

ATTACHMENT A

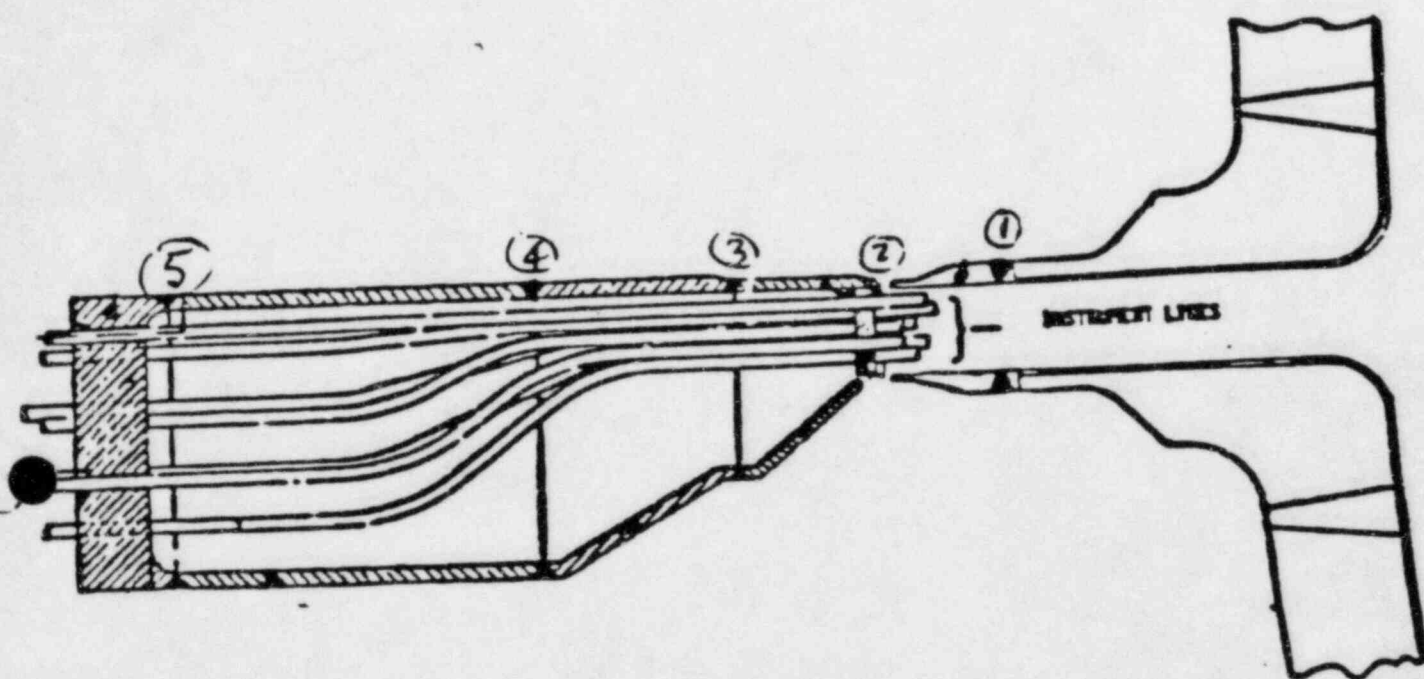
PHILADELPHIA ELECTRIC COMPANY

PEACH BOTTOM ATOMIC POWER STATION

UNIT 3

DOCKET NO. 50-278

ULTRASONIC INDICATIONS IN THE  
JET PUMP INSTRUMENTATION PENETRATIONS  
OF PEACH BOTTOM ATOMIC POWER STATION  
UNIT 3



JET PUMP INSTRUMENTATION  
SEAL AND SAFE END

Peach Bottom No. 3  
Jet Pump Instrumentation Nozzle

Weld # JP-A-2  
Ultrasonic Indication

GECO

0.5"-1.5"

1.0"

SAFE-END

— CIRC. LOCATION —

— TOTAL LENGTH —

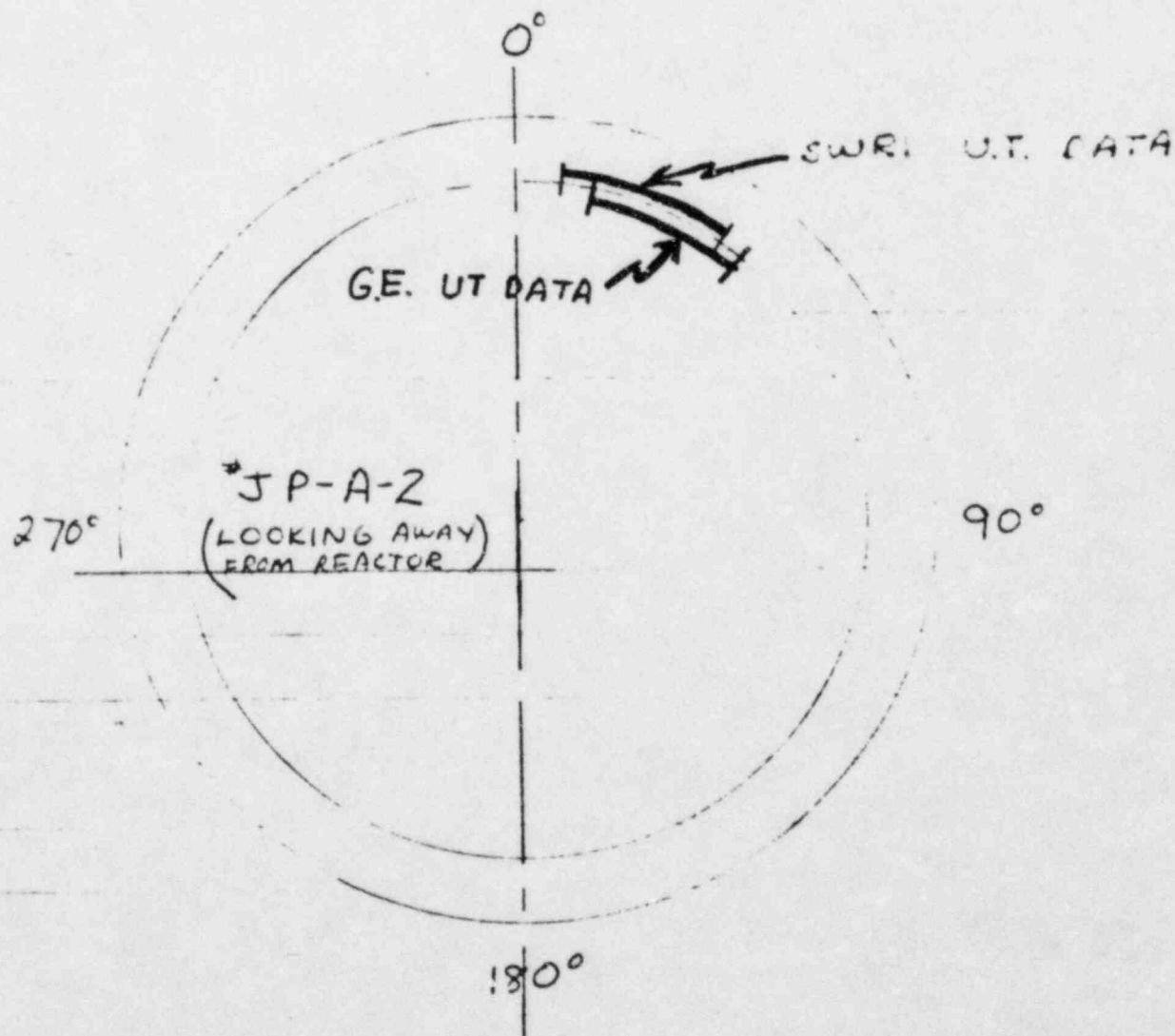
— SIDE OF WELD —

SWRI

0.25"-1.3125"

1.06"

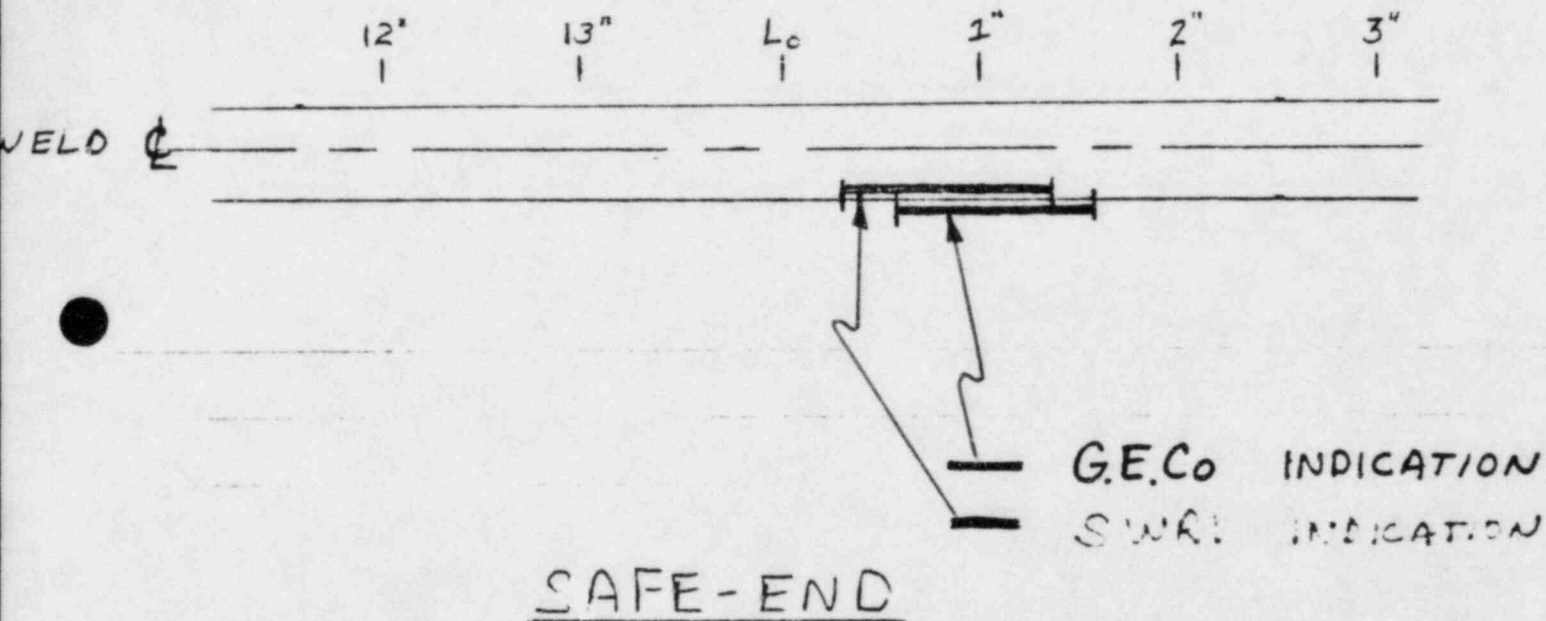
SAFE-END



TLA 6/12/84

Weld # JP-A-2 (CON'T.)

REDUCER



TLA 6/12/84

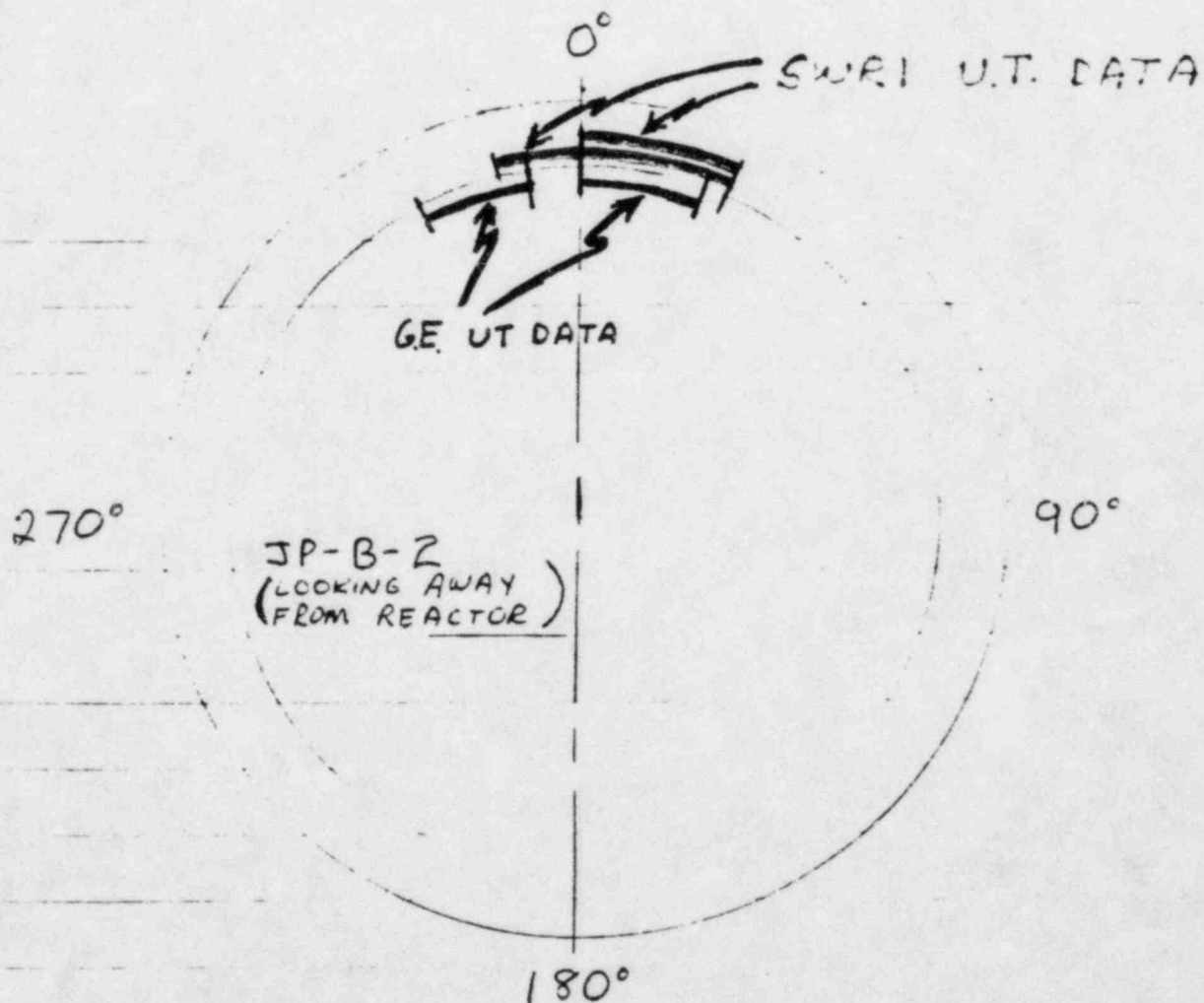
Peach Bottom No 3  
Jet Pump Instrumentation Nozzle

Weld # JP-B-2  
 Ultrasonic Indication

G.E. Co

SWRI

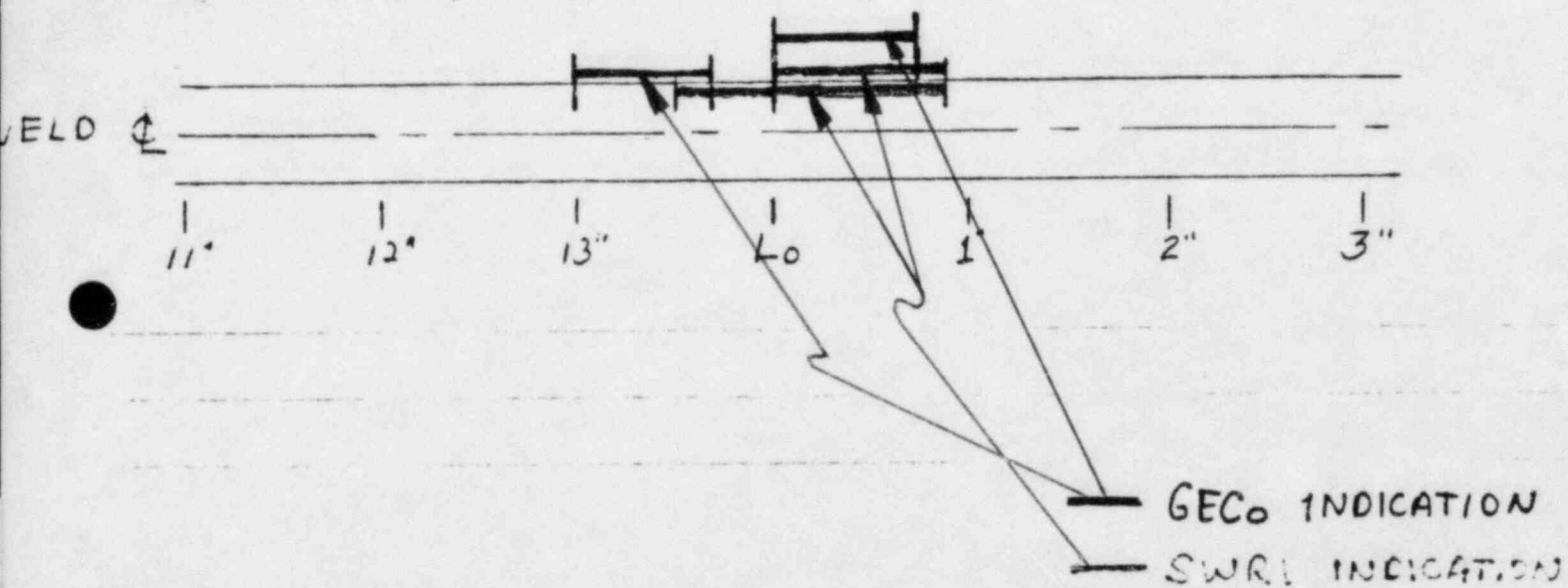
3'-13.7' + 0'-.75'	—	CIRC. LOCATION	—	13 $\frac{1}{2}$ " - $\frac{7}{8}$ " + 0" - $\frac{7}{8}$ "
.7 + .3 + .75 = 1.75'	—	TOTAL LENGTH	—	1.375'
REDUCER	—	SIDE OF WELD	—	REDUCER



TLA 6/12/84

Weld # JP-B-2 (CON'T.)

REDUCER



SAFE - END

TLA 6/12/84



# PIPE UT CALIBRATION DATA SHEET

SITE PEACH BOTTOM UNIT #3 ☐ Preoperational ☒ I.S.I.  
 SYSTEM JET PUMP INST. NOZZLE CALIBRATION BLOCK NO. 6A-PED  
 PROCEDURE NO. 83-1 REV. 4 CALIBRATION SHEET NO. 001  
 DATE 6-10-84 COUPLANT SONOTRACE IIW-2 BLOCK NO. 790339  
 EXAMINER JOHN DECKER ASNT LEVEL III  
 DATA TAKER BILLY ANDERSON ASNT LEVEL II  
 INSTRUMENT MODEL NO. SONIC MK-1 INSTRUMENT SERIAL NO. 08053E  
 CABLE NO. C-1 CABLE TYPE BUL-MCD CABLE LENGTH 6'

## TRANSDUCER DATA

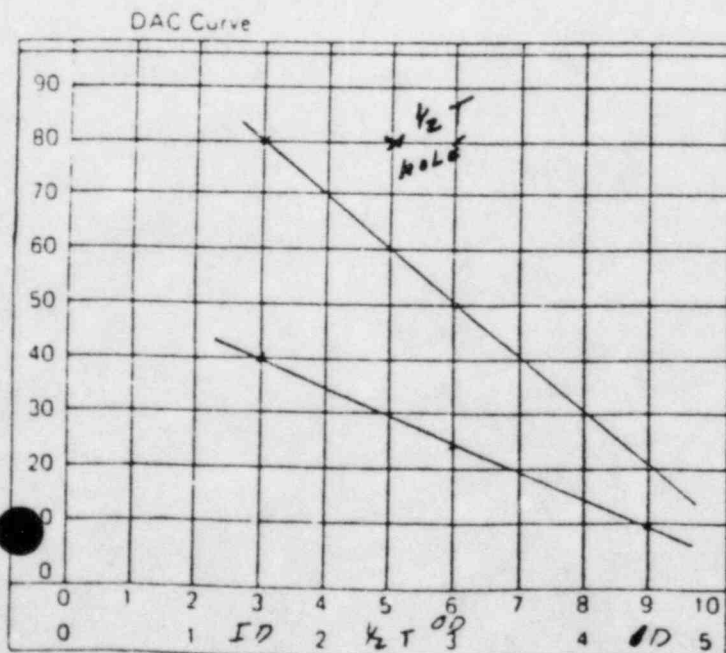
	STRAIGHT BEAM	ANGLE BEAM
SERIAL NO.		<u>E02408</u>
IDENTITY		<u>GAMMA</u>
FREQUENCY		<u>1.5 MHZ</u>
SIZE		<u>1375</u>

SHOE TYPE LUCITE  
 SHOE NO. SSI-4  
 SHOE ANGLE 45°  
 MODE SHEAR

REFLECTORS ORIENTED ☐ PARALLEL ☐ OR ☐ TRANSVERSE TO WELD SEAM (Cross Out One)  
 COUPLANT SONOTRACE

CAL STD TEMP \_\_\_\_\_

## INSTRUMENT SETTINGS:



	START	FINISH
Uncalibrated Gain	<u>N/A</u>	<u>N/A</u>
Coarse Sweep	<u>N/A</u>	<u>N/A</u>
Fine Sweep	<u>1-32</u>	<u>1-32</u>
Coarse Range	<u>5</u>	<u>5</u>
Fine Range	<u>1.22</u>	<u>1.22</u>
Scanning Gain	<u>78</u>	<u>78</u>
Attenuation (in)	<u>N/A</u>	<u>N/A</u>
Evaluating Gain	<u>72</u>	<u>72</u>
Attenuation (in)	<u>N/A</u>	<u>N/A</u>
Filter Position	<u>H1</u>	<u>H1</u>
Rep Rate	<u>3K</u>	<u>3K</u>
Damping	<u>MIN</u>	<u>MIN</u>
Reject	<u>OFF</u>	<u>OFF</u>



# PIPE UT CALIBRATION DATA SHEET

SITE PEACH BOTTOM UNIT #3 ☐ Preoperational ☒ I.S.I.  
 SYSTEM JET PUMP INST. NOZZLE CALIBRATION BLOCK NO. 6A-PED  
 PROCEDURE NO. 83-1 REV. 4 CALIBRATION SHEET NO. 001  
 DATE 6-10-84 COUPLANT SONOTRAC IIW-2 BLOCK NO. 790339  
 EXAMINER JOHN DECKER ASNT LEVEL III  
 DATA TAKER BILLY ANDERSON ASNT LEVEL II  
 INSTRUMENT MODEL NO. SONIC MK-1 INSTRUMENT SERIAL NO. 08053E  
 CABLE NO. C-1 CABLE TYPE BUL-MCD CABLE LENGTH 6'

## TRANSDUCER DATA

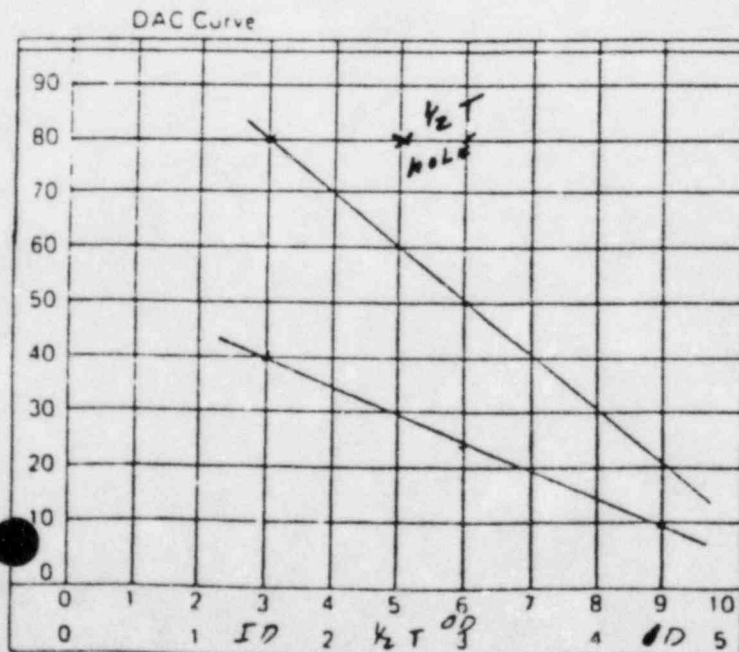
STRAIGHT BEAM ANGLE BEAM  
 SERIAL NO. E02408  
 IDENTITY GAMMA  
 FREQUENCY 1.5 MHZ  
 SIZE 1375

SHOE TYPE LUCITE  
 SHOE NO. SSI-4  
 SHOE ANGLE 45°  
 MODE SHEAR

REFLECTORS ORIENTED ☐ PARALLEL ☐ COUPLANT SONOTRAC  
 or TO WELD SEAM (Cross Out One)  
☐ TRANSVERSE

CAL STD TEMP \_\_\_\_\_

## INSTRUMENT SETTINGS:



	START	FINISH
Uncalibrated Gain	N/A	N/A
Coarse Sweep	N/A	N/A
Fine Sweep	1-32	1-32
Coarse Range	5	5
Fine Range	1.22	1.22
Scanning Gain	78	78
Attenuation (in)	N/A	N/A
Evaluating Gain	72	72
Attenuation (in)	N/A	N/A
Filter Position	H1	H1
Rep Rate	3K	3K
Damping	MIN	MIN
Reject	OFF	OFF

	Hole Depth "T" Inches	Gain @ 1X	Max. Amp.	"W" Inch	D or MP Inch	SDH or FBH
	1/4	1X				
	1/2	.659	1X	80%	.6	50
ID	<del>3/4</del> 7/8	1X	80%	.7	30	
OD	2% T.D. Notch 1.436	1X	50%	1.4	60	N/A
ID	2% O.D. Notch 2.154	1X	20%	1.95	90	N/A

Initial Calibration Time 14/07

Periodic Checks:

Time	Value	Last Data Sheet

Final Check:

1500 100% 003

Calibration in Depth (D) ☐ or Metal Path (MP) ☐

Amplitude Linearity Check (Made Daily)					
100% FSH	<u>50</u>	% FSH	50% FSH	<u>25</u>	% FSH
90% "	<u>45</u>	"	40% "	<u>20</u>	"
80% "	<u>40</u>	"	30% "	<u>15</u>	"
70% "	<u>35</u>	"	20% "	<u>10</u>	"
60% "	<u>30</u>	"			

Control Linearity (Made Daily)		
80% FSH	-6db	<u>40</u> (32-48)
80% "	-12db	<u>20</u> (16-24)
40% "	+ 6db	<u>80</u> (64-96)
20% "	+12db	<u>80</u> (64-96)

Equip. Data - Straight Beam For Linearity Checks	
11W-2	<u>790339</u>
Transducer Data:	
Serial No.	<u>E02408</u>
Beam Angle	<u>45°</u>
Size	<u>.375</u> Freq. <u>1.5 MHz</u>
Shoe No.	<u>SS1-4</u> Cable No. <u>C-1</u>
Check Made By.	
<u>John Decker</u>	

Checks on 11W-2

Block on 1/8" SDH for Field Calib

Checks @ Max Amp. for Both Near & Far

Positions in % Screen Height

1/8" SDH	Near	Far
Max. Amp.	%	%
Metal Path	"	"

Reviewed by Wade H Miller III  
SNT-TC Level



## ULTRASONIC EXAMINATION DATA FORM

Exam Form 003

Cal. Form No. 001

Site PEACH BOTTOM UNIT 3 ☐ Preoperational ☐ I.S.I. Date 6-10-84  
 Weld Type PWT

Site PEARL HARBOR Weld No. JP-B-1 Weld Type RWT  
System JET PUMP INSTAL ASNT Level III

System \_\_\_\_\_ ASNT Level II  
Examiner John DECKER ASNT Level II

Examiner Steve ASNT Level II  
Data Taker BILLY ANDERSON 83-1 4

Data Taker W. J. R. 1 U.T. Procedure 83-1 Rev. 7  
Search Angle 45° 7218

Search Angle \_\_\_\_\_  
Scan Sens X2 78dB Other STAINLESS STEEL Evaluation Sens: X1 72dB

Couplant SONOTRACE

EXAMINATIONS:

- 1 Angle beam for reflectors parallel to weld
- 2 Angle beam for reflectors transverse to weld  
(clockwise and counter clockwise)

Benchmark or Referenced "O" Location: TDC

$$L_0 = \underline{TDC} \quad W_0 = \underline{\text{£}}$$

Performed		Indication	
Yes	No	Yes	No
X			+
X			X

[illegible]

Reviewed by Wade H. Miller

ASNT-TC-1A Level

☐ 11



# PIPE UT CALIBRATION DATA SHEET

SITE PEACH BOTTOM UNIT 3 ☐ Preoperational ☒ I.S.I.  
 SYSTEM JET PUMP INST NOZZLE CALIBRATION BLOCK NO. 21-PFB  
 PROCEDURE NO. 83-1 REV. 4 CALIBRATION SHEET NO. 004  
 DATE 6-10-84 COUPLANT SONO TRACE IIW-2 BLOCK NO. 790339  
 EXAMINER BILLY ANDERSON ASNT LEVEL II  
 DATA TAKER JOHN DECKER ASNT LEVEL III  
 INSTRUMENT MODEL NO. SONIC MK-1 INSTRUMENT SERIAL NO. 08053E  
 CABLE NO. C-1 CABLE TYPE BK 70 MCD CABLE LENGTH 6'

## TRANSDUCER DATA

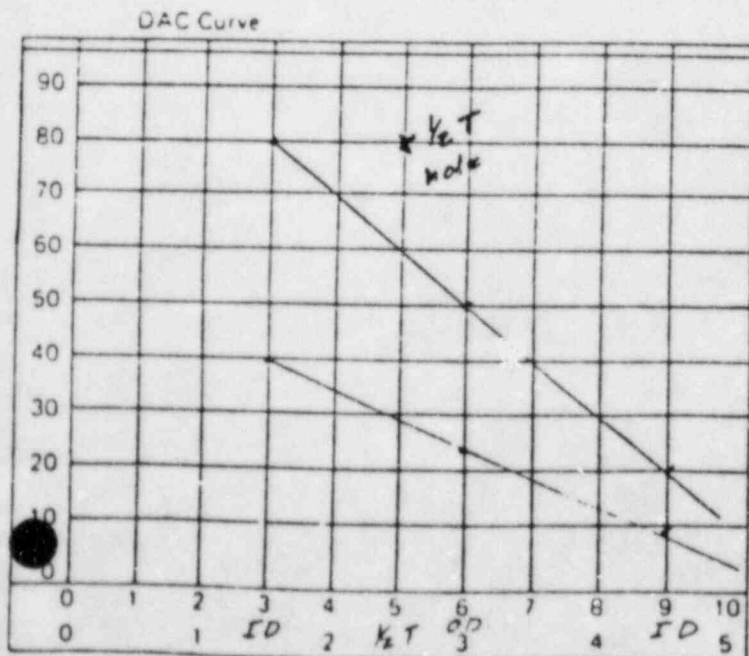
STRAIGHT BEAM ANGLE BEAM  
 SERIAL NO. EO2408  
 IDENTITY GAMMA  
 FREQUENCY 1.5 MHZ  
 SIZE .375"

SHOE TYPE LUCITE  
 SHOE NO. 551-4  
 SHOE ANGLE 45°  
 MODE SHEAR

REFLECTORS ORIENTED PARALLEL OR TRANSVERSE TO WELD SEAM (Cross Out One)  
 COUPLANT SONO TRACE

CAL STD TEMP \_\_\_\_\_

## INSTRUMENT SETTINGS:



Uncalibrated Gain  
 Coarse Sweep  
 Fine Sweep  
 Coarse Range  
 Fine Range  
 Scanning Gain  
 Attenuation (in)  
 Evaluating Gain  
 Attenuation (in)  
 Filter Position  
 Rep Rate  
 Damping  
 Reject

START	FINISH
N/A	N/A
N/A	N/A
1.32	1.32
5	5
1.22	1.22
72	72
N/A	N/A
66	66
N/A	N/A
H1	H1
3K	3K
MIN	MIN
off	off

004

Hole Depth "T" Inches	Gain @ 1X	Max. Amp.	"W" Inch	D or MP Inch	SDH or FBH
1/4	1X				
1/2 .45	1X	80%	.4	50	SDH
<del>ID</del> <del>3/4</del> .718	1X	80	.7	30	
<del>2% I.D.</del> <del>Notch</del> 1.436	1X	50	1.4	60	N/A
<del>2% O.D.</del> <del>Notch</del> 2.154	1X	20	1.95	90	N/A

OD

ID

Initial Calibration Time 1100

Periodic Checks:

Time	Value	Last Data Sheet
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Final Check:

1200 100% 006

Calibration in Depth (D) ☐ or Metal Path (MP) ☐

Amplitude Linearity Check (Made Daily)					
100% FSH	<u>50</u>	% FSH	50% FSH	<u>25</u>	% FSH
90% "	<u>45</u>	"	40% "	<u>20</u>	"
80% "	<u>40</u>	"	30% "	<u>15</u>	"
70% "	<u>35</u>	"	20% "	<u>10</u>	"
60% "	<u>30</u>	"			

Control Linearity (Made Daily)		
80% FSH	-6db <u>40</u>	(32-48)
60% "	-12db <u>20</u>	(16-24)
40% "	+ 6db <u>80</u>	(64-96)
20% "	+12db <u>80</u>	(64-96)

Equip. Data - Straight Beam For Linearity Checks	
11W-2	<u>790339</u>
Transducer Data:	
Serial No.	<u>E02408</u>
Beam Angle	<u>45°</u>
Size	<u>.375</u> Freq. <u>1.5 MHz</u>
Shoe No.	<u>SSI-4</u> Cable No. <u>C-1</u>
Check Made By:	
<u>JOHN DECKER</u>	

Checks on 11W-2

Block on 1/8" SDH for Field Calib  
Checks @ Max Amp. for Both Near & Far  
Positions in % Screen Height

1/8" SDH	Near	Far
Max. Amp.	%	%
Metal Path	"	"

Reviewed by Wade F. Miller III  
SNT-TC Level







# PIPE UT CALIBRATION DATA SHEET

SITE PEACH BOTTOM UNIT 3 ☐ Preoperational ☒ I.S.I.  
 SYSTEM JET PUMP INST. NOZZLE CALIBRATION BLOCK NO. HT-6274  
 PROCEDURE NO. 83-1 REV. 4 CALIBRATION SHEET NO. 007  
 DATE 6-10-84 COUPLANT SONOTRACE IIW-2 BLOCK NO. 790339  
 EXAMINER JOHN DECKER ASNT LEVEL III  
 DATA TAKER BILLY ANDERSON ASNT LEVEL II  
 INSTRUMENT MODEL NO. SONIC MK-1 INSTRUMENT SERIAL NO. 04057E  
 CABLE NO. C-2 CABLE TYPE BNC TO MCD CABLE LENGTH 6'

## TRANSDUCER DATA

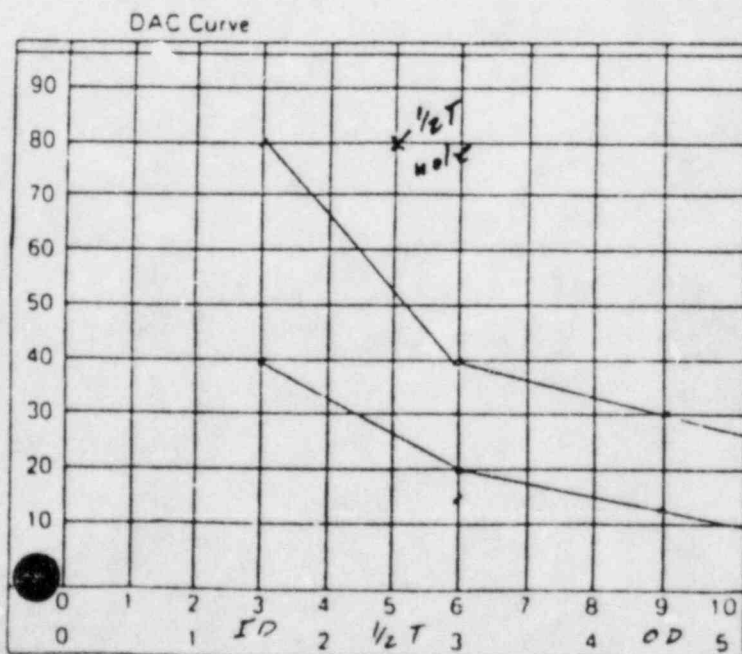
STRAIGHT BEAM ANGLE BEAM  
 SERIAL NO. K17925  
 IDENTITY CANMA  
 FREQUENCY 2.25 MHZ  
 SIZE 1.25"

SHOE TYPE LUCITE  
 SHOE NO. SS1-5  
 SHOE ANGLE 45°  
 MODE SHEAR

REFLECTORS ORIENTED PARALLEL OR COUPLANT SONOTRACE  
TRANSVERSE TO WELD SEAM (Cross Out One)

CAL STD TEMP \_\_\_\_\_

## INSTRUMENT SETTINGS:



	START	FINISH
Uncalibrated Gain	N/A	N/A
Coarse Sweep	N/A	N/A
Fine Sweep	5.68	5.68
Coarse Range	1	1
Fine Range	1.66	1.66
Scanning Gain	62	62
Attenuation (in)	N/A	N/A
Evaluating Gain	56	56
Attenuation (in)	N/A	N/A
Filter Position	H1	H1
Rep Rate	3K	3K
Damping	MIN	MIN
Reject	OFF	OFF

007

Hole Depth "T"	Inches	Gain @ 1X	Max. Amp.	"W" Inch	D or MP Inch	SDH or FBH
1/4		1X				
1/2	.16	1X	80%	.4	50	SDH
1D 2/4	.33	1X	80%	.4	30	
2D Notch	.66	1X	40%	0.85	60	N/A
FD 2D Notch	.99	1X	30%	1.15	90	N/A

Initial Calibration Time 1500

Periodic Checks:

Time	Value	Last Data Sheet

Final Check:

1600 100% 009Calibration in Depth (D) ☐ or Metal Path (MP) ☐

Amplitude Linearity Check (Made Daily)					
100%FSH	<u>48</u>	% FSH	50% FSH	<u>25</u>	% FSH
90% "	<u>45</u>	"	40% "	<u>20</u>	"
80% "	<u>40</u>	"	30% "	<u>15</u>	"
70% "	<u>35</u>	"	20% "	<u>10</u>	"
60% "	<u>28</u>	"			

Control Linearity (Made Daily)		
80%FSH	-6db	<u>40</u> (32-48)
80% "	-12db	<u>20</u> (16-24)
40% "	+ 6db	<u>80</u> (64-96)
20% "	+12db	<u>80</u> (64-96)

Equip. Data - Straight Beam  
For Linearity Checks11W-2 790339

Transducer Data:

Serial No. E02406Beam Angle 45°Size 125 Freq. 2.25 MHzShoe No. SSI-3 Cable No. C-2

Check Made By:

John Decker

Checks on 11W-2

Block on 1/8" SDH for Field Calib.

Checks @ Max Amp. for Both Near &amp; Far

Positions in % Screen Height

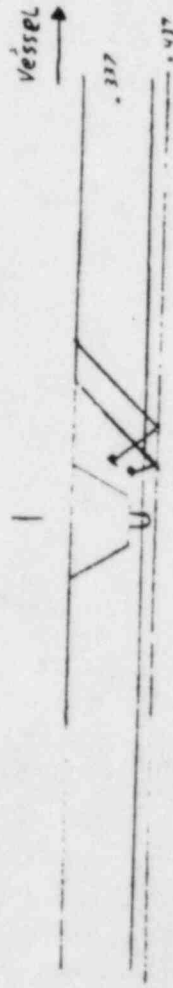
1/8" SDH	Near	Far
Max. Amp.	%	%
Metal Path	"	"

Reviewed by Madette Miller III  
SNT TC Level



JET PUMP INSTANT

WELD # JPA-  
DATA SHEET 008  
CAL SHEET 007



SHORT MP = W.7 MP 4.2 t = .360  
SHORT MP = W.9 MP 5.0 t = .360

CAN NOT PEAR INDICATION DUE TO WELD CROWN  
STOPPING FORWARD MOVEMENT AT SEVEN UNIT.

$$l = .75''$$

$$d = .175'' \text{ etc}$$

$$t = .360'' \text{ (UT MEASUREMENT)}$$

$$d/l = .23$$

$$d/t \% = 48.6$$

Photo. J. H. H. H.  
WE DARESSO L. L.  
10.11.1977

## ULTRASONIC EXAMINATION DATA FORM

Exam Form 009

Cal. Form No. 007

Site PEACH BOTTOM UNIT 3 ☐ Preoperational ☐ I.S.I. Date 6-10-84

System JET PUMP INST NOZZLE Weld No. JP-B-2 Weld Type PLTT

Examiner John Decker ASNT Level III

Data Taker BILLY ANDERSON ASNT Level II

Search Angle 45° U.T. Procedure 83-1 Rev. 4

Scan Sens: X2 62dB Other \_\_\_\_\_ Evaluation Sens: X1 56dB

Couplant SONOTRACE

EXAMINATIONS:

- 1 Angle beam for reflectors parallel to weld
- 2 Angle beam for reflectors transverse to weld  
(clockwise and counter clockwise)

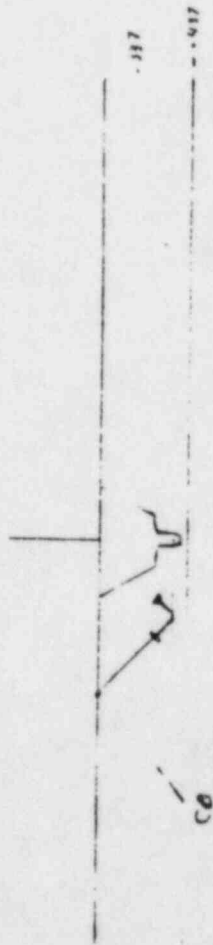
Benchmark or Referenced "O" Location: TDC

$L_0 = \underline{TDC}$        $W_0 = \underline{2 CF WELD}$

Performed		Indication	
Yes	No	Yes	No
+		+	
+			+

[illegible]Reviewed by Wade H. Miller ASNT TC-1A Level ☐ II ☒ III

JET PUMP INSTRUMENT  
WELL # JPB-2



SHORT MP : W.B MP 2.8 T : .337

SHORT MP : W.B MP 3.6 T : .117

Both reflections originate at the same W DISTANCE  
AT DIFFERENT MEASUREMENTS THIS IS INDICATIVE  
OF AERATION.

Kelowna City Plot  
Made by Miller  
GE DARESO ESC  
LEVEL III



INSTALLATION & SERVICE  
ENGINEERING DIVISION

## PIPE UT CALIBRATION DATA SHEET

SITE PEACH BOTTOM UNIT #3

☐ Preoperational ☒ I.S.I.

SYSTEM FEI PUMP INST. NOZZLE

CALIBRATION BLOCK NO. 5-A-PEB

PROCEDURE NO. 83-1 REV. 4

CALIBRATION SHEET NO. 010

DATE 6-10-84 COUPLANT SONOTRAC

IIW-2 BLOCK NO. 790337

EXAMINER BILLY ANDERSON

ASNT LEVEL II

DATA TAKER JOHN DECKER

ASNT LEVEL III

INSTRUMENT MODEL NO. SONIC MK-1

INSTRUMENT SERIAL NO. 08053E

CABLE NO. C-1 CABLE TYPE BNC - MCD CABLE LENGTH 6'

### TRANSDUCER DATA

STRAIGHT  
BEAM

ANGLE BEAM

SERIAL NO. 1E02408  
IDENTITY GAMMA  
FREQUENCY 1.5 MHz  
SIZE 1375

SHOE TYPE LUCITE

SHOE NO. SSI-4

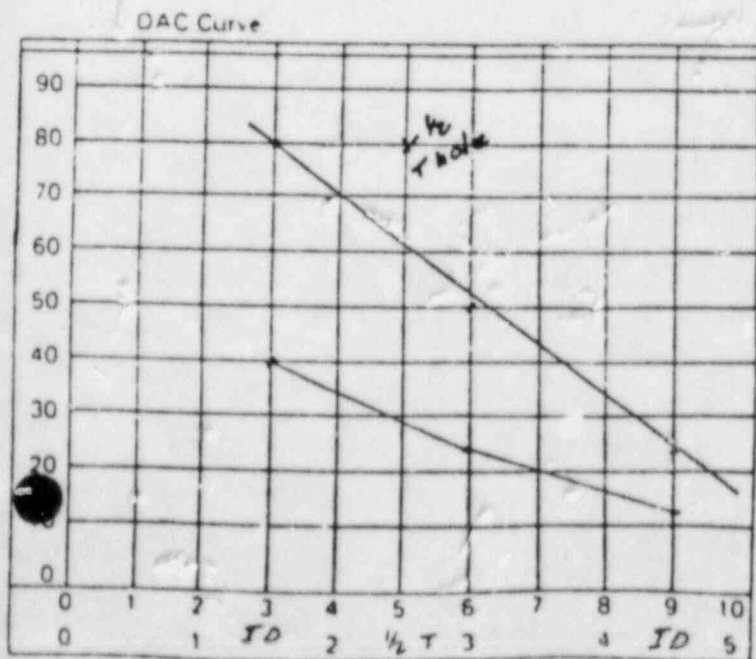
SHOE ANGLE 45°

MODE SHEAR

REFLECTORS ORIENTED PARALLEL OR COUPLANT SONOTRAC  
TRANSVERSE TO WELD SEAM (Cross Out One)

CAL STD TEMP \_\_\_\_\_

### INSTRUMENT SETTINGS:



Uncalibrated Gain

Coarse Sweep

Fine Sweep

Coarse Range

Fine Range

Scanning Gain

Attenuation (in)

Evaluating Gain

Attenuation (in)

Filter Position

Rep Rate

Damping

Reject

START	FINISH
N/A	N/A
N/A	N/A
5.68	5.68
1	1
7.02	7.02
59	59
N/A	N/A
53	53
N/A	N/A
MIN	MIN
MIN	MIN
OFF	OFF

Q10

	Hole Depth "T"	Inches	Gain @ 1X	Max. Amp.	"W" Inch	D or MP Inch	SDH or FBH
	1/4		1X				
	1/2	.216	1X	80%	.5	50	SDH
ID	<del>3/4</del>	.432	1X	80%	.4	30	
OD	<del>2 1/4</del> Notch	.864	1X	50%	.9	60	N/A
ID	<del>2 1/4</del> Notch	1.264	1X	35%	1.350	90	N/A

Initial Calibration Time 1800

Periodic Checks:

Time	Value	Last Data Sheet
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Final Check:

1950 100% 012

Calibration in Depth (D) ☐ or Metal Path (MP) ☐

Amplitude Linearity Check (Made Daily)					
100%FSH	<u>50</u>	% FSH	50% FSH	<u>25</u>	% FSH
90% "	<u>45</u>	"	40% "	<u>20</u>	"
80% "	<u>40</u>	"	30% "	<u>15</u>	"
70% "	<u>35</u>	"	20% "	<u>10</u>	"
60% "	<u>30</u>	"			

Control Linearity (Made Daily)		
80%FSH	-6db	<u>40</u> (32-48)
80% "	-12db	<u>20</u> (16-24)
40% "	+ 6db	<u>80</u> (64-96)
20% "	+12db	<u>80</u> (64-96)

Equip. Data - Straight Beam For Linearity Checks	
11W-2	<u>790359</u>
Transducer Data	
Serial No.	<u>E02408</u>
Beam Angle	<u>45°</u>
Size	<u>.375</u> Freq. <u>1.5 MHz</u>
Shoe No.	<u>SSI-4</u> Cable No. <u>C-1</u>
Check Made By:	
<u>John Decker</u>	

Checks on 11W-2

Block on 1/8" SDH for Field Calib

Checks @ Max Amp. for Both Near & Far

Positions in % Screen Height

1/8" SDH	Near	Far
Max. Amp.	%	%
Metal Path	"	"

Reviewed by Wade H. Mullen III  
SNT-TC Level







# PIPE UT CALIBRATION DATA SHEET

SITE PEACH BOTTOM UNIT 3 ☐ Preoperational ☒ I.S.I.  
 SYSTEM JET PUMP INST NOZZLE CALIBRATION BLOCK NO. HA-PEB  
 PROCEDURE NO. 83-1 REV. 4 CALIBRATION SHEET NO. 013  
 DATE 6-9-84 COUPLANT SONOTRAC IIW-2 BLOCK NO. 790339  
 EXAMINER BILLY ANDERSON ASNT LEVEL II  
 DATA TAKER JOHN DECKER ASNT LEVEL III  
 INSTRUMENT MODEL NO. SONIC MK-1 INSTRUMENT SERIAL NO. 04057E  
 CABLE NO. C-2 CABLE TYPE BNC-MCD CABLE LENGTH 6'

## TRANSDUCER DATA

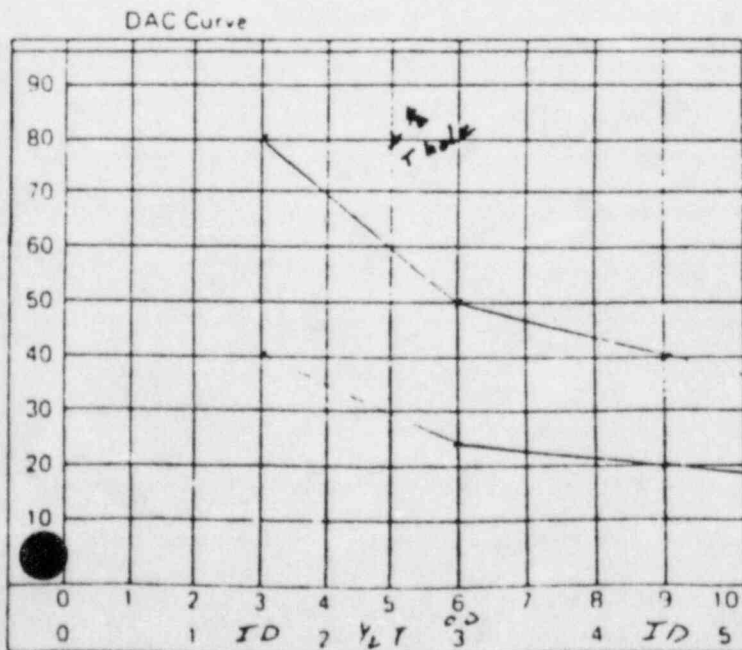
STRAIGHT BEAM ANGLE BEAM  
 SERIAL NO. LE02408  
 IDENTITY GAMMA  
 FREQUENCY 1.5 MHZ  
 SIZE .375

SHOE TYPE LUCITE  
 SHOE NO. SSI-3  
 SHOE ANGLE 45°  
 MODE SHEAR

REFLECTORS ORIENTED PARALLEL OR COUPLANT SONOTRAC  
TRANSVERSE TO WELD SEAM (Cross Out One)

CAL STD TEMP \_\_\_\_\_

## INSTRUMENT SETTINGS:



Uncalibrated Gain  
 Coarse Sweep  
 Fine Sweep  
 Coarse Range  
 Fine Range  
 Scanning Gain  
 Attenuation (in)  
 Evaluating Gain  
 Attenuation (in)  
 Filter Position  
 Rep Rate  
 Damping  
 Reject

START	FINISH
N/A	N/A
N/A	N/A
0	0
5	5
1	1
51	51
N/A	N/A
45	45
N/A	N/A
H1	H1
3K	3K
MIN	MIN
OFF	OFF

	Hole Depth "T" Inches	Gain @ 1X	Max. Amp.	"W" Inch	D or MP Inch	SDH or FBH
	1/4	1X				
	1/2 .345	1X	80%	.4	50	SDH
IP	<del>3/4</del> .689	1X	80%	.55	30	
OD	<del>2 1/2 D. Notch</del> 1.354	1X	50%	1.1	60	N/A
ID	<del>2 1/2 D. Notch</del> 2.081	1X	40%	1.7	90	N/A

Initial Calibration Time 1900

Periodic Checks:

Time	Value	Last Data Sheet
_____	_____	_____
_____	_____	_____
_____	_____	_____

Final Check:

2000 100% 017

Calibration in Depth (D) ☐ or Metal Path (MP) ☐

Amplitude Linearity Check (Made Daily)					
100% FSH	<u>48</u>	% FSH	50% FSH	<u>25</u>	% FSH
90% "	<u>45</u>	"	40% "	<u>20</u>	"
80% "	<u>40</u>	"	30% "	<u>15</u>	"
70% "	<u>35</u>	"	20% "	<u>10</u>	"
60% "	<u>28</u>	"			

Control Linearity (Made Daily)		
80% FSH	-6db <u>40</u>	(32-48)
80% "	-12db <u>20</u>	(16-24)
40% "	+ 6db <u>80</u>	(64-96)
20% "	+12db <u>80</u>	(64-96)

Equip. Data - Straight Beam For Linearity Checks	
11W-2	<u>790339</u>
Transducer Data:	
Serial No.	<u>E02406</u>
Beam Angle	<u>45°</u>
Size	<u>.375</u> Freq. <u>1.5 MHz</u>
Shoe No.	<u>SSI-3</u> Cable No. <u>C-2</u>
Check Made By:	
<u>John Decker</u>	

Checks on 11W-2

Block on 1/8" SDH for Field Calib

Checks @ Max Amp. for Both Near & Far  
Positions in % Screen Height

1/8" SDH	Near	Far
Max. Amp.	%	%
Metal Path	"	"

Reviewed by Wade H. Miller III  
SNT-TC Level



## ULTRASONIC EXAMINATION DATA FORM

Exam Form 015

Cal. Form No. 013

Site PEAK BOTTOM UNIT 3 ☐ Preoperational ☒

I.S.I. Date 6-10-84

System JET PUMP INST. NOZZLE Weld No. JP-B-4

Weld Type BUTT

Examiner Billy Anderson

ASNT Level II

Data Taker John Döcker

ASNT Level III

Search Angle 450 U.T. Procedure 8

Rev. 2/

Scan Sens: X2 51dB Other: \_\_\_\_\_

Evaluation Sens: X1 45dB

Couplant SONOTRACE

EXAMINATIONS:

1. Angle beam for reflectors parallel to weld
2. Angle beam for reflectors transverse to weld (clockwise and counter clockwise)

Benchmark or Referenced "O" Location: TDC

$L_0 = \underline{\text{TOC}}$        $W_0 = \underline{\text{2 CF WELD}}$

Performed		Indication	
Yes	No	Yes	No
X			X
X			X

[illegible]

Reviewed by Wade B. Miller ASNT-TC-1A Level

☐ 11 111





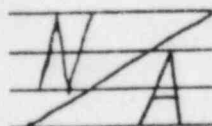


# PIPE UT CALIBRATION DATA SHEET

SITE PEACH BOTTOM UNIT 3 ☐ Preoperational ☒ I.S.I.  
SYSTEM JET PUMP INST. NOZZLE CALIBRATION BLOCK NO. 6A-PEB  
PROCEDURE NO. 83-1 REV. 4 CALIBRATION SHEET NO. 018  
DATE 6-10-84 COUPLANT SONOTRACE IIW-2 BLOCK NO. 790339  
EXAMINER J. DECKER ASNT LEVEL III  
DATA TAKER B. ANDERSON ASNT LEVEL II  
INSTRUMENT MODEL NO. SONIC MK-1 INSTRUMENT SERIAL NO. 04057E  
CABLE NO. C-2 CABLE TYPE BNC TO MCD CABLE LENGTH 6'

## TRANSDUCER DATA

STRAIGHT BEAM ANGLE BEAM  
SERIAL NO. 023752  
IDENTITY GAMMA  
FREQUENCY 5 MHz  
SIZE .25



SHOE TYPE N/A

SHOE NO. N/A

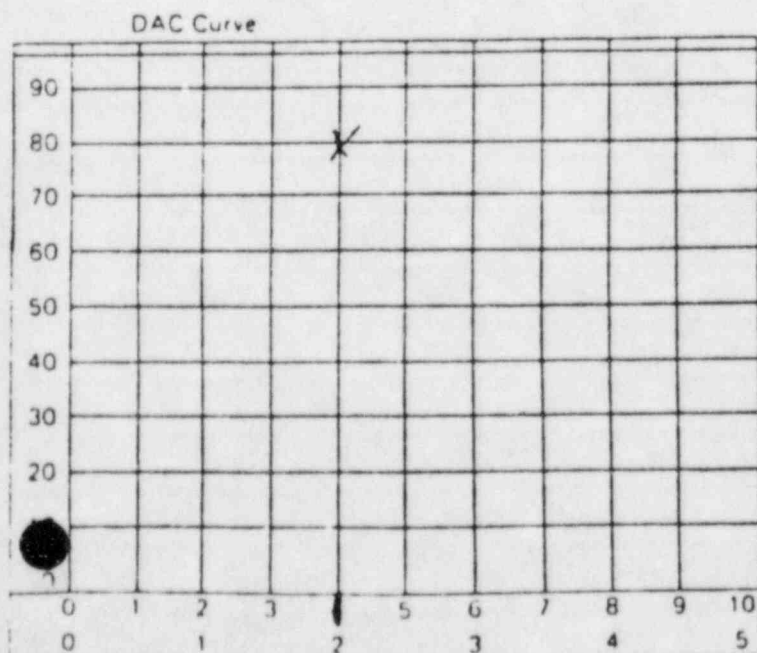
SHOE ANGLE 0°

MODE LONGITUDINAL

REFLECTORS ORIENTED PARALLEL OR TRANSVERSE TO WELD SEAM (Cross Out One)

CAL STD TEMP \_\_\_\_\_

## INSTRUMENT SETTINGS:



Uncalibrated Gain  
Coarse Sweep  
Fine Sweep  
Coarse Range  
Fine Range  
Scanning Gain  
Attenuation (in)  
Evaluating Gain  
Attenuation (in)  
Filter Position  
Rep Rate  
Damping  
Reject

START	FINISH
N/A	N/A
N/A	N/A
.89	.89
1	1
.57	.57
54dB	54dB
N/A	N/A
48dB	48dB
N/A	N/A
H1	H1
3K	3K
MIN	MIN
OFF	OFF

018

IT

Hole Depth "T"   Inches		Gain @ 1X	Max. Amp.	"W" Inch	D or MP Inch	SDH or FBH
1/4	718	1X	80%	N/A	4.0	N/A
1/2	N/A	1X	N/A	N/A	N/A	N/A
3/4	N/A	1X	N/A	N/A	N/A	N/A
2% D. Notch	N/A	1X	N/A	N/A	N/A	N/A
2% D. Notch	N/A	1X	N/A	N/A	N/A	N/A

Calibration in Depth (D) ☐ or Metal Path (MP) ☐

Initial Calibration Time 1600

Periodic Checks:

Time Value Last  
Data Sheet

Final Check:

1615 100% 020

### Amplitude Linearity Check (Made Daily)

100% FSH 48 % FSH 50% FSH 25 % FSH  
 90% " 45 " 40% " 20 "  
 80% " 40 " 30% " 15 "  
 70% " 35 " 20% " 10 "  
 60% " 28 "

### Control Linearity (Made Daily)

80% FSH -6db 40 (32-48)  
 80% " -12db 20 (16-24)  
 40% " +6db 80 (64-96)  
 20% " +12db 80 (64-96)

### Equip Data - Straight Beam For Linearity Checks

11W-2 790339

Transducer Data:

Serial No. E02406Beam Angle 450Size .375 \* Freq. 1.5 MHzShoe No. SSI-3 Cable No. C-2

Check Made By:

J DECKER

### Checks on 11W-2

Block on 1/8" SDH for Field Calib.

Checks @ Max Amp. for Both Near &amp; Far

Positions in % Screen Height

1/8" SDH	Near	Far
Max. Amp.	N/A %	N/A %
Metal Path	N/A "	N/A "

Reviewed by Charles F. Miller III  
SNT-TC Level







# PIPE UT CALIBRATION DATA SHEET

SITE PEACHBOTTOM UNIT 3 ☐ Preoperational ☒ I.S.I.  
SYSTEM JET PUMP INST. NOZZLE CALIBRATION BLOCK NO. 21-PEB  
PROCEDURE NO. 83-1 REV. 4 CALIBRATION SHEET NO. 021  
DATE 6-10-84 COUPLANT SONO TRACE IIW-2 BLOCK NO. 790339  
EXAMINER J. DECKER ASNT LEVEL III  
DATA TAKER B. ANDERSON ASNT LEVEL II  
INSTRUMENT MODEL NO. SONIC MK-1 INSTRUMENT SERIAL NO. 04057E  
CABLE NO. C-2 CABLE TYPE PNC TO MCD CABLE LENGTH 6'

## TRANSDUCER DATA

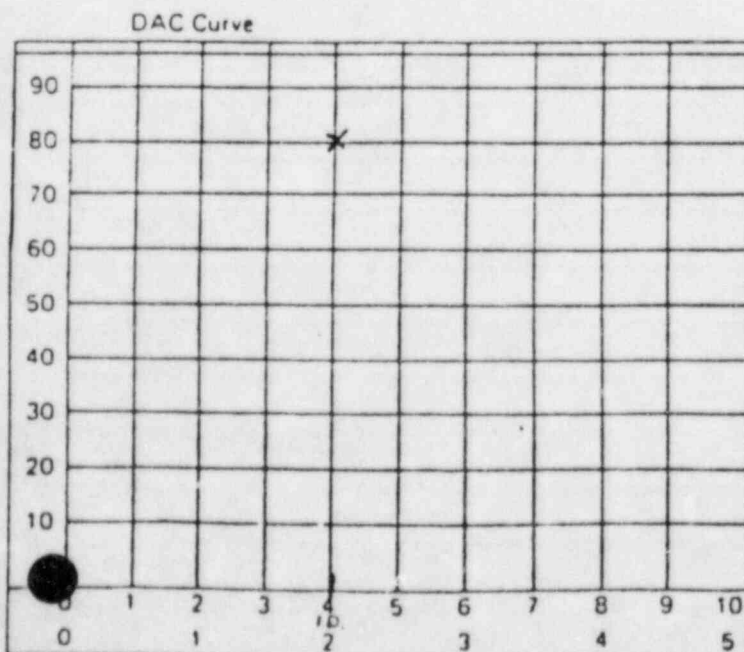
STRAIGHT BEAM ANGLE BEAM  
SERIAL NO. D23752  
IDENTITY GAMMA  
FREQUENCY 5 MHZ  
SIZE .25"

SHOE TYPE N/A  
SHOE NO. N/A  
SHOE ANGLE 0°  
MODE LONGITUDINAL

REFLECTORS ORIENTED ☐ PARALLEL ☐ COUPLANT SONO TRACE  
OR TO WELD SEAM (Cross Out One)  
☐ TRANSVERSE

CAL STD TEMP \_\_\_\_\_

## INSTRUMENT SETTINGS:



Uncalibrated Gain  
Coarse Sweep  
Fine Sweep  
Coarse Range  
Fine Range  
Scanning Gain  
Attenuation (in)  
Evaluating Gain  
Attenuation (in)  
Filter Position  
Rep Rate  
Damping  
Reject

START	FINISH
N/A	N/A
N/A	N/A
.94	.94
1	1
.62	.62
54dB	54dB
N/A	N/A
48dB	48dB
N/A	N/A
H1	H1
3K	3K
MIN	MIN
OFF	OFF

021

Hole Depth "T" Inches	Gain @ 1X	Max. Amp.	"W" Inch	D or MP Inch	SDH or FBH
<del>1/4</del> .75	1X	80%	N/A	4.0	N/A
1/2	N/A	1X	N/A	N/A	N/A
3/4	N/A	1X	N/A	N/A	N/A
2% I.D. Notch	N/A	1X	N/A	N/A	N/A
2% O.D. Notch	N/A	1X	N/A	N/A	N/A

Initial Calibration Time 1620

Periodic Checks:

Time	Value	Last Data Sheet
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Final Check:

1630 100% 023Calibration in Depth (D) ☐ or Metal Path (MP) ☐Amplitude Linearity Check  
(Made Daily)

100% FSH	<u>48</u>	% FSH	50% FSH	<u>25</u>	% FSH
90% "	<u>45</u>	"	40% "	<u>20</u>	"
80% "	<u>40</u>	"	30% "	<u>15</u>	"
70% "	<u>35</u>	"	20% "	<u>10</u>	"
60% "	<u>28</u>	"			

Control Linearity  
(Made Daily)

80% FSH	-6db	<u>40</u>	(32-48)
80% "	-12db	<u>20</u>	(16-24)
40% "	+ 6db	<u>80</u>	(64-96)
20% "	+12db	<u>80</u>	(64-96)

Equip. Data - Straight Beam  
For Linearity Checks11W-2 790339

Transducer Data:

Serial No. E02406Beam Angle 45°Size .375" Freq. 1.5 MHzShoe No. SSI-3 Cable No. C-2

Check Made By:

J. DECKER

## Checks on 11W-2

Block on 1/8" SDH for Field Calib.

Checks @ Max Amp. for Both Near &amp; Far

Positions in % Screen Height

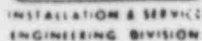
1/8" SDH	Near	Far
Max. Amp.	N/A %	N/A %
Metal Path	N/A "	N/A "

Reviewed by

Wade H. Miller III

SNT-TC Level







# PIPE UT CALIBRATION DATA SHEET

SITE PEACH BOTTOM UNIT 3

SYSTEM JET PUMP INST. NOZZLE

PROCEDURE NO. 83-1 REV. 4

DATE 6-10-84 COUPLANT SONOTRACE

EXAMINER J. DECKER

DATA TAKER B. ANDERSON

INSTRUMENT MODEL NO. SONIC MK-1

CABLE NO. C-2 CABLE TYPE BNC to MCD CABLE LENGTH 6'

☐ Preoperational ☒ I.S.I.

CALIBRATION BLOCK NO. HT-6274

CALIBRATION SHEET NO. 024

IIW-2 BLOCK NO. 790339

ASNT LEVEL III

ASNT LEVEL II

INSTRUMENT SERIAL NO. 04057E

## TRANSDUCER DATA

STRAIGHT BEAM

ANGLE BEAM

SERIAL NO. 023752

IDENTITY GAMMA

FREQUENCY 5 MHz

SIZE .25"



SHOE TYPE N/A

SHOE NO. N/A

SHOE ANGLE 0°

MODE LONGITUDINAL

PARALLEL

OR

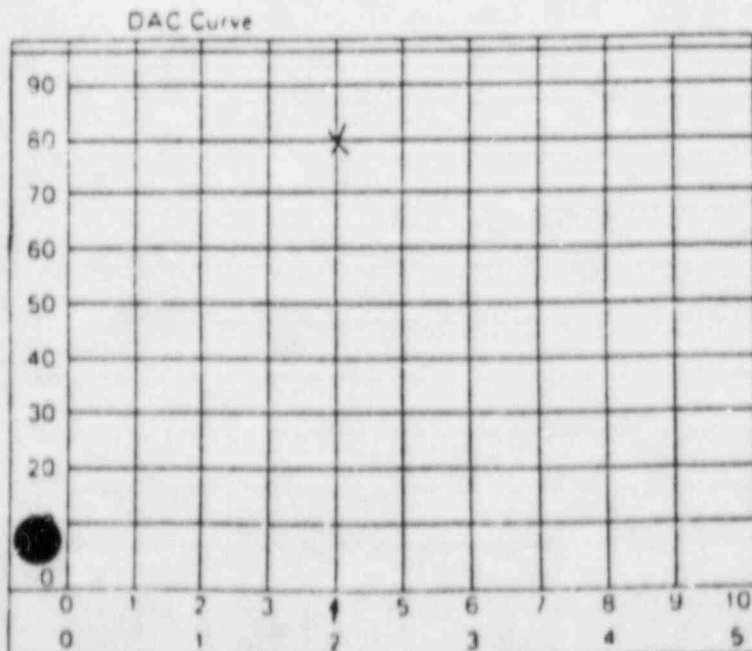
TRANSVERSE

COUPLANT SONOTRACE

REFLECTORS ORIENTED TO WELD SEAM (Cross Out One)

CAL STD TEMP \_\_\_\_\_

## INSTRUMENT SETTINGS:



Uncalibrated Gain

Coarse Sweep

Fine Sweep

Coarse Range

Fine Range

Scanning Gain

Attenuation (in)

Evaluating Gain

Attenuation (in)

Filter Position

Rep Rate

Damping

Reject

START	FINISH
N/A	N/A
N/A	N/A
.94	.94
1	1
.62	.62
54dB	54dB
N/A	N/A
48dB	48dB
N/A	N/A
H1	H1
3K	3K
MIN	MIN
OFF	OFF

024

Hole Depth "T" Inches	Gain @ 1X	Max. Amp.	"W" Inch	D or MP Inch	SDH or FBH
1 1/4 337	1X	80%	N/A	4.0	N/A
1/2 N/A	1X	N/A	N/A	N/A	N/A
3/4 N/A	1X	N/A	N/A	N/A	N/A
2 1/4 @ Notch N/A	1X	N/A	N/A	N/A	N/A
2 1/4 @ Notch N/A	1X	N/A	N/A	N/A	N/A

Initial Calibration Time 1645

Periodic Checks:

Time	Value	Last Data Sheet
------	-------	--------------------

_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Final Check:

1700 100% 026Calibration in Depth (D) ☐ or Metal Path (MP) ☐Amplitude Linearity Check  
(Made Daily)

100% FSH	<u>48</u>	% FSH	50% FSH	<u>25</u>	% FSH
90% "	<u>45</u>	"	40% "	<u>20</u>	"
80% "	<u>40</u>	"	30% "	<u>15</u>	"
70% "	<u>35</u>	"	20% "	<u>10</u>	"
60% "	<u>30</u>	"			

Control Linearity  
(Made Daily)

80% FSH	-6db	<u>40</u>	(32-48)
80% "	-12db	<u>20</u>	(16-24)
40% "	+ 6db	<u>80</u>	(64-96)
20% "	+12db	<u>80</u>	(64-96)

Equip. Data - Straight Beam  
For Linearity Checks11W-2 790339

Transducer Data:

Serial No. E02406Beam Angle 45°Size .375" Freq. 1.5 MHzShoe No. SS1-3 Cable No. C-2

Check Made By:

J. DECKER

## Checks on 11W-2

Block on 1/8" SDH for Field Calib.

Checks @ Max Amp. for Both Near &amp; Far

Positions in % Screen Height

1/8" SDH	Near	Far
Max. Amp.	N/A %	N/A %
Metal Path	N/A "	N/A "

Reviewed by:

Madu F Miller III

SNT-TC Level







METALLIZATION & SERVICE  
SPECIALIZED DIVISION

## PIPE UT CALIBRATION DATA SHEET

SITE PEACH BOTTOM UNIT 3  
SYSTEM JET PUMP INST, NOZZLE  
PROCEDURE NO. 83-1 REV. 4  
DATE 6-10-84 COUPLANT SONOTRACE  
EXAMINER J. DECKER  
DATA TAKER B. ANDERSON  
INSTRUMENT MODEL NO. SONIC MK-1  
CABLE NO. C-2 CABLE TYPE BNC to MCD CABLE LENGTH 6'

☐ Preoperational ☒ I.S.I.  
CALIBRATION BLOCK NO. 5A-PER  
CALIBRATION SHEET NO. 027  
IIW-2 BLOCK NO. 790339  
ASNT LEVEL III  
ASNT LEVEL II  
INSTRUMENT SERIAL NO. 04057E

### TRANSDUCER DATA

SERIAL NO. D23752  
IDENTITY GAMMA  
FREQUENCY 5 MHZ  
SIZE .25"

ANGLE BEAM



SHOE TYPE N/A

SHOE NO. N/A

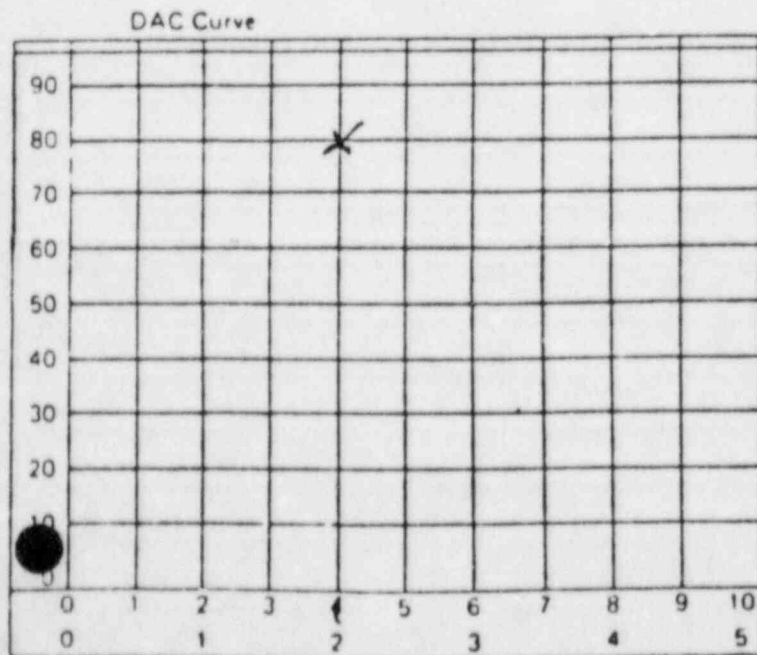
SHOE ANGLE 0°

MODE LONGITUDINAL

REFLECTORS ORIENTED PARALLEL OR TRANSVERSE TO WELD SEAM (Cross Out One)

CAL STD TEMP \_\_\_\_\_

### INSTRUMENT SETTINGS:



I.D.

Uncalibrated Gain  
Coarse Sweep  
Fine Sweep  
Coarse Range  
Fine Range  
Scanning Gain  
Attenuation (in)  
Evaluating Gain  
Attenuation (in)  
Filter Position  
Rep Rate  
Damping  
Reject

START	FINISH
N/A	N/A
N/A	N/A
.94	.94
1	1
.62	.62
54dB	54dB
N/A	N/A
48dB	48dB
N/A	N/A
H1	H1
3K	3K
MIN	MIN
OFF	OFF

027

1T

Hole Depth "T" Inches	Gain @ 1X	Max. Amp.	"W" Inch	D or MP Inch	SDH or FBH
1/4" .432	1X	80%	N/A	4.0	N/A
1/2" N/A	1X	N/A	N/A	N/A	N/A
3/4" N/A	1X	N/A	N/A	N/A	N/A
2 1/8" Ø Notch N/A	1X	N/A	N/A	N/A	N/A
2 3/8" Ø Notch N/A	1X	N/A	N/A	N/A	N/A

Initial Calibration Time 1705

Periodic Checks:

Time	Value	Last Data Sheet
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Final Check:

1720 100% 029Calibration in Depth (D) ☐ or Metal Path (MP) ☐

Amplitude Linearity Check (Made Daily)			
100% FSH	<u>48</u>	% FSH	50% FSH <u>25</u> % FSH
90% "	<u>45</u>	"	40% " <u>20</u> "
80% "	<u>40</u>	"	30% " <u>15</u> "
70% "	<u>35</u>	"	20% " <u>10</u> "
60% "	<u>28</u>	"	_____

Control Linearity (Made Daily)	
80% FSH	-6db <u>40</u> (32-48)
80% "	-12db <u>20</u> (16-24)
40% "	+6db <u>80</u> (64-96)
20% "	+12db <u>80</u> (64-96)

Equip. Data - Straight Beam For Linearity Checks	
11W 2 <u>790339</u>	
Transducer Data:	
Serial No.	<u>502406</u>
Beam Angle	<u>45°</u>
Size	<u>.375"</u> Freq. <u>1.5 MHz</u>
Shoe No.	<u>SS1-3</u> Cable No. <u>C-2</u>
Check Made By	<u>J. DECKER</u>

Checks on 11W-2

Block on 1/8" SDH for Field Calib

Checks @ Max Amp. for Both Near &amp; Far

Positions in % Screen Height

1/8" SDH	Near	Far
Max. Amp.	N/A %	N/A %
Metal Path	N/A "	N/A "

Reviewed by Wade H. Miller III  
SNT TC Level







INSTALLATION & SERVICE  
SOUTHERN REGION DIVISION

## PIPE UT CALIBRATION DATA SHEET

SITE PEAKHOBOTOM UNIT 3

SYSTEM JET PUMP INST. NOZZLE

PROCEDURE NO. 83-1 REV. 4

DATE 6-10-84 COUPLANT SONOTRACE

EXAMINER J. DECKER

DATA TAKER B. ANDERSON

INSTRUMENT MODEL NO. SONIC MK-1

CABLE NO. C-2

CABLE TYPE BNC TO MCD CABLE LENGTH 6'

☐ Preoperational ☒ I.S.I.

CALIBRATION BLOCK NO. 11A-PEB

CALIBRATION SHEET NO. 030

IIW-2 BLOCK NO. 790337

ASNT LEVEL III

ASNT LEVEL II

INSTRUMENT SERIAL NO. 04057E

### TRANSDUCER DATA

STRAIGHT  
BEAM

ANGLE BEAM

SERIAL NO. D23752

IDENTITY GAMMA

FREQUENCY 5 MHz

SIZE .25



SHOE TYPE N/A

SHOE NO. N/A

SHOE ANGLE 0°

MODE LONGITUDINAL

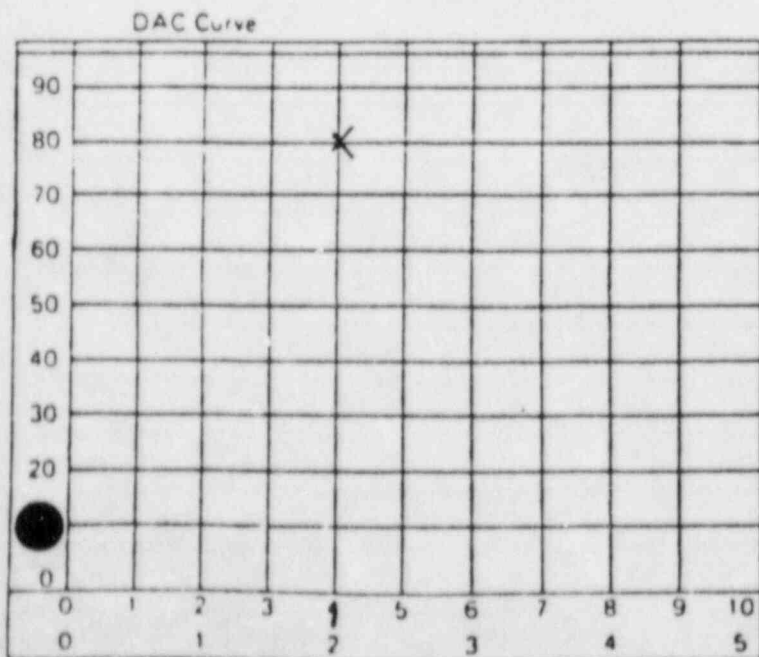
REFLECTORS ORIENTED PARALLEL  
OR  
TRANSVERSE

COUPLANT SONOTRACE

TO WELD SEAM (Cross Out One)

CAL STD TEMP \_\_\_\_\_

### INSTRUMENT SETTINGS:



Uncalibrated Gain

Coarse Sweep

Fine Sweep

Coarse Range

Fine Range

Scanning Gain

Attenuation (in)

Evaluating Gain

Attenuation (in)

Filter Position

Rep Rate

Damping

Reject

START	FINISH
N/A	N/A
N/A	N/A
.89	.89
1	1
.57	.57
54dB	54dB
N/A	N/A
48dB	48dB
N/A	N/A
H1	H1
3K	3K
MIN	MIN
OFF	OFF

030

IT

Hole Depth "T"   Inches	Gain @ 1X	Max. Amp.	"W" Inch	D or MP Inch	SDH or FBH
1/4   .625	1X	80%	N/A	4.0	N/A
1/2   N/A	1X	N/A	N/A	N/A	N/A
3/4   N/A	1X	N/A	N/A	N/A	N/A
2% I.D. Notch   N/A	1X	N/A	N/A	N/A	N/A
2% O.D. Notch   N/A	1X	N/A	N/A	N/A	N/A

Initial Calibration Time 1730

Periodic Checks:

Time	Value	Last Data Sheet
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Final Check:

1750 100% 034Calibration in Depth (D) ☐ or Metal Path (MP) ☐

Amplitude Linearity Check (Made Daily)					
100% FSH	<u>48</u>	% FSH	50% FSH	<u>25</u>	% FSH
90% "	<u>45</u>	"	40% "	<u>20</u>	"
80% "	<u>40</u>	"	30% "	<u>15</u>	"
70% "	<u>35</u>	"	20% "	<u>10</u>	"
60% "	<u>28</u>	"			

Control Linearity (Made Daily)		
80% FSH	-6db <u>40</u>	(32-48)
80% "	-12db <u>20</u>	(16-24)
40% "	+ 6db <u>80</u>	(64-96)
20% "	+12db <u>80</u>	(64-96)

Equip. Data - Straight Beam For Linearity Checks	
11W-2	<u>490339</u>
Transducer Data:	
Serial No.	<u>E02406</u>
Beam Angle	<u>45°</u>
Size	<u>.375"</u> Freq. <u>1.5 MHz</u>
Shoe No.	<u>SS1-3</u> Cable No. <u>C-2</u>
Check Made By:	
<u>J. DECKER</u>	

Checks on 11W-2

Block on 1/8" SDH for Field Calib.

Checks @ Max Amp. for Both Near &amp; Far

Positions in % Screen Height

1/8" SDH	Near	Far
Max. Amp.	N/A%	N/A%
Metal Path	N/A"	N/A"

Reviewed by

Charles E. Miller III

SNT-TC Level

## ULTRASONIC EXAMINATION DATA FORM

Exam Form 031

Cal. Form No. 030

Site Peach Bottom #3 ☐ Preoperational ☐

I.S.I. Date 6-10-84

System Jet Pump Inst No. 2 Weld No. JP-A-4

Weld Type Butt

Examiner Billy Anderson

ASNT Level II

Data Taker N/A

ASNT Level N/A

Search Angle 0° U T Procedure 83

Rev. 4

Scan Sens x2 54 Other \_\_\_\_\_

Evaluation Sens: X1 28

Couplant SONOTRAC

## EXAMINATIONS

- 1 Angle beam for reflectors parallel to weld
- 2 Angle beam for reflectors transverse to weld (clockwise and counter clockwise)

Benchmark or Referenced "O" Location T. D. C.

$l_0$  : T.D.C       $w_0$  : th. of weld

Performed		Indication	
Yes	No	Yes	No
	X		X
	X		X

[illegible]

Reviewed by Steve Miller ASNT TC 1A Level

☐ If





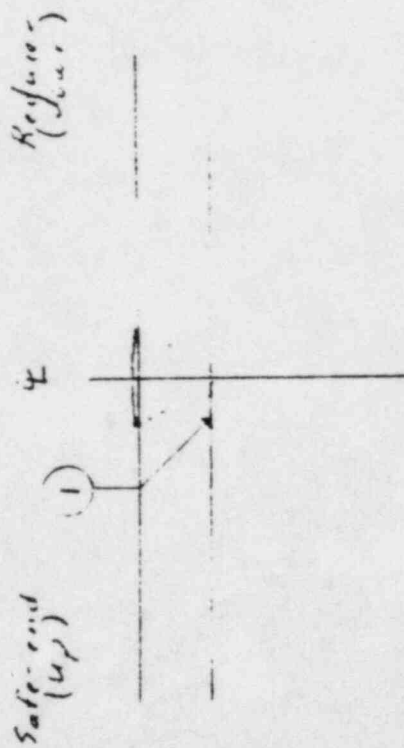


SW. R. I. WELD ULTRASONIC EXAMINATION RECORD														
PROJECT NO. : 174336			SITE : Peach Bottom Atomic Power Station, Unit 2			DATE : ( DAY-MON.-YR ) 11 JAN 84			TIME ( 24 HR - CLOCK ) SHEET STARTED 2340 SHEET ENDED 2440			SHEET NO. 480078		
EXAMINATION AREA : ( SYST./COMPONENT ) JET PUMP INSULATION			( LINE / SUBASSEMBLY ) JP-A			( IDENTIFICATION ) 2			L <sub>0</sub> LOCATION 1			W <sub>0</sub> LOCATION : 4 OF WELD		
EXAMINER : J. Williams			SNT LEVEL : II		PROCEDURE : NO. 800 3L REV. 25 REV. 13		CALIBRATION SHEET ( S ) 190011		ANGLE USED SCANNING DB		0° 45° 45° 60° N/A 69/3 69/3 N/A N/A		OTHER WELD TYPE : SAFE END Reducer	
EXAMINER : J. JOHANSON			SNT LEVEL : II											
IND. NO.	% OF DAC	W MAX W	MP	L <sub>1</sub> 50% DAC	L MAX 50% DAC	L <sub>2</sub> 50% DAC	SEARCH UNIT ANGLE	SEARCH UNIT LOCATION	DAMPS ( IF YES, EXPLAIN )	REMARKS	INI			
1	20	9/16	.48	1/4	3/4	1 5/16	45°	UP	NO	* +14db Switch L <sub>1</sub> & L <sub>2</sub> measurements RECORDED AT BASELINE	Red			
							45°	ON WELD AND UNDER METAL			Red			
							45°	NO RECORDABLE INDICATIONS	NO		Red			
							45°	NO RECORDABLE INDICATIONS	NO		Red			
							45°	NO RECORDABLE INDICATIONS	NO		Red			
REMARKS : AZIMUTH 105° (W)														
PARTIAL Exam FROM 0" L TO 4" L AND FROM 10 1/4" L TO 0" L MEASURING COUNTERCLOCKWISE														
EXAMINATION AREA LIMITATION ( IF NONE , SO STATE ) :														
EXAMINATION LIMITED DOWNSTREAM TO 1 1/2" TO 4" AND 1/4" TO 1 3/4" DUE TO PROXIMITY OF REDUCER														
REVIEWED BY : Russell E. Turner						SNT LEVEL : II		DATE : 12 Jan 84		PAGE 1 OF 1				

PAGE 1 OF 1

# SwRI SONIC INSTRUMENT CALIBRATION RECORD

PROJECT NO. 174336		SITE Peach Bottom Atomic Power Station, Unit 2		DATE (DAY MO YR) 11 Jun 84		TIME (24 HR. CLOCK) 2235		SHEET NO. 190011	
1) EXAMINER (SIGNATURE) <i>E. W. Hillman</i>		SNT LEVEL II		PROCEDURE No. 800 36 +		INSTRUMENT SONIC MARK I I I I I I I I I I		SERIAL NO. 04337E	
2) EXAMINER <i>JOHN JOHANSON</i>		SNT LEVEL II		Rev. 28 Dev. 13		COUPLANT <input checked="" type="checkbox"/> Glycerine <input type="checkbox"/> Water <input type="checkbox"/> Other (Specify)		CALIBRATION VERIFICATION	
SEARCH UNITS		REFERENCE BLOCK S/N 55-DC-2		TIME 12 June 84		N/A <input checked="" type="checkbox"/>		TEMPERATURE	
NOMINAL ANGLE	45°	N/A		N/A		N/A		INITIALS <i>JS</i>	
MEASURED ANGLE	43°								
BRAND	SERIAL NUMBER(S)	SCREEN DISTANCE IN INCHES							
AEROTECH	J06943								
SIZE	1/4 Rd								
FREQUENCY (MHZ)	2.25								
INSTRUMENT SETTINGS		REFERENCE REFLECTOR		AMPLITUDE DETERMINATION 5/8 VEE PATH					
REJECT	0	1) Flat Block		45° 3/8 5/8 8 dB		60° 3/8 5/8 8 dB			
DEC	OFF	2) Axial - - - 1/16		dB % FSH		dB % FSH			
FINE dB	3	3) Circumferential - MATCH		dB % FSH		dB % FSH			
COARSE dB	60	1) Other		CABLE TYPE		INITIAL CAL BLOCK			
5 dB SWITCH	UP	10 SCREEN DIVISIONS		45° N/A		TEMP A			
14 dB SWITCH	UP	- 2 INCHES		RG 62 RG 174		PYROMETER S/N			
FREQUENCY	2	LONGITUDINAL 11		Other		INST. LINEARITY SHEET No.			
DELAY	139-1	SHEAR <input checked="" type="checkbox"/>		Length 121 in		BEAM SPREAD SHEET No.			
MATL CAL.	311	BASIC CALIBRATION BLOCK NO. 4-55-80-337-10-PEB (Hole)		EXAMINATION AREA					
RANGE	2	4-55-80-337-10A-PEB (MATCH) * PARTIAL EXAM TEST		Pump Instrumentation AT 105° AZIMUTH CW					
DAMPING	MIN	REMARKS Calibrated Reflectors Have been							
REP. RATE	3K	Verified at Scanning Speed							
FILTER	H1	Hole Sensitivity setting AT 1/20 SW							
VIDEO	NORM								
TRAN. MODE	NORMAL								
JACK USED	R								
20 ± 1 dB =	100 % N/A %								
METHOD PRIMARY	14 dB SUTCH								
SECONDARY	N/A								
REVIEWED BY <i>Russell L. Turner</i>	SNT LEVEL II	DATE 12 Jun 84							



JP-A-2  
 Russell & Johnson, Ltd.  
 12 Jan 84

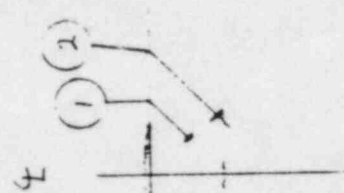
SW. R. I. WELD ULTRASONIC EXAMINATION RECORD														
PROJECT NO. : 174336				SITE : Peach Bottom Atomic Power Station, Unit 2				DATE : ( DAY-MON-YR ) 12 June 54			TIME ( 24 HR - CLOCK ) SHEET STARTED 0002 SHEET ENDED 0031		SHEET NO. : 480077	
EXAMINATION AREA : ( SYS. / COMPONENT ) TFT spray				( LINE / SUBASSEMBLY ) JP - B				( IDENTIFICATION ) J			L <sub>0</sub> LOCATION J		W <sub>0</sub> LOCATION : 604 weld	
EXAMINER J M. Haliski				SNT LEVEL II		PROCEDURE NO. 300-36		CALIBRATION SHEET(S) 140053		ANGLE USED 0° 45° 45°T 60°		OTHER WELD TYPE : SAFE END → RECOVER		
EXAMINER : S SOBBERN				SNT LEVEL II		REV. 13 4/1/53		SCANNING DB N/A		N/A		N/A		
IND. NO.	% OF DAC	W MAX		L <sub>1</sub>	L	L <sub>2</sub>	SEARCH UNIT ANGLE	SEARCH UNIT LOCATION	DAMPS ( IF YES, EXPLAIN )	REMARKS		INI		
		W	MP	50% DAC	MAX	50% DAC								
1	40	3/8	.28	0	1/3	7/8	45°	Down	NO DAMP	* Plus 14dB switch pm		pm		
2	56	5/8	.48	13 1/2	1/3	7/8	45°	Down	NO DAMP	Indication 1 & 2 could be seen		pm		
										Tangentially looking clockwise at		pm		
										lower amplitudes		pm		
							45°	UP				pm		
							45° TAN	UP				pm		
							45° T	UP/DOWN				pm		
REMARKS : PARTIAL Exam from 0" to 4" and 10 1/2" to 0														
EXAMINATION AREA LIMITATION ( IF NONE , SO STATE ) : Limited from L 2 1/2" to 11 5/8" Due to Reducers on Down steam side														
REVIEWED BY : Russell E. Turner								SNT LEVEL : II		DATE : 12 June 54		PAGE 1 OF 1		

## SwRI SONIC INSTRUMENT CALIBRATION RECORD

PROJECT NO 174336		SITE Peach Bottom Atomic Power Station, Unit 2		DATE (DAY MO YR) 11 Jun 84		TIME (24 HR CLOCK) 2034		SHEET NO 190053	
1) EXAMINER (SIGNATURE) J. H. H. H.		SNT LEVEL II		PROCEDURE No. 1		INSTRUMENT SONIC MARK M 11111111		SERIAL NO 31108	
2) EXAMINER S. SORBERN		SNT LEVEL II		Dev. 1		COMPLIANT X Glycerine 11 Water 11 Other (Specify)		CALIBRATION VERIFICATION	
SEARCH UNITS		REFERENCE BLOCK S/N 55-DC-2		NOMINAL ANGLE N/A		N/A 1X TEMPERATURE		INITIALS pm pm	
NOMINAL ANGLE 45°		MEASURED ANGLE 44°		SIGNAL DISTANCE IN INCHES V		SCREEN DISTANCE IN INCHES V		ADDITIONAL INFORMATION	
BRAND AZN TECH		SERIAL NUMBER(S) OC1953		SIZE 1/4 RD		FREQUENCY (MHZ) 2.25		AMPLITUDE DETERMINATION 5/8 VEE PATH	
INSTRUMENT SETTINGS		REJECT 0		DEC CFF		FINE dB 13		CABLE TYPE RG 62	
COARSE dB 50		6 dB SWITCH UP		14 dB SWITCH UP		FREQUENCY 2		INITIAL CAL BLOCK TEMP	
DELAY 192-1		MATL CAL 283		RANGE 2		DAMPING MIN		PYROMETER S/N INST LINEARITY SHEET No	
REP RATE 3K		FILTER H1		VIDEO NORM		TRAN. MODE NORMAL		BEAM SPREAD SHEET No	
JACK USED R		ZC % +14 dB = 100%		METHOD PRIMARY +14 dB Switch		SECONDARY N/A		EXAMINATION AREA 190053	
REVIEWED BY J. H. H. H.		SNT LEVEL II		DATE 12 Jun 84		REMARKS Calibration Reflectors have been verified at scanning speed Hole Sensitivity Settings 17/50		EXAMINATION AREA 190053	

Safe end  
(up)

red  
(down)



TP-8-2

Roll 8. Turner Level II

12 Jan 84

June 15, 1984

PEACH BOTTOM UNIT #3

ULTRASONIC EXAMINATION OF  
JET PUMP INSTRUMENTATION PENETRATION SEAL WELD NO. 2

June 10 and 11, 1984

SUPPLEMENT NO. 1 TO SUMMARY REPORT DATED JUNE 11, 1984

The General Electric Company, in conjunction with our NDE subcontractor, Sonic Systems International, performed ultrasonic examinations on the five Jet Pump Instrumentation safe end and penetration assembly welds on Peach Bottom Unit #3. Since indications were found only in the No. 2 weld on both the A and B assemblies, this Supplement will therefore deal with only the examination of the No. 2 welds.

The configuration of the #2 weld in the jet pump instrumentation penetration seal assembly does not allow a complete examination. The restriction is caused by insufficient scanning area due to interference from the weld crown and the taper on the reducer. (See attached Figure 1.)

The first (information only) examination was attempted with a 3/8" diameter, 45° search unit calibrated for sweep distance only. This examination revealed the following:

- 1) A smaller search unit would be required.
- 2) The configuration was more restrictive than originally anticipated.
- 3) Indications were detected at very low amplitudes suggesting that modification to the search unit would be required to obtain additional examination volume.

As a result of the first examination, 1/4" diameter 45° search units were obtained, and the wedges were field modified to allow the maximum scanning possible. The modifications consisted of removing the maximum possible amount of wedge material from both the leading and trailing wedge surfaces. The leading surface was radiused to reflect the modification induced wedge noise away from the transducer. The radius was designed to retain the maximum amount of potting material and all signal splitting grooves. The over-all wedge size reduction (gain in scanning area) was .160".

The modified wedge was then used to examine the No. 2 welds on both the "A" and "B" loop penetration seals. At the time of the examination, the effects of the restriction had not been determined due to the lack of detailed information on the actual configuration.

When the design and construction information was made available, the restriction to the examination was determined by creating a full-scale stretch-out of the configuration and applying the modified wedge dimensions. The gain in scanning dimensions was .080" in the forward direction and .080" in the rearward direction. Figure 2 shows a standard and a modified 45° wedge, their dimensions, and the examined volume for each. Please note that, had only standard (non-modified) wedges been used, the indication could have gone undetected.

The ultrasonic data from both of the No. 2 welds exhibited crack-like indications. Both the graphic plotting and UT operator's observations confirmed that IGSCC was a definite possibility. The restrictions to the examination discussed above, and further detailed in the attached sketches, prevented gathering of necessary sizing data. These restrictions also prevented use of alternate standard (60° or 70°) search angles. Attempts to field modify 60° and 70° shoes resulted in wedge noise that rendered them useless for examination purposes.

Following the GE examinations, PECO had a third party examine portions of the No. 2 welds in an attempt to confirm GE's data. It is our understanding that data correlation was excellent.

As a result of the restrictions, sizing for through-wall dimension had to be attempted on a best-effort basis using available data. The crack depths were shown as 22% and 49% with the caveat that more, rather than less, depth was to be expected. Due to the magnitude of the restrictions on the examination, it was not possible to determine if the crack depths exceeded the stated percentages or, if so, by how much.

The attached plots, sketches, reports, and data sheets document the efforts by GE/PECO to examine and analyze these weldments.

*Wade F. Miller*  
\_\_\_\_\_  
Wade F. Miller  
GE/A&ES - Eastern Service Department  
Level III Examiner

1.375" MAX DISTANCE FROM TAPER

1.00" MIN DISTANCE FROM TAPER

REDUCER TAPER

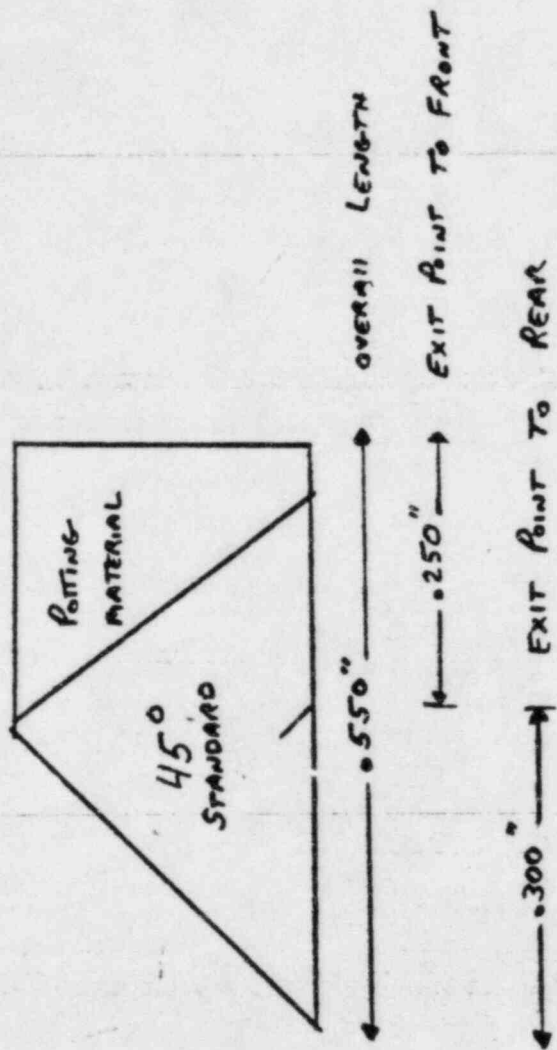
.300"

AREA WITH INDICATIONS

THIS SKETCH SHOWS THE CONFIGURATION AND DIMENSIONS THAT CAUSED  
A LIMITED EXAMINATION OF THE #2 WELDS.

WTH  
6/15/84

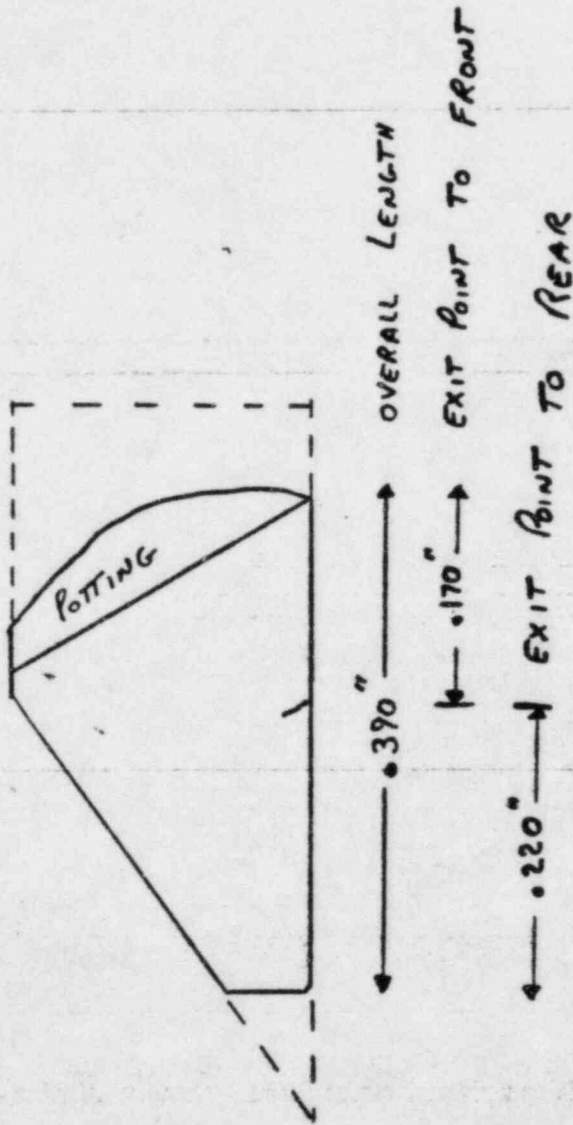
FIGURE 1



THIS SKETCH SHOWS THE DIMENSIONS OF A STANDARD 45° WEDGE DESIGNED FOR A 1/4" DIAMETER TRANSDUCER.

WFM  
6/15/84

FIGURE 2a

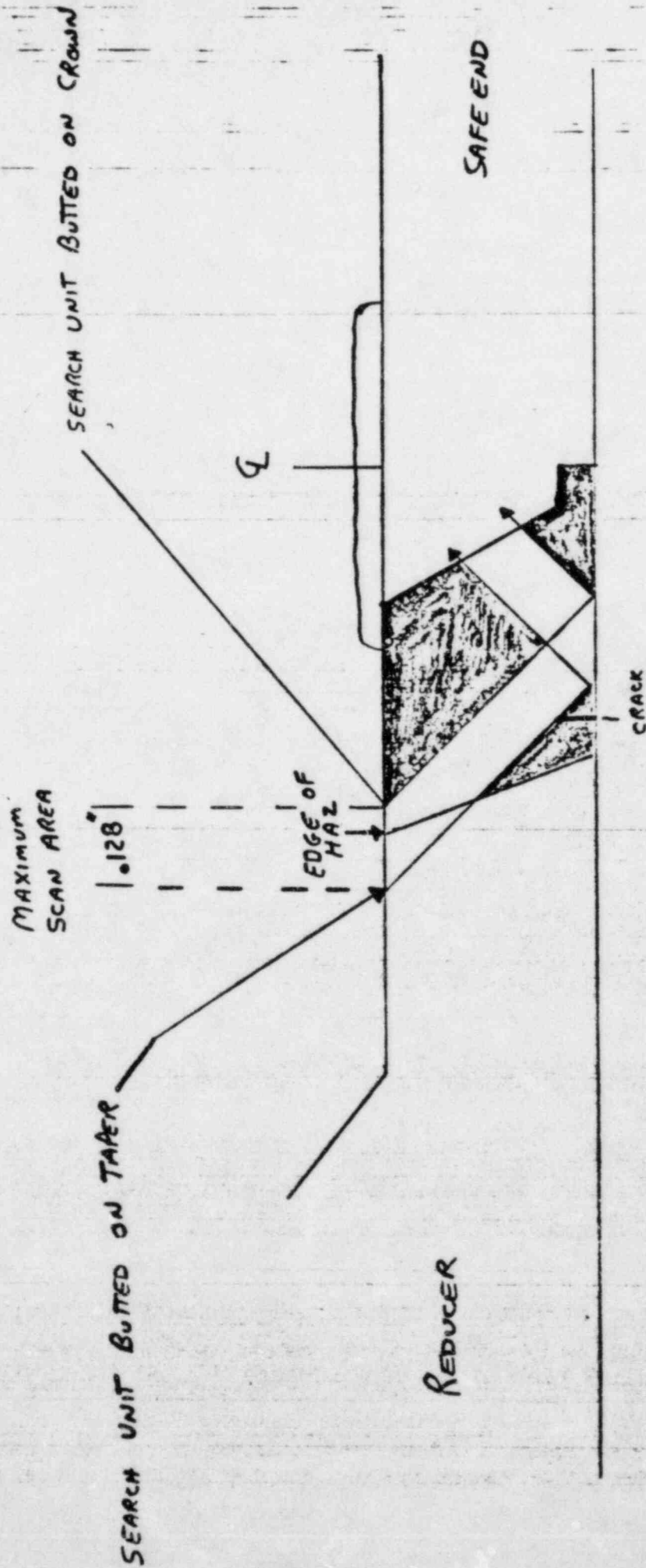


THIS SKETCH SHOWS THE DIMENSIONS OF THE FIELD MODIFIED  
 WEDGE USED TO EXAMINE THE #2 WELDS

WFM  
 6/15/84

FIGURE 2b

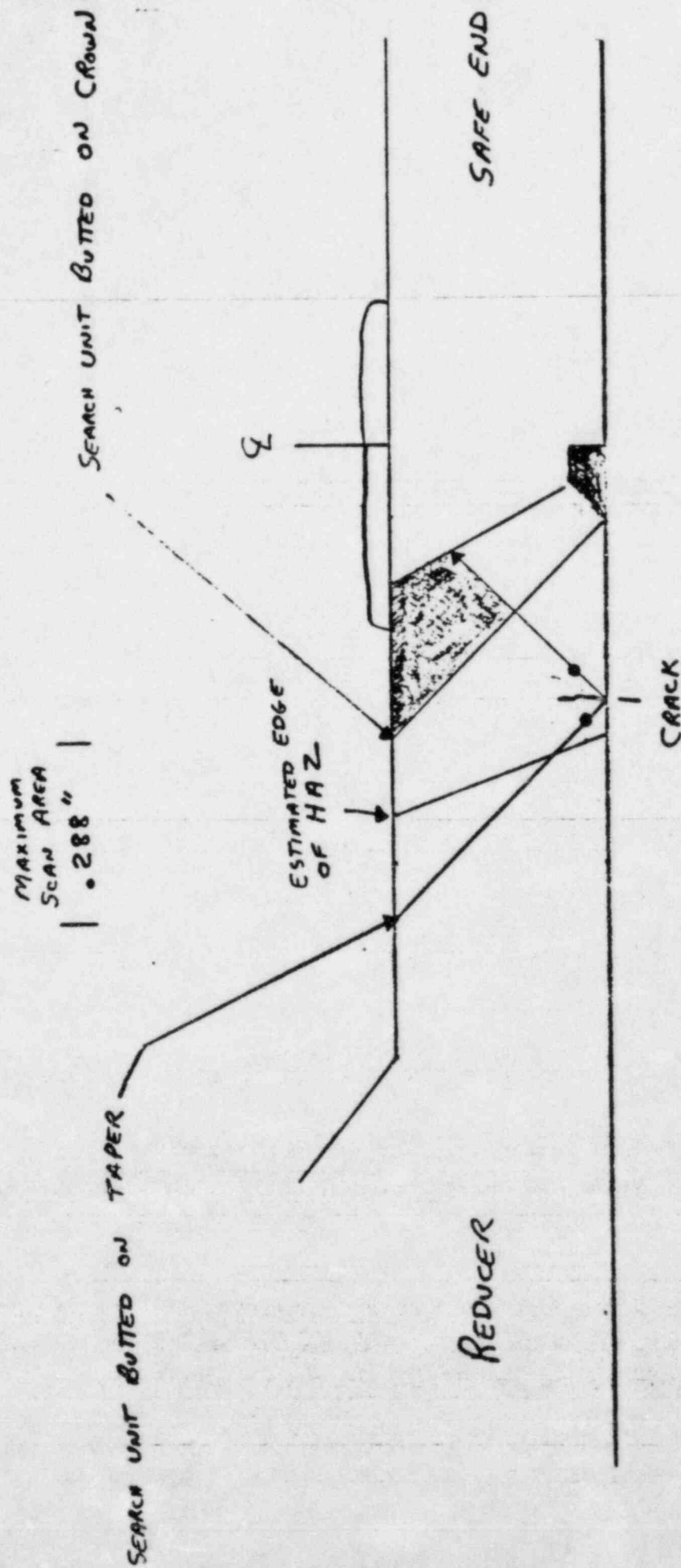
FIGURE 2 C



SKETCH SHOWING MAXIMUM SCAN AREA USING A STANDARD  $45^{\circ}$  WEDGE. SKETCH DRAWN AT 4 X FOR CLARITY. UNEXAMINED VOLUME SHADED. NOTE CRACK LOCATION.

WFM  
6/15/84

FIGURE 2 d



SKETCH SHOWING MAXIMUM SCAN AREA USING THE MODIFIED

45° WEDGE. SKETCH DRAWN AT 4X FOR CLARITY. UNEXAMINED

VOLUME SHADED.

WFM

6/15/84



EASTERN SERVICE  
DEPARTMENT

PEACH BOTTOM ATOMIC POWER STATION

SUBJECT ULTRASONIC EXAMINATION  
OF WELDS IN PIPE

No. P.B. 83-1 REV 4 PAGE 10F 20

PREPARED BY/DATE *E. J. Boyle* *3/16/83*

APPROVED BY/DATE *E. J. Boyle* *3/16/83*

QA APPROVED BY/DATE *[Signature]* *3/17/83*

STATEMENT OF INTENDED USE

THIS DOCUMENT CONTAINS INFORMATION PREPARED BY THE GENERAL ELECTRIC COMPANY FOR THE PHILADELPHIA ELECTRIC COMPANY AND IS INTENDED FOR USE BY THE EMPLOYEES OF BOTH COMPANIES. IT IS SUBMITTED TO THE PHILADELPHIA ELECTRIC COMPANY UPON THE CONDITION THAT IT WILL BE USED IN THE CONDUCT OF PHILADELPHIA ELECTRIC COMPANY INTERNAL TECHNICAL WORK AND WILL NOT BE RELEASED BY THE PHILADELPHIA ELECTRIC COMPANY TO COMPETITORS OF THE GENERAL ELECTRIC COMPANY, WILL NOT BE DISTRIBUTED FOR GENERAL INDUSTRY AND WILL NOT BE USED DIRECTLY OR INDIRECTLY IN AN UNFAIR COMPETITIVE MANNER TO THE INTERESTS OF THE GENERAL ELECTRIC COMPANY.

PROCEDURE CHANGES

CHANGES TO THIS PROCEDURE WILL BE MADE IN ACCORDANCE WITH GENERAL ELECTRIC QUALITY ASSURANCE MANUAL, AND APPROVED BY PECO ENGINEERING.

PECO APPROVAL

PECO Engineering Approval

*REC 4/5/83*

*A R Diederich*

Date *4/5/83*

*Robert R. [Signature] 4/5/83*

REVIEWED BY *[Signature]*

APR 7 1983

PHILA. ELECTRIC CO.  
INSPECTION SECTION

REVIEWED BY



Procedure No: P.B. 83-1  
Revision No: 4  
Page: LA of 20

### LIST OF EFFECTIVE PAGES

<u>PAGE</u>	<u>REVISION</u>	<u>DATE</u>	<u>COMMENTS</u>
• 1	4	03/14/83	Cover Page
• LA	4	03/14/83	List of Effective Pages
2	0	12/01/82	
3	2	01/03/83	
4	3	03/14/83	
5	0	12/01/83	
6	0	12/01/82	
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8	1	12/03/82	
9	3	02/04/83	
10	1	12/03/82	
11	3	02/04/83	
12	1	12/03/82	
13	0	12/01/82	
14	2	01/03/83	
15	2	01/03/83	
16	2	01/03/83	
17	2	01/03/83	
18	2	01/03/83	
19	2	01/03/83	
20	2	01/03/83	



## 1.0 SCOPE

- 1.1 The ultrasonic pulse echo contact method examination described herein is applicable to full penetration circumferential and longitudinal welds in piping systems.
- 1.2 The applicable material thickness range is from 0.200 to 2.50 inches.
- 1.3 This procedure covers angle beam shear wave ultrasonic examination of piping welds and a straight beam longitudinal wave examination of piping base material through which the angle beam passes.

## 2.0 APPLICABLE DOCUMENTS

- 2.1 Codes and Standards. The following documents form a part of this specification to the extent specified herein.
  - a. American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code
    - (1) Section V, Nondestructive Examination, Article 5, 1974 Edition, Summer 1975 Addenda
    - (2) Section XI, Inservice Inspection of Nuclear Power Plant Components, 1974 Edition, Summer 1975 Addenda
  - b. American Society for Nondestructive Testing (ASNT)
    - (1) Recommended Practice for Nondestructive Testing Personnel Qualification and Certification, SNT-TC-1A, Ultrasonic Testing Method - 1975 Edition

## 3.0 DESCRIPTION

- 3.1 The objective of the methods given herein is the location and recording of indications within the counter bore area, the heat affected zone, the fusion zone and the base material within two thicknesses (2T) of the weld. The examination shall be performed from the outside surface of the piping system.

## 4.0 REQUIREMENTS

### 4.1 Personnel

- 4.1.1 All personnel performing ultrasonic examinations shall be certified to at least Level I in accordance with SNT-TC-1A, Ultrasonic Testing. Level I personnel shall perform the



- 4.1.2 All personnel reviewing the results of the ultrasonic examinations shall be certified to at least Level II in accordance with SNT-TC-1A, Ultrasonic Testing.
- 4.1.3 When actual samples containing IGSCC are available at the jobsite, all inspection teams shall be trained on these samples prior to their performing any actual examinations. The purpose of this training is to allow the inspection teams to become familiar with the appearance and behavior of IGSCC indications in welded samples and to demonstrate their proficiency to the satisfaction to the person(s) responsible for evaluating the results of the examinations. The duration of the training shall be at the discretion of the responsible individual(s).

#### 4.2 Equipment

- 4.2.1 Pulse echo ultrasonic equipment shall be used with contact search units. The ultrasonic instrument shall be equipped with a dB calibrated gain or attenuation control.
- 4.2.2 Angle beam shear wave examination shall be performed using single element transmit/receive or dual element pitch-catch ceramic type search units having a nominal frequency from 1.0 to 2.25 MHz. Other frequencies may be used to obtain adequate penetration or resolution.
- 4.2.2.1 The size and configuration of search units should conform to the chart below. If piping geometry (weld crown width, mismatch, etc.) preclude the use of the recommended search unit(s), alternative search units may be used. The use of any alternative search unit(s) shall be documented as well as the reason the alternative was necessary.

<u>Pipe Outer Diameter (In.)</u>	<u>Wall Thickness (In.)</u>	<u>Search Unit</u>
Less Than 4.500	Less Than .750	1/4 Dia. or 1/4 sq. Single 1/4 x 3/8 *Dual
	Greater Than .750	1/4 x 3/4 *Dual
Over 4.500 Through 12.750	Less Than .750	1/2 Dia. or 1/2 Sq. Single
		3/8 x 3/4 *Dual
		1/4 x 3/8 *Dual
	Greater Than .750	3/8 x 3/4 *Dual
		1/4 x 3/8 *Dual
		1/2 Dia. or 1/2 Sq. Single



Outer Diameter (In.)	Wall Thickness (In.)	Search Unit
12.750 thru 20.000	Less Than .750	1/2 Dia. or 1/2 Sq. Single
		3/8 x 3/4 *Dual
		1/4 x 3/8 *Dual
	Greater Than .750	3/8 x 3/4 *Dual
		1/4 x 3/8 *Dual
		1/2 Dia. or 1/2 Sq. Single
20.000	Less Than .750	1/2 Dia. or 1/2 Sq. Single
		3/8 x 3/4 *Dual
		1/4 x 3/8 *Dual
	Greater than .750	3/8 x 3/4 *Dual
		1/4 x 3/8 *Dual
		1/2 Dia. or 1/2 Sq. Single

Search units must be qualified on a cracked sample prior to use on piping welds. Qualification may take place on site, if a cracked sample is available, or at a location designated by the plant owner. If an alternative search unit is required due to piping geometry, etc., qualification of the alternative shall be at the discretion of the plant owner.

For piping 12.750" OD and larger, consideration should be given to qualifying the smallest size search unit possible to minimize radiation exposure.

In selection of the focal length of dual element search units should be considered. The focal point should fall as close as possible to the pipe ID to avoid crossing over beyond the focal point. When an examination requires a vee path calibration focused dual element search units should not be used.

- 4.2.3 Wedges shall be used to produce shear wave beam angles of 45 degrees,  $\pm 3$  deg., as determined using the IFT-2 ultrasonic calibration block. The distance from the index point of the wedge to the front end of the wedge should be short enough to permit 1/2 node examination of the near side of the weld root fusion zone without placing the transducer on the weld reinforcement. Where a 1/2 node examination cannot be performed, wedges producing shear wave beam angles up to  $70^\circ \pm 3^\circ$  may be used or a DAC may be constructed to allow for 1-1/2 vee path examination.

- 4.2.4 Couplants. Glycerine, ultra gel - II or Hercules powder 7H and demineralized water shall be used. Alternate couplants require approval by BWRSD Materials Engineering.

#### 4.3 Calibration Blocks

- 4.3.1 Field Examinations: The primary calibration blocks shall be



- 4.3.2 An IIW-2 ultrasonic calibration block shall be used during calibration to establish angle beam index point and beam angle as required in paragraphs 4.4.6.1 and 4.4.6.2.

#### 4.4 Equipment Calibration

- 4.4.1 Calibration shall include the complete ultrasonic examination system. Any change in search units, test shoes, (wedges), couplants, cables or ultrasonic instruments shall be cause for recalibration.

- 4.4.2 The calibration data shall be recorded and plotted for each calibration on the Calibration Data Sheet (Figure 1). These sheets shall be numbered in sequence with the Examination Data Sheets (Figure 2).

#### 4.4.3 Instrument Calibration

- 4.4.3.1 Laboratory: At the beginning of each period of continuous use, (or every three months, whichever is less), the ultrasonic instrument shall be checked for amplitude linearity and amplitude control linearity per Paragraphs 4.4.4 and 4.4.5, respectively.

- 4.4.3.2 Field: After any transport of the instruments in any commercial carrier, the instruments shall be checked per Paragraphs 4.4.4 and 4.4.5, respectively. These checks shall also be repeated once each week for the duration of the field examination.

#### 4.4.4 Amplitude Linearity Check

An angle beam search unit shall be positioned on a block and signals obtained from two reflectors. The search unit position shall be adjusted to give an exact 2-to-1 ratio of amplitudes between the two. The gain control (sensitivity) shall be adjusted and the larger signal brought to 80 percent of full screen height (FSH), adjust position if necessary, maintaining the 2:1 signal ratio. Without moving the search unit, the gain control shall be adjusted to successively set the larger signal from 100 percent to 20 percent FSH in 10 percent increments. The smaller indication shall be read at each setting. The signal amplitude must be 50 percent of the larger amplitude within five percent of FSH. Instruments that do not meet this requirement shall not be used. The data shall be recorded on the calibration data sheet provided.



- 4.4.5 Amplitude Control Linearity Check. The angle beam search unit shall be positioned on a calibration block and a peaked signal amplitude obtained from a hole. The indication shall be brought as near as possible to 80 percent FSH with the dB control. If necessary, the final adjustment to 80 percent FSH is made with the variable gain control. Using only the dB control, the dB changes indicated below shall be made and the resulting amplitude compared with the allowable amplitude limits. The resultant signal must fall within the amplitude limits as specified below. Instruments that do not meet these limits shall not be used. The procedure shall be repeated for the 40 percent and 20 percent FSH amplitudes and the data recorded on the calibration data sheet.

<u>Initial Amplitude</u> <u>Set of % FSH</u>	<u>dB Control</u> <u>Change</u>	<u>Amplitude Limits</u> <u>% FSH</u>
80	-6	32 to 48
80	-12	16 to 24
40	+6	64 to 96
20	+12	64 to 96

4.4.6 Beam Angle Determination

4.4.6.1 Determination of Angle Beam Index. The angle beam search unit is positioned on the IIW-2 calibration block so the beam is directed toward the four-inch radius surface. Move the search unit parallel to the sides of the calibration block until a maximum echo is obtained from the reflecting radius. The beam index point is now above the center line of the radius. Place a mark on the side of the angle beam wedge to identify the index point.

4.4.6.2 Determination of Beam Angle. Place the angle beam search unit on the IIW-2 calibration block and obtain a peak signal amplitude from the two-inch diameter hole. Read the refracted beam angle from the side of the calibration block using the angle which corresponds with the beam index point and record it on the Calibration Data Sheet.

4.4.7 Sweep Range Calibration

The calibration block shall be used to calibrate the ultrasonic instrument search unit combination for sweep range over the metal path to be used.



## 8 Recalibration, Sweep Only

If any indication of the DAC curve has moved on the sweep line more than five percent of the sweep division reading, correct the sweep range calibration and note the correction on the Calibration Data Sheet. If recordable reflectors are noted on the examination data sheets, those data sheets shall be voided and destroyed. A new calibration shall be made and recorded, and the voided examination areas shall be re-examined.

## 9 Recalibration, Amplitude Only

If the amplitude on the DAC curve has changed by more than 20 percent of its amplitude when a check is made on the calibration standard, all data sheets since the last positive calibration check shall be marked void and destroyed. A new calibration shall be made and recorded and the voided examination areas shall be re-examined.

## 10 Verification of ZX Scanning Sensitivity

The dB switches required to obtain the scanning sensitivity shall be determined using the calibration standards. A reflected signal from one of the side-drilled calibration holes shall be detected and the amplitude adjusted to a level between 30 percent and 40 percent of Full Screen Height. Using the dB switches, increase the signal amplitude to twice the sensitivity level amplitude and record the setting change required. This dB change shall be used to obtain the minimum scanning sensitivity.

## 11 Scanning Rate

The manual scanning rate for angle beam scanning shall be sufficiently slow to allow careful observation of the ultrasonic instrument screen and shall not exceed six inches per second of search unit movement.

## 12 Calibration shall be performed at the beginning of each series of examinations on the calibration block applicable to the system(s) being examined. A calibration verification shall be made at the end of each series of examinations and at intervals not exceeding four hours during the examinations.

● A curve representing 20 percent of the DAC level shall be marked on the display screen during calibration to aid in the determination of indication amplitude.



#### 4.5 Surface Preparation

4.5.1 The base material scanning surface shall be free of weld spatter and any other condition that would interfere with free movement of the search unit or impair coupling of ultrasonic vibrations to and from the material being examined. Unacceptable surface conditions shall be reported to the customer.

4.5.2 Surface preparation and cleaning operations are not within the scope of this procedure.

#### 5.0 CALIBRATION AND EXAMINATION

##### 5.1 0 Degree Base Material Sensitivity Calibration

5.1.1 Position the search unit on the applicable Plant Owner's calibration standard and obtain a back reflection. Adjust the peak signal amplitude to 75 or 80 percent of the Full Screen Height and mark the position on the display screen. This point represents primary reference level for the base material examination. Record this calibration data on the Calibration Data Sheet.

##### 5.2 0 Degree Base Material Examination

5.2.1 Scan the volume of base material through which the angle beam examination will be performed to detect reflectors that could interfere with the performance or the results of the angle beam examination. This examination is not intended to be used for acceptance or rejection of piping welds.

##### 5.3 Angle Beam (45 Degree) Sensitivity and DAC Calibration

5.3.1 Position the search unit on the applicable Plant Owner's calibration standard and obtain the first point on the DAC curve using a sound path no less than 3/8 of the full skip distance. Adjust the peak signal amplitude to 75 or 80 percent of the full screen height and mark its position and amplitude on the display screen. Without changing the gain level, obtain the peak signal amplitude for the next two metal paths of the sound beam. Mark their position and amplitudes on the display screen. Signal responses for metal paths less than 3/8 of the full skip distance may be obtained by determining the 2/8 node response (off scale) to determine the shape of the DAC curve. Join the points with a smooth line, the length of which shall cover the examination range. This DAC line



when adjusted for acoustic equivalency, represents the primary reference level (IX Sensitivity) for the angle beam examination. Record this calibration data on the Calibration Data Sheet. This calibration shall be performed using reflectors parallel and transverse to the weld seam as applicable to the examinations to be performed.

\* Vee path and skip distance are considered equivalent terms.

5.3.1.1 The 1/2 nodal and, if required, the 1-1/2 nodal point locations for the pipe to be examined shall be determined off the calibration standard notches or corners. Their location(s) shall be marked on the screen and on the calibration sheet. Their location shall be marked on the screen and on the calibration sheet.

#### 5.3.2 Acoustic Equivalency

5.3.2.1 The calibration block shall be checked as follows for use in comparisons with the plant piping for acoustic equivalency:

- With the instrument at the primary instrument gain established in 5.3.1, set instrument for pitch/catch operation.
- Attach two 45 degree single element search units to the instrument T/R jacks.
- Couple the transmitting search unit to the calibration standard.
- Manipulate the receiving search unit on the calibration standard to obtain a maximum (% FSH) CRT indication from the received signal.
- Record the dB change required to bring the amplitude of the signal to approximately 80% FSH.

#### Angle Beam Examination

##### 1. Establishing Primary Reference Level

5.4.1.1 The primary reference level shall be adjusted to provide acoustic equivalency between plant piping and the calibration standard as follows:

... as defined in 5.3.2.1 (a) and



- b) Set the instrument gain to the level established in 5.3.2.1 (e). In three equally spaced (120 degree) locations on the pipe weld perform the operations outlined in 5.3.2.1 (c) and (d).
- c) Determine average dB increase or decrease necessary to attain approximately 80 percent FSH. Record this dB difference on the ultrasonic examination data form and increase or decrease the instrument gain established in paragraph 5.3.1 by this amount.
- d) These steps (a)-(c) must be performed for each weld examined. Care must be exercised to insure that the instrument is returned to primary instrument gain prior to performing these steps.

#### 5.4.2 Scanning Sensitivity Level

The scanning shall be performed at a gain setting equal to or greater than twice the primary reference level. At the scanning level, the operator should be able to distinguish reflectors from the I.D. root geometry, increasing the gain beyond 2X may be required to accomplish this.

#### 5.4.3 Recording Sensitivity Level

Indications shall be recorded at the primary reference level (1x).

#### 5.4.4 Scanning for Reflectors Oriented Parallel to the Weld

The search unit shall be placed on the contact surface with the beam aimed about 90 degrees to the weld and manipulated laterally and longitudinally so that the ultrasonic beam passes through 2T minimum of base material from the edge of the weld. In addition, the search unit shall be angulated 0 degrees (perpendicular to the weld) through 45 degrees to the right and left of the normal (perpendicular to the weld) scan. See Figure 4. This examination shall be performed from both sides of the weld where component geometry permits.



#### 5.4.5 Scanning for Reflectors Oriented Transverse to the Weld

On prepared or sufficiently smooth surfaces the angle beam unit shall be aimed parallel to the longitudinal centerline of the weld with the search unit contacting the weld surface. The search unit shall be moved along the weld so that the sound beam passes through all the weld metal and weld HAZ on both sides of the weld where practical. Scanning shall be done in two directions 180 degrees to each other. In addition, the search unit shall be angulated from 0 degrees (parallel to the weld through 45 degrees, aimed at the weld) on both sides of the weld for parallel scanning. (See Figure 4).

#### 5.4.6 Specific Area of Interest

Angle beam indications of intergranular stress corrosion cracking (if present) will be evident at the 4/8 node or 1/2 "Vee path" metal path distance.

### 6. RECORDING

#### 6.1 0 Degree Base Material Indications

- 6.1.1 Record on the data sheet all areas of base material which exhibit a total loss of back reflection. In addition, record all areas where intermediate reflector(s) with signal amplitudes equal to or greater than the remaining back reflection appear. If numerous overlapping indications of lesser amplitudes exist which in the opinion of the level II might prevent a meaningful shear wave examination they shall be documented.

#### 6.2 Angle Beam Indications

- 6.2.1 All angle beam indications in the HAZ or base material in excess of 20 percent of the primary reference level DAC shall be recorded on the Examination Data Sheets, Figure 2. Indications observed on the CRT, which emanate at the root (I.D. surface) and travel along the sweep toward the O.D. shall be investigated regardless of amplitude. Indications indicative of IGSCC shall be recorded.

#### 6.3 Reference Positions for Physical Measurements

- 6.3.1  $W_0$  shall be the weld's centerline and shall be used for measuring transducer movements perpendicular to the weld. See Figure 3.

#### 6.4 Selecting the Location of In Reference Point (if not previously)



#### 6.4.1 Piping Within Containment

On horizontal pipe,  $L_0$  reference shall be an axial line or point at the pipe top dead center. On vertical pipe,  $L_0$  reference shall be an axial line or point on the pipe circumference farthest from the reactor pressure vessel.

#### 6.4.2 Piping Outside Containment

On horizontal pipe,  $L_0$  reference shall be an axial line or point at the pipe top dead center. When possible, on vertical pipe, the  $L_0$  reference shall be selected by drawing an imaginary line down from the outermost radius of the next highest elevation elbow. When no elbows are in sight, the  $L_0$  reference shall be an imaginary line on the pipe 180 degrees from the nearest wall or obstruction.

6.4.3 Pipe welds with indications may be stamped with low stress V stamp. The V stamp shall be placed on the circumferential weld centerline. The top of the V shall be  $L_0$  (for circumferential welds) and shall point in the direction from which measurements are made. For longitudinal piping welds,  $L_0$  shall be the pipe circumferential weld centerline.

#### 6.5 Method of Recording Examination Data

6.5.1 Figure 3 sketches the relationship between transducer movements (positions  $W_1$ ,  $W_m$ ,  $W_2$ ), weld center ( $W_0$ ), weld reference point ( $L_0$ ) and location and length of indications ( $L_1$  and  $L_2$ ). This attachment also contains a sample copy of an Examination Data Sheet. Hypothetical information based on the above sketch has been recorded on it.

6.5.2 Search unit positions  $W_1$  and  $W_2$  shall be recorded only when the wall thickness of the pipe exceeds one inch. Signals caused by geometric changes such as weld crown, mismatch, fitup ID preparations, etc., shall require recording of  $W_m$ ,  $MP_m$ , the peak signal amplitude, and the length of the indication in inches or degrees azimuth.

6.5.3 The following "transducer positions" and "data to be recorded" information shall be recorded on the Examination Data Sheets for indications which exceed the minimum detectable level (MDL).



### Transducer Positions

- (a)  $W_1$  - Distance between the search unit index point and the weld centerline ( $W_0$ ) when the signal amplitude decreases to 20 percent DAC when moving towards the weld from  $W_m$ .
- (b)  $W_m$  - Distance between the search unit index point and the weld centerline ( $W_0$ ) when the signal amplitude is at maximum.
- (c)  $W_2$  - Distance between the search unit index point and the weld centerline ( $W_0$ ) when the signal amplitude decreases to 20 percent DAC when moving away from the weld and  $W_m$ .

### Data to be Recorded

- (1) Distance from referenced centerline ( $W_0$ ).
- (2) Indicated metal path to reflector distance ( $MP_1$ ).
- (1) Distance from reference centerline ( $W_0$ ).
- (2) Indicated metal path to reflector distance ( $MP_m$ ).
- (3) Signal amplitude in % DAC at Primary Reference Level.
- (1) Distance from reference centerline ( $W_0$ ).
- (2) Indicated metal path of reflector distance ( $MP_2$ ).

6.5.3.1 The transducer positions  $L_1$  and  $L_2$ , correspond to the 20 percent DAC length end points of an indication. The end points of the indication at 50 percent DAC shall also be noted on the data sheet.

6.5.4 When indications other than geometric have been identified within the fusion zone, the heat affected zone or the base material, the transducer's positions should be recorded as follows: 1) The transducer's movement for each data point is perpendicular to the length direction. 2) The data shall be obtained at 1/4-inch intervals along the length of the reflector for indications less than 2 inches in length. In addition, the maximum amplitude points shall be checked at 1/4-inch intervals. 3) For indications greater than 2 inches in length, the data shall be taken at 1-inch intervals. 4) The continuity of indications between intervals shall be confirmed.



## 7.0 REVIEW OF DATA

7.1 The recorded data shall be reviewed by an individual certified to at least Level II to determine if additional examination and/or evaluation is required.

### 7.2 Evaluation of Indications

Disposition and evaluation of indications shall be as specified in the contract.

7.2.1 Geometric plots of all recordable indications shall be made to show location of the indications with respect to the weld root and weld heat affected zone (HAZ).

7.2.2 To assist in preparation of geometric plots, the responsible individual shall assure that thickness measurements, where required, are available.

7.2.3 Indications that appear to originate from a geometric condition shall be plotted to determine their origin.

7.2.4 When geometric plotting appears to be inconclusive or plotted data appears to result in a condition that may not be correct, such as a reflector that appears to emanate from the far (opposite) side of the weld root, the Level III may elect to evaluate the indication based on signal behavior. Some characteristics of IGSCC signal behavior are:

- A) IGSCC indications will originate at or near the sweep position corresponding to the component ID.
- B) IGSCC indications will walk (travel on the CRT) from ID toward OD.
- C) When the search unit is angulated (per Figure 4) while the indication is peaked, a geometric indication will decrease in amplitude rapidly with a variation in incident angle. An indication caused by IGSCC tends to decrease in amplitude slowly and become more broad based as the search unit is angulated.
- D) At times, an indication will separate from an IGSCC indication, as the search unit is moved toward the indication, and walk toward the OD. This indication, when it appears, is indicative of a crack tip and is associated with indications of IGSCC.



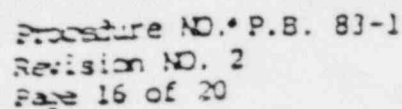
These characteristics of IGSCC indications should be checked at or near the middle of the indication. If the indication is short (less than 3 times the width of the search unit) it will be necessary to move the search unit to an end of the indication before angulation is performed (Step C).

#### 7.2.5

Indications determined not to be from geometric reflectors shall be evaluated as follows:

- 7.2.5.1 0 degree base material indications shall be evaluated to ensure that no interference to the angle beam examination exists.
- 7.2.5.2 Indications which appear to be from IGSCC shall be reported to the Plant Owner within 24 hours of evaluation. The Owner shall supply disposition of the indication.
- 7.2.5.3 Indications shall be reported to the Owner for disposition if the amplitude exceeds the reference level, and discontinuities have lengths which exceed:
  - (1)  $1/4$  inch from  $t$  up to  $3/4$  inch, inclusive
  - (2)  $1/3t$  for  $t$  from  $3/4$  inch to  $2-1/4$  inch, inclusive
  - (3)  $3/4$  inch for  $t$  over  $2-1/4$  inch

where  $t$  is the thickness of the weld being examined; if a weld joins two members having different thicknesses at the weld,  $t$  is the thinner of these two thicknesses.



SITE \_\_\_\_\_  
SYSTEM \_\_\_\_\_  
PROCEDURE NO. \_\_\_\_\_ REV. \_\_\_\_\_  
DATE \_\_\_\_\_ COUPLANT \_\_\_\_\_  
EXAMINER \_\_\_\_\_  
DATA TAKER \_\_\_\_\_  
INSTRUMENT MODEL NO. \_\_\_\_\_

CALIBRATION BLOCK 1 \_\_\_\_\_

CALIBRATION SHEET # \_\_\_\_\_

ITW-2 SLOOK 1 \_\_\_\_\_

ASNT L.E.

ASNT LEVE

INSTRUMENT SERIAL # \_\_\_\_\_

CABLE NO. \_\_\_\_\_ CABLE TYPE \_\_\_\_\_ CABLE LENGTH \_\_\_\_\_

SEC TYPE \_\_\_\_\_

ANGLE  
BEAM

SIB AREA

SERIAL NO. \_\_\_\_\_  
IDENTITY \_\_\_\_\_  
FREQUENCY \_\_\_\_\_  
DATE \_\_\_\_\_

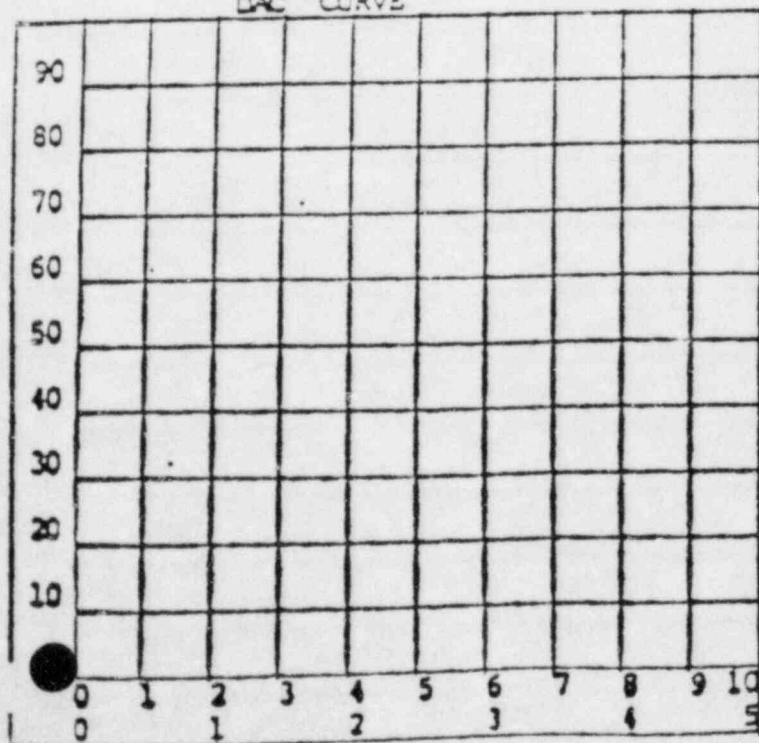
ॐ

DEFEND

REFLECTOR ORIENTED (PARALLEL OR TRANSVERSE) TO WELD SEAM (CROSS OUT ONE)

DAC CURVE

CAL STD 22: \_\_\_\_\_



**INSTRUMENT SETTINGS:**

Uncalibrated Gain  
Coarse Sweep  
Fine Sweep  
Coarse Range  
Fine Range  
Scanning Gain  
Attenuation (In)  
Evaluating Gain  
Attenuation (In)  
Filter Position  
Rep Rate  
Damping  
Reject  
Acoustic Equivalency  
(Para. 5.3.2)

[illegible]



NAVY  
U.S. NAVY

Proc. P.B. 83-1

Rev. 2

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Bolt Type	Depth Inches	Gain LX	Max Amp.	"W" Inch	D or MP Inch	SDH or PSH
1/4		LX				
1/2		LX				
3/4		LX				
2 1/2 I.D. Notch		LX				
2 1/2 O.D. Notch		LX				

Initial Calibration Time \_\_\_\_\_

Periodic Checks: Last  
Time Value Data Sheet

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Final Check:

Calibration in Dept. (D) ☐ or Metal Path (MP) ☐

### Amplitude Linearity Check (Made Daily)

dB	WFSH	50% WFSH	WFSH
90%		40%	
80%		30%	
70%		20%	
60%			

### Control Linearity (Made Daily)

80% WFSH	-5dB	(32-48)
80% WFSH	-12dB	(16-24)
40% WFSH	-5dB	(64-96)
20% WFSH	+12dB	(64-96)

### Equip. Data-Straight Beam For Linearity Checks

LIW-2 \_\_\_\_\_

#### Transducer Data:

Serial NO. \_\_\_\_\_

Beam Angle \_\_\_\_\_

Size \_\_\_\_\_ Freq. \_\_\_\_\_

Shoe No. \_\_\_\_\_ Cable No. \_\_\_\_\_

Check Made By: \_\_\_\_\_

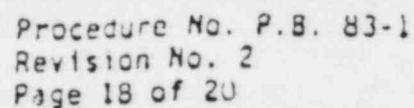
### Checks on LIW-2

Block on 1/8" SDE for Field Calib.  
Checks @ Max Amp. for Both Near/Par  
Position In @ Screen Height

1/8" SDE	Near	Par
Max. Amp.		
Metal Path		

Reviewed by \_\_\_\_\_

SNT-TC Level



Exam Form \_\_\_\_\_  
Cal. Form No. \_\_\_\_\_

Site \_\_\_\_\_ ☐ Preoperational ☐ I.S.I. Date \_\_\_\_\_  
System \_\_\_\_\_ Weld No. \_\_\_\_\_ Weld Type \_\_\_\_\_  
Examiner \_\_\_\_\_ ASNT Level \_\_\_\_\_  
Data Taker \_\_\_\_\_ ASNT Level \_\_\_\_\_  
Search Angle \_\_\_\_\_ U.T. Procedure \_\_\_\_\_ Rev. \_\_\_\_\_  
Scan Sens: X2 \_\_\_\_\_ Other \_\_\_\_\_ Evaluation Sens: X1 \_\_\_\_\_  
Couplant \_\_\_\_\_ Comp. Temp. \_\_\_\_\_

Performed		Indication	
Yes	No	Yes	No

1. Angle beam for reflectors parallel to weld
2. Angle beam for reflectors transverse to weld (clockwise and counter clockwise)

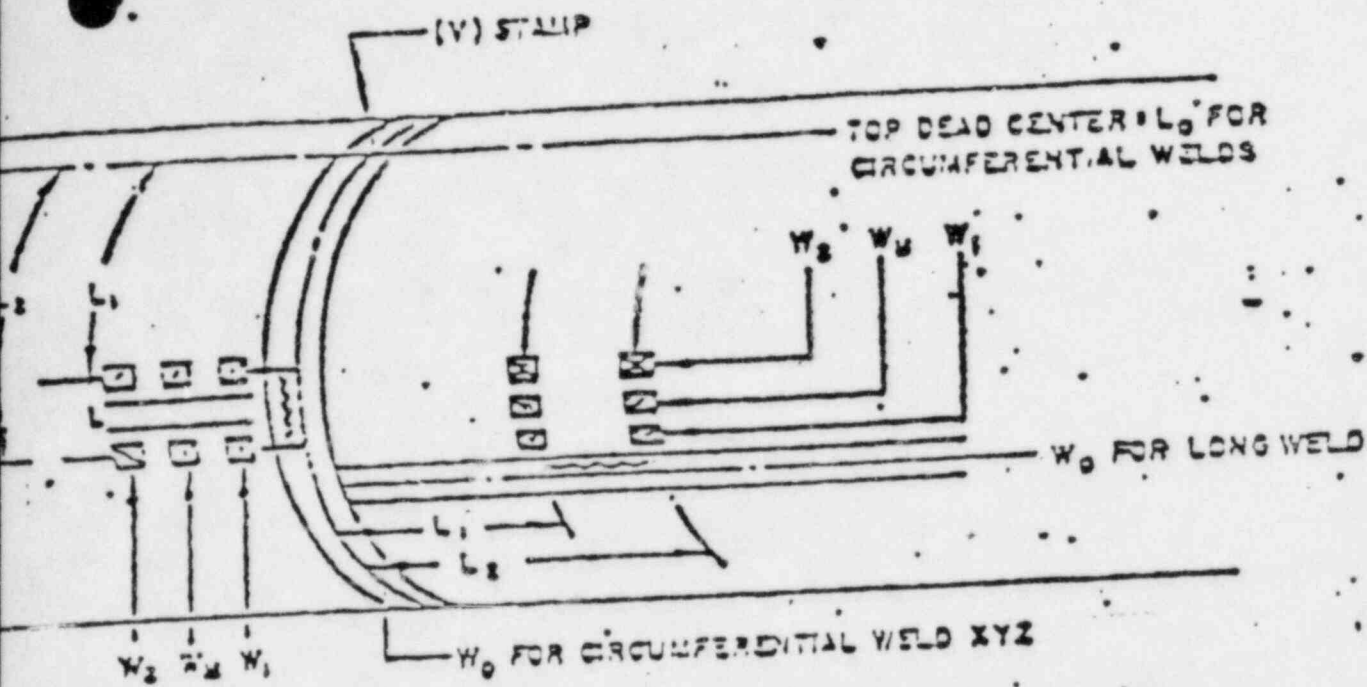
Benchmark or Referenced "O" Location: \_\_\_\_\_

$L_0 =$  \_\_\_\_\_  $W_0 =$  \_\_\_\_\_

AVERAGE ACOUSTIC DIFFERENCE (db) Para. 5 4 1 1 :

Reviewed by: \_\_\_\_\_ ASNT-TC-1A Level ☐ II ☐ III

DOES ☒ DOES NOT ☐ MEET CODE



Weld Type	$W_1$ Inches	$W_2$ Inches	$W_4$ Inches	TDAC	Metal Patch			Emm No.	Scarring & Repair
					$MP_1$	$MP_2$	$MP_3$		
	2.0	2.7	3.6	25	2.7	3.5	4.8	3	
	2.0	2.6	3.5	35	2.6	3.4	4.7	3	
.5	2.0	2.6	3.4	20	2.7	3.4	4.6	3	
1.0	2.0	2.6	3.4						
5	2.1	2.4	2.7	20	2.4	2.7	2.9	2	
	2.1	2.6	2.9	35	2.4	2.8	3.3	2	
10	2.1	2.6	2.9						
	2.1	2.4	2.7	22	2.4	2.7	2.9	2	

FIGURE 3

AL ELECTRIC

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Tests 263

Same as  
Test 2 Side

Test 3 Side

WELD



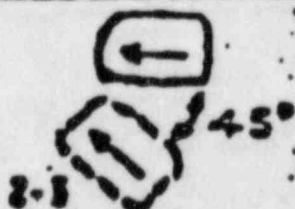
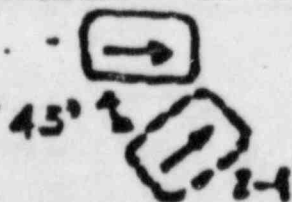
Test 2 Side

Tests 425



Test 3 Side

WELD



Test 2 Side

Figure 4. Scanning Pattern