Weatherford®

ARRAY INDUCTION SHALLOW FOCUSED ELECTRIC LOG

COMPANY	SHAKESPEARE OIL CO., INC.
WELL	OTTLEY #4-16
FIELD	WILDCAT
PROVINCE/COUNTY	LOGAN
COUNTRY/STATE	U.S.A. / KANSAS
LOCATION	1599' FNL & 1852' FWL

SEC	TWP	RGE	Other Services
16	14S	32W	MPD/MDN
API Number 15-109-21198			MML
Permit Number			MSS

Permanent Datum G.L., Elevation 2808 feet
Log Measured From KB
Drilling Measured From K.B. @10 FEET

Elevations:	feet
KB	2818.00
DF	2816.00
GL	2808.00

Date	04-AUG-2013			
Run Number	ONE			
Service Order	3539955			
Depth Driller	4530.00	feet		
Depth Logger	4528.00	feet		
First Reading	4525.00	feet		
Last Reading	221.00	feet		
Casing Driller	222.00	feet		
Casing Logger	221.00	feet		
Bit Size	7.875	inches		
Hole Fluid Type	CHEMICAL			
Density / Viscosity	9.10 lb/USg	55.00 CP		
PH / Fluid Loss	10.00	10.00 ml/30Min		
Sample Source	FLOWLINE			
Rm @ Measured Temp	0.51 @ 98.0	ohm-m		
Rmf @ Measured Temp	0.41 @ 98.0	ohm-m		
Rmc @ Measured Temp	0.61 @ 98.0	ohm-m		
Source Rmf / Rmc	CALC	CALC		
Rm @ BHT	0.44 @115.0	ohm-m		
Time Since Circulation	3 HOURS			
Max Recorded Temp	115.00	deg F		
Equipment / Base	13096	LIB		
Recorded By	ROB HOFFMAN			
Witnessed By	TIM PRIEST			
JOB #	LB13-218			

BOREHOLE RECORD

Last Edited: 04-AUG-2013 15:52

Bit Size inches	Depth From feet	Depth To feet
7.875	222.00	4530.00

CASING RECORD

Type	Size inches	Depth From feet	Shoe Depth feet	Weight pounds/ft
SURFACE	8.625	0.00	222.00	24.00

REMARKS

- SOFTWARE ISSUE: WLS 13.05.9583.
- 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: 1952 CU. FT.
- ANNULAR HOLE VOLUME WITH 5.5 INCH CASING FROM TD TO SURFACE CASING: 175 CU. FT.

- SERVICE ORDER # 3539955

- RIG: HD DRILLING #2.

- ENGINEER: ROB HOFFMAN

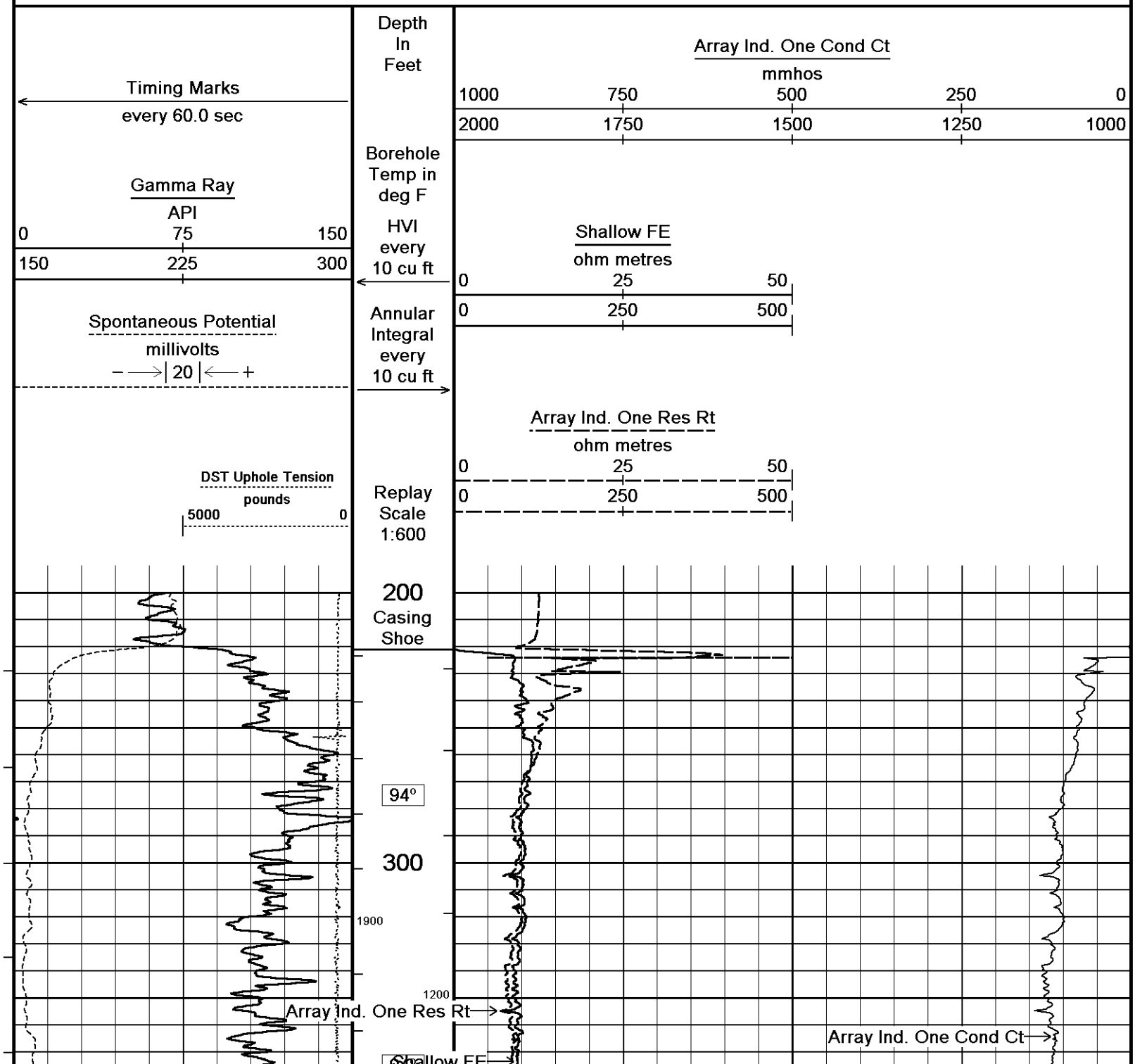
- OPERATOR(S): NICK ADAME

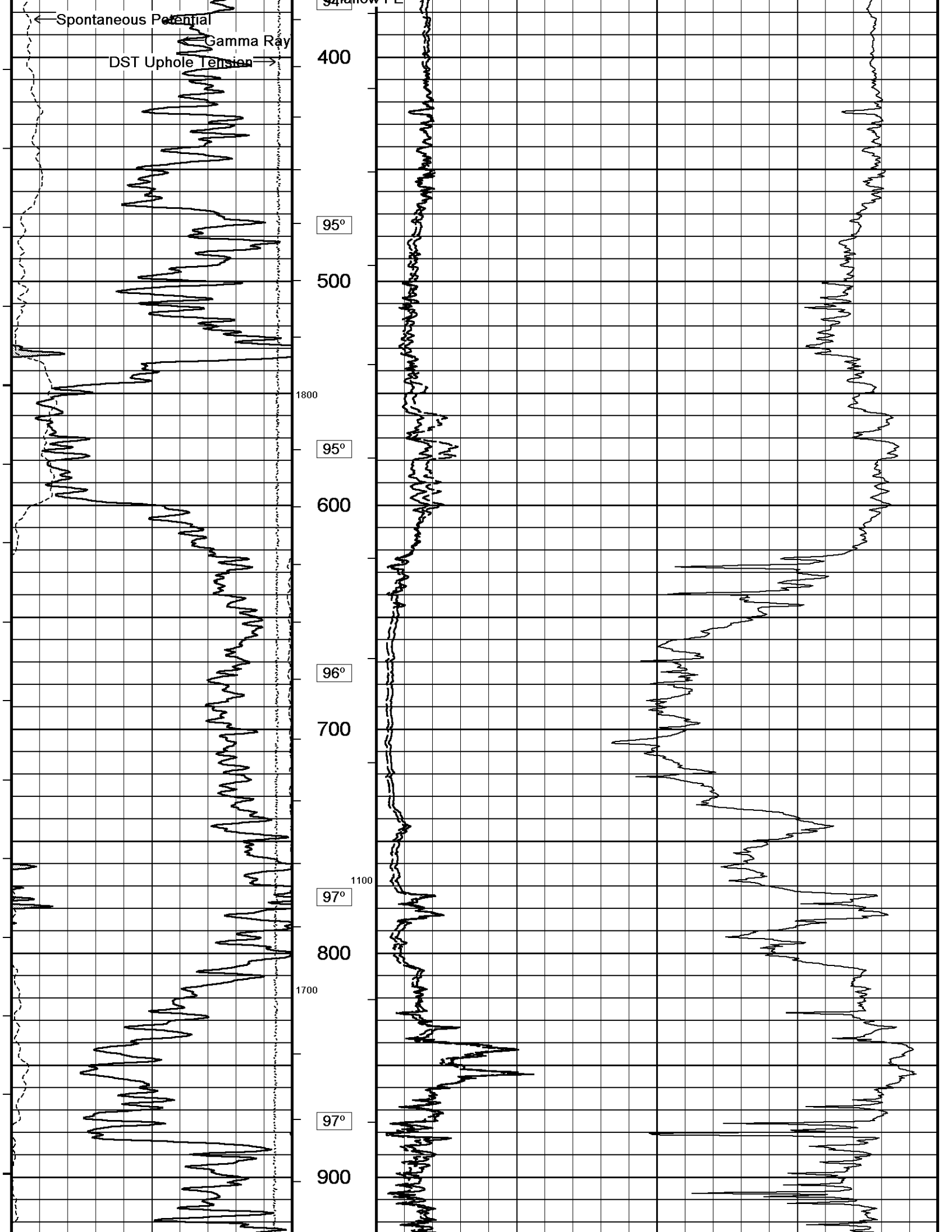
2 INCH MAIN

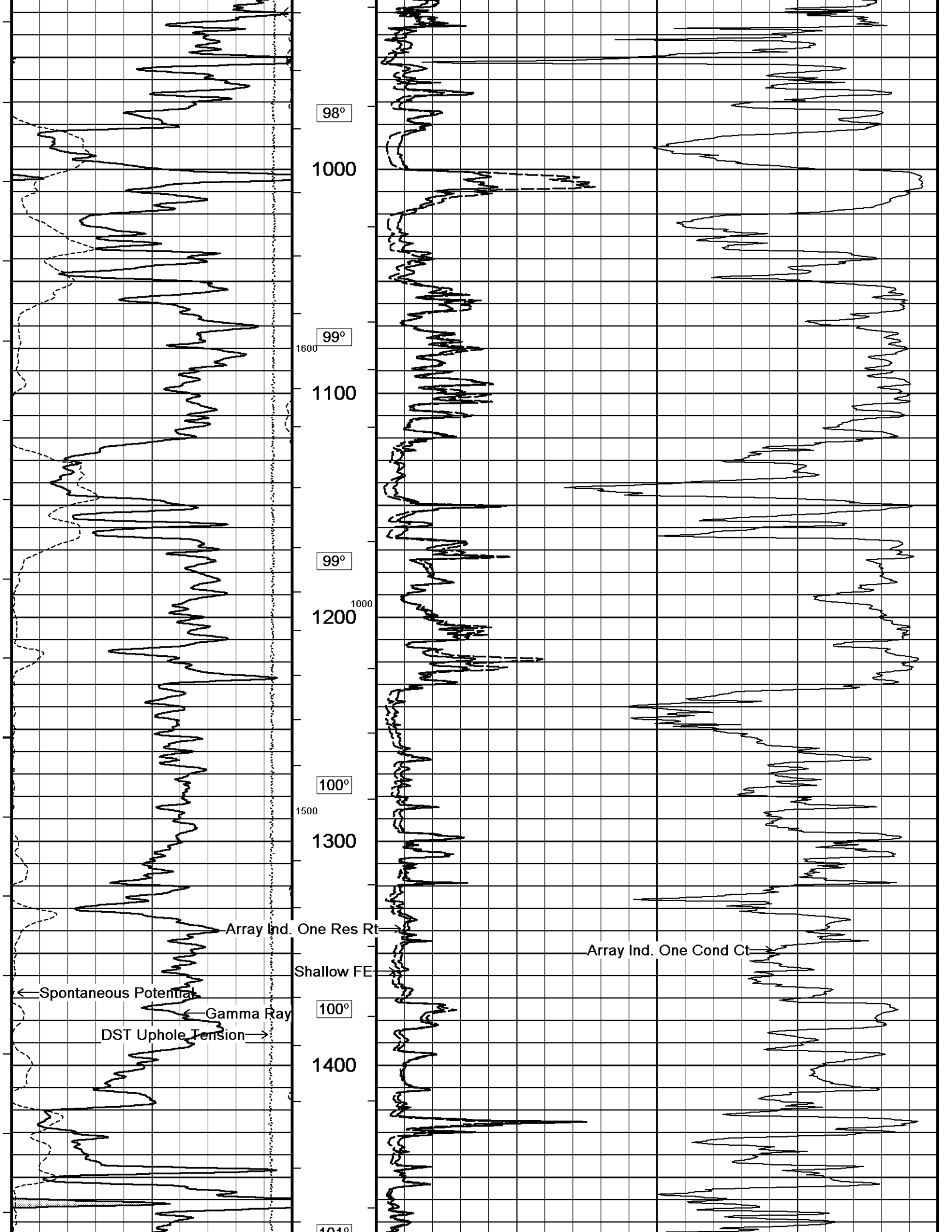
Depth Based Data - Maximum Sampling Increment 10.0cm — Plotted on 04-AUG-2013 21:51

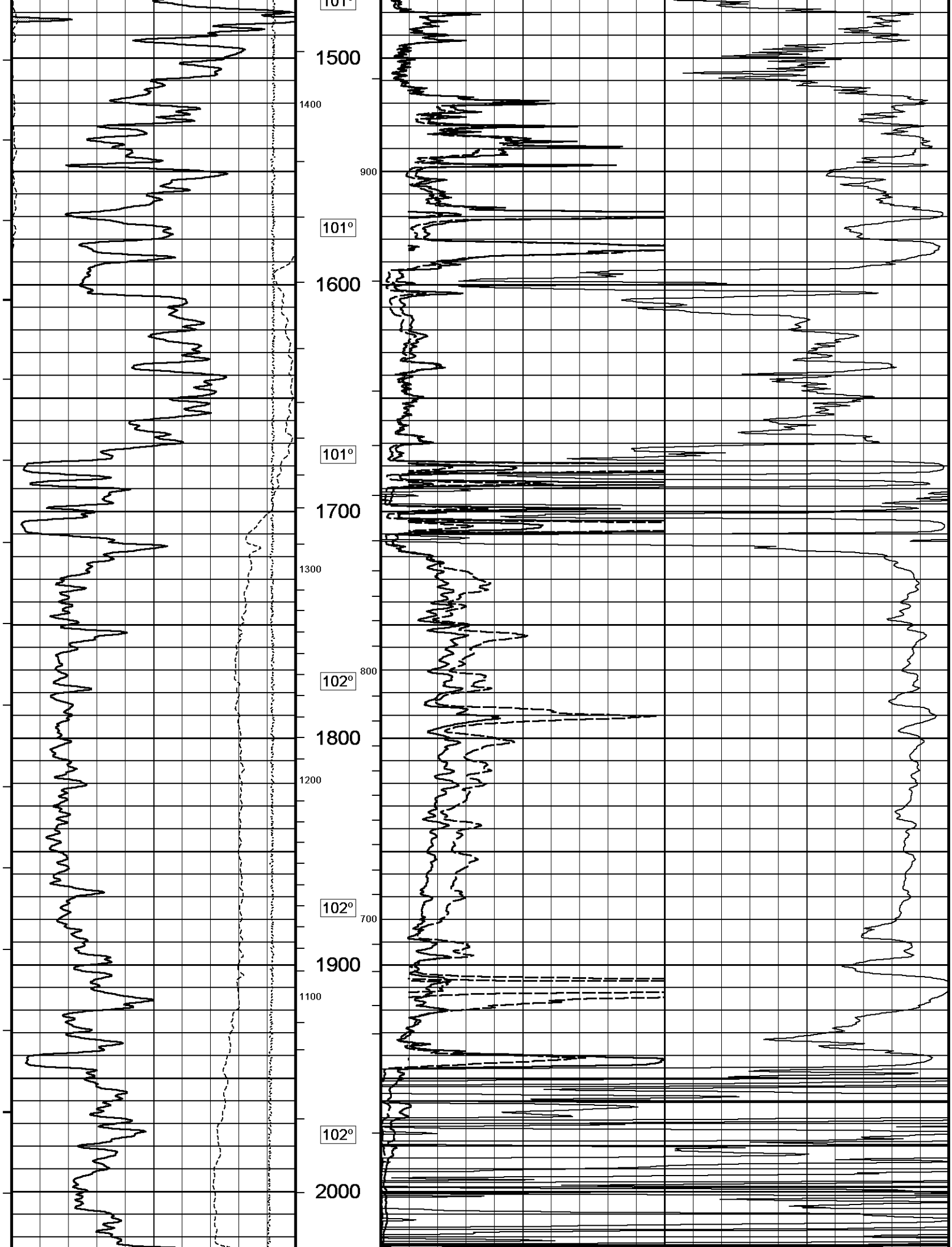
Filename: C:\Minimus 13.05.9583\Log\Shakespeare Ottley #4-16\Shakespeare Ottley #4-16 Main.dta — Recorded on 04-AUG-2013 19:03

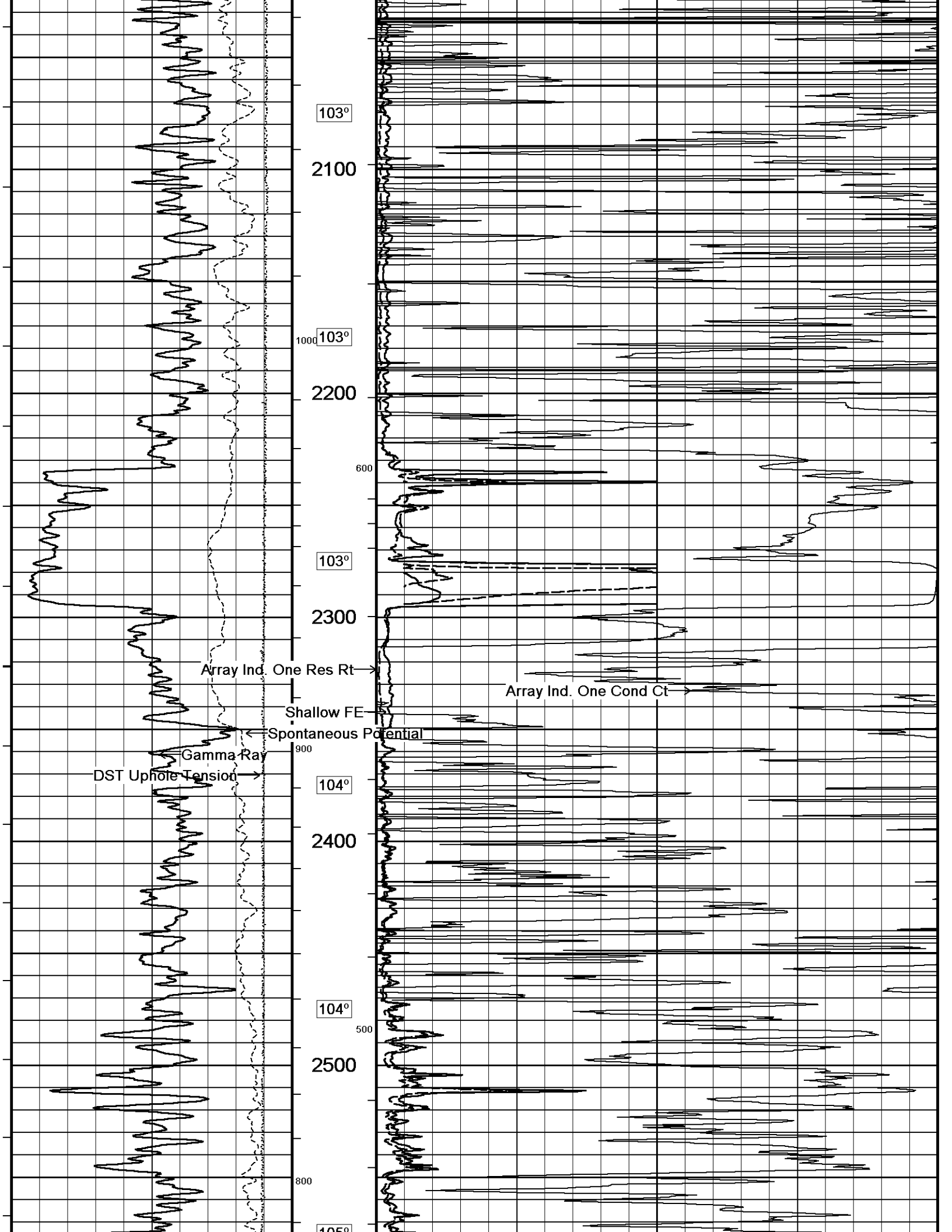
System Versions: Logged with 13.05.9583 Plotted with 13.05.9583

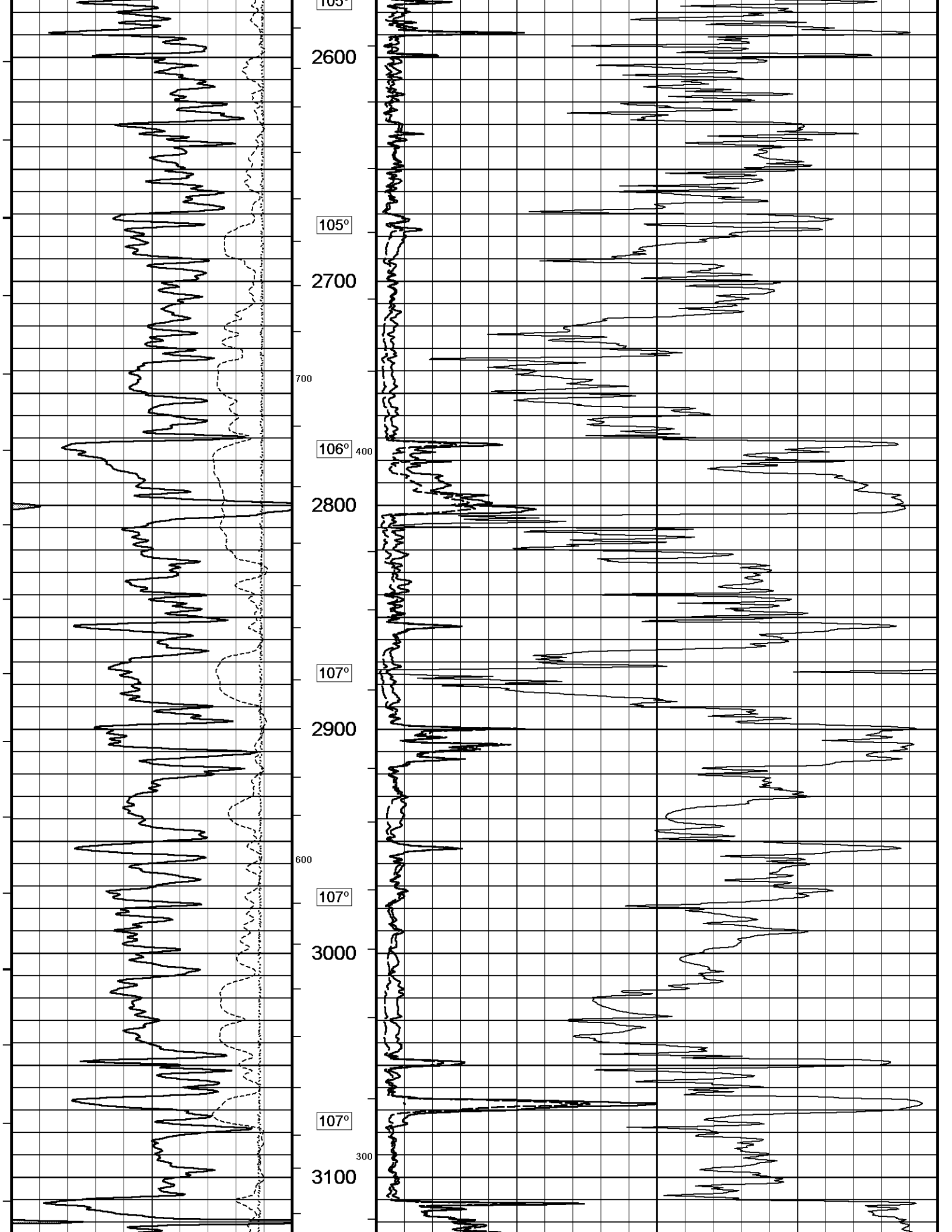


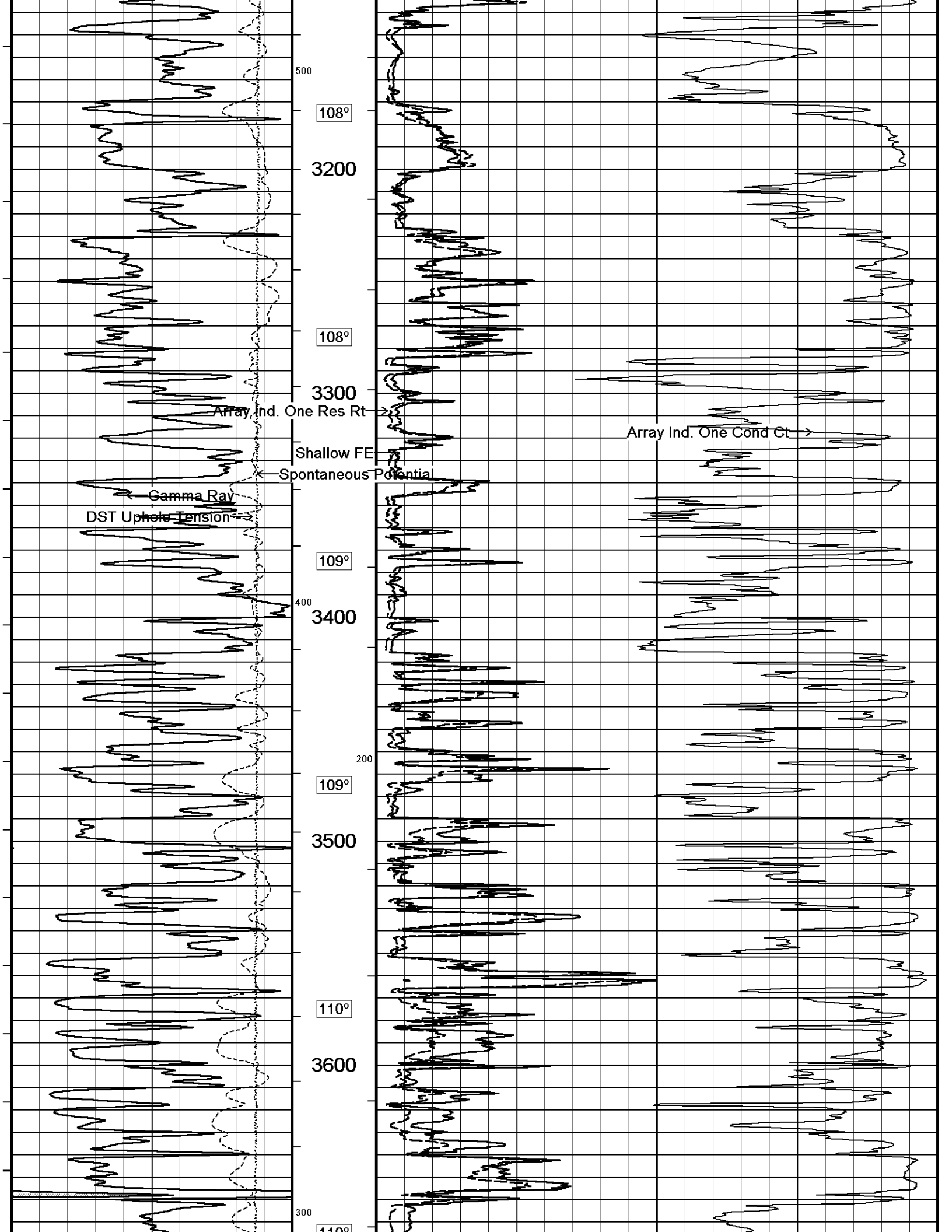

Spontaneous Potential
Gamma Ray
DST Uphole Tension
400
95°
500
1800
95°
600
96°
700
1100
97°
800
1700
97°
900

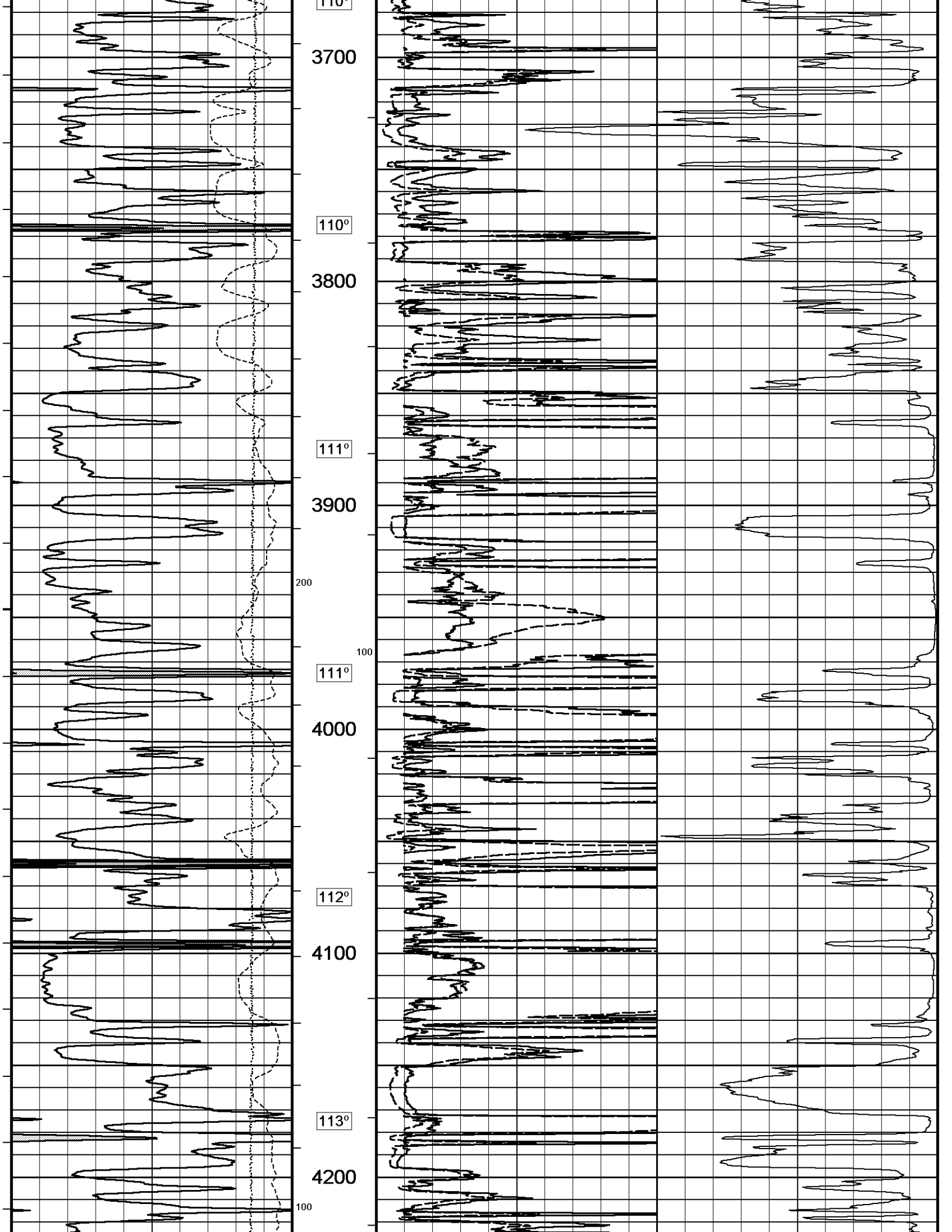

98°
1000
99°
1600
1100
99°
1200
1000
100°
1500
1300
Array Ind. One Res Rt
Array Ind. One Cond Ct
Shallow FE
Spontaneous Potential
100°
Gamma Ray
DST Uphole Tension
1400

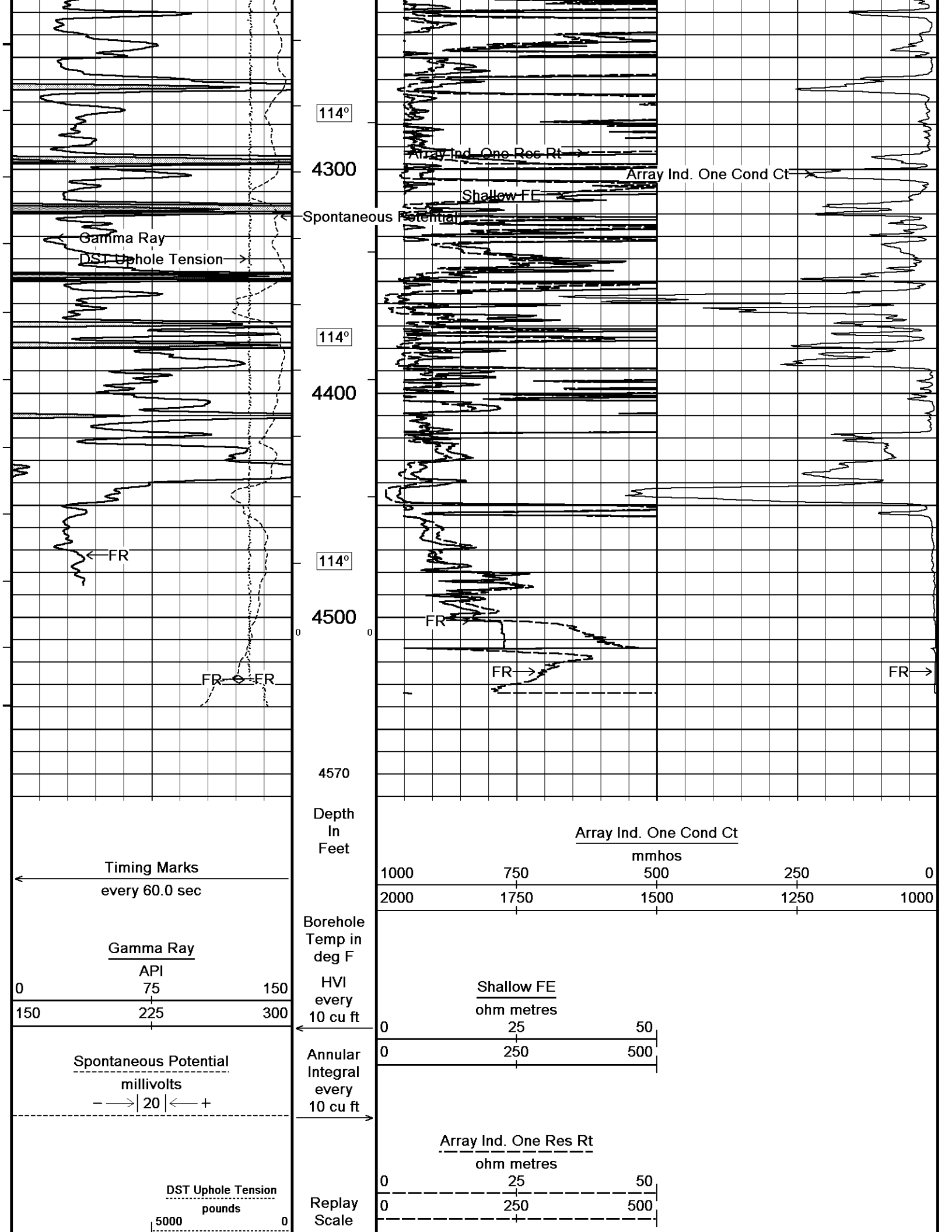

1500
1400
900
101°
1600
101°
1700
1300
102°
800
1800
1200
102°
700
1900
1100
102°
2000


103°
2100
1000
103°
2200
600
103°
2300
Array Ind. One Res Rt
Array Ind. One Cond Ct
Shallow FE
Spontaneous Potential
900
Gamma Ray
DST Uphole Tension
104°
2400
104°
500
2500
800
105°


105°
2600
105°
2700
700
106°
400
2800
107°
2900
600
107°
3000
107°
300
3100


500
108°
3200
108°
3300
Array Ind. One Res Rt
Shallow FE
Spontaneous Potential
Gamma Ray
DST Uphole Tension
Array Ind. One Cond Ct
109°
400
3400
200
109°
3500
110°
3600
300
110°


110°
3700
110°
3800
111°
3900
200
100
111°
4000
112°
4100
113°
4200
100


114°
4300
Array Ind. One Res Rt
Array Ind. One Cond Ct
Shallow FE
Spontaneous Potential
Gamma Ray
DST Uphole Tension
114°
4400
FR
114°
4500
FR
FR
FR
FR
4570
Depth In Feet
Timing Marks
every 60.0 sec
Array Ind. One Cond Ct
mmhos
1000 750 500 250 0
2000 1750 1500 1250 1000
Borehole Temp in deg F
Gamma Ray
API
0 75 150
150 225 300
HVI every 10 cu ft
Shallow FE
ohm metres
0 25 50
0 250 500
Annular Integral every 10 cu ft
Spontaneous Potential
millivolts
− 20 +
Array Ind. One Res Rt
ohm metres
0 25 50
0 250 500
DST Uphole Tension
pounds
5000 0
Replay Scale

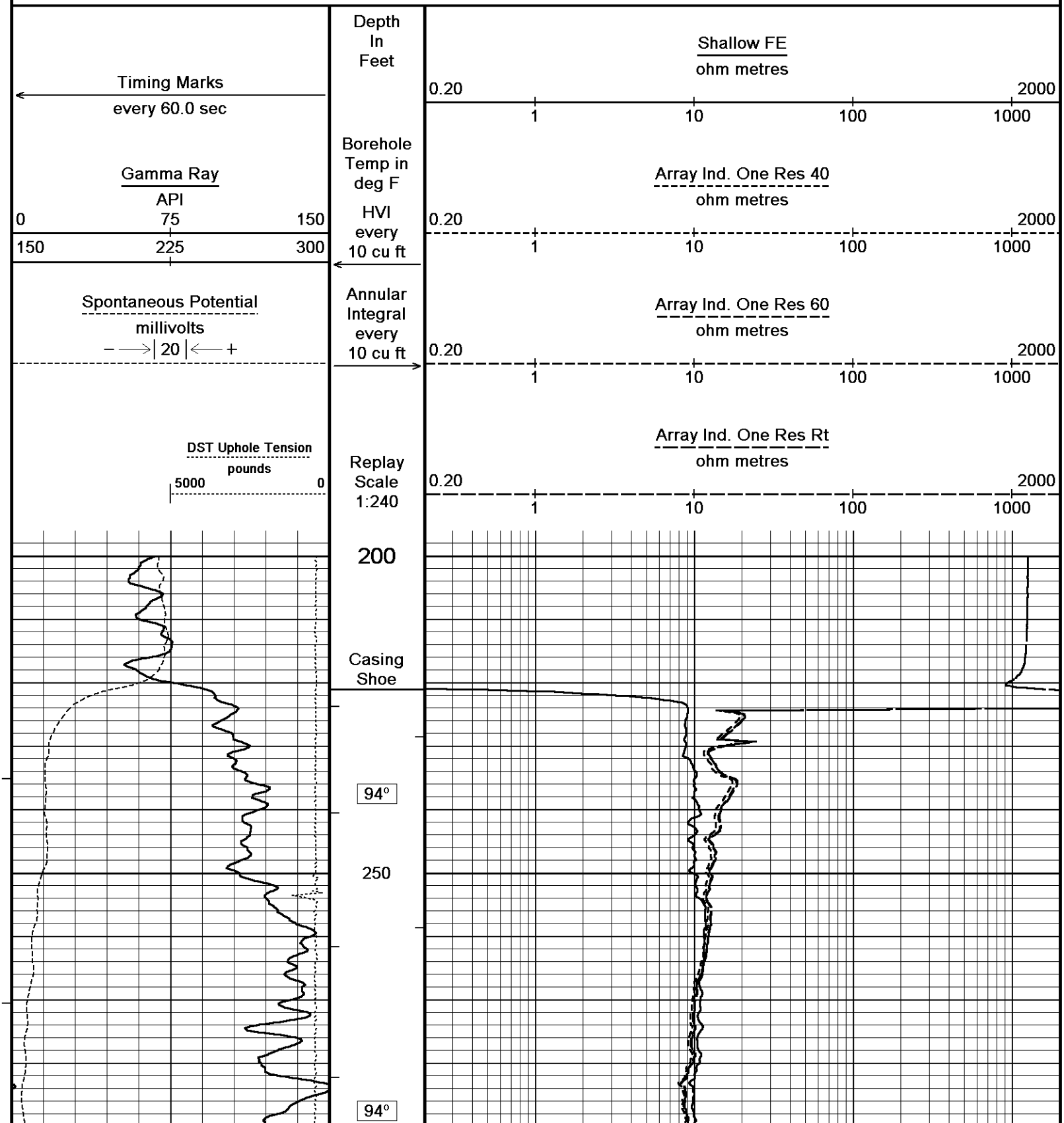
1:600

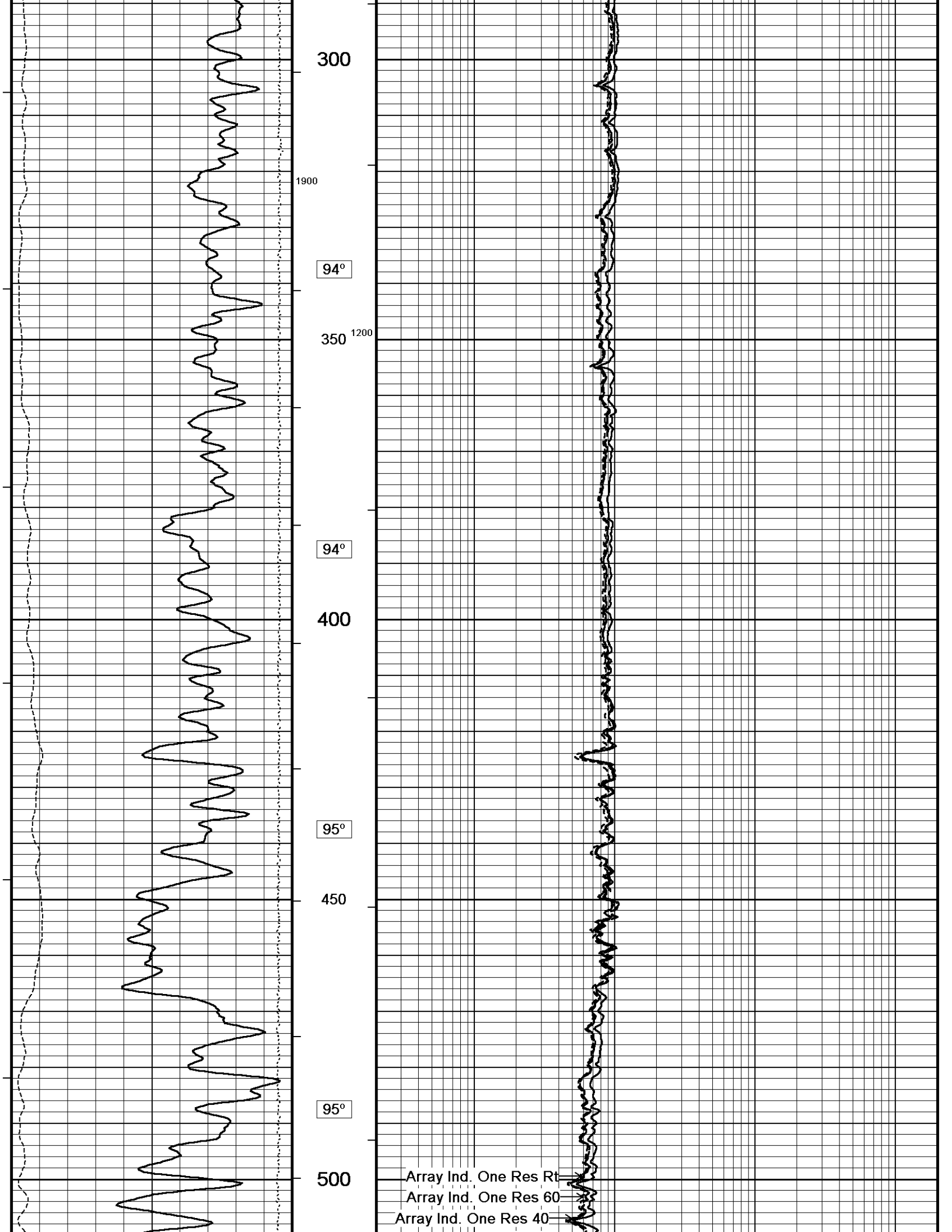
Depth Based Data - Maximum Sampling Increment 10.0cm
Plotted on 04-AUG-2013 21:51
Filename: C:\Minimus 13.05.9583\Log\Shakespeare Ottley #4-16\Shakespeare Ottley #4-16 Main.dta
Recorded on 04-AUG-2013 19:03
System Versions: Logged with 13.05.9583 Plotted with 13.05.9583

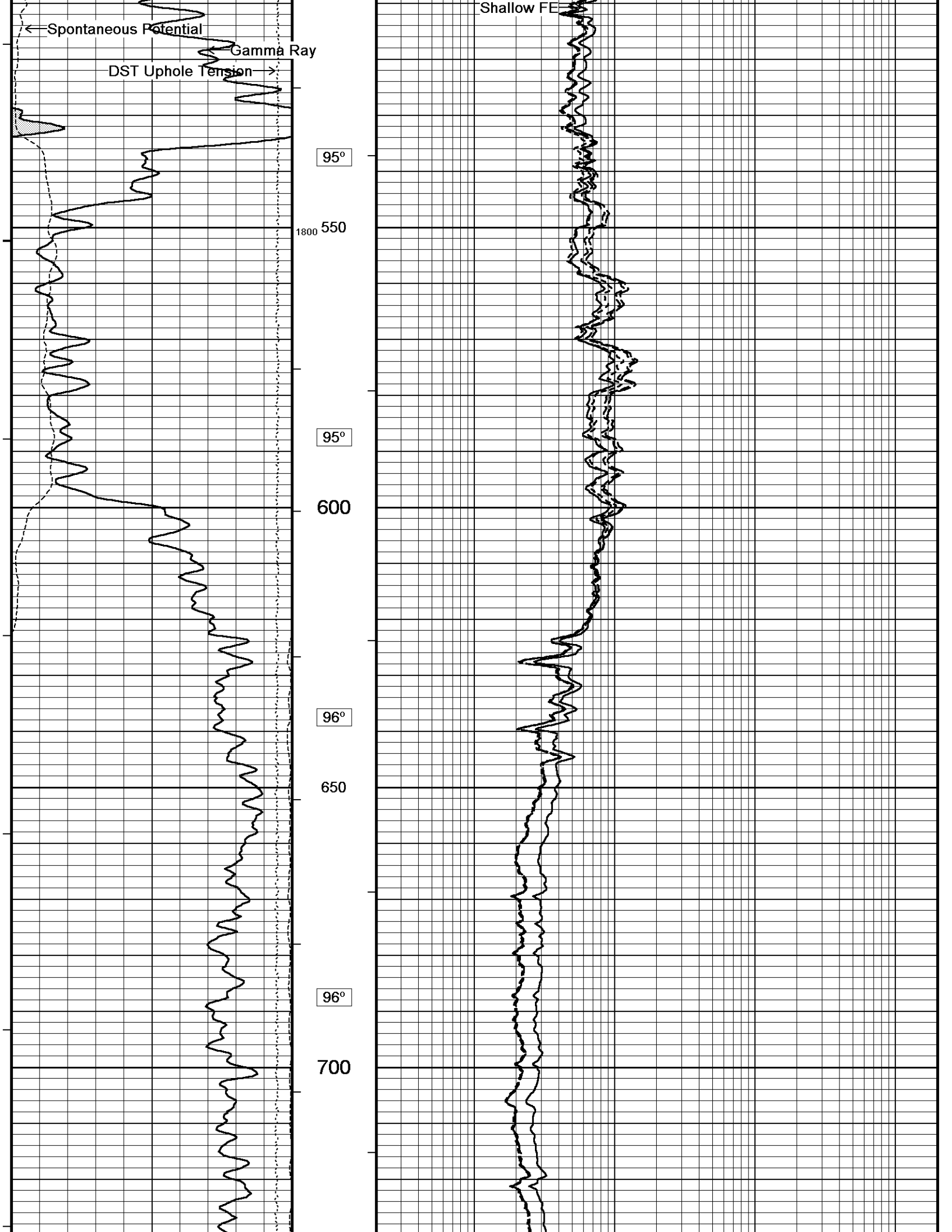
2 INCH MAIN

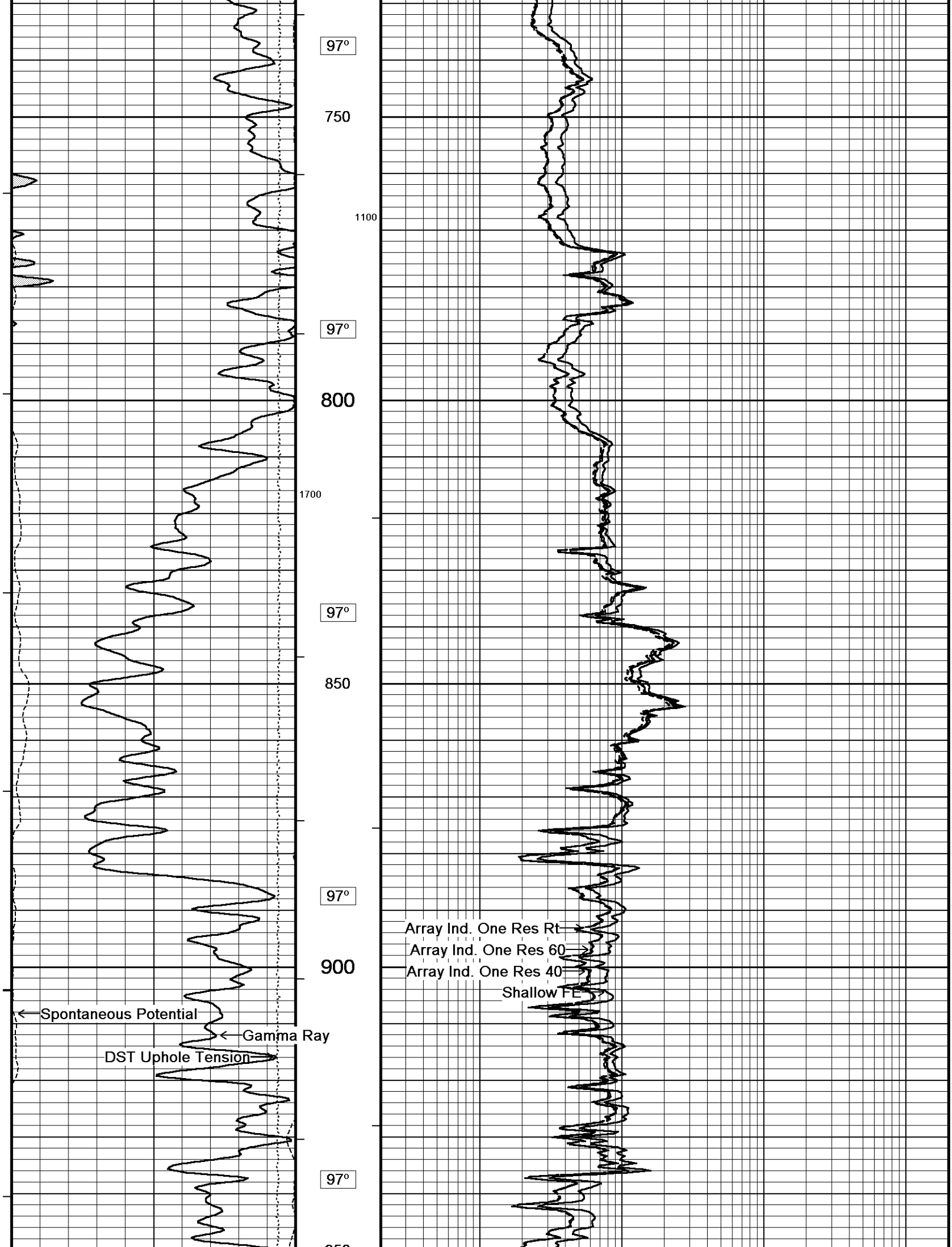
5 INCH MAIN

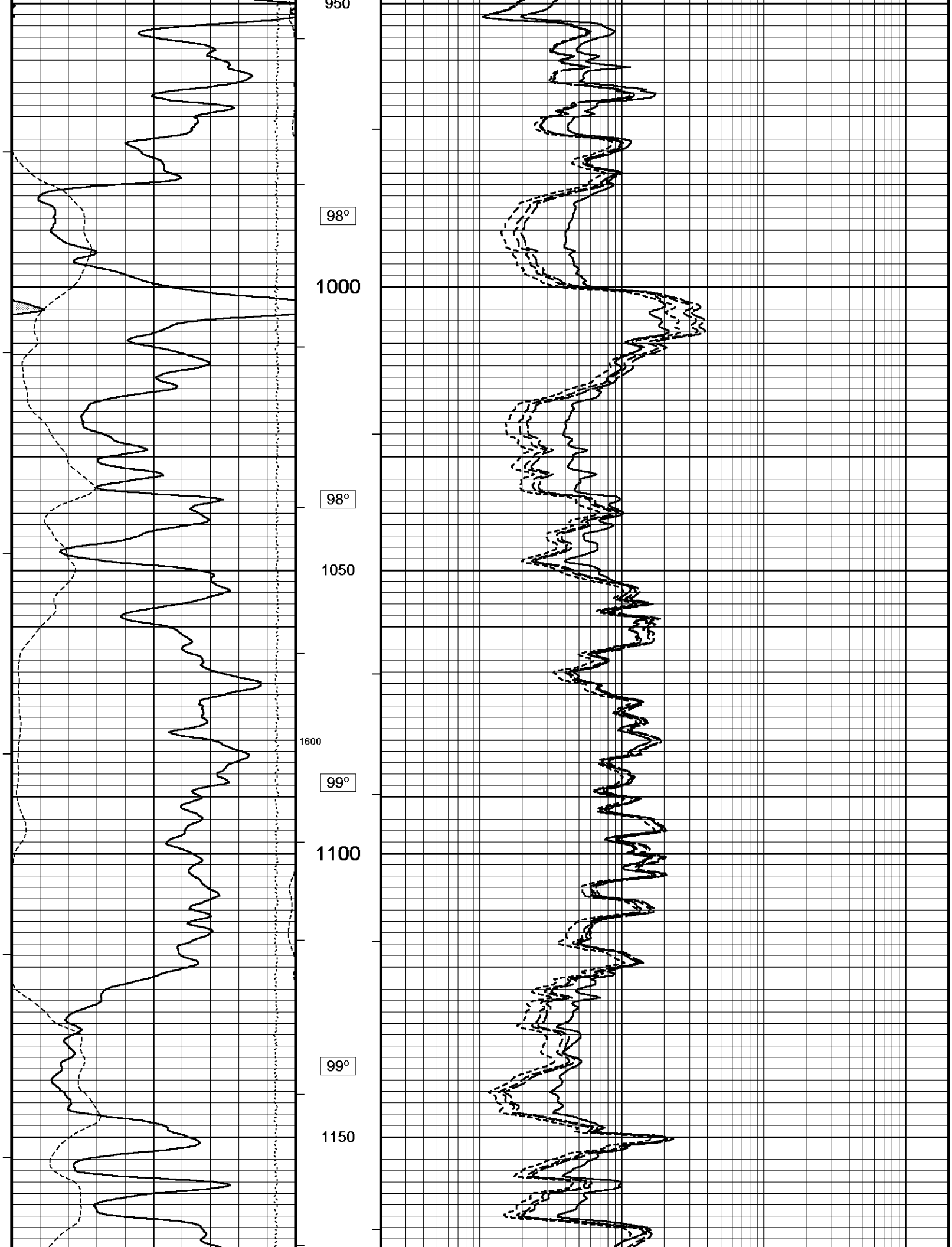
Depth Based Data - Maximum Sampling Increment 10.0cm
Plotted on 04-AUG-2013 21:51
Filename: C:\Minimus 13.05.9583\Log\Shakespeare Ottley #4-16\Shakespeare Ottley #4-16 Main.dta
Recorded on 04-AUG-2013 19:03
System Versions: Logged with 13.05.9583 Plotted with 13.05.9583

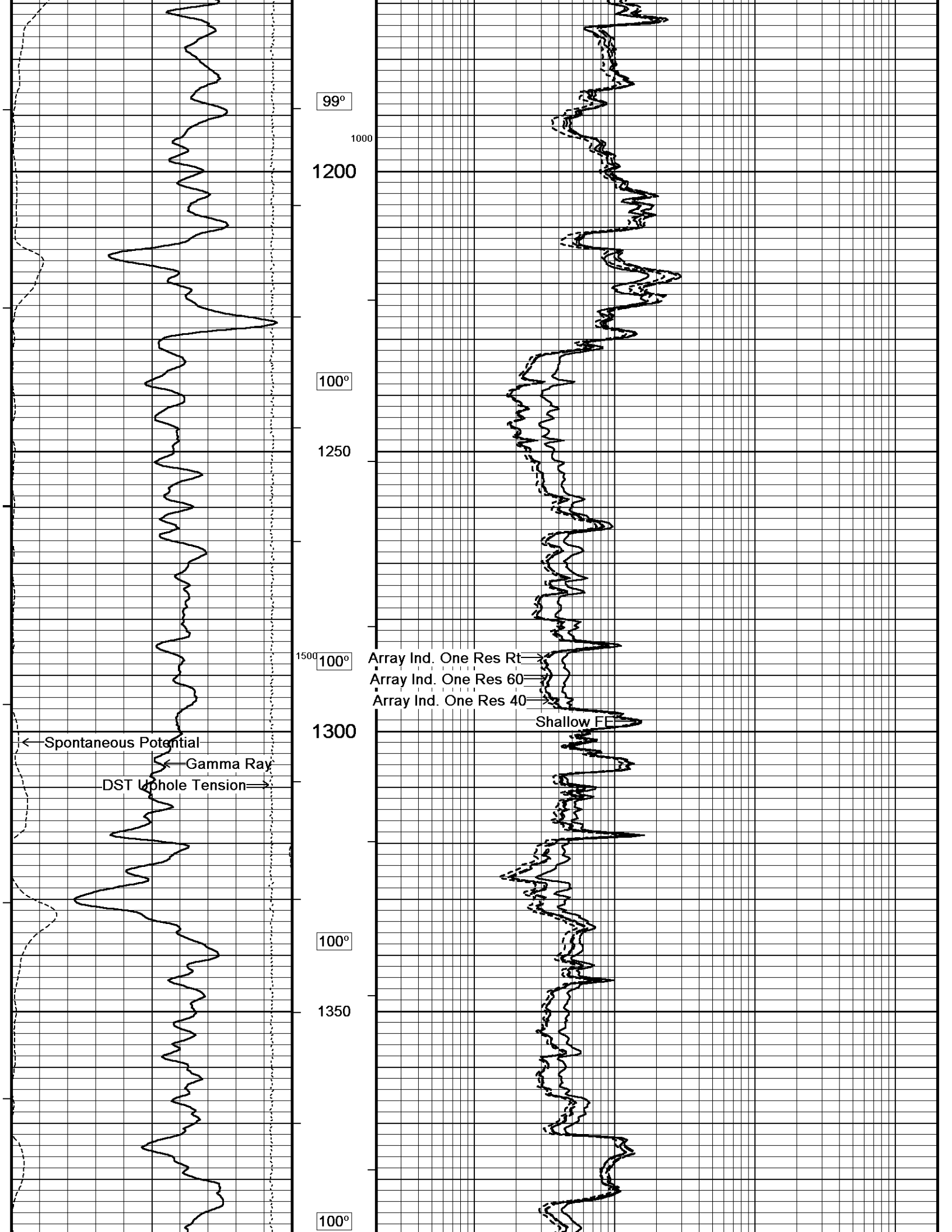


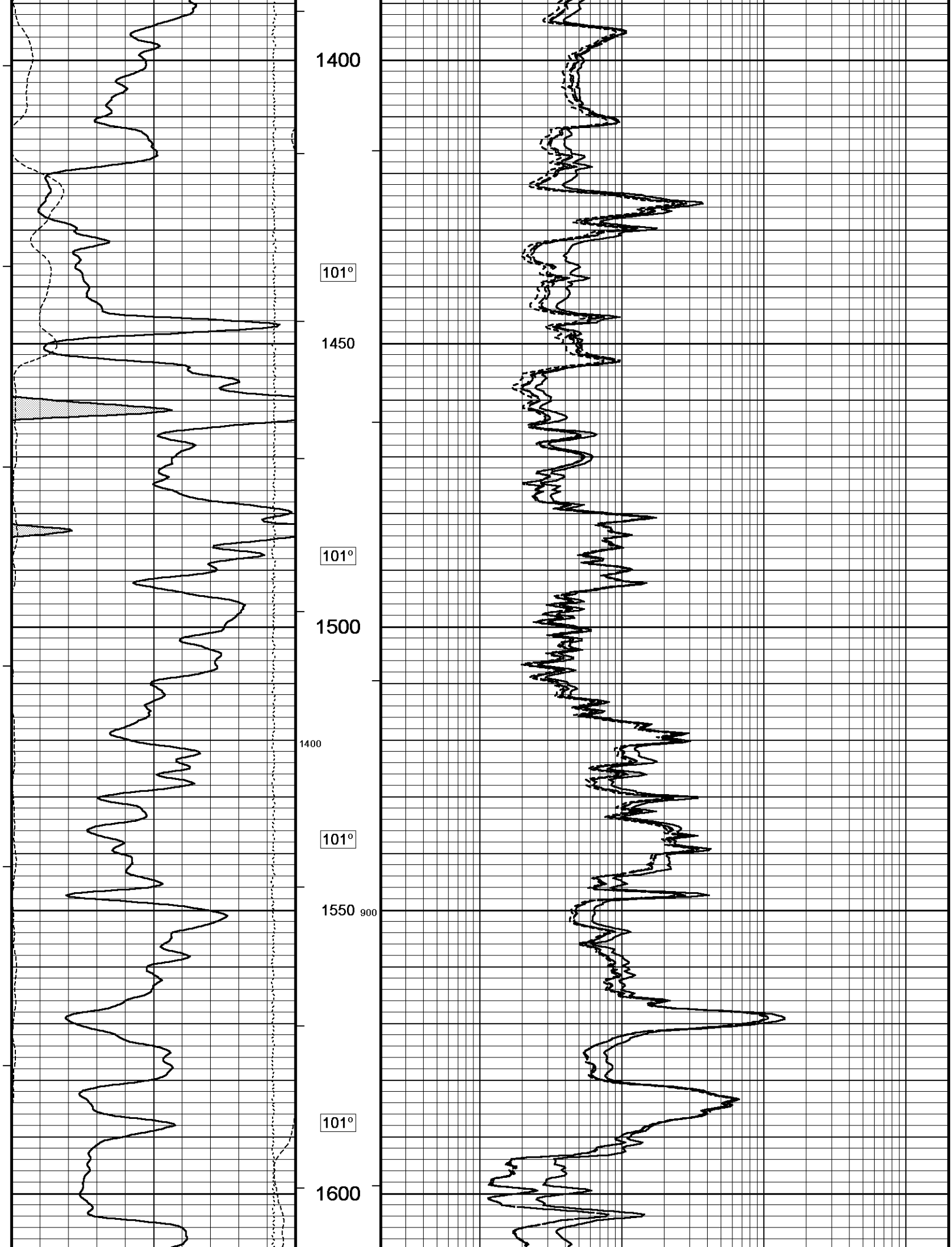

300
1900
94°
350
1200
94°
400
95°
450
95°
500
Array Ind. One Res Rt
Array Ind. One Res 60
Array Ind. One Res 40

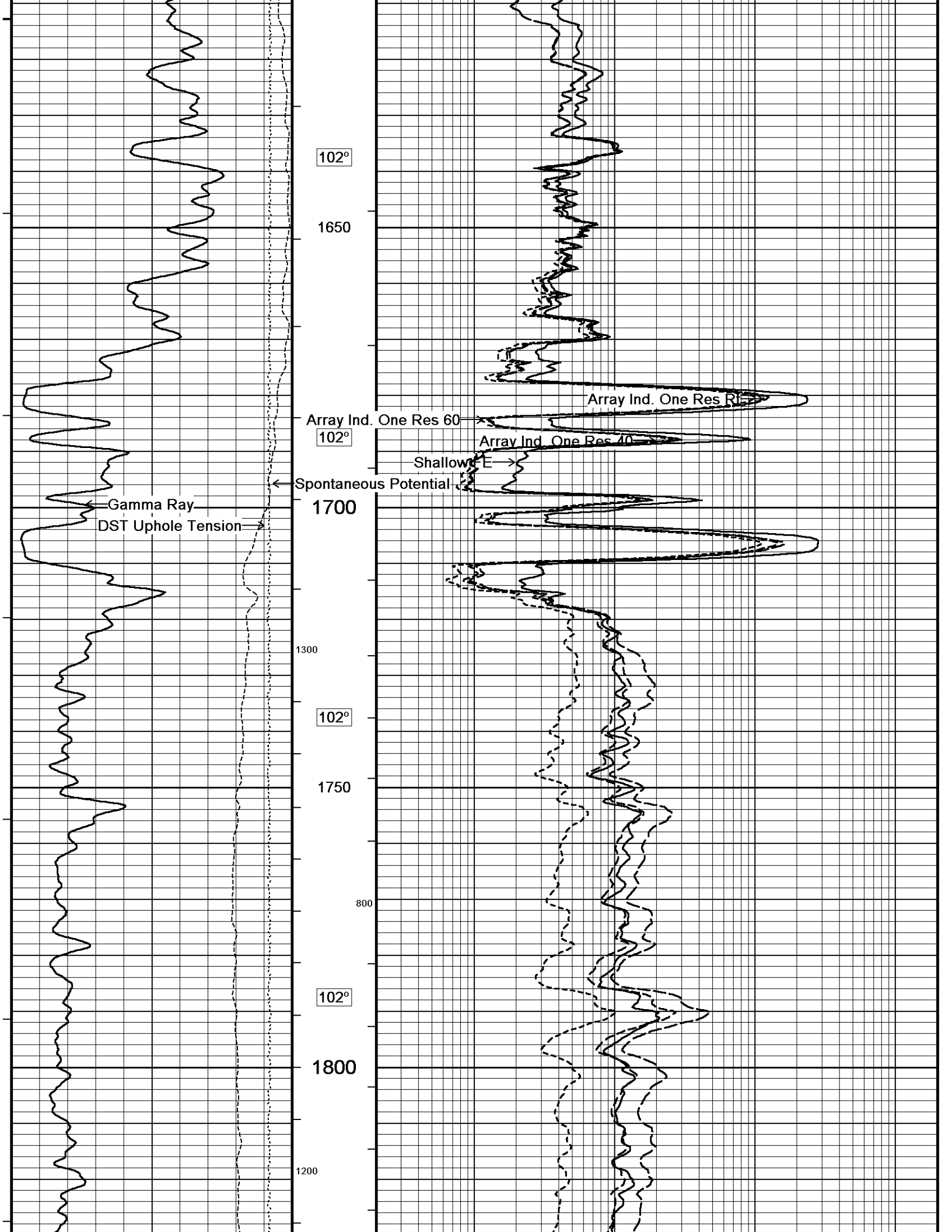

Spontaneous Potential
Gamma Ray
DST Uphole Tension
Shallow FE
95°
1800 550
95°
600
96°
650
96°
700

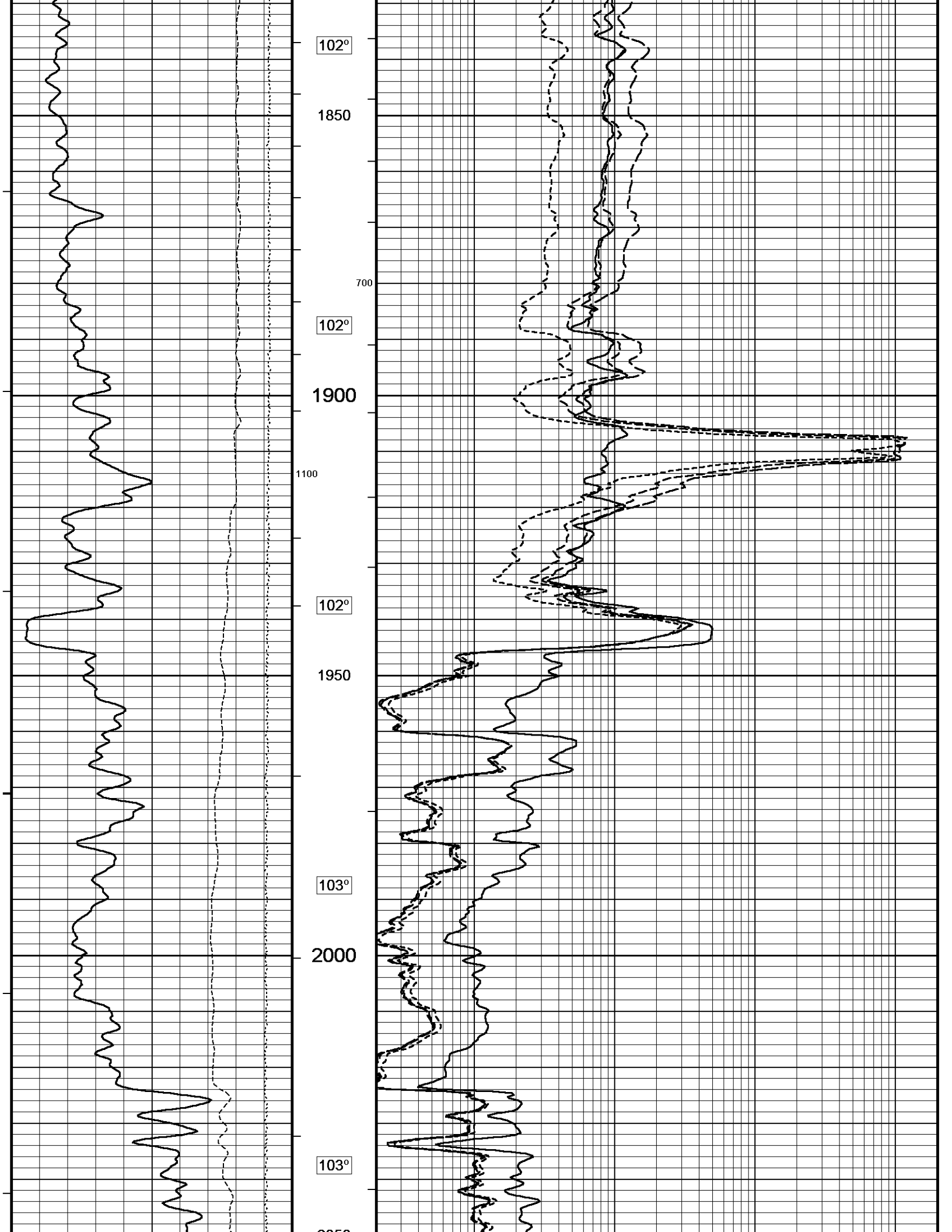

97°
750
1100
97°
800
1700
97°
850
97°
900
97°
Array Ind. One Res Rt
Array Ind. One Res 60
Array Ind. One Res 40
Shallow FE
Spontaneous Potential
Gamma Ray
DST Uphole Tension

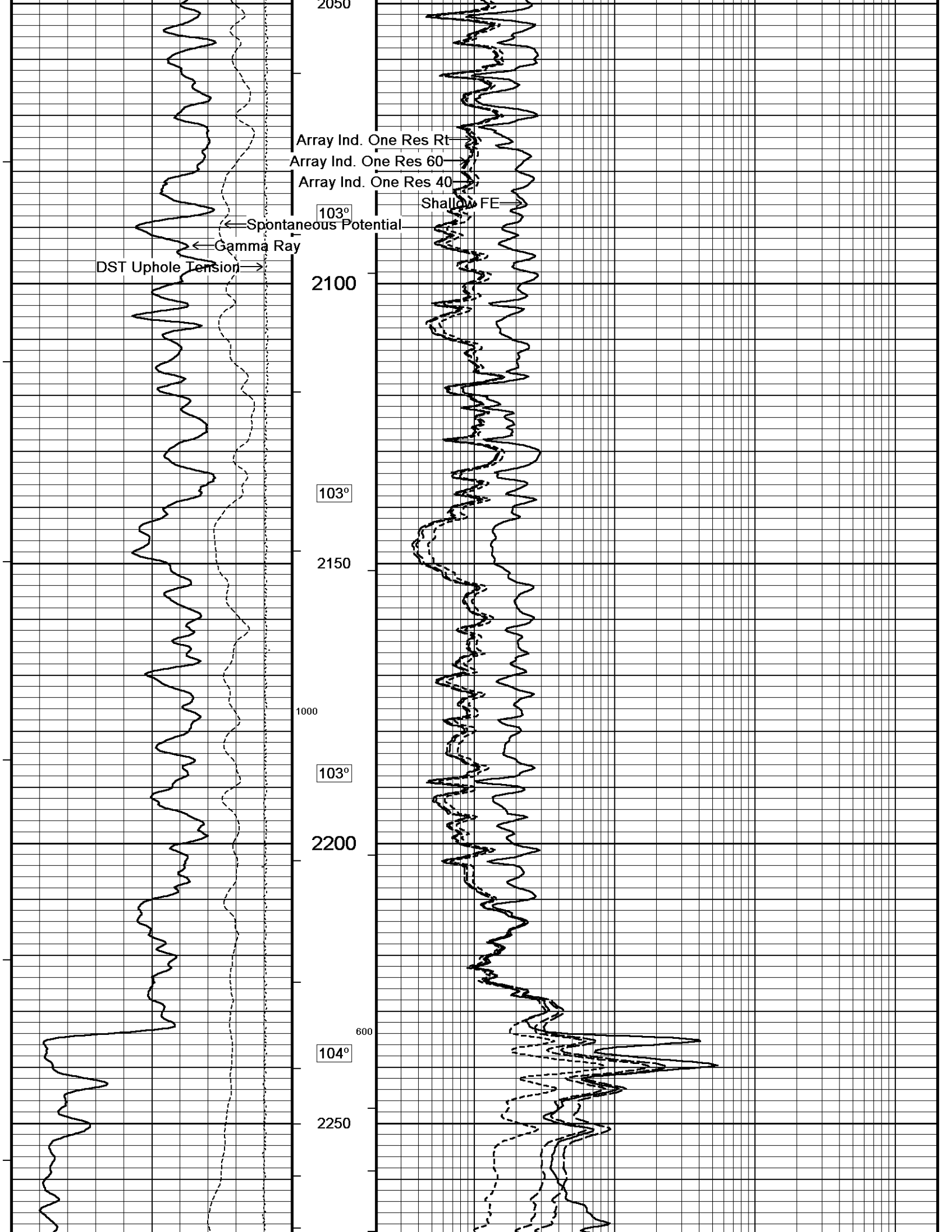

950
98°
1000
98°
1050
1600
99°
1100
99°
1150

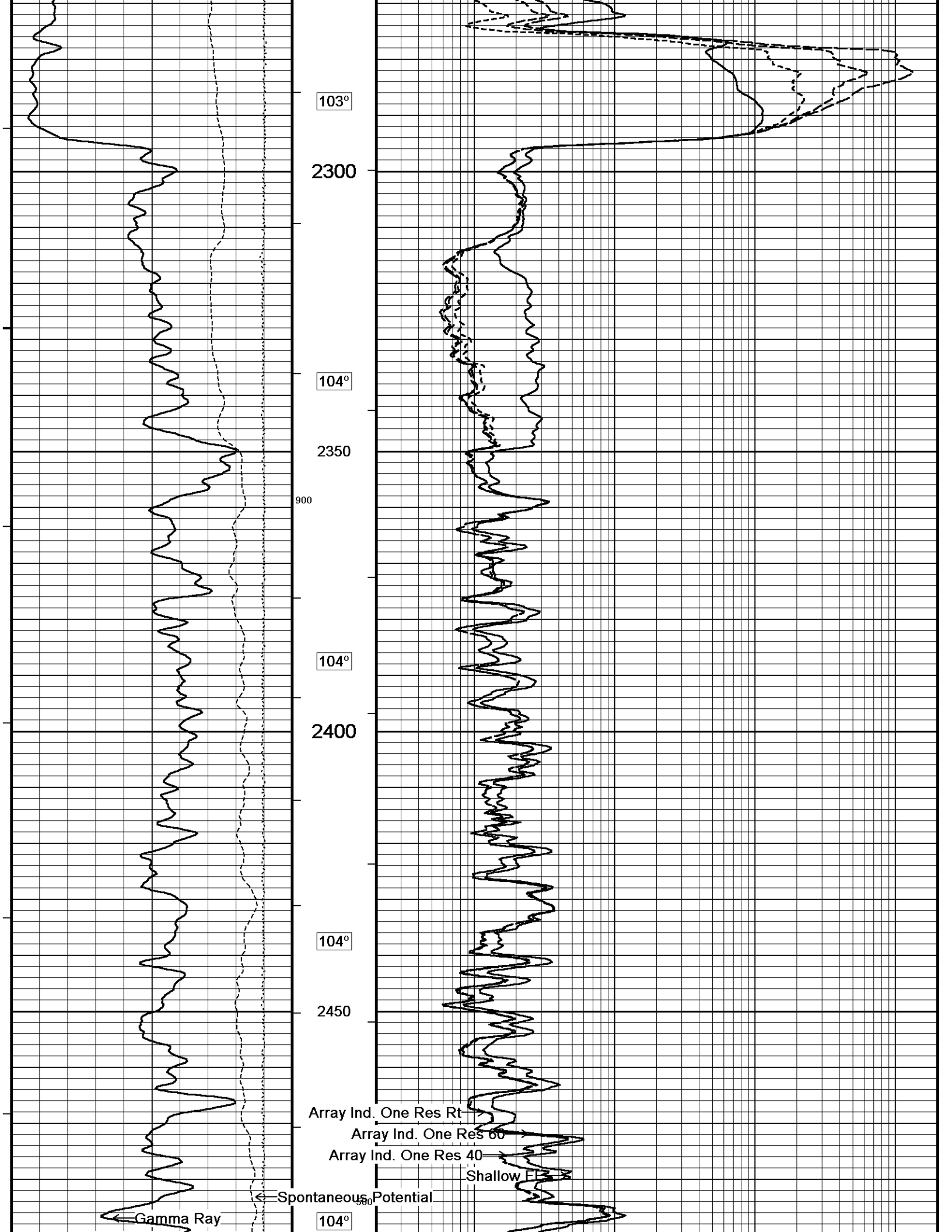

99°
1000
1200
100°
1250
1500
100°
Array Ind. One Res Rt
Array Ind. One Res 60
Array Ind. One Res 40
Shallow FE
1300
Spontaneous Potential
Gamma Ray
DST Uphole Tension
100°
1350
100°

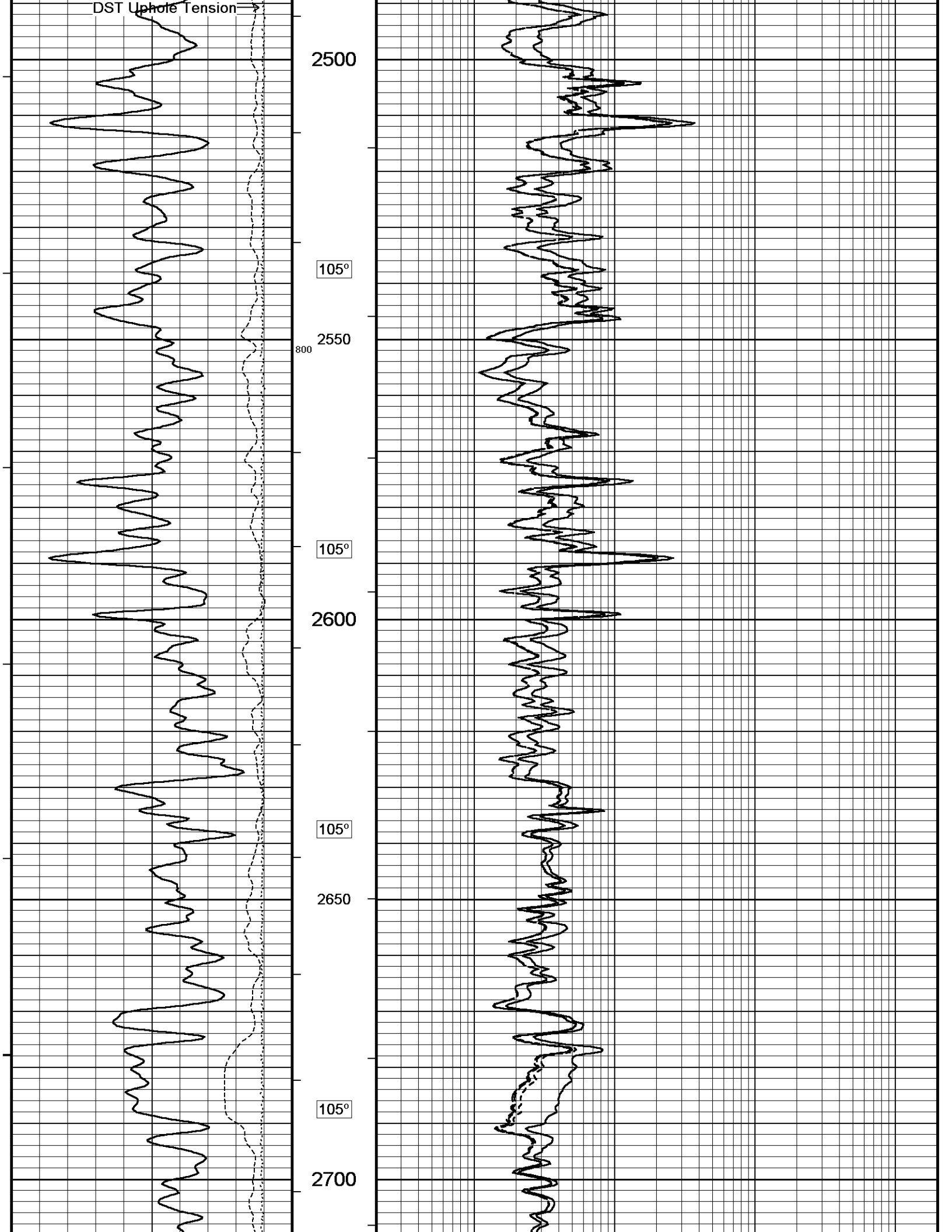

1400
101°
1450
101°
1500
1400
101°
1550
900
101°
1600

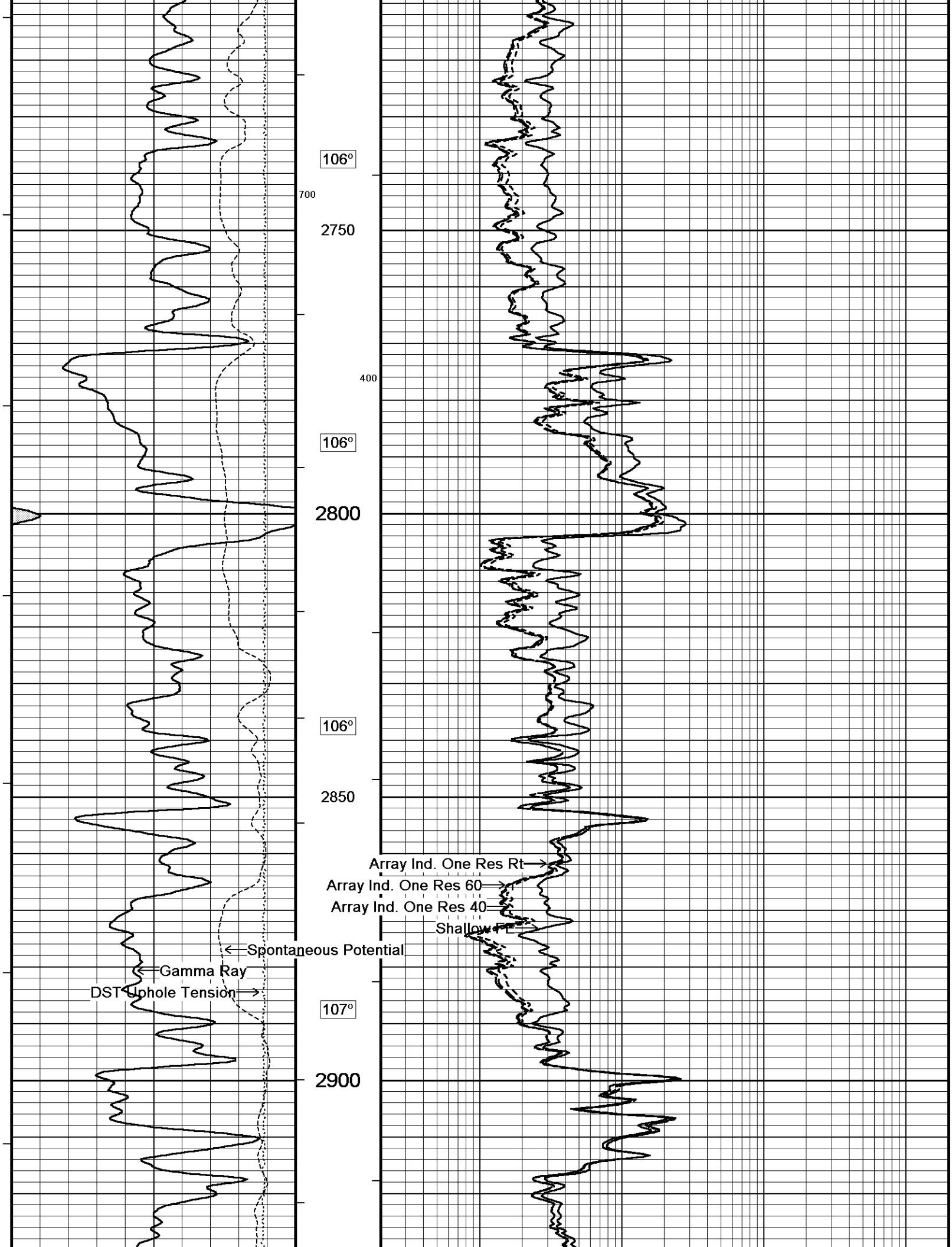

Array Ind. One Res RT
Array Ind. One Res 60
Array Ind. One Res 40
Shallow LL
Spontaneous Potential
Gamma Ray
DST Uphole Tension
102°
1650
102°
1700
1300
102°
1750
800
102°
1800
1200

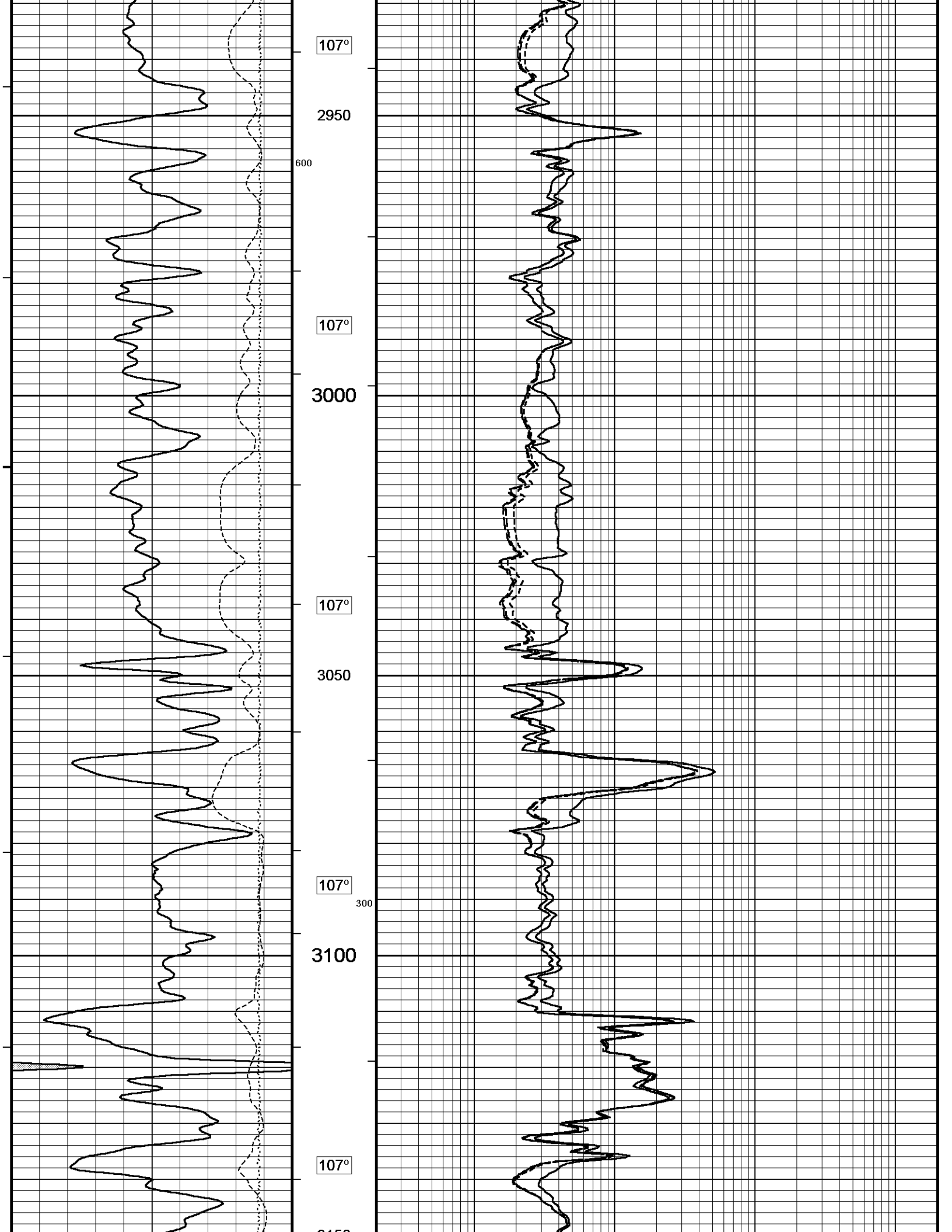

102°
1850
700
102°
1900
1100
102°
1950
103°
2000
103°

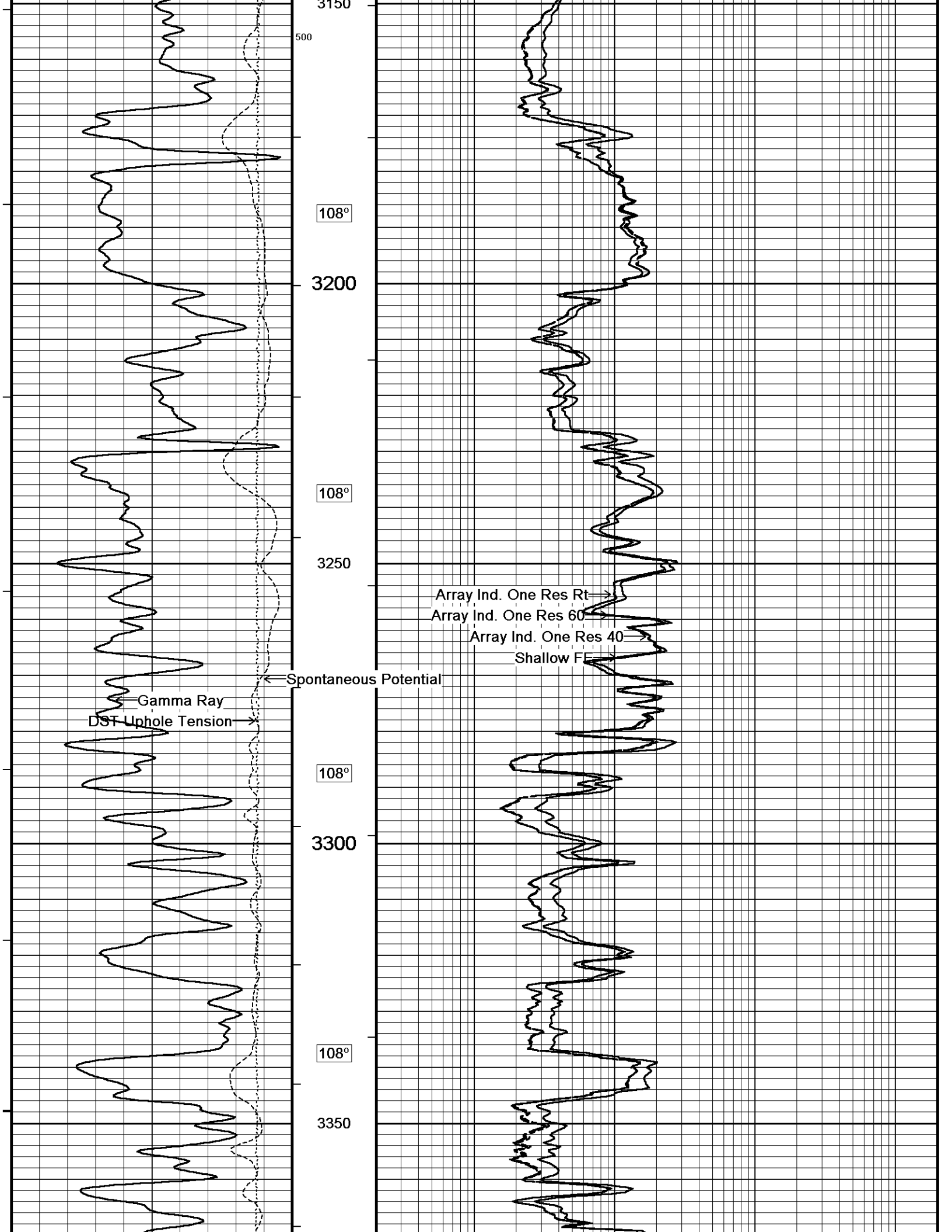

2050
Array Ind. One Res Rt
Array Ind. One Res 60
Array Ind. One Res 40
Shallow FE
103°
Spontaneous Potential
Gamma Ray
DST Uphole Tension
2100
103°
2150
1000
103°
2200
600
104°
2250

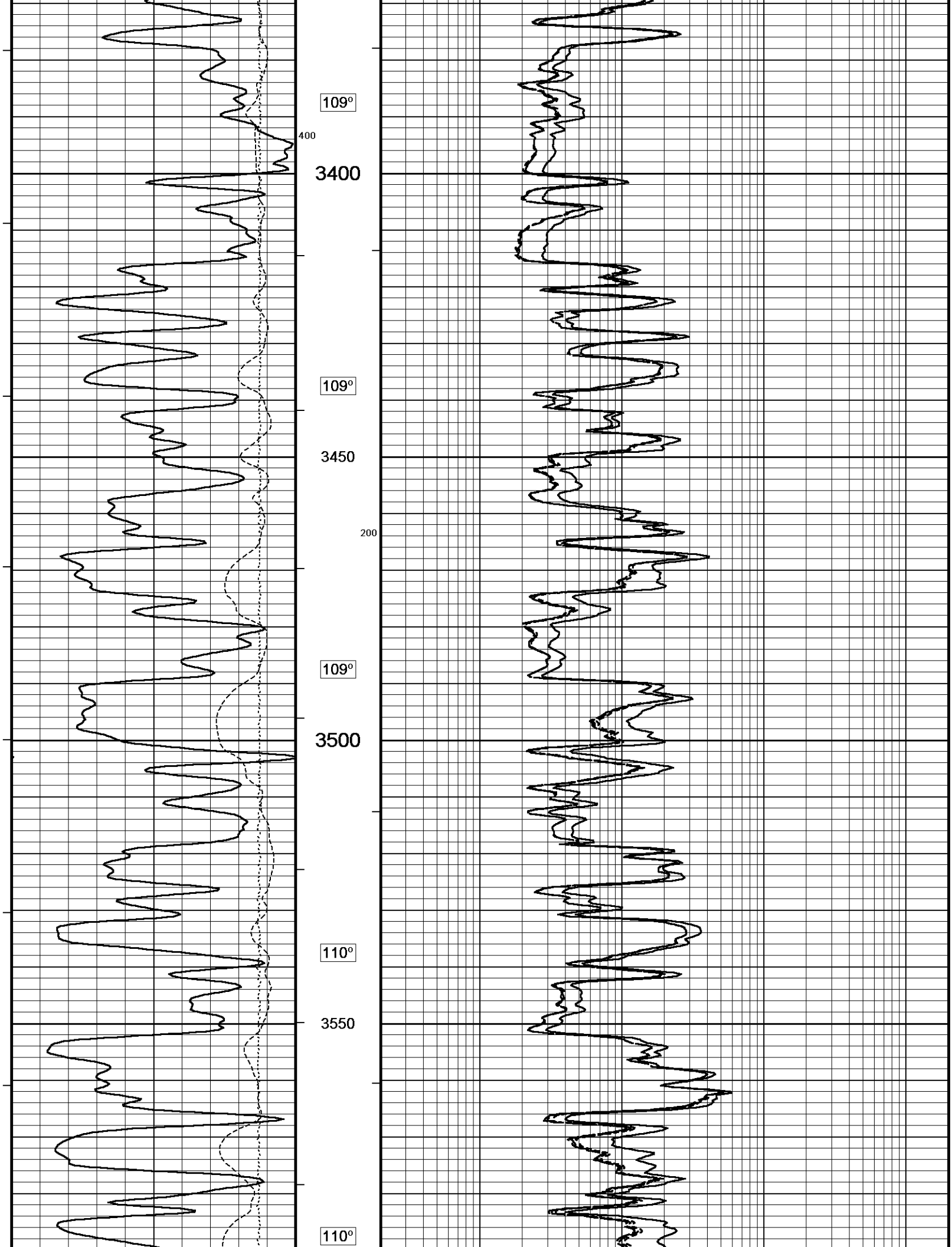

103°
2300
104°
2350
900
104°
2400
104°
2450
Array Ind. One Res Rt
Array Ind. One Res 60
Array Ind. One Res 40
Shallow Ft
Spontaneous Potential
500
Gamma Ray
104°

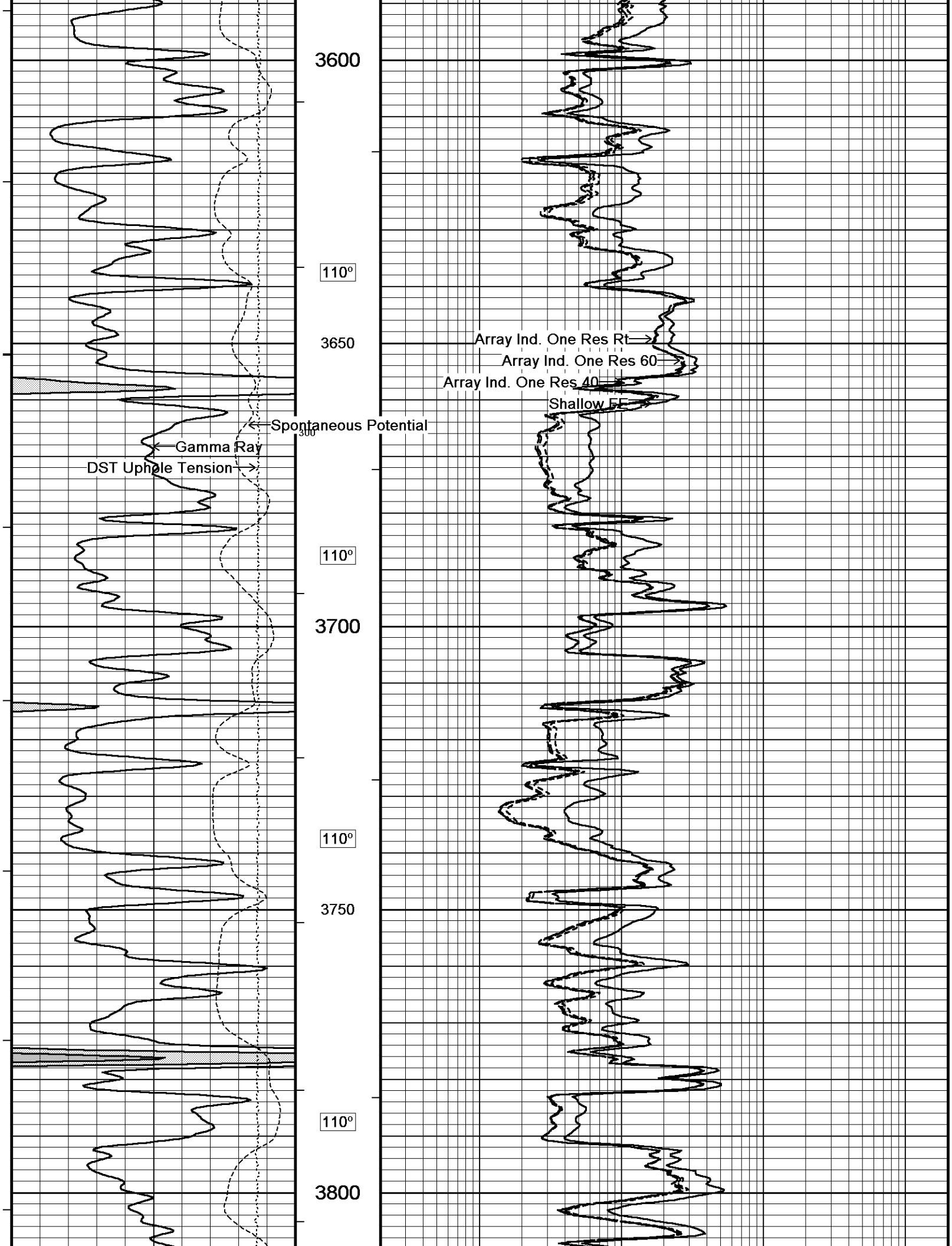

DST Uphole Tension
2500
105°
800
2550
105°
2600
105°
2650
105°
2700

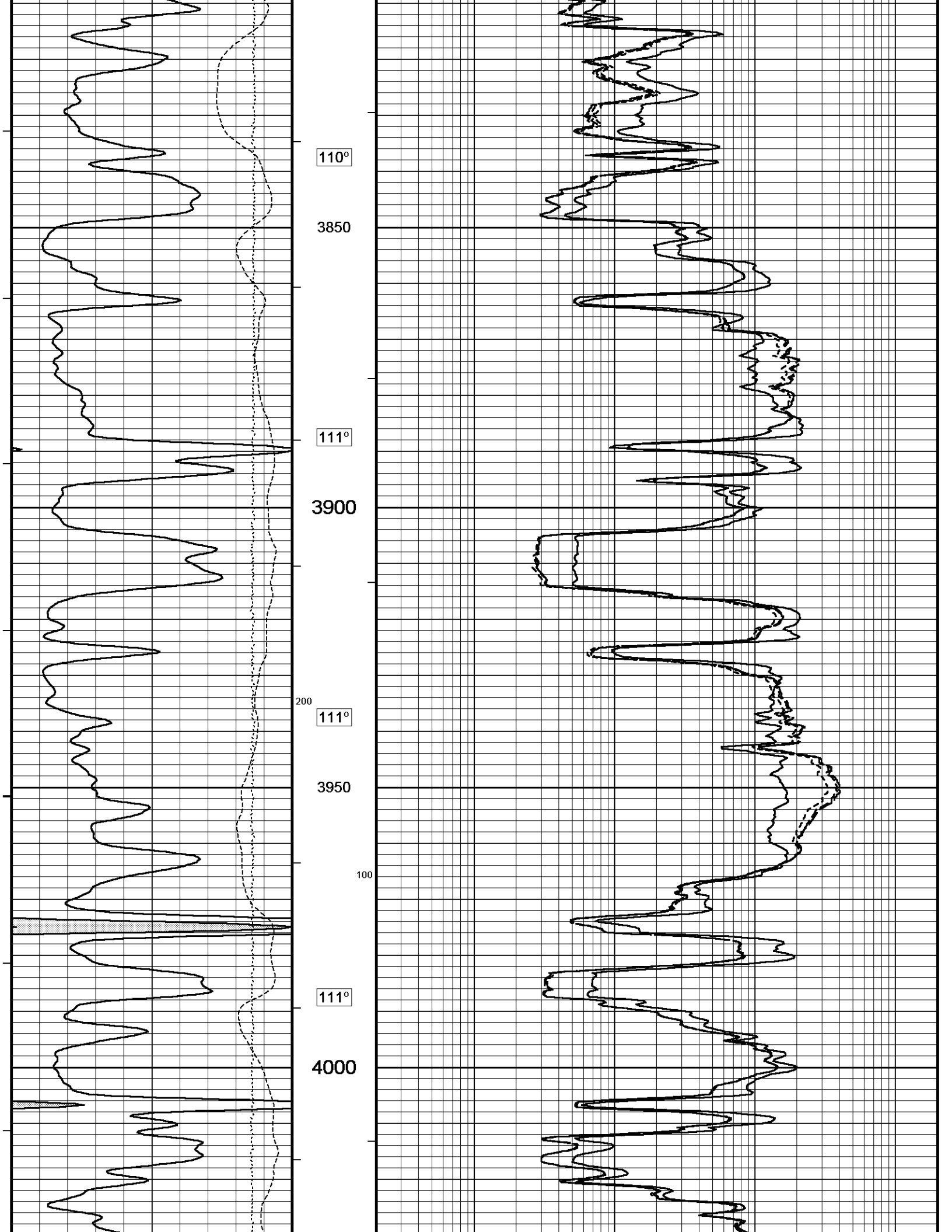

106°
700
2750
400
106°
2800
106°
2850
Array Ind. One Res Rt
Array Ind. One Res 60
Array Ind. One Res 40
Shallow FE
Spontaneous Potential
Gamma Ray
DST Uphole Tension
107°
2900

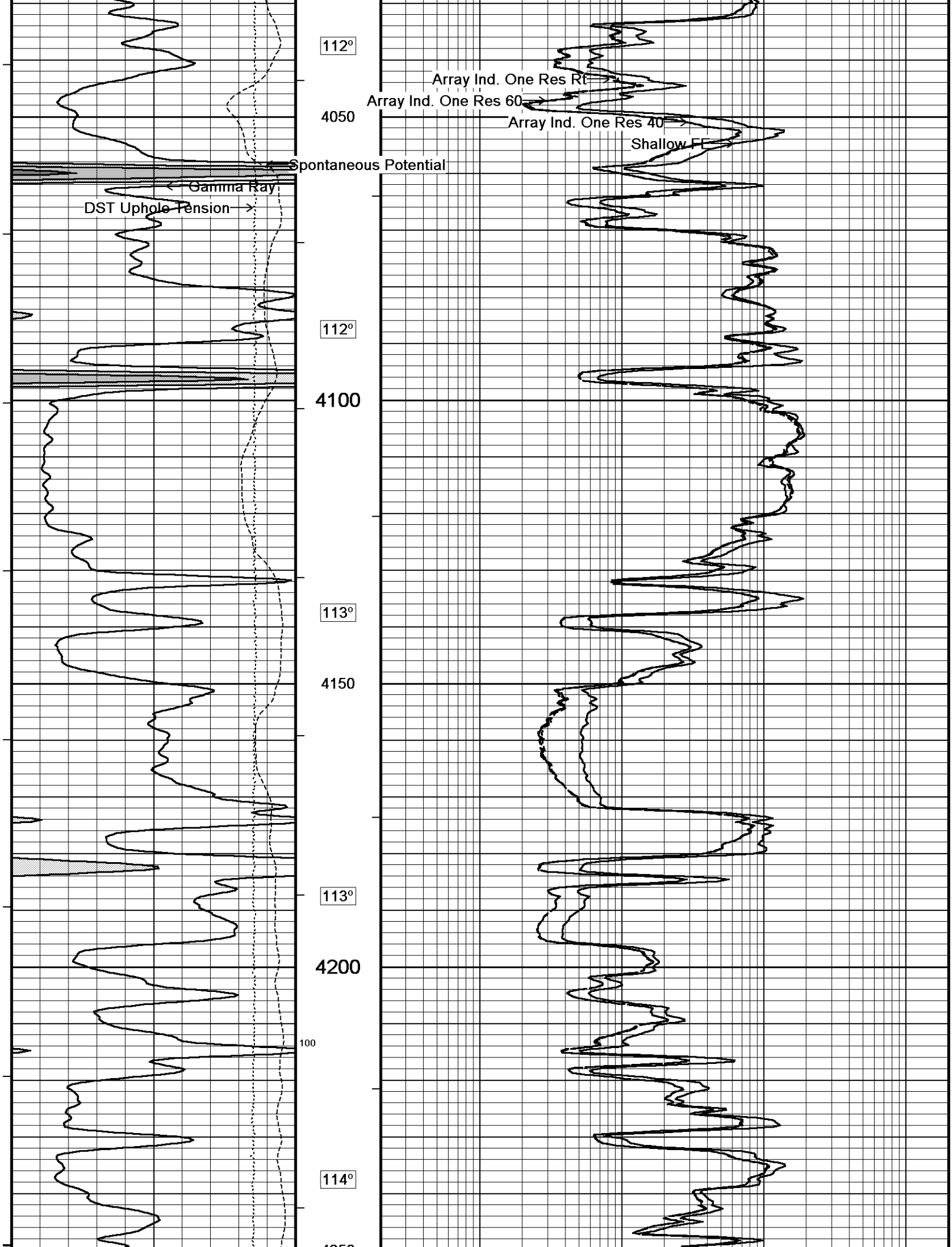

107°
2950
600
107°
3000
107°
3050
107°
300
3100
107°

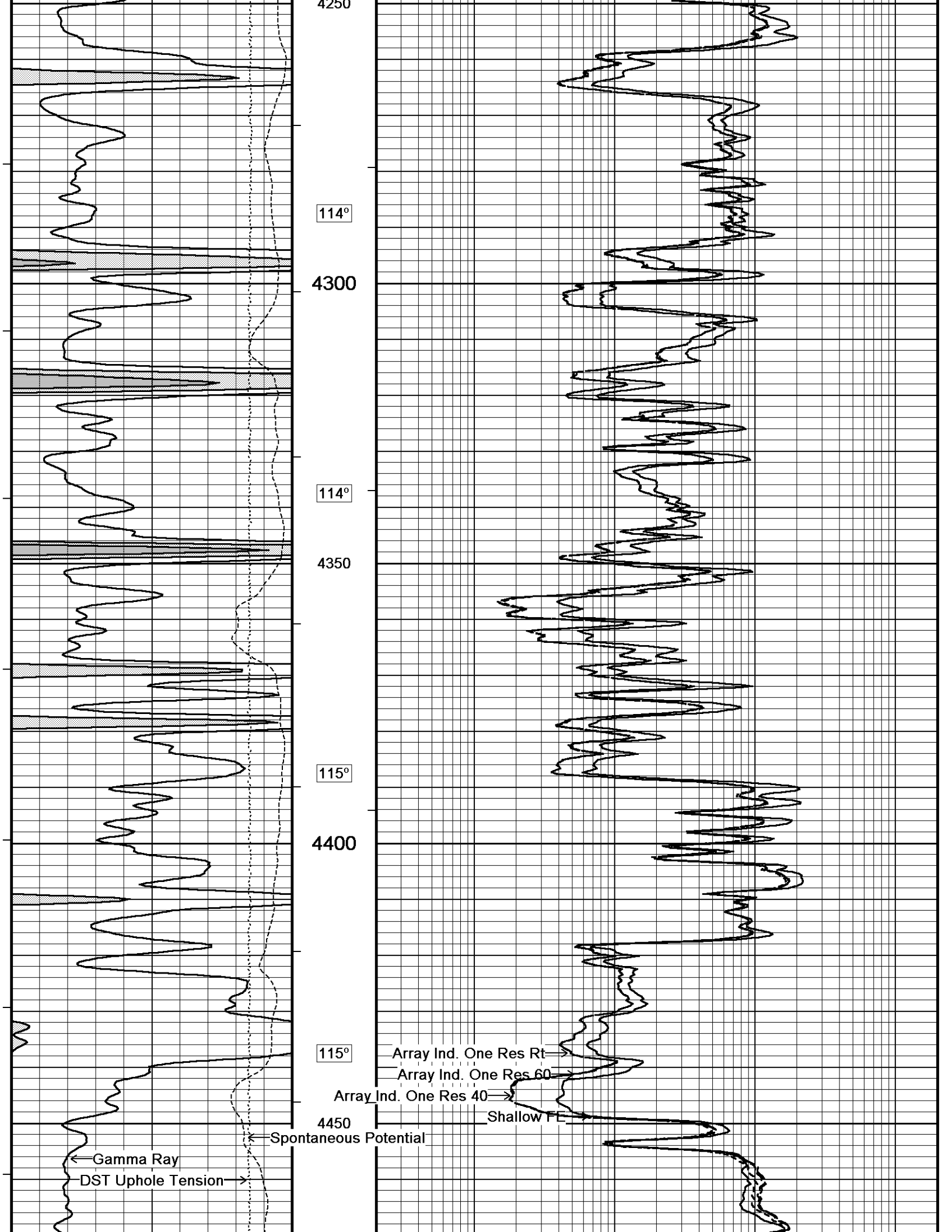

3150
500
108°
3200
108°
3250
Array Ind. One Res Rt
Array Ind. One Res 60
Array Ind. One Res 40
Shallow FE
Spontaneous Potential
Gamma Ray
DST Uphole Tension
108°
3300
108°
3350

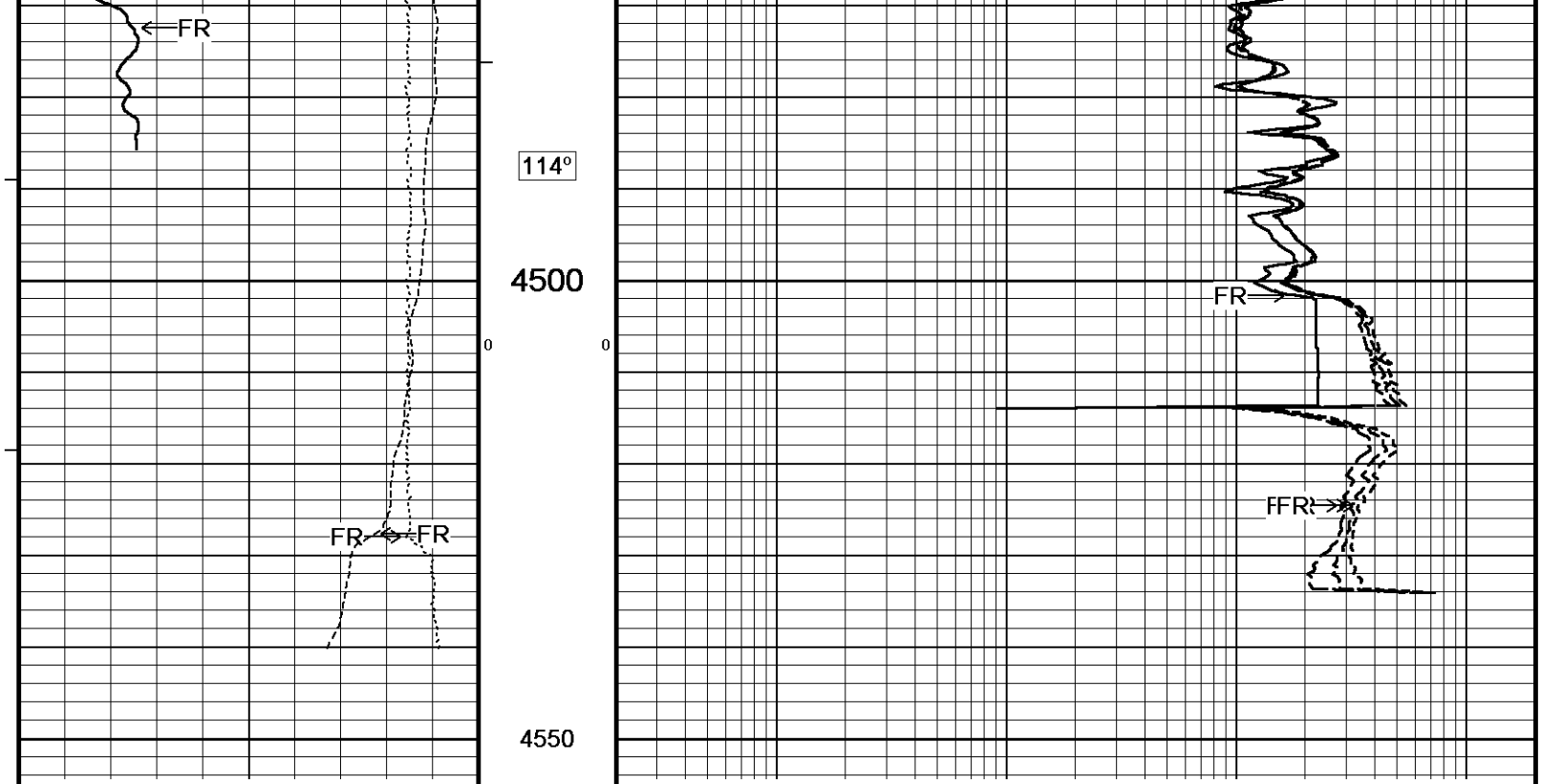

109°
400
3400
109°
3450
200
109°
3500
110°
3550
110°


3600
110°
3650
Array Ind. One Res Rt
Array Ind. One Res 60
Array Ind. One Res 40
Shallow FE
Spontaneous Potential
300
Gamma Ray
DST Uphole Tension
110°
3700
110°
3750
110°
3800


110°
3850
111°
3900
200
111°
3950
100
111°
4000


112°
Array Ind. One Res Rt
Array Ind. One Res 60
4050
Array Ind. One Res 40
Shallow FE
Spontaneous Potential
Gamma Ray
DST Uphole Tension
112°
4100
113°
4150
113°
4200
100
114°


4250
114°
4300
114°
4350
115°
4400
115°
4450
Array Ind. One Res Rt
Array Ind. One Res 60
Array Ind. One Res 40
Shallow FE
Spontaneous Potential
Gamma Ray
DST Uphole Tension



Depth In Feet

Timing Marks
every 60.0 sec

Gamma Ray
API
0 75 150
150 225 300

Spontaneous Potential
millivolts
− 20 +

DST Uphole Tension
pounds
5000 0

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

Depth Based Data - Maximum Sampling Increment 10.0cm
Plotted on 04-AUG-2013 21:51
Filename: C:\Minimus 13.05.9583\Log\Shakespeare Ottley #4-16\Shakespeare Ottley #4-16 Main.dta
Recorded on 04-AUG-2013 19:03
System Versions: Logged with 13.05.9583 Plotted with 13.05.9583

5 INCH MAIN

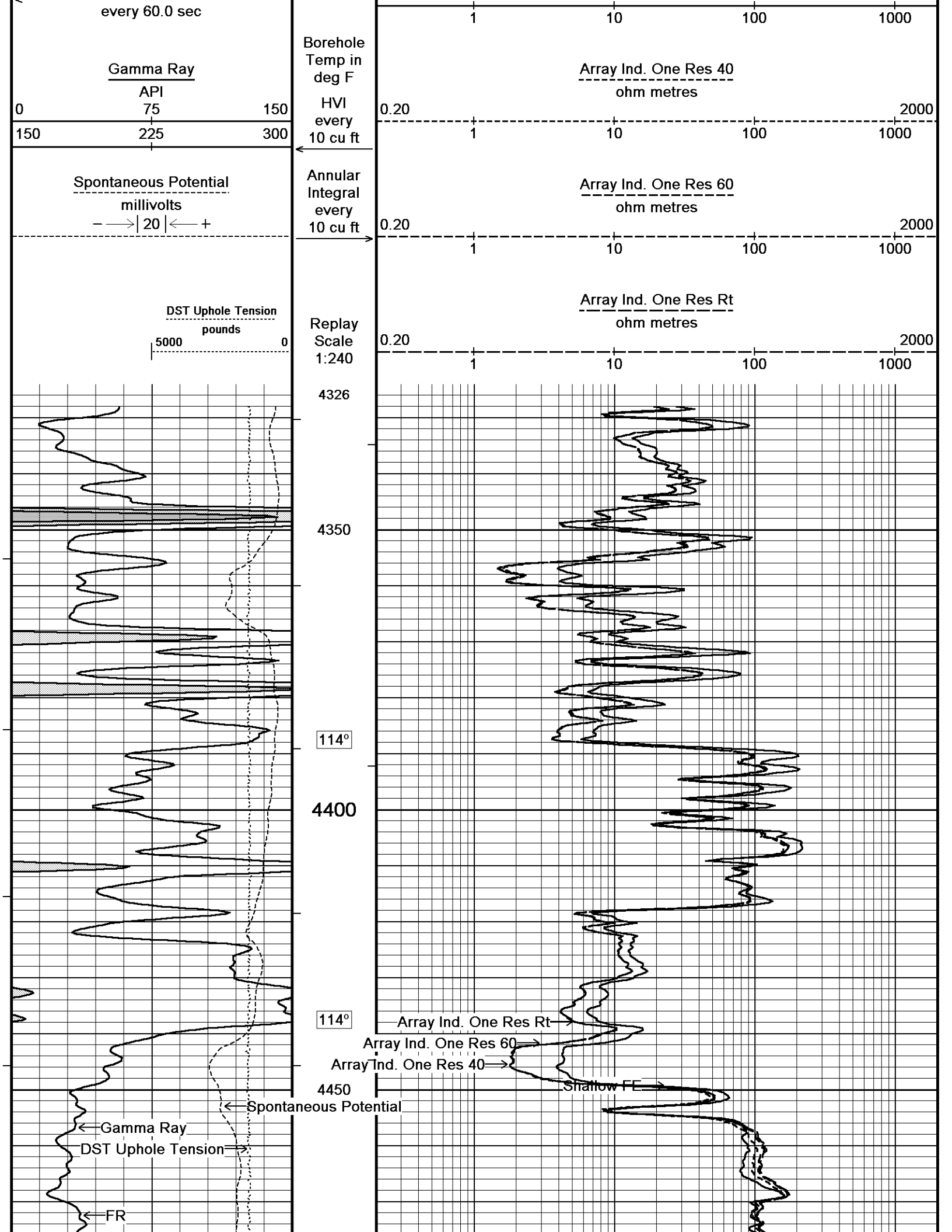
REPEAT SECTION

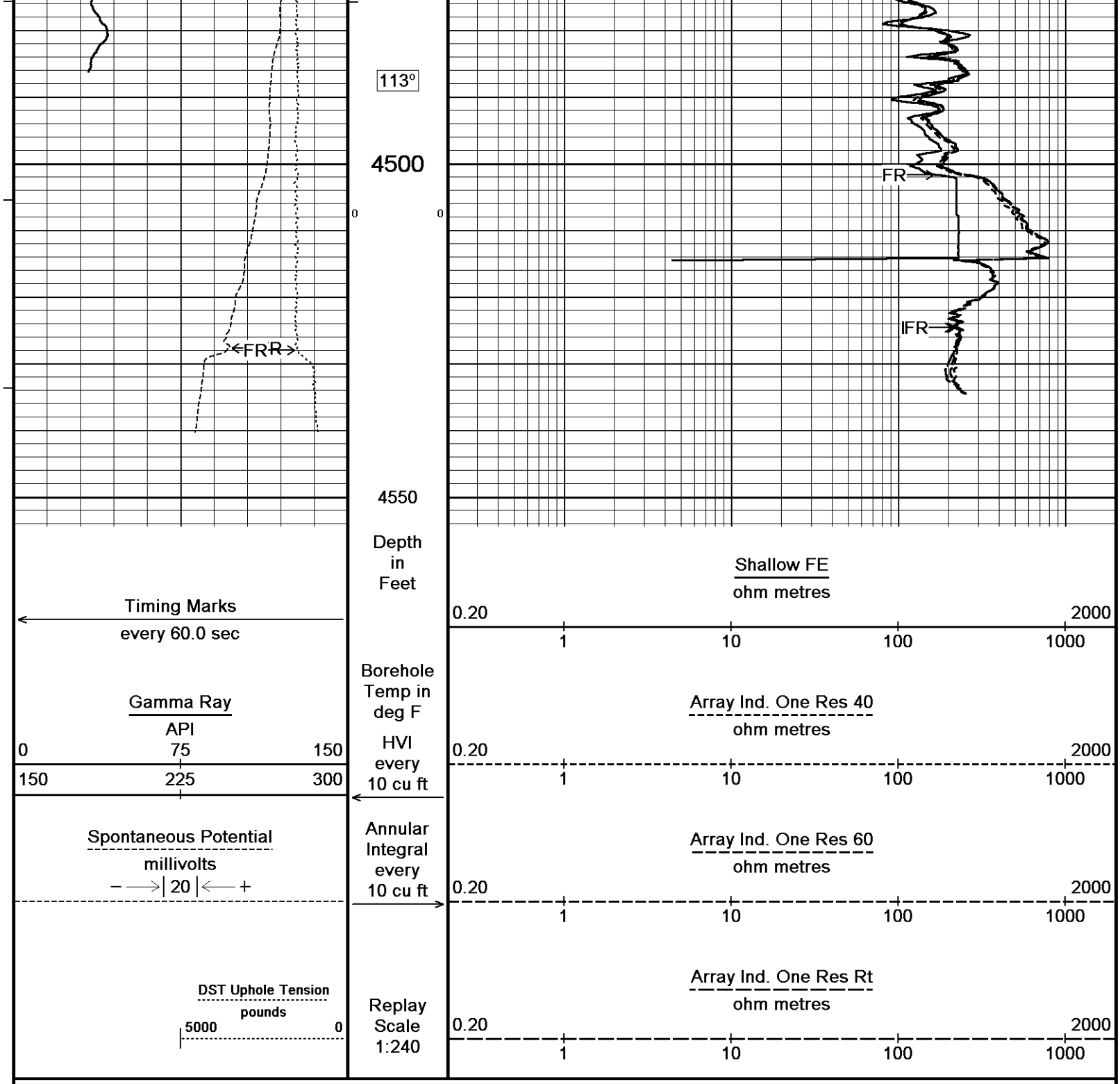
Depth Based Data - Maximum Sampling Increment 10.0cm
Plotted on 04-AUG-2013 21:51
Filename: C:\Minimus 13.05.9583\Log\Shakespeare Ottley #4-16\Shakespeare Ottley #4-16 Repeat.dta
Recorded on 04-AUG-2013 18:49
System Versions: Logged with 13.05.9583 Plotted with 13.05.9583

Depth in Feet

Timing Marks

Shallow FE
ohm metres
0.20 2000


every 60.0 sec
Gamma Ray
API
0
75
150
150
225
300
Spontaneous Potential
millivolts
– 20 +
DST Uphole Tension
pounds
5000
0
Borehole Temp in deg F
HVI every 10 cu ft
Annular Integral every 10 cu ft
Replay Scale 1:240
1
10
100
1000
Array Ind. One Res 40
ohm metres
0.20
2000
Array Ind. One Res 60
ohm metres
Array Ind. One Res Rt
ohm metres
4326
4350
114°
4400
114°
4450
Array Ind. One Res Rt
Array Ind. One Res 60
Array Ind. One Res 40
Shallow FE
Spontaneous Potential
Gamma Ray
DST Uphole Tension
FR



Depth Based Data - Maximum Sampling Increment 10.0cm
Plotted on 04-AUG-2013 21:51
Filename: C:\Minimus 13.05.9583\Log\Shakespeare Ottley #4-16\Shakespeare Ottley #4-16 Repeat.dta
Recorded on 04-AUG-2013 18:49
System Versions: Logged with 13.05.9583 Plotted with 13.05.9583

REPEAT SECTION

BEFORE SURVEY CALIBRATION

C:\Minimus 13.05.9583\Log\Shakespeare Ottley #4-16\Shakespeare Ottley #4-16 Main.dta

General Constants All 000

Last Edited on 04-AUG-2013,16:01

General Parameters

Mud Resistivity	0.510	ohm-metres
Mud Resistivity Temperature	98.000	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	5.500	inches
Caliper for Differential Caliper	Density Caliper	

Rwa Parameters

Porosity used	Base Density Porosity	
Resistivity used	Array Ind. Six Res Rt	
RWA Constant A	1.000	
RWA Constant M	2.000	
SW/APOR Tool Source	0.000	

Down-hole Tension Calibration SMS 0

Field Calibration on 04-AUG-2013 18:05

Reading No	Measured	Calibrated (lbs)
1	13735.13	0.00
2	14289.75	471.00

Gamma Calibration MCG-B 39

Field Calibration on 04-AUG-2013 10:53

	Measured	Calibrated (API)
Background	64	43
Calibrator (Gross)	1141	768
Calibrator (Net)	1077	725

Gamma Constants MCG-B 39

Last Edited on 04-AUG-2013,16:01

Gamma Calibrator Number	GRC38	
Mud Density	1.09	gm/cc
Caliper Source for Processing	Density Caliper	
Tool Position	Eccentred	
Concentration of KCl		kppm
K Mud Type	Chloride	
K Mud Concentration	0.00	%

SP Calibration MCG-B 39

Field Calibration on 30-JUL-2013,09:41

	Measured	Calibrated (mV)
Reference 1	105.8	100.0
Reference 2	-94.3	-100.0

High Resolution Temperature Calibration MCG-B 39

Field Calibration on 30-JUL-2013,09:41

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

High Resolution Temperature Constants MCG-B 39

Last Edited on 30-JUL-2013,09:41

Pre-filter Length	11

Caliper Calibration MML-A 3

Base Calibration on 05-JUN-2013 15:43
Field Calibration on 04-AUG-2013 10:46

Base Calibration

Reading No	Measured	Calibrator Size (in)
1	14624	5.98
2	17958	7.97
3	21263	9.86
4	25213	11.92
5	0	0.00
6	N/A	N/A

Field Calibration

Measured Caliper (in)	Actual Caliper (in)
6.15	5.98

Micro Normal and Micro Inverse Calibration MML-A 3

Base Calibration on 05-JUN-2013 15:36
Field Check on 04-AUG-2013 10:47

Base Calibration

		Measured		Calibrated (ohm-m)	
Channel	Resistor 1	Resistor 2	Resistor 1	Resistor 2	
Micro Normal	12.2	60.2	5.0	25.0	

Micro Inverse	15.7	78.3	5.0	25.0

Channel	Base Check (ohm-m)	Field Check (ohm-m)
Micro Normal	63.0	63.0
Micro Inverse	48.2	48.2

Micro Normal and Micro Inverse Constants MML-A 3

Last Edited on 04-AUG-2013,10:46

Pad Type	8-12 in Soft Rubber Inflatable 006-9011-159	
Micro Normal K Factor	1.0000	
Micro Inverse K Factor	1.0000	
Standoff Offset	N/A	inches

Neutron Calibration MDN-A.B 66

Base Calibration on 31-JUL-2013 10:25
Field Check on 04-AUG-2013 10:58

Base Calibration

	Measured		Calibrated (cps)	
	Near	Far	Near	Far
	3180	99	3714	110
Ratio	32.180		33.764	

Field Calibrator at Base

	Calibrated (cps)	
	1617	2323
Ratio	0.696	

Field Check

	Calibrated (cps)	
	1624	2337
Ratio	0.697	

Neutron Constants MDN-A.B 66

Last Edited on 04-AUG-2013,10:54

Neutron Source Id	P0204NN	
Neutron Jig Number	5824NE	
Epithermal Neutron	No	
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	Constant Value	
Formation Pressure	0.00	kpsi
Temperature Source	Constant Value	
Temperature	68.00	degrees F
Mud Salinity	0.00	kppm
Salinity Correction	Not Applied	
Formation Fluid Salinity Source	Constant Value	
Formation Fluid Salinity	0.00	kppm
Barite Mud Correction	Not Applied	

FE Calibration MFE-B.J 353

Base Calibration on 22-MAY-2013 08:22
Field Check on 04-AUG-2013 10:23

Base Calibration

	Measured	Calibrated (ohm-m)
Reference 1	0.0	0.0
Reference 2	964.9	126.8
Base Check		280.9
Field Check		280.8

FE Constants MFE-B.J 353

Last Edited on 04-AUG-2013,16:01

Running Mode	No Sleeve	
MFE K Factor	0.1268	
Caliper Source for FE correction	Density Caliper	
Caliper Value for FE correction	N/A	inches
Rm Source for FE correction	Temperature Corr	
Temp. for Rm Corr.	MCG External Temperature	
Stand-off	0.5	inches

Sonic Constants MSS-A.A 55

Last Edited on 04-AUG-2013,16:01

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	Not 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
3' Waveform Filter	N/A	
4' Waveform Filter	N/A	
5' Waveform Filter	N/A	
6' Waveform Filter	N/A	
Semblance Level	N/A	
Semblance Window Width	N/A	micro-sec
Sonic 1 Despiker	N/A	N/A
Sonic 2 Despiker	N/A	N/A

Induction Calibration MAI-A.A 167

Base Calibration on 19-APR-2013,13:41
Field Check on 04-AUG-2013 10:21

Base Calibration

Test Loop Calibration Channel	Measured Low	Measured High	Calibrated (mmho/m) Low	Calibrated (mmho/m) High
1	17.3	474.2	9.3	966.2
2	6.3	388.4	7.6	821.4
3	3.3	259.4	5.2	566.0
4	1.9	133.0	2.6	279.2

Array Temperature 76.8 Deg F

Channel	Base Check (mmho/m) Low	Base Check (mmho/m) High	Field Check (mmho/m) Low	Field Check (mmho/m) High

1	13.4	3838.7	
2	29.7	3476.3	
3	29.2	3052.4	
4	19.8	2081.3	
Deep	18.7	2048.6	
Medium	42.3	3990.3	
Shallow	43.1	5053.2	
Array Temperature		78.6	Deg F

Induction Constants MAI-A.A 167

Last Edited on 04-AUG-2013,16:01

Induction Model	RtAP-WBM	
Caliper for Borehole Corr.	Density Caliper	
Hole Size for Borehole Correction	N/A	inches
Tool Centred	No	
Stand-off Type	Fins	
Stand-off	0.50	inches
Number of Fins on Stand-off	8.0000	
Stand-off Fin Angle	60.00	degrees
Stand-off Fin Width	0.5000	inches
Borehole Corr. Rm Source	Temperature Corr	
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

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 167

Field Calibration on 30-JUL-2013,09:41

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

High Resolution Temperature Constants MAI-A.A 167

Last Edited on 30-JUL-2013,09:41

Pre-filter Length	11

Caliper Calibration MPD-B 64

Base Calibration on 04-AUG-2013 10:37
Field Calibration on 04-AUG-2013 10:38

Base Calibration

Reading No	Measured	Calibrator Size (in)
1	15388	3.99
2	24325	5.98
3	32740	7.97
4	41178	9.86
5	50491	11.92
6	N/A	N/A

Field Calibration

Measured Caliper (in)	Actual Caliper (in)
6.00	5.98

Photo Density Calibration MPD-B 64

Base Calibration on 10-JUL-2013 10:09
Field Check on 04-AUG-2013 10:44

Density Calibration

Base Calibration	Measured Near	Measured Far	Calibrated (sdu) Near	Calibrated (sdu) Far
Reference 1	60252	33858	59556	30836
Reference 2	25108	2914	24941	2541
Field Check at Base	1163.0	1342.8		
Field Check	1165.2	1346.7		

PE Calibration

Base Calibration	WS	Measured WH	Measured Ratio	Calibrated Ratio
Background	211	1034		
Reference 1	22924	60048	0.385	0.371
Reference 2	6861	24971	0.278	0.272
Field Check at Base	210.7	1033.8		
Field Check	211.1	1036.7		

Density Constants MPD-B 64

Last Edited on 04-AUG-2013,16:01

Density Source Id	18235B	
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	1.09	gm/cc
Mud Density Z/A Multiplier	1.11	
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	

Matrix density (gm/cc)	Depth (m)
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

DOWNHOLE EQUIPMENT

C:\Minimus 13.05.9583\Log\Shakespeare Ottley #4-16\Shakespeare Ottley #4-16 Main.dta

3/8" Triple Cone Cable Head (MCB C A)
MCB-C.A 5 LG: 1.58 ft WT: 15.4 lb OD: 2.24 in

Compact Comms Gamma
MCG-B 39 LG: 8.70 ft WT: 63.9 lb OD: 2.24 in

Compact Micro-log
MML-A 3 LG: 7.97 ft WT: 81.6 lb OD: 2.24 in

55.39 ft GRGC - Gamma Ray
52.48 ft CGXT - MCG External Temperature
45.76 ft MINV - Micro-inverse
45.76 ft MNRL - Micro-normal

Compact Neutron
MDN-A.B 66 LG: 5.04 ft WT: 50.7 lb OD: 2.24 in

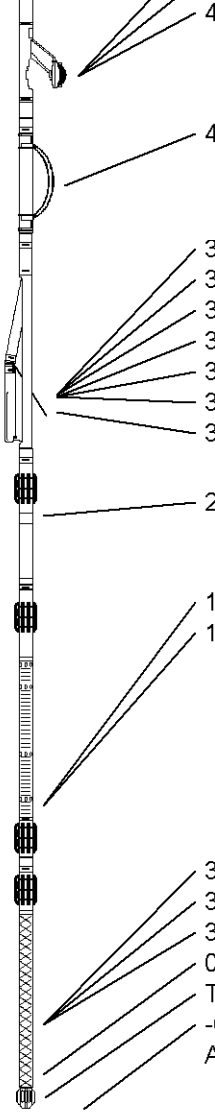
Compact Density/Caliper
MPD-B 64 LG: 9.59 ft WT: 90.4 lb OD: 2.45 in

Compact Focussed Electric
MFE-B.J 353 LG: 6.05 ft WT: 48.5 lb OD: 2.24 in

Compact Sonic
MSS-A.A 55 LG: 12.52 ft WT: 72.8 lb OD: 2.24 in

Compact Induction
MAI-A.A 167 LG: 10.81 ft WT: 48.5 lb OD: 2.24 in

Total Length: 62.25 ft Weight: 471.8 lb



46.76 ft	MLTC - MML Caliper
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
12.96 ft	DT35 - 3-5' Compensated Sonic
12.96 ft	SPRL - Wyllie Lime. Sonic Por.
3.34 ft	R40O - Array Ind. One Res 40
3.34 ft	RTAO - Array Ind. One Res Rt
3.34 ft	R60O - Array Ind. One Res 60
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	OTTLEY #4-16
FIELD	WILDCAT
PROVINCE/COUNTY	LOGAN
COUNTRY/STATE	U.S.A. / KANSAS

Elevation Kelly Bushing	2818.00	feet	First Reading	4525.00	feet
Elevation Drill Floor	2816.00	feet	Depth Driller	4530.00	feet
Elevation Ground Level	2808.00	feet	Depth Logger	4528.00	feet

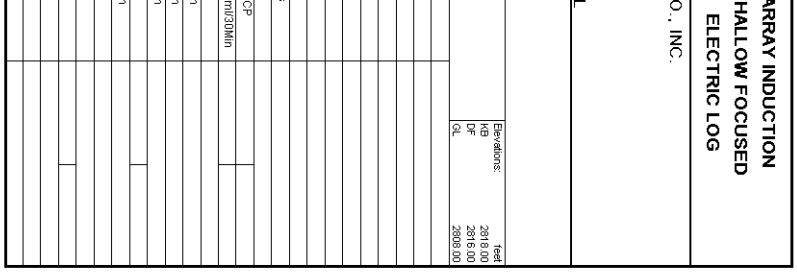
Weatherford®

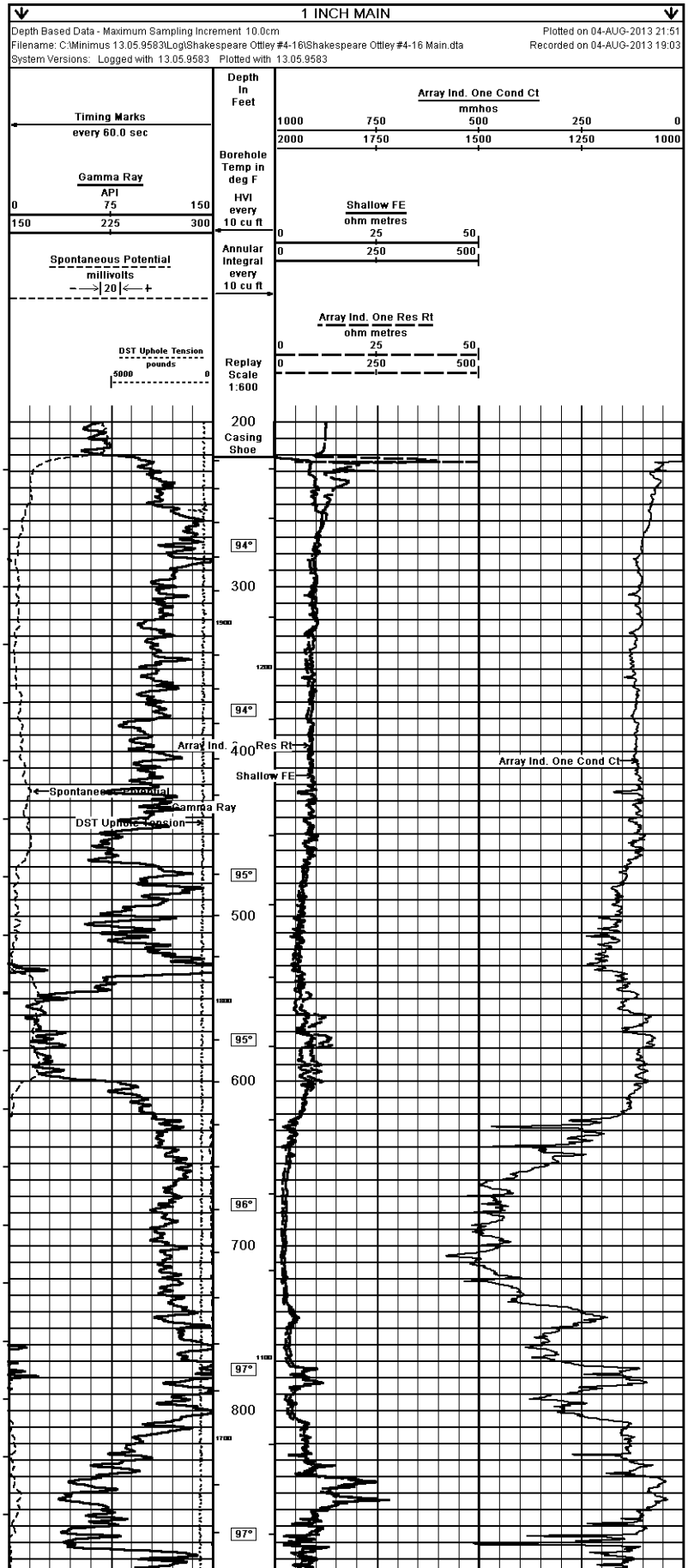
ARRAY INDUCTION
SHALLOW FOCUSED
ELECTRIC LOG

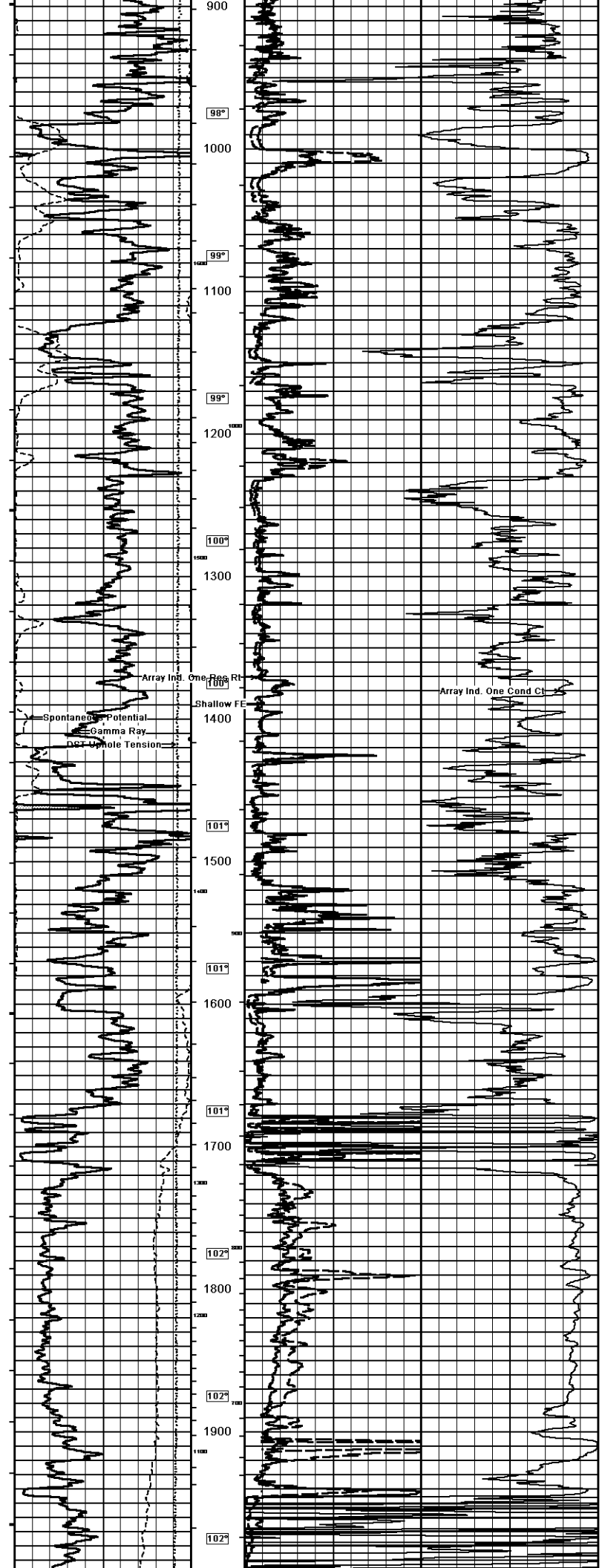
Weatherford

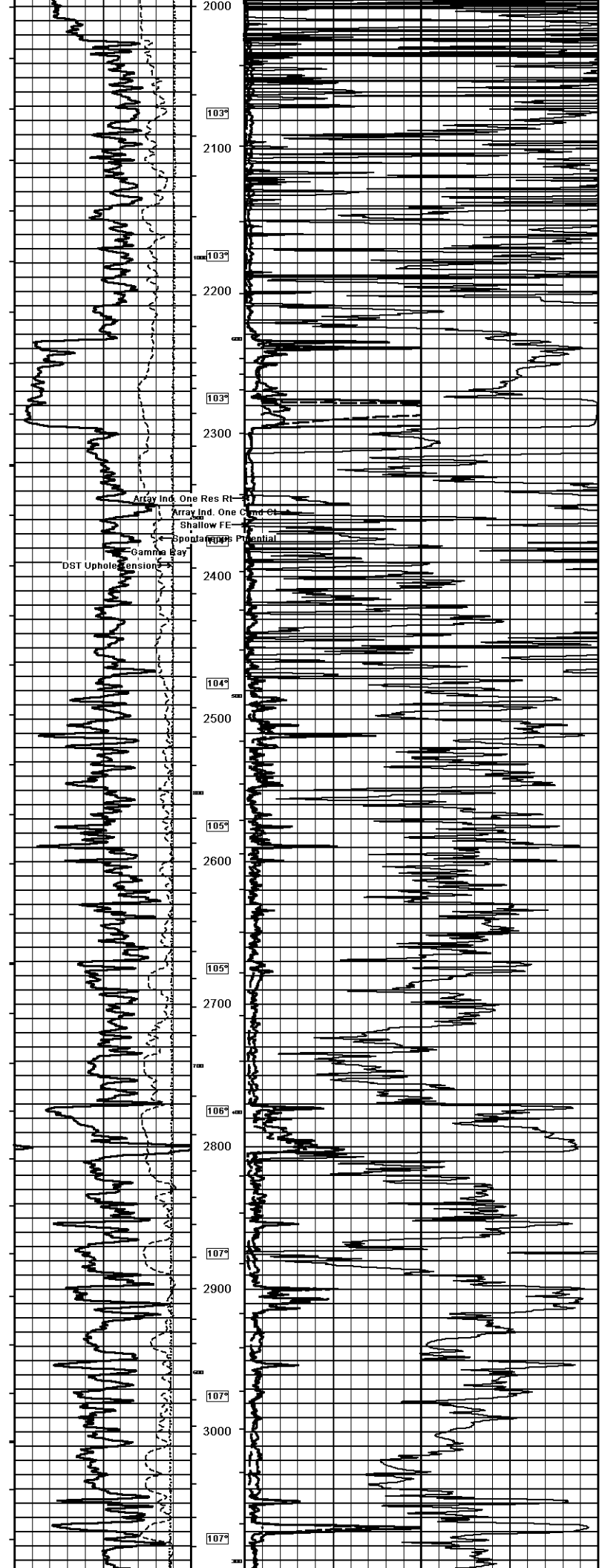
COMPANY	SHAKESPEARE OIL CO., INC.
WELL	OTTLEY #4-16
FIELD	WILDCAT
PROVINCE/COUNTY	LOGAN
COUNTRY/STATE	U.S.A. / KANSAS
LOCATION	1599' FNL & 1852' FWL
Permanent Datum G.L. Elevation 2808 feet	
Log Measured From KB	
Drilling Measured From K.B. @10 FEET	

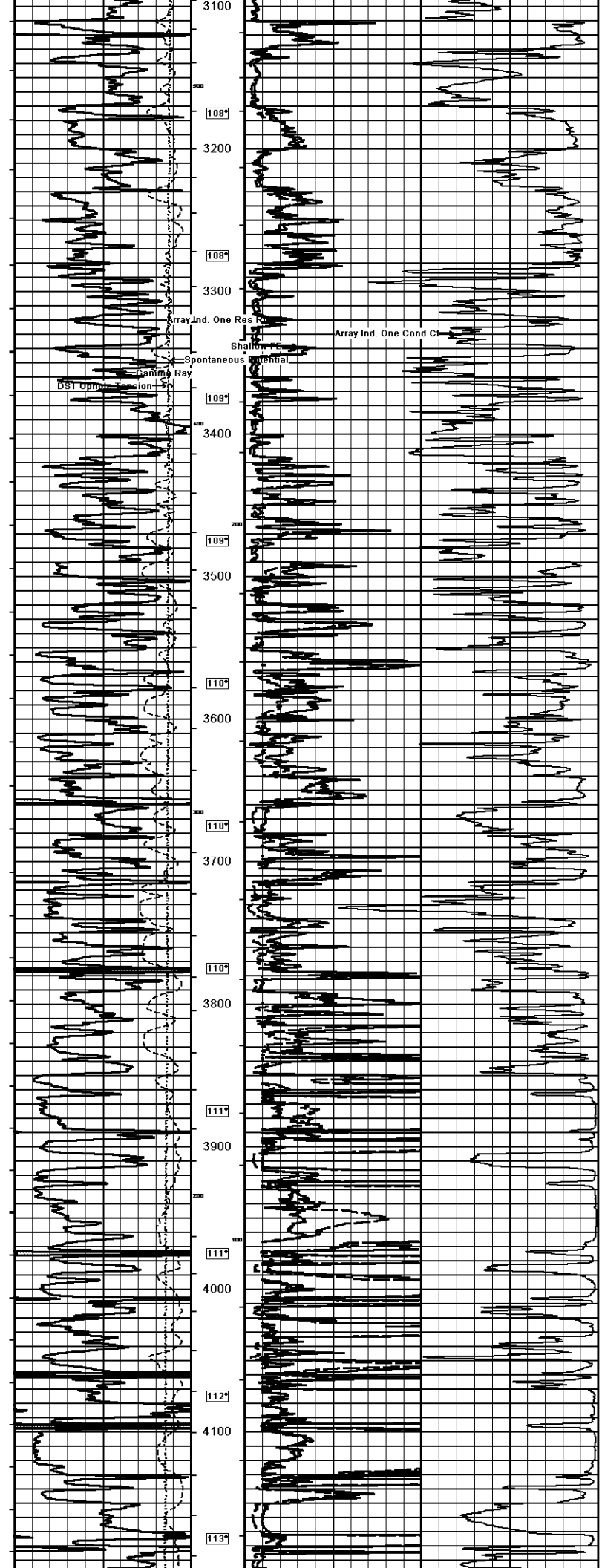
SEC	TWP	RGE	Other Services						
16	14S	32W	MPD/MDN						
API Number			MML						
Permit Number	15-109-21198		MSS						
Date	04-AUG-2013								
Run Number	ONE								
Service Order	3539955								
Depth Driller	4530.00	feet							
Depth Logger	4528.00	feet							
First Reading	4525.00	feet							
Last Reading	221.00	feet							
Casing Driller	222.00	feet							
Casing Logger	221.00	feet							
Bit Size	7.875	inches							
Hole Fluid Type	CHEMICAL								
Density / Viscosity	9.10	lb/Usg	55.00						
PH / Fluid Loss	10.00	lb/Usg	10.00						
Sample Source	FLOWLINE								
Rm @ Measured Temp	0.51 @ 98.0	ohm-m	deg F						
Rmf @ Measured Temp	0.41 @ 98.0	ohm-m	deg F						
Rmc @ Measured Temp	0.61 @ 98.0	ohm-m	deg F						
Source Rmf / Rmc	CALC	CALC							
Rm @ BHT	0.44 @115.0	ohm-m	deg F						
Time Since Circulation	3 HOURS								
Max Recorded Temp	115.00	deg F							
Equipment / Base	13096	LIB							
Recorded By	ROB HOFFMAN								
Witnessed By	TIM PRIEST								
JOB #	LB13-218								

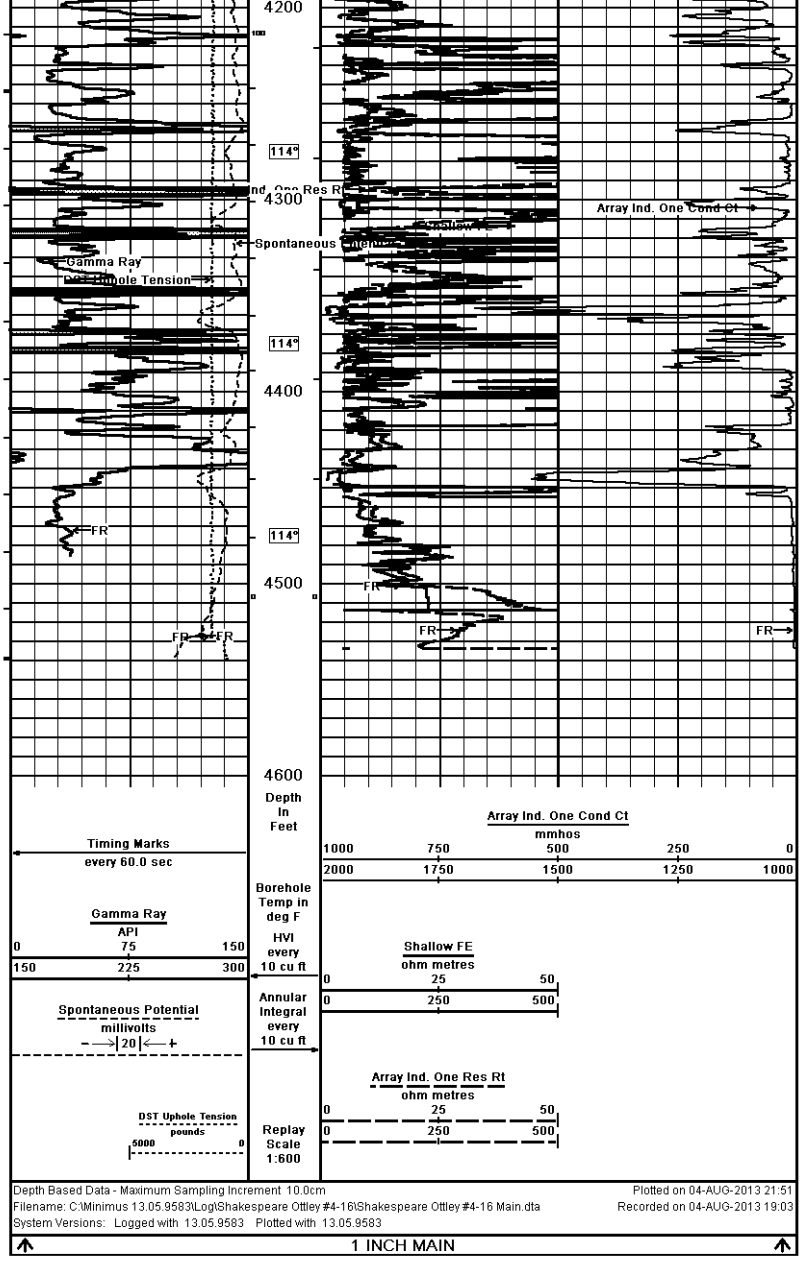

ARRAY INDUCTION
SHALLOW FOCUSED
ELECTRIC LOG
O., INC.
Elevations:
KB
DF
GL
2818.00
2816.00
2808.00
feet
mil30Min
CP


1 INCH MAIN
Depth Based Data - Maximum Sampling Increment 10.0cm
Plotted on 04-AUG-2013 21:51
Filename: C:\Minimus 13.05.9583\Log\Shakespeare Ottley #4-16\Shakespeare Ottley #4-16 Main.dta
Recorded on 04-AUG-2013 19:03
System Versions: Logged with 13.05.9583 Plotted with 13.05.9583
Timing Marks
every 60.0 sec
Gamma Ray
API
0
75
150
150
225
300
Spontaneous Potential
millivolts
20
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
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
200
Casing
Shoe
94°
300
94°
400
Array Ind.
Res Rt
Shallow FE
Spontaneous Potential
Gamma Ray
DST Uphole Tension
95°
500
95°
600
96°
700
97°
800
97°
Array Ind. One Cond Ct


900
98°
1000
99°
1100
99°
1200
100°
1300
Array Ind. One Rxo Rt
100
Shallow FE
Spontaneous Potential
Gamma Ray
DST Uphole Tension
Array Ind. One Cond Ct
1400
101°
1500
101°
1600
101°
1700
102°
1800
102°
1900
102°


2000
103°
2100
103°
2200
103°
2300
Array Ind. One Res Rt
Array Ind. One Cond Ct
Shallow FE
Spontaneous Potential
Gamma Ray
DST Upholecension
2400
104°
2500
105°
2600
105°
2700
106°
2800
107°
2900
107°
3000
107°


3100
108°
3200
108°
3300
Array Ind. One Res Fo
Array Ind. One Cond Cl
Shallow FE
Spontaneous Potential
Gamma Ray
DST Option Version
109°
3400
109°
3500
110°
3600
110°
3700
110°
3800
111°
3900
111°
4000
112°
4100
113°



Depth Based Data - Maximum Sampling Increment 10.0cm — Plotted on 04-AUG-2013 21:51

Filename: C:\Minimus 13.05.9583\Log\Shakespeare Ottley #4-16\Shakespeare Ottley #4-16 Main.dta — Recorded on 04-AUG-2013 19:03

System Versions: Logged with 13.05.9583 Plotted with 13.05.9583

1 INCH MAIN

COMPANY	SHAKESPEARE OIL CO., INC.
WELL	OTTLEY #4-16
FIELD	WILDCAT
PROVINCE/COUNTY	LOGAN
COUNTRY/STATE	U.S.A. / KANSAS

Elevation Kelly Bushing	2818.00	feet	First Reading	4525.00	feet
Elevation Drill Floor	2816.00	feet	Depth Driller	4530.00	feet
Elevation Ground Level	2808.00	feet	Depth Logger	4528.00	feet

Weatherford

ARRAY INDUCTION
SHALLOW FOCUSED
ELECTRIC LOG