



GE Nuclear Energy

R1167

GERIS 2000 Examination Summary Sheet

Project: TVA, Browns Ferry Nuclear Plant, Unit 3

System: Reactor Pressure Vessel

Weld ID: V-4-B

ASME Code Category: B-A

Calibration Sheets: C-001

Supporting Data: Examination Data Sheets E-14-00 and E-14-01, Indication Data Sheets 14-001 thru 14-005 and G-100 thru G-108, 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-B resulted in one (1) recorded indication that exceeds 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. This examination was limited due to the N11-A Nozzle at 40°. The total examination coverage was calculated to be 83%.

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 one indication evaluated as being reportable to IWB-3500, ASME Section XI, 1986 Edition, No Addenda was recorded and sized in accordance with GE-UT-700, Rev. 2 and GE-UT-701, Rev. 2. This indication was recorded during the examination of both welds V-4-B as 14-002 and C-3-4 as 12-015. The flaw dimensions were determined from weld C-3-4 Indication Data Sheet 12-015 with the results tabulated below:

Ind. No.	Oriented	Type	X Pos	Y Pos	Z Pos	"S"	T wall	Length	T Meas	a/l	% a/t Calculated	% a/t Allowed
12-015	circ.	subsurface	94.35"	525.43"	1.13"	0.94"	.44"	1.75"	6.53"	0.13	3.4	2.71

This indication was sized with the 70°RL utilizing the PATT technique. It was also recorded with the 45° and 60° shear waves.

The GERIS 2000 also recorded an indication with the 0° weld metal scan that was evaluated and found to be acceptable per the referencing Code section. Geometric indications from the stabilizer bracket at 45° were recorded with the 0° weld metal, 45° and 60° shear wave scans.

No manual supplemental examination was performed from the RPV outside surface due to access restrictions.

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

GERIS Analyst: *Jenisa Kimball*

GE Reviewer: *R.D. Forman*

LEVEL: *III* DATE: *12-21-93*

LEVEL: *II* DATE: *12-21-93*

UTILITY Review: *JRM/only*

ANII Review:

TITLE: *W* DATE: *1/26/94*

TITLE: *What's Left* DATE: *7/13/94*

524.5"

70° RL

- WELD -

Flow "X" location	94.35"
Flow "Y" location	525.43"
Flow Thruwall	.444"
Flow Length	1.75"
"T" Measured	6.53"

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

[illegible]

2197

REV. 0



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GERIS 2000 Examination Data Sheet

Project: TVA, Browns Ferry, Unit 3

Weld ID: V-4-B

Exam Data Sheet: E-14-01**Procedure No.: GE-UT-700**

Revision No.: 2

FRR No.: N/A

[illegible]

Comments: N/A

Limitations: Instrumentation Nozzle N-11A @ 40°.

Analyst:

Analyst: Alesia Kimball

Level:

Level: III Date: 12-16-93

Reviewed By:

Reviewed By: R.O. Forman

Level:

Level: II Date: 12-16-93



GE Nuclear Energy

**GERIS 2000 Indication
Evaluation Sheet**

Project: TVA, Browns Ferry Unit 3
Weld ID: V-4-B
Patch: BF-048

Exam Data Sheet No.: E-14-01
Ind. Data Sheet No.: 14-002
Indication: 14-002

Flaw Thruwall Dimension = 0.44
Flaw Length "I" = 1.75
Seperation with clad "S" = 1.13
Surface Separation "S" = 0.94

T measured = 6.53
Clad T nominal = 0.19

Flaw is unacceptable 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	2.36	2.71 Y
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	~	~
			Allowed	Allowed
			2.36	2.71

a = 0.222
a/l value = 0.127
Y = 1.000

Flaw is Subsurface

Allowed a/t = 2.71%
a/t = 3.40%

Comments: The size of this indication was determined with information from
Examination Data Sheet No. E-12-02: Indication Data Sheet No. 12-015.

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GERIS 2000 Indication Data Sheet

Project: TVA, Browns Ferry, Unit 3

Weld ID: V-4-B

Cal. ID: C-001

Exam Data Sheet No.: E-14-01**Patch ID:** BF-048**Ind. Data Sheet No.: 14-003**

Indication: 14-003

Channel: 7

Angle: 45

Direction: 0

[illegible]

Comments: This indication also recorded with Ch. 5 (see 14-002), Ch. 11 (see 14-004), and Ch. 13 (see 14-005).

This indication was also recorded during the examination of weld C-3-4 as indication # 12-015.

The size of this indication was determined with the PATT technique

from Examination Data Sheet No. E-12-02; Indication Data Sheet No. 12-015.

Analyst:

Analyst: Jessica Kimball

Level:

Level: III

Date: _____

Date: 12-16-93

Reviewed By:

Reviewed By: R.O. Forman

Level:

Level: π

Date:

Date: 12-16-93

R1167



GE Nuclear Energy

GERIS 2000 Indication Evaluation Sheet

Project: TVA, Browns Ferry Unit 3

Weld ID: V-4-B

Patch: BF-048

Exam Data Sheet No.: E-14-01

Ind. Data Sheet No.: 14-003

Indication: 14-003

Flaw Thruwall Dimension = 0.44

Flaw Length "I" = 1.75

Seperation with clad "S" = 1.13

Surface Separation "S" = 0.94

T measured = 6.53

Clad T nominal = 0.19

Flaw is unacceptable by Table IWB-3510-1

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

a/l	Surface %	Subsurface	Surface %	Subsurface %
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0.05	2.00	2.2	~	~
0.10	2.20	2.5	2.36	2.71 Y
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	~	~
			Allowed	Allowed
			2.36	2.71

a = 0.222

a/l value = 0.127

Y = 1.000

Flaw is Subsurface

Allowed a/t = 2.71%

a/t = 3.40%

Comments: The size of this indication was determined with information from
Examination Data Sheet No. E-12-02: Indication Data Sheet No. 12-015.



GE Nuclear Energy

**GERIS 2000 Indication
Evaluation Sheet**

Project: TVA, Browns Ferry Unit 3

Weld ID: V-4-B

Patch: BF-048

Exam Data Sheet No.: E-14-01

Ind. Data Sheet No.: 14-004

Indication: 14-004

Flaw Thruwall Dimension = 0.44

Flaw Length "I" = 1.75

Seperation with clad "S" = 1.13

Surface Separation "S" = 0.94

T measured = 6.53

Clad T nominal = 0.19

Flaw is unacceptable 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	2.36	2.71 Y
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	~	~
			Allowed	Allowed
			2.36	2.71

a = 0.222

a/l value = 0.127

Y = 1.000

Flaw is Subsurface

Allowed a/t = 2.71%

a/t = 3.40%

Comments: The size of this indication was determined with information from
Examination Data Sheet No. E-12-02: Indication Data Sheet No. 12-015.



GE Nuclear Energy

GERIS 2000 Indication Data Sheet

Project: TVA, Browns Ferry, Unit 3

Weld ID: V-4-B

Cal. ID: C-001

Exam Data Sheet No.: E-14-01**Patch ID:** BF-048

Ind. Data Sheet No.: 14-005

Indication: 14-005

Channel: 13

Angle: 60

Direction: 180

[illegible]

Comments: This indication also recorded with Ch. 5 (see 14-002), Ch. 7 (see 14-003), and Ch. 11 (see 14-004).

This indication was also recorded during the examination of weld C-3-4 as indication # 12-015.

The size of this indication was determined with the PATT technique

from Examination Data Sheet No. E-12-02; Indication Data Sheet No. 12-015.

Analyst:

Alessa Kimball

Level:

III

Date: 12-16-93

Reviewed By:

R.O. Forman

Level:

 π

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-B
Patch: BF-048

Exam Data Sheet No.: E-14-01
Ind. Data Sheet No.: 14-005
Indication: 14-005

Flaw Thruwall Dimension = 0.44
Flaw Length "l" = 1.75
Seperation with clad "S" = 1.13
Surface Separation "S" = 0.94

T measured = 6.53
Clad T nominal = 0.19

Flaw is unacceptable 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	2.36	2.71 Y
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	~	~
			Allowed	Allowed
			2.36	2.71

a = 0.222
a/l value = 0.127
Y = 1.000

Flaw is Subsurface

Allowed a/t = 2.71%
a/t = 3.40%

Comments: The size of this indication was determined with information from
Examination Data Sheet No. E-12-02: Indication Data Sheet No. 12-015.



GE Nuclear Energy

GERIS 2000 Indication Data Sheet

Project: TVA, Browns Ferry, Unit 3

Weld ID: V-4-B

Cal. ID: C-001

Exam Data Sheet No.: E-14-01

Patch ID: BF-048

Ind. Data Sheet No.: G-100

Indication: G-100

Channel: 1

Angle: 0

Direction: 0

[illegible]

Comments: Above area is loss of BW due to stabilizer bracket @ 45° and can also be seen with Channels 2, 15 and 16.

Analyst: Veresa Kimball

Level: III Date: 12-16-93

Reviewed By: R.D. Forman

Level: II Date: 12-16-93



GE Nuclear Energy

GERIS 2000 Indication Data Sheet

Project: TVA, Browns Ferry, Unit 3

Weld ID: V-4-B

Cal. ID: C-001

Exam Data Sheet No.: E-14-01**Patch ID:** BF-048

Ind. Data Sheet No.: G-101

Indication: G-101

Channel: 7

Angle: 45

Direction: 0

[illegible]

Comments: OD geometry due to stabilizer bracket @ 45°

Analyst:

Analyst: Quessa Kimball

Level:

Level: III

Date: 12-16-93

Reviewed By:

Reviewed By: R.O. Forman

Level:

Level: π

Date: 12-16-93



GE Nuclear Energy

GERIS 2000 Indication Data Sheet

Project: TVA, Browns Ferry, Unit 3

Weld ID: V-4-B

Cal. ID: C-001

Exam Data Sheet No.: E-14-01**Patch ID: BF-048****Ind. Data Sheet No.: G-102**

Indication: G-102

Channel: 8

Angle: 45

Direction: 90

[illegible]

Comments: OD geometry due to stabilizer bracket at 45°.

Analyst: Jeresa Kimball

Level: III

Date: 12-16-93

Reviewed By: R. O. Forman

Level: II

Date: 12-16-93



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Ind. Data Sheet No.: G-103

Direction: 180

[illegible]

Comments: OD geometry due to stabilizer bracket at 45°.

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 Data Sheet

Project: TVA, Browns Ferry, Unit 3

Weld ID: V-4-B

Cal. ID: C-001

Exam Data Sheet No.: E-14-01

Patch ID: BF-048

Ind. Data Sheet No.: G-104

Indication: G-104

Channel: 10

Angle: 45

Direction: 270

[illegible]

Comments: OD geometry due to stabilizer bracket at 45°.

Analyst: Jenna Kimball

Level: III Date: 12-16-93

Reviewed By: R.D. Forman

Level: II Date: 12-16-93



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GERIS 2000 Indication Data Sheet

Project: TVA, Browns Ferry, Unit 3

Weld ID: V-4-B

Cal. ID: C-001

Exam Data Sheet No.: E-14-01

Patch ID: BF-048**Ind. Data Sheet No.: G-105**

Indication: G-105

Channel: 11

Angle: 60

Direction: 0

[illegible]

Comments: OD geometry due to stabilizer bracket at 45°.

Analyst:

Jesusa Kimball

Level:

III

Date:

12-110-93

Reviewed By:

R.O. Forman

Level:

 π

Date:

12-16-93



GE Nuclear Energy

GERIS 2000 Indication Data Sheet

Project: TVA, Browns Ferry, Unit 3

Weld ID: V-4-B

Cal. ID: C-001

Exam Data Sheet No.: E-14-01

Patch ID: BF-048**Ind. Data Sheet No.: G-106**

Indication: G-106

Channel: 12

Angle: 60

Direction: 90

[illegible]

Comments: OD geometry due to stabilizer bracket at 45°.

Analyst: Kenna Kimball

Level: III Date: 12-16-93

Reviewed By: K.D. Forman

Level: II Date: 12-16-93



GE Nuclear Energy

GERIS 2000 Indication Data Sheet

Project: TVA, Browns Ferry, Unit 3

Weld ID: V-4-B

Cal. ID: C-001

Exam Data Sheet No.: E-14-01

Patch ID: BF-048

Ind. Data Sheet No.: G-107

Indication: G-107

Channel: 13

Angle: 60

Direction: 180

[illegible]

Comments: OD geometry due to stabilizer bracket at 45°.

Analyst:

Analyst: Alexa Kimball

Level:

Level: III Date: 12-16-93

Reviewed By:

Reviewed By: R.O. Forman

Level:

Level: II Date: 12-16-93



GE Nuclear Energy

GERIS 2000 Indication Data Sheet

Project: TVA, Browns Ferry, Unit 3

Weld ID: V-4-B

Cal. ID: C-001

Exam Data Sheet No.: E-14-01

Patch ID: BF-048**Ind. Data Sheet No.: G-108**

Indication: G-108

Channel: 14

Angle: 60

Direction: 270

[illegible]

Comments: OD geometry due to stabilizer bracket at 45°.

Analyst:

Analyst: Debra Kimball

Level:

Level: III

Date: 12-16-93

Date: 12-16-93

Reviewed By:

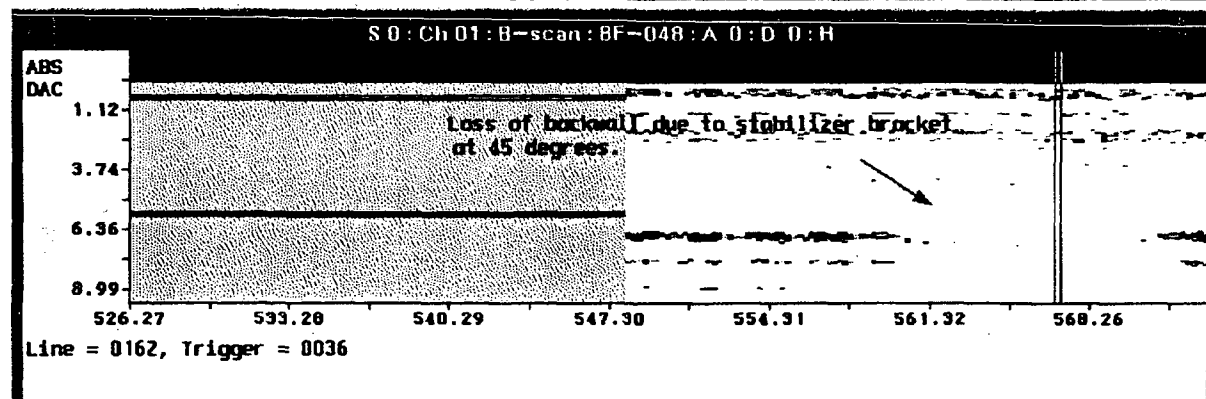
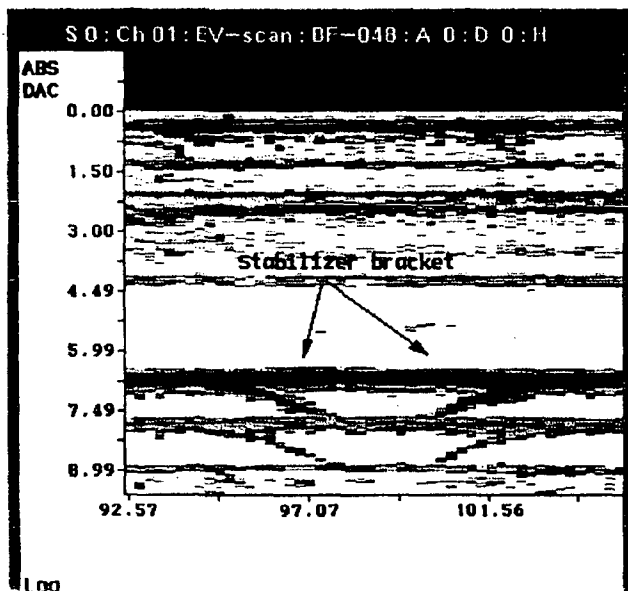
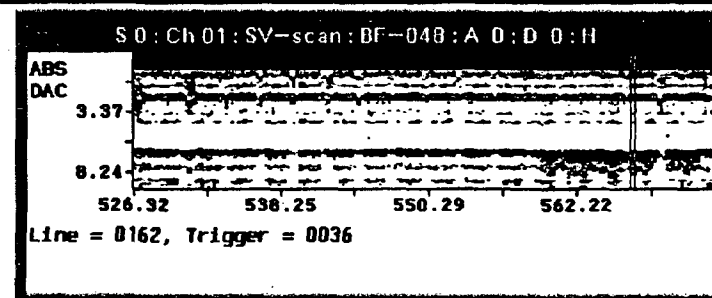
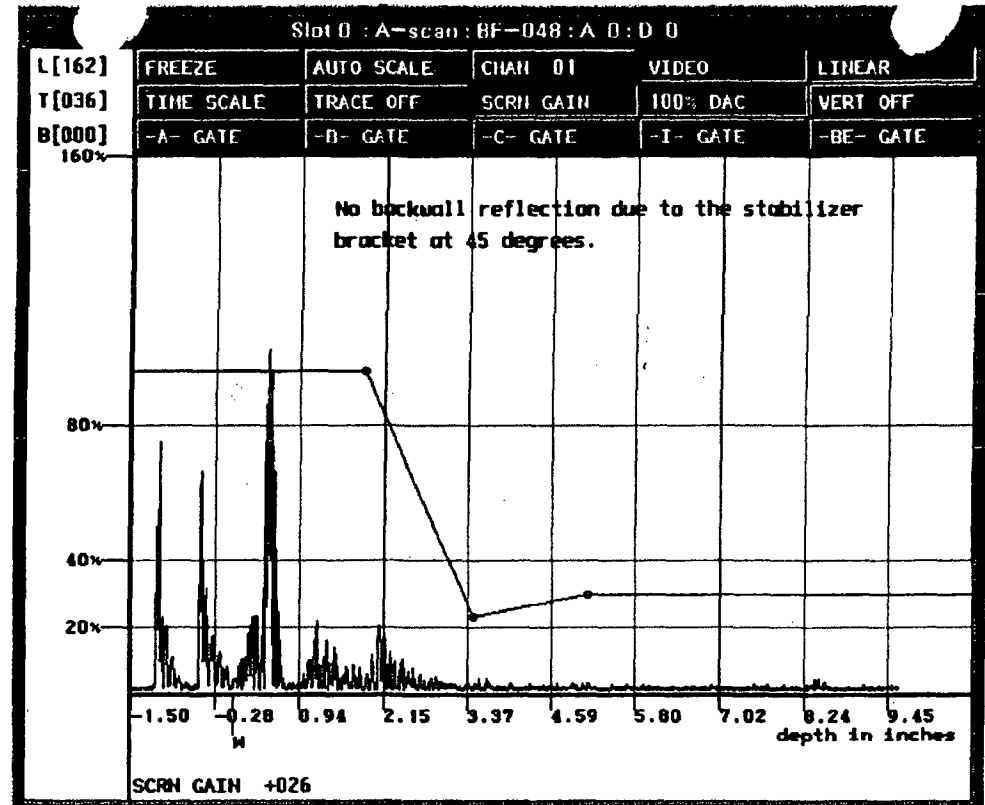
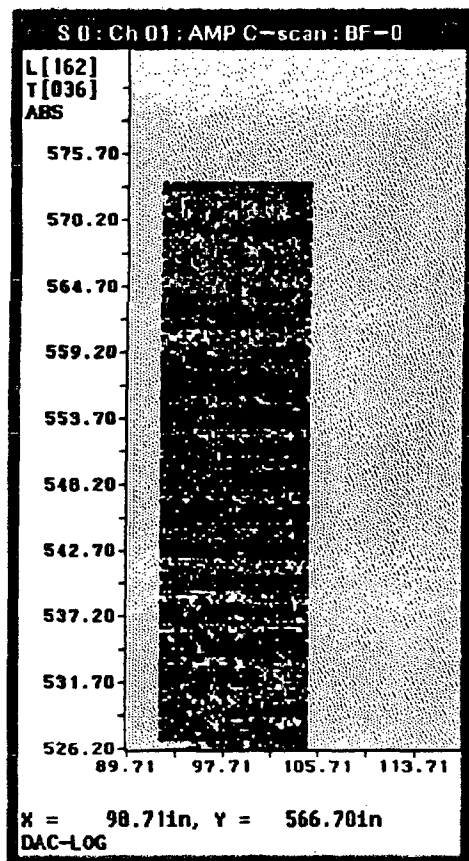
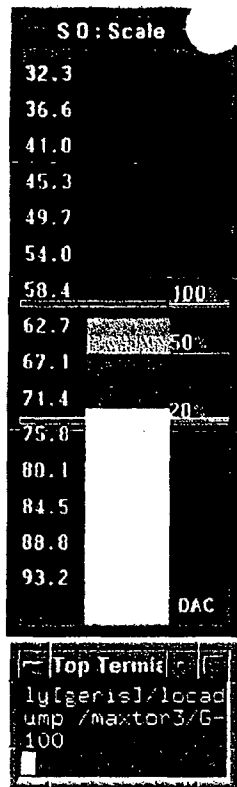
Reviewed By: R.O. Forman

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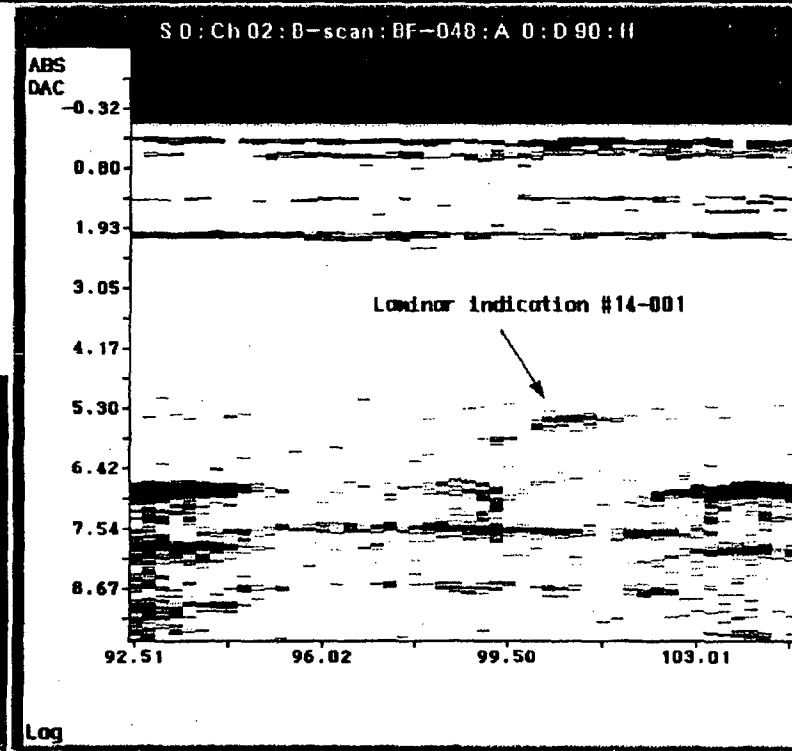
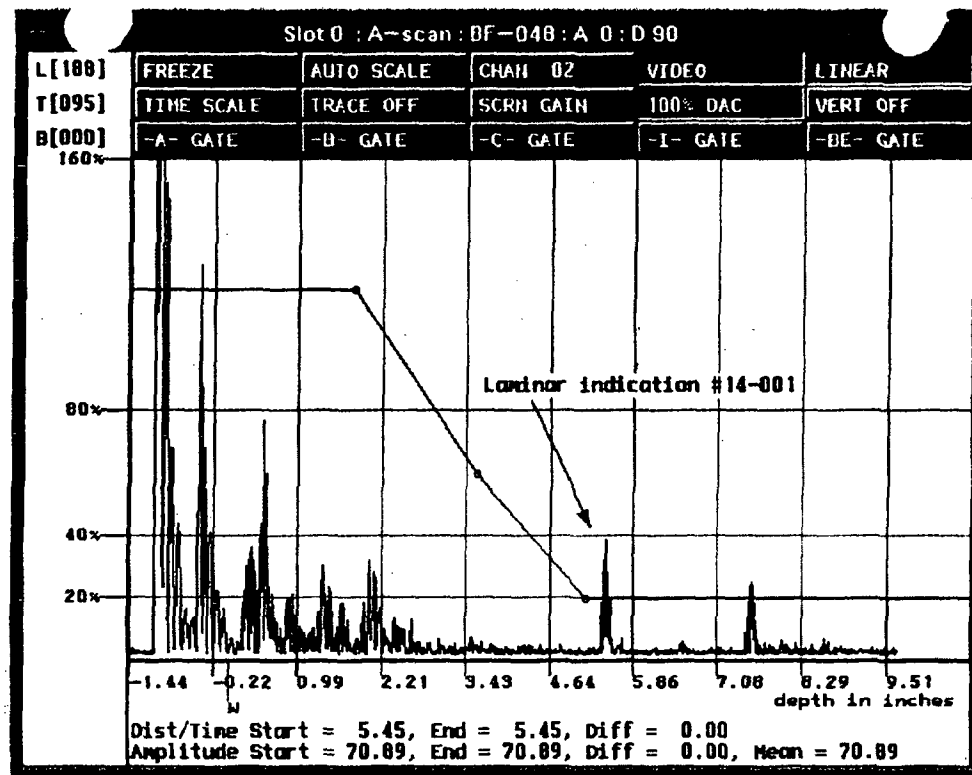
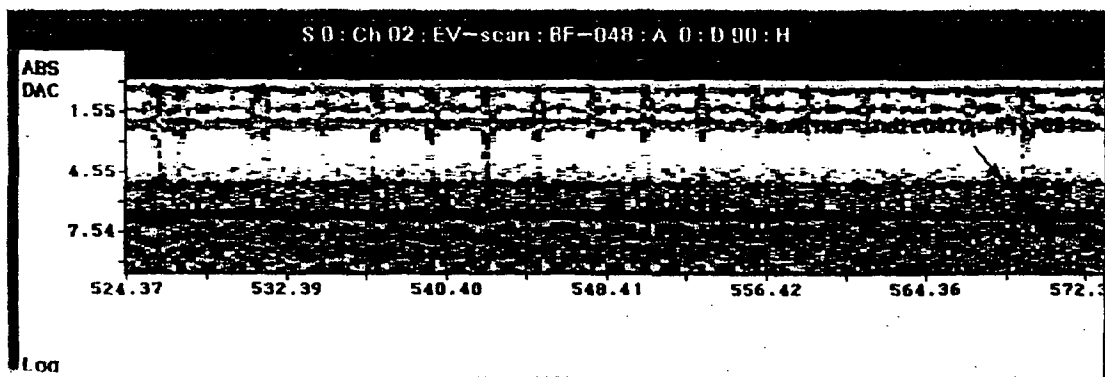
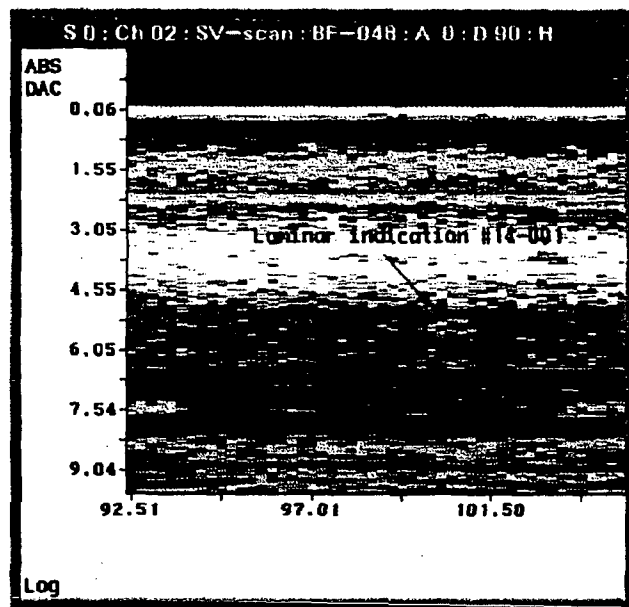
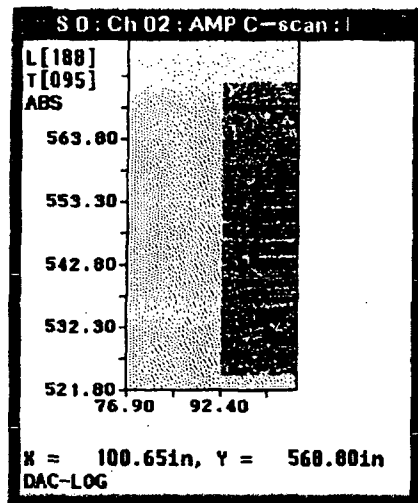
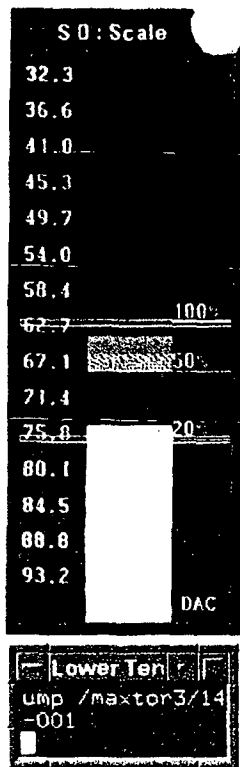
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Date: 12-16-93

Date: 12-16-93

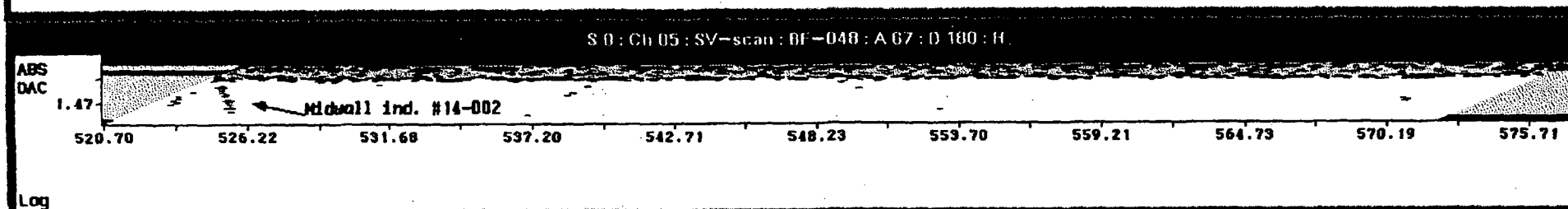
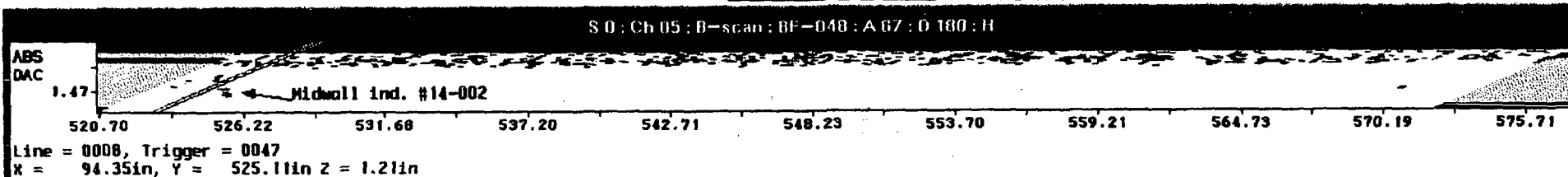
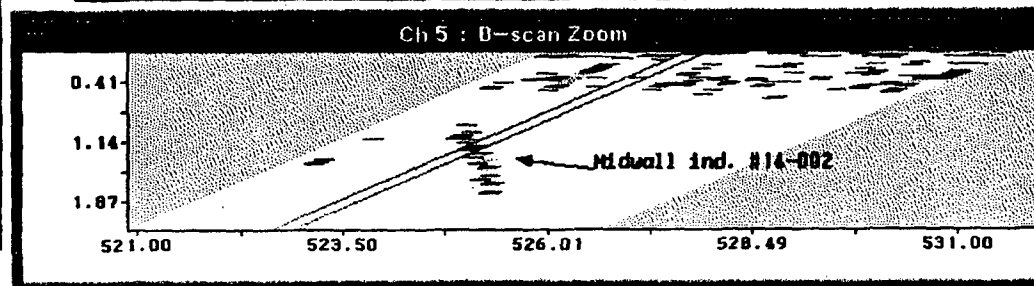
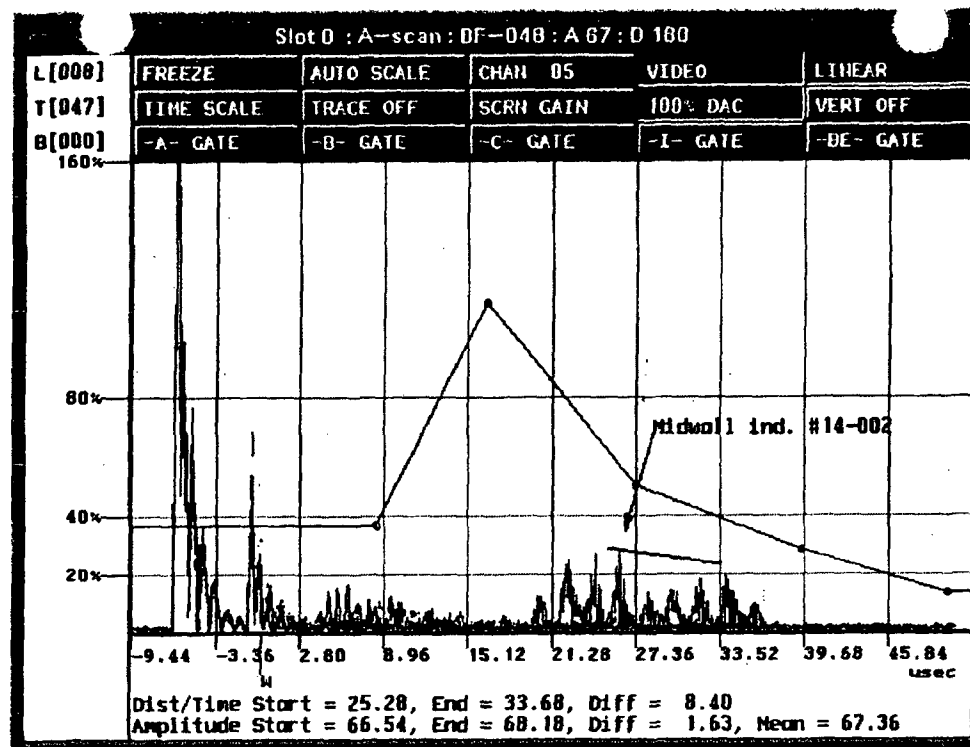
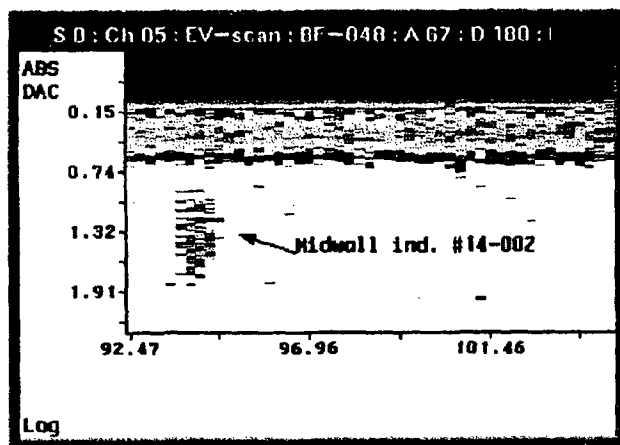
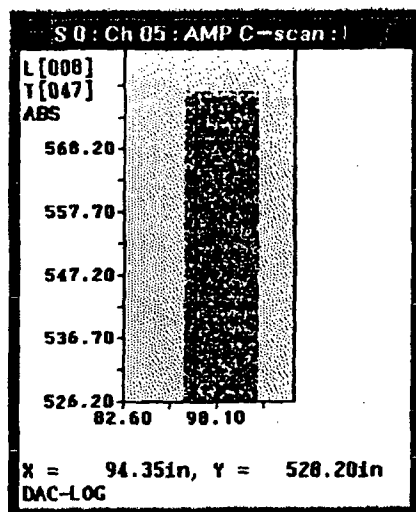
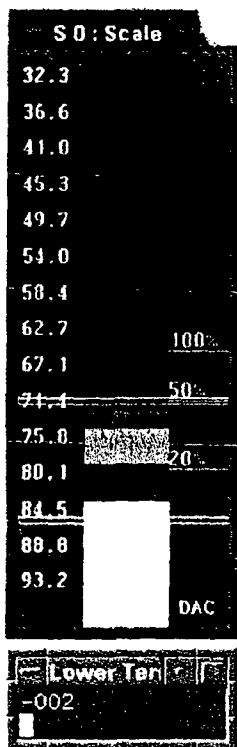


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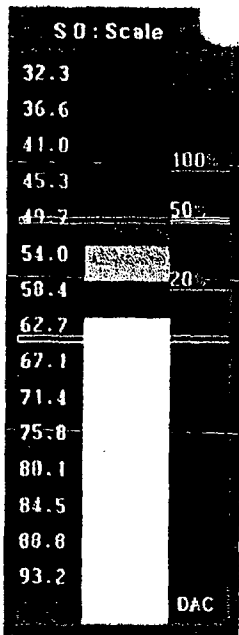
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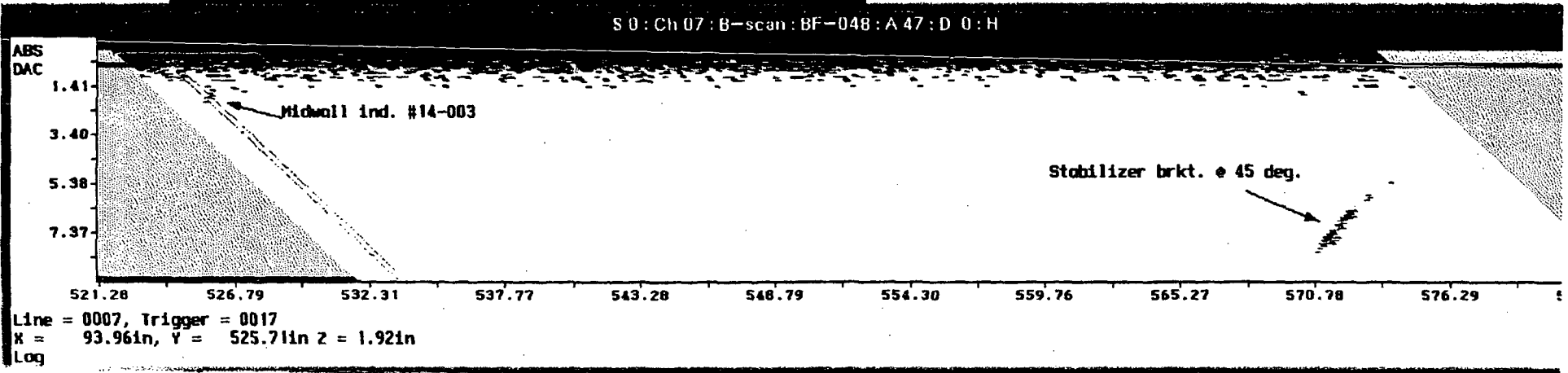
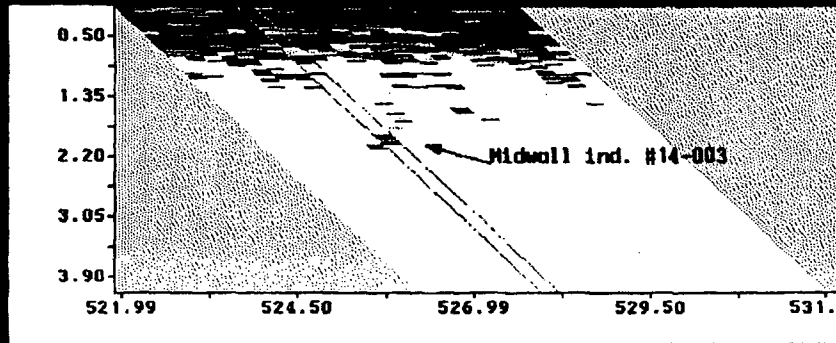
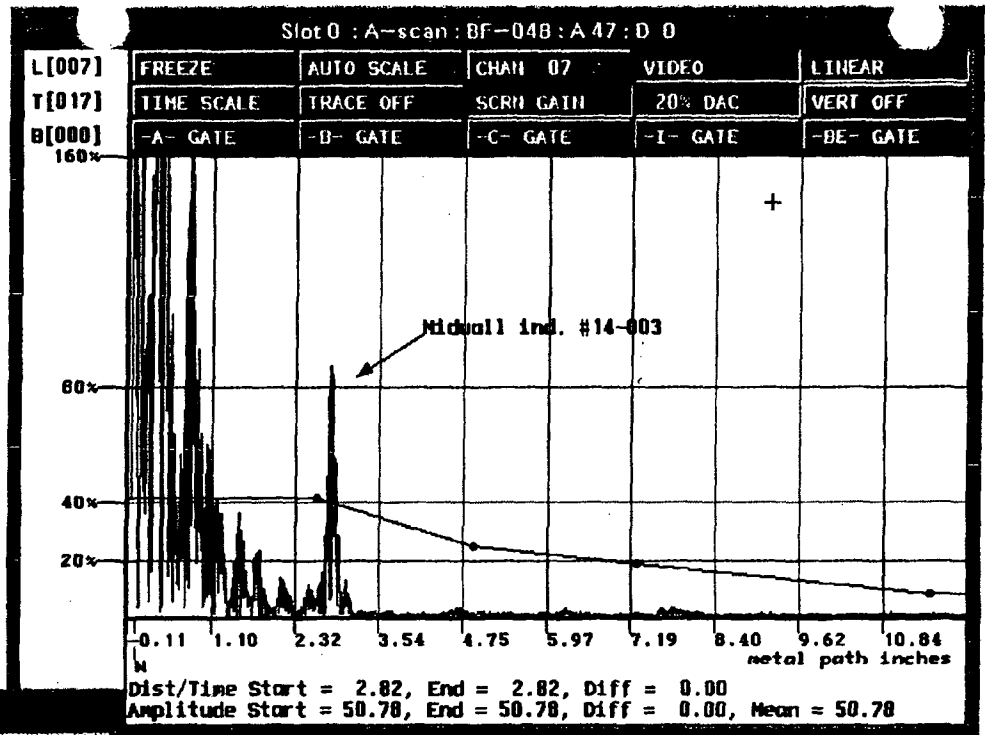
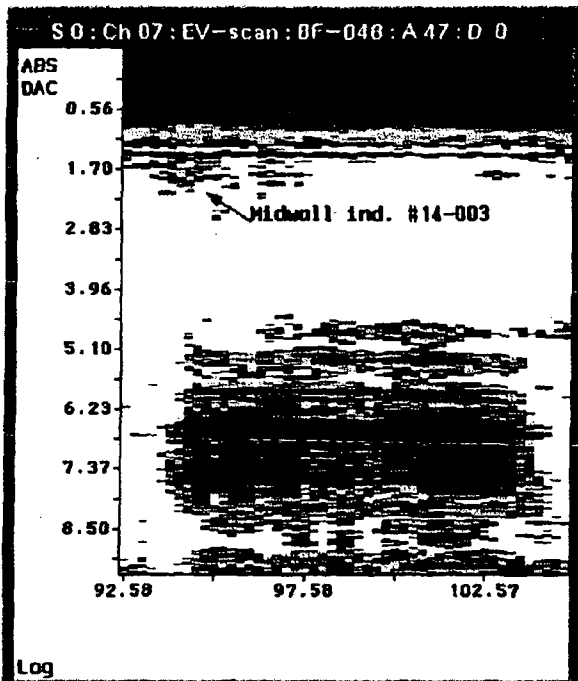


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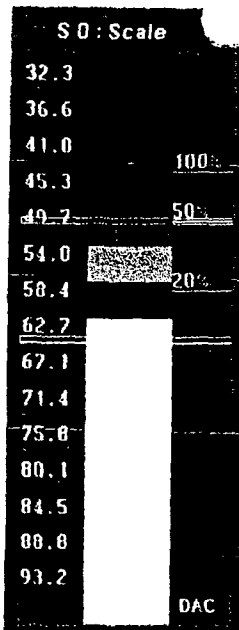
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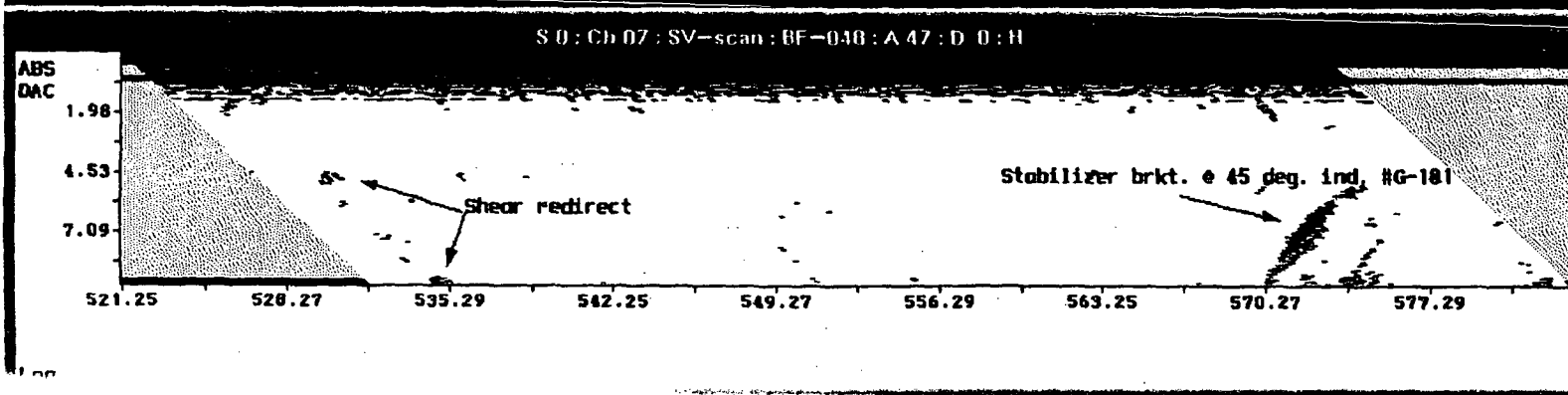
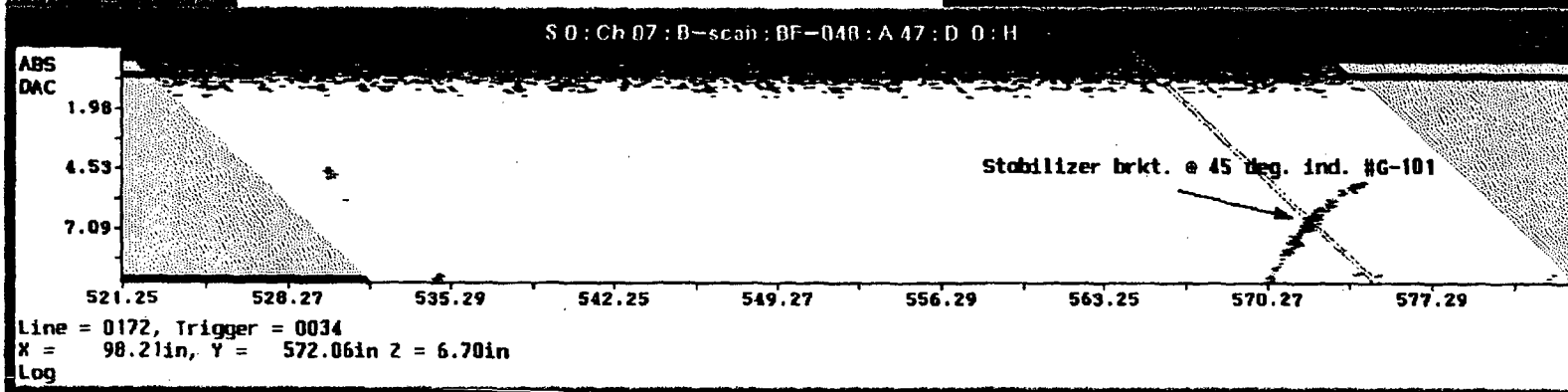
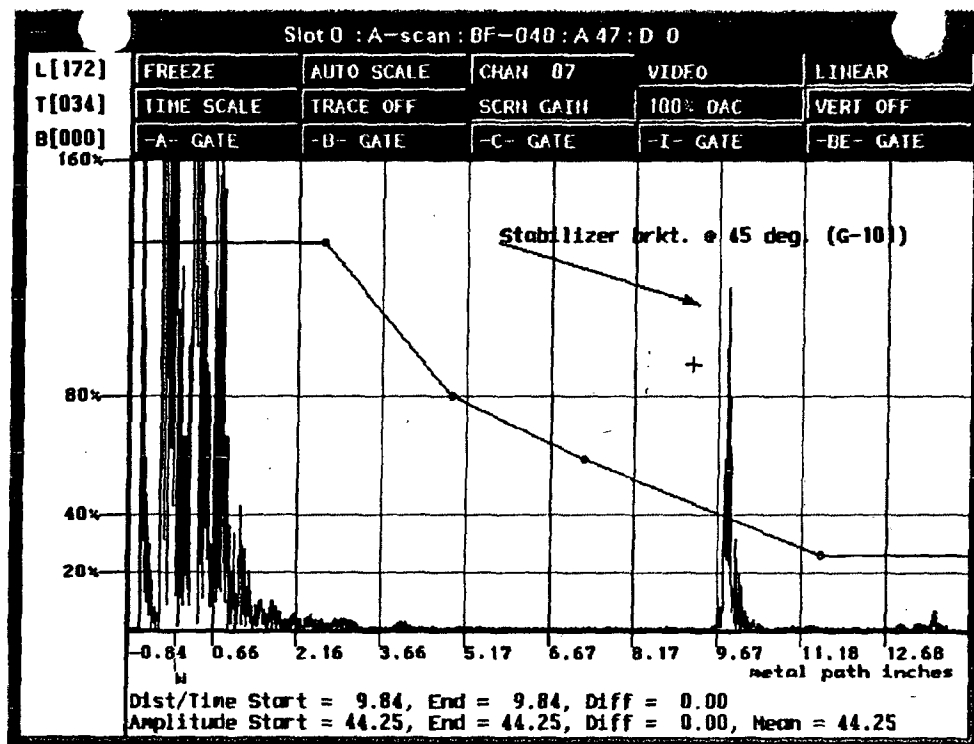
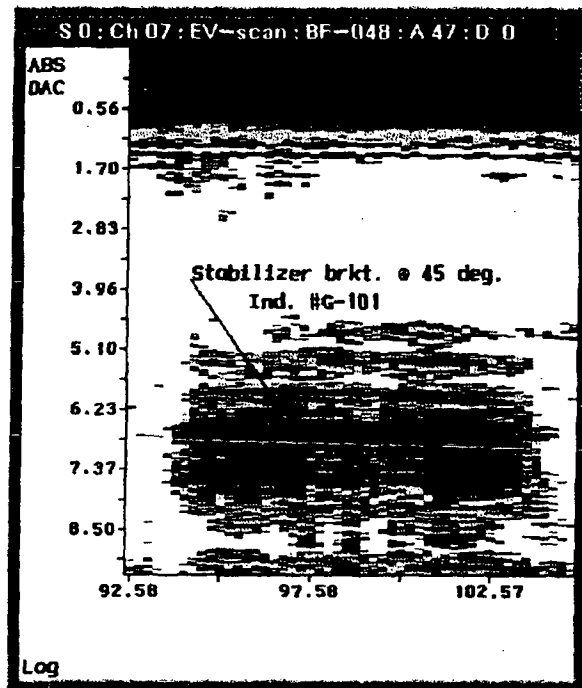
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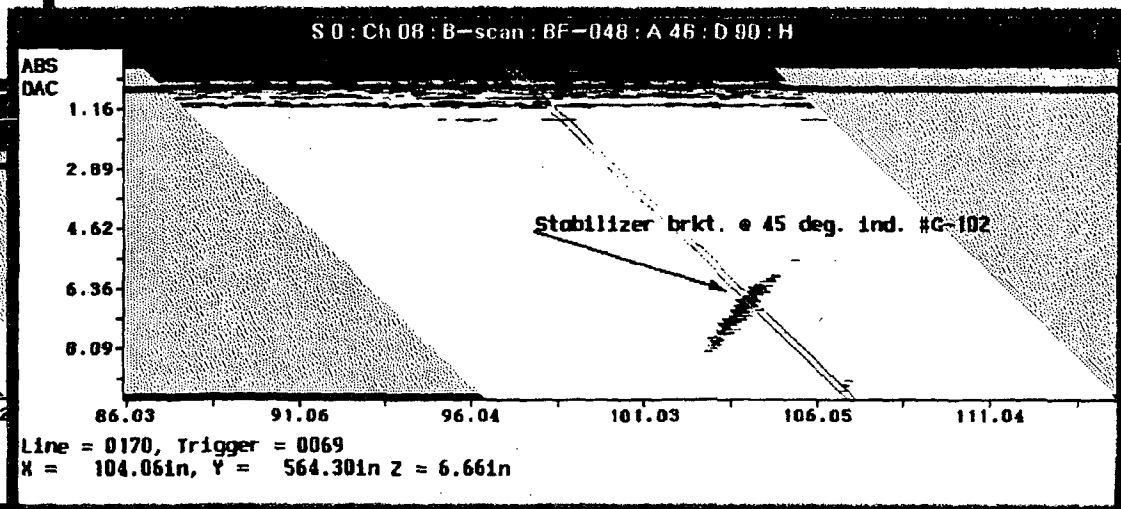
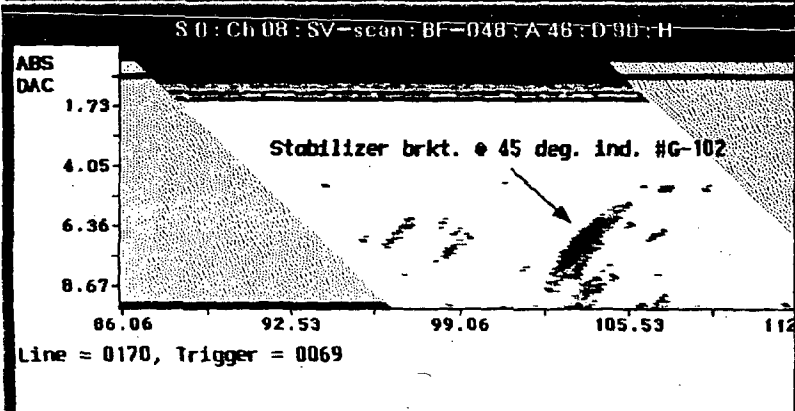
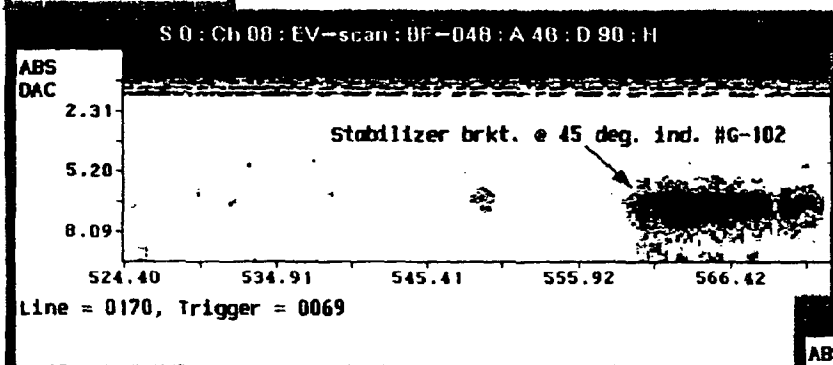
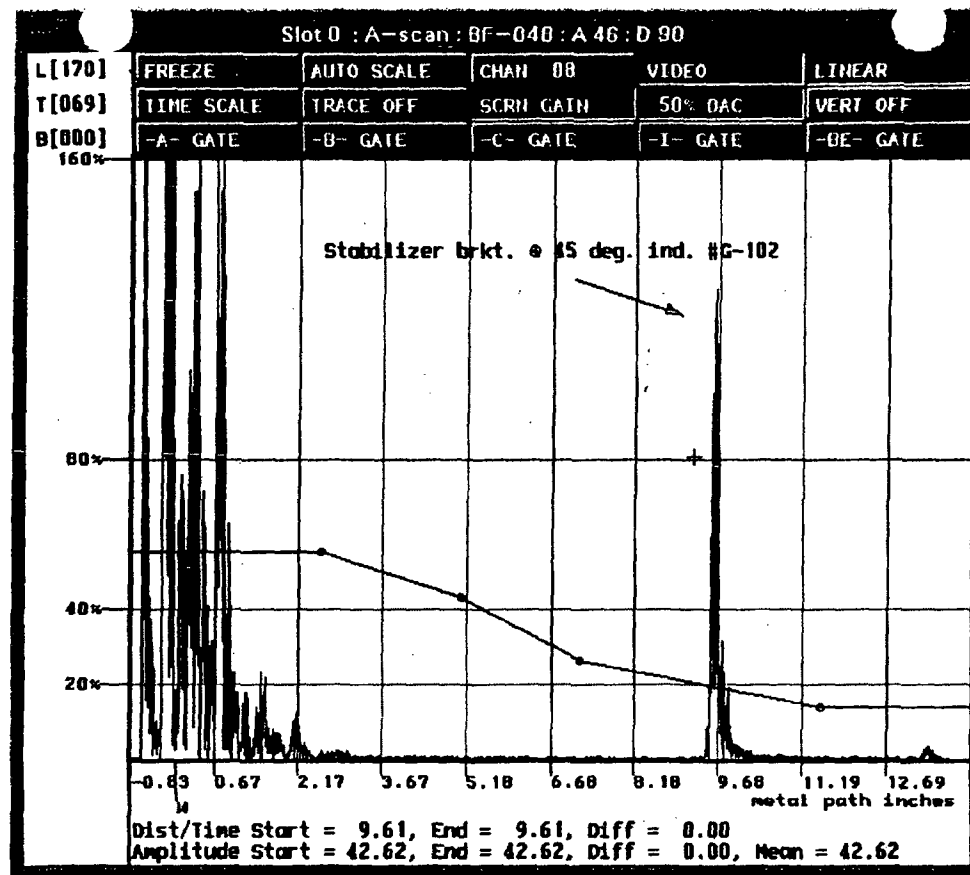
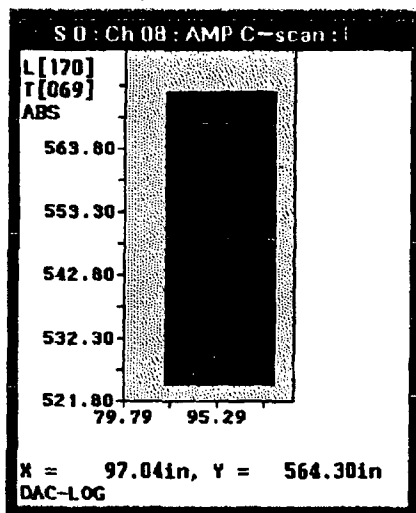
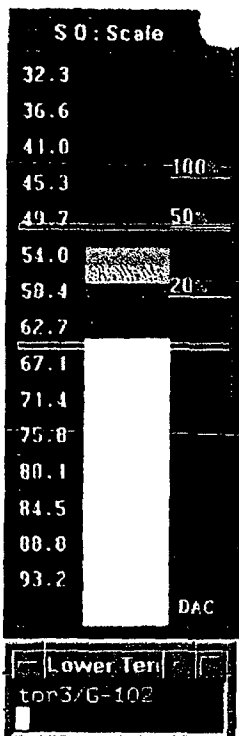
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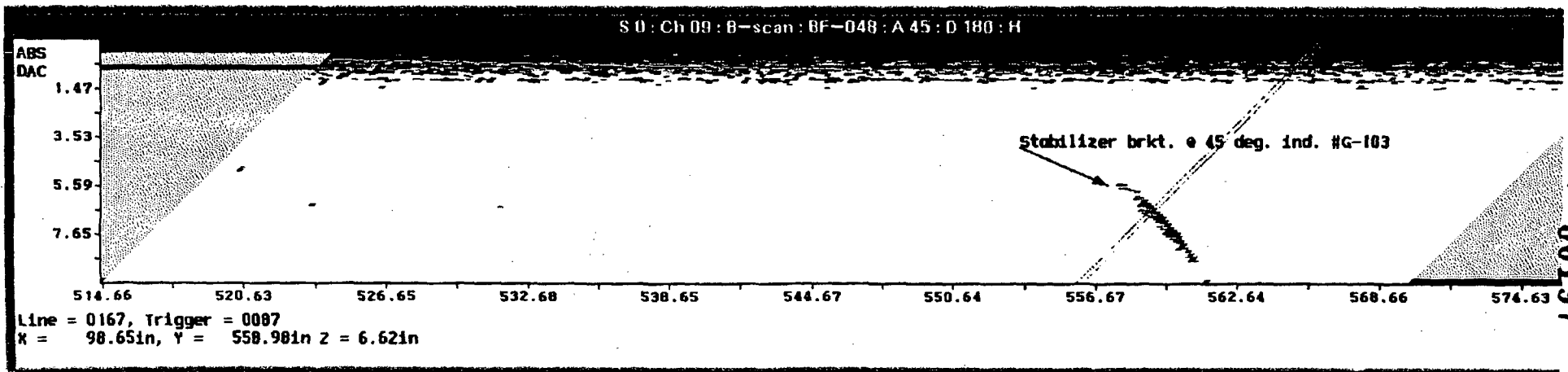
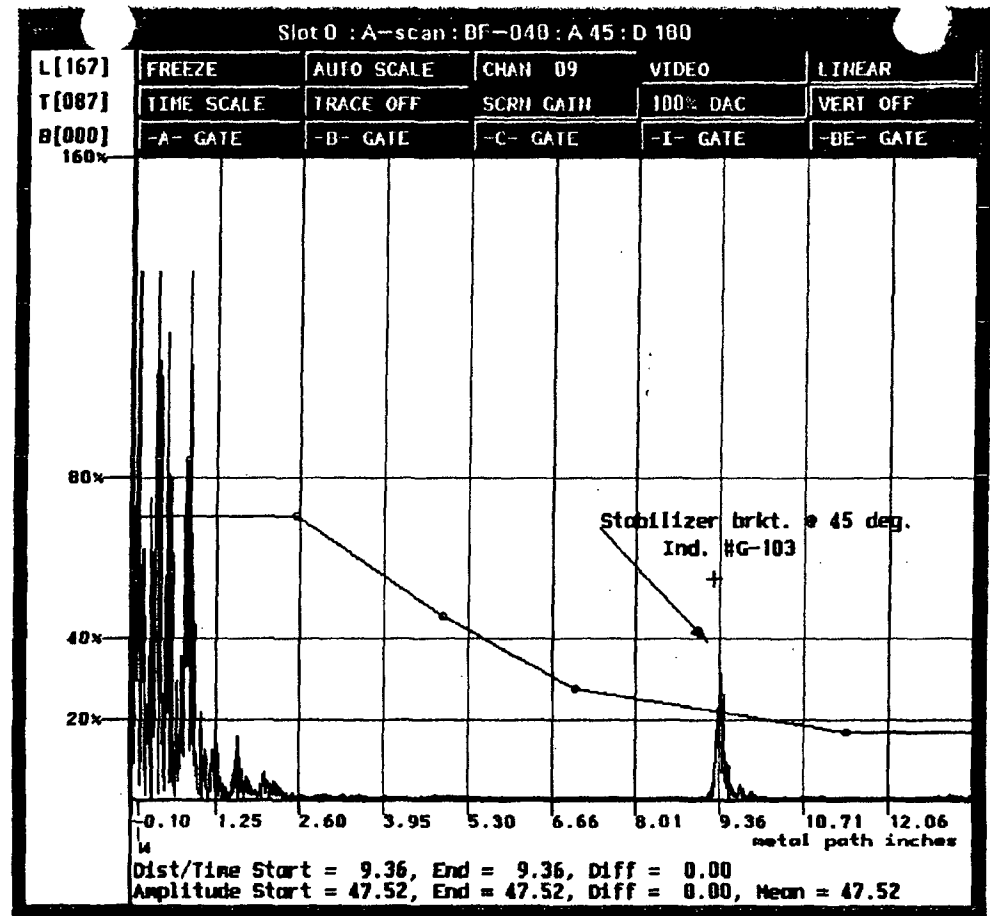
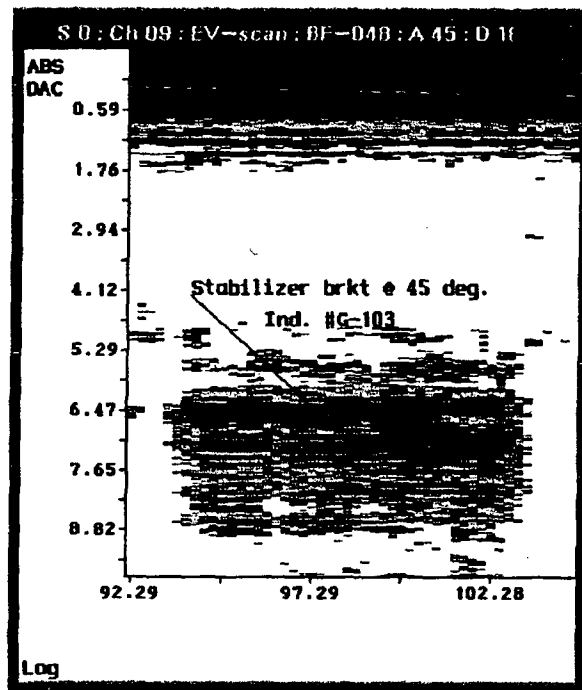
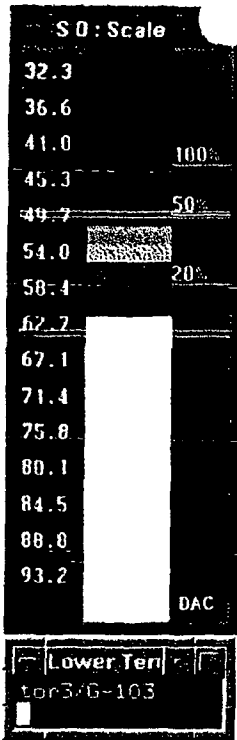
Lower Ter
tor3/G-101



R1167
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4 00195



R116 1
290F39
00196



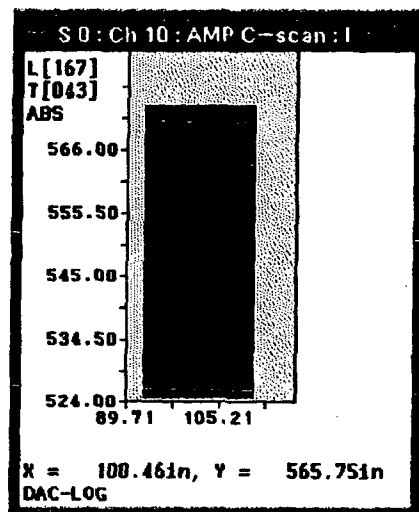
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00197
K1161

S 0 : Scale

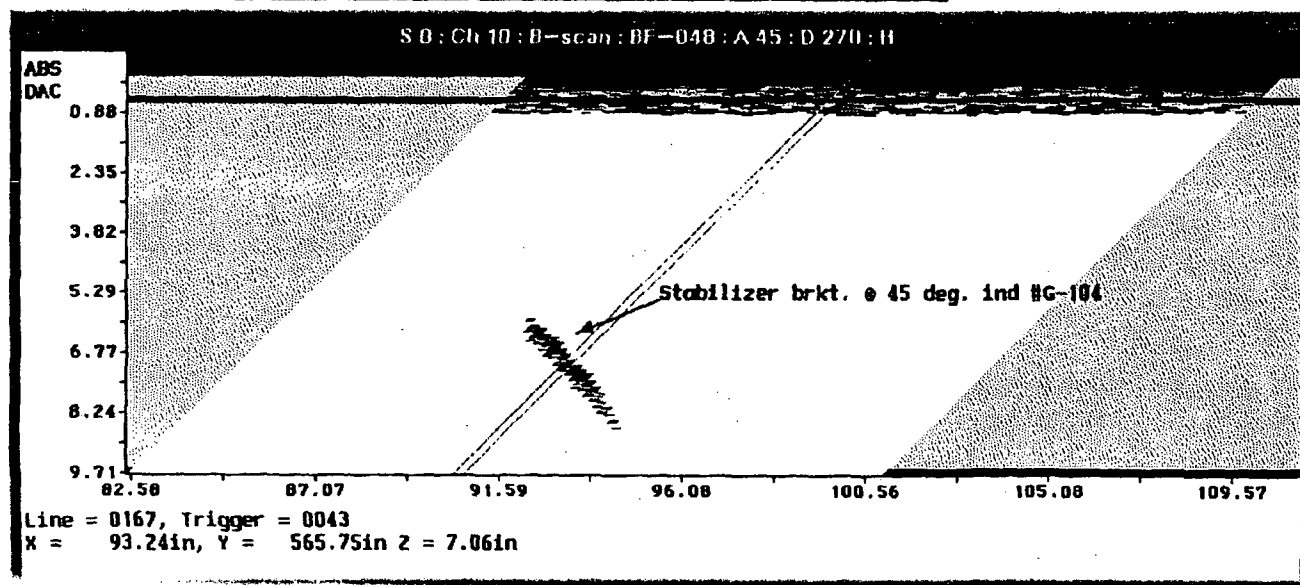
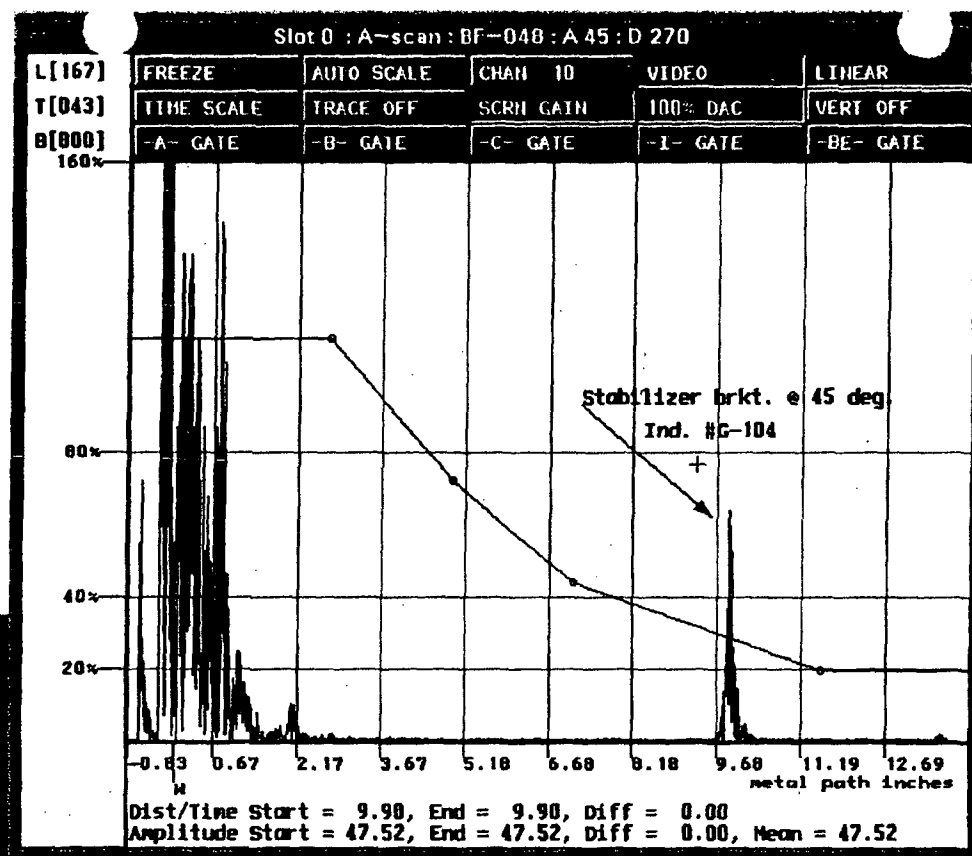
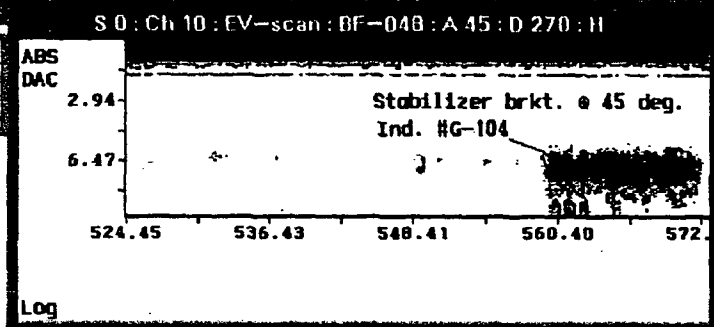
32.3
36.6
41.0
45.3
49.7
54.0
58.4
62.7
67.1
71.4
75.8
80.1
84.5
88.8
93.2

100%
50%
20%

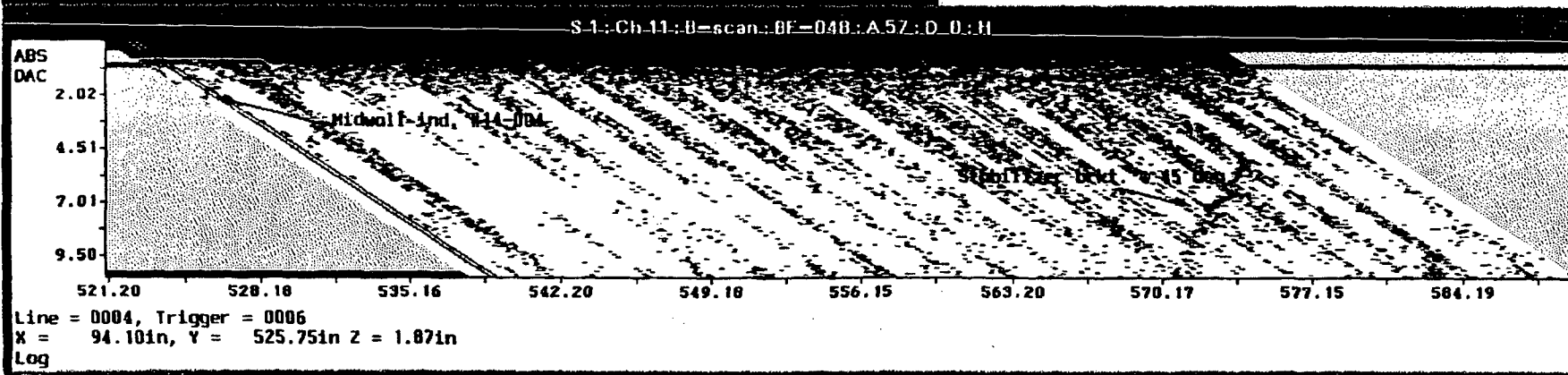
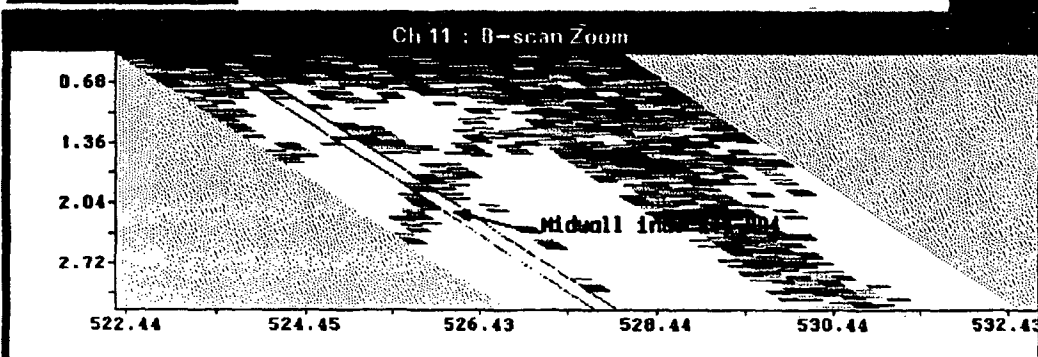
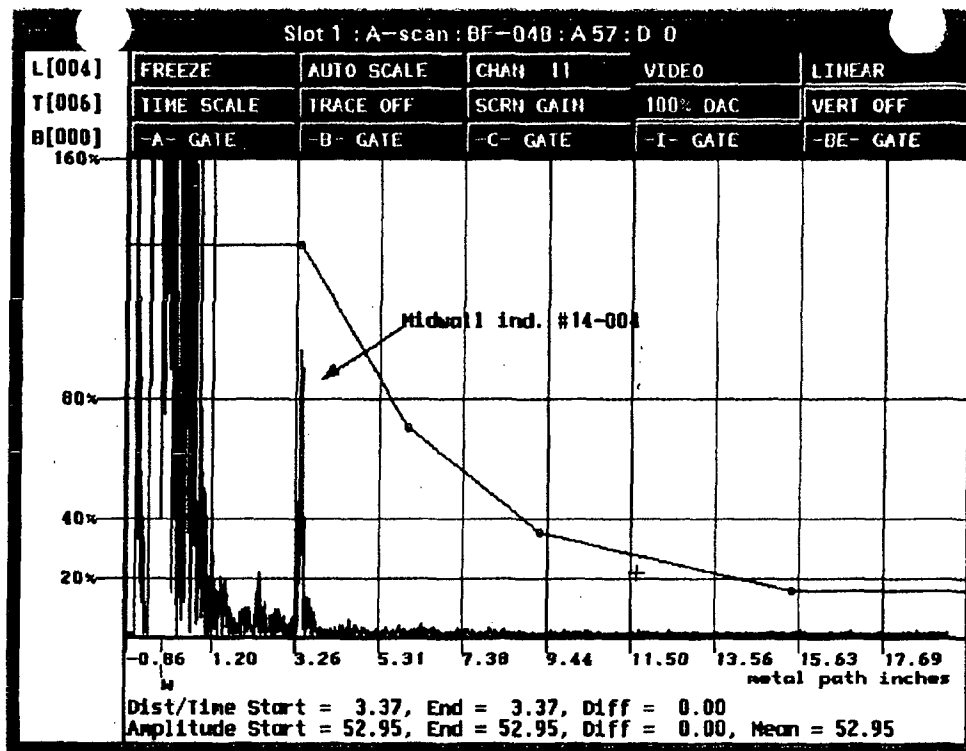
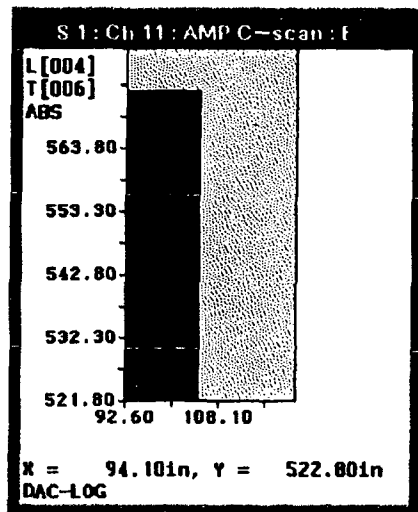
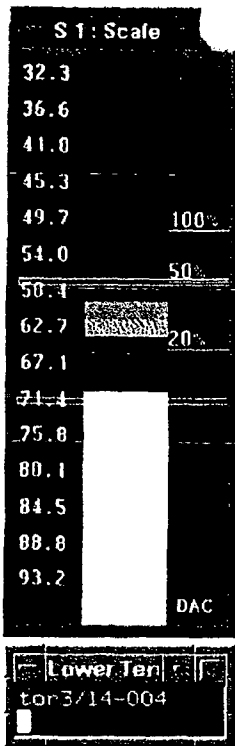
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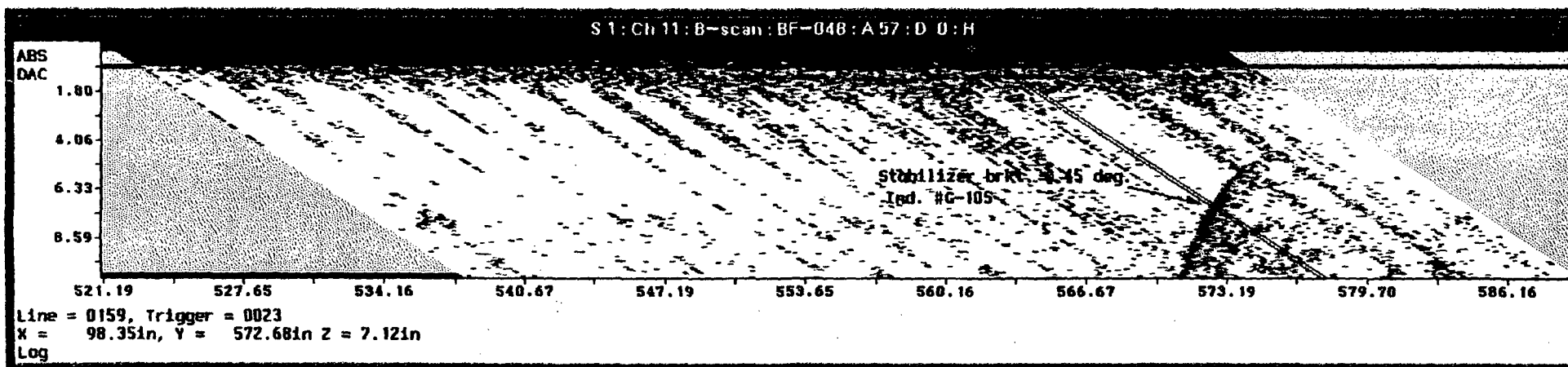
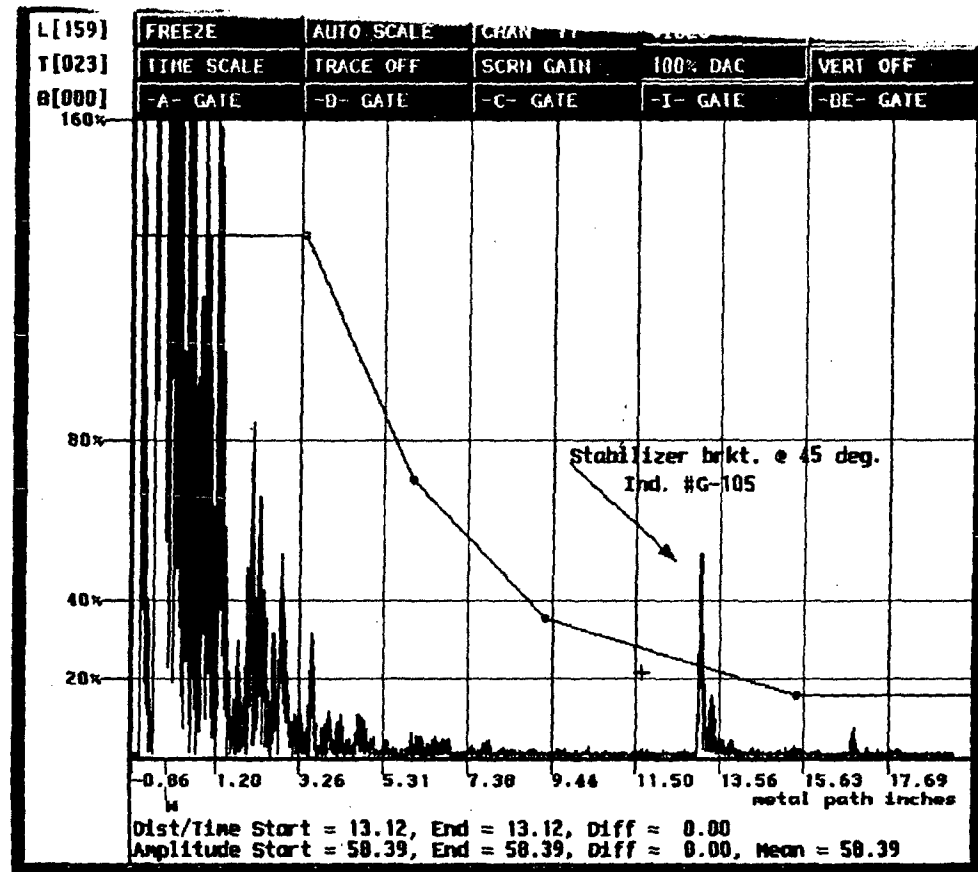
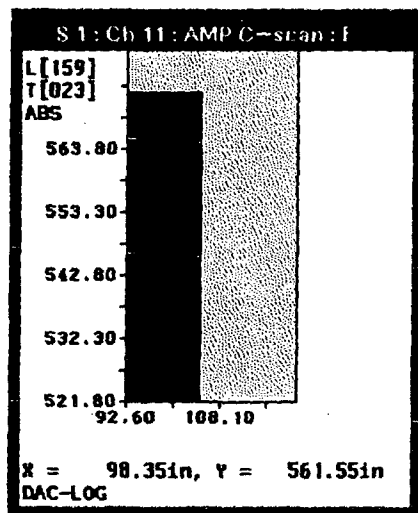
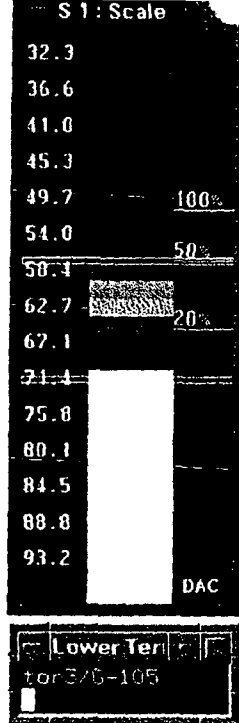
Lower Ter
104



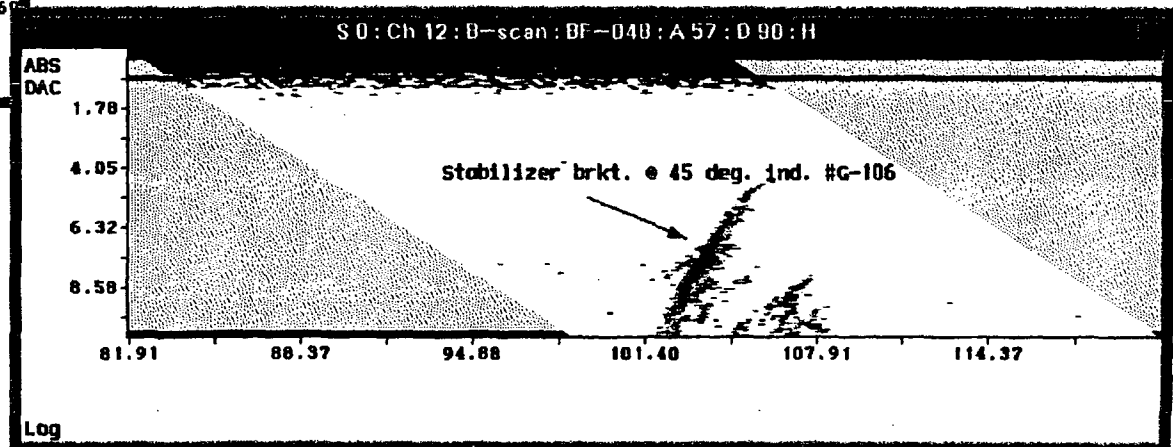
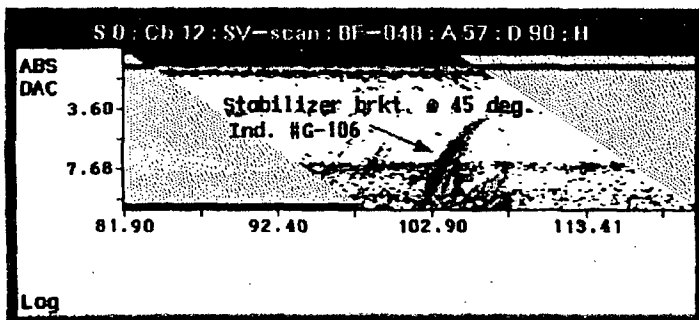
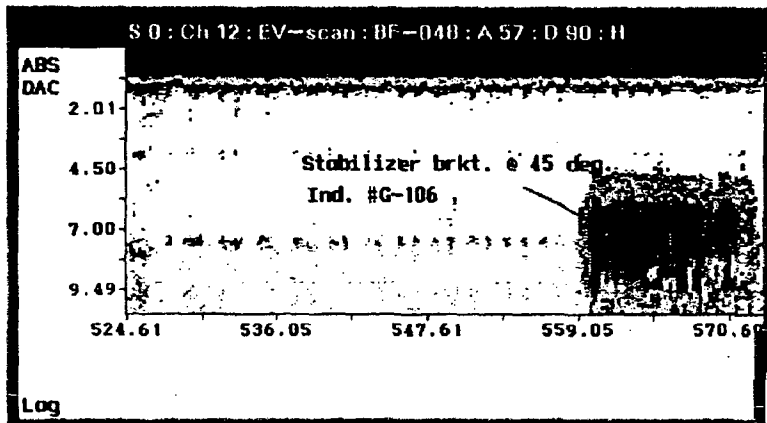
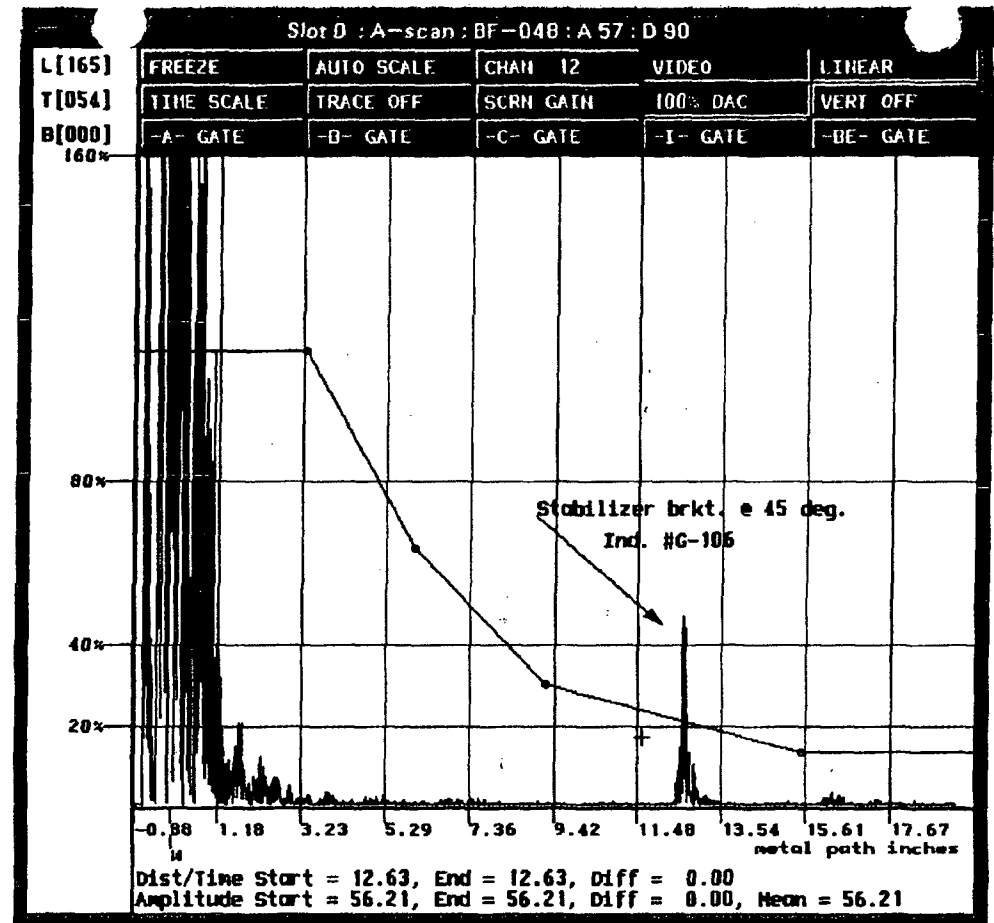
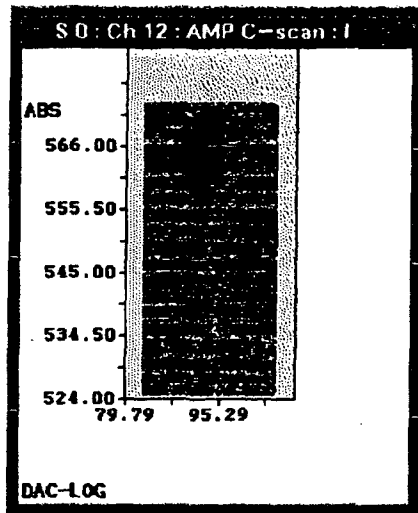
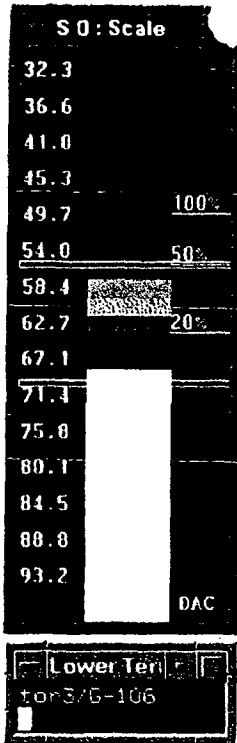
K1161
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00198



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00199



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00200



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K1161
00201

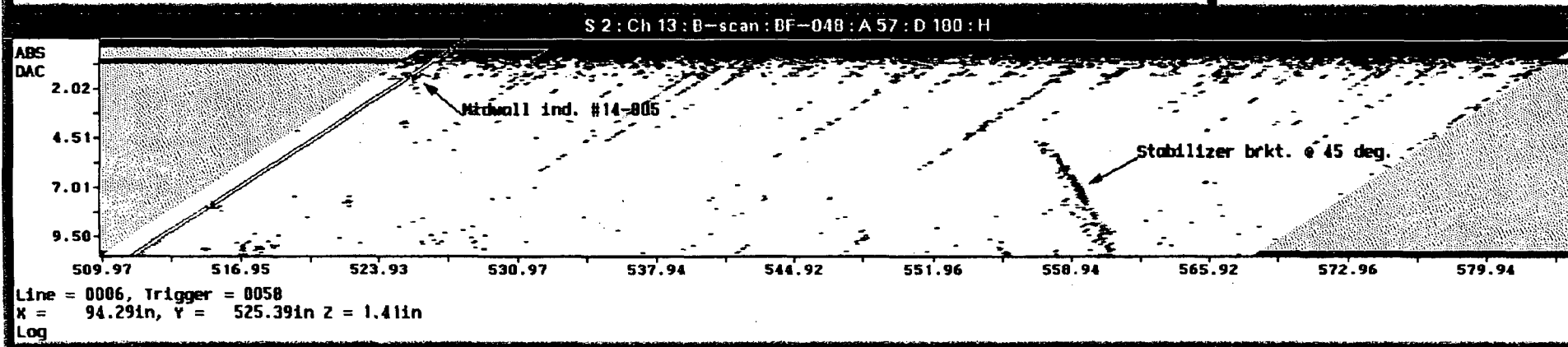
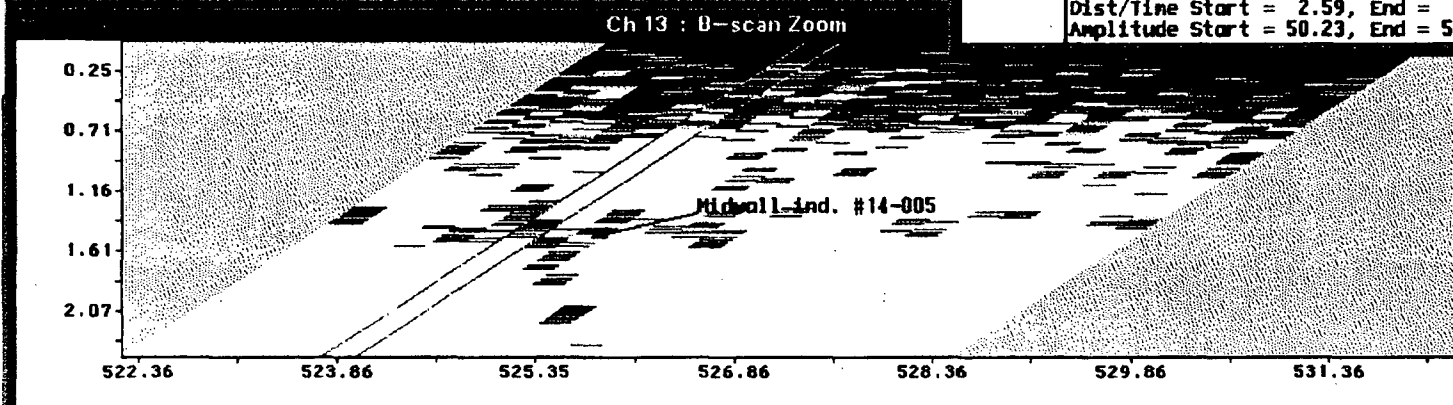
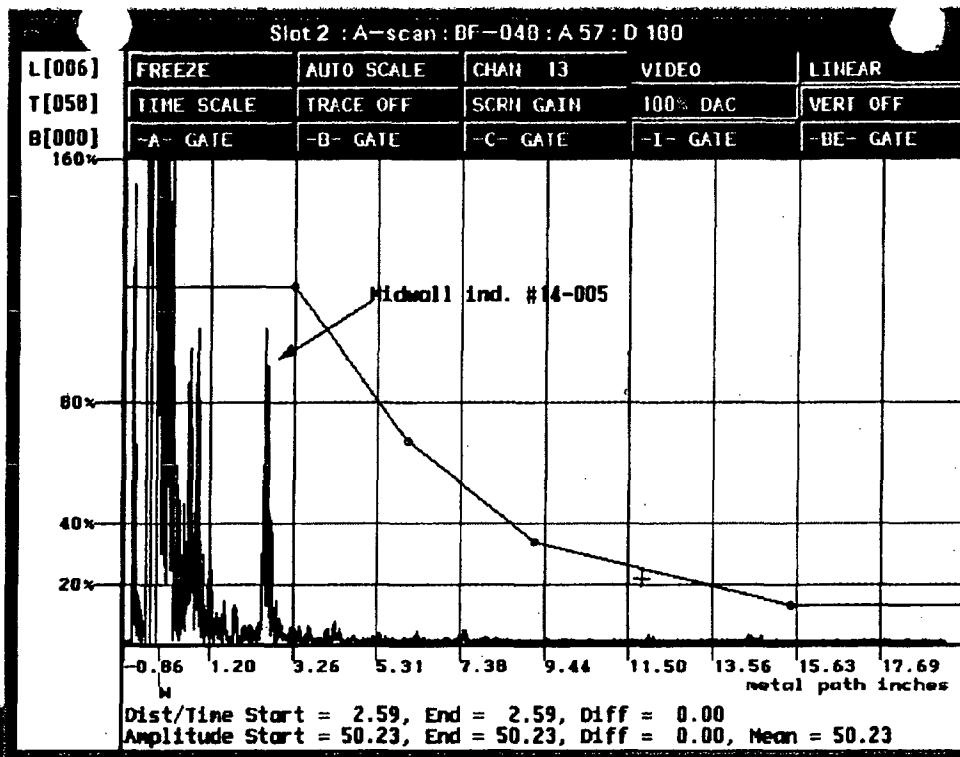
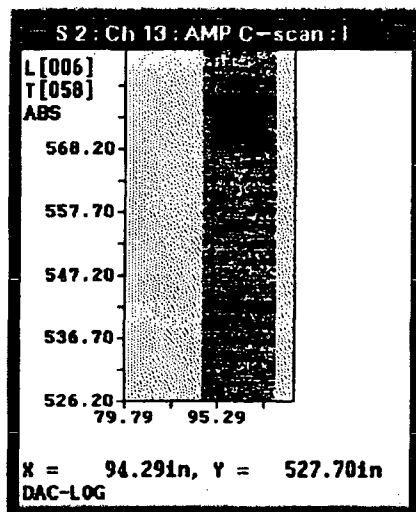
S 2 : Scale

32.3
36.6
41.0
45.3
49.7
54.0
58.4
62.7
67.1
71.4
75.8
80.1
84.5
88.8
93.2

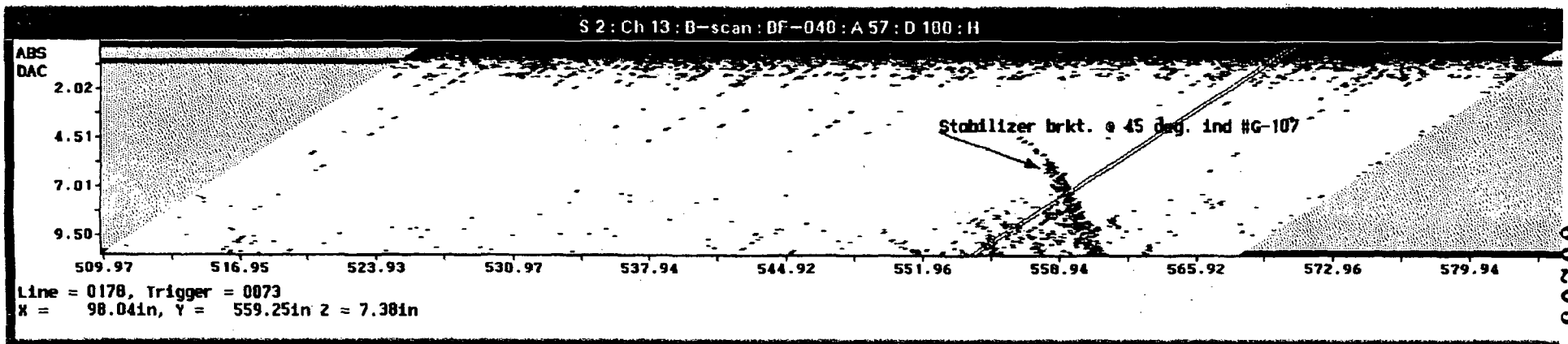
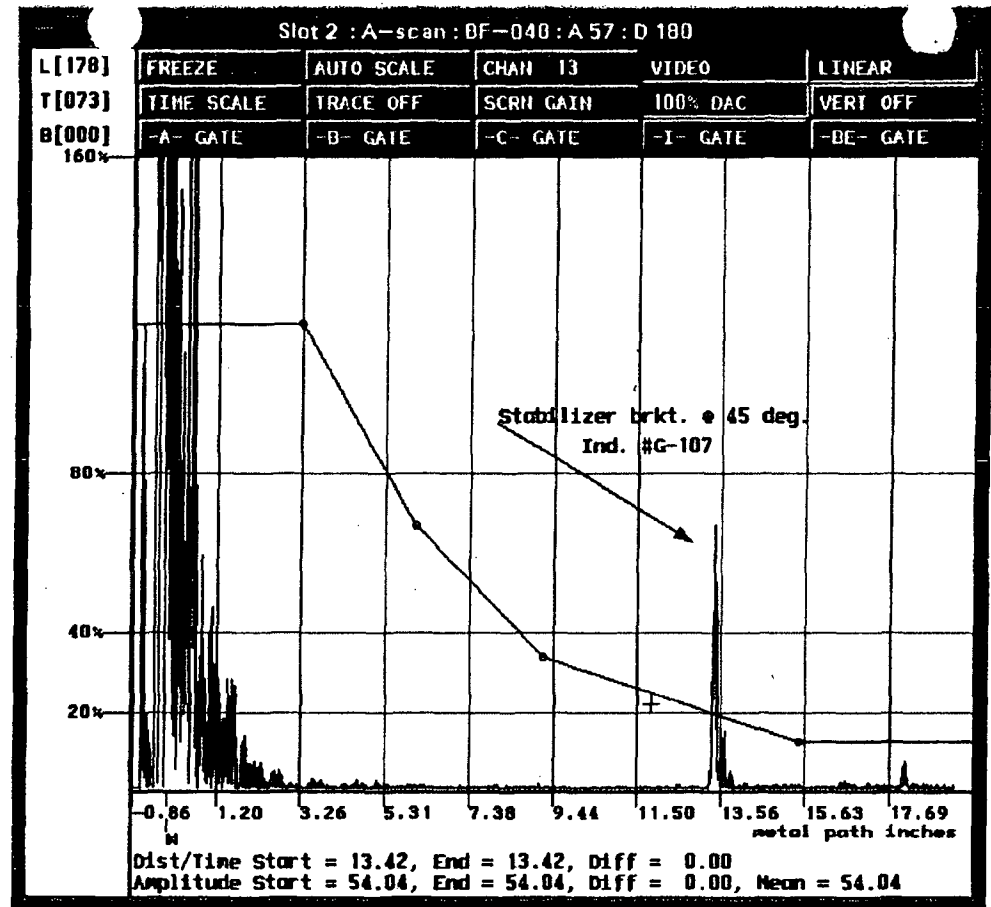
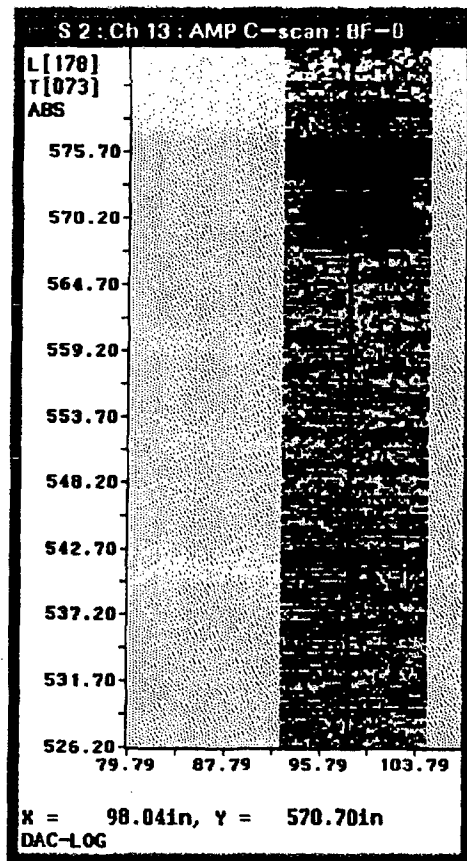
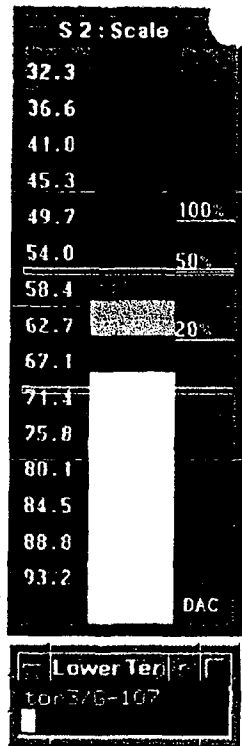
100%
50%
20%

DAC

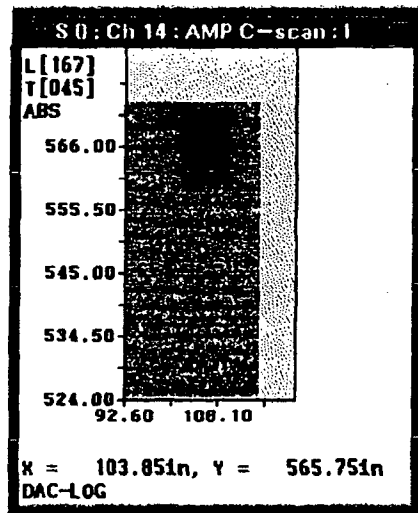
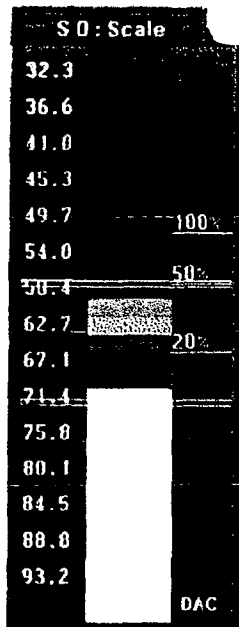
Lower Ten
tor3/14-005



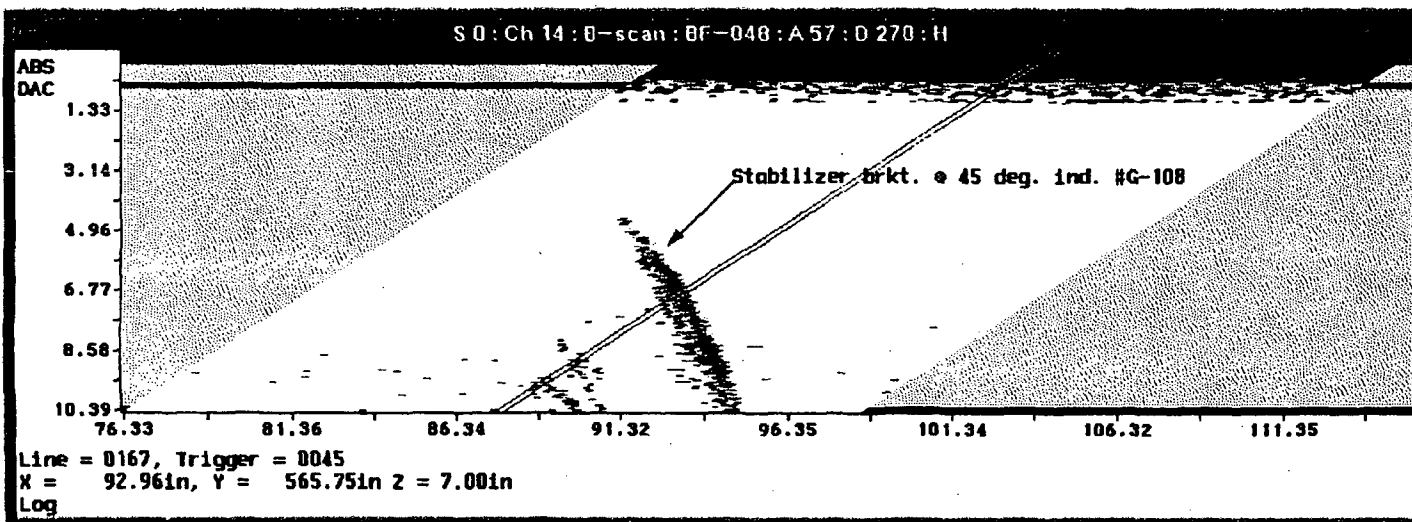
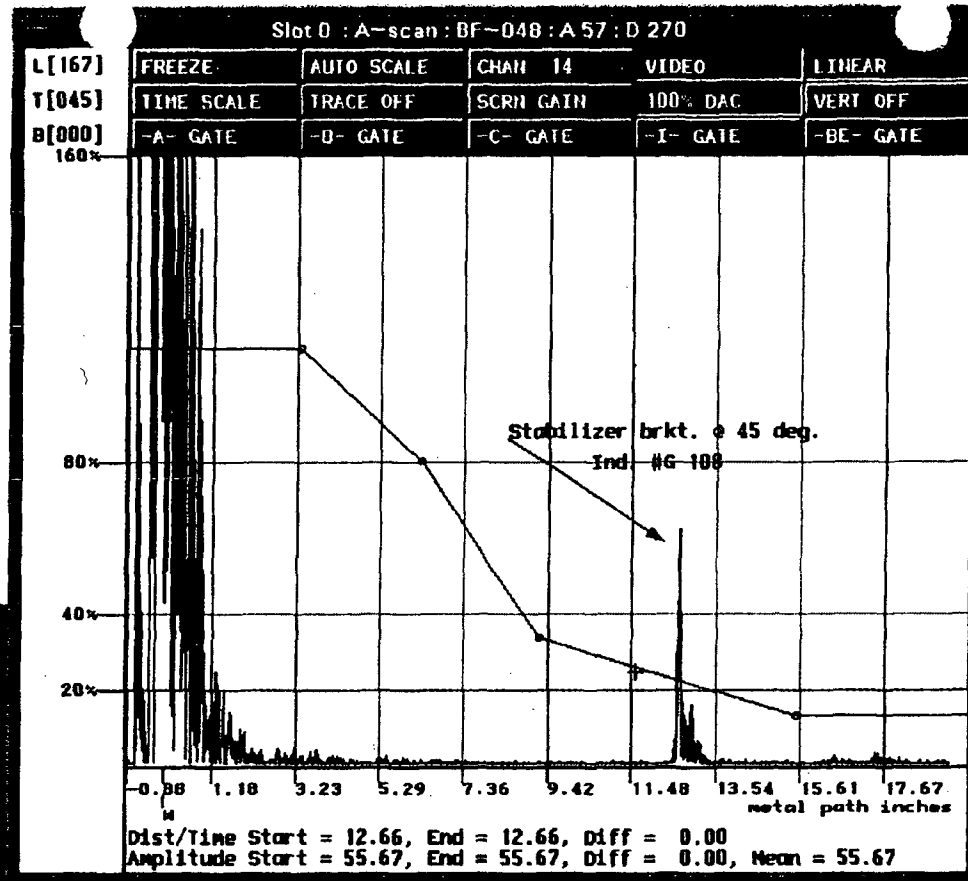
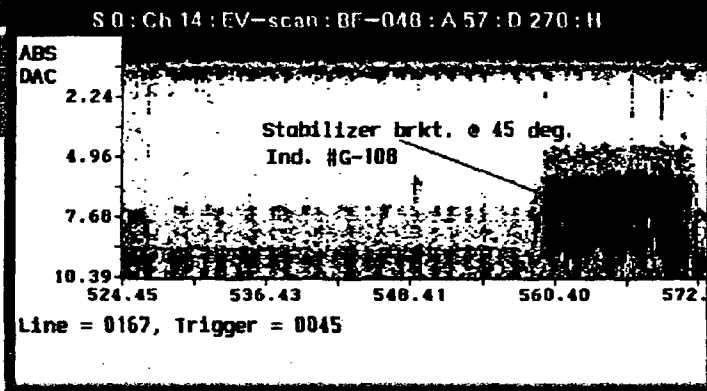
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00202
K1101



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00203



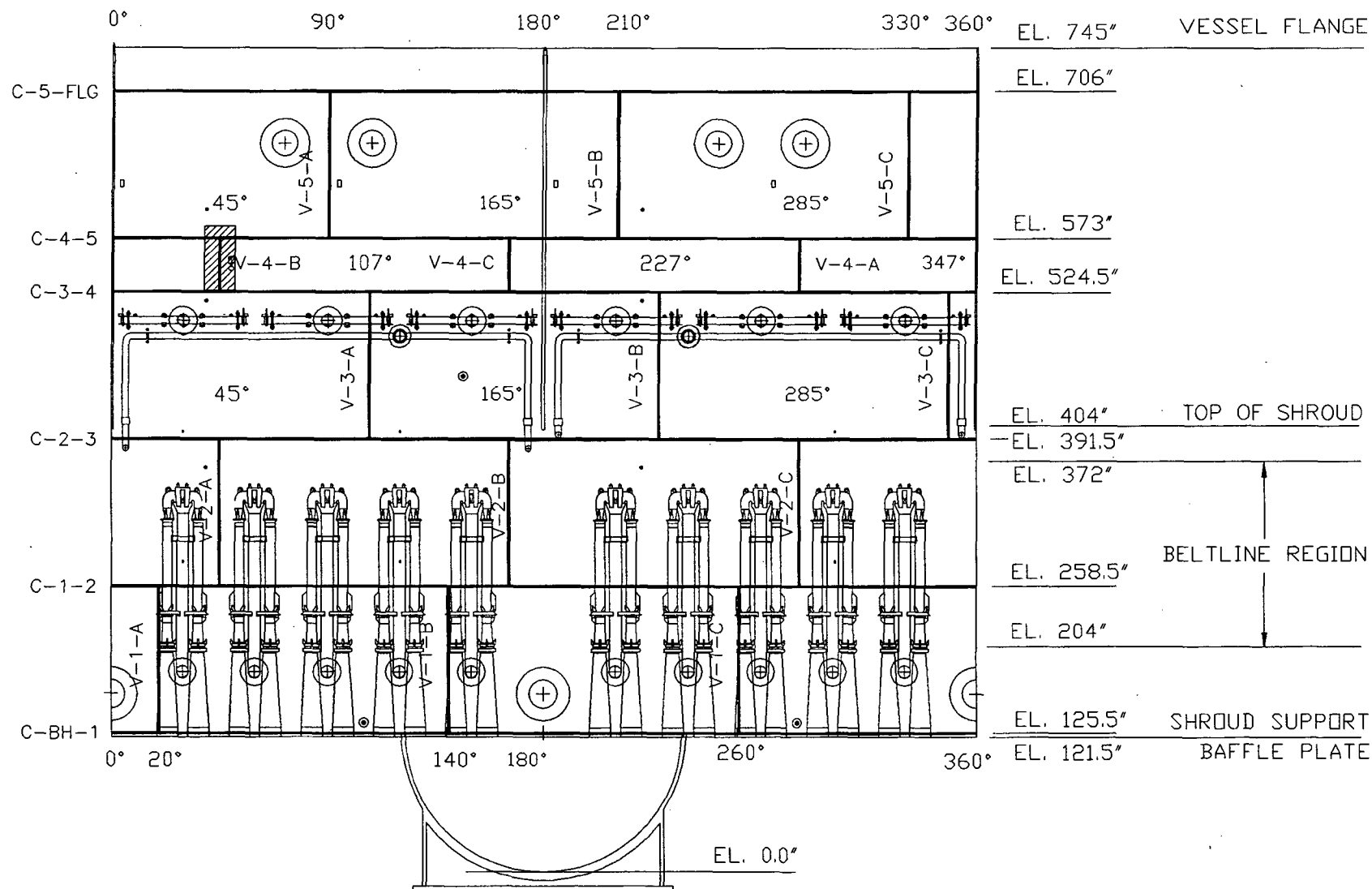
Lower Ten
tor 3/G-108



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00204

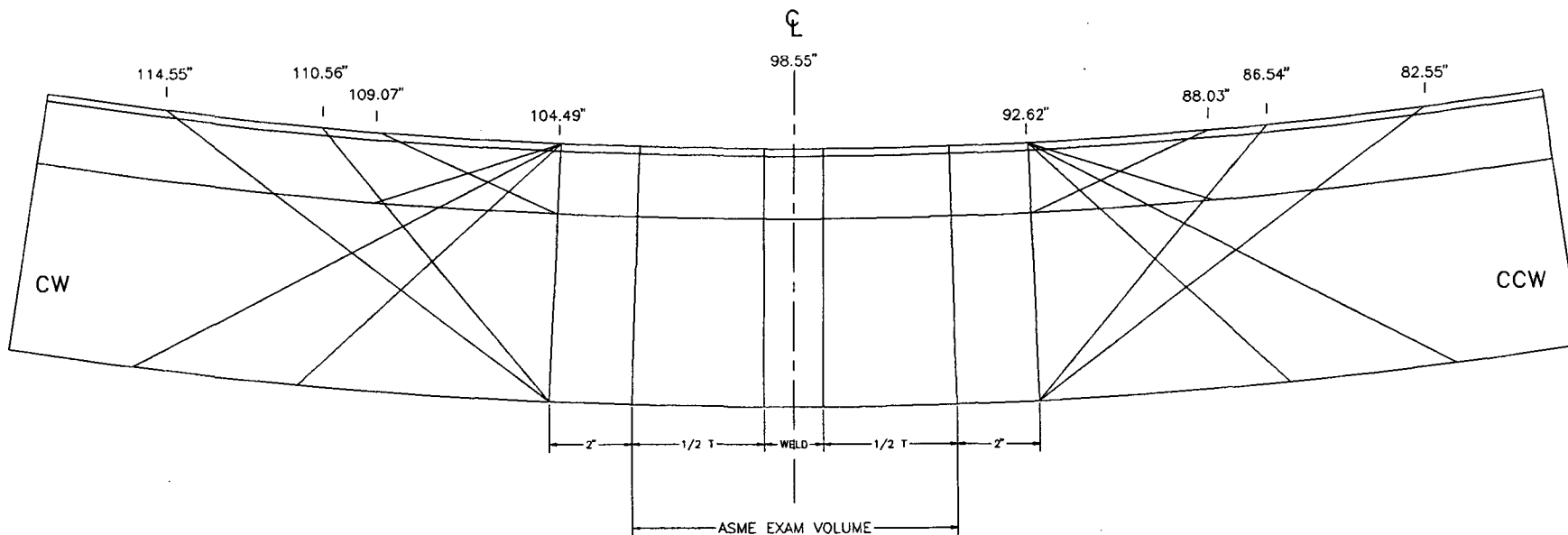
00205

BROWNS FERRY UNIT-3 WELD LOCATIONS



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00200



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	92.62	104.49
2	0 W	90	92.62	104.49
3	70 UP	0	92.62	104.49
4	70 CW	90	88.03	104.49
5	70 DN	180	92.62	104.49
6	70 CCW	270	92.62	109.07
7	45 UP	0	92.62	104.49
8	45 CW	90	86.54	104.49
9	45 DN	180	92.62	104.49
10	45 CCW	270	92.62	110.56
11	60 UP	0	92.62	104.49
12	60 CW	90	82.55	104.49
13	60 DN	180	92.62	104.49
14	60 CCW	270	92.62	114.55
15	0 BM	0	92.62	114.55
16	0 BM	90	82.55	104.49

GE NUCLEAR ENERGY

BROWNS FERRY UNIT 3

WELD V-4-B EXAM VOLUME

SCALE: NONE

DWG. BF3-VERT

REV. 0

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