nes NUCLEAR ENERGY SERVICES, INC

DOCUMENT NO. 80A6401 REV. 3

REACTOR PRESSURE VESSEL
PRESERVICE INSPECTION PROGRAM PLAN
FOR
SEABROOK NUCLEAR POWER STATION
UNIT # 1

PREPARED FOR

PUBLIC SERVICE COMPANY OF NEW HAMPSHIRE

Project Application 5562	Prepared By Asrar Ahmed Asrar Ahmed	Date 8/31/82
	APPROVALS	
TITLE/DEPT.	SIGNATURE	DATE
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REVISION LOG

DOCUMENT NO. 80A6401

REV. NO.	DATE	PAGE NO.	DESCRIPTION	APPROVAL
1	2/20/84		CRA. No. 4023 Customer Comments	Mike Kosup
			and Inhouse Changes	
2	3/2/84	10-12	CRA No. 4078, Included implementation	Farooq Ahmed
		23-26	of Reg. Guide 1.150 per customer request	
3	3/15/84	25-26	To reflect NES inhouse comments	Farooq Ahmed
			See CRA number 4103	

TABLE OF CONTENTS

TABLES

1. INTRODUCTION

This Program Plan has been prepared to fulfill the Preservice Inspection (PSI) requirements for the Reactor Pressure Vessel (RPV) of the Seabrook Nuclear Power Station (NPS) Unit #1, owned by Publec Service Company of New Hampshire, NH.

The scope of these examinations, procedures, and acceptance criteria meet the requirements outlined in Section XI of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel (BPV) Code, "Rules for Inservice Inspection of Nuclear Power Plant Components", 1977 Edition with Addenda up to and including the Summer 1978 Addenda.

2. BASES FOR PRESERVICE INSPECTION PROGRAM

Title 10 of the Code of Federal Regulations, Part 50, Subsection 10CFR 50.55(a) establishes the edition of Section XI of the 'ASME' BPV Code applicable to Preservice Inspection of the Reactor Pressure Vessel based upon the construction permit, which was issued on September 7, 1976. This unit is required to comply with requirements set forth in ASME Code no earlier than Summer 1972 Addenda of 1971 edition. However, the examinations requirements of the program plan, in accordance with Public Service Company of New Hampshire specification NO. SBISI-1 REV 2 "Preservice/Inservice Inspection Services for Seabrook Nuclear Power Station" comply with ASME 1977 Edition with Addenda through Summer 1978. ASME Section XI Code Cases in accordance with Reg. Guide 1.147 will be used where applicable.

Consideration will be given to the provisions of Nuclear Regulatory Commission (NRC) Regulatory Guide 1.150, "Ultrasonic Testing of Reactor Vessel welds during Preservice and Inservice Examinations", Regulatory Guide 1.65, "Inspection of Reactor Vessel Studs" and Regulatory Guide 1.58, "Qualification of Inspection Personnel".

3. PRESERVICE INSPECTION PROGRAM PLAN DESCRIPTION

3.1 CLASSIFICATION

All the components covered in this program plan are part of the reactor coolant pressure boundary as defined in 10CFR 50 subsection 50.2(v) and therefore this classification complies with requirements for Class I components set forth in Section III of ASME BPV Code.

3.2 EXEMPTIONS

None of the welds or components of the RPV are exempted from examination by subparagraph IWB-1220 of Section XI.

3.3 EXCEPTIONS

Exceptions to Code required examinations may be authorized by the regulatory authority, as allowed by 10CFR 50.55 a(a)(2), provided that design fabrication, installation, testing and inspection performed in compliance with Codes and Section XI requirements would result in hardship without a compensating increase in the level of quality and safety, or provided that the proposed alternative examination will provide an acceptable level of quality and safety. Detailed descriptions and justifications for exceptions taken are itemized in Table 3.3 (Provided Later).

3.4 ULTRASONIC TESTING CALIBRATION STANDARDS

The UT Examination Calibration Standard design and material selection is in accordance with subarticle T-540 of Article 4 of 'ASME' Section V, 1977 Edition, through Summer 1978 Addenda.

Table 3.4 lists all the UT Calibration Standards required to perform the Ultrasonic Examinations for the RPV at Seabrook Nuclear Power Station.

TABLE 3.4
Reference Calibration Standards

Title	Where Used	Block Wall Thickness	Material
196-102	Closure/Bottom Head	7"	SA 533 GRB, CLI
196-103	Intermediate Vessel	9"	SA 533 GRB, CLI
196-104	Upper Vessel	11"	SA 533 GRB, CLI
196-201	Vessel Flange/Ligament	Later	SA 508 CLASS II
196-202	Nozzle Safe End	Later	SA 182 TYPE F-316 & SA 508 CLASS II
SB-RV-Stud	Closure Head Studs	57.69" x 7"Ø	SA 540 GR. B. 24

3.5 EXAMINATION PROCEDURES

Subarticle IWA-1400 of Section XI requires the development and preparation of written examination procedures necessary for the conduct of the nondestructive examinations associated with PSI operations. The written procedures for the performance of visual, surface, and volumentric examinations are referenced in Table 3.5.

Visual Testing (VT) examination is employed to provide a report of the general condition of the part, component or surface to be examined; including such conditions as scratches, wear, cracks, corrosion or erosion on the surfaces; misalignment or movement of the part or component; or any evidence of leaking. The NES VT examination procedures are based on the requirements of Paragraph IWA-2210 of ASME SEction XI.

Liquid Penetrant Testing (PT) examination is specified as the surface examination method to delineate or verify the presence of cracks or discontinuities open to the examinaiton surface. The NES PT Examination Procedure is based on the requirements of Paragraph IWA-2222 of Section XI.

The Ultrasonic (pulse echo) Testing (UT) examination is selected as the volumetric examination method to indicate the presence of subsurface discontinuities by examining the required volume of metal contained beneath the surface to be examined. The NES UT examination procedures are based on Appendix III of Section XI and Article 4 of ASME Section V. Automated volumetric examination procedures have been written in compliance with Reg. Guide 1.150.

TABEL 3.5

REFERENCE NDE PROCEDURES

80A6468	-	Ultrasonic Examination Procedure for Studs and Bolts
80A6471	-	Ultrasonic Examination Procedure for Reactor Pressure Vessel Closure Head Welds
80A6472	-	Procedure for Liquid Penetrant Examinations
80A6473	-	Procedure for Magnetic Particle Examinations
80A6474	-	Procedure for Visual Examinations
80A6476	-	Automated Reactor Vessel Preservice Examination Scan Plan
80A6477	-	Automated Ultrasonic Examination Procedure for Reactor Vessel Shell Welds
80A6478	-	Automated Ultrasonic Examination Procedure for Reactor Vessel Upper Shell to Flange Weld from the Flange Mating Surface
80A6479	-	Automated Ultrasonic Examination Procedure for Reactor Vessel Nozzle to Shell Welds from the Nozzle Bore
80A6480	-	Automated Ultrasonic Examination Procedure for Near Surface Technique from ID Surface
80A6482	-	Ultrasonic Examination Procedure for Reactor Vessel FLange Ligament Areas

3.6 FIGURES AND SKETCHES

The figures listed in Table 3.6 delineates the identification and location of areas of the Reactor Pressure Vessel requiring examinations.

TABLE 3.6

REACTOR PRESSURE VESSEL SKETCHES

A-01 -	REV 0	General Arrangement
A-02 -	REV 0	Circumferential Weld Map Reactor Vessel Assembly
A-03 -	REV 0	Longitudinal Weld Map Reactor Vessel Assembly
A-04 -	REV 0	Closure Head Weld Map
A-05 -	REV 0	Bottom Head Weld Map
A-06 -	REV 0	Nozzle Weld Map
A-07 -	REV 0	Top Head Partial Penetration Weld Map
A-08 -	REV 0	Bottom Head Partial Penetration Weld Maps
A-09 -	REV 0	Closure Head Bolting Reference
A-10 -	REV 0	Bolting Details

3.7 QUALITY ASSURANCE

The NES Quality Assurance Program Plan (QAPP), Document No. 80A5034, governs the design review and implementation of the Seabrook Nuclear Power Station Preservice/Inservice Inspection Program Plan. This document is in accordance with NES ISI Quality Assurance Manual, Document No. 80A9021, which is in compliance with Appendix B of 10CFR50. The QAPP includes the detailed quality assurance requirements that are common to all activities of the program including organization, management, liaison, examination implementations, control of inspection records, qualifications of personnel, materials and procedures, etc. The QAPP is presented as part of the PSI Program Plan.

3.8 EVALUATION CRITERIA

Evaluation of any indications detected during PSI shall be made in accordance with IWA-3000 of Section XI. Indications detected may be evaluated by other nondestructive methods, where practical, to assist in the determination (size, shape, location, orientation) of the type of indication and acceptability before final disposition is made.

3.9 RECORDS AND REPORTS

A system of records of the Preservice Inspection, plans, schedules and calibration standards; the examination results and reports, the corrective action required and taken, will be developed and maintained at the site in accordance with Article IWA-6000 of Section XI.

3.10 PERSONNEL QUALIFICATION REQUIREMENTS

Personnel performing nondestructive examination operations shall be qualified with procedures prepared in accordance with SNT-TC-1A, 1975 Edition, for the applicable examiantion technique and methods as required by Article IWA-2300 of Section XI. All examinations shall be performed and the results evaluated by qualified nondestructive examination personnel.

For those nondestructive examinaiton methods not covered by SNT-TC-1A documents, NES shall qualify personnel on the particular method involved. The NES procedures for such qualification provide uniform programs of training, evaluation, and certification of personnel.

3.11 PRE-EXAMINATION REQUIREMENTS

General provisions for accessibility have been defined by Article IWA-1500 of Section XI of the ASME Code.

1. All portions of 'RPV' that require inspection in accordance with the requirements of ASME Section XI are designed with adequate physical access to allow the required inspection.

4. IMPLEMENTATION OF REGULATORY GUIDE 1.150

"Ultrasonic Testing of Reactor Vessel Welds
During Preservice and Inservice Examinations"

4.1 INTRODUCTION

Nuclear Energy Services has established methods and techniques which are in full compliance with the provisions of Revision 1 to Regulatory Guide 1.150 (as recommended by the AdHoc Committee of the Electric Utility Industry). The specific methods and processes developed and followed by NES are detailed in a number of Reg. Guide specific implementing procedures as well as in the ultrasonic examination procedures themselves. It is the intent of this document to provide a synopsis of NES' approach to compliance.

4.2 GENERAL CONSIDERATIONS

The general approach taken is to use a layered examination. Specifically, the inner 1/4 to 1/3 of the volume is examined utilizing much more sensitive techniques than is the outer 3/4 (2/3). The layered examination is accomplished utilizing different transducer configurations rather than electronic gating or gain differential utilizing the same transducer. NES has developed and qualified inner near surface techniques utilizing dual 60^{o} search units. These near surface techniques are utilized at all RPV examination areas except some lower head areas where a "full vee" 45^{o} shear near surface technique is used. This approach, although more conservative than some other implementation schemes, assures that the amount of unexamined volume is negligible throughout the reactor vessel.

Qualification of the ID near surface techniques utilized for detection of cracking at/or near the clad to base metal interface was performed on test blocks belonging to the EPRI NDE Center at Charlotte, North Carolina. The methods utilized were demonstrated to be fully capable of detecting the maximum allowable flaw sizes in this most critical region of the examination volume.

Correction factors for static calibration versus dynamic scanning and clad direction versus scan direction are developed utilizing a section of clad vessel plate which is representative of clad and clad base metal interface conditions.

4.3 IMPLEMENTING PROCEDURE SUMMARY

I. NES Procedure 80A5532, "Automated Ultrasonic Examinations Systems Performance Procedure".

Defines requirements for photos of RF waveforms from search unit/exam system setup before deployment, on site before exam, and after exam information for comparison.

II. NES Procedure 80A5533, "Automated Ultrasonic Examination Technique Qualification for RG 1.150 Compliance".

Documents the success of an ultrasonic technique in locating specific reflectors.

III. NES Procedure 80A5534, "Automated Ultrasonic Examinations Head Qualifications Procedure".

Certifies exam heads to be operational. Results in documentation of empirical determination of beam angle, exit point, and beam spread.

IV. NES Procedure 80A5535, "Automated Ultrasonic Examination Procedure for Flaw Evaluation".

Defines "recordable" and "reportable" indications. Ensures proper disposition and documentation of flaws in each of these categories.

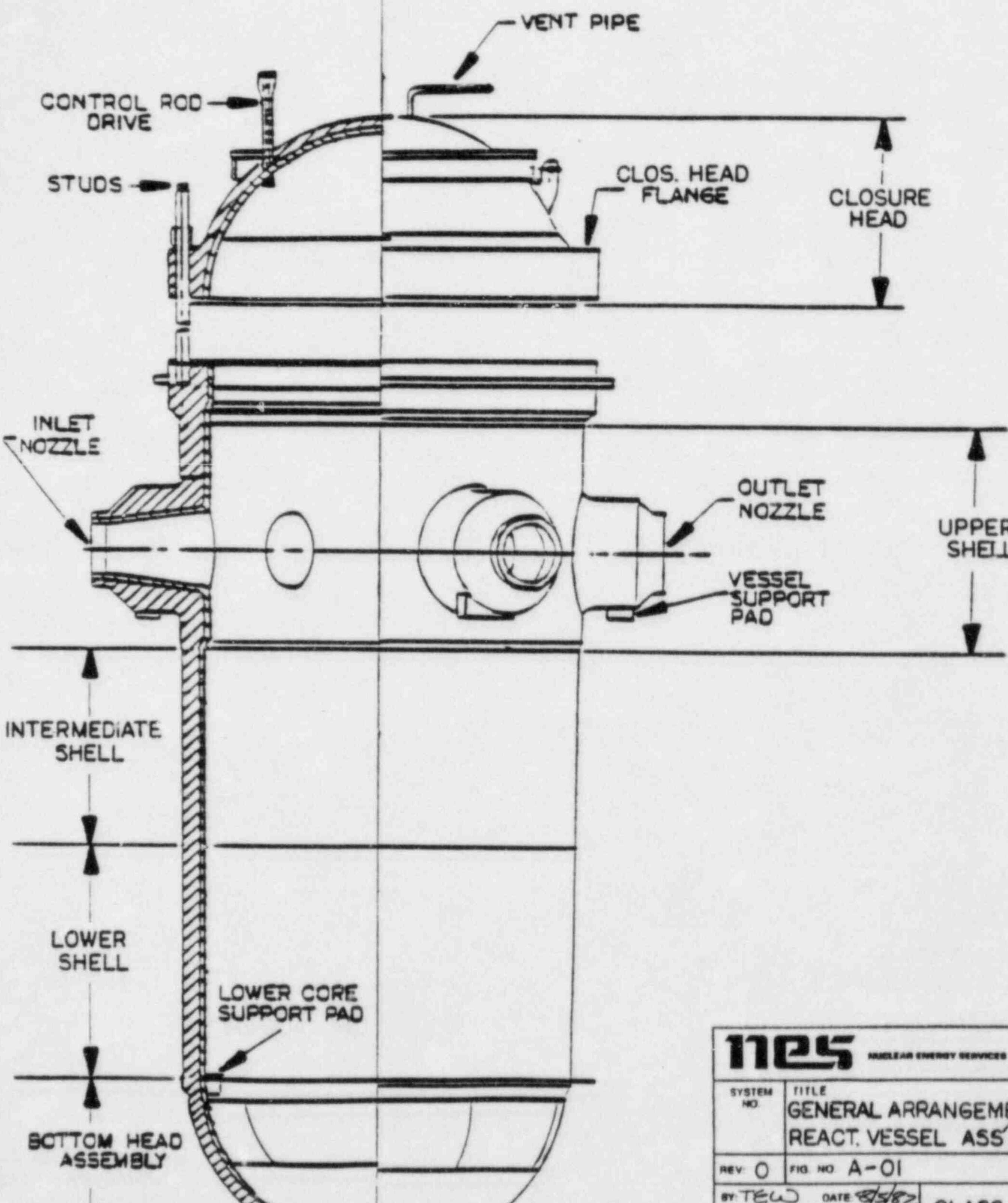
V. NES Procedure 80A5536, "Procedure for Evaluation and Certification of Ultrasonic Search Units".

Provides a uniform means of measurement and evaluation of search unit performance. Results in a documentation of frequency spectrum, waveform, and characteristics.

5. PROGRAM PLAN AND SCHEDULE

The specific PSI examination requirements are defined in the PSI Program Plan and its schedule tables. Each weld or other examination area is designated by a unique identification number, and then described. Also identified are applicable examination category, method, procedure number, and any calibration standard, number referenced for ultrasonic examination.

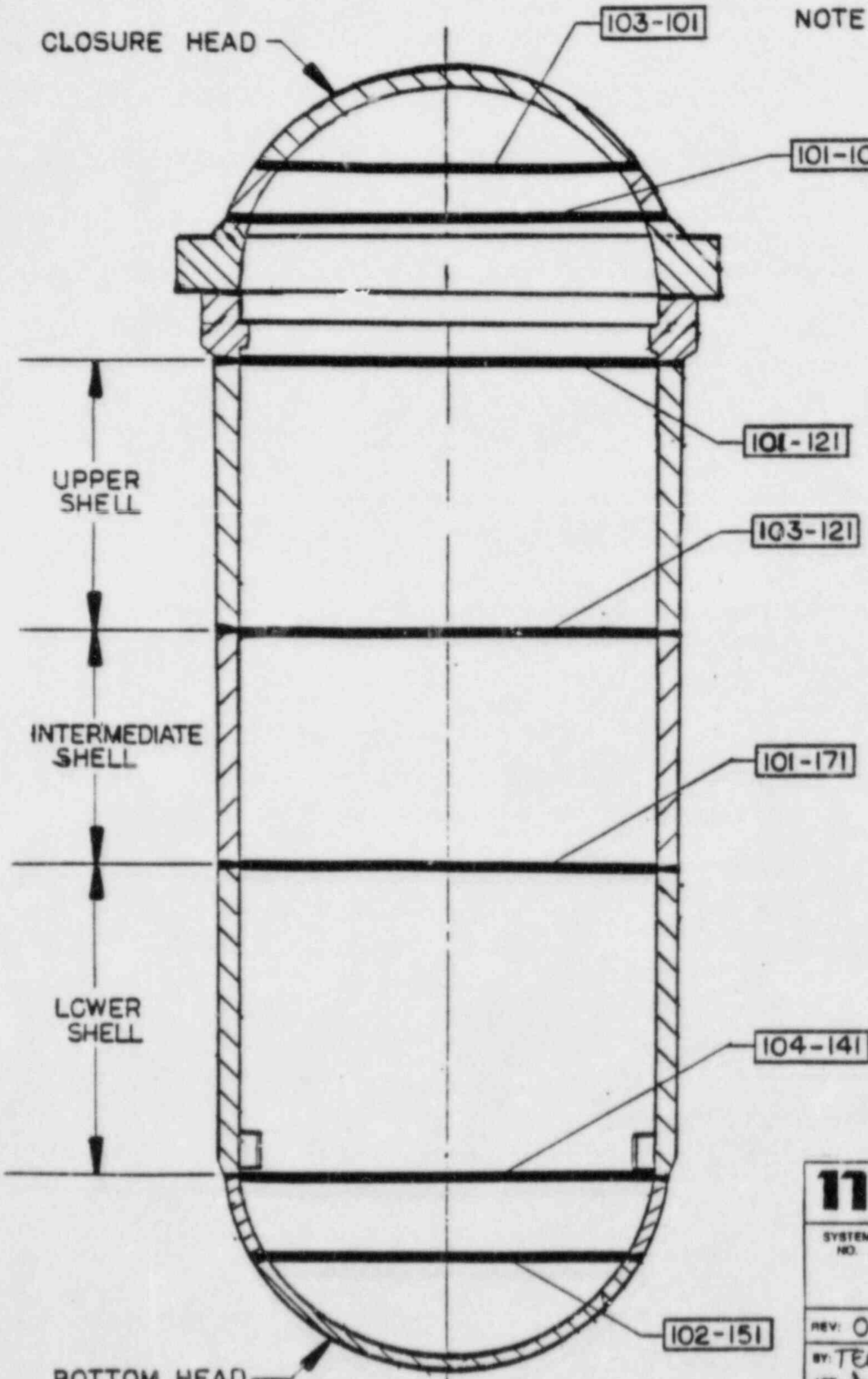
Examination items are first divided according to the figure that they appear on. Multiple examination requirements of the same component are listed together in the schedule tables.



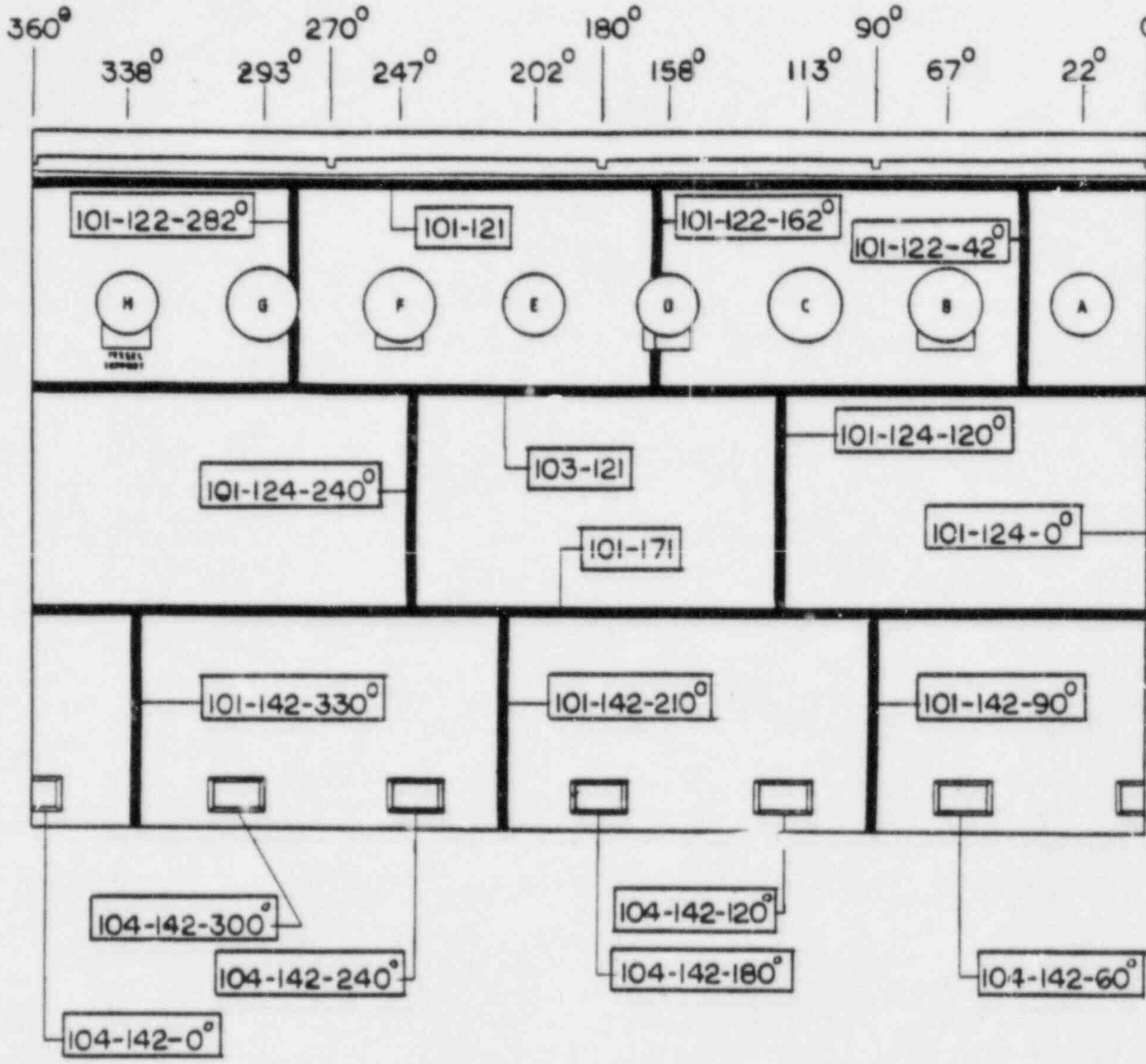
nes NUCLEAR ENERGY SERVICES

SYSTEM NO.	TITLE GENERAL ARRANGEMENT REACT. VESSEL ASS'BLY
REV: 0	FIG. NO. A-01
BY: TEW DATE 8/5/82 APP: AA DATE 8/23/82	CLASS 1
PROJECT	SEABROOK N.P.S.

NOT TO SCALE

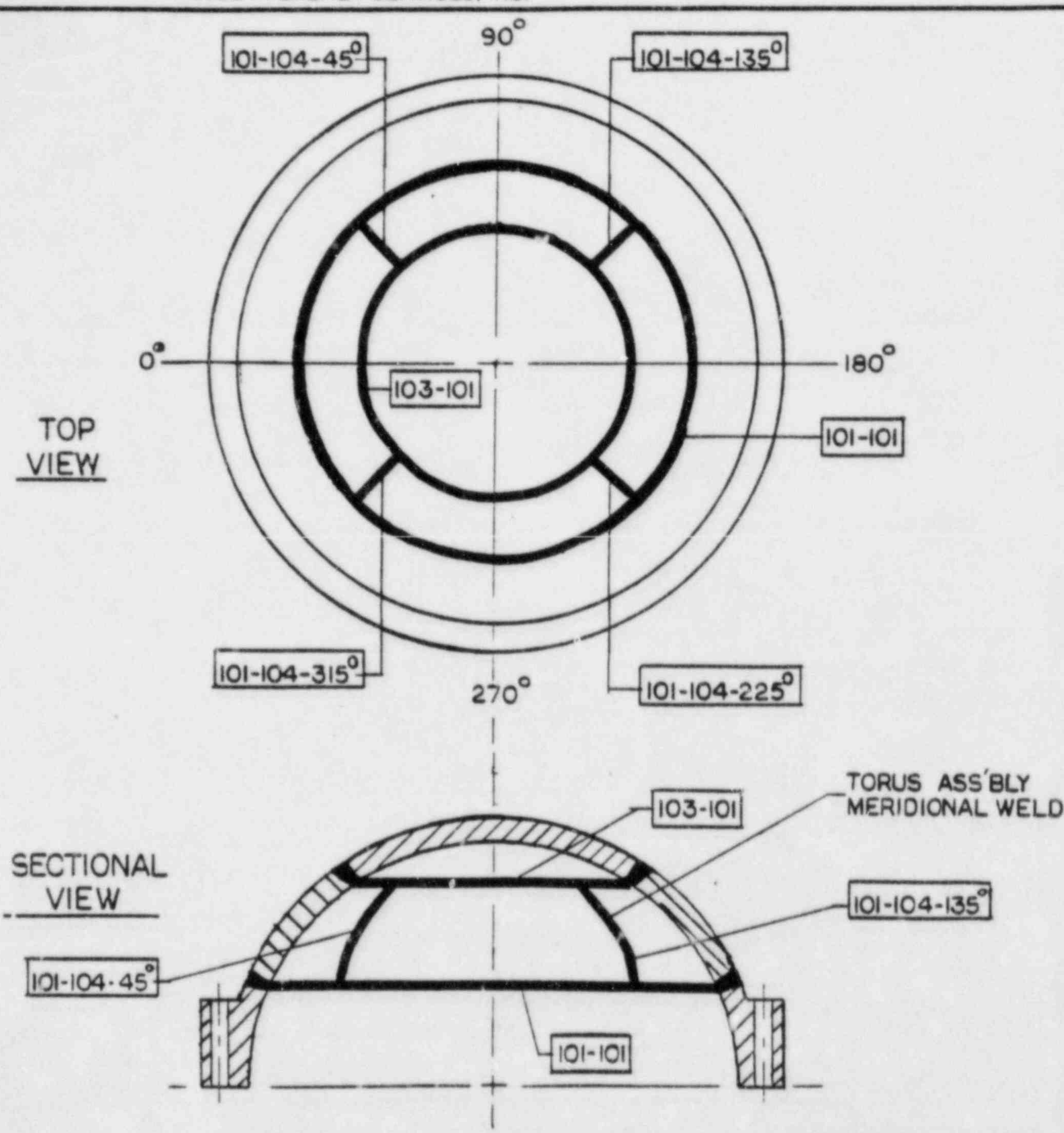


nes NUCLEAR ENERGY SERVICES	
SYSTEM NO.	TITLE CIRCUMFERENTIAL WELD MAP REACT. VESSEL ASS'BLY
REV: 0	FIG. NO. A-02
BY: TEW DATE 8/3/82 APP: JA DATE 8/23/82	CLASS I
PROJECT SEABROOK N.P.S.	
NOT TO SCALE	



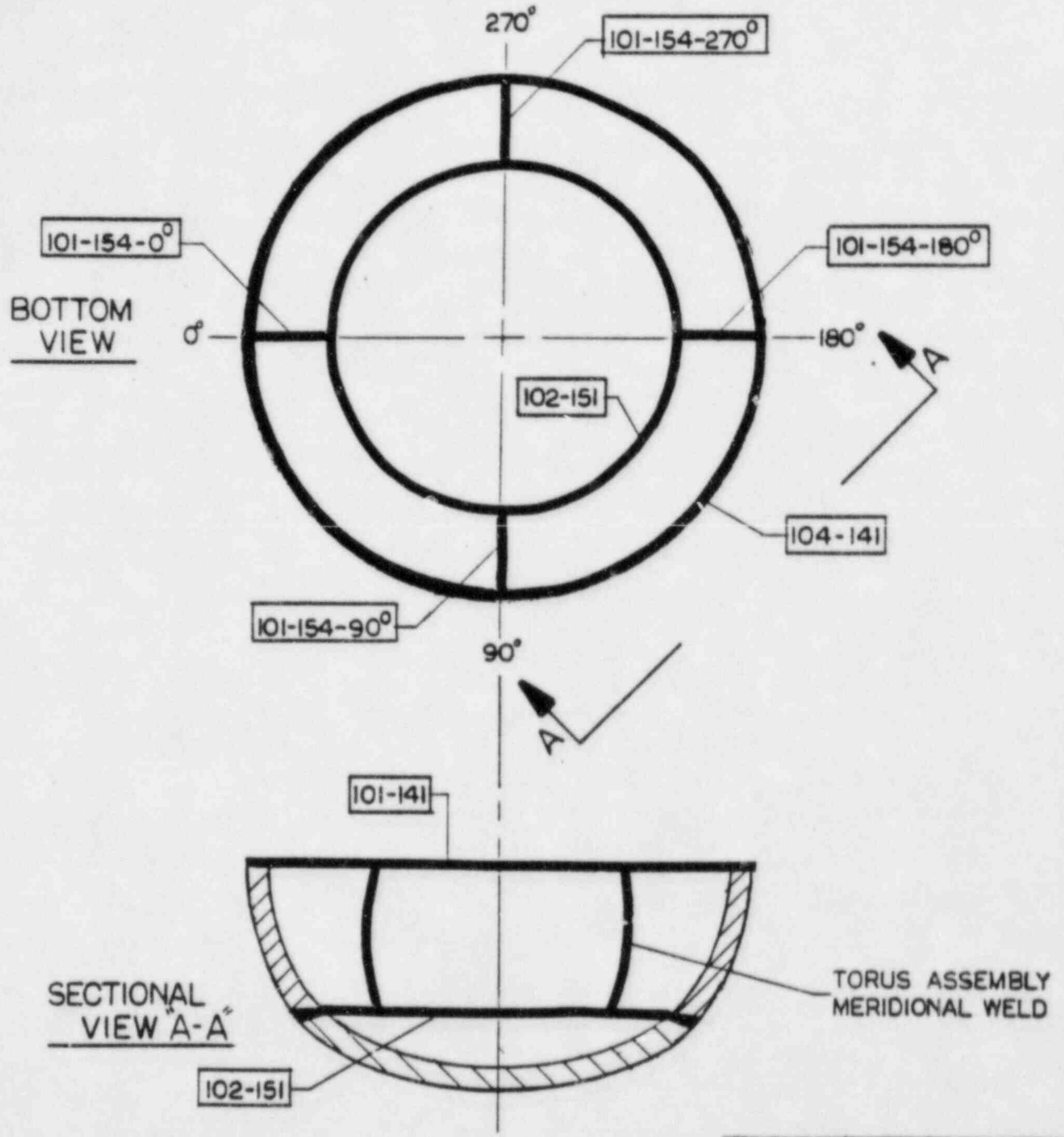
NOTE:
WELD IDENTIFICATION NOS. HAVE THE PREFIX 1-SB-RV-.

NUCLEAR ENERGY SERVICES	
SYSTEM NO.	TITLE LONGITUDINAL WELD MAP REACT. VESSEL ASS'BLY
REV. 0	FIG. NO A-03
BY: TEW DATE 8/4/82 APP: AA DATE 8/23/82	CLASS 1
PROJECT SEABROOK N.P.S.	
NOT TO SCALE	



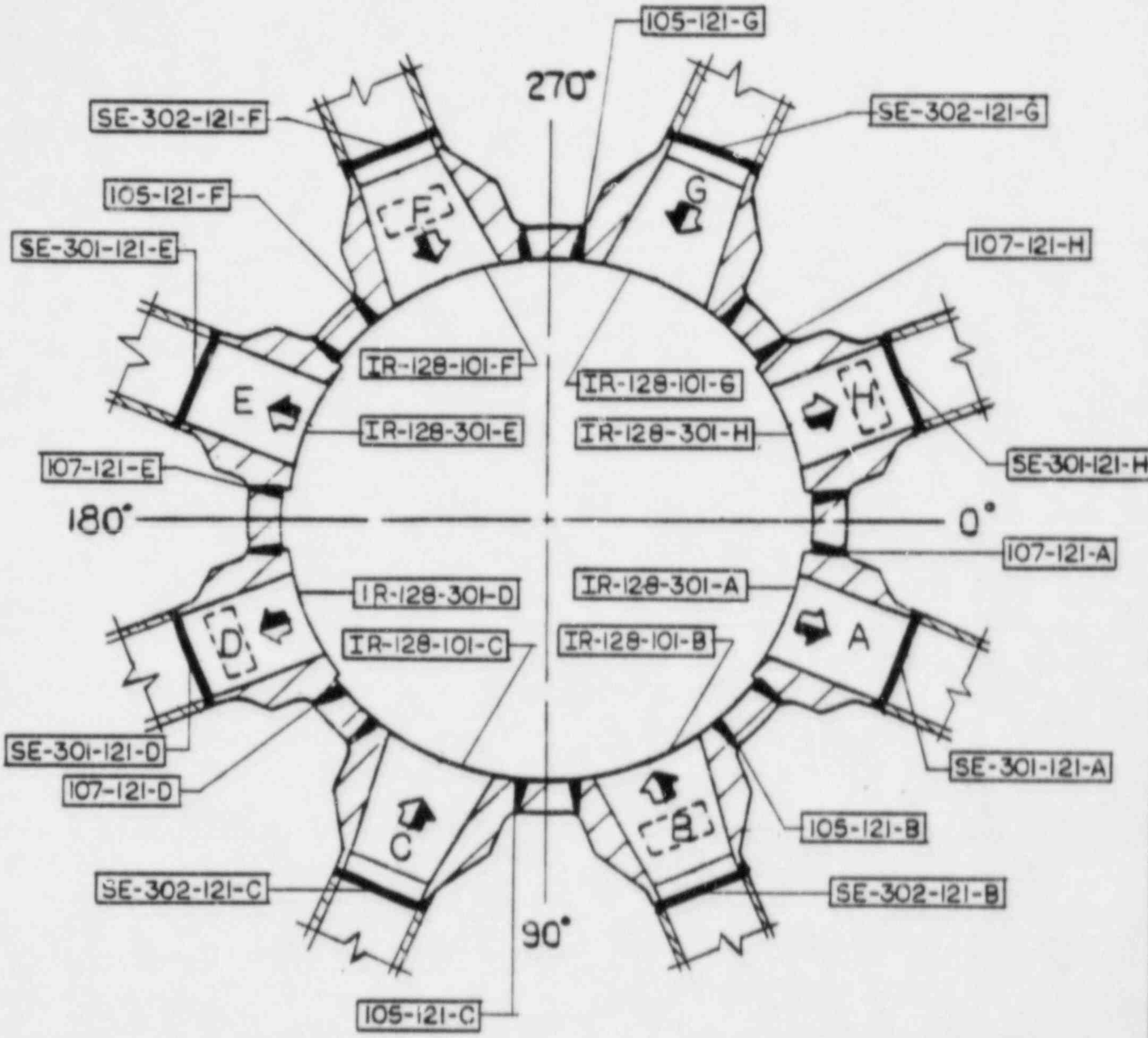
NOTE:
WELD IDENTIFICATION NOS. HAVE THE PREFIX 1-SB-RV-.

nes NUCLEAR ENERGY SERVICES		
SYSTEM NO.	TITLE CLOSURE HEAD WELD MAP	
REV. 0	FIG. NO. A-04	
BY: TEW DATE 8/4/82	APP: JTA DATE 8/23/82	CLASS I
PROJECT SEABROOK N.P.S.		
NOT TO SCALE		



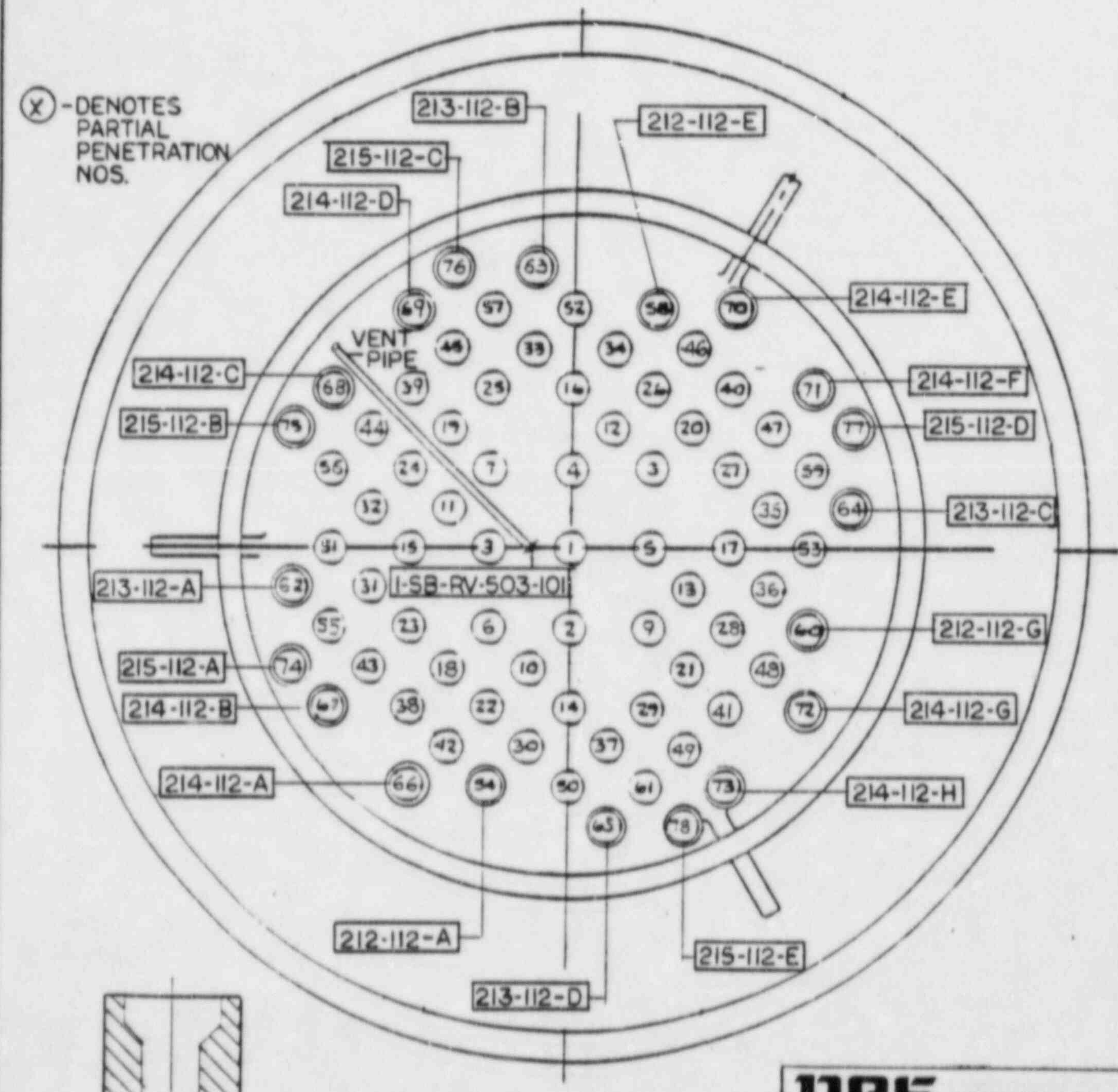
NOTE:
WELD IDENTIFICATION NOS. HAVE THE PREFIX 1-SB-RV-.

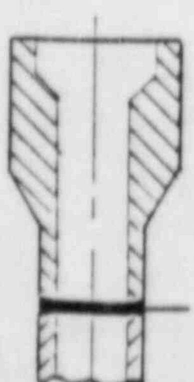
nes NUCLEAR ENERGY SERVICES	
SYSTEM NO.	TITLE BOTTOM HEAD WELD MAP REACT. VESSEL ASS'BLY
REV 0	FIG NO A-05
BY TEW DATE 8/4/82 APP AA DATE 8/23/82	CLASS 1
PROJECT SEABROOK N.P.S.	
NOT TO SCALE	



NOTE:
ALL IDENTIFICATION NOS. HAVE THE PREFIX 1-SB-RV- FOR COMPLETE IDENTIFICATION.

nes NUCLEAR ENERGY SERVICES		
SYSTEM NO	TITLE NOZZLE WELD MAP REACT. VESSEL ASSBLY	
REV 0	FIG. NO A-06	
BY RLW	DATE 4/9/82	CLASS I
APP AA	DATE 8/23/82	
PROJECT SEABROOK N.P.S.		
NOT TO SCALE		

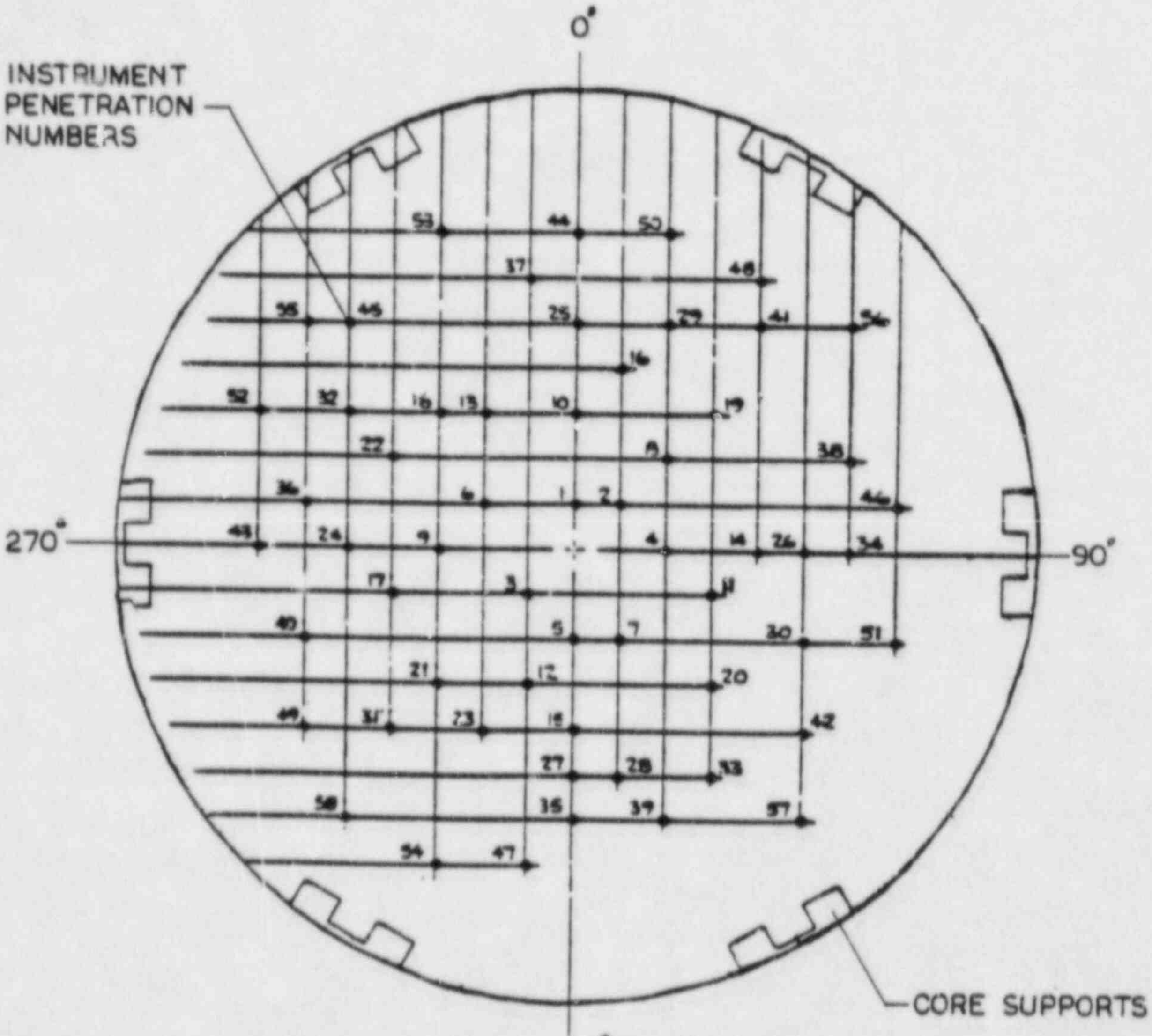




SECTION VIEW
CONTROL ROD HOUSING

NOTE:
CRD HOUSING WELD IDENT. NOS. ARE PRECEDED BY 1-SB-RV- ◯

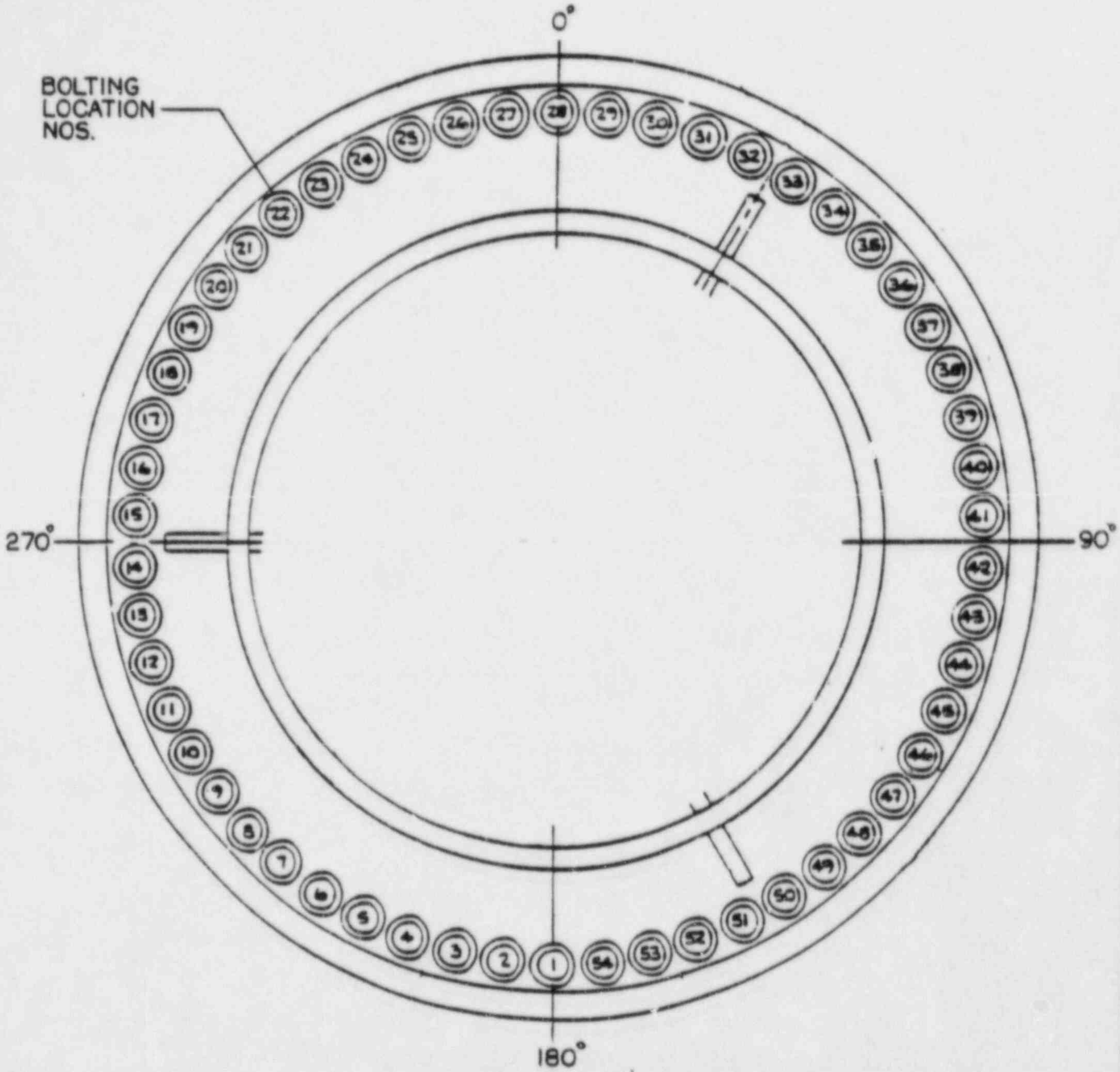
nes NUCLEAR ENERGY SERVICES	
SYSTEM NO	TITLE TOP HEAD PENETRATIONS REACT. VESSEL ASSBLY
REV 1	FIG NO A-07
BY eag	DATE 2/7/84
APP AA	DATE 2/7/84
PROJECT SEABROOK N.P.S.	
NOT TO SCALE	



BOTTOM HEAD
INSTRUMENT PENETRATION LOCATION

NOTE: ALL BOTTOM HEAD PARTIAL PENETRATION WELD NOS. ARE PRECEEDED BY 1-SB-RV-201-151- FOR COMPLETE IDENTIFICATION.

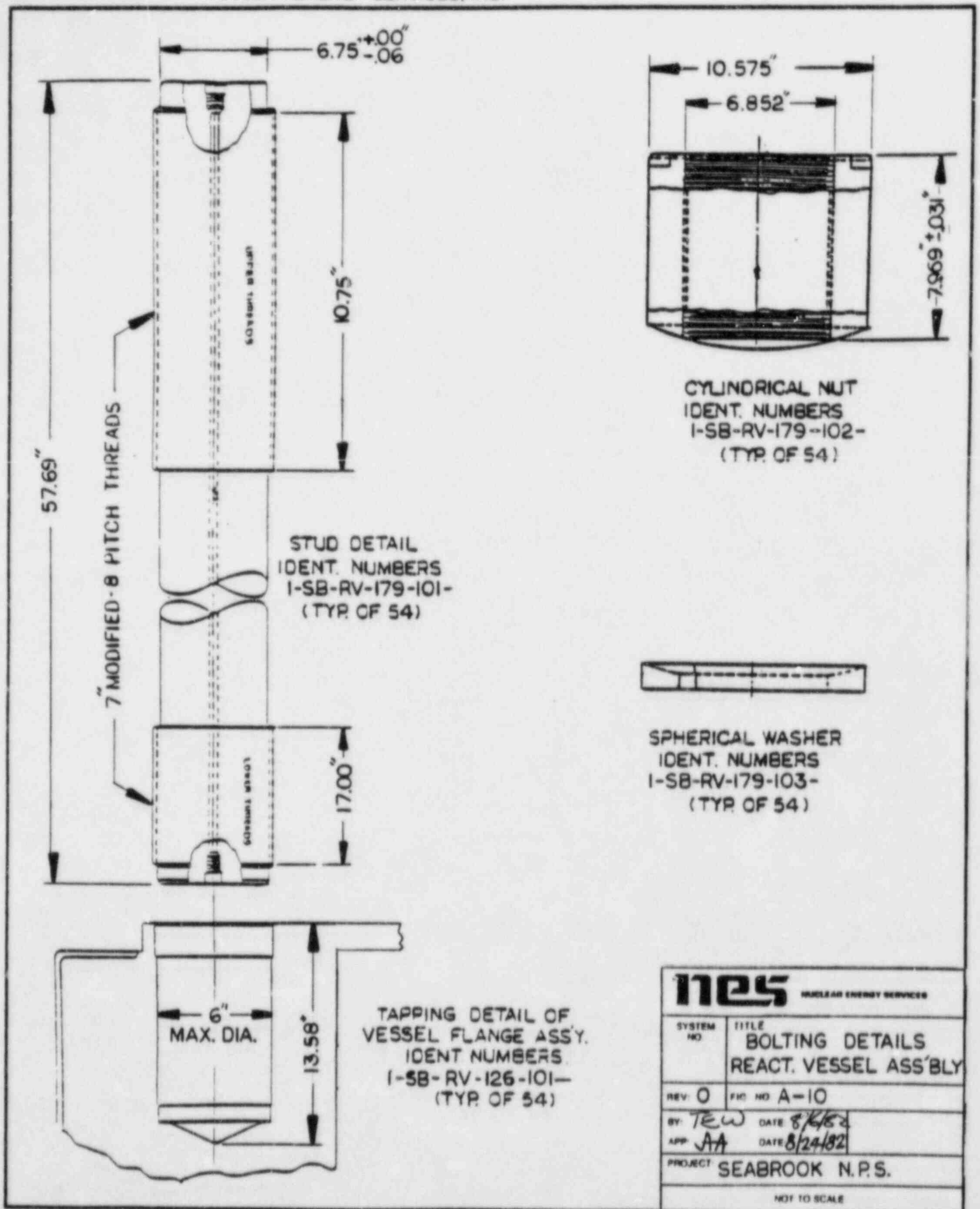
nes NUCLEAR ENERGY SERVICES	
SYSTEM NO.	TITLE BOTTOM HEAD PARTIAL PENETRATION REACT. VESSEL ASS'BLY
REV 0	FIG NO A-08
BY TEW	DATE 8/10/82
APP AA	DATE 8/24/82
PROJECT SEABROOK N.P.S.	
NOT TO SCALE	



PLAN VIEW-CLOSURE HEAD
FLANGE STUD HOLE LOCATION

NOTE:
FOR BOLTING IDENTIFICATION NOS. SEE DWG. NO. A-10

nes NUCLEAR ENERGY SERVICES	
SYSTEM NO.	TITLE CLOSURE HEAD BOLTING REFERENCE REACT. VESSEL ASS'BLY
REV. 0	FIG. NO. A-09
BY TEW	DATE 8/11/82
APP. AA	DATE 8/24/82
PROJECT SEABROOK N.P.S.	
NOT TO SCALE	


6.75" +.00" -.06
57.69"
10.75"
17.00"
7" MODIFIED-8 PITCH THREADS
STUD DETAIL
IDENT. NUMBERS
1-SB-RV-179-101-
(TYP. OF 54)
10.575"
6.852"
7.969" ±.031"
CYLINDRICAL NUT
IDENT. NUMBERS
1-SB-RV-179--102-
(TYP. OF 54)
SPHERICAL WASHER
IDENT. NUMBERS
1-SB-RV-179-103-
(TYP. OF 54)
6"
MAX. DIA.
13.58"
TAPPING DETAIL OF
VESSEL FLANGE ASS'Y.
IDENT NUMBERS
1-SB-RV-126-101-
(TYP. OF 54)
nes NUCLEAR ENERGY SERVICES
SYSTEM NO.
TITLE
BOLTING DETAILS
REACT. VESSEL ASS'BLY
REV. 0
FIG. NO. A-10
BY: TEW DATE 8/6/82
APP: AA DATE 8/24/82
PROJECT SEABROOK N.P.S.
NOT TO SCALE

COMPONENT IDENTIFICATION	COMPONENT DESCRIPTION	PROCEDURE NUMBER	CALIBRATION BLOCK (If applicable)	CODE CATEGORY	CODE EXAM METHOD	ZONE NO.	REMARKS
	CIRCUMFERENTIAL WELDS **REF. DWG. NO. A-02**						
1-SB-RV-103 -101	Closure Head Dome Section to Torus Assy Circumferential Weld	80A6471	196-102	B-A B1.21	UT		
1-SB-RV-101 -101	Torus Assembly to Closure Head Flange Circumferential Weld	80A6471	196-102	B-A B1.40	UT		
1-SB-RV-101 -121	Vessel Flange Assy to Upper Shell Assy Circumferential Weld	80A6477 80A6480 80A6478	196-104 196-201	B-A B1.30	UT		
1-SB-RV-103 -121	Upper Shell Assy to Intermediate Shell Assy Circumferential Weld	80A6477 80A6480	196-104 196-103	B-A B1.11	UT		
1-SB-RV-101 -171	Inter. Shell Assy to Lower Shell Assy Circumferential Weld	80A6477 80A6480	196-103	B-A B1.11	UT		
1-SB-RV-104 -141	Lower Shell Assy to Bottom Torus Assy Circumferential Weld	80A6477 80A6480	196-103 196-102	B-A B1.11	UT		
1-SB-RV-102 -151	Bottom Torus Assy to Bottom Dome Section Circumferential Weld	80A6477	196-102	B-A B1.11	UT		

COMPONENT IDENTIFICATION	COMPONENT DESCRIPTION	PROCEDURE NUMBER	CALIBRATION BLOCK (If applicable)	CODE CATEGORY	CODE EXAM METHOD	ZONE NO	REMARKS
	VESSEL LONGITUDINAL WELDS **REF. DWG. NO: A-03**						
1-SB-RV- 101-122-282°	Upper Shell Longitudinal Weld At 282 Degrees	80A6477 80A6480	196-104	B-A B1.12	UT		
1-SB-RV- 101-122-162°	Upper Shell Longitudinal Weld at 162 degrees	80A6477 80A6480	196-104	B-A B1.12	UT		
1-SB-RV- 101-122-42°	Upper Shell Longitudinal Weld at 42 degrees	80A6477 80A6480	196-104	B-A B1.12	UT		
1-SB-RV- 101-124-240°	Intermediate Shell Longitudinal Weld at 240 degrees	80A6477 80A6480	196-103	B-A B1.12	UT		
1-SB-RV- 101-124-120°	Intermediate Shell Longitudinal Weld at 120 degrees	80A6477 80A6480	196-103	B-A B1.12	UT		
1-SB-RV- 101-124-0°	Intermediate Shell Longitudinal Weld at 0 degrees	80A6477 80A6480	196-103	B-A B1.12	UT		
1-SB-RV- 101-142-330°	Lower Shell Longitudinal Weld at 330 degrees	80A6477 80A6480	196-103	B-A B1.12	UT		

COMPONENT IDENTIFICATION	COMPONENT DESCRIPTION	PROCEDURE NUMBER	CALIBRATION BLOCK (If applicable)	CODE CATEGORY	CODE EXAM METHOD	ZONE NO.	REMARKS
	VESSEL LONGITUDINAL WELDS **REF. DWG. NO: A-03**						
1-SB-RV- 1-101-142-210°	Lower Shell Longitudinal Weld at 210 degrees	80A6477 80A6480	196-103	B-A B1.12	UT		
1-SB-RV- 101-142-90o	Lower Shell Longitudinal Weld at 90 degrees	80A6477 80A6480	196-103	B-A B1.12	UT		

COMPONENT IDENTIFICATION	COMPONENT DESCRIPTION	PROCEDURE NUMBER	CALIBRATION BLOCK (If applicable)	CODE CATEGORY	CODE EXAM METHOD	ZONE NO	REMARKS
	VESSEL INTERIOR EXAM						
1-SB-RV-Interior	Vessel Interior	80A6474	N/A	B-N-1 B13.10	VT-3		
1-SB-RV-Core Support	Core Support Structures	80A6474	N/A	B-N-3 B13.10	VT-3		

COMPONENT IDENTIFICATION	COMPONENT DESCRIPTION	PROCEDURE NUMBER	CALIBRATION BLOCK (If applicable)	CODE CATEGORY	CODE EXAM METHOD	ZONE NO	REMARKS
	MERIDIONAL WELDS **REF. DWG. NO: A-04, A-05**						
1-SB-RV-101-104-45o	Closure Head Torus Assy Meridional Weld at 45 degrees	80A6471	196-102	B-A B1.22	UT		
1-SB-RV-101-104-135o	Closure Head Torus Assy Meridional Weld at 45 degrees	80A6471	196-102	B-A B1.22	UT		
1-SB-RV-101-104-225o	Closure Head Torus Assy Meridional Weld at 225 degrees	80A6471	196-102	B-A B1.22	UT		
1-SB-RV-101-104-315o	Closure Head Torus Assy Meridional Weld at 315 degrees	80A6471	196-102	B-A B1.22	UT		
1-SB-RV-101-154-0o	Bottom Head Torus Assy Meridional Weld at 0 degrees	80A6477 80A6480	196-102	B-A B1.22	UT		
1-SB-RV-101-154-90o	Bottom Head Torus Assy Meridional Weld at 90 degrees	80A6477 80A6480	196-102	B-A B1.22	UT		
1-SB-RV-101-154-180o	Bottom Head Torus Assy Meridional Weld at 180 degrees	80A6477 80A6480	196-102	B-A B1.22	UT		

System: Reactor Pressure Vessel
Document No. 80A6401
Preservice Inspection

nes

PROGRAM PLAN AND SCHEDULE

5562-SEABROOK

By: mK Date: 3/84
App: AA Date: 3/84
Rev: 1

COMPONENT IDENTIFICATION	COMPONENT DESCRIPTION	PROCEDURE NUMBER	CALIBRATION BLOCK (If applicable)	CODE CATEGORY	CODE EXAM METHOD	ZONE NO	REMARKS
	MERIDIONAL WELDS **REF. DWG. NO: A-04, A-05**						
1-SB-RV- 101-154-270o	Bottom Head Torus Assy Meridional Weld at 270 degrees	80A6477 80A6480	196-102	B-A B1.22	UT		

COMPONENT IDENTIFICATION	COMPONENT DESCRIPTION	PROCEDURE NUMBER	CALIBRATION BLOCK (If applicable)	CODE CATEGORY	CODE EXAM METHOD	ZONE NO	REMARKS
	VESSEL NOZZLE WELDS **REF. DWG. NO: A-06**						
1-SB-RV- 107-121-A	Upper Shell to Outlet Nozzle 'A'	80A6477 80A6480 80A6479	196-104 196-201	B-D B3.90	UT		
1-SB-RV- 105-121-B	Upper Shell to Inlet Nozzle 'B'	80A6477 80A6480 80A6479	196-104 196-201	B-D B3.90	UT		
1-SB-RV- 105-121-C	Upper Shell to Inlet Nozzle 'C'	80A6477 80A6480 80A6479	196-104 196-201	B-D B3.90	UT		
1-SB-RV- 107-121-D	Upper Shell to Outlet Nozzle 'D'	80A6477 80A6480 80A6479	196-104 196-201	B-D B3.90	UT		
1-SB-RV- 107-121-E	Upper Shell to Outlet Nozzle 'E'	80A6477 80A6480 80A6479	196-104 196-201	B-D B3.90	UT		
1-SB-RV- 105-121-F	Upper Shell to Inlet Nozzle 'F'	80A6477 80A6480 80A6479	196-104 196-201	B-D B3.90	UT		
1-SB-RV- 105-121-G	Upper Shell to Inlet Nozzle 'G'	80A6477 80A6480 80A6479	196-104 196-201	B-D B3.90	UT		

COMPONENT IDENTIFICATION	COMPONENT DESCRIPTION	PROCEDURE NUMBER	CALIBRATION BLOCK (If applicable)	CODE CATEGORY	CODE EXAM METHOD	ZONE NO.	REMARKS
	VESSEL NOZZLE WELDS **REF. DWG. NO: A-06**						
1-SB-RV- 107-121-H	Upper Shell to Outlet Nozzle 'H'	80A6477 80A6480 80A6479	196-104 196-201	B-D B3.90	UT		
1-SB-RV-IR 128-301-A	Outlet Nozzle 'A' Inner Radius and Bore	80A6480	196-202	B-D B3.100	UT		
1-SB-RV-IR 128-101-B	Inlet Nozzle 'B' Inner Radius and Bore	80A6480	196-202	B-D B3.100	UT		
1-SB-RV-IR 128-101-C	Outlet Nozzle 'C' Inner Radius and Bore	80A6480	196-202	B-D B3.100	UT		
1-SB-RV-IR 128-301-D	Outlet Nozzle 'D' Inner Radius and Bore	80A6480	196-202	B-D B3.100	UT		
1-SB-RV-IR 128-301-E	Outlet Nozzle 'E' Inner Radius and Bore	80A6480	196-202	B-D B3.100	UT		
1-SB-RV-IR 128-101-F	Inlet Nozzle 'F' Inner Radius and Bore	80A6480	196-202	B-D B3.100	UT		

COMPONENT IDENTIFICATION	COMPONENT DESCRIPTION	PROCEDURE NUMBER	CALIBRATION BLOCK (If applicable)	CODE CATEGORY	CODE EXAM METHOD	ZONE NO	REMARKS
	VESSEL NOZZLE WELDS **REF. DWG. NO: A-06**						
1-SB-RV-IR 128-101-G	Inlet Nozzle 'G' Inner Radius and Bore	80A6480	196-202	B-D B3.100	UT		
1-SB-RV-IR 128-301-H	Outlet Nozzle 'H' Inner Radius and Bore	80A6480	196-202	B-D B3.100	UT		
1-SB-RV-SE -301-121-A	Outlet Nozzle 'A' to Safe End	80A6480	196-202	B-F B5.10	UT		
		80A6472	N/A		PT		
1-SB-RV-SE -302-121-B	Inlet Nozzle 'B' to Safe End	80A6480	196-202	B-F B5.10	UT		
		80A6472	N/A		PT		
1-SB-RV-SE -302-121-C	Inlet Nozzle 'C' to Safe End	80A6480	196-202	B-F B5.10	UT		
		80A6472	N/A		PT		
1-SB-RV-SE -301-121-D	Outlet Nozzle 'D'	80A6480	196-202	B-F B5.10	UT		
		80A6472	N/A		PT		
1-SB-RV-SE -301-121-E	Outlet Nozzle 'E' to Safe End	80A6480	196-202	B-F B5.10	UT		
		80A6472	N/A		PT		

COMPONENT IDENTIFICATION	COMPONENT DESCRIPTION	PROCEDURE NUMBER	CALIBRATION BLOCK (If applicable)	CODE CATEGORY	CODE EXAM METHOD	ZONE NO.	REMARKS
	VESSEL NOZZLE WELDS REF. DWG. NO: A-06						
1-SB-RV-SE -302-121-F	Inlet Nozzle 'F' to Safe End	80A6480	196-202	B-F B5.10	UT		
		80A6472	N/A		PT		
1-SB-RV-SE -302-121-G	Inlet Nozzle 'G' to Safe End	80A6480	196-202	B-F B5.10	UT		
		80A6472	N/A		PT		
1-SB-RV-SE -301-121-H	Outlet Nozzle 'H' to Safe End	80A6480	196-202	B-F B5.10	UT		
		80A6472	N/A		PT		

COMPONENT IDENTIFICATION	COMPONENT DESCRIPTION	PROCEDURE NUMBER	CALIBRATION BLOCK (If applicable)	CODE CATEGORY	CODE EXAM METHOD	ZONE NO.	REMARKS
	CRDM HOUSING WELDS **REF DWG. NO: A-07**						
1-SB-RV- 212-112-E	CRDM Housing #58	80A6472	N/A	B-O B14.10	PT		
1-SB-RV- 214-112-E	CRDM Housing #70	80A6472	N/A	B-O B14.10	PT		
1-SB-RV- 214-112-F	CRDM Housing #71	80A6472	N/A	B-O B14.10	PT		
1-SB-RV- 215-112-D	CRDM Housing #77	80A6472	N/A	B-O B14.10	PT		
1-SB-RV- 213-112-C	CRDM Housing #64	80A6472	N/A	B-O B14.10	PT		
1-SB-RV- 212-112-G	CRDM Housing #60	80A6472	N/A	B-O B14.10	PT		
1-SB-RV- 214-112-G	CRDM Housing #72	80A6472	N/A	B-O B14.10	PT		

COMPONENT IDENTIFICATION	COMPONENT DESCRIPTION	PROCEDURE NUMBER	CALIBRATION BLOCK (If applicable)	CODE CATEGORY	CODE EXAM METHOD	ZONE NO	REMARKS
	CRDM HOUSING WELDS **REF DWG. NO: A-07**						
1-SB-RV- 214-112-H	CRDM Housing #73	80A6472	N/A	B-O B14.10	PT		
1-SB-RV- 215-112-E	CRDM Housing #78	80A6472	N/A	B-O B14.10	PT		
1-SB-RV- 213-112-D	CRDM Housing #65	80A6472	N/A	B-O B14.10	PT		
1-SB-RV- 212-112-A	CRDM Housing #54	80A6472	N/A	B-O B14.10	PT		
1-SB-RV- 214-112-A	CRDM Housing #66	80A6472	N/A	B-O B14.10	PT		
1-SB-RV- 214-112-B	CRDM Housing #67	80A6472	N/A	B-O B14.10	PT		
1-SB-RV- 215-112-A	CRDM Housing #74	80A6472	N/A	B-O B14.10	PT		

COMPONENT IDENTIFICATION	COMPONENT DESCRIPTION	PROCEDURE NUMBER	CALIBRATION BLOCK (If applicable)	CODE CATEGORY	CODE EXAM METHOD	ZONE NO	REMARKS
	CRDM HOUSING WELDS **REF DWG. NO: A-07**						
1-SB-RV-213-112-A	CRDM Housing #62	80A6472	N/A	B-O B14.10	PT		
1-SB-RV-215-112-B	CRDM Housing #75	80A6472	N/A	B-O B14.10	PT		
1-SB-RV-214-112-C	CRDM Housing #68	80A6472	N/A	B-O B14.10	PT		
1-SB-RV-214-112-D	CRDM Housing #69	80A6472	N/A	B-O B14.10	PT		
1-SB-RV-215-112-C	CRDM Housing #76	80A6472	N/A	B-O B14.10	PT		
1-SB-RV-213-112-B	CRDM Housing #63	80A6472	N/A	B-O B14.10	PT		

COMPONENT IDENTIFICATION	COMPONENT DESCRIPTION	PROCEDURE NUMBER	CALIBRATION BLOCK (If applicable)	CODE CATEGORY	CODE EXAM METHOD	ZONE NO	REMARKS
	CLOSURE HEAD BOLTING **REF. DWG. NO: A-09 & A-10**						
1-SB-RV-179-101-01	Closure Stud #1	80A6468	SB-RV-STUD	B-G-1 B6.30	UT		
		80A6472	N/A		PT		
1-SB-RV-179-101-02	Closure Stud #2	80A6468	SB-RV-STUD	B-G-1 B6.30	UT		
		80A6472	N/A		PT		
1-SB-RV-179-101-03	Closure Stud #3	80A6468	SB-RV-STUD	B-G-1 B6.30	UT		
		80A6472	N/A		PT		
1-SB-RV-179-101-04	Closure Stud #4	80A6468	SB-RV-STUD	B-G-1 B6.30	UT		
		80A6472	N/A		PT		
1-SB-RV-179-101-05	Closure Stud #5	80A6468	SB-RV-STUD	B-G-1 B6.30	UT		
		80A6472	N/A		PT		
1-SB-RV-179-101-06	Closure Stud #6	80A6468	SB-RV-STUD	B-G-1 B6.30	UT		
		80A6472	N/A		PT		
1-SB-RV-179-101-07	Closure Stud #7	80A6468	SB-RV-STUD	B-G-1 B6.30	UT		
		80A6472	N/A		PT		

COMPONENT IDENTIFICATION	COMPONENT DESCRIPTION	PROCEDURE NUMBER	CALIBRATION BLOCK (If applicable)	CODE CATEGORY	CODE EXAM METHOD	ZONE NO	REMARKS
	CLOSURE HEAD BOLTING REF. DWG. NO: A-09 & A-10						
1-SB-RV-179-101-08	Closure Stud #8	80A6468	SB-RV-STUD	B-G-1 B6.30	UT		
		80A6472	N/A		PT		
1-SB-RV-179-101-09	Closure Stud #9	80A6468	SB-RV-STUD	B-G-1 B6.30	UT		
		80A6472	N/A		PT		
1-SB-RV-179-101-10	Closure Stud #10	80A6468	SB-RV-STUD	B-G-1 B6.30	UT		
		80A6472	N/A		PT		
1-SB-RV-179-101-11	Closure Stud #11	80A6468	SB-RV-STUD	B-G-1 B6.30	UT		
		80A6472	N/A		PT		
1-SB-RV-179-101-12	Clsoure Stud #12	80A6468	SB-RV-STUD	B-G-1 B6.30	UT		
		80A6472	N/A		PT		
1-SB-RV-179-101-13	Closure Stud #13	80A6468	SB-RV-STUD	B-G-1 B6.30	UT		
		80A6472	N/A		PT		
1-SB-RV-179-101-14	Closure Stud #14	80A6468	SB-RV-STUD	B-G-1 B6.30	UT		
		80A6472	N/A		PT		

COMPONENT IDENTIFICATION	COMPONENT DESCRIPTION	PROCEDURE NUMBER	CALIBRATION BLOCK (If applicable)	CODE CATEGORY	CODE EXAM METHOD	ZONE NO	REMARKS
	CLOSURE HEAD BOLTING REF. DWG. NO: A-09 & A-10						
1-SB-RV-179-101-15	Closure Stud #15	80A6468	SB-RV-STUD	B-G-1 B6.30	UT		
		80A6472	N/A		PT		
1-SB-RV-179-101-16	Closure Stud #16	80A6468	SB-RV-STUD	B-G-1 B6.30	UT		
		80A6472	N/A		PT		
1-SB-RV-179-101-17	Closure Stud #17	80A6468	SB-RV-STUD	B-G-1 B6.30	UT		
		80A6472	N/A		PT		
1-SB-RV-179-101-18	Closure Stud #18	80A6468	SB-RV-STUD	B-G-1 B6.30	UT		
		80A6472	N/A		PT		
1-SB-RV-179-101-19	Closure Stud #19	80A6468	SB-RV-STUD	B-G-1 B6.30	UT		
		80A6472	N/A		PT		
1-SB-RV-179-101-20	Closure Stud #20	80A6468	SB-RV-STUD	B-G-1 B6.30	UT		
		80A6472	N/A		PT		
1-SB-RV-179-101-21	Closure Stud #21	80A6468	SB-RV-STUD	B-G-1 B6.30	UT		
		80A6472	N/A		PT		

COMPONENT IDENTIFICATION	COMPONENT DESCRIPTION	PROCEDURE NUMBER	CALIBRATION BLOCK (If applicable)	CODE CATEGORY	CODE EXAM METHOD	ZONE NO	REMARKS
	CLOSURE HEAD BOLTING **REF. DWG. NO: A-09 & A-10**						
1-SB-RV-179-101-22	Closure Stud #22	80A6468	SB-RV-STUD	B-G-1 B6.30	UT		
		80A6472	N/A		PT		
1-SB-RV-179-101-23	Closure Stud #23	80A6468	SB-RV-STUD	B-G-1 B6.30	UT		
		80A6472	N/A		PT		
1-SB-RV-179-101-24	Closure Stud #24	80A6468	SB-RV-STUD	B-G-1 B6.30	UT		
		80A6472	N/A		PT		
1-SB-RV-179-101-25	Closure Stud #25	80A6468	SB-RV-STUD	B-G-1 B6.30	UT		
		80A6472	N/A		PT		
1-SB-RV-179-101-26	Closure Stud #26	80A6468	SB-RV-STUD	B-G-1 B6.30	UT		
		80A6472	N/A		PT		
1-SB-RV-179-101-27	Closure Stud #27	80A6468	SB-RV-STUD	B-G-1 B6.30	UT		
		80A6472	N/A		PT		
1-SB-RV-179-101-28	Closure Stud #28	80A6468	SB-RV-STUD	B-G-1 B6.30	UT		
		80A6472	N/A		PT		

COMPONENT IDENTIFICATION	COMPONENT DESCRIPTION	PROCEDURE NUMBER	CALIBRATION BLOCK (If applicable)	CODE CATEGORY	CODE EXAM METHOD	ZONE NO	REMARKS
	CLOSURE HEAD BOLTING **REF. DWG. NO: A-09 & A-10**						
1-SB-RV-179-101-29	Closure Stud #29	80A6468	SB-RV-STUD	B-G-1 B6.30	UT		
		80A6472	N/A		PT		
1-SB-RV-179-101-30	Closure Stud #30	80A6468	SB-RV-STUD	B-G-1 B6.30	UT		
		80A6472	N/A		PT		
1-SB-RV-179-101-31	Closure Stud #31	80A6468	SB-RV-STUD	B-G-1 B6.30	UT		
		80A6472	N/A		PT		
1-SB-RV-179-101-32	Closure Stud #32	80A6468	SB-RV-STUD	B-G-1 B6.30	UT		
		80A6472	N/A		PT		
1-SB-RV-179-101-33	Closure Stud #33	80A6468	SB-RV-STUD	B-G-1 B6.30	UT		
		80A6472	N/A		PT		
1-SB-RV-179-101-34	Closure Stud #34	80A6468	SB-RV-STUD	B-G-1 B6.30	UT		
		80A6472	N/A		PT		
1-SB-RV-179-101-35	Clsoure Stud #35	80A6468	SB-RV-STUD	B-G-1 B6.30	UT		
		80A6472	N/A		PT		

COMPONENT IDENTIFICATION	COMPONENT DESCRIPTION	PROCEDURE NUMBER	CALIBRATION BLOCK (If applicable)	CODE CATEGORY	CODE EXAM METHOD	ZONE NO	REMARKS
	CLOSURE HEAD BOLTING **REF. DWG. NO: A-09 & A-10**						
1-SB-RV-179-101-36	Closure Stud #36	80A6468	SB-RV-STUD	B-G-1 B6.30	UT		
		80A6472	N/A		PT		
1-SB-RV-179-101-37	Closure Stud #37	80A6468	SB-RV-STUD	B-G-1 B6.30	UT		
		80A6472	N/A		PT		
1-SB-RV-179-101-38	Closure Stud #38	80A6468	SB-RV-STUD	B-G-1 B6.30	UT		
		80A6472	N/A		PT		
1-SB-RV-179-101-39	Closure Stud #39	80A6468	SB-RV-STUD	B-G-1 B6.30	UT		
		80A6472	N/A		PT		
1-SB-RV-179-101-40	Closure Stud #40	80A6468	SB-RV-STUD	B-G-1 B6.30	UT		
		80A6472	N/A		PT		
1-SB-RV-179-101-41	Closure Stud #41	80A6468	SB-RV-STUD	B-G-1 B6.30	UT		
		80A6472	N/A		PT		
1-SB-RV-179-101-42	Closure Stud #42	80A6468	SB-RV-STUD	B-G-1 B6.30	UT		
		80A6472	N/A		PT		

System: Reactor Pressure Vessel
Document No. 80A6401
Preservice Inspection

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PROGRAM PLAN AND SCHEDULE

5562-SEABROOK

By: mK Date: 3/84
App: AA Date: 3/84
Rev: 1

COMPONENT IDENTIFICATION	COMPONENT DESCRIPTION	PROCEDURE NUMBER	CALIBRATION BLOCK (If applicable)	CODE CATEGORY	CODE EXAM METHOD	ZONE NO.	REMARKS
	CLOSURE HEAD BOLTING REF. DWG. NO: A-09 & A-10						
1-SB-RV-179-101-43	Closure Stud #43	80A6468	SB-RV-STUD	B-G-1 B6.30	UT		
		80A6472	N/A		PT		
1-SB-RV-179-101-44	Closure Stud #44	80A6468	SB-RV-STUD	B-G-1 B6.30	UT		
		80A6472	N/A		PT		
1-SB-RV-179-101-45	Closure Stud #45	80A6468	SB-RV-STUD	B-G-1 B6.30	UT		
		80A64712	N/A		PT		
1-SB-RV-179-101-46	Closure Stud #46	80A6468	SB-RV-STUD	B-G-1 B6.30	UT		
		80A6472	N/A		PT		
1-SB-RV-179-101-47	Closure Stud #47	80A6468	SB-RV-STUD	B-G-1 B6.30	UT		
		80A6472	N/A		PT		
1-SB-RV-179-101-48	Closure Stud #48	80A6468	SB-RV-STUD	B-G-1 B6.30	UT		
		80A6472	N/A		PT		
1-SB-RV-179-101-49	Closure Stud #49	80A6468	SB-RV-STUD	B-G-1 B6.30	UT		
		80A6472	N/A		PT		

COMPONENT IDENTIFICATION	COMPONENT DESCRIPTION	PROCEDURE NUMBER	CALIBRATION BLOCK (If applicable)	CODE CATEGORY	CODE EXAM METHOD	ZONE NO.	REMARKS
	CLOSURE HEAD BOLTING **REF. DWG. NO: A-09 & A-10**						
1-SB-RV-179-101-50	Closure Stud #50	80A6468	SB-RV-STUD	B-G-1 B6.30	UT		
		80A6472	N/A		PT		
1-SB-RV-179-101-51	Closure Stud #51	80A6468	SB-RV-STUD	B-G-1 B6.30	UT		
		80A6472	N/A		PT		
1-SB-RV-179-101-52	Closure Stud #52	80A6468	SB-RV-STUD	B-G-1 B6.30	UT		
		80A6472	N/A		PT		
1-SB-RV-179-101-53	Closure Stud #53	80A6468	SB-RV-STUD	B-G-1 B6.30	UT		
		80A6472	N/A		PT		
1-SB-RV-179-101-54	Closure Stud #54	80A6468	SB-RV-STUD	B-G-1 B6.30	UT		
		80A6472	N/A		PT		
1-SB-RV-179-102-01	Closure Head Nut #1	80A6472	N/A	B-G-1 B6.10	PT		
1-SB-RV-179-102-02	Closure Head Nut #2	80A6472	N/A	B-G-1 B6.10	PT		

COMPONENT IDENTIFICATION	COMPONENT DESCRIPTION	PROCEDURE NUMBER	CALIBRATION BLOCK (If applicable)	CODE CATEGORY	CODE EXAM METHOD	ZONE NO	REMARKS
	CLOSURE HEAD BOLTING **REF. DWG. NO: A-09 & A-10**						
1-SB-RV-179-102-03	Closure Head Nut #3	80A6472	N/A	B-G-1 B6.10	PT		
1-SB-RV-179-102-04	Closure Head Nut #4	80A6472	N/A	B-G-1 B6.10	PT		
1-SB-RV-179-102-05	Closure Head Nut #5	80A6472	N/A	B-G-1 B6.10	PT		
1-SB-RV-179-102-06	Closure Head Nut #6	80A6472	N/A	B-G-1 B6.10	PT		
1-SB-RV-179-102-07	Closure Head Nut #7	80A6472	N/A	B-G-1 B6.10	PT		
1-SB-RV-179-102-08	Closure Head Nut #8	80A6472	N/A	B-G-1 B6.10	PT		
1-SB-RV-179-102-09	Closure Head Nut #9	80A6472	N/A	B-G-1 B6.10	PT		

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System: Reactor Pressure Vessel
Document No. 80A6401
Preservice Inspection

PROGRAM PLAN AND SCHEDULE

5562-SEABROOK

By: MK Date: 3/84
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Rev: 1

COMPONENT IDENTIFICATION	COMPONENT DESCRIPTION	PROCEDURE NUMBER	CALIBRATION BLOCK (If applicable)	CODE CATEGORY	CODE EXAM METHOD	ZONE NO	REMARKS
	CLOSURE HEAD BOLTING **REF. DWG. NO: A-09 & A-10**						
1-SB-RV-179-102-10	Closure Head Nut #10	80A6472	N/A	B-G-1 B6.10	PT		
1-SB-RV-179-102-11	Closure Head Nut #11	80A6472	N/A	B-G-1 B6.10	PT		
1-SB-RV-179-102-12	Closure Head Nut #12	80A6472	N/A	B-G-1 B6.10	PT		
1-SB-RV-179-102-13	Closure Head Nut #13	80A6472	N/A	B-G-1 B6.10	PT		
1-SB-RV-179-102-14	Closure Head Nut #14	80A6472	N/A	B-G-1 B6.10	PT		
1-SB-RV-179-102-15	Closure Head Nut #15	80A6472	N/A	B-G-1 B6.10	PT		
1-SB-RV-179-102-16	Closure Head Nut #16	80A6472	N/A	B-G-1 B6.10	PT		

COMPONENT IDENTIFICATION	COMPONENT DESCRIPTION	PROCEDURE NUMBER	CALIBRATION BLOCK (If applicable)	CODE CATEGORY	CODE EXAM METHOD	ZONE NO	REMARKS
	CLOSURE HEAD BOLTING **REF. DWG. NO: A-09**						
1-SB-RV- 179-102-17	Closure Head Nut #17	80A6472	N/A	B-G-1 B6.10	PT		
1-SB-RV- 179-102-18	Closure Head Nut #18	80A6472	N/A	B-G-1 B6.10	PT		
1-SB-RV- 179-102-19	Closure Head Nut #19	80A6472	N/A	B-G-1 B6.10	PT		
1-SB-RV- 179-102-20	Closure Head Nut #20	80A6472	N/A	B-G-1 B6.10	PT		
1-SB-RV- 179-102-21	Closure Head Nut #21	80A6472	N/A	B-G-1 B6.10	PT		
1-SB-RV- 179-102-22	Closure Head Nut #22	80A6472	N/A	B-G-1 B6.10	PT		
1-SB-RV- 179-102-23	Closure Head Nut #23	80A6472	N/A	B-G-1 B6.10	PT		

COMPONENT IDENTIFICATION	COMPONENT DESCRIPTION	PROCEDURE NUMBER	CALIBRATION BLOCK (If applicable)	CODE CATEGORY	CODE EXAM METHOD	ZONE NO	REMARKS
	CLOSURE HEAD BOLTING **REF. DWG. NO: A-09**						
1-SB-RV- 179-102-24	Closure Head Nut #24	80A6472	N/A	B-G-1 B6.10	PT		
1-SB-RV- 179-102-25	Closure Head Nut #25	80A6472	N/A	B-G-1 B6.10	PT		
1-SB-RV- 179-102-26	Closure Head Nut #26	80A6472	N/A	B-G-1 B6.10	PT		
1-SB-RV- 179-102-27	Closure Head Nut #27	80A6472	N/A	B-G-1 B6.10	PT		
1-SB-RV 179-102-28	Closure Head Nut #28	80A6472	N/A	B-G-1 B6.10	PT		
1-SB-RV- 179-102-29	Closure Head Nut #29	80A6472	N/A	B-G-1 B6.10	PT		
1-SB-RV- 179-102-30	Closure Head Nut #30	80A6472	N/A	B-G-1 B6.10	PT		

COMPONENT IDENTIFICATION	COMPONENT DESCRIPTION	PROCEDURE NUMBER	CALIBRATION BLOCK (If applicable)	CODE CATEGORY	CODE EXAM METHOD	ZONE NO.	REMARKS
	CLOSURE HEAD BOLTING **REF. DWG. NO: A-09**						
1-SB-RV-179-102-31	Closure Head Nut #31	80A6472	N/A	B-G-1 B6.10	PT		
1-SB-RV-179-102-32	Closure Head Nut #32	80A6472	N/A	B-G-1 B6.10	PT		
1-SB-RV-179-102-33	Closure Head Nut #33	80A6472	N/A	B-G-1 B6.10	PT		
1-SB-RV-179-102-34	Closure Head Nut #34	80A6472	N/A	B-G-1 B6.10	PT		
1-SB-RV-179-102-35	Closure Head Nut #35	80A6472	N/A	B-G-1 B6.10	PT		
1-SB-RV-179-102-36	Closure Head Nut #36	80A6472	N/A	B-G-1 B6.10	PT		
1-SB-RV-179-102-37	Closure Head Nut #37	80A6472	N/A	B-G-1 B6.10	PT		

System: Reactor Pressure Vessel
Document No. 80A6401
Preservice Inspection

nes

PROGRAM PLAN AND SCHEDULE

5562-SEABROOK

By: mlc Date: 3/84
App: JA Date: 3/84
Rev: 1

COMPONENT IDENTIFICATION	COMPONENT DESCRIPTION	PROCEDURE NUMBER	CALIBRATION BLOCK (If applicable)	CODE CATEGORY	CODE EXAM METHOD	ZONE NO	REMARKS
	CLOSURE HEAD BOLTING REF. DWG. NO: A-09						
1-SB-RV-179-102-38	Closure Head Nut #38	80A6472	N/A	B-G-1 B6.10	PT		
1-SB-RV-179-102-39	Closure Head Nut #39	80A6472	N/A	B-G-1 B6.10	PT		
1-SB-RV-179-102-40	Closure Head Nut #40	80A6472	N/A	B-G-1 B6.10	PT		
1-SB-RV-179-102-41	Closure Head Nut #41	80A6472	N/A	B-G-1 B6.10	PT		
1-SB-RV-179-102-42	Closure Head Nut #42	80A6472	N/A	B-G-1 B6.10	PT		
1-SB-RV-179-102-43	Closure Head Nut #43	80A6472	N/A	B-G-1 B6.10	PT		
1-SB-RV-179-102-44	Closure Head Nut #44	80A6472	N/A	B-G-1 B6.10	PT		

COMPONENT IDENTIFICATION	COMPONENT DESCRIPTION	PROCEDURE NUMBER	CALIBRATION BLOCK (If applicable)	CODE CATEGORY	CODE EXAM METHOD	ZONE NO.	REMARKS
	CLOSURE HEAD BOLTING **REF. DWG. NO: A-09**						
1-SB-RV- 179-102-45	Closure Head Nut #45	80A6472	N/A	B-G-1 B6.10	PT		
1-SB-RV- 179-102-46	Closure Head Nut #46	80A6472	N/A	B-G-1 B6.10	PT		
1-SB-RV- 179-102-47	Closure Head Nut #47	80A6472	N/A	B-G-1 B6.10	PT		
1-SB-RV- 179-102-48	Closure Head Nut #48	80A6472	N/A	B-G-1 B6.10	PT		
1-SB-RV- 179-102-49	Closure Head Nut #49	80A6472	N/A	B-G-1 B6.10	PT		
1-SB-RV- 179-102-50	Closure Head Nut #50	80A6472	N/A	B-G-1 B6.10	PT		
1-SB-RV- 179-102-51	Closure Head Nut #51	80A6472	N/A	B-G-1 B6.10	PT		

COMPONENT IDENTIFICATION	COMPONENT DESCRIPTION	PROCEDURE NUMBER	CALIBRATION BLOCK (If applicable)	CODE CATEGORY	CODE EXAM METHOD	ZONE NO	REMARKS
	CLOSURE HEAD BOLTING **REF. DWG. NO: A-09**						
1-SB-RV- 179-102-52	Closure Head Nut #52	80A6472	N/A	B-G-1 B6.10	PT		
1-SB-RV- 179-102-53	Closure Head Nut #53	80A6472	N/A	B-G-1 B6.10	PT		
1-SB-RV- 179-102-54	Closure Head Nut #54	80A6472	N/A	B-G-1 B6.10	PT		
1-SB-RV- 179-103-01	Closure Washer #1	80A6474	N/A	B-G-1 B6.50	VT-1		
1-SB-RV- 179-103-02	Closure Washer #2	80A6474	N/A	B-G-1 B6.50	VT-1		
1-SB-RV- 179-103-03	Closure Washer #3	80A6474	N/A	B-G-1 B6.50	VT-1		
1-SB-RV- 179-103-04	Closure Washer #4	80A6474	N/A	B-G-1 B6.50	VT-1		

PROGRAM PLAN AND SCHEDULE

5562-SEABROOK

COMPONENT IDENTIFICATION	COMPONENT DESCRIPTION	PROCEDURE NUMBER	CALIBRATION BLOCK (If applicable)	CODE CATEGORY	CODE EXAM METHOD	ZONE NO	REMARKS
	CLOSURE HEAD BOLTING **REF. DWG. NO: A-09**						
1-SB-RV- 179-103-05	Closure Washer #5	80A6474	N/A	B-G-1 B6.50	VT-1		
1-SB-RV- 179-103-06	Closure Washer #6	80A6474	N/A	B-G-1 B6.50	VT-1		
1-SB-RV- 179-103-07	Closure Washer #7	80A6474	N/A	B-G-1 B6.50	VT-1		
1-SB-RV- 179-103-08	Closure Washer #8	80A6474	N/A	B-G-1 B6.50	VT-1		
1-SB-RV- 179-103-09	Closure Washer #9	80A6474	N/A	B-G-1 B6.50	VT-1		
1-SB-RV- 179-103-10	Closure Washer #10	80A6474	N/A	B-G-1 B6.50	VT-1		
1-SB-RV- 179-103-11	Closure Washer #11	80A6474	N/A	B-G-1 B6.50	VT-1		

COMPONENT IDENTIFICATION	COMPONENT DESCRIPTION	PROCEDURE NUMBER	CALIBRATION BLOCK (If applicable)	CODE CATEGORY	CODE EXAM METHOD	ZONE NO	REMARKS
	CLOSURE HEAD BOLTING **REF. DWG. NO: A-09**						
1-SB-RV- 179-103-12	Closure Washer #12	80A6474	N/A	B-G-1 B6.50	VT-1		
1-SB-RV- 179-103-13	Closure Washer #13	80A6474	N/A	B-G-1 B6.50	VT-1		
1-SB-RV- 179-103-14	Closure Washer #14	80A6474	N/A	B-G-1 B6.50	VT-1		
1-SB-RV- 179-103-15	Closure Washer #15	80A6474	N/A	B-G-1 B6.50	VT-1		
1-SB-RV- 179-103-16	Closure Washer #16	80A6474	N/A	B-G-1 B6.50	VT-1		
1-SB-RV- 179-103-17	Closure Washer #17	80A6474	N/A	B-G-1 B6.50	VT-1		
1-SB-RV- 179-102-18	Closure Washer #18	80A6474	N/A	B-G-1 B6.50	VT-1		

COMPONENT IDENTIFICATION	COMPONENT DESCRIPTION	PROCEDURE NUMBER	CALIBRATION BLOCK (If applicable)	CODE CATEGORY	CODE EXAM METHOD	ZONE NO.	REMARKS
	CLOSURE HEAD BOLTING **REF. DWG. NO: A-09**						
1-SB-RV-179-103-19	Closure Washer #19	80A6474	N/A	B-G-1 B6.50	VT-1		
1-SB-RV-179-103-20	Closure Washer #20	80A6474	N/A	B-G-1 B6.50	VT-1		
1-SB-RV-179-103-21	Closure Washer #21	80A6474	N/A	B-G-1 B6.50	VT-1		
1-SB-RV-179-103-22	Closure Washer #22	80A6474	N/A	B-G-1 B6.50	VT-1		
1-SB-RV-179-103-23	Closure Washer #23	80A6474	N/A	B-G-1 B6.50	VT-1		
1-SB-RV-179-103-24	Closure Washer #24	80A6474	N/A	B-G-1 B6.50	VT-1		
1-SB-RV-179-103-25	Closure Washer #25	80A6474	N/A	B-G-1 B6.50	VT-1		

COMPONENT IDENTIFICATION	COMPONENT DESCRIPTION	PROCEDURE NUMBER	CALIBRATION BLOCK (If applicable)	CODE CATEGORY	CODE EXAM METHOD	ZONE NO	REMARKS
	CLOSURE HEAD BOLTING **REF. DWG. NO: A-09**						
1-SB-RV- 179-103-26	Closure Washer #26	80A6474	N/A	B-G-1 B6.50	VT-1		
1-SB-RV- 179-103-27	Closure Washer #27	80A6474	N/A	B-G-1 B6.50	VT-1		
1-SB-RV- 179-103-28	Closure Washer #28	80A6474	N/A	B-G-1 B6.50	VT-1		
1-SB-RV- 179-103-29	Closure Washer #29	80A6474	N/A	B-G-1 B6.50	VT-1		
1-SB-RV- 179-103-30	Closure Washer #30	80A6474	N/A	B-G-1 B6.50	VT-1		
1-SB-RV- 179-103-31-	Closure Washer #31	80A6474	N/A	B-G-1 B6.50	VT-1		
1-SB-RV- 179-103-32	Closure Washer #32	80A6474	N/A	B-G-1 B6.50	VT-1		

COMPONENT IDENTIFICATION	COMPONENT DESCRIPTION	PROCEDURE NUMBER	CALIBRATION BLOCK (If applicable)	CODE CATEGORY	CODE EXAM METHOD	ZONE NO.	REMARKS
	CLOSURE HEAD BOLTING **REF. DWG. NO: A-10**						
1-SB-RV- 179-103-33	Closure Washer #33	80A6474	N/A	B-G-1 B6.50	VT-1		
1-SB-RV- 179-103-34	Closure Washer #34	80A6474	N/A	B-G-1 B6.50	VT-1		
1-SB-RV- 179-103-35	Closure Washer #35	80A6474	N/A	B-G-1 B6.50	VT-1		
1-SB-RV- 179-103-36	Closure Washer #36	80A6474	N/A	B-G-1 B6.50	VT-1		
1-SB-RV- 179-103-37	Closure Washer #37	80A6474	N/A	B-G-1 B6.50	VT-1		
1-SB-RV- 179-103-38	Closure Washer #38	80A6474	N/A	B-G-1 B6.50	VT-1		
1-SB-RV- 179-103-39	Closure Washer #39	80AS6474	N/A	B-G-1 B6.50	VT-1		

COMPONENT IDENTIFICATION	COMPONENT DESCRIPTION	PROCEDURE NUMBER	CALIBRATION BLOCK (If applicable)	CODE CATEGORY	CODE EXAM METHOD	ZONE NO.	REMARKS
	CLOSURE HEAD BOLTING **REF. DWG. NO: A-10**						
1-SB-RV-179-103-40	Closure Washer #40	80A6474	N/A	B-G-1 B6.50	VT-1		
1-SB-RV-179-103-41	Closure Washer #41	80A6474	N/A	B-G-1 B6.50	VT-1		
1-SB-RV-179-103-42	Closure Washer #42	80A6474	N/A	B-G-1 B6.50	VT-1		
1-SB-RV-179-103-43	Closure Washer #43	80A6474	N/A	B-G-1 B6.50	VT-1		
1-SB-RV-179-103-44	Closure Washer #44	80A6474	N/A	B-G-1 B6.50	VT-1		
1-SB-RV-179-103-45	Closure Washer #45	80A6474	N/A	B-G-1 B6.50	VT-1		
1-SB-RV-179-103-46	Closure Washer #46	80A6474	N/A	B-G-1 B6.50	VT-1		

COMPONENT IDENTIFICATION	COMPONENT DESCRIPTION	PROCEDURE NUMBER	CALIBRATION BLOCK (If applicable)	CODE CATEGORY	CODE EXAM METHOD	ZONE NO.	REMARKS
	CLOSURE HEAD BOLTING **REF. DWG. NO: A-10**						
1-SB-RV- 179-103-47	Closure Washer #47	80A6474	N/A	B-G-1 B6.50	VT-1		
1-SB-RV- 179-103-48	Closure Washer #48	80A6474	N/A	B-G-1 B6.50	VT-1		
1-SB-RV- 179-103-49	Closure Washer #49	80A6474	N/A	B-G-1 B6.50	VT-1		
1-SB-RV- 179-103-50	Closure Washer #50	80A6474	N/A	B-G-1 B6.50	VT-1		
1-SB-RV- 179-103-51	Closure Washer #51	80A6474	N/A	B-G-1 B6.50	VT-1		
1-SB-RV- 179-103-52	Closure Washer #52	80A6474	N/A	B-G-1 B6.50	VT-1		
1-SB-RV- 179-103-53	Closure Washer #53	80A6474	N/A	B-G-1 B6.50	VT-1		

COMPONENT IDENTIFICATION	COMPONENT DESCRIPTION	PROCEDURE NUMBER	CALIBRATION BLOCK (If applicable)	CODE CATEGORY	CODE EXAM METHOD	ZONE NO.	REMARKS
	CLOSURE HEAD BOLTING **REF. DWG. NO: A-10**						
1-SB-RV-179-103-54	Closure Washer #54	80A6474	N/A	B-G-1 B6.50	VT-1		

COMPONENT IDENTIFICATION	COMPONENT DESCRIPTION	PROCEDURE NUMBER	CALIBRATION BLOCK (If applicable)	CODE CATEGORY	CODE EXAM METHOD	ZONE NO.	REMARKS
	CLOSURE HEAD BOLTING **REF. DWG. NO: A-10**						
1-SB-RV- 126-101-01	Vessel Flange Threads, Hole #1	80A6482	196-201	B-G-1 B6.40	UT		
1-SB-RV- 126-101-02	Vessel Flange Threads, Hole #2	80A6482	196-201	B-G-1 B6.40	UT		
1-SB-RV- 126-101-03	Vessel Flange Threads, Hole #3	80A6482	196-201	B-G-1 B6.40	UT		
1-SB-RV- 126-101-04	Vessel Flange Threads, Hole #4	80A6482	196-201	B-G-1 B6.40	UT		
1-SB-RV- 126-101-05	Vessel Flange Threads, Hole #5	80A6482	196-201	B-G-1 B6.40	UT		
1-SB-RV- 126-101-06	Vessel Flange Threads, Hole #6	80A6482	196-201	B-G-1 B6.40	UT		

COMPONENT IDENTIFICATION	COMPONENT DESCRIPTION	PROCEDURE NUMBER	CALIBRATION BLOCK (If applicable)	CODE CATEGORY	CODE EXAM METHOD	ZONE NO	REMARKS
	CLOSURE HEAD BOLTING REF. DWG. NO: A-10						
1-SB-RV- 126-101-07	Vessel Flange Threads, Hole #7	80A6482	196-201	B-G-1 B6.40	UT		
1-SB-RV- 126-101-08	Vessel Flange Threads, Hole #8	80A6482	196-201	B-G-1 B6.40	UT		
1-SB-RV 126-101-09	Vessel Flange Threads, Hole #9	80A6482	196-201	B-G-1 B6.40	UT		
1-SB-RV- 126-101-10	Vessel Flange Threads, Hole #10	80A6482	196-201	B-G-1 B6.40	UT		
1-SB-RV- 126-101-11	Vessel Flange Threads, Hole #11	80A6482	196-201	B-G-1 B6.40	UT		
1-SB-RV- 126-101-12	Vessel Flange Threads, Hole #12	80A6482	196-201	B-G-1 B6.40	UT		
1-SB-RV- 126-101-13	Vessel Flange Threads Hole #13	80A6482	196-201	B-G-1 B6.40	UT		

COMPONENT IDENTIFICATION	COMPONENT DESCRIPTION	PROCEDURE NUMBER	CALIBRATION BLOCK (If applicable)	CODE CATEGORY	CODE EXAM METHOD	ZONE NO.	REMARKS
	CLOSURE HEAD BOLTING **REF. DWG. NO: A-10**						
1-SB-RV- 126-101-14	Vessel Flange Threads, Hole #14	80A6482	196-201	B-G-1 B6.40	UT		
1-SB-RV- 126-101-15	Vessel Flange Threads, Hole #15	80A6482	196-201	B-G-1 B6.40	UT		
1-SB-RV- 126-101-16	Vessel Flange Threads, Hole #16	80A6482	196-201	B-G-1 B6.40	UT		
1-SB-RV- 126-101-17	Vessel Flange Threads, Hole #17	80A6482	196-201	B-G-1 B6.40	UT		
1-SB-RV- 126-101-18	Vessel Flange Threads, Hole #18	80A6482	196-201	B-G-1 B6.40	UT		
1-SB-RV- 126-101-19	Vessel Flange Threads, Hole #19	80A6482	196-201	B-G-1 B6.40	UT		
1-SB-RV- 126-101-20	Vessel Flange Threads, Hole #20	80A6482	196-201	B-G-1 B6.40	UT		

COMPONENT IDENTIFICATION	COMPONENT DESCRIPTION	PROCEDURE NUMBER	CALIBRATION BLOCK (If applicable)	CODE CATEGORY	CODE EXAM METHOD	ZONE NO	REMARKS
	CLOSURE HEAD BOLTING **REF. DWG. NO: A-10**						
1-SB-RV-126-101-21	Vessel Flange Threads, Hole #21	80A6482	196-201	B-G-1 B6.40	UT		
1-SB-RV-126-101-22	Vessel Flange Threads, Hole #22	80A6482	196-201	B-G-1 B6.40	UT		
1-SB-RV-126-101-23	Vessel Flange Threads, Hole #23	80A6482	196-201	B-G-1 B6.40	UT		
1-SB-RV-126-101-24	Vessel Flange Threads Hole #24	80A6482	196-201	B-G-1 B6.40	UT		
1-SB-RV-126-101-25	Vessel Flange Threads, Hole #25	80A6482	196-201	B-G-1 B6.40	UT		
1-SB-RV-126-101-26	Vessel Flange Threads, Hole #26	80A6482	196-201	B-G-1 B6.40	UT		
1-SB-RV-126-101-27	Vessel Flange Threads, Hole #27	80A6482	196-201	B-G-1 B6.40	UT		

COMPONENT IDENTIFICATION	COMPONENT DESCRIPTION	PROCEDURE NUMBER	CALIBRATION BLOCK (If applicable)	CODE CATEGORY	CODE EXAM METHOD	ZONE NO.	REMARKS
	CLOSURE HEAD BOLTING **REF. DWG. NO: A-10**						
1-SB-RV- 126-101-28	Vessel Flange Threads Hole #28	80A6482	196-201	B-G-1 B6.40	UT		
1-SB-RV- 126-101-29	Vessel Flange Threads, Hole #29	80A6482	196-201	B-G-1 B6.40	UT		
1-SB-RV- 126-101-30	Vessel Flange Threads, Hole #30	80A6482	196-201	B-G-1 B6.40	UT		
1-SB-RV- 126-101-31	Vessel Flange Threads, Hole #31	80A6482	196-201	B-G-1 B6.40	UT		
1-SB-RV- 126-101-32	Vessel Flange Threads, Hole #32	80A6482	196-201	B-G-1 B6.40	UT		
1-SB-RV- 126-101-33	Vessel Flange Threads, Hole #33	80A6482	196-201	B-G-1 B6.40	UT		
1-SB-RV- 126-101-34	Vessel Flange Threads, Hole #34	80A6482	196-201	B-G-1 B6.40	UT		

System: Reactor Pressure Vessel
Document No. 80A6401
Preservice Inspection

PROGRAM PLAN AND SCHEDULE

5562-SEABROOK

By: MK Date: 3/84
App: AA Date: 3/84
Rev: 1

COMPONENT IDENTIFICATION	COMPONENT DESCRIPTION	PROCEDURE NUMBER	CALIBRATION BLOCK (If applicable)	CODE CATEGORY	CODE EXAM METHOD	ZONE NO.	REMARKS
	CLOSURE HEAD BOLTING REF. DWG. NO: A-10						
1-SB-RV-126-101-35	Vessel Flange Threads, Hole #35	80A6482	196-201	B-G-1 B6.40	UT		
1-SB-RV-126-101-36	Vessel Flange Threads, Hole #36	80A6482	196-201	B-G-1 B6.40	UT		
1-SB-RV-126-101-37	Vessel Flange Threads, Hole #37	80A6482	196-201	B-G-1 B6.40	UT		
1-SB-RV-126-101-38	Vessel Flange Threads, Hole #38	80A6482	196-201	B-G-1 B6.40	UT		
1-SB-RV-126-101-39	Vessel Flange Threads, Hole #39	80A6482	196-201	B-G-1 B6.40	UT		
1-SB-RV-126-101-40	Vessel Flange Threads, Hole #40	80A6482	196-201	B-G-1 B6.40	UT		
1-SB-RV-126-101-41	Vessel Flange Threads, Hole #41	80A6482	196-201	B-G-1 B6.40	UT		

COMPONENT IDENTIFICATION	COMPONENT DESCRIPTION	PROCEDURE NUMBER	CALIBRATION BLOCK (If applicable)	CODE CATEGORY	CODE EXAM METHOD	ZONE NO	REMARKS
	CLOSURE HEAD BOLTING REF. DWG. NO: A-10						
1-SB-RV-126-101-42	Vessel Flange Threads, Hole #42	80A6482	196-201	B-G-1 B6.40	UT		
1-SB-RV-126-101-43	Vessel Flange Threads, Hole #43	80A6482	196-201	B-G-1 B6.40	UT		
1-SB-RV-126-101-44	Vessel Flange Threads, Hole #44	80A6482	196-201	B-G-1 B6.40	UT		
1-SB-RV-126-101-45	Vessel Flange Threads, Hole #45	80A6482	196-201	B-G-1 B6.40	UT		
1-SB-RV-125-101-46	Vessel Flange Threads, Hole #46	80A6482	196-201	B-G-1 B6.40	UT		
1-SB-RV-126-101-47	Vessel Flange Threads, Hole #47	80A6482	196-201	B-G-1 B6.40	UT		
1-SB-RV-126-101-48	Vessel Flange Threads, Hole #48	80A6482	196-201	B-G-1 B6.40	UT		

COMPONENT IDENTIFICATION	COMPONENT DESCRIPTION	PROCEDURE NUMBER	CALIBRATION BLOCK (If applicable)	CODE CATEGORY	CODE EXAM METHOD	ZONE NO.	REMARKS
	CLOSURE HEAD BOLTING REF. DWG. NO: A-10						
1-SB-RV-126-101-49	Vessel Flange Threads, Hole #49	80A6482	196-201	B-G-1 B6.40	UT		
1-SB-RV-126-101-50	Vessel Flange Threads, Hole #50	80A6482	196-201	B-G-1 B6.40	UT		
1-SB-RV-126-101-51	Vessel Flange Threads, Hole #51	80A6482	196-201	B-G-1 B6.40	UT		
1-SB-RV-126-101-52	Vessel Flange Threads, Hole #52	80A6482	196-201	B-G-1 B6.40	UT		
1-SB-RV-126-101-53	Vessel Flange Threads, Hole #53	80A6482	196-201	B-G-1 B6.40	UT		
1-SB-RV-126-101-54	Vessel Flange Threads, Hole #54	80A6482	196-201	B-G-1 B6.40	UT		

NUCLEAR ENERGY SERVICES, INC.

PROCEDURE FOR THE OPERATION

OF THE

RPV ID EXAMINATION POSITIONING DEVICE

FOR

SEABROOK NUCLEAR POWER STATION

UNIT 1

CONTROLLED COPY
VALID ONLY IF THIS STAMP IS RED

Project Application 5562	Prepared By Troy A. Konnick	Date 1-3-84
	APPROVALS	
TITLE/DEPT.	SIGNATURE	DATE
Reactor Services Operations Manager	K W Tinklein	1-10-84
Project Engineer	Paul DiWando	1-10-84
Project Manager	Lawrence P. Brundige	1/10/84
QA Manager	Mary-Ellen Alling for WSG	1-11-84

FORM # NES 204 2/80

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REVISION LOG

NUCLEAR ENERGY SERVICES, INC.

DOCUMENT NO. 80A6476

REV. NO.	DATE	PAGE NO.	DESCRIPTION	APPROVAL

PROCEDURE FOR THE OPERATION

OF

RPV ID EXAMINATION POSITIONING DEVICE

TABLE OF CONTENTS

SECTION I

GENERAL INFORMATION AND REQUIREMENTS

TABLE OF CONTENTS

SECTION I

GENERAL INFORMATION AND REQUIREMENTS

1. SCOPE

1.1 MECHANICAL EXAMINATION POSITIONING EQUIPMENT

1. This document governs the operation of the RPV ID Examination Positioning Device used for ultrasonic examination of the reactor pressure vessel (RPV) from the ID surfaces.

2. Operation of the additional attachments is covered in the Operation and Maintenance Manuals for each device.

1.2 TIME OF EXAMINATION

This document shall be employed for the preservice (baseline) examination and reexamination of any repaired areas of the reactor vessel as required by the ASME Boiler and Pressure Vessel Code, Section XI.

2. REFERENCES

2.1 REFERENCE DOCUMENTS

1. NRC Regulatory Guide 1.150 Rev. 1.

2. ASME Boiler and Pressure Vessel Code, Section XI, 1977 edition through Summer of 1978 addenda.

3. NES Document 80A6401, Reactor Pressure Vessel Preservice Inspection Program Plan for Seabrook Nuclear Power Station Unit 1

4. NES Document 80A5187, Quality Assurance Program Plan for Seabrook Nuclear Power Station Unit 1

5. NES Document 80A9023 Inservice Inspection Data Control Procedure (latest revision).

6. NES Document 80A9060, Inservice Inspection Field Change Procedure (latest revision).

2.2 APPLICABLE ULTRASONIC PROCEDURES

1. 80A6477 Automated Ultrasonic Examination Procedure for Reactor Vessel Shell Welds from the ID Surface

2. 80A6478 Automated Ultrasonic Examination Procedure for Reactor Vessel Upper Shell to Flange Weld from the Flange Mating Surface

3. 80A6479 Automated Ultrasonic Examination Procedure for Reactor Vessel Nozzle to Shell Welds from the Nozzle Bore

4. 80A6480 Automated Ultrasonic Examination Procedure for Reactor Vessel Near Surface Technique

2.3 APPLICABLE DRAWINGS

1. Seabrook Drawings

	Drawing No.	Title
A.	10773-161-003	As Built Location of Weld Seams Vessel
B.	10873-171-004	General Arrangen ent Elevation
C.	10873-171-005	General Arrangement Plan
D.	10873-121-001	Upper Vessel Assembly
E.	10873-121-002	Upper Vessel Machining
F.	10873-121-002	Upper Vessel Machining
G.	10873-121-004	Upper Vessel Machining
H.	10873-121-005	Upper Vessel Machining
I.	10873-122-001	Upper Shell

J. 10873-124-001 Intermediate Shell

K. 10873-126-001 Vessel Flange

L. 10873-126-002 Vessel Flange Machining & Cladding

M. 10873-128-001 Inlet Nozzle

N. 10873-128-002 Inlet Nozzle Cladding & Machining

O. 10873-128-003 Outlet Nozzle

P. 10873-128-004 Outlet Nozzle Cladding & Machining

Q. 10873-141-001 Lower Vessel Assembly

R. 10873-142-001 Lower Shell

S. 10873-151-001 Bottom Head Welded Assembly

T. 10873-151-002 Bottom Head Penetrations

2. NES Weld Maps

As specified in Zone 1 of NES Document 80A6401, RPV Preservice Inspection Program Plan, Reactor Pressure Vessel.

3. Calibration Block Drawings

A. 80E6306 Basic 7" Calibration Block, Seabrook Unit 1 PC. No.196-102

B. 80E6307 Basic 9" Calibration Block, Seabrook Unit 1 PC. No. 196-103

C. 80E6308 Basic 11" Calibration Block, Seabrook Unit 1 PC. No. 196-104

D. 80D6309 Vessel Flange Ligament Calibration Block, Seabrook Unit 1, PC. No. 196-201

E. 80D6310 Safe End Calibration Block, Seabrook Unit 1, PC. No. 196-202

2.4 OPERATIONAL MANUALS

1. The following special equipment operations manuals form a part of this procedure.

A. 80A5405; Operation and Maintenance Manual for the RPV ID Examination Positioning Device

B. 80A5631; Operation and Maintenance Manual, Extender

C. 80A5632; Operation and Maintenance Manual, I.D. Nozzle Scanner

D. 80A5633; Operation and Maintenance Manual, Nozzle Bore Scanner

E. 80A5634; Operation and Maintenance Manual, Flange Scanner

F. 80A5635; Operation and Maintenance Manual, Rotators

G. 80A5543; On-site Functional Test Procedure for the RPV ID Examination Positioning Device

3. PROCEDURE CERTIFICATION

The examination procedures described in this document comply with Section XI of the ASME Boiler and Pressure Vessel Code and the NRC Regulatory Guide 1.150 Rev. 1 except where coverage is limited by part geometry or access.

4. PERSONNEL QUALIFICATION

4.1 PERSONNEL CERTIFICATION

Each person operating the mechanical equipment has demonstrated sufficient skills and knowledge to the Reactor Services Operations Manager, or his designated alternate.

4.2 PERSONNEL RECORDS

1. Records of personnel qualifications shall be maintained by the Examination Contractor.

2. A copy of each operator's certification shall become a part of the final examination report, with a copy submitted to the Plant Owner, or his

agent, prior to the performance of examinations per this procedure. A current eye test shall be included.

5. EXAMINATION REQUIREMENTS

5.1 WELD IDENTIFICATION

Each weld shall be located and identified per the appropriate weld map, serial number, or other identification.

5.2 EXAMINATION COVERAGE

The intent of this procedure is to provide maximum examination coverage to insure weld integrity. The amount of transducer overlap and the volume of material examined shall be as required by the appropriate ultrasonic procedure (see paragraph 2.2).

6. EQUIPMENT REQUIREMENTS

6.1 EXAMINATION CONTRACTOR'S EQUIPMENT

The following test equipment or its equivalent shall be provided and/or operated by the Examination Contractor for examination of the reactor vessel welds.

1. RPV ID Examination Positioning Device, Model ISI-2
2. Extender
3. ID Nozzle Scanner
4. Nozzle Bore Scanner
5. Dollar Plate Scanner
6. Flange Scanner
7. Rotators
8. PaR Scanners Control Unit
9. Closed-Circuit Television System(s)
10. Applicable Examination Heads

6.2 PLANT OWNER'S EQUIPMENT

The Plant Owner or his Agent shall provide and maintain the following service facilities and equipment as required. NES shall provide details as to the amounts and ratings of power, water, etc. required.

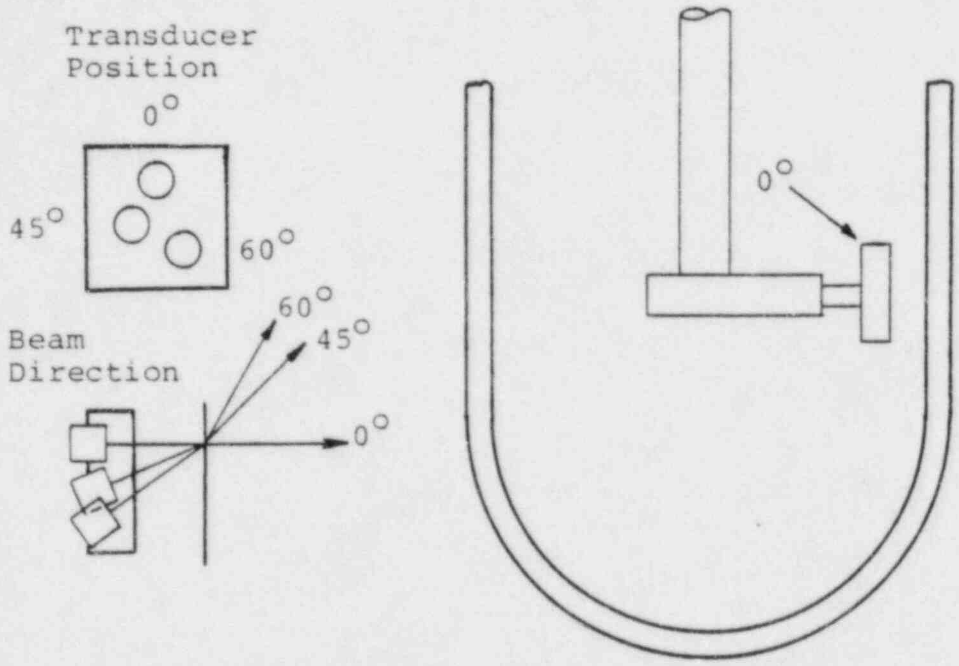
A. Scaffolding
B. Water, air, and electricity
C. Temporary Lighting
D. Crane or lifting device
*E. Radiation monitoring equipment
*F. Radiation shielding
*G. Decontamination facilities
H. Post-Inspection cleanup of test area

7. CONTRACTOR'S RESPONSIBILITY

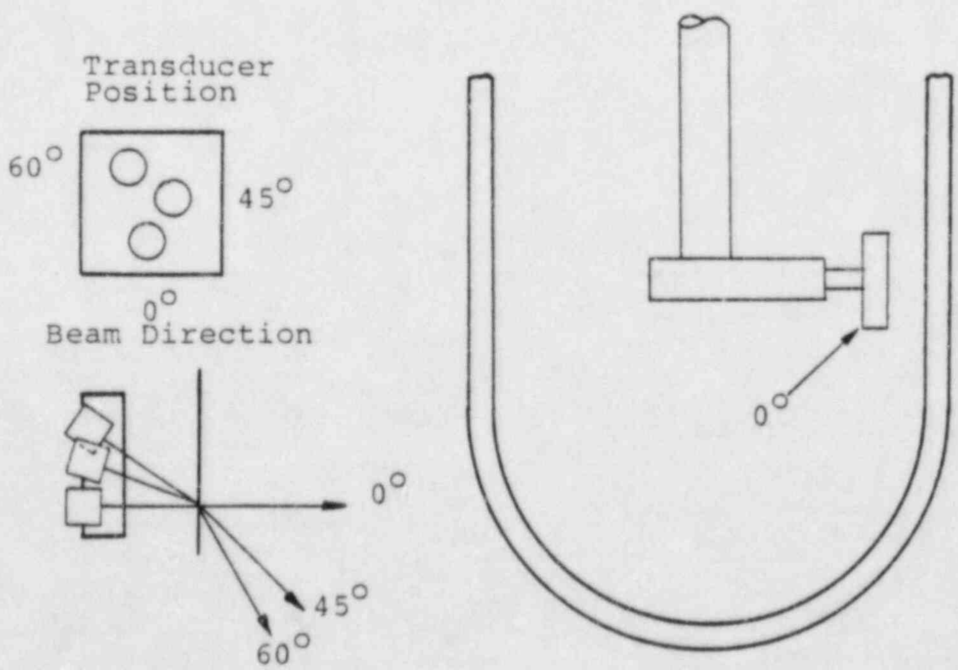
The NES Site Supervisor shall have the ultimate responsibility for determining that all examinations have been completed in accordance with the requirements of Section XI of the ASME Boiler and Pressure Vessel Code to the maximum extent possible, and for determining the most effective sequence in which to perform these examinations.

* If applicable

DIAGRAM FOR ORIENTATION NUMBERS 3 AND 4
SHELL HEAD NO. 80D8580-2
FIGURE 1



Orientation No. 3
Shooting <u>Up</u>



Orientation No. 4
Shooting <u>Down</u>

Note: Shooting direction refers to the orientation of the 0° straight beam when looking outward from the center of the RPV.

RASTER SUMMARY SHEET

Raster Set: III-7

Section: III Pg. __ of __

Raster No.:

Cal. Data Pkg.:

Scanning Mode: Parallel

Procedure No.: 80A6477 Rev.

Head Attitude: Vertical

Video Tape No.:

Orient.: 3 Shooting: UP

Cal. Block No.: 196-103 (9")

Index Increment: 0.45°

Head No.: 80D8580-2

Index With: Rotate Drive (5.10° - 354.90°)

Weld No.: 1-SB-RV-101-124-0°

Sweep With: Hoist (125.66" - 235.63")

Weld Centerline: 0°

Weld Title: Intermediate Shell Longitudinal Weld at 0°

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: Refer to Section 13.2 before scanning.

Operator ____ Date ____ Time ____ Reviewer

Operator ____ Date ____ Time ____ ____ Date ____

nes NUCLEAR ENERGY SERVICES, INC.

RASTER SUMMARY SHEET

Raster Set: III-7

Raster No.:

Scanning Mode: Parallel

Head Attitude: Vertical

Orient.: 4 Shooting: Down

Index Increment: 0.45°

Index With: Rotate Drive (5.10° - 354.90°)

Sweep With: Hoist (125.66"- 235.63")

Weld Title: Intermediate Shell Longitudinal Weld at 0°

Section: III Pg. of

Cal. Data Pkg.:

Procedure No.: 80A6477 Rev.

Video Tape No.:

Cal. Block No.: 196-103 (9")

Head No.: 80D8580-2

Weld No.: 1-SB-RV-101-124-0°

Weld Centerline: 0°

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: Refer to Section 13.2 before scanning.

Operator Date Time Reviewer

Operator Date Time Date

NES NUCLEAR ENERGY SERVICES, INC.

RASTER SUMMARY SHEET

Raster Set: III-7

Raster No.:

Scanning Mode: Parallel

Head Attitude: Vertical

Orient.: 3 Shooting: UP

Index Increment: 0.45°

Index With: Rotate Drive (114.90° - 125.10°)

Sweep With: Hoist (125.66" - 235.63")

Weld Title: Intermediate Shell Longitudinal Weld at 120°

Section: III Pg.___ of___

Cal. Data Pkg.:

Procedure No.: 80A6477 Rev.

Video Tape No.:

Cal. Block No.: 196-103 (9")

Head No.: 80D8580-2

Weld No.: 1-SB-RV-101-124-120°

Weld Centerline: 120°

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: Refer to Section 13.2 before scanning.

Operator______ Date______ Time______ Reviewer

Operator______ Date______ Time______ ______ Date______

nes NUCLEAR ENERGY SERVICES, INC.

RASTER SUMMARY SHEET

Raster Set: III-7
Raster No.:
Scanning Mode: Parallel
Head Attitude: Vertical
Orient.: 4 Shooting: Down
Index Increment: 0.45°
Index With: Rotate Drive (114.90° - 125.10°)
Sweep With: Hoist (125.66" - 253.63")
Weld Title: Intermediate Shell Longitudinal Weld at 120°

Section: III Pg.___ of___
Cal. Data Pkg.:
Procedure No.: 80A6477 Rev.___
Video Tape No.:
Cal. Block No.: 196-103 (9")
Head No.: 80D8580-2
Weld No.: 1-SB-RV-101-124-120°
Weld Centerline: 120°

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: Refer to Section 13.2 before scanning.

Operator________ Date______ Time______ Reviewer

Operator________ Date______ Time______ ________ Date______

NES NUCLEAR ENERGY SERVICES, INC.

RASTER SUMMARY SHEET

Raster Set: III-7
Raster No.:
Scanning Mode: Parallel
Head Attitude: Vertical
Orient.: 3 Shooting: UP
Index Increment: 0.45°
Index With: Rotate Drive (234.90° - 245.10°)
Sweep With: Hoist (125.66" - 235.63")

Section: III Pg.___of___
Cal. Data Pkg.:
Procedure No.: 80A6477 Rev.___
Video Tape No.:
Cal. Block No.: 196-103 (9")
Head No.: 80D8580-2
Weld No.: 1-SB-RV-101-124-240°
Weld Centerline: 240°

Weld Title: Intermediate Shell Longitudinal Weld at 240°

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: Refer to Section 13.2 before scanning.

Operator_____ Date_____ Time_____ Reviewer

Operator_____ Date_____ Time_____ _____ Date_____

NES NUCLEAR ENERGY SERVICES, INC.

RASTER SUMMARY SHEET

Raster Set: III-7 | Section: III | Pg.___ of___

Raster No.: | Cal. Data Pkg.:

Scanning Mode: Parallel | Procedure No.: 80A6477 | Rev.___

Head Attitude: Vertical | Video Tape No.:

Orient.: 4 Shooting: Down | Cal. Block No.: 196-103 (9")

Index Increment: 0.45° | Head No.: 80D8580-2

Index With: Rotate Drive (234.90° - 245.10°) | Weld No.: 1-SB-RV-101-124-240°

Sweep With: Hoist (125.66" - 235.63") | Weld Centerline: 240°

Weld Title: Intermediate Shell Longitudinal Weld at 240°

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: Refer to Section 13.2 before scanning.

Operator______ Date______ Time______ Reviewer

Operator______ Date______ Time______ ______ Date______

NUCLEAR ENERGY SERVICES, INC.

RASTER SUMMARY SHEET

Raster Set: III-7
Raster No.:
Scanning Mode: Parallel
Head Attitude: Vertical
Orient.: 3 Shooting: UP
Index Increment: 0.45°
Index With: Rotate Drive (84.90° - 95.10°)
Sweep With: Hoist (235.63" - 341.23")
Weld Title: Lower Shell Longitudinal Weld at 90°

Section: III Pg.__ of__
Cal. Data Pkg.:
Procedure No.: 80A6477 Rev.
Video Tape No.:
Cal. Block No.: 196-103 (9")
Head No.: 80D8580-2
Weld No.: 1-SB-RV-101-142-90°
Weld Centerline: 90°

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: Refer to Section 13.2 before scanning.

Operator____ Date____ Time____ Reviewer

Operator____ Date____ Time____ ____ Date____

nes NUCLEAR ENERGY SERVICES, INC.

RASTER SUMMARY SHEET

Raster Set: III-7

Raster No.:

Scanning Mode: Parallel

Head Attitude: Vertical

Orient.: 4 Shooting: Down

Index Increment: 0.45°

Index With: Rotate Drive (84.90° - 95.10°)

Sweep With: Hoist (235.63" - 341.23")

Weld Title: Lower Shell Longitudinal Weld at 90°

Section: III Pg.___ of___

Cal. Data Pkg.:

Procedure No.: 80A6477 Rev.___

Video Tape No.:

Cal. Block No.: 196-103 (9")

Head No.: 80D8580-2

Weld No.: 1-SB-RV-101-142-90°

Weld Centerline: 90°

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: Refer to Section 13.2 before scanning.

Operator________ Date______ Time______ Reviewer

Operator________ Date______ Time______ ________ Date______

nes NUCLEAR ENERGY SERVICES, INC.

RASTER SUMMARY SHEET

Raster Set: III-7

Raster No.:

Scanning Mode: Parallel

Head Attitude: Vertical

Orient.: 3 Shooting: UP

Index Increment: 0.45°

Index With: Rotate Drive (204.90° - 215.10°)

Sweep With: Hoist (235.63" - 341.23")

Weld Title: Lower Shell Longitudinal Weld at 210°

Section: III Pg. of

Cal. Data Pkg.:

Procedure No.: 80A6477 Rev.

Video Tape No.: •

Cal. Block No.: 196-103 (9")

Head No.: 80D8580-2

Weld No.: 1-SB-RV-101-142-210°

Weld Centerline: 210°

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: Refer to Section 13.2 before scanning.

Operator ______ Date ______ Time ______ Reviewer

Operator ______ Date ______ Time ______ ______ Date ______

NES NUCLEAR ENERGY SERVICES, INC.

RASTER SUMMARY SHEET

Raster Set: III-7

Raster No.:

Scanning Mode: Parallel

Head Attitude: Vertical

Orient.: 4 Shooting: Down

Index Increment: 0.45°

Index With: Rotate Drive (204.90° - 215.10°)

Sweep With: Hoist (235.63" - 341.23")

Weld Title: Lower Shell Longitudinal Weld at 210°

Section: III Pg.___ of___

Cal. Data Pkg.:

Procedure No.: 80A6477 Rev.

Video Tape No.:

Cal. Block No.: 196-103 (9")

Head No.: 80D8580-2

Weld No.: 1-SB-RV-101-142-210°

Weld Centerline: 210°

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: Refer to Section 13.2 before scanning.

Operator______ Date______ Time______ Reviewer

Operator______ Date______ Time______ ______ Date______

nes NUCLEAR ENERGY SERVICES, INC.

RASTER SUMMARY SHEET

Raster Set: III-7

Section: III Pg. ___ of ___

Raster No.: ___

Cal. Data Pkg.: ___

Scanning Mode: Parallel

Procedure No.: 80A6477 Rev. ___

Head Attitude: Vertical

Video Tape No.: ___

Orient.: 3 Shooting: UP

Cal. Block No.: 196-103 (9")

Index Increment: 0.45°

Head No.: 80D8580-2

Index With: Rotate Drive (324.90° - 335.10°)

Weld No.: 1-SB-RV-101-142-330°

Sweep With: Hoist (235.63" - 341.23")

Weld Centerline: 330°

Weld Title: Lower Shell Longitudinal Weld at 330°

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: Refer to Section 13.2 before scanning.

Operator ___ Date ___ Time ___ Reviewer

Operator ___ Date ___ Time ___ ___ Date ___

nes NUCLEAR ENERGY SERVICES, INC.

Form 028-110/1 1/83

RASTER SUMMARY SHEET

Raster Set: III-7

Section: III Pg.___ of___

Raster No.: ______

Cal. Data Pkg.: ______

Scanning Mode: Parallel

Procedure No.: 80A6477 Rev.___

Head Attitude: Vertical

Video Tape No.: ______

Orient.: 4 Shooting: Down

Cal. Block No.: 196-103 (9")

Index Increment: 0.45°

Head No.: 80D8580-2

Index With: Rotate Drive (324.90° - 341.23°)

Weld No.: 1-SB-RV-101-142-330°

Sweep With: Hoist (235.63" - 341.23")

Weld Centerline: 330°

Weld Title: Lower Shell Longitudinal Weld at 330°

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: Refer to Section 13.2 before scanning.

Operator______ Date______ Time______ Reviewer

Operator______ Date______ Time______ ______ Date______

nes NUCLEAR ENERGY SERVICES, INC.

14. RASTER SET III-8
THREE UNIT SHELL HEAD 80D8580-2

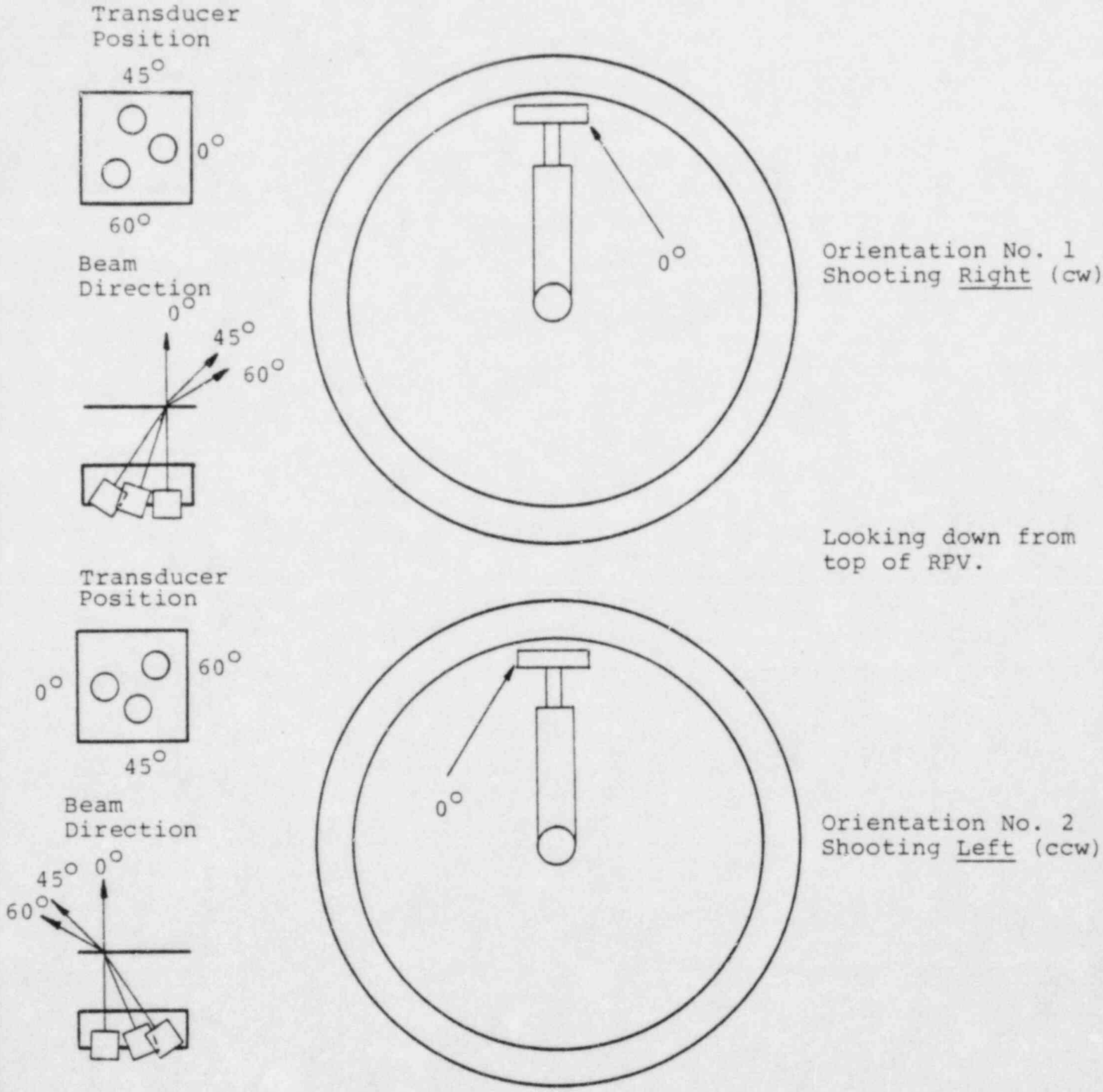
14.1 This raster set covers the perpendicular examinations for the longitudinal welds in the intermediate shell and lower shell.

14.2 Physical (lower core support pads) obstructions and limitations may exist in several areas throughout the longitudinal welds in the lower shell. Carefully monitor all operations in these areas via the television system. Scanning is to be stopped whenever an obstruction is met, or head contact is lost.

14.3 Figure 1 is an illustration of the orientations to be used with head 80D8580-2. Note that when reference is made to shooting left or right on the raster summary sheets, this direction refers to the orientation of the 0° straight team.

14.4 Each raster summary sheet in this section provides full coverage in one direction perpendicular to the weld. Each weld is examined twice to provide coverage in both perpendicular directions as required.

DIAGRAM FOR ORIENTATION NUMBERS 1 AND 2
SHELL HEAD NO. 80D8580-2
FIGURE 1



Note: Shooting direction refers to the orientation of the 0° straight beam when looking outward from the center of the RPV.

RASTER SUMMARY SHEET

Raster Set: III-8

Section: III Pg.___ of___

Raster No.:

Cal. Data Pkg.:

Scanning Mode: Perpendicular

Procedure No.: 80A6477 Rev.___

Head Attitude: Horizontal

Video Tape No.:

Orient.: 2 Shooting: Left

Cal. Block No.: 196-103 (9")

Index Increment: 0.45°

Head No.: 80D8580-2

Index With: Rotate Drive (12.90° - 358.41°)

Weld No.: 1-SB-RV-101-124-0°

Sweep With: Hoist (124.66" - 236.63")

Weld Centerline: 0°

Weld Title: Intermediate Shell Longitudinal Weld at 0°

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: Refer to Section 14.2 before scanning.

Operator______ Date______ Time______ Reviewer

Operator______ Date______ Time______ ______ Date______

NES NUCLEAR ENERGY SERVICES, INC.

RASTER SUMMARY SHEET

Raster Set: III-8
Raster No.:
Scanning Mode: Perpendicular
Head Attitude: Horizontal
Orient.: 1 Shooting: Right
Index Increment: 0.45°
Index With: Rotate Drive (347.10° - 1.59°)
Sweep With: Hoist (124.66" - 236.63")
Weld Title: Intermediate Shell Longitudinal Weld at 0°

Section: III Pg. of
Cal. Data Pkg.:
Procedure No.: 80A6477 Rev.
Video Tape No.:
Cal. Block No.: 196-103 (9")
Head No.: 80D8580-2
Weld No.: 1-SB-RV-101-124-0°
Weld Centerline: 0°

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: Refer to Section 14.2 before scanning.

Operator Date Time Reviewer

Operator Date Time Date

nes NUCLEAR ENERGY SERVICES, INC.

RASTER SUMMARY SHEET

Raster Set: III-8 | Section: III Pg.___ of___

Raster No.: | Cal. Data Pkg.:

Scanning Mode: Perpendicular | Procedure No.: 80A6477 Rev.___

Head Attitude: Horizontal | Video Tape No.:

Orient.: 2 Shooting: Left | Cal. Block No.: 196-103 (9")

Index Increment: 0.45° | Head No.: 80D8580-2

Index With: Rotate Drive (132.90° - 118.41°) | Weld No.: 1-SB-RV-101-124-120°

Sweep With: Hoist (124.66" - 236.63") | Weld Centerline: 120°

Weld Title: Intermediate Shell Longitudinal Weld at 120°

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: Refer to Section 14.2 before scanning.

Operator______ Date______ Time______ Reviewer

Operator______ Date______ Time______ ______ Date______

nes NUCLEAR ENERGY SERVICES, INC.

RASTER SUMMARY SHEET

Raster Set: III-8

Section: III Pg. ___ of ___

Raster No.: ___

Cal. Data Pkg.: ___

Scanning Mode: Perpendicular

Procedure No.: 80A6477 Rev. ___

Head Attitude: Horizontal

Video Tape No.: ___

Orient.: 1 Shooting: Right

Cal. Block No.: 196-103 (9")

Ind ∡ Increment: 0.45°

Head No.: 80D8580-2

Index With: Rotate Drive (107.10° - 121.59°)

Weld No.: 1-SB-RV-101-124-120°

Sweep With: Hoist (124.66" - 236.63")

Weld Centerline: 120°

Weld Title: Intermediate Shell Longitudinal Weld at 120°

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: Refer to Section 14.2 before scanning.

Operator ___ Date ___ Time ___ Reviewer

Operator ___ Date ___ Time ___ ___ Date ___

NES NUCLEAR ENERGY SERVICES, INC.

Form 028-110/1 1/83

RASTER SUMMARY SHEET

Raster Set: III-8

Raster No.:

Scanning Mode: Perpendicular

Head Attitude: Horizontal

Orient.: 2 Shooting: Left

Index Increment: 0.45°

Index With: Rotate Drive (252.90° - 238.41°)

Sweep With: Hoist (124.66" - 236.63")

Weld Title: Intermediate Shell Longitudinal Weld at 240°

Section: III Pg. ___ of ___

Cal. Data Pkg.:

Procedure No.: 80A6477 Rev.

Video Tape No.:

Cal. Block No.: 196-103 (9")

Head No.: 80D8580-2

Weld No.: 1-SB-RV-101-124-240°

Weld Centerline: 240°

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: Refer to Section 14.2 before scanning.

Operator ___ Date ___ Time ___ Reviewer

Operator ___ Date ___ Time ___ ___ Date ___

NES NUCLEAR ENERGY SERVICES, INC.

Form 028-110/1 1/83

RASTER SUMMARY SHEET

Raster Set: III-8

Raster No.:

Scanning Mode: Perpendicular

Head Attitude: Horizontal

Orient.: 1 Shooting: Right

Index Increment: 0.45°

Index With: Rotate Drive (227.10° - 241.59°)

Sweep With: Hoist (124.66" - 236.63")

Weld Title: Intermediate Shell Longitudinal Weld at 240°

Section: III Pg.___ of___

Cal. Data Pkg.:

Procedure No.: 80A6477 Rev.

Video Tape No.:

Cal. Block No.: 196-103 (9")

Head No.: 80D8580-2

Weld No.: 1-SB-RV-101-124-240°

Weld Centerline: 240°

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: Refer to Section 14.2 before scanning.

Operator______ Date______ Time______ Reviewer

Operator______ Date______ Time______ ______ Date______

NES NUCLEAR ENERGY SERVICES, INC.

RASTER SUMMARY SHEET

Raster Set: III-8
Raster No.:
Scanning Mode: Perpendicular
Head Attitude: Horizontal
Orient.: 2 Shooting: Left
Index Increment: 0.45°
Index With: Rotate Drive (102.90° - 88.41°)
Sweep With: Hoist (234.63" - 342.23")
Weld Title: Lower Shell Longitudinal Weld at 90°

Section: III Pg. ___ of ___
Cal. Data Pkg.:
Procedure No.: 80A6477 Rev.
Video Tape No.:
Cal. Block No.: 196-103 (9")
Head No.: 80D8580-2
Weld No.: 1-SB-RV-101-142-90°
Weld Centerline: 90°

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: Refer to Section 14.2 before scanning.

Operator ___ Date ___ Time ___ Reviewer
Operator ___ Date ___ Time ___ ___ Date ___

nes NUCLEAR ENERGY SERVICES, INC.

RASTER SUMMARY SHEET

Raster Set: III-8

Raster No.:

Scanning Mode: Perpendicular

Head Attitude: Horizontal

Orient.: 1 Shooting: Right

Index Increment: 0.45°

Index With: Rotate Drive (77.10° - 91.59°)

Sweep With: Hoist (234.63" - 342.23")

Weld Title: Lower Shell Longitudinal Weld at 90°

Section: III Pg.___of___

Cal. Data Pkg.:

Procedure No.: 80A6477 Rev.

Video Tape No.:

Cal. Block No.: 196-103 (9")

Head No.: 80D8580-2

Weld No.: 1-SB-RV-101-142-90°

Weld Centerline: 90°

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: Refer to Section 14.2 before scanning.

Operator____ Date____ Time____ Reviewer

Operator____ Date____ Time____ ____ Date____

nes NUCLEAR ENERGY SERVICES, INC.

RASTER SUMMARY SHEET

Raster Set: III-8

Raster No.:

Scanning Mode: Perpendicular

Head Attitude: Horizontal

Orient.: 2 Shooting: Left

Index Increment: 0.45°

Index With: Rotate Drive (222,90° - [illegible].41°)

Sweep With: Hoist (234.63" - 342.23")

Weld Title: Lower Shell Longitudinal Weld at 210°

Section: III Pg.___ of___

Cal. Data Pkg.:

Procedure No.: 80A6477 Rev.___

Video Tape No.:

Cal. Block No.: 196-103 (9")

Head No.: 80D8580-2

Weld No.: 1-SB-RV-101-142-210°

Weld Centerline: 210°

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: Refer to Section 14.2 before scanning.

Operator________ Date________ Time________ Reviewer

Operator________ Date________ Time________ ________ Date________

NUCLEAR ENERGY SERVICES, INC.

Form 028-110/1 1/83

RASTER SUMMARY SHEET

Raster Set: III-8

Section: III Pg. ___ of ___

Raster No.:

Cal. Data Pkg.:

Scanning Mode: Perpendicular

Procedure No.: 80A6477 Rev. ___

Head Attitude: Horizontal

Video Tape No.:

Orient.: 1 Shooting: Right

Cal. Block No.: 196-103 (9")

Index Increment: 0.45°

Head No.: 80D8580-2

Index With: Rotate Drive (197.10° - 211.59°)

Weld No.: 1-SB-RV-101-142-210°

Sweep With: Hoist (234.63" - 342.23")

Weld Centerline: 210°

Weld Title: Lower Shell Longitudinal Weld at 210°

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: Refer to Section 14.2 before scanning.

Operator ___ Date ___ Time ___ Reviewer

Operator ___ Date ___ Time ___ ___ Date ___

NES NUCLEAR ENERGY SERVICES, INC.

RASTER SUMMARY SHEET

Raster Set: III-8
Section: III Pg. __ of __
Raster No.:
Cal. Data Pkg.:
Scanning Mode: Perpendicular
Procedure No.: 80A6477 Rev.
Head Attitude: Horizontal
Video Tape No.:
Orient.: 2 Shooting: Left
Cal. Block No.: 196-103 (9")
Index Increment: 0.45°
Head No.: 80D8580-2
Index With: Rotate Drive (342.90° - 328.41°)
Weld No.: 1-SB-RV-101-142-330°
Sweep With: Hoist (234.63" - 342.23")
Weld Centerline: 330°
Weld Title: Lower Shell Longitudinal Weld at 330°

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: Refer to Section 14.2 before scanning.

Operator ___ Date ___ Time ___ Reviewer

Operator ___ Date ___ Time ___ ___ Date ___

nes NUCLEAR ENERGY SERVICES, INC.

RASTER SUMMARY SHEET

Raster Set: III-8

Raster No.:

Scanning Mode: Perpendicular

Head Attitude: Horizontal

Orient.: 1 Shooting: Right

Index Increment: 0.45°

Index With: Rotate Drive (317.10° - 331.59°)

Sweep With: Hoist (234.63" - 342.23")

Weld Title: Lower Shell Longitudinal Weld at 330°

Section: III Pg.___ of___

Cal. Data Pkg.:

Procedure No.: 80A6477 Rev.

Video Tape No.:

Cal. Block No.: 196-103 (9")

Head No.: 80D8580-2

Weld No.: 1-SB-RV-101-142-330°

Weld Centerline: 330°

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: Refer to Section 14.2 before scanning.

Operator ___ Date ___ Time ___ Reviewer

Operator ___ Date ___ Time ___ ___ Date ___

nes NUCLEAR ENERGY SERVICES, INC.

15. RASTER SET III-9
THREE UNIT SHELL HEAD 80D8580-2

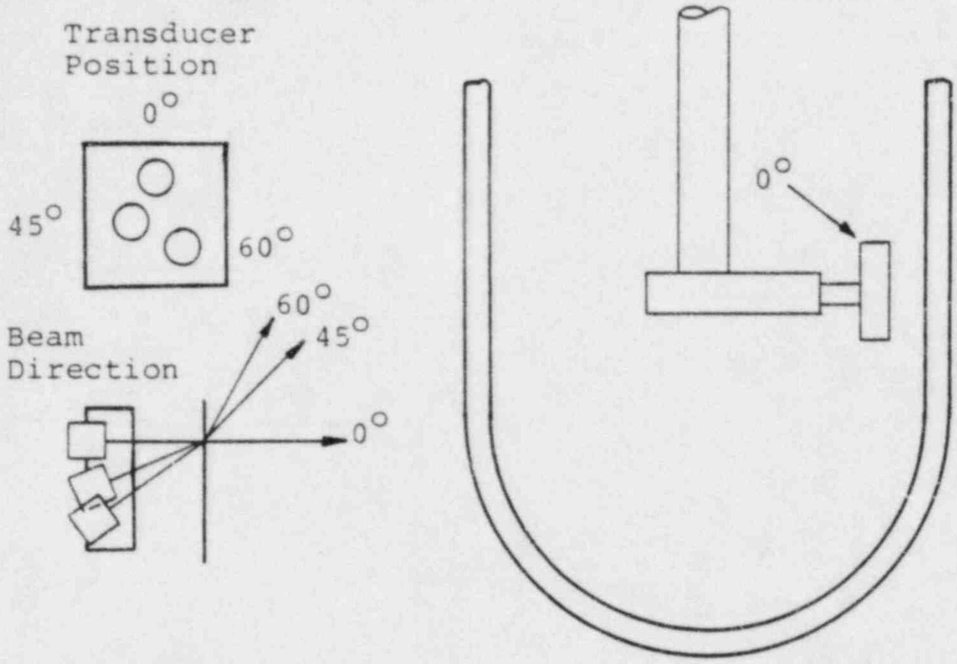
15.1 This raster set covers the perpendicular examination, shooting up, for the lower shell to bottom head circumferential weld.

15.2 Physical (lower core support pads) obstructions and limitations may exist in several areas throughout the weld. Carefully monitor all operations in these areas via the television system. Scanning is to be stopped whenever an obstruction is met, or head contact is lost.

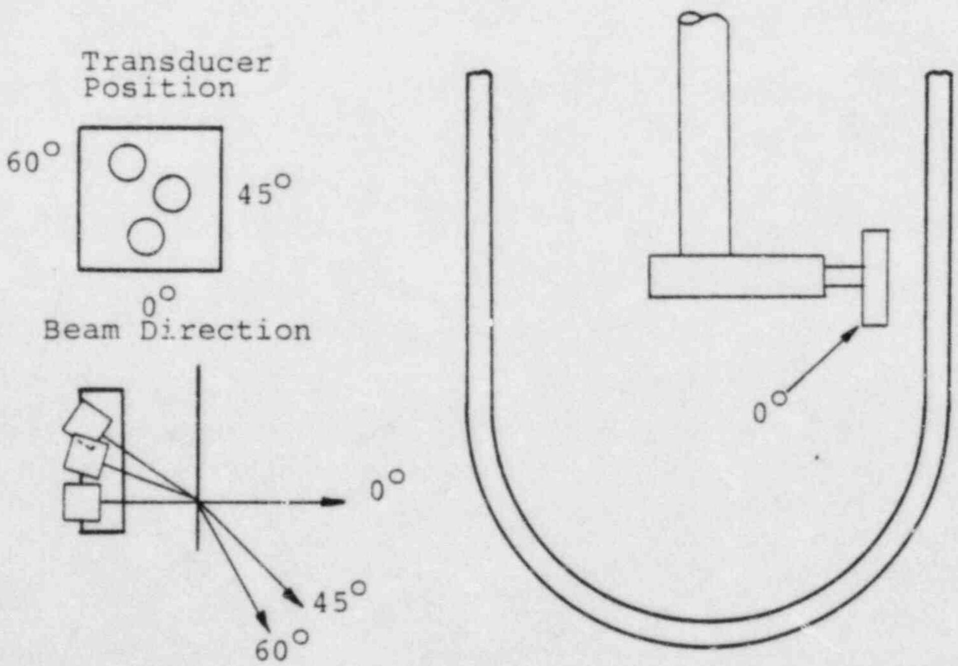
15.3 Figure 1 is an illustration of the orientations to be used with head 80D8580-2. Note that when reference is made to shooting up on the raster summary sheet, this direction refers to the orientation of the 0° straight team.

15.4 Each raster summary sheet in this section provides full coverage in one direction perpendicular to the weld. Each weld is examined twice to provide coverage in both perpendicular directions as required.

DIAGRAM FOR ORIENTATION NUMBERS 3 AND 4
SHELL HEAD NO. 80D8580-2
FIGURE 1



Orientation No. 3
Shooting Up



Orientation No. 4
Shooting Down

Note: Shooting direction refers to the orientation of the 0° straight beam when looking outward from the center of the RPV.

RASTER SUMMARY SHEET

Raster Set: III-9

Raster No.:

Scanning Mode: Perpendicular

Head Attitude: Vertical

Orient.: 3 Shooting: UP

Index Increment: 0.45°

Index With: Boom Swing (170.29° - 157.89°)

Sweep With: Rotate Drive (0° -361°)

Section: III Pg. ___ of ___

Cal. Data Pkg.:

Procedure No.: 80A6477 Rev. ___

Video Tape No.:

Cal. Block No.: 196-102 (7")

Head No.: 80D8580-2

Weld No.: 1-SB-RV-104-141

Weld Centerline: 168.73°

Weld Title: Lower Shell to Bottom Head Circ. Weld

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: Refer to Section 15.2 before scanning.

Operator ______ Date ______ Time ______ Reviewer

Operator ______ Date ______ Time ______ ______ Date ______

NES NUCLEAR ENERGY SERVICES, INC.

16. RASTER SET III-10
THREE UNIT SHELL HEAD 80D8580-2

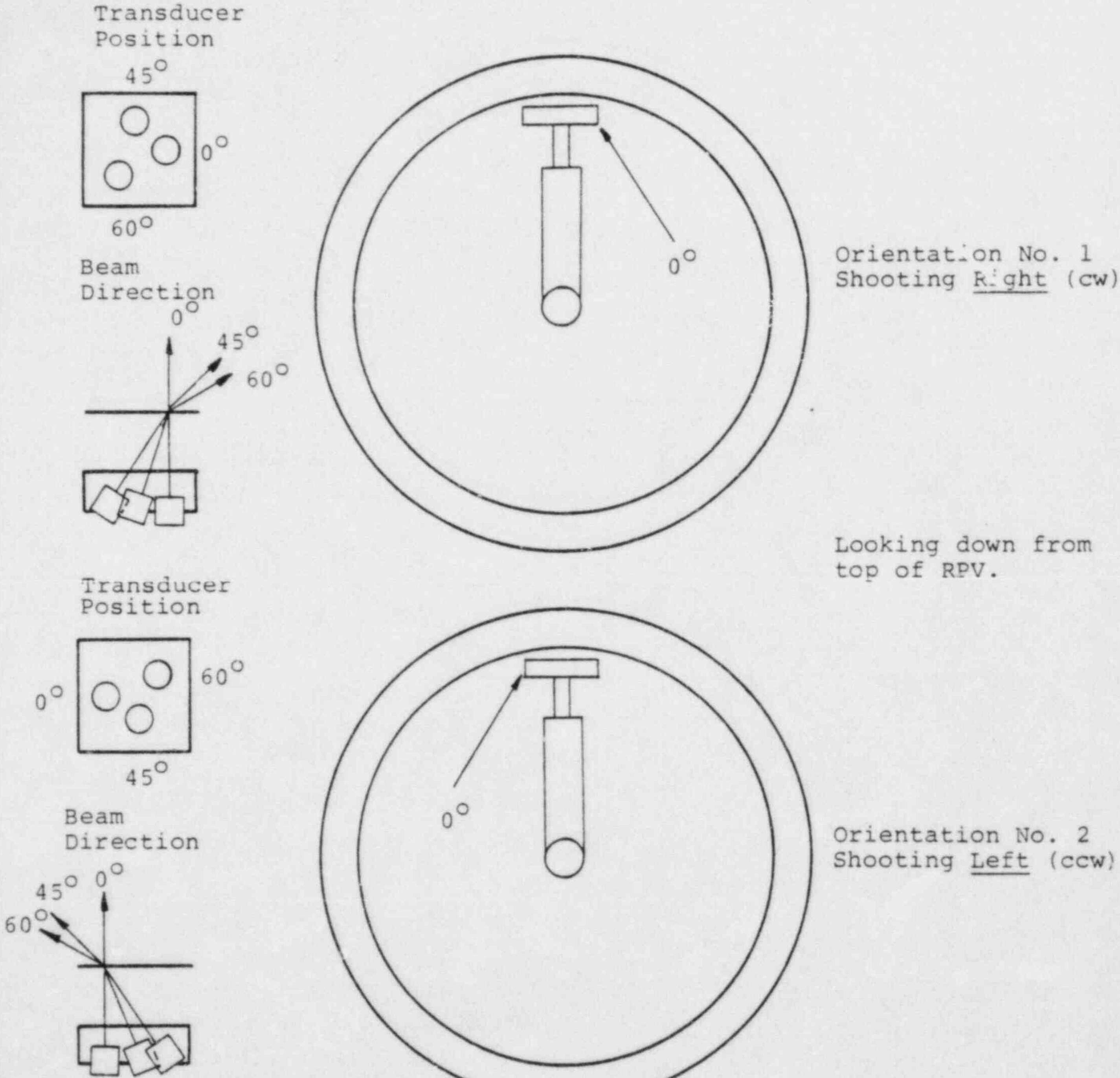
16.1 This raster set covers the parallel examinations for the lower shell to bottom head circumferential weld.

16.2 Physical (lower core support pads) obstructions and limitations may exist in several areas throughout the weld. Carefully monitor all operations in these areas via the television system. Scanning is to be stopped whenever an obstruction is met, or head contact is lost.

16.3 Figure 1 is an illustration of the orientations to be used with head 80D8580-2. Note that when reference is made to shooting left or right on the raster summary sheets, this direction refers to the orientation of the 0^{o} straight beam.

16.4 Each raster summary sheet in this section provides full coverage in one direction parallel to the weld. Each weld is examined twice to provide coverage in both parallel directions as required.

DIAGRAM FOR ORIENTATION NUMBERS 1 AND 2
SHELL HEAD NO. 80D8580-2
FIGURE 1



Note: Shooting direction refers to the orientation of the 0° straight beam when looking outward from the center of the RPV.

RASTER SUMMARY SHEET

Raster Set: III-10

Raster No.:

Scanning Mode: Parallel

Head Attitude: Horizontal

Orient.: 1 Shooting: Right

Index Increment: 0.70"

Index With: Hoist (333.52" - 347.64")

Sweep With: Rotate Drive (0° - 361°)

Weld Title: Lower Shell to Bottom Head Circ. Weld

Section: III Pg.__ of __

Cal. Data Pkg.:

Procedure No.: 80A6477 Rev.

Video Tape No.:

Cal. Block No.: 196-102 (7")

Head No.: 80D8580-2

Weld No.: 1-SB-RV-104-141

Weld Centerline: 341.23"

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: Refer to Section 16.2 before scanning.

Operator____ Date____ Time____ Reviewer

Operator____ Date____ Time____ ____ Date____

nes NUCLEAR ENERGY SERVICES, INC.

RASTER SUMMARY SHEET

Raster Set: III-10

Raster No.:

Scanning Mode: Parallel

Head Attitude: Horizontal

Orient.: 2 Shooting: Left

Index Increment: 0.70"

Index With: Hoist (333.52" - 347.64")

Sweep With: Rotate Drive (0° -361°)

Weld Title: Lower Shell to Bottom Head Circ. Weld

Section: III Pg. ___ of ___

Cal. Data Pkg.:

Procedure No.: 80A6477 Rev.

Video Tape No.:

Cal. Block No.: 196-102 (7")

Head No.: 80D8580-2

Weld No.: 1-SE-RV-104-141

Weld Centerline: 341.23"

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: Refer to Section 16.2 before scanning.

Operator ___ Date ___ Time ___ Reviewer

Operator ___ Date ___ Time ___ ___ Date ___

nes NUCLEAR ENERGY SERVICES, INC.

17. RASTER SET III-11
THREE UNIT SHELL HEAD 80D8580-2

17.1 This raster set covers the perpendicular examinations for bottom head radial seams.

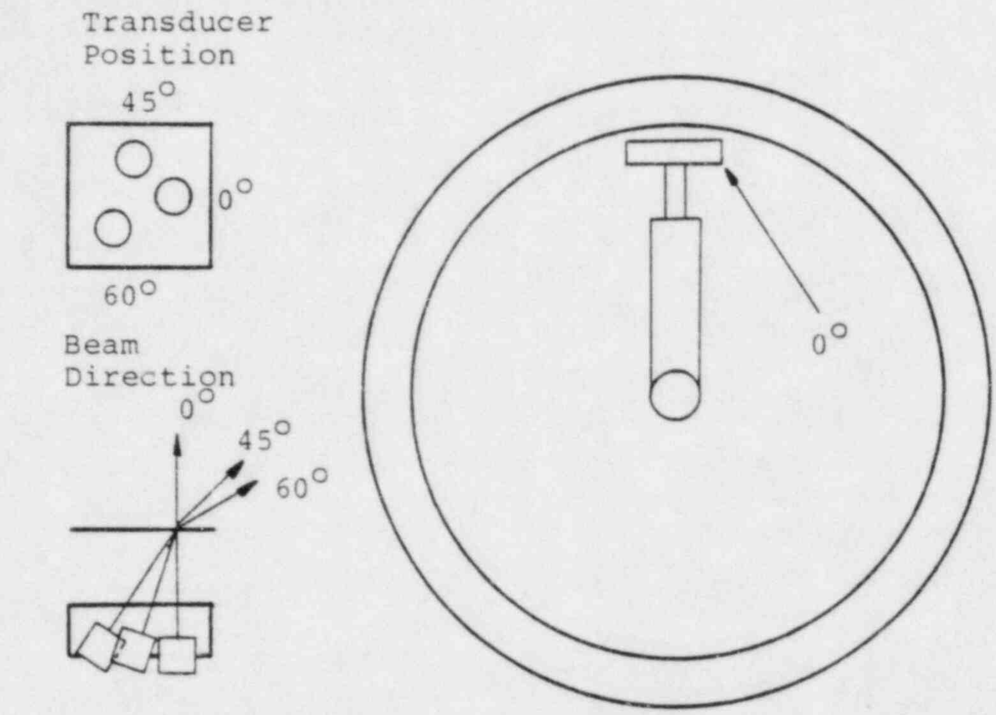
17.2 Physical (instrumentation tubes or lower core support pads) obstructions and limitations may exist in several areas throughout the bottom head radial seams. Carefully monitor all operations in these areas via the television system. Scanning is to be stopped whenever an obstruction is met, or when head contact is lost.

17.3 Figure 1 is an illustration of the orientations to be used with head 80D8580-2. Note that when reference is made to shooting right, left, clockwise, or counterclockwise on the raster summary sheets, this direction refers to the orientation of the 0° straight beam.

17.4 Each raster summary sheet in this section provides full coverage in one direction perpendicular to the weld. Each weld is examined twice to provide coverage in both directions as required.

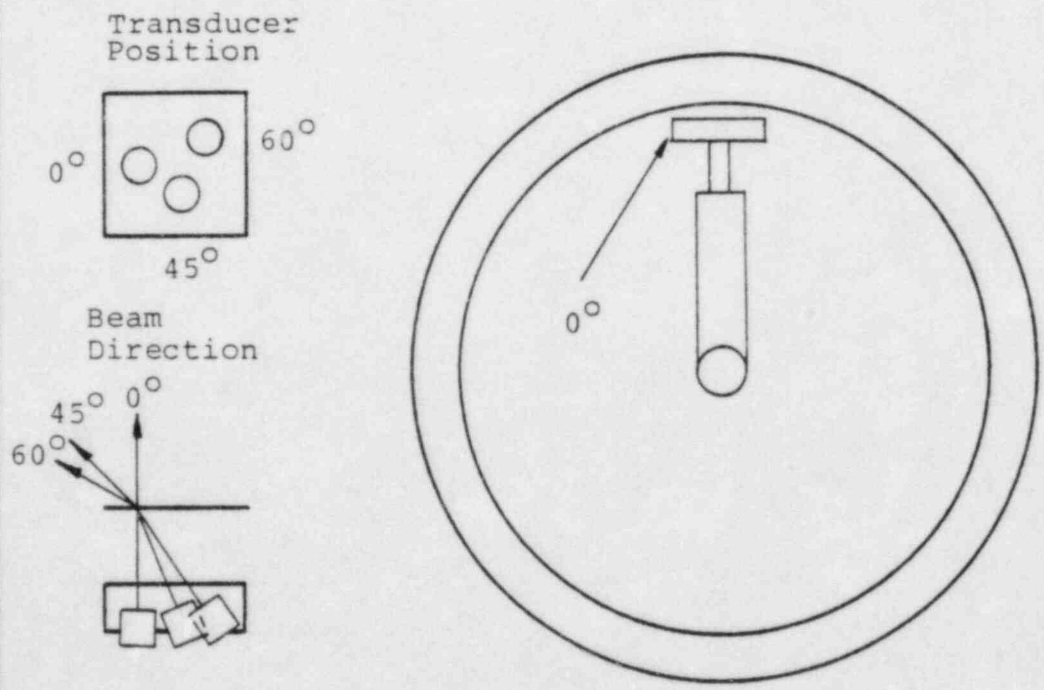
17.5 Lower the hoist to elevation 324.00" and maintain this position on the hoist throughout the exam. With the double pivot boom in a horizontal position, the boom swing read outs should be set at 180.00°.

DIAGRAM FOR ORIENTATION NUMBERS 1 AND 2
SHELL HEAD NO. 80D8580-2
FIGURE 1



Orientation No. 1
Shooting <u>Right</u> (cw)

Looking down from
top of RPV.



Orientation No. 2
Shooting <u>Left</u> (ccw)

Note: Shooting direction refers to the orientation of the 0° straight beam when looking outward from the center of the RPV.

RASTER SUMMARY SHEET

Raster Set: III-11

Raster No.:

Scanning Mode: Perpendicular

Head Attitude: Horizontal

Orient.: 2 Shooting: Left

Index Increment: 0.45°

Index With: Boom Pivot (9.72° - 358.52°)

Sweep With: Boom Swing (169.38° - 139.09°)

Weld Title: Bottom Head Radial Seam at 0°

Section: III Pg.___of___

Cal. Data Pkg.:

Procedure No.: 80A6477 Rev.

Video Tape No.:

Cal. Block No.: 196-102 (7")

Head No.: 80D8580-2

Weld No.: 1-SB-RV-101-154-0°

Weld Centerline: 0°

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: Refer to Section 17.2 and 17.5 before scanning.

Operator______ Date______ Time______ Reviewer

Operator______ Date______ Time______ ______ Date______

nes NUCLEAR ENERGY SERVICES, INC.

Form 028-110/1 1/83

RASTER SUMMARY SHEET

Raster Set: III-11

Section: III Pg. ___ of ___

Raster No.:

Cal. Data Pkg.:

Scanning Mode: Perpendicular

Procedure No.: 80A6477 Rev.

Head Attitude: Horizontal

Video Tape No.:

Orient.: 1 Shooting: Right

Cal. Block No.: 196-102 (7")

Index Increment: 0.45°

Head No.: 80D8580-2

Index With: Boom Pivot (350.28° - 1.48°)

Weld No.: 1-SB-RV-101-154-0°

Sweep With: Boom Swing (169.38° - 139.09°)

Weld Centerline: 0°

Weld Title: Bottom Head Radial Seam at 0°

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: Refer to Sections 17.2 and 17.5 before scanning.

Operator ___ Date ___ Time ___ Reviewer

Operator ___ Date ___ Time ___ ___ Date ___

NES NUCLEAR ENERGY SERVICES, INC.

RASTER SUMMARY SHEET

Raster Set: III-11
Raster No.:
Scanning Mode: Perpendicular
Head Attitude: Horizontal
Orient.: 2 Shooting: Left
Index Increment: 0.45°
Index With: Boom Pivot (99.72° - 33.52°)
Sweep With: Boom Swing (169.38° - 139.09°)
Weld Title: Bottom Head Radial Seam at 90°

Section: III Pg.___ of___
Cal. Data Pkg.:
Procedure No.: 80A6477 Rev.___
Video Tape No.:
Cal. Block No.: 196-102 (7")
Head No.: 80D8580-2
Weld No.: 1-SB-RV-101-154-90°
Weld Centerline: 90°

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: Refer to Section 17.2 and 17.5 before scanning.

Operator________ Date________ Time________ Reviewer

Operator________ Date________ Time________ ________ Date________

nes NUCLEAR ENERGY SERVICES, INC.

RASTER SUMMARY SHEET

Raster Set: III-11
Section: III Pg. ___ of ___
Raster No.: ___
Cal. Data Pkg.: ___
Scanning Mode: Perpendicular
Procedure No.: 80A6477 Rev. ___
Head Attitude: Horizontal
Video Tape No.: ___
Orient.: 1 Shooting: Right
Cal. Block No.: 196-102 (7")
Index Increment: 0.45°
Head No.: 80D8580-2
Index With: Boom Pivot (80.28° - 91.48°)
Weld No.: 1-SB-RV-101-154-90°
Sweep With: Boom Swing (169.38° - 139.09°)
Weld Centerline: 90°
Weld Title: Bottom Head Radial Seam at 90°

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: Refer to Sections 17.2 and 17.5 before scanning.

Operator ___ Date ___ Time ___ Reviewer

Operator ___ Date ___ Time ___ ___ Date ___

nes NUCLEAR ENERGY SERVICES, INC.

Form 028-110/1 1/83

RASTER SUMMARY SHEET

Raster Set: III-11
Raster No.:
Scanning Mode: Perpendicular
Head Attitude: Horizontal
Orient.: 2 Shooting: Left
Index Increment: 0.45°
Index With: Boom Pivot (189.72° - 178.52°)
Sweep With: Boom Swing (169.38° - 139.09°)
Weld Title: Bottom Head Radial Seam at 180°

Section: III Pg. ___ of ___
Cal. Data Pkg.:
Procedure No.: 80A6477 Rev.
Video Tape No.:
Cal. Block No.: 196-102 (7")
Head No.: 80D8580-2
Weld No.: 1-SB-RV-101-154-180°
Weld Centerline: 180°

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: Refer to Sections 17.2 and 17.5 before scanning.

Operator ____ Date ____ Time ____ Reviewer
Operator ____ Date ____ Time ____ ____ Date ____

NES NUCLEAR ENERGY SERVICES, INC.

RASTER SUMMARY SHEET

Raster Set: III-11

Section: III Pg.___ of___

Raster No.:

Cal. Data Pkg.:

Scanning Mode: Perpendicular

Procedure No.: 80A6477 Rev.___

Head Attitude: Horizontal

Video Tape No.:

Orient.: 1 Shooting: Right

Cal. Block No.: 196-102 (7")

Index Increment: 0.45°

Head No.: 80D8580-2

Index With: Boom Pivot (170.28° - 181.48°)

Weld No.: 1-SB-RV-101-154-180°

Sweep With: Boom Swing (169.38° - 139.09°)

Weld Centerline: 180°

Weld Title: Bottom Head Radial Seam at 180°

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: Refer to Section 17.2 and 17.5 before scanning.

Operator______ Date______ Time______ Reviewer

Operator______ Date______ Time______ ______ Date______

nes NUCLEAR ENERGY SERVICES, INC.

RASTER SUMMARY SHEET

Raster Set: III-11

Section: III Pg. ___ of ___

Raster No.: ___

Cal. Data Pkg.: ___

Scanning Mode: Perpendicular

Procedure No.: 80A6477 Rev. ___

Head Attitude: Horizontal

Video Tape No.: ___

Orient.: 2 Shooting: Left

Cal. Block No.: 196-102 (7")

Index Increment: 0.45°

Head No.: 80D8580-2

Index With: Boom Pivot (279.72° - 268.52°)

Weld No.: 1-SB-RV-101-154-270°

Sweep With: Boom Swing (169.38° - 139.09°)

Weld Centerline: 270°

Weld Title: Bottom Head Radial Seam at 270°

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: Refer to Sections 17.2 and 17.5 before scanning.

Operator ___ Date ___ Time ___ Reviewer

Operator ___ Date ___ Time ___ ___ Date ___

NES NUCLEAR ENERGY SERVICES, INC.

RASTER SUMMARY SHEET

Raster Set: III-11

Raster No.:

Scanning Mode: Perpendicular

Head Attitude: Horizontal

Orient.: 1 Shooting: Right

Index Increment: 0.45°

Index With: Boom Pivot (260.28° - 271.48°)

Sweep With: Boom Swing (169.38° - 139.09°)

Weld Title: Bottom Head Radial Seam at 270°

Section: III Pg. ___ of ___

Cal. Data Pkg.:

Procedure No.: 80A6477 Rev. ___

Video Tape No.:

Cal. Block No.: 196-102 (7")

Head No.: 80D8580-2

Weld No.: 1-SB-RV-101-154-270°

Weld Centerline: 270°

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: Refer to Sections 17.2 and 17.5 before scanning.

Operator ______ Date ______ Time ______ Reviewer

Operator ______ Date ______ Time ______ ______ Date ______

nes NUCLEAR ENERGY SERVICES, INC.

Form 028-110/1 1/83

18. RASTER SET III-12
THREE UNIT SHELL HEAD 80D8580-2

18.1 This raster set covers the parallel examinations for the bottom head radial seams.

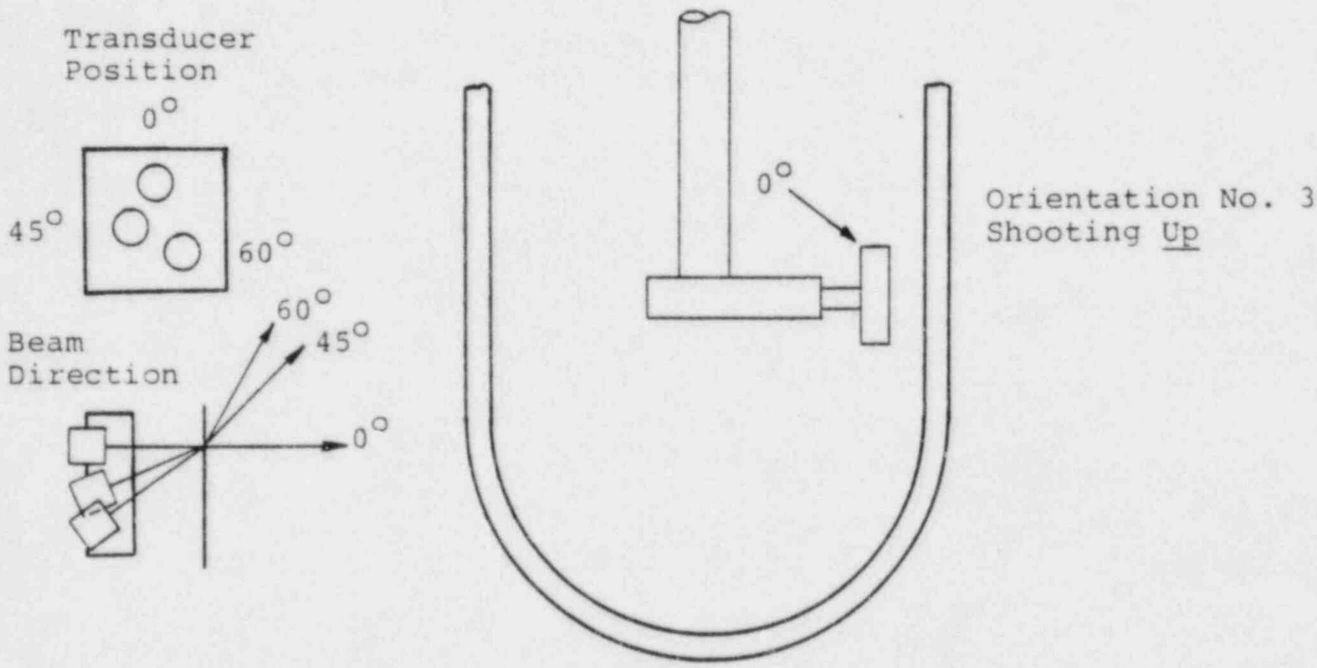
18.2 Physical (instrumentation tubes or lower core support pads) obstructions and limitations may exist in several areas throughout bottom head radial seams. Carefully monitor all operations in these areas via the television system. Scanning is to be stopped whenever an obstruction is met, or when head contact is lost.

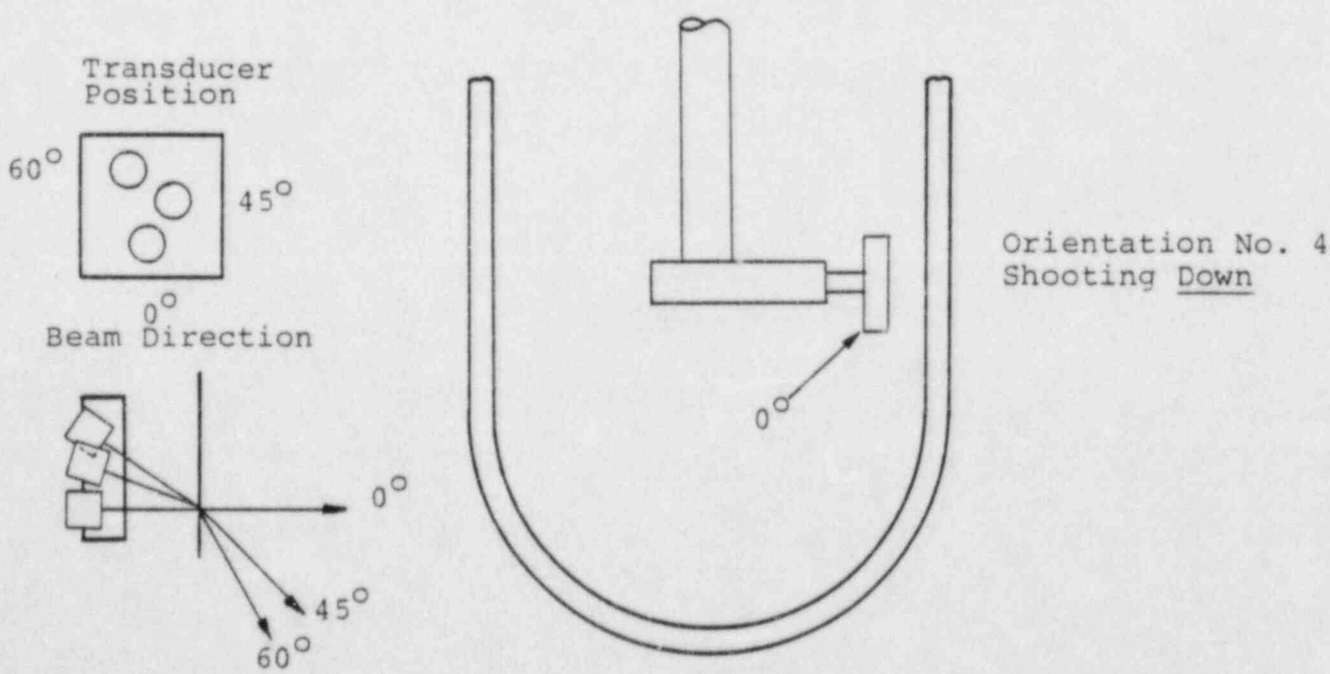
18.3 Figure 1 is an illustration of the orientations to be used with head 80D8580-2. Note that when reference is made to shooting up or down on the raster summary sheets, this direction refers to the orientation of the 0^{o} straight beam.

18.4 Each raster summary sheet in this section provides full coverage in on direction parallel to the weld. Each weld is examined twice to provide coverage in both directions as required.

18.5 Lower the hoist to elevation 324.00" and maintain this position on the hoist throughout the exam. With the double pivot boom in a horizontal position, the boom swing readouts should be set at 180.00^{o}.

DIAGRAM FOR ORIENTATION NUMBERS 3 AND 4
SHELL HEAD NO. 80D8580-2
FIGURE 1





Note: Shooting direction refers to the orientation of the 0° straight beam when looking outward from the center of the RPV.

RASTER SUMMARY SHEET

Raster Set: III-12

Raster No.:

Scanning Mode: Parallel

Head Attitude: Vertical

Orient.: 3 Shooting: UP

Index Increment: 0.45°

Index With: Boom Pivot (355.92° - 4.09°)

Sweep With: Boom Swing (168.73° - 139.74°)

Weld Title: Bottom Head Radial Seam at 0°

Section: III Pg.___of___

Cal. Data Pkg.:

Procedure No.: 80A6477 Rev.

Video Tape No.:

Cal. Block No.: 196-102 (7")

Head No.: 80D8580-2

Weld No.: 1-SB-RV-101-154-0°

Weld Centerline: 0°

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: Refer to Sections 18.2 and 18.5 before scanning.

Operator______ Date______ Time______ Reviewer

Operator______ Date______ Time______ ______ Date______

NES NUCLEAR ENERGY SERVICES, INC.

RASTER SUMMARY SHEET

Raster Set: III-12

Raster No.:

Scanning Mode: Parallel

Head Attitude: Vertical

Orient.: 4 Shooting: Down

Index Increment: 0.45°

Index With: Boom Pivot (355.92° - 4.09°)

Sweep With: Boom Swing (168.73° - 139.74°)

Weld Title: Bottom Head Radial Seam at 0°

Section: III Pg.___ of ___

Cal. Data Pkg.:

Procedure No.: 80A6477 Rev.

Video Tape No.:

Cal. Block No.: 196-102 (7")

Head No.: 80D8580-2

Weld No.: 1-SB-RV-101-154-0°

Weld Centerline: 0°

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: Refer to Sections 18.2 and 18.5 before scanning.

Operator ___ Date ___ Time ___ Reviewer

Operator ___ Date ___ Time ___ ___ Date ___

NES NUCLEAR ENERGY SERVICES, INC.

RASTER SUMMARY SHEET

Raster Set: III-12
Raster No.:
Scanning Mode: Parallel
Head Attitude: Vertical
Orient.: 3 Shooting: UP
Index Increment: 0.45°
Index With: Boom Pivot (85.92° - 94.09°)
Sweep With: Boom Swing (168.73° - 139.74°)
Weld Title: Bottom Head Radial Seam at 90°

Section: III Pg. ___ of ___
Cal. Data Pkg.:
Procedure No.: 80A6477 Rev.
Video Tape No.:
Cal. Block No.: 196-102 (7")
Head No.: 80D8580-2
Weld No.: 1-SB-RV-101-154-90°
Weld Centerline: 90°

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: Refer to Sections 18.2 and 18.5 before scanning.

Operator ______ Date ______ Time ______ Reviewer

Operator ______ Date ______ Time ______ ______ Date ______

nes NUCLEAR ENERGY SERVICES, INC.

Form 028-110/1 1/83

RASTER SUMMARY SHEET

Raster Set: III-12

Section: III Pg. ___ of ___

Raster No.: ___

Cal. Data Pkg.: ___

Scanning Mode: Parallel

Procedure No.: 80A6477 Rev. ___

Head Attitude: Vertical

Video Tape No.: ___

Orient.: 4 Shooting: Down

Cal. Block No.: 196-102 (7")

Index Increment: 0.45°

Head No.: 80D8580-2

Index With: Boom Pivot (85.92° - 94.09°)

Weld No.: 1-SB-RV-101-154-90°

Sweep With: Boom Swing (168.73° - 139.74°)

Weld Centerline: 90°

Weld Title: Bottom Head Radial Seam at 90°

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: Refer to Sections 18.2 and 18.5 before scanning.

Operator ___ Date ___ Time ___ Reviewer

Operator ___ Date ___ Time ___ ___ Date ___

NES NUCLEAR ENERGY SERVICES, INC.

RASTER SUMMARY SHEET

Raster Set: III-12

Section: III Pg. ___ of ___

Raster No.: ___

Cal. Data Pkg.: ___

Scanning Mode: Parallel

Procedure No.: 80A6477 Rev. ___

Head Attitude: Vertical

Video Tape No.: ___

Orient.: 3 Shooting: UP

Cal. Block No.: 196-102 (7")

Index Increment: 0.45°

Head No.: 80D8580-2

Index With: Boom Pivot (175.92° - 184.09°)

Weld No.: 1-SB-RV-101-154-180°

Sweep With: Boom Swing (168.73° - 139.74°)

Weld Centerline: 180°

Weld Title: Bottom Head Radial Seam at 180°

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: Refer to Sections 18.2 and 18.5 before scanning.

Operator ___ Date ___ Time ___ Reviewer

Operator ___ Date ___ Time ___ ___ Date ___

nes NUCLEAR ENERGY SERVICES, INC.

RASTER SUMMARY SHEET

Raster Set: III-12

Section: III Pg.___ of___

Raster No.:

Cal. Data Pkg.:

Scanning Mode: Parallel

Procedure No.: 80A6477 Rev.

Head Attitude: Vertical

Video Tape No.:

Orient.: 4 Shooting: Down

Cal. Block No.: 196-102 (7")

Index Increment: 0.45°

Head No.: 80D8580-2

Index With: Boom Pivot (175.92° - 184 09°)

Weld No.: 1-SB -RV-101-154-180°

Sweep With: Boom Swing (168.73° - 139.74°)

Weld Centerline: 180°

Weld Title: Bottom Head Radial Seam at 180°

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: Refer to Sections 18.2 and 18.5 before scanning.

Operator ______ Date ______ Time ______ Reviewer

Operator ______ Date ______ Time ______ ______ Date ______

nes NUCLEAR ENERGY SERVICES, INC.

RASTER SUMMARY SHEET

Raster Set: III-12

Raster No.:

Scanning Mode: Parallel

Head Attitude: Vertical

Orient.: 3 Shooting: UP

Index Increment: 0.45°

Index With: Boom Pivot (265.92° - 274.09°)

Sweep With: Boom Swing (168.73° - 139.74°)

Weld Title: Bottom Head Radial Seam at 270°

Section: III Pg.___ of___

Cal. Data Pkg.:

Procedure No.: 80A6477 Rev.

Video Tape No.:

Cal. Block No.: 196-102 (7")

Head No.: 80D8580-2

Weld No.: 1-SB-RV-101-154-270°

Weld Centerline: 270°

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: Refer to Sections 18.2 and 18.5 before scanning.

Operator______ Date______ Time______ Reviewer

Operator______ Date______ Time______ ______ Date______

nes NUCLEAR ENERGY SERVICES, INC.

Form 02E-110/1 1/83

RASTER SUMMARY SHEET

Raster Set: III-12

Section: III Pg. ___ of ___

Raster No.:

Cal. Data Pkg.:

Scanning Mode: Parallel

Procedure No.: 80A6477 Rev.

Head Attitude: Vertical

Video Tape No.:

Orient.: 4 Shooting: Down

Cal. Block No.: 196-102 (7")

Index Increment: 0.45°

Head No.: 80D8580-2

Index With: Boom Pivot (265.92° - 274.09°)

Weld No.: 1-SB-RV-101-154-270°

Sweep With: Boom Swing (168.73° - 139.74°)

Weld Centerline: 270°

Weld Title: Bottom Head Radial Seam at 270°

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: Refer to Sections 18.2 and 18.5 before scanning.

Operator ______ Date ______ Time ______ Reviewer

Operator ______ Date ______ Time ______ ______ Date ______

nes NUCLEAR ENERGY SERVICES, INC.

19. RASTER SET III-13
THREE UNIT SHELL HEAD 80D5915

19.1 This raster set covers the perpendicular examinations for the bottom head to dollar plate circumferential weld.

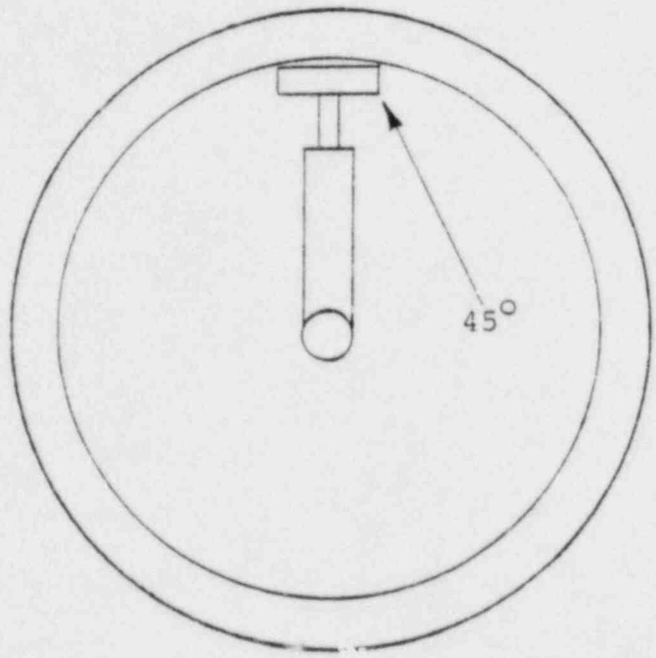
19.2 Physical (instrumentation tubes) obstructions and limitations may exist in several areas throughout weld 1-SB-RV-102-151. Carefully monitor all operations in these areas via the television system. Scanning is to be stopped whenever an obstruction is met, or when head contact is lost.

19.3 Figure 1 is an illustration of the orientations to be used with head 80D5915. Note that when reference is made to shooting up or down on the raster summary sheets, this direction refers to the orientation of the 45^{o} angle.

19.4 The raster summary sheet in this section provides full coverage in one direction perpendicular to the weld.

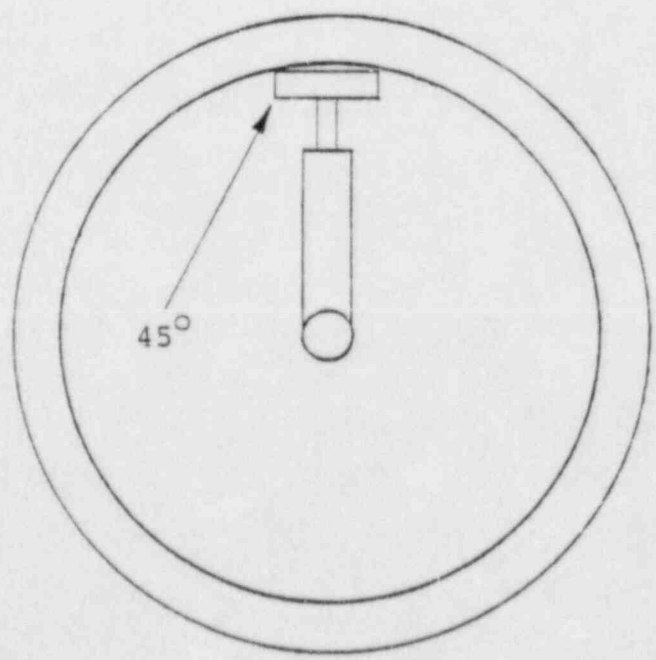
19.5 Lower the hoist to elevation 324.00" and maintain this position on the hoist throughout the exam. With the double pivot boom in a horizontal position, the boom swing readouts should be set at 180.00^{o}.

DIAGRAM FOR ORIENTATION NUMBERS 3 and 4
SHELL HEAD NO. 80D5915
FIGURE 1



Orientation No. 3
Shooting UP

Looking down from
top of RPV



Orientation No. 4
shooting DOWN

Note: Shooting direction refers to the orientation of the 45° angle beam when looking outward from the center of the RPV.

RASTER SUMMARY SHEET

Raster Set: III-13
Section: III Pg. ___ of ___
Raster No.: ___
Cal. Data Pkg.: ___
Scanning Mode: Perpendicular
Procedure No.: 80A6477 Rev. ___
Head Attitude: Horizontal
Video Tape No.: ___
Orient.: 4 Shooting: Down
Cal. Block No.: 196-102 (7")
Index Increment: 0.45°
Head No.: 80D5915
Index With: Rotate Drive (0° - 361°)
Weld No.: 1-SB-RV-102-151
Sweep With: Boom Swing (159.26° - 145.90°)
Weld Centerline: 139.74°
Weld Title: Bottom Head to Dollar Plate Circ. Weld

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: Refer to Sections 19.2 and 19.3 before scanning.

Operator ___ Date ___ Time ___ Reviewer

Operator ___ Date ___ Time ___ ___ Date ___

NES NUCLEAR ENERGY SERVICES, INC.

20. RASTER SET III-14
THREE UNIT SHELL HEAD 80D5915

20.1 This raster set covers the parallel examinations for the bottom head to dollar plate circumferential weld.

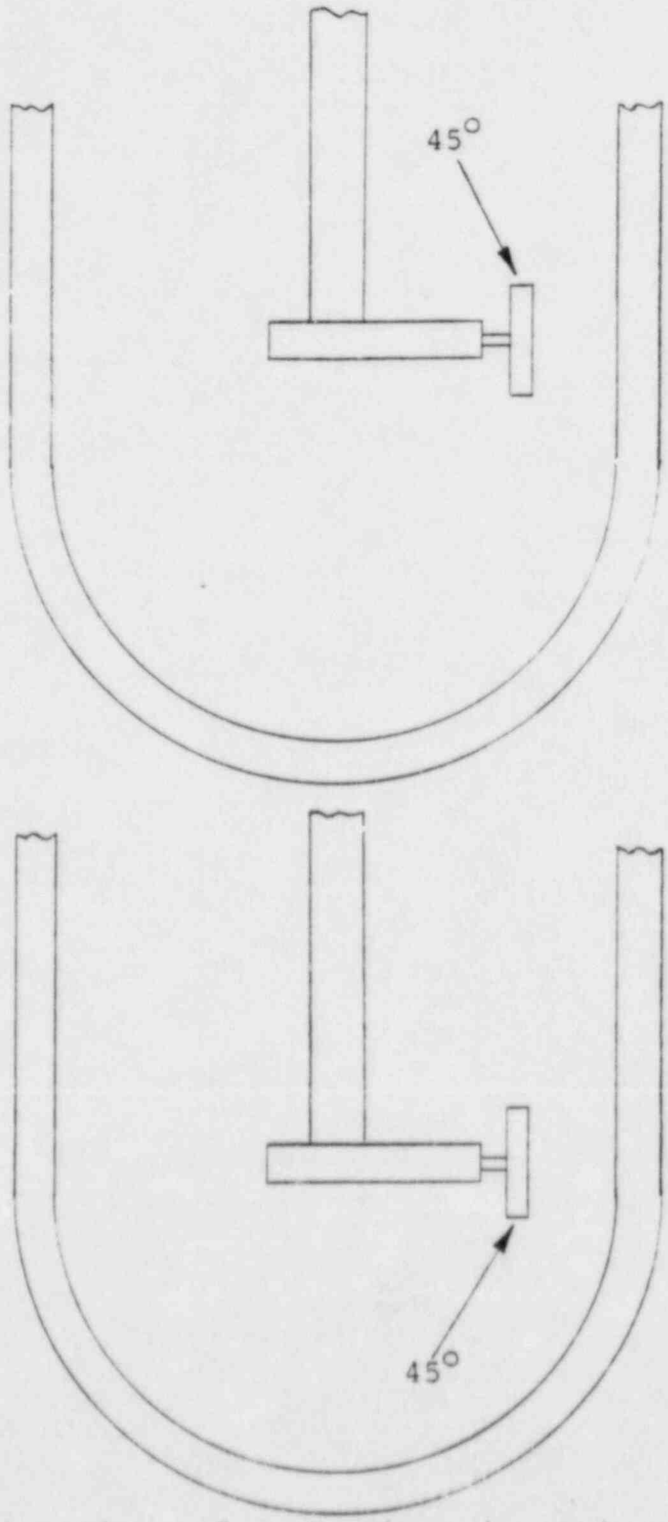
20.2 Physical (instrumentation tubes) obstructions and limitations may exist in several areas throughout weld 1-SB-RV-102-151. Carefully monitor all operations in these areas via the television system. Scanning is to be stopped whenever an obstruction is met, or when head contact is lost.

20.3 Figure 1 (next page) is an illustration of the orientations to be used with head 80D5915. Note that when reference is made to shooting right, left, clockwise or counterclockwise on the raster summary sheets, this direction refers to the orientation of the 45° angle beam.

20.4 Each raster summary sheet in this section provides full coverage in one direction parallel to the weld. Each weld is examined twice to provide coverage in both parallel directions as required.

20.5 Lower the hoist to elevation 324.00" and maintain this position on the hoist throughout the exam. With the double pivot boom in a horizontal position, the boom swing readouts should be set at 180.00°.

DIAGRAM FOR ORIENTATION NUMBERS 1 AND 2
SHELL HEAD NO. 80D5915
FIGURE 1



Orientation No. 1
Shooting Right.

Orientation No. 2
Shooting Left

Note: Shooting direction refers to the orientation of the 45° angle beam when looking outward from the centerline of the RPV.

RASTER SUMMARY SHEET

Raster Set: III-14

Raster No.:

Scanning Mode: Parallel

Head Attitude: Vertical

Orient.: 1 Shooting: Right

Index Increment: 0.45°

Index With: Boom Swing (150.25° - 142.08°)

Sweep With: Rotate Drive (0° - 361°)

Weld Title: Bottom Head To Dollar Plate Circ. Weld

Section: III Pg. ___ of ___

Cal. Data Pkg.:

Procedure No.: 80A6477 Rev. ___

Video Tape No.:

Cal. Block No.: 196-102 (7")

Head No.: 80D5915

Weld No.: 1-SB-RV-102-151

Weld Centerline: 139.74°

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: Refer to Sections 20.2 and 20.5 before scanning.

Operator ___ Date ___ Time ___ Reviewer

Operator ___ Date ___ Time ___ ___ Date ___

NES NUCLEAR ENERGY SERVICES, INC.

RASTER SUMMARY SHEET

Raster Set: III-14

Raster No.:

Scanning Mode: Parallel

Head Attitude: Vertical

Orient.: 2 Shooting: Left

Index Increment: 0.45°

Index With: Boom Swing (150.25° - 142.08°)

Sweep With: Rotate Drive (0° -361°)

Weld Title: Bottom Head to Dollar Plate Circ. Weld

Section: III Pg.___ of ___

Cal. Data Pkg.:

Procedure No.: 80A6477 Rev.

Video Tape No.:

Cal. Block No.: 196-102 (7")

Head No.: 80D5915

Weld No.: 1-SB-RV-102-151

Weld Centerline: 139.74°

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: Refer to Sections 20.2 and 20.5 before scanning.

Operator ___ Date ___ Time ___ Reviewer

Operator ___ Date ___ Time ___ ___ Date ___

nes NUCLEAR ENERGY SERVICES, INC.

21. RASTER SET III-15
60° LONGITUDINAL HEAD

21.1 This raster set covers the parallel and perpendicular examinations for the first 25% of the material from the inside (ID) surface.

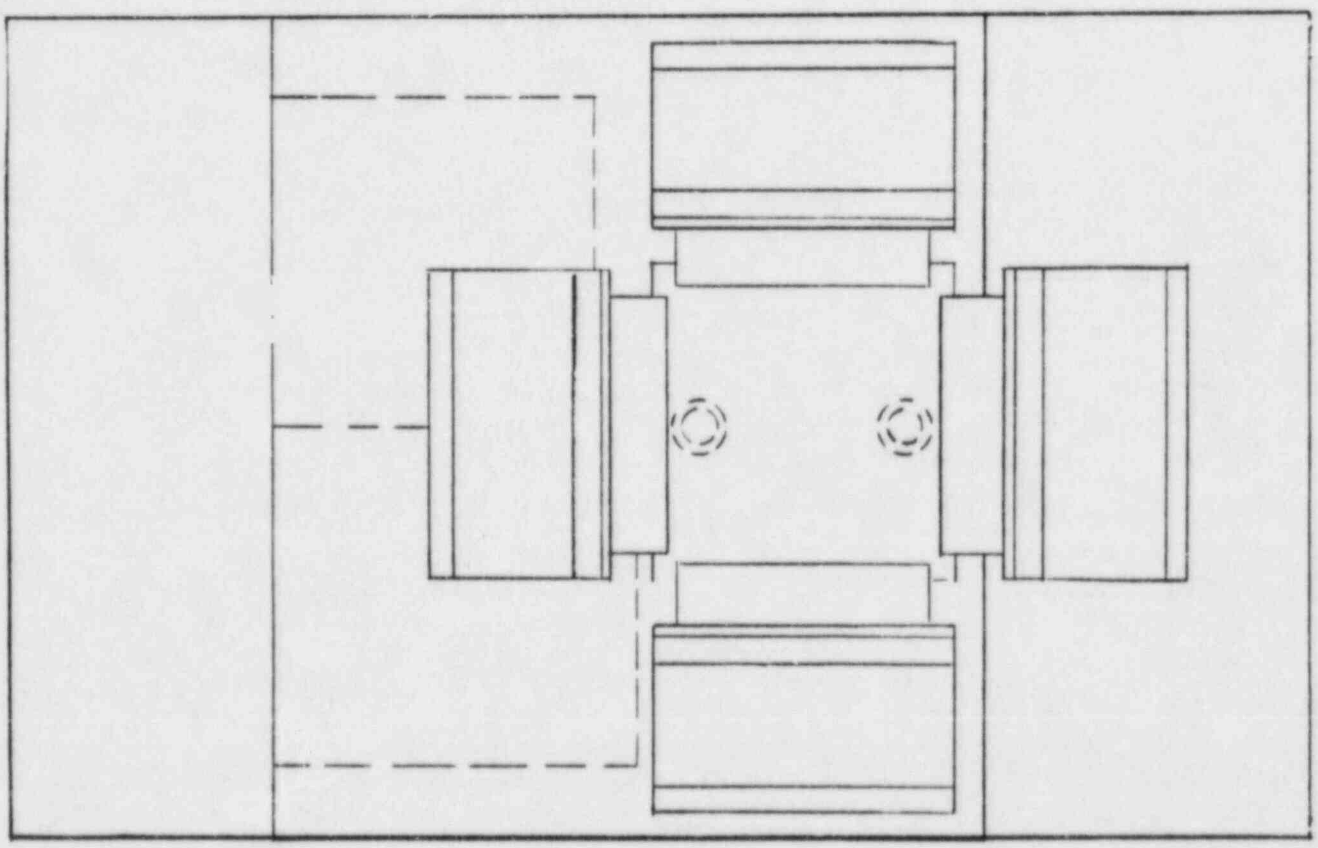
21.2 To ensure maximum examination coverage of the upper shell longitudinal welds, the following steps will be followed. Scanning above the nozzles, the equipment operator shall position the shell head as close as practical to the nozzle edge (inlet) or nozzle knuckle (outlet). Scan limits will vary depending on the flange taper and nozzle configurations. To examine below the nozzles, the equipment operator shall begin and end scan limits as close as practical to the nozzle edge (inlet) or nozzle knuckle (outlet). Carefully monitor all operations in the obstructed areas via the television system. Scanning is to be stopped whenever an obstruction is met, or when head contact is lost.

21.3 Figure 1 is an illustration of the orientations of the 60°L Dual transducers (Head 80D8580-3). Head 80D8580-3 beams are orientated in two directions parallel and two directions perpendicular to the RPV welds.

21.4 Each raster summary sheet in this section provides full coverage in two directions parallel and two directions perpendicular simultaneously.

DIAGRAM FOR ORIENTATION NO. 1
HEAD 80D8580-3

FIGURE 1



NOTE: Head 80D8580-3 beams are orientated in two directions parallel and two directions perpendicular to the RPV welds

RASTER SUMMARY SHEET

Raster Set: III-15

Raster No.:

Scanning Mode: Perpendicular/Parallel

Head Attitude: Horizontal

Orient.: 1 Shooting: See Remarks

Index Increment: 0.50"

Index With: Hoist* (Taper - 38.77")

Sweep With: Rotate Drive (0° - 361°)

Weld Title: Upper Shell to Flange Circ. Weld

Section: III Pg.___ of___

Cal. Data Pkg.:

Procedure No.: 80A6480 Rev.___

Video Tape No.:

Cal. Block No.: 196-104 (11")

Head No.: 80D8580-3

Weld No.: 1-SB-RV-101-121

Weld Centerline: 26.38"

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: Head No. 80D8580-3 beams are oriented in two directions parallel and two directions perpendicular to the RPV welds.

*Refer to Section 21.2 for examination coverage.

Operator______ Date______ Time______ Reviewer

Operator______ Date______ Time______ ______ Date______

NES NUCLEAR ENERGY SERVICES, INC.

RASTER SUMMARY SHEET

Raster Set: III-15

Section: III Pg. ___ of ___

Raster No.:

Cal. Data Pkg.:

Scanning Mode: Perpendicular/Parallel

Procedure No.: 80A6480 Rev.

Head Attitude: Horizontal

Video Tape No.:

Orient.: 1 Shooting: See Remarks

Cal. Block No.: 196-104 (11")

Index Increment: 0.50"

Head No.: 80D8580-3

Index With: Hoist (113.27" - 136.18")

Weld No.: 1-SB-RV-103-121

Sweep With: Rotate Drive (0° - 361°)

Weld Centerline: 125.66"

Weld Title: Upper Shell to Intermediate Shell Circ. Weld

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: Head No. 80D8580-3 beams are oriented in two directions parallel and two directions perpendicular to the RPV welds.
Refer to Section 21.2 for examination coverage.

Operator ___ Date ___ Time ___ Reviewer

Operator ___ Date ___ Time ___ ___ Date ___

nes NUCLEAR ENERGY SERVICES, INC.

RASTER SUMMARY SHEET

Raster Set: III-15

Raster No.:

Scanning Mode: Perpendicular/Parallel

Head Attitude: Vertical

Orient.: 1 Shooting: See Remarks

Index Increment: 0.33°

Index With: Rotate Drive (33.70° - 50.30°)

Sweep With: Hoist* (Taper to 126.56")

Weld Title: Upper Shell Longitudinal Weld at 42°

Section: III Pg.___of___

Cal. Data Pkg.:

Procedure No.: 80A6480 Rev.___

Video Tape No.:

Cal. Block No.: 196-104 (11")

Head No.: 80D8580-3

Weld No.: 1-SB-RV-101-122-42°

Weld Centerline: 42°

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: Head No. 80D8580-3 beams are oriented in two directions parallel and two directions perpendicular to the RPV welds.

*Refer to Section 21.2 for examination coverage.

Operator______ Date____ Time____ Reviewer

Operator______ Date____ Time____ ______ Date____

NES NUCLEAR ENERGY SERVICES, INC.

Form 028-110/1 1/83

RASTER SUMMARY SHEET

Raster Set: III-15

Raster No.:

Scanning Mode: Perpendicular/Parallel

Head Attitude: Vertical

Orient.: 1 Shooting: See Remarks

Index Increment: 0.33°

Index With: Rotate Drive (153.70° - 170.3°)

Sweep With: Hoist* (Taper - 126.66")

Weld Title: Upper Shell Longitudinal Weld at 162°

Section: III Pg.___ of___

Cal. Data Pkg.:

Procedure No.: 80A6480 Rev.___

Video Tape No.:

Cal. Block No.: 196-104 (11")

Head No.: 80D8580-3

Weld No.: 1-SB-RV-101-122-162°

Weld Centerline: 162°

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: Head No. 80D8580-3 beams are oriented in two directions parallel and two directions perpendicular to the RPV welds.

*Refer to Section 21.2 for examination coverage.

Operator________ Date_____ Time_____ Reviewer

Operator________ Date_____ Time_____ ________ Date_____

NUCLEAR ENERGY SERVICES, INC.

RASTER SUMMARY SHEET

Raster Set: III-15

Section: III Pg.___ of___

Raster No.:

Cal. Data Pkg.:

Scanning Mode: Perpendicular/Parallel

Procedure No.: 80A6480 Rev.___

Head Attitude: Vertical

Video Tape No.:

Orient.: 1 Shooting: See Remarks

Cal. Block No.: 196-104 (11")

Index Increment: 0.33°

Head No.: 80D8580-3

Index With: Rotate Drive (273.70° - 290.30°)

Weld No.: 1-SB-RV-101-122-282°

Sweep With: Hoist* (Taper - 126.66")

Weld Centerline: 282°

Weld Title: Upper Shell Longitudinal Weld at 282°

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: Head No. 80D8580-3 beams are oriented in two directions parallel and two directions perpendicular to the RPV welds.

*Refer to Section 21.2 for examination coverage.

Operator______ Date______ Time______ Reviewer

Operator______ Date______ Time______ ______ Date______

NES NUCLEAR ENERGY SERVICES, INC.

22. RASTER SET III-16
60° LONGITUDINAL HEAD

22.1 This raster set covers the parallel and perpendicular examinations for the inner near surface and the first 25% of the material from the inside (ID) surface.

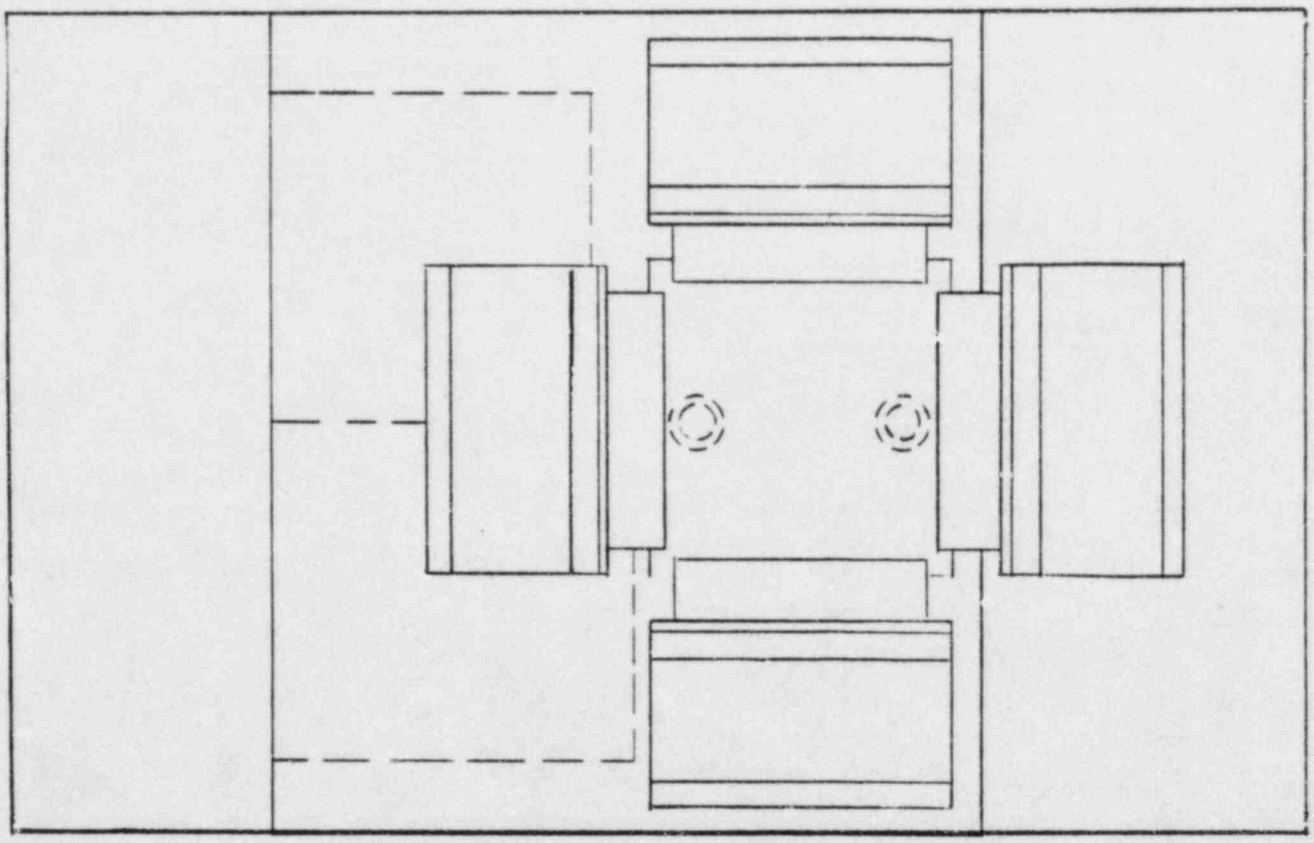
22.2 Physical obstructions and limitations may exist in several areas throughout these examinations. Carefully monitor all operations in these areas via the television system. Scanning is to be stopped whenever an obstruction is met, or when head contact is lost.

22.3 Figure 1 is an illustration of the orientations of the 60°L Dual transducers (Head 80D8580-3). Head 80D8580-3 beams are orientated in two directions parallel and two directions perpendicular to the RPV welds.

22.4 Each raster summary sheet in this section provides full coverage in two directions parallel and two directions perpendicular simultaneously.

DIAGRAM FOR ORIENTATION NO. 1
HEAD 80D8580-3

FIGURE 1



NOTE: Head 80D8580-3 beams are orientated in two directions parallel and two directions perpendicular to the RPV welds

RASTER SUMMARY SHEET

Raster Set: III-16

Raster No.:

Scanning Mode: Perpendicular/Parallel

Head Attitude: Horizontal

Orient.: 1 Shooting: See Remarks

Index Increment: 0.50"

Index With: Hoist (225.23" - 246.03")

Sweep With: Rotate Drive (0° - 361°)

Section: III Pg.___of___

Cal. Data Pkg.:

Procedure No.: 80A6480 Rev.

Video Tape No.:

Cal. Block No.: 196-103 (9")

Head No.: 80D8580-3

Weld No.: 1-SB-RV-101-171

Weld Centerline: 235.63"

Weld Title: Intermediate Shell to Lower Shell Circ. Weld

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: Head No. 80D8580-3 beams are oriented in two directions parallel and two directions perpendicular to the RPV welds.

Refer to Section 22.2 before scanning.

Operator______ Date______ Time______ Reviewer

Operator______ Date______ Time______ ______ Date______

NES NUCLEAR ENERGY SERVICES, INC.

RASTER SUMMARY SHEET

Raster Set: III-16

Raster No.:

Scanning Mode: Perpendicular/Parallel

Head Attitude: Vertical

Orient.: 1 Shooting: See Remarks

Index Increment: 0.33°

Index With: Rotate Drive (353.12° - 6.88°)

Sweep With: Hoist (124.66" - 236.63")

Weld Title: Intermediate Shell Longitudinal Weld at 0°

Section: III Pg. ___ of ___

Cal. Data Pkg.:

Procedure No.: 80A6480 Rev. ___

Video Tape No.:

Cal. Block No.: 196-103 (9")

Head No.: 80D8580-3

Weld No.: 1-SB-RV-101-124-0°

Weld Centerline: 0°

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: Head No. 80D8580-3 beams are oriented in two directions parallel and two directions perpendicular to the RPV welds.

Refer to Section 22.2 before scanning.

Operator ________ Date ______ Time ______ Reviewer

Operator ________ Date ______ Time ______ ________ Date ______

nes NUCLEAR ENERGY SERVICES, INC.

RASTER SUMMARY SHEET

Raster Set: III-16
Raster No.:
Scanning Mode: Perpendicular/Parallel
Head Attitude: Vertical
Orient.: 1 Shooting: See Remarks
Index Increment: 0.33°
Index With: Rotate Drive (113.12° - 126.88°)
Sweep With: Hoist (124.66" - 236.63")
Weld Title: Intermediate Shell Longitudinal Weld at 120°

Section: III Pg.___ of___
Cal. Data Pkg.:
Procedure No.: 80A6480 Rev.___
Video Tape No.:
Cal. Block No.: 196-103 (9")
Head No.: 80D8580-3
Weld No.: 1-SB-RV-101-124-120°
Weld Centerline: 120°

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: Head No. 80D8580-3 beams are oriented in two directions parallel and two directions perpendicular to the RPV welds.
Refer to Section 22.2 before scanning.

Operator________ Date________ Time________ Reviewer
Operator________ Date________ Time________ ________ Date________

nes NUCLEAR ENERGY SERVICES, INC.

RASTER SUMMARY SHEET

Raster Set: III-16
Raster No.:
Scanning Mode: Perpendicular/Parallel
Head Attitude: Vertical
Orient.: 1 Shooting: See Remarks
Index Increment: 0.33°
Index With: Rotate Drive (233.2° - 246.88°)
Sweep With: Hoist (124.66" - 236.63")

Section: III Pg.___of___
Cal. Data Pkg.:
Procedure No.: 80A6480 Rev.
Video Tape No.:
Cal. Block No.: 196-103 (9")
Head No.: 80D8580-3
Weld No.: 1-SB-RV-101-124-240°
Weld Centerline: 240°

Weld Title: Intermediate Shell Longitudinal Weld at 240°

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: Head No. 80D8580-3 beams are oriented in two directions parallel and two directions perpendicular to the RPV welds.
Refer to Section 22.2 before scanning.

Operator___ Date___ Time___ Reviewer
Operator___ Date___ Time___ ___ Date___

NES NUCLEAR ENERGY SERVICES, INC.

RASTER SUMMARY SHEET

Raster Set: III-16

Raster No.:

Scanning Mode: Perpendicular/Parallel

Head Attitude: Vertical

Orient.: 1 Shooting: See Remarks

Index Increment: 0.33°

Index With: Rotate Drive (83.12° - 96.88°)

Sweep With: Hoist (234.63" - 342.23")

Section: III Pg.___ of___

Cal. Data Pkg.:

Procedure No.: 80A6480 Rev.

Video Tape No.:

Cal. Block No.: 196-103 (9")

Head No.: 80D8580-3

Weld No.: 1-SB-RV-101-142-90°

Weld Centerline: 90°

Weld Title: Lower Shell Longitudinal Weld at 90°

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: Head No. 80D8580-3 beams are oriented in two directions parallel and two directions perpendicular to the RPV welds.

Refer to Section 22.2 before scanning.

Operator______ Date______ Time______ Reviewer

Operator______ Date______ Time______ ______ Date______

NES NUCLEAR ENERGY SERVICES, INC.

RASTER SUMMARY SHEET

Raster Set: III-16
Raster No.:
Scanning Mode: Perpendicular/Parallel
Head Attitude: Vertical
Orient.: 1 Shooting: See Remarks
Index Increment: 0.33°
Index With: Rotate Drive (203.12° - 216.88°)
Sweep With: Hoist (234.63" - 342.23")
Weld Title: Lower Shell Longitudinal Weld at 210°

Section: III Pg.___ of___
Cal. Data Pkg.:
Procedure No.: 80A6480 Rev.___
Video Tape No.:
Cal. Block No.: 196-103 (9")
Head No.: 80D8580-3
Weld No.: 1-SB-RV-101-142-210°
Weld Centerline: 210°

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: Head No. 80D8580-3 beams are oriented in two directions parallel and two directions perpendicular to the RPV welds.
Refer to Section 22.2 before scanning.

Operator______ Date______ Time______ Reviewer
Operator______ Date______ Time______ ______ Date______

NES NUCLEAR ENERGY SERVICES, INC.

RASTER SUMMARY SHEET

Raster Set: III-16

Section: III Pg. ___ of ___

Raster No.: ___

Cal. Data Pkg.: ___

Scanning Mode: Perpendicular/Parallel

Procedure No.: 80A6480 Rev. ___

Head Attitude: Vertical

Video Tape No.: ___

Orient.: 1 Shooting: See Remarks

Cal. Block No.: 196-103 (9")

Index Increment: 0.33°

Head No.: 80D8580-3

Index With: Rotate Drive (323.12° - 336.88°)

Weld No.: 1-SB-RV-101-142-330°

Sweep With: Hoist (234.63" - 342.23")

Weld Centerline: 330°

Weld Title: Lower Shell Longitudinal Weld at 330°

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: Head No. 80D8580-3 beams are oriented in two directions parallel and two directions perpendicular to the RPV welds.
Refer to Section 22.2 before scanning.

Operator ___ Date ___ Time ___ Reviewer

Operator ___ Date ___ Time ___ ___ Date ___

NES NUCLEAR ENERGY SERVICES, INC.

23. RASTER SET III-17
60° LONGITUDINAL HEAD

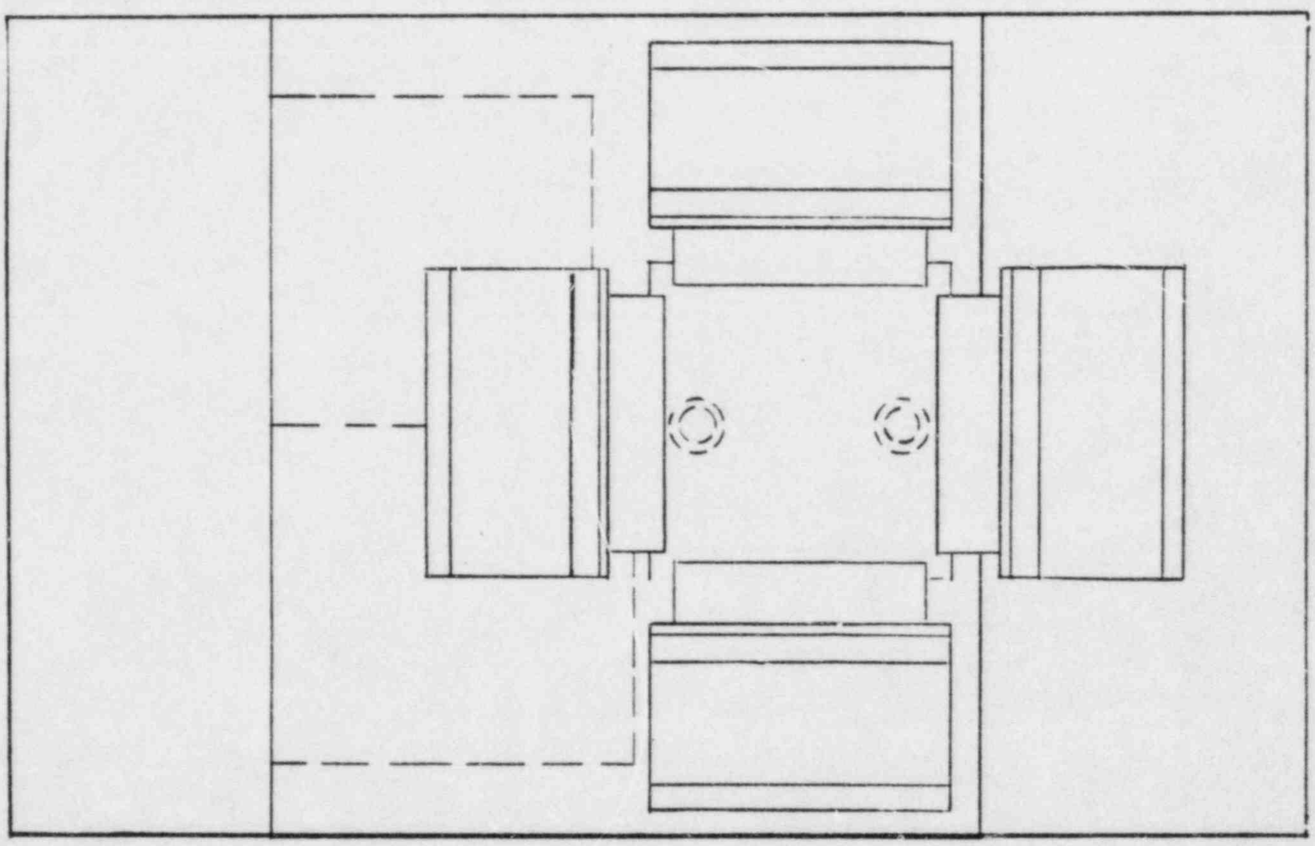
23.1 This raster set covers the parallel and perpendicular examinations for the first 25% of the material from the inside (ID) surface.

23.2 Physical obstructions and limitations may exist in several areas throughout these examinations. Carefully monitor all operations in these areas via the television system. Scanning is to be stopped whenever an obstruction is met, or when head contact is lost.

23.3 Figure 1 is an illustration of the orientations of the 60°L Dual transducers (Head 80D8580-3). Head 80D8580-3 beams are oriented in two directions parallel and two directions perpendicular to the RPV welds.

23.4 Each raster summary sheet in this section provides full coverage in two directions parallel and two directions perpendicular simultaneously.

DIAGRAM FOR ORIENTATION NO. 1
HEAD 80D8580-3
FIGURE 1



NOTE: Head 80D8580-3 beams are orientated in two directions parallel and two directions perpendicular to the RPV welds

RASTER SUMMARY SHEET

Raster Set: III-17

Raster No.:

Scanning Mode: Perpendicular/Parallel

Head Attitude: Horizontal

Orient.: 1 Shooting: See Remarks

Index Increment: 0.50"

Index With: Hoist (330.83" - 349.20")

Sweep With: Rotate Drive (0° - 361°)

Section: III Pg.___of___

Cal. Data Pkg.:

Procedure No.: 80A6480 Rev.

Video Tape No.:

Cal. Block No.: 196-102 (7")

Head No.: 80D8580-3

Weld No.: 1-SB-RV-104-141

Weld Centerline: 341.23"

Weld Title: Lower Shell to Bottom Head Circ. Weld

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: Head No. 80D8580-3 beams are oriented in two directions parallel and two directions perpendicular to the RPV welds.
Refer to Section 23.2 before scanning.

Operator______ Date______ Time______ Reviewer

Operator______ Date______ Time______ ______ Date______

nes NUCLEAR ENERGY SERVICES, INC.

RASTER SUMMARY SHEET

Raster Set: III-17
Section: III Pg. ___ of ___
Raster No.: ___
Cal. Data Pkg.: ___
Scanning Mode: Perpendicular/Parallel
Procedure No.: 80A6480 Rev. ___
Head Attitude: Vertical
Video Tape No.: ___
Orient.: 1 Shooting: See Remarks
Cal. Block No.: 196-102 (7")
Index Increment: 0.33°
Head No.: 80D8580-3
Index With: Boom Pivot (354.90° - 05.10°)
Weld No.: 1-SB-RV-101-154-0°
Sweep With: Boom Swing (169.38° - 139.09°)
Weld Centerline: 0°
Weld Title: Bottom Head Radial Seam at 0°

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: Head No. 80D8580-3 beams are oriented in two directions parallel and two directions perpendicular to the RPV welds.
Refer to Section 23.2 before scanning.

Operator ___ Date ___ Time ___ Reviewer
Operator ___ Date ___ Time ___ ___ Date ___

NES NUCLEAR ENERGY SERVICES, INC.

RASTER SUMMARY SHEET

Raster Set: III-17

Raster No.:

Scanning Mode: Perpendicular/Parallel

Head Attitude: Vertical

Orient.: 1 Shooting: See Remarks

Index Increment: 0.33°

Index With: Boom Pivot (84.90° - 95.10°)

Sweep With: Boom Swing (169.38° - 139.09°)

Weld Title: Bottom Head Radial Seam at 90°

Section: III Pg. ___ of ___

Cal. Data Pkg.:

Procedure No.: 80A6480 Rev. ___

Video Tape No.:

Cal. Block No.: 196-102 (7")

Head No.: 80D8580-3

Weld No.: 1-SB-RV-101-154-90°

Weld Centerline: 90°

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: Head No. 80D8580-3 beams are oriented in two directions parallel and two directions perpendicular to the RPV welds.
Refer to Section 23.2 before scanning.

Operator ___ Date ___ Time ___ Reviewer

Operator ___ Date ___ Time ___ ___ Date ___

NES NUCLEAR ENERGY SERVICES, INC.

RASTER SUMMARY SHEET

Raster Set: III-17
Section: III Pg. ___ of ___
Raster No.: ___
Cal. Data Pkg.: ___
Scanning Mode: Perpendicular/Parallel
Procedure No.: 80A6480 Rev. ___
Head Attitude: Vertical
Video Tape No.: ___
Orient.: 1 Shooting: See Remarks
Cal. Block No.: 196-102 (7")
Index Increment: 0.33°
Head No.: 80D8580-3
Index With: Boom Pivot (174.90° - 185.10°)
Weld No.: 1-SB-RV-101-154-180°
Sweep With: Boom Swing (169.38° - 139.09°)
Weld Centerline: 180°
Weld Title: Bottom Head Radial Seam at 180°

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: Head No. 80D8580-3 beams are oriented in two directions parallel and two directions perpendicular to the RPV welds.
Refer to Section 23.2 before scanning.

Operator ___ Date ___ Time ___ Reviewer
Operator ___ Date ___ Time ___ ___ Date ___

NES NUCLEAR ENERGY SERVICES, INC.

Form 028-110/1 1/83

RASTER SUMMARY SHEET

Raster Set: III-17
Raster No.:
Scanning Mode: Perpendicular/Parallel
Head Attitude: Vertical
Orient.: 1 Shooting: See Remarks
Index Increment: 0.33°
Index With: Boom Pivot (264.90° - 275.10°)
Sweep With: Boom Swing (169.38° - 139.09°)
Weld Title: Bottom Head Radial Seam at 270°

Section: III Pg.___of___
Cal. Data Pkg.:
Procedure No.: 80A6480 Rev.
Video Tape No.:
Cal. Block No.: 196-102 (7")
Head No.: 80D8580-3
Weld No.: 1-SB-RV-101-154-270°
Weld Centerline: 270°

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: Head No. 80D8580-3 beams are oriented in two directions parallel and two directions perpendicular to the RPV welds.
Refer to Section 23.2 before scanning.

Operator______ Date______ Time______ Reviewer
Operator______ Date______ Time______ ______ Date______

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Form 028-110/1 1/83

24. RASTER SET III-18
EXAMINATION HEAD 80D5770

24.1 This raster set covers the perpendicular examinations of the flange-to-upper shell circumferential weld. The 0^{o}, 8^{o}, and 19^{o} examination head is used to perform the examinations.

24.2 To ensure maximum examination coverage of the flange-to-upper shell circumferential weld, the equipment operator shall position the head against the vertical edge of the flange mating surface. This weld shall be scanned with a minimum of two scan passes to ensure maximum coverage.

24.3 Figures 1 and 2 illustrate the orientations to be used with head #80D5770. Note that when reference is made to shooting in (towards RPV ℄) and out (away from RPV ℄) on the raster summary sheets, the direction refers to the orientation of the 19^{o} angle beam.

HEAD POSITION #1 ANGLE BEAMS DIRECTED TOWARDS RPV ℄

Head should be positioned against the vertical edge of the flange mating surface.

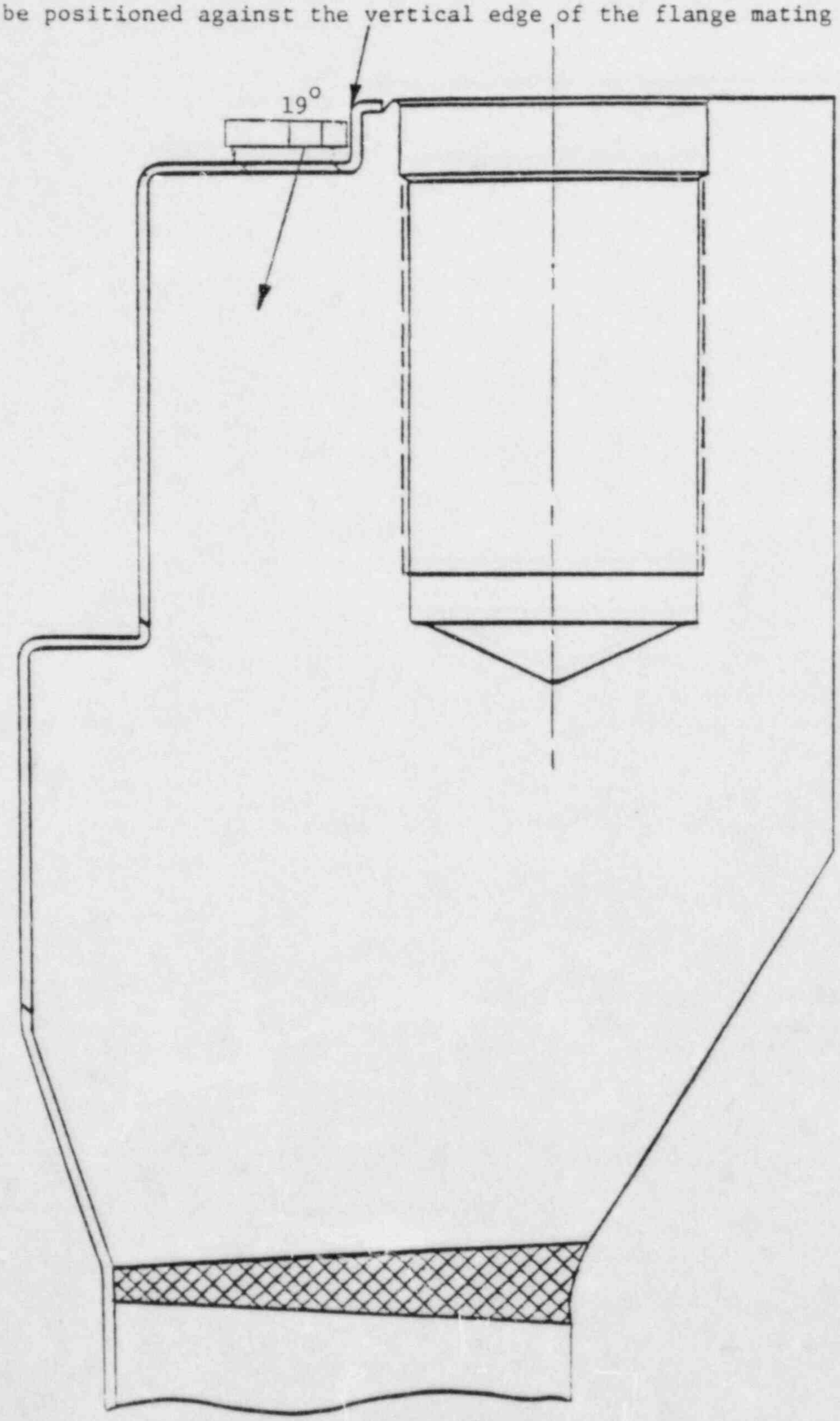


FIGURE 1

HEAD POSITION #2 ANGLE BEAMS DIRECTED AWAY FROM RPV ℄

Head should be positioned 1.5" from the vertical edge of the flange mating surface.

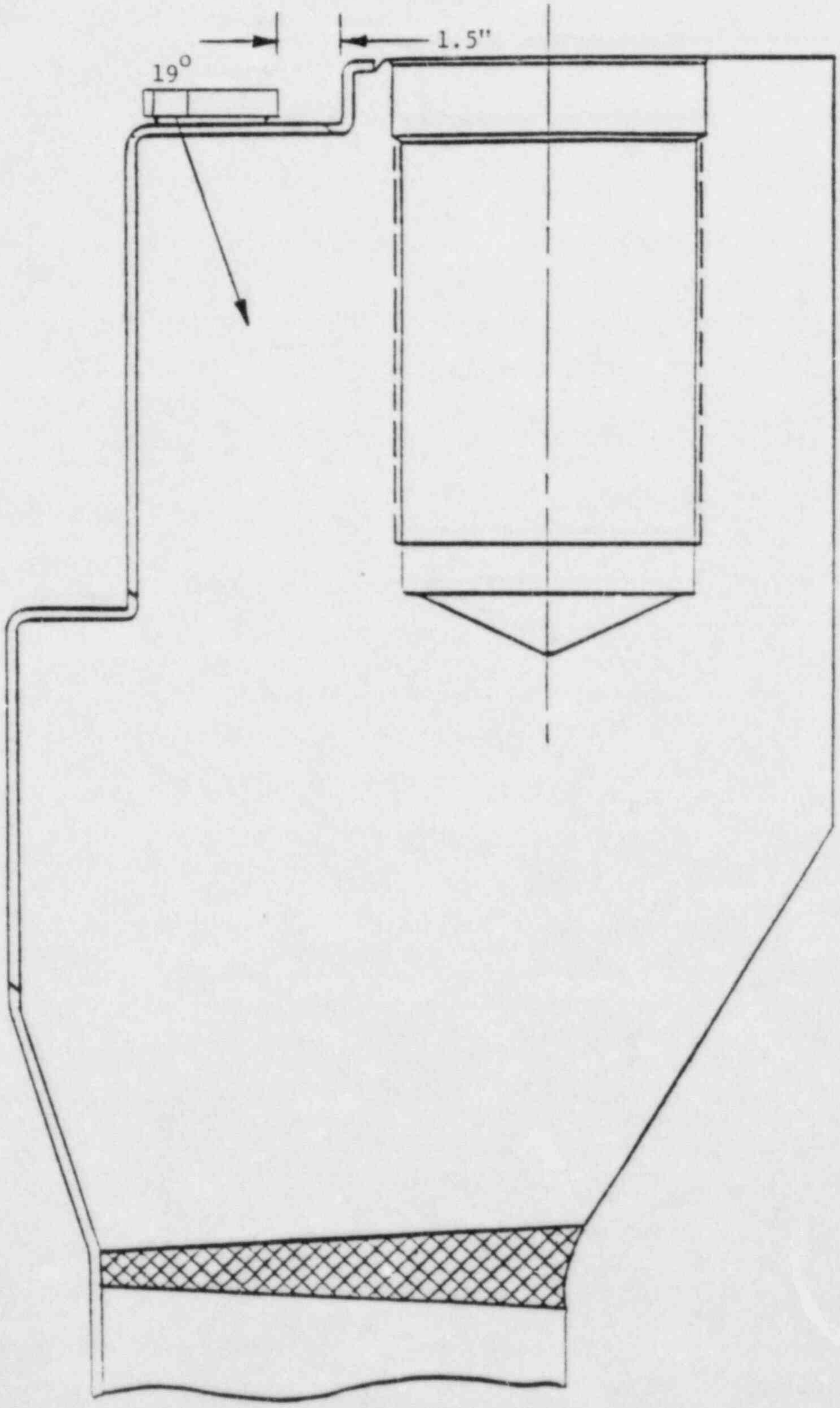


FIGURE 2

RASTER SUMMARY SHEET

Raster Set: III-18
Section: III Pg. ___ of ___
Raster No.: ___
Cal. Data Pkg.: ___
Scanning Mode: Perpendicular
Procedure No.: 80A6478 Rev. ___
Head Attitude: In
Video Tape No.: ___
Orient.: 1 Shooting: In
Cal. Block No.: 196-201 (Flange)
Index Increment: N/A
Head No.: 80D5770
Index With: N/A
Weld No.: 1-SB-RV-101-121
Sweep With: Boom Rotate (0° - 361°)
Weld Centerline: 26.38"
Weld Title: Flange to Upper Shell Circ. Weld

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: ___

Operator ___ Date ___ Time ___ Reviewer
Operator ___ Date ___ Time ___ ___ Date ___

nes NUCLEAR ENERGY SERVICES, INC.

RASTER SUMMARY SHEET

Raster Set: III-18

Raster No.:

Scanning Mode: Perpendicular

Head Attitude: Out

Orient.: 2 Shooting: Out

Index Increment: N/A

Index With: N/A

Sweep With: Boom Rotate (0° - 361°)

Weld Title: Flange to Upper Shell Circ. Weld

Section: III Pg.___ of___

Cal. Data Pkg.:

Procedure No.: 80A6478 Rev.___

Video Tape No.:

Cal. Block No.: 196-201 (Flange)

Head No.: 80D5770

Weld No.: 1-SB-RV-101-121

Weld Centerline: 26.38"

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks:

Operator________ Date________ Time________ Reviewer

Operator________ Date________ Time________ ________ Date________

nes NUCLEAR ENERGY SERVICES, INC.

SECTION IV

EXAMINATION OF NOZZLE WELDS

TABLE OF CONTENTS

SECTION IV

EXAMINATION OF NOZZLE WELDS

1. SCOPE

This section covers the examination of the nozzle to vessel welds, nozzle to safe end welds safe end to primary piping welds, and the nozzle inner radii. The examinations are conducted from both the nozzle bore and the shell side of the reactor vessel.

2. EXAMINATION PREREQUISITES

1. The maximum scanning speed permitted by Section XI of the ASME Boiler and Pressure Vessel Code is six (6) inches per second. Depending on the type of examination equipment used, the actual maximum permissible scanning speed may be less, as required for proper ultrasonic evaluation.

2. Extreme caution must be exercised during the setup and operation of all examinations in which the rotator is used in order to prevent binding of and possible damage to the transducer cables.

3. Nozzle weld examinations are performed from the main inspection boom. Since the inspection boom is at a different elevation than the pivot/swing boom, the hoist position readouts must be re-initialized so that they display "00.00" when the centerline of the main inspection boom is aligned with the top of the reactor vessel flange.

4. Due to the number of options available regarding the sequence of examinations covered in this Section, it may well be advantageous to perform the examination in some order other than that which is presented herein. Care must be taken to ensure that all areas to be examined receive adequate coverage. The NES shift engineer shall be responsible for ensuring that all measurements, checks and examinations required by this section have been performed completely and accurately.

3. FIXTURE INSTALLATION AND ALIGNMENT

1. Install the nozzle bore weld examination fixture on the end of the inspection boom.

2. Using a level, ensure that the main axis of the examination fixture is vertical with the nozzle bore head at the upper end. Set the rotator controller readout equal to zero at this point.

   Controller Readout ____ Operator Initial: ____
   Date: ______

3. Drape the transducer cables in such a manner that a full 360 degrees rotation can be readily achieved in the clockwise direction.

4. Exercising <u>extreme caution</u> to ensure that the transducer cables do not bind or break, rotate the fixture in the clockwise direction. Using the level, place the fixture in both horizontal orientations and the remaining vertical orientation. Record the readout values for these orientations in the applicable boxes in Table IV-1.

5. Exercising <u>extreme caution</u> to ensure that the transducer cables do not bind or break, rotate the fixture in the counterclockwise directions from zero to the first horizontal orientation <u>or</u> as far as the cables will allow the fixture to rotate. If the horizontal orientation is achievable, use the level to verify that the fixture is, in fact, horizontal and record the readout value in Table IV-1. Fill in the maximum achievable value below.

   Controller Readout ____ Operator Initial ____
   Date ______

TABLE IV-1
ROTATOR CONTROLLER READOUT CHECKS

Orientation	Degrees from Zero	Direction from Zero	Actual Readout Counts
Vertical	0	N/A	________
Horizontal	90	CW	________
Vertical	180	CW	________
Horizontal	270	CW	________
Horizontal	90	CCW	________

Operator Signature: ____________

Date: ____________

6. Using the hoist and boom rotate mechanism, line up the main boom on the centerline of the first nozzle to be examined.

   NOTE: This step is to be carried out with the boom retracted 10-15 inches from the wall.

7. In cooperation with the ultrasonics operator, carefully extend the fixture into the nozzle until an echo is obtained from the search unit oriented to transmit sound approximately perpendicular to the nozzle bore. While maintaining a very close watch on the transducer cables, rotate the nozzle scanning mechanism, watching the return echo from that search unit. Adjust the hoist and/or boom rotate mechanisms as necessary, until the timing of the echo is unchanged through a full rotation. This centerline determination is the one used for the examination. Record the readings (in turn) for the centerline locations of each nozzle bore in Table IV-2.

8. Record the time and date of the initial determination in the "Before Examinations" block on the Positional Check Log Sheet in Section V.

Operator Signature: ______________

Date: ______________

TABLE IV-2
NOZZLE BORE CENTERLINE COORDINATES

Nozzle Location	Hoist Readout	Boom Rotate Readout	Operator Sign/Date
22 Degrees-Outlet	________	________	________
67 Degrees-Inlet	________	________	________
113 Degrees-Inlet	________	________	________
158 Degrees-Outlet	________	________	________
202 Degrees-Outlet	________	________	________
247 Degrees-Inlet	________	________	________
293 Degrees-Inlet	________	________	________
338 Degrees-Outlet	________	________	________

9. Proceed with the bore examination of the nozzle whose centerline has just been located (refer to paragraph 4 of this section). If this is not possible at this time, consult the Shift Engineer.

10. Locate the centerlines of each remaining nozzle prior to beginning examinations of that nozzle. Follow the procedure given in paragraphs 3.6 and 3.7.

4. NOZZLE WELD EXAMINATIONS

1. The maximum permissible scanning speed is 6 in./sec. Table IV-3 gives the equivalent angular speed for inlet and outlet nozzles. The speed used should be at or below the maximum permissible.

TABLE IV-3
MAXIMUM SCAN SPEEDS

Examination Area	Max. Exam Dia.	Maximum Speed (in/sec.)	Maximum Speed (deg/sec.)
Outlet Nozzle Bore	29.41"	6	23.38
Outlet Nozzle-to-Shell (Shell Side)	65.98"	6	10.42
Inlet Nozzle Bore	35.63"	6	19.30
Inlet Nozzle-to-shell (Shell Side)	73.92"	6	9.30"

2. Locate the datum point for the nozzle to be examined and record the boom extend readout in Table IV-4.

NOTE: Use 5 degree examination head (80D5780) for the inlet nozzles and 0 degree examination head (80D5850) for the outlet nozzles.

TABLE IV-4
NOZZLE BORE DATUM POINTS

Nozzle	Datum Point Location (Boom Extend Readout)	Operator Sign/Date
22 Degrees Outlet	________	________
67 Degrees Inlet	________	________
113 Degrees Inlet	________	________
158 Degrees Outlet	________	________
202 Degrees Outlet	________	________
247 Degrees Inlet	________	________
293 Degrees Inlet	________	________
338 Degrees Outlet	________	________

3. In cooperation with the ultrasonics operator, locate the fixture at the datum point and advance the search unit head to contact the wall.

4. Perform the appropriate examination in accordance with the scan limits listed on the raster summary sheet at the rear of this section. Begin the first scan with the rotator controller readout at 00000 and rotate the fixture 360 degrees clockwise, carefully watching the transducer cables throughout the course of the exams.

5. Index the examination fixture the required amount (see paragraph 4.6 and scan in the opposite direction until a readout of 00000 is obtained. Repeat scanning, alternating between clockwise and counterclockwise sweeps, until the total required examination area has been inspected. The examination is complete when the fixture has withdrawn far enough that no front reflection is observed throughout a rotation.

6. Required index increments to be used for the various tranducer sizes are as follows:

Transducer Size	Index Increment
1/2" x 1/2"	0.37"
1" Dia.	0.70"

7. Return to paragraph 3.7 and repeat each applicable step for the remaining nozzles to be examined.

8. During examinations from the nozzle bores, use Table IV-3 for scanning speed and Table IV-4 for "Datum Point" locations.

9. The scan starting and end positions are noted on the following pages. The Boom Extend position shall be indexed in increments as listed in paragraph 4.6 above.

5. SHELL-SIDE EXAMINATIONS

1. Install the ID nozzle scanner and extender on the end of the main inspection boom, such that the rotator controller reads 00000 with the fixture vertical. Use a level to verify that the fixture is, in fact, vertical.

2. Drape the cables such that a full 360 degree rotation can be made beginning at either end of the upper vertical quadrant with head at full extension of index.

3. Verify proper operation of the rotation system by rotating the fixture 360 degrees once in each direction.

4. Verify proper operation of the I.D. nozzle scanner and its readout by running the head holder to its limit of travel once in each direction as per paragraph 5.5.

5. Prior to performing examinations with the I.D. Nozzle Scanner, verify the accuracy of the position readout as follows:

   A. Drive the I.D. Nozzle Scanner to its minimum travel point, and set the encoder to a convenient whole number. Extend the radial arm towards its maximum point stopping at three points to verify actual distance traveled versus digital readout. Position readout shall agree with actual position to a tolerance of plus or minus .5". If it does not, notify the Shift Engineer.

6. Obtain the maximum permissible scanning speed for the shell side examinations from Table IV-3. The maximum linear speed will be obtained when the search unit is traversed radially outward the greatest distance for each type of nozzle.

7. Set the proper speed for the type (inlet or outlet) nozzle to be examined using the speed pot. on the front of the controller. Time the rotation of the fixture through a continuous 360 degree cycle (approximate). (DO NOT JOG TO OBTAIN 360 DEGREE.) Repeat this operation, as necessary, until the speed of rotation is at or below the applicable value in Table IV-3.

8. Determine the scan speeds to be used in Table IV-6.

   NOTE: Enter only the final figures in the Table. Trial calculations may be made on other paper.

TABLE IV-6

EXAMINATION SCAN SPEEDS

		Examination Area Inlet	Examination Area Outlet
1.	Final Controller Readout	______	______
2.	Initial Controller Readout	______	______
3.	Degrees of Rotation (Line 1 - Line 2)	______	______
4.	Elapsed Time (secs..)	______	______
5.	Scan Speed (deg/sec.)	______	______

Operator Signature: ______________

Date: ______________

9. Using the hoist and boom rotate controls, position the main boom at the center of the nozzle to be examined. The coordinates of the nozzle bore centers are listed in Table IV-2.

10. Extend the boom so that the head contacts the vessel wall and position the test head at the nozzle radius to shell junctions.

11. Visually monitor the head on the remote TV screen, and rotate the fixture about the nozzle to ensure it is centered. If necessary, make fine adjustments using the hoist and boom rotate.

12. If there is any difference in the hoist and boom rotate values for the nozzle centerlines, record the appropriate information in Table IV-7. If all centers correspond to the values in Table IV-2, enter N/A in each column of Table IV-7.

TABLE IV-7

NOZZLE BORE CENTERLINE COORDINATES

Nozzle Location	Hoist Readout	Boom Rotate Readout	Operator Sign/Date
22 Degrees-Outlet			
67 Degrees-Inlet			
113 Degrees-Inlet			
158 Degrees-Outlet			
202 Degrees-Outlet			
247 Degrees-Inlet			
293 Degrees-Inlet			
338 Degrees-Outlet			

6. POST EXAMINATION POSITIONAL CHECK

Upon completion of all nozzle examinations performed during these examinations, enter the information required for "After Examination" on the Positional Check Log Sheet in Section V.

7. RASTER SET IV 1
THREE-UNIT SHELL HEAD 80D8580-2

7.1 This raster set covers the parallel examinations for the nozzle to shell weld from the shell side, right and left horizontal quadrants.

7.2 These examinations are performed in 90° quadrants, with the quadrant boundaries at 45° angles to the horizontal/vertical nozzle centerlines. Thus, the quadrants which straddle 0° and 180° on each nozzle are referred to as the vertical quadrants, while those straddling 90° and 270° are called the horizontal quadrants.

7.3 For each quadrant, start the examination as specified on the raster summary sheet or where head contact can be established. The examination is carried out by rotating the fixture back through the same quadrant. This pattern is continued until the outer examination radius is reached. The boom extend/retract may be used as necessary to maintain optimum wall contact.

7.4 Rotate the fixture 180° to provide the same examination angles in the opposite directions and perform the examination again, beginning at the inner examination radius.

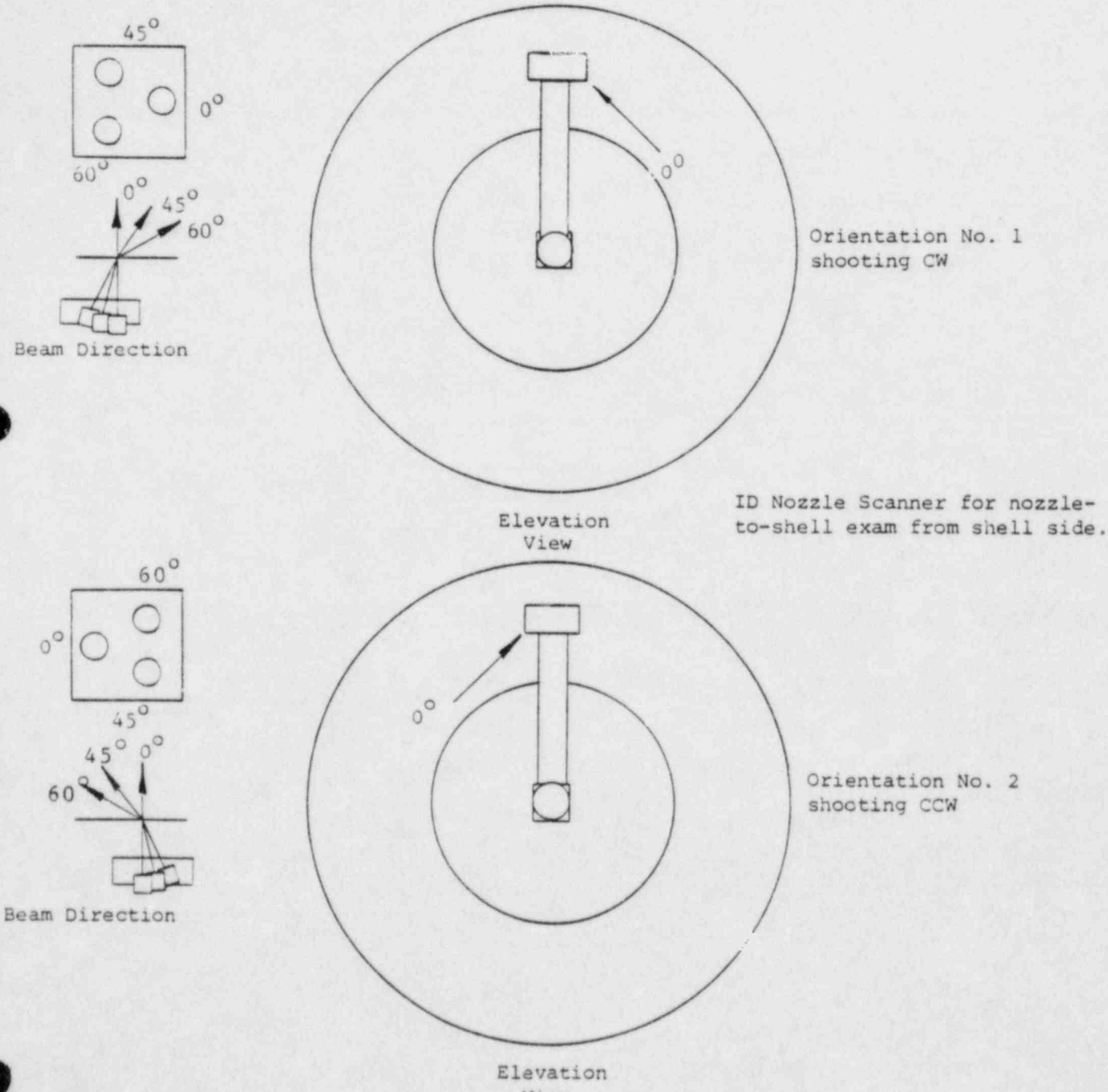
7.5 Figure 1 is an illustration of the orientations to be used with head 80D8580-2. Note that when reference is made to shooting clockwise or counterclockwise on the raster summary sheets, this direction refers to the orientation of the 0° straight beam.

7.6 Each raster summary sheet in this section provides full coverage in one direction parallel to the weld. Each weld is examined twice to provide coverage in both parallel directions as required.

7.7 Weld centerline refers to readout on ID nozzle scanner.

DIAGRAM FOR ORIENTATION NUMBERS 1 and 2
SHELL HEAD NO. 80D8580-2

FIGURE 1



NOTE: Shooting direction refers to the orientation of the 0° straight beam when looking outward from the center of the RPV.

RASTER SUMMARY SHEET

Raster Set: IV-1

Section: IV Pg.___of___

Raster No.:

Cal. Data Pkg.:

Scanning Mode: Parallel

Procedure No.: 80A6477 Rev.

Head Attitude: Horizontal

Video Tape No.:

Orient.: 1 Shooting: CW

Cal. Block No.: 196-104 (11")

Index Increment: 0.70"

Head No.: 80D8580-2

Index With: Nozzle Scanner (18.41" - Nozzle Knuckle

Weld No.: 1-SB-RV-107-121-A

Sweep With: Rotator (44° - 136°)

Weld Centerline: 9.41"

Weld Title: Outlet Nozzle to Shell at 22° (Right Horizontal Quadrant)

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: See Section 7.3 for examination coverage.

Operator____ Date____ Time____ Reviewer

Operator____ Date____ Time____ ____ Date____

NES NUCLEAR ENERGY SERVICES, INC.

RASTER SUMMARY SHEET

Raster Set: IV-1

Raster No.:

Scanning Mode: Parallel

Head Attitude: Horizontal

Orient.: 1 Shooting: CW

Index Increment: 0.70"

Index With: Nozzle Scanner (18.41" - Nozzle Knuckle

Sweep With: Rotator (224° - 316°)

Section: IV Pg. __ of __

Cal. Data Pkg.:

Procedure No.: 80A6477 Rev.

Video Tape No.:

Cal. Block No.: 196-104 (11")

Head No.: 80D8580-2

Weld No.: 1-SB-RV-107-121-A

Weld Centerline: 9.41"

Weld Title: Outlet Nozzle to Shell at 22° (Left Horizontal Quadrant)

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: See Section 7.3 for examination coverage.

Operator ____ Date ____ Time ____ Reviewer

Operator ____ Date ____ Time ____ ____ Date ____

nes NUCLEAR ENERGY SERVICES, INC.

Form 028-110/1 1/83

RASTER SUMMARY SHEET

Raster Set: IV-1

Section: IV Pg. ___ of ___

Raster No.: ___

Cal. Data Pkg.: ___

Scanning Mode: Parallel

Procedure No.: 80A6477 Rev. ___

Head Attitude: Horizontal

Video Tape No.: ___

Orient.: 1 Shooting: CW

Cal. Block No.: 196-104 (11")

Index Increment: 0.70"

Head No.: 80D8580-2

Index With: Nozzle Scanner (22.64" - 4.63")

Weld No.: 1-SB-RV-105-121-B

Sweep With: Rotator (44° - 136°)

Weld Centerline: 13.63"

Weld Title: Inlet Nozzle to Shell at 67° (Right Horizontal Quadrant)

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: See Section 7.3 for examination coverage.

Operator ___ Date ___ Time ___ Reviewer

Operator ___ Date ___ Time ___ ___ Date ___

NUCLEAR ENERGY SERVICES, INC.

RASTER SUMMARY SHEET

Raster Set: IV-1

Raster No.:

Scanning Mode: Parallel

Head Attitude: Horizontal

Orient.: 1 Shooting: CW

Index Increment: 0.70"

Index With: Nozzle Scanner (22.64" - 4.63")

Sweep With: Rotator (224° - 316°)

Section: IV Pg. of

Cal. Data Pkg.:

Procedure No.: 80A6477 Rev.

Video Tape No.:

Cal. Block No.: 196-104 (11")

Head No.: 80D8580-2

Weld No.: 1-SB-RV-105-121-B

Weld Centerline: 13.63"

Weld Title: Inlet Nozzle to Shell at 67° (Left Horizontal Quadrant)

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: See Section 7.3 for examination coverage.

Operator Date Time Reviewer

Operator Date Time Date

NES NUCLEAR ENERGY SERVICES, INC.

RASTER SUMMARY SHEET

Raster Set: IV-1
Section: IV Pg.___ of___
Raster No.:
Cal. Data Pkg.:
Scanning Mode: Parallel
Procedure No.: 80A6477 Rev.___
Head Attitude: Horizontal
Video Tape No.:
Orient.: 1 Shooting: CW
Cal. Block No.: 196-104 (11")
Index Increment: 0.70"
Head No.: 80D8580-2
Index With: Nozzle Scanner (22.64" - 4.63")
Weld No.: 1-SB-RV-105-121-C
Sweep With: Rotator (44° - 136°)
Weld Centerline: 13.63"
Weld Title: Inlet Nozzle to Shell at 113° (Right Horizontal Quadrant)

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: See Section 7.3 for examination coverage.

Operator_______ Date_______ Time_______ Reviewer
Operator_______ Date_______ Time_______ _______ Date_______

RASTER SUMMARY SHEET

Raster Set: IV-1

Raster No.:

Scanning Mode: Parallel

Head Attitude: Horizontal

Orient.: 1 Shooting: CW

Index Increment: 0.70"

Index With: Nozzle Scanner (22.64" - 4.63")

Sweep With: Rotator (224° - 316°)

Section: IV Pg.___ of___

Cal. Data Pkg.:

Procedure No.: 80A6477 Rev.___

Video Tape No.:

Cal. Block No.: 196-104 (11")

Head No.: 80D8580-2

Weld No.: 1-SB-RV-105-121-C

Weld Centerline: 13.63"

Weld Title: Inlet Nozzle to Shell at 113° (Left Horizontal Quadrant)

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: See Section 7.3 for examination coverage.

Operator________ Date______ Time______ Reviewer

Operator________ Date______ Time______ ________ Date______

NES NUCLEAR ENERGY SERVICES, INC.

Form 028-110/1 1/83

RASTER SUMMARY SHEET

Raster Set: IV-1

Raster No.:

Scanning Mode: Parallel

Head Attitude: Horizontal

Orient.: 1 Shooting: CW

Index Increment: 0.70"

Index With: Nozzle Scanner (18.41" - Nozzle Knuckle)

Sweep With: Rotator (44° - 136°)

Section: IV Pg. ___ of ___

Cal. Data Pkg.:

Procedure No.: 80A6477 Rev.

Video Tape No.:

Cal. Block No.: 196-104 (11")

Head No.: 80D8580-2

Weld No.: 1-SB-RV-107-121-D

Weld Centerline: 9.41"

Weld Title: Outlet Nozzle to Shell at 158° (Right Horizontal Quadrant)

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: See Section 7.3 for examination coverage.

Operator ___ Date ___ Time ___ Reviewer

Operator ___ Date ___ Time ___ ___ Date ___

NES NUCLEAR ENERGY SERVICES, INC.

Form 028-110/1 1/83

RASTER SUMMARY SHEET

Raster Set: IV-1

Section: IV Pg. ___ of ___

Raster No.: ___

Cal. Data Pkg.: ___

Scanning Mode: Parallel

Procedure No.: 80A6477 Rev. ___

Head Attitude: Horizontal

Video Tape No.: ___

Orient.: 1 Shooting: CW

Cal. Block No.: 196-104 (11")

Index Increment: 0.70"

Head No.: 80D8580-2

Index With: Nozzle Scanner (18.41" - Nozzle Knuckle)

Weld No.: 1-SB-RV-107-121-D

Sweep With: Rotator (224° - 316°)

Weld Centerline: 9.41"

Weld Title: Outlet Nozzle to Shell at 158° (Left Horizontal Quadrant)

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: See Section 7.3 for examination coverage.

Operator ___ Date ___ Time ___ Reviewer

Operator ___ Date ___ Time ___ ___ Date ___

NES NUCLEAR ENERGY SERVICES, INC.

Form 028-110/1 1/83

RASTER SUMMARY SHEET

Raster Set: IV-1

Raster No.:

Scanning Mode: Parallel

Head Attitude: Horizontal

Orient.: 1 Shooting: CW

Index Increment: 0.70"

Index With: Nozzle Scanner (18.41" - Nozzle Knuckle)

Sweep With: Rotator (44° - 136°)

Section: IV Pg.___ of___

Cal. Data Pkg.:

Procedure No.: 80A6477 Rev.___

Video Tape No.:

Cal. Block No.: 196-104 (11")

Head No.: 80D8580-2

Weld No.: 1-SB-RV-107-121-E

Weld Centerline: 9.41"

Weld Title: Outlet Nozzle to Shell at 202° (Right Horizontal Quadrant)

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: See Section 7.3 for examination coverage.

Operator______ Date______ Time______ Reviewer

Operator______ Date______ Time______ ______ Date______

NES NUCLEAR ENERGY SERVICES, INC.

RASTER SUMMARY SHEET

Raster Set: IV-1 Section: IV Pg.___ of___

Raster No.: Cal. Data Pkg.:

Scanning Mode: Parallel Procedure No.: 80A6477 Rev.___

Head Attitude: Horizontal Video Tape No.:

Orient.: 1 Shooting: CW Cal. Block No.: 196-104 (11")

Index Increment: 0.70" Head No.: 80D8580-2

Index With: Nozzle Scanner (18.41" - Nozzle Knuckle) Weld No.: 1-SB-RV-107-121-E

Sweep With: Rotator (224° - 316°) Weld Centerline: 9.41"

Weld Title: Outlet Nozzle to Shell at 202° (Left Horizontal Quadrant)

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: See Section 7.3 for examination coverage.

Operator______ Date______ Time______ Reviewer

Operator______ Date______ Time______ ______ Date______

NES NUCLEAR ENERGY SERVICES, INC.

RASTER SUMMARY SHEET

Raster Set: IV-1

Raster No.:

Scanning Mode: Parallel

Head Attitude: Horizontal

Orient.: 1 Shooting: CW

Index Increment: 0.70"

Index With: Nozzle Scanner (22.64" - 4.63")

Sweep With: Rotator (44° - 136°)

Section: IV Pg. of

Cal. Data Pkg.:

Procedure No.: 80A6477 Rev.

Video Tape No.:

Cal. Block No.: 196-104 (11")

Head No.: 80A8580-2

Weld No.: 1-SB-RV-105-121-F

Weld Centerline: 13.63"

Weld Title: Inlet Nozzle to Shell at 247° (Right Horizontal Quadrant)

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: See Section 7.3 for examination coverage.

Operator ____ Date ____ Time ____ Reviewer

Operator ____ Date ____ Time ____ ____ Date ____

NES NUCLEAR ENERGY SERVICES, INC.

RASTER SUMMARY SHEET

Raster Set: IV-1

Section: IV Pg. ___ of ___

Raster No.: ___

Cal. Data Pkg.: ___

Scanning Mode: Parallel

Procedure No.: 80A6477 Rev. ___

Head Attitude: Horizontal

Video Tape No.: ___

Orient.: 1 Shooting: CW

Cal. Block No.: 196-104 (11")

Index Increment: 0.70"

Head No.: 80D8580-2

Index With: Nozzle Scanner (22.64" - 4.63")

Weld No.: 1-SB-RV-105-121-F

Sweep With: Rotator (224° - 316°)

Weld Centerline: 13.63"

Weld Title: Inlet Nozzle to Shell at 247° (Left Horizontal Quadrant)

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: See Section 7.3 for examination coverage.

Operator ___ Date ___ Time ___ Reviewer

Operator ___ Date ___ Time ___ ___ Date ___

NES NUCLEAR ENERGY SERVICES, INC.

RASTER SUMMARY SHEET

Raster Set: IV-1

Raster No.:

Scanning Mode: Parallel

Head Attitude: Horizontal

Orient.: 1 Shooting: CW

Index Increment: 0.70"

Index With: Nozzle Scanner (22.64" - 4.63")

Sweep With: Rotator (44° - 136°)

Section: IV Pg.__ of__

Cal. Data Pkg.:

Procedure No.: 80A6477 Rev.__

Video Tape No.:

Cal. Block No.: 196-104 (11")

Head No.: 80D8580-2

Weld No.: 1-SB-RV-105-121-G

Weld Centerline: 13.63"

Weld Title: Inlet Nozzle to Shell at 293° (Right Horizontal Quadrant)

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: See Section 7.3 for examination coverage.

Operator____ Date____ Time____ Reviewer

Operator____ Date____ Time____ ____ Date____

NES NUCLEAR ENERGY SERVICES, INC.

Form 028-110/1 1/83

RASTER SUMMARY SHEET

Raster Set: IV-1

Section: IV Pg. ___ of ___

Raster No.: ___

Cal. Data Pkg.: ___

Scanning Mode: Parallel

Procedure No.: 80A6477 Rev. ___

Head Attitude: Horizontal

Video Tape No.: ___

Orient.: 1 Shooting: CW

Cal. Block No.: 196-104 (11")

Index Increment: 0.70"

Head No.: 80D8580-2

Index With: Nozzle Scanner (22.64" - 4.63")

Weld No.: 1-SB-RV-105-121-G

Sweep With: Rotator (224° - 316°)

Weld Centerline: 13.63"

Weld Title: Inlet Nozzle to Shell at 293° (Left Horizontal Quadrant)

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: See Section 7.3 for examination coverage.

Operator ___ Date ___ Time ___ Reviewer

Operator ___ Date ___ Time ___ ___ Date ___

NES NUCLEAR ENERGY SERVICES, INC.

Form 028-110/1 1/83

RASTER SUMMARY SHEET

Raster Set: IV-1

Section: IV Pg.___ of___

Raster No.:

Cal. Data Pkg.:

Scanning Mode: Parallel

Procedure No.: 80A6477 Rev.

Head Attitude: Horizontal

Video Tape No.:

Orient.: 1 Shooting: CW

Cal. Block No.: 196-104 (11")

Index Increment: 0.70"

Head No.: 80D8580-2

Index With: Nozzle Scanner (18.41" - Nozzle Knuckle)

Weld No.: 1-SB-RV-107-121-H

Sweep With: Rotator (44° -136°)

Weld Centerline: 9.41"

Weld Title: Outlet Nozzle to Shell at 338° (Right Horizontal Quadrant)

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: See Section 7.3 for examination coverage.

Operator_____ Date_____ Time_____ Reviewer

Operator_____ Date_____ Time_____ _____ Date_____

NES NUCLEAR ENERGY SERVICES, INC.

RASTER SUMMARY SHEET

Raster Set: IV-1

Raster No.:

Scanning Mode: Parallel

Head Attitude: Horizontal

Orient.: 1 Shooting: CW

Index Increment: 0.70"

Index With: Nozzle Scanner (18.41" - Nozzle Knuckle)

Sweep With: Rotator (224° - 316°)

Section: IV Pg.___ of___

Cal. Data Pkg.:

Procedure No.: 80A6477 Rev.___

Video Tape No.:

Cal. Block No.: 196-104 (11")

Head No.: 80D8580-2

Weld No.: 1-SB-RV-107-121-H

Weld Centerline: 9.41"

Weld Title: Outlet Nozzle to Shell at 338° (Left Horizontal Quadrant)

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: See Section 7.3 for examination coverage.

Operator______ Date______ Time______ Reviewer

Operator______ Date______ Time______ ______ Date______

NES NUCLEAR ENERGY SERVICES, INC.

Form 028-110/1 1/83

RASTER SUMMARY SHEET

Raster Set: IV-1

Raster No.:

Scanning Mode: Parallel

Head Attitude: Horizontal

Orient.: 2 Shooting: CCW

Index Increment: 0.70"

Index With: Nozzle Scanner (18.41" - Nozzle Knuckle)

Sweep With: Rotator (44° - 136°)

Section: IV Pg. __ of __

Cal. Data Pkg.:

Procedure No.: 80A6477 Rev.

Video Tape No.:

Cal. Block No.: 196-104 (11")

Head No.: 80D8580-2

Weld No.: 1-SB-RV-107-121-A

Weld Centerline: 9.41"

Weld Title: Outlet Nozzle to Shell at 22° (Right Horizontal Quadrant)

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: See Section 7.3 for examination coverage.

Operator ____ Date ____ Time ____ Reviewer

Operator ____ Date ____ Time ____ ____ Date ____

NES NUCLEAR ENERGY SERVICES, INC.

RASTER SUMMARY SHEET

Raster Set: IV-1

Raster No.:

Scanning Mode: Parallel

Head Attitude: Horizontal

Orient.: 2 Shooting: CCW

Index Increment: 0.70"

Index With: Nozzle Scanner (18.41" - Nozzle Knuckle)

Sweep With: Rotator (224° - 316°)

Section: IV Pg. ___ of ___

Cal. Data Pkg.:

Procedure No.: 80A6477 Rev.

Video Tape No.:

Cal. Block No.: 196-104 (11")

Head No.: 80D8580-2

Weld No.: 1-SB-RV-107-121-A

Weld Centerline: 9.41"

Weld Title: Outlet Nozzle to Shell at 22° (Left Horizontal Quadrant)

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: See Section 7.3 for examination coverage.

Operator ___ Date ___ Time ___ Reviewer

Operator ___ Date ___ Time ___ ___ Date ___

NES NUCLEAR ENERGY SERVICES, INC.

Form 028-110/1 1/83

RASTER SUMMARY SHEET

Raster Set: IV-1

Raster No.:

Scanning Mode: Parallel

Head Attitude: Horizontal

Orient.: 2 Shooting: CCW

Index Increment: 0.70"

Index With: Nozzle Scanner (18.41" - 4.63")

Sweep With: Rotator (44°- 136°)

Section: IV Pg. ___ of ___

Cal. Data Pkg.:

Procedure No.: 80A6477 Rev.

Video Tape No.:

Cal. Block No.: 196-104 (11")

Head No.: 80D8580-2

Weld No.: 1-SB-RV-105-121-B

Weld Centerline: 13.63"

Weld Title: Inlet Nozzle to Shell at 67° (Right Horizontal Quadrant)

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: See Section 7.3 for examination coverage.

Operator ______ Date ______ Time ______ Reviewer

Operator ______ Date ______ Time ______ ______ Date ______

NES NUCLEAR ENERGY SERVICES, INC.

RASTER SUMMARY SHEET

Raster Set: IV-1
Section: IV Pg. ___ of ___
Raster No.: ___
Cal. Data Pkg.: ___
Scanning Mode: Parallel
Procedure No.: 80A6477 Rev. ___
Head Attitude: Horizontal
Video Tape No.: ___
Orient.: 2 Shooting: CCW
Cal. Block No.: 196-104 (11")
Index Increment: 0.70"
Head No.: 80D8580-2
Index With: Nozzle Scanner (22.64" - 4.63")
Weld No.: 1-SB-RV-105-121-B
Sweep With: Rotator (224° - 316°)
Weld Centerline: 13.63"
Weld Title: Inlet Nozzle to Shell at 67° (Left Horizontal Quadrant)

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: See Section 7.3 for examination coverage.

Operator ___ Date ___ Time ___ Reviewer
Operator ___ Date ___ Time ___ ___ Date ___

nes NUCLEAR ENERGY SERVICES, INC.

RASTER SUMMARY SHEET

Raster Set: IV-1

Raster No.:

Scanning Mode: Parallel

Head Attitude: Horizontal

Orient.: 2 Shooting: CCW

Index Increment: 0.70"

Index With: Nozzle Scanner (22.64" - 4.63")

Sweep With: Rotator (44° - 136°)

Section: IV Pg. ___ of ___

Cal. Data Pkg.:

Procedure No.: 80A6477 Rev. ___

Video Tape No.:

Cal. Block No.: 196-104 (11")

Head No.: 80D8580-2

Weld No.: 1-SB-RV-105-121-C

Weld Centerline: 13.63"

Weld Title: Inlet Nozzle to Shell at 113° (Right Horizontal Quadrant)

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: See Section 7.3 for examination coverage.

Operator ________ Date ________ Time ________ Reviewer

Operator ________ Date ________ Time ________ ________ Date ________

NUCLEAR ENERGY SERVICES, INC.

RASTER SUMMARY SHEET

Raster Set: IV-1

Raster No.:

Scanning Mode: Parallel

Head Altitude: Horizontal

Orient.: 2 Shooting: CCW

Index Increment: 0.70"

Index With: Nozzle Scanner (22.64" - 4.63")

Sweep With: Rotator (224° - 316°)

Section: IV Pg. of

Cal. Data Pkg.:

Procedure No.: 80A6477 Rev.

Video Tape No.:

Cal. Block No.: 196-104 (11")

Head No.: 80D8580-2

Weld No.: 1-SB-RV-105-121-C

Weld Centerline: 13.63"

Weld Title: Inlet Nozzle to Shell to 113° (Left Horizontal Quadrant)

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: See Section 7.3 for examination coverage.

Operator ______ Date ______ Time ______ Reviewer

Operator ______ Date ______ Time ______ ______ Date ______

NES NUCLEAR ENERGY SERVICES, INC.

RASTER SUMMARY SHEET

Raster Set: IV-1

Raster No.:

Scanning Mode: Parallel

Head Attitude: Horizontal

Orient.: 2 Shooting: CCW

Index Increment: 0.70"

Index With: Nozzle Scanner (18.41" - Nozzle Knuckle)

Sweep With: Rotator (44° - 136°)

Section: IV Pg. of

Cal. Data Pkg.:

Procedure No.: 80A6477 Rev.

Video Tape No.:

Cal. Block No.: 196-104 (11")

Head No.: 80D8580-2

Weld No.: 1-SB-RV-107-121-D

Weld Centerline: 9.41"

Weld Title: Outlet Nozzle to Shell at 158° (Right Horizontal Quadrant)

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: See Section 7.3 for examination coverage.

Operator Date Time Reviewer

Operator Date Time Date

NES NUCLEAR ENERGY SERVICES, INC.

RASTER SUMMARY SHEET

Raster Set: IV-1

Raster No.:

Scanning Mode: Parallel

Head Attitude: Horizontal

Orient.: 2 Shooting: CCW

Index Increment: 0.70"

Index With: Nozzle Scanner (18.41" - Nozzle Knuckle)

Sweep With: Rotator (224° - 316°)

Section: IV Pg.___ of___

Cal. Data Pkg.:

Procedure No.: 80A6477 Rev.___

Video Tape No.:

Cal. Block No.: 196-104 (11")

Head No.: 80D8580-2

Weld No.: 1-SB-RV-107-121-D

Weld Centerline: 9.41"

Weld Title: Outlet Nozzle to Shell at 158° (Left Horizontal Quadrant)

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: See Section 7.3 for examination coverage.

Operator________ Date________ Time________ Reviewer

Operator________ Date________ Time________ ________ Date________

NES NUCLEAR ENERGY SERVICES, INC.

RASTER SUMMARY SHEET

Raster Set: IV-1
Raster No.:
Scanning Mode: Parallel
Head Attitude: Horizontal
Orient.: 2 Shooting: CCW
Index Increment: 0.70"
Index With: Nozzle Scanner (18.41" - Nozzle Knuckle)
Sweep With: Rotator (44° - 136°)

Section: IV Pg.___of___
Cal. Data Pkg.:
Procedure No.: 80A6477 Rev.___
Video Tape No.:
Cal. Block No.: 196-104 (11")
Head No.: 80D8580-2
Weld No.: 1-SB-RV-107-121-E
Weld Centerline: 9.41"

Weld Title: Outlet Nozzle to Shell at 202° (Right Horizontal Quadrant)

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: See Section 7.3 for examination coverage.

Operator______ Date______ Time______ Reviewer

Operator______ Date______ Time______ ______ Date______

NES NUCLEAR ENERGY SERVICES, INC.

RASTER SUMMARY SHEET

Raster Set: IV-1

Raster No.:

Scanning Mode: Parallel

Head Attitude: Horizontal

Orient.: 2 Shooting: CCW

Index Increment: 0.70"

Index With: Nozzle Scanner (18.41" - Nozzle Knuckle)

Sweep With: Rotator (224° - 316°)

Section: IV Pg. __ of __

Cal. Data Pkg.:

Procedure No.: 80A6477 Rev.

Video Tape No.:

Cal. Block No.: 196-104 (11")

Head No.: 80D8580-2

Weld No.: 1-SB-RV-107-121-E

Weld Centerline: 9.41"

Weld Title: Outlet Nozzle to Shell at 202° (Left Horizontal Quadrant)

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: See Section 7.3 for examination coverage.

Operator ___ Date ___ Time ___ Reviewer

Operator ___ Date ___ Time ___ ___ Date ___

NES NUCLEAR ENERGY SERVICES, INC.

RASTER SUMMARY SHEET

Raster Set: IV-1

Raster No.:

Scanning Mode: Parallel

Head Attitude: Horizontal

Orient.: 2 Shooting: CCW

Index Increment: 0.70"

Index With: Nozzle Scanner (22.64" - 4.63")

Sweep With: Rotator (44° - 136°)

Section: IV Pg. ___ of ___

Cal. Data Pkg.:

Procedure No.: 80A6477 Rev.

Video Tape No.:

Cal. Block No.: 196-104 (11")

Head No.: 80D8580-2

Weld No.: 1-SB-RV-105-121-F

Weld Centerline: 13.63"

Weld Title: Inlet Nozzle to Shell at 247° (Right Horizontal Quadrant)

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: See Section 7.3 for examination coverage.

Operator ______ Date ______ Time ______ Reviewer

Operator ______ Date ______ Time ______ ______ Date ______

RASTER SUMMARY SHEET

Raster Set: IV-1

Raster No.:

Scanning Mode: Parallel

Head Attitude: Horizontal

Orient.: 2 Shooting: CCW

Index Increment: 0.70"

Index With: Nozzle Scanner (22.64" - 4.63")

Sweep With: Rotator (224° - 316°)

Section: IV Pg. of

Cal. Data Pkg.:

Procedure No.: 80A6477 Rev.

Video Tape No.:

Cal. Block No.: 196-104 (11")

Head No.: 80D8580-2

Weld No.: 1-SB-RV-105-121-F

Weld Centerline: 13.63"

Weld Title: Inlet Nozzle to Shell at 247° (Left Horizontal Quadrant)

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: See Section 7.3 for examination coverage.

Operator ______ Date ______ Time ______ Reviewer

Operator ______ Date ______ Time ______ ______ Date ______

NUCLEAR ENERGY SERVICES, INC.

RASTER SUMMARY SHEET

Raster Set: IV-1

Raster No.:

Scanning Mode: Parallel

Head Attitude: Horizontal

Orient.: 2 Shooting: CCW

Index Increment: 0.70"

Index With: Nozzle Scanner (18.41" - Nozzle Knuckle)

Sweep With: Rotator (44° - 136°)

Section: IV Pg. ___ of ___

Cal. Data Pkg.:

Procedure No.: 80A6477 Rev. ___

Video Tape No.:

Cal. Block No.: 196-104 (11")

Head No.: 80D8580-2

Weld No.: 1-SB-RV-107-121-H

Weld Centerline: 9.41"

Weld Title: Outlet Nozzle to Shell at 338° (Right Horizontal Quadrant)

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: See Section 7.3 for examination coverage.

Operator ______ Date ______ Time ______ Reviewer

Operator ______ Date ______ Time ______ ______ Date ______

NES NUCLEAR ENERGY SERVICES, INC.

RASTER SUMMARY SHEET

Raster Set: IV-1

Raster No.:

Scanning Mode: Parallel

Head Attitude: Horizontal

Orient.: 2 Shooting: CCW

Index Increment: 0.70"

Index With: Nozzle Scanner (18.41" - Nozzle Knuckle)

Sweep With: Rotator (224° - 316°)

Section: IV Pg. ___ of ___

Cal. Data Pkg.:

Procedure No.: 80A6477 Rev.

Video Tape No.:

Cal. Block No.: 196-104 (11")

Head No.: 80D8580-2

Weld No.: 1-SB-RV-107-121-H

Weld Centerline: 9.41"

Weld Title: Outlet Nozzle to Shell at 338° (Left Horizontal Quadrant)

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: See Section 7.3 for examination coverage.

Operator ___ Date ___ Time ___ Reviewer

Operator ___ Date ___ Time ___ ___ Date ___

NES NUCLEAR ENERGY SERVICES, INC.

Form 028-110/1 1/83

8. RASTER SET IV-2
THREE-UNIT SHELL HEAD 80D8580-2

8.1 This raster set covers the parallel examinations for the nozzle to shell weld from the shell side, upper and lower vertical quadrants.

8.2 These examinations are performed in 90° quadrants, with the quadrant boundaries at 45° angles to the horizontal/vertical nozzle centerlines. Thus, the quadrant which straddle 0° and 180° on each nozzle are referred to as the vertical quadrants, while those straddling 90° and 270° are called the horizontal quadrants.

8.3 For each quadrant, start the examination as specified on the raster summary sheet or where head contact can be established. The examination is carried out by rotating the fixture through the quadrant, indexing outward by the specified increment, and rotating the fixture back through the same quadrant. This pattern is continued until the outer examination radius is reached. The boom extend/retract may be used as necessary to maintain optimum wall contact.

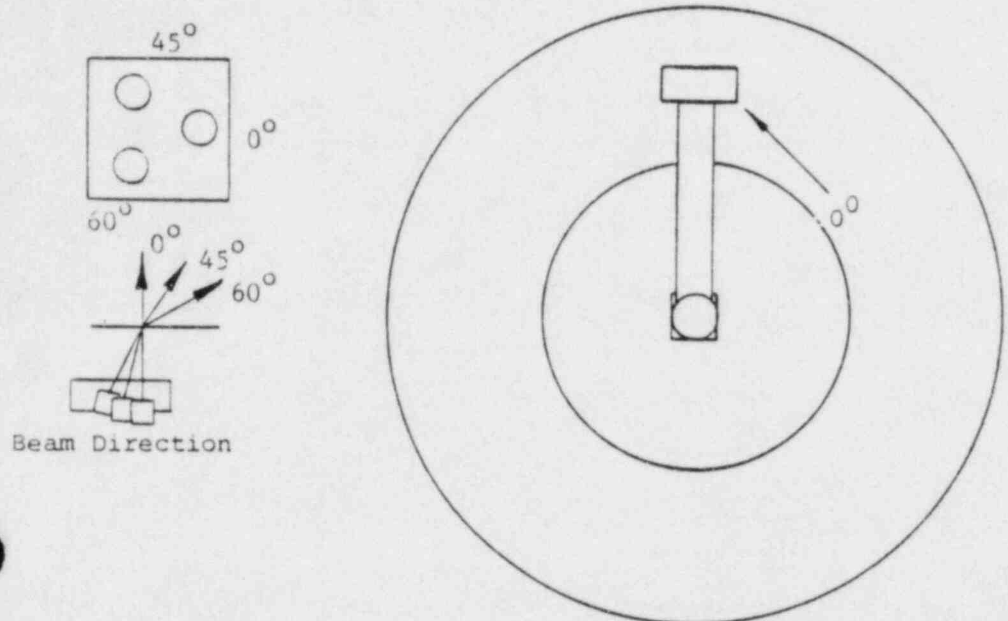
8.4 Rotate the fixture 180° to provide the same examination angles in the opposite directions and perform the examination again, beginning at the inner examination radius.

8.5 Figure 1 is an illustration of the orientations to be used with head 80D8580-2. Note that when reference is make to shooting clockwise or counterclockwise on the raster summary sheets, this direction refers to the orientation of the 0° straight beam.

8.6 Each raster summary sheet in this section provides full coverage in one direction parallel to the weld. Each weld is examined twice to provide coverage in both parallel directions as required.

8.7 Weld centerline refers to readout on ID nozzle scanner.

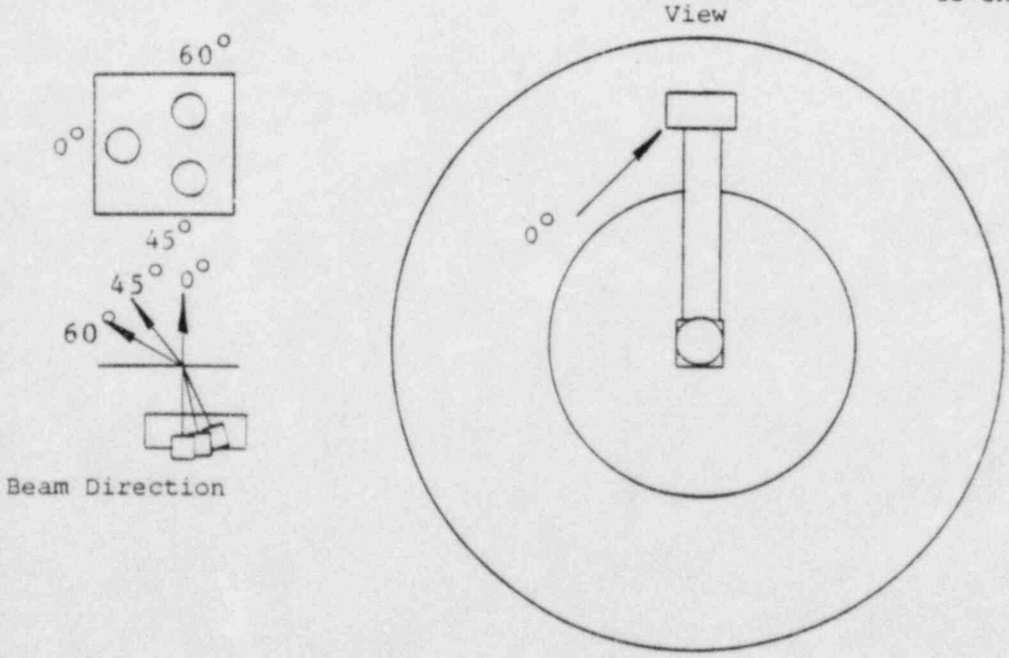
DIAGRAM FOR ORIENTATION NUMBERS 1 and 2
SHELL HEAD NO. 80D8580-2
FIGURE 1



Orientation No. 1
shooting CW

Elevation
View

ID Nozzle Scanner for nozzle-to-shell exam from shell side.



Orientation No. 2
shooting CCW

Elevation
View

NOTE: Shooting direction refers to the orientation of the 0° straight beam when looking outward from the center of the RPV.

RASTER SUMMARY SHEET

Raster Set: IV-2

Section: IV Pg. ___ of ___

Raster No.: ___

Cal. Data Pkg.: ___

Scanning Mode: Parallel

Procedure No.: 80A6477 Rev. ___

Head Attitude: Horizontal

Video Tape No.: ___

Orient.: 1 Shooting: CW

Cal. Block No.: 196-104 (11")

Index Increment: 0.70"

Head No.: 80D8580-2

Index With: Nozzle Scanner (18.41" - Nozzle Knuckle)

Weld No.: 1-SB-RV-107-121-A

Sweep With: Rotator (314° - 46°)

Weld Centerline: 9.41"

Weld Title: Outlet Nozzle to Shell at 22° (Upper Vertical Quadrant)

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: See Section 8.3 for examination coverage.

Operator ___ Date ___ Time ___ Reviewer

Operator ___ Date ___ Time ___ ___ Date ___

RASTER SUMMARY SHEET

Raster Set: IV-2

Section: IV Pg. ___ of ___

Raster No.:

Cal. Data Pkg.:

Scanning Mode: Parallel

Procedure No.: 80A6477 Rev. ___

Head Attitude: Horizontal

Video Tape No.:

Orient.: 1 Shooting: CW

Cal. Block No.: 196-104 (11")

Index Increment: 0.70"

Head No.: 80D8580-2

Index With: Nozzle Scanner (18.41" - Nozzle Knuckle)

Weld No.: 1-SB-RV-107-121-A

Sweep With: Rotator (134° - 226°)

Weld Centerline: 9.41"

Weld Title: Outlet Nozzle to Shell at 22° (Lower Vertical Quadrant)

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: See Section 8.3 for examination coverage.

Operator ___ Date ___ Time ___ Reviewer

Operator ___ Date ___ Time ___ ___ Date ___

NES NUCLEAR ENERGY SERVICES, INC.

RASTER SUMMARY SHEET

Raster Set: IV-2
Section: IV Pg. ___ of ___
Raster No.:
Cal. Data Pkg.:
Scanning Mode: Parallel
Procedure No.: 80A6477 Rev.
Head Attitude: Horizontal
Video Tape No.:
Orient.: 1 Shooting: CW
Cal. Block No.: 196-104 (11")
Index Increment: 0.70"
Head No.: 80D8580-2
Index With: Nozzle Scanner (22.64" - 4.63")
Weld No.: 1-SB-RV-105-121-B
Sweep With: Rotator (314° - 46°)
Weld Centerline: 13.63"
Weld Title: Inlet Nozzle to Shell at 67° (Upper Vertical Quadrant)

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: See Section 8.3 for examination coverage.

Operator ___ Date ___ Time ___ Reviewer

Operator ___ Date ___ Time ___ Date ___

nes NUCLEAR ENERGY SERVICES, INC.

RASTER SUMMARY SHEET

Raster Set: IV-2
Section: IV Pg. ___ of ___
Raster No.: ___
Cal. Data Pkg.: ___
Scanning Mode: Parallel
Procedure No.: 80A6477 Rev. ___
Head Attitude: Horizontal
Video Tape No.: ___
Orient.: 1 Shooting: CW
Cal. Block No.: 196-104 (11")
Index Increment: 0.70"
Head No.: 80D8580-2
Index With: Nozzle Scanner (22.64" - 4.63")
Weld No.: 1-SB-RV-105-121-B
Sweep With: Rotator (134° - 226°)
Weld Centerline: 13.63"
Weld Title: Inlet Nozzle to Shell at 67° (Lower Vertical Quadrant)

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: See Section 8.3 for examination coverage.

Operator ___ Date ___ Time ___ Reviewer
Operator ___ Date ___ Time ___ ___ Date ___

NES NUCLEAR ENERGY SERVICES, INC.

RASTER SUMMARY SHEET

Raster Set: IV-2
Section: IV Pg. ___ of ___
Raster No.: ___
Cal. Data Pkg.: ___
Scanning Mode: Parallel
Procedure No.: 80A6477 Rev. ___
Head Attitude: Horizontal
Video Tape No.: ___
Orient.: 1 Shooting: CW
Cal. Block No.: 196-104 (11")
Index Increment: 0.70"
Head No.: 80D8580-2
Index With: Nozzle Scanner (22.64" - 4.63")
Weld No.: 1-SB-RV-105-121-C
Sweep With: Rotator (314° - 46°)
Weld Centerline: 13.63"
Weld Title: Inlet Nozzle to Shell at 113° (Upper Vertical Quadrant)

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: See Section 8.3 for examination coverage.

Operator ___ Date ___ Time ___ Reviewer
Operator ___ Date ___ Time ___ ___ Date ___

RASTER SUMMARY SHEET

Raster Set: IV-2
Section: IV Pg. ___ of ___
Raster No.: ___
Cal. Data Pkg.: ___
Scanning Mode: Parallel
Procedure No.: 80A6477 Rev. ___
Head Attitude: Horizontal
Video Tape No.: ___
Orient.: 1 Shooting: CW
Cal. Block No.: 196-104 (11")
Index Increment: 0.70"
Head No.: 80D8580-2
Index With: Nozzle Scanner (22.64" - 4.63')
Weld No.: 1-SB-RV-105-121-C
Sweep With: Rotator (134° - 226°)
Weld Centerline: 13.63"
Weld Title: Inlet Nozzle to Shell at 113° (Lower Vertical Quadrant)

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: See Section 8.3 for examination coverage.

Operator ___ Date ___ Time ___ Reviewer

Operator ___ Date ___ Time ___ ___ Date ___

NES NUCLEAR ENERGY SERVICES, INC.

RASTER SUMMARY SHEET

Raster Set: IV-2
Raster No.:
Scanning Mode: Parallel
Head Attitude: Horizontal
Orient.: 1 Shooting: CW
Index Increment: 0.70"
Index With: Nozzle Scanner (18.41" - Nozzle Knuckle)
Sweep With: Rotator (314° - 46°)
Weld Title: Outlet Nozzle to Shell at 158° (Upper Vertical Quadrant)

Section: IV Pg. of
Cal. Data Pkg.:
Procedure No.: 80A6477 Rev.
Video Tape No.:
Cal. Block No.: 196-104 (11")
Head No.: 80D8580-2
Weld No.: 1-SB-RV-107-121-D
Weld Centerline: 9.41"

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: See Section 8.3 for examination coverage.

Operator Date Time Reviewer

Operator Date Time Date

NES NUCLEAR ENERGY SERVICES, INC.

RASTER SUMMARY SHEET

Raster Set: IV-2
Section: IV Pg. ___ of ___
Raster No.: ___
Cal. Data Pkg.: ___
Scanning Mode: Parallel
Procedure No.: 80A6477 Rev. ___
Head Attitude: Horizontal
Video Tape No.: ___
Orient.: 1 Shooting: CW
Cal. Block No.: 196-104 (11")
Index Increment: 0.70"
Head No.: 80D8580-2
Index With: Nozzle Scanner (18.41" - Nozzle Knuckle)
Weld No.: 1-SB-RV-107-121-D
Sweep With: Rotator (134° - 226°)
Weld Centerline: 9.41"
Weld Title: Outlet Nozzle to Shell at 158° (Lower Vertical Quadrant)

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: See Section 8.3 for examination coverage.

Operator ___ Date ___ Time ___ Reviewer

Operator ___ Date ___ Time ___ ___ Date ___

NES NUCLEAR ENERGY SERVICES, INC.

RASTER SUMMARY SHEET

Raster Set: IV-2

Section: IV Pg. ___ of ___

Raster No.: ___

Cal. Data Pkg.: ___

Scanning Mode: Parallel

Procedure No.: 80A6477 Rev. ___

Head Attitude: Horizontal

Video Tape No.: ___

Orient.: 1 Shooting: CW

Cal. Block No.: 196-104 (11")

Index Increment: 0.70"

Head No.: 80D8580-2

Index With: Nozzle Scanner (18.41" - Nozzle Knuckle)

Weld No.: 1-SB-RV-107-121-E

Sweep With: Rotator (314° - 46°)

Weld Centerline: 9.41"

Weld Title: Outlet Nozzle to Shell at 202° (Upper Vertical Quadrant)

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: See Section 8.3 for examination coverage.

Operator ___ Date ___ Time ___ Reviewer

Operator ___ Date ___ Time ___ ___ Date ___

RASTER SUMMARY SHEET

Raster Set: IV-2
Section: IV Pg. ___ of ___
Raster No.: ___
Cal. Data Pkg.: ___
Scanning Mode: Parallel
Procedure No.: 80A6477 Rev. ___
Head Attitude: Horizontal
Video Tape No.: ___
Orient.: 1 Shooting: CW
Cal. Block No.: 196-104 (11")
Index Increment: 0.70"
Head No.: 80D8580-2
Index With: Nozzle Scanner (18.41" - Nozzle Knuckle)
Weld No.: 1-SB-RV-107-121-E
Sweep With: Rotator (134° - 226°)
Weld Centerline: 9.41"
Weld Title: Outlet Nozzle to shell at 202° (Lower Vertical Quadrant)

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: See Section 8.3 for examination coverage.

Operator ___ Date ___ Time ___ Reviewer
Operator ___ Date ___ Time ___ ___ Date ___

NES NUCLEAR ENERGY SERVICES, INC.

RASTER SUMMARY SHEET

Raster Set: IV-2

Section: IV Pg. __ of __

Raster No.:

Cal. Data Pkg.:

Scanning Mode: Parallel

Procedure No.: 80A6477 Rev.

Head Attitude: Horizontal

Video Tape No.:

Orient.: 1 Shooting: CW

Cal. Block No.: 196-104 (11")

Index Increment: 0.70"

Head No.: 80D8580-2

Index With: Nozzle Scanner (22.64" - 4.63")

Weld No.: 1-SB-RV-105-121-F

Sweep With: Rotator (314° - 46°)

Weld Centerline: 13.63"

Weld Title: Inlet Nozzle to Shell at 247° (Upper ertical Quadrant)

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: See Section 8.3 for examination coverage.

Operator ____ Date ____ Time ____ Reviewer

Operator ____ Date ____ Time ____ ____ Date ____

RASTER SUMMARY SHEET

Raster Set: IV-2
Section: IV Pg. ___ of ___
Raster No.: ___
Cal. Data Pkg.: ___
Scanning Mode: Parallel
Procedure No.: 80A6477 Rev. ___
Head Attitude: Horizontal
Video Tape No.: ___
Orient.: 1 Shooting: CW
Cal. Block No.: 196-104 (11")
Index Increment: 0.70"
Head No.: 80D8580-2
Index With: Nozzle Scanner (22.64" - 4.63")
Weld No.: 1-SB-RV-105-121-F
Sweep With: Rotator (134° - 226°)
Weld Centerline: 13.63"
Weld Title: Inlet Nozzle to Shell at 247° (Lower Vertical Quadrant)

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: See Section 8.3 for examination coverage.

Operator ___ Date ___ Time ___ Reviewer

Operator ___ Date ___ Time ___ ___ Date ___

NES NUCLEAR ENERGY SERVICES, INC.

Form 038-110/1 1/83

RASTER SUMMARY SHEET

Raster Set: IV-2
Section: IV Pg.___ of___
Raster No.: ___
Cal. Data Pkg.: ___
Scanning Mode: Parallel
Procedure No.: 80A6477 Rev.___
Head Attitude: Horizontal
Video Tape No.: ___
Orient.: 1 Shooting: CW
Cal. Block No.: 196-104 (11")
Index Increment: 0.70"
Head No.: 80D8580-2
Index With: Nozzle Scanner (22.64" - 4.63")
Weld No.: 1-SB-RV-105-121-G
Sweep With: Rotator (314° - 46°)
Weld Centerline: 13.63"
Weld Title: Inlet Nozzle to Shell at 293° (Upper Vertical Quadrant)

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: See Section 8.3 for examination coverage.

Operator___ Date___ Time___ Reviewer
Operator___ Date___ Time___ ___ Date___

NUCLEAR ENERGY SERVICES, INC.

RASTER SUMMARY SHEET

Raster Set: IV-2

Raster No.:

Scanning Mode: Parallel

Head Attitude: Horizontal

Orient.: 1 Shooting: CW

Index Increment: 0.70"

Index With: Nozzle Scanner (22.64" - 4.63")

Sweep With: Rotator (134° - 226°)

Weld Title: Inlet Nozzle to Shell at 293° (Lower Vertical Quadrant)

Section: IV Pg. of

Cal. Data Pkg.:

Procedure No.: 80A6477 Rev.

Video Tape No.:

Cal. Block No.: 196-104 (11")

Head No.: 80D8580-2

Weld No.: 1-SB-RV-105-121-G

Weld Centerline: 13.63"

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: See Section 8.3 for examination coverage.

Operator Date Time Reviewer

Operator Date Time Date

nes NUCLEAR ENERGY SERVICES, INC.

RASTER SUMMARY SHEET

Raster Set: IV-2
Section: IV Pg. ___ of ___
Raster No.:
Cal. Data Pkg.:
Scanning Mode: Parallel
Procedure No.: 80A6477 Rev. ___
Head Attitude: Horizontal
Video Tape No.:
Orient.: 1 Shooting: CW
Cal. Block No.: 196-104 (11")
Index Increment: 0.70"
Head No.: 80D6580-2
Index With: Nozzle Scanner (18.41" - Nozzle Knuckle)
Weld No.: 1-SB-RV-107-121-H
Sweep With: Rotator (314° - 46°)
Weld Centerline: 9.41"
Weld Title: Outlet Nozzle to Shell at 338° (Upper Vertical Quadrant)

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: See Section 8.3 for examination coverage.

Operator ______ Date ______ Time ______ Reviewer

Operator ______ Date ______ Time ______ ______ Date ______

RASTER SUMMARY SHEET

Raster Set: IV-2
Section: IV Pg.___ of___
Raster No.:
Cal. Data Pkg.:
Scanning Mode: Parallel
Procedure No.: 80A6477 Rev.___
Head Attitude: Horizontal
Video Tape No.:
Orient.: 1 Shooting: CW
Cal. Block No.: 196-104 (11")
Index Increment: 0.70"
Head No.: 80D8580-2
Index With: Nozzle Scanner (18.41" - Nozzle Knuckle)
Weld No.: 1-SB-RV-107-121-H
Sweep With: Rotator (134° - 226°)
Weld Centerline: 9.41"
Weld Title: Outlet Nozzle to Shell at 338° (Lower Vertical Quadrant)

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: See Section 8.3 for examination coverage.

Operator______ Date______ Time______ Reviewer

Operator______ Date______ Time______ ______ Date______

NES NUCLEAR ENERGY SERVICES, INC.

RASTER SUMMARY SHEET

Raster Set: IV-2
Section: IV Pg. ___ of ___
Raster No.: ___
Cal. Data Pkg.: ___
Scanning Mode: Parallel
Procedure No.: 80A6477 Rev. ___
Head Attitude: Horizontal
Video Tape No.: ___
Orient.: 2 Shooting: CCW
Cal. Block No.: 196-104 (11")
Index Increment: 0.70"
Head No.: 80D8580-2
Index With: Nozzle Scanner (18.41" - Nozzle knuckle)
Weld No.: 1-SB-RV-107-121-A
Sweep With: Rotator (314° - 46°)
Weld Centerline: 9.41"
Weld Title: Outlet Nozzle to Shell at 22° (Upper Vertical Quadrant)

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: See Section 8.3 for examination coverage.

Operator ___ Date ___ Time ___ Reviewer
Operator ___ Date ___ Time ___ ___ Date ___

NUCLEAR ENERGY SERVICES, INC.

Form 028-110/1 1/83

RASTER SUMMARY SHEET

Raster Set: IV-2
Section: IV Pg. ___ of ___
Raster No.: ___
Cal. Data Pkg.: ___
Scanning Mode: Parallel
Procedure No.: 80A6477 Rev. ___
Head Attitude: Horizontal
Video Tape No.: ___
Orient.: 2 Shooting: CCW
Cal. Block No.: 196-104 (11")
Index Increment: 0.70"
Head No.: 80D8580-2
Index With: Nozzle Scanner (18.41" - Nozzle Knuckle)
Weld No.: 1-SB-RV-107-121-A
Sweep With: Rotator (134° - 226°)
Weld Centerline: 9.41"
Weld Title: Outlet Nozzle to Shell at 22° (Lower Vertical Quadrant)

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: See Section 8.3 for examination coverage.

Operator ___ Date ___ Time ___ Reviewer

Operator ___ Date ___ Time ___ ___ Date ___

nes NUCLEAR ENERGY SERVICES, INC.

RASTER SUMMARY SHEET

Raster Set: IV-2
Raster No.:
Scanning Mode: Parallel
Head Attitude: Horizontal
Orient.: 2 Shooting: CCW
Index Increment: 0.70"
Index With: Nozzle Scanner (22.64" - 4.63")
Sweep With: Rotator (314° - 46°)

Section: IV Pg. ___ of ___
Cal. Data Pkg.:
Procedure No.: 80A6477 Rev. ___
Video Tape No.:
Cal. Block No.: 196-104 (11")
Head No.: 80D8580-2
Weld No.: 1-SB-RV-105-121-B
Weld Centerline: 13.63"

Weld Title: Inlet Nozzle to Shell at 67° (Upper Vertical Quadrant)

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: See Section 8.3 for examination coverage.

Operator ______ Date ______ Time ______ Reviewer

Operator ______ Date ______ Time ______ ______ Date ______

NUCLEAR ENERGY SERVICES, INC.

Form 028-110/1 1/83

RASTER SUMMARY SHEET

Raster Set: IV-2

Section: IV Pg. ___ of ___

Raster No.:

Cal. Data Pkg.:

Scanning Mode: Parallel

Procedure No.: 80A6477 Rev.

Head Attitude: Horizontal

Video Tape No.:

Orient.: 2 Shooting: CCW

Cal. Block No.: 196-104 (11")

Index Increment: 0.70"

Head No.: 80D8580-2

Index With: Nozzle Scanner (22.64" - 4.63")

Weld No.: 1-SB-RV-105-121-B

Sweep With: Rotator (134° - 226°)

Weld Centerline: 13.63"

Weld Title: Inlet Nozzle to Shell at 67° (Lower Vertical Quadrant)

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: See Section 8.3 for examination coverage.

Operator ______ Date ______ Time ______ Reviewer

Operator ______ Date ______ Time ______ ______ Date ______

nes NUCLEAR ENERGY SERVICES, INC.

RASTER SUMMARY SHEET

Raster Set: IV-2

Section: IV Pg. ___ of ___

Raster No.: ___

Cal. Data Pkg.: ___

Scanning Mode: Parallel

Procedure No.: 80A6477 Rev. ___

Head Attitude: Horizontal

Video Tape No.: ___

Orient.: 2 Shooting: CCW

Cal. Block No.: 196-104 (11")

Index Increment: 0.70"

Head No.: 80D8580-2

Index With: Nozzle Scanner (22.64" - 4.63")

Weld No.: 1-SB-RV-105-121-C

Sweep With: Rotator (314° - 46°)

Weld Centerline: 13.63"

Weld Title: Inlet Nozzle to Shell at 113° (Upper Vertical Quadrant)

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: See Section 8.3 for examination coverage.

Operator ___ Date ___ Time ___ Reviewer

Operator ___ Date ___ Time ___ ___ Date ___

NES NUCLEAR ENERGY SERVICES, INC.

RASTER SUMMARY SHEET

Raster Set: IV-2
Raster No.:
Scanning Mode: Parallel
Head Attitude: Horizontal
Orient.: 2 Shooting: CCW
Index Increment: 0.70"
Index With: Nozzle Scanner (22.64" - 4.63")
Sweep With: Rotator (134° - 226°)

Section: IV Pg. of
Cal. Data Pkg.:
Procedure No.: 80A6477 Rev.
Video Tape No.:
Cal. Block No.: 196-104 (11")
Head No.: 80D8580-2
Weld No.: 1-SB-RV-105-121-C
Weld Centerline: 13.63"

Weld Title: Inlet Nozzle to Shell at 113° (Lower Vertical Quadrant)

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: See Section 8.3 for examination coverage.

Operator Date Time Reviewer
Operator Date Time Date

nes NUCLEAR ENERGY SERVICES, INC.

RASTER SUMMARY SHEET

Raster Set: IV-2

Section: IV Pg.___of___

Raster No.:

Cal. Data Pkg.:

Scanning Mode: Parallel

Procedure No.: 80A6477 Rev.___

Head Attitude: Horizontal

Video Tape No.:

Orient.: 2 Shooting: CCW

Cal. Block No.: 196-104 (11")

Index Increment: 0.70"

Head No.: 80D8580-2

Index With: Nozzle Scanner (18.41" - Nozzle Knuckle)

Weld No.: 1-SB-RV-107-121-D

Sweep With: Rotator (314° - 46°)

Weld Centerline: 9.41"

Weld Title: Outlet Nozzle to Shell at 158° (Upper Vertical Quadrant)

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: See Section 8.3 for examination coverage.

Operator________ Date________ Time________ Reviewer

Operator________ Date________ Time________ ________ Date________

NES NUCLEAR ENERGY SERVICES, INC.

RASTER SUMMARY SHEET

Raster Set: IV-2

Raster No.:

Scanning Mode: Parallel

Head Attitude: Horizontal

Orient.: 2 Shooting: CCW

Index Increment: 0.70"

Index With: Nozzle Scanner (18.41" - Nozzle Knuckle)

Sweep With: Rotator (134° - 226°)

Weld Title: Outlet Nozzle to Shell at 158° (Lower Vertical Quadrant)

Section: IV Pg.___ of___

Cal. Data Pkg.:

Procedure No.: 80A6477 Rev.___

Video Tape No.:

Cal. Block No.: 196-104 (11")

Head No.: 80D8580-2

Weld No.: 1-SB-RV-107-121-D

Weld Centerline: 9.41"

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: See Section 8.3 for examination coverage.

Operator________ Date______ Time______ Reviewer

Operator________ Date______ Time______ ________ Date______

nes NUCLEAR ENERGY SERVICES, INC.

Form 028-110/1 1/83

RASTER SUMMARY SHEET

Raster Set: IV-2

Raster No.:

Scanning Mode: Parallel

Head Attitude: Horizontal

Orient.: 2 Shooting: CCW

Index Increment: 0.70"

Index With: Nozzle Scanner (18.41" - Nozzle Knuckle)

Sweep With: Rotator (314° - 46°)

Section: IV Pg.__ of __

Cal. Data Pkg.:

Procedure No.: 80A6477 Rev.

Video Tape No.:

Cal. Block No.: 196-104 (11")

Head No.: 80D8580-2

Weld No.: 1-SB-RV-107-121-E

Weld Centerline: 9.41"

Weld Title: Outlet Nozzle to Shell at 202° (Upper Vertical Quadrant)

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: See Section 8.3 for examination coverage.

Operator ___ Date ___ Time ___ Reviewer

Operator ___ Date ___ Time ___ ___ Date ___

nes NUCLEAR ENERGY SERVICES, INC.

RASTER SUMMARY SHEET

Raster Set: IV-2

Raster No.:

Scanning Mode: Parallel

Head Attitude: Horizontal

Orient.: 2 Shooting: CCW

Index Increment: 0.70"

Index With: Nozzle Scanner (18.41" - Nozzle Knuckle)

Sweep With: Rotator (134° - 226°)

Weld Title: Outlet Nozzle to Shell at 202° (Lower Vertical Quadrant)

Section: IV Pg. __ of __

Cal. Data Pkg.:

Procedure No.: 80A6477 Rev.

Video Tape No.:

Cal. Block No.: 196-104 (11")

Head No.: 80D8580-2

Weld No.: 1-SB-RV-107-121-E

Weld Centerline: 9.41"

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: See Section 8.3 for examination coverage.

Operator ____ Date ____ Time ____ Reviewer

Operator ____ Date ____ Time ____ ____ Date ____

NES NUCLEAR ENERGY SERVICES, INC.

RASTER SUMMARY SHEET

Raster Set: IV-2

Section: IV Pg. ___ of ___

Raster No.: ___

Cal. Data Pkg.: ___

Scanning Mode: Parallel

Procedure No.: 80A6477 Rev. ___

Head Attitude: Horizontal

Video Tape No.: ___

Orient.: 2 Shooting: CCW

Cal. Block No.: 196-104 (11")

Index Increment: 0.70"

Head No.: 80D8580-2

Index With: Nozzle Scanner (22.64" - 4.63")

Weld No.: 1-SB-RV-105-121-F

Sweep With: Rotator (314° - 46°)

Weld Centerline: 13.63"

Weld Title: Inlet Nozzle to Shell at 247° (Upper Vertical Quadrant)

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: See Section 8.3 for examination coverage.

Operator ___ Date ___ Time ___

Operator ___ Date ___ Time ___

Reviewer ___ Date ___

nes NUCLEAR ENERGY SERVICES, INC.

RASTER SUMMARY SHEET

Raster Set: IV-2

Raster No.:

Scanning Mode: Parallel

Head Attitude: Horizontal

Orient.: 2 Shooting: CCW

Index Increment: 0.70"

Index With: Nozzle Scanner (22.64" - 4.63")

Sweep With: Rotator (134° - 226°)

Section: IV Pg. of

Cal. Data Pkg.:

Procedure No.: 80A6477 Rev.

Video Tape No.:

Cal. Block No.: 196-104 (11")

Head No.: 80D8580-2

Weld No.: 1-SB-RV-105-121-F

Weld Centerline: 13.63"

Weld Title: Inlet Nozzle to Shell at 247° (Lower Vertical Quadrant)

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: See Section 8.3 for examination coverage.

Operator Date Time Reviewer

Operator Date Time Date

NES NUCLEAR ENERGY SERVICES, INC.

Form 028-110/1 1/83

RASTER SUMMARY SHEET

Raster Set: IV-2

Section: IV Pg. ___ of ___

Raster No.: ___

Cal. Data Pkg.: ___

Scanning Mode: Parallel

Procedure No.: 80A6477 Rev. ___

Head Attitude: Horizontal

Video Tape No.: ___

Orient.: 2 Shooting: CCW

Cal. Block No.: 196-104 (11")

Index Increment: 0.70"

Head No.: 80D8580-2

Index With: Nozzle Scanner (22.64" - 4.63")

Weld No.: 1-SB-RV-105-121-G

Sweep With: Rotator (314° - 46°)

Weld Centerline: 13.63"

Weld Title: Inlet Nozzle to Shell at 293° (Upper Vertical Quadrant)

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: See Section 8.3 for examination coverage.

Operator ___ Date ___ Time ___ Reviewer

Operator ___ Date ___ Time ___ ___ Date ___

NES NUCLEAR ENERGY SERVICES, INC.

RASTER SUMMARY SHEET

Raster Set: IV-2
Raster No.:
Scanning Mode: Parallel
Head Attitude: Horizontal
Orient.: 2 Shooting: CCW
Index Increment: 0.70"
Index With: Nozzle Scanner (22.64" - 4.63")
Sweep With: Rotator (134° - 226°)
Weld Title: Inlet Nozzle to Shell at 293° (Lower Vertical Quadrant)

Section: IV Pg. ___ of ___
Cal. Data Pkg.:
Procedure No.: 80A6477 Rev.
Video Tape No.:
Cal. Block No.: 196-104 (11")
Head No.: 80D8580-2
Weld No.: 1-SB-RV-105-121-G
Weld Centerline: 13.63"

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: See Section 8.3 for examination coverage.

Operator ___ Date ___ Time ___ Reviewer

Operator ___ Date ___ Time ___ ___ Date ___

nes NUCLEAR ENERGY SERVICES, INC.

RASTER SUMMARY SHEET

Raster Set: IV-2

Raster No.:

Scanning Mode: Parallel

Head Attitude: Horizontal

Orient.: 2 Shooting: CCW

Index Increment: 0.70"

Index With: Nozzle Scanner (18.41" - Nozzle Knuckle)

Sweep With: Rotator (314° - 46°)

Section: IV Pg. ___ of ___

Cal. Data Pkg.:

Procedure No.: 80A6477 Rev.

Video Tape No.:

Cal. Block No.: 196-104 (11")

Head No.: 80D8580-2

Weld No.: 1-SB-RV-107-121-H

Weld Centerline: 9.41"

Weld Title: Outlet Nozzle to shell to 338° (Upper Vertical Quadrant)

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: See Section 8.3 for examination coverage.

Operator ___ Date ___ Time ___ Reviewer

Operator ___ Date ___ Time ___ ___ Date ___

NES NUCLEAR ENERGY SERVICES, INC.

RASTER SUMMARY SHEET

Raster Set: IV-2
Raster No.:
Scanning Mode: Parallel
Head Attitude: Horizontal
Orient.: 2 Shooting: CCW
Index Increment: 0.70"
Index With: Nozzle Scanner (18.41" - Nozzle Knuckle)
Sweep With: Rotator (134° - 226°)
Weld Title: Outlet Nozzle to Shell at 338° (Lower Vertical Quadrant)

Section: IV Pg. ___ of ___
Cal. Data Pkg.:
Procedure No.: 80A6477 Rev.
Video Tape No.:
Cal. Block No.: 196-104 (11")
Head No.: 80D8580-2
Weld No.: 1-SB-RV-107-121-H
Weld Centerline: 9.41"

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: See Section 8.3 for examination coverage.

Operator ___ Date ___ Time ___ Reviewer
Operator ___ Date ___ Time ___ Date ___

nes NUCLEAR ENERGY SERVICES, INC.

9. RASTER SET IV-3
60° LONGITUDINAL HEAD

9.1 This raster set covers the parallel and perpendicular examinations for the first 25 percent of the material from the inside (ID) surface of the nozzle to shell welds. The following examinations are performed from the shell side, right and left horizontal quadrants.

9.2 These examinations are performed in 90° quadrants, with the quadrant boundaries at 45° angles to the horizontal/vertical nozzle centerlines. Thus, the quadrants which straddle 0° and 180° on each nozzle are referred to as the vertical quadrants, while those straddling 90° and 270° are called the horizontal quadrants.

9.3 For each quadrant, start the examination as specified on the raster summary sheet or where head contact can be established. The examination is carried out by rotating the fixture through the quadrant, indexing outward by the specified increment, and rotating the fixture back through the same quadrant. This pattern is continued until the outer examination radius is reached. The boom extend/retract may be used as necessary to maintain optimum wall contact.

9.4 Rotate the fixture 180° to provide the same examination angles in the opposite directions and perform the examination again, beginning at the inner examination radius.

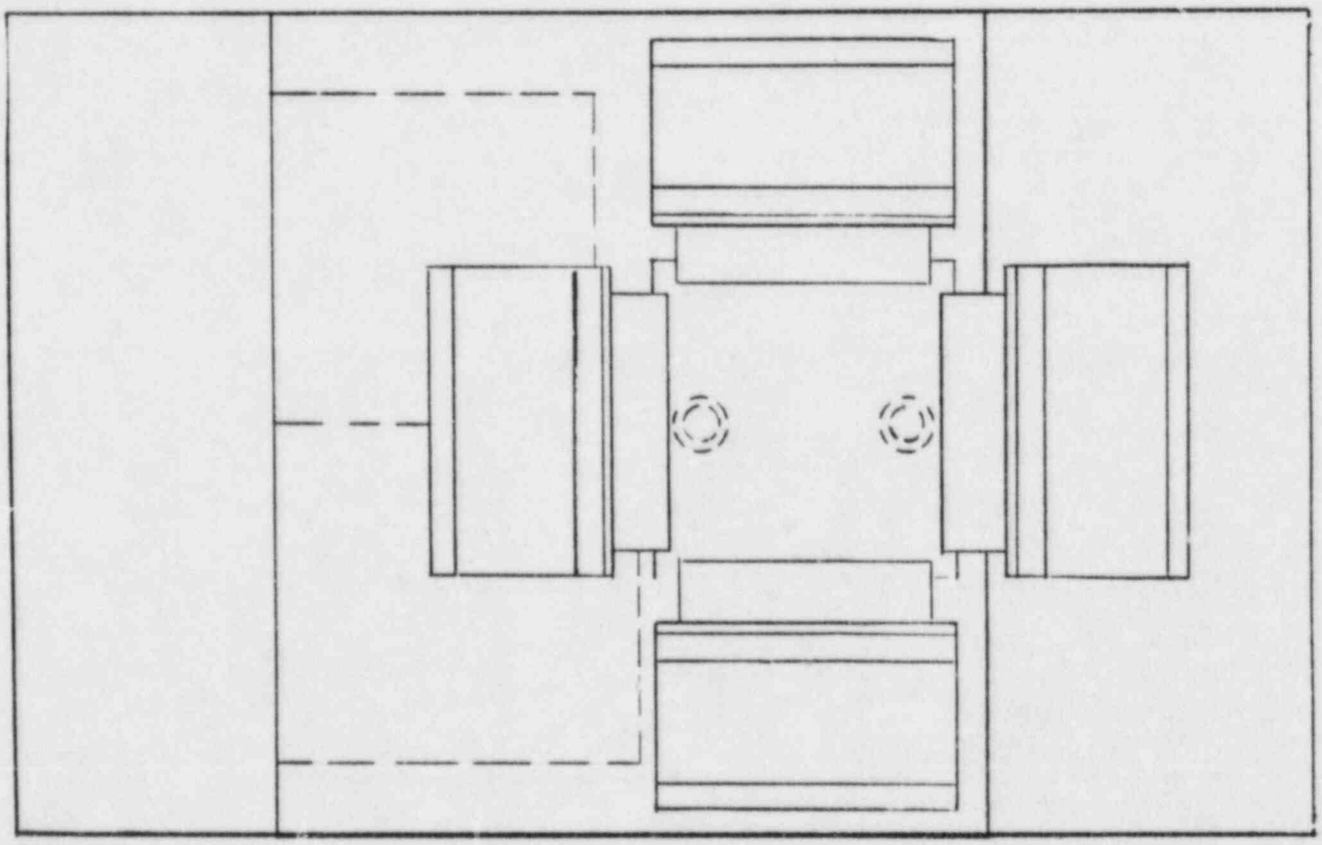
9.5 Figure 1 is an illustration of the orientations of the 60°L Dual transducers (Head 80D8580-3). Head 80D8580-3 beams are orientated in two directions perpendicular and two directions parallel to the RPV welds.

9.6 Each raster summary sheet in this section provides full coverage in two directions parallel and two directions perpendicular simultaneously.

9.7 Weld centerline refers to readout on ID nozzle scanner.

DIAGRAM FOR ORIENTATION NO. 1
HEAD 80D8580-3

FIGURE 1



NOTE: Head 80D8580-3 beams are orientated in two directions parallel and two directions perpendicular to the RPV welds

RASTER SUMMARY SHEET

Raster Set: IV-3
Section: IV Pg. ___ of ___
Raster No.: ___
Cal. Data Pkg.: ___
Scanning Mode: Parallel/Perpendicular
Procedure No.: 80A6480 Rev. ___
Head Attitude: Horizontal
Video Tape No.: ___
Orient.: 1 Shooting: *See Remarks
Cal. Block No.: 196-104 (11")
Index Increment: 0.50"
Head No.: 80D8580-3
Index With: **nozzle scanner (22.19" - nozzle knuckle)
Weld No.: 1-SB-RV-107-121-A
Sweep With: Rotator (44^{o} - 136^{o})
Weld Centerline: 9.41"
Weld Title: Outlet Nozzle at 22^{o} (Right Horizontal Quadrant)

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: *Head 80D8580-3 beams are oriented in two directions parallel and two directions perpendicular to the RPV welds.
**See Section 9.3 for examination coverage.

Operator ___ Date ___ Time ___ Reviewer
Operator ___ Date ___ Time ___ ___ Date ___

nes NUCLEAR ENERGY SERVICES, INC.

RASTER SUMMARY SHEET

Raster Set: IV-3
Section: IV Pg. ___ of ___
Raster No.: ___
Cal. Data Pkg.: ___
Scanning Mode: Parallel/Perpendicular
Procedure No.: 80A6480 Rev. ___
Head Attitude: ___
Video Tape No.: ___
Orient.: 1 Shooting: *See Remarks
Cal. Block No.: 196-104 (11")
Index Increment: 0.50"
Head No.: 80D8580-3
Index With: **nozzle scanner (22.19° - nozzle knuckle)
Weld No.: 1-SB-RV-107-121-A
Sweep With: Rotator (224° - 316°)
Weld Centerline: 9.41"
Weld Title: Outlet Nozzle at 22° (Left Horizontal Quadrant)

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: *Head 80D8580-3 beams are oriented in two directions parallel and two directions perpendicular to the RPV welds.
**See Section 9.3 for examination coverage.

Operator ___ Date ___ Time ___ Reviewer
Operator ___ Date ___ Time ___ ___ Date ___

NES NUCLEAR ENERGY SERVICES, INC.

Form 028-110/1 1/83

RASTER SUMMARY SHEET

Raster Set: IV-3
Section: IV Pg.___ of___
Raster No.:
Cal. Data Pkg.:
Scanning Mode: Parallel/Perpendicular
Procedure No.: 80A6430 Rev.___
Head Attitude: Horizontal
Video Tape No.:
Orient.: 1 Shooting: *See Remarks
Cal. Block No.: 196-104 (11")
Index Increment: 0.50"
Head No.: 80D8580-3
Index With: **Nozzle Scanner (26.42" - nozzle edge)
Weld No.: 1-SB-RV-105-121-B
Sweep With: Rotator (44° - 136°)
Weld Centerline: 13.63"
Weld Title: Inlet Nozzle at 67° (Right Horizontal Quadrant)

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: *Head 80D3580-3 beams are oriented in two directions parallel and two directions perpendicular to the RPV welds.
**See Section 9.3 for examination coverage.

Operator______ Date______ Time______ Reviewer
Operator______ Date______ Time______ ______ Date______

nes NUCLEAR ENERGY SERVICES, INC.

Form 028-110/1 1/83

RASTER SUMMARY SHEET

Raster Set: IV-3
Raster No.:
Scanning Mode: Parallel/Perpendicular
Head Attitude: Horizontal
Orient.: 1 Shooting: *See Remarks
Index Increment: 0.50"
Index With: **nozzle scanner (26.42" - nozzle edge)
Sweep With: Rotator (224^o - 316^o)
Weld Title: Inlet Nozzle at 67^o (Left Horizontal Quadrant)

Section: IV Pg.__ of__
Cal. Data Pkg.:
Procedure No.: 80A6480 Rev.
Video Tape No.:
Cal. Block No.: 196-104 (11")
Head No.: 80D8580-3
Weld No.: 1-SB-RV-105-121-B
Weld Centerline: 13.63"

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: *Head 80D8580-3 beams are oriented in two direction parallel and two directions perpendicular to the RPV welds.
**See Section 9.3 for examination coverage.

Operator____ Date____ Time____ Reviewer
Operator____ Date____ Time____ ____ Date____

nes NUCLEAR ENERGY SERVICES, INC.

Form 028-110/1 1/83

RASTER SUMMARY SHEET

Raster Set: IV-3

Raster No.:

Scanning Mode: Parallel/Perpendicular

Head Attitude: Horizontal

Orient.: 1 Shooting: *See Remarks

Index Increment: 0.50"

Index With: **nozzle scanner (26.42" - nozzle edge)

Sweep With: Rotator (44^{O} - 136^{O})

Section: IV Pg.___of___

Cal. Data Pkg.:

Procedure No.: 80A6480 Rev.___

Video Tape No.:

Cal. Block No.: 196-104 (11")

Head No.: 80D8580-3

Weld No.: 1-SB-RV-105-121-C

Weld Centerline: 13.63"

Weld Title: Inlet Nozzle at 113^{O} (Right Horizontal Quadrant)

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: *Head 80D8580-3 beams are oriented in two directions parallel and two directions perpendicular to the RPV welds.

**See Section 9.3 for examination coverage.

Operator ______ Date ______ Time ______ Reviewer

Operator ______ Date ______ Time ______ ______ Date ______

nes NUCLEAR ENERGY SERVICES, INC.

RASTER SUMMARY SHEET

Raster Set: IV-3
Section: IV Pg. ___ of ___
Raster No.: ___
Cal. Data Pkg.: ___
Scanning Mode: Paralled/Perpendicular
Procedure No.: 80A6480 Rev. ___
Head Attitude: Horizontal
Video Tape No.: ___
Orient.: 1 Shooting: *See Remarks
Cal. Block No.: 196-104 (11")
Index Increment: 0.50"
Head No.: 80D8580-3
Index With: **nozzle scanner (20.42" - nozzle edge)
Weld No.: 1-SB-RV-105-121-C
Sweep With: Rotator (224° - 316°)
Weld Centerline: 13.63"
Weld Title: Inlet Nozzle at 113° (Left Horizontal Quadrant)

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: *Head 80D8580-3 beams are oriented in two directions parallel and two directions perpendicular to the RPV welds.
**See Section 9.3 for examination coverage.

Operator ___ Date ___ Time ___ Reviewer
Operator ___ Date ___ Time ___ ___ Date ___

NES NUCLEAR ENERGY SERVICES, INC.

Form 028-110/1 1/83

RASTER SUMMARY SHEET

Raster Set: IV-J

Raster No.:

Scanning Mode: Parallel/Perpendicular

Head Attitude: Horizontal

Orient.: 1 Shooting: *See Remarks

Index Increment: 0.50"

Index With: **nozzle scanner (22.19" - nozzle knuckle)

Sweep With: Rotator (44^{o} - 136^{o})

Weld Title: Outlet Nozzle at 158^{o} (Right Horizontal Quadrant)

Section: IV Pg.___ of___

Cal. Data Pkg.:

Procedure No.: 80A6480 Rev.___

Video Tape No.:

Cal. Block No.: 196-104 (11")

Head No.: 80D8580-3

Weld No.: 1-SD-RV-107-121-D

Weld Centerline: 9.41"

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: *Head 80D8580-3 beams are oriented in two directions parallel and two directions perpendicular to the RPV welds.

**See Section 9.3 for examination coverage.

Operator______ Date______ Time______ Reviewer

Operator______ Date______ Time______ ______ Date______

nes NUCLEAR ENERGY SERVICES, INC.

Form 028-110/1 1/83

RASTER SUMMARY SHEET

Raster Set: IV-3

Raster No.:

Scanning Mode: Parallel/Perpendicular

Head Attitude: Horizontal

Orient.: 1 Shooting: *See Remarks

Index Increment: 0.50"

Index With: **nozzle scanner (22.19" - nozzle knuckle)

Sweep With: Rotator (224^{o} - 316^{o})

Weld Title: Outlet Nozzle at 153° (Left Horizontal Quadrant)

Section: IV Pg. __ of __

Cal. Data Pkg.:

Procedure No.: 80A6480 Rev. __

Video Tape No.:

Cal. Block No.: 196-104 (11")

Head No.: 80D8580-3

Weld No.: 1-SB-RV-107-121-D

Weld Centerline: 9.41"

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: *Head 80D8580-3 beams are oriented in two directions parallel and two directions perpendicular to the RPV welds.

**See Section 9.3 for examination coverage.

Operator ______ Date ______ Time ______ Reviewer

Operator ______ Date ______ Time ______ ______ Date ______

nes NUCLEAR ENERGY SERVICES, INC.

Form 028-110/1 1/83

RASTER SUMMARY SHEET

Raster Set: IV-3 Section: IV Pg.___ of___

Raster No.: Cal. Data Pkg.:

Scanning Mode: Parallel/Perpendicular Procedure No.: 80A6480 Rev.___

Head Attitude: Horizontal Video Tape No.:

Orient.: 1 Shooting: *See Remarks Cal. Block No.: 19C-104 (11")

Index Increment: 0.50" Head No.: 80D8580-3

Index With: **nozzle scanner (22.19" nozzle knuckle) Weld No.: 1-SB-RV-107-121-E

Sweep With: Rotator (44° - 136°) Weld Centerline: 9.41"

Weld Title: Outlet Nozzle at 202° (Right Horizontal Quadrant)

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: *Head 80D8580-3 beams are oriented in two directions parallel and two directions perpendicular to the RPV welds.
**See Section 9.3 for examination coverage.

Operator_______ Date_______ Time_______ Reviewer

Operator_______ Date_______ Time_______ _______ Date_______

nes NUCLEAR ENERGY SERVICES, INC.

RASTER SUMMARY SHEET

Raster Set: IV-3
Section: IV Pg. ___ of ___
Raster No.: ___
Cal. Data Pkg.: ___
Scanning Mode: Parallel/Perpendicular
Procedure No.: 80A6480 Rev. ___
Head Attitude: Horizontal
Video Tape No.: ___
Orient.: 1 Shooting: *See Remarks
Cal. Block No.: 196-104 (11")
Index Increment: 0.50"
Head No.: 80D8580-3
Index With: **nozzle scanner (22.19" - nozzle knuckle)
Weld No.: 1-SB-RV-107-121-E
Sweep With: Rotator (224^{o} - 316^{o})
Weld Centerline: 9.41"
Weld Title: Outlet Nozzle at 202^{o} (Left Horizontal Quadrant)

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: *Head 80D8580-3 beams are oriented in two directions parallel and two directions perpendicular to the RPV welds.
**See Section 9.3 for examination coverage.

Operator ___ Date ___ Time ___ Reviewer
Operator ___ Date ___ Time ___ ___ Date ___

nes NUCLEAR ENERGY SERVICES, INC.

RASTER SUMMARY SHEET

Raster Set: IV-3
Section: IV Pg.___ of___
Raster No.:
Cal. Data Pkg.:
Scanning Mode: Parallel/Perpendicular
Procedure No.: 80A6480 Rev.___
Head Attitude: Horizontal
Video Tape No.:
Orient.: 1 Shooting: *See Remarks
Cal. Block No.: 10G-104 (11")
Index Increment: 0.50"
Head No.: 80D8580-3
Index With: **nozzle scanner (26.42" - nozzle edge)
Weld No.: 1-SB-RV-105-121-F
Sweep With: Rotator (44° - 136°)
Weld Centerline: 13.63"
Weld Title: Inlet Nozzle at 247° (Right Horizontal Quadrant)

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: *Head 80D8580-3 beams are oriented in two directions parallel and two directions perpendicular to the RPV welds.
**See Section 9.3 for examination coverage.

Operator______ Date______ Time______ Reviewer
Operator______ Date______ Time______ ______ Date______

NES NUCLEAR ENERGY SERVICES, INC.

Form 028-110/1 1/83

RASTER SUMMARY SHEET

Raster Set: IV-3

Raster No.:

Scanning Mode: Parallel/Perpendicular

Head Attitude: Horizontal

Orient.: 1 Shooting: *See Remarks

Index Increment: 0.50"

Index With: **nozzle scanner (20.38° - nozzle edge)

Sweep With: Rotator (224° - 310°)

Section: IV Pg. of

Cal. Data Pkg.:

Procedure No.: 80A6480 Rev.

Video Tape No.:

Cal. Block No.: 190-104 (11)"

Head No.: 80D8580-3

Weld No.: 1-SB-RV-105-121-F

Weld Centerline: 13.63"

Weld Title: Inlet Nozzle at 247° (Left Horizontal Quadrant)

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: *Head 80D8580-3 beams are oriented in two directions parallel and two directions perpendicular to the RPV welds.

**See Section 9.3 for examination coverage.

Operator ______ Date ______ Time ______ Reviewer

Operator ______ Date ______ Time ______ ______ Date ______

nes NUCLEAR ENERGY SERVICES, INC.

RASTER SUMMARY SHEET

Raster Set: IV-3
Section: IV Pg. ___ of ___
Raster No.: ___
Cal. Data Pkg.: ___
Scanning Mode: Parallel/Perpendicular
Procedure No.: 80A6480 Rev. ___
Head Attitude: Horizontal
Video Tape No.: ___
Orient.: 1 Shooting: *See Remarks
Cal. Block No.: 19C-104 (11")
Index Increment: 0.50"
Head No.: 80D8580-3
Index With: **nozzle scanner (26.42" - nozzle edge)
Weld No.: 1-SB-RV-105-121-G
Sweep With: Rotator (44^{O} - 136^{O})
Weld Centerline: 13.63"
Weld Title: Inlet Nozzle at 293^{O} (Right Horizontal Quadrant)

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: *Head 80D8580-3 beams are oriented in two directions parallel and two directions perpendicular to the RPV welds.

**See Section 9.3 for examination coverage

Operator ___ Date ___ Time ___ Reviewer

Operator ___ Date ___ Time ___ ___ Date ___

nes NUCLEAR ENERGY SERVICES, INC.

RASTER SUMMARY SHEET

Raster Set: IV-3

Raster No.:

Scanning Mode: Parallel/Perpendicular

Head Attitude: Horizontal

Orient.: 1 Shooting: *See Remarks

Index Increment: 0.50"

Index With: **nozzle scanner (26.42" - nozzle edge)

Sweep With: Rotator (224° - 316°)

Section: IV Pg.___ of___

Cal. Data Pkg.:

Procedure No.: 80A6480 Rev.___

Video Tape No.:

Cal. Block No.: 196-104 (11")

Head No.: 80D8580-3

Weld No.: 1-SB-RV-105-121-G

Weld Centerline: 13.63"

Weld Title: Inlet Nozzle at 293° (Left Horizontal Quadrant)

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: *Head 80D8580-3 beams are oriented in two directions parallel and two directions perpendicular to the RPV welds.

**See Section 9.3 for examination coverage.

Operator_______ Date_______ Time_______ Reviewer

Operator_______ Date_______ Time_______ _______ Date_______

nes NUCLEAR ENERGY SERVICES, INC.

Form 028-110/1 1/83

RASTER SUMMARY SHEET

Raster Set: IV-3
Section: IV Pg.___ of___
Raster No.:
Cal. Data Pkg.:
Scanning Mode: Parallel/Perpendicular
Procedure No.: 80A6480 Rev.___
Head Attitude: Horizontal
Video Tape No.:
Orient.: 1 Shooting: *See Remarks
Cal. Block No.: 196-104 (11")
Index Increment: 0.50"
Head No.: 80D8580-3
Index With: **nozzle scanner (22.19" - nozzle knuckle)
Weld No.: 1-SB-RV-107-121-H
Sweep With: Rotator (44^{o} - 136^{o})
Weld Centerline: 9.41"
Weld Title: Outlet nozzle at 338^{o} (Right Horizontal Quadrant)

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: *Head 80D8580-3 beams are oriented in two directions parallel and two directions perpendicular to the RPV welds.
**See Section 9.3 for examination coverage.

Operator________ Date________ Time________ Reviewer
Operator________ Date________ Time________ ________ Date________

NES NUCLEAR ENERGY SERVICES, INC.

RASTER SUMMARY SHEET

Raster Set: IV-3
Raster No.:
Scanning Mode: Parallel/Perpendicular
Head Attitude: Horizontal
Orient.: 1 Shooting: *See Remarks
Index Increment: 0.50"
Index With: **Nozzle scanner (22.19" - nozzle knuckle)
Sweep With: Rotator (224° - 316°)
Weld Title: Outlet nozzle at 338° (Left Horizontal Quadrant)

Section: IV Pg.___ of___
Cal. Data Pkg.:
Procedure No.: 80A6480 Rev.___
Video Tape No.:
Cal. Block No.: 19G-104 (11")
Head No.: 80D8580-3
Weld No.: 1-SB-RV-107-121-H
Weld Centerline: 9.41"

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: *Head 80D8580-3 beams are oriented in two directions parallel and two directions perpendicular to the RPV welds.
**See Section 9.3 for examination coverage.

Operator________ Date______ Time______ Reviewer
Operator________ Date______ Time______ ________ Date______

nes NUCLEAR ENERGY SERVICES, INC.

10. RASTER SET IV-4
60° LONGITUDINAL HEAD

10.1 This raster set covers the parallel and perpendicular examinations for the first 25 percent of the material from the inside (ID) surface of the nozzle to shell welds. The following examinations are performed from the shell side, upper and lower vertical quadrants.

10.2 These examinations are performed in 90° quadrants, with the quadrant boundaries at 45° angles to the horizontal/vertical nozzle centerlines. Thus, the quadrants which straddle 0° and 180° on each nozzle are referred to as the vertical quadrants, while those straddling 90° and 270° are called the horizontal quadrants.

10.3 For each quadrant, start the examination as specified on the raster summary sheet or where head contact can be established. The examination is carried out by rotating the fixture through the quadrant, indexing outward by the specified increment, and rotating the fixture back through the same quadrant. This pattern is continued until the outer examination radius is reached. The boom extend/retract may be used as necessary to maintain optimum wall contact.

10.4 Rotate the fixture 180° to provide the same examination angles in the opposite directions and perform the examination again, beginning at the inner examination radius.

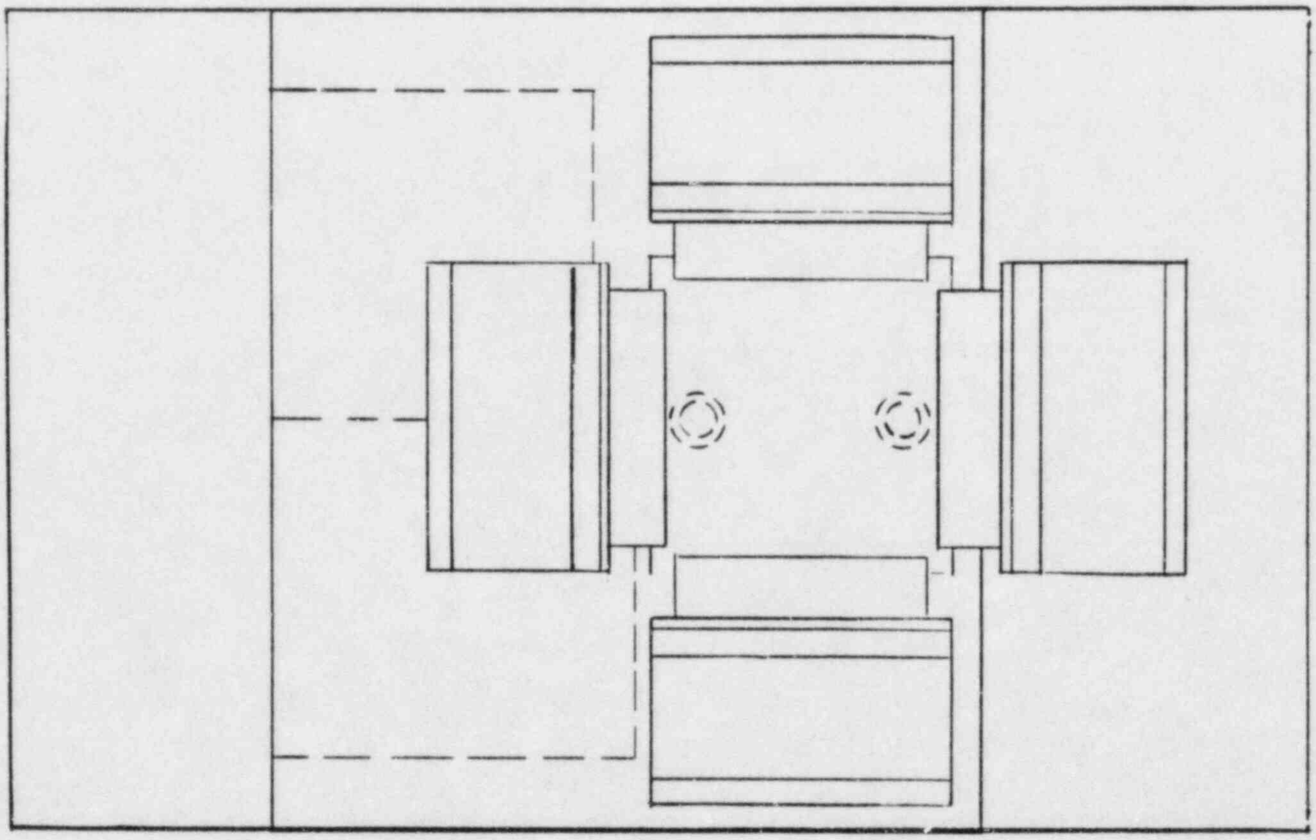
10.5 Figure 1 is an illustration of the orientations of the 60°L Dual transducers (Head 80D8580-3). Head 80D8580-3 beams are orientated in two directions perpendicular and two directions parallel to the RPV welds.

10.6 Each raster summary sheet in this section provides full coverage in two directions parallel and two directions perpendicular simultaneously.

10.7 Weld centerline refers to readout on ID nozzle scanner.

DIAGRAM FOR ORIENTATION NO. 1
HEAD 80D8580-3

FIGURE 1



NOTE: Head 80D8580-3 beams are orientated in two directions parallel and two directions perpendicular to the RPV welds

RASTER SUMMARY SHEET

Raster Set: IV-4

Raster No.:

Scanning Mode: Parallel/Perpendicular

Head Attitude: Horizontal

Orient.: 1 Shooting: *See Remarks

Index Increment: 0.50"

Index With: **nozzle scanner (26.42" - nozzle edge)

Sweep With: Rotator (314^{o} - 46^{o})

Section: IV Pg. ___ of ___

Cal. Data Pkg.:

Procedure No.: 80A6480 Rev.

Video Tape No.:

Cal. Block No.: 196-104 (11")

Head No.: 80D8580-3

Weld No.: 1-SB-RV-105-121-B

Weld Centerline: 13.63"

Weld Title: Inlet Nozzle at 67^{o} (Upper Vertical Quadrant)

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: *Head 80D8580-3 beams are oriented in two directions parallel and two directions perpendicular to the RPV welds.

**See Section 10.3 for examination coverage.

Operator ___ Date ___ Time ___ Reviewer

Operator ___ Date ___ Time ___ Date ___

nes NUCLEAR ENERGY SERVICES, INC.

Form 028-110/1 1/83

RASTER SUMMARY SHEET

Raster Set: IV-4
Section: IV Pg. ___ of ___
Raster No.: ___
Cal. Data Pkg.: ___
Scanning Mode: Parallel/Perpendicular
Procedure No.: 80A6480 Rev. ___
Head Attitude: Horizontal
Video Tape No.: ___
Orient.: 1 Shooting: *See Remarks
Cal. Block No.: 196-104 (11")
Index Increment: 0.50"
Head No.: 80D8580-3
Index With: **nozzle scanner (26.42" - nozzle edge)
Weld No.: 1-SB-RV-105-121-B
Sweep With: Rotator (134^{o} - 226^{o})
Weld Centerline: 13.63"
Weld Title: Inlet Nozzle at 67^{o} (Lower Vertical Quadrant)

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: *Head 80D8580-3 beams are oriented in two directions parallel and two directions perpendicular to the RPV welds.

**See Section 10.3 for examination coverage.

Operator ___ Date ___ Time ___ Reviewer

Operator ___ Date ___ Time ___ ___ Date ___

NES NUCLEAR ENERGY SERVICES, INC.

RASTER SUMMARY SHEET

Raster Set: IV-4

Raster No.:

Scanning Mode Parallel/Perpendicular

Head Attitude: Horizontal

Orient.: 1 Shooting: *See Remarks

Index Increment: 0.50"

Index With: **Nozzle scanner (26.42" - nozzle edge)

Sweep With: Rotator (314° - 46°)

Section: IV Pg.___ of___

Cal. Data Pkg.:

Procedure No.: 80A6480 Rev.___

Video Tape No.:

Cal. Block No.: 196-104 (11")

Head No.: 80D8530-3

Weld No.: 1-SB-RV-105-121-C

Weld Centerline: 13.63"

Weld Title: Inlet Nozzle at 113° (Upper Vertical Quadrant)

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: *Head 80D8580-3 beams are oriented in two directions parallel and two directions perpendicular to the RPV welds.

**See Section 10.3 for examination coverage.

Operator________ Date________ Time________ Reviewer

Operator________ Date________ Time________ ________ Date________

NES NUCLEAR ENERGY SERVICES, INC.

Form 028-110/1 1/83

RASTER SUMMARY SHEET

Raster Set: IV-4

Section: IV Pg. ___ of ___

Raster No.: ___

Cal. Data Pkg.: ___

Scanning Mode: Parallel/Perpendicular

Procedure No.: 80A6480 Rev. ___

Head Attitude: Horizontal

Video Tape No.: ___

Orient.: 1 Shooting: *See Remarks

Cal. Block No.: 196-104 (11")

Index Increment: 0.50"

Head No.: 80D8580-3

Index With: **nozzle scanner (26.42" - nozzle edge)

Weld No.: 1-SB-RV-105-121-C

Sweep With: Rotator (134^{o} - 226^{o})

Weld Centerline: 13.63"

Weld Title: Inlet Nozzle at 113^{o} (Lower Vertical Quadrant)

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: *Head 80D8580-3 beams are oriented in two directions parallel and two directions perpendicular to the RPV welds.

**See Section 10.3 for examination coverage.

Operator ___ Date ___ Time ___ Reviewer

Operator ___ Date ___ Time ___ ___ Date ___

NES NUCLEAR ENERGY SERVICES, INC.

Form 028-110/1 1/83

RASTER SUMMARY SHEET

Raster Set: IV-4

Raster No.:

Scanning Mode: Parallel/Perpendicular

Head Attitude: Horizontal

Orient.: 1 Shooting: *See Remarks

Index Increment: 0.50"

Index With: **nozzle scanner (26.42" -nozzle edge)

Sweep With: Rotator (314^{o} - 46^{o})

Weld Title: Inlet Nozzle at 247^{o} (Upper Vertical Quadrant)

Section: IV Pg. ___ of ___

Cal. Data Pkg.:

Procedure No.: 80A6480 Rev. ___

Video Tape No.:

Cal. Block No.: 196-104 (11")

Head No.: 80D8580-3

Weld No.: 1-SB-RV-105-121-F

Weld Centerline: 13.63"

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: *Head 80D8580-3 beams are oriented in two directions parallel and two directions perpendicular to the RPV welds.

**See Section 10.3 for examination coverage.

Operator ________ Date ____ Time ____ Reviewer

Operator ________ Date ____ Time ____ ________ Date ____

NES NUCLEAR ENERGY SERVICES, INC.

RASTER SUMMARY SHEET

Raster Set: IV-4

Section: IV Pg. ___ of ___

Raster No.:

Cal. Data Pkg.:

Scanning Mode: Parallel/Perpendicular

Procedure No.: 80A6480 Rev.

Head Attitude: Horizontal

Video Tape No.:

Orient.: 1 Shooting: *See Remarks

Cal. Block No.: 196-104 (11")

Index Increment: 0.50"

Head No.: 80D8580-3

Index With: **nozzle scanner (26.42" - nozzle edge)

Weld No.: 1-SB-RV-105-121-F

Sweep With: Rotator (134° - 226°)

Weld Centerline: 13.63"

Weld Title: Inlet Nozzle at 247° (Lower Vertical Quadrant)

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: *Head 80D8580-3 beams are oriented in two directions parallel and two directions perpendicular to the RPV welds.

**See Section 10.3 for examination coverage.

Operator _____ Date _____ Time _____ Reviewer

Operator _____ Date _____ Time _____ _____ Date _____

NES NUCLEAR ENERGY SERVICES, INC.

Form 028-110/1 1/83

RASTER SUMMARY SHEET

Raster Set: IV-4

Section: IV Pg. ___ of ___

Raster No.: ___

Cal. Data Pkg.: ___

Scanning Mode: Parallel/Perpendicular

Procedure No.: 80A6480 Rev. ___

Head Attitude: Horizontal

Video Tape No.: ___

Orient.: 1 Shooting: *See Remarks

Cal. Block No.: 196-104 (11")

Index Increment: 0.50"

Head No.: 80D8580-3

Index With: **nozzle scanner (26.42" - nozzle edge)

Weld No.: 1-SB-RV-105-121-G

Sweep With: Rotator (314° - 46°)

Weld Centerline: 13.63"

Weld Title: Inlet Nozzle at 293° (Upper Vertical Quadrant)

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: *Head 80D8580-3 beams are oriented in two directions parallel and two directions perpendicular to the RPV welds

**See Section 10.3 for examination coverage.

Operator ___ Date ___ Time ___ Reviewer

Operator ___ Date ___ Time ___ ___ Date ___

NES NUCLEAR ENERGY SERVICES, INC.

Form 028-110/1 1/83

RASTER SUMMARY SHEET

Raster Set: IV-4 | Section: IV Pg.___ of___

Raster No.: ______ | Cal. Data Pkg.: ______

Scanning Mode: Parallel/Perpendicular | Procedure No.: 80A6480 Rev.___

Head Attitude: Horizontal | Video Tape No.: ______

Orient.: 1 Shooting: *See Remarks | Cal. Block No.: 196-104 (11")

Index Increment: 0.50" | Head No.: 80D8580-3

Index With: **nozzle scanner (26.42" - nozzle edge) | Weld No.: 1-SB-RV-105-121-G

Sweep With: Rotator (134^o - 226^o) | Weld Centerline: 13.63"

Weld Title: Inlet nozzle at 293^o (lower Vertical Quadrant)

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: *Head 80D8580-3 beams are oriented in two directions parallel and two directions perpendicular to the RPV welds.

**See Section 10.3 for examination coverage.

Operator______ Date______ Time______ Reviewer

Operator______ Date______ Time______ ______ Date______

NES NUCLEAR ENERGY SERVICES, INC.

Form 028-110/1 1/83

RASTER SUMMARY SHEET

Raster Set: IV-4
Section: IV Pg.___ of___
Raster No.:
Cal. Data Pkg.:
Scanning Mode: Parallel/Perpendicular
Procedure No.: 80A6480 Rev.___
Head Attitude: Horizontal
Video Tape No.:
Orient.: 1 Shooting: *See Remarks
Cal. Block No.: 196-104 (11")
Index Increment: 0.50"
Head No.: 80D8580-3
Index With: **nozzle scanner (22.19" - nozzle knuckle)
Weld No.: 1-SB-RV-107-121-A
Sweep With: Rotator (314^o - 46^o)
Weld Centerline: 9.41"
Weld Title: Outlet Nozzle at 22^o (Upper Vertical Quadrant)

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: *Head 80D8580-3 beams are oriented in two directions parallel and two directions perpendicular to the RPV welds.

**See Section 10.3 for examination coverage.

Operator________ Date______ Time______ Reviewer

Operator________ Date______ Time______ ________ Date______

NES NUCLEAR ENERGY SERVICES, INC.

Form 028-110/1 1/83

RASTER SUMMARY SHEET

Raster Set: IV-4

Section: IV Pg. ___ of ___

Raster No.: ______

Cal. Data Pkg.: ______

Scanning Mode: Parallel/Perpendicular

Procedure No.: 80A6480 Rev. ___

Head Attitude: Horizontal

Video Tape No.: ______

Orient.: 1 Shooting: *See Remarks

Cal. Block No.: 196-104 (11")

Index Increment: 0.50"

Head No.: 80D8580-3

Index With: ** nozzle scanner (22.19" - nozzle knuckle)

Weld No.: 1-SB-RV-107-121-A

Sweep With: Rotator (134^o - 226^o)

Weld Centerline: 9.41"

Weld Title: Outlet Nozzle at 22^o (Lower Vertical Quadrant)

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: *Head 80D8580-3 beams are oriented in two directions parallel and two directions perpendicular to the RPV welds.

**See Section 10.3 for examination coverage.

Operator ______ Date ______ Time ______ Reviewer

Operator ______ Date ______ Time ______ ______ Date ______

NES NUCLEAR ENERGY SERVICES, INC.

RASTER SUMMARY SHEET

Raster Set: IV-4

Raster No.:

Scanning Mode: Parallel/Perpendicular

Head Attitude: Horizontal

Orient.: 1 Shooting: *See Remarks

Index Increment: 0.50"

Index With: **nozzle scanner (22.19" - nozzle knuckle)

Sweep With: Rotator (314^{O} - 46^{O})

Weld Title: Outlet Nozzle at 158^{O} (Upper Vertical Quadrant)

Section: IV Pg. __ of __

Cal. Data Pkg.:

Procedure No.: 80A6480 Rev.

Video Tape No.:

Cal. Block No.: 196-104 (11")

Head No.: 80D8580-3

Weld No.: 1-SB-RV-107-121-D

Weld Centerline: 9.41"

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: *Head 80D8580-3 beams are oriented in two directions parallel and two directions perpendicular to the RPV welds.

**See Section 10.3 for examination coverage.

Operator ___ Date ___ Time ___ Reviewer

Operator ___ Date ___ Time ___ Date ___

nes NUCLEAR ENERGY SERVICES, INC.

RASTER SUMMARY SHEET

Raster Set: IV-4

Raster No.:

Scanning Mode: Parallel/Perpendicular

Head Attitude: Horizontal

Orient.: 1 Shooting: *See Remarks

Index Increment: 0.50"

Index With: **nozzle scanner (22.19" - nozzle knuckle)

Sweep With: Rotator (134^{O} - 226^{O})

Section: IV Pg.___of___

Cal. Data Pkg.:

Procedure No.: 80A6480 Rev.___

Video Tape No.:

Cal. Block No.: 196-104 (11")

Head No.: 80D8580-3

Weld No.: 1-SB-RV-107-121-D

Weld Centerline: 9.41"

Weld Title: Outlet Nozzle at 158^{O} (Lower Vertical Quadrant)

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: *Head 80D8580-3 beams are oriented in two directions parallel and two directions perpendicular to the RPV welds.

**See Section 10.3 for examination coverage.

Operator________ Date________ Time________ Reviewer

Operator________ Date________ Time________ ________ Date________

NES NUCLEAR ENERGY SERVICES, INC.

RASTER SUMMARY SHEET

Raster Set: IV-4
Section: IV Pg. ___ of ___
Raster No.:
Cal. Data Pkg.:
Scanning Mode: Parallel/Perpendicular
Procedure No.: 80A6480 Rev.
Head Attitude: Horizontal
Video Tape No.:
Orient.: 1 Shooting: *See Remarks
Cal. Block No.: 196-104 (11")
Index Increment: 0.50"
Head No.: 80D8580-3
Index With: **nozzle scanner (22.19" = nozzle knuckle)
Weld No.: 1-SB-RV-107-121-E
Sweep With: Rotator (314^{o} - 46^{o})
Weld Centerline: 9.41"
Weld Title: Outlet Nozzle at 202^{o} (Upper Vertical Quadrant)

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: *Head 80D8580-3 beams are oriented in two directions parallel and two directions perpendicular to the RPV welds.

**See Section 10.3 for examination coverage.

Operator ___ Date ___ Time ___ Reviewer

Operator ___ Date ___ Time ___ ___ Date ___

nes NUCLEAR ENERGY SERVICES, INC.

Form 028-110/1 1/83

RASTER SUMMARY SHEET

Raster Set: IV-4

Section: IV Pg. ___ of ___

Raster No.: ___

Cal. Data Pkg.: ___

Scanning Mode: Parallel/Perpendicular

Procedure No.: 80A6480 Rev. ___

Head Attitude: Horizontal

Video Tape No.: ___

Orient.: 1 Shooting: *See Remarks

Cal. Block No.: 196-104 (11")

Index Increment: 0.50"

Head No.: 80D8580-3

Index With: **nozzle scanner (22.19" - nozzle knuckle)

Weld No.: 1-SB-RV-107-121-E

Sweep With: Rotator (134^{o} - 226^{o})

Weld Centerline: 9.41"

Weld Title: Outlet nozzle at 202^{o} (Lower Vertical Quadrant)

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: *Head 80D8580-3 beams are oriented in two directions parallel and two directions perpendicular to the RPV welds.

**See Section 10.3 for examination coverage.

Operator ___ Date ___ Time ___ Reviewer

Operator ___ Date ___ Time ___ ___ Date ___

NES NUCLEAR ENERGY SERVICES, INC.

RASTER SUMMARY SHEET

Raster Set: IV-4

Section: IV Pg.___of___

Raster No.:

Cal. Data Pkg.:

Scanning Mode: Parallel/Perpendicular

Procedure No.: 80A6480 Rev.___

Head Attitude: Horizontal

Video Tape No.:

Orient.: 1 Shooting: *See Remarks

Cal. Block No.: 196-104 (11")

Index Increment: 0.50"

Head No.: 80D8580-3

Index With: **nozzle scanner (22.19" - nozzle knuckle)

Weld No.: 1-SB-RV-107-121-H

Sweep With: Rotator (314^{o} - 46^{o})

Weld Centerline: 9.41"

Weld Title: Outlet Nozzle at 338^{o} (Upper Vertical Quadrant)

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: *Head 80D8580-3 beams are oriented in two directions parallel and two directions perpendicular to the RPV welds.

**See Section 10.3 for examination coverage.

Operator______ Date______ Time______ Reviewer

Operator______ Date______ Time______ ______ Date______

nes NUCLEAR ENERGY SERVICES, INC.

RASTER SUMMARY SHEET

Raster Set: IV-4
Section: IV Pg. ___ of ___
Raster No.: ___
Cal. Data Pkg.: ___
Scanning Mode: Parallel/Perpendicular
Procedure No.: 80A6480 Rev. ___
Head Attitude: Horizontal
Video Tape No.: ___
Orient.: 1 Shooting: *See Remarks
Cal. Block No.: 196-104 (11")
Index Increment: 0.50"
Head No.: 80D8580-3
Index With: **nozzle scanner (22.12" - nozzle knuckle)
Weld No.: 1-SB-RV-107-121-H
Sweep With: Rotator (134° - 226°)
Weld Centerline: 9.41"
Weld Title: Outlet Nozzle at 338° (Lower Vertical Quadrant)

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: *Head 80D8580-3 beams are oriented in two directions parallel and two directions perpendicular to the RPV welds.

**See Section 10.3 for examination coverage.

Operator ___ Date ___ Time ___ Reviewer

Operator ___ Date ___ Time ___ ___ Date ___

NES NUCLEAR ENERGY SERVICES, INC.

Form 028-110/1 1/83

11. RASTER SET IV-5
EXAMINATION HEAD 80D5780 and 80D5790

11.1 This raster set covers the perpendicular examinations of the nozzle to shell from the nozzle bore. The 5^{o} and 20^{o} examination heads are used to perform the perpendicular examinations.

11.2 In cooperation with the ultrasonics operator, locate the examination heads at the datum point found in Table IV-4 of this section.

11.3 Examination of the inlet nozzle shall begin at the datum point. The outlet nozzle examination begins 3.13" inboard from the datum.

11.4 NOTE: If the boom extend mechanism, on an indexing motion, is inadvertently run past the specified index, do not simply run the fixture back to the proper index. To insure that mechanical flexing and backlash do not result in an unexamined region, run the fixture back 1"-2" beyond the desired point and then advance it to the correct position.

11.5 Figure 1 is an illustration of the orientation of the 5^{o} and 20^{o} examination heads and how they should be mounted on the nozzle bore scanner.

11.6 The examination is complete when the fixture has withdrawn far enough that head contact is lost for 360^{o} rotation.

NOTE: Visual observation of scanner should be monitored as soon as contact is initially lost for either channel.

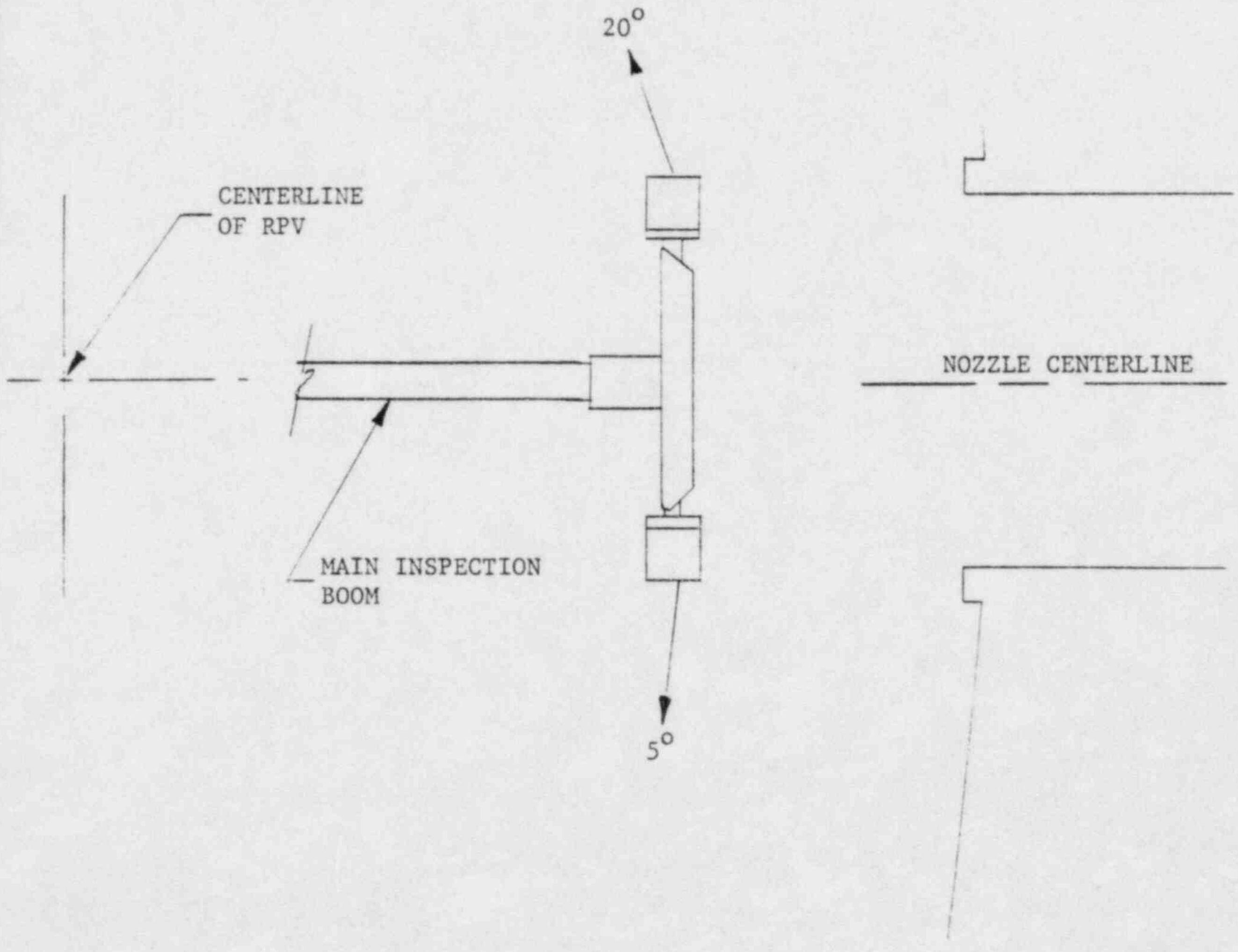


FIGURE 1 - ORIENTATION OF THE 5° AND 20° BEAMS

RASTER SUMMARY SHEET

Raster Set: IV-5

Section: IV Pg. ___ of ___

Raster No.: ___

Cal. Data Pkg.: ___

Scanning Mode: Perpendicular

Procedure No.: 80A6479 Rev. 1

Head Attitude: Rotational

Video Tape No.: ___

Orient.: N/A Shooting: N/A

Cal. Block No.: 196-201 (flange)

Index Increment: 0.70"

Head No.: 80D5780/80D5790

Index With: Boom Extend (See Note)

Weld No.: 1-SB-RV-107-121-A

Sweep With: Rotator (0^{o} - 361^{o})

Weld Centerline: 24.53" radius from nozzle C_L

Weld Title: Outlet nozzle to shell at 22^{o}

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: Note: Index limits are established after nozzle datum points are located. ~~(See Section 11.3 for~~ scan limits.

Operator ___ Date ___ Time ___ Reviewer

Operator ___ Date ___ Time ___ ___ Date ___

NES NUCLEAR ENERGY SERVICES, INC.

RASTER SUMMARY SHEET

Raster Set: IV-5

Raster No.:

Scanning Mode: Perpendicular

Head Attitude: Rotational

Orient.: N/A Shooting: N/A

Index Increment: 0.70"

Index With: Boom extend (See note)

Sweep With: Rotator (0^o - 361^o)

Weld Title: Inlet nozzle to shell at 67^o

Section: IV Pg. ___ of ___

Cal. Data Pkg.:

Procedure No.: 80A6479 Rev. 1

Video Tape No.:

Cal. Block No.: 196 - 201 (flange)

Head No.: 80D5780/80D5790

Weld No.: 1-SB-RV-105-121-B

Weld Centerline: 28.50" Radius from nozzle C_L

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: Note: Index limits are established after nozzle datum points are located. (See Section 11.3 for scan limits.)

Operator ______ Date ______ Time ______ Reviewer

Operator ______ Date ______ Time ______ ______ Date ______

nes NUCLEAR ENERGY SERVICES, INC.

Form 028-110/1 1/83

RASTER SUMMARY SHEET

Raster Set: IV-5

Raster No.:

Scanning Mode: Perpendicular

Head Attitude: Rotational

Orient.: N/A Shooting: N/A

Index Increment: 0.70"

Index With: Boom Extend (See note)

Sweep With: Rotator (0^{o} - 361^{o})

Weld Title: Inlet nozzle to shell at 113^{o}

Section: IV Pg.___ of___

Cal. Data Pkg.:

Procedure No.: 80A6479 Rev. 1

Video Tape No.:

Cal. Block No.: 196-201(Flange)

Head No.: 80D5780/80D5790

Weld No.: 1-SB-RV-105-121-C

Weld Centerline: 28.50" radius from nozzle C_L

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: Note: Index limits are established after nozzle datum points are located. (See Section 11.3 for scan limits.)

Operator______ Date______ Time______ Reviewer

Operator______ Date______ Time______ ______ Date______

NES NUCLEAR ENERGY SERVICES, INC.

RASTER SUMMARY SHEET

Raster Set: IV-5

Section: IV Pg. ___ of ___

Raster No.: ___

Cal. Data Pkg.: ___

Scanning Mode: Perpendicular

Procedure No.: 80A6479 Rev. 1

Head Attitude: Rotational

Video Tape No.: ___

Orient.: N/A Shooting: N/A

Cal. Block No.: 196-201 (Flange)

Index Increment: 0.70"

Head No.: 80D5780/80D5790

Index With: Boom Extend (See note)

Weld No.: 1-SB-RV-107-121-D

Sweep With: Rotator (0^{o} - 361^{o})

Weld Centerline: 24.53" radius from nozzle C_L

Weld Title: Outlet nozzle to shell at 158^{o}

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: Note: Index limits are established after nozzle datum points are located. (See Section 11.3 for scan limits.)

Operator ___ Date ___ Time ___ Reviewer

Operator ___ Date ___ Time ___ ___ Date ___

nes NUCLEAR ENERGY SERVICES, INC.

RASTER SUMMARY SHEET

Raster Set: IV-5

Section: IV Pg. ___ of ___

Raster No.:

Cal. Data Pkg.:

Scanning Mode: Perpendicular

Procedure No.: 80A6479 Rev. 1

Head Attitude: Rotational

Video Tape No.:

Orient.: N/A Shooting: N/A

Cal. Block No.: 196-201 (Flange)

Index Increment: 0.70"

Head No.: 80D5780/80D5790

Index With: Boom extend (See note)

Weld No.: 1-SB-RV-107-121-E

Sweep With: Rotator (0^{o} - 361^{o})

Weld Centerline: 24.53" radius from nozzle C_L

Weld Title: Outlet nozzle to shell at 202^{o}

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: Note: Index limits are established after nozzle datum points are located. (See Section 11.3 for scan limits.)

Operator ___ Date ___ Time ___ Reviewer

Operator ___ Date ___ Time ___ ___ Date ___

nes NUCLEAR ENERGY SERVICES, INC.

RASTER SUMMARY SHEET

Raster Set: IV-5
Raster No.:
Scanning Mode: Perpendicular
Head Attitude: Rotational
Orient.: N/A Shooting: N/A
Index Increment: 0.70"
Index With: Boom Extend (See note)
Sweep With: Rotator (0^o - 361^o)
Weld Title: Inlet nozzle to shell at 247^o

Section: IV Pg. ___ of ___
Cal. Data Pkg.:
Procedure No.: 80A6479 Rev. 1
Video Tape No.:
Cal. Block No.: 196-201 (Flange)
Head No.: 80D5780/80D5790
Weld No.: 1-SB-RV-105-121-F
Weld Centerline: 28.50" radius from nozzle C_L

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: Note: Index limits are established after nozzle datum points are located. (See Section 11.3 for scan limits.)

Operator ______ Date ______ Time ______ Reviewer
Operator ______ Date ______ Time ______ ______ Date ______

NES NUCLEAR ENERGY SERVICES, INC.

Form 028-110/1 1/83

RASTER SUMMARY SHEET

Raster Set: IV-5

Raster No.:

Scanning Mode: Perpendicular

Head Attitude: Rotational

Orient.: N/A Shooting: N/A

Index Increment: 0.70"

Index With: Boom extend (See note)

Sweep With: Rotator (0° - 361°)

Weld Title: Inlet nozzle to shell at 293°

Section: IV Pg. ___ of ___

Cal. Data Pkg.:

Procedure No.: 80A6479 Rev. 1

Video Tape No.:

Cal. Block No.: 196-201 (Flange)

Head No.: 80D5780/80D5790

Weld No.: 1-SB-RV-105-121-G

Weld Centerline: 28.50" radius from nozzle C_L

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: Note: Index limits are established after nozzle datum points are located. (See Section 11.3 for scan limits.)

Operator ___ Date ___ Time ___ Reviewer

Operator ___ Date ___ Time ___ Date ___

nes NUCLEAR ENERGY SERVICES, INC.

Form 028-110/1 1/83

RASTER SUMMARY SHEET

Raster Set: IV-5

Raster No.:

Scanning Mode: Perpendicular

Head Attitude: Rotational

Orient.: N/A Shooting: N/A

Index Increment: 0.70"

Index With: Boom extend (See note)

Sweep With: Rotator (0^{o} - 316^{o})

Weld Title: Outlet nozzle to shell at 338^{o}

Section: IV Pg. of

Cal. Data Pkg.:

Procedure No.: 80A6479 Rev. 1

Video Tape No.:

Cal. Block No.: 196-201 (Flange)

Head No.: 80D5780/80D5790

Weld No.: 1-SB-RV-107-121-H

Weld Centerline: 24.53" radius from nozzle C_L

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: Note: Index limits are established after nozzle datum points are located. (See Section 11.3 for scan limits.)

Operator Date Time Reviewer

Operator Date Time Date

nes NUCLEAR ENERGY SERVICES, INC.

12. RASTER SET IV-6
EXAMINATION HEAD 80D5720

12.1 This raster set covers the circumferential examination of the ID nozzle bore and inner radius. The 65° dual inner radius scanner is used to perform this examination.

12.2 In cooperation with the ultrasonics operator, locate the examination heads at the datum point found in Table IV-4 of this section.

12.3 Examination of the inlet nozzles shall begin 9.5" outboard from the datum point. The outlet nozzle examination begins 4.5" outboard from the datum point.

12.4 There is a 3.0" spacer that must be added to the inner radius scanner to examine the inlet nozzles. The spacer must be removed to examine the outlet nozzles.

12.5 NOTE: If the boom extend mechanism, on an indexing motion, is inadvertently run past the specified index, do not simply run the fixture back to the proper index. To insure that mechanical flexing and backlash do not result in an unexamined region, run the fixture back 1"-2" beyond the desired point and then advance it to the correct position.

12.6 The examination is complete when the fixture has withdrawn far enough that head contact is lost for 360° rotation.

12.7 Figure 1 is an illustration of the equipment setup for the nozzle inner radii examination.

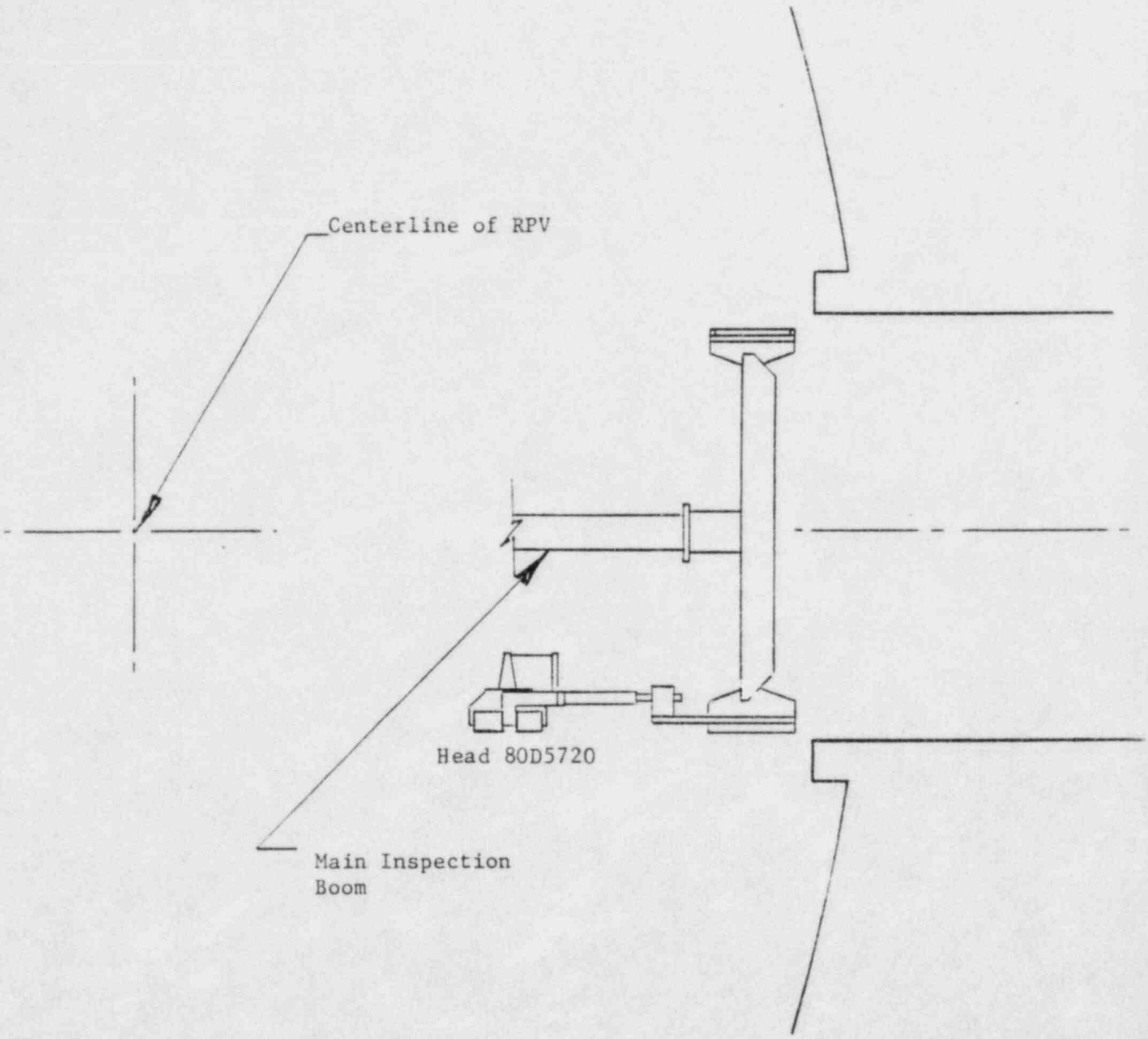


FIGURE 1. EQUIPMENT SET-UP FOR INNER RADIUS EXAMINATION.

RASTER SUMMARY SHEET

Raster Set: IV-6

Section: IV Pg. ___ of ___

Raster No.: ___

Cal. Data Pkg.: ___

Scanning Mode: Circumferential

Procedure No.: 80A6480 Rev. ___

Head Attitude: Rotational

Video Tape No.: ___

Orient.: N/A Shooting: N/A

Cal. Block No.: 196-202 (S.E.)

Index Increment: 0.37"

Head No.: 80D5720

Index With: Boom extend (See note)

Weld No.: 1-SB-RV-IR-128-301-A

Sweep With: Rotator (0^{o} - 361^{o})

Weld Centerline: N/A

Weld Title: Outlet nozzle at 22^{o}

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: Note: Index limits are established after nozzle datum points are located. (See Section 12.3 for scan limits.)

Operator ___ Date ___ Time ___ Reviewer ___

Operator ___ Date ___ Time ___ Date ___

nes NUCLEAR ENERGY SERVICES, INC.

RASTER SUMMARY SHEET

Raster Set: IV-6

Raster No.:

Scanning Mode: Circumferential

Head Attitude: Rotational

Orient.: N/A Shooting: N/A

Index Increment: 0.37"

Index With: Boom extend (See note)

Sweep With: Rotator (0^{o} - 361^{o})

Weld Title: Inlet nozzle at 67^{o}

Section: IV Pg. of

Cal. Data Pkg.:

Procedure No.: 80A6480 Rev.

Video Tape No.:

Cal. Block No.: 196-202 (S.E.)

Head No.: 80D5720

Weld No.: 1-SB-RV-IR-128-101-B

Weld Centerline: N/A

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: Note: Index limits are established after nozzle datum points are located. (See Section 12.3 for scan limits.)

Operator Date Time Reviewer

Operator Date Time Date

NES NUCLEAR ENERGY SERVICES, INC.

Form 028-110/1 1/83

RASTER SUMMARY SHEET

Raster Set: IV-6

Raster No.:

Scanning Mode: Circumferential

Head Attitude: Rotational

Orient.: N/A Shooting: N/A

Index Increment: 0.37"

Index With: Boom extend (See note)

Sweep With: Rotator (0^o - 361^o)

Weld Title: Inlet nozzle at 113^o

Section: IV Pg.___ of___

Cal. Data Pkg.:

Procedure No.: 80A6480 Rev.___

Video Tape No.:

Cal. Block No.: 196-202 (S.E.)

Head No.: 80D5720

Weld No.: 1-SB-RV-IR-128-101-C

Weld Centerline: N/A

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: Note: Index limits are established after nozzle datum points are located. (See Section 12.3 for scan limits.)

Operator______ Date______ Time______ Reviewer

Operator______ Date______ Time______ ______ Date______

NES NUCLEAR ENERGY SERVICES, INC.

RASTER SUMMARY SHEET

Raster Set: IV-6

Raster No.:

Scanning Mode: Circumferential

Head Attitude: Rotational

Orient.: N/A Shooting: N/A

Index Increment: 0.37'

Index With: Boom extend (See note)

Sweep With: Rotator (0^o - 361^o)

Weld Title: Outlet nozzle at 158^o

Section: IV Pg.___of___

Cal. Data Pkg.:

Procedure No.: 80A6480 Rev.___

Video Tape No.:

Cal. Block No.: 196-202 (S.E.)

Head No.: 80D5700

Weld No.: 1-SB-RV-IR-128-301-D

Weld Centerline: N/A

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: Note: Index limits are established after nozzle datum points are located. (See Section 12.3 for scan limits.)

Operator__________ Date______ Time______ Reviewer

Operator__________ Date______ Time______ __________ Date______

nes NUCLEAR ENERGY SERVICES, INC.

Form 028-110/1 1/83

RASTER SUMMARY SHEET

Raster Set: IV-6
Section: IV Pg. ___ of ___
Raster No.: ___
Cal. Data Pkg.: ___
Scanning Mode: Circumferential
Procedure No.: 80A6480 Rev. ___
Head Attitude: Rotational
Video Tape No.: ___
Orient.: N/A Shooting: N/A
Cal. Block No.: 196-202 (S.E.)
Index Increment: 0.37"
Head No.: 80D5720
Index With: Boom extend (See note)
Weld No.: 1-SB-RV-IR-128-301-E
Sweep With: Rotator (0^{o} - 361^{o})
Weld Centerline: N/A
Weld Title: Outlet nozzle at 202^{o}

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: Note: Index limits are established after nozzle datum points are located. (See Section 12.3 for scan limits.)

Operator ___ Date ___ Time ___ Reviewer
Operator ___ Date ___ Time ___ ___ Date ___

nes NUCLEAR ENERGY SERVICES, INC.

RASTER SUMMARY SHEET

Raster Set: IV-6
Section: IV Pg.___ of___
Raster No.: ___
Cal. Data Pkg.: ___
Scanning Mode: Circumferential
Procedure No.: 80A6480 Rev.___
Head Attitude: Rotational
Video Tape No.: ___
Orient.: N/A Shooting: N/A
Cal. Block No.: 196-202 (S.E.)
Index Increment: 0.37"
Head No.: 80D5720
Index With: Boom extend (See note)
Weld No.: 1-SB-RV-IR-128-101-F
Sweep With: Rotator (0^{o} - 361^{o})
Weld Centerline: N/A
Weld Title: Inlet nozzle at 247^{o}

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: Note: Index limits are established after nozzle datum points are located. (See Section 12.3 for scan limits.)

Operator___ Date___ Time___ Reviewer

Operator___ Date___ Time___ ___ Date___

NES NUCLEAR ENERGY SERVICES, INC.

RASTER SUMMARY SHEET

Raster Set: IV-6
Section: IV Pg.___ of___
Raster No.:
Cal. Data Pkg.:
Scanning Mode: Circumferential
Procedure No.: 80A6480 Rev.___
Head Attitude: Rotational
Video Tape No.:
Orient.: N/A Shooting: N/A
Cal. Block No.: 196-202 (S.E.)
Index Increment: 0.37"
Head No.: 80D5720
Index With: Boom extend (See note)
Weld No.: 1-SB-RV-IR-128-101-G
Sweep With: Rotator (0^{o} - 361^{o})
Weld Centerline: N/A
Weld Title: Inlet nozzle at 293^{o}

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: Note: Index limits are established after nozzle datum points are located. (See Section 12.3 for scan limits.)

Operator________ Date______ Time______ Reviewer

Operator________ Date______ Time______ ____________ Date______

NES NUCLEAR ENERGY SERVICES, INC.

Form 028-110/1 1/83

RASTER SUMMARY SHEET

Raster Set: IV-6

Raster No.:

Scanning Mode: Circumferential

Head Attitude: Rotational

Orient.: N/A Shooting: N/A

Index Increment: 0.37"

Index With: Boom extend (See note)

Sweep With: Rotator (0^o - 361^o)

Weld Title: Outlet nozzle at 338^o

Section: IV Pg.___of___

Cal. Data Pkg.:

Procedure No.: 80A6480 Rev.___

Video Tape No.:

Cal. Block No.: 196-202 (S.E.)

Head No.: 80D5720

Weld No.: 1-SB-RV-IR-128-301-H

Weld Centerline: N/A

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: Note: index limits are established after nozzle datum points are located. (See Section 12.3 for scan limits.)

Operator________ Date______ Time______ Reviewer

Operator________ Date______ Time______ ________ Date______

NES NUCLEAR ENERGY SERVICES, INC.

Form 028-110/1 1/83

13. RASTER SET IV-7
EXAMINATION HEAD 80D5720

13.1 This raster set covers the parallel examinations of the inlet and outlet nozzle safe-ends. The 65° dual examination head is used to perform this examination.

13.2 In cooperation with the ultrasonics operation, locate the examination heads at the datum point found in Table IV-4 of this section.

13.3 The parallel examination of the inlet nozzle safe-end shall begin 3.2" outboard form the datum point. The outlet nozzle safe-end parallel examination begins 4.3" inboard from the datum point. There is a 3.0" spacer that must be removed to examine the inlet and outlet nozzle safe-ends. Scans are completed 7" outboard of the start point or when weld root geometry precludes further ultrasonic examination.

13.4 Note: If the boom extend mechanism, on an indexing motion, is inadvertently run past the specified index, do not simply run the fixture back to the proper index. To insure that mechanical flexing and backlash do not result in an unexamined region, run the fixture back 1"-2" beyond the desired point and then advance it to the correct position.

13.5 Figure 1 is an illustration of the equipment setup for the parallel examination of the nozzle safe-ends.

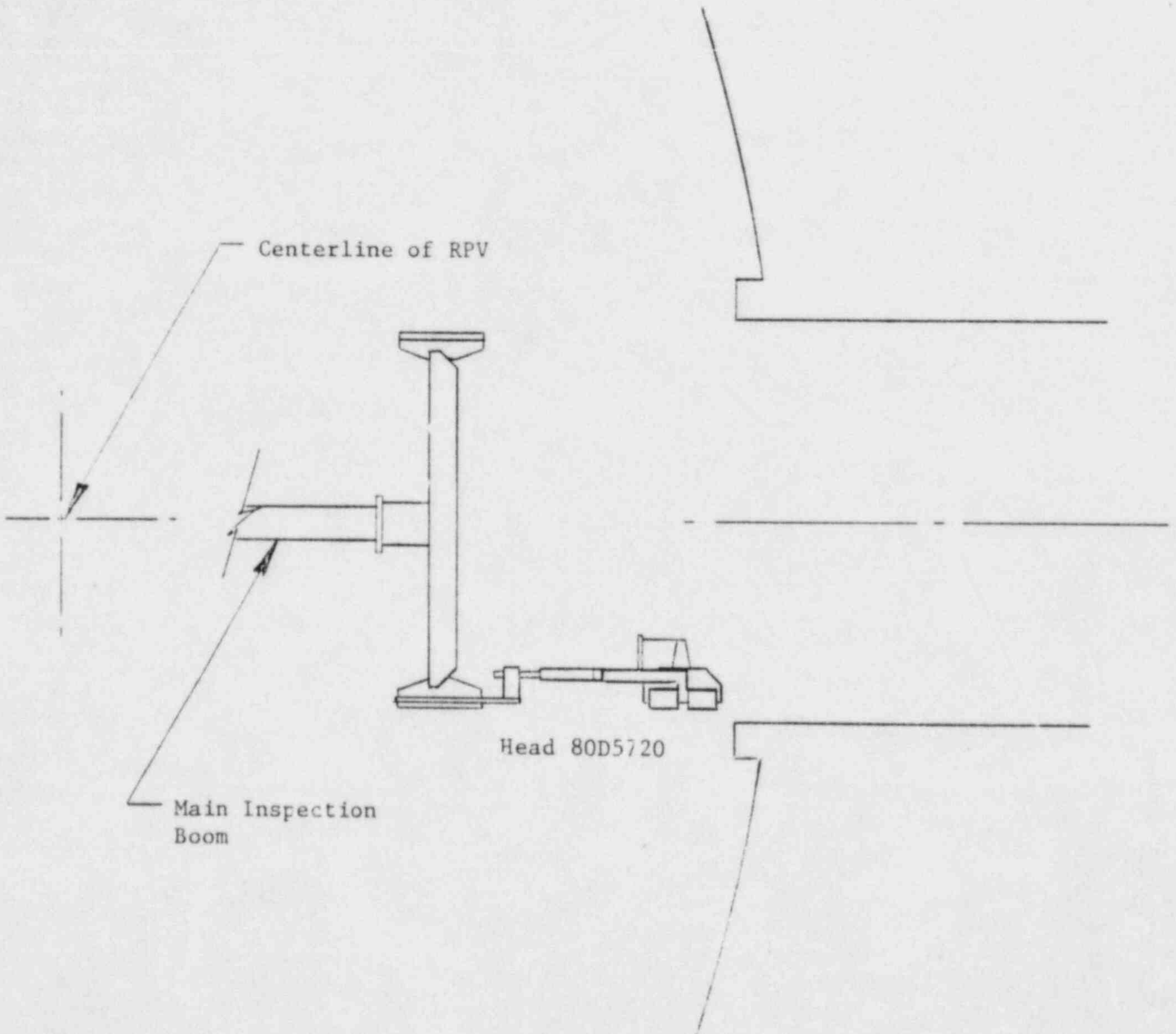


FIGURE 1. EQUIPMENT SET-UP FOR PARALLEL EXAMINATION OF SAFE-END WELDS.

RASTER SUMMARY SHEET

Raster Set: IV-7

Raster No.:

Scanning Mode: Parallel

Head Attitude: Rotational

Orient.: N/A Shooting: N/A

Index Increment: 0.37"

Index With: Boom extend (See note)

Sweep With: Rotator (0^{o} - 361^{o})

Weld Title: Outlet nozzle safe-end at 22^{o}

Section: IV Pg. ___ of ___

Cal. Data Pkg.:

Procedure No.: 80A6480 Rev.

Video Tape No.:

Cal. Block No.: 196-202 (S.E.)

Head No.: 80D5720

Weld No.: 1-SB-RV-SE-301-121-A

Weld Centerline: 12.38" from datum point

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: Note: Index limits are established after nozzle datum points are located. (See paragraph 13.3 for scan limits.)

Operator ___ Date ___ Time ___ Reviewer

Operator ___ Date ___ Time ___ Date ___

nes NUCLEAR ENERGY SERVICES, INC.

Form 028-110/1 1/83

RASTER SUMMARY SHEET

Raster Set: IV-7

Section: IV Pg.___ of___

Raster No.:

Cal. Data Pkg.:

Scanning Mode: Parallel

Procedure No.: 80A6480 Rev.___

Head Attitude: Rotational

Video Tape No.:

Orient.: N/A Shooting: N/A

Cal. Block No.: 196-202 (S.E.)

Index Increment: 0.37"

Head No.: 80D5720

Index With: Boom extend (See note)

Weld No.: 1-SB-RV-SE-302-121-B

Sweep With: Rotator (0^{o} - 361^{o})

Weld Centerline: 19.88" from datum points

Weld Title: Inlet nozzle safe-end at 67^{o}

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: Note: Index limits are established after nozzle datum points are located. (See paragraph 13.3 for scan limits.)

Operator___ Date___ Time___ Reviewer

Operator___ Date___ Time___ ___ Date___

nes NUCLEAR ENERGY SERVICES, INC.

RASTER SUMMARY SHEET

Raster Set: IV-7

Section: IV Pg.___of___

Raster No.: ___

Cal. Data Pkg.: ___

Scanning Mode: Parallel

Procedure No.: 80A6480 Rev.___

Head Attitude: Rotational

Video Tape No.: ___

Orient.: N/A Shooting: N/A

Cal. Block No.: 196-202 (S.E.)

Index Increment: 0.37"

Head No.: 80D5720

Index With: Boom extend (See note)

Weld No.: 1-SB-RV-SE-302-121-C

Sweep With: Rotator (0° - 361°)

Weld Centerline: 19.88" from datum point

Weld Title: Inlet nozzle safe-end at 113°

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: Note: Index limits are established after nozzle datum points are located. (See paragraph 13.3 for scan limits.)

Operator___ Date___ Time___ Reviewer

Operator___ Date___ Time___ ___ Date___

nes NUCLEAR ENERGY SERVICES, INC.

RASTER SUMMARY SHEET

Raster Set: IV-7 Section: IV Pg.___of___

Raster No.: Cal. Data Pkg.:

Scanning Mode: Parallel Procedure No.: 80A6480 Rev.___

Head Attitude: Rotational Video Tape No.:

Orient.: N/A Shooting: N/A Cal. Block No.: 196-202 (S.E.)

Index Increment: 0.37" Head No.: 80D5720

Index With: Boom extend (See note) Weld No.: 1-SB-RV-SE-301-121-D

Sweep With: Rotator (0° - 361°) Weld Centerline: 12.38" from datum point

Weld Title: Outlet nozzle safe-end at 158°

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: Note: Index limits are established after nozzle datum points are located. (See paragraph 13.3 for scan limits.)

Operator______ Date______ Time______ Reviewer

Operator______ Date______ Time______ ______ Date______

NES NUCLEAR ENERGY SERVICES, INC.

RASTER SUMMARY SHEET

Raster Set: IV-7

Raster No.:

Scanning Mode: Parallel

Head Attitude: Rotational

Orient.: N/A Shooting: N/A

Index Increment: 0.37"

Index With: Boom extend (See note)

Sweep With: Rotator (0^{o} - 361^{o})

Weld Title: Outlet nozzle safe-end at 202^{o}

Section: IV Pg. ___ of ___

Cal. Data Pkg.:

Procedure No.: 80A6480 Rev.

Video Tape No.:

Cal. Block No.: 196-202 (S.E.)

Head No.: SOD5720

Weld No.: 1-SB-RV-SE-301-121-E

Weld Centerline: 12.38" from datum point

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: Note: Index limits are established after nozzle datum points are located. (See paragraph 13.3 for scan limits.)

Operator ___ Date ___ Time ___ Reviewer

Operator ___ Date ___ Time ___ ___ Date ___

NES NUCLEAR ENERGY SERVICES, INC.

RASTER SUMMARY SHEET

Raster Set: IV-7

Section: IV Pg. ___ of ___

Raster No.: ___

Cal. Data Pkg.: ___

Scanning Mode: Parallel

Procedure No.: 80A6480 Rev. ___

Head Attitude: Rotational

Video Tape No.: ___

Orient.: N/A Shooting: N/A

Cal. Block No.: 196-202 (S E.)

Index Increment: 0.37"

Head No.: 80D5720

Index With: Boom extend (See note)

Weld No.: 1-SB-RV-SE-302-121-F

Sweep With: Rotator (0° - 361°)

Weld Centerline: 19.88" from datum point

Weld Title: Inlet nozzle safe-end at 247°

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: Note: Index limits are established after nozzle datum points are located. (See paragraph 13.3 for scan limits.)

Operator ___ Date ___ Time ___ Reviewer

Operator ___ Date ___ Time ___ ___ Date ___

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Form 028-110/1 1/83

RASTER SUMMARY SHEET

Raster Set: IV-7 | Section: IV | Pg. ___ of ___

Raster No.: ___ | Cal. Data Pkg.: ___

Scanning Mode: Parallel | Procedure No.: 80A6480 | Rev. ___

Head Attitude: Rotational | Video Tape No.: ___

Orient.: N/A | Shooting: N/A | Cal. Block No.: 196-202 (S.E.)

Index Increment: 0.37" | Head No.: 80D5720

Index With: Boom extend (See note) | Weld No.: 1-SB-RV-SE-302-121-G

Sweep With: Rotator (0^{o} - 361^{o}) | Weld Centerline: 19.88" from datum point

Weld Title: Inlet nozzle safe-end at 293^{o}

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: Note: Index limits are established after nozzle datum points are located. (See paragraph 13.3 for scan limits.

Operator ___ Date ___ Time ___ Reviewer

Operator ___ Date ___ Time ___ ___ Date ___

NES NUCLEAR ENERGY SERVICES, INC.

RASTER SUMMARY SHEET

Raster Set: IV-7

Section: IV Pg.___of___

Raster No.:

Cal. Data Pkg.:

Scanning Mode: Parallel

Procedure No.: 80A6480 Rev.

Head Attitude: Rotational

Video Tape No.:

Orient.: N/A Shooting: N/A

Cal. Block No.: 196-202 (S.E.)

Index Increment: 0.37"

Head No.: 80D5720

Index With: Boom extend (See note)

Weld No.: 1-SB-RV-SE-301-121-H

Sweep With: Rotator (0^{o} - 361^{o})

Weld Centerline: 12.38" from datum point

Weld Title: Outlet nozzle safe-end at 338^{o}

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: Note: Index limits are established after nozzle datum points are located. (See paragraph 13.3 for scan limits.)

Operator________ Date________ Time________ Reviewer

Operator________ Date________ Time________ ________ Date________

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14. RASTER SET IV-8
EXAMINATION HEAD 80D6005

14.1 This raster set covers the perpendicular examinations of the inlet and outlet nozzle safe-ends. The 65° dual examination head is used to perform this examination.

14.2 In cooperation with the ultrasonics operator, locate the examination heads at the datum point found in Table IV-4 of this section.

14.3 The perpendicular examination of the inlet nozzle safe-ends shall begin 16.38" outboard from the datum point. The outlet nozzle safe-ends examination begins 8.8" outboard from the datum point. The inner radius scanner must be removed to examine (perpendicular) the inlet and outlet nozzle safe-ends. Scans are completed 7" outboard of the start point or when weld root geometry precludes further ultrasonic examination.

14.4 NOTE: If the boom extend mechanism, on an indexing motion, is inadvertently run past the specified index, do not simply run the fixture back to the proper index. To insure that mechanical flexing and backlash do not result in an unexamined region, run the fixture back 1"-2" beyond the desired point and then advance it to the correct position.

14.5 Figure 1 is an illustration of the equipment setup for the perpendicular examination of the nozzle safe-ends.

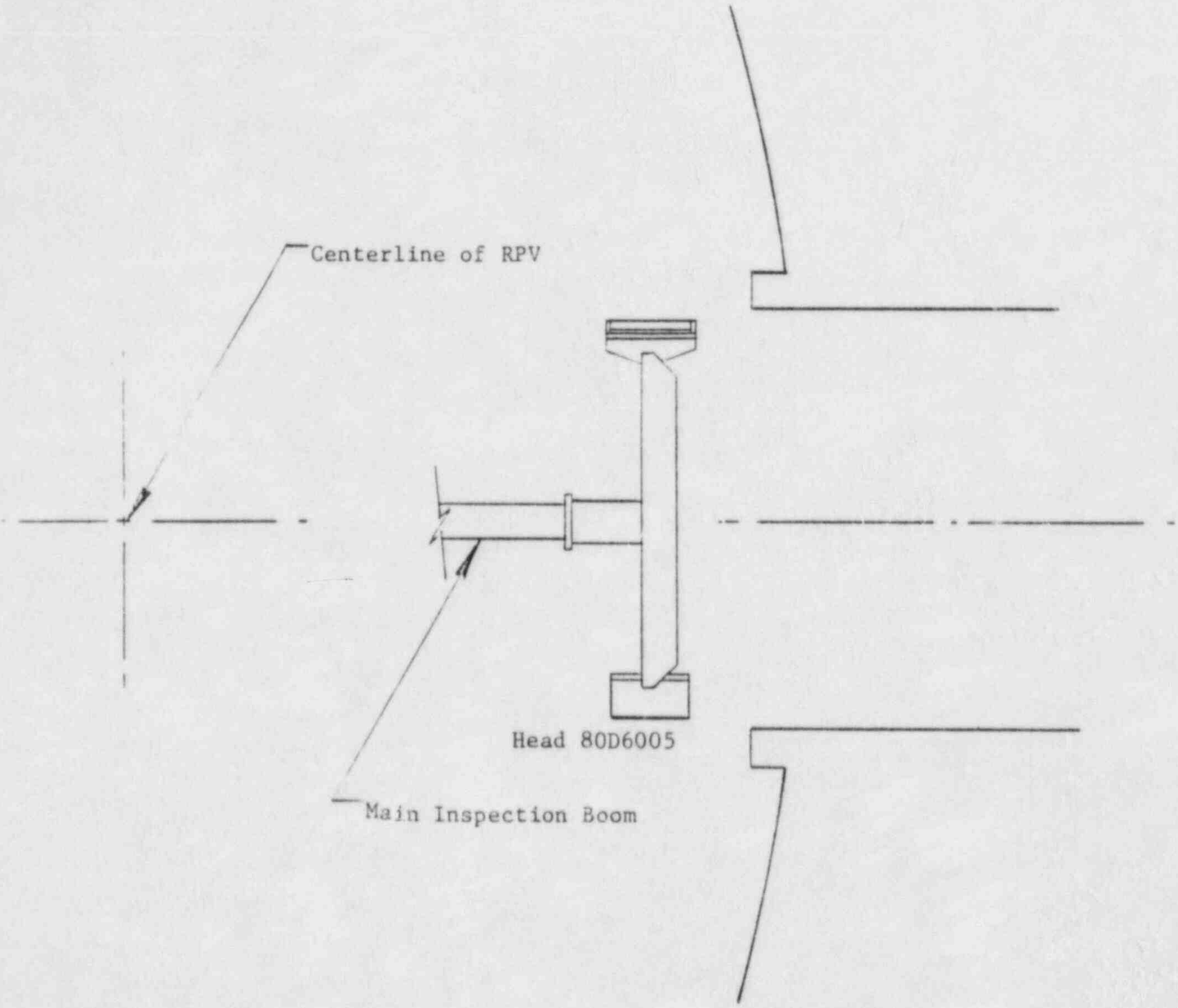

FIGURE 1. EQUIPMENT SET-UP FOR PERPENDICULAR EXAMINATION OF SAFE-END WELDS.

RASTER SUMMARY SHEET

Raster Set: IV-8

Section: IV Pg.___ of___

Raster No.: ___

Cal. Data Pkg.: ___

Scanning Mode: Perpendicular

Procedure No.: 80A6480 Rev.___

Head Attitude: Rotational

Video Tape No.: ___

Orient.: N/A Shooting: N/A

Cal. Block No.: 196-202 (S.E.)

Index Increment: 0.37"

Head No.: 80D6005

Index With: Boom Extend (See note)

Weld No.: 1-SB-RV-SE-301-121-A

Sweep With: Rotator (0^{o} - 361^{o})

Weld Centerline: 12.38" from datum point

Weld Title: Outlet nozzle safe-end at 22^{o}

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: Note: Index limits are established after nozzle datum points are located. (See paragraph 14.3 for scan limits.)

Operator___ Date___ Time___ Reviewer

Operator___ Date___ Time___ ___ Date___

NES NUCLEAR ENERGY SERVICES, INC.

RASTER SUMMARY SHEET

Raster Set: IV-8
Section: IV Pg.___ of___
Raster No.: ___
Cal. Data Pkg.: ___
Scanning Mode: Perpendicular
Procedure No.: 80A6480 Rev.___
Head Attitude: Rotational
Video Tape No.: ___
Orient.: N/A Shooting: N/A
Cal. Block No.: 196-202 (S.E.)
Index Increment: 0.37"
Head No.: 80D6005
Index With: Boom extend (See note)
Weld No.: 1-SB-RV-SE-302-121-B
Sweep With: Rotator (0^{o} - 361^{o})
Weld Centerline: 19.88" from datum point
Weld Title: Inlet nozzle safe-end at 67^{o}

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: Note: Index limits are established after nozzle datum points are located. (See paragraph 14.3 for scan limits.)

Operator______ Date______ Time______ Reviewer
Operator______ Date______ Time______ ______ Date______

nes NUCLEAR ENERGY SERVICES, INC.

Form 028-110/1 1/83

RASTER SUMMARY SHEET

Raster Set: IV-8
Section: IV Pg.___ of___
Raster No.:
Cal. Data Pkg.:
Scanning Mode: Perpendicular
Procedure No.: 80A6480 Rev.___
Head Attitude: Rotational
Video Tape No.:
Orient.: N/A Shooting: N/A
Cal. Block No.: 196-202 (S.E.)
Index Increment: 0.37"
Head No.: 80D6005
Index With: Boom-extend (See note)
Weld No.: 1-SB-RV-SE-302-121-C
Sweep With: Rotator (0^{o} - 361^{o})
Weld Centerline: 10.88" from datum point
Weld Title: Inlet nozzle safe-end at 113^{o}

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: Note: Index limits are established after nozzle datum points are located. (See paragraph 14.3 for scan limits.)

Operator________ Date______ Time______ Reviewer

Operator________ Date______ Time______ ________ Date______

nes NUCLEAR ENERGY SERVICES, INC.

Form 028-110/1 1/83

RASTER SUMMARY SHEET

Raster Set: IV-8

Section: IV Pg.___of___

Raster No.: ______

Cal. Data Pkg.: ______

Scanning Mode: Perpendicular

Procedure No.: 80A6480 Rev.___

Head Attitude: Rotational

Video Tape No.: ______

Orient.: N/A Shooting: N/A

Cal. Block No.: 196-202 (S.E.)

Index Increment: 0.37"

Head No.: 80D6005

Index With: Boom extend (See note)

Weld No.: 1-SB-RV-SE-301-121-D

Sweep With: Rotator (0^{o} - 361^{o})

Weld Centerline: 12.38" from datum point

Weld Title: Outlet nozzle safe-end at 158^{o}

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: Note: Index limits are established after nozzle datum points are located. (See paragraph 14.3 for scan limits.)

Operator______ Date______ Time______ Reviewer

Operator______ Date______ Time______ ______ Date______

NUCLEAR ENERGY SERVICES, INC.

RASTER SUMMARY SHEET

Raster Set: IV-8
Section: IV Pg.___of___
Raster No.:
Cal. Data Pkg.:
Scanning Mode: Perpendicular
Procedure No.: 80A6480 Rev.___
Head Attitude: Rotational
Video Tape No.:
Orient.: N/A Shooting: N/A
Cal. Block No.: 196-202 (S.E.)
Index Increment: 0.37"
Head No.: 80D6005
Index With: Boom extend (See note)
Weld No.: 1-SB-RV-SE-301-121-E
Sweep With: Rotator (0^{o} - 361^{o})
Weld Centerline: 12.33" from datum point
Weld Title: Outlet nozzle safe-end at 202^{o}

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: Note: Index limits are established after nozzle datum points are located. (See paragraph 14.3 for scan limits.)

Operator________ Date________ Time________ Reviewer

Operator________ Date________ Time________ ________ Date________

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RASTER SUMMARY SHEET

Raster Set: IV-8
Section: IV Pg.___ of___
Raster No.:
Cal. Data Pkg.:
Scanning Mode: Perpendicular
Procedure No.: 80A6480 Rev.___
Head Attitude: Rotational
Video Tape No.:
Orient.: N/A Shooting: N/A
Cal. Block No.: 196-202 (S.E.)
Index Increment: 0.37"
Head No.: 80D6005
Index With: Boom extend (See note)
Weld No.: 1-SB-RV-SE-302-121-F
Sweep With: Rotator (0^{o} - 361^{o})
Weld Centerline: 19.88" from datum point
Weld Title: Inlet nozzle safe-end at 247^{o}

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: Note: Index limits are established after nozzle datum points are located. (See paragraph 14.3 for scan limits.)

Operator____ Date____ Time____ Reviewer

Operator____ Date____ Time____ ____ Date____

NES NUCLEAR ENERGY SERVICES, INC.

Form 028-110/1 1/83

RASTER SUMMARY SHEET

Raster Set: IV-8

Section: IV Pg. ___ of ___

Raster No.: ___

Cal. Data Pkg.: ___

Scanning Mode: Perpendicular

Procedure No.: 80A6480 Rev. ___

Head Attitude: Rotational

Video Tape No.: ___

Orient.: N/A Shooting: N/A

Cal. Block No.: 196-202 (S.E.)

Index Increment: 0.37"

Head No.: 80D6005

Index With: Boom extend (See note)

Weld No.: 1-SB-RV-SE-302-121-G

Sweep With: Rotator (0^{o} - 361^{o})

Weld Centerline: 19.88" from datum point

Weld Title: Inlet nozzle safe-end at 293^{o}

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: Note: Index limits are established after nozzle datum points are located. (See paragraph 14.3 for scan limits.)

Operator ___ Date ___ Time ___ Reviewer

Operator ___ Date ___ Time ___ ___ Date ___

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RASTER SUMMARY SHEET

Raster Set: IV-8

Raster No.:

Scanning Mode: Perpendicular

Head Attitude: Rotational

Orient.: N/A Shooting: N/A

Index Increment: 0.37"

Index With: Boom extend (See note)

Sweep With: Rotator (0^{o} - 361^{o})

Weld Title: Outlet nozzle safe-end at 338^{o}

Section: IV Pg. ___ of ___

Cal. Data Pkg.:

Procedure No.: 80A6480 Rev. ___

Video Tape No.:

Cal. Block No.: 196-202 (S.E.)

Head No.: 80D6005

Weld No.: 1-SB-RV-SE-301-121-H

Weld Centerline: 12.38" from datum points

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: Note: Index limits are established after nozzle datum points are located. (See paragraph 14.3 for scan limits.)

Operator ______ Date ______ Time ______ Reviewer

Operator ______ Date ______ Time ______ ______ Date ______

NUCLEAR ENERGY SERVICES, INC.

SECTION V

POSITIONAL REPEATABILITY CHECKS

I. GENERAL REQUIREMENTS

1. Record the date and time of all checks on the Positional Check Log Sheet(s) provided in this Section.

2. Positional repeatability checks shall be conducted, as a minimum, one time within each 24 hour period. Positional checks with a longer interval shall be brought to the attention of the Shift Supervisor.

   NOTE: Ultrasonic system calibration checks and scanning shall take precedence over positional repeatability checks.

   NOTE: Positional checks are required only prior to and after completion of nozzles.

3. Positional repeatability shall be verified whenever power to the system has been secured for 12 hours or more, prior to performing weld scans.

4. Additional repeatability checks may be performed at the discretion of the NES Shift Engineer.

5. The location of the ultrasonic target shall be within $\pm$ 1.00" (.0.67°) of the values recorded for the target in Section II. If the readouts fail to conform to these tolerances, the following steps shall be taken:

   A. Notify the NES Site Supervisor immediately.

   B. Return the search unit assembly to the ultrasonic target called out in paragraph 6.1, 6.2, and 6.3 of section II. Relocate the exact center ultrasonically, and record the values of the positional readouts. Reset the appropriate thumbswitches to the values recorded in the applicable paragraph.

C. The NES Site Supervisor shall determine the extent of rescanning necessary to ensure adequate coverage of the weld and required volume. As a minimum, all reportable indications found since the last valid position check shall be relocated, and their correct locations recorded.

NOTE: All scan patterns are extended a minimum of 1.0" or 1.0° beyond that which is required.

D. Indicate any checks in which out-of-spec readings were encountered by an asterisk (*) on the Positional Check Log Sheet.

2. SHELL WELDS

Ensure all the requirements of paragraph 1 above have been met.

3. NOZZLE WELDS

Location checks shall be performed at the beginning and end of the nozzle examinations to insure the proper recording of the centerlines of the nozzles.

Any deviations of $\pm$ 1/2° or 1/2" shall result in reevaluation of any indications found since the last location check. Any deviation of $\pm$ 1° or 3/4" shall result in voiding of data taken since last location check and reexamination of the subject areas.

4. BOTTOM HEAD WELDS

A positional check per paragraph 1 will be performed before the hoist is positioned in the fixed location.

POSITIONAL CHECK LOG SHEET

Record the times and dates of the periodic position repeatability checks below.

Time	Date	Component Checked	Reading	Operator

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POSITIONAL CHECK LOG SHEET

Record the times and dates of the periodic position repeatability checks below.

Time	Date	Component Checked	Reading	Operator

Record the times and dates of the positional checks carried out before and after the nozzle examinations below.

	Time	Date	Operator
Before Examinations			
After Examinations			

SECTION VI

EXAMINATION RECORDS

TABLE OF CONTENTS

SECTION VI
EXAMINATION RECORDS

1. CERTIFICATION OF RECORDS

The operator shall complete and sign the appropriate positioning system data sheets immediately upon the completion of each weld examination, noting the date, the applicable UT calibration data sheet number, and the tape number.

2. FILING OF RECORDS

The Examination Contractor is responsible for submitting to the Plant Owner or his Agent a complete set of certified examination records.

SECTION VII

OPERATOR'S CRITIQUE

TABLE OF CONTENTS

SECTION VII
OPERATORS' CRITIQUE

1. PROCEDURE CORRECTIONS AND ADDITIONS

All procedure corrections and/or additions to the text of this procedure, which are required during the Preservice Examinations, shall be made in accordance with the document referenced in Section I, Paragraph 2.2.2(5). Corrections and/or additions to the Raster Summary Sheets, however, which are required during the course of the examination, and which do not in any way diminish examination requirements, may be made in the Equipment Operator's Controlled Copy of this Procedure(80A6476)by drawing a single line through the entry to be corrected, writing in the correction, and initialing and dating the item. All changes shall be recorded on the "Raster Summary Sheet Log of Revisions". All such corrections shall be incorporated into the next revision of the procedure.

SECTION VII

RASTER SUMMARY SHEETS LOG OF REVISION

PAGE NO.	DATE	DESCRIPTION	REASON	ORIGINATOR (INITIALS)	NES APPROVAL (SHIFT ENGR.)

SECTION II

INSTALLATION AND ORIENTATION

TABLE OF CONTENTS

SECTION II

INSTALLATION AND ORIENTATION

1. INTRODUCTION

The Reactor Pressure Vessel for the Seabrook Nuclear Power Station has a nominal inside diameter of 173.25 in., with a 191.88 in. bolt hole circle.

Ultrasonic examinations are conducted from the inside diameter (ID) of the Reactor Pressure Vessel using remotely operated positioning equipment. The equipment to be used is the RPV ID Examination Positioning Device and appropriate attachments and controllers.

2. ASSEMBLY

The positioning device shall be assembled in accordance with the instructions given in the Operation and Maintenance Manual referenced in Section I, Paragraph 2.4A. The basic mounting feet with the appropriate extension blocks shall be used.

The positioning device should be assembled such that the rotate drive mounting bolt circle is lined up with the match mark stamped on the flange of the 6" dia. hoist tube.

3. PRE-INSTALLATION CHECKS

After the positioning device has been assembled in accordance with Paragraph 2.0 above, the positioning device checks shall be performed in accordance with 80A5543 On-site Functional Test Procedure, referenced in Section I, Paragraph 2.4G.

4. ULTRASONIC TRANSDUCER HEAD INSTALLATION

1. Ultrasonic transducer head 80D8580-2 (Shell head) must have its rotator readouts recorded for both horizontal and both vertical orientations. This step shall be performed prior to examination with this examination head. Using a carpenter's level to ensure proper orientation, record the actual readouts below.

2. The applicable orientation diagrams for all appropriate ultrasonic test heads are shown in Raster sets 1 through 23.

ROTATION CHECK FOR TEST HEAD 80D8580-2

	ORIENTATION	READOUT
1.	Vertical (shooting up)	________
2.	Vertical (shooting down)	________
3.	Horizontal (shooting right)	________
4.	Horizontal (shooting left)	________

Operators initials: ____________

Date: ____________

NOTE: Orientation is reference when looking outward from center of the RPV.

5. ORIENTATION

1. Using any necessary aids such as tape measure and straight edge, adjust the vertical position of the inspection boom until the rotator output shaft centerline is aligned with the reactor vessel flange and the vertical centerline of the 180 degree keyway.

2. Set the thumbwheel switches so that the digital readout indications for the hoist and boom rotate are 0.00 inches and 180.00^{o} respectively. This is done to establish an approximation between the actual references of the reactor vessel and the coordinate readouts of the RPV ID Examination Positioning Device.

3. Using the 0 degree longitudinal ultrasonic beam, locate the exact center of the ultrasonic target. For a given scan in one direction the exact center is defined as the average of the two points where the magnitude of the echo falls to one-half that of the central region. The determinations of the center in each direction should alternate, scanning along the centerline previously determined in one direction to find the center in the other. This process is to be continued

until there is no change larger than 0.5" or 0.3° between successive measurements in each direction. Reset the thumb switches to correspond exactly to the values given for the center of the ultrasonic target and record the thumbswitch settings in Table II-3 below:

TABLE II-3

THUMBSWITCH SETTINGS (ULTRASONIC TARGET)

Hoist	Boom Rotate
______	______

Operator Initials: ______________

Date: ______________

6. CERTIFICATION OF COMPLIANCE

Certification is hereby given that all the above operations required for the performance of examinations have been accomplished, and that all checks established herein are correct.

NES Shift Engineer: ______________

Date: ______________

SECTION III

EXAMINATION OF RPV SHELL WELDS

TABLE OF CONTENTS

SECTION III

EXAMINATION OF RPV SHELL WELDS

TABLE OF CONTENTS (cont')

SECTION III

EXAMINATION OF RPV SHELL WELDS

1. SCOPE

This section covers the examinations to be performed on the Reactor Pressure Vessel longitudinal and circumferential welds in the upper, intermediate, and lower shell regions.

2. EXAMINATION AREAS

The areas to be covered for the various shell weld examinations and the applicable raster summary sheets are contained in this Section. The different types and modes of examination, with the individual scan parameters required for each, are categorized in the Raster Sets outlined in Paragraphs of this Section.

3. CORRECTIONS FOR MISALIGNMENT

The required scan dimensions listed in each Raster Set are defined by the actual vessel dimensions obtained from the manufacturer's drawings. The dimensions indicated by the digital readouts of the positioning device may differ from the drawing dimensions because of possible misalignment of the positioning device relative to the reactor vessel.

NOTE: All scan patterns are extended a minimum of 1.0" beyond that which are required. Therefore, no correction is necessary where the measured misalignment falls within these values.

4. CONCENTRICITY CHECKS

In cooperation with the ultrasonic operator, position the inspection boom so that the shell head is 2" - 4" off the vessel wall, ensuring that a front surface echo is displayed on the 0° CRT. Calibrate the CRT so that a motion of 1/4" can be discerned.

While rotating the inspection boom, move the shell head towards and away from the vessel wall. Monitor the front surface echo (on the UT scope) to determine the relationship between the exam head movement and the signal's sweep position on the screen.

The concentricity check is to be performed on the upper and lower shell course. This will enable the shift engineer to verify and report any severe irregularities of the RPV or gross misalignment of the RPV ID Examination Positioning Device.

NOTE: Change of 1.5" or greater in concentricity of any shell course should be brought to the attention of the Site Supervisor for disposition.

5. WELD EXAMINATION PREREQUISITES

5.1 PRECAUTIONS

1. Certain regions of some welds are (or will be during inservice examinations) obscured by attachments on the vessel interior surface. For this reason, some of these regions must be scanned using a number of different ultrasonic techniques and search unit fixture angles. The applicable areas and the different techniques to be used are covered in this procedure, and the relevant information will be recorded on the appropriate pages and raster summary sheets.

2. In other areas where internal attachments make complete coverage impossible, closed-circuit television is used to monitor the boom motion and ensure that maximum possible coverage is obtained by moving the fixture as close as possible to the obstruction. These areas, as well as any search unit fixture changes which may be necessary, are covered in this procedure. The scan limits in each region, as determined visually, shall be recorded on the appropriate raster summary sheet(s).

3. Care must be taken when scanning in tapered areas to index <u>downward</u> only. An upward index in these areas could bind the spring loading of the shell head fixture or cause serious damage to the inspection equipment.

4. Weld scans in which obstructions may be expected are noted with an asterisk (*). Extreme caution must be exercised when scanning in these areas to prevent damage to the equipment. Refer to the appropriate weld drawing to obtain approximate locations of obstructions prior to scanning these welds.

5.2 SCAN REQUIREMENTS

1. The index increments to be used in all of the examinations specified in this procedure shall provide a nominal 25 percent overlap between adjacent scans.

   The actual increments to be used for exam heads carrying 1.0" transducers shall be:

Horizontal (angular) Index:	0.45°
Vertical Index:	0.70"

2. In order to assure that each transducer examines the total required volume for a given weld, the remaining transducers on a given search unit fixture will be moved beyond the required examination area. The result is that more metal volume will be examined than is required by Section XI of the ASME Boiler and Pressure Vessel Code. Any indications which are found in these non-required areas shall be reported and recorded in accordance with the requirements of the applicable ultrasonic procedure.

3. If an indication or group of indications are found by the ultrasonics, a more detailed examination of that area may be carried out at a lower speed, if such is deemed necessary by the examiner. This is in addition to the evaluation of indications as required by the applicable ultrasonics procedure.

4. After a set of welds have been examined with one shell head configuration, the shell head will be changed to the next configuration, as directed by the NES Shift Engineer. The Shift Engineer shall be responsible for ensuring that all required examinations in a given Raster Set have been performed to the maximum extent practical prior to proceeding to the next Raster Set.

5. The sequence in which these examinations are performed shall be at the discretion of the Site Supervisor or his designee.

6. GENERAL EXAMINATION PROCEDURES

The types of Reactor Pressure Vessel Shell Welds covered by this section can be divided into two general categories. These are longitudinal welds and circumferential welds. A brief description of the examination procedure for each is given below.

The Raster Sets which follow are divided into categories. The criteria used to categorize the various rasters into Raster Sets is the type of weld (circumferential or longitudinal), shell course thickness and scanning mode (perpendicular or parallel). The categories are also set up to allow for the fewest calibrations and equipment changes. The 80D8580-2 Shell Head will be used to examine all longitudinal and circumferential welds in the shell course areas to the maximum extent possible. The definitions of head orientations called for on the data sheets are provided in the applicable section(s) of the procedure. In cases where obstructions or component geometry prevent complete scanning, the areas not scanned shall be completely defined and recorded.

NOTE: All references to Examination Head 80D8580-2 within this procedure do not prevent the use of an equivalent examination head for the performance of ultrasonic examinations.

7. RASTER SET III-1

FLANGE EXAMINATION

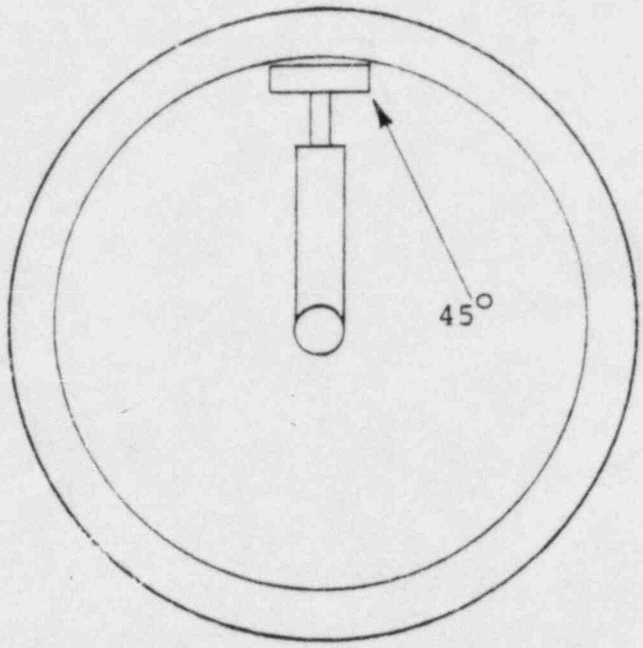
7.1 This raster set covers the parallel examinations of the flange-to-upper shell circumference weld. Three-unit shell head #80D5850-2 is used for the parallel examinations.

7.2 To ensure the maximum examination coverage of the flange-to-upper shell weld, the equipment operator shall position the shell head as close as possible to the taper. The examination will start at these coordinates indexing downward until the coverage below the weld is completed.

7.3 Figure 1 is an illus ation of the orientations to be used with Head #80D5850-2. Note that when reference is made to shooting right, left, clockwise or counterclockwise on the raster summary sheets, this direction refers to the orientation of the 45° angle beam.

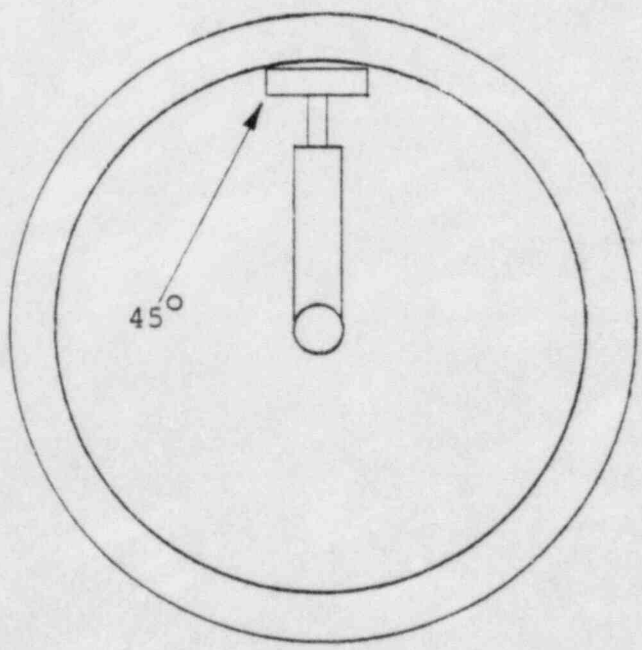
NOTE: Only the parallel examinations are performed on this weld from the I.D. surface. Perpendicular examinations are conducted from the flange mating surface.

DIAGRAM FOR ORIENTATION NUMBERS 1 AND 2
SHELL HEAD NO. 80D5850-2
FIGURE 1



Orientation No. 1
shooting Right (cw)

Looking down from top of RPV.



Orientation No. 2
Shooting Left (ccw)

Note: Shooting direction refers to the orientation of the 45° angle beam when looking outward from the center of the RPV.

RASTER SUMMARY SHEET

Raster Set: III-1
Raster No.:
Scanning Mode: Parallel
Head Attitude: Horizontal
Orient.: 1 Shooting: Right
Index Increment: 0.70"
Index With: Hoist (See Note - 34.41")
Sweep With: Rotate Drive (0° - 361°)
Weld Title: Flange to Upper Shell Circ. Weld

Section: III Pg. ___ of ___
Cal. Data Pkg.:
Procedure No.: 80A6477 Rev.
Video Tape No.:
Cal. Block No.: 196-104 (11")
Head No.: 80D5850-2
Weld No.: 1-SB-RV-101-121
Weld Centerline: 26.38"

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: NOTE: Upper index limit arbitrary; begin scan at bottom edge of flange taper where head contact is established.

Operator ___ Date ___ Time ___ Reviewer

Operator ___ Date ___ Time ___ ___ Date ___

nes NUCLEAR ENERGY SERVICES, INC.

Form 028-110/1 1/83

RASTER SUMMARY SHEET

Raster Set: III-1

Raster No.:

Scanning Mode: Parallel

Head Attitude: Horizontal

Orient.: 2 Shooting: Left

Index Increment: 0.70"

Index With: Hoist (See note - 34.41")

Sweep With: Rotate Drive (0° - 361°)

Section: III Pg. ___ of ___

Cal. Data Pkg.:

Procedure No.: 80A6477 Rev. ___

Video Tape No.:

Cal. Block No.: 196-104 (11")

Head No.: 30D5850-2

Weld No.: 1-SB-RV-101-121

Weld Centerline: 26.38"

Weld Title: Flange to Upper Shell Circ. Weld

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: NOTE: Upper index limit arbitrary; begin scan at bottom edge of flange taper where head contact is established.

Operator ______ Date ______ Time ______ Reviewer

Operator ______ Date ______ Time ______ ______ Date ______

NES NUCLEAR ENERGY SERVICES, INC.

Form 028-110/1 1/83

8. RASTER III-2
THREE UNIT SHELL HEAD 80D8580-2

8.1 This raster set covers the perpendicular examinations for the longitudinal welds in the upper shell.

8.2 To ensure maximum examination coverage of the upper shell longitudinal welds, the following steps will be followed. Scanning above the nozzles, the equipment operator shall position the shell head as close as practical to the flange taper and scan downward as close as practical to the nozzle edge (inlet) or nozzle knuckle (outlet). Scan limits will vary depending on the flange taper and nozzle configurations. To examine below the nozzles, the equipment operator shall begin and end scan limits as close as practical to the nozzle edge (inlet) or nozzle knuckle (outlet). Carefully monitor all operations in the obstructed areas via the television system. Scanning is to be stopped whenever an obstruction is met, or when head contact is lost.

8.3 Figure 1 is an illustration of the orientations to be used with head 80D8580-2. Note that when reference is made to shooting left, right, clockwise or counter-clockwise on the raster summary sheets, this direction refers to the orientation of the 0° straight beam.

8.4 Each raster summary sheet in this section provides full coverage in one direction perpendicular to the weld. Each weld is examined twice to provide coverage in both perpendicular directions as required.

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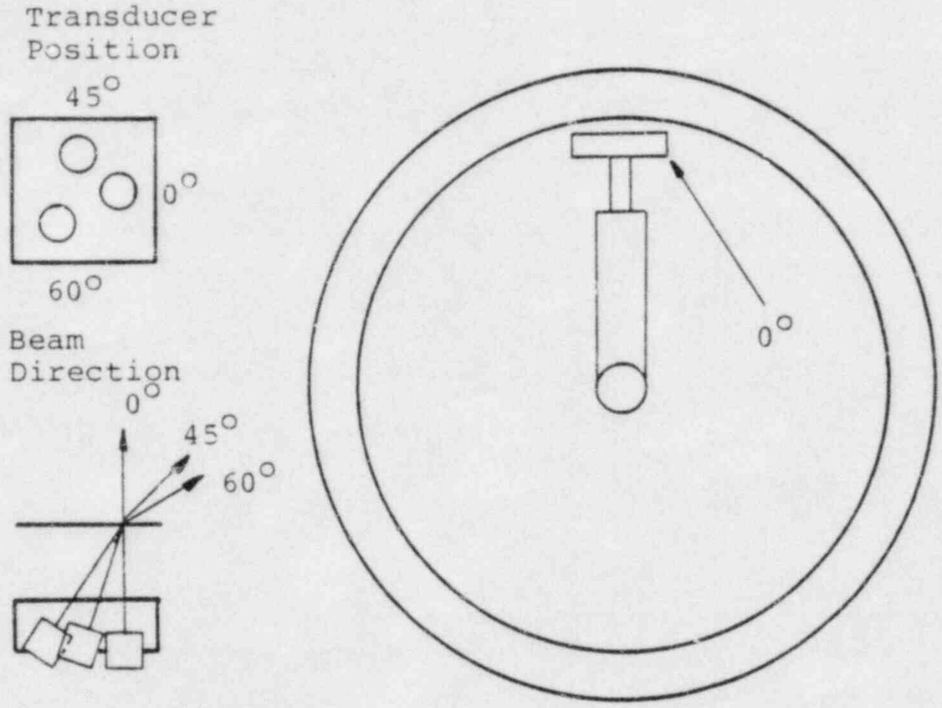
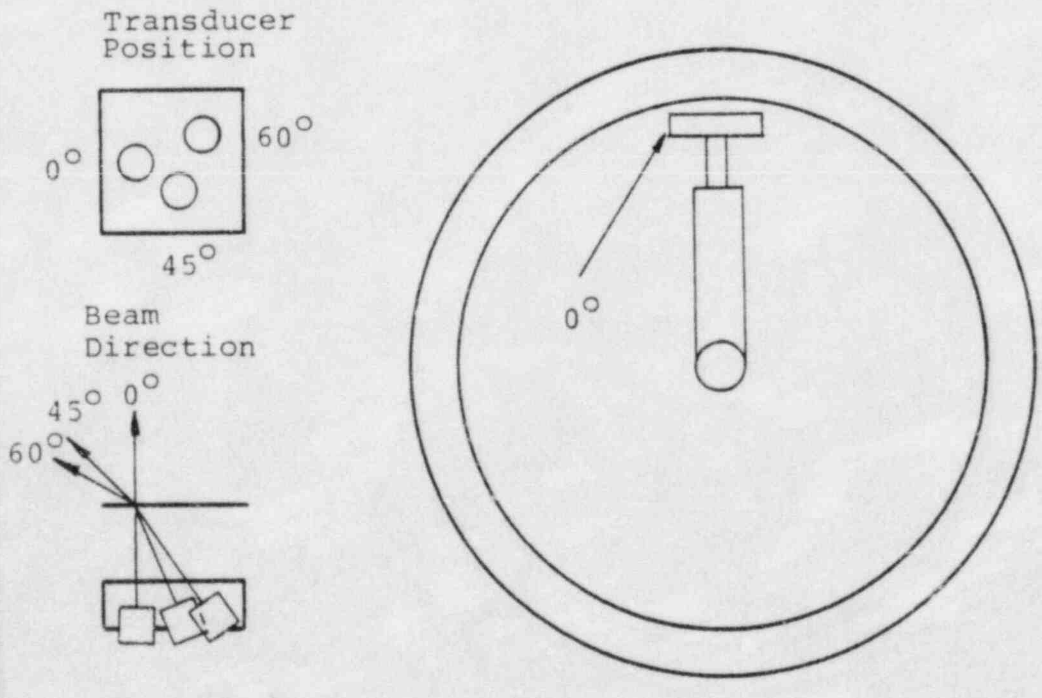
DIAGRAM FOR ORIENTATION NUMBERS 1 AND 2
SHELL HEAD NO. 80D8580-2
FIGURE 1



Orientation No. 1
Shooting Right (cw)

Looking down from top of RPV.



Orientation No. 2
Shooting Left (ccw)

Note: Shooting direction refers to the orientation of the 0° straight beam when looking outward from the center of the RPV.

RASTER SUMMARY SHEET

Raster Set: III-2
Section: III Pg. ___ of ___
Raster No.: ___
Cal. Data Pkg.: ___
Scanning Mode: Perpendicular
Procedure No.: 80A6477 Rev. ___
Head Attitude: Horizontal
Video Tape No.: ___
Orient.: 2 Shooting: Left
Cal. Block No.: 196-104 (11")
Index Increment: 0.45°
Head No.: 80D8580-2
Index With: Rotate Drive (57.26° - 40.31°)
Weld No.: 1-SB-RV-101-122-42°
Sweep With: Hoist* (Taper to 126.66")
Weld Centerline: 42°
Weld Title: Upper Shell Longitudinal Weld at 42°

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: *Refer to Section 8.2 for examination coverage.

Operator ___ Date ___ Time ___ Reviewer

Operator ___ Date ___ Time ___ ___ Date ___

NES NUCLEAR ENERGY SERVICES, INC.

Form 028-110/1 1/83

RASTER SUMMARY SHEET

Raster Set: III-2

Section: III Pg. ___ of ___

Raster No.: ___

Cal. Data Pkg.: ___

Scanning Mode: Perpendicular

Procedure No.: 80A6477 Rev. ___

Head Attitude: Horizontal

Video Tape No.: ___

Orient.: 1 Shooting: Right

Cal. Block No.: 196-104 (11")

Index Increment: 0.45°

Head No.: 80D8580-2

Index With: Rotate Drive (26.74° - 43.69°)

Weld No.: 1-SB-RV-101-122-42°

Sweep With: Hoist* (Taper to 126.66")

Weld Centerline: 42°

Weld Title: Upper Shell Longitudinal Weld at 42°

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: *Refer to Section 8.2 for examination coverage.

Operator ___ Date ___ Time ___ Reviewer

Operator ___ Date ___ Time ___ ___ Date ___

nes NUCLEAR ENERGY SERVICES, INC.

RASTER SUMMARY SHEET

Raster Set: III-2

Raster No.:

Scanning Mode: Perpendicular

Head Attitude: Horizontal

Orient.: 2 Shooting: Left

Index Increment: 0.45°

Index With: Rotate Drive (177.26° - 160.31°)

Sweep With: Hoist* (Taper to 126.66")

Weld Title: Upper Shell Longitudinal Weld at 162°

Section: III Pg.___ of___

Cal. Data Pkg.:

Procedure No.: 80A6477 Rev.___

Video Tape No.:

Cal. Block No.: 196-104 (11")

Head No.: 80D8580-2

Weld No.: 1-SB-RV-101-122-162°

Weld Centerline: 162°

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: *Refe to Section 8.2 for examination coverage.

Operator________ Date______ Time______ Reviewer

Operator________ Date______ Time______ ________ Date______

NES NUCLEAR ENERGY SERVICES, INC.

RASTER SUMMARY SHEET

Raster Set: III-2

Raster No.:

Scanning Mode: Perpendicular

Head Attitude: Horizontal

Orient.: 1 Shooting: Right

Index Increment: 0.45°

Index With: Rotate Drive (146.74° - 163.69°)

Sweep With: Hoist* (Taper to 126.66")

Section: III Pg. of

Cal. Data Pkg.:

Procedure No.: 80A6477 Rev.

Video Tape No.:

Cal. Block No.: 196-104 (11")

Head No.: 80D8580-2

Weld No.: 1-SB-RV-101-122-162°

Weld Centerline: 162°

Weld Title: Upper Shell Longitudinal Weld at 162°

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: *Refer to Section 8.2 for examination coverage.

Operator Date Time Reviewer

Operator Date Time Date

NUCLEAR ENERGY SERVICES, INC.

RASTER SUMMARY SHEET

Raster Set: III-2

Raster No.:

Scanning Mode: Perpendicular

Head Attitude: Horizontal

Orient.: 2 Shooting: Left

Index Increment: 0.45°

Index With: Rotate Drive (297.26° - 280.31°)

Sweep With: Hoist* (Taper to 126.66")

Section: III Pg. of

Cal. Data Pkg.:

Procedure No.: 80A6477 Rev.

Video Tape No.:

Cal. Block No.: 196-104 (11")

Head No.: 80D8580-2

Weld No.: 1-SB-RV-101-122-282°

Weld Centerline: 282°

Weld Title: Upper Shell Longitudinal Weld at 282°

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: *Refer to Section 8.2 for examination coverage.

Operator Date Time Reviewer

Operator Date Time Date

NUCLEAR ENERGY SERVICES, INC.

RASTER SUMMARY SHEET

Raster Set: III-2
Raster No.:
Scanning Mode: Perpendicular
Head Attitude: Horizontal
Orient.: 1 Shooting: Right
Index Increment: 0.45°
Index With: Rotate Drive (266.74° - 283.69°)
Sweep With: Hoist* (Taper to 126.66")
Weld Title: Upper Shell Longitudinal Weld at 282°

Section: III Pg.___ of___
Cal. Data Pkg.:
Procedure No.: 80A6477 Rev.___
Video Tape No.:
Cal. Block No.: 196-104 (11")
Head No.: 80D8580-2
Weld No.: 1-SB-RV-101-122-282°
Weld Centerline: 282°

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: *Refer to Section 8.2 for examination coverage.

Operator________ Date______ Time______ Reviewer

Operator________ Date______ Time______ ________ Date______

NES NUCLEAR ENERGY SERVICES, INC.

Form 028-110/1 1/83

9. RASTER III-3
THREE UNIT SHELL HEAD 80D8580-2

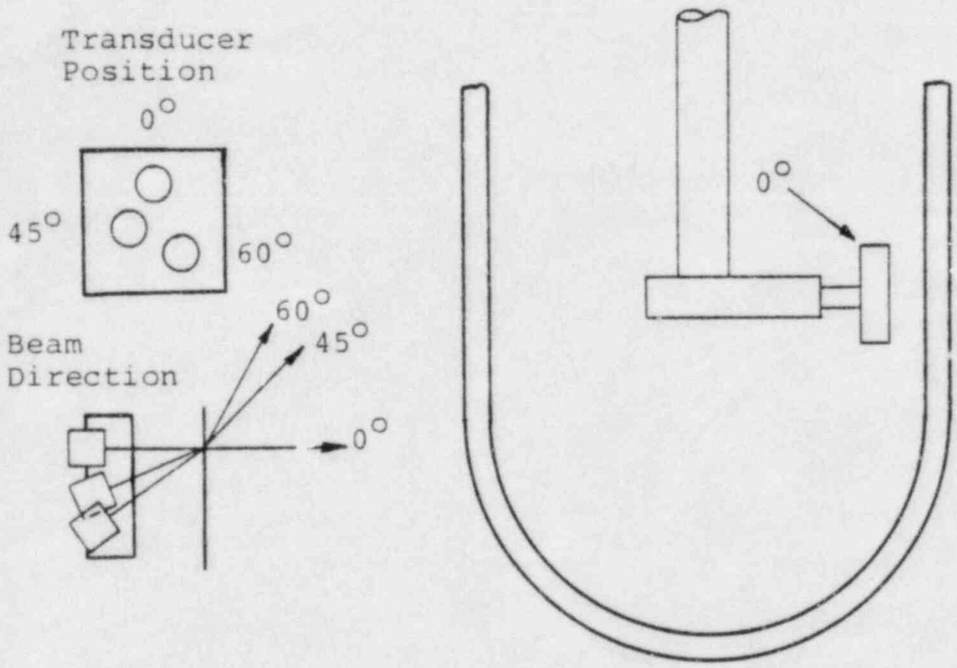
9.1 This raster set covers the parallel examinations for the longitudinal welds in the upper shell.

9.2 To ensure maximum examination coverage of the upper shell longitudinal welds, the following steps will be followed. Scanning above the nozzles, the equipment operator shall position the shell head as close as practical to the flange taper and scan downward as close as practical to the nozzle edge (inlet) or nozzle knuckle (outlet). Scan limits will vary depending on the flange taper and the nozzle configurations. To examine below the nozzles, the equipment operator shall begin and end scan limits as close as practical to the nozzle edge (inlet) or nozzle knuckle (outlet). Carefully monitor all operations in the obstructed areas via the television system. Scanning is to be stopped whenever an obstruction is met, or when head contact is lost.

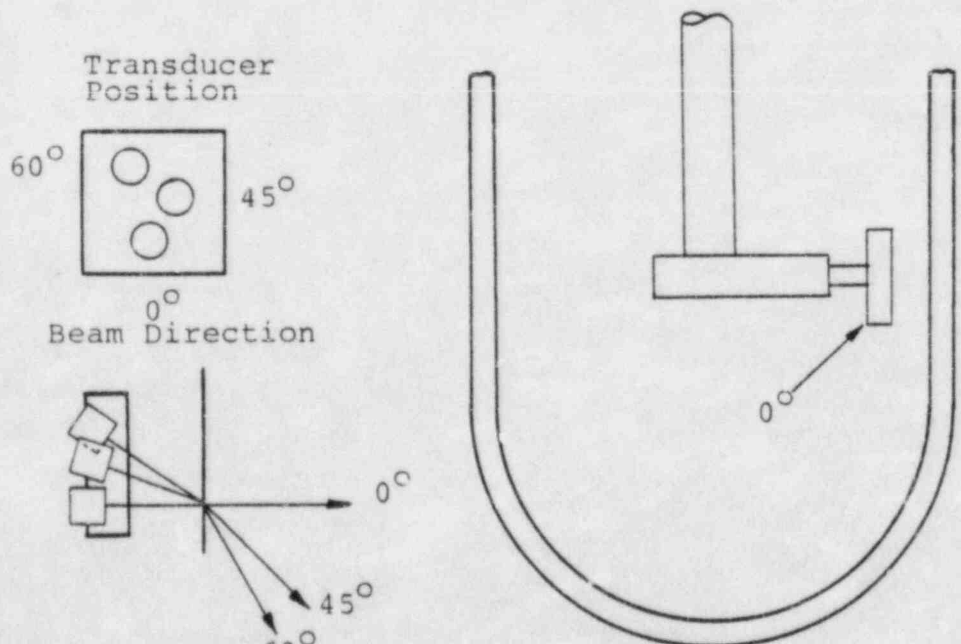
9.3 Figure 1 is an illustration of the orientations to be used with head 80D8580-2. Note that when reference is made to shooting up or down on the raster summary sheets, this direction refers to the orientation of the 0° straight beam.

9.4 Each raster summary sheet in this section provides full coverage in one direction parallel to the weld. Each weld is examined twice to provide coverage in both parallel directions as required.

DIAGRAM FOR ORIENTATION NUMBERS 3 AND 4
SHELL HEAD NO. 80D8580-2
FIGURE 1



Orientation No. 3
Shooting <u>Up</u>



Orientation No. 4
Shooting <u>Down</u>

Note: Shooting direction refers to the orientation of the 0° straight beam when looking outward from the center of the RPV.

RASTER SUMMARY SHEET

Raster Set: III-3

Raster No.:

Scanning Mode: Parallel

Head Attitude: Vertical

Orient.: 3 Shooting: UP

Index Increment: 0.45°

Index With: Rotate Drive (36.08° - 47.92°)

Sweep With: Hoist* (Taper - 126.66")

Section: III Pg.___ of___

Cal. Data Pkg.:

Procedure No.: 80A6477 Rev.___

Video Tape No.:

Cal. Block No.: 196-104 (11")

Head No.: 80D8580-2

Weld No.: 1-SB-RV-101-122-42°

Weld Centerline: 42°

Weld Title: Upper Shell Longitudinal Weld at 42°

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: *Refer to Section 9.2 for examination coverage.

Operator_______ Date_______ Time_______ Reviewer

Operator_______ Date_______ Time_______ _______ Date_______

NES NUCLEAR ENERGY SERVICES, INC.

RASTER SUMMARY SHEET

Raster Set: III-3

Raster No.:

Scanning Mode: Parallel

Head Attitude: Vertical

Orient.: 4 Shooting: Down

Index Increment: 0.45°

Index With: Rotate Drive (36.08° - 47.92°)

Sweep With: Hoist* (Taper - 126.66")

Section: III Pg. ___ of ___

Cal. Data Pkg.:

Procedure No.: 80A6477 Rev.

Video Tape No.:

Cal. Block No.: 196-104 (11")

Head No.: 80D8580-2

Weld No.: 1-SB-RV-101-122-42°

Weld Centerline: 42°

Weld Title: Upper Shell Longitudinal Weld at 42°

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: *Refer to Section 9.2 for examination coverage.

Operator ___ Date ___ Time ___ Reviewer

Operator ___ Date ___ Time ___ ___ Date ___

RASTER SUMMARY SHEET

Raster Set: III-3

Raster No.:

Scanning Mode: Parallel

Head Attitude: Vertical

Orient.: 3 Shooting: Up

Index Increment: 0.45°

Index With: Rotate Drive (156.08°-167.92°)

Sweep With: Hoist* (Taper to 126.66")

Weld Title: Upper Shell Longitudinal Weld at 162°

Section: III Pg.___ of___

Cal. Data Pkg.:

Procedure No.: 80A6477 Rev.___

Video Tape No.:

Cal. Block No.: 196-104 (11")

Head No.: 80D8580-2

Weld No.: 1-SB-RV-101-122-162°

Weld Centerline: 162°

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: *Refer to Section 9.2 for examination coverage.

Operator_______ Date_______ Time_______ Reviewer

Operator_______ Date_______ Time_______ _______ Date_______

NES NUCLEAR ENERGY SERVICES, INC.

RASTER SUMMARY SHEET

Raster Set: III-3

Raster No.:

Scanning Mode: Parallel

Head Attitude: Vertical

Orient.: 4 Shooting: Down

Index Increment: 0.45°

Index With: Rotate Drive (156.08° - 167.92°)

Sweep With: Hoist* (Taper - 126.66")

Weld Title: Upper Shell Longitudinal Weld at 162°

Section: III Pg. ___ of ___

Cal. Data Pkg.:

Procedure No.: 80A6477 Rev. ___

Video Tape No.:

Cal. Block No.: 196-104 (11")

Head No.: 80D8580-2

Weld No.: 1-SB-RV-101-122-162°

Weld Centerline: 162°

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: *Refer to Section 9.2 for examination coverage.

Operator ______ Date ______ Time ______ Reviewer

Operator ______ Date ______ Time ______ ______ Date ______

NES NUCLEAR ENERGY SERVICES, INC.

RASTER SUMMARY SHEET

Raster Set: III-3

Raster No.:

Scanning Mode: Parallel

Head Attitude: Vertical

Orient.: 3 Shooting: UP

Index Increment: 0.45°

Index With: Rotate Drive (276.08° - 287.92°)

Sweep With: Hoist* (Taper - 126.66")

Section: III Pg. ___ of ___

Cal. Data Pkg.:

Procedure No.: 80A6477 Rev. ___

Video Tape No.:

Cal. Block No.: 196-104 (11")

Head No.: 80D8580-2

Weld No.: 1-SB-RV-101-122-282°

Weld Centerline: 282°

Weld Title: Upper Shell Longitudinal Weld at 282°

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: *Refer to Section 9.2 for examination coverage.

Operator ________ Date ________ Time ________ Reviewer

Operator ________ Date ________ Time ________ ________ Date ________

NUCLEAR ENERGY SERVICES, INC.

Form 028-110/1 1/83

RASTER SUMMARY SHEET

Raster Set: III-3
Raster No.:
Scanning Mode: Parallel
Head Attitude: Vertical
Orient.: 4 Shooting: Down
Index Increment: 0.45°
Index With: Rotate Drive (276.08° - 287.92°)
Sweep With: Hoist* (Taper - 126.66")
Weld Title: Upper Shell Longitudinal Weld at 282°

Section: III Pg. __ of __
Cal. Data Pkg.:
Procedure No.: 80A6477 Rev.
Video Tape No.: *
Cal. Block No.: 196-104 (11")
Head No.: 80D8580-2
Weld No.: 1-SB-RV-101-122-282°
Weld Centerline: 282°

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: *Refer to Section 9.2 for examination coverage.

Operator ____ Date ____ Time ____ Reviewer

Operator ____ Date ____ Time ____ ____ Date ____

nes NUCLEAR ENERGY SERVICES, INC.

10. RASTER SET III-4
THREE UNIT SHELL HEAD 80D8580-2

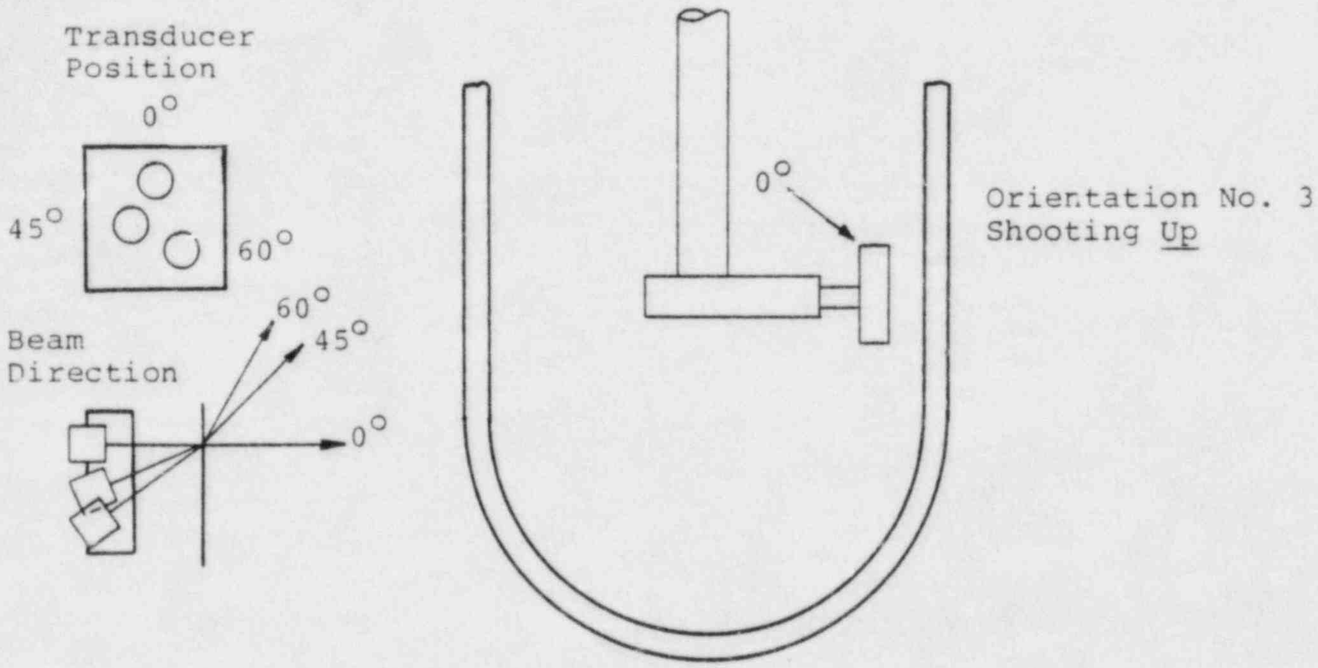
10.1 This raster set covers the perpendicular examination, shooting down, for the circumferential weld, upper shell to intermediate shell.

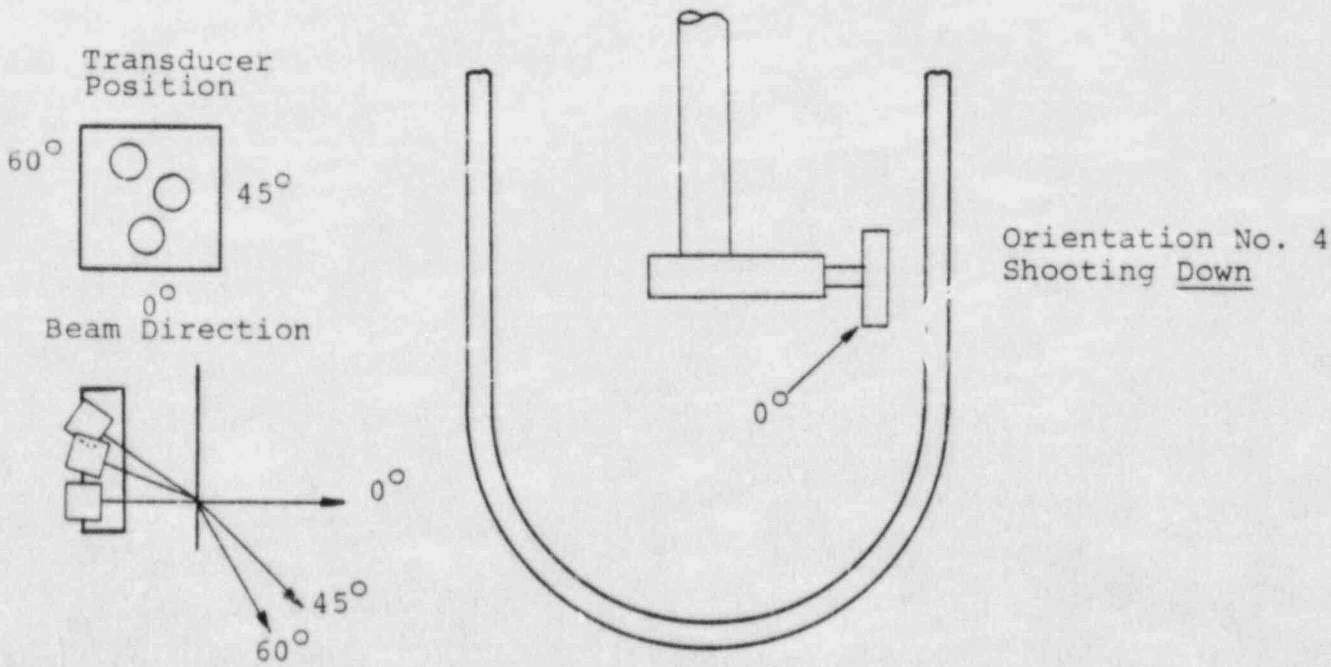
10.2 Physical (nozzles) obstructions and limitations exist in several areas throughout weld 1-SB-RV-103-121. Carefully monitor all operations in these areas via the television system. Scanning is to be stopped whenever an obstruction is met, or when head contact is lost.

10.3 Figure 1 is an illustration of the orientations to be used with head 80D8580-2. Note that when reference is made to shooting down on the raster summary sheet, this direction refers to the orientation of the 0° straight beam.

10.4 Each raster summary sheet in this section provides full coverage in one direction perpendicular to the weld. Each weld is examined twice to provide coverage in both perpendicular directions as required.

DIAGRAM FOR ORIENTATION NUMBERS 3 AND 4
SHELL HEAD NO. 80D8580-2
FIGURE 1





Note: Shooting direction refers to the orientation of the 0° straight beam when looking outward from the center of the RPV.

RASTER SUMMARY SHEET

Raster Set: III-4
Raster No.:
Scanning Mode: Perpendicular
Head Attitude: Vertical
Orient.: 4 Shooting: Down
Index Increment: 0.70"
Index With: Hoist (98.58" - 128.19")
Sweep With: Rotate Drive (0° - 361°)
Weld Title: Upper Shell to Intermediate Shell Circ. Weld

Section: III Pg. of
Cal. Data Pkg.:
Procedure No.: 80A6477 Rev.
Video Tape No.: *
Cal. Block No.: 196-104 (11")
Head No.: 80D8580-2
Weld No.: 1-SB-RV-103-121
Weld Centerline: 125.66"

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: Refer to Section 10.2 before scanning.

Operator ______ Date ______ Time ______ Reviewer
Operator ______ Date ______ Time ______ ______ Date ______

nes NUCLEAR ENERGY SERVICES, INC.

Form 028-110/1 1/83

11. RASTER SET III-5
THREE UNIT SHELL HEAD 80D8580-2

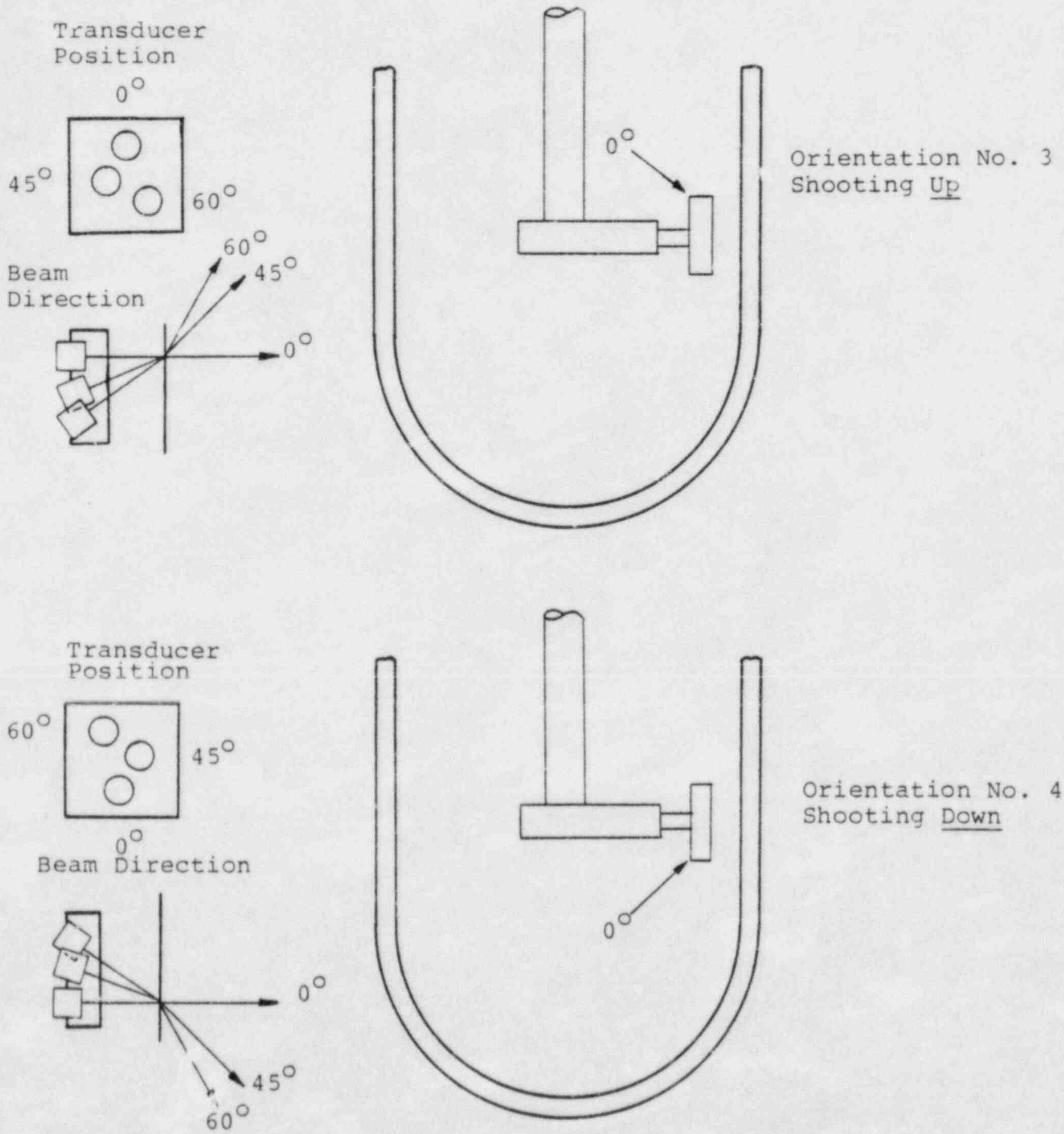
11.1 This raster set covers the following: The perpendicular examination, shooting up, for the upper shell to intermediate shell circumferential weld; the perpendicular examination for the intermediate shell to lower shell circumferential weld; the perpendicular examination, shooting down, for the lower shell to bottom head circumferential weld.

11.2 Physical (lower core support pads) obstructions and limitations may exist in several areas throughout weld 1-SB-RV-104-141. Carefully monitor all operations in these areas via the television system. Scanning is to be stopped whenever an obstruction is met, or when head contact is lost.

11.3 Figure 1 is an illustration of the orientations to be used with head 80D8580-2. Note that when reference is made to shooting up or down on the raster summary sheets, this direction refers to the orientation of the 0^{o} straight beam.

11.4 Each raster summary sheet in this section provides full coverage in one direction perpendicular to the weld. Each weld is examined twice to provide coverage in both perpendicular directions as required.

DIAGRAM FOR ORIENTATION NUMBERS 3 AND 4
SHELL HEAD NO. 80D8580-2
FIGURE 1



Note: Shooting direction refers to the orientation of the 0° straight beam when looking outward from the center of the RPV.

RASTER SUMMARY SHEET

Raster Set: III-5

Section: III Pg.___of___

Raster No.:

Cal. Data Pkg.:

Scanning Mode: Perpendicular

Procedure No.: 80A6477 Rev.

Head Attitude: Vertical

Video Tape No.:

Orient.: 3 Shooting: UP

Cal. Block No.: 196-103 (9")

Index Increment: 0.70"

Head No.: 80D8580-2

Index With: Hoist (123.14" - 148.27")

Weld No.: 1-SB-RV-103-121

Sweep With: Rotate Drive (0° - 361°)

Weld Centerline: 125.66"

Weld Title: Upper Shell to Intermediate Shell Circ. Weld

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: Refer to Section 11.2 before scanning.

Operator______ Date______ Time______ Reviewer

Operator______ Date______ Time______ ______ Date______

NES NUCLEAR ENERGY SERVICES, INC.

RASTER SUMMARY SHEET

Raster Set: III-5

Raster No.:

Scanning Mode: Perpendicular

Head Attitude: Vertical

Orient.: 3 Shooting: UP

Index Increment: 0.70"

Index With: Hoist (233.23" - 258.12")

Sweep With: Rotate Drive (0° - 361°)

Section: III Pg.___ of___

Cal. Data Pkg.:

Procedure No.: 80A6477 Rev.___

Video Tape No.:

Cal. Block No.: 196-103 (9")

Head No.: 80D8580-2

Weld No.: 1-SB-RV-101-171

Weld Centerline: 235.63"

Weld Title: Intermediate Shell to Lower Shell Circ. Weld

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: Refer to Section 11.2 before scanning.

Operator__________ Date______ Time______ Reviewer

Operator__________ Date______ Time______ __________ Date______

nes NUCLEAR ENERGY SERVICES, INC.

RASTER SUMMARY SHEET

Raster Set: III-5

Raster No.:

Scanning Mode: Perpendicular

Head Attitude: Vertical

Orient.: 4 Shooting: Down

Index Increment: 0.70"

Index With: Hoist (213.14" - 238.08")

Sweep With: Rotate Drive (0° -361°)

Section: III Pg.___of___

Cal. Data Pkg.:

Procedure No.: 80A6477 Rev.___

Video Tape No.:

Cal. Block No.: 196-103 (9")

Head No.: 80D8580-2

Weld No.: 1-SB-RV-101-171

Weld Centerline: 235.63"

Weld Title: Intermediate Shell to Lower Shell Circ. Weld

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: Refer to Section 11.2 before scanning

Operator______ Date______ Time______ Reviewer

Operator______ Date______ Time______ ______ Date______

NUCLEAR ENERGY SERVICES, INC.

RASTER SUMMARY SHEET

Raster Set: III-5

Section: III Pg.___ of___

Raster No.:

Cal. Data Pkg.:

Scanning Mode: Perpendicular

Procedure No.: 80A6477 Rev.___

Head Attitude: Vertical

Video Tape No.:

Orient.: 4 Shooting: Down

Cal. Block No.: 196-103 (9")

Index Increment: 0.70"

Head No.: 80D8580-2

Index With: Hoist (318.74" - 343.63")

Weld No.: 1-SB-RV-104-141

Sweep With: Rotate Drive (0° -361°)

Weld Centerline: 341.23"

Weld Title: Lower Shell to Bottom Head Circ. Weld

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: Refer to Section 11.2 before scanning.

Operator______ Date______ Time______ Reviewer

Operator______ Date______ Time______ ______ Date______

12. RASTER SET III-6
THREE UNIT SHELL HEAD 80D8580-2

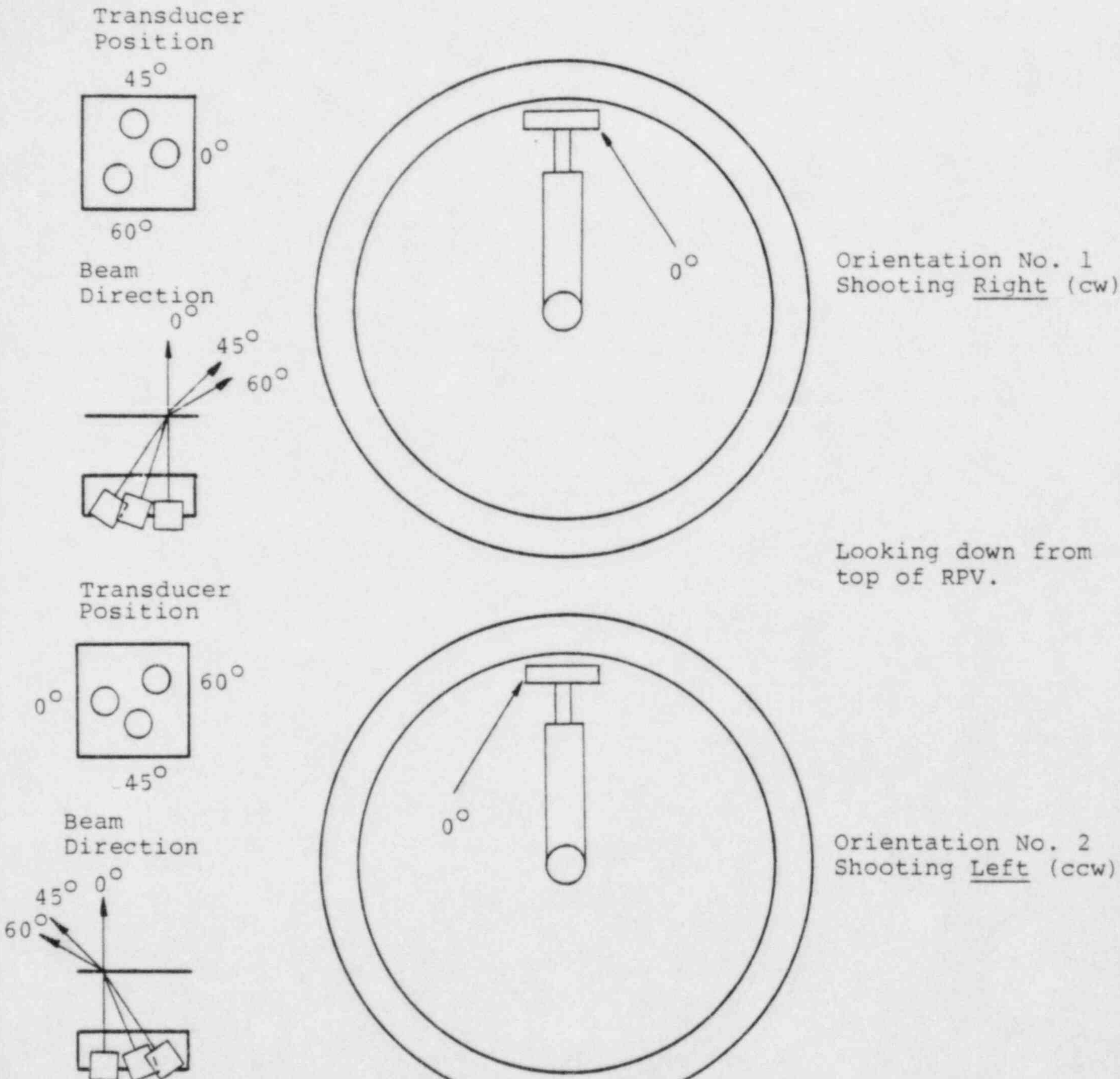
12.1 This raster set covers the parallel examination for the circumferential welds, upper shell to intermediate shell and intermediate shell to lower shell.

12.2 Physical (nozzles) obstructions and limitations exist in several areas throughout weld 1-SB-RV-103-121. Carefully monitor all operations in these areas via the television system. Scanning is to be stopped whenever an obstruction is met, or when head contact is lost.

12.3 Figure 1 is an illustration of the orientations to be used with head 80D8580-2. Note that when reference is made to shooting right, left, clockwise or counterclockwise on the raster summary sheets, this direction refers to the orientation of the 0° straight beam.

12.4 Each raster summary sheet in this section provides full coverage in one direction parallel to the weld. Each weld is examined twice to provide coverage in both parallel directions as required.

DIAGRAM FOR ORIENTATION NUMBERS 1 AND 2
SHELL HEAD NO. 80D8580-2
FIGURE 1



Note: Shooting direction refers to the orientation of the 0° straight beam when looking outward from the center of the RPV.

RASTER SUMMARY SHEET

Raster Set: III-6

Section: III Pg. ___ of ___

Raster No.: ___

Cal. Data Pkg.: ___

Scanning Mode: Parallel

Procedure No.: 80A6477 Rev. ___

Head Attitude: Horizontal

Video Tape No.: ___

Orient.: 1 Shooting: Right

Cal. Block No.: 196-103 (9")

Index Increment: 0.70"

Head No.: 80D85_. 2

Index With: Hoist (116.83" - 133.50")

Weld No.: 1-SB-RV-103-121

Sweep With: Rotate Drive (0° - 361°)

Weld Centerline: 125.66"

Weld Title: Upper Shell to Intermediate Shell Circ. Weld

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: Refer to Section 12.2 before scanning.

Operator ___ Date ___ Time ___ Reviewer

Operator ___ Date ___ Time ___ ___ Date ___

nes NUCLEAR ENERGY SERVICES, INC.

Form 028-110/1 1/83

RASTER SUMMARY SHEET

Raster Set: III-6

Section: III Pg. ___ of ___

Raster No.: ___

Cal. Data Pkg.: ___

Scanning Mode: Parallel

Procedure No.: 80A6477 Rev. ___

Head Attitude: Horizontal

Video Tape No.: ___

Orient.: 2 Shooting: Left

Cal. Block No.: 196-103 (9")

Index Increment: 0.70"

Head No.: 80D8580-2

Index With: Hoist (116.83" - 133.50")

Weld No.: 1-SB-RV-103-121

Sweep With: Rotate Drive (0° - 361°)

Weld Centerline: 125.66"

Weld Title: Upper Shell to Intermediate Shell Circ. Weld

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: Refer to Section 12.2 before scanning.

Operator ___ Date ___ Time ___ Reviewer

Operator ___ Date ___ Time ___ ___ Date ___

RASTER SUMMARY SHEET

Raster Set: III-6

Section: III Pg.___ of___

Raster No.:

Cal. Data Pkg.:

Scanning Mode: Parallel

Procedure No.: 80A6477 Rev.

Head Attitude: Horizontal

Video Tape No.:

Orient.: 1 Shooting: Right

Cal. Block No.: 196-103 (9")

Index Increment: 0.70"

Head No.: 80D8580-2

Index With: Hoist (227.92" - 243.34")

Weld No.: 1-SB-RV-101-171

Sweep With: Rotate Drive (0° - 361°)

Weld Centerline: 235.63"

Weld Title: Intermediate Shell to Lower Shell Circ. Weld

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: Refer to Section 12.2 before scanning.

Operator________ Date________ Time________ Reviewer

Operator________ Date________ Time________ ________ Date________

NES NUCLEAR ENERGY SERVICES, INC.

Form 028-110/1 1/83

RASTER SUMMARY SHEET

Raster Set: III-6

Raster No.:

Scanning Mode: Parallel

Head Attitude: Horizontal

Orient.: 2 Shooting: Left

Index Increment: 0.70"

Index With: Hoist (227.92" - 243.34")

Sweep With: Rotate Drive (0° - 361°)

Section: III Pg. ___ of ___

Cal. Data Pkg.:

Procedure No.: 80A6477 Rev. ___

Video Tape No.:

Cal. Block No.: 196-103 (9")

Head No.: 80D8580-2

Weld No.: 1-SB-RV-101-171

Weld Centerline: 235.63"

Weld Title: Intermediate Shell to Lower Shell Circ. Weld

INDEX	START	STOP	INDEX	START	STOP	INDEX	START	STOP

Remarks: Refer to Section 12.2 before scanning.

Operator ___ Date ___ Time ___ Reviewer

Operator ___ Date ___ Time ___ ___ Date ___

NES NUCLEAR ENERGY SERVICES, INC.

13. RASTER SET III-7
THREE UNIT SHELL HEAD 80D8580-2

13.1 This raster set covers the parallel examinations for the longitudinal welds in the intermediate shell and lower shell.

13.2 Physical (lower core support pads) obstructions and limitations may exist in several areas throughout the longitudinal welds in the lower shell. Carefully monitor all operations in these areas via the television system. Scanning is to be stopped whenever an obstruction is met, or head contact is lost.

13.3 Figure 1 is an illustration of the orientations to be used with head 80D8580-2. Note that when reference is made to shooting up or down on the raster summary sheets, this direction refers to the orientation of the 0^{o} straight beam.

13.4 Each raster summary sheet in this section provides full coverage in one direction parallel to the weld. Each weld is examined twice to provide coverage in both parallel directions as required.

AUTOMATED ULTRASONIC EXAMINATION

PROCEDURE FOR REACTOR PRESSURE VESSEL SHELL WELDS

FROM THE ID SURFACE

SEABROOK NUCLEAR POWER STATION
UNIT 1

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VALID ONLY IF THIS STAMP IS RED

Project Application 5562	Prepared By S. Larson	Date 11-16-83
APPROVALS		
TITLE/DEPT.	SIGNATURE	DATE
Level III	[signature]	2/24/84
Project Engineer	KW Tinklen for P. DINARDO	2/24/84
⚠ Reactor Services Opers. Mgr.	KW Tinklen	2/24/84
Project Manager	Lawrence P. Brundage	2/24/84
QA Manager	MJ Dizdul for WSG	2/24/84

nes

REVISION LOG

NUCLEAR ENERGY SERVICES, INC.

DOCUMENT NO. 80A6477

REV. NO.	DATE	PAGE NO.	DESCRIPTION	APPROVAL
1	2/24/84	1 & 7	Incorporate changes listed on CRA 4057	K. Jazzone

AUTOMATED ULTRASONIC EXAMINATION PROCEDURE FOR REACTOR PRESSURE VESSEL SHELL WELDS FROM THE ID SURFACE

1. SCOPE

1.1 AREA OF EXAMINATION

1. This document covers the ultrasonic examination procedures for the Reactor Pressure Vessel (RPV) welds as follows:

   A. Flange to upper shell circumferential weld shown in Figures 1 and 2.
   B. Upper shell to intermediate shell circumferential weld shown in Figures 1 and 3.
   C. Upper shell longitudinal welds shown in Figures 1 and 4.
   D. Intermediate shell and lower shell longitudinal welds shown in Figures 1 and 5.
   E. Intermediate shell to lower shell circumferential weld shown in Figures 1 and 6.
   F. Inlet nozzle to shell welds shown in Figures 1 and 7.
   G. Outlet nozzle to shell welds shown in Figures 1 and 8.
   H. Lower shell to bottom head circumferential weld shown in Figures 1 and 9.
   I. Bottom head circumferential (dollar plate) weld and bottom head meridional welds shown in Figures 1 and 10.

2. Flange and nozzle weld examinations, specified in this procedure, provide parallel only coverage of those welds. Perpendicular coverage of flange and nozzle welds is specified in Procedures 80A6478 and 80A6479.

3. Near Surface coverage of the welds mentioned in 1.1(1) shall be specified in NES Document 80A6480.

1.2 TYPE OF EXAMINATION

1. Volumetric examination shall be performed using ultrasonic pulse echo nominal 45° and 60° shear wave angle beams and 0° straight beam techniques applied to the clad inside (ID) surfaces of the RPV.

2. The examinations will be performed using the RPV ID Examination Positioning Device and immersion search units (transducers).

1.3 TIME OF EXAMINATION

These procedures shall govern the preservice (baseline) examination of the Reactor Vessel as required by the ASME Boiler and Pressure Vessel Code, Section XI and the NRC Regulatory Guide 1.150 Rev. 1.

1.4 MATERIALS

The RPV shell, bottom head, and flange assembly are constructed of low carbon steel with stainless steel cladding on the inside (ID) surfaces.

2. REFERENCES

2.1 REFERENCE DOCUMENTS

1. NRC Regulatory Guide 1.150 Rev. 1.

2. ASME Boiler and Pressure Vessel Code, Section XI, 1977 Edition through Summer of 1978 Addenda

3. ASNT Recommended Practice, SNT-TC-1A, 1975 Edition

4. NES Document 80A6401, Reactor Pressure Vessel Preservice Inspection Program Plan for Seabrook Nuclear Power Station Unit 1

5. NES Document 80A5187, Quality Assurance Program Plan for Seabrook Nuclear Power Station Unit 1

6. NES Document 80A9068, Procedure for Training and Certification of Nondestructive Examination Personnel (latest revision)

7. NES Document 80A9053, Procedure for Ultrasonic Instrument Linearity Verification (latest revision), as modified in paragraph 7.4.2 of this procedure

8. NES Document 80A9060, Inservice Inspection Field Change Procedure (latest revision)

9. NES Document 80A6476, Procedure for the Operation of the RPV ID Examination Positioning Device

2.2 APPLICABLE DRAWINGS

1. Seabrook Drawings

	Drawing No.	Title
A.	10773-161-003	As Built Location of Weld Seams Vessel
B.	10873-171-004	General Arrangement Elevation
C.	10873-171-005	General Arrangement Plan

2. Calibration Block Drawings:

A. NES Drawing No. 80E6306 Basic 7" Calibration Block, Seabrook Unit 1 PC. NO. 196-102

B. NES Drawing No. 80E6307 Basic 9" Calibration Block, Seabrook Unit PC. NO. 196-103

C. NES Drawing No. 80E6308 Basic 11" Calibration Block, Seabrook Unit PC. NO. 196-104

3. PROCEDURE COMPLIANCE

The examination procedures described in this document comply with Section XI of the ASME Boiler and Pressure Vessel Code and the NRC Regulatory Guide 1.150 Rev. 1 except where examination coverage is limited by part geometry or access. Where part geometry or access result in limited coverage, such limitations shall be identified and described on the appropriate documentation for reporting the examination.

4. PREREQUISITES

4.1 PERSONNEL CERTIFICATION REQUIREMENTS

1. Each person performing ultrasonic examinations governed by this procedure shall be certified in accordance with ASME Boiler and Pressure Vessel Code Section XI, 1977 Edition through Summer of 1978 Addenda and NES 80A9068, Procedure for Training and Certification of Nondestructive Examination Personnel.

2. Examination crews shall have two or more members on each shift as necessary. At least one member of each crew shall have a minimum qualification of Level II in accordance with the above referenced documents. At least one additional member must have a minimum qualification of Level I. Supplemental data evaluations/reporting required by RG 1.150 shall be conducted by a Level II (minimum).

4.2 PERSONNEL RECORDS

1. Records of personnel qualification shall be maintained by the on-site NES Automated Site Supervisor, or Data Reviewer.

2. A copy of the examiner's certification summary and a current eye test shall be submitted to the Plant Owner or his Agent, prior to performing examinations per this procedure.

△ 4.3 SURFACE PREPARATION

All examination surfaces must 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. EXAMINATION REQUIREMENTS

5.1 EXAMINATION FREQUENCY

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

2. During preservice examination, other pulse frequencies shall be used 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

1. The intent of this procedure is to provide maximum examination coverage. Each weld shall be scanned with a minimal 25% overlap of the transducer width (diameter) for each scan pass.

2. The rate of search unit movement shall be recorded as required and in no case shall the scanning speed exceed 6 inches/second.

3. Each weld and the volume of metal for 1/2T on each side of the weld (WRV)* shall be examined using 0° longitudinal techniques, 45° and 60° shear wave angle beam techniques, except where restricted by part

*WRV = Weld and Required Volume

geometry or access and as noted in Paragraph 1.1(2). The angle beams shall be oriented both perpendicular and parallel to the weld.

4. Straight beam techniques shall be applied to the required examination volume (WRV) and to all adjacent base material through which angle beams will pass during angle beam examination of the WRV.

5. Other angles and techniques may be used if required for aid in evaluation and the appropriate information (angle, frequency, techniques, etc.) shall be recorded.

6. Examination coverage for the welds specified in this procedure is shown in Figures 2 through 10. Actual scan dimensions and coordinates are specified in NES Document 80A6476, Procedure for the Operation of the RPV ID Examination Positioning Device.

5.3 LIQUID COUPLANT

The ultrasonic couplant shall be the inhibited water used to fill the RPV.

5.4 SCAN COVERAGE LIMITATIONS

Where the surface or other conditions do not permit a meaningful examination of the scan areas designated, the examiner shall record the location and the particular interfering condition in the space provided on the Regulatory Guide 1.150 Examination Limitation Report Sheet and report same to the NES Automated Site Supervisor for corrective action or disposition.

5.5 WELD IDENTIFICATION

The appropriate weld maps in NES Document 80A6401, Reactor Pressure Vessel, Preservice Inspection Program Plan shall be used to locate each weld.

5.6 REFERENCE POINT

1. The reference point for all RPV shell welds (except the nozzle - shell welds) shall be RPV 0o at the flange mating surface.

2. The reference points for the RPV nozzle - shell welds shall be 0o at the nozzle top dead center for angular displacement and the nozzle axis for radial displacement.

6. EQUIPMENT REQUIREMENTS

6.1 EXAMINATION EQUIPMENT

The following test equipment or its equivalent shall be provided (as a minimum) for examination of the welds specified in this procedure.

1. Nuclear Reflectoscope System.
2. RPV ID Examination Positioning Device.
3. Calibration Tank.
4. Transducers, as required.
5. Examination Head Assemblies.
6. Other ultrasonic equipment as required.

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. Air and Electricity.
3. Temporary Lighting.
4. Moving or Lifting Devices.
5. Calibration Blocks.
   A. 196-102

B. 196-103

C. 196-104

6. Inhibited Water (couplant).
7. Test Surface Preparation.
8. Post-Examination Cleanup of Test Area.
9. Work Space Adjacent to the RPV Cavity (defined by separate cover).
10. Office Space with Phone Communication (defined by separate cover).

7. CALIBRATION REQUIREMENTS

7.1 CALIBRATION DATA PACKAGES

Calibration Data Packages shall be numbered 6477-1, 6477-2, and 6477-3 etc., at the time of calibration and shall be signed by the examiner(s) upon completion, noting applicable NDE levels. A Calibration Data Package shall consist of a Weld Scan Data Sheet, Calibration Data Sheets, Daily Linearity Sheet (one per 24 hour period), and Supplements as required.

7.2 CALIBRATION BLOCKS

1. The calibration blocks designated in 6.2(5), shall be used for basic instrument calibration and for establishing reference sensitivity levels for examinations.

2. The identity of the calibration block used for performing the calibration shall be recorded on each Calibration Data Sheet.

3. System calibration shall be performed on the clad surface of the calibration blocks.

4. The temperature of the calibration couplant shall be within 25° F of the component couplant temperature. Calibration couplant and component couplant temperatures shall be recorded on the Calibration Data Sheet.

5. Spot Thickness Checks of the components shall be made prior to the preservice examination to ensure that the proper calibration sweep length includes the maximum thickness. Readings shall be taken at 3 locations on each vessel shell weld and shall be recorded on the Weld Thickness Spot Check Data Sheet.

7.3 EXAMINATION SENSITIVITY LEVELS

1. Primary Reference Sensitivity

The primary reference sensitivity level shall be the distance-amplitude correction (DAC) curve initially established on the calibration block.

2. Equalized Response Sensitivity

When an electronic DAC is used, the primary reference response shall be equalized at a nominal 80% FSH over the distance to be gated during the examination. The equalized response sensitivity setting of the ultrasonic instrument is that control setting which provides an 80% FSH response from all calibration reflectors after the electronic DAC curve equalization. If equalization is not possible refer to Paragraph 8.1(E).

3. Examination Sensitivity

The examination sensitivity shall be the equalized response sensitivity with correction factors included as determined in NES 80A5533, Automated Ultrasonic Examination Technique Qualification Procedure.

7.4 TIMES OF CALIBRATION

1. Examination system calibration shall be performed prior to the examination of the specified welds and shall include establishment of DAC curve(s), correction factors, setting of gates, establishment of electronic DAC curve(s) and the programming of Transponding Ultrasonic Calibrator (TUC) cards to establish equalized amplitude response.

2. Instrument vertical and amplitude control linearity checks shall be performed at the beginning of each day of examination, in accordance with NES 80A9053, Procedure for Ultrasonic Instrument Linearity Verification, using an angle beam search unit applied to the appropriate Code Calibration block, TUC pulses, or other sources of suitable stable signals.

   When performing the vertical linearity check required on the Daily Linearity Sheet, the smaller signal amplitude shall be equal to half the corresponding larger signal amplitude, within ± 5% FSH, for all high points 80% FSH and below. This information shall be recorded on the Daily Linearity Sheet shown in Figure 12.

3. Calibration checks using the TUC shall be performed at the beginning of each 12 hour period of the examination, and at the change of Level II examination personnel. A TUC check shall be made at any time there is a reason to suspect equipment malfunction.

4. A check of the examination system calibration, search unit heads and coaxial cables shall be performed each time the head, transducers, cables, etc. require replacement or each time the equipment is removed from the examination area or at the beginning and end of each 12 hour examination period, whichever is sooner.

7.5 CALIBRATION RESPONSE

1. Calibration response shall be checked at the equalized response sensitivity level.

2. Signal response obtained during calibration check shall be within plus or minus 20% of that established during basic system calibration.

3. If any point of the equalized response level has decreased by more than 20% of its amplitude, the examiner shall:

A. Void all scans completed since previous calibration or calibration check.

B. Recalibrate examination system.

C. Re-examine voided areas.

4. If any point of the equalized response level has increased by more than 20% of its amplitude, the examiner shall:

A. Recalibrate examination system.

B. Re-evaluate all indications recorded since the previous calibration check at the corrected equalized response level.

5. If any point on the DAC curve has moved horizontally more than 10% of the sweep line from its original settings, the examiner shall:

A. Correct sweep calibration, noting correction on the Calibration Data Sheet.

B. Void any scans made since the previous calibration or calibration check which have recorded indications, perform and record the new calibration, and re-examine those areas.

7.6 CALIBRATION FIXTURES

Calibration shall be performed using the same mounting fixture as required for the examination.

8. EXAMINATION SYSTEM CALIBRATION

8.1 BASIC SYSTEM CALIBRATION

The Level II Examiner of each shift shall establish basic examination system calibration settings and parameters at any time prior to the ultrasonic examination of the RPV welds. Initial calibration shall be from the clad side of the appropriate calibration block.

1. First half vee angle beam calibration not including the inner 25% shall be performed as follows:

   A. Adjust instrument sweep range to correspond with the area to be covered during the examination. For initial 0° straight beam and 60° angle beam calibration, the 1/4T hole indication from the calibration block shall occur at the second horizontal screen division; the 3/4T indication shall occur at the sixth horizontal screen division; and the 1/2T indication will occur at approximately the fourth horizontal screen division. For angle beam examination, the far surface notch and the 3/4T hole after bounce (1-1/4T hole, when it can be adequately resolved) shall occur at approximately the 8th and 10th horizontal divisions, respectively.

   B. For 0°, start the first gated area as close as practical to the front interface signal and end the gated area as close as practical to the back reflection signal. Do not set the start of the first gated area so close to the front interface signal as to cause the gate to trigger, as this will produce large amounts of meaningless data. A second gate shall be used on the 0° channel to monitor the back reflection signal. For the angle beam exams, the start of the gated area shall include at least 1 inch of material before the 1/4T hole. Similarly, end the gated area far enough to include the far surface notch and include the 1 1/4T hole wherever possible. The final gate set-up should be flexible enough to allow for minor adjustments as may be required by the actual examination conditions, provided the required examination volume is included.

   C. Establish actual DAC curve for the proper angle and examination depth combination by plotting the signal response amplitudes from the 1/4T, 1/2T, and 3/4T (and 1-1/4T for angle beams wherever possible) reference holes. Adjust the response from the hole giving the highest amplitude to 80% Full Screen Height (FSH). Connect the points plotted on the CRT with a continuous line covering the examination range.

D. Program a TUC card to match the distance-amplitude curve established in (C) above.

E. Electronically equalize the reference sensitivity at 80% FSH over the examination range. If the sensitivity cannot be equalized over the entire range, the minimum response level from the side drilled holes (1/4T, 1/2T or 3/4T) will be used for determining recording levels. In this case, 50% of the lowest of the above responses shall be used as the recording level. For the angle beam exams, if the far surface notch and/or 1 1/4T hole cannot be equalized note its best equalized sensitivity and the amount of db (+ or -) necessary to bring its echo to 80% FSH on the Calibration Data Sheet.

F. Record all information required on the Calibration Data Sheet. The ultrasonic examiner(s) shall sign the completed data sheet(s), noting their applicable NDE certification levels.

G. If the 45^{o} and 60^{o} angle beam examinations are to be displayed on the same CRT (dual traces) the 45^{o} examination shall use the sweep settings established for the 60^{o} examination. Repeat steps (B) through (F) for the complete calibration of the 45^{o} angle beam channel.

2. Special calibration for the Lower Head Dollar Plate full vee angle beam calibration shall be performed using 45^{o} shear wave angle beam and as follows:

NOTE: If the 45^{o} full vee and 60^{o} half vee examinations are to be displayed on the same CRT, the 60^{o} half vee examination shall use the sweep settings established for the 45^{o} full vee examination. Repeat steps 8.1.1(B) through 8.1.1(F) for complete calibration of the 60^{o} half vee examination.

A. Adjust the instrument sweep range to correspond with the area to be covered during the examination. Position the 1/4T hole indication to occur at the first horizontal screen division and the 1 3/4T hole indication to occur at the seventh horizontal screen division. The 1/2T, 3/4T, 1 1/4T, and 1 1/2T hole indications shall occur at approximately the second, third, fifth, and sixth horizontal screen divisions respectively. The 1T notch and the 2T notch shall occur at approximately the fourth and eighth horizontal screen divisions respectively.

B. Start the gate as close as practical to the front interface. End the gate at the ninth horizontal screen division or higher.

C. Position search unit to obtain maximum response from the hole which gives the highest amplitude signal. Adjust sensitivity controls to provide a signal amplitude of 80% FSH and mark location and amplitude on the CRT.

D. Without changing sensitivity, position search unit on the remaining angle beam calibration holes and mark signal amplitudes and locations on the CRT.

E. Plot a DAC curve by connecting the locations with a continuous line extended to cover the full examination range.

F. Program a TUC card to match the DAC Curve established in (D) above.

G. Electronically equalize the primary reference response to 80% FSH over the entire depth range to be used during the examination. If equalization within ±10% FSH is not possible, the equalized sensitivity shall be raised until the lowest response is at 80% FSH.

NOTE: If the 1/4T hole can not be equalized, it is permissable to equalize, starting with the 1/2T hole, provided the 1/4T hole amplitude is at least 80% FSH after the 8 dB increase described in 8.1.2. (H), and any indications occuring between gate start and the second horizontal screen division are initially recorded at the increased examination sensitivity.

H. Examination sensitivity shall be increased a minimum 8db and the 2T notch should be at least 80% FSH. This increased sensitivity shall be used to size any indication (to 50% DAC) between the seventh and ninth horizontal screen divisions. This additional gain shall be reduced to equalized sensitivity for indication sizing between gate start and the seventh horizontal screen division.

8.2 SYSTEM CALIBRATION CHECK

1. Calibration checks of the examination system, as required by paragraph 7.4(3), shall be performed as follows:

   A. Use the TUC and previously recorded instrument settings to perform a check of the examination instrumentation system including sensitivity level, gate function and position, and data recording system.

   B. Verify that the amplitude response is within plus or minus 20% of the equalized response obtained during initial calibration.

2. Performance checks of search units and cables, as required by paragraph 7.4(4), shall be performed as follows:

   A. Reposition search unit on the calibration block at each test hole and observe maximum signal response amplitude and horizontal positions.

B. Verify that all amplitudes fall within 20% of the equalized response sensitivity level and the horizontal displacement is within the required ± 10%. Refer to paragraph 7.5 if the response from any hole is beyond the allowed tolerance.

3. Record time, date, examiner's initials, and type of calibration check in the space provided on the appropriate Calibration Data Sheet.

8.3 BEAM SPREAD

An alternative data record may be used when establishing a search unit beam spread.

Beam spread measurements for the vertical plane of each angle beam search unit may be made as follows:

NOTE: This is only one of the optional beam spread measurement methods which may be performed. Additional beam spread measurements may be made at the time of evaluations.

1. Position search unit for maximum response from 1/4T hole.

2. Beam spread measurements should be made at the reference sensitivity required for sizing. For example, if sizing will be done to both 50% and 20% DAC, beam spread measurements will be done to both criteria. Move the search unit towards the 1/4T hole, through the maximum amplitude point until the signal amplitude reads 50% then 20% of the DAC line on the screen. Mark the corresponding positions of the fixture on the block surface at some convenient point.

3. Move the search unit back past the 1/4T hole, through the maximum amplitude point, until the signal amplitude comes again to 50% and 20% of the DAC line on the screen. Again, mark the block to indicate the new fixture positions.

4. Repeat steps (2) and (3) for the 1/2T and 3/4T holes.

5. Using suitable paper, transfer the measurements from the block to the paper. Connect points to determine beam spread and angle information.

   NOTE: Curvature of the calibration block used may cause some deviation in beam spread and beam angle information.

6. Beam spread plots shall become part of the examination record.

9. EXAMINATION PROCEDURES

1. Refer to Figures (2) through (10) and to NES Document 80A6476, Procedure for the Operation of the RPV ID Examination Positioning Device for scan coverage and scan sequence information.

2. Calibrate examination equipment as required by Section 8.1; or if 12 hours have elapsed since initial calibration, perform calibration checks as required by Section 8.2.

3. Locate the datum point, position the head on the RPV ID Examination Positioning Device and begin examination.

4. Continue scanning sequences until all welds requiring the same calibration have been examined. Examinations shall not be considered complete until all recordable indications have been investigated, recorded and evaluated as required in 10.

10. RECORDING CRITERIA

10.1 GEOMETRIC INDICATIONS

Indications that are evaluated as geometric in origin and are equal to or greater than 50% DAC shall be recorded at one location and noted as "Geometric caused by weld prep design," or "ID or OD design geometry," etc. and verified by the applicable drawings. All geometric indications shall be recorded on the "Report Sheet for Geometric Reflectors".

10.2 INDICATIONS WITH CHANGING METAL PATH

Indications that change metal distances and are within the outer 75% of the through-wall dimension shall be recorded at 50% DAC.

The inner 25% of the through-wall dimension recording criteria is specified in NES Document 80A6480. Refer to 8.1.2 (H) for recording indications using the full vee calibration technique.

10.3 INDICATIONS WITHOUT CHANGING METAL PATH

1. Indications equal to or greater than 50% DAC which do not change metal path distances and are within the outer 75% of the through-wall dimension shall be recorded when any continuous dimension exceeds one inch. The inner 25% of the through-wall dimension recording criteria is specified in NES Document 80A6480. Refer to 8.1.2(H) for recording indications using the full vee calibration technique.

2. Indications lying parallel to welds may appear as nontraveling (without changing metal path) when scanned by parallel moving transducers whose beams are aimed normal to the weld, ie. at 90o. Multiple scans, however, may reveal that these indications are traveling indications.

   NOTE: Any non-traveling indication appearing in more than one scan shall be investigated for travel for travel by comparing the multiple scans. If the multiple scan evaluation reveals travel record the indication in accordance with Section 10.2.

11. EVALUATION CRITERIA

1. Evaluation of flaw indications (excluding geometry) shall be performed in accordance with the Flaw Evaluation Procedure 80A5535.

2. Results of the evaluation shall be reported to the Plant Owner or his Agent.

12. EXAMINATION RECORDS

12.1 CERTIFICATION OF RECORDS

1. The examiner(s) shall complete and sign the appropriate data sheet(s) immediately upon the completion of RPV shell weld examinations, noting their applicable NDE certification levels. All Calibration Data Packages shall be reviewed for procedural compliance by the Data Reviewer or the designee of the site supervisor.

2. Should the performance of an examination overlap two shifts, the Level II Examiners of each shift shall sign the appropriate data sheets.

12.2 FILING OF RECORDS

NES 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 current eye test reports.

12.3 PROCEDURE CORRECTIONS AND ADDITIONS

1. All procedure corrections and/or additions required during the preservice examinations may be initiated by either the owner or the senior NES site representative. All such changes shall have the approval of the owner and an NES Level III.

2. Each procedure revision shall be documented in accordance with the NES Field Change Procedure. The Plant Owner or his Agent shall be notified of such changes and approval obtained as required.

1. Flange to Upper Shell Circumferential Weld
2. Upper Shell Longitudinal Welds
3. Upper Shell to Intermediate Shell Circumferential Weld
4. Intermediate Shell Longitudinal Welds
5. Intermediate Shell to Lower Shell Circumferential Weld
6. Lower Shell Longitudinal Welds
7. Lower Shell to Bottom Head Circumferential Weld
8. Bottom Head Meridional Welds
9. Bottom Head Circumferential Weld (Dollar Plate)
10. Outlet Nozzle to Shell Welds
11. Inlet Nozzle to Shell Welds
12. Nozzle to Safe End Welds

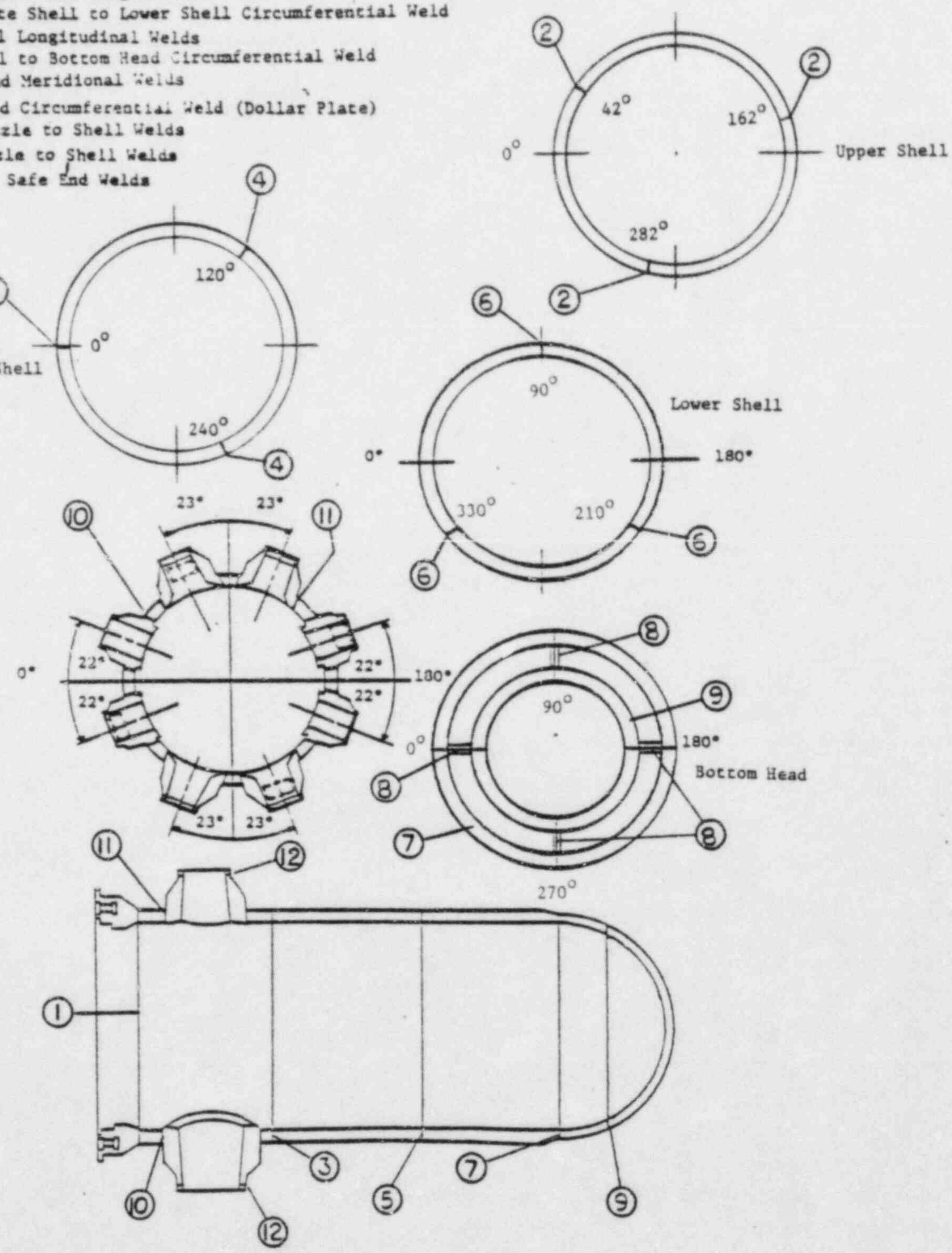


FIGURE 1
WELD LOCATIONS

FIGURE 2
FLANGE TO UPPER SHELL
CIRCUMFERENTIAL WELD

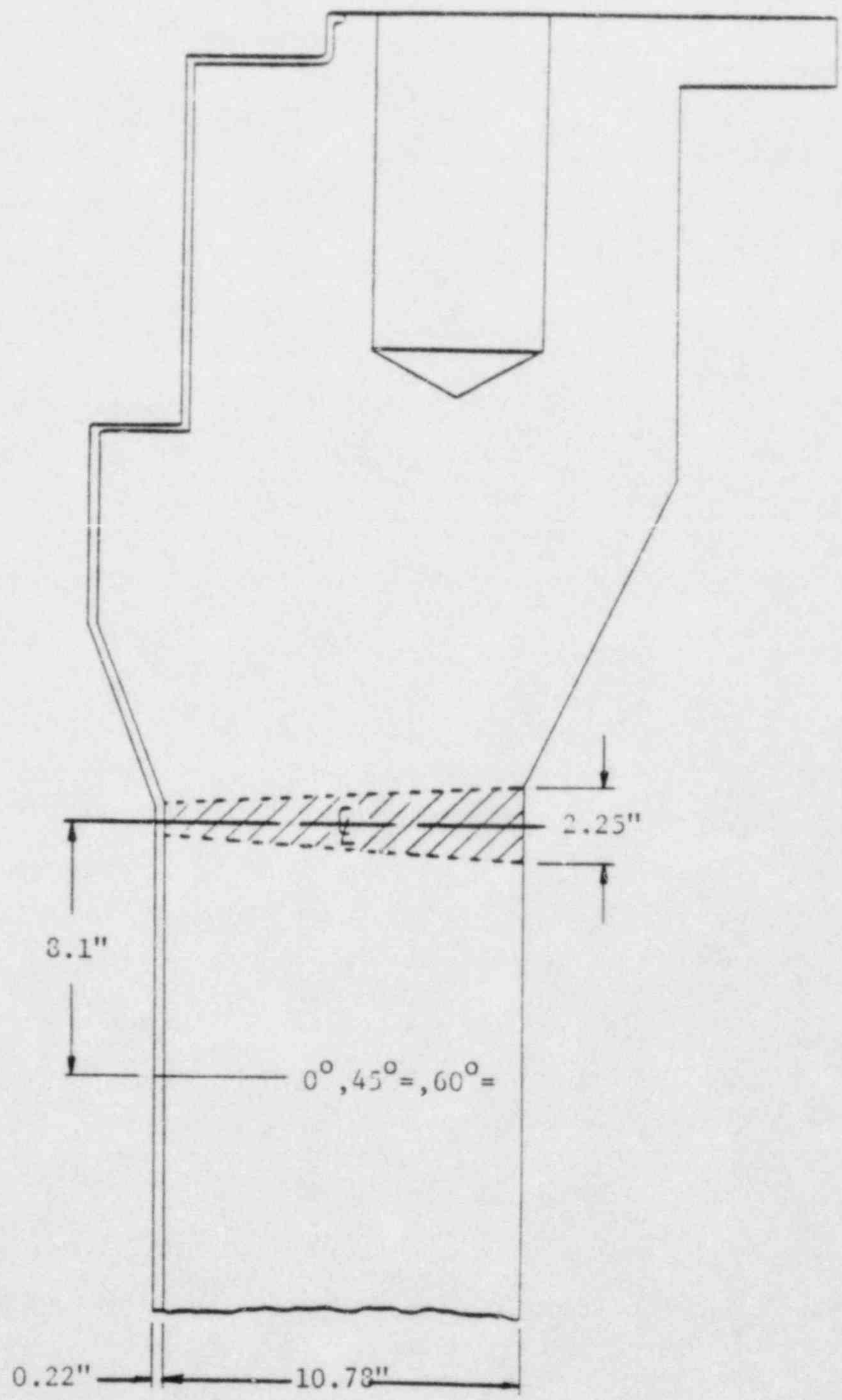


FIGURE 3
UPPER SHELL TO
INTERMEDIATE SHELL
CIRCUMFERENTIAL WELD

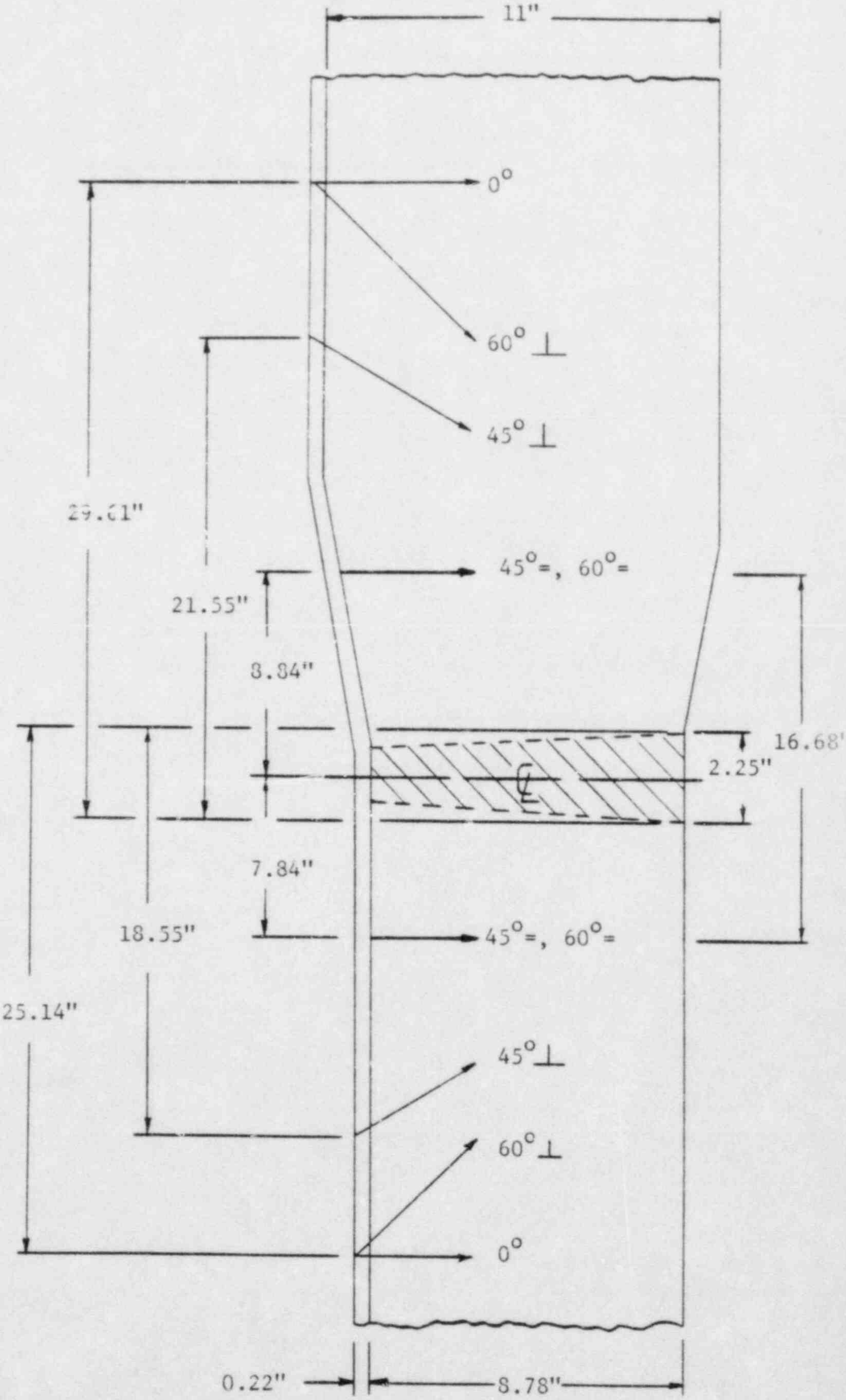


FIGURE 4
UPPER SHELL LONGITUDINAL WELDS

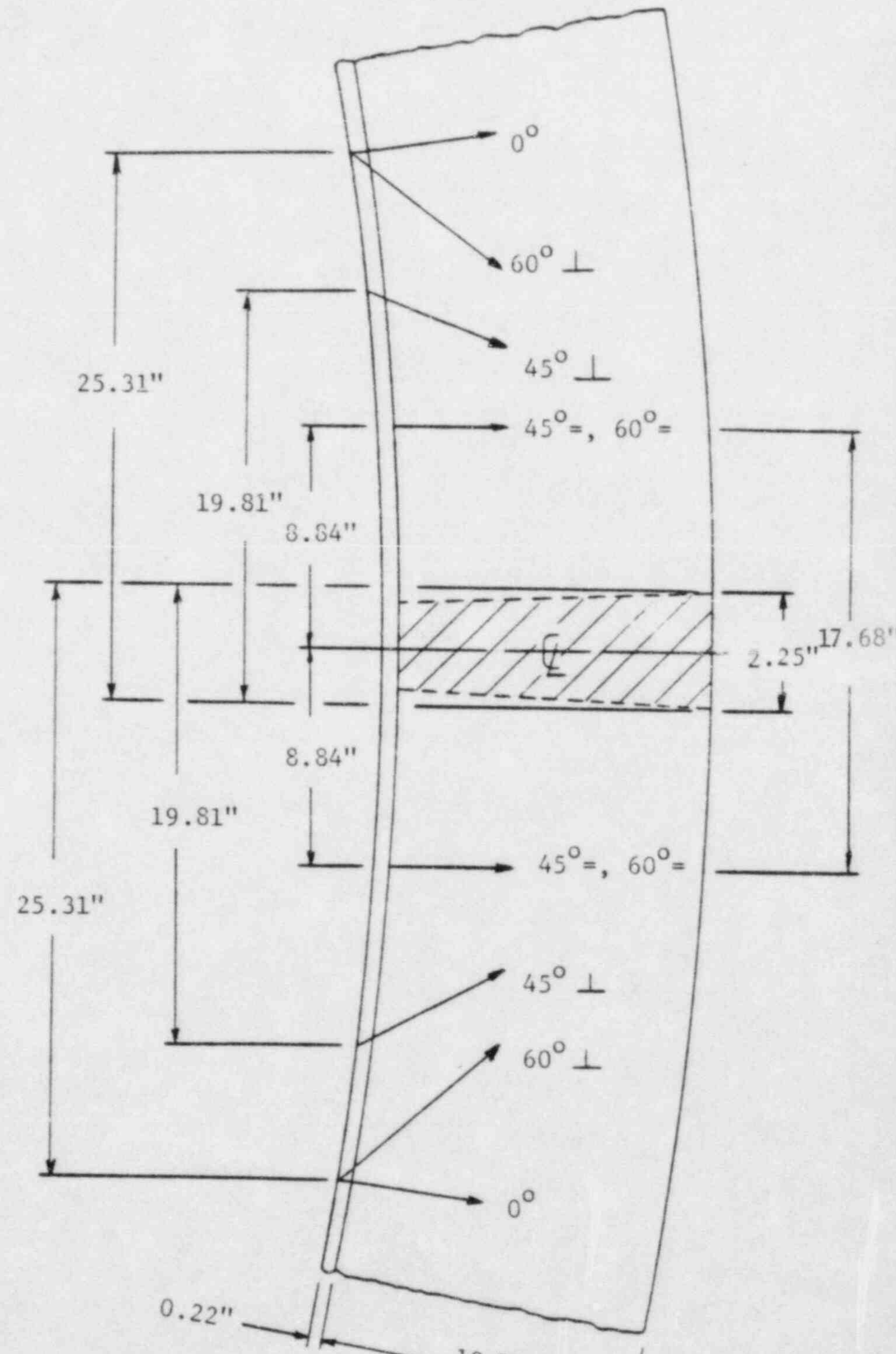


FIGURE 5
INTERMEDIATE AND LOWER SHELL
LONGITUDINAL WELDS

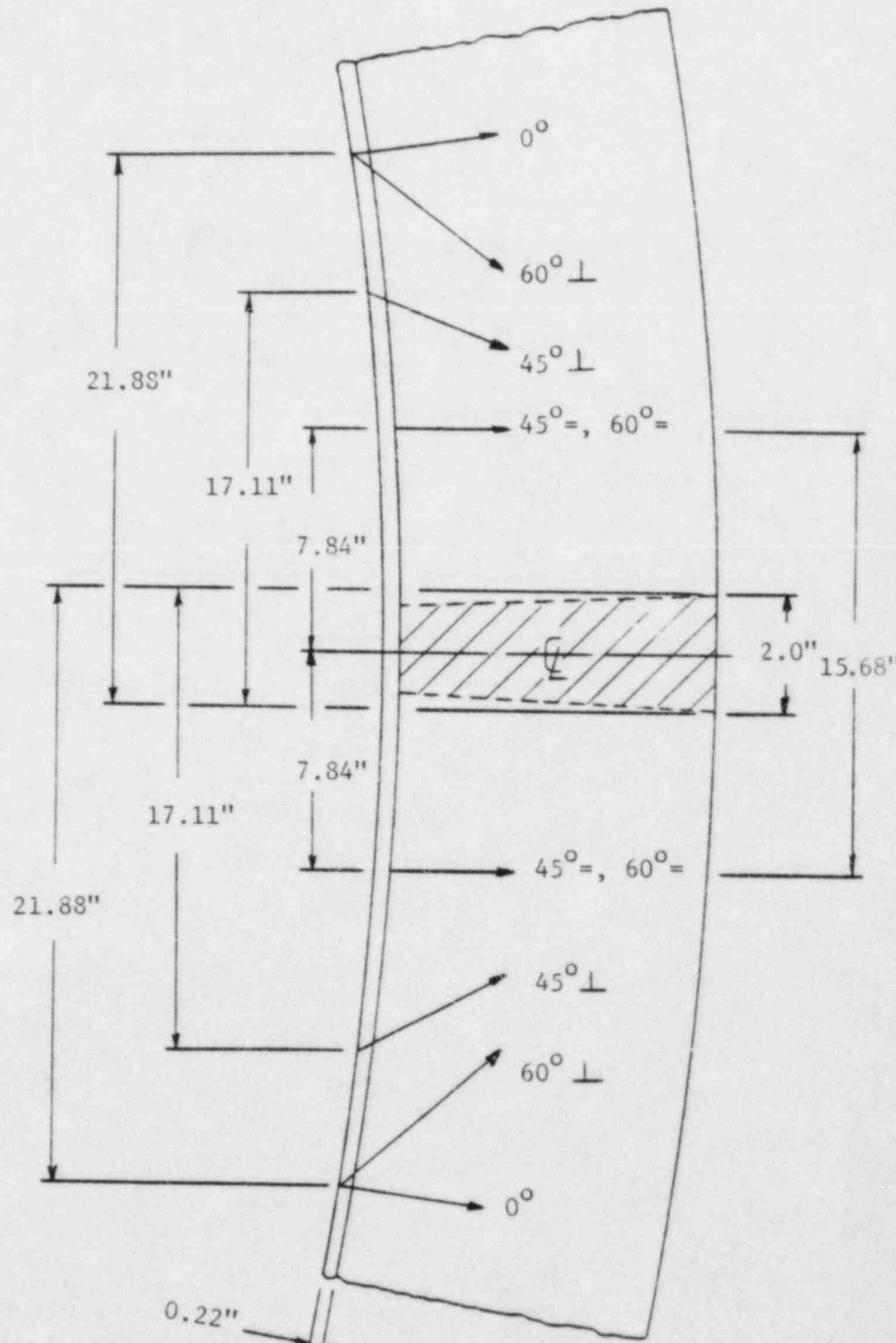


FIGURE 6
INTERMEDIATE SHELL TO LOWER
SHELL CIRCUMFERENTIAL WELD

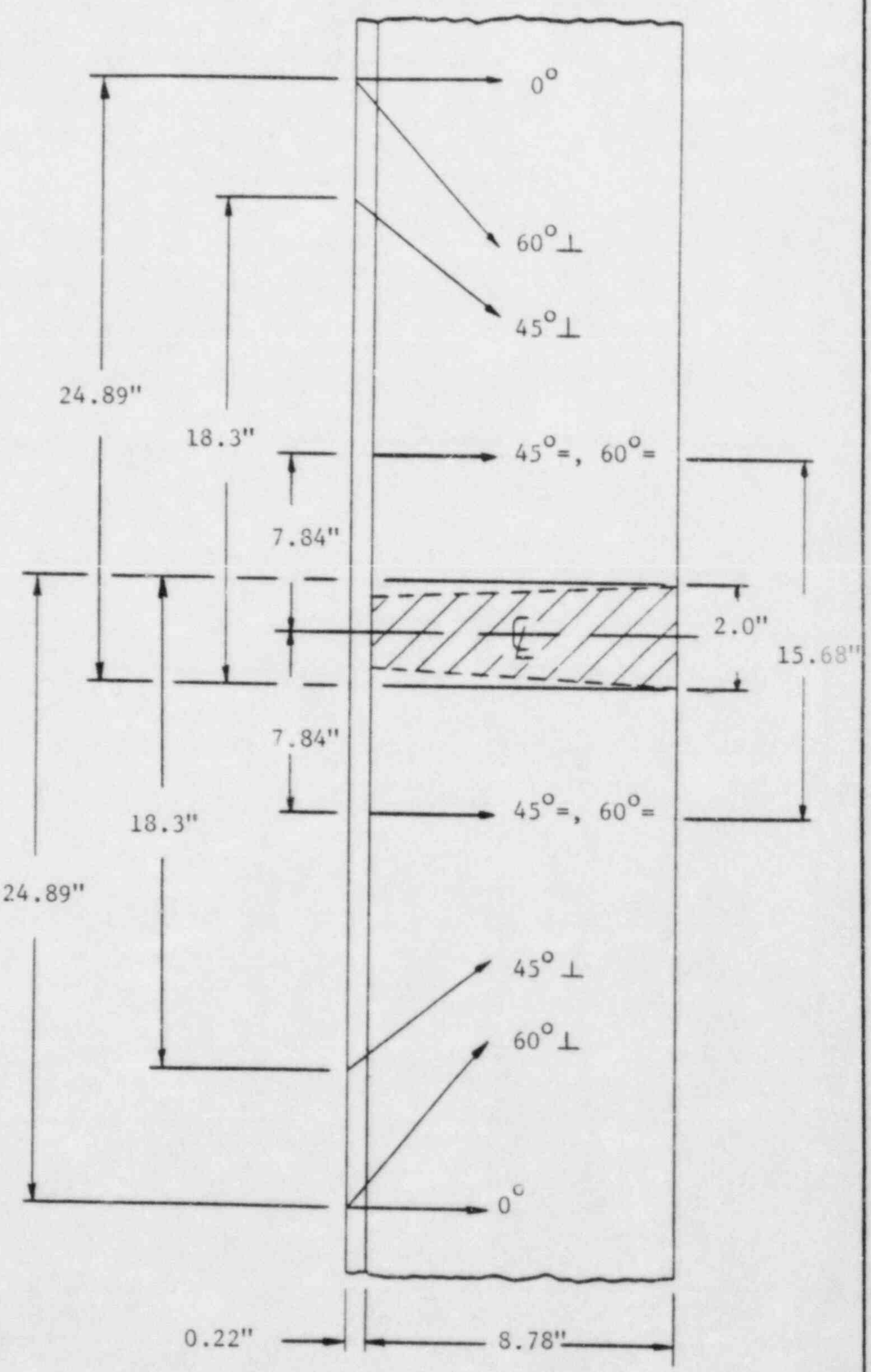


FIGURE 7
INLET NOZZLE TO SHELL WELDS
(PARALLEL COVERAGE)

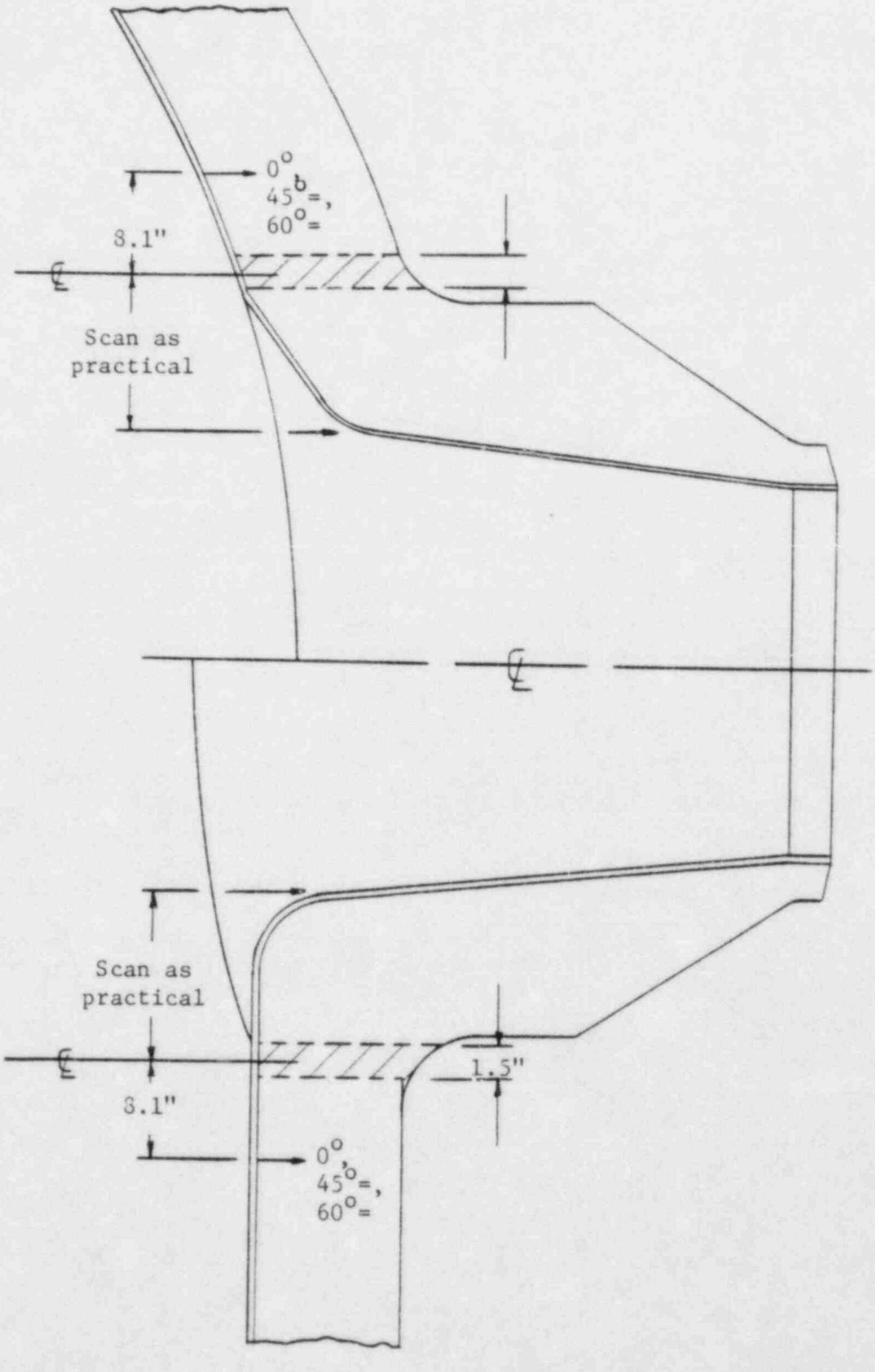


FIGURE 8
OUTLET NOZZLE TO SHELL WELDS
(PARALLEL COVERAGE)

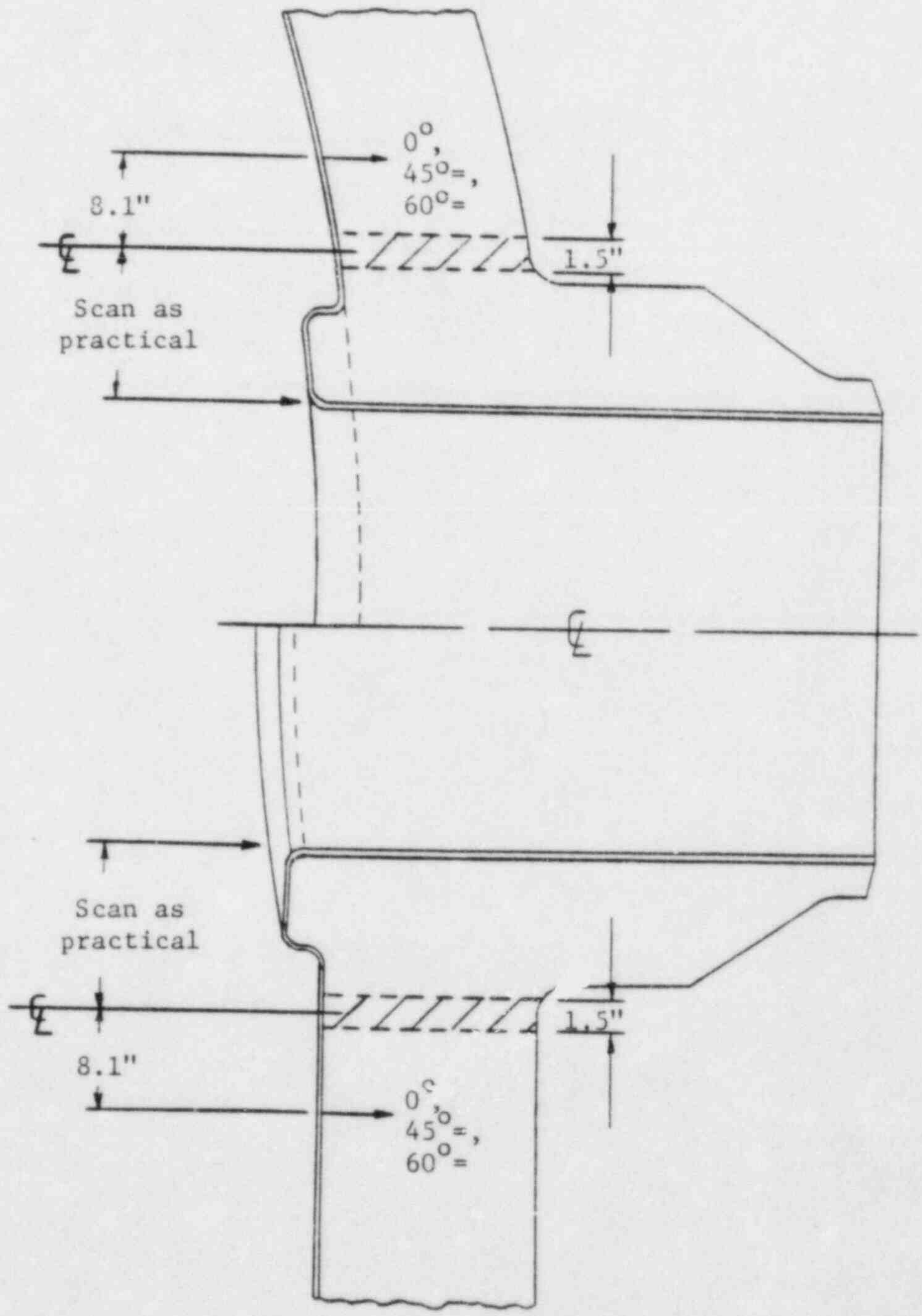


FIGURE 9
LOWER SHELL TO BOTTOM HEAD
CIRCUMFERENTIAL WELD

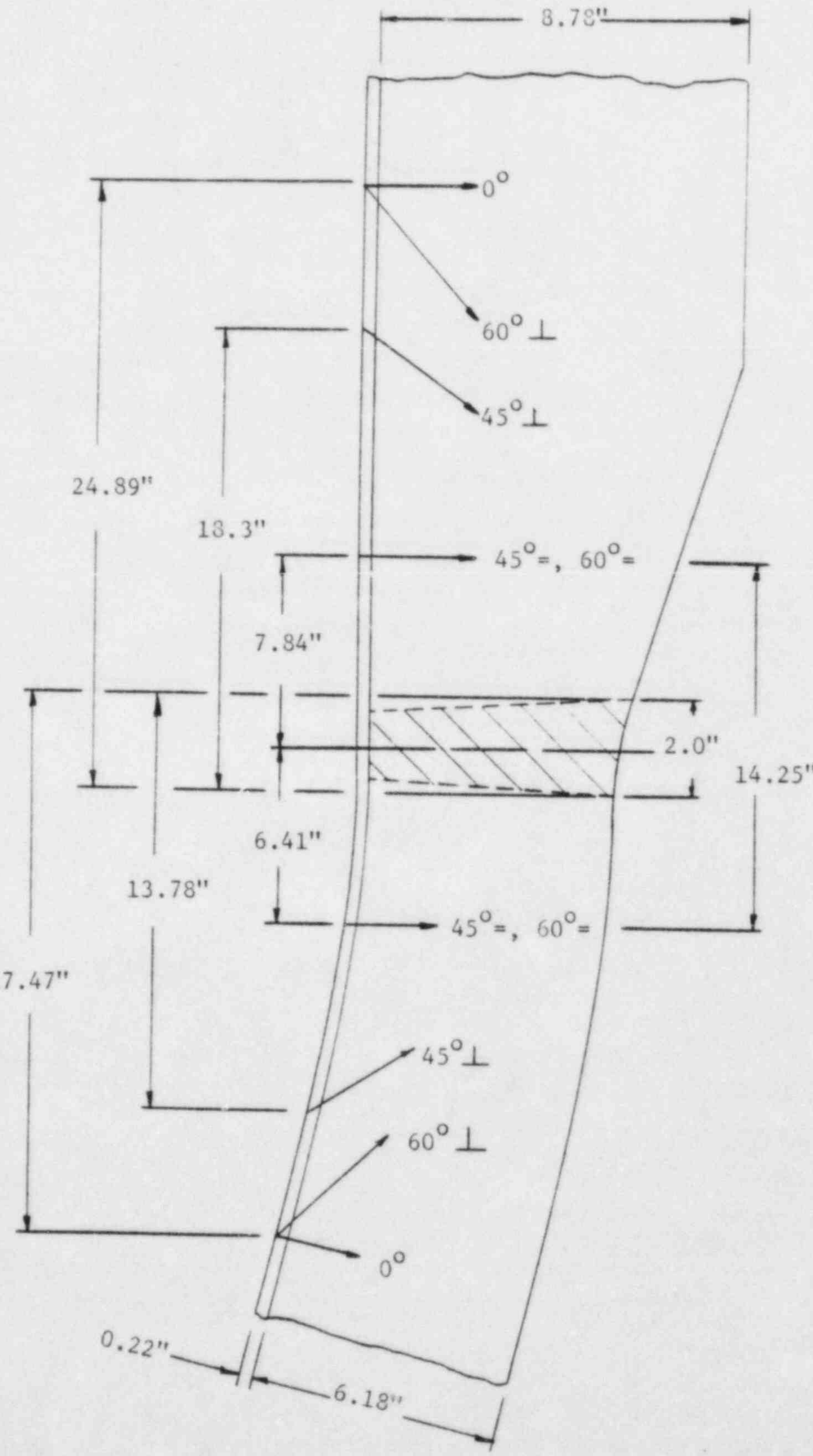
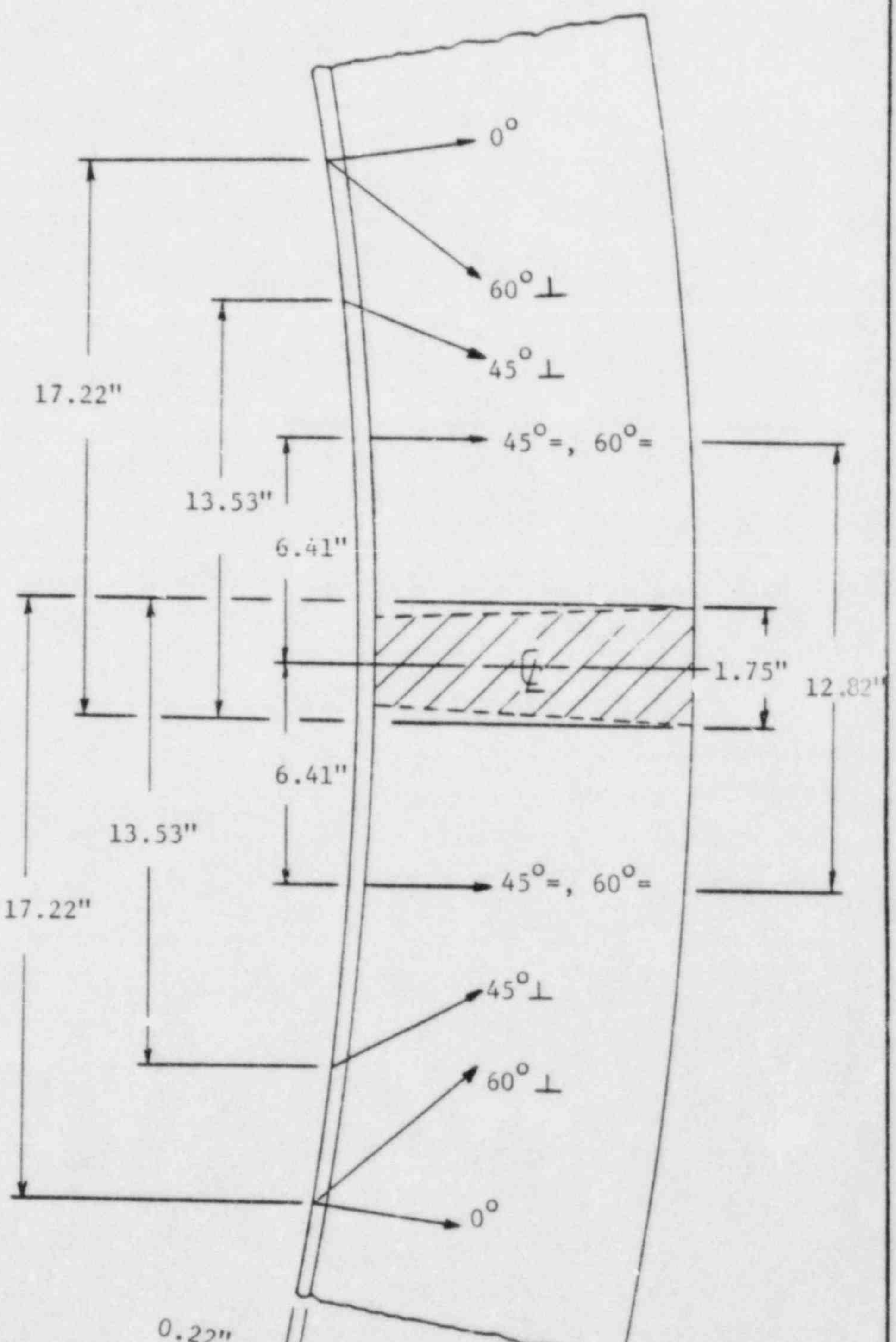


FIGURE 10
BOTTOM HEAD MERIDIONAL
WELDS AND BOTTOM HEAD
CIRCUMFERENTIAL (DOLLAR PLATE) WELD



nes

ULTRASONIC INSTRUMENT LINEARITY RECORD

ULTRASONIC INSTRUMENT

MODEL NO.____________ SERIAL NO.____________

CALIBRATION BLOCK

TYPE____________ SERIAL NO.____________

TRANSDUCER

BRAND____________ FREQUENCY____________ SIZE______ STRAIGHT BEAM (   )

BRAND____________ FREQUENCY____________ SIZE______ ANGLE BEAM (   )

SAMPLE ONLY

SIMILAR VERSIONS WHICH REQUIRE THE SAME INFORMATION ARE ACCEPTABLE.

HORIZONTAL LINEARITY

BACK REFLECTOR	GRID LOC.	ACCEPT LIMITS
1	1	1
2		1.90-2.10
3		2.85-3.15
4		[illegible]
5		4.75-5.25
6		5.70-6.30
7		[illegible]
8		7.60-8.40
9		8.55-9.45
10	10	10

VERTICAL LINEARITY

SIGNAL AMPLITUDES IN % FSH

NO.	ACTUAL HIGHER SIGNAL	(CALCULATE) 1/2 OF HIGHER	ACCEPT. LIMITS*	ACTUAL LOWER SIGNAL
1		( )	( )-( )	
2		( )	( )-( )	
3		( )	( )-( )	
4			( )-( )	
5		( )	( )-( )	
6		( )	( )-( )	
7				
8		( )	( )-( )	
9		( )	( )-( )	
10		( )	( )-( )	

*ACCEPTANCE LIMITS ARE 1/2 OF THE HIGHER SIGNAL ± 5% FSH

AMPLITUDE CONTROL LINEARITY

INITIAL AMPLITUDE	db CHANGE	RESULT	LIMIT
80% FSE	DOWN 6		32% - 48%
80% FSE	DOWN 12		16% - 24%
40% FSE	UP 6		64% - 96%
20% FSE	UP 12		64% - 96%

THIS INSTRUMENT IS CONSIDERED: (   ) ACCEPTABLE
(   ) NOT ACCEPTABLE

SIGNED____________ LEVEL________ DATE____________ NUCLEAR ENERGY SERVICES, INC.

FIGURE 11

SAMPLE ONLY

SIMILAR VERSIONS WHICH REQUIRE THE SAME INFORMATION ARE ACCEPTABLE.

DAILY LINEARITY SHEET

Plant/Unit________ Page____ of____

Channel____

INSTR. LINEARITY RESPONSE					
	Amplitude				
	High	Low		High	Low
1			5		
2	80	40	6		
3			7		
4			8		

AMPL. CONTROL LINEARITY			
Init.	db	Result	Limits
80	-6		32-48%
80	-12		16-24%
40	+6		64-96%
20	+12		64-96%

Mfg/Model No.____

Serial No.____

Date____

Time____

Examiner____

Level____

Channel____

INSTR. LINEARITY RESPONSE					
	Amplitude				
	High	Low		High	Low
1			5		
2	80	40	6		
3			7		
4			8		

AMPL. CONTROL LINEARITY			
Init.	db	Result	Limits
80	-6		32-48%
80	-12		16-24%
40	+6		64-96%
20	+12		64-96%

Mfg/Model No.____

Serial No.____

Date____

Time____

Examiner____

Level____

Channel____

INSTR. LINEARITY RESPONSE					
	Amplitude				
	High	Low		High	Low
1			5		
2	80	40	6		
3			7		
4			8		

AMPL. CONTROL LINEARITY			
Init.	db	Result	Limits
80	-6		32-48%
80	-12		16-24%
40	+6		64-92%
20	+12		64-96%

Mfg/Model No.____

Serial No.____

Date____

Time____

Examiner____

Level____

Channel____

INSTR. LINEARITY RESPONSE					
	Amplitude				
	High	Low		High	Low
1			5		
2	80	40	6		
3			7		
4			8		

AMPL. CONTROL LINEARITY			
Init.	db	Result	Limits
80	-6		32-48%
80	-12		16-24%
40	+6		64-96%
20	+12		64-96%

Mfg/Model No.____

Serial No.____

Date____

Time____

Examiner____

Level____

Reviewer________ Date____

NUCLEAR ENERGY SERVICES, INC.

FORM 078 103/0 2/82

FIGURE 12

NUCLEAR ENERGY SERVICES, INC.

Plant/Unit ____________ Proc. No. ____________ Rev. ______

WELD THICKNESS SPOT CHECK DATA SHEET

Transducer Identification - 0°

Size ____________

SAMPLE ONLY

SIMILAR VERSIONS WHICH REQUIRE THE SAME INFORMATION ARE ACCEPTABLE.

Model ____________

Serial No. ____________

Calibrate the screen in inches, using either two different size blocks or the first two bach echoes within one block. Record thickness at various points on the welds as required. Digital thickness instruments are acceptable.

Weld Number	Left Up	℄	Right Down	Left Up	℄	Right Down	Left Up	℄	Right Down

Examiner ____________ Level ______ Date ______

NUCLEAR ENERGY SERVICES, INC.

FORM 028-119/0 1/83

FIGURE 13

WELD SCAN DATA SHEET

Plant/Unit ______________________

____

Subject ______________________

NR System ______________________

Page ________ of ________

Cal. Data Pkg. ______________

Procedure No. ________ Rev. ______

Video Tape No. ______________

Raster No.	Head Orient.	Scan Direction 0°	⊥ To Weld	═ To Weld	Recordable Indication Yes	No	Comments/Reason for Incomplete Raster

SAMPLE ONLY

SIMILAR VERSIONS WHICH REQUIRE THE SAME INFORMATION ARE ACCEPTABLE.

Remarks ______________________

Examiners

1 ______________ Level ______ Date ______

2 ______________ Level ______ Date ______

3 ______________ Level ______ Date ______

Reviewer ______________ Date ______

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FORM 028-106/1 1/83

FIGURE 14

CALIBRATION DATA SHEET

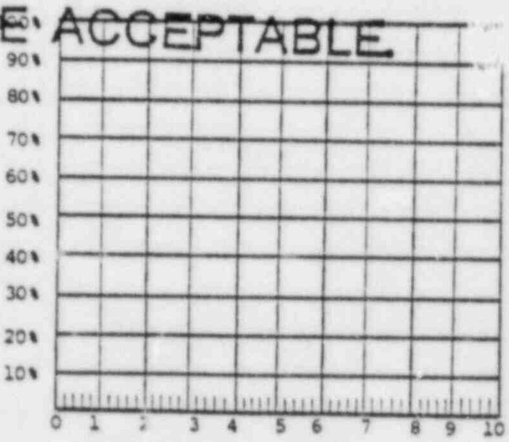
Cal. Blk. No. ____________ Page ________ of ______
Surface Temp. ________ °F Cal. Data Pkg. ____________
Block Temp. ________ °F Procedure No. ______ Rev. ______

Instrument		Hole Ident	Depth In.	Sweep Div.	Amp% (FSH)
Mfg.:	Model:				
Serial No.:	Channel:				
Nom. Angle:	Mode:				
Transducer					
Mfg.:	Model:				

		Calibration	Date	Time	By
Serial No.:	Size:				
Freq.: MHz	Measured Angle:	Initial			
Cable Type:	Length:	Intermediate			
Head No.:	Couplant:	Intermediate			
Main Sweep Range: in.		Intermediate			
Delay/Setup Range: sec		Intermediate			
Main Sweep Calib.:		Intermediate			
Delay:		Final			

SAMPLE ONLY
SIMILAR VERSIONS WHICH REQUIRE THE SAME INFORMATION ARE ACCEPTABLE.

Rep Rate Range: KHz	Var:
Display:	Linear Spec
Fltr:	Mode:
Q:	Freq.:
Jack:	
Ref.: Min.: Max.:	
Pulse Length: Min.: Max.:	
Primary Reference Sensitivity db	
Equalized Response: db	
Exam Sensitivity: db	
Screen Gated: sd to sd	
Front Interface Signal Position: sd	
1 Major Screen Division: in	
TUC Card No.:	Pulses:
Trigger: + -	Freq.: A B C
Pulse Period: C F	
Pulse Delay: C F	
Attenuation: C F	
Resistance Added:	

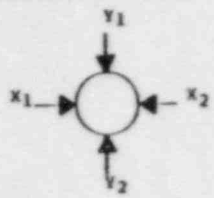


Examiners
1 ____________ Level ____ Date ______
2 ____________ Level ____ Date ______
3 ____________ Level ____ Date ______
Reviewer ____________ Date ______

NES NUCLEAR ENERGY SERVICES, INC.

FORM 028-102/1 11/82

FIGURE 15



SUPPLEMENT A

INDICATION REPORT SHEET

Page ______ of ______

Cal. Data Pkg. ______

Raster No. ______

Video Tape No. ______

Weld No. ______ Weld ℄ ______

IND.	CH.	BM.		0°	MAXIMUM PEAK				LOCATION OF ___ % DAC END POINTS								LOCATION OF ___ % DAC END POINTS							
NO.	NO.	DIR.	∠	BR SD	% DAC	SD	X	Y	X_1	SD	X_2	SD	Y_1	SD	Y_2	SD	X_1	SD	X_2	SD	Y_1	SD	Y_2	SD

SAMPLE ONLY

SIMILAR VERSIONS WHICH REQUIRE THE SAME INFORMATION ARE ACCEPTABLE.

REMARKS ______

EXAMINERS
1 ______ Level ___ Date ______
2 ______ Level ___ Date ______
3 ______ Level ___ Date ______
REVIEWER ______ Date ______

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FORM 028-116/1 1/83

FIGURE 16

Plant/Unit ______________________

____

Subject ______________________

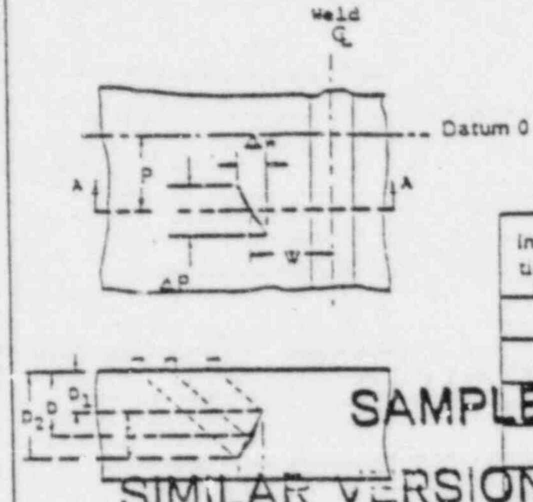
Page ________ of ________

Cal. Data Pkg. ______________

Procedure No. ________ Rev. ______

INDICATION EVALUATION SHEET

SUPPLEMENT 8

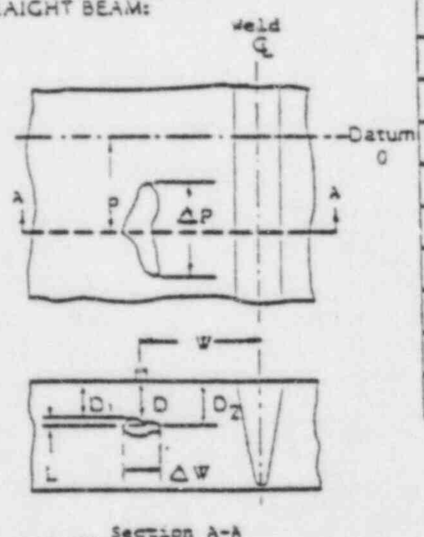


Section A-A

SAMPLE ONLY

SIMILAR VERSIONS WHICH REQUIRE THE SAME INFORMATION ARE ACCEPTABLE.

STRAIGHT BEAM:



Section A-A

Indication No.	CH. No.	W	P	D	L	ΔP	ΔW	

COMMENTS:

Prepared by:

1 ______________ Level ______ Date ______

2 ______________ Level ______ Date ______

Reviewer ______________ Date ______

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FORM 028-128/0 5/83

FIGURE 17

Plant/Unit ______________ Page ______ of ______

______________ Cal. Data Pkg. ______________

Subject ______________ Procedure No. ______ Rev. ______

EVALUATION SHEET FOR RECORDABLE INDICATIONS

Supplement C

A. Zone number ______________ Examination Procedure No. ______________
B. Scan number ______________ Weld number ______________
C. Indication number ______________
D. Applicable ASME Code Standards used for evaluation.
Section ______________ Article ______________
E. Size of indication
Length ______________ Depth ______________
Width ______________ Plate thickness(t) ______________
F. Characterization of Flaw Indication per Para. ______________
1. Type of Flaw: ______________
2. Sketch of indication

SAMPLE ONLY

SIMILAR VERSIONS WHICH REQUIRE THE SAME INFORMATION ARE ACCEPTABLE.

3. Flaw characteristic calculations:

G. Comparison of pertinent evaluation standard (Para. ______________ to actual flaw size.

☐ acceptable ☐ rejectable*

Prepared By: ______________ Approval ______________ SNT-TC-1A Level III

Reviewed By: ______________ Authorized Inspector ______________

*If a rejectable indication is found during an inservice examination, additional evaluation analysis shall be performed.

NES NUCLEAR ENERGY SERVICES, INC

FORM 025-120/0 1/83

FIGURE 18

Plant/Unit ______________

____

Procedure No. ______________

Subject ______________

Weld No. ______________

Sheet ______ of ______

Attachment to Calibration Data

Pkg. No. ______________

SUPPLEMENT D

REPORT SHEET FOR GEOMETRIC REFLECTORS

Depth of Reflector (in.) ______________ Channel ______________

Maximum % DAC ______________ Indication(s) No. ______________

Positional Coordinates ______________ and ______________

SAMPLE ONLY

Comments (Use Sketches to provide clarity): Ref. Dwg. No. ______________

~~SIMILAR VERSIONS WHICH~~

REQUIRE THE SAME

INFORMATION ARE ACCEPTABLE.

NES NUCLEAR ENERGY SERVICES, INC.

FORM 028-125/0 5/83

FIGURE 19

Plant/Unit ______________________ Page __________ of __________

______________________ Cal. Data Pkg. __________

Proc. No. __________ Rev.___

SUPPLEMENT E

REGULATORY GUIDE 1.150 EXAMINATION LIMITATION

REPORT SHEET

Weld Number ______________________________

Volume of WRV not covered due to the limitation described below

SAMPLE ONLY

SIMILAR VERSIONS WHICH REQUIRE THE SAME INFORMATION ARE ACCEPTABLE

Type of Interference

Comments (Use sketch to provide clarity)

FORM NES 028-114/0 nes NUCLEAR ENERGY SERVICES, INC.

FIGURE 20.

nes NUCLEAR ENERGY SERVICES, INC.

DOCUMENT NO. 80A6478 REV. 1

AUTOMATED ULTRASONIC EXAMINATION PROCEDURE

FOR

REACTOR PRESSURE VESSEL

UPPER SHELL TO FLANGE WELD FROM THE FLANGE MATING SURFACE

SEABROOK NUCLEAR POWER STATION

CONTROLLED COPY
VALID ONLY IF THIS STAMP IS RED

Project Application 5562	Prepared By S. Larson	Date 11/21/83
	APPROVALS	
TITLE/DEPT.	SIGNATURE	DATE
Level III	P. S. Barry	2/24/84
Project Engineer	K W Tunklein for P. DINARDO	2/24/84
Reactor Services Opers. Mgr.	K W Tunklein	2/24/84
Project Manager	Laurence P. Brundage	2/24/84
QA Manager	M J Digdul for WSG	2/24/84

nes

REVISION LOG

NUCLEAR ENERGY SERVICES, INC.

REV. NO.	DATE	PAGE NO.	DESCRIPTION	APPROVAL
1	2/24/84	1 & 6	Incorporate changes listed on CRA 4056	K. Zazone

AUTOMATED ULTRASONIC EXAMINATION PROCEDURE FOR REACTOR PRESSURE VESSEL UPPER SHELL TO FLANGE WELD FROM THE FLANGE MATING SURFACE

1. SCOPE

1.1 AREA OF EXAMINATION

1. This document covers the ultrasonic examination procedure for the Reactor Pressure Vessel (RPV) Flange to Upper Shell Weld from the flange step (mating) surface, shown in Figures 1 and 2.

2. Examinations required by this procedure provide beam direction essentially normal to the plane of the weld only. Parallel coverage of this weld is specified in 80A6477.

1.2 TYPE OF EXAMINATION

1. Volumetric examination shall be performed using ultrasonic pulse echo 0° straight beam and 8° and 19° refracted longitudinal beam techniques applied to the step surface of the RPV Flange as shown in Figure 2. The three longitudinal beams are used to provide coverage for the complete width of the weld.

2. The examination will be performed using the RPV ID Examination Positioning Device and/or manual scanning techniques.

1.3 TIME OF EXAMINATION

These procedures shall govern the preservice (baseline) examination of the Reactor Vessel as required by the ASME Boiler and Pressure Vessel Code, Section XI and the NRC Regulatory Guide 1.150 Rev. 1.

1.4 MATERIALS

The Reactor Vessel and Flange Assembly are constructed of low carbon steel with stainless steel cladding on the inside (ID) surfaces.

2. REFERENCES

2.1 REFERENCE DOCUMENTS

1. NRC Regulatory Guide 1.150 Rev. 1
2. ASME Boiler and Pressure Vessel Code, Section XI, 1977 Edition through Summer of 1978 Addenda
3. ASNT Recommended Practice, SNT-TC-1A, 1975 Edition
4. NES Document 80A6401, Reactor Pressure Vessel Preservice Inspection Program Plan for Seabrook Nuclear Power Station Unit 1
5. NES Document 80A5187, Quality Assurance Program Plan for Seabrook Nuclear Power Station Unit 1
6. NES Document 80A9068, Procedure for Training and Certification of Nondestructive Examination Personnel (latest revision)
7. NES Document 80A9053, Procedure for Ultrasonic Instrument Linearity Verification (latest revision), as modified in paragraph 7.4.2 of this procedure
8. NES Document 80A9060, Inservice Inspection Field Change Procedure (latest revision)
9. NES Document 80A6476, Procedure for the Operation of the RPV ID Examination Positioning Device

2.2 APPLICABLE DRAWINGS

1. Seabrook Drawings

	Drawing No.	Title
A.	10773-161-003	As Built Location of Weld Seams Vessel
B.	10873-171-004	General Arrangement Elevation
C.	10873-121-001	Upper Vessel Assembly
D.	10873-121-002	Upper Vessel Machining
E.	10873-121-005	Upper Vessel Machining
F.	10873-126-001	Vessel Flange
G.	10873-126-002	Vessel Flange Machining and Cladding

2. Calibration Block Drawing

NES Drawing 80D6509 — Vessel Flange Ligament Calibration Block,
Seabrook Unit 1
PC No. 196-201

3. PROCEDURE COMPLIANCE

The examination procedures described in this document comply with Section XI of the ASME Boiler and Pressure Vessel Code and the NRC Regulatory Guide 1.150 Rev. 1 except where examination coverage is limited by part geometry or access. Where part geometry or access result in limited coverage, such limitations shall be identified and described on the appropriate documentation for reporting the examination.

4. PREREQUISITES

4.1 PERSONNEL CERTIFICATION REQUIREMENTS

1. Each person performing ultrasonic examinations governed by this procedure shall be certified in accordance with ASME Boiler and Pressure Vessel

Code Section XI, 1977 Edition through Summer of 1978 Addenda and NES 80A9068, Procedure for Training and Certification of Nondestructive Examination Personnel.

2. Examination crews shall have two or more members on each shift as necessary. At least one member of each crew shall have a minimum qualification of Level II in accordance with the above referenced documents. At least one additional member must have a minimum qualification of Level I. Supplemental data evaluations/reporting required by RG 1.150 shall be conducted by a Level II (minimum).

4.2 PERSONNEL RECORDS

1. Records of personnel qualification shall be maintained by the on-site NES Automated Site Supervisor, or Data Reviewer.

2. A copy of each examiner's certification summary and a current eye test report shall be submitted to the Plant Owner or his Agent, prior to performing examinations per this procedure.

△ 4.3 SURFACE PREPARATION

All examination surfaces must 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. EXAMINATION REQUIREMENTS

5.1 EXAMINATION FREQUENCY

1. The nominal examination frequency shall be 2.25 MHz for all examinations.

2. During preservice examinations, other pulse frequencies shall be used if variables such 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

1. The intent of this procedure is to provide maximum examination coverage. This weld shall be scanned with a minimum of two scan passes to insure maximum coverage.

2. The rate of search unit movement shall not exceed 6" per second.

3. The Reactor Vessel to Flange Weld shall be ultrasonically examined using 0°, 8° and 19° longitudinal beam techniques applied in one direction through the weld. Coverage for this weld is shown in Figure 2.

4. Other angles may be used if required for aid in evaluation, and the appropriate information (angle, frequency, technique, etc.) shall be recorded.

5.3 LIQUID COUPLANT

The ultrasonic couplant shall be the inhibited water used to flood the RPV.

5.4 SCAN COVERAGE LIMITATIONS

Where the surface or other conditions do not permit a meaningful examination of the scan areas designated, the examiner shall record the location and the particular interfering condition in the space provided on the Regulatory Guide 1.150 Examination Limitation Report Sheet and report same to the NES Automated Site Supervisor for corrective action or disposition.

5.5 WELD IDENTIFICATION

The appropriate weld maps in NES Document 80A6401, Reactor Pressure Vessel, Preservice Inspection Program Plan shall be used to locate each weld.

5.6 REFERENCE POINT

The reference point for this examination shall be the flange mating surface at Reactor Pressure Vessel 0° reference location.

6. 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 welds specified in this procedure.

1. Nuclear Reflectoscope System.
2. RPV ID Examination Positioning Device.
3. Transducers, as required.
4. Examination Head Assembly
5. Other Ultrasonic Equipment as Required.

6.2 PLANT OWNER EQUIPMENT

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

1. Scaffolding
2. Air, and Electricity
3. Temporary lighting
4. Moving or Lifting Devices
5. Calibration Block, PC. No. 196-201
6. Inhibited Water (couplant)
7. Test surface Preparation
8. Post-Examination Cleanup of Test Area
9. Work Space Adjacent to the RPV Cavity (defined by separate cover).
10. Office Space with Phone Communication (defined by separate cover).

7. CALIBRATION REQUIREMENTS

7.1 CALIBRATION DATA PACKAGES

Calibration Data Packages shall be numbered 6478-1, 6478-2 and 6478-3 etc., at the time of each calibration and shall be signed by the examiner(s) upon completion, noting applicable NDE levels. A Calibration Data Package shall consist of a Weld Scan Data Sheet, Calibration Data Sheet(s), Daily Linearity Sheet (as required), and supplements as required.

7.2 CALIBRATION BLOCKS

1. The calibration blocks designated in 6.2.5 shall be used for basic instrument calibration and for establishing reference sensitivity levels for examinations.

2. The identity of the calibration block used for performing calibration shall be recorded on each Calibration Data Sheet.

3. System Calibration shall be performed on the clad surface of the calibration block.

4. The temperature of the calibration couplant shall be within 25°F of the component couplant temperature. The calibration couplant and component couplant temperatures shall be recorded on the Calibration Data Sheet.

7.3 EXAMINATION SENSITIVITY LEVELS

1. Primary Reference Sensitivity

   The primary reference sensitivity level shall be the distance-amplitude correction (DAC) curve initially established on the calibration block.

2. Equalized Response Sensitivity

   When an electronic DAC is used, the primary reference response shall be equalized at a nominal 80% FSH over the distance to be gated during the examination. The equalized response sensitivity setting of the ultrasonic instrument is that control setting which provides an 80% (± 10%) FSH response from all calibration reflectors after the electronic DAC curve equalization. If equalization is not possible, refer to paragraph 8.1.5.

3. Examination Sensitivity

   The examination sensitivity shall be the equalized response sensitivity with correction factors included as determined in NES 80A5533, Automated Ultrasonic Examination Technique Qualification Procedure.

7.4 TIMES OF CALIBRATION

1. Examination system calibration shall be performed prior to the examination of the specified welds and shall include establishment of DAC curve(s), correction factors, setting of gates, establishment of electronic DAC curve(s) and the programming of Transponding Ultrasonic Calibrator (TUC) cards to establish equalized amplitude response.

2. Instrument vertical and amplitude control linearity checks shall be performed at the beginning of each day of examination, in accordance with NES 80A9053, Procedure for Ultrasonic Instrument Linearity Verification using a search unit applied to an appropriate calibration block, TUC pulses, or other sources of suitable stable signals. When performing the vertical linearity check required on the Daily Linearity Sheet, the smaller signal amplitude shall be equal to half the corresponding larger signal amplitude, within $\pm$ 5% FSH, for all high points 80% FSH and below. This information shall be recorded on the Daily Linearity Sheet.

3. Calibration checks using the TUC shall be performed at the beginning of each 12 hour period of the examination, and at the change of Level II examination personnel. A TUC check shall be done at any time there is a reason to suspect equipment malfunction.

4. A calibration check of the examination system, search unit heads and coaxial cables shall be performed each time the head, transducers, cables, etc. require replacement, or each time the equipment is removed from the examination area, or at the beginning and end of each 12 hour examination period, whichever is sooner. This calibration check shall be performed also at the completion of examination of welds specified in this procedure.

7.5 CALIBRATION RESPONSE

1. Calibration response shall be checked at the equalized response sensitivity level.

2. Signal response obtained during calibration check shall be within plus or minus 20% of that established during basic system calibration.

3. If any point of the equalized response level has decreased by more than 20% of its amplitude, the examiner shall:

A. Void all scans completed since previous calibration or calibration check

B. Recalibrate examination system

C. Re-examine voided areas

4. If any point of the equalized response level has increased by more than 20% of its amplitude, the examiner shall:

A. Recalibrate examination system

B. Re-evaluate all indications recorded since the previous calibration check at the corrected equalized response level.

5. If any point on the DAC curve has moved horizontally more than 10% of the sweep reading from its original settings, the examiner shall:

A. Correct sweep calibration, noting correction on the Calibration Data Sheet.

B. Void any scans made since the previous calibration or calibration check which have recorded indications, perform and record a new calibration, and reexamine those areas.

7.6 CALIBRATION FIXTURES

Calibration shall be performed using the same mounting fixture as required for the examination.

8. EXAMINATION SYSTEM CALIBRATION

8.1 BASIC SYSTEM CALIBRATION

The Level II Examiner shall establish basic examination system calibration settings and parameters at any time prior to the ultrasonic examination of Reactor Pressure Vessel Flange Weld. Initial calibration shall consist of the following:

NOTE: In order to display the dual traces, one each for 8^{O} and 19^{O}, on a single time base ultrasonic scope the examination system sweep will be calibrated for the 19^{O} exam and calibration echo positions recorded on the calibration sheet for the 8^{O} exam.

1. Adjust instrument sweep and delay to correspond with the area to be covered during the examination. For the 0° and 19o search units, the indication from the 24.75" hole (D in Figure 3) shall occur at 3.5 horizontal screen divisions; the indication from the 28.875" hole (E in Figure 3) shall occur at 6.0 horizontal screen divisions.

2. Adjust gate positions to cover the entire examination range extending from the 0 to the 10 horizontal screen divisions.

3. Establish a DAC curve for the examination area by plotting the signal response amplitudes from the "D" hole and "E" hole with the D hole response set at 80% FSH. Connect the TUC to the proper channel and match the "D" hole and "E" hole signal responses. A third TUC pulse should be programmed beyond the "E" hole response. All 3 TUC pulses should be equally spaced along the time base line. The amplitude for the third TUC pulse should be programmed to reflect the same db difference as that between the "D" hole and "E" hole responses established above. Connect the three points and extrapolate the line to cover the entire examination range (horizontal screen divisions 0 through 10).

4. Program a TUC card to match the distance amplitude curve established above.

5. Electronically equalize the TUC pulses at the specified (80% FSH) amplitude over the entire depth range to be used during the examination.

If the response can not be equalized, the reference sensitivity level shall be the DAC curve initially established in 8.1.3 and shall be the sensitivity used for evaluating and recording all indications. During actual weld scanning the reference sensitivity level shall be increased a minimum of 2X.

6. Record all information required on the Calibration Data Sheet. The ultrasonic examiner(s) shall sign the completed Calibration Data Sheet, noting applicable NDE level(s).

7. For the 8° examination use the sweep settings established for the 19° examination. Repeat steps 2 through 6 for remaining calibration of the 8° channel.

8.2 SYSTEM CALIBRATION CHECK

1. Calibration checks of the examination system, as required by paragraph 7.4.3, shall be performed as follows:

   A. Use the TUC and previously recorded instrument settings to perform a check of the examination instrumentation system including sensitivity level, gate function and position, and data recording system.

   B. Verify that the amplitude response is within plus or minus 20% of the equalized response obtained during initial calibration.

2. Performance checks of search units and cables, as required by paragraph 7.4.4, shall be performed as follows:

   A. Reposition search unit on the calibration block at each test hole and observe maximum signal response amplitudes and horizontal positions.

B. Verify that all amplitudes fall within 20% of the equalized response sensitivity level and the horizontal displacement is within the required ± 10%. Refer to paragraph 7.5 if the response from any hole is beyond the allowed tolerance.

3. Record time, date, examiner's signature, and type of calibration check in the space provided on the appropriate Calibration Data Sheet.

8.3 BEAM SPREAD

An alternative data record may be used when establishing a search unit beam spread.

Beam spread measurements for the vertical plane of each angle beam search unit may be made as follows:

NOTE: This is only one of the optional beam spread measurement methods which may be performed. Additional beam spread measurements may be made at the time of evaluations.

1. Position search unit for maximum response from 1/4T hole.

2. Beam spread measurements should be made at the reference sensitivity required for sizing. For example, if sizing will be done to both 50% and 20% DAC, beam spread measurements will be done to both criteria. Move the search unit towards the 1/4T hole, through the maximum amplitude point until the signal amplitude reads 50% then 20% of the DAC line on the screen. Mark the corresponding positions of the fixture on the block surface at some convenient point.

3. Move the search unit back past the 1/4T hole, through the maximum amplitude point, until the signal amplitude comes again to 50% and 20% of the DAC line on the screen. Again, mark the block to indicate the new fixture positions.

4. Repeat steps (2) and (3) for the 1/2T and 3/4T holes.

5. Using suitable paper, transfer the measurements from the block to the paper. Connect points to determine beam spread and angle information.

   NOTE: Curvature of the calibration block used may cause some deviation in beam spread and beam angle information.

6. Beam spread plots shall become part of the examination record.

9. EXAMINATION SEQUENCE

1. Refer to Figure 2 and to NES 80A6476, Procedure for the Operation of the RPV ID Examination Positioning Device, for scan coverage and scan sequence information.

2. Calibrate examination equipment or perform calibration check as required by Section 8(2).

3. Locate the datum point, position head either manually or on the RPV ID Examination Positioning Device and commence examination.

4. Continue scanning sequences until the weld has been examined. Examinations shall not be considered complete until all recordable indications have been investigated, recorded and evaluated as required in 10.

10. RECORDING CRITERIA

10.1 GEOMETRIC INDICATIONS

Indications that are determined to be geometric in origin and are equal to or greater than 50% DAC shall be recorded at one location and noted as "Geometric caused by weld prep design," or "ID or OD design geometry," etc. and verified by the applicable drawings. All geometric indications shall be recorded on the "Report Sheet for Geometric Reflectors".

10.2 INDICATIONS WITH CHANGING METAL PATH

1. Indications that change metal path distances and are within the outer 75% of the through-wall dimension shall be recorded at 50% DAC.

2. Indications that change metal path distances and are within the inner 25% of the through-wall dimensions, shall be recorded at 20% DAC and 50% DAC.

10.3 INDICATIONS WITHOUT CHANGING METAL PATH

1. Indications equal to or greater than 50% DAC which do not change metal path distances and are within the outer 75% of the through-wall dimension should be recorded when any continuous dimension exceeds one inch.

2. Indications which do not change metal path distances and are within the inner 25% of the through-wall dimensions, should be recorded at 20% DAC and 50% DAC.

3. Indications lying parallel to welds may appear as nontraveling (without changing metal path) when scanned by parallel moving transducers whose beams are aimed normal to the weld, ie. at 90°. Multiple scans, however, may reveal that these indications are traveling indications.

NOTE: Any non-traveling indication appearing in more than one scan, shall be investigated for travel by comparing the multiple scans. If the multiple scan evaluation reveals travel record the indication in accordance with 10.2.

11. EVALUATION CRITERIA

1. Evaluation of flaw indications (excluding geometry) shall be in accordance with Flaw Evaluation Procedure 80A5535.

2. Results of the evaluation shall be reported to the Plant Owner or his Agent.

12. EXAMINATION RECORDS

12.1 CERTIFICATION OF RECORDS

1. The examiner(s) shall complete and sign the appropriate data sheet(s) immediately upon the completion of RPV shell weld examinations, noting applicable NDE certification levels. All Calibration Data Packages shall be reviewed for Procedural Compliance by the Data Reviewer or the designee of Automated Site Supervisor.

2. Should the performance of an examination overlap two shifts, the Level II Examiners of each shift shall sign the appropriate data sheets.

12.2 FILING OF RECORDS

NES shall be responsible for submitting to the Plant Owner or his Agent, a completely documented set of examination records including certifications of personnel qualifications with current eye test reports.

12.3 PROCEDURE CORRECTIONS AND ADDITIONS

1. All procedure corrections and/or additions required during the preservice examinations may be initiated by either the owner or the senior NES site representative. All such changes shall have the approval of the owner and an NES Level III.

2. Each procedure revision shall be documented in accordance with the NES Field Change Procedure. The Plant Owner or his Agent shall be notified of such changes and approval obtained as required.

1. Flange to Upper Shell Circumferential Weld
2. Upper Shell Longitudinal Welds
3. Upper Shell to Intermediate Shell Circumferential Weld
4. Intermediate Shell Longitudinal Welds
5. Intermediate Shell to Lower Shell Circumferential Weld
6. Lower Shell Longitudinal Welds
7. Lower Shell to Bottom Head Circumferential Weld
8. Bottom Head Meridional Welds
9. Bottom Head Circumferential Weld (Dollar Plate)
10. Outlet Nozzle to Shell Welds
11. Inlet Nozzle to Shell Welds
12. Nozzle to Safe End Welds

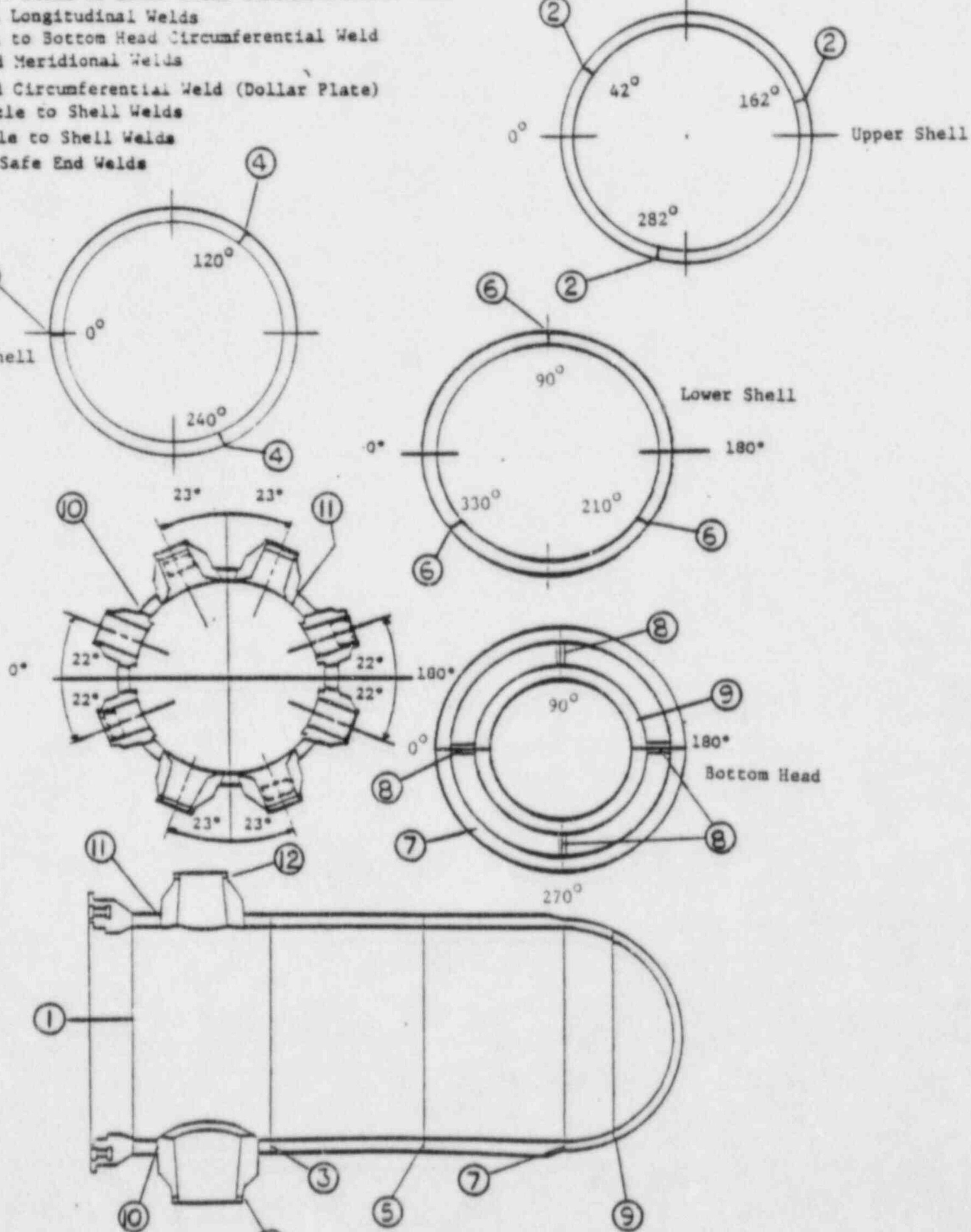


FIGURE 1
Weld Locations

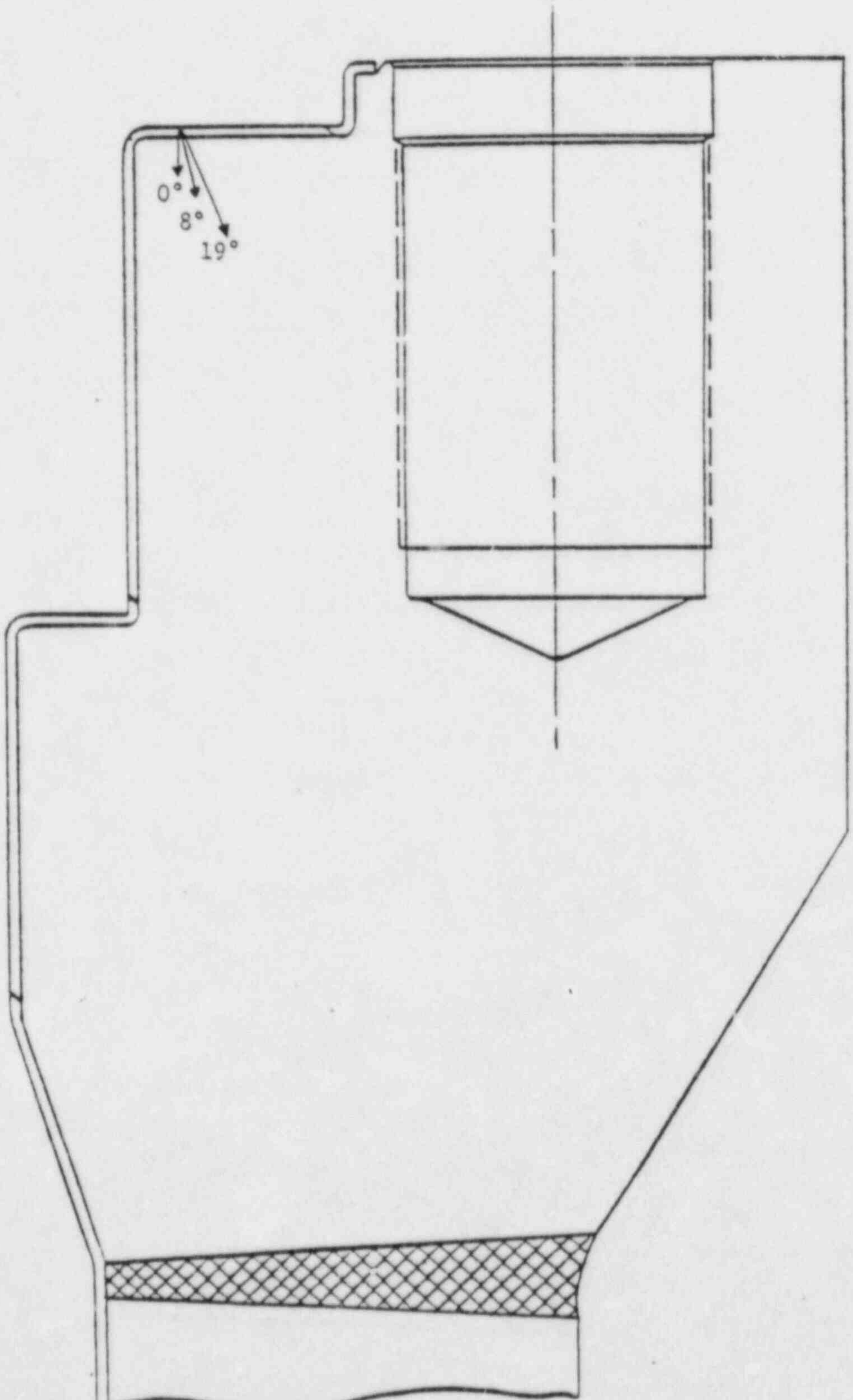


FIGURE 2 PERPENDICULAR COVERAGE ONLY

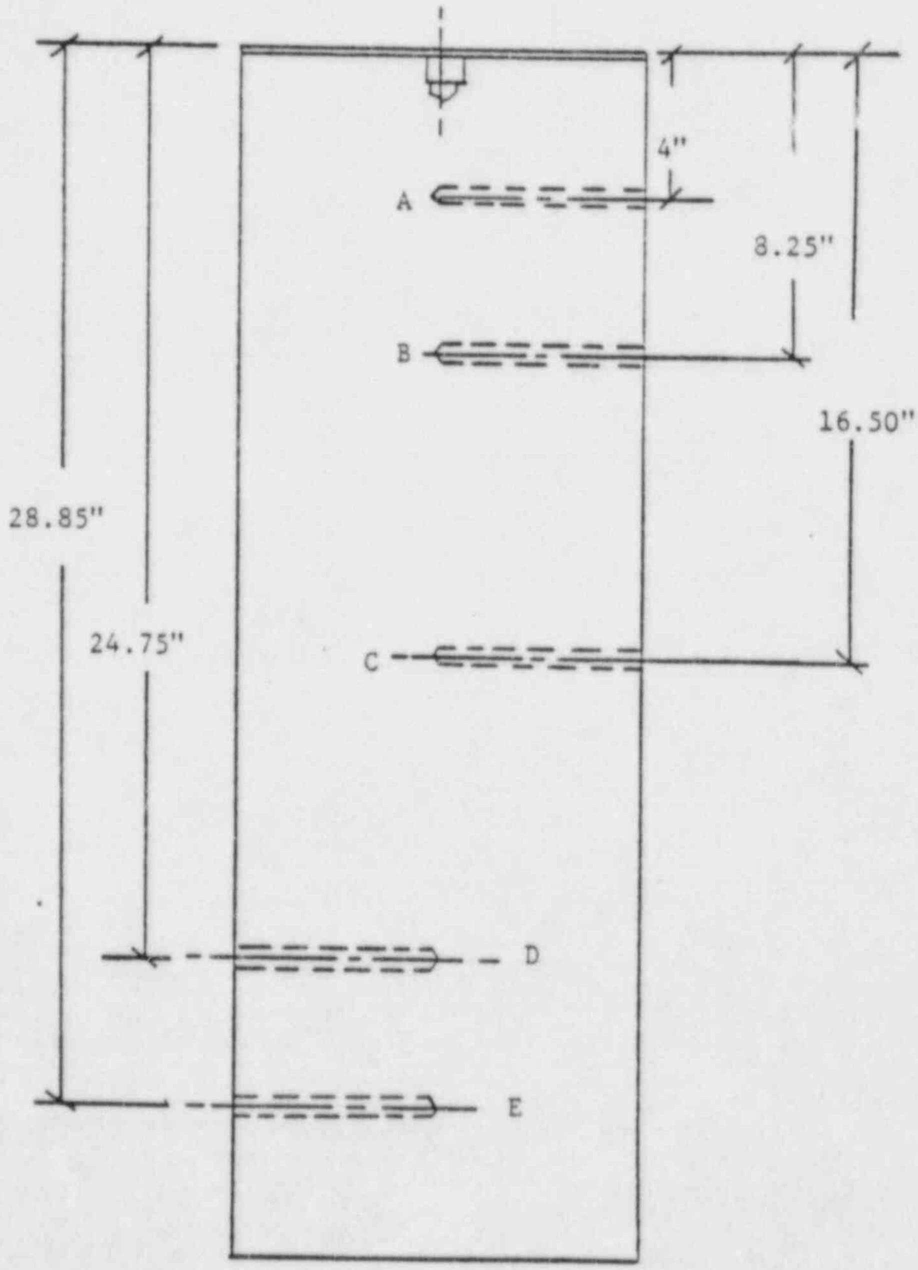


FIGURE 3

WELD SCAN DATA SHEET

Plant/Unit ____________________ Page ________ of __________

____________________ Cal. Data Pkg. ______________

Subject ____________________ Procedure No. ________ Rev. ______

NR System ____________________ Video Tape No. ______________

Raster No.	Head Orient.	Scan Direction 0°	⊥ To Weld	═ To Weld	Recordable Indication Yes	No	Comments/Reason for Incomplete Raster

SAMPLE ONLY

SIMILAR VERSIONS WHICH REQUIRE THE SAME INFORMATION ARE ACCEPTABLE.

Remarks ____________________ Examiners

1 ____________ Level ______ Date ______

2 ____________ Level ______ Date ______

3 ____________ Level ______ Date ______

Reviewer ____________ Date ______

NES NUCLEAR ENERGY SERVICES, INC.

FORM 028-106/1 1/83

FIGURE 4

SAMPLE ONLY
SIMILAR VERSIONS WHICH
REQUIRE THE SAME
INFORMATION ARE ACCEPTABLE.

DAILY LINEARITY SHEET

Plant/Unit ____________ Page ____ of ____

Channel ____

INSTR. LINEARITY RESPONSE					
	Amplitude				
	High	Low		High	Low
1			5		
2	80	40	6		
3			7		
4			8		

AMPL. CONTROL LINEARITY			
Init.	db	Result	Limits
80	-6		32-48%
80	-12		16-24%
40	+6		64-96%
20	+12		64-96%

Mfg/Model No. ____
Serial No. ____
Date ____
Time ____
Examiner ____
Level ____

Channel ____

INSTR. LINEARITY RESPONSE					
	Amplitude				
	High	Low		High	Low
1			5		
2	80	40	6		
3			7		
4			8		

AMPL. CONTROL LINEARITY			
Init.	db	Result	Limits
80	-6		32-48%
80	-12		16-24%
40	+6		64-96%
20	+12		64-96%

Mfg/Model No. ____
Serial No. ____
Date ____
Time ____
Examiner ____
Level ____

Channel ____

INSTR. LINEARITY RESPONSE					
	Amplitude				
	High	Low		High	Low
1			5		
2	80	40	6		
3			7		
4			8		

AMPL. CONTROL LINEARITY			
Init.	db	Result	Limits
80	-6		32-48%
80	-12		16-24%
40	+6		64-92%
20	+12		64-96%

Mfg/Model No. ____
Serial No. ____
Date ____
Time ____
Examiner ____
Level ____

Channel ____

INSTR. LINEARITY RESPONSE					
	Amplitude				
	High	Low		High	Low
1			5		
2	80	40	6		
3			7		
4			8		

AMPL. CONTROL LINEARITY			
Init.	db	Result	Limits
80	-6		32-48%
80	-12		16-24%
40	+6		64-96%
20	+12		64-96%

Mfg/Model No. ____
Serial No. ____
Date ____
Time ____
Examiner ____
Level ____

Reviewer ____________ Date ____________

FORM 078 103/0 2/82

NES NUCLEAR ENERGY SERVICES, INC

FIGURE 5

Proc. No.________ Rev._____

WELD THICKNESS SPOT CHECK DATA SHEET

Transducer Identification - 0°

Size____________

SAMPLE ONLY.

SIMILAR VERSIONS WHICH
REQUIRE THE SAME
INFORMATION ARE ACCEPTABLE.

Model____________

Serial No.____________

Calibrate the screen in inches, using either two different size blocks or the first two back echoes within one block. Record thickness at various points on the welds as required. Digital thickness instruments are acceptable.

Weld Number	Left Up	℄	Right Down	Left Up	℄	Right Down	Left Up	℄	Right Down

Examiner____________ Level_____ Date_____

FORM 028-119/0 1/83 nes NUCLEAR ENERGY SERVICES, INC.

FIGURE 6

CALIBRATION DATA SHEET

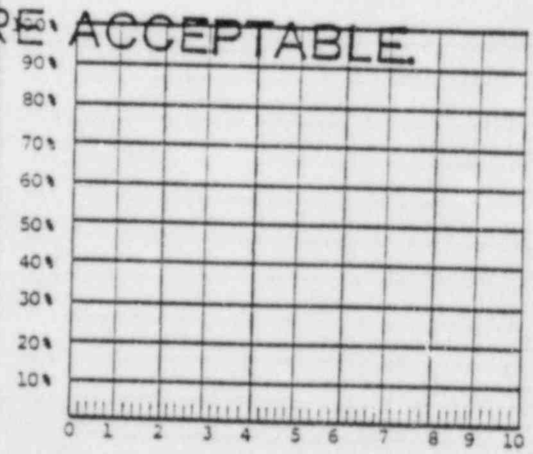
Cal. Blk. No. ____________ Page ________ of ________
Surface Temp. ________ °F Cal. Data Pkg. ____________
Block Temp. ________ °F Procedure No. ______ Rev. ______

Instrument		Hole Ident	Depth In.	Sweep Div.	Amp% (FSH)
Mfg.:	Model:				
Serial No.:	Channel:				
Nom. Angle:	Mode:				
Transducer					
Mfg.:	Model:				

		Calibration	Date	Time	By
Serial No.:	Size:				
Freq.: MHz	Measured Angle:	Initial			
Cable Type:	Length:	Intermediate			
Head No.:	Couplant:	Intermediate			
Main Sweep Range: in.		Intermediate			
Delay/Setup Range: sec		Intermediate			
Main Sweep Calib.:		Intermediate			
Delay:		Final			

Rep Rate Range: KHz	Var:
Display:	Sec
Fltr:	Mode:
Q:	Freq.:
Jack:	
Ref.: Min.:	Max.:
Pulse Length: Min.:	Max.:
Primary Reference Sensitivity	db
Equalized Response:	db
Exam Sensitivity:	db
Screen Gated: sd to	sd
Front Interface Signal Position:	sd
1 Major Screen Division:	in
TUC Card No.:	Pulses:
Trigger: + -	Freq.: A B C
Pulse Period: C	F
Pulse Delay: C	F
Attenuation: C	F
Resistance Added:	

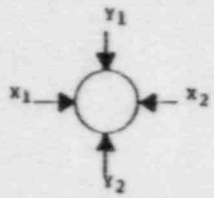
SAMPLE ONLY
SIMILAR VERSIONS WHICH
REQUIRE THE SAME
INFORMATION ARE ACCEPTABLE.



Examiners
1 ____________ Level ____ Date ______
2 ____________ Level ____ Date ______
3 ____________ Level ____ Date ______
Reviewer ____________ Date ______

FORM 028-102/1 11/82 NES NUCLEAR ENERGY SERVICES, INC.

FIGURE 7



SUPPLEMENT A

INDICATION REPORT SHEET

Weld No.________ Weld ℄ ________

Page ________ of ________

Cal. Data Pkg. ________

Raster No. ________

Video Tape No. ________

IND. NO.	CH. NO.	BM. DIR.	∠	0° BR SD	MAXIMUM PEAK % DAC	SD	X	Y	LOCATION OF ___% DAC END POINTS Y_1	SD	X_2	SD	Y_1	SD	Y_2	SD	LOCATION OF ___% DAC END POINTS X_1	SD	X_2	SD	Y_1	SD	Y_2	SD

SAMPLE ONLY

SIMILAR VERSIONS WHICH REQUIRE THE SAME INFORMATION ARE ACCEPTABLE.

REMARKS ________

EXAMINERS

1 ________ Level ___ Date ________

2 ________ Level ___ Date ________

3 ________ Level ___ Date ________

REVIEWER ________ Date ________

FORM 028-116/1 1/83

nes NUCLEAR ENERGY SERVICES, INC.

FIGURE 8

Plant/Unit ______________

____

Subject ______________

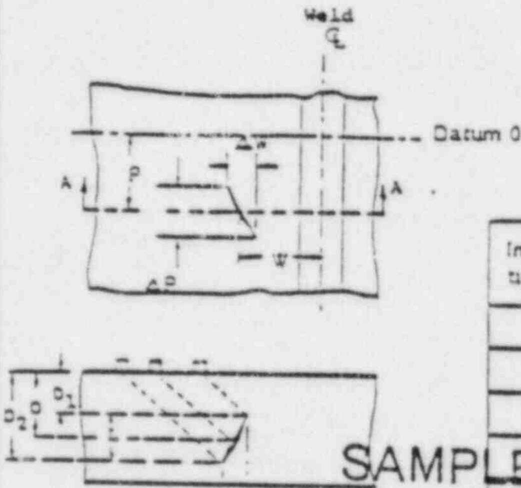
Page ______ of ______

Cal. Data Pkg. ______________

Procedure No. ______ Rev. ______

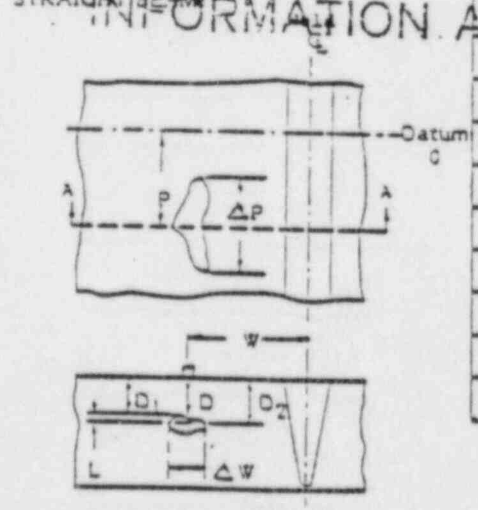
INDICATION EVALUATION SHEET

SUPPLEMENT B



SAMPLE ONLY
SIMILAR VERSIONS WHICH
REQUIRE THE SAME
INFORMATION ARE ACCEPTABLE.

STRAIGHT BEAM



Indication No.	CH. No.	W	P	D	L	ΔP	ΔW	

Prepared by:

1 ______________ Level ______ Date ______

2 ______________ Level ______ Date ______

Reviewer ______________ Date ______

COMMENTS:

FORM 026-128/0 5/83 NES NUCLEAR ENERGY SERVICES, INC.

FIGURE 9

[illegible] ________

Page ______ of ______
Cal. Data Pkg. ______
Procedure No. ______ Rev. ______

EVALUATION SHEET FOR RECORDABLE INDICATIONS

Supplement C

A. Zone number ______ Examination Procedure No. ______
B. Scan number ______ Weld number ______
C. Indication number ______
D. Applicable ASME Code standards used for evaluation.
Section ______ Article ______
E. Size of indication
Length ______ Depth ______
Width ______ Plate thickness(t) ______
F. Characterization of Flaw Indication per Para. ______
1. Type of Flaw: ______
2. Sketch of indication: ______

SAMPLE ONLY

SIMILAR VERSIONS WHICH REQUIRE THE SAME INFORMATION ARE ACCEPTABLE.

3. Flaw characteristic calculations:

G. Comparison of pertinent evaluation standard (Para. ______ to actual flaw size.

☐ acceptable ☐ rejectable*

Prepared By: ______ Approval ______ SNT-TC-1A Level III

Reviewed By: ______ Authorized Inspector ______

*If a rejectable indication is found during an inservice examination, additional evaluation analysis shall be performed.

FORM 023-120/0 1/83 nes NUCLEAR ENERGY SERVICES, INC.

FIGURE 10

Plant/Unit ____________________

____

Procedure No. ____________

Subject ____________

Weld No. ____________

Sheet ______ of ______
Attachment to Calibration Data

Pkg. No. ____________

SUPPLEMENT D

REPORT SHEET FOR GEOMETRIC REFLECTORS

Depth of Reflector (in.) ____________ Channel ____________

Maximum % DAC ____________ Indication(s) No. ____________

Positional Coordinates ____________ and ____________

SAMPLE ONLY

Comments (Use Sketches to provide clarity): Ref. Dwg. No. ____________

~~SIMILAR VERSIONS WHICH~~
REQUIRE THE SAME
INFORMATION ARE ACCEPTABLE.

FORM 028-125/0 5/83 — nes NUCLEAR ENERGY SERVICES, INC.

FIGURE 11

Plant/Unit ______________________ Page __________ of __________

______________________ Cal. Data Pkg. ______________

Proc. No. ______________ Rev. ____

SUPPLEMENT E

REGULATORY GUIDE 1.150 EXAMINATION LIMITATION

REPORT SHEET

Weld Number ____

Volume of WRV not covered due to the limitation described below

SAMPLE ONLY

____

SIMILAR VERSIONS WHICH

____

Type of Interference

REQUIRE THE SAME

____

INFORMATION ARE ACCEPTABLE.

Comments (Use sketch to provide clarity)

____

____

FORM NES 028-114/0 nes NUCLEAR ENERGY SERVICES, INC.

FIGURE 12

nes NUCLEAR ENERGY SERVICES, INC.

DOCUMENT NO. 80A6479 REV. 1

PAGE 1 OF 30

AUTOMATED ULTRASONIC EXAMINATION PROCEDURE FOR REACTOR VESSEL NOZZLE TO SHELL WELDS FROM THE NOZZLE BORE

SEABROOK NUCLEAR POWER STATION

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VALID ONLY IF THIS STAMP IS RED

Project Application	Prepared By	Date
5562	S. Larson	11/21/83
APPROVALS		
TITLE/DEPT.	SIGNATURE	DATE
Level III	[illegible]	[illegible]
Project Engineer	KW Tinklein for P. DINARDO	2/24/84
Reactor Services Opers. Mgr.	KW Tinklein	2/24/84
Project Manager	Lawrence P. Brundage	2/24/84
QA Manager	MJ Dizdul for WSG	2/24/84

FORM # NES 204 2/80

nes NUCLEAR ENERGY SERVICES, INC.

REVISION LOG

DOCUMENT NO. 80A6479

REV. NO.	DATE	PAGE NO.	DESCRIPTION	APPROVAL
1	2/24/84	1,5 & 7	Incorporate changes listed on CRA 4055	K jayone

AUTOMATED ULTRASONIC EXAMINATION PROCEDURE FOR REACTOR VESSEL NOZZLE TO SHELL WELDS FROM THE NOZZLE BORE

I. SCOPE

1.1 AREA OF EXAMINATION

1. This document covers the ultrasonic examination procedures for the Reactor Pressure Vessel (RPV) welds as follows:

   A. RPV to Outlet Nozzle Welds, shown in Figures 1 and 2.

   B. RPV to Inlet Nozzle Welds, shown in Figures 1 and 3.

2. The examination of RPV to Nozzle Welds specified in this procedure provide coverage with the beam direction essentially normal to the plane of the weld. For parallel coverage of these welds see Procedure 80A6477. For near surface coverage of these areas, refer to Procedure 80A6480.

1.2 TYPE OF EXAMINATION

1. Volumetric examinations for the RPV to Nozzle Welds shall be performed using ultrasonic pulse echo 5° and 20° refracted longitudinal beam techniques from the clad inside (ID) surface, one direction perpendicular to, and through the weld as shown in Figures 2 and 3.

2. At the discretion of the on-site NES Level III, a supplemental 0° examination from the examination surface specified for the 5° and 20° examinations shall be performed to a depth of at least 7". This examination will provide additional volumetric coverage of material which may be obscured during performance of the 5° and 20° examinations.

3. The examinations will be performed using the RPV ID Examinations Positioning Device and immersion search units (transducers).

1.3 TIME OF EXAMINATION

These procedures shall govern the preservice (baseline) examination of the Reactor Vessel as required by the ASME Boiler and Pressure Vessel Code, Section XI and the NRC Regulatory Guide 1.150 Rev. 1.

1.4 MATERIALS

The RPV Inlet and Outlet Nozzles are constructed of low carbon steel with stainless steel cladding on the ID surfaces.

2. REFERENCES

2.1 REFERENCES DOCUMENTS

1. NRC Regulatory Guide 1.150 Rev. 1.

2. ASME Boiler and Pressure Vessel Code, Section XI, 1977 Edition through Summer of 1978 Addenda

3. ASNT Recommended Practice, SNT-TC-1A, 1975 Edition

4. NES Document 80A6401, Reactor Pressure Vessel Preservice Inspection Program Plan for Seabrook Nuclear Power Station Unit 1

5. NES Document 80A5187, Quality Assurance Program Plan for Seabrook Nuclear Power Station Unit 1

6. NES Document 80A9068, Procedure for Training and Certification of Nondestructive Examination Personnel (latest revision)

7. NES Document 80A9053, Procedure for Ultrasonic Instrument Linearity Verification (latest revision), as modified in paragraph 7.4.2 of this procedure

8. NES Document 80A9060, Inservice Inspection Field Change Procedure (latest revision)

9. NES Document 80A6476, Procedure for the Operation of the RPV ID Examination Positioning Device

2.2 APPLICABLE DRAWINGS

⚠ 1. Seabrook Drawings

	Drawing No.	Title
A.	10773-161-003	As Built Location of Weld Seams Vessel and Closure Head
B.	10873-171-004	General Arrangement Elevation
C.	10873-121-001	Upper Vessel Assembly
D.	10873-121-003	Upper Vessel Machining
E.	10873-121-004	Upper Vessel Machining
F.	10873-128-001	Inlet Nozzle
G.	10873-128-002	Inlet Nozzle Machining and Cladding
H.	10873-128-003	Outlet Nozzle
I.	10873-128-004	Outlet Nozzle Machining and Cladding

2. Calibration Block Drawing

NES Drawing 80D6309	Vessel Flange Ligament Calibration Block, Seabrook Unit 1, PC No. 196-201

3. PROCEDURE COMPLIANCE

The examination procedures described in this document comply with Section XI of the ASME Boiler and Pressure Vessel Code and the NRC Regulatory Guide 1.150 Rev. 1 except where examination coverage is limited by part geometry or access. Where part geometry or access result in limited coverage, such limitations shall be identified and described on the appropriate documentation for reporting the examination.

4. PREREQUISITES

4.1 PERSONNEL CERTIFICATION REQUIREMENTS

1. Each person performing ultrasonic examinations governed by this procedure shall be certified in accordance with ASME Boiler and Pressure Vessel Code, Section XI, 1977 Edition through Summer of 1978 Addenda and NES 80A9068, Procedure for Training and Certification of Nondestructive Examination Personnel.

2. Examination crews shall have two or more members on each shift as necessary. At least one member of each crew shall have a minimum qualification of Level II in accordance with the above referenced documents. At least one additional member must have a minimum qualification of Level I. Supplemental data evaluations/reporting required by RG 1.150 shall be conducted by a Level II (minimum).

4.2 PERSONNEL RECORDS

1. Records of personnel qualification shall be maintained by the on-site NES Automated Site Supervisor, or Data Reviewer.

2. A copy of each examiner's certification summary and a current eye test report shall be submitted to the Plant Owner or his Agent, prior to performing examinations per this procedure.

⚠ 4.3 SURFACE PREPARATION

All examination surfaces must 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. EXAMINATION REQUIREMENTS

5.1 EXAMINATION FREQUENCY

1. The nominal examination frequency shall be either 5 MHz or 2.25 MHz for all straight beam and angle beam examinations.

2. During preservice examination, other pulse frequencies shall be used 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

1. The intent of this procedure is to provide maximum examination coverage. Each weld shall be scanned with a minimal 25% overlap of the transducer width (diameter) for each scan pass.

2. The rate of search unit movement shall be recorded as required and in no case shall the scanning speed exceed 6 inches/second.

3. Each RPV to Inlet and Outlet Nozzle Weld shall be ultrasonically examined using 5° and 20° refracted longitudinal beam techniques applied in one direction, perpendicular to, and through the weld, except where restricted by part geometry or access.

4. The 5o angle provides a beam essentially perpendicular to the weld; the 20o angle ensures adequate coverage of the weld and adjacent base material in areas where vessel/nozzle geometry limits perpendicular coverage.

5. Other angles and techniques may be used if required for aid in evaluation, and the appropriate information (angle, frequency, technique, etc.) shall be recorded.

6. Examination coverage for the weld specified in this procedure is shown in Figures 2 and 3. Actual scan dimensions and coordinates are specified in NES Document 80A6476, Procedure for the Operation of the RPV ID Examination Positioning Device.

5.3 LIQUID COUPLANT

The ultrasonic couplant shall be the inhibited water used to fill the RPV.

5.4 SCAN COVERAGE LIMITATIONS

Where the surface or other conditions do not permit a meaningful examination of the scan areas designated, the examiner shall record the location and the particular interfering condition in the space provided on the Regulatory Guide 1.150 Examination Report Sheet and report same to the NES Automated Site Supervisor for corrective action or disposition.

5.5 WELD IDENTIFICATION

NES Document 80A6476, Procedure for the Operation of the RPV ID Examination Positioning Device, shall be used to locate each weld.

5.6 REFERENCE POINT

1. Datum points for the RPV to Nozzle Welds shall be the change of section between the barrel and cone of the nozzle as shown in Figures 2 and 3 and at the uppermost point of the nozzle.

2. Datum point to transducer location correspondence shall be established per NES Document 80A6476.

6. 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 welds specified in this procedure.

1. Nuclear Reflectoscope System
2. RPV ID Examination Positioning Device
3. Calibration Tank
4. 1" Diameter, 2.25 MHz or 5 MHz Transducers, as required
5. Head Assemblies
6. Other Ultrasonic Equipment as Required

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. Air and Electricity
3. Temporary Lighting
4. Moving or Lifting Devices
5. Calibration Blocks
   - A. 196-102
   - B. 196-201
6. Inhibited Water (couplant)
7. Test Surface Preparation
8. Post-Examination Cleanup of Test Area
9. Work Space Adjacent to the RPV Cavity (defined by separate cover).
10. Office Space With Phone Communication (defined by separate cover).

7. CALIBRATION REQUIREMENTS

7.1 CALIBRATION DATA PACKAGES

Calibration Data Packages shall be numbered 6479-1, 6479-2, and 6479-3 etc., at the time of calibration and shall be signed by the examiner(s) upon completion, noting applicable NDE levels. A Calibration Data Package shall consist of a Weld Scan Data Sheet, Calibration Data Sheets, Daily Linearity Sheet (one per 24 hour period), and Supplements as required.

7.2 CALIBRATION BLOCKS

1. The calibration blocks designated in 6.2(5), shall be used for basic instrument calibration and for establishing reference sensitivity levels for examinations.

2. The identity of the calibration block used for performing calibration shall be recorded on each Calibration Data Sheet.

3. System Calibration shall be performed from the clad surface of the calibration blocks.

4. The temperature of the calibration couplant shall be within 25 degrees F of the component couplant temperature. Calibration couplant and component couplant temperatures shall be recorded on the Calibration Data Sheet.

7.3 EXAMINATION SENSITIVITY LEVELS

1. <u>Primary Reference Sensitivity</u>

   The primary reference sensitivity level shall be the distance-amplitude correction (DAC) curve initially established on the calibration block.

2. Equalized Response Sensitivity

When an electronic DAC is used, the primary reference response shall be equalized at a nominal 80% (± 10%) FSH over the distance to be gated during the examination. The equalized response sensitivity setting of the ultrasonic instrument is that control setting which provides an 80% FSH response from all calibration reflectors after the electronic DAC curve equalization.

3. Examination Sensitivity

The examination sensitivity shall be the equalized response sensitivity with correction factors included as determined in NES 80A5533, Automated Ultrasonic Examination Head Qualification Procedure. If equalization is not possible, refer to paragraph 8.1(E).

7.4 TIMES OF CALIBRATION

1. Examination system calibration shall be performed prior to examination of the specified welds and shall include establishment of DAC curve(s), correction factors, setting of gates, establishment of electronic DAC curve(s) and the programming of Transponding Ultrasonic Calibrator (TUC) cards to establish equalized amplitude response.

2. Instrument vertical and amplitude control linearity checks shall be performed at the beginning of each day of examination, in accordance with NES 80A9053, Procedure for Ultrasonic Instrument Linearity Verification, using a search unit applied to an appropriate Calibration block, TUC pulses, or other sources of suitable stable signals. When performing the vertical linearity check required on the Daily Linearity Sheet, the smaller signal amplitude shall be equal to half the corresponding larger signal amplitude, within ± 5% FSH, for all high points 80% FSH and below. This information shall be recorded on the Daily Linearity Sheet.

3. Calibration checks using the TUC shall be performed at the beginning of each 12 hour period of the examination, and at the change of Level II

examination personnel. A TUC check shall be done at any time there is a reason to suspect equipment malfunction.

4. Calibration of the examination system, search unit heads and coaxial cables shall be verified each time the head, transducers, cables, etc. require replacement or each time the equipment is removed from the examination area or at the beginning and end of each 12 hour examination period, whichever is sooner. This calibration check shall also be performed at the completion of examination of welds specified in this procedure.

7.5 CALIBRATION RESPONSE

1. Calibration response shall be checked at the equalized response sensitivity level.

2. Signal response obtained during calibration check shall be within plus or minus 20% of that established during basic system calibration.

3. If any point of the equalized response level has decreased by more than 20% of its amplitude, the examiner shall:

   A. Void all scans completed since previous calibration or calibration check
   B. Recalibrate examination system
   C. Re-examine voided areas.

4. If any point of the equalized response level has increased by more than 20% of its amplitude, the examiner shall:

   A. Recalibrate examination system
   B. Re-evaluate all indications recorded since the previous calibration check at the corrected equalized response level.

5. If any point on the DAC curve has moved horizontally more than 10% of the sweep line from its original settings, the examiner shall:

   A. Correct sweep calibration, noting correction on the Calibration Data Sheet

   B. Void any scans made since the previous calibration or calibration check which have recorded indications, perform and record the new calibrations, and re-examine those areas.

7.6 CALIBRATION FIXTURES

Calibration shall be performed using the same mounting fixture as required for the examination.

8. EXAMINATION SYSTEM CALIBRATION

8.1 BASIC SYSTEM CALIBRATION

The Level II Examiner(s) of each shift shall establish basic examination system calibration settings and parameters at any time prior to the ultrasonic examination of the specified welds.

1. Initial calibration for 5° and 20° examination of the RPV nozzle to shell welds shall be performed as follows:

   A. Adjust instrument sweep range to correspond with the material volume covered by the examination. For the 20° examination the reflection from the hole in the calibration block (A in Figure 4) shall occur at the second horizontal screen division; and the reflection from the hole in the calibration block (C in Figure 4) shall occur at the eighth horizontal screen division.

   B. Adjust the gated area to include the complete WRV. Do not start the gated volume so close as to cause the gate to trigger from the front interface multiples, as this will produce large amounts of meaningless data. The final gate set-up should be flexible enough to allow for minor adjustments as may be required by the actual examination conditions provided the required examination volume is included.

C. Establish actual distance-amplitude curve for the proper angle and examination depth combination by plotting the signal response amplitudes from the A, B, and C reference holes. Adjust the response from the hole giving the highest amplitude to 80% Full Screen Height (FSH). Connect the points plotted on the CRT with a continuous line covering the examination range.

D. Program a TUC card to match the distance-amplitude curve established in (C) above.

E. Electronically equalize the examination sensitivity at 80% ($\pm$ 10%) FSH over the examination range. If the sensitivity cannot be equalized over the entire range, the minimum response level from the side drilled holes (A, B, or C) will be used for determining recording levels. In this case, 50% of the lowest of the above responses shall be used as the recording level.

F. Record all information required on the Calibration Data Sheet. The ultrasonic examiner(s) shall sign the completed data sheet(s), noting their applicable NDE certification levels.

G. Repeat steps (A) through (F) for the complete calibration of the 5° channel.

2. Initial Calibration for the supplemental 0° examination of RPV Inlet Nozzle and Outlet Nozzles shall be performed as follows:

A. Adjust instrument sweep range to correspond with the area to be covered during the examination. For initial calibration the 1/4T hole indication from the calibration block (7") shall occur at the second horizontal screen division; the 3/4T indication shall occur at the sixth horizontal screen division; and the 1/2T indication shall occur at approximately the fourth horizontal screen division.

B. Adjust the gated area as close as practical to the front interface signal. Do not set the start of the gated area so close as to cause the first gate to trigger as this will produce large amounts of meaningless data. Similarly, end the gated area to cover at least the first 7". The final gate set-up should be flexible enough to allow for minor adjustments as may be required by the actual examination conditions, provided the required examination volume is included.

C. Establish actual (DAC) curve for the proper angle and examination depth combination by plotting the signal response amplitudes from the 1/4T, 1/2T, and 3/4T reference holes. Adjust the response from the hole giving the highest amplitude to 80% Full Screen Height (FSH). Connect the points plotted on the CRT with a continuous line covering the examination range.

D. Program a TUC card to match the (DAC) curve established above.

E. Electronically equalize the examination sensitivity at 80% ($\pm$ 10%) FSH over the examination range. If the sensitivity cannot be equalized over the entire range, the minimum response level from the side drilled holes (1/4T, 1/2T or 3/4T) will be used for determining recording levels. In this case, 50% of the lowest of the above response shall be used as the recording level.

F. Record all information required on the Calibration Data Sheet. The ultrasonic examiner(s) shall sign the completed data sheet(s), noting their applicable NDE certification levels.

8.2 SYSTEM CALIBRATION CHECK

1. Calibration checks of the examination system, as required by paragraph 7.4(3), shall be performed as follows:

A. Use the TUC and previously recorded instrument settings to perform a check of the examination instrumentation system including sensitivity level, gate function and position, and data recording system.

B. Verify that the amplitude response is within plus or minus 20% of the equalized response obtained during initial calibration.

2. Performance checks of search units and cables, as required by paragraph 7.4(4), shall be performed as follows:

A. Reposition search unit on the calibration block at each test hole and observe maximum signal response amplitudes and horizontal positions.

B. Verify that all amplitudes fall within 20% of the equalized response sensitivity level and the horizontal displacement is within the required ± 10%. Refer to paragraph 7.5 if the response from any hole is beyond the allowed tolerance.

C. Record time, date, examiner's signature, and type of calibration check in the space provided on the appropriate Calibration Data Sheet.

8.3 BEAM SPREAD

An alternative data record may be used when establishing a search unit beam spread.

Beam spread measurements for the vertical plane of each angle beam search unit may be made as follows:

NOTE: This is only one of the optional beam spread measurement methods which may be performed. Additional beam spread measurements may be made at the time of evaluations.

1. Position search unit for maximum response from 1/4T hole.

2. Beam spread measurements should be made at the reference sensitivity required for sizing. For example, if sizing will be done to both 50% and 20% DAC, beam spread measurements will be done to both criteria. Move the search unit towards the 1/4T hole, through the maximum amplitude point until the signal amplitude reads 50% then 20% of the DAC line on the screen. Mark the corresponding positions of the fixture on the block surface at some convenient point.

3. Move the search unit back past the 1/4T hole, through the maximum amplitude point, until the signal amplitude comes again to 50% and 20% of the DAC line on the screen. Again, mark the block to indicate the new fixture positions.

4. Repeat steps (2) and (3) for the 1/2T and 3/4T holes.

5. Using suitable paper, transfer the measurements from the block to the paper. Connect points to determine beam spread and angle information.

   NOTE: Curvature of the calibration block used may cause some deviation in beam spread and beam angle information.

6. Beam spread plots shall become part of the examination record.

9. EXAMINATION SEQUENCE

1. Refer to Figures (1) through (3) and to NES Document 806476 for scan coverage and scan sequence information.

2. Calibrate examination equipment or perform calibration check as required.

3. Locate the datum point, position the head on the RPV ID Examination Positioning Device and begin examination.

4. Continue scanning sequences until all welds requiring the same calibration have been examined. Examinations shall not be considered complete until all recordable indications have been investigated, recorded and evaluated as required in 10.

10. RECORDING CRITERIA

10.1 GEOMETRIC INDICATIONS

Indications that are determined to be geometric in origin and are equal to or greater that 50% DAC shall be recorded at one location and noted as "Geometric caused by weld prep design," or "ID or OD design geometry," etc. and verified by the applicable drawings. All geometric indications shall be recorded on the "Report Sheet for Geometric Reflectors".

10.2 NON-GEOMETRIC INDICATIONS

Record all non-geometric indications $\geq$ 50% DAC on the Indication Report Sheet, using 50% DAC end points.

11. EVALUATION CRITERIA

1. Evaluation of flaw indications (excluding geometry) shall be performed in accordance with Flaw Evaluation Procedure 80A5535.

2. Results of the evaluation shall be reported to the Plant Owner or his Agent.

12. EXAMINATION RECORDS

12.1 CERTIFICATION OF RECORDS

1. The examiner(s) shall complete and sign the appropriate data sheet(s) immediately upon the completion of RPV shell weld examinations, noting

their applicable NDE certification levels. All Calibration Data Packages shall be reviewed for procedural compliance by the Data Reviewer or the designee of the site supervisor.

2. Should the performance of an examination overlap two shifts, the Level II Examiners of each shift shall sign the appropriate data sheets.

12.2 FILING OF RECORDS

NES 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 current eye test reports.

12.3 PROCEDURE CORRECTIONS AND ADDITIONS

1. All procedure corrections and/or additions required during the preservice examinations may be initiated by either the owner or the senior NES site representative. All such changes shall have the approval of the owner and an NES Level III.

2. The Plant Owner of his Agent shall be notified of such changes and approval obtained as required.

1. Flange to Upper Shell Circumferential Weld
2. Upper Shell Longitudinal Welds
3. Upper Shell to Intermediate Shell Circumferential Weld
4. Intermediate Shell Longitudinal Welds
5. Intermediate Shell to Lower Shell Circumferential Weld
6. Lower Shell Longitudinal Welds
7. Lower Shell to Bottom Head Circumferential Weld
8. Bottom Head Meridional Welds
9. Bottom Head Circumferential Weld (Dollar Plate)
10. Outlet Nozzle to Shell Welds
11. Inlet Nozzle to Shell Welds
12. Nozzle to Safe End Welds

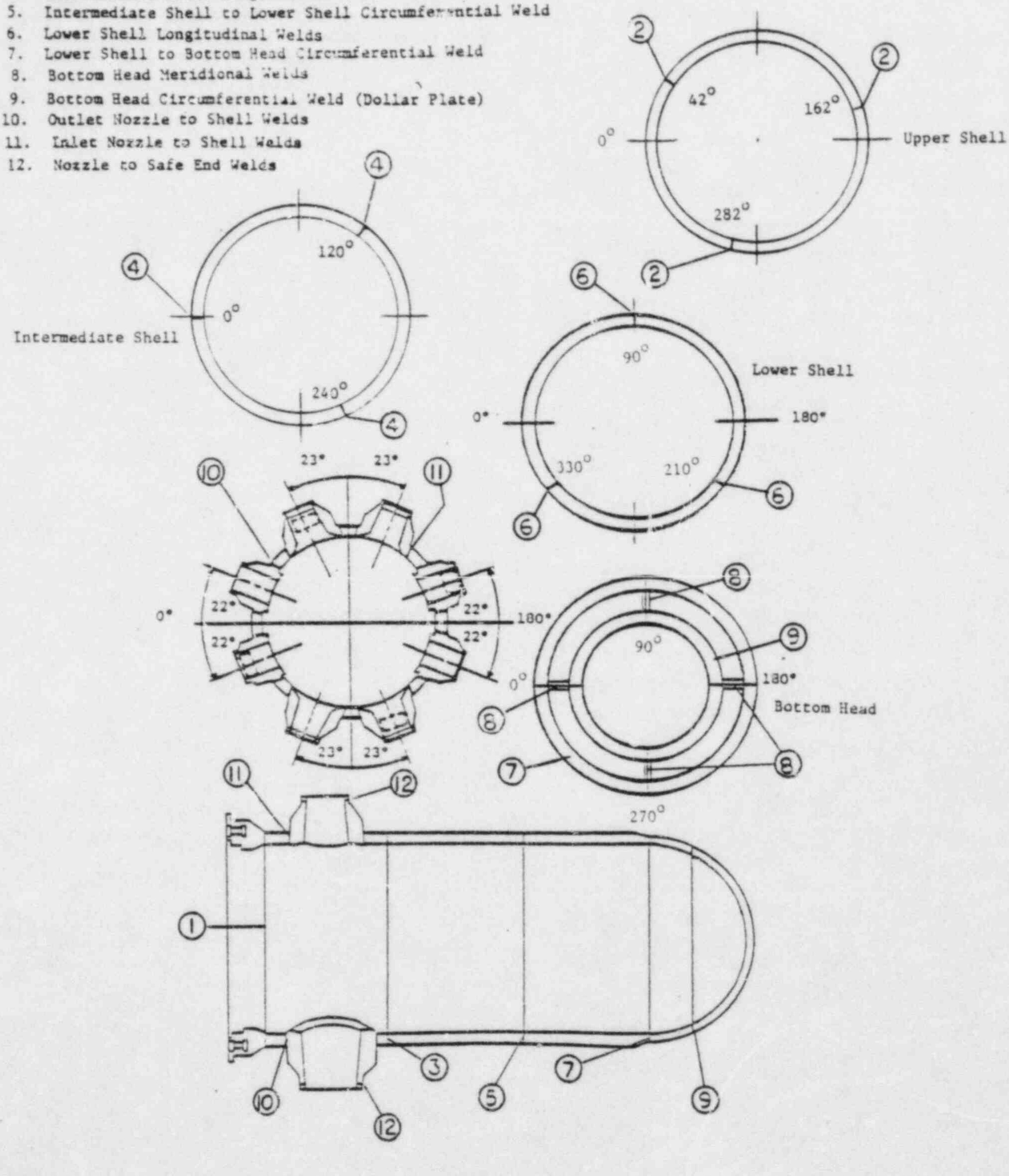


FIGURE 1

Weld Locations

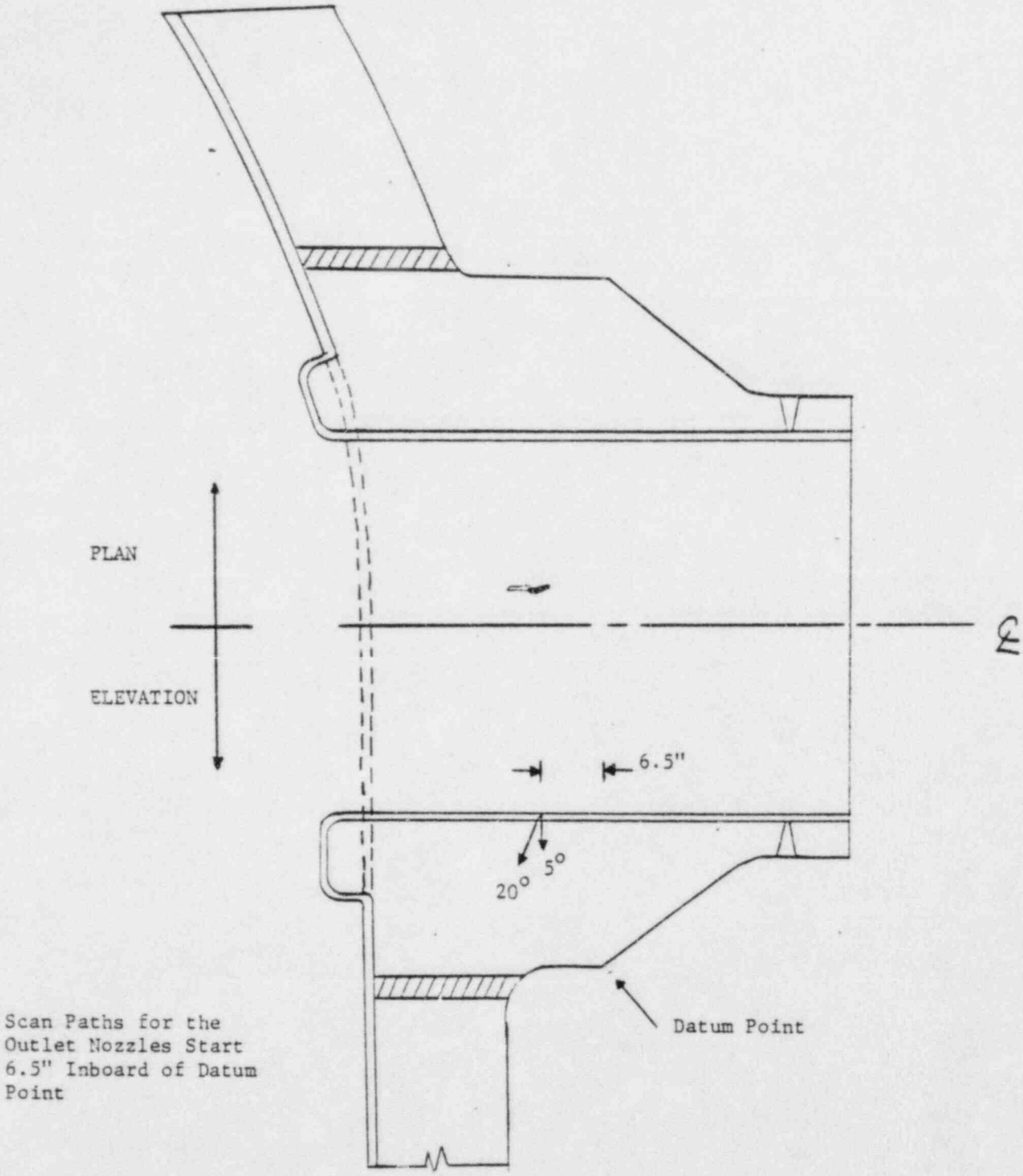


FIGURE 2 - OUTLET NOZZLE

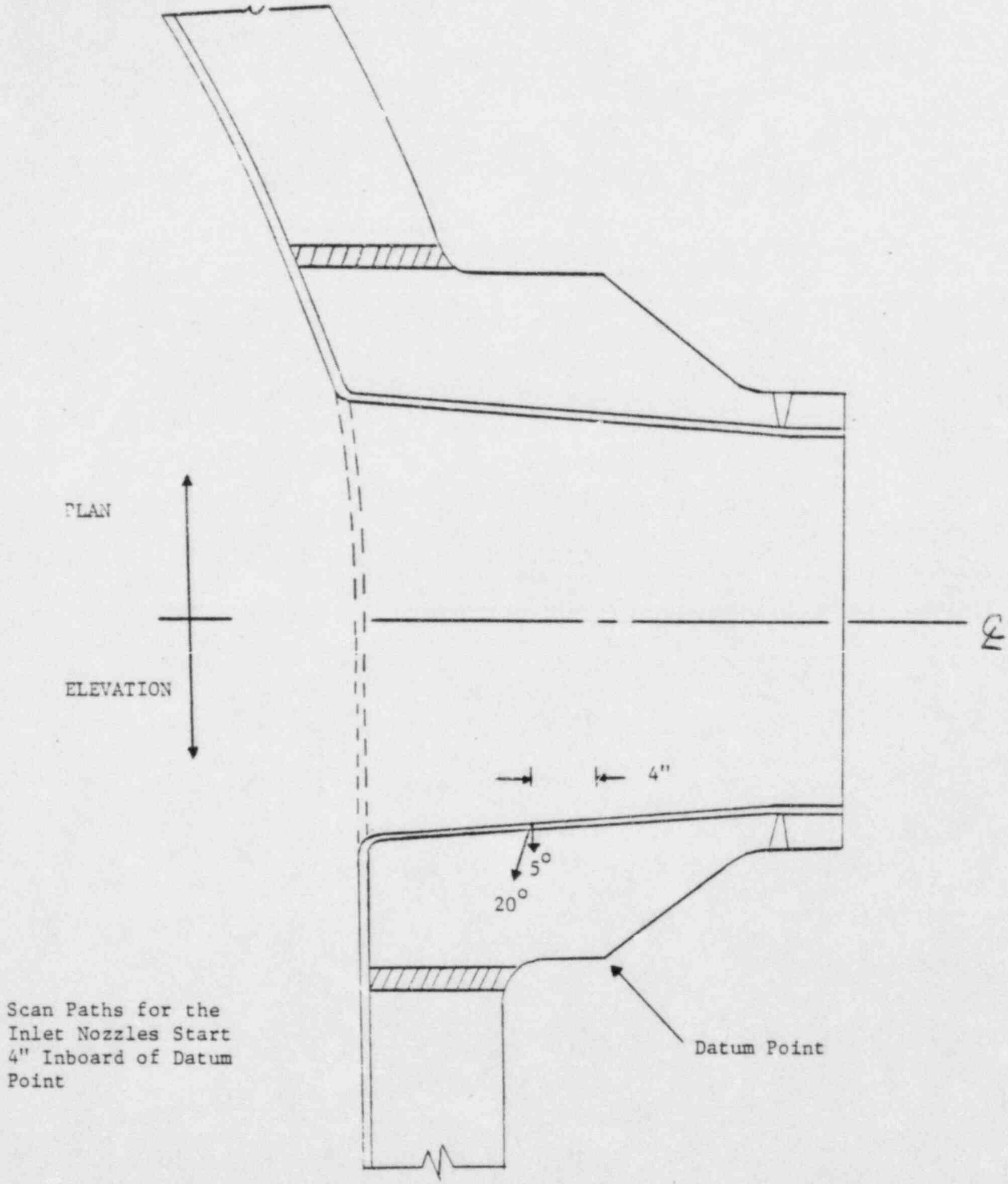


FIGURE 3 - INLET NOZZLE

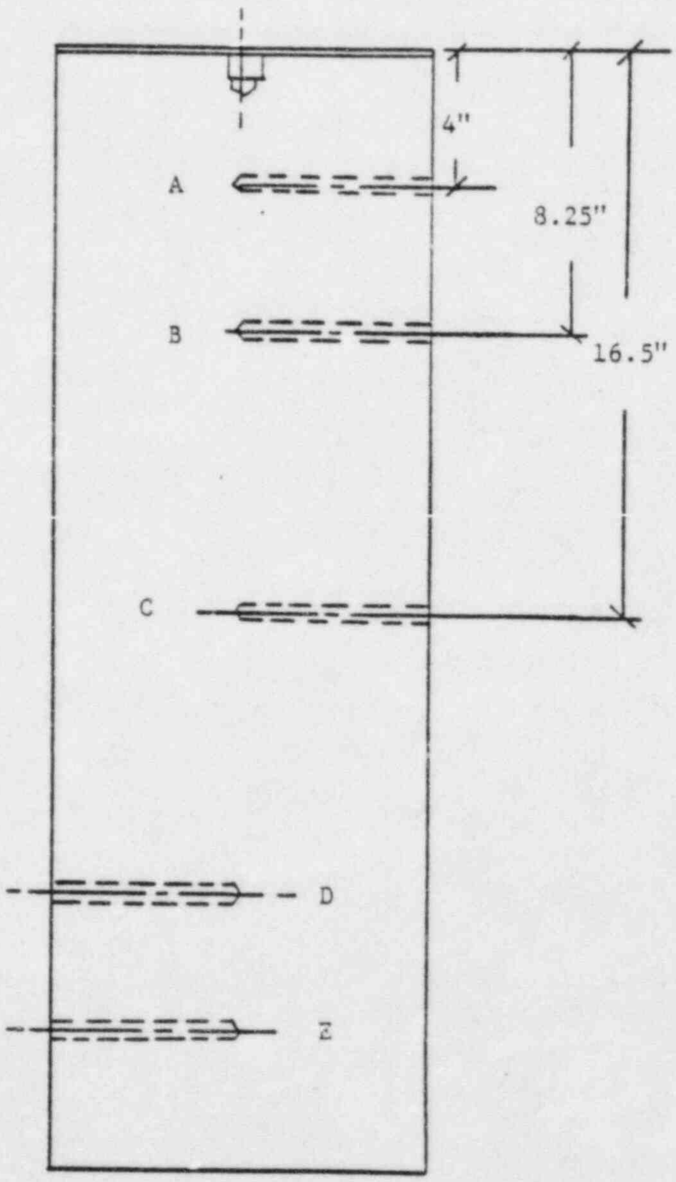


FIGURE 4 - UT-6

WELD SCAN DATA SHEET

Plant/Unit ____________________ Page ________ of ____________

____________________ Cal. Data Pkg. ____________

Subject ____________________ Procedure No. ________ Rev. ______

NR System ____________________ Video Tape No. ____________

Raster No.	Head Orient.	Scan Direction 0°	⊥ To Weld	= To Weld	Recordable Indication Yes	No	Comments/Reason for Incomplete Raster

~~SAMPLE ONLY~~

~~SIMILAR VERSIONS WHICH~~
~~REQUIRE THE SAME~~
~~INFORMATION ARE ACCEPTABLE.~~

Remarks ____________________

Examiners
1. ____________ Level ______ Date ______
2. ____________ Level ______ Date ______
3. ____________ Level ______ Date ______
Reviewer ____________ Date ______

NES NUCLEAR ENERGY SERVICES, INC.

FORM 028-106/1 1/83

FIGURE 5

SAMPLE ONLY
SIMILAR VERSIONS WHICH REQUIRE THE SAME INFORMATION ARE ACCEPTABLE

DAILY LINEARITY SHEET

Plant/Unit ______

Page ____ of ____

Channel ____

INSTR. LINEARITY RESPONSE					
	Amplitude				
	High	Low		High	Low
1			5		
2	80	40	6		
3			7		
4			8		

AMPL. CONTROL LINEARITY			
Init.	db	Result	Limits
80	-6		32-48%
80	-12		16-24%
40	+6		64-96%
20	+12		64-96%

Mfg/Model No. ______
Serial No. ______
Date ______
Time ______
Examiner ______
Level ______

Channel ____

INSTR. LINEARITY RESPONSE					
	Amplitude				
	High	Low		High	Low
1			5		
2	80	40	6		
3			7		
4			8		

AMPL. CONTROL LINEARITY			
Init.	db	Result	Limits
80	-6		32-48%
80	-12		16-24%
40	+6		64-96%
20	+12		64-96%

Mfg/Model No. ______
Serial No. ______
Date ______
Time ______
Examiner ______
Level ______

Channel ____

INSTR. LINEARITY RESPONSE					
	Amplitude				
	High	Low		High	Low
1			5		
2	80	40	6		
3			7		
4			8		

AMPL. CONTROL LINEARITY			
Init.	db	Result	Limits
80	-6		32-48%
80	-12		16-24%
40	+6		64-92%
20	+12		64-96%

Mfg/Model No. ______
Serial No. ______
Date ______
Time ______
Examiner ______
Level ______

Channel ____

INSTR. LINEARITY RESPONSE					
	Amplitude				
	High	Low		High	Low
1			5		
2	80	40	6		
3			7		
4			8		

AMPL. CONTROL LINEARITY			
Init.	db	Result	Limits
80	-6		32-48%
80	-12		16-24%
40	+6		64-96%
20	+12		64-96%

Mfg/Model No. ______
Serial No. ______
Date ______
Time ______
Examiner ______
Level ______

Reviewer ______ Date ______

FORM 078 103/0 2/82 NUCLEAR ENERGY SERVICES, INC

FIGURE 6

CALIBRATION DATA SHEET

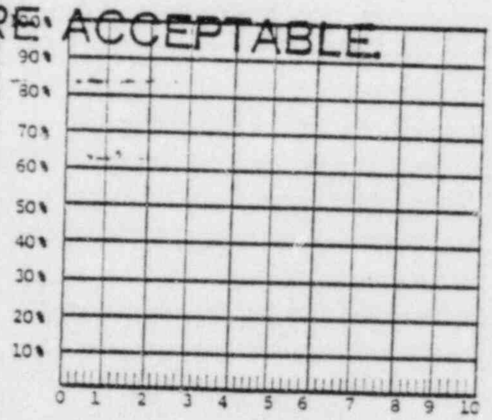
Cal. Blk. No. ______________ Page ________ of ________
Surface Temp. ________ °F Cal. Data Pkg. ______________
Block Temp. ________ °F Procedure No. ________ Rev. ________

Instrument		Hole Ident	Depth In.	Sweep Div.	Amp% (FSH)
Mfg.:	Model:				
Serial No.:	Channel:				
Nom. Angle:	Mode:				
Transducer					
Mfg.:	Model:				

		Calibration	Date	Time	By
Serial No.:	Size:				
Freq.: MHz	Measured Angle:	Initial			
Cable Type:	Length:	Intermediate			
Head No.:	Couplant:	Intermediate			
Main Sweep Range: in.		Intermediate			
Delay/Setup Range: sec		Intermediate			
Main Sweep Calib.:		Intermediate			
Delay:		Final			

SAMPLE ONLY
SIMILAR VERSIONS WHICH
REQUIRE THE SAME
INFORMATION ARE ACCEPTABLE.

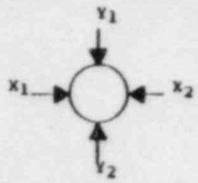
Rep Rate Range: KHz	Var:
Display:	Sweep Sec:
Fltr:	Mode:
Q:	Freq.:
Jack:	
Ref.: Min.: Max.:	
Pulse Length: Min.: Max.:	
Primary Reference Sensitivity db	
Equalized Response: db	
Exam Sensitivity: db	
Screen Gated: sd to sd	
Front Interface Signal Position: sd	
1 Major Screen Division: in.	
TUC Card No.:	Pulses:
Trigger: + -	Freq.: A B C
Pulse Period: C F	
Pulse Delay: C F	
Attenuation: C F	
Resistance Added:	



Examiners
1 ______________ Level ____ Date ________
2 ______________ Level ____ Date ________
3 ______________ Level ____ Date ________
Reviewer ______________ Date ________

FORM 028-102/1 11/82 NES NUCLEAR ENERGY SERVICES, INC.

FIGURE 7



SUPPLEMENT A

INDICATION REPORT SHEET

Weld No.________ Weld ℄ ________

Page ________ of ________

Cal. Data Pkg. ________

Raster No. ________

Video Tape No. ________

IND. NO.	CH. NO.	BM. DIR.	∠	0° bR SD	MAXIMUM PEAK % DAC	SD	X	Y	LOCATION OF ___ % DAC END POINTS X_1	SD	X_2	SD	Y_1	SD	Y_2	SD	LOCATION OF ___ % DAC END POINTS X_1	SD	X_2	SD	Y_1	SD	Y_2	SD

SAMPLE ONLY.

SIMILAR VERSIONS WHICH REQUIRE THE SAME INFORMATION ARE ACCEPTABLE

REMARKS ________

EXAMINERS

1 ________ Level ___ Date ________

2 ________ Level ___ Date ________

3 ________ Level ___ Date ________

REVIEWER ________ Date ________

FORM 028-116/1 1/83

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FIGURE 8

Plant/Unit ______________

____

Subject ______________

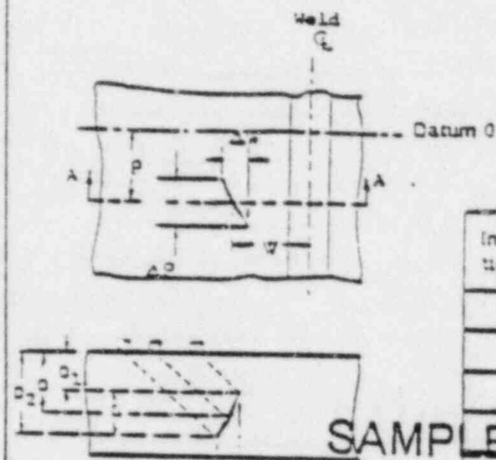
Page ______ of ______

Cal. Data Pkg. ______________

Procedure No. ______ Rev. ______

INDICATION EVALUATION SHEET

SUPPLEMENT 8

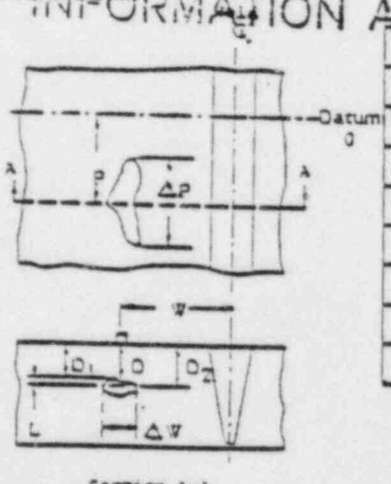


Section A-A

SAMPLE ONLY

SIMILAR VERSIONS WHICH REQUIRE THE SAME INFORMATION ARE ACCEPTABLE.

STRAIGHT BEAM



Section A-A

Indication No.	CH. No.	W	P	D	L	ΔP	ΔW	

Prepared by:

1. ______________ Level ______ Date ______

2. ______________ Level ______ Date ______

Reviewer ______________ Date ______

COMMENTS:

FORM 026-128/0 5/83

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FIGURE 9

[illegible] ____________ Page ______ of ______

____________ ______ Cal. Data Pkg. ____________

[illegible] ____________ Procedure No. ______ Rev. ______

EVALUATION SHEET FOR RECORDABLE INDICATIONS

Supplement C

A. Zone number ____________ Examination Procedure No. ____________

B. Scan number ____________ Weld number ____________

C. Indication number ____________

D. Applicable ASME Code standards used for evaluation.
   Section ____________ Article ____________

E. Size of indication
   Length ____________ Depth ____________
   Width ____________ Plate thickness(t) ____________

F. Characterization of Flaw Indication per Para. ____________
   1. Type of Flaw: ____________
   2. Sketch of indication

SAMPLE ONLY

SIMILAR VERSIONS WHICH REQUIRE THE SAME INFORMATION ARE ACCEPTABLE.

   3. Flaw characteristic calculations:

G. Comparison of pertinent evaluation standard (Para. ____________
   to actual flaw size.

☐ acceptable ☐ rejectable*

Prepared By: ____________ Approval ____________ SNT-TC-1A Level III

Reviewed By: ____________ Authorized Inspector ____________

*If a rejectable indication is found during an inservice examination, additional evaluation analysis shall be performed.

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FORM 028-120/0 1/83

FIGURE 10

Plant/Unit ______________

Procedure No. ______________
Subject ______________
Weld No. ______________

Sheet ______ of ______
Attachment to Calibration Data
Pkg. No. ______________

SUPPLEMENT D

REPORT SHEET FOR GEOMETRIC REFLECTORS

Depth of Reflector (in.) ______________ Channel ______________

Maximum % DAC ______________ Indication(s) No. ______________

Positional Coordinates ______________ and ______________

SAMPLE ONLY

Comments (Use Sketches to provide clarity): Ref. Dwg. No. ______________

~~SIMILAR VERSIONS WHICH~~
REQUIRE THE SAME
INFORMATION ARE ACCEPTABLE.

FORM 028-125/0 5/83 NES NUCLEAR ENERGY SERVICES, INC.

FIGURE 11

AUTOMATED ULTRASONIC EXAMINATION

PROCEDURE FOR NEAR SURFACE TECHNIQUE

FROM THE ID SURFACE

SEABROOK

NUCLEAR POWER STATION

CONTROLLED COPY
VALID ONLY IF THIS STAMP IS RED

Project Application 5562	Prepared By S. Larson	Date 11/21/83
APPROVALS		
TITLE/DEPT.	SIGNATURE	DATE
Level III	R.S. [illegible]	2/24/84
Project Engineer	KW Tunkler for P. DINARDO	2/24/84
Reactor Services Opers. Mgr.	KW Tunkler	2/24/84
Project Manager	Laurence P. Burdage	2/24/84
QA Manager	MJ Dizdul for WSG	2/24/84

nes

REVISION LOG

NUCLEAR ENERGY SERVICES, INC.

REV. NO.	DATE	PAGE NO.	DESCRIPTION	APPROVAL
1	2/24/84	1, 15, & 32	Incorporate changes listed on CRA 4058	K. Jozzone

AUTOMATED EXAMINATION PROCEDURE FOR NEAR SURFACE ULTRASONIC TECHNIQUE

1. SCOPE

1.1 AREA OF EXAMINATION

1. This document covers the Near Surface Ultrasonic examination procedures for the following areas:

   A. RPV outlet nozzle inner radii and bore shown in Figures 1 and 2.

   B. RPV inlet nozzle inner radii and bore shown in Figures 1 and 3.

   C. RPV outlet nozzle to safe-end weld and nozzle to shell weld shown in Figures 1 and 2.

   D. RPV inlet nozzle to safe-end weld and nozzle to shell weld shown in Figures 1 and 3.

   E. Flange to upper shell circumferential weld shown in Figures 1 and 4.

   F. Upper shell to intermediate shell circumferential weld shown in Figures 1 and 5.

   G. Intermediate to lower shell circumferential weld shown in Figures 1 and 6.

   H. Upper shell longitudinal welds shown in Figures 1 and 7.

   I. Intermediate and lower shell longitudinal welds shown in Figures 1 and 8.

   J. Lower shell to bottom head circumferential weld shown in Figures 1 and 9.

   K. Bottom head meridional welds shown in Figures 1 and 10.

1.2 TYPE OF EXAMINATION

1. Nozzle bore and Inner Radius and Nozzle to Safe End Weld examinations shall be performed using ultrasonic nominal 65° dual longitudinal technique.

2. The first 25% of the materi... from the inside (ID) surfaces of the RPV shall be examined using an ultrasonic nominal 60° dual longitudinal beam technique. All nozzle to shell welds shall be examined to 1/2T to provide additional perpendicular coverage using the 60° dual longitudinal technique.

3. The examinations will be performed using the RPV ID Examination Positioning Device and immersion search units (transducers).

1.3 TIME OF EXAMINATION

These procedures shall govern the preservice (baseline) examination of the Reactor Vessel as required by the ASME Boiler and Pressure Vessel Code, Section XI and the NRC Regulatory Guide 1.150 position Rev. 1.

1.4 MATERIALS

The RPV shell, bottom head, and flange assembly are constructed of low carbon steel with stainless steel cladding on the inside (ID) surfaces.

2. REFERENCES

2.1 REFERENCE DOCUMENTS

1. NRC Regulatory Guide 1.150 Rev. 1.

2. ASME Boiler and Pressure Vessel Code, Section XI, 1977 Edition through Summer of 1978 Addenda

3. ASNT Recommended Practice, SNT-TC-1A, 1975 Edition

4. NES Document 80A6401, Reactor Pressure Vessel Preservice Inspection Program Plan for Seabrook Nuclear Power Station Unit 1

5. NES Document 80A5187, Quality Assurance Program Plan for Seabrook Nuclear Power Station Unit 1

6. NES Document 80A9068, Procedure for Training and Certification of Nondestructive Examination Personnel (latest revision)

7. NES Document 80A9053, Procedure for Ultrasonic Instrument Linearity Verification (latest revision), as modified in paragraph 7.4.2 of this procedure

8. NES Document 80A9060, Inservice Inspection Field Change Procedure (latest revision)

9. NES Document 80A6476, Procedure for the Operation of the RPV ID Examination Positioning Device

2.2 APPLICABLE DRAWINGS

1. Seabrook Drawings

	Drawing No.	Title
A.	10773-161-003	As Built Location of Weld Seams Vessel
B.	10873-171-004	General Arrangement Elevation
C.	10873-171-005	General Arrangement Plan

2. Calibration Block Drawings:

A. NES Drawing No. 80E6306 Basic 7" Calibration Block, Seabrook Unit 1 PC. NO. 196-102

B. NES Drawing No. 80E6307 Basic 9" Calibration Block, Seabrook Unit PC. NO. 196-103

C. NES Drawing No. 80E6308 Basic 11" Calibration Block, Seabrook Unit PC. NO. 196-104

D. NES Drawing No. 80D6310 Safe End Calibration Block, Seabrook Unit 1 PC. NO. 196-202

3. PROCEDURE COMPLIANCE

The examination procedures described in this document comply with Section XI of the ASME Boiler and Pressure Vessel Code and the NRC Regulatory Guide 1.150 Rev. 1 except where examination coverage is limited by part geometry or access. Where part geometry or access result in limited coverage, such limitations shall be identified and described on the appropriate documentation for reporting the examination.

4. PREREQUISITES

4.1 PERSONNEL CERTIFICATION REQUIREMENTS

1. Each person performing ultrasonic examinations governed by this procedure shall be certified in accordance with ASME Boiler and Pressure Vessel Code Section XI, 1977 Edition through Summer of 1978 Addenda and NES 80A9068, Procedure for Training and Certification of Nondestructive Examination Personnel.

2. Examination crews shall have two or more members on each shift as necessary. At least one member of each crew shall have a minimum qualification of Level II in accordance with the above referenced documents. At least one additional member must have a minimum qualification of Level I. Supplemental data evaluations/reporting required by RG 1.150 shall be conducted by a Level II (minimum).

4.2 PERSONNEL RECORDS

1. Records of personnel qualification shall be maintained by the on-site NES Automated Site Supervisor, or Data Reviewer.

2. A copy of the examiner's certification summary and a current eye test shall be submitted to the Plant Owner or his Agent, prior to performing examinations per this procedure.

5. EXAMINATION REQUIREMENTS

5.1 EXAMINATION FREQUENCY

1. The nominal examination frequency shall be 2.25 MHz for all angle beam examinations.

2. During preservice examination, other pulse frequencies shall be used 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

1. The rate of search unit movement shall be recorded as required and in no case shall the scanning speed exceed 6 inches/second.

2. Each RPV shell weld (except the bottom head circumferential weld) and the volume of metal for 1/2T on each side of the weld (WRV)* shall be examined using 60° dual longitudinal wave technique except where restricted by part geometry or access. The angle beams shall be oriented both perpendicular and parallel to the weld.

3. The inner 1/3 only of the nozzle safe-end welds shall be examined for 2.5 inches either side of the weld using a nominal 65° dual longitudinal angle beam technique. The angle beams shall be oriented both perpendicular and parallel to the weld.

4. The Inner Radii and Bore examination shall be performed using a 65° dual longitudinal angle beam technique applied in two directions circumferentially from the clad ID surface of the nozzles.

*WRV = Weld and Required Volume

5. Other angles and techniques may be used if required for aid in evaluation, and the appropriate information (angle, frequency, techniques, etc.) shall be recorded.

6. Examination coverage for the welds specified in this procedure is shown in Figures 2 through 10. Actual scan dimensions and coordinates are specified in NES Document 80A6476, Procedure for the Operation of the RPV ID Examination Positioning Device.

5.3 LIQUID COUPLANT

The ultrasonic couplant shall be the inhibited water used to fill the RPV.

5.4 SCAN COVERAGE LIMITATIONS

Where the surface or other conditions do not permit a meaningful examination of the scan areas designated, the examiner shall record the location and the particular interfering condition in the space provided on the Regulatory Guide 1.150 Examination Report Sheet and report same to the NES Automated Site Supervisor for corrective action or disposition.

5.5 WELD IDENTIFICATION

The appropriate weld maps in NES Document 80A6401, Reactor Pressure Vessel, Preservice Inspection Program Plan shall be used to locate each weld.

5.6 REFERENCE POINT

1. The reference point for all RPV shell welds (except the nozzle - shell welds) shall be RPV 0° reference location at the flange mating surface.

2. The reference points for the RPV nozzle - shell welds shall be 0° at the nozzle top dead center for angular displacement and the nozzle axis for radial displacement.

3. The reference point for Reactor Vessel Nozzle Inner Radii and Bore and Nozzle to Safe-End welds shall be the change of section between the barrel and the cone of the nozzles as located by the Datum Point search unit at the upper most point of the nozzle.

6. EQUIPMENT REQUIREMENTS

6.1 EXAMINATION EQUIPMENT

The following test equipment or its equivalent shall be provided (as a minimum) for examination of the welds specified in this procedure.

1. Nuclear Reflectoscope System.
2. RPV ID Examination Positioning Device.
3. Calibration Tank.
4. Transducers, as required.
5. Examination Head Assemblies.
6. Other ultrasonic equipment as required.

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. Air and Electricity.
3. Temporary Lighting.
4. Moving or Lifting Devices.
5. Calibration Blocks.
   A. 196-102
   B. 196-103
   C. 196-104
   D. 196-202

6. Inhibited Water (couplant).
7. Test Surface Preparation.
8. Post-Examination Cleanup of Test Area.
9. Work Space Adjacent to the RPV Cavity (defined by separate cover).
10. Office Space with Phone Communication (defined by separate cover).

7. CALIBRATION REQUIREMENTS

7.1 CALIBRATION DATA PACKAGES

Calibration Data Packages shall be numbered 6480-1, 6480-2, and 6480-3 etc., at the time of calibration and shall be signed by the examiner(s) upon completion, noting applicable NDE levels. A Calibration Data Package shall consist of a Weld Scan Data Sheet, Calibration Data Sheets, Daily Linearity Sheet (one per 24 hour period), and Supplements as required.

7.2 CALIBRATION BLOCKS

1. The calibration blocks designated in 6.2(5), shall be used for basic instrument calibration and for establishing reference sensitivity levels for examinations.

2. The identity of the calibration block used for performing the calibration shall be recorded on each Calibration Data Sheet.

3. System calibration shall be performed from the clad surface of the calibration blocks.

4. The temperature of the calibration couplant shall be within 25° F of the component couplant temperature. Calibration couplant and component couplant temperatures shall be recorded on the Calibration Data Sheet.

5. Spot Thickness Checks of the components shall be made prior to the preservice examination to ensure that the proper calibration sweep length

includes the maximum thickness. Readings shall be taken at 3 locations on each vessel shell weld and shall be recorded on the Weld Thickness Spot Check Data Sheet.

7.3 EXAMINATION SENSITIVITY LEVELS

1. Primary Reference Sensitivity

The primary reference sensitivity level shall be the distance-amplitude correction (DAC) curve initially established on the calibration block.

2. Equalized Response Sensitivity

When an electronic DAC is used, the primary reference response shall be equalized at a nominal 80% (± 10%) FSH over the distance to be gated during the examination. The equalized response sensitivity setting of the ultrasonic instrument is that control setting which provides an 80% FSH response from all calibration reflectors after the electronic DAC curve equalization.

3. Examination Sensitivity

The examination sensitivity shall be the equalized response sensitivity with correction factors included as determined in NES 80A5533, Automated Ultrasonic Examination Technique Qualification Procedure.

7.4 TIMES OF CALIBRATION

1. Examination system calibration shall be performed prior to the examination of the specified welds and shall include establishment of DAC curve(s), correction factors, setting of gates, establishment of electronic DAC curve(s) and the programming of Transponding Ultrasonic Calibrator (TUC) cards to establish equalized amplitude response.

2. Instrument vertical and amplitude control linearity checks shall be performed at the beginning of each day of examination, in accordance with NES 80A9053, Procedure for Ultrasonic Instrument Linearity Verification, using a search unit applied to an appropriate Code Calibration block, TUC pulses, or other sources of suitable stable signals. When performing the vertical linearity check required on the Daily Linearity Sheet, the smaller signal amplitude shall be equal to half the corresponding larger signal amplitude, within $\pm$ 5% FSH, for all high points 80% FSH and below. This information shall be recorded on the Daily Linearity Sheet.

3. Calibration checks using the TUC shall be performed at the beginning of each 12 hour period of the examination, and at the change of Level II examination personnel. A TUC check shall be done at any time there is a reason to suspect equipment malfunction.

4. A calibration check of the examination system search unit heads and coaxial cables shall be performed each time the head, transducers, cables, etc. require replacement or each time the equipment is removed from the examination area or at the beginning and end of each 12 hour examination period, whichever is sooner.

7.5 CALIBRATION RESPONSE

1. Calibration response shall be checked at the equalized response sensitivity level.

2. Signal response obtained during calibration check shall be within plus or minus 20% of that established during basic system calibration.

3. If any point of the equalized response level has decreased by more than 20% of its amplitude, the examiner shall:

A. Void all scans completed since previous calibration or calibration check.
B. Recalibrate examination system.
C. Re-examine voided areas.

4. If any point of the equalized response level has increased by more than 20% of its amplitude, the examiner shall:

A. Recalibrate examination system.
B. Re-evaluate all indications recorded since the previous calibration check at the corrected equalized response level.

5. If any point on the DAC curve has moved horizontally more than 10% of the sweep line from its original settings, the examiner shall:

A. Correct sweep calibration, noting correction on the Calibration Data Sheet.

B. Void any scans made since the previous calibration or calibration check which have recorded indications, perform and record the new calibration, and re-examine those areas.

7.6 CALIBRATION FIXTURES

Calibration shall be performed using the same mounting fixture as required for the examination.

8. EXAMINATION SYSTEM CALIBRATION

8.1 BASIC SYSTEM CALIBRATION

The Level II Examiner of each shift shall establish basic examination system calibration settings and parameters at any time prior to the ultrasonic examination of the RPV welds. Initial calibration shall be from the clad side of the appropriate calibration block.

1. First 1/4T and near surface angle beam calibration shall be performed as follows:

   A. Adjust instrument sweep range to correspond with the area to be covered during the examination. The near surface hole A and the 1/4T code size hole in Figure 11 shall occur at approximately the second and eighth horizontal screen divisions.

   Note: When two angle beams are displayed on the same CRT (single time base) it is necessary to use the instrument sweep settings established for the first angle beam calibration for the second angle beam calibration also.

   B. The gated time shall be from horizontal screen division 1 to a width to include the 1/4T code hole response.

   C. Establish the actual DAC curve for the proper angle and examination depth combination by plotting the signal response amplitudes from the code size near surface hole and the 1/4T code hole. Adjust the response from the near surface hole giving the highest amplitude to 80% Full Screen Height (FSH). Connect the points plotted on the CRT with a continuous line covering the examination range.

   D. Program a TUC card to match the DAC curve established in (C) above.

   E. Electronically equalize the sensitivity at 80% FSH over the examination range.

⚠ F. Increase the equalized sensitivity established above by a minimum of 8db. Verify that the near surface holes A and B (Figure 11) are at least 80% FSH. If not, increase the sensitivity until both the A and B near surface holes are at least 80% FSH.

Note: Pre-development Technique Qualification Data shall include amplitudes from the end notches as well as the holes for direct comparison at examination sensitivity. Previous empirical results have shown a very close relationship. The relationship may be demonstrated during any calibration.

G. Record all information required on the Calibration Data Sheet. The ultrasonic examiner(s) shall sign the completed data sheet(s) noting their applicable NDE certification levels.

H. Repeat steps (A) through (G) for each angle beam to be used for the examination.

2. The inner radii/nozzle bore and the nozzle to safe-end calibration shall be performed as follows:

A. Due to the flat calibration block versus the concave examination area it is necessary to shim the examination head up off the calibration block with .100" shims. These shims shall be removed for the actual examination.

Note: Use of the .100" shims during calibration compensates for the increase in water path caused by the concave curvature of the examination area.

B. Adjust instrument sweep range to correspond with the area to be covered during the examination. The near surface holes A and C in Figure 12 shall occur at approximately the second and sixth horizontal screen divisions.

C. Set the gate to correspond with the area to be covered during the examination.

D. Establish the actual DAC curve for the proper angle and examination depth combination by plotting the signal response amplitudes from the three near surface holes (A, B and C in Figure 12). Adjust the response from the near surface hole (A, B or C) giving the highest amplitude to 80% Full Screen Height (FSH). Connect the points plotted on the CRT with a continuous line covering the examination range.

E. Program a TUC card to match the DAC curve established above.

F. Electronically equalize the sensitivity at 80% FSH over the examination range. If the sensitivity cannot be equalized over the entire range, the minimum response level from the near surface holes (A, B and C in Figure 12) will be used for determining recording levels. In this case, 50% of the lowest of the above responses shall be used as the recording level.

G. Record the location and amplitude of the code size near surface hole and 1/4T code size hole on the calibration data sheet. For nozzle to safe-end calibration also record the location and amplitude of the remaining near surface holes (D, E, and F in Figure 12) on the calibration data sheet.

H. Record all information required on the Calibration Data Sheet. The ultrasonic examiner(s) shall sign the completed data sheet(s) noting their applicable NDE certification levels.

I. Repeat steps (A) through (H) for each channel to be used for the examination.

8.2 SYSTEM CALIBRATION CHECK

1. Calibration checks of the examination system, as required by paragraph 7.4(3), shall be performed as follows:

   A. Use the TUC and previously recorded instrument settings to perform a check of the examination instrumentation system including sensitivity level, gate function and position, and data recording system.

   B. Verify that the amplitude response is within plus or minus 20% of the equalized response obtained during initial calibration.

2. Performance checks of search units and cables, as required by paragraph 7.4(4), shall be performed as follows:

   A. Reposition search unit on the calibration block at each test hole and observe maximum signal response amplitude and horizontal positions.

   B. Verify that all amplitudes fall within 20% of the equalized response sensitivity level and the horizontal displacement is within the required $\pm$ 10%. Refer to paragraph 7.5 if the response from any hole is beyond the allowed tolerance.

3. Record time, date, examiner's initials, and type of calibration check in the space provided on the appropriate Calibration Data Sheet.

8.3 BEAM SPREAD

An alternative data record may be used when establishing a search unit beam spread.

Beam spread measurements for the vertical plane of each angle beam search unit may be made as follows:

NOTE: This is only one of the optional beam spread measurement methods which may be performed. Additional beam spread measurements may be made at the time of evaluations.

1. Position search unit for maximum response from 1/4T hole.

2. Beam spread measurements should be made at the reference sensitivity required for sizing. For example, if sizing will be done to both 50% and 20% DAC, beam spread measurements will be done to both criteria. Move the search unit towards the 1/4T hole, through the maximum amplitude point until the signal amplitude reads 50% then 20% of the DAC line on the screen. Mark the corresponding positions of the fixture on the block surface at some convenient point.

3. Move the search unit back past the 1/4T hole, through the maximum amplitude point, until the signal amplitude comes again to 50% and 20% of the DAC line on the screen. Again, mark the block to indicate the new fixture positions.

4. Repeat steps (2) and (3) for the 1/2T and 3/4T holes.

5. Using suitable paper, transfer the measurements from the block to the paper. Connect points to determine beam spread and angle information.

   NOTE: Curvature of the calibration block used may cause some deviation in beam spread and beam angle information.

6. Beam spread plots shall become part of the examination record.

9. EXAMINATION SEQUENCE

1. Refer to Figures (2) through (10) and to NES Document 80A6476 for scan coverage and scan sequence information.

2. Calibrate examination equipment as required by Section 8.1; or if 12 hours have elapsed since initial calibration, perform calibration checks as required by Section 8.2.

3. Locate the datum point, position the head on the RPV ID Examination Posi ioning Device and begin examination.

4. Continue scanning sequences until all welds requiring the same calibration have been examined. Examinations shall not be considered complete until all recordable indications have been investigated, recorded and evaluated as required in 10.

10. RECORDING CRITERIA

10.1 GEOMETRIC INDICATIONS

Indications that are determined to be geometric in origin and are equal to or greater than 50% DAC need be recorded at one location only and noted as "Geometric caused by weld prep design," or "ID or OD design geometry," etc. and verified by the applicable drawings. All geometric indications shall be recorded on the "Report Sheet for Geometric Reflectors".

10.2 NON-GEOMETRIC INDICATIONS

Record all non-geometric indications equal to or greater than 50% DAC on the Indication Report Sheet, using 50% DAC and points.

11. EVALUATION CRITERIA

1. Evaluation of flaw indications (excluding geometry) shall be performed in accordance with the Flaw Evaluation Procedure 80A5535.

2. Results of the evaluation shall be reported to the Plant Owner or his Agent.

12. EXAMINATION RECORDS

12.1 CERTIFICATION OF RECORDS

1. The examiner(s) shall complete and sign the appropriate data sheet(s) immediately upon the completion of RPV shell weld examinations, noting their applicable NDE certification levels. All Calibration Data Packages shall be reviewed for procedural compliance by the Data Reviewer or the designee of the Site Supervisor.

2. Should the performance of an examination overlap two shifts, the Level II Examiners of each shift shall sign the appropriate data sheets.

12.2 FILING OF RECORDS

NES 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 current eye test reports.

12.3 PROCEDURE CORRECTIONS AND ADDITIONS

1. All procedure corrections and/or additions required during the preservice examinations may be initiated by either the owner or the senior NES site representative. All such changes shall have the approval of the owner and an NES Level III.

2. Each procedure revision shall be documented in accordance with the NES Field Change Procedure. The Plant Owner or his Agent shall be notified of such changes and approval obtained as required.

1. Flange to Upper Shell Circumferential Weld
2. Upper Shell Longitudinal Welds
3. Upper Shell to Intermediate Shell Circumferential Weld
4. Intermediate Shell Longitudinal Welds
5. Intermediate Shell to Lower Shell Circumferential Weld
6. Lower Shell Longitudinal Welds
7. Lower Shell to Bottom Head Circumferential Weld
8. Bottom Head Meridional Welds
9. Bottom Head Circumferential Weld (Dollar Plate)
10. Outlet Nozzle to Shell Welds
11. Inlet Nozzle to Shell Welds
12. Nozzle to Safe End Welds

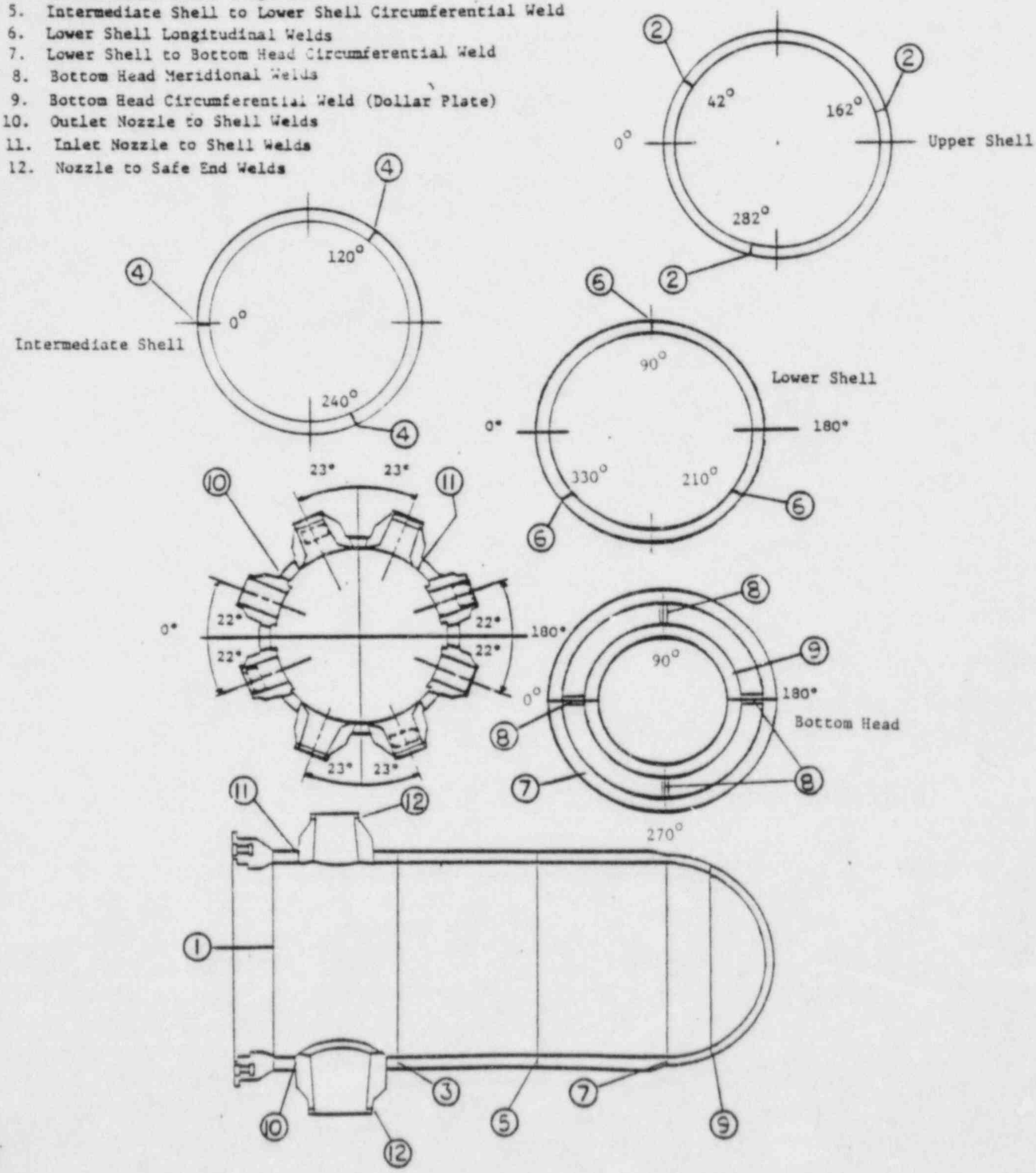


FIGURE 1

Weld Locations

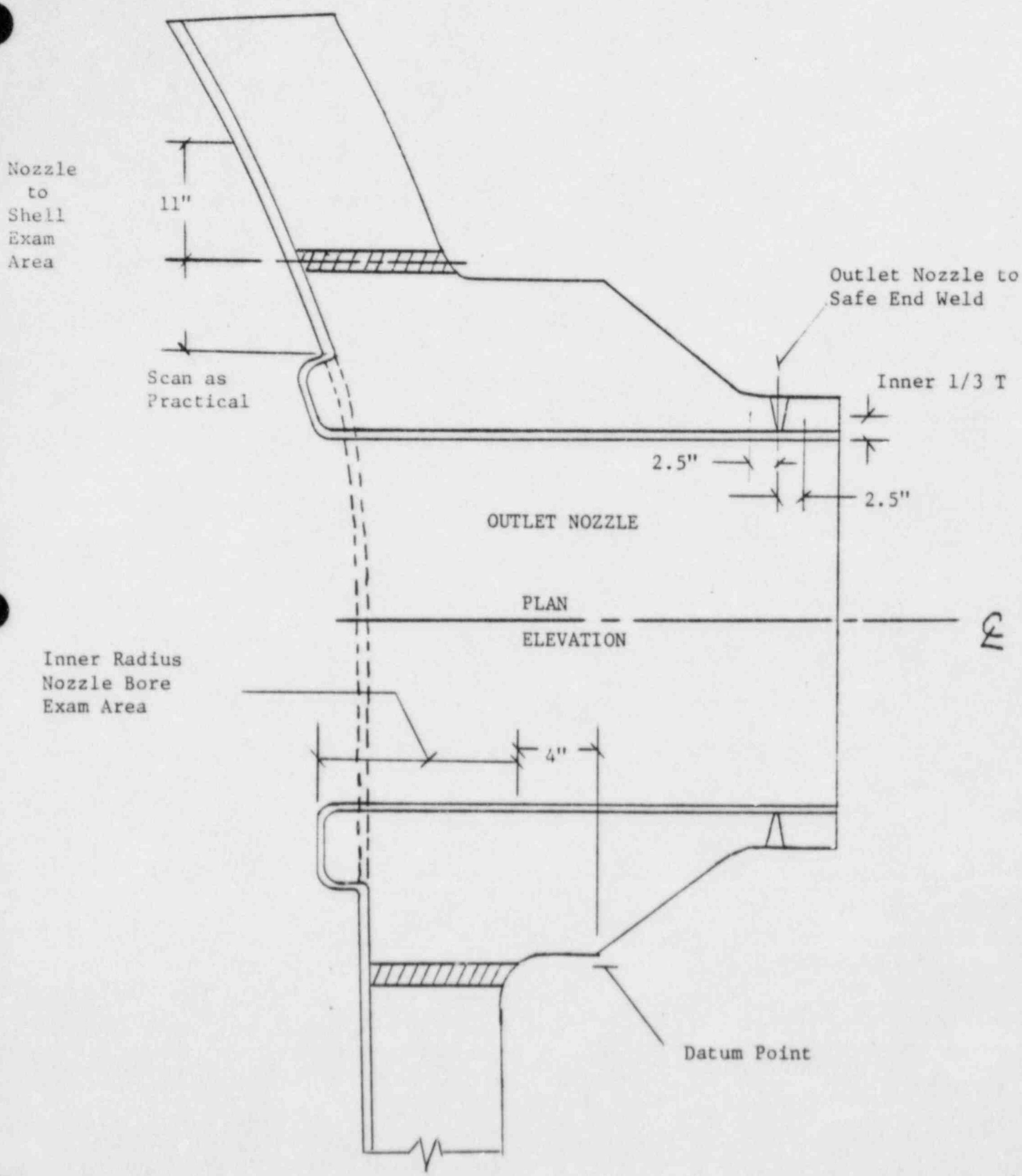


FIGURE 2

OUTLET NOZZLE, INNER RADIUS, NOZZLE BORE
AND SAFE END WELD

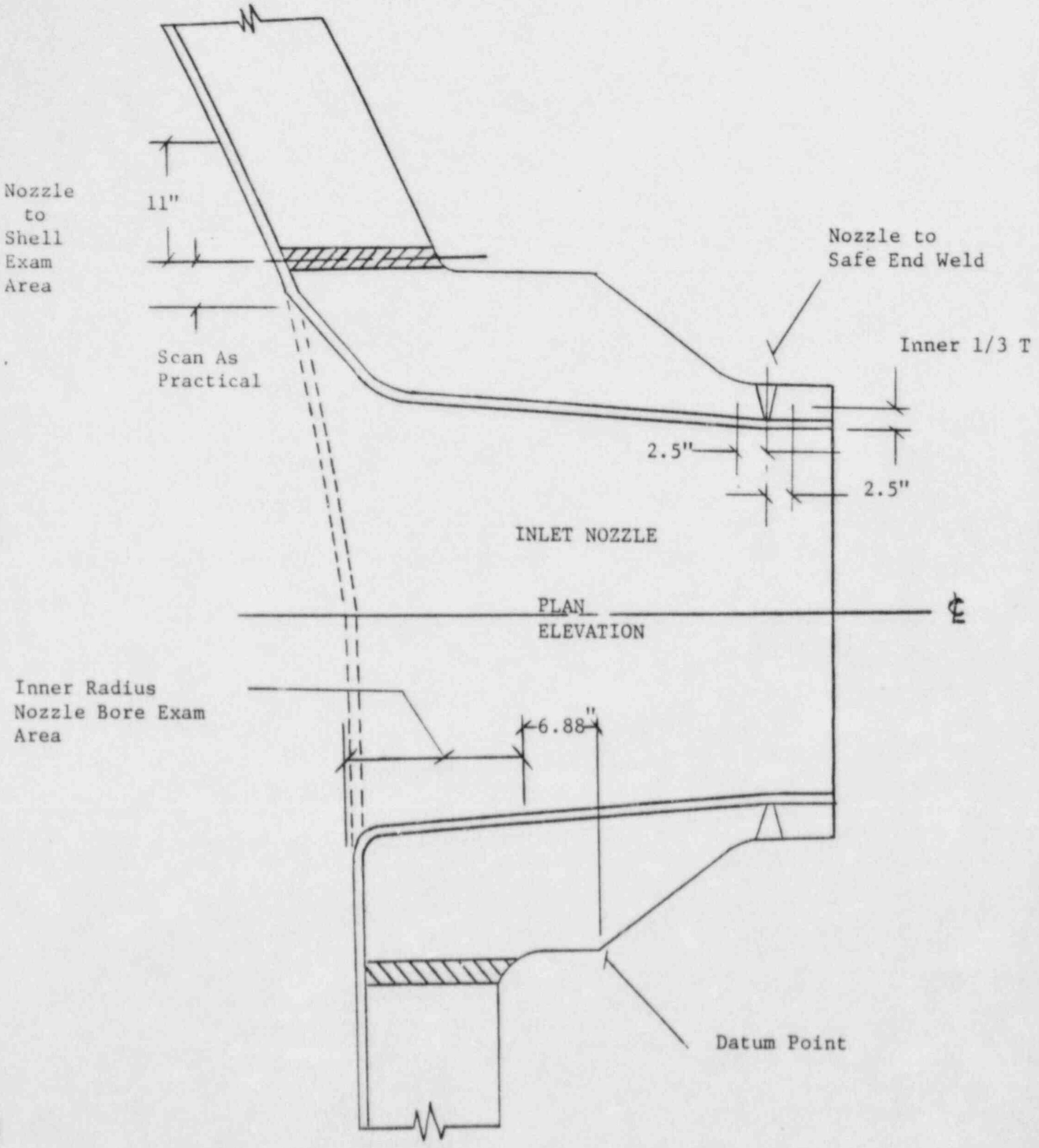


FIGURE 3

INLET NOZZLES, INNER RADIUS, NOZZLE BORE AND SAFE END WELD

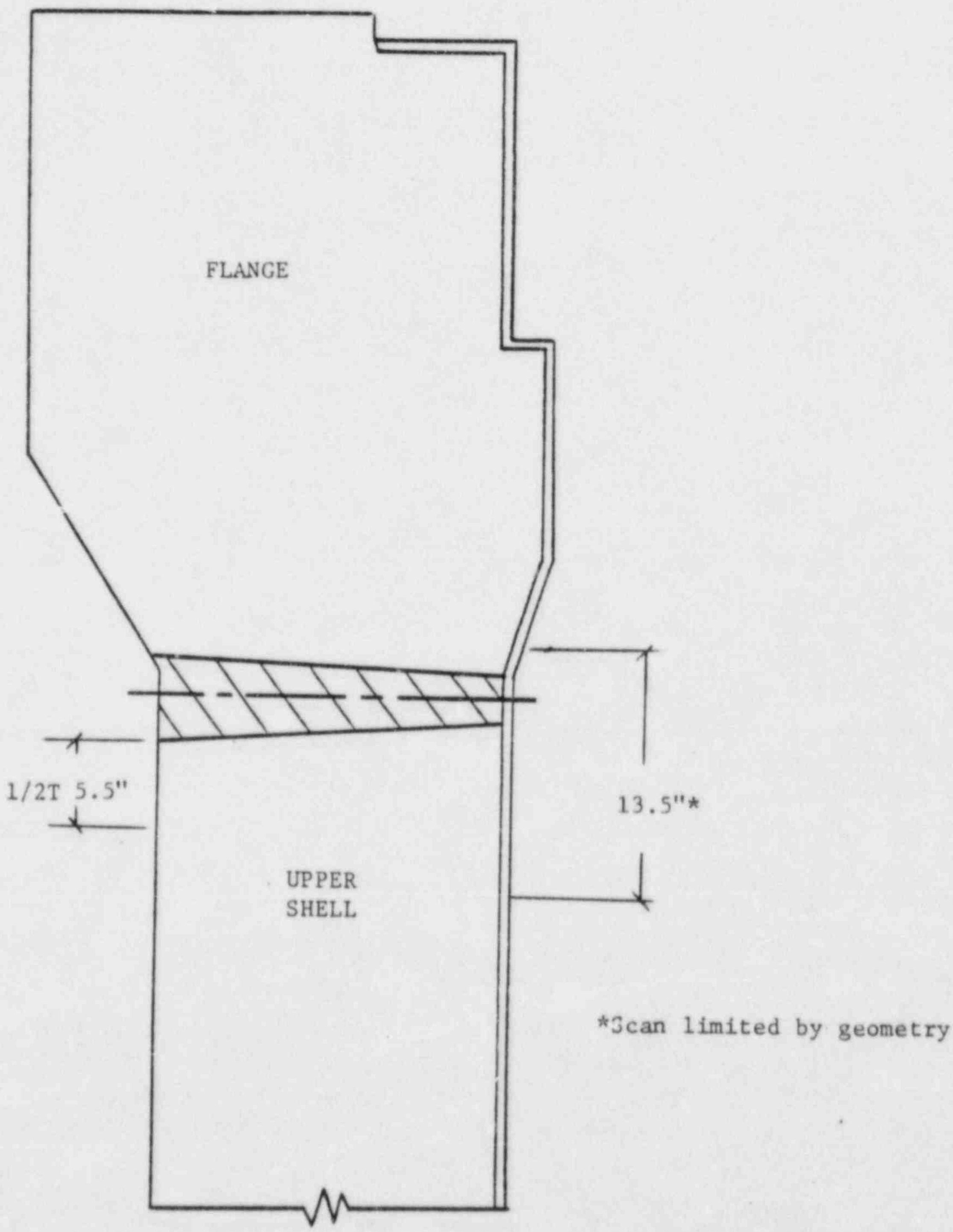


FIGURE 4

FLANGE TO UPPER SHELL CIRCUMFERENTIAL WELD

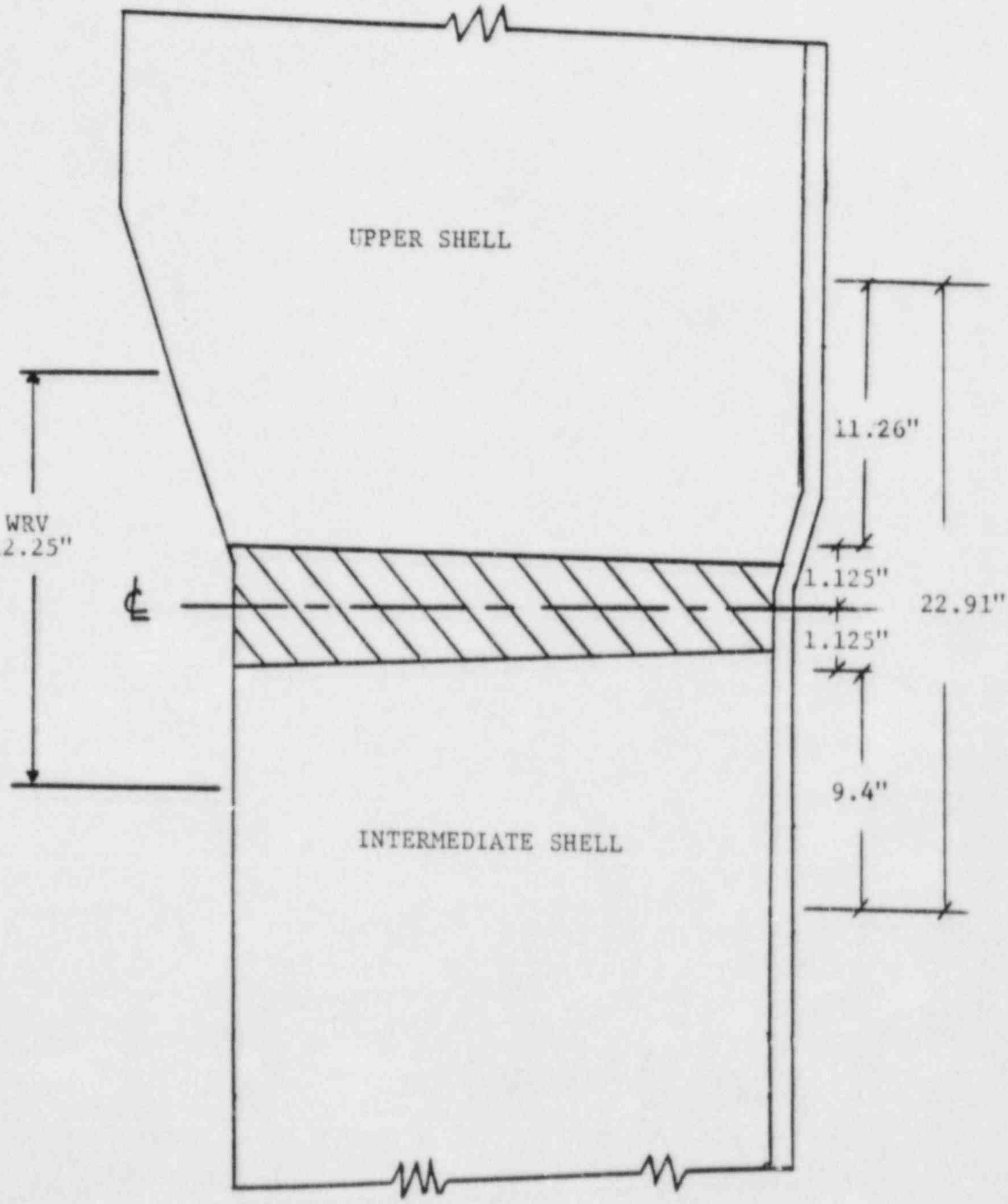


FIGURE 5

UPPER SHELL TO INTERMEDIATE SHELL CIRCUMFERENTIAL WELD

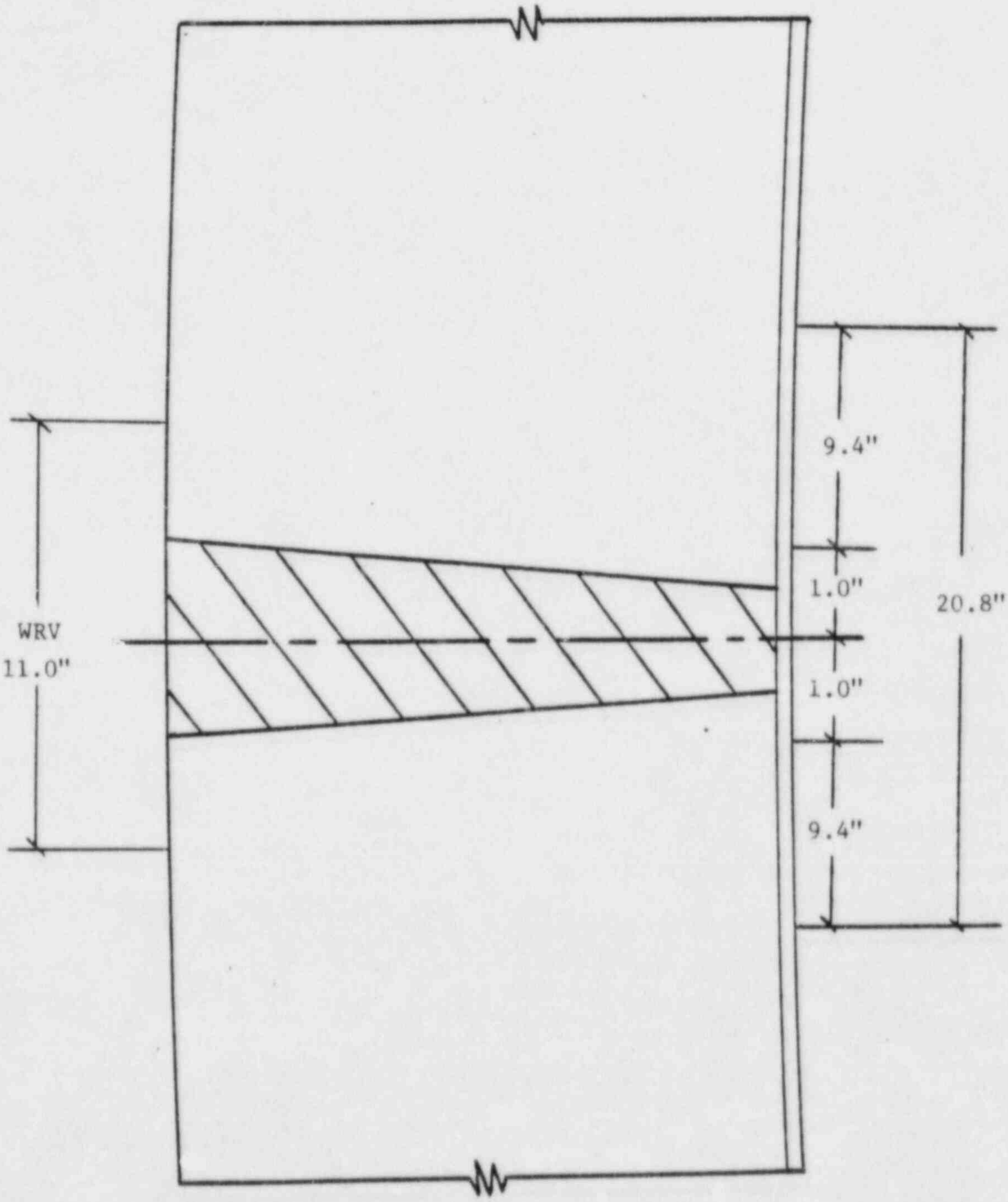


FIGURE 6

INTERMEDIATE SHELL TO LOWER SHELL CIRCUMFERENTIAL WELD

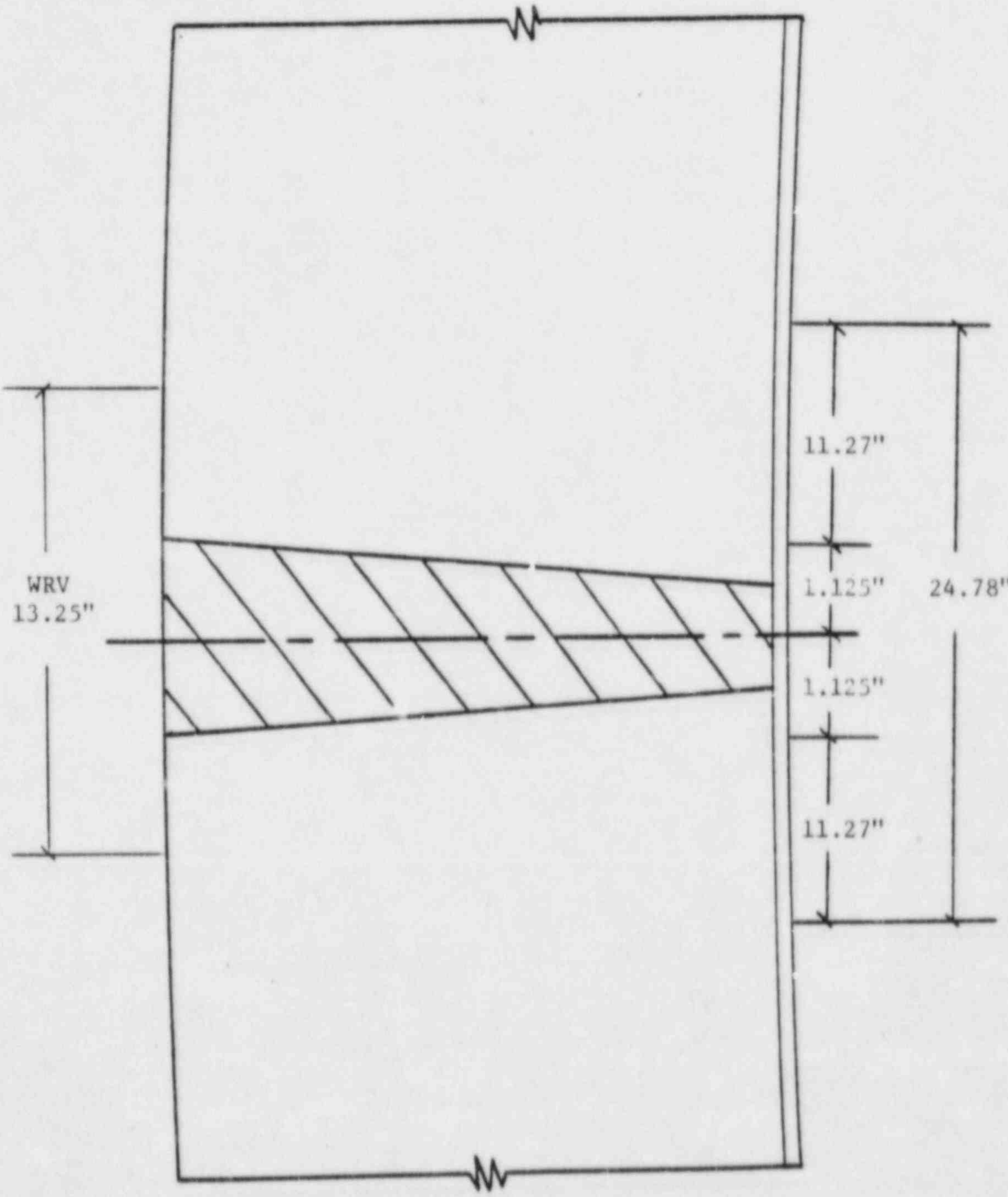


FIGURE 7

UPPER SHELL LONGITUDINAL WELDS

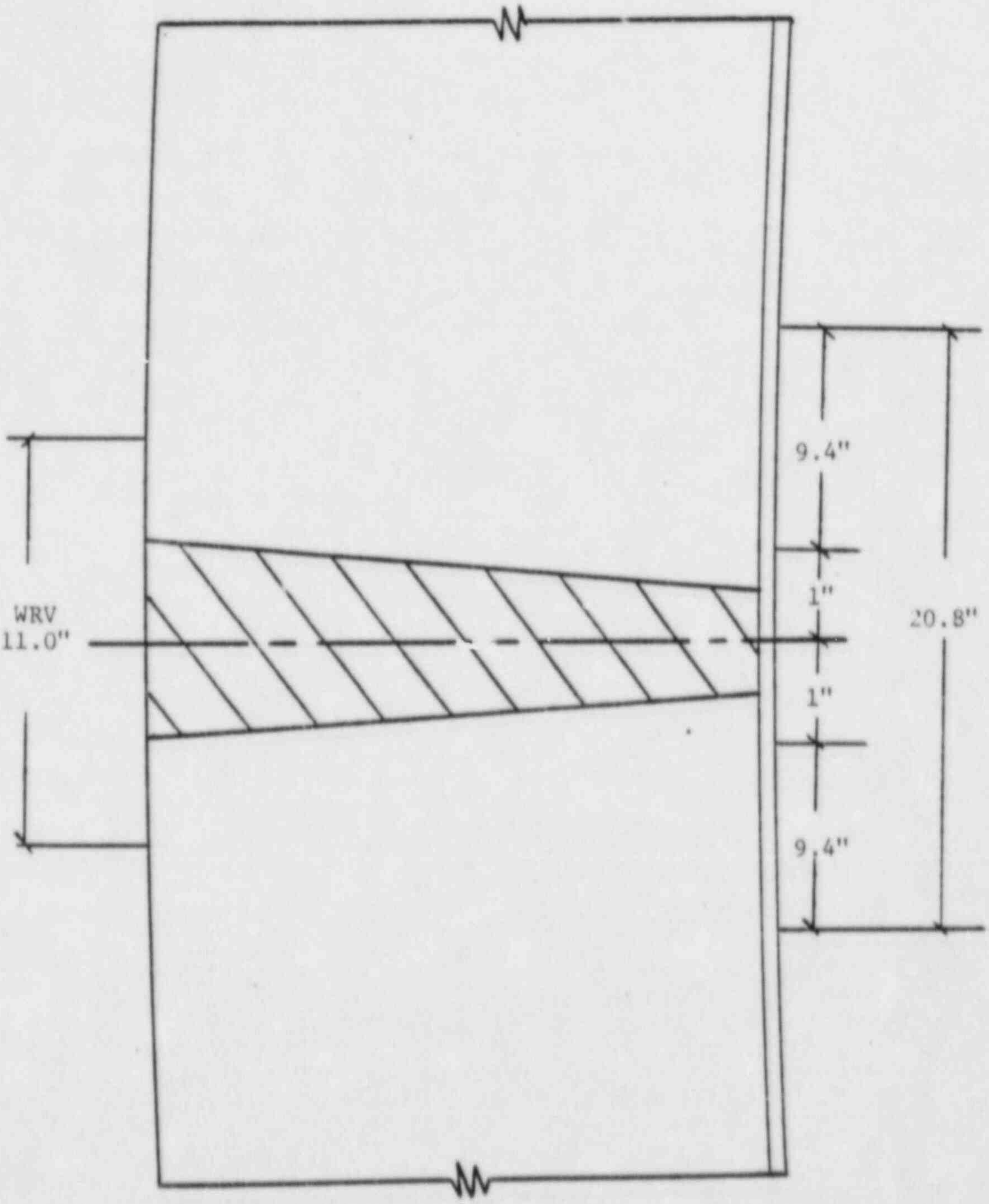


FIGURE 8

INTERMEDIATE AND LOWER SHELL LONGITUDINAL WELDS

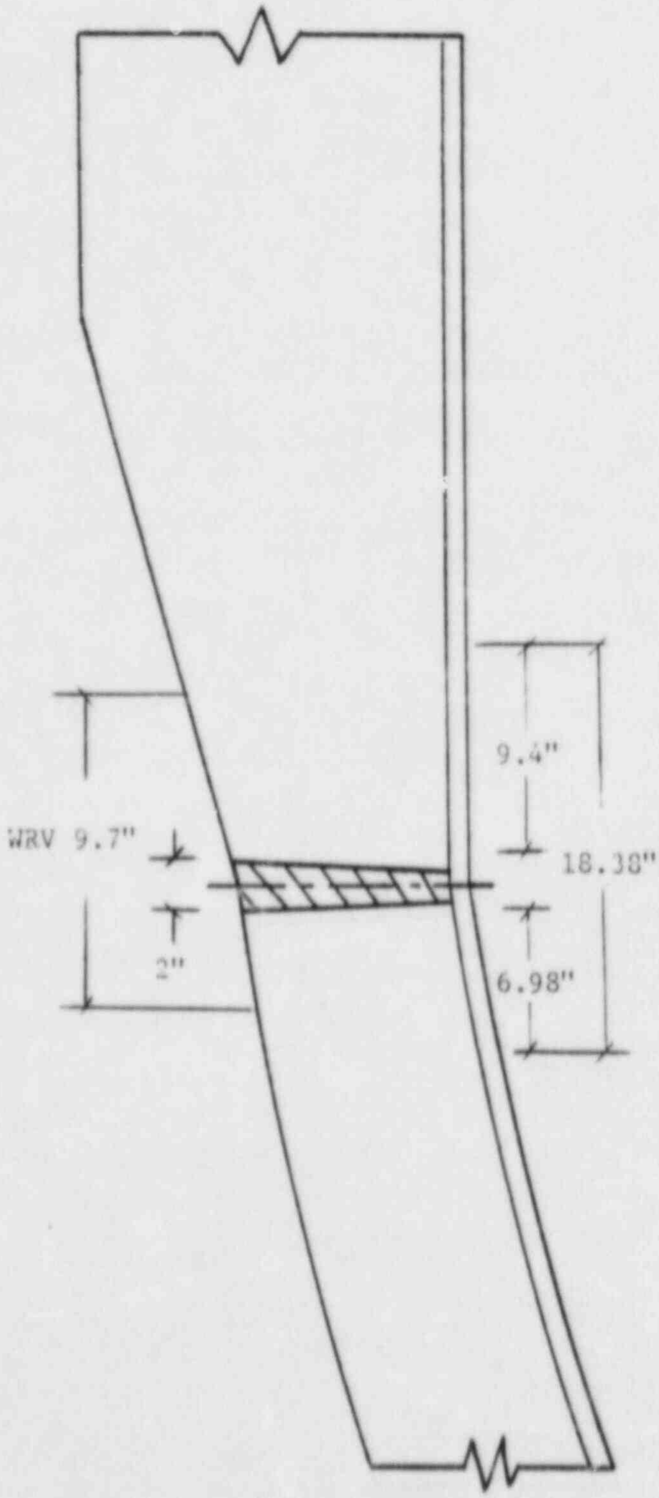


FIGURE 9

Lower Shell To Bottom Head Circumferential Weld

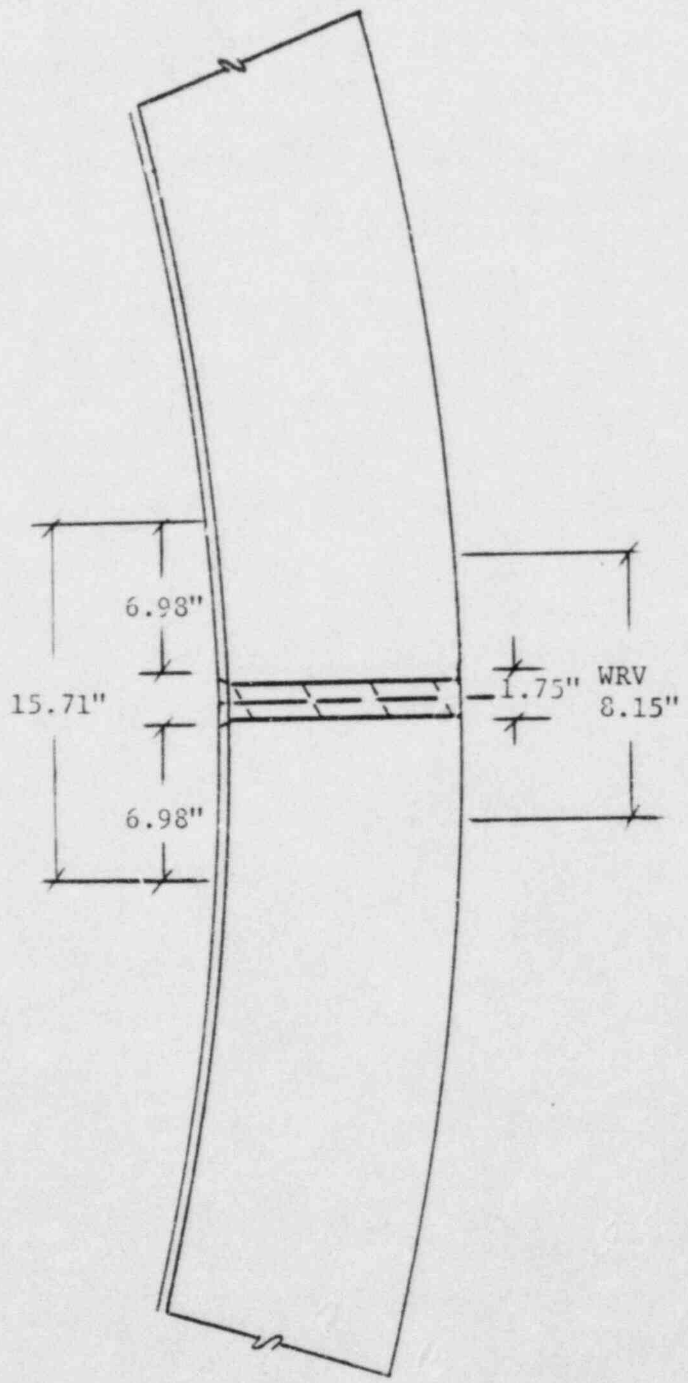


FIGURE 10

Bottom Head Meridional Welds

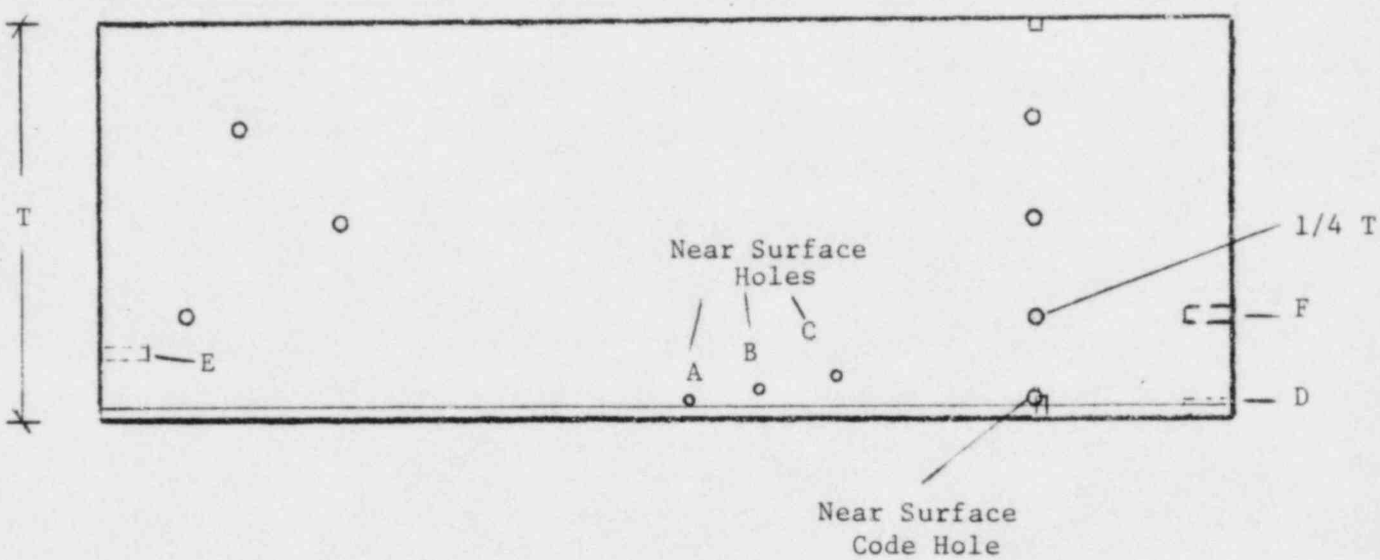


FIGURE 11

Near Surface (Inner 25%)
Calibration Blocks

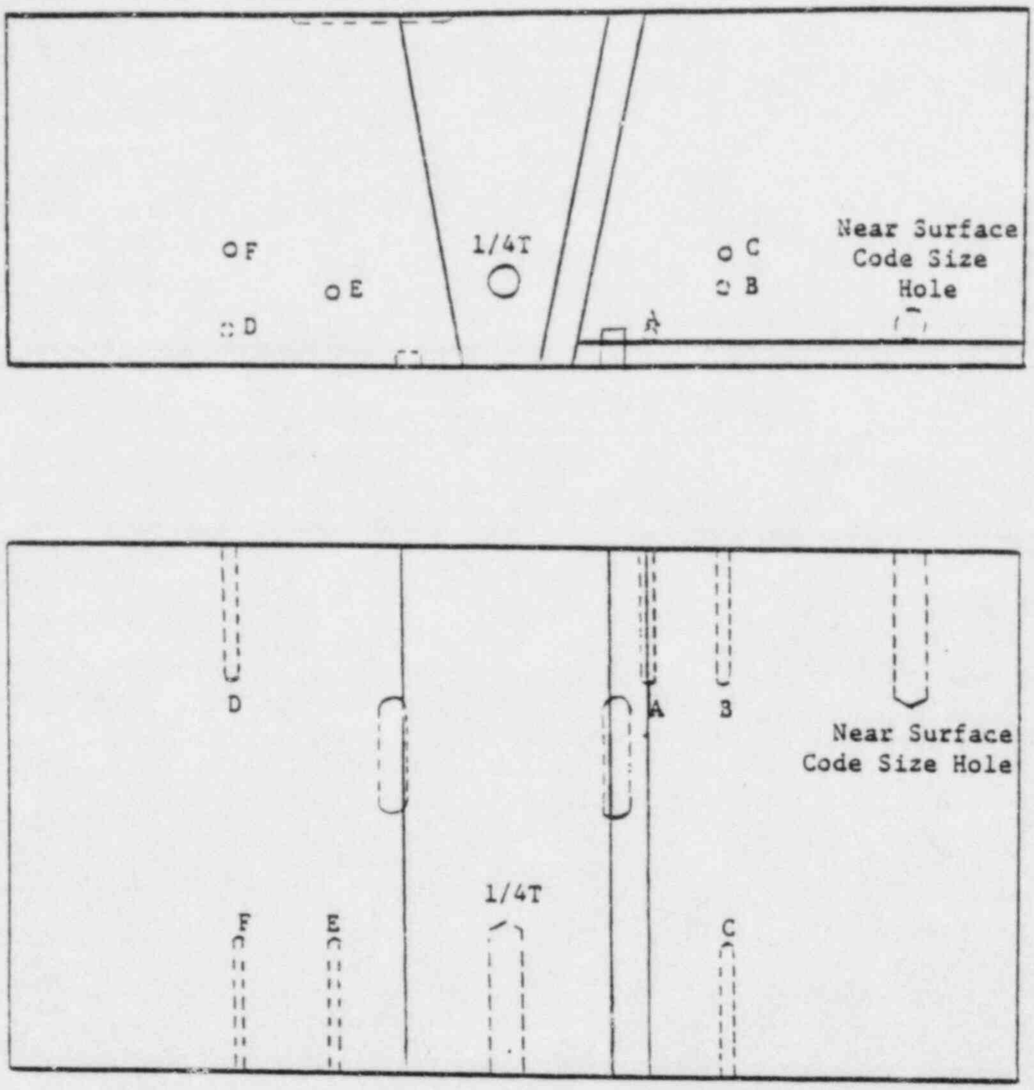


Figure 12

Nozzle Inner Radius, Nozzle Bore and Nozzle to Safe End Calibration Block

Plant Unit ______________ Proc. No. ________ Rev. ______

WELD THICKNESS SPOT CHECK DATA SHEET

Transducer Identification - 0°

Size ______________

~~SAMPLE ONLY~~

SIMILAR VERSIONS WHICH REQUIRE THE SAME INFORMATION ARE ACCEPTABLE

Model ______________

Serial No. ______________

Calibration Details

Calibrate the screen in inches, using either two different size blocks or the first two back echoes within one block. Record thickness at various points on the welds as required. Digital thickness instruments are acceptable.

Weld Number	Left Up	℄	Right Down	Left Up	℄	Right Down	Left Up	℄	Right Down

Examiner ______________ Level ______ Date ______

FORM 028-119/0 1/83 NES NUCLEAR ENERGY SERVICES, INC.

FIGURE 13

SAMPLE ONLY

SIMILAR VERSIONS WHICH REQUIRE THE SAME INFORMATION ARE ACCEPTABLE.

DAILY LINEARITY SHEET

Plant/Unit ____________ Page ____ of ____

Channel ____

INSTR. LINEARITY RESPONSE					
Amplitude					
	High	Low		High	Low
1			5		
2	80	40	6		
3			7		
4			8		

AMPL. CONTROL LINEARITY			
Init.	db	Result	Limits
80	-6		32-48%
80	-12		16-24%
40	+6		64-96%
20	+12		64-96%

Mfg/Model No. ____________

Serial No. ____________

Date ____________

Time ____________

Examiner ____________

Level ____________

Channel ____

INSTR. LINEARITY RESPONSE					
Amplitude					
	High	Low		High	Low
1			5		
2	80	40	6		
3			7		
4			8		

AMPL. CONTROL LINEARITY			
Init.	db	Result	Limits
80	-6		32-48%
80	-12		16-24%
40	+6		64-96%
20	+12		64-96%

Mfg/Model No. ____________

Serial No. ____________

Date ____________

Time ____________

Examiner ____________

Level ____________

Channel ____

INSTR. LINEARITY RESPONSE					
Amplitude					
	High	Low		High	Low
1			5		
2	80	40	6		
3			7		
4			8		

AMPL. CONTROL LINEARITY			
Init.	db	Result	Limits
80	-6		32-48%
80	-12		16-24%
40	+6		64-92%
20	+12		64-96%

Mfg/Model No. ____________

Serial No. ____________

Date ____________

Time ____________

Examiner ____________

Level ____________

Channel ____

INSTR. LINEARITY RESPONSE					
Amplitude					
	High	Low		High	Low
1			5		
2	80	40	6		
3			7		
4			8		

AMPL. CONTROL LINEARITY			
Init.	db	Result	Limits
80	-6		32-48%
80	-12		16-24%
40	+6		64-96%
20	+12		64-96%

Mfg/Model No. ____________

Serial No. ____________

Date ____________

Time ____________

Examiner ____________

Level ____________

Reviewer ____________ Date ____________

FORM 078 103/0 2/82 NES NUCLEAR ENERGY SERVICES, INC.

FIGURE 14

CALIBRATION DATA SHEET

Cal. Blk. No. ____________ Page ________ of ________

Surface Temp. ________ °F Cal. Data Pkg. ____________

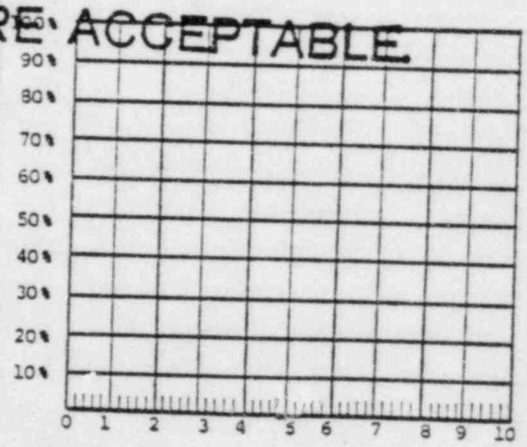
Block Temp. ________ °F Procedure No. ______ Rev. ______

Instrument		Hole Ident	Depth In.	Sweep Div.	Amp% (FSH)
Mfg.:	Model:				
Serial No.:	Channel:				
Nom. Angle:	Mode:				
Transducer					
Mfg.:	Model:				
Serial No.:	Size:				

		Calibration	Date	Time	By
Freq.: MHz	Measured Angle:	Initial			
Cable Type:	Length:	Intermediate			
Head No.:	Couplant:	Intermediate			
Main Sweep Range: in.		Intermediate			
Delay/Setup Range: sec		Intermediate			
Main Sweep Calib.:		Intermediate			
Delay:		Final			
Rep Rate Range: KHz	Var:				
Display:	Sec				

SAMPLE ONLY
SIMILAR VERSIONS WHICH
REQUIRE THE SAME
INFORMATION ARE ACCEPTABLE.

Fltr:	Mode:
Q:	Freq.:
Jack:	
Ref.: Min.:	Max.:
Pulse Length: Min.:	Max.:
Primary Reference Sensitivity	db
Equalized Response:	db
Exam Sensitivity:	db
Screen Gated: sd to	sd
Front Interface Signal Position:	sd
1 Major Screen Division:	in.
TUC Card No.:	Pulses:
Trigger: + -	Freq.: A B C
Pulse Period: C F	
Pulse Delay: C F	
Attenuation: C F	
Resistance Added:	



Examiners

1 ____________ Level ____ Date ______

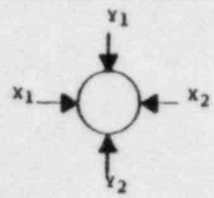
2 ____________ Level ____ Date ______

3 ____________ Level ____ Date ______

Reviewer ____________ Date ______

FORM 028-102/1 11/82 nes NUCLEAR ENERGY SERVICES, INC.

FIGURE 15



SUPPLEMENT A

INDICATION REPORT SHEET

Weld No. ________ Weld ℄ ________

Page ________ of ________

Cal. Data Pkg. ________

Raster No. ________

Video Tape No. ________

IND. NO.	CH. NO.	BM. DIR.	∠	0° BR SD	MAXIMUM PEAK % DAC				LOCATION OF ___ % DAC END POINTS								LOCATION OF ___ % DAC END POINTS							
					DAC	SD	X	Y	X_1	SD	X_2	SD	Y_1	SD	Y_2	SD	X_1	SD	X_2	SD	Y_1	SD	Y_2	SD

SAMPLE ONLY

SIMILAR VERSIONS WHICH REQUIRE THE SAME INFORMATION ARE ACCEPTABLE.

REMARKS ________

EXAMINERS

1 ________ Level ___ Date ________

2 ________ Level ___ Date ________

3 ________ Level ___ Date ________

REVIEWER ________ Date ________

NUCLEAR ENERGY SERVICES, INC.

FORM 028-116/1 1/83

FIGURE 16

Plant/Unit ____________________

____

Subject ____________________

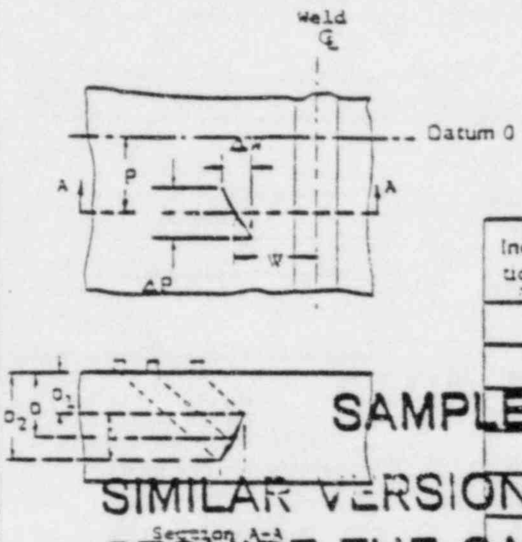
Page ________ of ____________

Cal. Data Pkg. ____________

Procedure No. ________ Rev. ______

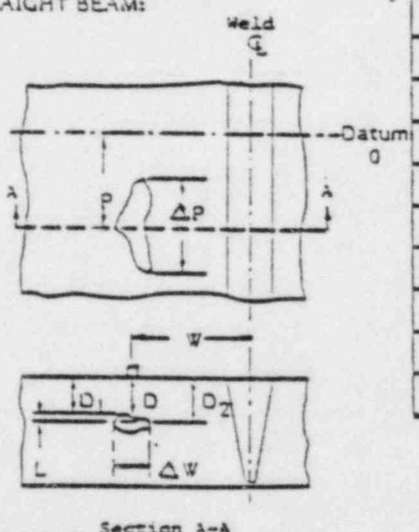
INDICATION EVALUATION SHEET

SUPPLEMENT B



SAMPLE ONLY
SIMILAR VERSIONS WHICH
REQUIRE THE SAME
INFORMATION ARE ACCEPTABLE.

STRAIGHT BEAM:



Indication No.	CH. No.	W	P	D	L	$\frac{\Delta}{P}$	$\frac{\Delta}{W}$	

COMMENTS:

Prepared by:

1 ____________________ Level ______ Date ________

2 ____________________ Level ______ Date ________

Reviewer ____________________ Date ________

FORM 028-128/0 5/83

NES NUCLEAR ENERGY SERVICES, INC.

FIGURE 17

Plant/Unit ____________ Page ______ of ______

____________ ______ Cal. Data Pkg. ____________

Subject ____________ Procedure No. ______ Rev. ______

EVALUATION SHEET FOR RECORDABLE INDICATIONS

Supplement C

A. Zone number ____________ Examination Procedure No. ____________

B. Scan number ____________ Weld number ____________

C. Indication number ____________

D. Applicable ASME Code Standards used for evaluation.
Section ____________ Article ____________

E. Size of indication
Length ____________ Depth ____________
Width ____________ Plate thickness(t) ____________

F. Characterization of Flaw Indication per Para. ____________
1. Type of Flaw: ____________
2. Sketch of indication:

SAMPLE ONLY

SIMILAR VERSIONS WHICH REQUIRE THE SAME INFORMATION ARE ACCEPTABLE.

3. Flaw characteristic calculations:

G. Comparison of pertinent evaluation standard (Para. ____________ to actual flaw size.

☐ acceptable ☐ rejectable*

Prepared By: ____________ Approval ____________ SNT-TC-1A Level III

Reviewed By: ____________ Authoriz ed Inspector ____________

*If a rejectable indication is found during an inservice examination, additional evaluation analysis shall be performed.

FORM 028-120/0 1/83 nes NUCLEAR ENERGY SERVICES, INC.

FIGURE 18

Plant/Unit ____________________

____

Procedure No. ____________

Subject ____________

Weld No. ____________

Sheet ____ of ____
Attachment to Calibration Data

Pkg. No. ____________

SUPPLEMENT D

REPORT SHEET FOR GEOMETRIC REFLECTORS

Depth of Reflector (in.) ____________ Channel ____________

Maximum % DAC ____________ Indication(s) No. ____________

Positional Coordinates ____________ and ____________

SAMPLE ONLY,

Comments (Use Sketches to provide clarity): Ref. Dwg. No. ____________

~~SIMILAR VERSIONS WHICH~~

REQUIRE THE SAME

INFORMATION ARE ACCEPTABLE.

FORM 028-125/0 5/83 nes NUCLEAR ENERGY SERVICES, INC.

FIGURE 19

Plant/Unit ______________________ Page __________ of ____________

______________________ Cal. Data Pkg. ________________

Proc. No. ______________ Rev.___

SUPPLEMENT E

REGULATORY GUIDE 1.150 EXAMINATION LIMITATION

REPORT SHEET

Weld Number ____

Volume of WRV not covered due to the limitation described below

SAMPLE ONLY

SIMILAR VERSIONS WHICH

Type of interference

REQUIRE THE SAME

INFORMATION ARE ACCEPTABLE.

Comments (Use sketch to provide clarity)

FORM NES 028-114/0

NUCLEAR ENERGY SERVICES, INC.

FIGURE 20

VISUAL EXAMINATION PROCEDURE

FOR

SEABROOK NUCLEAR POWER STATION

△1

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VALID ONLY IF THIS STAMP IS RED

Project Application	Prepared By	Date
5562	T. Tricozzi	12/1/82
APPROVALS		
TITLE/DEPT.	SIGNATURE	DATE
VT Level III	Stephen Poole	12/16/82
ISI Manual Operations Mgr.	Geoffrey M Griffiths	12/17/82
Project Manager	Lawrence P. Blumberg	12/17/82
Q. A. Manager	H Gall for FJW	12/20/82

nes

REVISION LOG

NUCLEAR ENERGY SERVICES, INC.

DOCUMENT NO. 80A6474

REV. NO.	DATE	PAGE NO.	DESCRIPTION	APPROVAL
1	9/27/83	1	Deleted "Reference" in title	T. Y. [illegible]
		3	Deleted "Reference" in title	
		5	Para. 6.1 revised	
		7	Para. 8.1 revised	
			Para. 8.4 reworded	
		10	Section 3 revised	
		13	Para. 2.3.4.A reworded	
		17	Para. 1.2 revised	
		21	Para. 3.1 reworded	
		22	Para. 3.2 reworded	
			Refer to CRA #3673	
1	3/16/84	1 thru 16	CRA # 4110 , Changes incorporated per customer comments.	[illegible] 3/16/84

VISUAL EXAMINATION PROCEDURE
GENERAL REQUIREMENTS

1. SCOPE

1.1 INTENT

This procedure shall be utilized during the performance of visual examinations of nuclear power systems and related components as required by the ASME Boiler and Pressure Vessel Code Section XI, 1977 Edition through the Summer of 1978 Addenda.

1.2 GENERAL AREAS OF EXAMINATION

1. Pressure retaining welds
2. Support members and welds
3. Valves
4. Pumps
5. Bolting
6. Cladding.

1.3 TIME OF EXAMINATION

This procedure shall be utilized for Preservice Inspection (PSI), and reexamination after repairs of components and piping systems as required by ASME Boiler and Pressure Vessel Code Section XI, 1977 Edition through the Summer of 1978 Addenda.

2. REFERENCES

1. ASME Boiler and Pressure Vessel Code, Section V and Section XI, 1977 Edition through the Summer of 1978 Addenda
2. NES Document 80A9069; NES "Procedure for Certification of Visual Examination Personnel" (Latest revision)
3. ANSI/ASME N45.2.6 - 1978; "Qualifications of Inspection, Examination, and Testing Personnel for Nuclear Power Plants"
4. The American Society for Nondestructive Testing, SNT-TC-1A, 1975 Edition
5. The applicable Appendices shall be used in conjunction with this procedure.

   A) Appendix A; VT-1 Examination Category

   B) Appendix B; VT-2 Examination Category (Later)

C) Appendix C; VT-3 Examination Category

D) Appendix D; VT-4 Examination Category (Later)

3. PROCEDURE CERTIFICATION

The examination procedures described in this document are in compliance with the ASME Boiler and Pressure Vessel Code Section XI, 1977 Edition through the Summer of 1978 Addenda, except where limited by part geometry or access.

4. PERSONNEL CERTIFICATION

At least one member of a visual examination team shall be certified to at least Level II and shall have passed his/her visual acuity examination in accordance with the minimum qualification requirements defined in NES Document 80A9069 (Latest revision).

5. EQUIPMENT REQUIREMENTS

5.1 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 areas specified in this procedure.

1. Telescope/Binoculars
2. Low and high power magnifying lenses
3. Mirrors
4. Dimensional measuring equipment
5. 18% neutral gray card with 1/32" black line
6. Portable light source
7. Any additional equipment to aid in visual examination.
8. Camera and Video recording system. 2

5.2 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. Adequate temporary lighting
4. Moving or lifting devices
5. Fiber optic devices and borescopes
6. Test surface preparation
7. Pressure gages and sensors as required for system pressure tests
8. Various tools required for disassembly of components
9. Post-examination cleanup.

2

6. EXAMINATION REQUIREMENTS

6.1 EXAMINATION COVERAGE

This procedure shall be utilized in providing examination coverage of Class 1, 2, and 3 systems in accordance with the areas identified in Tables IWA-5210-1, IWB-2500-1, IWC-2500-1, and IWD-2500-1 of Section XI of the ASME Boiler and Pressure Vessel Code, 1977 Edition through the Summer of 1978 Addenda, except where limited by part geometry or access. To ensure total examination of the welds or components, additional visual review techniques may be required.

6.2 EXAMINATION METHOD

1. The direct visual examination is utilized to provide a report on the general condition of the part, component (and its supports), or surface(s) to be examined, including but not limited to such conditions as scratches, wear, cracks, structural distress, corrosion, or erosion on the surfaces, misalignment or movement of the part or component, or signs of leakage.

2. Remote visual examinations may be substituted for direct visual examinations. Remote visual examinations may use visual aids such as telescopes, borescopes, mirrors, fiber optics, cameras, or any other instruments as may be required. These systems shall have a resolution capability at least equivalent to that of direct visual examination.

3. Surface replication methods shall be considered acceptable and may be utilized, provided the surface resolution is at least equivalent to resolution obtained in direct visual examination.

4. All preservice visual examinations shall be performed in the same manner as subsequent inservice examinations whenever feasible.

6.3 SURFACE CONDITIONS

Surfaces of components to be examined shall be clean to ensure that visual examination and evaluation is valid.

6.4 EXAMINATION CATEGORIES

1. VT-1 visual examinations shall be conducted to determine the condition of the parts, component, or surface(s) examined, including but not limited to such conditions as cracks, wear, erosion, corrosion, or physical damage. Refer to Appendix A for specific examination requirements.

2. VT-2 (later)

3. VT-3 visual examinations shall be conducted to determine the general mechanical and structural condition of components and their supports. Conditions to be examined include but are not limited to, the presence of loose parts, debris, corrosion, wear, erosion, and the loss of integrity at bolted or welded connections. This examination category is applicable in the examination of both component supports and component interiors. Refer to Appendix C for specific examination requirements.

4. VT-4 (later)

7. RECORDING OF INDICATIONS

All recordable indications shall be reported and detailed on the corresponding data sheet for the applicable area being examined, which shall contain as a minimum the data listed below. The results of the examination(s) shall be submitted to the Plant Owner, or his Agent, for final disposition.

1. Date of examination
2. Identification and signature of Examiner
3. Identification of item examined and its location in the system
4. Description of indication
5. Special equipment used
6. Photographs used to assist in evaluation
7. Location of indications with respect to a convenient reference point on the object
8. Any limitation due to geometry or access and additional information as required
9. Data sheets shall be numbered 6474-1, 6474-2, 6474-3, etc. and signed by the Examiner, noting applicable NDE certification levels.

8. EVALUATION OF INDICATIONS

8.1 Evaluation of indications shall be in accordance with the ASME Boiler and Pressure Vessel Code Section XI, 1977 Edition through the Summer of 1978 Addenda. Specific evaluation criteria are referenced in Article IWB-3000 and Table IWB-2500-1 for Class 1 Pressure Retaining Components, Article IWC-3000 and Table IWC-2500-1 for Class 2 Pressure Retaining Components, and Article IWD-3000 and Table IWD-2500-1 for Class 3 Pressure Retaining Components.

8.2 Evaluation of indications shall be performed by a Level III Visual Examiner. Evaluations shall be sumbitted to the Plant Owner, or his Agent, for final disposition.

8.3 Any components or welds with surface flaw indications detected through visual examination shall be unacceptable for continued service unless supplemental examinations verify the indications to be acceptable.

8.4 In the event that there are no code requirements for evaluation of indications, technical specifications or the requirements of the Plant Owner, or his Agent, shall be used as the evaluation criteria.

9. EXAMINATION RECORDS

9.1 FILING OF RECORDS

The Examination Contractor shall be responsible for submitting to the Plant Owner, or his Agent, a complete set of examination records, including certification of personnel qualifications with a current eye test. The examination contractor shall maintain permanent records.

9.2 PROCEDURE CORRECTIONS AND ADDITIONS

All procedure corrections and additions required during examinations shall be initiated by the NES Site Superivsor. All corrections and additions require approval by the Plant Owner, or his Agent, and an Level III Visual Examiner.

10. PROCEDURE QUALIFICATION

This procedure, when required, shall be qualified to demonstrate compliance with the applicable code and addenda. Qualification of this procedure will be to the satisfaction of the Plant Owner, or his Agent, and the Authorized Nuclear Inservice Inspector.

APPENDIX A
VT-1 EXAMINATION CATEGORY

1. SCOPE

1.1 INTENT

This Appendix is to be used in conjunction with the General Requirements for the examination of the surface condition of parts and components. Included in this examination shall be measures to determine the existence and dimension (where possible) of cracks, wear, erosion, corrosion, or physical surface damage. This examination may be performed either directly or remotely. Remote examinations shall have resolution capabilities equivalent to direct visual examination. 2

1.2 AREA OF EXAMINATION

This Appendix is applicable for all VT-1 surface examinations including but not limited to washers, bushings and bolting for the reactor vessel, heat exchangers, piping, pumps, and valves.

2. EXAMINATION REQUIREMENTS

In addition to the examination requirements referenced in the General Requirements section, the specific requirements applicable to VT-1 examinations shall include but are not limited to the following steps.

2.1 GENERAL VISIBILITY

A direct visual examination shall be used when accessibility and visibility permit the Examiner to place the eye within 24" of the surface to the examined, and at an angle to be no less than 30° to the surface being examined. Mirrors may be used to improve the angle of vision. Lighting shall be sufficient to resolve a 1/32" black line on an 18% neutral gray card at the least discernible area. 2

2.2 EXAMINATION LOCATION

The isometric drawings of the system shall be used in referencing the location of a weld or component to be examined. Where no isometric drawing exists, the area of interest shall be referenced according to construction drawings and noted as such in the data sheet.

2.3 WELD EXAMINATION

1. Ensure that the weld and at least 1" on each side is clean enough to permit examination of the weld.

2. In the case where a longitudinal weld intersects a circumferential weld, at least 12" of the adjoining longitudinal weld shall be examined.

3. Examine the weld or component surface for leakage, excessive grinding, arc strikes, cracks, linear indications, wear, gouges, corrosion, undercut, surface porosity, or any other symptoms of structural distress.

2.4 BOLTING MATERIAL EXAMINATION

Examine the surfaces of bolts and bolting material for any cracks, wear, erosion, corrosion, or physical damage. Typical bolting material includes the following: studs, nuts, bushings, threads in flange stud holes, and washers.

3. RECORDING OF INDICATIONS

The Examiner shall record all surface conditions in detail and submit the results of the examination to the Plant Owner, or his Agent, for final disposition. Detrimental surface conditions shall include evidence of the following:

- leakage
- excessive grinding
- cracks
- arc strikes
- wear
- corrosion
- physical damage
- undercut
- errosion
- linear indication
- surface porosity

Any other conditions possibly affecting the integrity of the examination area shall be recorded for further disposition by qualified NES personnel and the Plant Owner, or his Agent.

4. EVALUATION OF INDICATIONS

All indications shall be evaluated by a Level III Visual Examiner in accordance with Section 8 of the General Requirements for this procedure. Evaluations shall be submitted to the Plant Owner, or his Agent, for final disposition.

APPENDIX B
VT-2 CATEGORY

△2

(Later)

APPENDIX C
VT-3 CATEGORY

1. SCOPE

1.1 INTENT

This appendix is to be used in conjunction with the General Requirements for the examination and evaluation of the general mechanical and structural conditions of the components and their supports. The VT-3 visual examination may require the measuring of clearances, detection of physical displacements, structural soundness of supporting elements, connections between load carrying structural members, and tightness of bolting.

Direct examination shall be used unless conditions warrant the use of remote examination.

1.2 AREA OF EXAMINATION

VT-3 visual examinations shall be conducted on all components and supports in the system that are subjected to mechanical or structural stress. Specific areas subject to VT-3 visual examination include but are not limited to internal surfaces of pump casings, valve bodies exceeding 4" nominal pipe size (NPS), reactor vessel interiors, accessible surfaces and welds of core support structures (snubbers, supports, restraints, and shock absorbers) for integral attachments. Further details of areas requiring examination are referenced in Table IWB-2500-1, Table IWD-2500-1 and IWC-2500-1. 2

2. EXAMINATION REQUIREMENTS

In addition to the examination requirements in the General Requirements section of this procedure, the following specific requirements are applicable for VT-3 visual inspections.

2.1 GENERAL VISIBILITY

Lighting shall be sufficient to resolve a 1/32" black line on an 18% neutral gray card, in least discernible area. 2

2.2 PUMP CASING AND VALVE BODIES

Examine the internal surfaces of pump casings and valve bodies for evidence of erosion, cracks, and galling caused by close clearances between rotating, reciprocating and stationary parts, mechanical damage, corrosion and wear.

2.3 REACTOR VESSEL INTERIOR

Examine all accessible areas of vessel interior including the spaces above and below the reactor core. Examine the clad surface for evidence of cracking and surface nonconformity.

2.4 SUPPORT STRUCTURE FOR REACTOR VESSEL

Examine all accessible welds and base metal surfaces for indications of wear, corrosion, erosion, cracks, physical damage or loss of structural integrity.

2.5 INTEGRAL ATTACHMENTS

Examine all integral attachments including snubbers, supports, restraints, and shock absorbers for evidence of cracks, misalignment, or other signs of loss of structural integrity.

3. RECORDING OF INDICATIONS

The Examiner shall record all indications and detrimental conditions in detail and submit the results of the examination to the Plant Owner, or his Agent, for final disposition. Description of the shape, size, orientation, and exact location of the indication shall also be recorded. Where applicable, the description of indication location shall use a routine examination point as a reference.

1. Any surface flaw indications revealed in VT-3 visual examinations require recording and description. Verification of component acceptability or rejection shall be determined by supplemental examination. 2

2. Where applicable, depth of wear, corrosion, or surface erosion shall be measured as a percentage of thickness.

4. EVALUATION OF INDICATIONS

All indications shall be evaluated by a Level III Visual Examiner in accordance with Section 8 of the General Requirements for this procedure. Evaluations shall be submitted to the Plant Owner, or his Agent, for final disposition.

APPENDIX D
VT-4 CATEGORY

2

(Later)

VISUAL EXAMINATION DATA SHEET NO. ______

SYSTEM/AREA ______ ITEM ______

PHOTOS ______ TEMP ______ PRESSURE ______

HOLDING TIME ______ VISUAL AIDS ______

PUMPS AND VALVES	YES	NO	COMMENTS
Leakage			
External Damage			
Excessive Friction			
Excessive Vibration			
Corrosion			
Internal Wear/Gouging			
Smoking or Cavitation			

BOLTING	YES	NO	COMMENTS
Cracks			SAMPLE ONLY
Galling/Stripping			SIMILAR VERSIONS WHICH REQUIRE THE SAME
Corrosion			INFORMATION ARE ACCEPTABLE.
Mechanical Damage			

EXAMINER ______ LEVEL ___ DATE ______

REVIEWER ______ DATE ______

REVIEWER ______ DATE ______

REVIEWER ______ DATE ______

VISUAL EXAMINATION DATA SHEET NO. ____

SYSTEM/AREA ____________________ ITEM ____________

PHOTOS ____________ TEMP ____________ PRESSURE ____________

HOLDING TIME ____________ VISUAL AIDS ____________

WELDS	YES	NO	COMMENTS
Cracks/Linear Indication			
Wear/Corrosion			
Gouges/Grind Marks			
ARC strikes/Undercut			
Surface Porosity			
Leakage			
Other Indications			

SYPPORT COMPONENTS	YES	NO	COMMENTS
Cracks			
Wear/Gouges/Corrosion			SAMPLE ONLY
Loose/Missing/Bent Part			SIMILAR VERSIONS WHICH
Leakage			
Misalignment			REQUIRE THE SAME
Movement			INFORMATION ARE ACCEPTABLE.
Hanger Setting			
Fluid Level			
Other Indications			

CLADDING	YES	NO	COMMENTS
Cracking			
Gouges			
Mechanical Damage			
Other Indications			

EXAMINER ____________ LEVEL ______ DATE ________

REVIEWER ____________ DATE ________

REVIEWER ____________ DATE ________

REVIEWER ____________ DATE ________

VISUAL EXAMINATION DATA SHEET NO. ___

SYSTEM/AREA ______________________ ITEM ______________

PHOTOS ______________ TEMP ______________ PRESSURE ______________

HOLDING TIME ______________ VISUAL AIDS ______________

HYDROTEST	YES	NO	COMMENTS
Leakage			
Corrosion of Ferritics			
			SAMPLE ONLY SIMILAR VERSIONS WHICH REQUIRE THE SAME INFORMATION ARE ACCEPTABLE.

EXAMINER ______________ LEVEL ____ DATE ______________

REVIEWER ______________ DATE ______________

REVIEWER ______________ DATE ______________

REVIEWER ______________ DATE ______________