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Stephenie L. Pyle
Manager, Licensing
Arkansas Nuclear One

2CAN021302

February 5, 2013

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555

SUBJECT: Response to Request for Additional Information
Request for Relief ANO2-ISI-010
Arkansas Nuclear One, Unit 2
Docket No. 50-368
License No. NPF-6

REFERENCES:
1. Entergy letter to NRC, "Requests for Relief from American Society of Mechanical Engineers (ASME) Section XI Volumetric and Surface Examination Requirements – Third 10-Year Interval," dated March 26, 2012 (2CAN031203) (ML12086A293)

2. NRC email to Entergy, "RAI on Request for Relief No. ANO2-ISI-010," dated September 6, 2012 (TAC No. ME8272) (ML12250A771)

Dear Sir or Madam:

Entergy Operations, Inc. requested NRC's approval of several Requests for Relief for Arkansas Nuclear One, Unit 2 via Reference 1. These requests are associated with the requirements of the ASME, Boiler and Pressure Vessel Code, Section XI pertaining to volumetric and surface examinations. In several locations, the required coverage cannot be obtained due to interference or geometry.

In Reference 2, the NRC determined that additional information was needed to complete the review of Request for Relief ANO2-ISI-010 provided in Reference 1. Attached are the requests for additional information and corresponding responses.

This submittal contains no regulatory commitments.

If you have any questions or require additional information, please contact me.

Sincerely,

Original signed by Stephenie L. Pyle

SLP/rwc

Attachment: Response to Request for Additional Information – Relief Request – ANO2-ISI-010

cc: Mr. Elmo E. Collins
Regional Administrator
U. S. Nuclear Regulatory Commission, Region IV
1600 East Lamar Boulevard
Arlington, TX 76011-4511

NRC Senior Resident Inspector
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U. S. Nuclear Regulatory Commission
Attn: Mr. Kaly Kalyanam
MS O-8B1
One White Flint North
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Rockville, MD 20852

Attachment to

2CAN021302

Response to Request for Additional Information
Relief Request - ANO2-ISI-010

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION
RELIEF REQUEST ANO2-ISI-010

By letter dated March 26, 2012, Entergy Operations, Inc., submitted proposed alternative ANO2-ISI-010 (Reference 1) requesting relief from required volumetric examination coverage of American Society of Mechanical Engineers (ASME), Boiler and Pressure Vessel Code (Code), Section XI, Examination Category B-J welds under the Arkansas Nuclear One, Unit 2 (ANO-2) Risk Informed Inservice Inspection (RI-ISI) Program (Reference 2). In order to complete the review, the staff requests the following additional information:

1. **How many Examination Category B-J welds exist at ANO-2 and how many were to be examined under the RI-ISI Program?**

   The total population of ANO-2 Examination Category B-J welds is 736. A total of 68 ANO-2 Examination Category B-J welds were to be examined under the RI-ISI program during the third 10-year interval.

2. **How many Examination Category B-J welds for which adequate coverage was obtained were examined with ASME Code, Section XI, Appendix VIII qualified procedures?**

   Thirty four (34) Examination Category B-J welds were examined with ASME Code, Section XI, Appendix VIII qualified procedures and completed with the required coverage obtained.

3. **Describe the procedure used for calculating the scan coverage.**

   Scan coverage was calculated by illustrating the cross-sectional profile of the weld with the Code required examination volume being depicted as a rectangle at the lower 1/3t of the component in a scale drawing. The volume of the rectangle was then calculated.

   The extent of scanning with the appropriate angle beam transducer(s) was then overlaid on the examination volume in the axial direction scan which interrogates for circumferential flaws. Any limitation to these scans providing 100% coverage on both sides of the weld is documented.

   The extent of any scan limitation is measured, and the volume calculated.

   The volume of the area scanned is divided by the total volume to determine the estimated percentage of coverage.

   Circumferential scans for axial flaws were performed on the adjacent material and the weld crown to the extent possible. These scans were not credited in the coverage calculation.

4. For each of the 30 subject Examination Category B-J welds for which adequate examination coverage could not be obtained:

a. Specify the safety significance classification (High or Medium) of each.

See Table 1.

b. Specify whether it was examined using an ASME Code, Section XI, Appendix VIII qualified procedure.

See Table 1.

c. Specify the diameter and wall thickness, and the materials of construction

See Table 1.

d. Provide accurately proportioned drawings clearly showing the area of missed examination coverage for each weld. Describe the reason for the missed coverage.

See Table 1 and figures.

e. Was the weld examined under the RI-ISI program? For those welds that are described by ASME Code, Section XI, Table IWB-2500-1 item numbers (e.g., B9.11, B9.21) identify any potential degradation mechanism the welds may be susceptible to.

See Table 1.

f. For those welds that have a potential degradation mechanism, explain why the examination coverage achieved is adequate to detect the potential degradation mechanism. Was an adjacent weld examined?

See Table 1.

Of the 30 welds reported with limited examinations, 11 had identified degradation mechanisms. Of the 11 with degradation mechanisms, six had adjacent components examined during the third 10-year interval.

Other Examination Category B-J components that were not selected for examination by volumetric processes but are examined during System Pressure Tests and plant walk-downs have not been found to have degradation issues. The examinations that have been performed, demonstrate effective inservice inspection (ISI) rigor.

g. For those welds that do not have a potential degradation mechanism, explain why other welds with the same safety significance, for which adequate examination coverage could be achieved, are not being examined.

The component selection process purposely includes welds that have configurations to fittings such as elbows, tees, valves and nozzles. To remove these components in favor of a non-restricted component, e.g., pipe to pipe, would result in an ISI program selection process that would not be conservative or represent the piping system configurations.

h. For those welds where the scan in the axial direction was performed from one side of the weld only, was a best effort attempt made to scan the material on the opposite side of the weld? If not, explain why this was not done and discuss any benefit that a best effort scan may provide.

Review of the data sheets indicates that best effort scanning was performed on both sides of the weld joint where accessible and feasible. Generally, it is not feasible to scan from a valve side or branch connection due to material, surface condition, or part geometry.

REFERENCES

1. **"Requests for Relief from American Society of Mechanical Engineers (ASME) Section XI Volumetric and Surface Examination Requirements – Third 10-Yewar Interval," Agencywide Documents Access and Management System (ADAMS) Accession No. ML 12086A293**

2. **"Safety Evaluation by the Office of Nuclear Reactor Regulation, Proposal to Use ASME Code Case N-578 as an Alternative to ASME Code Section XI, Table IWX-2500," ADAMS Accession Nos. 9901050347 and 9901050353**

Table 1
Limited B-J Examinations

Component Description			Additional Information								
Item Number	**Comp. ID**	**Item Description**	**Safety Significance (High or Med)**	**Examined with ASME Sect. XI App VIII procedure**	**Dia. (in)**	**Wall Thick. (in)**	**Material**	**Reason for missed coverage**	**Examined RI-ISI (Y/N)**	**Degradation Mechanism**	**Adjacent Weld Examined (Y/N)**
B9.11	02-T-082	**Reactor Vessel Closure Head (RVCH) Instrument Nozzle Tube to Flange #82**	None Identified	Y 2008 2R19	5.565	0.563	Stainless Steel (SS) to SB-167 Nickel-Chromium-Iron (Ni-Cr-Fe)	Missed coverage was due to Instrument Nozzle Tube to Flange/Weld Configuration. The inside surface was examined. The upper portion of the code volume was missed. 80% exam. See Figure 1	N	N/A	N/A
B9.11	02-T-083	**RVCH Instrument Nozzle Tube to Flange #83**	None Identified	Y 2008 2R19	5.565	0.563	SS to SB-167 Ni-Cr-Fe	Missed coverage was due to Instrument Nozzle Tube to Flange/Weld Configuration. The inside surface was examined. The upper portion of the code volume was missed. 80% exam. See Figure 2	N	N/A	N/A
B9.11	21-001	**Safety Injection Loop 1A Safe End to Nozzle Circumferential (Circ) Weld – Dissimilar Metal (DM) Weld**	High	N 2000 2R14	12.0	1.125	SA-351 CF-8M CSS to SA-182 CS	Missed coverage was due to the Safe End to Nozzle Weld Configuration. 100% of the volume was scanned; however, the nozzle side was only scanned in one direction. 82.5% exam. See Figure 3	Y	None Identified	N
R1.11	21-007	**Safety Injection Loop 1A Elbow to Valve Circ Weld**	Med	Y 2009 2R20	12.0	1.125	SS SA-403 WP 316	Missed coverage was due to Single Side exam due to the Elbow to Valve Configuration. Sound was projected into the valve side of the weld. Coverage volume limited to 50% due to procedure qualification restrictions. See Figure 4	Y	Intergranular Stress Corrosion Cracking (IGSCC) Thermal Stratification, Cycling, and Striping (TASCS)	N

Table 1
Limited B-J Examinations

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Item Number	**Comp. ID**	**Item Description**	**Safety Significance (High or Med)**	**Examined with ASME Sect. XI App VIII procedure**	**Dia. (in)**	**Wall Thick. (in)**	**Material**	**Reason for missed coverage**	**Examined RI-ISI (Y/N)**	**Degradation Mechanism**	**Adjacent Weld Examined (Y/N)**
B9.11	22-001	**Safety Injection Loop 1B Safe End to Nozzle Circ Weld – DM Weld**	High	N 2000 2R14	12.0	1.125	SA-351 CF-8M CSS to SA-182 CS	Missed coverage was due to the Safe End to Nozzle Weld Configuration. 100% of the volume was scanned; however, most of the nozzle side was only scanned in one direction. 70% exam. See Figure 5	Y	None Identified	N
R1.11	22-004	**Safety Injection Loop 1B Valve to Pipe Circ Weld**	High	Y 2005 2R17	12.0	1.125	SS SA-376 TP 316	Missed coverage was due to single side exam due to the Valve to Pipe Configuration. Sound was projected into the valve side of the weld. Coverage volume limited to 50% due to procedure qualification restrictions. See Figure 6	Y	None Identified	Y
R1.11	22-005	**Safety Injection Loop 1B Pipe to Valve Circ Weld**	Med	Y 2005 2R17	12.0	1.125	SS SA-376 TP 316	Missed coverage was due to Single Side exam due to the Pipe to Valve Configuration. Sound was projected into the valve side of the weld. Coverage volume limited to 50% due to procedure qualification restrictions. See Figure 7	Y	IGSCC TASCS	Y
B9.11	23-001	**Safety Injection Loop 2A Safe End to Nozzle Circ Weld – DM Weld**	High	N 2000 2R14	12.0	1.125	SA-351 CF-8M CSS to SA-182 CS	Missed Coverage was due to the Safe End to Nozzle Weld Configuration. 100% of the volume was scanned; however, the nozzle side was only scanned in one direction. 70% exam. See Figure 8	Y	None Identified	N

Table 1 Limited B-J Examinations											
Component Description			**Additional Information**								
Item Number	**Comp. ID**	**Item Description**	**Safety Significance (High or Med)**	**Examined with ASME Sect. XI App VIII procedure**	**Dia. (in)**	**Wall Thick. (in)**	**Material**	**Reason for missed coverage**	**Examined RI-ISI (Y/N)**	**Degradation Mechanism**	**Adjacent Weld Examined (Y/N)**
B9.11	23-006	**Safety Injection Loop 2A Valve to Pipe Circ Weld**	High	Y 2002 2R15	12.0	1.125	SS SA-376 TP 316	Missed coverage was due to Single Side exam due to the Valve to Pipe Configuration. Sound was projected into the valve side of the weld. Coverage volume limited to 50% due to procedure qualification restrictions. See Figure 9	Y	None Identified	Y
B9.11	23-007	**Safety Injection Loop 2A Pipe to Valve Circ Weld**	Med	Y 2002 2R15	12.0	1.125	SS SA-376 TP 316	Missed coverage was due to Single Side exam due to the Pipe to Valve Configuration. Sound was projected into the valve side of the weld. Coverage volume limited to 50% due to procedure qualification restrictions. See Figure 10	Y	IGSCC TASCS	Y
B9.11	24-001	**Safety Injection Loop 2B Safe End to Nozzle Circ Weld – DM Weld**	High	N 2000 2R14	12.0	1.125	SA-351 CF-8M CSS to SA-182 CS	Missed coverage was due to the Safe End to Nozzle Weld Configuration. 100% of the volume was scanned; however, the nozzle side was only scanned in one direction. 66.5% exam. See Figure 11	Y	None Identified	N
R1.11	24-006	**Safety Injection Loop 2B Pipe to Valve Circ Weld**	Med	Y 2006 2R18	12.0	1.125	SS SA-376 TP 316	Missed coverage was due to Single Side exam due to the Pipe to Valve Configuration. Sound was projected into the valve side of the weld. Coverage volume limited to 50% due to procedure qualification restrictions. See Figure 12	Y	IGSCC TASCS	N

Table 1 Limited B-J Examinations											
Component Description			**Additional Information**								
Item Number	**Comp. ID**	**Item Description**	**Safety Significance (High or Med)**	**Examined with ASME Sect. XI App VIII procedure**	**Dia. (in)**	**Wall Thick. (in)**	**Material**	**Reason for missed coverage**	**Examined RI-ISI (Y/N)**	**Degradation Mechanism**	**Adjacent Weld Examined (Y/N)**
B9.11	25-024	**Shutdown Cooling Pipe to Weld-o-let Circ Weld**	High	Y 2002 2R15	3.0	0.438	SA-312 TP 316 SS to SA-182 F316 SS	Missed coverage was due to Single Side exam due to the Pipe to Weld-o-let Configuration where coverage was limited in the upper code volume. 68.75% exam. See Figure 13	Y	TASCS	Y
B9.21	27-001	**Pressurizer Spray Loop 1B Safe End to Nozzle Circ Weld – DM Weld**	Med	N 2R14 2002	3.0	0.438	SA-182 TP 316 SS to SA-105 CS	Missed coverage was due to the Nozzle to Safe End Weld and adjacent Pipe Weld Configuration. The area of limited coverage is in the base material on the Safe End side. 83% exam. See Figure 14	Y	None Identified	Y
R1.20	27-002	**Pressurizer Spray Piping Loop 1B Elbow to Safe End Circ Weld**	Med	Y 2006 2R18	3.0	0.438	SA-403 WP316 SS to SA-182 TP 316	Missed coverage was due to the intrados of the elbow configuration for approximately 33% of scan on one side. Volume was scanned 100% in one direction. 83% exam. See Figure 15	Y	None Identified	Y
R1.20	27-003	**Pressurizer Spray Piping Loop 1B Elbow to Pipe Circ Weld**	Med	Y 2006 2R18	3.0	0.438	SS SA-312 TP 316	Missed coverage was due to the intrados of the elbow configuration for approximately 33% of scan on one side. Volume was scanned 100% in one direction. 83% exam. See Figure 16	Y	None Identified	Y

Table 1 Limited B-J Examinations											
Component Description			**Additional Information**								
Item Number	**Comp. ID**	**Item Description**	**Safety Significance (High or Med)**	**Examined with ASME Sect. XI App VIII procedure**	**Dia. (in)**	**Wall Thick. (in)**	**Material**	**Reason for missed coverage**	**Examined RI-ISI (Y/N)**	**Degradation Mechanism**	**Adjacent Weld Examined (Y/N)**
R1.20	27-065	**Pressurizer Spray Piping Loop 1B Valve to Pipe Circ Weld**	Med	Y 2005 2R17	3.0	0.438	SS SA-312 TP 316	Missed coverage was due to Single Side exam due to the Valve to Pipe Configuration. Sound was projected into the valve side of the weld. Coverage volume limited to 50% due to procedure qualification restrictions. See Figure 17	Y	None Identified	Y
R1.20	27-066	**Pressurizer Spray Piping Loop 1B Pipe to Tee Circ Weld**	Med	Y 2005 2R17	3.0	0.438	SS SA-312 TP 316	Missed coverage was due to the tee configuration for approximately 55% of scan on one side. 73% exam. See Figure 18	Y	None Identified	Y
B9.21	40-005	**Charging Piping Loop 1A Valve to Pipe Circ Weld**	Med	Y 2002 2R15	2.0	0.344	SS SA-312 TP 316	Missed coverage was due to Single Side exam due to the Valve to Pipe Configuration. Volume was limited on the valve side. 59.6% exam. See Figure 19	Y	None Identified	N
B9.21	40-008	**Charging Piping Loop 1A Pipe to Elbow Circ Weld**	Med	Y 2002 2R15	2.0	0.344	SS SA-312 TP 316 to SA-403 WP 316	Missed coverage was due to the intrados of the elbow configuration for approximately 20% on one side and weld crown. 74% exam. See Figure 20	Y	None Identified	Y
R1.11	40-025	**Charging Piping Loop 1A Elbow to Safe End Circ Weld**	High	Y 2009 2R20	2.0	0.344	SS/SS SA-403 TP 316 to SA-182 TP 316	Missed coverage was due to the intrados of the elbow configuration for approximately 30% on one side. 85% exam. See Figure 21	Y	Thermal Transient (TT)	N

Table 1
Limited B-J Examinations

Component Description			Additional Information								
Item Number	**Comp. ID**	**Item Description**	**Safety Significance (High or Med)**	**Examined with ASME Sect. XI App VIII procedure**	**Dia. (in)**	**Wall Thick. (in)**	**Material**	**Reason for missed coverage**	**Examined RI-ISI (Y/N)**	**Degradation Mechanism**	**Adjacent Weld Examined (Y/N)**
B9.21	41-003	**Charging Piping Loop 2A Valve to Pipe Circ Weld**	Med	Y 2002 2R15	2.0	0.344	SS SA-312 TP 316	Missed coverage was due to Single Side exam due to the Valve to Pipe Configuration. Volume was limited on the valve side. 60% exam. See Figure 22	Y	None Identified	N
B9.21	41-003C	**Charging Piping Loop 2A Tee to Pipe Circ Weld**	Med	Y 2002 2R15	2.0	0.344	SS SA-312 TP 316	Missed coverage was due to Single Side exam due to the Tee to Pipe configuration. Volume was limited on the Tee side. 60% exam. See Figure 23	Y	None Identified	N
B9.11	43-022	**Pressurizer LTOP Tee to Pipe Circ Weld**	High	Y 2003 2R16	6.0	0.562	SS SA-312 TP 316	Missed coverage was due to the Tee to Pipe configuration and branch connection. Volume was limited in base material. 71.2% exam. See Figure 24	Y	TASCS	Y
R1.11	43-023	**Pressurizer LTOP Tee to Pipe Circ Weld**	High	Y 2005 2R17	6.0	0.562	SS SA-312 TP 316	Missed coverage was due to the Tee to Pipe configuration. Sound was projected into Tee side but scan credit restricted by procedure as single side. 81% exam. See Figure 25	Y	TASCS	Y
B9.11	43-027	**Pressurizer LTOP Pipe to Valve Circ Weld**	Med	Y 2002 2R15	4.0	0.438	SS SA-312 TP 316	Missed coverage was due to Single Side exam due to the Valve to Pipe Configuration. Volume was limited on the valve side. 67.6% exam. See Figure 26	Y	TASCS TT	N

Table 1 Limited B-J Examinations											
Component Description			**Additional Information**								
Item Number	**Comp. ID**	**Item Description**	**Safety Significance (High or Med)**	**Examined with ASME Sect. XI App VIII procedure**	**Dia. (in)**	**Wall Thick. (in)**	**Material**	**Reason for missed coverage**	**Examined RI-ISI (Y/N)**	**Degradation Mechanism**	**Adjacent Weld Examined (Y/N)**
B9.11	43-033	**Pressurizer LTOP Tee to Pipe Circ Weld**	Med	Y 2002 2R15	3.0	0.438	SS SA-312 TP 316	Missed coverage was due to the Tee to Pipe configuration. Volume was limited on Tee side. 72.5% exam. See Figure 27	Y	TASCS TT	N
R1.20	13-008	**RCP 2P-32C Discharge Nozzle SE to Pipe Circ Weld –DM Weld**	Med	Y 2009 2R20	30.0	3.25	CSS/SS to SA-533-67A	Missed Coverage was due to Cast Stainless Steel Safe End Side and Weld Crown. Procedure is restricted from crediting Centrifugal Cast Stainless Steel (CCSS) volume credit. Scanned with Phased Array. 60.1% exam. See Figure 28	Y	None Identified	N
R1.20	15-008	**RCP 2P-32D Discharge Nozzle SE to Pipe Circ Weld-DM Weld**	Med	Y 2009 2R10	30.0	3.25	CSS/SS to SA-533-67A	Missed Coverage was due to Cast Stainless Steel Safe End Side and Weld Crown. Procedure restricted from crediting CCSS volume credit. Scanned with Phased Array. 62.8% exam. See Figure 29	Y	None Identified	N
R1.11	29-056	**Pressurizer Auxiliary Spray Pipe to Tee Circ Weld**	High	Y 2008 2R19	2.0	0.344	SS SA-312 TP 316	Missed coverage was due to the Tee to Pipe configuration. Sound was projected into Tee side but coverage volume limited to 50% due to procedure qualification restrictions. See Figure 30	Y	TASCS	Y

Figure 1

Scan Plan and Coverage for ISI Component 02-T-082

Not to Scale

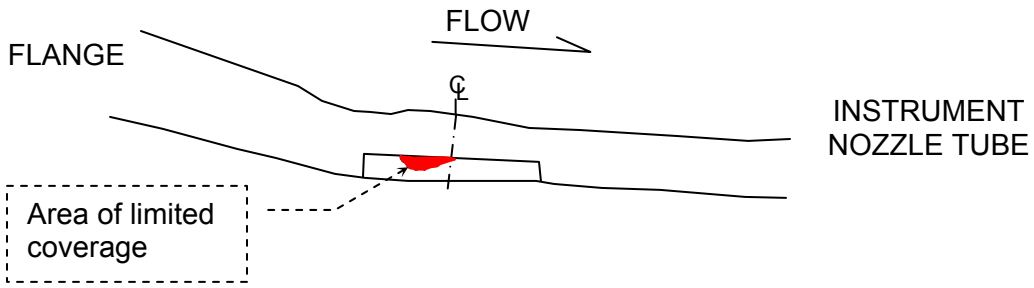

Figure 2

Scan Plan and Coverage for ISI Component 02-T-083

Not to Scale

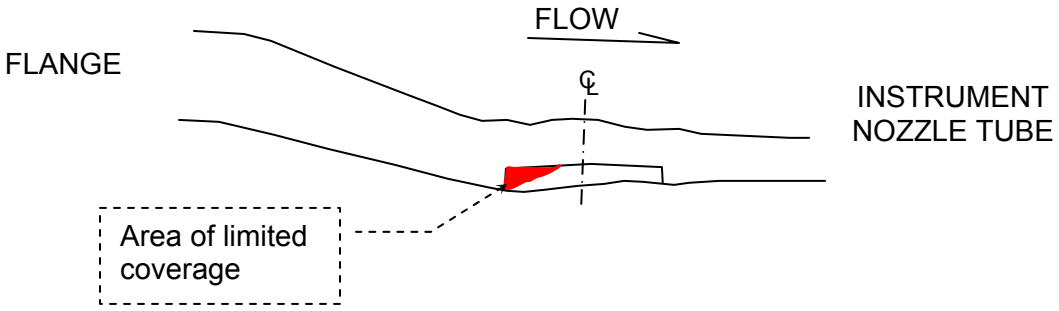

Figure 3

Scan Plan and Coverage for ISI Component 21-001

Not to Scale

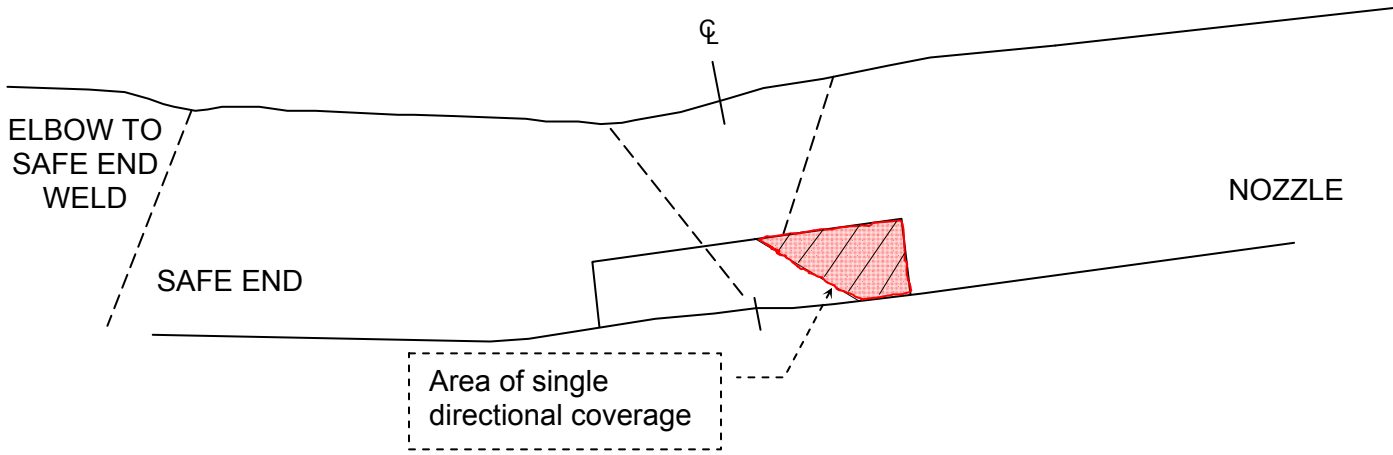

Figure 4

Scan Plan and Coverage for ISI Component 21-007

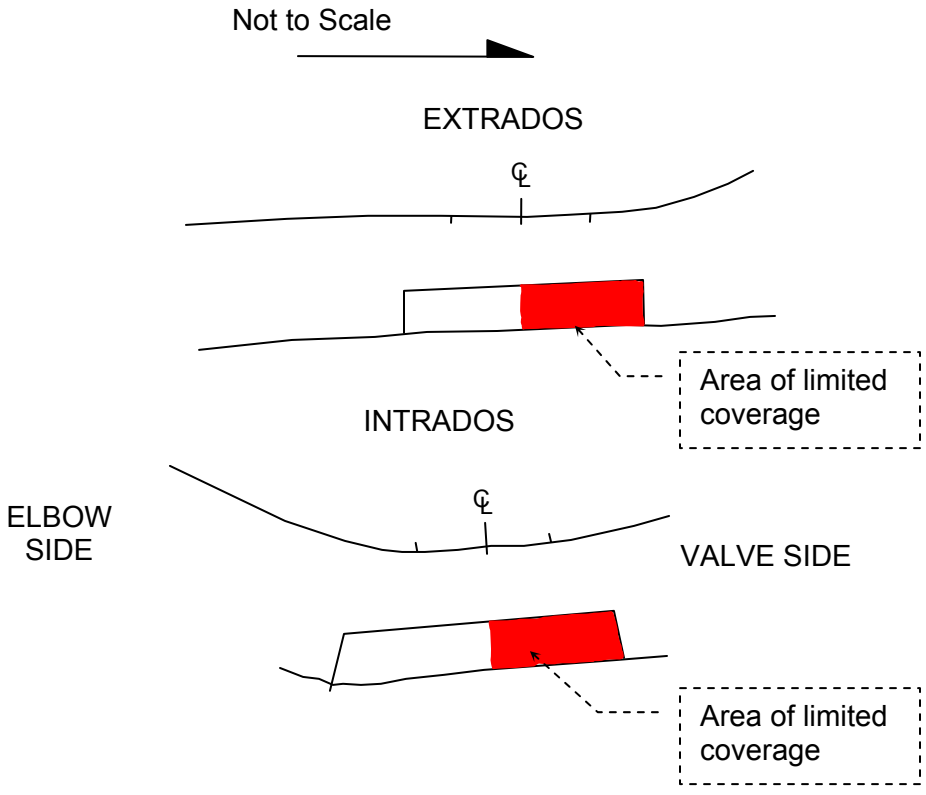

Figure 5

Scan Plan and Coverage for ISI Component 22-001

Not to Scale

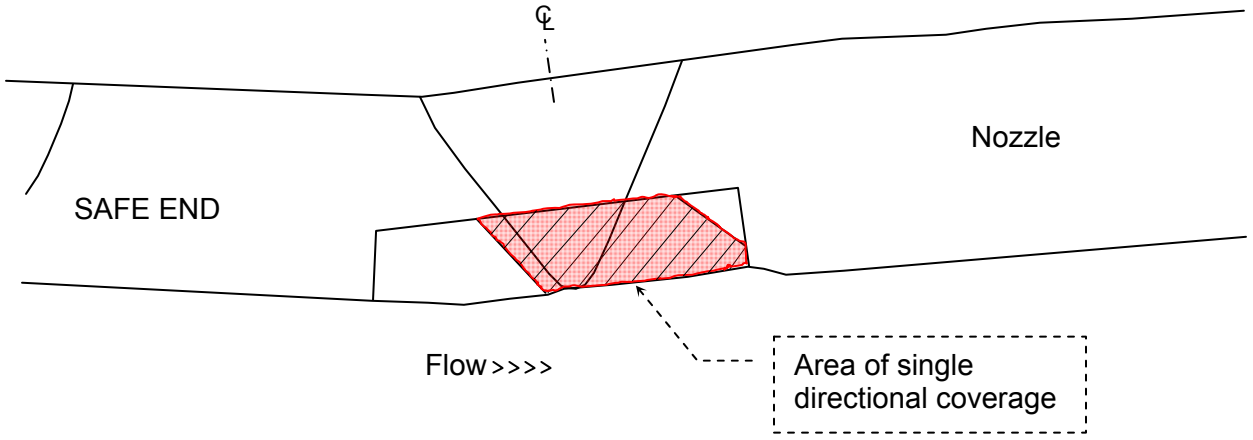

Figure 6

Scan Plan and Coverage for ISI Component 22-004

Not to Scale

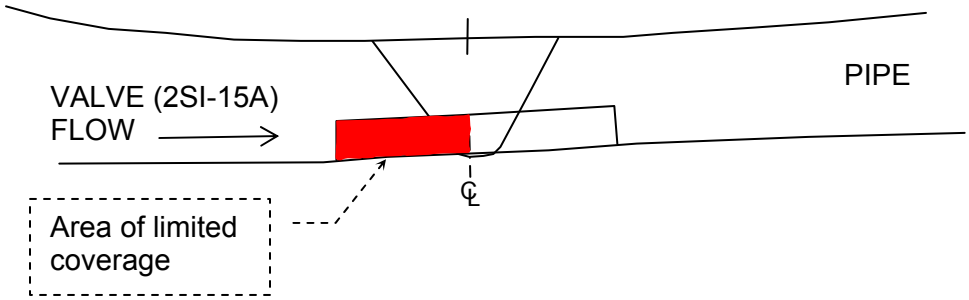

Figure 7

Scan Plan and Coverage for ISI Component 22-005

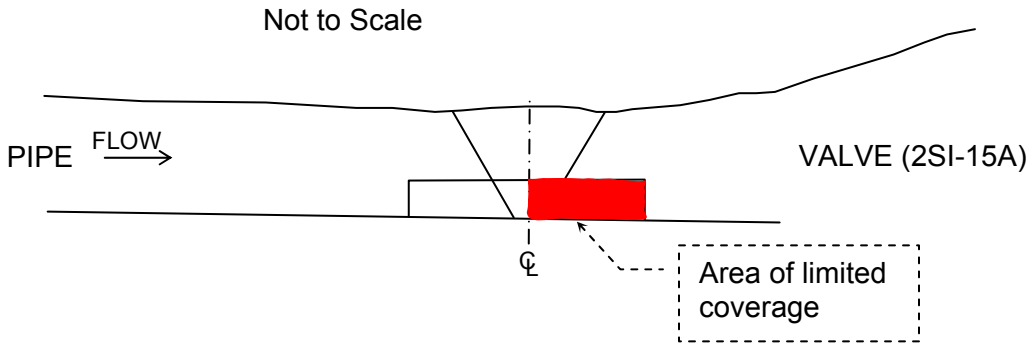

Figure 8

Scan Plan and Coverage for ISI Component 23-001

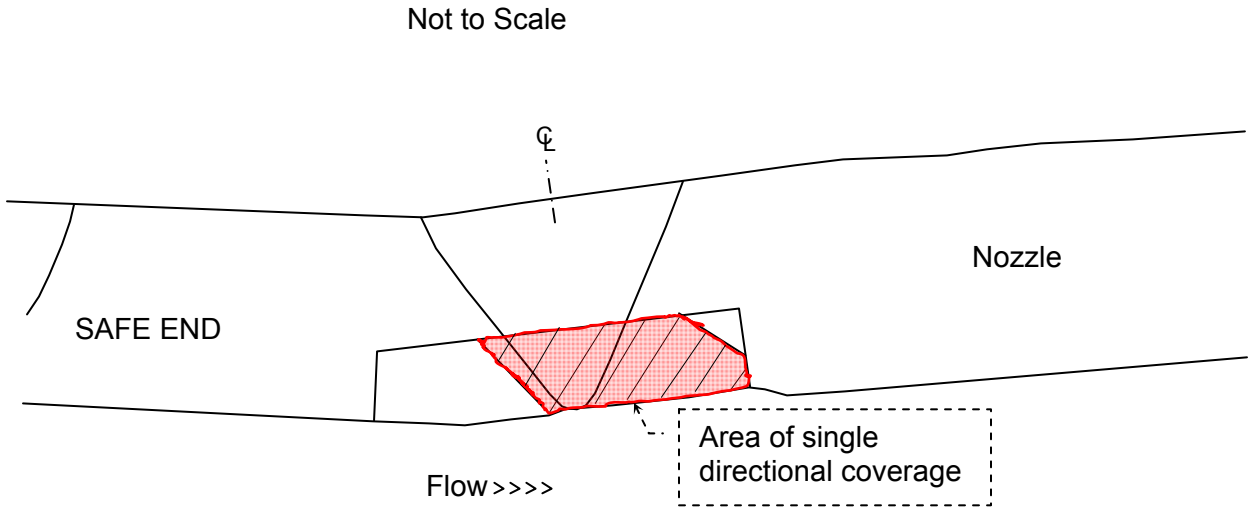

Figure 9

Scan Plan and Coverage for ISI Component 23-006

Not to Scale

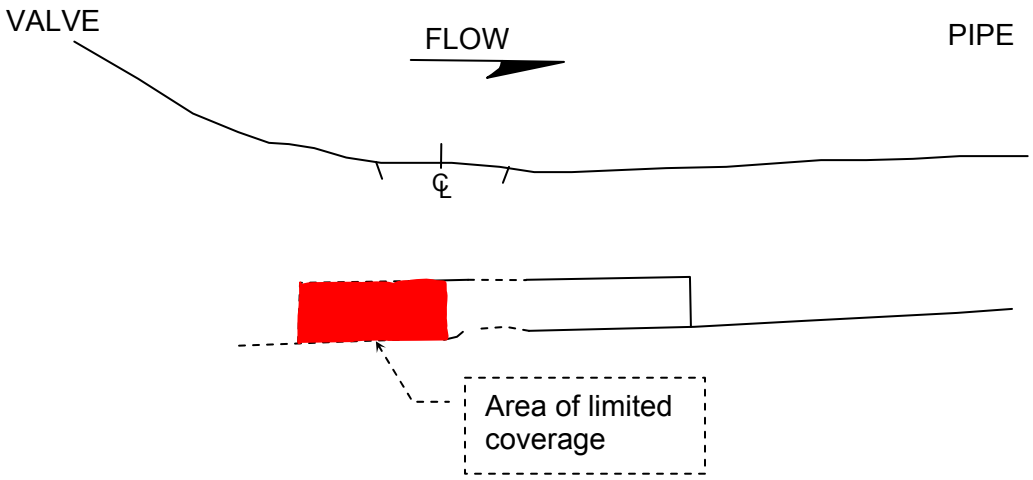

Figure 10

Scan Plan and Coverage for ISI Component 23-007

Not to Scale

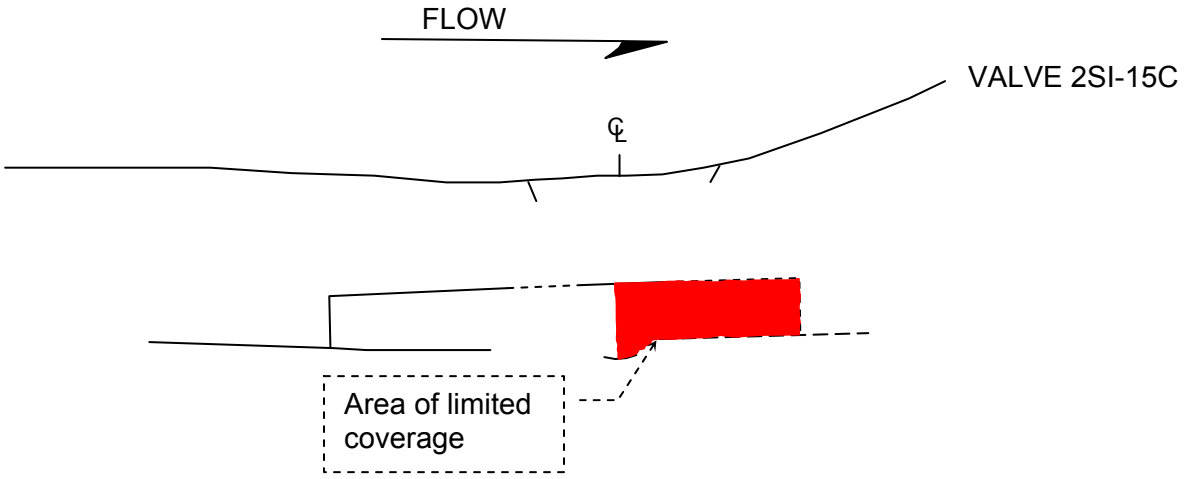

Figure 11

Scan Plan and Coverage for ISI Component 24-001

Not to Scale

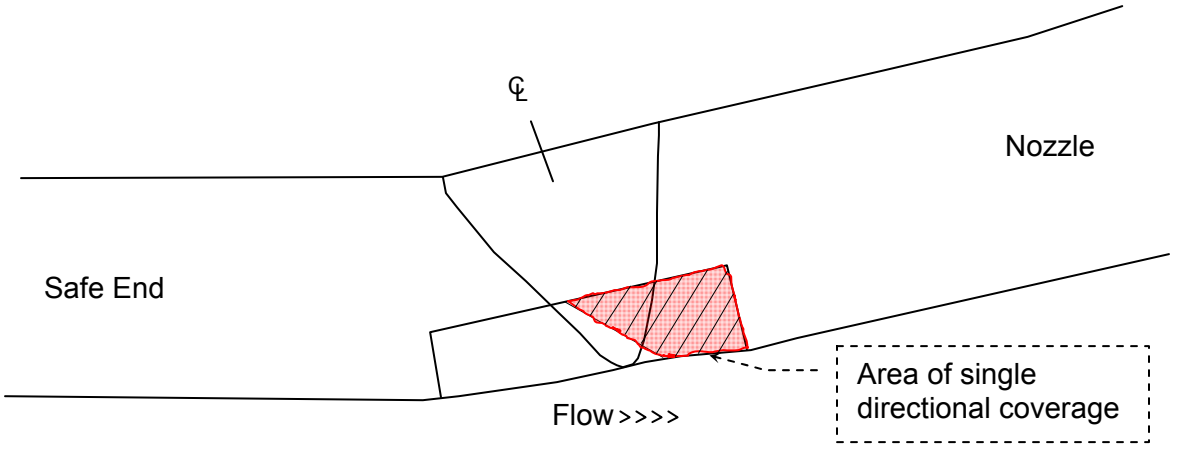

Figure 12

Scan Plan and Coverage for ISI Component 24-006

Not to Scale

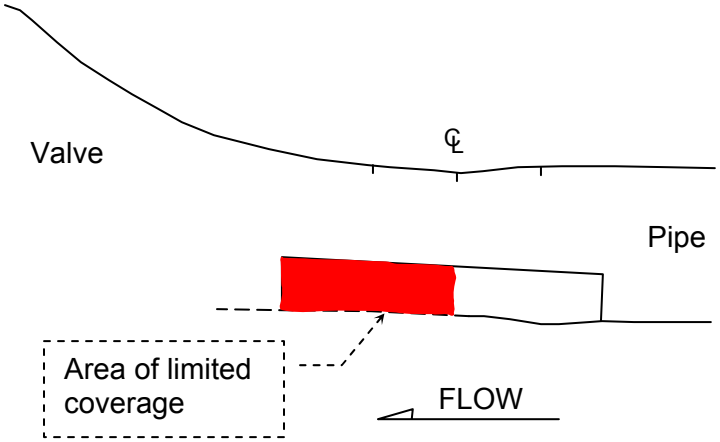

Figure 13

Scan Plan and Coverage for ISI Component 25-024

Not to Scale

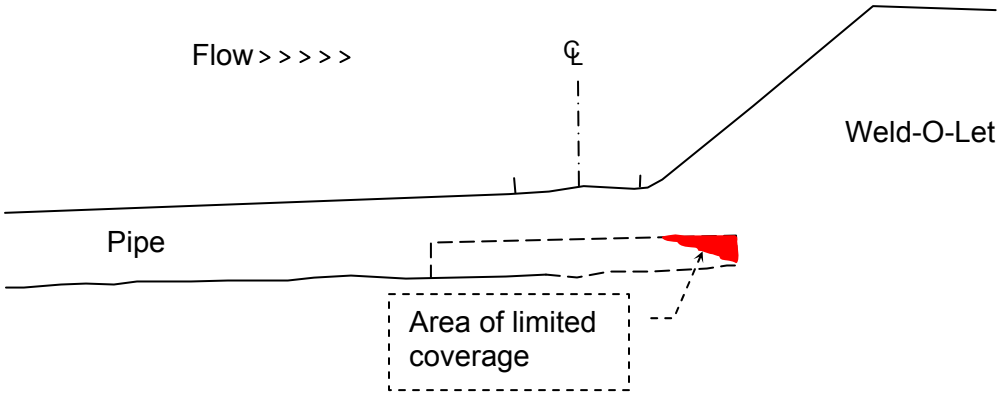

Figure 14

Scan Plan and Coverage for ISI Component 27-001

Not to Scale

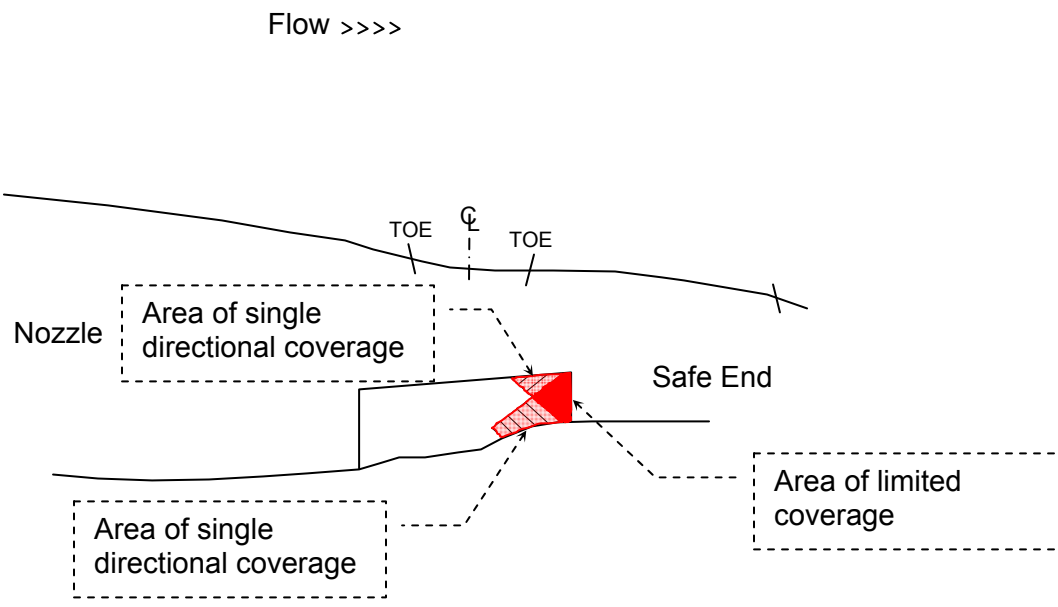

Figure 15

Scan Plan and Coverage for ISI Component 27-002

Not to Scale

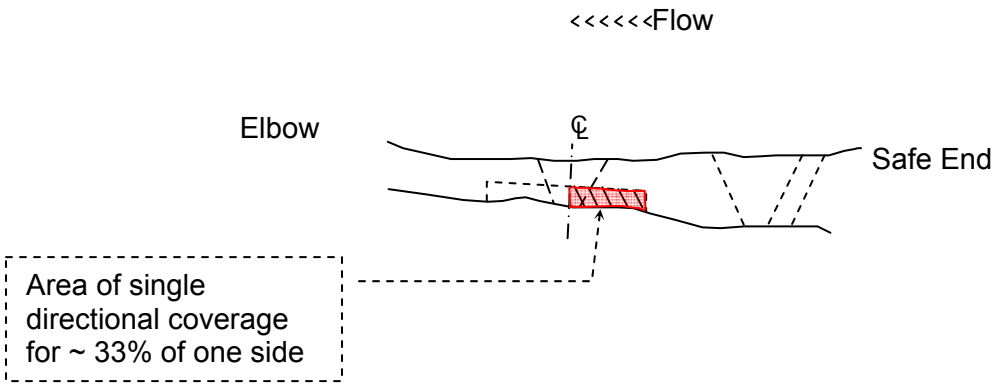

Figure 16

Scan Plan and Coverage for ISI Component 27-003

Not to Scale

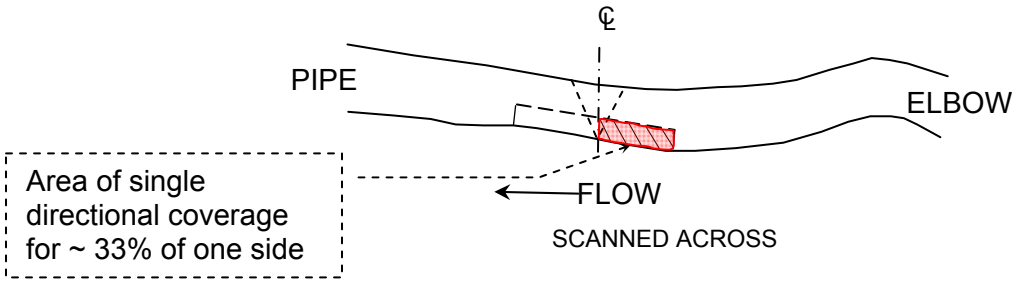

Figure 17

Scan Plan and Coverage for ISI Component 27-065

Not to Scale

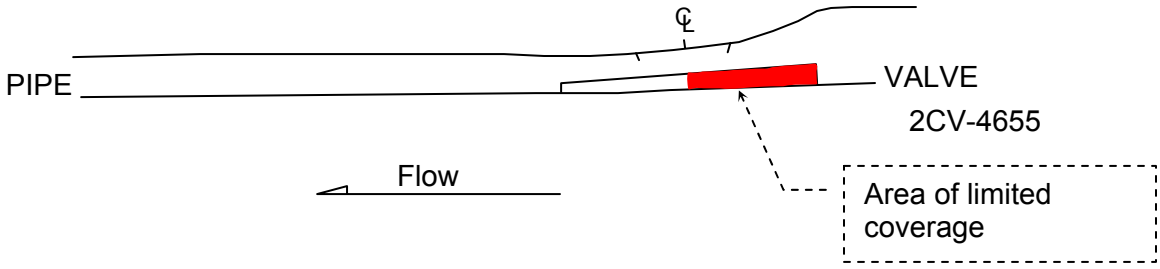

Figure 18

Scan Plan and Coverage for ISI Component 27-066

Not to Scale

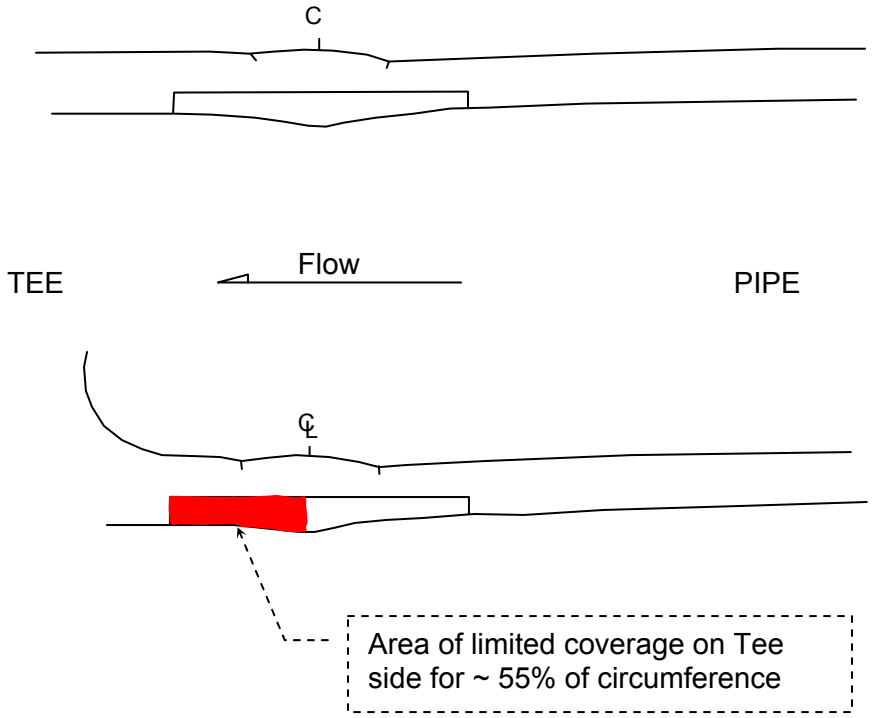

Figure 19

Scan Plan and Coverage for ISI Component 40-005

Not to Scale

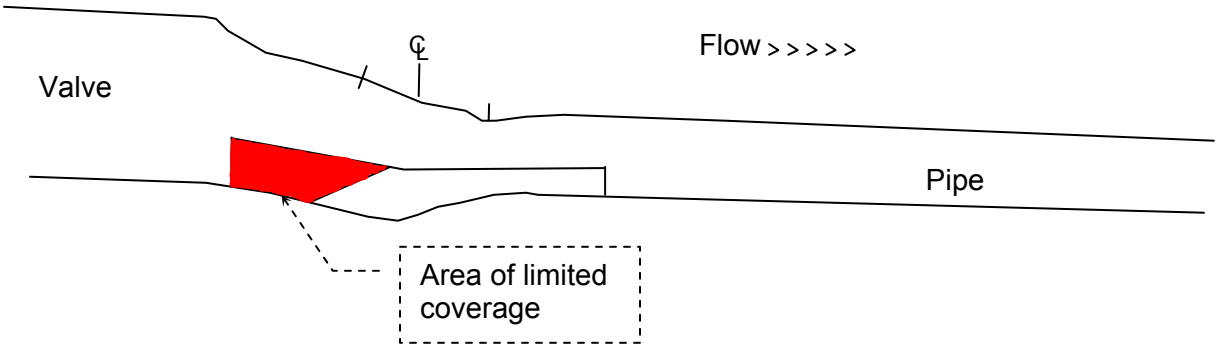

Figure 20

Scan Plan and Coverage for ISI Component 40-008

Not to Scale

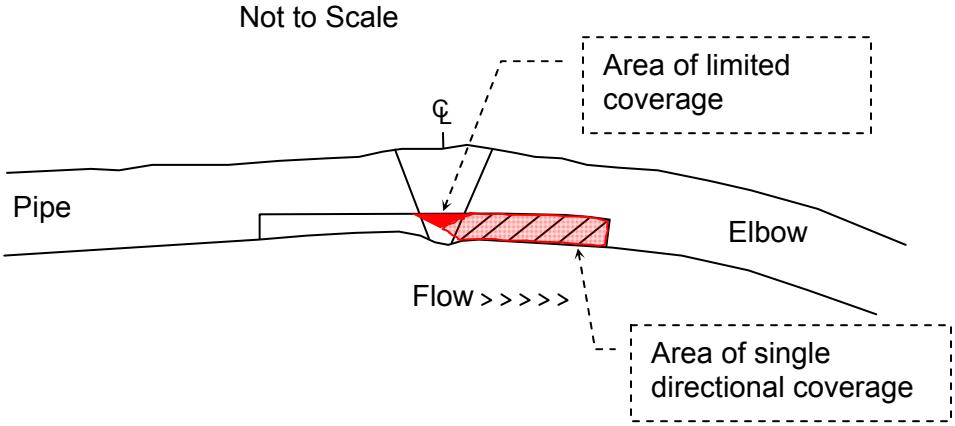

Figure 21

Scan Plan and Coverage for ISI Component 40-025

Not to Scale

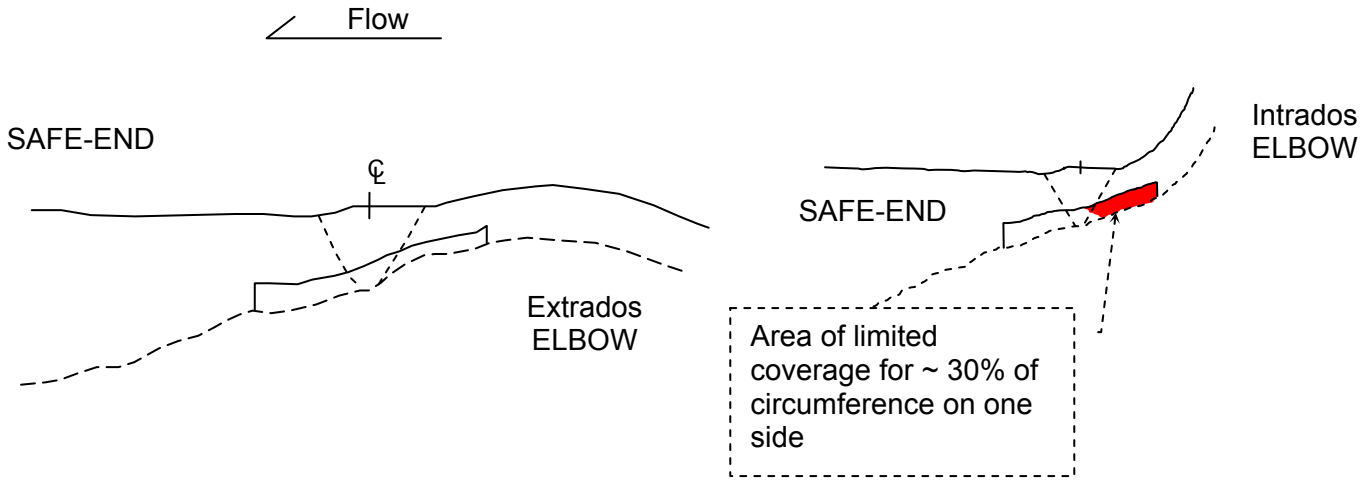

Figure 22

Scan Plan and Coverage for ISI Component 41-003

Not to Scale

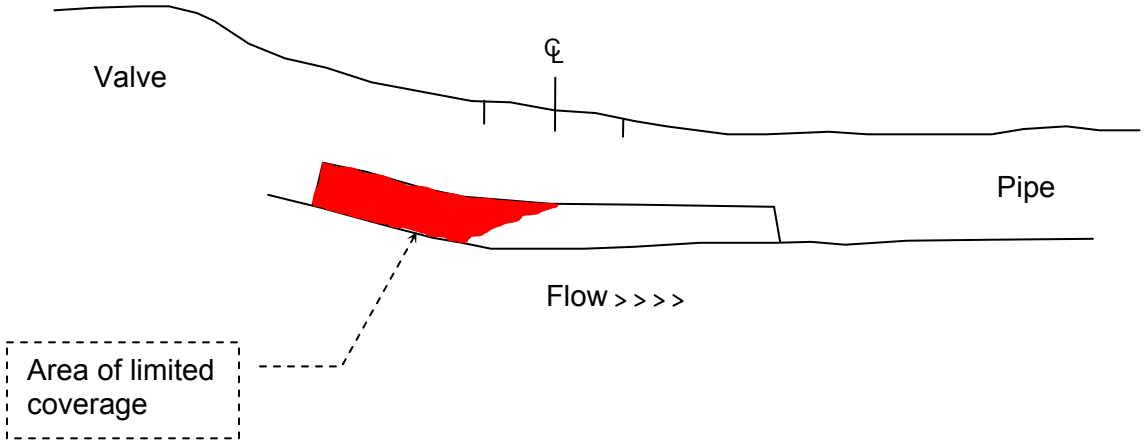

Figure 23

Scan Plan and Coverage for ISI Component 41-003C

Not to Scale

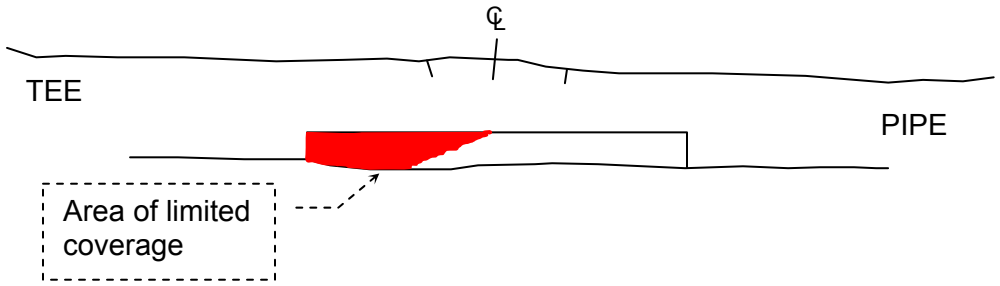

Figure 24

Scan Plan and Coverage for ISI Component 43-022

Not to Scale

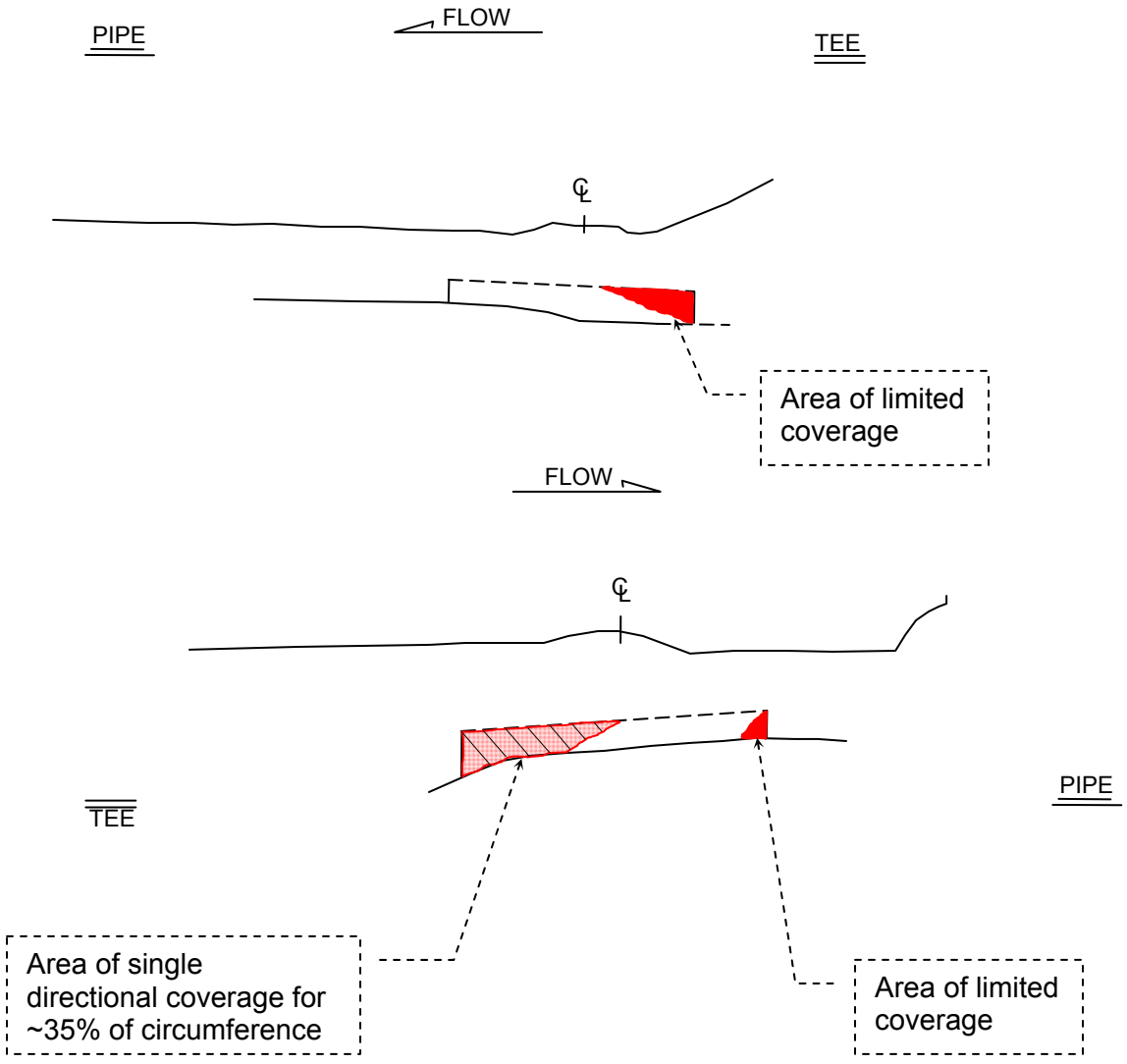

Figure 25

Scan Plan and Coverage for ISI Component 43-023

Not to Scale

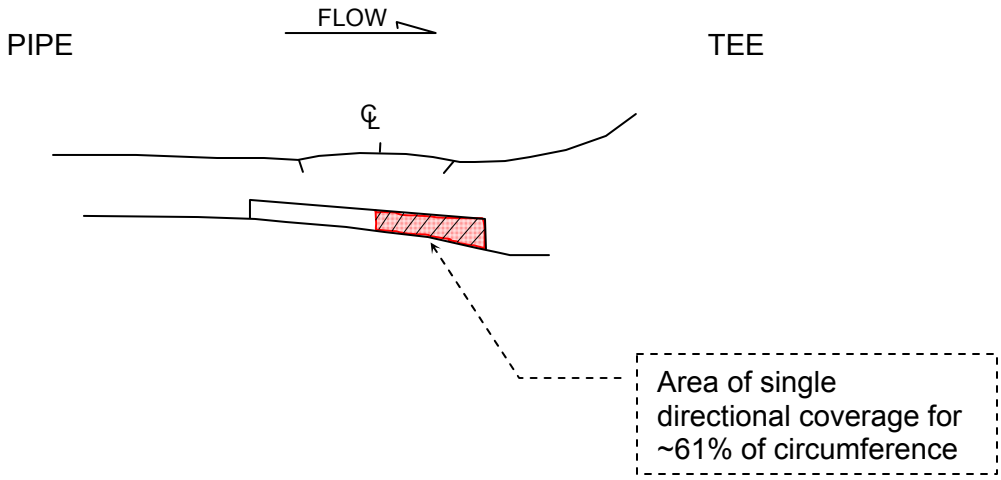

Figure 26

Scan Plan and Coverage for ISI Component 43-027

Not to Scale

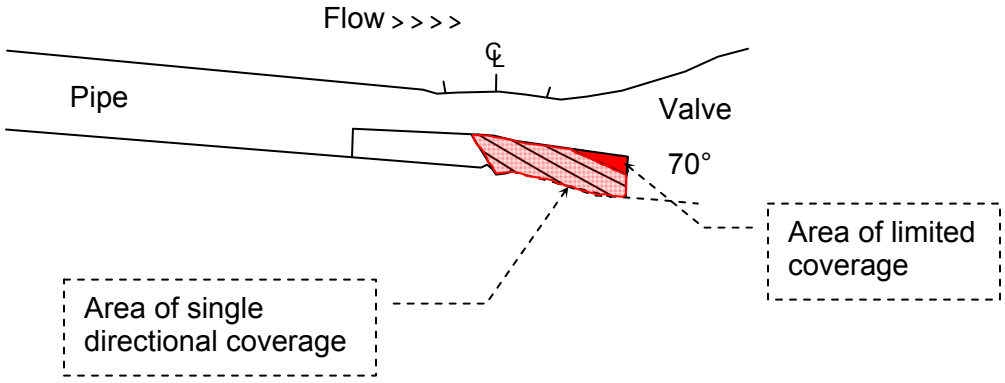

Figure 27

Scan Plan and Coverage for ISI Component 43-033

Not to Scale

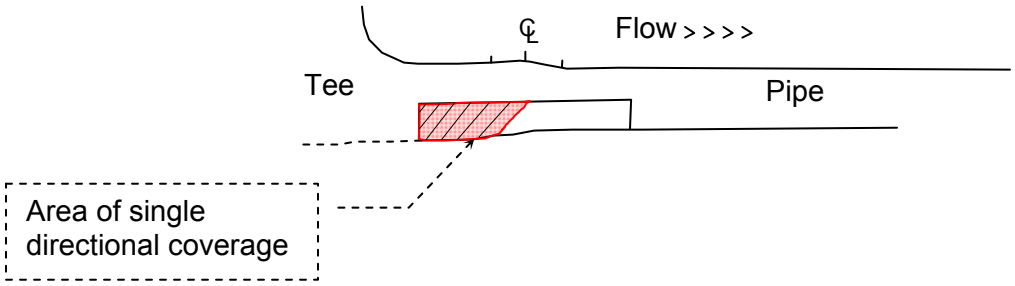

Figure 28

Scan Plan and Coverage for ISI Component 13-008

Not to Scale

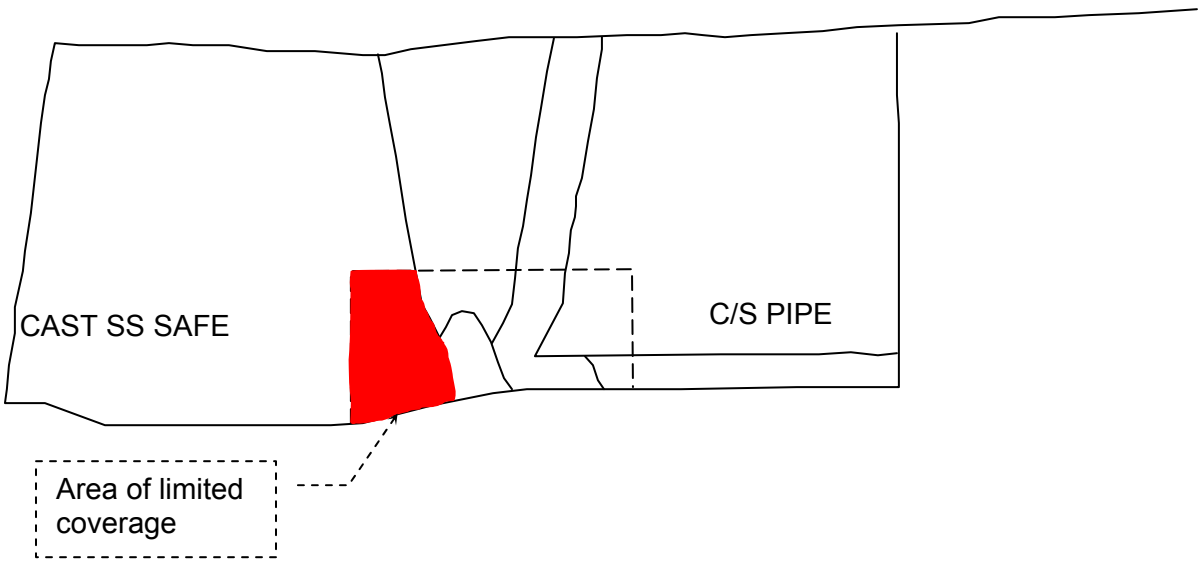

Figure 29

Scan Plan and Coverage for ISI Component 15-008

Not to Scale

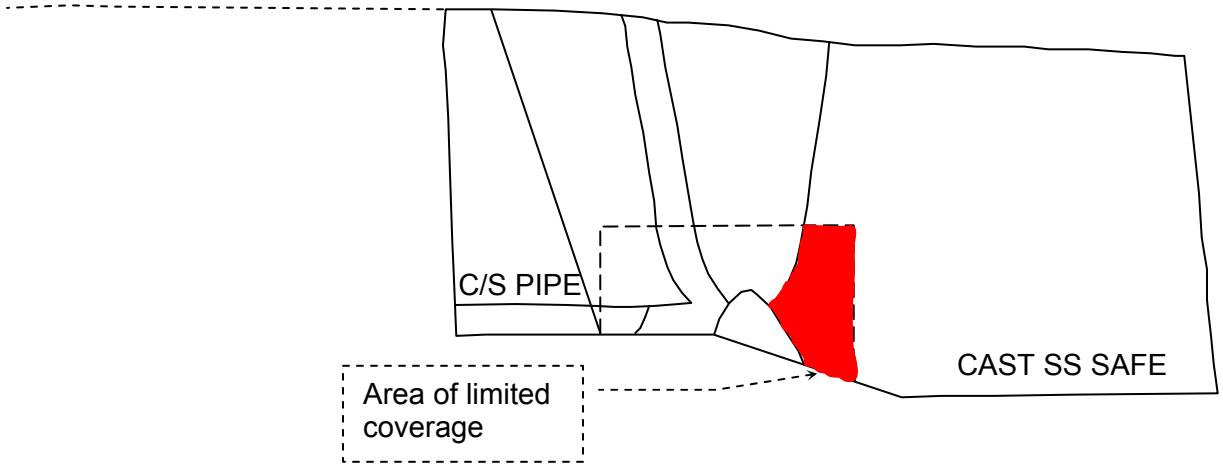

Figure 30

Scan Plan and Coverage for ISI Component 29-056

Not to Scale