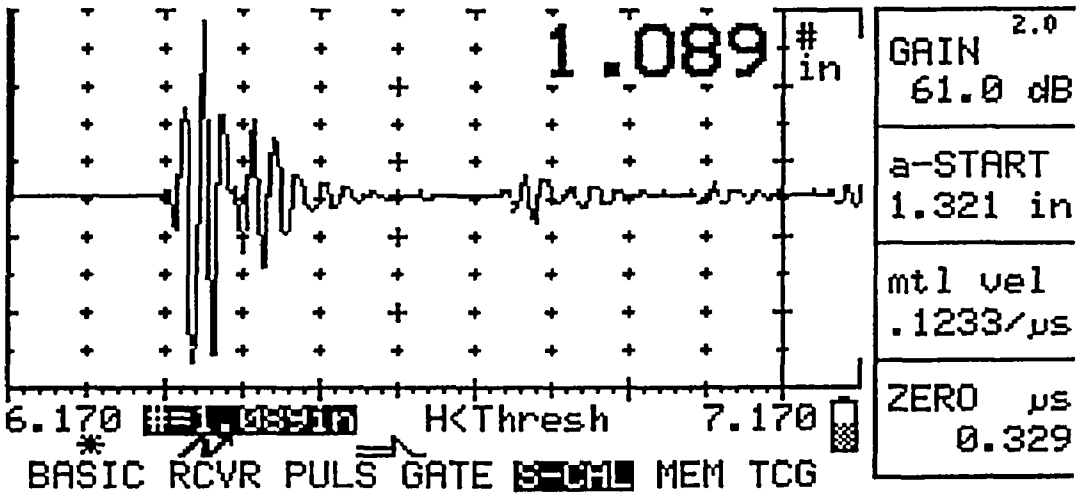
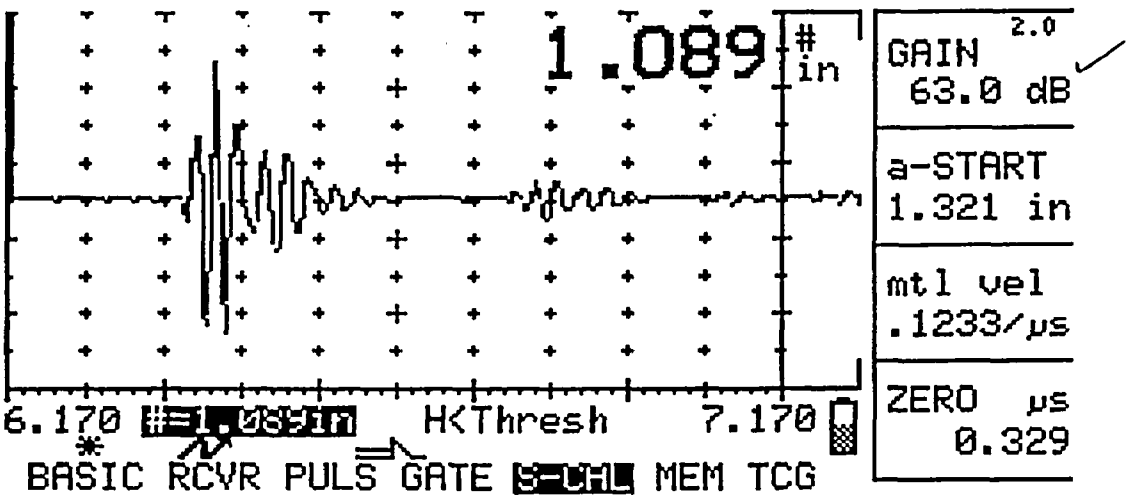
00010
Report Number
R156

Nozzle Examination 60 ° Waveforms



60° Pre Waveform



60° Post Waveform

H SBCT
4/18/08

TVA	BEAM SPREAD AND RESOLUTION DATA SHEET	REPORT NO. R156

PROJECT: BFN UNIT: 3 CALIBRATION BLOCK NO.: BF 18

PROCEDURE NO.: N-UT-9 REV.: 9 PCR: 0206 N/A → 1st Update

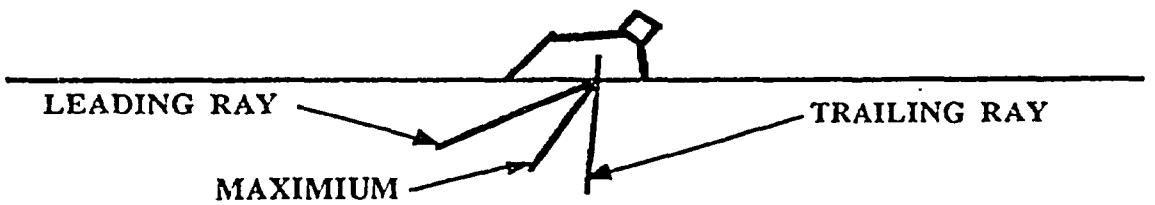
SEARCH UNIT-MAKE: Krautkramer SIZE: .5X1 FREQ.: 2.25

S/N: DB 34843 ANGLE: 45

ULTRASONIC INSTRUMENT-MAKE: Sonic 135 S/N: VH 751

BEAM SPREAD

	TRAILING RAY						LEADING RAY			
HOLE	20% DAC		50% DAC		100% DAC		20% DAC		50% DAC	
DEPTH	W	MP	W	MP	MP	W	MP	W	W	MP
1/4T	1 1/8	1.9	1 1/4	2.	2.1	1 5/8	2.4	2	1 7/8	2.3
1/2T	2 7/8	4	3	4.1	4.3	3 1/4	4.8	4 1/8	3 3/4	4.6
3/4T	4 1/4	6	4 1/2	6.3	6.5	4 7/8	7	5 7/8	5 1/4	6.8



RESOLUTION

NEAR SURFACE REFLECTOR: Notch OD DEPTH: 25 SIZE: .253 CAL BLK.: BF 18

FAR SURFACE REFLECTOR: Notch DEPTH: 6.1 SIZE: .253

SCANNING REFLECTORS PROVIDE 50% DAC SIGNALS AT SCANNING SPEED Y ☑ N ☐

EXAMINER: [signature]	REVIEWED BY: [signature]	ANII: [signature]
LEVEL: II DATE: 3-30-02	LEVEL: III DATE: 4/4/02	DATE: 4/18/02 PAGE: 11 OF 15

TVA	BEAM SPREAD AND RESOLUTION DATA SHEET	REPORT NO. R156

PROJECT: BFN UNIT: 3 CALIBRATION BLOCK NO.: BF 18

PROCEDURE NO.: N-UT-9 REV.: 9 PCR: 0206 4/10/02

SEARCH UNIT-MAKE: Krautkramer SIZE: .5X1 FREQ.: 2.25

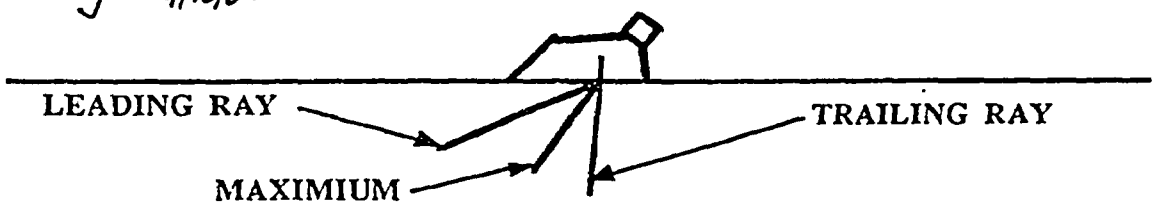
S/N: DB 34154 ANGLE: 60

ULTRASONIC INSTRUMENT-MAKE: Sonic 136 S/N: VH 751

BEAM SPREAD

HOLE DEPTH	TRAILING RAY 20% DAC W	TRAILING RAY 20% DAC MP	TRAILING RAY 50% DAC W	TRAILING RAY 50% DAC MP	100% DAC MP	100% DAC W	LEADING RAY 20% DAC MP	LEADING RAY 20% DAC W	LEADING RAY 50% DAC W	LEADING RAY 50% DAC MP
1/4T	2 1/8	2.4	2 3/8	2.7	2.9	2 5/8	3.2	3 1/8	2 7/8	3.1
1/2T	4 3/4	4.8	5	5.3	5.8	5 1/4	6.4	6 5/8	6	6.1
3/4T	~~8 3/8~~ 7 3/4	7.6	7 1/4	8	8.7	7 7/8	9.6	8 5/8	8	9.1

jm 4/10/02



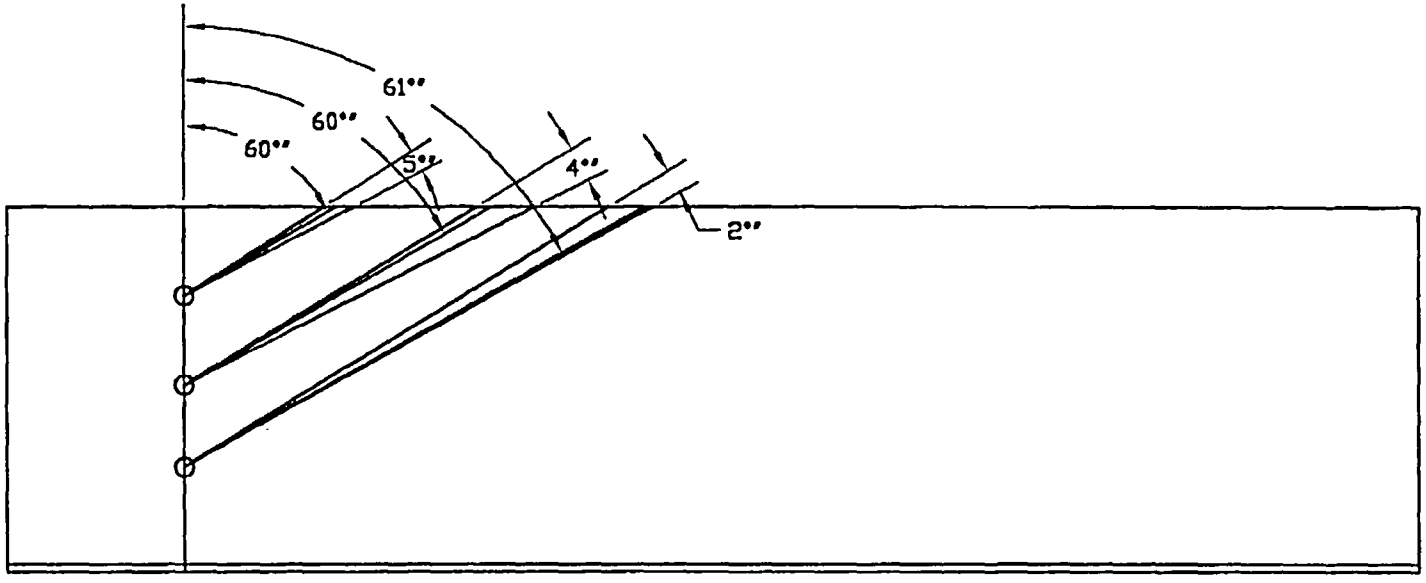
RESOLUTION

NEAR SURFACE REFLECTOR: Notch OD DEPTH: .25 SIZE: .253 CAL BLK.: BF 18

FAR SURFACE REFLECTOR: Notch ID DEPTH: 6.1 SIZE: .253

SCANNING REFLECTORS PROVIDE 50% DAC SIGNALS AT SCANNING SPEED Y☒ N☐

EXAMINER: Mike W Kenyon	REVIEWED BY: [signature]	ANI: [signature]
LEVEL: II DATE: 3-30-02	LEVEL: III DATE: 4/4/02	DATE: 4/18/02 4/11/02 PAGE: 12 OF 15



REPORT NUMBER
R156

Browns Ferry Unit 3
Beamspread
MARCH 2002
BF-18

00013

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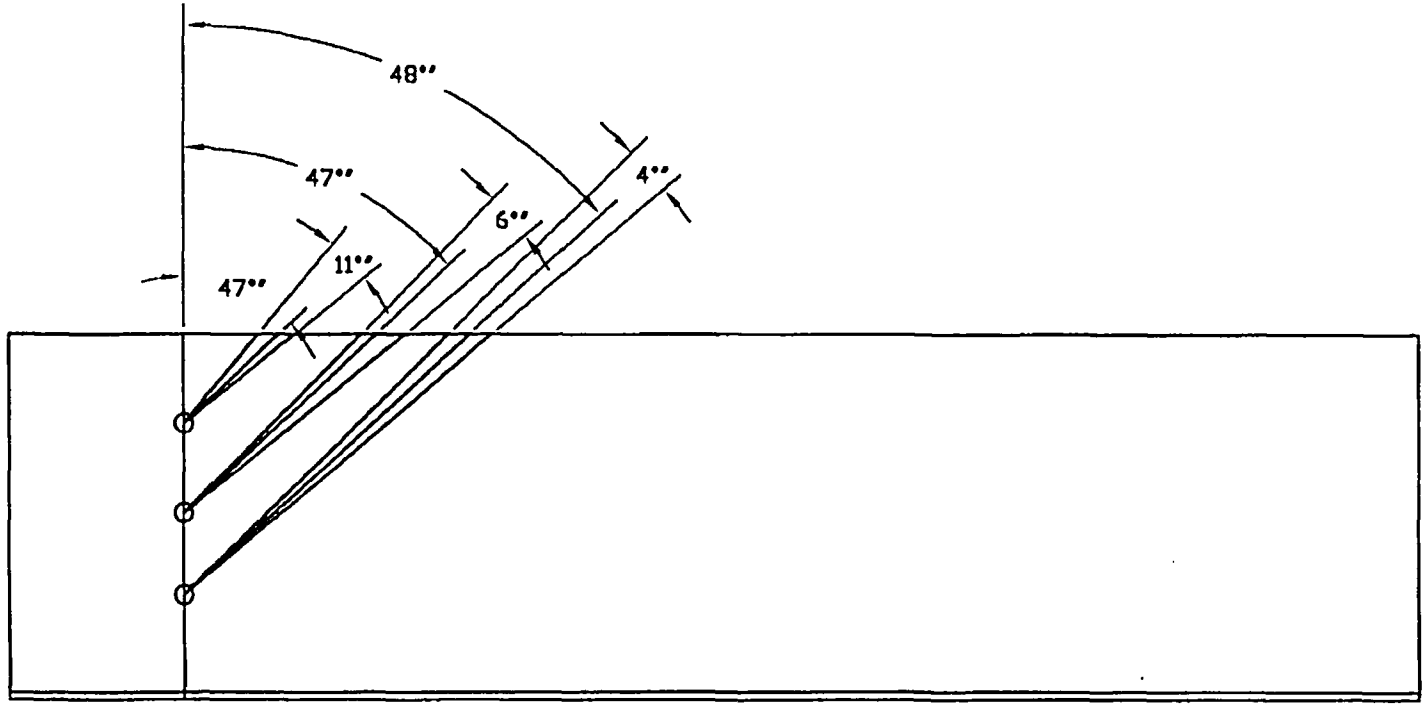


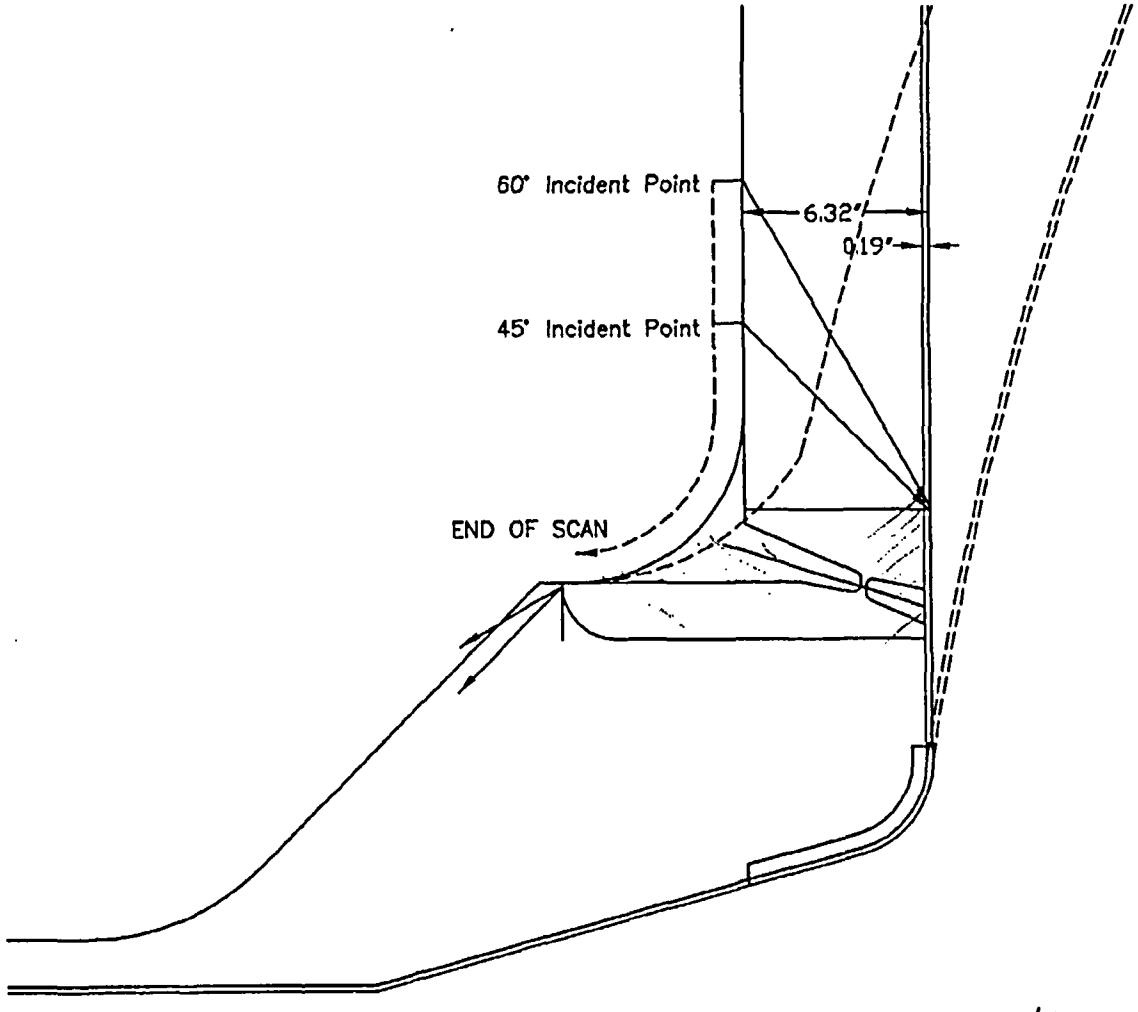
REPORT NUMBER
R156

HSBCT
4/18/02

Browns Ferry Unit 3
Beamspread
MARCH 2002
BF-18

00014

14-S 45



Transverse coverage includes coverage obtained during the inner radious examination

Browns Ferry Unit 3
N1B Nozzle-to-Shell
MARCH 2002
SP-N1B-NS

HSBC 4/18/02

Report Number R156

00015

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00016

TENNESSEE VALLEY AUTHORITY	EXAMINATION SUMMARY AND RESOLUTION SHEET	REPORT NUMBER: R157

PROJECT: BFN	UNIT: 3	CYCLE: 10		COMPONENT ID: N1B-IR	
EXAMINATION METHOD				SYSTEM RPV	ISI DWG. NO. 3-ISI-0328-C
MT ☐	PT ☐	UT ☒	VT ☐	CODE CLASS: 1	CATEGORY: B-D
PROCEDURE: N-UT-55	REV:9	TC: ~~N/A~~ 03-08		COFIG.: Nozzle TO Vessel	
EXAMINER: MIKE KLEINJAN LEVEL: II 5/10/02	EXAMINER: DAVID KLEINJAN LEVEL: II	EXAMINER: N/A LEVEL: N/A		EXAMINER: N/A LEVEL: N/A	

This report contains the data associated with the manual ultrasonic examination of code category B-D, Nozzle Inner radius. This examination report satisfies ASME section XI requirements for the inner radius examination.

N1B-IR: This examination was performed using a 28° and 32° in the blend radius in two directions CW/CCW

100% code coverage was obtained

This exam was performed with equipment, Procedures, and personnel qualified in accordance with ASME Section XI

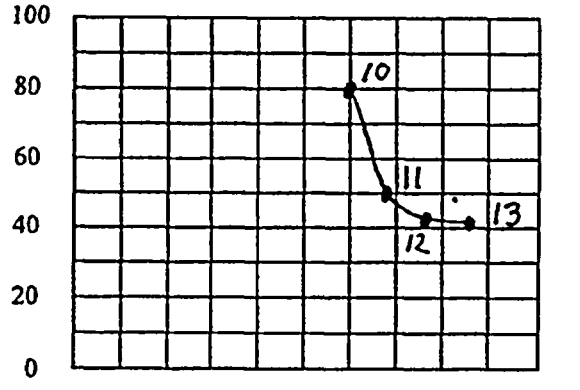
No Recordable Indication

RESOLUTION BY:	REVIEWED BY:	ANII:
Mike Kleinjan		DATE: 4/18/02
LEVEL: II DATE: 4-4-02	LEVEL: III DATE: 4/4/02	PG. 1 OF 4

Jan 4/11/02

TENNESSEE VALLEY AUTHORITY	DIGITAL ULTRASONIC CALIBRATION DATA SHEET	REPORT NUMBER: R157

PROJECT: BFN UNIT: 3 CYCLE: 10	CALIBRATION DATE: 03-29-02
PROC.: N-UT- 55 REV:9 ~~TC:N/A~~	CALIBRATION BLOCK NO.: BF-84-IR TEMP: 70.5°F
INSTR. MFG: STAVELEY DUE DATE: 08-11-02	SIMULATOR BLOCK NO: N/A
MODEL/TYPE: SONIC-137 M & TE NO.: VH-5473	THERMOMTER S/N: 522352 DUE DATE: 05-17-02
TRANSDUCER MFG: KRAUTKRAMER	COUPLANT SONOTRACE BATCH: 01141
S/N DB 35164 SIZE: 1.0" FREQ: 2.25 MHz	EXAM TYPE: SHEAR☐ LONG☐ RL☒
CABLE TYPE: RG 174 LENGTH: 120 inches	ANGLE VERIFICATION
	BLOCK TYPE: CS IIW S/N: DB 55074
DAC	NOMINAL ANGLE: 32° ACTUAL ANGLE: N/A



DISPLAY WIDTH: 20 inches

INSTRUMENT SETTINGS

REFLECTOR SCAN DIRECT.	NTCH	SDH	REFERENCE SENSITIVITY	MEMORY NUMBER
AXIAL	☒	☐	63.8 dB	21
CIRC	☐	☐	N/A dB	N/A

FREQ: 2.25 MHz	REJECT: OFF %
ANGLE: N/A deg	DAMPING: 200 ohms
DELAY: 1.35 msec	PULSER: 222
ZERO: N/A msec	FILTER: FILT 1
VELOCITY: 0.235 msec	REP RATE: 4 KHZ
RANGE: 20.0 inches	TOF: ☐PEAK ☒ FLANK
DISPLAY MODE: PE	POWER: AC
DUAL: ☐ ON ☒ OFF	TCG: ☐ ON ☒ OFF

REF. REFLECTOR: N/A	GAIN: N/A dB
AMPLITUDE: N/A %	METAL PATH: N/A"

CALIBRATION TIMES

INITIAL TIME: 0940 FINAL TIME: 1410

VERIFICATION TIMES	1)N/A	2)N/A	3)N/A	4)N/A	5)N/A	6)N/A	7)N/A	8)N/A	9)N/A

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	

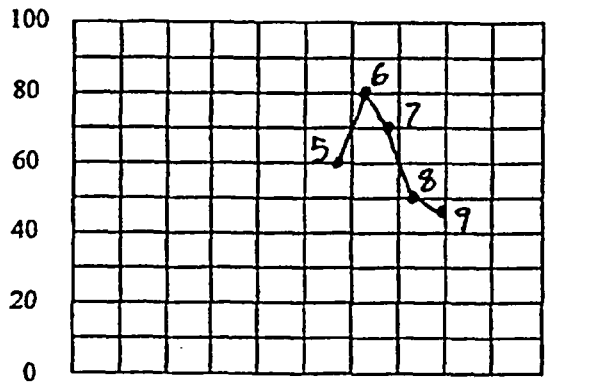
ATTENUATOR	GAIN	SET	-6 dB	-12 dB	SET	+12	SET	+6	
	AMP	80%	32 TO 48	16 TO 24	20 %	64 TO 96	40%	64 TO 96	
			40	20		80		80	

COMMENTS:	WELDS/ITEMS EXAMINED:
Wedge ID D-14795-250	REACTOR PRESSURE VESSEL
	N1B-IR

EXAMINER:	EXAMINER:	REVIEWER:	ANII:
DAVID KLEINJAN	MIKE KLEINJAN		DATE: 4/18/02
LEVEL: II	LEVEL: II	LEVEL: III DATE: 4/18/02	PG.: ~~1 OF 1~~ 2 OF 4

TENNESSEE VALLEY AUTHORITY	DIGITAL ULTRASONIC CALIBRATION DATA SHEET	REPORT NUMBER: R157

PROJECT: BFN UNIT: 3 CYCLE: 10	CALIBRATION DATE: 03-29-02
PROC.: N-UT- 55 REV:9 DSTC: 4-10-02	CALIBRATION BLOCK NO.: BF-84-IR TEMP: 70.5'F
INSTR. MFG: STAVELEY DUE DATE: 08-11-02	SIMULATOR BLOCK NO: N/A
MODEL/TYPE: SONIC-137 M & TE NO.: VH-5473	THERMOMETER S/N: 522352 DUE DATE: 05-17-02
TRANSDUCER MFG: KRAUTKRAMER	COUPLANT SONOTRACE BATCH: 01141
S/N DB 35163 SIZE: 1.0" FREQ: 2.25 MHz	EXAM TYPE: SHEAR☐ LONG☐ RL☒
CABLE TYPE: RG 174 LENGTH: 120 inches	ANGLE VERIFICATION
	BLOCK TYPE: CS IIW / S/N: DB 55074
DAC	NOMINAL ANGLE: 28 / ACTUAL ANGLE: N/A



DISPLAY WIDTH: 20 inches

INSTRUMENT SETTINGS

REFLECTOR SCAN DIRECT.	NTCH	SDH	REFERENCE SENSITIVITY	MEMORY NUMBER
AXIAL	☒	☐	63.6 dB	20
CIRC	☐	☐	N/A dB	N/A

FREQ: 2.25 MHz	REJECT: OFF %
ANGLE: N/A deg	DAMPING: 200 ohms
DELAY: 1.66 msec	PULSER: 222
ZERO: N/A msec	FILTER: FILT 1
VELOCITY: 0.233 msec	REP RATE: 4 KHZ
RANGE: 20.0 inches	TOF: ☐PEAK ☒FLANK
DISPLAY MODE: PE	POWER: AC
DUAL: ☐ON ☒OFF	TCG: ☐ON ☒OFF

REF. REFLECTOR: N/A GAIN: N/A dB	CALIBRATION TIMES
AMPLITUDE: N/A % METAL PATH: N/A"	INITIAL TIME: 0830 FINAL TIME: 1400

VERIFICATION TIMES	1)N/A	2)N/A	3)N/A	4)N/A	5)N/A	6)N/A	7)N/A	8)N/A	9)N/A

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	-12 dB	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:	WELDS/ITEMS EXAMINED:
Wedge ID D-14795-214	REACTOR PRESSURE VESSEL
	N1B-IR

EXAMINER:	EXAMINER:	REVIEWER:	ANII
DAVID KLEINJAN	MIKE KLEINJAN		DATE: 4/18/02
LEVEL: II	LEVEL: II	LEVEL: III DATE: 4/18/02	PG.: ~~1 of 1~~ ~~4~~ 3/4/02 3 of 4

TVA	MANUAL ULTRASONIC VESSEL EXAMINATION DATA SHEET	REPORT NO. R157

PROJECT: BFN UNIT: 3 WELD ID: N1B CONFIG.: INNER RADIUS COMPONENT: N/A

CAL. SHT. NO.: N/A PROCEDURE: N-UT 55 REV.: 9 PCR.: ~~N/A~~ 03-08 04-10-03 TEMP.: 85 PYRO.: 522352

SCAN SENS.: ~~N/A~~ dB EXAM START: 3/29/02 11:15 EXAM END: 13 10 EXAM ANGLE: 28° & 32°

Lo LOCATION: TDC Wo LOCATION: ℄ of WELD

IND NO.	20%			50%			100%			MAX. AMP.			20%			50%			100%		
	Mp1	W1	L1	Mp1 *	W1	L1	Mp1	W1	L1	Mp	W	L	Mp2	W2	L2	Mp2	W2	L2	Mp2	W2	L2
28°	SCAN		dB	69.8			SCANNING		#	10/11			Blend	Radius							
32°	SCAN		dB	69.8			SCANNING		#	10/11			Blend	Radius							
			No	Recordable			Indication														

COMMENTS: A MATERIAL NOISE LEVEL OF 5-10% WAS OBSERVED

EXAMINER: [signature] LEVEL: II DATE: 03-29-02 REVIEWED BY: [signature] LEVEL: III DATE: 4/8/02

EXAMINER: [signature] LEVEL: II DATE: 4-4-02 ANII: [signature] DATE: 4/18/02 PAGE 2 OF 4

00019

TVA 40094 (NP-1-89) 1-108-999-48

Inspection Report R-158
Weld N2A-NV

TENNESSEE VALLEY AUTHORITY	EXAMINATION SUMMARY AND RESOLUTION SHEET	REPORT NUMBER: R158

PROJECT: BFN	UNIT: 3	CYCLE: 10		COMPONENT ID: N2A	
EXAMINATION METHOD				SYSTEM RPV	ISI DWG. NO. 3-ISI-0328-C
MT ☐	PT ☐	UT ☒	VT ☐	CODE CLASS: 1	CATEGORY: B-D
PROCEDURE: N-UT-9	REV:9	TC:02-06		COFIG.: Nozzle TO Vessel	
EXAMINER: MIKE KLEINJAN	EXAMINER: DAVID KLEINJAN			EXAMINER: N/A	EXAMINER: N/A
LEVEL: II	LEVEL:II			LEVEL: N/A	LEVEL: N/A

This report contains the data associated with the manual ultrasonic examination of code category B-D, Nozzle to Vessel welds. This examination report satisfies ASME section XI requirements for the Nozzle to shell weld..

Examination. Nozzle to Vessel weld N2A

Transverse coverage for the Nozzle to Vessel weld was supplemented by the inner radius examination.

(N2A-IR) See R 159

0° was used on the weld crown and base material Vessel side

45° was used on the vessel side only scanning over the weld crown

45° Tangent to the weld was used on vessel side CW/CCW

45° Parallel to the weld was used on vessel side CW/CCW

60° was used on the vessel side only scanning over the weld crown

60° Tangent to the weld was used on vessel side CW/CCW

60° Parallel to the weld was used on vessel side CW/CCW

77% code coverage was obtained

This exam was performed with equipment, Procedures, and personnel qualified in accordance with ASME Section XI

NO RECORDABLE INDICATIONS

RESOLUTION BY:	REVIEWED BY:	ANII:
Mike Kleinjan		DATE: 4/18/02
LEVEL: II DATE: 4-4-02	LEVEL: III DATE: 4/4/02	PG. 1 OF 15

00021 Report Number R158

Calculation of ASME code coverage
For section XI NDE Examination

N2A

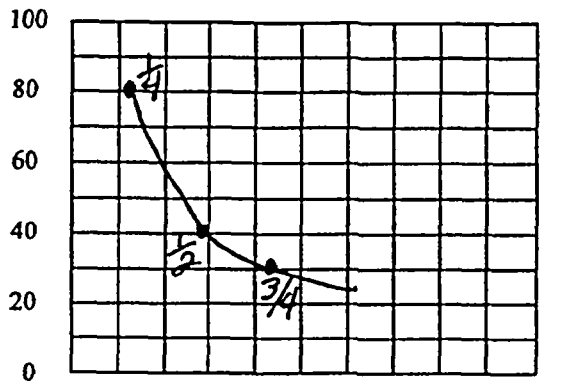
1) O degree (weld metal scan)	100%
2) 45 degree Transverse-scan from vessel side of weld	100%
3) 45 degree Transverse-scan from nozzle side of weld	0%
4) 60 degree Transverse-scan from vessel side of weld	100%
5) 60 degree Transverse-scan from nozzle side of weld	0%
6) 45 degree Parallel-scan CW direction	100% *
7) 45 degree Parallel-scan CCW direction	100% *
8) 60 degree Parallel-scan CW direction	100% *
9) 60 degree Parallel-scan CCW direction	100% *
The sum of all the percentage of scans	700%
Divided by the total # of scans	9
Percentage of examination Volume coverage	77%

* Transverse coverage includes coverage obtained during the inner radius examination.

HSBCT
4/18/02

TENNESSEE VALLEY AUTHORITY	DIGITAL ULTRASONIC CALIBRATION DATA SHEET	REPORT NUMBER: R158

PROJECT: BFN UNIT: 3 CYCLE: 10	CALIBRATION DATE: 4-1-02
PROC.: N-UT- 9 REV:9 TC:02-06	CALIBRATION BLOCK NO.: BF18 TEMP: 72.6'F
INSTR. MFG: Staveley DUE DATE: 8-05-02	SIMULATOR BLOCK NO: DB55079
MODEL/TYPE: Sonic 136 M & TE NO.: VH751	THERMOMTER S/N: 522352 DUE DATE: 5-17-02
TRANSDUCER MFG: Harisonic	COUPLANT SONOTRACE BATCH: 01141
S/N DB34198 SIZE: .75 FREQ: 2.25 MHz	EXAM TYPE: SHEAR☐ LONG☒ RL☐
CABLE TYPE: RG174 LENGTH: 120 inches	ANGLE VERIFICATION
	BLOCK TYPE: ~~Rompus~~ Aiken Ramjock S/N: DB55079
DAC	NOMINAL ANGLE: 0 ACTUAL ANGLE: N/A



DISPLAY WIDTH: 10 inches

INSTRUMENT SETTINGS

REFLECTOR SCAN DIRECT.	NTCH	SDH	REFERENCE SENSITIVITY	MEMORY NUMBER
AXIAL	☐	☒	20.8 dB	1
CIRC	☐	☐	n/a dB	n/a

FREQ: 2.25 MHz	REJECT: off %
ANGLE: n/a deg	DAMPING: 500 ohms
DELAY: .499 msec	PULSER: 222
ZERO: n/a msec	FILTER: Filt 3
VELOCITY: .238 msec	REP RATE: 2KHZ
RANGE: 10 inches	TOF: ☒PEAK ☐ FLANK
DISPLAY MODE: PE	POWER: AC
DUAL: ☐ ON ☒ OFF	TCG: ☐ ON ☒ OFF

REF. REFLECTOR: 1" GAIN: 8 dB	CALIBRATION TIMES
AMPLITUDE: 80 % METAL PATH: 1"	INITIAL TIME: 13:30 FINAL TIME: 18:00

VERIFICATION TIMES	1) ~~11:45~~ 11:45	2)n/a	3)n/a	4)n/a	5)n/a	6)n/a	7)n/a	8)n/a	9)n/a

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	-12 dB	SET	+12	SET	+6	
	AMP	80%	32 TO 48	16 TO 24	20 %	64 TO 96	40%	64 TO 96	
			40	20		80		80	

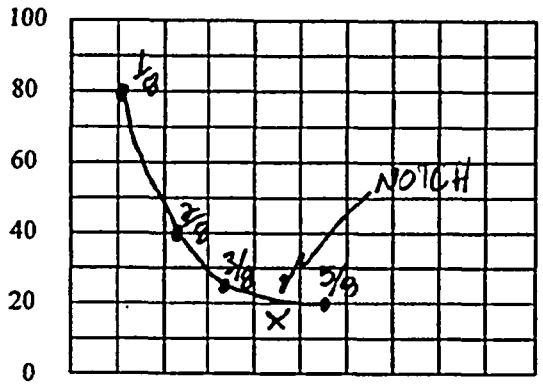
COMMENTS:	WELDS/ITEMS EXAMINED:
	N2A, N2C, N2E Nozzle to Shell

EXAMINER:	EXAMINER:	REVIEWER:	ANII:
MIKE W. KLEINJAN	DAVID KLEINJAN		DATE: 4/10/02
LEVEL: II	LEVEL: II	LEVEL: III DATE: 4/4/02	PG.: 13 OF 15

4/10/02

TENNESSEE VALLEY AUTHORITY	DIGITAL ULTRASONIC CALIBRATION DATA SHEET	REPORT NUMBER: R158

PROJECT: BFN UNIT: 3 CYCLE: 10	CALIBRATION DATE: 4-1-02
PROC.: N-UT- 9 REV:9 TC:02-06	CALIBRATION BLOCK NO.: BF18 TEMP: 72.6'F
INSTR. MFG: Staveley DUE DATE: 8-05-02	SIMULATOR BLOCK NO: DB55079
MODEL/TYPE: Sonic 136 M & TE NO.: VH751	THERMOMTER S/N: 522352 DUE DATE: 5-17-02
TRANSDUCER MFG: Krauntkramer	COUPLANT SONOTRACE BATCH: 01141
S/N DB34843 SIZE: .5x1 FREQ: 2.25 MHz	EXAM TYPE: SHEAR☒ LONG☐ RL☐
CABLE TYPE: RG1743 LENGTH: 120 inches	ANGLE VERIFICATION
	BLOCK TYPE: IIW S/N: DB55074
DAC	NOMINAL ANGLE: 45° ACTUAL ANGLE: 46°



DISPLAY WIDTH: 10 inches

INSTRUMENT SETTINGS

REFLECTOR SCAN DIRECT.	NTCH	SDH	REFERENCE SENSITIVITY	MEMORY NUMBER
AXIAL	☐	☒	45.6 dB	2
CIRC	☐	☐	n/a dB	n/a

FREQ: 2.25 MHz	REJECT: off %
ANGLE: N/A deg	DAMPING: 500 ohms
DELAY: .830 msec	PULSER: 222
ZERO: N/A msec	FILTER: FITL 3
VELOCITY: .126 msec	REP RATE: 2KHZ
RANGE: 20 inches	TOF: ☒PEAK ☐ FLANK
DISPLAY MODE: PE	POWER: AC
DUAL: ☐ ON ☒ OFF	TCG: ☐ ON ☒ OFF

REF. REFLECTOR: 1" GAIN: 33.6 dB	CALIBRATION TIMES
AMPLITUDE: 80 % METAL PATH: 1"	INITIAL TIME: 13:30 FINAL TIME: 18:00

VERIFICATION TIMES	1) ~~11:45~~ 4:10	2)n/a	3)n/a	4)n/a	5)n/a	6)n/a	7)n/a	8)n/a	9)n/a

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	-12 dB	SET	+12	SET	+6
	AMP	80%	32 TO 48	16 TO 24	20 %	64 TO 96	40%	64 TO 96
			40	20		80		80

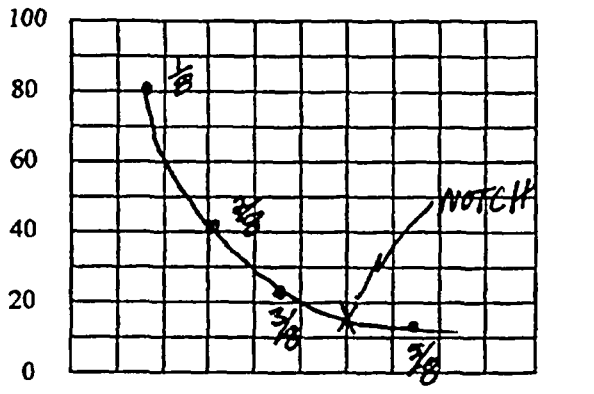
COMMENTS:	WELDS/ITEMS EXAMINED:
Delta difference between 3/8 to 5/8 on the clad side is 3 dB	N2A, N2C,N2E Nozzle to Shell

EXAMINER:	EXAMINER:	REVIEWER:	ANII:
MIKE W. KLEINJAN	DAVID KLEINJAN		DATE: 4/18/02
LEVEL:II	LEVEL:II	LEVEL: III DATE: 4/4/02	PG.: 14 OF 15

4/18/02

TENNESSEE VALLEY AUTHORITY	DIGITAL ULTRASONIC CALIBRATION DATA SHEET	REPORT NUMBER: R158

PROJECT: BFN UNIT: 3 CYCLE: 10	CALIBRATION DATE: 4-1-02
PROC.: N-UT- 9 REV:9 TC:02-06	CALIBRATION BLOCK NO.: BF18 TEMP: 72.6'F
INSTR. MFG: Staveley DUE DATE: 8-05-02	SIMULATOR BLOCK NO: DB55079
MODEL/TYPE: Sonic 136 M & TE NO.: VH751	THERMOMTER S/N: 522352 DUE DATE: 5-17-02
TRANSDUCER MFG: Krauntkramer	COUPLANT SONOTRACE BATCH: 01141
S/N DB34154 SIZE: .5x1 FREQ: 2.25 MHz	EXAM TYPE: SHEAR☒ LONG☐ RL☐
CABLE TYPE: RG174 LENGTH: 120 inches	ANGLE VERIFICATION
	BLOCK TYPE: IIW / S/N: DB55074
DAC	NOMINAL ANGLE: 60 / ACTUAL ANGLE: 59



DISPLAY WIDTH: 10 inches

INSTRUMENT SETTINGS

REFLECTOR			REFERENCE SENSITIVITY	MEMORY NUMBER
SCAN DIRECT.	NTCH	SDH		
AXIAL	☐	☒	52 dB	3
CIRC	☐	☐	n/a dB	n/a

FREQ: 2.25 MHz	REJECT: off %
ANGLE: N/A deg	DAMPING: 500 ohms
DELAY: 1.20 msec	PULSER: 222
ZERO: N/A msec	FILTER: FITL 3
VELOCITY: .123 msec	REP RATE: 2KHZ
RANGE: 20 inches	TOF: ☒PEAK ☐ FLANK
DISPLAY MODE: PE	POWER: AC
DUAL: ☐ ON ☒ OFF	TCG: ☐ ON ☒ OFF

REF. REFLECTOR: 1" GAIN: 36 dB	CALIBRATION TIMES
AMPLITUDE: 80 % METAL PATH: 1"	INITIAL TIME: 13:30 ✓ FINAL TIME: 18:00 ✓

VERIFICATION TIMES	1) n/a	2)n/a	3)n/a	4)n/a	5)n/a	6)n/a	7)n/a	8)n/a	9)n/a

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	-12 dB	SET	+12	SET	+6			
	AMP	80%	32 TO 48	16 TO 24	20 %	64 TO 96	40%	64 TO 96			
			40	20		80		80			

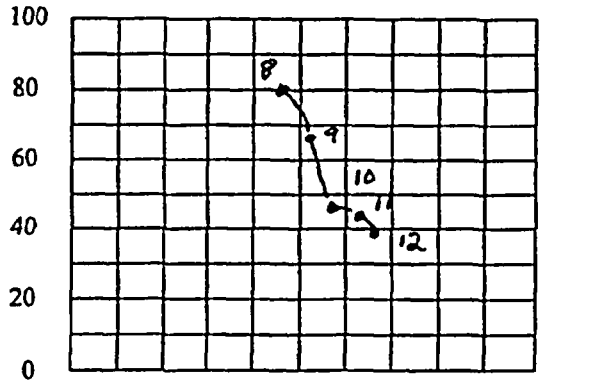
COMMENTS:	WELDS/ITEMS EXAMINED:
DELTA dB DIFFERENCE IS 4.4 FROM THE 3/8 TO 5/8 ON THE	N2A, N2C, N2E Nozzle to Shell
CLAD SIDE	

EXAMINER:	EXAMINER:	REVIEWER:	ANII:
MIKE W. KLEINJAN	DAVID KLEINJAN		DATE: 4/18/02
LEVEL: II	LEVEL: II	LEVEL: III DATE: 4/4/02	PG.: 15 OF 15

4/18/02

TENNESSEE VALLEY AUTHORITY	DIGITAL ULTRASONIC CALIBRATION DATA SHEET	REPORT NUMBER: R158

PROJECT: BFN UNIT: 3 CYCLE: 10	CALIBRATION DATE: 04-01-02
PROC.: N-UT- 55 REV:9 ~~TC:N/A~~	CALIBRATION BLOCK NO.: BF-85-IR TEMP: 68.1° F
INSTR. MFG: STAVELEY DUE DATE: 08-11-02	SIMULATOR BLOCK NO: N/A
MODEL/TYPE: SONIC-137 M & TE NO.: VH-5473	THERMOMTER S/N: 522352 DUE DATE: 05-17-02
TRANSDUCER MFG: KRAUTKRAMER	COUPLANT SONOTRACE BATCH: 01141
S/N DB 35164 SIZE: 1.0" FREQ: 2.25 MHz	EXAM TYPE: SHEAR☐ LONG☐ RL☒
CABLE TYPE: RG 174 LENGTH: 120 inches	ANGLE VERIFICATION
	BLOCK TYPE: CS IIW S/N: DB 55074
DAC	NOMINAL ANGLE: 25° ACTUAL ANGLE: N/A



DISPLAY WIDTH: 20 inches

INSTRUMENT SETTINGS

REFLECTOR SCAN DIRECT.	NTCH	SDH	REFERENCE SENSITIVITY	MEMORY NUMBER
AXIAL	☒	☐	60.0 dB	25
CIRC	☐	☐	N/A dB	N/A

FREQ: 2.25 MHz	REJECT: OFF %
ANGLE: N/A deg	DAMPING: 200 ohms
DELAY: 1.12 msec	PULSER: 222
ZERO: N/A msec	FILTER: FILT 1
VELOCITY: 0.234 msec	REP RATE: 4 KHZ
RANGE: 20.0 inches	TOF: ☐PEAK ☒ FLANK
DISPLAY MODE: PE	POWER: AC
DUAL: ☐ ON ☒ OFF	TCG: ☐ ON ☒ OFF

REF. REFLECTOR: N/A GAIN: N/A dB	CALIBRATION TIMES
AMPLITUDE: N/A % METAL PATH: N/A"	INITIAL TIME: 1355 FINAL TIME: 1805

VERIFICATION TIMES	1)N/A	2)N/A	3)N/A	4)N/A	5)N/A	6)N/A	7)N/A	8)N/A	9)N/A

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	-12 dB	SET	+12	SET	+6	
	AMP	80%	32 TO 48	16 TO 24	20 %	64 TO 96	40%	64 TO 96	
			40	20		80		80	

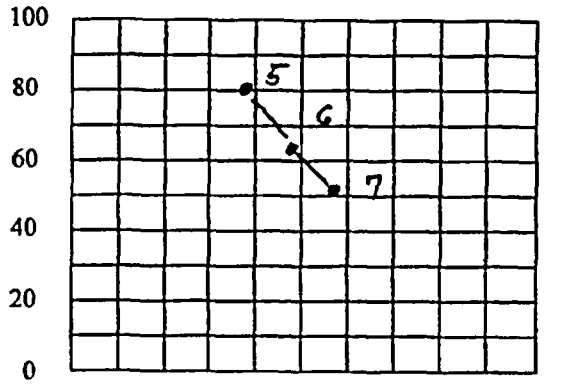
COMMENTS:	WELDS/ITEMS EXAMINED:
	REACTOR PRESSURE VESSEL
	N2A-IR, N2C-IR, N2E-IR
	Wedge ID D-14795-147

EXAMINER:	EXAMINER:	REVIEWER:	ANII:
DAVID KLEINJAN	MIKE KLEINJAN		DATE: 4/18/02
LEVEL: II	LEVEL: II	LEVEL: III DATE: 4/4/02	PG.: 26 OF 15

4/10/02

TENNESSEE VALLEY AUTHORITY	DIGITAL ULTRASONIC CALIBRATION DATA SHEET	REPORT NUMBER: R158

PROJECT: BFN UNIT: 3 CYCLE: 10	CALIBRATION DATE: 04-01-02
PROC.: N-UT- 55 REV:9 ~~TC:N/A~~	CALIBRATION BLOCK NO.: BF-85-IR TEMP: 68.1° F
INSTR. MFG: STAVELEY DUE DATE: 08-11-02	SIMULATOR BLOCK NO: N/A
MODEL/TYPE: SONIC-137 M & TE NO.: VH-5473	THERMOMTER S/N: 522352 DUE DATE: 05-17-02
TRANSDUCER MFG: KRAUTKRAMER	COUPLANT SONOTRACE BATCH: 01141
S/N DB 35163 SIZE: 1.0" FREQ: 2.25 MHz	EXAM TYPE: SHEAR☐ LONG☐ RL☒
CABLE TYPE: RG 174 LENGTH: 120 inches	ANGLE VERIFICATION
	BLOCK TYPE: CS IIW / S/N: DB 55074
DAC	NOMINAL ANGLE: 19° / ACTUAL ANGLE: N/A



DISPLAY WIDTH: 20 inches

INSTRUMENT SETTINGS

REFLECTOR SCAN DIRECT.	NTCH	SDH	REFERENCE SENSITIVITY	MEMORY NUMBER
AXIAL	☒	☐	57.2 dB	19
CIRC	☐	☐	N/A dB	N/A

FREQ: 2.25 MHz	REJECT: OFF %
ANGLE: N/A deg	DAMPING: 200 ohms
DELAY: 0.996 msec	PULSER: 222
ZERO: N/A msec	FILTER: FILT 1
VELOCITY: 0.234 msec	REP RATE: 4 KHZ
RANGE: 20.0 inches	TOF: ☐PEAK ☒ FLANK
DISPLAY MODE: PE	POWER: AC
DUAL: ☐ ON ☒ OFF	TCG: ☐ ON ☒ OFF

REF. REFLECTOR: N/A GAIN: N/A dB	CALIBRATION TIMES
AMPLITUDE: N/A % METAL PATH: N/A"	INITIAL TIME: 1245 FINAL TIME: 1807

VERIFICATION TIMES	1)N/A	2)N/A	3)N/A	4)N/A	5)N/A	6)N/A	7)N/A	8)N/A	9)N/A

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	-12 dB	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:	WELDS/ITEMS EXAMINED:
	REACTOR PRESSURE VESSEL
	N2A-IR, N2C-IR, N2E-IR
	Wedge ID D-14795-144

EXAMINER:	EXAMINER:	REVIEWER:	ANII:
DAVID KLEINJAN	MIKE KLEINJAN		DATE:
LEVEL: II	LEVEL: II	LEVEL: III DATE: 4/4/02	PG.: 17 OF 15

4/10/02

TVA	MANUAL ULTRASONIC VESSEL EXAMINATION DATA SHEET	REPORT NO. R158

PROJECT: BFN UNIT: 3 WELD ID: N2A CONFIG.: Nozzle COMPONENT: VESSEL

CAL. SHT. NO.: NA PROCEDURE: NI-UT-9 REV.: 9 PCR.: 02-06 TEMP.: 85 PYRO.: 522352

SCAN SENS.: * dB EXAM START: 4/01/02 14:30 EXAM END: 1520 EXAM ANGLE: 0°, 45°, 60°

Lo LOCATION: TDC Wo LOCATION: ℄ OF WELD

IND NO.	20%			50%			100%			MAX. AMP.			20%			50%			100%		
	Mp1	W1	L1	Mp1 *	W1	L1	Mp1	W1	L1	Mp	W	L	Mp2	W2	L2	Mp2	W2	L2	Mp2	W2	L2
19°	SCAN.		dB	63.2		SCANNING		#	10/11	BLEND RADIUS											
25°	SCAN		dB	66.		SCANNING		#	10/11	BLEND RADIUS											
0°	SCAN		dB	34.8		SCANNING		#	9	ON WELD AND BASE MATERIAL											
45°	SCAN		dB	56.6		SCANNING		#	9	ON WELD AND VESSEL SIDE											
45T	SCAN		dB	56.6		SCANNING		#	10/11	CW/CCW VESSEL SIDE											
45TAN	SCAN		dB	56.6		SCANNING		#	10/11	CW/CCW VESSEL SIDE											
60°	SCAN		dB	63.		SCANNING		#	9	ON weld AND VESSEL SIDE											
60T	SCAN		dB	63.		SCANNING		#	10/11	CW/CCW VESSEL SIDE											
60TAN	SCAN		dB	63.		SCANNING		#	10/11	CW/CCW VESSEL SIDE											
				NO RECORDABLE INDICATION																	

COMMENTS: 19° AND 25° EXAMINATIONS ARE THE BLEND RADIUS EXAMINATIONS TRANSVERSE EXAMINATION COVERAGE WILL INCLUDE COVERAGE OBTAINED DURING THE INNER RADIUS EXAMINATIONS. 5 TO 10% Noise Level was observed

EXAMINER: [signature] LEVEL: II DATE: 4-4-02 REVIEWED BY: [signature] LEVEL: III DATE: 4/4/02

EXAMINER: [signature] LEVEL: II DATE: 04-01-02 ANII: [signature] DATE: 4/18/02 PAGE 8 OF 15

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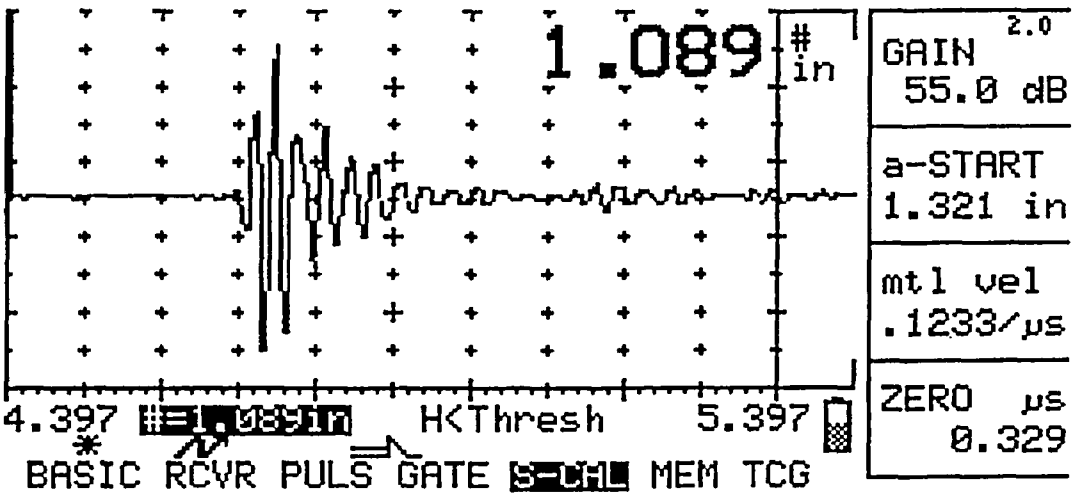
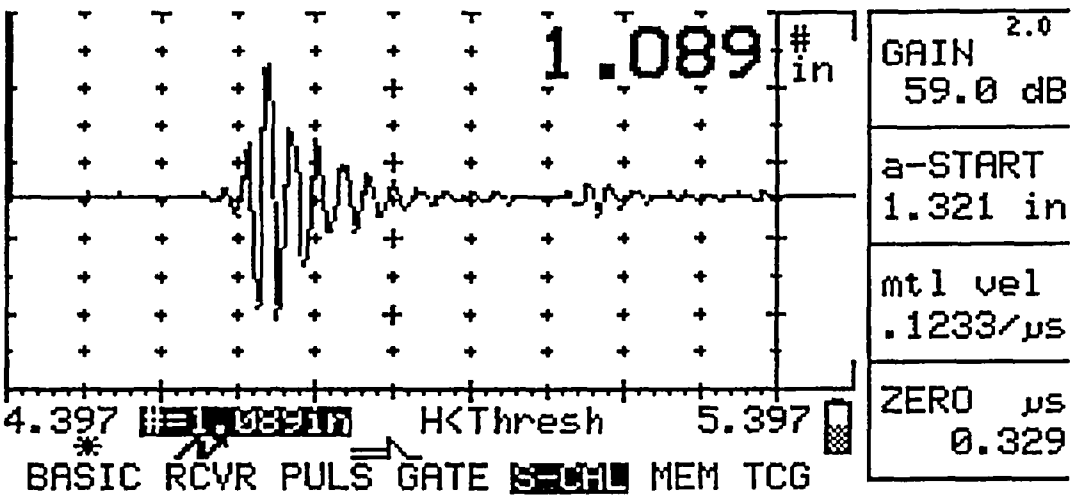
00028 Report Number R158

Nozzle Examination 45 °Waveforms



45° Pre Waveform

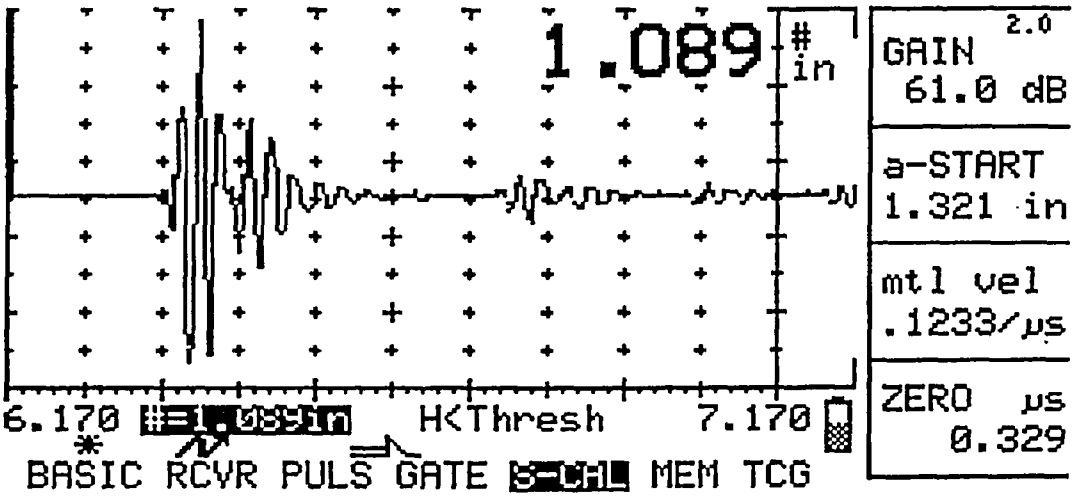


45° Post Waveform

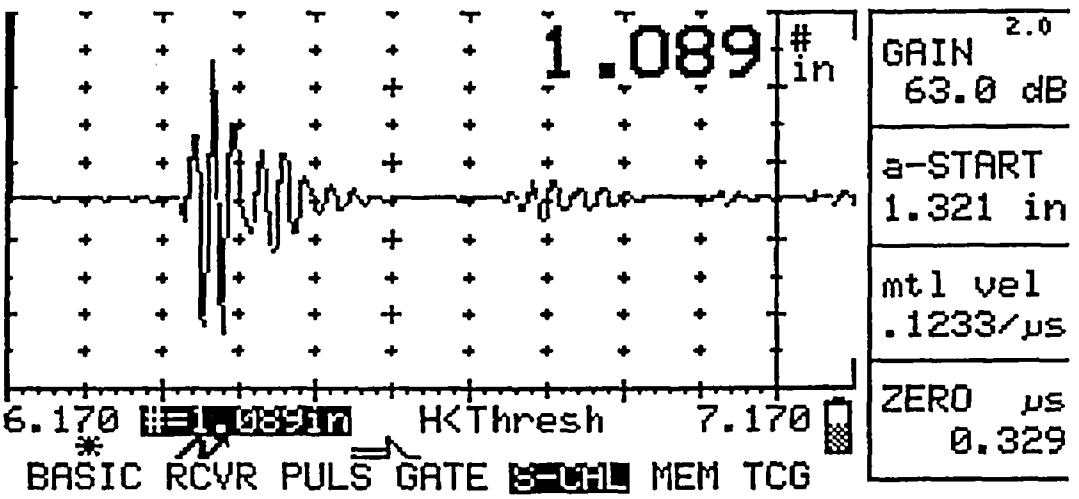
HSBCT 4/19/02

00029
Report Number
R158

Nozzle Examination 60 ° Waveforms



60° Pre Waveform



60° Post Waveform

HSBCT
ATT
4/18/02

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TVA	BEAM SPREAD AND RESOLUTION DATA SHEET	REPORT NO. R158

PROJECT: BFN UNIT: 3 CALIBRATION BLOCK NO.: BF 18

PROCEDURE NO.: N-UT-9 REV.: 9 PCR: ~~0206~~ Final 3-30-02

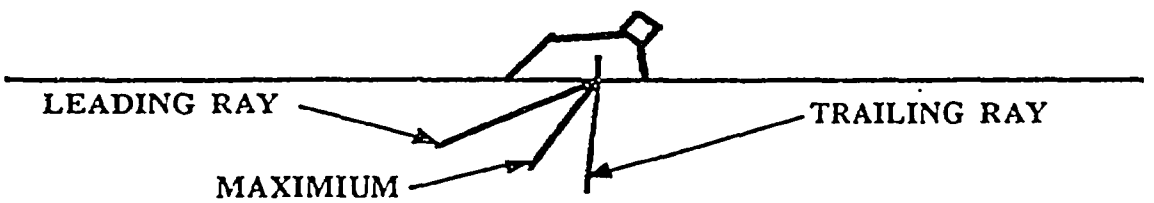
SEARCH UNIT-MAKE: Krautkramer SIZE: .5X1 FREQ.: 2.25

S/N: DB 34843 ANGLE: 45

ULTRASONIC INSTRUMENT-MAKE: Sonic 135 S/N: VH 751

BEAM SPREAD

	TRAILING RAY						LEADING RAY			
HOLE	20% DAC		50% DAC		100% DAC		20% DAC		50% DAC	
DEPTH	W	MP	W	MP	MP	W	MP	W	W	MP
1/4T	1 1/8	1.9	1 1/4	2.	2.1	1 5/8	2.4	2	1 7/8	2.3
2T	2 7/8	4	3	4.1	4.3	3 1/4	4.8	4 1/8	3 3/4	4.6
3/4T	4 1/4	6	4 1/2	6.3	6.5	4 7/8	7	5 7/8	5 1/4	6.8



RESOLUTION

NEAR SURFACE REFLECTOR: Notch OD DEPTH: 25 SIZE: .253 CAL BLK.: BF 18

FAR SURFACE REFLECTOR: Notch ID DEPTH: 6.1 SIZE: .253

SCANNING REFLECTORS PROVIDE 50% DAC SIGNALS AT SCANNING SPEED Y ☒ N ☐

EXAMINER: [illegible]	REVIEWED BY: [illegible]	ANI: [illegible]
		DATE: 4/18/02
LEVEL: II DATE: 3-30-02	LEVEL: III DATE: 4/4/02	PAGE: 11 OF 15

TVA	BEAM SPREAD AND RESOLUTION DATA SHEET	REPORT NO. R158

PROJECT: BFN UNIT: 3 CALIBRATION BLOCK NO.: BF 18

PROCEDURE NO.: N-UT-9 REV.: 9 PCR: 0206 N/A 3-30-02

SEARCH UNIT-MAKE: Kraut Kramer SIZE: .5x1 FREQ.: 2.25

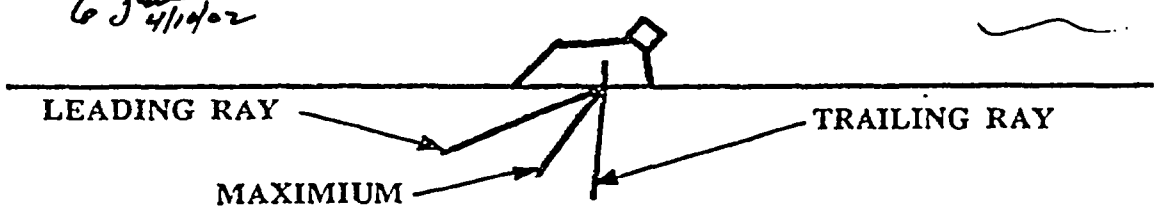
S/N: DB 34154 ANGLE: 60

ULTRASONIC INSTRUMENT-MAKE: Sonic 136 S/N: VH 751

BEAM SPREAD

HOLE DEPTH	TRAILING RAY 20% DAC W	TRAILING RAY 20% DAC MP	TRAILING RAY 50% DAC W	TRAILING RAY 50% DAC MP	100% DAC MP	100% DAC W	LEADING RAY 20% DAC MP	LEADING RAY 20% DAC W	LEADING RAY 50% DAC W	LEADING RAY 50% DAC MP
1/4T	2 1/8	2.4	2 3/8	2.7	2.9	2 5/8	3.2	3 1/8	2 7/8	3.1
1/2T	4 3/4	4.8	5	5.3	5.8	5 1/4	6.4	6 5/8	6	6.1
3/4T	~~8 3/8~~ 6 3/8	7.6	7 1/4	8	8.7	7 7/8	9.6	8 5/8	8	9.1

6 JS 4/14/02



RESOLUTION

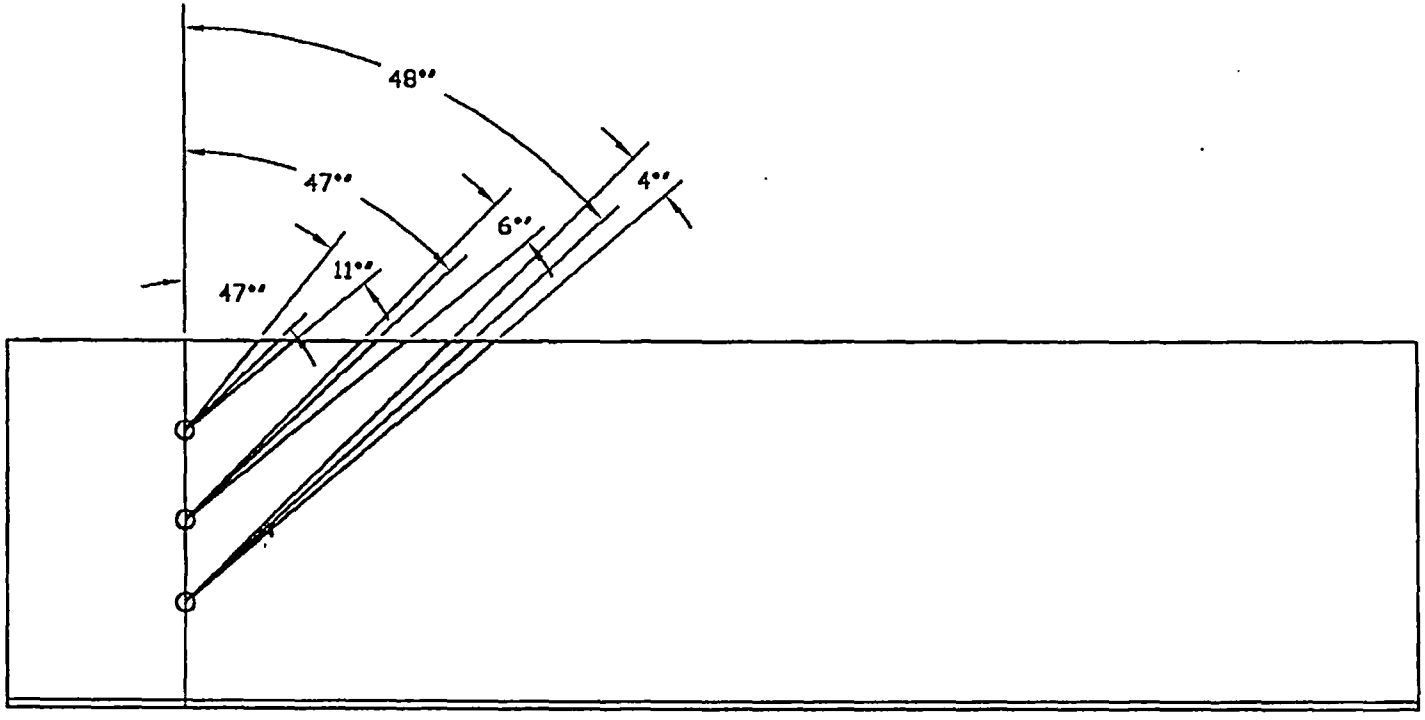
NEAR SURFACE REFLECTOR: Notch OD DEPTH: .25 SIZE: .253 CAL BLK.: BF 18

FAR SURFACE REFLECTOR: Notch ID DEPTH: 6.1 SIZE: .253

SCANNING REFLECTORS PROVIDE 50% DAC SIGNALS AT SCANNING SPEED Y ☒ N ☐

EXAMINER: Mike W Henry Jr	REVIEWED BY: [signature]	ANII: [signature]
		DATE: 4/18/02
LEVEL: II DATE: 3-30-02	LEVEL: III DATE: 4/4/02	PAGE: 10 OF 15

00032 Report Number R158



Browns Ferry Unit 3
Beamspread
MARCH 2002
BF-18

HSBCT 4/18/02

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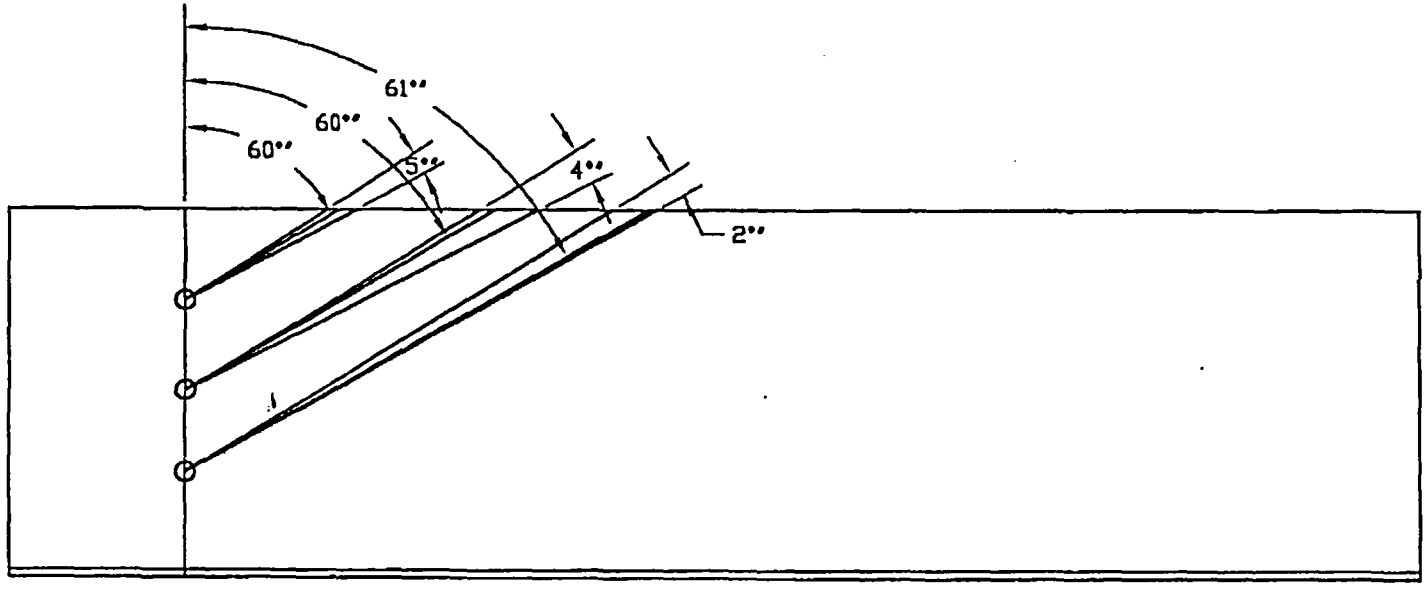
00033 Report Number R158



Browns Ferry Unit 3
Beamspread
MARCH 2002
BF-18

HSDCT 4/18/08

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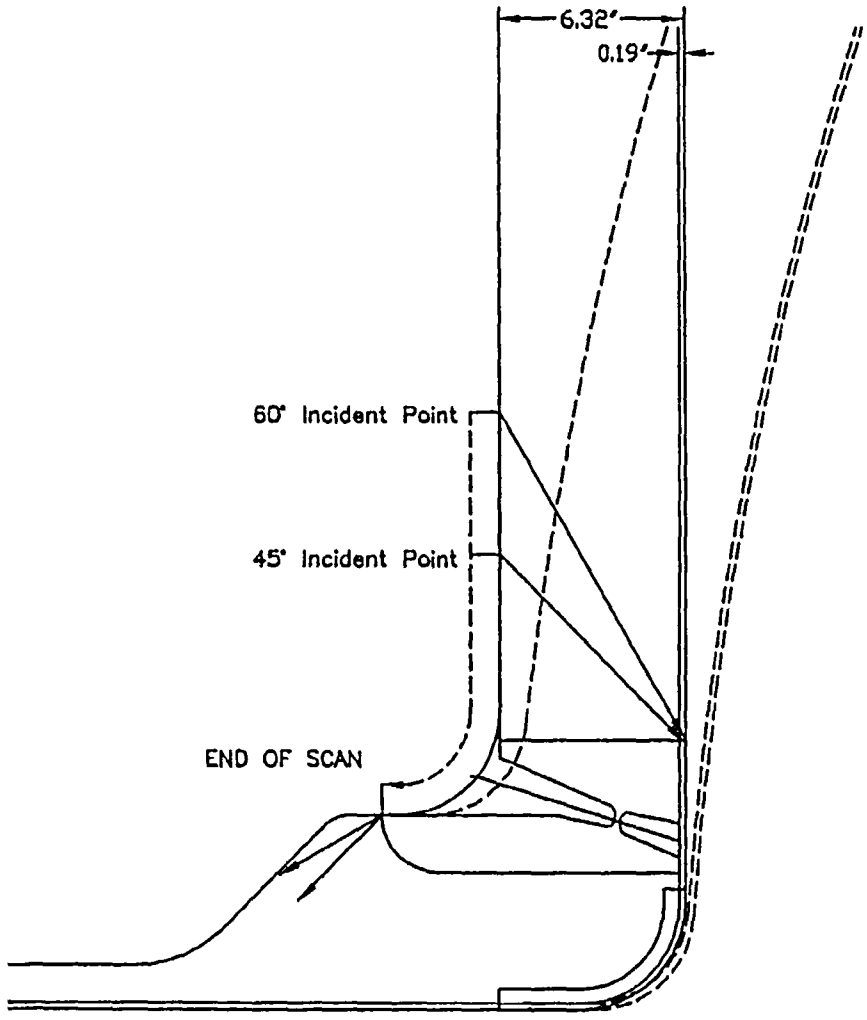
00034 REPORT NUMBER R158

15 of 15



Transverse coverage includes coverage obtained during the inner radious examination

HSBCT
A11
4/18/02

Browns Ferry Unit 3
N2 Nozzle-to-Shell
MARCH 2002
SP-N2-NS

TENNESSEE VALLEY AUTHORITY	EXAMINATION SUMMARY AND RESOLUTION SHEET	REPORT NUMBER: R 159

PROJECT: BFN	UNIT: 3	CYCLE: 10		COMPONENT ID: N2A-IR	
EXAMINATION METHOD				SYSTEM RPV	ISI DWG. NO. 3-ISI-0328-C
MT ☐	PT ☐	UT ☒	VT ☐	CODE CLASS: 1	CATEGORY: B-D
PROCEDURE: N-UT-55	REV:9	TC:N/A 03-08		COFIG.: Nozzle TO Vessel	
EXAMINER: MIKE KLEINJAN LEVEL: II	EXAMINER: DAVID KLEINJAN LEVEL: II	EXAMINER: N/A LEVEL: N/A		EXAMINER: N/A LEVEL: N/A	

This report contains the data associated with the manual ultrasonic examination of code category B-D, Nozzle Inner radius. This examination report satisfies ASME section XI requirements for the inner radius examination.

N2A-IR: This examination was performed using a 19° and 25° in the blend radius in two directions CW/CCW

100% code coverage was obtained

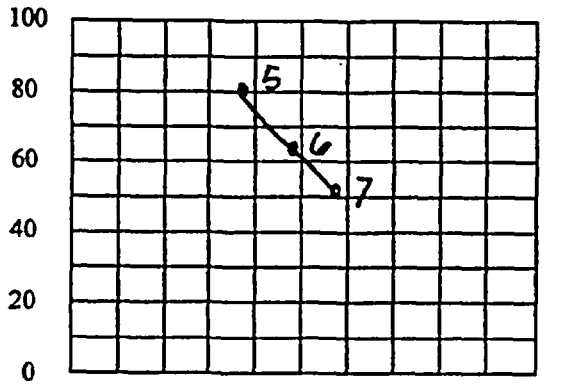
This exam was performed with equipment, Procedures, and personnel qualified in accordance with ASME Section XI.

No Recordable Indication

RESOLUTION BY:	REVIEWED BY:	ANII:
Mike Kleinjan		DATE: 4/18/02
LEVEL: II DATE: 4-4-02	LEVEL: III DATE: 4/4/02	PG. 1 OF 4

TENNESSEE VALLEY AUTHORITY	DIGITAL ULTRASONIC CALIBRATION DATA SHEET	REPORT NUMBER: R159

PROJECT: BFN UNIT: 3 CYCLE: 10	CALIBRATION DATE: 04-01-02
PROC.: N-UT- 55 REV:9 ~~TC:N/A~~	CALIBRATION BLOCK NO.: BF-85-IR TEMP: 68.1° F
INSTR. MFG: STAVELEY DUE DATE: 08-11-02	SIMULATOR BLOCK NO: N/A
MODEL/TYPE: SONIC-137 M & TE NO.: VH-5473	THERMOMTER S/N: 522352 DUE DATE: 05-17-02
TRANSDUCER MFG: KRAUTKRAMER	COUPLANT SONOTRACE BATCH: 01141
S/N DB 35163 SIZE: 1.0" FREQ: 2.25 MHz	EXAM TYPE: SHEAR☐ LONG☐ RL☒
CABLE TYPE: RG 174 LENGTH: 120 inches	ANGLE VERIFICATION
	BLOCK TYPE: CS IIW / S/N: DB 55074
DAC	NOMINAL ANGLE: 19° / ACTUAL ANGLE: N/A



DISPLAY WIDTH: 20 inches

INSTRUMENT SETTINGS

REFLECTOR SCAN DIRECT.	NTCH	SDH	REFERENCE SENSITIVITY	MEMORY NUMBER
AXIAL	☒	☐	57.2 dB	19
CIRC	☐	☐	N/A dB	N/A

FREQ: 2.25 MHz	REJECT: OFF %
ANGLE: N/A deg	DAMPING: 200 ohms
DELAY: 0.996 msec	PULSER: 222
ZERO: N/A msec	FILTER: FILT 1
VELOCITY: 0.234 msec	REP RATE: 4 KHZ
RANGE: 20.0 inches	TOF: ☐PEAK ☒FLANK
DISPLAY MODE: PE	POWER: AC
DUAL: ☐ ON ☒ OFF	TCG: ☐ ON ☒ OFF

REF. REFLECTOR: N/A	GAIN: N/A dB
AMPLITUDE: N/A %	METAL PATH: N/A"

CALIBRATION TIMES

INITIAL TIME: 1245 FINAL TIME: 1807

VERIFICATION TIMES	1)N/A	2)N/A	3)N/A	4)N/A	5)N/A	6)N/A	7)N/A	8)N/A	9)N/A

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	-12 dB	SET	+12	SET	+6	
	AMP	80%	32 TO 48	16 TO 24	20 %	64 TO 96	40%	64 TO 96	
			40	20		80		80	

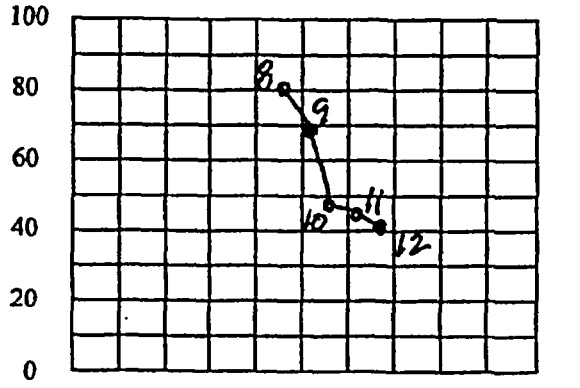
COMMENTS:	WELDS/ITEMS EXAMINED:
Wedge ID D-14795-144	REACTOR PRESSURE VESSEL
	N2A-IR, N2C-IR, N2E-IR

EXAMINER:	EXAMINER:	REVIEWER:	ANII:
DAVID KLEINJAN	MIKE KLEINJAN		DATE: 4/18/02
LEVEL: II	LEVEL: II	LEVEL: III DATE: 4/4/02	PG.: ~~1 OF 1~~ 2 OF 4

4/18/02

TENNESSEE VALLEY AUTHORITY	DIGITAL ULTRASONIC CALIBRATION DATA SHEET	REPORT NUMBER: R159

PROJECT: BFN UNIT: 3 CYCLE: 10	CALIBRATION DATE: 04-01-02
PROC.: N-UT- 55 REV:9 ~~TC:N/A~~	CALIBRATION BLOCK NO.: BF-85-IR TEMP: 68.1° F
INSTR. MFG: STAVELEY DUE DATE: 08-11-02	SIMULATOR BLOCK NO: N/A
MODEL/TYPE: SONIC-137 M & TE NO.: VH-5473	THERMOMTER S/N: 522352 DUE DATE: 05-17-02
TRANSDUCER MFG: KRAUTKRAMER	COUPLANT SONOTRACE BATCH: 01141
S/N DB 35164 SIZE: 1.0" FREQ: 2.25 MHz	EXAM TYPE: SHEAR☐ LONG☐ RL☒
CABLE TYPE: RG 174 LENGTH: 120 inches	ANGLE VERIFICATION
	BLOCK TYPE: CS IIW S/N: DB 55074
DAC	NOMINAL ANGLE: 25° ACTUAL ANGLE: N/A



DISPLAY WIDTH: 20 inches

INSTRUMENT SETTINGS

REFLECTOR SCAN DIRECT.	NTCH	SDH	REFERENCE SENSITIVITY	MEMORY NUMBER
AXIAL	☒	☐	60.0 dB	25
CIRC	☐	☐	N/A dB	N/A

FREQ: 2.25 MHz	REJECT: OFF %
ANGLE: N/A deg	DAMPING: 200 ohms
DELAY: 1.12 msec	PULSER: 222
ZERO: N/A msec	FILTER: FILT 1
VELOCITY: 0.234 msec	REP RATE: 4 KHZ
RANGE: 20.0 inches	TOF: ☐PEAK ☒ FLANK
DISPLAY MODE: PE	POWER: AC
DUAL: ☐ ON ☒ OFF	TCG: ☐ ON ☒ OFF

REF. REFLECTOR: N/A	GAIN: N/A dB
AMPLITUDE: N/A %	METAL PATH: N/A"

CALIBRATION TIMES

INITIAL TIME: 1355	FINAL TIME: 1805

VERIFICATION TIMES	1)N/A	2)N/A	3)N/A	4)N/A	5)N/A	6)N/A	7)N/A	8)N/A	9)N/A

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	-12 dB	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:	WELDS/ITEMS EXAMINED:
Wedge ID D-14795-147	REACTOR PRESSURE VESSEL
	N2A-IR, N2C-IR, N2E-IR

EXAMINER:	EXAMINER:	REVIEWER:	ANII:
DAVID KLEINJAN	MIKE KLEINJAN		DATE: 4/18/02
LEVEL: II	LEVEL: II	LEVEL: III DATE: 4/4/02	PG.: ~~1 OF 1~~ 3 of 4

4/18/02

TVA	MANUAL ULTRASONIC VESSEL EXAMINATION DATA SHEET	REPORT NO. R159

PROJECT: BFN UNIT: 3 WELD ID: N2A CONFIG.: INNER RADIUS COMPONENT: N/A

CAL. SHT. NO.: NA PROCEDURE: N-UT-55 REV.: 9 PCR.: 02-08 ~~N/A~~ 04-10-02 TEMP.: 85 PYRO.: 522352

SCAN SENS.: X dB EXAM START: 1430 EXAM END: 1520 EXAM ANGLE: 19°, 25°

Lo LOCATION: TDC Wo LOCATION: ℄ of WELD

IND NO.	20%			50%			100%			MAX. AMP.			20%			50%			100%		
	Mp1	W1	L1	Mp1 X	W1	L1	Mp1	W1	L1	Mp	W	L	Mp2	W2	L2	Mp2	W2	L2	Mp2	W2	L2
19	SCAN		dB	63.2		SCANNING				10/11		BLEND RADIUS									
25	SCAN		dB	66		SCANNING				19/11		BLEND RADIUS									
				No Recordable Indication																	

COMMENTS: A MATERIAL NOISE LEVEL of 5-10% was observed 4/11/02

EXAMINER: D.R. Klein LEVEL: II DATE: 04-01-02 REVIEWED BY: [illegible] LEVEL: III DATE: 4/4/02

EXAMINER: Mike [illegible] LEVEL: II DATE: 4-4-02 ANII: [illegible] DATE: 4/18/02 PAGE 4 OF 4

TVA 40094 (NP-1-89) 1-108-999-48

000338

Inspection Report R-160
Weld N2C-NV

TENNESSEE VALLEY AUTHORITY	EXAMINATION SUMMARY AND RESOLUTION SHEET	REPORT NUMBER: R160

PROJECT: BFN	UNIT: 3	CYCLE: 10		COMPONENT ID: N2C	
EXAMINATION METHOD				SYSTEM RPV	ISI DWG. NO. 3-ISI-0328-C
MT ☐	PT ☐	UT ☒	VT ☐	CODE CLASS: 1	CATEGORY: B-D
PROCEDURE: N_UT_9	REV:9	TC:02-06		COFIG.: Nozzle TO Vessel	
EXAMINER: MIKE KLEINJAN LEVEL: II	EXAMINER: DAVID KLEINJAN LEVEL: II			EXAMINER: N/A LEVEL: N/A	EXAMINER: N/A LEVEL: N/A

This report contains the data associated with the manual ultrasonic examination of code category B-D, Nozzle to Vessel welds. This examination report satisfies ASME section XI requirements for the Nozzle to shell weld..

Examination. Nozzle to Vessel weld N2C
Transverse coverage for the Nozzle to Vessel weld was supplemented by the inner radius examination.
(N2C-IR) See R161

0° was used on the weld crown and base material Vessel side

45° was used on the vessel side only scanning over the weld crown
45° Tangent to the weld was used on vessel side CW/CCW
45° Parallel to the weld was used on vessel side CW/CCW

60° was used on the vessel side only scanning over the weld crown
60° Tangent to the weld was used on vessel side CW/CCW
60° Parallel to the weld was used on vessel side CW/CCW

77% code coverage was obtained

This exam was performed with equipment, Procedures, and personnel qualified in accordance with ASME Section XI

No Recordable Indication

RESOLUTION BY:	REVIEWED BY:	ANII:
Mike Kleinjan		DATE: 4/18/02
LEVEL: II DATE: 4-4-02	LEVEL: III DATE: 4/4/02	PG. 1 OF 15

00040
REPORT NUMBER
R160

Calculation of ASME code coverage
For section XI NDE Examination

N2C

1) O degree (weld metal scan)	100%
2) 45 degree Transverse-scan from vessel side of weld	100%
3) 45 degree Transverse-scan from nozzle side of weld	0%
4) 60 degree Transverse-scan from vessel side of weld	100%
5) 60 degree Transverse-scan from nozzle side of weld	0%
6) 45 degree Parallel-scan CW direction	100% *
7) 45 degree Parallel-scan CCW direction	100% *
8) 60 degree Parallel-scan CW direction	100% *
9) 60 degree Parallel-scan CCW direction	100% *
The sum of all the percentage of scans	700%
Divided by the total # of scans	9
Percentage of examination Volume coverage	77%

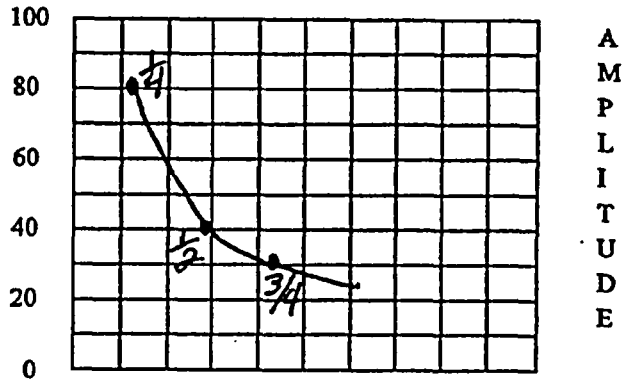
* Transverse coverage includes coverage obtained during the inner radius examination.

HSBCI
4/18/02

4/18/02

TENNESSEE VALLEY AUTHORITY	DIGITAL ULTRASONIC CALIBRATION DATA SHEET	REPORT NUMBER: R160

PROJECT: BFN UNIT: 3 CYCLE: 10	CALIBRATION DATE: 4-1-02
PROC.: N-UT- 9 REV:9 TC:02-06	CALIBRATION BLOCK NO.: BF18 TEMP: 72.6'F
INSTR. MFG: Staveley DUE DATE: 8-05-02	SIMULATOR BLOCK NO: DB55079
MODEL/TYPE: Sonic 136 M & TE NO.: VH751	THERMOMTER S/N: 522352 DUE DATE: 5-17-02
TRANSDUCER MFG: Harisonic	COUPLANT SONOTRACE BATCH: 01141
S/N DB34198 SIZE: .75 FREQ: 2.25 MHz	EXAM TYPE: SHEAR☐ LONG☒ RL☐
CABLE TYPE: RG174 LENGTH: 120 inches	ANGLE VERIFICATION
	BLOCK TYPE: ~~Rompus~~ Rompos S/N: DB55079
DAC	NOMINAL ANGLE: 0 ACTUAL ANGLE: N/A



DISPLAY WIDTH: 10 inches

INSTRUMENT SETTINGS

REFLECTOR SCAN DIRECT.	NTCH	SDH	REFERENCE SENSITIVITY	MEMORY NUMBER
AXIAL	☐	☒	20.8 dB	1
CIRC	☐	☐	n/a dB	n/a

FREQ: 2.25 MHz	REJECT: off %
ANGLE: n/a deg	DAMPING: 500 ohms
DELAY: .499 msec	PULSER: 222
ZERO: n/a msec	FILTER: Filt 3
VELOCITY: .238 msec	REP RATE: 2KHZ
RANGE: 10 inches	TOF: ☒PEAK ☐ FLANK
DISPLAY MODE: PE	POWER: AC
DUAL: ☐ ON ☒ OFF	TCG: ☐ ON ☒ OFF

REF. REFLECTOR: 1" GAIN: 8 dB	CALIBRATION TIMES
AMPLITUDE: 80 % METAL PATH: 1"	INITIAL TIME: 13:30 FINAL TIME: 18:00

VERIFICATION TIMES	1)~~11:45~~	2)n/a	3)n/a	4)n/a	5)n/a	6)n/a	7)n/a	8)n/a	9)n/a
	JC 4/18/02								

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	-12 dB	SET	+12	SET	+6	
	AMP	80%	32 TO 48	16 TO 24	20 %	64 TO 96	40%	64 TO 96	
			40	20		80		80	

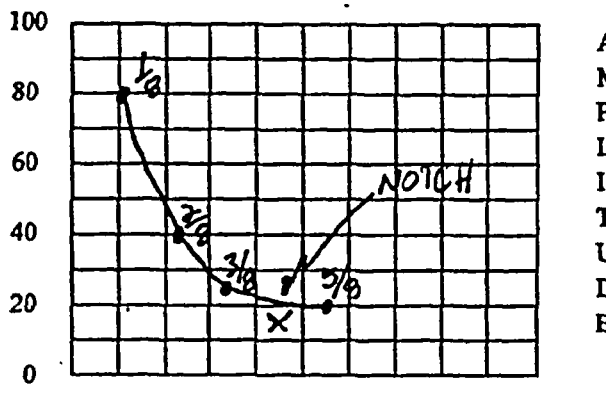
COMMENTS:	WELDS/ITEMS EXAMINED:
	N2A, N2C, N2E Nozzle to Shell

EXAMINER:	EXAMINER:	REVIEWER:	ANII:
MIKE W. KLEINJAN	DAVID KLEINJAN		DATE: 4/18/02
LEVEL: II	LEVEL: II	LEVEL: III DATE: 4/4/02	PG.: ~~1 OF 15~~ 3 of 15

JC 4/18/02

TENNESSEE VALLEY AUTHORITY	DIGITAL ULTRASONIC CALIBRATION DATA SHEET	REPORT NUMBER: R160

PROJECT: BFN UNIT: 3 CYCLE: 10	CALIBRATION DATE: 4-1-02
PROC.: N-UT- 9 REV:9 TC:02-06	CALIBRATION BLOCK NO.: BF18 TEMP: 72.6'F
INSTR. MFG: Staveley DUE DATE: 8-05-02	SIMULATOR BLOCK NO: DB55079
MODEL/TYPE: Sonic 136 M & TE NO.: VH751	THERMOMTER S/N: 522352 DUE DATE: 5-17-02
TRANSDUCER MFG: Krauntkramer	COUPLANT SONOTRACE BATCH: 01141
S/N DB34843 SIZE: .5x1 FREQ: 2.25 MHz	EXAM TYPE: SHEAR☒ LONG☐ RL☐
CABLE TYPE: RG1743 LENGTH: 120 inches	ANGLE VERIFICATION
	BLOCK TYPE: IIW S/N: DB55074
DAC	NOMINAL ANGLE: 45° ACTUAL ANGLE: 46°



DISPLAY WIDTH: 10 inches

INSTRUMENT SETTINGS

REFLECTOR SCAN DIRECT.	NTCH	SDH	REFERENCE SENSITIVITY	MEMORY NUMBER
AXIAL	☐	☒	45.6 dB	2
CIRC	☐	☐	n/a dB	n/a

FREQ: 2.25 MHz	REJECT: off %
ANGLE: N/A deg	DAMPING: 500 ohms
DELAY: .830 msec	PULSER: 222
ZERO: N/A msec	FILTER: FITL 3
VELOCITY: .126 msec	REP RATE: 2KHZ
RANGE: 20 inches	TOF: ☒PEAK ☐ FLANK
DISPLAY MODE: PE	POWER: AC
DUAL: ☐ ON ☒ OFF	TCG: ☐ ON ☒ OFF

REF. REFLECTOR: 1" GAIN: 33.6 dB	CALIBRATION TIMES
AMPLITUDE: 80 % METAL PATH: 1"	INITIAL TIME: 13:30 FINAL TIME: 18:00

VERIFICATION TIMES	1)~~11:45~~ 11:00	2)n/a	3)n/a	4)n/a	5)n/a	6)n/a	7)n/a	8)n/a	9)n/a

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	-12 dB	SET	+12	SET	+6
	AMP	80%	32 TO 48	16 TO 24	20 %	64 TO 96	40%	64 TO 96
			40	20		80		80

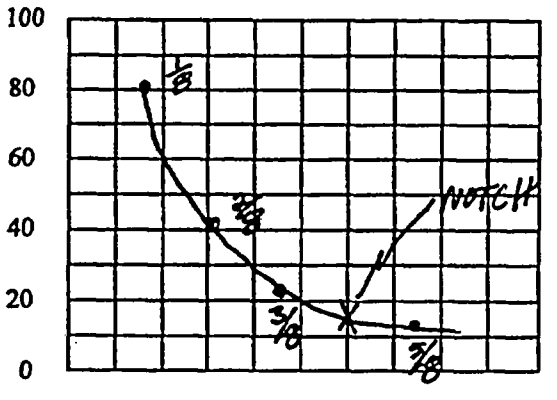
COMMENTS:	WELDS/ITEMS EXAMINED:
Delta difference between 3/8 to 5/8 on the clad side is 3 dB	N2A, N2C,N2E Nozzle to Shell

EXAMINER:	EXAMINER:	REVIEWER:	ANII:
MIKE W. KLEINJAN	DAVID KLEINJAN		DATE: 4/18/02
LEVEL:II	LEVEL:II	LEVEL:III DATE: 4/4/02	PG.: ~~1 OF 15~~ 4 OF 15

JL 4/11/02

TENNESSEE VALLEY AUTHORITY	DIGITAL ULTRASONIC CALIBRATION DATA SHEET	REPORT NUMBER: R160

PROJECT: BFN UNIT: 3 CYCLE: 10	CALIBRATION DATE: 4-1-02
PROC.: N-UT- 9 REV:9 TC:02-06	CALIBRATION BLOCK NO.: BF18 TEMP: 72.6'F
INSTR. MFG: Staveley DUE DATE: 8-05-02	SIMULATOR BLOCK NO: DB55079
MODEL/TYPE: Sonic 136 M & TE NO.: VH751	THERMOMTER S/N: 522352 DUE DATE: 5-17-02
TRANSDUCER MFG: Krauntkramer	COUPLANT SONOTRACE BATCH: 01141
S/N DB34154 SIZE: .5x1 FREQ: 2.25 MHz	EXAM TYPE: SHEAR☒ LONG☐ RL☐
CABLE TYPE: RG174 LENGTH: 120 inches	ANGLE VERIFICATION
	BLOCK TYPE: IIW / S/N: DB55074
DAC	NOMINAL ANGLE: 60 / ACTUAL ANGLE: 59



DISPLAY WIDTH: 10 inches

INSTRUMENT SETTINGS

REFLECTOR SCAN DIRECT.	NTCH	SDH	REFERENCE SENSITIVITY	MEMORY NUMBER
AXIAL	☐	☒	52 dB	3
CIRC	☐	☐	n/a dB	n/a

FREQ: 2.25 MHz	REJECT: off %
ANGLE: N/A deg	DAMPING: 500 ohms
DELAY: 1.20 msec	PULSER: 222
ZERO: N/A msec	FILTER: FITL 3
VELOCITY: .123 msec	REP RATE: 2KHZ
RANGE: 20 inches	TOF: ☒PEAK ☐ FLANK
DISPLAY MODE: PE	POWER: AC
DUAL: ☐ ON ☒ OFF	TCG: ☐ ON ☒ OFF

REF. REFLECTOR: 1" GAIN: 36 dB	CALIBRATION TIMES
AMPLITUDE: 80 % METAL PATH: 1"	INITIAL TIME: 13:30 FINAL TIME: 18:00

VERIFICATION TIMES	1) n/a	2)n/a	3)n/a	4)n/a	5)n/a	6)n/a	7)n/a	8)n/a	9)n/a

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	-12 dB	SET	+12	SET	+6			
	AMP	80%	32 TO 48	16 TO 24	20 %	64 TO 96	40%	64 TO 96			
			40	20		80		80			

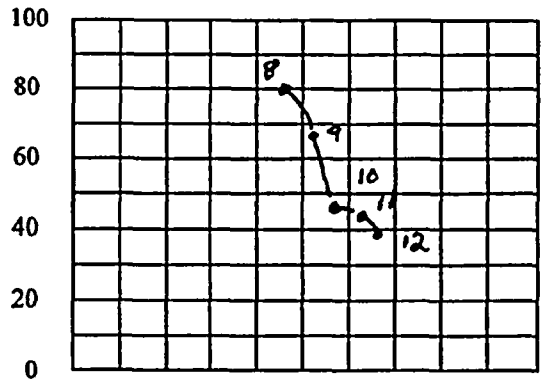
COMMENTS:	WELDS/ITEMS EXAMINED:
DELTA dB DIFFERENCE IS 4.4 FROM THE 3/8 TO 5/8 ON THE	N2A, N2C, N2E Nozzle to Shell
CLAD SIDE	

EXAMINER:	EXAMINER:	REVIEWER:	ANII:
MIKE W. KLEINJAN	DAVID KLEINJAN		DATE: 4/18/02
LEVEL: II	LEVEL: II	LEVEL: III DATE: 4/4/02	PG.: ~~1 OF 15~~ 5 OF 15

j- 4/18/02

TENNESSEE VALLEY AUTHORITY	DIGITAL ULTRASONIC CALIBRATION DATA SHEET	REPORT NUMBER: R160

PROJECT: BFN UNIT: 3 CYCLE: 10	CALIBRATION DATE: 04-01-02
PROC.: N-UT- 55 REV:9 ~~TC:N/A~~	CALIBRATION BLOCK NO.: BF-85-IR TEMP: 68.1° F
INSTR. MFG: STAVELEY DUE DATE: 08-11-02	SIMULATOR BLOCK NO: N/A
MODEL/TYPE: SONIC-137 M & TE NO.: VH-5473	THERMOMTER S/N: 522352 DUE DATE: 05-17-02
TRANSDUCER MFG: KRAUTKRAMER	COUPLANT SONOTRACE BATCH: 01141
S/N DB 35164 SIZE: 1.0" FREQ: 2.25 MHz	EXAM TYPE: SHEAR☐ LONG☐ RL☒
CABLE TYPE: RG 174 LENGTH: 120 inches	ANGLE VERIFICATION
	BLOCK TYPE: CS IIW S/N: DB 55074
DAC	NOMINAL ANGLE: 25° ACTUAL ANGLE: N/A



DISPLAY WIDTH: 20 inches

INSTRUMENT SETTINGS

REFLECTOR SCAN DIRECT.	NTCH	SDH	REFERENCE SENSITIVITY	MEMORY NUMBER
AXIAL	☒	☐	60.0 dB	25
CIRC	☐	☐	N/A dB	N/A

FREQ: 2.25 MHz	REJECT: OFF %
ANGLE: N/A deg	DAMPING: 200 ohms
DELAY: 1.12 msec	PULSER: 222
ZERO: N/A msec	FILTER: FILT 1
VELOCITY: 0.234 msec	REP RATE: 4 KHZ
RANGE: 20.0 inches	TOF: ☐PEAK ☒ FLANK
DISPLAY MODE: PE	POWER: AC
DUAL: ☐ ON ☒ OFF	TCG: ☐ ON ☒ OFF

REF. REFLECTOR: N/A	GAIN: N/A dB
AMPLITUDE: N/A %	METAL PATH: N/A"

CALIBRATION TIMES

INITIAL TIME: 1355 FINAL TIME: 1805

VERIFICATION TIMES	1)N/A	2)N/A	3)N/A	4)N/A	5)N/A	6)N/A	7)N/A	8)N/A	9)N/A

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	

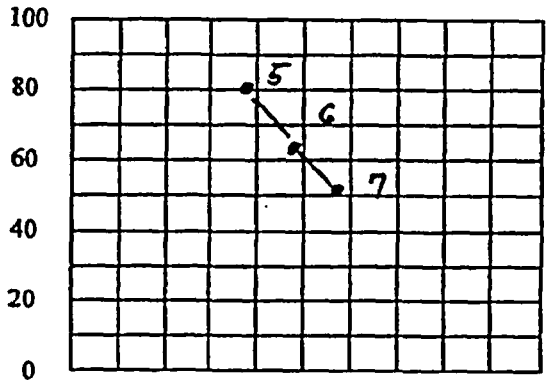
ATTENUATOR	GAIN	SET	-6 dB	-12 dB	SET	+12	SET	+6	
	AMP	80%	32 TO 48	16 TO 24	20 %	64 TO 96	40%	64 TO 96	
			40	20		80		80	

COMMENTS:	WELDS/ITEMS EXAMINED:
	REACTOR PRESSURE VESSEL
	N2A-IR, N2C-IR, N2E-IR
	wedge ID D-14795-147

EXAMINER:	EXAMINER:	REVIEWER:	ANII:
DAVID KLEINJAN	MIKE KLEINJAN		DATE: 4/18/02
LEVEL: II	LEVEL: II	LEVEL: III DATE: 4/18/02	PG.: ~~1 OF 1~~ ~~15~~ 6 of 15

TENNESSEE VALLEY AUTHORITY	DIGITAL ULTRASONIC CALIBRATION DATA SHEET	REPORT NUMBER: R160

PROJECT: BFN UNIT: 3 CYCLE: 10	CALIBRATION DATE: 04-01-02
PROC.: N-UT- 55 REV:9 ~~TC:N/A~~	CALIBRATION BLOCK NO.: BF-85-IR TEMP: 68.1° F
INSTR. MFG: STAVELEY DUE DATE: 08-11-02	SIMULATOR BLOCK NO: N/A
MODEL/TYPE: SONIC-137 M & TE NO.: VH-5473	THERMOMTER S/N: 522352 DUE DATE: 05-17-02
TRANSDUCER MFG: KRAUTKRAMER	COUPLANT SONOTRACE BATCH: 01141
S/N DB 35163 SIZE: 1.0" FREQ: 2.25 MHz	EXAM TYPE: SHEAR☐ LONG☐ RL☒
CABLE TYPE: RG 174 LENGTH: 120 inches	ANGLE VERIFICATION
	BLOCK TYPE: CS IIW S/N: DB 55074
DAC	NOMINAL ANGLE: 19° ACTUAL ANGLE: N/A



DISPLAY WIDTH: 20 inches

INSTRUMENT SETTINGS

REFLECTOR SCAN DIRECT.	NTCH	SDH	REFERENCE SENSITIVITY	MEMORY NUMBER
AXIAL	☒	☐	57.2 dB	19
CIRC	☐	☐	N/A dB	N/A

FREQ: 2.25 MHz	REJECT: OFF %
ANGLE: N/A deg	DAMPING: 200 ohms
DELAY: 0.996 msec	PULSER: 222
ZERO: N/A msec	FILTER: FILT 1
VELOCITY: 0.234 msec	REP RATE: 4 KHZ
RANGE: 20.0 inches	TOF: ☐PEAK ☒ FLANK
DISPLAY MODE: PE	POWER: AC
DUAL: ☐ ON ☒ OFF	TCG: ☐ ON ☒ OFF

REF. REFLECTOR: N/A	GAIN: N/A dB
AMPLITUDE: N/A %	METAL PATH: N/A"

CALIBRATION TIMES

INITIAL TIME: 1245 FINAL TIME: 1807

VERIFICATION TIMES	1)N/A	2)N/A	3)N/A	4)N/A	5)N/A	6)N/A	7)N/A	8)N/A	9)N/A

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	-12 dB	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:	WELDS/ITEMS EXAMINED:
	REACTOR PRESSURE VESSEL
	N2A-IR, N2C-IR, N2E-IR
	Wedge ID D-14795-144

EXAMINER:	EXAMINER:	REVIEWER:	ANII:
DAVID KLEINJAN	MIKE KLEINJAN		DATE: 4/18/02
LEVEL: II	LEVEL: II	LEVEL: III DATE: 4/4/02	PG.: ~~8 OF 15~~ 7 OF 15

TVA	MANUAL ULTRASONIC VESSEL EXAMINATION DATA SHEET	REPORT NO. R160

PROJECT: BFN UNIT: 3 WELD ID: N2C CONFIG.: Nozzle COMPONENT: VESSEL

CAL. SHT. NO.: NA PROCEDURE: NP-UT-9 REV.: 9 PCR.: 02-06 / 1471 ~~N/A~~ TEMP.: 85 PYRO.: 522352

SCAN SENS.: * dB EXAM START: 4/01/02 1520 EXAM END: 1620 EXAM ANGLE: 0°, 45°, 60°

Lo LOCATION: TDC Wo LOCATION: ℄ OF WELD

IND NO.	20%			50%			100%			MAX. AMP.			20%			50%			100%		
	Mp1	W1	L1	Mp1 *	W1	L1	Mp1	W1	L1	Mp	W	L	Mp2	W2	L2	Mp2	W2	L2	Mp2	W2	L2
19°	SCAN.		dB	63.2		SCANNING	#		10/11	BLEND RADIUS											
25°	SCAN		dB	66.		SCANNING	#		10/11	BLEND RADIUS											
0°	SCAN		dB	34.8		SCANNING	#		9	ON WELD AND BASE MATERIAL											
45°	SCAN		dB	56.6		SCANNING	#		9	ON WELD AND VESSEL SIDE											
45T	SCAN		dB	56.6		SCANNING	#		10/11	CW/CCW VESSEL SIDE											
45TAN	SCAN		dB	56.6		SCANNING	#		10/11	CW/CCW VESSEL SIDE											
60°	SCAN		dB	63.		SCANNING	#		9	ON weld AND VESSEL SIDE											
60T	SCAN		dB	63.		SCANNING	#		10/11	CW/CCW VESSEL SIDE											
60TAN	SCAN		dB	63.		SCANNING	#		10/11	CW/CCW VESSEL SIDE											
				NO RECORDABLE INDICATION																	

COMMENTS: 19° AND 25 EXAMINATIONS ARE THE BLEND RADIUS EXAMINATIONS TRANSVERSE EXAMINATION COVERAGE WILL INCLUDE COVERAGE OBTAINED DURING THE INNER RADIUS EXAMINATIONS. 50% TO 10% NOISE LEVEL WAS OBSERVED

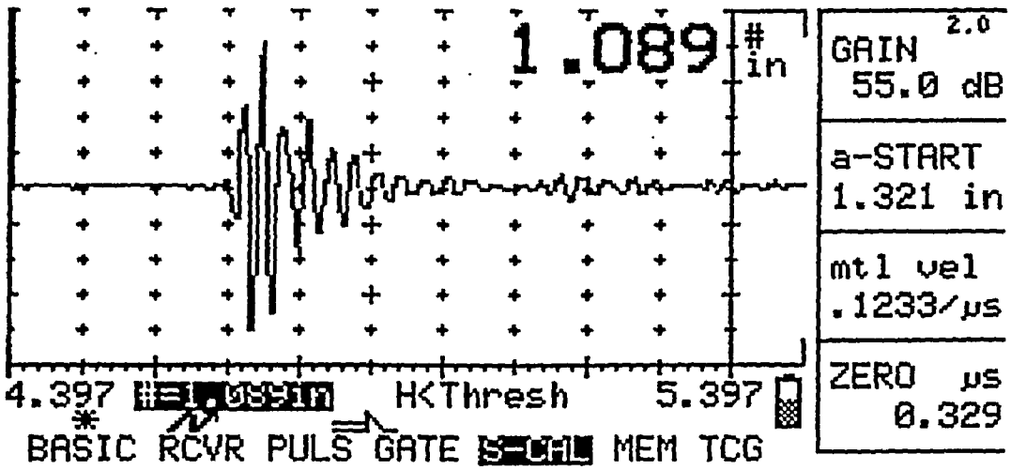
EXAMINER: [signature] LEVEL: II DATE: 4-4-02 REVIEWED BY: [signature] LEVEL: III DATE: 4/4/02

EXAMINER: [signature] LEVEL: II DATE: 04-01-02 ANII: [signature] DATE: 4/18/02 PAGE 8 OF 15

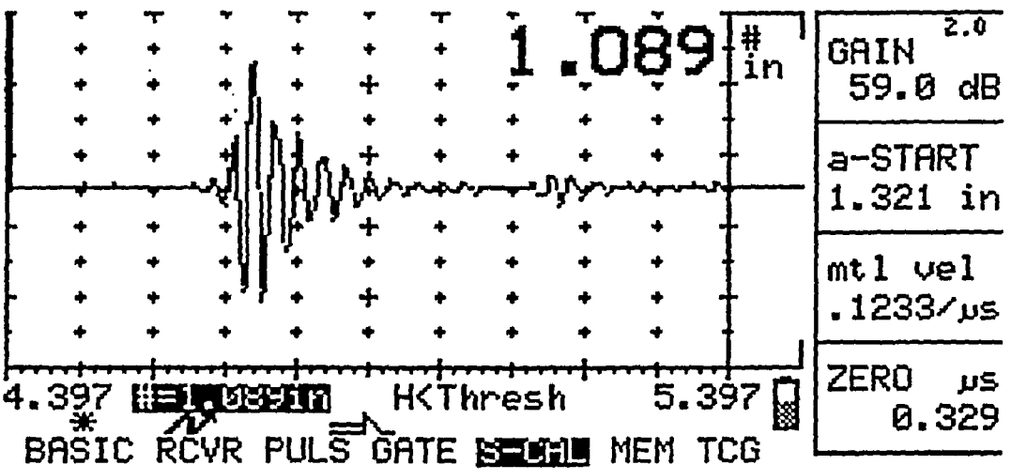
TVA 40094 (NP-1-89) 1-108-999-48

00047 Report Number
R160

Nozzle Examination 45 °Waveforms



45° Pre Waveform

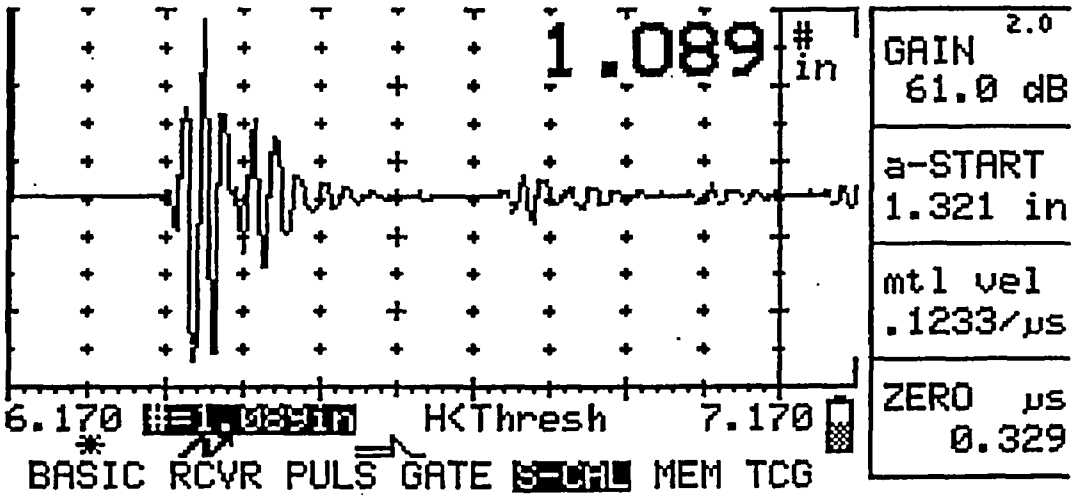


45° Post Waveform

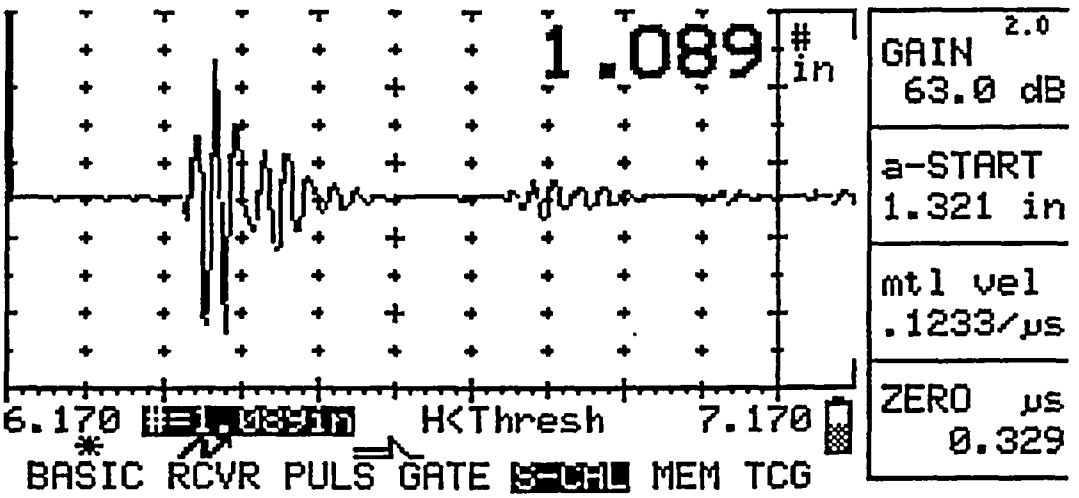
HSBCT
4/18/02
ATT

00048.
REPORT NUMBER
R16D

Nozzle Examination 60 ° Waveforms



60° Pre Waveform



60° Post Waveform

HSBGT
4/18/02

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TVA	BEAM SPREAD AND RESOLUTION DATA SHEET	REPORT NO. R160

PROJECT: BFN UNIT: 3 CALIBRATION BLOCK NO.: BF 18

PROCEDURE NO.: N-UT-9 REV.: 9 PCR: ~~0205 N/A~~ 3/30/02

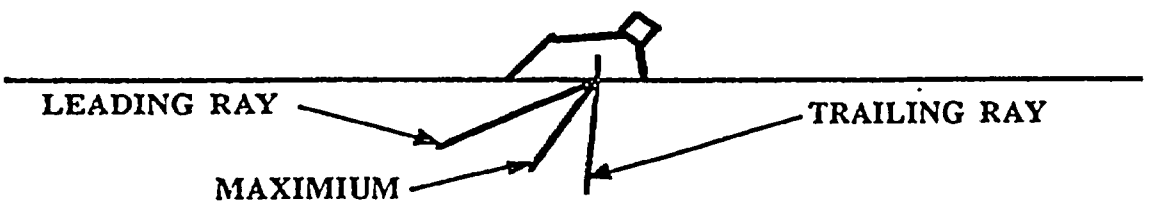
SEARCH UNIT-MAKE: Krautkramer SIZE: .5X1 FREQ.: 2.25

S/N: DB 34843 ANGLE: 45

ULTRASONIC INSTRUMENT-MAKE: Sonic 135 S/N: VH 751

BEAM SPREAD

	TRAILING RAY						LEADING RAY			
HOLE DEPTH	20% DAC		50% DAC		100% DAC		20% DAC		50% DAC	
	W	MP	W	MP	MP	W	MP	W	W	MP
1/4T	1 1/8	1.9	1 1/4	2.	2.1	1 5/8	2.4	2	1 7/8	2.3
2T	2 7/8	4	3	4.1	4.3	3 1/4	4.8	4 1/8	3 3/4	4.6
3/4T	4 1/4	6	4 1/2	6.3	6.5	4 7/8	7	5 7/8	5 1/4	6.8



RESOLUTION

NEAR SURFACE REFLECTOR: Notch OD DEPTH: 25 SIZE: .253 CAL BLK.: BF 18

FAR SURFACE REFLECTOR: Notch ID DEPTH: 6.1 SIZE: .253

SCANNING REFLECTORS PROVIDE 50% DAC SIGNALS AT SCANNING SPEED Y☑ N☐

EXAMINER: [signature]	REVIEWED BY: [signature]	ANII: [signature]
LEVEL: II DATE: 3-30-02	LEVEL: III DATE: 4/4/02	DATE: 4/18/02
		PAGE: 11 OF 15

TVA	BEAM SPREAD AND RESOLUTION DATA SHEET	REPORT NO. R160

PROJECT: BFN UNIT: 3 CALIBRATION BLOCK NO.: BF 18

PROCEDURE NO.: N-UT-9 REV.: 9 PCR: 0206 N/A 3/30/02

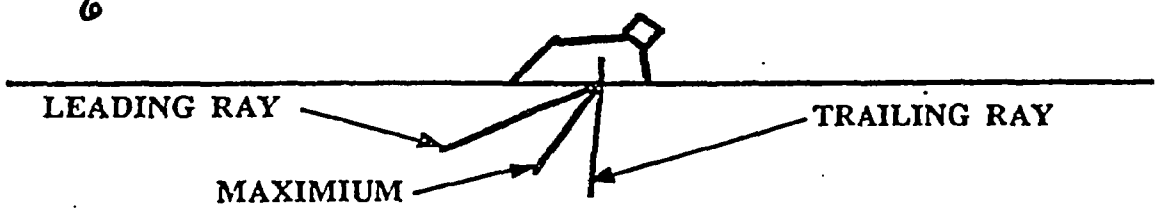
SEARCH UNIT-MAKE: Krautk SIZE: .5X1 FREQ.: 2.25

S/N: DB 34154 ANGLE: 60

ULTRASONIC INSTRUMENT-MAKE: Sonic 136 S/N: VH 751

BEAM SPREAD

	TRAILING RAY						LEADING RAY			
HOLE	20% DAC		50% DAC		100% DAC		20% DAC		50% DAC	
DEPTH	W	MP	W	MP	MP	W	MP	W	W	MP
1/4T	2 1/8	2.4	2 3/8	2.7	2.9	2 5/8	3.2	3 1/8	2 7/8	3.1
1/2T	4 3/4	4.8	5	5.3	5.8	5 1/4	6.4	6 5/8	6	6.1
3/4T	6 3/8	7.6	7 1/4	8	8.7	7 7/8	9.6	8 5/8	8	9.1



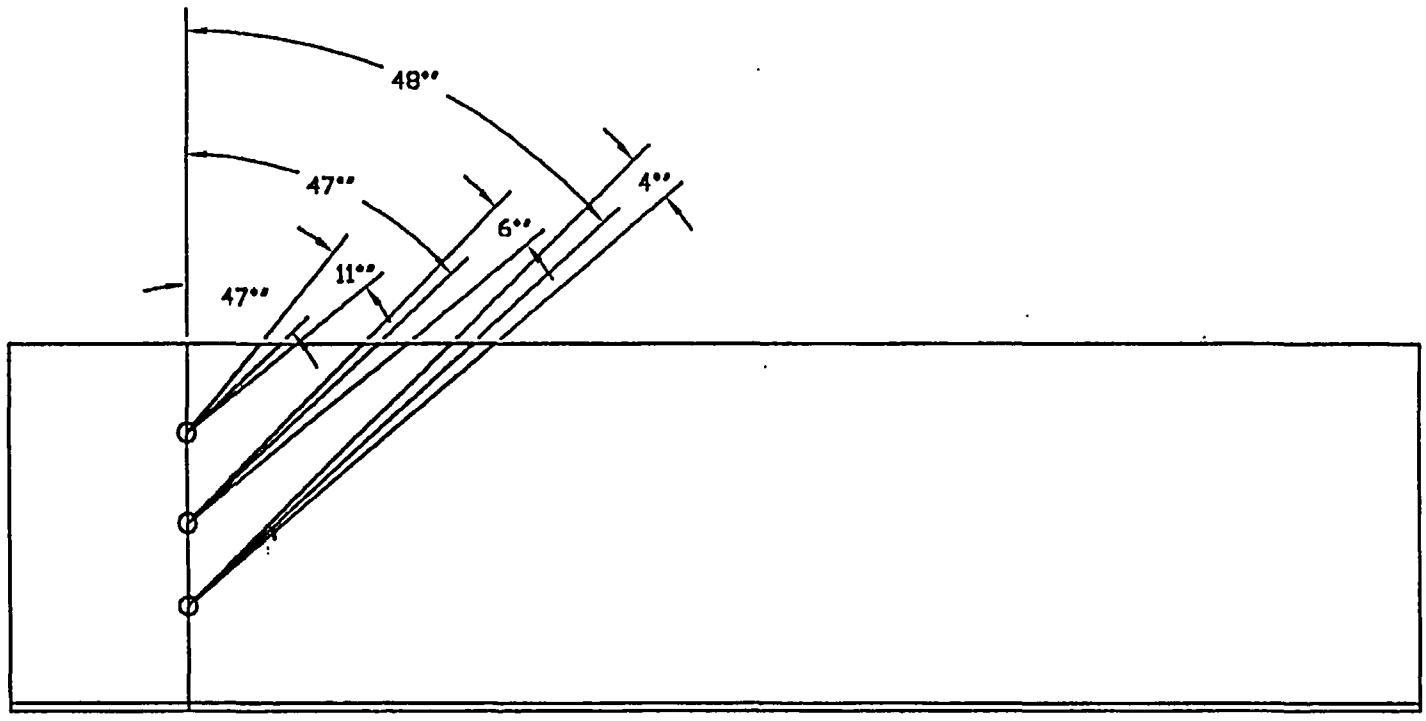
RESOLUTION

NEAR SURFACE REFLECTOR: Notch OD DEPTH: .25 SIZE: .253 CAL BLK.: BF 18

FAR SURFACE REFLECTOR: Notch ID DEPTH: 6.1 SIZE: .253

SCANNING REFLECTORS PROVIDE 50% DAC SIGNALS AT SCANNING SPEED Y ☒ N ☐

EXAMINER: Mike W Hemyer	REVIEWED BY: [signature]	ANII: Albert Todd
LEVEL: II DATE: 3-30-02	LEVEL: III DATE: 4/4/02	DATE: 4/18/02 PAGE: 12 OF 15



Report Number
R160

HSBCT
4/18/02

Browns Ferry Unit 3
Beamspread
MARCH 2002
BF-18

00051

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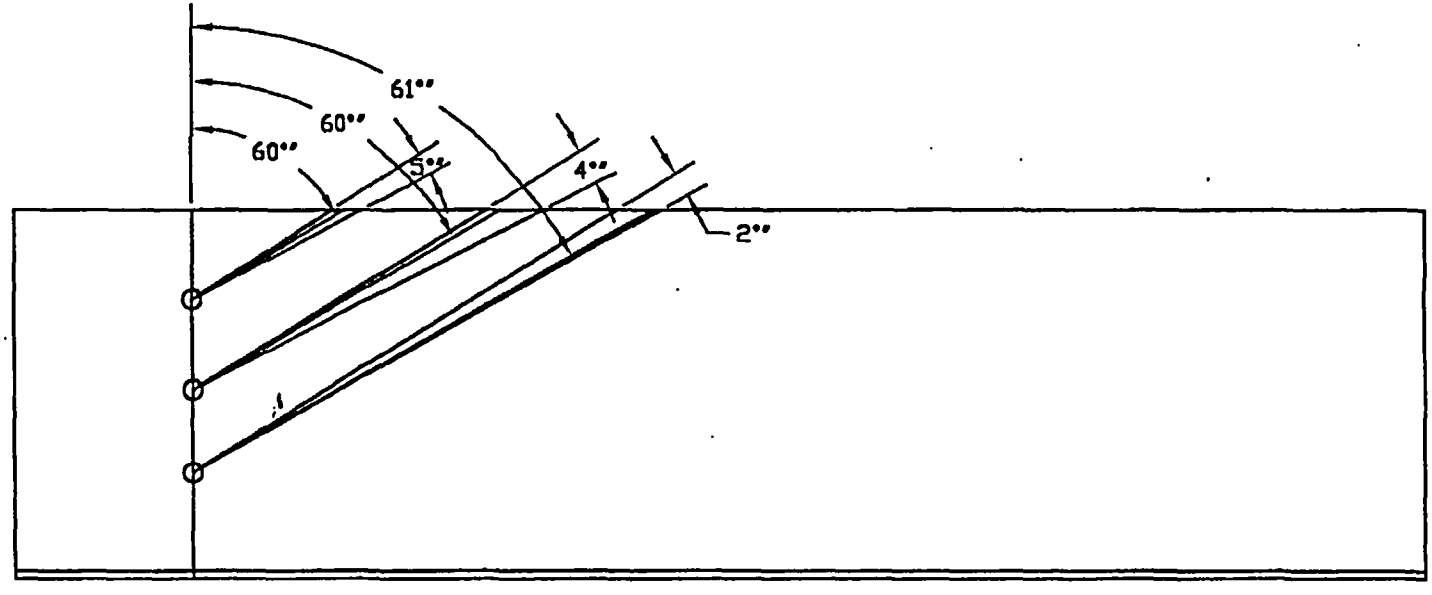

REPORT NUMBER
R160

HSBCT
9/1
4/18/02

Browns Ferry Unit 3
Beamspread
MARCH 2002
BF-18

00052

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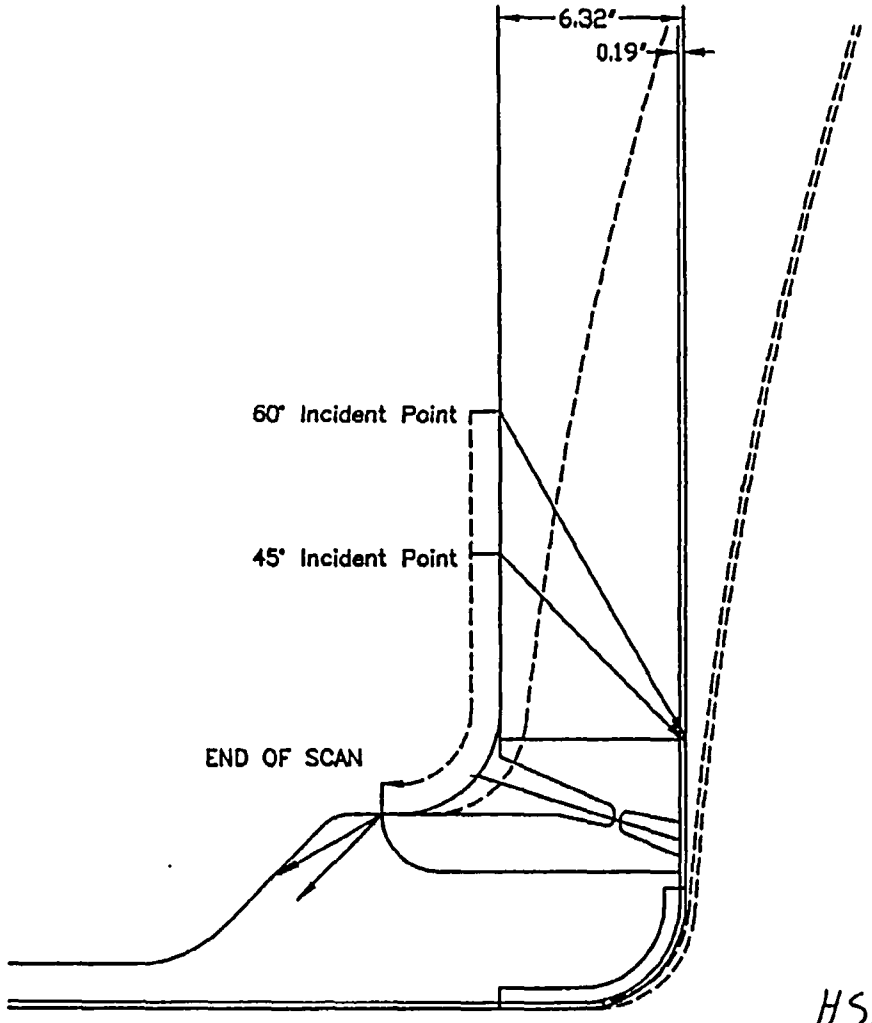
Report Number
00053 R160



Transverse coverage includes coverage obtained during the inner radious examination

HSBCT
4/18/03

Browns Ferry Unit 3
N2 Nozzle-to-Shell
MARCH 2002
SP-N2-NS

TENNESSEE VALLEY AUTHORITY	EXAMINATION SUMMARY AND RESOLUTION SHEET	REPORT NUMBER: R161

PROJECT: BFN	UNIT: 3	CYCLE: 10		COMPONENT ID: N2C-IR	
EXAMINATION METHOD				SYSTEM RPV	ISI DWG. NO. 3-ISI-0328-C
MT ☐	PT ☐	UT ☒	VT ☐	CODE CLASS: 1	CATEGORY: B-D
PROCEDURE: N-UT-55	REV:9	TC:N/A		COFIG.: Nozzle TO Vessel	
EXAMINER: MIKE KLEINJAN 4/18/02 LEVEL: II	EXAMINER: DAVID KLEINJAN LEVEL: II			EXAMINER: N/A LEVEL: N/A	EXAMINER: N/A LEVEL: N/A

This report contains the data associated with the manual ultrasonic examination of code category B-D, Nozzle Inner radius. This examination report satisfies ASME section XI requirements for the inner radius examination.

N2C-IR: This examination was performed using a 19° and 25° in the blend radius in two directions CW/CCW

100% code coverage was obtained

This exam was performed with equipment, Procedures, and personnel qualified in accordance with ASME Section XI

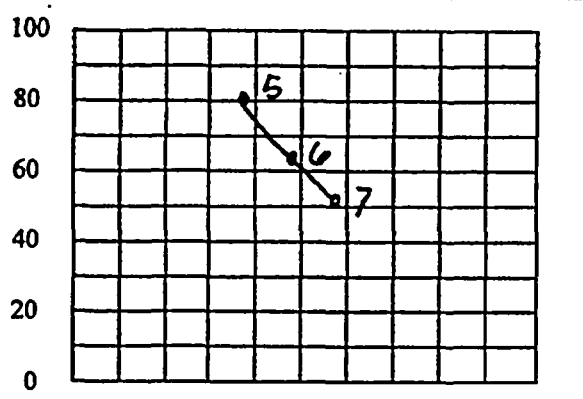
No Recordable Indications

RESOLUTION BY:	REVIEWED BY:	ANII:
Mike Kleinjan		DATE: 4/18/02
LEVEL: II DATE: 4-4-02	LEVEL: III DATE: 4/14/02	PG. 1 OF 14

4/18/02

TENNESSEE VALLEY AUTHORITY	DIGITAL ULTRASONIC CALIBRATION DATA SHEET	REPORT NUMBER: R161

PROJECT: BFN UNIT: 3 CYCLE: 10	CALIBRATION DATE: 04-01-02
PROC.: N-UT- 55 REV:9 TC:N/A	CALIBRATION BLOCK NO.: BF-85-IR TEMP: 68.1° F
INSTR. MFG: STAVELEY DUE DATE: 08-11-02	SIMULATOR BLOCK NO: N/A
MODEL/TYPE: SONIC-137 M & TE NO.: VH-5473	THERMOMTER S/N: 522352 DUE DATE: 05-17-02
TRANSDUCER MFG: KRAUTKRAMER	COUPLANT SONOTRACE BATCH: 01141
S/N DB 35163 SIZE: 1.0" FREQ: 2.25 MHz	EXAM TYPE: SHEAR☐ LONG☐ RL☒
CABLE TYPE: RG 174 LENGTH: 120 inches	ANGLE VERIFICATION
	BLOCK TYPE: CS IIW / S/N: DB 55074
DAC	NOMINAL ANGLE: 19° / ACTUAL ANGLE: N/A



DISPLAY WIDTH: 20 inches

INSTRUMENT SETTINGS

REFLECTOR SCAN DIRECT.	NTCH	SDH	REFERENCE SENSITIVITY	MEMORY NUMBER
AXIAL	☒	☐	57.2 dB	19
CIRC	☐	☐	N/A dB	N/A

FREQ: 2.25 MHz	REJECT: OFF %
ANGLE: N/A deg	DAMPING: 200 ohms
DELAY: 0.996 msec	PULSER: 222
ZERO: N/A msec	FILTER: FILT 1
VELOCITY: 0.234 msec	REP RATE: 4 KHZ
RANGE: 20.0 inches	TOF: ☐PEAK ☒FLANK
DISPLAY MODE: PE	POWER: AC
DUAL: ☐ ON ☒ OFF	TCG: ☐ ON ☒ OFF

REF. REFLECTOR: N/A	GAIN: N/A dB
AMPLITUDE: N/A %	METAL PATH: N/A"

CALIBRATION TIMES

INITIAL TIME: 1245 FINAL TIME: 1807

VERIFICATION TIMES	1)N/A	2)N/A	3)N/A	4)N/A	5)N/A	6)N/A	7)N/A	8)N/A	9)N/A

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	-12 dB	SET	+12	SET	+6	
	AMP	80%	32 TO 48	16 TO 24	20 %	64 TO 96	40%	64 TO 96	
			40	20		80		80	

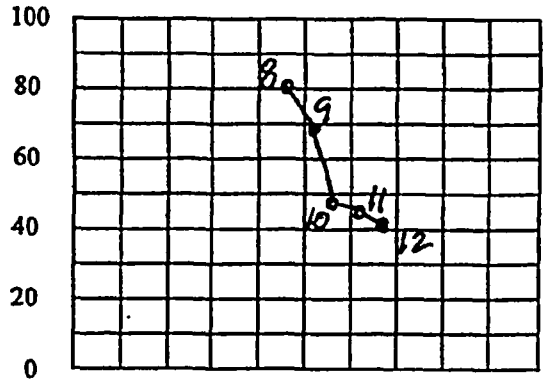
COMMENTS:	WELDS/ITEMS EXAMINED:
Wedge ID D-14795-144 ✓	REACTOR PRESSURE VESSEL
	N2A-IR, N2C-IR, N2E-IR ✓

EXAMINER:	EXAMINER:	REVIEWER:	ANII:
DAVID KLEINJAN	MIKE KLEINJAN		DATE: 4/10/02
LEVEL: II	LEVEL: II	LEVEL: III DATE: 4/4/02	PG.: ~~1 OF 1~~ 2 of 4

4/10/02

TENNESSEE VALLEY AUTHORITY	DIGITAL ULTRASONIC CALIBRATION DATA SHEET	REPORT NUMBER: R161

PROJECT: BFN UNIT: 3 CYCLE: 10	CALIBRATION DATE: 04-01-02
PROC.: N-UT- 55 REV:9 ~~TC:N/A~~	CALIBRATION BLOCK NO.: BF-85-IR TEMP: 68.1° F
INSTR. MFG: STAVELEY DUE DATE: 08-11-02	SIMULATOR BLOCK NO: N/A
MODEL/TYPE: SONIC-137 M & TE NO.: VH-5473	THERMOMTER S/N: 522352 DUE DATE: 05-17-02
TRANSDUCER MFG: KRAUTKRAMER	COUPLANT SONOTRACE BATCH: 01141
S/N DB 35164 SIZE: 1.0" FREQ: 2.25 MHz	EXAM TYPE: SHEAR☐ LONG☐ RL☒
CABLE TYPE: RG 174 LENGTH: 120 inches	ANGLE VERIFICATION
	BLOCK TYPE: CS IIW S/N: DB 55074
DAC	NOMINAL ANGLE: 25° ACTUAL ANGLE: N/A



DISPLAY WIDTH: 20 inches

INSTRUMENT SETTINGS

REFLECTOR SCAN DIRECT.	NTCH	SDH	REFERENCE SENSITIVITY	MEMORY NUMBER
AXIAL	☒	☐	60.0 dB	25
CIRC	☐	☐	N/A dB	N/A

FREQ: 2.25 MHz	REJECT: OFF %
ANGLE: N/A deg	DAMPING: 200 ohms
DELAY: 1.12 msec	PULSER: 222
ZERO: N/A msec	FILTER: FILT 1
VELOCITY: 0.234 msec	REP RATE: 4 KHZ
RANGE: 20.0 inches	TOF: ☐PEAK ☒ FLANK
DISPLAY MODE: PE	POWER: AC
DUAL: ☐ ON ☒ OFF	TCG: ☐ ON ☒ OFF

REF. REFLECTOR: N/A GAIN: N/A dB	CALIBRATION TIMES
AMPLITUDE: N/A % METAL PATH: N/A"	INITIAL TIME: 1355 FINAL TIME: 1805

VERIFICATION TIMES	1)N/A	2)N/A	3)N/A	4)N/A	5)N/A	6)N/A	7)N/A	8)N/A	9)N/A

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	-12 dB	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:	WELDS/ITEMS EXAMINED:
Wedge ID D-14795-147	REACTOR PRESSURE VESSEL
	N2A-IR, N2C-IR, N2E-IR

EXAMINER:	EXAMINER:	REVIEWER:	ANII:
DAVID KLEINJAN	MIKE KLEINJAN		DATE: 4/10/02
LEVEL: II	LEVEL: II	LEVEL: II DATE: 4/10/02	PG.: ~~1 OF 1~~ 3 OF 4

4/10/02

TVA	MANUAL ULTRASONIC VESSEL EXAMINATION DATA SHEET	REPORT NO. R161

PROJECT: BFN UNIT: 3 WELD ID: N2C CONFIG.: INNER RADIUS COMPONENT: N/A

CAL. SHT. NO.: NA PROCEDURE: N-UT-53 REV.: 9 PCR.: ~~N/A~~ 02-08 04-10-03 TEMP.: 85 PYRO.: 532352

SCAN SENS.: * dB EXAM START: 1520 EXAM END: 1620 EXAM ANGLE: 19°, 25°

Lo LOCATION: TDC Wo LOCATION: ℄ of WELD

IND NO.	20%			50%			100%			MAX. AMP.			20%			50%			100%		
	Mp1	W1	L1	Mp1 *	W1	L1	Mp1	W1	L1	Mp	W	L	Mp2	W2	L2	Mp2	W2	L2	Mp2	W2	L2
19°	SCAN		dB	63.2		SCANNING		*	10/11		BLEND RADIUS										
25°	SCAN		dB	66.0		SCANNING		*	10/11		BLEND RADIUS										
				No Recordable Indication																	

COMMENTS: A MATERIAL NOISE LEVEL of 5-10% WAS OBSERVED

EXAMINER: [signature] LEVEL: II DATE: 04-01-02 REVIEWED BY: [signature] LEVEL: III DATE: 4/4/02

EXAMINER: [signature] LEVEL: II DATE: 04-04-02 ANII: [signature] DATE: 4/18/02 PAGE 24 OF 4

TVA 40094 (NP-1-89) 1-108-999-48

00157

Inspection Report R-162
Weld N2E-NV

TENNESSEE VALLEY AUTHORITY	EXAMINATION SUMMARY AND RESOLUTION SHEET	REPORT NUMBER: R162

PROJECT: BFN	UNIT: 3	CYCLE: 10		COMPONENT ID: N2E	
EXAMINATION METHOD				SYSTEM RPV	ISI DWG. NO. 3-ISI-0328-C
MT ☐	PT ☐	UT ☒	VT ☐	CODE CLASS: 1	CATEGORY: B-D
PROCEDURE: N-UT-9	REV:9	TC:02-06		COFIG.: Nozzle TO Vessel	
EXAMINER: MIKE KLEINJAN	EXAMINER: DAVID KLEINJAN			EXAMINER: N/A	EXAMINER: N/A
LEVEL: II	LEVEL: II			LEVEL: N/A	LEVEL: N/A

This report contains the data associated with the manual ultrasonic examination of code category B-D, Nozzle to Vessel welds. This examination report satisfies ASME section XI requirements for the Nozzle to shell weld..

Examination. Nozzle to Vessel weld N2E
Transverse coverage for the Nozzle to Vessel weld was supplemented by the inner radius examination.
(N2E-IR) See R163

0° was used on the weld crown and base material Vessel side

45° was used on the vessel side only scanning over the weld crown
45° Tangent to the weld was used on vessel side CW/CCW
45° Parallel to the weld was used on vessel side CW/CCW

60° was used on the vessel side only scanning over the weld crown
60° Tangent to the weld was used on vessel side CW/CCW
60° Parallel to the weld was used on vessel side CW/CCW

77% code coverage was obtained

This exam was performed with equipment, Procedures, and personnel qualified in accordance with ASME Section XI

No Recordable Indication

RESOLUTION BY:	REVIEWED BY:	ANII:
Mike Kleinjan		DATE: 4/10
LEVEL: II DATE: 4-4-02	LEVEL: III DATE: 4/4/02	PG. 1 OF ~~15~~ 15 4/10/02

00059 REPORT NUMBER R162

Calculation of ASME code coverage
For section XI NDE Examination

N2E

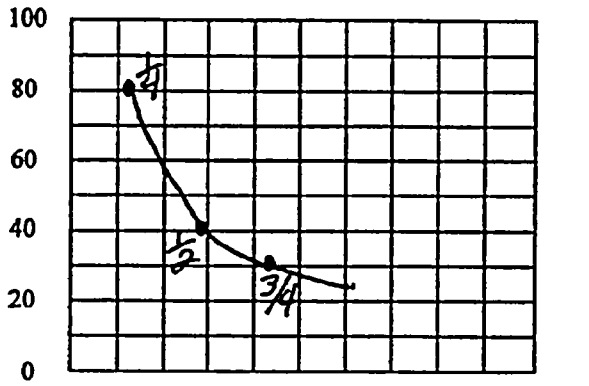
1) O degree (weld metal scan)	100%
2) 45 degree Transverse-scan from vessel side of weld	100%
3) 45 degree Transverse-scan from nozzle side of weld	0%
4) 60 degree Transverse-scan from vessel side of weld	100%
5) 60 degree Transverse-scan from nozzle side of weld	0%
6) 45 degree Parallel-scan CW direction	100% *
7) 45 degree Parallel-scan CCW direction	100% *
8) 60 degree Parallel-scan CW direction	100% *
9) 60 degree Parallel-scan CCW direction	100% *
The sum of all the percentage of scans	700%
Divided by the total # of scans	9
Percentage of examination Volume coverage	77%

* Transverse coverage includes coverage obtained during the inner radius examination.

HSBCT 4/19/00
2 of 15

TENNESSEE VALLEY AUTHORITY	DIGITAL ULTRASONIC CALIBRATION DATA SHEET	REPORT NUMBER: R162

PROJECT: BFN UNIT: 3 CYCLE: 10	CALIBRATION DATE: 4-1-02
PROC.: N-UT- 9 REV:9 TC:02-06	CALIBRATION BLOCK NO.: BF18 TEMP: 72.6'F
INSTR. MFG: Staveley DUE DATE: 8-05-02	SIMULATOR BLOCK NO: DB55079
MODEL/TYPE: Sonic 136 M & TE NO.: VH751	THERMOMTER S/N: 522352 DUE DATE: 5-17-02
TRANSDUCER MFG: Harisonic	COUPLANT SONOTRACE BATCH: 01141
S/N DB34198 SIZE: .75 FREQ: 2.25 MHz	EXAM TYPE: SHEAR☐ LONG☒ RL☐
CABLE TYPE: RG174 LENGTH: 120 inches	ANGLE VERIFICATION
	BLOCK TYPE: ~~Rompus~~ Rompas S/N: DB55079
DAC	NOMINAL ANGLE: 0 ACTUAL ANGLE: N/A



DISPLAY WIDTH: 10 inches

INSTRUMENT SETTINGS

REFLECTOR			REFERENCE	MEMORY
SCAN DIRECT.	NTCH	SDH	SENSITIVITY	NUMBER
AXIAL	☐	☒	20.8 dB	1
CIRC	☐	☐	n/a dB	n/a

FREQ: 2.25 MHz	REJECT: off %
ANGLE: n/a deg	DAMPING: 500 ohms
DELAY: .499 msec	PULSER: 222
ZERO: n/a msec	FILTER: Filt 3
VELOCITY: .238 msec	REP RATE: 2KHZ
RANGE: 10 inches	TOF: ☒PEAK ☐ FLANK
DISPLAY MODE: PE	POWER: AC
DUAL: ☐ ON ☒ OFF	TCG: ☐ ON ☒ OFF

REF. REFLECTOR: 1" GAIN: 8 dB	CALIBRATION TIMES
AMPLITUDE: 80 % METAL PATH: 1"	INITIAL TIME: 13:30 FINAL TIME: 18:00

VERIFICATION TIMES	1) ~~11:45~~ 4/10/02	2)n/a	3)n/a	4)n/a	5)n/a	6)n/a	7)n/a	8)n/a	9)n/a

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	

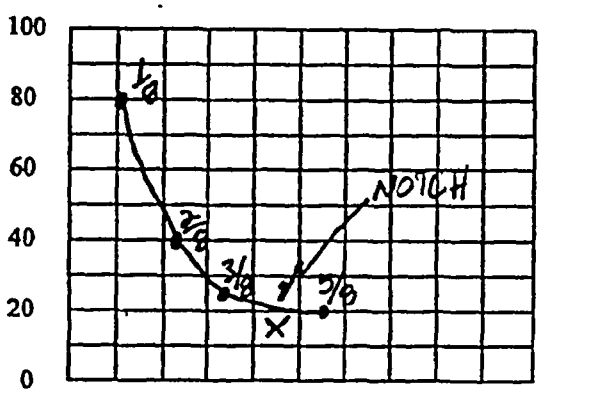
ATTENUATOR	GAIN	SET	-6 dB	-12 dB	SET	+12	SET	+6	
	AMP	80%	32 TO 48	16 TO 24	20 %	64 TO 96	40%	64 TO 96	
			40	20		80		80	

COMMENTS:	WELDS/ITEMS EXAMINED:
	N2A, N2C, N2E Nozzle to Shell

EXAMINER:	EXAMINER:	REVIEWER:	ANII:
MIKE W. KLEINJAN	DAVID KLEINJAN		DATE: 4/19/02
LEVEL: II	LEVEL: II	LEVEL: III DATE: 4/4/02	PG.: ~~14~~ 3 OF 15 4/10/02

TENNESSEE VALLEY AUTHORITY	DIGITAL ULTRASONIC CALIBRATION DATA SHEET	REPORT NUMBER: R162

PROJECT: BFN UNIT: 3 CYCLE: 10	CALIBRATION DATE: 4-1-02
PROC.: N-UT- 9 REV:9 TC:02-06	CALIBRATION BLOCK NO.: BF18 TEMP: 72.6'F
INSTR. MFG: Staveley DUE DATE: 8-05-02	SIMULATOR BLOCK NO: DB55079
MODEL/TYPE: Sonic 136 M & TE NO.: VH751	THERMOMTER S/N: 522352 DUE DATE: 5-17-02
TRANSDUCER MFG: Krauntkramer	COUPLANT SONOTRACE BATCH: 01141
S/N DB34843 SIZE: .5x1 FREQ: 2.25 MHz	EXAM TYPE: SHEAR☒ LONG☐ RL☐
CABLE TYPE: RG1743 LENGTH: 120 inches	ANGLE VERIFICATION
	BLOCK TYPE: IIW S/N: DB55074
DAC	NOMINAL ANGLE: 45° ACTUAL ANGLE: 46°



DISPLAY WIDTH: 10 inches

INSTRUMENT SETTINGS

REFLECTOR			REFERENCE		MEMORY
SCAN DIRECT.	NTCH	SDH	SENSITIVITY		NUMBER
AXIAL	☐	☒	45.6	dB	2
CIRC	☐	☐	n/a	dB	n/a

FREQ:	2.25	MHz	REJECT:	off	%
ANGLE:	N/A	deg	DAMPING:	500	ohms
DELAY:	.830	msec	PULSER:	222	
ZERO:	N/A	msec	FILTER:	FITL 3	
VELOCITY:	.126	msec	REP RATE:	2KHZ	
RANGE:	20	inches	TOF:	☒PEAK ☐ FLANK	
DISPLAY MODE: PE			POWER:	AC	
DUAL: ☐ ON ☒ OFF			TCG:	☐ ON ☒ OFF	

REF. REFLECTOR: 1" GAIN: 33.6 dB	CALIBRATION TIMES
AMPLITUDE: 80 % METAL PATH: 1"	INITIAL TIME: 13:30 FINAL TIME: 18:00

VERIFICATION TIMES	1) ~~11:45~~	2)n/a	3)n/a	4)n/a	5)n/a	6)n/a	7)n/a	8)n/a	9)n/a

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	-12 dB	SET	+12	SET	+6	
	AMP	80%	32 TO 48	16 TO 24	20 %	64 TO 96	40%	64 TO 96	
			40	20		80		80	

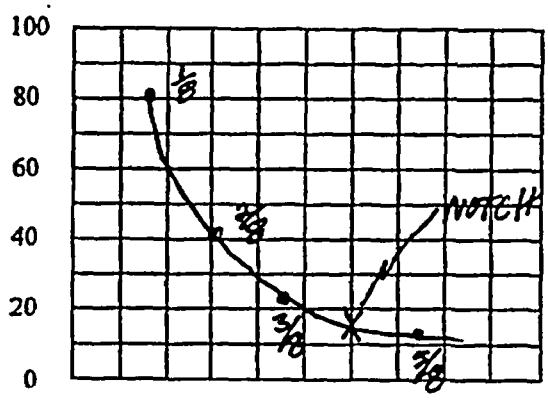
COMMENTS:	WELDS/ITEMS EXAMINED:
Delta difference between 3/8 to 5/8 on the clad side is 3 dB	N2A, N2C,N2E Nozzle to Shell

EXAMINER:	EXAMINER:	REVIEWER:	ANII:
MIKE W. KLEINJAN	DAVID KLEINJAN		DATE: 4/19/02
LEVEL:II	LEVEL:II	LEVEL:III DATE:4/4/02	PG.: ~~18~~ OF 16

4/17/10/02

TENNESSEE VALLEY AUTHORITY	DIGITAL ULTRASONIC CALIBRATION DATA SHEET	REPORT NUMBER: R162

PROJECT: BFN UNIT: 3 CYCLE: 10	CALIBRATION DATE: 4-1-02
PROC.: N-UT- 9 REV:9 TC:02-06	CALIBRATION BLOCK NO.: BF18 TEMP: 72.6°F
INSTR. MFG: Staveley DUE DATE: 8-05-02	SIMULATOR BLOCK NO: DB55079
MODEL/TYPE: Sonic 136 M & TE NO.: VH751	THERMOMTER S/N: 522352 DUE DATE: 5-17-02
TRANSDUCER MFG: Krauntkramer	COUPLANT SONOTRACE BATCH: 01141
S/N DB34154 SIZE: .5x1 FREQ: 2.25 MHz	EXAM TYPE: SHEAR☒ LONG☐ RL☐
CABLE TYPE: RG174 LENGTH: 120 inches	ANGLE VERIFICATION
	BLOCK TYPE: IIW S/N: DB55074
DAC	NOMINAL ANGLE: 60 ACTUAL ANGLE: 59



DISPLAY WIDTH: 10 inches

INSTRUMENT SETTINGS

REFLECTOR SCAN DIRECT.	NTCH	SDH	REFERENCE SENSITIVITY	MEMORY NUMBER
AXIAL	☐	☒	52 dB	3
CIRC	☐	☐	n/a dB	n/a

FREQ: 2.25 MHz	REJECT: off %
ANGLE: N/A deg	DAMPING: 500 ohms
DELAY: 1.20 msec	PULSER: 222
ZERO: N/A msec	FILTER: FITL 3
VELOCITY: .123 msec	REP RATE: 2KHZ
RANGE: 20 inches	TOF: ☒PEAK ☐ FLANK
DISPLAY MODE: PE	POWER: AC
DUAL: ☐ ON ☒ OFF	TCG: ☐ ON ☒ OFF

REF. REFLECTOR: 1" GAIN: 36 dB	CALIBRATION TIMES
AMPLITUDE: 80 % METAL PATH: 1"	INITIAL TIME: 13:30 FINAL TIME: 18:00

VERIFICATION TIMES	1) n/a	2)n/a	3)n/a	4)n/a	5)n/a	6)n/a	7)n/a	8)n/a	9)n/a

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	-12 dB	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:	WELDS/ITEMS EXAMINED:
DELTA dB DIFFERENCE IS 4.4 FROM THE 3/8 TO 5/8 ON THE	N2A, N2C, N2E Nozzle to Shell
CLAD SIDE	

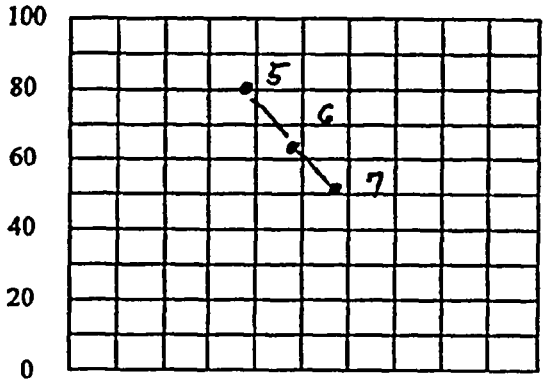
EXAMINER:	EXAMINER:	REVIEWER:	ANII:
MIKE W. KLEINJAN	DAVID KLEINJAN		DATE: 4/19/02
LEVEL: II	LEVEL: II	LEVEL: ~~II~~ DATE: 4/4/02	PG.: ~~14~~ 5 OF 15

4/19/02

00063

TENNESSEE VALLEY AUTHORITY	DIGITAL ULTRASONIC CALIBRATION DATA SHEET	REPORT NUMBER: R162

PROJECT: BFN UNIT: 3 CYCLE: 10	CALIBRATION DATE: 04-01-02
PROC.: N-UT- . 55 REV:9 ~~TC:N/A~~	CALIBRATION BLOCK NO.: BF-85-IR TEMP: 68.1° F
INSTR. MFG: STAVELEY DUE DATE: 08-11-02	SIMULATOR BLOCK NO: N/A
MODEL/TYPE: SONIC-137 M & TE NO.: VH-5473	THERMOMTER S/N: 522352 DUE DATE: 05-17-02
TRANSDUCER MFG: KRAUTKRAMER	COUPLANT SONOTRACE BATCH: 01141
S/N DB 35163 SIZE: 1.0" FREQ: 2.25 MHz	EXAM TYPE: SHEAR☐ LONG☐ RL☒
CABLE TYPE: RG 174 LENGTH: 120 inches	ANGLE VERIFICATION
	BLOCK TYPE: CS IIW / S/N: DB 55074
DAC	NOMINAL ANGLE: 19° / ACTUAL ANGLE: N/A



DISPLAY WIDTH: 20 inches

INSTRUMENT SETTINGS

REFLECTOR SCAN DIRECT.	NTCH	SDH	REFERENCE SENSITIVITY	MEMORY NUMBER
AXIAL	☒	☐	57.2 dB	19
CIRC	☐	☐	N/A dB	N/A

FREQ: 2.25 MHz	REJECT: OFF %
ANGLE: N/A deg	DAMPING: 200 ohms
DELAY: 0.996 msec	PULSER: 222
ZERO: N/A msec	FILTER: FILT 1
VELOCITY: 0.234 msec	REP RATE: 4 KHZ
RANGE: 20.0 inches	TOF: ☐PEAK ☒ FLANK
DISPLAY MODE: PE	POWER: AC
DUAL: ☐ ON ☒ OFF	TCG: ☐ ON ☒ OFF

REF. REFLECTOR: N/A	GAIN: N/A dB
AMPLITUDE: N/A %	METAL PATH: N/A"

CALIBRATION TIMES

INITIAL TIME: 1245 FINAL TIME: 1807

VERIFICATION TIMES	1)N/A	2)N/A	3)N/A	4)N/A	5)N/A	6)N/A	7)N/A	8)N/A	9)N/A

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	-12 dB	SET	+12	SET	+6			
	AMP	80%	32 TO 48	16 TO 24	20 %	64 TO 96	40%	64 TO 96			
			40	20		80		80			

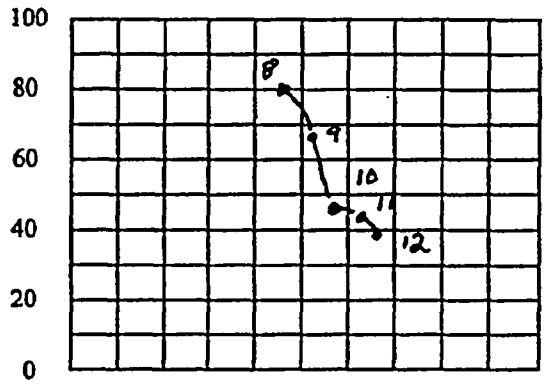
COMMENTS:	WELDS/ITEMS EXAMINED:
	REACTOR PRESSURE VESSEL
	N2A-IR, N2C-IR, N2E-IR
	Wedge ID D-14795-144

EXAMINER:	EXAMINER:	REVIEWER:	ANII:
DAVID KLEINJAN	MIKE KLEINJAN		DATE: 4/19/02
LEVEL: II	LEVEL: II	LEVEL: III DATE: 4/4/02	PG.: 1 OF 15

G J 4/19/02

TENNESSEE VALLEY AUTHORITY	DIGITAL ULTRASONIC CALIBRATION DATA SHEET	REPORT NUMBER: R162

PROJECT: BFN UNIT: 3 CYCLE: 10	CALIBRATION DATE: 04-01-02
PROC.: N-UT- 55 REV:9 ~~TC:N/A~~	CALIBRATION BLOCK NO.: BF-85-IR TEMP: 68.1° F
INSTR. MFG: STAVELEY DUE DATE: 08-11-02	SIMULATOR BLOCK NO: N/A
MODEL/TYPE: SONIC-137 M & TE NO.: VH-5473	THERMOMTER S/N: 522352 DUE DATE: 05-17-02
TRANSDUCER MFG: KRAUTKRAMER	COUPLANT SONOTRACE BATCH: 01141
S/N DB 35164 SIZE: 1.0" FREQ: 2.25 MHz	EXAM TYPE: SHEAR☐ LONG☐ RL☒
CABLE TYPE: RG 174 LENGTH: 120 inches	ANGLE VERIFICATION
	BLOCK TYPE: CS IIW / S/N: DB 55074
DAC	NOMINAL ANGLE: 25° / ACTUAL ANGLE: N/A



DISPLAY WIDTH: 20 inches

INSTRUMENT SETTINGS

REFLECTOR SCAN DIRECT.	NTCH	SDH	REFERENCE SENSITIVITY	MEMORY NUMBER
AXIAL	☒	☐	60.0 dB	25
CIRC	☐	☐	N/A dB	N/A

FREQ: 2.25 MHz	REJECT: OFF %
ANGLE: N/A deg	DAMPING: 200 ohms
DELAY: 1.12 msec	PULSER: 222
ZERO: N/A msec	FILTER: FILT 1
VELOCITY: 0.234 msec	REP RATE: 4 KHZ
RANGE: 20.0 inches	TOF: ☐PEAK ☒ FLANK
DISPLAY MODE: PE	POWER: AC
DUAL: ☐ ON ☒ OFF	TCG: ☐ ON ☒ OFF

REF. REFLECTOR: N/A GAIN: N/A dB	CALIBRATION TIMES
AMPLITUDE: N/A % METAL PATH: N/A"	INITIAL TIME: 1355 FINAL TIME: 1805

VERIFICATION TIMES	1)N/A	2)N/A	3)N/A	4)N/A	5)N/A	6)N/A	7)N/A	8)N/A	9)N/A

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	-12 dB	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:	WELDS/ITEMS EXAMINED:
	REACTOR PRESSURE VESSEL
	N2A-IR, N2C-IR, N2E-IR
	Wedge TO D-14795-147

EXAMINER:	EXAMINER:	REVIEWER:	ANI:
DAVID KLEINJAN	MIKE KLEINJAN		DATE: 4/19/02
LEVEL: II	LEVEL: II	LEVEL: III DATE: 4/19/02	PG.: ~~16~~ 7 OF 15

4/10/02

TVA	MANUAL ULTRASONIC VESSEL EXAMINATION DATA SHEET	REPORT NO. R162

PROJECT: BFN UNIT: 3 WELD ID: N2E CONFIG.: Nozzle COMPONENT: VESSEL

CAL. SHT. NO.: NA PROCEDURE: NT-UT-9 REV.: 9 PCR.: ~~N/A~~ 02-06 TEMP.: 85 PYRO.: 522352

4/1/02 4/10/02

SCAN SENS.: X dB EXAM START: 1630 EXAM END: 1745 EXAM ANGLE: 0°, 45°, 60°

Lo LOCATION: TDC Wo LOCATION: ℄ OF WELD

IND NO.	20%			50%			100%			MAX. AMP.			20%			50%			100%		
	Mp1	W1	L1	Mp1 X	W1	L1	Mp1	W1	L1	Mp	W	L	Mp2	W2	L2	Mp2	W2	L2	Mp2	W2	L2
19°	SCAN.		dB	63.2		SCANNING	#		10/11	BLEND RADIUS											
25°	SCAN		dB	66.		SCANNING	#		10/11	BLEND RADIUS											
0°	SCAN		dB	34.8		SCANNING	#		9	ON WELD AND BASE MATERIAL											
45°	SCAN		dB	56.6		SCANNING	#		9	ON WELD AND VESSEL SIDE											
45T	SCAN		dB	56.6		SCANNING	#		10/11	CW/CCW VESSEL SIDE											
45TAN	SCAN		dB	56.6		SCANNING	#		10/11	CW/CCW VESSEL SIDE											
60°	SCAN		dB	63.		SCANNING	#		9	ON weld AND VESSEL SIDE											
60T	SCAN		dB	63.		SCANNING	#		10/11	CW/CCW VESSEL SIDE											
60TAN	SCAN		dB	63.		SCANNING	#		10/11	CW/CCW VESSEL SIDE											
				NO RECORDABLE INDICATION																	

COMMENTS: 19° AND 25° EXAMINATIONS ARE THE BLEND RADIUS EXAMINATIONS TRANSVERSE EXAMINATION COVERAGE WILL INCLUDE COVERAGE OBTAINED DURING THE INNER RADIUS EXAMINATIONS. 5 TO 10% NOISE LEVEL WAS OBSERVED

EXAMINER: [signature] LEVEL: II DATE: 4-4-02 REVIEWED BY: [signature] LEVEL: III DATE: 4/4/02

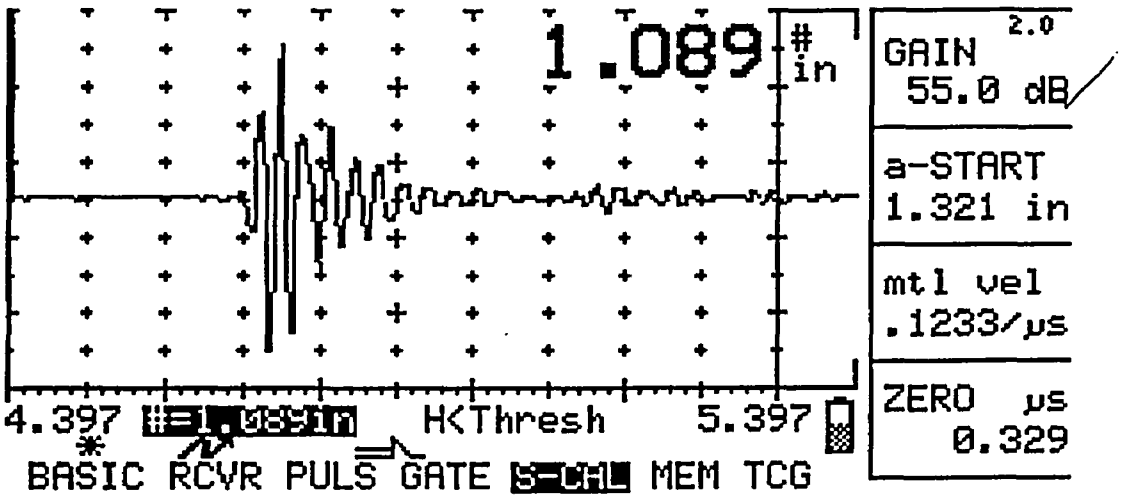
EXAMINER: [signature] LEVEL: II DATE: 04-04-02 ANII: [signature] DATE: 4/9/02 4/10/02 PAGE 28 OF 15

00065

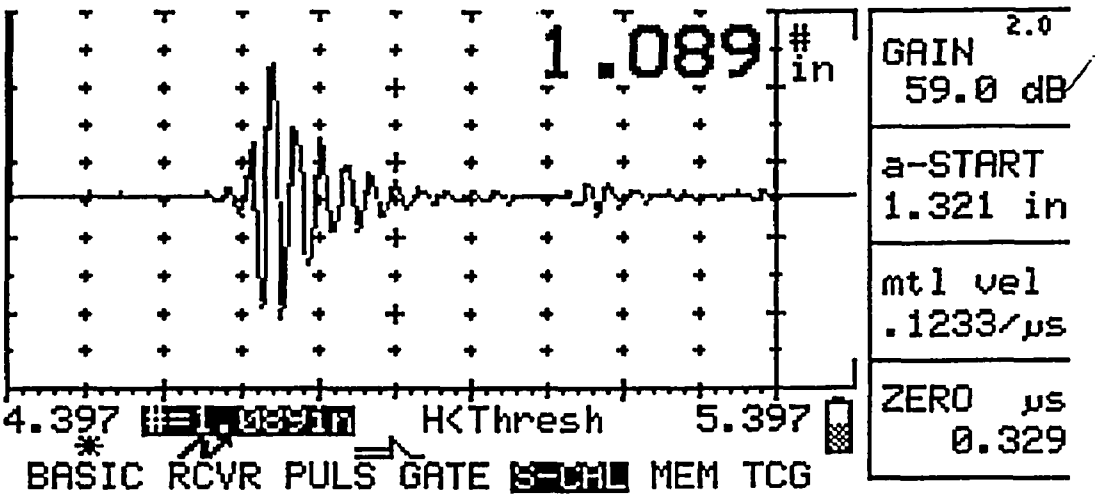
REPORT NUMBER
R162

00066

Nozzle Examination 45 °Waveforms



45° Pre Waveform



45° Post Waveform

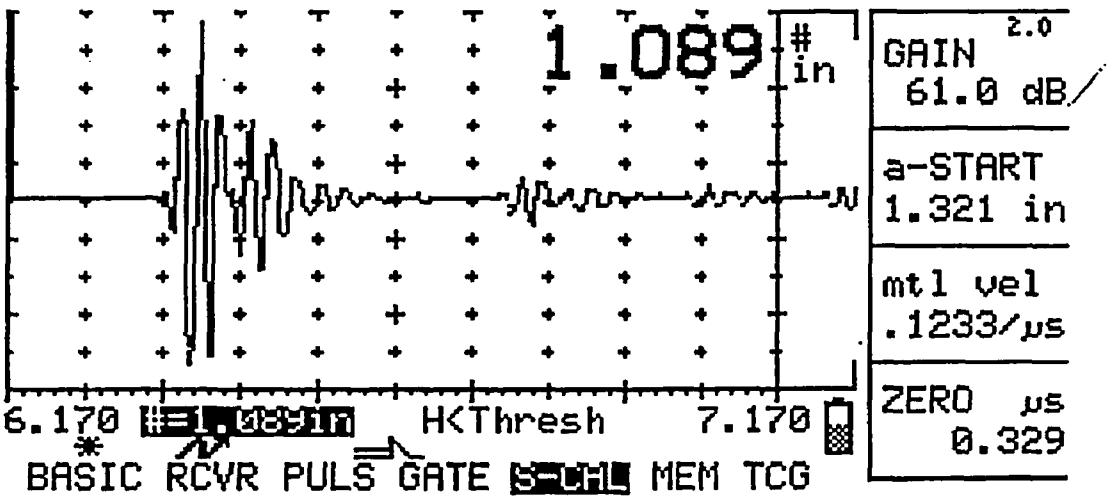
HSBCT
4/19/02

9 5/4/02
10 08 15

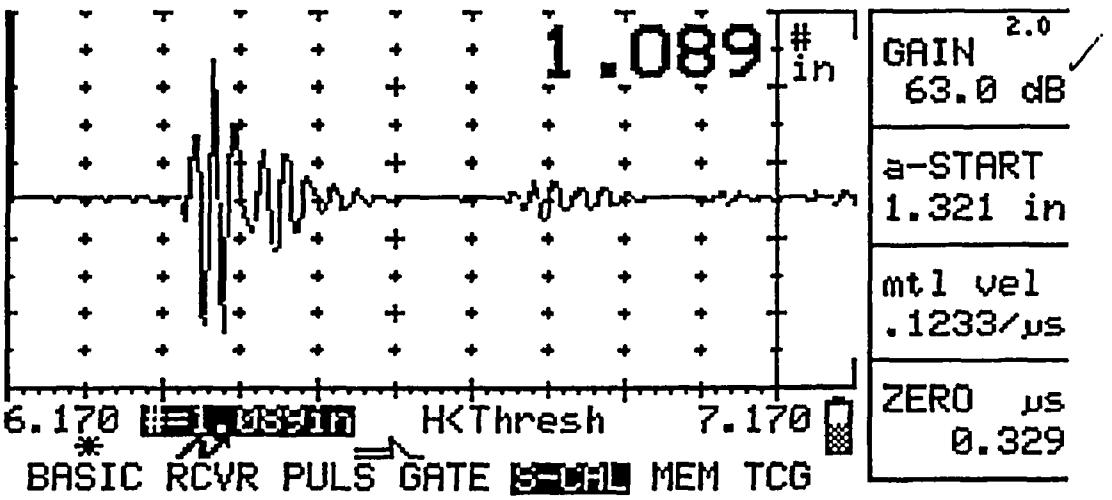
REPORT NUMBER
R162

00067

Nozzle Examination 60 ° Waveforms



60° Pre Waveform



60° Post Waveform

HSBCT 4/19/02

10 of 15
4/19/02

TVA	BEAM SPREAD AND RESOLUTION DATA SHEET	REPORT NO. R162

PROJECT: BFN UNIT: 3 CALIBRATION BLOCK NO.: BF 18

PROCEDURE NO.: N-UT-9 REV.: 9 PCR: ~~[illegible]~~ 02-04 4/3/02

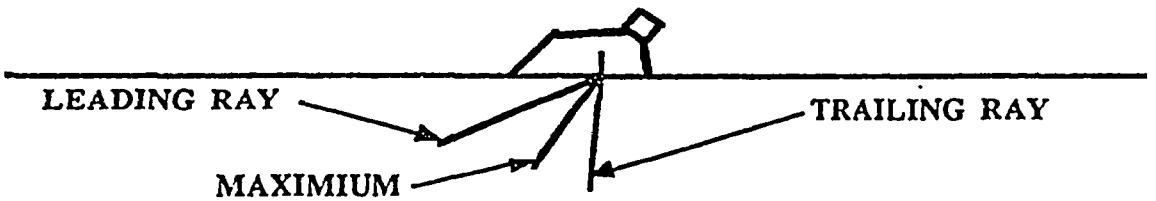
SEARCH UNIT-MAKE: Krautkramer SIZE: .5X1 FREQ.: 2.25

S/N: DB 34843 ANGLE: 45

ULTRASONIC INSTRUMENT-MAKE: Sonic 135 S/N: VH 751

BEAM SPREAD

HOLE DEPTH	TRAILING RAY 20% DAC W	TRAILING RAY 20% DAC MP	TRAILING RAY 50% DAC W	TRAILING RAY 50% DAC MP	100% DAC MP	100% DAC W	LEADING RAY 20% DAC MP	LEADING RAY 20% DAC W	LEADING RAY 50% DAC W	LEADING RAY 50% DAC MP
1/4T	1 1/8	1.9	1 1/4	2.	2.1	1 5/8	2.4	2	1 7/8	2.3
2T	2 7/8	4	3	4.1	4.3	3 1/4	4.8	4 1/8	3 3/4	4.6
3/4T	4 1/4	6	4 1/2	6.3	6.5	4 7/8	7	5 7/8	5 1/4	6.8



RESOLUTION

NEAR SURFACE
REFLECTOR: Notch OD DEPTH: 25 SIZE: .253 CAL BLK.: BF 18

FAR SURFACE
REFLECTOR: Notch ID DEPTH: 6.1 SIZE: .253

SCANNING
REFLECTORS PROVIDE 50% DAC SIGNALS AT SCANNING SPEED Y ☒ N ☐

EXAMINER: [signature]	REVIEWED BY: [signature]	ANII: [signature]
LEVEL: II DATE: 3-30-02	LEVEL: III DATE: 4/4/02	DATE: 4/19/02
		PAGE: 11 OF 15

J— 4/10/02

TVA	BEAM SPREAD AND RESOLUTION DATA SHEET	REPORT NO. R162

PROJECT: BFN UNIT: 3 CALIBRATION BLOCK NO.: BF 18

PROCEDURE NO.: N-UT-9 REV.: 9 PCR: 0206 [illegible] 3-30-02

SEARCH UNIT-MAKE: Krautkramer SIZE: .5X1 FREQ.: 2.25

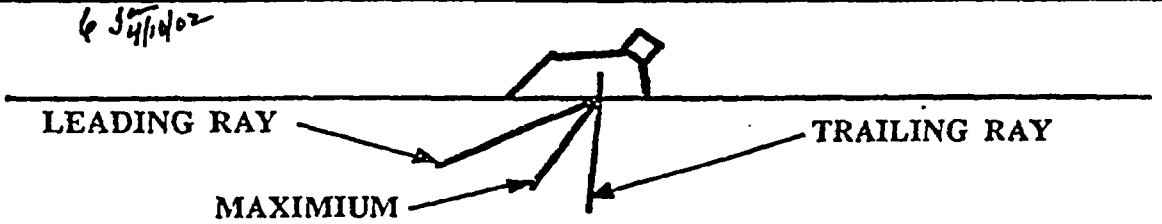
S/N: DB 34154 ANGLE: 60

ULTRASONIC INSTRUMENT-MAKE: Sonic 136 S/N: VH 751

BEAM SPREAD

	TRAILING RAY						LEADING RAY			
HOLE	20% DAC		50% DAC		100% DAC		20% DAC		50% DAC	
DEPTH	W	MP	W	MP	MP	W	MP	W	W	MP
1/4T	2 1/8	2.4	2 3/8	2.7	2.9	2 5/8	3.2	3 1/8	2 7/8	3.1
1/2T	4 3/4	4.8	5	5.3	5.8	5 1/4	6.4	6 5/8	6	6.1
3/4T	~~6 7/8~~ ~~8~~ 3/8	7.6	7 1/4	8	8.7	7 7/8	9.6	8 5/8	8	8.1

6 [illegible] 4/10/02



RESOLUTION

NEAR SURFACE REFLECTOR: Notch OD DEPTH: .25 SIZE: .253 CAL BLK.: BF 18

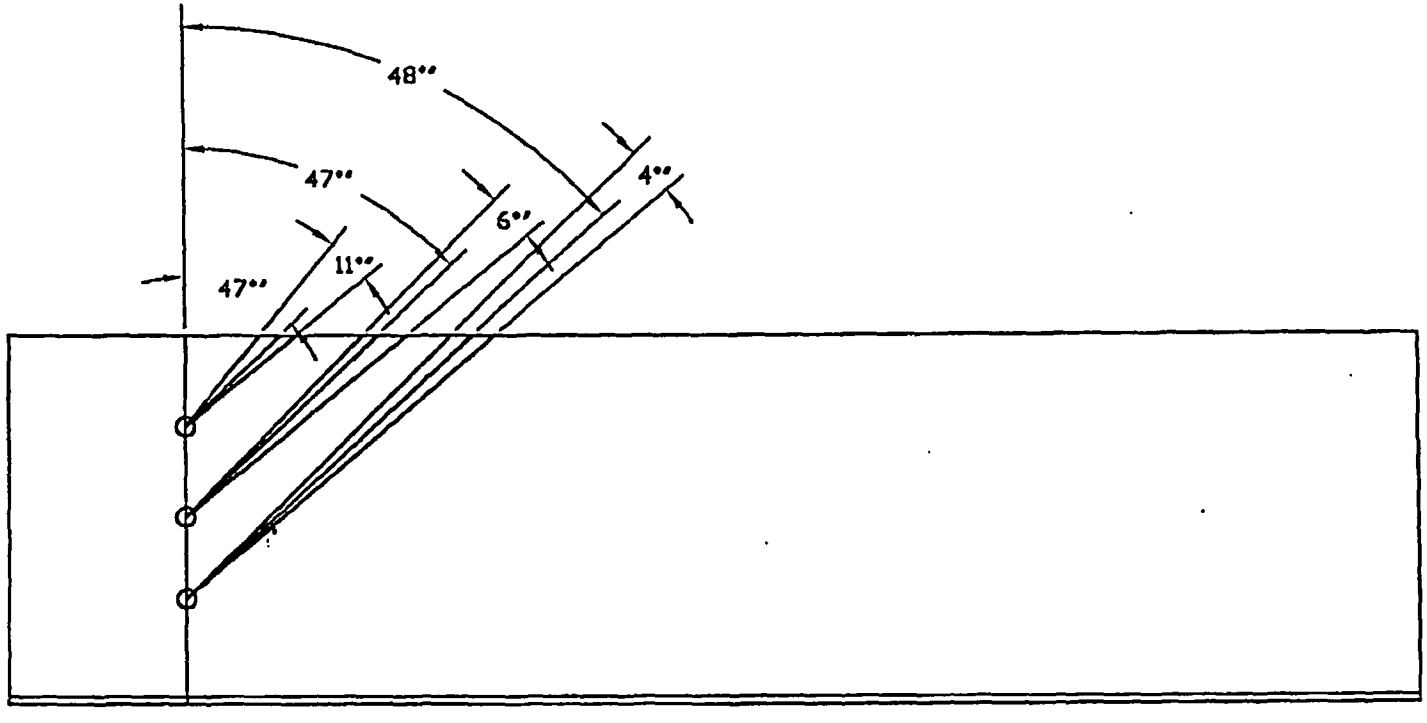
FAR SURFACE REFLECTOR: Notch ID DEPTH: 6.1 SIZE: .253

SCANNING REFLECTORS PROVIDE 50% DAC SIGNALS AT SCANNING SPEED Y ☒ N ☐

EXAMINER: Mike W Kleny Jr	REVIEWED BY: [illegible]	ANII: [illegible]
		DATE: 4/19/02
LEVEL: II DATE: 3-30-02	LEVEL: III DATE: 4/4/02	PAGE: ~~13~~ 12 OF 15

[illegible] 4/10/02

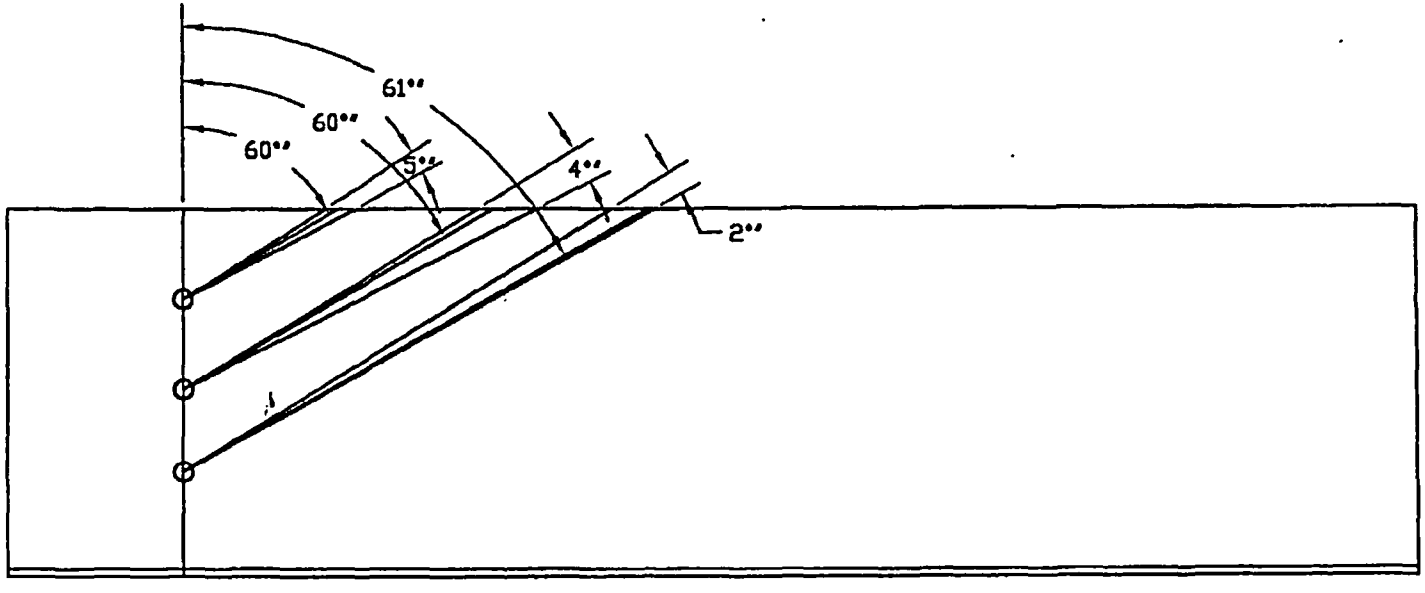
REPORT NUMBER R162 00070



HSBC A-1 4/19/02

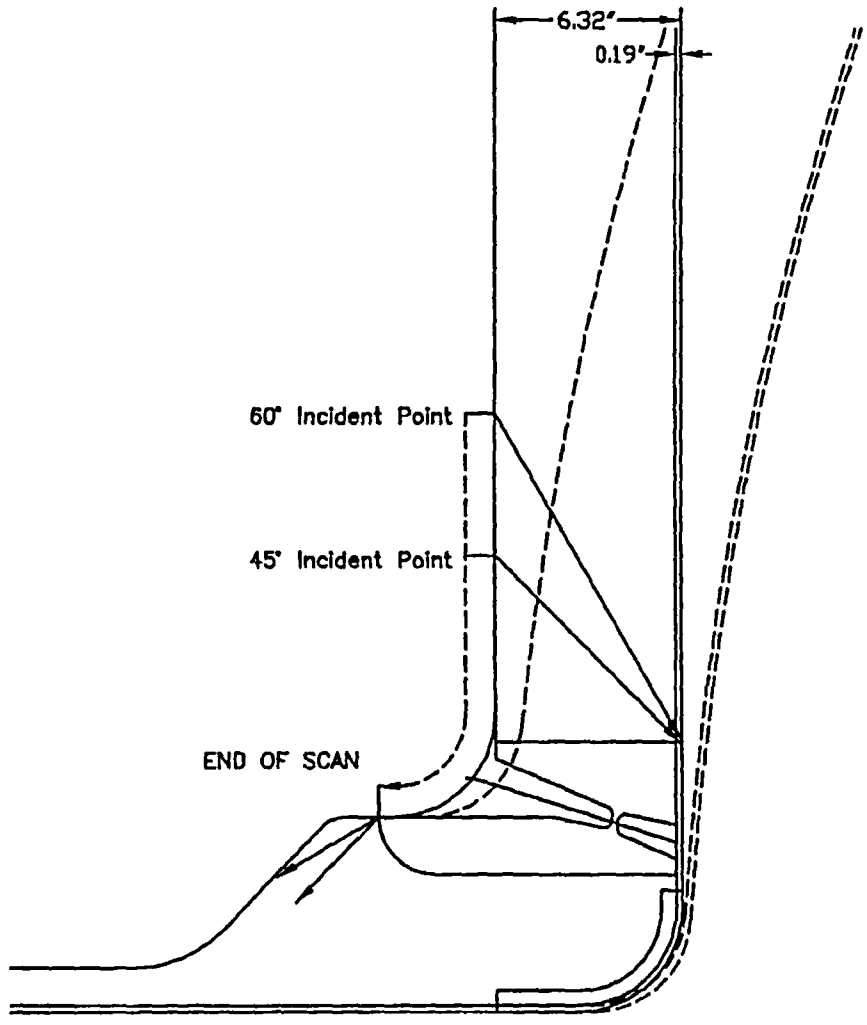
Browns Ferry Unit 3
Beamspread
MARCH 2002
BF-18

REPORT NUMBER
R162
00071



HSBCF
4/14/03

Browns Ferry Unit 3
Beamspread
MARCH 2002
BF-18



Transverse coverage includes coverage obtained during the inner radious examination

15 of 15

REPORT NUMBER R162

00072

HSBGT 4/19/02

Browns Ferry Unit 3
N2 Nozzle-to-Shell
MARCH 2002
SP-N2-NS

TENNESSEE VALLEY AUTHORITY	EXAMINATION SUMMARY AND RESOLUTION SHEET	REPORT NUMBER: R163

PROJECT: BFN	UNIT: 3	CYCLE: 10		COMPONENT ID: N2E-IR	
EXAMINATION METHOD				SYSTEM RPV	ISI DWG. NO. 3-ISI-0328-C
MT ☐	PT ☐	UT ☒	VT ☐	CODE CLASS: 1	CATEGORY: B-D
PROCEDURE: N-UT-55	REV:9	TC:N/A		COFIG.: Nozzle TO Vessel	
EXAMINER: MIKE KLEINJAN LEVEL: II	EXAMINER: DAVID KLEINJAN LEVEL:II	EXAMINER: N/A LEVEL: N/A		EXAMINER: N/A LEVEL: N/A	

This report contains the data associated with the manual ultrasonic examination of code category B-D, Nozzle Inner radius. This examination report satisfies ASME section XI requirements for the inner radius examination.

N2E-IR: This examination was performed using a 19° and 25° in the blend radius in two directions CW/CCW

100% code coverage was obtained

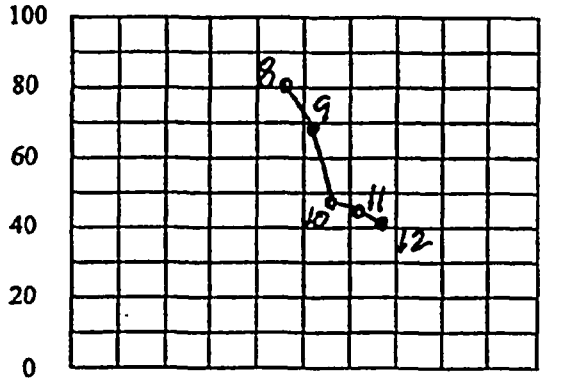
This exam was performed with equipment, Procedures, and personnel qualified in accordance with ASME Section XI

No Recordable Indication

RESOLUTION BY:	REVIEWED BY:	ANII:
Mike Kleinjan		DATE: 4/19/02
LEVEL: II DATE: 4-4-02	LEVEL: III DATE: 4/4/02	PG. 1 OF 4

TENNESSEE VALLEY AUTHORITY	DIGITAL ULTRASONIC CALIBRATION DATA SHEET	REPORT NUMBER: R163

PROJECT: BFN UNIT: 3 CYCLE: 10	CALIBRATION DATE: 04-01-02
PROC.: N-UT- 55 REV:9 ~~TC:N/A~~	CALIBRATION BLOCK NO.: BF-85-IR TEMP: 68.1° F
INSTR. MFG: STAVELEY DUE DATE: 08-11-02	SIMULATOR BLOCK NO: N/A
MODEL/TYPE: SONIC-137 M & TE NO.: VH-5473	THERMOMTER S/N: 522352 DUE DATE: 05-17-02
TRANSDUCER MFG: KRAUTKRAMER	COUPLANT SONOTRACE BATCH: 01141
S/N DB 35164 SIZE: 1.0" FREQ: 2.25 MHz	EXAM TYPE: SHEAR☐ LONG☐ RL☒
CABLE TYPE: RG 174 LENGTH: 120 inches	ANGLE VERIFICATION
	BLOCK TYPE: CS IIW / S/N: DB 55074
DAC	NOMINAL ANGLE: 25° / ACTUAL ANGLE: N/A



DISPLAY WIDTH: 20 inches

INSTRUMENT SETTINGS

REFLECTOR SCAN DIRECT.	NTCH	SDH	REFERENCE SENSITIVITY	MEMORY NUMBER
AXIAL	☒	☐	60.0 dB	25
CIRC	☐	☐	N/A dB	N/A

FREQ: 2.25 MHz	REJECT: OFF %
ANGLE: N/A deg	DAMPING: 200 ohms
DELAY: 1.12 msec	PULSER: 222
ZERO: N/A msec	FILTER: FILT 1
VELOCITY: 0.234 msec	REP RATE: 4 KHZ
RANGE: 20.0 inches	TOF: ☐PEAK ☒ FLANK
DISPLAY MODE: PE	POWER: AC
DUAL: ☐ ON ☒ OFF	TCG: ☐ ON ☒ OFF

REF. REFLECTOR: N/A	GAIN: N/A dB
AMPLITUDE: N/A %	METAL PATH: N/A"

CALIBRATION TIMES

INITIAL TIME: 1355	FINAL TIME: 1805

VERIFICATION TIMES	1)N/A	2)N/A	3)N/A	4)N/A	5)N/A	6)N/A	7)N/A	8)N/A	9)N/A

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	-12 dB	SET	+12	SET	+6
	AMP	80%	32 TO 48	16 TO 24	20 %	64 TO 96	40%	64 TO 96
			40	20		80		80

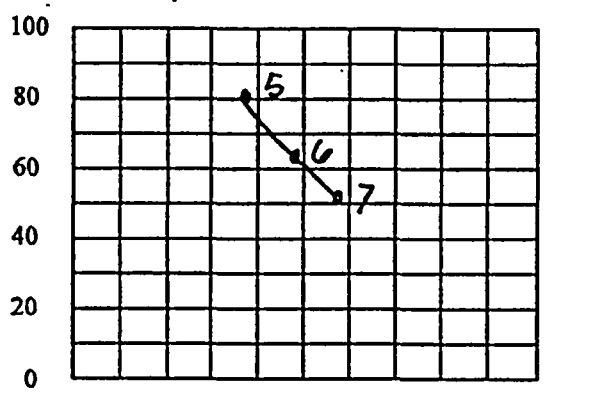
COMMENTS:	WELDS/ITEMS EXAMINED:
Wedge ID D-14795-147	REACTOR PRESSURE VESSEL
	N2A-IR, N2C-IR, N2E-IR

EXAMINER:	EXAMINER:	REVIEWER:	ANII:
DAVID KLEINJAN	MIKE KLEINJAN		DATE:
LEVEL: II	LEVEL: II	LEVEL: III DATE: 4/4/02	PG.: ~~1 2 OF 1 1~~ 2 OF 4

4/10/02

TENNESSEE VALLEY AUTHORITY	DIGITAL ULTRASONIC CALIBRATION DATA SHEET	REPORT NUMBER: R163

PROJECT: BFN UNIT: 3 CYCLE: 10	CALIBRATION DATE: 04-01-02
~~PROC.:~~ N-UT- 55 REV:9 ~~TC:N/A~~	CALIBRATION BLOCK NO.: BF-85-IR TEMP: 68.1° F
INSTR. MFG: STAVELEY DUE DATE: 08-11-02	SIMULATOR BLOCK NO: N/A
MODEL/TYPE: SONIC-137 M & TE NO.: VH-5473	THERMOMTER S/N: 522352 DUE DATE: 05-17-02
TRANSDUCER MFG: KRAUTKRAMER	COUPLANT SONOTRACE BATCH: 01141
S/N ~~DB~~ 35163 SIZE: 1.0" FREQ: 2.25 MHz	EXAM TYPE: SHEAR☐ LONG☐ RL☒
CABLE TYPE: ~~RG174~~ 174 LENGTH: 120 inches	ANGLE VERIFICATION
Jan 4/10/02	BLOCK TYPE: CS IIW S/N: DB 55074
DAC	NOMINAL ANGLE: 19° ACTUAL ANGLE: N/A



DISPLAY WIDTH: 20 inches

INSTRUMENT SETTINGS

REFLECTOR SCAN DIRECT.	NTCH	SDH	REFERENCE SENSITIVITY	MEMORY NUMBER
AXIAL	☒	☐	57.2 dB	19
CIRC	☐	☐	N/A dB	N/A

FREQ: 2.25 MHz	REJECT: OFF %
ANGLE: N/A deg	DAMPING: 200 ohms
DELAY: 0.996 msec	PULSER: 222
ZERO: N/A msec	FILTER: FILT 1
VELOCITY: 0.234 msec	REP RATE: 4 KHZ
RANGE: 20.0 inches	TOF: ☐PEAK ☒ FLANK
DISPLAY MODE: PE	POWER: AC
DUAL: ☐ ON ☒ OFF	TCG: ☐ ON ☒ OFF

REF. REFLECTOR: N/A	GAIN: N/A dB
AMPLITUDE: N/A %	METAL PATH: N/A"

CALIBRATION TIMES

INITIAL TIME: 1245 FINAL TIME: 1807

VERIFICATION TIMES	1)N/A	2)N/A	3)N/A	4)N/A	5)N/A	6)N/A	7)N/A	8)N/A	9)N/A

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	-12 dB	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:	WELDS/ITEMS EXAMINED:
Wedge ID D-14795-144	REACTOR PRESSURE VESSEL
	N2A-IR, N2C-IR, N2E-IR

EXAMINER:	EXAMINER:	REVIEWER:	ANII:
DAVID KLEINJAN	MIKE KLEINJAN		DATE: 4/14/02
LEVEL: II	LEVEL: II	LEVEL: III DATE: 4/14/02	PG.: ~~1 OF 1~~ ~~4~~ 3 OF 4

Jan 4/10/02

TVA	MANUAL ULTRASONIC VESSEL EXAMINATION DATA SHEET	REPORT NO. R163

PROJECT: BFN UNIT: 3 WELD ID: N2E CONFIG.: INNER RADIUS COMPONENT: — N/A

CAL. SHT. NO.: NA PROCEDURE: N-UT-55 REV.: 9 PCR.: ~~02-08~~ N/A 03-08 TEMP.: 85 PYRO.: 52235

SCAN SENS.: * dB EXAM START: 1630 EXAM END: 1745 EXAM ANGLE: 19, 25°

Lo LOCATION: TDC Wo LOCATION: ℄ of WELD

IND NO.	20%			50%			100%			MAX. AMP.			20%			50%			100%		
	Mp1	W1	L1	Mp1	W1	L1	Mp1	W1	L1	Mp	W	L	Mp2	W2	L2	Mp2	W2	L2	Mp2	W2	L2
19	SCAN		dB	* 63.2			SCANNING		#	10/11			BLEND	RADIUS							
25	SCAN		dB	66			SCANNING		#	10/11			BLEND	RADIUS							
		No		Recordable				Indication													

COMMENTS: A MATERIAL NOISE LEVEL OF 5-10% WAS OBSERVED

EXAMINER: [signature] LEVEL: II DATE: 04-01-02 REVIEWED BY: [signature] LEVEL: III DATE: 4/4/02

EXAMINER: [signature] LEVEL: II DATE: 4-4-02 ANII: [signature] DATE: 4/19/02 PAGE 4 OF 4

TVA 40094 (NP-1-89) 1-108-999-48

Inspection Report R-164
Weld N3A-NV

TENNESSEE VALLEY AUTHORITY	EXAMINATION SUMMARY AND RESOLUTION SHEET	REPORT NUMBER: R164

PROJECT: BFN	UNIT: 3	CYCLE: 10		COMPONENT ID: N3A	
EXAMINATION METHOD				SYSTEM RPV	ISI DWG. NO. 3-ISI-0329-C
MT ☐	PT ☐	UT ☒	VT ☐	CODE CLASS: 1	CATEGORY: B-D
PROCEDURE: N_UT_9	REV:9	TC:02-06		COFIG.: Nozzle TO Vessel	
EXAMINER: MIKE KLEINJAN	EXAMINER: DAVID KLEINJAN			EXAMINER: N/A	EXAMINER: N/A
LEVEL: II	LEVEL: II			LEVEL: N/A	LEVEL: N/A

This report contains the data associated with the manual ultrasonic examination of code category B-D, Nozzle to Vessel welds. This examination report satisfies ASME section XI requirements for the Nozzle to shell weld..

Examination. Nozzle to Vessel weld N3A
Transverse coverage for the Nozzle to Vessel weld was supplemented by the inner radius examination.
(N3A-IR) see R 165

0° was used on the weld crown and base material Vessel side

45° was used on the vessel side only scanning over the weld crown
45° Tangent to the weld was used on vessel side CW/CCW
45° Parallel to the weld was used on vessel side CW/CCW

60° was used on the vessel side only scanning over the weld crown
60° Tangent to the weld was used on vessel side CW/CCW
60° Parallel to the weld was used on vessel side CW/CCW

77% code coverage was obtained

This exam was performed with equipment, Procedures, and personnel qualified in accordance with ASME Section XI

No Recordable Indication

RESOLUTION BY:	REVIEWED BY:	ANII:
Mike Kleinjan		DATE: 4/19/02
LEVEL: II DATE: 4-4-02	LEVEL: III DATE: 4/4/02	PG. 1 OF 16

REPORT NUMBER
R164

00078

Calculation of ASME code coverage
For section XI NDE Examination

N3A

1) O degree (weld metal scan)	100%
2) 45 degree Transverse-scan from vessel side of weld	100%
3) 45 degree Transverse-scan from nozzle side of weld	0%
4) 60 degree Transverse-scan from vessel side of weld	100%
5) 60 degree Transverse-scan from nozzle side of weld	0%
6) 45 degree Parallel-scan CW direction	100% *
7) 45 degree Parallel-scan CCW direction	100% *
8) 60 degree Parallel-scan CW direction	100% *
9) 60 degree Parallel-scan CCW direction	100% *
The sum of all the percentage of scans	700%
Divided by the total # of scans	9
Percentage of examination Volume coverage	77%

* Transverse coverage includes coverage obtained during the inner radius examination.

HSBCT
4/17/08
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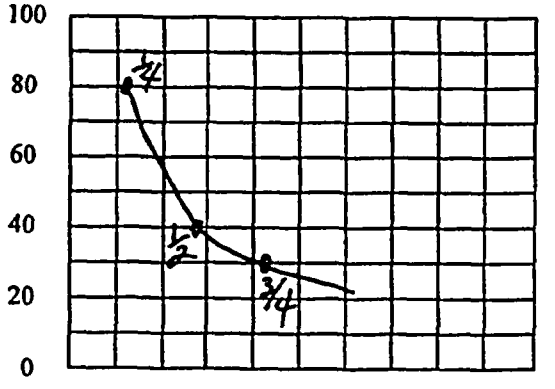
TENNESSEE VALLEY AUTHORITY	DIGITAL ULTRASONIC CALIBRATION DATA SHEET	REPORT NUMBER: R164

PROJECT: BFN UNIT: 3 CYCLE: 10	CALIBRATION DATE: 3-31-02
PROC.: N-UT- 9 REV:9 TC:02-06	CALIBRATION BLOCK NO.: BF18 TEMP: 72.6'F
INSTR. MFG: STAVELEY DUE DATE: 8-05-02	SIMULATOR BLOCK NO: DB55079
MODEL/TYPE: SONIC-136 M & TE NO.: VH751	THERMOMTER S/N: 522352 DUE DATE: 5-17-02
TRANSDUCER MFG: Harisonic	COUPLANT SONOTRACE BATCH: 01141
S/N DB34198 SIZE: .75 FREQ: 2.25 MHz	EXAM TYPE: SHEAR☐ LONG☒ RL☐
CABLE TYPE: RG174 LENGTH: 120 inches	ANGLE VERIFICATION
	BLOCK TYPE: ~~Rompas~~ RS-V2-EX Rompas S/N: DB55079
DAC	NOMINAL ANGLE: 0 ACTUAL ANGLE: N/A



DISPLAY WIDTH: 10 inches

INSTRUMENT SETTINGS

REFLECTOR SCAN DIRECT.	NTCH	SDH	REFERENCE SENSITIVITY	MEMORY NUMBER
AXIAL	☐	☒	20.8 dB	1
CIRC	☐	☐	n/a dB	n/a

FREQ: 2.25 MHz	REJECT: off %
ANGLE: n/a deg	DAMPING: 500 ohms
DELAY: .499 msec	PULSER: 222
ZERO: n/a msec	FILTER: Filt 3
VELOCITY: .238 msec	REP RATE: 2KHZ
RANGE: 10 inches	TOF: ☒PEAK ☐ FLANK
DISPLAY MODE: PE	POWER: AC
DUAL: ☐ ON ☒ OFF	TCG: ☐ ON ☒ OFF

REF. REFLECTOR: 1" GAIN: 8 dB	CALIBRATION TIMES
AMPLITUDE: 80 % METAL PATH: 1"	INITIAL TIME: 9:00 FINAL TIME: 11:45

VERIFICATION TIMES	1)	2) N/A	3) N/A	4) N/A	5) N/A	6) N/A	7) N/A	8) N/A	9) N/A

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	

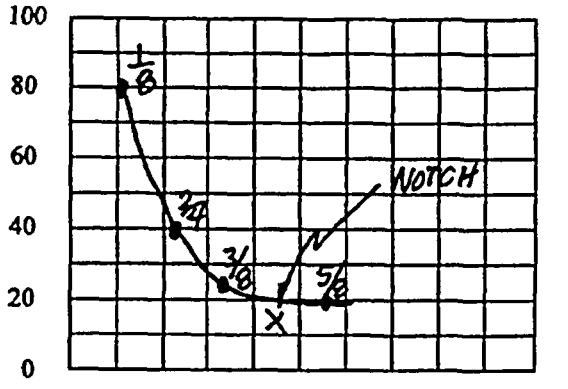
ATTENUATOR	GAIN	SET	-6 dB	-12 dB	SET	+12	SET	+6	
	AMP	80%	32 TO 48	16 TO 24	20 %	64 TO 96	40%	64 TO 96	
			40	20		80		80	

COMMENTS:	WELDS/ITEMS EXAMINED:
	N3A Nozzle to Shell

EXAMINER:	EXAMINER:	REVIEWER:	ANII:
MIKE W. KLEINJAN	DAVID KLEINJAN		DATE: 4/19/02
LEVEL: II	LEVEL: II	LEVEL: III DATE: 4/19/02	PG.: ~~4 OF 15~~ 3 OF 15

TENNESSEE VALLEY AUTHORITY	DIGITAL ULTRASONIC CALIBRATION DATA SHEET	REPORT NUMBER: R164

PROJECT: BFN UNIT: 3 CYCLE: 10	CALIBRATION DATE: ~~3-29-02~~ 3-31-02 JT 4/10/02
PROC.: N-UT- 9 REV:9 TC:02-06	CALIBRATION BLOCK NO.: BF18 TEMP: 72.6'F
INSTR. MFG: STAVELEY DUE DATE: 8-05-02	SIMULATOR BLOCK NO: DB55079
MODEL/TYPE: SONIC-136 M & TE NO.: VH751	THERMOMTER S/N: 522352 DUE DATE: 5-17-02
TRANSDUCER MFG: Krauntkramer	COUPLANT SONOTRACE BATCH: 01141
S/N DB34843 SIZE: .5x1 FREQ: 2.25 MHz	EXAM TYPE: SHEAR☒ LONG☐ RL☐
CABLE TYPE: RG1743 LENGTH: 120 inches	**ANGLE VERIFICATION**
	BLOCK TYPE: IIW / S/N: DB55074
DAC	NOMINAL ANGLE: 45° / ACTUAL ANGLE: 46°



DISPLAY WIDTH: 10 inches

INSTRUMENT SETTINGS

REFLECTOR SCAN DIRECT.	NTCH	SDH	REFERENCE SENSITIVITY	MEMORY NUMBER
AXIAL	☐	☒	42.6 dB	2
CIRC	☐	☐	n/a dB	n/a

FREQ: 2.25 MHz	REJECT: off %
ANGLE: N/A deg	DAMPING: 500 ohms
DELAY: .830 msec	PULSER: 222
ZERO: N/A msec	FILTER: FITL 3
VELOCITY: .126 msec	REP RATE: 2KHZ
RANGE: 20 inches	TOF: ☒PEAK ☐ FLANK
DISPLAY MODE: PE	POWER: AC
DUAL: ☐ ON ☒ OFF	TCG: ☐ ON ☒ OFF

REF. REFLECTOR: 1" GAIN: 33.6 dB	**CALIBRATION TIMES**
AMPLITUDE: 80 % METAL PATH: 1"	INITIAL TIME: 9:00 FINAL TIME: 11:45

VERIFICATION TIMES	1) N/A	2) N/A	3) N/A	4) N/A	5) N/A	6) N/A	7) N/A	8) N/A	9) N/A

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	

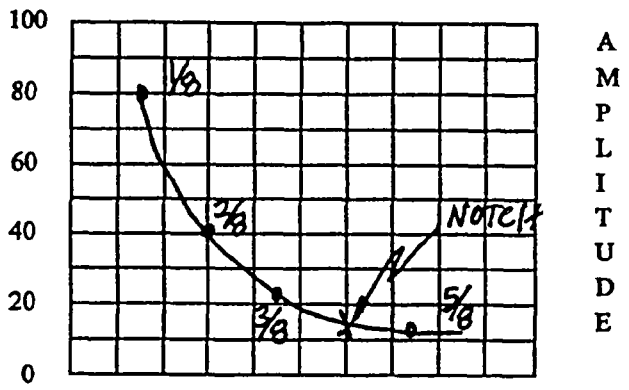
ATTENUATOR	GAIN	SET	-6 dB	-12 dB	SET	+12	SET	+6	
	AMP	80%	32 TO 48	16 TO 24	20 %	64 TO 96	40%	64 TO 96	
			40	20		80		80	

COMMENTS:	WELDS/ITEMS EXAMINED:
Delta difference between 3/8 to 5/8 on the clad side is 3 dB	N3A Nozzle to Shell

EXAMINER:	EXAMINER:	REVIEWER:	ANI:
MIKE W. KLEINJAN	DAVID KLEINJAN		DATE: 4/19/02
LEVEL:II	LEVEL:II	LEVEL: II DATE: 4/19/02	PG.: ~~1. 5 OF 1. 15~~ 4 OF 15 JT 4/10/02

TENNESSEE VALLEY AUTHORITY	DIGITAL ULTRASONIC CALIBRATION DATA SHEET	REPORT NUMBER: R164

PROJECT: BFN UNIT: 3 CYCLE: 10	CALIBRATION DATE: ~~3-29-02~~ 3-31-02
PROC.: N-UT- 9 REV:9 TC:02-06	CALIBRATION BLOCK NO.: BF18 TEMP: 72.6°F
INSTR. MFG: STAVELEY DUE DATE: 8-05-02	SIMULATOR BLOCK NO: DB55079
MODEL/TYPE: SONIC-136 M & TE NO.: VH751	THERMOMTER S/N: 522352 DUE DATE: 5-17-02
TRANSDUCER MFG: Krauntkramer	COUPLANT SONOTRACE BATCH: 01141
S/N DB34154 SIZE: .5x1 FREQ: 2.25 MHz	EXAM TYPE: SHEAR☒ LONG☐ RL☐
CABLE TYPE: RG174 LENGTH: 120 inches	**ANGLE VERIFICATION**
	BLOCK TYPE: IIW S/N: DB55074
DAC	NOMINAL ANGLE: 60 ACTUAL ANGLE: 59



DISPLAY WIDTH: 10 inches

INSTRUMENT SETTINGS

REFLECTOR SCAN DIRECT.	NTCH	SDH	REFERENCE SENSITIVITY	MEMORY NUMBER
AXIAL	☐	☒	49 dB	3
CIRC	☐	☐	n/a dB	n/a

FREQ: 2.25 MHz	REJECT: off %
ANGLE: N/A deg	DAMPING: 500 ohms
DELAY: 1.20 msec	PULSER: 222
ZERO: N/A msec	FILTER: FITL 3
VELOCITY: .123 msec	REP RATE: 2KHZ
RANGE: 20 inches	TOF: ☒PEAK ☐ FLANK
DISPLAY MODE: PE	POWER: AC
DUAL: ☐ ON ☒ OFF	TCG: ☐ ON ☒ OFF

REF. REFLECTOR: 1" GAIN: 36 dB	**CALIBRATION TIMES**
AMPLITUDE: 80 % METAL PATH: 1"	INITIAL TIME: 9:00 FINAL TIME: 11:45

VERIFICATION TIMES	1) N/A	2) N/A	3) N/A	4) N/A	5) N/A	6) N/A	7) N/A	8) N/A	9) N/A

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	-12 dB	SET	+12	SET	+6	
	AMP	80%	32 TO 48	16 TO 24	20 %	64 TO 96	40%	64 TO 96	
			40	20		80		80	

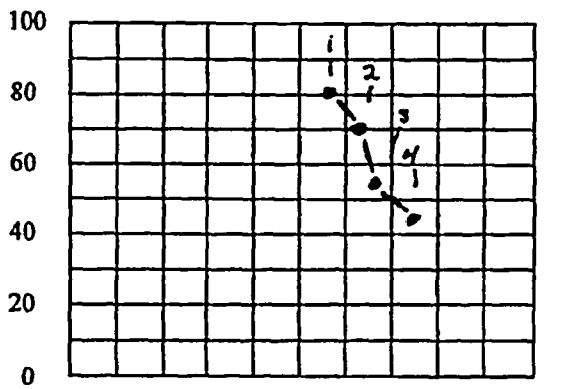
COMMENTS:	WELDS/ITEMS EXAMINED:
DELTA dB DIFFERENCE IS 4.4 FROM THE 3/8 TO 5/8 ON THE	N3A Nozzle to Shell
CLAD SIDE	

EXAMINER:	EXAMINER:	REVIEWER:	ANII:
MIKE W. KLEINJAN	DAVID KLEINJAN		DATE: 4/19/02
LEVEL: II	LEVEL: II	LEVEL: III DATE: 4/19/02	PG.: ~~1 OF 1~~ ~~1 OF 10~~ 5 OF 15 4/10/02

00082

TENNESSEE VALLEY AUTHORITY	DIGITAL ULTRASONIC CALIBRATION DATA SHEET	REPORT NUMBER: R164

PROJECT: BFN UNIT: 3 CYCLE: 10	CALIBRATION DATE: 03-31-02
PROC.: N-UT- 55 REV:9 ~~TC: N/A~~	CALIBRATION BLOCK NO.: BF-84-IR TEMP: 70.5° F
INSTR. MFG: STAVELEY DUE DATE: 08-11-02	SIMULATOR BLOCK NO: N/A
MODEL/TYPE: SONIC-137 M & TE NO.: VH-5473	THERMOMETER S/N: 522352 DUE DATE: 05-17-02
TRANSDUCER MFG: KRAUTKRAMER	COUPLANT SONOTRACE BATCH: 01141
S/N DB 35163 SIZE: 1.0" FREQ: 2.25 MHz	EXAM TYPE: SHEAR☐ LONG☐ RL☒
CABLE TYPE: RG 174 LENGTH: 120 inches	ANGLE VERIFICATION
	BLOCK TYPE: CS IIW S/N: DB 55074
DAC	NOMINAL ANGLE: 24 ACTUAL ANGLE: N/A



DISPLAY WIDTH: 20 inches

INSTRUMENT SETTINGS

REFLECTOR SCAN DIRECT.	NTCH	SDH	REFERENCE SENSITIVITY	MEMORY NUMBER
AXIAL	☒	☐	57.0 dB	24
CIRC	☐	☐	N/A dB	N/A

FREQ:	2.25	MHz	REJECT:	OFF	%
ANGLE:	N/A	deg	DAMPING:	200	ohms
DELAY:	0.999	msec	PULSER:	222	
ZERO:	N/A	msec	FILTER:	FILT	
VELOCITY:	0.233	msec	REP RATE:	4 KHZ	
RANGE:	20.0	inches	TOF:	☐PEAK	☒ FLANK
DISPLAY MODE: PE			POWER:	AC	
DUAL:	☐ ON	☒ OFF	TCG:	☐ ON	☒ OFF

REF. REFLECTOR: N/A	GAIN: N/A dB
AMPLITUDE: N/A %	METAL PATH: N/A"

CALIBRATION TIMES

INITIAL TIME: 0815 FINAL TIME: 1135

VERIFICATION TIMES	1)N/A	2)N/A	3)N/A	4)N/A	5)N/A	6)N/A	7)N/A	8)N/A	9)N/A

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	-12 dB	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:	WELDS/ITEMS EXAMINED:
	REACTOR PRESSURE VESSEL
	N3A-IR
	Wedge ID 0-14795-248

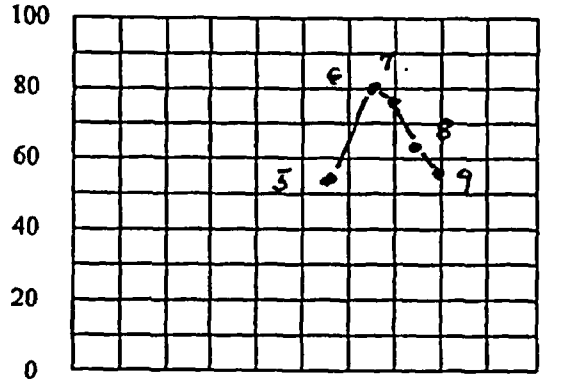
EXAMINER:	EXAMINER:	REVIEWER:	ANI:
DAVID KLEINJAN	MIKE KLEINJAN		DATE: 4/19/02
LEVEL: II	LEVEL: II	LEVEL: ~~III~~ DATE: 4/19/02	PG.: 7 OF 15

6 Jan 4/10/02

00083

TENNESSEE VALLEY AUTHORITY	DIGITAL ULTRASONIC CALIBRATION DATA SHEET	REPORT NUMBER: R164

PROJECT: BFN UNIT: 3 CYCLE: 10	CALIBRATION DATE: 03-31-02
PROC.: N-UT- 55 REV:9 ~~TC: N/A~~	CALIBRATION BLOCK NO.: BF-84-IR TEMP: 70.5° F
INSTR. MFG: STAVELEY DUE DATE: 08-11-02	SIMULATOR BLOCK NO: N/A
MODEL/TYPE: SONIC-137 M & TE NO.: VH-5473	THERMOMETER S/N: 522352 DUE DATE: 05-17-02
TRANSDUCER MFG: KRAUTKRAMER	COUPLANT SONOTRACE BATCH: 01141
S/N DB 35164 SIZE: 1.0" FREQ: 2.25 MHz	EXAM TYPE: SHEAR☐ LONG☐ RL☒
CABLE TYPE: RG 174 LENGTH: 120 inches	ANGLE VERIFICATION
	BLOCK TYPE: CS IIW S/N: DB 55074
DAC	NOMINAL ANGLE: 28 ACTUAL ANGLE: N/A



DISPLAY WIDTH: 20 inches

INSTRUMENT SETTINGS

REFLECTOR SCAN DIRECT.	NTCH	SDH	REFERENCE SENSITIVITY	MEMORY NUMBER
AXIAL	☒	☐	59.6 dB	28
CIRC	☐	☐	N/A dB	N/A

FREQ: 2.25 MHz	REJECT: OFF %
ANGLE: N/A deg	DAMPING: 200 ohms
DELAY: 1.39 msec	PULSER: 222
ZERO: N/A msec	FILTER: FILT 1
VELOCITY: 0.236 msec	REP RATE: 4 KHZ
RANGE: 20.0 inches	TOF: ☐PEAK ☒ FLANK
DISPLAY MODE: PE	POWER: AC
DUAL: ☐ ON ☒ OFF	TCG: ☐ ON ☒ OFF

REF. REFLECTOR: N/A	GAIN: N/A dB
AMPLITUDE: N/A %	METAL PATH: N/A"

CALIBRATION TIMES

INITIAL TIME: 0900 FINAL TIME: 1136

VERIFICATION TIMES	1)N/A	2)N/A	3)N/A	4)N/A	5)N/A	6)N/A	7)N/A	8)N/A	9)N/A

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	-12 dB	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:	WELDS/ITEMS EXAMINED:
	REACTOR PRESSURE VESSEL
	N3A-IR
	Wedge IO D-14795-249

EXAMINER:	EXAMINER:	REVIEWER:	ANII:
DAVID KLEINJAN	MIKE KLEINJAN		DATE: 4/19/02
LEVEL: II	LEVEL: II	LEVEL: III DATE: 4/19/02	PG.: ~~7 OF 7~~ ~~8 OF 7~~ ~~15~~

7 OF 15 4/19/02

TVA	MANUAL ULTRASONIC VESSEL EXAMINATION DATA SHEET	REPORT NO. R164

PROJECT: BFN UNIT: 3 WELD ID: N3A CONFIG.: Nozzle COMPONENT: VESSEL

CAL. SHT. NO.: N/A PROCEDURE: ~~NI-UT-9~~ N-UT-9 J— 4/10/02 REV.: 9 PCR.: ~~N/A~~ 02-06, J— 4/10/02 TEMP.: 85 PYRO.: 522352

SCAN SENS.: X dB EXAM START: 3/31/02 9:30 EXAM END: 11:00 EXAM ANGLE: 0°, 45°, 60°

Lo LOCATION: TDC Wo LOCATION: ℄ OF WELD

IND NO.	20%			50%			100%			MAX. AMP.			20%			50%			100%		
	Mp1	W1	L1	Mp1 X	W1	L1	Mp1	W1	L1	Mp	W	L	Mp2	W2	L2	Mp2	W2	L2	Mp2	W2	L2
28°	SCAN.	dB	65.6			SCANNING	#	10/11		BLEND RADIUS											
24°	SCAN	dB	63			SCANNING	#	10/11		BLEND RADIUS											
0°	SCAN	dB	34.8			SCANNING	#	9		ON WELD AND BASE MATERIAL											
45°	SCAN	dB	56.6			SCANNING	#	9		ON WELD AND VESSEL SIDE											
45T	SCAN	dB	56.6			SCANNING	#	10/11		CW/CCW VESSEL SIDE											
45TAN	SCAN	dB	56.6			SCANNING	#	10/11		CW/CCW VESSEL SIDE											
60	SCAN	dB	63			SCANNING	#	9		ON weld AND VESSEL SIDE											
60T	SCAN	dB	63			SCANNING	#	10/11		CW/CCW VESSEL SIDE											
60TAN	SCAN	dB	63			SCANNING	#	10/11		CW/CCW VESSEL SIDE											
				NO RECORDABLE INDICATION																	

COMMENTS: 28° AND 24° EXAMINATIONS ARE THE BLEND RADIUS EXAMINATIONS TRANSVERSE EXAMINATION COVERAGE WILL INCLUDE COVERAGE OBTAINED DURING THE INNER RADIUS EXAMINATIONS. 5 TO 10% Horse Level was observed

EXAMINER: [signature] LEVEL: II DATE: 4-4-02 REVIEWED BY: [signature] LEVEL: III DATE: 4/4/02

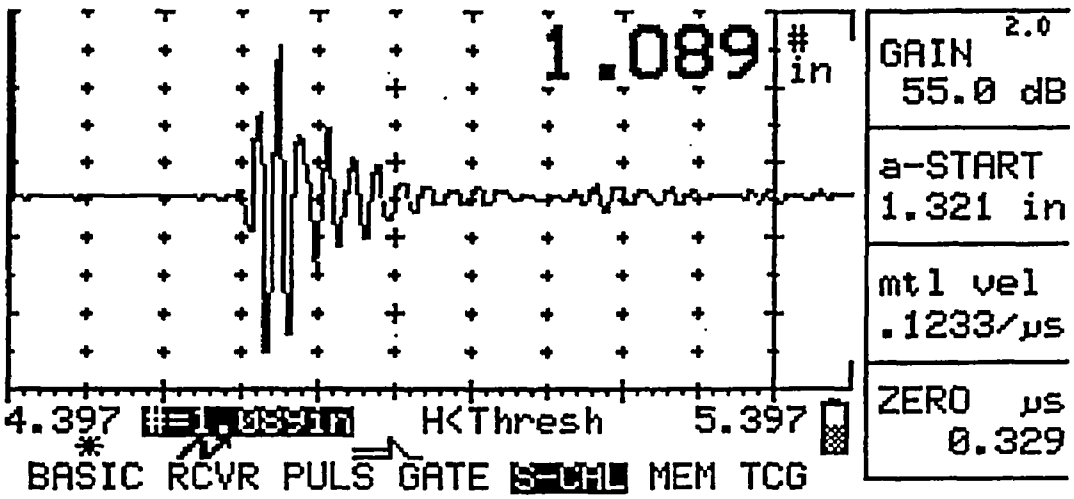
EXAMINER: [signature] LEVEL: II DATE: 03-31-02 ANII: [signature] DATE: 4/10/02 PAGE 8 J— 4/10/02 OF 15

TVA 40094 (NP-1-89) 1-108-999-48

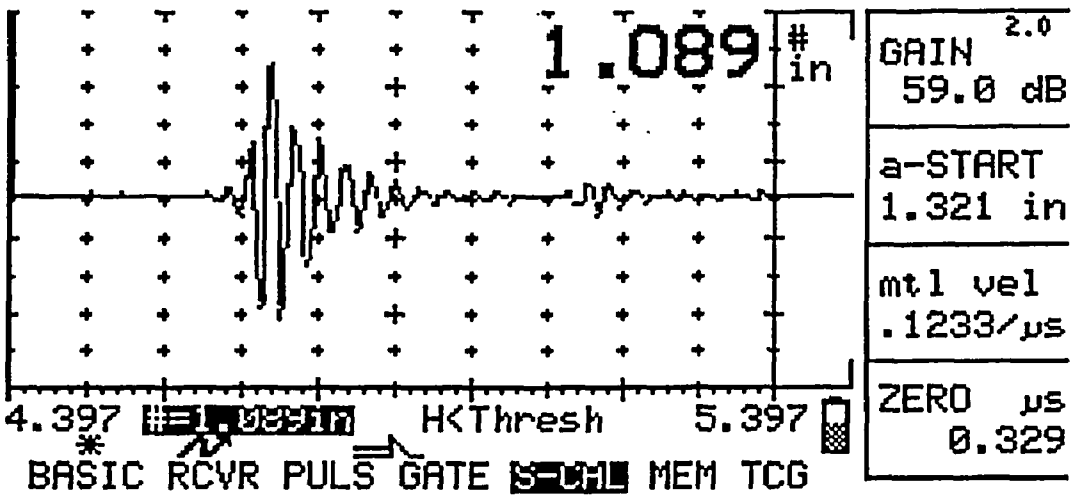
00084

Report Number 00085
R164

Nozzle Examination 45 °Waveforms



45° Pre Waveform



45° Post Waveform

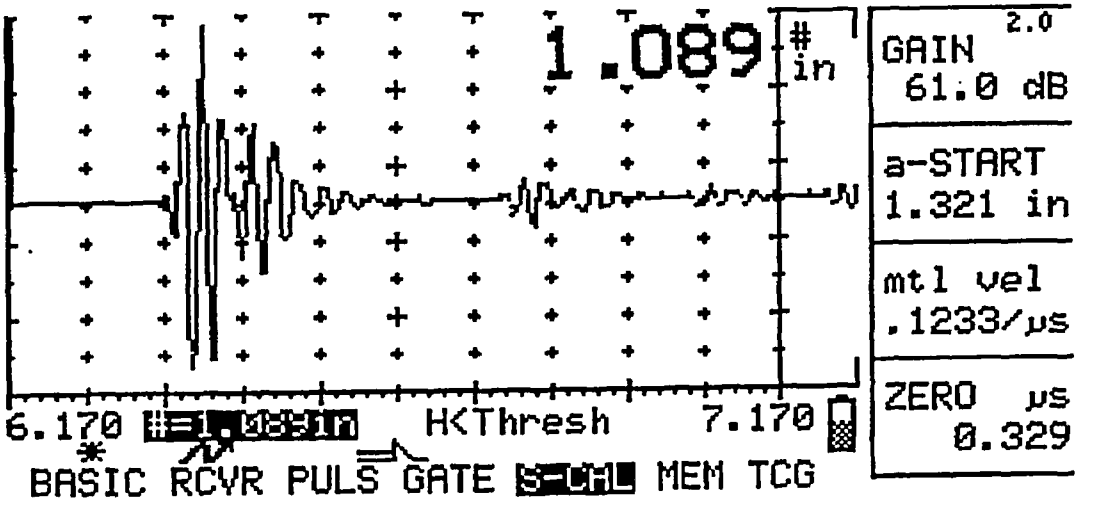
HSBCT
4/18/02

9 5 4/18/02
10 .5 46

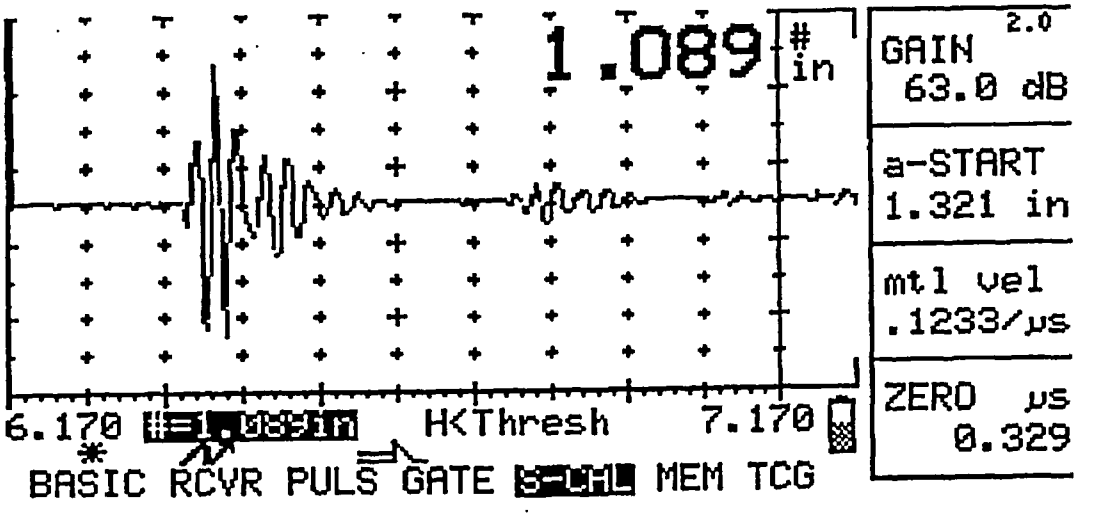
00086

REPORT NUMBER
R164

Nozzle Examination 60 ° Waveforms



60° Pre Waveform



60° Post Waveform

HSBCT 4/19/00
10 5/4/02
15 -5 15

TVA	BEAM SPREAD AND RESOLUTION DATA SHEET	REPORT NO. R164

PROJECT: BFN UNIT: 3 CALIBRATION BLOCK NO.: BF 18

PROCEDURE NO.: N-UT-9 REV.: 9 PCR: ~~0206 NTO~~ 3-30-02

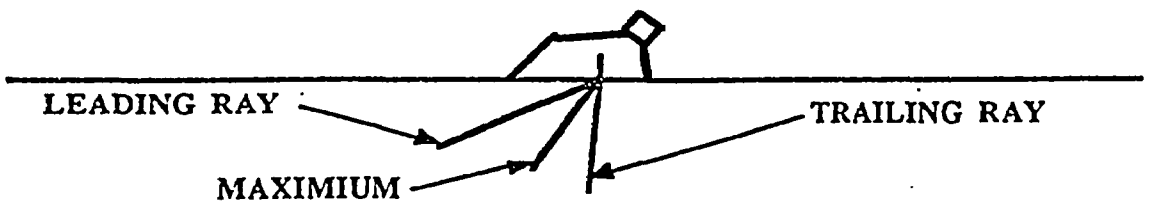
SEARCH UNIT-MAKE: Krautkramer SIZE: .5X1 FREQ.: 2.25

S/N: DB 34843 ANGLE: 45

ULTRASONIC INSTRUMENT-MAKE: Sonic 135 S/N: VH 751

BEAM SPREAD

	TRAILING RAY						LEADING RAY			
HOLE DEPTH	20% DAC		50% DAC		100% DAC		20% DAC		50% DAC	
	W	MP	W	MP	MP	W	MP	W	W	MP
1/4T	1 1/8	1.9	1 1/4	2.	2.1	1 5/8	2.4	2	1 7/8	2.3
2T	2 7/8	4	3	4.1	4.3	3 1/4	4.8	4 1/8	3 3/4	4.6
3/4T	4 1/4	6	4 1/2	6.3	6.5	4 7/8	7	5 7/8	5 1/4	6.8



RESOLUTION

NEAR SURFACE REFLECTOR: Notch OD DEPTH: 25 SIZE: .253 CAL BLK.: BF 18

FAR SURFACE REFLECTOR: Notch ID DEPTH: 6.1 SIZE: .253

SCANNING REFLECTORS PROVIDE 50% DAC SIGNALS AT SCANNING SPEED Y☑ N☐

EXAMINER: [signature]	REVIEWED BY: [signature]	ANII: [signature]
LEVEL: II DATE: 3-30-02	LEVEL: III DATE: 4/3/02	DATE: 4/10/02
		PAGE: 14 OF 15

SAR 4/10/02

TVA	BEAM SPREAD AND RESOLUTION DATA SHEET	REPORT NO. R164

PROJECT: BFN UNIT: 3 CALIBRATION BLOCK NO.: BF 18

PROCEDURE NO.: N-UT-9 REV.: 9 PCR: ~~0206 H/A~~ 3-30-02

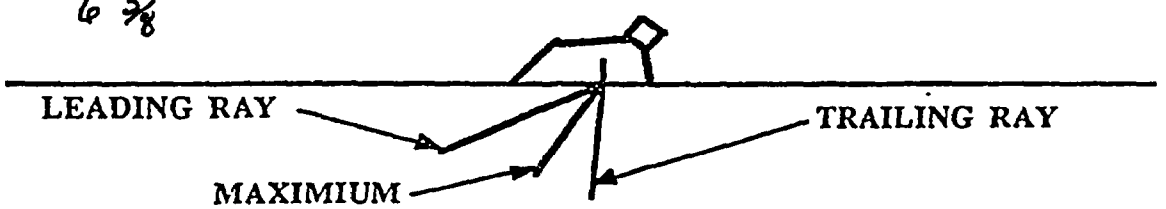
SEARCH UNIT-MAKE: Kraut Kramer SIZE: .5X1 FREQ.: 2.25

S/N: DB 34154 ANGLE: 60

ULTRASONIC INSTRUMENT-MAKE: Sonic 136 S/N: VH 751

BEAM SPREAD

	TRAILING RAY						LEADING RAY			
HOLE	20% DAC		50% DAC		100% DAC		20% DAC		50% DAC	
DEPTH	W	MP	W	MP	MP	W	MP	W	W	MP
1/4T	2 1/8	2.4	2 3/8	2.7	2.9	2 5/8	3.2	3 1/8	2 7/8	3.1
1/2T	4 3/4	4.8	5	5.3	5.8	5 1/4	6.4	6 5/8	6	6.1
3/4T	~~8 3/8~~ 6 3/8	7.6	7 1/4	8	8.7	7 7/8	9.6	8 5/8	8	9.1



RESOLUTION

NEAR SURFACE REFLECTOR: Notch OD DEPTH: .25 SIZE: .253 CAL BLK.: BF-18

FAR SURFACE REFLECTOR: Notch ID DEPTH: 6.1 SIZE: .253

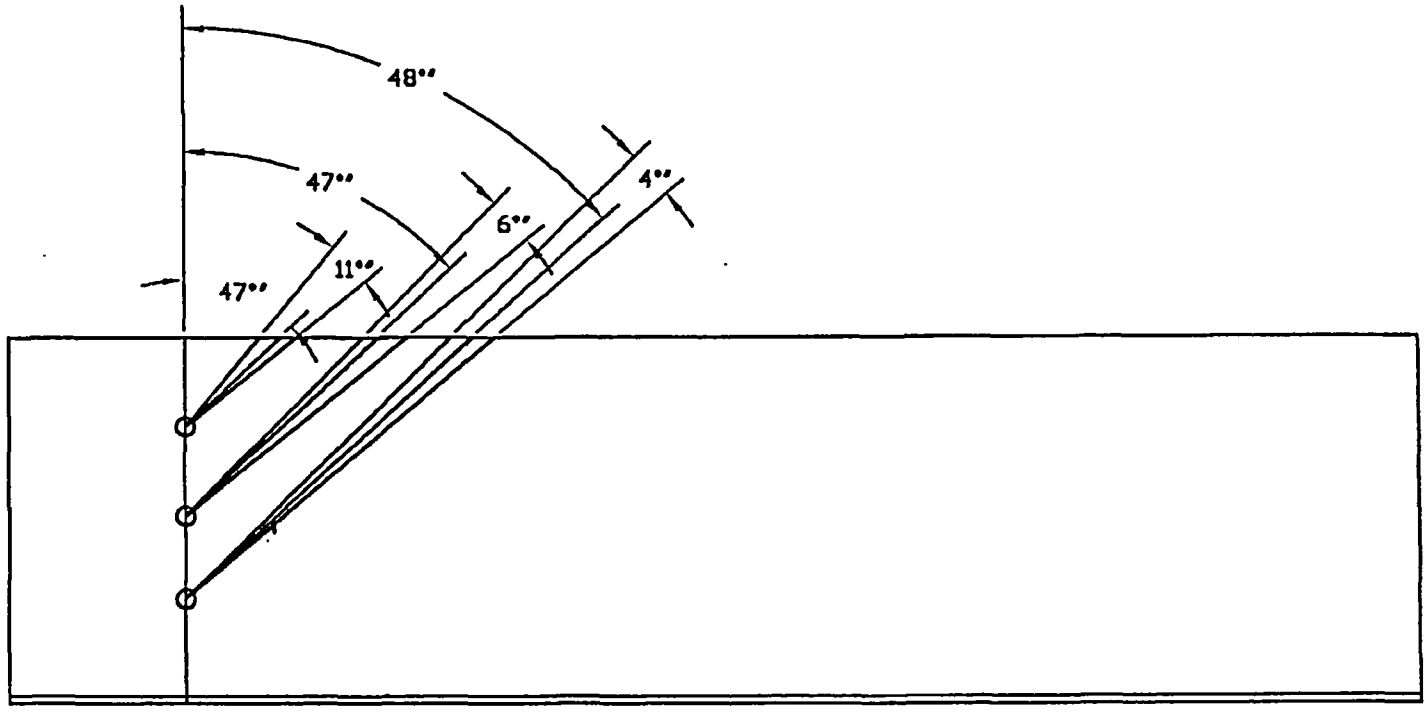
SCANNING REFLECTORS PROVIDE 50% DAC SIGNALS AT SCANNING SPEED Y ☒ N ☐

EXAMINER: Mike W Henry Jr	REVIEWED BY: [signature]	ANII: [signature]
		DATE: 4/19/02
LEVEL: II DATE: 3-30-02	LEVEL: III DATE: 4/3/02	PAGE: 32 OF 75

4/10/02

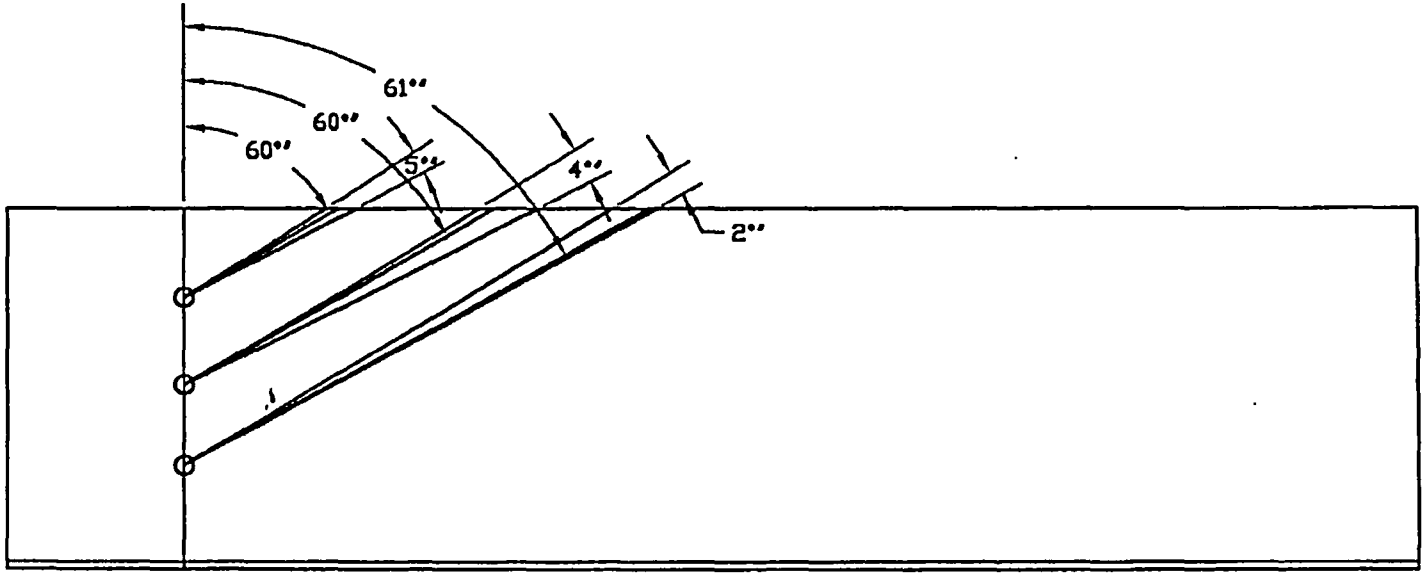
REPORT NUMBER R164 00089

HSBCT 4/19/02



Browns Ferry Unit 3
Beamspread
MARCH 2002
BF-18

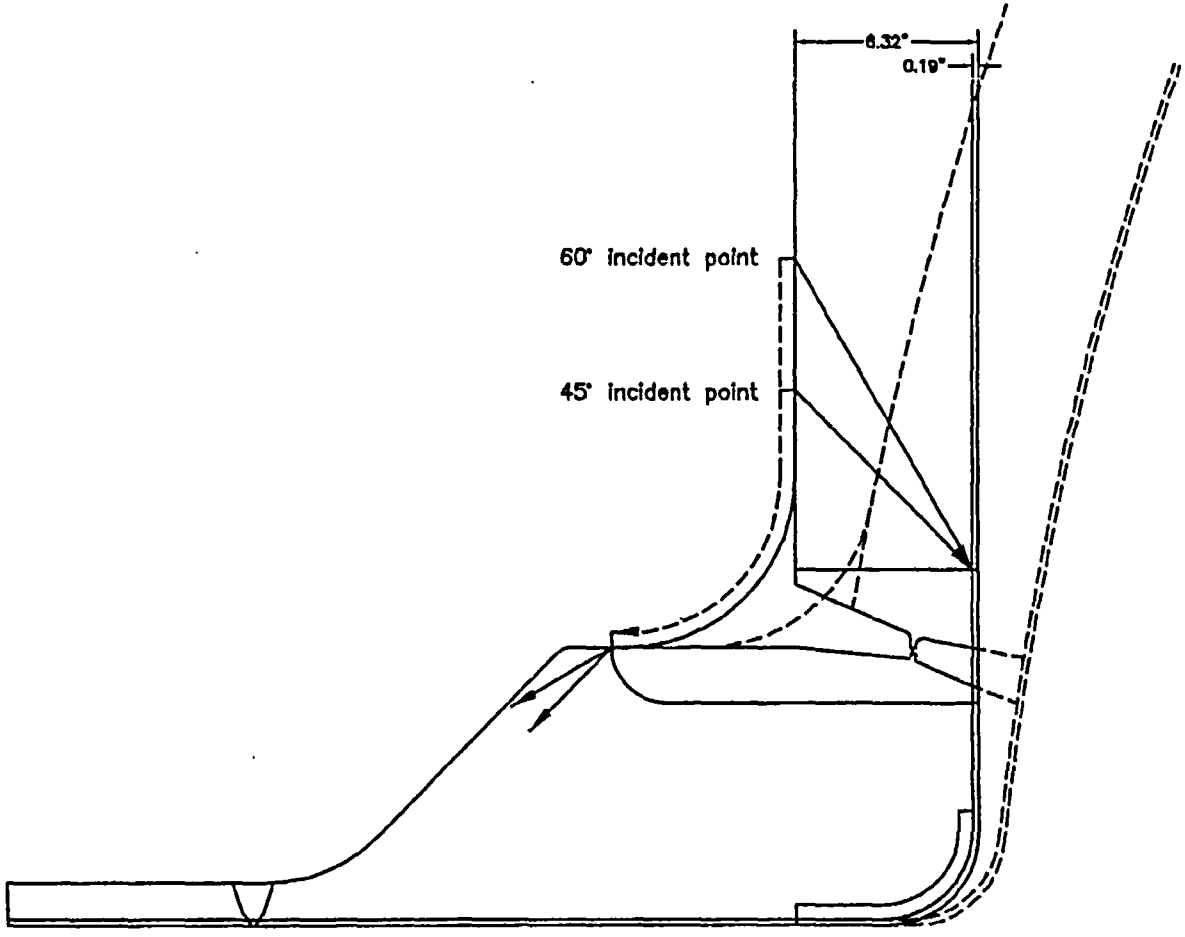
REPORT NUMBER
R164 00090



Browns Ferry Unit 3
Beamspread
MARCH 2002
BF-18

HSBCT
4/10/02

14 of 15



NOTE: transverse coverage includes coverage obtained during the inner radius examinations

REPORT NUMBER R164

HSBCT 4/19/02

Browns Ferry Unit 3	
N-3 Nozzle-to-Shell	
Mrach 2002	
SP-N3-NZ	

00091

Attachment 2 15 of 15

TENNESSEE VALLEY AUTHORITY	EXAMINATION SUMMARY AND RESOLUTION SHEET	REPORT NUMBER: R165

PROJECT: BFN	UNIT: 3	CYCLE: 10		COMPONENT ID: N3A-IR	
EXAMINATION METHOD				SYSTEM RPV	ISI DWG. NO. 3-ISI-0329-C
MT ☐	PT ☐	UT ☒	VT ☐	CODE CLASS: 1	CATEGORY: B-D
PROCEDURE: N-UT-55	REV:9	TC:N/A		COFIG.:	Nozzle TO Vessel
EXAMINER: MIKE KLEINJAN LEVEL: II	EXAMINER: DAVID KLEINJAN LEVEL:II			EXAMINER: N/A LEVEL: N/A	EXAMINER: N/A LEVEL: N/A

This report contains the data associated with the manual ultrasonic examination of code category B-D, Nozzle Inner radius. This examination report satisfies ASME section XI requirements for the inner radius examination.

N3A-IR: This examination was performed using a 24° and 28° in the blend radius in two directions CW/CCW

100% code coverage was obtained

This exam was performed with equipment, Procedures, and personnel qualified in accordance with ASME Section XI

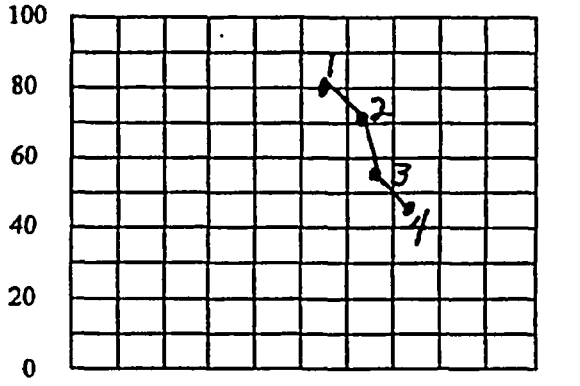
No Recordable Indication

RESOLUTION BY:	REVIEWED BY:	ANII:
Mike Kleinjan		DATE: 4/19/02
LEVEL: II DATE: 4-4-02	LEVEL: III DATE: 4/4/02	PG. 1 OF 14

4/10/02

TENNESSEE VALLEY AUTHORITY	DIGITAL ULTRASONIC CALIBRATION DATA SHEET	REPORT NUMBER: R165

PROJECT: BFN UNIT: 3 CYCLE: 10	CALIBRATION DATE: 03-31-02
PROC.: N-UT- 55 REV:9 TC: N/A	CALIBRATION BLOCK NO.: BF-84-IR TEMP: 70.5° F
INSTR. MFG: STAVELEY DUE DATE: 08-11-02	SIMULATOR BLOCK NO: N/A
MODEL/TYPE: SONIC-137 M & TE NO.: VH-5473	THERMOMETER S/N: 522352 DUE DATE: 05-17-02
TRANSDUCER MFG: KRAUTKRAMER	COUPLANT SONOTRACE BATCH: 01141
S/N DB 35163 SIZE: 1.0" FREQ: 2.25 MHz	EXAM TYPE: SHEAR☐ LONG☐ RL☒
CABLE TYPE: RG 174 LENGTH: 120 inches	ANGLE VERIFICATION
	BLOCK TYPE: CS IIW S/N: DB 55074
DAC	NOMINAL ANGLE: 24 ACTUAL ANGLE: N/A



DISPLAY WIDTH: 20 inches

INSTRUMENT SETTINGS

REFLECTOR SCAN DIRECT.	NTCH	SDH	REFERENCE SENSITIVITY	MEMORY NUMBER
AXIAL	☒	☐	57.0 dB	24
CIRC	☐	☐	N/A dB	N/A

FREQ:	2.25	MHz	REJECT:	OFF	%
ANGLE:	N/A	deg	DAMPING:	200	ohms
DELAY:	0.999	msec	PULSER:	222	
ZERO:	N/A	msec	FILTER:	FILT	
VELOCITY:	0.233	msec	REP RATE:	4 KHZ	
RANGE:	20.0	inches	TOF: ☐PEAK ☒ FLANK		
DISPLAY MODE: PE			POWER: AC		
DUAL: ☐ ON ☒ OFF			TCG: ☐ ON ☒ OFF		

REF. REFLECTOR: N/A GAIN: N/A dB	CALIBRATION TIMES
AMPLITUDE: N/A % METAL PATH: N/A"	INITIAL TIME: 0815 FINAL TIME: 1135

VERIFICATION TIMES	1)N/A	2)N/A	3)N/A	4)N/A	5)N/A	6)N/A	7)N/A	8)N/A	9)N/A

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	-12 dB	SET	+12	SET	+6	
	AMP	80%	32 TO 48	16 TO 24	20 %	64 TO 96	40%	64 TO 96	
			40	20		80		80	

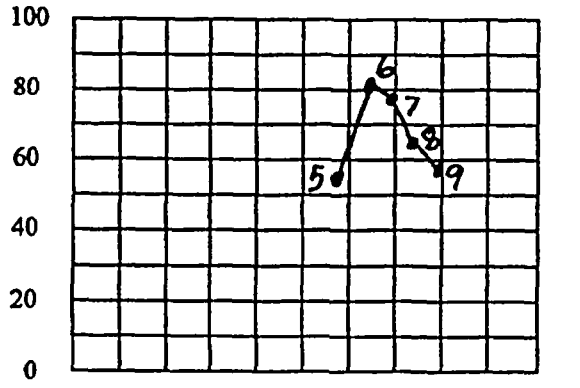
COMMENTS:	WELDS/ITEMS EXAMINED:
Wedge ID D-14795-248	REACTOR PRESSURE VESSEL
	N3A-IR

EXAMINER:	EXAMINER:	REVIEWER:	ANII:
DAVID KLEINJAN	MIKE KLEINJAN		DATE: 4/19/02
LEVEL: II	LEVEL: II	LEVEL: III DATE: 4/19/02	PG.: 3 OF 4

JAR 4/19/02

TENNESSEE VALLEY AUTHORITY	DIGITAL ULTRASONIC CALIBRATION DATA SHEET	REPORT NUMBER: R165

PROJECT: BFN UNIT: 3 CYCLE: 10	CALIBRATION DATE: 03-31-02
PROC.: N-UT- 55 REV:9 TC: ~~N/A~~	CALIBRATION BLOCK NO.: BF-84-IR TEMP: 70.5° F
INSTR. MFG: STAVELEY DUE DATE: 08-11-02	SIMULATOR BLOCK NO: N/A
MODEL/TYPE: SONIC-137 M & TE NO.: VH-5473	THERMOMETER S/N: 522352 DUE DATE: 05-17-02
TRANSDUCER MFG: KRAUTKRAMER	COUPLANT SONOTRACE BATCH: 01141
S/N DB 35164 SIZE: 1.0" FREQ: 2.25 MHz	EXAM TYPE: SHEAR☐ LONG☐ RL☒
CABLE TYPE: RG 174 LENGTH: 120 inches	ANGLE VERIFICATION
	BLOCK TYPE: CS IIW S/N: DB 55074
DAC	NOMINAL ANGLE: 28 ACTUAL ANGLE: N/A



DISPLAY WIDTH: 20 inches

INSTRUMENT SETTINGS

REFLECTOR SCAN DIRECT.	NTCH	SDH	REFERENCE SENSITIVITY	MEMORY NUMBER
AXIAL	☒	☐	59.6 dB	28
CIRC	☐	☐	N/A dB	N/A

FREQ: 2.25 MHz	REJECT: OFF %
ANGLE: N/A deg	DAMPING: 200 ohms
DELAY: 1.39 msec	PULSER: 222
ZERO: N/A msec	FILTER: FILT 1
VELOCITY: 0.236 msec	REP RATE: 4 KHZ
RANGE: 20.0 inches	TOF: ☐PEAK ☒ FLANK
DISPLAY MODE: PE	POWER: AC
DUAL: ☐ ON ☒ OFF	TCG: ☐ ON ☒ OFF

REF. REFLECTOR: N/A	GAIN: N/A dB
AMPLITUDE: N/A %	METAL PATH: N/A"

CALIBRATION TIMES

INITIAL TIME: 0900	FINAL TIME: 1136

VERIFICATION TIMES	1)N/A	2)N/A	3)N/A	4)N/A	5)N/A	6)N/A	7)N/A	8)N/A	9)N/A

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	-12 dB	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:	WELDS/ITEMS EXAMINED:
Wedge ID D-14795-249	REACTOR PRESSURE VESSEL
	N3A-IR

EXAMINER:	EXAMINER:	REVIEWER:	ANII:
DAVID KLEINJAN	MIKE KLEINJAN		DATE:
LEVEL: II	LEVEL: II	LEVEL: ~~II~~ DATE: 4/4/02	PG.: ~~14~~ OF ~~14~~ 4

3 Jan 4/10/02

TVA	MANUAL ULTRASONIC VESSEL EXAMINATION DATA SHEET	REPORT NO. R165

PROJECT: BFN UNIT: 3 WELD ID: N3A CONFIG.: INNER RADIUS COMPONENT: N/A

CAL. SHT. NO.: N/A PROCEDURE: N-UT-55 REV.: 9 PCR.: ~~N/A~~ 02-08 ~~03-4-10-02~~ TEMP.: 85 PYRO.: 522352

SCAN SENS.: * dB EXAM START: 3/31/02 9:30 EXAM END: 11:00 EXAM ANGLE: 28°, 24°

Lo LOCATION: TDC Wo LOCATION: ℄ of WELD

IND NO.	20%			50%			100%			MAX. AMP.			20%			50%			100%		
	Mp1	W1	L1	Mp1 *	W1	L1	Mp1	W1	L1	Mp	W	L	Mp2	W2	L2	Mp2	W2	L2	Mp2	W2	L2
28°	SCAN		dB	65.6		SCANNING			#	10/11		BLEND RADIUS									
24°	SCAN		dB	63		SCANNING			#	10/11		BLEND RADIUS									
			No Recordable Indication																		

COMMENTS: A MATERIAL NOISE LEVEL OF 5-10% WAS OBSERVED

EXAMINER: [signature] LEVEL: II DATE: 03-31-02
EXAMINER: [signature] LEVEL: II DATE: 4-4-02

REVIEWED BY: [signature] LEVEL: III DATE: 4/4/02
ANII: [signature] DATE: 4/19/02 PAGE 4 OF 4

TVA 40094 (NP-1-89) 1-108-999-48

Inspection Report R-166
Weld N4A-NV

TENNESSEE VALLEY AUTHORITY	EXAMINATION SUMMARY AND RESOLUTION SHEET	REPORT NUMBER: R166

PROJECT: BFN	UNIT: 3	CYCLE: 10		COMPONENT ID: N4A	
EXAMINATION METHOD				SYSTEM RPV	ISI DWG. NO. 3-ISI-0327-C
MT ☐	PT ☐	UT ☒	VT ☐	CODE CLASS: 1	CATEGORY: B-D
PROCEDURE: N-UT-9	REV:9	TC:02-06		COFIG.: Nozzle TO Vessel	
EXAMINER: MIKE KLEINJAN	EXAMINER: DAVID KLEINJAN	EXAMINER: N/A	EXAMINER: N/A		
LEVEL: II	LEVEL: II	LEVEL: N/A	LEVEL: N/A		

This report contains the data associated with the manual ultrasonic examination of code category B-D, Nozzle to Vessel welds. This examination report satisfies ASME section XI requirements for the Nozzle to shell weld..

Examination. Nozzle to Vessel weld N4A
Transverse coverage for the Nozzle to Vessel weld was supplemented by the inner radius examination.
(N4A-IR) See R.167

0° was used on the weld crown and base material Vessel side

45° was used on the vessel side only scanning over the weld crown
45° Tangent to the weld was used on vessel side CW/CCW
45° Parallel to the weld was used on vessel side CW/CCW

60° was used on the vessel side only scanning over the weld crown
60° Tangent to the weld was used on vessel side CW/CCW
60° Parallel to the weld was used on vessel side CW/CCW

77% code coverage was obtained

This exam was performed with equipment, Procedures, and personnel qualified in accordance with ASME Section XI

No Recordable Indications

RESOLUTION BY:	REVIEWED BY:	ANII:
Mike Kleinjan		DATE: 4/19/02
LEVEL: II DATE: 4-4-02	LEVEL: III DATE: 4/4/02	PG. 1 OF 15

REPORT NUMBER
R166 00097

Calculation of ASME code coverage
For section XI NDE Examination

N4A

1) O degree (weld metal scan)	100%
2) 45 degree Transverse-scan from vessel side of weld	100%
3) 45 degree Transverse-scan from nozzle side of weld	0%
4) 60 degree Transverse-scan from vessel side of weld	100%
5) 60 degree Transverse-scan from nozzle side of weld	0%
6) 45 degree Parallel-scan CW direction	100% *
7) 45 degree Parallel-scan CCW direction	100% *
8) 60 degree Parallel-scan CW direction	100% *
9) 60 degree Parallel-scan CCW direction	100% *
The sum of all the percentage of scans	700%
Divided by the total # of scans	9
Percentage of examination Volume coverage	77%

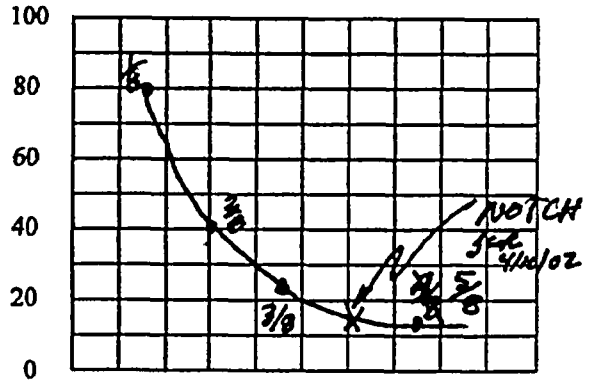
* Transverse coverage includes coverage obtained during the inner radius examination.

HSBCT
4/19/02

2 of 15
~~6 of 15~~ 4/19/02

TENNESSEE VALLEY AUTHORITY	DIGITAL ULTRASONIC CALIBRATION DATA SHEET	REPORT NUMBER: R166

PROJECT: BFN UNIT: 3 CYCLE: 10	CALIBRATION DATE: 3-30-02
PROC.: N-UT- 9 REV:9 TC:02-06	CALIBRATION BLOCK NO.: BF18 TEMP: 72.6'F
INSTR. MFG: Staveley DUE DATE: 8-05-02	SIMULATOR BLOCK NO: DB55079
MODEL/TYPE: Sonic 136 M & TE NO.: VH751	THERMOMTER S/N: 522352 DUE DATE: 5-17-02
TRANSDUCER MFG: Krauntkramer	COUPLANT SONOTRACE BATCH: 01141
S/N DB34154 SIZE: .5x1 FREQ: 2.25 MHz	EXAM TYPE: SHEAR☒ LONG☐ RL☐
CABLE TYPE: RG174 LENGTH: 120 inches	ANGLE VERIFICATION
	BLOCK TYPE: IIW / S/N: DB55074
DAC	NOMINAL ANGLE: 60 / ACTUAL ANGLE: 59



DISPLAY WIDTH: 10 inches

INSTRUMENT SETTINGS

REFLECTOR SCAN DIRECT.	NTCH	SDH	REFERENCE SENSITIVITY	MEMORY NUMBER
AXIAL	☐	☒	49 dB	3
CIRC	☐	☐	n/a dB	n/a

FREQ: 2.25 MHz	REJECT: off %
ANGLE: N/A deg	DAMPING: 500 ohms
DELAY: 1.20 msec	PULSER: 222
ZERO: N/A msec	FILTER: FITL 3
VELOCITY: .123 msec	REP RATE: 2KHZ
RANGE: 20 inches	TOF: ☒PEAK ☐ FLANK
DISPLAY MODE:	POWER: AC
DUAL: ☐ ON ☒ OFF	TCG: ☐ ON ☒ OFF

REF. REFLECTOR: 1" GAIN: 36 dB	CALIBRATION TIMES
AMPLITUDE: 80 % METAL PATH: 1"	INITIAL TIME: 9:00 FINAL TIME: 18:30

VERIFICATION TIMES	1)14:00	2)n/a	3)n/a	4)n/a	5)n/a	6)n/a	7)n/a	8)n/a	9)n/a

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

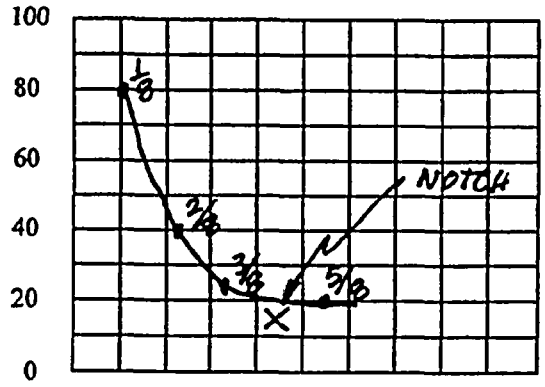
ATTENUATOR	GAIN	SET	-6 dB	-12 dB	SET	+12	SET	+6
	AMP	80%	32 TO 48	16 TO 24	20 %	64 TO 96	40%	64 TO 96
			40	20		80		80

COMMENTS:	WELDS/ITEMS EXAMINED:
DELTA dB DIFFERENCE IS 4.4 FROM THE 3/8 TO 5/8 ON THE	N4A,N4F Nozzle to Shell
CLAD SIDE	

EXAMINER:	EXAMINER:	REVIEWER:	ANII:
MIKE W. KLEINJAN	DAVID KLEINJAN		DATE: 4/19/02
LEVEL: II	LEVEL: II	LEVEL: DATE: 4/4/02	PG.: ~~10 OF 15~~ 3 OF 15 4/19/02

TENNESSEE VALLEY AUTHORITY	DIGITAL ULTRASONIC CALIBRATION DATA SHEET	REPORT NUMBER: R166

PROJECT: BFN UNIT: 3 CYCLE: 10	CALIBRATION DATE: 3-30-02
PROC.: N-UT- 9 REV:9 TC:02-06	CALIBRATION BLOCK NO.: BF18 TEMP: 72.6°F
INSTR. MFG: Staveley DUE DATE: 8-05-02	SIMULATOR BLOCK NO: DB55079
MODEL/TYPE: sonic 136 M & TE NO.: VH751	THERMOMTER S/N: 522352 DUE DATE: 5-17-02
TRANSDUCER MFG: Krauntkramer	COUPLANT SONOTRACE BATCH: 01141
S/N DB34843 SIZE: .5x1 FREQ: 2.25 MHz	EXAM TYPE: SHEAR☒ LONG☐ RL☐
CABLE TYPE: RG1743 LENGTH: 120 inches	ANGLE VERIFICATION
	BLOCK TYPE: IIW / S/N: DB55074
DAC	NOMINAL ANGLE: 45° / ACTUAL ANGLE: 46°



DISPLAY WIDTH: 10 inches

INSTRUMENT SETTINGS

REFLECTOR SCAN DIRECT.	NTCH	SDH	REFERENCE SENSITIVITY	MEMORY NUMBER
AXIAL	☐	☒	42.6 dB	2
CIRC	☐	☐	n/a dB	n/a

FREQ: 2.25 MHz	REJECT: off %
ANGLE: N/A deg	DAMPING: 500 ohms
DELAY: .830 msec	PULSER: 222
ZERO: N/A msec	FILTER: FITL 3
VELOCITY: .126 msec	REP RATE: 2KHZ
RANGE: 20 inches	TOF: ☒PEAK ☐ FLANK
DISPLAY MODE: PE	POWER: AC
DUAL: ☐ ON ☒ OFF	TCG: ☐ ON ☒ OFF

REF. REFLECTOR: 1"	GAIN: 33.6 dB
AMPLITUDE: 80 %	METAL PATH: 1"

CALIBRATION TIMES

INITIAL TIME: 9:00	FINAL TIME: 18:30

VERIFICATION TIMES	1)14:00	2) n/a	3) n/a	4) n/a	5) n/a	6) n/a	7) n/a	8) n/a	9) n/a

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	

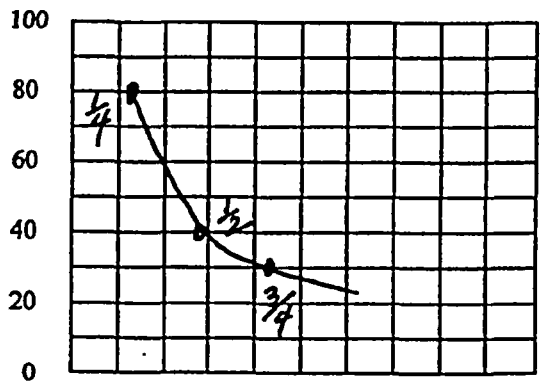
ATTENUATOR	GAIN	SET	-6 dB	-12 dB	SET	+12	SET	+6	
	AMP	80%	32 TO 48	16 TO 24	20 %	64 TO 96	40%	64 TO 96	
			40	20		80		80	

COMMENTS:	WELDS/ITEMS EXAMINED:
Delta difference between 3/8 to 5/8 on the clad side is 3 dB	N4A,N4F Nozzle to Shell

EXAMINER:	EXAMINER:	REVIEWER:	ANII:
MIKE W. KLEINJAN	DAVID KLEINJAN		DATE: 4/19/02
LEVEL:II	LEVEL:II	LEVEL: III DATE: 4/4/02	PG.: ~~1-3 OF 1-15~~ 4 OF 15

TENNESSEE VALLEY AUTHORITY	DIGITAL ULTRASONIC CALIBRATION DATA SHEET	REPORT NUMBER: R166

PROJECT: BFN UNIT: 3 CYCLE: 10	CALIBRATION DATE: 3-30-02
PROC.: N-UT- 9 REV:9 TC:02-06	CALIBRATION BLOCK NO.: BF18 TEMP: 72.6'F
INSTR. MFG: Staveley DUE DATE: 8-05-02	SIMULATOR BLOCK NO: DB55079
MODEL/TYPE: sonic 136 M & TE NO.: VH751	THERMOMTER S/N: 522352 DUE DATE: 5-17-02
TRANSDUCER MFG: Harisonic	COUPLANT SONOTRACE BATCH: 01141
S/N DB34198 SIZE: .75 FREQ: 2.25 MHz	EXAM TYPE: SHEAR☐ LONG☒ RL☐
CABLE TYPE: RG174 LENGTH: 120 inches	ANGLE VERIFICATION
	BLOCK TYPE: ~~Ronpus~~ 4-4-03 Rengoo S/N: DB55079
DAC	NOMINAL ANGLE: 0 ACTUAL ANGLE: N/A



DISPLAY WIDTH: 10 inches

INSTRUMENT SETTINGS

REFLECTOR SCAN DIRECT.	NTCH	SDH	REFERENCE SENSITIVITY	MEMORY NUMBER
AXIAL	☐	☒	20.8 dB	1
CIRC	☐	☐	n/a dB	n/a

FREQ: 2.25 MHz	REJECT: off %
ANGLE: n/a deg	DAMPING: 500 ohms
DELAY: .499 msec	PULSER: 222
ZERO: n/a msec	FILTER: Filt 3
VELOCITY: .238 msec	REP RATE: 2KHZ
RANGE: 10 inches	TOF: ☒PEAK ☐ FLANK
DISPLAY MODE:	POWER: AC
DUAL: ☐ ON ☒ OFF	TCG: ☐ ON ☒ OFF

REF. REFLECTOR: 1" GAIN: 8 dB	CALIBRATION TIMES
AMPLITUDE: 80 % METAL PATH: 1"	INITIAL TIME: 9:00 FINAL TIME: 1830

VERIFICATION TIMES	1)14:00	2) n/a	3) n/a	4) n/a	5) n/a	6) n/a	7) n/a	8) n/a	9) n/a

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	

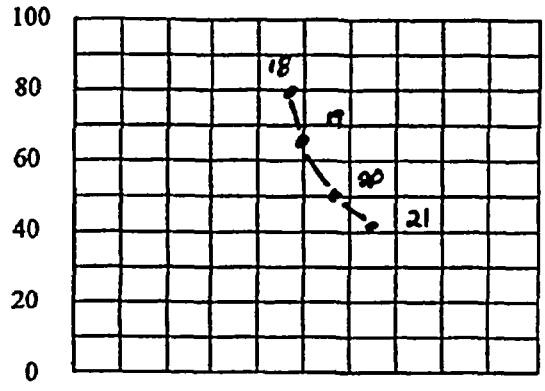
ATTENUATOR	GAIN	SET	-6 dB	-12 dB	SET	+12	SET	+6	
	AMP	80%	32 TO 48	16 TO 24	20 %	64 TO 96	40%	64 TO 96	
			40	20		80		80	

COMMENTS:	WELDS/ITEMS EXAMINED:
	N4A, N4F Nozzle to Shell

EXAMINER:	EXAMINER:	REVIEWER:	ANII:
MIKE W. KLEINJAN	DAVID KLEINJAN		DATE: 4/19/02
LEVEL: II	LEVEL: II	LEVEL: III DATE: 4/19/02	PG.: ~~1 OF 1 15~~ 5 OF 15 4/19/02

TENNESSEE VALLEY AUTHORITY	DIGITAL ULTRASONIC CALIBRATION DATA SHEET	REPORT NUMBER: R166

PROJECT: BFN UNIT: 3 CYCLE: 10	CALIBRATION DATE: 03-30-02
PROC.: N-UT- 55 REV:9 ~~TC:N/A 2-08~~	CALIBRATION BLOCK NO.: BF-84-IR TEMP: 70.5'F
INSTR. MFG: STAVELEY DUE DATE: 08-11-02	SIMULATOR BLOCK NO: N/A
MODEL/TYPE: SONIC-137 M & TE NO.: VH-5473	THERMOMETER S/N: 522352 DUE DATE: 05-17-02
TRANSDUCER MFG: KRAUTKRAMER	COUPLANT SONOTRACE BATCH: 01141
S/N DB 35164 SIZE: 1.0" FREQ: 2.25 MHz	EXAM TYPE: SHEAR☐ LONG☐ RL☒
CABLE TYPE: RG 174 LENGTH: 120 inches	ANGLE VERIFICATION
	BLOCK TYPE: CS IIW S/N: DB 55074
DAC	NOMINAL ANGLE: 27 ACTUAL ANGLE: N/A



DISPLAY WIDTH: 20 inches

INSTRUMENT SETTINGS

REFLECTOR			REFERENCE SENSITIVITY	MEMORY NUMBER
SCAN DIRECT.	NTCH	SDH		
AXIAL	☒	☐	56.2 dB	23
CIRC	☐	☐	N/A dB	N/A

FREQ: 2.25 MHz	REJECT: OFF %
ANGLE: N/A deg	DAMPING: 200 ohms
DELAY: 0.950 msec	PULSER: 222
ZERO: N/A msec	FILTER: FILT 1
VELOCITY: 0.233 msec	REP RATE: 4 KHZ
RANGE: 20.0 inches	TOF: ☐PEAK ☒ FLANK
DISPLAY MODE: PE	POWER: AC
DUAL: ☐ ON ☒ OFF	TCG: ☐ ON ☒ OFF

REF. REFLECTOR: N/A	GAIN: N/A dB
AMPLITUDE: N/A %	METAL PATH: N/A"

CALIBRATION TIMES

INITIAL TIME: 1505 FINAL TIME: 1810

VERIFICATION TIMES	1)N/A	2)N/A	3)N/A	4)N/A	5)N/A	6)N/A	7)N/A	8)N/A	9)N/A

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

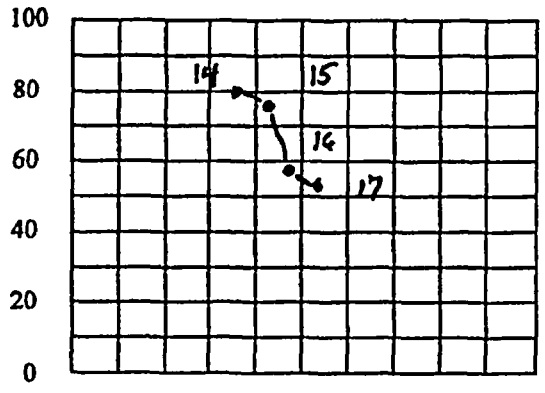
ATTENUATOR	GAIN	SET	-6 dB	-12 dB	SET	+12	SET	+6
	AMP	80%	32 TO 48	16 TO 24	20 %	64 TO 96	40%	64 TO 96
			40	20		80		80

COMMENTS:	WELDS/ITEMS EXAMINED:
	REACTOR PRESSURE VESSEL
	N4A-IR, N4F-IR
	Wedge ID D-14795-247

EXAMINER:	EXAMINER:	REVIEWER:	ANII:
DAVID KLEINJAN	MIKE KLEINJAN		DATE: 4/19/02
LEVEL: II	LEVEL: II	LEVEL: III DATE: 4/19/02	PG.: ~~4 7 OF 7 15~~ 6 OF 15

TENNESSEE VALLEY AUTHORITY	DIGITAL ULTRASONIC CALIBRATION DATA SHEET	REPORT NUMBER: R166

PROJECT: BFN UNIT: 3 CYCLE: 10	CALIBRATION DATE: 03-30-02
PROC.: N-UT- 55 REV:9 TC:N/A	CALIBRATION BLOCK NO.: BF-84-IR TEMP: 70.5°F
INSTR. MFG: STAVELEY DUE DATE: 08-11-02	SIMULATOR BLOCK NO: N/A
MODEL/TYPE: SONIC-137 M & TE NO.: VH-5473	THERMOMETER S/N: 522352 DUE DATE: 05-17-02
TRANSDUCER MFG: KRAUTKRAMER	COUPLANT SONOTRACE BATCH: 01141
S/N DB 35164 SIZE: 1.0" FREQ: 2.25 MHz	EXAM TYPE: SHEAR☐ LONG☐ RL☒
CABLE TYPE: RG 174 LENGTH: 120 inches	ANGLE VERIFICATION
	BLOCK TYPE: CS IIW S/N: DB 55074
DAC	NOMINAL ANGLE: 21 ACTUAL ANGLE: N/A



DISPLAY WIDTH: 20 inches

INSTRUMENT SETTINGS

REFLECTOR SCAN DIRECT.	NTCH	SDH	REFERENCE SENSITIVITY	MEMORY NUMBER
AXIAL	☒	☐	55.0 dB	22
CIRC	☐	☐	N/A dB	N/A

FREQ: 2.25 MHz	REJECT: OFF %
ANGLE: N/A deg	DAMPING: 200 ohms
DELAY: 1.61 msec	PULSER: 222
ZERO: N/A msec	FILTER: FILT 1
VELOCITY: 0.233 msec	REP RATE: 4 KHZ
RANGE: 20.0 inches	TOF: ☐PEAK ☒ FLANK
DISPLAY MODE: PE	POWER: AC
DUAL: ☐ ON ☒ OFF	TCG: ☐ ON ☒ OFF

REF. REFLECTOR: N/A	GAIN: N/A dB
AMPLITUDE: N/A %	METAL PATH: N/A"

CALIBRATION TIMES

INITIAL TIME: 1505 FINAL TIME: 1810

VERIFICATION TIMES	1)N/A	2)N/A	3)N/A	4)N/A	5)N/A	6)N/A	7)N/A	8)N/A	9)N/A

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	-12 dB	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:	WELDS/ITEMS EXAMINED:
	REACTOR PRESSURE VESSEL
	N4A-IR, N4F-IR
	Wedge ID D 14795-246 ✓

EXAMINER:	EXAMINER:	REVIEWER:	ANII:
DAVID KLEINJAN	MIKE KLEINJAN		DATE: 4/19/02
LEVEL: II	LEVEL: II	LEVEL: II DATE: 4/2/02	PG.: ~~1 8 OF 1 15~~ 7 OF 15 4/19/02

TVA	MANUAL ULTRASONIC VESSEL EXAMINATION DATA SHEET	REPORT NO. R166

PROJECT: BFN UNIT: 3 WELD ID: N4A CONFIG.: Nozzle COMPONENT: VESSEL

CAL. SHT. NO.: N/A PROCEDURE: ~~N-UT-9~~ N-UT-9 3/30/02 REV.: 9 PCR.: 02-06 TEMP.: 85 PYRO.: 522352

SCAN SENS.: * dB EXAM START: 1650 EXAM END: 1750 EXAM ANGLE: 0°, 45°, 60°

Lo LOCATION: TDC Wo LOCATION: ℄ OF WELD

IND NO.	20%			50%			100%			MAX. AMP.			20%			50%			100%		
	Mp1	W1	L1	Mp1 *	W1	L1	Mp1	W1	L1	Mp	W	L	Mp2	W2	L2	Mp2	W2	L2	Mp2	W2	L2
21°	SCAN.	dB	61		SCANNING	#	10/11	BLEND RADIUS													
27°	SCAN	dB	62.2		SCANNING	#	10/11	BLEND RADIUS													
0°	SCAN	dB	34.8		SCANNING	#	9	ON WELD AND BASE MATERIAL													
45°	SCAN	dB	56.6		SCANNING	#	9	ON WELD AND VESSEL SIDE													
45T	SCAN	dB	56.6		SCANNING	#	10/11	CW/CCW VESSEL SIDE													
45TAN	SCAN	dB	56.6		SCANNING	#	10/11	CW/CCW VESSEL SIDE													
60°	SCAN	dB	63		SCANNING	#	9	ON WELD AND VESSEL SIDE													
60°T	SCAN	dB	63		SCANNING	#	10/11	CW/CCW VESSEL SIDE													
60TAN	SCAN	dB	63		SCANNING	#	10/11	CW/CCW VESSEL SIDE													
			NO RECORDABLE INDICATION																		

001 of 03

COMMENTS: 21° AND 27° EXAMINATIONS ARE THE BLEND RADIUS EXAMINATIONS TRANSVERSE EXAMINATION COVERAGE WILL INCLUDE COVERAGE OBTAINED DURING THE INNER RADIUS EXAMINATIONS. 5 TO 10% NOISE LEVEL WAS OBSERVED

EXAMINER: [signature] LEVEL: III DATE: 4-4-02 REVIEWED BY: [signature] LEVEL: III DATE: 4/4/02

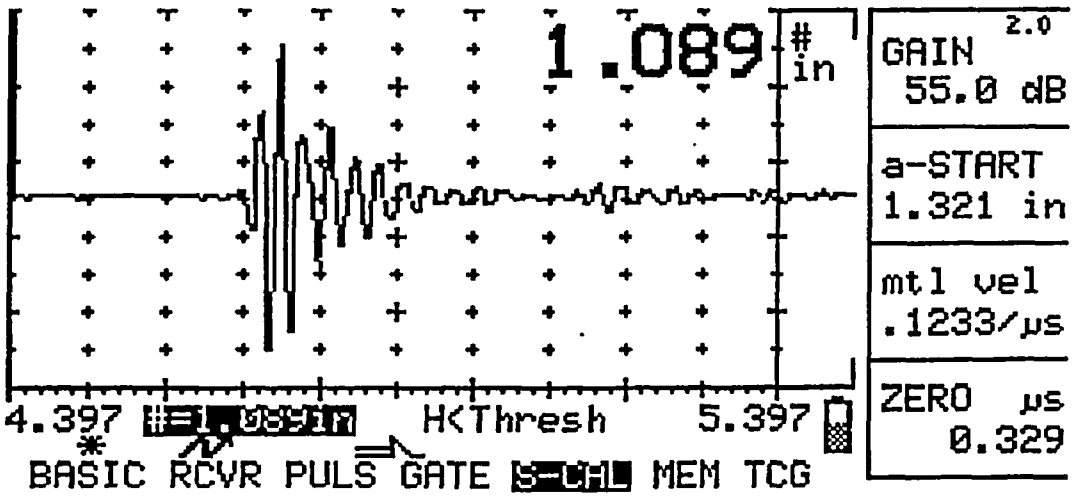
EXAMINER: [signature] LEVEL: II DATE: 3-30-02 ANII: [signature] DATE: 4/19/02 PAGE 8 OF 15

TVA 40094 (NP-1-89) 1-108-999-48

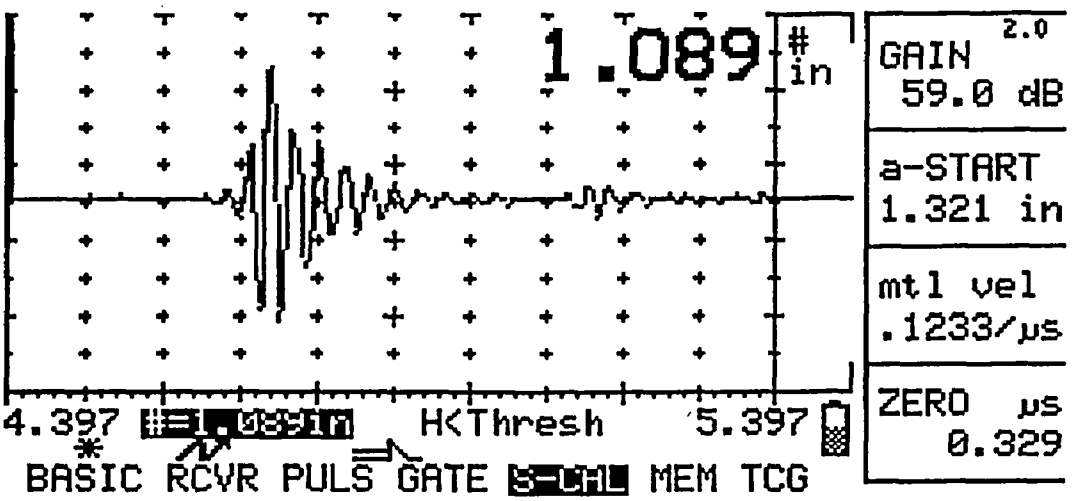
REPORT NUMBER
R166

00104

Nozzle Examination 45 °Waveforms



45° Pre Waveform



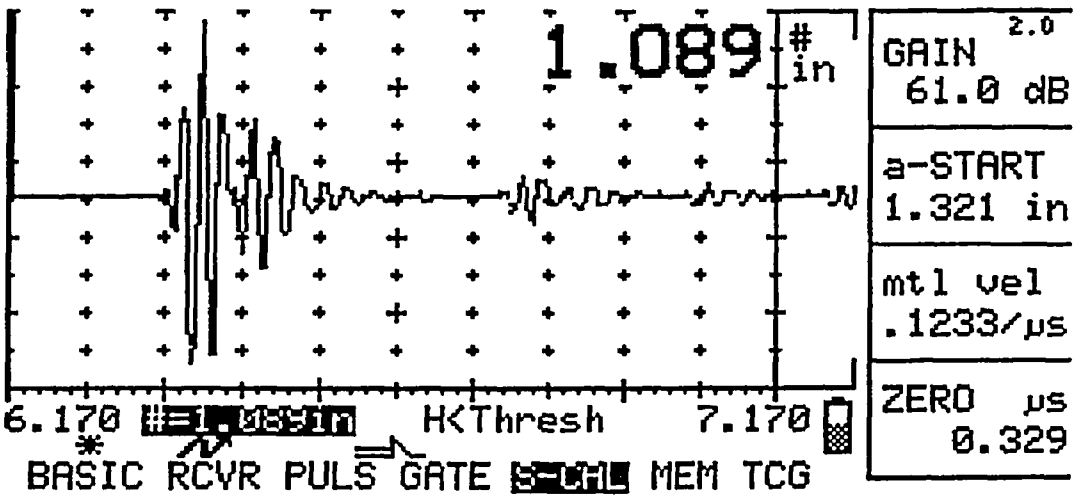
45° Post Waveform

HSBCT
4/19/02

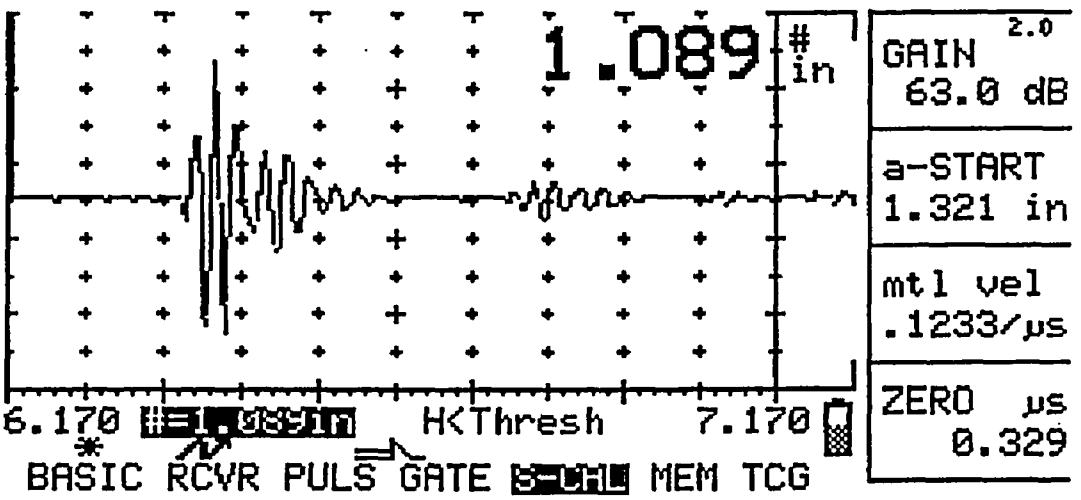
00105

REPORT NUMBER
R166

Nozzle Examination 60 ° Waveforms



60° Pre Waveform



60° Post Waveform

HSBGT
4/19/09

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TVA	BEAM SPREAD AND RESOLUTION DATA SHEET	REPORT NO. R166

PROJECT: BFN UNIT: 3 CALIBRATION BLOCK NO.: BF 18

PROCEDURE NO.: N-UT-9 REV.: 9 PCR: 0206 ~~4/19~~ 4-4-02

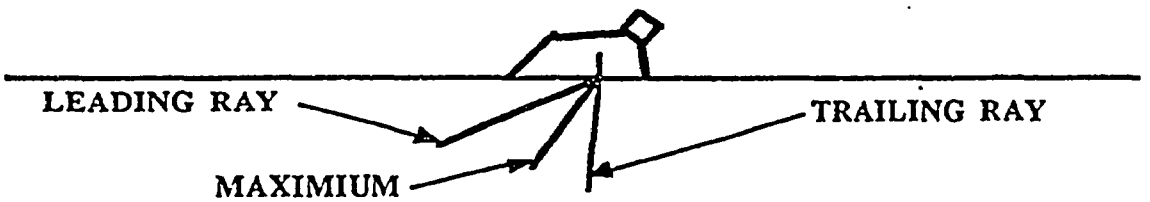
SEARCH UNIT-MAKE: Krautkramer SIZE: .5X1 FREQ.: 2.25

S/N: DB 34843 ANGLE: 45

ULTRASONIC INSTRUMENT-MAKE: Sonic 135 S/N: VH 751

BEAM SPREAD

	TRAILING RAY						LEADING RAY			
HOLE DEPTH	20% DAC		50% DAC		100% DAC		20% DAC		50% DAC	
	W	MP	W	MP	MP	W	MP	W	W	MP
1/4T	1 1/8	1.9	1 1/4	2.	2.1	1 5/8	2.4	2	1 7/8	2.3
[illegible]T	2 7/8	4	3	4.1	4.3	3 1/4	4.8	4 1/8	3 3/4	4.6
3/4T	4 1/4	6	4 1/2	6.3	6.5	4 7/8	7	5 7/8	5 1/4	6.8



RESOLUTION

NEAR SURFACE REFLECTOR: Notch OD DEPTH: 25 SIZE: .253 CAL BLK.: BF 18

FAR SURFACE REFLECTOR: Notch ID DEPTH: 6.1 SIZE: .253

SCANNING REFLECTORS PROVIDE 50% DAC SIGNALS AT SCANNING SPEED Y ☑ N ☐

EXAMINER: [signature]	REVIEWED BY: [signature]	ANII: [signature]
LEVEL: II DATE: 3-30-02	LEVEL: III DATE: 4/4/02	DATE: 4/19/02 4/19/02
		PAGE: 11 OF 15

TVA	BEAM SPREAD AND RESOLUTION DATA SHEET	REPORT NO. R166

PROJECT: BFN UNIT: 3 CALIBRATION BLOCK NO.: BF 18

PROCEDURE NO.: N-UT-9 REV.: 9 PCR: 0206 ~~HA~~ 04-04-02

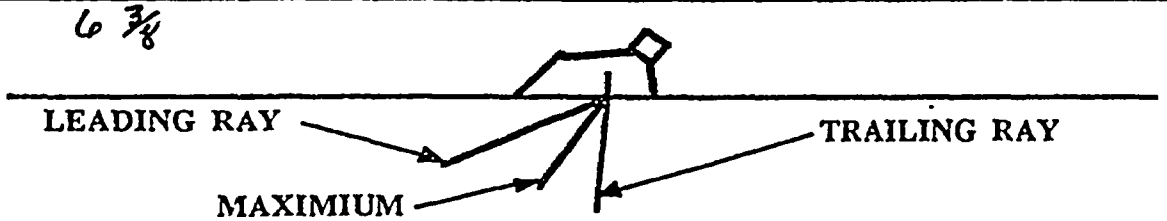
SEARCH UNIT-MAKE: Krautkramer SIZE: .5x1 FREQ.: 2.25

S/N: DB 34154 ANGLE: 60

ULTRASONIC INSTRUMENT-MAKE: Sonic 136 S/N: VH 751

BEAM SPREAD

	TRAILING RAY						LEADING RAY			
HOLE	20% DAC		50% DAC		100% DAC		20% DAC		50% DAC	
DEPTH	W	MP	W	MP	MP	W	MP	W	W	MP
1/4T	2 1/8	2.4	2 3/8	2.7	2.9	2 5/8	3.2	3 1/8	2 7/8	3.1
1/2T	4 3/4	4.8	5	5.3	5.8	5 1/4	6.4	6 5/8	6	6.1
3/4T	~~6 3/8~~ 6 3/8	~~6 3/8~~ 7.6	7 1/4	8	8.7	7 7/8	9.6	8 5/8	8	9.1



RESOLUTION

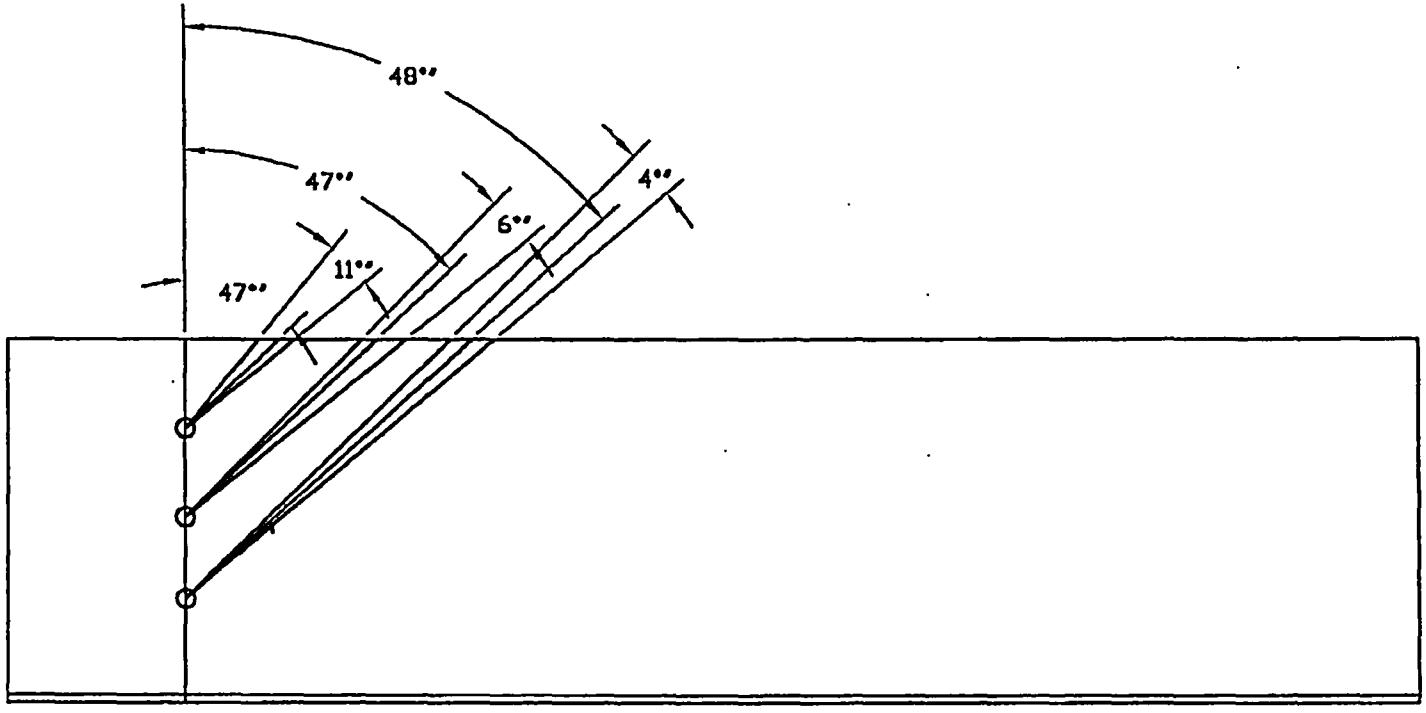
NEAR SURFACE REFLECTOR: Notch OD DEPTH: .25 SIZE: .253 CAL BLK.: BF 18

FAR SURFACE REFLECTOR: Notch ID DEPTH: 6.1 SIZE: .253

SCANNING REFLECTORS PROVIDE 50% DAC SIGNALS AT SCANNING SPEED Y ☒ N ☐

EXAMINER: Mike W Henry Jr	REVIEWED BY: [signature]	ANII: [signature]
LEVEL: II DATE: 3-30-02	LEVEL: III DATE: 4/4/02	DATE: 4/19/02 PAGE: 13 OF 13

REPORT NUMBER 00108
R166

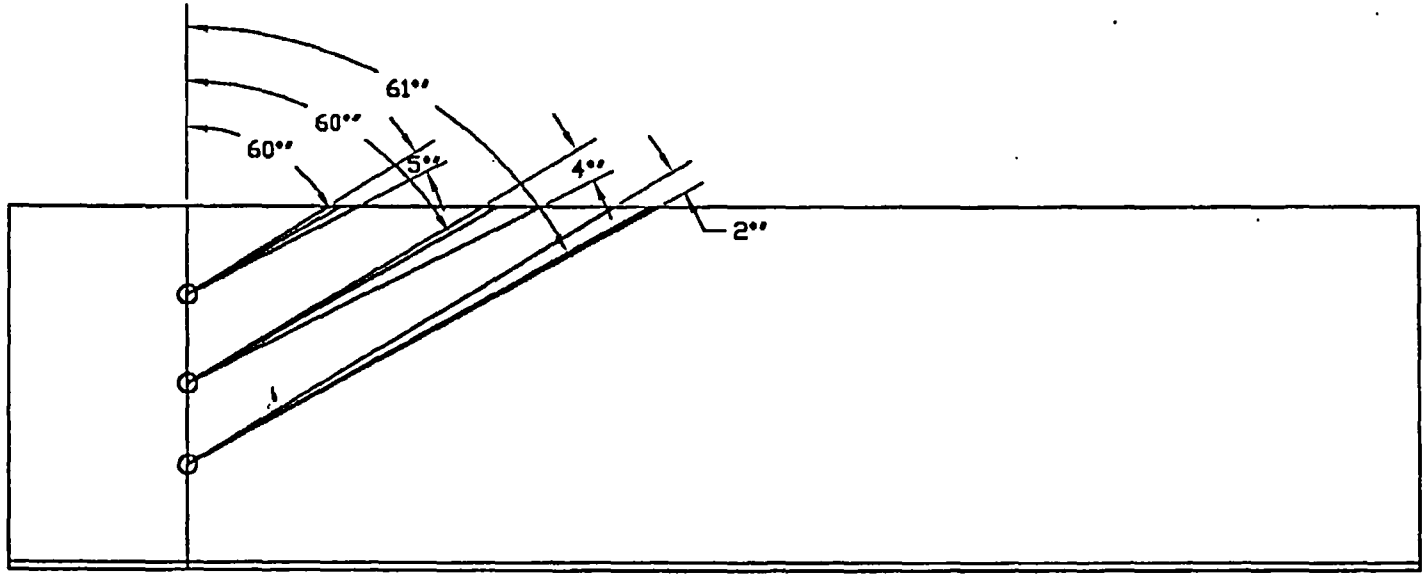


13 LF 0.5 15

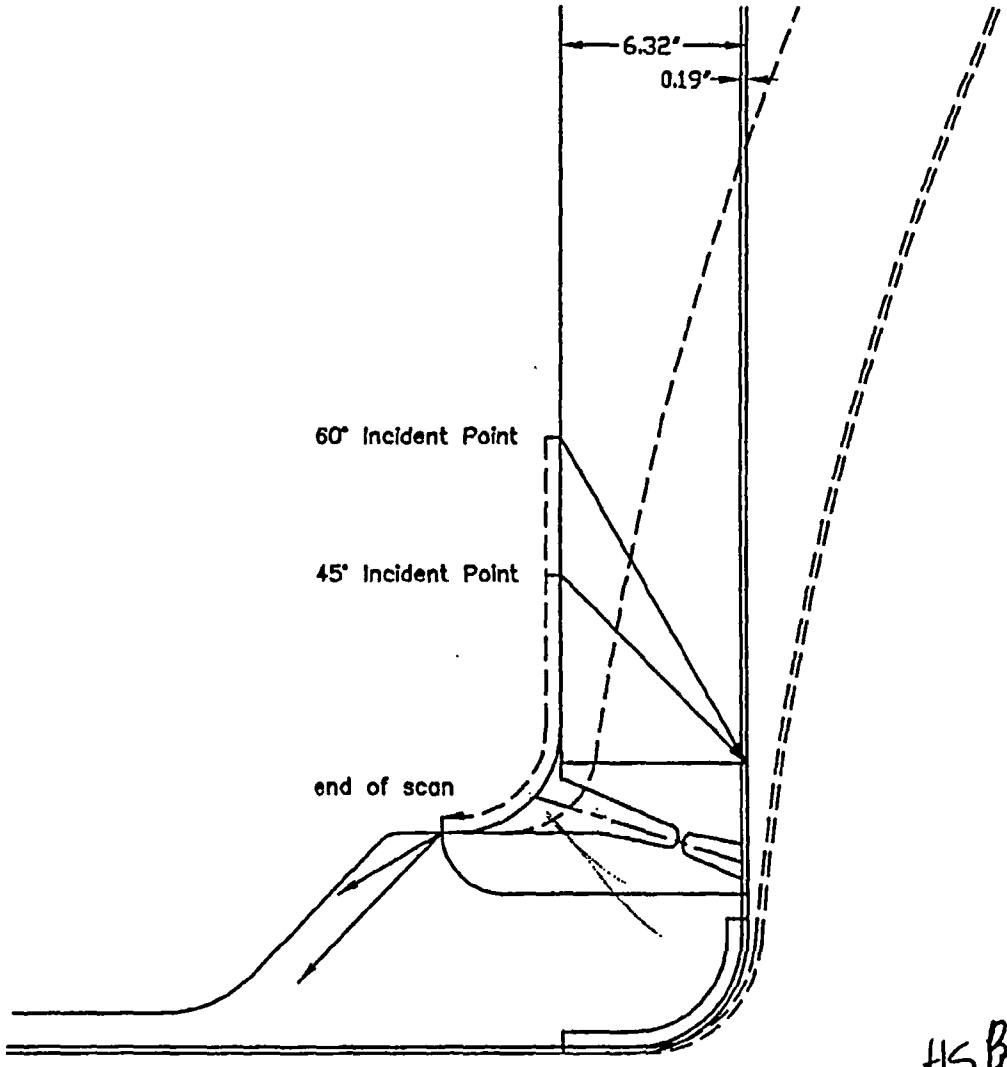
HSBCT
4/19/02

Browns Ferry Unit 3
Beamspread
MARCH 2002
BF-18

Report Number 00109
R166



HSBCT ATT 4/19/02	Browns Ferry Unit 3
	Beamspread
	MARCH 2002
	BF-18



NOTE: Transverse coverage includes coverage obtained during the inner radius examinations.

REPORT NUMBER R166

HSBCJ 4/19/02

Browns Ferry Unit 3	
N4 Nozzle-to-Shell	
March 2002	
SP-N4-NS	

00110

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TENNESSEE VALLEY AUTHORITY	EXAMINATION SUMMARY AND RESOLUTION SHEET	REPORT NUMBER: R167

PROJECT: BFN	UNIT: 3	CYCLE: 10		COMPONENT ID: N4A-IR	
EXAMINATION METHOD				SYSTEM RPV	ISI DWG. NO. 3-ISI-0327-C
MT ☐	PT ☐	UT ☒	VT ☐	CODE CLASS: 1	CATEGORY: B-D
PROCEDURE: N-UT-55	REV:9	TC:~~N/A~~ 03-08		COFIG.: Nozzle TO Vessel	
EXAMINER: MIKE KLEINJAN	EXAMINER: DAVID KLEINJAN			EXAMINER: N/A	EXAMINER: N/A
LEVEL: II	LEVEL: II			LEVEL: N/A	LEVEL: N/A

This report contains the data associated with the manual ultrasonic examination of code category B-D, Nozzle Inner radius. This examination report satisfies ASME section XI requirements for the inner radius examination.

N4A-IR: This examination was performed using a 21° and 27° in the blend radius in two directions CW/CCW

100% code coverage was obtained

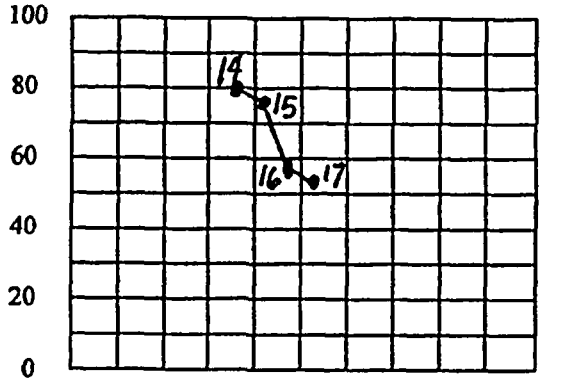
This exam was performed with equipment, Procedures, and personnel qualified in accordance with ASME Section XI

No Recordable Indications

RESOLUTION BY:	REVIEWED BY:	ANII:
Mike Kleinjan		DATE: 4/19/02
LEVEL: II DATE: 04-04-02	LEVEL: III DATE: 4/4/02	PG. 1 OF 14

TENNESSEE VALLEY AUTHORITY	DIGITAL ULTRASONIC CALIBRATION DATA SHEET	REPORT NUMBER: R167

PROJECT: BFN UNIT: 3 CYCLE: 10	CALIBRATION DATE: 03-30-02
PROC.: N-UT- 55 REV:9 ~~TC:N/A~~	CALIBRATION BLOCK NO.: BF-84-IR TEMP: 70.5'F
INSTR. MFG: STAVELEY DUE DATE: 08-11-02	SIMULATOR BLOCK NO: N/A
MODEL/TYPE: SONIC-137 M & TE NO.: VH-5473	THERMOMETER S/N: 522352 DUE DATE: 05-17-02
TRANSDUCER MFG: KRAUTKRAMER	COUPLANT SONOTRACE BATCH: 01141
S/N DB 351613 SIZE: 1.0" FREQ: 2.25 MHz	EXAM TYPE: SHEAR☐ LONG☐ RL☒
CABLE TYPE: RG 174 LENGTH: 120 inches	ANGLE VERIFICATION
	BLOCK TYPE: CS IIW S/N: DB 55074
DAC	NOMINAL ANGLE: 21 ACTUAL ANGLE: N/A



DISPLAY WIDTH: 20 inches

INSTRUMENT SETTINGS

REFLECTOR SCAN DIRECT.	NTCH	SDH	REFERENCE SENSITIVITY	MEMORY NUMBER
AXIAL	☒	☐	55.0 dB	22
CIRC	☐	☐	N/A dB	N/A

FREQ: 2.25 MHz	REJECT: OFF %
ANGLE: N/A deg	DAMPING: 200 ohms
DELAY: 1.61 msec	PULSER: 222
ZERO: N/A msec	FILTER: FILT 1
VELOCITY: 0.233 msec	REP RATE: 4 KHZ
RANGE: 20.0 inches	TOF: ☐PEAK ☒FLANK
DISPLAY MODE: PE	POWER: AC
DUAL: ☐ ON ☒ OFF	TCG: ☐ ON ☒ OFF

REF. REFLECTOR: N/A	GAIN: N/A dB
AMPLITUDE: N/A %	METAL PATH: N/A"

CALIBRATION TIMES

INITIAL TIME: 1505 FINAL TIME: 1810

VERIFICATION TIMES	1)N/A	2)N/A	3)N/A	4)N/A	5)N/A	6)N/A	7)N/A	8)N/A	9)N/A

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	

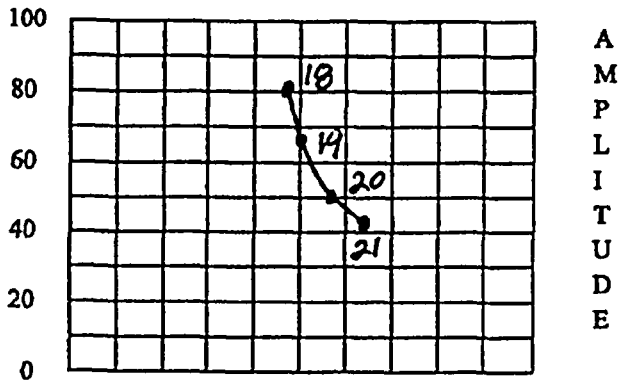
ATTENUATOR	GAIN	SET	-6 dB	-12 dB	SET	+12	SET	+6	
	AMP	80%	32 TO 48	16 TO 24	20 %	64 TO 96	40%	64 TO 96	
			40	20		80		80	

COMMENTS:	WELDS/ITEMS EXAMINED:
Wedge ID D-14795-246	REACTOR PRESSURE VESSEL
	N4A-IR, N4F-IR

EXAMINER:	EXAMINER:	REVIEWER:	ANII:
DAVID KLEINJAN	MIKE KLEINJAN		DATE: 4/19/02
LEVEL: II	LEVEL: II	LEVEL: III DATE: 4/4/02	PG.: ~~3 OF 4~~ ~~4 of 4~~ 4/10/02 2 OF 4

TENNESSEE VALLEY AUTHORITY	DIGITAL ULTRASONIC CALIBRATION DATA SHEET	REPORT NUMBER: R167

PROJECT: BFN UNIT: 3 CYCLE: 10	CALIBRATION DATE: 03-30-02
PROC.: N-UT- 55 REV:9 ~~TC:N/A~~	CALIBRATION BLOCK NO.: BF-84-IR TEMP: 70.5°F
INSTR. MFG: STAVELEY DUE DATE: 08-11-02	SIMULATOR BLOCK NO: N/A
MODEL/TYPE: SONIC-137 M & TE NO.: VH-5473	THERMOMETER S/N: 522352 DUE DATE: 05-17-02
TRANSDUCER MFG: KRAUTKRAMER	COUPLANT SONOTRACE BATCH: 01141
S/N DB 35164 SIZE: 1.0" FREQ: 2.25 MHz	EXAM TYPE: SHEAR☐ LONG☐ RL☒
CABLE TYPE: RG 174 LENGTH: 120 inches	ANGLE VERIFICATION
	BLOCK TYPE: CS IIW S/N: DB 55074
DAC	NOMINAL ANGLE: 27 ACTUAL ANGLE: N/A



DISPLAY WIDTH: 20 inches

INSTRUMENT SETTINGS

REFLECTOR SCAN DIRECT.	NTCH	SDH	REFERENCE SENSITIVITY	MEMORY NUMBER
AXIAL	☒	☐	56.2 dB	23
CIRC	☐	☐	N/A dB	N/A

FREQ: 2.25 MHz	REJECT: OFF %
ANGLE: N/A deg	DAMPING: 200 ohms
DELAY: 0.950 msec	PULSER: 222
ZERO: N/A msec	FILTER: FILT 1
VELOCITY: 0.233 msec	REP RATE: 4 KHZ
RANGE: 20.0 inches	TOF: ☐PEAK ☒ FLANK
DISPLAY MODE: PE	POWER: AC
DUAL: ☐ ON ☒ OFF	TCG: ☐ ON ☒ OFF

REF. REFLECTOR: N/A GAIN: N/A dB	CALIBRATION TIMES
AMPLITUDE: N/A % METAL PATH: N/A"	INITIAL TIME: 1505 FINAL TIME: 1810

VERIFICATION TIMES	1)N/A	2)N/A	3)N/A	4)N/A	5)N/A	6)N/A	7)N/A	8)N/A	9)N/A

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	-12 dB	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:	WELDS/ITEMS EXAMINED:
Wedge ID D-14795-247	REACTOR PRESSURE VESSEL
	N4A-IR, N4F-IR

EXAMINER:	EXAMINER:	REVIEWER:	ANII:
DAVID KLEINJAN	MIKE KLEINJAN		DATE: 4/19/02
LEVEL: II	LEVEL: II	LEVEL: ~~II~~ DATE: 4/19/02	PG.: ~~1 OF 1~~ 3 OF 4 4/19/02

TVA	MANUAL ULTRASONIC VESSEL EXAMINATION DATA SHEET	REPORT NO. R167

PROJECT: BFN UNIT: 3 WELD ID: N4A CONFIG.: INNER RADIUS COMPONENT: N/A

CAL. SHT. NO.: N/A PROCEDURE: N-UT-55 REV.: 9 PCR.: 02-081 ~~N/A~~ 054-10-02 TEMP.: 85 PYRO.: 52235

SCAN SENS.: * dB EXAM START: 1650 EXAM END: 1750 EXAM ANGLE: 21°, 27°

Lo LOCATION: TDC Wo LOCATION: ℄ OF WELD

IND NO.	20%			50%			100%			MAX. AMP.			20%			50%			100%		
	Mp1	W1	L1	Mp1	W1	L1	Mp1	W1	L1	Mp	W	L	Mp2	W2	L2	Mp2	W2	L2	Mp2	W2	L2
21°	SCAN		dB	* 61			SCANNING		* 10%		BLEND		RADIUS								
27°	SCAN		dB	622			SCANNING		* 10%		BLEND		RADIUS								
				No Recordable Indication																	

COMMENTS: A MATERIAL NOISE LEVEL OF 5-10% WAS OBSERVED

EXAMINER: D.R. Gage LEVEL: II DATE: 03-30-02 REVIEWED BY: [signature] LEVEL: III DATE: 4/4/02

EXAMINER: Mike W. Hughes LEVEL: II DATE: 4-4-02 ANII: [signature] DATE: 4/18/02 PAGE 42 OF 4

00114

TVA 40094 (NP-1-89) 1-108-999-48

Inspection Report R-168
Weld N4F-NV

TENNESSEE VALLEY AUTHORITY	EXAMINATION SUMMARY AND RESOLUTION SHEET	REPORT NUMBER: R168

PROJECT: BFN	UNIT: 3	CYCLE: 10		COMPONENT ID: N4F	
EXAMINATION METHOD				SYSTEM RPV	ISI DWG. NO. 3-ISI-0327-C
MT ☐	PT ☐	UT ☒	VT ☐	CODE CLASS: 1	CATEGORY: B-D
PROCEDURE: N-UT-9	REV:9	TC:02-06		COFIG.: Nozzle TO Vessel	
EXAMINER: MIKE KLEINJAN LEVELII:	EXAMINER: DAVID KLEINJAN LEVEL:II			EXAMINER: N/A LEVEL: N/A	EXAMINER: N/A LEVEL: N/A

This report contains the data associated with the manual ultrasonic examination of code category B-D, Nozzle to Vessel welds. This examination report satisfies ASME section XI requirements for the Nozzle to shell weld..

Examination. Nozzle to Vessel weld N4F
Transverse coverage for the Nozzle to Vessel weld was supplemented by the inner radius examination. (N4F-IR) See R169

0° was used on the weld crown and base material Vessel side

45° was used on the vessel side only scanning over the weld crown
45° Tangent to the weld was used on vessel side CW/CCW
45° Parallel to the weld was used on vessel side CW/CCW

60° was used on the vessel side only scanning over the weld crown
60° Tangent to the weld was used on vessel side CW/CCW
60° Parallel to the weld was used on vessel side CW/CCW

77% code coverage was obtained

This exam was performed with equipment, Procedures, and personnel qualified in accordance with ASME Section XI

No Recordable Indications

RESOLUTION BY:	REVIEWED BY:	ANII:
Mike Kleinjan with w R Lyja		DATE: 4/19/02
LEVEL: II DATE: 4-4-02	LEVEL: III DATE: 4/4/02	PG. ~~1 OF 15~~ 1 OF 15

Report Number
R168

00116

Calculation of ASME code coverage
For section XI NDE Examination

N4F

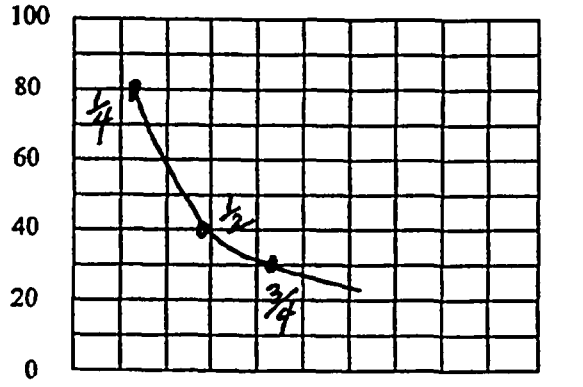
1) O degree (weld metal scan)	100%
2) 45 degree Transverse-scan from vessel side of weld	100%
3) 45 degree Transverse-scan from nozzle side of weld	0%
4) 60 degree Transverse-scan from vessel side of weld	100%
5) 60 degree Transverse-scan from nozzle side of weld	0%
6) 45 degree Parallel-scan CW direction	100% *
7) 45 degree Parallel-scan CCW direction	100% *
8) 60 degree Parallel-scan CW direction	100% *
9) 60 degree Parallel-scan CCW direction	100% *
The sum of all the percentage of scans	700%
Divided by the total # of scans	9
Percentage of examination Volume coverage	77%

* Transverse coverage includes coverage obtained during the inner radius examination.

HSBCT
4/19/02

TENNESSEE VALLEY AUTHORITY	DIGITAL ULTRASONIC CALIBRATION DATA SHEET	REPORT NUMBER: R168

PROJECT: BFN UNIT: 3 CYCLE: 10	CALIBRATION DATE: 3-30-02
PROC.: N-UT- 9 REV:9 TC:02-06	CALIBRATION BLOCK NO.: BF18 TEMP: 72.6°F
INSTR. MFG: Staveley DUE DATE: 8-05-02	SIMULATOR BLOCK NO: DB55079
MODEL/TYPE: sonic 136 M & TE NO.: VH751	THERMOMTER S/N: 522352 DUE DATE: 5-17-02
TRANSDUCER MFG: Harisonic	COUPLANT SONOTRACE BATCH: 01141
S/N DB34198 SIZE: .75 FREQ: 2.25 MHz	EXAM TYPE: SHEAR☐ LONG☒ RL☐
CABLE TYPE: RG174 LENGTH: 120 inches	4-4-02 ANGLE VERIFICATION
	BLOCK TYPE: ~~Rompus~~ Rompas S/N: DB55079
DAC	NOMINAL ANGLE: 0 ACTUAL ANGLE: N/A



DISPLAY WIDTH: 10 inches

INSTRUMENT SETTINGS

REFLECTOR SCAN DIRECT.	NTCH	SDH	REFERENCE SENSITIVITY	MEMORY NUMBER
AXIAL	☐	☒	20.8 dB	1
CIRC	☐	☐	n/a dB	n/a

FREQ: 2.25 MHz	REJECT: off %
ANGLE: n/a deg	DAMPING: 500 ohms
DELAY: .499 msec	PULSER: 222
ZERO: n/a msec	FILTER: Filt 3
VELOCITY: .238 msec	REP RATE: 2KHZ
RANGE: 10 inches	TOF: ☒PEAK ☐ FLANK
DISPLAY MODE:	POWER: AC
DUAL: ☐ ON ☒ OFF	TCG: ☐ ON ☒ OFF

REF. REFLECTOR: 1" GAIN: 8 dB	CALIBRATION TIMES
AMPLITUDE: 80 % METAL PATH: 1"	INITIAL TIME: 9:00 FINAL TIME: 1830

VERIFICATION TIMES	1)14:00	2) n/a	3) n/a	4) n/a	5) n/a	6) n/a	7) n/a	8) n/a	9) n/a

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	

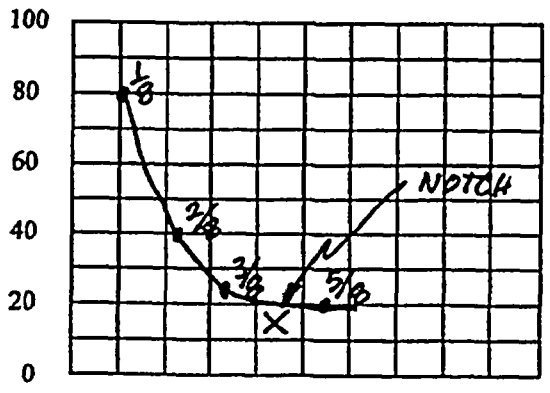
ATTENUATOR	GAIN	SET	-6 dB	-12 dB	SET	+12	SET	+6	
	AMP	80%	32 TO 48	16 TO 24	20 %	64 TO 96	40%	64 TO 96	
			40	20		80		80	

COMMENTS:	WELDS/ITEMS EXAMINED:
	N4A, N4F Nozzle to Shell

EXAMINER:	EXAMINER:	REVIEWER:	ANII:
MIKE W. KLEINJAN	DAVID KLEINJAN		DATE: 4/19/02
LEVEL: II	LEVEL: II	LEVEL: III DATE: 4/4/02	PG.: ~~1 C OF 1 15~~ 3 4/18/02 3 OF 15

TENNESSEE VALLEY AUTHORITY	DIGITAL ULTRASONIC CALIBRATION DATA SHEET	REPORT NUMBER: R168

PROJECT: BFN UNIT: 3 CYCLE: 10	CALIBRATION DATE: 3-30-02
PROC.: N-UT- 9 REV:9 TC:02-06	CALIBRATION BLOCK NO.: BF18 TEMP: 72.6°F
INSTR. MFG: Staveley DUE DATE: 8-05-02	SIMULATOR BLOCK NO: DB55079
MODEL/TYPE: sonic 136 M & TE NO.: VH751	THERMOMTER S/N: 522352 DUE DATE: 5-17-02
TRANSDUCER MFG: Krauntkramer	COUPLANT SONOTRACE BATCH: 01141
S/N DB34843 SIZE: .5x1 FREQ: 2.25 MHz	EXAM TYPE: SHEAR☒ LONG☐ RL☐
CABLE TYPE: RG1743 LENGTH: 120 inches	ANGLE VERIFICATION
	BLOCK TYPE: IIW / S/N: DB55074
DAC	NOMINAL ANGLE: 45° / ACTUAL ANGLE: 46°



DISPLAY WIDTH: 10 inches

INSTRUMENT SETTINGS

REFLECTOR SCAN DIRECT.	NTCH	SDH	REFERENCE SENSITIVITY	MEMORY NUMBER
AXIAL	☐	☒	42.6 dB	2
CIRC	☐	☐	n/a dB	n/a

FREQ: 2.25 MHz	REJECT: off %
ANGLE: N/A deg	DAMPING: 500 ohms
DELAY: .830 msec	PULSER: 222
ZERO: N/A msec	FILTER: FITL 3
VELOCITY: .126 msec	REP RATE: 2KHZ
RANGE: 20 inches	TOF: ☒PEAK ☐ FLANK
DISPLAY MODE: PE	POWER: AC
DUAL: ☐ ON ☒ OFF	TCG: ☐ ON ☒ OFF

REF. REFLECTOR: 1" GAIN: 33.6 dB	CALIBRATION TIMES
AMPLITUDE: 80 % METAL PATH: 1"	INITIAL TIME: 9:00 FINAL TIME: 18:30

VERIFICATION TIMES	1)14:00	2) N/A	3) N/A	4) N/A	5) N/A	6) N/A	7) N/A	8) N/A	9) N/A

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	

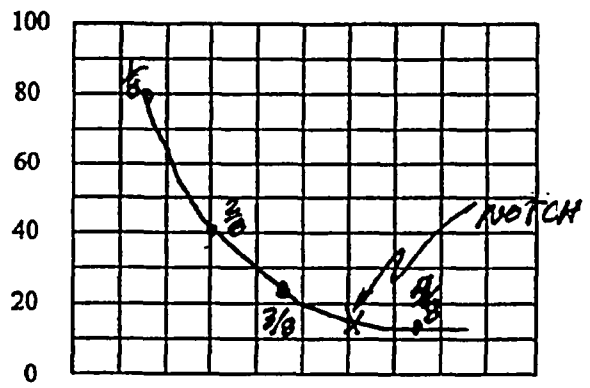
ATTENUATOR									
GAIN	SET	-6 dB	-12 dB	SET	+12	SET	+6	
AMP	80%	32 TO 48	16 TO 24	20 %	64 TO 96	40%	64 TO 96	
		40	20		80		80	

COMMENTS:	WELDS/ITEMS EXAMINED:
Delta difference between 3/8 to 5/8 on the clad side is 3 dB	N4A,N4F Nozzle to Shell

EXAMINER:	EXAMINER:	REVIEWER:	ANII:
MIKE W. KLEINJAN	DAVID KLEINJAN		DATE: 4/19/02
LEVEL:II	LEVEL:II	LEVEL: II DATE: 4/4/02	PG.: ~~1 8 OF 1 15~~ 4/10/02 4 OF 15

TENNESSEE VALLEY AUTHORITY	DIGITAL ULTRASONIC CALIBRATION DATA SHEET	REPORT NUMBER: R168

PROJECT: BFN UNIT: 3 CYCLE: 10	CALIBRATION DATE: 3-30-02
PROC.: N-UT- 9 REV:9 TC:02-06	CALIBRATION BLOCK NO.: BF18 TEMP: 72.6'F
INSTR. MFG: Staveley DUE DATE: 8-05-02	SIMULATOR BLOCK NO: DB55079
MODEL/TYPE: Sonic 136 M & TE NO.: VH751	THERMOMTER S/N: 522352 DUE DATE: 5-17-02
TRANSDUCER MFG: Krauntkramer	COUPLANT SONOTRACE BATCH: 01141
S/N DB34154 SIZE: .5x1 FREQ: 2.25 MHz	EXAM TYPE: SHEAR☒ LONG☐ RL☐
CABLE TYPE: RG174 LENGTH: 120 inches	ANGLE VERIFICATION
	BLOCK TYPE: IIW / S/N: DB55074
DAC	NOMINAL ANGLE: 60 / ACTUAL ANGLE: 59



DISPLAY WIDTH: 10 inches

INSTRUMENT SETTINGS

REFLECTOR SCAN DIRECT.	NTCH	SDH	REFERENCE SENSITIVITY	MEMORY NUMBER
AXIAL	☐	☒	49 dB	3
CIRC	☐	☐	n/a dB	n/a

FREQ: 2.25 MHz	REJECT: off %
ANGLE: N/A deg	DAMPING: 500 ohms
DELAY: 1.20 msec	PULSER: 222
ZERO: N/A msec	FILTER: FITL 3
VELOCITY: .123 msec	REP RATE: 2KHZ
RANGE: 20 inches	TOF: ☒PEAK ☐ FLANK
DISPLAY MODE:	POWER: AC
DUAL: ☐ ON ☒ OFF	TCG: ☐ ON ☒ OFF

REF. REFLECTOR: 1" GAIN: 36 dB	CALIBRATION TIMES
AMPLITUDE: 80 % METAL PATH: 1"	INITIAL TIME: 9:00 FINAL TIME: 18:30

VERIFICATION TIMES	1)14:00	2)n/a	3)n/a	4)n/a	5)n/a	6)n/a	7)n/a	8)n/a	9)n/a

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	

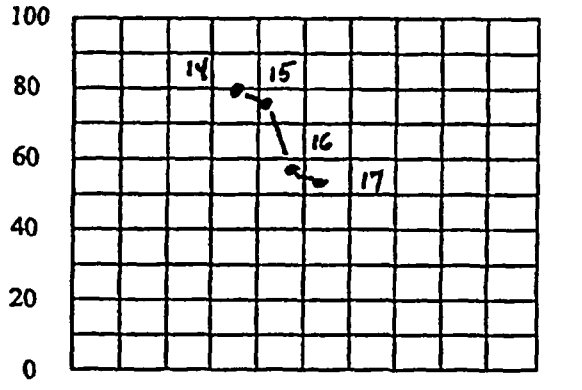
ATTENUATOR									
GAIN	SET	-6 dB	-12 dB	SET	+12	SET	+6	
AMP	80%	32 TO 48	16 TO 24	20 %	64 TO 96	40%	64 TO 96	
		40	20		80		80	

COMMENTS:	WELDS/ITEMS EXAMINED:
DELTA dB DIFFERENCE IS 4.4 FROM THE 3/8 TO 5/8 ON THE	N4A,N4F Nozzle to Shell
CLAD SIDE	

EXAMINER:	EXAMINER:	REVIEWER:	ANII:
MIKE W. KLEINJAN	DAVID KLEINJAN		DATE: 4/19/02
LEVEL: II	LEVEL: II	LEVEL: III DATE: 4/4/02	PG.: ~~4 7 OF 1 15~~ 4/10/02 5 OF 15

TENNESSEE VALLEY AUTHORITY	DIGITAL ULTRASONIC CALIBRATION DATA SHEET	REPORT NUMBER: R168

PROJECT: BFN UNIT: 3 CYCLE: 10	CALIBRATION DATE: 03-30-02
PROC.: N-UT- 55 REV:9 ~~TC:N/A~~	CALIBRATION BLOCK NO.: BF-84-IR TEMP: 70.5°F
INSTR. MFG: STAVELEY DUE DATE: 08-11-02	SIMULATOR BLOCK NO: N/A
MODEL/TYPE: SONIC-137 M & TE NO.: VH-5473	THERMOMETER S/N: 522352 DUE DATE: 05-17-02
TRANSDUCER MFG: KRAUTKRAMER	COUPLANT SONOTRACE BATCH: 01141
S/N DB 35164 SIZE: 1.0" FREQ: 2.25 MHz	EXAM TYPE: SHEAR☐ LONG☐ RL☒
CABLE TYPE: RG 174 LENGTH: 120 inches	ANGLE VERIFICATION
	BLOCK TYPE: CS IIW / S/N: DB 55074
DAC	NOMINAL ANGLE: 21 / ACTUAL ANGLE: N/A



DISPLAY WIDTH: 20 inches

INSTRUMENT SETTINGS

REFLECTOR SCAN DIRECT.	NTCH	SDH	REFERENCE SENSITIVITY	MEMORY NUMBER
AXIAL	☒	☐	55.0 dB	22
CIRC	☐	☐	N/A dB	N/A

FREQ: 2.25 MHz	REJECT: OFF %
ANGLE: N/A deg	DAMPING: 200 ohms
DELAY: 1.61 msec	PULSER: 222
ZERO: N/A msec	FILTER: FILT 1
VELOCITY: 0.233 msec	REP RATE: 4 KHZ
RANGE: 20.0 inches	TOF: ☐PEAK ☒FLANK
DISPLAY MODE: PE	POWER: AC
DUAL: ☐ ON ☒ OFF	TCG: ☐ ON ☒ OFF

REF. REFLECTOR: N/A	GAIN: N/A dB
AMPLITUDE: N/A %	METAL PATH: N/A"

CALIBRATION TIMES

INITIAL TIME: 1505 FINAL TIME: 1810

VERIFICATION TIMES	1)N/A	2)N/A	3)N/A	4)N/A	5)N/A	6)N/A	7)N/A	8)N/A	9)N/A

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

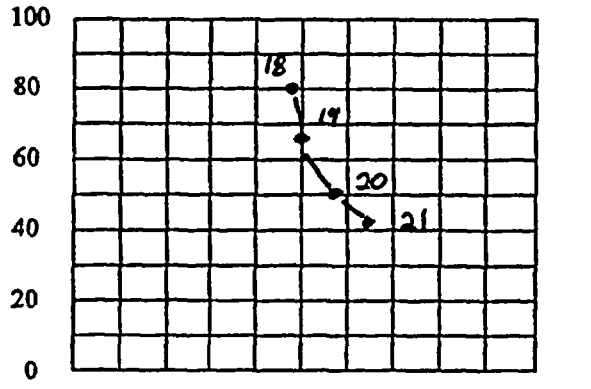
ATTENUATOR	GAIN	SET	-6 dB	-12 dB	SET	+12	SET	+6	
	AMP	80%	32 TO 48	16 TO 24	20 %	64 TO 96	40%	64 TO 96	
			40	20		80		80	

COMMENTS:	WELDS/ITEMS EXAMINED:
	REACTOR PRESSURE VESSEL
	N4A-IR, N4F-IR
	wedge ID D-14795-246

EXAMINER:	EXAMINER:	REVIEWER:	ANII:
DAVID KLEINJAN	MIKE KLEINJAN		DATE: 4/19/02
LEVEL: II	LEVEL: II	LEVEL: III DATE: 4/4/02	PG. ~~14 OF 15~~ 4/10/02 6 OF 15

TENNESSEE VALLEY AUTHORITY	DIGITAL ULTRASONIC CALIBRATION DATA SHEET	REPORT NUMBER: R168

PROJECT: BFN UNIT: 3 CYCLE: 10	CALIBRATION DATE: 03-30-02
PROC.: N-UT- 55 REV:9 ~~TC:N/A~~	CALIBRATION BLOCK NO.: BF-84-IR TEMP: 70.5°F
INSTR. MFG: STAVELEY DUE DATE: 08-11-02	SIMULATOR BLOCK NO: N/A
MODEL/TYPE: SONIC-137 M & TE NO.: VH-5473	THERMOMETER S/N: 522352 DUE DATE: 05-17-02
TRANSDUCER MFG: KRAUTKRAMER	COUPLANT SONOTRACE BATCH: 01141
S/N DB 35164 SIZE: 1.0" FREQ: 2.25 MHz	EXAM TYPE: SHEAR☐ LONG☐ RL☒
CABLE TYPE: RG 174 LENGTH: 120 inches	ANGLE VERIFICATION
	BLOCK TYPE: CS IIW / S/N: DB 55074
DAC	NOMINAL ANGLE: 27 / ACTUAL ANGLE: N/A



DISPLAY WIDTH: 20 inches

INSTRUMENT SETTINGS

REFLECTOR SCAN DIRECT.	NTCH	SDH	REFERENCE SENSITIVITY	MEMORY NUMBER
AXIAL	☒	☐	56.2 dB	23
CIRC	☐	☐	N/A dB	N/A

FREQ: 2.25 MHz	REJECT: OFF %
ANGLE: N/A deg	DAMPING: 200 ohms
DELAY: 0.950 msec	PULSER: 222
ZERO: N/A msec	FILTER: FILT 1
VELOCITY: 0.233 msec	REP RATE: 4 KHZ
RANGE: 20.0 inches	TOF: ☐ PEAK ☒ FLANK
DISPLAY MODE: PE	POWER: AC
DUAL: ☐ ON ☒ OFF	TCG: ☐ ON ☒ OFF

REF. REFLECTOR: N/A	GAIN: N/A dB
AMPLITUDE: N/A %	METAL PATH: N/A"

CALIBRATION TIMES

INITIAL TIME: 1505 FINAL TIME: 1810

VERIFICATION TIMES	1)N/A	2)N/A	3)N/A	4)N/A	5)N/A	6)N/A	7)N/A	8)N/A	9)N/A

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	-12 dB	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:	WELDS/ITEMS EXAMINED:
	REACTOR PRESSURE VESSEL
	N4A-IR, N4F-IR
	wedge TO D-14795-247

EXAMINER:	EXAMINER:	REVIEWER:	ANII:
DAVID KLEINJAN	MIKE KLEINJAN		DATE: 4/19/02
LEVEL: II	LEVEL: II	LEVEL: III DATE: 4/19/02	PG.: ~~1 5 OF 1 15~~ 7 OF 15 4/19/02

TVA	MANUAL ULTRASONIC VESSEL EXAMINATION DATA SHEET	REPORT NO. R168

PROJECT: BFN UNIT: 3 WELD ID: N4F CONFIG.: Nozzle COMPONENT: VESSEL

CAL. SHT. NO.: N/A PROCEDURE: NI-UT-9 REV.: 9 PCR.: 0206 ~~N/A~~ 2-04-02 TEMP.: 85 PYRO.: 522352

SCAN SENS.: ~~X~~ dB EXAM START: 3/30/02 15:50 EXAM END: 1650 EXAM ANGLE: 0°, 45°, 60°

Lo LOCATION: TDC Wo LOCATION: ℄ OF WELD

IND NO.	20%			50%			100%			MAX. AMP.			20%			50%			100%		
	Mp1	W1	L1	Mp1 ~~X~~	W1	L1	Mp1	W1	L1	Mp	W	L	Mp2	W2	L2	Mp2	W2	L2	Mp2	W2	L2
21°	SCAN.		dB	61		SCANNING		#	10/11	BLEND RADIUS											
27°	SCAN		dB	62.2		SCANNING		#	10/11	BLEND RADIUS											
0°	SCAN		dB	34.8		SCANNING		#	9	ON WELD AND BASE MATERIAL											
45°	SCAN		dB	56.6		SCANNING		#	9	ON WELD AND VESSEL SIDE											
45°T	SCAN		dB	56.6		SCANNING		#	10/11	CW/CCW VESSEL SIDE											
45 TAN	SCAN		dB	56.6		SCANNING		#	10/11	CW/CCW VESSEL SIDE											
60°	SCAN		dB	63		SCANNING		#	9	ON weld AND VESSEL SIDE											
60°T	SCAN		dB	63		SCANNING		#	10/11	CW/CCW VESSEL SIDE											
60 TAN	SCAN		dB	63		SCANNING		#	10/11	CW/CCW VESSEL SIDE											
				NO RECORDABLE INDICATION																	

COMMENTS: 21° AND 27° EXAMINATIONS ARE THE BLEND RADIUS EXAMINATIONS TRANSVERSE EXAMINATION COVERAGE WILL INCLUDE COVERAGE OBTAINED DURING THE INNER RADIUS EXAMINATIONS. 5 TO 10 % Noise Level was observed

EXAMINER: [signature] LEVEL: II DATE: 3-30-02 REVIEWED BY: [signature] LEVEL: III DATE: 4/16/02

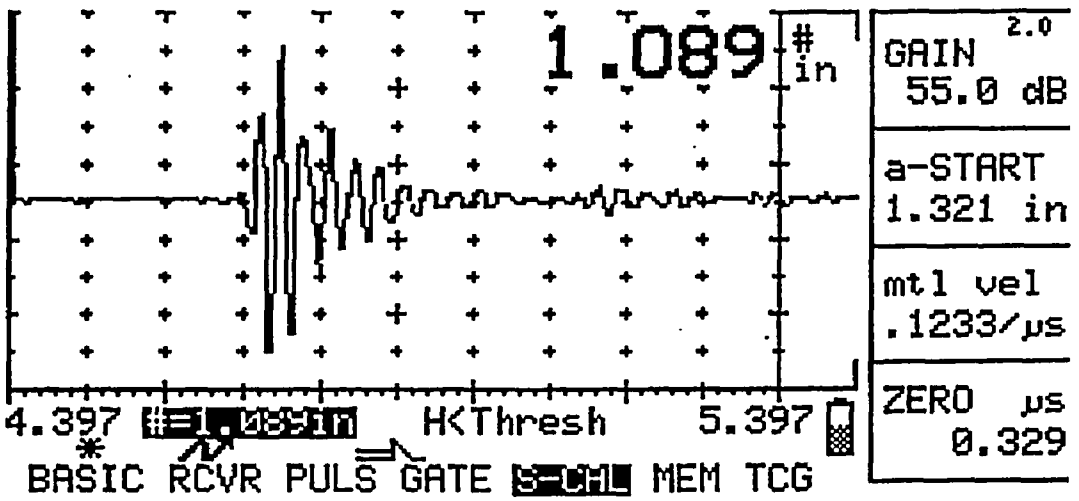
EXAMINER: [signature] LEVEL: II DATE: 3-30-02 ANII: [signature] DATE: 4/16/02 PAGE 8 OF 15

TVA 40094 (NP-1-89) 1-108-999-48

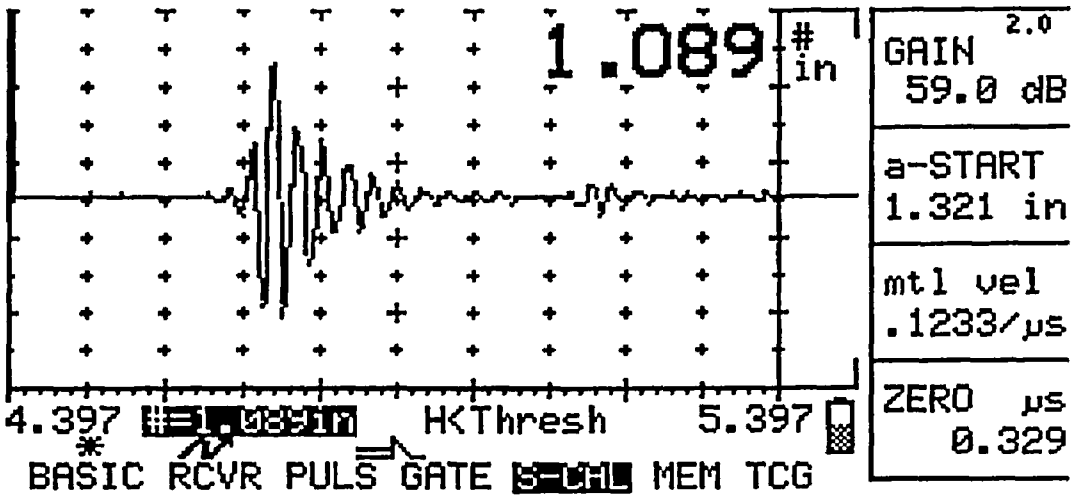
001122

Report Number
R168 00123

Nozzle Examination 45 °Waveforms



45° Pre Waveform



45° Post Waveform

HSB CT 4/19/02
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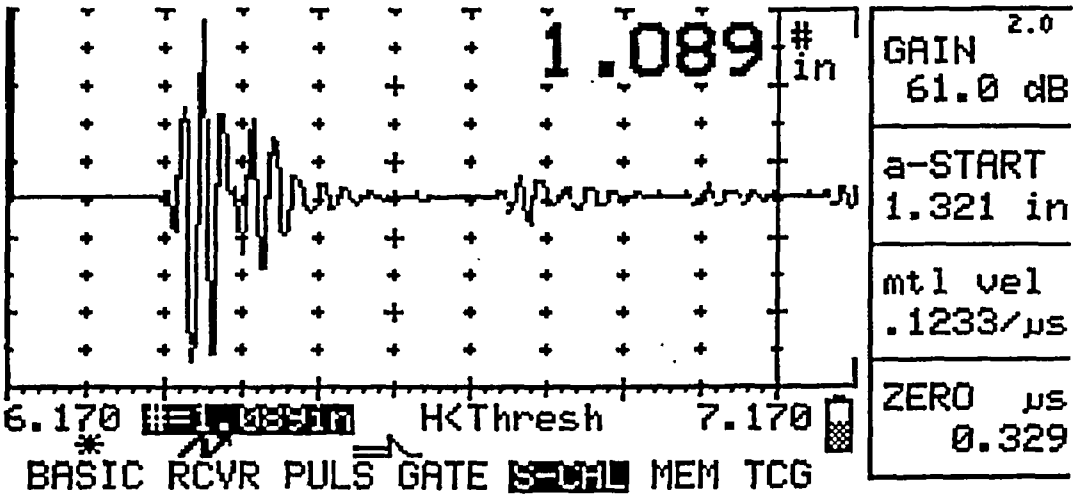
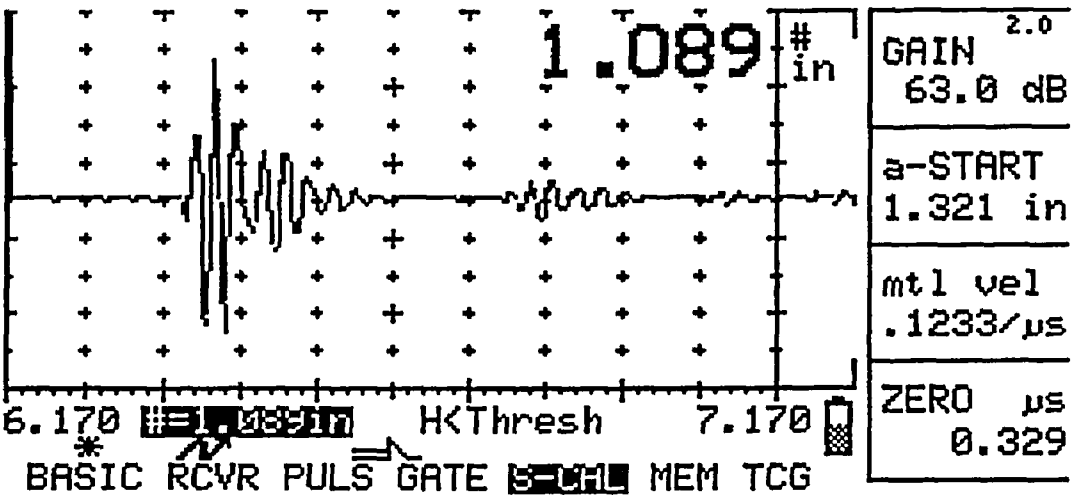
4/19/02

00124
REPORT NUMBER
R168

Nozzle Examination 60 ° Waveforms



60° Pre Waveform



60° Post Waveform

HSBC 4/16/02

4/10/02 10 OF 15

TVA	BEAM SPREAD AND RESOLUTION DATA SHEET	REPORT NO. R168

PROJECT: BFN UNIT: 3 CALIBRATION BLOCK NO.: BF 18

PROCEDURE NO.: N-UT-9 REV.: 9 PCR: 0206 ~~8/18~~ 3-30-02

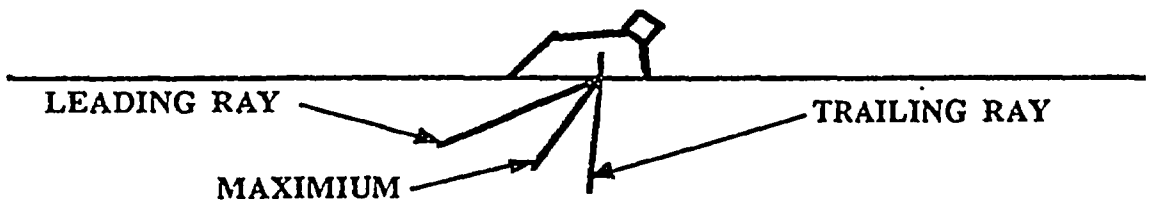
SEARCH UNIT-MAKE: Krautkramer SIZE: .5X1 FREQ.: 2.25

S/N: DB 34843 ANGLE: 45

ULTRASONIC INSTRUMENT-MAKE: Sonic 135 S/N: VH 751

BEAM SPREAD

	TRAILING RAY						LEADING RAY			
HOLE DEPTH	20% DAC		50% DAC		100% DAC		20% DAC		50% DAC	
	W	MP	W	MP	MP	W	MP	W	W	MP
1/4T	1 1/8	1.9	1 1/4	2.	2.1	1 5/8	2.4	2	1 7/8	2.3
2T	2 7/8	4	3	4.1	4.3	3 1/4	4.8	4 1/8	3 3/4	4.6
3/4T	4 1/4	6	4 1/2	6.3	6.5	4 7/8	7	5 7/8	5 1/4	6.8



RESOLUTION

NEAR SURFACE REFLECTOR: Notch OD DEPTH: .25 SIZE: .253 CAL BLK.: BF 18

FAR SURFACE REFLECTOR: Notch ID DEPTH: 6.1 SIZE: .253

SCANNING REFLECTORS PROVIDE 50% DAC SIGNALS AT SCANNING SPEED Y ☑ N ☐

EXAMINER: [signature]	REVIEWED BY: [signature]	ANII: [signature]
		DATE: 4/19/02
LEVEL: II DATE: 3-30-02	LEVEL: III DATE: 4/4/02	PAGE: 11 OF 15

[signature] 4/19/02

TVA	BEAM SPREAD AND RESOLUTION DATA SHEET	REPORT NO. R168

PROJECT: BFN UNIT: 3 CALIBRATION BLOCK NO.: BF 18

PROCEDURE NO.: N-UT-9 REV.: 9 PCR: 0206 N/A 3-30-02

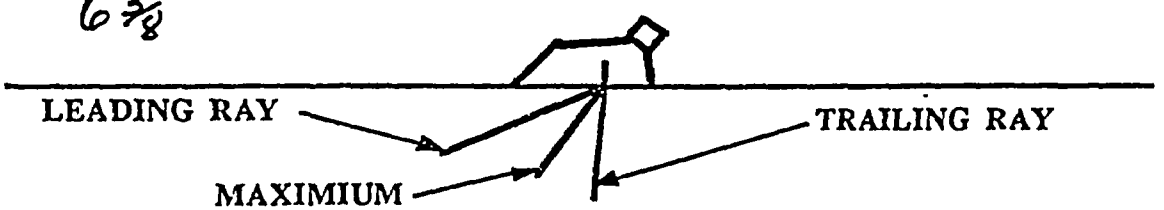
SEARCH UNIT-MAKE: Krautkramer SIZE: .5X1 FREQ.: 2.25

S/N: DB 34154 ANGLE: 60

ULTRASONIC INSTRUMENT-MAKE: Sonic 136 S/N: VH 751

BEAM SPREAD

	TRAILING RAY						LEADING RAY			
HOLE	20% DAC		50% DAC		100% DAC		20% DAC		50% DAC	
DEPTH	W	MP	W	MP	MP	W	MP	W	W	MP
1/4T	2 1/8	2.4	2 3/8	2.7	2.9	2 5/8	3.2	3 1/8	2 7/8	3.1
1/2T	4 3/4	4.8	5	5.3	5.8	5 1/4	6.4	6 5/8	6	6.1
3/4T	~~8 3/4~~ 6 3/8	7.6	7 1/4	8	8.7	7 7/8	9.6	8 5/8	8	9.1



RESOLUTION

NEAR SURFACE REFLECTOR: Notch OD DEPTH: .25 SIZE: .253 CAL BLK.: BF 18

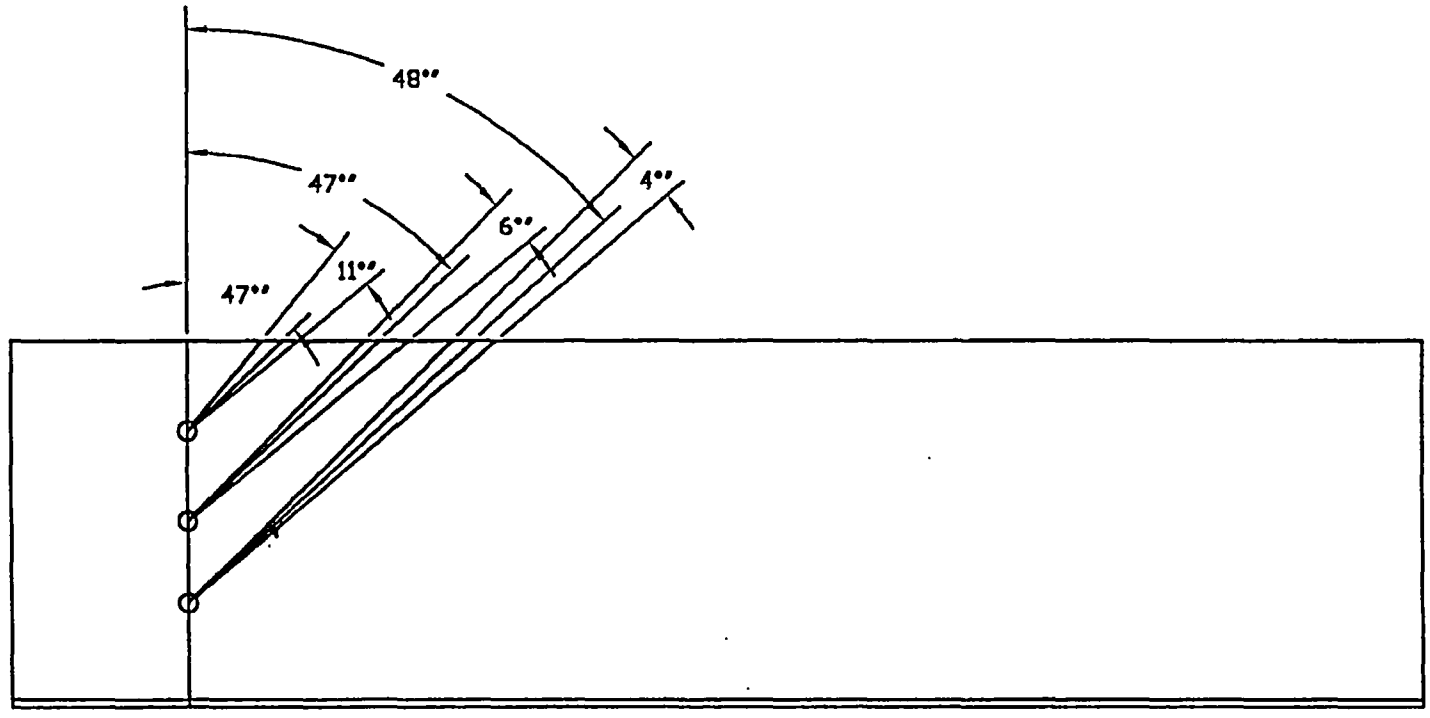
FAR SURFACE REFLECTOR: Notch ID DEPTH: 6.1 SIZE: .253

SCANNING REFLECTORS PROVIDE 50% DAC SIGNALS AT SCANNING SPEED Y ☒ N ☐

EXAMINER: Mike W Kleny Jr	REVIEWED BY: [signature]	ANII: [signature] DATE: 4/19/02
LEVEL: II DATE: 3-30-02	LEVEL: III DATE: 4/4/02	PAGE: 12 OF 15

4/19/02

TVA 40095 (NP-1-89) 1-108-999-50



REPORT NUMBER
R168

HSBCT
4/19/02

Browns Ferry Unit 3
Beamspread
MARCH 2002
BF-18

00127

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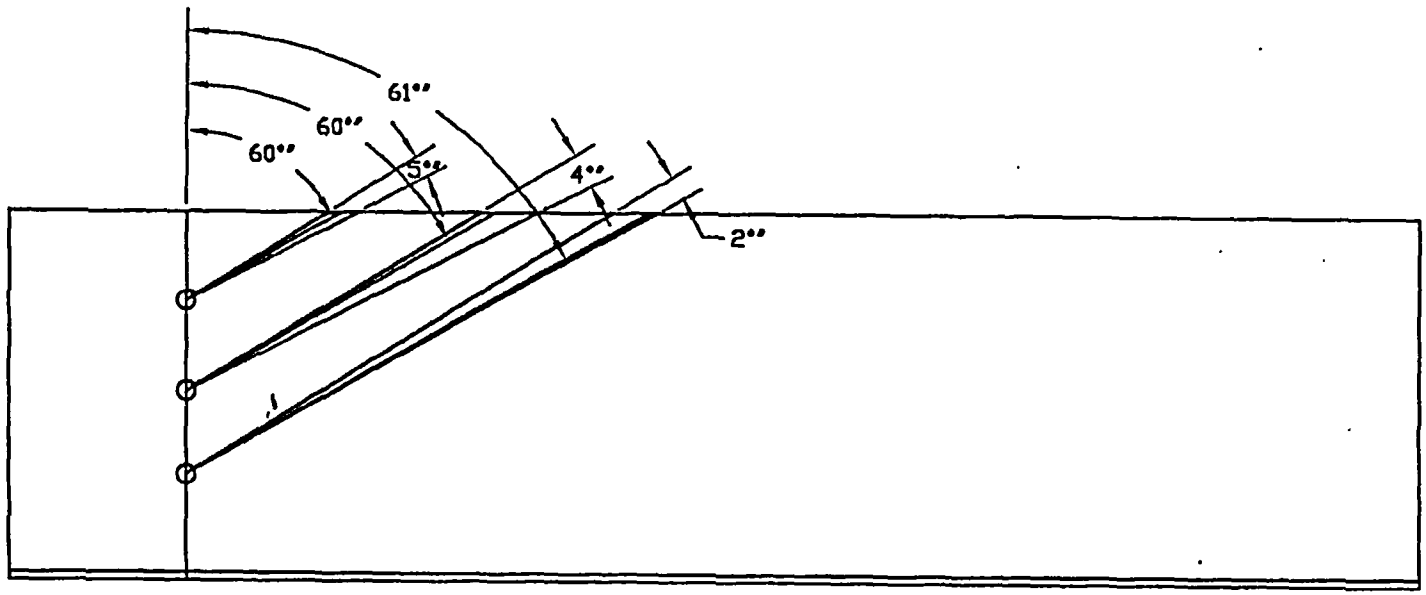
4 of 15
4/10/02



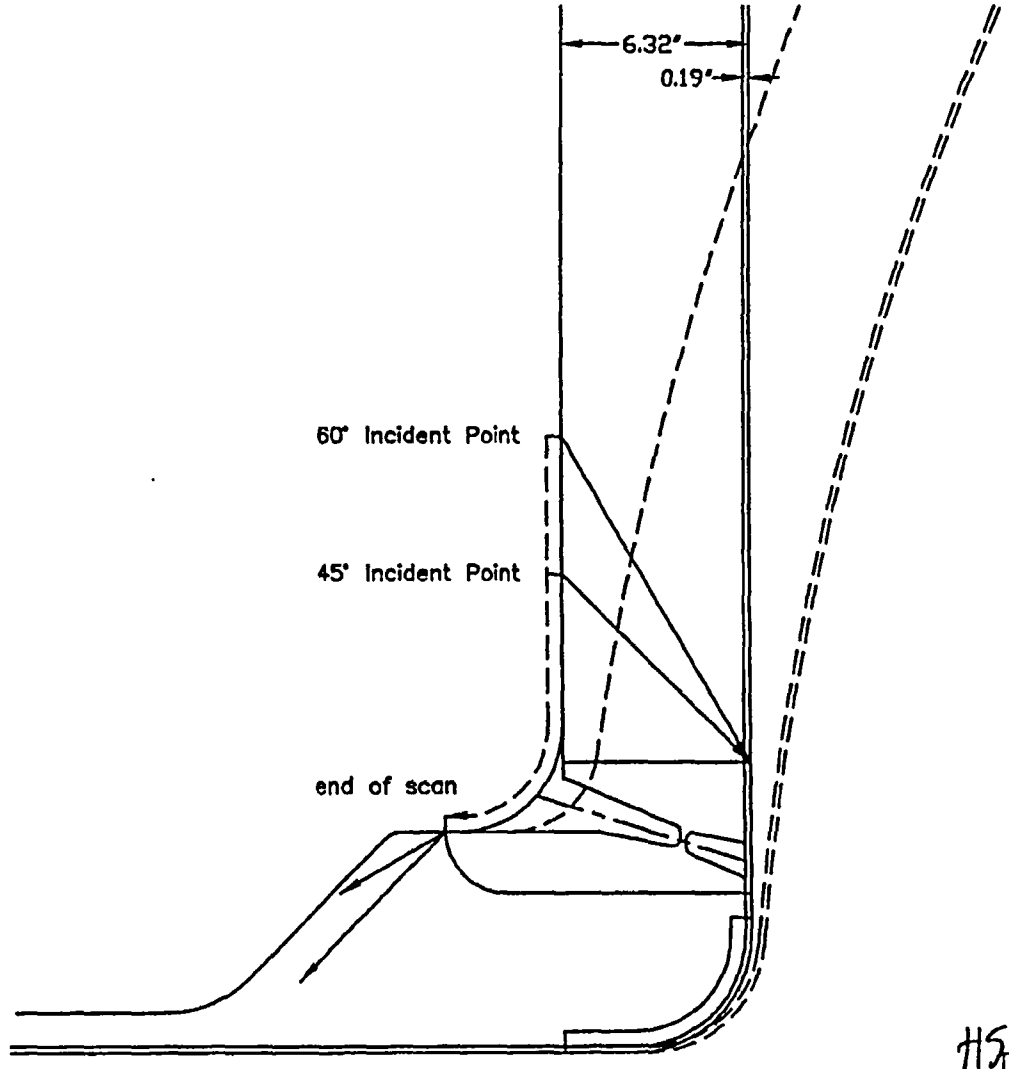
REPORT NUMBER R168

HSBCT 4/18/02

Browns Ferry Unit 3
Beamspread
MARCH 2002
BF-18

00128

14
S 15
4/18/02



NOTE: Transverse coverage includes coverage obtained during the inner radius examinations.

Report Number R168

HSBCT 4/19/02

Browns Ferry Unit 3	
N4 Nozzle-to-Shell	
March 2002	
SP-N4-NS	

15 of 15

00129

TENNESSEE VALLEY AUTHORITY	EXAMINATION SUMMARY AND RESOLUTION SHEET	REPORT NUMBER: R169

PROJECT: BFN	UNIT: 3	CYCLE: 10		COMPONENT ID: N4F-IR	
EXAMINATION METHOD				SYSTEM RPV	ISI DWG. NO. 3-ISI-0327-C
MT ☐	PT ☐	UT ☒	VT ☐	CODE CLASS: 1	CATEGORY: B-D
PROCEDURE: N-UT-55	REV:9	TC: ~~N/A~~ 02-08		COFIG.: Nozzle TO Vessel	
EXAMINER: MIKE KLEINJAN LEVELII:	EXAMINER: DAVID KLEINJAN LEVEL:II			EXAMINER: N/A LEVEL: N/A	EXAMINER: N/A LEVEL: N/A

This report contains the data associated with the manual ultrasonic examination of code category B-D, Nozzle Inner radius. This examination report satisfies ASME section XI requirements for the inner radius examination.

N4F-IR: This examination was performed using a 21° and 27° in the blend radius in two directions CW/CCW

100% code coverage was obtained

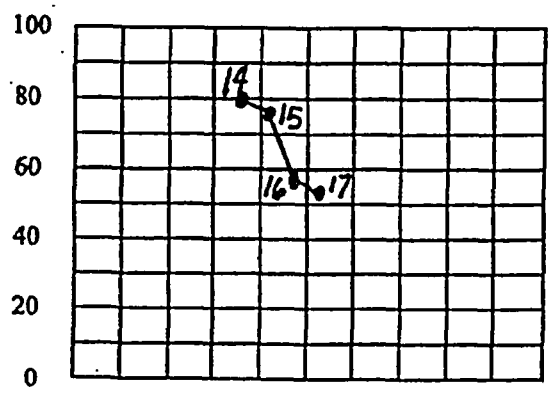
This exam was performed with equipment, Procedures, and personnel qualified in accordance with ASME Section XI

No Recordable Indications

RESOLUTION BY:	REVIEWED BY:	ANII:
Mike Kleinjan		DATE: 4/19/02
LEVEL: II DATE: 4-4-02	LEVEL: III DATE: 4/4/02	PG. ~~1 OF 4~~ 1 OF 4

TENNESSEE VALLEY AUTHORITY	DIGITAL ULTRASONIC CALIBRATION DATA SHEET	REPORT NUMBER: R169

PROJECT: BFN UNIT: 3 CYCLE: 10	CALIBRATION DATE: 03-30-02
PROC.: N-UT- 55 REV:9 TC: ~~N/A~~ 4.100	CALIBRATION BLOCK NO.: BF-84-IR TEMP: 70.5'F
INSTR. MFG: STAVELEY DUE DATE: 08-11-02	SIMULATOR BLOCK NO: N/A
MODEL/TYPE: SONIC-137 M & TE NO.: VH-5473	THERMOMETER S/N: 522352 DUE DATE: 05-17-02
TRANSDUCER MFG: KRAUTKRAMER	COUPLANT SONOTRACE BATCH: 01141
S/N DB 351643 SIZE: 1.0" FREQ: 2.25 MHz	EXAM TYPE: SHEAR☐ LONG☐ RL☒
CABLE TYPE: RG 174 LENGTH: 120 inches 4.4 ft	ANGLE VERIFICATION
	BLOCK TYPE: CS IIW S/N: DB 55074
DAC	NOMINAL ANGLE: 21 ACTUAL ANGLE: N/A



DISPLAY WIDTH: 20 inches

INSTRUMENT SETTINGS

REFLECTOR SCAN DIRECT.	NTCH	SDH	REFERENCE SENSITIVITY	MEMORY NUMBER
AXIAL	☒	☐	55.0 dB	22
CIRC	☐	☐	N/A dB	N/A

FREQ: 2.25 MHz	REJECT: OFF %
ANGLE: N/A deg	DAMPING: 200 ohms
DELAY: 1.61 msec	PULSER: 222
ZERO: N/A msec	FILTER: FILT 1
VELOCITY: 0.233 msec	REP RATE: 4 KHZ
RANGE: 20.0 inches	TOF: ☐PEAK ☒ FLANK
DISPLAY MODE: PE	POWER: AC
DUAL: ☐ ON ☒ OFF	TCG: ☐ ON ☒ OFF

REF. REFLECTOR: N/A	GAIN: N/A dB
AMPLITUDE: N/A %	METAL PATH: N/A"

CALIBRATION TIMES

INITIAL TIME: 1505 FINAL TIME: 1810

VERIFICATION TIMES	1)N/A	2)N/A	3)N/A	4)N/A	5)N/A	6)N/A	7)N/A	8)N/A	9)N/A

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	

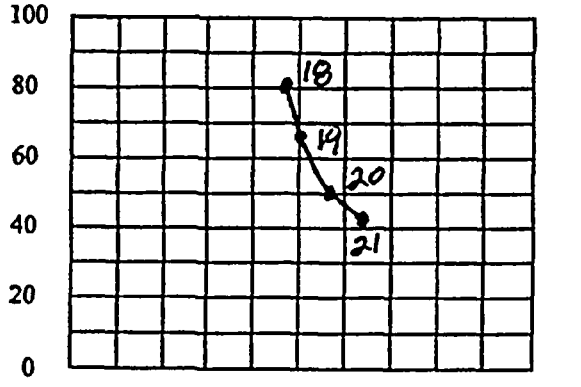
ATTENUATOR	GAIN	SET	-6 dB	-12 dB	SET	+12	SET	+6	
	AMP	80%	32 TO 48	16 TO 24	20 %	64 TO 96	40%	64 TO 96	
			40	20		80		80	

COMMENTS:	WELDS/ITEMS EXAMINED:
Wedge ID D-=14795-246	REACTOR PRESSURE VESSEL
	N4A-IR, N4F-IR

EXAMINER:	EXAMINER:	REVIEWER:	ANII:
DAVID KLEINJAN	MIKE KLEINJAN		DATE: 4/19/02
LEVEL: II	LEVEL: II	LEVEL: DATE:	PG.: ~~1 OF 1~~ 2 of 4 4/19/02

TENNESSEE VALLEY AUTHORITY	DIGITAL ULTRASONIC CALIBRATION DATA SHEET	REPORT NUMBER: R169

PROJECT: BFN UNIT: 3 CYCLE: 10	CALIBRATION DATE: 03-30-02
PROC.: N-UT- 55 REV:9 TC: ~~N/A~~	CALIBRATION BLOCK NO.: BF-84-IR TEMP: 70.5°F
INSTR. MFG: STAVELEY DUE DATE: 08-11-02	SIMULATOR BLOCK NO: N/A
MODEL/TYPE: SONIC-137 M & TE NO.: VH-5473	THERMOMETER S/N: 522352 DUE DATE: 05-17-02
TRANSDUCER MFG: KRAUTKRAMER	COUPLANT SONOTRACE BATCH: 01141
S/N DB 35164 SIZE: 1.0" FREQ: 2.25 MHz	EXAM TYPE: SHEAR☐ LONG☐ RL☒
CABLE TYPE: RG 174 LENGTH: 120 inches	ANGLE VERIFICATION
	BLOCK TYPE: CS IIW S/N: DB 55074
DAC	NOMINAL ANGLE: 27 ACTUAL ANGLE: N/A



DISPLAY WIDTH: 20 inches

INSTRUMENT SETTINGS

REFLECTOR SCAN DIRECT.	NTCH	SDH	REFERENCE SENSITIVITY	MEMORY NUMBER
AXIAL	☒	☐	56.2 dB	23
CIRC	☐	☐	N/A dB	N/A

FREQ: 2.25 MHz	REJECT: OFF %
ANGLE: N/A deg	DAMPING: 200 ohms
DELAY: 0.950 msec	PULSER: 222
ZERO: N/A msec	FILTER: FILT 1
VELOCITY: 0.233 msec	REP RATE: 4 KHZ
RANGE: 20.0 inches	TOF: ☐PEAK ☒FLANK
DISPLAY MODE: PE	POWER: AC
DUAL: ☐ON ☒OFF	TCG: ☐ON ☒OFF

REF. REFLECTOR: N/A	GAIN: N/A dB
AMPLITUDE: N/A %	METAL PATH: N/A"

CALIBRATION TIMES

INITIAL TIME: 1505 FINAL TIME: 1810

VERIFICATION TIMES	1)N/A	2)N/A	3)N/A	4)N/A	5)N/A	6)N/A	7)N/A	8)N/A	9)N/A

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	-12 dB	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:	WELDS/ITEMS EXAMINED:
Wedge ID D-14795-247	REACTOR PRESSURE VESSEL
	N4A-IR, N4F-IR

EXAMINER:	EXAMINER:	REVIEWER:	ANII:
DAVID KLEINJAN	MIKE KLEINJAN		DATE: 4/19/02
LEVEL: II	LEVEL: II	LEVEL: III DATE: 4/18/02	PG.: ~~1 OF 1~~ 3 OF 4

TVA	MANUAL ULTRASONIC VESSEL EXAMINATION DATA SHEET	REPORT NO. R169

PROJECT: BFN UNIT: 3 WELD ID: N4F CONFIG.: INNER RADIUS COMPONENT: N/A

CAL. SHT. NO.: NA PROCEDURE: N-UT-55 REV.: 9 PCR.: N/A 02-08 TEMP.: 85 PYRO.: 52235

SCAN SENS.: * dB EXAM START: 1550 3/30/02 EXAM END: 1650 EXAM ANGLE: 21, 27

Lo LOCATION: TDC Wo LOCATION: E of WELD

IND NO.	20%			50%			100%			MAX. AMP.			20%			50%			100%		
	Mp1	W1	L1	Mp1 *	W1	L1	Mp1	W1	L1	Mp	W	L	Mp2	W2	L2	Mp2	W2	L2	Mp2	W2	L2
21°	SCAN		dB	61			SCANNING				BLEND		RADIUS								
27°	SCAN		dB	62.2			SCANNING				BLEND		RADIUS								
				No Recordable Indication																	

COMMENTS: A MATERIAL NOISE LEVEL OF 5-10% WAS OBSERVED

EXAMINER: [signature] LEVEL: II DATE: 03-30-02 REVIEWED BY: [signature] LEVEL: III DATE: 4/8/02 for 4/10/02

EXAMINER: [signature] LEVEL: II DATE: 4-4-02 ANII: [signature] DATE: 4/19/02 PAGE 24 OF 4

TVA 40094 (NP-1-89) 1-108-999-48

001330

Inspection Report R-170
Weld N5B-NV

TENNESSEE VALLEY AUTHORITY	EXAMINATION SUMMARY AND RESOLUTION SHEET	REPORT NUMBER: R170

PROJECT: BFN	UNIT: 3	CYCLE: 10		COMPONENT ID: N5B	
EXAMINATION METHOD				SYSTEM RPV	ISI DWG. NO. 3-ISI-0331-C
MT ☐	PT ☐	UT ☒	VT ☐	CODE CLASS: 1	CATEGORY: B-D
PROCEDURE: N-UT-9	REV:9	TC:02-06		COFIG.: Nozzle TO Vessel	

EXAMINER:	EXAMINER:	EXAMINER:	EXAMINER:
MIKE KLEINJAN	DAVID KLEINJAN	N/A	N/A
LEVEL: II	LEVEL: II	LEVEL: N/A	LEVEL: N/A

This report contains the data associated with the manual ultrasonic examination of code category B-D, Nozzle to Vessel welds. This examination report satisfies ASME section XI requirements for the Nozzle to shell weld..

Examination. Nozzle to Vessel weld N5B
Transverse coverage for the Nozzle to Vessel weld was supplemented by the inner radius examination.
(N5B-IR) See R171

0° was used on the weld crown and base material Vessel side

45° was used on the vessel side only scanning over the weld crown
45° Tangent to the weld was used on vessel side CW/CCW
45° Parallel to the weld was used on vessel side CW/CCW

60° was used on the vessel side only scanning over the weld crown
60° Tangent to the weld was used on vessel side CW/CCW
60° Parallel to the weld was used on vessel side CW/CCW

71% code coverage was obtained

This exam was performed with equipment, Procedures, and personnel qualified in accordance with ASME Section XI

— (1)(2) Geometric transverse indications observed (Feedwater Bracket Pads) using the 1.0 and 2.5 search units. (Transverse SCAN Supplement)
— No Reportable Indications using the 0, 45T, 45P, 60T, 60P Search Units
• (Bracket Pads were verified by underwater cameras) MK

RESOLUTION BY:	REVIEWED BY:	ANII: Albert Todd
Mike Kleinjan MK w. Kleinjan		DATE: 4/19/02
LEVEL: II DATE: 4-4-02.	LEVEL: III DATE: 4/4/02	PG. 1 OF 18

JAC 4/11/02

REPORT NUMBER
R170

00135

Calculation of ASME code coverage
For section XI NDE Examination

N5B

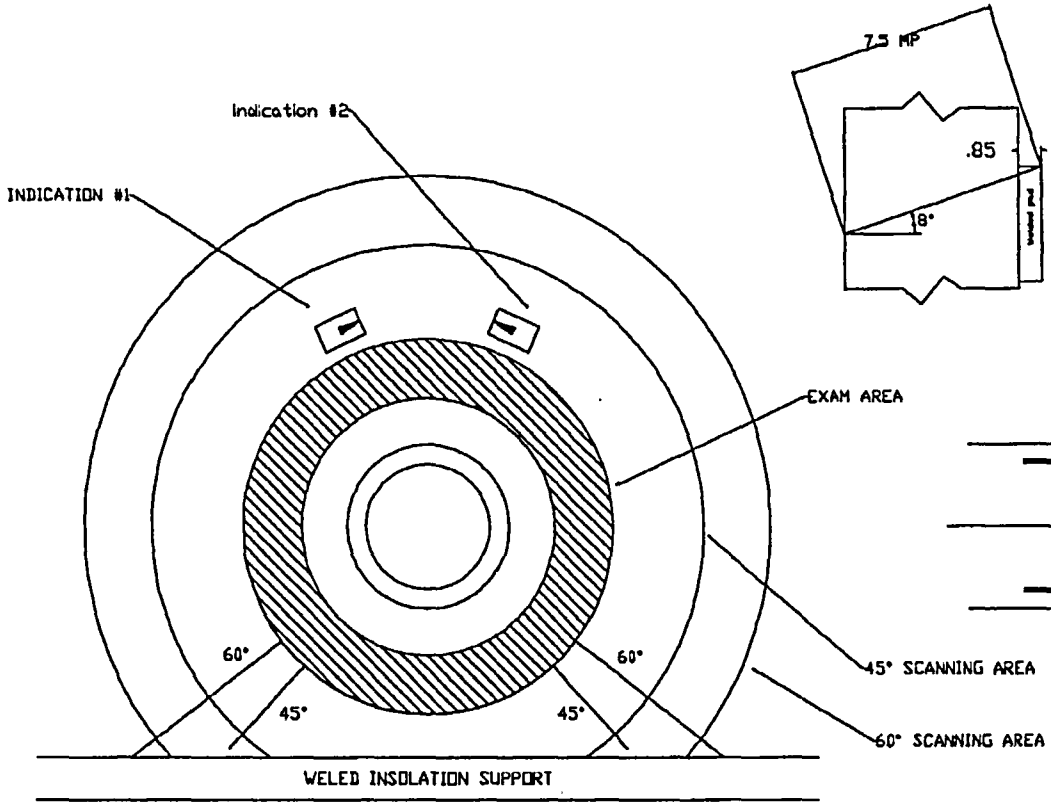
1) 0 Degree (weld metal scan)	100%
2) 45 degree Transverse-scan from vessel side of weld	74%
3) 45 degree Transverse-scan from nozzle side of weld	0%
4) 60 degree Transverse-scan from vessel side of weld	65%
5) 60 degree Transverse-scan from nozzle side of weld	0%
6) 45 degree Parallel-scan CW direction	100%
7) 45 degree Parallel-scan CCW direction	100%
8) 60 degree Parallel-scan CW direction	100%
9) 60 degree Parallel-scan CCW direction	100%

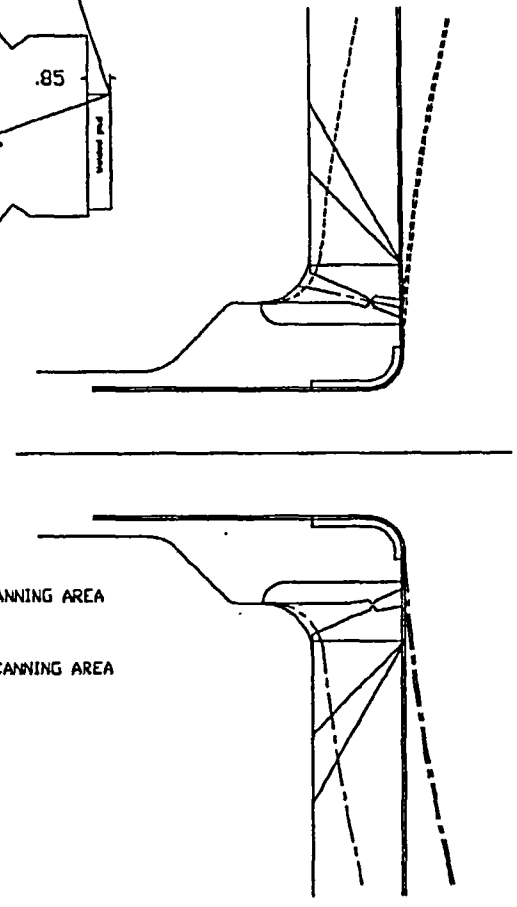
The sum of all the percentage of scans	639%
Divided by the total # of scans	9
Percentage of examination Volume coverage	71%

*Transverse coverage includes coverage obtained during the inner radius examination.

HSBCT 4/19/02

REPORT NUMBER R170 00136





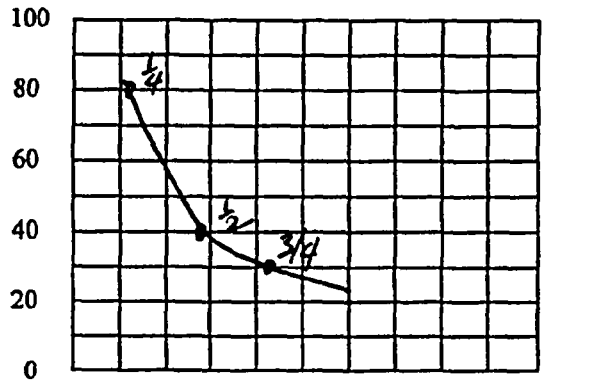
LIMITED SCAN 45° AND 60° DUE TO WELDED INSOLATION SUPPORT

TOTAL EXAM AREA	2555	TOTAL EXAM AREA	2555
EXAM LIMITATION 45°	665	EXAM LIMITATION 60°	875
45° COVERAGE	1819 = 74°	60° COVERAGE	1680 = 65°

Browns Ferry Unit 3
N5 Nozzle-to-Shell
MARCH 2002
SP-N5-NS

TENNESSEE VALLEY AUTHORITY	DIGITAL ULTRASONIC CALIBRATION DATA SHEET	REPORT NUMBER: R170

PROJECT: BFN UNIT: 3 CYCLE: 10	CALIBRATION DATE: ~~2-21-02~~ 4-4-02 4/14/02
PROC.: N-UT- 9 REV:9 TC:02-06	CALIBRATION BLOCK NO.: BF18 TEMP: 72.6'F
INSTR. MFG: STAVELEY DUE DATE: 8-05-02	SIMULATOR BLOCK NO: DB55079
MODEL/TYPE: SONIC 136 M & TE NO.: VH751	THERMOMTER S/N: 522352 DUE DATE: 5-17-02
TRANSDUCER MFG: Harisonic	COUPLANT SONOTRACE BATCH: 01141
S/N DB34198 SIZE: .75 FREQ: 2.25 MHz	EXAM TYPE: SHEAR☐ LONG☒ RL☐
CABLE TYPE: RG174 LENGTH: 120 inches	ANGLE VERIFICATION
	BLOCK TYPE: ~~Ronpus~~ Ronpco S/N: DB55079
DAC	NOMINAL ANGLE: 0 ACTUAL ANGLE: N/A



DISPLAY WIDTH: 10 inches

INSTRUMENT SETTINGS

REFLECTOR			REFERENCE SENSITIVITY	MEMORY NUMBER
SCAN DIRECT.	NTCH	SDH		
AXIAL	☐	☒	20.8 dB	1
CIRC	☐	☐	n/a dB	n/a

FREQ: 2.25 MHz	REJECT: off %
ANGLE: n/a deg	DAMPING: 500 ohms
DELAY: .499 msec	PULSER: 222
ZERO: n/a msec	FILTER: Filt 3
VELOCITY: .238 msec	REP RATE: 2KHZ
RANGE: 10 inches	TOF: ☒PEAK ☐ FLANK
DISPLAY MODE: PE	POWER: AC
DUAL: ☐ ON ☒ OFF	TCG: ☐ ON ☒ OFF

REF. REFLECTOR: 1" GAIN: 8 dB	CALIBRATION TIMES
AMPLITUDE: 80 % METAL PATH: 1"	INITIAL TIME: 9:00 FINAL TIME: 17:30

VERIFICATION TIMES	1)11:45	2)N/A	3)N/A	4)N/A	5)N/A	6)N/A	7)N/A	8)N/A	9)N/A

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	-12 dB	SET	+12	SET	+6	
	AMP	80%	32 TO 48	16 TO 24	20 %	64 TO 96	40%	64 TO 96	
			40	20		80		80	

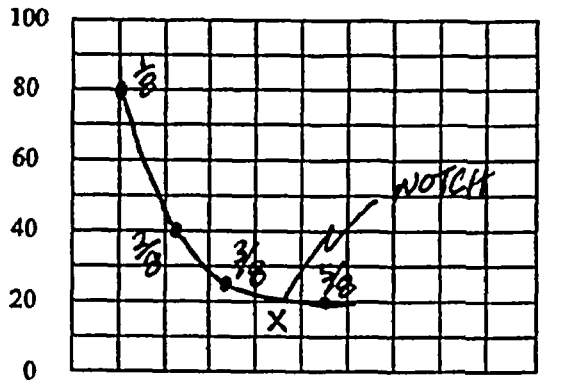
COMMENTS:	WELDS/ITEMS EXAMINED:
	N5B Nozzle to Shell

EXAMINER:	EXAMINER:	REVIEWER:	ANII:
MIKE W. KLEINJAN	DAVID KLEINJAN		DATE: 4/19/02
LEVEL: II	LEVEL: II	LEVEL: ~~II~~ DATE: 4/4/02	PG.: ~~1 6 OF 7 18~~ 4/11/02

4 OF 18

TENNESSEE VALLEY AUTHORITY	DIGITAL ULTRASONIC CALIBRATION DATA SHEET	REPORT NUMBER: R170

PROJECT: BFN UNIT: 3 CYCLE: 10	CALIBRATION DATE: ~~2-31-02~~ 4-4-02 J 4/11/02
PROC.: N-UT- 9 REV:9 TC:02-06	CALIBRATION BLOCK NO.: BF18 TEMP: 72.6'F
INSTR. MFG: STAVELEY DUE DATE: 8-05-02	SIMULATOR BLOCK NO: DB55079
MODEL/TYPE: SONIC 136 M & TE NO.: VH751	THERMOMTER S/N: 522352 DUE DATE: 5-17-02
TRANSDUCER MFG: Krauntkramer	COUPLANT SONOTRACE BATCH: 01141
S/N DB34843 SIZE: .5x1 FREQ: 2.25 MHz	EXAM TYPE: SHEAR☒ LONG☐ RL☐
CABLE TYPE: RG1743 LENGTH: 120 inches	ANGLE VERIFICATION
	BLOCK TYPE: IIW / S/N: DB55074
DAC	NOMINAL ANGLE: 45° / ACTUAL ANGLE: 46°



DISPLAY WIDTH: 10 inches

INSTRUMENT SETTINGS

REFLECTOR SCAN DIRECT.	NTCH	SDH	REFERENCE SENSITIVITY	MEMORY NUMBER
AXIAL	☐	☒	45.6 dB	2
CIRC	☐	☐	n/a dB	n/a

FREQ: 2.25 MHz	REJECT: off %
ANGLE: N/A deg	DAMPING: 500 ohms
DELAY: .830 msec	PULSER: 222
ZERO: N/A msec	FILTER: FITL 3
VELOCITY: .126 msec	REP RATE: 2KHZ
RANGE: 20 inches	TOF: ☒PEAK ☐ FLANK
DISPLAY MODE: PE	POWER: AC
DUAL: ☐ ON ☒ OFF	TCG: ☐ ON ☒ OFF

REF. REFLECTOR: 1" GAIN: 33.6 dB	CALIBRATION TIMES
AMPLITUDE: 80 % METAL PATH: 1"	INITIAL TIME: 9:00 FINAL TIME: 17:30

VERIFICATION TIMES	1)11:45	2) N/A	3) N/A	4) N/A	5) N/A	6) N/A	7) N/A	8) N/A	9) N/A

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	

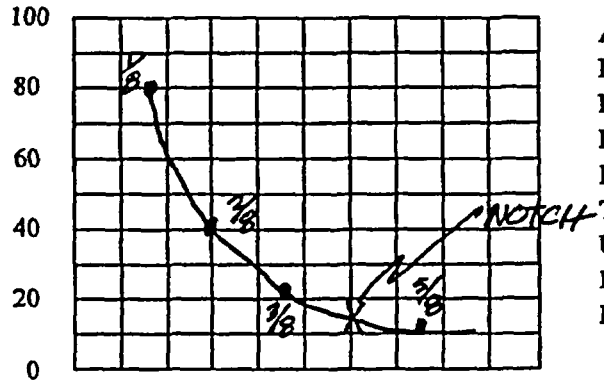
ATTENUATOR	GAIN	SET	-6 dB	-12 dB	SET	+12	SET	+6	
	AMP	80%	32 TO 48	16 TO 24	20 %	64 TO 96	40%	64 TO 96	
			40	20		80		80	

COMMENTS:	WELDS/ITEMS EXAMINED:
Delta difference between 3/8 to 5/8 on the clad side is 3 dB	N5B Nozzle to shell

EXAMINER:	EXAMINER:	REVIEWER:	ANII:
MIKE W. KLEINJAN Mike W Kleinjan	DAVID KLEINJAN D.R. Klein		DATE: 4/19/02
LEVEL:II	LEVEL:II	LEVEL: III DATE: 4/19/02	PG.: ~~4 OF 4, 18~~ 5 OF 18 J 4/11/02

TENNESSEE VALLEY AUTHORITY	DIGITAL ULTRASONIC CALIBRATION DATA SHEET	REPORT NUMBER: R170

PROJECT: BFN UNIT: 3 CYCLE: 10	CALIBRATION DATE: ~~3-31-02~~ 4/4/02
PROC.: N-UT- 9 REV:9 TC:02-06	CALIBRATION BLOCK NO.: BF18 TEMP: 72.6'F
INSTR. MFG: STAVELEY DUE DATE: 8-05-02	SIMULATOR BLOCK NO: DB55079
MODEL/TYPE: SONIC 136 M & TE NO.: VH751	THERMOMTER S/N: 522352 DUE DATE: 5-17-02
TRANSDUCER MFG: Krauntkramer	COUPLANT SONOTRACE BATCH: 01141
S/N DB34154 SIZE: .5x1 FREQ: 2.25 MHz	EXAM TYPE: SHEAR☒ LONG☐ RL☐
CABLE TYPE: RG174 LENGTH: 120 inches	ANGLE VERIFICATION
	BLOCK TYPE: IIW S/N: DB55074
DAC	NOMINAL ANGLE: 60 ACTUAL ANGLE: 59



DISPLAY WIDTH: 10 inches

INSTRUMENT SETTINGS

REFLECTOR SCAN DIRECT.	NTCH	SDH	REFERENCE SENSITIVITY	MEMORY NUMBER
AXIAL	☐	☒	52 dB	3
CIRC	☐	☐	n/a dB	n/a

FREQ: 2.25 MHz	REJECT: off %
ANGLE: N/A deg	DAMPING: 500 ohms
DELAY: 1.20 msec	PULSER: 222
ZERO: N/A msec	FILTER: FITL 3
VELOCITY: .123 msec	REP RATE: 2KHZ
RANGE: 20 inches	TOF: ☒PEAK ☐ FLANK
DISPLAY MODE: PE	POWER: AC
DUAL: ☐ ON ☒ OFF	TCG: ☐ ON ☒ OFF

REF. REFLECTOR: 1" GAIN: 36 dB	CALIBRATION TIMES
AMPLITUDE: 80 % METAL PATH: 1"	INITIAL TIME: 9:00 FINAL TIME: 17:30

VERIFICATION TIMES	1)11:45	2) N/A	3) N/A	4) N/A	5) N/A	6) N/A	7) N/A	8) N/A	9) N/A

LINEARITY CHECK

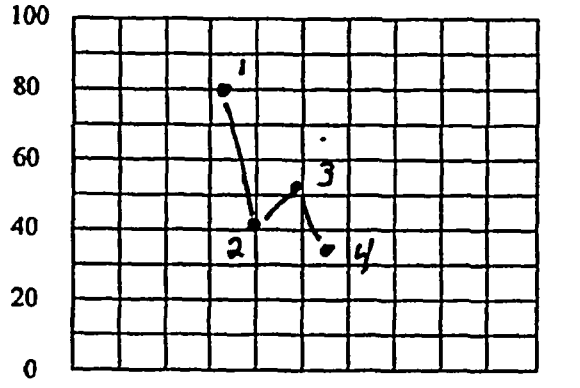
VERTICAL	SIGNAL 1	100	90	80	70	60	50	40	30	20	
	SIGNAL 2	50	45	40	35	30	25	20	15	10	
ATTENUATOR	GAIN	SET	-6 dB	-12 dB	SET	+12	SET	+6			
	AMP	80%	32 TO 48	16 TO 24	20 %	64 TO 96	40%	64 TO 96			
			40	20		80		80			

COMMENTS:	WELDS/ITEMS EXAMINED:
DELTA dB DIFFERENCE IS 4.4 FROM THE 3/8 TO 5/8 ON THE CLAD SIDE	N5B Nozzle to Shell

EXAMINER:	EXAMINER:	REVIEWER:	ANII:
MIKE W. KLEINJAN	DAVID KLEINJAN		DATE: 4/19/02
LEVEL: II	LEVEL: II	LEVEL: III DATE: 4/4/02	PG.: ~~3 OF 18~~ 6 OF 18

TENNESSEE VALLEY AUTHORITY	DIGITAL ULTRASONIC CALIBRATION DATA SHEET	REPORT NUMBER: R170

PROJECT: BFN UNIT: 3 CYCLE: 10	CALIBRATION DATE: ~~03-31-02~~ 4-4-02 4/11/02
PROC.: N-UT- 55 REV:9 ~~EC: N/A~~	CALIBRATION BLOCK NO.: BF-85-IR TEMP: 70.5° F
INSTR. MFG: STAVELEY DUE DATE: 08-11-02	SIMULATOR BLOCK NO: N/A
MODEL/TYPE: SONIC-137 M & TE NO.: VH-5473	THERMOMETER S/N: 522352 DUE DATE: 05-17-02
TRANSDUCER MFG: KRAUTKRAMER	COUPLANT SONOTRACE BATCH: 01141
S/N DB 351643 SIZE: 1.0" FREQ: 2.25 MHz	EXAM TYPE: SHEAR☐ LONG☐ RL☒
CABLE TYPE: RG 174 LENGTH: 120 inches	ANGLE VERIFICATION
	BLOCK TYPE: CS IIW S/N: DB 55074
DAC	NOMINAL ANGLE: 18 ACTUAL ANGLE: N/A



DISPLAY WIDTH: 20 inches

INSTRUMENT SETTINGS

REFLECTOR SCAN DIRECT.	NTCH	SDH	REFERENCE SENSITIVITY	MEMORY NUMBER
AXIAL	☒	☐	52.0 dB	18
CIRC	☐	☐	N/A dB	N/A

FREQ: 2.25 MHz	REJECT: OFF %
ANGLE: N/A deg	DAMPING: 200 ohms
DELAY: 1.02 msec	PULSER: 222
ZERO: N/A msec	FILTER: FILT 1
VELOCITY: 0.234 msec	REP RATE: 4 KHZ
RANGE: 20.0 inches	TOF: ☐PEAK ☒ FLANK
DISPLAY MODE: PE	POWER: AC
DUAL: ☐ ON ☒ OFF	TCG: ☐ ON ☒ OFF

REF. REFLECTOR: N/A	GAIN: N/A dB
AMPLITUDE: N/A %	METAL PATH: N/A"

CALIBRATION TIMES

INITIAL TIME: 1330	FINAL TIME: 1700

VERIFICATION TIMES	1)N/A	2)N/A	3)N/A	4)N/A	5)N/A	6)N/A	7)N/A	8)N/A	9)N/A

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	

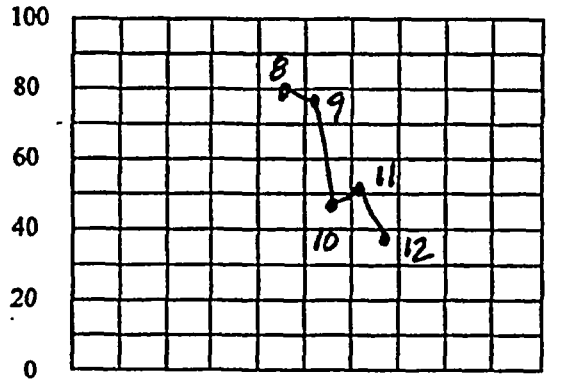
ATTENUATOR	GAIN	SET	-6 dB	-12 dB	SET	+12	SET	+6	
	AMP	80%	32 TO 48	16 TO 24	20 %	64 TO 96	40%	64 TO 96	
			40	20		80		80	

COMMENTS:	WELDS/ITEMS EXAMINED:
	REACTOR PRESSURE VESSEL
	N5B-IR
	wedge TO D-14795-2531

EXAMINER:	EXAMINER:	REVIEWER:	ANII:
DAVID KLEINJAN	MIKE KLEINJAN		DATE: 4/19/02
LEVEL: II	LEVEL: II	LEVEL: III DATE: 4/4/02	PG.: ~~1 9 OF 1 18~~ 7 of 18 4/4/02

TENNESSEE VALLEY AUTHORITY	DIGITAL ULTRASONIC CALIBRATION DATA SHEET	REPORT NUMBER: R170

PROJECT: BFN UNIT: 3 CYCLE: 10	CALIBRATION DATE: ~~03-31-02~~ 4-4-02
PROC.: N-UT- 55 REV:9 TC: N/A	CALIBRATION BLOCK NO.: BF-85-IR TEMP: 70.5° F
INSTR. MFG: STAVELEY DUE DATE: 08-11-02	SIMULATOR BLOCK NO: N/A
MODEL/TYPE: SONIC-137 M & TE NO.: VH-5473	THERMOMETER S/N: 522352 DUE DATE: 05-17-02
TRANSDUCER MFG: KRAUTKRAMER	COUPLANT SONOTRACE BATCH: 01141
S/N DB 35164 SIZE: 1.0" FREQ: 2.25 MHz	EXAM TYPE: SHEAR☐ LONG☐ RL☒
CABLE TYPE: RG 174 LENGTH: 120 inches	ANGLE VERIFICATION
	BLOCK TYPE: CS IIW S/N: DB 55074
DAC	NOMINAL ANGLE: 25 ACTUAL ANGLE: N/A



DISPLAY WIDTH: 20 inches

INSTRUMENT SETTINGS

REFLECTOR SCAN DIRECT.	NTCH	SDH	REFERENCE SENSITIVITY	MEMORY NUMBER
AXIAL	☒	☐	55.4 dB	25
CIRC	☐	☐	N/A dB	N/A

FREQ: 2.25 MHz	REJECT: OFF %
ANGLE: N/A deg	DAMPING: 200 ohms
DELAY: 1.22 msec	PULSER: 222
ZERO: N/A msec	FILTER: FILT 1
VELOCITY: 0.235 msec	REP RATE: 4 KHZ
RANGE: 20.0 inches	TOF: ☐PEAK ☒ FLANK
*DISPLAY MODE: PE	POWER: AC
DUAL: ☐ ON ☒ OFF	TCG: ☐ ON ☒ OFF

REF. REFLECTOR: N/A	GAIN: N/A dB
AMPLITUDE: N/A %	METAL PATH: N/A"

CALIBRATION TIMES

INITIAL TIME: 1440 FINAL TIME: 1700

VERIFICATION TIMES	1)N/A	2)N/A	3)N/A	4)N/A	5)N/A	6)N/A	7)N/A	8)N/A	9)N/A

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	-12 dB	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:	WELDS/ITEMS EXAMINED:
Wedge ID D-14795-166 ✓	REACTOR PRESSURE VESSEL
	N5B-IR

R Seale for M. Kleinjan

EXAMINER:	EXAMINER:	REVIEWER:	ANII:
DAVID KLEINJAN	~~MIKE KLEINJAN~~ 1st 4/11/02		DATE: 4/19/02
LEVEL: II	LEVEL: II	LEVEL: III DATE: 4/4/02	PG.: ~~1 OF 1~~ 1st 4/11/02 8 OF 18

TVA	MANUAL ULTRASONIC VESSEL EXAMINATION DATA SHEET	REPORT NO. R170

PROJECT: BFN UNIT: 3 WELD ID: N5B CONFIG.: INNER RADIUS COMPONENT: — N/A

CAL. SHT. NO.: N/A PROCEDURE: N-UT-55 REV.: 9 PCR.: N/A 02-06 TEMP.: 85 PYRO.: 502352 02-4-10-02

SCAN SENS.: 58 dB 4/11/02 EXAM START: 1445 EXAM END: 1641 EXAM ANGLE: 18°

Lo LOCATION: TDC Wo LOCATION: ℄ of weld

IND NO.	20%			50%			100%			MAX. AMP.			20%			50%			100%		
	Mp1	W1	L1	Mp1	W1	L1	Mp1	W1	L1	Mp	W	L	Mp2	W2	L2	Mp2	W2	L2	Mp2	W2	L2
1							7.5	5 1/4	1.75	7.5	5	1.75							7.5	4 3/4	1.75
2							7.5	68 1/4	1.75	7.5	68	1.75							7.5	67 3/4	1.75

INDICATION #1 AND #2 are GEOMETRICAL REFLECTORS FROM welded Pads on THE ID of THE VESSEL. ABOVE Nozzle N5B. SEE PHOTOS

THE Location of The welded Pads are at L=5" AND L=68 1/4"

COMMENTS: COVERAGE of THE TRANSVERSE EXAM WILL INCLUDE COVERAGE OBTAINED DURING THE INNER RADIUS EXAMINATION. 200% DAC @ Reference indications (1) and (2).

EXAMINER: [signature] LEVEL: II DATE: 4-4-02 REVIEWED BY: [signature] LEVEL: III DATE: 4/4/02

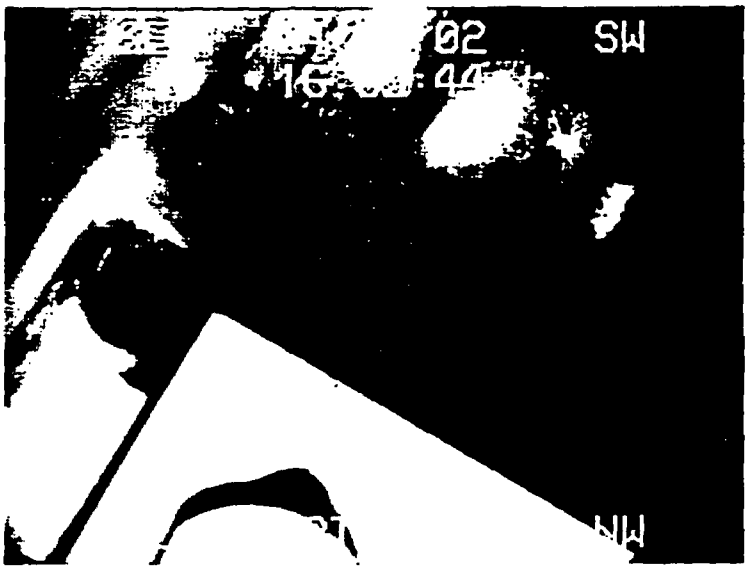
EXAMINER: N/A LEVEL: N/A DATE: N/A ANII: [signature] for 4/11/02 DATE: 4/11/02 PAGE 9 OF 18

TVA 40094 (NP-1-89) 1-108-999-48

NOZZLE N5B
WELDED PADS

REPORT NUMBER
R170

00143



Browns Ferry U3 C10 R. O. V. Tech.

Browns Ferry U3 C10 R. O. V. Tech.

HSBCT 4/19/02

4/11/02 10 6 8 18

TVA	MANUAL ULTRASONIC VESSEL EXAMINATION DATA SHEET	REPORT NO. R170

PROJECT: BFN UNIT: 3 WELD ID: N5B CONFIG.: Nozzle COMPONENT: VESSEL

CAL. SHT. NO.: N/A PROCEDURE: NI-UT-9 REV.: 9 PCR.: 02-06 TEMP.: 85 PYRO.: 522352

SCAN SENS.: X dB EXAM START: 1415 EXAM END: 1641 EXAM ANGLE: 0°, 45°, 60°

Lo LOCATION: TDC Wo LOCATION: ℄ OF WELD

IND NO.	20%			50%			100%			MAX. AMP.			20%			50%			100%		
	Mp1	W1	L1	Mp1 X	W1	L1	Mp1	W1	L1	Mp	W	L	Mp2	W2	L2	Mp2	W2	L2	Mp2	W2	L2
18	SCAN.		dB	58		SCANNING		#	10/11	BLEND RADIUS						(See	page	11 of	18)		
25	SCAN		dB	61.4		SCANNING		#	10/11	BLEND RADIUS						(See	page	11 of	18 for	Indication Recorded	
0	SCAN		dB	54.8		SCANNING		#	9	ON WELD AND BASE MATERIAL											
45	SCAN		dB	56.6		SCANNING		#	9	ON WELD AND VESSEL SIDE											
45T	SCAN		dB	56.6		SCANNING		#	10/11	CW/CCW VESSEL SIDE											
45TAN	SCAN		dB	56.6		SCANNING		#	10/11	CW/CCW VESSEL SIDE											
60	SCAN		dB	63		SCANNING		#	9	ON weld AND VESSEL SIDE											
60T	SCAN		dB	63		SCANNING		#	10/11	CW/CCW VESSEL SIDE											
60TAN	SCAN		dB	63		SCANNING		#	10/11	CW/CCW VESSEL SIDE											
			NO RECORDABLE INDICATION																		
			SEE SKETCH FOR EXAM LIMITATION																		

COMMENTS: 18" AND 25" EXAMINATIONS ARE THE BLEND RADIUS EXAMINATIONS TRANSVERSE EXAMINATION COVERAGE WILL INCLUDE COVERAGE OBTAINED DURING THE INNER RADIUS EXAMINATIONS. 5 TO 10% Noise Level was observed.

EXAMINER: Mike W Flynn LEVEL: II DATE: 4-4-02 REVIEWED BY: [signature] LEVEL: III DATE: 4/4/02

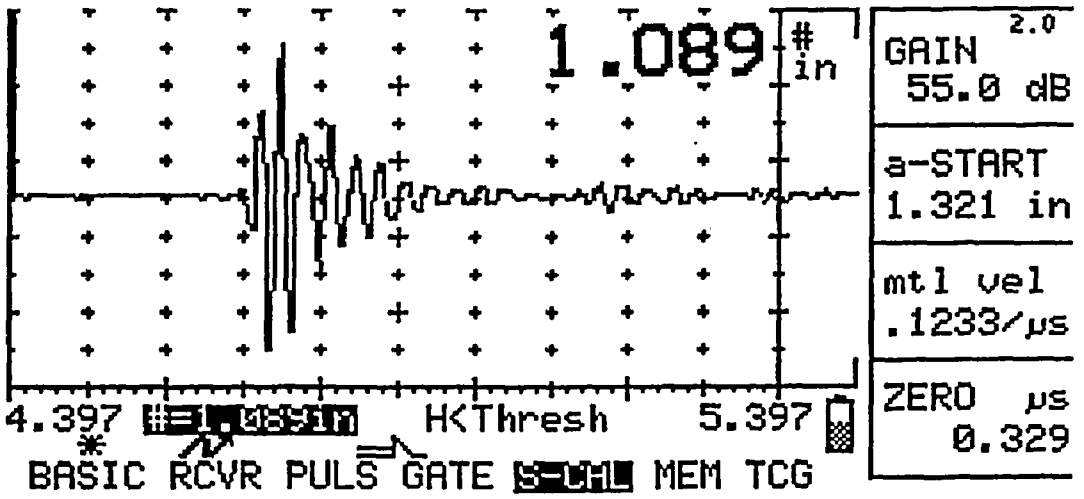
EXAMINER: LEVEL: DATE: ANII: [signature] DATE: 4/19/02 PAGE 11 OF 18

001144

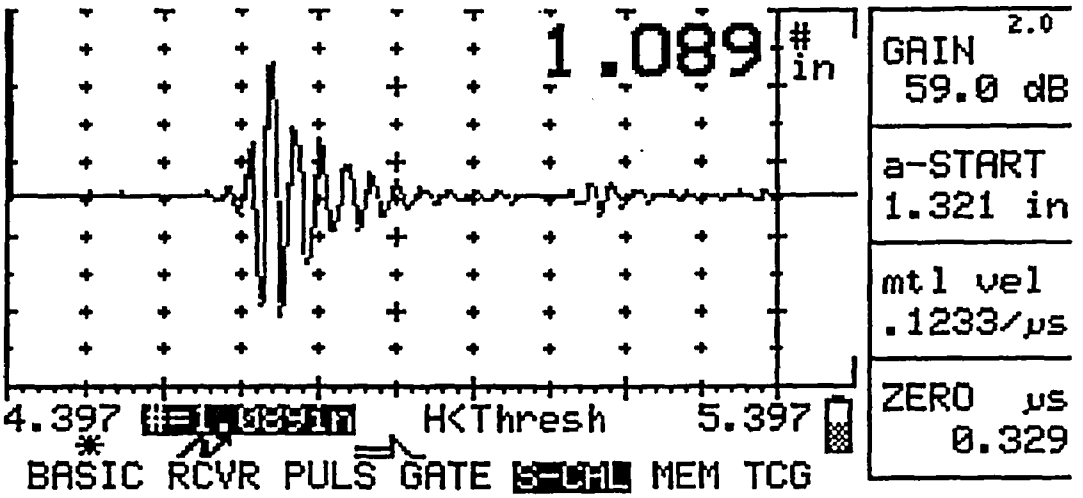
TVA 40094 (NP-1-89) 1-108-999-48

REPORT NUMBER
R170 00145

Nozzle Examination 45 °Waveforms



45° Pre Waveform



45° Post Waveform

HSBCT 4/19/02

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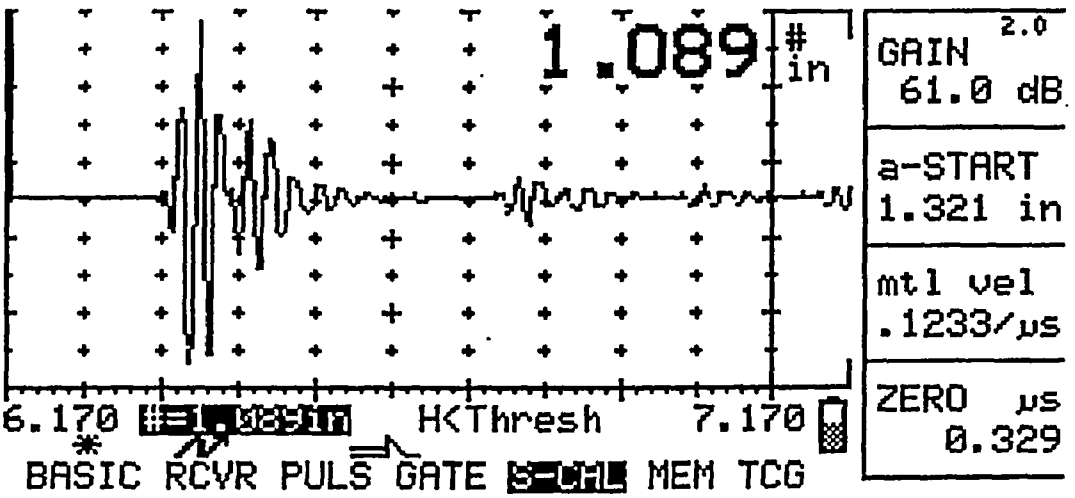
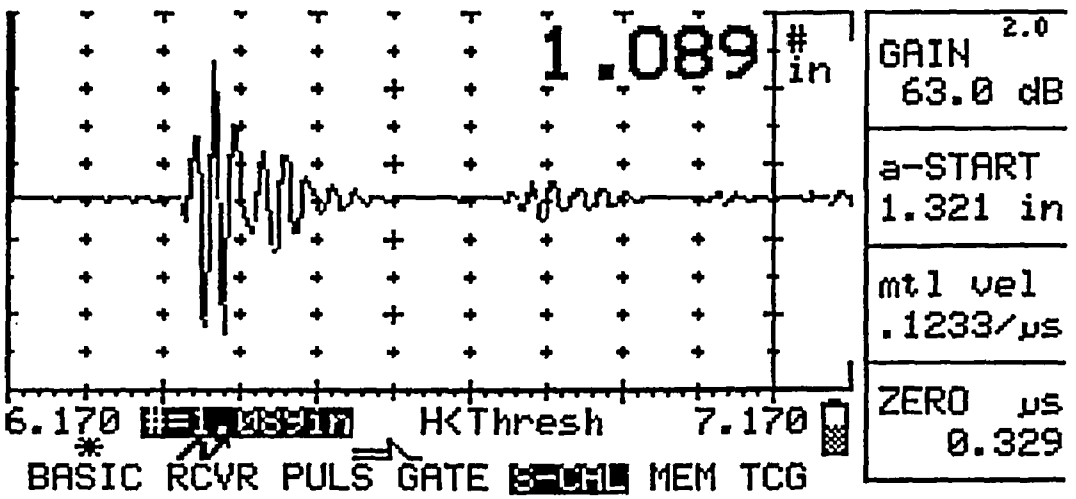
REPORT NUMBER
R170 00146

Nozzle Examination 60 ° Waveforms



60° Pre Waveform



60° Post Waveform

HSBCT
4/19/02

13
4/11/02 ~~18~~ 05 18

TVA	BEAM SPREAD AND RESOLUTION DATA SHEET	REPORT NO. R170

PROJECT: BFN UNIT: 3 CALIBRATION BLOCK NO.: BF 18

PROCEDURE NO.: N-UT-9 REV.: 9 PCR: 02-06 ~~N/A~~ 4/11/02

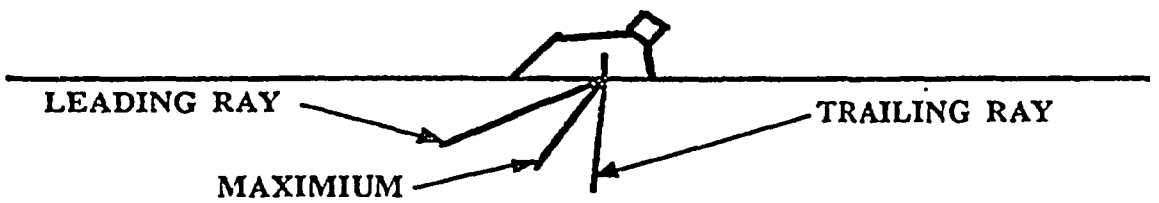
SEARCH UNIT-MAKE: Krautkramer SIZE: .5X1 FREQ.: 2.25

S/N: DB 34843 ANGLE: 45

ULTRASONIC INSTRUMENT-MAKE: Sonic 135 S/N: VH 751

BEAM SPREAD

HOLE DEPTH	TRAILING RAY 20% DAC W	TRAILING RAY 20% DAC MP	TRAILING RAY 50% DAC W	TRAILING RAY 50% DAC MP	100% DAC MP	100% DAC W	LEADING RAY 20% DAC MP	LEADING RAY 20% DAC W	LEADING RAY 50% DAC W	LEADING RAY 50% DAC MP
1/4T	1 1/8	1.9	1 1/4	2.	2.1	1 5/8	2.4	2	1 7/8	2.3
[illegible]T	2 7/8	4	3	4.1	4.3	3 1/4	4.8	4 1/8	3 3/4	4.6
3/4T	4 1/4	6	4 1/2	6.3	6.5	4 7/8	7	5 7/8	5 1/4	6.8



RESOLUTION

NEAR SURFACE REFLECTOR: Notch OD DEPTH: .25 SIZE: .253 CAL BLK.: BF 18

FAR SURFACE REFLECTOR: Notch ID DEPTH: 6.1 SIZE: .253

SCANNING REFLECTORS PROVIDE 50% DAC SIGNALS AT SCANNING SPEED Y ☑ N ☐

EXAMINER: [signature]	REVIEWED BY: [signature]	ANII: [signature]
LEVEL: II DATE: 3-30-02	LEVEL: III DATE: 4/4/02	DATE: 4/19/02 for 4/11/02 PAGE: 14 OF 18

TVA	BEAM SPREAD AND RESOLUTION DATA SHEET	REPORT NO. R170

PROJECT: BFN UNIT: 3 CALIBRATION BLOCK NO.: BF 18

PROCEDURE NO.: N-UT-9 REV.: 9 PCR: 02-06 ~~N/A~~ 4/11/02

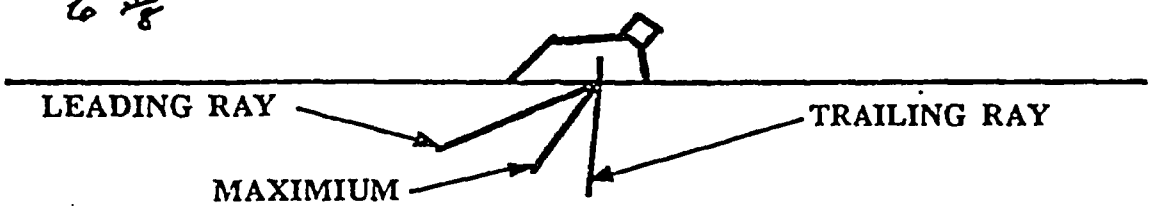
SEARCH UNIT-MAKE: Kraut Kramer SIZE: .5X1 FREQ.: 2.25

S/N: DB 34154 ANGLE: 60

ULTRASONIC INSTRUMENT-MAKE: Sonic 136 S/N: VH 751

BEAM SPREAD

HOLE DEPTH	TRAILING RAY 20% DAC W	TRAILING RAY 20% DAC MP	TRAILING RAY 50% DAC W	TRAILING RAY 50% DAC MP	100% DAC MP	100% DAC W	LEADING RAY 20% DAC MP	LEADING RAY 20% DAC W	LEADING RAY 50% DAC W	LEADING RAY 50% DAC MP
1/4T	2 1/8	2.4	2 3/8	2.7	2.9	2 5/8	3.2	3 1/8	2 7/8	3.1
1/2T	4 3/4	4.8	5	5.3	5.8	5 1/4	6.4	6 5/8	6	6.1
3/4T	~~6 3/8~~ ~~8 3/4~~ 6 3/8	7.6	7 1/4	8	8.7	7 7/8	9.6	8 5/8	8	9.1



RESOLUTION

NEAR SURFACE REFLECTOR: Notch OD DEPTH: .25 SIZE: .253 CAL BLK.: BF 18

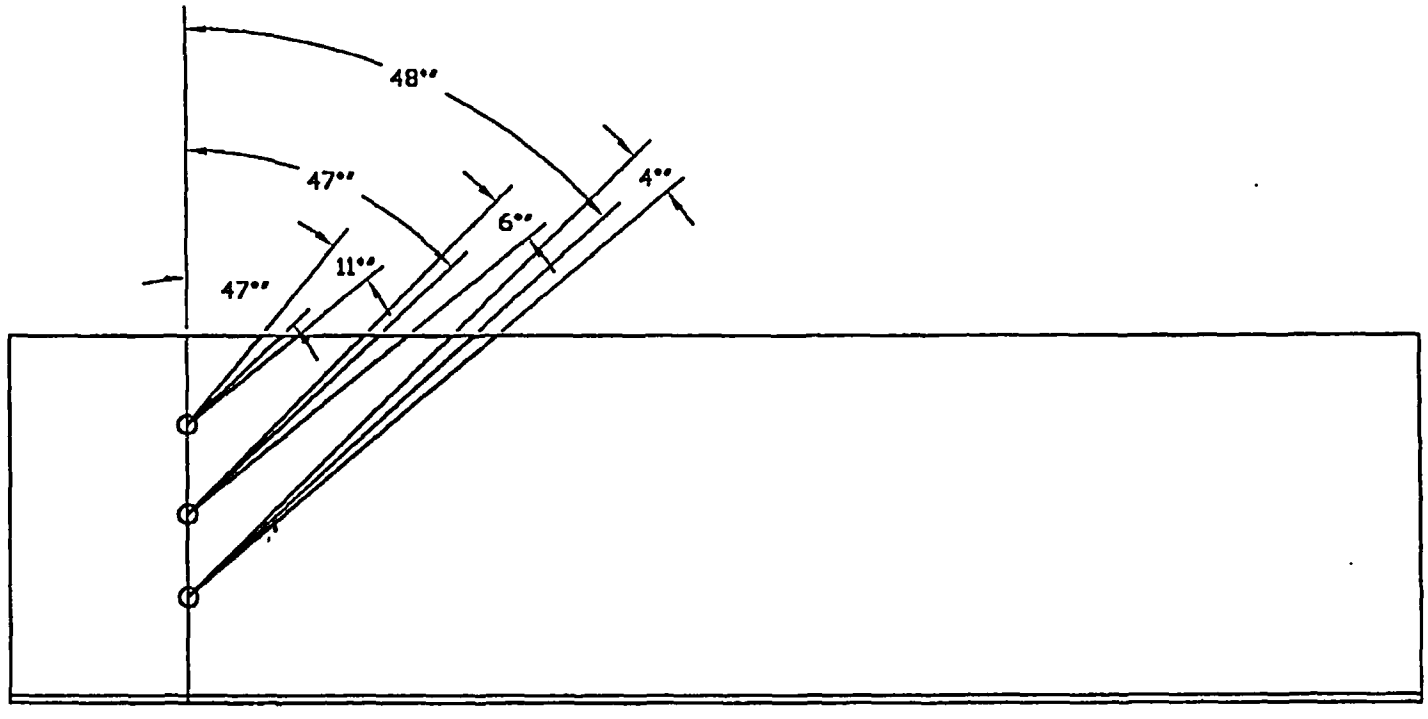
FAR SURFACE REFLECTOR: Notch ID DEPTH: 6.1 SIZE: .253

SCANNING REFLECTORS PROVIDE 50% DAC SIGNALS AT SCANNING SPEED Y ☒ N ☐

EXAMINER: Mike W Henry	REVIEWED BY: [illegible]	ANII: Albert Pall
LEVEL: II DATE: 3-30-02	LEVEL: III DATE: 4/4/02	DATE: 4/19/02 PAGE: 15 OF 18

Report Number R17D

00149

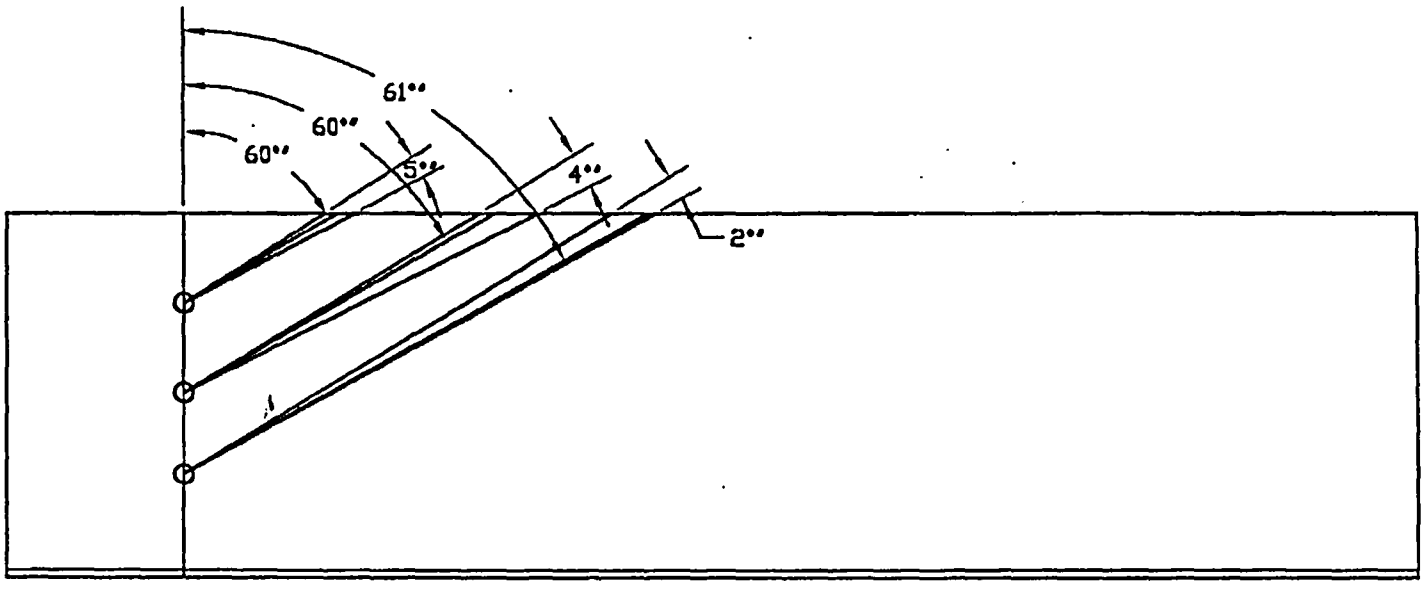


HSBCT
9/11
4/19/02

Browns Ferry Unit 3
Beamspread
MARCH 2002
BF-18

16.8.18

Report Number R17D 00150



HSBCT 4/19/02

Browns Ferry Unit 3
Beamspread
MARCH 2002
BF-18

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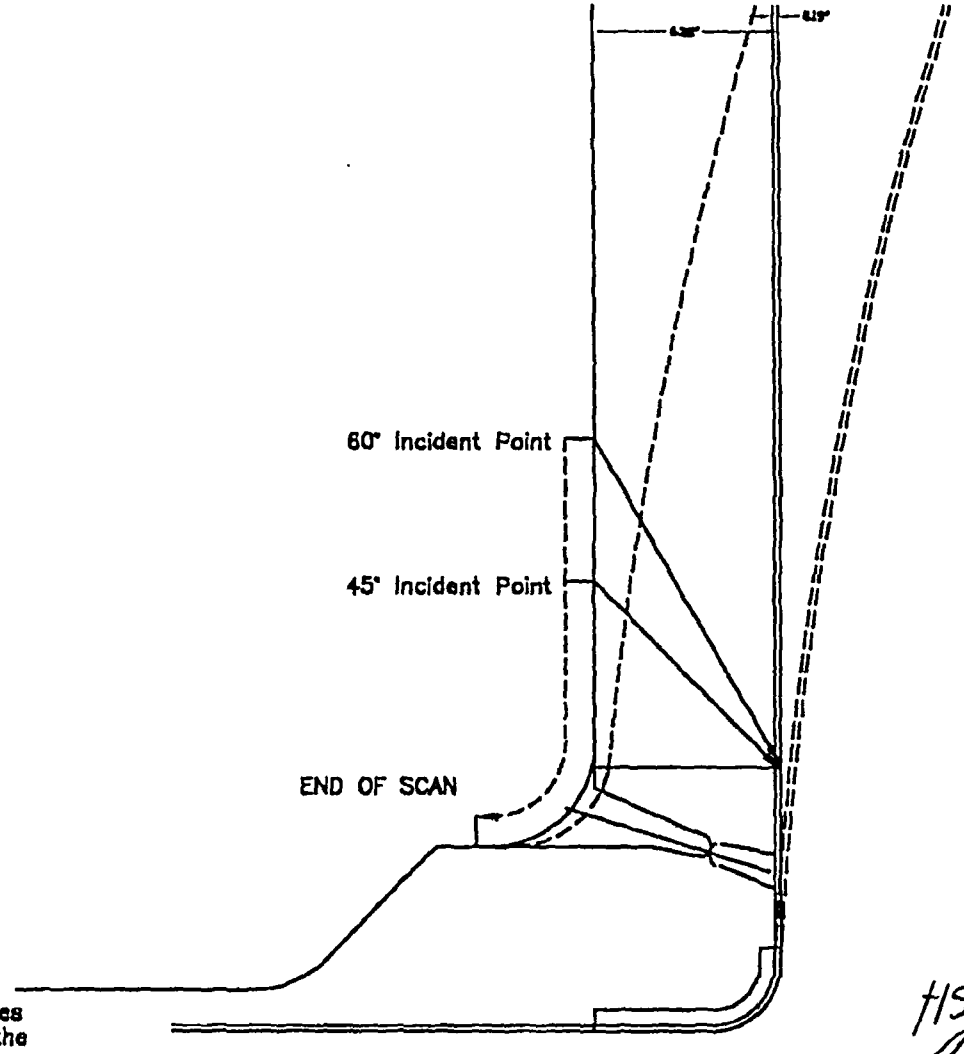
REPORT NUMBER
R170 00151



Transverse coverage includes coverage obtained during the inner radious examination

HSBCT
4/19/02

Browns Ferry Unit 3
N5 Nozzle-to-Shell
MARCH 2002
SP-N5-NS

4/19/02 18

TENNESSEE VALLEY AUTHORITY	EXAMINATION SUMMARY AND RESOLUTION SHEET	REPORT NUMBER: R171

PROJECT: BFN	UNIT: 3	CYCLE: 10		COMPONENT ID: N5B-IR	
EXAMINATION METHOD				SYSTEM RPV	ISI DWG. NO. 3-ISI-0331-C
MT ☐	PT ☐	UT ☒	VT ☐	CODE CLASS: 1	CATEGORY: B-D
PROCEDURE: N-UT-55	REV:9	TC:~~N/A~~ 03-08		COFIG.: Nozzle TO Vessel	
EXAMINER: MIKE KLEINJAN 4/11/02 LEVEL: II	EXAMINER: DAVID KLEINJAN LEVEL:II			EXAMINER: N/A LEVEL: N/A	EXAMINER: N/A LEVEL: N/A

This report contains the data associated with the manual ultrasonic examination of code category B-D, Nozzle to Vessel welds. This examination report satisfies ASME section XI requirements for the Nozzle to shell weld and the inner radius examination.

N5B-IR: This examination was performed using a 25° and 18° in the blend radius in two directions CW/CCW

100% code coverage was obtained

This exam was performed with equipment, Procedures, and personnel qualified in accordance with ASME Section XI

Geometric indications observed out of the exam Area for the inner radius exam. (Feedwater Bracket Pads) (See N5B for details)

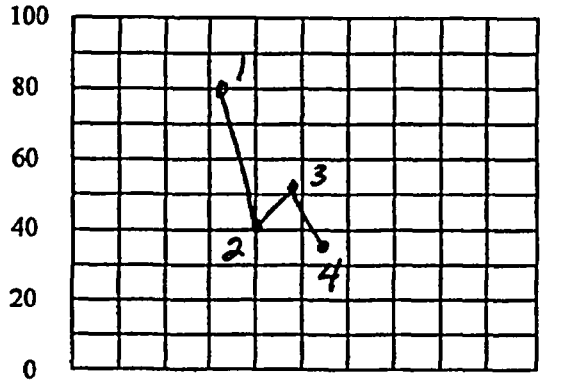
No Recordable Indications

RESOLUTION BY:	REVIEWED BY:	ANII:
Mike Kleinjan		DATE: 4/19/02
LEVEL: II DATE: 4/2/02	LEVEL: III DATE: 4/4/02	PG. 1 OF 24

4/11/02

TENNESSEE VALLEY AUTHORITY	DIGITAL ULTRASONIC CALIBRATION DATA SHEET	REPORT NUMBER: R171

PROJECT: BFN UNIT: 3 CYCLE: 10	CALIBRATION DATE: 03-31-02
PROC.: N-UT- 55 REV:9 ~~TC: N/A~~	CALIBRATION BLOCK NO.: BF-85-IR TEMP: 70.5° F
INSTR. MFG: STAVELEY DUE DATE: 08-11-02	SIMULATOR BLOCK NO: N/A
MODEL/TYPE: SONIC-137 M & TE NO.: VH-5473	THERMOMETER S/N: 522352 DUE DATE: 05-17-02
TRANSDUCER MFG: KRAUTKRAMER	COUPLANT SONOTRACE BATCH: 01141
S/N DB 351643 SIZE: 1.0" FREQ: 2.25 MHz	EXAM TYPE: SHEAR☐ LONG☐ RL☒
CABLE TYPE: RG 174 LENGTH: 120 inches	ANGLE VERIFICATION
	BLOCK TYPE: CS IIW / S/N: DB 55074
DAC	NOMINAL ANGLE: 18 / ACTUAL ANGLE: N/A



DISPLAY WIDTH: 20 inches

INSTRUMENT SETTINGS

REFLECTOR SCAN DIRECT.	NTCH	SDH	REFERENCE SENSITIVITY	MEMORY NUMBER
AXIAL	☒	☐	52.0 dB	18
CIRC	☐	☐	N/A dB	N/A

FREQ: 2.25 MHz	REJECT: OFF %
ANGLE: N/A deg	DAMPING: 200 ohms
DELAY: 1.02 msec	PULSER: 222
ZERO: N/A msec	FILTER: FILT 1
VELOCITY: 0.234 msec	REP RATE: 4 KHZ
RANGE: 20.0 inches	TOF: ☐PEAK ☒ FLANK
DISPLAY MODE: PE	POWER: AC
DUAL: ☐ ON ☒ OFF	TCG: ☐ ON ☒ OFF

REF. REFLECTOR: N/A GAIN: N/A dB	CALIBRATION TIMES
AMPLITUDE: N/A % METAL PATH: N/A"	INITIAL TIME: 1330 FINAL TIME: 1700

VERIFICATION TIMES	1)N/A	2)N/A	3)N/A	4)N/A	5)N/A	6)N/A	7)N/A	8)N/A	9)N/A

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	

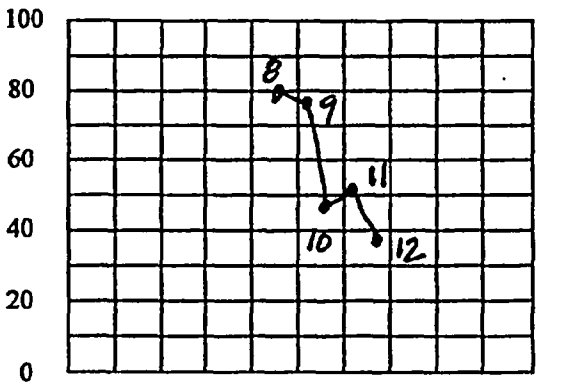
ATTENUATOR	GAIN	SET	-6 dB	-12 dB	SET	+12	SET	+6	
	AMP	80%	32 TO 48	16 TO 24	20 %	64 TO 96	40%	64 TO 96	
			40	20		80		80	

COMMENTS:	WELDS/ITEMS EXAMINED:
Wedge ID d-14795-253	REACTOR PRESSURE VESSEL
	N5B-IR

EXAMINER:	EXAMINER:	REVIEWER:	ANII:
DAVID KLEINJAN	~~MIKE KLEINJAN~~ 04/11/02 N/A		DATE: 4/18/02
LEVEL: II	LEVEL: II	LEVEL III DATE: 4/4/02	PG.: ~~1 OF 1~~ 04/11/02 2 OF 4

TENNESSEE VALLEY AUTHORITY	DIGITAL ULTRASONIC CALIBRATION DATA SHEET	REPORT NUMBER: R171

PROJECT: BFN UNIT: 3 CYCLE: 10	CALIBRATION DATE: 03-31-02
PROC.: N-UT- 55 REV:9 TC: ~~N/A~~	CALIBRATION BLOCK NO.: BF-85-IR TEMP: 70.5° F
INSTR. MFG: STAVELEY DUE DATE: 08-11-02	SIMULATOR BLOCK NO: N/A
MODEL/TYPE: SONIC-137 M & TE NO.: VH-5473	THERMOMETER S/N: 522352 DUE DATE: 05-17-02
TRANSDUCER MFG: KRAUTKRAMER	COUPLANT SONOTRACE BATCH: 01141
S/N DB 35164 SIZE: 1.0" FREQ: 2.25 MHz	EXAM TYPE: SHEAR☐ LONG☐ RL☒
CABLE TYPE: RG 174 LENGTH: 120 inches	ANGLE VERIFICATION
	BLOCK TYPE: CS IIW / S/N: DB 55074
DAC	NOMINAL ANGLE: 25 / ACTUAL ANGLE: N/A



DISPLAY WIDTH: 20 inches

INSTRUMENT SETTINGS

REFLECTOR SCAN DIRECT.	NTCH	SDH	REFERENCE SENSITIVITY	MEMORY NUMBER
AXIAL	☒	☐	55.4 dB	25
CIRC	☐	☐	N/A dB	N/A

FREQ: 2.25 MHz	REJECT: OFF %
ANGLE: N/A deg	DAMPING: 200 ohms
DELAY: 1.22 msec	PULSER: 222
ZERO: N/A msec	FILTER: FILT 1
VELOCITY: 0.235 msec	REP RATE: 4 KHZ
RANGE: 20.0 inches	TOF: ☐PEAK ☒ FLANK
*DISPLAY MODE: PE	POWER: AC
DUAL: ☐ ON ☒ OFF	TCG: ☐ ON ☒ OFF

REF. REFLECTOR: N/A	GAIN: N/A dB
AMPLITUDE: N/A %	METAL PATH: N/A"

CALIBRATION TIMES

INITIAL TIME: 1440 FINAL TIME: 1700

VERIFICATION TIMES	1)N/A	2)N/A	3)N/A	4)N/A	5)N/A	6)N/A	7)N/A	8)N/A	9)N/A

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	-12 dB	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:	WELDS/ITEMS EXAMINED:
Wedge ID D-14795-166	REACTOR PRESSURE VESSEL
	N5B-IR

EXAMINER:	EXAMINER:	REVIEWER:	ANII:
DAVID KLEINJAN	~~MIKE KLEINJAN~~ 4/19/02		DATE: 4/19/02
LEVEL: II	LEVEL: II	LEVEL: III DATE: 4/19/02	PG.: ~~2 OF 4~~ 3 OF 4 4/19/02

TVA	MANUAL ULTRASONIC VESSEL EXAMINATION DATA SHEET	REPORT NO. R171

PROJECT: BFN UNIT: 3 WELD ID: N5B CONFIG.: INNER RADIUS COMPONENT: N/A

CAL. SHT. NO.: N/A PROCEDURE: N-UT-55 REV.: 9 PCR.: ~~N/A~~ 02-08 ~~054-10-02~~ TEMP.: 85 PYRO.: 522352

SCAN SENS.: * dB EXAM START: 1445 EXAM END: 1641 EXAM ANGLE: 18°, 25°

Lo LOCATION: TDC Wo LOCATION: Ø of WELD

IND NO.	20%			50%			100%			MAX. AMP.			20%			50%			100%		
	Mp1	W1	L1	Mp1 *	W1	L1	Mp1	W1	L1	Mp	W	L	Mp2	W2	L2	Mp2	W2	L2	Mp2	W2	L2
18	SCAN		dB	58		SCANNING			10/11		BLEND		RADIUS								
25	SCAN		dB	61.4		SCANNING			10/11		BLEND		RADIUS								
	NO RECORDABLE INDICATION																				

COMMENTS: A MATERIAL NOISE LEVEL OF 5-10% WAS OBSERVED

EXAMINER: D.P. Hoyle LEVEL: II DATE: 03-31-02 REVIEWED BY: [illegible] LEVEL: III DATE: 4/4/02

EXAMINER: N/A LEVEL: N/A DATE: N/A ANII: Albert Todd DATE: 4/19/02 PAGE 4 OF 4

00155

TVA 40094 (NP-1-89) 1-108-999-48

Inspection Report R-125
Weld N7-NV

TENNESSEE VALLEY AUTHORITY	EXAMINATION SUMMARY AND RESOLUTION SHEET	REPORT NUMBER: R125

PROJECT: BFN	UNIT: 3	CYCLE: 10		COMPONENT ID: N7 NOZZLE	
EXAMINATION METHOD				SYSTEM: RPV	ISI DWG. NO. 3-ISI-0295-A
MT ☐	PT ☐	UT ☒	VT ☐	CODE CLASS: 1	CATEGORY: B-D
PROCEDURE: N-UT-9	REV:9	TC: ~~N/A~~ 02-04		COFIG.: .RPV HEAD TO NOZZLE	
EXAMINER: D. GRONEWOLD LEVEL: II	EXAMINER: N/A LEVEL: N/A			EXAMINER: N/A LEVEL: N/A	EXAMINER: N/A LEVEL:N/A

A MANUAL ULTRASONIC EXAMINATION WAS PERFORMED ON THE N7 NOZZLE WHICH IS A RPV HEAD TO NOZZLE WELD TO THE REQUIREMENTS OF ASME SECTION ~~N~~ XI 4/5/02

A 0 deg., 45 deg. and a 60deg INSPECTION ANGLES WERE USED.

THIS WELD WAS LIMITED TO SCANNING ON THE HEAD SIDE DUE TO THE CONFIGURATION.

THE NOZZLE INNER RADIUS WAS SEEN 360 WITH THE 45 AND THE 60

NO OTHER INDICATIONS WERE DETECTED.

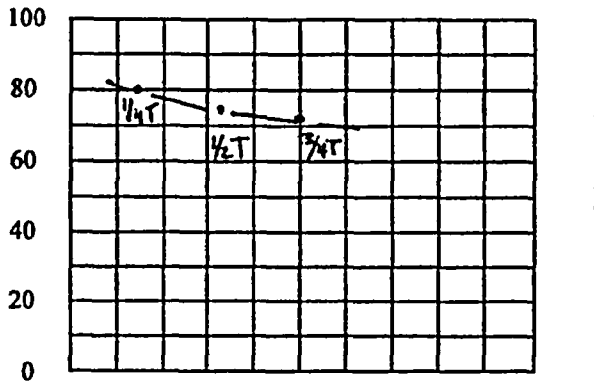
70 % COVERAGE WAS ACHEIVED

0 deg. = 50%
45 deg. = 82 %
60 deg. = 90 %
45 & 60 CW & CCW = 60 %

RESOLUTION BY:	REVIEWED BY:	ANII:
DOUGLAS GRONEWOLD Douglas Gronewold	Douglas Gronewold	DATE: 4/5/02
LEVEL: II DATE: 3-29-02	LEVEL: III DATE: 3-31-02	PG. 1 OF 13

TENNESSEE VALLEY AUTHORITY	DIGITAL ULTRASONIC CALIBRATION DATA SHEET	REPORT NUMBER: R125

PROJECT: BFN UNIT: 3 CYCLE: 10	CALIBRATION DATE: 3/29/02
PROC.: N-UT- 9 REV:9 TC: ~~NA~~ 02-06	CALIBRATION BLOCK NO.: BF 19 TEMP: 81°F
INSTR. MFG: KRAUTKRAMER DUE DATE: 6/15/02	SIMULATOR BLOCK NO: NA
MODEL/TYPE: USN 52L M & TE NO.: E30219	THERMOMTER S/N: 562775 DUE DATE: 12/8/02
TRANSDUCER MFG: Aerotech	COUPLANT ULTRAGEL II BATCH: 0325
S/N C03305 SIZE: 1.0 FREQ: 2.25 MHz	EXAM TYPE: SHEAR ☐ LONG ☒ RL ☐
CABLE TYPE: RG 58 LENGTH: 72" inches	ANGLE VERIFICATION
	BLOCK TYPE: NA / S/N: NA
DAC	NOMINAL ANGLE: 0° / ACTUAL ANGLE: NA



DISPLAY WIDTH: 5.61 inches

INSTRUMENT SETTINGS

REFLECTOR			REFERENCE	MEMORY
SCAN DIRECT.	NTCH	SDH	SENSITIVITY	NUMBER
AXIAL	☐	☒	22 dB	12
CIRC	☐	☐	NA dB	NA

FREQ: 2-8 MHz	REJECT: 0 %
ANGLE: OFF deg	DAMPING: 1000 ohms
DELAY: -0.125 msec	PULSER: SINGLE *
ZERO: 1.261 msec	FILTER: FIXED *
VELOCITY: .2318 msec	REP RATE: HIGH
RANGE: 5.61 inches	TOF: ☒ PEAK ☐ FLANK
RECTIFIER: FULL	POWER: DC
DUAL: ☐ ON ☒ OFF	TCG: ☐ ON ☒ OFF

REF. REFLECTOR: NA GAIN: NA dB	CALIBRATION TIMES
AMPLITUDE: NA % METAL PATH: NA"	INITIAL TIME: 0640 FINAL TIME: 1345

VERIFICATION TIMES	1)N/A	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

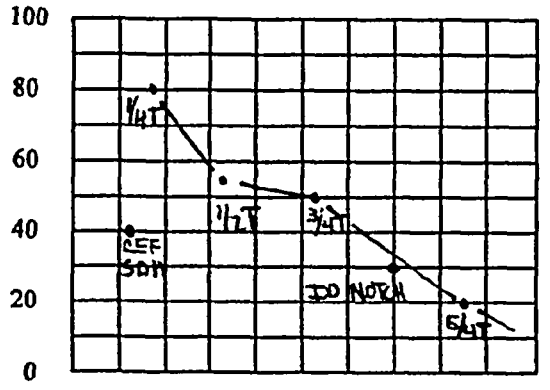
ATTENUATOR	GAIN	SET	-6 dB	-12 dB	SET	+12	SET	+6
	AMP	80%	32 TO 48	16 TO 24	20 %	64 TO 96	40%	64 TO 96
			40	20		80		80

COMMENTS:	WELDS/ITEMS EXAMINED:
	N7 SHELL TO NOZZLE WELD head

EXAMINER:	EXAMINER:	REVIEWER:	ANII:
Douglas Drumwell	N/A	Darlene Dulay	DATE: 4/5/02
LEVEL: II	LEVEL:	LEVEL: II DATE: 5-30-02	PG.: 2 OF 13

TENNESSEE VALLEY AUTHORITY	DIGITAL ULTRASONIC CALIBRATION DATA SHEET	REPORT NUMBER: R125

PROJECT: BFN UNIT: 3 CYCLE: 10	CALIBRATION DATE: 3/29/02
PROC.: N-UT- 9 REV:9 TC:NA	CALIBRATION BLOCK NO.: BF 19 TEMP: 81°F
INSTR. MFG: KRAUTKRAMER DUE DATE: 6/15/02	SIMULATOR BLOCK NO: 790913
MODEL/TYPE: USN 52L M & TE NO.: E30219	THERMOMTER S/N: 562775 DUE DATE: 12/8/02
TRANSDUCER MFG: HARISONICS	COUPLANT ULTRAGEL II BATCH: 0325
S/N T7429 SIZE: 1"x.5" FREQ: 2.25 MHz	EXAM TYPE: SHEAR☒ LONG☐ RL☐
CABLE TYPE: RG 58 LENGTH: 72" inches	ANGLE VERIFICATION
	BLOCK TYPE: IIW S/N: 5307
DAC	NOMINAL ANGLE: 45° ACTUAL ANGLE: 47



DISPLAY WIDTH: 8.6 inches

INSTRUMENT SETTINGS

REFLECTOR SCAN DIRECT.	NTCH	SDH	REFERENCE SENSITIVITY	MEMORY NUMBER
AXIAL	☐	☑	30 dB	10
CIRC	☐	☐	NA dB	NA

FREQ: 2-8 MHz	REJECT: 0 %
ANGLE: 47 deg	DAMPING: 1000 ohms
DELAY: -0.555 msec	PULSER: SINGLE *
ZERO: 12.337 msec	FILTER: FIXED *
VELOCITY: .1272 msec	REP RATE: HIGH
RANGE: 8.6 inches	TOF: ☒PEAK ☐ FLANK
RECTIFIER: FULL	POWER: DC
DUAL: ☐ ON ☒ OFF	TCG: ☐ ON ☒ OFF

REF. REFLECTOR: ROMPAS SDH GAIN: 30 dB	CALIBRATION TIMES
AMPLITUDE: 40 % METAL PATH: 1.08"	INITIAL TIME: 0620 FINAL TIME: 1330

VERIFICATION TIMES	1)N/A	2)N/A	3)N/A	4)N/A	5)N/A	6)N	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	

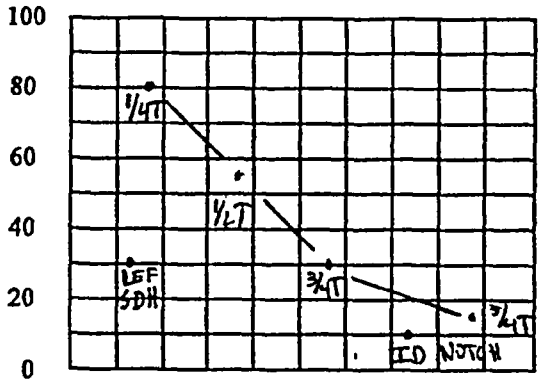
ATTENUATOR	GAIN	SET	-6 dB	-12 dB	SET	+12	SET	+6	
	AMP	80%	32 TO 48	16 TO 24	20 %	64 TO 96	40%	64 TO 96	
			40	20		80		80	

COMMENTS:	WELDS/ITEMS EXAMINED:
NEAR FIELD RESOLUTION WAS CHECKED BY MOVING	N7 NOZZLE to Head
TRANDUCER OVER THE OD NOTCH AND WATCHING THE	
SIGNAL RESPONSE WALK INTO THE INITIAL PULSE.	

EXAMINER:	EXAMINER:	REVIEWER:	ANII:
Douglas Ironemuth	N/A	Darlene Dulog	Albert Todd
LEVEL: II	LEVEL:	LEVEL: III DATE: 3-30-02	DATE: 4/5/02
			PG.: 3 OF 13

TENNESSEE VALLEY AUTHORITY	DIGITAL ULTRASONIC CALIBRATION DATA SHEET	REPORT NUMBER: R125

PROJECT: BFN UNIT: 3 CYCLE: 10	CALIBRATION DATE: 3/29/02
PROC.: N-UT- 9 REV:9 TC:	CALIBRATION BLOCK NO.: BF 19 TEMP: 81°F
INSTR. MFG: KRAUTKRAMER DUE DATE: 6/15/02	SIMULATOR BLOCK NO: 790913
MODEL/TYPE: USN 52L M & TE NO.: E30219	THERMOMTER S/N: 562775 DUE DATE: 12/8/02
TRANSDUCER MFG: Harisonic	COUPLANT ULTRAGEL II BATCH: 0325
S/N T7429 SIZE: 1" x .5" FREQ: 2.25 MHz	EXAM TYPE: SHEAR☒ LONG☐ RL☐
CABLE TYPE: RG 58 LENGTH: 72" inches	ANGLE VERIFICATION
	BLOCK TYPE: IIW S/N: 5307
DAC	NOMINAL ANGLE: 60° ACTUAL ANGLE: 63



DISPLAY WIDTH: 11.23 inches

INSTRUMENT SETTINGS

REFLECTOR SCAN DIRECT.	NTCH	SDH	REFERENCE SENSITIVITY	MEMORY NUMBER
AXIAL	☐	☑	38 dB	20
CIRC	☐	☐	dB	

FREQ:	2-8	MHz	REJECT: 0		%
ANGLE:	63	deg	DAMPING: 1000		ohms
DELAY:	-.859	msec	PULSER: SINGLE		*
ZERO:	16.478	msec	FILTER: FIXED		*
VELOCITY:	1.287	msec	REP RATE: HIGH		
RANGE:	11.23	inches	TOF: ☒PEAK	☐ FLANK	
RECTIFIER: FULL			POWER: DC		
DUAL: ☐ ON	☒ OFF		TCG: ☐ ON	☒ OFF	

REF. REFLECTOR: ROMPAS SDH GAIN: 38 dB	CALIBRATION TIMES
AMPLITUDE: 30 % METAL PATH: 1.59"	INITIAL TIME: 0610 FINAL TIME: 1340

VERIFICATION TIMES	1)N/A	2)N/A	3)N/A	4)N/A	5)N/A	6)N	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	-12 dB	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:	WELDS/ITEMS EXAMINED:
NEAR FIELD RESOLUTION WAS CHECKED BY MOVING THE TRANSDUCER OVER THE OD NOTCH AND WATCHING THE SIGNAL RESPONSE WALK INTO THE INITIAL PULSE.	N7 NOZZLE to head 04/05/02

EXAMINER:	EXAMINER:	REVIEWER:	ANII:
Douglas Ironewood	N/A	Darlene Dailey	DATE: 4/5/02
LEVEL: II	LEVEL:	LEVEL: II DATE 3-30-02	PG.: 4 OF 13

TVA	MANUAL ULTRASONIC VESSEL EXAMINATION DATA SHEET	REPORT NO. R125

PROJECT: BFNP UNIT: 3 WELD ID: N7 CONFIG.: HEAD COMPONENT: NOZZLE

CAL. SHT. NO.: _____ PROCEDURE: N-UT-9 REV.: 9 PCR.: ~~N/A~~ 03-06 ~~00-4-3-00~~ TEMP.: 79°F PYRO.: 562775

SCAN SENS.: 46 dB EXAM START: 1040 EXAM END: 1110 EXAM ANGLE: 60

Lo LOCATION: VESSEL 0° Wo LOCATION: WELD 4

IND NO.	20%			50%			100%			MAX. AMP.			20%			50%			100%		
	Mp1	W1	L1	Mp1	W1	L1	Mp1	W1	L1	Mp	W	L	Mp2	W2	L2	Mp2	W2	L2	Mp2	W2	L2
NRI																					
N/A										N/A											

COMMENTS: 5% TO 10% NOISE @ +8dB OVER REFERENCE, SCAN FROM HEAD SIDE ONLY, NOZZEL IR SEEN 360°
NO INDICATIONS DETECTED

EXAMINER: [signature] LEVEL: II DATE: 3-29-02 REVIEWED BY: [signature] LEVEL: III DATE: 5-30-02
EXAMINER: _____ LEVEL: ____ DATE: ____ ANII: [signature] DATE: 4/5/02 PAGE 5 OF 13

TVA 40094 (NP-1-89) 1-108-999-48

00059

TVA	MANUAL ULTRASONIC VESSEL EXAMINATION DATA SHEET	REPORT NO. R125

PROJECT: BFNP UNIT: 3 WELD ID: N7 CONFIG.: HEAD COMPONENT: NOZZLE

CAL. SHT. NO.: _____ PROCEDURE: N-UT-9 REV.: 9 PCR.: ~~N/A~~ 03-06 ~~0004-800~~ TEMP.: 79°F PYRO.: 562775

SCAN SENS.: 42 dB EXAM START: 1040 EXAM END: 1110 EXAM ANGLE: 45°

Lo LOCATION: VESSEL 0° Wo LOCATION: WELD ℄

IND NO.	20%			50%			100%			MAX. AMP.			20%			50%			100%		
	Mp1	W1	L1	Mp1	W1	L1	Mp1	W1	L1	Mp	W	L	Mp2	W2	L2	Mp2	W2	L2	Mp2	W2	L2
NRI																					

N/A

N/A

COMMENTS: 5% TO 10% NOISE WITH +12dB OVER REF, SCAN FROM HEAD SIDE ONLY; NOZZLE IR SEEN 360°
NO INDICATIONS WERE DETECTED

EXAMINER: Douglas Tomewski LEVEL: II DATE: 3-29-02 REVIEWED BY: Daylene Shelley LEVEL: III DATE: 3-29-02

EXAMINER: _____ LEVEL: ____ DATE: ____ ANII: Albert Tall DATE: 4/5/02 PAGE 6 OF 13

TVA 40094 (NP-1-89) 1-108-999-48

09000

TVA	MANUAL ULTRASONIC VESSEL EXAMINATION DATA SHEET	REPORT NO. R125

PROJECT: BFNP UNIT: 3 WELD ID: N7 CONFIG.: HEAD COMPONENT: NOZZLE

CAL. SHT. NO.: _____ PROCEDURE: N-UT-9 REV.: 9 PCR.: ~~N/A~~ 03-06 ~~04-3-03~~ TEMP.: 79°F PYRO..562775 12-8-02

SCAN SENS.: 34 dB EXAM START: 1040 EXAM END: 1110 EXAM ANGLE: 0°

Lo LOCATION: VESSEL 0° Wo LOCATION: WELD ℄

IND NO.	20%			50%			100%			MAX. AMP.			20%			50%			100%		
	Mp1	W1	L1	Mp1	W1	L1	Mp1	W1	L1	Mp	W	L	Mp2	W2	L2	Mp2	W2	L2	Mp2	W2	L2
NRI																					
										N/A											
N/A																					

COMMENTS: 80% FSH TO 100% FSH BACKWALL @ +12dB OVER REF (34dB)
NO INDICATIONS WERE DETECTED

EXAMINER: [signature] LEVEL: II DATE: 3-29-02 REVIEWED BY: [signature] LEVEL: III DATE: 3-31-02
EXAMINER: _____ LEVEL: ____ DATE: ____ ANII: [signature] DATE: 4/5/02 PAGE 7 OF 13

TVA 40094 (NP-1-89) 1-108-999-48

000061

00062

TVA	WALL THICKNESS PROFILE SHEET	REPORT NO: R125

PROJECT: BFN

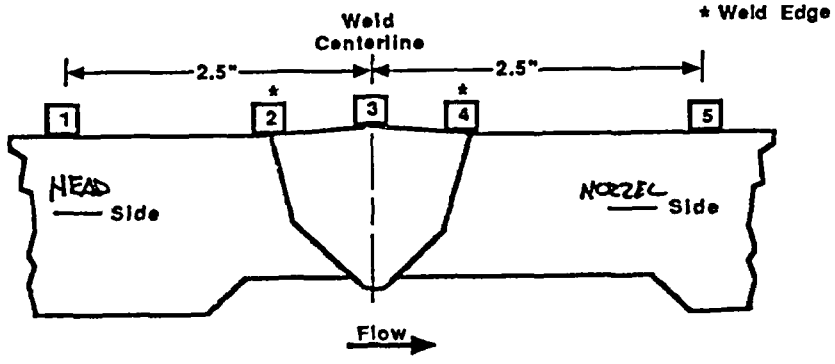
UNIT: 3

WELD NO: N7

SYSTEM: RV Head

Record Thickness Measurements As Indicated, Including Weld Width, Edge-To-Edge At 0°

Position	0°	90°	180°	270°
1	4.2	4.2	4.2	4.2
2	4.15	4.15	4.15	4.15
3	4.15	4.15	4.15	4.15
4	4.15	4.5	4.15	4.15
5	N/A	N/A	N/A	N/A

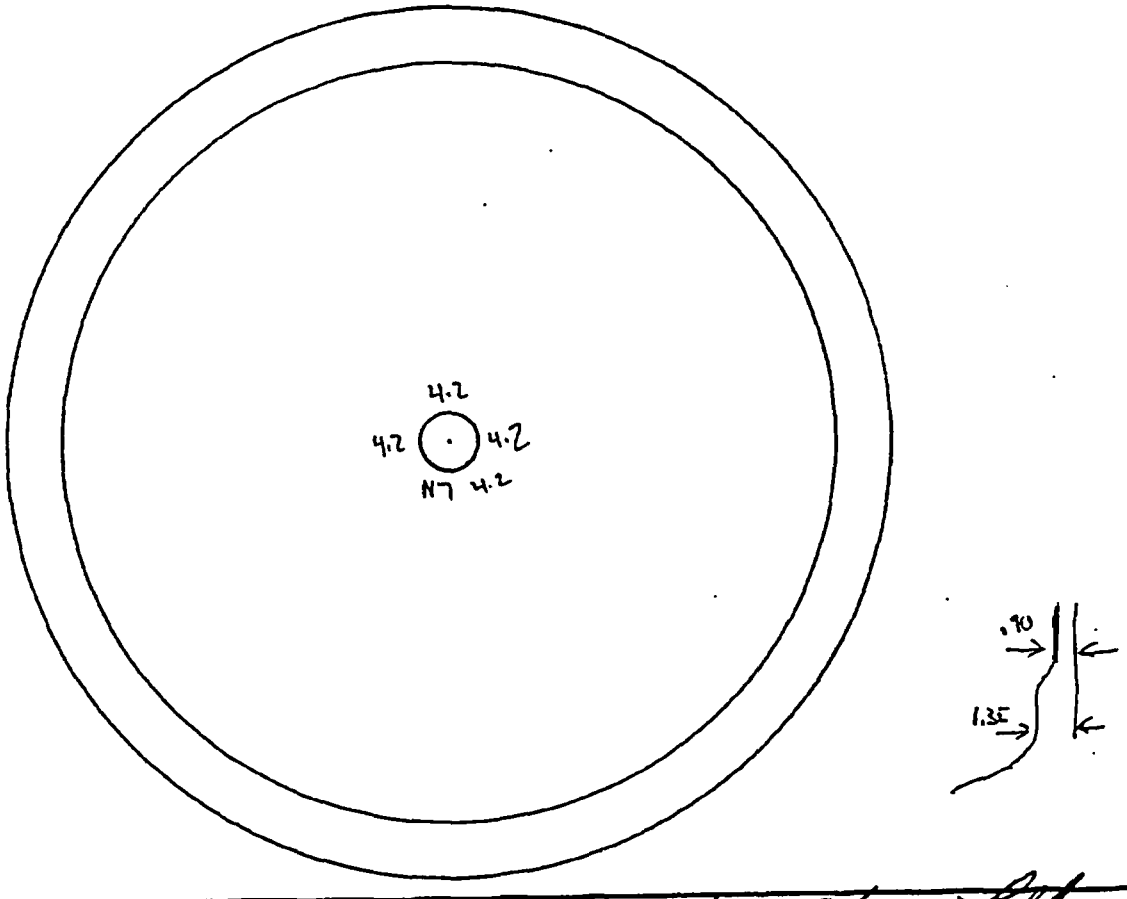


CROWN HEIGHT:

DIAMETER:

CROWN WIDTH:

WELD LENGTH:



EXAMINER: [signature]

LEVEL: II

DATE: 3-29-02

REVIEWED BY: [signature]

LEVEL: III

DATE: 3-31-02

ANII: [signature] 4/5/02

DATE:

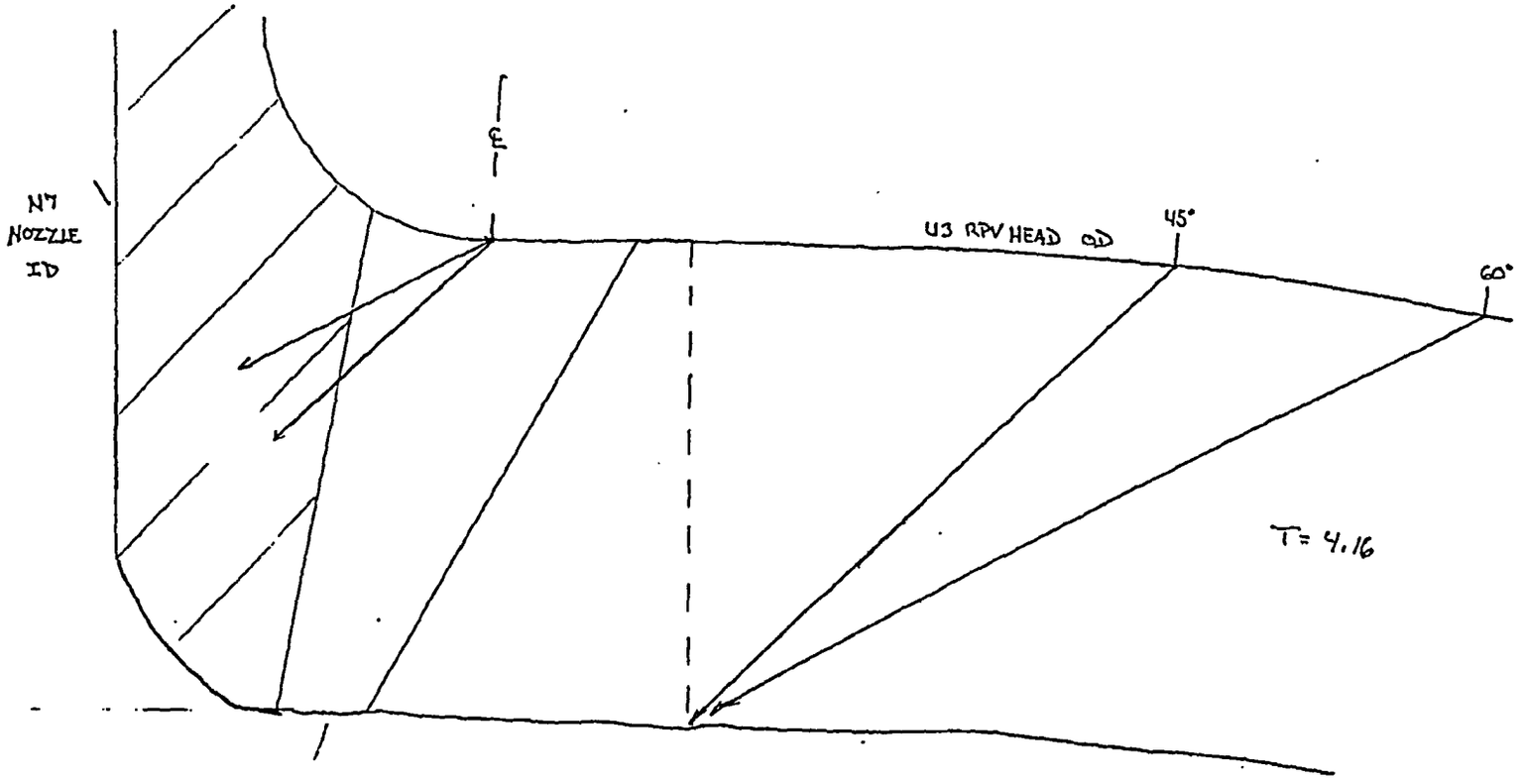
PAGE 8 OF 13

TVA 19668 (NP-5-89)

1-108-999-44

00063

R-125



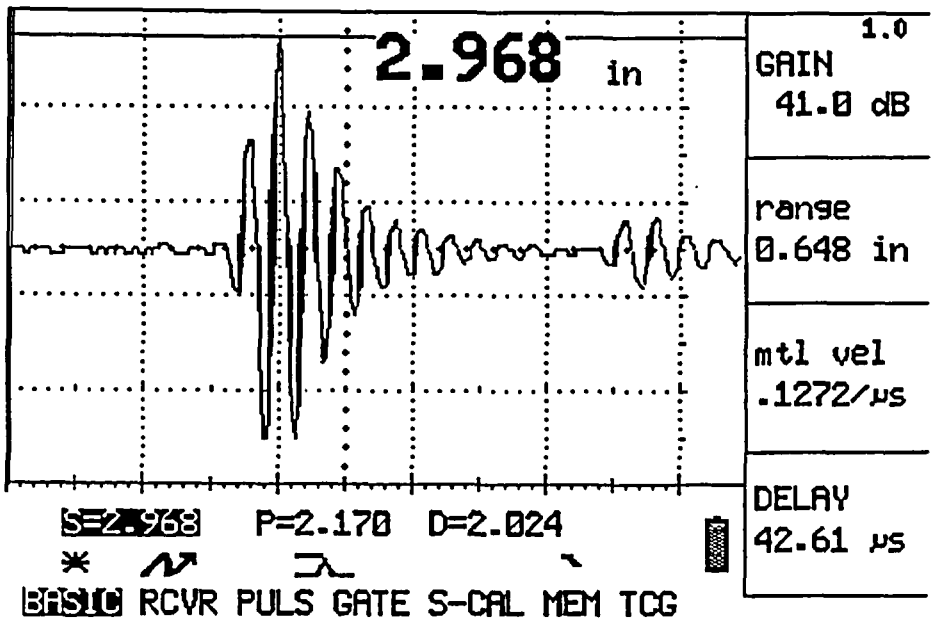
HSBCT
01/1/01

Douglas Gronewold LVII
3-29-02

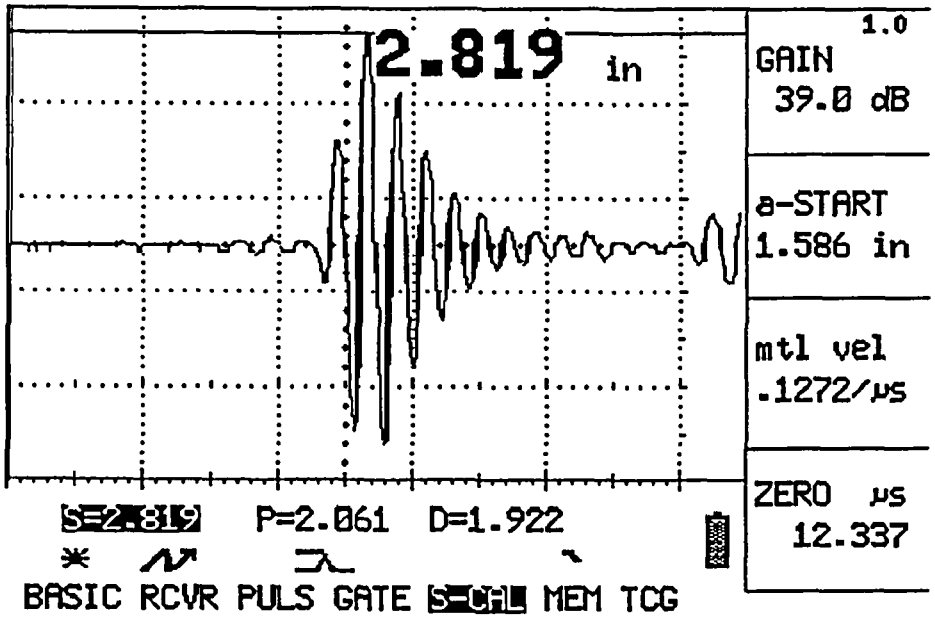
Page 9 of 13

R125
00064

45° Waveforms



45° Pre Examination Waveform



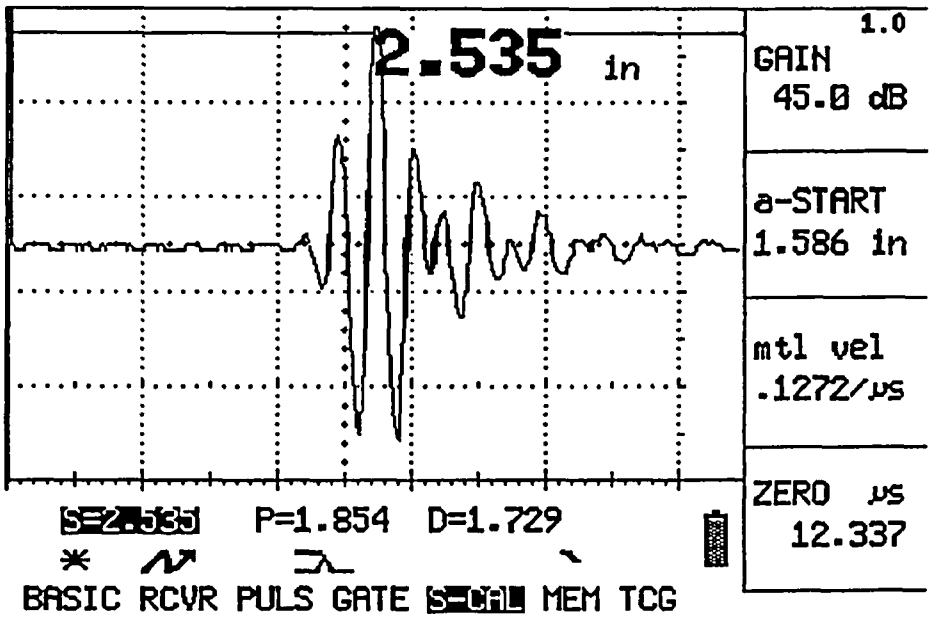
45° Post Examination Waveform

HSBCT
011
4/5/02

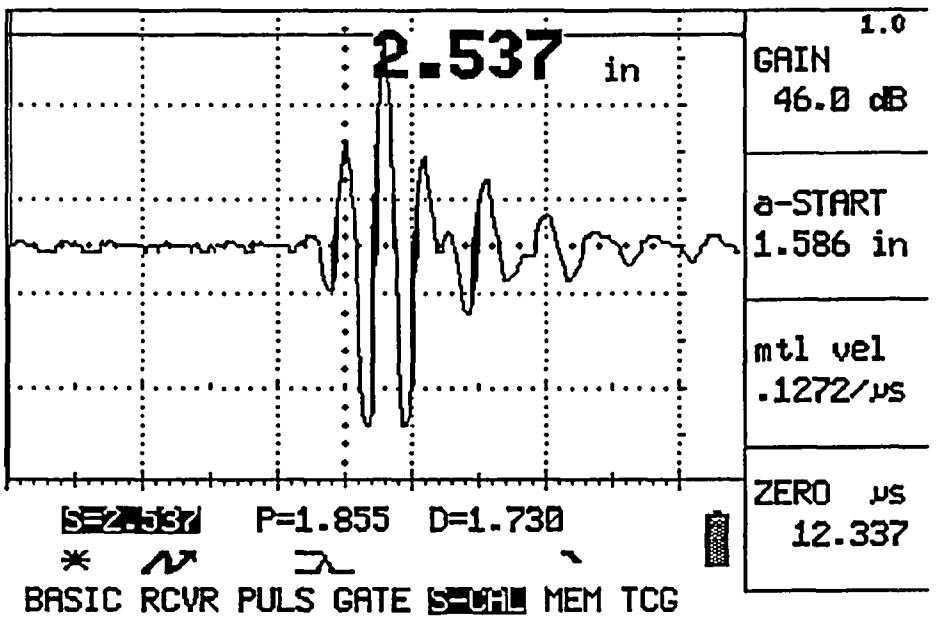
R125

00065

60° Waveforms



60° Pre Examination Waveform



60° Post Examination Waveform

HSBCJ
4/1/00

TVA	BEAM SPREAD AND RESOLUTION DATA SHEET	REPORT NO. R125

PROJECT: BFNP UNIT: 3 CALIBRATION BLOCK NO.: BF19

PROCEDURE NO.: N-UT-9 REV.: 9 PCR: N/A

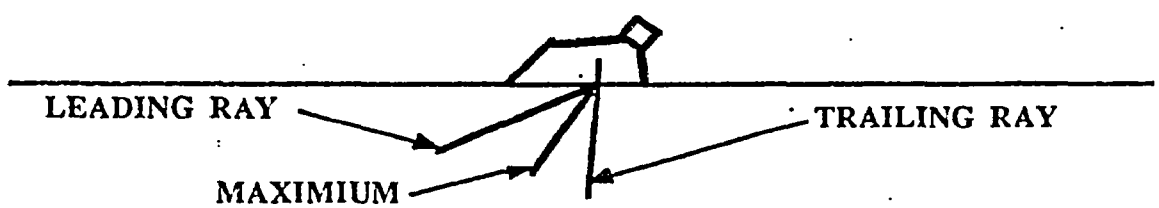
SEARCH UNIT-MAKE: Harasonic SIZE: 1"x.5" FREQ.: 2.25

S/N: T7429 ANGLE: 60

ULTRASONIC INSTRUMENT-MAKE: KB S/N: E30219

BEAM SPREAD

	TRAILING RAY						LEADING RAY			
HOLE	20% DAC		50% DAC		100% DAC		20% DAC		50% DAC	
DEPTH	W	MP	W	MP	MP	W	MP	W	W	MP
1/4T	1.3	1.58	1.55	1.70	2.09	1.9	2.74	2.65	2.3	2.46
1/2T	2.85	3.39	3.0	3.55	4.16	3.7	5.32	4.95	4.55	4.98
3/4T	4.4	5.33	4.65	5.56	6.35	5.57	7.25	6.53	6.40	7.08



RESOLUTION

NEAR SURFACE REFLECTOR: OD NOTCH DEPTH: 0.08" SIZE: 2"x 1/4" CAL BLK.: BF 19

FAR SURFACE REFLECTOR: ID NOTCH DEPTH: 0.15" SIZE: 2"x 1/4"

SCANNING REFLECTORS PROVIDE 50% DAC SIGNALS AT SCANNING SPEED Y ☑ N ☐

EXAMINER: Douglas Arrowsmith	REVIEWED BY: [illegible]	ANII: [illegible]
		DATE: 4/5/02
LEVEL: II DATE: 3-29-02	LEVEL: III DATE: 3-31-02	PAGE: 12 OF 13

TVA	BEAM SPREAD AND RESOLUTION DATA SHEET	REPORT NO. R125

PROJECT: BFNP UNIT: 3 CALIBRATION BLOCK NO.: BF19

PROCEDURE NO.: N-UT-9 REV.: 9 PCR: N/A

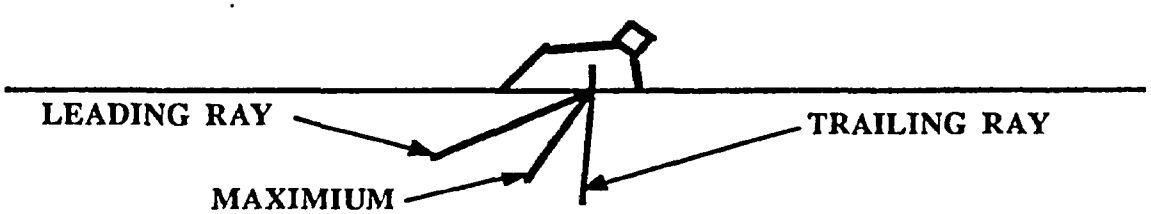
SEARCH UNIT-MAKE: Harsonic SIZE: 1" X .5" FREQ.: 2.25

S/N: T7429 ANGLE: 45

ULTRASONIC INSTRUMENT-MAKE: KB S/N: E30219

BEAM SPREAD

	TRAILING RAY						LEADING RAY			
HOLE	20% DAC		50% DAC		100% DAC		20% DAC		50% DAC	
DEPTH	W	MP	W	MP	MP	W	MP	W	W	MP
1/4T	.8	1.19	.93	1.30	1.42	1.13	1.67	1.42	1.135	1.162
1/2T	1.8	2.65	1.95	2.73	2.95	2.35	3.35	2.75	2.65	3.2
3/4T	2.9	4.09	3.05	4.19	4.48	3.4	5.03	4.1	3.85	4.83



RESOLUTION

NEAR SURFACE REFLECTOR: OD NOTCH DEPTH: .078" SIZE: 2" x 1/4" CAL BLK.: BF19

FAR SURFACE REFLECTOR: ID NOTCH DEPTH: .075" SIZE: 2" x 1/4"

SCANNING REFLECTORS PROVIDE 50% DAC SIGNALS AT SCANNING SPEED Y ☑ N ☐

EXAMINER: [signature]	REVIEWED BY: [signature]	ANII: [signature]
LEVEL: II DATE: 3-29-02	LEVEL: III DATE: 3-31-02	DATE: 4/5/02
		PAGE: 13 OF 13

Inspection Report R-172
Weld N9-NV

TENNESSEE VALLEY AUTHORITY	EXAMINATION SUMMARY AND RESOLUTION SHEET	REPORT NUMBER: R172

PROJECT: BFN	UNIT: 3	CYCLE: 10		COMPONENT ID: N9	
EXAMINATION METHOD				SYSTEM RPV	ISI DWG. NO. 3-ISI-0332-C
MT ☐	PT ☐	UT ☒	VT ☐	CODE CLASS: 1	CATEGORY: B-D
PROCEDURE: N_UT_9	REV:9	TC:02-06		COFIG.:	Nozzle TO Vessel
EXAMINER: MIKE KLEINJAN LEVEL: II	EXAMINER: DAVID KLEINJAN LEVEL: II			EXAMINER: N/A LEVEL: N/A	EXAMINER: N/A LEVEL: N/A

This report contains the data associated with the manual ultrasonic examination of code category B-D, Nozzle to Vessel welds. This examination report satisfies ASME section XI requirements for the Nozzle to shell weld..

Examination. Nozzle to Vessel weld N9
Transverse coverage for the Nozzle to Vessel weld was supplemented by the inner radius examination.
(N9-IR) See R 173

0° was used on the weld crown and base material Vessel side

45° was used on the vessel side only scanning over the weld crown
45° Tangent to the weld was used on vessel side CW/CCW
45° Parallel to the weld was used on vessel side CW/CCW

60° was used on the vessel side only scanning over the weld crown
60° Tangent to the weld was used on vessel side CW/CCW
60° Parallel to the weld was used on vessel side CW/CCW

74% code coverage was obtained

This exam was performed with equipment, Procedures, and personnel qualified in accordance with ASME Section XI

No Recordable Indications

RESOLUTION BY:	REVIEWED BY:	ANII:
Mike Kleinjan		DATE: 4/19/02
LEVEL: II DATE: 4-4-02	LEVEL: III DATE: 4/4/02	PG. 1 OF 16

REPORT NUMBER
R172

00157

Calculation of ASME code coverage
For section XI NDE Examination

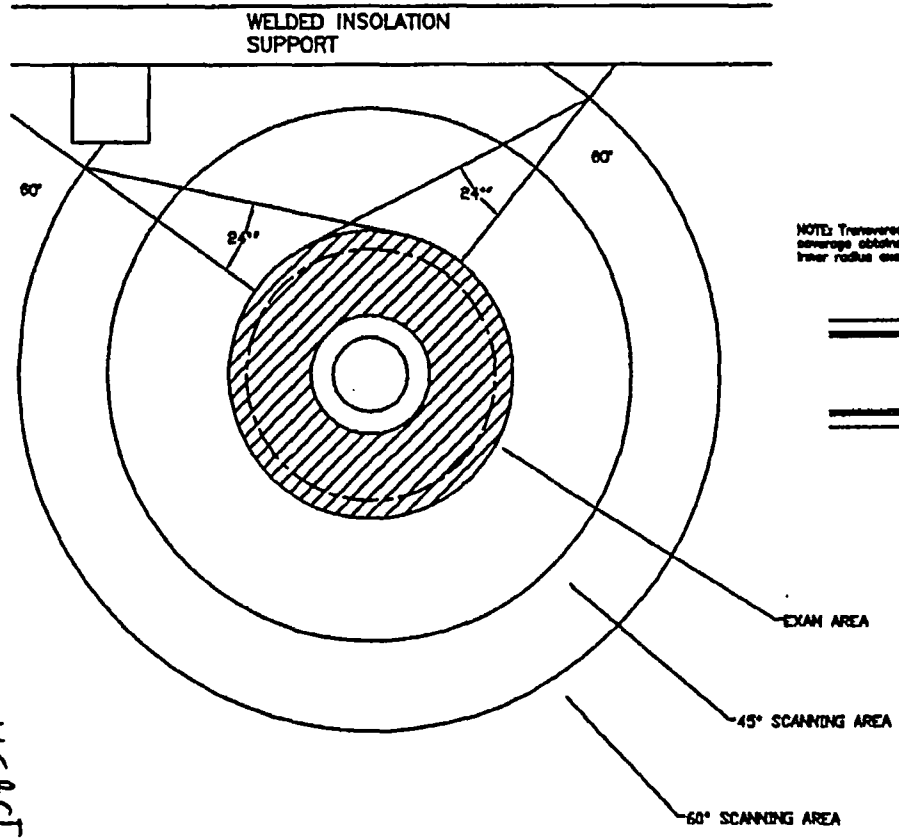
N9

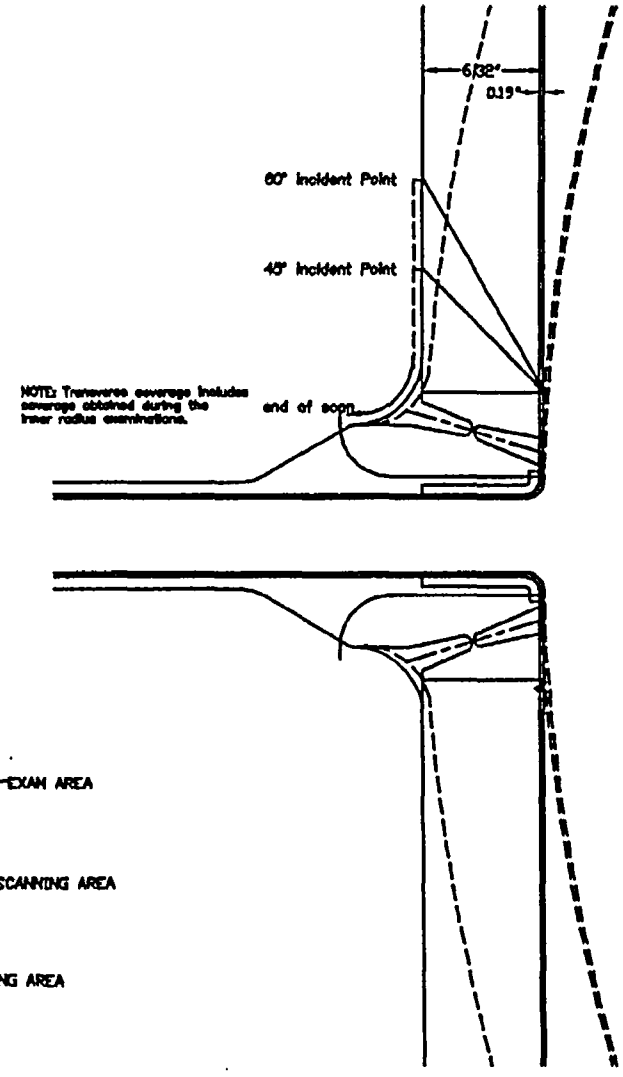
1) O degree (weld metal scan)	100%
2) 45 degree Transverse-scan from vessel side of weld	100%
3) 45 degree Transverse-scan from nozzle side of weld	0%
4) 60 degree Transverse-scan from vessel side of weld	70 %
5) 60 degree Transverse-scan from nozzle side of weld	0%
6) 45 degree Parallel-scan CW direction	100% *
7) 45 degree Parallel-scan CCW direction	100% *
8) 60 degree Parallel-scan CW direction	100% *
9) 60 degree Parallel-scan CCW direction	100% *
The sum of all the percentage of scans	670%
Divided by the total # of scans	9
Percentage of examination Volume coverage	74%

* Transverse coverage includes coverage obtained during the inner radius examination.

HSBCT
4/19/02

2 of 6





LIMITED SCAN 60° DUE TO WELDED INSOLATION SUPPORT

TOTAL EXAM AREA 179.17
EXAM LIMITATION 60° 54.62
60° COVERAGE 124.55 = 70%

HSBCT 4/19/02

3 of 4

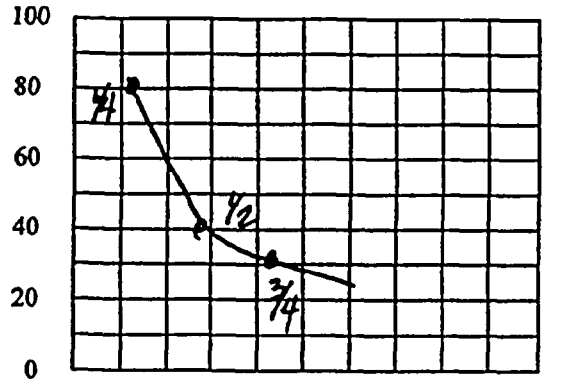
REPORT NUMBER R172

Browns Ferry Unit 3
N9 Nozzle-to-Shell
March 2002
SP-N9-NS

00158

TENNESSEE VALLEY AUTHORITY	DIGITAL ULTRASONIC CALIBRATION DATA SHEET	REPORT NUMBER: R172

PROJECT: BFN UNIT: 3 CYCLE: 10	CALIBRATION DATE: 04-01-02
PROC.: N-UT- 9 REV:9 TC:02-06	CALIBRATION BLOCK NO.: BF18 TEMP: 72.6'F
INSTR. MFG: STAVELEY DUE DATE: 8-05-02	SIMULATOR BLOCK NO: DB55079
MODEL/TYPE: SONIC 136 M & TE NO.: VH751	THERMOMTER S/N: 522352 DUE DATE: 5-17-02
TRANSDUCER MFG: Harisonic	COUPLANT SONOTRACE BATCH: 01141
S/N DB34198 SIZE: .75 FREQ: 2.25 MHz	EXAM TYPE: SHEAR☐ LONG☒ RL☐
CABLE TYPE: RG174 LENGTH: 120 inches	ANGLE VERIFICATION
	BLOCK TYPE: ~~Rempus~~ Rempas S/N: DB55079
DAC	NOMINAL ANGLE: 0 ACTUAL ANGLE: N/A



DISPLAY WIDTH: 10 inches

INSTRUMENT SETTINGS

REFLECTOR SCAN DIRECT.	NTCH	SDH	REFERENCE SENSITIVITY	MEMORY NUMBER
AXIAL	☐	☒	20.8 dB	1
CIRC	☐	☐	n/a dB	n/a

FREQ: 2.25 MHz	REJECT: off %
ANGLE: n/a deg	DAMPING: 500 ohms
DELAY: .499 msec	PULSER: 222
ZERO: n/a msec	FILTER: Filt 3
VELOCITY: .238 msec	REP RATE: 2KHZ
RANGE: 10 inches	TOF: ☒PEAK ☐ FLANK
DISPLAY MODE: PE	POWER: AC
DUAL: ☐ ON ☒ OFF	TCG: ☐ ON ☒ OFF

REF. REFLECTOR: 1" GAIN: 8 dB	CALIBRATION TIMES
AMPLITUDE: 80 % METAL PATH: 1"	INITIAL TIME: 9:00 FINAL TIME: 17:30

VERIFICATION TIMES	1)11:45	2) N/A	3) N/A	4) N/A	5) N/A	6) N/A	7) N/A	8) N/A	9) N/A

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	

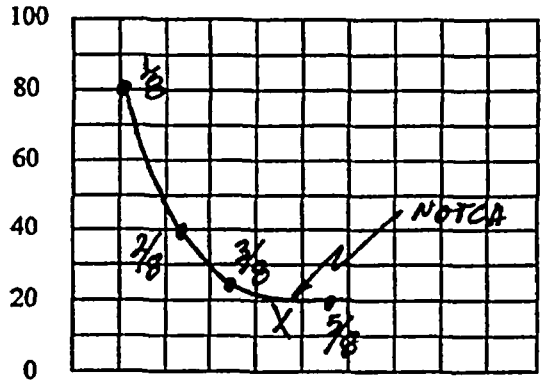
ATTENUATOR	GAIN	SET	-6 dB	-12 dB	SET	+12	SET	+6
	AMP	80%	32 TO 48	16 TO 24	20 %	64 TO 96	40%	64 TO 96
			40	20		80		80

COMMENTS:	WELDS/ITEMS EXAMINED:
	N9 Nozzle to Shell

EXAMINER:	EXAMINER:	REVIEWER:	ANII:
MIKE W. KLEINJAN	DAVID KLEINJAN		DATE: 4/19/02
LEVEL: II	LEVEL: II	LEVEL: III DATE: 4/19/02	PG.: ~~16 OF 16~~ 4/19/02 4 OF 16

TENNESSEE VALLEY AUTHORITY	DIGITAL ULTRASONIC CALIBRATION DATA SHEET	REPORT NUMBER: R172

PROJECT: BFN UNIT: 3 CYCLE: 10	CALIBRATION DATE: 04-01-02
PROC.: N-UT- 9 REV:9 TC:02-06	CALIBRATION BLOCK NO.: BF18 TEMP: 72.6'F
INSTR. MFG: STAVELEY DUE DATE: 8-05-02	SIMULATOR BLOCK NO: DB55079
MODEL/TYPE: SONIC 136 M & TE NO.: VH751	THERMOMTER S/N: 522352 DUE DATE: 5-17-02
TRANSDUCER MFG: Krauntkramer	COUPLANT SONOTRACE BATCH: 01141
S/N DB34843 SIZE: .5x1 FREQ: 2.25 MHz	EXAM TYPE: SHEAR☒ LONG☐ RL☐
CABLE TYPE: RG1743 LENGTH: 120 inches	ANGLE VERIFICATION
	BLOCK TYPE: IIW / S/N: DB55074
DAC	NOMINAL ANGLE: 45° / ACTUAL ANGLE: 46°



DISPLAY WIDTH: 10 inches

INSTRUMENT SETTINGS

REFLECTOR SCAN DIRECT.	NTCH	SDH	REFERENCE SENSITIVITY	MEMORY NUMBER
AXIAL	☐	☒	45.6 dB	2
CIRC	☐	☐	n/a dB	n/a

FREQ: 2.25 MHz	REJECT: off %
ANGLE: N/A deg	DAMPING: 500 ohms
DELAY: .830 msec	PULSER: 222
ZERO: N/A msec	FILTER: FITL 3
VELOCITY: .126 msec	REP RATE: 2KHZ
RANGE: 20 inches	TOF: ☒PEAK ☐ FLANK
DISPLAY MODE: PE	POWER: AC
DUAL: ☐ ON ☒ OFF	TCG: ☐ ON ☒ OFF

REF. REFLECTOR: 1" GAIN: 33.6 dB	CALIBRATION TIMES
AMPLITUDE: 80 % METAL PATH: 1"	INITIAL TIME: 9:00 FINAL TIME: 17:30

VERIFICATION TIMES	1)11:45	2) N/A	3) N/A	4) N/A	5) N/A	6) N/A	7) N/A	8) N/A	9) N/A

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	-12 dB	SET	+12	SET	+6
	AMP	80%	32 TO 48	16 TO 24	20 %	64 TO 96	40%	64 TO 96
			40	20		80		80

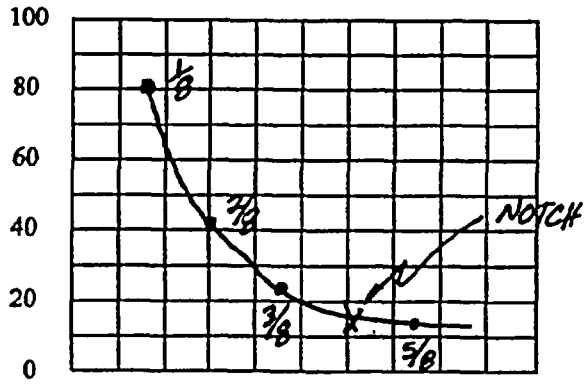
COMMENTS:	WELDS/ITEMS EXAMINED:
Delta difference between 3/8 to 5/8 on the clad side is 3 dB	N9 Nozzle to shell

EXAMINER:	EXAMINER:	REVIEWER:	ANII:
MIKE W. KLEINJAN	DAVID KLEINJAN		DATE: 4/19/02
LEVEL:II	LEVEL:II	LEVEL: ~~II~~ DATE: 4/4/02	PG.: ~~7 OF 16~~ 5 OF 16

00161

TENNESSEE VALLEY AUTHORITY	DIGITAL ULTRASONIC CALIBRATION DATA SHEET	REPORT NUMBER: R172

PROJECT: BFN UNIT: 3 CYCLE: 10	CALIBRATION DATE: 04-01-02
PROC.: N-UT- 9 REV:9 TC:02-06	CALIBRATION BLOCK NO.: BF18 TEMP: 72.6'F
INSTR. MFG: STAVELEY DUE DATE: 8-05-02	SIMULATOR BLOCK NO: DB55079
MODEL/TYPE: SONIC 136 M & TE NO.: VH751	THERMOMTER S/N: 522352 DUE DATE: 5-17-02
TRANSDUCER MFG: Krauntkramer	COUPLANT SONOTRACE BATCH: 01141
S/N DB34154 SIZE: .5x1 FREQ: 2.25 MHz	EXAM TYPE: SHEAR☒ LONG☐ RL☐
CABLE TYPE: RG174 LENGTH: 120 inches	ANGLE VERIFICATION
	BLOCK TYPE: IIW / S/N: DB55074
DAC	NOMINAL ANGLE: 60 / ACTUAL ANGLE: 59



DISPLAY WIDTH: 10 inches

INSTRUMENT SETTINGS

REFLECTOR SCAN DIRECT.	NTCH	SDH	REFERENCE SENSITIVITY	MEMORY NUMBER
AXIAL	☐	☒	52 dB	3
CIRC	☐	☐	n/a dB	n/a

FREQ: 2.25 MHz	REJECT: off %
ANGLE: N/A deg	DAMPING: 500 ohms
DELAY: 1.20 msec	PULSER: 222
ZERO: N/A msec	FILTER: FITL 3
VELOCITY: .123 msec	REP RATE: 2KHZ
RANGE: 20 inches	TOF: ☒PEAK ☐ FLANK
DISPLAY MODE: PE	POWER: AC
DUAL: ☐ ON ☒ OFF	TCG: ☐ ON ☒ OFF

REF. REFLECTOR: 1" GAIN: 36 dB	CALIBRATION TIMES
AMPLITUDE: 80 % METAL PATH: 1"	INITIAL TIME: 9:00 FINAL TIME: 17:30

VERIFICATION TIMES	1)11:45	2) N/A	3) N/A	4) N/A	5) N/A	6) N/A	7) N/A	8) N/A	9) N/A

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	

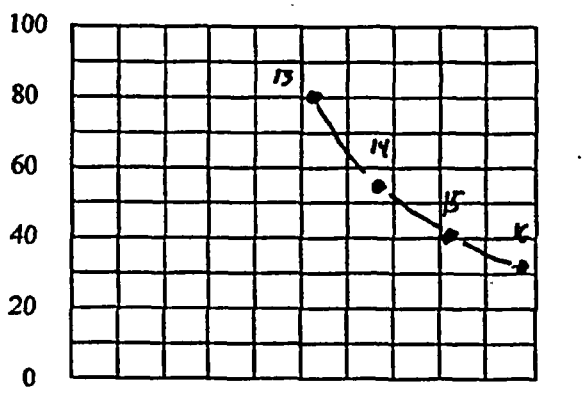
ATTENUATOR	GAIN	SET	-6 dB	-12 dB	SET	+12	SET	+6
	AMP	80%	32 TO 48	16 TO 24	20 %	64 TO 96	40%	64 TO 96
			40	20		80		80

COMMENTS:	WELDS/ITEMS EXAMINED:
DELTA dB DIFFERENCE IS 4.4 FROM THE 3/8 TO 5/8 ON THE	N9 Nozzle to Shell
CLAD SIDE	

EXAMINER:	EXAMINER:	REVIEWER:	ANII:
MIKE W. KLEINJAN	DAVID KLEINJAN		DATE: 4/19/02
LEVEL: II	LEVEL: II	LEVEL: III DATE: 4/4/02	PG.: ~~1 8 OF 1 10~~ 6 OF 16

TENNESSEE VALLEY AUTHORITY	DIGITAL ULTRASONIC CALIBRATION DATA SHEET	REPORT NUMBER: R172

PROJECT: BFN UNIT: 3 CYCLE: 10	CALIBRATION DATE: 04-01-02
PROC.: N-UT- 55 REV:9 TC:N/A	CALIBRATION BLOCK NO.: BF-85-IR TEMP: 65.4° F
INSTR. MFG: STAVELEY DUE DATE: 08-11-02	SIMULATOR BLOCK NO: N/A
MODEL/TYPE: SONIC-137 M & TE NO.: VH-5473	THERMOMTER S/N: 522352 DUE DATE: 05-17-02
TRANSDUCER MFG: KRAUTKRAMER	COUPLANT SONOTRACE BATCH: 01141
S/N DB 35164 SIZE: 1.0" FREQ: 2.25 MHz	EXAM TYPE: SHEAR☐ LONG☐ RL☒
CABLE TYPE: RG 174 LENGTH: 120 inches	ANGLE VERIFICATION
	BLOCK TYPE: CS IIW S/N: DB 55074
DAC	NOMINAL ANGLE: 13° ACTUAL ANGLE: N/A



DISPLAY WIDTH: 10 inches

INSTRUMENT SETTINGS

REFLECTOR SCAN DIRECT.	NTCH	SDH	REFERENCE SENSITIVITY	MEMORY NUMBER
AXIAL	☒	☐	50.0 dB	13
CIRC	☐	☐	N/A dB	N/A

FREQ: 2.25 MHz	REJECT: OFF %
ANGLE: N/A deg	DAMPING: 200 ohms
DELAY: 0.875 msec	PULSER: 222
ZERO: N/A msec	FILTER: FILT 1
VELOCITY: 0.234 msec	REP RATE: 4 KHZ
RANGE: 10.0 inches	TOF: ☐PEAK ☒ FLANK
DISPLAY MODE: PE	POWER: AC
DUAL: ☐ ON ☒ OFF	TCG: ☐ ON ☒ OFF

REF. REFLECTOR: N/A	GAIN: N/A dB
AMPLITUDE: N/A %	METAL PATH: N/A"

CALIBRATION TIMES

INITIAL TIME: 0915	FINAL TIME: 1105

VERIFICATION TIMES	1)N/A	2)N/A	3)N/A	4)N/A	5)N/A	6)N/A	7)N/A	8)N/A	9)N/A

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	

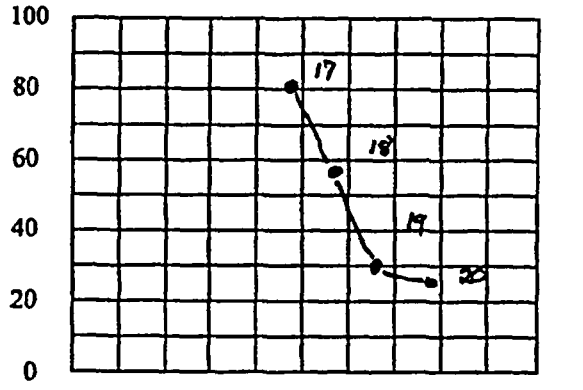
ATTENUATOR	GAIN	SET	-6 dB	-12 dB	SET	+12	SET	+6	
	AMP	80%	32 TO 48	16 TO 24	20 %	64 TO 96	40%	64 TO 96	
			40	20		80		80	

COMMENTS:	WELDS/ITEMS EXAMINED:
	REACTOR PRESSURE VESSEL
	N9-IR
	wedge ID D 14795-251

EXAMINER:	EXAMINER:	REVIEWER:	ANII:
DAVID KLEINJAN	MIKE KLEINJAN		DATE: 4/19/02
LEVEL: II	LEVEL: II	LEVEL: ~~III~~ DATE: 4/19/02	PG.: ~~1 OF 1~~ ~~16~~ 7 OF 16

TENNESSEE VALLEY AUTHORITY	DIGITAL ULTRASONIC CALIBRATION DATA SHEET	REPORT NUMBER: R172

PROJECT: BFN UNIT: 3 CYCLE: 10	CALIBRATION DATE: 04-01-02
PROC.: N-UT- 55 REV:9 ~~TC:N/A~~	CALIBRATION BLOCK NO.: BF-85-IR TEMP: 65.4° F
INSTR. MFG: STAVELEY DUE DATE: 08-11-02	SIMULATOR BLOCK NO: N/A
MODEL/TYPE: SONIC-137 M & TE NO.: VH-5473	THERMOMTER S/N: 522352 DUE DATE: 05-17-02
TRANSDUCER MFG: KRAUTKRAMER	COUPLANT SONOTRACE BATCH: 01141
S/N DB 35164 SIZE: 1.0" FREQ: 2.25 MHz	EXAM TYPE: SHEAR☐ LONG☐ RL☒
CABLE TYPE: RG 174 LENGTH: 120 inches	ANGLE VERIFICATION
	BLOCK TYPE: CS IIW S/N: DB 55074
DAC	NOMINAL ANGLE: 16° ACTUAL ANGLE: N/A



DISPLAY WIDTH: 10 inches

INSTRUMENT SETTINGS

REFLECTOR SCAN DIRECT.	NTCH	SDH	REFERENCE SENSITIVITY	MEMORY NUMBER
AXIAL	☒	☐	47.0 dB	16
CIRC	☐	☐	N/A dB	N/A

FREQ: 2.25 MHz	REJECT: OFF %
ANGLE: N/A deg	DAMPING: 200 ohms
DELAY: 1.01 msec	PULSER: 222
ZERO: N/A msec	FILTER: FILT 1
VELOCITY: 0.234 msec	REP RATE: 4 KHZ
RANGE: 10.0 inches	TOF: ☐PEAK ☒ FLANK
DISPLAY MODE: PE	POWER: AC
DUAL: ☐ ON ☒ OFF	TCG: ☐ ON ☒ OFF

REF. REFLECTOR: N/A GAIN: N/A dB	CALIBRATION TIMES
AMPLITUDE: N/A % METAL PATH: N/A"	INITIAL TIME: 0820 FINAL TIME: 1107

VERIFICATION TIMES	1)N/A	2)N/A	3)N/A	4)N/A	5)N/A	6)N/A	7)N/A	8)N/A	9)N/A

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	-12 dB	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:	WELDS/ITEMS EXAMINED:
	REACTOR PRESSURE VESSEL
	N9-IR
	wedge TO D-14795-252

EXAMINER:	EXAMINER:	REVIEWER:	ANII:
DAVID KLEINJAN	MIKE KLEINJAN		DATE: 4/19/02
LEVEL: II	LEVEL: II	LEVEL: III DATE: 4/4/02	PG.: ~~1 OF 1~~ 8 of 16

4/4/02

TVA	MANUAL ULTRASONIC VESSEL EXAMINATION DATA SHEET	REPORT NO. R172

PROJECT: BFN UNIT: 3 WELD ID: N9 CONFIG.: Nozzle COMPONENT: VESSEL

CAL. SHT. NO.: N/A PROCEDURE: NT-UT-9 REV.: 9 PCR.: 02006 ~~N/A~~ 4-1-02 TEMP.: 85 PYRO.: 52235

SCAN SENS.: X dB EXAM START: 4/01/02 9:45 EXAM END: 10:30 EXAM ANGLE: 0°, 45°, 60°

Lo LOCATION: TDC Wo LOCATION: ℄ OF WELD

IND NO.	20%			50%			100%			MAX. AMP.			20%			50%			100%		
	Mp1	W1	L1	Mp1 *	W1	L1	Mp1	W1	L1	Mp	W	L	Mp2	W2	L2	Mp2	W2	L2	Mp2	W2	L2
13°	SCAN.		dB	56		SCANNING		#	10/11	BLEND RADIUS											
16°	SCAN		dB	53		SCANNING		#	10/11	BLEND RADIUS											
0°	SCAN		dB	34.8		SCANNING		#	9	ON WELD AND BASE MATERIAL											
45°	SCAN		dB	56.6		SCANNING		#	9	ON WELD AND VESSEL SIDE											
45T	SCAN		dB	56.6		SCANNING		#	10/11	CW/CCW VESSEL SIDE											
45 TAN	SCAN		dB	56.6		SCANNING		#	10/11	CW/CCW VESSEL SIDE											
60°	SCAN		dB	63		SCANNING		#	9	ON weld AND VESSEL SIDE											
60T	SCAN		dB	63		SCANNING		#	10/11	CW/CCW VESSEL SIDE											
60 TAN	SCAN		dB	63		SCANNING		#	10/11	CW/CCW VESSEL SIDE											
				NO RECORDABLE INDICATION																	

COMMENTS: 13° AND 16° EXAMINATIONS ARE THE BLEND RADIUS EXAMINATIONS
TRANSVERSE EXAMINATION COVERAGE WILL INCLUDE COVERAGE OBTAINED DURING THE INNER RADIUS EXAMINATIONS. 5 TO 10% Noise Level was observed 4-1-02

EXAMINER: Mike W Kline LEVEL: II DATE: 4-1-02 REVIEWED BY: [signature] LEVEL: III DATE: 4/4/02

EXAMINER: [signature] LEVEL: II DATE: 04-01-02 ANII: [signature] DATE: 4/19/02 PAGE 9 OF 16

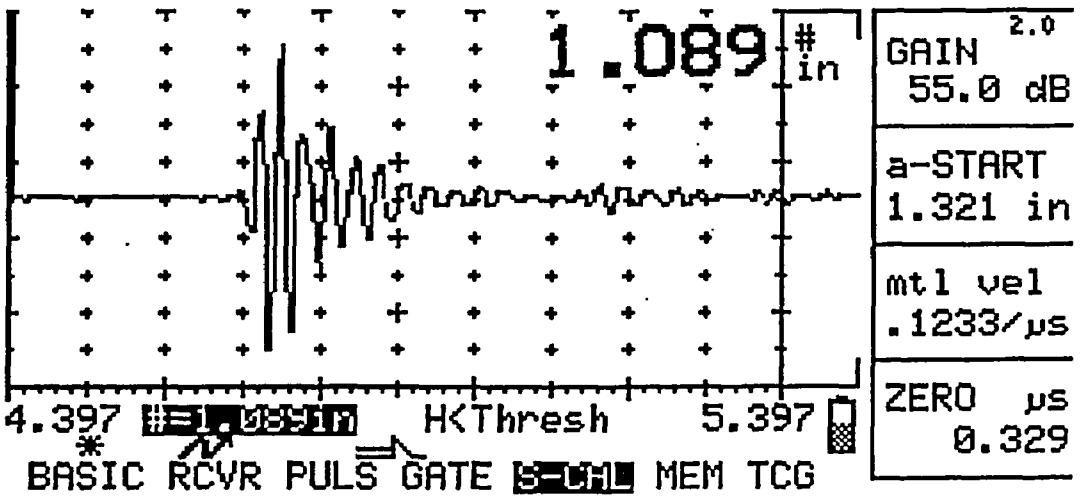
TVA 40094 (NP-1-89) 1-108-999-48

00164

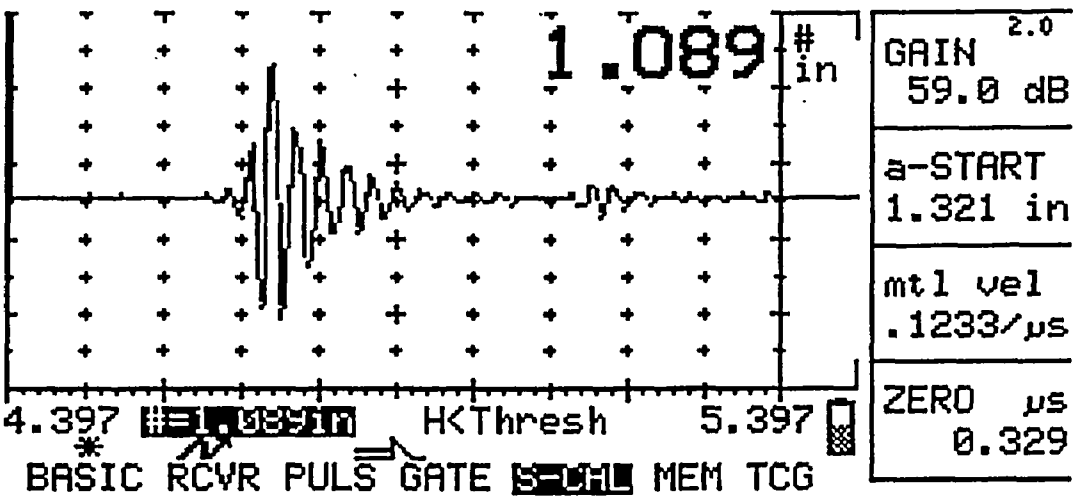
REPORT NUMBER
R172

00165

Nozzle Examination 45 °Waveforms



45° Pre Waveform



45° Post Waveform

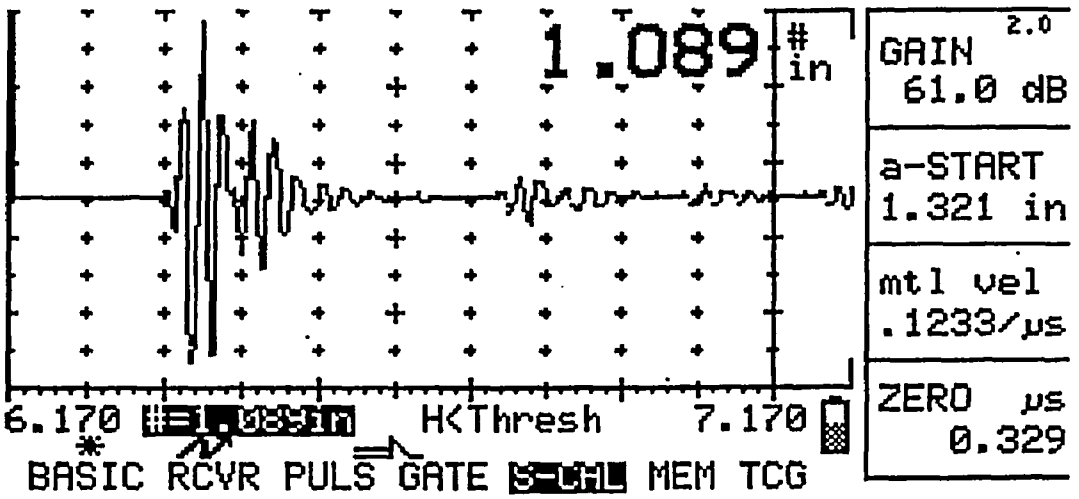
MSBCT
4/19/02

10 Jun 02
+5 = $ 10

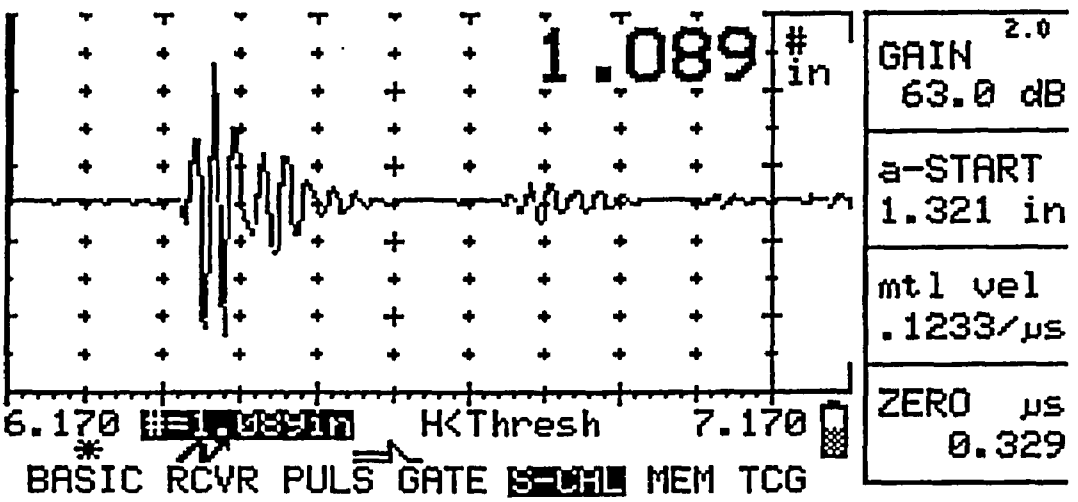
REPORT NUMBER
R172

00166

Nozzle Examination 60 ° Waveforms



60° Pre Waveform



60° Post Waveform

HSBCT
4/19/00

4/19/00

TVA	BEAM SPREAD AND RESOLUTION DATA SHEET	REPORT NO. R172

PROJECT: BFN UNIT: 3 CALIBRATION BLOCK NO.: BF 18

PROCEDURE NO.: N-UT-9 REV.: 9 PCR: 0206 ~~[illegible]~~ 3-30-02

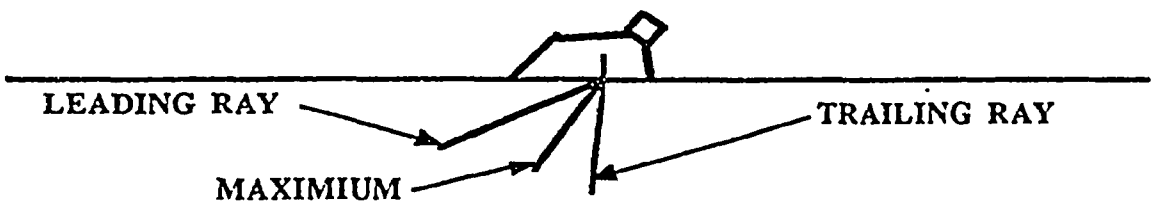
SEARCH UNIT-MAKE: Krautkramer SIZE: .5X1 FREQ.: 2.25

S/N: DB 34843 ANGLE: 45

ULTRASONIC INSTRUMENT-MAKE: Sonic 135 S/N: VH 751

BEAM SPREAD

	TRAILING RAY						LEADING RAY			
HOLE DEPTH	20% DAC		50% DAC		100% DAC		20% DAC		50% DAC	
	W	MP	W	MP	MP	W	MP	W	W	MP
1/4T	1 1/8	1.9	1 1/4	2.	2.1	1 5/8	2.4	2	1 7/8	2.3
2T	2 7/8	4	3	4.1	4.3	3 1/4	4.8	4 1/8	3 3/4	4.6
3/4T	4 1/4	6	4 1/2	6.3	6.5	4 7/8	7	5 7/8	5 1/4	6.8



RESOLUTION

NEAR SURFACE
REFLECTOR: Notch OD DEPTH: 25 SIZE: .253 CAL BLK.: BF 18

FAR SURFACE
REFLECTOR: Notch ID DEPTH: 6.1 SIZE: .253

SCANNING
REFLECTORS PROVIDE 50% DAC SIGNALS AT SCANNING SPEED Y ☒ N ☐

EXAMINER: [signature]	REVIEWED BY: [signature]	ANII: [signature]
LEVEL: II DATE: 3-30-02	LEVEL: III DATE: 4/4/02	DATE: 4/19/02
		PAGE: H12 OF 16

00168

TVA	BEAM SPREAD AND RESOLUTION DATA SHEET	REPORT NO. R172

PROJECT: BFN UNIT: 3 CALIBRATION BLOCK NO.: BF 18

PROCEDURE NO.: N-UT-9 REV.: 9 PCR: 0206 ~~N/A~~ mc 3-30-02

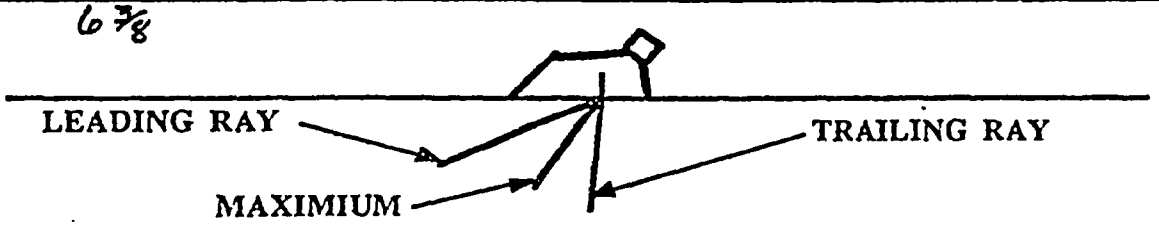
SEARCH UNIT-MAKE: Krautkramer SIZE: .5x1 FREQ.: 2.25

S/N: DB 34154 ANGLE: 60

ULTRASONIC INSTRUMENT-MAKE: Sonic 136 S/N: VH 751

BEAM SPREAD

HOLE DEPTH	TRAILING RAY 20% DAC W	TRAILING RAY 20% DAC MP	TRAILING RAY 50% DAC W	TRAILING RAY 50% DAC MP	100% DAC MP	100% DAC W	LEADING RAY 20% DAC MP	LEADING RAY 20% DAC W	LEADING RAY 50% DAC W	LEADING RAY 50% DAC MP
1/4T	2 1/8	2.4	2 3/8	2.7	2.9	2 5/8	3.2	3 1/8	2 7/8	3.1
1/2T	4 3/4	4.8	5	5.3	5.8	5 1/4	6.4	6 5/8	6	6.1
3/4T	~~6 7/8~~ ~~6 3/8~~ Jan 4/4/02 6 7/8	7.6	7 1/4	8	8.7	7 7/8	9.6	8 5/8	8	9.1



RESOLUTION

NEAR SURFACE REFLECTOR: Notch OD DEPTH: .25 SIZE: .253 CAL BLK.: BF 18

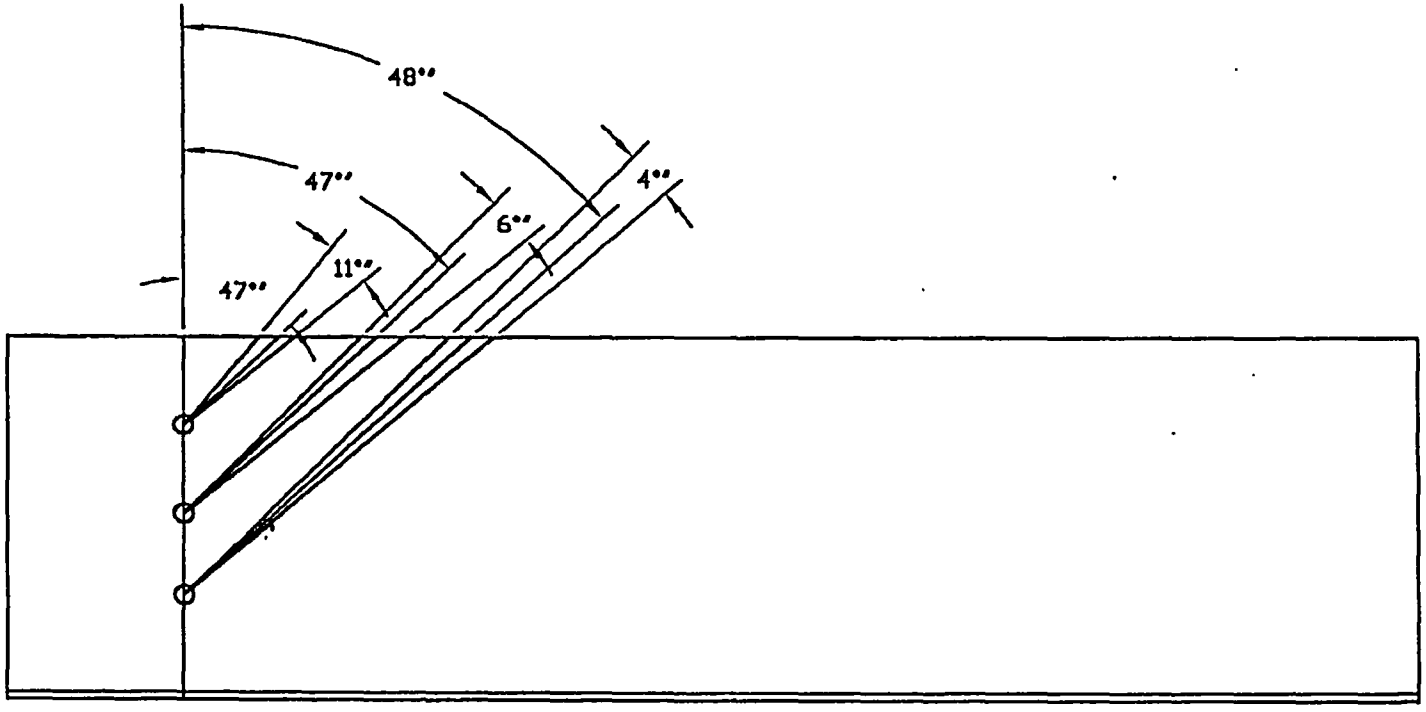
FAR SURFACE REFLECTOR: Notch ID DEPTH: 6.1 SIZE: .253

SCANNING REFLECTORS PROVIDE 50% DAC SIGNALS AT SCANNING SPEED Y ☒ N ☐

EXAMINER: Mike W Stenger	REVIEWED BY: [signature]	ANII: Albert Todd
		DATE: 4/19/02
LEVEL: II DATE: 3-30-02	LEVEL: III DATE: 4/4/02	PAGE: ~~18~~ 13 OF 16

TVA 40095 (NP-1-89) 1-108-999-50

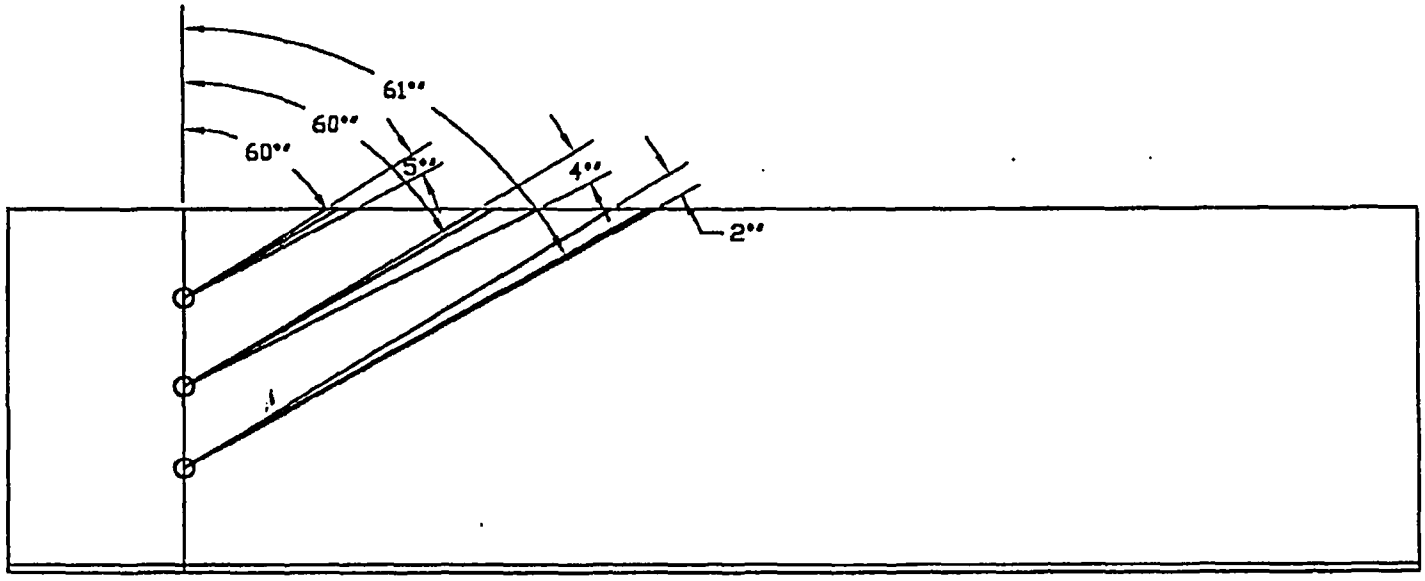
REPORT NUMBER
R172
00169



HSBCT
9/97
4/19/02

Browns Ferry Unit 3
Beamspread
MARCH 2002
BF-18

REPORT NUMBER
R172 00170



HSBCT
AN
4/18/02

Browns Ferry Unit 3
Beamspread
MARCH 2002
BF-18

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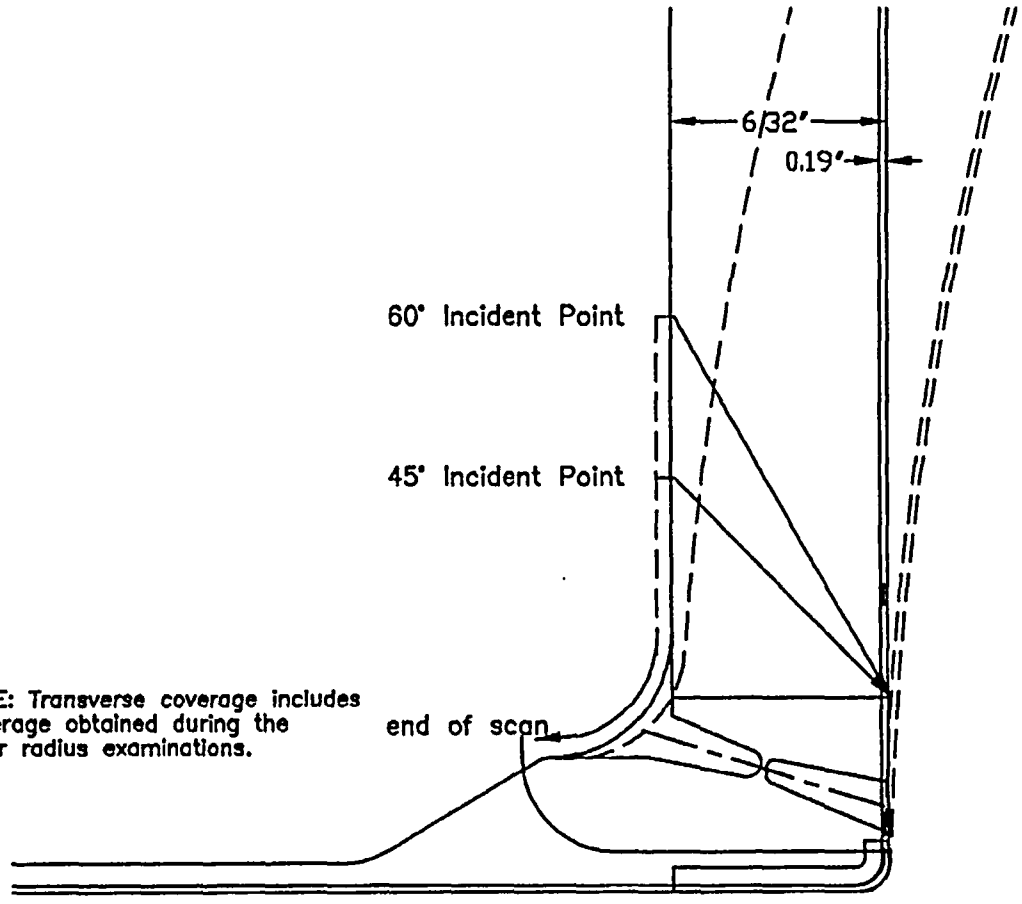


NOTE: *Transverse coverage includes coverage obtained during the inner radius examinations.*

REPORT NUMBER R172

Browns Ferry Unit 3	
N9 Nozzle-to-Shell	
March 2002	
SP-N9-NS	

HSBCT 4/19/02

00171

4/19/02 16 of 16

TENNESSEE VALLEY AUTHORITY	EXAMINATION SUMMARY AND RESOLUTION SHEET	REPORT NUMBER: R173

PROJECT: BFN	UNIT: 3	CYCLE: 10		COMPONENT ID: N9-IR	
EXAMINATION METHOD				SYSTEM RPV	ISI DWG. NO. 3-ISI-0332-C
MT ☐	PT ☐	UT ☒	VT ☐	CODE CLASS: 1	CATEGORY: B-D
PROCEDURE: N-UT-55	REV:9	TC:N/A		COFIG.: Nozzle TO Vessel	
EXAMINER: MIKE KLEINJAN LEVEL: II	EXAMINER: DAVID KLEINJAN LEVEL:II			EXAMINER: N/A LEVEL: N/A	EXAMINER: N/A LEVEL: N/A

This report contains the data associated with the manual ultrasonic examination of code category B-D, Nozzle Inner radius. This examination report satisfies ASME section XI requirements for the inner radius examination.

N9-IR: This examination was performed using a 16° and 13° in the blend radius in two directions CW/CCW

100% code coverage was obtained

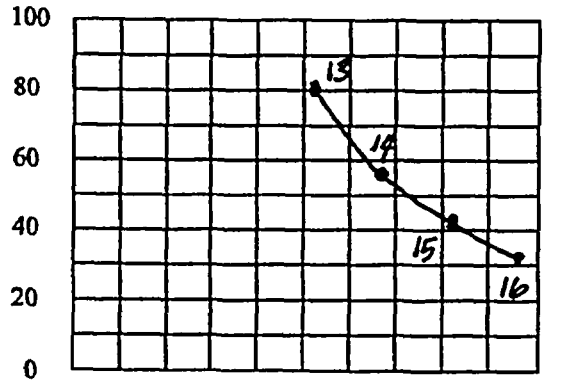
This exam was performed with equipment, Procedures, and personnel qualified in accordance with ASME Section XI

No Recordable Indication

RESOLUTION BY:	REVIEWED BY:	ANII:
Mike Kleinjan		DATE: 4/19/02
LEVEL: II DATE: 4-4-02	LEVEL: III DATE: 4/4/02	PG. 1 OF 4

TENNESSEE VALLEY AUTHORITY	DIGITAL ULTRASONIC CALIBRATION DATA SHEET	REPORT NUMBER: R173

PROJECT: BFN UNIT: 3 CYCLE: 10	CALIBRATION DATE: 04-01-02
PROC.: N-UT- 55 REV:9 TC:N/A	CALIBRATION BLOCK NO.: BF-85-IR TEMP: 65.4° F
INSTR. MFG: STAVELEY DUE DATE: 08-11-02	SIMULATOR BLOCK NO: N/A
MODEL/TYPE: SONIC-137 M & TE NO.: VH-5473	THERMOMTER S/N: 522352 DUE DATE: 05-17-02
TRANSDUCER MFG: KRAUTKRAMER	COUPLANT SONOTRACE BATCH: 01141
S/N DB 3516 SIZE: 1.0" FREQ: 2.25 MHz	EXAM TYPE: SHEAR☐ LONG☐ RL☒
CABLE TYPE: RG 174 LENGTH: 120 inches	ANGLE VERIFICATION
	BLOCK TYPE: CS IIW / S/N: DB 55074
DAC	NOMINAL ANGLE: 13° / ACTUAL ANGLE: N/A



DISPLAY WIDTH: 10 inches

INSTRUMENT SETTINGS

REFLECTOR SCAN DIRECT.	NTCH	SDH	REFERENCE SENSITIVITY	MEMORY NUMBER
AXIAL	☒	☐	50.0 dB	13
CIRC	☐	☐	N/A dB	N/A

FREQ: 2.25 MHz	REJECT: OFF %
ANGLE: N/A deg	DAMPING: 200 ohms
DELAY: 0.875 msec	PULSER: 222
ZERO: N/A msec	FILTER: FILT 1
VELOCITY: 0.234 msec	REP RATE: 4 KHZ
RANGE: 10.0 inches	TOF: ☐PEAK ☒ FLANK
DISPLAY MODE: PE	POWER: AC
DUAL: ☐ ON ☒ OFF	TCG: ☐ ON ☒ OFF

REF. REFLECTOR: N/A	GAIN: N/A dB
AMPLITUDE: N/A %	METAL PATH: N/A"

CALIBRATION TIMES

INITIAL TIME: 0915	FINAL TIME: 1105

VERIFICATION TIMES	1)N/A	2)N/A	3)N/A	4)N/A	5)N/A	6)N/A	7)N/A	8)N/A	9)N/A

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	

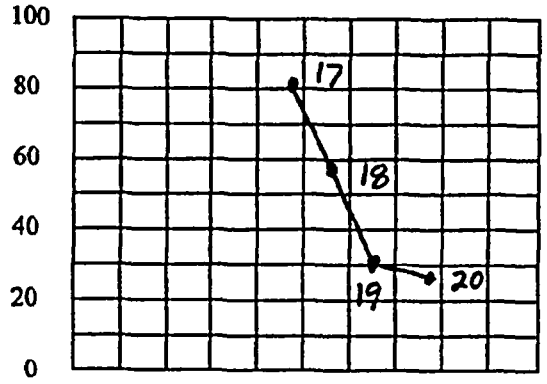
ATTENUATOR	GAIN	SET	-6 dB	-12 dB	SET	+12	SET	+6
	AMP	80%	32 TO 48	16 TO 24	20 %	64 TO 96	40%	64 TO 96
			40	20		80		80

COMMENTS:	WELDS/ITEMS EXAMINED:
Wedge ID D-14795-251	REACTOR PRESSURE VESSEL
	N9-IR

EXAMINER:	EXAMINER:	REVIEWER:	ANII:
DAVID KLEINJAN	MIKE KLEINJAN		DATE: 4/19/02
LEVEL: II	LEVEL: II	LEVEL: III DATE: 4/19/02	PG.: ~~4 OF 4~~ 2 OF 4

TENNESSEE VALLEY AUTHORITY	DIGITAL ULTRASONIC CALIBRATION DATA SHEET	REPORT NUMBER: R173

PROJECT: BFN UNIT: 3 CYCLE: 10	CALIBRATION DATE: 04-01-02
PROC.: N-UT- 55 REV:9 4-10-02 TC: ~~N/A 03-08~~	CALIBRATION BLOCK NO.: BF-85-IR TEMP: 65.4° F
INSTR. MFG: STAVELEY DUE DATE: 08-11-02	SIMULATOR BLOCK NO: N/A
MODEL/TYPE: SONIC-137 M & TE NO.: VH-5473	THERMOMTER S/N: 522352 DUE DATE: 05-17-02
TRANSDUCER MFG: KRAUTKRAMER	COUPLANT SONOTRACE BATCH: 01141
S/N DB 35164 SIZE: 1.0" FREQ: 2.25 MHz	EXAM TYPE: SHEAR☐ LONG☐ RL☒
CABLE TYPE: RG 174 LENGTH: 120 inches	ANGLE VERIFICATION
	BLOCK TYPE: CS IIW / S/N: DB 55074
DAC	NOMINAL ANGLE: 16° / ACTUAL ANGLE: N/A



DISPLAY WIDTH: 10 inches

INSTRUMENT SETTINGS

REFLECTOR SCAN DIRECT.	NTCH	SDH	REFERENCE SENSITIVITY	MEMORY NUMBER
AXIAL	☒	☐	47.0 dB	16
CIRC	☐	☐	N/A dB	N/A

FREQ: 2.25 MHz	REJECT: OFF %
ANGLE: N/A deg	DAMPING: 200 ohms
DELAY: 1.01 msec	PULSER: 222
ZERO: N/A msec	FILTER: FILT 1
VELOCITY: 0.234 msec	REP RATE: 4 KHZ
RANGE: 10.0 inches	TOF: ☐PEAK ☒ FLANK
DISPLAY MODE: PE	POWER: AC
DUAL: ☐ ON ☒ OFF	TCG: ☐ ON ☒ OFF

REF. REFLECTOR: N/A	GAIN: N/A dB
AMPLITUDE: N/A %	METAL PATH: N/A"

CALIBRATION TIMES

INITIAL TIME: 0820 FINAL TIME: 1107

VERIFICATION TIMES	1)N/A	2)N/A	3)N/A	4)N/A	5)N/A	6)N/A	7)N/A	8)N/A	9)N/A

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	-12 dB	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:	WELDS/ITEMS EXAMINED:
Wedge ID D-14795-252	REACTOR PRESSURE VESSEL
	N9-IR

EXAMINER:	EXAMINER:	REVIEWER:	ANII:
DAVID KLEINJAN	MIKE KLEINJAN		DATE: 4/19/02
LEVEL: II	LEVEL: II	LEVEL: III DATE:	PG.: ~~1 OF 1~~ ~~4 OF 4~~ 3 OF 4 4/18/02

TVA	MANUAL ULTRASONIC VESSEL EXAMINATION DATA SHEET	REPORT NO. R173

PROJECT: BFN UNIT: 3 WELD ID: N9 CONFIG.: INNER RADIUS COMPONENT: N/A

CAL. SHT. NO.: NA PROCEDURE: N-UT-55 REV.: 7 PCR.: ~~N/A~~ 02-98 DCN 4-1002 TEMP.: 85 PYRO.: 522352

SCAN SENS.: * dB EXAM START: 9:45 EXAM END: 10:30 EXAM ANGLE: 13°, 16°

Lo LOCATION: TDC Wo LOCATION: ℄ of WELD

IND NO.	20%			50%			100%			MAX. AMP.			20%			50%			100%		
	Mp1	W1	L1	Mp1 *	W1	L1	Mp1	W1	L1	Mp	W	L	Mp2	W2	L2	Mp2	W2	L2	Mp2	W2	L2
13°	SCAN		dB	56			SCANNING		#10/11	BLEND			RADIUS								
16°	SCAN		dB	53			SCANNING		#10/11	BLEND			RADIUS								
			NO RECORDABLE INDICATION																		

COMMENTS: A MATERIAL NOISE LEVEL of 5-10% was observed

EXAMINER: [signature] LEVEL: II DATE: 04-01-02 REVIEWED BY: [signature] LEVEL: III DATE: 4/4/02 JAR 4/11/02

EXAMINER: [signature] LEVEL: II DATE: 04-01-02 ANII: [signature] DATE: 4/19/02 PAGE 2 OF 4

TVA 40094 (NP-1-89) 1-108-999-48

001173

Inspection Report R-188
Nozzle N10-Inner Radius

TENNESSEE VALLEY AUTHORITY	EXAMINATION SUMMARY AND RESOLUTION SHEET	REPORT NUMBER: R188

PROJECT: BFN	UNIT: 3	CYCLE: 11		COMPONENT ID: N10-IR	
EXAMINATION METHOD				SYSTEM: RVP	ISI DWG. NO: 3-ISI-0411-C-01
MT ☐	PT ☐	UT ☒	VT ☐	CODE CLASS: 1	CATEGORY: B-D
PROCEDURE: 54-ISI-850*	REV: 3	TC: *		COFIG.: VESSEL to NOZZLE	
EXAMINER: FOR DREW PETERSON PER TEL CON	EXAMINER: NA			EXAMINER: NA	EXAMINER: NA
LEVEL: 3-18-04	LEVEL:			LEVEL:	LEVEL:

* SDCN 30-5037583-00

This report contains the data associated with the manual ultrasonic examination of the N10-IR Nozzle to RPV lower head weld inner radius.

The inner radius was examined with a 65 deg shear and a 70 deg shear from the head side and no recordable indications were observed. The procedure utilized for the examination was 54-ISI-850 rev-3. Note: Refer to EPRI Model IR-2008-43 for a description of the scanning volume and coverage plots. Examination combined volume coverage 90%.

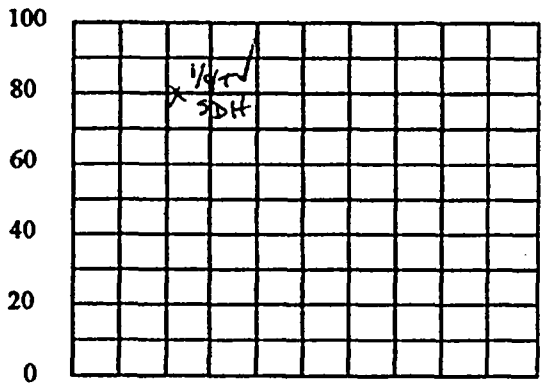
Note 1: This ultrasonic examination was performed in accordance the criteria of 10CFR 50.55a(b) (2) (xv) (G) and the minimum coverage requirements of 10CFR 50.55a(b) (2) (xv) (K) were met.

This examination satisfies the requirements of ASME Sec.XI, Category B-D, for item number B3.90, figure number IWB 2500-7(b) exam volume, and was performed using ASME Sec XI, Appendix VIII qualified personnel, procedures, and equipment as amended by the Final Rule.

RESOLUTION BY:	REVIEWED BY:	ANII:
LEVEL: III DATE: 3/19/04	LEVEL: II DATE: 3-18-04	DATE: 3/29/04
		PG. 1 OF 6

TENNESSEE VALLEY AUTHORITY	DIGITAL ULTRASONIC CALIBRATION DATA SHEET	REPORT NUMBER: R188

PROJECT: BFN UNIT 3 CYCLE: 11	CALIBRATION DATE: 3-4-04
PROC.: 54-ISI-850 REV:03 TC: (2)	CALIBRATION BLOCK NO.: BF-18 TEMP: 69° F
INSTR. MFG: Staveley DUE DATE: 5-12-04	SIMULATOR BLOCK NO: N/A
MODEL/TYPE: Sonic136 M & TE NO.: VH-8035 ✓	THERMOMTER S/N: VH-8875 ✓ DUE DATE: 7-19-04
TRANSDUCER MFG: Benchmark/KBA	COUPLANT Sonotrace BATCH: 01141
S/N DB 35289 ✓ SIZE: .5x1.0 ✓ FREQ: ✓ 2.25 MHz	EXAM TYPE: SHEAR [X] LONG [ ] RL [ ]
CABLE TYPE: RG-174 LENGTH: 300 inches ✓	ANGLE VERIFICATION
	BLOCK TYPE: IIW S/N: 7500586
DAC	NOMINAL ANGLE: 70° ACTUAL ANGLE: 70°



DISPLAY WIDTH: inches 20.0"

INSTRUMENT SETTINGS

REFLECTOR SCAN DIRECT.	NTCH	SDH	REFERENCE SENSITIVITY	MEMORY NUMBER
AXIAL	[ ]	[X]	50.4 dB	3
CIRC	[ ]	[ ]	NA dB	NA

*FREQ: 2.25 MHz	*REJECT: OFF %
ANGLE: 70° deg	*DAMPING: 500 ✓ ohms
DELAY: 2.44" msec	*PULSER: 222 ns ✓
ZERO: N/A msec	FILTER: 2
VELOCITY: 0.128" ✓ msec	*PRR/PRF: 2kHz
RANGE: 20.0" inches	TOF: [ ] PEAK [X] FLANK
*DISPLAY MODE: P-E	TCG: ON [ ] OFF [X]

REF. REFLECTOR: N/A GAIN: N/A	CALIBRATION TIMES
AMPLITUDE: N/A METAL PATH: N/A	INITIAL TIME: 0815 FINAL TIME: 1200

VERIFICATION TIMES	1)	2)	3)	4)	5)	6)	7)	8)	9)

*** 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	10
	SIGNAL 2	50	45	40	35	30	25	20	15	10	5

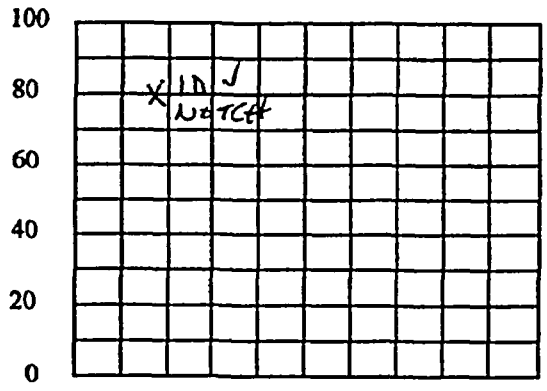
ATTENUATOR	GAIN	SET	-6 dB	-12 dB	SET	+12	SET	+6	
	AMP	80	32-48	16-24	20	64-96	40	64-96	
			40	20		80		85	

COMMENTS:	WELDS/ITEMS EXAMINED:
(1) No intermediate connections used	N10-IR
(2) SDCN 30-5037583-00	

EXAMINER:	EXAMINER:	REVIEWER:	ANII:
	N/A		DATE: 3/29/04
LEVEL: II	LEVEL: II	LEVEL: II DATE: 3-14-04	PG. 2 OF 6

TENNESSEE VALLEY AUTHORITY	DIGITAL ULTRASONIC CALIBRATION DATA SHEET	REPORT NUMBER: R188

PROJECT: BFN UNIT 3 CYCLE: 11	CALIBRATION DATE: 3-4-04
PROC.: 54-ISI-850 REV:03 TC: (2)	CALIBRATION BLOCK NO.: BF-18 TEMP: 69° F
INSTR. MFG: Staveley DUE DATE: 5-12-04	SIMULATOR BLOCK NO: N/A
MODEL/TYPE: Sonic136 M & TE NO.: VH-8035 ✓	THERMOMTER S/N: VH-8875 ✓ DUE DATE: 7-19-04
TRANSDUCER MFG: Benchmark/KBA	COUPLANT Sonotrace BATCH: 01141
S/N DB 34852 ✓ SIZE: .5x1.0 ✓ FREQ: ✓2.25 MHz	EXAM TYPE: SHEAR [X] LONG [ ] RL [ ]
CABLE TYPE: RG-174 LENGTH: 300 inches ✓	ANGLE VERIFICATION
	BLOCK TYPE: IIW S/N: 7500586
DAC	NOMINAL ANGLE: 65° ACTUAL ANGLE: 65°



DISPLAY WIDTH: inches 5.0" **

INSTRUMENT SETTINGS

REFLECTOR SCAN DIRECT.	NTCH	SDH	REFERENCE SENSITIVITY	MEMORY NUMBER
AXIAL	[X]	[ ]	61.4 dB	4
CIRC	[ ]	[ ]	NA dB	NA

*FREQ: 2.25 MHz	*REJECT: OFF %
ANGLE: 65° deg	*DAMPING: 500 ✓ ohms
DELAY: 14.1" msec	*PULSER: 222 ns
ZERO: N/A msec	FILTER: 2
VELOCITY: 0.127" msec	*PRR/PRF: 2kHz
RANGE: 5.0" ** inches	TOF: [ ] PEAK [X] FLANK
*DISPLAY MODE: P-E	TCG: ON [ ] OFF [X]

REF. REFLECTOR: N/A GAIN: N/A	CALIBRATION TIMES
AMPLITUDE: N/A METAL PATH: N/A	INITIAL TIME: 0820 FINAL TIME: 1157

VERIFICATION TIMES	1)	2)	3)	4)	5)	6)	7)	8)	9)

*** 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	10
	SIGNAL 2	50	45	40	35	30	25	20	15	10	5

ATTENUATOR	GAIN	SET	-6 dB	-12 dB	SET	+12	SET	+6	
	AMP	80	32-48	16-24	20	64-96	40	64-96	
			40	20		80		85	

COMMENTS:	WELDS/ITEMS EXAMINED:
** Screen 5.0" with 13.0" delayed off	N10-IR
(1) No intermediate connections used	
(2) SDCN 30-5037583-00	

EXAMINER:	EXAMINER:	REVIEWER:	ANII:
	N/A		DATE: 3/29/04
LEVEL: II	LEVEL: II	LEVEL: II DATE: 3-4-04	PG. 3 OF 6

TVA	MANUAL ULTRASONIC VESSEL EXAMINATION DATA SHEET	REPORT NO. R188

PROJECT: BFN UNIT: 3 WELD ID: N10-IR CONFIG.: IR COMPONENT: RPV

CAL. SHT. NO.: N/A PROCEDURE: 54-ISI-850 REV.: 03 PCR: * TMP.: 80 F PYRO.: VH-8875

SCAN SENS.: 84.4 dB EXAM START 09:50 EXAM END 10:20 EXAM ANGLE: 70°

Lo LOCATION: N/A Wo LOCATION: N/A

IND NO.	20%			50%			100%			MAX. AMP			20%			50%			100%		
	Mpl	Wl	Ll	Mpl	Wl	Ll	Mpl	Wl	Ll	Mpl	Wl	Ll	Mpl	Wl	Ll	Mpl	Wl	Ll	Mpl	Wl	Ll
	NO RECORDABLE INDICATIONS																				

COMMENTS: (1) 70° IR
(2) * SDCN 30-5037583 2004-13 3-2-04
(3) Refer to EPRI Model IR-~~2003-31~~ for a description of scan directions.

EXAMINER: [signature] LEVEL: II DATE: 3-4-04
EXAMINER: N/A LEVEL ___ DATE: ___

REVIEWED BY: [signature] LEVEL: II DATE: 3-14-04
ANII: [signature] DATE: 3/29/04 PAGE 4 OF 6

TVA 40094 (NP)-1-89 1-108-999-48

U0334

TVA	MANUAL ULTRASONIC VESSEL EXAMINATION DATA SHEET	REPORT NO. R188

PROJECT: BFN UNIT: 3 WELD ID: N10-IR CONFIG.: IR COMPONENT: RPV

CAL. SHT. NO.: N/A PROCEDURE: 54-ISI-850 REV.: 03 PCR.: * TMP.: 80 F PYRO.: VH-8875

SCAN SENS.: 80.6 dB EXAM START 09:20 EXAM END 09:45 EXAM ANGLE: 65°

Lo LOCATION: N/A Wo LOCATION: N/A

IND NO.	20%			50%			100%			MAX. AMP			20%			50%			100%		
	Mpl	Wl	Ll	Mpl	Wl	Ll	Mpl	Wl	Ll	Mpl	Wl	Ll	Mpl	Wl	Ll	Mpl	Wl	Ll	Mpl	Wl	Ll
	NO RECORDABLE INDICATIONS																				

COMMENTS: (1) 65° IR
(2) * SDCN 30-5037583-00 2004-43 MP 3-29-04
(3) Refer to EPRI Model IR-~~2003-31~~ for a description of scan directions.

EXAMINER: [signature] LEVEL: II DATE: 3-4-04
EXAMINER: N/A LEVEL ___ DATE: ___

REVIEWED BY: [signature] LEVEL: II DATE: 3-14-04
ANII: [signature] DATE: 3/29/04 PAGE 5 OF 6

TVA 40094 (NP)-1-89 1-108-999-48

010335

AREVA

Ultrasonic Examination Limitation and Coverage Report

Browns Ferry Unit-3
Standby Liquid Control Nozzle Inner Radius

N10-IR

The ultrasonic examination volume includes the clad and inner ½" thickness as measured from the inside diameter surface. The EPRI Model parameters were used to inspect the examination volume using 65, and 70 degree shear wave scans.
The combined model scans were used to calculate the total examination coverage and limited area not covered by these techniques. The examination limitations are shown in square inches in order to simplify calculations. See the applicable Ultrasonic Examination Limitation/Coverage Sketch and the Browns Ferry Unit 3 – N10 Model Plots.

Required Examination Area: = 5.35 sq. in.

Model Combined Area Examined: = 4.815 sq. in.
Model Limited Area Not Examined: = .45 sq. in.

Model Percentages: 90%

Reviewed By: _____ Level: II Date: 3-19-04

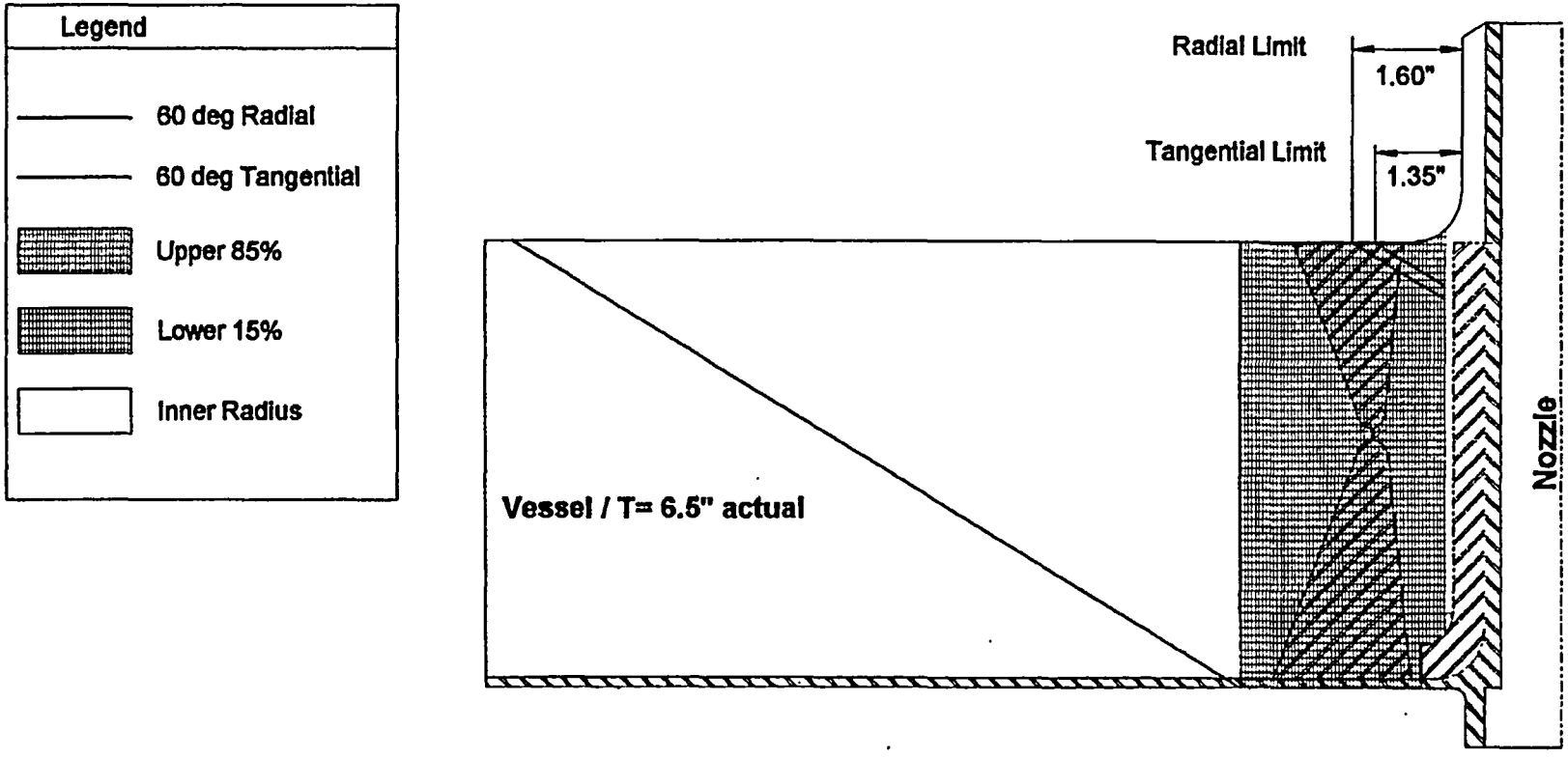
AREVA

Ultrasonic Examination Limitation/Coverage Sketch

Browns Ferry Unit - 3

N10 Liquid Control Nozzle Inner Radius/Nozzle to Shell Weld

Component No.: N10-NV



Examiner:	Level: II	Date: 3-14-04	Examiner: N/A	Level:	Date:
Reviewed By:	LEVEL II	Date: 3-19-04	ANII:	Date: 3/29/04	Page: 9 of 10

0329 1487

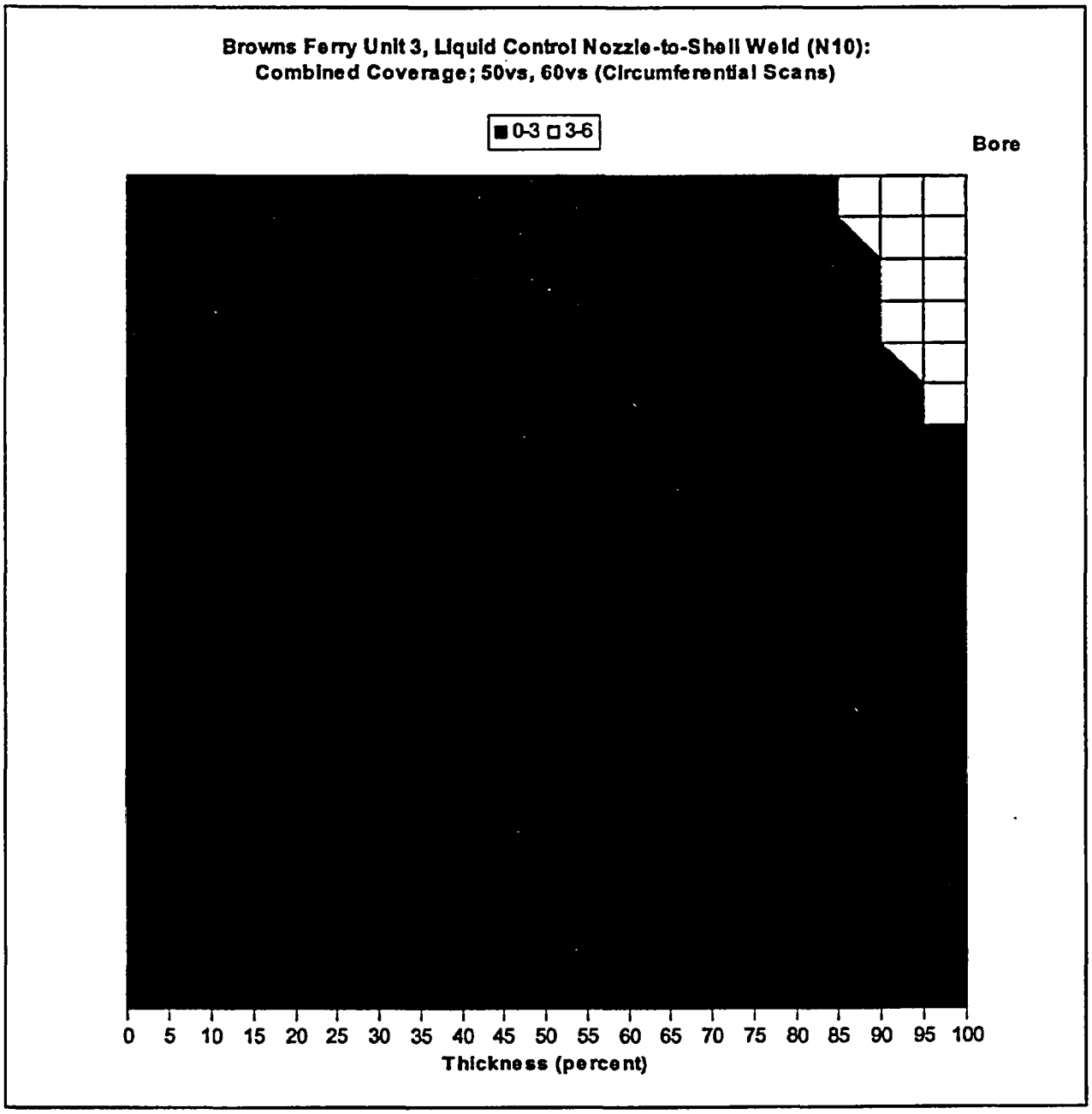


Figure 10. Browns Ferry Standby Liquid Control Nozzle-to-Shell Weld (N10): Summary Coverage Map; Union of Vessel Techniques, 50/(13 to 40)v and 60/(12 to 90)v.

pg 10/10

Attachment B

Inspection Reports For RHR Piping Welds Listed In The Table Below

COMPONENT WELD	REPORT NUMBER	CYCLE NUMBER	EXAMINATION COVERAGE
DRHR-3-19	R-086	11	50%
DRHR-3-21	R-140	10	50%
TRHR-3-191	R-189	11	50%
RWCU-3-007-G004	R-081	11	50%

Inspection Report R-086
Weld DRHR-3-19

00278

TENNESSEE VALLEY AUTHORITY	EXAMINATION SUMMARY AND	REPORT NUMBER: R086

PROJECT: *BFN* UNIT: *3* CYCLE *11*				COMPONENT ID: *DRHR-3-19*	
EXAMINATION METHOD				SYSTEM: RHRS	ISI DWG NO: *3-ISI-0330-C-01*
MT ☐	PT ☐	UT ☑	VT ☐	CONFIGURATION	CATEGORY
PROCEDURE *N-UT-64*	REV 7	TC N/A		*TEE TO P*	*R-A*
EXAMINER: Dickey Michael	EXAMINER:			EXAMINER:	EXAMINER:
Dickey Michael					
LEVEL: II	LEVEL:			LEVEL:	LEVEL:

Total coverage calculated to be approximately 100 % ASME Code Coverage
⊛ 50% 10CFR50.55(a) coverage achieved

This report contains the UT data associated with the manual Ultrasonic examination of weld DRHR-3-19 for ASME Section XI Category R-A Item number R1.11 ~~and NU0913~~ Rich Informed. RW 3/6/04

This exam was performed with 45° Shear scans 4, 5 & 6 and 60° RL Scan 4

There was No Reordable Indications with the 45° Shear ID geometry was observed below recordables.
60° RL observed the previously recorded root geometry below Recordable levels

45° Exams was performed to maintain 5% to 20% ID Roll
60° RL Exam was performed to maintain 5% to 20% IC Noise

This examination was performed with equipment procedures and personnel qualified in accordance with ASME Section XI Appendix VIII as amended by the Rule

⊛ Single sided exam. Matt Welch TVA/NDE LIII 3/7/04

RESOLUTION BY	REVIEWED BY	ANII: B.O. Rice
Dickey Michael Dickey Michael	Matt Welch	DATE 3/22/04
LEVEL II DATE 3 4 04	LEVEL: III DATE 3/6/04	Page: 1 OF 5

ACCESS: FORMS DATABASE R-10/04/01

TENNESSEE VALLEY AUTHORITY	DIGITAL ULTRASONIC CALIBRATION DATA SHEET	REPORT NUMBER R086

PROJECT BFN UNIT/CYCLE 3/II
PROCEDURE: N-UT-64 REV: 7 TC: N/A

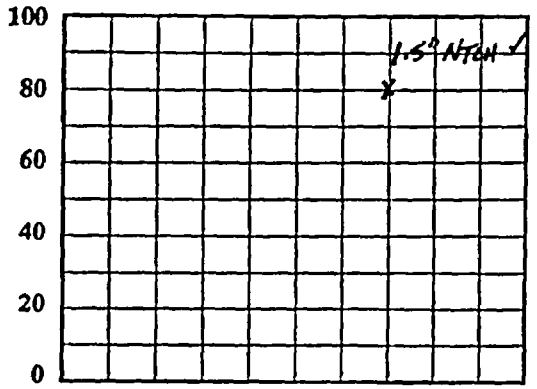
TRANSDUCER
MANUFACTURER KBA
MODEL: Comp G ✓ S/N 00FCYR ✓
SIZE: .50" ✓ FREQ: 1.5 ✓ MH
SHAPE: Round # ELEMENTS: 1 # CONS: 0
CABLE TYPE RG 174 LENGTH: 6'
MODE: ☒ SHEAR ☐ LONG ☐ RL

CALIBRATION DATE: 3-4-04
CALIBRATION BLOCK NO. WB 85 TEMP: 73 °F
SIMULATOR BLOCK: Rompas
THERMOMETER S/N 531992 DUE DATE 12-11-04
COUPLANT: Ultragel II BATCH: 790662

ANGLE VERIFICATION
BLOCK TYPE: Rompas S/N: 790662
NOMINAL ANGLE: 45° ACTUAL ANGLE 45 °

INSTRUMENT
MANUFACTURER KBA DUE DATE 5-27-04
MODEL NO.: USN 52L S/N: E18733 ✓

DAC



DISPLAY WIDTH 2.0 inches

INSTRUMENT SETTINGS

REFLECTOR SCAN DIRECT.	NTC	SDH	REFERENCE SENSITIVITY	MEMORY NUMBER
AXIAL	☐	☐	14 dB	16
CIRC.	☐	☐	14 dB	16

FREQ: 2-8 ✓ MH REJECT:= 0 %
ANGLE: 45 deg DAMPING: 1000 ohms ✓
DELAY 0.0 msec PULSER: Single *
ZERO: 6.121 msec
VELOCITY .1210 msec PRR/PRF: High ✓
RANGE: 3.0 inches TOF: N/A
DISP. MODE: FULL WAV POWER: N/A

REF. REFLECTOR: N/A GAIN: N/A dB
AMPLITUDE: N/A % METAL PATH: N/A

CALIBRATION TIMES
INITIAL TIME: 2120 FINAL TIME 0015

VERIFICATION TIMES 1) N/A 2) 3) 4) 5) 6) 7) 8) 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
	DRHR-3-19

EXAMINER: Dickey Michael LVL.: II
EXAMINER: LVL.:
REVIEWER: Uldan Welch LVL.: III DATE 3/6/04

ANII: B. F. Rino
DATE 5/29/04
PAGE 2 OF 5

ACCESS: FORMS DATABASE 10-27-01

uw 3/6/04

TENNESSEE VALLEY AUTHORITY	DIGITAL ULTRASONIC CALIBRATION DATA SHEET	REPORT NUMBER R086

PROJECT BFN UNIT/CYCLE 3/11
PROCEDURE: N-UT-64 REV: 7 TC: N/A

TRANSDUCER
MANUFACTURER RTD
MODEL: TLRA ✓ S/N 85-630 ✓
SIZE: 2(10X18) ✓ FREQ: 2 MH
SHAPE: Rect. # ELEMENTS: 2 # CONS: 0
CABLE TYPE RG 174 LENGTH: 6'

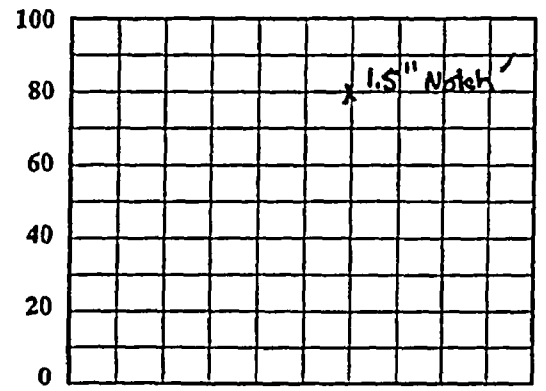
MODE: ☐ SHEAR ☐ LONG ☒ RL

CALIBRATION DATE: 3-4-04
CALIBRATION BLOCK NO. WB 85 TEMP: 73 °F
SIMULATOR BLOCK: Rompas 790662
THERMOMETER S/N 531992 DUE DATE 12-11-04
COUPLANT: Ultracel II BATCH: 01225I

ANGLE VERIFICATION
BLOCK TYPE: Rompas S/N: 790662
NOMINAL ANGLE: 60° ACTUAL ANGLE 60°

INSTRUMENT
MANUFACTURER KBA DUE DATE 5-27-04
MODEL NO.: USN 52 L S/N: E18733 ✓

DAC



DISPLAY WIDTH 5.0 inches

INSTRUMENT SETTINGS

REFLECTOR SCAN DIRECT.	NTC	SDH	REFERENCE SENSITIVITY	MEMORY NUMBER
AXIAL	☐	☐	59 dB	15
CIRC.	☐	☐	N/A dB	N/A

FREQ: 2-8 MH ✓ REJECT:= 0 %
ANGLE: 60 deg DAMPING: 1000 ohms ✓
DELAY 0.0 msec PULSER: Dual ✓ *
ZERO: 9.559 msec
VELOCITY .2390 msec PRR/PRF: High ✓
RANGE: 5.0 inches TOF: N/A
DISP. MODE: FULL WAV ✓ POWER: N/A

REF. REFLECTOR: N/A GAIN: N/A dB
AMPLITUDE: N/A % METAL PATH: N/A

CALIBRATION TIMES
INITIAL TIME: 2115 FINAL TIME 0013

VERIFICATION TIMES 1) N/A ~~2)~~ ~~3)~~ ~~4)~~ ~~5)~~ ~~6)~~ ~~7)~~ ~~8)~~ 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
	DRHR-3-19

EXAMINER: Rickey Michael LVL.: II
EXAMINER: N/A LVL.:
REVIEWER: [signature] LVL.: III DATE 3/6/04

ANII: B. F. Rice
DATE 3/26/04
PAGE 3 OF 5

3/6/04

TENNESSEE VALLEY AUTHORITY	MANUAL ULTRASONIC PIPING EXAMINATION DATA SHEET	REPORT NUMBER R086

PROJECT: BFN UNIT/CYCLE 3/11
SYSTEM RHRS
WELD I.D.: DRHR-3-19
CONFIG.: TEE TO P
FLOW →

EXAMINATION DATE 3-4-04
START TIME: 2250 END TIME: 2348
EXAM SURFACE ☐ ID ☒ OD
MATERIAL TYPE: ☐ CS ☒ SS ☐ CSCL ☐ CCSS
SURFACE TEMP. 77° PYRO NO. 531992

PROCEDURE: N-UT-64 REV: 7 TC: N/A
Wo REFERENCE: Weld ℄
Lo REFERENCE: TDC

EXAMINATION ANGLE	45 DEG.	60 DEG.
AXIAL SCAN SENSITIVITY	34 dB	59 dB
CIRC. SCAN SENSITIVITY	34 dB	N/A dB

IND NO.	L (in) FROM REF.			AT MAX AMP			MAX AMP % DAC	EXAM NO. 3-14	NOM. ANG.	NRI	INDICATION INFORMATION: TYPE, DAMPING, ETC.
	L1	L Max	L2	W MAX	MP MAX	D MAX					
								4	45°	☒	
								5	45°	☒	
								6	45°	☒	
								4	60°	☒	Previously recorded root geometry scan at below recordable levels
										☐	
										☐	

REMARKS/LIMITATIONS

EXAMINER: Dickey Michael LEVEL: II
EXAMINER: LEVEL:
REVIEWED BY: [signature] LEVEL: III DATE 3/6/04

ANII: B. O. Rico
DATE 3/29/04
PAGE 4 OF 5

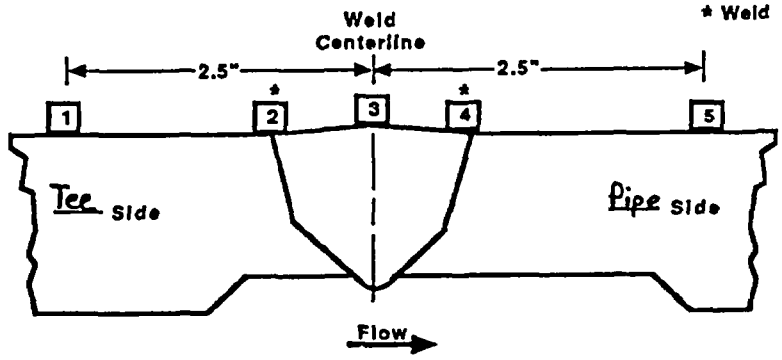
00282

TVA	WALL THICKNESS PROFILE SHEET	REPORT NO: R086

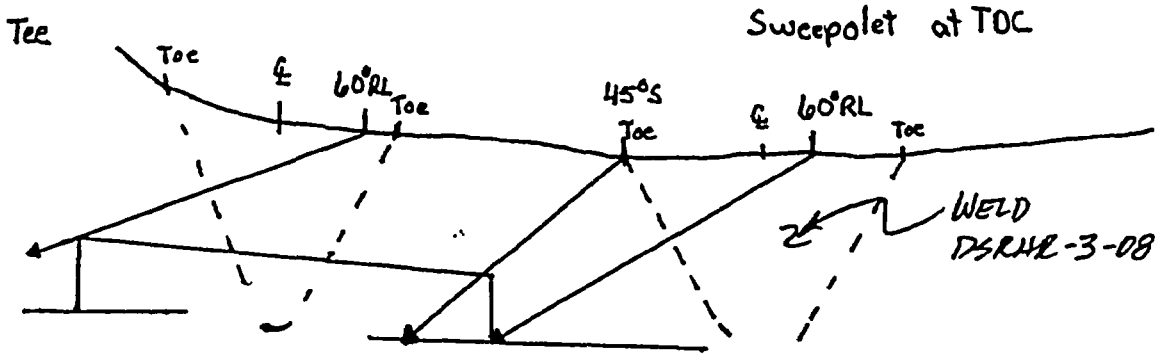
PROJECT: BFNP
UNIT: 3
WELD NO: DRHR-3-19
SYSTEM: RHR

Record Thickness Measurements As Indicated, Including Weld Width, Edge-To-Edge At 0°

Position	0°	90°	180°	270°
1	N/A			
2	1.050			
3	1.162			
4	1.152			
5	1.092			



CROWN HEIGHT: Tapered
CROWN WIDTH: 1.3"
DIAMETER: 20"
WELD LENGTH: 63"



Area Missed 6" Wide TDC 45° Shear, coverage obtained using 60°R/L
MM 3/6/04

Previous T+C

EXAMINER: Dickey Michael	REVIEWED BY: Mark Miller	ANII: B. F. Rice
LEVEL: II	LEVEL: III DATE: 3/6/04	DATE: 3/29/04
DATE: 3-4-04		PAGE 5 OF 5

TVA 19668 (NP-5-89) 1-108-999-44

Inspection Report R-140
Weld DRHR-3-21

TENNESSEE VALLEY AUTHORITY	EXAMINATION SUMMARY AND RESOLUTION SHEET	REPORT NUMBER: R140

PROJECT: BFN	UNIT: 3	CYCLE: 10		COMPONENT ID: DRHR-3-21	
EXAMINATION METHOD				SYSTEM: RHR	ISI DWG. NO. 3-ISI-0330-C-01
MT ☐	PT ☐	UT ☒	VT ☐	CODE CLASS: 1	CATEGORY: R-A
PROCEDURE: N-UT-64	REV:5	TC:N/A		CONFIG.: ELBOW TO VALVE	

EXAMINER:	EXAMINER:	EXAMINER:	EXAMINER:
Richard Money	N/A	N/A	N/A
LEVEL: II	LEVEL:	LEVEL:	LEVEL:

Component # DRHR-3-21, a stainless steel elbow to valve weld, was ultrasonically examined utilizing a 45 degree shear wave and a 60 degree refracted longitudinal wave. Scans 3, 5, and 6, were performed utilizing a 1/2 node calibration. Single sided examination. All scans were performed maintaining a 5 to 20 % ID roll.

This examination satisfies the requirements of ASME Section XI and NUREG 0313
Essentially 100 % of the ASME Section XI required volume was examined.
50 % of 10CFR50.55a required volume examined.

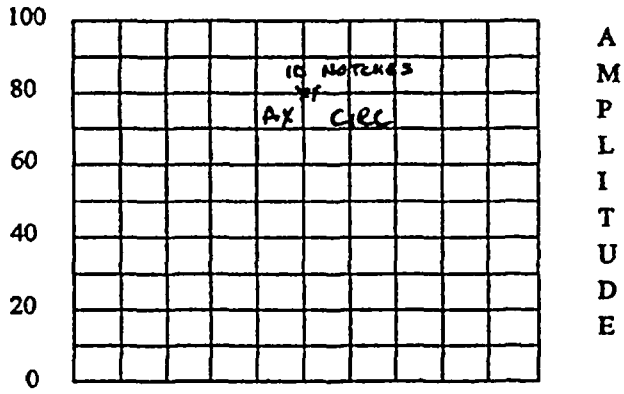
This examination was performed with equipment, procedures, and personnel qualified in accordance with ASME Section XI, Appendix VIII as amended by the rule.

No recordable indications were observed.

RESOLUTION BY:	REVIEWED BY:	ANII:
Richard Money	Darren Dudley	DATE: 4/17/02
LEVEL: II DATE: 3-31-2002	LEVEL: III DATE: 4-2-01	PG. 1 OF 5

TENNESSEE VALLEY AUTHORITY	DIGITAL ULTRASONIC CALIBRATION DATA SHEET	REPORT NUMBER: R140

PROJECT: *BFN* UNIT: *3* CYCLE: *10*	CALIBRATION DATE: *3-31-2002*
PROC.: *N-UT-* *64* REV: *5* TC: *N/A*	CALIBRATION BLOCK NO.: *BF-87* ✓ TEMP: *76*'F
INSTR. MFG: *Krautkramer* DUE DATE: *6-15-02*	SIMULATOR BLOCK NO: *83-3236*
MODEL/TYPE: *USN-52L* M & TE NO.: *E21665*	THERMOMTER S/N: *562779* . DUE DATE: *7-12-02*
TRANSDUCER MFG: *KBA*	COUPLANT *Ultragel II* BATCH: *00325*
S/N *00FCYT* SIZE: *0.5"* FREQ: *1.5* MHz	EXAM TYPE: SHEAR☒ LONG☐ RL☐
CABLE TYPE: *RG-174* LENGTH: 72 inches	**ANGLE VERIFICATION**
	BLOCK TYPE: *Rompas* S/N: *83-3236*
DAC	NOMINAL ANGLE: *45* ACTUAL ANGLE: *43*



DISPLAY WIDTH: *3.0* inches

INSTRUMENT SETTINGS

REFLECTOR			REFERENCE SENSITIVITY	MEMORY NUMBER
SCAN DIRECT.	NTCH	SDH		
AXIAL	☒	☐	*27.0* dB	1
CIRC	☒	☐	*31.0* dB	1

*FREQ: *2-8* MHz	*REJECT: *0* %
ANGLE: *43* deg	*DAMPING: *1000* ohms
DELAY: *0.0* msec	*PULSER: *Single*
ZERO: *6.080* msec	FILTER: *N/A*
VELOCITY: *0.1210* msec	*REP RATE: *High*
RANGE: *3.0* inches	TOF: ☐PEAK ☒FLANK
*DISPLAY MODE: *Full*	POWER: *Battery*
DUAL: ☐ON ☒OFF	TCG: ☐ON ☒OFF

REF. REFLECTOR: *N/A* GAIN: *N/A* dB	**CALIBRATION TIMES**
AMPLITUDE: *N/A* METAL PATH: *SD*	INITIAL TIME: *9:45* FINAL TIME: *14:32*

VERIFICATION TIMES	1) *N/A*	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*

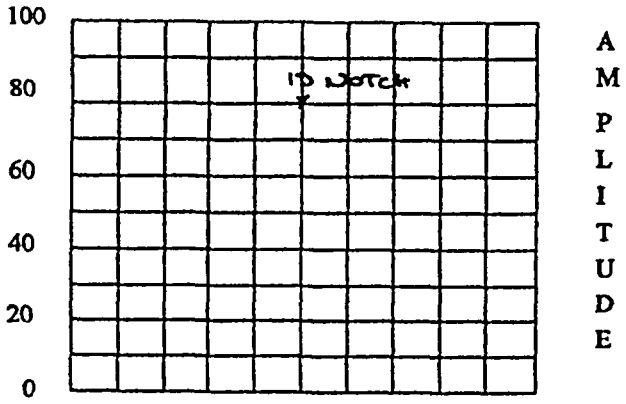
ATTENUATOR	GAIN	SET	-6 dB	-12 dB	SET	+12	SET	+6
	AMP	80%	32 TO 48	16 TO 24	20 %	64 TO 96	40%	64 TO 96
			40	*20*		*80*		*80*

COMMENTS: *1/2 NODE CALIBRATION*	WELDS/ITEMS EXAMINED:
	DRHR-3-21

EXAMINER:	EXAMINER:	REVIEWER:	ANII:
Richard Money	N/A		DATE: 4/17/02
LEVEL: II	LEVEL:	LEVEL: III DATE: 4-2-01	PG.: 2 OF 5

TENNESSEE VALLEY AUTHORITY	DIGITAL ULTRASONIC CALIBRATION DATA SHEET	REPORT NUMBER: R140

PROJECT: *BFN* UNIT: *3* CYCLE: *10*	CALIBRATION DATE: *3-31-2002*
PROC.: *N-UT-* *64* REV:*5* TC:*N/A*	CALIBRATION BLOCK NO.: *BF-87* TEMP: *76°F*
INSTR. MFG: *Krautkramer* DUE DATE: *6-15-02*	SIMULATOR BLOCK NO: *83-3236*
MODEL/TYPE: *USN-52L* M & TE NO.: *E21685*	THERMOMETER S/N: *562779* DUE DATE: *7-12-02*
TRANSDUCER MFG: ~~*KBA*~~ S16mA PER D. Tinker 4/17/02	COUPLANT *Ultragel* BATCH: *00325*
S/N *223A94001* SIZE: *2(10X18)* FREQ: *2.0* MHz	EXAM TYPE: SHEAR ☐ LONG ☐ RL ☒
CABLE TYPE: *RG-174* LENGTH: 72 inches	**ANGLE VERIFICATION**
	BLOCK TYPE: *Rompas* S/N: *83-3236*
DAC	NOMINAL ANGLE: *60* ACTUAL ANGLE: *59*



DISPLAY WIDTH: *4.0* inches

INSTRUMENT SETTINGS

REFLECTOR SCAN DIRECT.	NTCH	SDH	REFERENCE SENSITIVITY	MEMORY NUMBER
AXIAL	☒	☐	*57.0* dB	*22*
CIRC	☐	☐	N/A dB	*N/A*

*FREQ: *2-8* MHz	*REJECT: *0* %
ANGLE: *59* deg	*DAMPING: *1000* ohms
DELAY: *0.0* msec	*PULSER: *Dual*
ZERO: *8.408* msec	FILTER: *N/A*
VELOCITY: *0.230* msec	*REP RATE: *High*
RANGE: *4.0* inches	TOF: ☐ PEAK ☒ FLANK
*DISPLAY MODE: *Full*	POWER: *Battery*
DUAL: ☒ ON ☐ OFF	TCG: ☐ ON ☒ OFF

REF. REFLECTOR: *N/A* GAIN: *N/A* dB	**CALIBRATION TIMES**
AMPLITUDE: *N/A* % METAL PATH: *N/A*"	INITIAL TIME: *10:00* FINAL TIME: *14:30*

VERIFICATION TIMES	1) *N/A*	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	-12 dB	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: *1/2 NODE CALIBRATION*	WELDS/ITEMS EXAMINED: *DRHR-3-21*

EXAMINER:	EXAMINER:	REVIEWER:	ANII:
Richard Money	N/A	Darlene Culay	DATE: 4/17/02
LEVEL: II	LEVEL:	LEVEL III DATE: 4-2-03	PG.: 3 OF 5

TENNESSEE VALLEY AUTHORITY	ULTRASONIC PIPING EXAMINATION DATA SHEET	REPORT NUMBER: R140

PROJECT: BFNP UNIT: 3 CYCLE: 10 EXAMINATION DATE: 3-31-2002

PROCEDURE: N-UT-64 REV: 5 TC: N/A START TIME: 1155 END TIME: 1245

SYSTEM: RARS ISI DWG. NO: 3-151-0330-C-01 EXAM SURFACE ☐ ID ☒ OD

COMPONENT ID: DRHR-3-21 MATL. TYPE: ☐ CS ☒ SS ☐ CSCL ☐ CCSS

CONFIGURATION: ELBOW TO VALVE

FLOW →

SURFACE TEMP.: 78 °F PYRO. NO.: 562779

CAL DUE DATE: 7-12-02

Wo REFERENCE: WELD CENTERLINE

Lo REFERENCE: TDC

EXAM ANGLE	45 DEG	60 DEG
CIRC. SCAN SENSITIVITY	39 dB	N/A dB
AXIAL SCAN SENSITIVITY	39 dB	63 dB

IND. NO.	L (in) FROM REF. L1	L MAX	L2	AT MAX AMP W MAX	MP MAX	D MAX	MAX AMP %DAC	EXAM NO. 3-14	NOM. ANG.	N R I	IND. INFO: TYPE, DAMPING, ETC.
NRI							%	3	45/60	X	NRI
NRI							%	5	45	X	NRI
NRI							%	6	45	X	NRI
							%				
							%				
							%				
							%				
							%				
							%				
							%				
							%				
							%				
							%				
							%				

REMARKS / LIMITATIONS: MAINTAINED 5% to 20% ID Roll during Scanning

Single Sided Exam. (No Scan 4)

EXAMINER: [signature] LEVEL: II ANI: [signature]

EXAMINER: N/A LEVEL: DATE: 4/17/02

REVIEWER: [signature] LEVEL: III DATE: 4-2-02 PAGE 4 OF 5

00157

TVA	WALL THICKNESS PROFILE SHEET	REPORT NO: R140

PROJECT: BFNP

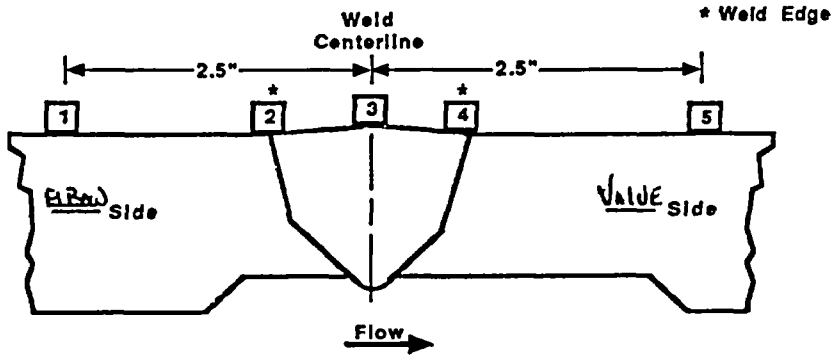
UNIT: 3

WELD NO: DRHR-3-21

SYSTEM: RHR

Record Thickness Measurements As Indicated, Including Weld Width, Edge-To-Edge At 0°

Position	0°	90°	180°	270°
1	1.23			
2	1.19		N	
3	1.20			
4	N/A		A	
5	N/A			

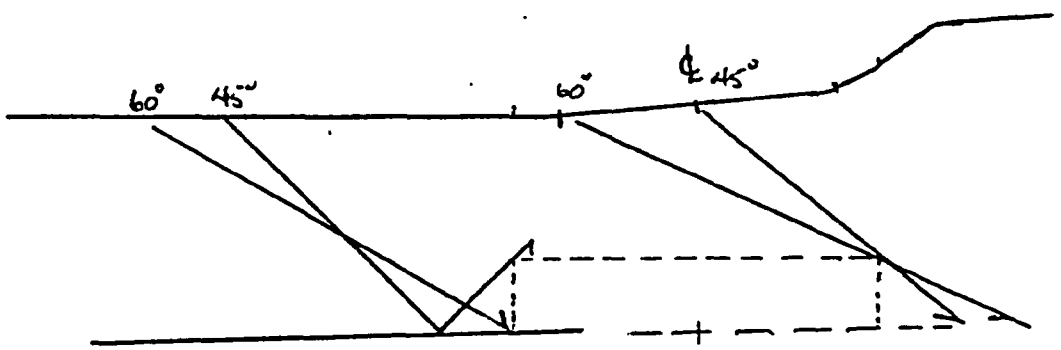


CROWN HEIGHT: Flush

CROWN WIDTH: 1.5"

DIAMETER: 20"

WELD LENGTH: 60.45"



THICKNESS & CONTOUR DATA TAKEN from PREVIOUS DATA

EXAMINER: Richard Harvey

LEVEL: II

DATE: 3-31-2002

REVIEWED BY: [illegible]

LEVEL: III

DATE: 4-2-02

ANII: [illegible]

DATE: 4/17/02

PAGE 5 OF 5

TVA 19668 (NP-5-89)

1-108-999-44

Inspection Report R-189
Weld TRHR-3-191

00337 ✓

TENNESSEE VALLEY AUTHORITY	EXAMINATION SUMMARY AND RESOLUTION SHEET	REPORT NUMBER: R189

PROJECT: BFN	UNIT: 3	CYCLE: 11		COMPONENT ID: TRHR-3-191	
EXAMINATION METHOD				SYSTEM: RHR	ISI DWG. NO: 3-ISI-0330-C-01
MT ☐	PT ☐	UT ☒	VT ☐	CODE CLASS: 1	CATEGORY: R-A
PROCEDURE: N-82-UT	REV: 1	TC: NA		COFIG.: VALVE to ELBOW	
EXAMINER: EDWARD MAZYCK PER TEL-CON 3-17-04 LEVEL:	EXAMINER: NA LEVEL:			EXAMINER: NA LEVEL:	EXAMINER: NA LEVEL:

This report contains the data associated with the manual ultrasonic examination of the TRHR-3-191 Weld

The weld was examined with a 45, 60 degree RL and 45, 60 degree S transducers from the elbow side and recordable indications were observed which plotted to root geometry. The procedure utilized for this examination was N-UT-82 rev-1.

Examination volume combined coverage 100%.

10CFR 50.55a coverage is 50% due to single side access and cast austenitic material of valve body. Mark Welch 4/6/04

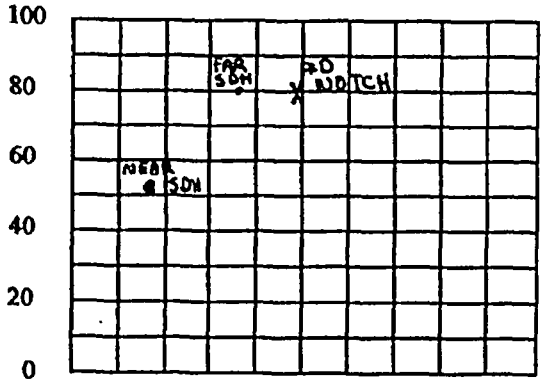
This examination satisfies the requirements of ASME Sec.XI, Category R-A, for item number R1.16C, also the exam volume required by procedure, and was performed using ASME Sec XI, Appendix VIII qualified personnel, procedures, and equipment as amended by the Final Rule.

Reference RFR# 3-ISI-16. [illegible] 3/22/04

RESOLUTION BY:	REVIEWED BY:	ANII:
Mark Welch	[signature]	[signature] DATE: 3/29/04
LEVEL: III DATE: 3/19/04	LEVEL: II DATE: 3-16-04	PG. 1 OF 10

TENNESSEE VALLEY AUTHORITY	DIGITAL ULTRASONIC CALIBRATION DATA SHEET	REPORT NUMBER: R189

PROJECT: BFN UNIT 3 CYCLE: 11	CALIBRATION DATE: 03/06/04
PROC.: N-UT-82 REV:01 TC: N/A	CALIBRATION BLOCK NO.: BF-87 TEMP: 67° F
INSTR. MFG: Staveley DUE DATE: 5/11/04	SIMULATOR BLOCK NO: 7500551
MODEL/TYPE: Sonic136 M & TE NO.: VH-8034	THERMOMTER S/N: VH-9058 DUE DATE: 04/06/04
TRANSDUCER MFG: RTD / TRLA	COUPLANT Sonotrace BATCH: 01141
S/N DB 34638 SIZE:2(10x18) FREQ: 2.0 MHz	EXAM TYPE: SHEAR☐ LONG☐ RL☒
CABLE TYPE: RG-174 LENGTH: 72 inches	ANGLE VERIFICATION
	BLOCK TYPE: Rompus S/N: 7500551
DAC	NOMINAL ANGLE: 60RL° ACTUAL ANGLE: 60RL°



DISPLAY WIDTH: inches 2.0" Depth

INSTRUMENT SETTINGS

REFLECTOR SCAN DIRECT.	NTCH	SDH	REFERENCE SENSITIVITY	MEMORY NUMBER
AXIAL	☒	☐	65.0 dB	18
CIRC	☐	☐	N/A dB	N/A

*FREQ: 2.25 MHz	*REJECT: OFF %
ANGLE: 60RL° deg	*DAMPING: 500 ohms
DELAY: 1.30" msec	*PULSER: 250 ns
ZERO: N/A msec	FILTER: 2
VELOCITY: 0.257" msec	*PRR/PRF: 4 KHz
RANGE: 4.0" inches	TOF:☒ PEAK ☐FLANK
*DISPLAY MODE: Dual	TCG: ON☐ OFF☒

REF. REFLECTOR: Near Hole GAIN: 58.0 dB	CALIBRATION TIMES
AMPLITUDE: 54% METAL PATH: .36" Depth	INITIAL TIME: 1940 FINAL TIME: 0105

VERIFICATION TIMES	1) 2135	2) 0005	3)	4)	5)	6)	7)	8)	9)

*** 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	10
	SIGNAL 2	50	45	40	35	30	25	20	15	10	5

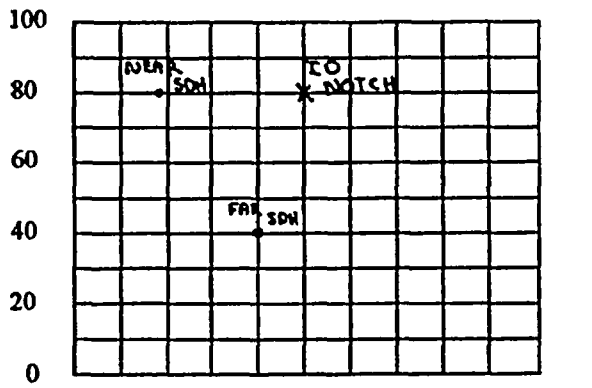
ATTENUATOR	GAIN	SET	-6 dB	-12 dB	SET	+12	SET	+6
	AMP	80	32-48	16-24	20	64-96	40	64-96
			40	20		80		80

COMMENTS:	WELDS/ITEMS EXAMINED:
60° RL was used to perform axial scans.	TRHR-3-191
Cal. Check was performed between transducer changes.	Valve to Elbow
Far hole .76" depth @80% 58.0db	
Near hole .36" depth @54% 58.0db	

EXAMINER:	EXAMINER:	REVIEWER:	ANII:
Edward Mazyck	N/A		DATE: 3/29/04
LEVEL: II	LEVEL:	LEVEL: II DATE: 3-16-04	PG. 2 OF 10

TENNESSEE VALLEY AUTHORITY	DIGITAL ULTRASONIC CALIBRATION DATA SHEET	REPORT NUMBER: R189

PROJECT: BFN UNIT 3 CYCLE: 11	CALIBRATION DATE: 03/06/04
PROC.: N-UT-82 REV:01 TC: N/A	CALIBRATION BLOCK NO.: BF-87 TEMP:67° F
INSTR. MFG: Staveley DUE DATE: 5/11/04	SIMULATOR BLOCK NO: 7500551
MODEL/TYPE: Sonic136 M & TE NO.: VH-8034	THERMOMTER S/N: VH-9058 DUE DATE: 04/06/04
TRANSDUCER MFG: KBA / COMP-B	COUPLANT Sonotrace BATCH: 01141
S/N DB 34739 SIZE: 0.5" FREQ: 1.5 MHz	EXAM TYPE: SHEAR☒ LONG☐ RL☐
CABLE TYPE: RG-174 LENGTH: 72 inches	ANGLE VERIFICATION
	BLOCK TYPE: Rompus / S/N: 7500551
DAC	NOMINAL ANGLE: 60° / ACTUAL ANGLE: 60°



DISPLAY WIDTH: inches 2.0" Depth

INSTRUMENT SETTINGS

REFLECTOR SCAN DIRECT.	NTCH	SDH	REFERENCE SENSITIVITY	MEMORY NUMBER
AXIAL	☒	☐	40.4 dB	16
CIRC	☐	☐	N/A dB	N/A

*FREQ: 2.25 MHz	*REJECT: OFF %
ANGLE: 60° deg	*DAMPING: 500 ohms
DELAY: 0.314" msec	*PULSER: 334 ps
ZERO: N/A msec	FILTER: 2
VELOCITY: 0.123" msec	*PRR/PRF: 4 KHz
RANGE: 4.0" inches	TOF:☐ PEAK ☒FLANK
*DISPLAY MODE: P E	TCG: ON☐ OFF ☒

REF. REFLECTOR: Near Hole	GAIN: 36.0 dB
AMPLITUDE: 80%	METAL PATH: .38" Depth

CALIBRATION TIMES

INITIAL TIME: 0200 FINAL TIME: 0610

VERIFICATION TIMES	1) 2105	2) 2330	3)	4)	5)	6)	7)	8)	9)

*** 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

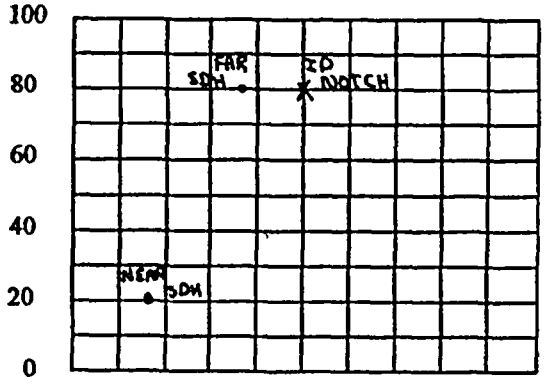
VERTICAL	SIGNAL 1		100	90	80	70	60	50	40	30	20	10
	SIGNAL 2		50	45	40	35	30	25	20	15	10	5
ATTENUATOR	GAIN	SET	-6 dB		-12 dB	SET	+12		SET	+6		
	AMP	80	32-48		16-24	20	64-96		40	64-96		
			40		20		80			80		

COMMENTS:	WELDS/ITEMS EXAMINED:
60° shear was used to perform axial scans.	TRHR-3-191
Cal. Check was performed between transducer changes.	Valve to Elbow
Far Hole .80" depth @40% 36.0db	
Near hole .38" depth @80% 36.0db	

EXAMINER:	EXAMINER:	REVIEWER:	ANII:
Edward P. Mazyck	N/A		DATE: 3/29/04
LEVEL: II	LEVEL:	LEVEL: II DATE: 3-16-04	PG. 3 OF 10

TENNESSEE VALLEY AUTHORITY	DIGITAL ULTRASONIC CALIBRATION DATA SHEET	REPORT NUMBER: R189

PROJECT: BFN UNIT 3 CYCLE: 11	CALIBRATION DATE: 03/06/04
PROC.: N-UT-82 REV:01 TC: N/A	CALIBRATION BLOCK NO.: BF-87 TEMP: 67° F
INSTR. MFG: Staveley DUE DATE: 5/11/04	SIMULATOR BLOCK NO: 7500551
MODEL/TYPE: Sonic136 M & TE NO.: VH-8034	THERMOMTER S/N: VH-9058 DUE DATE: 04/06/04
TRANSDUCER MFG: RTD / TRLA	COUPLANT Sonotrace BATCH: 01141
S/N DB 35359 SIZE:2(15x25) FREQ: 2.0 MHz	EXAM TYPE: SHEAR☐ LONG☐ RL☒
CABLE TYPE: RG-174 LENGTH: 72 inches	ANGLE VERIFICATION
	BLOCK TYPE: Rompus / S/N: 7500551
DAC	NOMINAL ANGLE: 45RL° / ACTUAL ANGLE: 45RL°



DISPLAY WIDTH: inches 2.0" Depth

INSTRUMENT SETTINGS

REFLECTOR SCAN DIRECT.	NTCH	SDH	REFERENCE SENSITIVITY	MEMORY NUMBER
AXIAL	☒	☐	52.0 dB	19
CIRC	☐	☐	N/A dB	N/A

*FREQ: 2.25 MHz	*REJECT: OFF %
ANGLE: 45RL° deg	*DAMPING: 500 ohms
DELAY: 1.36" msec	*PULSER: 250 ns
ZERO: N/A msec	FILTER: 2
VELOCITY: 0.248" msec	*PRR/PRF: 4 KHz
RANGE: 2.82" inches	TOF:☒ PEAK ☐FLANK
*DISPLAY MODE: Dual	TCG: ON☐ OFF☒

REF. REFLECTOR: Near Hole GAIN: 45.0 dB	CALIBRATION TIMES
AMPLITUDE: 20% METAL PATH: .34" Depth	INITIAL TIME: 1945 FINAL TIME: 0110

VERIFICATION TIMES	1) 2210	2)	3)	4)	5)	6)	7)	8)	9)

*** 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	10
	SIGNAL 2	50	45	40	35	30	25	20	15	10	5

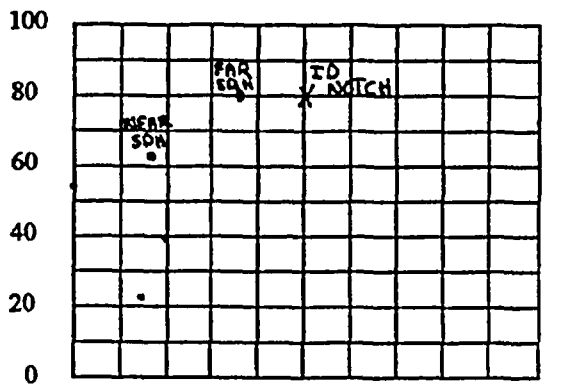
ATTENUATOR	GAIN	SET	-6 dB	-12 dB	SET	+12	SET	+6
	AMP	80	32-48	16-24	20	64-96	40	64-96
			40	20		80		80

COMMENTS:	WELDS/ITEMS EXAMINED:
45° RL was used to perform axial scans.	TRHR-3-191
Cal. Check was performed between transducer changes.	Valve to Elbow
Far hole .74" depth @80% 45 db	
Near hole .34" depth @ 20% 45 db	

EXAMINER:	EXAMINER:	REVIEWER:	ANII:
Edward Mazyck Edward P. Mazyck	N/A		DATE: 3/29/04
LEVEL: II	LEVEL:	LEVEL: II DATE: 3-16-04	PG. 4 OF 10

TENNESSEE VALLEY AUTHORITY	DIGITAL ULTRASONIC CALIBRATION DATA SHEET	REPORT NUMBER: R189

PROJECT: BFN UNIT 3 CYCLE: 11	CALIBRATION DATE: 03/06/04
PROC.: N-UT-82 REV:01 TC: N/A	CALIBRATION BLOCK NO.: BF-87 TEMP: 67 ° F
INSTR. MFG: Staveley DUE DATE: 5-11-04	SIMULATOR BLOCK NO: 7500551
MODEL/TYPE: Sonic136 M & TE NO.: VH-8034	THERMOMTER S/N: VH-9058 DUE DATE: 04-06-04
TRANSDUCER MFG: RTD / TRLA	COUPLANT Sonotrace BATCH: 01141
S/N DB 35258 SIZE:2(10x18) FREQ: 1.0 MHz	EXAM TYPE: SHEAR☐ LONG☐ RL☒
CABLE TYPE: RG-174 LENGTH: 72 inches	ANGLE VERIFICATION
	BLOCK TYPE: Rompus / S/N: 7500551
DAC	NOMINAL ANGLE: 45RL° / ACTUAL ANGLE: 45RL°



DISPLAY WIDTH: inches 2.0" Depth

INSTRUMENT SETTINGS

REFLECTOR			REFERENCE SENSITIVITY	MEMORY NUMBER
SCAN DIRECT.	NTCH	SDH		
AXIAL	☐	☐	N/A dB	N/A
CIRC	☒	☐	49.6 dB	20

*FREQ: 1.0 MHz	*REJECT: OFF %
ANGLE: 45RL° deg	*DAMPING: 500 ohms
DELAY: 1.35" msec	*PULSER: 500 ns
ZERO: N/A msec	FILTER: 3
VELOCITY: 0.248" msec	*PRR/PRF: 2 KHz
RANGE: 2.82" inches	TOF:☒ PEAK ☐FLANK
*DISPLAY MODE: Dual	TCG: ON☐ OFF ☒

REF. REFLECTOR: Near Hole GAIN: 46.4 dB	CALIBRATION TIMES
AMPLITUDE: 62% METAL PATH: .36" Depth	INITIAL TIME: 2000 FINAL TIME: 0115

VERIFICATION TIMES	1) 2305	2)	3)	4)	5)	6)	7)	8)	9)

*** 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	10
	SIGNAL 2	50	45	40	35	30	25	20	15	10	5

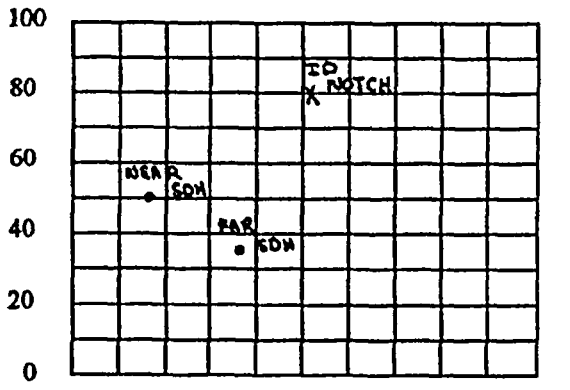
ATTENUATOR	GAIN	SET	-6 dB	-12 dB	SET	+12	SET	+6	
	AMP	80	32-48	16-24	20	64-96	40	64-96	
			40	20		80		80	

COMMENTS:	WELDS/ITEMS EXAMINED:
45° RL was used to perform circumferential scans.	TRHR-3-191
Cal. Check was performed between transducer change.	Valve to Elbow
Far hole .76" depth @80% 46.4db	
Near hole .36" depth @62% 46.4db	

EXAMINER:	EXAMINER:	REVIEWER:	ANII:
Edward Mazyck			DATE: 3/29/04
LEVEL: II	LEVEL: N/A	LEVEL: II DATE: 3-16-04	PG. 5 OF 10

TENNESSEE VALLEY AUTHORITY	DIGITAL ULTRASONIC CALIBRATION DATA SHEET	REPORT NUMBER: R149

PROJECT: BFN UNIT 3 CYCLE: 11	CALIBRATION DATE: 03/06/04
PROC.: N-UT-82 REV:01 TC: N/A	CALIBRATION BLOCK NO.: BF-87 TEMP: 67 ° F
INSTR. MFG: Staveley DUE DATE: 5/11/04	SIMULATOR BLOCK NO: 7500551
MODEL/TYPE: Sonic136 M & TE NO.: VH-8034	THERMOMTER S/N: VH-9058 DUE DATE: 04-06-04
TRANSDUCER MFG: KBA / COMP-B	COUPLANT Sonotrace BATCH: 01141
S/N DB 34739 SIZE: 0.5" FREQ: 1.5 MHz	EXAM TYPE: SHEAR☒ LONG☐ RL☐
CABLE TYPE: RG-174 LENGTH: 72 inches	ANGLE VERIFICATION
	BLOCK TYPE: Rompus / S/N: 7500551
DAC	NOMINAL ANGLE: 45s° / ACTUAL ANGLE: 45s°



DISPLAY WIDTH: inches 2.0" Depth

INSTRUMENT SETTINGS

REFLECTOR SCAN DIRECT.	NTCH	SDH	REFERENCE SENSITIVITY	MEMORY NUMBER
AXIAL	☐	☐	N/A dB	N/A
CIRC	☒	☐	24.0 dB	17

*FREQ: 2.25 MHz	*REJECT: OFF %
ANGLE: 45s° deg	*DAMPING: 500 ohms
DELAY: 0.290" msec	*PULSER: 334 ns
ZERO: N/A msec	FILTER: 2
VELOCITY: 0.123" msec	*PRR/PRF: 4 KHz
RANGE: 2.82" inches	TOF:☐ PEAK ☒FLANK
*DISPLAY MODE: P E	TCG: ON☐ OFF☒

REF. REFLECTOR: Near Hole GAIN: 27.0 dB	CALIBRATION TIMES
AMPLITUDE: 50% METAL PATH: .36" Depth	INITIAL TIME: 1955 FINAL TIME: 0125

VERIFICATION TIMES	1)2242	2)	3)	4)	5)	6)	7)	8)	9)

*** 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	10
	SIGNAL 2	50	45	40	35	30	25	20	15	10	5

ATTENUATOR	GAIN	SET	-6 dB	-12 dB	SET	+12	SET	+6
	AMP	80	32-48	16-24	20	64-96	40	64-96
			40	20		80		80

COMMENTS:	WELDS/ITEMS EXAMINED:
45° shear was used to perform circumferential scans.	TRHR-3-191
Cal. Check was performed between transducer changes.	Valve to Elbow
Far hole .76" depth @35% 27db	
Near hole .36" depth @ 50% 27db	

EXAMINER:	EXAMINER:	REVIEWER:	ANII:
Edward P. Mazyck Edward P. Mazyck	N/A		DATE: 3/29/04
LEVEL: II	LEVEL:	LEVEL: II DATE: 3-16-04	PG. 6 OF 10

TENNESSEE VALLEY AUTHORITY	ULTRASONIC PIPING EXAMINATION DATA SHEET	REPORT NUMBER: R189

PROJECT: BFN UNIT: 3 CYCLE: 11	EXAMINATION DATE: 03/06/04
PROCEDURE: N-UT-82 REV: 1 TC: N/A	START TIME: 2243 END TIME: 2325
SYSTEM: RHRS ISI DWG. NO: 3-ISI-0330-C / Rev.01	EXAM SURFACE ☐ ID ☒ OD
COMPONENT ID: TRHR-3-191	MATL. TYPE: ☒ CS ☒ SS ☐ CSCL ☐ CCSS
CONFIGURATION	SURFACE TEMP.: 62 'F PYRO. NO.: VH-9058
VALVE TO ELBOW	CAL DUE DATE: 04/06/04
FLOW →	EXAM ANGLE: 45 RL DEG / 45 Shear DEG
Wo REFERENCE: SS/CS INTERFACE	CIRC. SCAN SENSITIVITY: 49.6 dB / 24.0 dB
Lo REFERENCE: OUTSIDE RADIUS OF ELBOW	AXIAL SCAN SENSITIVITY: N/A dB / N/A dB

IND. NO.	L (in) FROM REF.			AT MAX AMP			MAX AMP %DAC	EXAM NO. 3-14	NOM. ANG.	N R I	IND. INFO: TYPE, DAMPING, ETC.
	L1	L MAX	L2	W MAX	MP MAX	D MAX					
							%	5	45 RL	X	
							%	6	45 RL	X	
							%	5	45 S	X	
							%	6	45 S	X	
							%				

REMARKS / LIMITATIONS: 45°RL and 45°S where used to perform circumferential scans parallel to the weld and on the weld. No exam perform upstream due to component configuration.

100% coverage was achieved per procedure requirements.

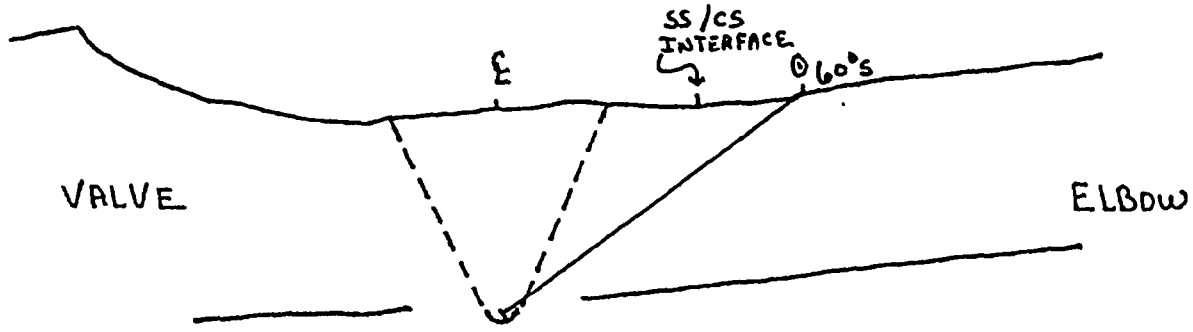
EXAMINER: Edward P. Mazyck	LEVEL: II	ANII:
EXAMINER:	LEVEL:	DATE: 3/24/04
REVIEWER:	LEVEL: II DATE: 3-16-04	PAGE 67 OF 10

3/18/04

TENNESSEE VALLEY AUTHORITY	ULTRASONIC PIPING EXAMINATION DATA SHEET	REPORT NUMBER: R189

PROJECT: BFN UNIT: 3 CYCLE: 11	EXAMINATION DATE: 03/06/04
PROCEDURE: N-UT-82 REV: 1 TC: N/A	START TIME: 2106 END TIME: 2133
SYSTEM: RHRS ISI DWG. NO: 3-ISI-0330-C / Rev.01	EXAM SURFACE ☐ ID ☒ OD
COMPONENT ID: TRHR-3-191	MATL. TYPE: ☒ CS ☒ SS ☐ CSCL ☐ CCSS
CONFIGURATION	SURFACE TEMP.: 62 'F PYRO. NO.: VH-9058
VALVE TO ELBOW	CAL DUE DATE: 04/06/04
FLOW →	EXAM ANGLE: 45 RL DEG / 60 Shear DEG
Wo REFERENCE: SS/CS INTERFACE	CIRC. SCAN SENSITIVITY: N/A dB / N/A dB
Lo REFERENCE: OUTSIDE RADIUS OF ELBOW	AXIAL SCAN SENSITIVITY: 52.0 dB / 40.4 dB

IND. NO.	L (in) FROM REF. L1	L MAX	L2	AT MAX AMP W MAX	MP MAX	D MAX	MAX AMP %DAC	EXAM NO. 3-14	NOM. ANG.	N R I	IND. INFO: TYPE, DAMPING, ETC.
1		31.5"		.6"	2.1"	1.05"	65%	4	60°s		Root geometry seen intermittently 360° at and below recordable.
							%	4	45RL	X	
							%				
							%				
							%				



REMARKS / LIMITATIONS: 45°RL and 60°S where used to perform axial scans perpendicular to the weld and across the weld. No exam perform upstream due to component configuration.

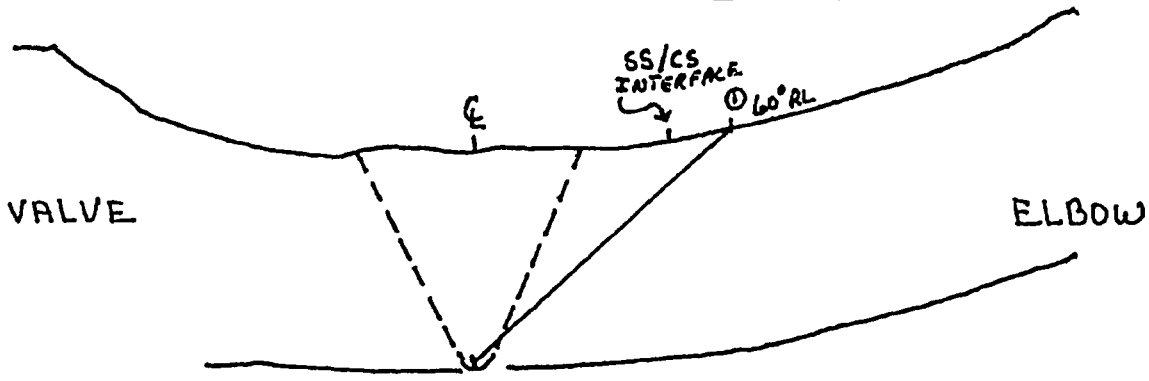
100% coverage was achieved per procedure requirements.

EXAMINER: Edward P. Mazyck Edward P. Mazyck	LEVEL: II	ANII:
EXAMINER:	LEVEL:	DATE: 3/29/04
REVIEWER:	LEVEL: II DATE: 3-16-04	PAGE 8 OF 10

TENNESSEE VALLEY AUTHORITY	ULTRASONIC PIPING EXAMINATION DATA SHEET	REPORT NUMBER: R189

PROJECT: BFN UNIT: 3 CYCLE: 11	EXAMINATION DATE: 03/06/04
PROCEDURE: N-UT-82 REV: 1 TC: N/A	START TIME: 2137 END TIME: 2208
SYSTEM: RHRS ISI DWG. NO: 3-ISI-0330-C / Rev. 01	EXAM SURFACE ☐ ID ☒ OD
COMPONENT ID: TRHR-3-191	MATL. TYPE: ☒ CS ☒ SS ☐ CSCL ☐ CCSS
CONFIGURATION VALVE TO ELBOW	SURFACE TEMP.: 62 °F PYRO. NO.: VH-9058
FLOW →	CAL DUE DATE: 04/06/04
Wo REFERENCE: SS/CS INTERFACE	EXAM ANGLE: 60RL DEG / N/A DEG
Lo REFERENCE: OUTSIDE RADIUS OF ELBOW	CIRC. SCAN SENSITIVITY: N/A dB / N/A dB
	AXIAL SCAN SENSITIVITY: 65.0 dB / N/A dB

IND. NO.	L (in) FROM REF. L1	L MAX	L2	AT MAX AMP W MAX	MP MAX	D MAX	MAX AMP %DAC	EXAM NO. 3-14	NOM. ANG.	N R I	IND. INFO: TYPE, DAMPING, ETC.
1		31.25"		.4"	1.92"	.96"	60%	4	60RL	X	W-Max taken from SS/CS Interface. Root Geometry
							%				
							%				
							%				
							%				



REMARKS / LIMITATIONS: Indication #1 Root Geometry seen intermittently 360° at and below recordable levels. Contour was taken on inside Radius of Elbow where indication was plotted.

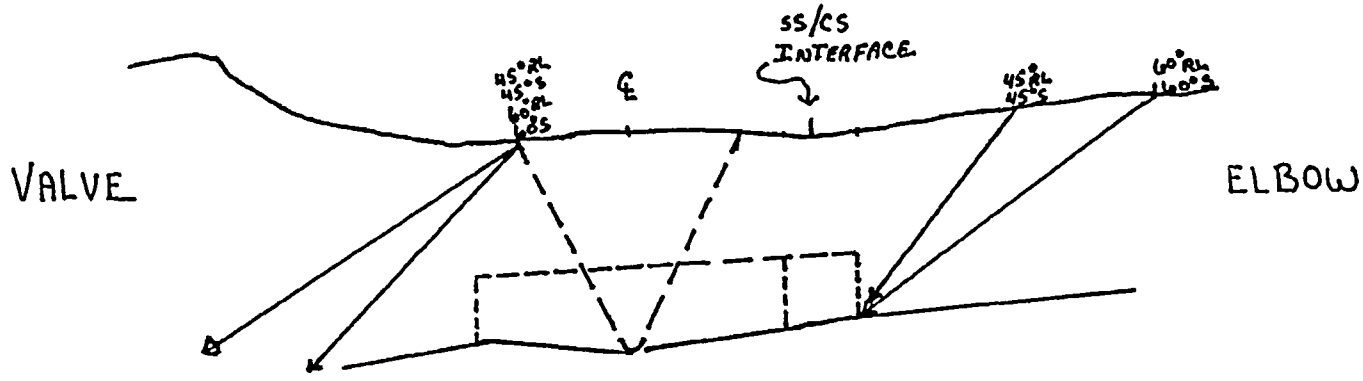
60°RL was used to perform axial scans perpendicular to the weld and on the weld.

100% coverage was achieved per procedure requirements.

EXAMINER: Edward P. Mazyck *Edward P. Mazyck*	LEVEL: II	ANII: *[illegible]*
EXAMINER:	LEVEL:	DATE: 3/29/04
REVIEWER:	LEVEL: DATE:	PAGE 9 OF 10

[illegible] 3/29/04

AREVA



CONTOUR TAKEN OUTSIDE RADIUS OF ELBOW 0°

Site: Browns Ferry / Unit - 3	**Weld TRHR-3-191: Coverage Plot**		Scale: 1" = 1"
Examiner: Edward P. Mazyck Level: II Date: 03/06/04	Examiner:	Level:	Date:
Reviewed By: Date: 3-16-04	ANII: Date: 3/19/04		Page: 10 of 10

00346

Inspection Report R-081
Weld RWCU-3-007-G004

TENNESSEE VALLEY AUTHORITY	EXAMINATION SUMMARY AND RESOLUTION SHEET	REPORT NUMBER: R081

PROJECT: BFN	UNIT: 3	CYCLE: 11		COMPONENT ID: RWCU 3-007-G004	
EXAMINATION METHOD				SYSTEM: 069	ISI DWG. NO. 3-ISI-0332-C 3/24/04
MT ☐	PT ☐	UT ☒	VT ☐	CODE CLASS: 1	CATEGORY: ~~RI~~ R-A
PROCEDURE: N-UT-82	REV:1	TC:N/A		COFIG.: Pipe TO Valve	
EXAMINER: R.W. Bertley	EXAMINER: N/A			EXAMINER: N/A	EXAMINER: N/A
LEVEL: III	LEVEL:			LEVEL:	LEVEL:

Weld RWCU 3-007-G004 is a dissimilar metal weld consisting of a ferritic steel pipe, 4" schedule 80, welded to a stainless steel valve. The weld is category RI and was examined in accordance with NUREG 0313 (IGSCC)
ASME Section XI Risk Informed, category R-A, item R1.16A Mark Welch III 3/4/04
The examination was in accordance with NDE procedure N-UT-82 which incorporates PDI procedure PDI-UT-10, "Generic Procedure for the Ultrasonic Examination of Dissimilar Metal Piping Welds". Weld RWCU 3-007-G004 has a maximum thickness of 0.382" and a crown with <0.50" and contains no buttering. Therefore the primary mode of examination was shear wave as stated in the procedure paragraph 6.2.1, "the primary mode of propagation for components with material thickness <0.40" and widths (including buttering) equal to or less than 0.50" shall be shear". A 45and 60-degree shear wave examination was performed in 3 directions, one axially and two circumferential A 70-degree shear wave examination was performed in one axial direction. Additionally, a 45-degree RL wave examination was performed in one axial and two circumferential directions. The configuration of the valve prevents scans from the valve side.

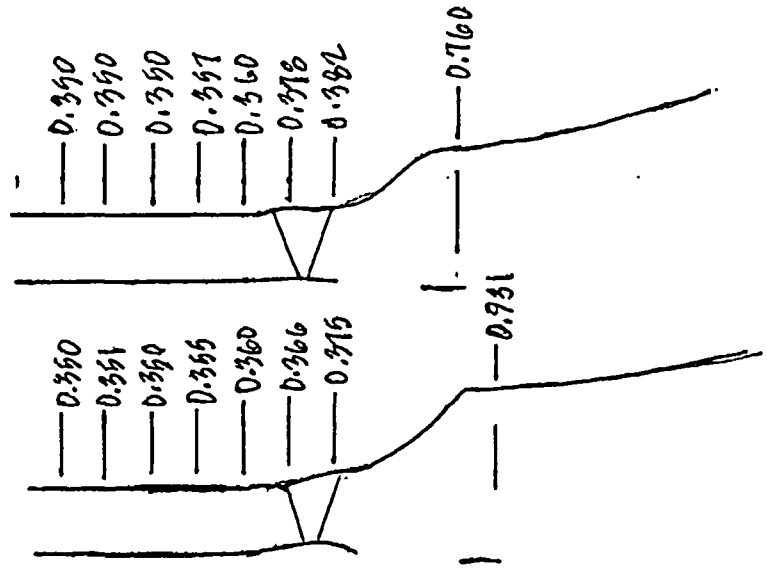
To further ensure that there were no flaws in the examination area a supplemental examination, as permitted in the procedure paragraph 8.7, was performed utilizing a 60 and 70-degree RL wave examination in the axial direction.

The 70-degree shear wave examination identified a signal from the weld root and was observed 360-degrees along the wels at varying amplitudes.

100% ASME code coverage was achieved.
50% 10CFR50-55(a) coverage was achieved due to single sided exam. Mark Welch 3/7/04 TVA/NDE III

RESOLUTION BY:	REVIEWED BY:	ANII: B.J. Rice
Roger Bertley	Darlene Dunlap	DATE: 3/26/04
LEVEL: III DATE: 3-3-04	LEVEL: III DATE: 3-4-04	PG. 1 OF 16

TVA Office of Nuclear Power	PROJECT: BFN SYSTEM: D69 Unit: 1 WELD NO.: RH/CU-3-007-G004	REPORT NO.: R081



BY: Roger Butty LEVEL: III DATE: 3-2-04 PAGE 2 OF 16

TVA 19669 (ONP-6-88)

00247

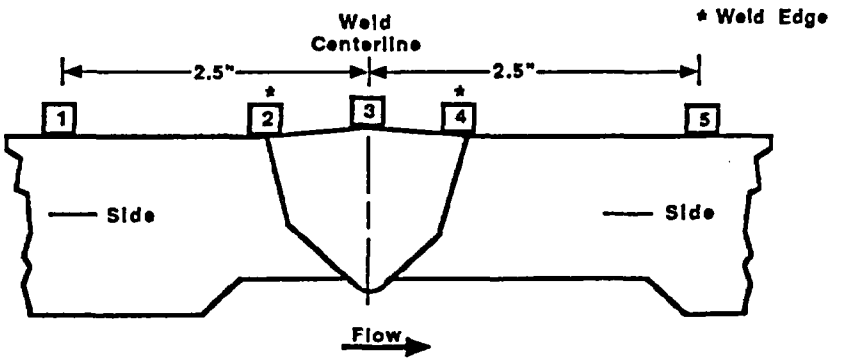
00248

TVA	WALL THICKNESS PROFILE SHEET	REPORT NO: R081

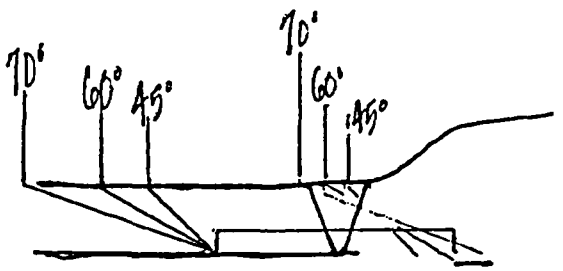
PROJECT: BFN
UNIT: 3
WELD NO: RHCU-3-007-G004
SYSTEM: 069

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: FLUSH
CROWN WIDTH: 0.30
DIAMETER: 4.5
WELD LENGTH: 14.25



COVERAGE PLOTS

EXAMINER: [signature]
LEVEL: II
DATE: 3.2.04

REVIEWED BY: [signature]
LEVEL: III
DATE: 3-4-04

ANII: B. J. Rico
DATE: 3/29/04

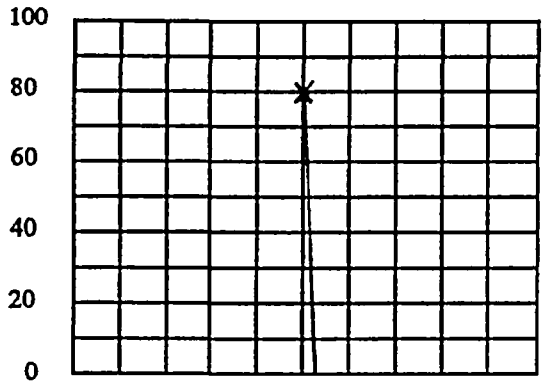
PAGE 3 OF 16

TVA 19668 (NP-5-89)

1-108-999-44

TENNESSEE VALLEY AUTHORITY	DIGITAL ULTRASONIC CALIBRATION DATA SHEET	REPORT NUMBER: R081

PROJECT: BFN UNIT 3 2-3-04 CYCLE: 11	CALIBRATION DATE: 3-2-04
PROC.: N-UT-82 REV: 01 TC: N/A	CALIBRATION BLOCK NO.: W/B-850 TEMP: 86 °F
INSTR. MFG: KRAUTKRAMER DUE DATE: 10-7-04	SIMULATOR BLOCK NO: N/A
MODEL/TYPE: USN 60 M & TE NO.: E36303	THERMOMTER S/N: 522350 DUE DATE: 6-16-04
TRANSDUCER MFG: KBA COMP G	COUPLANT ULTRAGEL II BATCH: 03125 M
S/N 00F 8TD SIZE: 0.375 FREQ: 2.25 MHz	EXAM TYPE: SHEAR ☑ LONG ☐ RL ☐
CABLE TYPE: RG-174 LENGTH: 72 inches	ANGLE VERIFICATION
	BLOCK TYPE: DSC S/N: A03671
DAC	NOMINAL ANGLE: 45° ACTUAL ANGLE: 45°



DISPLAY WIDTH: inches 1.50

INSTRUMENT SETTINGS

REFLECTOR SCAN DIRECT.	NTCH	SDH	REFERENCE SENSITIVITY	MEMORY NUMBER
AXIAL	☒	☐	28 dB	
CIRC	☐	☐	dB	

*FREQ: 2.25	MHz	*REJECT: 0	%
ANGLE: 45°	deg	*DAMPING: 1000	ohms
DELAY: 8.0113	msec	*PULSER: HIGH	
ZERO:* 0.015	msec	FILTER: FIXED	
VELOCITY: 0.1243	msec	*PRR/PRF: AUTO HIGH	
RANGE: 1.50	inches	TOF: ✓PEAK ☐ FLANK	
*DISPLAY MODE: FULL WAVE		TCG: ON ☐ OFF ☑	

~~REF. REFLECTOR:~~ N GAIN: dB	CALIBRATION TIMES
AMPLITUDE: A ~~METAL PATH:~~	INITIAL TIME: 1215 FINAL TIME: 1500

VERIFICATION TIMES	1)	2)	3)	4)	5)	6)	7)	8)	9)

*** 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	10
	SIGNAL 2	50	45	40	35	30	25	20	15	10	5

ATTENUATOR	GAIN	SET	-6 dB	-12 dB	SET	+12	SET	+6
	AMP	80	32-48	16-24	20	64-96	40	64-96
			40	20		80		80

COMMENTS: * DISPLAY DELAY	WELDS/ITEMS EXAMINED:
	RWCU 3-007-G004
① CAL ON 1/2" THICKNESS NOTCH	

EXAMINER:	EXAMINER:	REVIEWER:	ANII:
MMBentley	N/A	Darlene Dunlap	B. F. Rice
LEVEL: III	LEVEL:	LEVEL: III DATE: 3-4-04	DATE: 3/29/04
			PG. 4 OF 16

TENNESSEE VALLEY AUTHORITY	ULTRASONIC PIPING EXAMINATION DATA SHEET	REPORT NUMBER: R081

PROJECT: BFN UNIT: 1 CYCLE: 11 EXAMINATION DATE: 3-2-04

PROCEDURE: N-UT-82 REV: 1 TC: N/A START TIME: 1300 END TIME: 1500

SYSTEM: 069 ISI DWG. NO: 3-151-0332-C EXAM SURFACE ☐ ID ☑ OD

COMPONENT ID: RHCU-3-007-G00A MATL. TYPE: ☑ CS ☑ SS ☐ CSCL ☐ CCSS

CONFIGURATION: PIPE TO VALVE, FLOW →

SURFACE TEMP.: 100 °F PYRO. NO.: 522350

CAL DUE DATE: 6-16-04

EXAM ANGLE	45 DEG	N DEG
CIRC. SCAN SENSITIVITY	41 dB	A dB
AXIAL SCAN SENSITIVITY	41 dB	dB

Wo REFERENCE: WELD CENTER LINE

Lo REFERENCE: TOP DEAD CENTER

IND. NO.	L (in) FROM REF. L1	L MAX	L2	AT MAX AMP W MAX	MP MAX	D MAX	MAX AMP %DAC	EXAM NO. 3-14	NOM. ANG.	N R I	IND. INFO: TYPE, DAMPING, ETC.
							%	3	45°S	✓	
							%	4*	45°S		
							%	5	45°S	✓	
							%	6	45°S	✓	
							%				
							%				
							%				
							%				
							%				
							%				
							%				
							%				
							%				
							%				

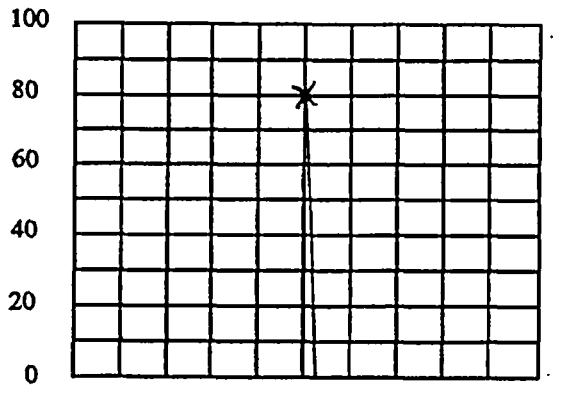
REMARKS / LIMITATIONS:

* SCAN 4 NOT AVAILABLE DUE TO CONFIGURATION.

EXAMINER: Roger Bentley	LEVEL: III	ANII: B. F. Rice	
EXAMINER: N/A	LEVEL: N/A	DATE: 3/26/04	
REVIEWER: Darlene Tuley	LEVEL: III	DATE: 3-4-04	PAGE 5 OF 16

TENNESSEE VALLEY AUTHORITY	DIGITAL ULTRASONIC CALIBRATION DATA SHEET	REPORT NUMBER: R081

PROJECT: BFN UNIT 3 CYCLE: 11	CALIBRATION DATE: 3-2-04
PROC.: N-UT-B2 REV: 0 TC: N/A	CALIBRATION BLOCK NO.: 11B-85 ① TEMP: 86 °F
INSTR. MFG: KRAUTKRAMER DUE DATE: 10-1-04	SIMULATOR BLOCK NO: N/A
MODEL/TYPE: USN-60 M & TE NO.: E-36303	THERMOMTER S/N: 522350 DUE DATE: 6-16-04
TRANSDUCER MFG: KBA COMP G	COUPLANT ULTRAGEL II BATCH: 03125M
S/N 00F8TD SIZE: 0.375 FREQ: 2.25 MHz	EXAM TYPE: SHEAR ☑ LONG ☐ RL ☐
CABLE TYPE: RG-174 LENGTH: 72 inches	ANGLE VERIFICATION
	BLOCK TYPE: DSC S/N: A03671
DAC	NOMINAL ANGLE: 60° ACTUAL ANGLE: 60°



DISPLAY WIDTH: inches 1.900

INSTRUMENT SETTINGS

REFLECTOR SCAN DIRECT.	NTCH	SDH	REFERENCE SENSITIVITY	MEMORY NUMBER
AXIAL	☐	☐	45 dB	
CIRC	☐	☐	dB	

*FREQ: 2.25	MHz	*REJECT: 0	%
ANGLE: 60°	deg	*DAMPING: 1000	ohms
DELAY: 9.9900	msec	*PULSER: HIGH	
ZERO:* 0.015	msec	FILTER: FIXED	
VELOCITY: 0.1254	msec	*PRR/PRF: AUTO HIGH	
RANGE: 1.900	inches	TOF: ✓ PEAK ☐ FLANK	
*DISPLAY MODE: FULL WAVE		TCG: ON ☐ OFF ☑	

~~REF. REFLECTOR:~~ N GAIN: dB	CALIBRATION TIMES
AMPLITUDE: A ~~METAL PATH:~~	INITIAL TIME: 1216 FINAL TIME: 1455

VERIFICATION TIMES	1)	2)	3)	4)	5)	6)	7)	8)	9)

*** 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	10
	SIGNAL 2	50	45	40	35	30	25	20	15	10	5

ATTENUATOR	GAIN	SET	-6 dB	-12 dB	SET	+12	SET	+6	
	AMP	80	32-48	16-24	20	64-96	40	64-96	
			40	20		80		80	

COMMENTS: * DISPLAY DELAY	WELDS/ITEMS EXAMINED:
	RH/CH 3-007-G004
① CAL ON 1/2" THICKNESS NOTCH	

EXAMINER: Roger Bentley	EXAMINER: N/A	REVIEWER: Darlene Dulog	ANII: B.F. Rico
LEVEL: III	LEVEL:	LEVEL: III DATE: 3-4-04	DATE: 3/29/04
			PG. 6 OF 16

TENNESSEE VALLEY AUTHORITY	ULTRASONIC PIPING EXAMINATION DATA SHEET	REPORT NUMBER: R081

PROJECT: BFN UNIT: 1 CYCLE: 11		EXAMINATION DATE: 3-2-04	
PROCEDURE: N-UT-82 REV: 1 TC: N/A		START TIME: 1300	END TIME: 1600
SYSTEM: 069	ISI DWG. NO: 3-151-0332-C	EXAM SURFACE ☐ ID ☑ OD	
COMPONENT ID: RWCU 3-007-6004		MATL. TYPE: ☑ CS ☑ SS ☐ CSCL ☐ CCSS	
CONFIGURATION		SURFACE TEMP.: 100 °F	PYRO. NO.: 522350
Pipe TO Valve		CAL DUE DATE: 6-16-04	
FLOW →		EXAM ANGLE	60 DEG / N DEG
Wo REFERENCE: 11 ELD CENTER LINE		CIRC. SCAN SENSITIVITY	53 dB / A dB
Lo REFERENCE: TOP DEAD CENTER		AXIAL SCAN SENSITIVITY	53 dB / dB

IND. NO.	L (in) FROM REF. L1	L MAX	L2	AT MAX AMP W MAX	MP MAX	D MAX	MAX AMP %DAC	EXAM NO. 3-14	NOM. ANG.	N R I	IND. INFO: TYPE, DAMPING, ETC.
							%	3	60°S	✓	
							%	4*	60°S		
							%	5	60°S	✓	
							%	6	60°S	✓	
							%				
							%				
							%				
							%				
							%				
							%				
							%				
							%				
							%				
							%				

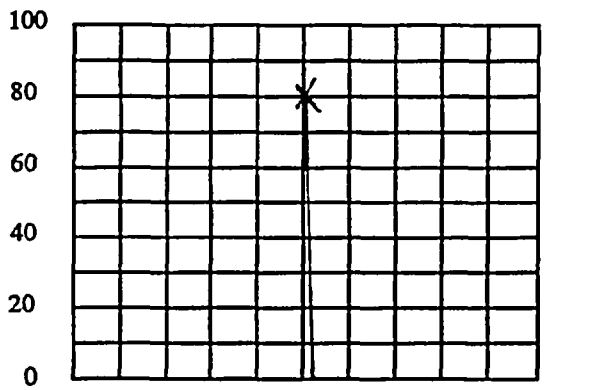
REMARKS / LIMITATIONS:

* NO SCAN A DUE TO CONFIGURATION

EXAMINER: Roger Bentley	LEVEL: III	ANII: B. J. Rice	
EXAMINER: N/A	LEVEL: N/A	DATE: 3/29/04	
REVIEWER: Darlene Dailey	LEVEL: III	DATE: 3-4-04	PAGE 1 OF 16

TENNESSEE VALLEY AUTHORITY	DIGITAL ULTRASONIC CALIBRATION DATA SHEET	REPORT NUMBER: R081

PROJECT: BFN UNIT 3 CYCLE: 11	CALIBRATION DATE: 3-2-04
PROC.: N-UT-82 REV: 01 TC: N/A	CALIBRATION BLOCK NO.: WB-85 ① TEMP: 86 °F
INSTR. MFG: KRAUTKRAMER DUE DATE: 10-7-04	SIMULATOR BLOCK NO: N/A
MODEL/TYPE: USN 60 M & TE NO.: E36303	THERMOMTER S/N: 522350 DUE DATE: 6-16-04
TRANSDUCER MFG: KBA COMP G	COUPLANT ULTRAGEL II BATCH: 03125 M
S/N 00F8TD SIZE: 0.375 FREQ: 2.25 MHz	EXAM TYPE: SHEAR ☑ LONG ☐ RL ☐
CABLE TYPE: RG-174 LENGTH: 72 inches	ANGLE VERIFICATION
	BLOCK TYPE: DSC S/N: A03671
DAC	NOMINAL ANGLE: 70° ACTUAL ANGLE: 67°



DISPLAY WIDTH: inches 2.50

INSTRUMENT SETTINGS

REFLECTOR SCAN DIRECT.	NTCH	SDH	REFERENCE SENSITIVITY	MEMORY NUMBER
AXIAL	☐	☐	AB dB	
CIRC	☐	☐	dB	

*FREQ: 2.25 MHz	*REJECT: 0 %
ANGLE: 67° deg	*DAMPING: 1000 ohms
DELAY: 7.5519 msec	*PULSER: HIGH
ZERO:* 0.015 msec	FILTER: FIXED
VELOCITY: 0.1246 msec	*PRR/PRF: AUTO HIGH
RANGE: 2.50 inches	TOF: ✓ PEAK ☐ FLANK
*DISPLAY MODE: FULL WAVE	TCG: ON ☐ OFF ☑

REF. ~~REFLECTOR:~~ N GAIN: dB	CALIBRATION TIMES
AMPLITUDE: A ~~METAL PATH:~~	INITIAL TIME: 1212 FINAL TIME: 1457

VERIFICATION TIMES	1)	2)	3)	4)	5)	6)	7)	8)	9)

*** 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	10
	SIGNAL 2	50	45	40	35	30	25	20	15	10	5

ATTENUATOR	GAIN	SET	-6 dB	-12 dB	SET	+12	SET	+6	
	AMP	80	32-48	16-24	20	64-96	40	64-96	
			40	20		80		80	

COMMENTS: *DISPLAY DELAY	WELDS/ITEMS EXAMINED:
	KN/CU 3-007-G00A
① CAL ON 1/2" THICKNESS NOTCH	

EXAMINER:	EXAMINER:	REVIEWER:	ANII:
LEVEL: III	LEVEL: N/A	LEVEL: III DATE: 3-4-04	DATE: 3/29/04
			PG. 8 OF 16

TENNESSEE VALLEY AUTHORITY	ULTRASONIC PIPING EXAMINATION DATA SHEET	REPORT NUMBER: R081

PROJECT: BFN UNIT: 3 CYCLE: 11 EXAMINATION DATE: 3-2-04

PROCEDURE: N-UT-82 REV: 1 TC: N/A START TIME: 1300 END TIME: 1500

SYSTEM: D69 ISI DWG. NO: 3-151-0332-C EXAM SURFACE ☐ ID ☑ OD

COMPONENT ID: RWCU 3-007-G004 MATL. TYPE: ☑ CS ☑ SS ☐ CSCL ☐ CCSS

CONFIGURATION: PIPE TO VALVE

FLOW →

SURFACE TEMP.: 100 °F PYRO. NO.: 522350

CAL DUE DATE: 6-16-04

EXAM ANGLE	70° DEG	N DEG
CIRC. SCAN SENSITIVITY	48 dB	A dB
AXIAL SCAN SENSITIVITY	N/A dB	dB

Wo REFERENCE: WELD CENTER LINE

Lo REFERENCE: TOP DEAD CENTER

IND. NO.	L (in) FROM REF. L1	L MAX	L2	AT MAX AMP W MAX	MP MAX	D MAX	MAX AMP %DAC	EXAM NO. 3-14	NOM. ANG.	N R I	IND. INFO: TYPE, DAMPING, ETC.
1		6.5		0.15	1.00		50 %	3	70°S		ROOT GEOMETRY*
							%	4*	70°S		
							%				
							%				
							%				
							%				
							%				
							%				
							%				
							%				
							%				
							%				
							%				
							%				

REMARKS / LIMITATIONS:

* ROOT GEOMETRY INTERMITTENT 360° AT LONGER AMPLITUDES

* NO SCAN 4 DUE TO CONFIGURATION.

EXAMINER: ROGER BENTLEY RMBentley LEVEL: III ANII: B. F. Rice

EXAMINER: N/A LEVEL: N/A DATE: 3/29/04

REVIEWER: Darlene Dalay LEVEL: III DATE: 3-4-04 PAGE 9 OF 16

00255

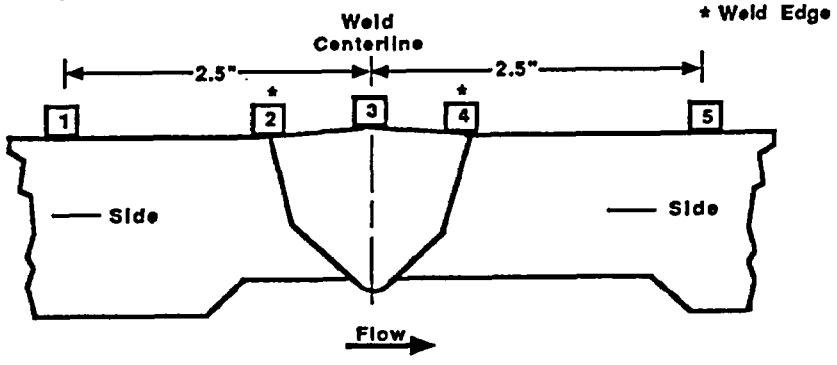
TVA	WALL THICKNESS PROFILE SHEET	REPORT NO: R081

PROJECT: BFN
UNIT: 3 Cycle 11

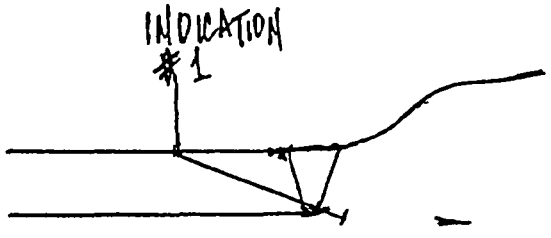
WELD NO: RWCU 3-007-G004
SYSTEM: 069

Record Thickness Measurements As Indicated, Including Weld Width, Edge-To-Edge At 0°

Position	0°	90°	180°	270°
1	0.35	0.35		
2	0.378	0.366		
3	0.382	0.375		
4	N/A	N/A		
5	0.76	0.93		



CROWN HEIGHT: FLUSH
CROWN WIDTH: 0.30
DIAMETER: 4.5
WELD LENGTH: 14.25



EXAMINER: [signature]
LEVEL: III
DATE: 3-2-04

REVIEWED BY: [signature]
LEVEL: III DATE: 3-4-04

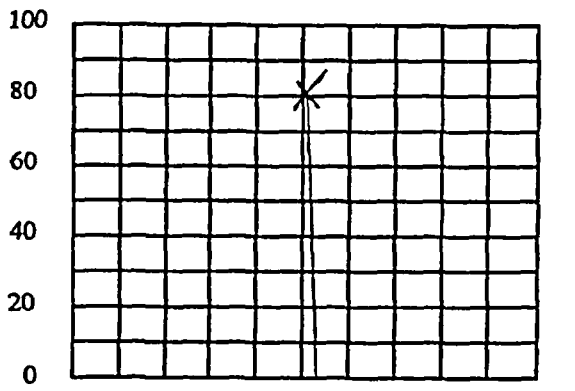
ANII: B. J. Rice
DATE: 3/29/04
PAGE 10 OF 16

TVA 19668 (NP-5-89)

1-108-999-44

TENNESSEE VALLEY AUTHORITY	DIGITAL ULTRASONIC CALIBRATION DATA SHEET	REPORT NUMBER: R081

PROJECT: BFN UNIT 3 11/23/04 CYCLE: 11	CALIBRATION DATE: 3-2-04
PROC.: N-UT-82 REV: 01 TC: N/A	CALIBRATION BLOCK NO.: 11B-85① TEMP: 86 °F
INSTR. MFG: KRAUTKRAMER DUE DATE: 10-7-04	SIMULATOR BLOCK NO: N/A
MODEL/TYPE: USN 60 M & TE NO.: E36303	THERMOMTER S/N: 522350 DUE DATE: 6-16-04
TRANSDUCER MFG: RTD TRLA (NOTE)	COUPLANT ULTRAGEL II BATCH: 03125M
S/N 03-895 SIZE: 2(7x10) FREQ: 2.0 MHz	EXAM TYPE: SHEAR ☐ LONG ☐ RL ☑
CABLE TYPE: RG-174 LENGTH: 72 inches	ANGLE VERIFICATION
	BLOCK TYPE: DSC S/N: A03671
DAC	NOMINAL ANGLE: 45° ACTUAL ANGLE: 45°



DISPLAY WIDTH: inches 1.250

INSTRUMENT SETTINGS

REFLECTOR SCAN DIRECT.	NTCH	SDH	REFERENCE SENSITIVITY	MEMORY NUMBER
AXIAL	☐	☐	41 dB	
CIRC	☐	☐	dB	

*FREQ: 2.25	MHz	*REJECT: 0	%
ANGLE: 45°	deg	*DAMPING: 1000	ohms
DELAY: 6.8981	msec	*PULSER: HIGH	
ZERO: X 0.015	msec	FILTER: FIXED	
VELOCITY: 0.2279	msec	*PRR/PRF: AUTO HIGH	
RANGE: 1.250	inches	TOF: ✓PEAK ☐ FLANK	
*DISPLAY MODE: FULL WAVE		TCG: ON ☐ OFF ☑	

REF. ~~REFLECTOR~~: N	GAIN: dB	CALIBRATION TIMES	
AMPLITUDE: A	METAL ~~PATH~~:	INITIAL TIME: 1210	FINAL TIME: 1510

VERIFICATION TIMES	1)	2)	3)	4)	5)	6)	7)	8)	9)

*** 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	10
	SIGNAL 2	50	45	40	35	30	25	20	15	10	5

ATTENUATOR	GAIN	SET	-6 dB	-12 dB	SET	+12	SET	+6	
	AMP	80	32-48	16-24	20	64-96	40	64-96	
			40	20		80		80	

COMMENTS: X DISPLAY DELAY	WELDS/ITEMS EXAMINED:
NOTE: FS=20MM SQUINT=10°	RH/CH 3-007-G004
①CAL ON 1/2" THICKNESS NOTCH	

EXAMINER:	EXAMINER:	REVIEWER	ANII:
LEVEL: III	LEVEL: N/A	LEVEL: III DATE: 3-4-04	DATE: 3/29/04
			PG. 11 OF 16

TENNESSEE VALLEY AUTHORITY	ULTRASONIC PIPING EXAMINATION DATA SHEET	REPORT NUMBER: R081

PROJECT: BFN UNIT: 3 CYCLE: 11 EXAMINATION DATE: 3-2-04

PROCEDURE: N-UT-82 REV: 1 TC: N/A START TIME: 1300 END TIME: 1500

SYSTEM: 069 | ISI DWG. NO: 3-151-0332-C EXAM SURFACE ☐ ID ☑ OD

COMPONENT ID: RHCH 3-007-G004A MATL. TYPE: ☑ CS ☑ SS ☐ CSCL ☐ CCSS

CONFIGURATION: PIPE TO VALVE (FLOW →) SURFACE TEMP.: 100 °F PYRO. NO.: 522350

CAL DUE DATE: 6-16-04

EXAM ANGLE	45 RL DEG	N DEG
CIRC. SCAN SENSITIVITY	56 dB	A dB
AXIAL SCAN SENSITIVITY	56 dB	dB

Wo REFERENCE: WELD CENTER LINE

Lo REFERENCE: TOP DEAD CENTER

IND. NO.	L (in) FROM REF. L1	L MAX	L2	AT MAX AMP W MAX	MP MAX	D MAX	MAX AMP %DAC	EXAM NO. 3-14	NOM. ANG.	N R I	IND. INFO: TYPE, DAMPING, ETC.
							%	3	45° RL	✓	
							%	4 *	45° RL		
							%	5	45° RL	✓	
							%	6	45° RL	✓	
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							%				
							%				

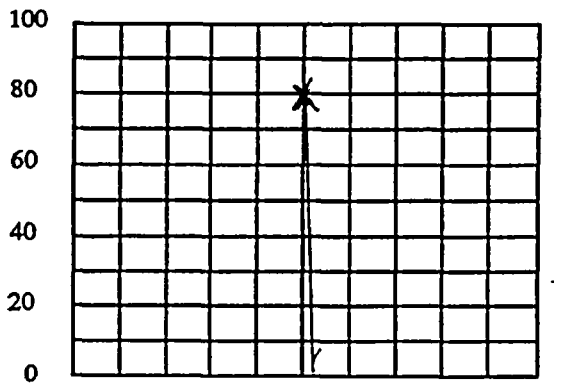
REMARKS / LIMITATIONS:

* NO SCAN A DUE TO CONFIGURATION.

EXAMINER: ROGER BENTLEY W.M. Bentley	LEVEL: III	ANII: B.F. Rice	
EXAMINER: N/A	LEVEL: N/A	DATE: 3/29/04	
REVIEWER: Darlene Culley	LEVEL: III	DATE: 3-4-04	PAGE 12 OF 16

TENNESSEE VALLEY AUTHORITY	DIGITAL ULTRASONIC CALIBRATION DATA SHEET	REPORT NUMBER: R081

PROJECT: BFN UNIT 3 CYCLE: 11	CALIBRATION DATE: 3-2-04
PROC.: N-UT-82 REV: 1 TC: N/A	CALIBRATION BLOCK NO.: 1B-850 TEMP: 86 °F
INSTR. MFG: KRAUTKRAMER DUE DATE: 10-7-04	SIMULATOR BLOCK NO: N/A
MODEL/TYPE: USN-60 M & TE NO.: E36303	THERMOMTER S/N: 522350 DUE DATE: 6-16-04
TRANSDUCER MFG: RTD TRLA (NOTE)	COUPLANT ULTRAGEL II BATCH: 03125M
S/N 03-896 SIZE: 2(7x10) FREQ: 2.0 MHz	EXAM TYPE: SHEAR ☐ LONG ☐ RL ☑
CABLE TYPE: RG-174 LENGTH: 72" inches	ANGLE VERIFICATION
	BLOCK TYPE: DSC S/N: A03671
DAC	NOMINAL ANGLE: 60° ACTUAL ANGLE: 60°



DISPLAY WIDTH: inches 2.0

INSTRUMENT SETTINGS

REFLECTOR SCAN DIRECT.	NTCH	SDH	REFERENCE SENSITIVITY	MEMORY NUMBER
AXIAL	☐	☐	57 dB	
CIRC	☐	☐	dB	

*FREQ: 2.25 MHz	*REJECT: 0 %
ANGLE: 60 deg	*DAMPING: 1000 ohms
DELAY: 7.0259 msec	*PULSER: HIGH
ZERO: ✗ 0.015 msec	FILTER: FIXED
VELOCITY: 0.2246 msec	*PRR/PRF: AUTO HIGH
RANGE: 2.00 inches	TOF: ✓ PEAK ☐ FLANK
*DISPLAY MODE: FULL WAVE	TCG: ON ☐ OFF ☑

REF. ~~REFLECTOR:~~ N GAIN: dB	CALIBRATION TIMES
AMPLITUDE: A ~~METAL PATH:~~	INITIAL TIME: 1217 FINAL TIME: 1904

VERIFICATION TIMES	1)	2)	3)	4)	5)	6)	7)	8)	9)

*** 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	10
	SIGNAL 2	50	45	40	35	30	25	20	15	10	5

ATTENUATOR	GAIN	SET	-6 dB	-12 dB	SET	+12	SET	+6	
	AMP	80	32-48	16-24	20	64-96	40	64-96	
			40	20		80		80	

COMMENTS: ✗ DISPLAY DELAY	WELDS/ITEMS EXAMINED:
NOTE: FS=25 SQUINT=3°	RWCU 3-007-G004
① CAL ON 1/2" THICKNESS NOTCH	
SUPPLEMENTAL EXAM	

EXAMINER:	EXAMINER:	REVIEWER:	ANII: B. F. Rico
LEVEL: III	LEVEL: N/A	LEVEL: III DATE: 3-4-04	DATE: 3/29/04
			PG. 13 OF 16

TENNESSEE VALLEY AUTHORITY	ULTRASONIC PIPING EXAMINATION DATA SHEET	REPORT NUMBER: R081

PROJECT: BFN UNIT: 3 CYCLE: 11 EXAMINATION DATE: 3-2-04

PROCEDURE: IN-UT-82 REV: 1 TC: N/A START TIME: 1300 END TIME: 1500

SYSTEM: 069 ISI DWG. NO: 3-151-0332-C EXAM SURFACE ☐ ID ☑ OD

COMPONENT ID: RHCU 3-007-G004 MATL. TYPE: ☑ CS ☑ SS ☐ CSCL ☐ CCSS

CONFIGURATION: PIPE TO VALVE

FLOW →

SURFACE TEMP.: 100 °F PYRO. NO.: 522350

CAL DUE DATE: 6-16-04

EXAM ANGLE	60° RL DEG		N DEG
CIRC. SCAN SENSITIVITY	57 dB		A dB
AXIAL SCAN SENSITIVITY	57 dB		dB

Wo REFERENCE: WELD CENTER LINE

Lo REFERENCE: TOP DEAD CENTER

IND. NO.	L (in) FROM REF. L1	L MAX	L2	AT MAX AMP W MAX	MP MAX	D MAX	MAX AMP %DAC	EXAM NO. 3-14	NOM. ANG.	N R I	IND. INFO: TYPE, DAMPING, ETC.
							%	3	60° RL	✓	
							%	4 *	60° RL		
							%	5	60° RL	✓	
							%	6	60° RL	✓	
							%				
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							%				
							%				
							%				
							%				

REMARKS / LIMITATIONS:

* NO SCAN 4 DUE TO CONFIGURATION

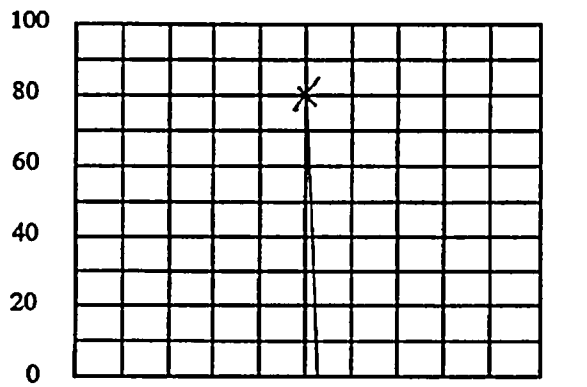
EXAMINER: Roger Bentley LEVEL: III ANII: B. F. Rice

EXAMINER: N/A LEVEL: N/A DATE: 3/29/04

REVIEWER: Darlene Dunlap LEVEL: III DATE: 3-4-04 PAGE 14 OF 16

TENNESSEE VALLEY AUTHORITY	DIGITAL ULTRASONIC CALIBRATION DATA SHEET	REPORT NUMBER: R081

PROJECT: BFN UNIT 3 CYCLE: 11	CALIBRATION DATE: 3-2-04
PROC.: N-UT-82 REV: 1 TC: N/A	CALIBRATION BLOCK NO.: 6B-85① TEMP: 86 °F
INSTR. MFG: KRAUTKRAMER DUE DATE: 10-7-04	SIMULATOR BLOCK NO: N/A
MODEL/TYPE: USN-60 M & TE NO.: E-36303	THERMOMTER S/N: 522350 DUE DATE: 6-16-04
TRANSDUCER MFG: RTD TRLA (NOTE)	COUPLANT ULTRAGEL II BATCH: 03125 M
S/N 03-909 SIZE: 2(7X10) FREQ: 2.0 MHz	EXAM TYPE: SHEAR ☐ LONG ☐ RL ☑
CABLE TYPE: RG-174 LENGTH: 72 inches	ANGLE VERIFICATION
	BLOCK TYPE: DSC S/N: A-03671
DAC	NOMINAL ANGLE: 70 ACTUAL ANGLE: 67°



DISPLAY WIDTH: inches 3.00

INSTRUMENT SETTINGS

REFLECTOR SCAN DIRECT.	NTCH	SDH	REFERENCE SENSITIVITY	MEMORY NUMBER
AXIAL	☐	☐	69 dB	
CIRC	☐	☐	dB	

*FREQ: 2.25 MHz	*REJECT: 0 %
ANGLE: 67° deg	*DAMPING: 1000 ohms
DELAY: 6.7450 msec	*PULSER: HIGH
ZERO: X 0.015 msec	FILTER: FIXED
VELOCITY: 0.2269 msec	*PRR/PRF: AUTO HIGH
RANGE: 3.00 inches	TOF: ✓ PEAK ☐ FLANK
*DISPLAY MODE: FULL WAVE	TCG: ON ☐ OFF ☑

~~REF. REFLECTOR:~~ N GAIN: dB	CALIBRATION TIMES
AMPLITUDE: A ~~METAL PATH:~~	INITIAL TIME: 1211 FINAL TIME: 1515

VERIFICATION TIMES	1)	2)	3)	4)	5)	6)	7)	8)	9)

*** 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	10
	SIGNAL 2	50	45	40	35	30	25	20	15	10	5

ATTENUATOR	GAIN	SET	-6 dB	-12 dB	SET	+12	SET	+6	
	AMP	80	32-48	16-24	20	64-96	40	64-96	
			40	20		80		80	

COMMENTS:	WELDS/ITEMS EXAMINED:
X DISPLAY DELAY	RHCU 3-007-G004
NOTE: FS = 25 SQUINT = 6°	
① CAL ON 1/2" THICKNESS NOTCH	
SUPPLEMENTAL EXAM	

EXAMINER:	EXAMINER:	REVIEWER:	ANII:
LEVEL: III	LEVEL: N/A	LEVEL: III DATE: 3-11-04	DATE: 3/29/04
			PG. 15 OF 16

TENNESSEE VALLEY AUTHORITY	ULTRASONIC PIPING EXAMINATION DATA SHEET	REPORT NUMBER: R081

PROJECT: BFN UNIT: 3 CYCLE: 11 EXAMINATION DATE: 3-2-04

PROCEDURE: N-UT-82 REV: 1 TC: N/A START TIME: 1300 END TIME: 1500

SYSTEM: 069 ISI DWG. NO: 3-151-0332-C EXAM SURFACE ☐ ID ☑ OD

COMPONENT ID: RWCU 3-007-G004 MATL. TYPE: ☑ CS ☑ SS ☐ CSCL ☐ CCSS

CONFIGURATION: PIPE TO VALVE (FLOW →)

SURFACE TEMP.: 100 °F PYRO. NO.: 522350

CAL DUE DATE: 6-16-04

EXAM ANGLE	60° DEG	N DEG
CIRC. SCAN SENSITIVITY	69 dB	A dB
AXIAL SCAN SENSITIVITY	69 dB	dB

Wo REFERENCE: WELD CENTER LINE

Lo REFERENCE: TOP DEAD CENTER

IND. NO.	L (in) FROM REF. L1	L MAX	L2	AT MAX AMP W MAX	MP MAX	D MAX	MAX AMP %DAC	EXAM NO. 3-14	NOM. ANG.	N R I	IND. INFO: TYPE, DAMPING, ETC.
							%	3	70°RL	✓	
							%	4*	70°RL		
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REMARKS / LIMITATIONS:

* NO SCAN 4 DUE TO CONFIGURATION

EXAMINER: ROGER BENTLEY LEVEL: III ANII: B. F. Rice

EXAMINER: N/A LEVEL: N/A DATE: 3/29/04

REVIEWER: Darlene Dulay LEVEL: III DATE: 3-4-04 PAGE 16 OF 16