Dominion Energy Nuclear Connecticut, Inc.
5000 Dominion Boulevard, Glen Allen, VA 23060
DominionEnergy.com

June 17, 2020

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

Serial No. 20-145
NRA/SS R0
Docket No. 50-423
License No. NPF-49

DOMINION ENERGY NUCLEAR CONNECTICUT, INC.
MILLSTONE POWER STATION UNIT 3
ASME SECTION XI INSERVICE INSPECTION PROGRAM
RELIEF REQUESTS FOR LIMITED COVERAGE EXAMINATIONS PERFORMED IN THE THIRD PERIOD OF THE THIRD 10-YEAR INSPECTION INTERVAL

The Millstone Power Station Unit 3 third 10-year interval for the inservice inspection program began on April 23, 2009. During the third inspection period of this interval, the components identified in Attachments 1 through 8 received less than the required examination coverage. Accordingly, pursuant to 10 CFR 50.55a(g)(5)(iii), Dominion Energy Nuclear Connecticut, Inc. requests relief on the basis that the required examination coverage was impractical due to physical obstructions and limitations imposed by design, geometry and materials of construction of the subject components.

Attachments 1 through 8 contain the specific relief requests and the individual basis for each request. These relief requests have been reviewed and approved by the station's Facility Safety Review Committee.

If you have any questions or require additional information, please contact Shayan Sinha at (804) 273-4687.

Sincerely,

Mark D. Sartain
Vice President – Nuclear Engineering & Fleet Support

Attachments:

1. Relief Request IR-3-40, Examination Category B-B, Pressure Retaining Welds in Vessels other than Reactor Vessels
2. Relief Request IR-3-41, Examination Category B-D, Full Penetration Welded Nozzles in Vessels - Inspection Program B
3. Relief Request IR-3-42, Examination Category C-A, Pressure Retaining Welds in Pressure Vessels
4. Relief Request IR-3-43, Examination Category C-B, Pressure Retaining Nozzle Welds in Vessels
5. Relief Request IR-3-44, Examination Category C-F-1, Pressure Retaining Welds in Austenitic Stainless Steel or High Alloy Piping
6. Relief Request IR-3-45, Examination Category C-F-2, Pressure Retaining Welds in Carbon or Low Alloy Steel Piping
7. Relief Request IR-3-46, Examination Category F-A, Supports
8. Relief Request IR-3-47, Examination Category R-A, Risk-Informed Piping Examinations

Commitments made in this letter: None

cc: U.S. Nuclear Regulatory Commission
Region I
2100 Renaissance Blvd, Suite 100
King of Prussia, PA 19406-2713

R. V. Guzman
Senior Project Manager
U.S. Nuclear Regulatory Commission
One White Flint North, Mail Stop 08-C 2
11555 Rockville Pike
Rockville, MD 20852-2738

NRC Senior Resident Inspector
Millstone Power Station

ATTACHMENT 1

RELIEF REQUEST IR-3-40
EXAMINATION CATEGORY B-B
PRESSURE RETAINING WELDS IN VESSELS OTHER THAN REACTOR VESSELS

DOMINION ENERGY NUCLEAR CONNECTICUT, INC. (DENC)
MILLSTONE POWER STATION UNIT 3 (MPS3)

10 CFR 50.55a Request Number: IR-3-40

Relief Requested
In Accordance with 10 CFR 50.55a(g)(5)(iii)

--Inservice Inspection Impracticality--

1. ASME Code Components Affected:

ASME Code Class:	Code Class 1
Examination Category:	B-B, Pressure Retaining Welds in Vessels other than Reactor Vessels
Item Numbers:	B2.11, Pressurizer Circumferential Weld, Shell-to-Head Weld
Component Identification:	Listed in Table 1
Material:	Shell and Heads SA533 Grade (A) CL 2

2. Applicable Code Edition and Addenda

ASME Section XI, 2004 Edition, No addenda

3. Applicable Code Requirement

ASME Section XI, 2004 Edition, Category B-B requires volumetric examination of 100 percent of the weld volume as defined in Table IWB-2500-1 and shown in Figure IWB-2500-20. The alternative requirements of ASME Section XI, Code Case N-460, approved for use in Regulatory Guide 1.147, allows credit for essentially 100 percent coverage of the weld provided greater than 90 percent of the required volume has been examined.

4. Impracticality of Compliance

Pursuant to 10 CFR 50.55a(g)(5)(iii), relief is requested from essentially 100 percent volumetric examination coverage requirement for the subject weld due to the design and permanent obstructions which limit the volumetric coverage that can be obtained.

The examination of the subject weld was performed with a manual ultrasonic technique using equipment and procedures written in accordance with ASME Section XI, Appendix 1 and Section V, Article 4.

The subject Pressurizer Upper Head to Shell weld 03-007-SW-J is limited due to obstruction caused by four vertical support members from a pressurizer safety valve restraint and seven permanently welded 2" x 2" insulation support mounting pads that obstruct portions of the subject weld and preclude achieving the required 100 percent volume examination coverage.

The required examination volume of this weld was interrogated ultrasonically to the maximum extent possible. No alternative techniques or advanced technologies, including phased array, were considered to be capable of obtaining complete examination coverage.

An isometric drawing and coverage calculations are provided in this attachment.

TABLE 1
Limited Examination Category B-B, Pressure Retaining Welds in Vessels other than Reactor Vessels

Weld Identification	Code Item #	System Configuration	Examination Angle and Wave Mode	Limitations and Results	Examination Coverage (%)
03-007-SW-J	B2.11	Reactor Coolant System Pressurizer Upper Head to Shell weld	0° Longitudinal Wave 45° Shear Wave 60° Shear Wave	Scan is limited due to obstruction caused by permanent support structure for pressurizer safety valves and welded insulation support mounting pads. No recordable indications were detected.	69.7%

5. Burden Caused by Compliance

Compliance with the Code coverage requirements for weld 03-007-SW-J would require removal of the support structure for the pressurizer safety valves. This support is extremely large with a weight of approximately 10,000 lbs. Due to the massive size of this support structure, it would require specialized rigging and handling techniques to attempt removal without damage to nearby plant equipment. Reinstallation with

critical alignments would also be a concern. In addition, this support is configured in such a manner that the pressurizer safety valve piping is routed through the support members, and would also need to be removed in order to remove this support. Additionally, removal of the permanently welded insulation support ring mounting pads would require mechanically cutting the pad welds and then reinstalling pads by welding following the completion of the examination. DENC considers performance of these activities in order to meet the 100 percent code examination requirement to be impractical due to the cost, increased radiation exposure, impact to plant equipment, and personnel resources required.

6. Proposed Alternative and Basis for Use

The subject weld received a volumetric examination to the maximum extent practical utilizing the best available techniques, and all results were acceptable. Additionally, this component is monitored for through-wall leakage as part of the ASME Section XI System Pressure Test Program and receives a visual (VT-2) examination at the end of each refueling outage during the system leakage test as required by Section XI, Table IWB-2500-1, Category B-P for Class 1 components.

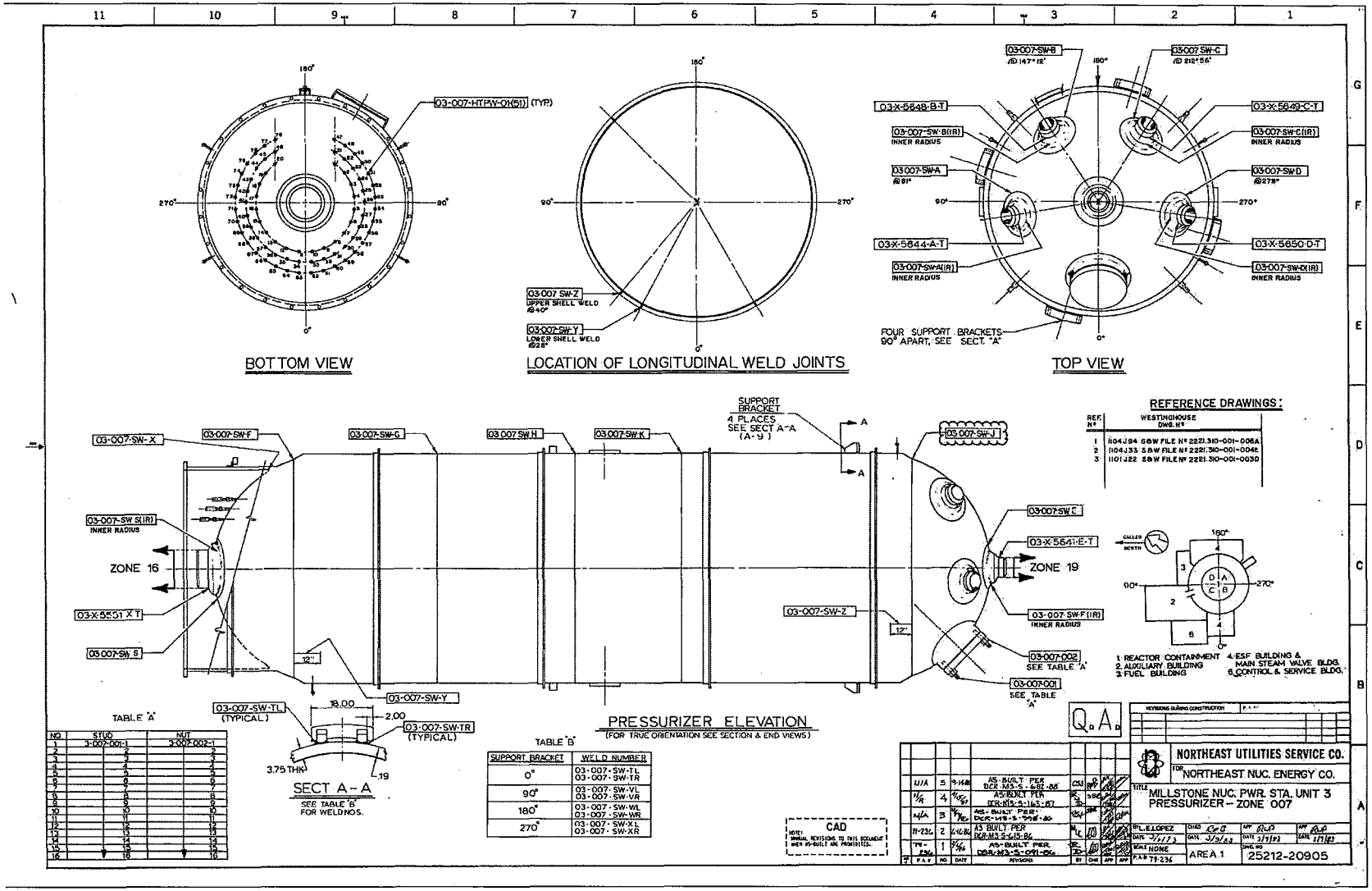
Based on the examination volumes that were obtained with acceptable results, along with the visual (VT-2) examination performed each refueling outage, it is reasonable to conclude that service-induced degradation would be detected. Therefore, this proposed alternative will provide an acceptable level of quality and safety by providing reasonable assurance of structural integrity of the subject welds.

7. Duration of Proposed Alternative

Relief is requested for the third 10-year inservice inspection interval for MPS3, which began on April 23, 2009 and ended on June 22, 2019.

8. Precedent

A similar relief request was approved for use at MPS3 during the second 10-year inservice inspection interval in NRC letter dated April 26, 2011 (i.e. Relief Request IR-2-52 (ADAMS Accession Number No. ML110691154)).

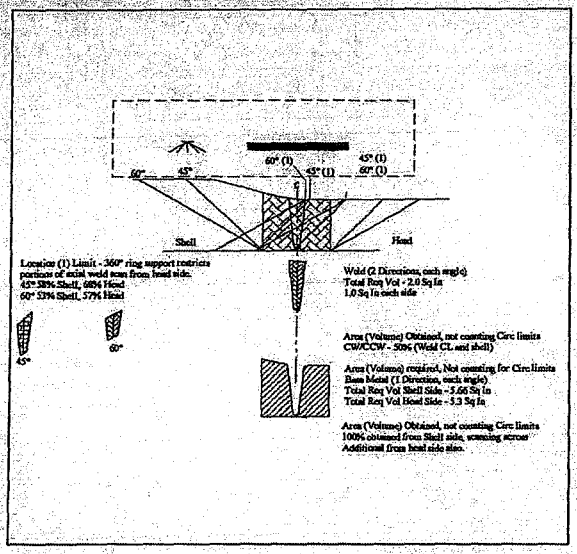


Dominion Energy

Report No: M3-UT-17-131
Summary No: M3.B2.11_0146
Page 2 of 3
Prepared By: D.R. Cordes L/III DRC
Date: 10/27/2017

R. Christopher Wray Lv. III 10-28-17
Effort Achieved 10-20-17

Weld Number	03-007-SW-J
Weld Thickness	3"
Weld Length	283"
Weld Width	1"



283" Circ

Circ Obstructions/Restrictions:
(1) 4 2x2" Pads on weld
Restricts all angles (2.8% of L)
(2) 4 ring 18" ring supports
restricts all angles (25.4% of L)
(3) unobstructed (71.8% of L)

Weld Cov (2 directions)			
0°	71.80%	0°	71.80%
45°Shell	58.00%	45°	67.40%
45°Hd	68.00%	-	
45°CW	71.80%	-	
45°CCW	71.80%	-	
60°Shell	53.00%	60°	63.40%
60°Hd	57.00%		-
60°CW	71.80%		-
60°CCW	71.80%		-
Base Metal Cov (at least 1 direction)			
0°BM	71.80%	0°	71.80%
45°Ax BM	71.80%	45°	71.80%
45°Cr BM	71.80%	-	
60°Ax BM	71.80%	60°	71.80%
60°Cr BM	71.80%	-	

Examination Volume Dimensions: Height 3.0" Length 283" Width 4.1"

Coverage Summary
Required Scans (each has a weighing factor of 100 for complete coverage)

Angle	Weld (2 Directions)		Base Metal (At Least One direction	
0°	71.80%		71.80%	
45°	67.40%		71.80%	
60°	63.40%		71.80%	
			Code Coverage Total	69.70%
			Best Effort Coverage(Max 25%) Total	N/A

Notes:

1) Code Coverage refers to the maximum percentage of the required examination volume that is effectively examined with the qualified examination procedure.

ATTACHMENT 2

RELIEF REQUEST IR-3-41
EXAMINATION CATEGORY B-D
FULL PENETRATION WELDED NOZZLES IN VESSELS – INSPECTION PROGRAM B

DOMINION ENERGY NUCLEAR CONNECTICUT, INC. (DENC)
MILLSTONE POWER STATION UNIT 3 (MPS3)

10 CFR 50.55a Relief Request IR-3-41

Relief Requested
In Accordance with 10 CFR 50.55a(g)(5)(iii)

--Inservice Inspection Impracticality--

1. ASME Code Components Affected:

ASME Code Class:	Code Class 1	
Examination Category:	B-D, Full Penetration Welded Nozzles in Vessels – Inspection Program B	
Item Numbers:	B3.110, Pressurizer, Nozzle-to-Vessel Welds B3.130, Steam Generator (Primary Side), Nozzle-to-Vessel Welds	
Component Identification:	Listed in Table 1	
Material:	Pressurizer:	Head – SA533, GR A, CL2 Carbon Steel Nozzle – SA508, CL2 Carbon Steel Internal surface clad with stainless steel
	Steam Generator:	Head – SA533, GR B, CL1 Carbon Steel Nozzle – SA508, CL2 Carbon Steel Internal surface clad with stainless steel

2. Applicable Code Edition and Addenda

ASME Section XI, 2004 Edition, No Addenda

3. Applicable Code Requirement

ASME Section XI, 2004 Edition, Examination Category B-D requires volumetric examination of 100 percent of the weld volume as defined in Table IWB-2500-1 and shown in Figures IWB-2500-7 (a) – (d). The alternative requirements of ASME Section XI, Code Case N-460, approved for use in Regulatory Guide 1.147, allows

credit for essentially 100 percent coverage of the welds provided greater than 90 percent of the required volume has been examined.

4. Impracticality of Compliance

Pursuant to 10 CFR 50.55a(g)(5)(iii), relief is requested from the 100 percent volumetric examination coverage requirement of the subject welds due to the geometric configurations which limit the volumetric coverage that can be obtained.

The steam generator nozzle-to-head welds, and the pressurizer surge nozzle-to-head weld were all examined with a manual ultrasonic technique using equipment and procedures written in accordance with ASME Section XI, Appendix 1 and Section V, Article 4. Limitations imposed by the nozzle configuration preclude obtaining 100 percent coverage. This configuration with the nozzle outside radius within close proximity of the weld (and the configuration of the heater sleeves, in the case of the pressurizer surge nozzles) prevents complete scanning in these areas due to lift-off of the search unit that occurs causing a loss of contact between the search unit and the component.

The required examination volume of these welds was interrogated ultrasonically to the maximum extent possible. No alternative techniques or advanced technologies, including phased array, were considered capable of obtaining complete examination coverage.

Isometric drawing(s) and coverage calculations are provided in this attachment.

TABLE 1
Examination Category B-D Welds with Limited Volumetric Coverage

Weld Identification	Code Item #	System Configuration	Examination Angle and Wave Mode	Limitations and Results	Examination Coverage (%)
03-005-SW-U	B3.130	Reactor Coolant System Steam Generator Outlet Nozzle-to-Head Weld	0° Longitudinal Wave 45° Shear Wave 60° Shear Wave	Scan is limited due to nozzle configuration restricting the scans from the nozzle side. No recordable indications were detected.	82.8%
03-005-SW-V	B3.130	Reactor Coolant System Steam Generator Inlet Nozzle-to-Head Weld	0° Longitudinal Wave 45° Shear Wave 60° Shear Wave	Scan is limited due to nozzle configuration restricting the scans from the nozzle side. No recordable indications were detected.	82.8 %
03-007-SW-S	B3.110	Reactor Coolant System Pressurizer Surge Nozzle-to-Lower Head Weld	0° Longitudinal Wave 45° Shear Wave 60° Shear Wave	Scan is limited due to nozzle configuration restricting the scans from the nozzle side, and heater sleeves. No recordable indications were detected.	64.6%

5. Burden Caused by Compliance

A significant design modification or replacement of components with a different design to eliminate the noted obstructions would be required to increase examination coverage on the subject welds. DENC considers these options to meet the 100 percent Code examination requirement to be impractical due to the cost, increased radiation exposure and impact to plant equipment.

6. Proposed Alternative and Basis for Use

The subject welds received a volumetric examination to the maximum extent practical utilizing the best available techniques, and all results were acceptable. Additionally, these components are monitored for through-wall leakage as part of the ASME Section XI System Pressure Test Program and receive a visual (VT-2) examination at the end of each refueling outage during the system leakage test, as required by Section XI, Table IWB-2500-1, Category B-P for Class 1 components.

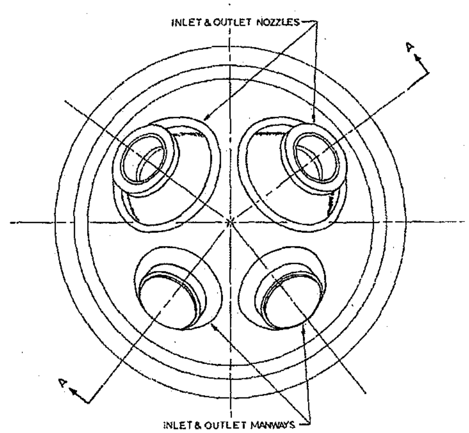
Based on the examinations volumes that were obtained with acceptable results, along with the visual (VT-2) examination performed each refueling outage, it is reasonable to conclude that service-induced degradation would be detected. Therefore, these proposed alternatives will provide an acceptable level of quality and safety by providing reasonable assurance of structural integrity of the subject welds.

7. Duration of Proposed Alternative

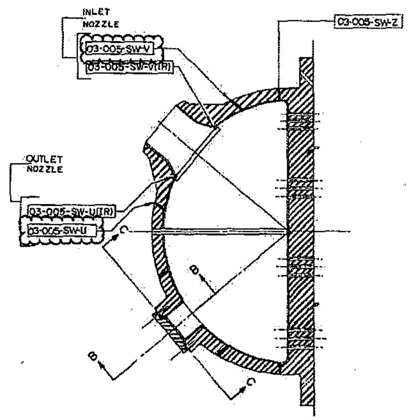
Relief is requested for the third 10-year inservice inspection interval for MPS3, which began on April 23, 2009 and ended on June 22, 2019.

8. Precedent

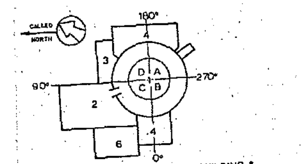
A similar relief request was approved for use at MPS3 during the second 10-year inservice inspection interval in NRC letter dated April 26, 2011 (i.e. Relief Request IR-2-53 (ADAMS Accession Number No. ML110691154)), and the second period of the third 10-year inservice inspection interval in NRC letter dated June 24, 2016 (i.e. Relief Request IR-3-20 (ADAMS Accession No. ML16136A001)).



BOTTOM VIEW



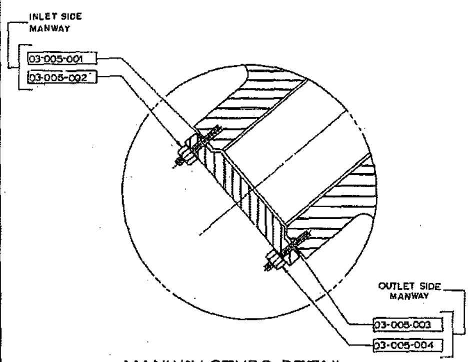
SECTIONAL ELEVATION
SECTION "A-A"



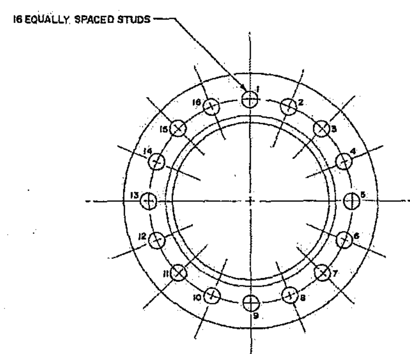
1. REACTOR CONTAINMENT
2. AUXILIARY BUILDING
3. FUEL BUILDING
4. ESF BUILDING & MAIN STEAM VALVE BLDG.
6. CONTROL & SERVICE BLDG.

REFERENCE DRAWINGS:

REF. Nº	WESTINGHOUSE DWG. Nº
1	1106J72 S&W FILE Nº 2221.210-001-006K
2	1182J06 S&W FILE Nº 2221.210-001-007K



MANWAY STUDS DETAIL
SECTION "B-B"



MANWAY STUDS LOCATION
SECTION "C-C"
(TYP.)

INLET SIDE
MANWAY DESIGNATION

NO	STUD	NUT
1	03-005-001-1	03-005-002-1
2	2	2
3	3	3
4	4	4
5	5	5
6	6	6
7	7	7
8	8	8
9	9	9
10	10	10
11	11	11
12	12	12
13	13	13
14	14	14
15	15	15
16	16	16

OULET SIDE
MANWAY DESIGNATION

NO	STUD	NUT
1	03-005-003-1	03-005-004-1
2	2	2
3	3	3
4	4	4
5	5	5
6	6	6
7	7	7
8	8	8
9	9	9
10	10	10
11	11	11
12	12	12
13	13	13
14	14	14
15	15	15
16	16	16

Q.A.

REVISIONS DURING CONSTRUCTION | P.A. NO.

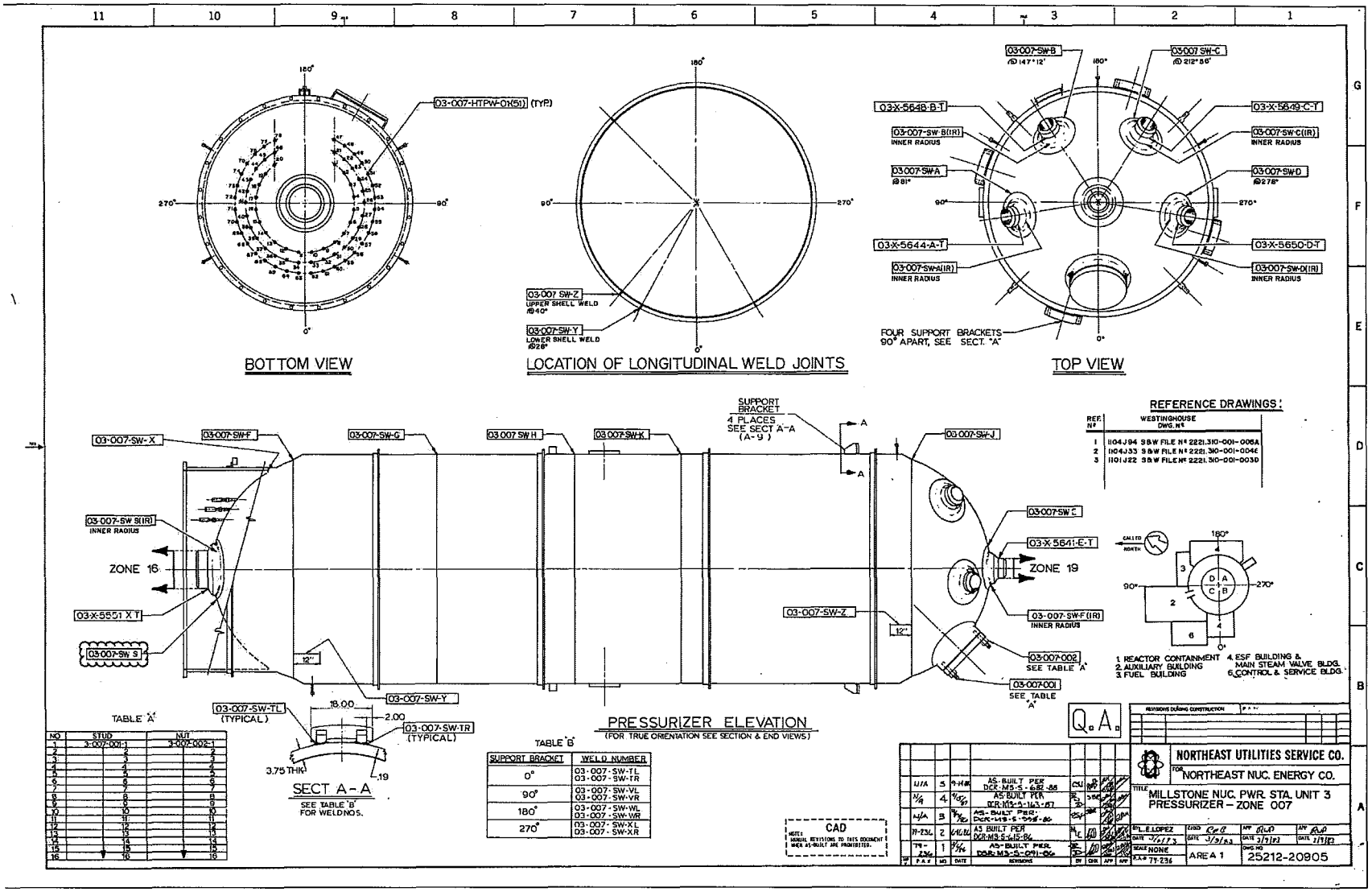
P.A.#	NO.	DATE	REVISIONS	BY	CHK	APP	APP
N/A	2	11/3/86	AS-BUILT PER DCR-M3-S-993-86				
79-236	1	11/1/86	AS-BUILT PER DSR-M3-S-091-86				

NORTHEAST UTILITIES SERVICE CO.
FOR NORTHEAST NUC. ENERGY CO.
TITLE MILLSTONE NUC. PWR. STA. UNIT 3
STEAM GENERATOR IC (LOOP 3)
ZONE 005

BY L.E. LOPEZ	CHKD RoB	APP RuP	APP RuP
DATE 2-15-83	DATE 3/1/83	DATE 3/8/83	DATE 3/8/83
SCALE NONE	AREA 1	DWG. NO. 25212-20903	
P.A. 79-236			

25212-20903

Serial No. 20-145
Docket No. 50-423
Attachment 2, Page 5 of 12

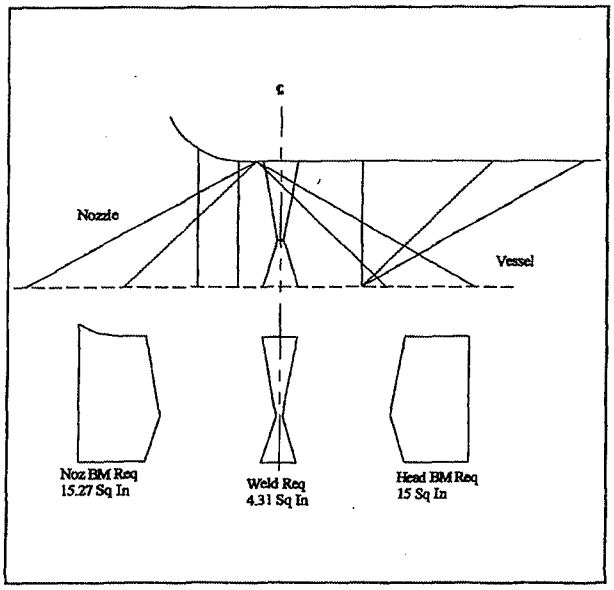


Dominion Energy

Report No: M3-UT-17-110
Summary No: M3.B3.130_0119
Page 2 of 2
Prepared By: D.R. Cordes L/III DRC
Date: 10/23/2017

R. Chapman Wing LV. III 10-26-17 Date #1/10-26-17

Weld Number	**03-005-SW-U**
Weld Thickness	5.2" (Nom)
Weld Length	140"
Weld Width	1.4"



Exam Area (CAD)
Total Exam Area = 34.58 Sq In
Total Weld Exam Area = 4.31 Sq In
Noz BM Exam Area = 15.27 Sq In
Head BM Exam Area = 15.00 Sq In
Limits (Nozzle Taper)

Weld Cov (2 directions)		
0°	100.00%	**100.00%**
45°Noz	27.38%	**81.80%**
45°Head	100.00%	-
45°CW	100.00%	-
45°CCW	100.00%	-
60°Noz	17.86%	**79.50%**
60°Head	100.00%	-
60°CW	100.00%	-
60°CCW	100.00%	-

Base Metal Cov (at least 1 direction)		
0°BM	71.70%	**71.70%**
45°Ax BM	90.40%	**81.00%**
45°Cr BM	71.70%	-
60°Ax BM	94.30%	**83.00%**
60°Cr BM	71.70%	-

Examination Volume Dimensions: Height 5.2" Nom Length 140" Width 6.6"

Coverage Summary

Required Scans (each has a weighing factor of 100 for complete coverage)

Angle	Weld		Base Metal	
0	100.00%		71.70%	
45	81.80%		81.00%	
60	79.50%		83.00%	
			Code Coverage Total	**82.80%**
			Best Effort Coverage(Max 25%) Total	N/A

Notes:

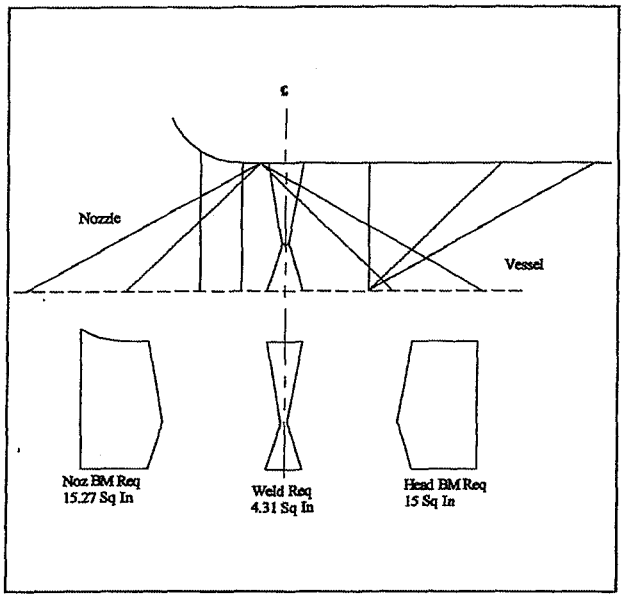
1) Code Coverage refers to the maximum percentage of the required examination volume that is effectively examined with the qualified examination procedure.
(2) Vol coverage obtained with CAD

Dominion Energy

Report No: M3-UT-17-112
Summary No: M3.B3.130_0121
Page 2 of 2
Prepared By: D.R. Cordes L/III DRC
Date: 10/23/2017

R. Chulyk Wg Lv III 10-26-17

Weld Number	03-005-SW-V
Weld Thickness	5.2" (Nom)
Weld Length	140"
Weld Width	1.4"



Exam Area (CAD) F/WSE 10-26-17

Total Exam Area = 34.58 Sq In
Total Weld Exam Area = 4.31 Sq In
Noz BM Exam Area = 15.27 Sq In
Head BM Exam Area = 15.00 Sq In
Limits (Nozzle Taper)

Weld Cov (2 directions)		
0°	100.00%	**100.00%**
45°Noz	27.38%	**81.80%**
45°Head	100.00%	-
45°CW	100.00%	-
45°CCW	100.00%	-
60°Noz	17.86%	**79.50%**
60°Head	100.00%	-
60°CW	100.00%	-
60°CCW	100.00%	-

Base Metal Cov (at least 1 direction)		
0°BM	71.70%	**71.70%**
45°Ax BM	90.40%	**81.00%**
45°Cr BM	71.70%	-
60°Ax BM	94.30%	**83.00%**
60°Cr BM	71.70%	-

Examination Volume Dimensions: Height 5.2" Nom Length 140" Width 6.6"

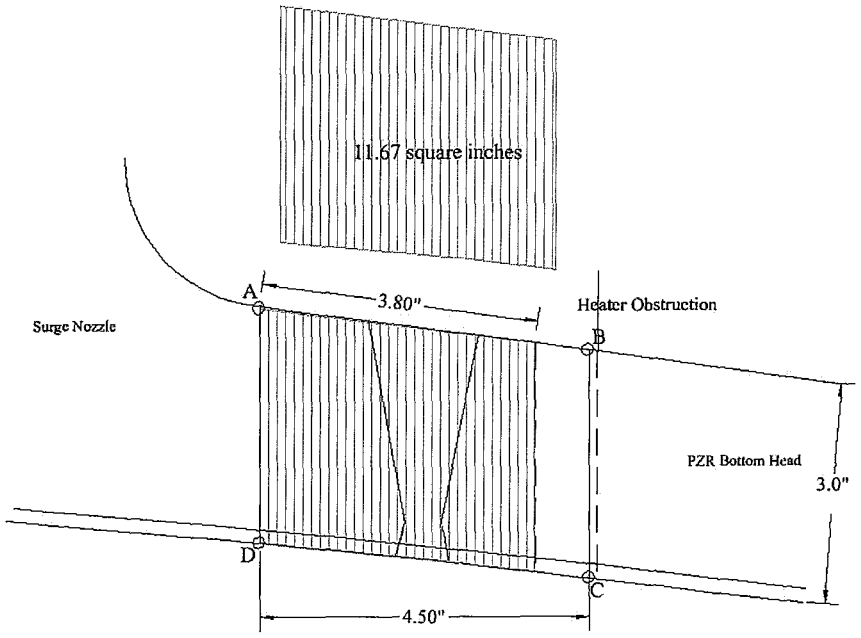
Coverage Summary

Required Scans (each has a weighing factor of 100 for complete coverage)

Angle	Weld		Base Metal		
0	100.00%		71.70%		
45	81.80%		81.00%		
60	79.50%		83.00%		
				Code Coverage Total	**82.80%**
				Best Effort Coverage(Max 25%) Total	N/A

Notes:

1) Code Coverage refers to the maximum percentage of the required examination volume that is effectively examined with the qualified examination procedure.
(2) Vol coverage obtained with CAD



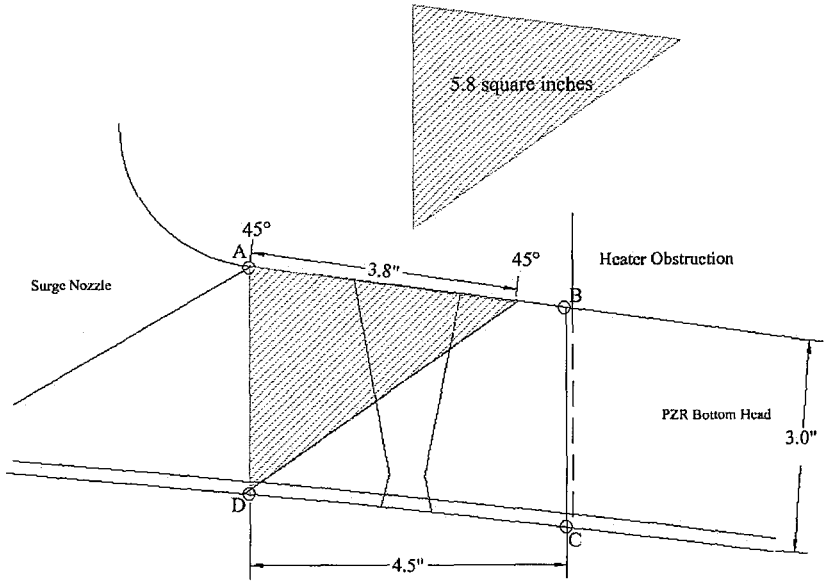
Exam area= A-B-C-D

0° Required exam volume= 1108 cubic inches

0° Total volume examined= 898.6 cubic inches square in.

Total Area examined 0°, 898.6/1108 =81.1%

Weld ID: 03-007-SW-S, Coverage 2 of 6



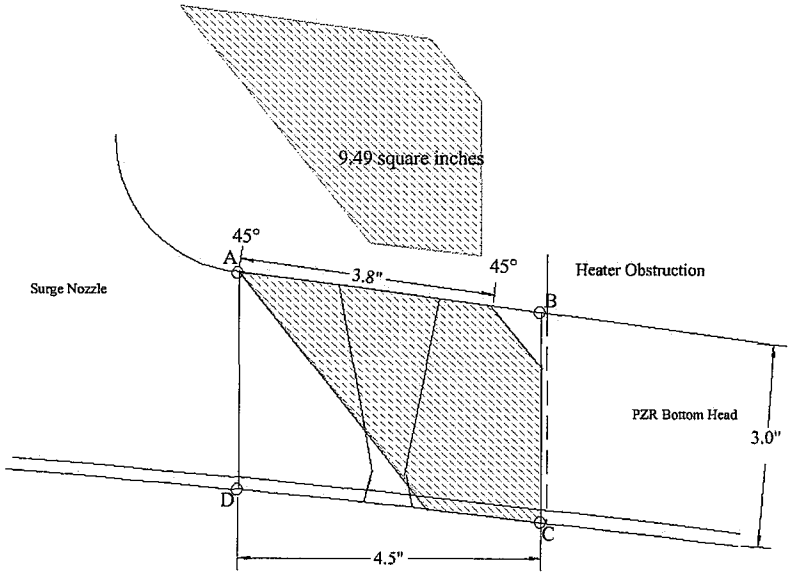
Exam area= A-B-C-D

'45° Required exam volume in axial scan direction from bottom head side= 1108 cubic inches

45° Total volume examined in axial scan direction from bottom head side=446.6 cubic inches

Total Area examined 45° axial scan direction from bottom head side 446.6/1108 =40.3%

Weld ID: 03-007-SW-S, Coverage 3 of 6



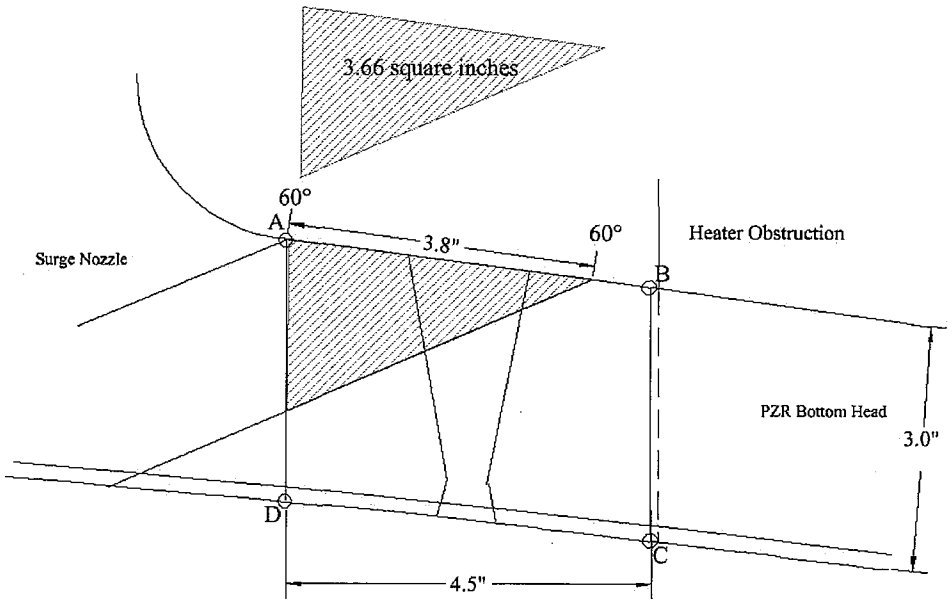
Exam area= A-B-C-D

45° Required exam volume in axial scan direction from nozzle side= 1108 cubic inches

45° Total volume examined in axial scan direction from nozzle side= 730.8 cubic inches

Total Area examined 45° axial scan direction from nozzle side 730.8/1108=65.9%

Weld ID: 03-007-SW-S, Coverage 4 of 6



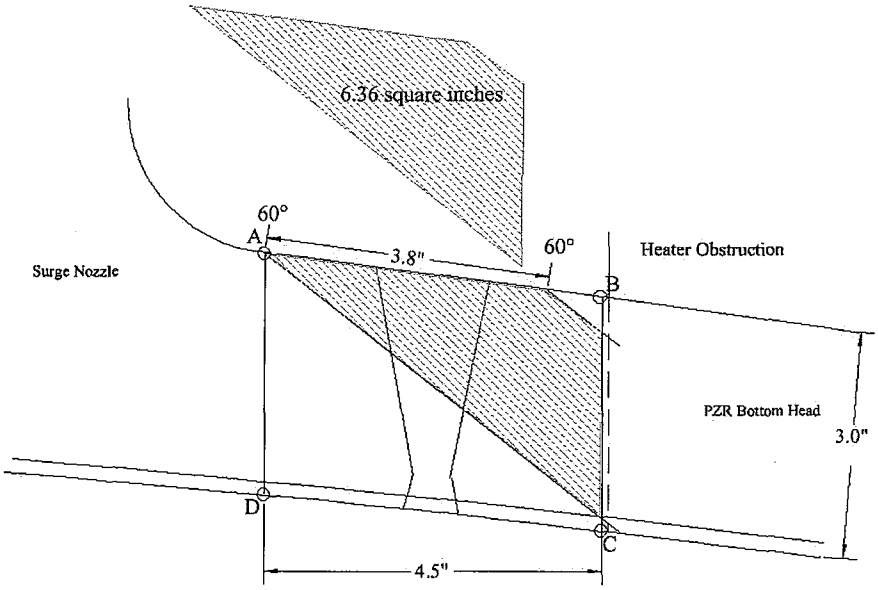
Exam area= A-B-C-D

60° Required exam volume in axial scan direction from bottom head side= 1108 cubic inches

60° Total volume examined in axial scan direction from bottom head side= 281.8 cubic inches

Total Area examined 60° axial scan direction from bottom head side 281.8/1108=25.4%

Weld ID: 03-007-SW-S, Coverage 5 of 6



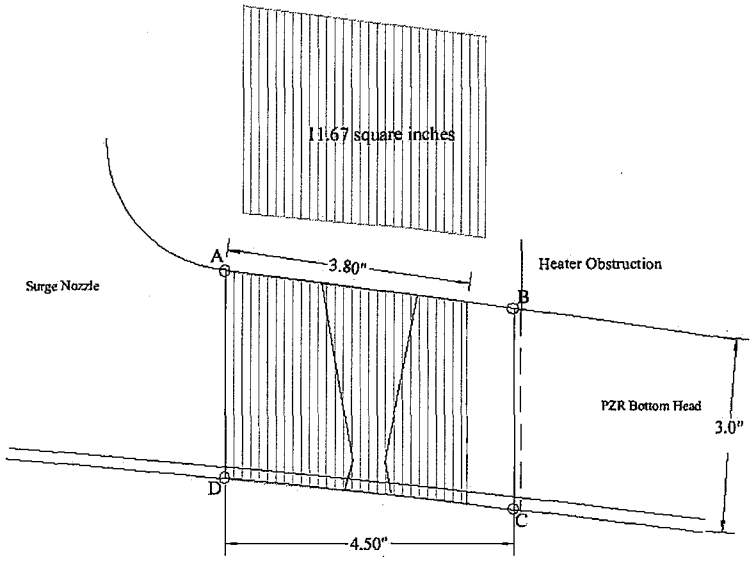
Exam area= A-B-C-D

60° Required exam volume in axial scan direction from nozzle side= 1108 cubic inches

60° Total volume examined in axial scan direction from nozzle side= 489.8 cubic inches

Total Area examined 60° axial scan direction from nozzle side 489.8/1108 =44.2%

Weld ID: 03-007-SW-S, Coverage 6 of 6



Exam area= A-B-C-D

45° & 60° CW and CCW scan directions required exam volume= 1108 cubic inches

45° CW total volume examined= 898.6 cubic inches square in.

45° CCW total volume examined= 898.6 cubic inches square in.

60° CW total volume examined=898.6 cubic inches square in.

60° CCW total volume examined= 898.6 cubic inches square in.

Total Area examined for 45° and 60° CW and CCW scan directions, 898.6/1108 =81.1%

Weld ID: 03-007-SW-S, Coverage Summary

Coverage Summary- Component ID: 03-007-SW-S						
Examination Volume Dimensions:	Thickness:	Weld Length:	Weld Width:	Volume Length:	Volume Width:	Volume Height:
	3.0"	38.5"	1.5"	38.5"	4.5"	3.0"
Limitations: Heater Sleeves located ~2.25" from weld centerline limit 0°, 45°&60°axial and circumferential scans on bottom head side of weld. Nozzle blend Radius also limits 45°&60°axial scans on nozzle side.						

	Required Scans- Each has a weighing factor of 100% for complete coverage			
Examination	Required Examination Volume	Volume Missed	Volume Examined	% Examined
0°	1108 inches^3	209.4 inches^3	898.6 inches^3	81.1%
45° Axial Bottom Head Side	1108 inches^3	661.4 inches^3	446.6 inches^3	40.3%
45° Axial Nozzle Side	1108 inches^3	377.2 inches^3	730.8 inches^3	65.9%
60° Axial Bottom Head Side	1108 inches^3	826.2 inches^3	281.8 inches^3	25.4%
60° Axial Nozzle Side	1108 inches^3	618.2 inches^3	489.8 inches^3	44.2%
45° CW Circumferential	1108 inches^3	209.4 inches^3	898.6 inches^3	81.1%
45° CCW Circumferential	1108 inches^3	209.4 inches^3	898.6 inches^3	81.1%
60° CW Circumferential	1108 inches^3	209.4 inches^3	898.6 inches^3	81.1%
60° CCW Circumferential	1108 inches^3	209.4 inches^3	898.6 inches^3	81.1%
				Total: 581.3%
			Cumulative Total/9 Examinations:	64.6%

ATTACHMENT 3

RELIEF REQUEST IR-3-42
EXAMINATION CATEGORY C-A
PRESSURE RETAINING WELDS IN PRESSURE VESSELS

DOMINION ENERGY NUCLEAR CONNECTICUT, INC. (DENC)
MILLSTONE POWER STATION UNIT 3 (MPS3)

10 CFR 50.55a Relief Request IR-3-42

Relief Requested
In Accordance with 10 CFR 50.55a(g)(5)(iii)

--Inservice Inspection Impracticality--

1. ASME Code Components Affected:

ASME Code Class:	Code Class 2
Examination Category:	C-A, Pressure Retaining Welds in Pressure Vessels
Item Numbers:	C1.20, Head Circumferential Welds
Component Identification:	Listed in Table 1
Material:	SA 240, Type 304

2. Applicable Code Edition and Addenda

ASME Section XI, 2004 Edition, No Addenda

3. Applicable Code Requirement

ASME Section XI, 2004 Edition, Examination Category C-A requires volumetric examination of 100 percent of the weld volume as defined in Table IWC-2500-1 and shown in Figure IWC 2500-1. The alternative requirements of ASME Section XI, Code Case N-460, approved for use in Regulatory Guide 1.147, allows credit for essentially 100 percent coverage of the weld provided greater than 90 percent of the required volume has been examined.

4. Impracticality of Compliance

Pursuant to 10 CFR 50.55a(g)(5)(iii), relief is requested from the 100% volumetric examination coverage requirement of the subject weld due to the geometric configuration and permanent obstructions which limit the volumetric coverage that can be obtained.

The Residual Heat Removal Heat Exchanger shell to lower head weld 03-073-008 was examined with a manual ultrasonic technique using the best technology available to achieve the maximum examination coverage practical. The examination was

performed using equipment and procedures written in accordance with ASME Section XI, Appendix 1 and Section V, Article 4. No alternative techniques or advanced technologies, including the use of phased array, were considered capable of obtaining complete coverage of the examination volume.

Due to the original design of the heat exchanger, the position of the inlet and outlet nozzle-to-shell reinforcing plates are in close proximity to the subject head to flange weld limiting the ultrasonic examination coverage from the shell side of the weld.

Isometric drawings and coverage calculations are provided in this attachment.

TABLE 1
Examination Category C-A Weld with Limited Volumetric Coverage

Weld Identification	Code Item #	System Configuration	Examination Angle and Wave Mode	Limitations and Results	Examination Coverage (%)
03-073-008	C1.20	Residual Heat Removal Shell to Lower Head	45° Shear Wave 60° Longitudinal Wave	Limited examination performed due to inlet and outlet reinforcement plates. No recordable indications were detected.	81.9%

5. Burden Caused by Compliance

A significant design modification or replacement of the component with a different design to eliminate the noted obstructions would be required to increase examination coverage on the subject welds. DENC considers these options to meet the 100 percent Code examination requirement impractical due to the cost, increased radiation exposure and impact to plant equipment.

6. Proposed Alternative and Basis for Use

The subject weld received a volumetric ultrasonic examination utilizing the best available techniques on the accessible portions of weld to the maximum extent practical, and all results were acceptable. Additionally, this component is monitored for through-wall leakage as part of the ASME Section XI Pressure Test Program and receives a visual (VT-2) examination during each inspection period as required by Section XI, Table IWC-2500-1, Category C-H, for Class 2 components.

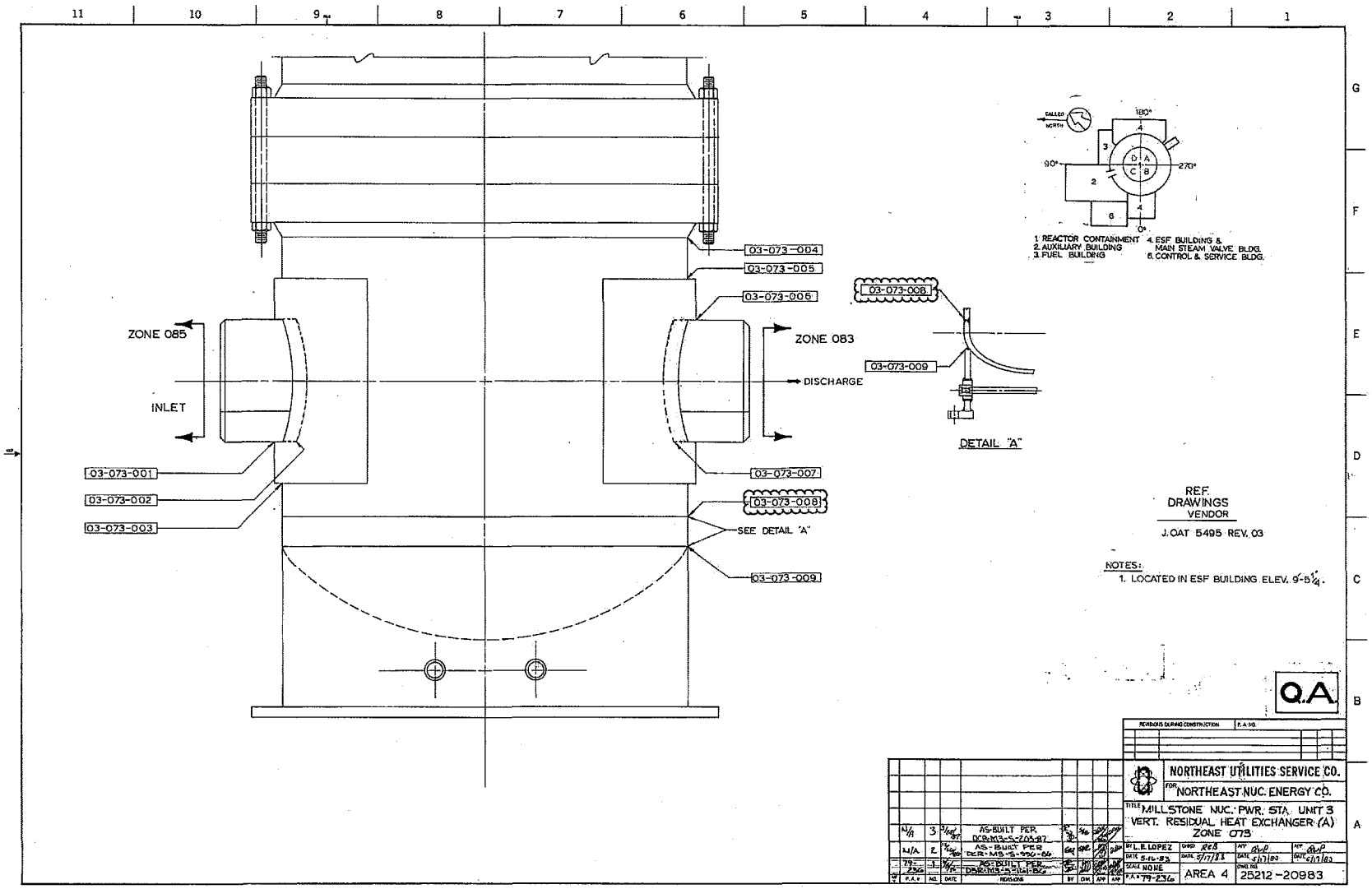
Based on the examination volume that was obtained with acceptable results, along with the visual (VT-2) examination performed each inspection period, it is reasonable to conclude that service-induced degradation would be detected. Therefore, this proposed alternative will provide an acceptable level of quality and safety by providing reasonable assurance of structural integrity of the subject weld.

7. Duration of Proposed Alternative

Relief is requested for the third 10-year inservice inspection interval for MPS3, which began on April 23, 2009 and ended on June 22, 2019.

8. Precedent

A similar relief request was approved for use at MPS3 during the second 10-year inservice inspection interval in NRC letter dated April 26, 2011 (i.e. Relief Request IR-2-55 (ADAMS Accession Number No. ML110691154)), and the second period of the third 10-year inservice inspection interval in NRC letter dated June 24, 2016 (i.e. Relief Request IR-3-21 (ADAMS Accession No. ML16136A001)).


11
10
9
8
7
6
5
4
3
2
1
G
F
E
D
C
B
A
03-073-004
03-073-005
03-073-006
03-073-007
03-073-008
03-073-009
03-073-001
03-073-002
03-073-003
ZONE 085
ZONE 083
INLET
DISCHARGE
SEE DETAIL "A"
DETAIL "A"
CALLED NORTH
180°
90°
270°
0°
1. REACTOR CONTAINMENT
2. AUXILIARY BUILDING
3. FUEL BUILDING
4. ESF BUILDING & MAIN STEAM VALVE BLDG.
6. CONTROL & SERVICE BLDG.
REF. DRAWINGS VENDOR
J.OAT 5495 REV. 03
NOTES:
1. LOCATED IN ESF BUILDING ELEV. 9'-5¼".
Q.A.
NORTHEAST UTILITIES SERVICE CO.
FOR NORTHEAST NUC. ENERGY CO.
TITLE MILLSTONE NUC. PWR. STA. UNIT 3
VERT. RESIDUAL HEAT EXCHANGER (A)
ZONE 073
W.L.E. LOPEZ
DATE 5-16-83
SCALE NONE
AREA 4
25212-20983
AS-BUILT PER DCR-M13-S-205-87
AS-BUILT PER DCR-M13-S-206-86
AS-BUILT PER DCR-M13-S-314-86

Supplemental Report

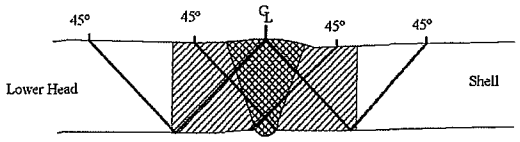
Report No.: M3-UT-16-012

Page: 2 of 2

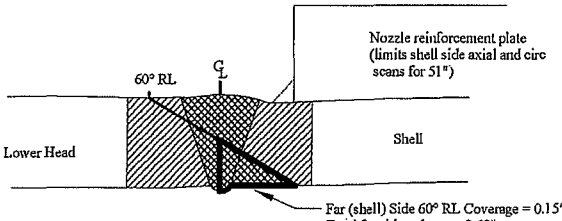
Summary No.: M3.C1.20_0224

Sketch or Photo: O:\Iddeal_Server_Ver8\Iddeal_MPS\Graphics\3R17_Certs_DataSheets\DS_Scans\03-073-008_cov.jpg

Exam Coverage for areas with no limitations



Exam coverage for area with limited scan access



*Not to Scale

Examination Volume Dimensions: Length 125.5" x Width 1.75" x Height .75"

Weld Thickness= .75" Weld Length= 125.5" Weld Width= .75" RTS 4/19/2020

(head ax 100%+head circ 100%+shell ax 68.3%+shell circ 59.4%)/4=~~81.8%~~ 81.9%

Coverage Summary- Weld # 03-073-008

	Required Scans- each has a weighing factor of 100% for complete coverage			
Angle	Head Side Axial	Head Side Circ.	Shell Side Axial	Shell Side Circ.
45°/60°RL	100%	100%	68.3%	59.4%
			Code Coverage Total	81.9%

Notes:

1. Code Coverage refers to the maximum percentage of the required examination volume that is effectively examined with the qualified examination procedure

ATTACHMENT 4

RELIEF REQUEST IR-3-43
EXAMINATION CATEGORY C-B
PRESSURE RETAINING NOZZLE WELDS IN VESSELS

DOMINION ENERGY NUCLEAR CONNECTICUT, INC. (DENC)
MILLSTONE POWER STATION UNIT 3 (MPS3)

10 CFR 50.55a Request Number IR-3-43

Relief Request
in Accordance with 10 CFR 50.55a(g)(5)(iii)

--Inservice Inspection Impracticality--

1. ASME Code Component(s) Affected

ASME Code Class:	Code Class 2
Examination Category:	C-B, Pressure Retaining Nozzle Welds in Vessels
Item Number:	C2.22, Nozzle Inside Radius Section
Component Identification:	03-053-SW-T-IR, 03-054-SW-T-IR, 03-055-SW-T-IR, 03-056-SW-T-IR

2. Applicable Code Edition and Addenda

ASME Section XI, 2004 Edition (No Addenda)

3. Applicable Code Requirement

ASME Section XI 2004 Edition, Examination Category C-B, Item C2.22 requires a volumetric examination of the nozzle inside radius of nozzles without reinforcing plate in vessels greater than ½ inch nominal thickness, as defined by Figure IWC-2500-4 (a), (b), or (d). In the case of multiple vessels of similar design, size, and service, the required examinations may be limited to one vessel or distributed among the vessels.

4. Impracticality of Compliance

Pursuant to 10 CFR 50.55a(g)(5)(iii), relief is requested from the 100% volumetric examination coverage requirement of the subject steam generator main steam outlet nozzle inner radius due to the design and geometric configuration.

The MPS3 steam generator nozzle is a one-piece forging containing a set of seven holes bored parallel to the nozzle centerline (see Figure 1). This nozzle design does not match the typical figures in Figure IWC-2500-4.

The design of the nozzles consists of seven, 8-1/2 inch bore holes, which make a square transition to the nozzle, with no inner radius. This design precludes a meaningful ultrasonic examination of the area of interest.

Additionally, the design of the steam generator precludes visual examination of the nozzle from the inside surface. Access to the steam generator main steam nozzle from inside the steam generator is restricted by the upper deck plate and moisture separators, therefore, visual examinations from inside the steam generator are not possible.

5. Burden Caused by Compliance

A significant design modification or replacement of the component with a different design to eliminate the noted obstructions would be required to increase examination coverage on the subject welds. DENC considers these options to meet the 100 percent Code examination requirement impractical due to the cost, increased radiation exposure and impact to plant equipment.

6. Proposed Alternative and Basis for Use

The subject welds are monitored for through-wall leakage as part of the ASME Section XI Pressure Test Program, and receive a visual (VT-2) examination on the accessible portions of the welds to the maximum extent practical during each inspection period, as required by Section XI, Table IWC-2500-1, Category C-H, for Class 2 components.

Based on the visual (VT-2) examination performed each inspection period, it is reasonable to conclude that service-induced degradation would be detected. Therefore, the proposed alternative will provide an acceptable level of quality and safety by providing reasonable assurance of structural integrity of the subject weld.

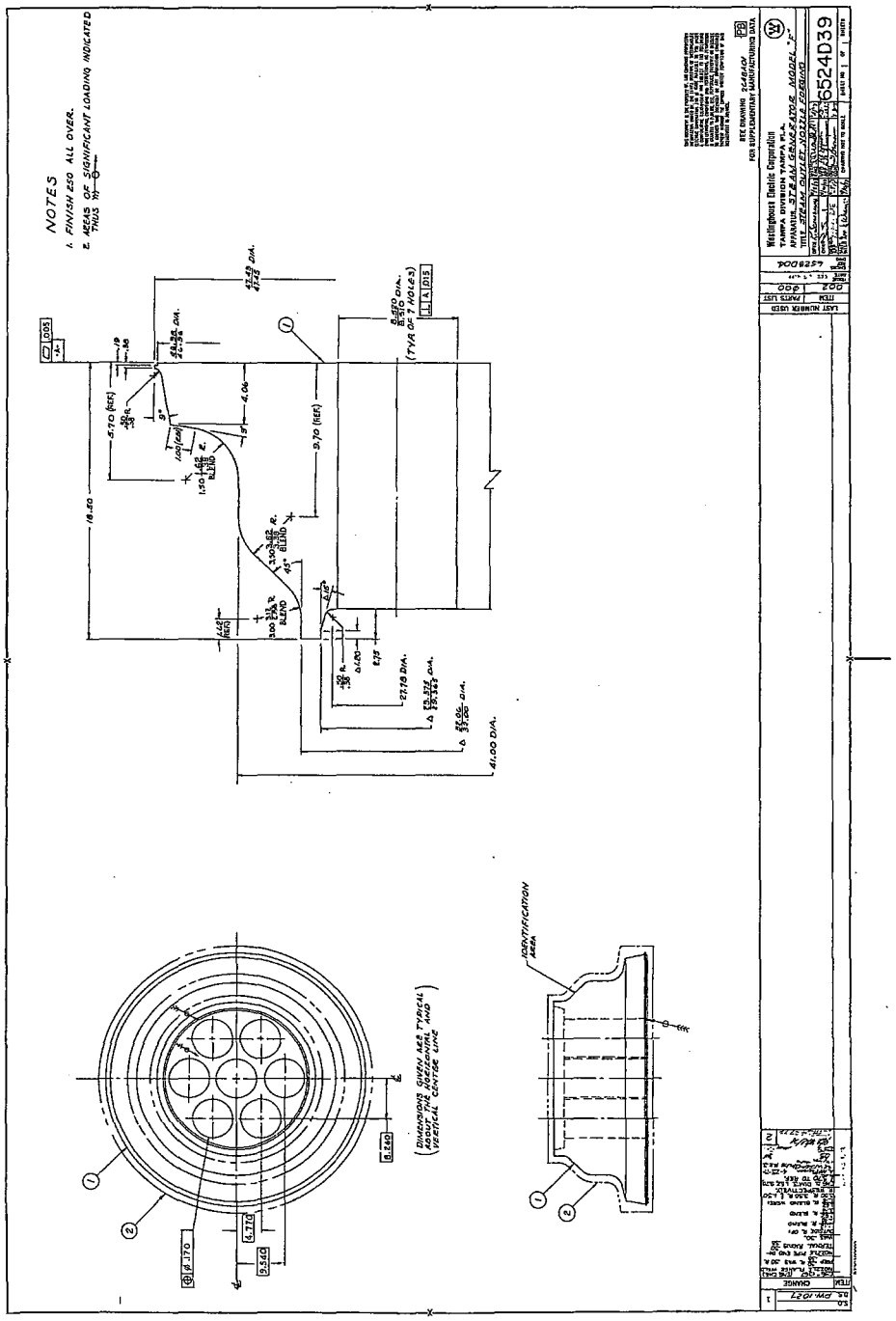
7. Duration of Proposed Alternative

This relief is requested for the third 10-year inservice inspection interval at MPS3, which began on April 23, 2009 and ended on June 22, 2019.

8. Precedent

Similar relief requests were approved for the second inservice inspection interval (Relief Request IR-2-05) in NRC letter A15322, dated July 24, 2000 (ADAMS Accession No. ML003730922).

Figure 1: Steam Generator Nozzle



ATTACHMENT 5

RELIEF REQUEST IR-3-44
EXAMINATION CATEGORY C-F-1
PRESSURE RETAINING WELDS IN AUSTENITIC STAINLESS STEEL OR HIGH ALLOY PIPING

DOMINION ENERGY NUCLEAR CONNECTICUT, INC. (DENC)
MILLSTONE POWER STATION UNIT 3 (MPS3)

10 CFR 50.55a Relief Request IR-3-44

Relief Requested
In Accordance with 10 CFR 50.55a(g)(5)(iii)

--Inservice Inspection Impracticality--

1. ASME Code Components Affected:

ASME Code Class:	Code Class 2
Examination Category:	C-F-1, Pressure Retaining Welds in Austenitic Stainless Steel or High Alloy Piping
Item Number:	C5.11, Circumferential welds: Piping Welds ≥3/8 in. Nominal Wall Thickness for Piping >NPS 4 in.
Component Identification:	Listed in Table 1
Material:	Listed in Table 1

2. Applicable Code Edition and Addenda

ASME Section XI, 2004 Edition, No Addenda

3. Applicable Code Requirement

ASME Section XI, 2004 Edition, Examination Category C-F-1 requires 100 percent volumetric examination coverage for circumferential piping welds. The alternative requirements of ASME Section XI, Code Case N-460 and Code Case N-663, approved for use in Regulatory Guide 1.147. Code Case N-460 allows credit for essentially 100 percent coverage of the weld provided greater than 90 percent of the required volume has been examined. Code Case N-663 states that the surface examinations may be limited to areas identified by the owner as susceptible to outside surface attack.

10 CFR 50.55a(b)(2)(xv)(A), requires the following examination coverage criteria when applying Supplement 2 to Appendix VIII:

(1) Piping must be examined in two axial directions and when examination in the circumferential direction is required, the circumferential examination must be performed in two directions, provided access is available.

(2) Where examination from both sides is not possible, full coverage credit may be claimed from a single side for ferritic welds. Where examination from both sides is not possible on austenitic welds, full coverage credit from a single side may be claimed only after completing a successful single-sided Appendix VIII demonstration using flaws on the opposite side of the weld.

10 CFR 50.55a(b)(2)(xvi)(B), requires that examinations performed from one side of a ferritic or stainless steel pipe weld must be conducted with equipment, procedures, and personnel that have demonstrated proficiency with single side examinations. To demonstrate equivalency to two-sided examinations, the demonstration must be performed to the requirements of Appendix VIII as modified by this paragraph and 10 CFR 50.55a(b)(2)(xv)(A).

4. Impracticality of Compliance

Pursuant to 10 CFR 50.55a(g)(5)(iii), relief is requested from the essentially 100% volumetric examination coverage requirement for austenitic piping welds with single side access.

The subject welds were examined with a manual ultrasonic technique utilizing personnel, equipment and procedures qualified in accordance with ASME Section XI, Appendix VIII as implemented by the Performance Demonstration Initiative (PDI).

There are currently no PDI-qualified single side examination procedures that demonstrate equivalency to two-sided examination procedures on austenitic piping welds. Current technology is not capable of reliably detecting or sizing flaws on the far side of an austenitic weld for configurations common to domestic nuclear applications.

PDI Performance Demonstration Qualification Summary (PDQS) certificates for austenitic piping list the limitation that single side examination is performed on a best effort basis. The best effort qualification is provided in place of a complete single side qualification to demonstrate that the examiner's qualification and the subsequent weld examination is based on application of the best available technology.

When the examination area is limited to one side of an austenitic weld, examination coverage does not comply with 10 CFR 50.55a(b)(2)(xv)(A) and proficiency demonstrations do not comply with 10 CFR 50.55a(b)(2)(xvi)(B) and full coverage credit may not be claimed.

The ASME Code-required volume of these welds was interrogated ultrasonically to the maximum extent possible. No alternative methods or advanced technologies, including the use of phased array, were considered capable of obtaining complete coverage of the examination volume.

The subject welds consist of pipe-to-flange, pipe-to-valve, pipe-to-tee, elbow-to-flange, reducer-to-flange, or reducer-to-nozzle configurations. Due to the tapered surface of the flange, valve, nozzle or tee within close proximity of the weld, the ability to scan from that side of the weld is limited.

Based on the configuration being limited to single-sided access, relief is requested from complying with the essentially 100 percent required volumetric examination coverage for the piping welds listed in Table 1. Note that the examination coverage listed is that which was obtained during examination with no credit taken for the far side of each weld for which examination from that side could not be performed. Also note that DENC did not consider the welds in Table 1 to be susceptible to outside surface attack, and therefore surface examinations were not performed per Code Case N-663.

Supplemental scanning was performed to provide additional best effort (non-Code) coverage as documented on the enclosed coverage calculation for each weld.

Coverage calculations are provided in this attachment.

Table 1
Examination Category C-F-1 Welds with Limited Volumetric Coverage

Weld Number	Code Item #	System Configuration Material	Examination Angle and Wave Mode	Limitation and Results	Ultrasonic Examination Coverage (%)
CHS-30-11-SW-E	C5.11	Chemical and Volume Control 6" Pipe-To-Flange SA312 TP304	45° Shear Wave 60° Shear Wave 70° Shear Wave	Single-sided examination was performed due to component configuration. No recordable indications were detected.	50%
CHS-30-12-SW-B	C5.11	Chemical and Volume Control 6" Pipe-To-Flange SA312 TP304	45° Shear Wave 60° Shear Wave 70° Shear Wave	Single-sided examination was performed due to component configuration. No recordable indications were detected.	50%
CHS-30-12-SW-C	C5.11	Chemical and Volume Control 6" Flange-To-Pipe SA312 TP304	45° Shear Wave 60° Shear Wave 70° Shear Wave	Single-sided examination was performed due to component configuration. No recordable indications were detected.	50%
CHS-30-13-SW-B	C5.11	Chemical And Volume Control 6" Flange-To-Elbow SA403 WP304	45° Shear Wave 60° Shear Wave 70° Shear Wave	Single-sided examination was performed due to component configuration. No recordable indications were detected.	50%

Table 1
Examination Category C-F-1 Welds with Limited Volumetric Coverage

Weld Number	Code Item #	System Configuration Material	Examination Angle and Wave Mode	Limitation and Results	Ultrasonic Examination Coverage (%)
QSS-6-3-SW-D	C5.11	Quench Spray System 14" Pipe-To-Flange SA312 TP304/ Flange SA182 F304	45° Shear Wave 60° Shear Wave 70° Shear Wave	Single-sided examination was performed due to component configuration. No recordable indications were detected.	50%
QSS-6-4-SW-D	C5.11	Quench Spray System 14" Pipe-To-Flange SA312 TP304/ Flange SA182 F304	45° Shear Wave 60° Shear Wave 70° Shear Wave	Single-sided examination was performed due to component configuration. No recordable indications were detected.	50%
RHS-501-FW-6	C5.11	Residual Heat Removal 12" Valve-To-Pipe Valve SA182 F304/ SA376 T316	45° Shear Wave 60° Shear Wave 60° Long. Wave	Single-sided examination was performed due to component configuration. No recordable indications were detected.	50%
RHS-502-FW-7	C5.11	Residual Heat Removal 12" Valve-To-Pipe Valve SA182 F304/ SA376 T316	45° Shear Wave 60° Shear Wave 60° Long. Wave	Single-sided examination was performed due to component configuration. No recordable indications were detected.	50%

Table 1
Examination Category C-F-1 Welds with Limited Volumetric Coverage

Weld Number	Code Item #	System Configuration Material	Examination Angle and Wave Mode	Limitation and Results	Ultrasonic Examination Coverage (%)
RSS-1-3-SW-B	C5.11	Recirculation Spray System 12" Flange-To-Pipe SA312 TP 304	45° Shear Wave 60° Shear Wave 70° Shear Wave	Single-sided examination was performed due to component configuration. No recordable indications were detected.	50%
RSS-8-2-SW-R	C5.11	Recirculation Spray System 12" Flange-To-Elbow SS SA182 F304/ Elbow SA312 TP304	45° Shear Wave 60° Shear Wave 70° Shear Wave	Single-sided examination was performed due to component configuration. No recordable indications were detected.	50%
RSS-16-2-SW-B	C5.11	Recirculation Spray System 12" Valve-To-Pipe SA312 TP304	45° Shear Wave 60° Shear Wave 70° Shear Wave	Single-sided examination was performed due to component configuration. No recordable indications were detected.	50%
RSS-19-4-SW-G	C5.11	Recirculation Spray System 16" Reducer-To-Nozzle SA402 WP304/ SA182 F304	45° Shear Wave 60° Shear Wave 70° Shear Wave	Single-sided examination was performed due to component configuration and weld-o-let at TDC. No recordable indications were detected.	48.5%

Table 1
Examination Category C-F-1 Welds with Limited Volumetric Coverage

Weld Number	Code Item #	System Configuration Material	Examination Angle and Wave Mode	Limitation and Results	Ultrasonic Examination Coverage (%)
RSS-21-4-SW-G	C5.11	Recirculation Spray System 16" Reducer-To-Flange SA403 WP 304/ Flange SA182 F304	45° Shear Wave 60° Shear Wave 70° Shear Wave	Single-sided examination was performed due to component configuration. No recordable indications were detected.	50%
SIH-12-3-SW-C	C5.11	Intermediate Head Safety Injection 6" Pipe-To-Flange SA312 TP304	45° Shear Wave 60° Shear Wave 70° Shear Wave	Single-sided examination was performed due to component configuration. No recordable indications were detected.	50%
SIH-12-FW-3	C5.11	Intermediate Head Safety Injection 6" Valve-To-Pipe Valve SA351 CF8/ SA312 TP304 Sch 40	45° Shear Wave 60° Shear Wave 70° Shear Wave	Single-sided examination was performed due to component configuration. No recordable indications were detected.	50%
SIL-25-FW-1-5M	C5.11	Low Pressure Safety Injection 8" Pipe-To-Tee SA 376 T316/ SA403 WP316	45° Shear Wave 60° Shear Wave 60° Long. Wave	Single-sided examination was performed due to component configuration. No recordable indications were detected.	75%

Table 1
Examination Category C-F-1 Welds with Limited Volumetric Coverage

Weld Number	Code Item #	System Configuration Material	Examination Angle and Wave Mode	Limitation and Results	Ultrasonic Examination Coverage (%)
SIL-25-FW-1-8M	C5.11	Low Pressure Safety Injection 8" Tee-To-Pipe SA376 T316/ SA403 WP316	45° Shear Wave 60° Shear Wave 60° Long. Wave	Single-sided examination was performed due to component configuration. No recordable indications were detected.	75%
SIL-25-FW-2	C5.11	Low Pressure Safety Injection 8" Pipe-To-Valve SA 376 TP316	45° Shear Wave 60° Shear Wave 60° Long. Wave	Single-sided examination was performed due to component configuration. No recordable indications were detected.	70.8%
SIL-25-FW-3	C5.11	Low Pressure Safety Injection 8" Pipe-To-Valve SA376 TP316	45° Shear Wave 60° Shear Wave 60° Long. Wave	Single-sided examination was performed due to component configuration. No recordable indications were detected.	75%
SIL-152A-FW-1	C5.11	Low Pressure Safety Injection 24" Pipe-To-Flange SA182 F304/ SA312 TP304	45° Shear Wave 60° Shear Wave 70° Shear Wave	Single-sided examination was performed due to component configuration. No recordable indications were detected.	50%

5. Burden Caused by Compliance

Compliance with the Code requirements would require extensive modification or replacement of components with a design that would allow examination from both sides of the weld. DENC considers these options to meet the 100 percent Code examination requirement for coverage to be impractical based on the cost, increased radiation exposure and impact to plant equipment.

6. Proposed Alternative and Basis for Use

The subject welds received a volumetric examination to the maximum extent practical utilizing the best available techniques, as qualified through the PDI for Supplement 2 with demonstrated best effort for single-sided examination, from the accessible side of the weld, and all results were acceptable. Also, these components are monitored for through-wall leakage as part of the ASME Section XI System Pressure Test Program and receive a visual (VT-2) examination each inspection period during the system leakage tests, as required by Section XI, Table IWC-2500-1, Category C-H for Class 2 components.

Based on the volumetric coverage that was obtained with acceptable results and the visual (VT-2) examination performed each inspection period, it is reasonable to conclude that service-induced degradation would be detected. Therefore, these proposed alternatives will provide an acceptable level of quality and safety by providing reasonable assurance of structural integrity of the subject welds.

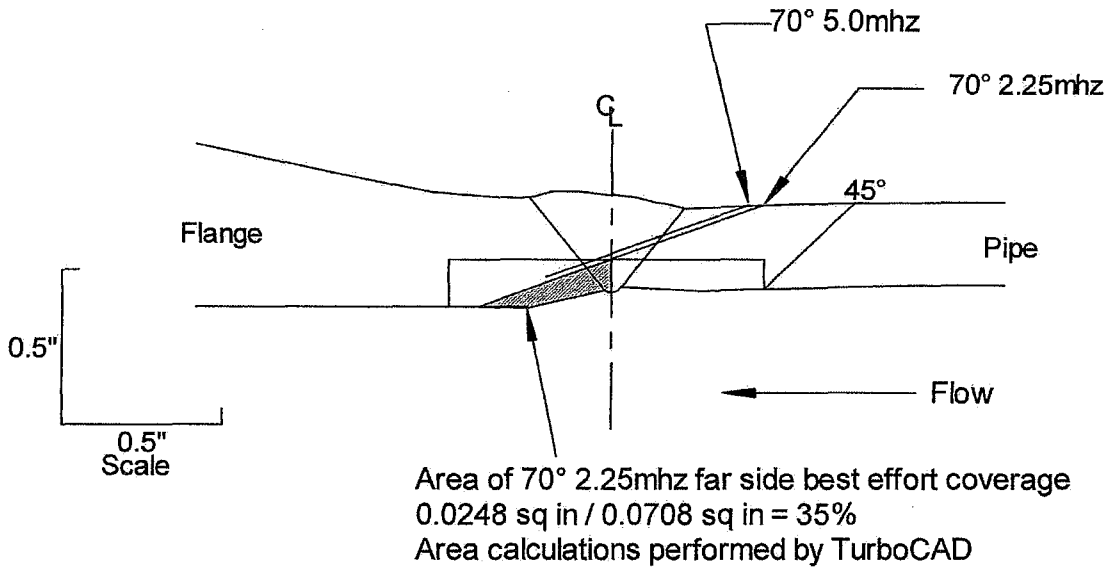
7. Period for Which Relief is Requested

Relief is requested for the third 10-year inservice inspection interval for MPS3, which began on April 23, 2009 and ended on June 22, 2019.

8. Precedent

A similar relief request was approved for use at MPS3 during the second 10-year inservice inspection interval in NRC letter dated April 26, 2011 (i.e. Relief Request IR-2-57 (ADAMS Accession No. ML110691154)), and the second period of the third 10-year inservice inspection interval in NRC letter dated June 24, 2016 (i.e. Relief Request IR-3-22 (ADAMS Accession No. ML16136A001)).

Weld Number	**CHS-30-11-SW-E**
Weld Thickness	0.28"
Weld Length	21.0"
Weld Width	0.5"



Examination Volume Dimensions: Height 0.094" Length 21.0" Width 1.0"

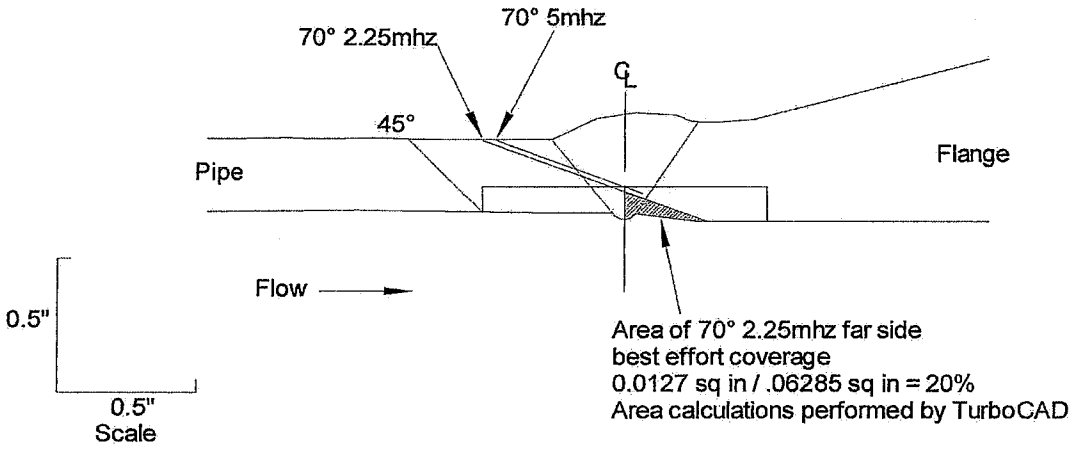
Coverage Summary				
Required Scans (each has a weighing factor of 100 for complete coverage)				
Angle	UpSt-Ax	UpSt-Circ	DnSt-Ax	DnSt-Circ
45°, 60°, 70°	100%			
45°, 60°		100%		0%
70° 2.25mhz			35%	
			Code Coverage Total	**50%**
			Best Effort Coverage(Max 25%) Total	**8.75%**

Notes:

1) Code Coverage refers to the maximum percentage of the required examination volume that is effectively examined with the qualified examination procedure.

2) Best Effort Coverage refers to the required examination volume past the weld centerline that is examined in the axial beam direction with an Appendix VIII demonstrated procedure for single sided coverage.

Weld Number	**CHS-30-12-SW-B**
Weld Thickness	0.28"
Weld Length	21.0"
Weld Width	0.5"



Examination Volume Dimensions: Height 0.94" Length 21.0" Width 1.0"

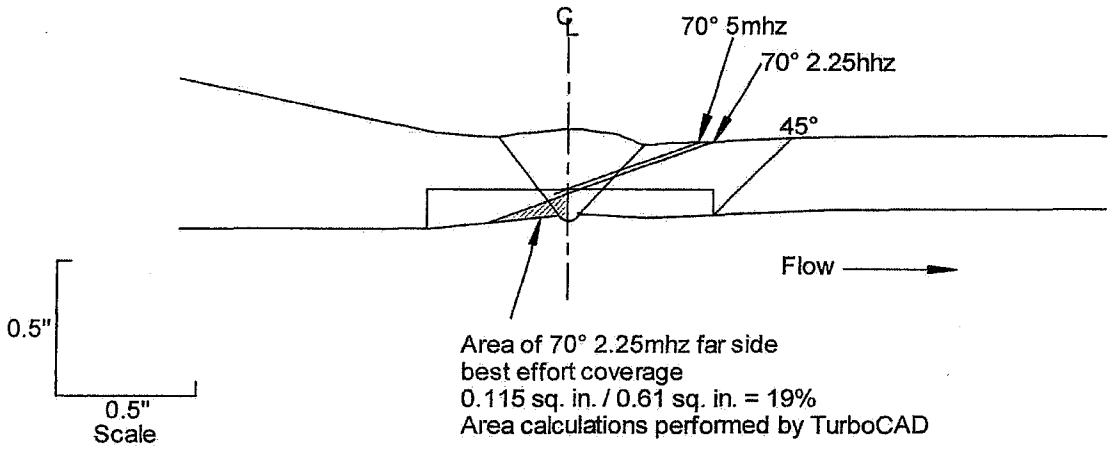
Coverage Summary				
Required Scans (each has a weighing factor of 100 for complete coverage)				
Angle	UpSt-Ax	UpSt-Circ	DnSt-Ax	DnSt-Circ
45°, 60°, 70°	100%			
45°, 60°		100%		0%
70° 2.25mhz			20%	
			Code Coverage Total	**50%**
			Best Effort Coverage(Max 25%) Total	**5%**

Notes:

1) Code Coverage refers to the maximum percentage of the required examination volume that is effectively examined with the qualified examination procedure.

2) Best Effort Coverage refers to the required examination volume past the weld centerline that is examined in the axial beam direction with an Appendix VIII demonstrated procedure for single sided coverage.

Weld Number	**CHS-30-12-SW-C**
Weld Thickness	0.28"
Weld Length	21.0"
Weld Width	0.6"



Examination Volume Dimensions: Height 0.094" Length 21.0" Width 1.1"

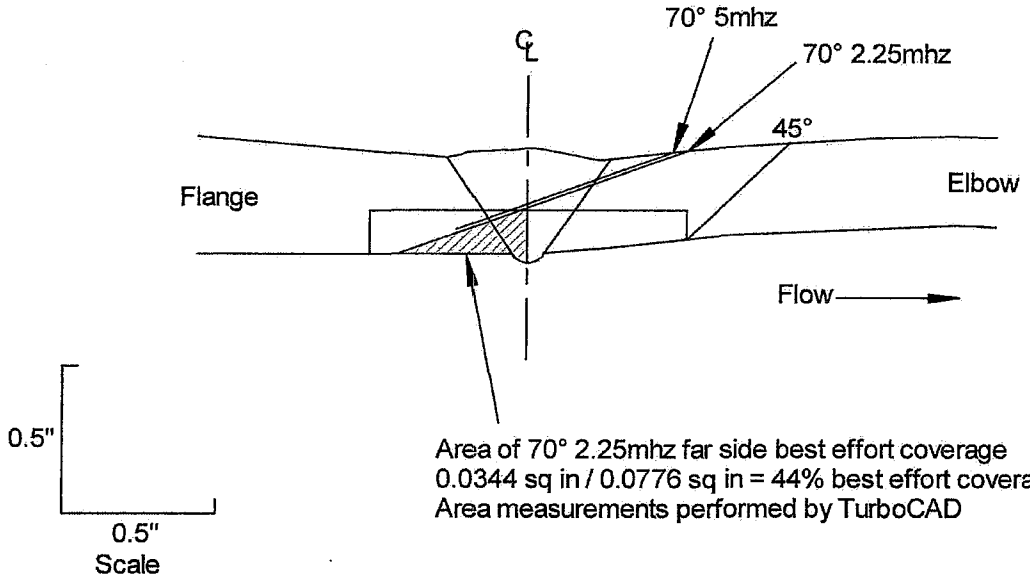
Coverage Summary				
Required Scans (each has a weighing factor of 100 for complete coverage)				
Angle	UpSt-Ax	UpSt-Circ	DnSt-Ax	DnSt-Circ
45°, 60°, 70°			100%	
45°, 60°		0%		100%
70° 2.25mhz	19%			
			Code Coverage Total	**50%**
			Best Effort Coverage(Max 25%) Total	**4.75%**

Notes:

1) Code Coverage refers to the maximum percentage of the required examination volume that is effectively examined with the qualified examination procedure.

2) Best Effort Coverage refers to the required examination volume past the weld centerline that is examined in the axial beam direction with an Appendix VIII demonstrated procedure for single sided coverage.

Weld Number	**CHS-30-13-SW-B**
Weld Thickness	0.28"
Weld Length	21.0"
Weld Width	0.5"



Examination Volume Dimensions: Height 0.1" Length 21.0" Width 1.0"

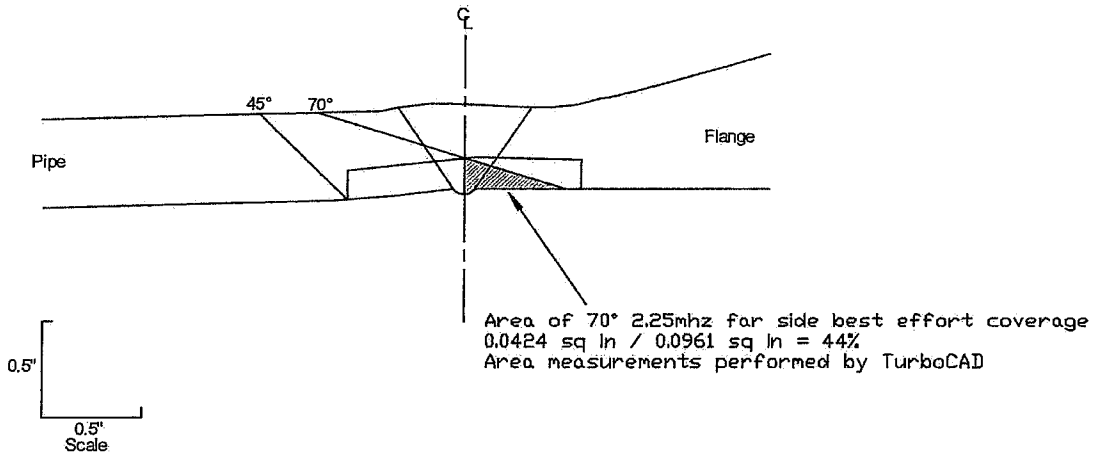
Coverage Summary				
Required Scans (each has a weighing factor of 100 for complete coverage)				
Angle	UpSt-Ax	UpSt-Circ	DnSt-Ax	DnSt-Circ
45°, 60°, 70°			100%	
45°, 60°		0%		100%
70° 2.25mhz	44%			
			Code Coverage Total	**50%**
			Best Effort Coverage(Max 25%) Total	**11%**

Notes:

1) Code Coverage refers to the maximum percentage of the required examination volume that is effectively examined with the qualified examination procedure.

2) Best Effort Coverage refers to the required examination volume past the weld centerline that is examined in the axial beam direction with an Appendix VIII demonstrated procedure for single sided coverage.

Weld Number	**QSS-6-3-SW-D**
Weld Thickness	0.46"
Weld Length	44.0"
Weld Width	0.8"



Examination Volume Dimensions: Height 0.154" Length 44.0" Width 1.3"

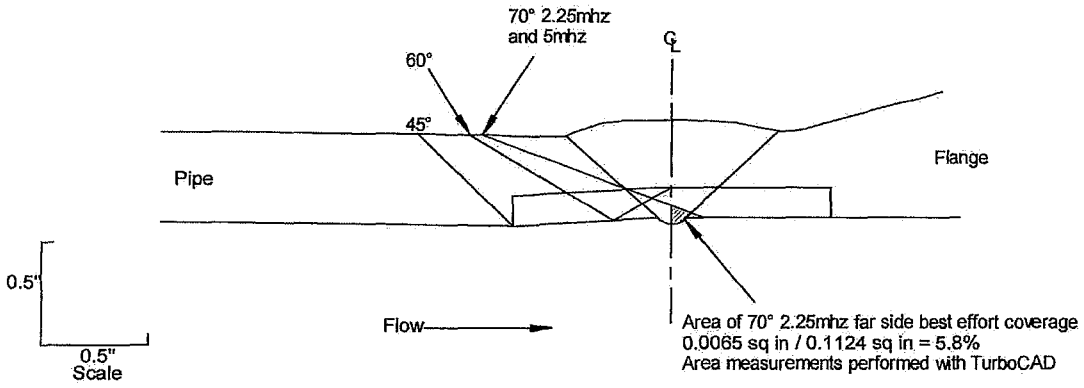
Coverage Summary				
Required Scans (each has a weighing factor of 100 for complete coverage)				
Angle	UpSt-Ax	UpSt-Circ	DnSt-Ax	DnSt-Circ
45°, 60°, 70°	100%		0%	
45°, 60°		100%		0%
70° 2.25mhz			44%	
			Code Coverage Total	**50%**
			Best Effort Coverage(Max 25%) Total	**11%**

Notes:

1) Code Coverage refers to the maximum percentage of the required examination volume that is effectively examined with the qualified examination procedure.

2) Best Effort Coverage refers to the required examination volume past the weld centerline that is examined in the axial beam direction with an Appendix VIII demonstrated procedure for single sided coverage.

Weld Number	QSS-6-4-SW-D
Weld Thickness	0.44"
Weld Length	44.0"
Weld Width	1.0"



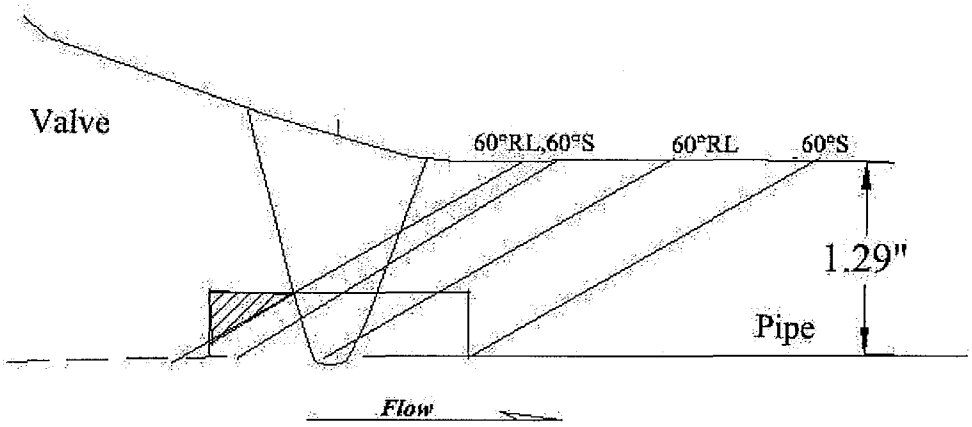
Examination Volume Dimensions: Height 0.147" Length 44.0" Width 1.5"

Coverage Summary				
Required Scans (each has a weighing factor of 100 for complete coverage)				
Angle	UpSt-Ax	UpSt-Circ	DnSt-Ax	DnSt-Circ
45°, 60°, 70°	100%			
45°, 60°		100%		0%
70° 2.25mhz			5.80%	
			Code Coverage Total	50%
			Best Effort Coverage(Max 25%) Total	1%

Notes:

1) Code Coverage refers to the maximum percentage of the required examination volume that is effectively examined with the qualified examination procedure.

2) Best Effort Coverage refers to the required examination volume past the weld centerline that is examined in the axial beam direction with an Appendix VIII demonstrated procedure for single sided coverage.



Required examination volume US axial scan direction-0.39 square in.

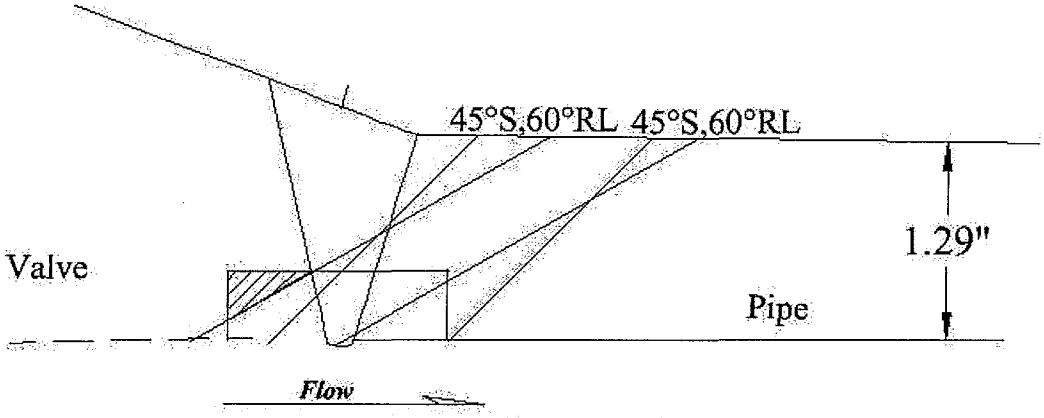
Volume missed upstream axial scan direction- 0.1 square in.
.1/.39= 25.6%, 74.4% Examined

Examination Volume Dimensions: Length 40.1" x Width 1.7" x Height .43"
Weld Thickness= 1.29" Weld Length= 40.1" Weld Width= 1.2"

Coverage Summary- Weld # RHS-501-FW-6

	Required Scans- each has a weighing factor of 100% for complete coverage			
Angle	Upstream-Axial	Upstream-Circ.	Downstream Axial	Downstream Circ.
45°S/60°S (DS only)	0%	0%	100%	100%
60°RL (US only)	74.4%	N/A	N/A	N/A
		(0+0+100+100)/4=50	Code Coverage Total	50%
Downstream axial scan coverage 74.4/4=18.6		Best effort coverage (Max 25%)		18.6%

Notes:
1. Code Coverage refers to the maximum percentage of the required examination volume that is effectively examined with the qualified examination procedure



Supplemental 60° RL- (US scan for DS best effort coverage)
Examined 100% of downstream volume in the axial scan direction

Required examination volume US axial scan direction-0.33 square in.

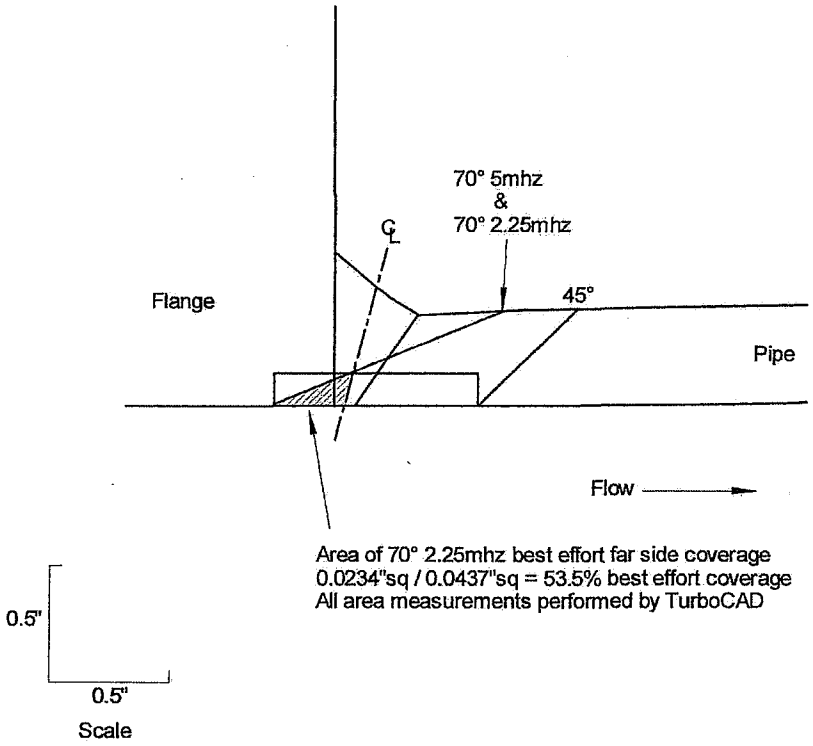
Volume missed upstream axial scan direction- 0.09 square in.
.09/.33= 27.2%, 72.8% Examined

Examination Volume Dimensions: Length 40.1" x Width 1.5" x Height .43" Weld Thickness= 1.29" Weld Length= 40.1" Weld Width= 1.0"				
Coverage Summary- Weld # RHS-502-FW-7				
	Required Scans- each has a weighing factor of 100% for complete coverage			
Angle	Upstream-Axial	Upstream- Circ.	Downstream Axial	Downstream Circ.
45°Shear (DS only)	0%	0%	100%	100%
60°RL (US only)	72.8%	N/A	N/A	N/A
		(0+0+100+100)/4=50	Code Coverage Total	50%
Downstream axial scan coverage 72.8/4=18.2			Best effort coverage (Max 25%)	18.2%

Notes:

1. **Code Coverage refers to the maximum percentage of the required examination volume that is effectively examined with the qualified examination procedure**

Weld Number	**RSS-1-3-SW-B**
Weld Thickness	0.42"
Weld Length	40.0"
Weld Width	0.4"



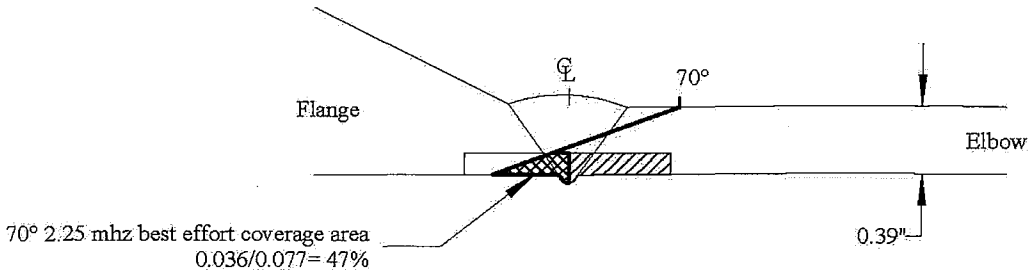
Examination Volume Dimensions: Height 0.14" Length 40.0" Width 0.9"

Coverage Summary				
Required Scans (each has a weighing factor of 100 for complete coverage)				
Angle	UpSt-Ax	UpSt-Circ	DnSt-Ax	DnSt-Circ
45°, 60°, 70°			100%	
45°, 60°		0%		100%
70° 2.25mhz	53.50%			
			Code Coverage Total	**50%**
			Best Effort Coverage(Max 25%) Total	**13%**

Notes:

1) Code Coverage refers to the maximum percentage of the required examination volume that is effectively examined with the qualified examination procedure.

2) Best Effort Coverage refers to the required examination volume past the weld centerline that is examined in the axial beam direction with an Appendix VIII demonstrated procedure for single sided coverage.



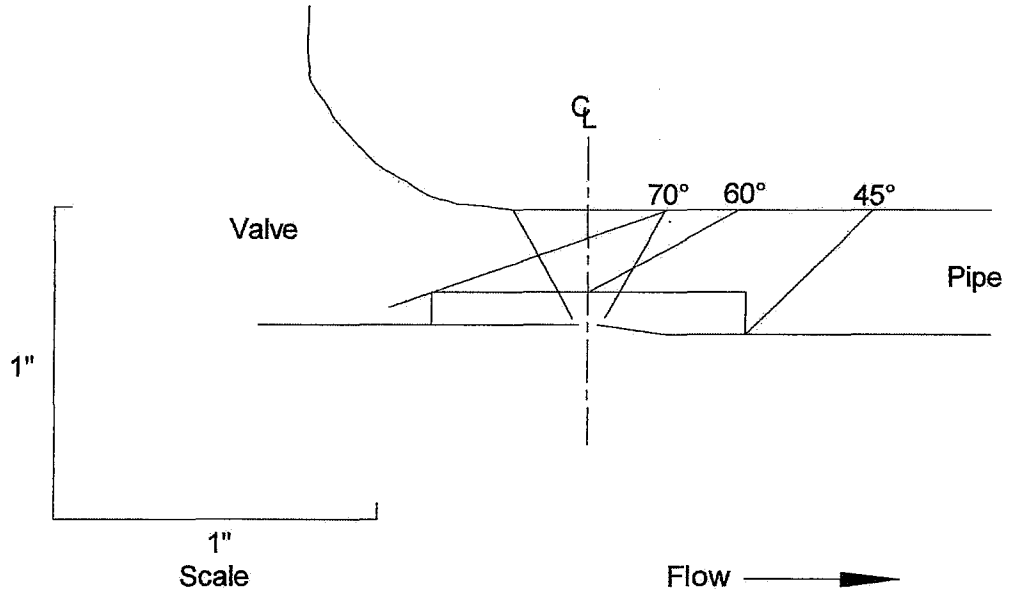
*Not to Scale

Examination Volume Dimensions: Length 50.25" x Width 1.15" x Height .125" Weld Thickness= .375" Weld Length= 50.25" Weld Width= 0.65"				
(US-0%+DS100%+CW-50%+CCW-50%)/4=50%				
Coverage Summary- Weld # RSS-8-2-SW-R				
	Required Scans- each has a weighing factor of 100% for complete coverage			
Angle	Upstream-Axial	Upstream- Circ.	Downstream Axial	Downstream Circ.
45°/60°/70°	0%	0%	100%	100%
70° 2.25mhz	47%	0%	0%	0%
			Code Coverage Total	50%
		Best Effort Coverage (Max 25%) Total		11.75%

Notes:

1. **Code Coverage refers to the maximum percentage of the required examination volume that is effectively examined with the qualified examination procedure**
2. **Best Effort Coverage refers to the required examination volume past the weld centerline that is examined in the axial beam direction with an Appendix VIII demonstrated procedure for single sided coverage.**

Weld Number	**RSS-16-2-SW-B**
Weld Thickness	0.4"
Weld Length	40.0"
Weld Width	0.5"



100% Code Required Volume Examined

Examination Volume Dimensions: Height 0.134" Length 40.0" Width 1.0"

Coverage Summary				
Required Scans (each has a weighing factor of 100 for complete coverage)				
Angle	UpSt-Ax	UpSt-Circ	DnSt-Ax	DnSt-Circ
45°				100%
60°			100%	
70° 2.25mhz	100%			
			Code Coverage Total	**50%**
			Best Effort Coverage(Max 25%) Total	**25%**

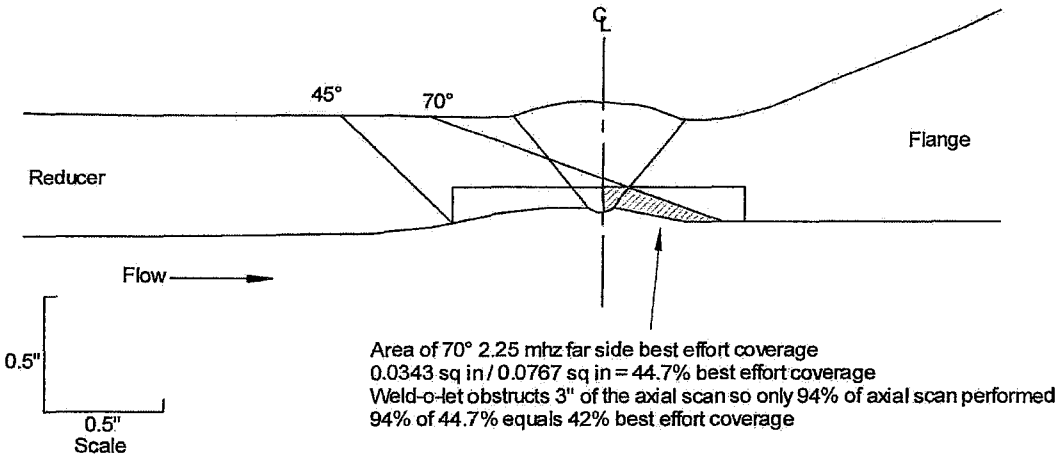
Notes:

1) Code Coverage refers to the maximum percentage of the required examination volume that is effectively examined with the qualified examination procedure.

2) Best Effort Coverage refers to the required examination volume past the weld centerline that is examined in the axial beam direction with an Appendix VIII demonstrated procedure for single sided coverage.

Weld Number	**RSS-19-4-SW-G**
Weld Thickness	0.44"
Weld Length	51.0"
Weld Width	0.7"

Note: Weld-o-let at TDC restricts US axial scan
from -1.5" to 1.5"= 3". Circ is 51" 48/51= 94%



Examination Volume Dimensions: Height 0.155" Length 51.0" Width 1.22"

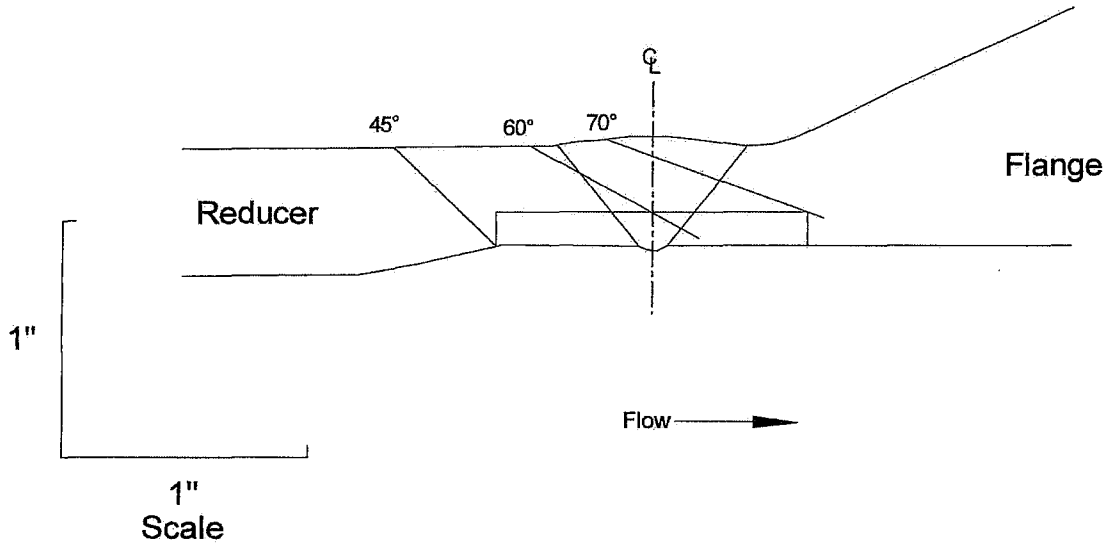
Coverage Summary				
	Required Scans (each has a weighing factor of 100 for complete coverage)			
Angle	UpSt-Ax	UpSt-Circ	DnSt-Ax	DnSt-Circ
45°, 60°, 70°	94%			
45°, 60°		100%		0%
70° 2.25mhz			44%	
			Code Coverage Total	**48.5%**
			Best Effort Coverage(Max 25%) Total	**11%**

Notes:

1) Code Coverage refers to the maximum percentage of the required examination volume that is effectively examined with the qualified examination procedure.

2) Best Effort Coverage refers to the required examination volume past the weld centerline that is examined in the axial beam direction with an Appendix VIII demonstrated procedure for single sided coverage.

Weld Number	**RSS-21-4-SW-G**
Weld Thickness	0.42"
Weld Length	51.0"
Weld Width	0.8"



100% Code Required Volume Examined

Examination Volume Dimensions: Height 0.14" Length 51.0" Width 1.3"

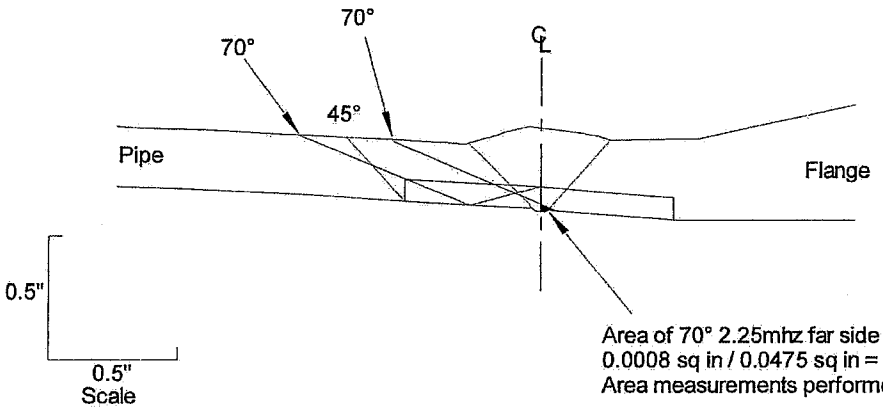
Coverage Summary				
Required Scans (each has a weighing factor of 100 for complete coverage)				
Angle	UpSt-Ax	UpSt-Circ	DnSt-Ax	DnSt-Circ
45°	100%			0%
60°		100%		
70° 2.25mhz			100%	
			Code Coverage Total	**50%**
			Best Effort Coverage(Max 25%) Total	**25%**

Notes:

1) Code Coverage refers to the maximum percentage of the required examination volume that is effectively examined with the qualified examination procedure.

2) Best Effort Coverage refers to the required examination volume past the weld centerline that is examined in the axial beam direction with an Appendix VIII demonstrated procedure for single sided coverage.

Weld Number	**SIH-12-3-SW-C**
Weld Thickness	0.27"
Weld Length	20.8"
Weld Width	0.5"



Examination Volume Dimensions: Height 0.09" Length 20.8" Width 1.0"

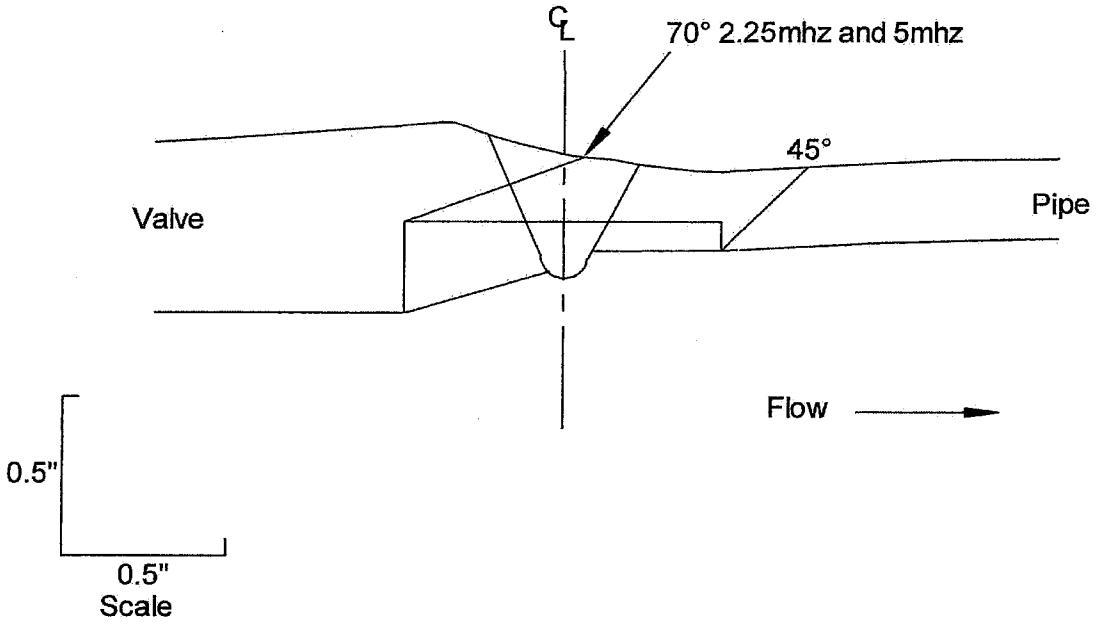
Coverage Summary				
Required Scans (each has a weighing factor of 100 for complete coverage)				
Angle	UpSt-Ax	UpSt-Circ	DnSt-Ax	DnSt-Circ
45°, 60°, 70°	100%			
45°, 60°		100%		0%
70° 2.25mhz			1.70%	
			Code Coverage Total	**50%**
			Best Effort Coverage(Max 25%) Total	**<1%**

Notes:

1) Code Coverage refers to the maximum percentage of the required examination volume that is effectively examined with the qualified examination procedure.

2) Best Effort Coverage refers to the required examination volume past the weld centerline that is examined in the axial beam direction with an Appendix VIII demonstrated procedure for single sided coverage.

Weld Number	**SIH-12-FW-3**
Weld Thickness	0.27"
Weld Length	20.8"
Weld Width	0.55"



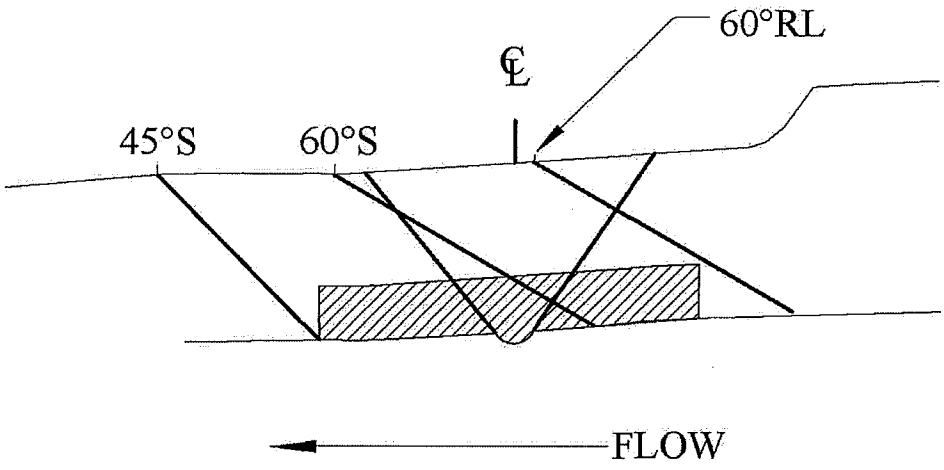
Examination Volume Dimensions: Height 0.09" Length 20.8" Width 1.05"

Coverage Summary				
Required Scans (each has a weighing factor of 100 for complete coverage)				
Angle	UpSt-Ax	UpSt-Circ	DnSt-Ax	DnSt-Circ
45°, 60°, 70°			100%	
45°, 60°		0%		100%
70° 2.25mhz	100%			
			Code Coverage Total	**50%**
			Best Effort Coverage(Max 25%) Total	**25%**

Notes:

1) Code Coverage refers to the maximum percentage of the required examination volume that is effectively examined with the qualified examination procedure.

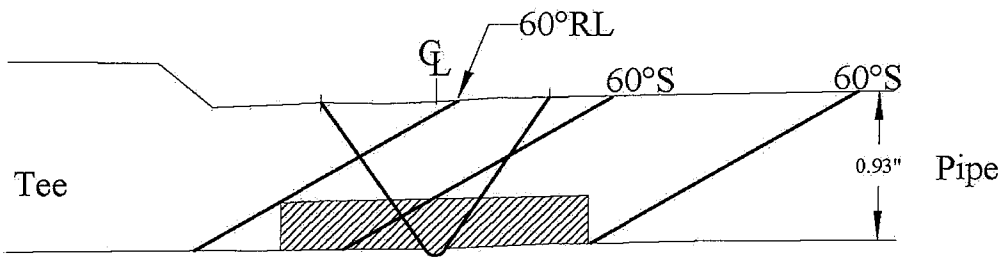
2) Best Effort Coverage refers to the required examination volume past the weld centerline that is examined in the axial beam direction with an Appendix VIII demonstrated procedure for single sided coverage.



Examination Volume Dimensions: Length 27.25" x Width 2.1" x Height .302" Weld Thickness= .906" Weld Length= 27.25" Weld Width= 1.6"				
(US-0%+DS100%+CW-100%+CCW-100%)/4=75%				
Coverage Summary- Weld # SIL-25-FW-1-5M				
	Required Scans- each has a weighing factor of 100% for complete coverage			
Angle	Upstream-Axial	Upstream- Circ.	Downstream Axial	Downstream Circ.
45/60	0%	100%	100%	100%
60 RL	100%			
			Code Coverage Total	75%
		Best Effort Coverage (Max 25%) Total		25%

Notes:

1. Code Coverage refers to the maximum percentage of the required examination volume that is effectively examined with the qualified examination procedure
2. Best effort coverage refers to the required examination volume past the centerline that is examined in the axial beam direction with an Appendix VIII demonstrated procedure for single sided coverage.

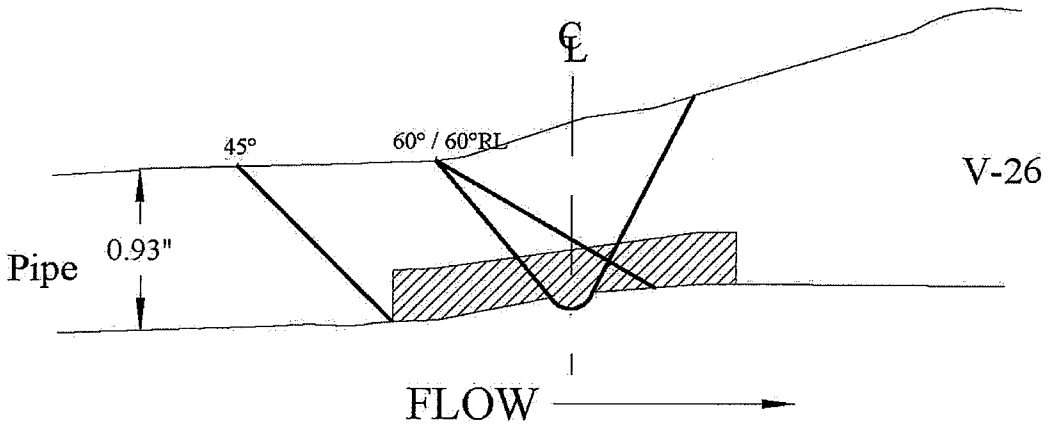


Flow →

Examination Volume Dimensions: Length 28.5" x Width 2.0" x Height .302" Weld Thickness= .906" Weld Length= 28.5" Weld Width= 1.5"				
(US-0%+DS100%+CW-100%+CCW-100%)/4=75%				
Coverage Summary- Weld # SIL-25-FW-1-8M				
	Required Scans- each has a weighing factor of 100% for complete coverage			
Angle	Upstream-Axial	Upstream- Circ.	Downstream Axial	Downstream Circ.
45/60	0%	100%	100%	100%
60 RL	100%			
			Code Coverage Total	75%
		Best Effort Coverage (Max 25%) Total		25%

Notes:

1. Code Coverage refers to the maximum percentage of the required examination volume that is effectively examined with the qualified examination procedure
2. Best effort coverage refers to the required examination volume past the centerline that is examined in the axial beam direction with an Appendix VIII demonstrated procedure for single sided coverage.



Note: Sock-o-let located at -1.2" to 1.2" (2.4" total limitation).
2.4/28.5=8.4% scan limitation

*Not to Scale

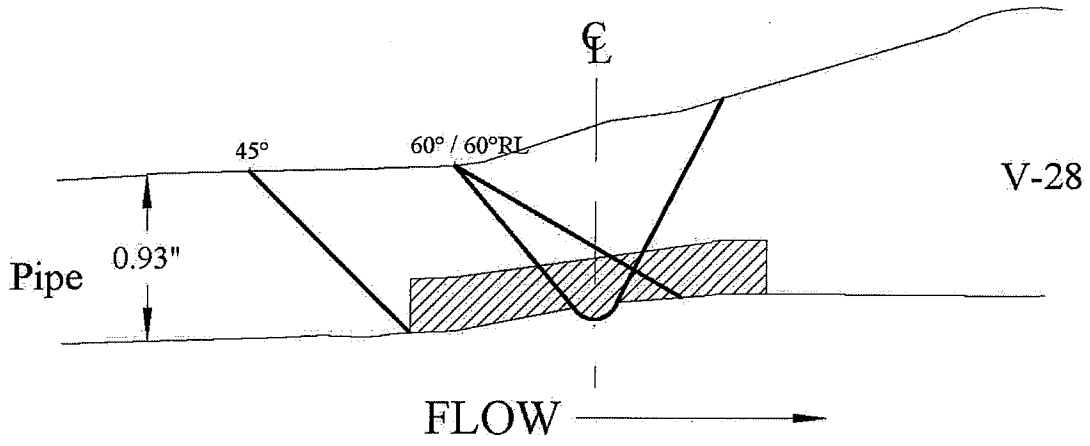
Examination Volume Dimensions: Length 28.5" x Width 2.0" x Height .302"
Weld Thickness= .906" Weld Length= 28.5" Weld Width= 1.5"

Coverage Summary- Weld # SIL-25-FW-2

	Required Scans- each has a weighing factor of 100% for complete coverage			
Angle	**Upstream-Axial**	**Upstream- Circ.**	**Downstream Axial**	**Downstream Circ.**
45°/60°	91.6%	91.6%	0%	100%
60° RL			25.6%	
91.6+91.6+0+100=283.2/4=70.8%			**Code Coverage Total**	**70.8%**
			Best Effort Coverage (Max 25%) Total	**6.4%**

Notes:

1. **Code Coverage refers to the maximum percentage of the required examination volume that is effectively examined with the qualified examination procedure**
2. **Best Effort Coverage refers to the required examination volume past the centerline that is examined in the axial beam direction with an Appendix VIII demonstrated procedure for single sided coverage**



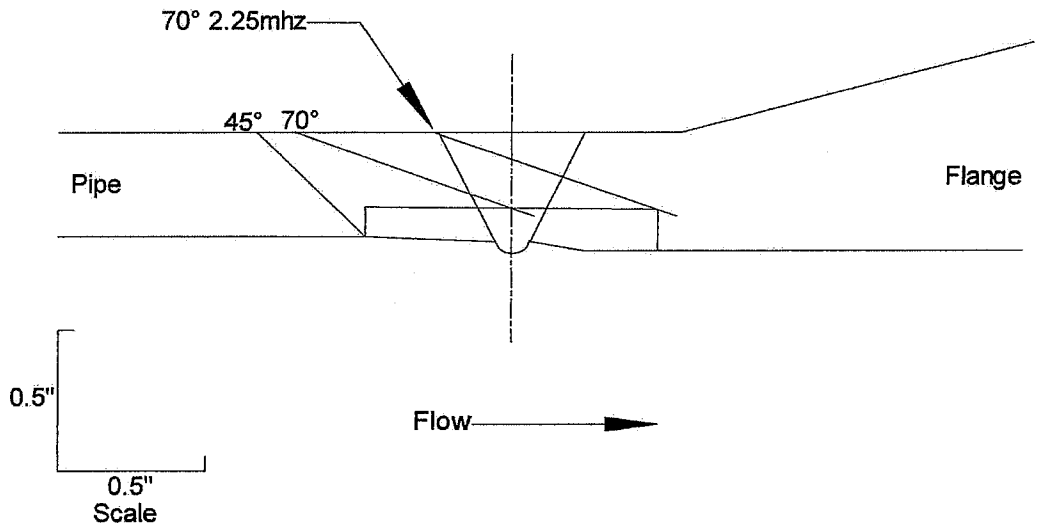
*Not to Scale

Examination Volume Dimensions: Length 28.5" x Width 2.0" x Height .302" Weld Thickness= .906" Weld Length= 28.5" Weld Width= 1.5"				
Coverage Summary- Weld # SIL-25-FW-3				
	Required Scans- each has a weighing factor of 100% for complete coverage			
Angle	Upstream-Axial	Upstream- Circ.	Downstream Axial	Downstream Circ.
45°/60°	100%	100%	0%	100%
60° RL			28%	
100+100+0+100=300/4=75%			Code Coverage Total	75%
			Best Effort Coverage (Max 25%) Total	7%

Notes:

1. **Code Coverage refers to the maximum percentage of the required examination volume that is effectively examined with the qualified examination procedure**
2. **Best Effort Coverage refers to the required examination volume past the centerline that is examined in the axial beam direction with an Appendix VIII demonstrated procedure for single sided coverage**

Weld Number	**SIL-152A-FW-1**
Weld Thickness	0.438"
Weld Length	76.0"
Weld Width	0.5"



Examination Volume Dimensions: Height 0.146" Length 76.0" Width 1.0"

Coverage Summary				
	Required Scans (each has a weighing factor of 100 for complete coverage)			
Angle	UpSt-Ax	UpSt-Circ	DnSt-Ax	DnSt-Circ
45°, 60°, 70°	100			
45°		100		
70° 2.25mhz			100	
			Code Coverage Total	**50%**
			Best Effort Coverage(Max 25%) Total	**25%**

Notes:

1) Code Coverage refers to the maximum percentage of the required examination volume that is effectively examined with the qualified examination procedure.

2) Best Effort Coverage refers to the required examination volume past the weld centerline that is examined in the axial beam direction with an Appendix VIII demonstrated procedure for single sided coverage.

ATTACHMENT 6

RELIEF REQUEST IR-3-45
EXAMINATION CATEGORY C-F-2
PRESSURE RETAINING WELDS IN CARBON OR LOW ALLOY STEEL PIPING

DOMINION ENERGY NUCLEAR CONNECTICUT, INC. (DENC)
MILLSTONE POWER STATION UNIT 3 (MPS3)

10 CFR 50.55a Relief Request IR-3-45

Relief Requested
In Accordance with 10 CFR 50.55a(g)(5)(iii)

--Inservice Inspection Impracticality--

1. ASME Code Components Affected:

ASME Code Class:	Code Class 2
Examination Category:	C-F-2, Pressure Retaining Welds in Carbon or Low Alloy Steel Piping.
Item Numbers:	C5.51, Circumferential Welds: Piping Welds $\geq$ 3/8 in. (10mm) Nominal Wall Thickness for Piping > NPS 4 (DN 100)
Component Identification:	Listed in Table 1
Material:	Listed in Table 1

2. Applicable Code Edition and Addenda

ASME Section XI, 2004 Edition, No Addenda

3. Applicable Code Requirement

ASME Section XI, 2004 Edition, Examination Category C-F-2 requires 100 percent volumetric examination coverage for circumferential piping welds. The alternative requirements of ASME Section XI, Code Case N-460, approved for use in Regulatory Guide 1.147 allows credit for essentially 100 percent coverage of the weld provided greater than 90 percent of the required volume has been examined.

4. Impracticality of Compliance

Pursuant to 10 CFR 50.55a(g)(5)(iii), relief is requested from the essentially 100 percent volumetric examination coverage requirement of the subject welds due to the geometric configuration which limit the volumetric coverage that can be obtained.

The subject welds were examined with a manual ultrasonic technique utilizing personnel, equipment and procedures qualified in accordance with ASME Section XI, Appendix VIII as implemented by the Performance Demonstration Initiative (PDI). The ASME Code-required volume of these welds was interrogated ultrasonically to the maximum extent possible. No alternative techniques or advanced technologies, including the use of phased array, were considered capable of obtaining complete coverage of the examination volume.

The subject welds consist of pipe-to-valve or pipe-to-weldolet configurations. Due to the tapered surface of the valve or weldolet within close proximity of the weld, the ability to scan on both sides of the weld is limited.

The coverage calculations are provided in this attachment.

TABLE 1
Examination Category C-F-2 Weld with Limited Volumetric Examination Coverage

Weld Number	Code Item #	System Configuration Material	Examination Angle and Wave Mode	Limitation and Results	Ultrasonic Examination Coverage (%)	Surface Examination Results
DTM-31-FW-1	C5.51	Main Steam 6" Weldolet-To-Pipe CS Weldolet SA105/ CS pipe SA106 GR.B	45° Shear Wave 60° Shear Wave 70° Shear Wave	Limited examination performed from the pipe side only due to the taper of the weldolet within close proximity of the weld. No recordable indications were detected.	73.45%	Magnetic particle examination was performed obtaining 100 percent coverage. No recordable indications were detected
FWS-11-FW-70	C5.51	Feedwater 16" Valve-To-Pipe CS Valve SA-216 WC-B / CS Pipe SA106 GR.C with internal Stainless Steel cladding	45° Shear Wave 45° Long. Wave 60° Long. Wave	Limited examination performed from the pipe side only due to the taper of the valve within close proximity of the weld. No recordable indications were detected.	62.5%	Liquid penetrant examination was performed obtaining 100 percent coverage. No recordable indications were detected.

TABLE 1
Examination Category C-F-2 Weld with Limited Volumetric Examination Coverage

Weld Number	Code Item #	System Configuration Material	Examination Angle and Wave Mode	Limitation and Results	Ultrasonic Examination Coverage (%)	Surface Examination Results
FWS-11-FW-74	C5.51	Feedwater 18" Pipe-To-Valve CS pipe SA106 GR.C with internal Stainless Steel cladding / CS Valve SA216 WC-B	45° Shear Wave 45° Long. Wave 60° Long. Wave	Limited examination performed from the pipe side only due to the taper of the valve within close proximity of the weld. Indications were detected that were evaluated as acceptable ID root geometry.	72.9%	Liquid penetrant examination was performed obtaining 100 percent coverage. No recordable indications were detected.
FWS-12-FW-27	C5.51	Feedwater 6" Pipe-To-Valve CS Valve SA216 WC-B / CS Pipe SA106 GR.C	45° Shear Wave 60° Shear Wave 70° Shear Wave	Limited examination performed from the pipe side only due to the taper of the valve within close proximity of the weld. Indications were detected that were evaluated as acceptable ID root geometry.	83%	Magnetic particle examination was performed obtaining 100 percent coverage. No recordable indications were detected

TABLE 1
Examination Category C-F-2 Weld with Limited Volumetric Examination Coverage

Weld Number	Code Item #	System Configuration Material	Examination Angle and Wave Mode	Limitation and Results	Ultrasonic Examination Coverage (%)	Surface Examination Results
FWS-17-FW-104	C5.51	Feedwater 16" Valve-To-Pipe CS Valve SA216 WC-B / CS pipe SA106 GR.C with internal stainless steel cladding	45° Shear Wave 45° Long. Wave 60° Long. Wave	Limited examination performed from the pipe side only due to the taper of the valve within close proximity of the weld. No recordable indications were detected.	47.15%	Liquid penetrant examination was performed obtaining 100 percent coverage. One recordable indication was detected that was evaluated as acceptable per the ASME Section XI, IWB-3514 acceptance standards.

TABLE 1
Examination Category C-F-2 Weld with Limited Volumetric Examination Coverage

Weld Number	Code Item #	System Configuration Material	Examination Angle and Wave Mode	Limitation and Results	Ultrasonic Examination Coverage (%)	Surface Examination Results
FWS-17-FW-70	C5.51	Feedwater 18" Pipe-To-Valve CS pipe SA106 GR.C with internal stainless steel cladding / CS Valve SA216 WC-B	45° Shear Wave 45° Long. Wave 60° Long. Wave	Limited examination performed from the pipe side only due to the taper of the valve within close proximity of the weld. Indications were detected that were evaluated as acceptable ID root geometry.	53.75%	Liquid penetrant examination was performed obtaining 100 percent coverage. One recordable indication was detected that was evaluated as acceptable per the ASME Section XI, IWB-3514 acceptance standards.
FWS-18-FW-35	C5.51	Feedwater 6" Valve-To-Pipe CS Valve SA216 WC-B/ CS pipe SA106 GR.C	45° Shear Wave 60° Shear Wave 70° Shear Wave	Limited examination performed from the pipe side only due to the taper of the valve within close proximity of the weld. Indications were detected that were evaluated as acceptable ID root geometry.	69.1%	Magnetic particle examination was performed obtaining 100 percent coverage. No recordable indications were detected

TABLE 1
Examination Category C-F-2 Weld with Limited Volumetric Examination Coverage

Weld Number	Code Item #	System Configuration Material	Examination Angle and Wave Mode	Limitation and Results	Ultrasonic Examination Coverage (%)	Surface Examination Results
MSS-29-FW-3	C5.51	Main Steam 8" Valve-To-Pipe CS Valve SA216 WC-B / CS pipe SA106 GR.B	45° Shear Wave 60° Shear Wave 70° Shear Wave	Limited examination performed from the pipe side only due to the taper of the valve within close proximity of the weld. Indications were detected that were evaluated as acceptable ID root geometry.	87.5%	Magnetic particle examination was performed obtaining 100 percent coverage. No recordable indications were detected

5. Burden Caused by Compliance

Compliance with the Code requirements would require extensive modification or replacement of components with a design that would allow examination from both sides of the weld. DENC considers these options to meet the 100 percent Code examination requirement for coverage to be impractical based on the cost, increased radiation exposure and impact to plant equipment.

6. Proposed Alternative and Basis for Use

The subject welds received a volumetric examination to the maximum extent practical on the accessible portions of the welds utilizing the best available techniques, and all results were acceptable. Additionally, a surface examination was performed with 100 percent coverage obtained. Also, these components are monitored for through-wall leakage as part of the ASME Section XI System Pressure Test Program and receive a visual (VT-2) examination each inspection period during the system leakage tests, as required by Section XI, Table IWC-2500-1, Category C-H for Class 2 components.

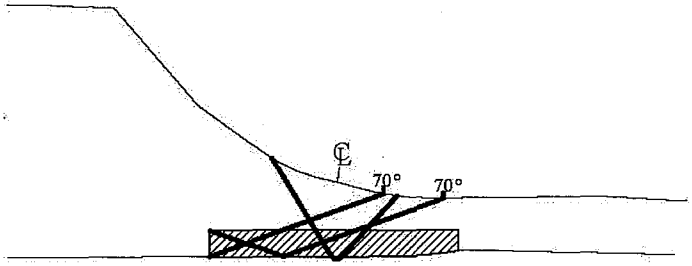
Based on the volumetric examination coverage that was obtained with acceptable results, the surface examination obtaining 100 percent coverage with acceptable results, and the visual (VT-2) examination performed each period, it is reasonable to conclude that service-induced degradation would be detected. Therefore, these proposed alternatives will provide an acceptable level of quality and safety by providing reasonable assurance of structural integrity of the subject welds.

7. Duration of Proposed Alternative

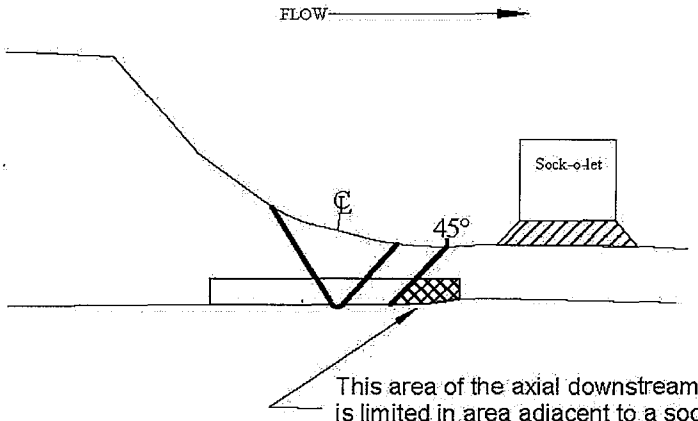
Relief is requested for the third 10-year inservice inspection interval for MPS3, which began on April 23, 2009 and ended on June 22, 2019.

8. Precedent

A similar relief request was approved for use at MPS3 during the third 10-year inservice inspection interval in NRC letter dated June 24, 2016 (i.e. Relief Request IR 3-23, (ADAMS Accession No ML16136A001)).



Scan area with no limitations



This area of the axial downstream scan coverage is limited in area adjacent to a sock-o-let interference
3" of total 21"circumference = 14.3% of circ
downstream axial coverage area = 0.21"sq.
Area limited due to sock-o-let =0.09"sq.
0.09/0.21=43%
43% of 14.3%=6.2% limitation for DS axial coverage

*Not to Scale

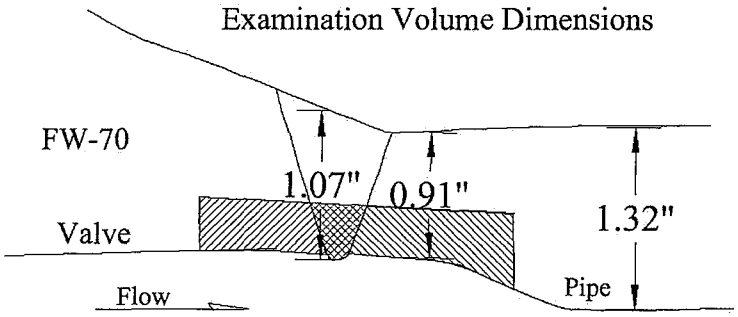
Examination Volume Dimensions: Length 21" x Width 2.2" x Height .167"				
Weld Thickness= .500" Weld Length= 21" Weld Width= 1.2"				
(US- 100% + DS- 93.8% + US Circ- 0% + DS Circ- 100%)/4 = 73.45%				
Coverage Summary- Weld # DTM-31-FW-1				
	Required Scans- each has a weighing factor of 100% for complete coverage			
Angle	Upstream-Axial	Upstream- Circ.	Downstream Axial	Downstream Circ.
45°/60°/70°	100%	0%	93.8%	100%
			Code Coverage Total	73.45%
		Best Effort Coverage (Max 25%) Total		n/a

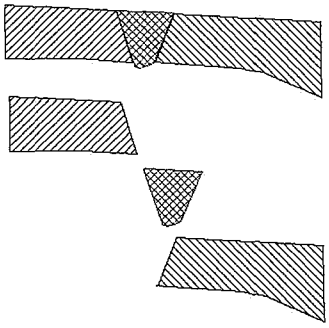
Notes:

1. Code Coverage refers to the maximum percentage of the required examination volume that is effectively examined with the qualified examination procedure
2. Best Effort Coverage refers to the required examination volume past the weld centerline that is examined in the axial beam direction with an Appendix VIII demonstrated procedure for single sided coverage.

Weld ID: FWS-11-FW-70, Coverage 1 of 3

Examination Volume Dimensions





Required Examination Volume= 0.88 square in.

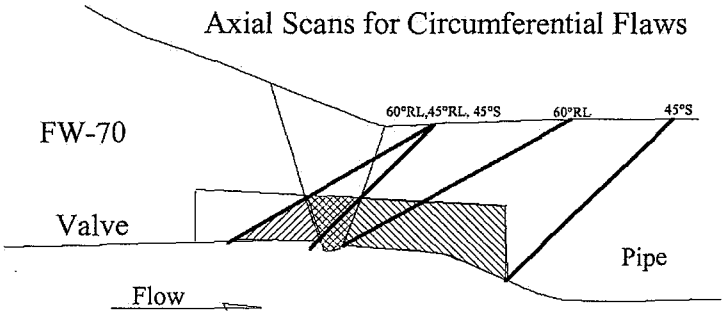
Upstream Base Metal Examination Volume= .31 square in.

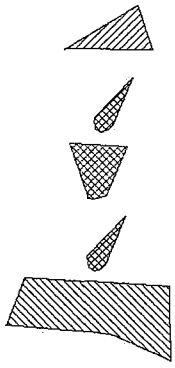
Weld Metal Examination Volume= 0.11 square in.

Downstream Base Metal Examination Volume= 0.46 square in.

Weld ID: FWS-11-FW-70, Coverage 2 of 3

Axial Scans for Circumferential Flaws





Upstream Base Metal Volume Examined= 0.10 square in.

Weld Metal Volume examined with 45°RL= 0.04 square in.

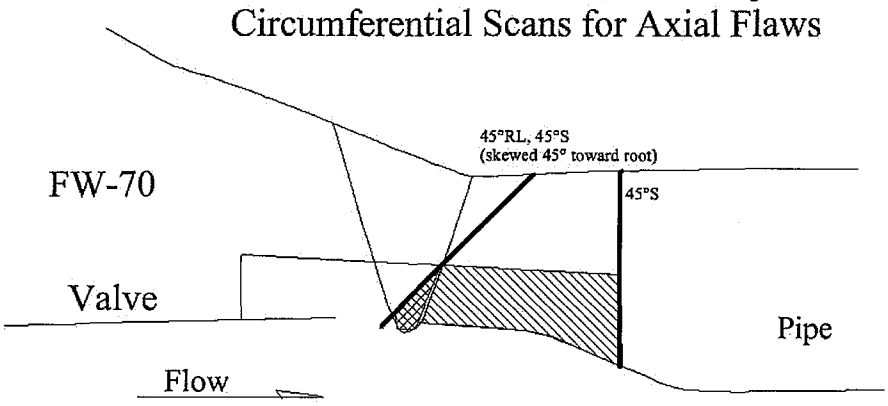
Weld Metal Volume examined with 60°RL= 0.11 square in.

Weld Metal Volume examined with both the 45°RL and 60°RL= 0.04 square in.

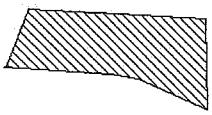
Downstream Base Metal Volume Examined= 0.46 square in.

Weld ID: FWS-11-FW-70, Coverage 3 of 3

Circumferential Scans for Axial Flaws



Weld Metal Volume examined with 45°RL= 0.04 square in.



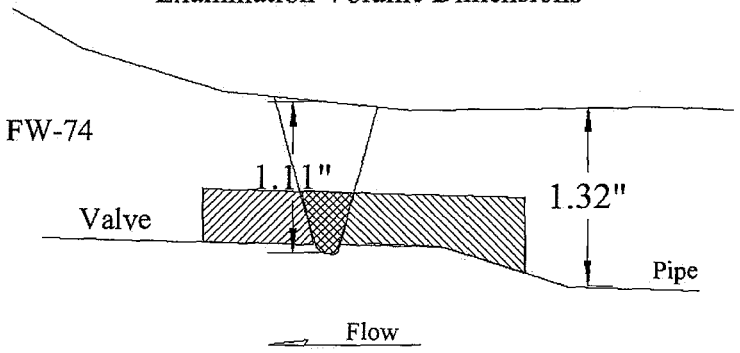
Downstream Base Metal Volume Examined= 0.46 square in.

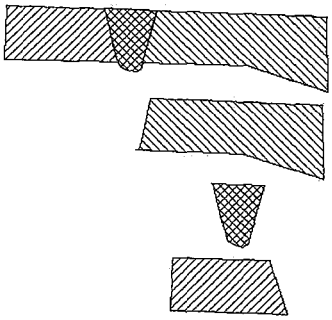
Weld ID: FWS-11-FW-70, Coverage Summary

Coverage Summary- Weld # FWS-11-FW-70			
Examination Volume Dimensions (area measurements taken using CAD)			
Upstream Base Metal Area:	0.31in²	Upstream Base Metal Volume:	15.81in³
SS Weld Metal Area:	0.11in²	SS Weld Metal Volume:	5.61in³
Downstream Base Metal Area:	0.46in²	Downstream Base Metal Volume:	23.46in³
Total Required Examination Area	0.88in²	Weld Crown Width:	0.95 inches
Weld Length:	51.0 inches	Total Required Examination Volume:	44.88in³
Volume Examined Axial Scan Direction (area measurements taken using CAD)			
Upstream Base Metal Area- 60°RL:	0.10in²	Upstream Base Metal Volume- 45°Shear:	5.10in³
SS Weld Metal Area- 45°RL:	0.04in²	SS Weld Metal Volume- 45°RL:	2.04in³
SS Weld Metal Area- 60°RL:	0.11in²	SS Weld Metal Volume- 60°RL:	5.61in³
SS Weld Metal Area Examined with 45°RL & 60°RL:	0.04in²	SS Weld Metal Area Examined with 45°RL & 60°RL:	2.04in³
Downstream Base Metal Area- 45°Shear:	0.46in²	Downstream Base Metal Volume- 45°Shear:	23.46 inches
		Total Volume Examined in Axial Scan Direction:	30.60in³
Volume Examined Circumferential Scan Direction (area measurements taken using CAD)			
Upstream Base Metal Area- 45°Shear:	0.00in²	Upstream Base Metal Volume- 45°Shear:	0.00in³
SS Weld Metal Area- 45°RL:	0.04in²	SS Weld Metal Volume- 45°RL:	2.04in³
Downstream Base Metal Area- 45°Shear:	0.46in²	Downstream Base Metal Volume- 45°Shear:	23.46 inches
		Total Volume Examined in Circumferential Scan Direction:	25.50in³
Coverage Total Axial Scan Direction:	68.2 %	Coverage Total Circumferential Scan Direction:	56.8 %
		Code Coverage Total:	62.5 %

Weld ID: FWS-11-FW-74, Coverage 1 of 3

Examination Volume Dimensions





Required Examination Volume= 0.96 square in.

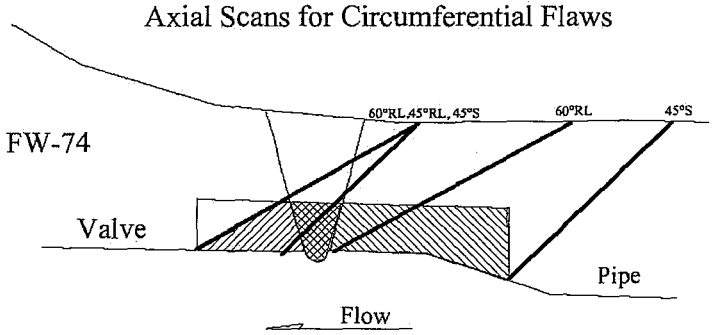
Upstream Base Metal Examination Volume= .54 square in.

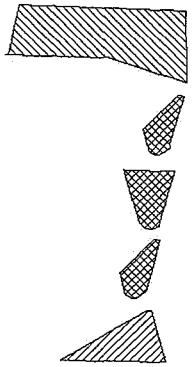
Weld Metal Examination Volume= 0.12 square in.

Downstream Base Metal Examination Volume= 0.30 square in.

Weld ID: FWS-11-FW-74, Coverage 2 of 3

Axial Scans for Circumferential Flaws





Upstream Base Metal Volume Examined= 0.54 square in.

Weld Metal Volume examined with 45°RL= 0.08 square in.

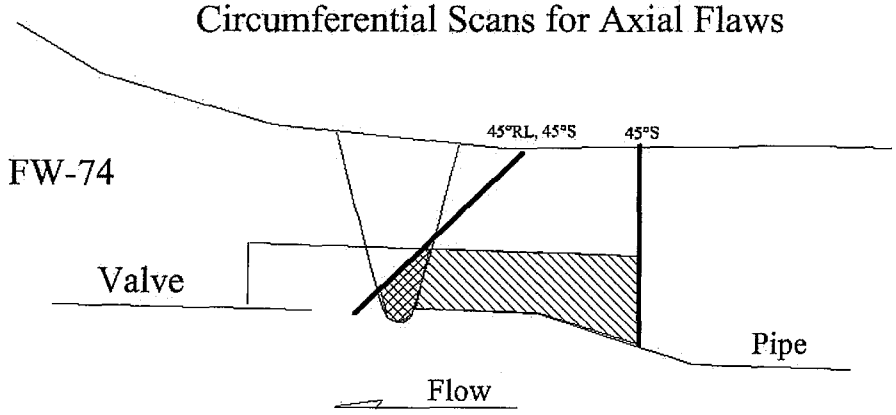
Weld Metal Volume examined with 60°RL= 0.12 square in.

Weld Metal Volume examined with both the 45°RL and 60°RL= 0.08 square in.

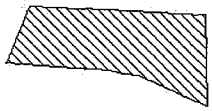
Downstream Base Metal Volume Examined= 0.16 square in.

Weld ID: FWS-11-FW-74, Coverage 3 of 3

Circumferential Scans for Axial Flaws



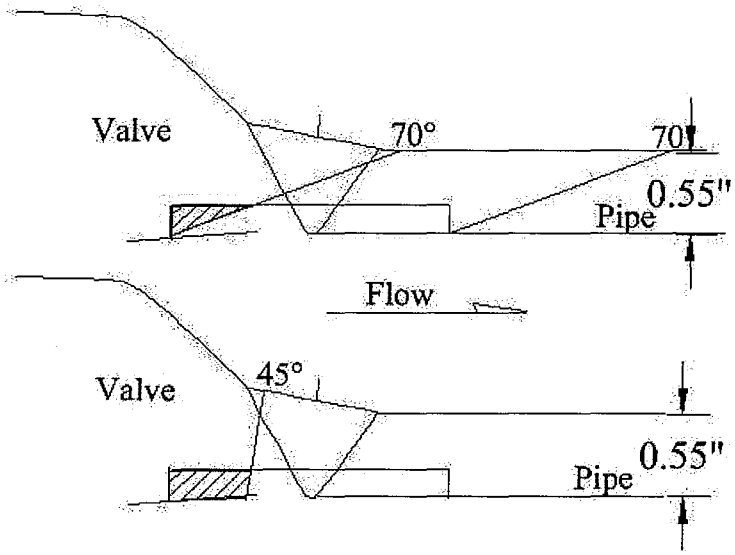
Weld Metal Volume examined with 45°RL= 0.08 square in.



Upstream Base Metal Volume Examined= 0.46 square in.

Weld ID: FWS-11-FW-74, Coverage Summary

Coverage Summary- Weld # FWS-11-FW-74			
Examination Volume Dimensions (area measurements taken using CAD)			
Upstream Base Metal Area:	0.54in²	Upstream Base Metal Volume:	30.65in³
SS Weld Metal Area:	0.12in²	SS Weld Metal Volume:	6.81in³
Downstream Base Metal Area:	0.30in²	Downstream Base Metal Volume:	17.03in³
Total Required Examination Area	0.96in²	Weld Crown Width:	0.70inches
Weld Length:	56.75 inches	Total Required Examination Volume:	54.48in³
Volume Examined Axial Scan Direction (area measurements taken using CAD)			
Upstream Base Metal Area- 60°RL:	0.54in²	Upstream Base Metal Volume- 45°Shear:	30.65in³
SS Weld Metal Area- 45°RL:	0.08in²	SS Weld Metal Volume- 45°RL:	4.54in³
SS Weld Metal Area- 60°RL:	0.12in²	SS Weld Metal Volume- 60°RL:	6.81in³
SS Weld Metal Area Examined with 45°RL & 60°RL:	0.08in²	SS Weld Metal Area Examined with 45°RL & 60°RL:	4.54in³
Downstream Base Metal Area-45°Shear:	0.16in²	Downstream Base Metal Volume- 45°Shear:	9.08 inches
		Total Volume Examined in Axial Scan Direction:	44.27in³
Volume Examined Circumferential Scan Direction (area measurements taken using CAD)			
Upstream Base Metal Area- 45°Shear:	0.54in²	Upstream Base Metal Volume- 45°Shear:	30.65in³
SS Weld Metal Area- 45°RL:	0.08in²	SS Weld Metal Volume- 45°RL:	4.54in³
Downstream Base Metal Area-45°Shear:	0.00in²	Downstream Base Metal Volume- 45°Shear:	0.00 inches
		Total Volume Examined in Circumferential Scan Direction:	35.19in³
Coverage Total Axial Scan Direction:	**81.3 %**	**Coverage Total Circumferential Scan Direction:**	**64.6 %**
		Code Coverage Total:	**72.9 %**



Required examination volume US side axial and circumferential scan directions- 0.235sq. in

Volume missed upstream axial scan direction- 0.06 sq. in. .06/.235=25.5%, 74.5% examined US side

Volume missed upstream circ. scan direction- 0.10 sq. in. .10/.235=42.5%, 57.5% examined US side

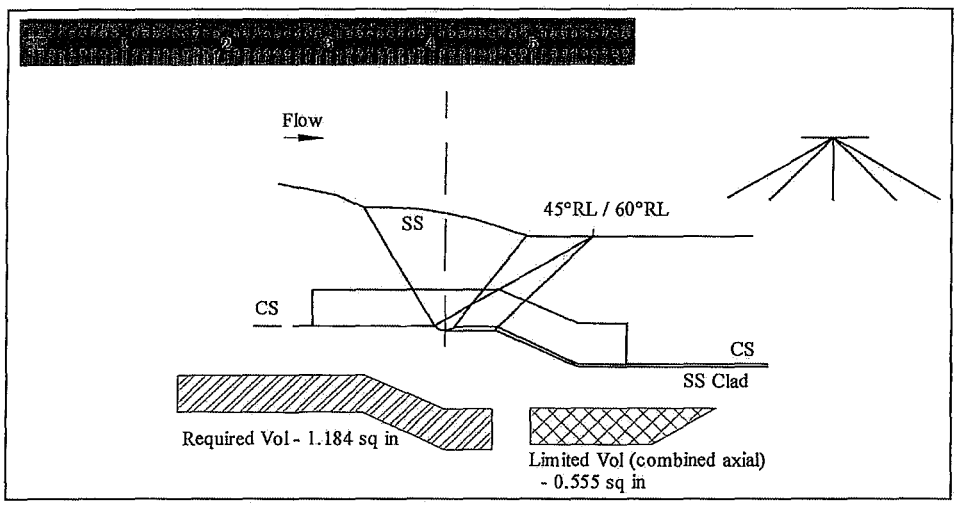
Examination Volume Dimensions: Length 21.13" x Width 2.0" x Height .19"
Weld Thickness= .57" Weld Length= 21.13" Weld Width= 1.0"

Coverage Summary- Weld # FWS-12-FW-27

	Required Scans- each has a weighing factor of 100% for complete coverage			
Angle	Upstream-Axial	Upstream- Circ.	Downstream Axial	Downstream Circ.
45°/70°	74.5%	57.5%	100%	100%
		(74.5+57.5+100+100)/4=83	Code Coverage Total	83%

Notes:
1. Code Coverage refers to the maximum percentage of the required examination volume that is effectively examined with the qualified examination procedure

Weld Number	**FWS-17-FW-104**
Weld Thickness	1.031" (Nom)
Weld Length	51"
Weld Width	1.6"



47.15% Code Required Volume Examined

Examination Volume Dimensions: Height 0.344" (2) Length 51" Width 3.0"

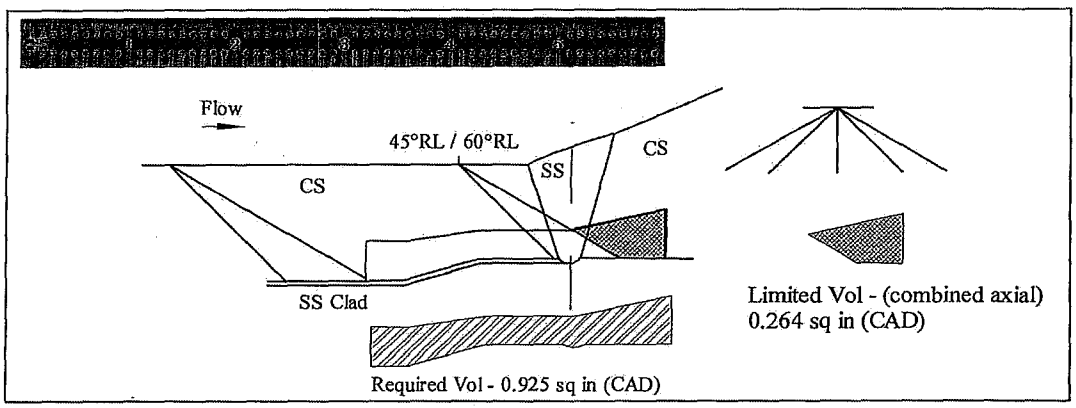
Coverage Summary				
Required Scans (each has a weighing factor of 100 for complete coverage)				
Angle	UpSt-Ax	UpSt-Circ	DnSt-Ax	DnSt-Circ
45° SH	0.00%	0.00%	(Used 60°)	100.00%
45° RL	0.00%	0.00%	(Used 60°)	100.00%
60° RL	0.00%	N/A	88.60%	N/A
			Code Coverage Total	**47.15%**
			Best Effort Coverage(Max 25%) Total	N/A

Notes:

1) Code Coverage refers to the maximum percentage of the required examination volume that is effectively examined with the qualified examination procedure.
2) Vol coverages obtained with CAD

3) RL coverage obtained past Weld CL.

Weld Number	**FWS-17-FW-70**
Weld Thickness	1.156" (Nom)
Weld Length	57"
Weld Width	0.8"



53.75% Code Required Volume Examined

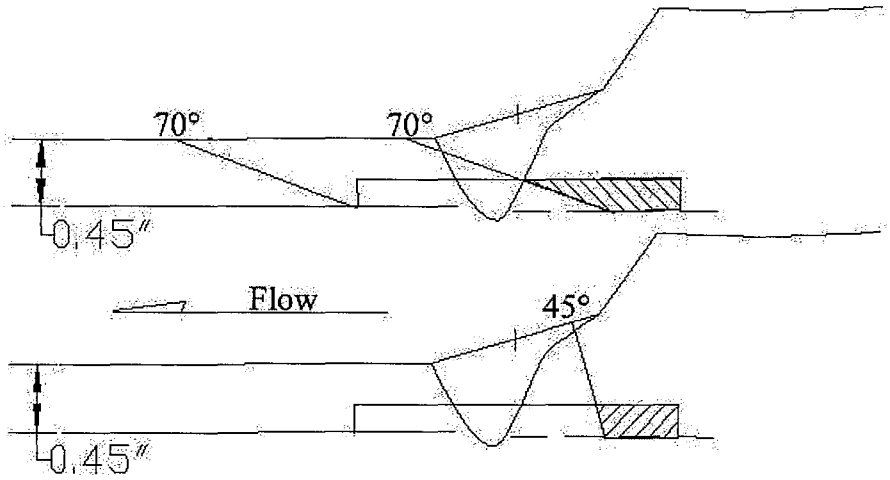
Examination Volume Dimensions: Height 0.385" (2) Length 57" Width 2.6"

Coverage Summary				
Required Scans (each has a weighing factor of 100 for complete coverage)				
Angle	UpSt-Ax	UpSt-Circ	DnSt-Ax	DnSt-Circ
45° SH	100% (Note 3)	100.00%	0% (Note 3)	0.00%
45° RL	(Used 60°)	100.00%	(Used 60°)	0.00%
60° RL	100.00%	N/A	15% (Note 3)	N/A
			Code Coverage Total	**53.75%**
			Best Effort Coverage(Max 25%) Total	N/A

Notes:

1) Code Coverage refers to the maximum percentage of the required examination volume that is effectively examined with the qualified examination procedure.
2) Vol coverages obtained with CAD

3) RL coverage obtained past Weld CL.



Required examination volume US axial and circumferential scan directions-0.21 sq. in.

Volume missed upstream axial scan direction- 0.16 square in. .16/.21= 76.2%, 23.8% examined US side

Volume missed upstream circ. scan direction- 0.16 sq. in. .10/.21= 47.6%, 52.4% examined US side

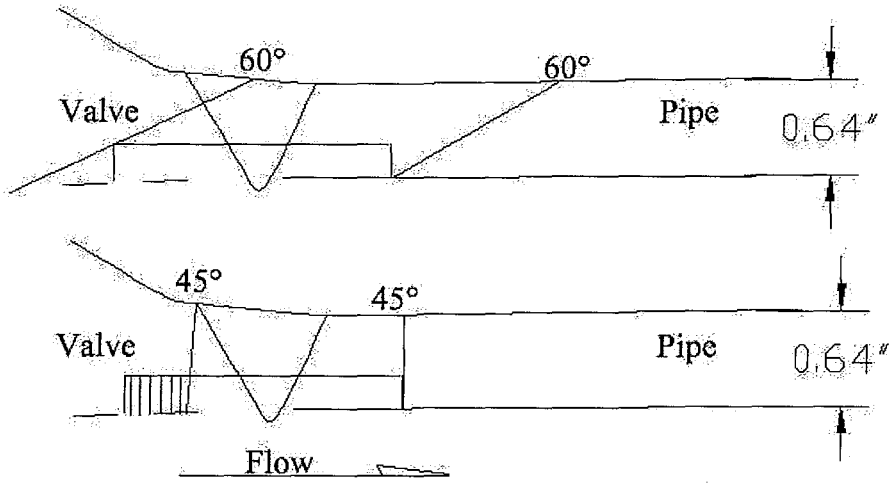
Examination Volume Dimensions: Length 20.0" x Width 2.2" x Height .15"
Weld Thickness= .45" Weld Length= 20.0" Weld Width= 1.2"

Coverage Summary- Weld # FWS-18-FW-35

	Required Scans- each has a weighing factor of 100% for complete coverage			
Angle	Upstream-Axial	Upstream- Circ.	Downstream Axial	Downstream Circ.
45°/70°	23.8%	52.4%	100%	100%
		(23.8+52.4+100+100)/4=69.1	Code Coverage Total	69.1%

Notes:

1. **Code Coverage refers to the maximum percentage of the required examination volume that is effectively examined with the qualified examination procedure**



Required examination volume US axial and circumferential scan directions- 0.22 square in.

Volume missed upstream circ. scan direction- 0.11 square in. .11/.22= 50%, 50% examined US side

Examination Volume Dimensions: Length 25.5" x Width 1.8" x Height .22" Weld Thickness= .64" Weld Length= 25.5" Weld Width= 0.8"				
Coverage Summary- Weld # MSS-29-FW-3				
	Required Scans- each has a weighing factor of 100% for complete coverage			
Angle	Upstream-Axial	Upstream- Circ.	Downstream Axial	Downstream Circ.
45°/60°	100%	50%	100%	100%
		(100+50+100+100)/4=87.5	Code Coverage Total	87.5%

Notes:

1. **Code Coverage refers to the maximum percentage of the required examination volume that is effectively examined with the qualified examination procedure**

ATTACHMENT 7

RELIEF REQUEST IR-3-46
EXAMINATION CATEGORY F-A
SUPPORTS

DOMINION ENERGY NUCLEAR CONNECTICUT, INC. (DENC)
MILLSTONE POWER STATION UNIT 3 (MPS3)

10 CFR 50.55a Request Number: IR-3-46

Relief Requested
In Accordance with 10 CFR 50.55a(g)(5)(iii)

--Inservice Inspection Impracticality--

1. ASME Code Components Affected:

ASME Code Class:	Code Class 1
Examination Category:	F-A, Supports
Item Numbers:	F1.40, Supports Other than Piping Supports
Component Identification:	3-RVS-1, 3-RVS-2, 3-RVS-3 and 3-RVS-4

2. Applicable Code Edition and Addenda

ASME Section XI, 2004 Edition, No addenda

3. Applicable Code Requirement

ASME Section XI, 2004 Edition, Examination Category F-A requires that supports, other than piping supports, be subjected to a VT-3 visual examination once each inspection interval.

4. Impracticality of Compliance

Pursuant to 10 CFR 50.55a(g)(5)(iii), relief is requested from performing the visual examination of the subject supports to the extent required by Code due to permanent obstruction caused by the reactor vessel insulation panels.

The MPS3 reactor pressure vessel (RPV) has four supports that are located under two cold leg nozzles and two hot leg nozzles. The support assembly for each of these nozzles consists of a nozzle pad and steel plates positioned between a steel support structure that is welded to the neutron shield tank, as shown in the figure in this attachment. The support is designed to act as a vertical restraint, loaded in compression so it is not subject to the typical failure mechanisms associated with stress at ridged connections and loosened fasteners. The majority of each support is encased in permanent insulation panels for the reactor vessel and the reactor

vessel nozzles. Only a portion of the end of each support and associated welds are accessible for VT-3 visual examination.

The RPV insulation panels consist of neutron shield package panels that are bolted in place and inhibit access to the surface of these supports. These panels cover the outside surface of the RPV nozzles and nozzle supports and are constructed of stainless steel plate filled with shielding material consisting of borated silicone rubber. There are eight individual panels covering the RPV nozzle and nozzle support that would need to be removed for each of the four support locations. A sketch of the typical shielding panel arrangement and listing of the weight of each panel is provided in this attachment. Note that it is anticipated that the panels labeled number 4, 5, 6, and 7, along with the bolting labeled number 3 would need to be removed for this examination. The individual panels to be removed for this examination range in weight from 230 lbs. to 1200 lbs. and are assembled in a sequence such that panels for the nozzles and nozzle supports need to be removed to gain access to visually inspect the subject supports. Removal of the panels is further complicated by their location in the restricted area under the permanently welded cavity seal ring. These panels have not been removed since original construction. Due to the size and weight of these panels and their location in the confined area under the cavity seal ring, specialized rigging equipment would need to be set up through the existing seal ring manways in an attempt to remove the panels without modification or removal of the cavity seal ring. The radiation exposure estimate based on rigging setup and removal, shielding panel removal and reinstallation, and the support visual examination time, would result in approximately 26.08 man-rem of exposure.

The RPV support assembly drawing, insulation panel arrangement and insulation weight listing are provided in this attachment.

5. Burden Caused by Compliance

Removal of the RPV insulation panels would be required to increase the direct visual examination coverage of the subject supports. DENC considers performance of this activity to meet the 100 percent Code examination requirement to be impractical, due to the access restrictions, high radiation levels and support design.

6. Proposed Alternative and Basis for Use

The subject supports received a VT-3 visual examination on the accessible portions of the subject supports to the maximum extent practical with the insulation panels in place, including examination of the insulation for any evidence of disturbance or degradation which may be attributed to abnormal support disturbance.

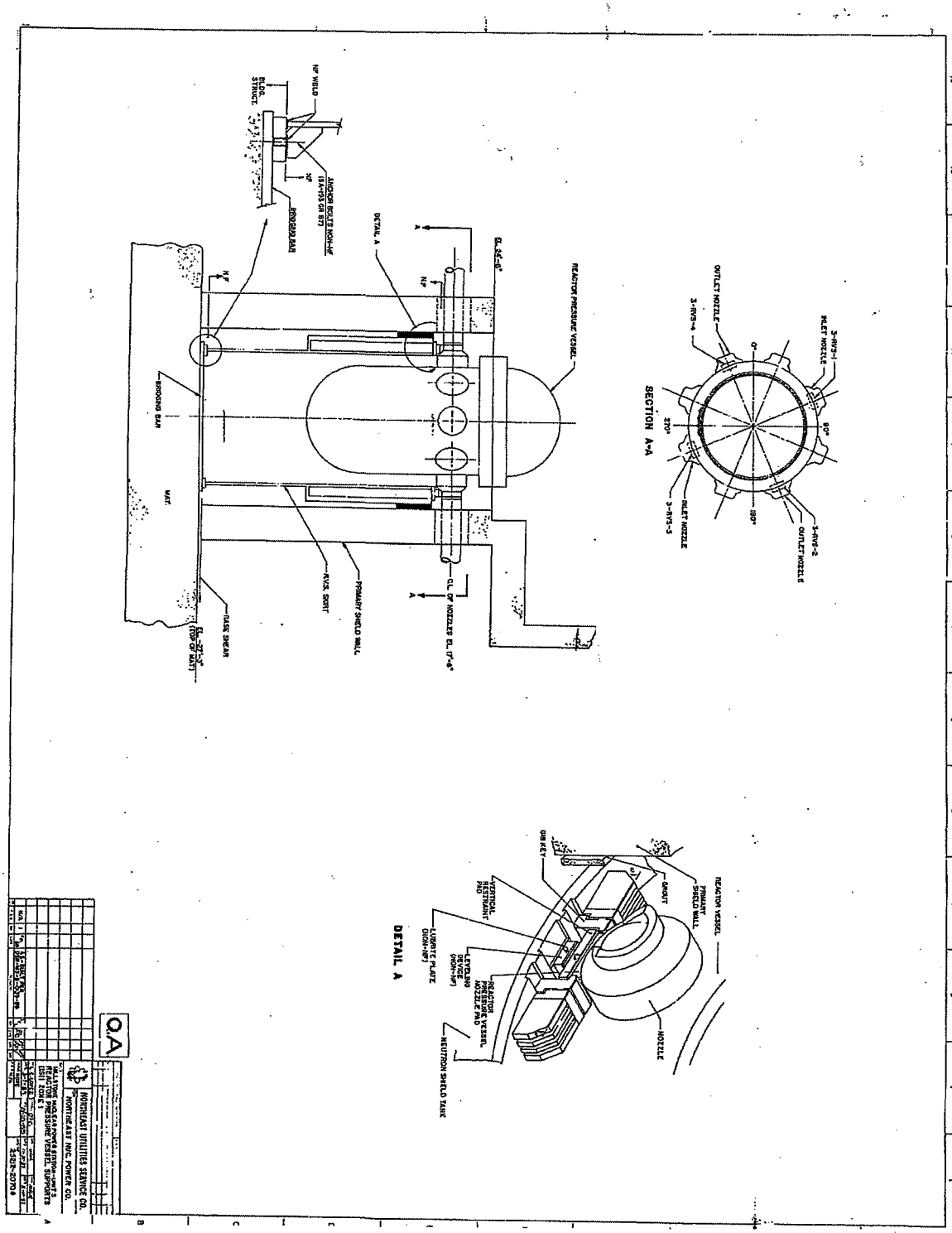
Based on the visual examination coverage attained, including examination of the insulation panels for degradation, it is reasonable to conclude that service-induced degradation would be detected. Therefore, the proposed alternative provides an acceptable level of quality and safety by providing reasonable assurance of structural integrity of the subject supports.

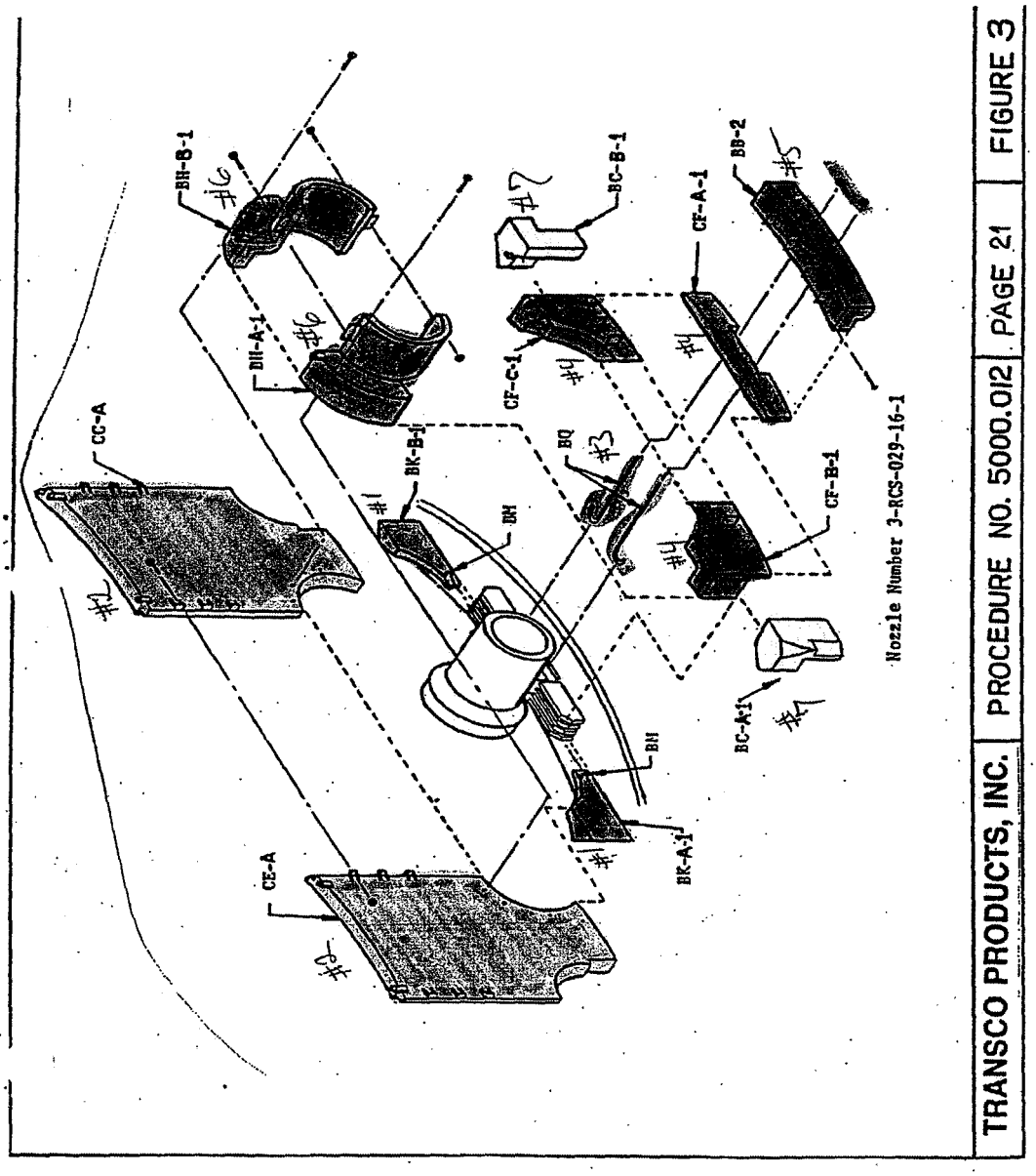
7. Duration of Proposed Alternative

Relief is requested for the third 10-year inservice inspection interval for MPS3, which began on April 23, 2009 and ended on June 22, 2019.

8. Precedent

A similar relief request was approved for use at MPS3 for the second 10-year inservice inspection interval (i.e., Relief Request IR-2-58) by letter dated April 26, 2011 (ADAMS Accession No. ML110691154).


REACTOR PRESSURE VESSEL
BIRDCAGE BAR
MAT
BASE SHEAR
AXIAL SHIM
PRIMARY SHIELD WALL
SECTION A-A
INLET NOZZLE
OUTLET NOZZLE
DETAIL A
GROUT
NOZZLE
NEUTRON SHIELD TANK
Q.A.
NORTHEAST UTILITIES SERVICE CO.
NORTHEAST NUCLEAR POWER CO.


CC-A
#2
BH-B-1
#6
BH-A-1
#6
CE-A
#8
BK-B-1
#1
BH
BK-A-1
#1
BH
BQ
#3
CF-C-1
#4
BC-B-1
#7
BC-A-1
#7
CF-A-1
#4
CF-B-1
#4
BB-2
#5
Nozzle Number 3-RCS-029-16-1
TRANSCO PRODUCTS, INC. | PROCEDURE NO. 5000.012 | PAGE 21 | FIGURE 3

TRANSCO PRODUCTS INC.

TABLE 1

NOTE: These calculated weights are to be used for the selection of rigging, hoisting and temporary supports. Appropriate Factors of Safety are to be applied.

MARK NUMBER	*WEIGHT*	*MARK NUMBER*	*WEIGHT*
CB-1	*3,520 lbs.*	*BE-D-1*	*340 lbs.*
CB-2	*3,520*	*BE-D-2*	*340*
CC-A	*3,520*	*BE-E-1*	*340*
CC-B	*3,440*	*BE-E-2*	*340*
CD-A	*3,520*	*BG-A-1*	*675*
CD-B	*3,520*	*BG-A-2*	*675*
CE-A	*3,520*	*BG-B-1*	*395*
CE-B	*3,610*	*BG-B-2*	*395*
CN-A-1	*19*	*BG-C-2*	*395*
CN-B-1	*19*	*BG-C-2*	*395*
CN-A-2	*19*	*BG-D-1*	*415*
CN-B-2	*19*	*BG-D-2*	*415*
BN-A-1	*470*	*BG-E-1*	*415*
BN-A-2	*470*	*BG-E-2*	*415*
BN-B-1	*410*	*CF-A-1*	*230*
BN-B-2	*410*	*CF-A-2*	*230*
BN-C-1	*410*	*CF-B-1*	*480*
BN-C-2	*410*	*CF-B-2*	*480*
BP-A-1	*470*	*CF-C-1*	*480*
BP-A-2	*470*	*CF-C-2*	*480*
BP-B-1	*370*	*CG-A-1*	*230*
BP-B-2	*370*	*CG-A-2*	*230*
BP-C-1	*370*	*CG-B-1*	*480*
BP-C-2	*370*	*CG-B-2*	*480*
BK-A-1	*620*	*CG-C-1*	*480*
BK-A-2	*620*	*CG-C-2*	*480*
BK-B-1	*620*	*BH-A-1*	*1,200*
BK-B-2	*620*	*BH-B-1*	*1,200*
BL-A-1	*620*	*BH-A-2*	*1,200*
BL-A-2	*620*	*BH-B-2*	*1,200*
BL-B-1	*620*	*BH-A-3*	*1,200*
BL-B-2	*620*	*BH-B-3*	*1,200*
BE-A-1	*590*	*BH-A-4*	*1,200*
BE-A-2	*590*	*BH-B-4*	*1,200*
BE-B-1	*710*	*BJ-AA-1*	*1,200*
BE-B-2	*710*	*BJ-AA-2*	*1,200*
BE-C-1	*730*	*BJ-AB-1*	*1,200*
BE-C-2	*730*	*BJ-AB-2*	*1,200*

TRANSCO PRODUCTS INC.

MARK NUMBER	WEIGHT
BJ-BA-1	1,200 lbs.
BJ-BA-2	1,200
BJ-BB-1	1,200
BJ-BB-2	1,200
BB-1	510
BB-2	510
BB-3	510
BB-4	510
BC-A-1	415
BC-A-2	415
BC-B-1	415
BC-B-2	415
BD-A-1	415
BD-A-2	415
BD-B-1	415
BD-B-1	415
BS-1	140
BS-2	140
BT-1	90
BT-2	90
BV-1	110
BV-2	110
BW-1	120
BW-2	120

ATTACHMENT 8

RELIEF REQUEST IR-3-47
EXAMINATION CATEGORY R-A
RISK-INFORMED PIPING EXAMINATIONS

DOMINION ENERGY NUCLEAR CONNECTICUT, INC. (DENC)
MILLSTONE POWER STATION UNIT 3 (MPS3)

10 CFR 50.55a Request Number: IR-3-47

Relief Requested
In Accordance with 10 CFR 50.55a(g)(5)(iii)

--Inservice Inspection Impracticality--

1. ASME Code Components Affected:

ASME Code Class:	Code Class 1
Examination Category:	R-A, Risk Informed Piping Examinations
Item Numbers:	R1.11, Elements Subject to Thermal Fatigue R1.20, Elements Not Subject to a Damage Mechanism
Component Identification:	Listed in Table 1
Material:	Listed in Table 1

2. Applicable Code Edition and Addenda

ASME Section XI, 2004 Edition, No Addenda

3. Applicable Code Requirement

The examination requirements for Class 1 piping welds are governed by the Risk Informed Inservice Inspection Program that was approved by the NRC in a letter dated March 24, 2011 (Adams Accession Number ML110680080). The program was developed in accordance with the Westinghouse Owners Group Topical Report, "WCAP 14572, Revision 1-NP-A." Examination Category R-A requires that essentially 100 percent of the weld volume be examined. The alternative requirements of ASME Code Case N-460, approved for use in Regulatory Guide 1.147, allows credit for essentially 100 percent coverage provided greater than 90 percent of the required volume has been examined.

10 CFR 50.55a(b)(2)(xv)(A), requires the following examination coverage criteria when applying Supplement 2 (Qualification Requirements for Wrought Austenitic Piping Welds) to Appendix VIII (Performance Demonstration for Ultrasonic Examination Systems):

(1) Piping must be examined in two axial directions and when examination in the circumferential direction is required, the circumferential examination must be performed in two directions, provided access is available.

(2) Where examination from both sides is not possible, full coverage credit may be claimed from a single side for ferritic welds. Where examination from both sides is not possible on austenitic welds, full coverage credit from a single side may be claimed only after completing a successful single-sided Appendix VIII demonstration using flaws on the opposite side of the weld.

10 CFR 50.55a(b)(2)(xvi)(B) requires that examinations performed from one side of a ferritic or stainless steel pipe weld must be conducted with equipment, procedures, and personnel that have demonstrated proficiency with single side examinations. To demonstrate equivalency to two-sided examinations, the demonstration must be performed to the requirements of Appendix VIII, as modified by this paragraph and 10 CFR 50.55a(b)(2)(xv)(A).

4. Impracticality of Compliance

Pursuant to 10 CFR 50.55a(g)(5)(iii), relief is requested from the 100 percent volumetric examination coverage requirement for the subject austenitic welds due to the geometric configuration which limits the volumetric coverage that can be obtained.

The subject welds were examined with a manual ultrasonic technique utilizing personnel, equipment and procedures qualified in accordance with ASME Section XI. The cast austenitic stainless steel (CASS) welds (RCS-5-FW-8, RCS-LP2-FW-4, RCS-LP2-FW-5, RCS-LP2-HL1-SW-C, and RCS-LP2-HL1-SW-C) were examined in accordance with Appendix III and the remaining austenitic welds were examined in accordance with Appendix VIII, as implemented by the Performance Demonstration Initiative (PDI).

The Appendix III examinations are performed to the extent possible that the weld configuration allows.

For the Appendix VIII examinations, there are currently no PDI-qualified single side examination procedures that demonstrate equivalency to two-sided examination procedures on austenitic piping welds. Current technology is not capable of reliably detecting or sizing flaws on the far side of an austenitic weld for configurations common to domestic nuclear applications.

PDI Performance Demonstration Qualification Summary (PDQS) certificates for austenitic piping list the limitation that single side examination is performed on a best effort basis. The best effort qualification is provided in place of a complete single side qualification to demonstrate that the examiner's qualification and the

subsequent weld examination is based on application of the best available technology.

When the examination area is limited to one side of an austenitic weld, examination coverage does not comply with 10 CFR 50.55a(b)(2)(xv)(A) and proficiency demonstrations do not comply with 10 CFR 50.55a(b)(2)(xvi)(B) and full coverage credit may not be claimed.

The ASME Code-required volume of these welds was interrogated ultrasonically to the maximum extent possible. No alternative methods or advanced technologies, including the use of phased array, were considered capable of obtaining complete coverage of the examination volume.

The subject welds consist of pipe-to-valve, pipe-to-nozzle, elbow-to-nozzle or pipe-to-flange configurations. Due to the tapered surface of the valve, nozzle or flange within close proximity of the weld, the ability to scan from that side of the weld is limited.

There are no welds in this request that are within the scope of the requirements of Electric Power Research Institute (EPRI) document MRP-146 (Management of Thermal Fatigue in Normally Stagnant Non-Isolable Reactor Coolant System Branch).

Based on the configuration being limited to single-sided access, relief is requested from complying with the 100 percent required volumetric examination coverage for the piping welds listed in Table 1. Note that examination coverage listed in Table 1 is that which was obtained during examination, with no credit taken for the far side of each weld.

Supplemental scanning was performed to provide additional best effort (non-Code) coverage as documented on the enclosed coverage calculation for each weld.

Coverage calculations are provided in this attachment.

Table 1
Examination Category R-A Welds with Limited Volumetric Coverage

Weld Identification	Code Item #	System / Code Class Configuration Material	Examination Angle and Wave Mode	Limitations and Results	Examination Coverage (%)
3-CHS-150-P1A-2	R1.20	Chemical and Volume Control / Class 1 1.5" BW Flange-To-Pipe Type 316 Stainless Steel, Schedule 160	45° Shear Wave 60° Shear Wave 70° Shear Wave	Single-sided examination was performed due to component configuration. No recordable indications were detected.	75%
3-CHS-150-P1C-2	R1.20	Chemical and Volume Control / Class 1 1.5" BW Flange-To-Pipe Type 316 Stainless Steel, Schedule 160	45° Shear Wave 60° Shear Wave 70° Shear Wave	Single-sided examination was performed due to component configuration. No recordable indications were detected.	50%
3-CHS-150-P1D-2	R1.20	Chemical and Volume Control / Class 1 1.5" BW Flange-To-Pipe Type 316 Stainless Steel, Schedule 160	45° Shear Wave 60° Shear Wave 70° Shear Wave	Single-sided examination was performed due to component configuration. No recordable indications were detected.	50%

Table 1
Examination Category R-A Welds with Limited Volumetric Coverage

Weld Identification	Code Item #	System / Code Class Configuration Material	Examination Angle and Wave Mode	Limitations and Results	Examination Coverage (%)
RCS-504A-FW-4	R1.11	Reactor Coolant / Class 1 8" Pipe-to-Valve SA-376, TP-304. Sch 160 Valve SA-351, CF8M	45° Shear Wave 60° Shear Wave 60° Longitudinal Wave	Single-sided examination was performed due to component configuration. No recordable indications were detected.	50%
RCS-504B-FW-4	R1.11	Reactor Coolant / Class 1 8" Pipe-to-Valve SA-376, TP-304. Sch 160	45° Shear Wave 60° Shear Wave 60° Longitudinal Wave	Single-sided examination was performed due to component configuration. No recordable indications were detected.	50%
RCS-504D-FW-1	R1.11	Reactor Coolant / Class 1 8" Pipe-to-Valve SA-376, TP-304. Sch 160 Valve SA-351, CF8MS	45° Shear Wave 60° Shear Wave 60° Longitudinal Wave	Single-sided examination was performed due to component configuration. No recordable indications were detected.	50%
RCS-5-FW-8	R1.20	Reactor Coolant / Class 1 2" Pipe-To-Valve SA 351 F316N Valve SA-351, CF8M.	45° Longitudinal Wave	Single-sided examination was performed due to component configuration. No effective circumferential scan coverage due to weld and valve surface condition. No recordable indications were detected.	32.2%

Table 1
Examination Category R-A Welds with Limited Volumetric Coverage

Weld Identification	Code Item #	System / Code Class Configuration Material	Examination Angle and Wave Mode	Limitations and Results	Examination Coverage (%)
RCS-LP2-FW-4	R1.20	Reactor Coolant / Class 1 29" Elbow-To-Nozzle Elbow SA-351 CF8A SG Nozzle SA-508 CL2A	45° Longitudinal Wave	Single-sided examination was performed due to component configuration. No recordable indications were detected.	53.22%
RCS-LP2-FW-5	R1.20	Reactor Coolant / Class 1 31" Elbow-To-Nozzle Elbow SA351, CF8M. SG Nozzle SA-508 CL2A	45° Longitudinal Wave	Single-sided examination was performed due to component configuration. No recordable indications were detected.	53.22%
RCS-LP2-HL1-SW-C	R1.20	Reactor Coolant / Class 1 14" Pipe-To-Nozzle SA-351, CF8A, Sch 160. Nozzle SA-182, F316N.	45° Longitudinal Wave	Single-sided examination was performed due to component configuration. No effective circumferential scan coverage due to configuration of nozzle and weld. No recordable indications were detected.	29.7%
RCS-LP4-FW-HL1-CMR	R1.20	Reactor Coolant / Class 1 12" Pipe-To-Nozzle SA-351, CF8A, Sch 140. Nozzle SA-182, F316N.	45° Longitudinal Wave	Single-sided examination was performed due to component configuration. No recordable indications were detected.	52.05%

Table 1
Examination Category R-A Welds with Limited Volumetric Coverage

Weld Identification	Code Item #	System / Code Class Configuration Material	Examination Angle and Wave Mode	Limitations and Results	Examination Coverage (%)
RHS-501-FW-3	R1.11	Residual Heat Removal / Class 12" Valve-To-Pipe Valve SA-182, F316. Sch 160. SA 376, T316	45° Shear Wave 60° Shear Wave 60° Longitudinal Wave	Single-sided examination was performed due to component configuration. No recordable indications were detected.	50%
SIL-13-FW-5	R1.11	Reactor Coolant / Class 6" Pipe-to-Valve Body SA-376, T316. Valve SA-182, F316.	45° Shear Wave 60° Shear Wave 70° Shear Wave 60° Longitudinal Wave	Single-sided examination was performed due to component configuration. Indications were detected that were evaluated as acceptable valve body internal geometry.	50%
SIL-4-FW-10	R1.11	Reactor Coolant / Class 10" Valve-To-Pipe SA-376, TP-316 Sch 140	45° Shear Wave 60° Shear Wave 70° Shear Wave	Single-sided examination was performed due to component configuration. No recordable indications were detected.	50%
SIL-5-FW-10	R1.11	Reactor Coolant / Class 10" Pipe-To-Valve SA-376, TP-316 Sch140.	45° Shear Wave 60° Shear Wave 60° Longitudinal Wave	Single-sided examination was performed due to component configuration. No recordable indications were detected.	50%

Table 1
Examination Category R-A Welds with Limited Volumetric Coverage

Weld Identification	Code Item #	System / Code Class Configuration Material	Examination Angle and Wave Mode	Limitations and Results	Examination Coverage (%)
SIL-6-FW-10	R1.11	Reactor Coolant / Class 10" Valve-To-Pipe Valve SA-351 CF8M SA376, T316 Sch 140.	45° Shear Wave 60° Shear Wave 70° Shear Wave	Single-sided examination was performed due to component configuration. No recordable indications were detected.	50%
SIL-7-FW-10	R1.11	Reactor Coolant / Class 10" Pipe-To-Valve SA-376, T316 Sch 140 Valve SA-182, F316.	45° Shear Wave 60° Shear Wave 60° Longitudinal Wave	Single-sided examination was performed due to component configuration. No recordable indications were detected.	50%

5. Burden Caused by Compliance

Compliance with the Code requirements would require extensive modification or replacement of components with a design that would allow full examination from both sides of the weld. DENC considers these options to meet the 100 percent Code examination requirement for coverage to be impractical based on the cost, increased radiation exposure and impact to plant equipment.

6. Proposed Alternative and Basis for Use

The subject welds received a volumetric examination to the maximum extent practical utilizing the best available techniques, as qualified through the PDI for Supplement 2 with demonstrated best effort for single-sided examination from the accessible side of the weld, and all results were acceptable. Also, these components are monitored for through-wall leakage as part of the ASME Section XI System Pressure Test Program and receive a visual (VT-2) examination at the end of each refueling outage during the system leakage tests as required by Section XI, Table IWB-2500-1, Category B-P for Class 1 components.

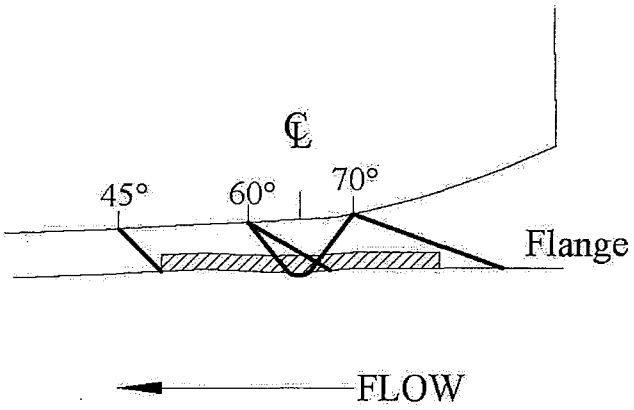
Based on the volumetric coverage that was obtained with acceptable results and the visual (VT-2) examination performed each refueling outage, it is reasonable to conclude that service-induced degradation would be detected. Therefore, these proposed alternatives will provide an acceptable level of quality and safety by providing reasonable assurance of structural integrity of the subject welds.

7. Duration of Proposed Alternative

Relief is requested for the third 10-year inservice inspection interval for MPS3, which began on April 23, 2009 and ended on June 22, 2019.

8. Precendent

A similar relief request was approved for use at MPS3 during the second 10-year inservice inspection interval in NRC letter dated April 26, 2011 (i.e. Relief Request 2-59, (ADAMS Accession No. ML110691154)).



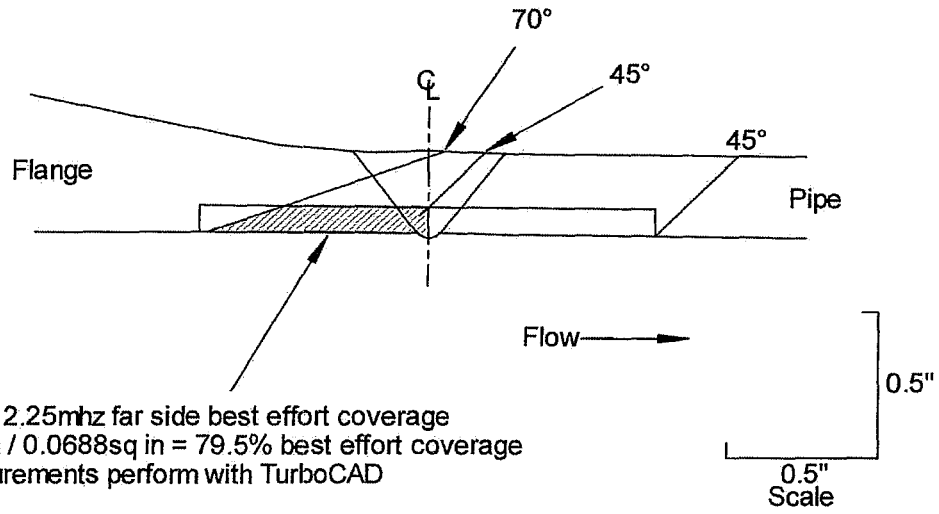
*Not to Scale

Examination Volume Dimensions: Length 4.70" x Width 1.6" x Height .094" Weld Thickness= .281" Weld Length= 4.70" Weld Width= 0.6"				
(US-0%+DS100%+CW-100%+CCW-100%)/4=75%				
Coverage Summary- Weld # 3-CHS-150-P1A-2				
	Required Scans- each has a weighing factor of 100% for complete coverage			
Angle	Upstream-Axial	Upstream- Circ.	Downstream Axial	Downstream Circ.
45°/60°	0%	100%	100%	100%
70°	25%			
			Code Coverage Total	75%
		Best Effort Coverage (Max 25%) Total		25%

Notes:

1. Code Coverage refers to the maximum percentage of the required examination volume that is effectively examined with the qualified examination procedure
2. Best Effort Coverage refers to the required examination volume past the weld centerline that is examined in the axial beam direction with an Appendix VIII demonstrated procedure for single sided coverage.

Weld Number	**3-CHS-150-P1C-2**
Weld Thickness	0.281"
Weld Length	6.0"
Weld Width	0.5"



Area of 70° 2.25mhz far side best effort coverage
0.0547sq in / 0.0688sq in = 79.5% best effort coverage
Area measurements perform with TurboCAD

Examination Volume Dimensions: Height 0.094" Length 6.0" Width 1.5"

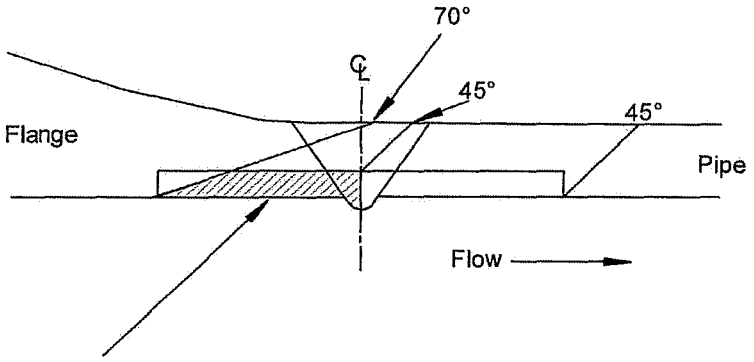
Coverage Summary				
Required Scans (each has a weighing factor of 100 for complete coverage)				
Angle	UpSt-Ax	UpSt-Circ	DnSt-Ax	DnSt-Circ
45°, 60°, 70°			100%	
45°, 60°		0%		100%
70° 2.25mhz	80%			
			Code Coverage Total	**50%**
			Best Effort Coverage(Max 25%) Total	**19.9%**

Notes:

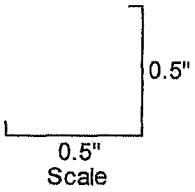
1) Code Coverage refers to the maximum percentage of the required examination volume that is effectively examined with the qualified examination procedure.

2) Best Effort Coverage refers to the required examination volume past the weld centerline that is examined in the axial beam direction with an Appendix VIII demonstrated procedure for single sided coverage.

Weld Number	**3-CHS-150-P1D-2**
Weld Thickness	0.281"
Weld Length	6.0"
Weld Width	0.5"



Area of 70° 2.25mhz far side best effort coverage
0.0653sq. in. / 0.0785sq. in. = 83% best effort coverage
All area measurements performed by TurboCAD



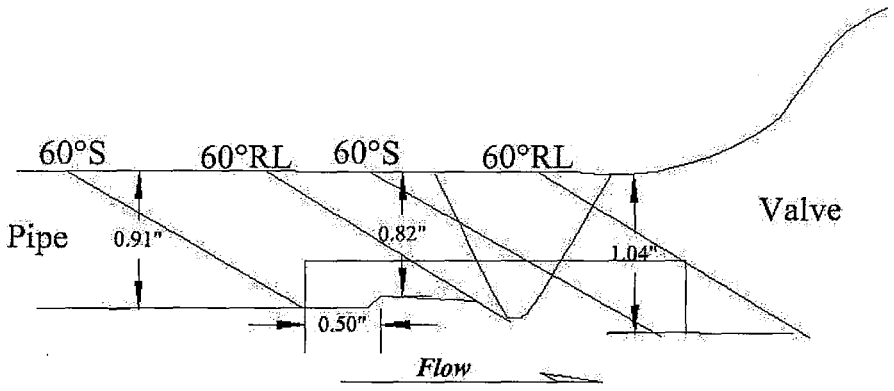
Examination Volume Dimensions: Height 0.097" Length 6.0" Width 1.5"

Coverage Summary				
Required Scans (each has a weighing factor of 100 for complete coverage)				
Angle	UpSt-Ax	UpSt-Circ	DnSt-Ax	DnSt-Circ
45°, 60°, 70°			100%	
45°, 60°		0%		100%
70° 2.25mhz	83%			
			Code Coverage Total	**50%**
			Best Effort Coverage(Max 25%) Total	**20.8%**

Notes:

1) Code Coverage refers to the maximum percentage of the required examination volume that is effectively examined with the qualified examination procedure.

2) Best Effort Coverage refers to the required examination volume past the weld centerline that is examined in the axial beam direction with an Appendix VIII demonstrated procedure for single sided coverage.

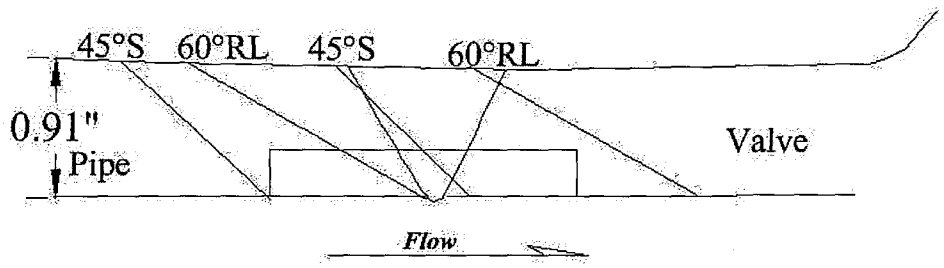


Supplemental 60° RL- (US scan for DS best effort coverage)
Examined 100% of downstream volume in the axial scan direction

Examination Volume Dimensions: Length 25.1" x Width 2.5" x Height .31"				
Weld Thickness= .91" Weld Length= 5.1" Weld Width= 1.15"				
Coverage Summary- Weld # RCS-504A-FW-4				
	Required Scans- each has a weighing factor of 100% for complete coverage			
Angle	**Upstream-Axial**	**Upstream- Circ.**	**Downstream Axial**	**Downstream Circ.**
45°/60°Shear (US only)	100%	100%	0%	0%
60°RL (DS only)	N/A	N/A	100%	N/A
		(100+100+0+0)/4=50	**Code Coverage Total**	**50%**
	Downstream axial scan coverage 100/4		**Best effort coverage (Max 25%)**	**25%**

Notes:

1. **Code Coverage refers to the maximum percentage of the required examination volume that is effectively examined with the qualified examination procedure**



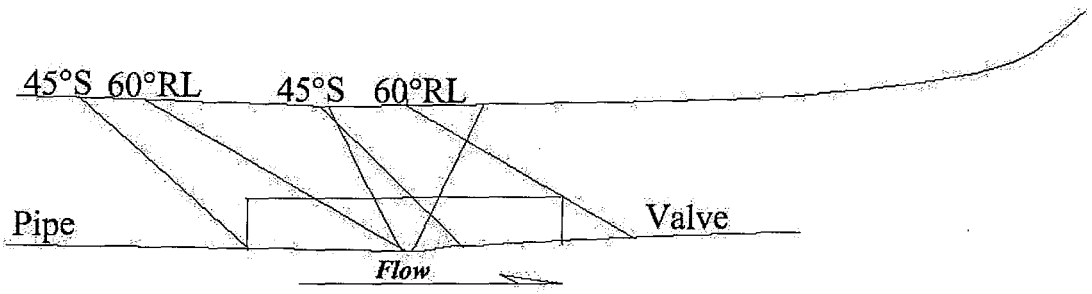
Supplemental 60° RL- (US scan for DS best effort coverage)
Examined 100% of downstream volume in the axial scan direction

Examination Volume Dimensions: Length 27.2" x Width 2.0" x Height .31"
Weld Thickness= .91" Weld Length= 27.2" Weld Width= 1.0"

Coverage Summary- Weld # RCS-504B-FW-4

	Required Scans- each has a weighing factor of 100% for complete coverage			
Angle	**Upstream-Axial**	**Upstream- Circ.**	**Downstream Axial**	**Downstream Circ.**
45°Shear (US only)	100%	100%	0%	0%
60°RL (DS only)	N/A	N/A	100%	N/A
		(100+100+0+0)/4=50	**Code Coverage Total**	**50%**
	Downstream axial scan coverage 100/4		Best effort coverage (Max 25%)	**25%**

Notes:
1. **Code Coverage refers to the maximum percentage of the required examination volume that is effectively examined with the qualified examination procedure**



Supplemental 60° RL- (US scan for DS best effort coverage)
Examined 100% of downstream volume in the axial scan direction

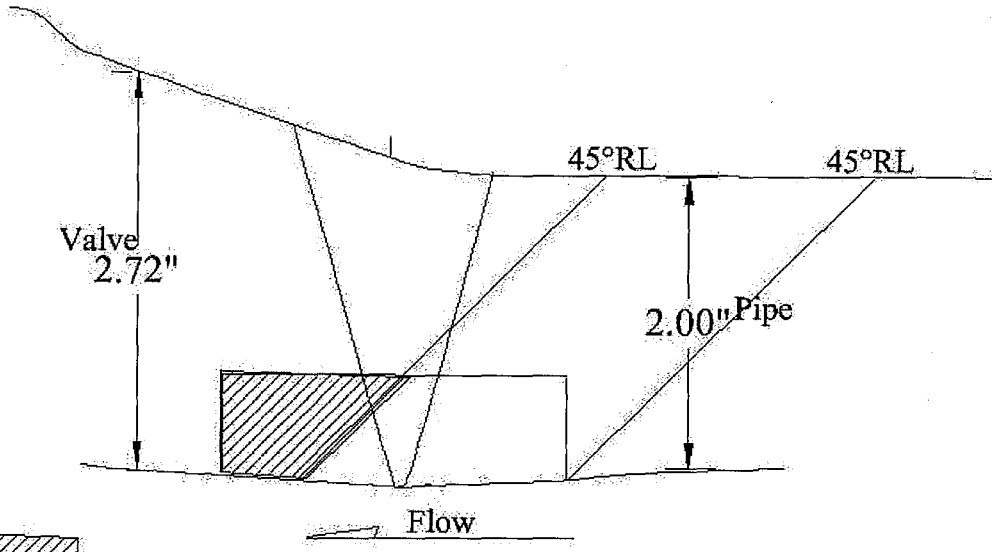
Examination Volume Dimensions: Length 27" x Width 2.0" x Height .31"
Weld Thickness= .91" Weld Length= 27" Weld Width= 1.0"

Coverage Summary- Weld # RCS-504D-FW-1

	Required Scans- each has a weighing factor of 100% for complete coverage			
Angle	**Upstream-Axial**	**Upstream- Circ.**	**Downstream Axial**	**Downstream Circ.**
45°Shear (US only)	100%	100%	0%	0%
60°RL (DS only)	N/A	N/A	100%	N/a
		(100+100+0+0)/4=50	**Code Coverage Total**	**50%**
Downstream axial scan coverage		**Best effort coverage (Max 25%)**		**25%**

Notes:

1. **Code Coverage refers to the maximum percentage of the required examination volume that is effectively examined with the qualified examination procedure**



Required examination volume DS axial scan direction-0.87 square in.

Volume missed DS axial scan direction- 0.62 square in.
.62/.87=71.2%, 28.8% Examined

Examination Volume Dimensions: Length 87" x Width 2.4" x Height .79"
Weld Thickness= 2.35" Weld Length= 87" Weld Width= 1.4

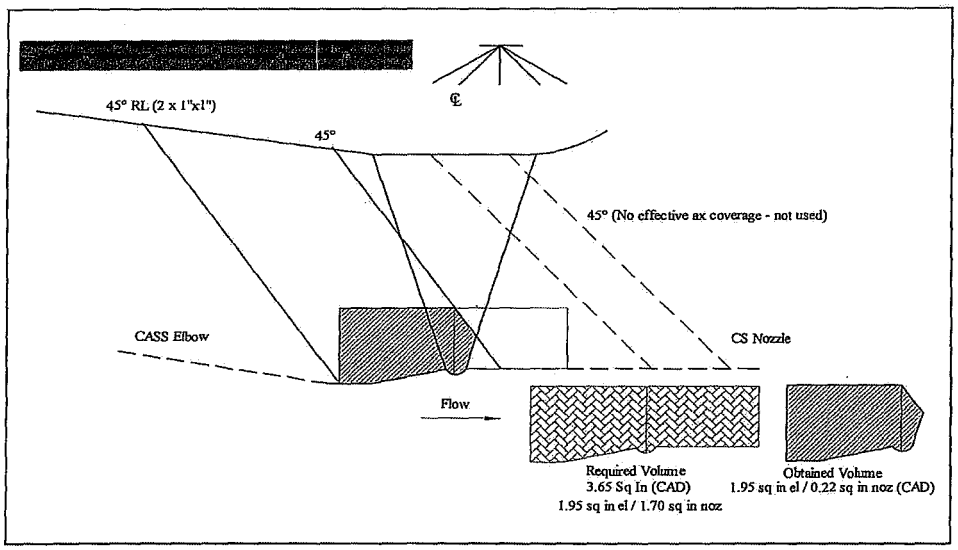
Coverage Summary- Weld # RCS-5-FW-8

	Required Scans- each has a weighing factor of 100% for complete coverage			
Angle	Upstream-Axial	Upstream-Circ.	Downstream Axial	Downstream Circ.
45°	100%	0%	28.8%	0%
		(100+0+28.8+0)/4=100	Code Coverage Total	32.2%

Notes:

1. **Code Coverage refers to the maximum percentage of the required examination volume that is effectively examined with the qualified examination procedure**

Weld Number	**RCS-LP2-FW-4**
Weld Thickness	2.45" (Nom)
Weld Length	91"
Weld Width	2.5"



53.22% Code Required Volume Examined

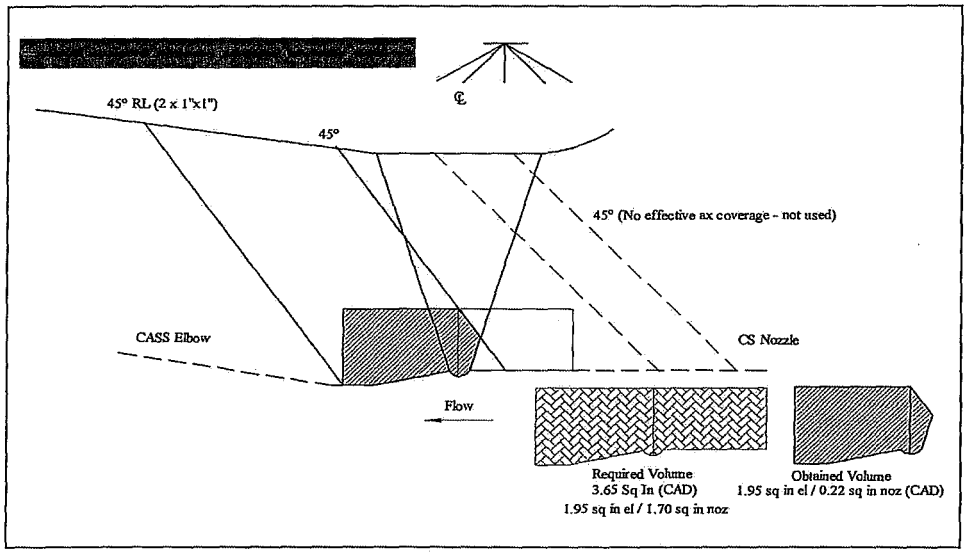
Examination Volume Dimensions: Height 0.82" (Nom) Length 91" Width 3.5"

Coverage Summary				
Required Scans (each has a weighing factor of 100 for complete coverage)				
Angle	UpSt-Ax	UpSt-Circ	DnSt-Ax	DnSt-Circ
45°RL	100.00%	100.00%	12.90%	0.00%
			Code Coverage Total	**53.22%**
			Best Effort Coverage(Max 25%) Total	N/A

Notes:

1) Code Coverage refers to the maximum percentage of the required examination volume that is effectively examined with the qualified examination procedure.

Weld Number	**RCS-LP2-FW-5**
Weld Thickness	2.6" (Nom)
Weld Length	97"
Weld Width	2.5"



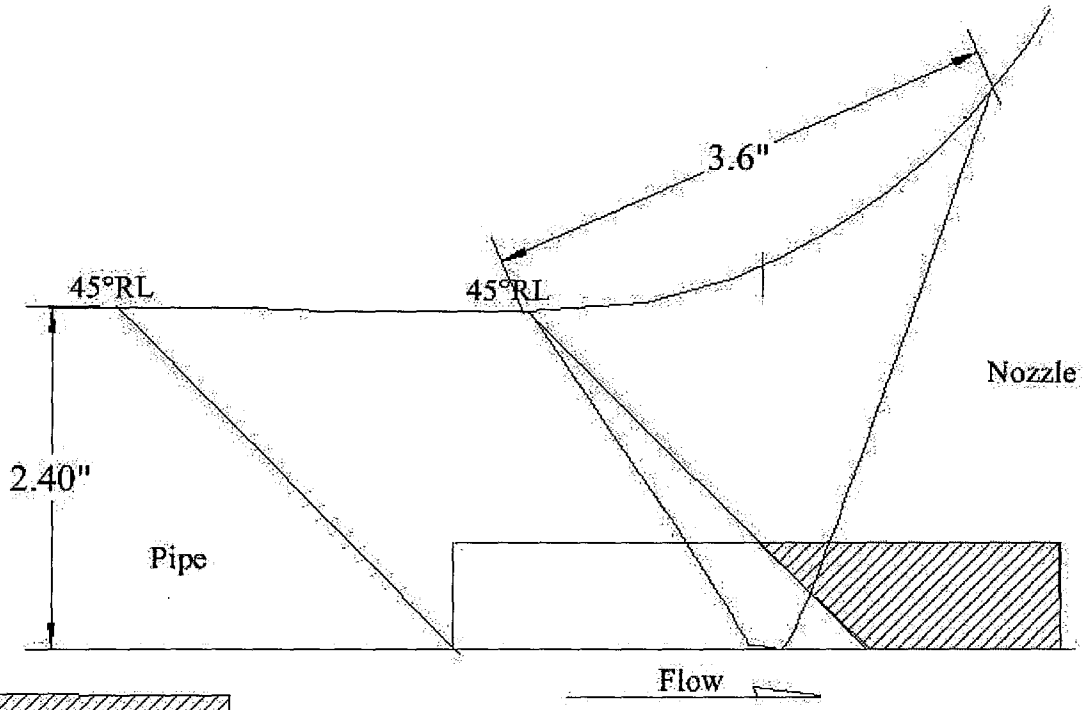
53.22% Code Required Volume Examined

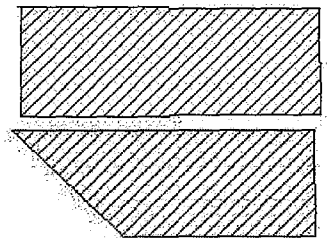
Examination Volume Dimensions: Height 0.87" (Nom) Length 97" Width 3.5"

Coverage Summary				
Required Scans (each has a weighing factor of 100 for complete coverage)				
Angle	UpSt-Ax	UpSt-Circ	DnSt-Ax	DnSt-Circ
45°RL	12.90%	0.00%	100.00%	100.00%
			Code Coverage Total	**53.22%**
			Best Effort Coverage(Max 25%) Total	N/A

Notes:

1) Code Coverage refers to the maximum percentage of the required examination volume that is effectively examined with the qualified examination procedure.





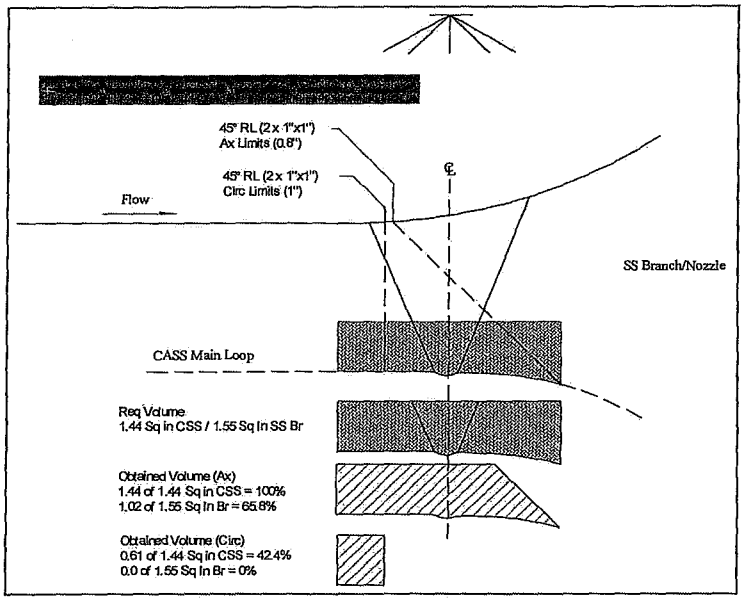
Required examination volume DS axial scan direction-1.6 square in

Volume missed DS axial scan direction- 1.3 square in.
1.3/1.6=81.3%, 18.7% Examined

Examination Volume Dimensions: Length 87" x Width 4.6" x Height .80"				
Weld Thickness= 2.40" Weld Length= 87" Weld Width= 3.6				
Coverage Summary- Weld # RCS-LP2-HL1-SW-C				
	Required Scans- each has a weighing factor of 100% for complete coverage			
Angle	Upstream-Axial	Upstream- Circ.	Downstream Axial	Downstream Circ.
45°	100%	0%	18.7%	0%
		(100+0+18.7+0)/4=29.7	Code Coverage Total	29.7%

Notes:
1. Code Coverage refers to the maximum percentage of the required examination volume that is effectively examined with the qualified examination procedure

Weld Number	**RCS-LP4-FW-HL1-CMR**
Weld Thickness	2.45" (Nom)
Weld Length	40"
Weld Width	2.5"



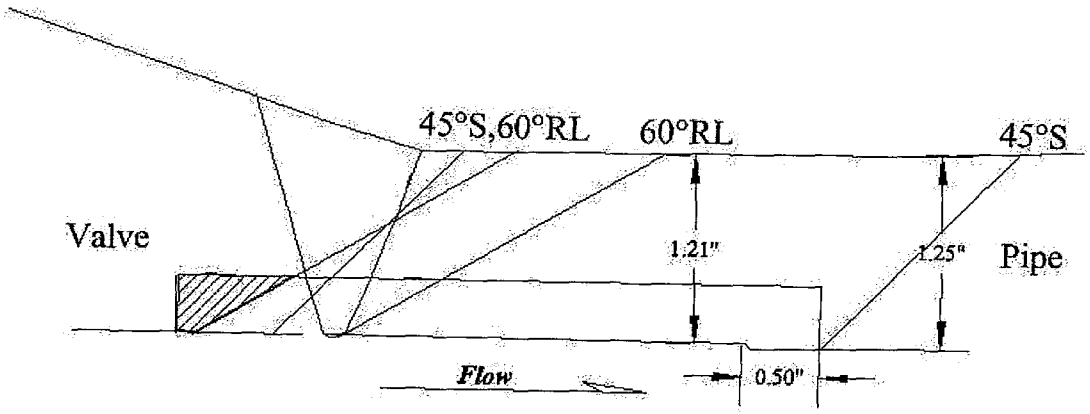
52.05% Code Required Volume Examined

Examination Volume Dimensions: Height 0.82" (Nom) Length 40" Width 3.5"

Coverage Summary				
Required Scans (each has a weighing factor of 100 for complete coverage)				
Angle	UpSt-Ax	UpSt-Circ	DnSt-Ax	DnSt-Circ
45°RL	100.00%	42.40%	65.80%	0.00%
			Code Coverage Total	**52.05%**
			Best Effort Coverage(Max 25%) Total	N/A

Notes:

1) Code Coverage refers to the maximum percentage of the required examination volume that is effectively examined with the qualified examination procedure.



Required examination volume US axial scan direction-0.42 square in

Volume missed upstream axial scan direction- 0.42 square in.
.16/.42=38.1%, 61.9% Examined

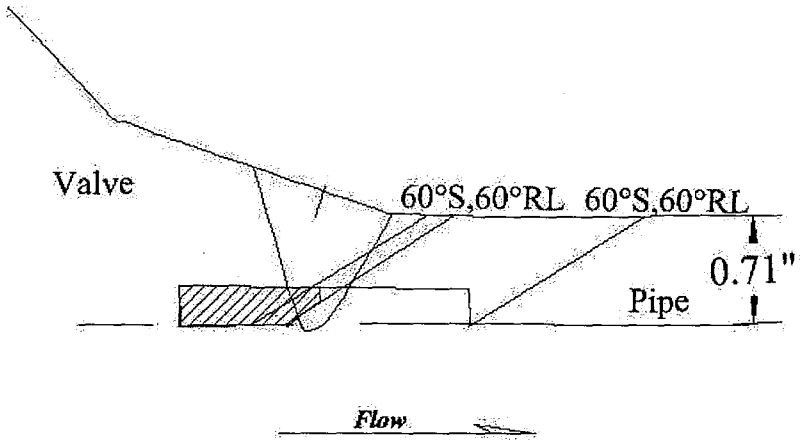
Examination Volume Dimensions: Length 40" x Width 4.1" x Height .42"
Weld Thickness= 1.25" Weld Length= 40" Weld Width= 1.0"

Coverage Summary- Weld # RHS-501-FW-3

	Required Scans- each has a weighing factor of 100% for complete coverage			
Angle	**Upstream-Axial**	**Upstream - Circ.**	**Downstream Axial**	**Downstream Circ.**
45°Shear (DS only)	0%	0%	100%	100%
60°RL (US only)	61.9%	N/A	N/A	N/A
		(0+0+100+100)/4=50	**Code Coverage Total**	**50%**
	Downstream axial scan coverage 61.9/4=15.5		Best effort coverage (Max 25%)	**15.5%**

Notes:

1. **Code Coverage refers to the maximum percentage of the required examination volume that is effectively examined with the qualified examination procedure**



Required examination volume US axial scan direction-0.25 square in.

Volume missed upstream axial scan direction- 0.23 square in.
.23/.25=92%, 8% Examined

Examination Volume Dimensions: Length 21" x Width 1.95" x Height .24"
Weld Thickness= .71" Weld Length= 21" Weld Width= .95"

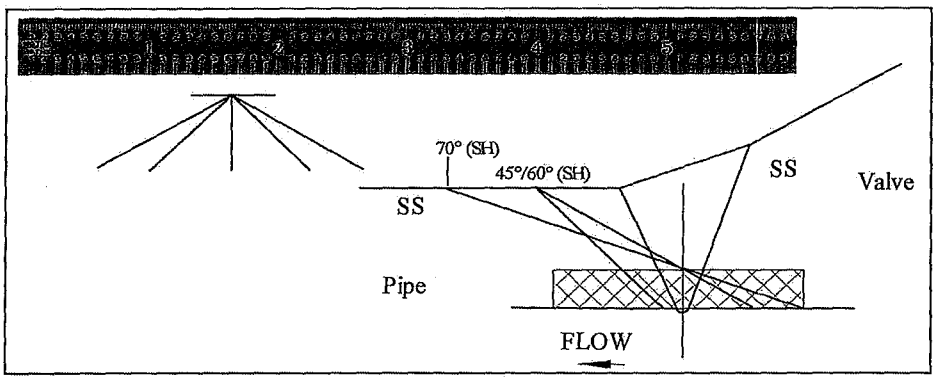
Coverage Summary- Weld # SIL-13-FW-5

	Required Scans- each has a weighing factor of 100% for complete coverage			
Angle	Upstream-Axial	Upstream- Circ.	Downstream Axial	Downstream Circ.
60°Shear (DS only)	0%	0%	100%	100%
60°RL (US only)	8%	N/A	N/A	N/A
		(0+0+100+100)/4=50	Code Coverage Total	50%
	Downstream axial scan coverage 8/4=2		Best effort coverage (Max 25%)	2.0%

Notes:

1. **Code Coverage refers to the maximum percentage of the required examination volume that is effectively examined with the qualified examination procedure**

Weld Number	**SIL-4-FW-10**
Weld Thickness	1.0" (Nom)
Weld Length	32.0"
Weld Width	1.0"



60RL unable to reach root due to index. 70RL for focusing requires larger ducer, also with excessive index. No supplemental coverage obtainable.

T&C's from previous data.

50% Code Required Volume Examined / Claimed

Examination Volume Dimensions: Height 0.333" Length 32" Width 2.0"

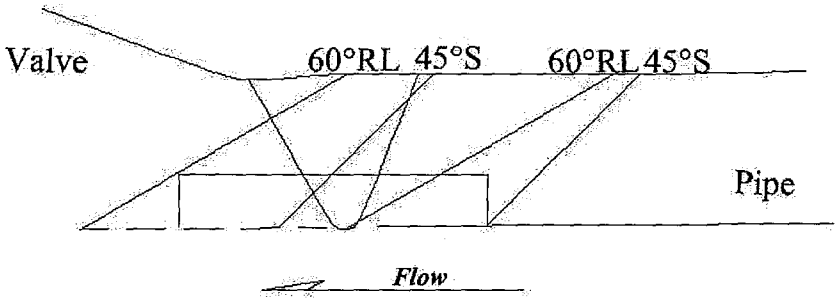
Coverage Summary

Angle	UpSt-Ax	UpSt-Circ	DnSt-Ax	DnSt-Circ
45°	0.00%	0.00%	See 60°	100.00%
60°	0.00%	N/A	100.00%	N/A
70°	0.00%	N/A	See 60°	N/A

Code Coverage Total	**50.00%**
Best Effort Coverage(Max 25%) Total	**N/A**

Notes:

1) Code Coverage refers to the maximum percentage of the required examination volume that is effectively examined with the qualified examination procedure.



Supplemental 60° RL- (US scan for DS best effort coverage)
Examined 100% of downstream volume in the axial scan direction

Examination Volume Dimensions: Length 33.75" x Width 2.0" x Height .32"
Weld Thickness= .96" Weld Length= 33.75" Weld Width= 1.0"

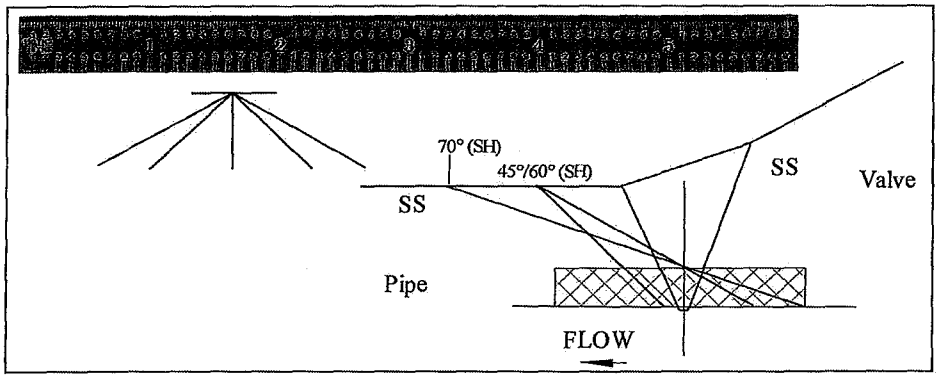
Coverage Summary- Weld # SIL-5-FW-10

	Required Scans- each has a weighing factor of 100% for complete coverage			
Angle	**Upstream-Axial**	**Upstream- Circ.**	**Downstream Axial**	**Downstream Circ.**
45°Shear (US only)	100%	100%	0%	0%
60°RL (DS only)	N/A	N/A	100%	N/a
			(100+100+0+0)/4=50 **Code Coverage Total**	**50%**
		Downstream axial scan coverage	**Best effort coverage (Max 25%)**	**25%**

Notes:

1. **Code Coverage refers to the maximum percentage of the required examination volume that is effectively examined with the qualified examination procedure**

Weld Number	**SIL-6-FW-10**
Weld Thickness	1.0" (Nom)
Weld Length	32.0"
Weld Width	1.0"



60RL unable to reach root due to index. 70RL for focusing requires larger ducer, also with excessive index. No supplemental coverage obtainable.

T&C's from previous data.

50% Code Required Volume Examined / Claimed

Examination Volume Dimensions: Height 0.333" Length 57" Width 2.0"

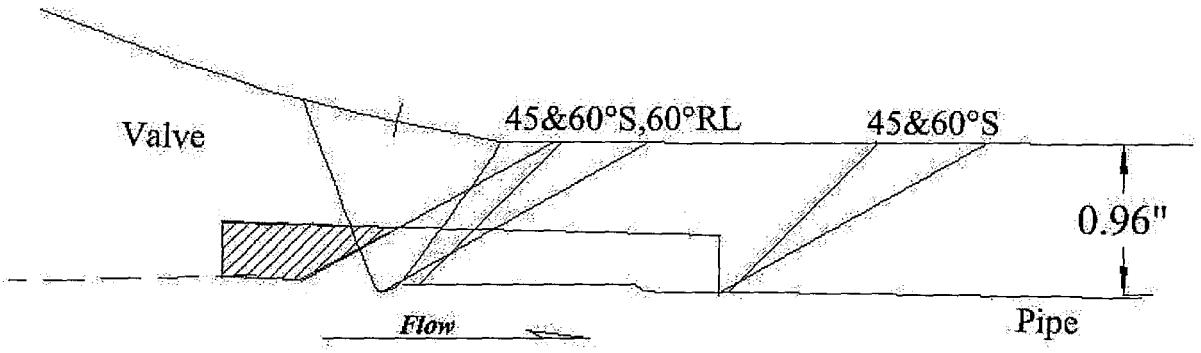
Coverage Summary

Angle	UpSt-Ax	UpSt-Circ	DnSt-Ax	DnSt-Circ
45°	0.00%	0.00%	See 60°	100.00%
60°	0.00%	N/A	100.00%	N/A
70°	0.00%	N/A	See 60°	N/A

Code Coverage Total	**50.00%**
Best Effort Coverage(Max 25%) Total	**N/A**

Notes:

1) Code Coverage refers to the maximum percentage of the required examination volume that is effectively examined with the qualified examination procedure.



Required examination volume US axial scan dircction-0.40 square in.

Volume missed upstream axial scan direction- 0.28 square in.
.28/.4=70%, 30% Examined

Examination Volume Dimensions: Length 33.8" x Width 3.2" x Height .32" Weld Thickness= .98" Weld Length= 33.8" Weld Width= 1.2"				
Coverage Summary- Weld # SIL-7-FW-10				
	Required Scans- each has a weighing factor of 100% for complete coverage			
Angle	Upstream-Axial	Upstream- Circ.	Downstream Axial	Downstream Circ.
45°Shear (DS only)	0%	0%	100%	100%
60°RL (US only)	30%	N/A	N/A	N/A
		(0+0+100+100)/4=50	Code Coverage Total	50%
	Downstream axial scan coverage 30/4=7.5		Best effort coverage (Max 25%)	7.5%

Notes:

1. **Code Coverage refers to the maximum percentage of the required examination volume that is effectively examined with the qualified examination procedure**