Weatherford®

ARRAY INDUCTION SHALLOW FOCUSED ELECTRIC LOG

COMPANY	O'BRIEN ENERGY RESOURCES CORP.
WELL	ANGELL 1-18
FIELD	ANGELL
PROVINCE/COUNTY	MEADE
COUNTRY/STATE	U.S.A. / KANSAS
LOCATION	2308' FNL & 335' FEL

SEC 18	TWP 32S	RGE 29W	Other Services
Latitude	37.265008232		MPD/MDN MML
Longitude	-100.508511657		
API Number	15-119-21381		

Permanent Datum GL, Elevation 2715 feet
Log Measured From KB
Drilling Measured From KB @ 12 FEET

Elevations:	feet
KB	2727.00
DF	2725.00
GL	2715.00

Date	02-JAN-2015			
Run Number	ONE			
Service Order	7036-107375855			
Depth Driller	6402.00	feet		
Depth Logger	6396.00	feet		
First Reading	6392.66	feet		
Last Reading	1487.00	feet		
Casing Driller	1487.00	feet		
Casing Logger	1487.00	feet		
Bit Size	7.875	inches		
Hole Fluid Type	WBM			
Density / Viscosity	9.30 lb/USg	52.00 CP		
PH / Fluid Loss	11.00	5.60 ml/30Min		
Sample Source	MUDPIT			
Rm @ Measured Temp	1.50 @ 75.0	ohm-m		
Rmf @ Measured Temp	1.20 @ 75.0	ohm-m		
Rmc @ Measured Temp	1.80 @ 75.0	ohm-m		
Source Rmf / Rmc	CALC	CALC		
Rm @ BHT	0.91 @126.0	ohm-m		
Time Since Circulation	5 HOURS			
Max Recorded Temp	126.00	deg F		
Equipment / Base	13096	LIB		
Recorded By	DEREK CARTER		JAKE HINES	
Witnessed By	ROGER PEARSON			
JOB #	LB15-001			

BOREHOLE RECORD

Last Edited: 02-JAN-2015 04:43

Bit Size inches	Depth From feet	Depth To feet
12.250	0.00	1505.00
7.875	1505.00	6402.00

CASING RECORD

Type	Size inches	Depth From feet	Shoe Depth feet	Weight pounds/ft
SURFACE	8.625	0.00	1487.00	24.00

REMARKS

- SOFTWARE ISSUE: WLS 14.05.5280
- TOOL STRING: MCG, MML, MDN, MPD, MFE, MAI RUN IN COMBINATION
- HARDWARE:
  - MDN: DUAL BOWSPRING ECCENTRALIZER
  - MFE: 1 X 0.5 INCH STANDOFF
  - MAI: 2 X 0.5 INCH STANDOFF
- 2.71 G/CC LIMESTONE DENSITY MATRIX USED TO CALCULATE POROSITY
  - REPEAT AND HIGH RESOLUTION SECTIONS PLOTTED ON SANDSTONE MATRIX PER CUSTOMER REQUEST
- BOREHOLE RUGOSITY, TIGHT PULLS, AND WASHOUTS WILL AFFECT DATA QUALITY
- ALL INTERVALS LOGGED AND SCALED PER CUSTOMER'S REQUEST

- HIGH RESOLUTION LOGS REQUESTED FROM TD TO 5500 FT.

- TOTAL HOLE VOLUME FROM TD TO 4000 FT.: 800 CU. FT.

- ANNULAR HOLE VOLUME WITH 4.5 INCH CASING FROM TD TO 4000 FT.: 540 CU. FT.

- SERVICE ORDER # 7036-107375855

- RIG: DUKE DRILLING #9

- ENGINEER: DEREK CARTER

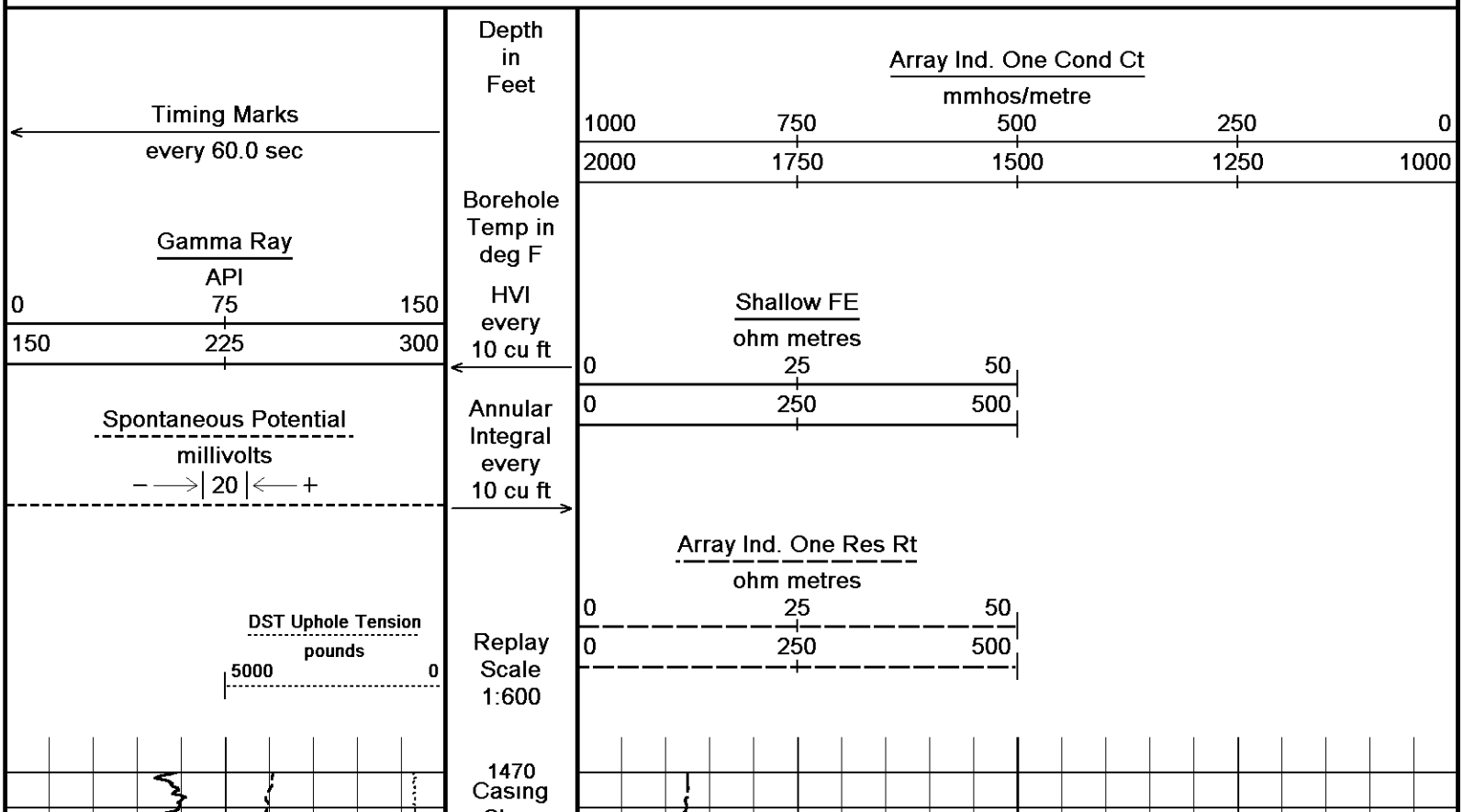
- JUNIOR FIELD ENGINEER: JAKE HINES

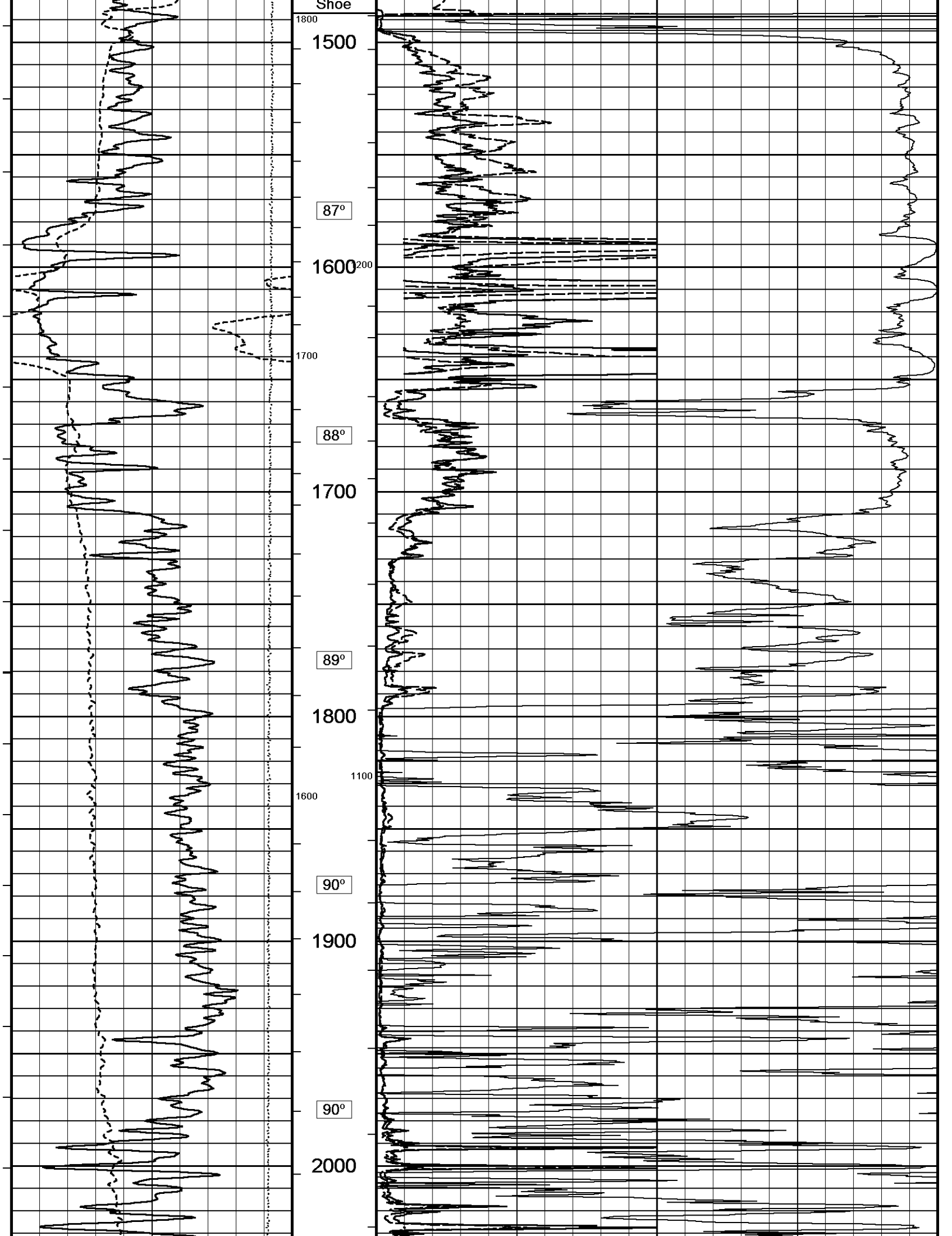
- OPERATOR: SAM LARES

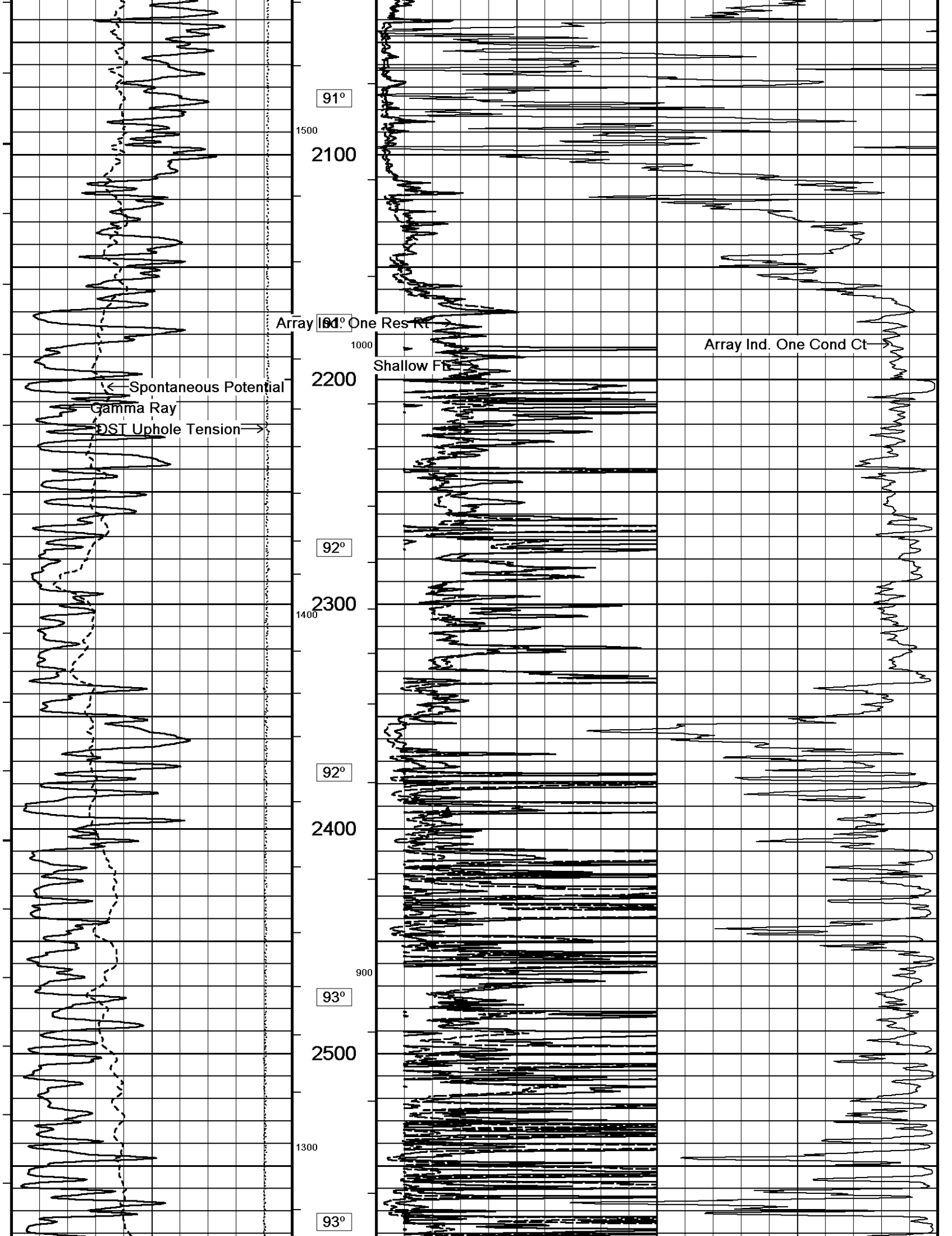
- TENSION PICKUP ON THE REPEAT PASS WAS AT 6396 FT.; HOWEVER, THE TENSION PICKUP ON THE SUBSEQUENT MAIN PASS WAS 6398 FT.; TENSION DROPPED OFF VERY GRADUALLY WHEN TAGGING TD PRIOR TO THE REPEAT PASS; THIS MIGHT INDICATE THAT THERE WAS MATERIAL IN THE HOLE THAT CAUSED THE DIFFERENCE IN TENSION PICKUP BETWEEN THE TWO PASSES

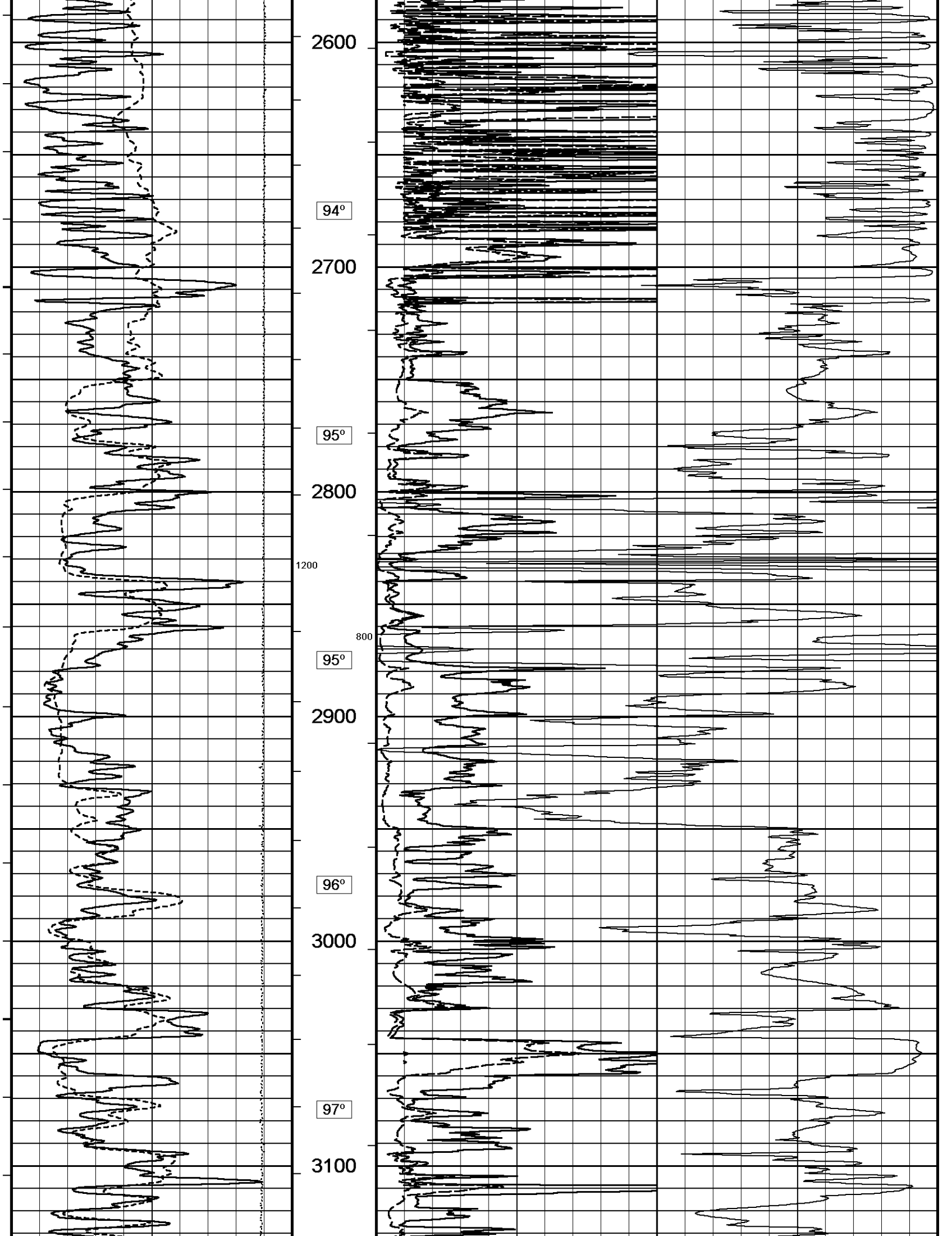
2 INCH MAIN

Depth Based Data - Maximum Sampling Increment 10.0cm — Plotted on 02-JAN-2015 11:02
Filename: C:\Minimus 14.05\Log Data\O'Brien Angell 1-18\O'Brien Angell 1-18 Main.dta — Recorded on 02-JAN-2015 08:05
System Versions: Logged with 14.05.5280 Processed with 14.05.5280 Plotted with 14.05.5280




Shoe
1800
1500
87°
1600
200
1700
88°
1700
89°
1800
1100
1600
90°
1900
90°
2000


91°
1500
2100
91°
Array Ind. One Res Rt
1000
Shallow Ft
Array Ind. One Cond Ct
2200
Spontaneous Potential
Gamma Ray
DST Uphole Tension
92°
2300
1400
92°
2400
900
93°
2500
1300
93°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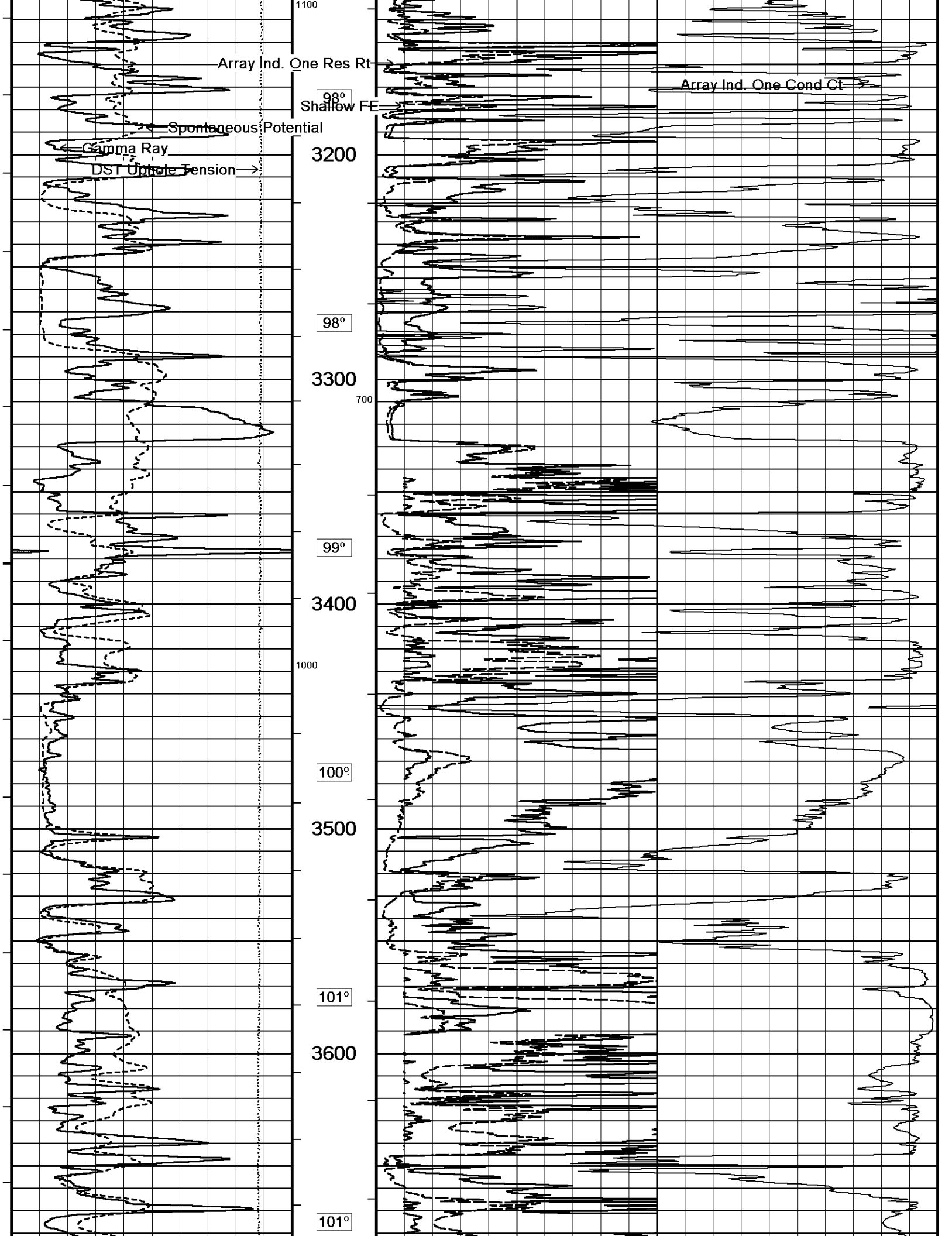
94°
2700
95°
2800
1200
800
95°
2900
96°
3000
97°
3100


Array Ind. One Res Rt
Array Ind. One Cond Ct
Shallow FE
Spontaneous Potential
Gamma Ray
DST Uphole Tension
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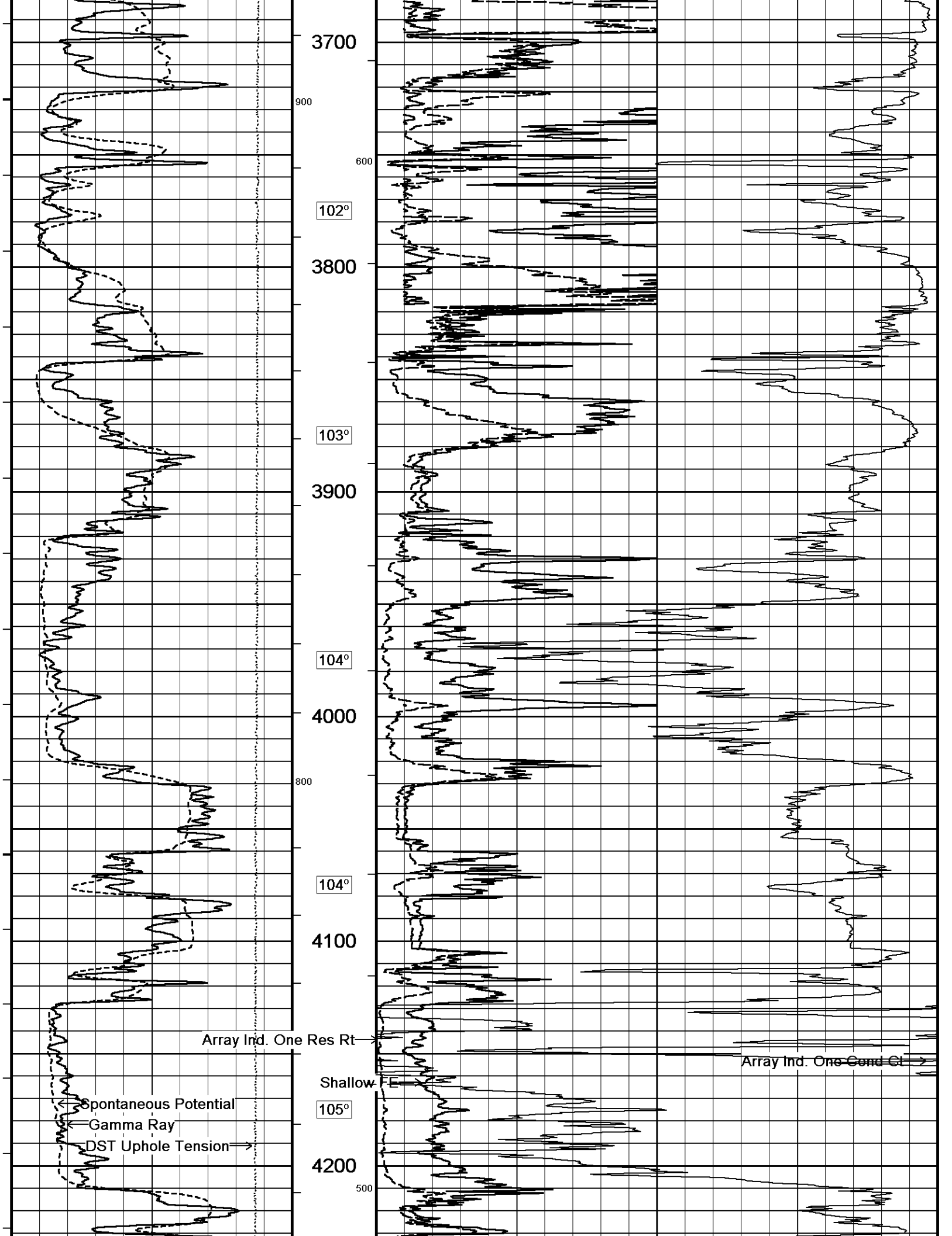
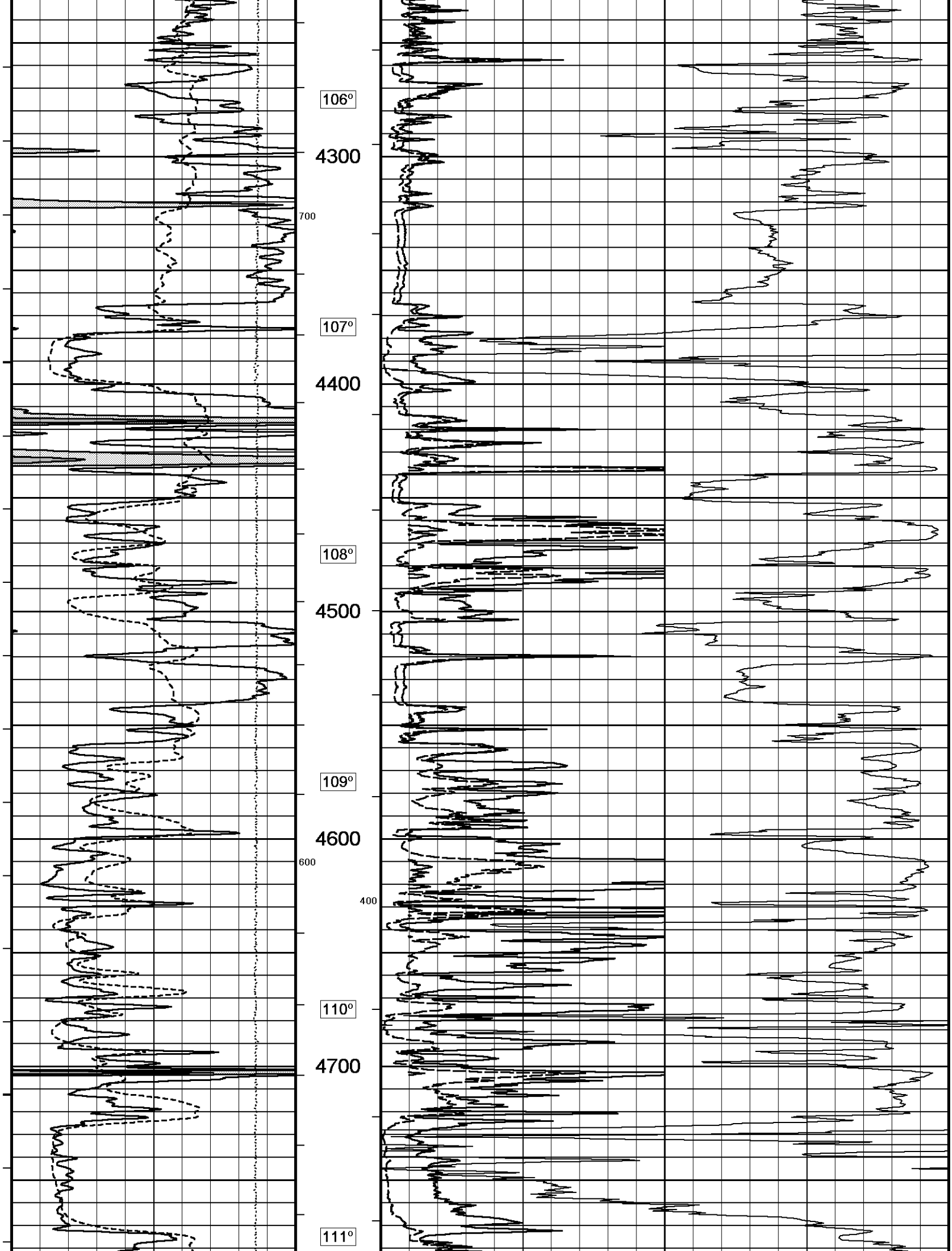
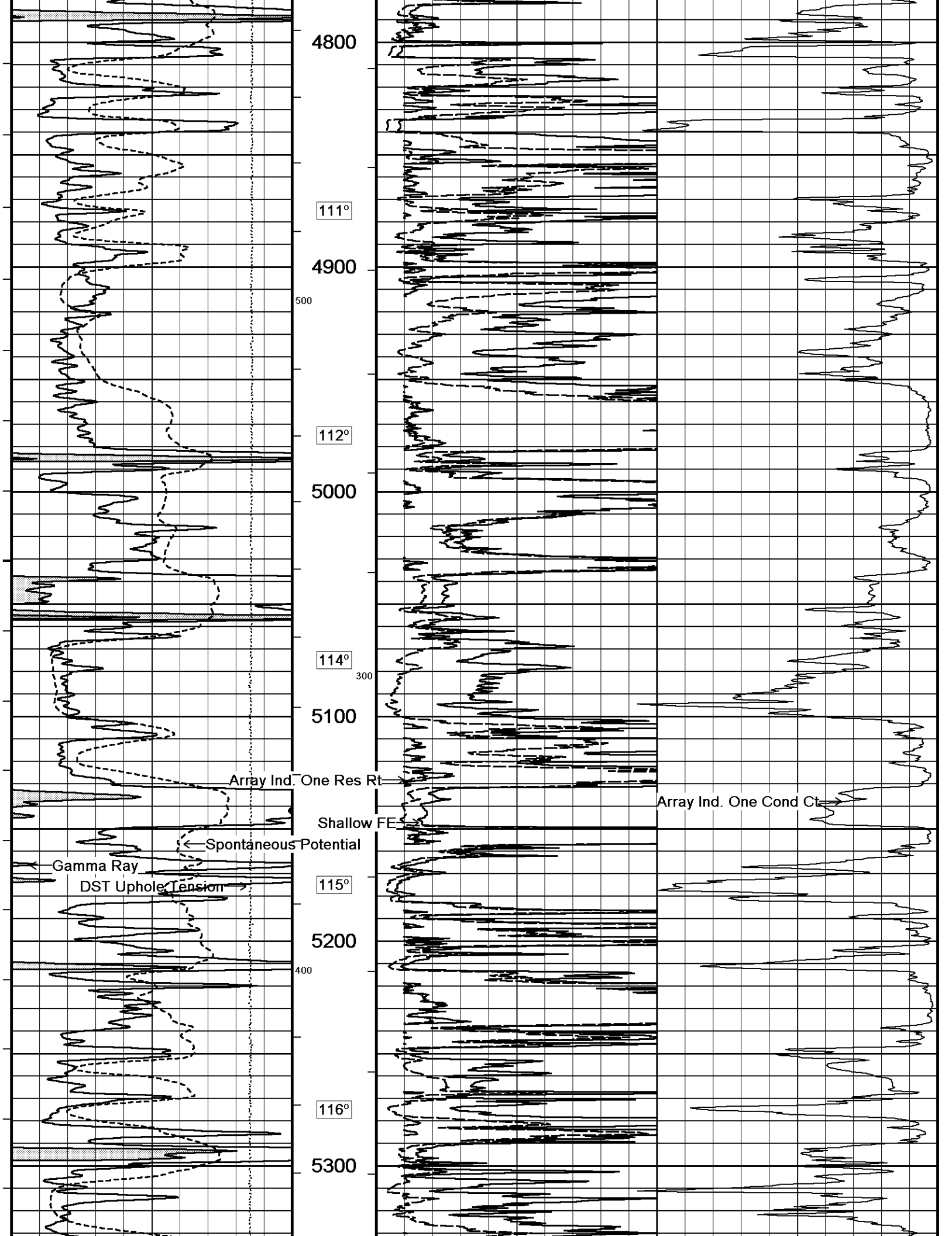
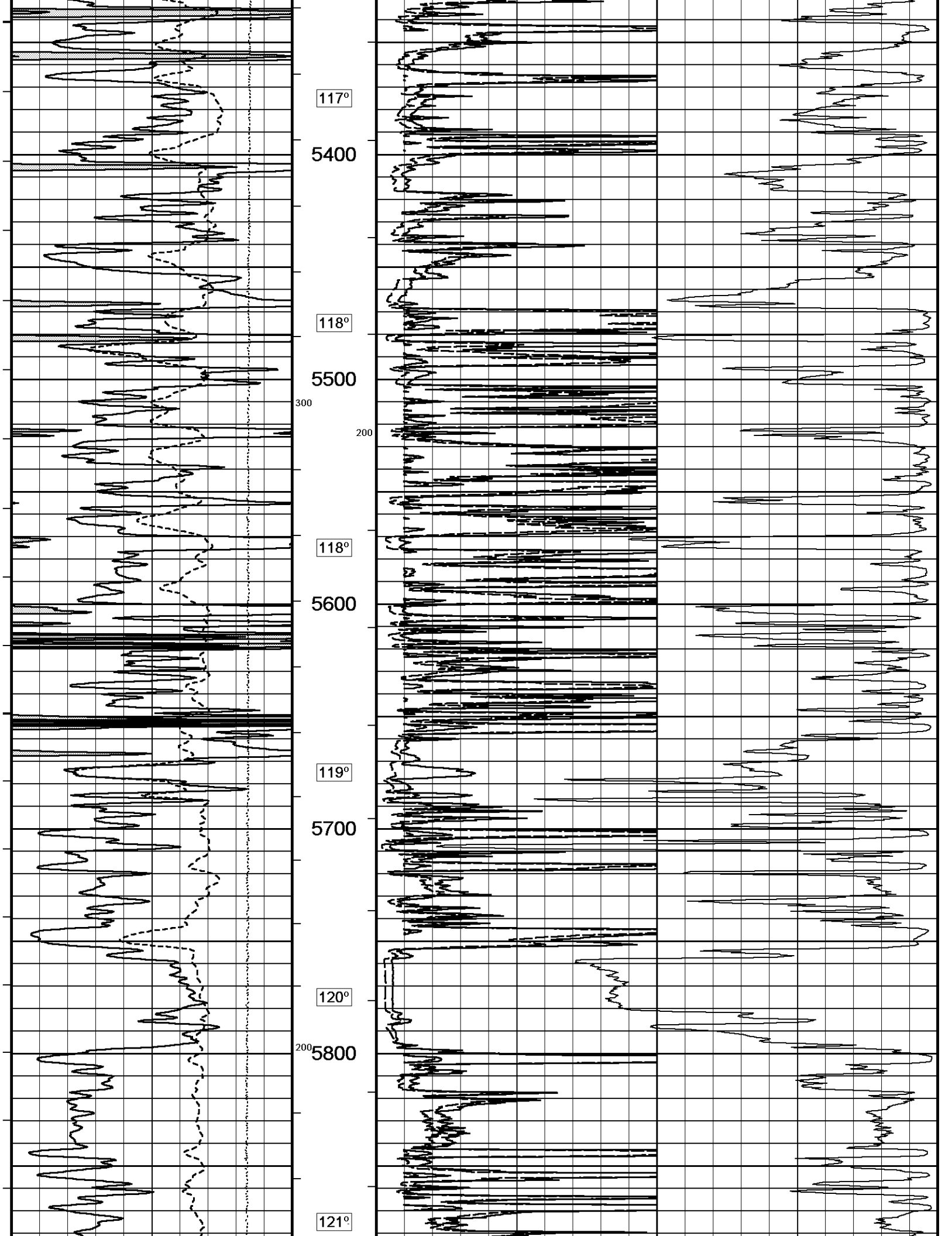
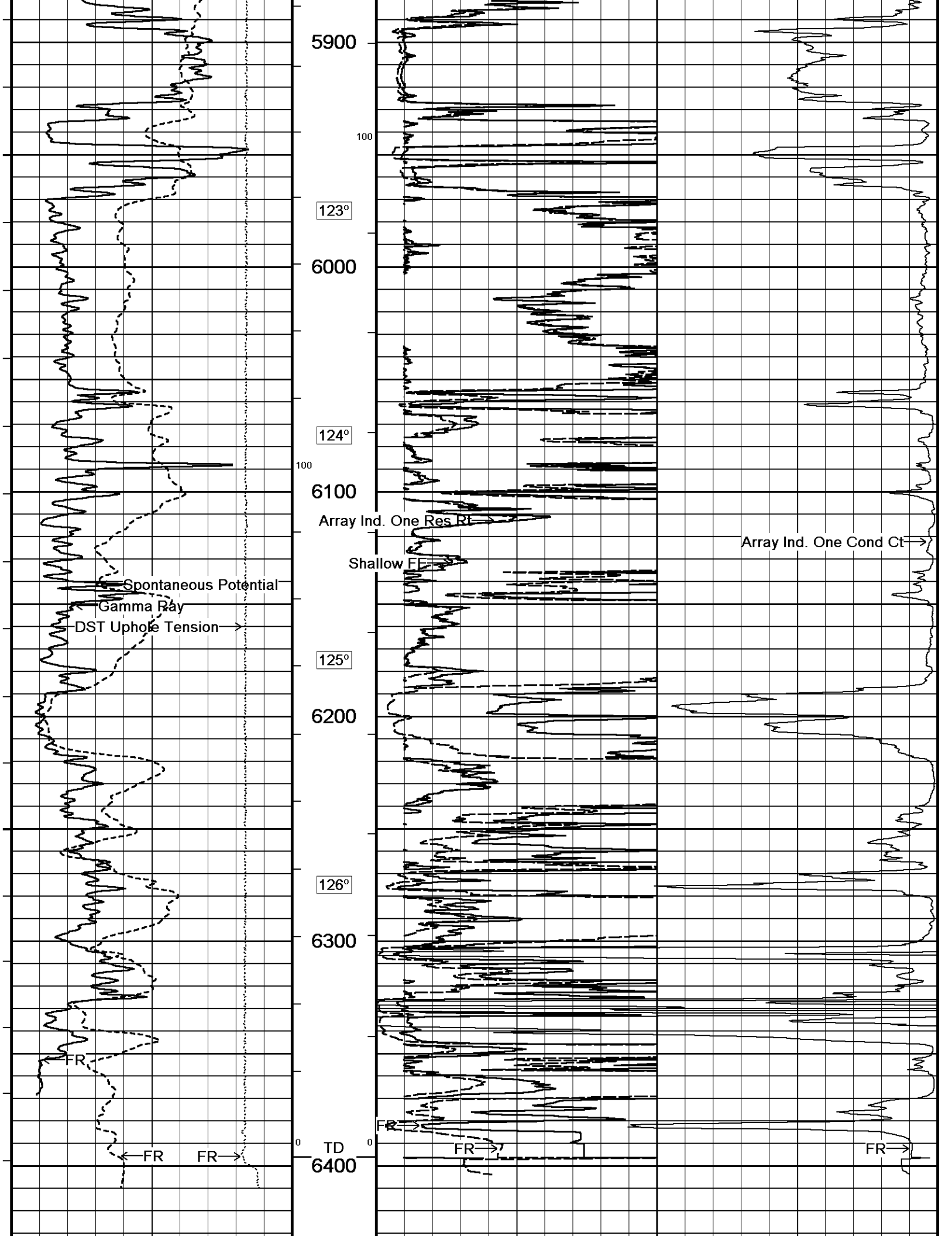
98°
3200
98°
3300
700
99°
3400
1000
100°
3500
101°
3600
101°

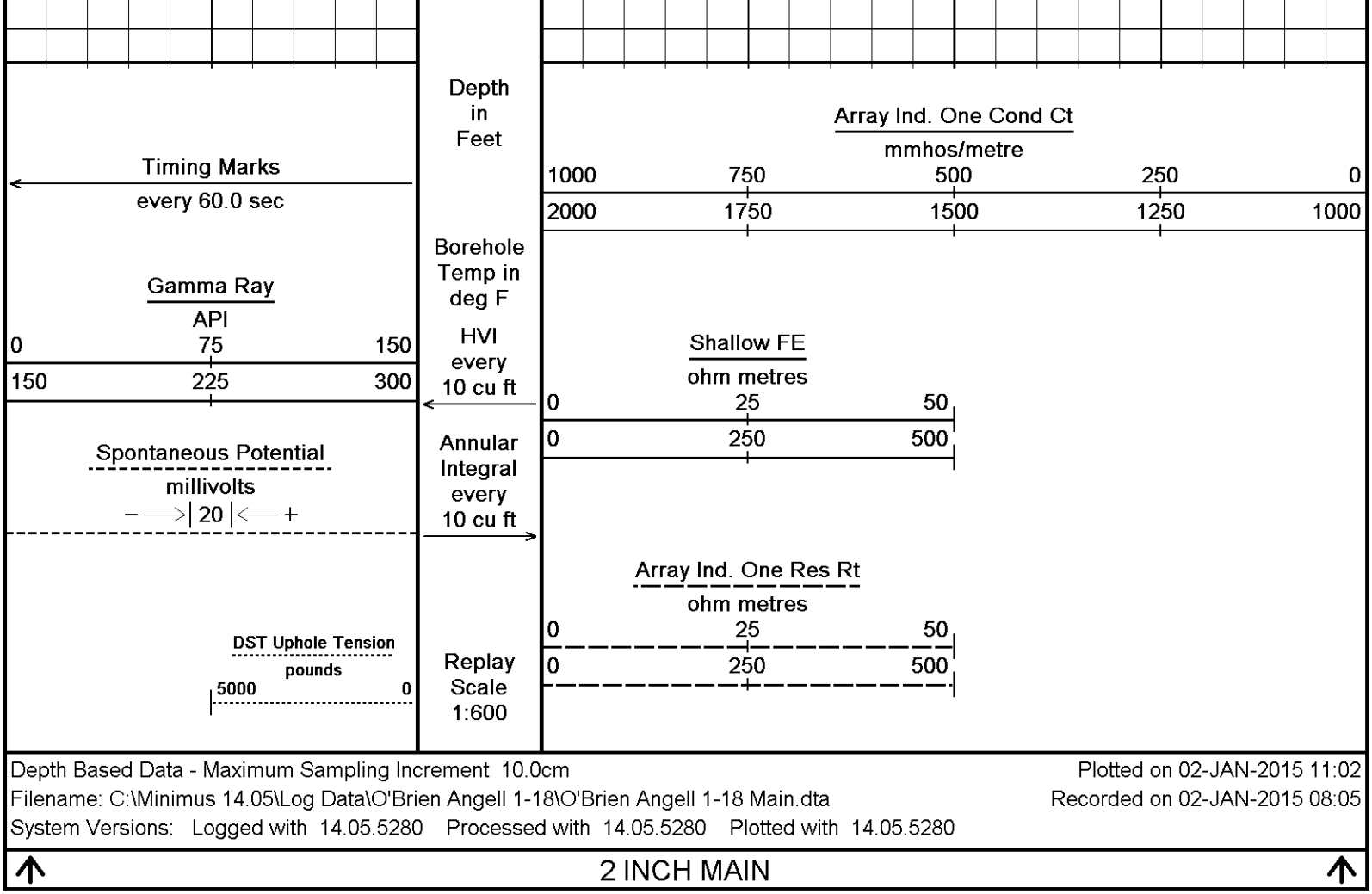

3700
900
600
102°
3800
103°
3900
104°
4000
800
104°
4100
Array Ind. One Res Rt
Shallow FE
Spontaneous Potential
105°
Gamma Ray
DST Uphole Tension
4200
500
Array Ind. One Cond Ct


106°
4300
700
107°
4400
108°
4500
109°
4600
600
400
110°
4700
111°


4800
111°
4900
500
112°
5000
114°
300
5100
Array Ind. One Res Rt
Array Ind. One Cond Ct
Shallow FE
Spontaneous Potential
Gamma Ray
DST Uphole Tension
115°
5200
400
116°
5300


117°
5400
118°
5500
300
200
118°
5600
119°
5700
120°
200
5800
121°


5900
100
123°
6000
124°
100
6100
Array Ind. One Res Rt
Shallow FE
Array Ind. One Cond Ct
Spontaneous Potential
Gamma Ray
DST Uphole Tension
125°
6200
126°
6300
FR
FR
FR
FR
FR
0
TD
0
6400



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2 INCH MAIN

5 INCH MAIN

Depth Based Data - Maximum Sampling Increment 10.0cm — Plotted on 02-JAN-2015 11:02
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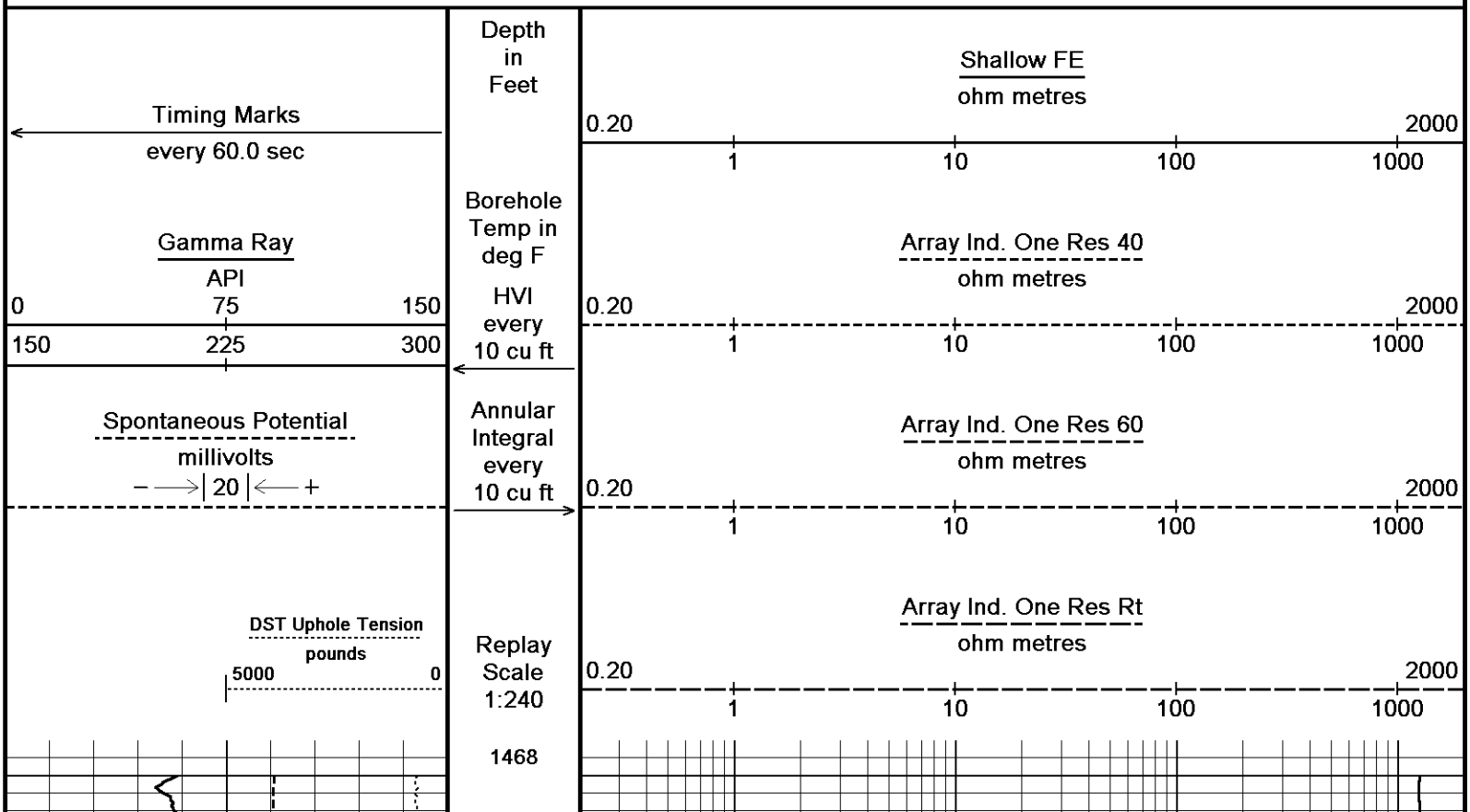
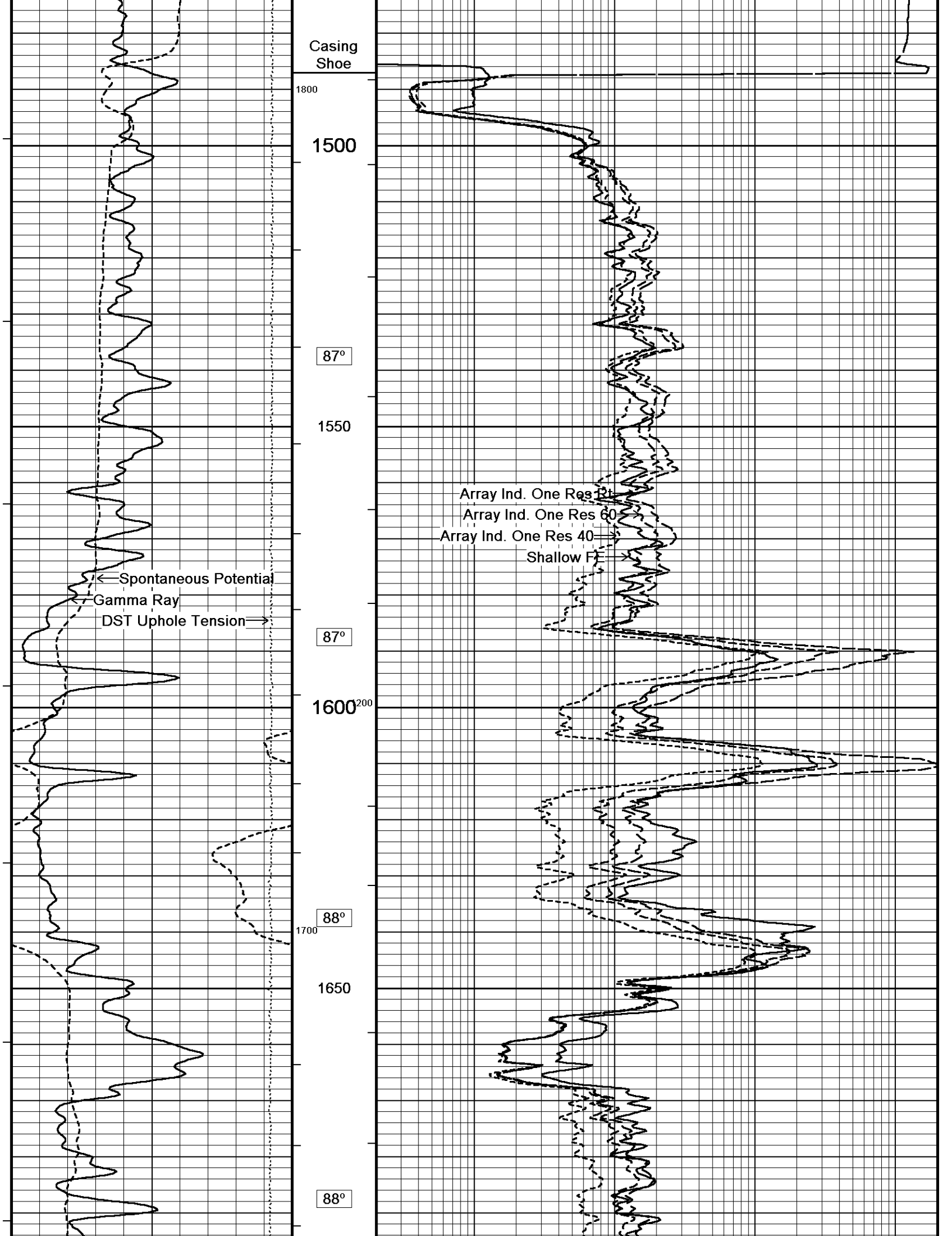
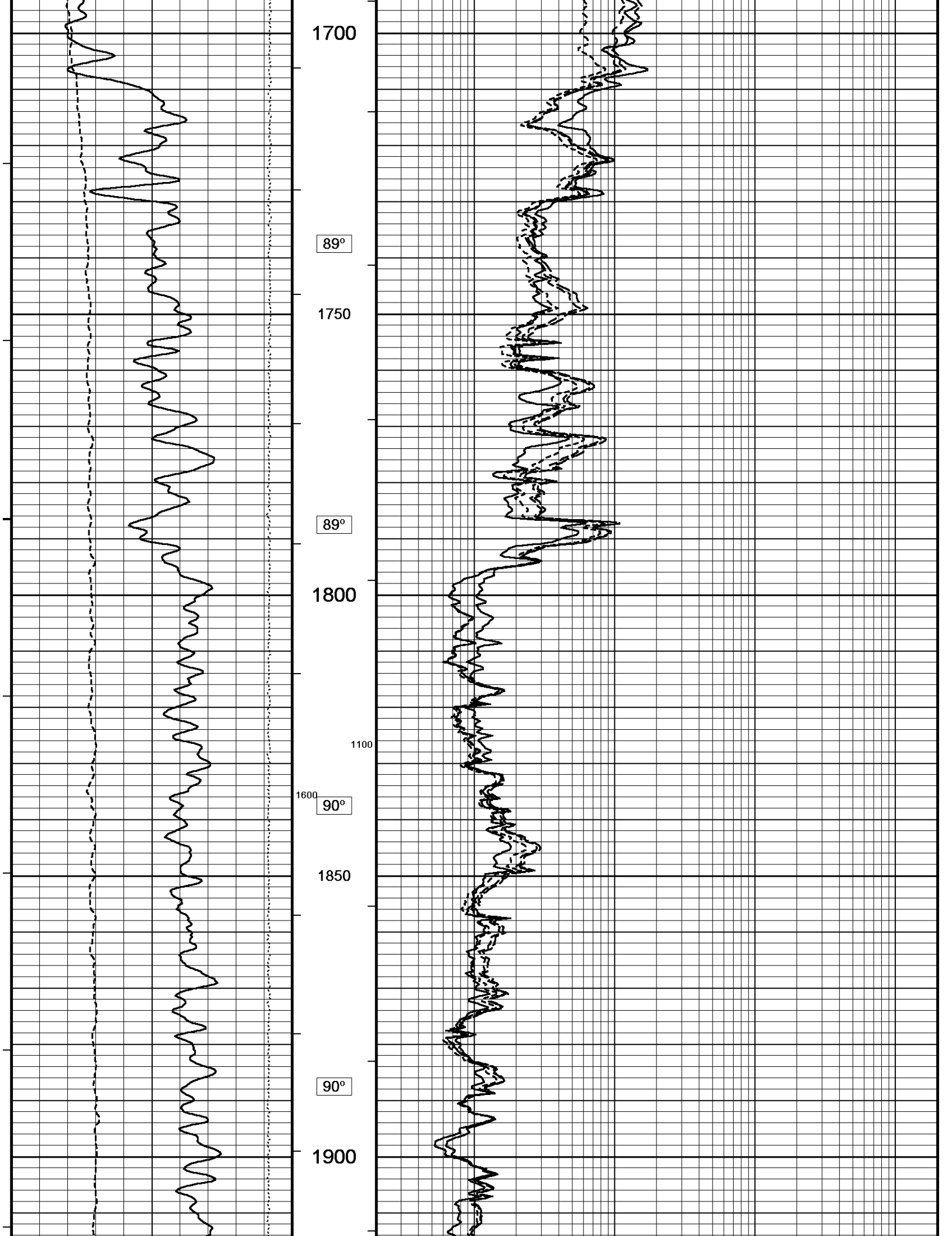
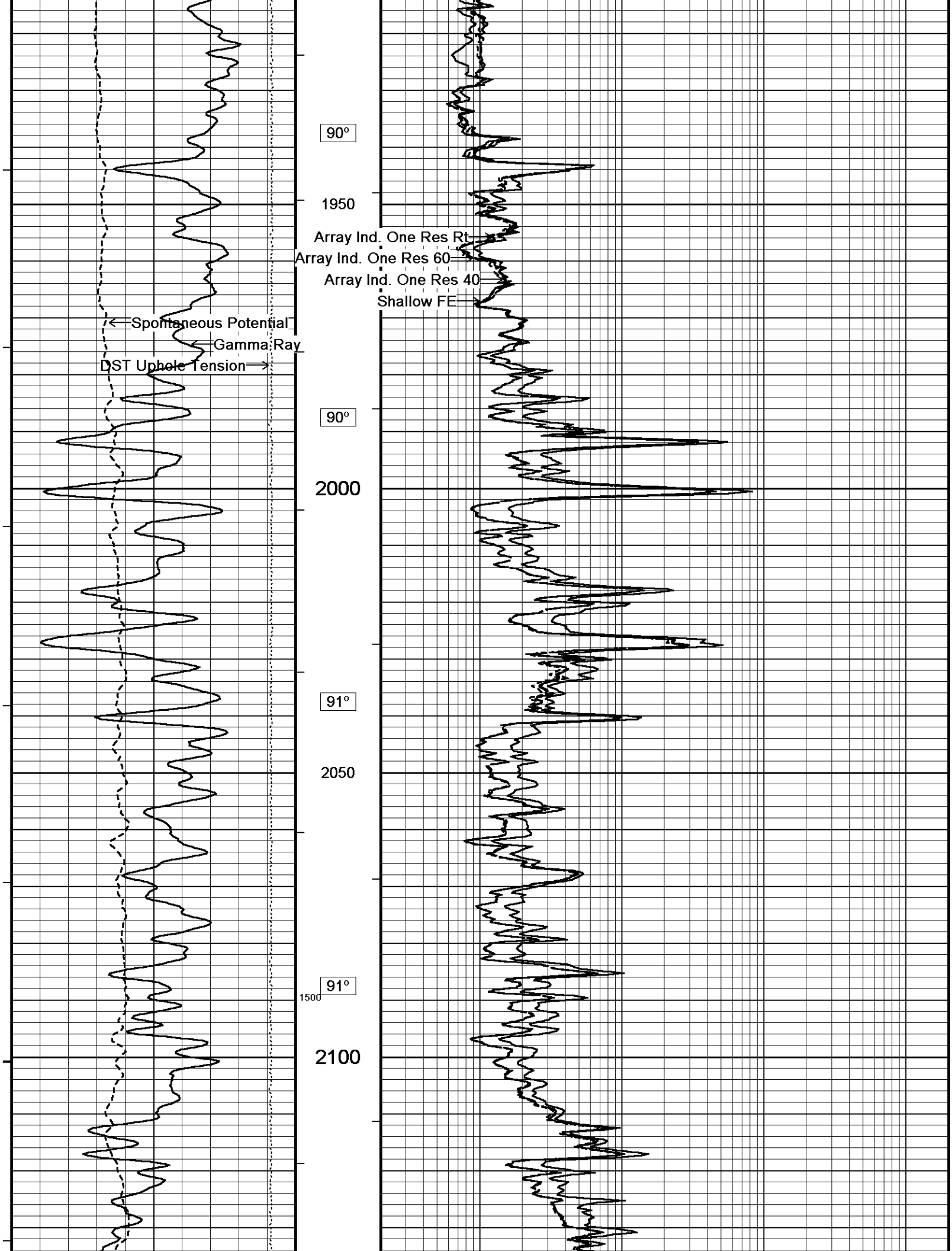
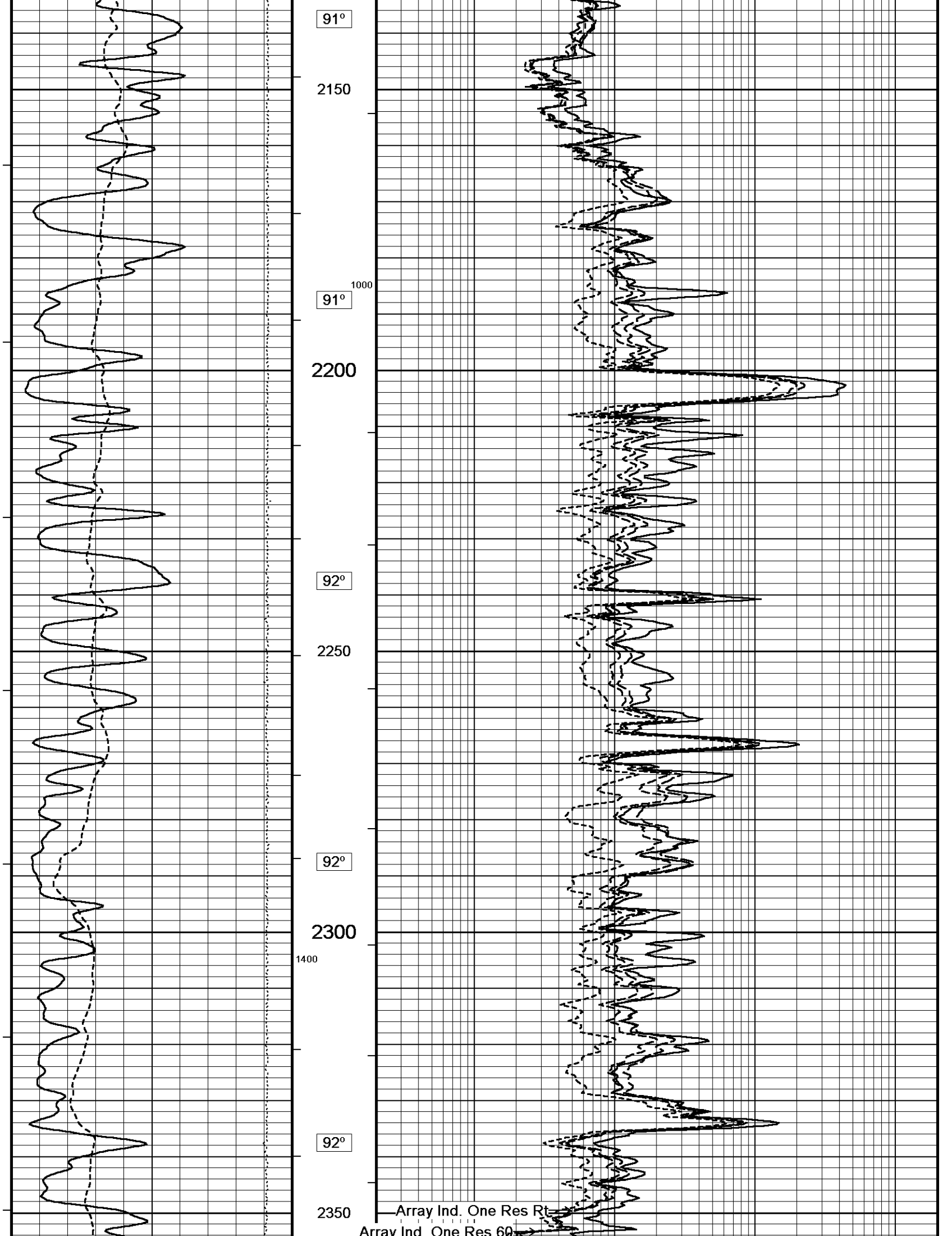
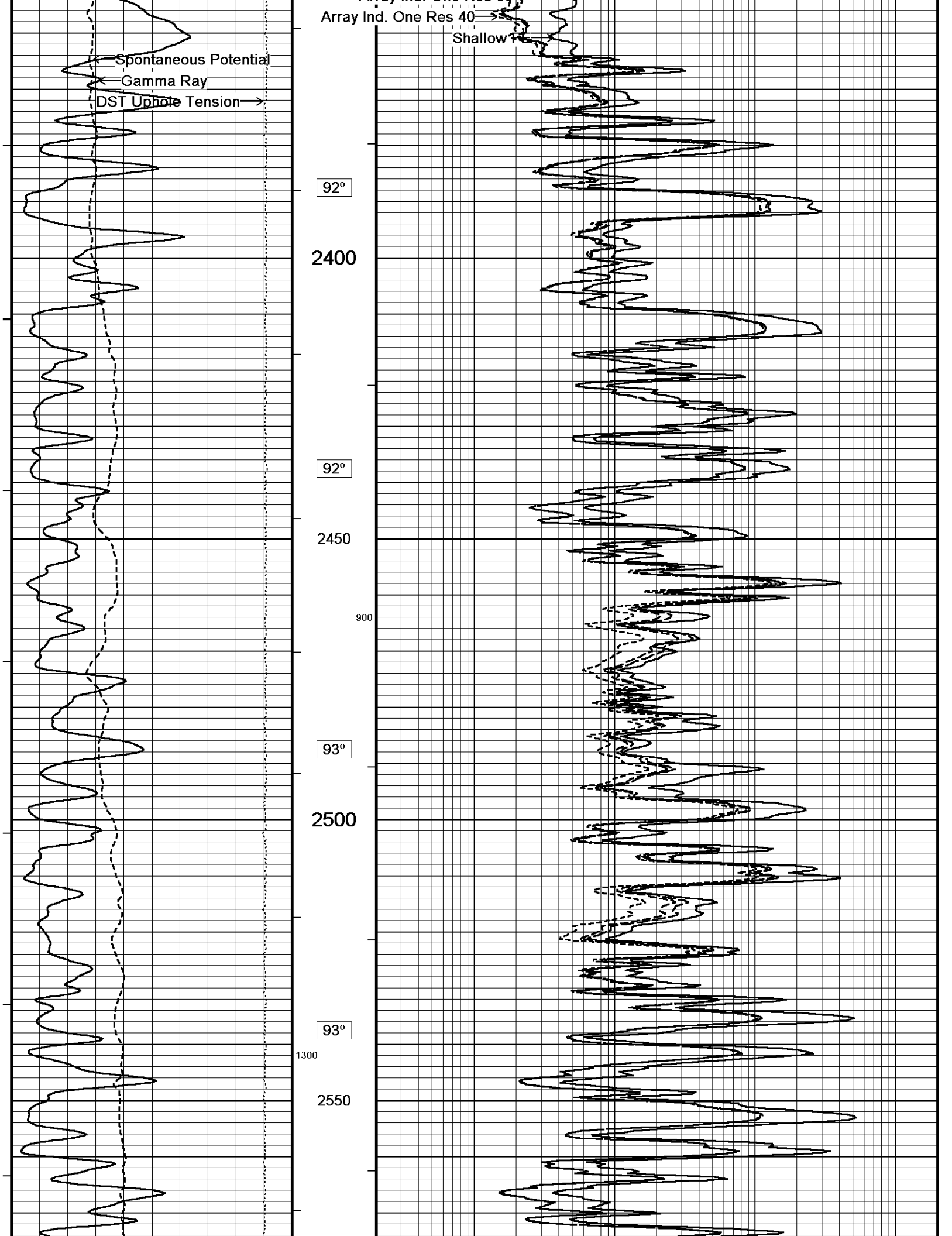


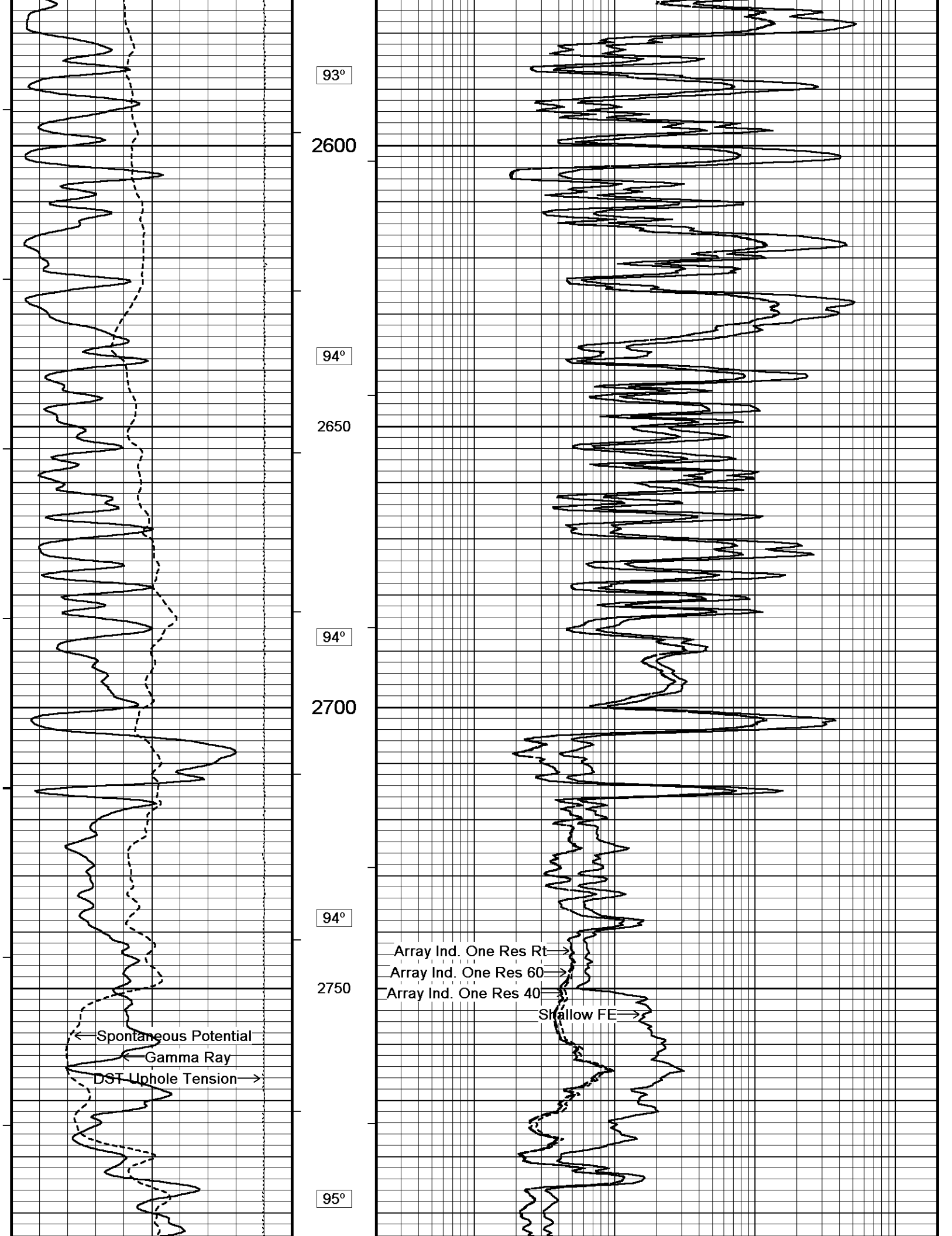

Casing
Shoe
1800
1500
87°
1550
Array Ind. One Res 120
Array Ind. One Res 60
Array Ind. One Res 40
Shallow Foc
Spontaneous Potential
Gamma Ray
DST Uphole Tension
87°
1600
200
88°
1700
1650
88°

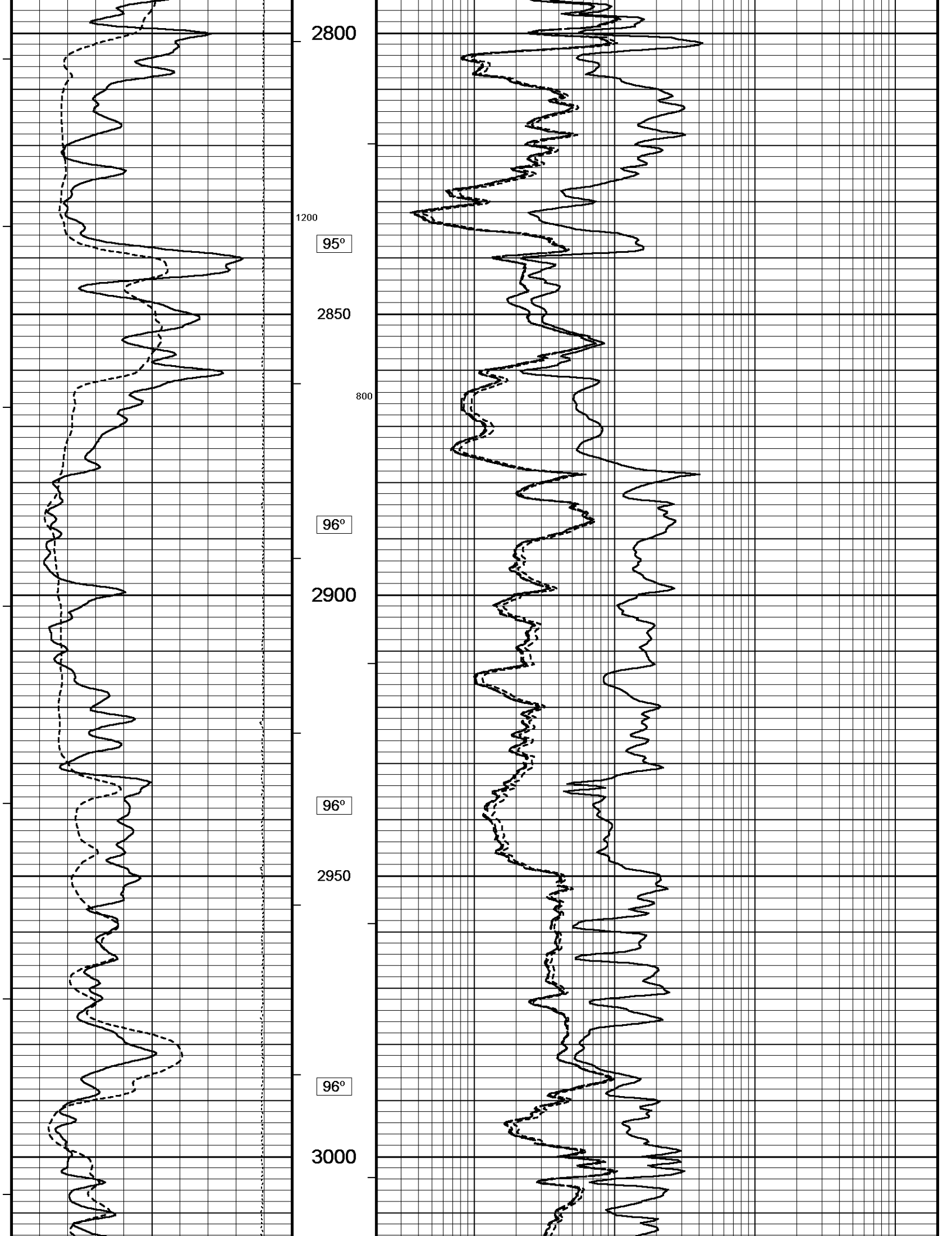

1700
89°
1750
89°
1800
1100
1600
90°
1850
90°
1900

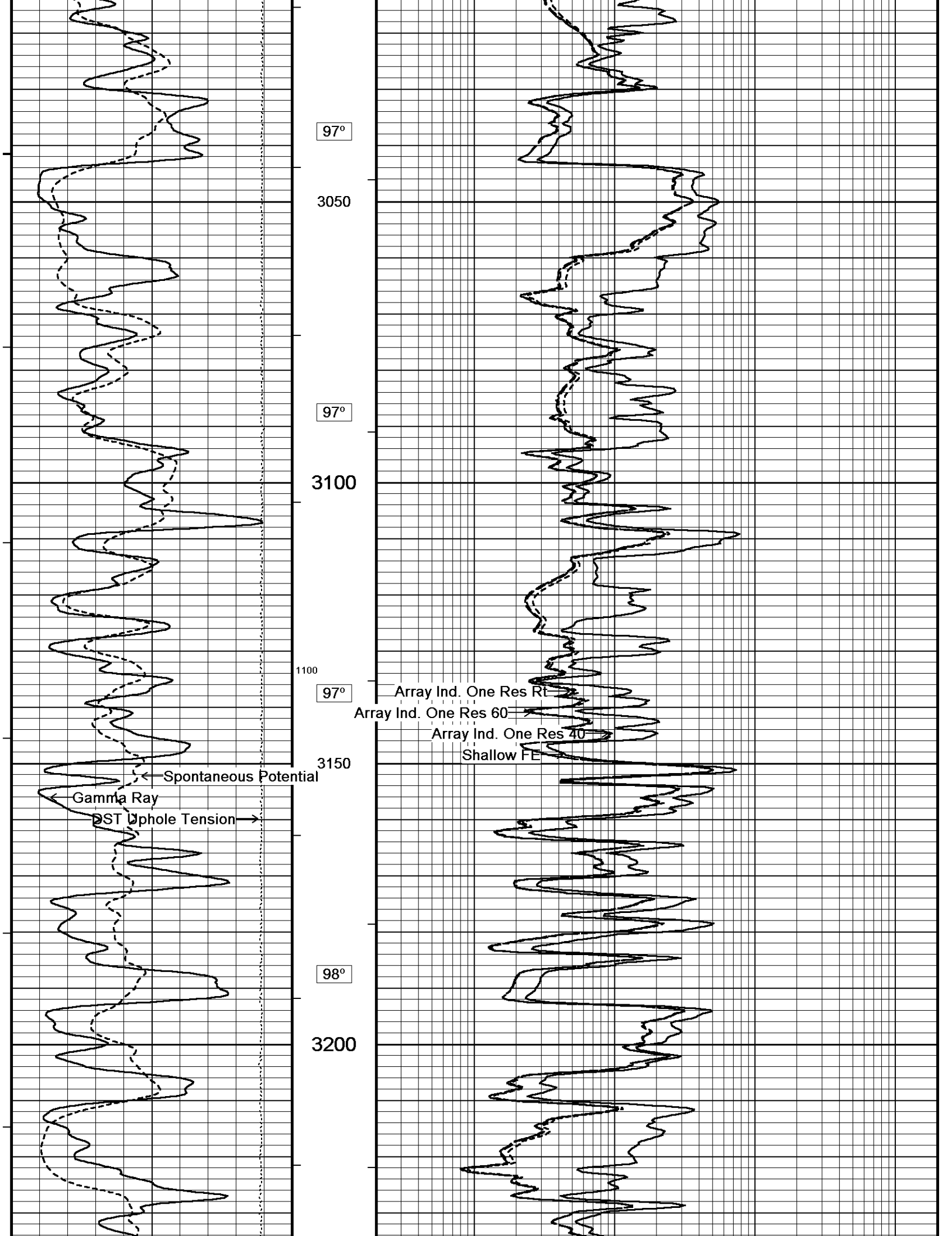

90°
1950
Array Ind. One Res Rt
Array Ind. One Res 60
Array Ind. One Res 40
Shallow FE
Spontaneous Potential
Gamma Ray
DST Uphole Tension
90°
2000
91°
2050
91°
1500
2100

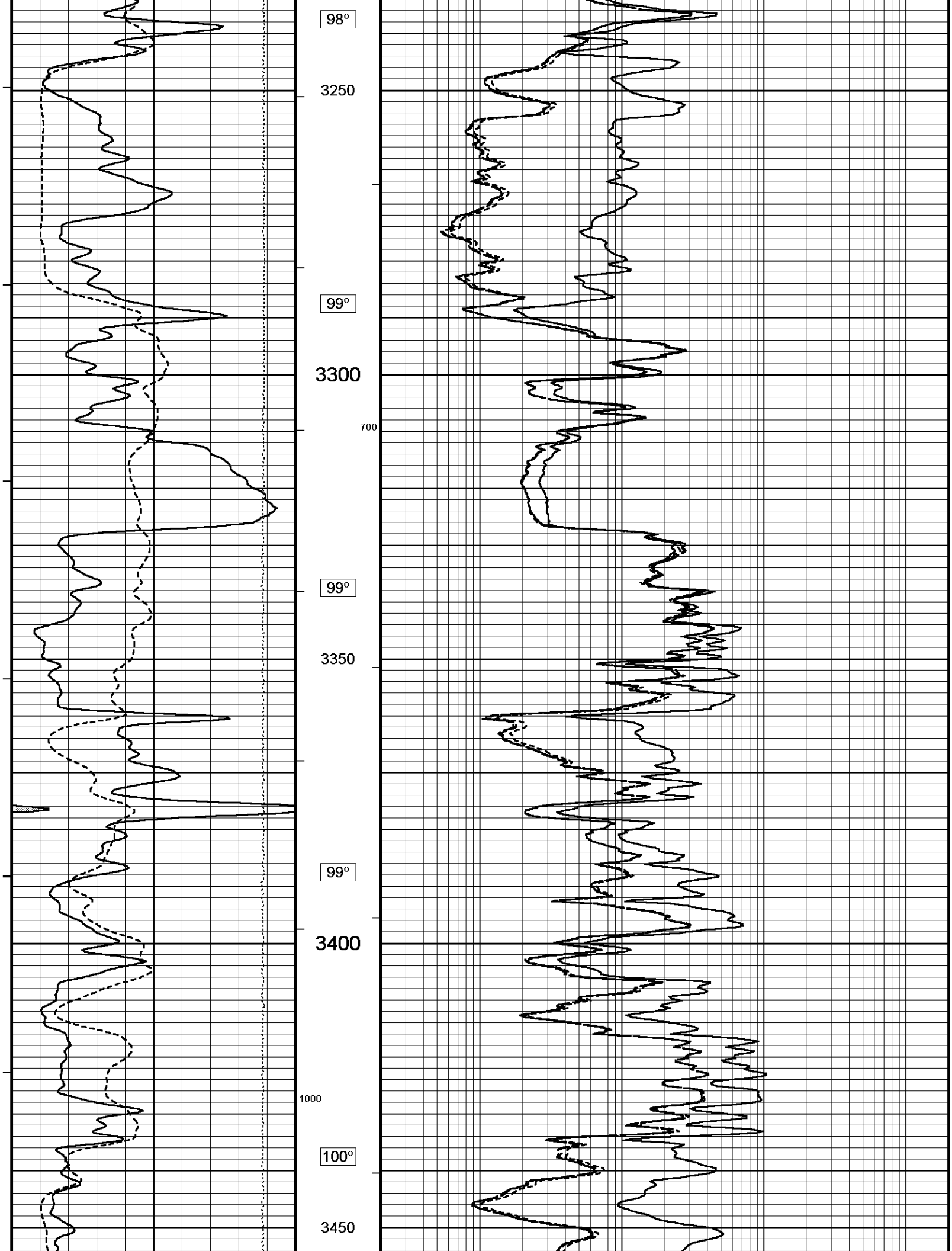

91°
2150
91°
1000
2200
92°
2250
92°
2300
1400
92°
2350
Array Ind. One Res Rt
Array Ind. One Res 60

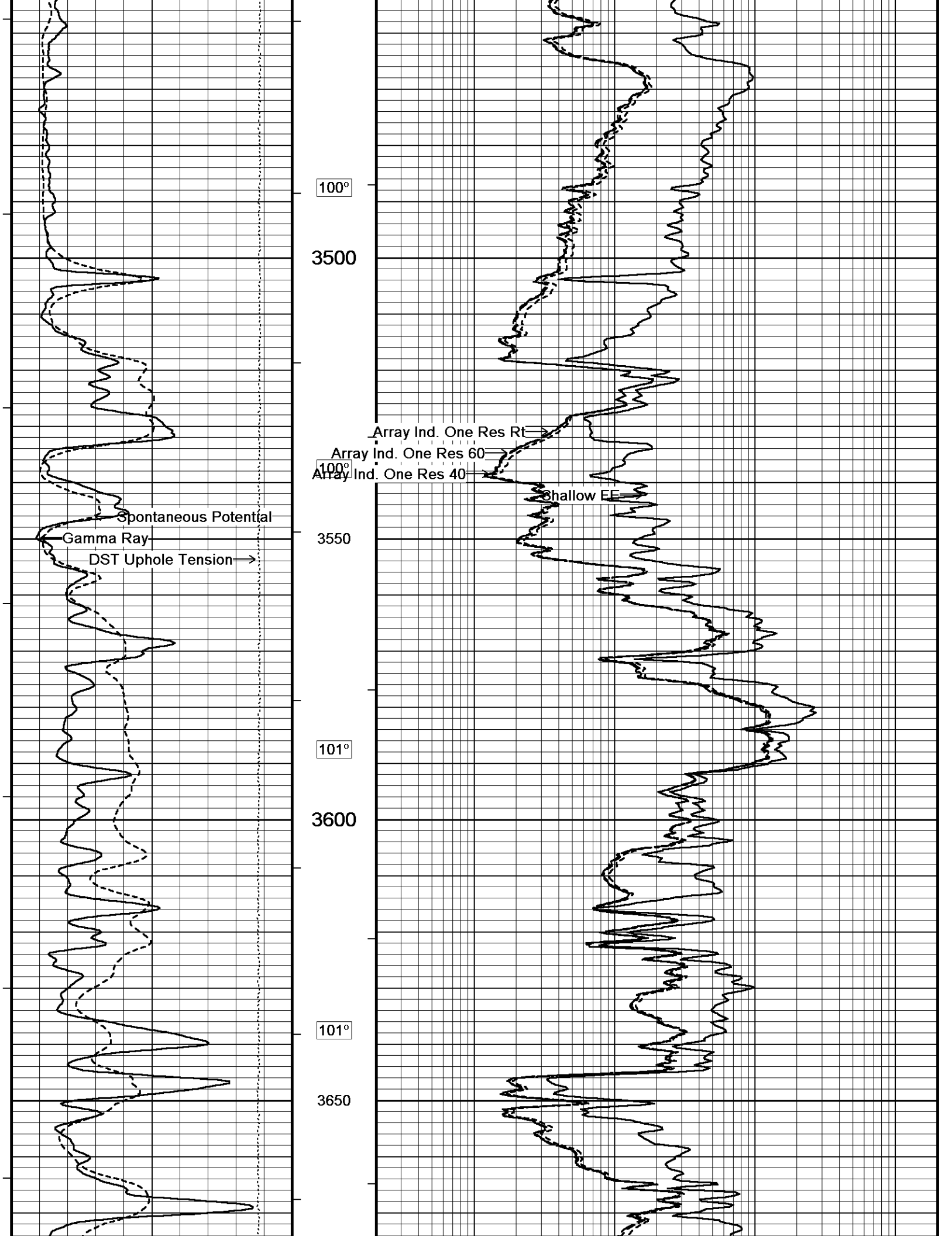

Array Ind. One Res 40
Shallow
Spontaneous Potential
Gamma Ray
DST Uphole Tension
92°
2400
92°
2450
900
93°
2500
93°
1300
2550

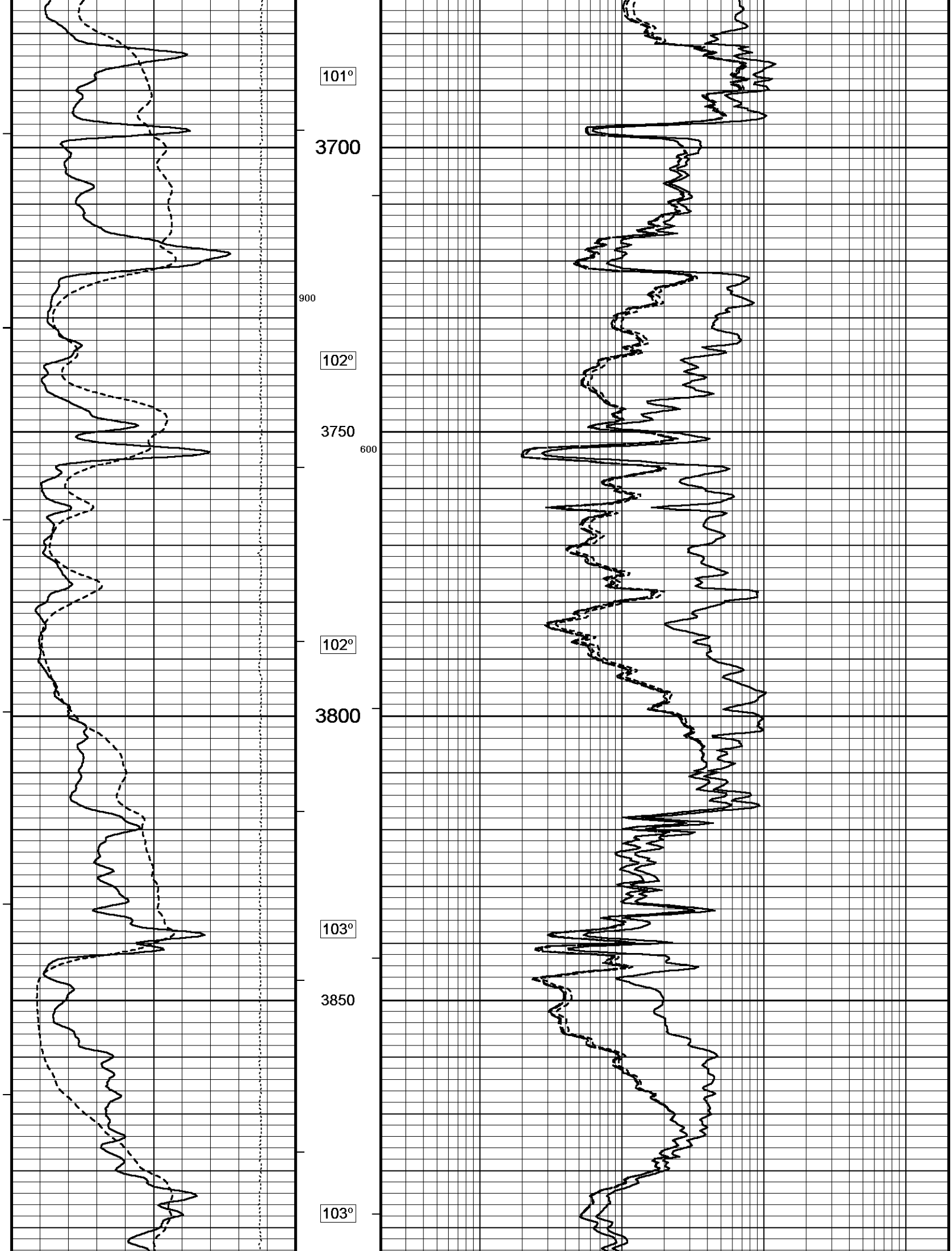

93°
2600
94°
2650
94°
2700
94°
2750
95°
Array Ind. One Res Rt
Array Ind. One Res 60
Array Ind. One Res 40
Shallow FE
Spontaneous Potential
Gamma Ray
DST Uphole Tension


2800
1200
95°
2850
800
96°
2900
96°
2950
96°
3000


97°
3050
97°
3100
1100
97°
Array Ind. One Res Rt
Array Ind. One Res 60
Array Ind. One Res 40
Shallow FE
3150
Spontaneous Potential
Gamma Ray
DST Uphole Tension
98°
3200


98°
3250
99°
3300
700
99°
3350
99°
3400
1000
100°
3450


100°
3500
Array Ind. One Res Rt
Array Ind. One Res 60
100°
Array Ind. One Res 40
Shallow EE
Spontaneous Potential
Gamma Ray
3550
DST Uphole Tension
101°
3600
101°
3650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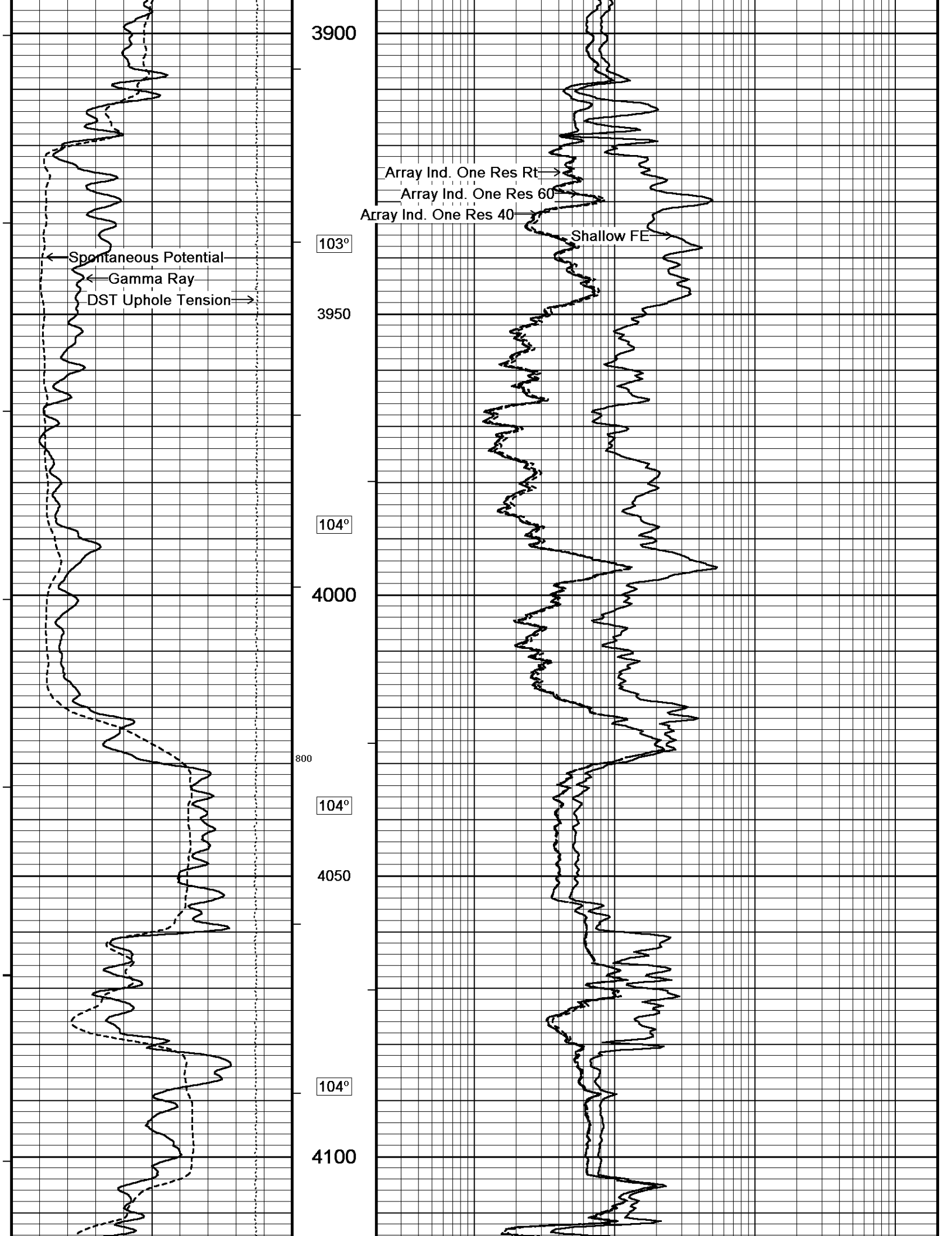
3700
900
102°
3750
600
102°
3800
103°
3850
103°


3900
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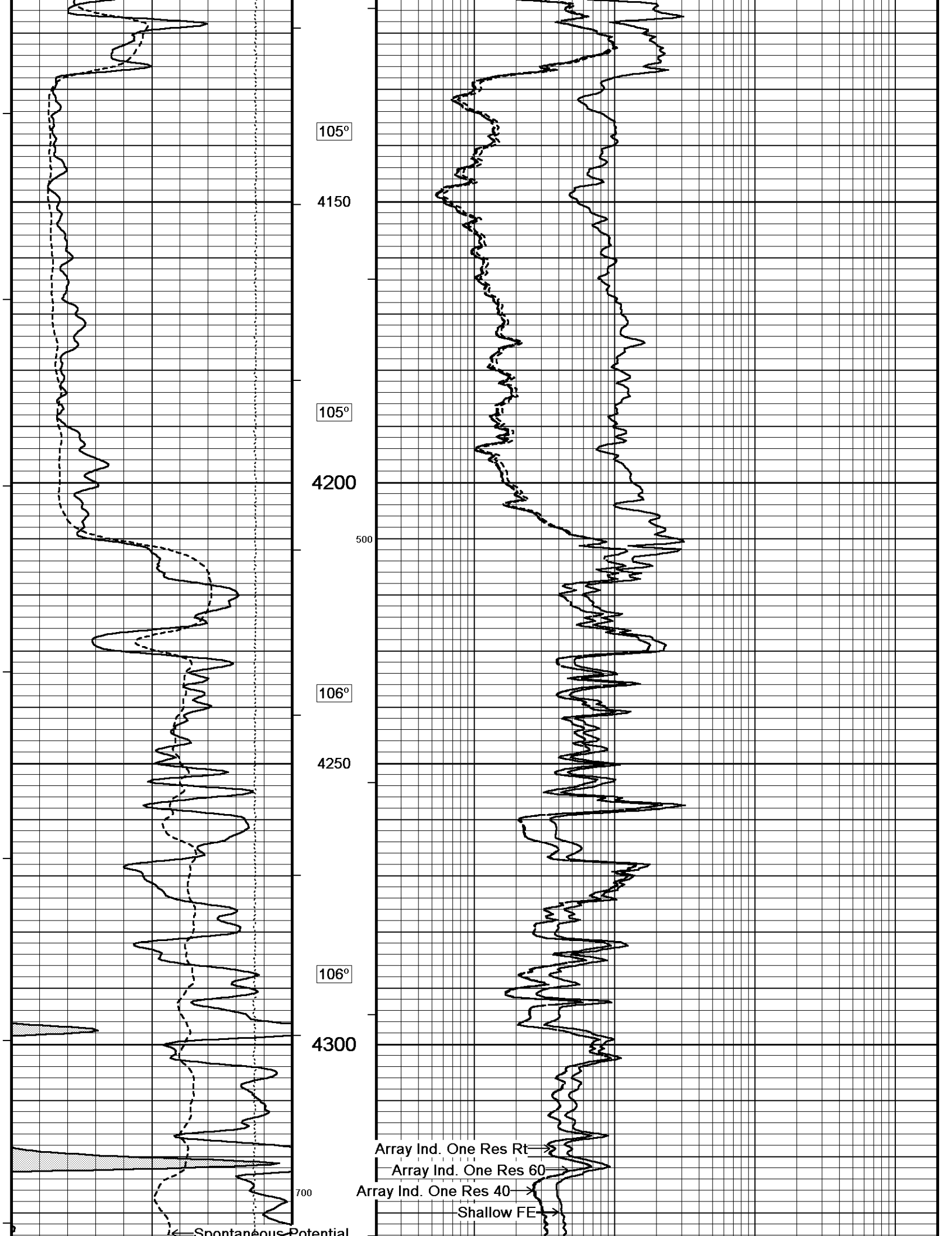
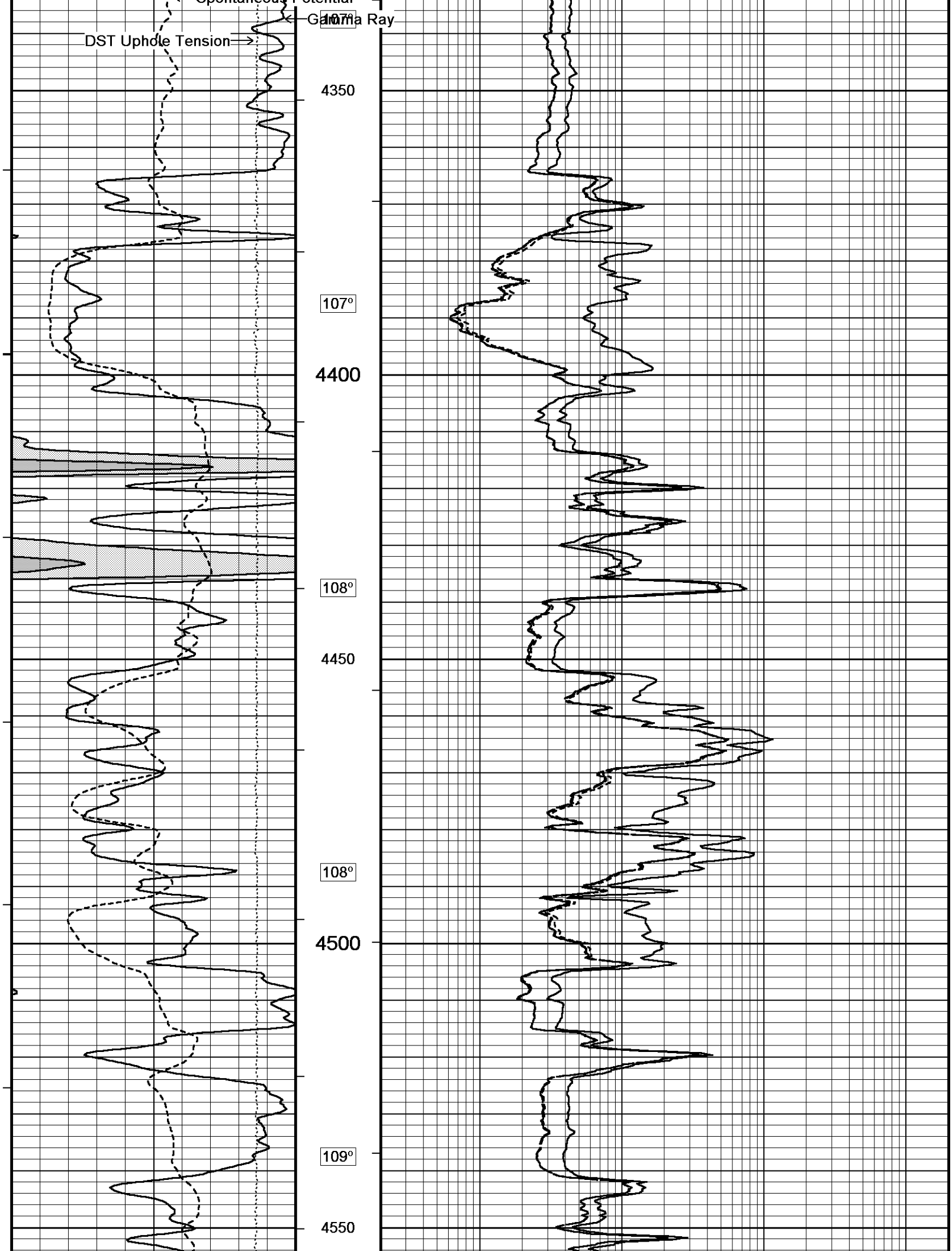
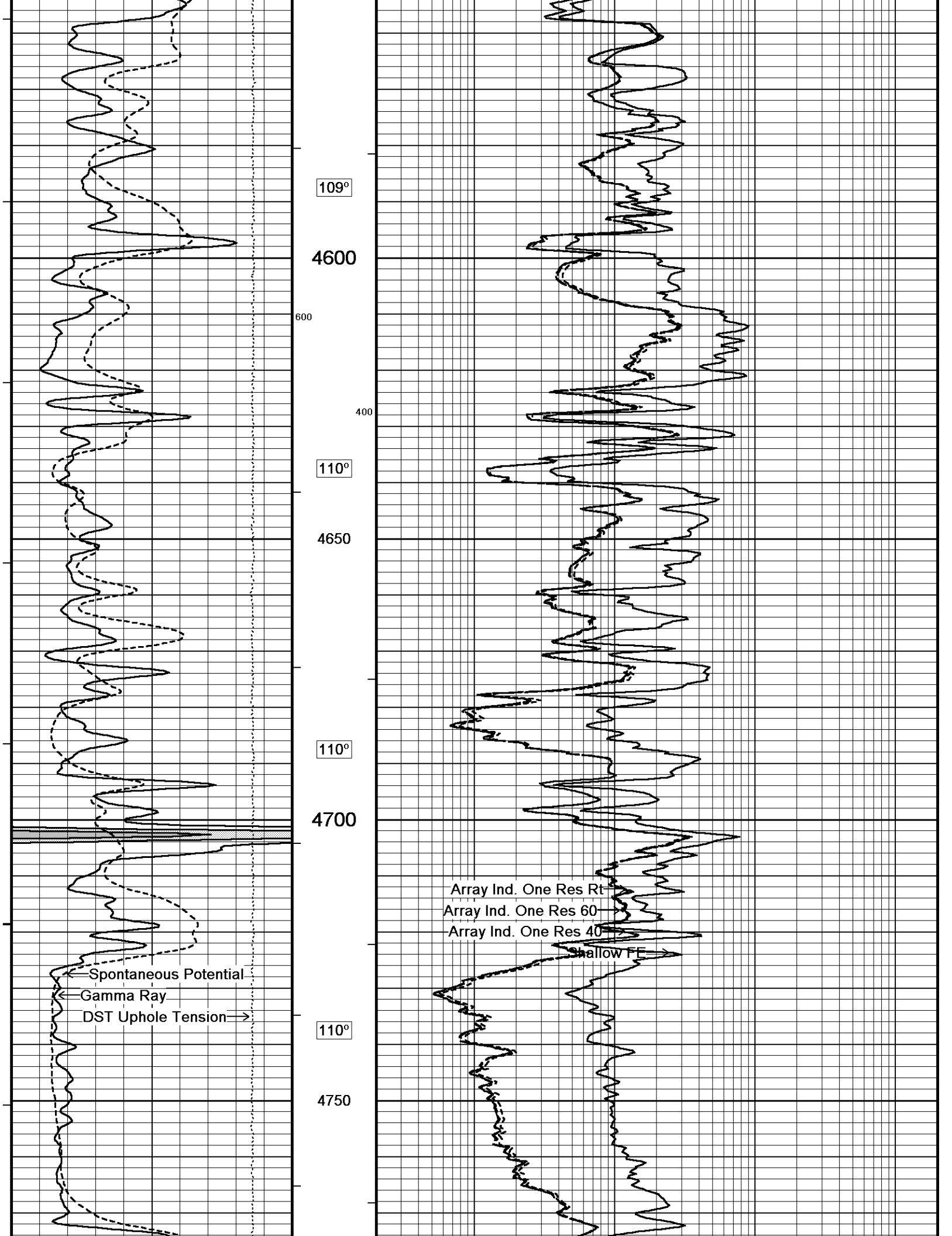
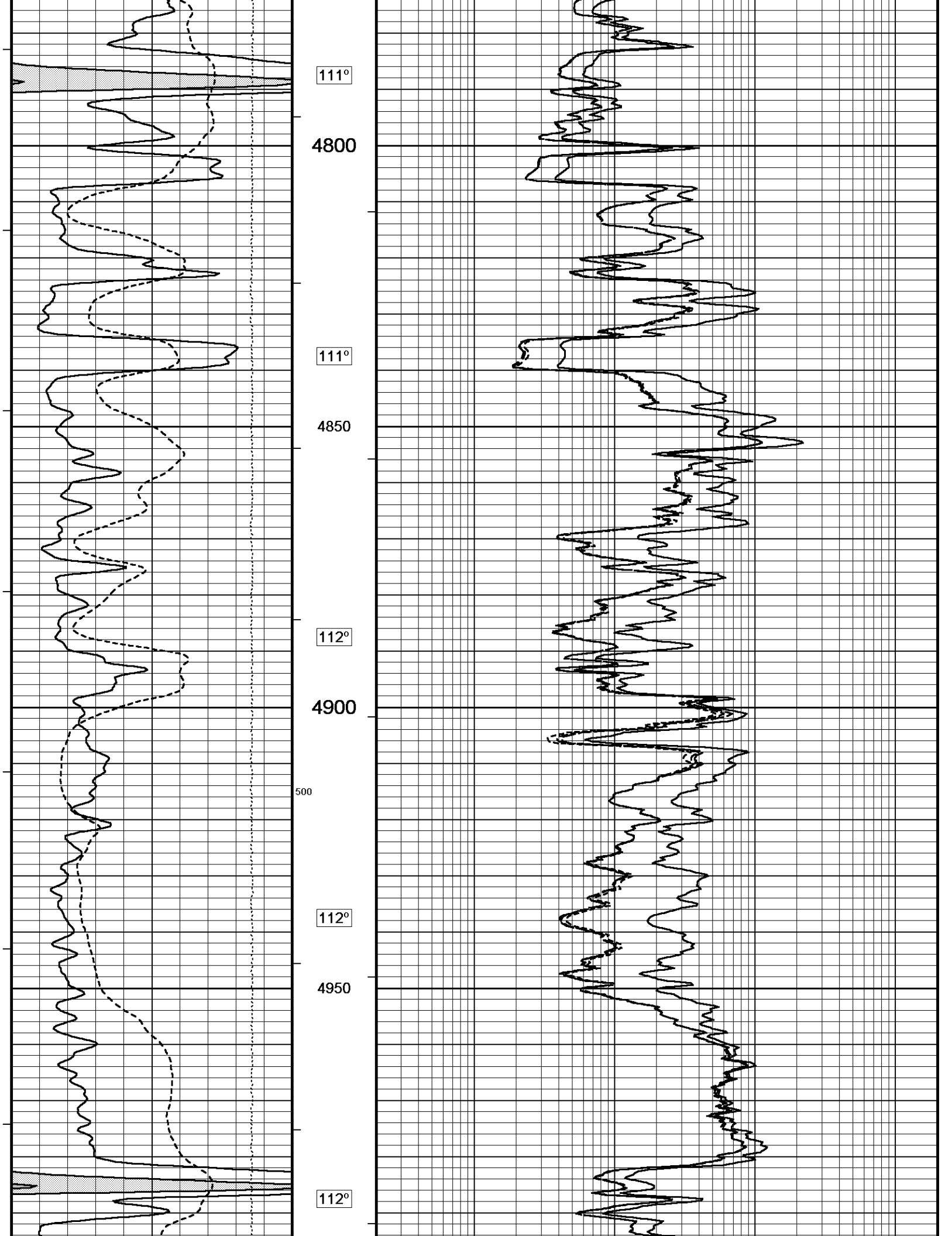
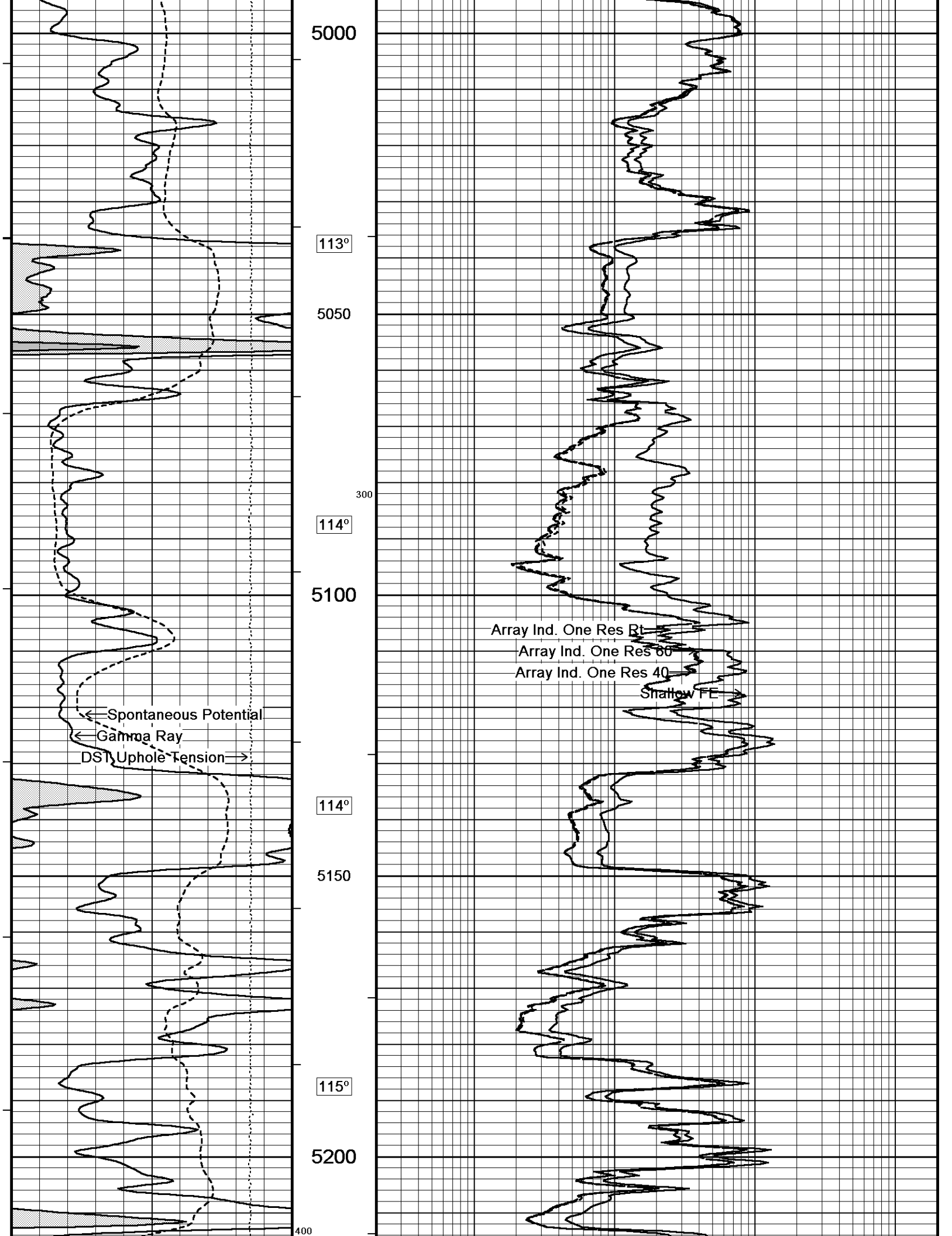
Array Ind. One Res 60
Array Ind. One Res 40
Shallow FE
103°
Spontaneous Potential
Gamma Ray
DST Uphole Tension
3950
104°
4000
800
104°
4050
104°
4100

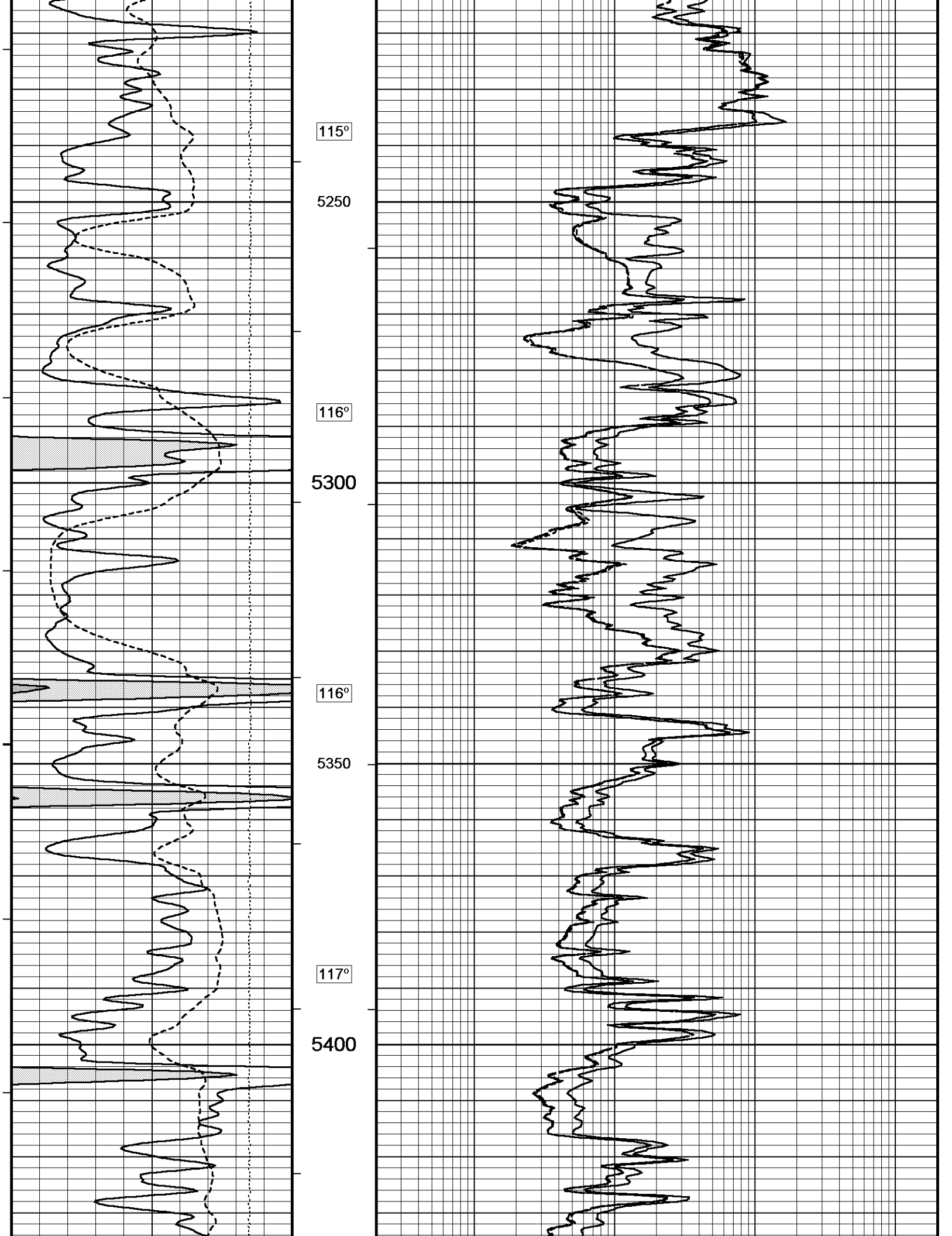

105°
4150
105°
4200
500
106°
4250
106°
4300
700
Array Ind. One Res Rt
Array Ind. One Res 60
Array Ind. One Res 40
Shallow FE
Spontaneous Potential

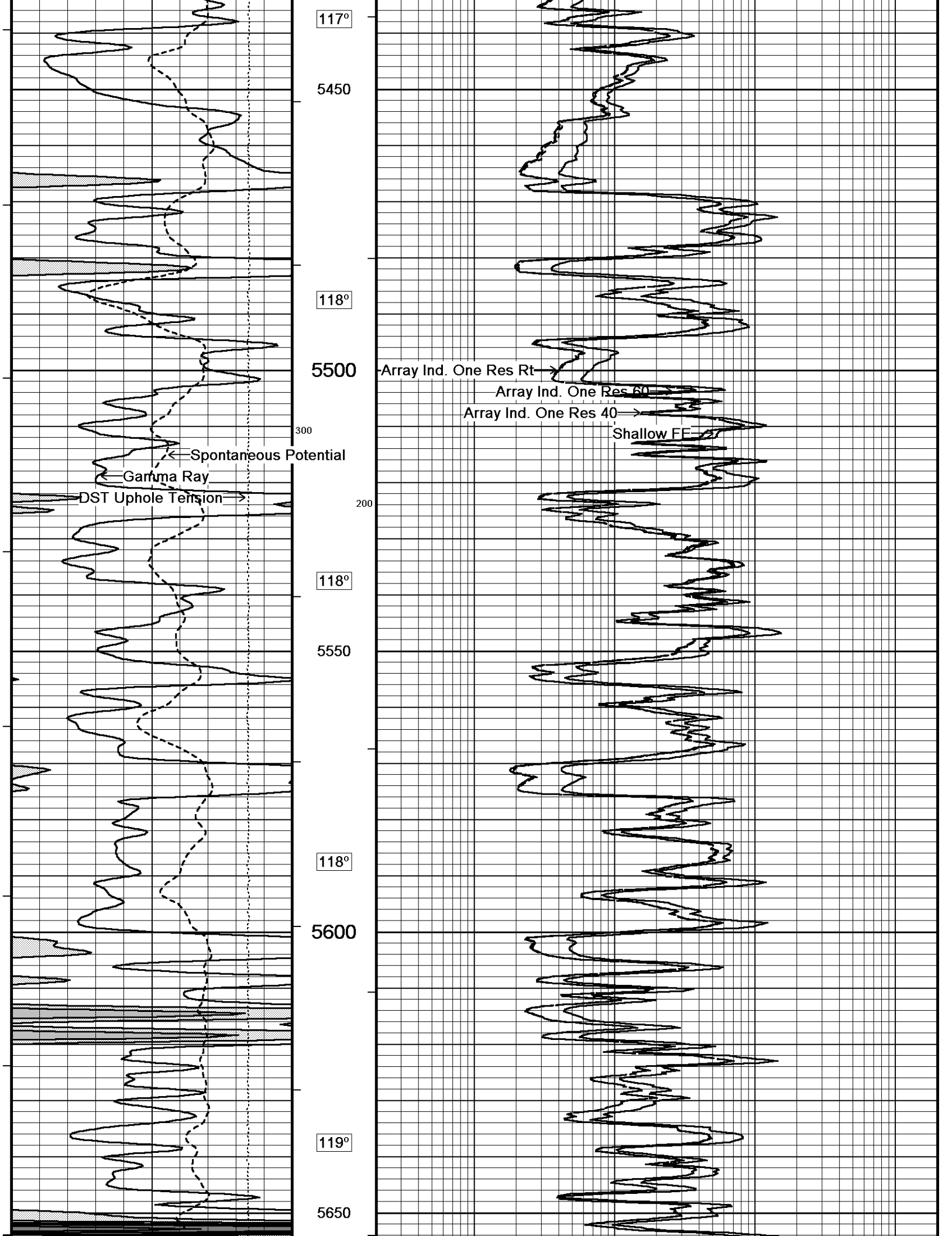

Spontaneous Potential
Gamma Ray
DST Uphole Tension
4350
107°
4400
107°
108°
4450
108°
4500
109°
4550

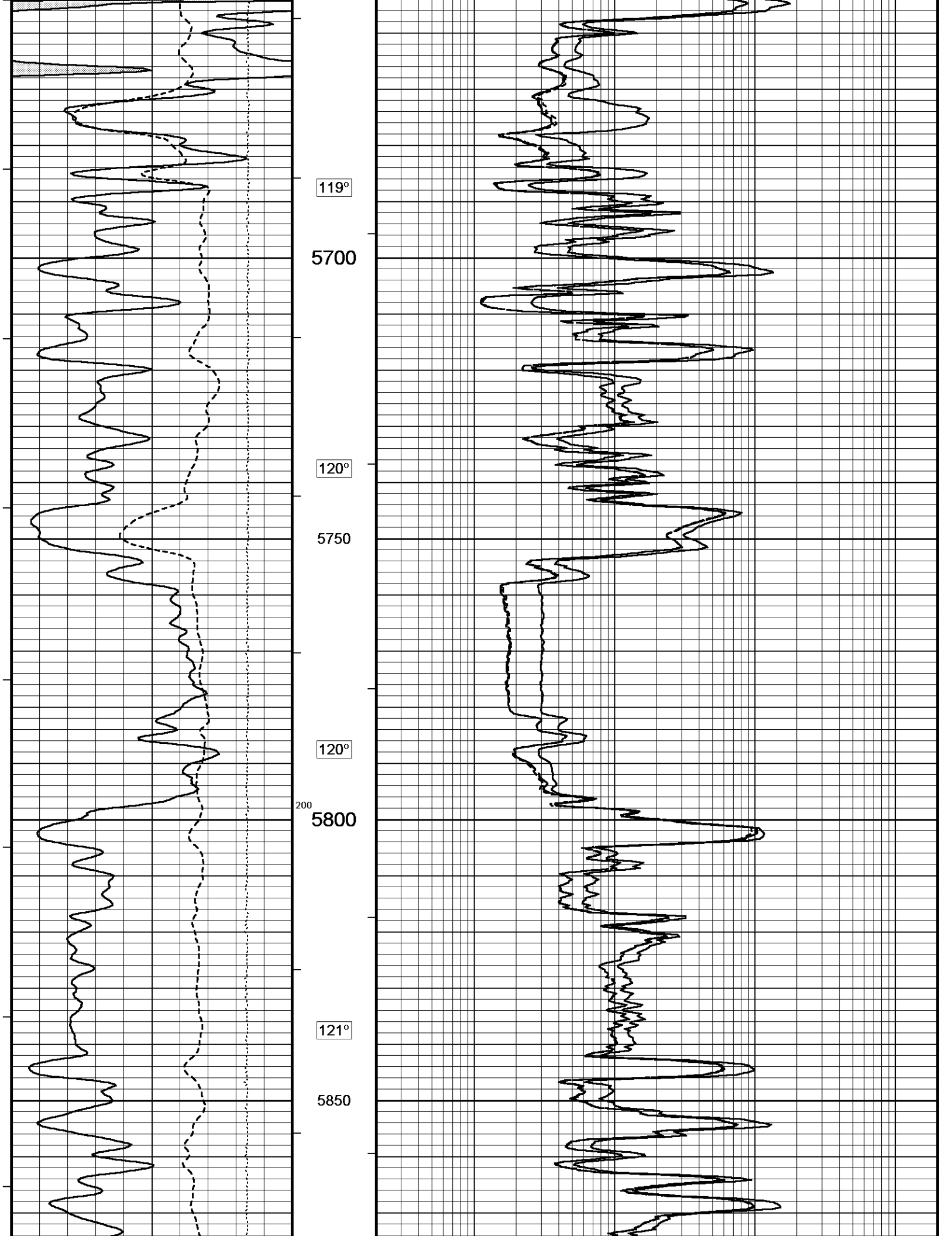

109°
4600
600
400
110°
4650
110°
4700
110°
4750
Array Ind. One Res Rt
Array Ind. One Res 60
Array Ind. One Res 40
Shallow FE
Spontaneous Potential
Gamma Ray
DST Uphole Tension

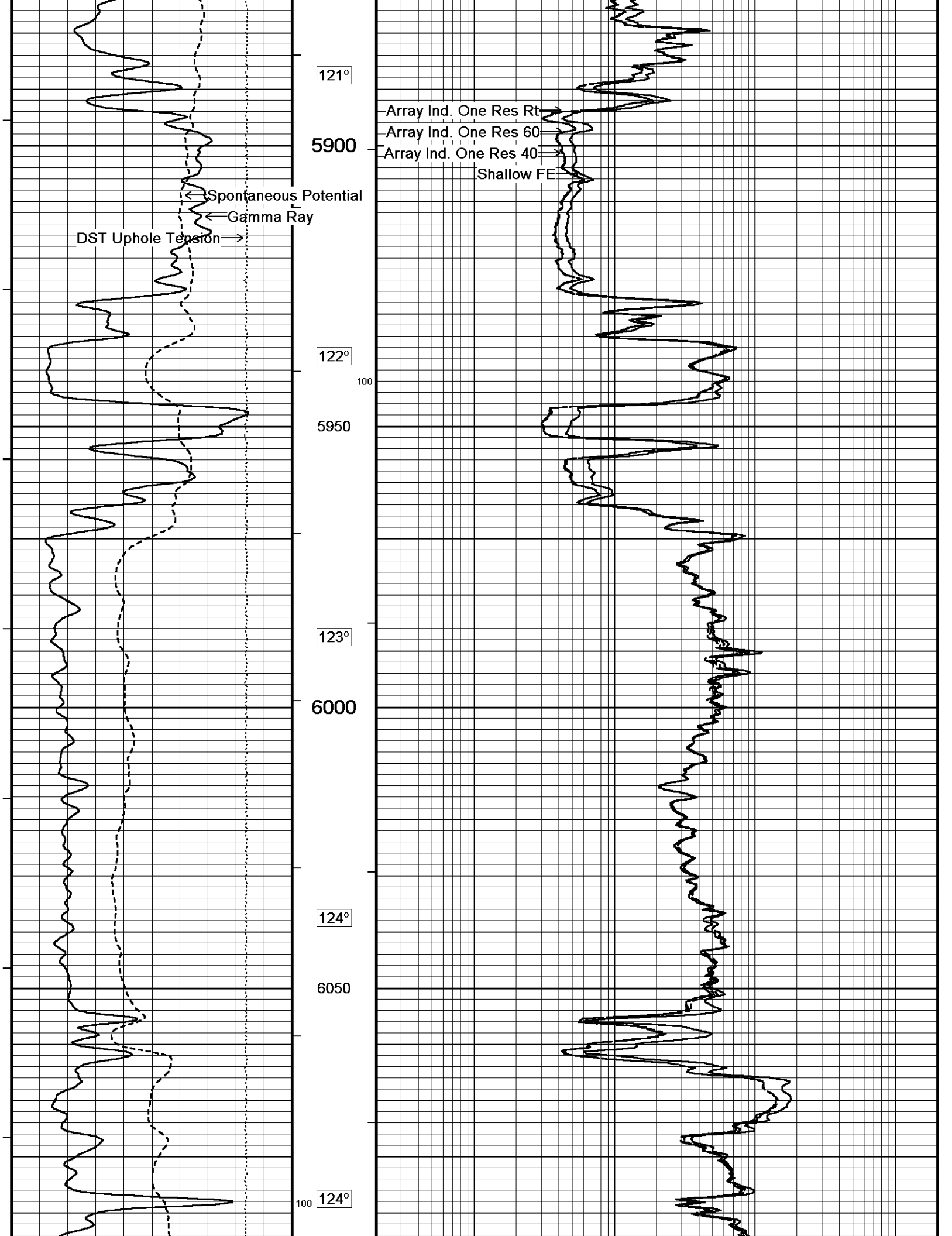

111°
4800
111°
4850
112°
4900
500
112°
4950
112°

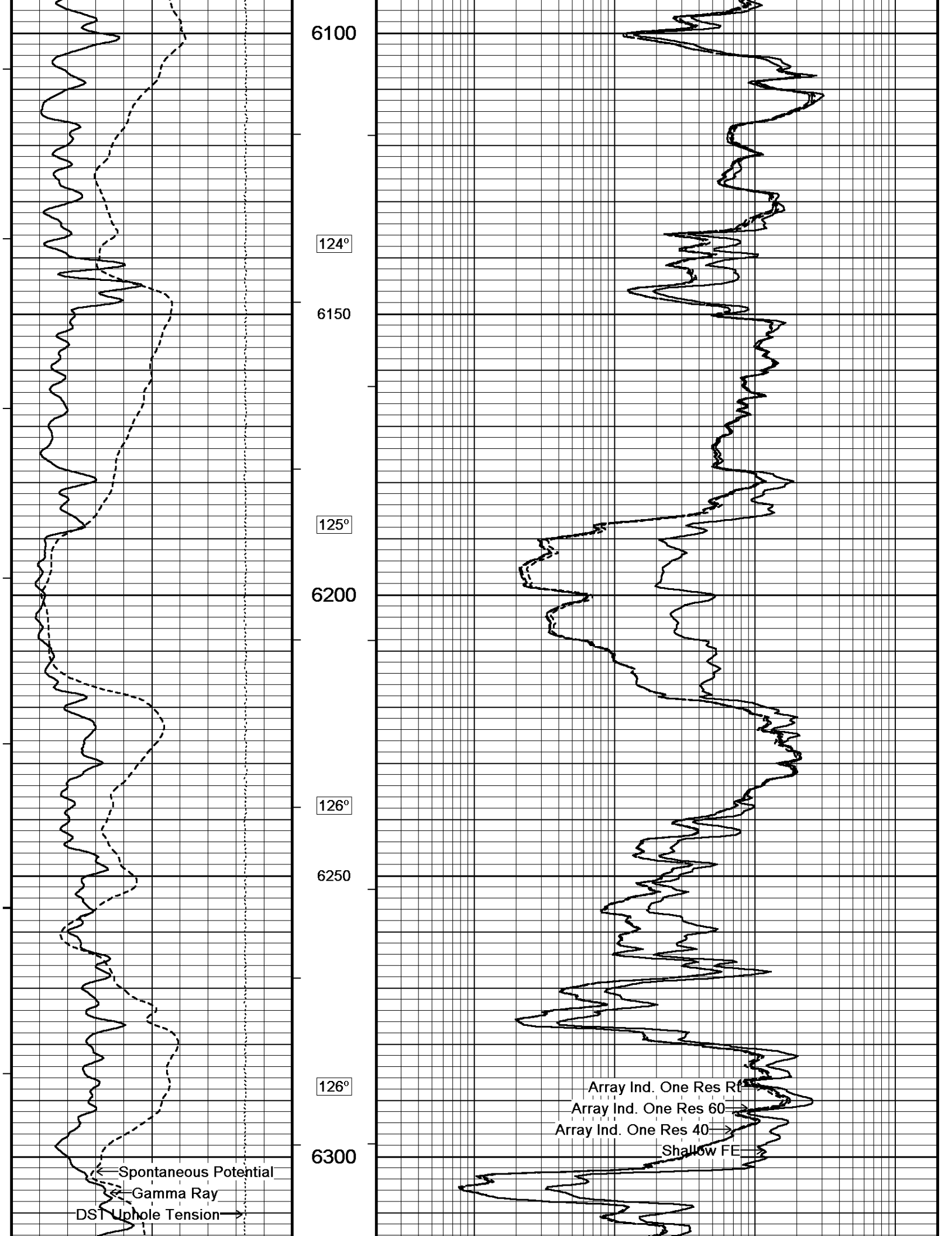

5000
113°
5050
300
114°
5100
Array Ind. One Res Rt
Array Ind. One Res 60
Array Ind. One Res 40
Shallow FE
Spontaneous Potential
Gamma Ray
DST Uphole Tension
114°
5150
115°
5200
400

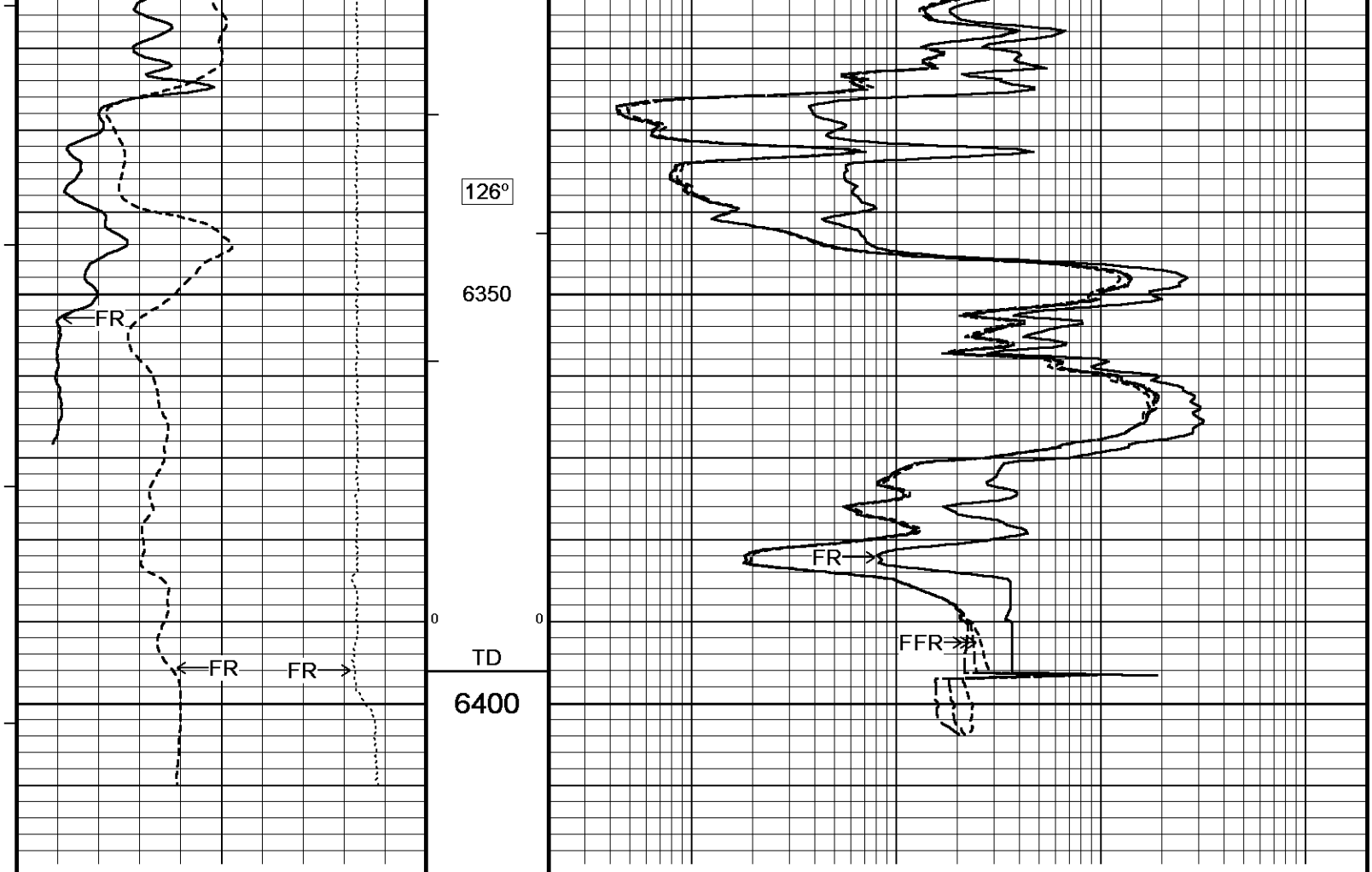

115°
5250
116°
5300
116°
5350
117°
5400


117°
5450
118°
5500
Array Ind. One Res Rt
Array Ind. One Res 60
Array Ind. One Res 40
Shallow FF
300
Spontaneous Potential
Gamma Ray
DST Uphole Tension
200
118°
5550
118°
5600
119°
5650


119°
5700
120°
5750
120°
200
5800
121°
5850


121°
5900
Spontaneous Potential
Gamma Ray
DST Uphole Tension
122°
100
5950
123°
6000
124°
6050
100
124°
Array Ind. One Res Rt
Array Ind. One Res 60
Array Ind. One Res 40
Shallow FE


6100
124°
6150
125°
6200
126°
6250
126°
6300
Spontaneous Potential
Gamma Ray
DST Uphole Tension
Array Ind. One Res RT
Array Ind. One Res 60
Array Ind. One Res 40
Shallow FE



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 02-JAN-2015 11:02
Filename: C:\Minimus 14.05\Log Data\O'Brien Angell 1-18\O'Brien Angell 1-18 Main.dta
Recorded on 02-JAN-2015 08:05
System Versions: Logged with 14.05.5280 Processed with 14.05.5280 Plotted with 14.05.5280

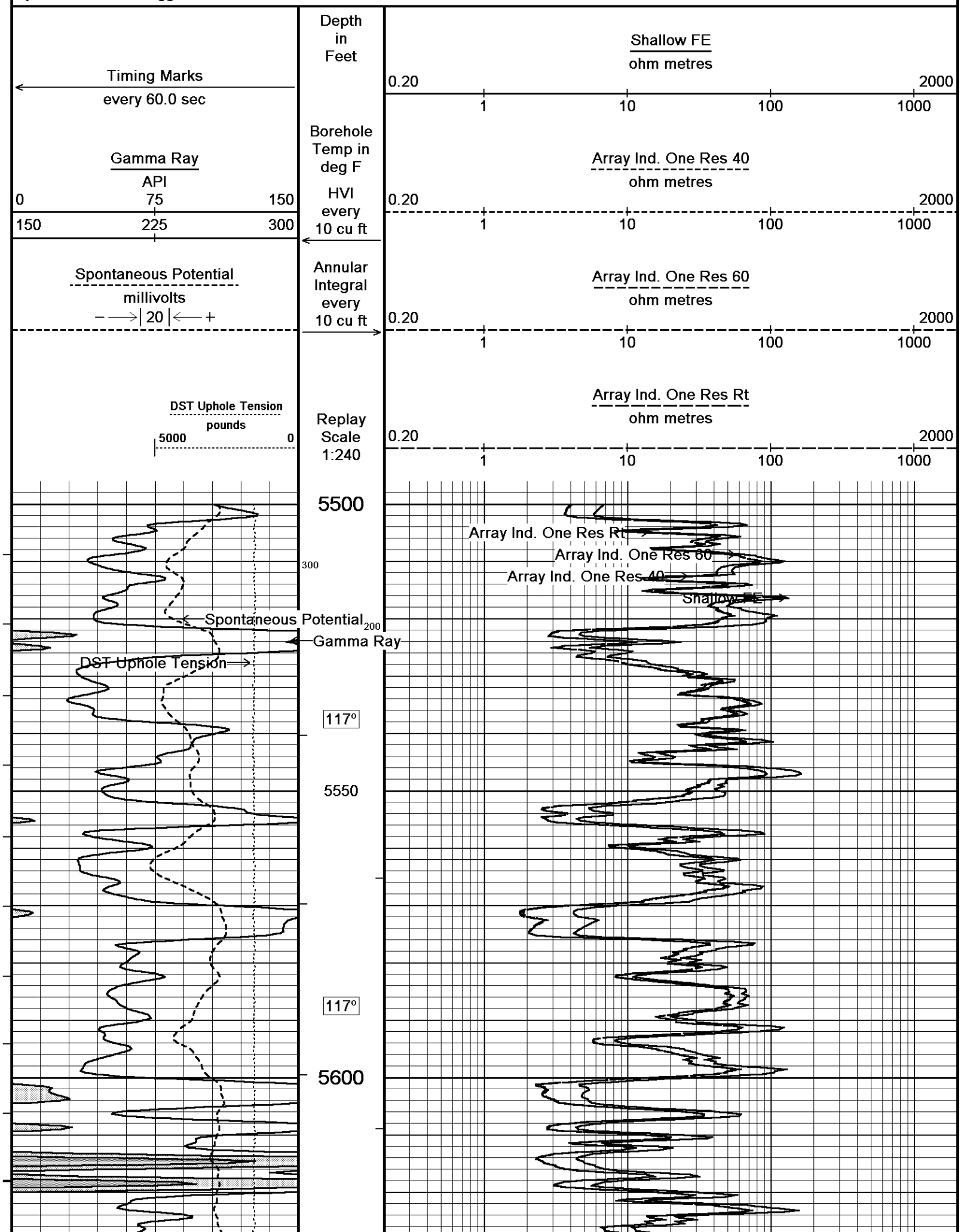
5 INCH MAIN

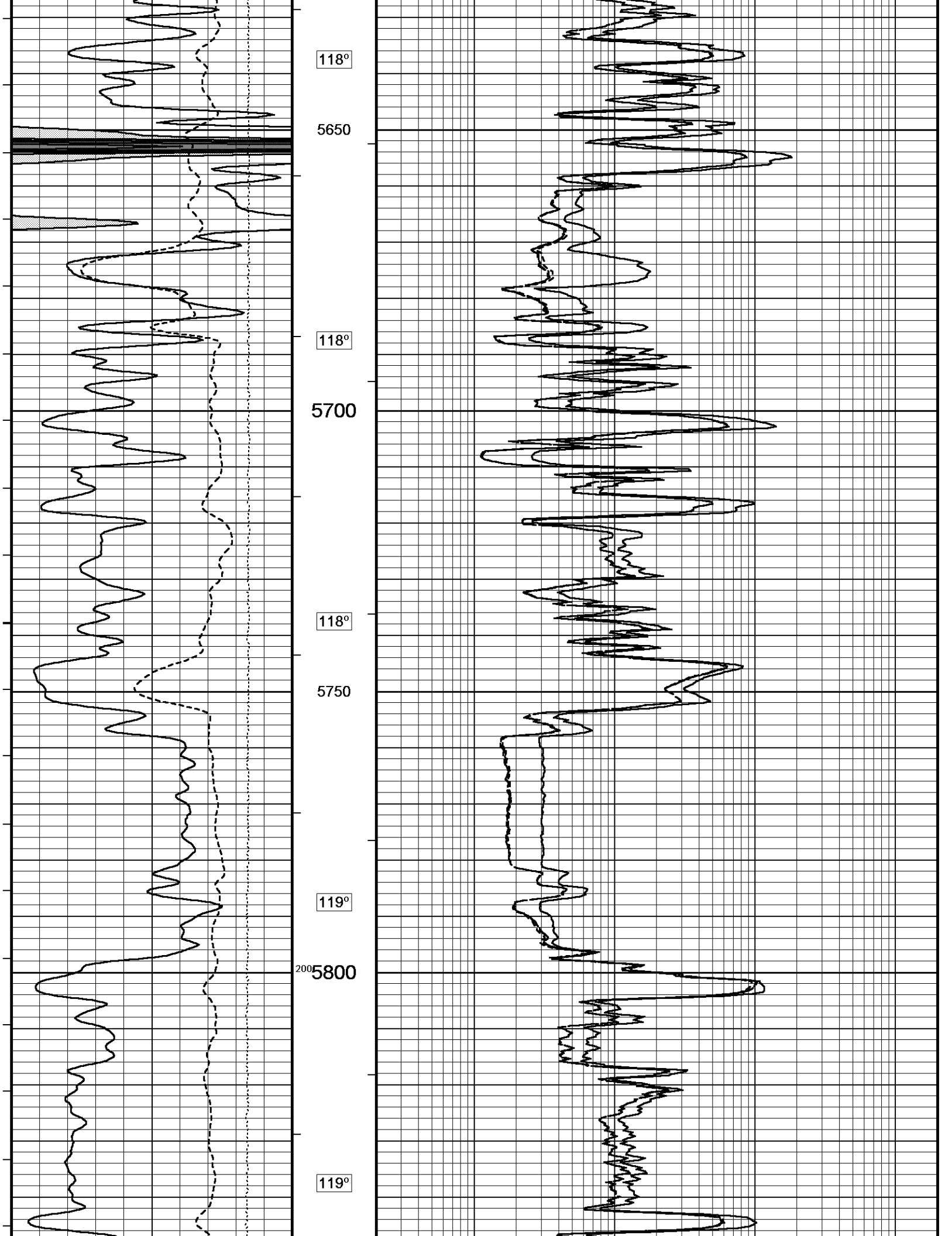
REPEAT SECTION

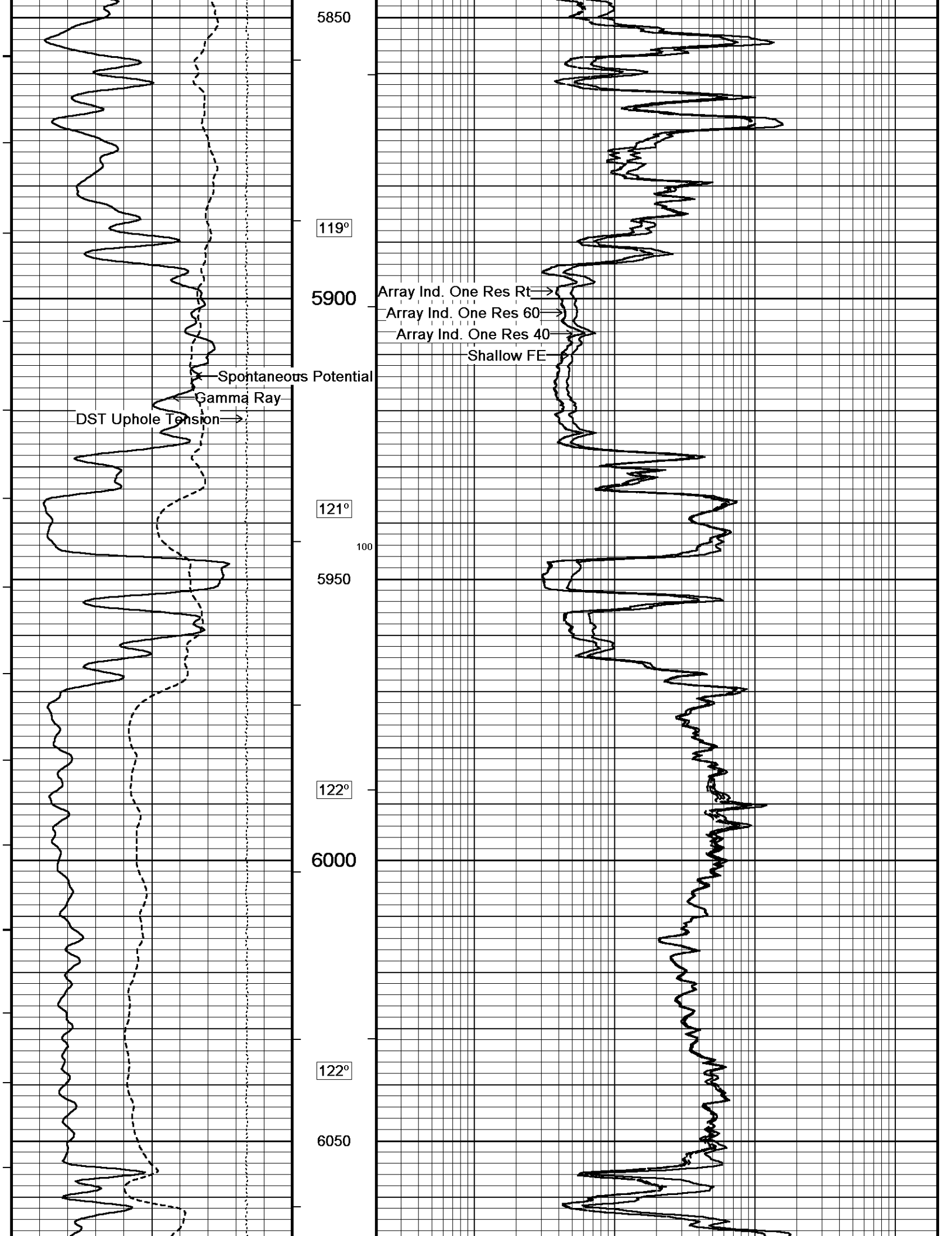
Depth Based Data - Maximum Sampling Increment 10.0cm
Plotted on 02-JAN-2015 11:02

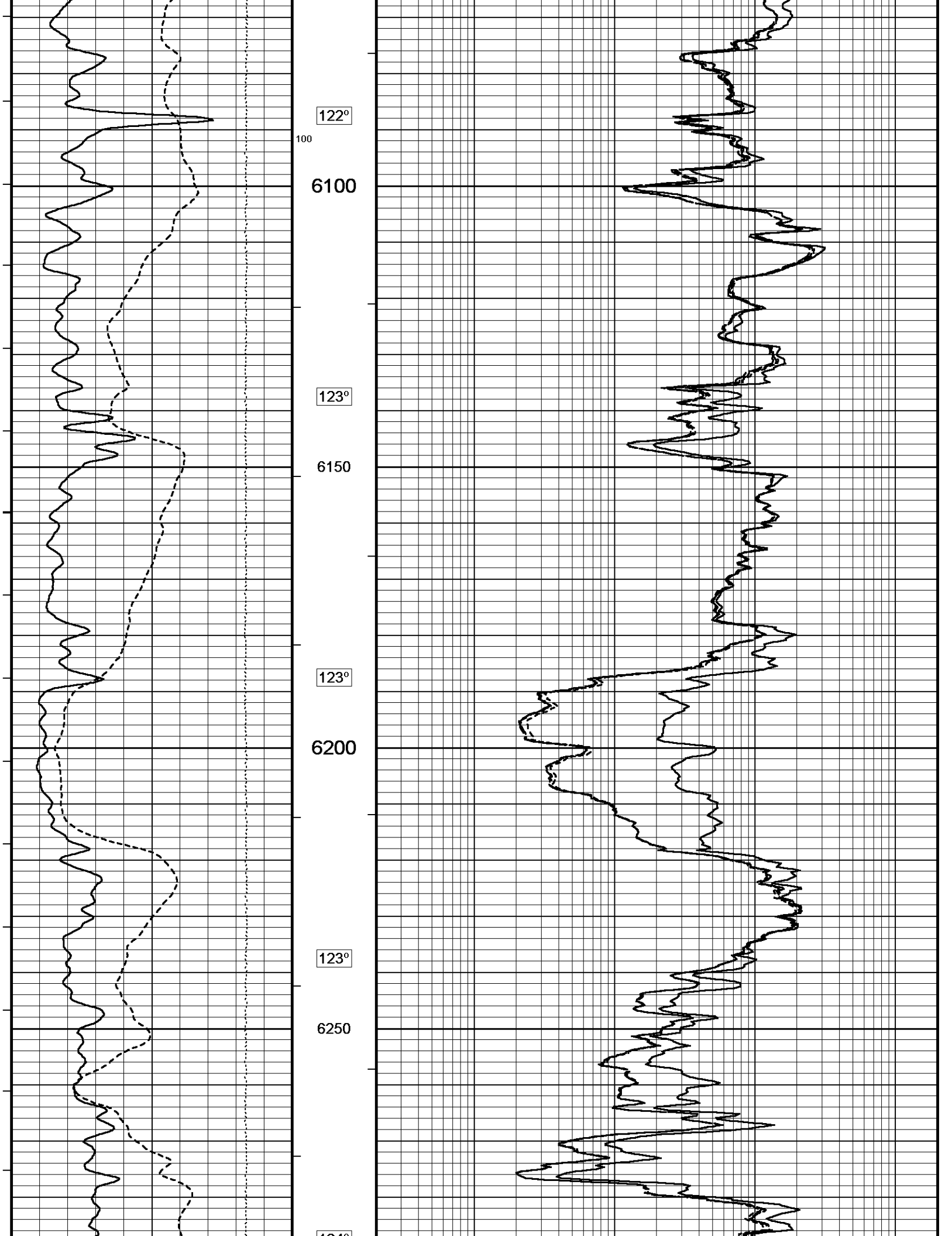
Filename: C:\Minimus 14.05\Log Data\O'Brien Angell 1-18\O'Brien Angell 1-18 Repeat.dta Recorded on 02-JAN-2015 06:46

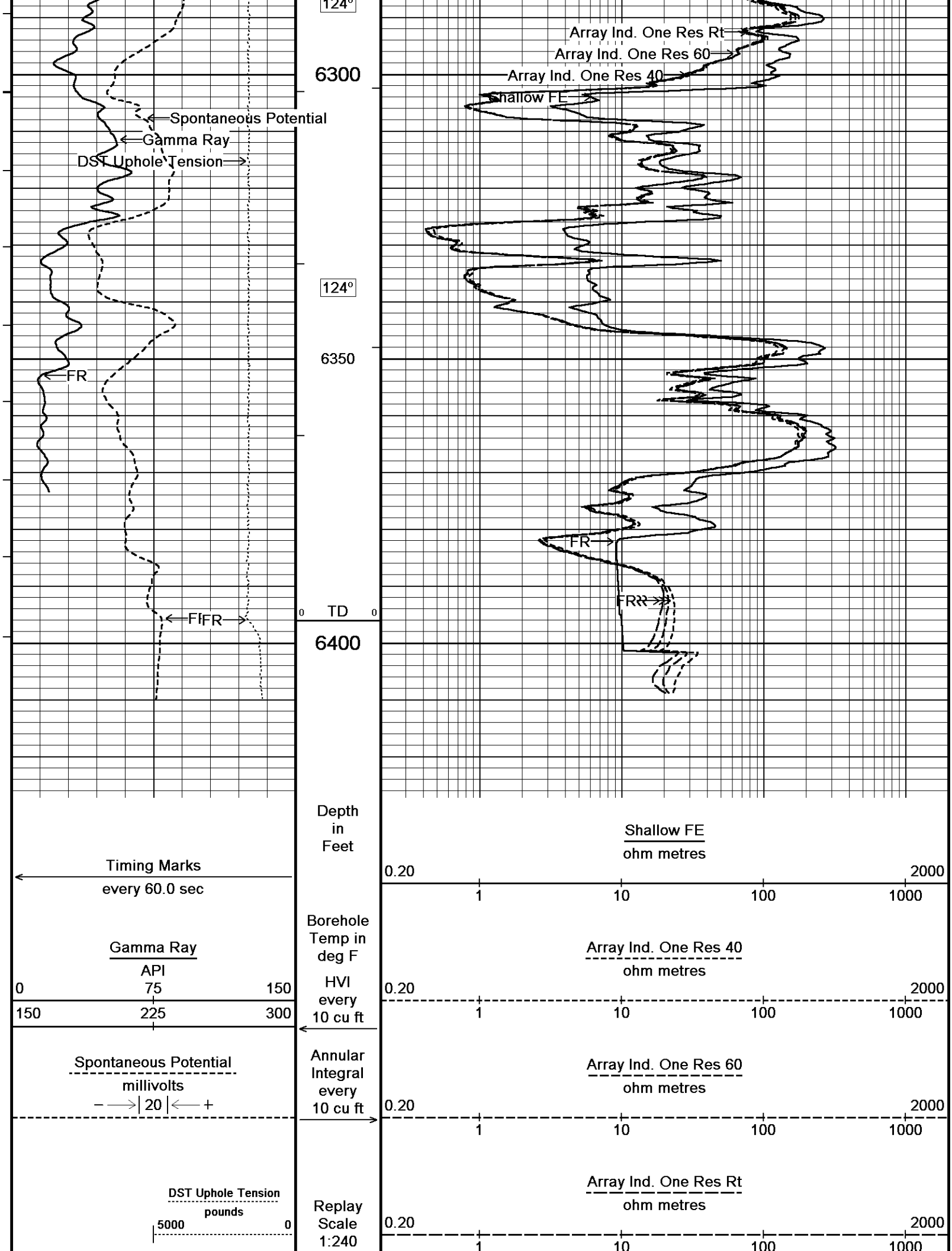
System Versions: Logged with 14.05.5280 Processed with 14.05.5280 Plotted with 14.05.5280




118°
5650
118°
5700
118°
5750
119°
200
5800
119°


5850
119°
5900
Array Ind. One Res Rt
Array Ind. One Res 60
Array Ind. One Res 40
Shallow FE
Spontaneous Potential
Gamma Ray
DST Uphole Tension
121°
100
5950
122°
6000
122°
6050


122°
100
6100
123°
6150
123°
6200
123°
6250

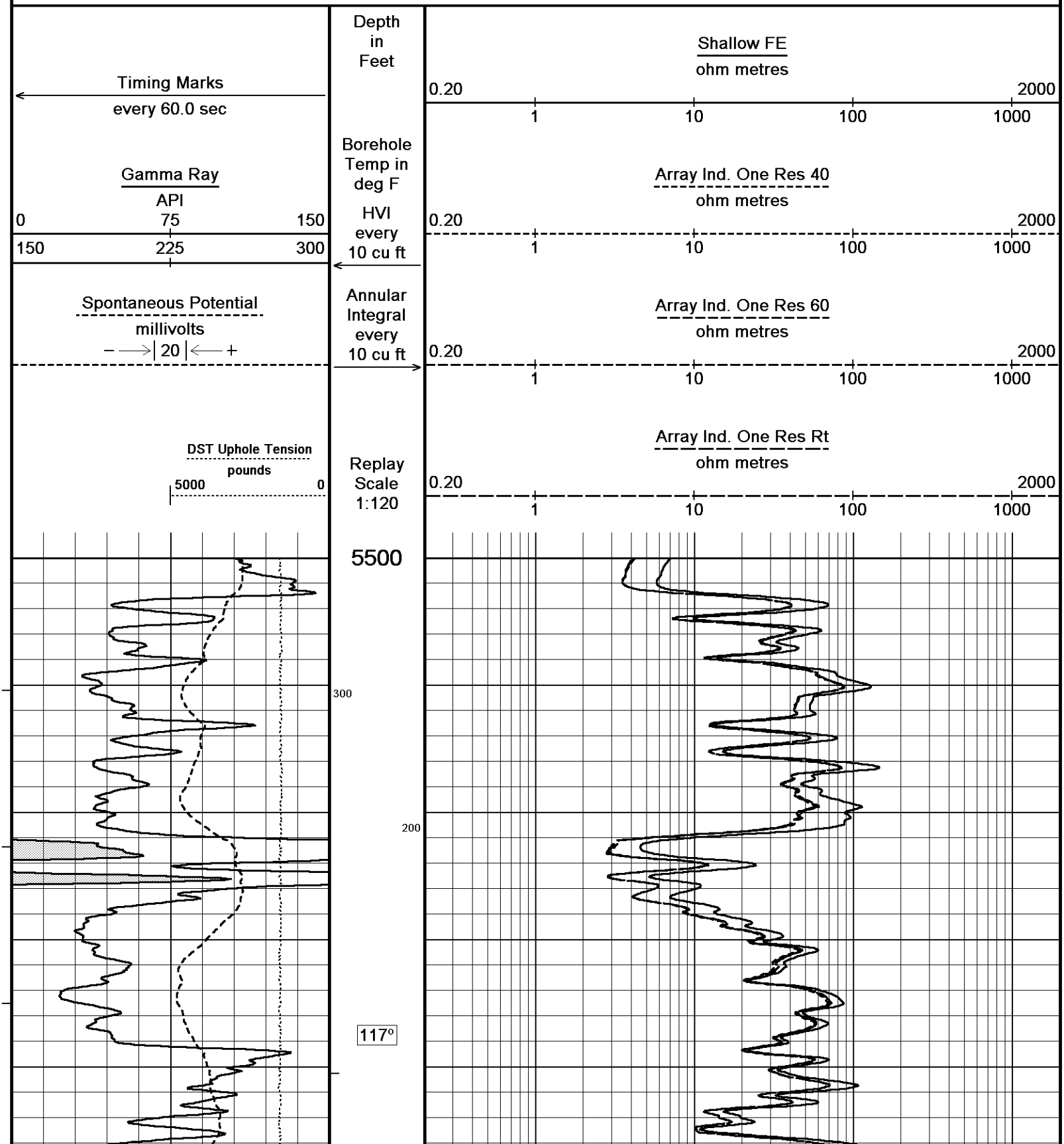

124°
6300
Spontaneous Potential
Gamma Ray
DST Uphole Tension
FR
124°
6350
FI
FR
0 TD 0
6400
Array Ind. One Res Rt
Array Ind. One Res 60
Array Ind. One Res 40
Shallow FE
FR
FR
Depth in Feet
Timing Marks
every 60.0 sec
Gamma Ray
API
0 75 150
150 225 300
Spontaneous Potential
millivolts
− 20 +
DST Uphole 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 2000
1 10 100 1000
Array Ind. One Res 40
ohm metres
0.20 2000
1 10 100 1000
Array Ind. One Res 60
ohm metres
0.20 2000
1 10 100 1000
Array Ind. One Res Rt
ohm metres
0.20 2000
1 10 100 1000

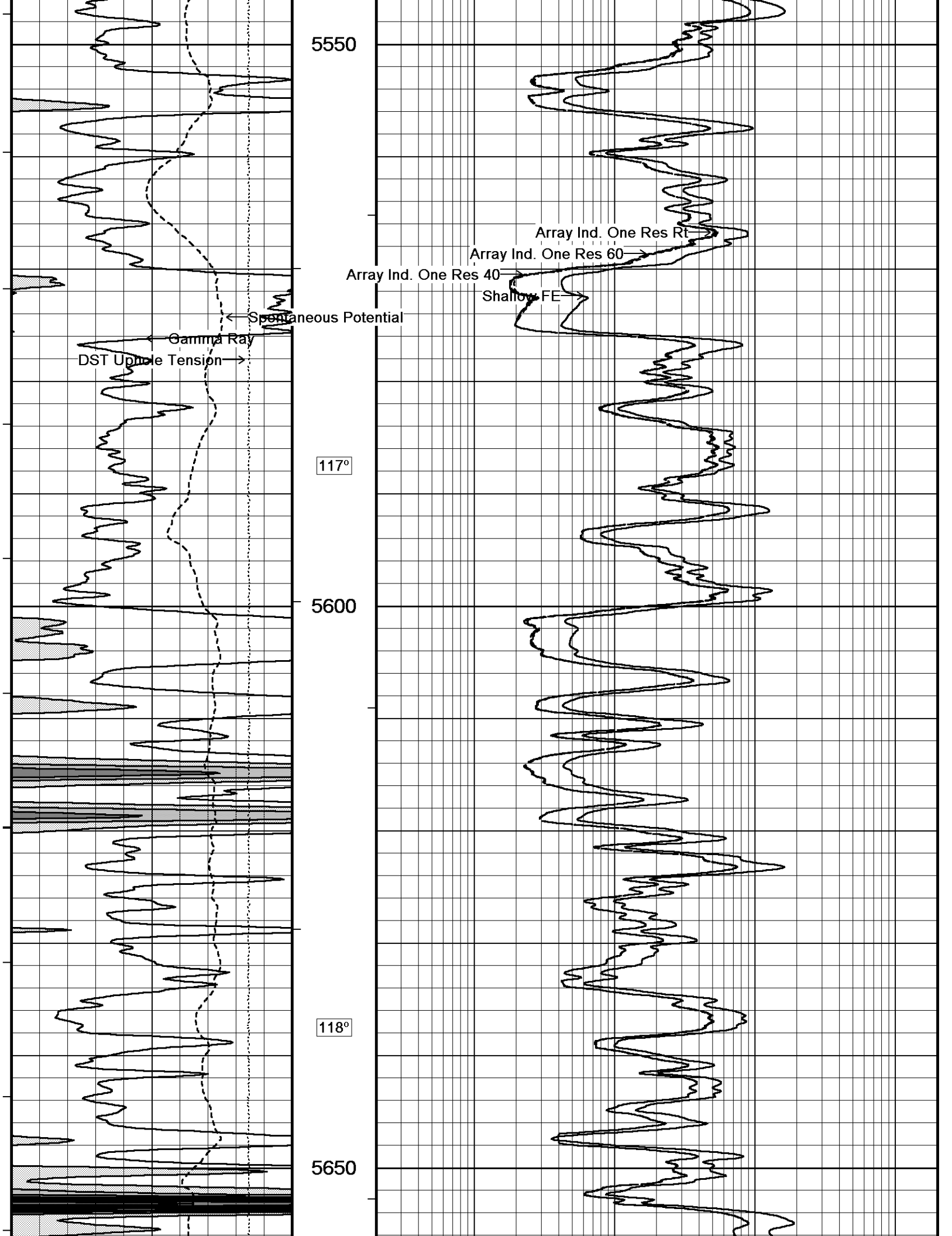
Depth Based Data - Maximum Sampling Increment 10.0cm
Plotted on 02-JAN-2015 11:02
Filename: C:\Minimus 14.05\Log Data\O'Brien Angell 1-18\O'Brien Angell 1-18 Repeat.dta
Recorded on 02-JAN-2015 06:46
System Versions: Logged with 14.05.5280 Processed with 14.05.5280 Plotted with 14.05.5280

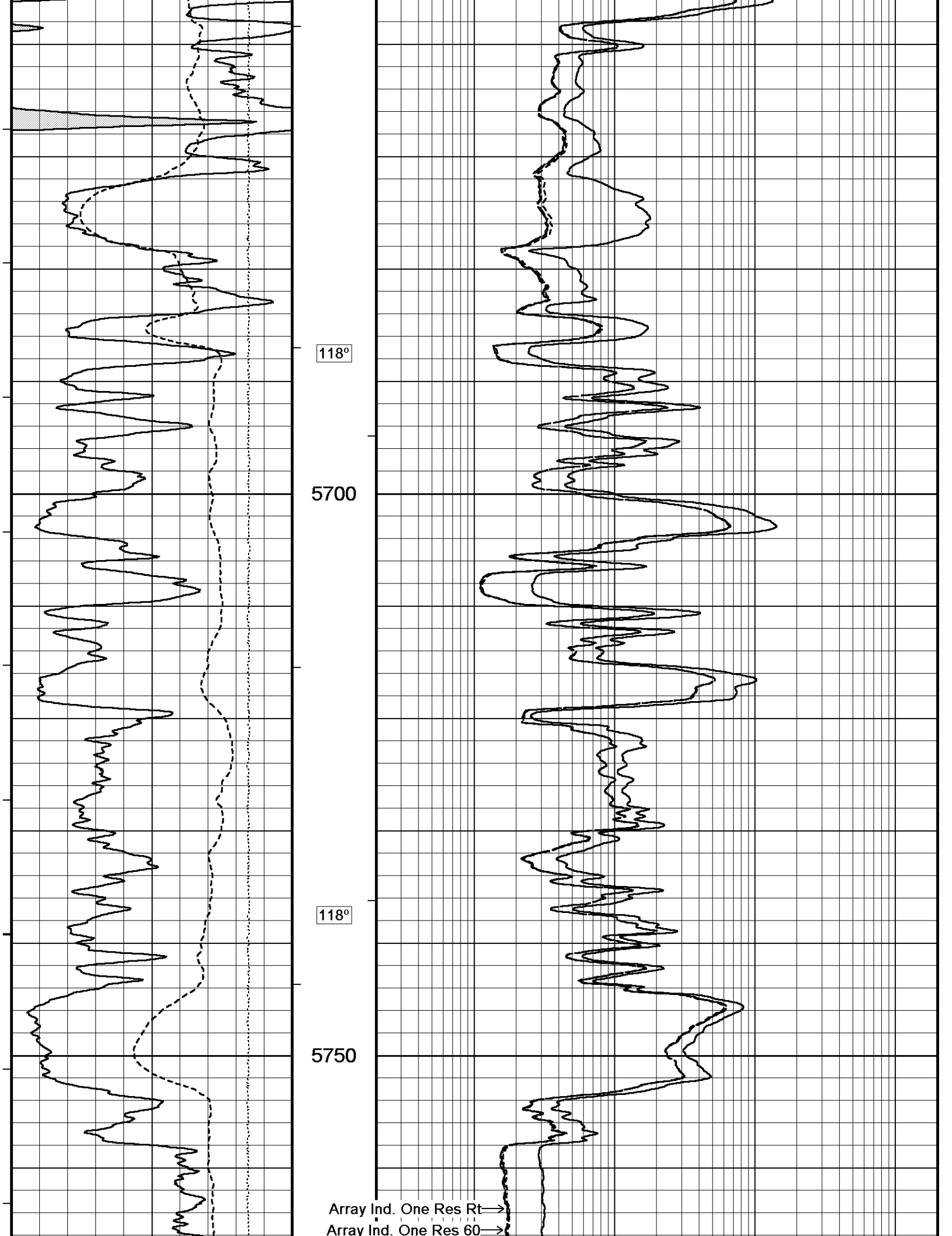
REPEAT SECTION

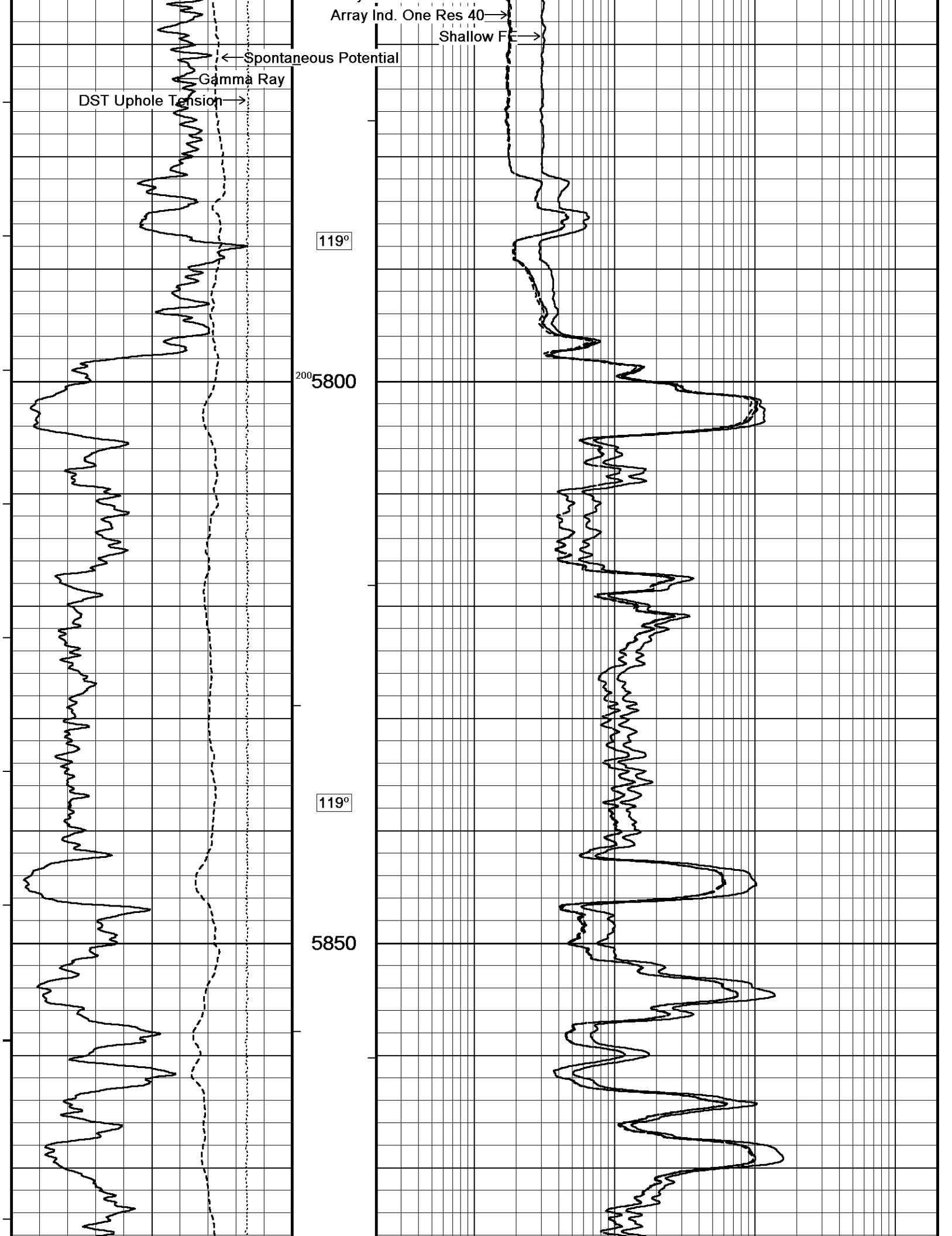
10 INCH HIGH RESOLUTION

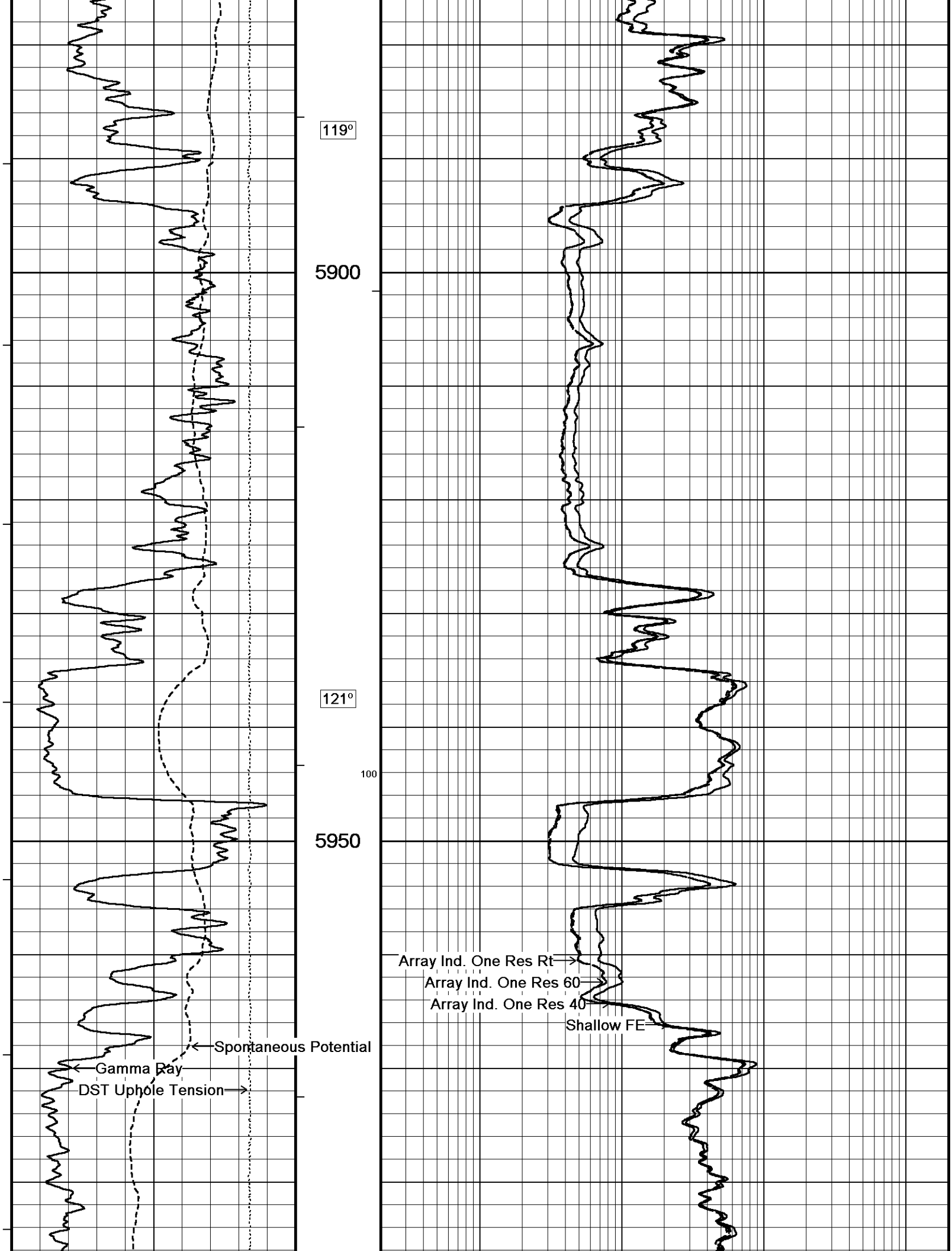
Depth Based Data - Maximum Sampling Increment 2.5cm
Plotted on 02-JAN-2015 11:02
Filename: C:\Minimus 14.05\Log Data\O'Brien Angell 1-18\O'Brien Angell 1-18 High Resolution.dta
Recorded on 02-JAN-2015 06:46
System Versions: Logged with 14.05.5280 Plotted with 14.05.5280

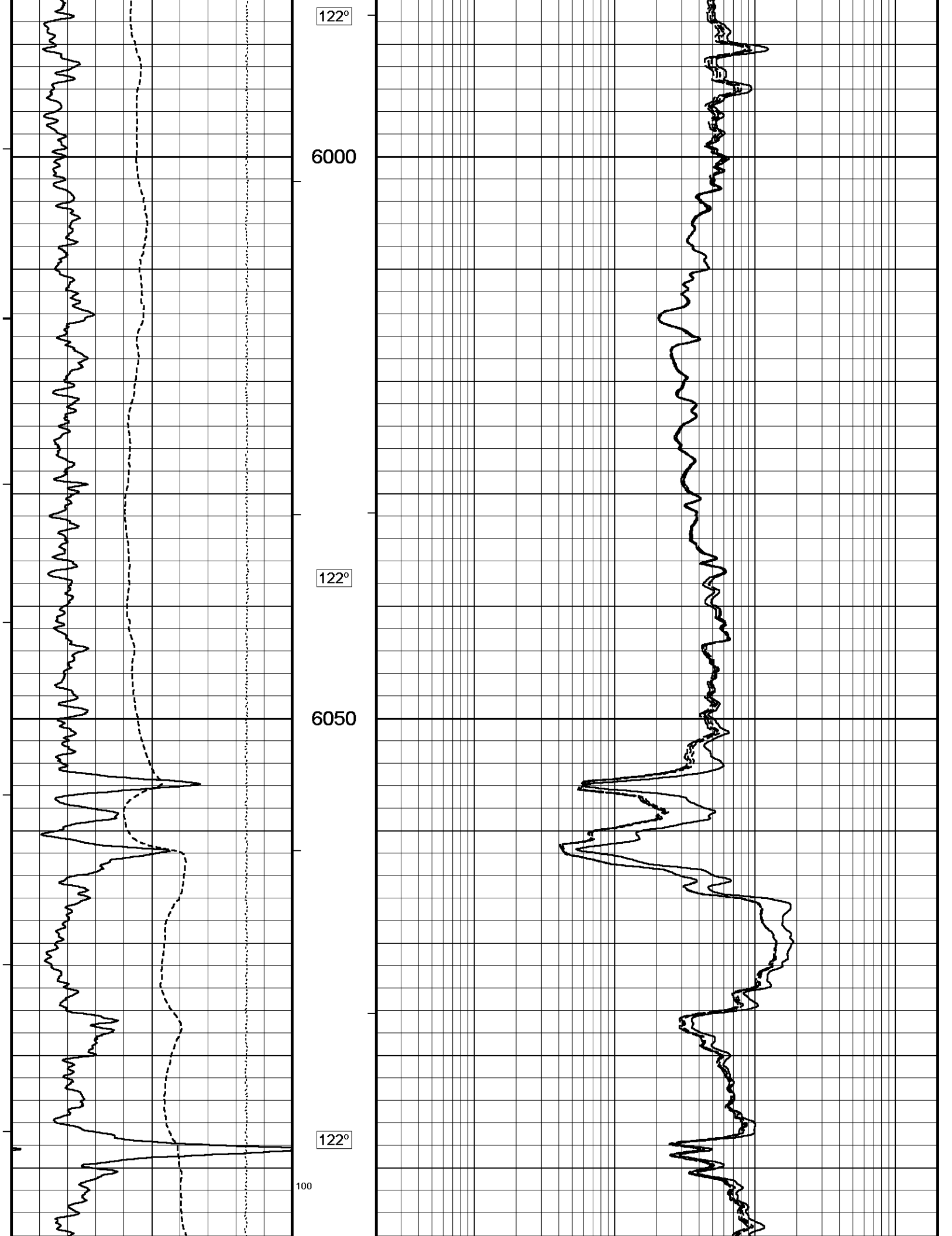


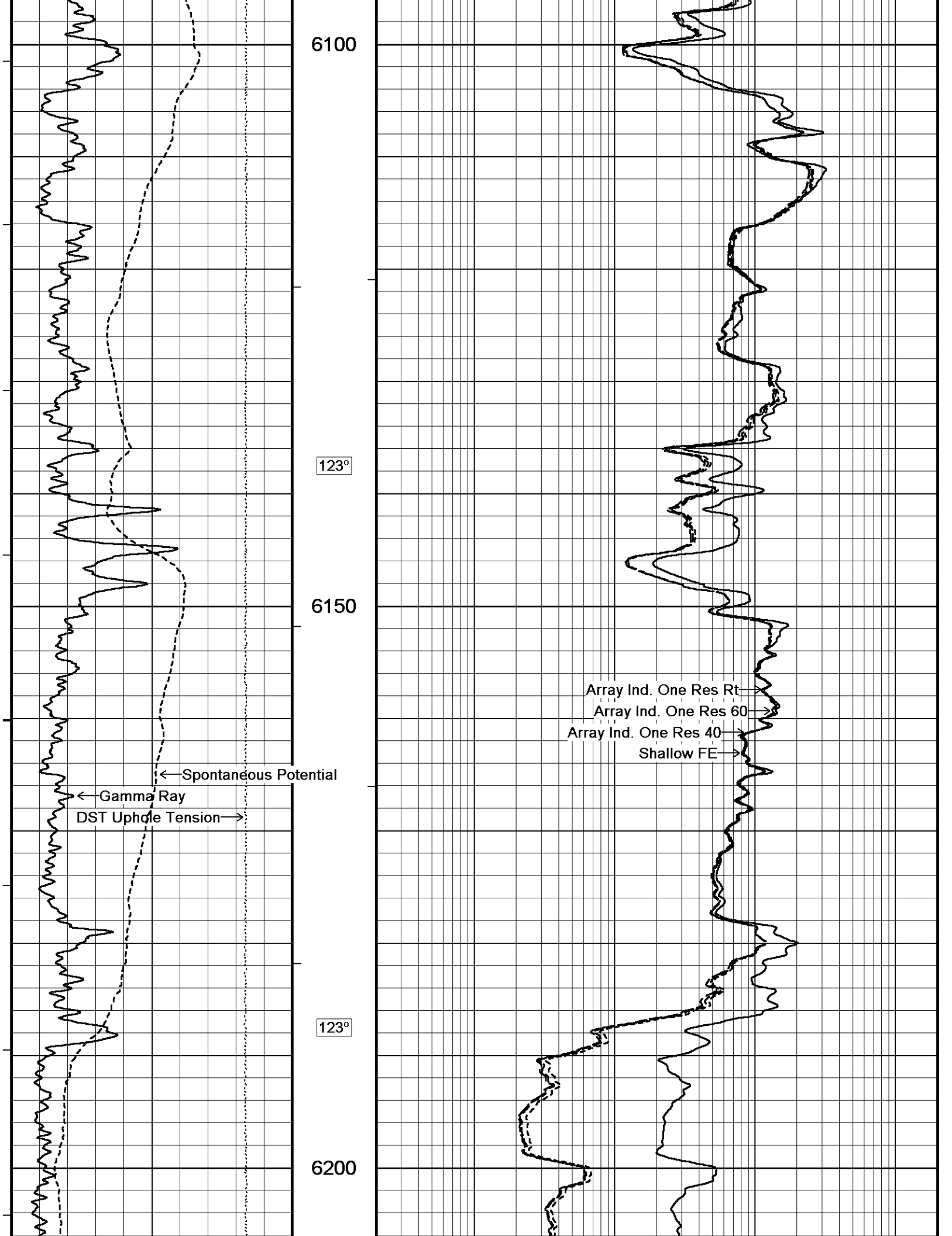

5550
Array Ind. One Res Rt
Array Ind. One Res 60
Array Ind. One Res 40
Shallow FE
Spontaneous Potential
Gamma Ray
DST Uphole Tension
117°
5600
118°
5650

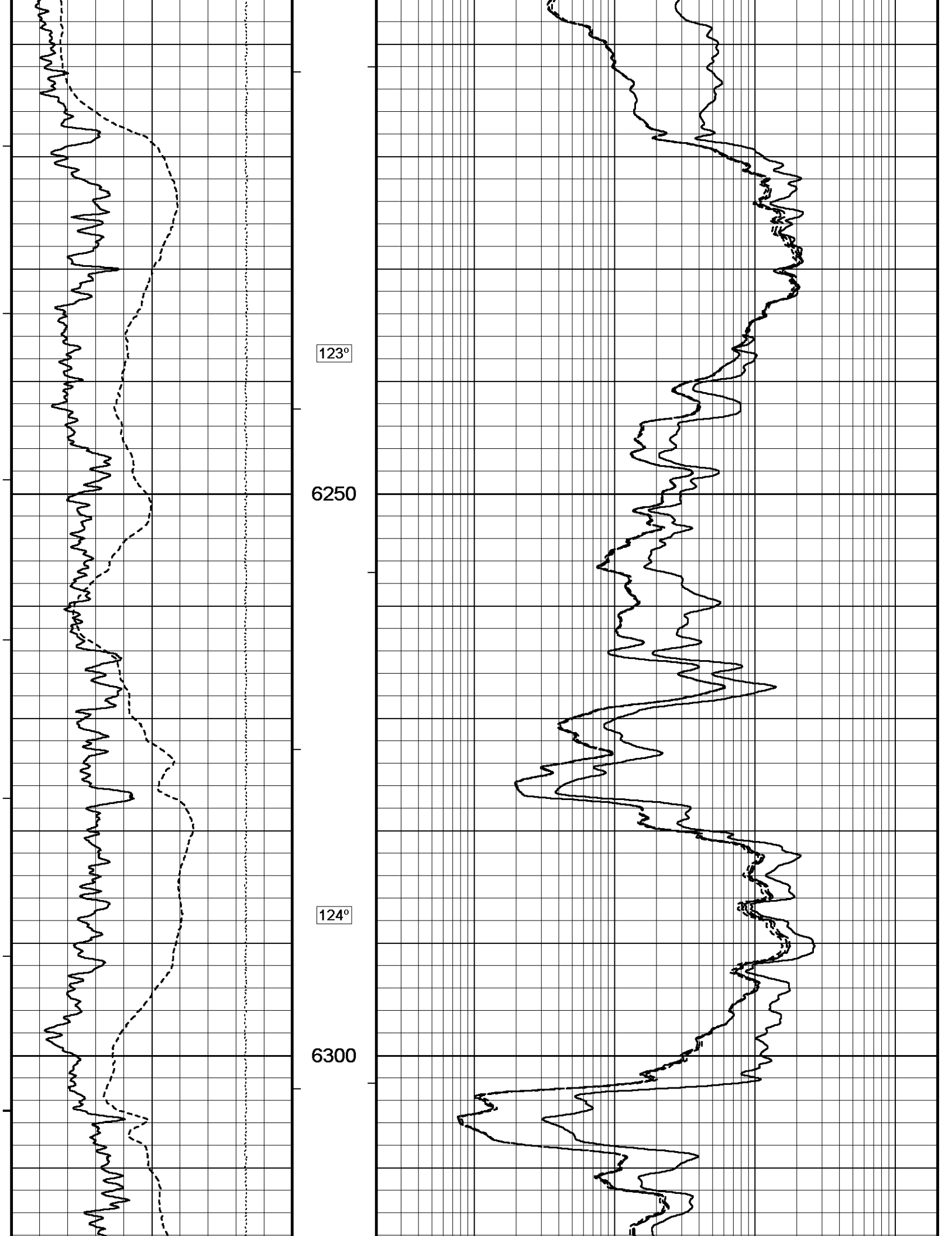

118°
5700
118°
5750
Array Ind. One Res Rt⟶
Array Ind. One Res 60⟶

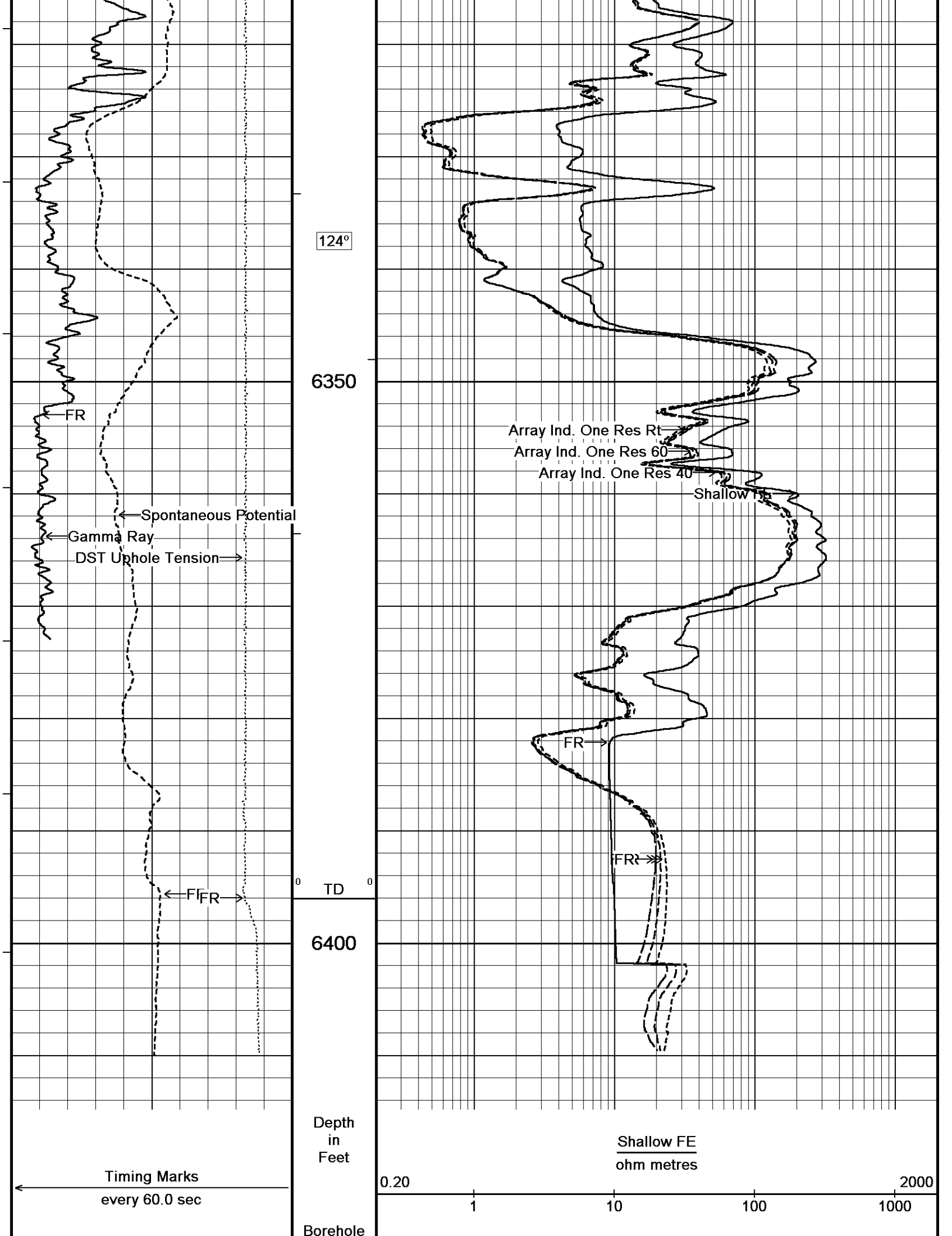

Array Ind. One Res 40
Shallow FE
Spontaneous Potential
Gamma Ray
DST Uphole Tension
119°
200
5800
119°
5850

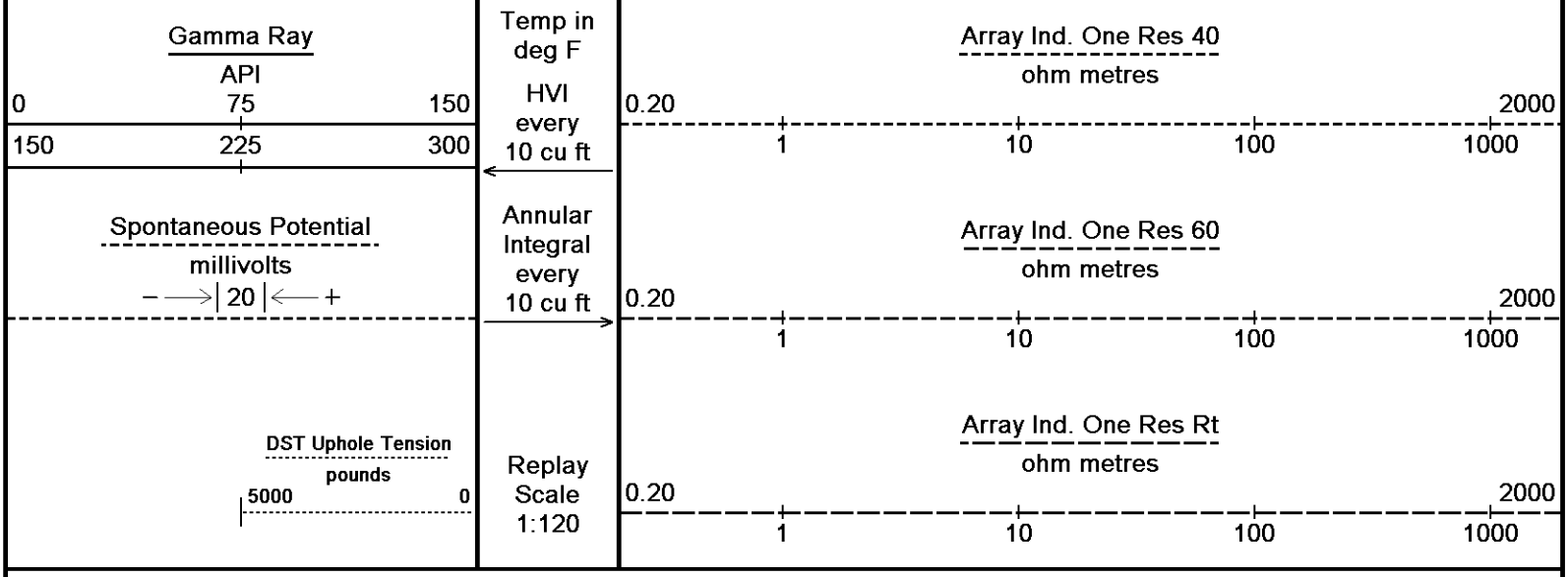

119°
5900
121°
100
5950
Array Ind. One Res Rt
Array Ind. One Res 60
Array Ind. One Res 40
Shallow FE
Spontaneous Potential
Gamma Ray
DST Uphole Tension


122°
6000
122°
6050
122°
100


6100
123°
6150
123°
6200
Array Ind. One Res Rt
Array Ind. One Res 60
Array Ind. One Res 40
Shallow FE
Spontaneous Potential
Gamma Ray
DST Uphole Tension


123°
6250
124°
6300


124°
6350
6400
FR
Spontaneous Potential
Gamma Ray
DST Uphole Tension
FR
FR
0
TD
0
Array Ind. One Res Rt
Array Ind. One Res 60
Array Ind. One Res 40
Shallow FE
FR
FR
Depth
in
Feet
Timing Marks
every 60.0 sec
Shallow FE
ohm metres
0.20
2000
1
10
100
1000
Borehole



Depth Based Data - Maximum Sampling Increment 2.5cm — Plotted on 02-JAN-2015 11:02

Filename: C:\Minimus 14.05\Log Data\O'Brien Angell 1-18\O'Brien Angell 1-18 High Resolution.dta — Recorded on 02-JAN-2015 06:46

System Versions: Logged with 14.05.5280 Plotted with 14.05.5280

10 INCH HIGH RESOLUTION

BEFORE SURVEY CALIBRATION

C:\Minimus 14.05\Log Data\O'Brien Angell 1-18\O'Brien Angell 1-18 Main.dta

General Constants All 000

Last Edited on 02-JAN-2015,06:07

General Parameters		
Mud Resistivity	1.500	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	None	
Rwa Parameters		
Porosity used	Crossplot Porosity	
Resistivity used	Array Ind. One Res Rt	
RWA Constant A	0.610	
RWA Constant M	2.150	
SW/APOR Tool Source	0.000	

High Resolution Temperature Calibration MCG-B 39

Field Calibration on 21-DEC-2014,10:31

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

High Resolution Temperature Constants MCG-B 39

Last Edited on 28-AUG-2014,01:02

Pre-filter Length	11

Gamma Calibration MCG-B 39

Field Calibration on 02-JAN-2015 02:38

	Measured	Calibrated (API)
Background	76	52
Calibrator (Gross)	1136	777
Calibrator (Net)	1060	725

Gamma Calibration Tolerances MCG-B 39

Ratio	1.462	1.40 1.475 1.55	Counts/API

Gamma Constants MCG-B 39

Last Edited on 02-JAN-2015,04:48

Gamma Calibrator Number	GRC038	
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	
Concentration of KCl		kppm
K Mud Type	Chloride	
K Mud Concentration	0.00	%

FE Calibration MFE-B.J 353

Base Calibration on 29-DEC-2014 11:25
Field Check on 02-JAN-2015 02:18

Base Calibration

	Measured	Calibrated (ohm-m)
Reference 1	0.0	0.0
Reference 2	964.6	126.8
Base Check		280.9
Field Check		281.0

FE Calibration Tolerances MFE-B.J 353

Reference 2	964.6	-3% 980.0 +3%	ohm
Base Check	280.9	-2% 277.0 +2%	ohm-m
Field Check	281.0	-2% 280.9 +2%	ohm-m

FE Constants MFE-B.J 353

Last Edited on 02-JAN-2015,04:47

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	Calculated Value: Temperature Corrected	
Temp. for Rm Corr.	MCG External Temperature	
Stand-off	0.5	inches

Induction Calibration MAI-A.A 111

Base Calibration on 05-AUG-2014,09:34
Field Check on 02-JAN-2015 02:14

Base Calibration

Test Loop Calibration

Channel	Measured Low	Measured High	Calibrated (mmho/m) Low	Calibrated (mmho/m) 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) Low	Base Check (mmho/m) High	Field Check (mmho/m) Low	Field Check (mmho/m) High
1	0.0	0.0	11.8	3872.1
2	0.0	0.0	29.7	3527.4
3	0.0	0.0	29.1	3020.7
4	0.0	0.0	19.1	2058.0
Deep			17.7	1961.5
Medium			43.2	3975.8
Shallow			44.3	5231.9
Array Temperature		0.0	58.9	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 02-JAN-2015,04:47

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	45.00	degrees
Stand-off Fin Width	0.5000	inches
Borehole Corr. Rm 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

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	

Caliper Calibration MPD-C.A 216

Base Calibration on 09-DEC-2014 13:29
Field Calibration on 02-JAN-2015 02:03

Base Calibration

Reading No	Measured	Calibrator Size (in)
1	19120	3.99
2	29184	5.98
3	39328	7.97
4	49072	9.86
5	60273	11.92
6	N/A	N/A

Field Calibration

Measured Caliper (in)	Actual Caliper (in)
7.92	7.97

Caliper Calibration Tolerances MPD-C.A 216

Short Arm Field Cal.	7.92	7.77 7.97 8.17	in

DOWNHOLE EQUIPMENT

C:\Minimus 14.05\Log Data\O'Brien Angell 1-18\O'Brien Angell 1-18 Main.dta

3/8" Triple Cone Cable Head (MCB C A)
MCB-C.A 233 LG: 1.58 ft WT: 15.4 lb OD: 2.240 in

Compact Comms Gamma
MCG-B 39 LG: 8.70 ft WT: 63.9 lb OD: 2.244 in

Compact Micro-log
MML-A 3 LG: 7.97 ft WT: 81.6 lb OD: 2.240 in

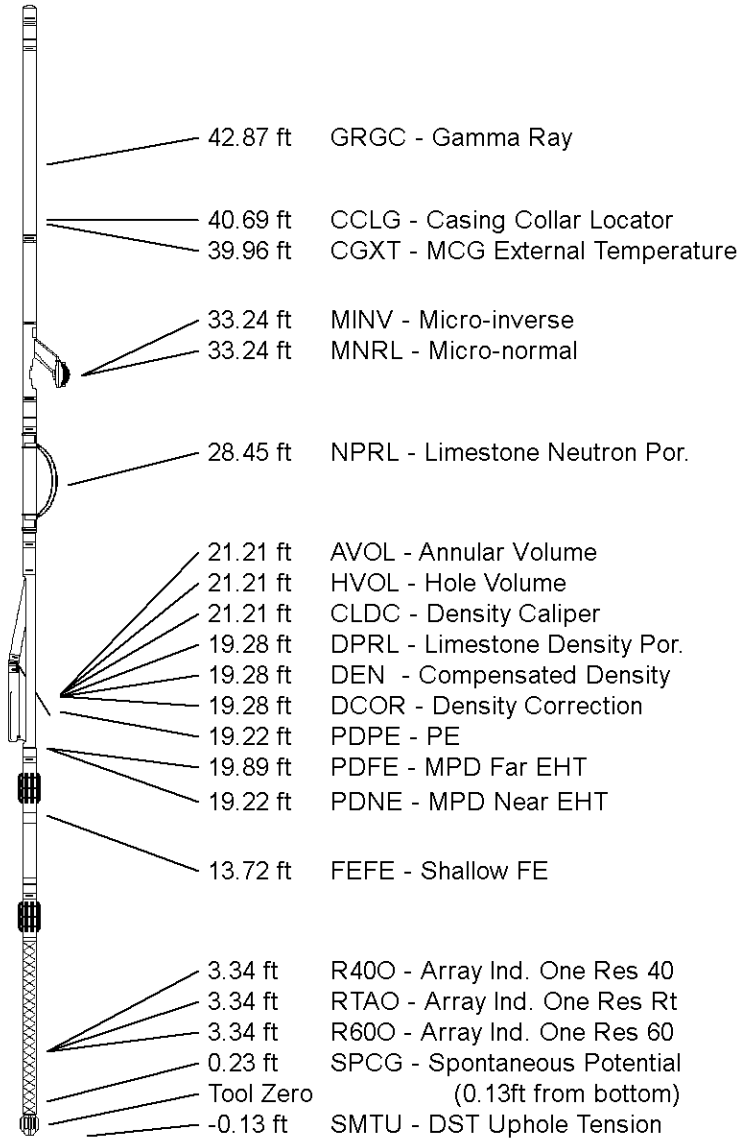
Compact Neutron
MDN-A.B 66 LG: 5.04 ft WT: 50.7 lb OD: 2.244 in

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

Compact Focussed Electric
MFE-B.J 353 LG: 6.05 ft WT: 48.5 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: 49.73 ft Weight: 399.0 lb



COMPANY	O'BRIEN ENERGY RESOURCES CORP.
WELL	ANGELL 1-18
FIELD	ANGELL
PROVINCE/COUNTY	MEADE
COUNTRY/STATE	U.S.A. / KANSAS

Elevation Kelly Bushing	2727.00	feet	First Reading	6392.66	feet
Elevation Drill Floor	2725.00	feet	Depth Driller	6402.00	feet
Elevation Ground Level	2715.00	feet	Depth Logger	6396.00	feet

Weatherford®

ARRAY INDUCTION
SHALLOW FOCUSED
ELECTRIC LOG

Weatherford®

COMPANY
WELL
FIELD
PROVINCE/COUNTY
COUNTRY/STATE
LOCATION 2
SEC 18 TWP 32S
Latitude
Longitude
API Number
Permanent Datum GL Elev
Log Measured From KB
Drilling Measured From K
Date
Run Number
Service Order
Depth Driller
Depth Logger
First Reading
Last Reading
Casing Driller
Casing Logger
Bit Size
Hole Fluid Type
Density/Viscosity
PH/Fluid Loss
Sample Source
Rm @ Measured Temp
Rmf @ Measured Temp
Rmc @ Measured Temp
Source Rmf/Rmc
Rm @ BHT
Time Since Circulation
Max Recorded Temp
Equipment/Base
Recorded By
Witnessed By
JOB #

ARRAY INDUCTION SHALLOW FOCUSED ELECTRIC LOG

O'BRIEN ENERGY RESOURCES CORP.
ANGELL 1-18
ANGELL
MEADE
U.S.A. / KANSAS
308' FNL & 335' FEL
RGE 29W | Other Services: MML
37.26500232 MPD/MDN
100.50851657
15-119-21381
Elevation 2715 feet
KB @ 12 FEET
Elevations: KB 2727.00 feet, DF 2725.00, GL 2715.00

02-JAN-2015			
ONE			
7036-107375855			
6402.00	feet		
6396.00	feet		
6392.66	feet		
1487.00	feet		
1487.00	feet		
1487.00	feet		
7.875	inches		
WBM			
9.30 lb/USg	52.00 CP		
11.00	5.60 ml/30Min		
MUDPIT			
1.50 @ 75.0	ohm-m		
1.20 @ 75.0	ohm-m		
1.80 @ 75.0	ohm-m		
CALC	CALC		
0.91 @ 126.0	ohm-m		
5 HOURS			
126.00	deg F		
13096	LIB		
DEREK CARTER		JAKE HINES	
ROGER PEARSON			
LB15-001			

1 INCH MAIN

Depth Based Data - Maximum Sampling Increment 10.0cm — Plotted on 02-JAN-2015 11:02
Filename: C:\Minimus 14.05\Log Data\O'Brien Angell 1-18\O'Brien Angell 1-18 Main.dta — Recorded on 02-JAN-2015 08:05
System Versions: Logged with 14.05.5280 Processed with 14.05.5280 Plotted with 14.05.5280

Timing Marks every 60.0 sec

Gamma Ray (API): 0 – 75 – 150; 150 – 225 – 300

Spontaneous Potential (millivolts): – →| 20 |← +

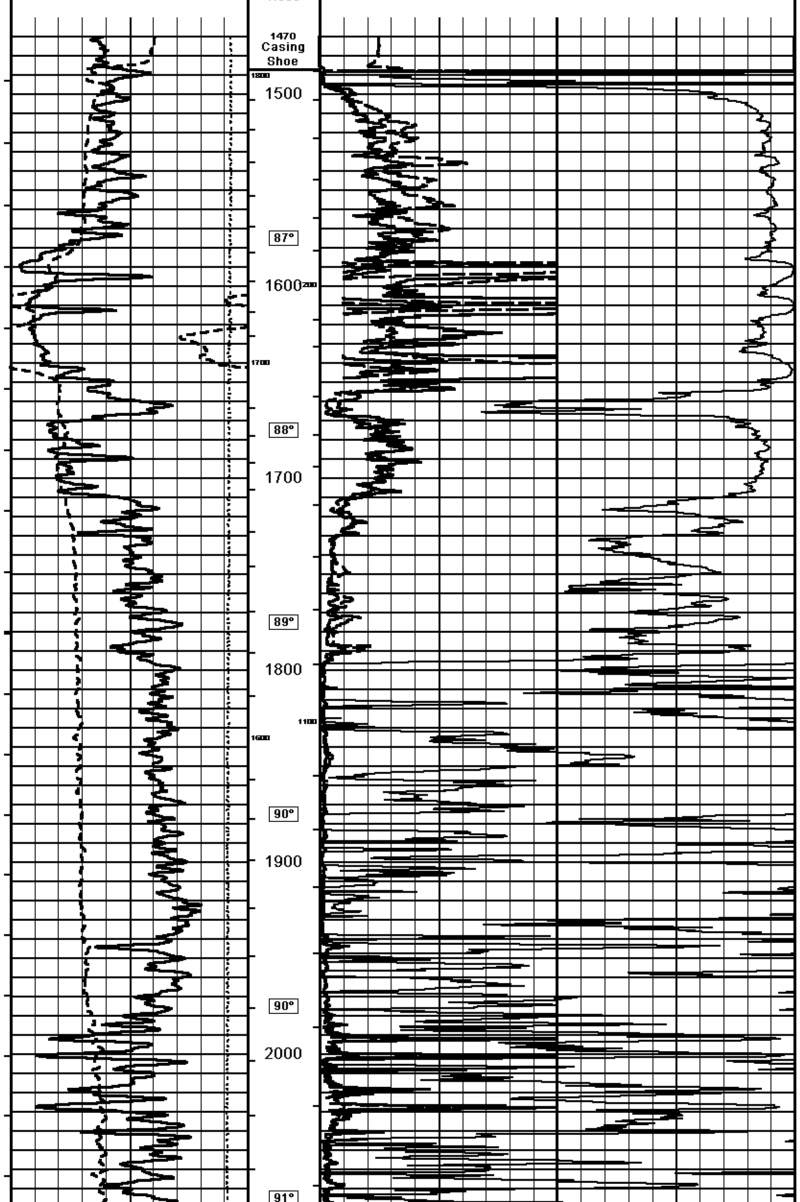
DST Uphole Tension (pounds): 5000 – 0

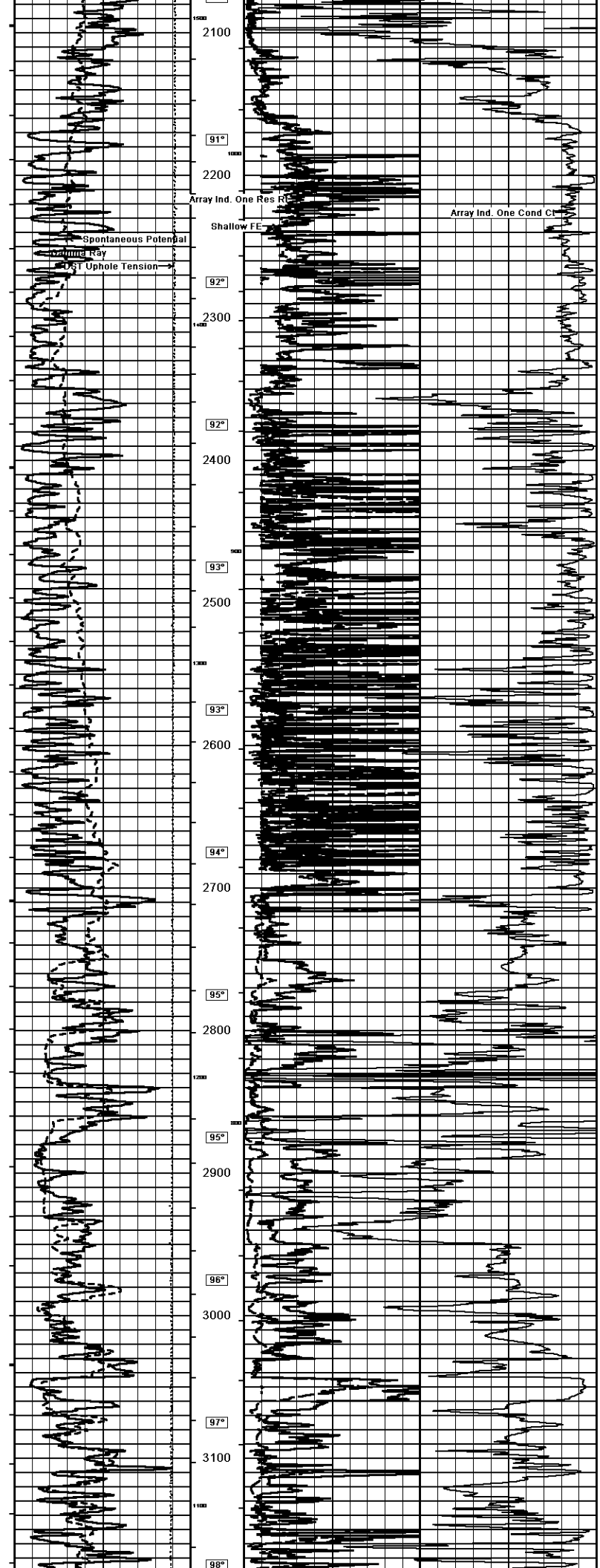
Depth in Feet; Borehole Temp in deg F; HVI every 10 cu ft; Annular Integral every 10 cu ft; Replay Scale 1:600

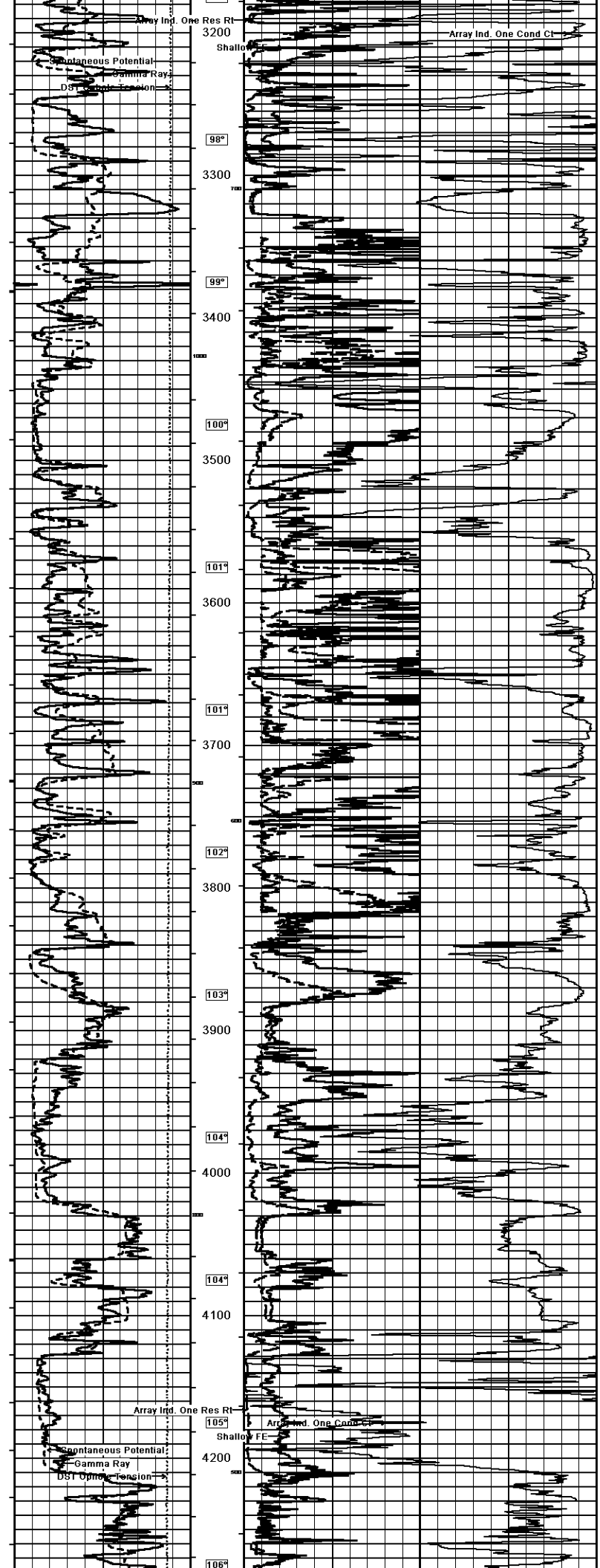
Array Ind. One Cond Ct (mmhos/metre): 1000 – 750 – 500 – 250 – 0; 2000 – 1750 – 1500 – 1250 – 1000

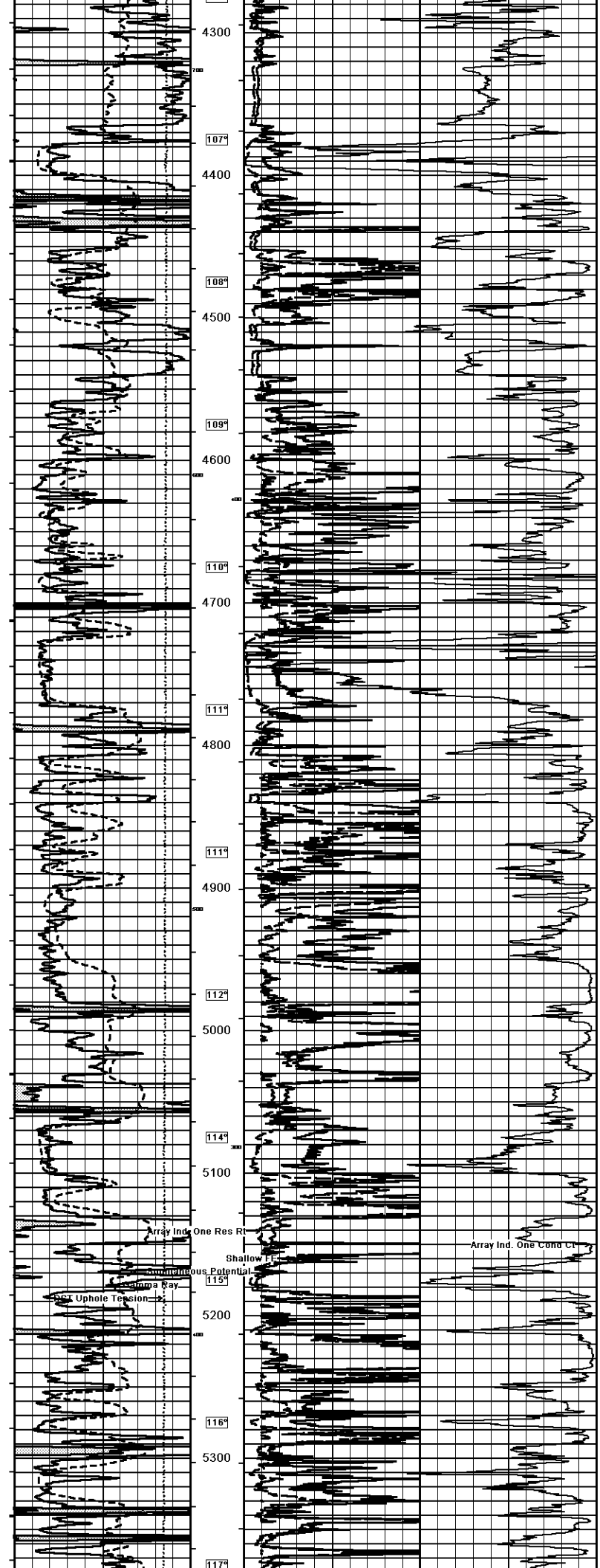
Shallow FE (ohm metres): 0 – 25 – 50; 0 – 250 – 500

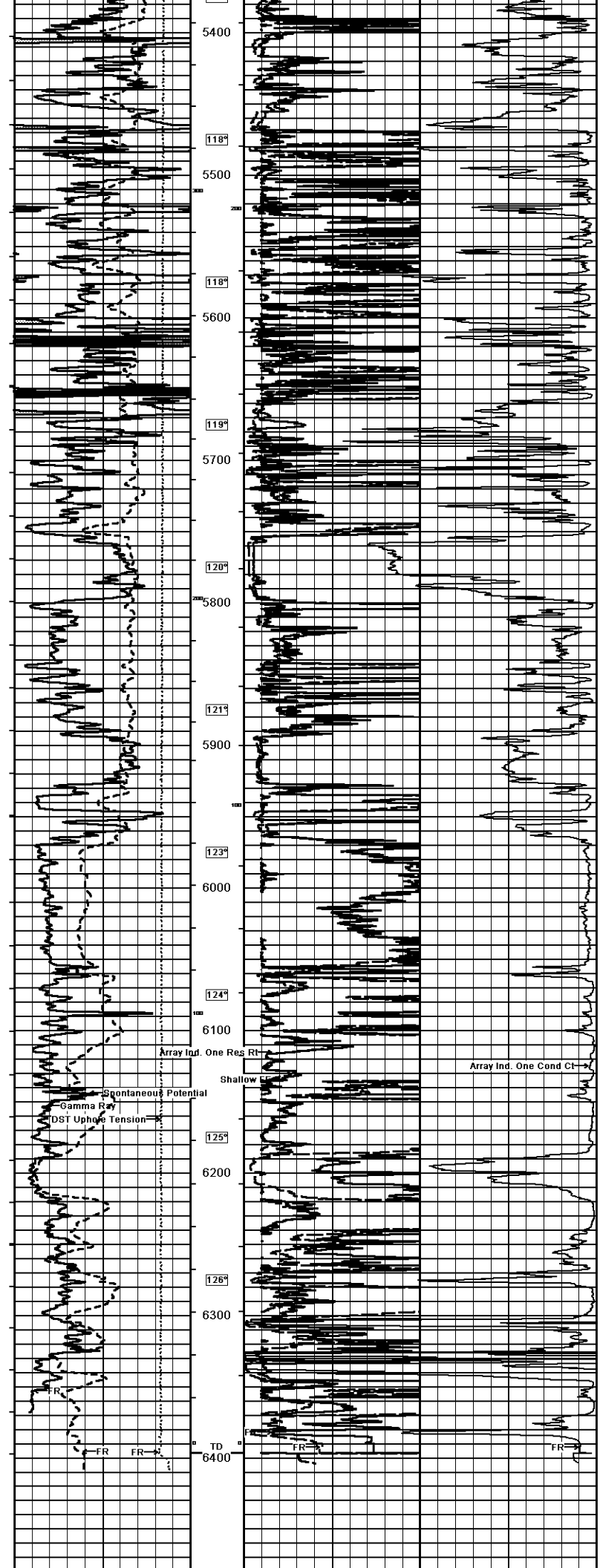
Array Ind. One Res Rt (ohm metres): 0 – 25 – 50; 0 – 250 – 500

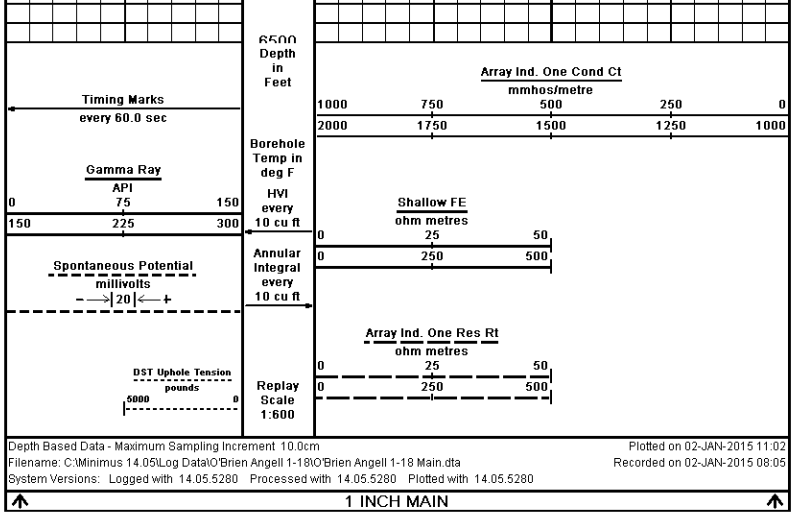



2100
91°
2200
Array Ind. One Res RT
Shallow FE
Array Ind. One Cond CT
Spontaneous Potential
Gamma Ray
DST Uphole Tension
92°
2300
92°
2400
93°
2500
93°
2600
94°
2700
95°
2800
95°
2900
96°
3000
97°
3100
98°


Array Ind. One Res Rt
Array Ind. One Cond Ct
Shallow FE
Spontaneous Potential
Gamma Ray
DST Upper Tension
3200
98°
3300
99°
3400
100°
3500
101°
3600
101°
3700
102°
3800
103°
3900
104°
4000
104°
4100
105°
4200
106°


4300
107°
4400
108°
4500
109°
4600
110°
4700
111°
4800
111°
4900
112°
5000
114°
5100
115°
5200
116°
5300
117°
Array Ind. One Res RI
Shallow I
Spontaneous Potential
Gamma Ray
DCT Uphole Tension
Array Ind. One Cond Ct


5400
118°
5500
118°
5600
119°
5700
120°
5800
121°
5900
123°
6000
124°
6100
Array Ind. One Res Rt
Shallow
Array Ind. One Cond Ct
Spontaneous Potential
Gamma Ray
DST Uphole Tension
125°
6200
126°
6300
FR
FR
FR
FR
FR
TD
6400



Depth Based Data - Maximum Sampling Increment 10.0cm — Plotted on 02-JAN-2015 11:02

Filename: C:\Minimus 14.05\Log Data\O'Brien Angell 1-18\O'Brien Angell 1-18 Main.dta — Recorded on 02-JAN-2015 08:05

System Versions: Logged with 14.05.5280 Processed with 14.05.5280 Plotted with 14.05.5280

1 INCH MAIN

COMPANY	O'BRIEN ENERGY RESOURCES CORP.
WELL	ANGELL 1-18
FIELD	ANGELL
PROVINCE/COUNTY	MEADE
COUNTRY/STATE	U.S.A. / KANSAS

Elevation Kelly Bushing	2727.00	feet	First Reading	6392.66	feet
Elevation Drill Floor	2725.00	feet	Depth Driller	6402.00	feet
Elevation Ground Level	2715.00	feet	Depth Logger	6396.00	feet

Weatherford

ARRAY INDUCTION
SHALLOW FOCUSED
ELECTRIC LOG