

ULTRASONIC EXAMINATION PROCEDURES
 FOR CLOSURE HEAD AND FLANGE WELDS

LONG ISLAND LIGHTING COMPANY
 SHOREHAM NUCLEAR POWER STATION
 UNIT 1

Prep'd by *Heutzijl* Date

CONTROLLED COPY
 VALID ONLY IF THIS STAMP IS RED NES

Heutzijl 9-12-77
 Project Mgr. Date

REV. NO.	DATE
0	8/4/77
1	10/14/77
2	12/20/77
3	7/20/78
4	10/30/78
5	5/19/83

NES _____ Date

NES *B. Bannister for LILCO* 9-23-77
 Mgr. ISI Level III Date

NES _____ Date

NES *J. S. Heutzijl* 9-23-77
 ISI Program Mgr. Level III Date

NES _____ Date

LILCO *F. X. Schoner* 10/17/77
 QA Mgr. Date

_____ Date

_____ Date

Copy No. _____

Assigned to: _____



NUCLEAR ENERGY SERVICES, INC.

RECORD OF REVISIONS

Rev. No.	Date	Description	Reason	Prep'd by	App'd by
1	10-15	p.1 : Add "Level III" Delete "S&W"	LILCO comments of 10-14-77 HARTFORD comments of 10-10-77	AU	NES LILCO
		1.2.2: Delete "and/or scan fixtures"			JXS 10/17/77
		2.1(6): Delete entirely.			
		5.2.8: Re-number as 5.2.9			
		5.2.8: "All examination weld/areas ... so recorded"			
		5.4.2: Delete entirely.			
		5.4.1: Delete "5.4.1"			
		5.6.2: Change 1/64" to 1/32".			
		5.6.3: Delete entirely. Re-number 5.6.4, 5 and 6.			
		6.1(1); Add "in compliance with Ref. 2.1(1)"			
		6.1(7): Add "Thermometer"			
		6.2: Delete (6), (7), Re-number (8) (9) (10)			
		8.1(1): Change "divisions" to "positions"			
		8.1(2): Spell out "FSH"			
		8.3(1): Change "divisions" to "positions"			
		11.1: Add "The data sheets..... Code Inspector."			

Rev. No.	Date	Description	Reason	Prep'd by	App'd by	
					NES	LILCO
1	10-15	11.3.1: Delete reference to "S&W E&DCR A5210.40" 11.3.2: Change "S&W" to "LILCO" p.22, 23, 24: Add sign. line for "reviewer"	LILCO comments of 10-14-77 HARTFORD comments of 10-10-77	AJ	NES	LILCO
2	12-77	Pg. 22: delete "T/8"			JG	FXS 11/5/78
3	7-78	2.1 Clarify Code Usage 8.3 Change to "Full Vee" Figures-Change to "Full Vee"	LILCO and NRC comments	VP	FC	FXS 11/6/78
4	10-78	8.3(1) Change to incorporate Full Vee Calibration. 8.3(2) Changed para. to read "...response from the 3/4T hole." Revised procedure to reflect use of full Vee examination as well as 1/2 Vee examination. (Section 8.3 and 8.4)	To meet Full Vee examination requirements.	M.P.	FC	FXS 11/4/78
5	5-83	5.3.1 change to certify that couplant not exceed PPM halogens and 200 PPM sulfur. See CRA 3324	LILCO comments	B	B	EJA 6-15-83

ULTRASONIC EXAMINATION PROCEDURES FOR CLOSURE HEAD
MERIDIONAL, CIRCUMFERENTIAL DOME AND FLANGE WELDS

1.0 SCOPE

1.1 Area of Examination

This document covers the ultrasonic examination procedures for the Closure Head:

- (1) Meridional welds.
- (2) Circumferential dome weld.
- (3) Flange weld.

1.2 Type of Examination

1.2.1 Volumetric examination shall be performed using ultrasonic pulse echo nominal 45° angle beam shear wave and 0° straight beam techniques applied to the outside surfaces of the Closure Head.

1.2.2 The examination shall be performed manually using contact search units (transducers).

1.3 Time of Examination

These procedures shall govern the preservice examination and re-examination of repaired areas of the Closure Head as required by the ASME Boiler and Pressure Vessel Code, Section XI.

1.4 Weld Configuration

1.4.1 The Closure Head meridional, circumferential dome, and flange welds have a nominal thickness of $4-1/16''$. (Minimum thickness of $3-3/16''$).

1.4.2 Typical Closure Head weld configurations and nominal weld thicknesses are shown in Figures 1 and 2.



1.5 Materials

The Closure Head is constructed of low carbon steel.

2.0 REFERENCES

2.1 Reference Documents

The following documents form a part of this examination procedure:

- (1) ASME Boiler and Pressure Vessel Code, Section XI, 1971 Edition and the Summer of 1972 Addenda for examination coverage.
- (2) ASME Boiler and Pressure Vessel Code, Section III, 1971 Edition and the Summer of 1972 Addenda.
- (3) ASNT Recommended Practice, SNT-TC-1A, Supplement C, Third Edition (1971).
- (4) ConAm Procedure for Certifying Inspection Personnel, CUTP-1, Rev. 4, September 1975.
- (5) ConAm Procedure for Ultrasonic Instrument Linearity Verification, 25-PS-002, Rev. 2, November 1975.
- (6) ASME Boiler and Pressure Vessel Code, Section XI, 1974 Edition for technique.

2.2 Applicable Drawings

The following drawings are part of this procedure:

- (1) CE Assembly Dwg. E-234-485

2.3 Operational Manuals

The equipment operational manuals for the particular ultrasonic instruments used form a part of this procedure.

3.0 PROCEDURE CERTIFICATION

The examination procedures described in this document comply with Section XI of the ASME Boiler and Pressure Vessel Code, 1971 Edition including Summer 1972 Addenda, except where examination coverage is limited by part geometry or access.

4.0 PERSONNEL CERTIFICATION

4.1 Personnel Certification Requirements

4.1.1 Each person performing ultrasonic examination governed by this procedure shall be certified in accordance with the References 2.1 (1), 2.1 (3), and 2.1 (4).

4.1.2 An examination crew shall consist of one or two members as needed. At least one member of each crew shall have a minimum qualification of Level II in accordance with the above referenced documents. The remaining member shall have a minimum qualification of Level I.

4.2 Personnel Records

4.2.1 Records of personnel qualification shall be maintained by Examination Contractor.

4.2.2 A copy of the examiner's certification summary and a current eye test as required by SNT-TC-1A shall be filed with each permanent examination record, with a copy submitted to the plant owner or his agent, prior to performing examination per this procedure.

5.0 EXAMINATION REQUIREMENTS

5.1 Examination Frequency

5.1.1 The nominal examination frequency shall be 2.25 MHz for all straight beam and angle beam examinations.

5.1.2 During preservice examination, other pulse frequencies shall be used only if such variables as material attenuation, grain structure, etc., necessitate their use to achieve penetration or resolution. This information shall be recorded on the data sheets.



5.2 Examination Angles and Coverage

- 5.2.1 The intent of this procedure is to provide maximum examination coverage to ensure weld integrity. Each weld shall be scanned with minimum 25% overlap of the transducer width (diameter) for each scan pass.
- 5.2.2 The rate of search unit movement shall not exceed six (6) inches per second.
- 5.2.3 Each weld and the required volume (WRV) of metal for one-half ($\frac{1}{2}$) wall thickness (T) on each side of the weld shall be ultrasonically examined using 45° shear wave angle beam techniques applied in two directions perpendicular to the weld axis and in two directions parallel with the weld axis, on both sides of the weld, except where restricted by part geometry or access.
- 5.2.4 Straight beam techniques shall be applied, where part geometry permits, to all parent material through which the angle beams will pass during angle beam examinations. Indications detected are to be recorded in accordance with Section 10.1.1 of this procedure.
- 5.2.5 In addition, straight beam techniques shall be applied to the weld and required volume where part geometry permits. Indications shall be recorded in accordance with Section 10.1.2 of this procedure.
- 5.2.6 Other angles may be used if required for aid in evaluation of reflectors or to accommodate geometric restrictions and limited access. All information shall be recorded on the data sheets.
- 5.2.7 Where examination surface, geometry, or other conditions (weld, contour, access, etc.) do not permit a meaningful ultrasonic examination to be performed, the examiner shall record the area of non-examination and the particular interfering condition in the space provided on the Calibration Data Sheet. In addition, he shall make a sketch of the weld and adjacent conditions on the reverse side of the calibration data sheet (Figure 5).
- 5.2.8 All examination weld/areas shall be entered in the space provided on the Calibration Data Sheet. If there are no recordable indications, it shall be so recorded.
- 5.2.9 Coverage for the welds specified in Table 1 is shown in Figures 1 and 2.



5.3 Liquid Couplant

- 5.3.1 The ultrasonic couplant shall be suitable for use on nuclear plant material and certified not to exceed 50 PPM halogens and 200 PPM sulfur.
- 5.3.2 The couplant shall be supplied in clean containers of sufficient quantity to perform the examination.
- 5.3.3 The couplant shall be applied manually with a brush or other suitable device.
- 5.3.4 Where required, the examiner shall be responsible for removing couplant from the examination surface at the conclusion of the examination.

5.4 Surface Preparation

All examination surfaces should be clean and free of dirt, weld spatter, etc., or any other condition which would interfere with the examination by impairing proper transmission of the sound beam, or by preventing free movement of the search unit along the examination surface.

5.5 Weld Identification

Each weld shall be located and identified per the appropriate weld map located in the Program Plan Book.

5.6 Datum Point

- 5.6.1 The examiner shall verify that there has been marked, a reference datum point on each weld from which all examination data and reported indications shall be referenced.
- 5.6.2 Datum points shall be marked by the use of low stress stamps or vibratooling and shall not be deeper than 1/32".



- 5.6.3 Circumferential dome head welds and closure head to flange weld datum points shall be located on the weld centerline at vessel 0°.
- 5.6.4 Meridional weld datum points shall be located on the weld centerline at the bottom end of each weld.
- 5.6.5 Each weld datum point along with respective weld reference points and divisions shall be shown on each examination report.

6.0 EQUIPMENT REQUIREMENTS

6.1 Examination Contractor's Equipment

The following test equipment or its equivalent shall be provided by the Examination Contractor (as a minimum) for examination of the Closure Head welds:

- (1) Pulse Echo Ultrasonic Instrument. (in compliance with Ref. 2.1(1))
- (2) Wedge, 45°, Refracted Shear Wave.
- (3) Search Units, 1/2", 3/4", or 1" Dia., 2.25 MHz, 0°.
- (4) Search Units, 1/2" x 1", 2.25 MHz.
- (5) Couplant.
- (6) Camera, (7) Thermometer.

6.2 Plant Owner's Equipment

The Plant Owner or his Agent shall provide the following service facilities and equipment as required:

- (1) Scaffolding.
- (2) Water, Air, and Electricity.
- (3) Temporary Lighting.
- (4) Crane or Lifting Devices.
- (5) Calibration Standard No. SNPS-4.



- (6) Test Surface Preparation.(cleaning and finishing)
- (7) Drawings of Each Examination Area.
- (8) Post-Examination Cleanup of Test Area.

7.0 CALIBRATION REQUIREMENTS

7.1 Calibration Data Sheets

Calibration Data Sheets shall be numbered 467-1, 467-2, 467-3, etc., at the time of calibration and shall be signed by the examiner(s) upon completion. Figure 5 is an example of the Calibration Data Sheet to be used with this procedure.

7.2 Calibration Standards

- 7.2.1 The calibration standard designated in Section 6.2 (5) shall be used for basic instrument calibration and for establishing reference sensitivity levels for examination of the specified welds. (See Figure 3).
- 7.2.2 The identity of the calibration standard used for performing calibration shall be recorded on each Calibration Data Sheet.
- 7.2.3 Calibration procedures for the examination shall be performed using the O D surface of the referenced standard.
- 7.2.4 The temperature of the calibration standard shall be within 25°F of the component temperature. Calibration standard and component temperatures shall be recorded on the Calibration Data Sheet.

7.3 Reference Sensitivity Level

- 7.3.1 The reference sensitivity level shall be the distance-amplitude curve initially obtained directly from the calibration standard and shall be the sensitivity level used for evaluating and recording all indications.
- 7.3.2 During actual weld scanning, the reference sensitivity level shall be increased a minimum of 2X (6dB).



7.4 Times of Calibration

- 7.4.1 Basic instrument calibration shall be performed using the appropriate calibration standard, search units, and instrumentation immediately prior to the examination of the Closure Head.
- 7.4.2 Instrument vertical linearity checks shall be performed at the beginning of each day of examination in accordance with the procedure referenced in Section 2.1(5), using an angle beam search unit applied to the code of calibration standard.
- 7.4.3 Examination system calibration checks shall be performed at least at the beginning and at the completion of each four (4) hour period of examination and/or at the change of examination personnel, equipment, search units, coupler shoes, etc., and at the completion of the examination of each similar series of welds in accordance with Sections 8.2 and 8.5 of this procedure.

7.5 Calibration Response

- 7.5.1 Calibration response shall be checked at the primary reference sensitivity level.
- 7.5.2 Signal response obtained during calibration check shall be within plus or minus 20% of that established during basic system calibration.
- 7.5.3 If any point on the DAC curve has decreased by more than 20% of its amplitude, the examiner shall:
 - (1) Mark all weld data sheets void since previous calibration.
 - (2) Recalibrate examination system.
 - (3) Re-examine voided areas.
- 7.5.4 If any point on the DAC curve has increased by more than 20% of its amplitude, the examiner shall:
 - (1) Recalibrate examination system.
 - (2) Re-evaluate all indications recorded since the previous calibration at the corrected sensitivity level.



7.5.5 If any point on the DAC curve has moved horizontally more than 5% of the sweep line from its original settings, the examiner shall:

- (1) Correct the sweep calibration and note it on the Calibration Data Sheet.
- (2) Void any data sheets made since the previous calibration which have recorded indications and re-examine those areas.

8.0 EXAMINATION SYSTEM CALIBRATION

8.1 Straight Beam Calibration

Straight beam sweep calibration and distance-amplitude correction shall be performed as follows and as shown in Figure 4:

- (1) Adjust the instrument sweep controls so that the signal responses from the 1/4T and 3/4T holes occur at the second (2nd) and sixth (6th) horizontal screen positions.
- (2) Position search unit to obtain maximum response from the hole which gives the highest amplitude signal. Adjust sensitivity control to provide a signal amplitude of 80% of Full Screen Height (FSH) and mark location and amplitude on the CRT.
- (3) Without changing sensitivity, position the search unit respectively on the remaining holes and mark signal amplitudes and locations on the CRT.
- (4) Plot a DAC curve by connecting the locations (marked on the CRT) with a continuous line extended to cover the full examination range as shown in Figure 4.
- (5) This is the primary reference sensitivity. Record all sensitivity control settings on the appropriate Calibration Data Sheet.

8.2 Straight Beam Calibration Check

Straight beam calibration check as required by Section 7.4.3 shall be performed as follows:



- (1) Adjust the sensitivity control settings to those recorded for the calibrated reference sensitivity. See Section 8.2(2).
- (2) Reposition search unit at each respective test Hole and observe maximum signal response amplitudes, and horizontal screen positions.
- (3) See Section 7.5 for signal response requirements during calibration check.

8.3 Angle Beam Calibration (Second Half of Vee Path)

Angle beam sweep calibration and Distance-Amplitude Correction should be performed as follows and as shown in Figure 4:

- (1) Adjust the instrument sweep controls so that the signal response from the $1/4T$ and $1\ 3/4T$ holes occur at the first (1st) and seventh (7th) horizontal screen positions as shown in Figure 4. To verify sweep calibration, ensure that response from square notches appear near the fourth (4th) and eighth (8th) horizontal positions respectively. ④
- (2) Position search unit to obtain maximum response from the $3/4T$ hole. Adjust sensitivity control to provide a signal amplitude of 80% of FSH and mark location and amplitude on CRT. ③
- (3) Without changing sensitivity, position search unit respectively on the remaining angle beam calibration holes and mark signal amplitudes and locations on CRT. ①
- (4) Position search unit for maximum response from the far surface notch and "X" mark the screen and data sheet to indicate amplitudes. ④
- (5) If the instrument is equipped with an electronic Distance-Amplitude Correction device, the primary reference response shall be equalized at 80% of FSH over the distance range to be employed in the examination.
- (6) Plot a Distance-Amplitude Correction (DAC) curve by connecting the locations (marked on the CRT) with a continuous line extended to cover the full examination range as shown in Figure 4.



- (7) This is the primary reference sensitivity. Record all sensitivity control settings on the appropriate Calibration Data Sheet.
- (8) Report all data and instrument settings on the Calibration Data Sheets.

8.4 Angle Beam Calibration (First Half of Vee Path)

Angle beam sweep calibration and distance-amplitude correction should be performed as follows and as shown in Figure 4:

- (1) Adjust the instrument sweep controls so that the signal response from the 1/4T and 3/4T holes occur at the first (1st) and third (3rd) horizontal screen positions as shown in Figure 4. To verify sweep calibration, ensure that response from square notch appears near the fourth (4th) horizontal positions.
- (2) Position search unit to obtain maximum response from the hole which gives the highest amplitude signal. Adjust sensitivity control to provide a signal amplitude of 80% of FSH and mark location and amplitude on CRT.
- (3) Without changing sensitivity, position search unit respectively on the remaining angle beam calibration holes and mark signal amplitudes and locations on CRT.
- (4) Position search unit for maximum response from the far surface notch and "X" mark the screen and data sheet to indicate amplitude.
- (5) If the instrument is equipped with an electronic distance-amplitude correction device, the primary reference response shall be equalized at 80% of FSH over the distance range to be employed in the examination.
- (6) Plot a Distance-Amplitude Correction (DAC) curve by connecting the locations (marked on the CRT) with a continuous line extended to cover the full examination range as shown in Figure 4.



- (7) This is the primary reference sensitivity. Record all sensitivity control settings on the appropriate Calibration Data Sheet.
- (8) Report all data and instrument settings on the Calibration Data Sheets.

8.5 Angle Beam Calibration Check

Angle beam calibration check as required by Section 7.4.3 shall be performed as follows:

- (1) Adjust the sensitivity control settings to those recorded for the calibrated reference sensitivity. See Section 8.3 (2).
- (2) Reposition search unit at each respective test hole and observe signal response amplitudes and horizontal screen positions.
- (3) See Section 7.5 for signal response requirements during calibration check.

9.0 EXAMINATION PROCEDURES

9.1 Examination of Base Material for Lamination

- 9.1.1 Straight beam examinations to detect laminar reflectors which might affect the interpretation of angle beam results shall be performed at a sensitivity level giving an initial back reflection signal amplitude of 80% FSH.
- 9.1.2 A rectilinear scan pattern shall be used.
- 9.1.3 For the location and the numbers of the welds refer to the Program Plan. Examination shall not be considered complete until all recordable indications have been evaluated.

9.2 Straight and Angle Beam Examination of WRV

- 9.2.1 Straight and angle beam examination of weld and required volume shall be performed at a scanning sensitivity level at least 2X (6dB) greater than the calibrated reference sensitivity level.



- 9.2.2 For all examinations, a rectilinear scan pattern shall be used.
- 9.2.3 For angle beam examinations, the search unit shall be swivelled to ensure maximum coverage as it is moved along a rectilinear scan pattern.
- 9.2.4 For the location and the numbers of the welds, refer to the Program Plan. Examination shall not be considered complete until all recordable indications have been evaluated.

10.0 EVALUATION CRITERIA

10.1 Recording of Indications

- 10.1.1 For straight beam examinations of base metal for laminations, all areas giving indications equal to or greater than the remaining back reflection shall be recorded on the appropriate data sheet prior to angle beam examination of the weld and the required volume.
- (1) Each recorded area shall be identified as to distance from surface, length and position relative to the weld datum point.
 - (2) Recorded data shall be taken on each parallel scan pass at increments not to exceed that permitted by the 25% overlap of transducer element diameter (width).
- 10.1.2 For examinations of the WRV, all indications showing a signal amplitude response equal to or greater than 50% of the reference response shall be recorded on the appropriate data sheet at the time of weld examination. Planar indications at or near the far surface shall be compared directly with the amplitude obtained from the notch.
- (1) Each recorded indication shall be identified as to depth (as a percent of thickness), distance from surface, length, signal amplitude, and location relative to the weld datum point.



- (2) Recorded data shall be taken on each parallel scan pass at increments not to exceed that permitted by the 25% overlap of transducer element diameter (width).
- (3) The end points of recorded indications shall be determined by 50% DAC amplitude points.

10.1.3 Indications from all meridional welds shall be recorded in inches above the weld datum point and in inches clockwise (CW) or counter-clockwise (CCW) from the weld centerline when looking down upon the top of the closure head.

10.1.4 Indications from all circumferential dome and flange welds shall be recorded in inches above or below the weld centerline and in inches CW or CCW from the weld datum point when looking down upon the top of the closure head.

10.2 Evaluation of Indications

10.2.1 Evaluation of all indications shall be made at the reference sensitivity and in accordance with the requirements of the ASME Boiler and Pressure Vessel Code, Section XI, IS-300. All evaluations shall be performed by a Level II or Level III.

10.2.2 Results of this evaluation shall be reported to the Plant Owner or his Agent in accordance with the requirements of the ASME Boiler and Pressure Vessel Code, Section XI, IS-600. Disposition of evaluation results shall be made in accordance with the Owner's Plant Procedures.

11.0 EXAMINATION RECORDS

11.1 Certification of Records

The examiner shall complete and sign all data sheets immediately upon the completion of each weld examination. The data sheets may be reviewed by the authorized Code Inspector.



11.2 Filing of Records

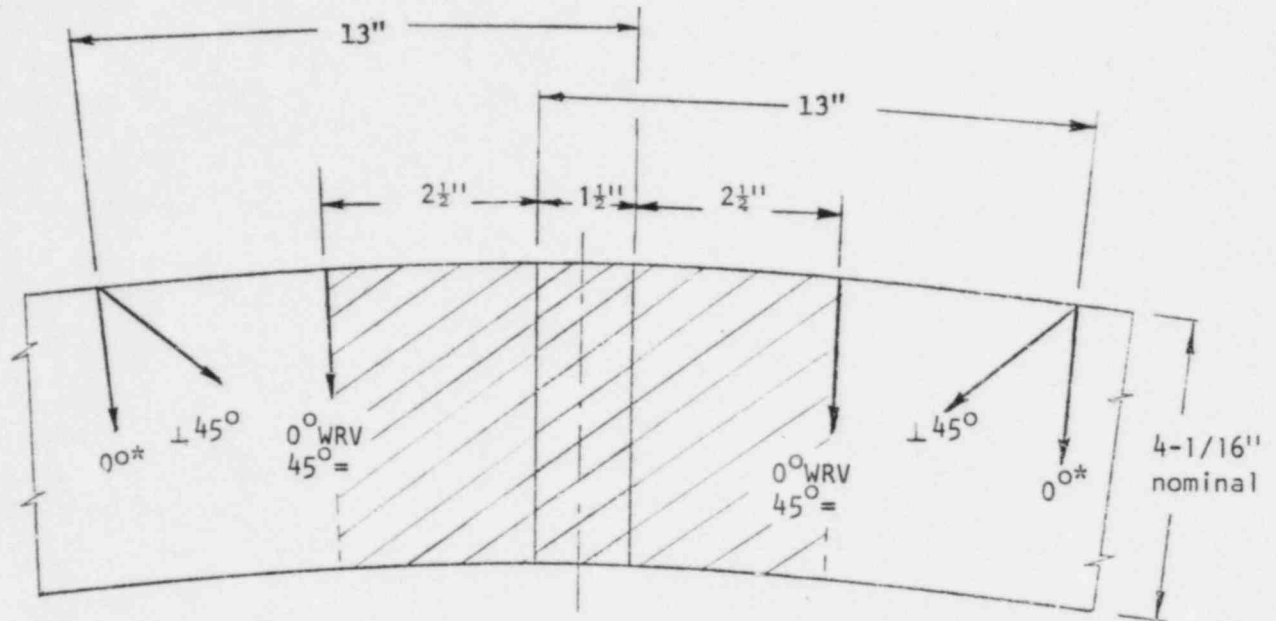
The examiner shall be responsible for submitting to the Plant Owner or his Agent a completely documented set of examination records including certification of personnel qualifications with a current eye test report in accordance with SNT-TC-1A.

11.3 Procedure Corrections and Additions

11.3.1 All procedure corrections and/or additions required during the preservice examinations shall be made in accordance with requirements of NES QA Program Plan # NES 80A0448.

11.3.2 The examiner will contact the LILCO representative on site to initiate all such changes. All changes shall be documented in the record of revisions section of this procedure.





LEGEND


- ⊥ Perpendicular to Weld
- ≡ Parallel to Weld
- * 0° Base Material
-  WRV Weld & Required Volume

FIGURE 1 - ULTRASONIC EXAMINATION OF CLOSURE HEAD CIRCUMFERENTIAL AND MERIDIONAL DOME WELDS.



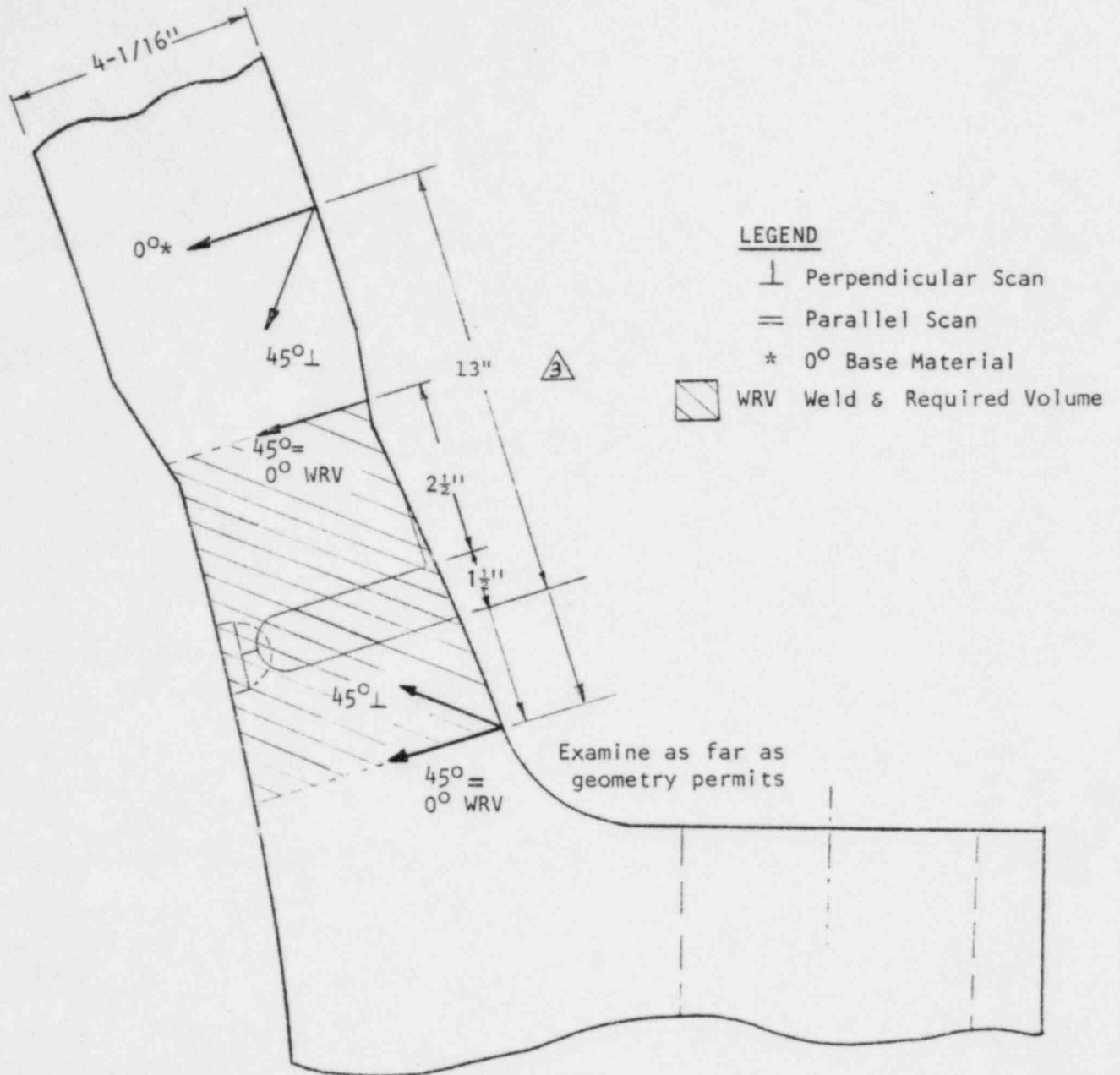
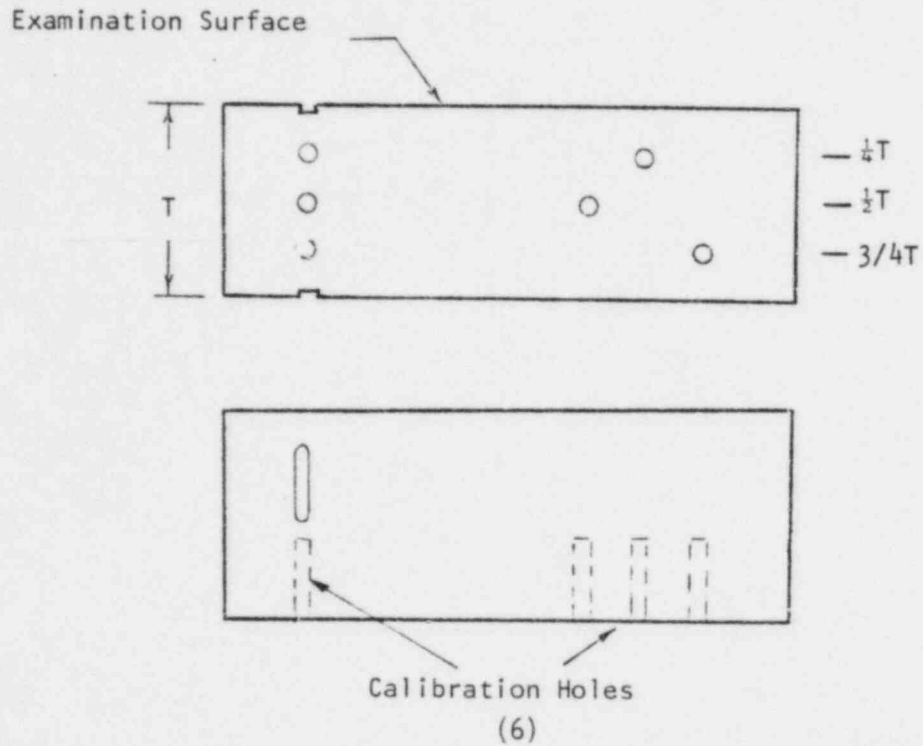


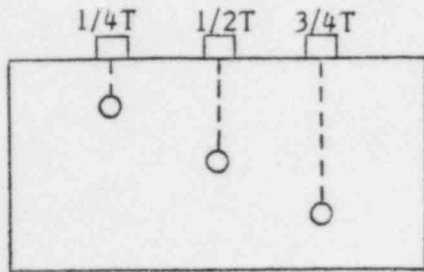
FIGURE 2 - ULTRASONIC EXAMINATION OF CLOSURE HEAD FLANGE WELD.



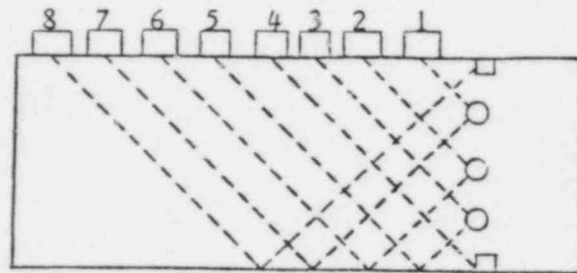
Standard No.	Block Thick.	$\frac{1}{4}T$	$\frac{1}{2}T$	$\frac{3}{4}T$	Hole Dia.	Hole Depth	Notch Depth
SNPS-4	4-3/32"	1.02"	2.04"	3.06"	0.25"	3.00"	0.082" (2%T)

FIGURE 3 - ULTRASONIC CALIBRATION STANDARD SNPS-4 FOR CLOSURE HEAD WELDS

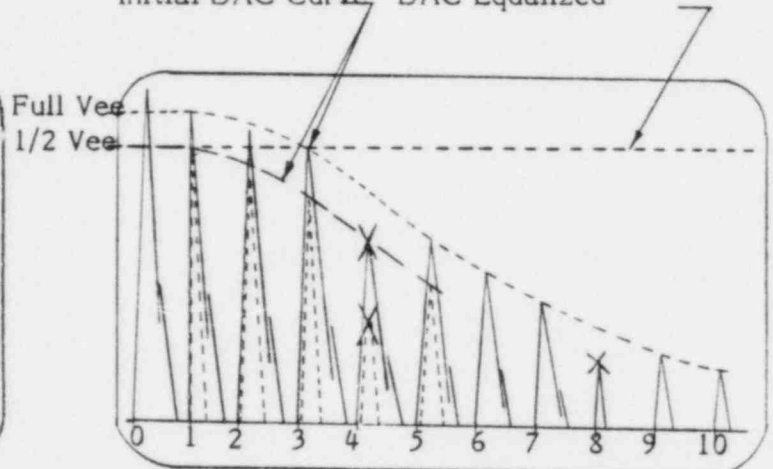
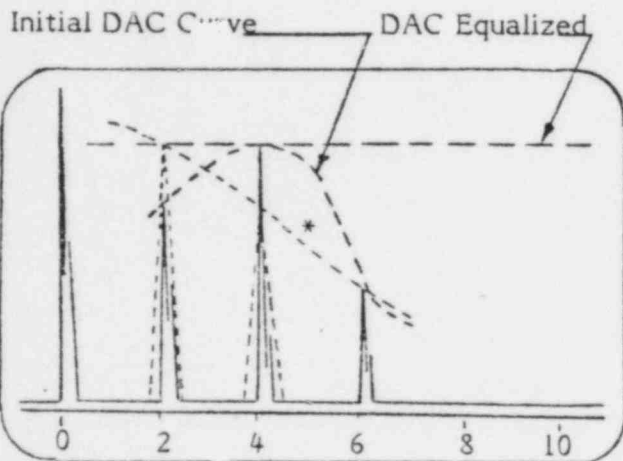




Straight Beam
Search Unit Positions



Angle Beam
Search Unit Positions
Initial DAC Curve DAC Equalized



- Step 1 - Adjust sweep controls so that indications from holes are located at the appropriate horizontal screen divisions.
- Step 2 - Adjust sensitivity to provide 80% FSH indications using 1/4T or 3/4T hole,** mark position on screen.
- Step 3 - Position search unit for maximum response from remaining holes - mark position on screen.
- Step 4 - Plot DAC by connecting points marked with line extended to cover entire examination range.
- Step 5 - Use Distance-Amplitude Correction to electronically equalize amplitude response at the specified reference level.
- Step 6 - Record all sweep and sensitivity control settings on respective data sheets.

FIGURE 4. - REFERENCE SENSITIVITY AND DAC CALIBRATION PROCEDURES FOR ULTRASONIC EXAMINATION OF WELDS.

*depending on transducer near field, either DAC shape can be expected

** use the 3/4T hole for full vee exam (see Section 8.3) use the 1/4T hole for 1/2 vee exam (see Section 8.4)



Plant/Unit _____
 Comp/System _____

CALIBRATION DATA SHEET

Data Sheet No. _____
 Procedure No. _____
 Subject _____
 Rev/Change No. _____
 Calibration _____
 Block No. _____
 Surface _____
 Block Temp _____ °F
 Comp. Temp _____ °F

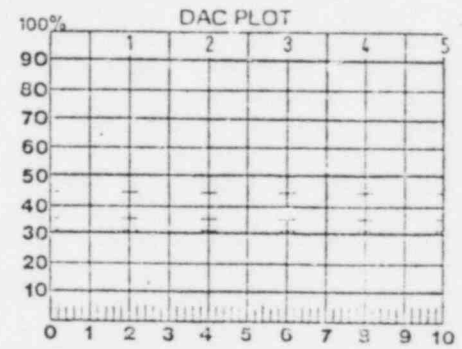
INSTRUMENT SETTINGS	
Mfg/Model No.:	
Serial No. :	
Sweep Length :	
Sweep Delay :	
Pulse Length/Damping:	
Freq.: Rep. Rate:	
Filter: Video: Jack:	
DEC/Gate Switch: Range:	
Mode Select: Reject:	
Gain (coarse): (fine):	

SEARCH UNIT	
Scan Angle: Mode:	
Fixturing (if any):	
Style or Type No. :	
Size & Shape :	
Frequency :	
Serial No/Brand:	
Measured Angle :	
Cable Type & Length:	
Couplant Brand:	
Couplant Batch:	

IDENT	DEPTH in.	AMPL. %	ATTEN. dB

INSTR. LINEARITY CAL.				
Amplitude				
	High	Low	High	Low
1			5	
2			6	
3			7	
4			8	

SCAN AREA	
0° WRV	
0° Mat'l	
↳ to Weld	
↳ to Weld	



AMPL. CONTROL LINEARITY		
Initial	Δ dB	Result
80	-6	
80	-12	
40	+6	
20	+12	

EXAMINATION WELD/AREA	RECORDABLE INDICATION		COMMENTS/REASON FOR INCOMPLETED SCAN(S)
	Yes	No	

CALIBRATION CHECKS	TIME
Initial Cal.	
Intermediate	
Intermediate	
Intermediate	
Final Cal.	

ADDITIONAL SHEETS? (CHECK BOX)		
Continuation	Beam Plot	
Supplements	None	

EXAMINERS 1 _____ Date _____ Level _____
 2 _____ Date _____ Level _____
 REVIEWER _____

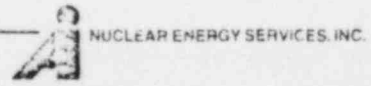
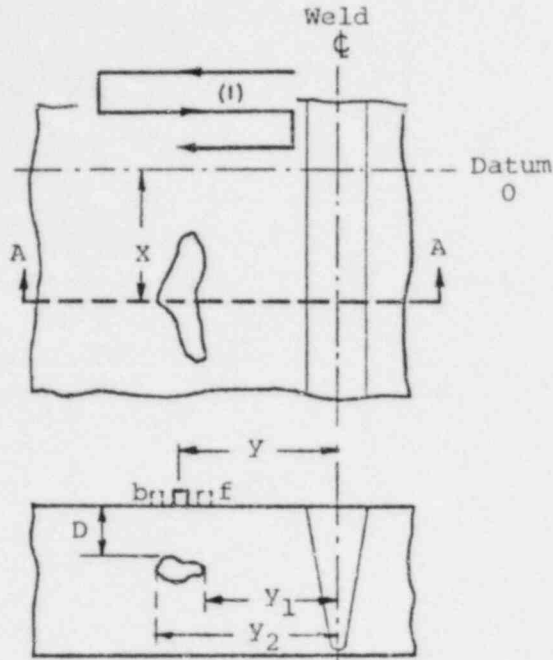


FIGURE 5 - CALIBRATION DATA SHEET

SUPPLEMENT A

INDICATION REPORT SHEET
STRAIGHT BEAM



Section A-A

Procedure No. _____
 Subject _____
 Weld No. _____
 Page _____ of _____
 Attached to Cal. _____
 Data Sheet No. _____

Notes:

- (1) X-axis increments not to exceed allowable scan increments.
- (2) End points shall be: (a) 50% of DAC (6db) for WRV Straight Beam exam, (b) equal to Remaining Back Reflection (RBR) for base material lamination exam.
- (3) This column for WRV Straight Beam exam only.
- (4) This column for base material lamination exam only.

INDI-CATION NO.	SIDE OF WELD	D (in T/8s)	X ⁽¹⁾	MAX ⁽³⁾ % DAC (±db)	RBR ⁽⁴⁾ % FSH	Y @ MAX % DAC	FORWARD	BACK
							(f) ENDPOINT	(b) ENDPOINT
							Y ₁ ⁽²⁾	Y ₂ ⁽²⁾

COMMENTS

EXAMINERS

1. _____ Date _____ Level _____

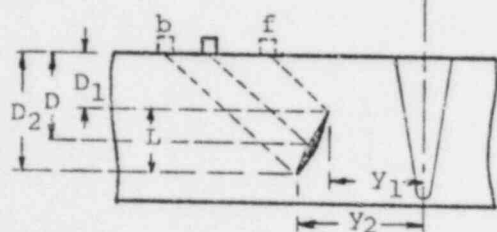
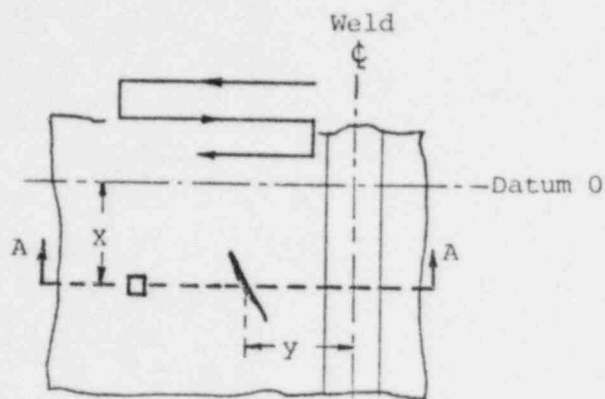
2. _____ Date _____ Level _____

REVIEWER _____ DATE _____



SUPPLEMENT B

INDICATION REPORT SHEET
L ANGLE BEAM



Section A-A

Procedure No. _____
 Subject _____
 Weld No. _____
 Page _____ of _____
 Attached to Cal. _____
 Data Sheet No. _____

Notes:

- (1) X-axis increments not to exceed allowable scan increments
- (2) End points shall be 50% of DAC (6db)
- (3) Data must be recorded from both sides. If indication cannot be found from the opposite side, so state.

INDI-CATION NO.	SIDE OF (3) WELD	X ⁽¹⁾ (in)	MAXIMUM INDICATION			FORWARD (f) ENDPOINT ⁽²⁾		BACK (b) ENDPOINT ⁽²⁾		CALC. L	
			MAX % DAC	D @ MAX (T/8s)	Y @ MAX (in)	D ₁	Y ₁ (in)	D ₂	Y ₂ (in)	in.	%T

COMMENTS

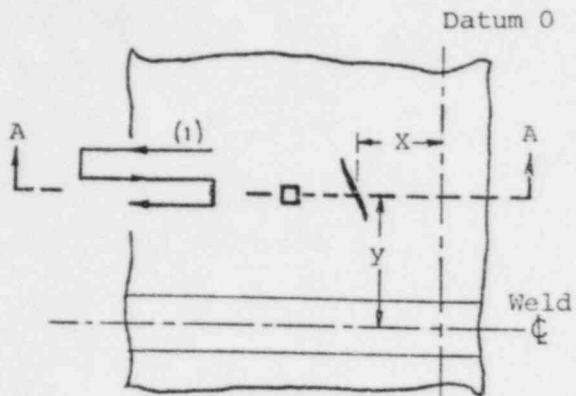
EXAMINERS

1 _____ Date _____ Level _____
 2 _____ Date _____ Level _____

REVIEWER _____ DATE _____

SUPPLEMENT C

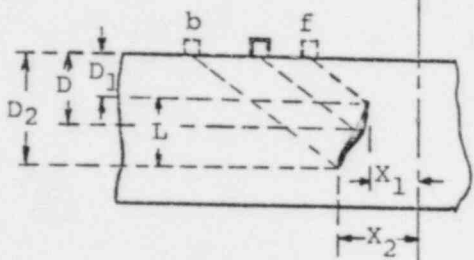
INDICATION REPORT SHEET
= ANGLE BEAM



Procedure No. _____
 Subject _____
 Weld No. _____
 Page _____ of _____
 Attached to Cal. _____
 Data Sheet No. _____

Notes:

- (1) Y-axis increments not to exceed allowable scan increments
- (2) End points shall be 50% of DAC (6db)
- (3) Data must be recorded from both sides. If indication cannot be found from the opposite side, so state.



Section A-A

INDI-CATION NO.	SIDE OF WELD (3)	y (1) (in)	MAXIMUM INDICATION			FOREWARD (f) ENDPOINT (2)		BACK (b) ENDPOINT (2)		CALC. L	
			MAX % DAC	D @ MAX (T/8s)	X @ MAX (in)	D ₁	X ₁ (in)	D ₂	X ₂ (in)	in.	%T

COMMENTS

EXAMINERS

1. _____ Date _____ Level _____

2. _____ Date _____ Level _____

REVIEWER _____ DATE _____



TABLE 1
 WELD IDENTIFICATION
NUCLEAR COMPONENTS

Weld No.	Description	Reference Block	Reference Figures	Notes
3-318	Closure Head Circumferential Weld	SNPS-4	CE-E-234-485 (Figure 2)	
1-318A	Closure Head Meridional Weld 0°	↓	↓	
1-318B	45°			
1-318C	90°			
1-318D	135°			
1-318E	180°			
1-318F	225°			
1-318G	270°			
1-318H	315°			
2-318	Closure Head to Flange Weld		CE-E-234-485 (Figure 3)	



STONE & WEBSTER ENGINEERING CORPORATION
 REVIEW OF SUPPLIER'S TECHNICAL DOCUMENT

Copy

4504051B

PAGE _____ OF _____

SUPPLIER <i>Nuclear Energy Services</i>	P.O. NO.	DOCUMENT TITLE <i>Manual UT Procedure No. NIP 631 for RIV Circ and beam welds</i>	DOC. ID. NO. <i>NIP 631</i>	REV. <i>1</i>	DATE <i>12/3/75</i>
DATE RECEIVED <input checked="" type="checkbox"/> NEW SUBMITTAL <input type="checkbox"/> RESUBMITTAL	SPEC. NO. / DATE <i>SH-392 / 12/1/75</i>	REV. ADDEN. <i>1</i>	SPEC. TITLE <i>In-line Inspection Program</i>		
GOVERNING CODE(S) & DATE(S) <i>ASME NPT II through Summer 72 Addenda</i>	SPECIAL REQUIREMENTS		DWG REFERENCE(S) <i>S & W SUPPLIER</i>		
SPECIALIST <i>J. B. Bennett</i>	PROJECT <i>SIVPS-1</i>	JO. NO. <i>116-00-02</i>	RESPONSIBLE ENG. <i>St. Whitehead</i>	LOCATION <i>245/4</i>	EXT. DATE <i>S 283 12/23/75</i>

COMMENTS:

Attenda applies only to coverage of manual UT examination and does not allow examination procedure or technology.

- APPROVED -
 AS DEFINED IN
 SPEC. NO. *SH 1-392-392*
 STONE & WEBSTER
 ENGINEERING CORPORATION
[Signature] 12/24/75

RESUBMITTAL REQUIRED
 YES NO

REVIEWER <i>[Signature]</i>	DEPT./DIV. <i>QA 26</i>	DATE <i>24 Dec 75</i>	LOCATION <i>245/S</i>	EXTENSION <i>7.570</i>
--------------------------------	----------------------------	--------------------------	--------------------------	---------------------------