

BPY-C-1001 / BPY-C-1003
3-inch Cold Leg Spray Line Loop 1A



Milestone Unit 2 UT Data Package Cover

Data Package No: 219-01-007



Reference ID: BPY-C-1001



AWO: 53102184602



Page #	Data Type	Exam Angle	Recordable	Limitations	Comments
1	C	0-85°	/		
2	C	0-85°		N	
3	C	0-85°			A
4	C	0-85°			
5	C	0-85°			
6	E	0-85°	NRI	NONE	
7	C	0-82°	/		
8	C	0-82°		N	
9	C	0-82°			A
10	C	0-82°			
11	C	0-82°			
12	E	0-82°	NRI	NONE	
13	P	0-85°	N/A	N/A	

% of Required Exam Area: Final Disposition: *IUP. BL/LL 10/20/09*

Previous Data Review: N/A RT

Dominion Review: Level:

Review Date:

- Legend: UT Data Type Reference**
- A = Additional Info
 - B = Beam Spread
 - C = Calibration Data
 - E = Examination Data
 - L = Linearity
 - P = Coverage Plot
 - S = Sketch
 - T = Thickness

Comments:



Milestone Unit 2
 UT Data Package Cover

Data Package No: 219-01-038



Reference ID: BPY-C-1003



AWO: 53102184602



Page #	Data Type	Exam Angle	Recordable	Limitations	Comments
1	C	0-85°			
2	C	0-85°			
3	C	0-85°			
4	C	0-85°			
5	C	0-85°			
6	E	0-85°	NRI	NONE	
7	C	0-82°			
8	C	0-82°			
9	C	0-82°			
10	C	0-82°			
11	C	0-82°			
12	E	0-82°	NRI	NONE	
13	P	0-85°	N/A	N/A	

% of Required Exam Area: Final Disposition: *J.P. [Signature]*
 Dominion Review: *10/20/09*
 Previous Data Review
 UT A RT
 Level:
 Review Date:

- Legend: UT Data Type Reference
- A = Additional Info
 - B = Beam Spread
 - C = Calibration Data
 - E = Examination Data
 - L = Linearity
 - P = Coverage Plot
 - S = Sketch
 - T = Thickness

Comments:



ULTRASONIC PHASED ARRAY WOR CALIBRATION REPORT

WOR Identification DM Weld: BPY-C-1001	Calibration Data Sheet: 219-01-007
WOR Identification SS Weld: BPY-C-1003	Calibration Data Sheet: 219-01-038
Plant/Unit: Millstone / 2	Procedure No. / Rev: ER-MP-NDE-UT-816/ Rev.0

Wedge	Comments:
Manufacturer: GEIT	See attached EPRI correspondence for Probe, Wedge and Focal Law information.
Model: 360-152-235	
Nominal Wedge Angle: 52°	
Measured Wedge Angle: 52°	
Contour Diameter: 5.50" AX OD	
Scan Direction: Axial	
Nominal Index Location: .70"	
Zero Reference: Front of Probe	

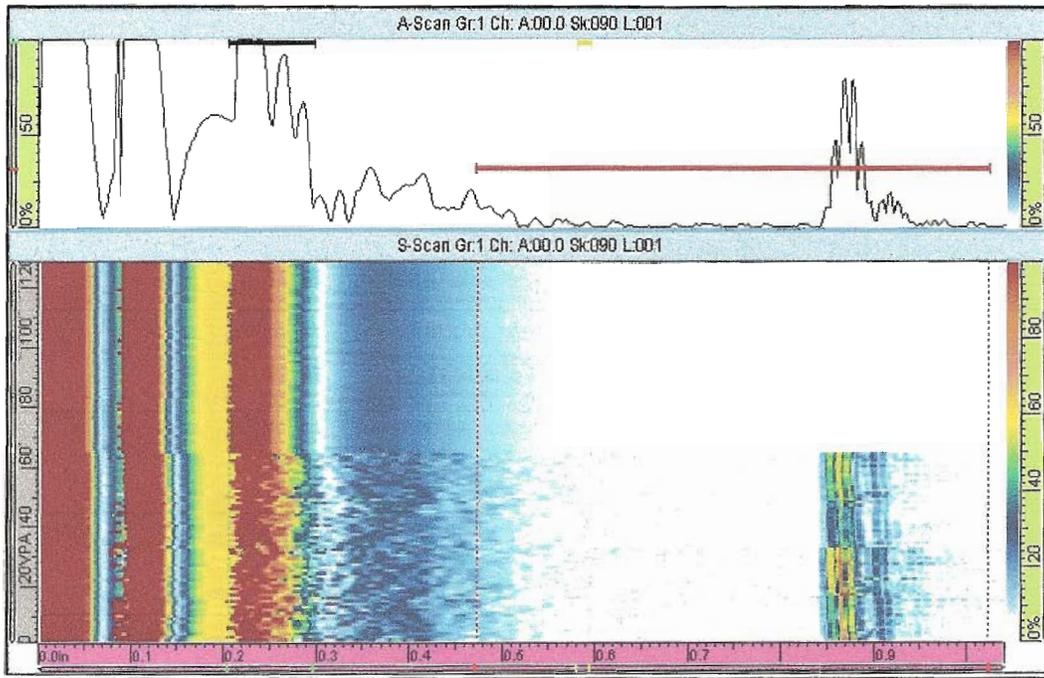
Instrument	Search Unit
Manufacturer: Zetec	Manufacturer: GEIT
Model: Omniscan 32/128 PR	Model: 115-000-631
PA Module Serial Number: Omni-Z-6034	Serial Number: 01Y28X-1/ 01Y28X-2
UT Mainframe Serial Number: Omni-Z-1062	
Software Revision: 1.4R3	
Table 2 Instrument Settings: See attached	
	Search Unit Integral Cable
	Type: See cable diagram
	Length: See cable diagram
	Connector Type #: See cable diagram

Couplant: Soundsafe	Temperature Gauge: PTC 312F
Manufacturer: Sonotech Inc.	Serial Number: 268025
Batch Number: 07220H	

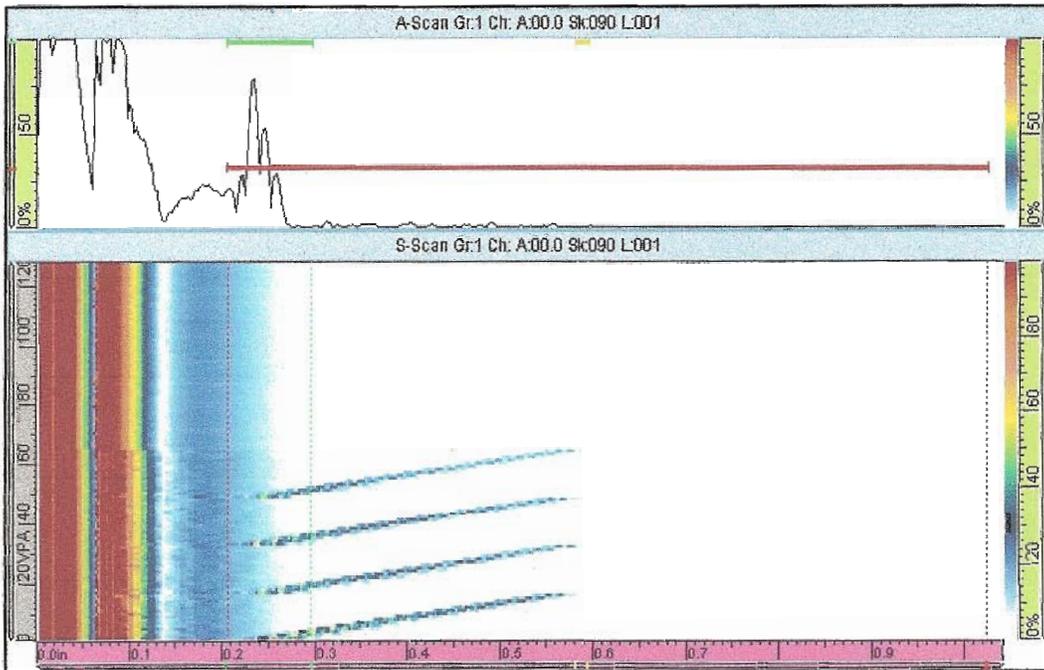
Calibration Data Files	
Focal Law: 032NJDZ2235L0085R2M1Z4_1.125MP.LAW	
Angles Generated: 0° to 85°	
Wave Mode: Longitudinal	
Focal Sound Path: 1.125" MP	

Calibration Reflector Data					
Calibration Block(s): 6039035		9C-041(.1" SDH only)		Temperature: 80°	
Calibration Reflector	Angle	% FSH	Ref. Sensitivity	UT Response	
(70°-85°)	0.1" SDH	75°	80	43 dB	.584" Sound Path
(25°-60°)	0.5" SDH	52°	80	24 dB	.802" Sound Path
(0°-25°)	0.5" SDH	0°	80	37 dB	.476" Sound Path
Channel Functional Checks	Pre Exam: Acceptable		Post Exam: Acceptable		
Number of Inactive Channels/Elements:	Transmit: 0	Receive: 0			

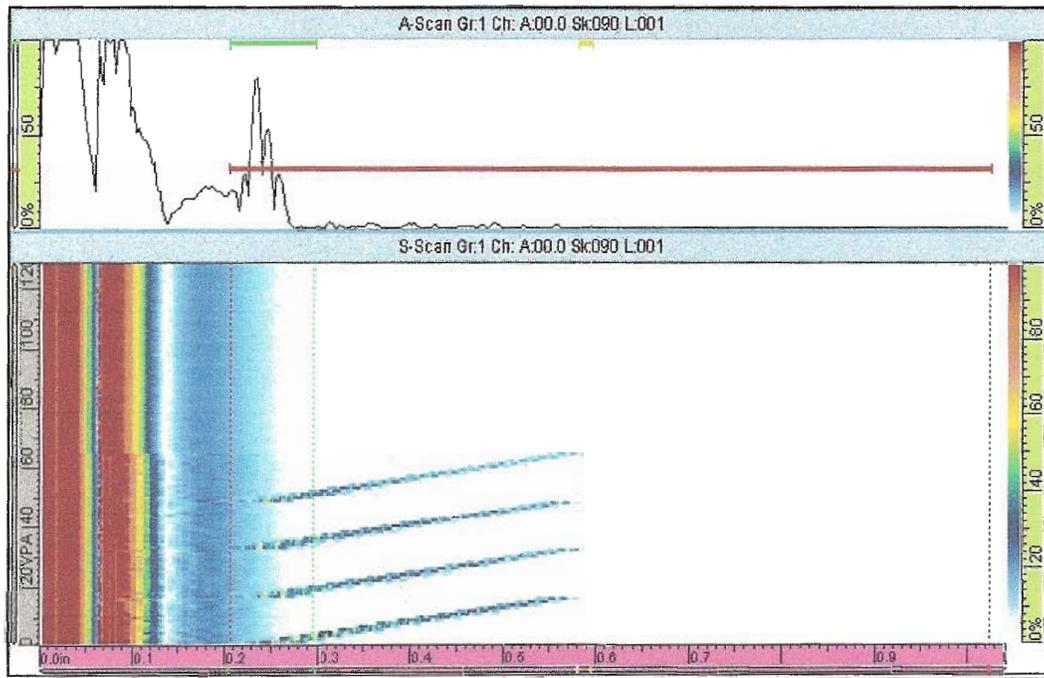
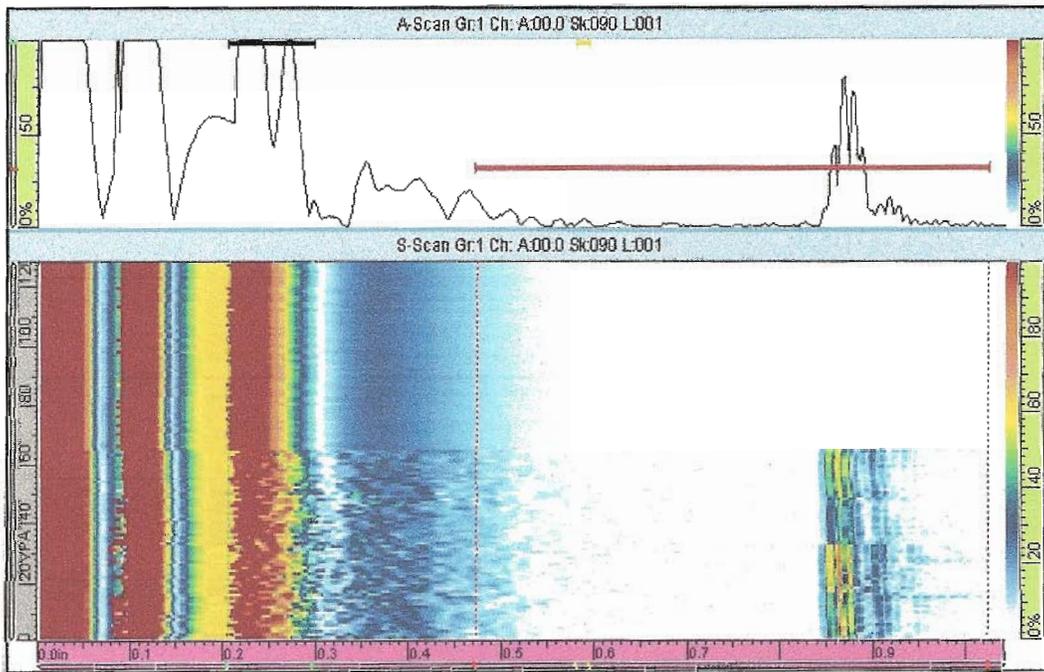
Calibration Performed	Examiner 1	Examiner 2	Level(s)	Date	Time
Initial:	Todd Blechinger	N/A	III	10/18/09	1445
Intermediate:	N/A	N/A	N/A	N/A	N/A
Final:	Todd Blechinger	N/A	III	10/18/09	1505



Element Check 1- Pre exam, off wedge



Element Check 2-Pre exam, on wedge

**Element Check 3- Post exam, on wedge****Element Check 4- Post exam, off wedge**

Phased Array Instrument Table 2 Essential Settings

Major Menu Item	Menu Item	Sub-menu Item	Setting
Reading	Result	Selector	List 1
		Field 1	A%
		Field 2	A^
		Field 3	SA
		Field 4	PA
UT	General	Gain	24 dB
		Start	0.00 in
		Range	1.896 in
		Wedge Delay	1.60 us
		Velocity	.2272 in/us
	Pulser	Pulser	1
		Tx/Rx Mode	PE
		Frequency	2
		Voltage	High
		PW	250ns (Auto)
		PRF	Optimum
	Receiver	Receiver	1
		Filter	None
		Rectifier	FW
		Video Filter	Off
		Averaging	1
		Reject	0
	Beam	Gain Offset	0.0 dB
		Scan Offset	-0.000 in
		Index Offset	-0.709 in
		Angle	52
		Skew	0.0°
		Beam Delay	8.52 us
	Advanced	dB Ref	Off
		Points Qty	452
		Scale Factor	6
		Sum Gain	22.0

Phased Array Instrument Table 2 Essential Settings (cont.)

Major Menu Item	Menu Item	Sub-menu Item	Setting	
Display	Selection	Display	A-S-[C]	
		C-Scan 1	Off	
		Group	Current	
		Projection	On	
	Rulers	UT Unit	True Depth	
		% Ruler	Linear (%)	
		DAC/TCG	Off	
		Gate	On	
		Cursor	Off	
		Color	Select	Amplitude
	Start (%)		0.0	
	End (%)		100.0	
	Properties	Display	A-Scan	
		Source	Normal	
	Probe Part	Select	Select	Select Tx/Rx
			Auto Detect	Off
		Position	Scan Offset (in)	0
Index Offset (in)			0	
Parts		Geometry	Plate	
		Thickness (in)	3.0 in	
PGM Probe		Configuration	Scan Type	Sectorial
	Connection P:		1	
	Laws	Auto Program	Off	
		Gate Alarm	Gate Select	Gate A
Gate A Synchro	Pulse			



ULTRASONIC PHASED ARRAY WOR ULTRASONIC EXAMINATION RECORD

Exam Data Sheet: 219-01-007		219-01-038		Calibration Data Sheet: 219-01-007		219-01-038		
Plant: Millstone			Unit: 2			Procedure: ER-MP-NDE-UT-816/Rev. 0		
Zones DM Weld: 1-08			SS Weld: 1-23					
Date: 10/18/09			Exam Start: 1445			Exam Stop: 1505		
WOR Identification DM Weld: BPY-C-1001			SS Weld: BPY-C-1003					
Component Configuration DM Weld: Nozzle to Safe End				SS Weld: Safe End to Pipe				
Weld Overlay Regions: Entire overlay surface								
Examination Surface: Surface of Weld Overlay					Reviewed Previous Data: N/A			
Temperature Gauge: PTC 312F			Serial Number: 268025			Component Temp: 79°		
Percent Of Coverage Obtained: 100%					Examination Angles			
Weld Overlay Thickness:					Axial		Circumferential	
Minimum: .30"					0° to 85°		N/A	
Maximum: .60"								
Examination Sensitivity:					36 dB		N/A dB	

Examination Scans Performed	Yes	No	N/A
(1) Axial (Downstream)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(2) Axial (Upstream)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(3) Circumferential (Clockwise)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
(4) Circumferential (Counterclockwise)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Comments: Maintained 5% to 20% average baseline noise level during examination. No suspected flaw indications were observed during examinations.

Examiner Todd Blechinger	Level III	Signature 	Date 10/18/09	LMT Review Todd Blechinger	Level III	Signature 	Date 10/19/09
Examiner N/A	Level N/A	Signature	Date	Site Review Kevin Hacker	Level III	Signature 	Date 10/20/09
Other N/A	Level N/A	Signature	Date	ANII Review E. York	Level N/A	Signature 	Date 10.20.09



ULTRASONIC PHASED ARRAY WOR CALIBRATION REPORT

WOR Identification DM Weld: BPY-C-1001	Calibration Data Sheet: 219-01-007
WOR Identification SS Weld: BPY-C-1003	Calibration Data Sheet: 219-01-038
Plant/Unit: Millstone / 2	Procedure No. / Rev: ER-MP-NDE-UT-816/ Rev.0

Wedge	Comments: See attached EPRI correspondence for Probe, Wedge and Focal Law information.
Manufacturer: GEIT	
Model: 360-152-234	
Nominal Wedge Angle: 52°	
Measured Wedge Angle: 52°	
Contour Diameter: 5.50" CIRC OD	
Scan Direction: Circumferential	
Nominal Index Location: .75"	
Zero Reference: Front of Probe	

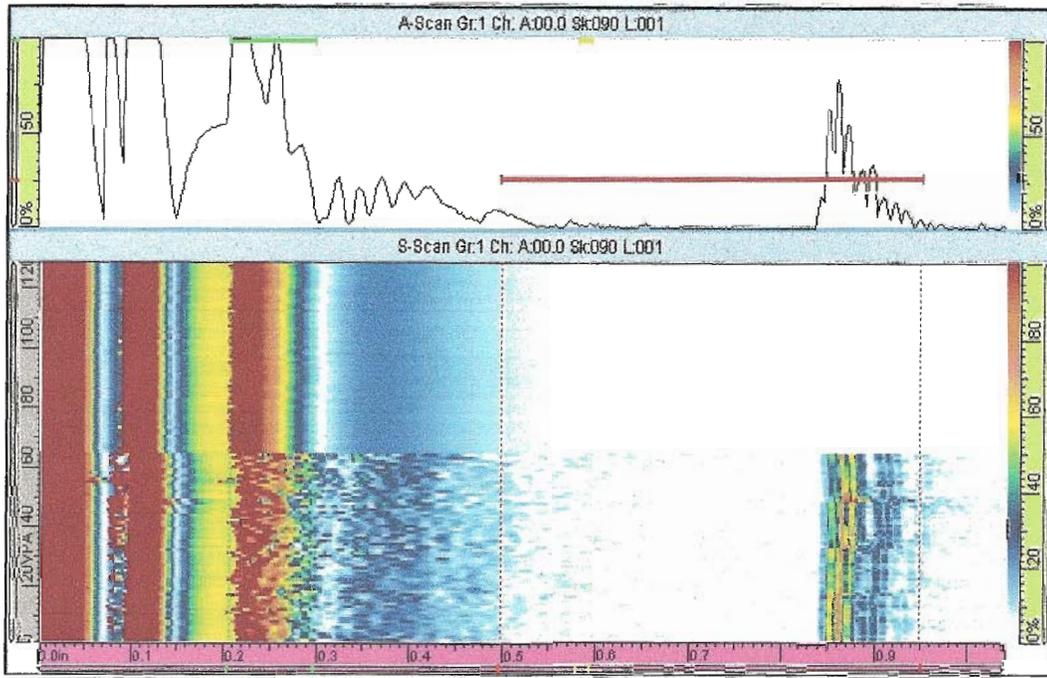
Instrument	Search Unit
Manufacturer: Zetec	Manufacturer: GEIT
Model: Omniscan 32/128 PR	Model: 115-000-631
PA Module Serial Number: Omni-Z-6034	Serial Number: 01Y28Y-1/ 01Y28Y-2
UT Mainframe Serial Number: Omni-Z-1062	
Software Revision: 1.4R3	
Table 2 Instrument Settings: See attached	
	Search Unit Integral Cable
	Type: See cable diagram
	Length: See cable diagram
	Connector Type #: See cable diagram

Couplant: Soundsafe	Temperature Gauge: PTC 312F
Manufacturer: Sonotech Inc.	Serial Number: 268025
Batch Number: 07220H	

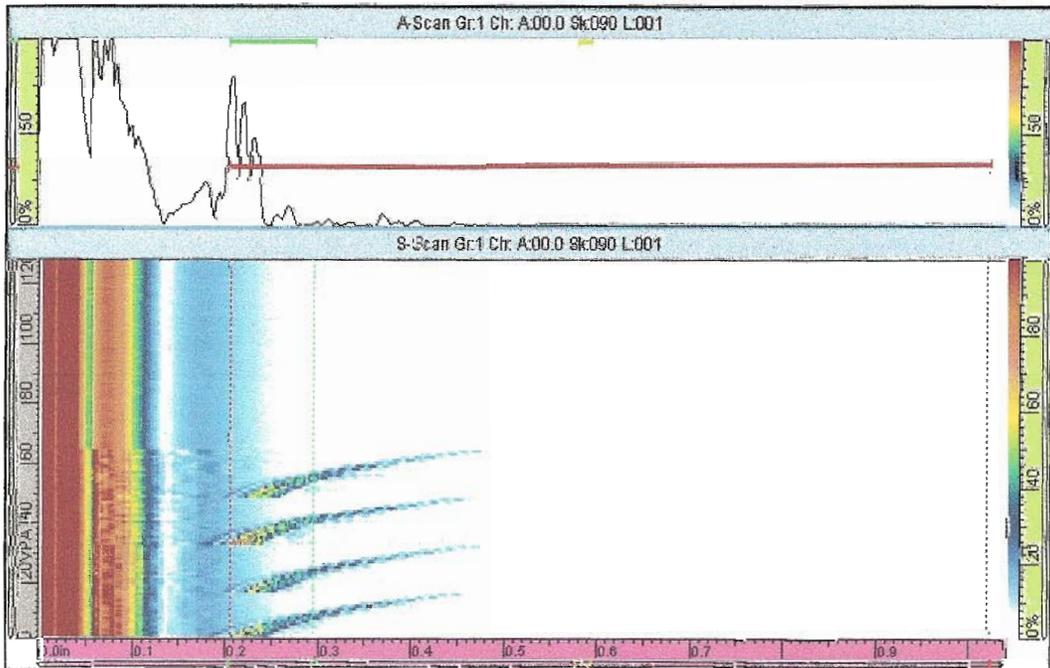
Calibration Data Files	
Focal Law: 032NJDZ2234L0082R2M1Z4_1.125MP.LAW	
Angles Generated: 0° to 82°	
Wave Mode: Longitudinal	
Focal Sound Path: 1.125" MP	

Calibration Reflector Data					
Calibration Block(s): 6039038			MEUXE017A (.1" SDH only)		Temperature: 80°
Calibration Reflector	Angle	% FSH	Ref. Sensitivity	UT Response	
(70°-85°)	0.1" SDH	70°	80	42 dB	.644" Sound Path
(25°-60°)	0.5" SDH	45°	80	22 dB	.920" Sound Path
(0°-25°)	0.5" SDH	0°	80	31 dB	.568" Sound Path
Channel Functional Checks		Pre Exam: Acceptable	Post Exam: Acceptable		
Number of Inactive Channels/Elements:		Transmit: 0	Receive: 0		

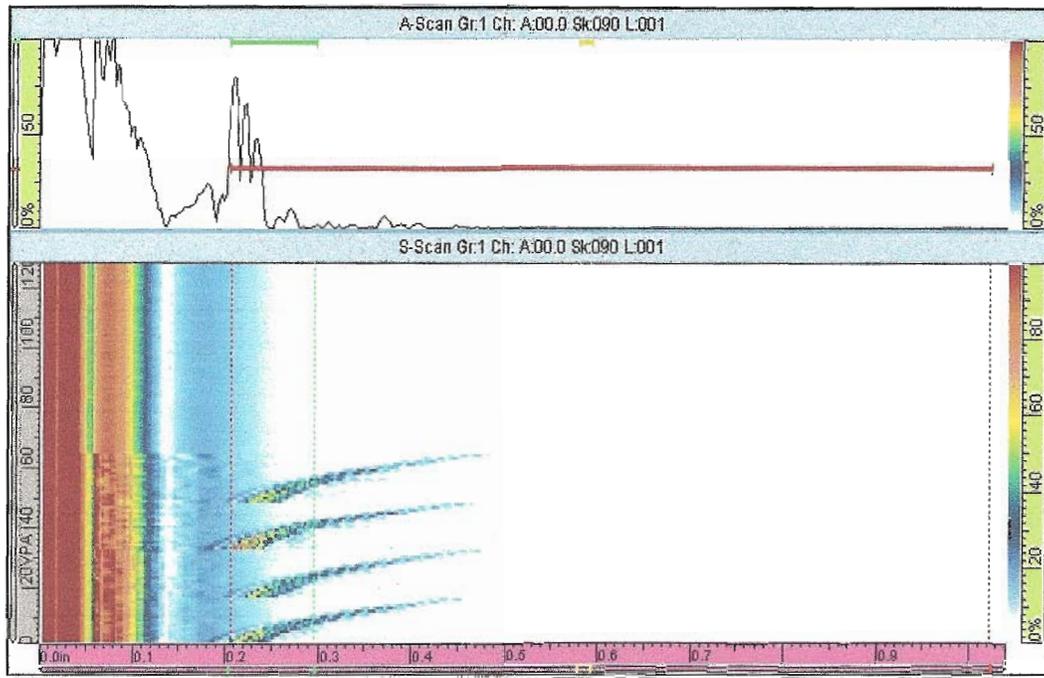
Calibration Performed	Examiner 1	Examiner 2	Level(s)	Date	Time
Initial:	Todd Blechinger	N/A	III	10/18/09	1505
Intermediate:	N/A	N/A	N/A	N/A	N/A
Final:	Todd Blechinger	N/A	III	10/18/09	1545



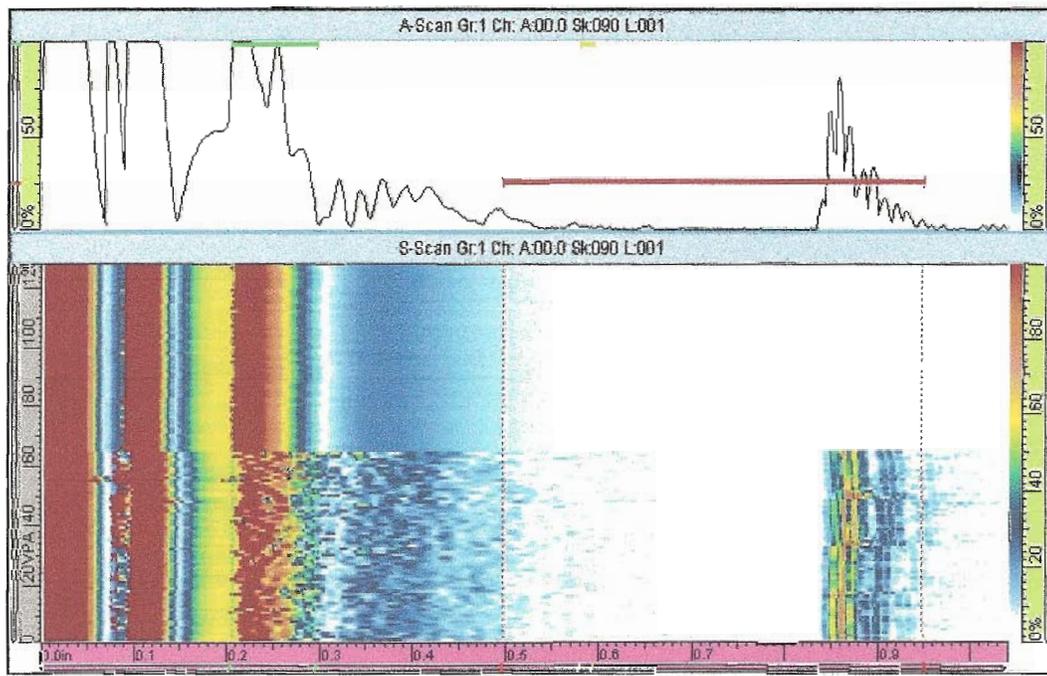
Element Check 5- Pre exam, off wedge



Element Check 6-Pre exam, on wedge



Element Check 7- Post exam, on wedge



Element Check 8-Post exam, off wedge

Phased Array Instrument Table 2 Essential Settings (cont.)

Major Menu Item	Menu Item	Sub-menu Item	Setting
Display	Selection	Display	A-S-[C]
		C-Scan 1	Off
		Group	Current
		Projection	On
	Rulers	UT Unit	True Depth
		% Ruler	Linear (%)
		DAC/TCG	Off
		Gate	On
		Cursor	Off
	Color	Select	Amplitude
		Start (%)	0.0
		End (%)	100.0
	Properties	Display	A-Scan
		Source	Normal
Probe Part	Select	Select	Select Tx/Rx
		Auto Detect	Off
	Position	Scan Offset (in)	0
		Index Offset (in)	0
	Parts	Geometry	Plate
		Thickness (in)	3.0 in
	PGM Probe	Configuration	Scan Type
Connection P:			1
Laws		Auto Program	Off
Gate Alarm	Gate	Gate Select	Gate A
		Gate A Synchro	Pulse



ULTRASONIC PHASED ARRAY WOR ULTRASONIC EXAMINATION RECORD

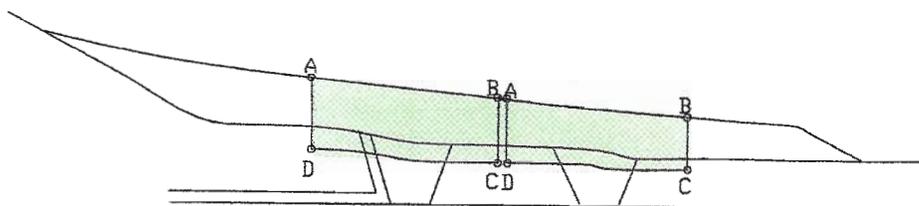
Exam Data Sheet: 219-01-007 219-01-038		Calibration Data Sheet: 219-01-007 219-01-038	
Plant: Millstone Unit: 2		Procedure: ER-MP-NDE-UT-816/Rev. 0	
Zones DM Weld: 1-08		SS Weld: 1-23	
Date: 10/18/09		Exam Start: 1505	Exam Stop: 1545
WOR Identification DM Weld: BPY-C-1001		SS Weld: BPY-C-1003	
Component Configuration DM Weld: Nozzle to Safe End		SS Weld: Safe End to Pipe	
Weld Overlay Regions: Entire overlay surface			
Examination Surface: Surface of Weld Overlay		Reviewed Previous Data: N/A	
Temperature Gauge: PTC 312F		Serial Number: 268025	Component Temp: 79°
Percent Of Coverage Obtained: 100%		Examination Angles	
Weld Overlay Thickness:		Axial	Circumferential
Minimum: .30"		N/A	0° to 82°
Maximum: .60"			
Examination Sensitivity:		N/A dB	34.0 dB

Examination Scans Performed	Yes	No	N/A
(1) Axial (Downstream)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
(2) Axial (Upstream)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
(3) Circumferential (Clockwise)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(4) Circumferential (Counterclockwise)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

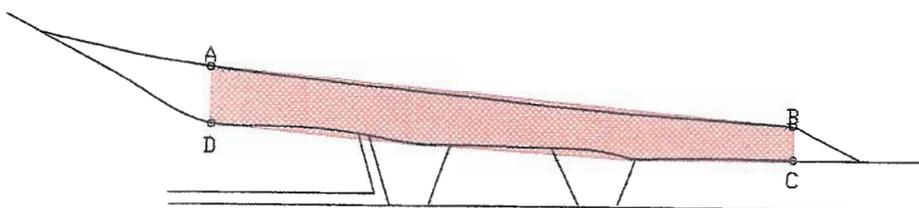
Comments: Maintained 5% to 20% average baseline noise level during examination. No suspected flaw indications were observed during examinations.

Examiner	Level	Signature	Date	LMT Review	Level	Signature	Date
Todd Blechinger	III		10/18/09	Todd Blechinger	III		10/19/09
Examiner	Level	Signature	Date	Site Review	Level	Signature	Date
N/A	N/A			Kevin Hacker	III		10/20/09
Other	Level	Signature	Date	ANII Review	Level	Signature	Date
N/A	N/A			E. York	N/A		10-20-2009

Coverage Plot



ISI Examination Volume A-B-C-D



PSI Examination Volume A-B-C-D

Scale: NOT TO SCALE

Examiner	Level	Signature	Date	LMT Review	Level	Signature	Date
Todd Blechinger	III	<i>T. Blechinger</i>	10/18/09	Todd Blechinger	III	<i>T. Blechinger</i>	10/19/09
Examiner	Level	Signature	Date	Site Review	Level	Signature	Date
N/A	N/A			Kevin Hacker	III	<i>K. Hacker</i>	10/20/09
Other	Level	Signature	Date	ANII Review	Level	Signature	Date
N/A	N/A			E. York	N/A	<i>E. York</i>	10-20-2009



September 23, 2009

Kevin Hacker
Dominion Corporate NDE Level III
Dominion Generation
Innsbrook Technical Center (M/S 3NE)
5000 Dominion Blvd
Glen Allen, VA 23060-3308

Subject: Phased Array Wedge Designs for Weld Overlay Examinations at Millstone 2 (Fall 2009)

Dear Mr. Hacker:

As requested, please find included with this letter the ultrasonic phased array wedge information for use with the EPRI Procedure for Manual Phased Array Ultrasonic Examination of Weld Overlaid Similar and Dissimilar Metal Welds (EPRI-WOL-PA-1) at Dominion's Millstone Power Station Unit 2 in the fall of 2009. These weld overlay inspections will require the use of one 2.0 MHz 2x16 ultrasonic phased array dual transducer with six wedges all manufactured by General Electric Inspection Technologies (GEIT) with the Zetec OmniScan 32-128 P/R phased array instrument (See Figure 1).

Table A indicates which GEIT wedge shall be used for each weld overlaid component while Table B contains the Zetec Advanced Phased Array Calculator 1.2R4 (ZAPAC 1.2R4) CAL file for each corresponding GEIT wedge and focal metal path distance. While these CAL files are attached to this letter, each should be loaded into ZAPAC 1.2R4 and verified with the settings contained in the EPRI report: Nondestructive Evaluation: Procedure for Manual Phased Array UT of Weld Overlays (Product ID 1015134). Figures 2 through 11 contain screen captures of the ZAPAC 1.2R4 for each CAL file. The user shall verify all of the parameters in the ZAPAC 1.2R4 for each CAL file with those found in the 1015134 EPRI report prior to generating a corresponding LAW file for field use.

It is important to note that the "O32NJDZ2232L0079R2M1Z4" and "O32NJDZ2234L0082R2M1Z4" CAL files only allow the user to generate a maximum angle range of 0° to 79° and 0° to 82° respectively instead of the 0° to 85° recommended in the procedure. These smaller angle ranges were formally demonstrated through the Performance Demonstration Initiative (PDI) Program for use with the OmniScan instruments and are acceptable for use (see EPRI-WOL-PA-1).

For your convenience, I have attached two OmniScan 32-128 P/R setup files (WOLPA1.ops - for basic setup, WOLPA1_ChannelCheck.ops - for channel/element checks) as a starting point for you to build your own setup files for the examination. You will need to verify all the parameters in the attached files prior to field use.

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CHARLOTTE OFFICE

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Customer Service 800.313.3774 • www.epri.com

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Please note that ZAPAC 1.2R4 is a standalone program that is also embedded in the Zetec UltraVision 1.2R4 software. The ZAPAC 1.2R4 standalone and embedded programs are equivalent for LAW file generation. Please let us know if you have any comments or questions.

Sincerely,

A handwritten signature in black ink, appearing to read "Mark D.", with a long horizontal stroke extending to the right.

Mark Dennis
EPRI Senior Project Manager

Attachment

September 23, 2009
Kevin Hacker
Page 3

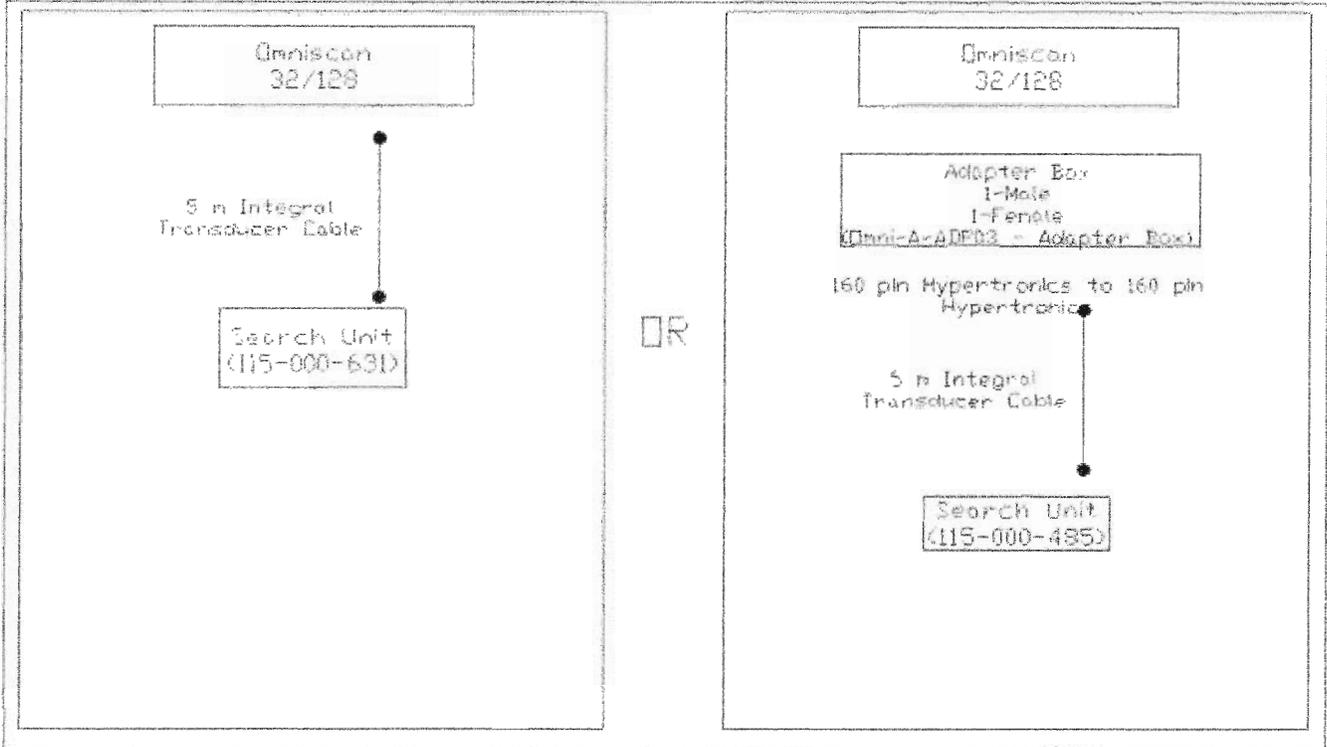


Figure 1. OmniScan 32-128 P/R Cable Diagram for EPRI-WOL-PA-1

Table A. GEIT Wedge Component Applicability

Zone	Weld Number	Location / Description	Wedge Contour Required Wedges	GEIT Axial Wedge Part #	GEIT Circ Wedge Part #
1-07	BPD-C-1017	2" Drain Line Loop 1A	4.125"	360-152-233	360-152-232
1-09	BPD-C-3000	2" Drain line Loop 1B			
1-11	BPD-C-2001	2" Drain line Loop 2A			
1-12	BCH-C-2001	2" Charging line Loop 2A			
1-08	BCH-C-1001	2" Charging Line Loop 1A	5.50"	360-152-235	360-152-234
1-08	BPY-C-1001	3" Spray line Loop 1A			
1-10	BPY-C-3000	3" Spray Line Loop 1B	16.75"	360-152-079	360-152-078
1-08	BSI-C-1001	12" Safety Injection 1A			
1-10	BSI-C-3000	12" Safety Injection 1B			
1-14	BSI-C-4000	12" Safety Injection 2B			
1-05	BPS-C-1001	12" Hot leg Surge Line Loop 1			
1-06	BSD-C-2001	12" SDC line Loop 1			
1-12	BSI-C-2001	12" Safety Injection Loop 2A			

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Table B. GEIT Wedge CAL File Applicability

GEIT Part #	Diameter (in)	Scanning Direction	Focal Metal Path (in)	CAL Filename	Weld Overlay Thickness (WOLT) Range
360-152-232	4.125	Circ.	0.5	O32NJDS2232L0085R2M1Z4	WOLT ≤ 0.20in
360-152-233	4.125	Axial	0.5	O32NJDS2233L0085R2M1Z4	WOLT ≤ 0.20in
360-152-232	4.125	Circ.	1.125	O32NJDZ2232L0079R2M1Z4	0.20in < WOLT < 0.75in
360-152-233	4.125	Axial	1.125	O32NJDZ2233L0085R2M1Z4	0.20in < WOLT < 0.75in
360-152-234	5.500	Circ.	1.125	O32NJDZ2234L0082R2M1Z4	0.20in < WOLT < 0.75in
360-152-235	5.500	Axial	1.125	O32NJDZ2235L0085R2M1Z4	0.20in < WOLT < 0.75in
360-152-078	16.750	Circ.	1.125	O32NJDZ2078L0085R2M1Z4	0.20in < WOLT < 0.75in
360-152-079	16.750	Axial	1.125	O32NJDZ2079L0085R2M1Z4	0.20in < WOLT < 0.75in
360-152-078	16.750	Circ.	1.5	O32NJDB2078L0085R2M1Z4	WOLT ≥ 0.75in
360-152-079	16.750	Axial	1.5	O32NJDB2079L0085R2M1Z4	WOLT ≥ 0.75in

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Kevin Hacker
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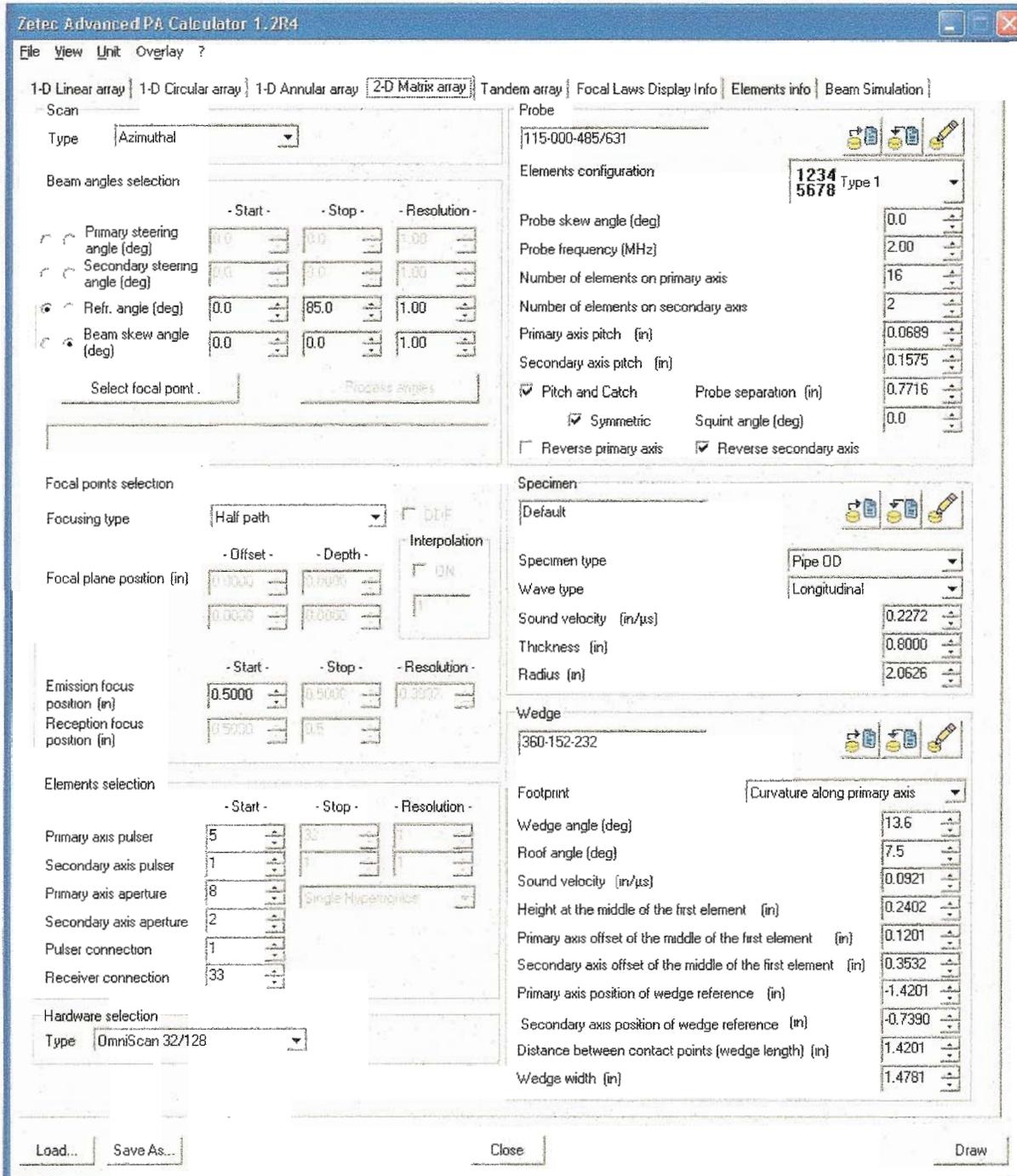


Figure 2.
ZAPAC Input for GEIT Array Part #115-000-485 or 115-000-631; GEIT Wedge Part #360-152-232; Diameter (in) = 4.125; Scanning Direction = Circumferential; Focal Metal Path (in) = 0.5

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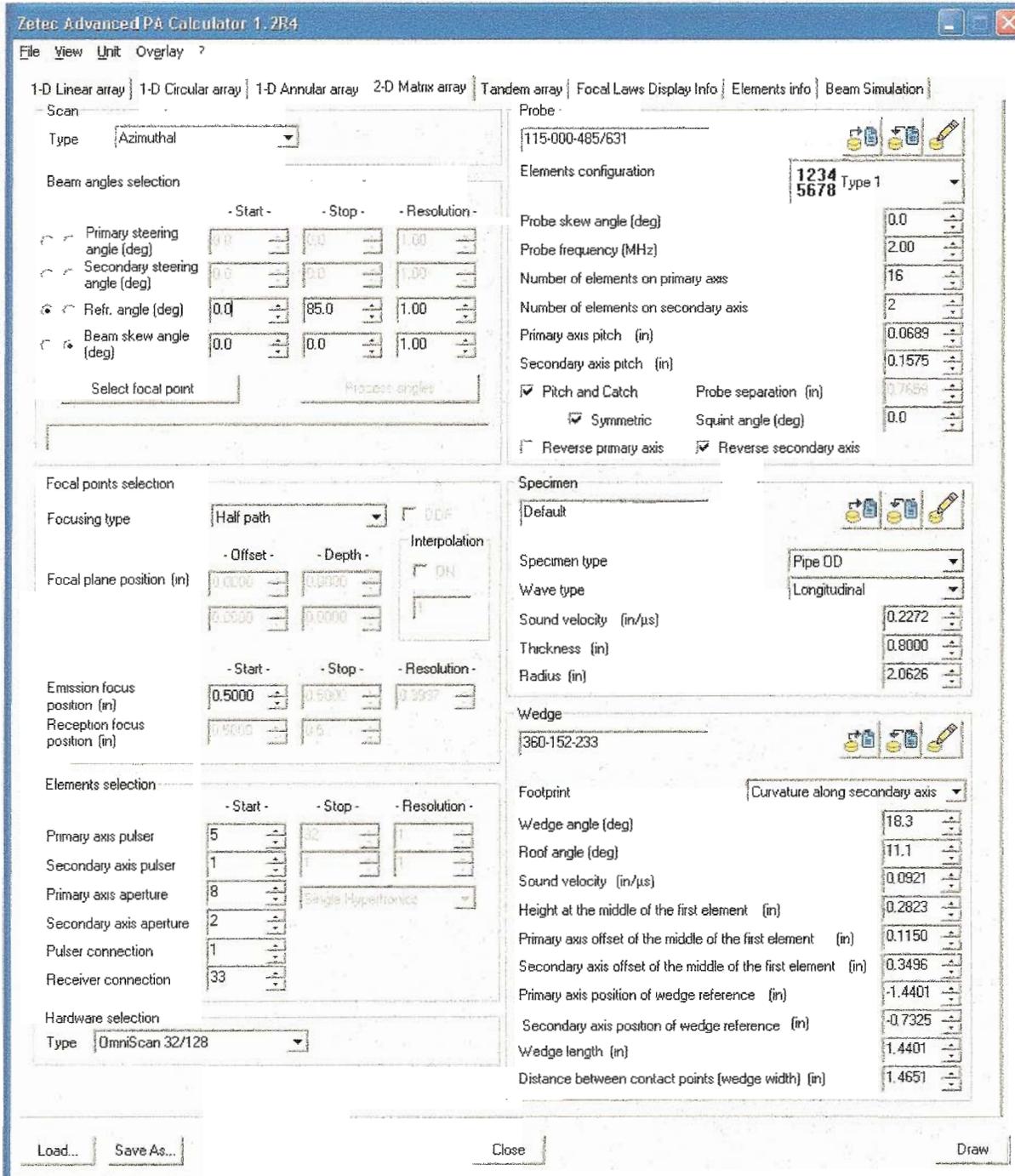


Figure 3.
ZAPAC Input for GEIT Array Part #115-000-485 or 115-000-631; GEIT Wedge Part #360-152-233; Diameter (in) = 4.125; Scanning Direction = Axial; Focal Metal Path (in) = 0.5

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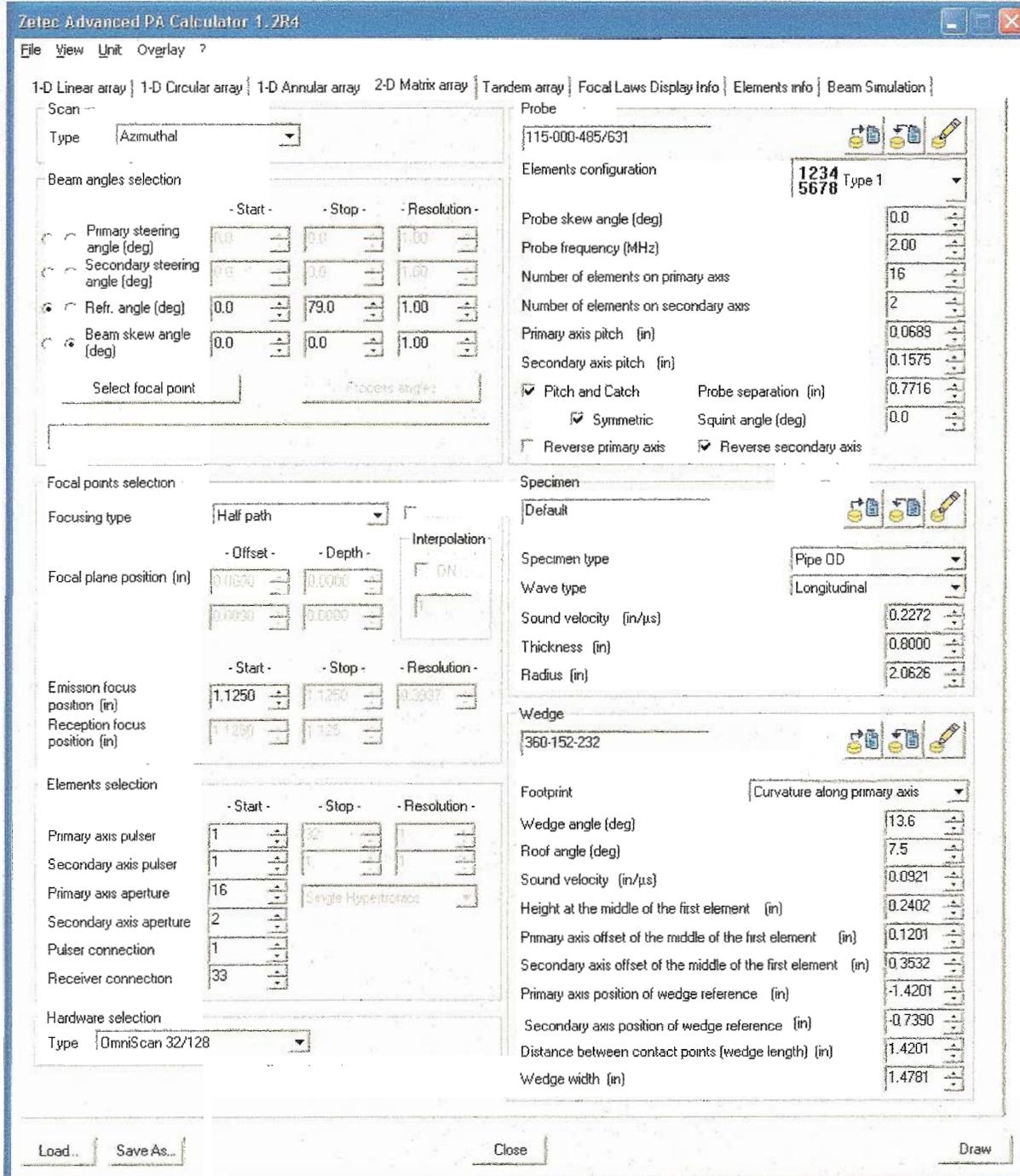


Figure 4.
ZAPAC Input for GEIT Array Part #115-000-485 or 115-000-631; GEIT Wedge Part #360-152-232; Diameter (in) = 4.125; Scanning Direction = Circumferential; Focal Metal Path (in) = 1.125

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Kevin Hacker
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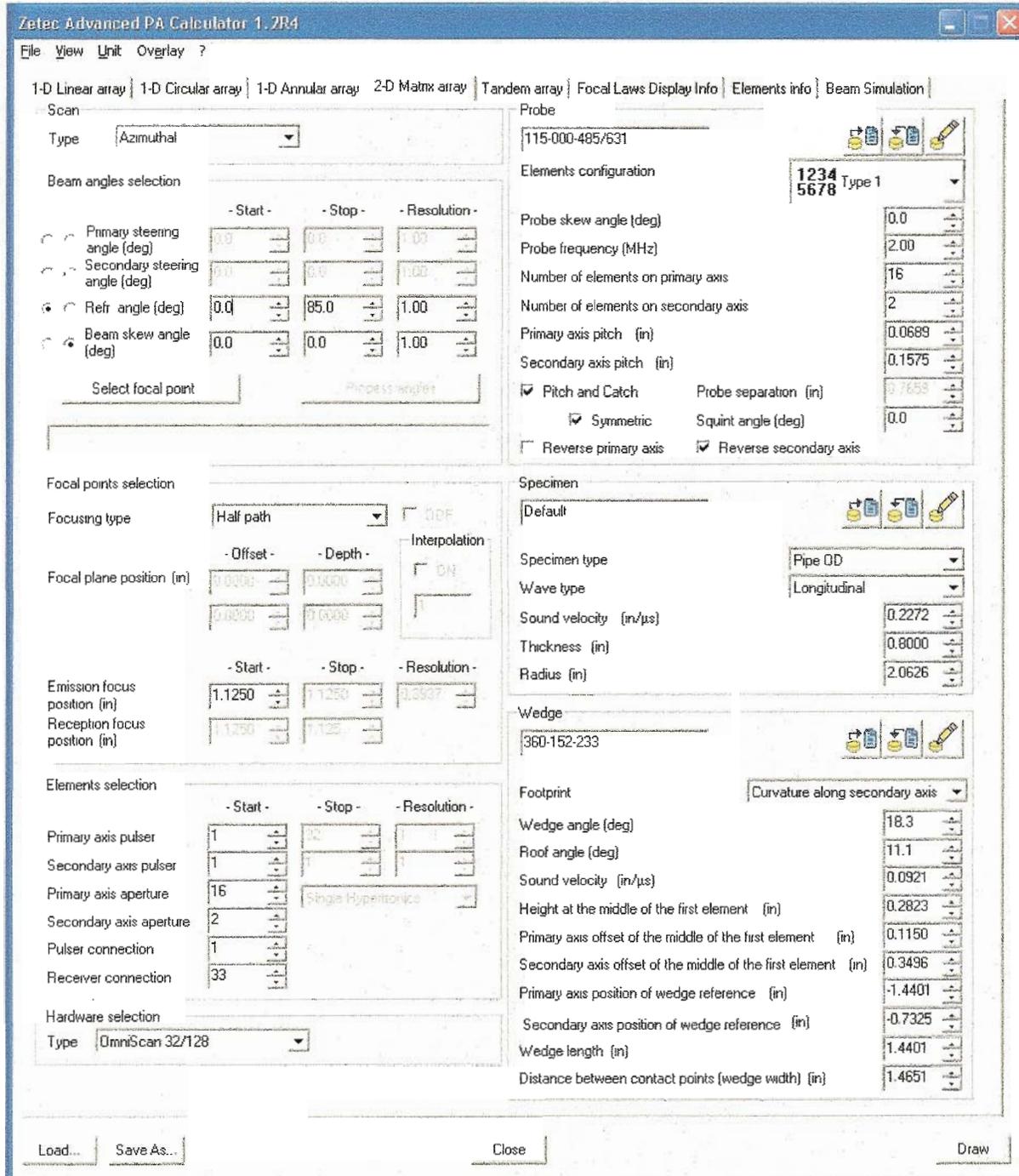


Figure 5.
ZAPAC Input for GEIT Array Part #115-000-485 or 115-000-631; GEIT Wedge Part #360-152-233; Diameter (in) = 4.125; Scanning Direction = Axial; Focal Metal Path (in) = 1.125

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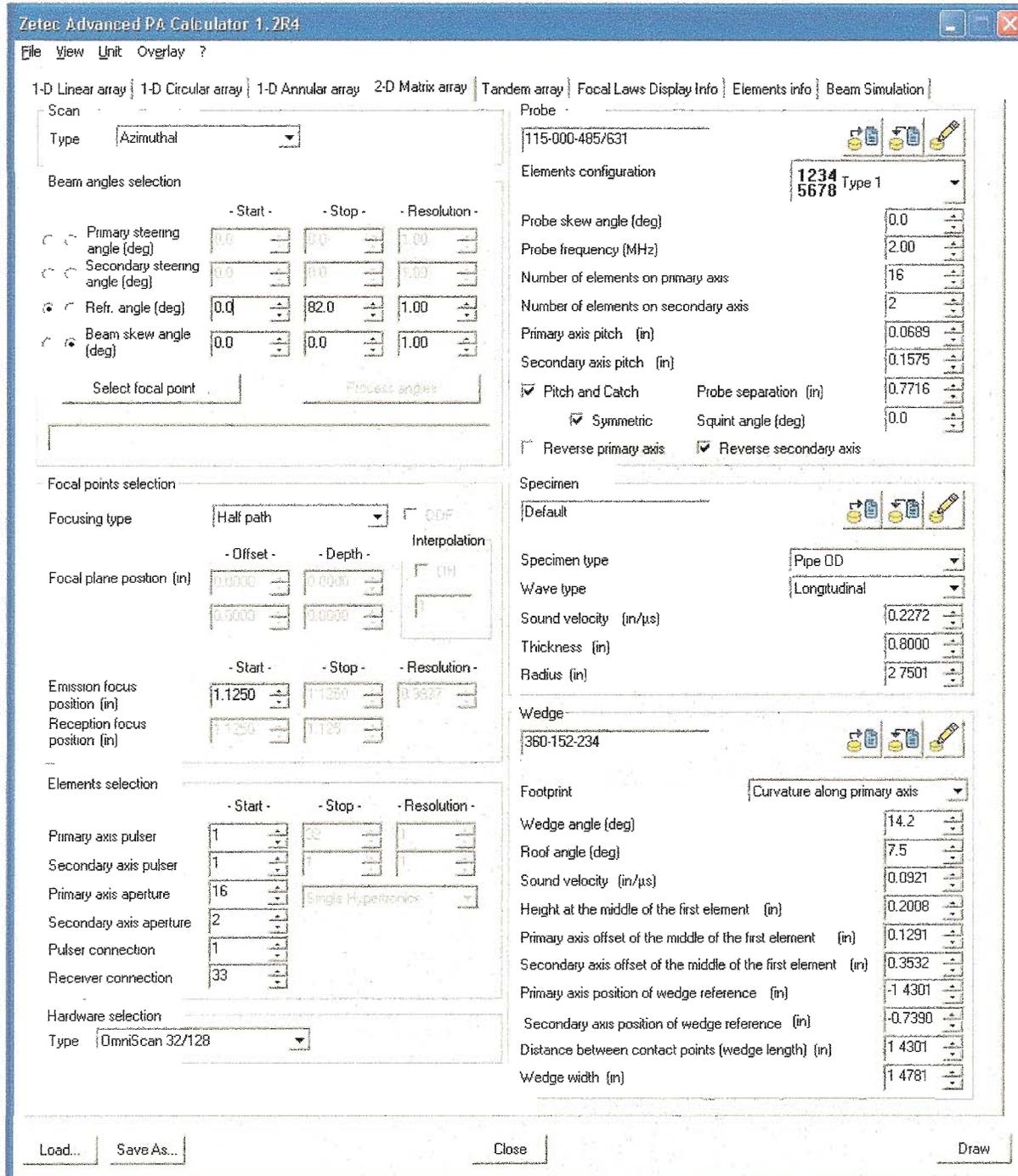


Figure 6.
ZAPAC Input for GEIT Array Part #115-000-485 or 115-000-631; GEIT Wedge Part #360-152-234; Diameter (in) = 5.5; Scanning Direction = Circumferential; Focal Metal Path (in) = 1.125

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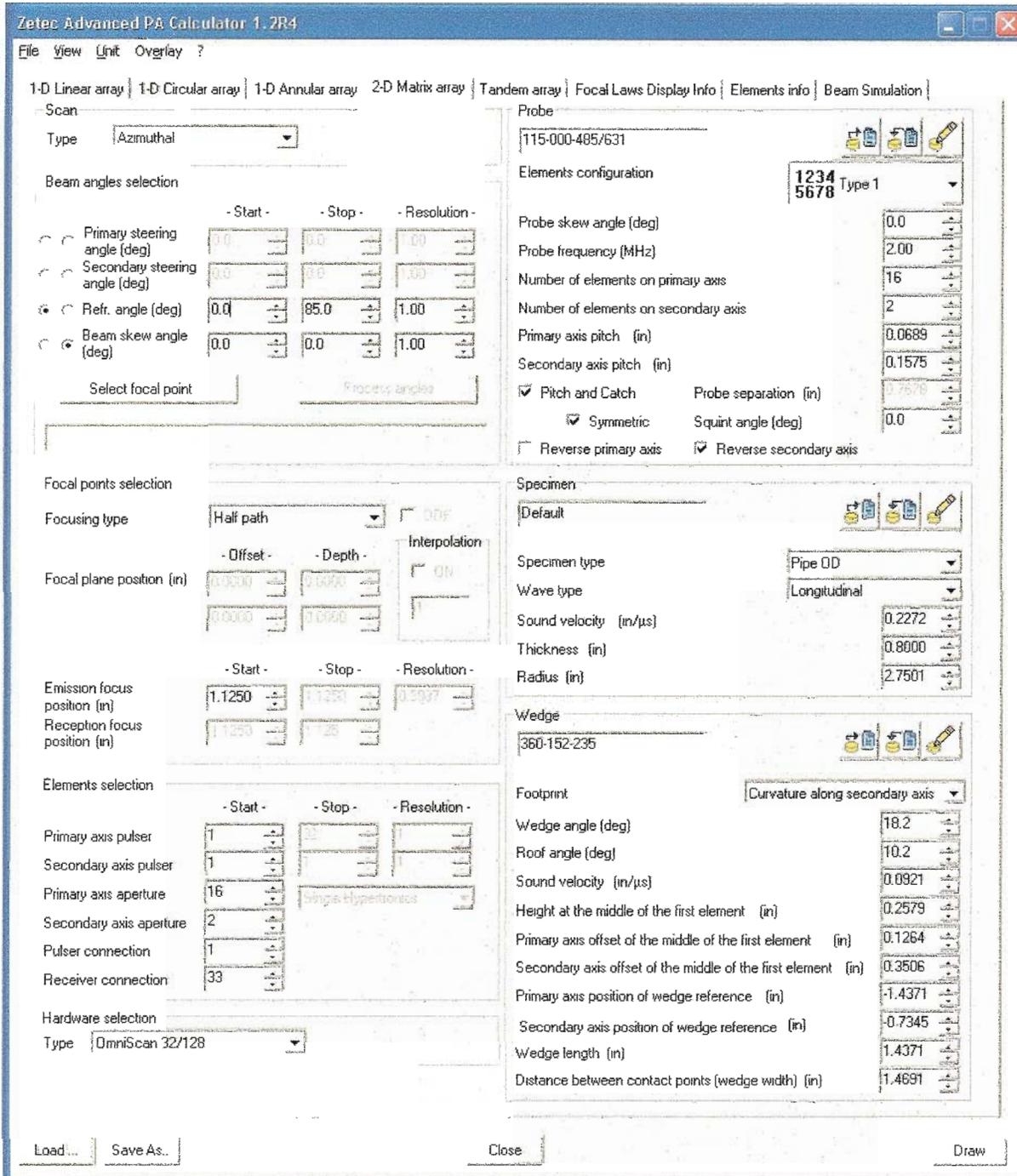


Figure 7.
ZAPAC Input for GEIT Array Part #115-000-485 or 115-000-631; GEIT Wedge Part #360-152-235; Diameter (in) = 5.5; Scanning Direction = Axial; Focal Metal Path (in) = 1.125

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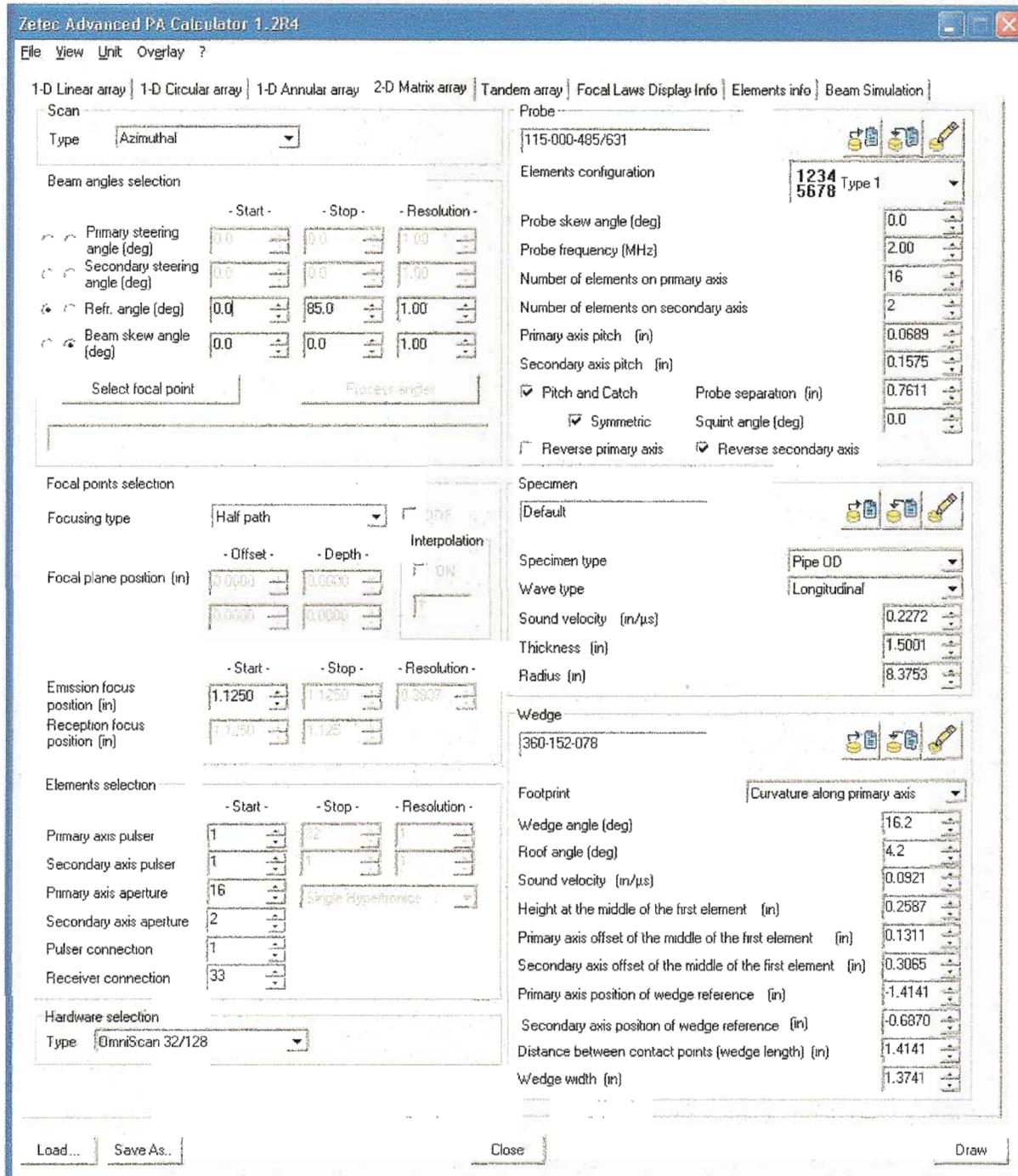


Figure 8.
ZAPAC Input for GEIT Array Part #115-000-485 or 115-000-631; GEIT Wedge Part #360-152-078; Diameter (in) = 16.75; Scanning Direction = Circumferential; Focal Metal Path (in) = 1.125

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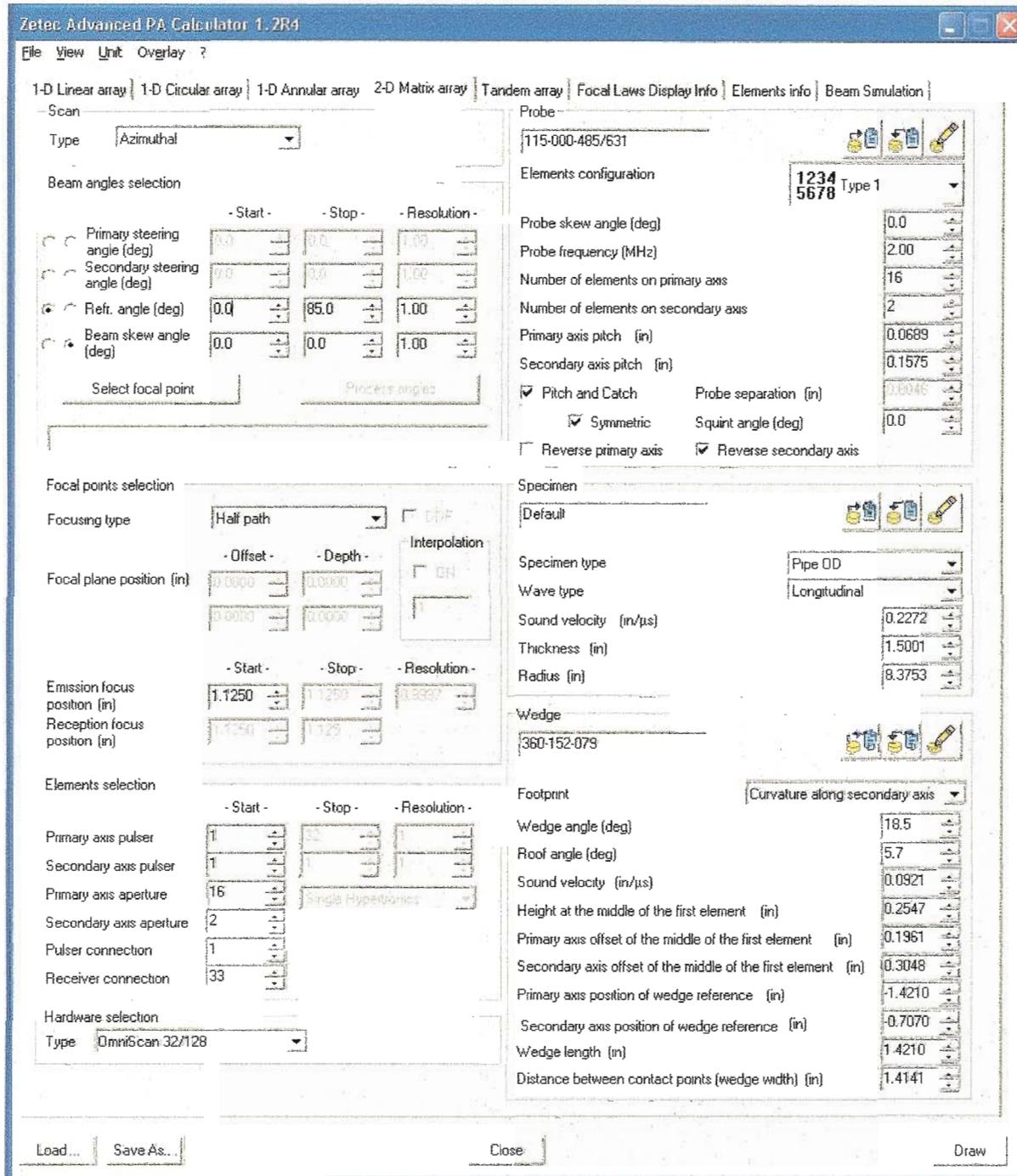


Figure 9.
ZAPAC Input for GEIT Array Part #115-000-485 or 115-000-631; GEIT Wedge Part #360-152-079; Diameter (in) = 16.75; Scanning Direction = Axial; Focal Metal Path (in) = 1.125

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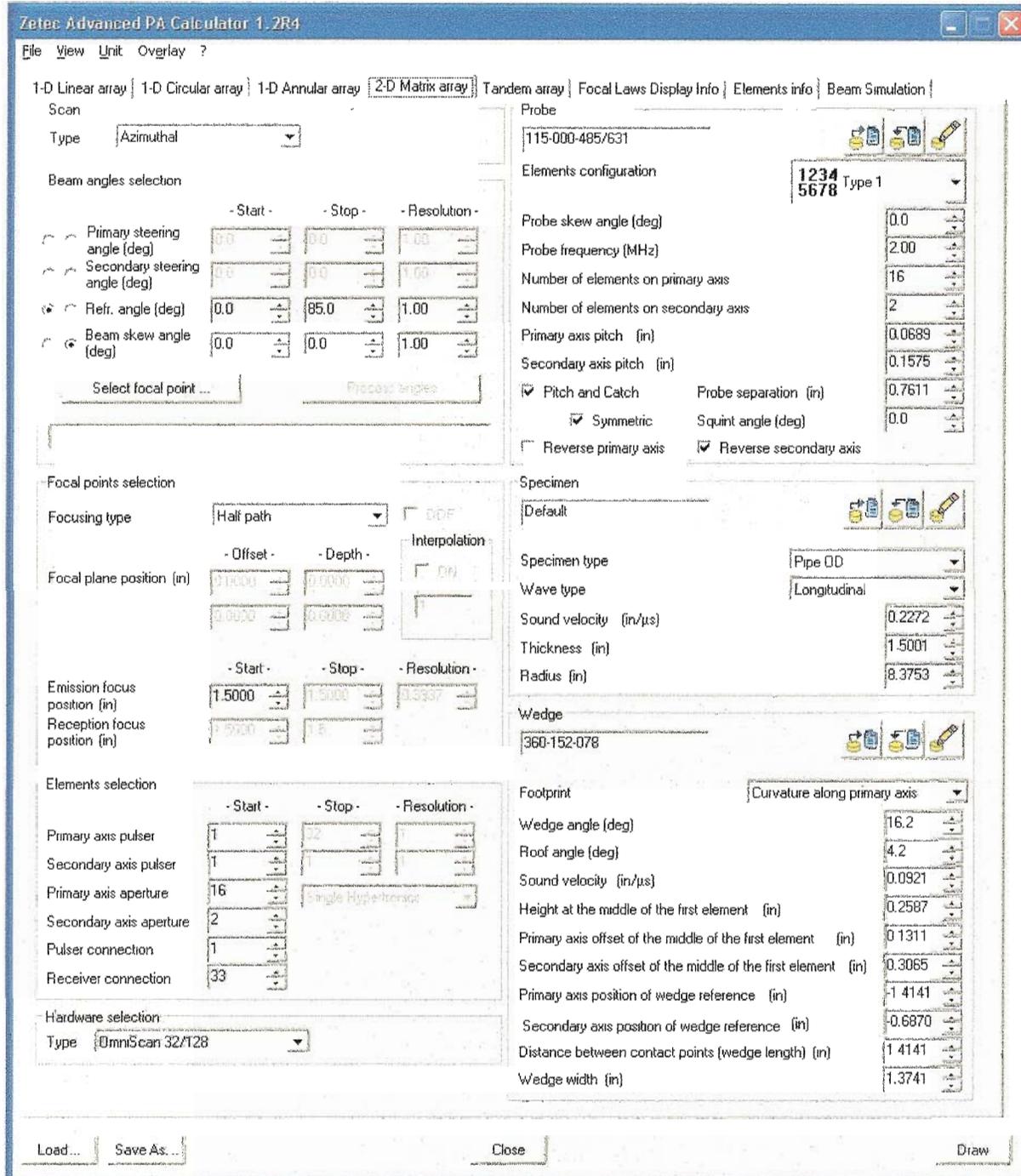


Figure 10.
ZAPAC Input for GEIT Array Part #115-000-485 or 115-000-631; GEIT Wedge Part #360-152-078; Diameter (in) = 16.75; Scanning Direction = Circumferential; Focal Metal Path (in) = 1.5

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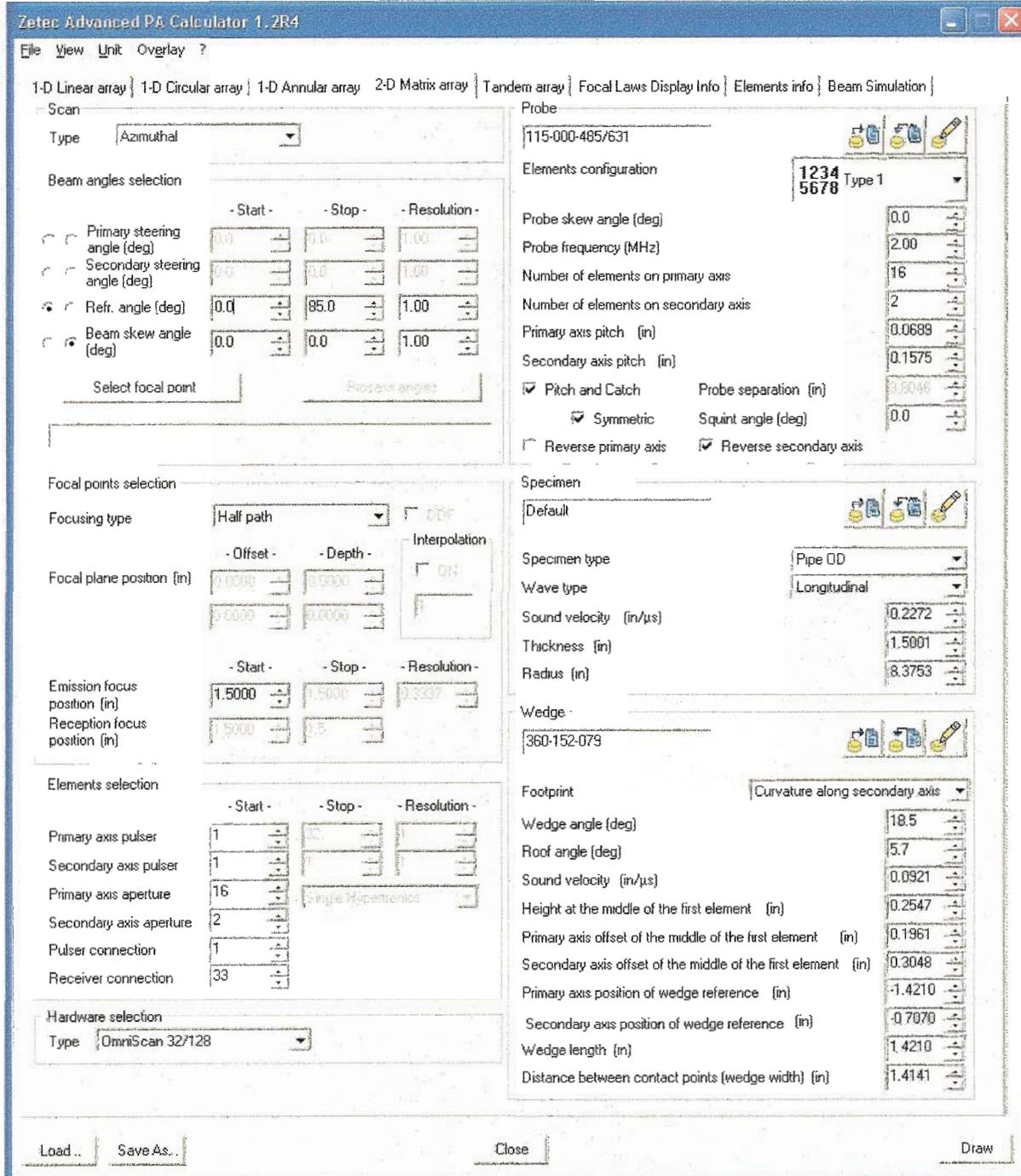


Figure 11.
ZAPAC Input for GEIT Array Part #115-000-485 or 115-000-631; GEIT Wedge Part #360-152-079; Diameter (in) = 16.75; Scanning Direction = Axial; Focal Metal Path (in) = 1.5

BPY-C-3000 / BPY-C-3002
3-inch Cold Leg Spray Line Loop 1B



UT Data Package Cover

Data Package No: 219-01-010



Reference ID: BPY-C-3000



AWO: 53102184603



Page #	Data Type	Exam Angle	Recordable	Limitations	Comments
1	C	0-85°			
2	C	0-85°			
3	C	0-85°	N		
4	C	0-85°		A	
5	C	0-85°			
6	E	0-85°	NRI	NONE	
7	C	0-82°			
8	C	0-82°			
9	C	0-82°	N		
10	C	0-82°		A	
11	C	0-82°			
12	E	0-82°	NRI	NONE	
13	P	0-85°	N/A	N/A	

% of Required Exam Area: Final Disposition: *JUP. [Signature]* 10/20/09

Previous Data Review: N/A RT

Dominion Review: *KS Hacker*

Level:

Review Date:

- Legend: UT Data Type Reference
- A = Additional Info
 - B = Beam Spread
 - C = Calibration Data
 - E = Examination Data
 - L = Linearity
 - P = Coverage Plot
 - S = Sketch
 - T = Thickness

Comments:

Data Package No: 219-01-039



Reference ID: BPY-C-3002



AWO: 53102184603



Page #	Data Type	Exam Angle	Recordable	Limitations	Comments
1	C	0-85°	N A	A	
2	C	0-85°			
3	C	0-85°			
4	C	0-85°			
5	C	0-85°			
6	E	0-85°	NRI	NONE	
7	C	0-82°	N A	A	
8	C	0-82°			
9	C	0-82°			
10	C	0-82°			
11	C	0-82°			
12	E	0-82°	NRI	NONE	
13	P	0-85°	N/A	N/A	

% of Required Exam Area:

Final Disposition: *TLLP* *TLL* *10/20/09*

Previous Data Review
 UT N/A RT

Dominion Review:

Level:

Review Date:

- Legend: UT Data Type Reference
- A = Additional Info
 - B = Beam Spread
 - C = Calibration Data
 - E = Examination Data
 - L = Linearity
 - P = Coverage Plot
 - S = Sketch
 - T = Thickness

Comments:



ULTRASONIC PHASED ARRAY WOR CALIBRATION REPORT

WOR Identification DM Weld: BPY-C-3000	Calibration Data Sheet: 219-01-010
WOR Identification SS Weld: BPY-C-3002	Calibration Data Sheet: 219-01-039
Plant/Unit: Millstone / 2	Procedure No. / Rev: ER-MP-NDE-UT-816/ Rev.0

<table border="1"> <tr><td align="center" colspan="2">Wedge</td></tr> <tr><td>Manufacturer:</td><td>GEIT</td></tr> <tr><td>Model:</td><td>360-152-235</td></tr> <tr><td>Nominal Wedge Angle:</td><td>52°</td></tr> <tr><td>Measured Wedge Angle:</td><td>52°</td></tr> <tr><td>Contour Diameter:</td><td>5.50" AX OD</td></tr> <tr><td>Scan Direction:</td><td>Axial</td></tr> <tr><td>Nominal Index Location:</td><td>.70"</td></tr> <tr><td>Zero Reference:</td><td>Front of Probe</td></tr> </table>	Wedge		Manufacturer:	GEIT	Model:	360-152-235	Nominal Wedge Angle:	52°	Measured Wedge Angle:	52°	Contour Diameter:	5.50" AX OD	Scan Direction:	Axial	Nominal Index Location:	.70"	Zero Reference:	Front of Probe	Comments: See attached EPRI correspondence for Probe, Wedge and Focal Law information.
Wedge																			
Manufacturer:	GEIT																		
Model:	360-152-235																		
Nominal Wedge Angle:	52°																		
Measured Wedge Angle:	52°																		
Contour Diameter:	5.50" AX OD																		
Scan Direction:	Axial																		
Nominal Index Location:	.70"																		
Zero Reference:	Front of Probe																		

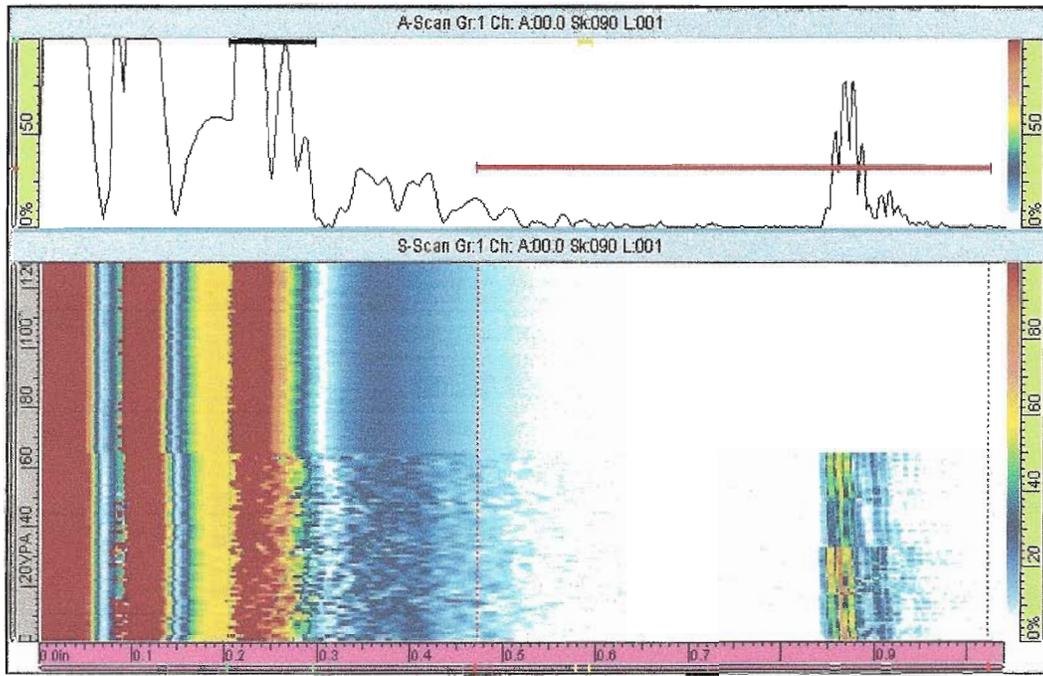
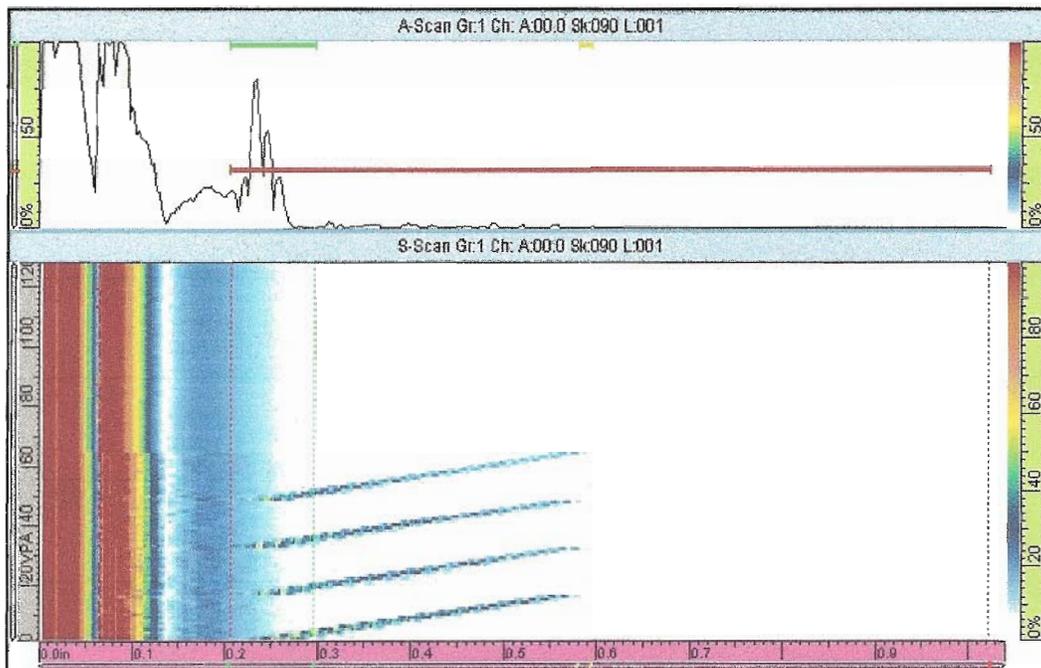
<table border="1"> <tr><td align="center" colspan="2">Instrument</td></tr> <tr><td>Manufacturer:</td><td>Zetec</td></tr> <tr><td>Model:</td><td>Omniscan 32/128 PR</td></tr> <tr><td>PA Module Serial Number:</td><td>Omni-Z-6034</td></tr> <tr><td>UT Mainframe Serial Number:</td><td>Omni-Z-1062</td></tr> <tr><td>Software Revision:</td><td>1.4R3</td></tr> <tr><td>Table 2 Instrument Settings:</td><td>See attached</td></tr> </table>	Instrument		Manufacturer:	Zetec	Model:	Omniscan 32/128 PR	PA Module Serial Number:	Omni-Z-6034	UT Mainframe Serial Number:	Omni-Z-1062	Software Revision:	1.4R3	Table 2 Instrument Settings:	See attached	<table border="1"> <tr><td align="center" colspan="2">Search Unit</td></tr> <tr><td>Manufacturer:</td><td>GEIT</td></tr> <tr><td>Model:</td><td>115-000-631</td></tr> <tr><td>Serial Number:</td><td>01Y28X-1/ 01Y28X-2</td></tr> <tr><td align="center" colspan="2">Search Unit Integral Cable</td></tr> <tr><td>Type:</td><td>See cable diagram</td></tr> <tr><td>Length:</td><td>See cable diagram</td></tr> <tr><td>Connector Type #:</td><td>See cable diagram</td></tr> </table>	Search Unit		Manufacturer:	GEIT	Model:	115-000-631	Serial Number:	01Y28X-1/ 01Y28X-2	Search Unit Integral Cable		Type:	See cable diagram	Length:	See cable diagram	Connector Type #:	See cable diagram
Instrument																															
Manufacturer:	Zetec																														
Model:	Omniscan 32/128 PR																														
PA Module Serial Number:	Omni-Z-6034																														
UT Mainframe Serial Number:	Omni-Z-1062																														
Software Revision:	1.4R3																														
Table 2 Instrument Settings:	See attached																														
Search Unit																															
Manufacturer:	GEIT																														
Model:	115-000-631																														
Serial Number:	01Y28X-1/ 01Y28X-2																														
Search Unit Integral Cable																															
Type:	See cable diagram																														
Length:	See cable diagram																														
Connector Type #:	See cable diagram																														

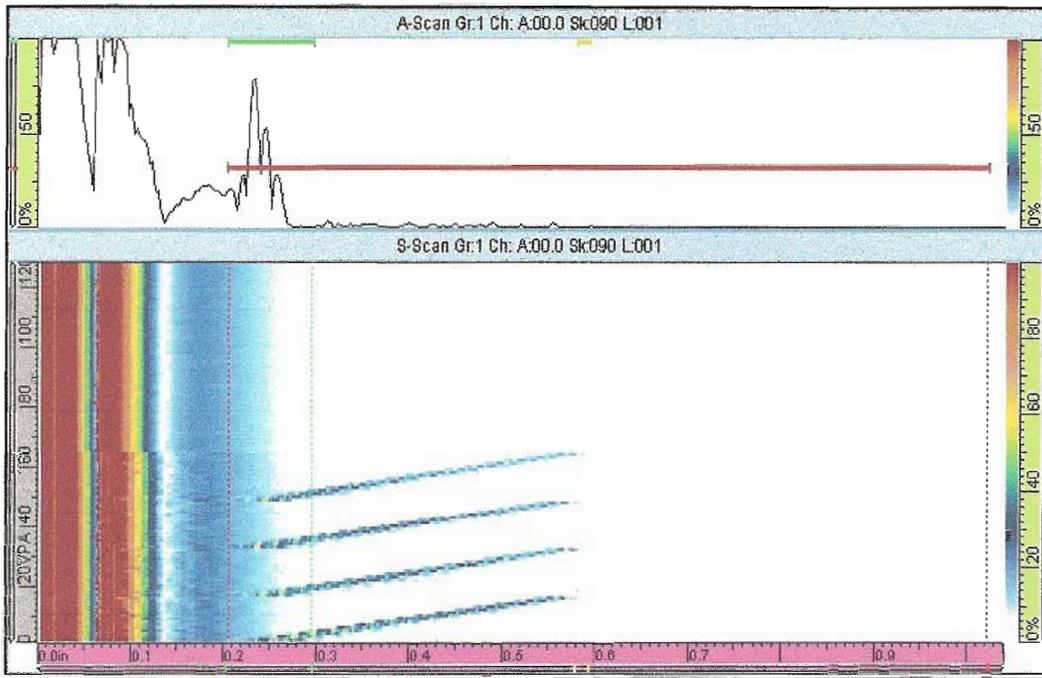
Couplant: Soundsafe	Temperature Gauge: PTC 312F
Manufacturer: Sonotech Inc.	Serial Number: 268025
Batch Number: 07220H	

Calibration Data Files	
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Angles Generated:	0° to 85°
Wave Mode:	Longitudinal
Focal Sound Path:	1.125" MP

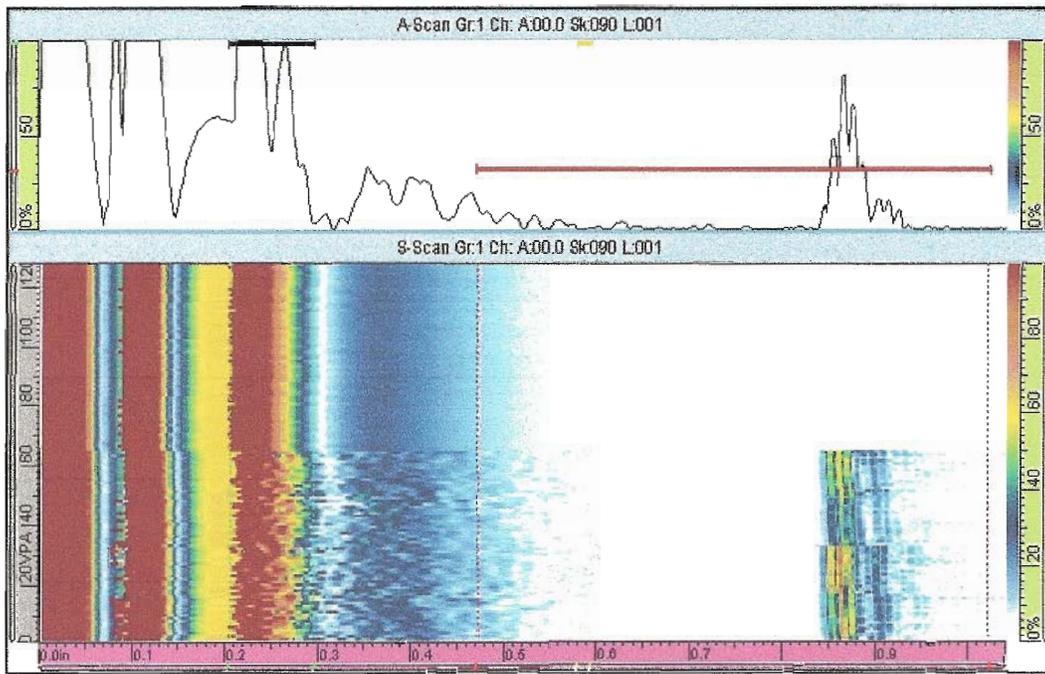
Calibration Reflector Data						
Calibration Block(s): 6039035		9C-041(.1" SDH only)			Temperature: 80°	
Calibration Reflector	Angle	% FSH	Ref. Sensitivity	UT Response		
(70°-85°)	0.1" SDH	75°	80	43 dB	.584"	Sound Path
(25°-60°)	0.5" SDH	52°	80	24 dB	.802"	Sound Path
(0°-25°)	0.5" SDH	0°	80	37 dB	.476"	Sound Path
Channel Functional Checks	Pre Exam: Acceptable		Post Exam: Acceptable			
Number of Inactive Channels/Elements: Transmit: 0 Receive: 0						

Calibration Performed	Examiner 1	Examiner 2	Level(s)	Date	Time
Initial:	Chris Van Ruler	Ryan Tolosky	II/II	10/17/09	0245
Intermediate:	N/A	N/A	N/A	N/A	N/A
Final:	Chris Van Ruler	Ryan Tolosky	II/II	10/17/09	0305

**Element Check 1- Pre exam, off wedge****Element Check 2- Pre exam, on wedge**



Element Check 3- Post exam, on wedge



Element Check 4-Post exam, off wedge

Phased Array Instrument Table 2 Essential Settings

Major Menu Item	Menu Item	Sub-menu Item	Setting
Reading			
	Result		
		Selector	List 1
		Field 1	A%
		Field 2	A^
		Field 3	SA
		Field 4	PA
UT			
	General		
		Gain	24 dB
		Start	0.00 in
		Range	1.896 in
		Wedge Delay	1.60 us
		Velocity	.2272 in/us
	Pulser		
		Pulser	1
		Tx/Rx Mode	PE
		Frequency	2
		Voltage	High
		PW	250ns (Auto)
		PRF	Optimum
	Receiver		
		Receiver	1
		Filter	None
		Rectifier	FW
		Video Filter	Off
		Averaging	1
		Reject	0
	Beam		
		Gain Offset	0.0 dB
		Scan Offset	-0.000 in
		Index Offset	-0.709 in
		Angle	52
		Skew	0.0°
		Beam Delay	8.52 us
	Advanced		
		dB Ref	Off
		Points Qty	452
		Scale Factor	6
		Sum Gain	22.0

Phased Array Instrument Table 2 Essential Settings (cont.)

Major Menu Item	Menu Item	Sub-menu Item	Setting	
Display	Selection	Display	A-S-[C]	
		C-Scan 1	Off	
		Group Projection	Current On	
	Rulers	UT Unit	True Depth	
		% Ruler	Linear (%)	
		DAC/TCG	Off	
		Gate	On	
		Cursor	Off	
		Color	Select	Amplitude
	Start (%)		0.0	
	End (%)		100.0	
	Properties	Display	A-Scan	
		Source	Normal	
	Probe Part	Select	Select	Select Tx/Rx
			Auto Detect	Off
		Position	Scan Offset (in)	0
			Index Offset (in)	0
		Parts	Geometry	Plate
			Thickness (in)	3.0 in
PGM Probe		Configuration	Scan Type	Sectorial
	Connection P:		1	
	Laws	Auto Program	Off	
		Gate Alarm	Gate Select	Gate A
Gate A Synchro	Pulse			



ULTRASONIC PHASED ARRAY WOR ULTRASONIC EXAMINATION RECORD

Exam Data Sheet: 219-01-010 219-01-039		Calibration Data Sheet: 219-01-010 219-01-039	
Plant: Millstone Unit: 2		Procedure: ER-MP-NDE-UT-816/Rev. 0	
Zones DM Weld: 1-10		SS Weld: 1-22	
Date: 10/17/09		Exam Start: 0245	Exam Stop: 0330
WOR Identification DM Weld: BPY-C-3000		SS Weld: BPY-C-3002	
Component Configuration DM Weld: Nozzle to Safe End		SS Weld: Safe End to Pipe	
Weld Overlay Regions: Entire overlay surface			
Examination Surface: Surface of Weld Overlay		Reviewed Previous Data: N/A	
Temperature Gauge: PTC 312F		Serial Number: 268025	Component Temp: 80°
Percent Of Coverage Obtained: 100%		Examination Angles	
Weld Overlay Thickness:		Axial	Circumferential
Minimum: .45"		0° to 85°	N/A
Maximum: .70"			
Examination Sensitivity:		36 dB	N/A dB

Examination Scans Performed	Yes	No	N/A
(1) Axial (Downstream)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(2) Axial (Upstream)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(3) Circumferential (Clockwise)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
(4) Circumferential (Counterclockwise)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Comments: Maintained 5% to 20% average baseline noise level during examination. No suspected flaw indications were observed during examinations.

Examiner	Level	Signature	Date	LMT Review	Level	Signature	Date
Chris Van Ruler	II	<i>CVR</i>	10/17/09	Todd Blechinger	III	<i>TBP</i>	10/19/09
Examiner	Level	Signature	Date	Site Review	Level	Signature	Date
Ryan Tolosky	II	<i>RT</i>	10/17/09	Kevin Hacker	III	<i>KHacker</i>	10/20/09
Other	Level	Signature	Date	ANII Review	Level	Signature	Date
N/A	N/A			E. York	N/A	<i>E. York</i>	10.20.2009



ULTRASONIC PHASED ARRAY WOR CALIBRATION REPORT

WOR Identification DM Weld: BPY-C-3000	Calibration Data Sheet: 219-01-010
WOR Identification SS Weld: BPY-C-3002	Calibration Data Sheet: 219-01-039
Plant/Unit: Millstone / 2	Procedure No. / Rev: ER-MP-NDE-UT-816/ Rev.0

Wedge	Comments:
Manufacturer: GEIT	See attached EPRI correspondence for Probe, Wedge and Focal Law information.
Model: 360-152-234	
Nominal Wedge Angle: 52°	
Measured Wedge Angle: 52°	
Contour Diameter: 5.50" CIRC OD	
Scan Direction: Circumferential	
Nominal Index Location: .75"	
Zero Reference: Front of Probe	

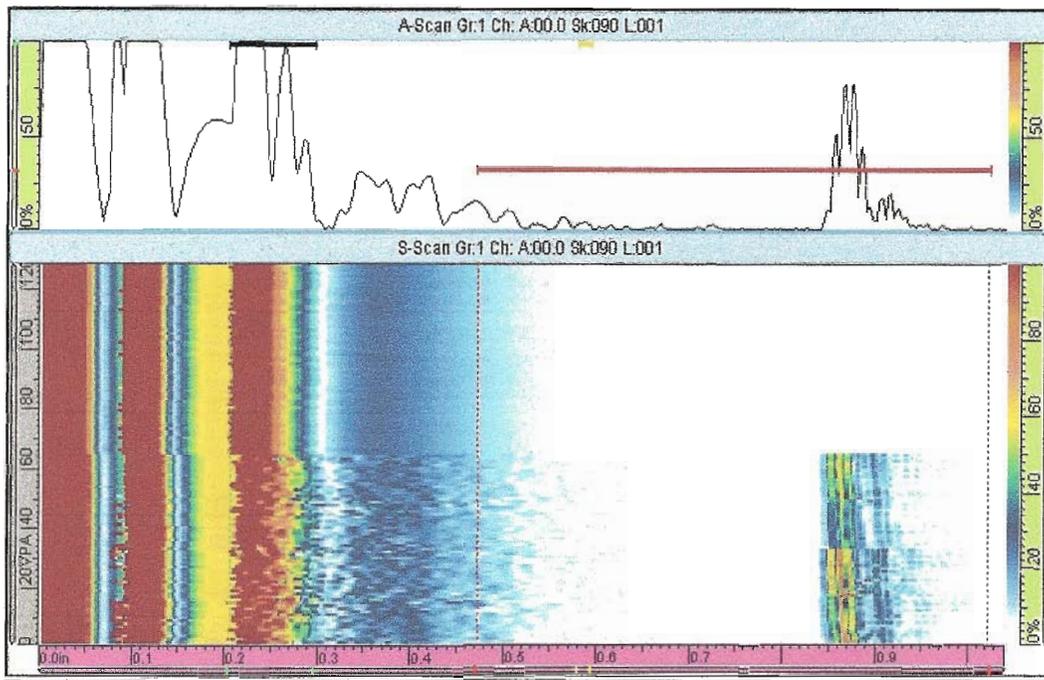
Instrument	Search Unit
Manufacturer: Zetec	Manufacturer: GEIT
Model: Omniscan 32/128 PR	Model: 115-000-631
PA Module Serial Number: Omni-Z-6034	Serial Number: 01Y28Y-1/ 01Y28Y-2
UT Mainframe Serial Number: Omni-Z-1062	
Software Revision: 1.4R3	
Table 2 Instrument Settings: See attached	
	Search Unit Integral Cable
	Type: See cable diagram
	Length: See cable diagram
	Connector Type #: See cable diagram

Couplant: Soundsafe	Temperature Gauge: PTC 312F
Manufacturer: Sonotech Inc.	Serial Number: 268025
Batch Number: 07220H	

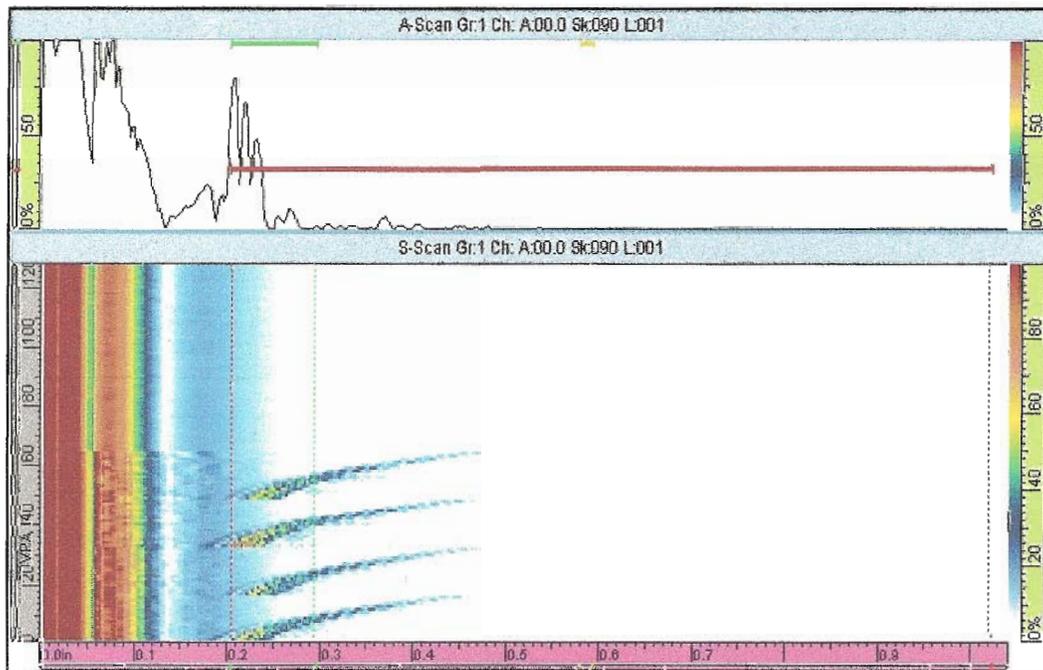
Calibration Data Files	
Focal Law: 032NJDZ2234L0082R2M1Z4_1.125MP.LAW	
Angles Generated: 0° to 82°	
Wave Mode: Longitudinal	
Focal Sound Path: 1.125" MP	

Calibration Reflector Data						
Calibration Block(s): 6039038			MEUXE017A (.1" SDH only)		Temperature: 80°	
Calibration Reflector	Angle	% FSH	Ref. Sensitivity	UT Response		
(70°-85°)	0.1" SDH	70°	42 dB	.644"	Sound Path	
(25°-60°)	0.5" SDH	45°	22 dB	.920"	Sound Path	
(0°-25°)	0.5" SDH	0°	31 dB	.568"	Sound Path	
Channel Functional Checks		Pre Exam: Acceptable	Post Exam: Acceptable			
Number of Inactive Channels/Elements:		Transmit: 0	Receive: 0			

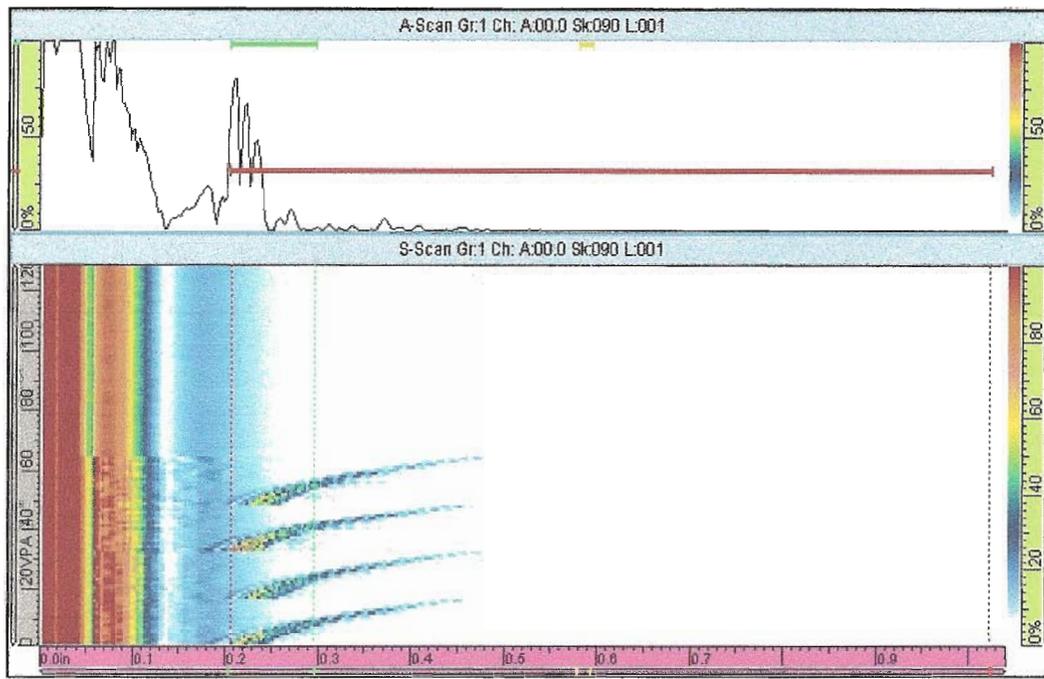
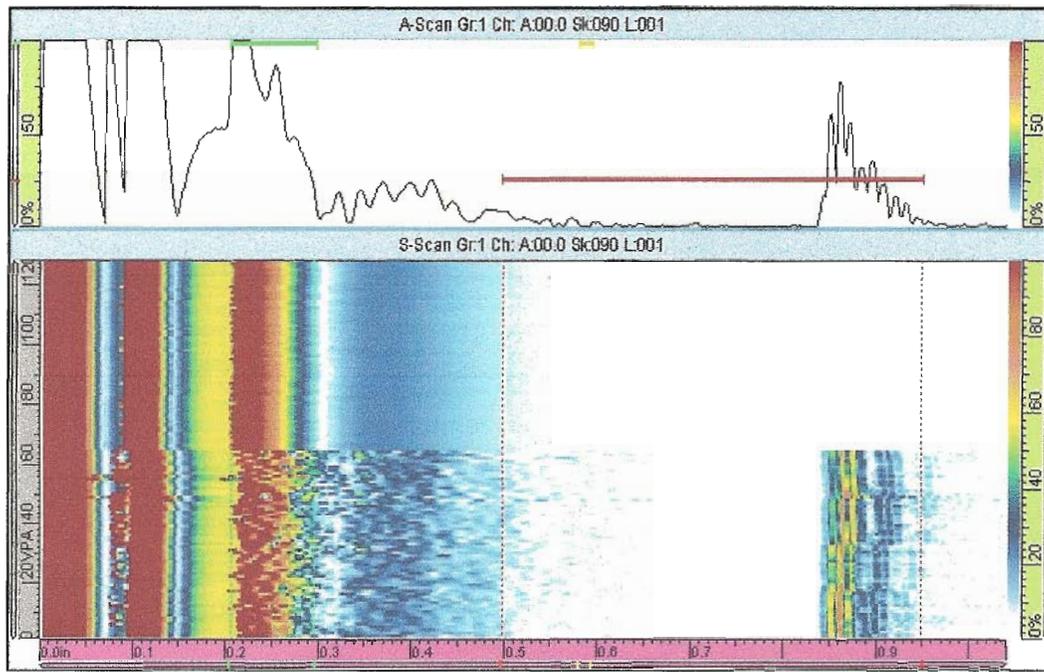
Calibration Performed	Examiner 1	Examiner 2	Level(s)	Date	Time
Initial:	Chris Van Ruler	Ryan Tolosky	II/II	10/17/09	0308
Intermediate:	N/A	N/A	N/A	N/A	N/A
Final:	Chris Van Ruler	Ryan Tolosky	II/II	10/17/09	0330



Element Check 5- Pre exam off wedge



Element Check 6-Pre exam, on wedge

**Element Check 7- Post exam on wedge****Element Check 8-Post exam, off wedge**

Phased Array Instrument Table 2 Essential Settings

Major Menu Item	Menu Item	Sub-menu Item	Setting
Reading			
	Result		
		Selector	List 1
		Field 1	A%
		Field 2	A^
		Field 3	SA
		Field 4	PA
UT			
	General		
		Gain	22 dB
		Start	0.00 in
		Range	1.452 in
		Wedge Delay	.90 us
		Velocity	.2272 in/us
	Pulser		
		Pulser	1
		Tx/Rx Mode	PE
		Frequency	2
		Voltage	High
		PW	250ns (Auto)
		PRF	Optimum
	Receiver		
		Receiver	1
		Filter	None
		Rectifier	FW
		Video Filter	Off
		Averaging	1
		Reject	0
	Beam		
		Gain Offset	0.0 dB
		Scan Offset	-0.001 in
		Index Offset	-0.722 in
		Angle	45
		Skew	0.0°
		Beam Delay	7.21 us
	Advanced		
		dB Ref	Off
		Points Qty	452
		Scale Factor	4
		Sum Gain	22.0

Phased Array Instrument Table 2 Essential Settings (cont.)

Major Menu Item	Menu Item	Sub-menu Item	Setting	
Display	Selection	Display	A-S-[C]	
		C-Scan 1	Off	
		Group Projection	Current On	
	Rulers	UT Unit	True Depth	
		% Ruler	Linear (%)	
		DAC/TCG	Off	
		Gate	On	
		Cursor	Off	
	Color	Select	Amplitude	
		Start (%)	0.0	
		End (%)	100.0	
	Properties	Display	A-Scan	
		Source	Normal	
	Probe Part	Select	Select	Select Tx/Rx
			Auto Detect	Off
Position		Scan Offset (in)	0	
		Index Offset (in)	0	
Parts		Geometry	Plate	
		Thickness (in)	3.0 in	
PGM Probe		Configuration	Scan Type	Sectorial
	Connection P:		1	
	Laws	Auto Program	Off	
		Gate Alarm	Gate Select	Gate A
Gate A Synchro	Pulse			



ULTRASONIC PHASED ARRAY WOR ULTRASONIC EXAMINATION RECORD

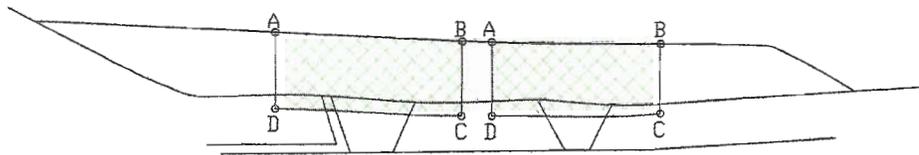
Exam Data Sheet: 219-01-010 219-01-039		Calibration Data Sheet: 219-01-010 219-01-039	
Plant: Millstone	Unit: 2	Procedure: ER-MP-NDE-UT-816/Rev. 0	
Zones DM Weld: 1-10		SS Weld: 1-22	
Date: 10/17/09		Exam Start: 0245	Exam Stop: 0330
WOR Identification DM Weld: BPY-C-3000		SS Weld: BPY-C-3002	
Component Configuration DM Weld: Nozzle to Safe End		SS Weld: Safe End to Pipe	
Weld Overlay Regions: Entire overlay surface			
Examination Surface: Surface of Weld Overlay		Reviewed Previous Data: N/A	
Temperature Gauge: PTC 312F		Serial Number: 268025	Component Temp: 80°
Percent Of Coverage Obtained: 100%		Examination Angles	
Weld Overlay Thickness:		Axial	Circumferential
Minimum: .45"		N/A	0° to 82°
Maximum: .70"			
Examination Sensitivity:		N/A dB	34.0 dB

Examination Scans Performed	Yes	No	N/A
(1) Axial (Downstream)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
(2) Axial (Upstream)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
(3) Circumferential (Clockwise)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(4) Circumferential (Counterclockwise)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

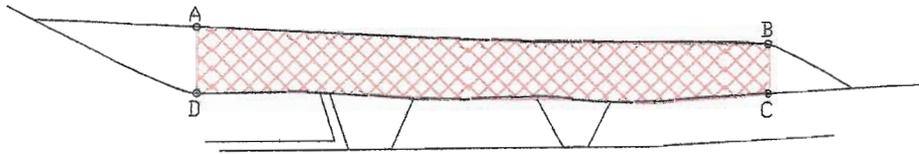
Comments: Maintained 5% to 20% average baseline noise level during examination. No suspected flaw indications were observed during examinations.

Examiner	Level	Signature	Date	LMT Review	Level	Signature	Date
Chris Van Ruler	II	<i>CVR</i>	10/17/09	Todd Blechinger	III	<i>T. Blechinger</i>	10/19/09
Examiner	Level	Signature	Date	Site Review	Level	Signature	Date
Ryan Tolosky	II	<i>R. Tolosky</i>	10/17/09	Kevin Hacker	III	<i>K. Hacker</i>	10/20/09
Other	Level	Signature	Date	ANII Review	Level	Signature	Date
N/A	N/A			E. York	N/A	<i>E. York</i>	10-20-09

Coverage Plot



ISI Examination Volume A-B-C-D



PSI Examination Volume A-B-C-D

Scale: NOT TO SCALE

Examiner	Level	Signature	Date	LMT Review	Level	Signature	Date
Chris Van Ruler	II	<i>CVR</i>	10/17/09	Todd Blechinger	III	<i>T.B.</i>	10/19/09
Examiner	Level	Signature	Date	Site Review	Level	Signature	Date
Ryan Tolosky	II	<i>R.T.</i>	10/17/09	Kevin Hacker	III	<i>K.H.</i>	10/20/09
Other	Level	Signature	Date	ANII Review	Level	Signature	Date
N/A	N/A			E. York	N/A	<i>E. York</i>	10.20.2009



September 23, 2009

Kevin Hacker
Dominion Corporate NDE Level III
Dominion Generation
Innsbrook Technical Center (M/S 3NE)
5000 Dominion Blvd
Glen Allen, VA 23060-3308

Subject: Phased Array Wedge Designs for Weld Overlay Examinations at Millstone 2 (Fall 2009)

Dear Mr. Hacker:

As requested, please find included with this letter the ultrasonic phased array wedge information for use with the EPRI Procedure for Manual Phased Array Ultrasonic Examination of Weld Overlaid Similar and Dissimilar Metal Welds (EPRI-WOL-PA-1) at Dominion's Millstone Power Station Unit 2 in the fall of 2009. These weld overlay inspections will require the use of one 2.0 MHz 2x16 ultrasonic phased array dual transducer with six wedges all manufactured by General Electric Inspection Technologies (GEIT) with the Zetec OmniScan 32-128 P/R phased array instrument (See Figure 1).

Table A indicates which GEIT wedge shall be used for each weld overlaid component while Table B contains the Zetec Advanced Phased Array Calculator 1.2R4 (ZAPAC 1.2R4) CAL file for each corresponding GEIT wedge and focal metal path distance. While these CAL files are attached to this letter, each should be loaded into ZAPAC 1.2R4 and verified with the settings contained in the EPRI report: Nondestructive Evaluation: Procedure for Manual Phased Array UT of Weld Overlays (Product ID 1015134). Figures 2 through 11 contain screen captures of the ZAPAC 1.2R4 for each CAL file. The user shall verify all of the parameters in the ZAPAC 1.2R4 for each CAL file with those found in the 1015134 EPRI report prior to generating a corresponding LAW file for field use.

It is important to note that the "O32NJDZ2232L0079R2M1Z4" and "O32NJDZ2234L0082R2M1Z4" CAL files only allow the user to generate a maximum angle range of 0° to 79° and 0° to 82° respectively instead of the 0° to 85° recommended in the procedure. These smaller angle ranges were formally demonstrated through the Performance Demonstration Initiative (PDI) Program for use with the OmniScan instruments and are acceptable for use (see EPRI-WOL-PA-1).

For your convenience, I have attached two OmniScan 32-128 P/R setup files (WOLPA1.ops - for basic setup, WOLPA1_ChannelCheck.ops - for channel/element checks) as a starting point for you to build your own setup files for the examination. You will need to verify all the parameters in the attached files prior to field use.

Together . . . Shaping the Future of Electricity

CHARLOTTE OFFICE

1300 West W.T. Harris Boulevard, Charlotte, NC 28262-8550 USA • 704.595.2000 • Fax 704.595.2860
Customer Service 800.313.3774 • www.epri.com

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Please note that ZAPAC 1.2R4 is a standalone program that is also embedded in the Zetec UltraVision 1.2R4 software. The ZAPAC 1.2R4 standalone and embedded programs are equivalent for LAW file generation. Please let us know if you have any comments or questions.

Sincerely,

A handwritten signature in black ink, appearing to read "Mark D.", with a long horizontal stroke extending to the right.

Mark Dennis
EPRI Senior Project Manager

Attachment

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Page 3

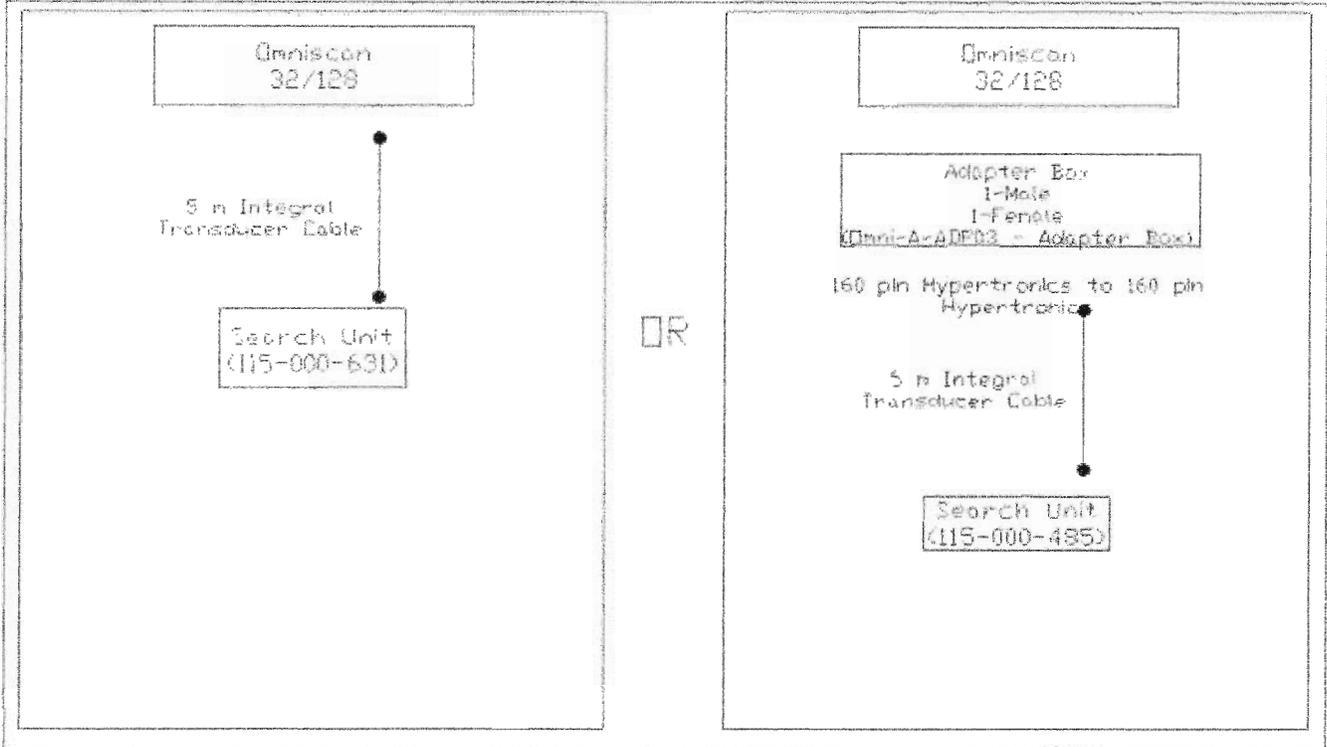


Figure 1. OmniScan 32-128 P/R Cable Diagram for EPRI-WOL-PA-1

Table A. GEIT Wedge Component Applicability

Zone	Weld Number	Location / Description	Wedge Contour Required Wedges	GEIT Axial Wedge Part #	GEIT Circ Wedge Part #
1-07	BPD-C-1017	2" Drain Line Loop 1A	4.125"	360-152-233	360-152-232
1-09	BPD-C-3000	2" Drain line Loop 1B			
1-11	BPD-C-2001	2" Drain line Loop 2A			
1-12	BCH-C-2001	2" Charging line Loop 2A			
1-08	BCH-C-1001	2" Charging Line Loop 1A	5.50"	360-152-235	360-152-234
1-08	BPY-C-1001	3" Spray line Loop 1A			
1-10	BPY-C-3000	3" Spray Line Loop 1B	16.75"	360-152-079	360-152-078
1-08	BSI-C-1001	12" Safety Injection 1A			
1-10	BSI-C-3000	12" Safety Injection 1B			
1-14	BSI-C-4000	12" Safety Injection 2B			
1-05	BPS-C-1001	12" Hot leg Surge Line Loop 1			
1-06	BSD-C-2001	12" SDC line Loop 1			
1-12	BSI-C-2001	12" Safety Injection Loop 2A			

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Table B. GEIT Wedge CAL File Applicability

GEIT Part #	Diameter (in)	Scanning Direction	Focal Metal Path (in)	CAL Filename	Weld Overlay Thickness (WOLT) Range
360-152-232	4.125	Circ.	0.5	O32NJDS2232L0085R2M1Z4	WOLT ≤ 0.20in
360-152-233	4.125	Axial	0.5	O32NJDS2233L0085R2M1Z4	WOLT ≤ 0.20in
360-152-232	4.125	Circ.	1.125	O32NJDZ2232L0079R2M1Z4	0.20in < WOLT < 0.75in
360-152-233	4.125	Axial	1.125	O32NJDZ2233L0085R2M1Z4	0.20in < WOLT < 0.75in
360-152-234	5.500	Circ.	1.125	O32NJDZ2234L0082R2M1Z4	0.20in < WOLT < 0.75in
360-152-235	5.500	Axial	1.125	O32NJDZ2235L0085R2M1Z4	0.20in < WOLT < 0.75in
360-152-078	16.750	Circ.	1.125	O32NJDZ2078L0085R2M1Z4	0.20in < WOLT < 0.75in
360-152-079	16.750	Axial	1.125	O32NJDZ2079L0085R2M1Z4	0.20in < WOLT < 0.75in
360-152-078	16.750	Circ.	1.5	O32NJDB2078L0085R2M1Z4	WOLT ≥ 0.75in
360-152-079	16.750	Axial	1.5	O32NJDB2079L0085R2M1Z4	WOLT ≥ 0.75in

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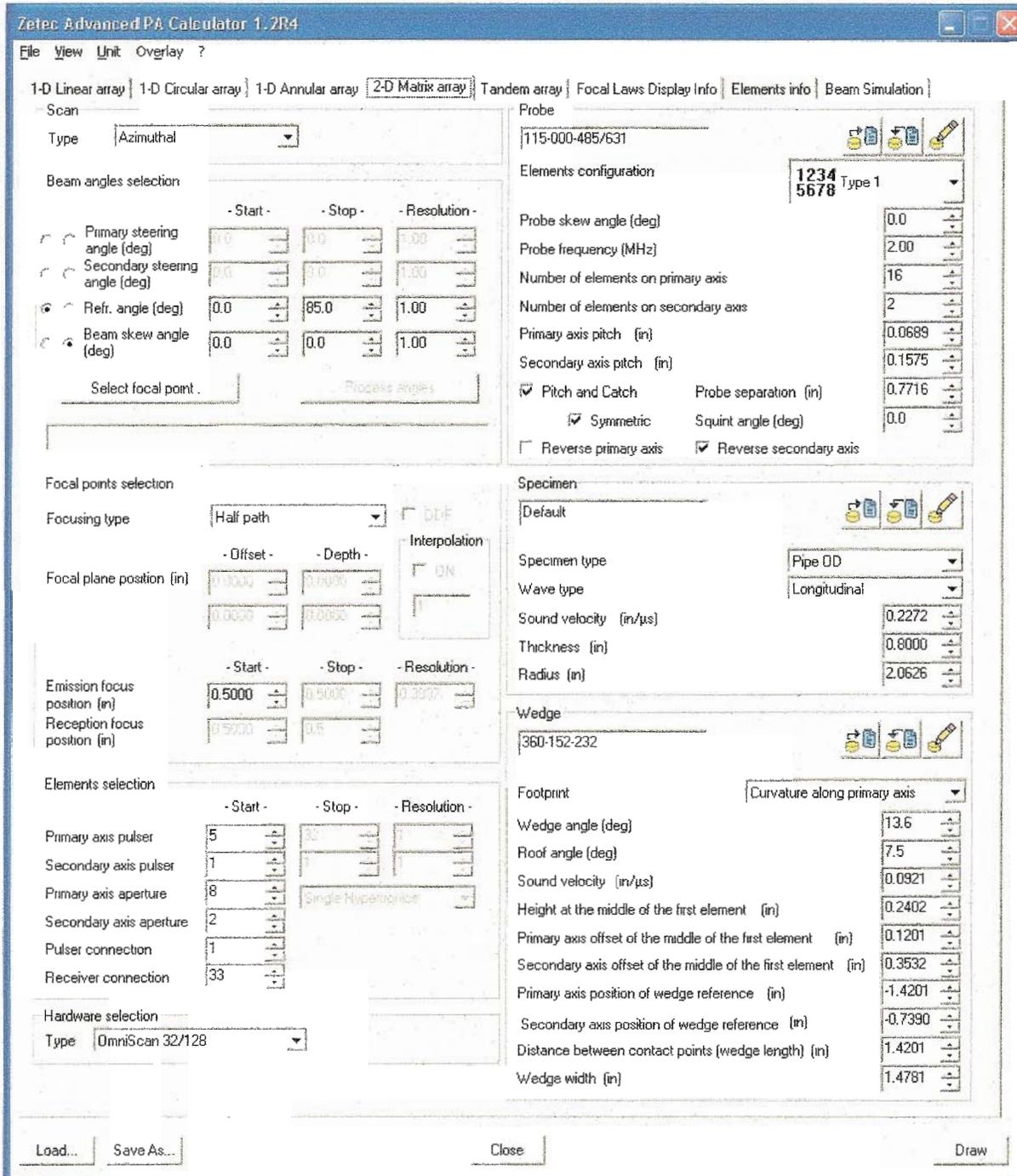


Figure 2.
ZAPAC Input for GEIT Array Part #115-000-485 or 115-000-631; GEIT Wedge Part #360-152-232; Diameter (in) = 4.125; Scanning Direction = Circumferential; Focal Metal Path (in) = 0.5

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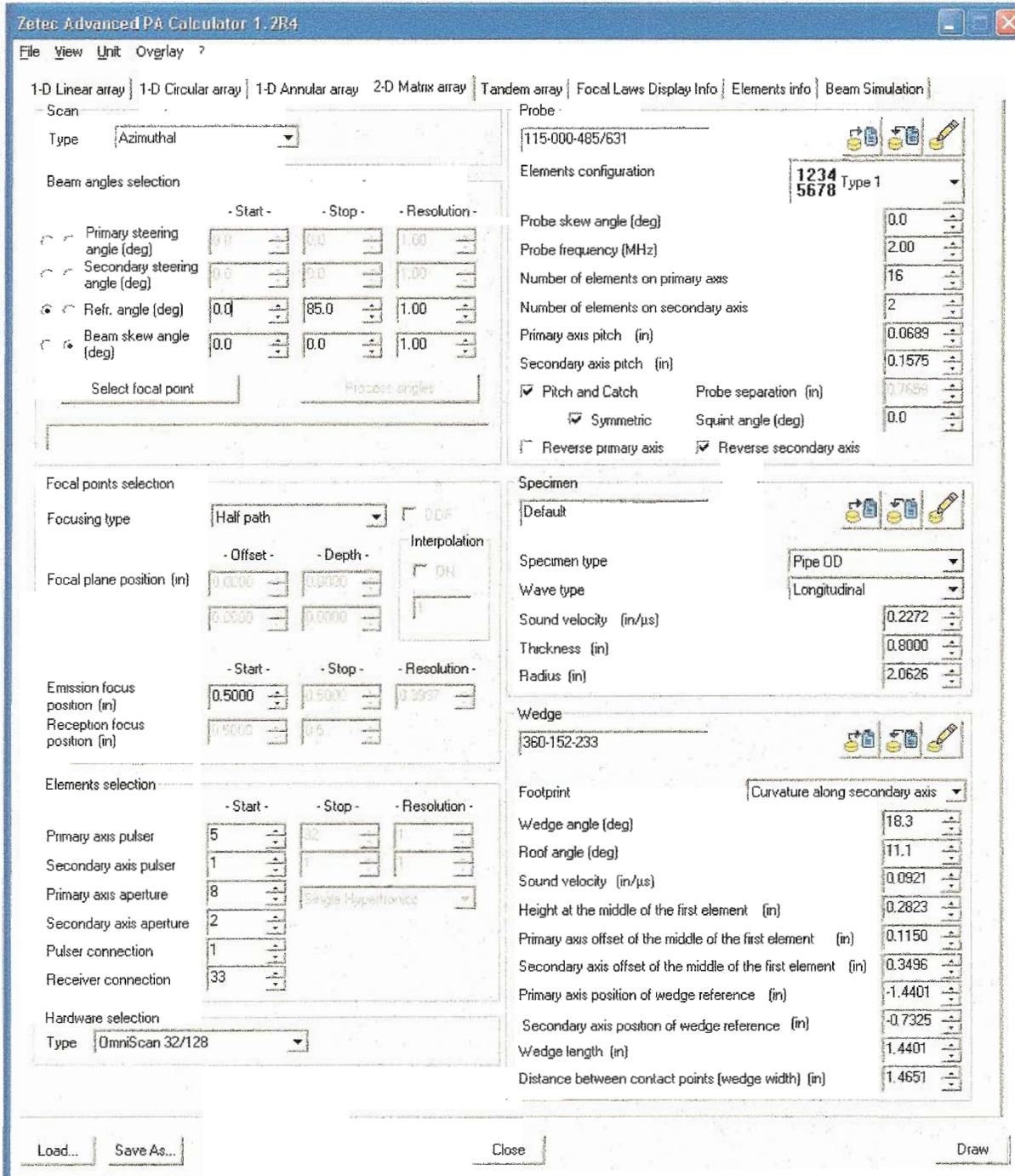


Figure 3.
ZAPAC Input for GEIT Array Part #115-000-485 or 115-000-631; GEIT Wedge Part #360-152-233; Diameter (in) = 4.125; Scanning Direction = Axial; Focal Metal Path (in) = 0.5

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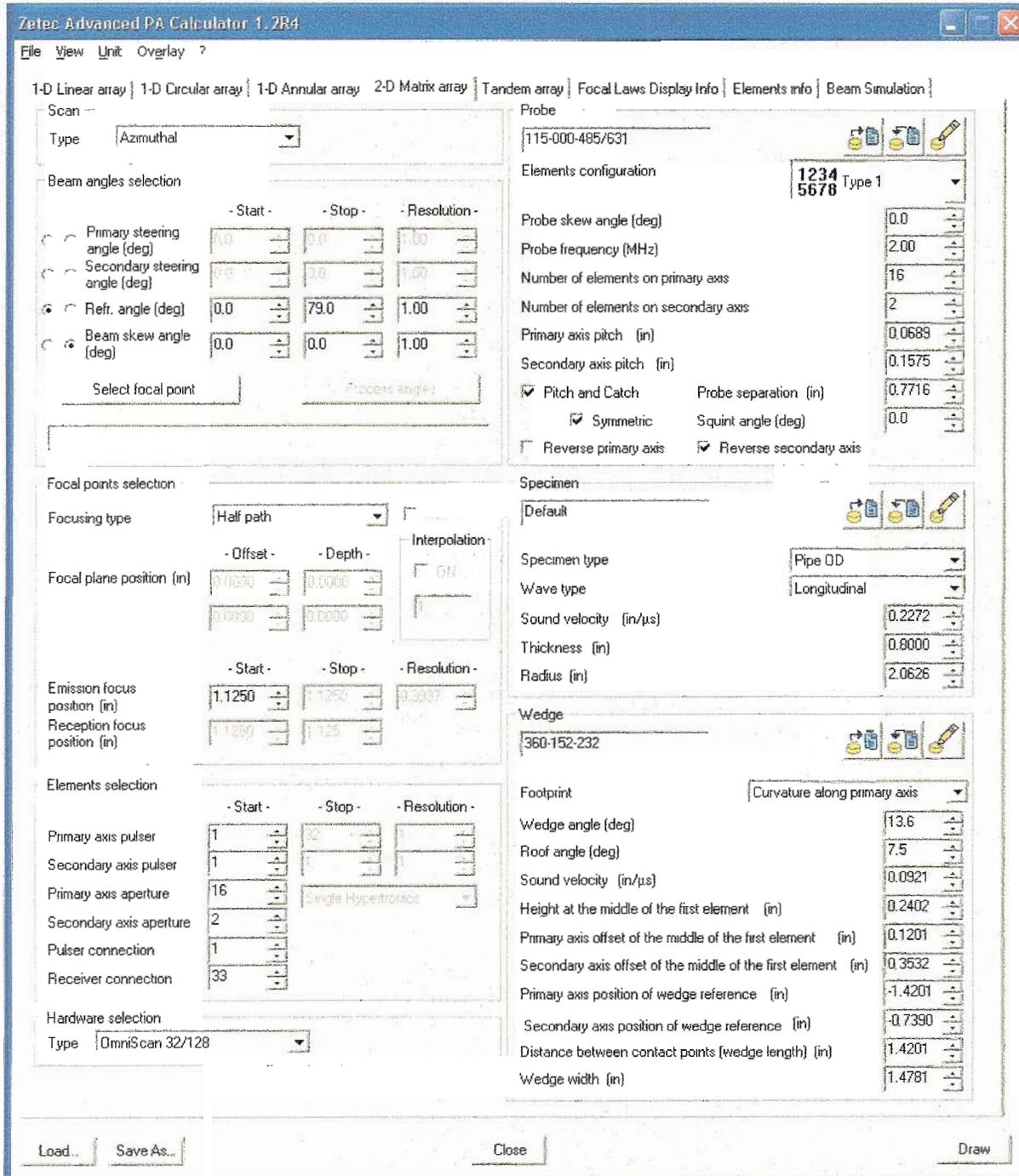


Figure 4.
ZAPAC Input for GEIT Array Part #115-000-485 or 115-000-631; GEIT Wedge Part #360-152-232; Diameter (in) = 4.125; Scanning Direction = Circumferential; Focal Metal Path (in) = 1.125

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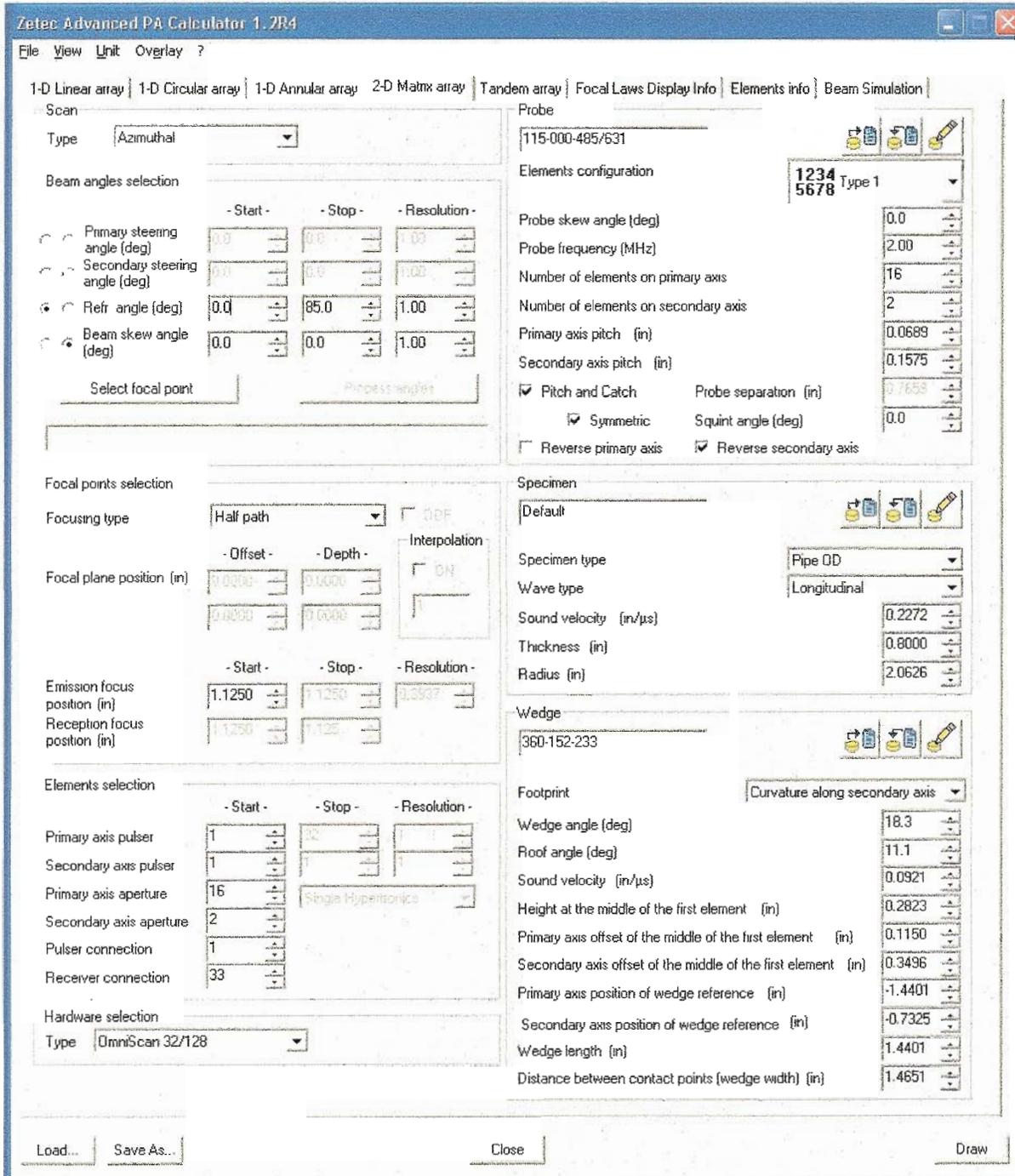


Figure 5.
ZAPAC Input for GEIT Array Part #115-000-485 or 115-000-631; GEIT Wedge Part #360-152-233; Diameter (in) = 4.125; Scanning Direction = Axial; Focal Metal Path (in) = 1.125

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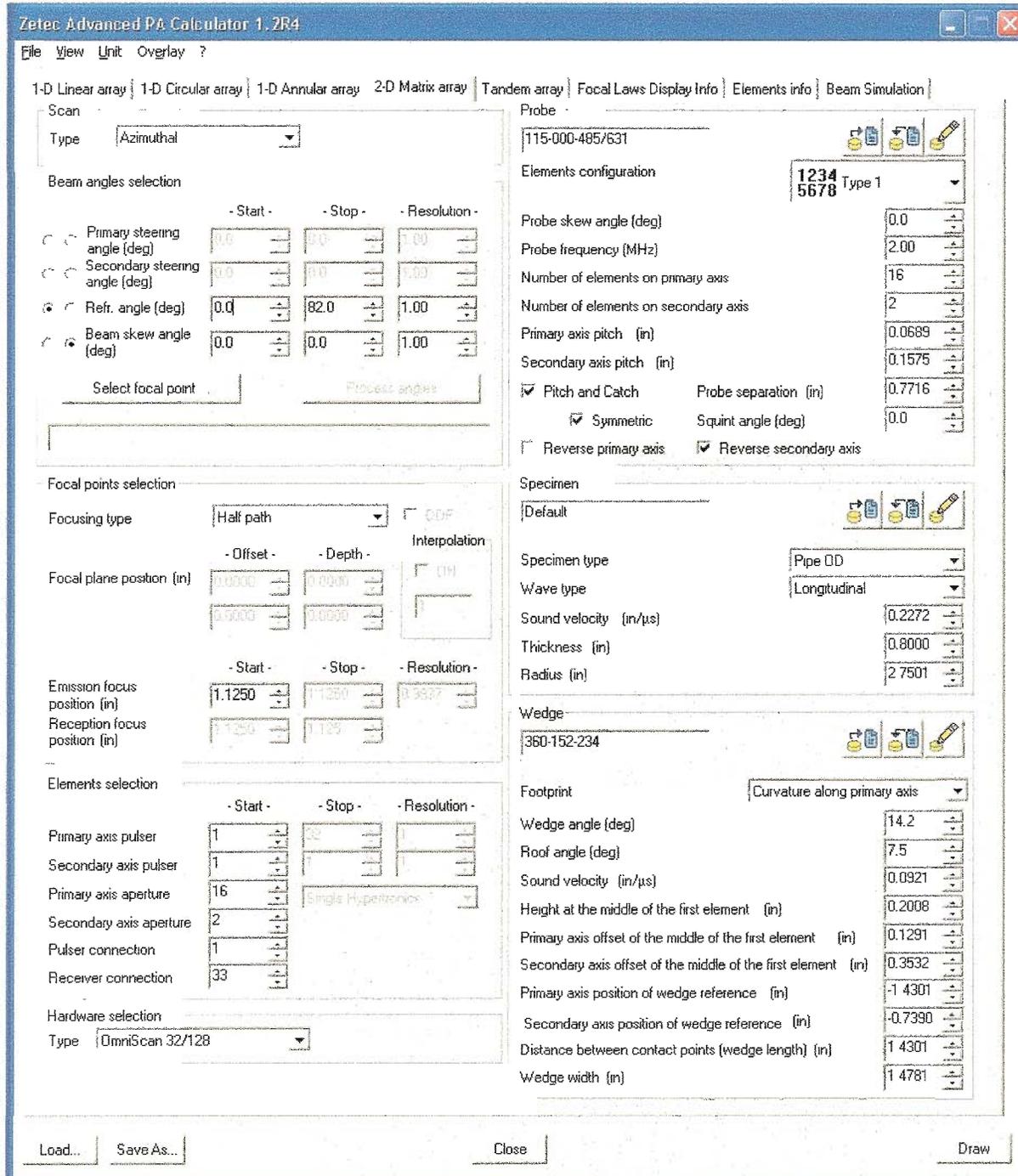


Figure 6.
ZAPAC Input for GEIT Array Part #115-000-485 or 115-000-631; GEIT Wedge Part #360-152-234; Diameter (in) = 5.5; Scanning Direction = Circumferential; Focal Metal Path (in) = 1.125

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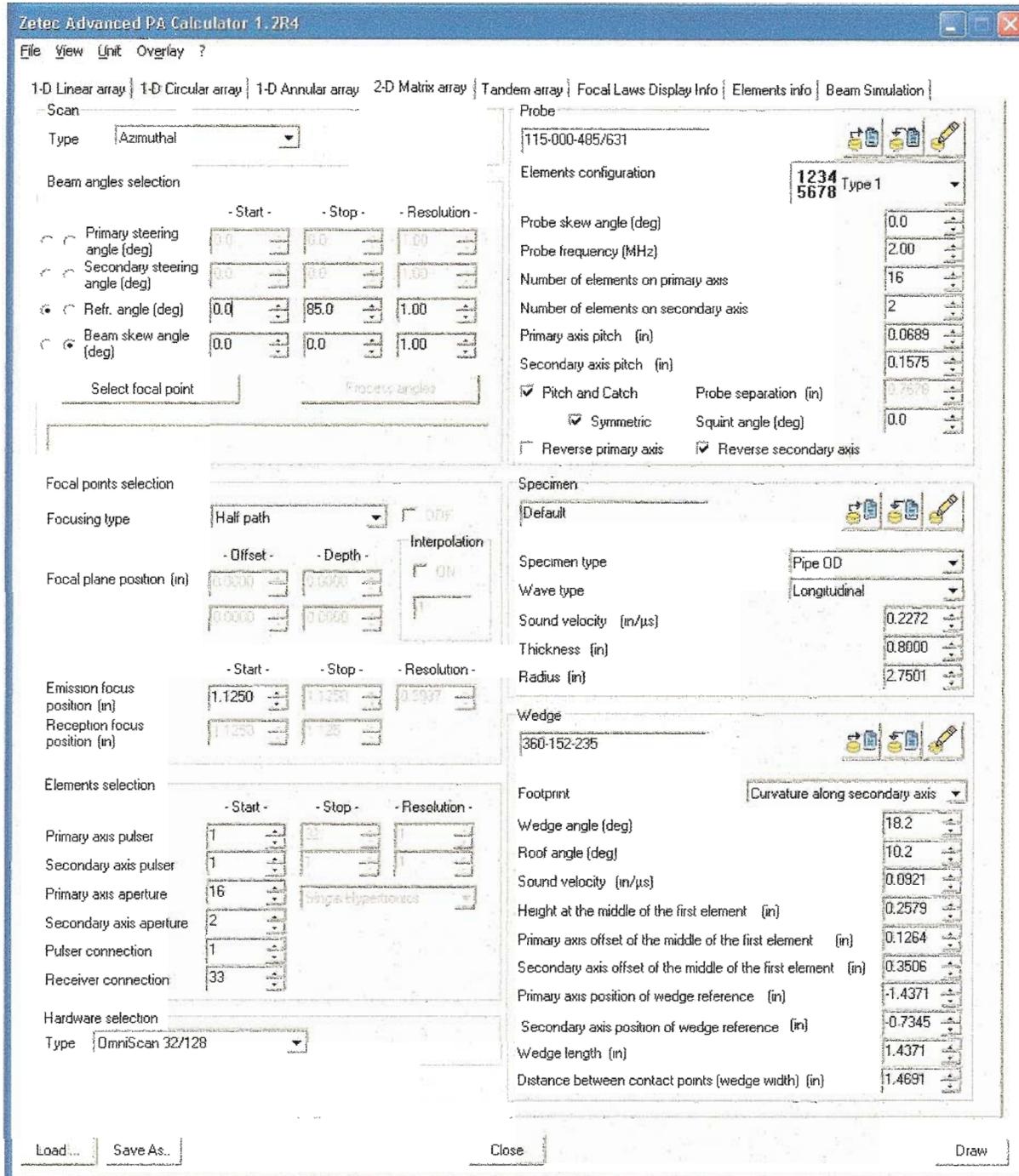


Figure 7.
ZAPAC Input for GEIT Array Part #115-000-485 or 115-000-631; GEIT Wedge Part #360-152-235; Diameter (in) = 5.5; Scanning Direction = Axial; Focal Metal Path (in) = 1.125

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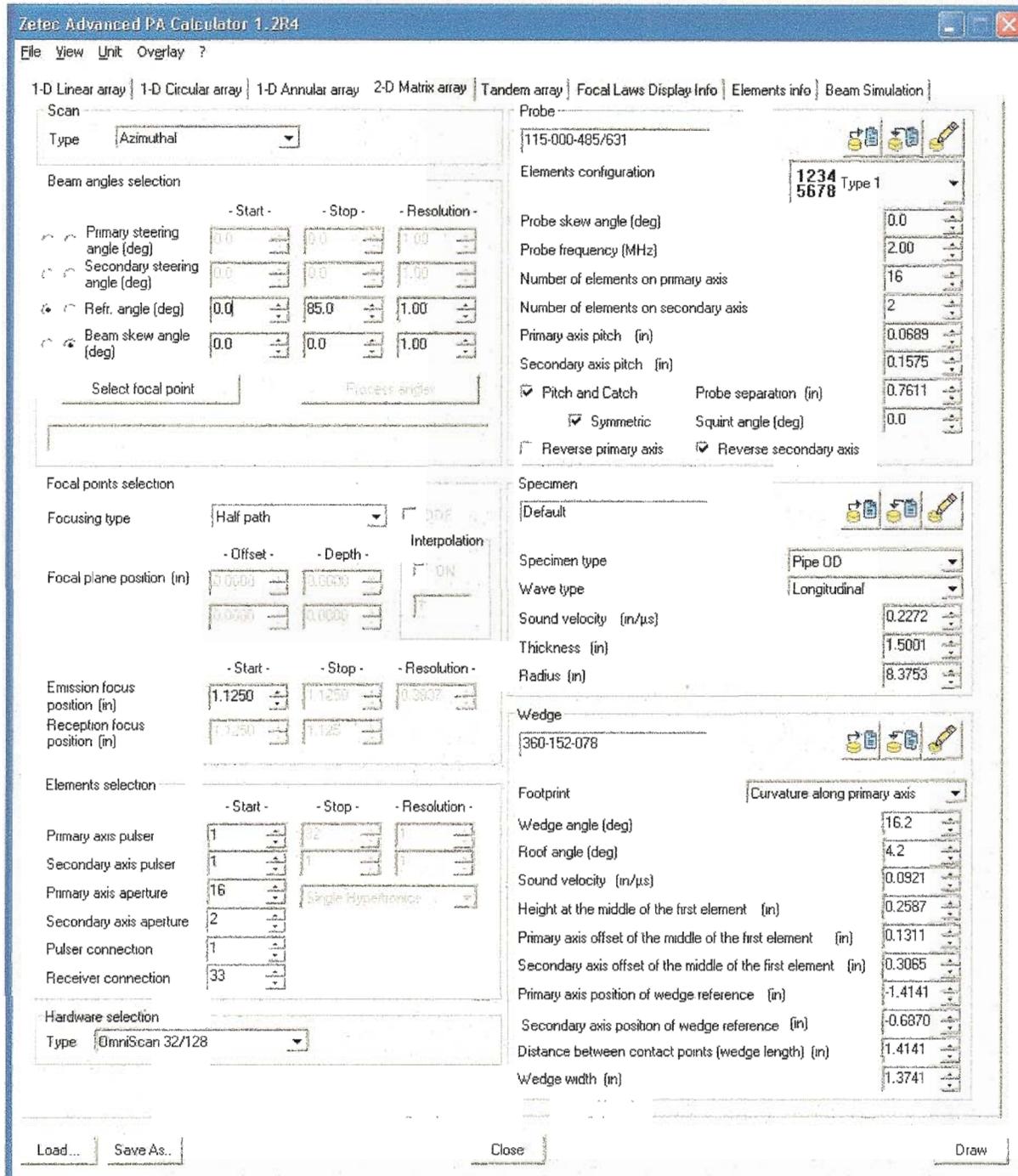


Figure 8.
ZAPAC Input for GEIT Array Part #115-000-485 or 115-000-631; GEIT Wedge Part #360-152-078; Diameter (in) = 16.75; Scanning Direction = Circumferential; Focal Metal Path (in) = 1.125

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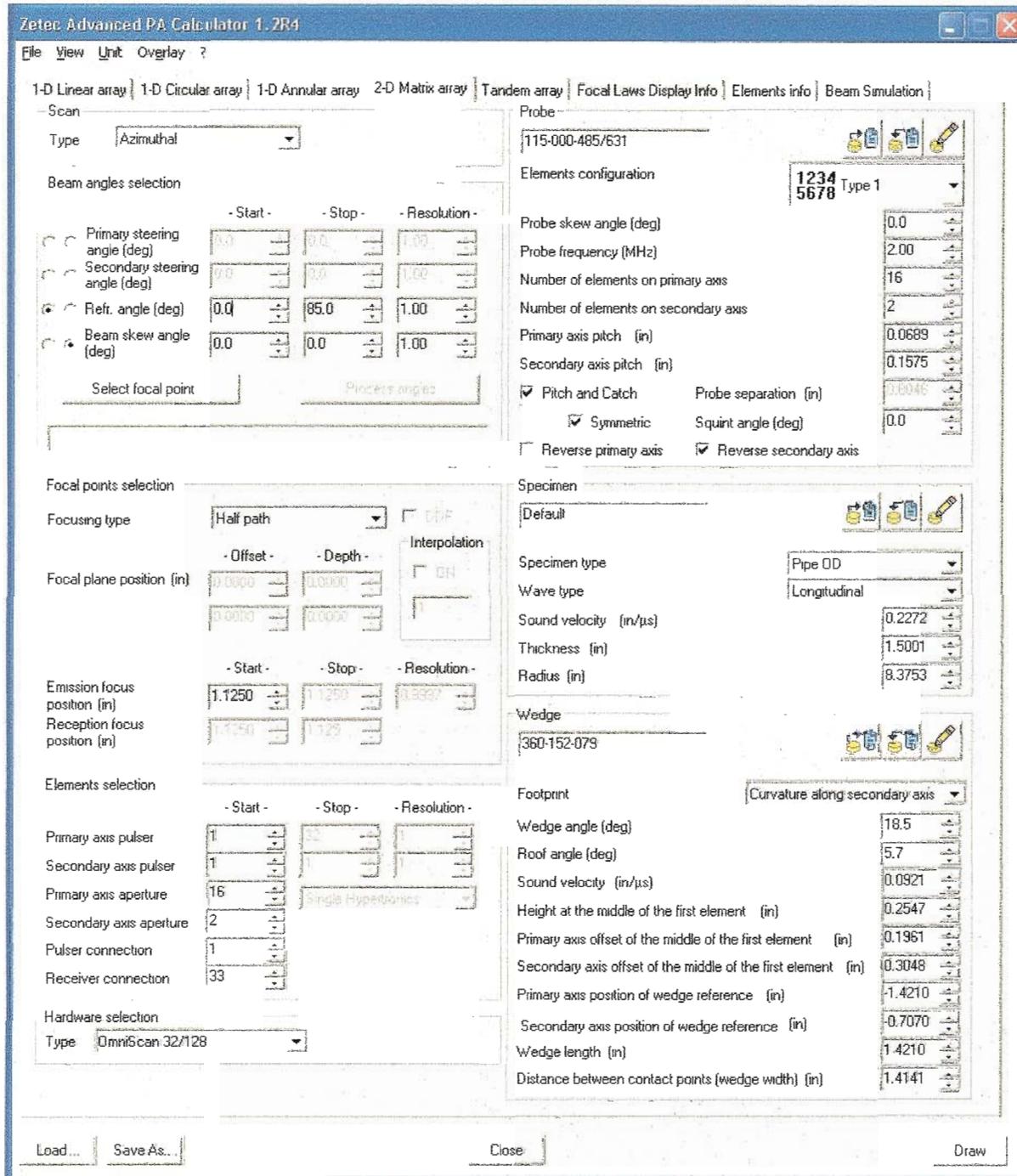


Figure 9.
ZAPAC Input for GEIT Array Part #115-000-485 or 115-000-631; GEIT Wedge Part #360-152-079; Diameter (in) = 16.75; Scanning Direction = Axial; Focal Metal Path (in) = 1.125

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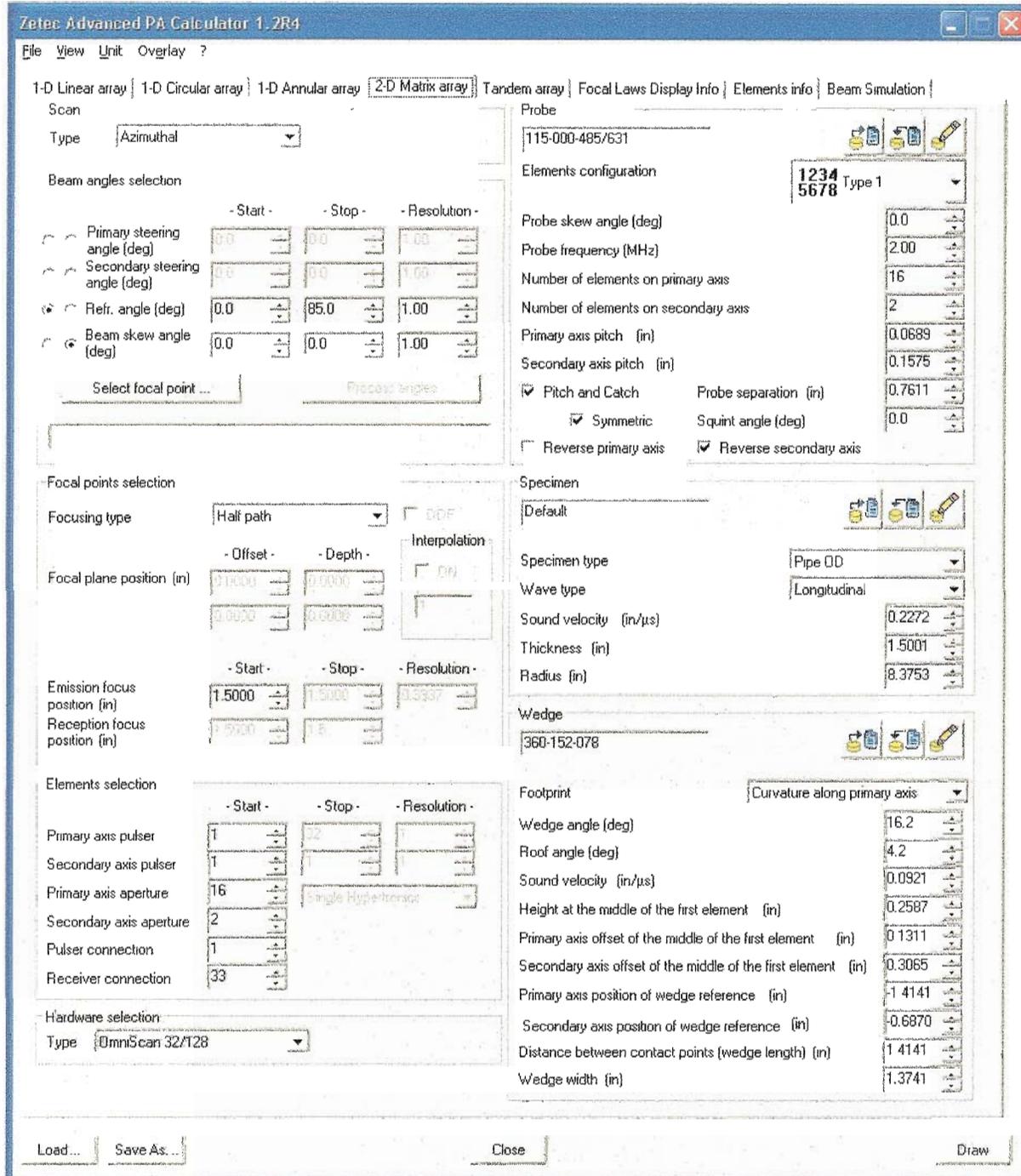


Figure 10.
ZAPAC Input for GEIT Array Part #115-000-485 or 115-000-631; GEIT Wedge Part #360-152-078; Diameter (in) = 16.75; Scanning Direction = Circumferential; Focal Metal Path (in) = 1.5

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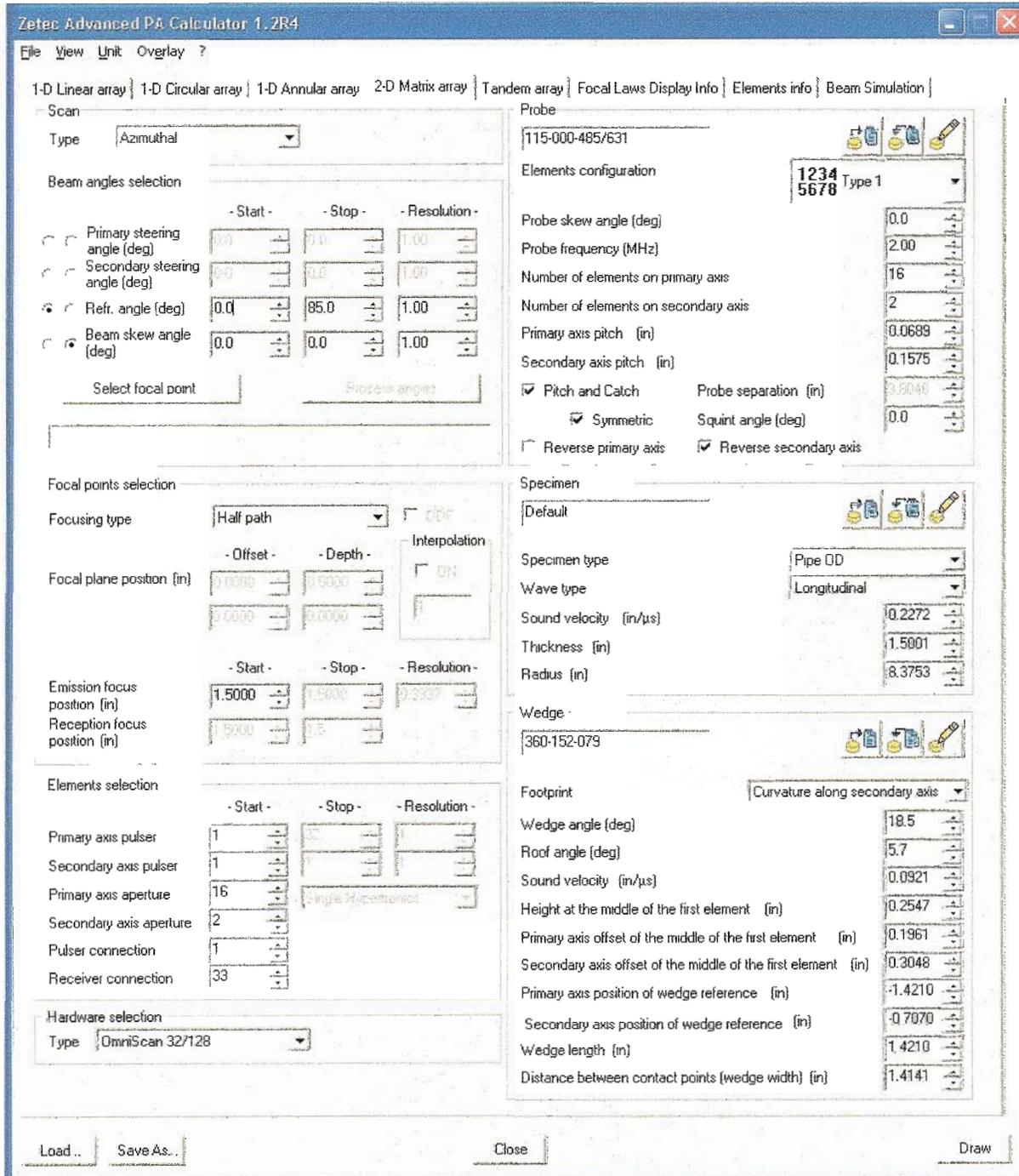


Figure 11.
ZAPAC Input for GEIT Array Part #115-000-485 or 115-000-631; GEIT Wedge Part #360-152-079; Diameter (in) = 16.75; Scanning Direction = Axial; Focal Metal Path (in) = 1.5

BPD-C-1017 / BPD-C-1019
2-inch Cold Leg Drain Line Loop 1A



Data Package No: 219-01-005



Reference ID: BPD-C-1017



AWO: 53102184598



Page #	Data Type	Exam Angle	Recordable	Limitations	Comments
1	C	0-85°			
2	C	↓	N	A	
3	C				
4	C				
5	C				
6	E				
7	C	0-79°	NRI	NONE	
8	C	↓	N	A	
9	C				
10	C				
11	C				
12	E				
13	P	0-85°	NRI N/A	NONE N/A	

% of Required Exam Area: Final Disposition: *F.P.B. 12/24/09*

Previous Data Review: UT N/A RT

Dominion Review: Level: Review Date:

- Legend: UT Data Type Reference**
- A = Additional Info
 - B = Beam Spread
 - C = Calibration Data
 - E = Examination Data
 - L = Linearity
 - P = Coverage Plot
 - S = Sketch
 - T = Thickness

Comments:



Milestone Unit 2
 UT Data Package Cover

Data Package No: 219-01-035



Reference ID: BPD-C-1019



AWO: 53102184598



Page #	Data Type	Exam Angle	Recordable	Limitations	Comments
1	C	0-85°			
2	C			N	
3	C			A	
4	C				
5	C				
6	E		NRI	NONE	
7	C	0-79°			
8	C			N	
9	C			A	
10	C				
11	C				
12	E		NRI	NONE	
13	P	0-85°	n/a	n/a	

% of Required Exam Area: Final Disposition: *J.P. B...*
 Dominion Review:
 Level:
 Review Date:
 Previous Data Review
 UT A RT

- Legend: UT Data Type Reference
- A = Additional Info
 - B = Beam Spread
 - C = Calibration Data
 - E = Examination Data
 - L = Linearity
 - P = Coverage Plot
 - S = Sketch
 - T = Thickness

Comments:



ULTRASONIC PHASED ARRAY WOR CALIBRATION REPORT

WOR Identification DM Weld: BPD-C-1017	Calibration Data Sheet: 219-01-005
WOR Identification SS Weld: BPD-C-1019	Calibration Data Sheet: 219-01-035
Plant/Unit: Millstone / 2	Procedure No. / Rev: ER-MP-NDE-UT-816/ Rev.0

Wedge	Comments: See attached EPRI correspondence for Probe, Wedge and Focal Law information.
Manufacturer: GEIT	
Model: 360-152-233	
Nominal Wedge Angle: 52°	
Measured Wedge Angle: 52°	
Contour Diameter: 4.125" AX OD	
Scan Direction: Axial	
Nominal Index Location: .70"	
Zero Reference: Front of Probe	

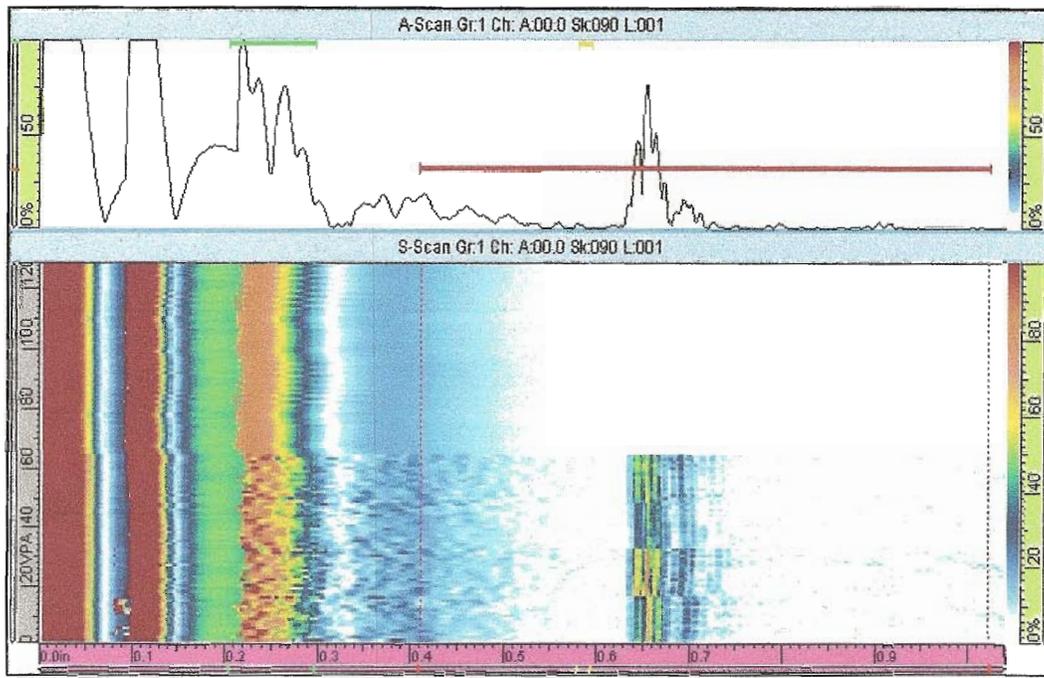
Instrument	Search Unit
Manufacturer: Zetec	Manufacturer: GEIT
Model: Omniscan 32/128 PR	Model: 115-000-631
PA Module Serial Number: Omni-Z-6034	Serial Number: 01Y28X-1/ 01Y28X-2
UT Mainframe Serial Number: Omni-Z-1062	
Software Revision: 1.4R3	
Table 2 Instrument Settings: See attached	
	Search Unit Integral Cable
	Type: See cable diagram
	Length: See cable diagram
	Connector Type #: See cable diagram

Couplant: Soundsafe	Temperature Gauge: PTC 312F
Manufacturer: Sonotech Inc.	Serial Number: 268025
Batch Number: 07220H	

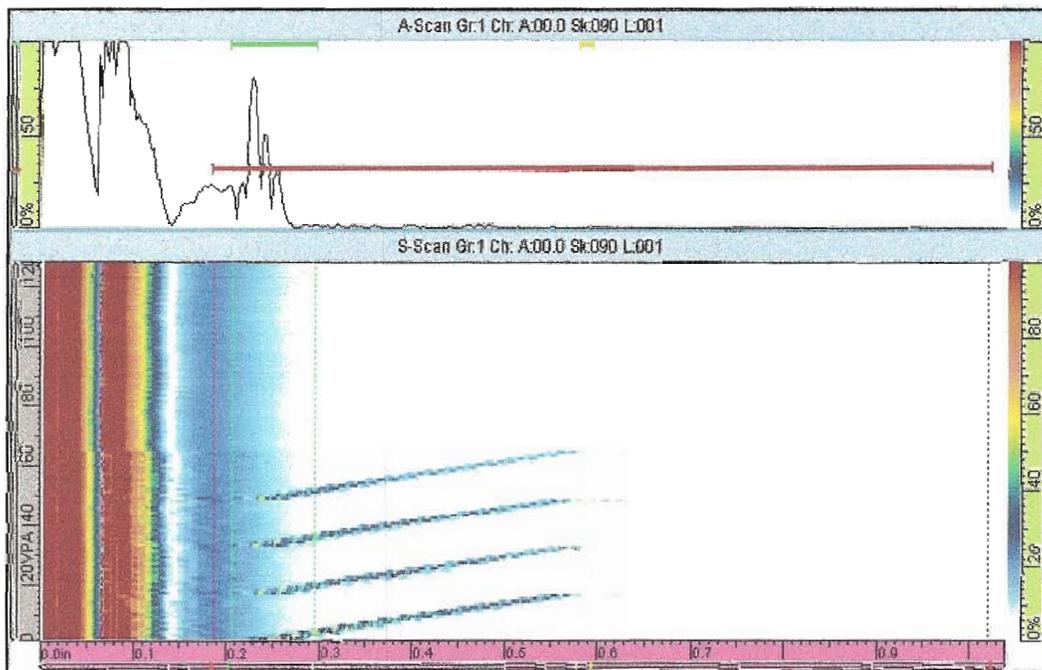
Calibration Data Files	
Focal Law: 032NJDZ2233L0085R2M1Z4_1.125MP.LAW	
Angles Generated: 0° to 85°	
Wave Mode: Longitudinal	
Focal Sound Path: 1.125" MP	

Calibration Reflector Data					
Calibration Block(s): CB-04-171		9C-041(.1" SDH only)		Temperature: 76°	
Calibration Reflector	Angle	% FSH	Ref. Sensitivity	UT Response	
(70°-85°)	0.1" SDH	80	38 dB	.603"	Sound Path
(25°-60°)	0.5" SDH	80	25 dB	.816"	Sound Path
(0°-25°)	0.5" SDH	80	36 dB	.491"	Sound Path
Channel Functional Checks	Pre Exam: Acceptable		Post Exam: Acceptable		
Number of Inactive Channels/Elements:	Transmit: 0	Receive: 0			

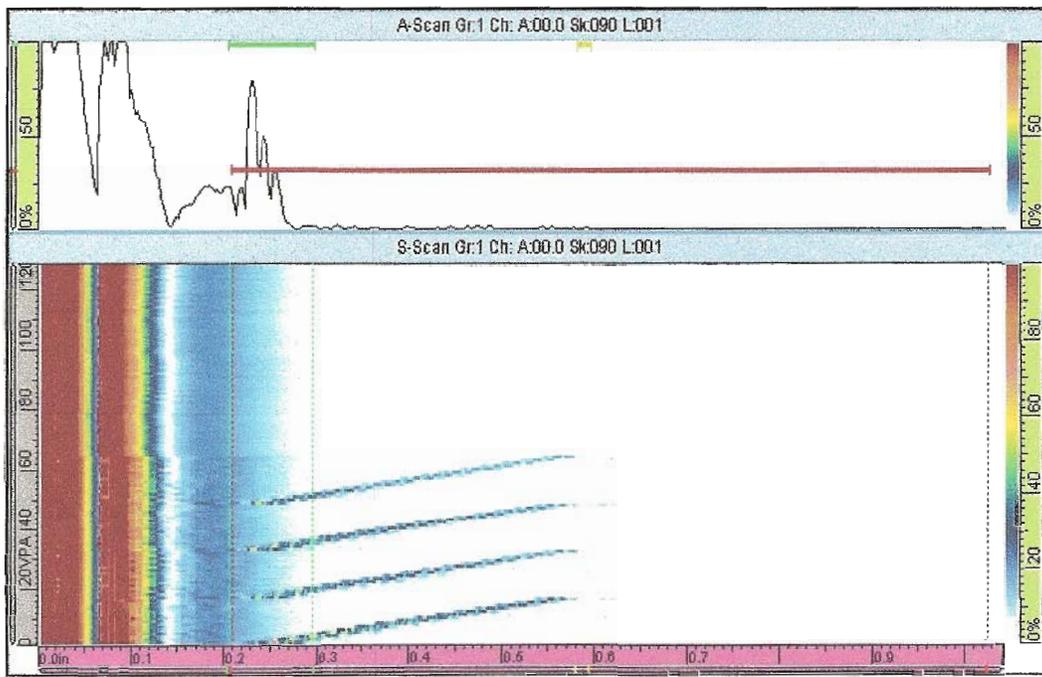
Calibration Performed	Examiner 1	Examiner 2	Level(s)	Date	Time
Initial:	Todd Blechinger	N/A	III	10/24/09	0530
Intermediate:	Todd Blechinger	N/A	III	10/24/09	0540
Final:	Todd Blechinger	N/A	III	10/24/09	0555



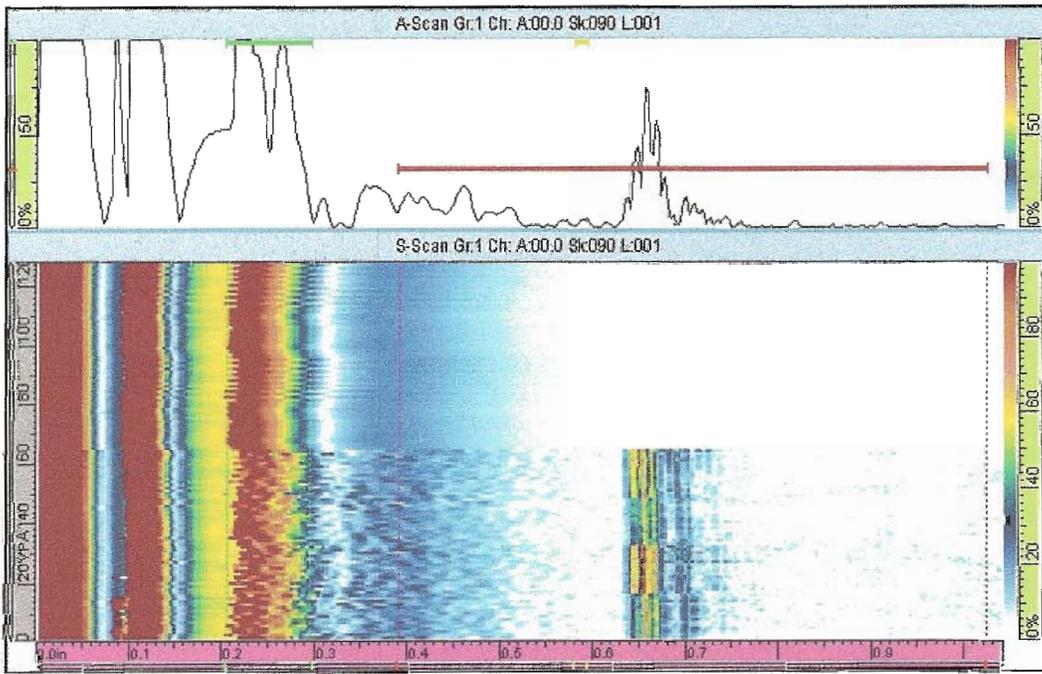
Element Check 1- Pre exam, off wedge



Element Check 2- Pre exam, on wedge



Element Check 3- Post exam, on wedge



Element Check 4- Post exam, off wedge

Phased Array Instrument Table 2 Essential Settings

Major Menu Item	Menu Item	Sub-menu Item	Setting	
Reading	Result			
		Selector	List 1	
		Field 1	A%	
		Field 2	A^	
		Field 3	SA	
		Field 4	PA	
UT	General			
		Gain	25 dB	
		Start	0.00 in	
		Range	1.896 in	
		Wedge Delay	1.40 us	
		Velocity	.2272 in/us	
	Pulser			
		Pulser	1	
		Tx/Rx Mode	PE	
		Frequency	2	
		Voltage	High	
		PW	250ns (Auto)	
		PRF	Optimum	
	Receiver			
		Receiver	1	
		Filter	None	
		Rectifier	FW	
		Video Filter	Off	
		Averaging	1	
	Beam			
		Reject	0	
		Gain Offset	0.0 dB	
		Scan Offset	-0.016 in	
		Index Offset	-0.725 in	
		Angle	52	
	Skew	0.0°		
		Beam Delay	8.43 us	
Advanced				
	dB Ref	Off		
	Points Qty	452		
	Scale Factor	6		
		Sum Gain	22.0	

Phased Array Instrument Table 2 Essential Settings (cont.)

Major Menu Item	Menu Item	Sub-menu Item	Setting	
Display	Selection	Display	A-S-[C]	
		C-Scan 1	Off	
		Group	Current	
		Projection	On	
	Rulers	UT Unit	True Depth	
		% Ruler	Linear (%)	
		DAC/TCG	Off	
		Gate	On	
		Cursor	Off	
		Color	Select	Amplitude
	Start (%)		0.0	
	End (%)		100.0	
	Properties	Display	A-Scan	
		Source	Normal	
	Probe Part	Select	Select	Select Tx/Rx
			Auto Detect	Off
		Position	Scan Offset (in)	0
			Index Offset (in)	0
		Parts	Geometry	Plate
			Thickness (in)	3.0 in
PGM Probe		Configuration	Scan Type	Sectorial
			Connection P:	1
	Laws	Auto Program	Off	
		Gate Alarm	Gate Select	Gate A
Gate A Synchro	Pulse			



ULTRASONIC PHASED ARRAY WOR ULTRASONIC EXAMINATION RECORD

Exam Data Sheet: 219-01-005		219-01-035		Calibration Data Sheet: 219-01-005		219-01-035		
Plant: Millstone			Unit: 2			Procedure: ER-MP-NDE-UT-816/Rev. 0		
Zones DM Weld: 1-07		SS Weld: 1-32						
Date: 10/24/09			Exam Start: 0540			Exam Stop: 0555		
WOR Identification DM Weld: BPD-C-1017		SS Weld: BPD-C-1019						
Component Configuration DM Weld: Nozzle to Safe End				SS Weld: Safe End to Pipe				
Weld Overlay Regions: Entire overlay surface								
Examination Surface: Surface of Weld Overlay				Reviewed Previous Data: N/A				
Temperature Gauge: PTC 312F		Serial Number: 268025		Component Temp: 78°				
Percent Of Coverage Obtained: 100%				Examination Angles				
Weld Overlay Thickness:				Axial		Circumferential		
Minimum: .30"				0° to 85°		N/A		
Maximum: .70"								
Examination Sensitivity:				37 dB		N/A dB		

Examination Scans Performed	Yes	No	N/A
(1) Axial (Downstream)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(2) Axial (Upstream)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(3) Circumferential (Clockwise)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
(4) Circumferential (Counterclockwise)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Comments: Maintained 5% to 20% average baseline noise level during examination. No suspected flaw indications were observed during examinations.

Examiner	Level	Signature	Date	LMT Review	Level	Signature	Date
Todd Blechinger	III		10/24/09	Todd Blechinger	III		10/24/09
Examiner	Level	Signature	Date	Site Review	Level	Signature	Date
N/A	N/A			Kevin Hacker	III		10/26/09
Other	Level	Signature	Date	ANII Review	Level	Signature	Date
N/A	N/A			E. York	N/A		10/26/2009



ULTRASONIC PHASED ARRAY WOR CALIBRATION REPORT

WOR Identification DM Weld: BPD-C-1017	Calibration Data Sheet: 219-01-005
WOR Identification SS Weld: BPD-C-1019	Calibration Data Sheet: 219-01-035
Plant/Unit: Millstone / 2	Procedure No. / Rev: ER-MP-NDE-UT-816/ Rev.0

<table border="1"> <tr><td align="center" colspan="2">Wedge</td></tr> <tr><td>Manufacturer:</td><td>GEIT</td></tr> <tr><td>Model:</td><td>360-152-232</td></tr> <tr><td>Nominal Wedge Angle:</td><td>52°</td></tr> <tr><td>Measured Wedge Angle:</td><td>52°</td></tr> <tr><td>Contour Diameter:</td><td>4.125" CIRC OD</td></tr> <tr><td>Scan Direction:</td><td>Circumferential</td></tr> <tr><td>Nominal Index Location:</td><td>.75"</td></tr> <tr><td>Zero Reference:</td><td>Front of Probe</td></tr> </table>	Wedge		Manufacturer:	GEIT	Model:	360-152-232	Nominal Wedge Angle:	52°	Measured Wedge Angle:	52°	Contour Diameter:	4.125" CIRC OD	Scan Direction:	Circumferential	Nominal Index Location:	.75"	Zero Reference:	Front of Probe	Comments: See attached EPRI correspondence for Probe, Wedge and Focal Law information.
Wedge																			
Manufacturer:	GEIT																		
Model:	360-152-232																		
Nominal Wedge Angle:	52°																		
Measured Wedge Angle:	52°																		
Contour Diameter:	4.125" CIRC OD																		
Scan Direction:	Circumferential																		
Nominal Index Location:	.75"																		
Zero Reference:	Front of Probe																		

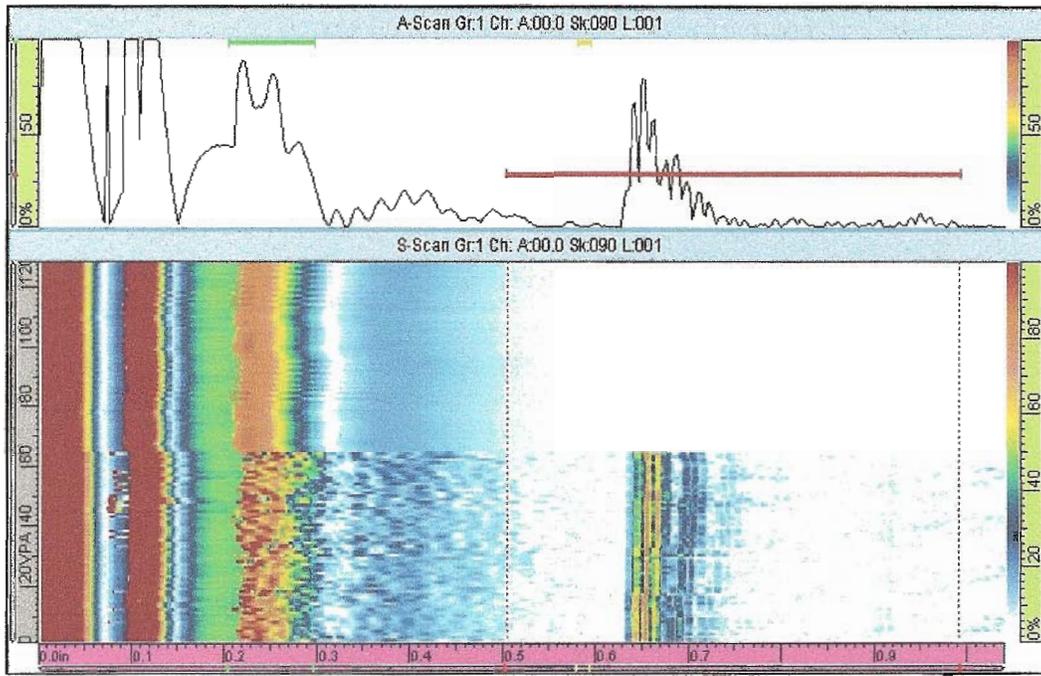
<table border="1"> <tr><td align="center" colspan="2">Instrument</td></tr> <tr><td>Manufacturer:</td><td>Zetec</td></tr> <tr><td>Model:</td><td>Omniscan 32/128 PR</td></tr> <tr><td>PA Module Serial Number:</td><td>Omni-Z-6034</td></tr> <tr><td>UT Mainframe Serial Number:</td><td>Omni-Z-1062</td></tr> <tr><td>Software Revision:</td><td>1.4R3</td></tr> <tr><td>Table 2 Instrument Settings:</td><td>See attached</td></tr> </table>	Instrument		Manufacturer:	Zetec	Model:	Omniscan 32/128 PR	PA Module Serial Number:	Omni-Z-6034	UT Mainframe Serial Number:	Omni-Z-1062	Software Revision:	1.4R3	Table 2 Instrument Settings:	See attached	<table border="1"> <tr><td align="center" colspan="2">Search Unit</td></tr> <tr><td>Manufacturer:</td><td>GEIT</td></tr> <tr><td>Model:</td><td>115-000-631</td></tr> <tr><td>Serial Number:</td><td>01Y28Y-1/ 01Y28Y-2</td></tr> <tr><td align="center" colspan="2">Search Unit Integral Cable</td></tr> <tr><td>Type:</td><td>See cable diagram</td></tr> <tr><td>Length:</td><td>See cable diagram</td></tr> <tr><td>Connector Type #:</td><td>See cable diagram</td></tr> </table>	Search Unit		Manufacturer:	GEIT	Model:	115-000-631	Serial Number:	01Y28Y-1/ 01Y28Y-2	Search Unit Integral Cable		Type:	See cable diagram	Length:	See cable diagram	Connector Type #:	See cable diagram
Instrument																															
Manufacturer:	Zetec																														
Model:	Omniscan 32/128 PR																														
PA Module Serial Number:	Omni-Z-6034																														
UT Mainframe Serial Number:	Omni-Z-1062																														
Software Revision:	1.4R3																														
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Model:	115-000-631																														
Serial Number:	01Y28Y-1/ 01Y28Y-2																														
Search Unit Integral Cable																															
Type:	See cable diagram																														
Length:	See cable diagram																														
Connector Type #:	See cable diagram																														

Couplant: Soundsafe	Temperature Gauge: PTC 312F
Manufacturer: Sonotech Inc.	Serial Number: 268025
Batch Number: 07220H	

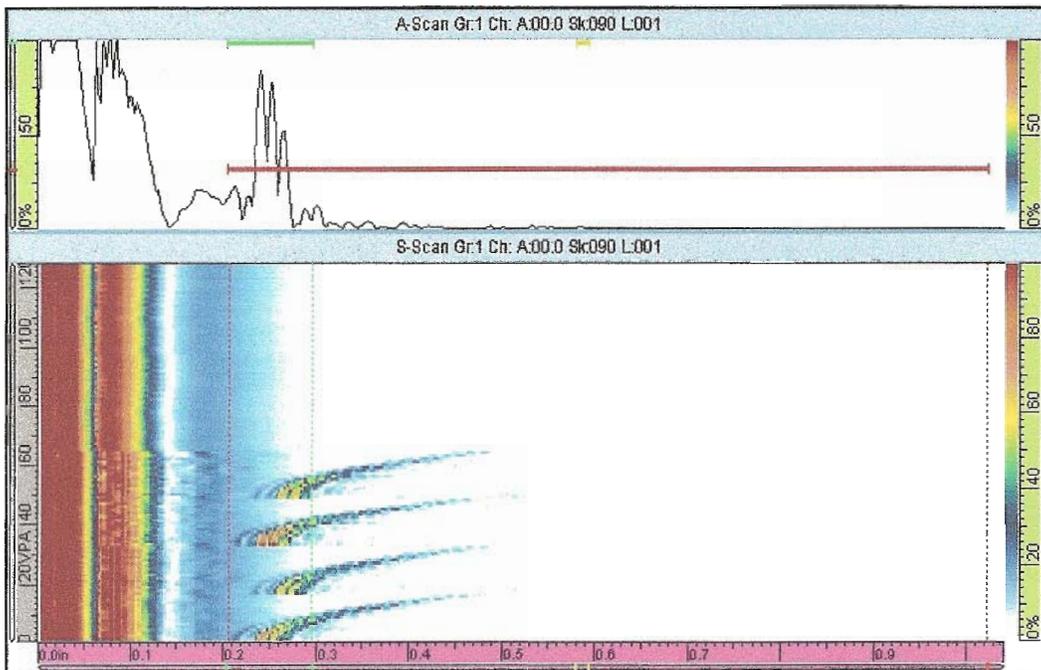
Calibration Data Files	
Focal Law:	032NJDZ2232L0079R2M1Z4_1.125MP.LAW
Angles Generated:	0° to 79°
Wave Mode:	Longitudinal
Focal Sound Path:	1.125" MP

Calibration Reflector Data					
Calibration Block(s): MEUXE017A		N/A		Temperature: 76°	
Calibration Reflector	Angle	% FSH	Ref. Sensitivity	UT Response	
(70°-85°)	0.1" SDH	70°	80	32 dB	.597" Sound Path
(25°-60°)	0.5" SDH	45°	80	23 dB	.916" Sound Path
(0°-25°)	0.5" SDH	0°	80	33 dB	.481" Sound Path
Channel Functional Checks	Pre Exam: Acceptable		Post Exam: Acceptable		
Number of Inactive Channels/Elements:	Transmit: 0	Receive: 0			

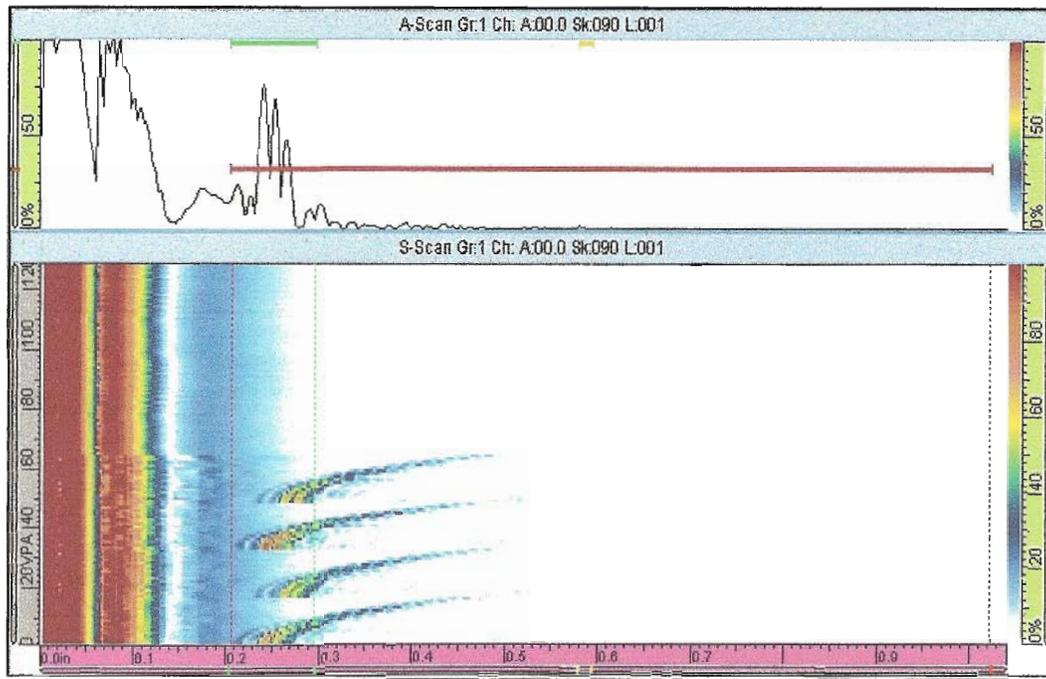
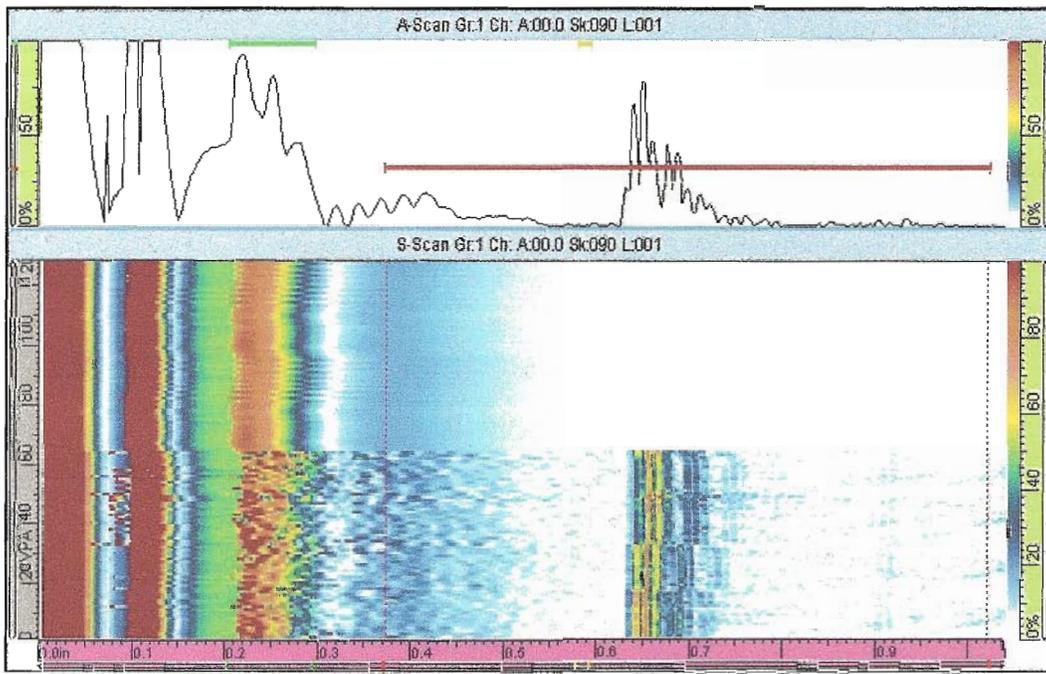
Calibration Performed	Examiner 1	Examiner 2	Level(s)	Date	Time
Initial:	Todd Blechinger	N/A	III	10/24/09	0557
Intermediate:	Todd Blechinger	N/A	III	10/24/09	0613
Final:	Todd Blechinger	N/A	III	10/24/09	0700



Element Check 5- Pre exam, off wedge



Element Check 6-Pre exam, on wedge

**Element Check 7- Post exam on wedge****Element Check 8-Post exam, off wedge**

Phased Array Instrument Table 2 Essential Settings

Major Menu Item	Menu Item	Sub-menu Item	Setting
Reading	Result	Selector	List 1
		Field 1	A%
		Field 2	A^
		Field 3	SA
		Field 4	PA
UT	General	Gain	23 dB
		Start	0.00 in
		Range	1.815 in
		Wedge Delay	1.90 us
		Velocity	.2272 in/us
		Pulser	Pulser
	Tx/Rx Mode		PE
	Frequency		2
	Voltage		High
	PW		250ns (Auto)
	PRF		Optimum
	Receiver	Receiver	1
		Filter	None
		Rectifier	FW
		Video Filter	Off
		Averaging	1
		Reject	0
	Beam	Gain Offset	0.0 dB
		Scan Offset	-0.000 in
		Index Offset	-0.704 in
		Angle	45
		Skew	0.0°
		Beam Delay	7.62 us
	Advanced	dB Ref	Off
		Points Qty	452
		Scale Factor	5
		Sum Gain	22.0

Phased Array Instrument Table 2 Essential Settings (cont.)

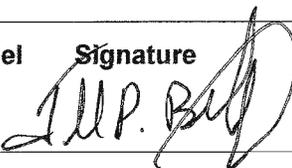
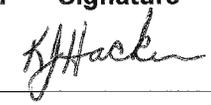
Major Menu Item	Menu Item	Sub-menu Item	Setting	
Display	Selection	Display	A-S-[C]	
		C-Scan 1	Off	
		Group	Current	
		Projection	On	
	Rulers	UT Unit	True Depth	
		% Ruler	Linear (%)	
		DAC/TCG	Off	
		Gate	On	
		Cursor	Off	
	Color	Select	Amplitude	
		Start (%)	0.0	
		End (%)	100.0	
	Properties	Display	A-Scan	
Source		Normal		
Probe Part	Select	Select	Select Tx/Rx	
		Auto Detect	Off	
	Position	Scan Offset (in)	0	
		Index Offset (in)	0	
	Parts	Geometry	Plate	
		Thickness (in)	3.0 in	
	PGM Probe	Configuration	Scan Type	Sectorial
			Connection P:	1
Laws		Auto Program	Off	
Gate Alarm		Gate	Gate Select	Gate A
	Gate A Synchro		Pulse	

ULTRASONIC PHASED ARRAY WOR ULTRASONIC EXAMINATION RECORD

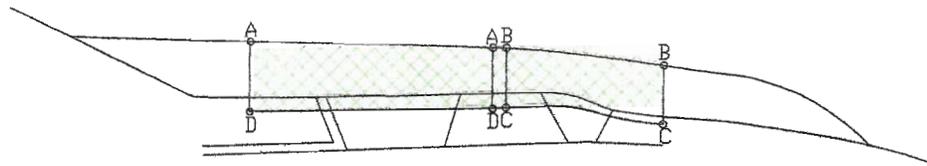
Exam Data Sheet: 219-01-005		219-01-035		Calibration Data Sheet: 219-01-005		219-01-035		
Plant: Millstone			Unit: 2			Procedure: ER-MP-NDE-UT-816/Rev. 0		
Zones DM Weld: 1-07		SS Weld: 1-32						
Date: 10/24/09			Exam Start: 0557			Exam Stop: 0613		
WOR Identification DM Weld: BPD-C-1017		SS Weld: BPD-C-1019						
Component Configuration DM Weld: Nozzle to Safe End				SS Weld: Safe End to Pipe				
Weld Overlay Regions: Entire overlay surface								
Examination Surface: Surface of Weld Overlay				Reviewed Previous Data: N/A				
Temperature Gauge: PTC 312F		Serial Number: 268025		Component Temp: 80°				
Percent Of Coverage Obtained: 100%				Examination Angles				
Weld Overlay Thickness:				Axial		Circumferential		
Minimum: .30"				N/A		0° to 79°		
Maximum: .70"								
Examination Sensitivity:				N/A dB		35 dB		

Examination Scans Performed	Yes	No	N/A
(1) Axial (Downstream)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
(2) Axial (Upstream)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
(3) Circumferential (Clockwise)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(4) Circumferential (Counterclockwise)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

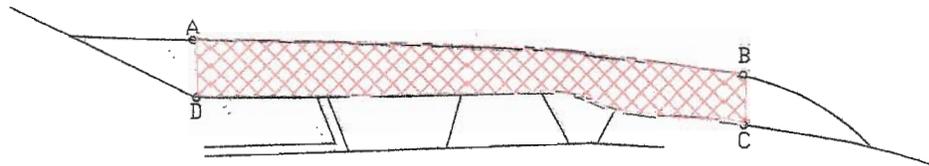
Comments: Maintained 5% to 20% average baseline noise level during examination. No suspected flaw indications were observed during examinations.

Examiner	Level	Signature	Date	LMT Review	Level	Signature	Date
Todd Blechinger	III		10/24/09	Todd Blechinger	III		10/24/09
Examiner	Level	Signature	Date	Site Review	Level	Signature	Date
N/A	N/A			Kevin Hacker	III		10/26/09
Other	Level	Signature	Date	ANII Review	Level	Signature	Date
N/A	N/A			E. York	N/A		10/26/2009

Coverage Plot



ISI Examination Volume A-B-C-D



PSI Examination Volume A-B-C-D

Scale: NOT TO SCALE

Examiner	Level	Signature	Date	LMT Review	Level	Signature	Date
Todd Blechinger	III	<i>T. Blechinger</i>	10/24/09	Todd Blechinger	III	<i>T. Blechinger</i>	10/24/09
Examiner	Level	Signature	Date	Site Review	Level	Signature	Date
N/A	N/A			Kevin Hacker	III	<i>K. Hacker</i>	10/26/09
Other	Level	Signature	Date	ANII Review	Level	Signature	Date
N/A	N/A			E. York	N/A	<i>E. York</i>	10/26/2009