Tennessee Valley Authority, 1101 Market Street, Chattanooga, Tennessee 37402-2801

February 24, 2010

10 CFR 50.4
10 CFR 50.55a

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

Browns Ferry Nuclear Plant, Unit 2
Facility Operating License No. DPR-52
NRC Docket No. 50-260

Subject: **American Society of Mechanical Engineers, Section XI, Inservice Inspection Program for the Unit 2 Third Ten-Year Inspection Interval, Request for Relief 2-ISI-18, Revision 2**

Reference: Letter from the Tennessee Valley Authority to the Nuclear Regulatory Commission, "American Society of Mechanical Engineers Section XI, Inservice Inspection, System Pressure Test, Containment Inspection, and Repair and Replacement Programs – Summary Report for Cycle 15 Operation," dated September 21, 2009

As identified in the reference letter and in accordance with 10 CFR 50.55a(g)(5)(iii), the Tennessee Valley Authority (TVA) is requesting relief from certain inservice inspection (ISI) requirements in Section XI of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code. The need for this request for relief was identified during ISI examinations completed during the BFN Unit 2, Cycle 15 refueling outage which is the first refueling outage in the third period of the Third Ten-Year Inservice Inspection (ISI) Interval. One remaining refueling outage, Cycle 16, is planned for the Third ISI Interval.

TVA has determined that three BFN Unit 2 welds had nondestructive examination (NDE) coverage limitations (less than 90 percent coverage completed) which exceed that specified in ASME Code Case N-460, "Alternative Examination Coverage for Class 1 and Class 2 Welds, Section XI, Division 1."

A047
NRR

These three welds are within the scope of the BFN Unit 2 Risk-Informed ISI Program. The welds are Category R-A (Westinghouse Owners Group (WOG) WCAP-14572, Revision 1-NP-A) Class 1 piping welds. These weld examinations had calculated NDE examination coverage of 50 percent. The welds received greater than 90 percent examination coverage per the requirements of ASME Section XI. However, 10 CFR 50.55a(b)(2)(xv)(A)(2) restricts taking credit for "one-sided" examinations without completing a single-sided ASME Section XI, Appendix VIII demonstration, using flaws on the opposite side of the weld. At the time of the examinations, no Performance Demonstration Initiative (PDI) Program existed for single-side austenitic stainless steel welds. Consequently, the percent examination of coverage achieved for each of the three welds was 50 percent. The enclosure to this letter contains BFN Unit 2 request for relief, 2-ISI-18, Revision 2, which addresses the examination coverage limitations for the three welds described above.

This request for relief is consistent with 2-ISI-18, Revision 0 (Unit 2 Cycle 12 weld examinations) submitted by TVA letters dated June 2, 2003 and December 16, 2003 and 2-ISI-18, Revision 1 (Unit 2 Cycles 13 and 14 examinations) submitted by TVA letter dated July 29, 2008. TVA's requests were approved by NRC as documented in safety evaluations dated April 12, 2004, and June 16, 2009 respectively.

TVA seeks review of this request for relief by January 3, 2011, to support resource planning for the Unit 2, Cycle 16 (Spring 2011) refueling outage.

There are no new regulatory commitments in this letter. If you have any questions, please contact Dan Green at (423) 751-8423.

Respectfully,

R. M. Krich
Vice President
Nuclear Licensing

Enclosure: Browns Ferry Nuclear Plant, Unit 2, Request for Relief
2-ISI-18, Revision 2

cc (Enclosure):
NRC Regional Administrator - Region II
NRC Senior Resident Inspector - Browns Ferry Nuclear Plant

Enclosure

Tennessee Valley Authority
Browns Ferry Nuclear Plant
Unit 2
American Society of Mechanical Engineers,
Section XI, Inservice Inspection Program,
Third Ten-Year Inspection Interval

Request for Relief 2-ISI-18, Revision 2

Executive Summary:

The Tennessee Valley Authority (TVA) is requesting relief for two Reactor Recirculation (RECIRC) System full penetration piping welds, and one Reactor Water Cleanup (RWCU) System full penetration piping weld examined during the Browns Ferry Nuclear Plant (BFN) Unit 2 Cycle 15 which is the first refueling outage in the third period of the Third Ten-Year Inservice Inspection (ISI) interval.

The subject welds were examined with the latest ultrasonic techniques, procedures, equipment, and personnel qualified to the requirements of the Performance Demonstration Initiative (PDI) Program, as required by 10 CFR 50.55a(g)(4).

Under the American Society of Mechanical Engineers (ASME) Section XI Code requirements, ultrasonic testing (UT) coverage attained was essentially 100 percent. However, credit for the single side access ultrasonic examination of RECIRC welds GR-2-22, GR-2-35, and Reactor Water Cleanup (RWCU) weld RWCU-2-003-025 provided 50 percent coverage, because of the requirement mandated in 10 CFR 50.55a(b)(2)(xv)(A)(2), which 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 the time of these BFN Unit 2 weld examinations, there was no ASME Section XI Appendix VIII Program for single sided austenitic stainless steel welds.

The performance of the ultrasonic examination of the subject areas to the maximum extent practical provides an acceptable level of quality and safety because the information and data obtained from the volume examined provides sufficient information to judge the overall integrity of the piping welds. Therefore, pursuant to 10 CFR 50.55a(g)(5)(iii), TVA is requesting that relief be granted for the BFN Unit 2 third ten-year inspection interval.

This request for relief is consistent with request for relief 2-ISI-18, Revision 0 (BFN Unit 2 Cycle 12 weld examinations) submitted by TVA letters dated June 2, 2003, and December 16, 2003, and request for relief 2-ISI-18, Revision 1 (BFN Unit 2 Cycles 13 and 14 weld examinations) submitted by TVA letter dated July 29, 2008. These TVA requests for relief were approved by NRC as documented in safety evaluations dated April 12, 2004, and June 16, 2009 respectively.

Unit: Browns Ferry Nuclear Plant, Unit 2

ISI Interval: ASME Section XI, Third Ten-Year ISI Inspection Interval (May 25, 2001 to May 24, 2011)

Systems: Reactor Recirculation (RECIRC) System and Reactor Water Cleanup (RWCU) System

Components: 3 Full Penetration Piping Welds Listed below and in Table 1 of this Enclosure.

ASME Code Class: ASME Code Class 1

ASME Section XI Code Edition: 1995 Edition, 1996 Addenda

Code Table: Code Case N-577, N-577-2500 Table I

Examination Category: R-A, Risk-Informed Piping Examinations

Examination Item Number: R1.16, Elements Subject to Intergranular Stress Corrosion Cracking (IGSCC)

Code Requirement: The BFN Unit 2 Risk-Informed ISI Program, Code Case N-577, N-577-2500 Table I, Examination Category R1.16, Requires Volumetric Examination of 100 percent of the Weld and Adjacent Base Material as depicted in Figure IWB-2500-8(c).

List of Items Associated with the Request for Relief:

Weld RWCU-2-003-025 - Pipe (SA 376, TP 316 NG, S.S.) to Valve (SA351, CF8M, S.S.)

Weld GR-2-22 - Pipe Saddle (A403, WP304 S.S.) to Pipe (A358, TP304 S.S.)

Weld GR-2-35 - Pipe Saddle (A403, WP304 S.S.) to Pipe (A358, TP 304 S.S.)

Basis for Request for Relief: It is not possible to achieve the required volumetric examination due to single side access. Because of the requirement in 10 CFR 50.55a(b)(2)(xv)(A)(2), which in part 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 flaws on the opposite side of the weld." Only 50 percent coverage for welds GR-2-22, GR-2-35, and RWCU-2-003-025 can be claimed. At the time of the examinations, there was no ASME Section XI Appendix VIII Program for single-sided austenitic stainless steel welds.

The performance of the ultrasonic examination of the subject areas to the maximum extent practical provides an acceptable level of quality and safety because the information and data obtained from the volume examined provides sufficient information to judge the overall integrity of the piping welds. Table 1 of this enclosure provides a detailed description of the limitations for each weld examination listed above.

Alternative Examination: None. In lieu of the ASME Code required essentially 100 percent volume ultrasonic examination, TVA proposes an ultrasonic examination of the accessible areas to the maximum extent practical given the component design and configuration of the aforementioned piping welds.

Justification for the Granting of Relief: The welds were examined with the latest ultrasonic techniques, procedures, equipment, and personnel qualified to the requirements of the Performance Demonstration Initiative (PDI) Program, as required by 10 CFR 50.55a(g)(4).

An ultrasonic examination was performed on the piping welds to the maximum extent practical due to the configuration. Credit for the one-sided examination of GR-2-22 and GR-2-35 and RWCU 2-003-025 provided 50 percent coverage because of the requirement in 10 CFR 50.55a(b)(2)(xv)(A)(2), which states in part, "Where examination from both sides is not possible on austenitic stainless steel 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 time of the examination, there was no ASME Section XI Appendix VIII Program for single sided austenitic welds. Under the original ASME Section XI Code requirements, UT coverage attained was essentially100 percent.

The performance of the ultrasonic examination of the subject areas to the maximum extent practical provides an acceptable level of quality and safety because the information and data obtained from the volume examined provides sufficient information to judge the overall integrity of the piping welds.

Welds associated with Request for Relief 2-ISI-18, Revision 2, are as follows.

Weld	Examination Report	Cycle Examined
RWCU-2-003-025	R-074	15
GR-2-22	R-026	15
GR-2-35	R-047	15

Therefore, pursuant to 10 CFR 50.55a(g)(5)(iii), TVA requests that relief be granted for the Third Ten-Year ISI inspection interval for the above listed welds.

Implementation Schedule: This request for relief is applicable to the BFN Unit 2 Third Ten-Year ISI inspection interval (May 25, 2001 to May 24, 2011). The Reactor Recirculation (RECIRC) System welds and the Reactor Water Cleanup (RWCU) System weld listed in Table 1 of this enclosure were examined during the first refueling outage, Cycle 15, of the third period of the Third Ten-Year ISI inspection interval.

Precedents:

The NRC has approved two similar requests for BFN Unit 2 during the third ten-year interval. Request for relief 2-ISI-18, Revision 0 (BFN Unit 2 Cycle 12 weld examinations) was submitted by TVA letters dated June 2, 2003 and December 16, 2003. NRC approved the TVA request for relief by letter dated April 12, 2004 (ADAMS Accession No. ML041040375). Request for relief 2-ISI-18, Revision 1 (BFN Unit 2 Cycles 13 and 14 weld examinations) was submitted by TVA letter dated July 29, 2008. NRC approved the TVA request for relief by letter dated June 16, 2009 (ADAMS Accession No. ML091200040).

Reference:

TVA Nuclear Power Group, Nondestructive Examination procedure, N-GP-31, "Calculation of ASME Code Coverage for Section XI, Appendix VIII Ultrasonic Examinations"

Attachments:

Attachment A

3 ISI Sketches:

2-ISI-0272-C, Sheet 1

2-ISI-0270-C, Sheet 1

2-ISI-0270-C, Sheet 2

Attachment B:

Three Nondestructive Examination Reports:

R-026
R-047
R-074

TABLE 1

WELD NUMBER	NPS	ISI DRAWING	PERCENT EXAMINED	REMARKS
RWCU-2-003-025 (Reactor Water Cleanup System)	6"	2-ISI-0272-C, Sheet 1	50%	Limitation due to the pipe to valve joint configuration. Weld contour prevented scanning on the weld surface in the axial direction to achieve full interrogation of the required examination volume. This weld was examined using PDI qualified personnel, procedures and equipment.
GR-2-22 (Reactor Recirculation System)	12"	2-ISI-0270-C, Sheet 1	50%	Limitation due to saddle to pipe component configuration and the requirement in 10 CFR 50.55a(b)(2)(xv)(A)(2), which requires UT of one side of austenitic stainless steel welds to be qualified to ASME Section XI Appendix VIII Program to claim full Code coverage. At the time of the examination, there was no ASME Section XI Appendix VIII Program for single sided austenitic welds.
GR-2-35 (Reactor Recirculation System)	12"	2-ISI-0270-C, Sheet 2	50%	Limitation due to saddle to pipe component configuration and the requirement in 10 CFR 50.55a(b)(2)(xv)(A)(2), which requires UT of one side of austenitic stainless steel welds to be qualified to ASME Section XI Appendix VIII Program to claim full Code coverage. At the time of the examination, there was no ASME Section XI Appendix VIII Program for single sided austenitic welds.

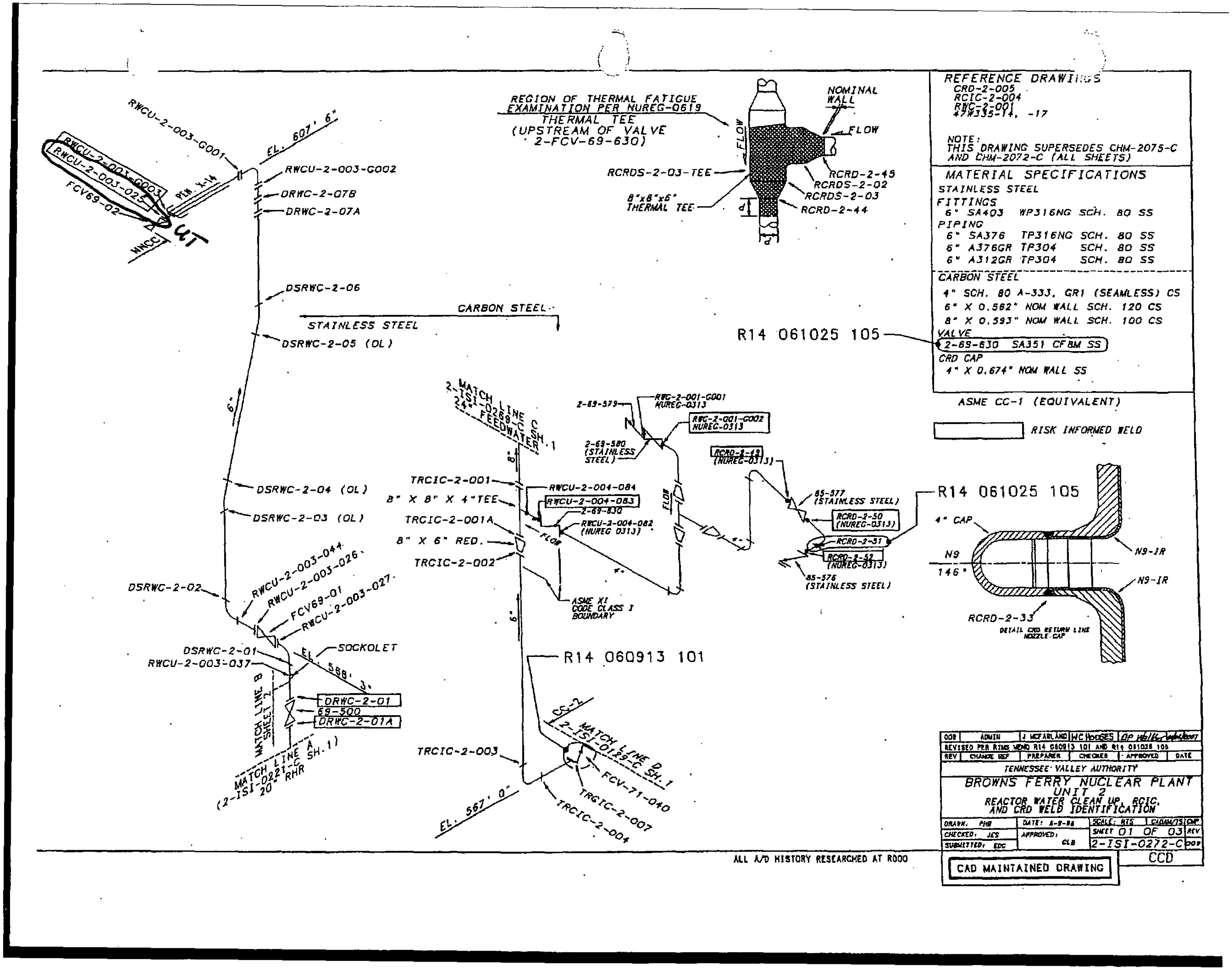
ATTACHMENT A

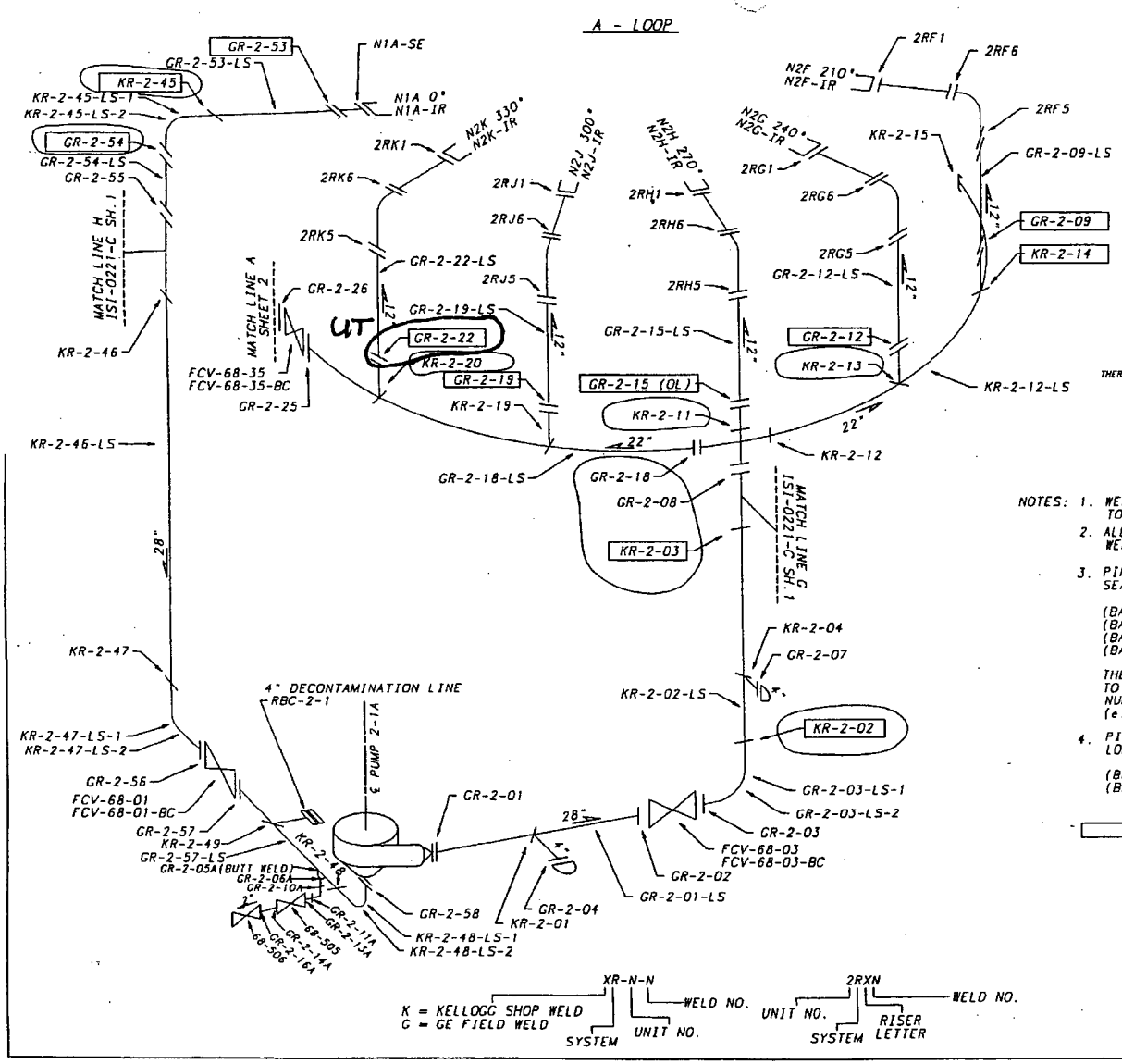
ISI SKETCHES

2-ISI-0272-C, Sheet 1

2-ISI-0270-C, Sheet 1

2-ISI-0270-C, Sheet 2


REFERENCE DRAWINGS
CRD-2-005
RCIC-2-004
RWC-2-001
47W335-14, -17
NOTE:
THIS DRAWING SUPERSEDES CHM-2075-C AND CHM-2072-C (ALL SHEETS)
MATERIAL SPECIFICATIONS
STAINLESS STEEL
FITTINGS
6" SA403 WP316NG SCH. 80 SS
PIPING
6" SA376 TP316NG SCH. 80 SS
6" A376GR TP304 SCH. 80 SS
6" A312GR TP304 SCH. 80 SS
CARBON STEEL
4" SCH. 80 A-333, GR1 (SEAMLESS) CS
6" X 0.562" NOM WALL SCH. 120 CS
8" X 0.593" NOM WALL SCH. 100 CS
VALVE
2-69-630 SA351 CF8M SS
CRD CAP
4" X 0.674" NOM WALL SS
ASME CC-1 (EQUIVALENT)
RISK INFORMED WELD
R14 061025 105
R14 061025 105
R14 060913 101
REGION OF THERMAL FATIGUE EXAMINATION PER NUREG-0619
THERMAL TEE (UPSTREAM OF VALVE 2-FCV-69-630)
NOMINAL WALL
FLOW
RCRDS-2-03-TEE
8"x8"x6" THERMAL TEE
RCRD-2-45
RCRDS-2-02
RCRDS-2-03
RCRD-2-44
RWCU-2-003-G001
RWCU-2-003-0003
RWCU-2-003-025
FCV69-02
EL. 607' 6"
RWCU-2-003-G002
DRWC-2-07B
DRWC-2-07A
DSRWC-2-06
CARBON STEEL
STAINLESS STEEL
DSRWC-2-05 (OL)
DSRWC-2-04 (OL)
DSRWC-2-03 (OL)
DSRWC-2-02
RWCU-2-003-044
RWCU-2-003-026
FCV69-01
RWCU-2-003-027
DSRWC-2-01
RWCU-2-003-037
SOCKOLET
EL. 588' 3"
DRWC-2-01
69-500
DRWC-2-01A
MATCH LINE B SHEET 2
MATCH LINE A (2-ISI-0221-C SH.1) 20" RHR
MATCH LINE C 2-ISI-0269-C SH.1 24" FEEDWATER
TRCIC-2-001
8" X 8" X 4" TEE
TRCIC-2-001A
8" X 6" RED.
TRCIC-2-002
RWCU-2-004-084
RWCU-2-004-083
2-69-630
RWCU-2-004-082 (NUREG 0313)
2-69-579
RWC-2-001-G001 NUREG-0313
RWC-2-001-G002 NUREG-0313
2-69-580 (STAINLESS STEEL)
RCRD-2-49 (NUREG-0313)
85-577 (STAINLESS STEEL)
RCRD-2-50 (NUREG-0313)
RCRD-2-51
RCRD-2-52 (NUREG-0313)
85-576 (STAINLESS STEEL)
ASME XI CODE CLASS I BOUNDARY
4" CAP
N9
146°
N9-IR
N9-IR
RCRD-2-33
DETAIL CRD RETURN LINE NOZZLE CAP
TRCIC-2-003
MATCH LINE D 2-ISI-0129-C SH.1
FCV-71-040
TRCIC-2-007
TRCIC-2-004
EL. 567' 0"
REVISED PER RIMS MEMO R14 060913 101 AND R14 061025 105
TENNESSEE VALLEY AUTHORITY
BROWNS FERRY NUCLEAR PLANT UNIT 2
REACTOR WATER CLEAN UP, RCIC, AND CRD WELD IDENTIFICATION
SHEET 01 OF 03
2-ISI-0272-C
CCD
CAD MAINTAINED DRAWING
ALL A/D HISTORY RESEARCHED AT R000



REFERENCE DRAWINGS:

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GE 769E96J (S.E. REPLA IT)
TVA 47K1544-2
GE 2-153F754
KELLOGG BF 2-180
NOTE: THIS DRAWING SUPERSEDES CHM-2068-C ALL SHEETS

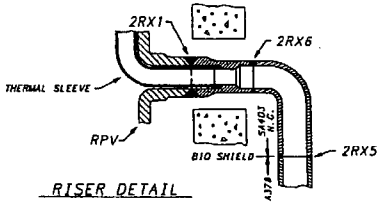
MATERIAL SPECIFICATIONS:

A358, TP 304
4" X 0.337" NOM WALL THK. (SS)
12" X 0.569" NOM. WALL THK. (SS)
22" X 1.030" NOM. WALL THK. (SS)
28" X 1.138" NOM. WALL THK. (SS) SUCTION
28" X 1.322" NOM. WALL THK. (SS) DISCHARGE

2½ SCH. 80 A-376, TP304
2" FITTINGS A-182, F304

SAFE END REPLACEMENT
12" X 0.688 NOM. WALL THK. (SS)
SA 403 WP 316 N.G.

ASME CC-1 (EQUIVALENT)



RISER DETAIL

NOTES:
1. WELDS 2RX1 ARE THE NOZZLE TO SAFE-END WELDS
2. ALL 2" WELDS ARE SOCKET WELDED EXCEPT WHERE NOTED.
3. PIPE SEGMENTS CONTAINING TWO LONGITUDINAL SEAMS WILL BE IDENTIFIED AS:

   (BASE WELD NO.)-LS-1D (DOWNSTREAM)
   (BASE WELD NO.)-LS-2D (DOWNSTREAM)
   (BASE WELD NO.)-LS-1U (UPSTREAM)
   (BASE WELD NO.)-LS-2U (UPSTREAM)

   THE -LS-1 SEAM WILL BE NUMERICALLY CLOSEST TO 0° ON THE PIPE, AND THE -LS-2 SEAM WILL BE NUMERICALLY FARTHERMOST FROM 0° ON THE PIPE. (e.g. -LS-1 AT 130°, AND -LS-2 AT 310°)
4. PIPE SEGMENTS CONTAINING ONLY ONE LONGITUDINAL SEAM WILL BE IDENTIFIED AS

   (BASE WELD NO.)-LS-D (DOWNSTREAM)
   (BASE WELD NO.)-LS-U (UPSTREAM)

RISK IMFORMED WELDS

003	ADMIN	RD LOOSIER	WCH	ALO	12-11-02
REVISED PER RIMS MEMO #14 021202 102					
REV	CHANGE REF	PREPARER	CHECKER	APPROVED	DATE

TENNESSEE VALLEY AUTHORITY

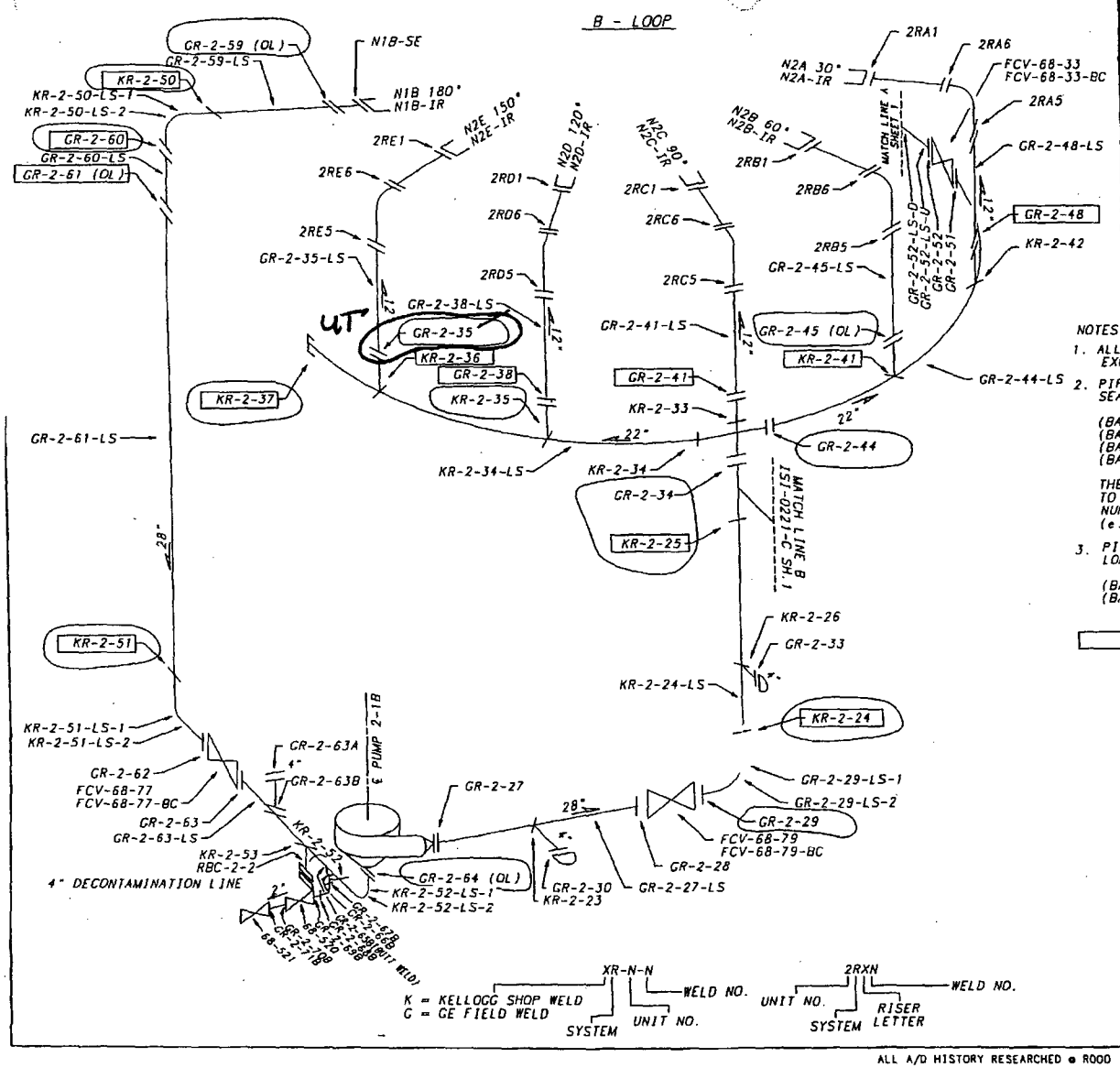
BROWNS FERRY NUCLEAR PLANT
UNIT 2
RECIRCULATION SYSTEM
WELD LOCATIONS

DRAWN: PHB	SUBMITTED	APPROVED	SCALE NTS
DATE: 9-10-87	DATE 6-14-88	DATE 6-14-88	SHEET 1 OF 2 SHEET(S)
CHECKED: JES	EDC	GLB	DRAWING NO. 2-ISI-0270-C
DATE: 6-14-88			REV 003

ALL A/D HISTORY RESEARCHED AT RODO

CAD MAINTAINED DRAWING

CCD



REFERENCE DRAWINGS:

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GE 769E963 (S.E. REPLA[illegible]T)
TVA 47K1544-2
GE 2-153F754
KELLOGG BF 2-180
NOTE: THIS DRAWING SUPERSEDES CHM-2068-C ALL SHEETS

MATERIAL SPECIFICATIONS:

A358, TP 304
4" X 0.337" NOM. WALL THK. (SS)
12" X 0.569" NOM. WALL THK. (SS)
22" X 1.030" NOM. WALL THK. (SS)
28" X 1.138" NOM. WALL THK. (SS) SUCTION
28" X 1.322" NOM. WALL THK. (SS) DISCHARGE

2" SCH. 80, AJ76, TP304
2" FITTINGS A182, F304

SAFE END REPLACEMENT
12" X 0.688 NOM. WALL THK. (SS)
SA 403 WP 316 N.G.

ASME CC-1 (EQUIVALENT)

NOTES:

1. ALL 2" WELDS ARE SOCKET WELDED EXCEPT WHERE NOTED.
2. PIPE SEGMENTS CONTAINING TWO LONGITUDINAL SEAMS WILL BE IDENTIFIED AS:

   (BASE WELD NO.)-LS-1D (DOWNSTREAM)
   (BASE WELD NO.)-LS-2D (DOWNSTREAM)
   (BASE WELD NO.)-LS-1U (UPSTREAM)
   (BASE WELD NO.)-LS-2U (UPSTREAM)

   THE -LS-1 SEAM WILL BE NUMERICALLY CLOSEST TO 0° ON THE PIPE, AND THE -LS-2 SEAM WILL BE NUMERICALLY FARTHERMOST FROM 0° ON THE PIPE. (e.g. -LS-1 AT 130°, AND -LS-2 AT 310°)
3. PIPE SEGMENTS CONTAINING ONLY ONE LONGITUDINAL SEAM WILL BE IDENTIFIED AS

   (BASE WELD NO.)-LS-D (DOWNSTREAM)
   (BASE WELD NO.)-LS-U (UPSTREAM)

[ ] RISK INFORMED WELDS

004	ADMIN	RD LOOSLER	WCH	RLD	12-11-08
REVISED PER RIMS MEMO R14 021202 102					
REV	CHANGE REF	PREPARER	CHECKER	APPROVED	DATE

TENNESSEE VALLEY AUTHORITY

BROWNS FERRY NUCLEAR PLANT
UNIT 2
RECIRCULATION SYSTEM
WELD LOCATIONS

DRAWN: PHB	SUBMITTED	APPROVED	SCALE NTS
DATE: 3-28-89	DATE 5-8-89	DATE 5-12-89	SHEET 2 OF 2 SHEET(S)
CHECKED: JES	EDC	CLB	DRAWING NO. REV.
DATE: 5-3-89			2-ISI-0270-C004

CAD MAINTAINED DRAWING

CCD

ALL A/D HISTORY RESEARCHED @ R000

ATTACHMENT B

Weld Examination Reports

R-074
R-026
R-047

Examination Report No. R-074

Weld No. RWCU-2-003-025

000269

TENNESSEE VALLEY AUTHORITY	EXAMINATION SUMMARY AND RESOLUTION DATA SHEET	REPORT NUMBER: R074

PROJECT: BFN	UNIT: 2	CYCLE: 15		COMPONENT ID: RWCU-2-003-025			
EXAMINATION METHOD				SYSTEM: RWCU		ISI DWG. NO. 2-ISI-0272-C-01	
MT ☐	PT ☐	UT ☒	VT ☐	CODE CLASS: 1		CATEGORY: R-A	
PROCEDURE: N-UT- 64		REV: 11	TC: N/A	CONFIG.:	Pipe	TO	Valve
EXAMINER: Tommy Brown		**EXAMINER:** N/A		**EXAMINER:** N/A		**EXAMINER:** N/A	
LEVEL: III		**LEVEL:**		**LEVEL:**		**LEVEL:**	

This report contains the data associated with the manual ultrasonic examination weld RWCU-2-003-025.

The exam was performed to meet the requirements of ASME Section XI 1995 Edition 1996 Addenda, Category R-A, Item R1.16A.

This exam was performed using TVA Nuclear Procedure N-UT-64 Rev. 11 which incorporates PDI-UT 2 Rev C Addenda No. 1, 2, and 3, for UT examination Austenitic Welds. .

A 45° Shear was used for the circ scans and a 45° and a 70° Shear was used for the axial scans.

No scan on the downstream side due to Pipe to Valve configuration.

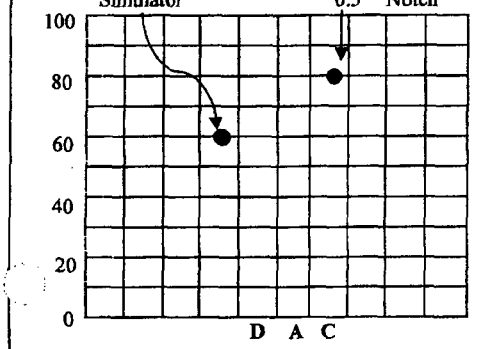
50% Code Required Coverage was achieved.

RESOLUTION BY: Tommy Brown	REVIEWED BY:	ANII:
LEVEL: III DATE: 05/11/09	LEVEL: III DATE: 5/14/09	DATE: 5/16/09
		PG. 1 OF 6

000270

TENNESSEE VALLEY AUTHORITY	DIGITAL ULTRASONIC CALIBRATION DATA SHEET	REPORT NUMBER: R074

PROJECT: BFN UNIT 2 CYCLE: 15	CALIBRATION DATE: 05/11/09
PROC.: N-UT-64 REV: 11 TC:N/A	CALIBRATION BLOCK NO.: WB - 84 TEMP: 81 'F
INSTR. MFG: Krautkramer DUE DATE: 08/18/09	SIMULATOR BLOCK NO: 93-5721
MODEL/TYPE: USN 60 M & TE NO.: E36305	THERMOMTER S/N: 562777 DUE DATE: 3/21/10
TRANSDUCER MFG: KBA MODEL: Comp-G	COUPLANT Ultragell II BATCH: 06125
ELEMENTS: 1 SHAPE: Round	
S/N 00W27L SIZE: .375" FREQ 2.25 MHz	EXAM TYPE: SHEAR☒ LONG☐ RL☐
CONTOUR: Flat FOCUS: N/A	**ANGLE VERIFICATION**
CONFIG: ☐ D-SBS ☐ D-TANDEM ☒ SINGLE	BLOCK TYPE: Rompas S/N: 93-5721
CABLE TYPE: RG 174 LENGTH: 6'0 #CNT: 0	NOMINAL ANGLE: 70 ° ACTUAL ANGLE: 70 °



DISPLAY WIDTH: 2.0 inches

INSTRUMENT SETTINGS

REFLECTOR			REFERENCE	MEMORY
SCAN DIRECT.	NTCH	SDH	SENSITIVITY	NUMBER
AXIAL	☒	☐	51.0 dB	RWCU-25-70
CIRC	☐	☐	N/A dB	N/A

RANGE: 2.0 "	*INST. FREQ.: 2.25 Mhz
PROBE DELAY: 7.1488	*RECTIFY:Fullwave
VELOCITY: 0. 1230	DUAL ☐ ON ☒ OFF
DISPLAY DELAY: 0.0	*REJECT: 0 %
*ENERGY: High	*DISPLAY START: IP
*DAMPING: 1K Ω	DET: ☐PEAK☒ FLANK
*PRF MODE: Autohigh	TCG: ON☐ OFF☒

REF. REFLECTOR: 0.5 Notch GAIN: 41.0 dB	**CALIBRATION TIMES**
AMPLITUDE: 80% FSH METAL PATH: 1.42	INITIAL TIME: 1227 FINAL TIME: 1350

VERIFICATION TIMES	1) 1305	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	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	

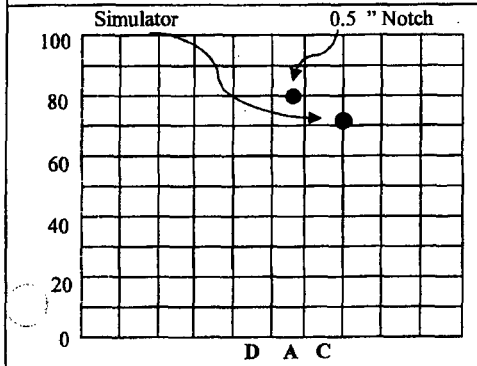
COMMENTS: Maintained 10% to 20% ID roll.	WELDS/ITEMS EXAMINED: RWCU-2-003-025

EXAMINER: Tommy Brown	EXAMINER: Roger Senger	REVIEWER:	ANII:
LEVEL: III	LEVEL: Trn	LEVEL: III DATE: 5/14/09	DATE: 5/16/09
			PG. 2 OF 6

000271

TENNESSEE VALLEY AUTHORITY	DIGITAL ULTRASONIC CALIBRATION DATA SHEET	REPORT NUMBER: R074

PROJECT: BFN UNIT 2 CYCLE: 15	CALIBRATION DATE: 05/11 /09
PROC.: N-UT- 64 REV: 11 TC:N/A	CALIBRATION BLOCK NO.: WB - 84 TEMP: 81 'F
INSTR. MFG: Krautkramer DUE DATE: 08/18/09	SIMULATOR BLOCK NO: 93-5721
MODEL/TYPE: USN 60 M & TE NO.: E36305	THERMOMTER S/N: 562777 DUE DATE: 3/21/10
TRANSDUCER MFG: KBA MODEL: Comp-G	COUPLANT Ultragell II BATCH: 06125
ELEMENTS: 1 SHAPE: Round	
S/N 00W40C SIZE: .375" FREQ 2.25 MHz	EXAM TYPE: SHEAR☒ LONG☐ RL☐
CONTOUR: Flat FOCUS: N/A	**ANGLE VERIFICATION**
CONFIG: ☐ D-SBS ☐ D-TANDEM ☒ SINGLE	BLOCK TYPE: Rompas S/N: 93-5721
CABLE TYPE: RG 174 LENGTH: 6'0 #CNT: 0	NOMINAL ANGLE: 45° ACTUAL ANGLE: 45 °



DISPLAY WIDTH: 1.25 inches

INSTRUMENT SETTINGS

REFLECTOR			REFERENCE	MEMORY
SCAN DIRECT.	NTCH	SDH	SENSITIVITY	NUMBER
AXIAL	☒	☐	27.0 dB	RWCU-25
CIRC	☒	☐	27.0 dB	N/A

RANGE: 1.25"	*INST. FREQ.: 2.25 Mhz
PROBE DELAY: 4.8897	*RECTIFY:Fullwave
VELOCITY: 0. 1230	DUAL ☐ ON ☒ OFF
DISPLAY DELAY: 0.0	*REJECT: 0 %
*ENERGY: High	*DISPLAY START: IP
*DAMPING: 1K Ω	DET: ☐PEAK☒ FLANK
*PRF MODE: Autohigh	TCG: ON☐ OFF☒

REF. REFLECTOR: 0.5 Notch	GAIN: 27.0 dB
AMPLITUDE: 80% FSH	METAL PATH: 0.7

CALIBRATION TIMES

INITIAL TIME: 1230 FINAL TIME: 1355

VERIFICATION TIMES	1) 1320	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	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: Maintained 10% to 20% ID roll.

WELDS/ITEMS EXAMINED: RWCU-2-003-025

EXAMINER: Tommy Brown	EXAMINER: Roger Senger	REVIEWER:	ANII:
LEVEL: III	LEVEL: Trn	LEVEL: III DATE: 5/14/09	DATE: 5/16/09
			PG. 3 OF 6

000272

TENNESSEE VALLEY AUTHORITY	MANUAL ULTRASONIC PIPING EXAMINATION DATA SHEET	REPORT NUMBER: R014

PROJECT: BFN UNIT: 2 CYCLE: 15 | EXAMINATION DATE: 05/11/09

PROCEDURE: N-UT-64 REV: 0011 TC: N/A | START TIME: 1306 END TIME: 1334

SYSTEM: RWCU | ISI DWG. NO: 2-ISI-0272-C-01 | EXAM SURFACE ☐ ID ☒ OD

COMPONENT ID: RWCU-2-003-025 | MATL. TYPE: ☐ CS ☒ SS ☐ CSCL ☐ CCSS

CONFIGURATION | SURFACE TEMP.: 83° F | PYRO. NO.: 562777

Pipe TO Valve | CAL DUE DATE: 03/21/10

FLOW →

	45S	70S	N/A		
EXAM INATION ANGLE					
CIRC. SCAN SENSITIVITY	42.0	N/A	N/A		
AXIAL SCAN SENSITIVITY	42.0	55.0	N/A		

Wo REFERENCE: CENTERLINE OF WELD

Lo REFERENCE: Outside radius of elbow

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	11.0	11.75	12.0	.5	.6		100%	3	45	☒	SHEAR **
NRI							%	3	70	☒	SHEAR
NRI							%	5	45	☒	SHEAR
NRI							%	6	45	☒	SHEAR
							%			☐	
							%			☐	
							%			☐	
							%			☐	
							%			☐	
							%			☐	
							%				
							%				
							%				
							%				

REMARKS / LIMITATIONS: Maintained 5% to 20% ID Roll.

**** Indication number 1 is root concavity verified on RT Film from Previous data report number R-315 From cycle 10.**

EXAMINER: Tommy Brown Tommy D Brown **LEVEL: III** ANII: [signature]

EXAMINER: Roger Senger Roger Senger **LEVEL: Trn** DATE: 5/16/09

REVIEWER: Mark Welch **LEVEL:** III **DATE:** 5/14/09 PAGE 4 OF 6

000273

TVA

WALL THICKNESS PROFILE SHEET

REPORT NO: R074

PROJECT: BFN

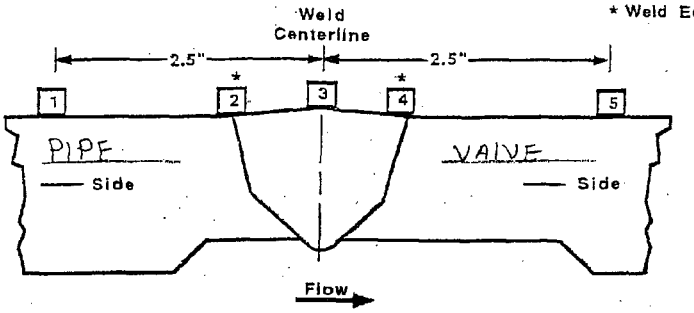
UNIT: 2

WELD NO: RWCU-2-003-025

SYSTEM: RWCU

Record Thickness Measurements As Indicated, Including Weld Width, Edge-To-Edge At 0°

Position	0°	90°	180°	270°
1	.46"			
2	.42"			
3	.48"		N/A	
4	N/A			
5				



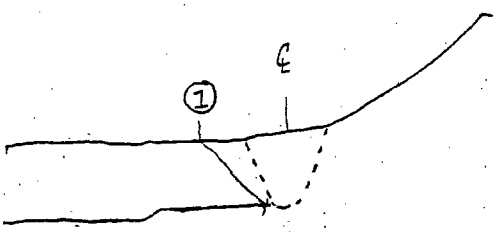
CROWN HEIGHT: FLUSH

CROWN WIDTH: .5"

DIAMETER: 6"

WELD LENGTH: 21"

PIPE VALVE



FLOW

* Root Concavity SEEN From 11-12" CW.

EXAMINER: [signature] LEVEL: III

REVIEWED BY: [signature] LEVEL: III DATE: 5/14/09

ANII: [signature] DATE: 5/16/09

PAGE 6 OF 6

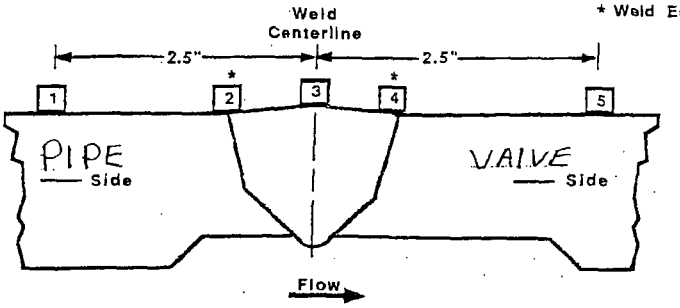
000274

TVA	WALL THICKNESS PROFILE SHEET	REPORT NO: R074

PROJECT: BFN
UNIT: 2
WELD NO: RWCU-2-003-025
SYSTEM: RWCU

Record Thickness Measurements As Indicated, Including Weld Width, Edge-To-Edge At 0°

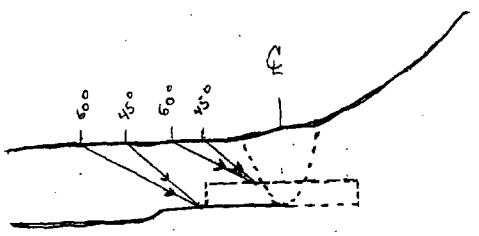
Position	0°	90°	180°	270°
1	.46"			
2	.42"			
3	.48"		N/A	
4	N/A			
5				



CROWN HEIGHT: FLUSH
CROWN WIDTH: .5"
DIAMETER: 6"
WELD LENGTH: 21"

PIPE

VAIVE



TOTAL Volume = 1.0 x .15 = .15 x 21 = 3.15 in³

OBTained Volume = .5 x .15 = .075 x 21 = 1.575 in³

TOTAL Coverage = 1.575 / 3.15 = 0.50 x 100 = 50 %

50% Coverage Obtained

FLOW

EXAMINER: [signature]
LEVEL: III
DATE: 5/14/09

REVIEWED BY: [signature]
LEVEL: III
DATE: 5/14/09

ANII: [signature]
DATE: 5/16/09

PAGE 6 OF 6

Examination Report No. R-026

Weld No. GR-2-22

000098

TENNESSEE VALLEY AUTHORITY		EXAMINATION SUMMARY AND RESOLUTION DATA SHEET		REPORT NUMBER: R-026
PROJECT: BFN UNIT: 2		CYCLE: 15	COMPONENT ID: GR-2-22	
EXAMINATION METHOD			SYSTEM: Recirc	ISI DWG. NO. 2-ISI-0270-C-03
MT ☐	PT ☐	UT ☒ VT ☐	CODE CLASS: 1	CATEGORY: R-A
PROCEDURE: N-UT- 64	REV: 11	TC: N/A	CONFIG.: SDL TO PIPE	
EXAMINER: Tommy Brown	EXAMINER: N/A		EXAMINER: N/A	EXAMINER: N/A
LEVEL: III	LEVEL:		LEVEL:	LEVEL:

This report contains the data associated with the manual ultrasonic examination weld GR-2-22.

The exam was performed to meet the requirements of NU0313, EXREQ B02-02 category C and ASME Section XI ~~2001~~ 1995 w-5/4/09 1996 Edition ~~2003~~ Addenda, Category R-A, Item R1.16C.

This exam was performed using TVA Nuclear Procedure N-UT-64 Rev. 11 which incorporates PDI-UT 2 Rev C Addenda No. 1, 2, and 3, for UT examination Austenitic Welds. .

A 45° Shear and a 60° RL was used for the axial scans and a 45° Shear for circ scans.

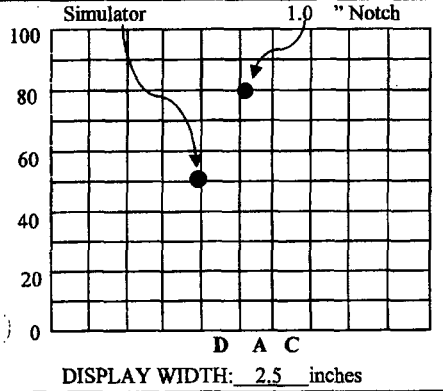
50% Coverage Achieved.

RESOLUTION BY: Tommy Brown	REVIEWED BY:	ANII:
Tommy D Brown	Mark Welch	DATE: 5/9/09
LEVEL: III DATE: 04/30/09	LEVEL: III DATE: 5/4/09	PG. 1 OF 5

000099

TENNESSEE VALLEY AUTHORITY	DIGITAL ULTRASONIC CALIBRATION DATA SHEET	REPORT NUMBER: R-026

PROJECT: BFN UNIT 2 CYCLE: 15	CALIBRATION DATE: 05/01 /09
PROC.: N-UT- 64 REV: 11 TC:N/A	CALIBRATION BLOCK NO.: WB - 84 TEMP: 83 'F
INSTR. MFG: Krautkramer DUE DATE: 08/18/09	SIMULATOR BLOCK NO: 93-5721
MODEL/TYPE: USN 60 M & TE NO.: E36305	THERMOMTER S/N: 562777 DUE DATE: 3/21/10
TRANSDUCER MFG: KBA MODEL: Comp-G	COUPLANT Ultragell II BATCH: 06125
ELEMENTS: 1 SHAPE: Round	
S/N 01FH9R SIZE: 0.5" FREQ 1.5 MHz	EXAM TYPE: SHEAR☒ LONG☐ RL☐
CONTOUR: Flat FOCUS: N/A	**ANGLE VERIFICATION**
CONFIG: ☐ D-SBS ☐ D-TANDEM ☒ SINGLE	BLOCK TYPE: Rompas S/N: 93-5721
CABLE TYPE: RG 174 LENGTH: 6'0 #CNT: 0	NOMINAL ANGLE: 45° ACTUAL ANGLE: 45 °



DISPLAY WIDTH: 2.5 inches

REF. REFLECTOR: 1.0 Notch GAIN: 21.0 dB	
AMPLITUDE: 80% FSH METAL PATH: 1.28	

INSTRUMENT SETTINGS

REFLECTOR SCAN DIRECT.	NTCH	SDH	REFERENCE SENSITIVITY	MEMORY NUMBER
AXIAL	☒	☐	21.0 dB	GR-22 45
CIRC	☒	☐	21.0 dB	N/A

RANGE: 2.5 "	*INST. FREQ.: 2.25 Mhz
PROBE DELAY: 5.9912	*RECTIFY:Fullwave
VELOCITY: 0.1230	DUAL ☐ ON ☒ OFF
DISPLAY DELAY: 0.0	*REJECT: 0 %
*ENERGY: High	*DISPLAY START: IP
*DAMPING: 1K Ω	DET: ☐ PEAK ☒ FLANK
*PRF MODE: Autohigh	TCG: ON☐ OFF☒

CALIBRATION TIMES

INITIAL TIME: 1320	FINAL TIME: 1650

VERIFICATION TIMES	1(1510	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	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	

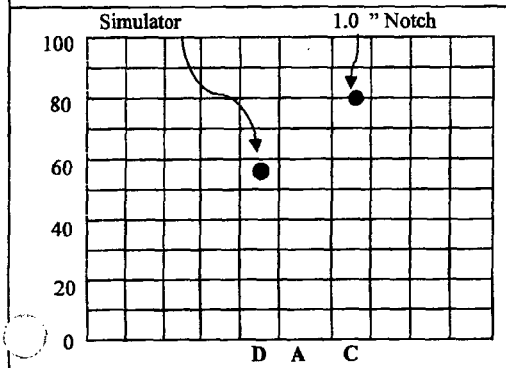
COMMENTS: Maintained 10% to 20% ID roll.	WELDS/ITEMS EXAMINED: GR-2-22

EXAMINER: Tommy Brown	EXAMINER: Roger Senger	REVIEWER:	ANII:
LEVEL: III	LEVEL: Trn	LEVEL: III DATE: 5/4/09	DATE: 5/9/09
			PG. 2 OF 5

000100

TENNESSEE VALLEY AUTHORITY	DIGITAL ULTRASONIC CALIBRATION DATA SHEET	REPORT NUMBER: R-026

PROJECT: BFN UNIT 2 CYCLE: 15	CALIBRATION DATE: 05/01 /09
PROC.: N-UT- 64 REV: 11 TC:N/A	CALIBRATION BLOCK NO.: WB - 84 TEMP: 83 'F
INSTR. MFG: Krautkramer DUE DATE: 08/18/09	SIMULATOR BLOCK NO: 93-5721
MODEL/TYPE: USN 60 M & TE NO.: E36305	THERMOMTER S/N: 562777 DUE DATE: 3/21/10
TRANSDUCER MFG: RTD MODEL: TRL2-Aust	COUPLANT Ultragell II BATCH: 06125
ELEMENTS: 2 SHAPE: Rect	
S/N 99-1219 SIZE:2(8x14) FREQ 2.0 MHz	EXAM TYPE: SHEAR☐ LONG☐ RL☒
CONTOUR: Flat FOCUS: 20 FS	**ANGLE VERIFICATION**
CONFIG: ☒ D-SBS ☐ D-TANDEM ☐ SINGLE	BLOCK TYPE: Rompas / S/N: 93-5721
CABLE TYPE: RG (2) 174 LENGTH: 6'0 #CNT: 0	NOMINAL ANGLE: 60 ° / ACTUAL ANGLE: 60 °



DISPLAY WIDTH: 3.0 inches

INSTRUMENT SETTINGS

REFLECTOR			REFERENCE	MEMORY
SCAN DIRECT.	NTCH	SDH	SENSITIVITY	NUMBER
AXIAL	☒	☐	68.0 dB	99-1219
CIRC	☐	☐	N/A dB	N/A

RANGE: 3.0 "	*INST. FREQ.: 2.0 Mhz
PROBE DELAY: 8.7925	*RECTIFY:Fullwave
VELOCITY: 0.2302	DUAL ☒ ON ☐ OFF
DISPLAY DELAY: 0.0	*REJECT: 0 %
*ENERGY: High	*DISPLAY START: IP
*DAMPING: 1K Ω	DET: ☒PEAK☐ FLANK
*PRF MODE: Autohigh	TCG: ON☐ OFF☒

REF. REFLECTOR: 1.0 Notch GAIN: 68.0 dB	**CALIBRATION TIMES**
AMPLITUDE: 80% FSH METAL PATH: 2.0	INITIAL TIME: 1310 FINAL TIME: 1645

VERIFICATION TIMES	1)1535	2)N/A	3) N/A	4) N/A	5) N/A	6) N/A	7) N/A	8) N/A	9) N/

*** 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: Maintained 10% to 20% ID roll.	WELDS/ITEMS EXAMINED: GR-2-22

EXAMINER: Tommy Brown	EXAMINER: Roger Senger	REVIEWER:	ANII:
Tommy D Brown	Roger L Senger	Matt Welch	DATE: 5/9/09
LEVEL: III	LEVEL: Trn	LEVEL: III DATE: 3/4/09	PG. 3 OF 5

000101

TENNESSEE VALLEY AUTHORITY	MANUAL ULTRASONIC PIPING EXAMINATION DATA SHEET	REPORT NUMBER: R-026

PROJECT: **BFN** UNIT: **2** CYCLE: **15** | EXAMINATION DATE: **05/01/09**

PROCEDURE: **N-UT-64** REV: **0011** TC: **N/A** | START TIME: **1503** END TIME: **1555**

SYSTEM: Recirc | ISI DWG. NO: 2-ISI-0270-C-01-03 | EXAM SURFACE ☐ ID ☒ OD

COMPONENT ID: **GR-2-22** 5/4/09 | MATL. TYPE: ☐ CS ☒ SS ☐ CSCL ☐ CCSS

CONFIGURATION | SURFACE TEMP.: **85° F** PYRO. NO.: **562777**

SDL TO Pipe | CAL DUE DATE: **03/21/10**

FLOW →

EXAM INATION ANGLE	**45S**	**60RL**	**70S**		
CIRC. SCAN SENSITIVITY	**40.0**	**N/A**	**N/A**		
AXIAL SCAN SENSITIVITY	**40.0**	**70.0**	**N/A**		

Wo REFERENCE: **CENTERLINE OF WELD**

Lo REFERENCE: **Outside radius of elbow**

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							%	4	45	☒	**SHEAR**
NRI							%	5	45	☒	**SHEAR**
NRI							%	6	45	☒	**SHEAR**
NRI							%	4	60	☒	**RL**
							%			☐	
							%			☐	
							%			☐	
							%			☐	
							%			☐	
							%			☐	
							%				
							%				
							%				
							%				

REMARKS / LIMITATIONS:

MAINTAINED 5 TO 20% ID ROLL DURING SCANNING.

EXAMINER: Tommy Brown Tommy D Brown **LEVEL: III** **ANII:**

EXAMINER: Roger Senger Roger E Senger **LEVEL: Trn** **DATE:** 5/9/09

REVIEWER: Marc Wilch **LEVEL:** III **DATE:** 5/4/09 **PAGE** 4 **OF** 5

000102

TVA

WALL THICKNESS PROFILE SHEET

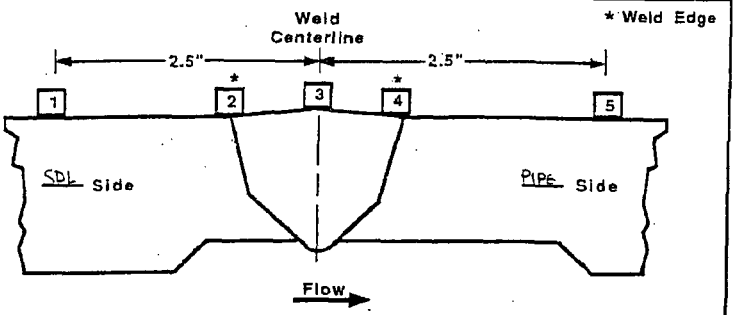
REPORT NO: R-026

PROJECT: BFN
UNIT: 2

WELD NO: GR-2-22
SYSTEM: Recirc

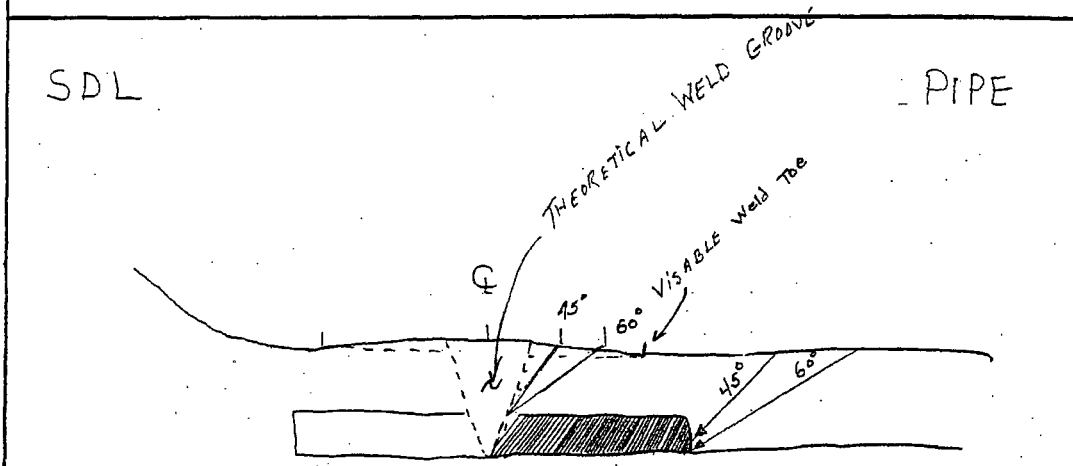
Record Thickness Measurements As Indicated, Including Weld Width, Edge-To-Edge At 0°

Position	0°	90°	180°	270°
1	N/A			
2	.66			
3	.74			
4	.60			
5	.60			



CROWN HEIGHT: .07
CROWN WIDTH: 2"

DIAMETER: 12"
WELD LENGTH: 38"



TOTAL VOLUME = .25 x 25 x 38 = 23.75 in³

OBTAINED VOLUME = .25 x 1.25 x 38 = 11.875 in³

11.875/23.75 = .50 x 100 = 50%

50% COVERAG OBTAINED

FLOW

EXAMINER: Jay D Bro
LEVEL: III
DATE: 5/1/09

REVIEWED BY: Mark Welch
LEVEL: III DATE: 5/4/09

ANII:
DATE: 5/9/09

PAGE 5 OF 5

Examination Report No. R-047

Weld No. GR-2-35

000152

TENNESSEE VALLEY AUTHORITY	EXAMINATION SUMMARY AND RESOLUTION DATA SHEET	REPORT NUMBER: R047

PROJECT: BFN	UNIT: 2	CYCLE: 15		COMPONENT ID: GR-2-35			
EXAMINATION METHOD				SYSTEM: Recirc		ISI DWG. NO. 2-ISI-0270-C-02	
MT ☐	PT ☐	UT ☒	VT ☐	CODE CLASS: 1		CATEGORY: R-A	
PROCEDURE: N-UT-64		REV: 11	TC: N/A	CONFIG.:	SDL	TO	PIPE
EXAMINER: Tommy Brown		EXAMINER: N/A		EXAMINER: N/A		EXAMINER: N/A	
LEVEL: III		LEVEL:		LEVEL:		LEVEL:	

This report contains the data associated with the manual ultrasonic examination weld GR-2-35.

The exam was performed to meet the requirements of NU0313, EXREQ B02-02 category C and ASME Section XI ~~2001~~ 1995 Edition ~~2003~~ 1996 Addenda, Category R-A, Item R1.16C. 5/6/09

This exam was performed using TVA Nuclear Procedure N-UT-64 Rev. 11 which incorporates PDI-UT 2 Rev C Addenda No. 1, 2, and 3, for UT examination Austenitic Welds. .

A 45° Shear and a 60° RL was used for the axial scans and a 45° Shear for circ scans.

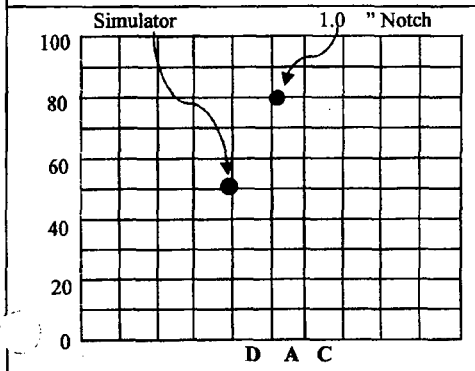
50% Coverage Achieved.

RESOLUTION BY: Tommy Brown	REVIEWED BY:	ANII:
LEVEL: III DATE: 05/04/09	LEVEL: III DATE: 5/6/09	DATE: 5/11/09
		PG. 1 OF 5

000153

TENNESSEE VALLEY AUTHORITY	DIGITAL ULTRASONIC CALIBRATION DATA SHEET	REPORT NUMBER: R047

PROJECT: BFN UNIT 2 CYCLE: 15	CALIBRATION DATE: 05/04 /09
PROC.: N-UT- 64 REV: 11 TC:N/A	CALIBRATION BLOCK NO.: WB - 84 TEMP: 83 'F
INSTR. MFG: Krautkramer DUE DATE: 08/18/09	SIMULATOR BLOCK NO: 93-5721
MODEL/TYPE: USN 60 M & TE NO.: E36305	THERMOMTER S/N: 562777 DUE DATE: 3/21/10
TRANSDUCER MFG: KBA MODEL: Comp-G	COUPLANT Ultragell II BATCH: 06125
ELEMENTS: 1 SHAPE: Round	
S/N 01FH9R SIZE: 0.5" FREQ 1.5 MHz	EXAM TYPE: SHEAR☒ LONG☐ RL☐
CONTOUR: Flat FOCUS: N/A	**ANGLE VERIFICATION**
CONFIG: ☐ D-SBS ☐ D-TANDEM ☒ SINGLE	BLOCK TYPE: Rompas / S/N: 93-5721
CABLE TYPE: RG 174 LENGTH: 6'0 #CNT: 0	NOMINAL ANGLE: 45° / ACTUAL ANGLE: 45 °



DISPLAY WIDTH: 2.5 inches

INSTRUMENT SETTINGS

REFLECTOR			REFERENCE	MEMORY
SCAN DIRECT.	NTCH	SDH	SENSITIVITY	NUMBER
AXIAL	☒	☐	21.0 dB	GR-22 45
CIRC	☒	☐	21.0 dB	N/A

RANGE: 2.5 "	*INST. FREQ.: 2.25 Mhz
PROBE DELAY: 5.9912	*RECTIFY:Fullwave
VELOCITY: 0.1230	DUAL ☐ ON ☒ OFF
DISPLAY DELAY: 0.0	*REJECT: 0 %
*ENERGY: High	*DISPLAY START: IP
*DAMPING: 1K Ω	DET: ☐PEAK☒ FLANK
*PRF MODE: Autohigh	TCG: ON☐ OFF☒

REF. REFLECTOR: 1.0 Notch GAIN: 21.0 dB	**CALIBRATION TIMES**
AMPLITUDE: 80% FSH METAL PATH: 1.28	INITIAL TIME: 0840 FINAL TIME: 1130

VERIFICATION TIMES	1(0955	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	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: Maintained 10% to 20% ID roll.	WELDS/ITEMS EXAMINED: GR-2-35

EXAMINER: Tommy Brown	EXAMINER: Roger Senger	REVIEWER:	ANII:
LEVEL: III	LEVEL: Trn	LEVEL: III DATE: 5/6/09	DATE: 5/11/09
			PG. 2 OF 5

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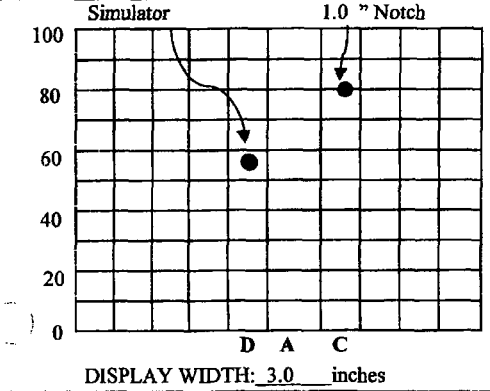
TENNESSEE VALLEY AUTHORITY	DIGITAL ULTRASONIC CALIBRATION DATA SHEET	REPORT NUMBER: R047

PROJECT: BFN UNIT 2 CYCLE: 15	CALIBRATION DATE: 05/04 /09
PROC.: N-UT- 64 REV: 11 TC:N/A	CALIBRATION BLOCK NO.: WB - 84 TEMP: 83 'F
INSTR. MFG: Krautkramer DUE DATE: 08/18/09	SIMULATOR BLOCK NO: 93-5721
MODEL/TYPE: USN 60 M & TE NO.: E36305	THERMOMTER S/N: 562777 DUE DATE: 3/21/10
TRANSDUCER MFG: RTD MODEL: TRL2-Aust	COUPLANT Ultragell II BATCH: 06125
ELEMENTS: 2 SHAPE: Rect	
S/N 99-1219 SIZE:2(8x14) FREQ 2.0 MHz	EXAM TYPE: SHEAR☐ LONG☐ RL☒
CONTOUR: Flat FOCUS: 20 FS	**ANGLE VERIFICATION**
CONFIG: ☒ D-SBS ☐ D-TANDEM ☐ SINGLE	BLOCK TYPE: Rompas / S/N: 93-5721
CABLE TYPE: RG (2) 174 LENGTH: 6'0 #CNT: 0	NOMINAL ANGLE: 60 ° / ACTUAL ANGLE: 60 °



DISPLAY WIDTH: 3.0 inches

INSTRUMENT SETTINGS

REFLECTOR SCAN DIRECT.	NTCH	SDH	REFERENCE SENSITIVITY	MEMORY NUMBER
AXIAL	☒	☐	68.0 dB	99-1219
CIRC	☐	☐	N/A dB	N/A

RANGE: 3.0 "	*INST. FREQ.: 2.0 Mhz
PROBE DELAY: 8.7925	*RECTIFY:Fullwave
VELOCITY: 0.2302	DUAL ☒ ON ☐ OFF
DISPLAY DELAY: 0.0	*REJECT: 0 %
*ENERGY: High	*DISPLAY START: IP
*DAMPING: 1K Ω	DET: ☒PEAK☐ FLANK
*PRF MODE: Autohigh	TCG: ON☐ OFF☒

REF. REFLECTOR: 1.0 Notch GAIN: 68.0 dB	**CALIBRATION TIMES**
AMPLITUDE: 80% FSH METAL PATH: 2.0	INITIAL TIME: 0830 FINAL TIME: 1128

VERIFICATION TIMES	1)0936	2)N/A	3) N/A	4) N/A	5) N/A	6) N/A	7) N/A	8) N/A	9) N/

*** 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: Maintained 10% to 20% ID roll.	WELDS/ITEMS EXAMINED: GR-2-35

EXAMINER: Tommy Brown	EXAMINER: Roger Senger	REVIEWER:	ANII:
Tommy D Brown	Roger L Senger	Walter Wilson	DATE: 5/11/09
LEVEL: III	LEVEL: Trn	LEVEL: III DATE: 5/6/09	PG. 3 OF 5

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TENNESSEE VALLEY AUTHORITY	MANUAL ULTRASONIC PIPING EXAMINATION DATA SHEET	REPORT NUMBER: R047

PROJECT: BFN	UNIT: 2	CYCLE: 15	EXAMINATION DATE: 05/04/09
PROCEDURE: N-UT-64	REV: 0011	TC: N/A	START TIME: 0937 END TIME: 1010
SYSTEM: Recirc	ISI DWG. NO: 2-ISI-0270-C-01-07		EXAM SURFACE ☐ ID ☒ OD
COMPONENT ID: GR-2-35		ms 5/6/09	MATL. TYPE: ☐ CS ☒ SS ☐ CSCL ☐ CCSS
CONFIGURATION			SURFACE TEMP.: 85° F PYRO. NO.: 562777
SDL TO Pipe			CAL DUE DATE: 03/21/10
FLOW →			EXAM INATION ANGLE: 45S / 60RL / 70S
Wo REFERENCE: CENTERLINE OF WELD			CIRC. SCAN SENSITIVITY: 40.0 / N/A / N/A
Lo REFERENCE: Outside radius of elbow			AXIAL SCAN SENSITIVITY: 40.0 / 70.0 / N/A

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							%	4	45	☒	SHEAR
NRI							%	5	45	☒	SHEAR
NRI							%	6	45	☒	SHEAR
NRI							%	4	60	☒	RL
							%			☐	
							%			☐	
							%			☐	
							%			☐	
							%			☐	
							%			☐	
							%				
							%				
							%				
							%				

REMARKS / LIMITATIONS:

MAINTAINED 5 TO 20% ID ROLL DURING SCANNING.

Previously recorded geometry noticed at less than recordable amplitude.

EXAMINER: Tommy Brown Tommy D Brown	**LEVEL: III**	**ANII:**
EXAMINER: Roger Senger Roger Senger	**LEVEL: Trn**	**DATE:** 5/11/09
REVIEWER: Alan Welch	**LEVEL:** III **DATE:** 5/6/09	**PAGE** 4 **OF** 5

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TVA

WALL THICKNESS PROFILE SHEET

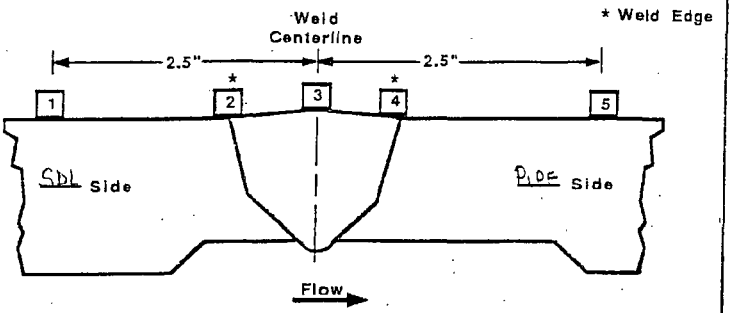
REPORT NO: R047

PROJECT: BROWNS FERRY
UNIT: 2

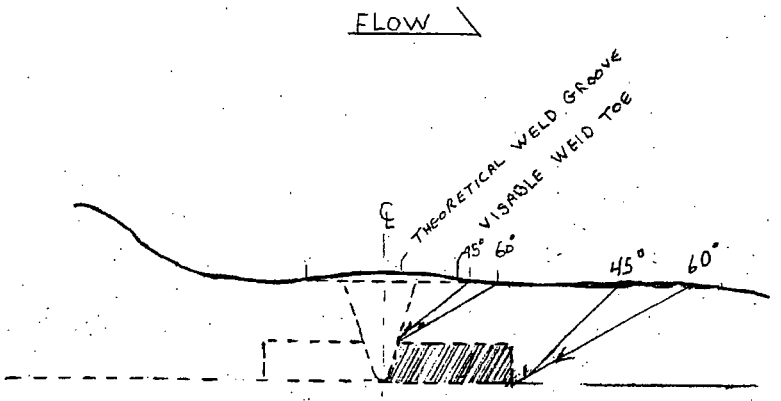
WELD NO: GR 2-35
SYSTEM: RECIRC

Record Thickness Measurements As Indicated, Including Weld Width, Edge-To-Edge At 0°

Position	0°	90°	180°	270°
1	N/A			
2	N/A			
3	.640			
4	.60			
5	.59			



CROWN HEIGHT: .30"
CROWN WIDTH: 1"
DIAMETER: 12"
WELD LENGTH: 39"



Total volume = 1.5 x .21 = .315 x 39 = 12.285

Obtained volume = .75 X .21 = .1575 x 39 = 6.1425

Total Coverage = 6.1425 / 12.285 = 0.50 x 100 = 50%

50% Coverage Obtained.

EXAMINER: [signature]
LEVEL: II
DATE: 5/4/09

REVIEWED BY: [signature]
LEVEL: III DATE: 5/6/09

ANII: [signature]
DATE: 5/11/09

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