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1CAN100901

October 28, 2009

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

SUBJECT: Response to Request for Additional Information on the
Third 10-Year Inservice Inspection Interval
Requests for Relief
Arkansas Nuclear One, Unit 1
Docket No. 50-313
License No. DPR-51

- REFERENCES:
1. Entergy letter to the NRC, dated May 29, 2009, "Requests for Relief from ASME Section XI Volumetric, Surface and Visual Examination Requirements – Third 10-Year Interval" (1CAN050902)
 2. Email from Kaly Kalyanam (NRC) to Robert W. Clark (Entergy), dated August 5, 2009, "RAI on Relief Requests for Limited Exams during Third 10-Year Interval (TAC Nos. ME1439, 1440, 1441, 1442, 1443, and 1444)"

Dear Sir or Madam:

By Reference 1, Entergy Operations, Inc. (Entergy) submitted its third 10-year inservice inspection (ISI) interval requests for relief for Arkansas Nuclear One, Unit 1 (ANO-1). The relief requests, ANO1-ISI-015 through -020, were submitted in accordance with 10 CFR 50.55a(g)(5)(iii). The subject requests are for limited examinations in multiple American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Section XI, examination categories. The ASME Code requires that 100% of the examination volumes, or surface areas, described in ASME Code, Section XI, Table IWB-2500 and IWC-2500 be performed during each 10-year interval.

10 CFR 50.55a(g)(5)(iii) requires information to be submitted to the NRC to support the determination that the ASME requirements were impractical. Based on the NRC's acceptance review of the Reference 1 submittal, it was determined that additional information was required to support the review of the relief requests. The Staff requested detailed and specific information to support the bases for limited examination in all requests, and therefore, demonstrate impracticality. The request for additional information (RAI) was provided to ANO-1

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via Reference 2. The response to the RAI is due 90 days after the date of transmission of Reference 2. Attached are the responses for ANO-1.

This report includes no new commitments.

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

Sincerely,

A handwritten signature in black ink, appearing to be 'DBB', written in a cursive style.

DBB/rwc

Attachment: Responses to NRC's RAIs on Third 10-Year Inservice Inspection Interval Requests for Relief

cc: Mr. Elmo E. Collins
Regional Administrator
U. S. Nuclear Regulatory Commission
Region IV
612 E. Lamar Blvd., Suite 400
Arlington, TX 76011-4125

NRC Senior Resident Inspector
Arkansas Nuclear One
P. O. Box 310
London, AR 72847

U. S. Nuclear Regulatory Commission
Attn: Mr. Kaly Kalyanam
MS O-8 B1
One White Flint North
11555 Rockville Pike
Rockville, MD 20852

Attachment to

1CAN100901

**Responses to NRC's RAIs on Third 10-Year
Inservice Inspection Interval Requests for Relief**

Response to Request for Additional Information

The NRC requested Arkansas Nuclear One, Unit 1 (ANO-1) to provide detailed and specific information to support the bases for limited examination in all requests for relief submitted on May 29, 2009, and therefore, demonstrate impracticality. The questions for each relief request are as follows:

- a) Include descriptions (written and/or sketches, as necessary) of the interferences to applied nondestructive examination (NDE) techniques.
- b) As applicable, describe NDE equipment (ultrasonic scanning apparatus), details of the listed obstructions (size, shape, proximity to the weld, etc.) to demonstrate accessibility limitations, and discuss whether alternative methods or advanced technologies could be employed to maximize American Society of Mechanical Engineers (ASME) Code coverage.
- c) Fully clarify the wave modality and insonification angles used for all ultrasonic examinations.
- d) Show cross-sectional coverage plots to describe ASME Code volumes examined.
- e) If surface examination is required by the ASME Code in addition to the volumetric examination, state whether surface examinations were performed on any of the subject components and examination coverage that was obtained.
- f) If not included, state whether any indications were discovered as a result of Code-required examinations, and how these indications have been dispositioned.

The questions apply to each of the following relief requests.

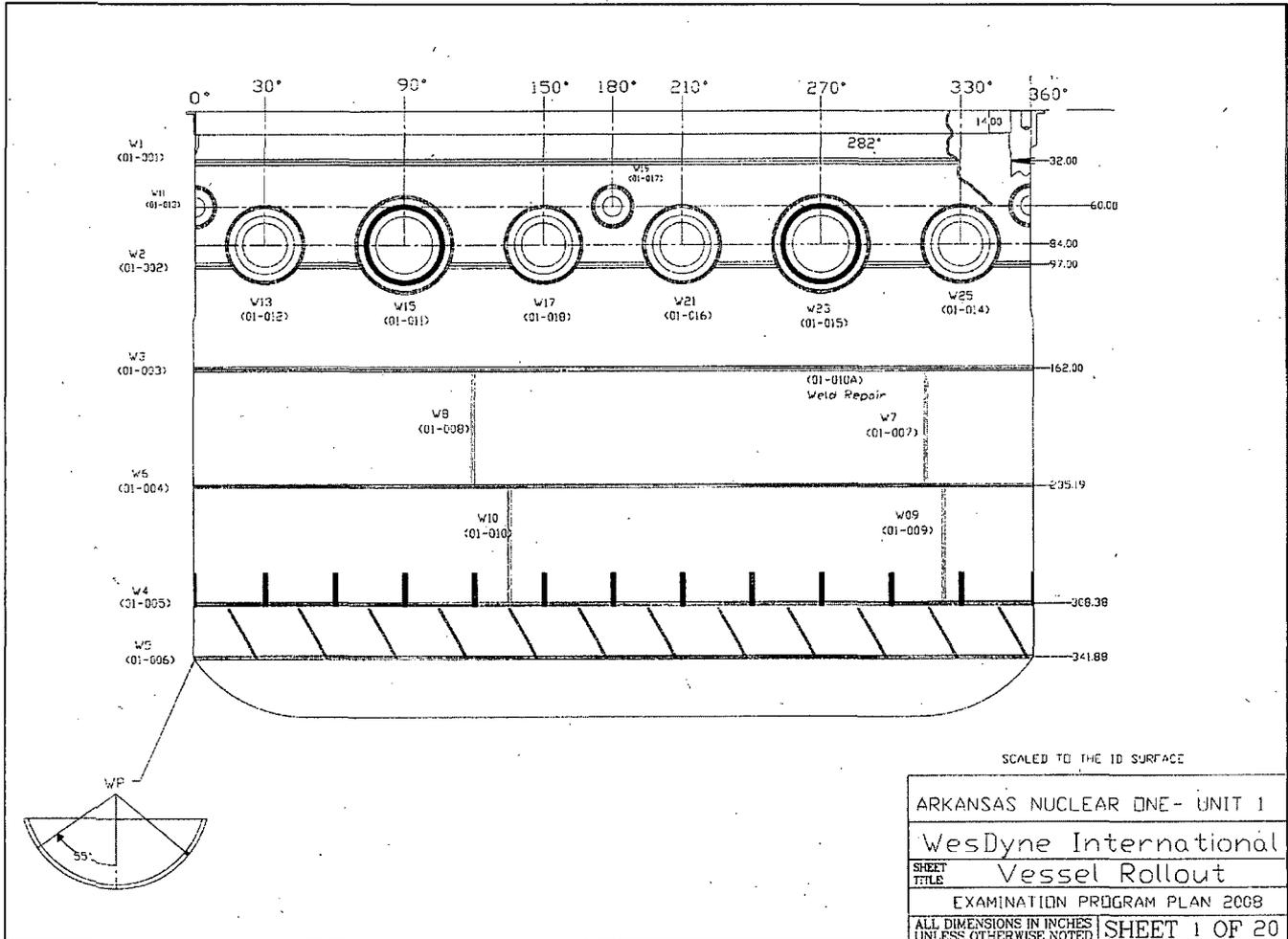
ANO1-ISI-015	CATEGORY B-A, PRESSURE RETAINING WELDS IN REACTOR VESSEL
ANO1-ISI-016	CATEGORY B-D, FULL PENETRATION WELDED NOZZLES IN VESSELS
ANO1-ISI-017	CATEGORY B-G-1, PRESSURE RETAINING BOLTING GREATER THAN 2 INCHES IN DIAMETER
ANO1-ISI-018	CATEGORY B-J, PRESSURE RETAINING WELDS IN PIPING
ANO1-ISI-019	CATEGORY B-K, WELDED ATTACHMENTS FOR VESSELS, PIPING, PUMPS, AND VALVES
ANO1-ISI-020	CATEGORY F-A, SUPPORTS OTHER THAN PIPING SUPPORTS

Request for Relief ANO1-ISI-015					
Limited B-A Examinations					
Item Number	Comp. ID	Item Description	% Coverage	Reason for Limitation	Response to NRC Request for Additional Information
B1.11	01-005	Lower Shell to Lower Reactor Pressure Vessel (RPV) Head Weld	App. VIII 36.38%	This examination is performed from the interior of the RPV. Coverage is physically limited due to the core support lugs and flow diverters attached to the RPV.	<p>a) See attached sketches derived from WesDyne examination program plan 2008 (sheets 1 and 8 of 20) on file at ANO.</p> <p>b) Automated ultrasonic testing (UT) examination performed by WesDyne International, utilizing an eight (8) transducer sled measuring 5.38" wide, 9.51" in length.</p> <p>Thirteen (13) core stop lugs and twelve (12) flow diverters precluded coverage of the full weld volume. See attached sketch.</p> <p>As stated in Section III of the request for relief, there are no alternative methods or advanced technologies which could be reasonably employed to maximize ASME Code coverage.</p> <p>c) Wave modality used include shear and refracted longitudinal.</p> <p>Insonification angles employed included a 45° shear and a 45° refracted longitudinal.</p> <p>For additional coverage, the transducer sled was rotated for both parallel and perpendicular scans beneath the core stop lugs.</p>

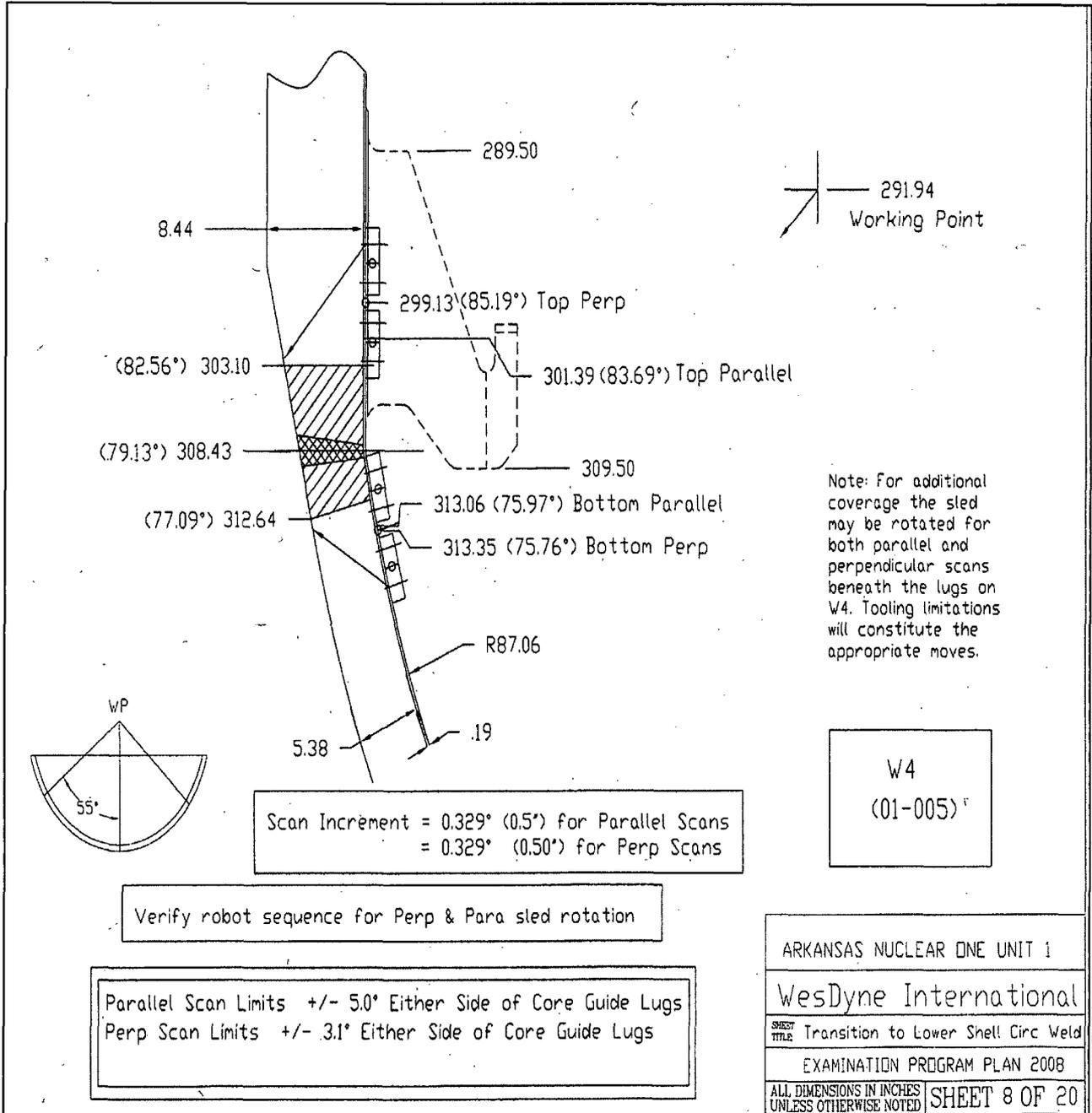
					<p>d) See attached sketch derived from WesDyne examination program plan 2008 (sheets 1 and 8 of 20) on file at ANO.</p> <p>e) Surface examination was not required.</p> <p>f) No indications were reported as a result of Code-required examinations.</p>
B1.21	01-006	Bottom RPV Head Weld	App. VIII 59.07%	<p>This examination is performed from the interior of the RPV. Coverage is physically limited due to the location of the twelve (12) flow diverters attached to the bottom head.</p>	<p>a) See attached sketches derived from WesDyne examination program plan 2008 (sheets 1 and 9 of 20) on file at ANO.</p> <p>b) Automated UT examination performed by WesDyne International, utilizing an eight (8) transducer sled measuring 5.38" wide, 9.51" in length.</p> <p>Twelve (12) flow diverters precluded coverage of the full weld volume. See attached sketch.</p> <p>As stated in Section III of the request for relief, there are no alternative methods or advanced technologies which could be reasonably employed to maximize ASME Code coverage.</p> <p>c) Wave modality used include shear and refracted longitudinal.</p> <p>Insonification angles employed included a 45° Shear and a 45° refracted longitudinal.</p> <p>For additional coverage, the transducer sled was rotated were possible.</p>

					<ul style="list-style-type: none">d) See attached sketch derived from WesDyne examination program plan 2008 (sheets 1 and 9 of 20) on file at ANO.e) Surface examination was not required.f) No indications were reported as a result of Code-required examinations.
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Scanning Limitations for Welds 01-005 and 01-006



Scan Path for Weld 01-005



Note: For additional coverage the sled may be rotated for both parallel and perpendicular scans beneath the lugs on W4. Tooling limitations will constitute the appropriate moves.

W4
 (01-005)

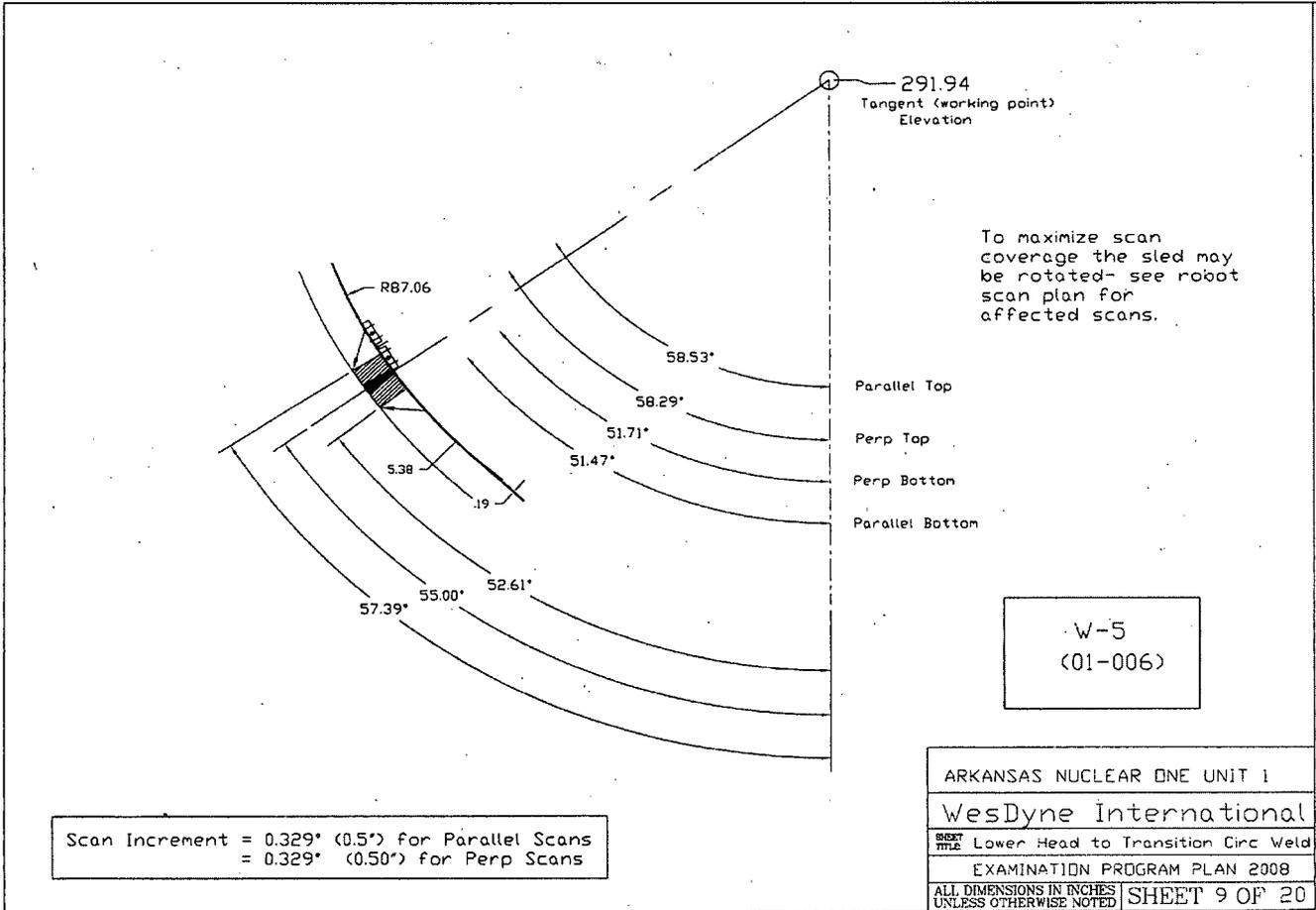
Scan Increment = 0.329° (0.5') for Parallel Scans
 = 0.329° (0.50') for Perp Scans

Verify robot sequence for Perp & Para sled rotation

Parallel Scan Limits +/- 5.0° Either Side of Core Guide Lugs
 Perp Scan Limits +/- .31° Either Side of Core Guide Lugs

ARKANSAS NUCLEAR ONE UNIT 1	
WesDyne International	
SHEET TITLE	Transition to Lower Shell Circ Weld
EXAMINATION PROGRAM PLAN 2008	
ALL DIMENSIONS IN INCHES UNLESS OTHERWISE NOTED	SHEET 8 OF 20

Scan Path for Weld 01-006



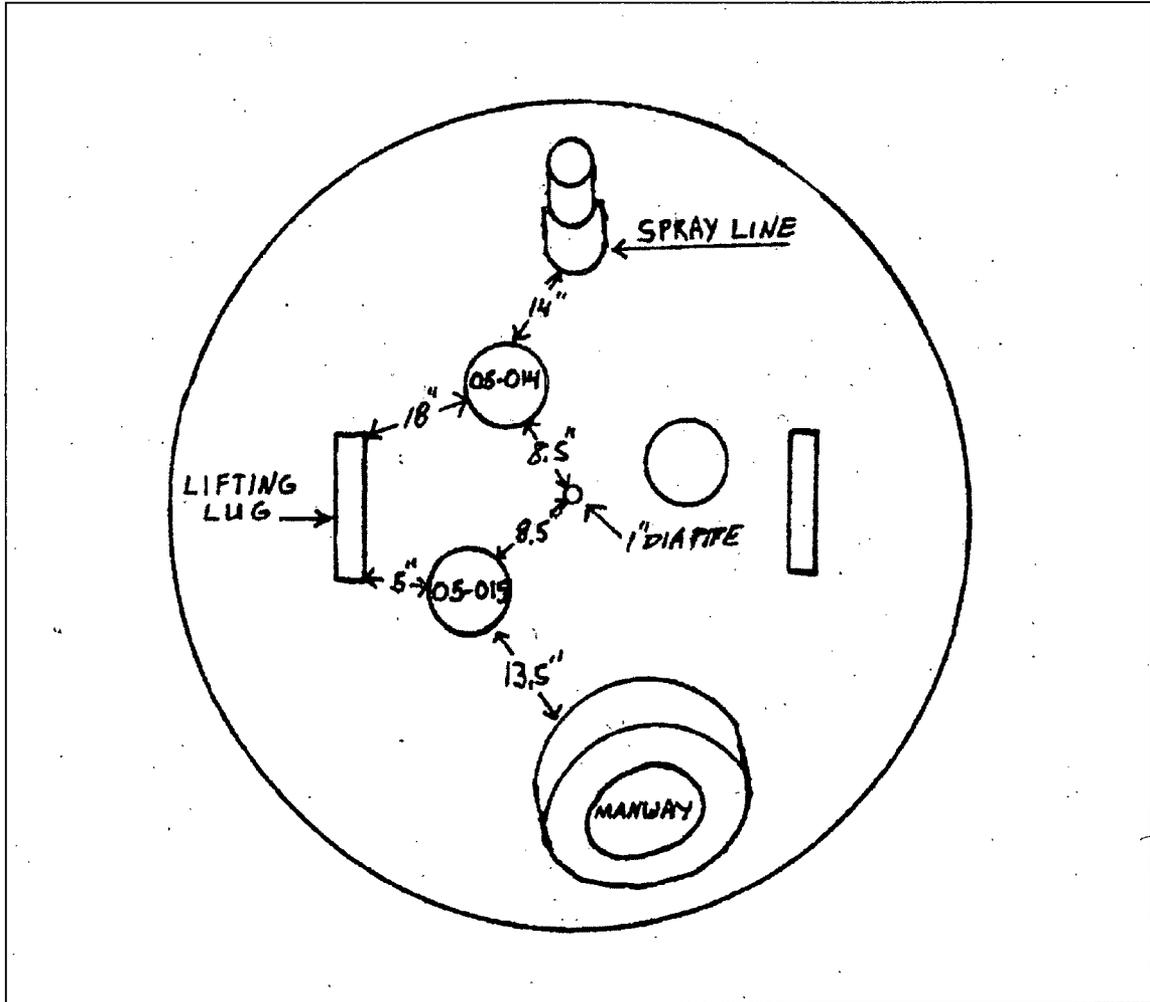
Scan Increment = 0.329° (0.5") for Parallel Scans
 = 0.329° (0.50") for Perp Scans

Request for Relief ANO1-ISI-016					
Limited B-D Examinations					
Item Number	Comp. ID	Item Description	% Coverage	Reason for Limitation	Response to NRC Request for Additional Information
B3.110	05-014	Pressurizer (PZR) Relief Nozzle-to-Head Circumferential (Circ) Weld	28.7%	This is essentially a single sided exam due to the component configuration. Scan paths were also limited due to close proximity of adjacent nozzles and welded lifting lugs as well as the curvature of the PZR head.	<p>a) See attached sketches derived from UT examination report 102ISIUT011 on file at ANO.</p> <p>b) Manual UT examination.</p> <p>A detailed sketch of the limitations and their proximity to the component are attached.</p> <p>c) Wave modality used included shear and longitudinal.</p> <p>Insonification angles included 0°, 45°, 60°, and 70°.</p> <p>d) See attached sketches derived from UT examination report 102ISIUT011 on file at ANO.</p> <p>e) Surface examination was not required.</p> <p>f) Intermittent geometric indications from the nozzle bore were observed.</p>
B3.110	05-015	PZR Relief Nozzle-to-Head Circ Weld	28.7%	This is essentially a single sided exam due to the component configuration. Scan paths were also limited due to the close proximity of adjacent	<p>a) See the attached sketches derived from UT examination report 102ISIUT024 on file at ANO.</p> <p>b) Manual UT examination.</p> <p>A detailed sketch of the limitations and their</p>

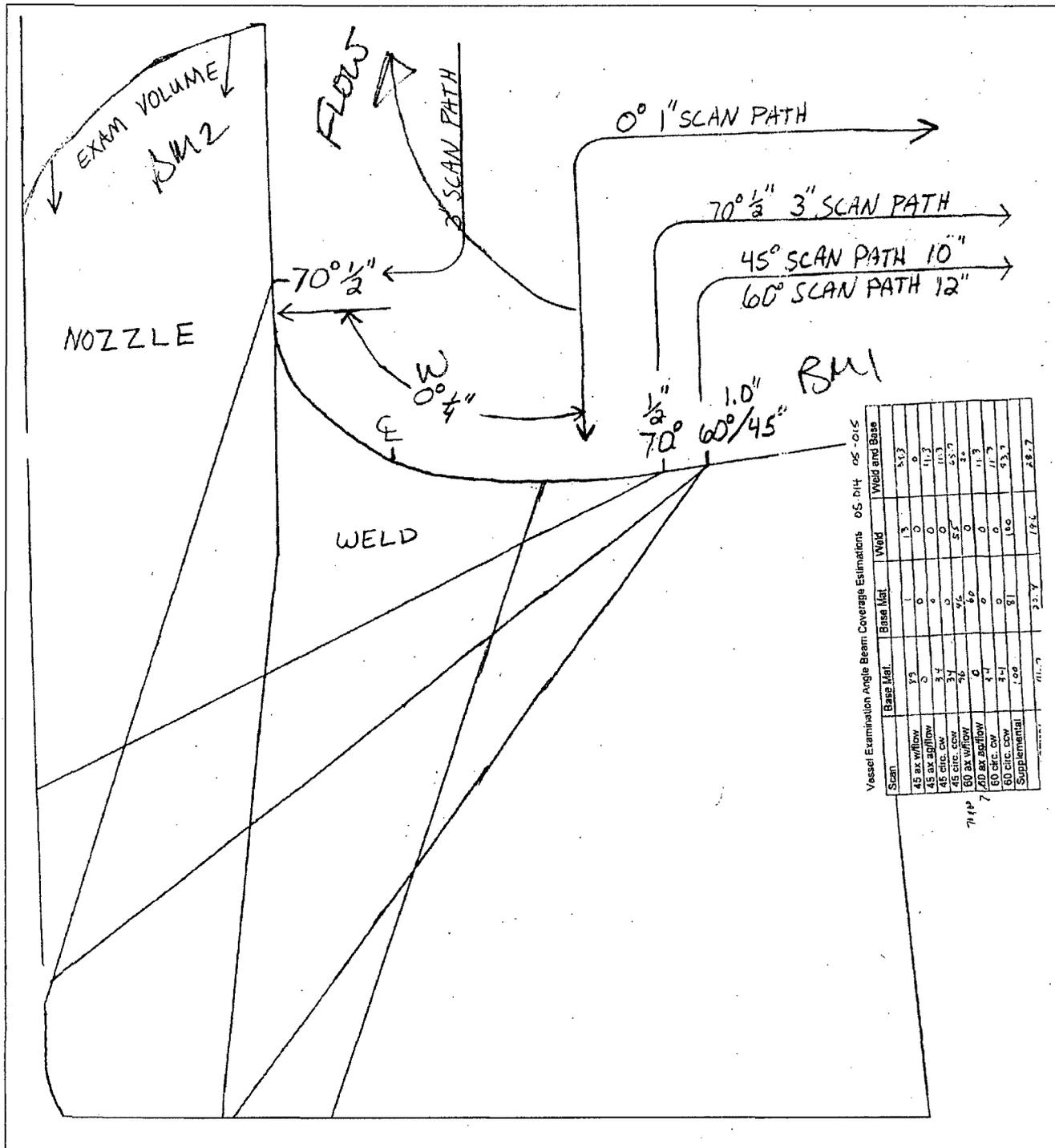
				nozzles and welded lifting lugs.	<p>proximity to the component are attached.</p> <p>c) Wave modality used included shear and longitudinal.</p> <p>Insonification angles included 0°, 45°, 60°, and 70°.</p> <p>d) See attached sketches derived from UT examination report 102ISIUT024 on file at ANO.</p> <p>e) Surface examination was not required.</p> <p>f) Intermittent geometric indications from the nozzle bore were observed.</p>
B3.110	05-021	PZR Surge Nozzle-to-Head Circ Weld	32%	This is essentially a single sided exam due to the component configuration. Scan paths were also limited due to the close proximity of adjacent nozzles and welded lifting lugs.	<p>a) See the attached sketches derived from UT examination report ISI-UT-07-027 on file at ANO.</p> <p>b) Manual UT examination.</p> <p>A detailed sketch of the limitations and their proximity to the ISI component are attached.</p> <p>c) Wave modality used included shear and longitudinal.</p> <p>Insonification angles included 0°, 45°, 60°, and 70°.</p> <p>d) See attached sketches derived from UT examination report ISI-UT-07-027 on file at ANO.</p>

					<p>e) Surface examination was not required.</p> <p>f) No indications were reported as a result of Code-required examinations.</p>
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Scanning Limitations for Welds 05-014 and 05-015



Scan Path for Welds 05-014 and 05-015



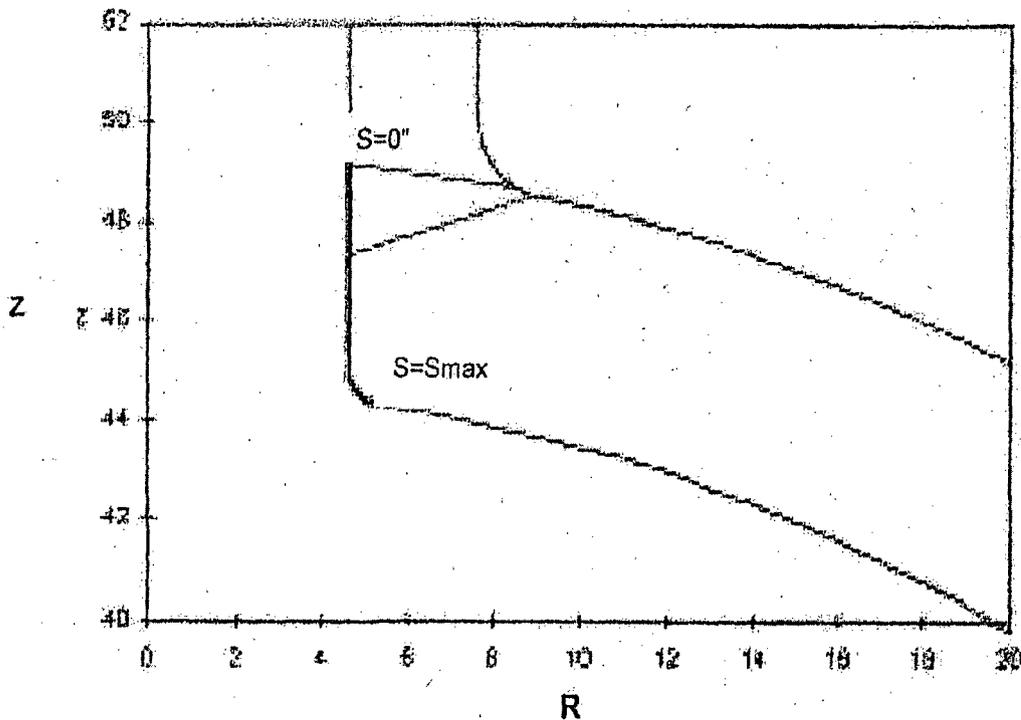
Scan Limitations and Coverage for Weld 05-021

Probe Angle	Probe Skew	Scan Surface	R _{min} (inch)	R _{max} (inch)	MP _{min}	MP _{max}	SD _{min} (inch)	SD _{max} (inch)
70°	32°	Blend	8.63	8.95	5.91	6.32	1.75	2.50
70°	12°-17°	Head	10.7	22.0	6.62	20.0	3.75	15.0
60°	17°-25°	Head	11.9	14.2	10.0	12.2	4.75	7.50

Figure 9.4.2 (a-c)

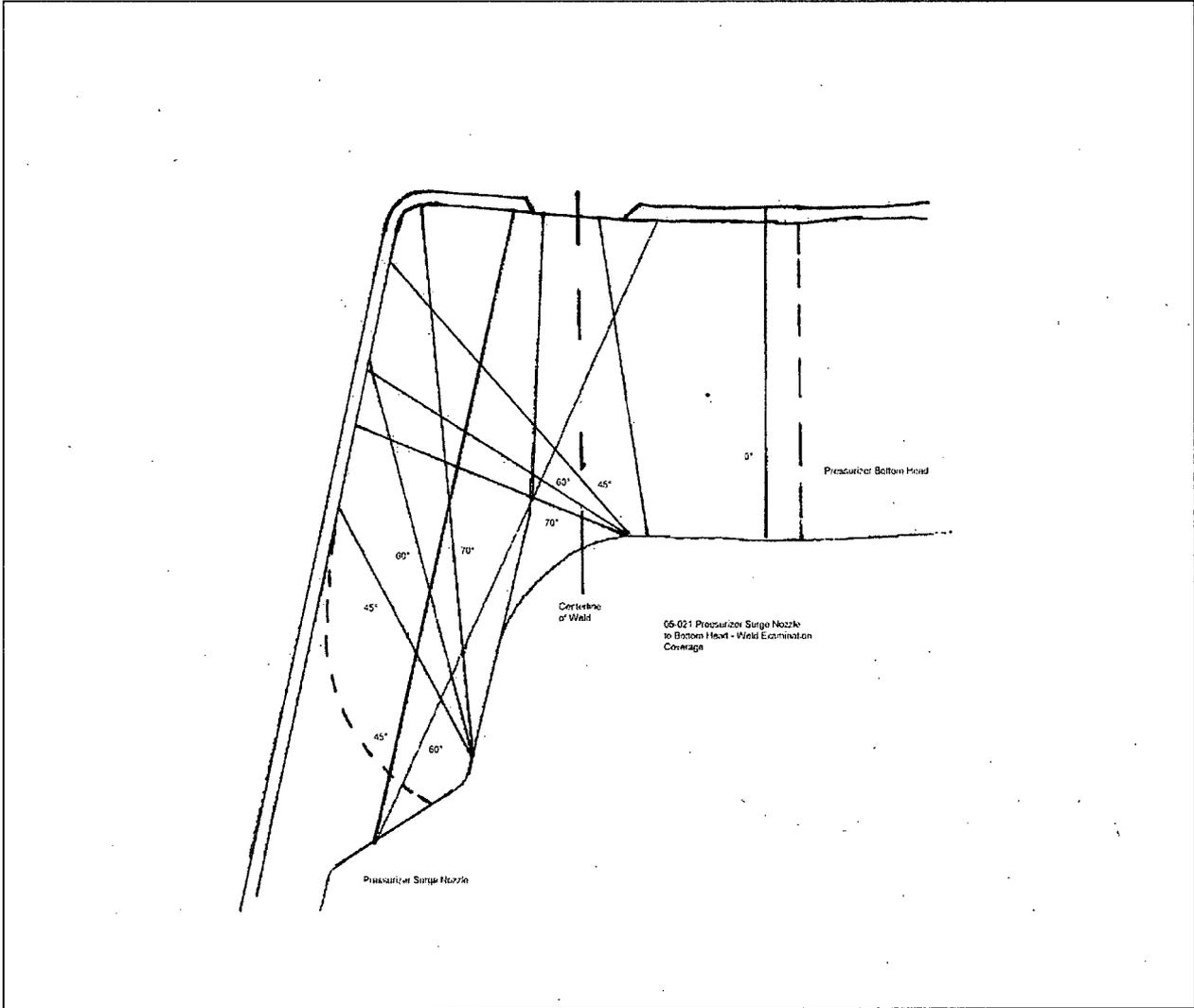
Probe Scan Limits and Examination Coverage. Minimum and maximum probe R positions and the associated portion of the examination volume covered.

Pressurizer Surge Nozzle, 70/32b



(a) Scan Limits & Coverage for Blend Procedure 70/32

Scan Path for Weld 05-021



Request for Relief ANO1-ISI-017					
Limited B-G-1 Examinations					
Item Number	Comp. ID	Item Description	% Coverage	Reason for Limitation	Response to NRC Request for Additional Information
B6.40	01-F-01 through 01-F-60	Threads in Reactor Vessel (RV) Flange	79%	Reactor Vessel Head (RVH) sealing surface precludes a 360° scan around each of the 60 RPV threaded stud holes. Additionally, RVH guide pins in stud holes #15 and #45 further limited the examination of those items.	<p>a) The exam volume is 1" around the outside of each stud hole in the RPV flange for one stud diameter deep into the material. See the attached sketch derived from UT examination reports 196ISIUT014 and 199ISIUT037 on file at ANO.</p> <p>b) Manual UT examination.</p> <p>A detailed sketch of the limitations and their proximity to the component are attached.</p> <p>There was no alternative methods or advanced technologies which could be employed to maximize ASME Code coverage.</p> <p>c) Wave modality used a 0° longitudinal transducer.</p> <p>d) The exam volume is 1" around the outside of each stud hole in the RPV flange for one stud diameter deep into the material. See the attached sketch derived from UT examination reports 196ISIUT014 and 199ISIUT037 on file at ANO.</p> <p>e) A surface examination was not required.</p>

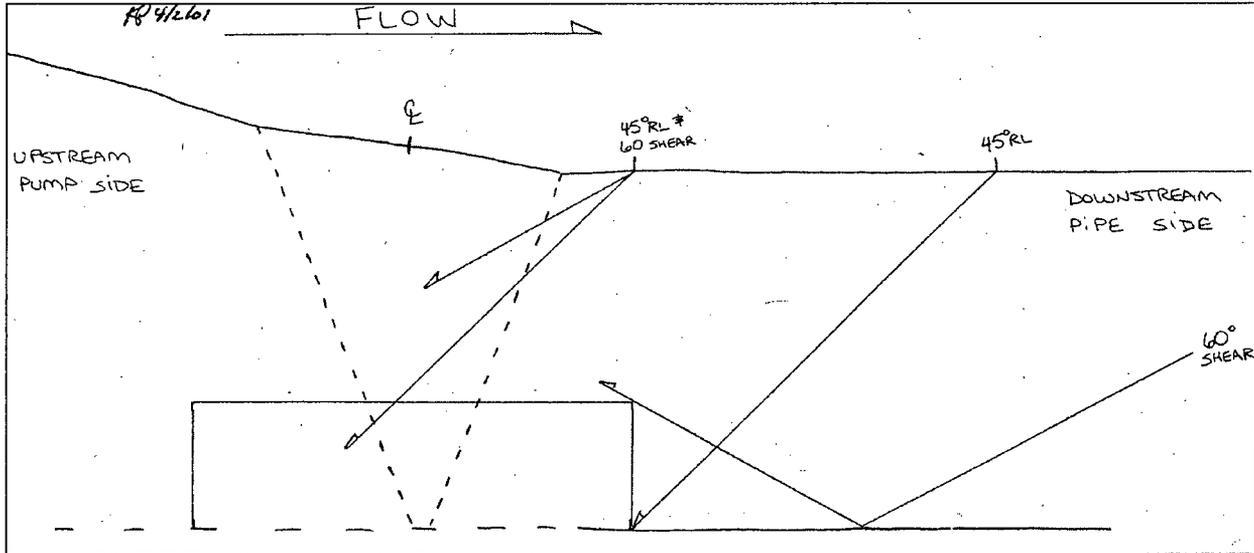
					f) No indications were discovered as a result of Code-required examinations.
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Request for Relief ANO1-ISI-018					
Limited B-J Examinations					
Item Number	Comp. ID	Item Description	% Coverage	Reason for Limitation	Response to NRC Request for Additional Information
B9.11	09-001	"D" Reactor Coolant Pump (RCP) Pump to Pipe Circ Weld	50.0%	This is a single sided examination from the pipe side only of the pump to 28" pipe configuration.	<p>a) See attached sketch derived from NDE report 101ISIUT037 on file at ANO.</p> <p>b) Manual UT examination.</p> <p>A detailed sketch of the scanning restriction is attached.</p> <p>c) Wave modality used included shear and refracted longitudinal.</p> <p>Insonification angles included 45° and 60°.</p> <p>d) See attached sketch derived from NDE report 101ISIUT037 on file at ANO.</p> <p>e) Surface examination was not required.</p> <p>f) No indications were reported as a result of Code required examinations.</p>
B9.32	09-006	Pipe-to-High Pressure Injection (HPI) Nozzle Circ Weld	50%	This is a single sided examination from the pipe side only of the 6" nozzle to 28" pipe configuration	<p>a) See attached sketch derived from NDE report 101ISIUT038 on file at ANO.</p> <p>b) Manual UT examination.</p> <p>A detailed sketch of the scanning restriction is</p>

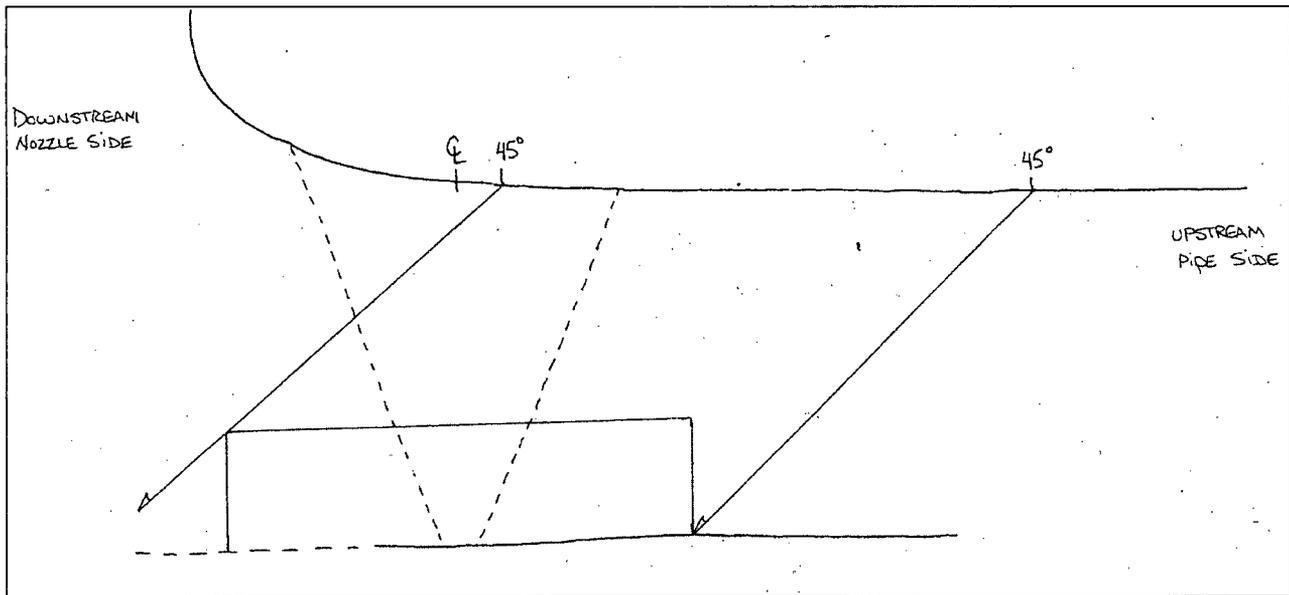
					<p>attached.</p> <p>c) Wave modality used included shear and refracted longitudinal.</p> <p>Insonification angles included 45°.</p> <p>d) See attached sketch derived from NDE report 101ISIUT038 on file at ANO.</p> <p>e) Surface examination was not required.</p> <p>f) No indications were reported as a result of Code-required examinations.</p>
B9.21	18-010	PZR Spray Valve-to-Pipe Circ Weld	50%	This is a single sided examination from the pipe side only of the 2.5" valve to 2.5" pipe configuration	<p>a) See attached sketch derived from NDE report ISI-UT-07-014 on file at ANO.</p> <p>b) Manual UT examination.</p> <p>A detailed sketch of the scanning restriction is attached.</p> <p>c) Wave modality is shear.</p> <p>Insonification angles included 45°, 60°, and 70°.</p> <p>d) See attached sketch derived from NDE report ISI-UT-07-014 on file at ANO.</p> <p>e) Surface examination was not required.</p> <p>f) One indication was recorded with the 70° shear and dispositioned as a geometric reflector.</p>

B9.21	23-055	HPI to B2 Loop Elbow- to-Valve Circ Weld	41%	<p>This is a single sided examination from the pipe side only of the 2.5" pipe to valve configuration. The exam is further limited due to a welded name tag on the pipe for ~ 180° around the circumference.</p>	<p>a) See attached sketch derived from NDE report ISI-UT-05-088 on file at ANO.</p> <p>b) Manual UT examination.</p> <p>A detailed sketch of the scanning restriction is attached. The position of the weld tag limits the axial movement of the transducer for ~ 180° around the circumference of the pipe allowing just 16% coverage in that area.</p> <p>c) Wave modality is shear.</p> <p>Insonification angle used is a 70°.</p> <p>d) See attached sketch derived from NDE report ISI-UT-05-088 on file at ANO.</p> <p>e) Surface examination was not required.</p> <p>f) No indications were reported as a result of Code-required examination.</p>
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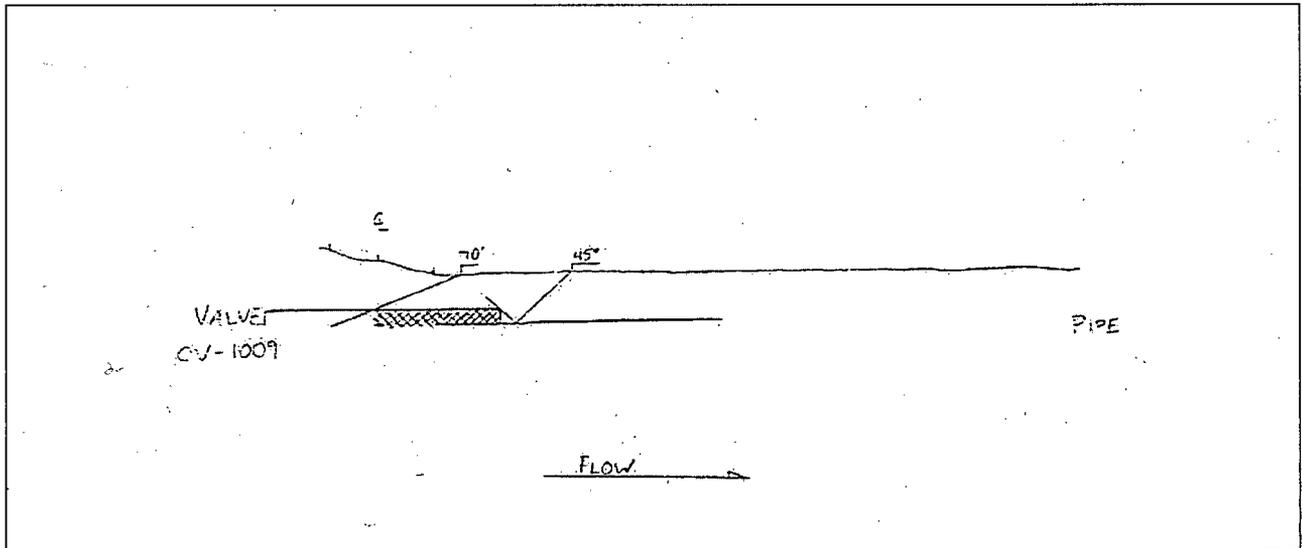
Coverage Plot for Weld 09-001



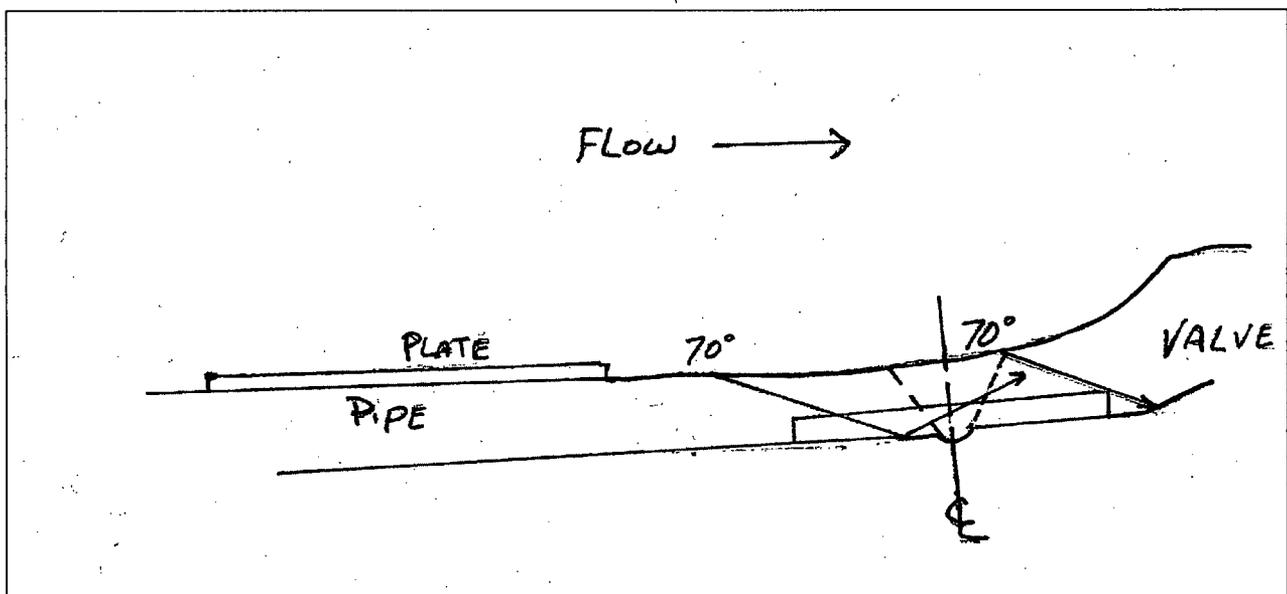
Coverage Plot for Weld 09-06



Coverage Plot for Weld 18-010

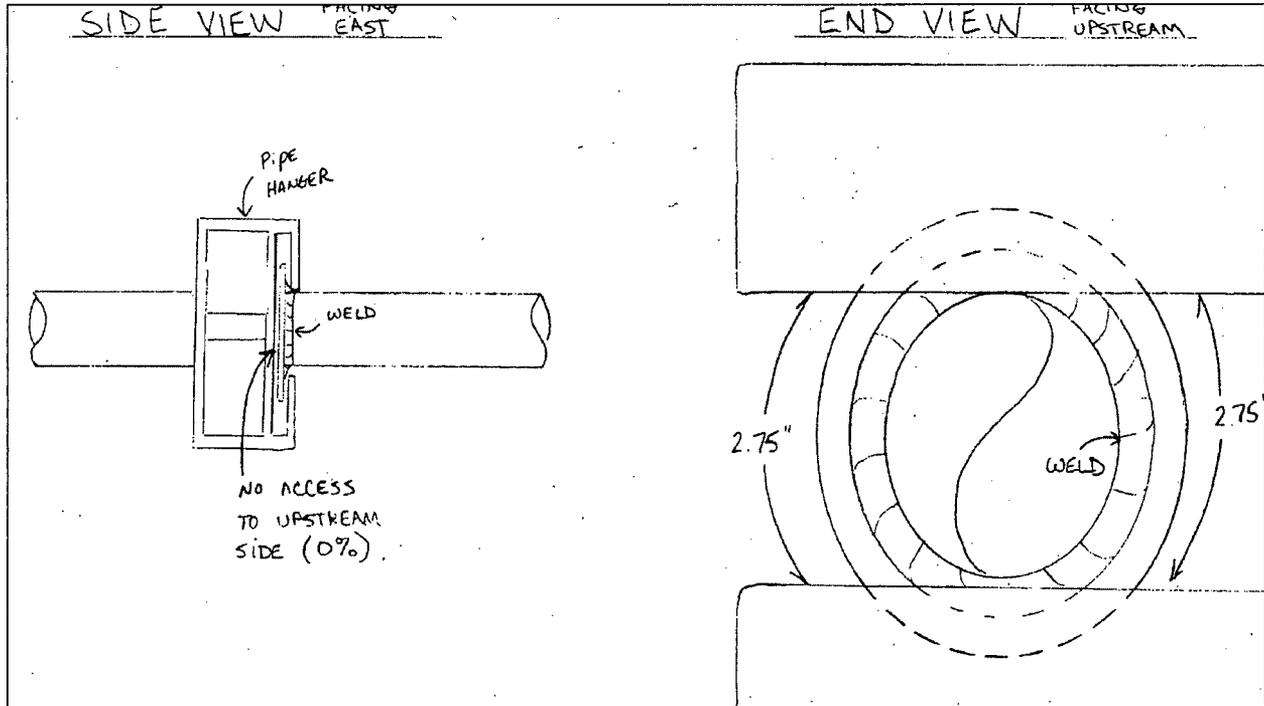


Coverage Plot for Weld 23-055



Request for Relief ANO1-ISI-019					
Limited B-K-1 Examinations					
Item Number	Comp. ID	Item Description	% Coverage	Reason for Limitation	Response to NRC Request for Additional Information
B10.20	22-099W	Pipe Support Integral Attachment Weld	38.5%	The examination area on the restraint was limited due to the configuration of the hanger.	<p>a) See attached sketch derived from NDE report 101ISIPT019 on file at ANO.</p> <p>b) A liquid penetrate surface examination was performed.</p> <p>There was no alternative methods or advanced technologies which could be employed to maximize ASME Code coverage.</p> <p>c) Not applicable.</p> <p>d) See attached sketch derived from NDE report 101ISIPT019 on file at ANO.</p> <p>e) A liquid penetrate surface examination was performed per Section XI requirements.</p> <p>f) No indications were discovered as a result of Code-required examinations.</p>

Limitation Sketch for Weld 22-099W



Request for Relief ANO1-ISI-020

Limited F-A Examinations

Item Number	Comp. ID	Item Description	% Coverage	Reason for Limitation	Response to NRC Request for Additional Information
F1.40	01-032	RPV Support Skirt Circ Weld	0.0%	This support weld is inaccessible for examination due to insulation blocks that are impractical to remove. General area dose rates of 500 – 600 mrem / hour coupled with a confined area congested with incore instrumentation piping preclude safe scaffold installation.	<p>a) See attached sketch derived from NDE report ISI-VT-07-121 on file at ANO.</p> <p>b) Not applicable. Only a visual exam was performed.</p> <p>c) Not applicable. Only a visual exam was performed.</p> <p>d) See attached sketch derived from NDE report ISI-VT-07-121 on file at ANO.</p> <p>e) Not applicable. Only a visual exam was performed.</p> <p>f) No indications were reported as a result of Code-required examinations.</p>
F1.40	01-033	RPV Support Skirt to Flange Weld	70.0%	This support weld was examined with a fiberscope deployed through cut-outs in the skirt. Removal of insulation blocks for better access is impractical. General area dose rates of 500 – 600 mrem / hour coupled with a confined	<p>a) See attached sketch derived from NDE report ISI-VT-07-122 on file at ANO.</p> <p>b) Not applicable. Only a visual exam was performed.</p> <p>c) Not applicable. Only a visual exam was performed.</p> <p>d) See attached sketch derived from NDE report ISI-</p>

				area congested with incore instrumentation piping preclude safe scaffold installation.	<p>VT-07-122 on file at ANO.</p> <p>e) Not applicable. Only a visual exam was performed.</p> <p>f) No indications were reported as a result of Code-required examinations.</p>
F1.40	01-034	RPV Support Skirt Flange Bolting	70.0%	Support skirt bolting was examined with a fiberscope deployed under the insulation blocks and through cut-outs in the skirt. Removal of insulation blocks for better access is impractical. General area dose rates of 500 – 600 mrem / hour coupled with a confined area congested with incore instrumentation piping preclude safe scaffold installation.	<p>a) See attached sketch derived from NDE report ISI-VT-07-123 on file at ANO.</p> <p>b) Not applicable. Only a visual exam was performed.</p> <p>c) Not applicable. Only a visual exam was performed.</p> <p>d) See attached sketch derived from NDE report ISI-VT-07-123 on file at ANO.</p> <p>e) Not applicable. Only a visual exam was performed.</p> <p>f) No indications were reported as a result of Code-required examinations. Light rust was noted on some bolting.</p>

Limitation Sketch for Welds 01-032; 01-033; and 01-034

