Weatherford

ARRAY INDUCTION SHALLOW FOCUSED ELECTRIC LOG

COMPANY	SHAKESPEARE OIL CO., INC.
WELL	SCHOWALTER #1-7
FIELD	WILDCAT
PROVINCE/COUNTY	SCOTT
COUNTRY/STATE	U.S.A. / KANSAS
LOCATION	480' FNL & 2220' FWL

SEC	TWP	RGE	Other Services
7	16S	32W	MPD/MDN MML MSS

Latitude
Longitude
API Number 15-171-21205

Permanent Datum GL, Elevation 3009 feet
Log Measured From KB, 11.00 feet above Permanent Datum
Drilling Measured From KB

Elevations:	feet
KB	3020.00
DF	3018.00
GL	3009.00

Date	09-JUL-2017		
Run Number	ONE		
Service Order	4558-186803695		
Depth Driller	4750.00 feet		
Depth Logger	4757.00 feet		
First Reading	4754.00 feet		
Last Reading	267.00 feet		
Casing Driller	265.00 feet		
Casing Logger	267.00 feet		
Bit Size	7.875 inches		
Hole Fluid Type	CHEMICAL		
Density / Viscosity	9.30 lb/USg	54.00 CP	
PH / Fluid Loss	10.50	8.80 ml/30Min	
Sample Source	FLOWLINE		
Rm @ Measured Temp	0.95 @ 75.0 ohm-m		
Rmf @ Measured Temp	0.76 @ 75.0 ohm-m		
Rmc @ Measured Temp	1.14 @ 75.0 ohm-m		
Source Rmf / Rmc	CALC	CALC	
Rm @ BHT	0.59 @120.0 ohm-m		
Time Since Circulation	5 HOURS		
Max Recorded Temp	120.00 deg F		
Equipment / Base	14249	LIB	
Recorded By	ADAM SILL		
Witnessed By	TIM PRIEST		

BOREHOLE RECORD

Last Edited: 09-JUL-2017 16:19

Bit Size inches	Depth From feet	Depth To feet
7.875	253.00	4750.00

CASING RECORD

Type	Size inches	Depth From feet	Shoe Depth feet	Weight pounds/ft
SURFACE	8.625	0.00	253.00	24.00

REMARKS

- SOFTWARE ISSUE: 17.01.7206.

- RUN ONE: MCG, MML, MDN, MPD, MFE, MSS, MAI RUN IN COMBINATION.
  - HARDWARE: DUAL BOWSPRING USED ON MDN.
    0.5 INCH STANDOFF USED ON MFE.
    TWO 0.5 INCH STANDOFFS USED ON MSS.
    0.5 INCH STANDOFF USED ON MAI.

- 2.71 G/CC LIMESTONE DENSITY MATRIX USED TO CALCULATE POROSITY.

- BOREHOLE RUGOSITY, TIGHT PULLS, AND WASHOUTS WILL AFFECT DATA QUALITY.

- ALL INTERVALS LOGGED AND SCALED PER CUSTOMER'S REQUEST.

- TOTAL HOLE VOLUME FROM TD TO SURFACE CASING: 1703 CU.FT.

- ANNULAR HOLE VOLUME WITH 4.5 INCH PRODUCTION CASING FROM TD TO 3800 FEET: 219 CU.FT.

- RIG: DUKE #5.

- ENGINEER: A. SILL.

- OPERATOR: B. TOVAR.

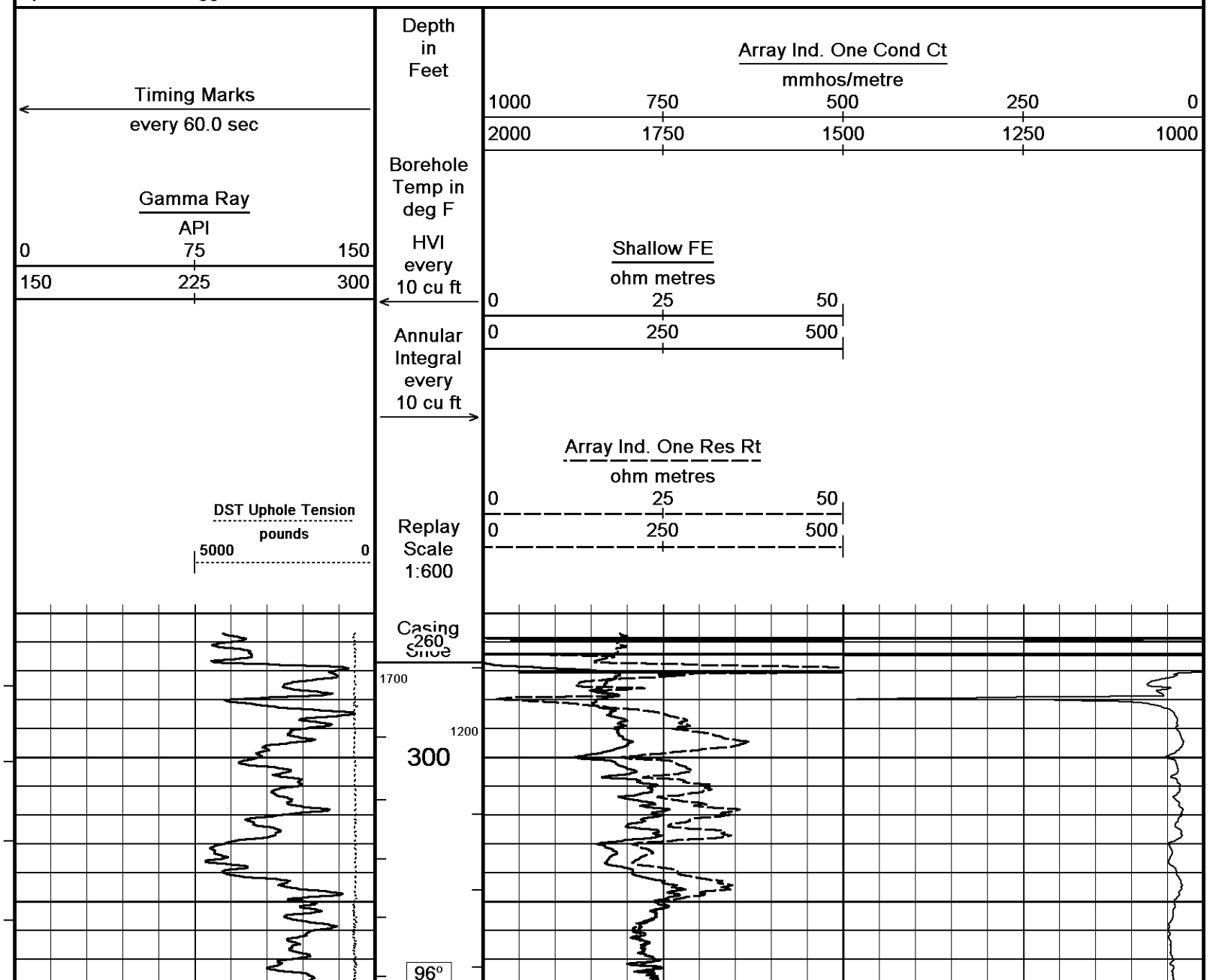
In interpreting, communicating or providing information and/or making recommendations, either written or oral, as to logs or test or other data, type or amount of material, or Work or other service to be furnished, or manner of performance, or in predicting results to be obtained, the Contractor will give the Company the benefit of the Contractor's best judgment based on its experience and will perform all such Work in a good and workmanlike manner. Any interpretation of test or other data, and any recommendation or reservoir description based upon such interpretations, are opinions based upon inferences from measurements and empirical relationships and assumptions, which inferences and assumptions are not infallible, and with respect to which professional engineers and analysts may differ. ACCORDINGLY ANY INTERPRETATION OR RECOMMENDATION RESULTING FROM THE SERVICES WILL BE AT THE SOLE RISK OF THE COMPANY, AND THE CONTRACTOR CANNOT AND DOES NOT WARRANT THE ACCURACY, CORRECTNESS OR COMPLETENESS OF ANY SUCH INTERPRETATION OR RECOMMENDATION, WHICH INTERPRETATIONS AND RECOMMENDATIONS SHOULD NOT, THEREFORE, UNDER ANY CIRCUMSTANCES BE RELIED UPON AS THE SOLE OR MAIN BASIS FOR ANY DRILLING, COMPLETION, WELL TREATMENT, PRODUCTION OR FINANCIAL DECISION, OR ANY PROCEDURE INVOLVING ANY RISK TO THE SAFETY OF ANY DRILLING ACTIVITY, DRILLING RIG OR ITS CREW OR ANY OTHER INDIVIDUAL. THE COMPANY HAS FULL RESPONSIBILITY FOR ALL DECISIONS CONCERNING THE SERVICES.

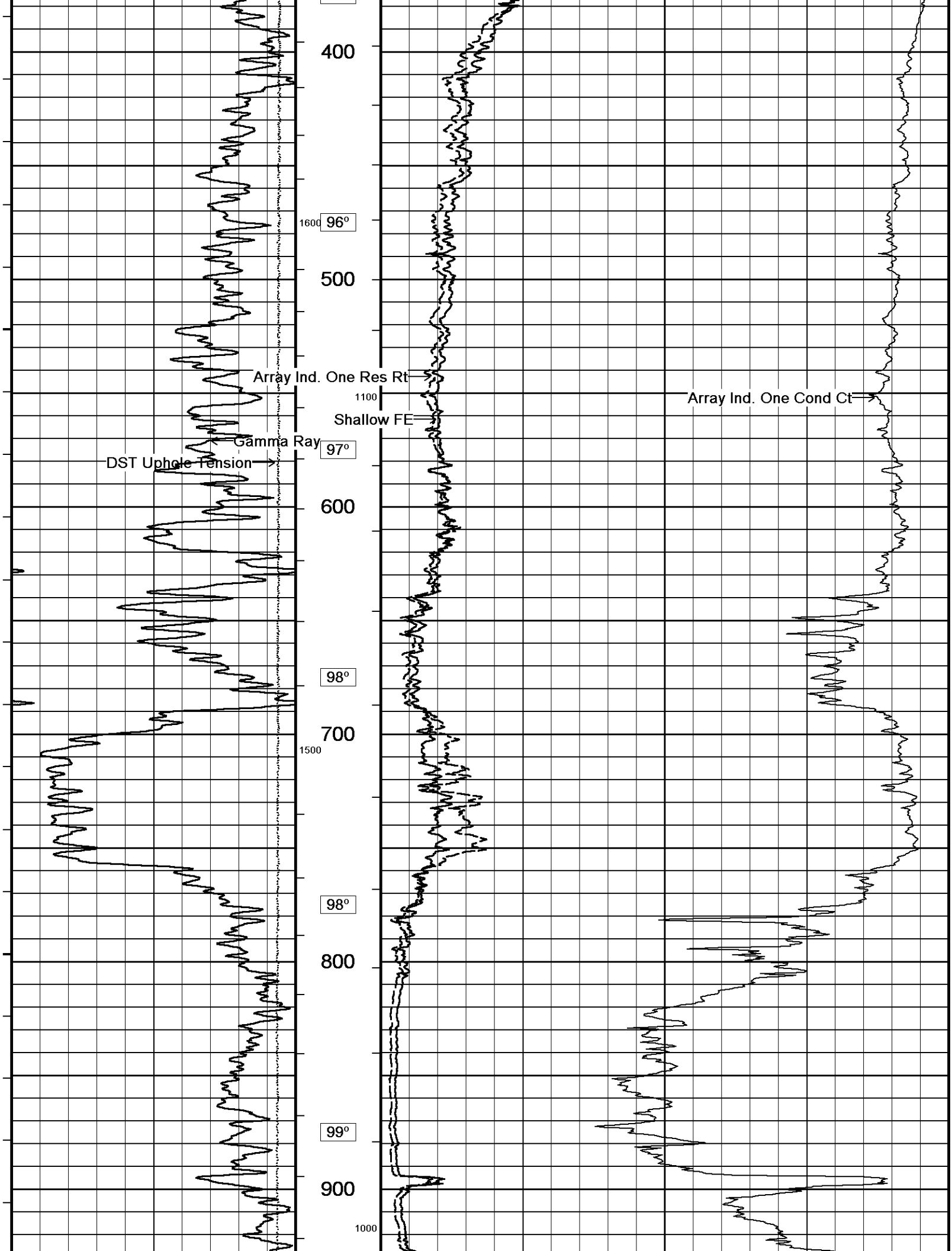
2 INCH MAIN

Depth Based Data - Maximum Sampling Increment 10.0cm — Plotted on 09-JUL-2017 21:59

Filename: C:\Minimus 17.01.7206\Logs\Shakespeare Schowal...\Shakespeare Schowalter #1-7_002.dta — Recorded on 09-JUL-2017 18:52

System Versions: Logged with 17.01.7206 Plotted with 17.01.7206

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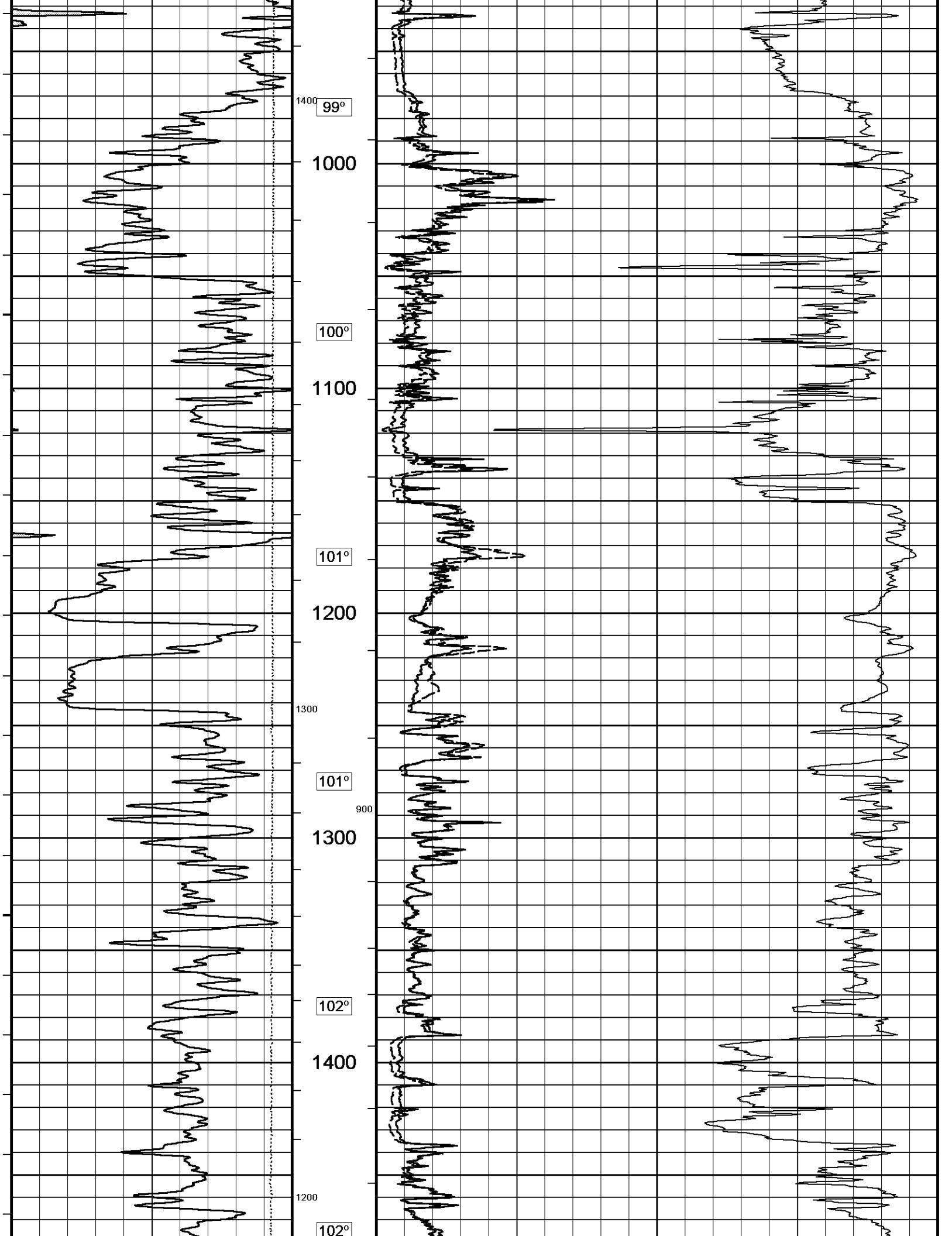
1600
96°
500
Array Ind. One Res Rt
1100
Shallow FE
Gamma Ray
97°
DST Uphole Tension
600
98°
700
1500
98°
800
99°
900
1000
Array Ind. One Cond Ct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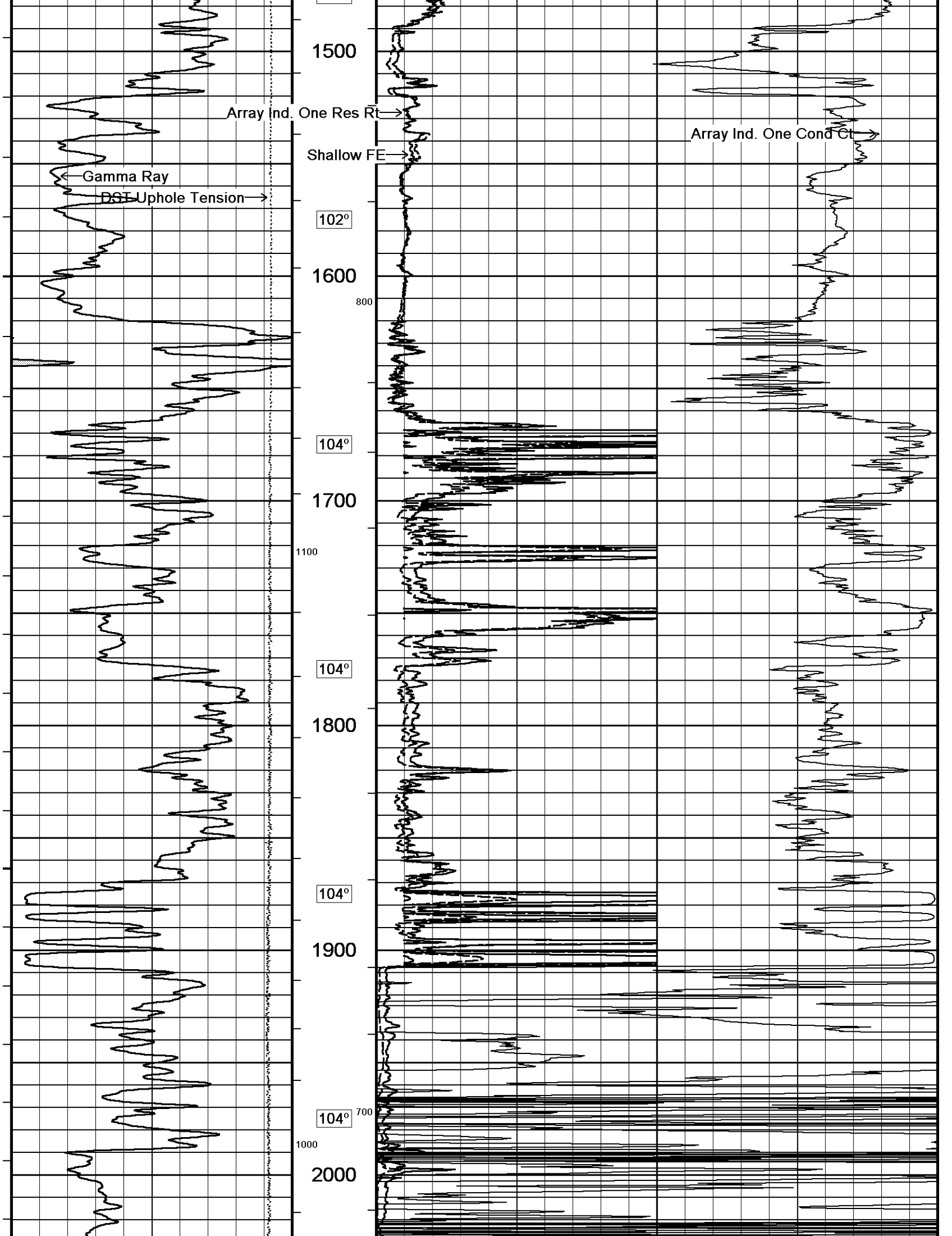
99°
1000
100°
1100
101°
1200
1300
101°
900
1300
102°
1400
1200
102°


1500
Array Ind. One Res Rt
Shallow FE
Array Ind. One Cond Ct
Gamma Ray
DST Uphole Tension
102°
1600
800
104°
1700
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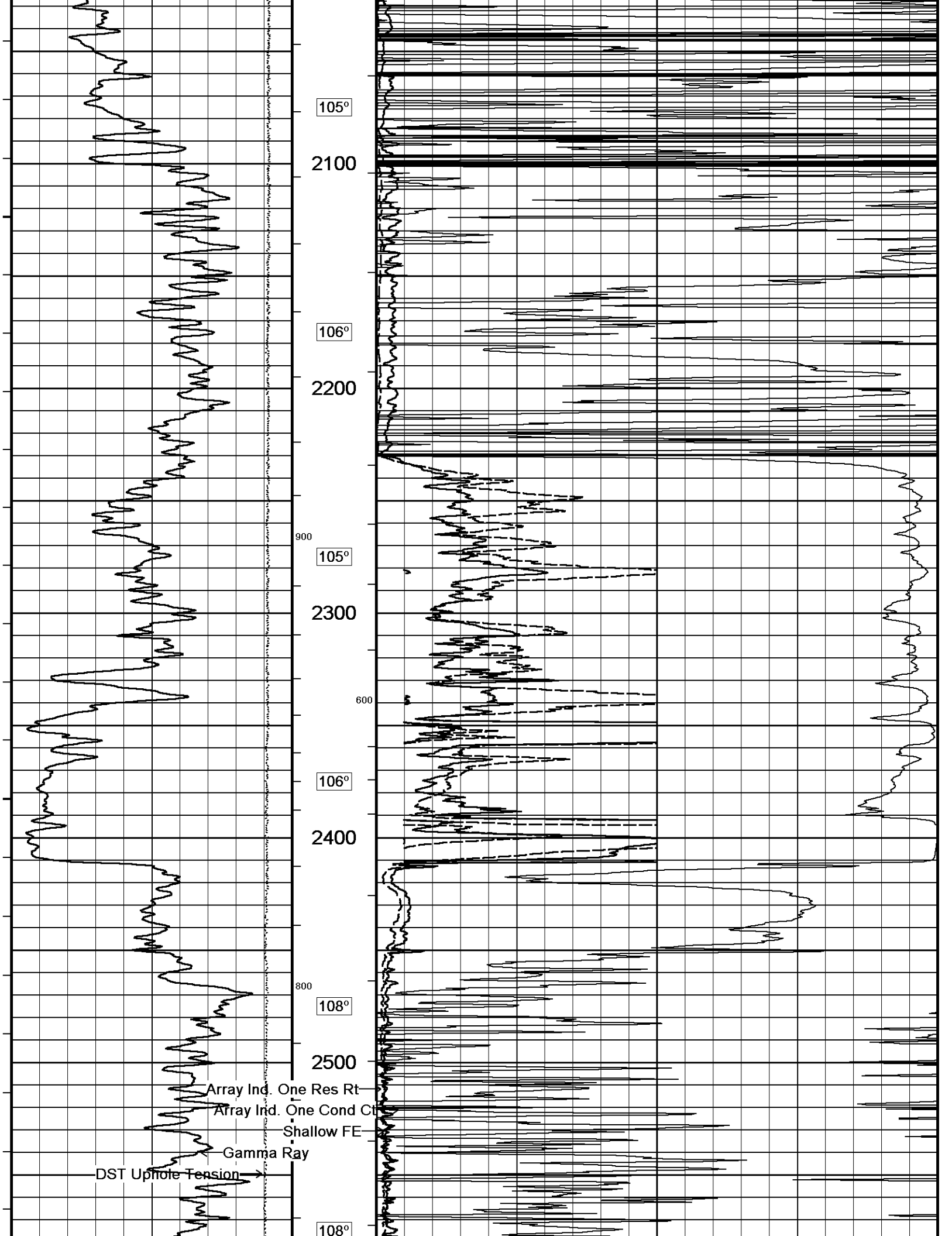
104°
1900
104°
700
1000
2000


105°
2100
106°
2200
900
105°
2300
600
106°
2400
800
108°
2500
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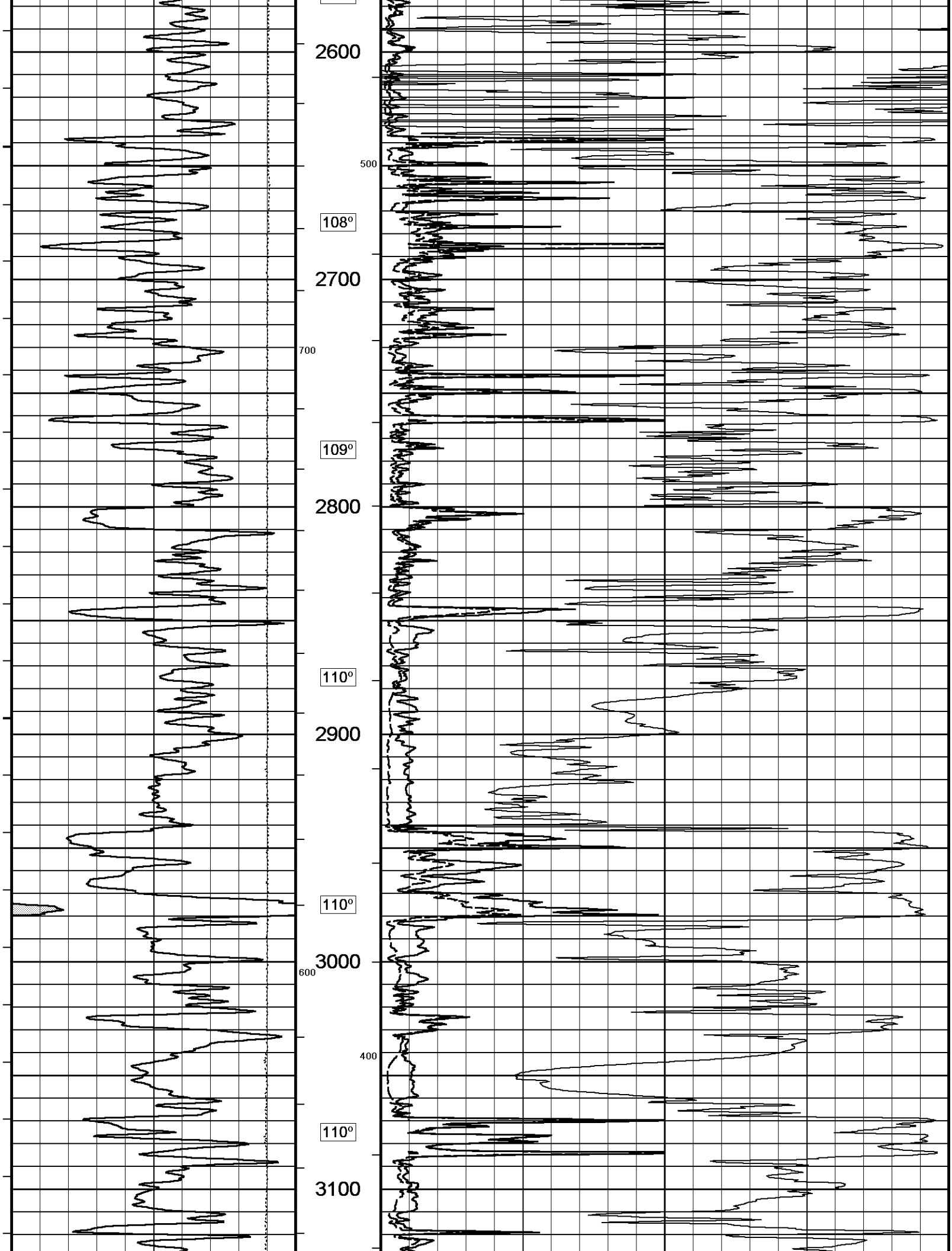
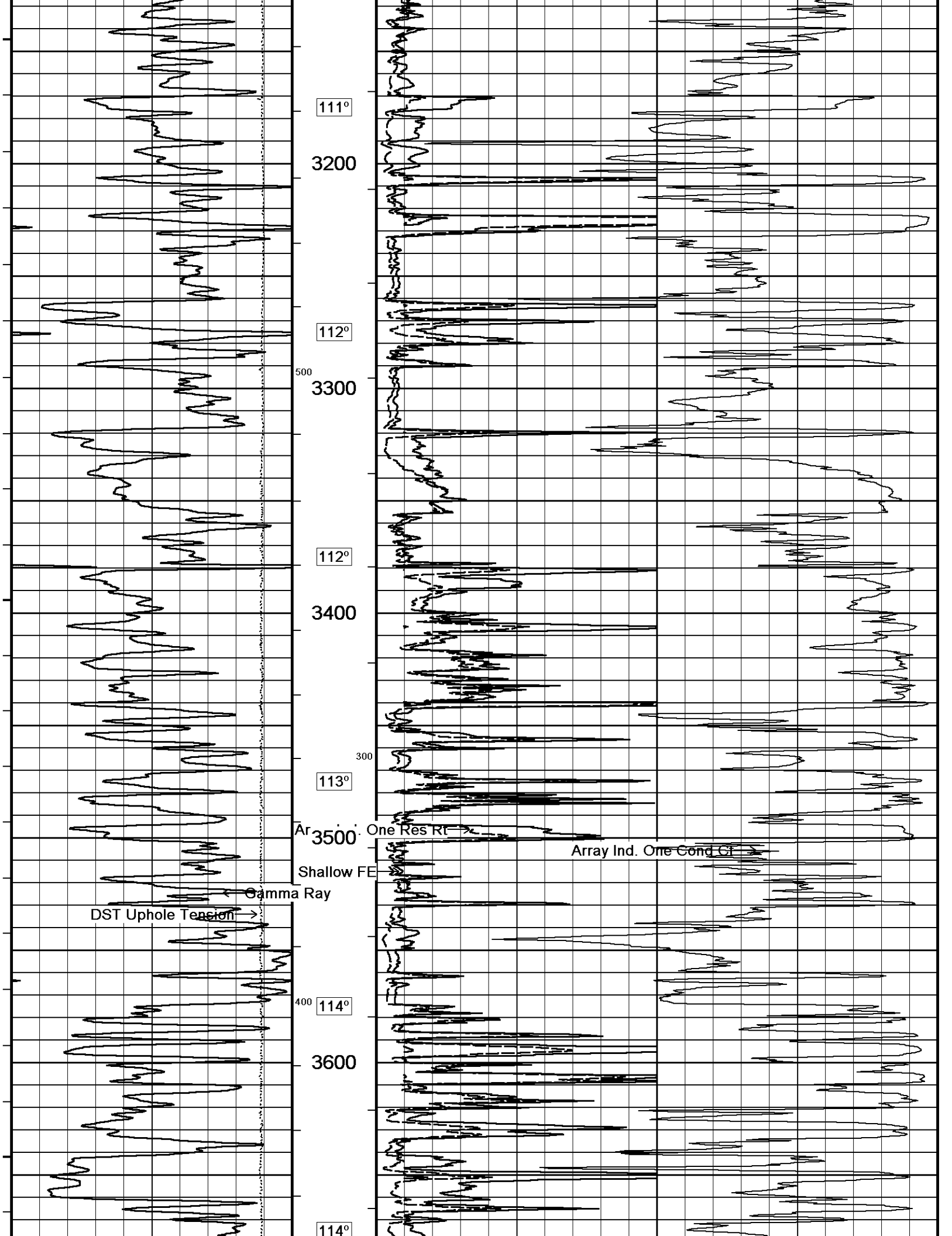
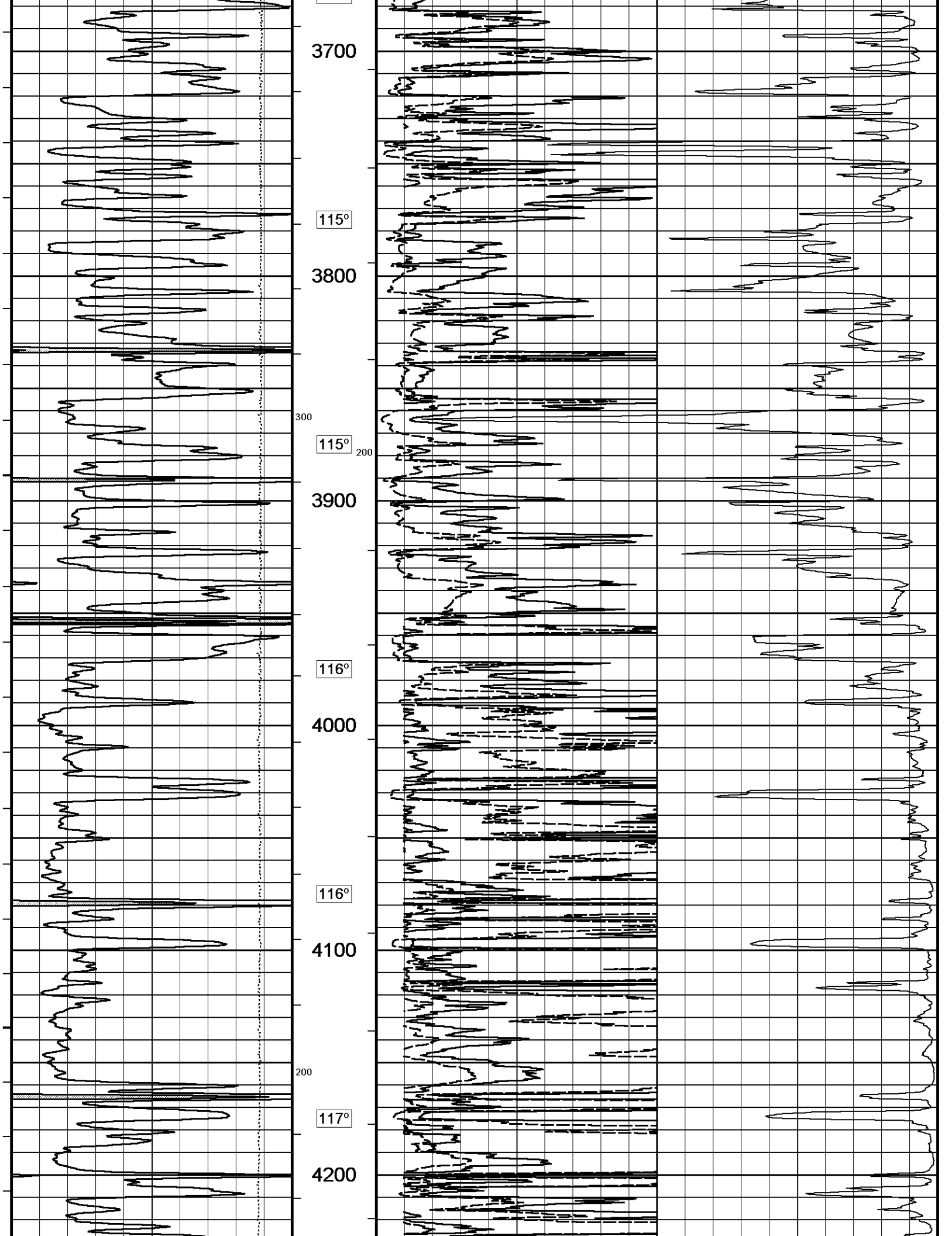
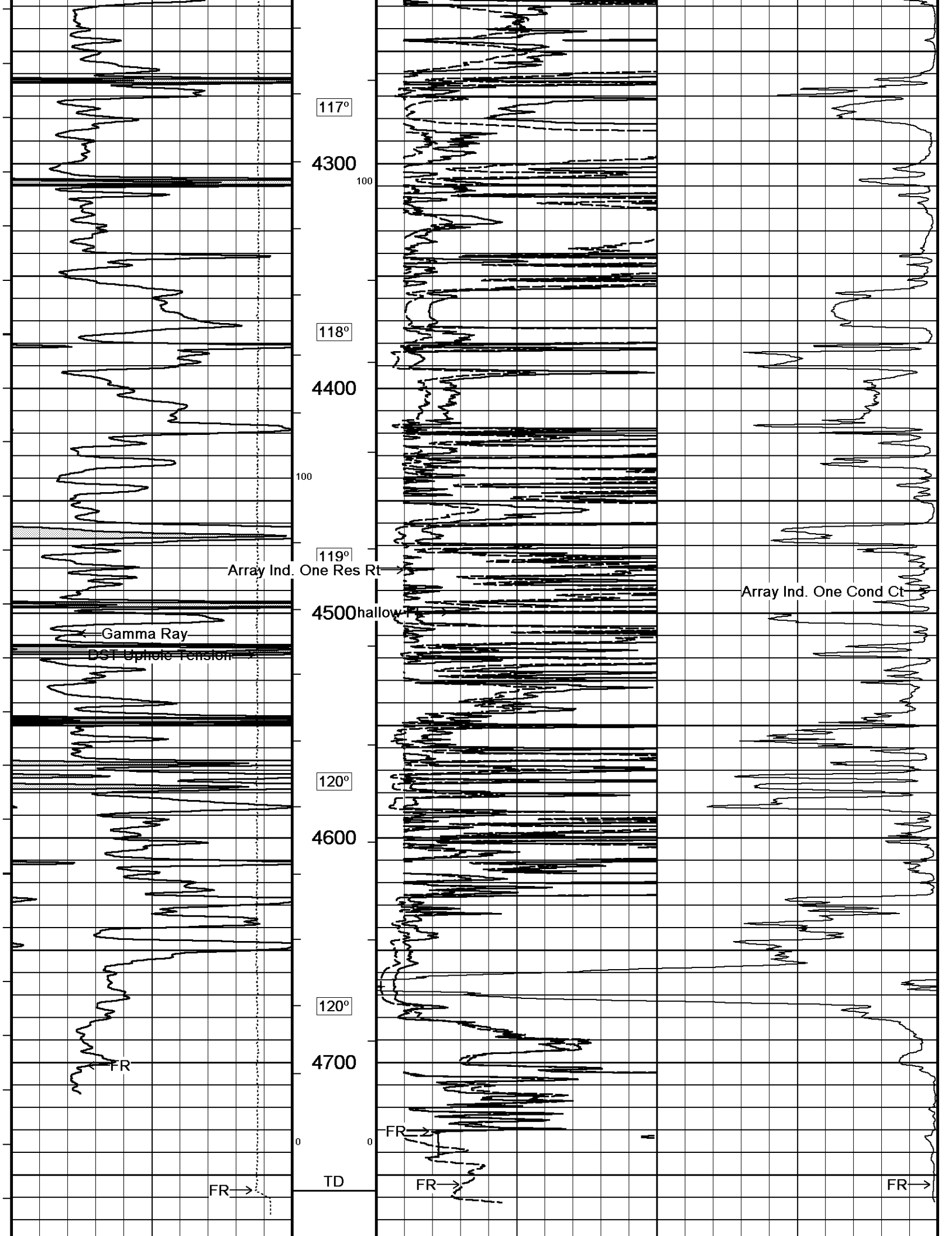
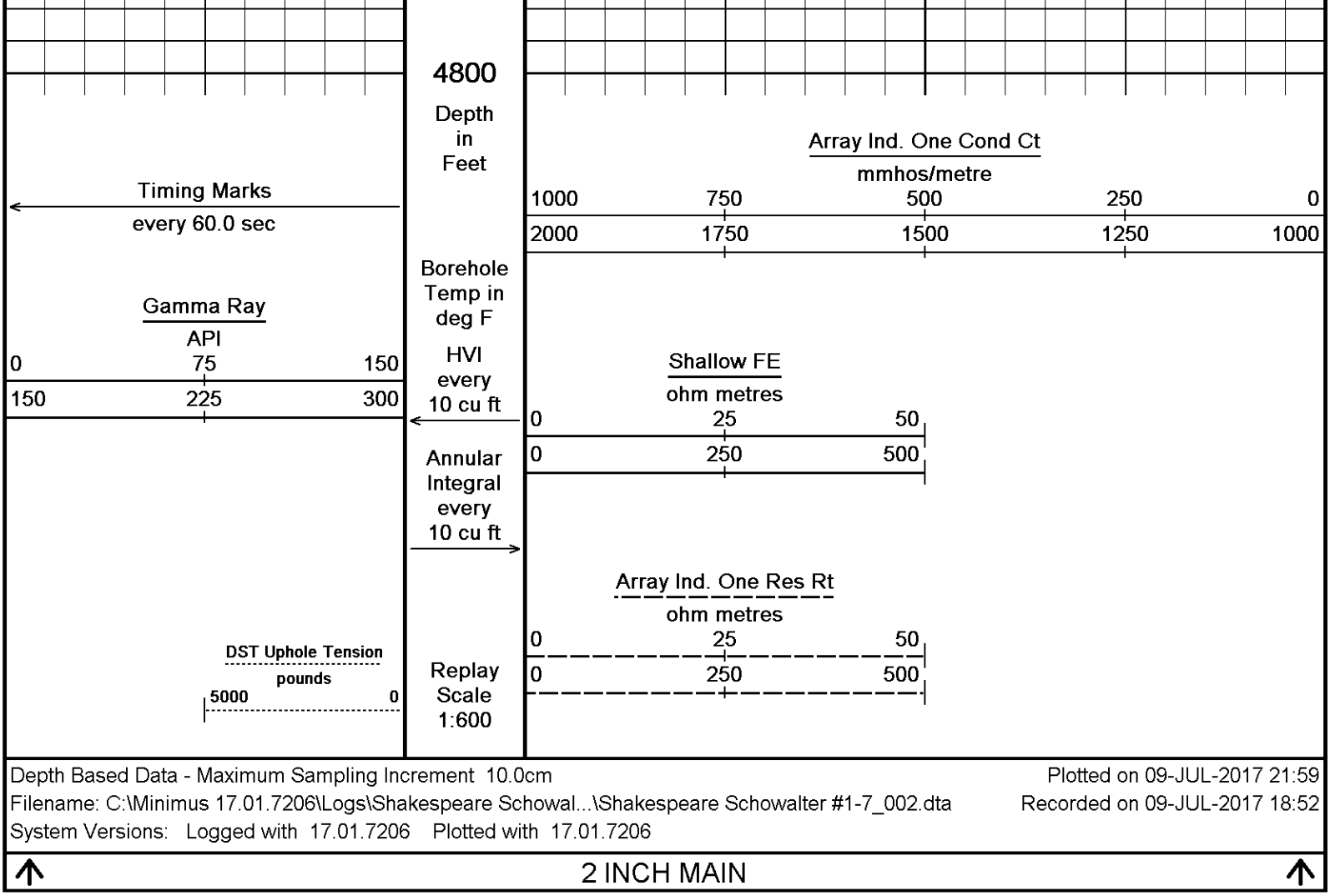
Array Ind. One Cond Ct
Shallow FE
Gamma Ray
DST Uphole Tension
108°


2600
500
108°
2700
700
109°
2800
110°
2900
110°
600
3000
400
110°
3100


111°
3200
112°
500
3300
112°
3400
300
113°
Ar
3500
One Res Rt
Array Ind. One Cond Ct
Shallow FE
Gamma Ray
DST Uphole Tension
400
114°
3600
114°


3700
115°
3800
300
115°
200
3900
116°
4000
116°
4100
200
117°
4200


117°
4300
100
118°
4400
100
119°
Array Ind. One Res Rt
4500
hallow R
Gamma Ray
DST Uphole Tension
120°
4600
120°
4700
FR
0
0
FR
TD
FR
Array Ind. One Cond Ct
FR

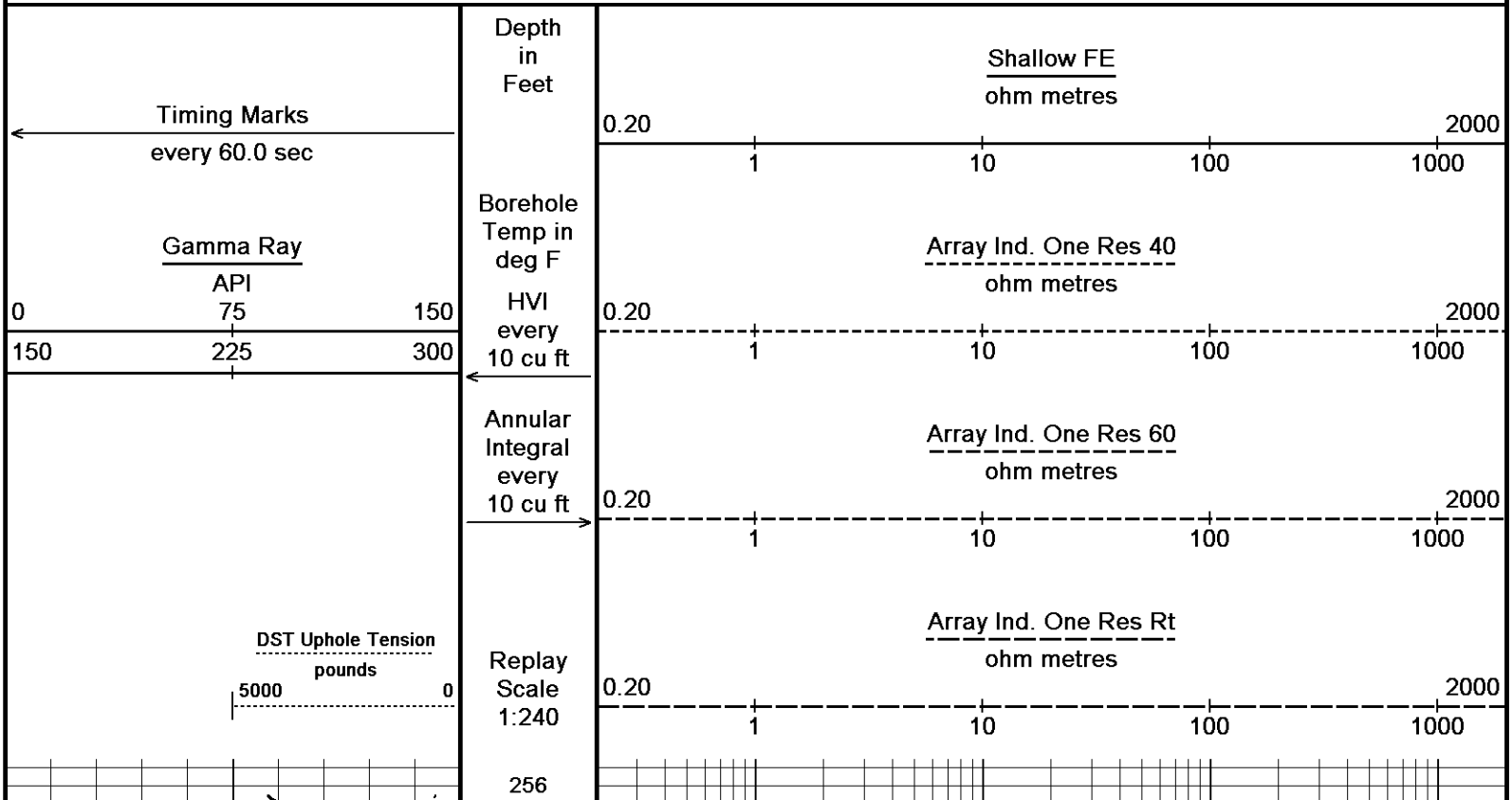


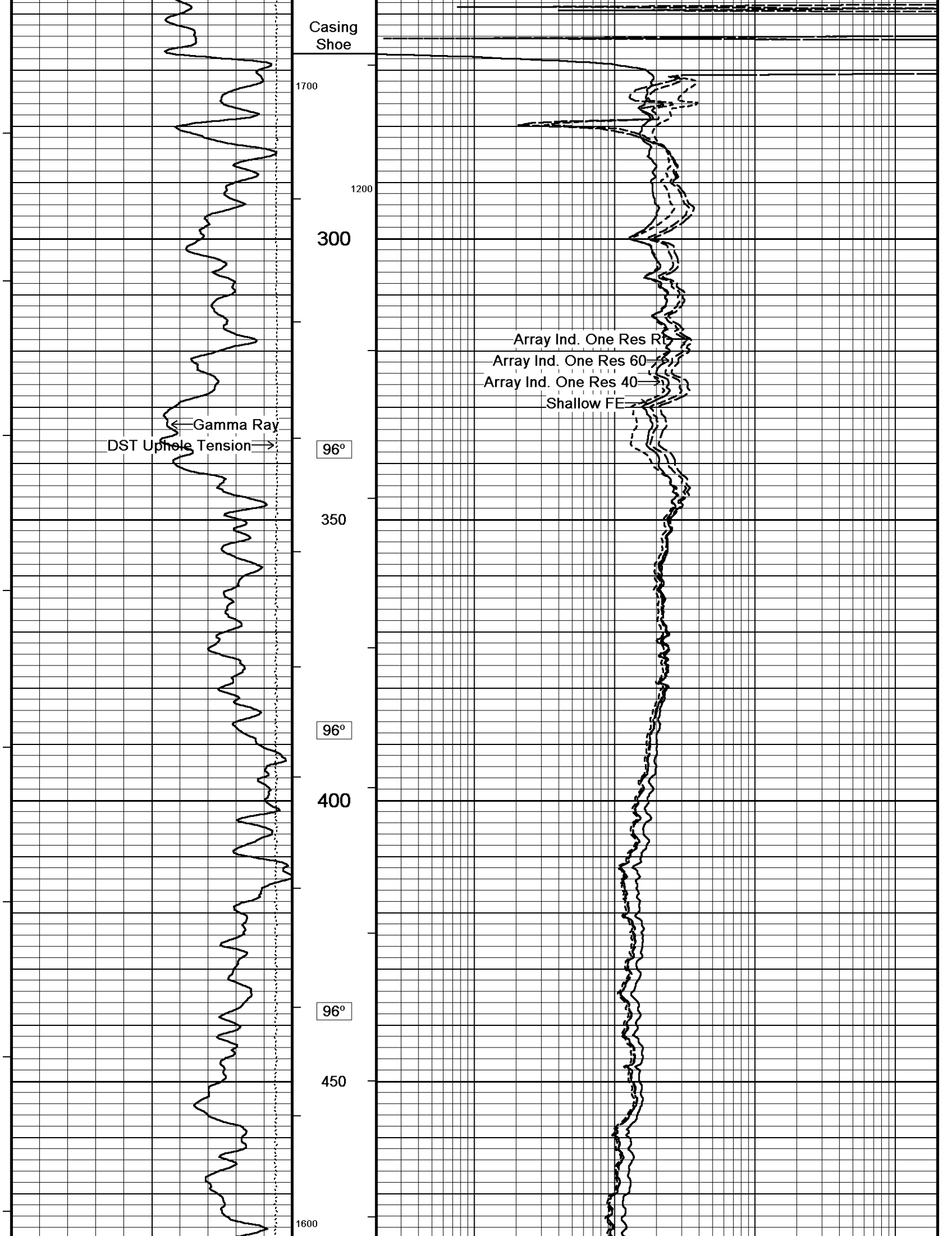
Depth Based Data - Maximum Sampling Increment 10.0cm — Plotted on 09-JUL-2017 21:59
Filename: C:\Minimus 17.01.7206\Logs\Shakespeare Schowal...\Shakespeare Schowalter #1-7_002.dta — Recorded on 09-JUL-2017 18:52
System Versions: Logged with 17.01.7206 Plotted with 17.01.7206

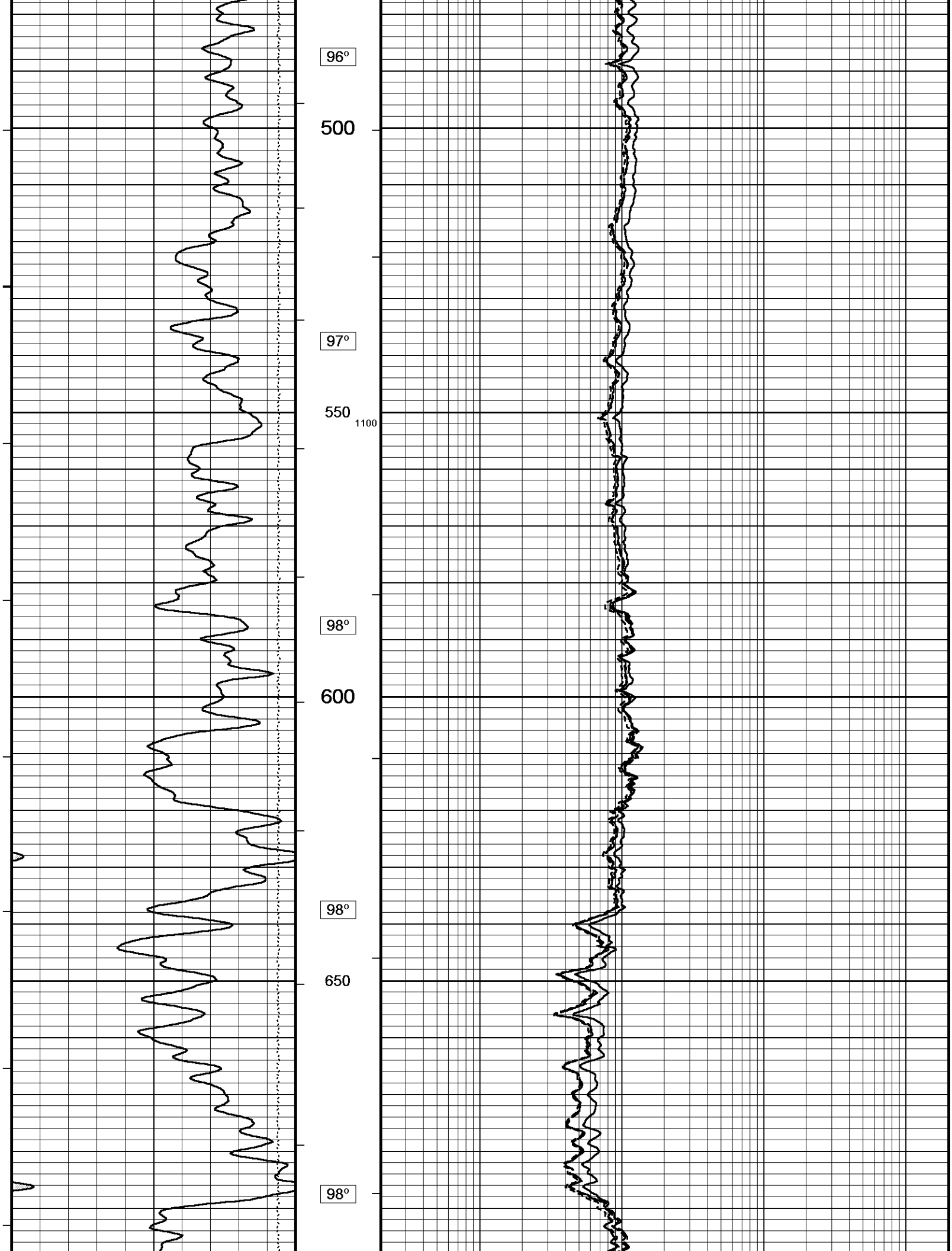
2 INCH MAIN

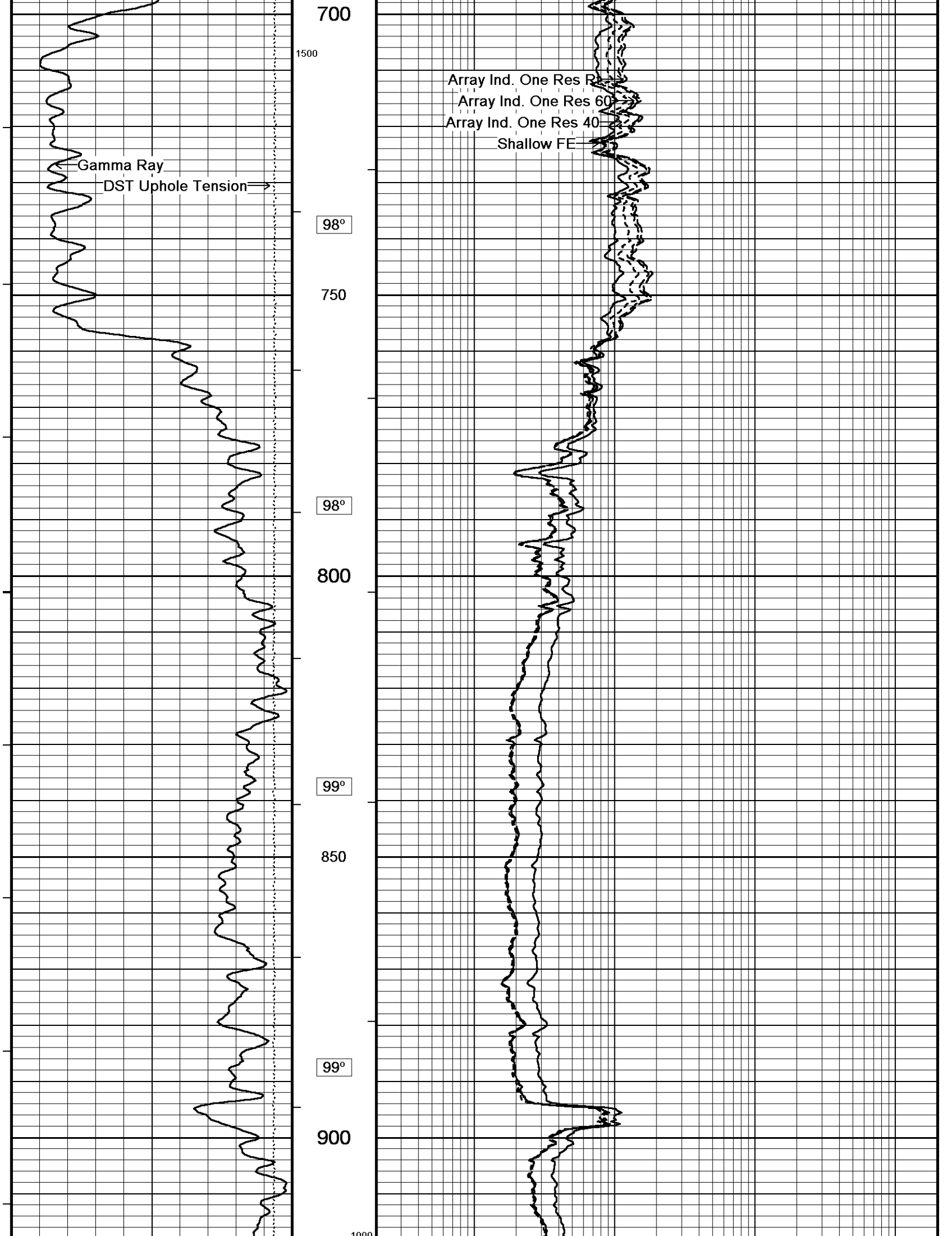
5 INCH MAIN

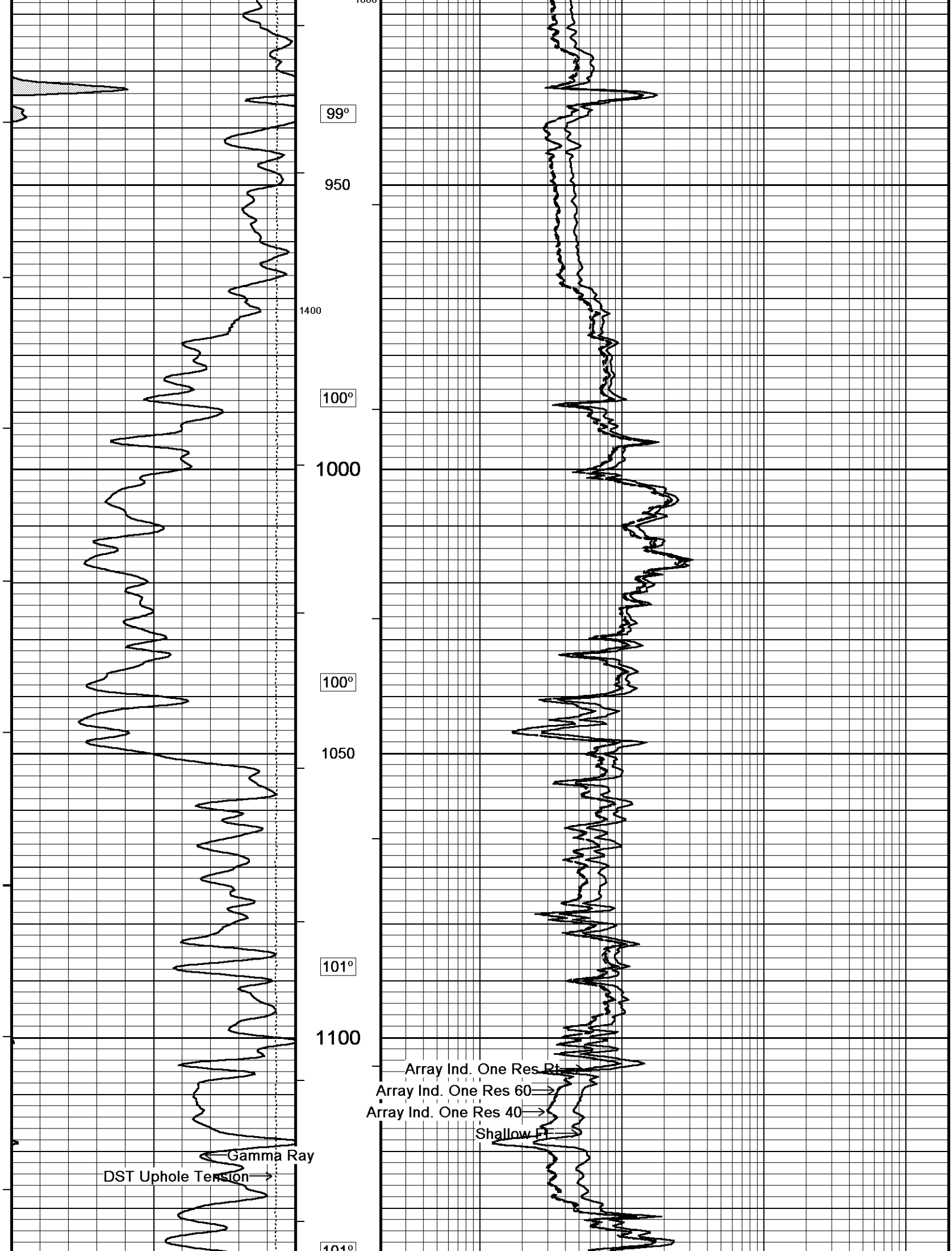
Depth Based Data - Maximum Sampling Increment 10.0cm — Plotted on 09-JUL-2017 21:59
Filename: C:\Minimus 17.01.7206\Logs\Shakespeare Schowal...\Shakespeare Schowalter #1-7_002.dta — Recorded on 09-JUL-2017 18:52
System Versions: Logged with 17.01.7206 Plotted with 17.01.7206

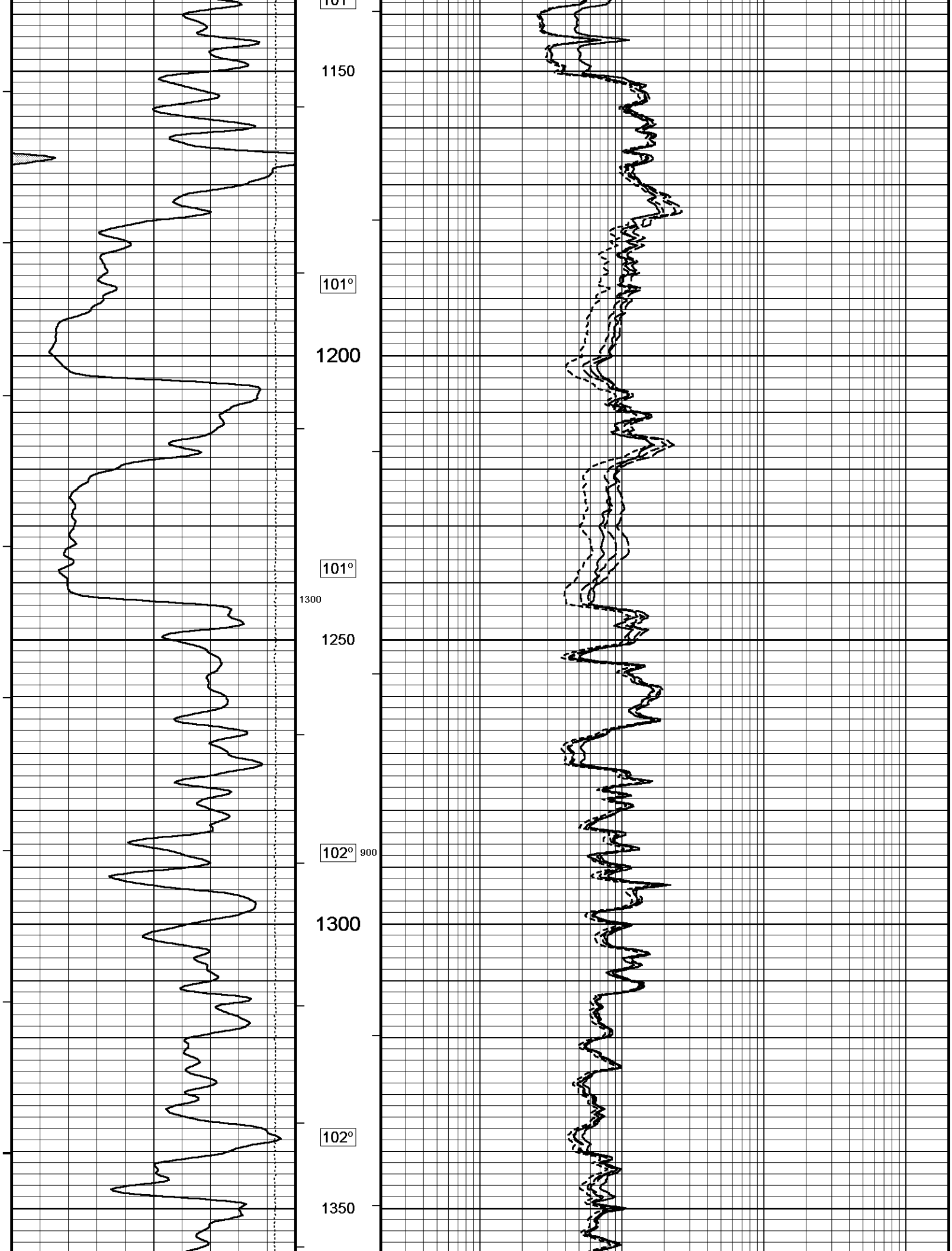


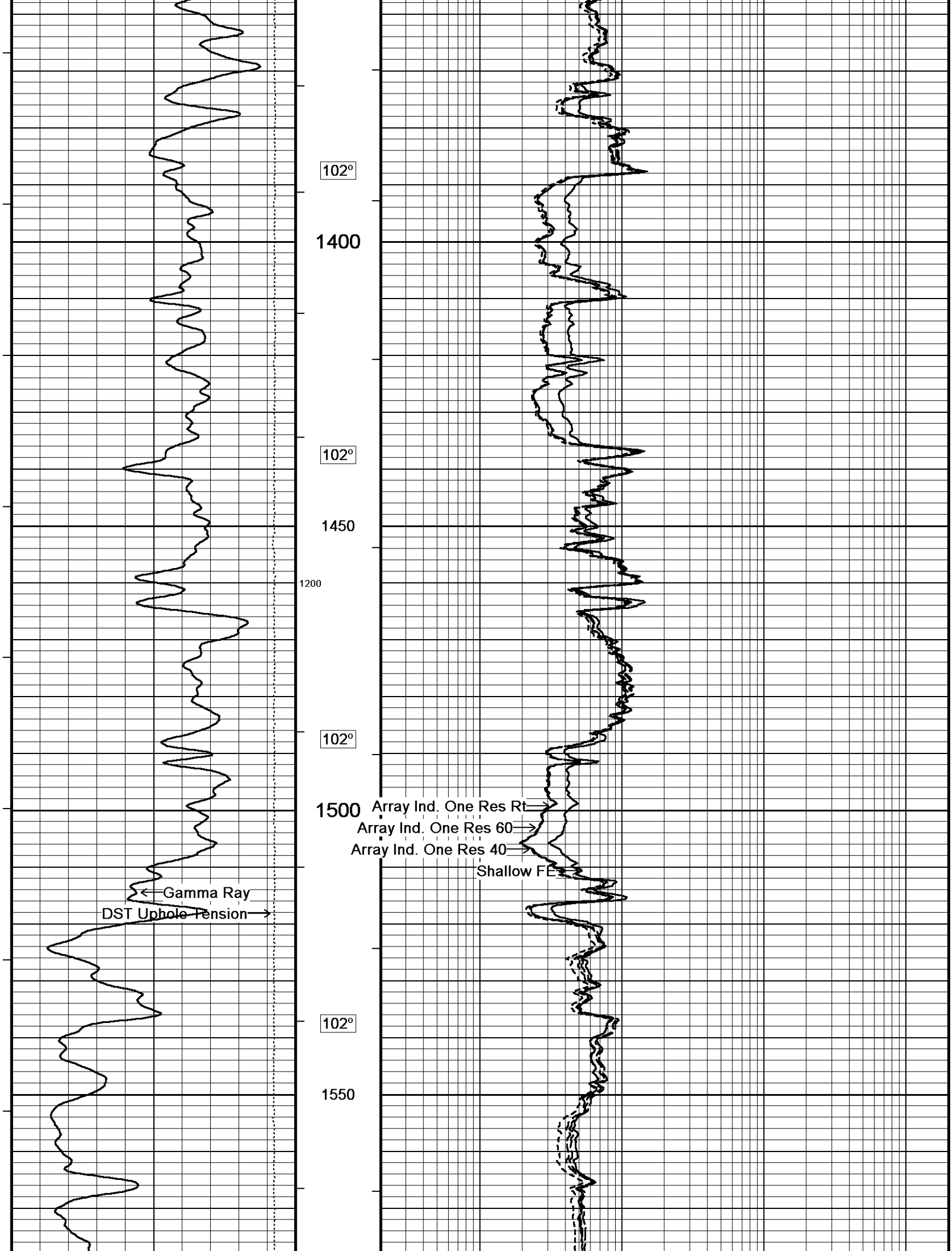

Casing
Shoe
1700
1200
300
Array Ind. One Res Rt
Array Ind. One Res 60
Array Ind. One Res 40
Shallow FE
Gamma Ray
DST Uphole Tension
96°
350
96°
400
96°
450
1600

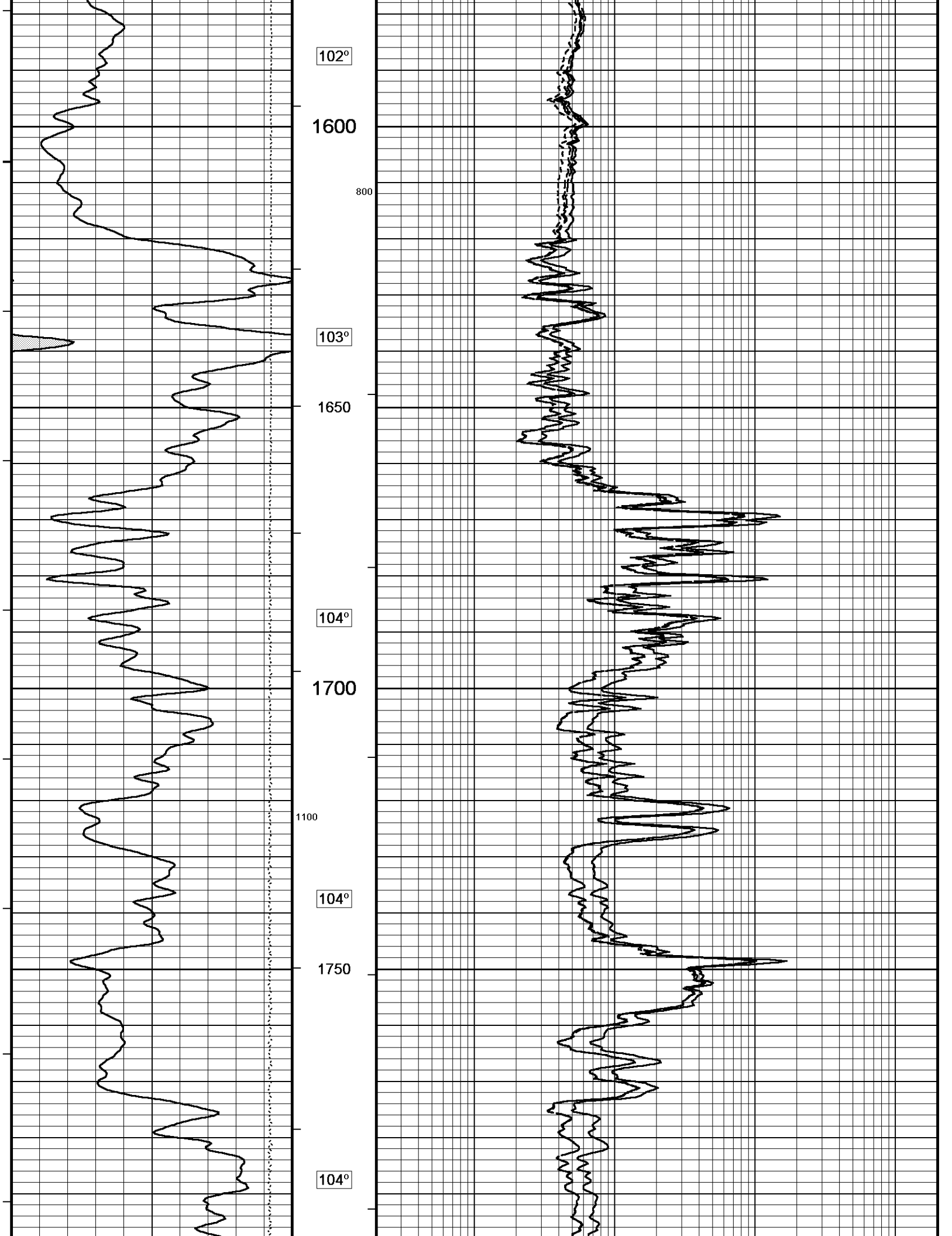

96°
500
97°
550
1100
98°
600
98°
650
98°

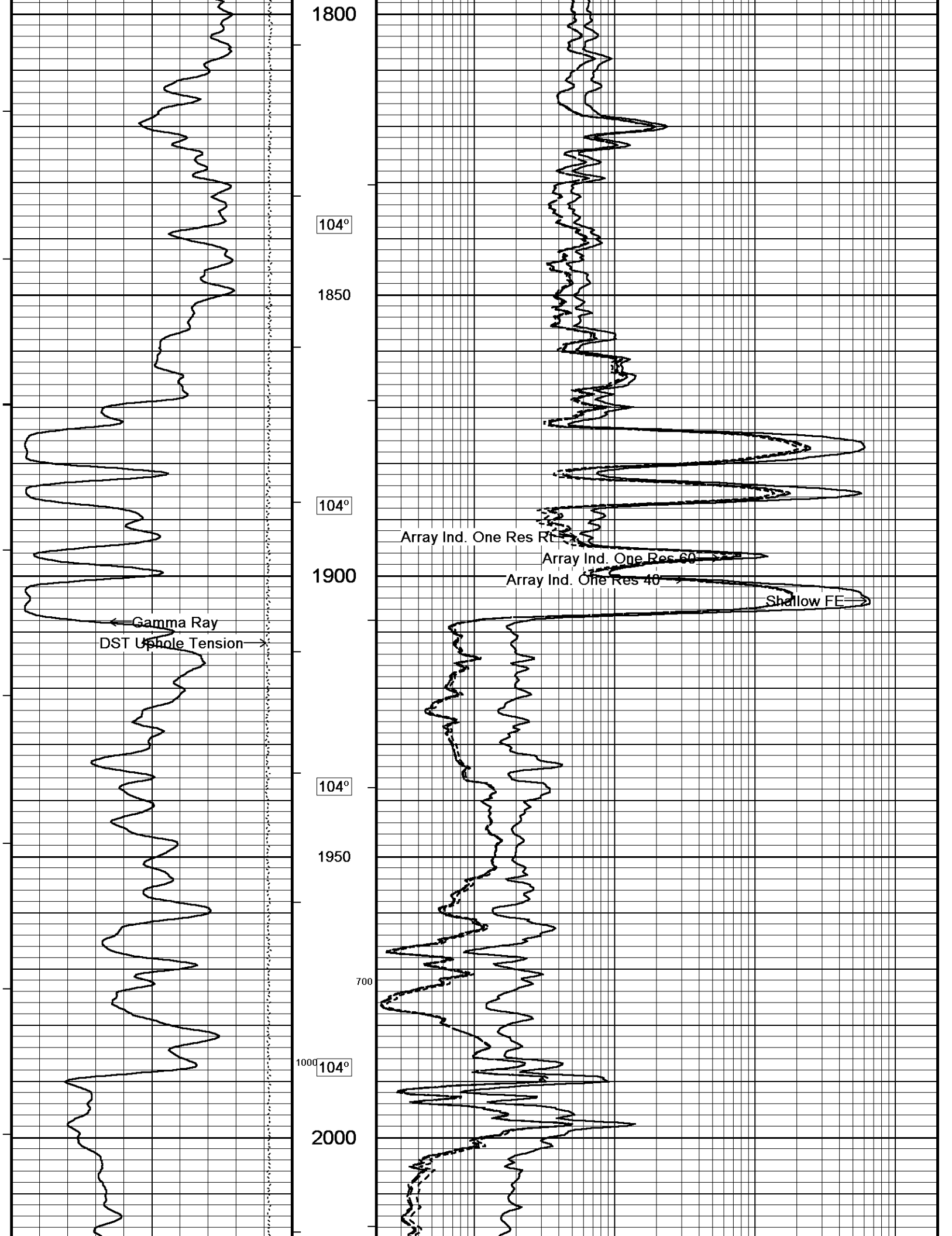

700
1500
Array Ind. One Res R
Array Ind. One Res 60
Array Ind. One Res 40
Shallow FE
Gamma Ray
DST Uphole Tension
98°
750
98°
800
99°
850
99°
900
1000

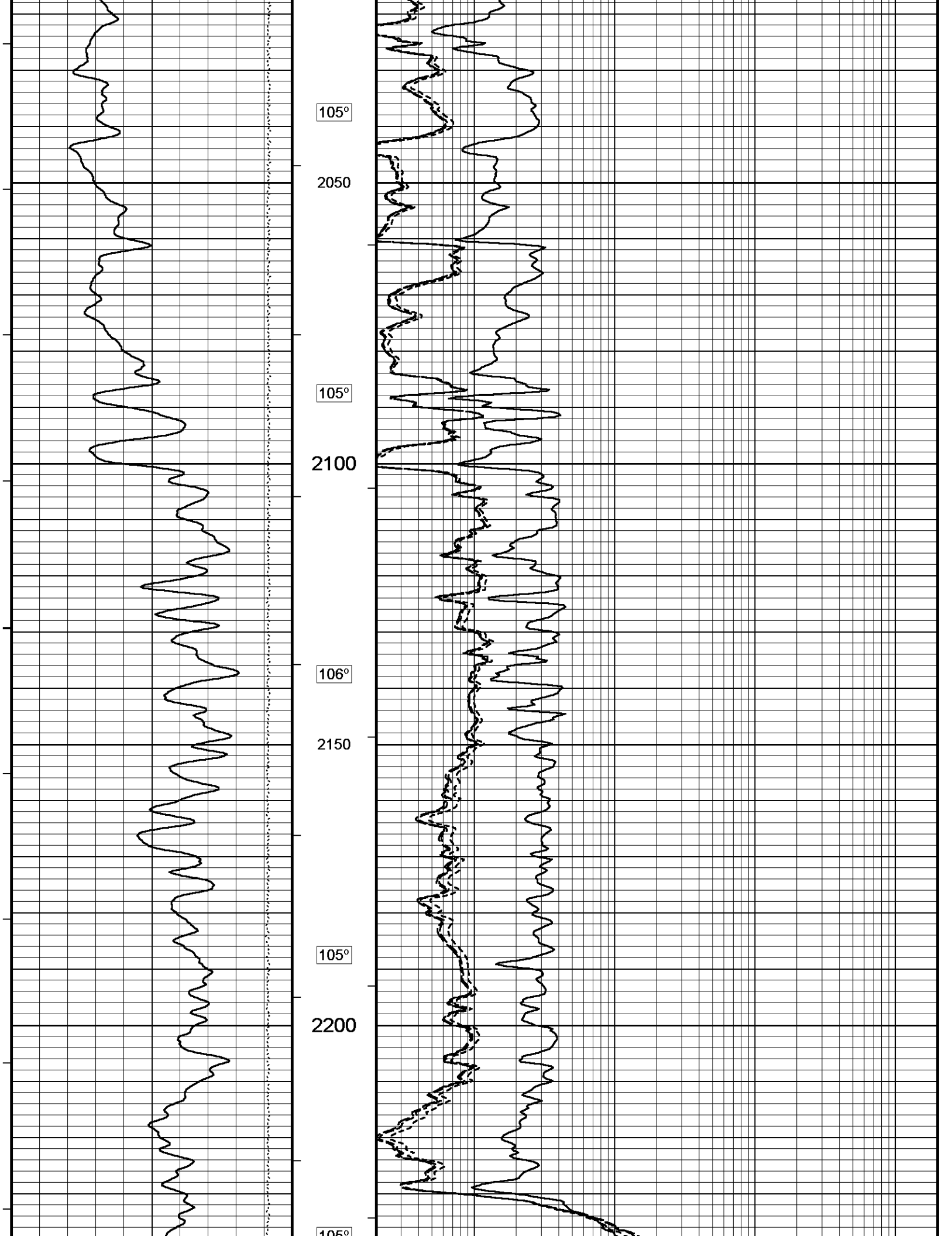

99°
950
1400
100°
1000
100°
1050
101°
1100
101°
Array Ind. One Res Rt
Array Ind. One Res 60
Array Ind. One Res 40
Shallow Ft
Gamma Ray
DST Uphole Tension

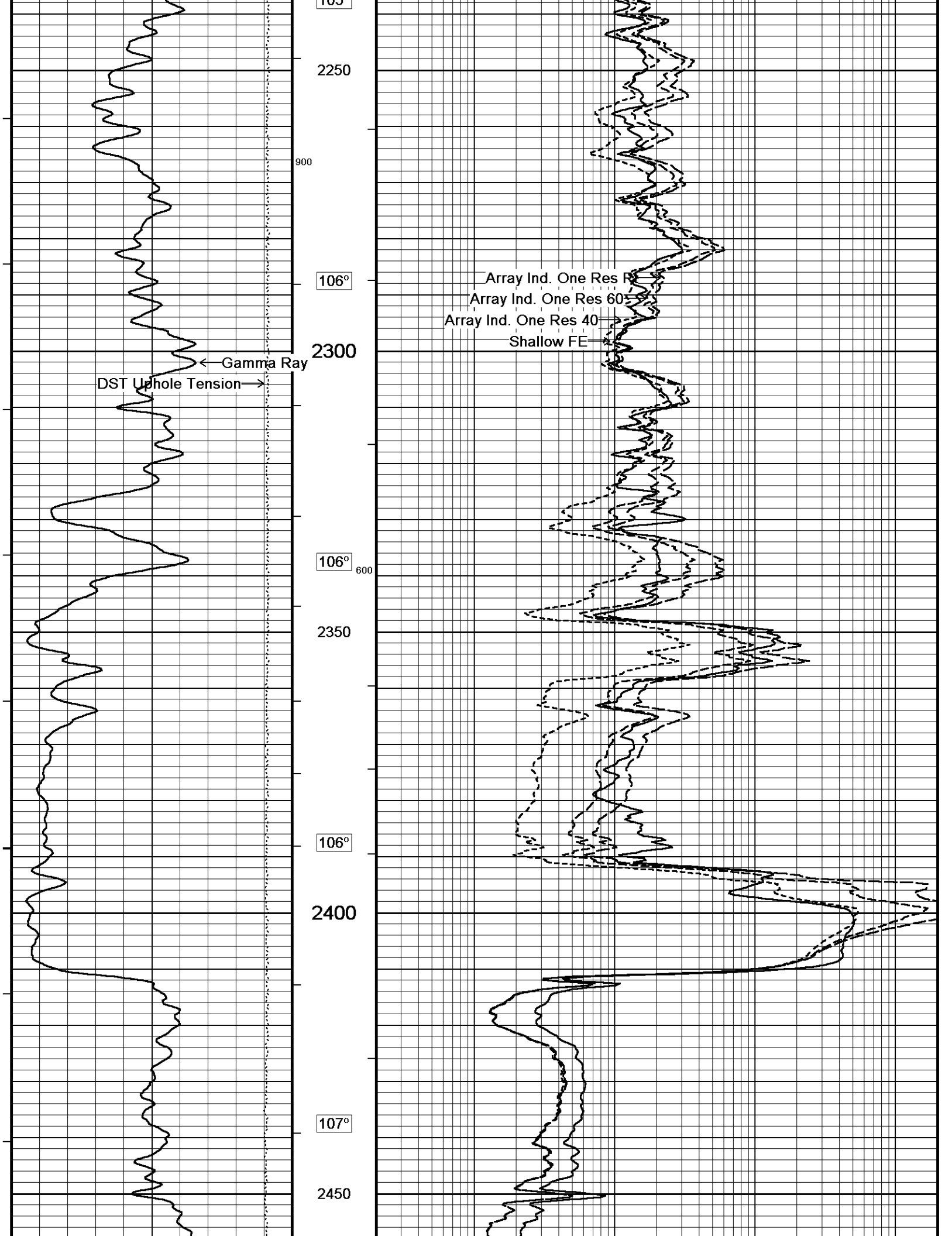

101
1150
101°
1200
101°
1300
1250
102° 900
1300
102°
1350

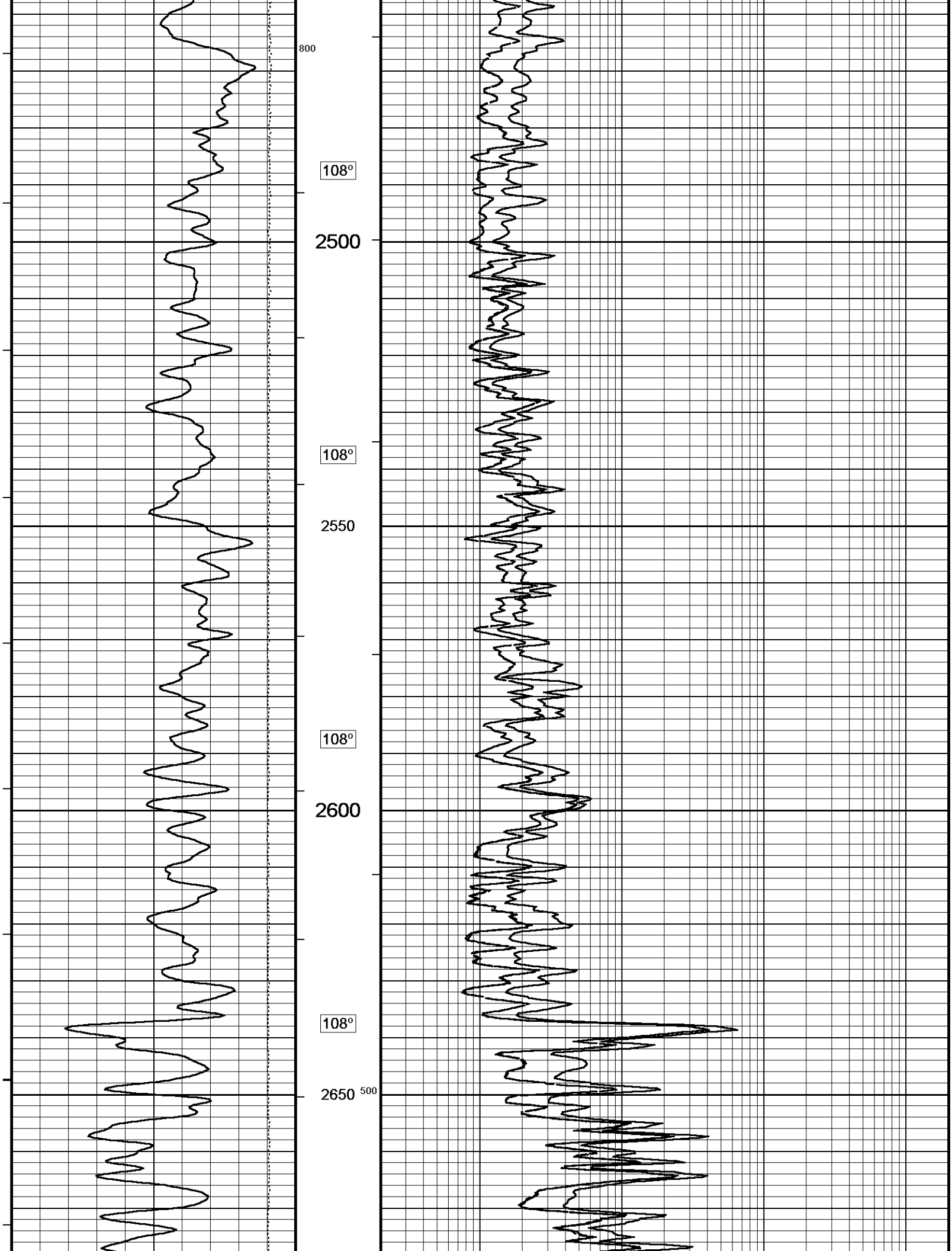

102°
1400
102°
1450
1200
102°
1500
Array Ind. One Res Rt
Array Ind. One Res 60
Array Ind. One Res 40
Shallow FE
Gamma Ray
DST Uphole Tension
102°
1550

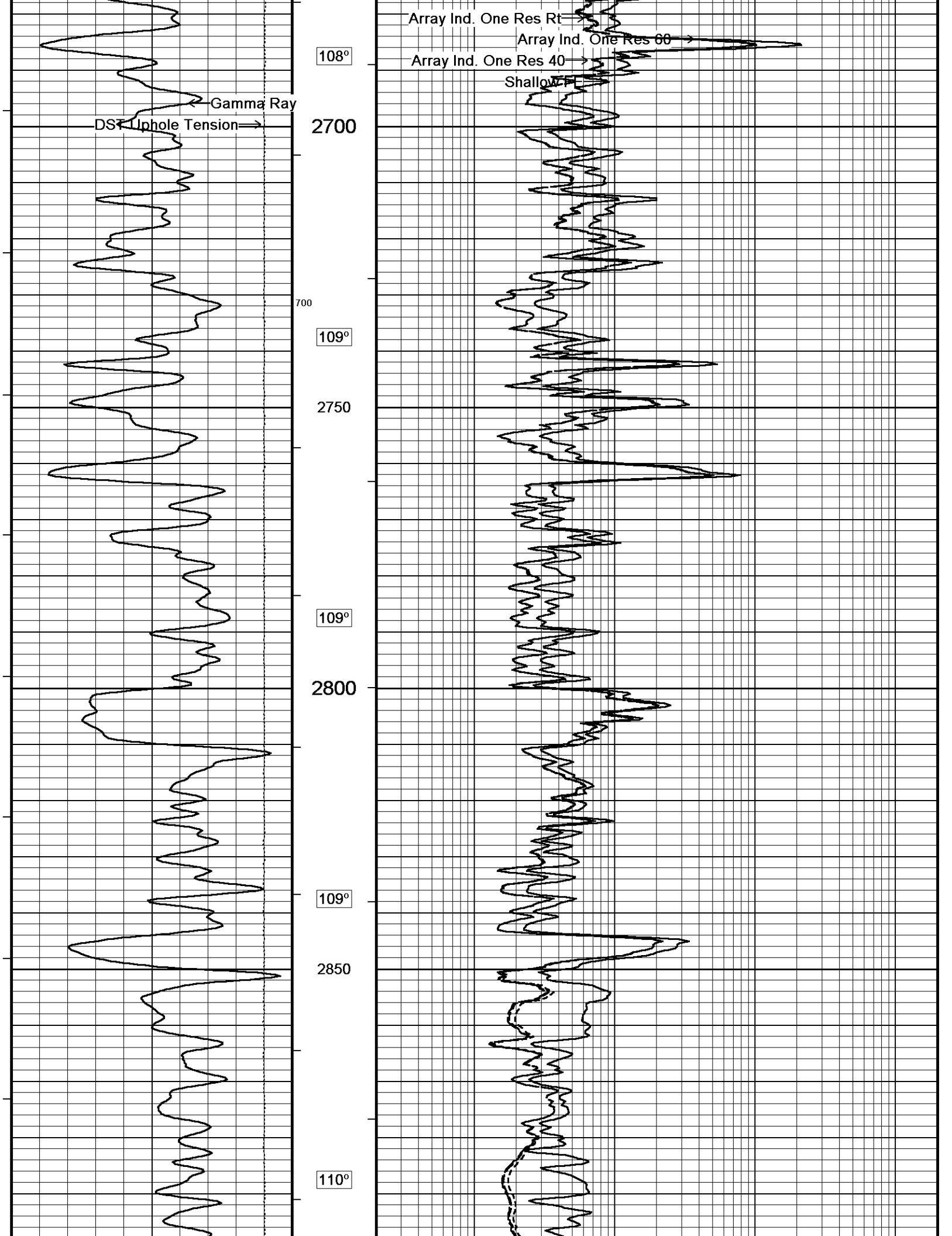

102°
1600
800
103°
1650
104°
1700
1100
104°
1750
104°

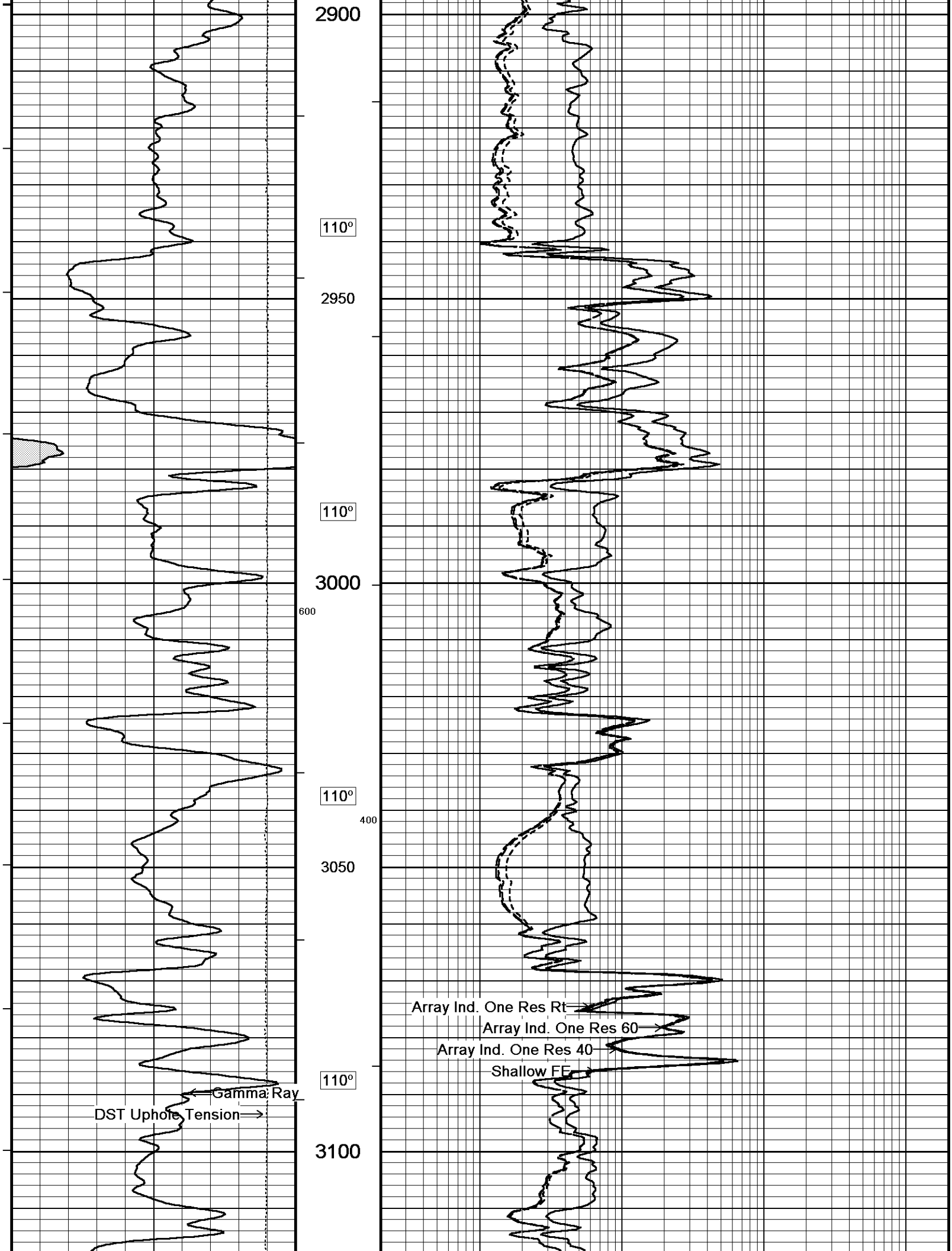

1800
104°
1850
104°
Array Ind. One Res RT
Array Ind. One Res 60
1900
Array Ind. One Res 40
Shallow FE
Gamma Ray
DST Uphole Tension
104°
1950
700
1000
104°
2000

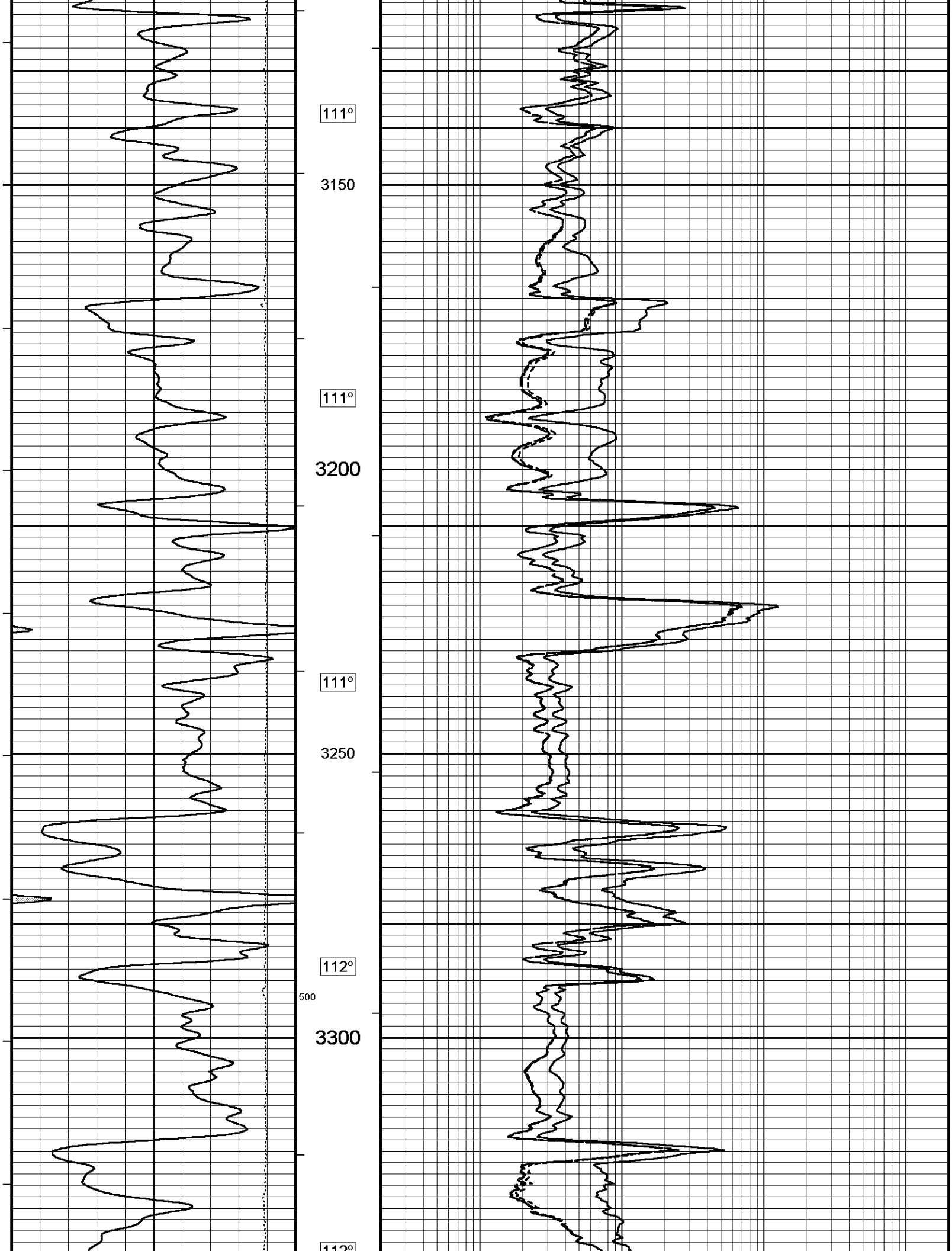

105°
2050
105°
2100
106°
2150
105°
2200
105°

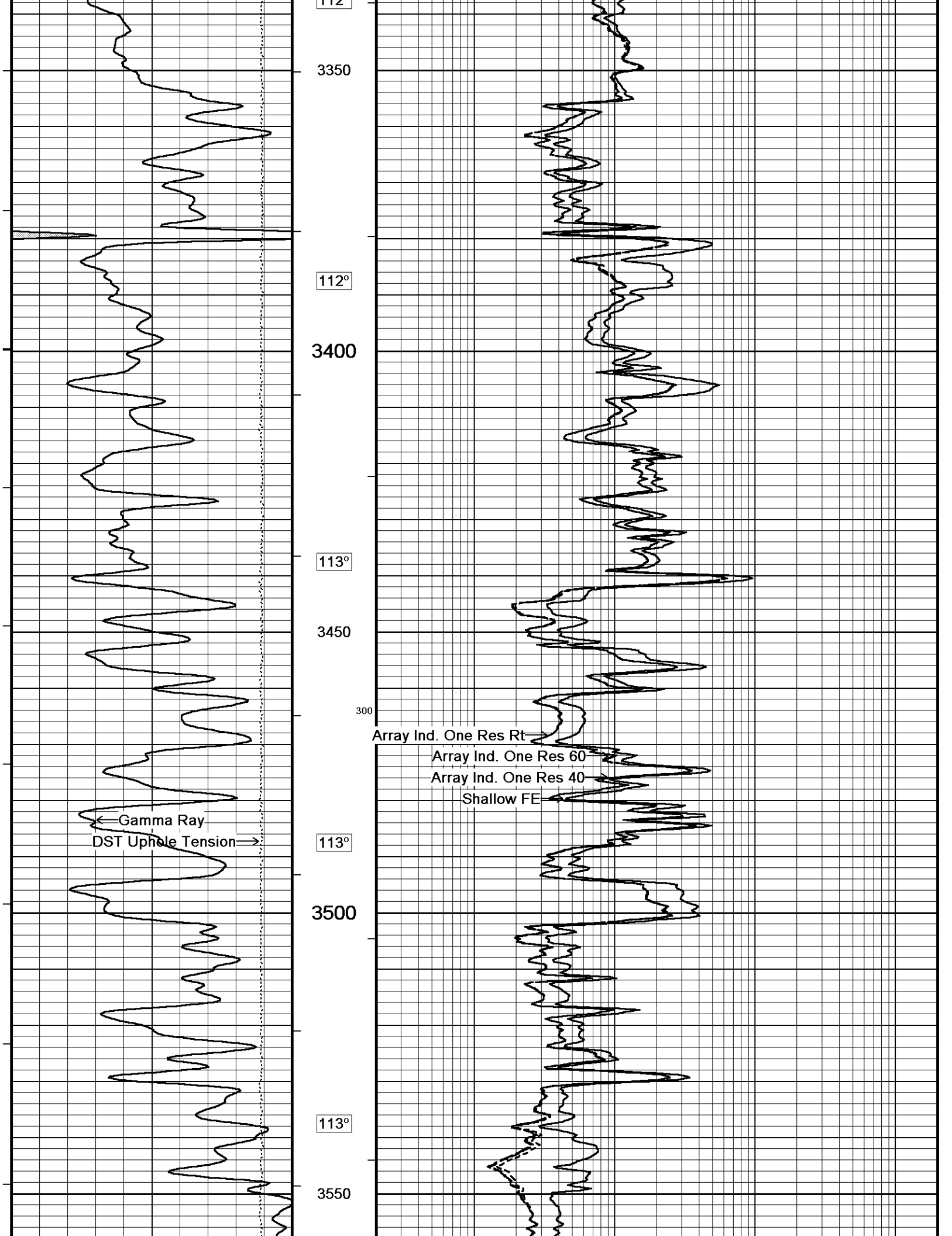

105
2250
900
106°
Array Ind. One Res R
Array Ind. One Res 60
Array Ind. One Res 40
Shallow FE
2300
Gamma Ray
DST Uphole Tension
106°
600
2350
106°
2400
107°
2450

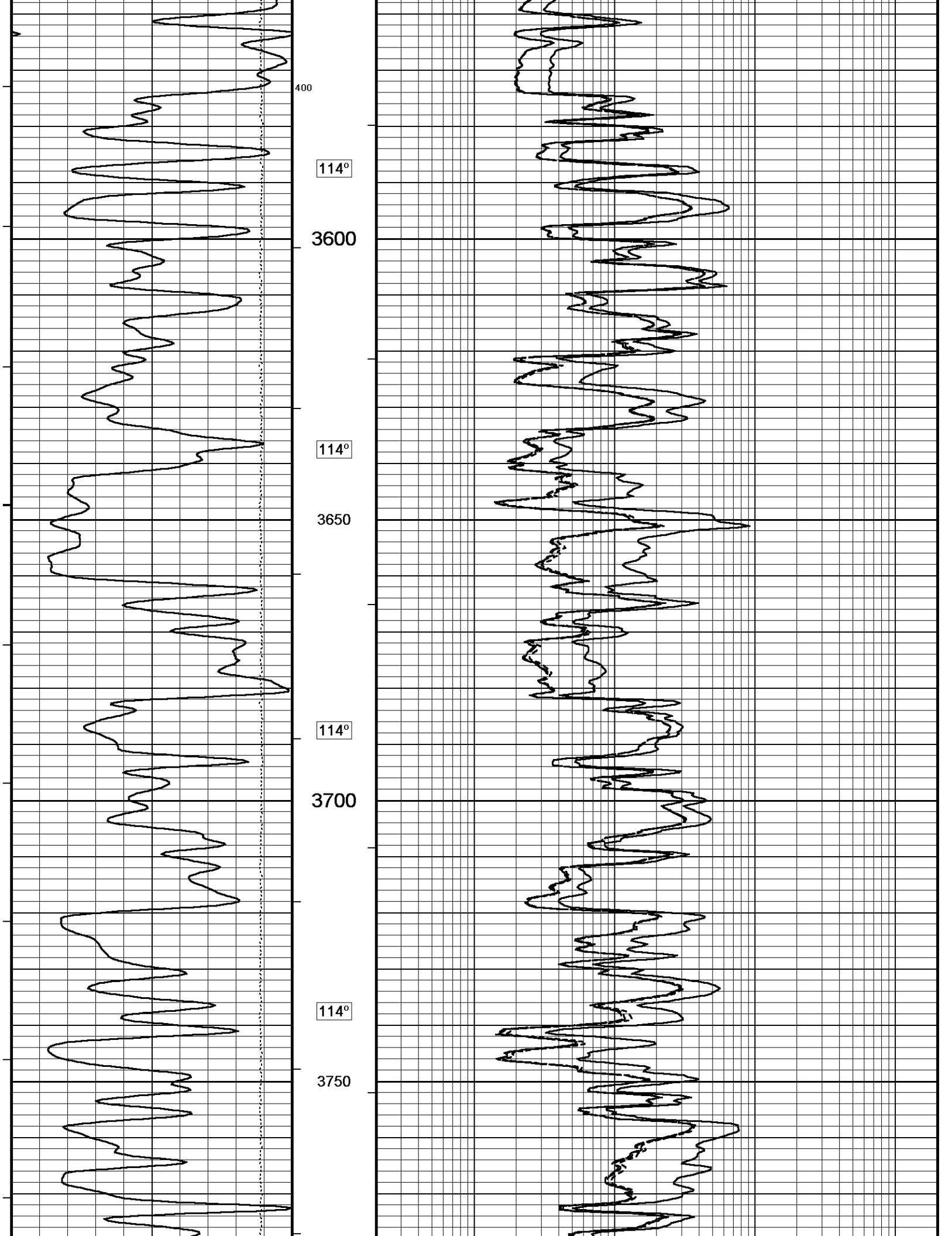

800
108°
2500
108°
2550
108°
2600
108°
2650
500

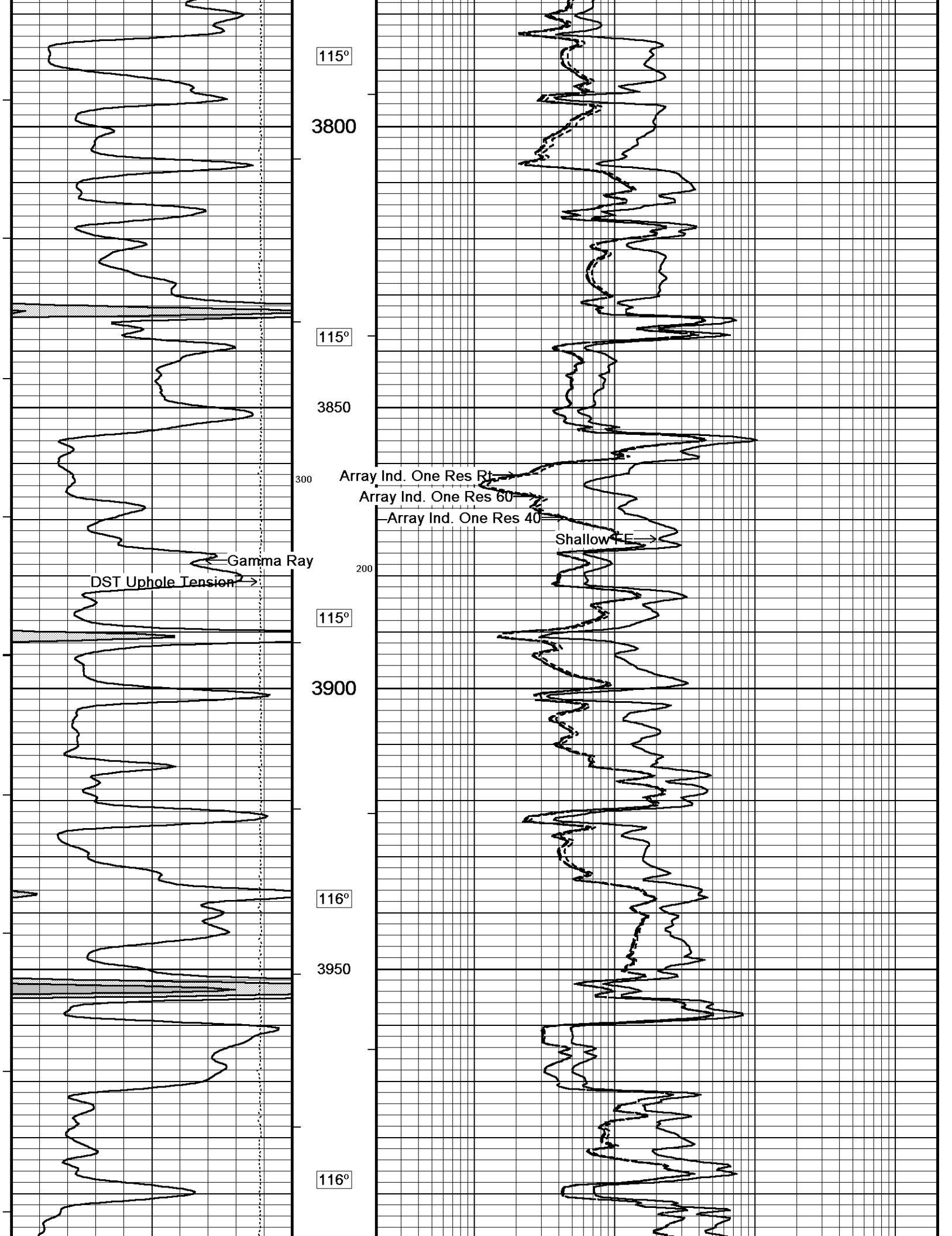

Array Ind. One Res Rt
Array Ind. One Res 60
Array Ind. One Res 40
Shallow FE
Gamma Ray
DST Uphole Tension
108°
2700
700
109°
2750
109°
2800
109°
2850
110°

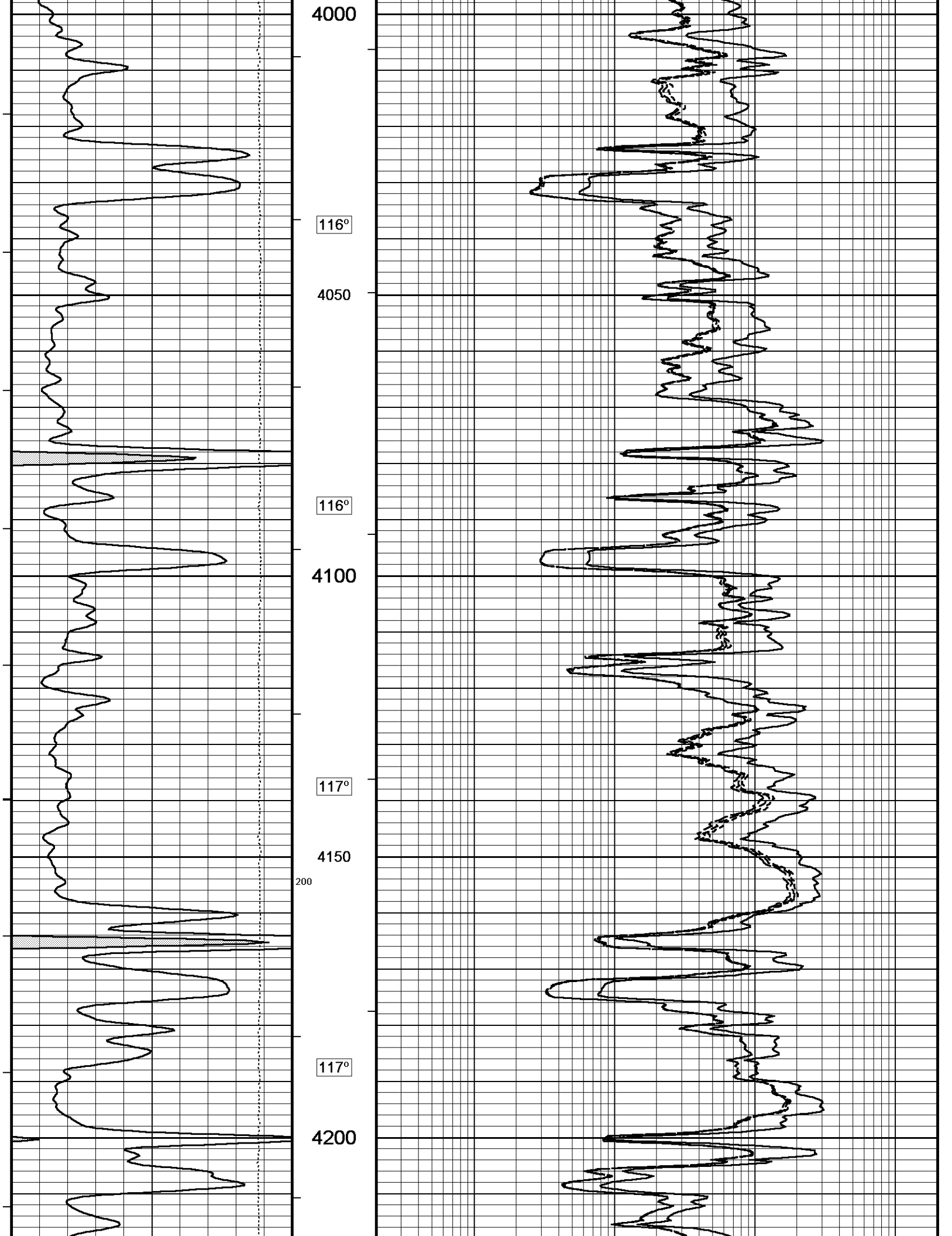

2900
110°
2950
110°
3000
600
110°
400
3050
110°
3100
Gamma Ray
DST Uphole Tension
Array Ind. One Res Rt
Array Ind. One Res 60
Array Ind. One Res 40
Shallow FE

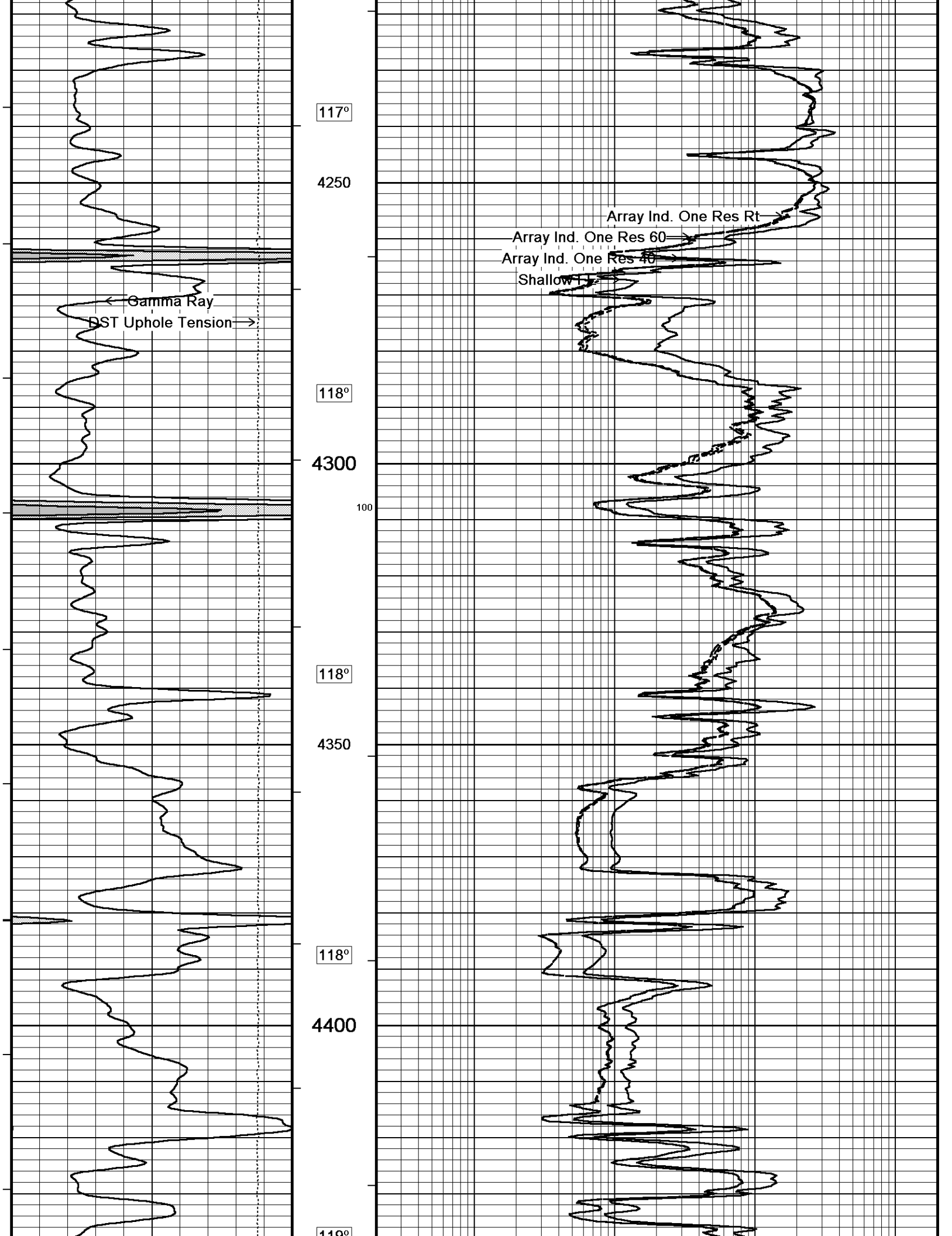

111°
3150
111°
3200
111°
3250
112°
500
3300
112°

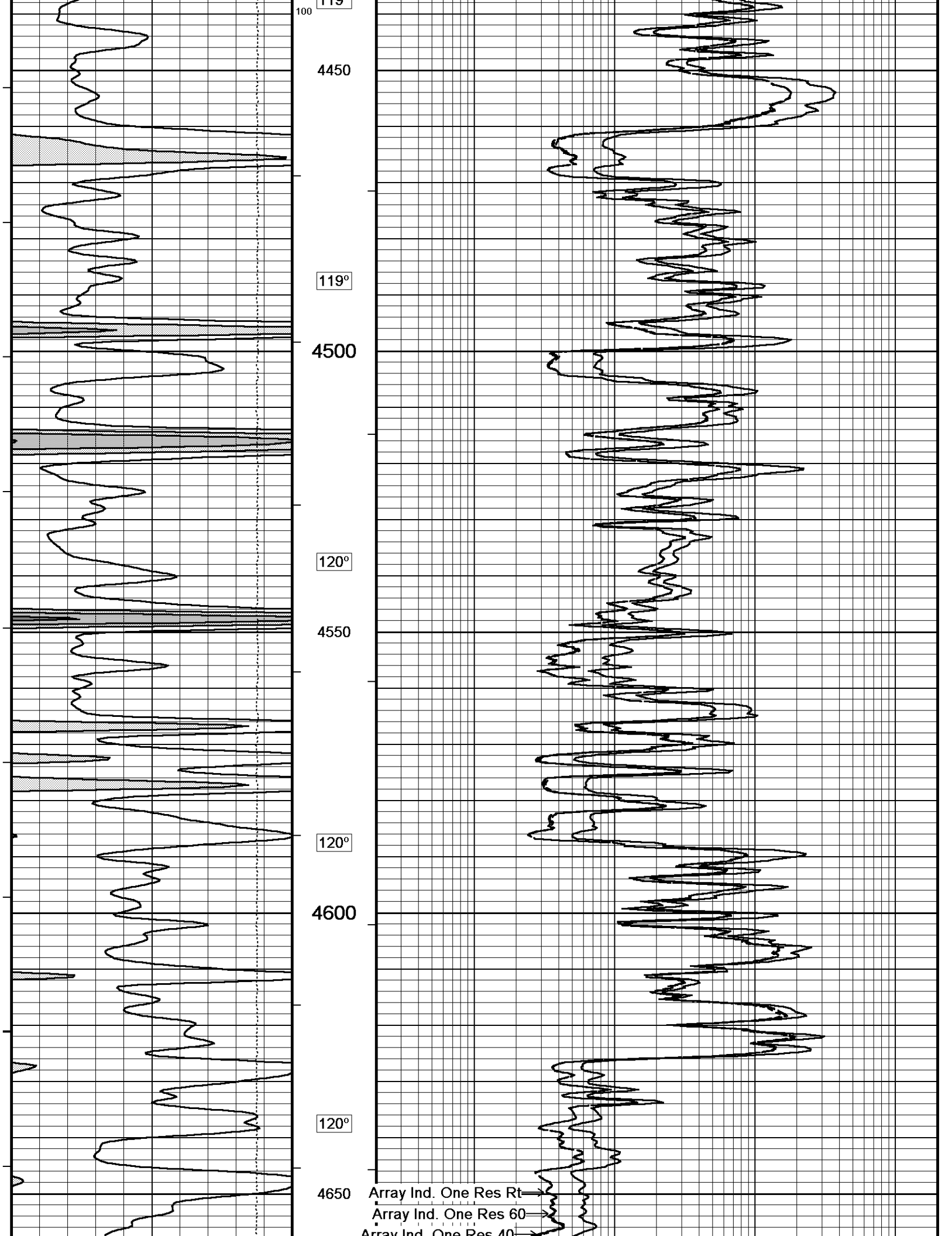

112
3350
112°
3400
113°
3450
300
Array Ind. One Res Rt
Array Ind. One Res 60
Array Ind. One Res 40
Shallow FE
←Gamma Ray
DST Uphole Tension→
113°
3500
113°
3550

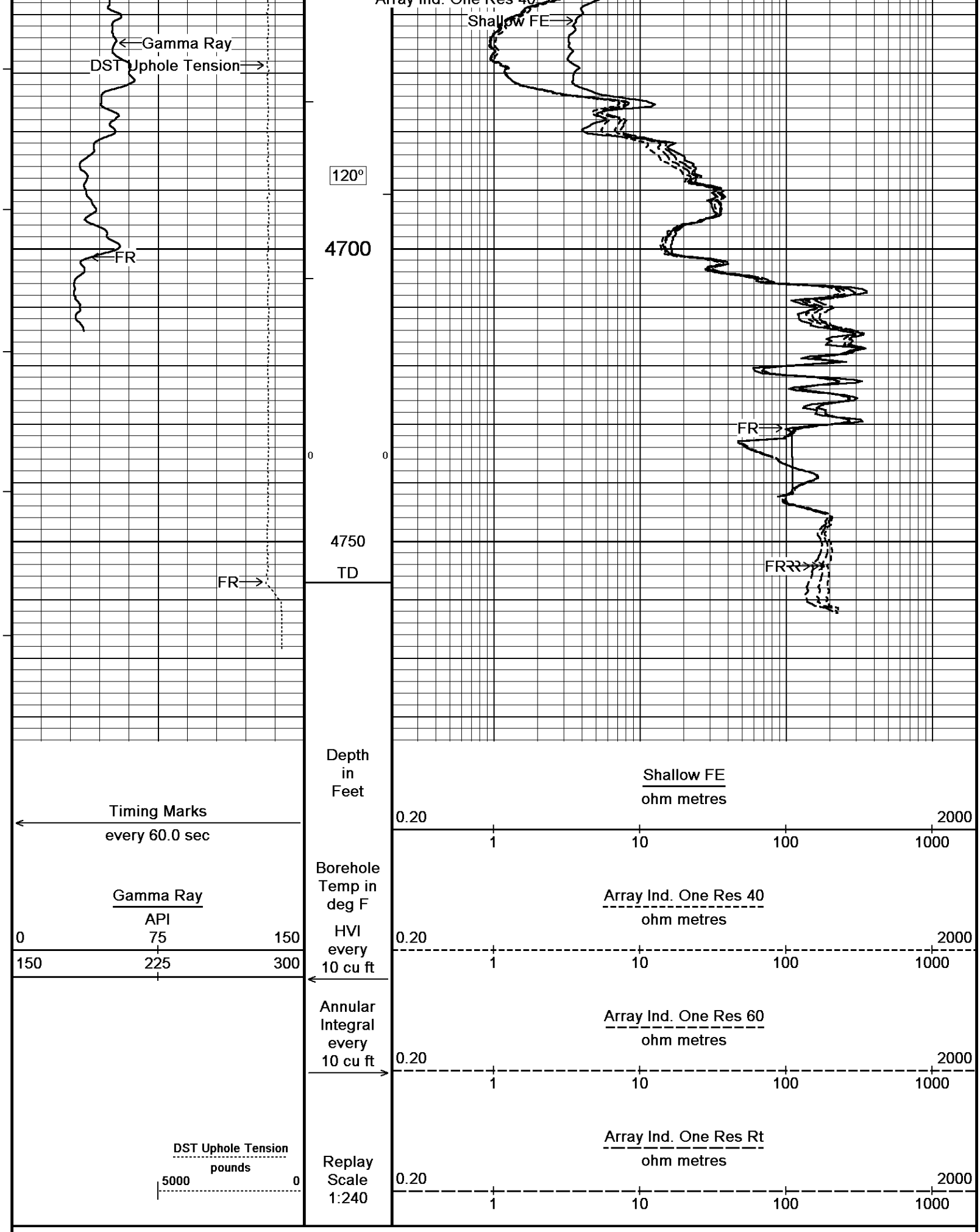

400
114°
3600
114°
3650
114°
3700
114°
3750


115°
3800
115°
3850
300
Array Ind. One Res Rt
Array Ind. One Res 60
Array Ind. One Res 40
Shallow Foc
200
Gamma Ray
DST Uphole Tension
115°
3900
116°
3950
116°


4000
116°
4050
116°
4100
117°
4150
200
117°
4200


117°
4250
Array Ind. One Res Rt
Array Ind. One Res 60
Array Ind. One Res 40
Shallow
Gamma Ray
DST Uphole Tension
118°
4300
100
118°
4350
118°
4400
119°


100
119
4450
119°
4500
120°
4550
120°
4600
120°
4650
Array Ind. One Res Rt
Array Ind. One Res 60
Array Ind. One Res 40



Depth Based Data - Maximum Sampling Increment 10.0cm
Plotted on 09-JUL-2017 21:59
Filename: C:\Minimus 17.01.7206\Logs\Shakespeare Schowal...\Shakespeare Schowalter #1-7_002.dta
Recorded on 09-JUL-2017 18:52
System Versions: Logged with 17.01.7206 Plotted with 17.01.7206

5 INCH MAIN

REPEAT SECTION

Depth Based Data - Maximum Sampling Increment 10.0cm
Plotted on 09-JUL-2017 21:59
Filename: C:\Minimus 17.01.7206\Logs\Shakespeare Schowal...\Shakespeare Schowalter #1-7_001.dta
Recorded on 09-JUL-2017 18:18
System Versions: Logged with 17.01.7206 Plotted with 17.01.7206

Timing Marks
every 60.0 sec

Gamma Ray
API
0 75 150
150 225 300

DST Uphole Tension
pounds
5000 0

Depth
in
Feet

Borehole
Temp in
deg F

HVI
every
10 cu ft

Annular
Integral
every
10 cu ft

Replay
Scale
1:240

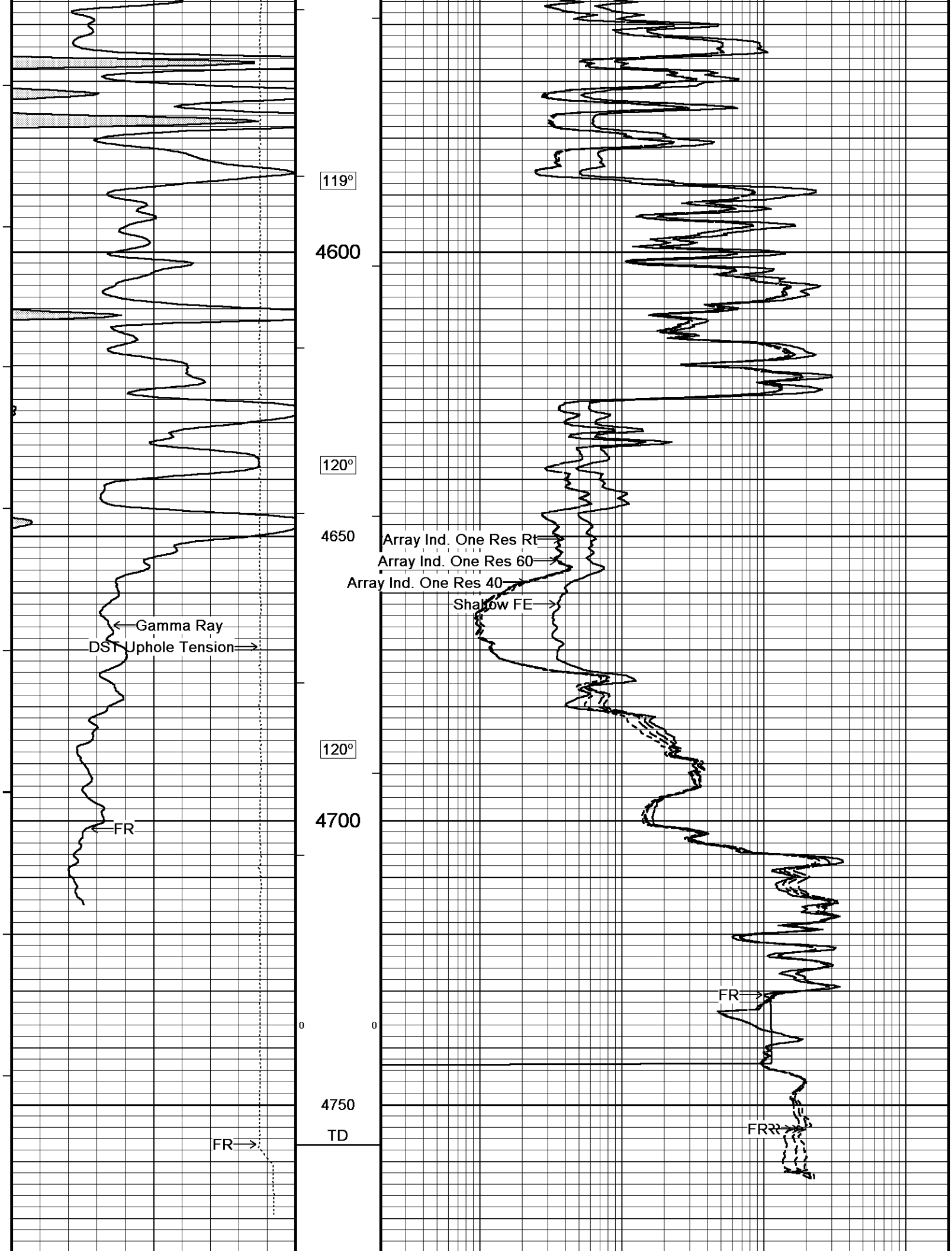
Shallow FE
ohm metres
0.20 1 10 100 1000 2000

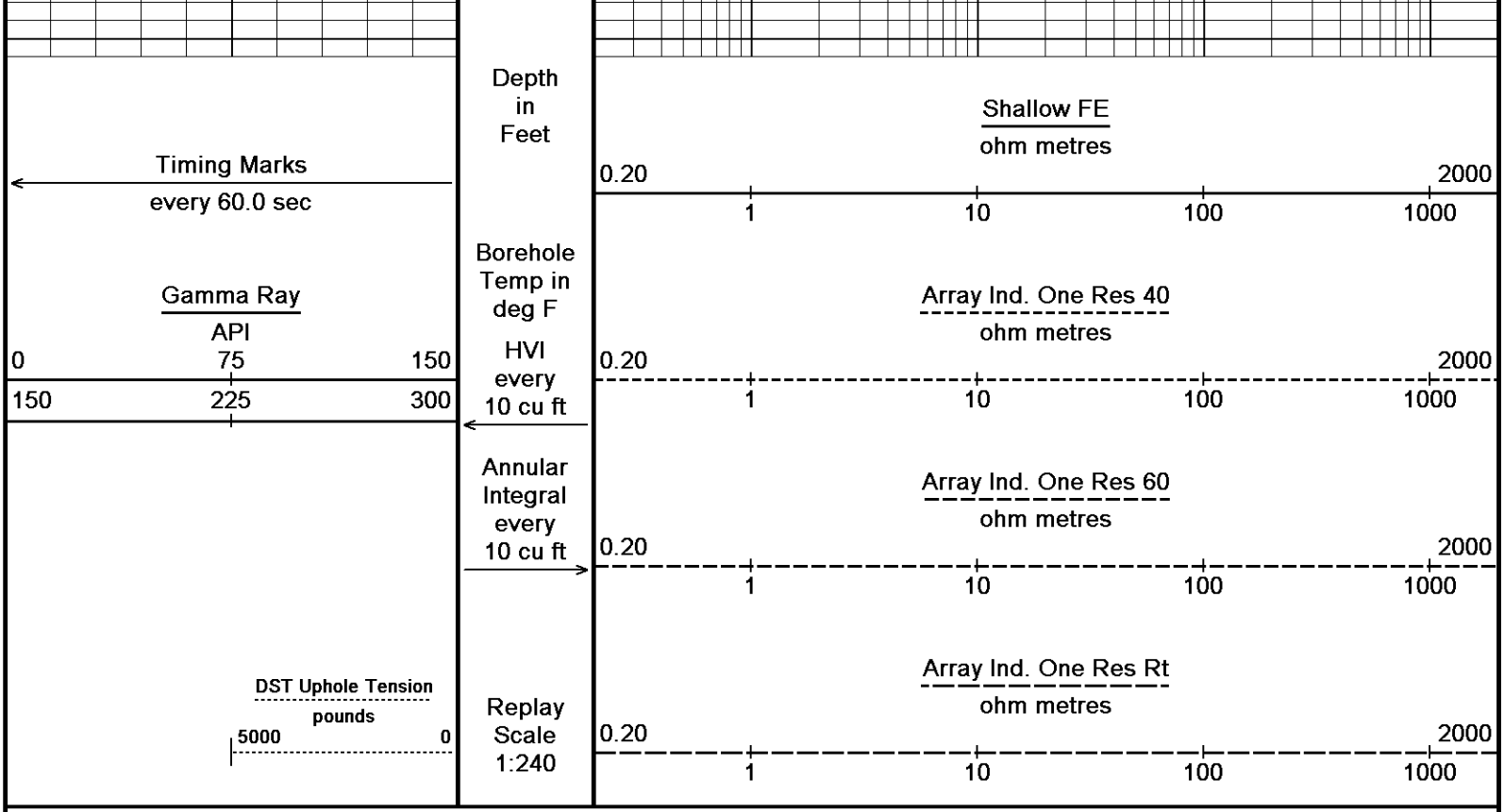
Array Ind. One Res 40
ohm metres
0.20 1 10 100 1000 2000

Array Ind. One Res 60
ohm metres
0.20 1 10 100 1000 2000

Array Ind. One Res Rt
ohm metres
0.20 1 10 100 1000 2000

4450
118°
4500
119°
4550


119°
4600
120°
4650
120°
4700
0
0
4750
TD
Gamma Ray
DST Uphole Tension
FR
FR
Array Ind. One Res Rt
Array Ind. One Res 60
Array Ind. One Res 40
Shallow FE
FR
FR



Depth Based Data - Maximum Sampling Increment 10.0cm — Plotted on 09-JUL-2017 21:59

Filename: C:\Minimus 17.01.7206\Logs\Shakespeare Schowal...\Shakespeare Schowalter #1-7_001.dta — Recorded on 09-JUL-2017 18:18

System Versions: Logged with 17.01.7206 Plotted with 17.01.7206

REPEAT SECTION

BEFORE SURVEY CALIBRATION

C:\Minimus 17.01.7206\Logs\Shakespeare Schowalter #1-7\Shakespeare Schowalter #1-7_001.dta

General Constants All 000

Last Edited on 09-JUL-2017,17:48

General Parameters		
Mud Resistivity	0.950	ohm-metres
Mud Resistivity Temperature	75.000	degrees F
Water Level	0.000	feet
Borehole Fluid Processing	Wet Hole	
Hole/Annular Volume and Differential Caliper Parameters		
HVOL Method	Single Caliper	
HVOL Caliper 1	Density Caliper	
HVOL Caliper 2	N/A	
Annular Volume Diameter	4.500	inches
Caliper for Differential Caliper	Density Caliper	
Rwa Parameters		
Porosity used	Base Density Porosity	
Resistivity used	Array Ind. Four Res Rt	
RWA Constant A	0.620	
RWA Constant M	2.150	
SW/APOR Tool Source	0.000	

Gamma Calibration MCG-C 84

Field Calibration on 09-JUL-2017 11:34

	Measured	Calibrated (API)
Background	82	57
Calibrator (Gross)	732	513
Calibrator (Net)	650	456

Gamma Calibration Tolerances MCG-C 84

Ratio	1.426	1.40 1.475 1.55	Counts/API

Gamma Constants MCG-C 84

Last Edited on 09-JUL-2017,16:21

Gamma Calibrator Number	MCGGRCC141	
GRC-M Calibrator Jig in Use?	NO	
Inactive Background Jig in Use?	NO	
Mud Density	1.12	gm/cc
Caliper Source for Processing	Density Caliper	
Tool Position	Eccentred	
Potassium Equivalence	Chloride	
K Mud Concentration	0.00	%

SP Calibration MCG-C 84

Field Calibration on 07-JUL-2017,19:38

	Measured	Calibrated (mV)
Reference 1	104.4	100.1
Reference 2	-95.8	-100.1

High Resolution Temperature Calibration MCG-C 84

Field Calibration on 24-JUN-2017,20:21

	Measured	Calibrated(Deg F)
Lower	50.00	50.00
Upper	75.00	75.00

High Resolution Temperature Constants MCG-C 84

Last Edited on 09-SEP-2014,02:23

Pre-filter Length	11

Micro Normal and Micro Inverse Calibration MML-A 7

Base Calibration on 22-JUN-2017 09:29
Field Check on 09-JUL-2017 17:32

Base Calibration

	Measured		Calibrated (ohm-m)	
Channel	Resistor 1	Resistor 2	Resistor 1	Resistor 2
Micro Normal	10.0	49.7	5.1	25.6
Micro Inverse	10.0	50.1	3.4	16.9

Channel	Base Check (ohm-m)	Field Check (ohm-m)
Micro Normal	77.9	77.9
Micro Inverse	51.0	51.0

Micro Normal & Micro Inverse Calibration Tolerance MML-A 7

Micro Normal Res. 1	10.0	-5% 10.0 +5%	ohm	Micro Normal Res. 2	49.7	-5% 50.0 +5% ohm
Micro Inverse Res. 1	10.0	-5% 10.0 +5%	ohm	Micro Inverse Res. 2	50.1	-5% 50.0 +5% ohm
Micro Normal Base Check	77.9	-2% 77.69 +2%	ohm-m			
Micro Inverse Base Check	51.0	-2% 50.89 +2%	ohm-m			
Micro Normal Field Check	77.9	-2% 77.9 +2%	ohm-m			
Micro Inverse Field Check	51.0	-2% 51.0 +2%	ohm-m			

Micro Normal and Micro Inverse Constants MML-A 7

Last Edited on 09-JUL-2017,17:31

Pad Type	8-12 in Soft Rubber Inflatable 006-9011-159	
Micro Normal K Factor	0.5110	
Micro Inverse K Factor	0.3380	
Standoff Offset	N/A	inches

Caliper Calibration MML-A 7

Base Calibration on 22-JUN-2017 09:39
Field Calibration on 09-JUL-2017 17:31

Base Calibration

Reading No	Measured	Calibrator Size (in)
1	13752	5.98
2	16863	7.97
3	19899	9.86
4	23808	11.92
5	0	0.00
6	N/A	N/A

Field Calibration

Measured Caliper (in)	Actual Caliper (in)

Measured Caliper (in)	Actual Caliper (in)
8.10	8.10

Caliper Calibration Tolerances MML-A 7

		7.90	8.10	8.30	
Short Arm Field Cal.	8.10				in

Neutron Calibration MDN-A.B 114

Base Calibration on 22-JUN-2017 14:55
Field Check on 09-JUL-2017 11:38

Base Calibration

	Measured Near	Measured Far	Calibrated (cps) Near	Calibrated (cps) Far
	3156	98	3714	110
Ratio	32.298		33.764	

Field Calibrator at Base

	Calibrated (cps) Near	Calibrated (cps) Far
	2073	3042
Ratio	0.682	

Field Check

	Calibrated (cps) Near	Calibrated (cps) Far
	2053	3040
Ratio	0.675	

Neutron Calibration Tolerances MDN-A.B 114

		-5%	33	+5%	
Ratio	32.298				

		0.65	0.7	0.75	
Base Check	0.682				

		0.662	0.682	0.702	
Field Check	0.675				

Neutron Constants MDN-A.B 114

Last Edited on 09-JUL-2017,16:21

Neutron Source Id	P0204NN	
Neutron Jig Number	NJ5736	
Air Hole Processing	Modified Ratio	
Caliper Source for Processing	Density Caliper	
Stand-off	0.00	inches
Mud Density	1.00	gm/cc
Limestone Sigma	7.10	cu
Sandstone Sigma	4.26	cu
Dolomite Sigma	4.70	cu
Formation Pressure Source	None	
Formation Pressure	N/A	kpsi
Temperature Source	Constant Value	
Temperature	68.00	degrees F
Mud Salinity	0.00	kppm
Salinity Correction	Not Applied	
Formation Fluid Salinity Source	None	
Formation Fluid Salinity	N/A	kppm
Barite Mud Correction	Not Applied	

FE Calibration MFE-A.A 135

Base Calibration on 22-JUN-2017 11:49
Field Check on 09-JUL-2017 17:10

Base Calibration

	Measured	Calibrated (ohm-m)
Reference 1	0.0	0.0
Reference 2	963.2	126.8
Base Check		281.3
Field Check		280.8

FE Calibration Tolerances MFE-A.A 135

		-3%	980.0	+3%	
Reference 2	963.2				ohm

		-2%	277.0	+2%	
Base Check	281.3				ohm-m

		-2%	281.3	+2%	
Field Check	280.8				ohm-m

FE Constants MFE-A.A 135

Last Edited on 09-JUL-2017,17:09

Running Mode	No Sleeve	
MFE K Factor	0.1268	
Borehole Correction Constants		
Sonde Position	0.5	inches
Hole Size Source	Density Caliper	
Hole Size Constant Value	N/A	inches
Rm Source	Global Value: Temperature Corrected	
Temp. for Rm Corr.	MCG External Temperature	

Sonic Constants MSS-A.A 55

Last Edited on 09-JUL-2017,16:20

Maximum Boundary Contrast	100.00	micro-sec/ft
Fluid Transit Time	189.00	micro-sec/ft
Limestone Transit Time	47.50	micro-sec/ft
Sandstone Transit Time	55.50	micro-sec/ft
Dolomite Transit Time	43.50	micro-sec/ft
Sonic used for Porosities	3-5' Compensated Sonic	
Correction for Sonde Skew	Applied	
Cycle Stretch Algorithm	Applied	
MN3FT	N/A	micro-sec
MX3FT	N/A	micro-sec
Hunt-Raymer Constant	83.13	micro-sec/ft
Sonde Mode	Compensated	
Hole Type	Open Hole	

Sonde Parameters

	Measured	Calibrated
Offset	N/A	0.0000
Free Pipe	N/A	N/A

Peak Amplitude Source: N/A

Waveform	Start Time (micro-sec)	Width (micro-sec)	Pre Gain	Start Gain	Discriminator (mV)
3'	N/A	N/A	N/A	N/A	N/A
4'	N/A	N/A	N/A	N/A	N/A
5'	N/A	N/A	N/A	N/A	N/A
6'	N/A	N/A	N/A	N/A	N/A

Processed Fixed Gate Parameters

Waveform Used For Processing: N/A

Start Time (micro-sec)	End Time (micro-sec)	Discriminator (mV)	N/A
N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A

Full Waveform Parameters

Use 3' Waveform to derive TR	N/A	
Use 4' Waveform to derive TR	N/A	
Use 5' Waveform to derive TR	N/A	
Use 6' Waveform to derive TR	N/A	
3' Waveform Discriminator Level	N/A	mV
4' Waveform Discriminator Level	N/A	mV
5' Waveform Discriminator Level	N/A	mV
6' Waveform Discriminator Level	N/A	mV
Waveform Discriminator Filter	N/A	
Semblance Window Width	N/A	micro-sec
Sonic Despiker	N/A	N/A

Induction Calibration MAI-A.A 111

Base Calibration on 22-JUN-2017 10:55
Field Check on 09-JUL-2017 17:29

Base Calibration

Test Loop Calibration	Measured		Calibrated (mmho/m)	
Channel	Low	High	Low	High

Channel	Low	High	Low	High
1	17.6	473.6	9.3	966.2
2	6.4	385.9	7.6	821.4
3	3.2	264.0	5.2	566.0
4	2.1	135.5	2.6	279.2

Array Temperature 23.0 Deg F

Test Loop Calibration Verified

Channel	Base Check (mmho/m)		Field Check (mmho/m)		
	Low	High	Low	High	
1	13.7	3869.0	16.8	3871.0	
2	30.1	3523.0	32.5	3524.3	
3	29.2	3017.0	31.3	3017.8	
4	19.2	2055.4	20.5	2056.0	
Deep	17.8	1959.3	19.2	1959.9	
Medium	43.1	3970.5	45.7	3971.4	
Shallow	44.9	5225.2	48.4	5227.1	
Array Temperature		95.2		104.7	Deg F

Induction Calibration Tolerances MAI-A.A 111

Low Conductivity 1	17.6	13.0 17.0 21.0	mmho/m	High Conductivity 1	473.6	430.0 475.0 520.0 mmho/m
Low Conductivity 2	6.4	4.5 6.0 7.5	mmho/m	High Conductivity 2	385.9	345.0 385.0 425.0 mmho/m
Low Conductivity 3	3.2	1.0 3.5 6.0	mmho/m	High Conductivity 3	264.0	240.0 260.0 280.0 mmho/m
Low Conductivity 4	2.1	0.0 2.0 4.0	mmho/m	High Conductivity 4	135.5	120.0 135.0 150.0 mmho/m
Background Vx 1	0.0	-110.0 -32.5 45.0	mmho/m	Phase Check Loop 1	0.0	-2.0 0.0 2.0 %
Background Vx 2	0.0	-35.0 20.0 75.0	mmho/m	Phase Check Loop 2	0.0	-2.0 0.0 2.0 %
Background Vx 3	0.0	-60.0 2.5 65.0	mmho/m	Phase Check Loop 3	0.0	-2.0 0.0 2.0 %
Background Vx 4	0.0	-50.0 -17.5 15.0	mmho/m	Phase Check Loop 4	0.0	-2.0 0.0 2.0 %

Induction Constants MAI-A.A 111

Last Edited on 09-JUL-2017,17:27

Induction Model	RtAP-WBM	
Borehole Correction Constants		
Tool Centred	No	
Hole Size Source	Density Caliper	
Hole Size Constant Value	N/A	inches
Stand-off Type	Fins	
Stand-off	0.50	inches
Number of Fins on Stand-off	8.0000	
Stand-off Fin Angle	45.00	degrees
Stand-off Fin Width	0.5000	inches
Rm Source	Global Value: Temperature Corrected	
Temp. for Rm Corr.	MCG External Temperature	
Squasher Start	0.0020	mhos/metre
Squasher Offset	N/A	mhos/metre

Borehole Normalisation

DRM1	0.0000	DRC1	0.0000
DRM2	0.0000	DRC2	0.0000
MRM1	0.0000	MRC1	0.0000
MRM2	0.0000	MRC2	0.0000
SRM1	0.0000	SRC1	0.0000
SRM2	0.0000	SRC2	0.0000

Calibration Site Corrections

Channel 1	0.00	mmhos/metre
Channel 2	0.00	mmhos/metre
Channel 3	0.00	mmhos/metre
Channel 4	0.00	mmhos/metre

Symmetrised Receiver Gains

Receiver 1	1.00

Receiver 2	1.00	
Receiver 3	1.00	
Receiver 4	1.00	
Apparent Porosity and Water Saturation Constants		
Archie Constant (A)	1.00	
Cementation Exponent (M)	2.00	
Saturation Exponent (N)	2.00	
Saturation of Water for Apor	100.00	percent
Resistivity of Water for Apor and Sw	0.05	ohm-m
Resistivity of Mud Filtrate for Sw	0.00	ohm-m
Source for Rt	0.00	
Source for Rxo	0.00	

High Resolution Temperature Calibration MAI-A.A 111

Field Calibration on 22-JUN-2017,10:28

	Measured	Calibrated(Deg F)
Lower	10.00	10.00
Upper	100.00	100.00

High Resolution Temperature Constants MAI-A.A 111

Last Edited on 26-JUN-2014,15:06

Pre-filter Length	11

Photo Density Calibration MPD-C.A 216

Base Calibration on 22-JUN-2017 10:47
Field Check on 09-JUL-2017 17:14

Density Calibration

Base Calibration	Measured		Calibrated (sdu)	
	Near	Far	Near	Far
Background	1034	1215		
Reference 1	51875	24845	59556	30836
Reference 2	20527	2316	24941	2541

Field Check at Base

1033.8	1215.4

Field Check

1030.0	1222.2

PE Calibration

Base Calibration	Measured			Calibrated
	WS	WH	Ratio	Ratio
Background	189	925		
Reference 1	21486	51702	0.419	0.371
Reference 2	5928	20410	0.295	0.272

Field Check at Base

189.2	924.8

Field Check

186.2	922.6

Photo Density Calibration Tolerances MPD-C.A 216

Near Density Ratio	2.61	-5% 2.52 +5%	Far Density Ratio	21.48	-5% 21.00 +5%
PE Calibration	0.116	0.089 0.110 0.131			
Near Den. Field Check	1030.0	-3% 1033.8 +3%	Far Den. Field Check	1222.2	-3% 1215.4 +3%
PE WS Field Check	186.2	-6% 189.2 +6%	PE WH Field Check	922.6	-6% 924.8 +6%

Density Constants MPD-C.A 216

Last Edited on 09-JUL-2017,17:15

Density Source Id	P50557B	
Nylon Calibrator Number	DNCE695	
Aluminium Calibrator Number	DACD698	
Density Shoe Profile	8 inch	
Caliper Source for Processing	Density Caliper	
PE Correction to Density	Not Applied	
Mud Density	1.12	gm/cc
Mud Density Type		

Mud Filtrate Density	1.00	gm/cc
Dry Hole Mud Filtrate Density	1.00	gm/cc
DNCT	0.00	gm/cc
CRCT	0.00	gm/cc
Density Z/A Correction	Hybrid	
Precision Enhanced Density Processing	Not Applied	

Matrix Density (gm/cc)	Depth (ft)
2.71	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00

Caliper Calibration MPD-C.A 216

Base Calibration on 22-JUN-2017 11:00
Field Calibration on 09-JUL-2017 17:26

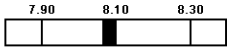
Base Calibration

Reading No	Measured	Calibrator Size (in)
1	18416	3.99
2	28544	5.98
3	38624	7.97
4	48448	9.86
5	59555	11.92
6	N/A	N/A

Field Calibration

Measured Caliper (in)	Actual Caliper (in)
8.06	8.10

Caliper Calibration Tolerances MPD-C.A 216

Short Arm Field Cal. 8.06 

in

DOWNHOLE EQUIPMENT

C:\Minimus 17.01.7206\Logs\Shakespeare Schowalter #1-7\Shakespeare Schowalter #1-7_001.dta

Mono-Cablehead
MCH-AA 0 LG: 1.02 ft WT: 2.2 lb OD: 1.417 in

11C-SLB 10-way Compact Tool Adaptor
MTA-B 1 LG: 0.78 ft WT: 19.8 lb OD: 3.540 in

Compact Comms Gamma
MCG-C 84 LG: 8.70 ft WT: 63.9 lb OD: 2.240 in

Compact Micro-log
MML-A 7 LG: 7.97 ft WT: 81.6 lb OD: 2.244 in

Compact Neutron
MDN-A.B 114 LG: 5.04 ft WT: 50.7 lb OD: 2.240 in

Compact Density/Caliper
MPD-C.A 216 LG: 9.59 ft WT: 90.4 lb OD: 2.449 in

Compact Focussed Electric
MFE-A.A 135 LG: 6.05 ft WT: 48.5 lb OD: 2.240 in

55.39 ft	GRGC - MCG Gamma Ray
52.48 ft	CGXT - MCG External Temperature
46.76 ft	MLTC - MML Caliper
45.76 ft	MINV - Micro-inverse
45.76 ft	MNRL - Micro-normal
40.97 ft	NPRL - Limestone Neutron Por.
33.73 ft	AVOL - Annular Volume
33.73 ft	HVOL - Hole Volume
33.73 ft	CLDC - Density Caliper
31.80 ft	DPRL - Limestone Density Por.
31.80 ft	DEN - Compensated Density
31.80 ft	DCOR - Density Correction
31.74 ft	PDPE - PE
26.24 ft	FEFE - Shallow FE

Compact Sonic
MSS-A.A 55 LG: 12.52 ft WT: 72.8 lb OD: 2.244 in

Compact Induction
MAI-A.A 111 LG: 10.81 ft WT: 48.5 lb OD: 2.244 in

Total Length: 62.47 ft Weight: 478.4 lb

16.96 ft	TR11 - 4' Transit Time
16.46 ft	TR21 - 3' Transit Time
15.95 ft	TR12 - 6' Transit Time
15.46 ft	TR22 - 5' Transit Time
12.96 ft	SPRL - Wyllie Lime. Sonic Por.
12.96 ft	DT35 - 3-5' Compensated Sonic
2.58 ft	R40O - Array Ind. One Res 40
2.58 ft	R60O - Array Ind. One Res 60
2.58 ft	CTAO - Array Ind. One Cond Ct
2.58 ft	RTAO - Array Ind. One Res Rt
0.23 ft	SPCG - Spontaneous Potential
Tool Zero	(0.13ft from bottom)
-0.13 ft	SMTU - DST Uphole Tension

All measurements relative to tool zero.

COMPANY	SHAKESPEARE OIL CO., INC.
WELL	SCHOWALTER #1-7
FIELD	WILDCAT
PROVINCE/COUNTY	SCOTT
COUNTRY/STATE	U.S.A. / KANSAS

Elevation Kelly Bushing	3020	feet	First Reading	4754.00	feet
Elevation Drill Floor	3018	feet	Depth Driller	4750.00	feet
Elevation Ground Level	3009	feet	Depth Logger	4757.00	feet

Weatherford®

ARRAY INDUCTION
SHALLOW FOCUSED
ELECTRIC LOG

Weatherford

ARRAY INDUCTION SHALLOW FOCUSED ELECTRIC LOG

COMPANY	SHAKESPEARE OIL CO., INC.
WELL	SCHOWALTER #1-7
FIELD	WILDCAT
PROVINCE/COUNTY	SCOTT
COUNTRY/STATE	U.S.A. / KANSAS
LOCATION	480' FNL & 2220' FWL
SEC 7 TWP 16S RGE 32W	Other Services: MPD/MDN, MSS, MML
Longitude / Latitude	
API Number	15-171-21205
Permanent Datum GL, Elevation 3009 feet	Elevations: KB 3020.00 feet, DF 3018.00, GL 3009.00
Log Measured From KB, 11.00 feet above Permanent Datum	
Drilling Measured From KB	
Date	09-JUL-2017
Run Number	ONE
Service Order	4558-186803695
Depth Driller	4750.00 feet
Depth Logger	4757.00 feet
First Reading	4754.00 feet
Last Reading	267.00 feet
Casing Driller	265.00 feet
Casing Logger	267.00 feet
Bit Size	7.875 inches
Hole Fluid Type	CHEMICAL
Density / Viscosity	9.30 lb/USg / 54.00 CP
PH / Fluid Loss	10.50 / 8.80 ml/30Min
Sample Source	FLOWLINE
Rm @ Measured Temp	0.95 @75.0 ohm-m
Rmf @ Measured Temp	0.76 @75.0 ohm-m
Rmc @ Measured Temp	1.14 @75.0 ohm-m
Source Rmf / Rmc	CALC / CALC
Rm @ BHT	0.59 @120.0 ohm-m
Time Since Circulation	5 HOURS
Max Recorded Temp	120.00 deg F
Equipment / Base	14249 / LIB
Recorded By	ADAM SILL
Witnessed By	TIM PRIEST

1 INCH MAIN

Depth Based Data - Maximum Sampling Increment 10.0cm
Plotted on 09-JUL-2017 21:59
Filename: C:\Minimus 17.01.7206\Logs\Shakespeare Schowalter...\Shakespeare Schowalter #1-7_002.dta
Recorded on 09-JUL-2017 18:52
System Versions: Logged with 17.01.7206 Plotted with 17.01.7206

Timing Marks
every 60.0 sec

Gamma Ray
API
0 75 150
150 225 300

DST Uphole Tension
pounds
5000 0

Depth
in
Feet

Borehole
Temp in
deg F

HVI
every
10 cu ft

Annular
Integral
every
10 cu ft

Replay
Scale
1:600

Array Ind. One Cond Ct
mmhos/metre
1000 750 500 250 0
2000 1750 1500 1250 1000

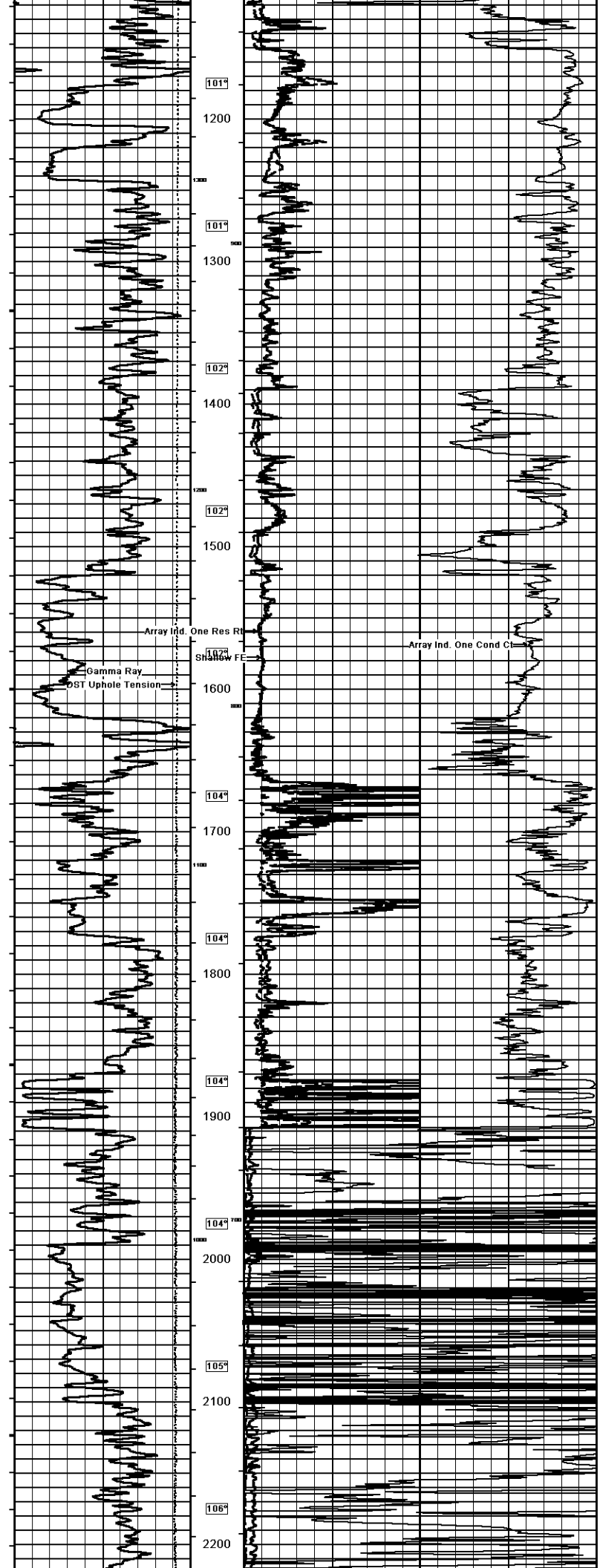
Shallow FE
ohm metres
0 25 50
0 250 500

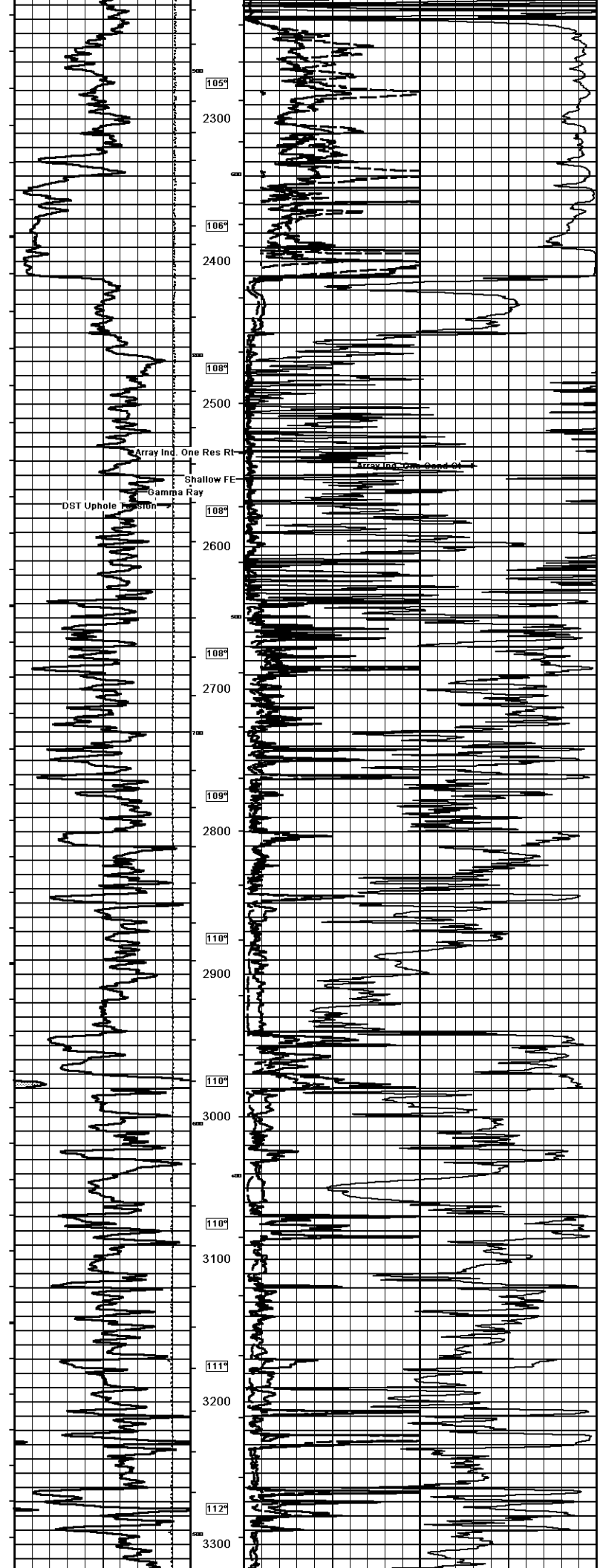
Array Ind. One Res Rt
ohm metres
0 25 50
0 250 500

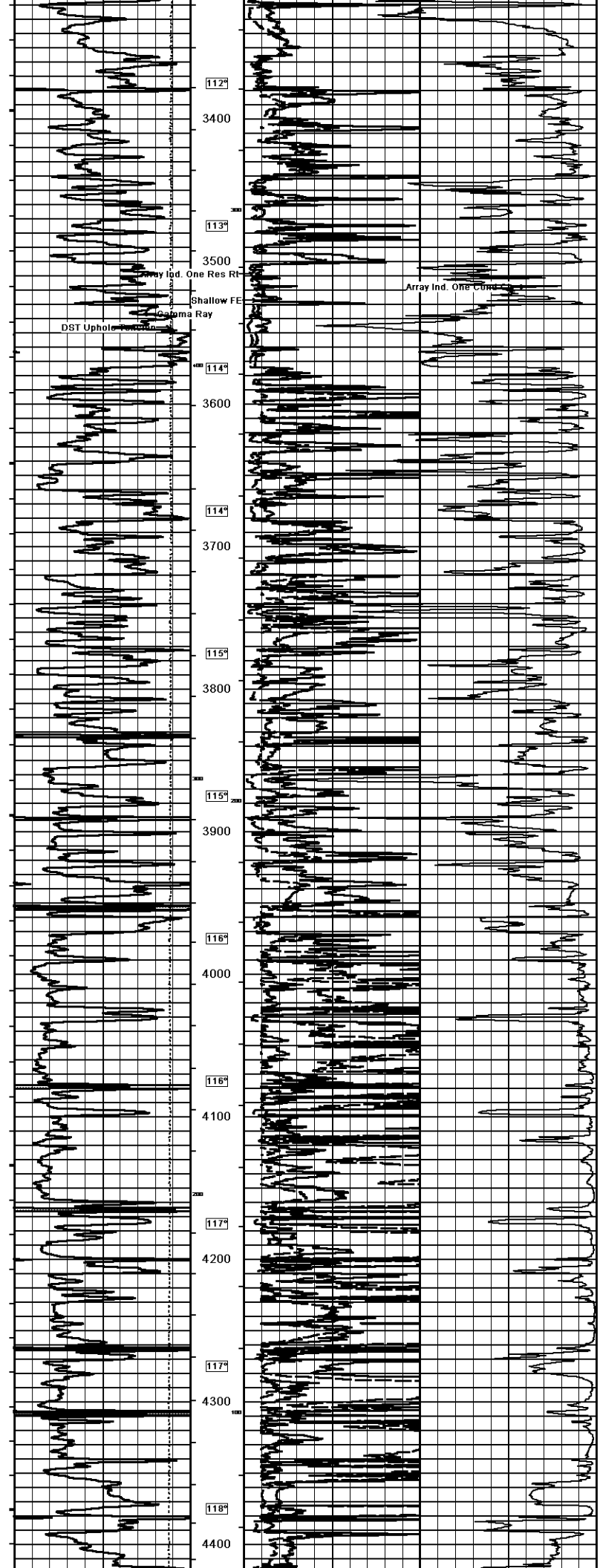
Casing
Shoe

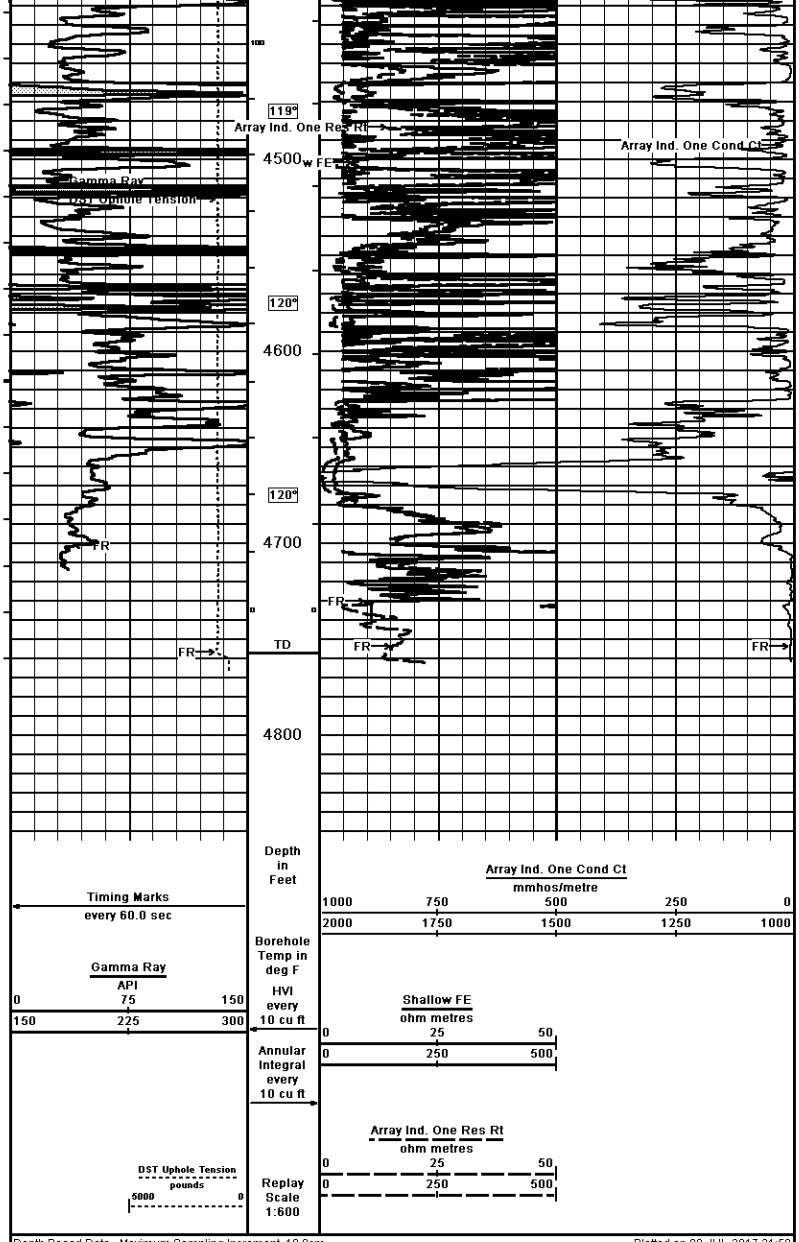
300
96°
400
96°
500
97°
600
98°
700
98°
800
99°
900
99°
1000
100°
1100

Array Ind. One Res Rt
Shallow FE
Gamma Ray
DST Uphole Tension
Array Ind. One Cond Ct


101°
1200
101°
1300
102°
1400
102°
1500
Array Ind. One Res Rt
Shallow FE
Array Ind. One Cond Ci
Gamma Ray
DST Uphole Tension
102°
1600
104°
1700
104°
1800
104°
1900
104°
2000
105°
2100
106°
2200


105°
2300
106°
2400
108°
2500
Array Ind. One Res Rt
Array Ind. One Cond Ot
Shallow FE
Gamma Ray
DST Uphole Tension
108°
2600
108°
2700
109°
2800
110°
2900
110°
3000
110°
3100
111°
3200
112°
3300


112°
3400
113°
3500
Array Ind. One Res Rt
Shallow FE
Gamma Ray
DST Uphole Temp
Array Ind. One Cond
114°
3600
114°
3700
115°
3800
115°
3900
116°
4000
116°
4100
117°
4200
117°
4300
118°
4400



Depth Based Data - Maximum Sampling Increment 10.0cm — Plotted on 09-JUL-2017 21:59
Filename: C:\Minimus 17.01.7206\Logs\Shakespeare Schowalter...\Shakespeare Schowalter #1-7_002.dta — Recorded on 09-JUL-2017 18:52
System Versions: Logged with 17.01.7206 Plotted with 17.01.7206

1 INCH MAIN

COMPANY	SHAKESPEARE OIL CO., INC.
WELL	SCHOWALTER #1-7
FIELD	WILDCAT
PROVINCE/COUNTY	SCOTT
COUNTRY/STATE	U.S.A. / KANSAS

Elevation Kelly Bushing	3020	feet	First Reading	4754.00	feet
Elevation Drill Floor	3018	feet	Depth Driller	4750.00	feet
Elevation Ground Level	3009	feet	Depth Logger	4757.00	feet

Weatherford

ARRAY INDUCTION
SHALLOW FOCUSED
ELECTRIC LOG