Field Revision Request

ject Cooper Nuclear Station

roject No. TA161 FRR No: NPPD-91-35 Date 11-15-91

Document to Be Changed:

Title: Procedure for Ultrasonic Examination of RPV Closure Studs Number: GE-UT-307

Reason Change is Requested: To Meet NPPD Requirements

Proposed Change:

#1 Delete Paragraphs 5.3.1, 5.3.2, 5.3.3, and 5.3.4. Replace with new 5.3.1, 5.3.2, 5.3.3, 5.3.4, to read as follows:

5.3.1 Sweep Range Calibration. Using a suitable Calibration Block, adjust the instrument sweep to display a minimum of 50" of Metal Path.

5.3.2 System Calibration and construction of DAC's shall be performed using a 2 (two) Zone technique on a full length Stud Calibration Block. Zone 1 (one) shall cover the metal path range from 0" - 24 7/16" minimum, as measured from the nut end of the block. Zone 2 (two) shall cover the metal path range from 24 7/16" - 48 7/8" minimum.

5.3.3 The Zone 1 (one) DAC shall be obtained using a 5.0 MHZ Nominal Frequency Transducer from the nut end of the block. Obtain signals from slots A and D in the Calibration Block. Set the higher amplitude

Approved By Project Manager Rick Hobbs Date 11-15-91 Approved By QC Supervisor [signature] Date 11-15-91

Comments:

Rick Hobbs 11-15-91

Change Approved, Work May Proceed By: _____ Date _____
Client (If Required)

Change Not Approved for Above Reasons By: _____ Date _____
Client (If Required)

Work May Proceed Provided the Above Comments are Incorporated By: _____ Date _____
Client (If Required)

Is Change May/May Not Be Used for Production Before the Base Document if Revised:

Project Manager _____ Date _____

QC Supervisor _____ Date _____

ANI (If Required) _____ Date _____

5.3.3 (cont'd)

response to 80% FSH. Mark the signal's position and amplitude on the CRT. Without changing gain, obtain a response from the remaining slot. Mark the position and amplitude on the CRT. Connect these points and extrapolate them to cover the examination range. This is primary reference level for Zone 1. Mark a second curve 20% of primary reference level on the CRT. Record instrument settings and DAC's on the Calibration Data Sheet.

5.3.4 The Zone 2 DAC shall be obtained using a 10.0 MHZ nominal frequency transducer from the flange end of the block. Obtain signals from slots A and D in the calibration block. Set the higher amplitude response to 80% FSH. Mark the signal's position and amplitude on the CRT. Without changing gain, obtain a response from the remaining slot. Mark the position and amplitude on the CRT. Connect these points and extrapolate them to cover the examination range. This is primary reference level for Zone 2. Mark a second curve 20% of primary reference level on the CRT. Record instrument settings and DAC's on the Calibration Data Sheet.

#2 Delete 5.3.4.1, 5.3.4.2, 5.3.4.3, 5.3.4.4, 5.3.4.5, 5.3.4.6.

#3 Change 6.1.1 to read as follows:

For Zone 1, the examination should be performed with search units with a frequency within the range of 2.25 MHZ - 5.0 MHZ. For Zone 2, the examination should be performed using search units with a frequency within the range of 5.0 MHZ - 10.0 MHZ.

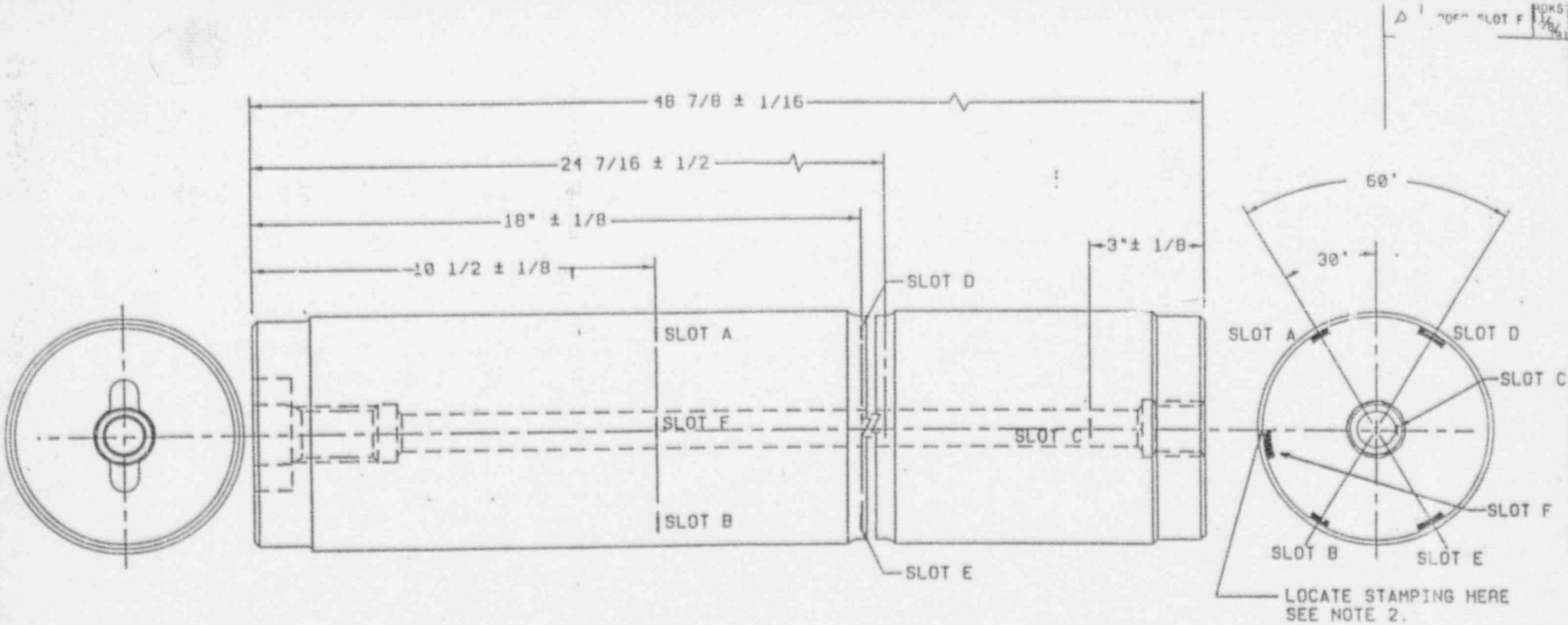
Change 6.1.2 to read as follows:

Scan at a gain setting of twice (2X) primary reference level. Record at primary reference level.

Change 6.1.4 to read as follows:

The examinations shall be performed in Zones that correspond to to those established during calibration.

proved By
roject Manager Richard Shaller Date 11-15-91 Approved By
QC Supervisor _____ Date _____



SLOT A TO BE .340" ±.010 LONG X .020" ±.010 WIDE X .155" ±.010 DEEP. THIS EQUALS .058 in^2 MAXIMUM.
SLOT B TO BE .890" ±.010 LONG X .020" ±.010 WIDE X .065" ±.010 DEEP. THIS EQUALS .067 in^2 MAXIMUM.
SLOT C TO BE .680" ±.010 LONG X .020" ±.010 WIDE X .060" ±.010 DEEP. THIS EQUALS .048 in^2 MAXIMUM.
SLOT D TO BE .340" ±.010 LONG X .020" ±.010 WIDE X .147" ±.010 DEEP. THIS EQUALS .054 in^2 MAXIMUM.
SLOT E TO BE .890" ±.010 LONG X .020" ±.010 WIDE X .055" ±.010 DEEP. THIS EQUALS .058 in^2 MAXIMUM.
SLOT F TO BE .890" ±.010 LONG X .020" ±.010 WIDE X .055" ±.010 DEEP. THIS EQUALS .058 in^2 MAXIMUM.

NOTES:

1. SLOTS D AND E ARE PLACED IN THE UNTHREADED PORTION OF THE STUD BODY. THEY ARE USED FOR SIZING INDICATIONS IN THE UNTHREADED PART OF THE STUD.
2. STAMP THE FOLLOWING IDENT. IN 1/4" CHARACTERS:-
   LINE 1) CNSCAL. STD. NO. 116
   LINE 2) CNSNO. 28036
   LINE 3) MAT'L. SPEC. SA-540 GR.B-24
   LINE 4) HT. NO. 14677 LOT NO.G5271-1

EQUIPMENT CLASS. CODE N

	SAFETY RELATED: THIS ITEM IS OR CONTAINS A SAFETY RELATED ITEM ☐ YES ☒ NO	IEEE CLASS 1E NUCLEAR SAFETY RELATED ☐ YES ☒ NO

SIGNATURES	DAY	MO	YR
DRAWN J.ROWAT	01	11	91
CHECKED R.O.KILGO	06	11	91
ISS R.E.CAMERON	11	11	91
ENGR W.MILLER			

Nuclear Energy — GENERAL ELECTRIC COMPANY San Jose CA

APPLIED PRACTICES _____ ALL SURF. ✓

UNLESS OTHERWISE SPECIFIED
TOLERANCES ON :
2 PLACE DECIMALS ± NA FRACTIONS ± NA
3 PLACE DECIMALS ± NA ANGLES ± NA

COOPER RPV STUD CALIBRATION BLOCK

FNF COOPER

DWG NO. SK-JR10-5 REV. A

SCALE C SHEET 1 OF F

Field Revision Request

Project: Cooper Nuclear Station

Project No.: TA161 FRR No.: NPPD-91-16 Date: 9-16-91

Document to Be Changed:

Title: Procedure for Ultrasonic Examinations of RPV Closure Studs Number: GE-UT-307, Rev. 0

Reason Change is Requested:

To meet customer requirements.

Proposed Change:

Change the last sentence in paragraph 4.5.2 to read: Total residual sulfur and halogen content shall not exceed the following:

* Fluorine - 300 PPM
* Chlorine - 500 PPM
  Sulfur - 700 PPM
* Halogen

Change sentence in paragraph 5.5.1 to read: Move the probe away from the notch until the amplitude of the signal is 50% (-6dB) from the maximum.

Add new Ultrasonic Calibration Data Sheet, Exhibit I.

Add new Ultrasonic Examination Data Sheet, Exhibit II.

Approved By Project Manager R. Shaddix Date 9-16-91 Approved By QC Supervisor Stanley Bruny Date 9-19-91

Comments:

R. Shaddix 9-16-91

Change Approved, Work May Proceed By: _____ Date _____
Client (If Required)

Change Not Approved for Above Reasons By: _____ Date _____
Client (If Required)

N/A

Work May Proceed Provided the Above Comments are Incorporated By: _____ Date _____
Client (If Required)

This Change May/May Not Be Used for Production Before the Base Document is Revised:

Project Manager _____ Date _____

QC Supervisor _____ Date _____

ANI (If Required) _____ Date _____

GE Nuclear Energy

EXHIBIT 1

STUD UT CALIBRATION DATA SHEET

Calibration Sheet No. _____

Site _____ ☐ P.S.I. ☐ I.S.I.

Procedure No. _____ Rev. _____ Calibration Block No. _____

Date _____ Couplant _____ Cal. Std. Temp. _____ °F

Examiner _____ ASNT Level _____

Recorder _____ ASNT Level _____

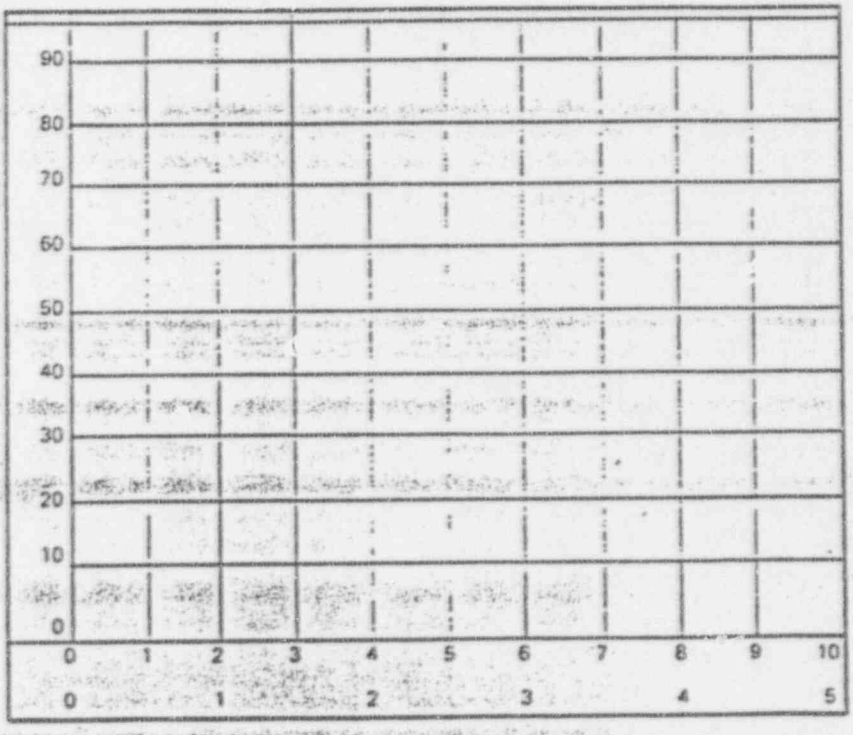
Equipment Data: Instrument Model No. _____ Shoe No. _____

Instrument Serial No. _____ Cable No. _____

Transducer Size _____ Frequency _____ MHZ

Transducer Serial No. _____ Beam Angle _____ °

DAC Curve: Range 0 – 5 ☐ 0 – 10 ☐ Other ☐



Reviewed by: _____
SNT-TC-1A Level III

NPPD ISI ENGINEERING _____ DATE _____

QA REVIEW _____ DATE _____

ANI REVIEW _____ DATE _____

GE Nuclear Energy

EXHIBIT 1

GENERAL ELECTRIC	CLOSURE STUD EXAMINATION DATA SHEET
SITE:	☐ Preservice ☐ Inservice
	EXAM. SHEET NO. _____
	CAL. SHEET NO. _____

DATE _____ EXAMINER _____ LEVEL _____

RECORDER _____ LEVEL _____

PROCEDURE/REV. _____ STUD IDENTIFICATION _____

SCANNING SENSITIVITY _____ dBs EVALUATING SENSITIVITY _____ dBs

COUPLANT _____ STUD TEMPERATURE _____ °F

BATCH NO. _____ THERMOMETER S/N _____

INDICATION RECORD:

Location		Max AMP % DAC	Metal Path Inches	Size of Indication 20% DAC to 20% DAC	Comments
AD= X"	D= X"				

Reviewed by: _____ Level: _____ Include Sketch if Applicable

MDDI IS! ENGINEERING _____ DATE _____

QA REVIEW _____ DATE _____

AN II REVIEW _____ DATE _____

GE Nuclear Energy

PROCEDURE NO.: GE-UT-307

TITLE

REVISION NO.: 0

PROCEDURE FOR ULTRASONIC EXAMINATION OF RPV CLOSURE STUDS

PREPARED BY:	REVIEWED BY:	APPROVED FOR USE BY:
DATE: MARCH 30, 1990 GE LEVEL: III	DATE: MARCH 30, 1990 GE LEVEL: III	DATE: MAR 30, 1990

COMMENTS:

FORM 83 3-10-90

TABLE OF CONTENTS

1.0 SCOPE

1.1 The scope of this Procedure encompasses the manual, contact, pulse echo, ultrasonic examination of the ASME Section XI, Category B-G-1, reactor pressure vessel closure studs.

1.2 This Procedure contains techniques for examination using a straight beam from one or both ends of the stud, using angle beams from the extensiometer hole, and using surface waves in the extensiometer hole. These techniques may be used singly or in combination as required by the Owner's program.

1.3 This Procedure is applicable to materials up to 70 inches in length.

1.4 This Procedure is applicable to RPV closure studs when the examination is performed with the stud left in place or removed.

1.5 This Procedure contains variances from ASME Section XI requirements, qualified in accordance with Paragraph IWA-2240.

1.6 This Procedure does not delineate the acceptance and/or rejection of indications disclosed during testing. Final evaluations will be the Owner's responsibility.

2.0 REFERENCES

2.1 The following documents form a part of this Procedure to the extent specified herein.

2.1.1 Codes and Standards

2.1.1.1 American Society of Mechanical Engineers, (ASME), Boiler and Pressure Vessel Code, Sections V and XI, 1980 Edition including Addenda through Winter 1981.

2.1.2 General Electric Documents

2.1.2.1 FQP-03, or equivalent, Qualification and Certification of Nondestructive Examination Personnel.

2.1.2.2 GE-ADM-1001, Procedure for Performing Linearity Checks on Ultrasonic Instruments

2.1.3 Vessel Fabrication Documents

2.1.4.1 Detailed identification and marking plan meeting the requirements of ASME Code Section XI.

3.0 PERSONNEL

3.1 All personnel performing the ultrasonic examinations in accordance with this Procedure shall be qualified and certified to at least Level I. Level I individuals shall work under the direct supervision of a certified Level II or Level III individual. A Level I individual shall not independently evaluate or accept the results of this examination.

3.2 Personnel performing examination in accordance with this Procedure shall receive instruction in its use prior to the examination. This indoctrination shall be documented.

4.0 EQUIPMENT

4.1 The basic equipment shall be pulse echo design and shall be equipped with a calibrated gain or attenuation control, graduated in units no larger than 2 dB.

4.2 Transducers

4.2.1 Straight beam examination from the end(s) of the stud shall be performed using a ceramic type longitudinal wave search unit having a nominal frequency in the range of 2.25 through 10.0 MHz. The search unit should be from 1/2 through 3/4 inch diameter. The search unit shall be capable of detecting the qualification notches in the calibration blocks. Detection of the ASME qualification notches in both the near and far positions shall be documented on the Calibration Data Sheet.

4.2.2 Angle beam examinations from the extensiometer hole shall be performed using a specially designed stud examination probe(s). The probe(s) shall contain, as a minimum, forward and aft pointing search units with a nominal frequency of 2.25 MHz. The search unit's active element size shall not exceed 3/8" diameter. The primary inspection angle should be in the range of 40° - 60°. Probes containing more than one beaming angle may be used. More than one probe may be required to accommodate the desired beaming angles and the required scanning directions.

4.2.3 Surface wave examinations in the extensiometer hole shall be performed using a search unit designed to produce surface waves at a nominal frequency of 5.0 MHz. The search unit's active element size shall not exceed 3/8" diameter. The search units may be incorporated in a specially designed surface wave stud examination probe or placed in a probe designed for angle beam examinations.

4.2.4 With the approval of the responsible Level III, transducers of different size, shape and frequency may be used for examination, investigation of defect size, location and orientation. The use of other transducers shall be documented.

4.3 Ultrasonic examinations should be performed using coaxial cables 4 to 12 feet in length, longer cables may be used when necessary to facilitate access. The cable used shall be documented on the Calibration Data Sheet. Documentation shall include the cable type, length, and number of connectors.

4.4 Calibration blocks shall be supplied or approved by the Owner. Figures 1, 2 and 3 show the GE recommended calibration block configurations.

4.5 Couplant

4.5.1 USP grade glycerine, deionized water, or Ultragel II should be used for calibration and examinations. When required to maintain coupling, the couplant may be thinned with a suitable reducing agent.

4.5.2 All couplants other than deionized water shall be certified for total sulfur and halogen content in accordance with ASTM D-129-64 and D-808-63. The total residual halogens and sulfur shall not exceed 250 PPM. Deionized water, when used, shall be supplied by the Owner. FRR NPPD-91-16

4.5.3 Other couplants which meet the above specification may be used with Owner approval.

5.0 CALIBRATION

5.1 General Requirements for Calibration

5.1.1 The surface temperature of the calibration block(s) shall be within ± 25 degree F of the component surface temperature. The identification of the temperature measuring device shall be entered on both the Calibration and Examination Data Sheets.

5.1.2 Complete system calibration shall be made for the applicable examination(s) prior to examination. A calibration check shall be made when the examination is complete, each four hour interval, and when any change is made in personnel or system combination. System calibration and calibration checks shall be performed using the basic calibration block.

5.1.2.1 If, during the system calibration check, any point on the DAC line has changed in amplitude by 20% (2dB) or changed on the sweep line by more than 5% of the sweep division reading, since the last system calibration or calibration check, a new calibration shall be made and recorded. All data sheets since the last valid calibration or calibration check shall be marked void and the affected studs shall be re-examined.

5.1.3 In addition to the requirements of Paragraph 5.1.2, system calibration shall be checked and DAC curve verified after any change in power supply (e.g., from AC to battery or vice versa).

5.1.4 For initial ASME XI examination, the reject and damping controls of the instrument shall be set at either minimum or off position. Other settings may be used when approved by a Level III. Such approval shall be documented by the Level III by signature or initial and date on the Calibration Data Sheet. If reject or damping are used, instrument calibration shall be verified. Verification shall be documented on the Calibration Data Sheet.

5.1.5 Calibration for the examination shall include the complete Ultrasonic Test System(s). Alternate cables and search units singly and in combination that have been included in a prior system calibration may be later substituted in the system; such substitution shall not necessitate a calibration check. When any other part of the ultrasonic test system is changed, a calibration check shall be made.

5.1.6 Calibration for examination shall be performed on the calibration block(s) applicable to the stud that is being examined.

5.1.7 The UT instrument frequency setting should be set as close to the transducer frequency as possible.

5.2 Instrument Calibration

5.2.1 Instrument calibration shall be performed daily, in accordance with Reference 2.1.2.2.

5.3 Calibration for Straight Beam Examination of Full Length Closure Studs (in place or when removed).

5.3.1 Sweep Range Calibration. Using the L/8 through L calibration blocks, adjust the instrument sweep range to display the zone(s) of the stud that are being examined.

FRR: NMP0-91-35

5.3.2 System calibration and construction of the DAC, shall be performed using a zoned technique. Examination zones shall be established by calibrating on the blocks that span the zone of the stud that is to be examined. It is expected that the zones will be: L/8 to L/4, L/4 to L/2, L/2 to 3L/4, and 3L/4 to L; however, zones may be combined if material attenuation permits. FRR-NMPD-35

5.3.3 The initial distance amplitude correction (DAC) curve shall be established by obtaining a peaked signal from the Flat Bottomed Hole (FBH) in the L/8 Calibration Block (see 7.1.2.1 for search unit recommendations). Using the variable gain control, adjust this signal amplitude to 80% FSH. Mark the sweep position and amplitude of this signal on the screen. Without changing the gain control, obtain a peaked signal from the FBH in the L/4 Calibration Block. Mark the sweep position and amplitude of this signal on the screen. Join the marks obtained above with a straight line point-to-point. This is the primary reference level for the zone extending from the scanning surface to L/4. Mark a second curve 20% of the primary DAC on the screen and record the data on the Calibration Data Sheet. FRR-NMPD-35 FRR-NMPD-35

5.3.4 Extension of the initial DAC to cover the other zones shall be performed (as necessary) as follows:

5.3.4.1 Determine the additional gain needed to increase the L/4 signal to 80% FSH and add this gain to the system. Mark the 80% amplitude on the screen and record the new gain setting on the Calibration Data Sheet. FRR-NMPD-35

5.3.4.2 Obtain a peaked signal from the FBH in the L/2 calibration block. Mark the sweep position and amplitude of this signal on the screen. FRR-NMPD-35

5.3.4.3 Connect the L/4 80% FSH point and the L/2 peak amplitude with a straight line point-to-point. This line is the primary reference level for the zone extending from L/4 to L/2. FRR-NMPD-35

5.3.4.4 Mark a second curve 20% of this reference level on the screen and record the data on the Calibration Data Sheet. FRR-AMD-35

5.3.4.5 Repeat steps 1-4 for the additional ranges of L/2 to 3L/4 and 3L/4 to L. When DAC's for these zones have been established, add an additional 12dB gain. This is the primary reference level for zones L/2 through L. The ASME code flaws in the near and far positions shall then be detected. The notches shall be detected at reference level with the equipment set up for the range where the flaw lies. The amplitudes from the notches shall be marked on the Calibration Data Sheet. The near position flaws are to be detected by scanning from the threaded end (nut end) of the calibration block containing the notch. The far position flaws are to be detected by scanning from the nut end of the full length (L) calibration block. FRR-AMD-35

5.3.4.6 Combination of examination zones, if possible, shall be performed. Three points shall be established, i.e., L/8 to L/2 requires DAC points from the L/8, the L/4, and the L/2 Calibration Blocks. The DAC established in this case would be valid for the examination zone extending from the scanning surface to L/2. FRR-AMD-35

5.4 Calibration for angle beam examinations performed from the extensiometer hole (in place or when removed).

5.4.1 Sweep Range Calibration. Insert the desired stud examination probe (see Figure 4) into the extensiometer hole and detect the signal from the calibrated notch in the stud threads. Adjust the instrument's sweep controls to display the distance from the OD surface of the bore hole to the notch in metal path. The sweep range is considered to be calibrated when the metal path displayed on the instrument is within ± 5% of the calibrated value. Record the instrument settings on the Calibration Data Sheet.

5.4.2 System Calibration. System calibration for this technique consists of establishing reference sensitivity only. Insert the desired stud examination probe into the extensiometer hole and detect the signal from the calibration notch. Maximize the signal and set the amplitude to 80% ± 5% FSH. This represents primary reference sensitivity. Other notches, e.g., .5 a/e. .05 a/e, etc. may be present for assistance in spring indications. If present data should be recorded from these notches for future use. Record the instrument settings on the Calibration Data Sheet.

5.4.3 More than one examination probe may be required to complete examination of a stud. When a single channel instrument is used, it is intended that all necessary calibrations be performed for each probe, e.g., fore and aft facing search units, fore or aft facing multi-angle search units, etc. Sensitivity differences between search units on the same stud examination probe shall be recorded on the Calibration Data Sheet. Appropriate adjustments, based on this data, shall be made to primary reference sensitivity during indication recording.

5.4.4 When primary reference sensitivity has been established, draw a horizontal line on the CRT screen representing the amplitude. A secondary line, representing 20% of the primary amplitude, shall also be drawn on the CRT screen. Both lines shall also be drawn on the Calibration Data Sheet.

5.5 Calibration for Surface Wave Examination in the Extensiometer Hole

5.5.1 Sweep Range Calibration. Insert the surface wave stud examination probe (see Figure 4) into the extensiometer hole and detect the ID surface notch on the stud. Move the probe toward and away from the notch and observe the signal's amplitude. Determine the point where the amplitude peaks and the distance of the search unit from the notch at peak amplitude. The distance from the notch will

usually be short. Adjust the sweep controls to display the determined distance from the notch in inches. Move the prove away from the notch until the amplitude of the signal is 50% (-6dB) from the maximum. Determine the distance. Adjust the sweep controls, if necessary, to display the minimum and maximum distances from the notch within ± 5% of the measured values. Mark the minimum and maximum points on the CRT screen and on the Calibration Data Sheet. FRA NPPD-91-46

Rough or parkerized surfaces can preclude a surface wave having a working distance. If little or no probe movement is possible without losing the notch signal, determine the search unit distance from the notch and adjust the sweep controls to display the distance within ± 5% of the measured distance. Mark the point on the CRT screen and the Calibration Data Sheet. Note on the Calibration Data Sheet that no probe movement was possible. In this case, no DAC (see 5.5.2) is necessary.

5.5.2 System Calibration. System calibration for this technique consists of establishing primary reference sensitivity and a DAC (see 5.5.1). Move the probe to the minimum distance from the notch and detect the signal from the notch. Set this amplitude to 80% ± 5% FSH. Mark the amplitude on the CRT screen. Move the probe to the maximum distance from the notch and mark the signal amplitude on the screen. Connect the points with a straight line. This establishes the primary reference sensitivity and DAC for the working distance determined for the search unit. Construct a secondary DAC equal to 20% of primary. Record the instrument settings and CRT markings on the Calibration Data Sheet.

If no working distance can be established for the search unit, no DAC is required. In this case, set the notch response to 80% ± 5% FSH and mark the position and amplitude on the CRT screen. Mark a secondary point equal to 20% of primary. Record the instrument settings and CRT markings on the Calibration Data Sheet.

6.0 EXAMINATION

6.1 Straight Beam Examination of Full Length Closure Studs (in place or when removed)

6.1.1 For zones L/8 through L/2, examination should be performed with search units in the range of 2.25 through 5.0 MHZ. For zones L/2 through L, examination should be performed with search units in the range of 5.0 through 10.0 MHZ, to minimize beam spreading at the longer distances. FRR-NMP-35

6.1.2 For zones L/8 through L/2, scan at a gain setting of twice (2X) the primary reference level. Record with the gain control set at the reference level (1X). For zones L/2 through L the scanning and recording levels shall be those established in Paragraph 5.3.4.5. FRR-NMP-35

6.1.3 The studs shall be examined from one end. The complete end surface shall be scanned. The scan path of the search unit shall overlap adjacent scans by a minimum of 10% of the transducer active element. The scanning speed shall not exceed 6 inches per second. RES 12-4-91 ~~FRR-NMP-35~~

6.1.4 The examination shall be performed in zones that correspond to the zones established during calibration. The instrument gain shall be set at 2X primary reference level and the zone from the scanning surface to L/4 examined. The instrument gain shall then be set at the gain established for the next examination zone, i.e., L/4 to L/2 and that zone shall be examined. This progressive examination shall be continued until the full length of the stud (all zones) has been examined. FRR-NMP-35

6.1.5 When the calibration zones display less than full stud length, occasionally verify search unit operation by obtaining a reflection from the radial dimension of the stud. RES 12-4-91 ~~FRR-NMP-35~~

6.2 Angle Beam Examination from the Extensiometer Hole

6.2.1 Select the desired stud examination probe and insert it into the extensiometer hole. Rotate the probe to the 0° axis of the stud.

6.2.2 Move the probe to the end of the stud opposite the end of the scan was started at, observing the CRT for indications. Scan speed shall not exceed 3" per second.

6.2.3 At the end of each scan, index the probe to the next scan location. Maintain a 50% overlap of the search unit active element. Scan the length of the stud to the limits imposed by the probe design. Repeat until the entire stud has been examined.

6.2.4 For single channel instruments, repeat 6.2.1 through 6.2.3 for each search unit in the probe. If a multiplexed instrument with automated data recording is used, it will not be necessary to scan the stud more than once.

6.3 Surface Wave Examination in the Extensiometer Hole

6.3.1 Select the desired stud examination probe and insert it into the extensiometer hole. Rotate the probe to the 0° axis of the stud.

6.3.2 Move the probe to the end of the stud opposite the end of the scan was started at, observing the CRT for indications. Scan speed shall not exceed 3" per second.

6.3.3 At the end of each scan, index the probe to the next scan location. Maintain a 50% overlap of the search unit active element. Scan the length of the stud to the limits imposed by the probe design. Repeat until the entire stud has been examined.

6.3.4 For single channel instruments, repeat 6.3.1 through 6.3.3 for each search unit in the probe. If a multiplexed instrument with automated data recording is used, it will not be necessary to scan the stud more than once.

7.0 RECORDING

7.1 Record all indications which exceed 20% DAC at 1X sensitivity on the Examination Data Sheet. Indications caused by stud geometry shall only be recorded once per stud.

7.2 For straight and angle beam examinations, record maximum amplitude in percent DAC, transducer movement between 20% DAC points and metal path at the maximum amplitude. Include a sketch showing the stud number and the location of any indications data recorded.

7.3 For surface wave examinations, record maximum amplitude and the surface distance shown on the CRT. Include a sketch showing the stud number and the location of any indications recorded.

8.0 EVALUATION

8.1 Data Review: All data shall be reviewed by an individual certified to Level III to determine if further examination or evaluation is required.

8.2 Evaluation of Indications: All indications shall be evaluated in accordance with the ultrasonic acceptance criteria specified in Paragraph IWB 3515 of ASME Section XI.

8.3 Recordable indications that are determined not to be geometric reflectors will be reported to the Owner after preliminary evaluation.

8.4 Final evaluation will be the Owner's responsibility.

9.0 RECORDS

9.1 Data sheets are typical; the format may change provided the minimum information shown in 9.2 and 9.3 is maintained.

9.2 Calibration Data Sheet

a) Calibration sheet identification, date and time period of calibration
b) Name(s) and ASNT Level(s) of examination personnel
c) Examination procedure number and revision
d) Basic calibration block identification
e) Ultrasonic instrument identification and serial number
f) Beam angle, couplant, and mode of wave propagation in the material
g) Search unit identification - frequency, size, manufacturer, and serial number
h) Reviewer's signature, ASNT Level and date
i) Search unit cable type, length, and number of connectors
j) Times of initial calibration and subsequent and final calibration checks
k) Calibration reflector(s) and the instrument settings, amplitudes, and sweep positions used to establish primary reference sensitivity
l) Thermometer serial number and calibration block temperatures

9.3 Examination Data Sheet

a) Data sheet identity, examination date and time period of examination
b) Name(s) and ASNT level(s) of examination personnel
c) Examination procedure and revision
d) Applicable calibration sheet identity
e) Weld identification
f) Record of indications or of volume free from indications
g) Examination surface, volume scanned, scan identification and scan limitations if any
h) Reviewer's signature, ASNT Level and date
i) Search unit position and locations of recorded indications
j) Thermometer serial number and examination surface temperature

STUD UT CALIBRATION DATA SHEET

Calibration Sheet No. _____

Site _____ ☐ P.S.I. ☐ I.S.I.

Procedure No. _____ Rev. _____ Calibration Block No. _____

Date _____ Couplant _____ Cal. Std. Temp. _____ °F

Examiner _____ ASNT Level _____

Recorder _____ ASNT Level _____

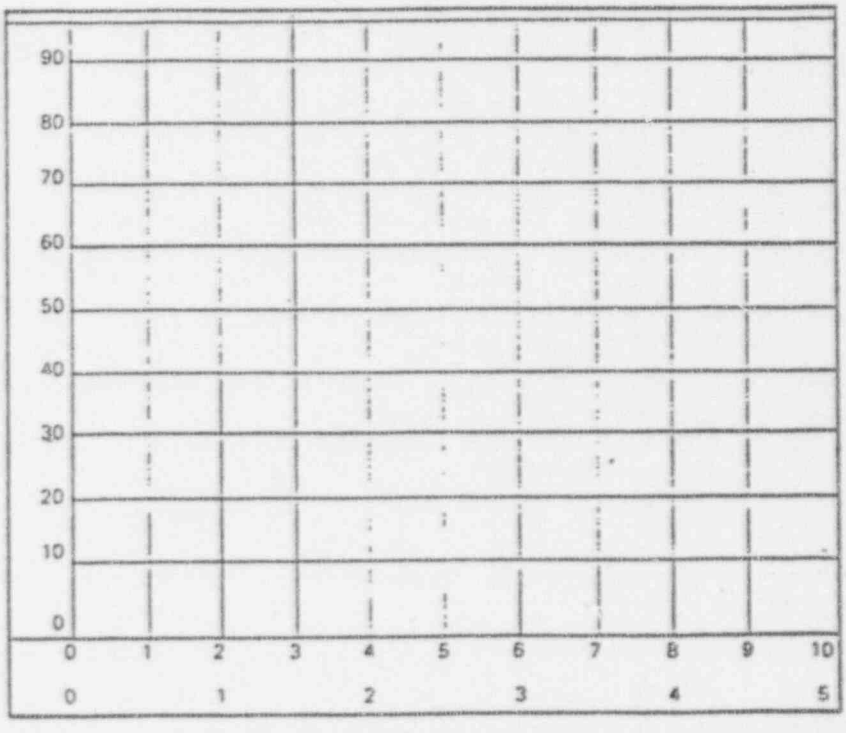
Equipment Data: Instrument Model No. _____ Shoe No. _____

Instrument Serial No. _____ Cable No. _____

Transducer Size _____ Frequency _____ MHZ

Transducer Serial No. _____ Beam Angle _____ °

DAC Curve: Range 0 – 5 ☐ 0 – 10 ☐ Other ☐



Reviewed by: _____
SNT-TC-1A Level III

EXHBIT 1

GENERAL ELECTRIC	CLOSURE STUD EXAMINATION DATA SHEET

SITE:

☐ Preservice
☐ Inservice

EXAM. SHEET NO. _____
CAL. SHEET NO. _____

DATE _____

EXAMINER _____ LEVEL _____
RECORDER _____ LEVEL _____

PROCEDURE/REV. _____
STUD IDENTIFICATION _____
SCANNING SENSITIVITY _____ dBe
EVALUATING SENSITIVITY _____ dBe
COUPLANT _____
STUD TEMPERATURE _____ °F
BATCH NO. _____
THERMOMETER S/N _____

INDICATION RECORD:

Location RAD= X°	Location D= X"	Max AMP % DAC	Metal Path Inches	Size of Indication 20% DAC to 20% DAC	Comments

Reviewed by: _____ Level: _____

Include Sketch if Applicable

EXHIBIT 2

CALIBRATION BLOCK SET
FOR STRAIGHT BEAM EXAMINATION
FROM THE END OF THE STUD

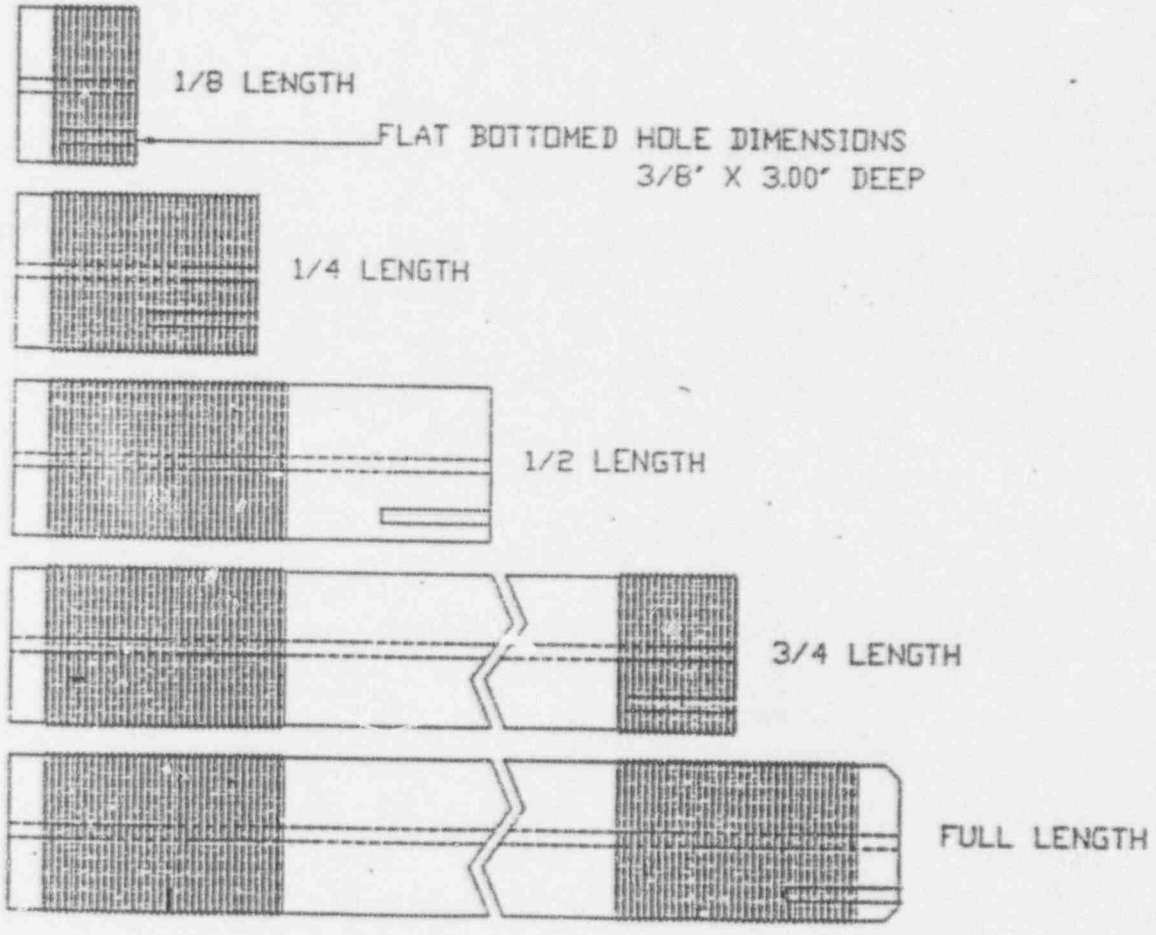
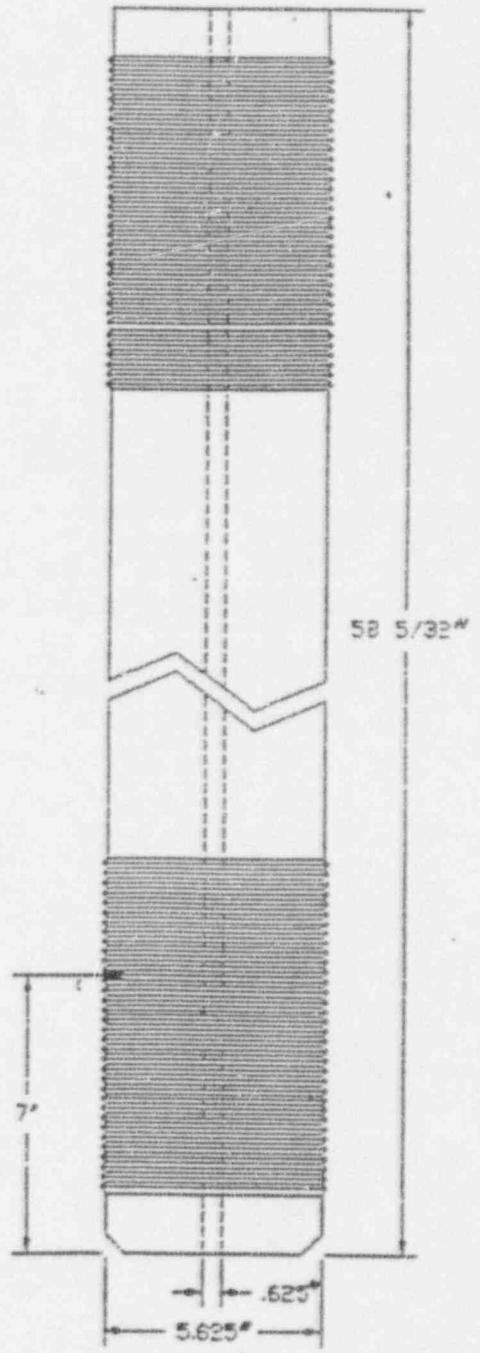


FIGURE 1

CALIBRATION BLOCK

FOR ANGLE BEAM EXAMINATION
FROM THE EXTENSIOMETER HOLE



NOTCH DEPTH
.115" ±.003 FROM THREAD ROOT

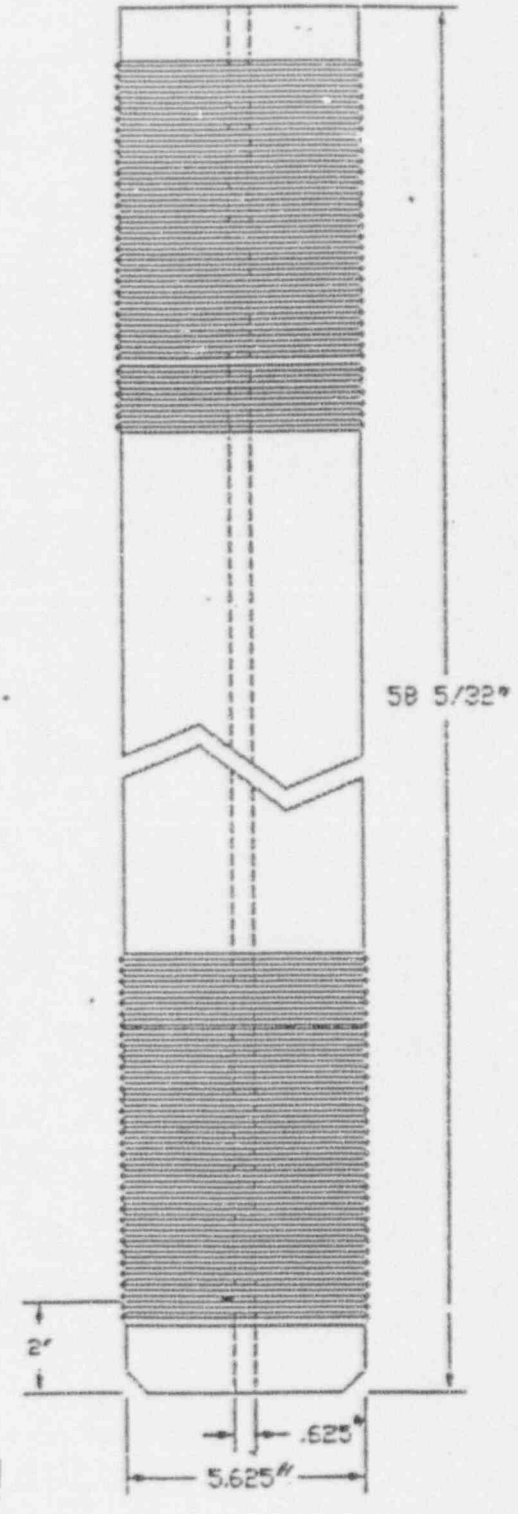
NOTCH LENGTH
.490" ±.010 CIRCUMFERENTIALLY

NOTCH REFLECTING AREA
≤.059 IN^2

FIGURE 2

CALIBRATION BLOCK

FOR SURFACE WAVE EXAMINATION
IN THE EXTENSIOMETER HOLE



ID NOTCH DEPTH
.020" +.020
-.000

ID NOTCH LENGTH
.060" ±.010

FIGURE 3

FIXTURE FOR EXAMINATIONS
PERFORMED FROM THE EXTENSIOMETER HOLE

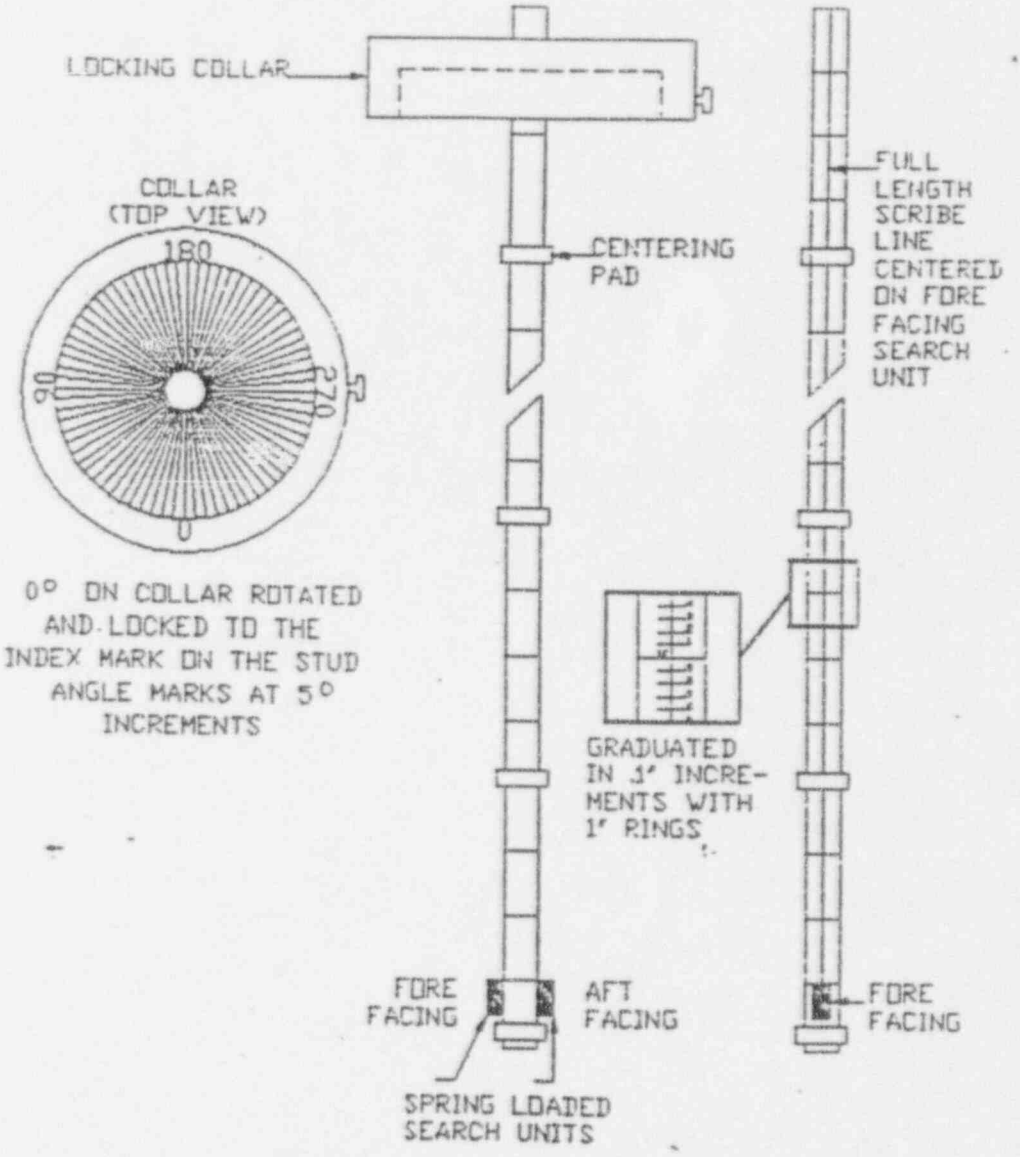


FIGURE 4