



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

March 22, 2013

10 CFR 50.4
10CFR 50.55a

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

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

Subject: **Response to Request for Additional Information Regarding Relief Request 2-ISI-29 (TAC NO. ME8854)**

- References:
1. Letter from TVA to NRC, "American Society of Mechanical Engineers, Section XI Code, Inservice Inspection Program for the Unit 2 Third Ten-Year Inspection Interval, Request for Relief 2-ISI-29," dated May 25, 2012 (ADAMS No. ML12150A368)
 2. Letter from NRC to TVA, "Browns Ferry Nuclear Plant, Unit 2 - Request for Additional Information Regarding Relief Request 2-ISI-29 (TAC NO. ME8854)," dated February 20, 2013 (ADAMS No. ML13038A144)

On May 25, 2012, Tennessee Valley Authority (TVA) submitted "American Society of Mechanical Engineers, Section XI Code, Inservice Inspection Program for the Unit 2 Third Ten-Year Inspection Interval, Request for Relief 2-ISI-29" (Reference 1). By NRC letter dated February 20, 2013 (Reference 2), TVA received a Request for Additional Information (RAI) regarding Relief Request 2-ISI-29 for Browns Ferry Nuclear Plant (BFN) Unit 2. The NRC requested the response within 30 days from the date of issuance. Therefore, the response is due by March 22, 2013.

The enclosure to this letter provides the TVA response to the NRC RAI letter.

A047
NRC

U.S. Nuclear Regulatory Commission
Page 2
March 22, 2013

This letter does not include any new regulatory commitments. Please direct any questions concerning this matter to Tom Hess at (423) 751-3487.

Respectfully,

A handwritten signature in black ink, appearing to read "J. W. Shea". The signature is written in a cursive, flowing style.

J. W. Shea

Vice President, Nuclear Licensing

Enclosure:

TVA Response to NRC Request for Information Regarding Relief
Request 2-ISI-29

cc: (Enclosure):

NRC Regional Administrator – Region II
NRC Senior Resident Inspector – Browns Ferry Nuclear Plant
Alabama State Department of Public Health

ENCLOSURE

Response to Request for Additional Information Regarding Relief Request 2-ISI-29

TVA Response to NRC Request for Information

For All Welds:

NRC Request for Additional Information Question 1

The piping and components are described as being constructed from "Stainless" or "Carbon" steel, but the alloys are not identified. For each weld, provide the materials of construction for the pipes, weld metals, and welded components.

TVA Response

- Weld RCRD-2-50:
 - Valve (85-577) A182 F316
 - Elbow SA420 GRWPL6
 - Weld Material ER309
- Weld RWCU-2-003-070:
 - Pipe SA376 TP316
 - Sweep-o-let A403 WP304
 - Weld Material ER316/316L
- Weld DRHR-2-03:
 - Flued Head SA182 F304
 - Valve (2-FCV-74-53) A351 CF8M
 - Weld Material ER308
- Weld GR-2-09:
 - Sweep-o-let A403 WP304
 - Pipe A358 Class 1
 - Weld Material ER308

NRC Request for Additional Information Question 2

These welds are covered by a risk-informed inservice inspection program. Address whether any additional welds in the same segments were examined to compensate for the missed volume.

TVA Response

No additional welds in the same segments were examined to compensate for the missed volume.

For Weld RCRD-2-50:

NRC Request for Additional Information Question 3

Provide the operating temperature at the dissimilar metal weld RCRD-2-50.

TVA Response

Design temperature of the line segment is 545 degrees F. Operating temperature is approximately 438 degrees F based on RWCU return temperature.

ENCLOSURE

NRC Request for Additional Information Question 4

Address whether any of the stress corrosion cracking mitigation methods, such as Mechanical Stress Improvement, have been applied to RCRD-2-50.

TVA Response

No stress improvements have been applied to weld RCRD-2-50.

For Welds RCRD-2-50 and GR-2-09:

NRC Request for Additional Information Question 5

The provided coverage map does not clearly show where coverage is being claimed for the inspection and where coverage was missed. Please provide a coverage map showing the regions that were not inspected.

TVA Response

Attachments 1 and 2 contain copies of revised versions of Unit 2, Cycle 16 Inservice Inspection Report, UT-11-023 for GR-2-09 and Unit 2, Cycle 16 Inservice Inspection Report, UT-11-043 for RCRD-2-50, which contain detailed coverage maps indicating regions that were not inspected.

For weld DRHR-2-03

NRC Request for Additional Information Question 6

The exact inspection process proposed for this weld is unclear to the NRC staff. Please confirm or correct the following:

- a. The weld was inspected using 45° shear waves*
- b. The weld was inspected from both sides*
- c. Only coverage on the flued side of the weld is counted*

TVA Response

- a. DRHR-2-03 was inspected using 45° shear waves.
- b. As described in the enclosure to the Reference 1 letter, DRHR-2-03 was inspected from both sides. However, the techniques used to interrogate the casting side of the weld were not qualified. Therefore, no credit was taken for the inspection performed on the valve side of the weld.
- c. Coverage is only credited for inspection performed on the flued head side of the weld.

ENCLOSURE

ATTACHMENTS:

1. Unit 2 Cycle 16 Inservice Inspection Report, UT-11-023
2. Unit 2 Cycle 16 Inservice Inspection Report, UT-11-043

Response to Request for Additional Information Regarding Relief Request 2-ISI-29

TVA Response to NRC Request for Information

Attachment 1



UT Calibration Examination

Site/Unit: BFN / 2
 Summary No.: 05479-ISI-BFN2
 Workscope: ISI

Procedure: N-UT-64
 Procedure Rev.: 11
 Work Order No.: 2-SI-4.6.G

Outage No.: U2RF18
 Report No.: UT-11-023
 Page: 1 of 15

Code: Section XI 1995 Ed/1998 Add Cat./Item: R-AR1.18C Location: Reactor Building - Drywell
 Drawing No.: 2-ISI-0270-C-01 Description: SDL - P
 System ID: 068 - Reactor Water Recirculating System
 Component ID: GR-2-09 Size/Length: N/A Thickness/Diameter: 0.568 / 12"
 Limitations: None Start Time: 1428 Finish Time: 1449

Instrument Settings		Search Unit		Cal. Checks		Axial Orientated Search Unit			
Serial No.: <u>E36302</u>	Manufacturer: <u>KRAUTKRAMER</u>	Serial No.: <u>01FH9L</u>	Manufacturer: <u>KBA</u>	Initial Cal. <u>0930</u>	Time <u>3/15/2011</u>	Calibration Reflector	Signal Amplitude %	Sweep Division	Sound Path
Model: <u>USN 60</u>	Linearity: <u>L-11-008</u>	Size: <u>0.5"</u>	Model: <u>Comp G</u>	Inter. Cal. <u>1427</u>	Time <u>3/15/2011</u>	1.0" Notch	80%	4.7	1.40"
Delay: <u>6.9897µ</u>	Range: <u>3.000</u>	Freq.: <u>1.5 MHz</u>	Center Freq.: <u>N/A</u>	Inter. Cal. <u>N/A</u>					
M'tl Cal/Vel: <u>.1251</u>	Energy: <u>High</u>	Exam Angle: <u>45°</u>	Squint Angle: <u>N/A</u>	Final Cal. <u>1555</u>	Time <u>3/15/2011</u>				
Damping: <u>1000 Ω</u>	Reject: <u>0</u>	Measured Angle: <u>45°</u>	Mode: <u>Shear</u>	Couplant					
PRF Mode: <u>Auto High</u>	SU Freq.: <u>1.5 MHz</u>	Exit Point: <u>N/A</u>	# of Elements: <u>1</u>	Cal. Batch: <u>10325</u>	Circumferential Orientated Search Unit				
Disp. Start: <u>IP</u>	Rectify: <u>Full Wave</u>	Config.: <u>Single</u>	Focus: <u>N/A</u>	Type: <u>Ultragel II</u>	Calibration Reflector				
Inst. Freq.: <u>2.0 MHz</u>		Shape: <u>Round</u>	Contour: <u>Flat</u>	Mfg.: <u>Sonotech</u>	Signal Amplitude %				
		Wedge Style: <u>Non-Integral</u>		Exam Batch: <u>10325</u>	Sweep Division				
Ax. Gain (dB): <u>21.4</u>	Circ. Gain (dB): <u>21.4</u>	Search Unit Cable		Type: <u>Ultragel II</u>	Sound Path				
1 Screen Div. = <u>.30</u>	In. of <u>Sound Path</u>	Type: <u>RG-174</u>	Length: <u>6'</u>	Mfg.: <u>Sonotech</u>	1.0" Notch				
		No. Conn.: <u>0</u>			80%				
Calibration Block		Scan Coverage			4.7				
Cal. Block No.: <u>SQ-123</u>	Upstream <input type="checkbox"/>	Downstream <input checked="" type="checkbox"/>	Scan dB: <u>35</u>		1.40"				
Thickness: <u>1.0"</u>	Dia.: <u>Flat</u>	CW <input checked="" type="checkbox"/>	CCW <input checked="" type="checkbox"/>	Serial No.: <u>789631</u>	Reference/Simulator Block				
Cal. Blk. Temp.: <u>66°</u>	Temp. Tool: <u>531993</u>	Exam Surface: <u>OD</u>	Surface Condition: <u>Ground</u>	Type: <u>Rompas</u>	Gain dB	Reflector	Signal Amplitude %	Sweep Division	Sound Path
Comp. Temp.: <u>77°</u>	Temp. Tool: <u>531993</u>				21.4	FSDH	18%	3.5	1.02"
Recordable Indication(s):		(If Yes, Ref. Attached Ultrasonic Indication Report.)		Comments: E36302 - Cal Due Date 9/18/2011.					
Results: NRI <input checked="" type="checkbox"/>	RI <input type="checkbox"/>	Info <input type="checkbox"/>		531993 - Cal Due Date 9/18/2011.					
Percent Of Coverage Obtained > 90%: <u>No</u>		Reviewed Previous Data: <u>Yes</u>		75% Code Coverage					

Examiner	Level	I(N)	Signature	Date	Reviewer	Signature	Date
Hilborn, Mark R.			<i>Mark Hilborn</i>	3/15/2011	Matt Welch, LIII	<i>Matt Welch</i>	3/16/11
N/A					N/A		
Other	Level	N/A	Signature	Date	ANII Review	Signature	Date
N/A					<i>Jeremy Alayo</i>	<i>Jeremy Alayo</i>	3/21/11

UT Calibration/Examination



UT Calibration Examination

Site/Unit: BFN / 2
 Summary No.: 05479-ISI-BFN2
 Workscope: ISI

Procedure: N-UT-64
 Procedure Rev.: 11
 Work Order No.: 2-SI-4.6.G

Outage No.: U2RF16
 Report No.: UT-11-023
 Page: 2 of 2

Code: Section XI 1996 Ed/1998 Add Cat./Item: R-A/R1.16C Location: Reactor Building - Drywell
 Drawing No.: 2-ISI-0270-C-01 Description: SDL - P
 System ID: 068 - Reactor Water Recirculating System
 Component ID: GR-2-09 Size/Length: N/A Thickness/Diameter: 0.589 / 12"
 Limitations: None Start Time: 1451 Finish Time: 1607

Instrument Settings		Search Unit		Cal. Checks	Time	Date	Axial Orientated Search Unit			
Serial No.:	<u>E36302</u>	Serial No.:	<u>86-699</u>	Initial Cal.	<u>0937</u>	<u>3/15/2011</u>	Calibration Reflector	Signal Amplitude %	Sweep Division	Sound Path
Manufacturer:	<u>KRAUTKRAMER</u>	Manufacturer:	<u>RTD</u>	Inter. Cal.	<u>1450</u>	<u>3/15/2011</u>	<u>1.0" Notch</u>	<u>80%</u>	<u>5.5</u>	<u>1.90"</u>
Model:	<u>USN 60</u>	Size:	<u>2 (10x18mm)</u>	Inter. Cal.	<u>N/A</u>					
Linearity:	<u>L-11-006</u>	Model:	<u>TRL2-AUST</u>	Inter. Cal.	<u>N/A</u>					
Delay:	<u>10.2908µ</u>	Range:	<u>3.500</u>	Final Cal.	<u>1601</u>	<u>3/15/2011</u>				
M/I Cal/Vol:	<u>.2369</u>	Freq.:	<u>2.0 MHz</u>	Couplant						
Damping:	<u>1000 Ω</u>	Center Freq.:	<u>N/A</u>	Cal. Batch:	<u>10325</u>					
PRF Mode:	<u>Auto High</u>	Exam Angle:	<u>60°</u>	Type:	<u>Ultrigel II</u>					
Disp. Start:	<u>IP</u>	Squint Angle:	<u>9°</u>	Mfg.:	<u>Sonotech</u>					
Inst. Freq.:	<u>2.0 MHz</u>	Measured Angle:	<u>60°</u>	Exam Batch:	<u>10325</u>					
		Mode:	<u>LONG</u>	Type:	<u>Ultrigel II</u>					
		Exit Point:	<u>N/A</u>	Mfg.:	<u>Sonotech</u>					
		# of Elements:	<u>2</u>	Circumferential Orientated Search Unit						
		Config.:	<u>D-SBS</u>	Type:	<u>N/A</u>					
		Focus:	<u>FS-30</u>	Mfg.:	<u>N/A</u>					
		Shape:	<u>RECT</u>	Reference/Simulator Block						
		Contour:	<u>Flat</u>	Gain dB	Reflector	Signal Amplitude %	Sweep Division	Sound Path		
		Wedge Style:	<u>Integral</u>	<u>78.4</u>	<u>FSDH</u>	<u>80%</u>	<u>4.0</u>	<u>1.40"</u>		
		Search Unit Cable		Comments: E36302 - Cal Due Date 9/18/2011.						
		Type:	<u>RG-174</u>	531993 - Cal Due Date 9/18/2011.						
		Length:	<u>6'</u>	75% Code Coverage						
		No. Conn.:	<u>0</u>							
		Scan Coverage								
		Upstream	<input type="checkbox"/>							
		Downstream	<input checked="" type="checkbox"/>							
		Scan dB:	<u>84.1</u>							
		CW	<input type="checkbox"/>							
		CCW	<input type="checkbox"/>							
		Scan dB:	<u>N/A</u>							
		Exam Surface:	<u>OD</u>							
		Surface Condition:	<u>Ground</u>							
		Recordable Indication(s):	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>							
		Results:	NRI <input checked="" type="checkbox"/> RI <input type="checkbox"/> Info <input type="checkbox"/>							
		Percent Of Coverage Obtained > 90%:	<u>No</u>							
		Reviewed Previous Data:	<u>Yes</u>							

Examiner	Level	II(N)	Signature	Date	Reviewer	Signature	Date
Hilborn, Mark R.			<i>Mark Hilborn</i>	3/16/2011	Matt Welch, LIII	<i>Matt Welch</i>	3/16/11
Examiner	Level	N/A	Signature	Date	Site Review	Signature	Date
N/A					N/A		
Other	Level	N/A	Signature	Date	ANII Review	Signature	Date
N/A					<i>Jeremy Mayo</i>	<i>Jeremy Mayo</i>	3/16/11

UT Calibration/Examination

000382



Supplemental Report

000383

Report No.: UT-11-023

Page: 3 of 5

Summary No.: 05479-ISI-BFN2

Examiner: Hilborn, Mark R. *Mark R. Hilborn* Level: II(N)

Reviewer: *Matt Welch* Matt Welch, LIII

Date: 3/16/11

Examiner: N/A Level: N/A

Site Review: N/A

Date:

Other: N/A Level: N/A

ANII Review: *James G. ...*

Date: 3/21/11

Comments: None

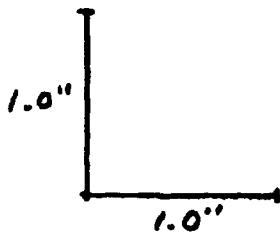
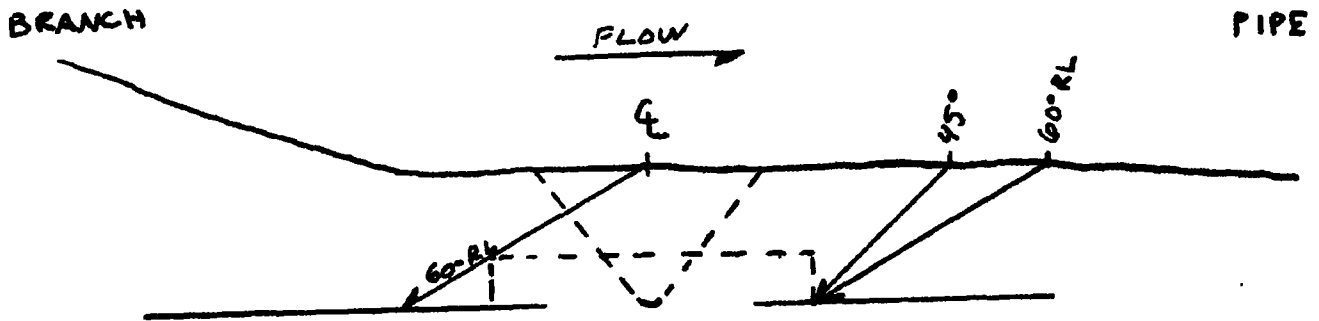
Sketch or Photo: O:\Ideal_Server\Ideal_BFN\Documentation\U2R16 Scanned Data\GR-2-09 Coverage Plot.jpg

$$CRV = \frac{H}{L} \times \frac{W}{L} \times L = 0.25'' \times 1.7'' \times 37.7'' = 16.02 \text{ in}^3$$

$$\text{Achieved Vol scan 4,5+6} = 0.25'' \times 1.7'' \times 37.7'' = 16.02 \text{ in}^3$$

$$\text{Achieved Vol scan 4,5+6} \div CRV = 1.0 = 100\%$$

$$\text{Scan} = 3+4+5+6 = 300/4 = 75\% \text{ Achieved Vol.}$$



Supplemental Report

000384



Report No.: UT-11-023 ²⁰⁶
 Page: 4 of 15 ^{15/13}

Summary No.: 05479-ISI-BFN2

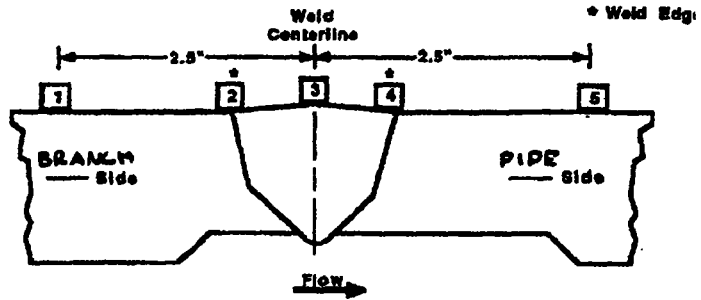
Examiner: Hilborn, Mark R. *M. R. Hilborn* Level: II(N) Reviewer: Matt Welch, LIII Date: 3/16/11
 Examiner: N/A Level: N/A Site Review: N/A Date: _____
 Other: N/A Level: N/A ANII Review: *James W. ...* Date: 3/21/11

Comments: None

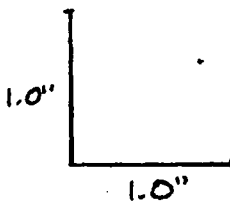
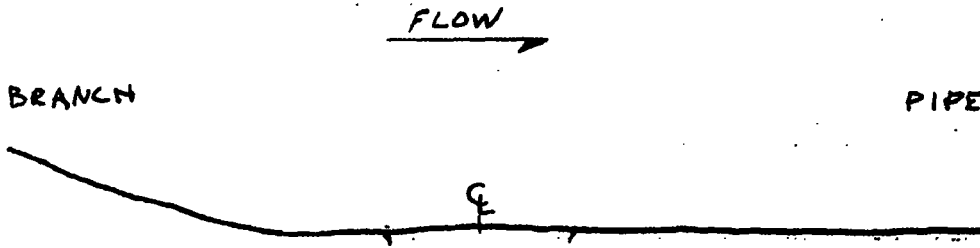
Sketch or Photo: O:\Ideal_Server\Ideal_BFN\Documentation\U2R16 Scanned Data\GR-2-09 T&C.jpg

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

Position	0°	90°	180°	270°
1	N/A			
2	.74"			
3	.75"	N/A		
4	.74"			
5	.59"			



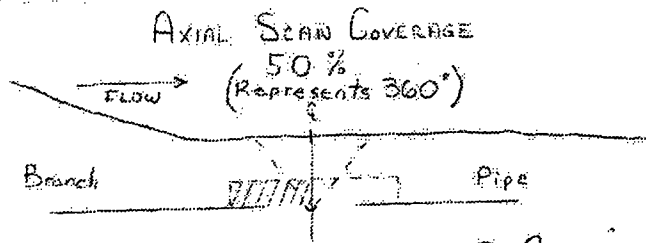
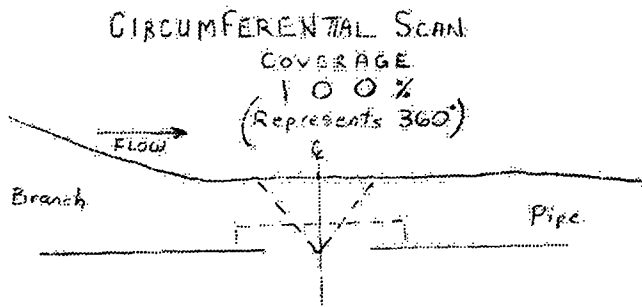
CROWN HEIGHT: FLUSH DIAMETER: 12"
 CROWN WIDTH: 1.2" WELD LENGTH: 37.7"





000384/UT-11-023


Pg. 5 of 5

GR-2-09



 = LIMITED
SCAN
COVERAGE.


Prepared By: Damon Priestby
UT L. III 3-5-2013


Reviewed By: Matt Welch
UT L. III 3-5-2013

Response to Request for Additional Information Regarding Relief Request 2-ISI-29

TVA Response to NRC Request for Information

Attachment 2



UT Calibration Examination

Site/Unit: BFN / 2
 Summary No.: 06610-ISI-BFN2
 Workscope: ISI

Procedure: N-UT-82
 Procedure Rev.: 4
 Work Order No.: 2-9I-4.6.G

Outage No.: U2RF16
 Report No.: UT-11-043
 Page: 1 of 2

Code: Section XI 1986 Ed/1986 Add Cat./Item: R-VR1.18D Location: Reactor Building, Main Steam Tunnel
 Drawing No.: 2-ISI-0272-C-01 Description: EL - VLV
 System ID: 069 - Reactor Water Cleanup System
 Component ID: RCRD-2-80 Size/Length: N/A Thickness/Diameter: 0.631 / 4"
 Limitations: None Start Time: 2245 Finish Time: 2255

Instrument Settings
 Serial No.: E37688 Manufacturer: KRAUTKRAMER Model: USN 60 Delay: 6.6197µ M'tl Cal/Vol: 2330 Damping: 1000 Ω PRF Mode: Auto High Disp. Start: IP Inst. Freq.: 2.0 MHz

Search Unit
 Serial No.: U0108 Manufacturer: Megasonics Model: CSS Size: 2 (10x18mm) Freq.: 2.0 MHz Center Freq.: N/A Exam Angle: 60° Squint Angle: N/A Measured Angle: 67° Mode: Long Exit Point: .4 / .68 # of Elements: 2 Config: D-SBS Focus: F8-17 Shape: Rect Contour: 8" Ax Wedge Style: Integral

Cal. Checks	Time	Date
Initial Cal.	2100	3/16/2011
Inter. Cal.	N/A	
Inter. Cal.	N/A	
Inter. Cal.	N/A	
Final Cal.	0027	3/17/2011

Axial Orientated Search Unit			
Calibration Reflector	Signal Amplitude %	Sweep Division	Sound Path
0.6 SDH	80%	6.3	1.05"

Ax. Gain (dB): 63.0 Circ. Gain (dB): N/A
 1 Screen Div. = .20 in. of Sound Path
 Calibration Block
 Cal. Block No.: BF-131 Thickness: 0.6" SDH Dia.: 4"
 Cal. Blk. Temp.: 70° Temp. Tool: 558272
 Comp. Temp.: 78° Temp. Tool: 558272
 Scan Coverage
 Upstream Downstream Scan dB: 63
 CW CCW Scan dB: N/A
 Exam Surface: OD Surface Condition: Flush

Couplant
 Cal. Batch: 06125
 Type: Ultragel II
 Mfg.: Sonotech
 Exam Batch: 06125
 Type: Ultragel II
 Mfg.: Sonotech

Circumferential Orientated Search Unit			
Calibration Reflector	Signal Amplitude %	Sweep Division	Sound Path
N/A	N/A	N/A	N/A

Reference Block
 Serial No.: BF-131
 Type: Cal Block

Reference/Simulator Block				
Gain dB	Reflector	Signal Amplitude %	Sweep Division	Sound Path
63.0	0.6 SDH	80%	6.3	1.05"

Recordable Indication(s): Yes No (If Yes, Ref. Attached Ultrasonic Indication Report.)
 Results: NRI RI Info
 Percent Of Coverage Obtained > 90%: No Reviewed Previous Data: Yes

Comments: E37688 - Cal Due Date 10/5/2011
 558272 - Cal Due Date 1/29/2012
 53.4% Code Coverage

Examiner	Level	Signature	Date	Reviewer	Signature	Date
Brown, Thomas D.	III(N)	<i>Thomas D. Brown</i>	3/17/2011	Matt Welch, LIII	<i>Matt Welch</i>	3/23/11
N/A	N/A			N/A		
N/A	N/A			N/A		

UT Calibration/Examination

000521



UT Calibration Examination

Site/Unit: BFN / 2
 Summary No.: 05510-ISI-BFN2
 Workscope: ISI

Procedure: N-UT-82
 Procedure Rev.: 4
 Work Order No.: 2-SI-4.6.G

Outage No.: U2RF18
 Report No.: UT-11-043
 Page: 2 of 10

Code: Section XI 1996 Ed/1996 Add Cat./Item: R-A/R1.18D Location: Reactor Building, Main Steam Tunnel
 Drawing No.: 2-ISI-0272-C-01 Description: EL - VLV
 System ID: 089 - Reactor Water Cleanup System
 Component ID: RCRD-2-60 Size/Length: N/A Thickness/Diameter: 0.531 / 4"
 Limitations: None Start Time: 2235 Finish Time: 2245

Instrument Settings		Search Unit		Cal. Checks			Axial Orientated Search Unit			
Serial No.: <u>E37688</u>	Serial No.: <u>U0110</u>	Cal. Checks	Time	Date	Calibration Reflector	Signal Amplitude %	Sweep Division	Sound Path		
Manufacturer: <u>KRAUTKRAMER</u>	Manufacturer: <u>Megasonics</u>	Initial Cal.	<u>2050</u>	<u>3/16/2011</u>	<u>0.6 SDH</u>	<u>80%</u>	<u>5.6</u>	<u>1.118"</u>		
Model: <u>USN 60</u> Linearity: <u>L-11-002</u>	Size: <u>2 (10x18mm)</u> Model: <u>CSS</u>	Inter. Cal.	<u>N/A</u>							
Delay: <u>8.3689µ</u> Range: <u>2.000</u>	Freq.: <u>2.0 MHz</u> Center Freq.: <u>N/A</u>	Inter. Cal.	<u>N/A</u>							
M'ti Cal/Vel: <u>.2330</u> Energy: <u>High</u>	Exam Angle: <u>70°</u> Squint Angle: <u>N/A</u>	Final Cal.	<u>0025</u>	<u>3/17/2011</u>						
Damping: <u>1000 Ω</u> Reject: <u>0</u>	Measured Angle: <u>70°</u> Mode: <u>Long</u>									
PRF Mode: <u>Auto High</u> SU Freq.: <u>2.0 MHz</u>	Exit Point: <u>.4 / .65</u> # of Elements: <u>2</u>									
Disp. Start: <u>IP</u> Rectify: <u>Full Wave</u>	Config.: <u>D-9BS</u> Focus: <u>FS-28</u>									
Inst. Freq.: <u>2.0 MHz</u>	Shape: <u>Rect</u> Contour: <u>6" Ax</u>									
Ax. Gain (dB): <u>70.0</u> Circ. Gain (dB): <u>N/A</u>										
<u>1</u> Screen Div. = <u>.20</u> in. of <u>Sound Path</u>										
Type: <u>RG-174</u> Length: <u>6'</u> No. Conn.: <u>0</u>										
Wedge Style: <u>Integral</u>										
Search Unit Cable										
Type: <u>RG-174</u> Length: <u>6'</u> No. Conn.: <u>0</u>										
Scan Coverage										
Upstream <input checked="" type="checkbox"/> Downstream <input type="checkbox"/> Scan dB: <u>70</u>										
CW <input type="checkbox"/> CCW <input type="checkbox"/> Scan dB: <u>N/A</u>										
Exam Surface: <u>OD</u>										
Surface Condition: <u>Flush</u>										
Reference Block										
Serial No.: <u>BF-131</u>										
Type: <u>Cal Block</u>										
Reference/Simulator Block										
Gain dB	Reflector	Signal Amplitude %	Sweep Division	Sound Path						
<u>70.0</u>	<u>0.6 SDH</u>	<u>80%</u>	<u>5.6</u>	<u>1.118"</u>						

Recordable Indication(s): Yes No (If Yes, Ref. Attached Ultrasonic Indication Report.)
 Results: NRI RI Info

Comments: E37688 - Cal Due Date 10/8/2011
558272 - Cal Due Date 1/29/2012
53.4% Code Coverage

Percent Of Coverage Obtained > 90%: No Reviewed Previous Data: Yes

Examiner	Level	III(N)	Signature	Date	Reviewer	Signature	Date
<u>Brown, Thomas D.</u>			<u>[Signature]</u>	<u>3/17/2011</u>	<u>Matt Welch, LIII</u>	<u>[Signature]</u>	<u>3/23/11</u>
<u>N/A</u>					<u>N/A</u>		
<u>N/A</u>					<u>N/A</u>		

UT Calibration/Examination

000522



UT Calibration Examination

Site/Unit: BFN / 2
 Summary No.: 05510-ISI-BFN2
 Workscope: ISI

Procedure: N-UT-82
 Procedure Rev.: 4
 Work Order No.: 2-SI-4.8.G

Outage No.: U2RF16
 Report No.: UT-11-043
 Page: 3 of 10

Code: Section XI 1996 Ed/1996 Add Cat./Item: R-A/R1.18D Location: Reactor Building, Main Steam Tunnel
 Drawing No.: 2-ISI-0272-C-01 Description: EL - VLV
 System ID: 089 - Reactor Water Cleanup System
 Component ID: RCRD-2-50 Size/Length: N/A Thickness/Diameter: 0.531 / 4"
 Limitations: None Start Time: 2325 Finish Time: 2335

Instrument Settings		Search Unit		Cal. Checks	Time	Date	Axial Orientated Search Unit				
Serial No.:	<u>E37688</u>	Serial No.:	<u>U0270</u>	Initial Cal.	<u>2130</u>	<u>3/18/2011</u>	Calibration Reflector	Signal Amplitude %	Sweep Division	Sound Path	
Manufacturer:	<u>KRAUTKRAMER</u>	Manufacturer:	<u>Megasonics</u>	Inter. Cal.	<u>N/A</u>		<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	
Model:	<u>USN 60</u>	Linearity:	<u>L-11-002</u>	Inter. Cal.	<u>N/A</u>						
Delay:	<u>9.0675µ</u>	Range:	<u>1.000</u>	Final Cal.	<u>0033</u>	<u>3/17/2011</u>					
M'tl Cal/Vel:	<u>.2330</u>	Energy:	<u>High</u>	Exam Angle:	<u>42°</u>	Squint Angle:	<u>N/A</u>	Circumferential Orientated Search Unit			
Damping:	<u>1000 Ω</u>	Reject:	<u>0</u>	Measured Angle:	<u>42°</u>	Mode:	<u>Long</u>	Calibration Reflector	Signal Amplitude %	Sweep Division	Sound Path
PRF Mode:	<u>Auto High</u>	SU Freq.:	<u>2.0 MHz</u>	Exit Point:	<u>.34 / .38</u>	# of Elements:	<u>2</u>	<u>0.5 SDH</u>	<u>80%</u>	<u>6.7</u>	<u>.667"</u>
Disp. Start:	<u>IP</u>	Rectify:	<u>Full Wave</u>	Config.:	<u>D-SBS</u>	Focus:	<u>FS-14</u>				
Inst. Freq.:	<u>2.0 MHz</u>			Shape:	<u>Rect</u>	Contour:	<u>6" Circ</u>				
Ax. Gain (dB):	<u>66.5</u>	Circ. Gain (dB):	<u>N/A</u>	Wedge Style:	<u>Integral</u>	Reference/Simulator Block					
1 Screen Div. =	<u>.10</u>	in. of	<u>Sound Path</u>	Search Unit Cable	Type:	<u>Ultragel II</u>	Gain dB	Reflector	Signal Amplitude %	Sweep Division	Sound Path
				Type:	<u>RG-174</u>	Length:	<u>8'</u>	No. Conn.:	<u>0</u>		
Cal. Block No.:	<u>BF-132</u>	Scan Coverage	Upstream <input type="checkbox"/> Downstream <input type="checkbox"/>	Scan dB:	<u>N/A</u>	Reference Block					
Thickness:	<u>0.5" SDH</u>	Dia.:	<u>4"</u>	CW <input checked="" type="checkbox"/> CCW <input type="checkbox"/>	Scan dB:	<u>69</u>	Serial No.:	<u>BF-132</u>			
Cal. Blk. Temp.:	<u>70°</u>	Temp. Tool:	<u>558272</u>	Exam Surface:	<u>OD</u>	Type:	<u>Cal Block</u>				
Comp. Temp.:	<u>78°</u>	Temp. Tool:	<u>558272</u>	Surface Condition:	<u>Flush</u>						
Recordable Indication(s):	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	(If Yes, Ref. Attached Ultrasonic Indication Report.)									
Results:	NRI <input checked="" type="checkbox"/> Ri <input type="checkbox"/> Info <input type="checkbox"/>	Comments: <u>E37688 - Cal Due Date 10/5/2011</u> <u>558272 - Cal Due Date 1/29/2012</u> <u>53.4% Code Coverage</u>									
Percent Of Coverage Obtained > 90%:	<u>No</u>	Reviewed Previous Data:	<u>Yes</u>								

Examiner	Level	III(N)	Signature	Date	Reviewer	Signature	Date
Brown, Thomas D.			<i>Thomas D. Brown</i>	3/17/2011	Matt Welch, LIII	<i>Matt Welch</i>	3/23/11
Examiner	Level	N/A	Signature	Date	Site Review	Signature	Date
N/A					N/A		
Other	Level	N/A	Signature	Date	ANII Review	Signature	Date
N/A						<i>Shane</i>	4/13/11

UT Calibration/Examination

3/13
 3/13
 10
 3/13

000523



UT Calibration Examination

Site/Unit: BFN / 2 Procedure: N-UT-82 Outage No.: U2RF16
 Summary No.: 08810-ISI-BFN2 Procedure Rev.: 4 Report No.: UT-11-043
 Workscope: ISI Work Order No.: 2-SI-4.6.G Page: 4 of 29

Handwritten notes:
 July 29 2011
 July 29/6/11

Code: Section XI 1995 Ed/1998 Add Cat./Item: R-A/R1.16D Location: Reactor Building, Main Steam Tunnel
 Drawing No.: 2-ISI-0272-C-01 Description: EL - VLV
 System ID: 069 - Reactor Water Cleanup System
 Component ID: RCRD-2-50 Size/Length: N/A Thickness/Diameter: 0.631 / 4"
 Limitations: None Start Time: 2315 Finish Time: 2325

Instrument Settings		Search Unit		Cal. Checks			Axial Orientated Search Unit			
Serial No.: <u>E37688</u>	Manufacturer: <u>KRAUTKRAMER</u>	Serial No.: <u>U0271</u>	Manufacturer: <u>Megasonics</u>	Initial Cal.	Time	Date	Calibration Reflector	Signal Amplitude %	Sweep Division	Sound Path
Model: <u>USN 60</u>	Linearity: <u>L-11-002</u>	Size: <u>2 (4x14mm)</u>	Model: <u>CSS</u>	Inter. Cal.	<u>N/A</u>		<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>
Delay: <u>9.0875µ</u>	Range: <u>1.000</u>	Freq.: <u>2.0 MHz</u>	Center Freq.: <u>N/A</u>	Inter. Cal.	<u>N/A</u>					
M'tl Cal/Val: <u>.2330</u>	Energy: <u>High</u>	Exam Angle: <u>42°</u>	Squint Angle: <u>N/A</u>	Final Cal.	<u>0031</u>	<u>3/17/2011</u>				
Damping: <u>1000 Ω</u>	Reject: <u>0</u>	Measured Angle: <u>42°</u>	Mode: <u>Long</u>	Couplant						
PRF Mode: <u>Auto High</u>	SU Freq.: <u>2.0 MHz</u>	Exit Point: <u>.32 / .38</u>	# of Elements: <u>2</u>	Cal. Batch:	<u>06125</u>					
Disp. Start: <u>IP</u>	Rectify: <u>Full Wave</u>	Config.: <u>D-SBS</u>	Focus: <u>FS-14</u>	Type:	<u>Ultragel II</u>					
Inst. Freq.: <u>2.0 MHz</u>	Wedge Style: <u>Integral</u>	Shape: <u>Rect</u>	Contour: <u>6" Circ</u>	Mfg.:	<u>Sonotech</u>					
Ax. Gain (dB): <u>56.5</u>	Circ. Gain (dB): <u>N/A</u>	Search Unit Cable	Type:	Circumferential Orientated Search Unit						
<u>1</u> Screen Div. = <u>.10</u> in. of <u>Sound Path</u>	Type: <u>RG-174</u>	Length: <u>6'</u>	No. Conn.: <u>0</u>	Exam Batch:	<u>06125</u>					
Cal. Block No.: <u>BF-132</u>	Scan Coverage	Upstream <input type="checkbox"/>	Downstream <input type="checkbox"/>	Type:	<u>Ultragel II</u>					
Thickness: <u>0.6" SDH</u>	Dia.: <u>4"</u>	CW <input type="checkbox"/>	CCW <input checked="" type="checkbox"/>	Mfg.:	<u>Sonotech</u>					
Cal. Bik. Temp.: <u>70°</u>	Temp. Tool: <u>588272</u>	Exam Surface: <u>OD</u>	Surface Condition: <u>Flush</u>	Serial No.:	<u>BF-132</u>					
Comp. Temp.: <u>78°</u>	Temp. Tool: <u>588272</u>	Reference Block								
Recordable Indication(s): Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	(If Yes, Ref. Attached Ultrasonic Indication Report.)									
Results: NRI <input checked="" type="checkbox"/> RI <input type="checkbox"/> Info <input type="checkbox"/>	Reference/Simulator Block									
Percent Of Coverage Obtained > 90%: <u>No</u>	Reviewed Previous Data: <u>Yes</u>	Gain dB Reflector Signal Amplitude % Sweep Division Sound Path								
		56.5 0.6 SDH 80% 8.0 .823"								

Comments: E37688 - Cal Due Date 10/5/2011
588272 - Cal Due Date 1/29/2012
53.4% Code Coverage

Examiner	Level	III(N)	Signature	Date	Reviewer	Signature	Date
<u>Brown, Thomas D.</u>			<i>[Signature]</i>	<u>3/17/2011</u>	<u>Matt Welch, LIII</u>	<i>[Signature]</i>	<u>3/23/11</u>
<u>N/A</u>					Site Review		
<u>N/A</u>					ANII Review		
<u>N/A</u>						<i>[Signature]</i>	<u>4/3/11</u>

000524



UT Calibration Examination

Site/Unit: BFN / 2
 Summary No.: 05510-ISI-BFN2
 Workscope: ISI

Procedure: N-UT-82
 Procedure Rev.: 4
 Work Order No.: 2-SI-4.8.G

Outage No.: U2RF16
 Report No.: UT-11-043
 Page: 5 of 10

Jeff
3/6/13
3/6/13

Code: Section XI 1995 Ed/1996 Add Cat./Item: R-A/R1.1B Location: Reactor Building, Main Steam Tunnel
 Drawing No.: 2-ISI-0272-C-01 Description: EL - VLV
 System ID: 069 - Reactor Water Cleanup System
 Component ID: RCRD-2-50 Size/Length: N/A Thickness/Diameter: 0.531 / 4"
 Limitations: None Start Time: 2328 Finish Time: 2336

Instrument Settings
 Serial No.: E37688 Manufacturer: KRAUTKRAMER
 Model: USN 60 Linearity: L-11-002
 Delay: 4.136µ Range: 4.000
 M'tl Cal/Vel: .1217 Energy: High
 Damping: 1000 Ω Reject: 0
 PRF Mode: Auto High SU Freq.: 2.26 MHz
 Disp. Start: IP Rectify: Full Wave
 Inst. Freq.: 2.25 MHz
 Ax. Gain (dB): 28.0 Circ. Gain (dB): 28.0
 10 Screen Div. = 4.0 in. of Sound Path

Search Unit
 Serial No.: SB0460 Manufacturer: KBA
 Model: Comp G Size: 0.250"
 Freq.: 2.25 MHz Center Freq.: N/A
 Exam Angle: 45° Squint Angle: N/A
 Measured Angle: 45° Mode: Shear
 Exit Point: N/A # of Elements: 1
 Config.: Single Focus: N/A
 Shape: Round Contour: Flat
 Wedge Style: Non-Integral
 Search Unit Cable Type: RG-174 Length: 6' No. Conn.: 0

Calibration Block
 Cal. Block No.: SQ-123 Upstream Downstream Scan dB: N/A
 Thickness: 1.0" Dia.: Flat CW CCW Scan dB: 38
 Cal. Blk. Temp.: 70° Temp. Tool: 558272 Exam Surface: OD
 Comp. Temp.: 78° Temp. Tool: 558272 Surface Condition: Flush

Recordable indication(s): Yes No (If Yes, Ref. Attached Ultrasonic Indication Report.)
 Results: NRI RI Info
 Percent Of Coverage Obtained > 80%: No Reviewed Previous Data: Yes

Cal. Checks	Time	Date
Initial Cal.	2140	3/16/2011
Inter. Cal.	N/A	
Inter. Cal.	N/A	
Final Cal.	0042	3/17/2011

Couplant
 Cal. Batch: 08125
 Type: Ultragel II
 Mfg.: Sonotech
 Exam Batch: 08125
 Type: Ultragel II
 Mfg.: Sonotech

Reference Block
 Serial No.: SQ-123
 Type: Cal Block

Axial Orientated Search Unit			
Calibration Reflector	Signal Amplitude %	Sweep Division	Sound Path
1.0" Notch	80%	3.4	1.40"
Circumferential Orientated Search Unit			
Calibration Reflector	Signal Amplitude %	Sweep Division	Sound Path
1.0" Notch	80%	3.4	1.40"
Reference/Simulator Block			
Gain dB	Reflector	Signal Amplitude %	Sweep Division
28.0	1.0" Notch	80%	3.4

Comments: E37688 - Cal Due Date 10/5/2011
 558272 - Cal Due Date 1/25/2012
 63.4% Code Coverage

Examiner	Level	Signature	Date	Reviewer	Signature	Date
Brown, Thomas D.	III(N)	<i>Thomas D. Brown</i>	3/17/2011	Matt Welch, LIII	<i>Matt Welch</i>	3/23/11
Examiner	Level	Signature	Date	Site Review	Signature	Date
N/A	N/A			N/A		
Other	Level	Signature	Date	ANII Review	Signature	Date
N/A	N/A				<i>John Hall</i>	4/3/11

000525



UT Calibration Examination

Site/Unit: BFN / 2
 Summary No.: 05510-481-BFN2
 Workscope: ISI

Procedure: N-UT-82
 Procedure Rev.: 4
 Work Order No.: 2-SI-4.6.G

Outage No.: U2RF16
 Report No.: UT-11-043
 Page: 6 of 10

*2008
3/13
10
3/13*

Code: Section XI 1995 Ed/1996 Add Cat./Item: R-A/R1.16D Location: Reactor Building, Main Steam Tunnel
 Drawing No.: 2-ISI-0272-C-01 Description: EL - VLV
 System ID: 089 - Reactor Water Cleanup System
 Component ID: RCRD-2-60 Size/Length: N/A Thickness/Diameter: 0.531 / 4"
 Limitations: None Start Time: 2338 Finish Time: 2344

Instrument Settings
 Serial No.: E37688 Manufacturer: KRAUTKRAMER Model: USN 60 Delay: 4.886µ M'tl Cal/Vel: .1273 Damping: 1000 Ω PRF Mode: Auto High Disp. Start: IP Inat. Freq.: 2.25 MHz
 Linearity: L-11-002 Range: 1.800 Energy: High Reject: 0 SU Freq.: 2.25 MHz Rectify: Full Wave
 Search Unit Serial No.: SB0450 Manufacturer: KBA Model: Comp G Size: 0.250" Freq.: 2.25 MHz Center Freq.: N/A Exam Angle: 60° Squint Angle: N/A Measured Angle: 60° Mode: Shear Exit Point: N/A # of Elements: 1 Config.: Single Focus: N/A Shape: Round Contour: Flat Wedge Style: Non-Integral

Cal. Checks	Time	Date
Initial Cal.	2130	3/16/2011
Inter. Cal.	N/A	
Inter. Cal.	N/A	
Inter. Cal.	N/A	
Final Cal.	0040	3/17/2011

Couplant
 Cal. Batch: 06125
 Type: Ultragel II
 Mfg.: Sonotech
 Exam Batch: 06125
 Type: Ultragel II
 Mfg.: Sonotech

Axial Orientated Search Unit			
Calibration Reflector	Signal Amplitude %	Sweep Division	Sound Path
0.5" Notch	80%	6.1	.915"

Circumferential Orientated Search Unit			
Calibration Reflector	Signal Amplitude %	Sweep Division	Sound Path
N/A	N/A	N/A	N/A

Reference/Simulator Block				
Gain dB	Reflector	Signal Amplitude %	Sweep Division	Sound Path
45.0	0.5" Nothc	80%	6.1	.915"

Ax. Gain (dB): 45.0 Circ. Gain (dB): N/A
 1 Screen Div. = .16 in. of Sound Path Type: RG-174 Length: 6' No. Conn.: 0
Calibration Block
 Cal. Block No.: SQ-123 Upstream Downstream Scan dB: 48
 Thickness: 0.5" Dia.: Flat CW CCW Scan dB: N/A
 Cal. Blk. Temp.: 70° Temp. Tool: 558272 Exam Surfaces: OD
 Comp. Temp.: 78° Temp. Tool: 558272 Surface Condition: Flush
 Recordable Indication(s): Yes No (If Yes, Ref. Attached Ultrasonic Indication Report.)
 Results: NRI RI Info

Reference Block
 Serial No.: SQ-123
 Type: Cal Block

Comments: E37688 - Cal Due Date 10/5/2011
558272 - Cal Due Date 1/29/2012
53.4% Code Coverage

Percent Of Coverage Obtained > 90%: No Reviewed Previous Data: Yes

Examiner	Level	Signature	Date	Reviewer	Signature	Date
Brown, Thomas D.	III(N)	<i>Thomas D. Brown</i>	3/17/2011	Matt Welch, LIII	<i>Matt Welch</i>	3/23/11
Examiner	Level	Signature	Date	Site Review	Signature	Date
N/A	N/A			N/A		
Other	Level	Signature	Date	ANII Review	Signature	Date
N/A	N/A				<i>Tom Hand</i>	4/3/11

000526



Supplemental Report

Report No.: UT-11-043

Page: 7 of 9

Summary No.: 05510-ISI-BFN2

Examiner: Brown, Thomas D. Level: III(N)

Reviewer: Matt Welch, LIII

Date: 3/23/11

Examiner: N/A Level: N/A

Site Review: N/A

Date: 3/6/13

Other: N/A Level: N/A

ANII Review: [Signature]

Date: 4/3/11

Comments: None

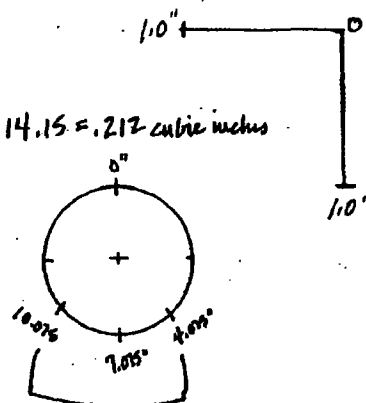
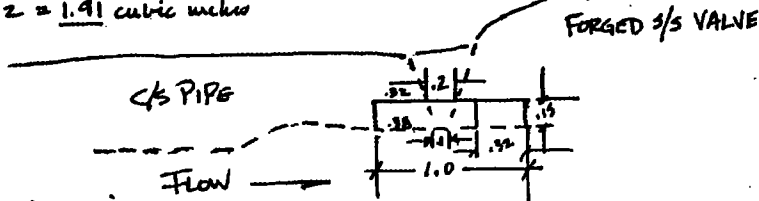
Sketch or Photo: O:\Ideal_Server\Ideal_BFN\Documentation\U2R16 Scanned Data\RCRD-2-50 Coverage Plot.jpg

REQUIRED EXAM VOLUME = $(.15 \times 1.0) \times 14.15 = 2.12$ cubic inches

REQUIRED EXAM VOLUME (RL) = 2.12 cubic inches

REQUIRED EXAM VOLUME (SHEAR) = $[(.2 \times 1.0) \div 2] \times 14.15 = .015 \times 14.15 = .212$ cubic inches

* $2.12 - .212 = 1.91$ cubic inches



Scan limitations:

RL = 6" of circ on elbow intradose for axial scan

RL = D/3 side of weld (valve body) for circ scan.

• Obtained exam volume R/L axial scan:

= $2.12 - [.6 \times 1.5] = 1.22 \div 2.12 = .575 \times 100 = 57.5\%$

• Obtained exam volume R/L circ scan:

= $2.12 - [(.32 \times 1.5) \times 14.15] = 1.44 \div 2.12 = .679 \times 100 = 67.9\%$

• Obtained exam volume shear wave axial and circ scan:

$[(.32 \times 1.5) + ((.06 \times 1.5) \div 2)] \times 14.15 = .743 \div 2.12 = .350 \times 100 = 35\%$

• Obtained exam volume = $57.5 + 67.9 + 35 = 160.4/3 = 53.4\%$



Supplemental Report

Report No.: UT-11-043

Page: 8 of 10

Summary No.: 05510-ISI-BFN2

Examiner: Brown, Thomas D Level: III(N)

Reviewer: Matt Welch, LIII

Date: 3/23/11

Examiner: N/A Level: N/A

Site Review: N/A

Date: 3/24/11

Other: N/A Level: N/A

ANII Review: [Signature]

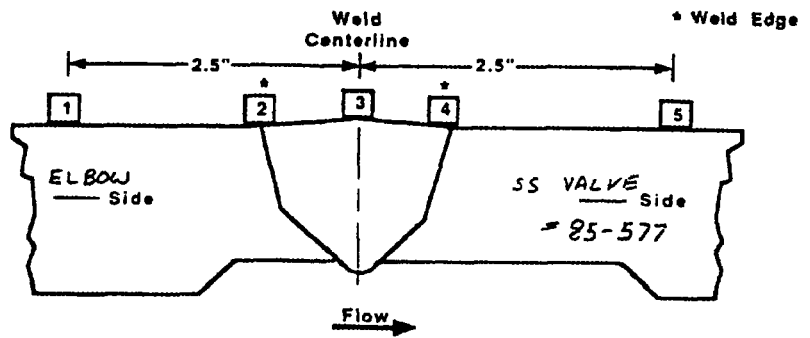
Date: 4/3/11

Comments: None

Sketch or Photo: O:\Ideal_Server\Ideal_BFN\Documentation\U2R16 Scanned Data\RCRD-2-50 T&C.jpg

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

Position	0°	90°	180°	270°
1	.58			
2	.46			
3	.48			
4	N/A			
5	N/A			

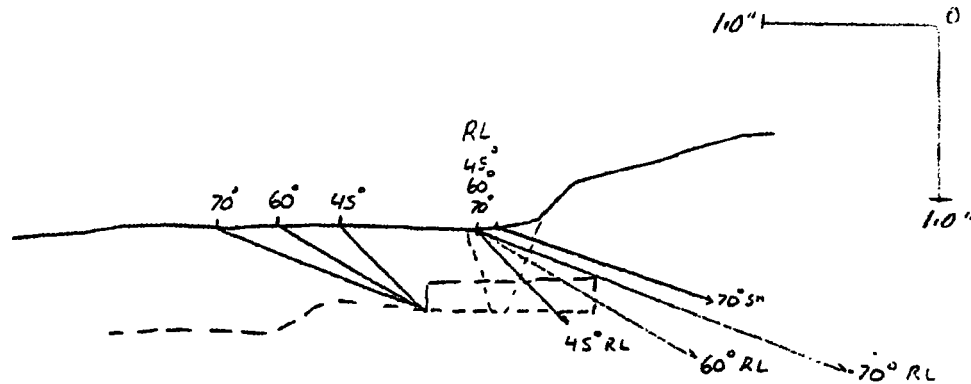


CROWN HEIGHT: ISI PREP

DIAMETER: 4.0"

CROWN WIDTH: 0.4"

WELD LENGTH: 141.15"



COULD NOT SCAN 6.0" OF WELD IN THE ELBOW INNER RADIUS WITH THE RL TRANSDUCERS DUE TO BRIDGING. THE SHEAR WAVE TRANSDUCERS WERE USED FOR THE ENTIRE CIRCUMFERENCE OF THE WELD.


AXIAL RL Scan LIMITATIONS

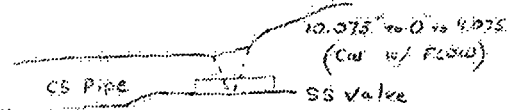
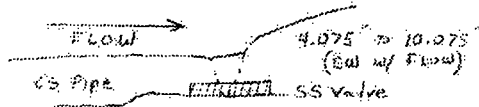
UT-11-043

000528A

RCRD-2-50

Pg. 9 of 10
zlf
3/6/13

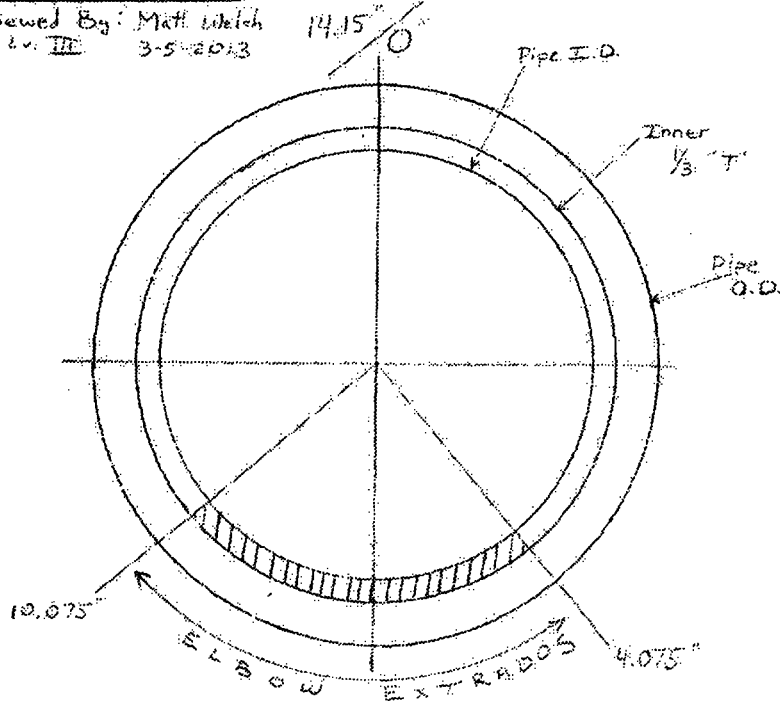
 = LIMITED SCAN COVERAGE




= 57.5% Coverage

DR
Prepared By: Damon Priestley
UT Lv. III 3-5-2013

Walt
Reviewed By: Matt Welch
UT Lv. III 3-5-2013

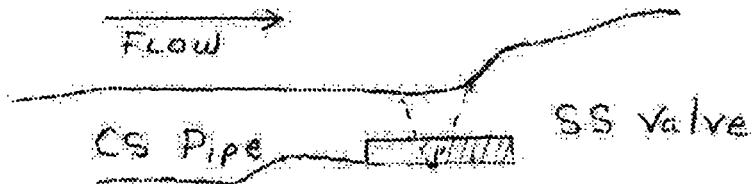


RCRD-2-50

 = LIMITED
SEAM
COVERAGE



RL Circ Limitations
(Represents 360°)
= 67.9% Coverage



Shear Axial & Circ Limitations
(Represents 360°)
= 35% Coverage (of Full Volume)
Incl. Weld

RP

Matt Welch

Prepared By: Damian Priestley
UT Lv. III 3-5-2013

Reviewed By: Matt Welch
UT Lv. III 3-5-2013