

December 1, 1999

L-99-244 10 CFR 50.4 10 CFR 50.55a

U. S. Nuclear Regulatory Commission Attn: Document Control Desk

Washington, D C 20555

RE:

St. Lucie Unit 1

Docket No. 50-335

In-Service-Inspection Plan Second Ten-Year Interval Revised Relief Request 21

The second ten-year in-service-inspection (ISI) interval for St. Lucie Unit 1 ended on February 11, 1998. Florida Power & Light Company (FPL) submitted the ISI program second ten-year interval closeout relief requests (R/R) by letter L-99-23 on February 11, 1999. After telephone conference calls on September 8, 1999, and October 21, 1999, and reviews of previous NRC safety evaluations, the NRC project manager for St. Lucie notified FPL that R/R 21 requires additional information.

The purpose of this letter is to supplement the ISI program second interval R/R 21 with the information requested by the NRC. Please contact us should you require any additional clarifications.

Very truly yours,

J. A. Stall

Vice President

St. Lucie Plant

JAS/GRM

Enclosure

cc:

Regional Administrator, Region II, USNRC

Senior Resident Inspector, USNRC, St. Lucie Plant

A047



ST. Lucie Unit 1 SECOND INSPECTION INTERVAL RELIEF REQUEST NUMBER 21

A. COMPONENT IDENTIFICATION:

Class 1 and 2 pressure retaining similar and dissimilar metal welds in vessels and piping examined at Florida Power and Light's (FPL) St. Lucie Unit 1.

B. EXAMINATION REQUIREMENTS:

Rules for in-service-inspection of Nuclear Power Plant Components, Section XI, 1983 Edition with Summer 1983 Addenda.

Exam Category	Exam Item No.	Examination Requirements
B-F	B5.130	Fig. IWB-2500-8(c), weld and 1/2" to each side of the weld, 1/3t from the inside surface out to 1/4" from a line drawn from the toe of the outside surface weld crown (area C-D-E-F)
B-J	B9.11	Fig. IWB-2500-8(c), weld and 1/2" to each side of the weld, 1/3t from the inside surface out to 1/4" from a line drawn from the toe of the outside surface weld crown (area C-D-E-F)
C-A	C1.10 C1.30	Fig. IWC-2500-1 and Fig. IWC-2500-2, weld and all base material 1/2" from toe of weld
С-В	C2.21	Fig. IWC-2500-4(b), surface of weld and 1/2" of surface base metal (area A-B), 1/3t from the inside surface out to 1/4" from a line drawn from the toe of the outside surface weld crown (area C-D-E-F)
C-C	C3.20	Fig. IWC-2500-5, surface of weld and 1/2" of base metal (area A-B)
C-F-1*	C5.11 C5.21	Fig. IWC-2500-7(b), surface of weld and 1/2" of surface base metal (area A-B), 1/3t from the inside surface out to 1/4" from a line drawn from the toe of the outside surface weld crown (area C-D-E-F)
C-F-2*	C5.51	Fig. IWC-2500-7(b), surface of weld and 1/2" of surface base metal (area A-B), 1/3t from the inside surface out to 1/4" from a line drawn from the toe of the outside surface weld crown (area C-D-E-F)

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ASME Code Case N-460: Alternative Examination Coverage for Class 1 and Class 2 Welds

*ASME Code Case N-408: Alternate Rules for Examination of Class 2 Piping

C. RELIEF REQUESTED:

Pursuant to 10 CFR 50.55a(g)(6)(i), FPL requests relief from the requirements of the Code required volumetric or surface coverage of Class 1 and 2 piping and component welds as specified in Tables IWB-2500-1 or IWC-2500-1 of the 1983 Edition with Summer 83 Addenda of ASME Section XI. These areas were found during the second inspection interval.

D. BASIS FOR RELIEF:

FPL performed in-service examinations of selected welds in accordance with the requirements of 10 CFR 50.55a, plant technical specifications, and the 1983 Edition with Summer 1983 Addenda of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code, Section XI, Rules for Inservice Inspection of Nuclear Power Plant Components. When a component has conditions which limit the examination area, Florida Power and Light is required to submit the information to the enforcement and regulatory authorities having jurisdiction at the plant site. This relief request has been written to address areas within the plant where those types of conditions exist and the required amount of coverage was reduced below the minimum acceptable.

The attached table (Attachment 1) summarizes the percent of coverage achieved and references specific figures (Attachment 2) that show the extent of the coverage.

Volumetric Examination Limitations (Examination Categories B-F, B-J, C-A, C-B, C-F-1, C-F-2)

When examined, the welds listed within this request did not receive the required code volume coverage due to one or more factors:

- 1. Portions of the required volumetric area are inaccessible due to permanent physical obstructions.
- 2. Some welds, such as branch connections, shell to flange welds, pipe/elbow to valve, can be examined and receive coverage from only one side due to their configuration.
- 3. High attenuation of the ultrasonic sound- When examining some welds, such as the Reactor Coolant pump to safe end, which are a cast stainless steel

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material and have highly attenuative acoustic properties, bouncing off the inside surface back up into the base metal and weld is not possible with current technology.

The Ultrasonic Testing (UT) techniques for each weld were reviewed to determine if additional coverage could have been achieved. FPL's procedures require the examiner to consider whether additional coverage is necessary and practical. Those alternate techniques were investigated at the time of discovery. The alternate techniques considered were extending the calibration distance and/or using additional beam angles or modes. This has often provided the additional coverage needed to avoid relief. Using additional UT techniques on the weld examination areas in this relief request would have provided little or no additional coverage. The coverage obtained were the maximum practical.

If practical, physical obstructions were removed. In most cases, it was not possible to remove the obstruction without significant work, radiation exposure, and/or damage to the plant. Additional weld preparation by welding or metal removal is a modification of the examination area requiring significant engineering and construction personnel support. High radiation exposure and costs would be incurred in order to perform these types of modifications. Radiography is impractical due to the amount of work being performed in the area on a 24 hour basis. This would result in numerous work related stoppages and increased exposure due to the shutdown and startup of other work in the area. The water must be drained from systems where radiography is performed. Removal of water from the associated piping is not always possible, and when performed, increases the radiation dose rates over a much broader area than the weld being examined. It would be a significant hardship to perform weld or area modifications or radiography in order to increase examination coverage.

FPL performed the examinations to the extent possible. Operations personnel and system engineers perform walkdowns of every system on a periodic basis looking for leakage or other abnormal conditions. Surface and volumetric examinations performed, along with the required system pressure tests, provide reasonable assurance of an acceptable level of quality and safety.

Surface Examination Limitation (Examination Category C-C)

When examined, the welded attachments listed within this request did not receive the required code required surface coverage due to portions of the required examination area being inaccessible because of permanent physical obstructions. If practical, the physical obstruction would be removed. In this case, it is not possible to remove the obstruction without significant work and/or damage to the plant.

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Radiography is impractical due to the configuration of the support and the amount of work being performed in the area on a 24 hour basis. This would result in numerous work related stoppages due to the shutdown and startup of other work in the area. It would be a significant hardship to perform support modifications for radiography in order to increase examination coverage.

FPL performed the examinations to the extent possible. Operations personnel and system engineers perform walkdowns of every system on a periodic basis looking for leakage or other abnormal conditions. The extent of the surface examinations performed, along with the required system pressure tests, provide reasonable assurance of an acceptable level of quality and safety.

E. ALTERNATIVE EXAMINATIONS OR TESTS:

Volumetric Examination Limitations (Examination Categories B-F, B-J, C-A, C-B, C-F-1, C-F-2)

- 1. Volumetric examinations are performed to the extent possible. Where practical, alternative ultrasonic examination techniques were performed.
- 2. Surface examinations are completed in accordance with Code requirements.
- 3. System pressure tests, as required by the St. Lucie in-service pressure test program, were performed.
- 4. Regular walkdowns by operations personnel and system engineers are performed on Class 2 systems to check for leakage, piping configuration, and/or damage. During outages, system engineers walkdown Class 1 and Class 2 systems inside containment. This walkdown is performed to look for system anomalies that could affect plant performance.

The examination volume achieved by ultrasonic and surface examinations, combined with the system pressure tests and system walkdowns, provide an acceptable level of quality and safety. If permanent obstructions are removed, FPL will examine those areas to the extent practical.

Surface Examination limitations (Examination Category C-C)

- 1. Surface examinations are performed to the extent possible.
- 2. System pressure tests, as required by the St. Lucie in-service pressure test program, were performed.

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3. Regular walkdowns by operations personnel and system engineers are performed on Class 2 systems to check for leakage, piping configuration, and/or damage. This walkdown is performed to look for system anomalies that could affect plant performance.

The examination volume achieved by the surface examinations combined with the system pressure tests and system walkdowns, provide an acceptable level of quality and safety. If permanent obstructions are removed, FPL will examine those areas to the extent practical.

F. JUSTIFICATION FOR THE GRANTING OF RELIEF:

FPL has made reasonable efforts to meet Code requirements.

For volumetric examination limitations, coverage attained was derived by graphically plotting the angles on a cross sectional view of the as welded surfaces (when possible) and looking at actual and theoretical coverage that could be obtained with additional UT angles. In each case, the coverage obtained was considered the maximum practical. Additional angles and/or techniques would not have enhanced the coverage, nor added to the quality of the examination or safety of the system.

For the surface examination limitation, coverage attained was derived by reviewing configuration drawings and data sheet drawings of the completed examination. In this case, the coverage obtained was considered the maximum practical.

Denial of this relief would result in FPL being required to perform significant rework of many of the areas or welds. The cost of reworking each area is significant. Radiation exposure would be very high. Reengineering and rework of the areas would not add to the safety of the system, but could be replacing welds that have performed satisfactorily for many years with new, untested welds. Baseline examinations are required on new welds and supports.

G. IMPLEMENTATION SCHEDULE:

These examinations were performed during the second in-service-inspection interval February 11, 1988 to February 10,1998.

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H. ATTACHMENTS TO THE RELIEF:

Attachment 1

The following tables list the areas where limited examinations were performed and the extent of coverage by Code category.

- 21-1 Examination Category B-F
- 21-2 Examination Category B-J
- 21-3 Examination Category C-A
- 21-4 Examination Category C-B
- 21-5 Examination Category C-C
- 21-6 Examination Category C-F-1
- 21-7 Examination Category C-F-2

Attachment 2

Drawings of areas with limited examinations.

Note: Examination volume achieved was determined using sketches derived from actual OD contours and ultrasonically measured wall thickness.

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Attachment 1

Tables

Limited Examination Areas

By Code Category

	Code Category B-F Table 21-1													
Summary#	Year Item No.	Zone	Component ID	NDE Method		Angle an Techniqu		Configuration	Fig #	% Coverage Comments				
					1/2 V	Full V	1 ½ V							
025700	91 B5.130	8	RC-115-6-503	UT	45			Elbow to Safe end	1	100% from elbow side 0% from safe end side				
028600	96 B5.130	10	RC-121-5-503	UT	45 60			Elbow to Safe end	2	100% from elbow side 25% from safe end side				
031800	88 B5.130	12	RC-112-5-503	UT	45L 60	458		Elbow to Safe end	3	100% from elbow side 25% from safe end side				
034700	96 B5.130	14	RC-124-5-503	UT	45 60			Elbow to Safe end	4	100% from elbow side 20% from safe end side				
080500	97 B5.130	28	10-509-A	UT	45			Nozzle to Safe end	5	100% from safe end side 40% from nozzle side				
083100	90 B5.130	29	10-509-B	UT	45 60			Nozzle to Safe end	6	100% from safe end side 75% from nozzle side				

	Code Category B-J Table 21-2													
Summary #	Year Item No.	Zone	Component ID	NDE Method	Angle	and Techn	ique	Configuration	Fig #	% Coverage Comments				
					% V	Full V	74 V							
025800	91 B9.11	8	RC-115-FW-3-500F	UT	45			Safe end to Pump	7	100% from safe end side 0% from pump side				
026000	91 B9.11	9	RC-115-FW-3-500E	ÜΤ	45			Pump to Safe end	8	100% from safe end side 0% from pump side				
028700	96 B9.11	10	RC-121-FW-3-500B	UT	45			Safe end to Pump	9	20% from safe end side 0% from pump side				
028900	96 B9.11	11	RC-121-FW-3-500A	UT	45			Pump to Safe end	10	100% from safe end side 1% from pump side				
032000	88 B9.11	12	RC-112-FW-3-500G	UT	45			Safe end to Pump	11	100% from safe end side 0% from pump side				
032200	88 B9.11	13	RC-112-FW-3-500H	UT	45			Pump to Safe end	12	100% from safe end side 0% from pump side				

	Code Category B-J Table 21-2													
Summary #	Year Item No.	Zone	Component ID	NDE Method	Angle	and Technique	Configuration	Fig #	% Coverage Comments					
					%V	Full V 1%V								
034800	96 B9.11	14	RC-124-FW-3-500C	UT	45		Safe end to Pump	13	19% from safe end side 0% from pump side					
035000	96 B9.11	15	RC-124-FW-3-500D	UT	45		Pump to Safe end	14	100% from safe end side 1% from pump side					
048900	88 B9.11	21	SI-148-FW-5	UT	45 60		Elbow to Valve 3227	15	100% from elbow side 0% from valve side					
047900	90 B9.11	21	SI-148-FW-1	UT	45 60		Valve 3624 to Pipe	16	100% from pipe side 0% from valve side					
049200	88 B9.11	21	RC-151-FW-1	UT	45 60		Valve 3227 to Elbow	17	100% from elbow side 0% from valve side					
055100	91 B9.11	22	SI-113-FW-13	UT	45 60		Pipe to Tee	18	100% from pipe side 0% from tee side					
055400	91 B9.11	22	SI-149-FW-1	UT	45 60		Valve V-3614 to Pipe	19	0% from valve side 100% from pipe side					
055800	91 B9.11	22	SI-149-2-SW-1	UT	45 60		Elbow to Tee	20	100% from elbow side 0% from tee side					
055900	91 B9.11	22	SI-149-2-SW-2	UT	45 60		Tee to Pipe	21	0% from tee side 100% from pipe side					
056500	91 B9.11	22	SI-149-FW-4	UT	45 60		Pipe to Valve V-3217	22	100% from pipe side 0% from valve side					
056800	91 B9.11	22	RC-154-FW-1	UT	45 60		Elbow to Valve V-3217	23	0% from valve side 100% from elbow side					
060700	96 B9.11	23	SI-150-FW-1	UT	45 60		Valve 3634 to Elbow	24	100% from elbow side 60% from valve side					
062200	96 B9.11	23	RC-152-FW-1	ÜT	45 60		Valve 3237 to Pipe	25	100% from pipe side 16% from valve side					
065600	91 B9.11	24	SI-151-1-SW-9	UT	45 60		Pipe to Reducer	26	100% from pipe side 0% from reducer side					
065900	91 B9.11	24	SI-151-FW-1	UT	45 60		Valve V-3644 to Pipe	27	55% from valve side 100% from pipe side					
066100	94 B9.11	24	SI-151-1-SW-4	UT	45 60		Pipe to Tee	28	100% from pipe side 55% from tee side					
066300	91 B9.11	24	SI-151-1-SW-2	UT	45 60		Tee to Pipe	29	0% from tee side 100% from pipe side					

	Code Category B-J Table 21-2													
Summary	Year	Zone	Component ID	NDE Method	Angle and Technique			Configuration	Fig	% Coverage Comments				
#	Item No.			Nietriou	%V	Full V	1%V		7					
081200	91 B9.11	28	SI-130-FW-1	UT	45 60			Pipe to Valve MV-3652	30	100% from pipe side 0% from valve side				
081500	90 B9.11	28	SI-130-FW-2	UT	45 60			Valve MV-3652 to Elbow	31	100% from elbow side 0% from valve side				
082000	91 B9.11	28	SI-130-FW-3	UT	45 60			Pipe to Valve MV-3651	32	100% from pipe side 0% from valve side				
084200	94 B9.11	29	SI-127-FW-600	UT	45 60			Pipe to Valve-3480	33	Baseline examination 100% from pipe side 35% from valve side				
084455	94 B9.11	29	SI-127-FW-601	UT	45 60			Valve-3480 to Elbow	34	Baseline examination 100% from elbow side 10% from valve side				
084600	90 B9.11	29	SI-127-FW-3	UT	45 60			Elbow to Valve 3481	35	100% from elbow side 0% from valve side				
123900	91 B9.11	39	SI-113-1-SW-6	UT	45 60			Reducer to Tee	36	70% from reducer side 0% from tee side				
124400	91 B9.11	39	SI-113-1-SW-5	ŪΤ	45 60			Tee to Pipe	37	23% from tee side 100% from pipe side				
126300	91 B9.11	39	SI-113-FW-6	UT	45 60			Pipe to Pentration #36	38	100% from pipe side 0% from penetration side				
133600	91 B9.11	40	SI-111-1-SW-3	UT	45 60			Reducer to Tee	36	70% from reducer side 0% from tee side				
134000	91 B9.11	40	SI-111-1-SW-2	UT	45 60			Tee to Pipe	39	0% from tee side 100% from pipe side				
136500	97 B9.11	40	SI-111-FW-8	UT	45 60			Pipe to penetration	40	100% from pipe side 57% from penetration side				

	Code Category C-A Table 21-3													
Summary Year Zone Component ID NDE Angle and Technique Configuration Fig % Coverage Comment # Item No.														
211300	97 C1.10	56	2-2701	UT	60 70		Flange to Body	41	85% from the body side 10% from the flange side					
211400	93 c1,30	56	2-2702	UT	45 60		Body to tube sheet	42	100% from body side 10% from tube sheet side					

				C		Category C-l able 21-4	3		
Summary #	Year Item No.	Zone	Component ID	NDE Method		and Technique	Configuration	Fig #	% Coverage Comments
211000	93 C2.21	56	2-2742-1	UT	45 60	1 1 1 1 7 2 4	Nozzle to Shell	43	100% from shell side 0% from nozzle side
211500	97 C2.21	56	2-2741-1	UT	60 70		Shell to Nozzle	43	100% from shell side 0% from nozzle side

				C	Code Category C Table 21-5	-C		grand production of the second se
Summary #	Year Item No.	Zone	Component ID	NDE Method	Angle and Technique	Configuration	Fig #	% Coverage Comments
					% V Full V 1 1/2 \	/		
272700	90 C3.20	71	BFH-6 IA	MT		Welded Lugs	44	44% CRS Achieved

Code Category C-F-1 Table 21-6												
Summary #	Year Item No.	Zone	Component ID	NDE Method		and Tech		Configuration	Fig #	Fig % Coverage Comments		
					32 V	Full V	1 1/2 V					
159200	97 C5,11	44	SI-146-FW-1	UT	45 60			Valve HCV-3645 to Pipe	45	100% from pipe side 13% from valve side		
159300	97 C5.11	44	SI-110-FW-9	UT	45 60			Pipe to Valve V-3144	46	100% from pipe side 25% from valve side		
161200	97 C5.11	44	SI-113-FW-9	UT	45 60			Pipe to Valve V-3114	47	100% from pipe side 32% from valve side		
164900	90 C5,11	44	SI-142-FW-1	UT			45 60	Valve HCV-3625 to Pipe	48	13% from valve side 100% from pipe side		
165000	90 C5.11	44	SI-112-FW-9A	UT			45 60	Pipe to Valve 3124	49	100% from pipe side 13% from valve side		
219000	97 C5.21	61	SI-208-1-SW-1	UT	45 60 70			Flange to Tee	50	81% from flange side 66% from tee side		
220000	91 C5.11	61	SI-212-FW-1A	UT	45 60			Tee to Pipe	51	0% from tee side 100% from pipe side		
220100	91 C5.11	61	SI-212-FW-1	UT	45 60			Pipe to Valve V-3656	52	100% from pipe side 0% from valve side		
220200	91 C5.11	61	SI-105-FW-1	UT	45 60			Valve V-3656 to Pipe	53	0% from valve side 100% from pipe side		
228400	97 C5.21	62	SI-209-FW-2	UT	45 60			Valve V-3405 to Pipe	54	80% from valve side 70% from pipe side		
229900	91 C5.11	62	SI-213-FW-2	ÜT	45 60			Valve 3654 to Pipe	55	0% from valve side 100% from pipe side		

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				C		atego able 2°		-2		
Summary #	Catgy/ Item No.	Zone	Component ID	NDE Method	Angle	and Tec	hnique	Configuration	Fig #	% Coverage Comments
					32 V	Full V	1 ½ V			
259000	91 C5.51	67	BF-14-FW-6	UT		60	45	Reducer to Valve V-09-252	56	50% from reducer side 55% from valve side
272600	88 C5.51	71	BF-55-FW-1	UT	60		45	Valve V-09-248 to Pipe	57	81% from valve side 68% from pipe side
273500	90 C5.51	72	BF-56-FW-1	UT	60		45	Valve V-09-280 to Pipe	57	81% from valve side 68% from pipe side

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Attachment 2

Drawings Showing Limited Examinations



RC -115-6-503(typical)

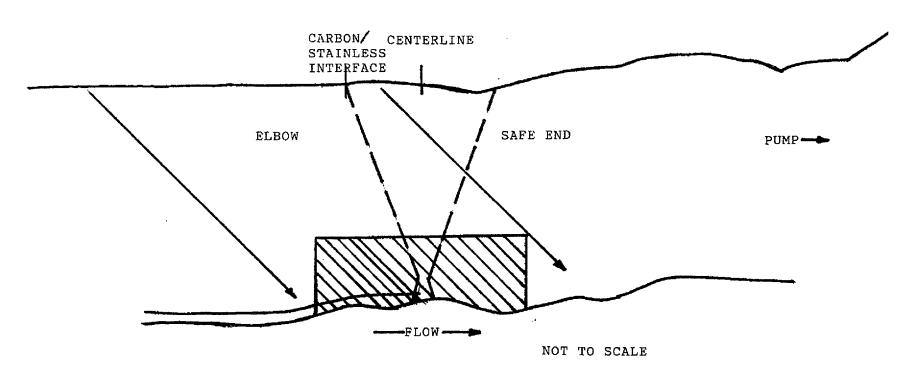
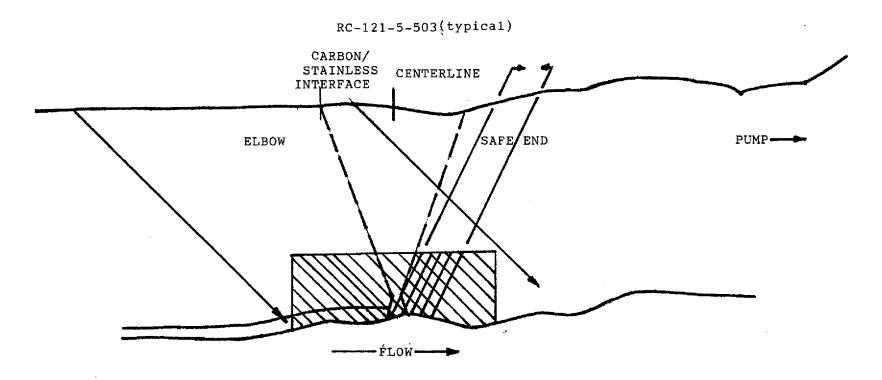


Figure 1



NOT TO SCALE

Figure 2

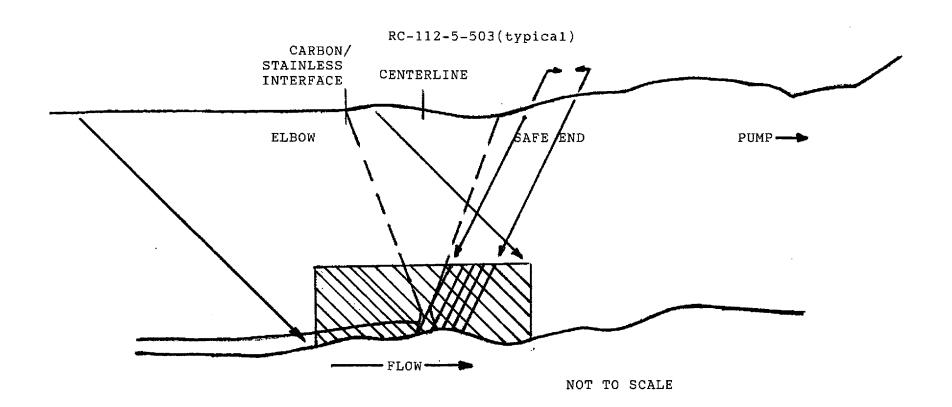


Figure 3

RC-124-5-503(typical)

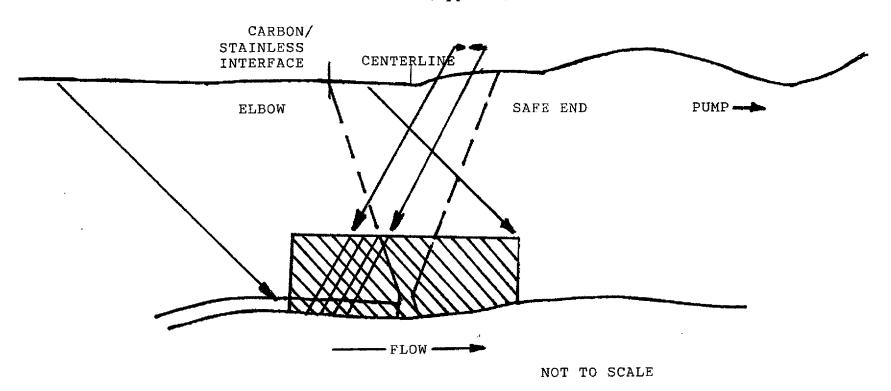


Figure 4

10-509-A(typical)

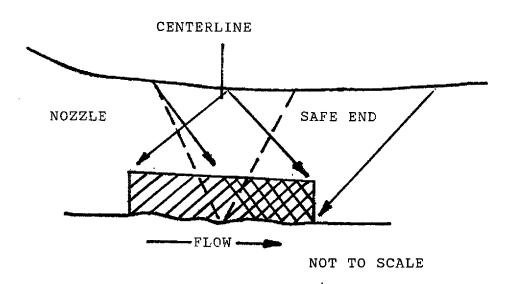


Figure 5

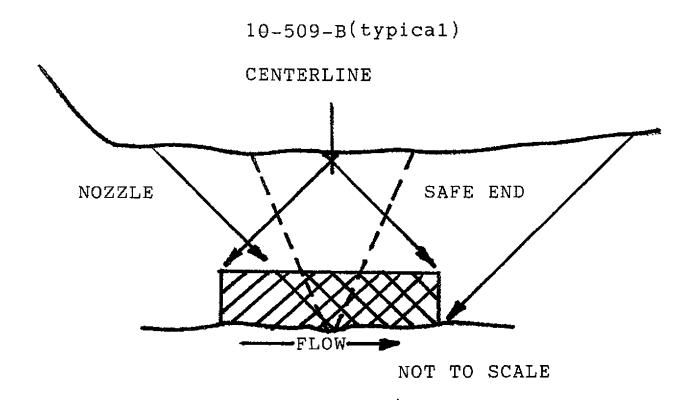


Figure 6

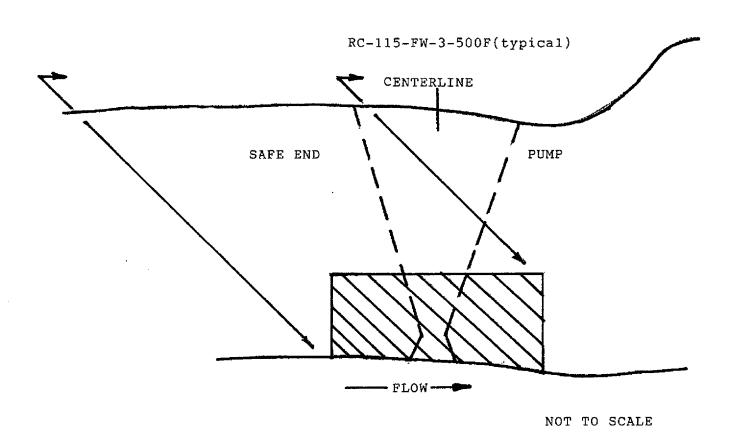


Figure 7

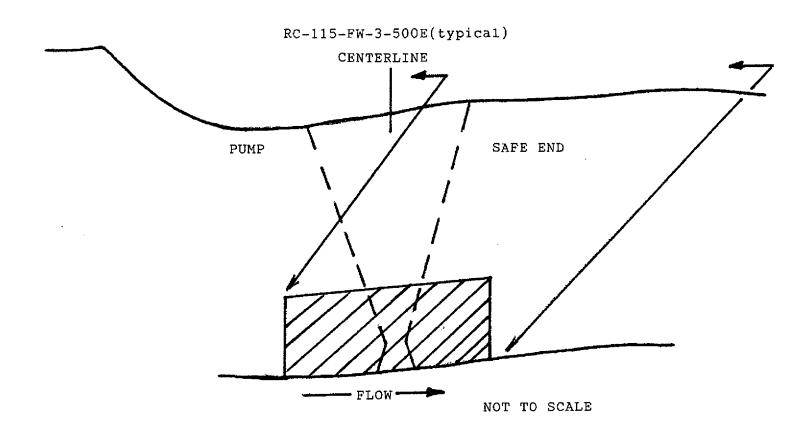


Figure 8

RC-121-FW-3-500B(typical)

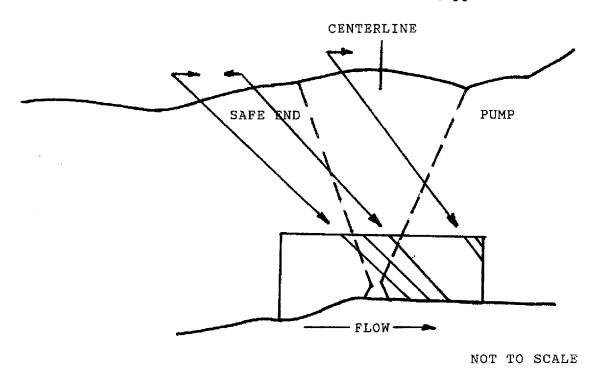


Figure 9

RC-121-FW-3-500A(typical)

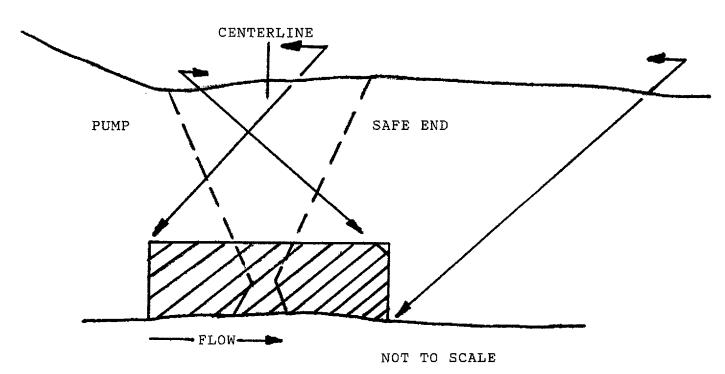


Figure 10

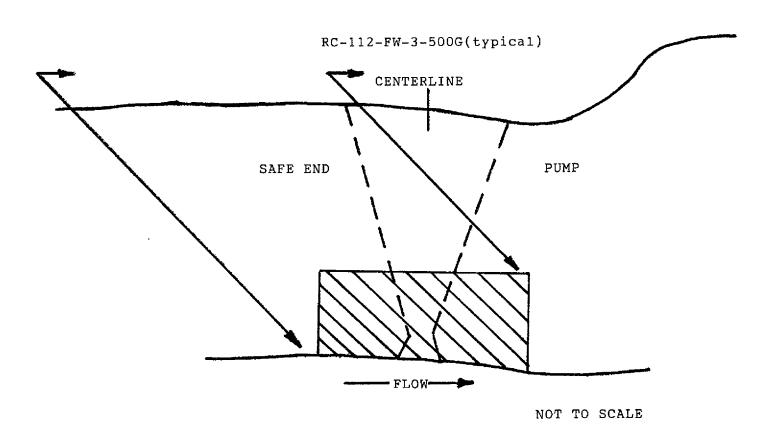


Figure 11

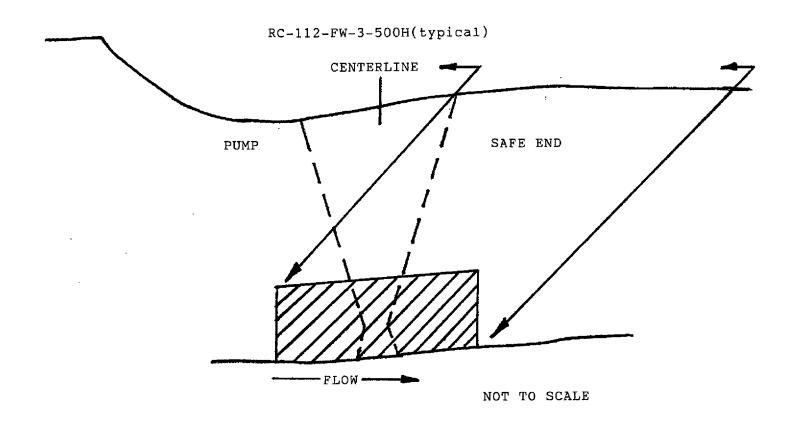


Figure 12

RC-124-FW-3-500C(typical)

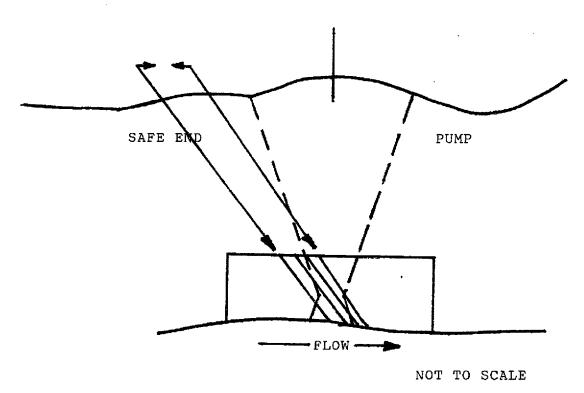


Figure 13

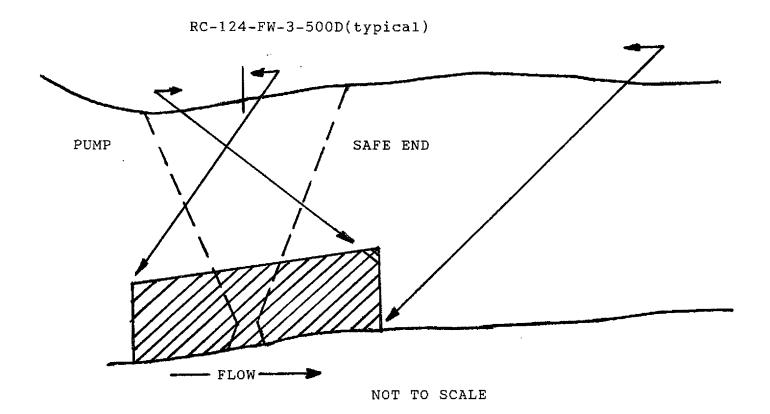


Figure 14

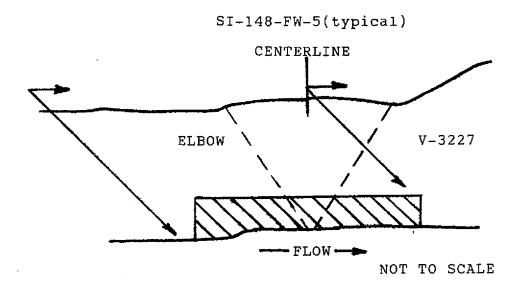


Figure 15

SI-148-FW-1(typical)

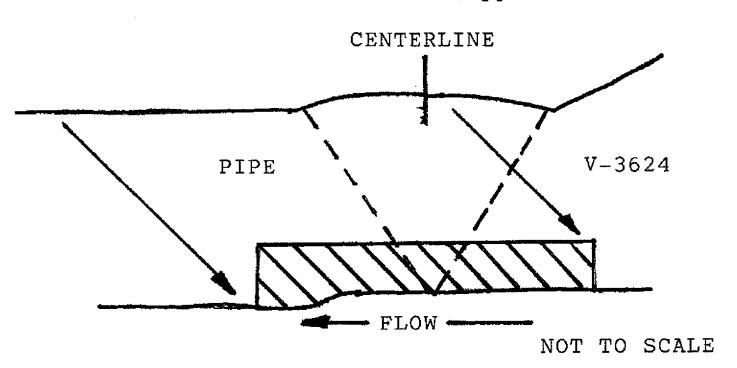
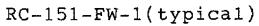


Figure 16



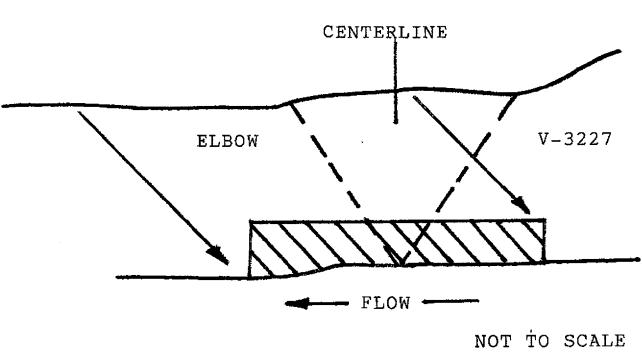


Figure 17

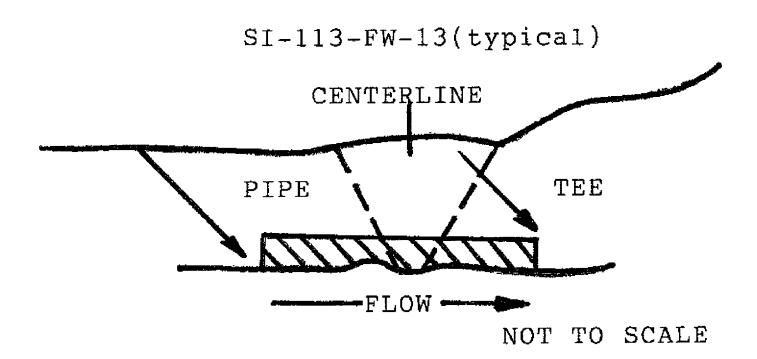
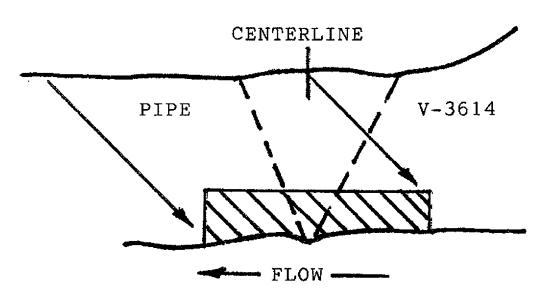


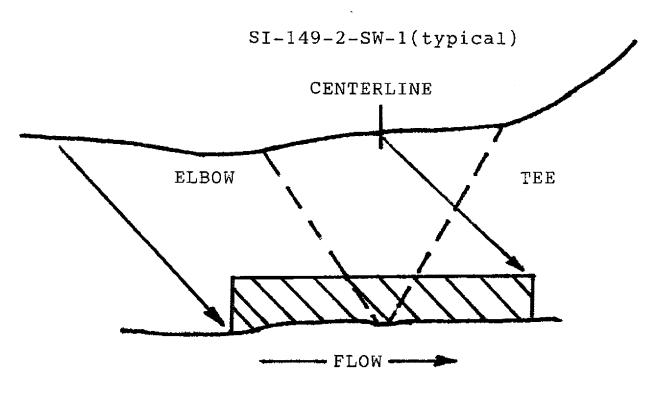
Figure 18

SI-149-FW-1(typical)



NOT TO SCALE

Figure 19



NOT TO SCALE

Figure 20

SI-149-2-SW-2(typical)

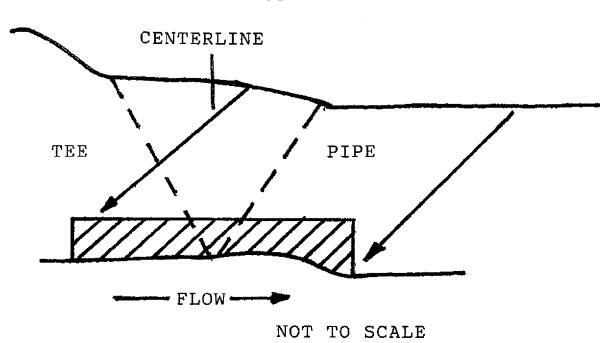


Figure 21

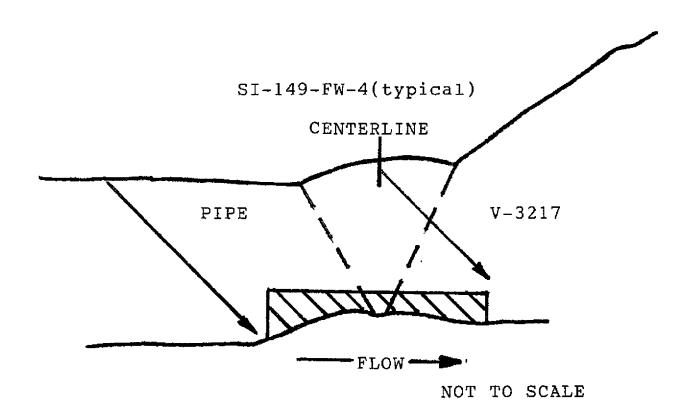


Figure 22

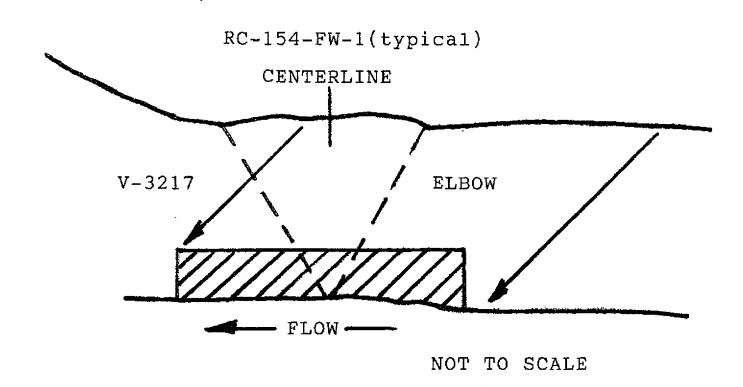


Figure 23

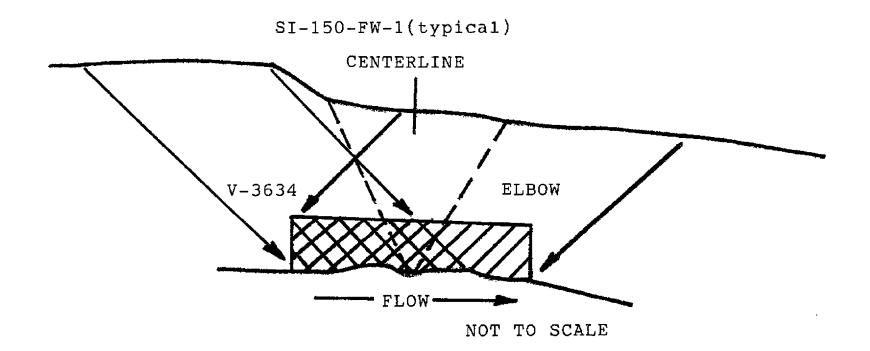


Figure 24

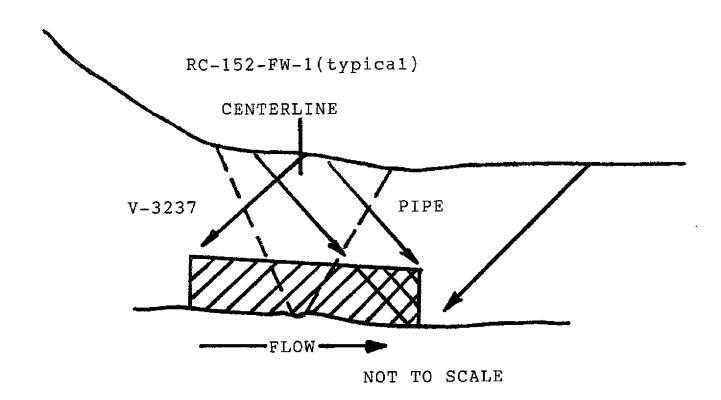


Figure 25

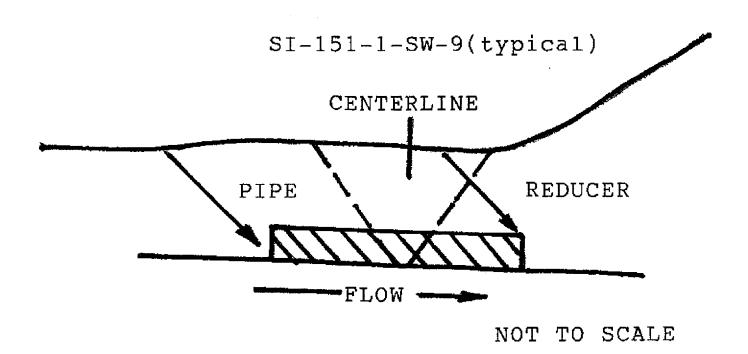


Figure 26

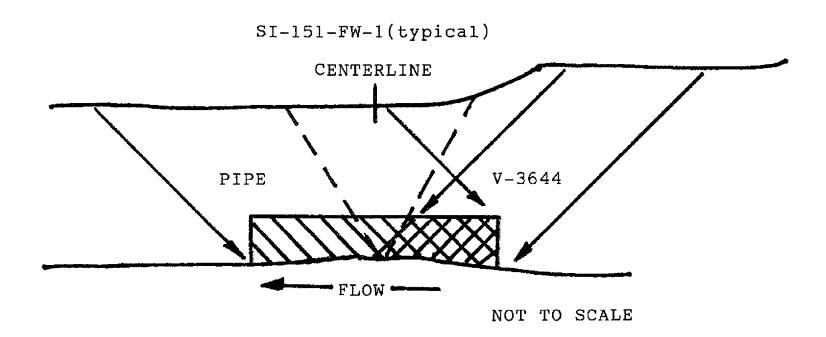


Figure 27

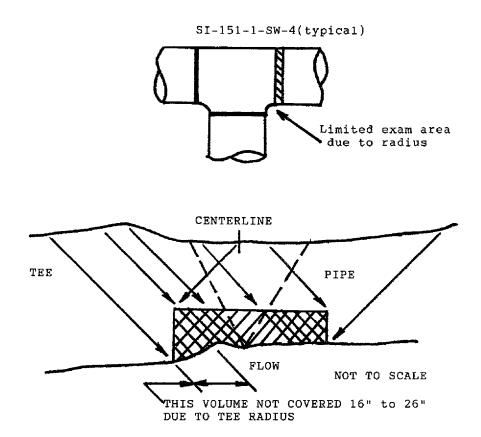


Figure 28

SI-151-1-SW-2(typical)

CENTERLINE

PIPE

FLOW

Figure 29

SI-130-FW-1(typical)

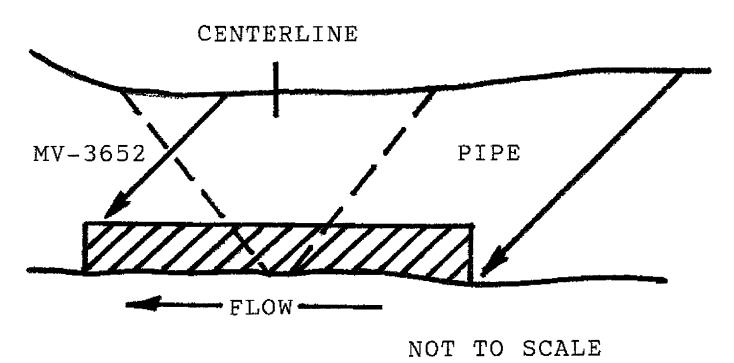


Figure 30

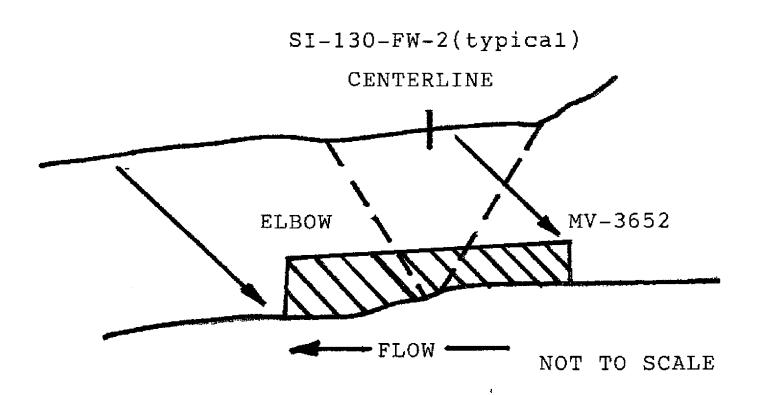


Figure 31

SI-130-FW-3(typical)
CENTERLINE

MV-3651

PIPE

FLOW

NOT TO SCALE

Figure 32

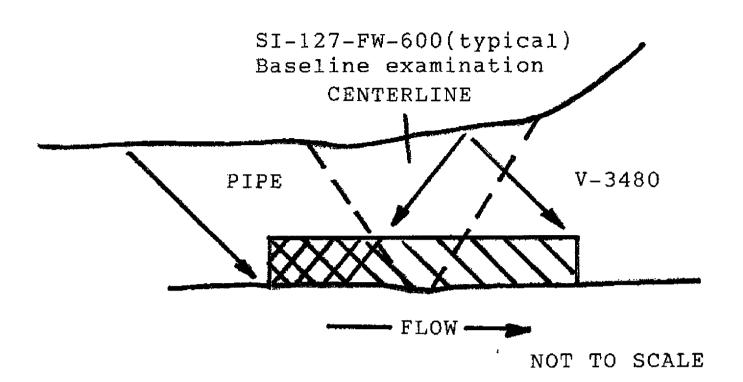


Figure 33

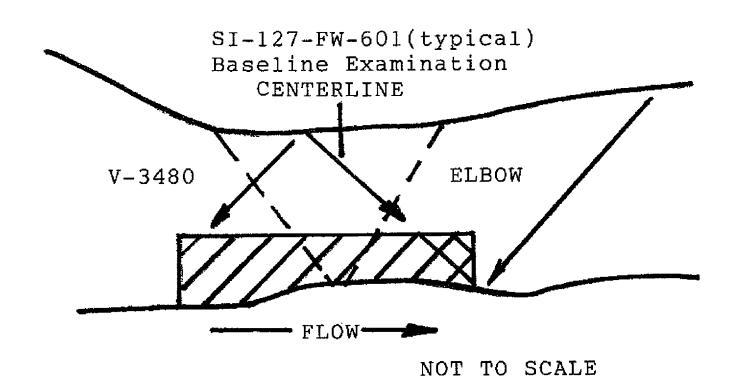


Figure 34

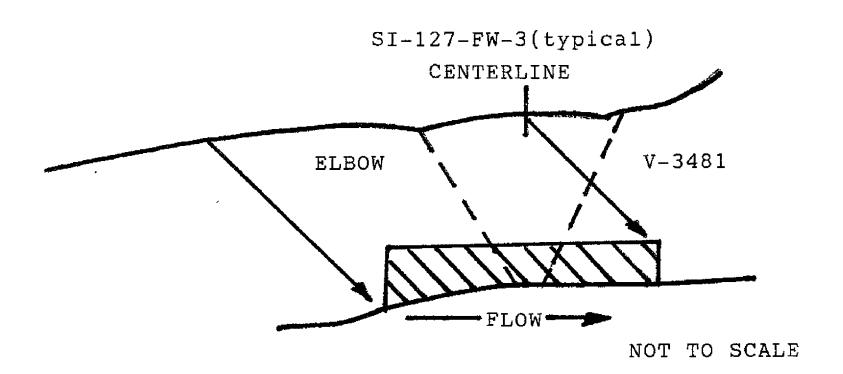


Figure 35

 $SI_{-}113-1-SW-6$ (typical) $SI_{-}111-1-SW-3$ (typical)

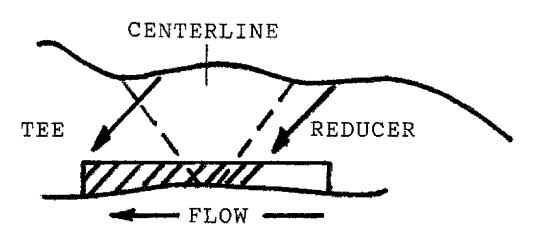


Figure 36

SI-113-1-SW-5(typical)

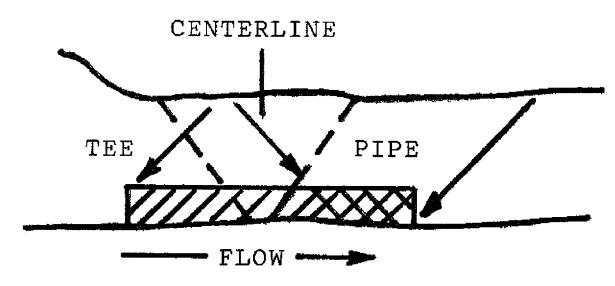


Figure 37

SI-113-FW-6(typical)

CENTERLINE

PENETRATION

PIPE

FLOW

NOT TO SCALE

Figure 38

SI-111-1-SW-2(typical)

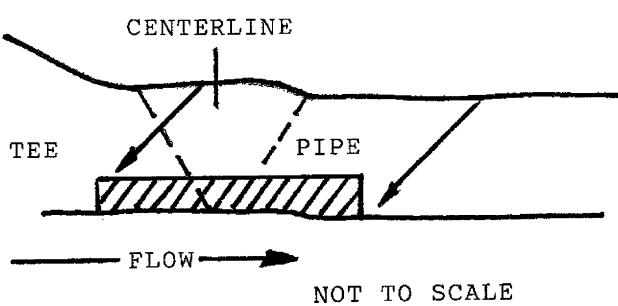


Figure 39

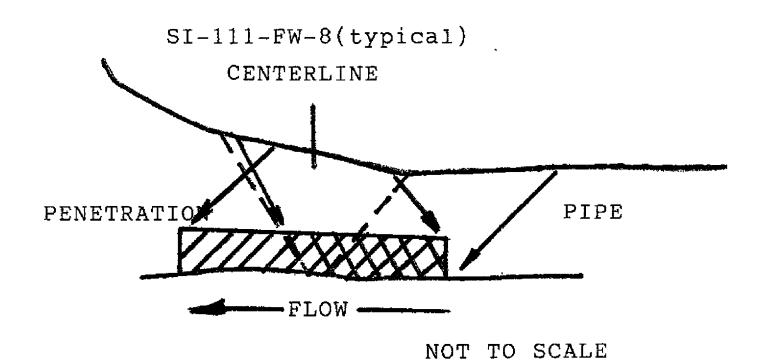


Figure 40

2-2701(typical)

CENTERLINE
FLANGE SHELL

Figure 41

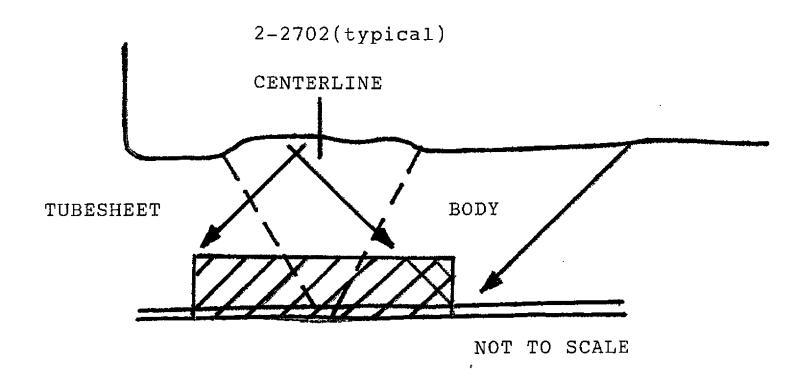


Figure 42

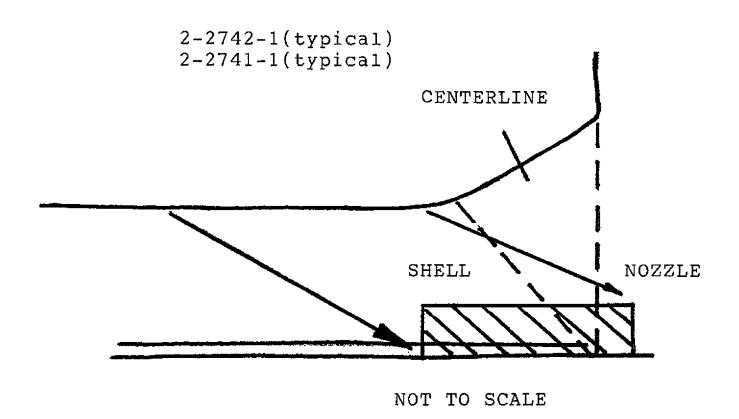
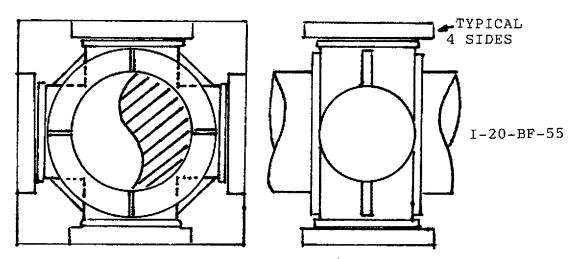


Figure 43

BFH-6(typical)



EXAMINATION AREA CONSISTS OF 4-16" WELDED LUGS TO MAIN FEEDWATER LINE.

LIMITED EXAMINATION DUE TO CONFIGURATION

NOT TO SCALE

Figure 44

SI-146-FW-1(typical)

HCV-3645 PIPE

Figure 45

SI-110-FW-9(typical)

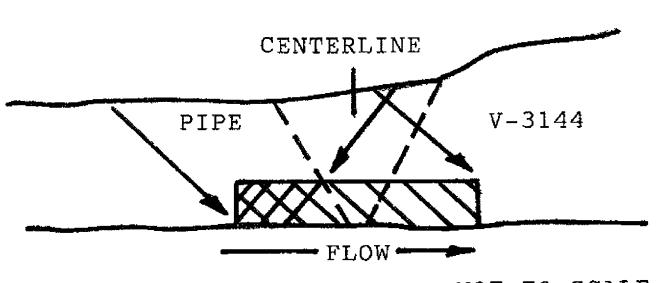


Figure 46

SI-113-FW-9(typical)

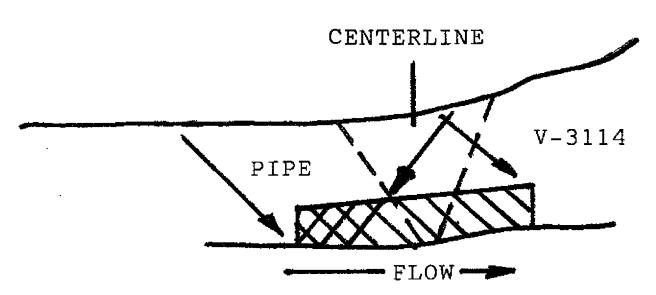


Figure 47

SI-142-FW-1(typical)

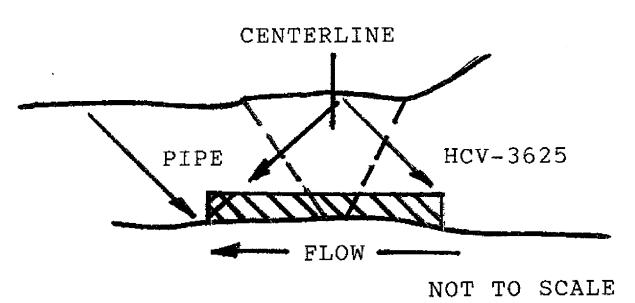


Figure 48

SI-112-FW-9A(typical)
CENTERLINE

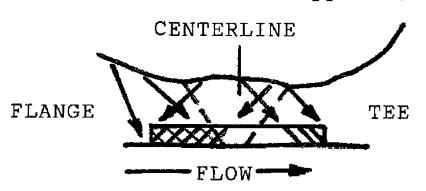
V-3124

PIPE

FLOW

Figure 49

SI-208-1-SW-1 (typical)



NOT TO SCALE

Area of incomplete coverage 2" either side of 0 reference. 4" length of 11" total weld length limited.

Figure 50

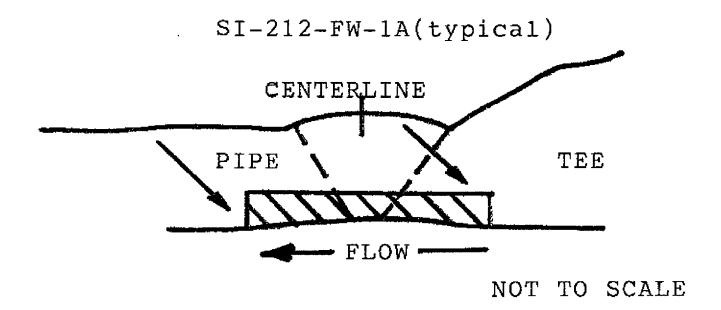


Figure 51

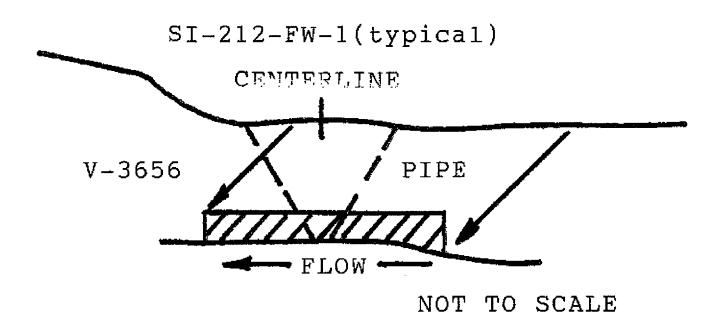


Figure 52

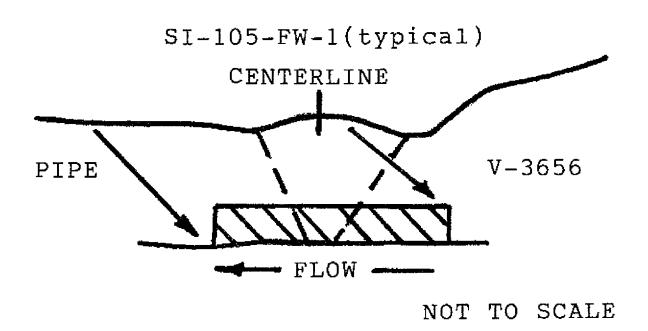


Figure 53

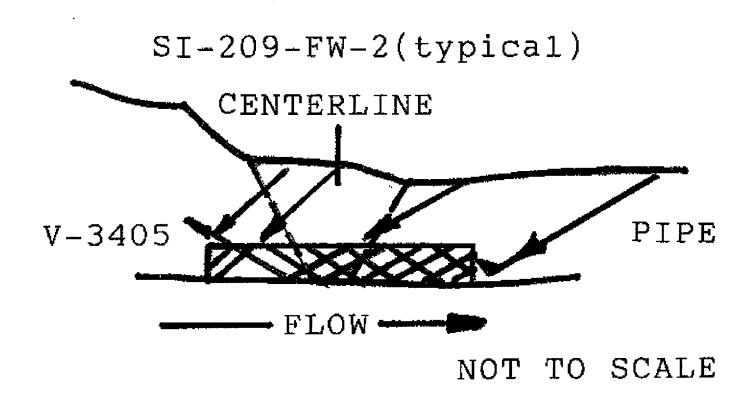


Figure 54

SI-213-FW-2(typical)

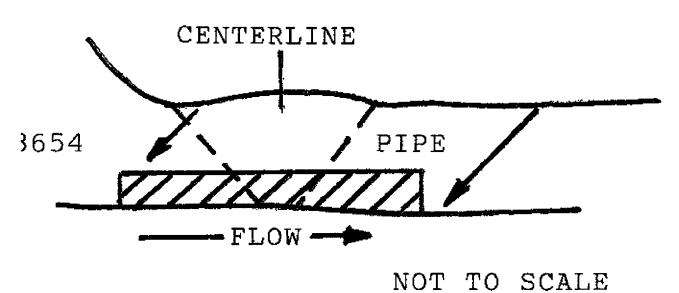


Figure 55

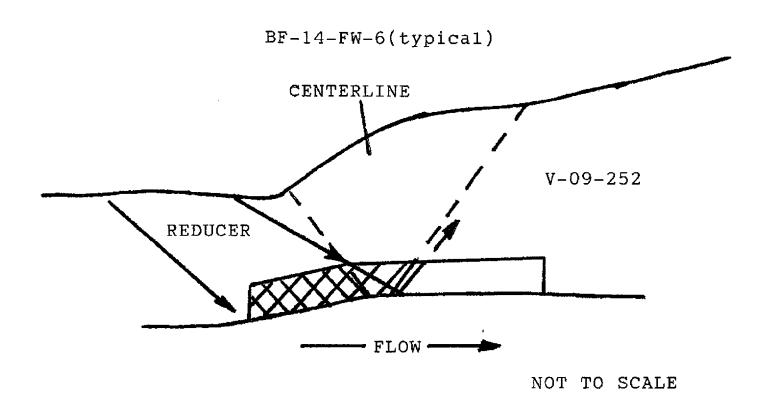


Figure 56

BF-55-FW-1(typical)

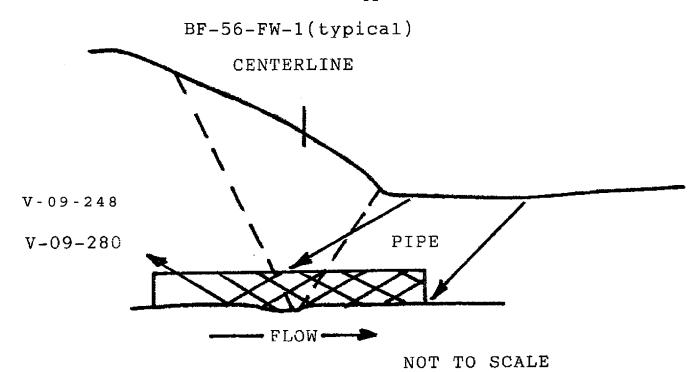


Figure 57