



GE Nuclear Energy

GERIS 2000 Examination Summary Sheet

Project: TVA, Browns Ferry Nuclear Plant, Unit 3
System: Reactor Pressure Vessel
Weld ID: V-4-A

ASME Code Category: B-A

Calibration Sheets: C-001

Supporting Data: Examination Data Sheets E-13-00 and E-13-01, Indication Data Sheets 13-001 thru 13-008, Indication Evaluation Sheets, Screen Prints, Exam Patch Location Map, Exam Coverage Plots, and GERIS 2000 Setup Records.

Examination Summary

The ultrasonic examination of weld V-4-A resulted in no recorded indications that exceed the allowable standards of IWB-3500, ASME Section XI, 1986 Edition, No Addenda.

The ASME Section XI required examination volume was examined with the GERIS 2000 System from the RPV inside surface utilizing Procedure No. GE-UT-700, Rev. 2. The total examination coverage was calculated to be 100%.

The GERIS 2000 utilizes an array of search units arranged to effectively examine the weld and adjacent base material parallel and perpendicular to the weld axis in two directions. The transducer package consisted of 0° longitudinal, 45° and 60° shear wave, and 70° refracted longitudinal (RL) wave search units.

The GERIS 2000 recorded indications with the 0° weld metal scans, 45° and 60° shear wave scans that were evaluated and found to be acceptable per the referencing Code section.

Fabrication records and previous examination results were reviewed prior to the completion of this examination summary.

GERIS Analyst: *Ceresa Kimball*

GE Reviewer: *R.D. Forman*

LEVEL: *III* DATE: *12-16-93*

LEVEL: *II* DATE: *12-16-93*

UTILITY Review: *A. M. W. [unclear]*

ANII Review:

TITLE: *[unclear]* DATE: *1/26/94*

TITLE: *Robert [unclear]* DATE: *7/13/94*

001001 0238

R11kda



GE Nuclear Energy

GERIS 2000 Examination Data Sheet

Project: TVA, Browns Ferry, Unit 3
Weld ID: V-4-A
Exam Data Sheet: E-13-00

Procedure No.: GE-UT-700
Revision No.: 2
FRR No.: N/A

Patch	Data Sh.	Date	Start	Stop	Min X	Max X	Min Y	Max Y	Disk No.	Examiner
BF-050	E-13-01	10/12/93	1709	1858	610.25	638	517.5	584	40A	ROF
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Comments: N/A

Limitations: None

Analyst: Olivera Kimball
Level: III **Date:** 12-16-93

Reviewed By: R.O. Foman
Level: II **Date:** 12-16-93



GE Nuclear Energy

GERIS 2000 Examination Data Sheet

R1166

Project: TVA, Browns Ferry, Unit 3
Weld ID: V-4-A
Cal. ID: C-001

Exam Data Sheet No.: E-13-01
Patch ID: BF-050
Ind. Data Sheet Series: 13-XXX

Channel	Angle	Direction	Ind.	Ind. Data Sh.	Ind. Data Sh.	Ind. Data Sh.	Ind. Data Sh.	Ind. Data Sheet
1	0 WM	N/A	1	13-001	13-002	~	~	~
2	0 WM	N/A	1	13-003	13-008	~	~	SAME AS CH 1
3	70 RL	0 UP	NRI	~	~	~	~	~
4	70 RL	90 CW	NRI	~	~	~	~	~
5	70 RL	180 DN	NRI	~	~	~	~	~
6	70 RL	270 CCW	NRI	~	~	~	~	~
7	45 RS	0 UP	1	13-004	13-005	13-006	~	~
8	45 RS	90 CW	NRI	~	~	~	~	~
9	45 RS	180 DN	NRI	~	~	~	~	~
10	45 RS	270 CCW	NRI	~	~	~	~	~
11	60 RS	0 UP	1	13-007	~	~	~	~
12	60 RS	90 CW	NRI	~	~	~	~	~
13	60 RS	180 DN	NRI	~	~	~	~	~
14	60 RS	270 CCW	NRI	~	~	~	~	~
15	0 BM	N/A	NRI	~	~	~	~	~
16	0 BM	N/A	NRI	~	~	~	~	~
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Comments: Plate segregates CCW side of longitudinal weld

Data Sheet Codes: G-XXX; "G" = Geometry (may be typical), 6-XXX; "6" = Weld Sequence, XXX = Sheet Number
Indication Codes: 1 = Flaw, 2 = OD Surface, 3 = OD Attachment, 4 = Nozzle, 5 = Other

Analyst: Debra Kimball
Level: III Date: 12-16-93

Reviewed By: R.D. Forman
Level: II Date: 12-16-93

R1166



GE Nuclear Energy

GERIS 2000 Indication Data Sheet

Project: TVA, Browns Ferry, Unit 3
Weld ID: V-4-A
Cal. ID: C-001

Exam Data Sheet No.: E-13-01
Patch ID: BF-050
Ind. Data Sheet No.: 13-001

Indication: 13-001 Channel: 1 Angle: 0 Direction: 0

Amp.	X	20% Min Y	MP	50% Min Y	MP	@ Max Y	MP	50% Max Y	MP	20% Max Y	MP	Remarks
64.5%	618.21	~	~	549.70	1.28	549.95	1.32	551.70	1.28	~	~	~
82.9%	618.46	~	~	550.45	1.32	550.95	1.30	551.20	1.28	~	~	~
100.0%	618.70	~	~	~	~	550.70	1.32	551.20	1.28	~	~	~
88.2%	618.96	~	~	549.95	1.37	550.95	1.39	551.95	1.26	~	~	~
100.0%	619.21	~	~	~	~	549.95	1.41	552.20	1.28	~	~	~
68.7%	619.46	~	~	549.70	1.37	550.70	1.30	551.95	1.26	~	~	~
88.2%	619.71	~	~	549.95	1.45	550.20	1.48	551.20	1.39	~	~	~
100.0%	619.96	~	~	547.45	1.28	548.20	1.22	551.70	1.35	~	~	~
113.4%	620.21	~	~	547.95	1.22	548.20	1.22	551.70	1.30	~	~	~
120.6%	620.46	~	~	547.95	1.28	550.48	1.35	551.70	1.26	~	~	~
272.3%	620.71	~	~	547.70	1.26	549.95	1.37	552.20	1.26	~	~	~
145.5%	620.96	~	~	547.70	1.30	550.20	1.35	552.20	1.26	~	~	~
128.4%	621.21	~	~	550.45	1.30	551.20	1.39	551.95	1.28	~	~	~
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Comments:

This indication recorded as a laminar reflector and is acceptable in accordance with IWB-3510-2, ASME Section XI, 1986 Edition, no Addenda.

Analyst: Jessica Kimball
Level: III Date: 12-16-93

Reviewed By: R.O. Foman
Level: II Date: 12-16-93



GE Nuclear Energy

GERIS 2000 Indication Data Sheet

Project: TVA, Browns Ferry, Unit 3
 Weld ID: V-4-A
 Cal. ID: C-001

Exam Data Sheet No.: E-13-01
 Patch ID: BF-050
 Ind. Data Sheet No.: 13-002

Indication: 13-002 Channel: 1 Angle: 0 Direction: 0

Amp.	X	20% Min Y	MP	50% Min Y	MP	@ Max Y	MP	50% Max Y	MP	20% Max Y	MP	Remarks
53.5%	619.21	~	~	~	~	546.45	1.28	~	~	~	~	~
60.6%	619.46	~	~	546.45	1.22	546.70	1.26	~	~	~	~	~
60.6%	619.71	~	~	546.20	1.24	546.70	1.26	546.95	1.35	~	~	~
57.0%	619.96	~	~	545.70	1.17	546.45	1.32	546.70	1.28	~	~	~
53.5%	620.21	~	~	545.45	1.17	545.70	1.22	545.95	1.15	~	~	~
64.5%	620.46	~	~	545.95	1.15	546.45	1.35	546.70	1.24	~	~	~
60.6%	620.71	~	~	~	~	545.70	1.20	~	~	~	~	~
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Comments:

This indication recorded as a laminar reflector and is acceptable in accordance with IWB-3510-2, ASME Section XI, 1986 Edition, no Addenda.

Analyst: Debra Kimball
 Level: III Date: 12-16-93

Reviewed By: R.O. Forman
 Level: II Date: 12-16-93

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GE Nuclear Energy

GERIS 2000 Indication Data Sheet

Project: TVA, Browns Ferry, Unit 3
 Weld ID: V-4-A
 Cal. ID: C-001

Exam Data Sheet No.: E-13-01
 Patch ID: BF-050
 Ind. Data Sheet No.: 13-003

Indication: 13-003 Channel: 2 Angle: 0 Direction: 90

Amp.	Y	20% Min X	MP	50% Min X	MP	@ Max X	MP	50% Max X	MP	20% Max X	MP	Remarks
64.5%	546.50	~	~	619.65	1.29	619.90	1.29	620.15	1.27	~	~	~
60.6%	546.30	~	~	619.40	1.23	619.95	1.25	620.15	1.29	~	~	~
108.4%	546.55	~	~	618.40	1.36	619.90	1.25	620.65	1.32	~	~	~
108.4%	546.80	~	~	618.90	1.27	619.15	1.32	620.65	1.32	~	~	~
199.1%	547.05	~	~	618.15	1.34	619.40	1.29	620.40	1.38	~	~	~
120.6%	547.30	~	~	618.15	1.34	619.90	1.36	620.90	1.34	~	~	~
88.2%	547.55	~	~	619.65	1.38	620.15	1.36	620.65	1.32	~	~	~
56.4%	547.80	~	~	619.40	1.40	619.65	1.38	619.90	1.38	~	~	~
53.5%	548.05	~	~	~	~	620.40	1.44	~	~	~	~	~
64.5%	548.30	~	~	620.15	1.38	620.40	1.38	620.65	1.38	~	~	~
100.0%	548.55	~	~	619.90	1.42	620.15	1.42	620.65	1.40	~	~	~
73.1%	548.80	~	~	619.65	1.38	620.40	1.44	620.65	1.44	~	~	~
88.2%	549.05	~	~	~	~	620.15	1.44	620.40	1.44	~	~	~
64.5%	549.30	~	~	619.65	1.34	619.90	1.36	620.15	1.38	~	~	~
272.3%	549.55	~	~	618.15	1.38	619.40	1.42	620.65	1.32	~	~	~
396.3%	549.80	~	~	618.15	1.40	619.40	1.42	620.90	1.36	~	~	~
289.7%	550.05	~	~	618.15	1.36	619.15	1.38	621.15	1.34	~	~	~
113.4%	550.30	~	~	619.15	1.47	619.40	1.47	619.65	1.51	~	~	~
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Comments:
 This indication recorded as a laminar reflector and is acceptable in accordance with IWB-3510-2, ASME Section XI, 1986 Edition, no Addenda.

Analyst: Deena Kimball
 Level: III Date: 12-16-93

Reviewed By: R.O. Forman
 Level: II Date: 12-16-93

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GE Nuclear Energy

GERIS 2000 Indication Data Sheet

Project: TVA, Browns Ferry, Unit 3
Weld ID: V-4-A
Cal. ID: C-001

Exam Data Sheet No.: E-13-01
Patch ID: BF-050
Ind. Data Sheet No.: 13-004

Indication: 13-004 Channel: 7 Angle: 45 Direction: 0

Amp.	X	20% Min Y	MP	50% Min Y	MP	@ Max Y	MP	50% Max Y	MP	20% Max Y	MP	Remarks
64.5%	619.21	~	~	522.80	4.22	523.05	4.01	~	~	~	~	~
77.9%	619.46	~	~	~	~	522.80	4.22	523.30	3.85	~	~	~
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Comments: Thruwall size was determined by the ASME 50% method.
This indication also seen with Ch. 9 and Ch. 11 below recordable levels.
Located along weld fusion intersection of V-4-A and C-4-5.

TW = .26 L = .25 S = 2.85 w/clad

Analyst: Jessica Kimball
Level: III Date: 12-16-93

Reviewed By: R.O. Forman
Level: II Date: 12-16-93

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GE Nuclear Energy

GERIS 2000 Indication Evaluation Sheet

Project: TVA, Browns Ferry Unit 3
Weld ID: V-4-A
Patch: BF-050

Exam Data Sheet No.: E-13-01
Ind. Data Sheet No.: 13-004
Indication: 13-004

Flaw Thruwall Dimension = 0.26
Flaw Length "l" = 0.25
Seperation with clad "S" = 2.85
Surface Separation "S" = 2.66

T nominal = 6.38
Clad T nominal = 0.19

Flaw is acceptable by Table IWB-3510-1

ASME Section XI, 1986 Edition TABLE IWB-3510-1 for 4" to 12"

a/l	Surface %	ubsurface	Surface %	Subsurface %
0.00	1.90	2	~	~
0.05	2.00	2.2	~	~
0.10	2.20	2.5	~	~
0.15	2.50	2.9	~	~
0.20	2.80	3.3	~	~
0.25	3.30	3.8	~	~
0.30	3.80	4.4	~	~
0.35	4.40	5.1	~	~
0.40	5.00	5.8	~	~
0.45	5.10	6.7	~	~
0.50	5.20	7.6	5.20	7.60 Y
			Allowed	Allowed
			5.20	7.60

a = 0.130
 a/l value = 0.500
 Y = 1.000

Flaw is Subsurface

Allowed a/t = 7.60%
 a/t = 2.04%

Comments:



GE Nuclear Energy

GERIS 2000 Indication Data Sheet

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Project: TVA, Browns Ferry, Unit 3
Weld ID: V-4-A
Cal. ID: C-001

Exam Data Sheet No.: E-13-01
Patch ID: BF-050
Ind. Data Sheet No.: 13-005

Indication: 13-005

Channel: 7

Angle: 45

Direction: 0

Amp.	X	20% Min Y	MP	50% Min Y	MP	@ Max Y	MP	50% Max Y	MP	20% Max Y	MP	Remarks
57.0%	618.21	~	~	566.80	5.38	567.30	5.05	567.55	4.87	~	~	~
53.5%	618.46	~	~	566.80	5.43	567.30	5.09	~	~	~	~	~
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Comments: Thruwall size was determined by the ASME 50% method.
Located along weld fusion line intersection of V-4-A and C-4-5.

TW = .396 L = .25 S = 2.83

Analyst: Deeresa Kimball

Reviewed By: R.O. Forman

Level: III Date: 12-16-93

Level: II Date: 12-16-93

R1166



GE Nuclear Energy

GERIS 2000 Indication Evaluation Sheet

Project: TVA, Browns Ferry Unit 3
Weld ID: V-4-A
Patch: BF-050

Exam Data Sheet No.: E-13-01
Ind. Data Sheet No.: 13-005
Indication: 13-005

Flaw Thruwall Dimension = 0.40
Flaw Length "l" = 0.25
Separation with clad "S" = N/A
Surface Separation "S" = 2.83

T nominal = 6.38
Clad T nominal = 0.19

Flaw is acceptable by Table IWB-3510-1

ASME Section XI, 1986 Edition TABLE IWB-3510-1 for 4" to 12"

a/l	Surface %	Subsurface %	Surface %	Subsurface %
0.00	1.90	2	~	~
0.05	2.00	2.2	~	~
0.10	2.20	2.5	~	~
0.15	2.50	2.9	~	~
0.20	2.80	3.3	~	~
0.25	3.30	3.8	~	~
0.30	3.80	4.4	~	~
0.35	4.40	5.1	~	~
0.40	5.00	5.8	~	~
0.45	5.10	6.7	~	~
0.50	5.20	7.6	5.20	7.60 Y
			Allowed	Allowed
			5.20	7.60

a = 0.198
a/l value = 0.500
Y = 1.000

Flaw is Subsurface

Allowed a/t = 7.60%
a/t = 3.10%

Comments:

R1166



GE Nuclear Energy

GERIS 2000 Indication Data Sheet

Project: TVA, Browns Ferry, Unit 3
Weld ID: V-4-A
Cal. ID: C-001

Exam Data Sheet No.: E-13-01
Patch ID: BF-050
Ind. Data Sheet No.: 13-006

Indication: 13-006

Channel: 7

Angle: 45

Direction: 0

Amp.	X	20% Min Y	MP	50% Min Y	MP	@ Max Y	MP	50% Max Y	MP	20% Max Y	MP	Remarks
57.0%	620.71	~	~	567.05	5.32	567.55	4.98	~	~	~	~	~
57.0%	620.96	~	~	567.30	5.14	567.55	4.95	~	~	~	~	~
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Comments: Continuation of Indication # 13-005.
Thruwall size was determined by the ASME 50% method.
Located along weld fusion line intersection of V-4-A and C-4-5.

TW = .262 L = .25 S = 2.948

Analyst: Gresa Kimball
Level: III Date: 12-16-93

Reviewed By: R.O. Forman
Level: II Date: 12-16-93

B1166



GE Nuclear Energy

GERIS 2000 Indication Evaluation Sheet

Project: TVA, Browns Ferry Unit 3
Weld ID: V-4-A
Patch: BF-050

Exam Data Sheet No.: E-13-01
Ind. Data Sheet No.: 13-006
Indication: 13-006

Flaw Thruwall Dimension = 0.26
Flaw Length "l" = 0.25
Seperation with clad "S" = N/A
Surface Separation "S" = 2.95

T nominal = 6.38
Clad T nominal = 0.19

Flaw is acceptable by Table IWB-3510-1

ASME Section XI, 1986 Edition
TABLE IWB-3510-1 for 4" to 12"

a/l	Surface %	ubsurface	Surface %	Subsurface %
0.00	1.90	2	~	~
0.05	2.00	2.2	~	~
0.10	2.20	2.5	~	~
0.15	2.50	2.9	~	~
0.20	2.80	3.3	~	~
0.25	3.30	3.8	~	~
0.30	3.80	4.4	~	~
0.35	4.40	5.1	~	~
0.40	5.00	5.8	~	~
0.45	5.10	6.7	~	~
0.50	5.20	7.6	5.20	7.60 Y
			Allowed	Allowed
			5.20	7.60

a = 0.131
a/l value = 0.500
Y = 1.000

Flaw is Subsurface

Allowed a/t = 7.60%
a/t = 2.05%

Comments:

R1166



GE Nuclear Energy

GERIS 2000 Indication Data Sheet

Project: TVA, Browns Ferry, Unit 3

Weld ID: V-4-A

Cal. ID: C-001

Exam Data Sheet No.: E-13-01

Patch ID: BF-050

Ind. Data Sheet No.: 13-007

Indication: 13-007

Channel: 11

Angle: 60

Direction: 0

Amp.	X	20% Min Y	MP	50% Min Y	MP	@ Max Y	MP	50% Max Y	MP	20% Max Y	MP	Remarks
128.4%	618.10	~	~	564.30	7.53	565.30	6.60	566.30	5.87	~	~	~
77.9%	618.35	~	~	564.30	7.49	565.30	6.65	565.80	6.20	~	~	~
53.5%	618.60	~	~	~	~	565.30	6.60	~	~	~	~	~
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Comments: Thruwall size was determined by the ASME 50% method.
This indication also seen with Ch. 7 (see 13-005)

TW = .83 L = .5 S = 2.885

Analyst: Debra Kimball

Reviewed By: R.O. Forman

Level: III Date: 12-16-93

Level: II Date: 12-16-93

R1166



GE Nuclear Energy

**GERIS 2000 Indication
Evaluation Sheet**

Project: TVA, Browns Ferry Unit 3
Weld ID: V-4-A
Patch: BF-050

Exam Data Sheet No.: E-13-01
Ind. Data Sheet No.: 13-007
Indication: 13-007

Flaw Thruwall Dimension = 0.83
Flaw Length "l" = 0.50
Seperation with clad "S" = N/A
Surface Separation "S" = 2.89

T nominal = 6.38
Clad T nominal = 0.19

Flaw is acceptable by Table IWB-3510-1

**ASME Section XI, 1986 Edition
TABLE IWB-3510-1 for 4" to 12"**

a/l	Surface %	ubsurface	Surface %	Subsurface %
0.00	1.90	2	~	~
0.05	2.00	2.2	~	~
0.10	2.20	2.5	~	~
0.15	2.50	2.9	~	~
0.20	2.80	3.3	~	~
0.25	3.30	3.8	~	~
0.30	3.80	4.4	~	~
0.35	4.40	5.1	~	~
0.40	5.00	5.8	~	~
0.45	5.10	6.7	~	~
0.50	5.20	7.6	5.20	7.60 Y
			Allowed	Allowed
			5.20	7.60

a = 0.415
a/l value = 0.500
Y = 1.000

Flaw is Subsurface

Allowed a/t = 7.60%
a/t = 6.50%

Comments:

R1166



GE Nuclear Energy

GERIS 2000 Indication Data Sheet

Project: TVA, Browns Ferry, Unit 3
Weld ID: V-4-A
Cal. ID: C-001

Exam Data Sheet No.: E-13-01
Patch ID: BF-050
Ind. Data Sheet No.: 13-008

Indication: 13-008

Channel: 2

Angle: 0

Direction: 90

Amp.	Y	20% Min X	MP	50% Min X	MP	@ Max X	MP	50% Max X	MP	20% Max X	MP	Remarks
136.8%	551.55	~	~	618.65	1.44	619.40	1.51	619.90	1.42	~	~	~
120.6%	551.80	~	~	618.90	1.36	620.40	1.34	620.90	1.38	~	~	~
88.2%	552.05	~	~	618.15	1.36	619.15	1.34	620.65	1.34	~	~	~
120.6%	552.30	~	~	618.90	1.32	619.15	1.38	620.40	1.40	~	~	~
88.2%	552.55	~	~	618.65	1.34	618.90	1.34	619.15	1.34	~	~	~
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Comments:

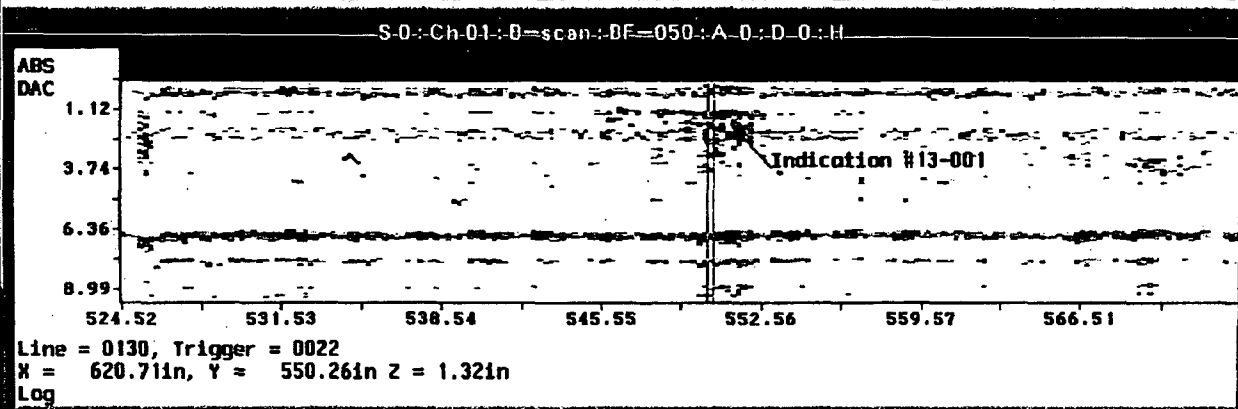
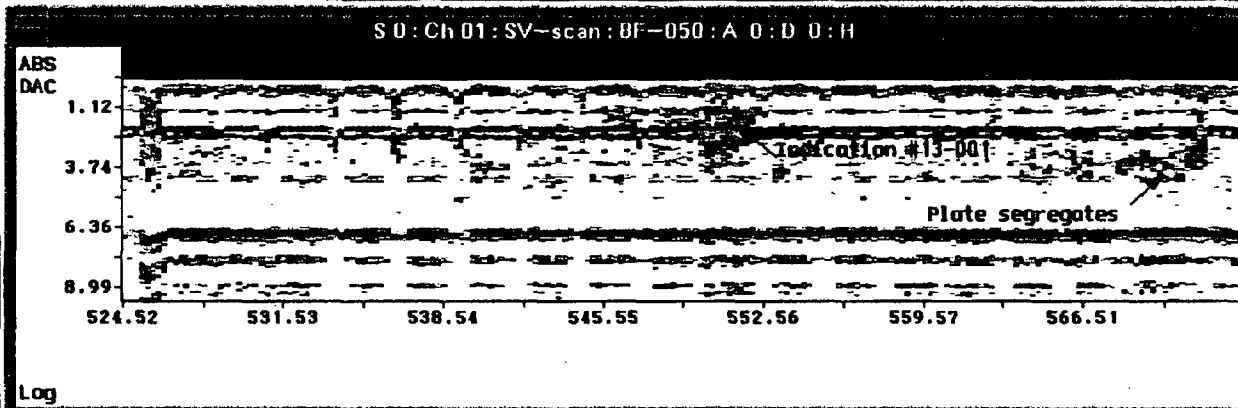
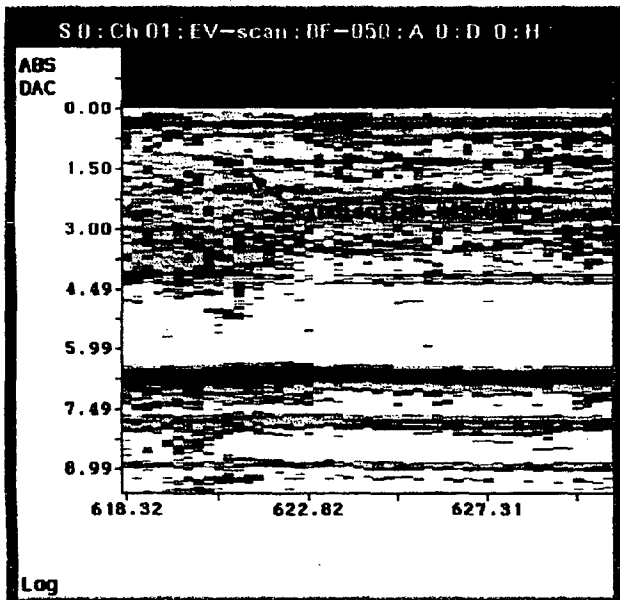
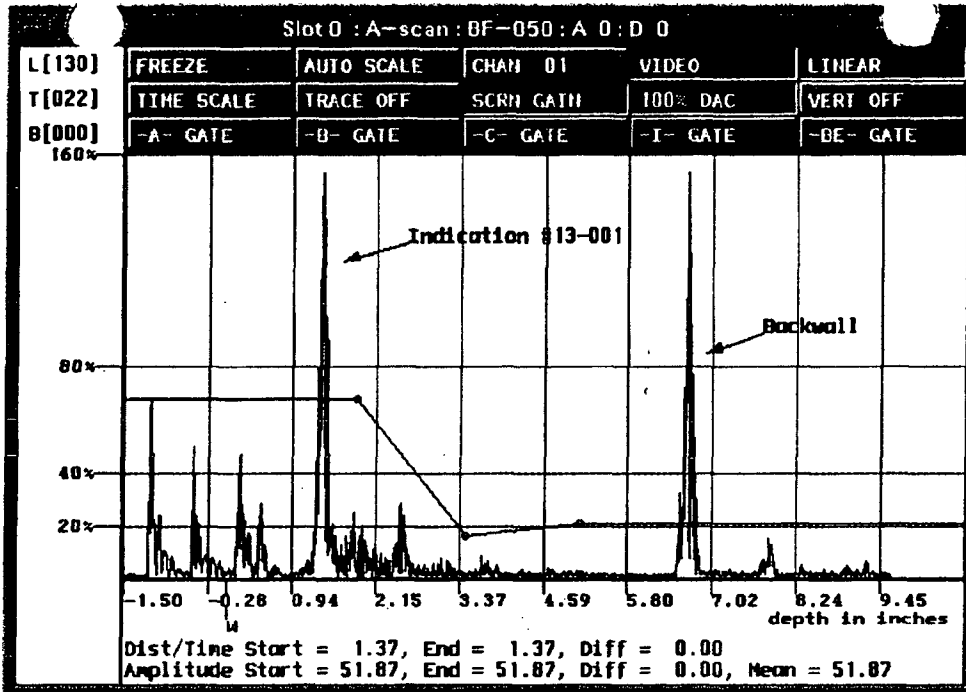
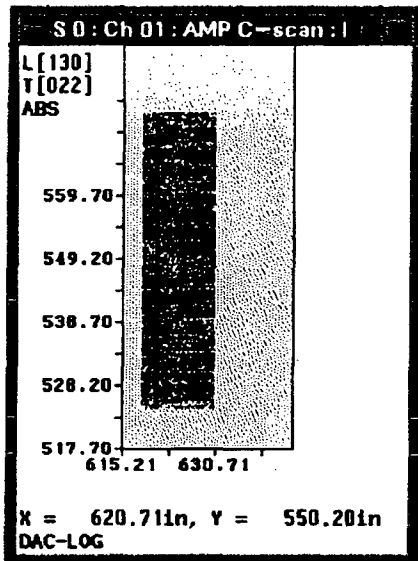
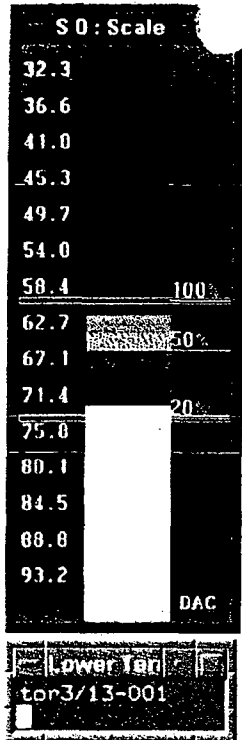
This indication recorded as a laminar reflector and is acceptable in accordance with IWB-3510-2, ASME Section XI, 1986 Edition, no Addenda.

Analyst: Ceresa Kimball

Reviewed By: R.O. Forman

Level: III Date: 12-16-93

Level: II Date: 12-16-93



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R1166
00158

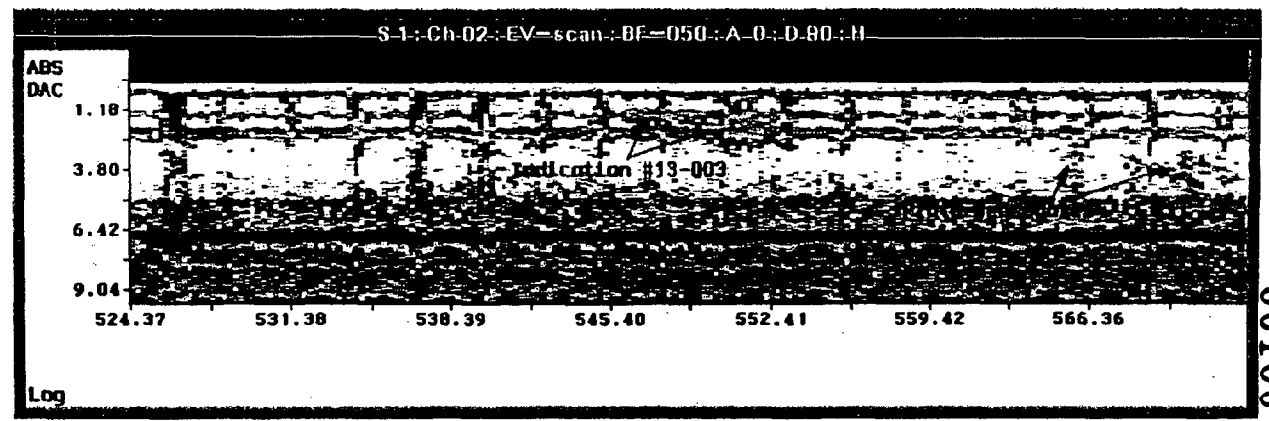
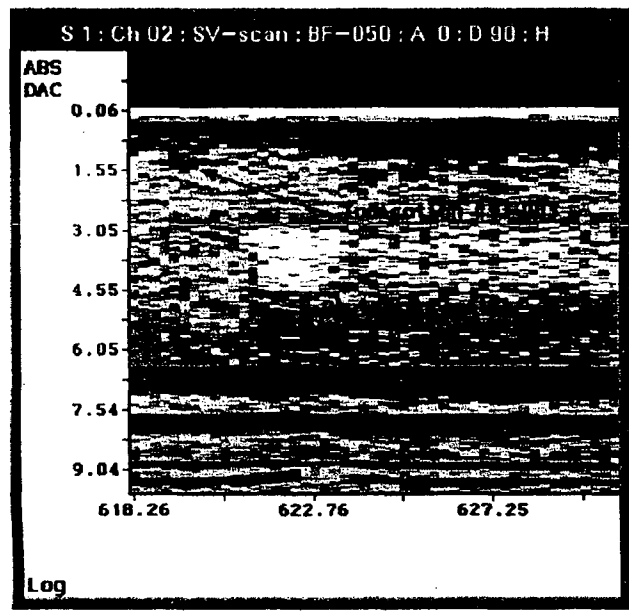
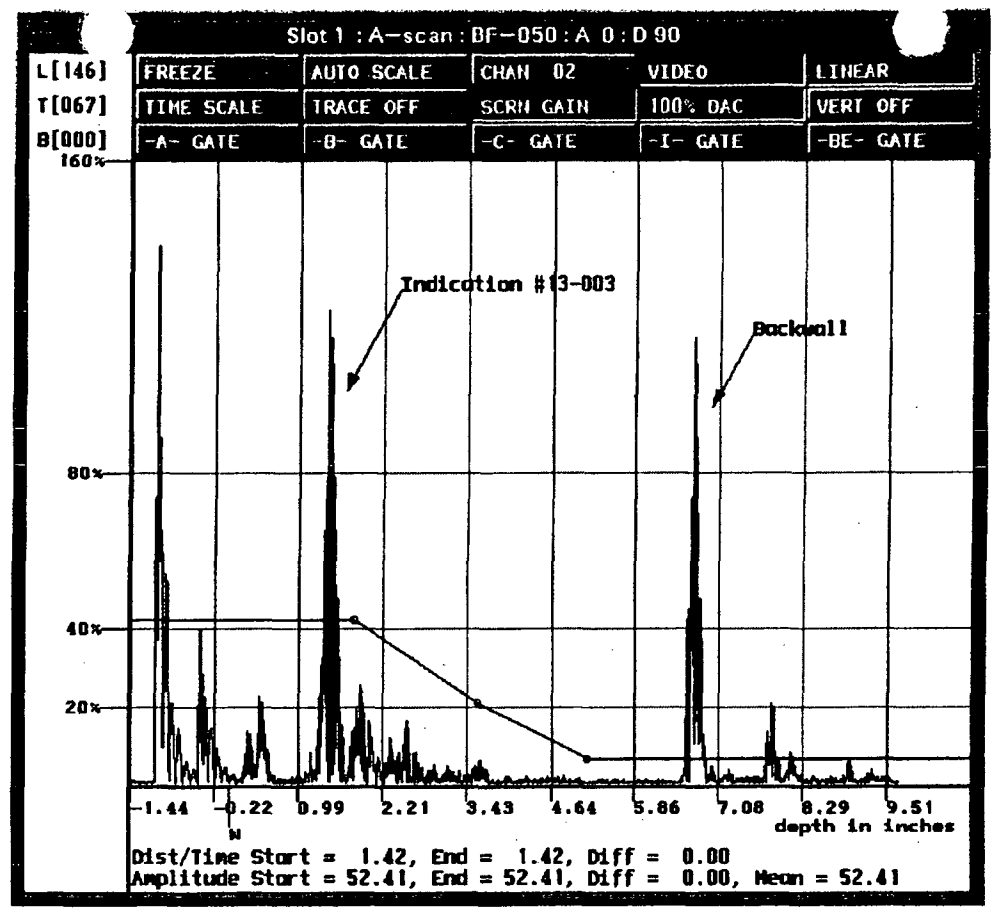
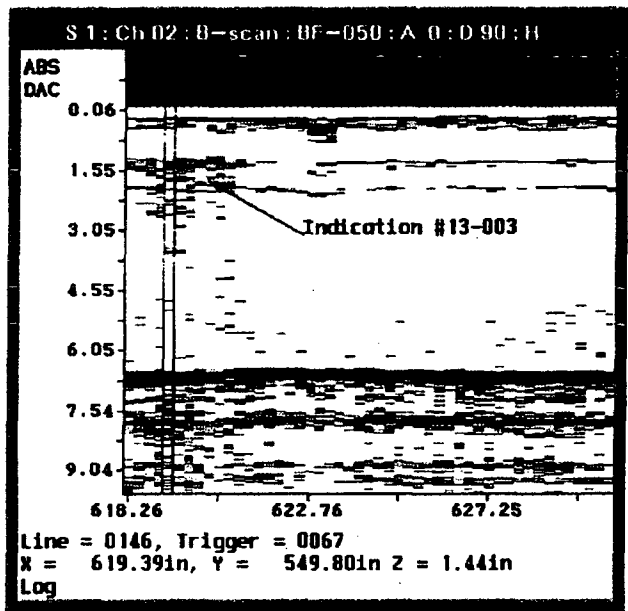
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80.1
84.5
88.8
93.2

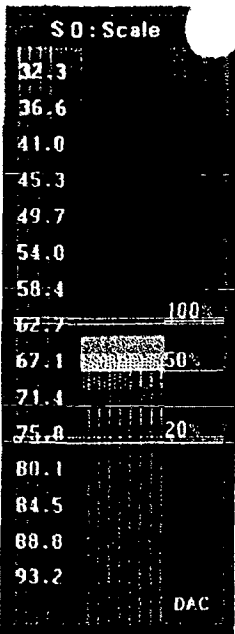
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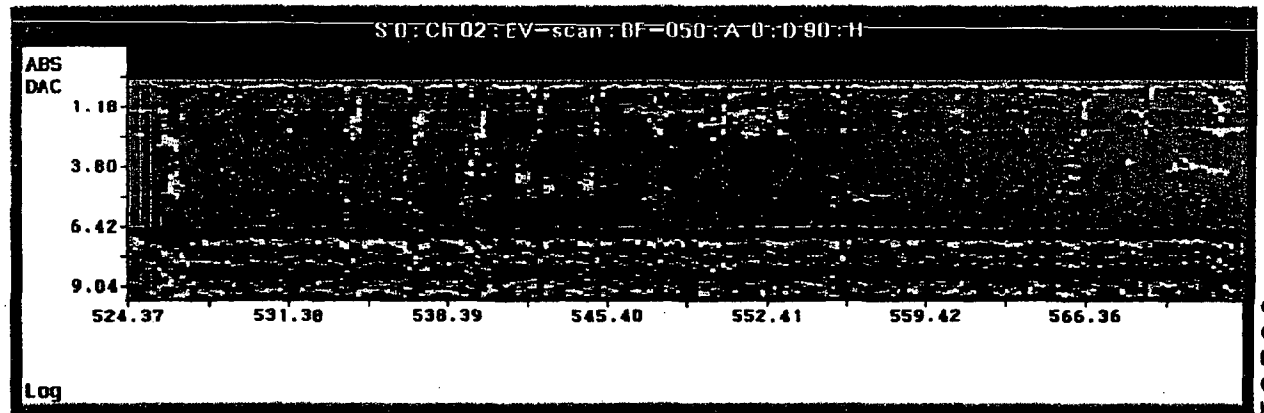
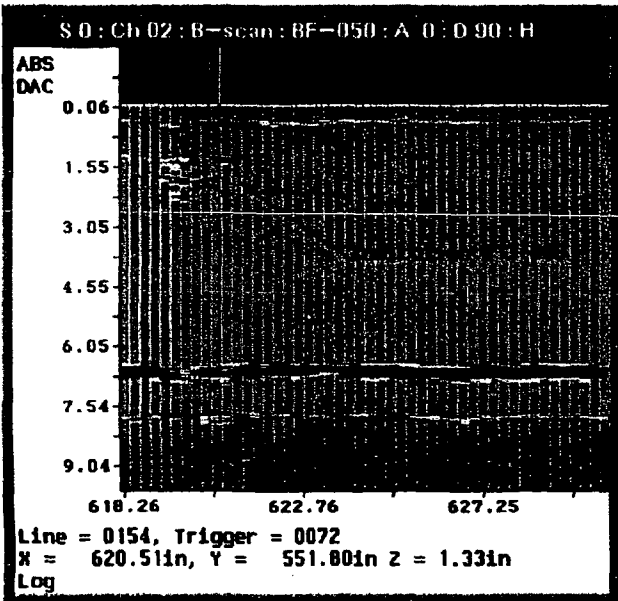
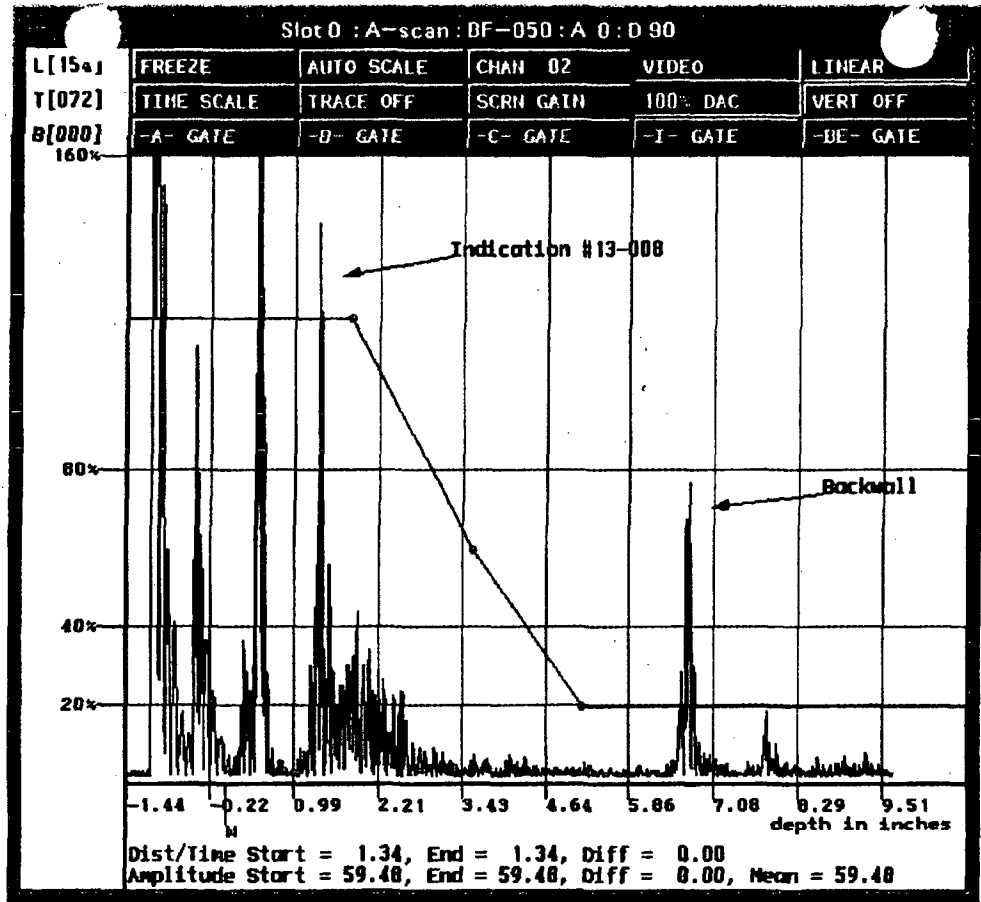
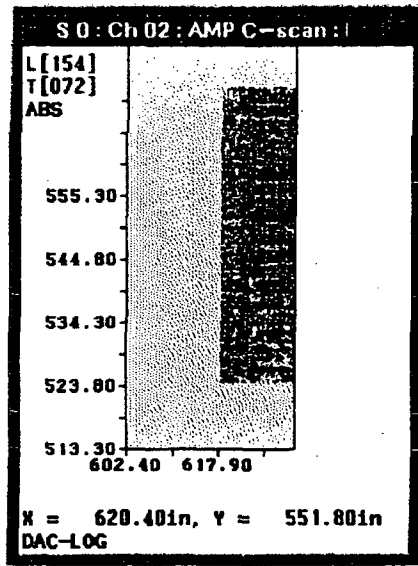
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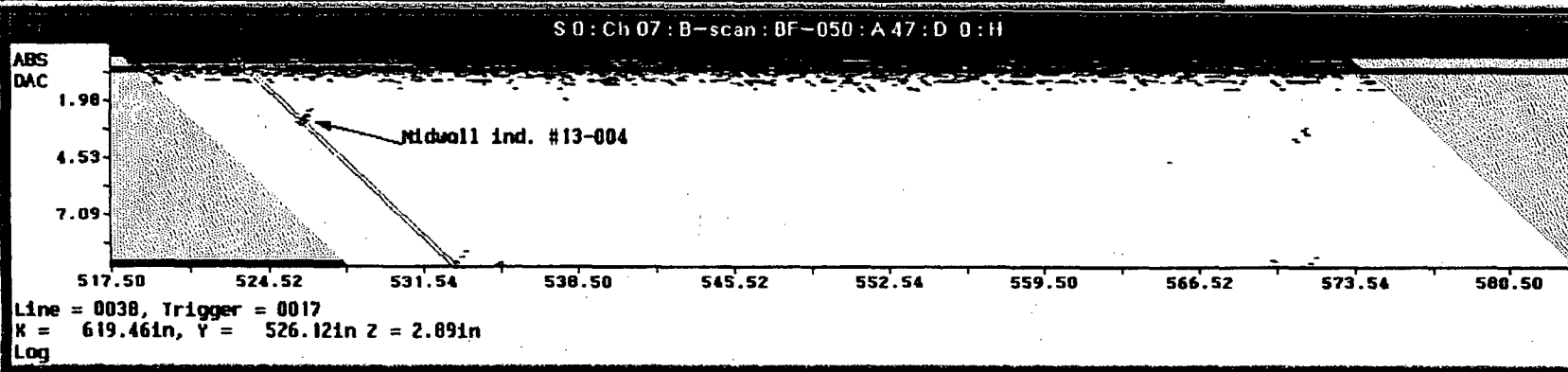
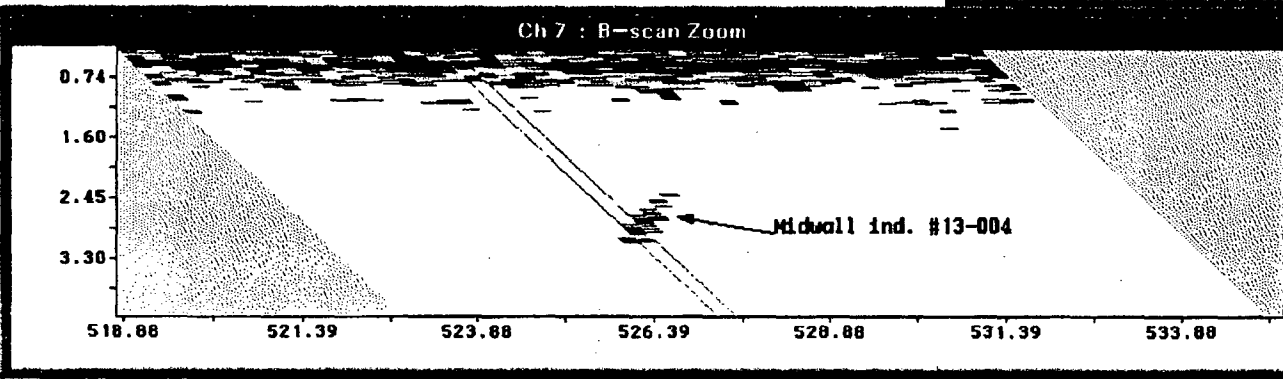
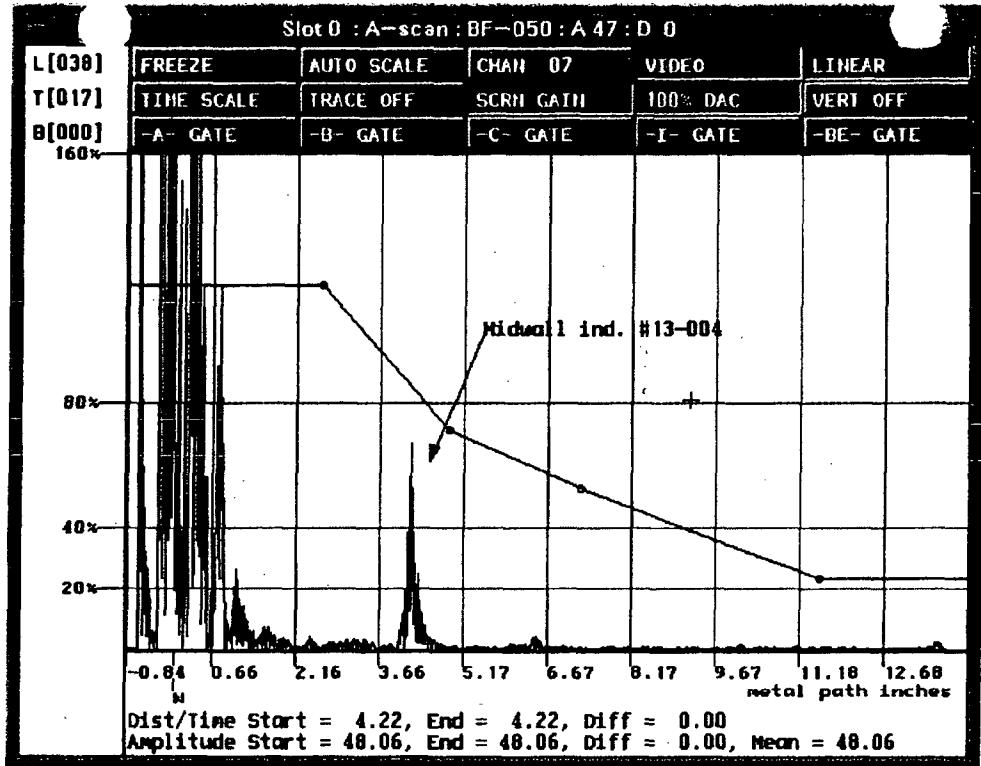
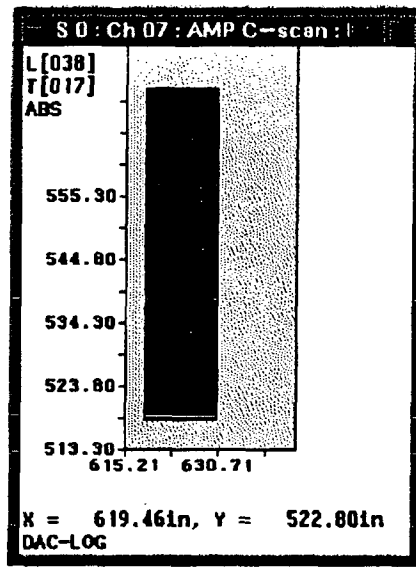
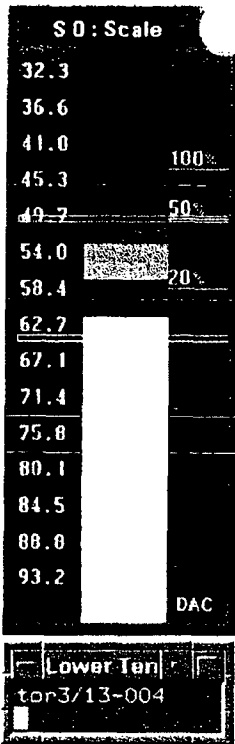
18 OF 25
R1165
00160



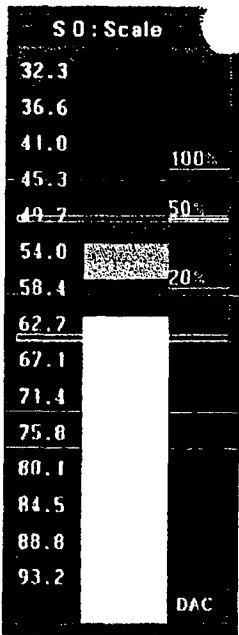
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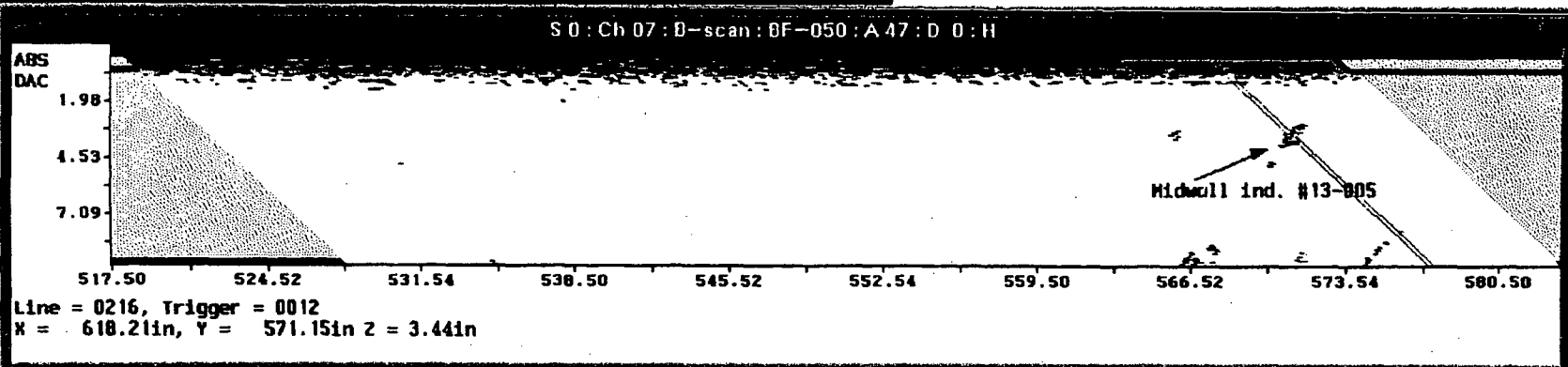
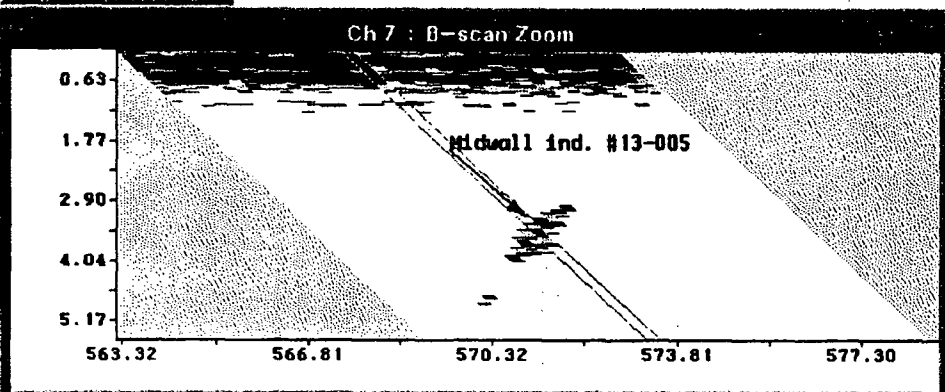
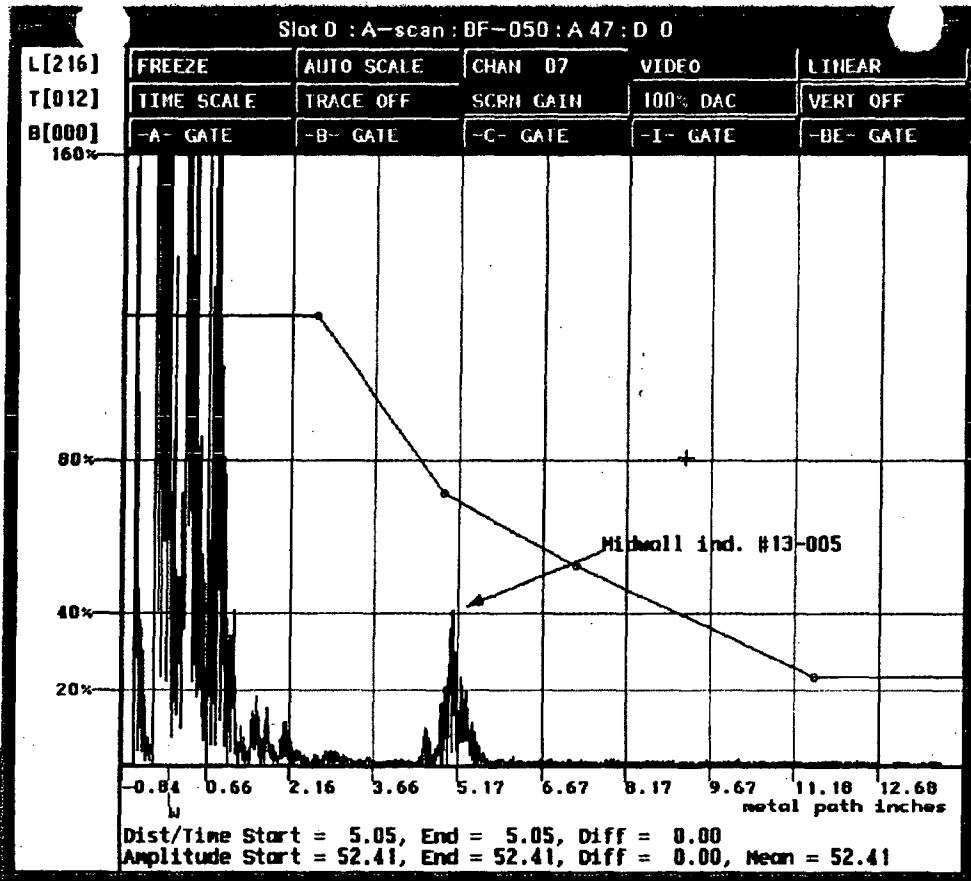
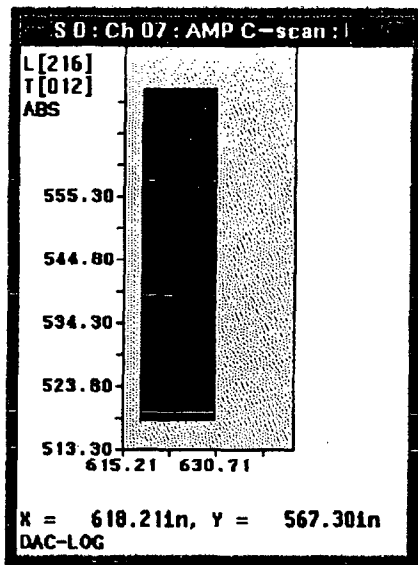
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 19 OF 25 # 00161
 R1166



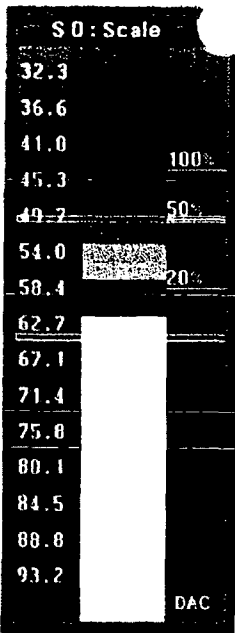
R1166
20 of 25
* 00162



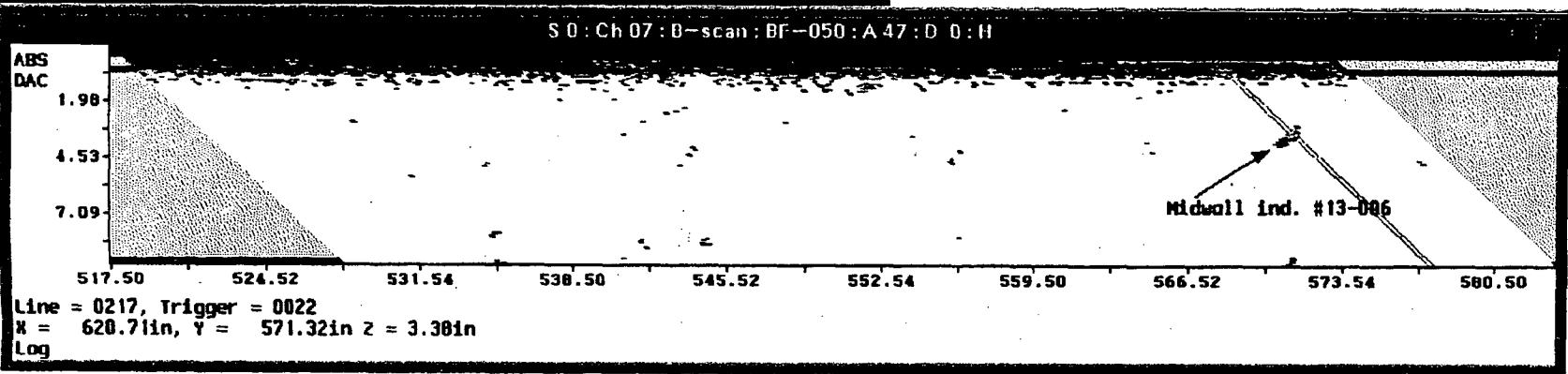
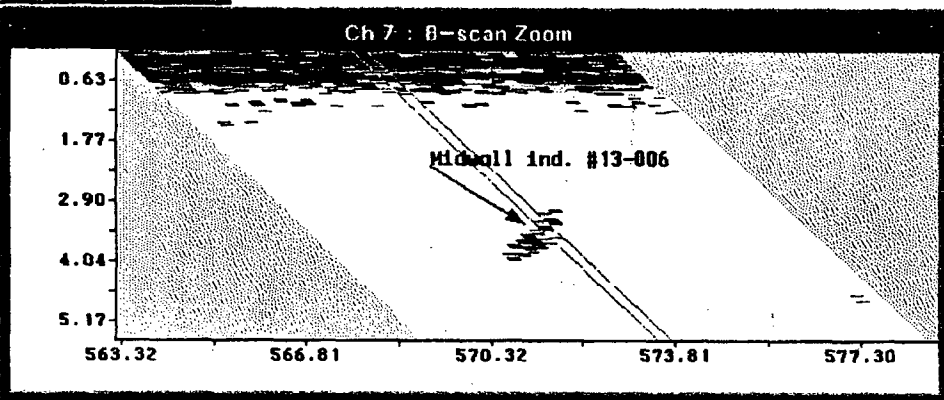
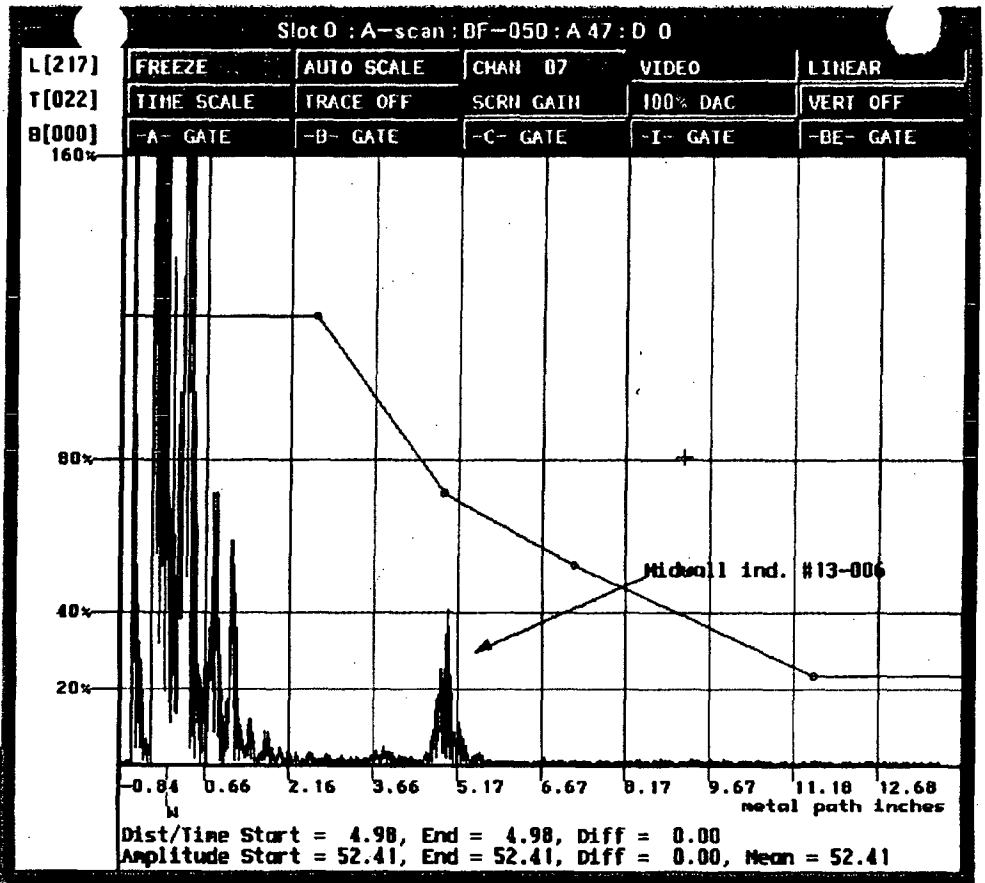
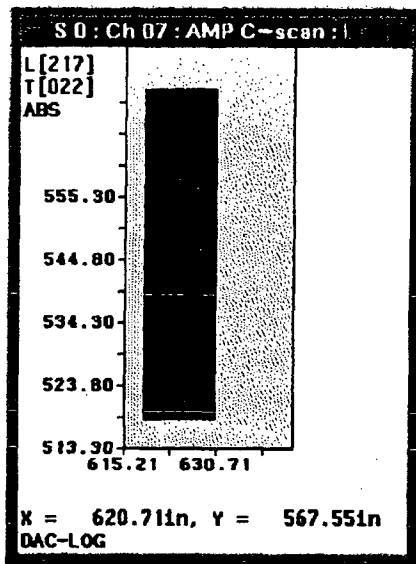
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ton3:13-005



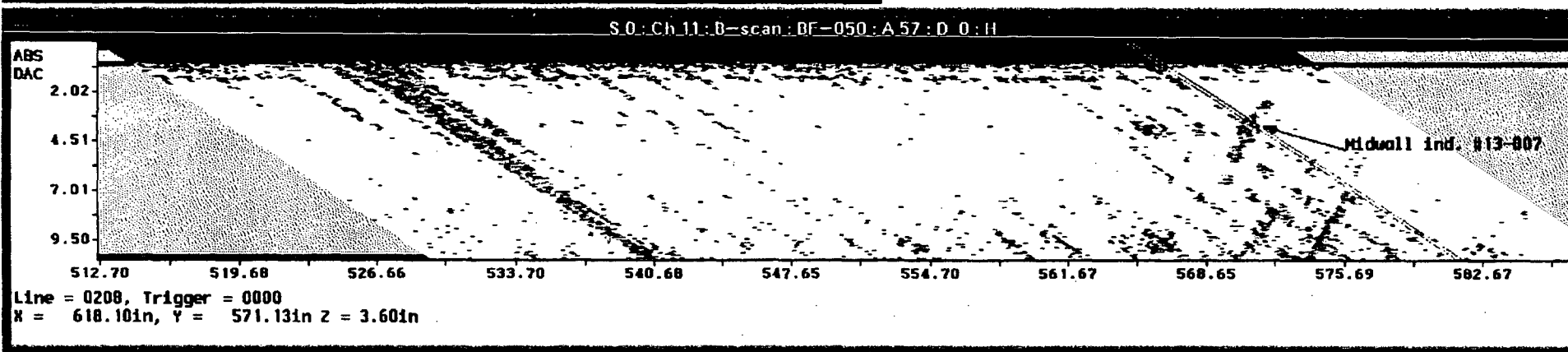
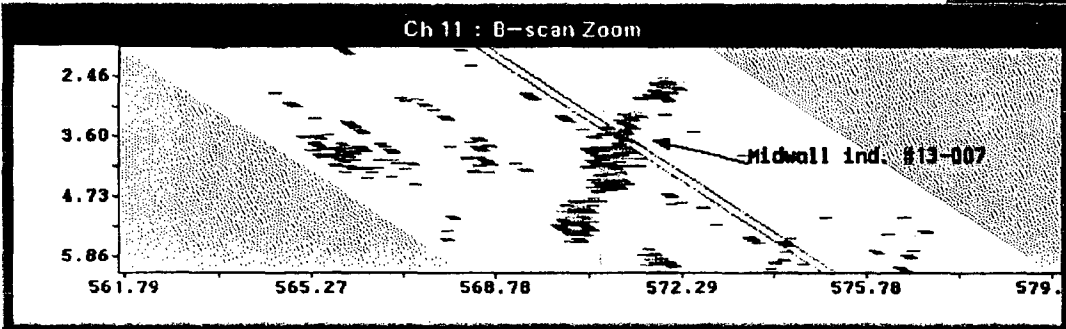
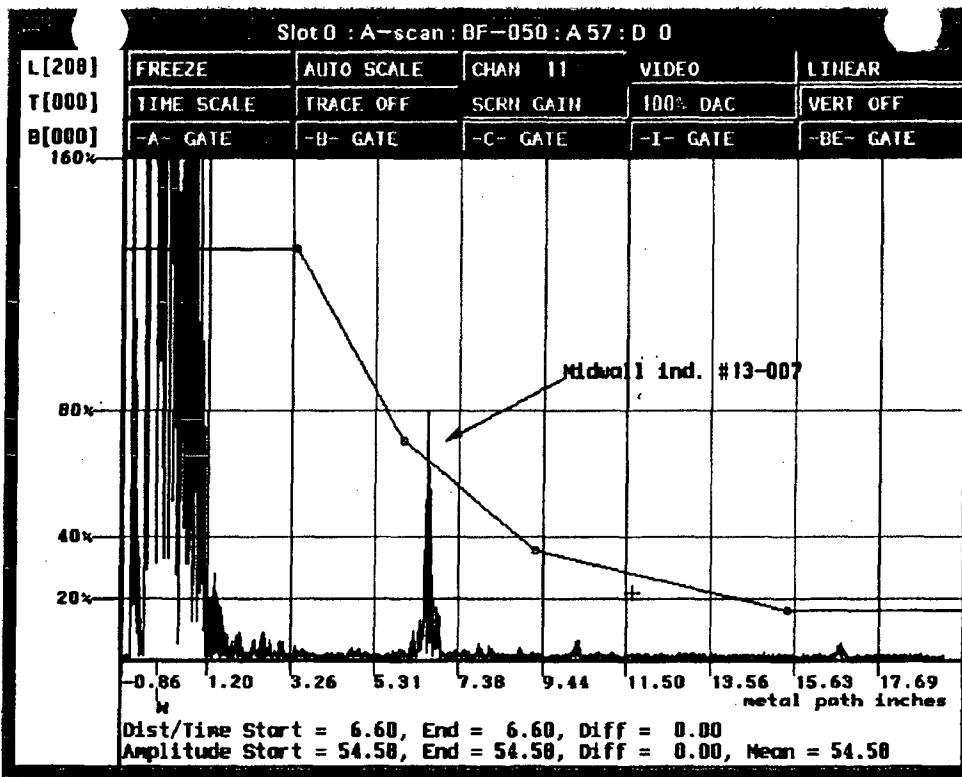
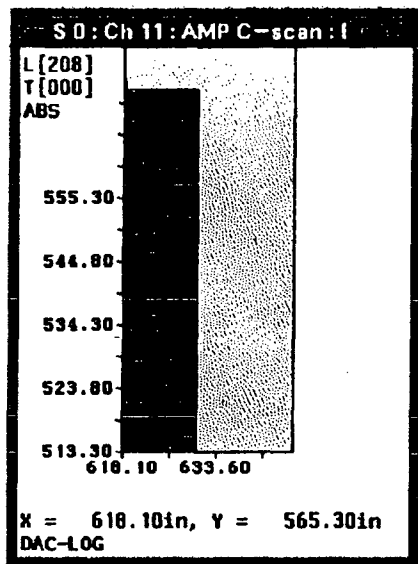
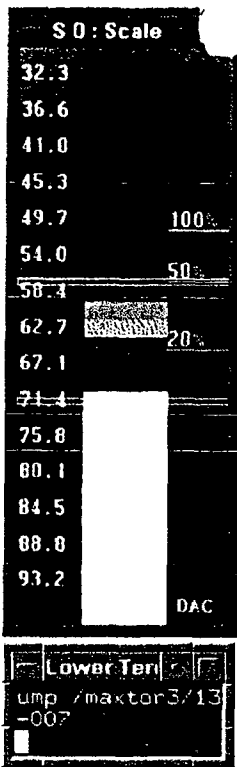
R1146
21 of 25
00163



Lower Ten
cor3/13-006

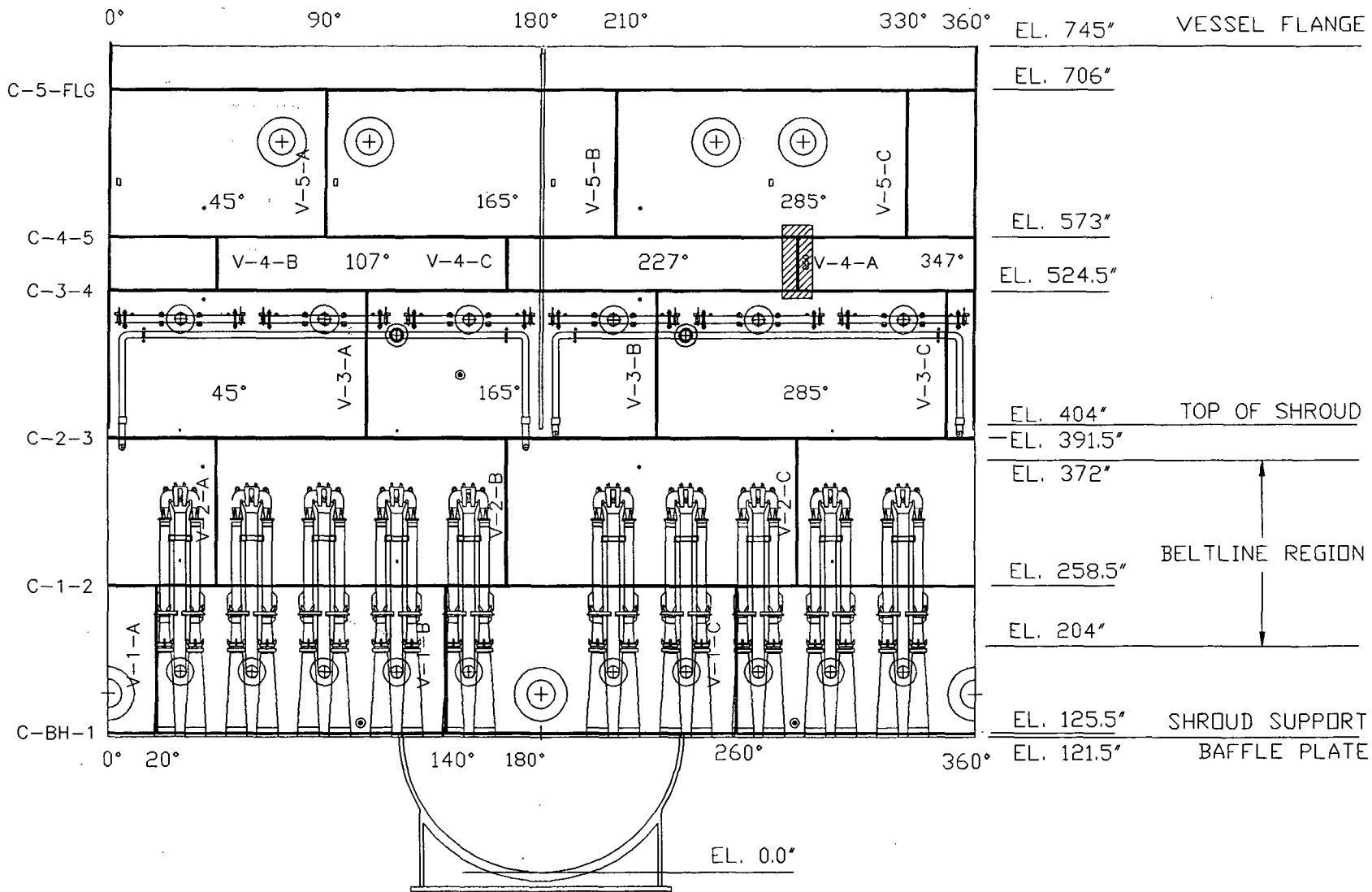


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00184



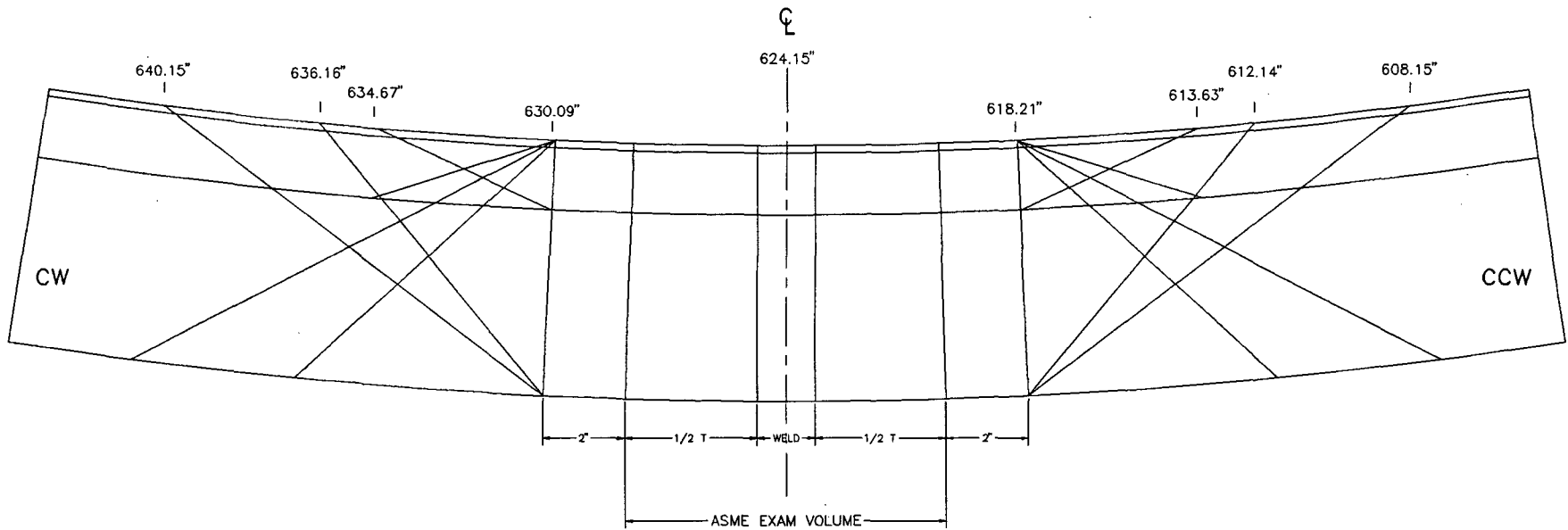
04 09 0000 0000
 23 OF 25
 R1140
 00165

BROWNS FERRY UNIT-3 WELD LOCATIONS



99100 * 00166

21166
24 OF 25



Nominal Clad T = 3/16"
 Nominal Base Metal T = 6 3/8"
 1 Degree = 2.19"

CH.	ANGLE	DIR.	MIN X	MAX X
1	0 W	0	618.21	630.09
2	0 W	90	618.21	630.09
3	70 UP	0	618.21	630.09
4	70 CW	90	613.63	630.09
5	70 DN	180	618.21	630.09
6	70 CCW	270	618.21	634.67
7	45 UP	0	618.21	630.09
8	45 CW	90	612.14	630.09
9	45 DN	180	618.21	630.09
10	45 CCW	270	618.21	636.16
11	60 UP	0	618.21	630.09
12	60 CW	90	608.15	630.09
13	60 DN	180	618.21	630.09
14	60 CCW	270	618.21	640.15
15	0 BM	0	618.21	640.15
16	0 BM	90	608.15	630.09

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