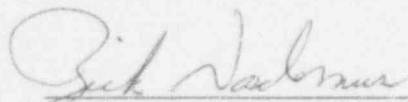


OYSTER CREEK CORE SPRAY SYSTEM
INSPECTION PROGRAM - 15R OUTAGE

TOPICAL REPORT NO. TR-098

Project No. 328352

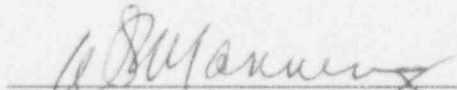
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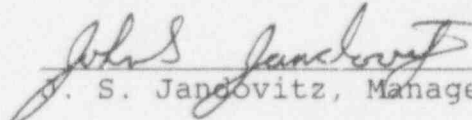
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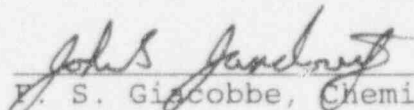
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Date


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ABSTRACT

During the 1994 refueling outage (15R) at Oyster Creek Nuclear Generating Station, an Augmented Inspection Program was implemented on the Core Spray Sparger System. This inspection scope included the in-vessel annulus piping and sparger assemblies utilizing remote visual examination and supplemental air test. Remote visual examination revealed no new relevant indications. The air test revealed leakage seen in previous outages in System II at the known 208° azimuth repair clamp and System I at the inlet piping coupling in the annulus. All anomalies noted had been previously reported.

TABLE OF CONTENTS

	<u>Page</u>
Introduction	4
Core Spray Sparger	5
Core Spray Annulus Piping	5
Air Test	6
Conclusion	8
References	9
Attachments	
Table 1 - Core Spray Piping Inspection Summary	
Figure 1 - Core Spray Annulus Piping Azimuths	
Figure 2 - General Layout - Core Spray Sparger	
Figure 3 - Upper Piping Unit	
Figure 4 - Lower Piping Unit	
Figure 5 - Pipe Joint Configuration for Downcomers at 60° and 240° Azimuths	
Figure 6 - Downcomer at 60° Azimuth and Location of Weld U-3A Indications	
Figure 7 - Downcomer at 240° Azimuth and Location of Weld L-3A Indication	

OYSTER CREEK CORE SPRAY SPARGER SYSTEM
INSPECTION PROGRAM

INTRODUCTION

The Augmented Inspection for the Core Spray Sparger System was performed during the 1994 refueling outage (15R). The results of the inspection reported herein meet the requirements outlined by Section 6.9.3.e, "Unique Reporting Requirements", of the Oyster Creek Technical Specification.

VISUAL INSPECTION

Core Spray Spargers

The Core Spray Spargers were visually inspected utilizing Westinghouse RTV 1250 camera with twin 50 watt underwater lighting affixed. Auxiliary lighting was provided as needed by Acorn lights and/or area lights lower into the vessel from the refueling bridge. The Westinghouse camera does not utilize auto-iris for lighting control. However, auxiliary lighting was controlled by a rheostat. The video camera was positioned in two fashions from the refuel bridge. The primary means of operating the camera system was utilizing an ABB rigid pole system mounted with a fixture to the refuel bridge. A secondary means was by hand held cameras manipulated by ropes. All accessible areas of the piping were inspected. The calibration standard utilized for qualification of the camera system was a 1 mil wire as a minimum in accordance with the requirements of NRC I & E Bulletin 80-13.

The visual inspection of the Core Spray Spargers were performed as follows:

Spargers A & C

1. Upper View - looking down on the sparger from above.
2. Front View - looking straight at the sparger.
3. Lower View - looking up at the sparger from below.
4. Nozzle View - looking below the sparger directly at the nozzles.

Spargers B & D

1. Upper View - looking down on the sparger from above.
2. Front View - looking straight at the sparger from a right angle and slightly below a right angle.
3. Nozzle View - looking below the sparger directly at the nozzles.

NOTE: A total lower view is not possible for Sparger B & D because of their location in the vessel.

No relevant indications were noted during the inspections or subsequent review of the video tapes.

Annulus Piping

Visual inspection of the Core Spray Annulus Piping was performed utilizing General Electric's (GE) "Firefly", a remotely operated submersible (ROV). All accessible areas of the annulus piping and attachments were inspected. Reference Figures 1 through 4. No relevant indications were noted during the inspection or subsequent review of the video tapes.

AIR TEST

Air tests were performed on the Core Spray Sparger Systems I and II. Because of the configuration of the Core Spray piping, the upper spargers with downward pointing nozzles should filled completely with air on (system II). The down leg between the reactor vessel penetration and the horizontal circumferential pipe run in the annulus is filled completely with air. All other piping will, at best, fill only partially with air or just past air bubbles along its upper centerline inside surface.

The Core Spray Sparger Systems air test was performed in accordance with Procedure SP-91.01 Rev. 2 with Technical Change TC #9-29-94-1. The pressure was held at approximately 72psi as verified through GPUN I&C Department.

Prior to the initial inspection of the System I (Lower Spargers) air bubbles were observed coming from the annulus area as noted in previous air test during refueling Outage 14R. These bubbles as noted in the referenced TR were leaking out of the fillet weld designated L-3A, 240° azimuth (see Figure 5 for joint configuration and weld type). The location of the leak was at the point along the circumference of the weld nearest the vessel wall. A direct straight on view of the weld was attained utilizing a water proof Elmo chip video camera. The video revealed three rounded indications at the lower toe of the weld. These rounded indications originated from initial fabrication. One of the three rounded indications emitted air bubbles while the System was under pressure. Once the pressure was reduced the air bubbles subsided. Further inspection of the balance of the annulus piping revealed no additional air leaks.

SYSTEM I (Lower Spargers)

During the performance of the air test, the Core Spray Sparger System I, was inspected utilizing a hand held Westinghouse RTV 1250 camera manipulated with an attached rope from the refuel bridge.

Core Spray Sparger System I (Lower Spargers) was the first system tested. Inspection of this System during the air test noted air bubbles coming from the nozzles. Air was trapped in the spargers and with no means of isolating the nozzles, air could escape. Further inspection of the balance of the lower spargers on System I revealed no additional air leaks.

SYSTEM II (Upper Spargers)

During the performance of the air test, the Core Spray Sparger System II was inspected utilizing a hand held Westinghouse RTV 1250 camera as outlined in the inspection of System I above. In addition, the General Electric "Fire Fly", GE's remote operated submersible was utilized to observe the annulus piping during this phase of the air test.

Core Spray Sparger System II (Upper Sparger) was the second system inspected. In addition, the annulus piping was inspected at this stage of the air test. As pointed out during the System I air test, air bubbles were observed emitting from the sparger nozzles. Air bubbles were also observed coming from the end (204°) and middle (208°) of the repair clamp located between azimuth 204 - 210°. No other air bubbles were observed coming from the other eight repair clamps, the spargers or the annulus piping other than that previously noted above.

CONCLUSIONS

The following are conclusions relative to the inspection of the Core Spray System conducted during the Oyster Creek Refueling Outage (15R):

- The number of confirmed cracks in the Core Spray Sparger Systems is one (1) in System II, that being the through-wall crack at 208° identified and clamped in 1978 and confirmed by a continuous stream of air bubbles. No change was noted from previous inspections.
- Visual inspection of the spargers and annulus piping showed various scuff marks, scrapes, undercut, arc strikes, oxide deposits and discolorations on the spargers surfaces. No change from previous inspections was noted.
- All repair clamps appear to be intact and in good condition.
- No indication that could be interpreted as crack-like in appearance was noted during the examination or post examination review of the sparger assembly.
- One rounded, through wall, indication was observed at the toe of the weld designated as L-3A. This weld is in System I of the annulus piping. The rounded indication was discovered during the air test perform in outage 14R and was determined to originate from initial fabrication of the component.
- Two linear indications originally observed during Outage 14R in the annulus piping in System II Weld U-3A (reference TR-093). These indications were revisited this outage (15R) and there appears to be no change and no air bubbles were observed emitting from this location during the air test.

REFERENCES

- 1) NRC I & E Bulletin 80-13, "Cracking in Core Spray Spargers".
- 2) GPUN Procedure 5361-NDE-7209.46, Rev 0, Visual Examination of Reactor Vessel Internals.
- 3) GPUN Specification SP-1302-56-123, Rev 0, Reactor Vessel Internals Inspection 15R Outage.
- 4) GPUN Topical Report No. TR-093, Oyster Creek Core Spray System Inspection Program - 14R.

TABLE 1
CORE SPRAY PIPING INSPECTION SUMMARY

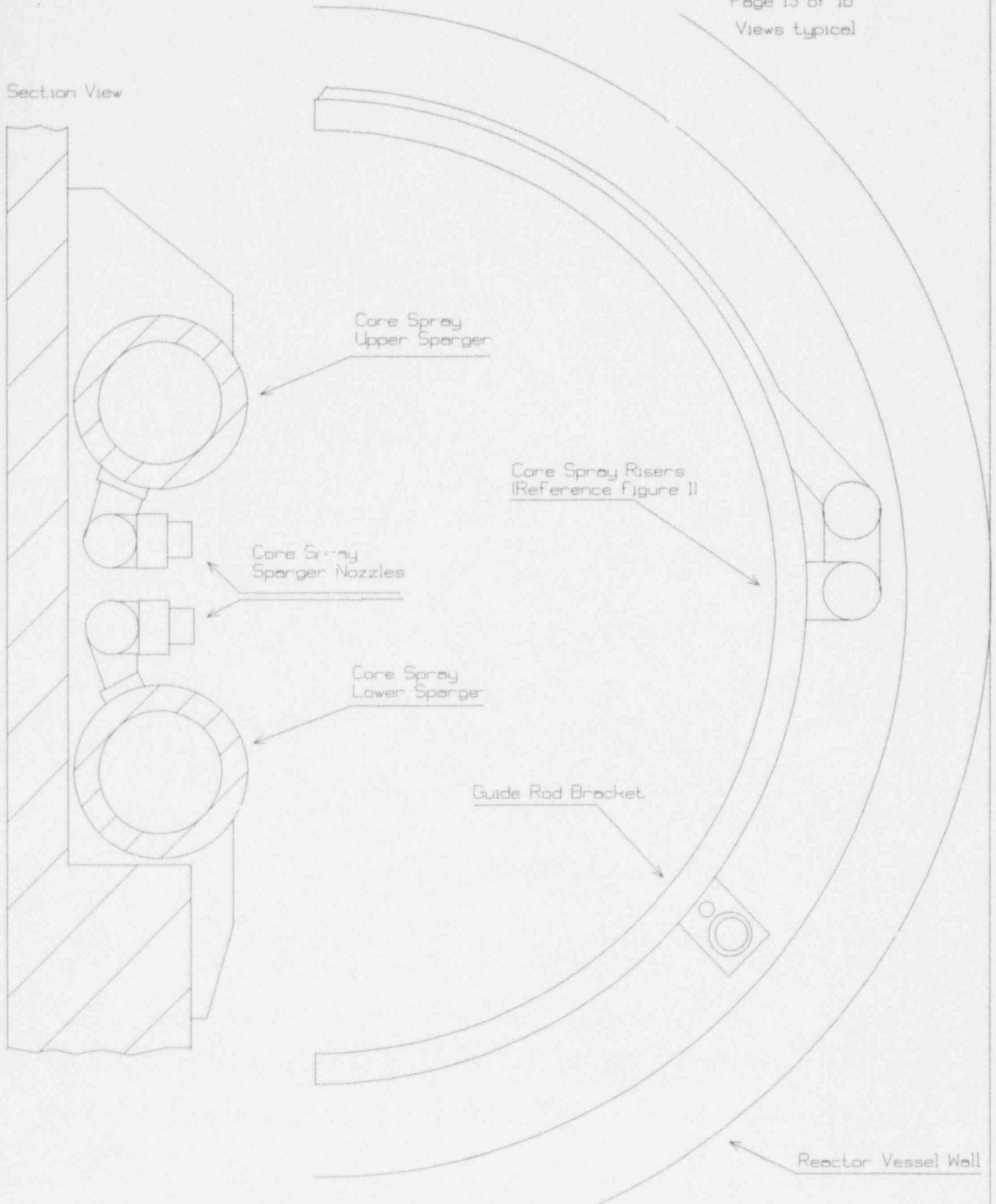
	<u>Spargers</u>		<u>Annulus Piping</u>		<u>Air Test</u>	<u>Remarks</u>
	<u>Visual</u>	<u>Ultrasonic</u>	<u>Visual</u>	<u>Ultrasonic</u>		
1978	1 through wall crack	--	No indications	--	Air release observed from 1 crack (208° only)	One Repair Bracket installed at 208° (Sys II)
1980	19 indications called cracks	16 indications	2 indications	--	"	Seven Repair Brackets installed (Sys II) two repair brackets installed (Sys I)
	28 Total Indications (excluding 1978 indication)					
1982 Video Enhancements	Video enhanced 1980 visual indications. Results identified: 3 cracks 2 possible cracks	--	Video enhanced on 1980 indication Results: Not a crack (6 x 5 reducer)	--	--	--
1983	No indications* (4 of 1980 indications examined)	No indications* (5 of 16-1980 indications rechecked)	No indications	No indications 7 welds inspected	"	*Area of Inspection limited by repair brackets
1986	No indications*	No indications*	No indications	--	--	--
1988	No indications*	--	No indications	--	**Air release observed from repair brackets upper sparger	** Air release from 196° repair bracket intermittent. Air release from 208° repair bracket continuous

TABLE 1 (Continued)
CORE SPRAY PIPING INSPECTION SUMMARY

	<u>Spargers</u>		<u>Annulus Piping</u>		<u>Air Test</u>	<u>Remarks</u>
	<u>Visual</u>	<u>Ultrasonic</u>	<u>Visual</u>	<u>Ultrasonic</u>		
1991	No indications*	--	No indications	--	Air release observed from one repair bracket(208') upper sparger.	Air release from 208' repair bracket continuous. (Sys.II)
1992	No indications*	--	Initial no indications	--	Air release observed from 1 repair bracket	Air release from 208' repair bracket continuous (Sys.II)
			***Additional Visual 3 indications A) 1 through weld hole B) 2-linear	--	Air release from downcomer at 240'. Weld L-3A has through weld hole.	Air release from weld L-3A is continuous (Sys.I)
1994	No indications*	--	No indications	--	Air release observed from repair bracket	Air release from 208' repair bracket continuous (Sys.II)
					Air release from downcomer at 240', Weld L-3A has through weld hole.	Air release from Weld L-3A is continuous (Sys.I)
						No change from 2 linears Note on Weld U-3A (Sys.II).

- * Area of inspection limited by repair brackets
 ** A subsequent air test confirmed that air bubbles were released from the sparger nozzles beneath the 196' repair clamp.
 *** Through weld hole in weld L-3A System I
 2 linears, both in same weld U-3A System II

Section View



Oyster Creek Nuclear Generating Station

Figure Number 2

OYSTER CREEK CORE SPRAY SPARGER INLET PIPE COUPLING

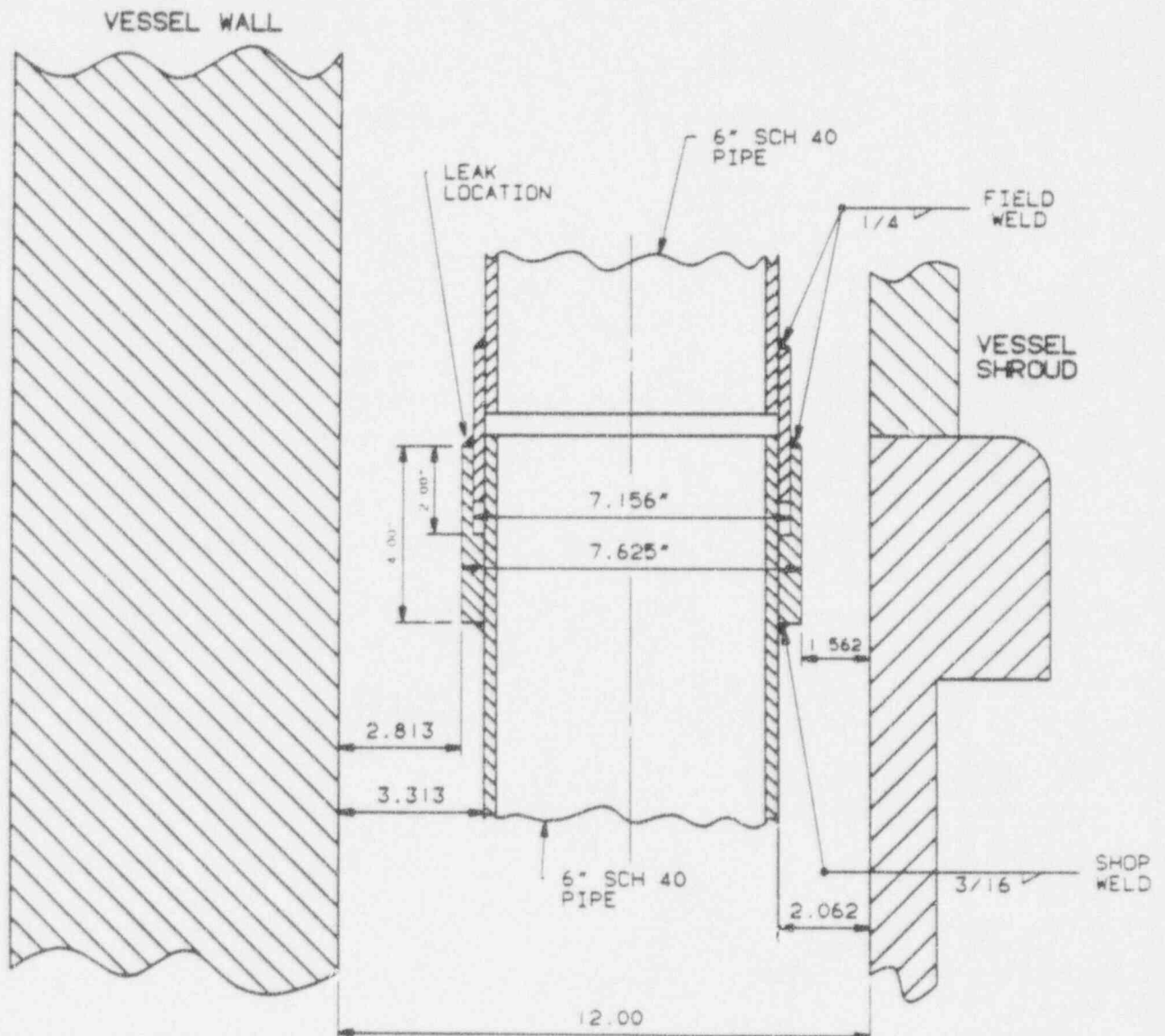


FIGURE 5

CORE SPRAY PIPING WELD I.D.'S
INDICATION AT WELD U-3A

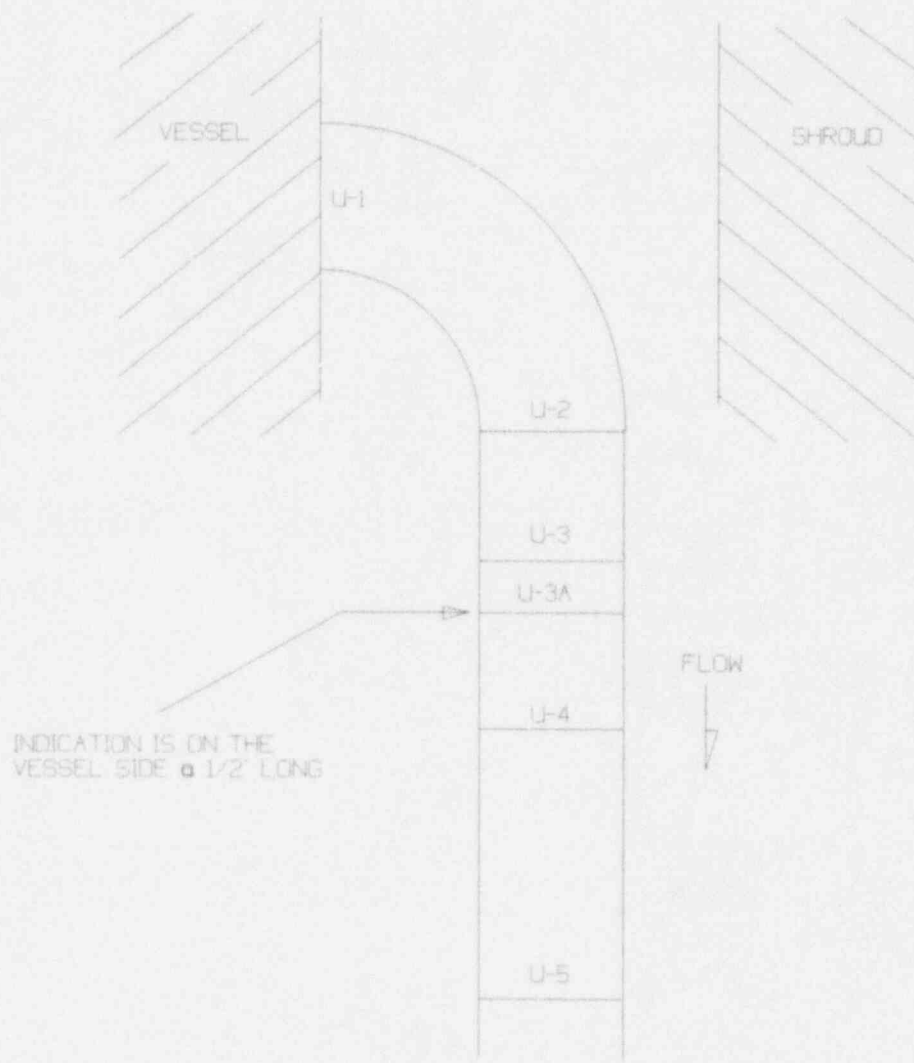


FIGURE 6

