Client:	**Conoco Phillips Canada**
Representative:	**Mr. Gerald Jakubec**
Project:	**Inlet Separator Inspection**
Method:	**Automated Ultrasonic Corrosion Mapping**
Object:	**Inlet Separator (Equipment # V1-201)**
Location:	**Gregg Lake Dehy (LSD: 13-30-53-25-W5M)**
Date:	**April 26 – 30, 2010**
RTD Job No.:	**105.00068**

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1.0 INTRODUCTION

Automated Ultrasonic (AUT) testing is capable of evaluating pipeline, vessels, and other equipment for potential degradation and service related damage. AUT is ideally suited for in-service inspection thus avoiding the costly shutdown, cleaning and preparation of equipment for an internal inspection. Whereas an internal inspection is limited to the inside surface, AUT provides a ***full volumetric*** inspection providing details on embedded weld flaws or cracking, material degradation such as corrosion, laminations, blistering, etc.

1.1 Background

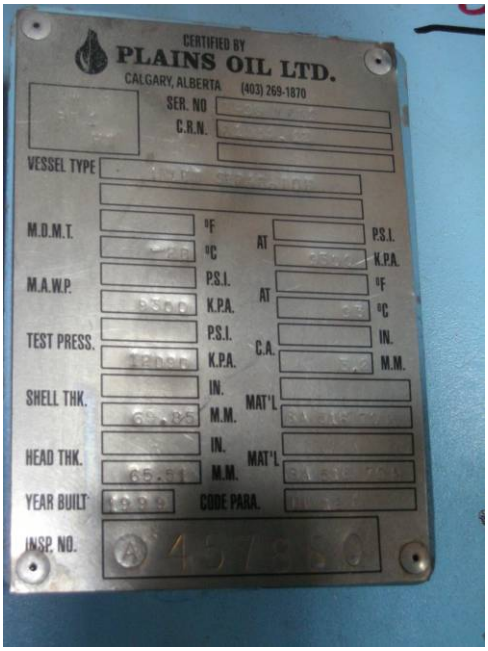
During the period of April 26th to April 30th Applus RTD performed corrosion mapping utilizing AM Data Ultrasonic Imaging system on bottom half of the inlet separator located at ConocoPhillips Gregg Lake Dehy facility.

1.2 Scope of Report

The objective of the inspection was to scan the bottom half of the Inlet Separator to identify the corrosion areas. This report provides information detailing imperfection located in the bottom half of the Inlet Separator. The depth of the imperfections were taken from the OD surface. Please see the "Indication Table" on page 14 for complete details of the inspection results.

1.3 Item Description

Vessel type: Inlet Separator
Vessel orientation: Horizontal
Equipment number: V1-201
Provincial reg. number: A457880
CRN: K-1554-12
Size: 72" x 240"
Service: Sour
Manufacturer: Plains Oil Limited
Year built: 1999
PWHT: Yes
Radiography: RT-1
Insulated: No
Head material: SA-516-70
Head nominal wall thickness: 65.5mm
Head Corrosion allowance: 3.2mm
Shell material: SA-516-70
Shell nominal wall thickness: 69.9mm
Shell corrosion allowance: 3.2mm
MAWP shell side: 9300 KPA at 93 deg. C



2.0 APPROACH

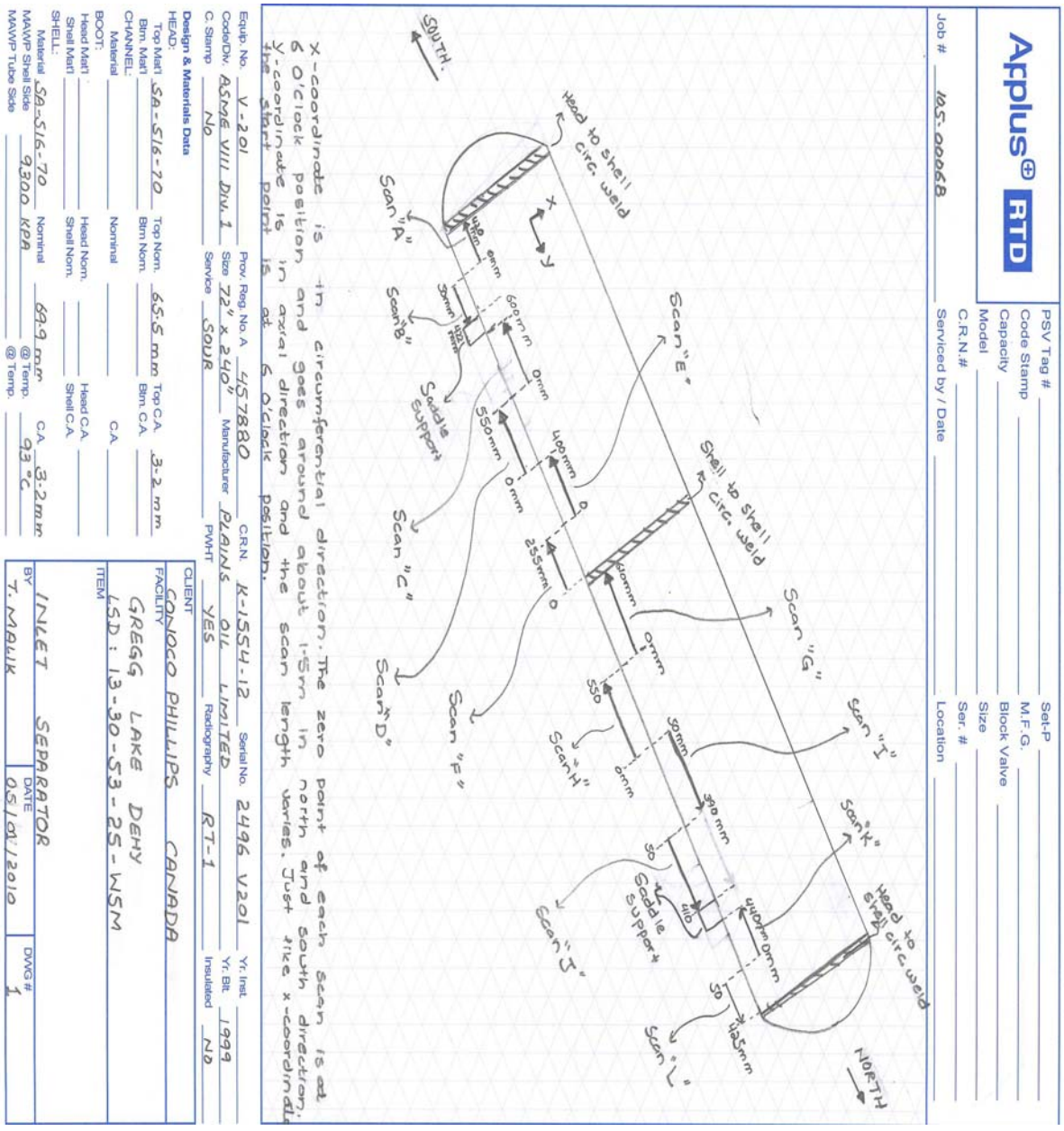
Ultrasonic Examination with automated corrosion mapping system:
Ultrasonic Corrosion Mapping and Manual Ultrasonic Examinations were performed on the following equipment;
Inlet Separator (Equipment Number: V1-201)

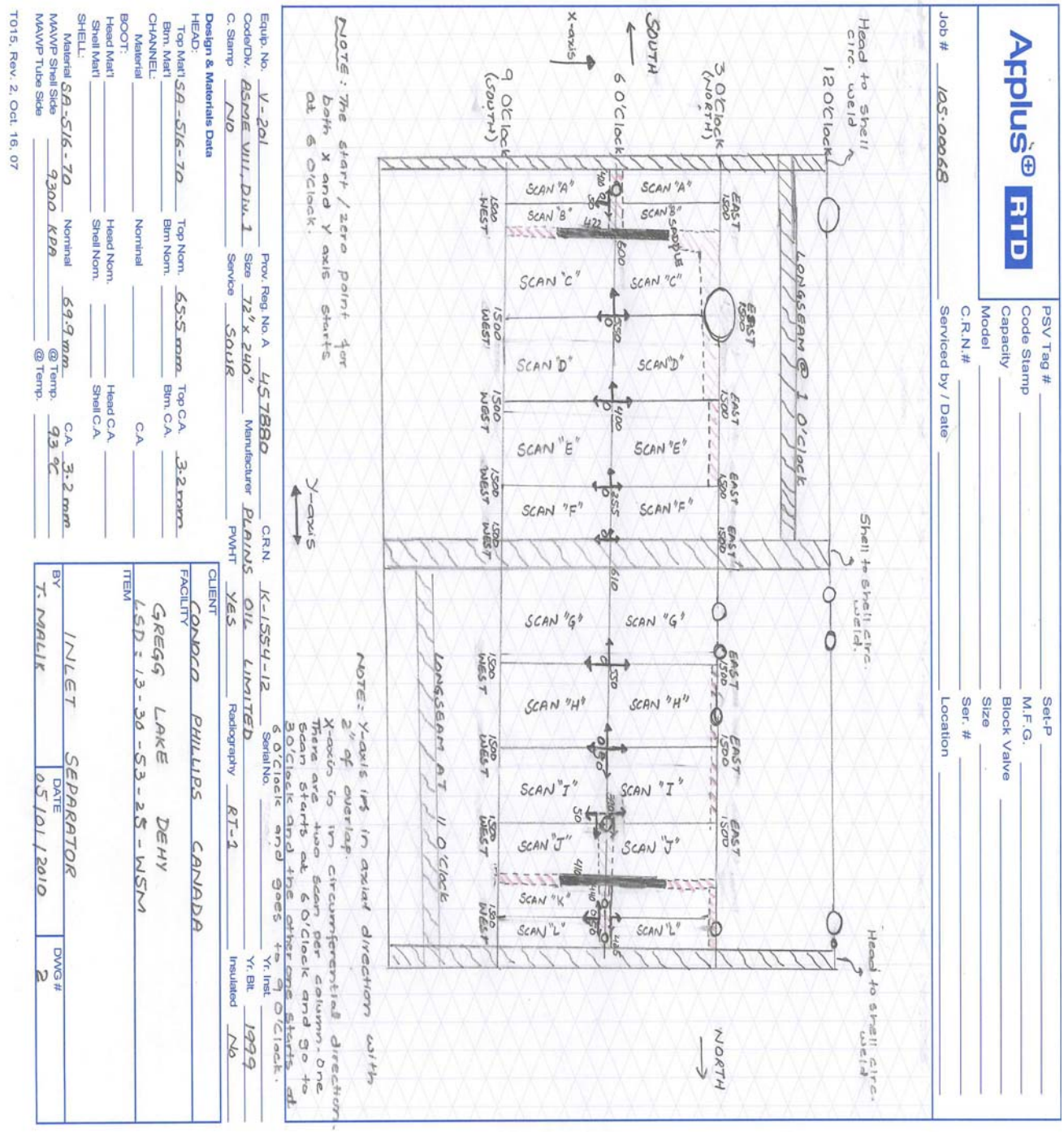
The AUT system interfaced to a 2-Axis scanner and transducer specifically designed for Automated Ultrasonic Inspection. The AUT transducer used in this examination consists a 0 degree Longitudinal wave dual-element, 5 MHz, .250” diameter.

The shell area was divided into 12 sections and two scans were made on each section. The east scan started at 6 o’clock position and ended at 3 o’clock position. The west scan started at 6 o’clock position and ended at 9 o’clock position. Each scan was made 1.5m in x-axis direction unless otherwise not permitted due to restricted access. Illustration can be seen on drawing numbers 1 and 2. Some areas of the shell were not accessible due to nozzles, manway, I-beams and the saddle supports. These areas were inspected manually with zero degree longitudinal waves.

The heads were scanned east to west. Only the bottom half of the heads were inspection. Scanner position might be off due to the curvature of the heads. Some areas of the heads were not accessible for the automated scanner. These areas were inspected manually.

Please see the drawing below for full scan plan details.





PSV Tag #		Set-P	
Code Stamp		M.F.G.	
Capacity		Block Valve	
Model		Size	
C.R.N.#		Ser. #	
Job # 105.00068	Serviced by / Date		Location

DIRECTION AND COVERAGE AREA OF EACH SCAN

SCAN	AXIAL DIRECTION (Y-AXIS)	CIRCUMFERENTIAL DIRECTION (X-AXIS)
SCAN "A" (EAST)	From north to South 420mm in length.	From 175mm past 6 O'Clock (in the direction of the scan) to 3 O'Clock position. There is a nozzle at 6 O'Clock position which restricts starting the scan at 6 O'Clock. Scan length = 1.5m
SCAN "A" (WEST)	From north to south with the Scan length of 420mm.	From 80mm past 6 O'Clock position (in the direction of the scan) to 9 O'Clock position. There is a nozzle at 6 O'Clock position that is why the scan could not be started at 6 O'Clock position. Scan length = 1.5m
SCAN "B" (EAST)	From South to north. Total scan length is 422 mm with 50mm of overlap with Scan "A" so the effective scan length is from 50mm to 422mm	From 175mm past 6 O'Clock position (in the direction of the scan) to 3 O'Clock position. The nozzle at 6 O'Clock position restrict Starting of scan at 6 O'Clock position. Scan length = 1.5m
SCAN "B" (WEST)	From South to north. Total scan length is 400 mm with 50mm of overlap with Scan "A", so effective scan length is from 30mm to 400mm.	From 125 mm past 6 O'Clock position (in the direction of the scan) to 9 O'Clock position. There is a nozzle at 6 O'Clock position that is why the scan cannot be started at 6 O'Clock position. Scan length = 1.5 m

Equip. No.	Prov. Reg. No. A	C.R.N.		Serial No.	Yr. Inst.
Code/Div.	Size	Manufacturer			Yr. Blt.
C. Stamp	Service	PWHT		Radiography	Insulated

Design & Materials Data

HEAD:			
Top Mat'l	Top Nom.	Top C.A.	
Btm. Mat'l	Btm Nom.	Btm. C.A.	
CHANNEL:			
Material	Nominal	C.A.	
BOOT:			
Head Mat'l	Head Nom.	Head C.A.	
Shell Mat'l	Shell Nom.	Shell C.A.	
SHELL:			
Material	Nominal	C.A.	
MAWP Shell Side	@ Temp.		
MAWP Tube Side	@ Temp.		

CLIENT: CONOCO PHILLIPS CANADA		
FACILITY: GREGG LAKE DEHY LSD: 13-30-53-25-W5M		
ITEM: INLET SEPARATOR		
BY: T. MALIK	DATE: 05/01/2010	DWG #

T015, Rev. 2, Oct. 16, 07

Results are interpretation of inspection method, not a guarantee.

Applus RTD

PSV Tag # ______ Set-P ______
Code Stamp ______ M.F.G. ______
Capacity ______ Block Valve ______
Model ______ Size ______
C.R.N.# ______ Ser. # ______
Job # 105.00068 Serviced by / Date ______ Location ______

DIRECTION AND COVERAGE AREA OF EACH SCAN

SCAN	AXIAL DIRECTION (Y-AXIS)	CIRCUMFERENTIAL DIRECTION (X-AXIS)
SCAN "C" (EAST)	From north to south 600mm in length	From 6 O'Clock to 3 O'Clock. Scan length was limited to 1.1 m because of the manway.
SCAN "C" (WEST)	From north to south 600 mm in length	From 6 O'Clock to 9 O'Clock. Scan length = 1.5m
SCAN "D" (EAST)	From north to south. Total scan length is 600mm with 50mm of overlap with Scan "C", so effective length of the scan is from 0mm to 550mm	From 6 O'Clock to 3 O'Clock. Scan length was limited to 1.2m because of the manway.
SCAN "D" (WEST)	From north to south. Total scan length is 600mm with 50mm of overlap with Scan "C", so effective length of the scan is from 0mm to 550 mm.	From 6 O'clock to 9 O'clock. Scan length = 1.5m
SCAN "E" (EAST)	From north to south. Total scan length is 450mm with 50mm of overlap with Scan "D", so effective length of the scan is from 0mm to 400mm.	From 6 O'Clock to 3 O'Clock. Full 1.5m scan could not be achieved due to the support beam in the way.
SCAN "E" (WEST)	From north to south. Total scan length is 450mm with 50mm of overlap with Scan "D", so effective length of the scan is from 0mm to 400mm.	From 6 O'Clock to 9 O'Clock. Scan length = 1.5m

Equip. No. ______ Prov. Reg. No. A ______ C.R.N. ______ Serial No. ______ Yr. Inst. ______
Code/Div. ______ Size ______ Manufacturer ______ Yr. Blt. ______
C. Stamp ______ Service ______ PWHT ______ Radiography ______ Insulated ______

Design & Materials Data
HEAD:
Top Mat'l ______ Top Nom. ______ Top C.A. ______
Btm. Mat'l ______ Btm Nom. ______ Btm. C.A. ______
CHANNEL:
Material ______ Nominal ______ C.A. ______
BOOT:
Head Mat'l ______ Head Nom. ______ Head C.A. ______
Shell Mat'l ______ Shell Nom. ______ Shell C.A. ______
SHELL:
Material ______ Nominal ______ C.A. ______
MAWP Shell Side ______ @ Temp. ______
MAWP Tube Side ______ @ Temp. ______

CLIENT: CONOCO PHILLIPS CANADA
FACILITY: GREGG LAKE DEHY
LSD: 13-30-53-25-W5M
ITEM: INLET SEPARATOR
BY: T. MALIK DATE: 05/01/2010 DWG #

T015, Rev. 2, Oct. 16, 07

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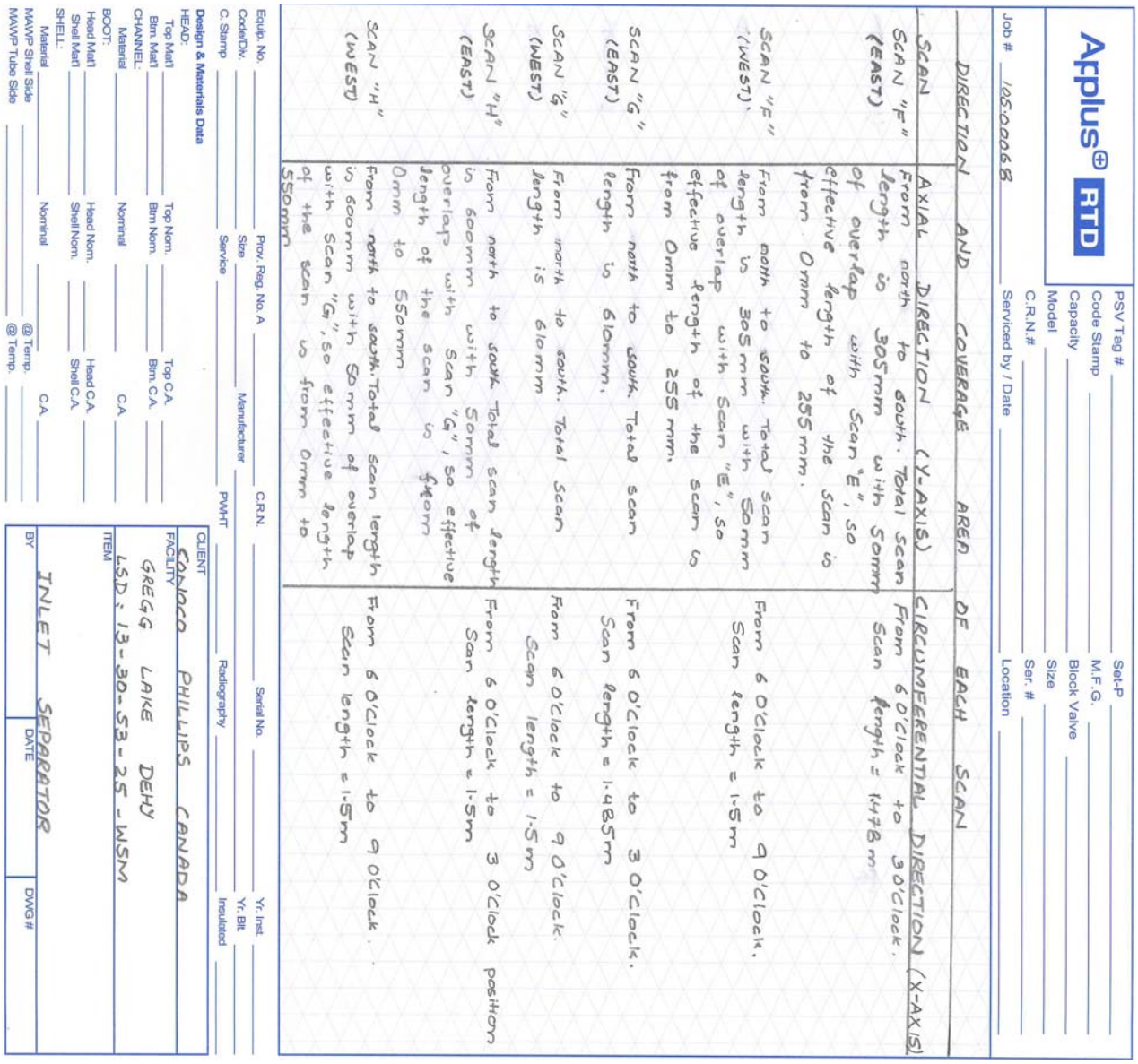

Applus RTD

PSV Tag # | Set-P
Code Stamp | M.F.G.
Capacity | Block Valve
Model | Size
C.R.N.# | Ser. #
Job # 105.00068 | Serviced by / Date | Location

DIRECTION AND COVERAGE AREA OF EACH SCAN

SCAN	AXIAL DIRECTION (Y-AXIS)	CIRCUMFERENTIAL DIRECTION (X-AXIS)
SCAN "F" (EAST)	From north to south. Total scan length is 305mm with 50mm of overlap with Scan "E", so effective length of the scan is from 0mm to 255 mm.	From 6 O'clock to 3 O'clock. Scan length = 1478 m
SCAN "F" (WEST)	From north to south. Total scan length is 305 mm with 50mm of overlap with Scan "E", so effective length of the scan is from 0mm to 255 mm.	From 6 O'clock to 9 O'clock. Scan length = 1.5m
SCAN "G" (EAST)	From north to south. Total scan length is 610mm.	From 6 O'clock to 3 O'clock. Scan length = 1.485m
SCAN "G" (WEST)	From north to south. Total scan length is 610mm	From 6 O'clock to 9 O'clock. Scan length = 1.5m
SCAN "H" (EAST)	From north to south. Total scan length is 610mm with Scan "G", so effective length of the scan is from 0mm to 550mm	From 6 O'clock to 3 O'clock position Scan length = 1.5m
SCAN "H" (WEST)	From north to south. Total scan length is 610mm with 50mm of overlap with Scan "G", so effective length of the scan is from 0mm to 550mm	From 6 O'clock to 9 O'clock. Scan length = 1.5m

Equip. No. | Prov. Reg. No. A | C.R.N. | Serial No. | Yr. Inst.
Code/Div. | Size | Manufacturer | Yr. Blt
C. Stamp | Service | PWHT | Radiography | Insulated

Design & Materials Data

HEAD:					
Top Mat'l	Top Nom.	Top C.A.			
Btm. Mat'l	Btm Nom.	Btm. C.A.			
CHANNEL:					
Material	Nominal	C.A			
BOOT:					
Head Mat'l	Head Nom.	Head C.A.			
Shell Mat'l	Shell Nom.	Shell C.A.			
SHELL:					
Material	Nominal	C.A			
MAWP Shell Side	@ Temp.				
MAWP Tube Side	@ Temp.				

CLIENT: Conoco Phillips Canada
FACILITY: Gregg Lake Dehy
LSD: 13-30-53-25-W5M
ITEM: Inlet Separator
BY | DATE | DWG #

T015, Rev. 2, Oct. 16, 07

Applus RTD

PSV Tag #	Set-P
Code Stamp	M.F.G.
Capacity	Block Valve
Model	Size
C.R.N.#	Ser. #
Job # 105.00068 / Serviced by / Date	Location

DIRECTION AND COVERAGE AREA OF EACH SCAN

SCAN	AXIAL DIRECTION (Y-AXIS)	CIRCUMFERENTIAL DIRECTION (X-AXIS)
SCAN "I" (EAST)	From south to north. Total Scan length is 390mm with 50 mm of overlap with Scan "H", so effective scan length is from 50mm to 390mm.	From 6 O'Clock to 3 O'Clock position. Scan length = 1.5m
SCAN "I" (WEST)	From south to north. Total scan length is 390mm with 50mm of overlap with Scan "H", so effective scan length is from 50mm to 390mm.	From 6 O'Clock to 9 O'Clock. Scan length = 1.5m
SCAN "J" (EAST)	From south to north. Total scan length is 410mm with 50mm of overlap with Scan "I", so effective scan length is from 50mm to 410mm.	From 130mm past 6 O'Clock position to 3 O'Clock position. There is a nozzle at 6 O'Clock position that is why the scan could not be started at 6 O'Clock position. Scan length = 1.5m
SCAN "J" (WEST)	From south to north. Total scan length is 410mm with 50mm of overlap with Scan "I", so effective length of the scan is from 50mm to 425mm	From 150mm past 6 O'Clock position to 9 O'Clock position. There is a nozzle at 6 O'Clock position that is why the scan could not be started at 6 O'Clock position. Scan length = 1.5m
SCAN "K" (EAST)	From north to south. Total scan length is 440mm.	From 180mm past 6 O'Clock position to 3 O'Clock position. There are two nozzles at 6 O'Clock position that is why the scan could not be started at 6 O'Clock position. Scan length = 1.329 m. There is a nozzle at 3 O'Clock which restrict full 1.5m scan.

Equip. No.	Prov. Reg. No. A	C.R.N.	Serial No.	Yr. Inst.	
Code/Div.	Size	Manufacturer		Yr. Blt.	
C. Stamp	Service	PWHT	Radiography	Insulated	

Design & Materials Data

HEAD:
Top Mat'l ___ Top Nom. ___ Top C.A. ___
Btm. Mat'l ___ Btm Nom. ___ Btm. C.A. ___
CHANNEL:
Material ___ Nominal ___ C.A. ___
BOOT:
Head Mat'l ___ Head Nom. ___ Head C.A. ___
Shell Mat'l ___ Shell Nom. ___ Shell C.A. ___
SHELL:
Material ___ Nominal ___ C.A. ___
MAWP Shell Side ___ @ Temp. ___
MAWP Tube Side ___ @ Temp. ___

CLIENT: CONOCO PHILLIPS CANADA		
FACILITY: GREGG LAKE DEHY LSD: 13-30-53-25-W5M		
ITEM: INLET SEPARATOR		
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Applus RTD

PSV Tag #		Set-P	
Code Stamp		M.F.G.	
Capacity		Block Valve	
Model		Size	
C.R.N.#		Ser. #	
Job # 105.00068	Serviced by / Date		Location

DIRECTION AND COVERAGE AREA OF EACH SCAN

SCAN	AXIAL DIRECTION (Y-AXIS)	CIRCUMFERENTIAL DIRECTION (X-AXIS)
SCAN "K" (WEST)	From north to south. Total scan length is 440 mm.	From 140mm past 6 O'Clock position (in the direction of the scan) to 3 O'Clock position. There are two nozzles at 6 O'Clock position that is why the scan could not be started at 6 O'Clock position. Scan length = 1.5m
SCAN "L" (EAST)	From south to north. Total scan length is 425mm with 50mm of overlap with Scan "K", so effective length of the scan is from 50mm to 425mm	From 140mm past 6 O'Clock position (in the direction of the scan) to 3 O'Clock position. There are two nozzles at 6 O'Clock position that is why the scan could not be started at 6 O'Clock position. Scan length is 1.242m. There is a nozzle at 3 O'Clock position which restrict the full 1.5m scan.
SCAN "L" (WEST)	From south to north. Total scan length is 425mm with 50mm of overlap with Scan "K", so effective scan length is from 50mm to 425mm.	From 140mm past 6 O'Clock position (in the direction of the scan) to 9 O'Clock position. There are two nozzles at 6 O'Clock position that is why the scan could not be started at 6 O'Clock position. Scan length = 1.5m

Equip. No.		Prov. Reg. No. A		C.R.N.		Serial No.		Yr. Inst.	
Code/Div.		Size		Manufacturer				Yr. Blt.	
C. Stamp		Service		PWHT		Radiography		Insulated	

Design & Materials Data

HEAD:					
Top Mat'l		Top Nom.		Top C.A.	
Btm. Mat'l		Btm Nom.		Btm. C.A.	
CHANNEL:					
Material		Nominal		C.A.	
BOOT:					
Head Mat'l		Head Nom.		Head C.A.	
Shell Mat'l		Shell Nom.		Shell C.A.	
SHELL:					
Material		Nominal		C.A.	
MAWP Shell Side		@ Temp.			
MAWP Tube Side		@ Temp.			

CLIENT: CONOCO PHILLIPS CANADA
FACILITY: GREGG LAKE DEHY
LSD: 13-30-53-25-W5M
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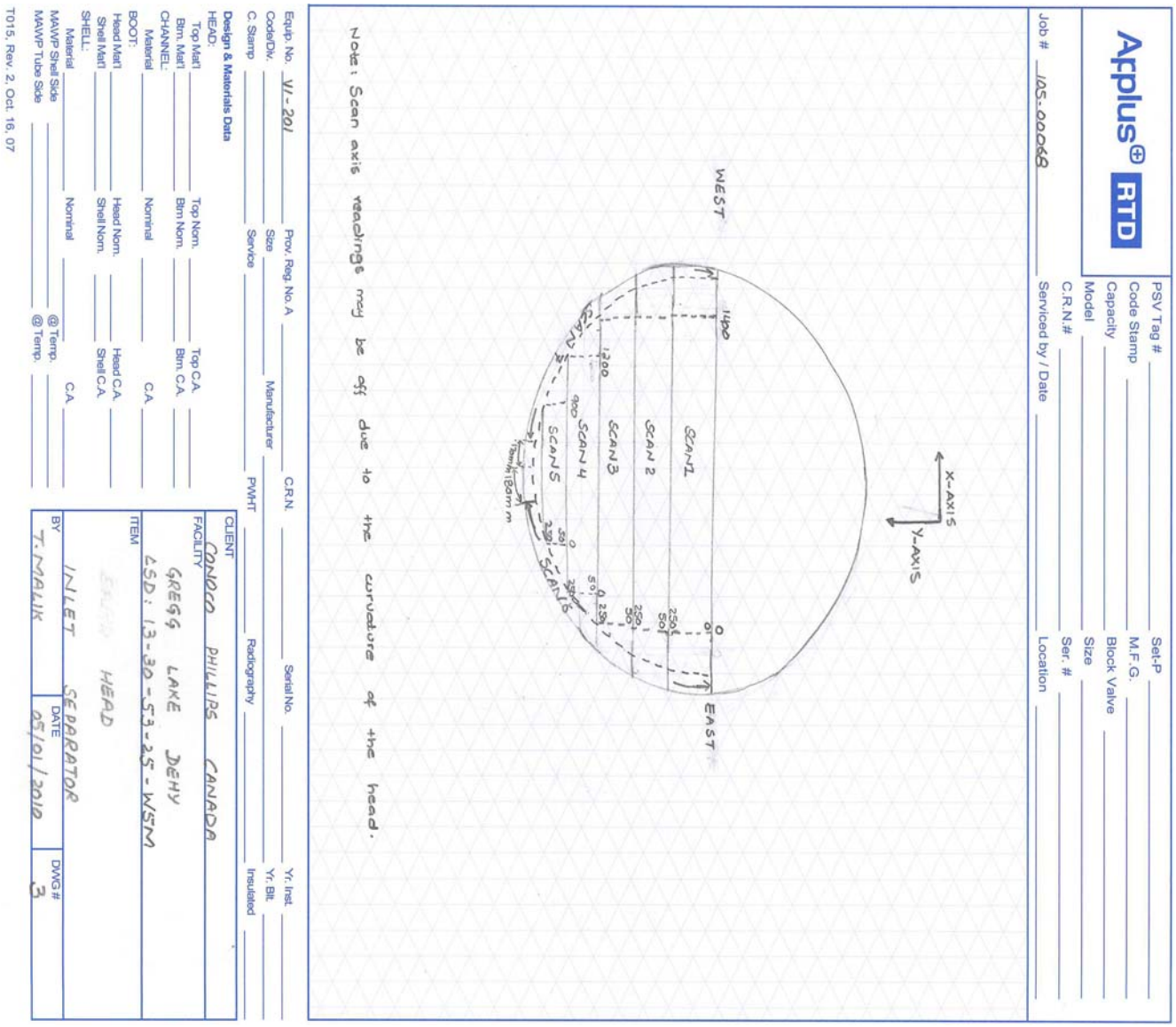
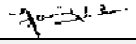
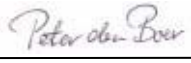


3.0 PERSONNEL

PA Tech.	Certification	Date	Signature
Tariq Malik	CGSB Level III UT	05/17/2010	
Assistant	**Certification**	**Date**	**Signature**
Nathan Evan			
Review	**Certification**	**Date**	**Signature**
Peter den Boer		05/18/2010	

4.0 RESULTS AND CONCLUSION

Some areas showed wall loss. Most of these areas are located from 5 o'clock to 7 o'clock position. Details of the inspection results are given in the table below.

Scan ID	Minimum WT (mm)	Maximum WT (mm)	Average WT (mm)	Comments
Scan "A" East From 6 o'clock to 3 o'clock	67.02	72.5	70.4	Minimum wall thickness X = 288mm, Y = 324mm See Fig. 1 and 2
Scan "A" West From 6 o'clock to 9 o'clock	69.03	71.3	70.6	Minimum wall thickness X = 102mm, Y = 21mm See Fig. 3
Scan "B" East From 6 o'clock to 3 o'clock	70.1	70.4	70.4	Minimum wall thickness X = 1095mm, Y = 225mm See Fig. 4
Scan "B" West From 6 o'clock to 9 o'clock	68.79	71.7	70.4	Minimum wall thickness X = 36mm, Y = 12mm See Fig. 5
Scan "C" East From 6 o'clock to 3 o'clock	65.8	71.4	70.7	Minimum wall thickness X = 57mm, Y = 351mm Isolated pit See Fig. 6
Scan "C" West From 6 o'clock to 9 o'clock	68.73	71.8	70.7	Minimum wall thickness X = 3mm, Y = 309mm See Fig. 7
Scan "D" East From 6 o'clock to 3 o'clock	69.9 Inclusion at 64.81	71.8	70.6	Minimum wall thickness X = 690mm, Y = 324mm Small sub-surface inclusion See Fig. 8
Scan "D" West From 6 o'clock to 9 o'clock	67.4	71.6	70.5	Minimum wall thickness X = 189mm, Y = 372mm See Fig. 9 and 10
Scan "E" East From 6 o'clock to 3 o'clock	70.3	72.7	70.7	Minimum wall thickness X = 72mm, Y = 369mm See Fig. 11

Scan ID	Minimum WT (mm)	Maximum WT (mm)	Average WT (mm)	Comments
Scan "E" West From 6 o'clock to 9 o'clock	68.20	72.5	70.7	Minimum wall thickness X = 297mm, Y = 450mm See Fig. 12 and 13
Scan "F" East From 6 o'clock to 3 o'clock	70.2	71.3	70.6	Minimum wall thickness X = 1374mm, Y = 72mm See Fig. 14
Scan "F" West From 6 o'clock to 9 o'clock	70.3 Inclusion at 65.19	71.2	70.4	Minimum wall thickness X = 1434mm, Y = 234mm Very small sub-surface inclusion X = 132, Y = 255 See Fig. 15 and 16
Scan "G" East From 6 o'clock to 3 o'clock	70.3	71.4	70.6	Minimum wall thickness X = 990mm, Y = 411mm See Fig. 17
Scan "G" West From 6 o'clock to 9 o'clock	68.8 Inclusion at 64.25	71.4	70.5	Minimum wall thickness X = 126mm, Y = 99mm Very small sub-surface inclusion X = 96mm, Y = 156mm See Fig. 18, 19 and 20
Scan "H" East From 6 o'clock to 3 o'clock	63.54	70.6	70.5	Minimum wall thickness X = 12mm, Y = 291mm See Fig. 21 and 22
Scan "H" West From 6 o'clock to 9 o'clock	65.08	71.2	70.5	Minimum wall thickness X = 6mm, Y = 264mm See Fig. 23, 24 and 25
Scan "I" East From 6 o'clock to 3 o'clock	70.5	72	70.7	Minimum wall thickness X = 1209mm, Y = 9mm Very small sub-surface inclusion X = 138mm, Y = 204mm See Fig. 26
Scan "I" West From 6 o'clock to 9 o'clock	70.38	71.0	70.5	Minimum wall thickness X = 0mm, Y = 0mm See Fig. 27
Scan "J" East From 6 o'clock to 3 o'clock	70.45	71.5	70.7	Minimum wall thickness X = 1305mm, Y = 381mm See Fig. 28
Scan "J" West From 6 o'clock to 9 o'clock	70.1 Inclusion at 63.8	71.6	70.6	Minimum wall thickness X = 945mm, Y = 324mm Very small sub-surface inclusion X = 705mm, Y = 330mm See Fig. 29 and 30
Scan "K" East From 6 o'clock to 3 o'clock	70.3	72.2	70.7	Minimum wall thickness X = 654mm, Y = 414mm See Fig. 31
Scan "K" West From 6 o'clock to 9 o'clock	70.3	71.2	70.7	Minimum wall thickness X = 1404mm, Y = 300mm Very small sub-surface inclusion X = 30mm, Y = 69mm See Fig. 32 and 33

Scan ID	Minimum WT (mm)	Maximum WT (mm)	Average WT (mm)	Comments
Scan "L" East From 6 o'clock to 3 o'clock	68.56 Inclusion at 64.43	72.5	70.7	Minimum wall thickness X = 195mm, Y = 351mm Very small sub-surface inclusion X = 225mm, Y = 201mm See Fig. 34 and 35
Scan "L" West From 6 o'clock to 9 o'clock	70.6	71.7	70.7	Minimum wall thickness X = 1101mm, Y = 390mm See Fig. 36
North Head Scan "1"	67.9	69.2	68.5	Minimum wall thickness X = 1164mm, Y = 72mm See Fig. 37
North Head Scan "2"	67.9	69.4	68.4	Minimum wall thickness X = 776mm, Y = 120mm See Fig. 38
North Head Scan "3"	68.3	69.7	68.7	Minimum wall thickness X = 900mm, Y = 24mm See Fig. 39
North Head Scan "4"	68.6	71.3	68.9	Minimum wall thickness X = 1080mm, Y = 20mm See Fig. 40
North Head Scan "5"	68.9	71.3	69.4	Minimum wall thickness X = 688mm, Y = 0mm See Fig. 41
North Head Scan "6" From 6 o'clock to 3 o'clock	71.3	74.8	72.9	Minimum wall thickness X = 1460mm, Y = 48mm See Fig. 42
North Head Scan "7" From 6 o'clock to 9 o'clock	70.1	73.5	72.1	Minimum wall thickness X = 180mm, Y = 44mm See Fig. 43
South Head Scan "1"	67.5	73.3	68.7	Minimum wall thickness X = 376mm, Y = 192mm See Fig. 44
South Head Scan "2"	67.1	69.7	68.4	Minimum wall thickness X = 684mm, Y = 102mm See Fig. 45
South Head Scan "3"	68.1	69.4	68.5	Minimum wall thickness X = 760mm, Y = 0mm See Fig. 46
South Head Scan "4"	68.4	70.3	68.8	Minimum wall thickness X = 736mm, Y = 100mm See Fig. 47
South Head Scan "5"	68.6	72.2	69.0	Minimum wall thickness X = 504mm, Y = 8mm See Fig. 48
South Head Scan "6" From 6 to 3 o'clock	70.4	74.8	72.4	Minimum wall thickness X = 84mm, Y = 24mm See Fig. 49

Following are the results for the areas that were scanned manually.

1. On the lower shell from the south head to the saddle support at 6 o' clock position. This area could not be inspected due to the restricted access because of nozzle.
   Minimum = 67.5mm
   Average = 70.0mm

2. Lower south head where the scanner could not fit
   Minimum = 66.5mm
   Average = 68.6mm

3. On the shell at 3 o'clock position right above the saddle
   Minimum = 68.9mm
   Average = 71.0mm

4. On the shell around the manway where the scanner could not fit
   Minimum = 69.1mm
   Average = 70.3mm

5. On the shell at 6 o'clock position around the nozzle on the south side of the north saddle
   Minimum = 69.8mm
   Average = 70.6mm

6. On the lower shell at 6 o'clock position between the north head and north side saddle
   Minimum = 69.8mm
   Average = 70.5mm

Below are the scan images. Areas with the wall loss are encircled or pointed by the arrow.

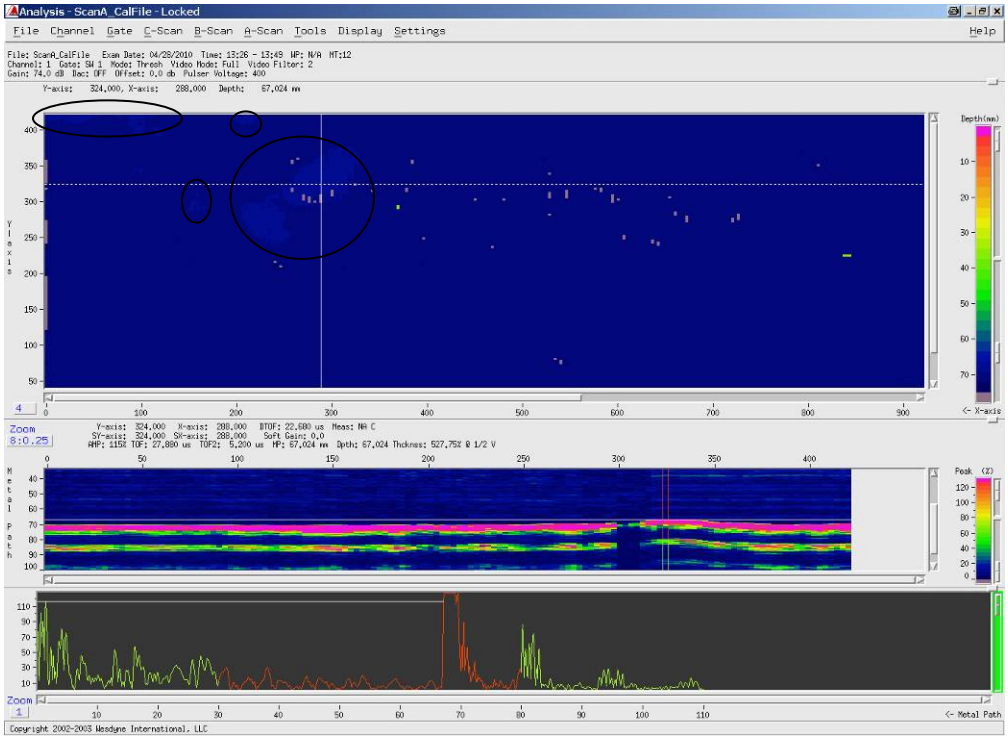


Fig. 1

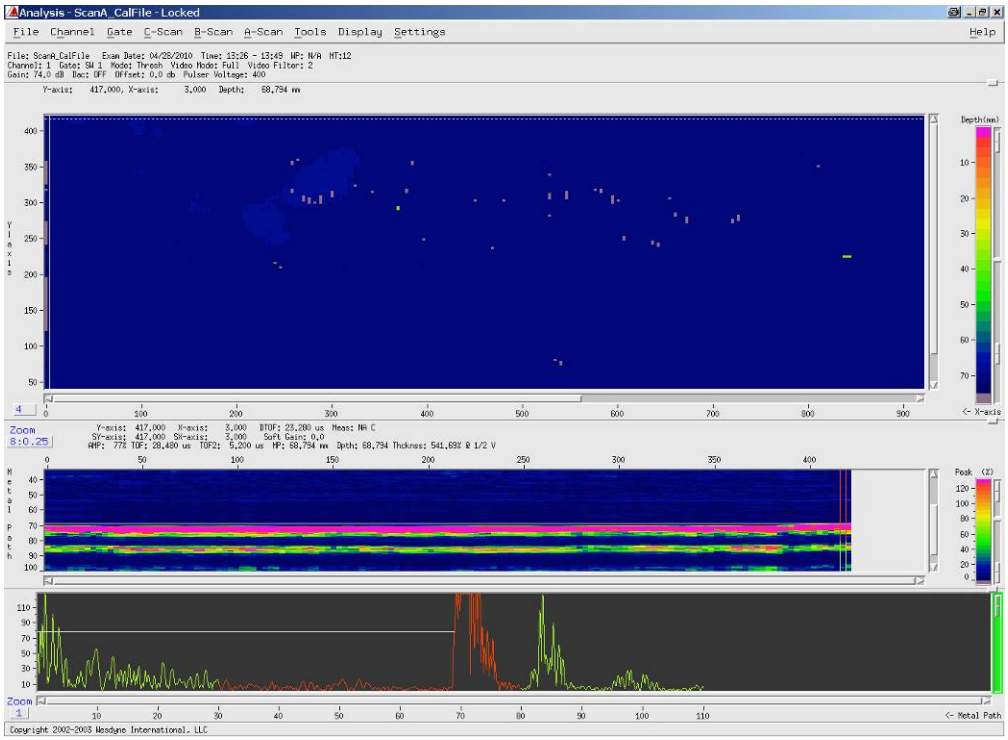


Fig. 2

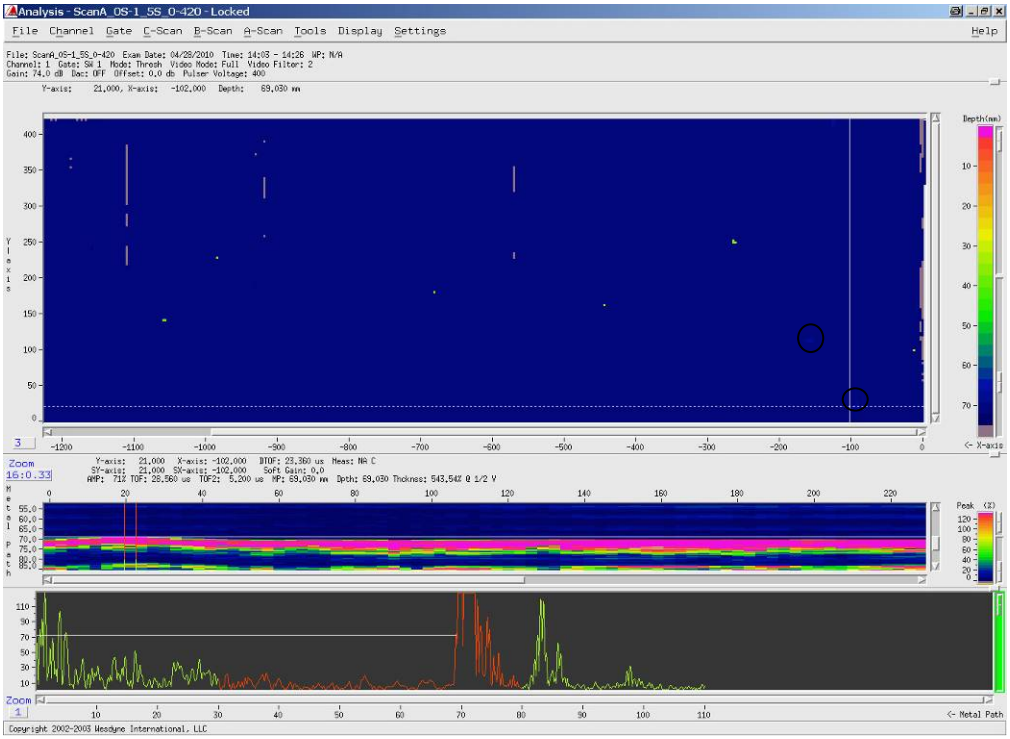


Fig. 3

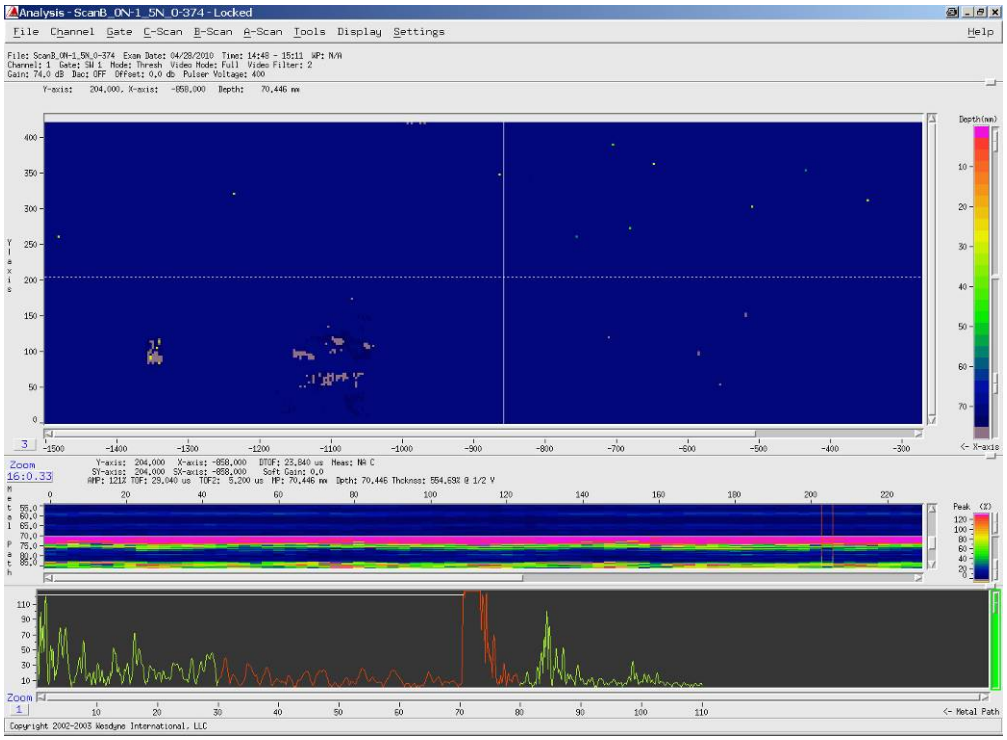
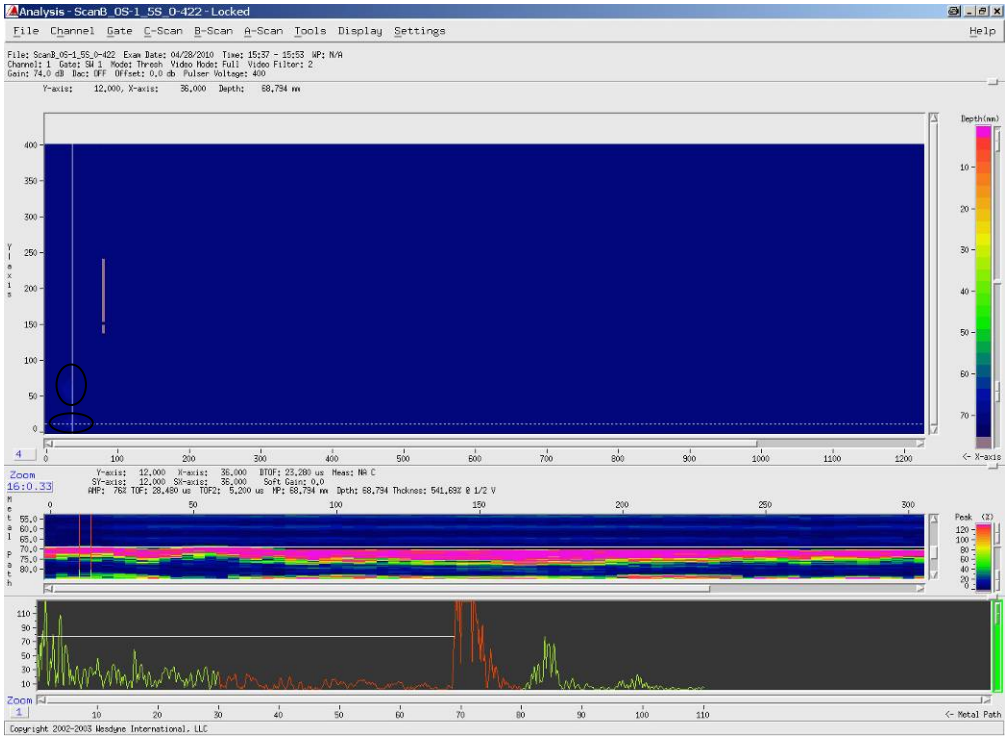


Fig. 4



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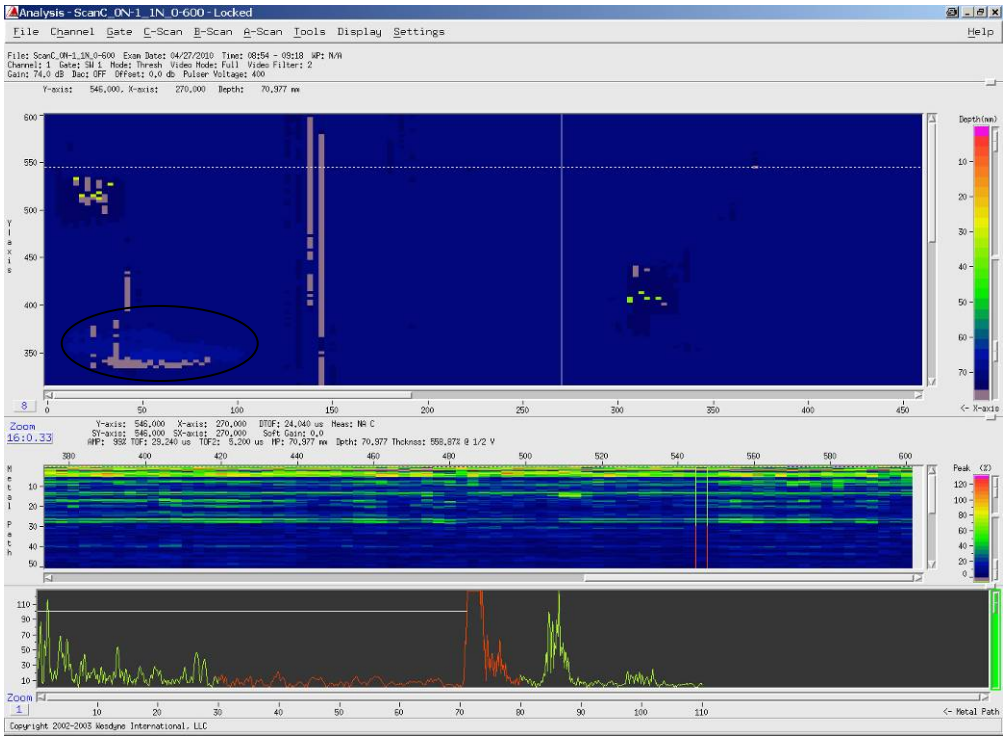

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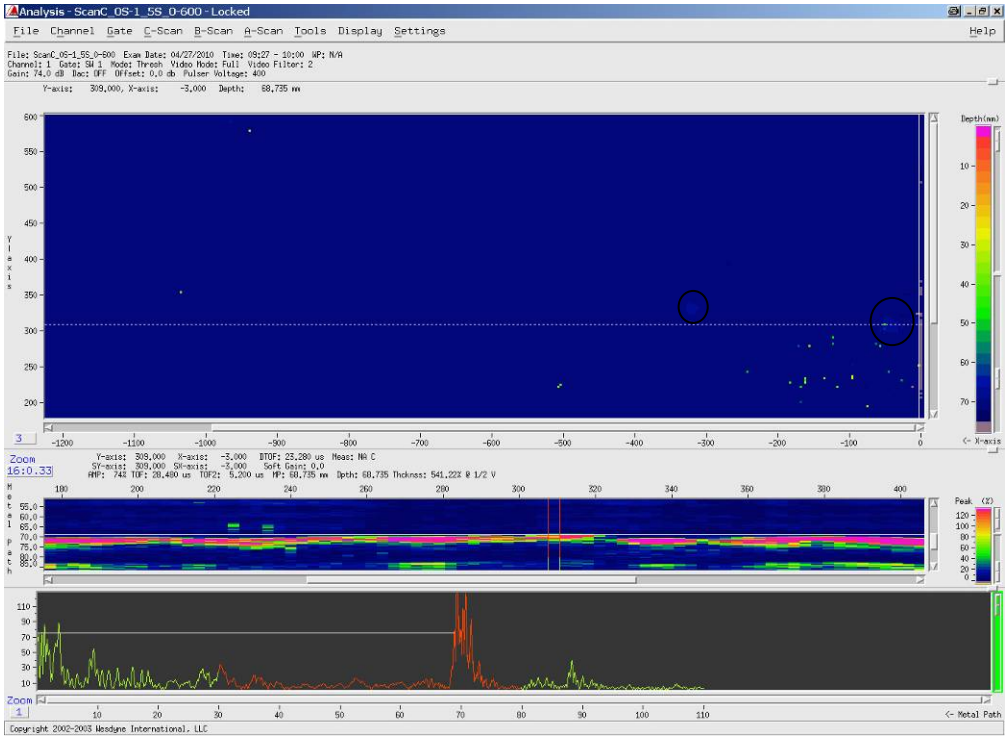

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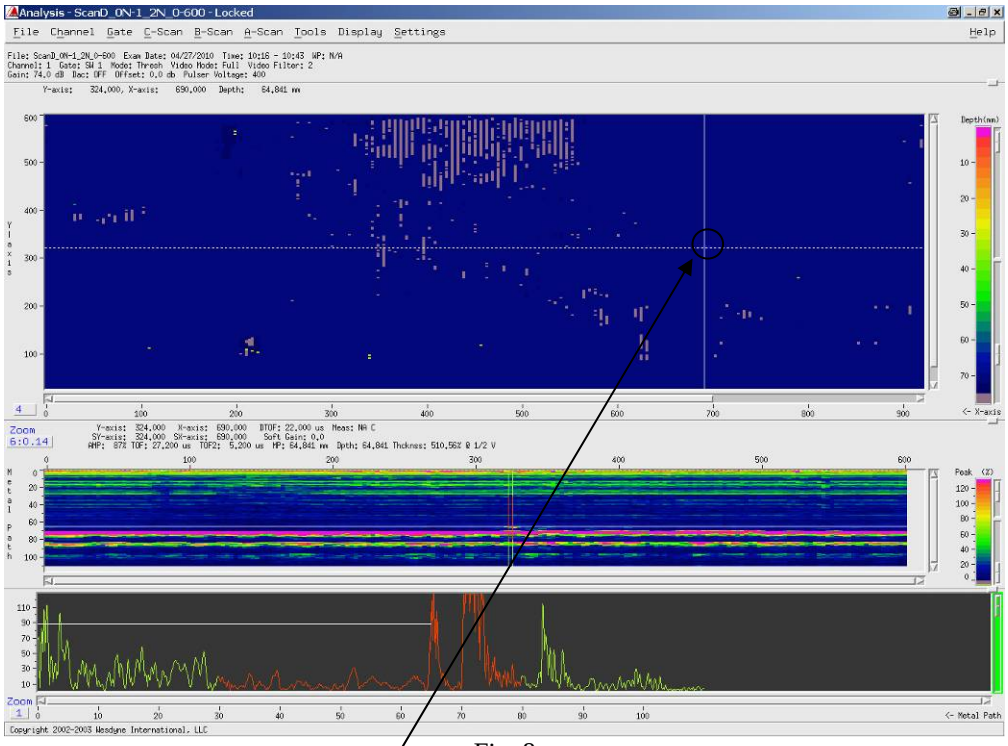

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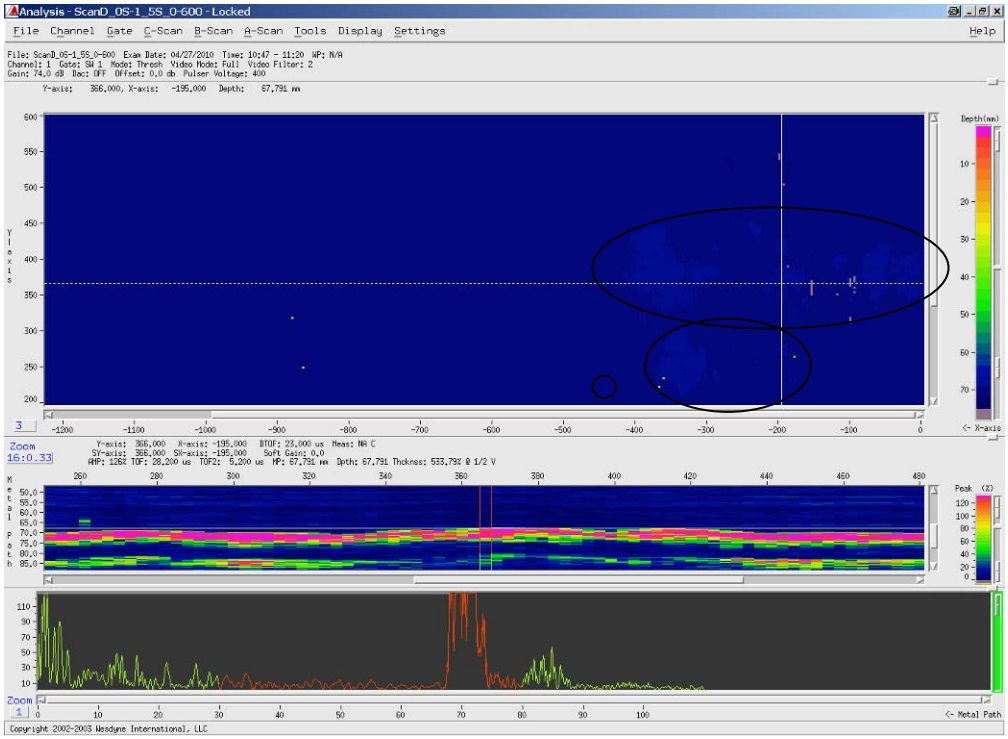

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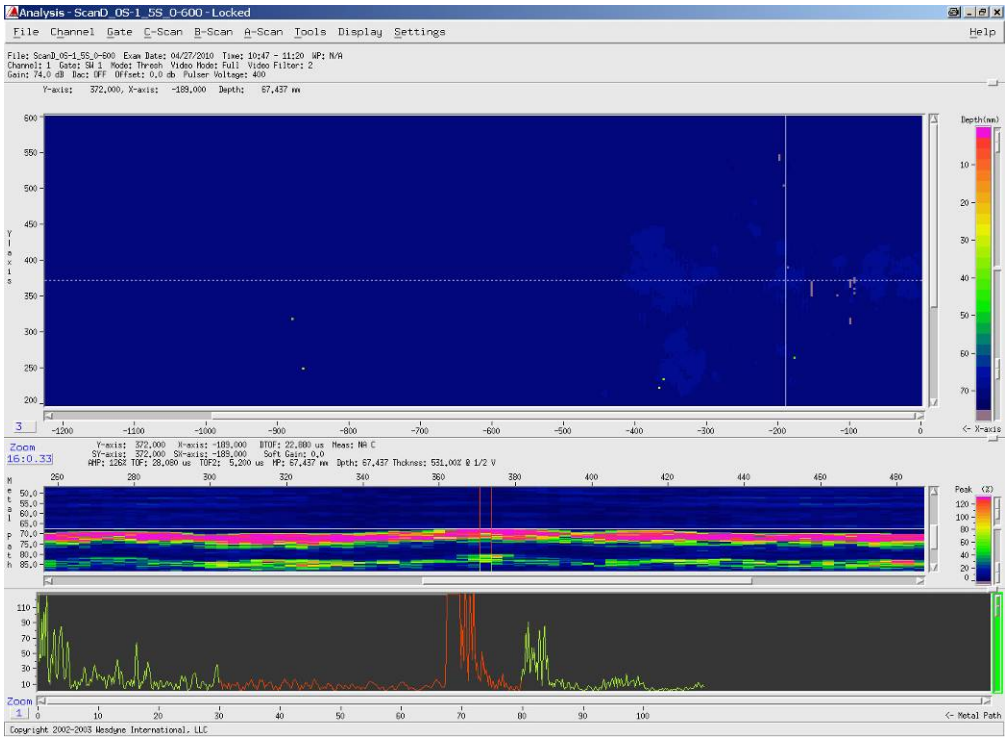
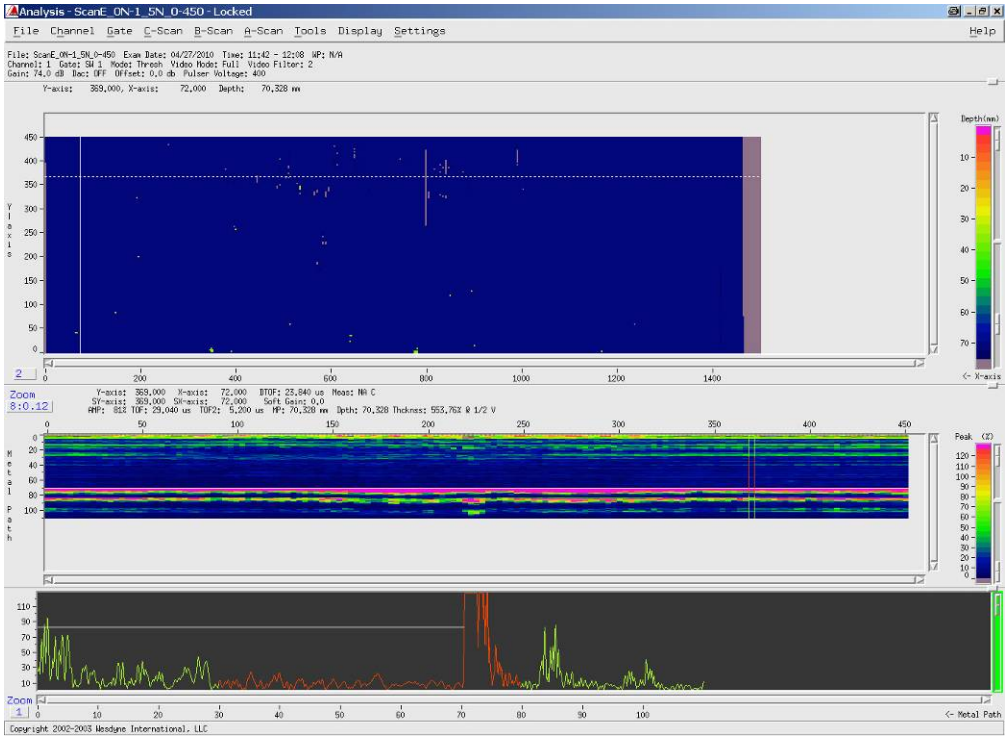


Fig. 10



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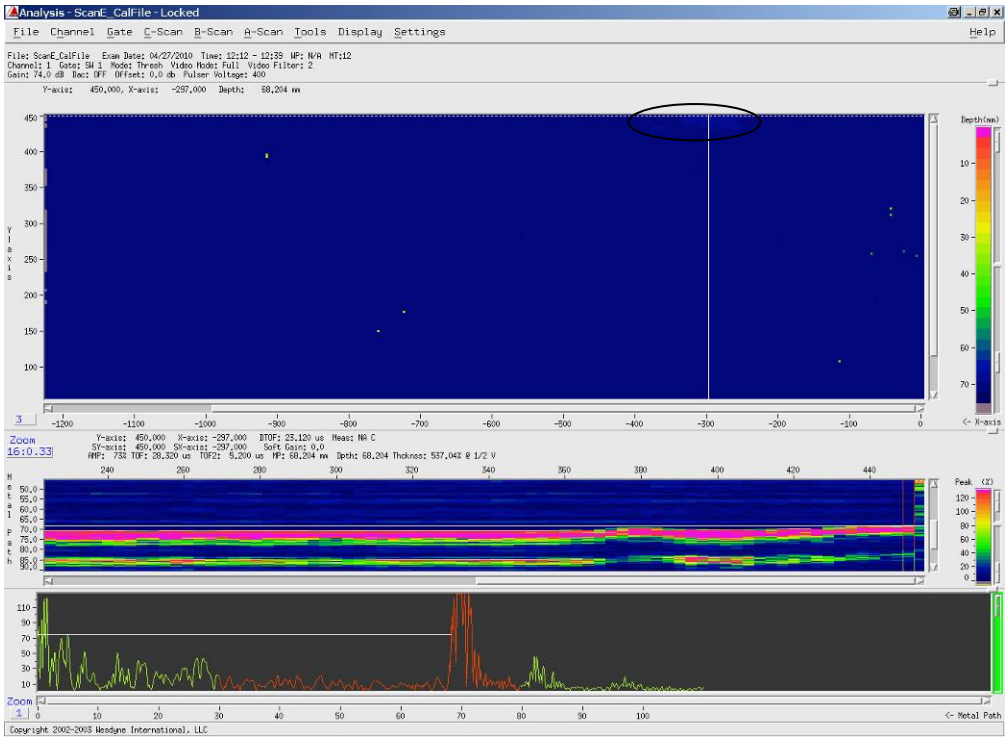

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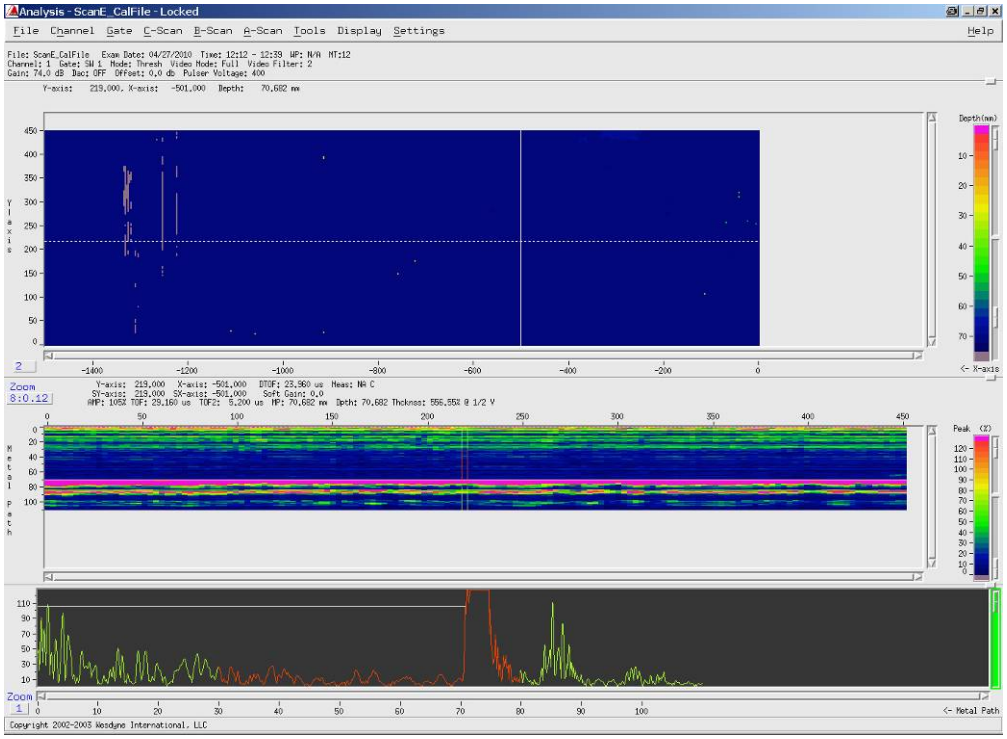

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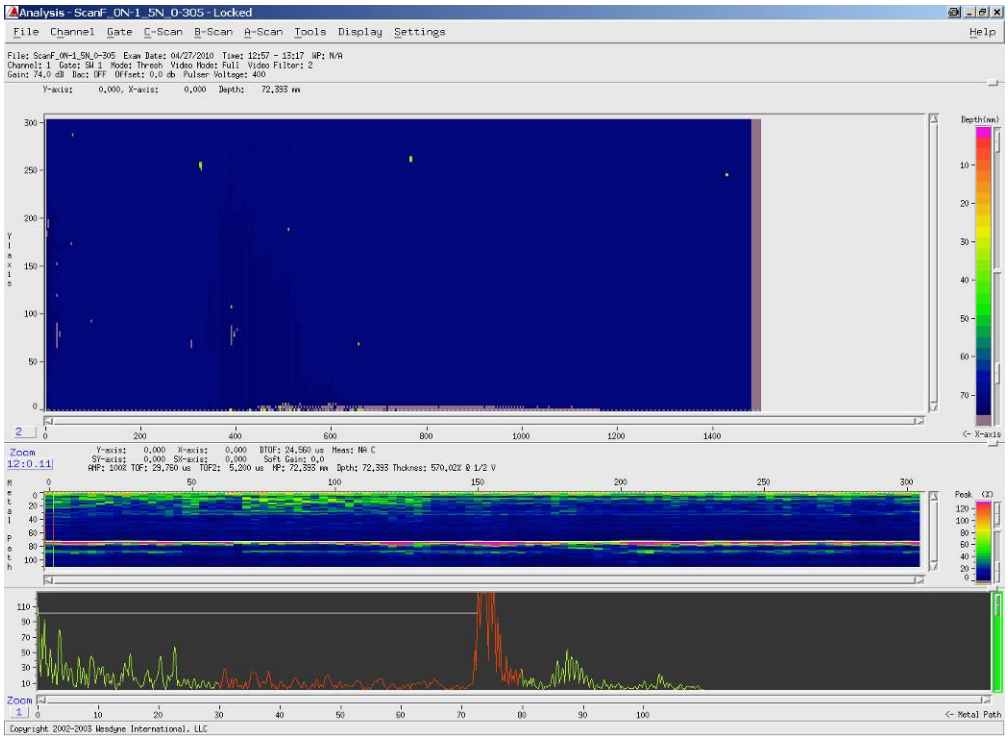

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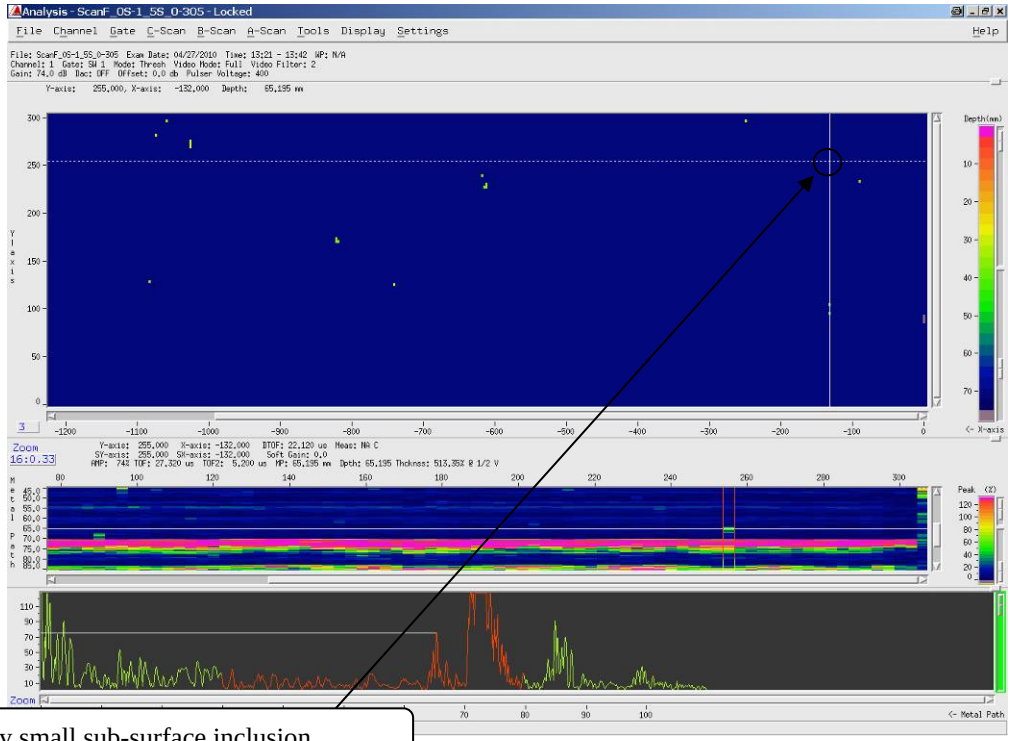

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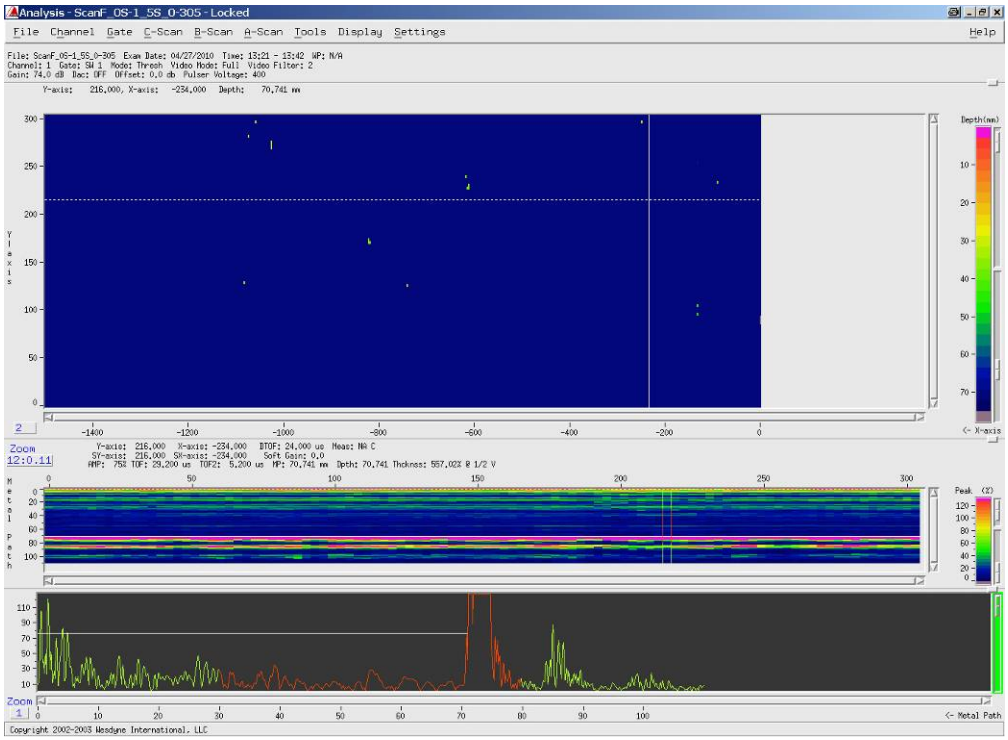


Fig. 16

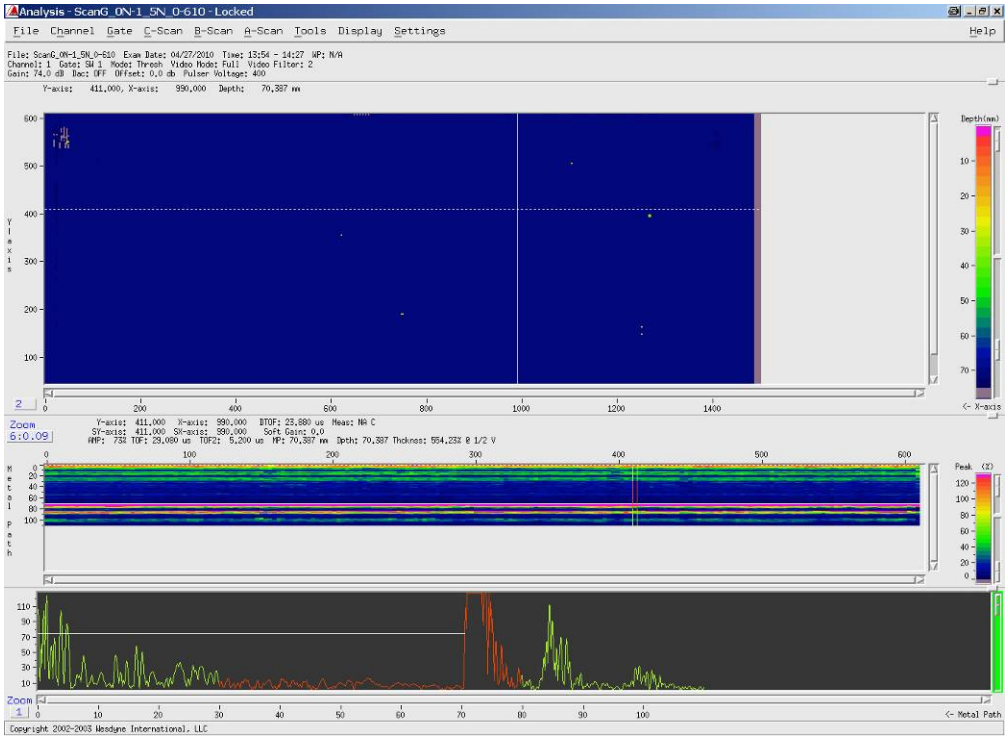


Fig. 17

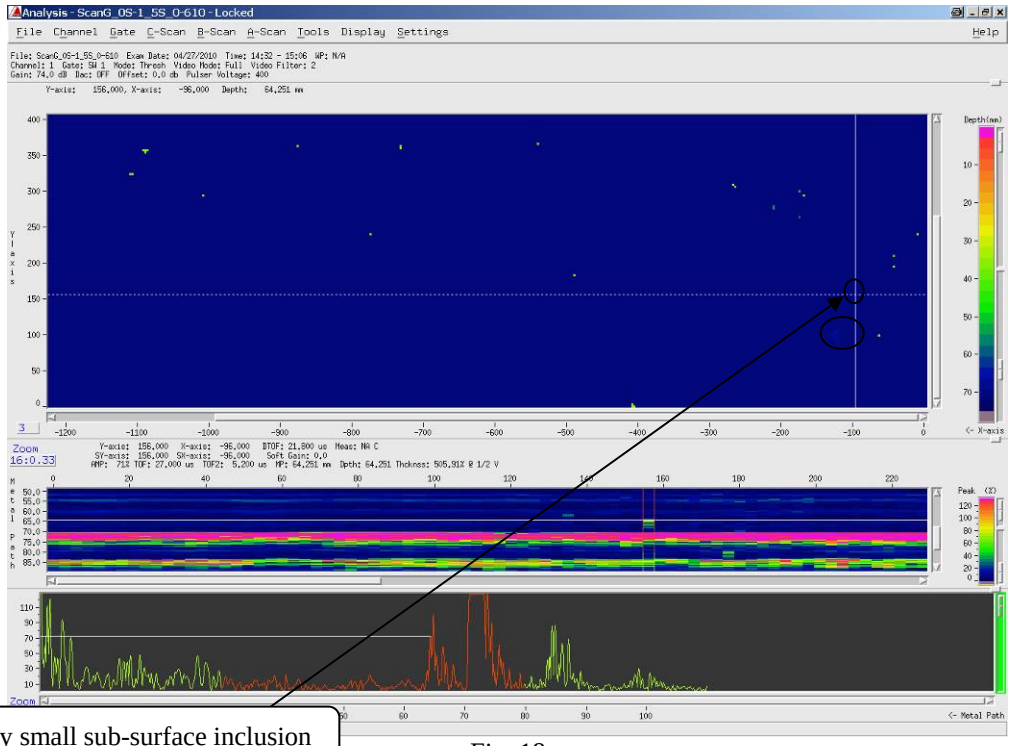


Fig. 18

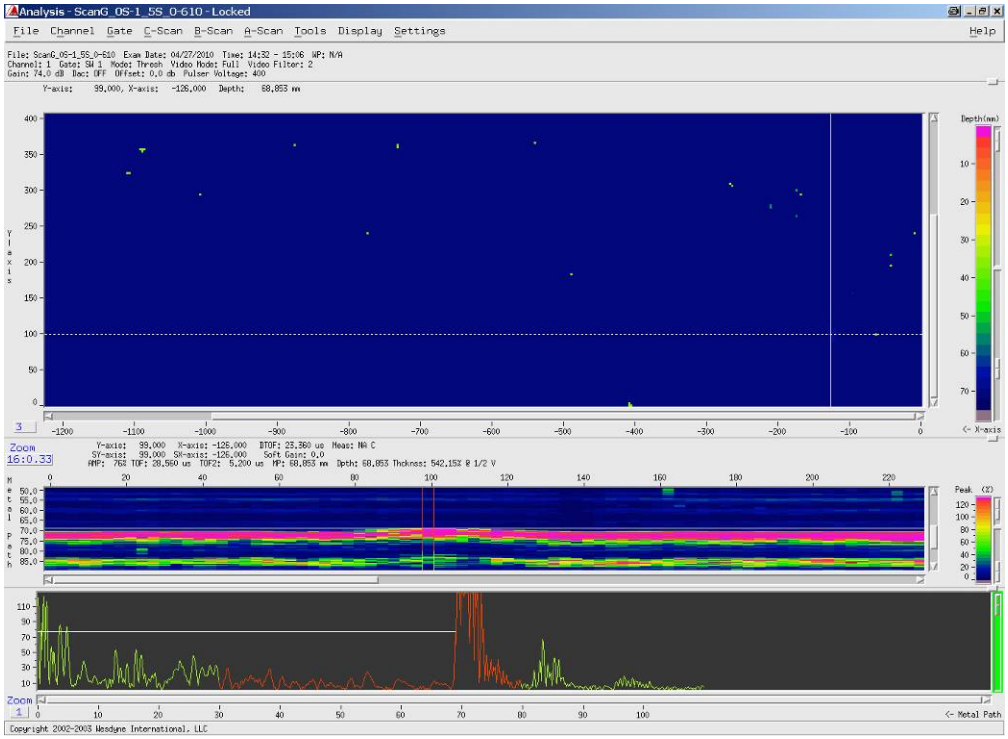


Fig. 19

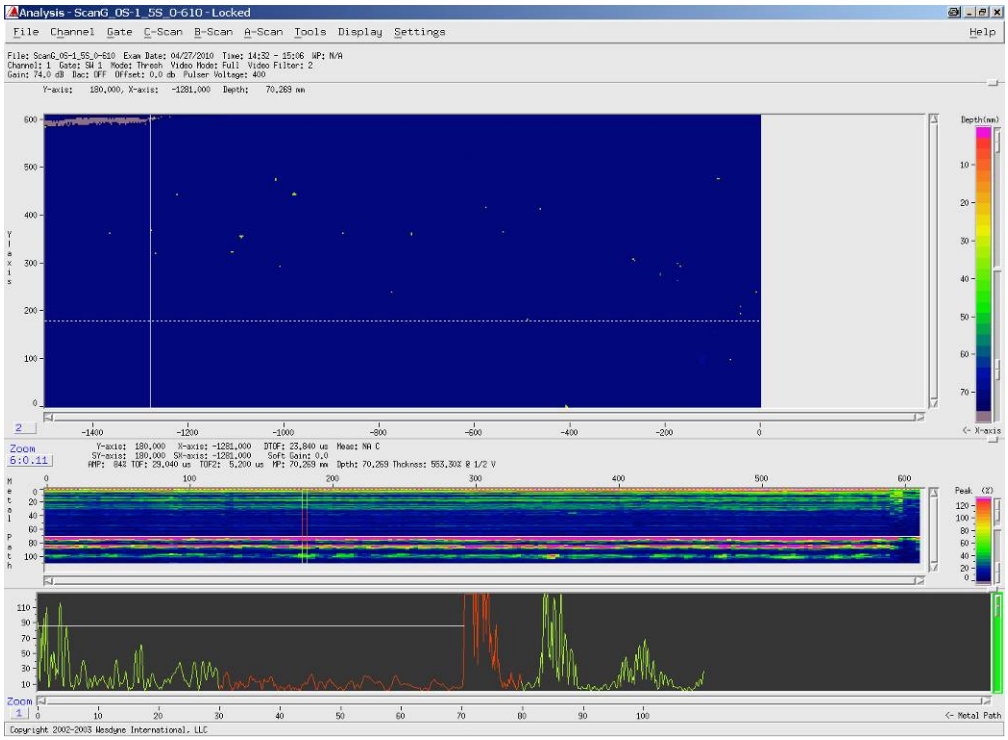
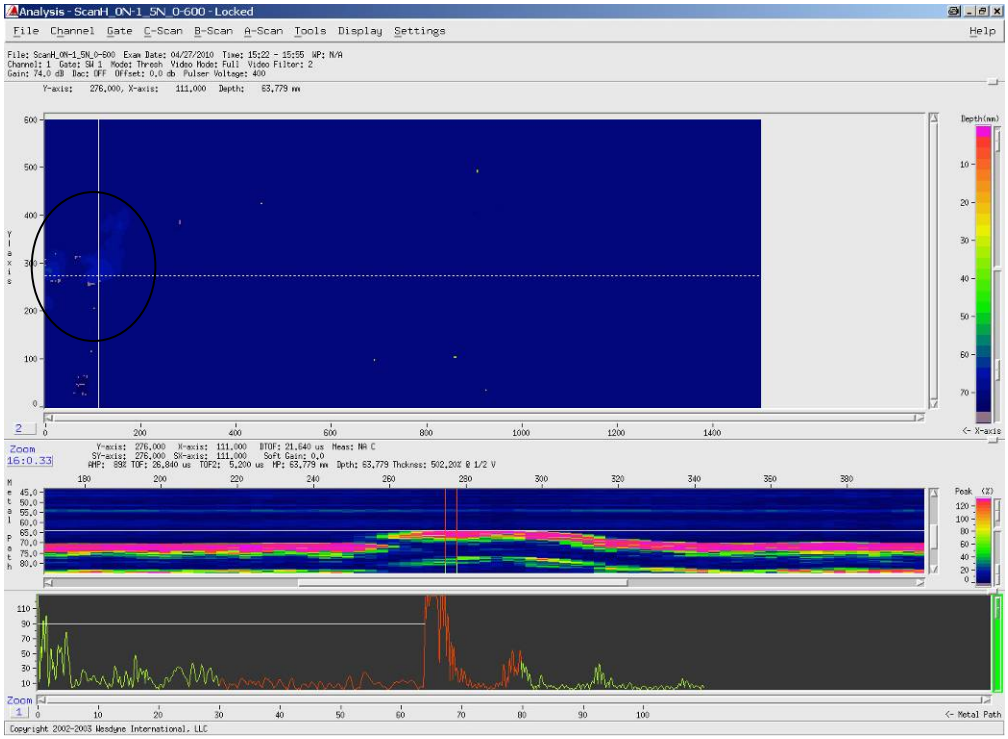


Fig. 20



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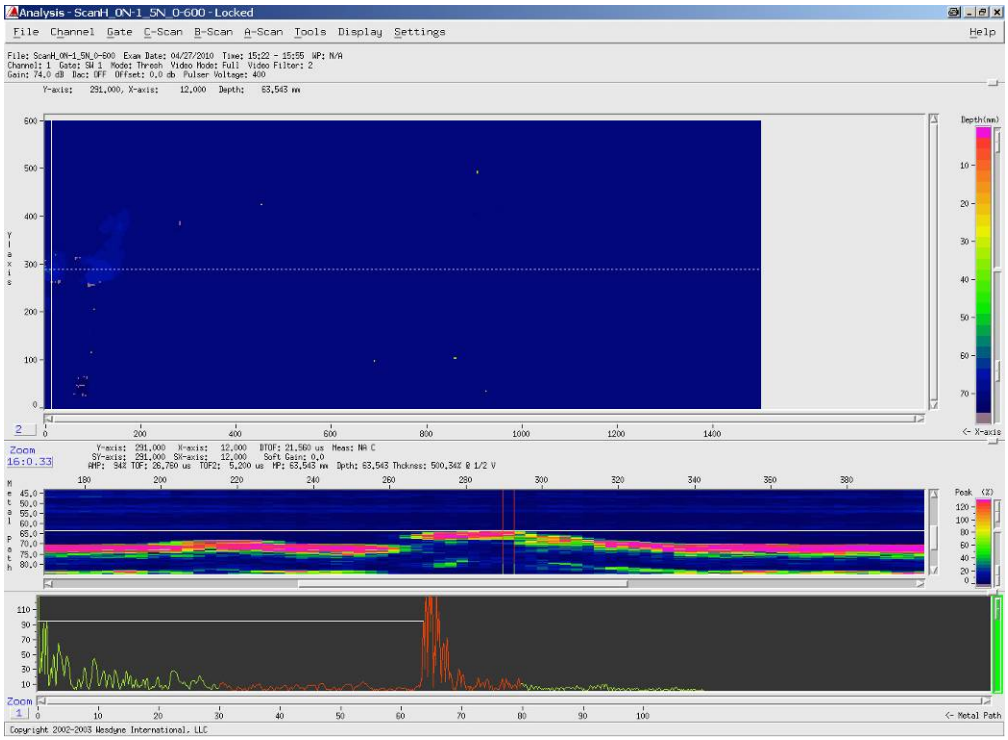

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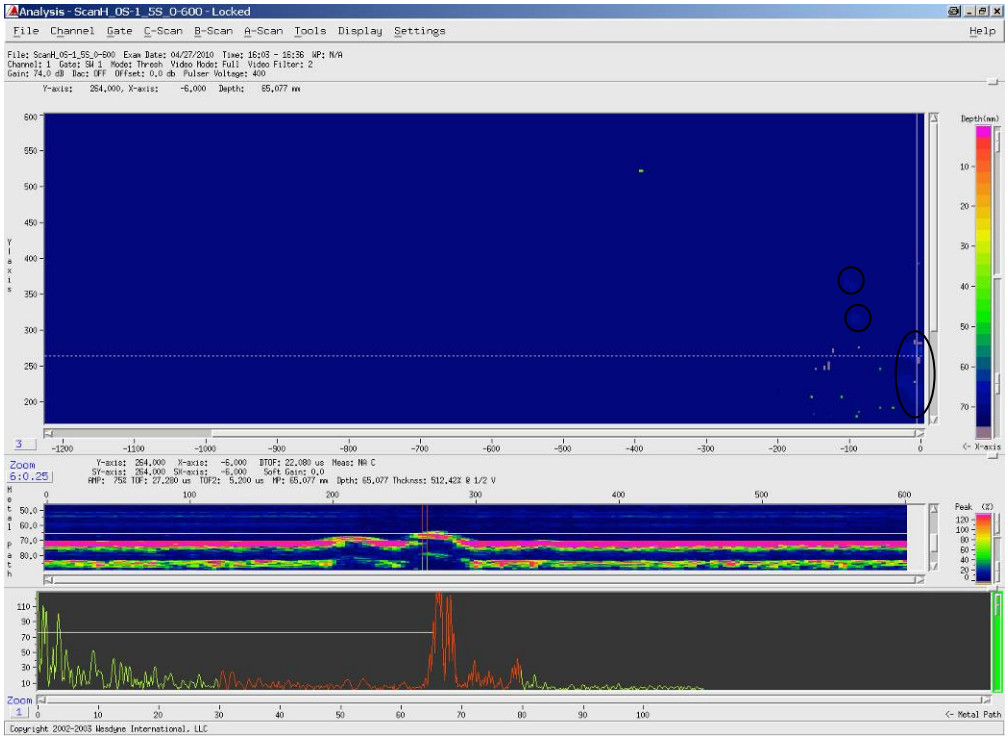
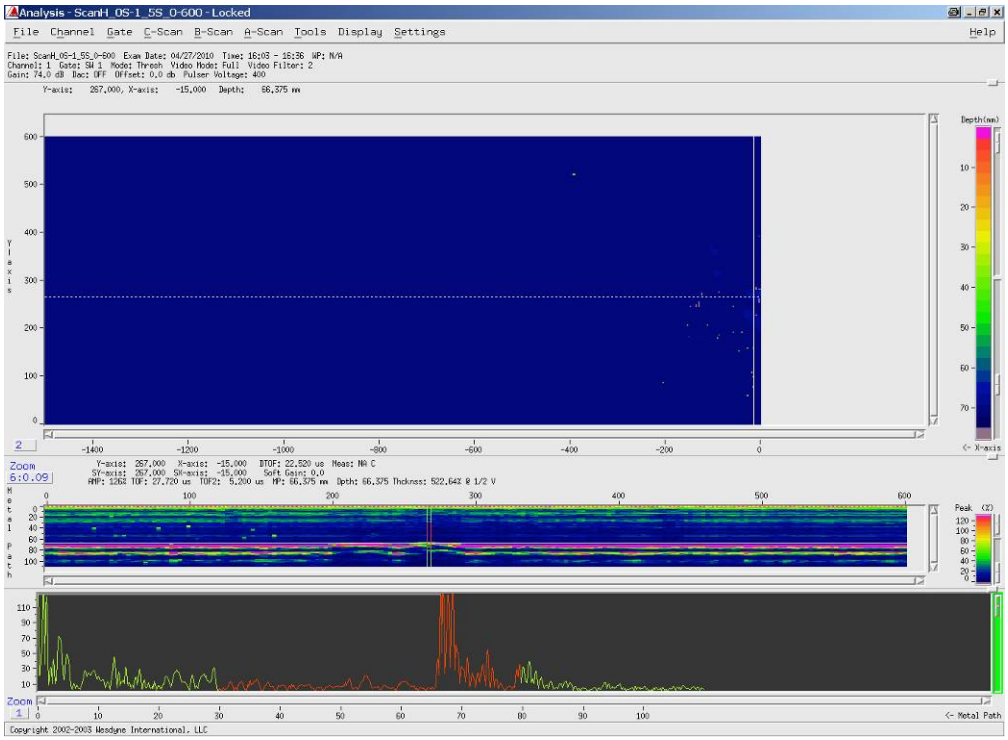


Fig. 23



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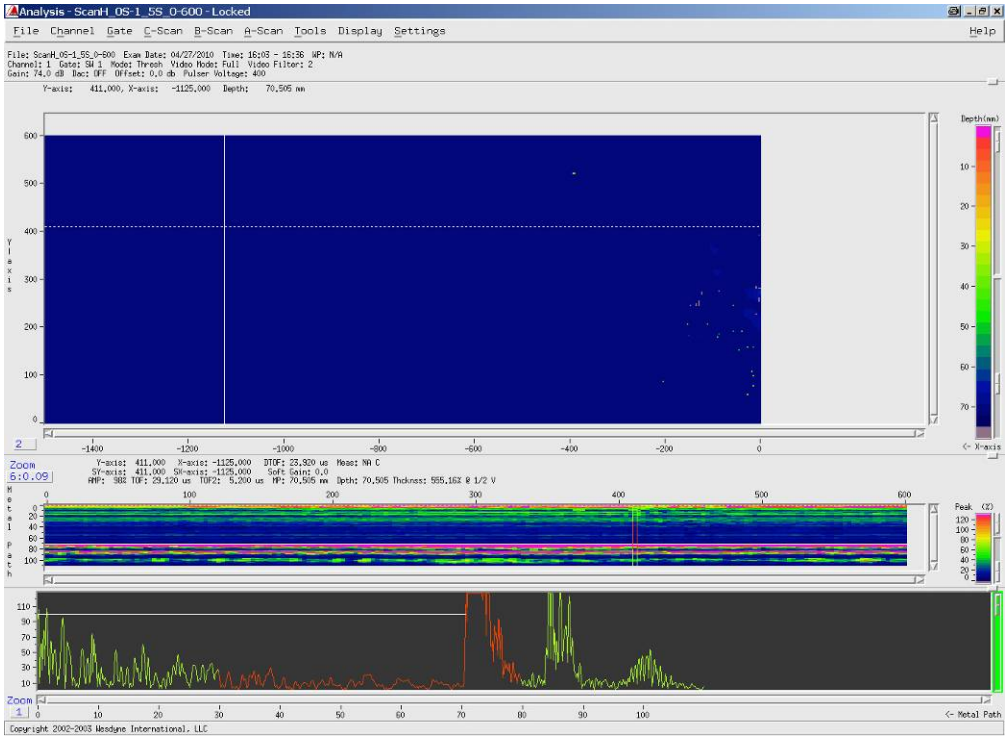


Fig. 25

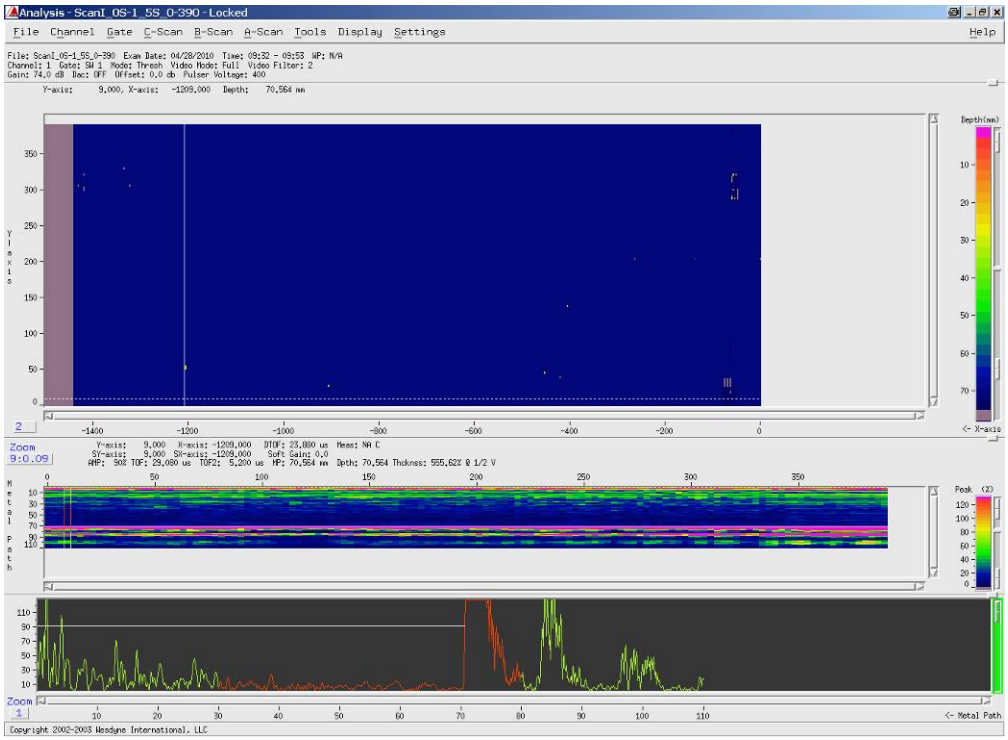


Fig. 26

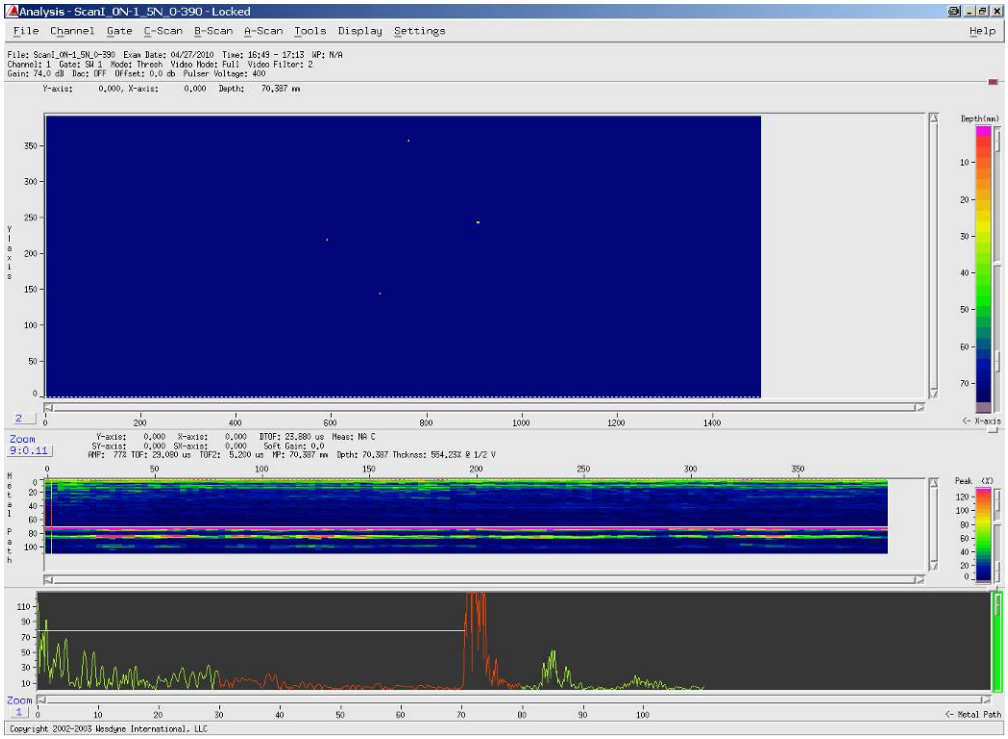


Fig. 27

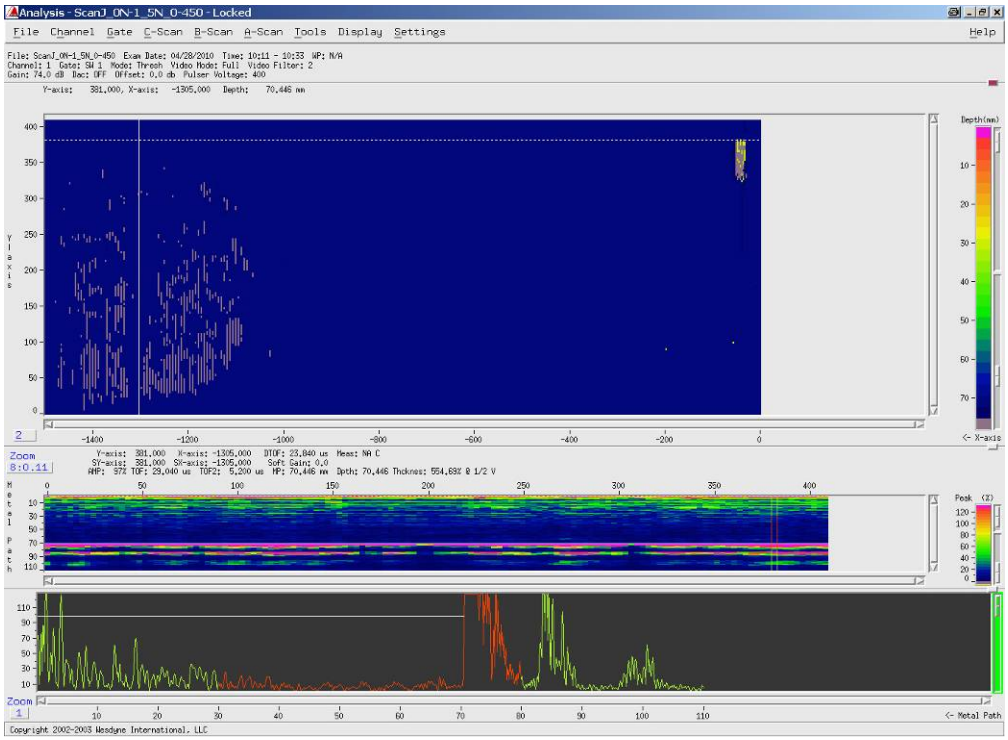


Fig. 28

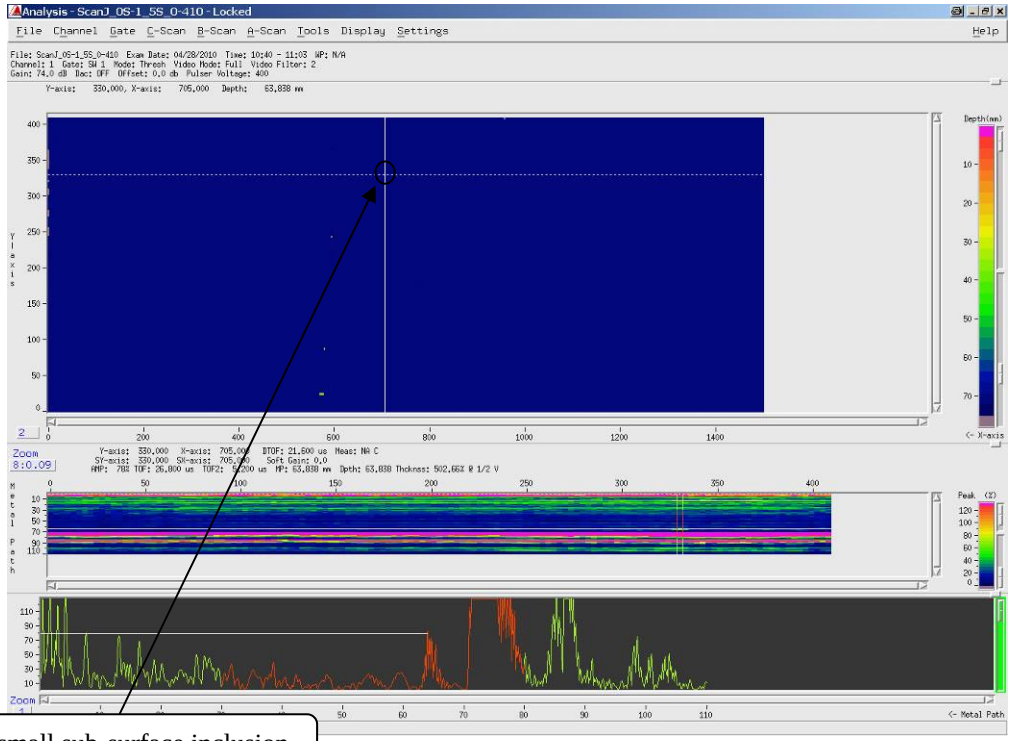


Fig. 29

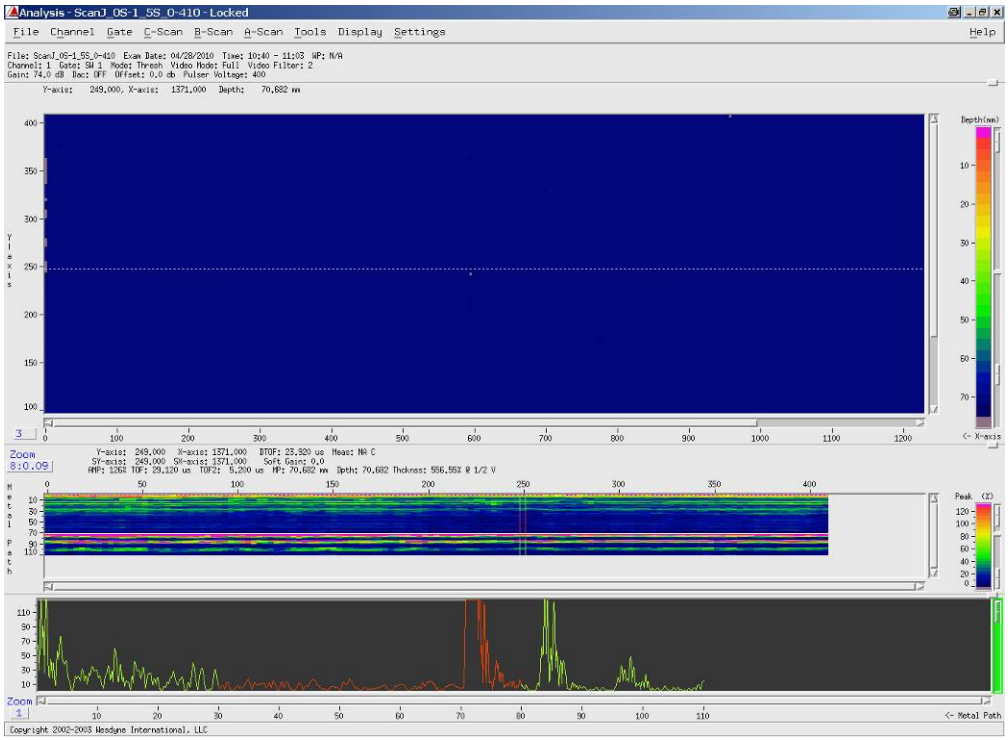


Fig. 30

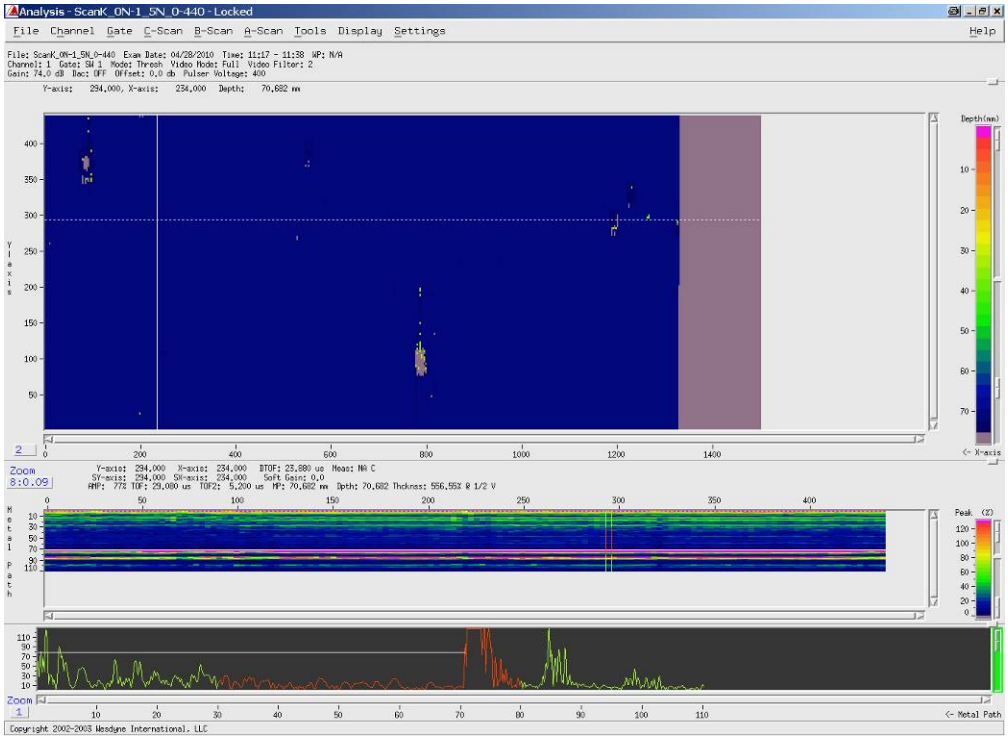


Fig. 31

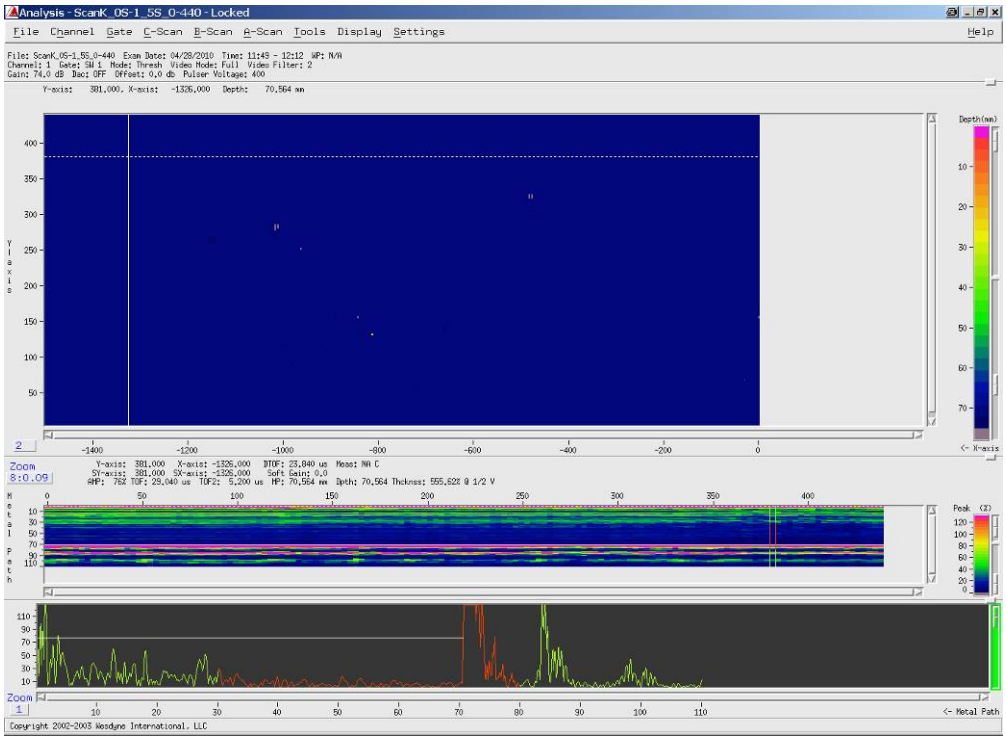


Fig. 32

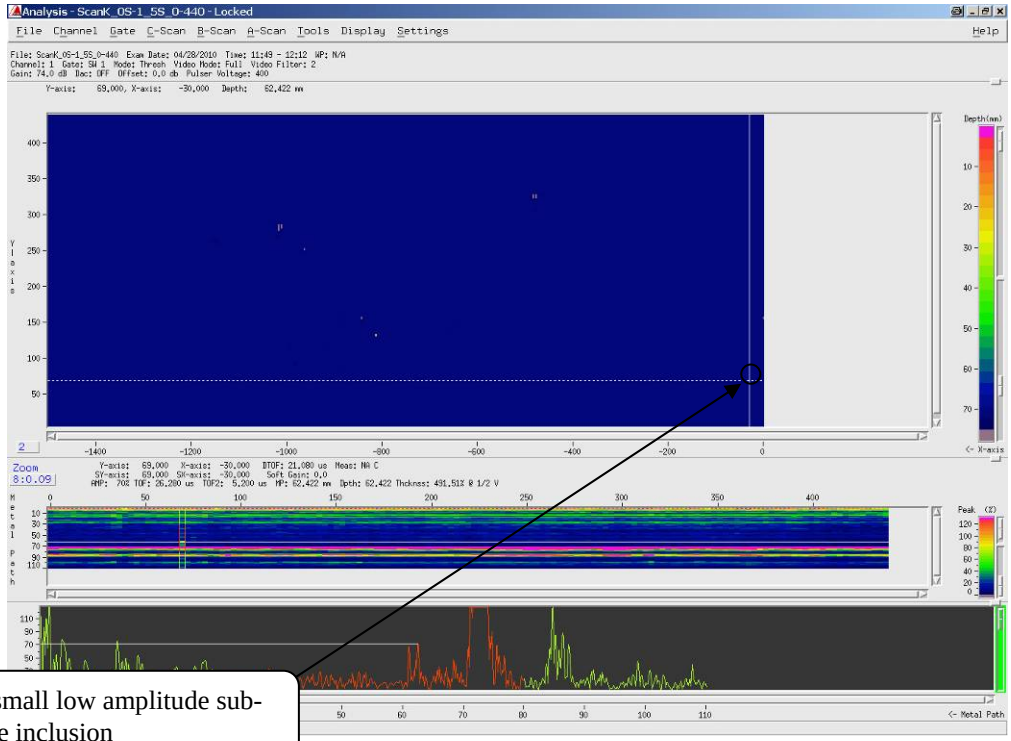


Fig. 33

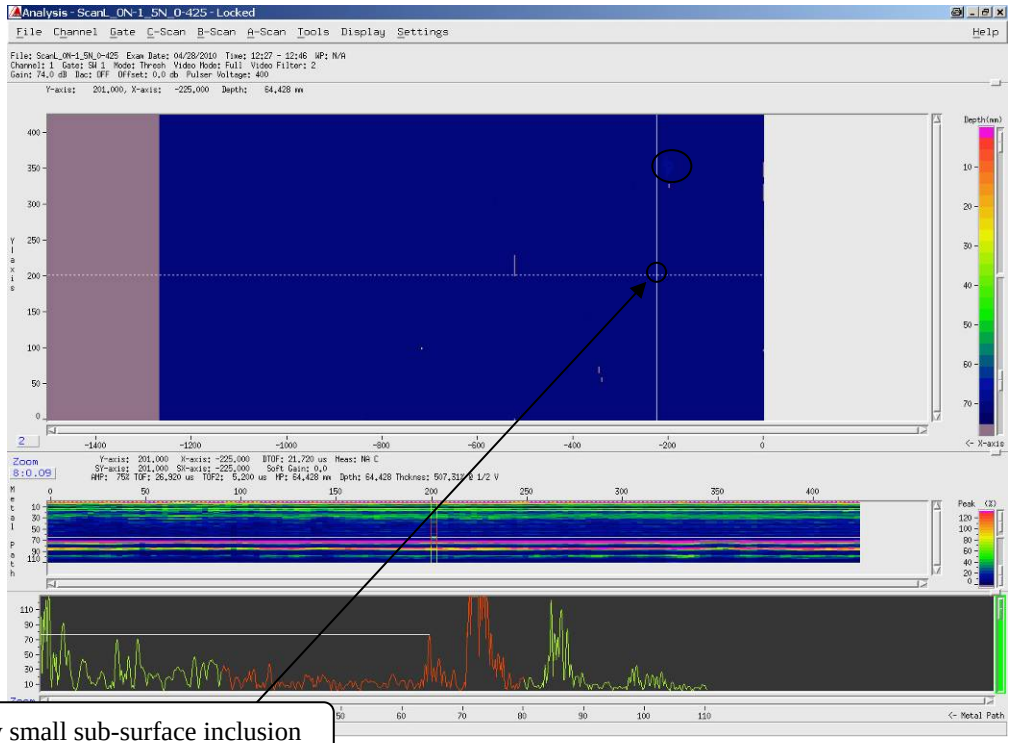


Fig. 34

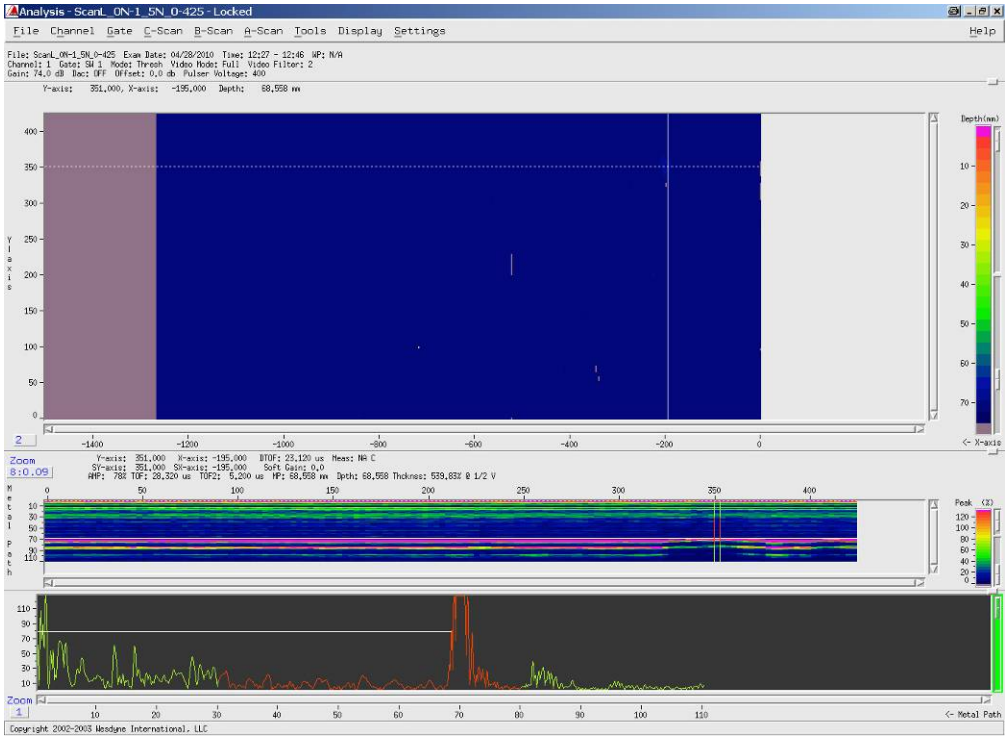


Fig. 35

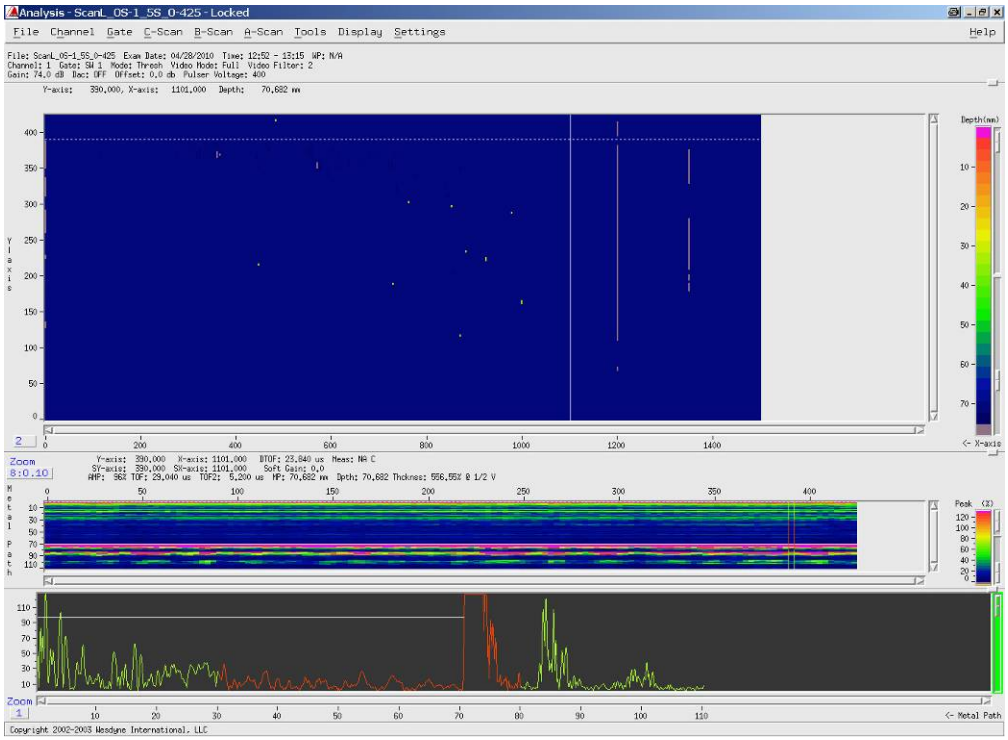


Fig. 36

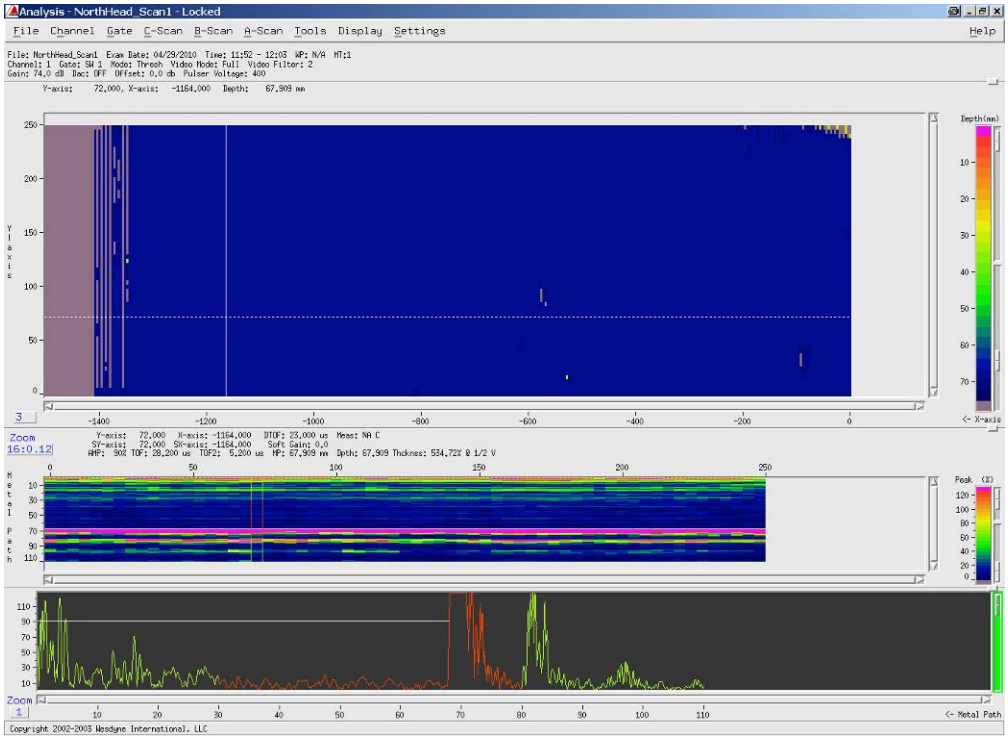


Fig. 37

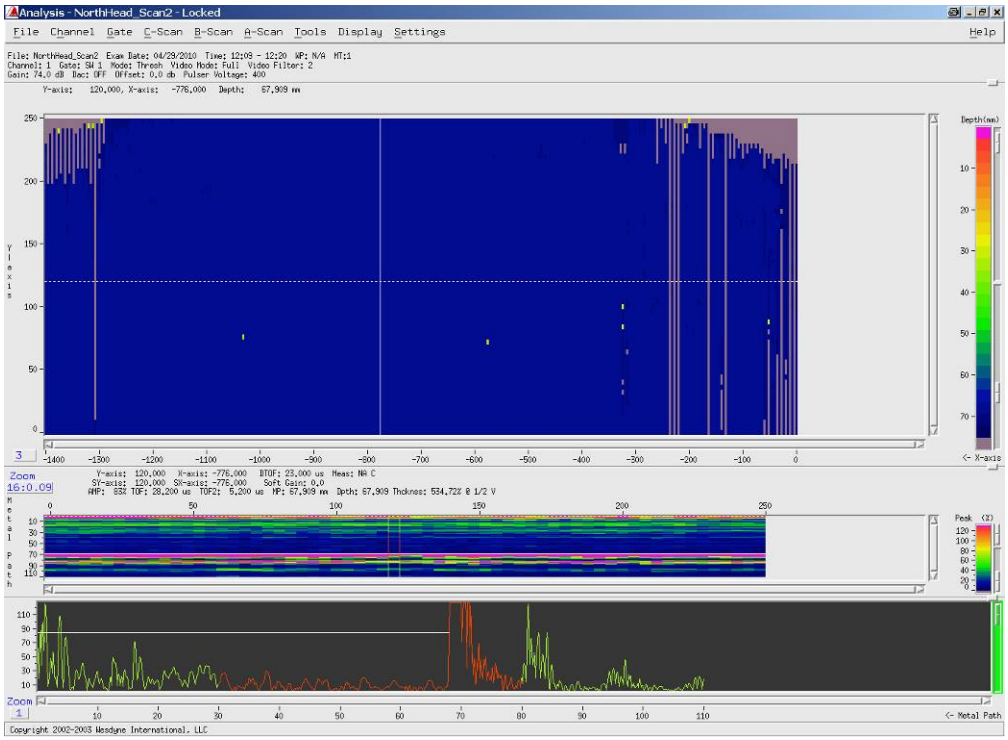


Fig. 38

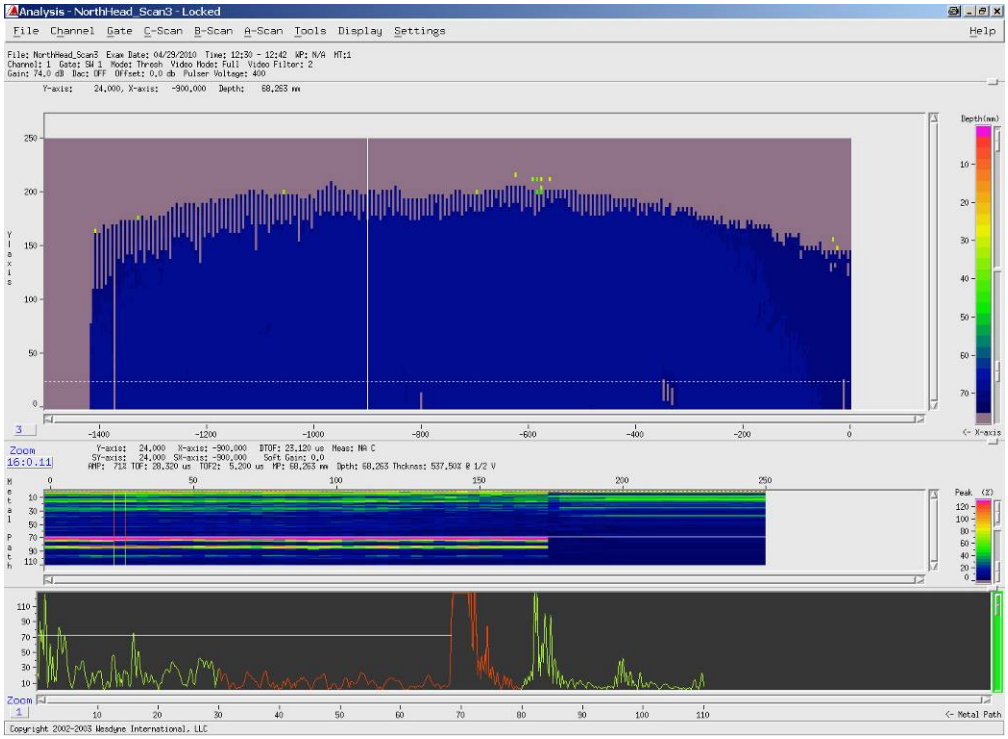


Fig. 39

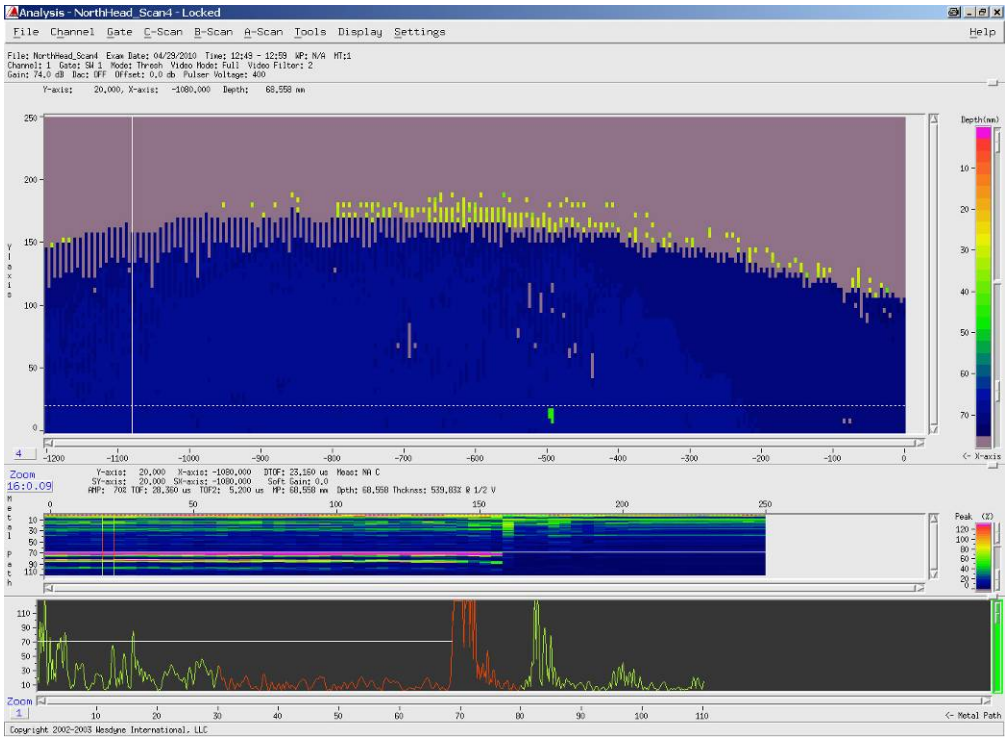
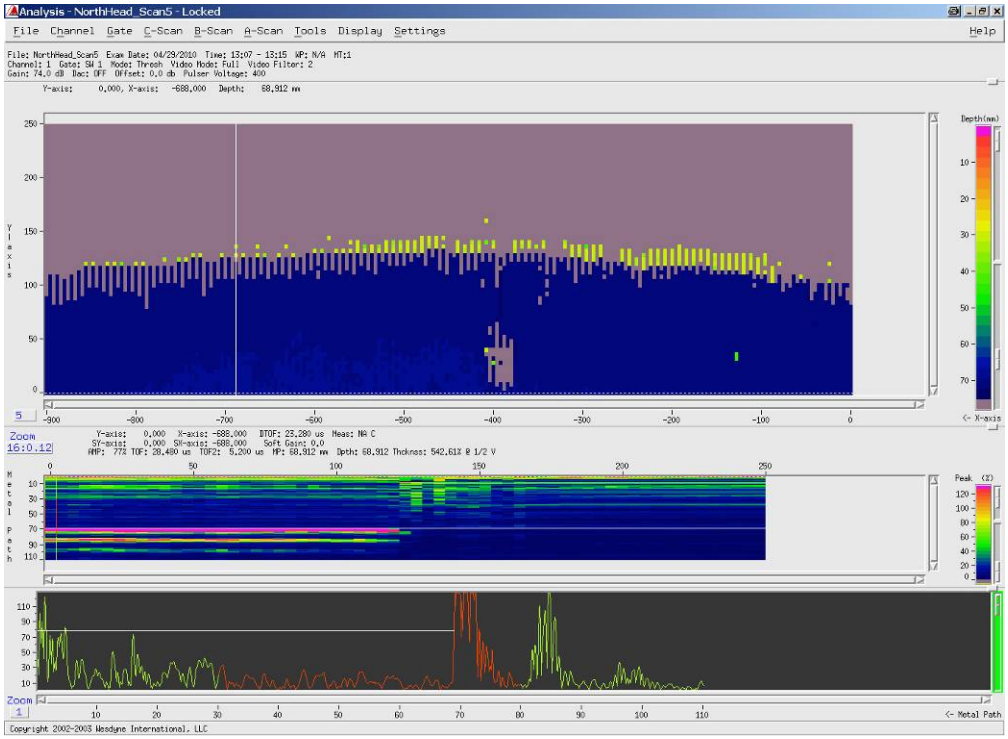


Fig. 40



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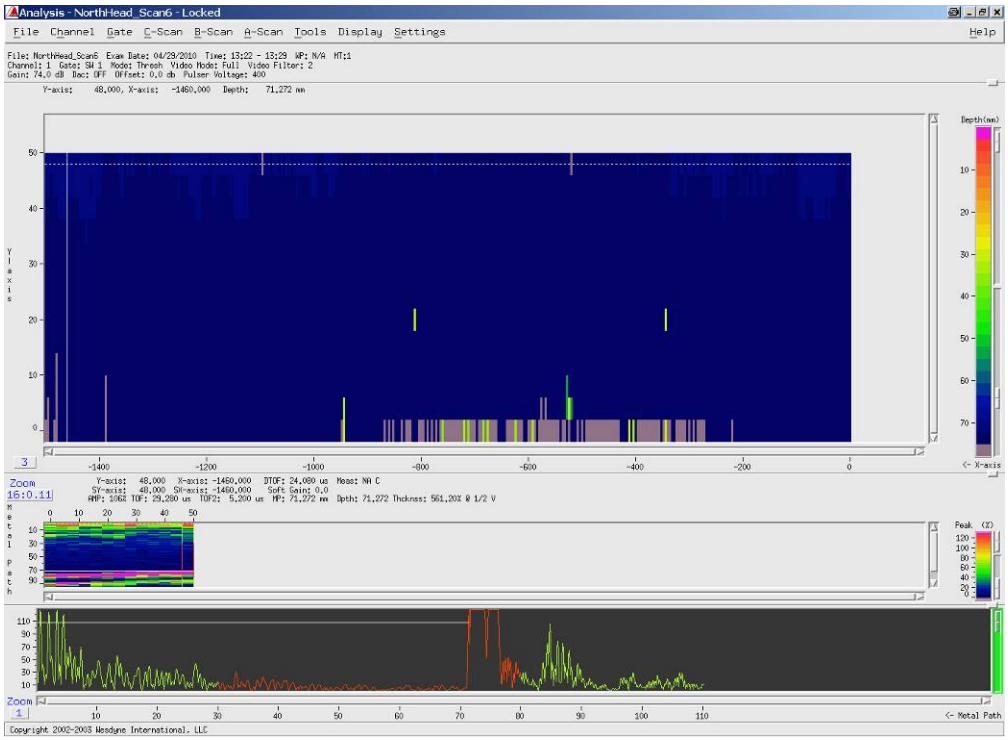


Fig. 42

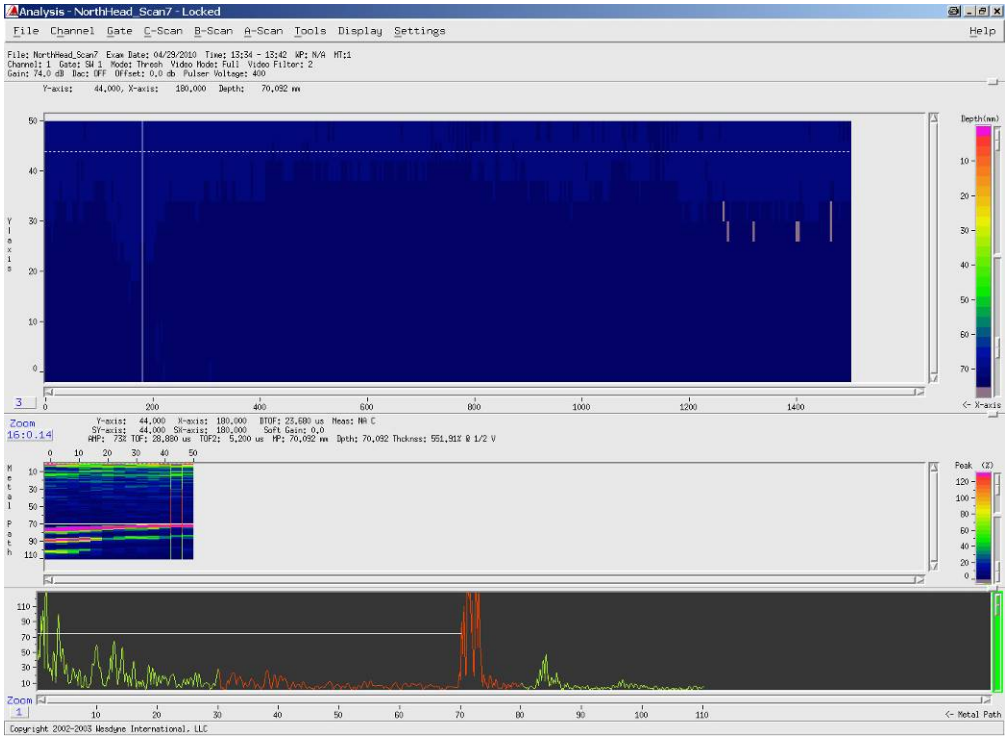


Fig. 43

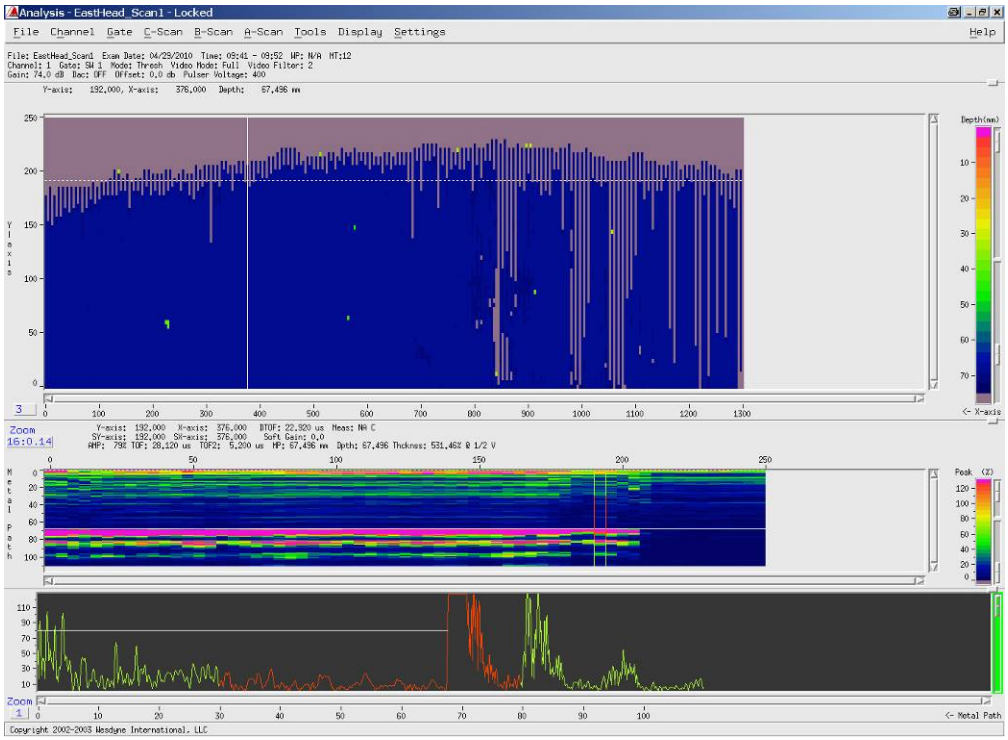


Fig. 44

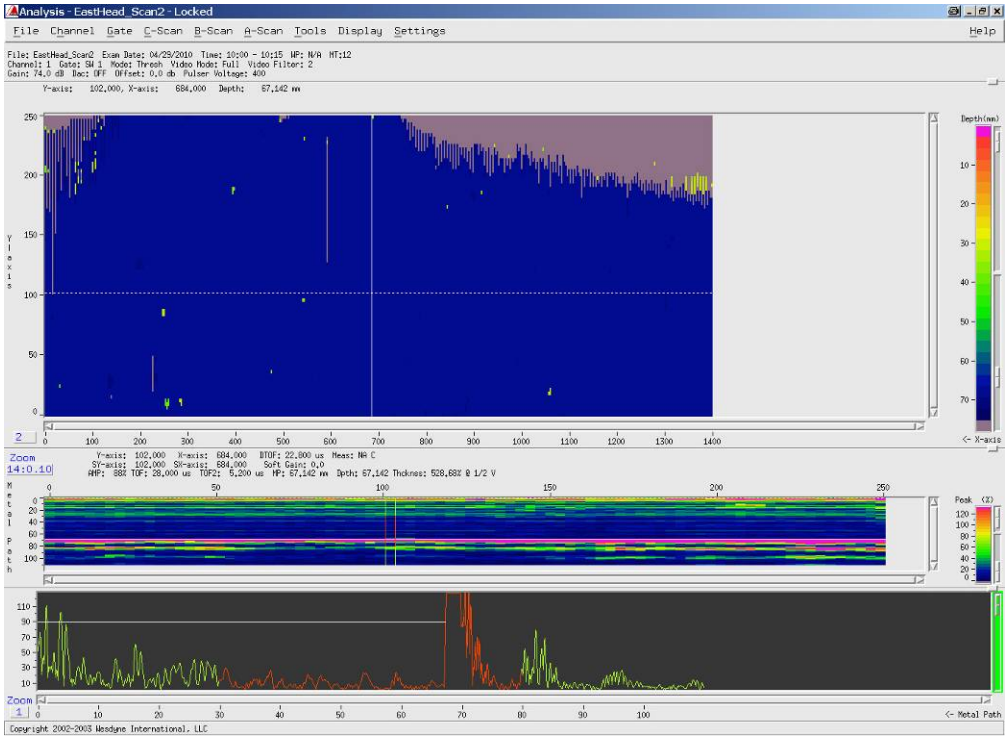


Fig. 45

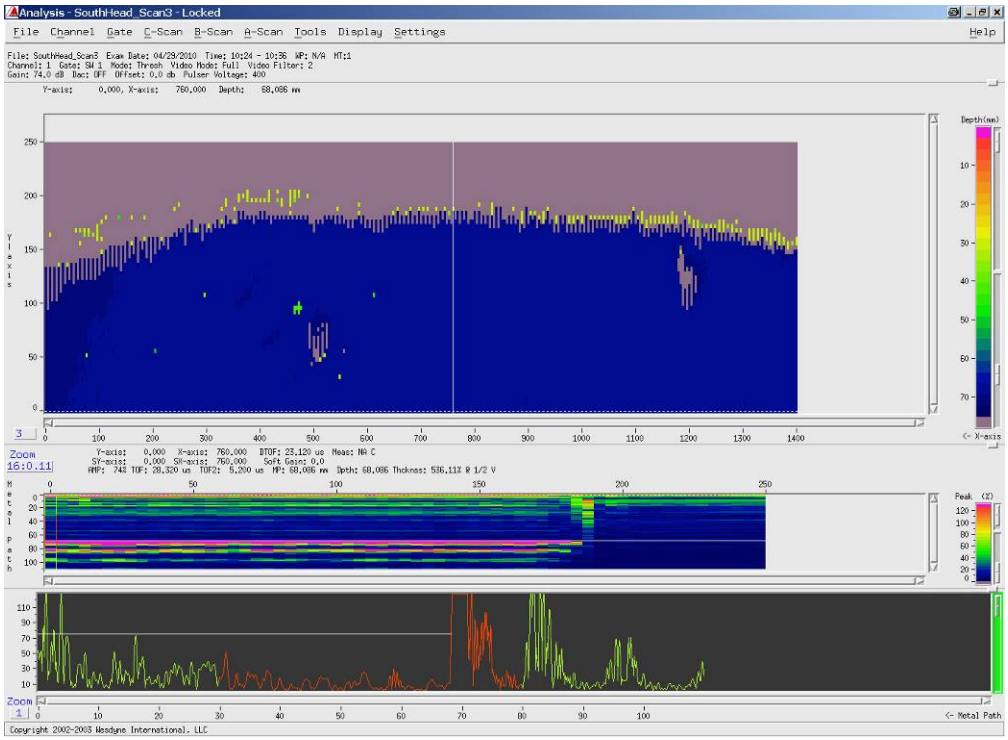


Fig. 46

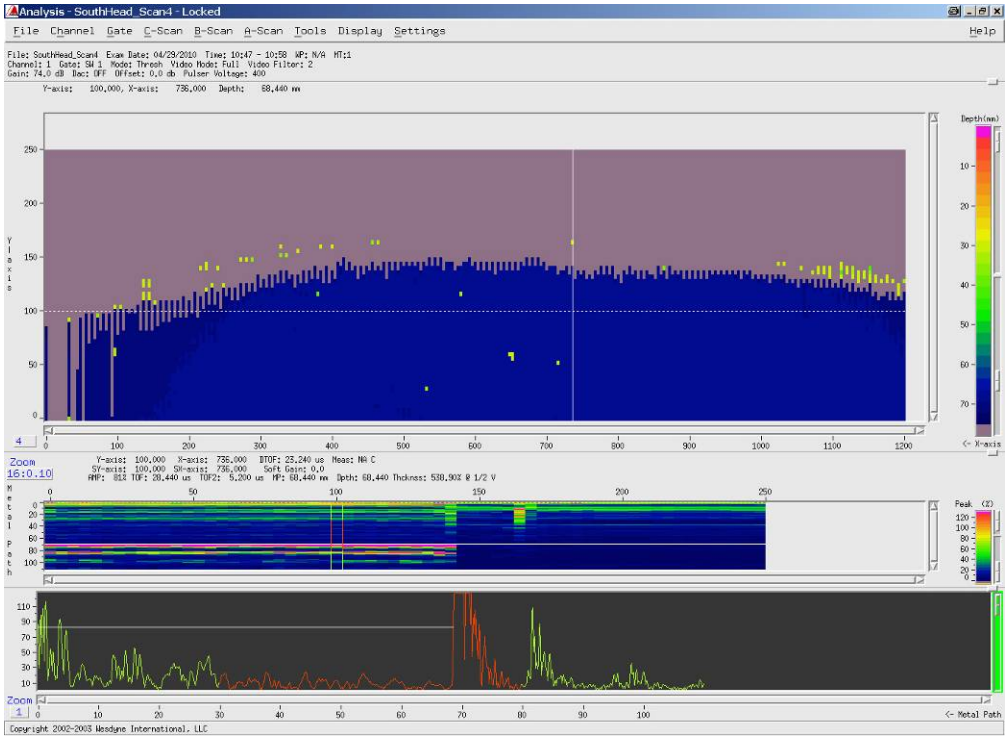


Fig. 47

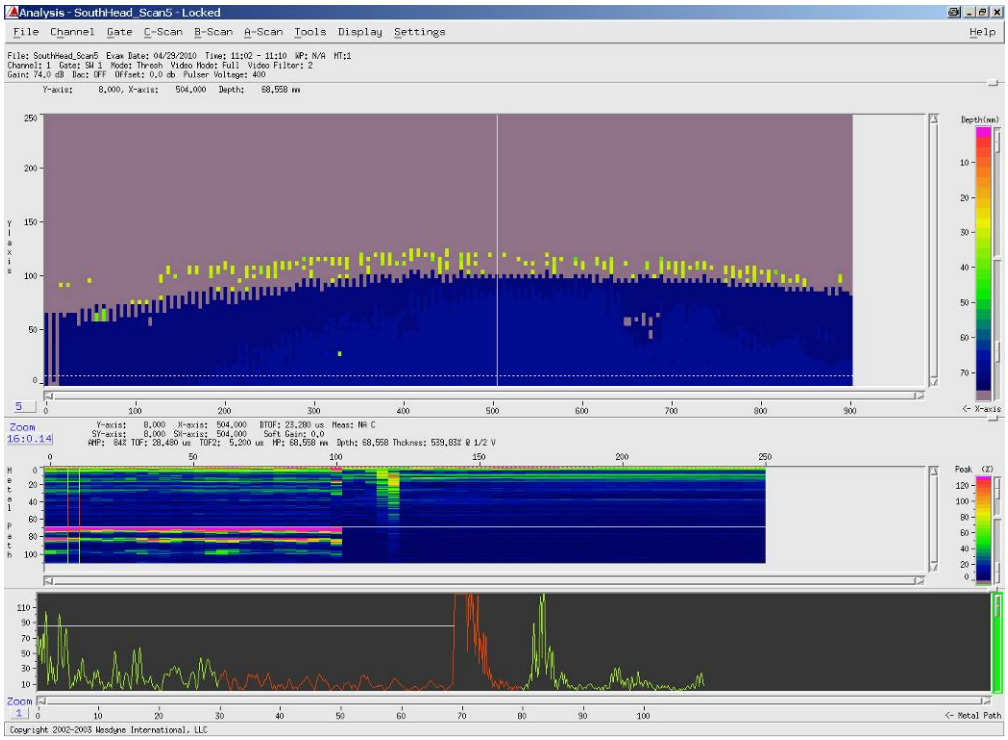


Fig. 48

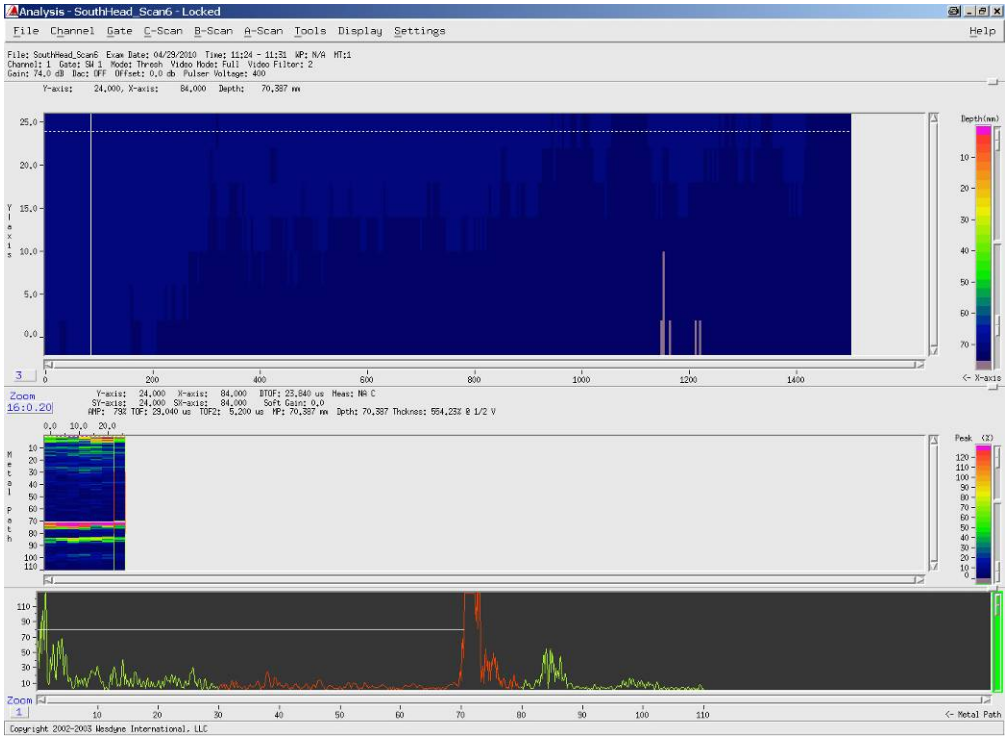


Fig. 49

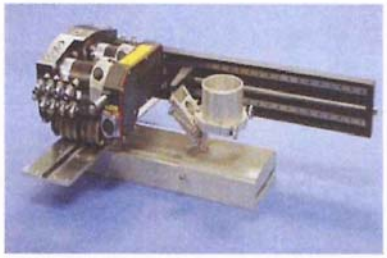
5.0 Equipment

AUT is combination of Microprocessor technology and advanced nondestructive testing techniques providing one of the most comprehensive Ultrasonic Inspection Programs in our industry.

AUT is a fully Automated Ultrasonic inspection technique which utilizes a Multi-channel Ultrasonic imaging system and a 2 axis Robotic scanner. The major advantage of AUT is to provide detailed inspection data at a high rate of speed with exceptional accuracy.

(AUT) is capable of inspecting Vessels, Piping, Storage tanks, and other equipment for potential degradation and service related damage. AUT provides a *full volumetric* inspection providing details on embedded weld flaws or cracking, shell material degradation such as laminations, blistering or hydrogen damage and potential interlinking (stepwise cracking) to the I.D. or O.D. surfaces as well as corrosion/erosion mapping.

AUT System



AUT Scanner

Advantages:

- High speed data acquisition (10 inches per second)
- Minimizes the need for costly internal entry
- Detailed information regarding fitness for service
- Exceptional repeatability, encoded scanning accurate to .001"
- Multi-Tasking capabilities utilizing a full array of transducers simultaneously.
- Can be done on-line at elevated temperatures
- Fully independent power and water supplies

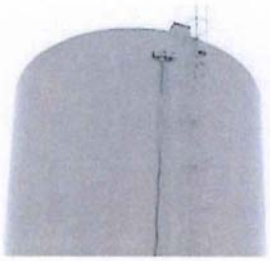
Applications:

Pulse Echo:

- Weld Inspection.
- Corrosion/Erosion Mapping.
- Hydrogen Degradation
- Environmentally Assisted Cracking

Time of Flight Diffraction (TOFD)

- Weld examination / flaw characterization
- Heavy wall reactor, vessel, and piping examinations in lieu of Radiography.



Tank Inspection

Pipe Inspection

Vessel Inspection

5.1 Examination equipment

5.1.1 Amdata system

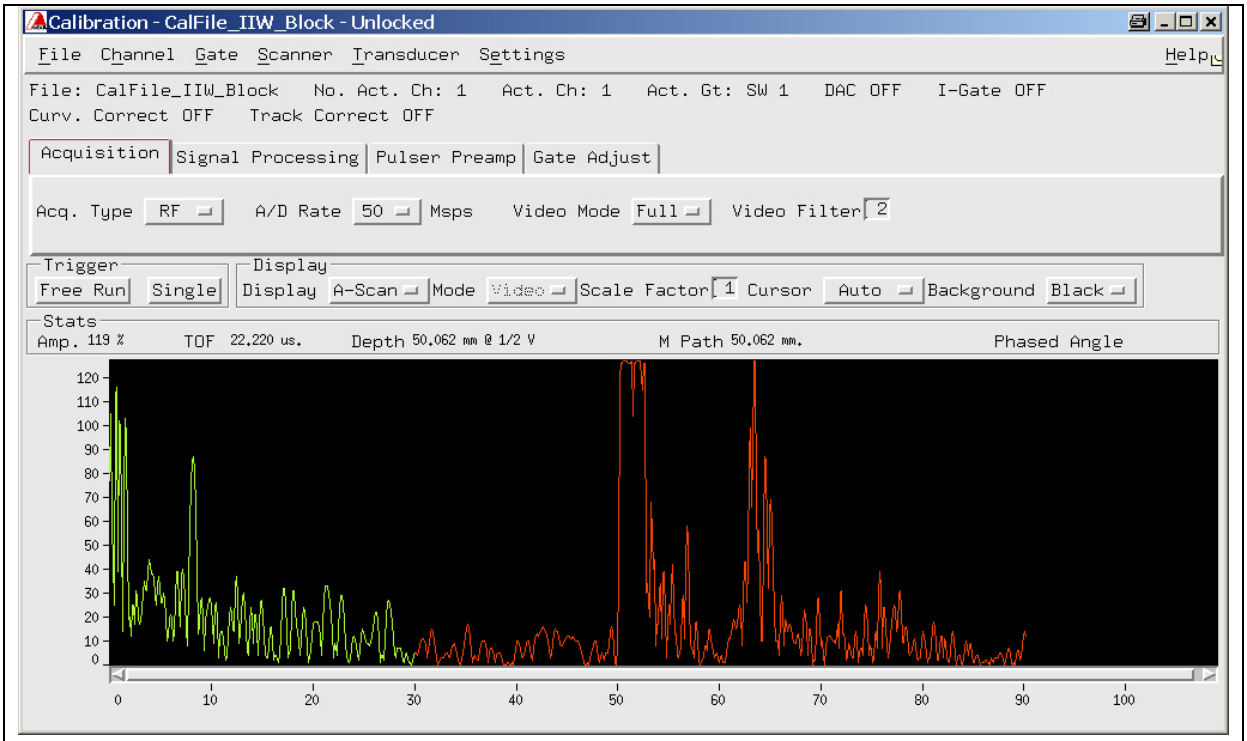
Instrument		Probes	
Model	Amdata	**Type**	IntraSpect
RTD Asset #	Amdata 1	**Angle**	0°
Cal Date	June 19, 2010	**Frequency**	5 MHz

5.1.2 Ultrasonic equipment

Instrument		Probe	
Make / Model	Panametrics Epoch XT	**Type/ size**	Panametrics .25"
Serial #	11195	**Serial #**	
RTD Asset #	6110	**Angle**	0°
Cal Due Date	July 21, 2010	**Couplant**	UT X
Cable	Coaxial	**Cal Block #**	0315/08

5.2 Equipment Calibration

Ultrasonic calibration was performed on the metric step wedge and was checked every few scans. Below are some of the calibration images.



On 50mm step