



Weatherford

ARRAY INDUCTION
SHALLOW FOCUSED
ELECTRIC LOG

COMPANY				O'BRIEN ENERGY RESOURCES CORP.			
WELL				VAIL 6-30			
FIELD				SINGLEY			
PROVINCE/COUNTY				MEADE			
COUNTRY/STATE				U.S.A. / KANSAS			
LOCATION				1976' FSL & 681' FEL NE SW NE SE			
SEC	TWP	RGE	Other Services		Elevations: KB 2659.00 DF 2657.00 GL 2647.00		
30	33S	29W	MPD/MDN MAI/MFE MML				
API Number		15-119-21356					
Permit Number							
Permanent Datum GL, Elevation 2647 feet							
Log Measured From KB							
Drilling Measured From KB @ 12 FEET							
Date	22-DEC-2013						
Run Number	ONE						
Service Order	3547637						
Depth Driller	6360.00			feet			
Depth Logger	6356.00			feet			
First Reading	6353.00			feet			
Last Reading	4000.00			feet			
Casing Driller	1485.00			feet			
Casing Logger	1486.00			feet			
Bit Size	7.875			inches			
Hole Fluid Type	CHEM						
Density / Viscosity	9.20 lb/USg		61.00 CP				
PH / Fluid Loss	10.00		7.20 ml/30Min				
Sample Source	PIT						
Rm @ Measured Temp	0.50 @ 90.0			ohm-m			
Rmf @ Measured Temp	0.40 @ 90.0			ohm-m			
Rmc @ Measured Temp	0.60 @ 90.0			ohm-m			
Source Rmf / Rmc	CALC	CALC	CALC				
Rm @ BHT	0.37 @121.0			ohm-m			
Time Since Circulation	5 HRS						
Max Recorded Temp	121.00			deg F			
Equipment / Base	13057			LIB			
Recorded By	D. COLE						
Witnessed By	R. PEARSON			P. DEBENHAM			
IOB#							

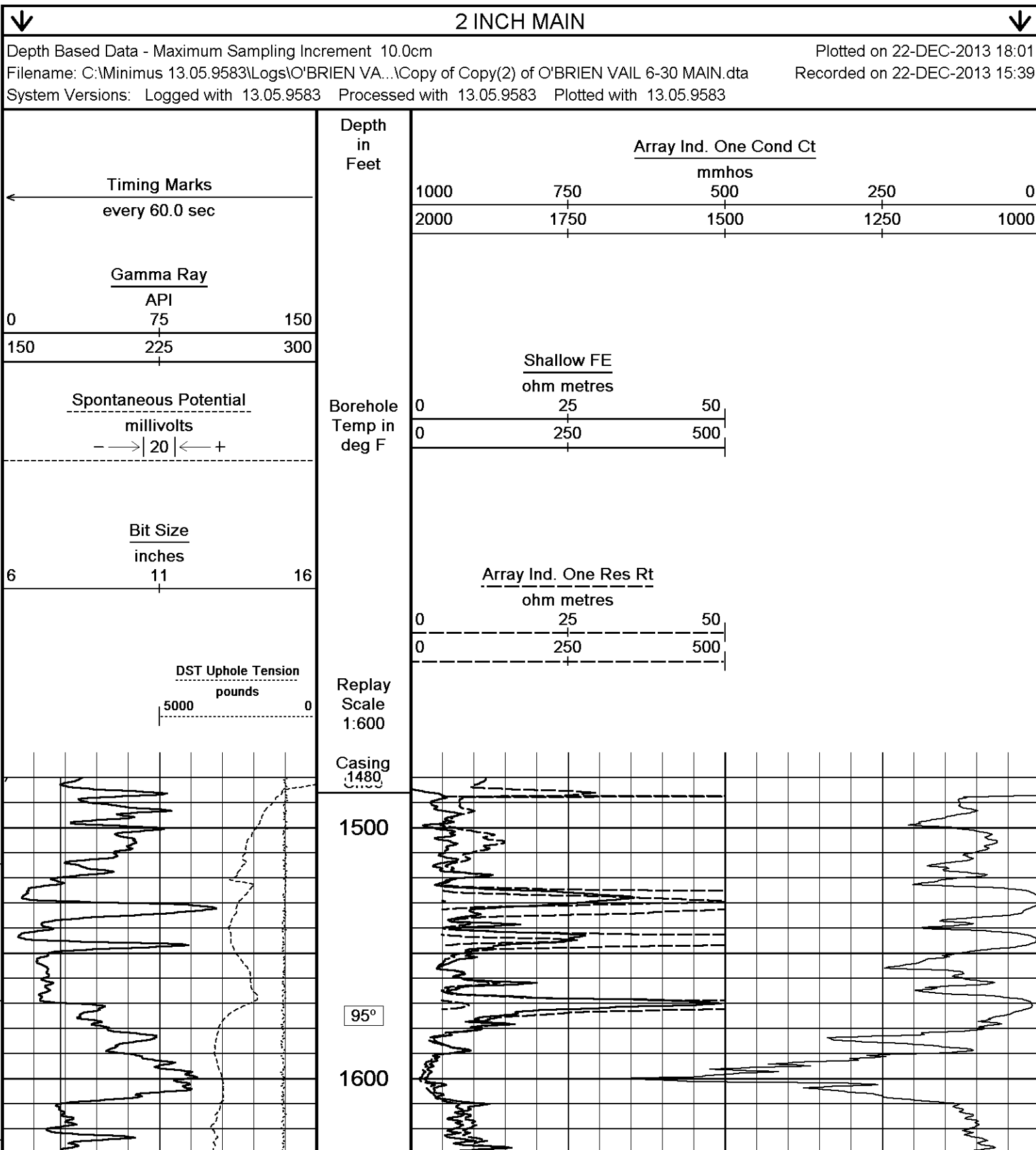
BOREHOLE RECORD					Last Edited: 22-DEC-2013 13:26
Bit Size inches		Depth From feet		Depth To feet	
7.875		1485.00		6360.00	
CASING RECORD					
Type	Size inches	Depth From feet	Shoe Depth feet	Weight pounds/ft	
CASING	8.625	0.00	1485.00	24.00	

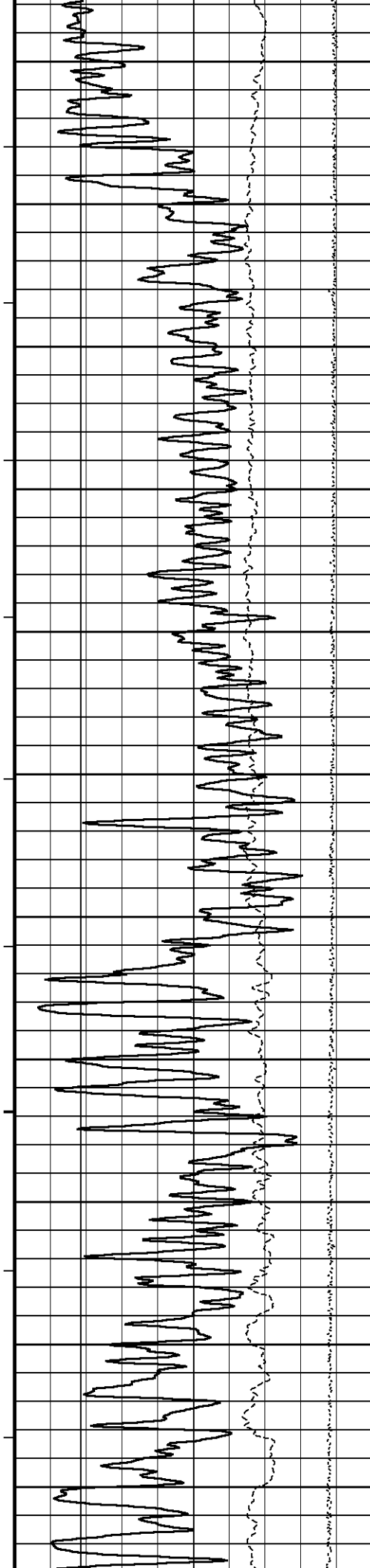
REMARKS
- SOFTWARE ISSUE: 13.05.9583
- MCG, MML, MDN, MPD, MFE, MAI RAN IN COMBINATION
- HARDWARE: DUAL BOWSPRING USED ON MDN 0.5 INCH STANDOFF USED ON MFE ,MAI
- 2.71 AND 2.65 G/CC LIMESTONE DENSITY MATRIX USED TO CALCULATE POROSITY
- BOREHOLE RUGOSITY, TIGHT PULLS, AND WASHOUTS WILL EFFECT DATA QUALITY
- ALL INTERVALS LOGGED AND SCALED PER CUSTOMRES REQUEST
- TOTAL HOLE VOLUME FROM TD TO SURFACE CASING: 1870 CU.FT.
- ANNULAR HOLE VOLUME WITH 4.5 INCH PRODUCTION CASING FROM TD TO SURFACE CASING: 1330 CU.FT.
-RIG: DUKE DRILLING RIG #6

- ENGINEER: D. COLE

- OPERATOR: K. PHILLIPS AND J. DUNLAP

All interpretations are opinions based on inferences from electrical or other measurements and we cannot, and do not, guarantee the accuracy or correctness of any interpretations, and we shall not, except in the case of gross or wilful negligence on our part, be liable or responsible for any loss, costs, damages or expenses incurred or sustained by anyone resulting from any interpretation made by any of our officers, agents or employees. These interpretations are also subject to our general terms and conditions in our price schedule.





97°

1700

97°

1800

96°

1900

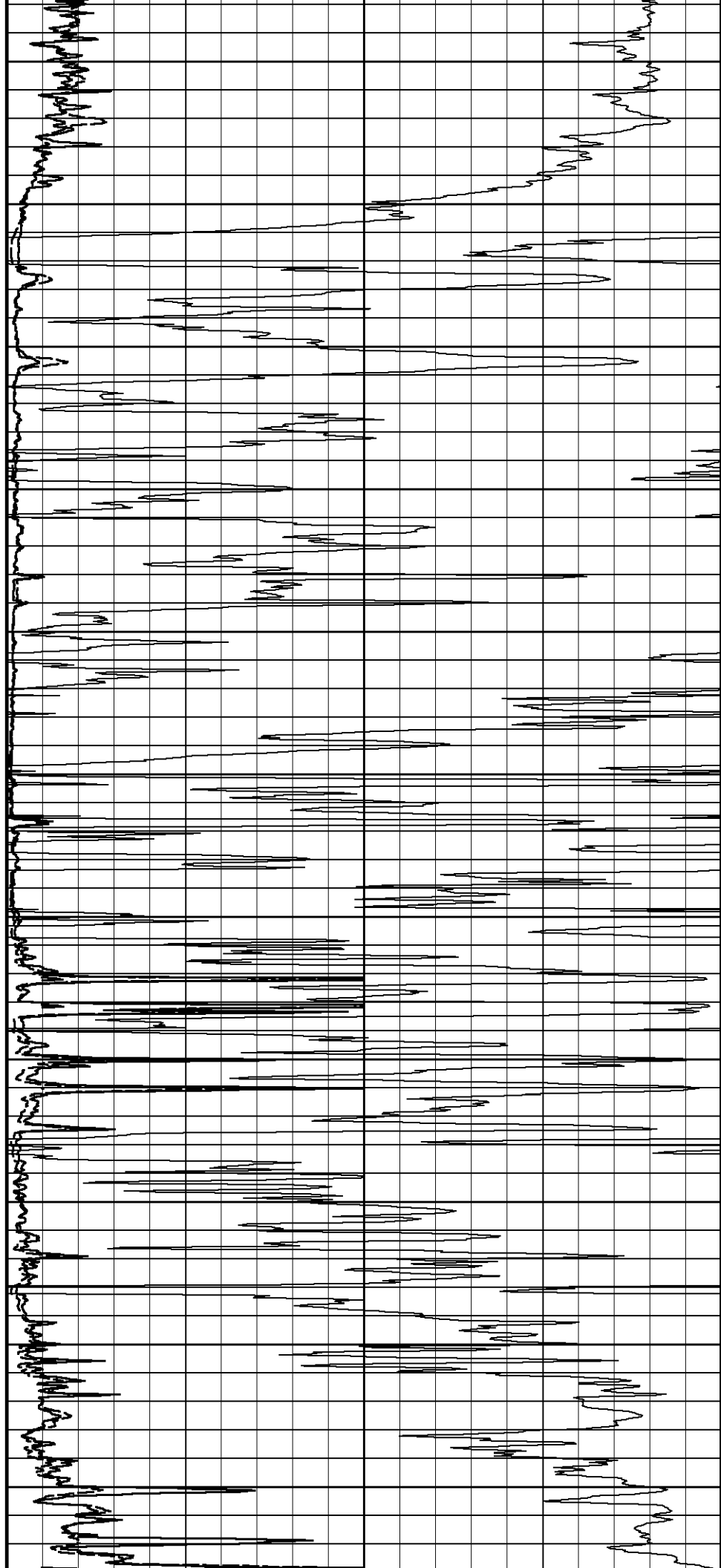
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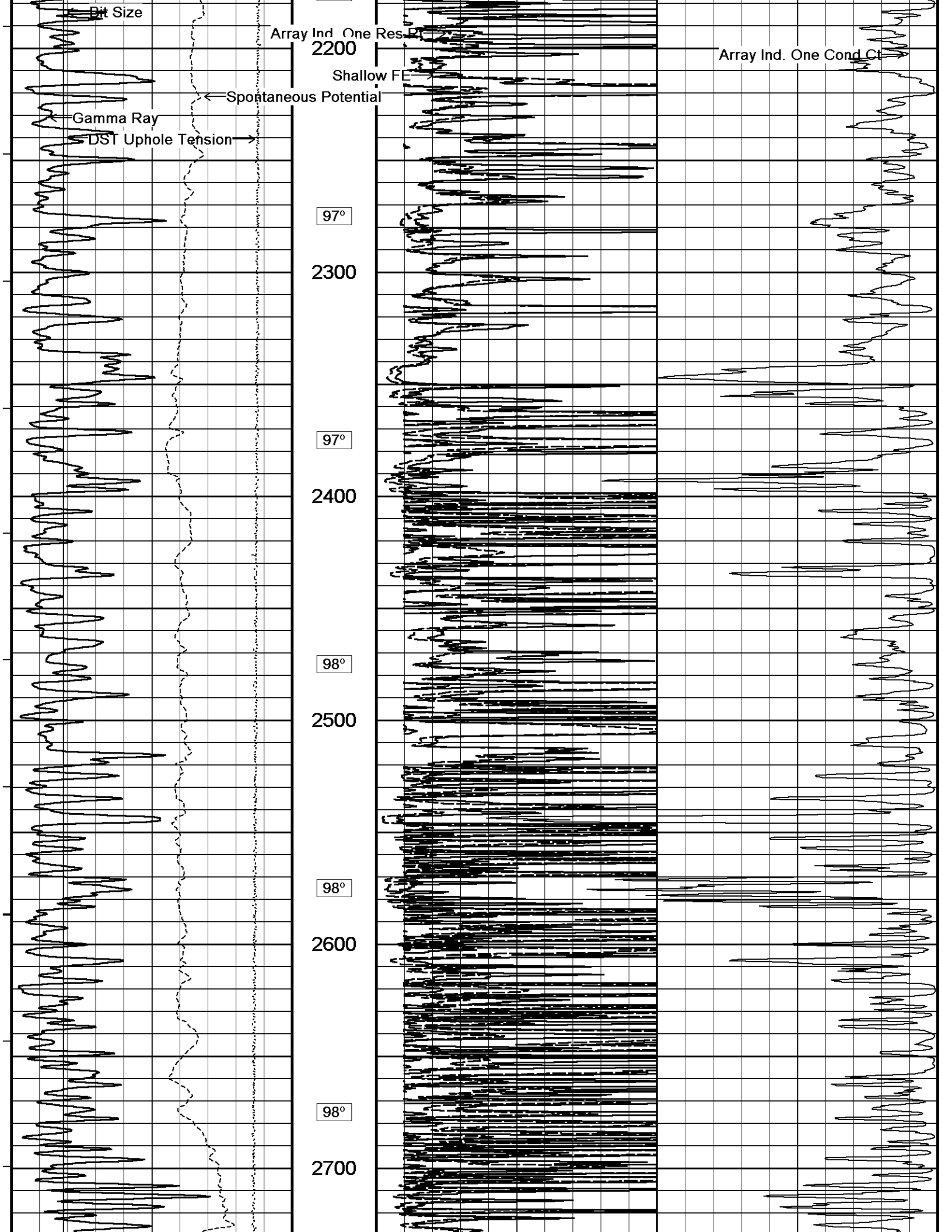
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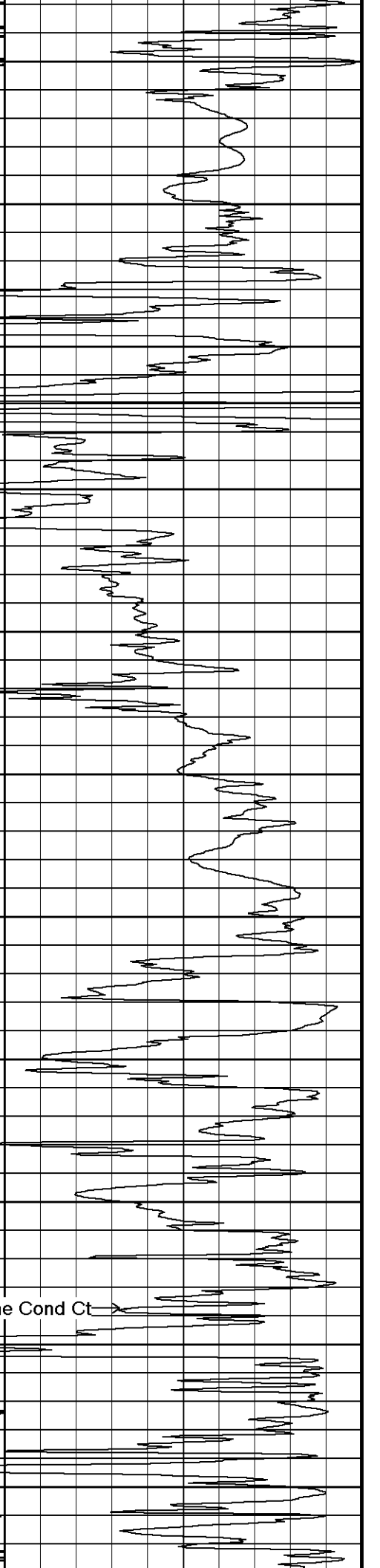
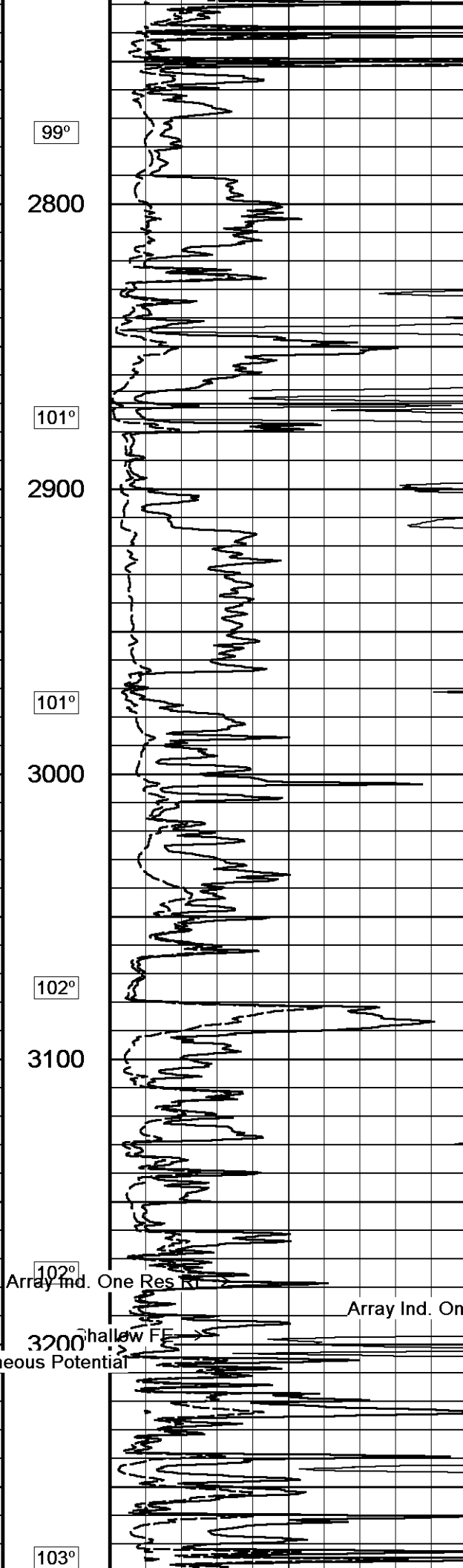
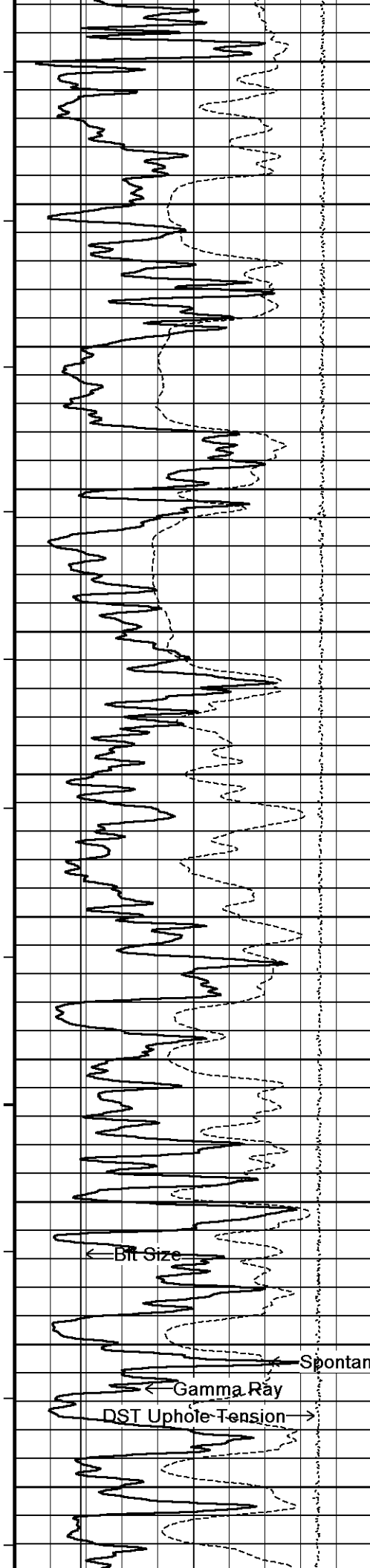
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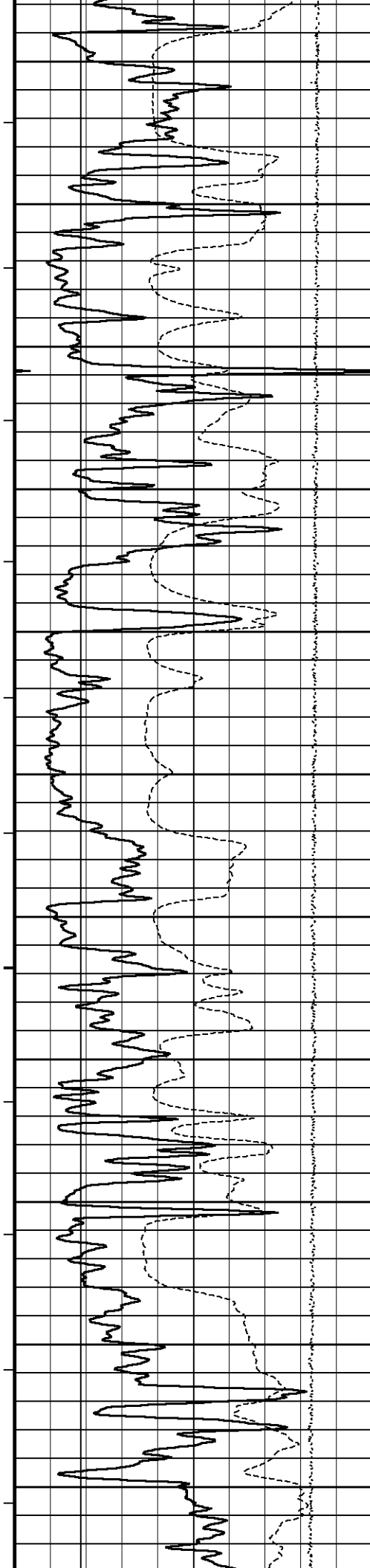
2100

97°









3300

103°

3400

104°

3500

105°

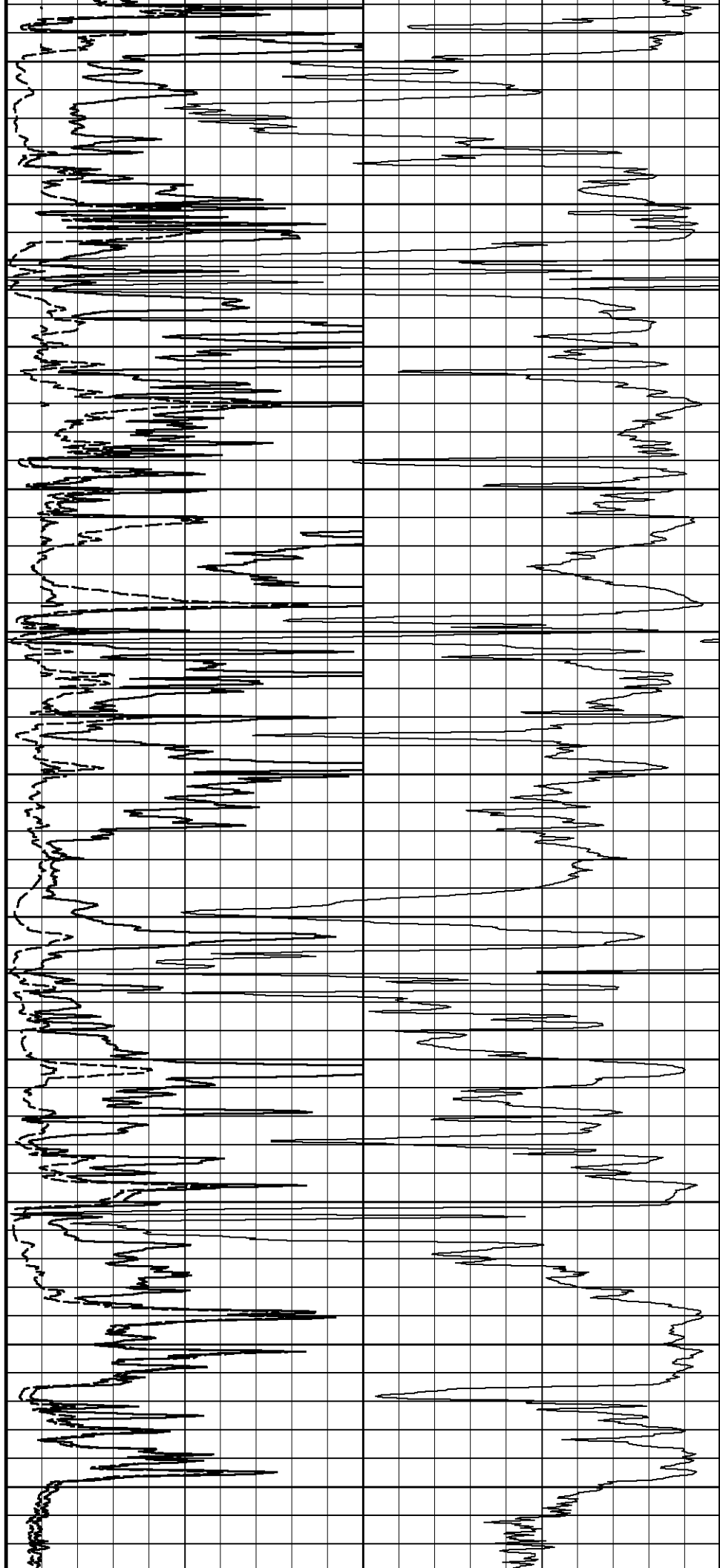
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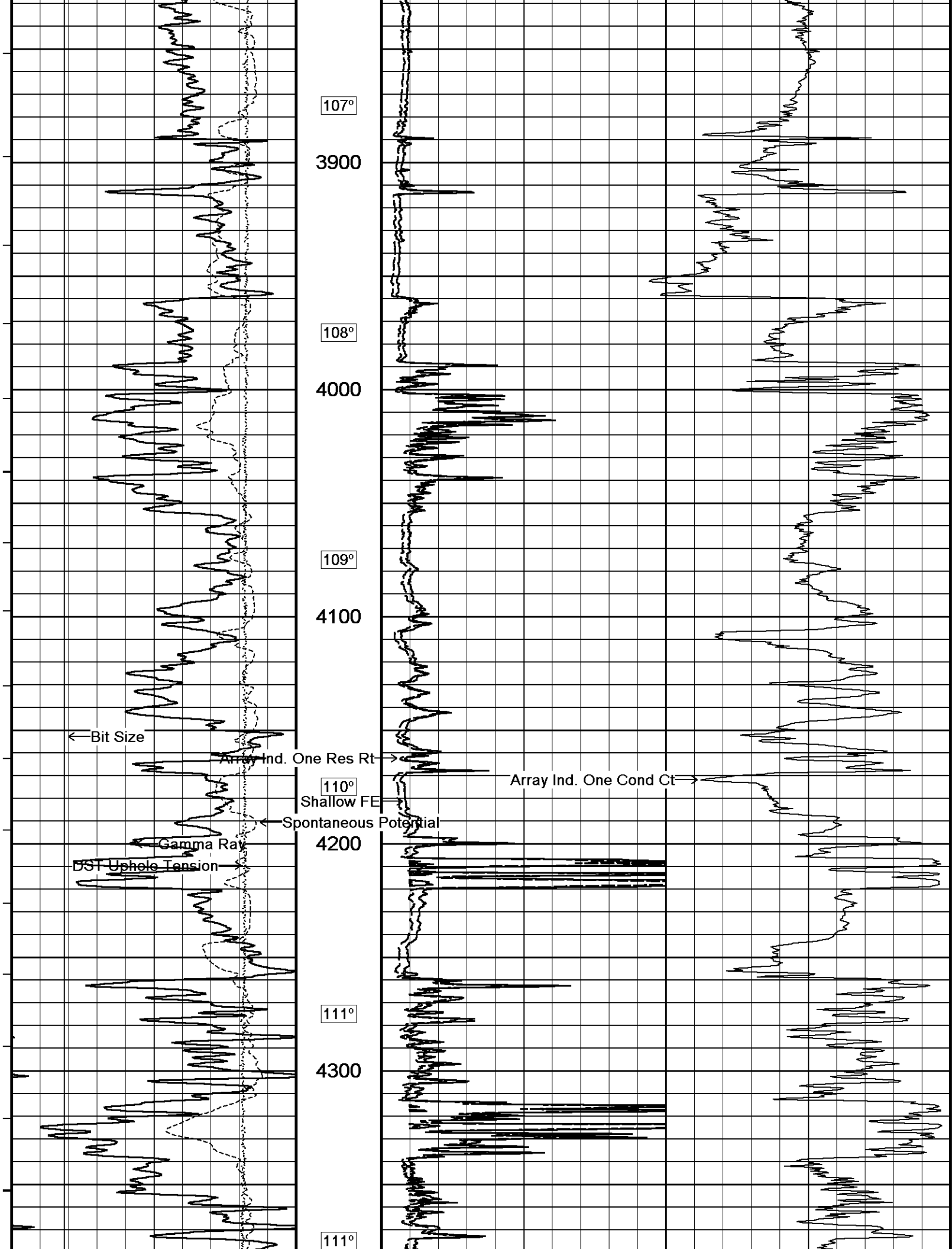
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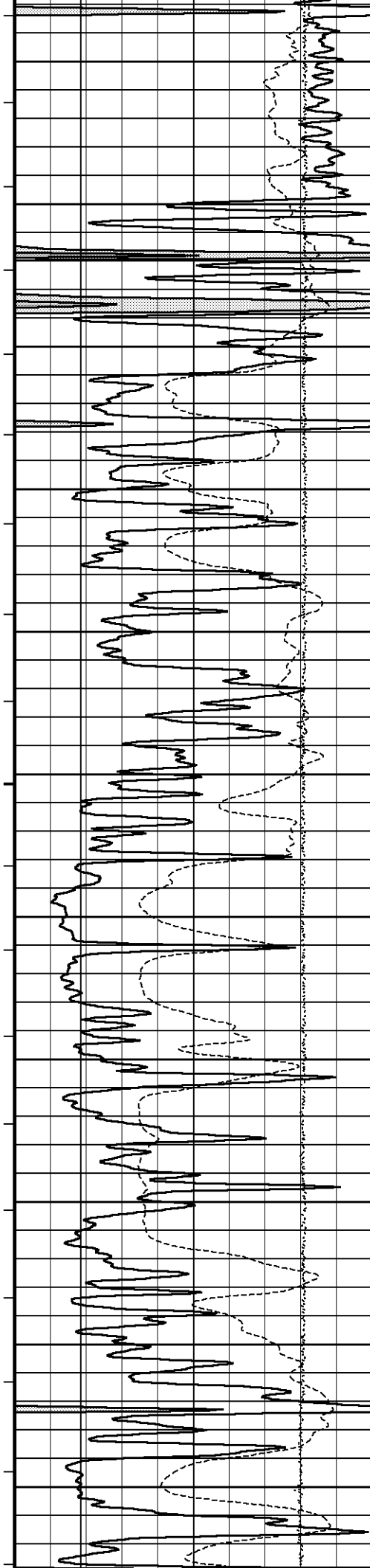
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106°

3800







4400

112°

4500

113°

4600

114°

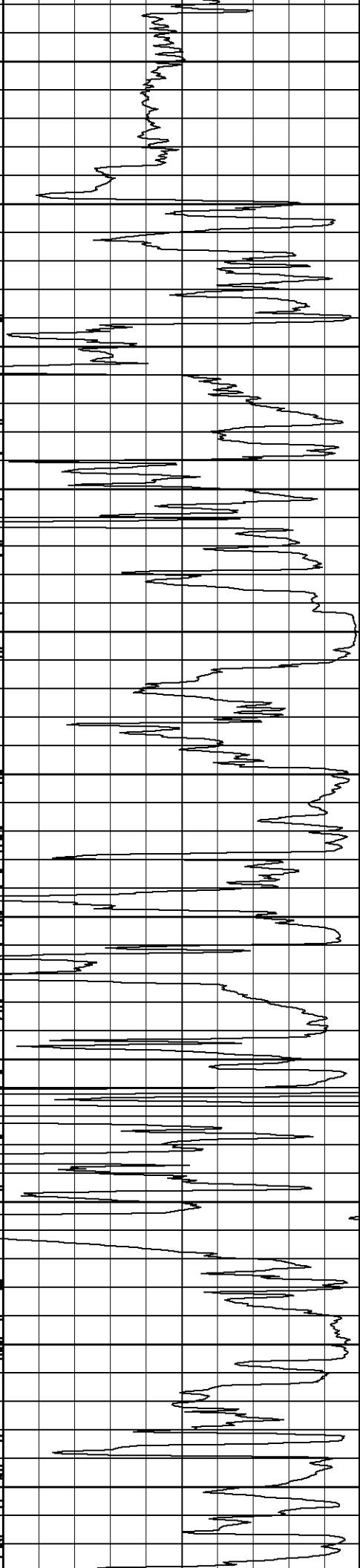
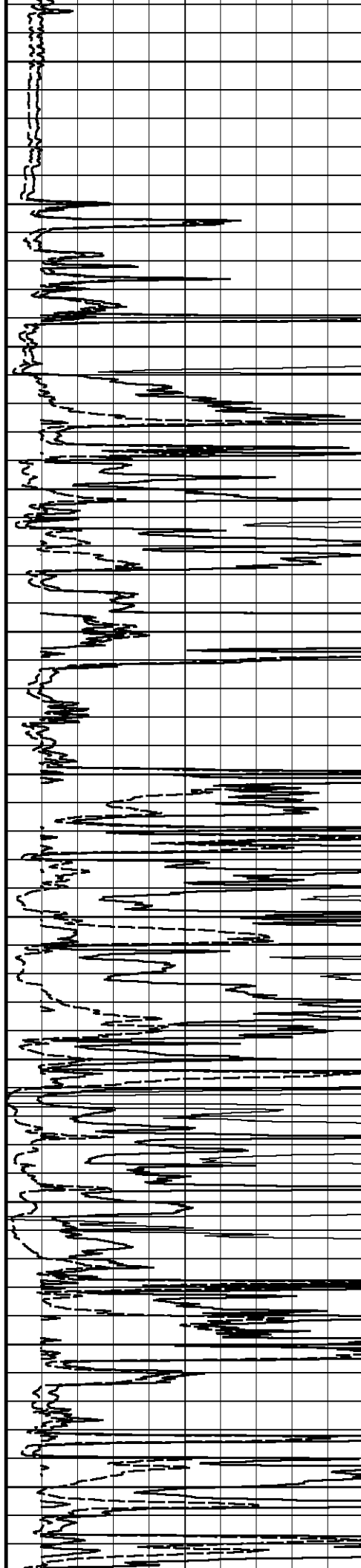
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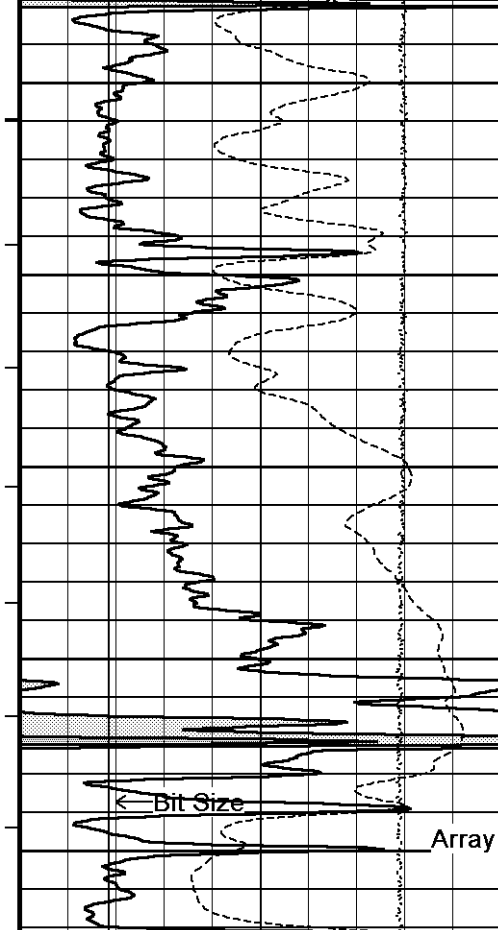
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4800

115°

4900





116°

5000

116°

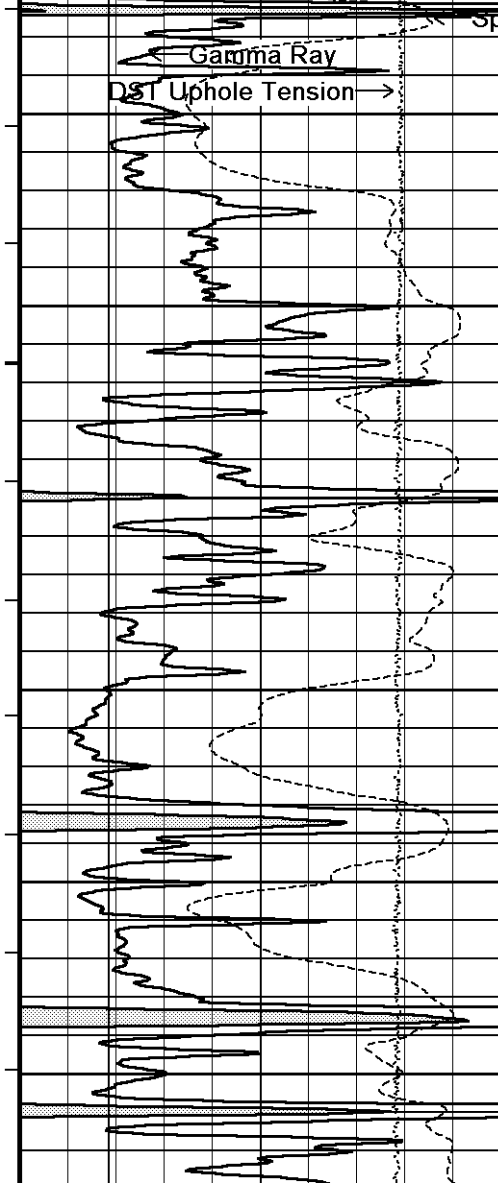
5100

← Bit Size

Array Ind. One Res Rt

Shallow FE

Spontaneous Potential



Gamma Ray

DST Uphole Tension →

117°

5200

118°

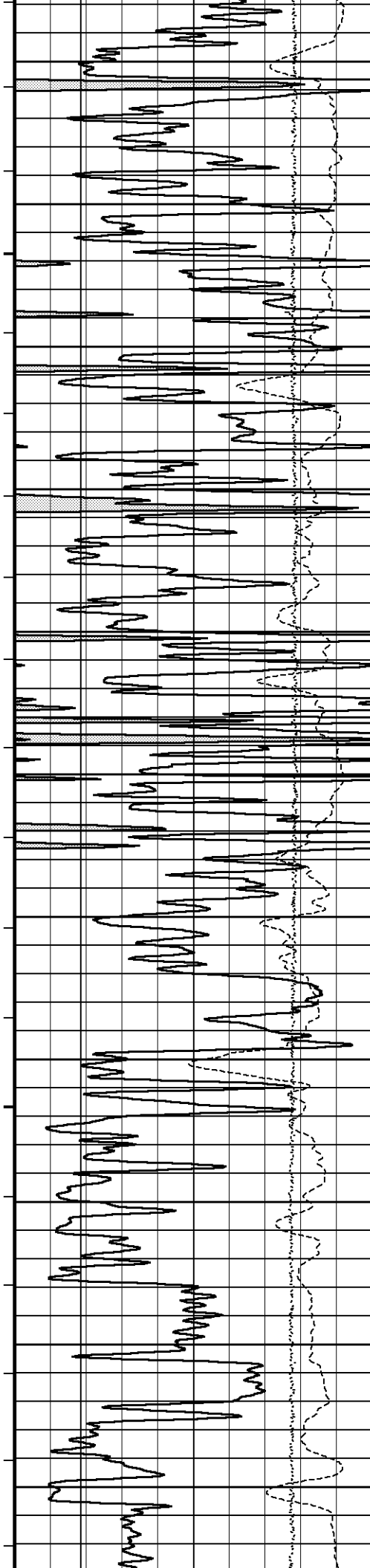
5300

119°

5400

119°

Array Ind. One Cond Ct →



5500

120°

5600

121°

5700

122°

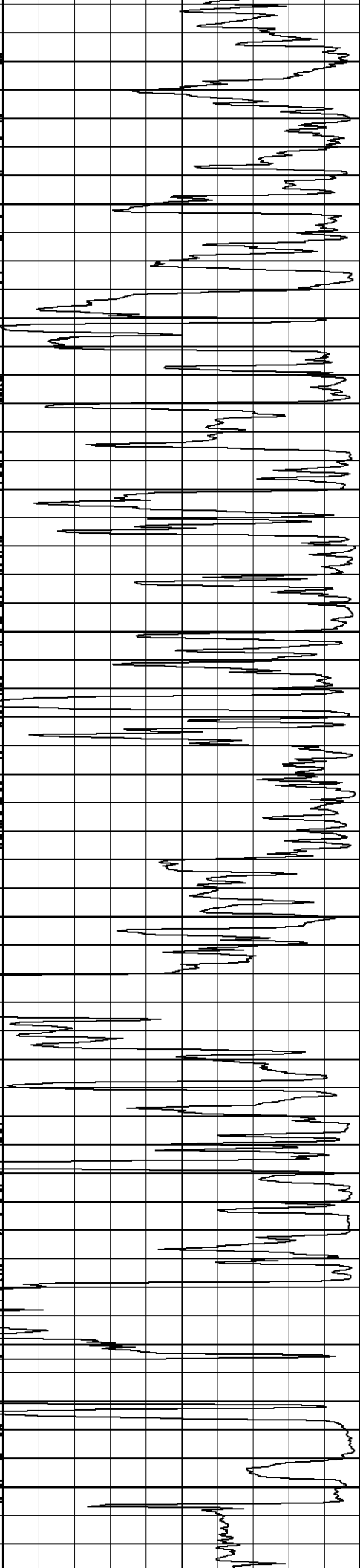
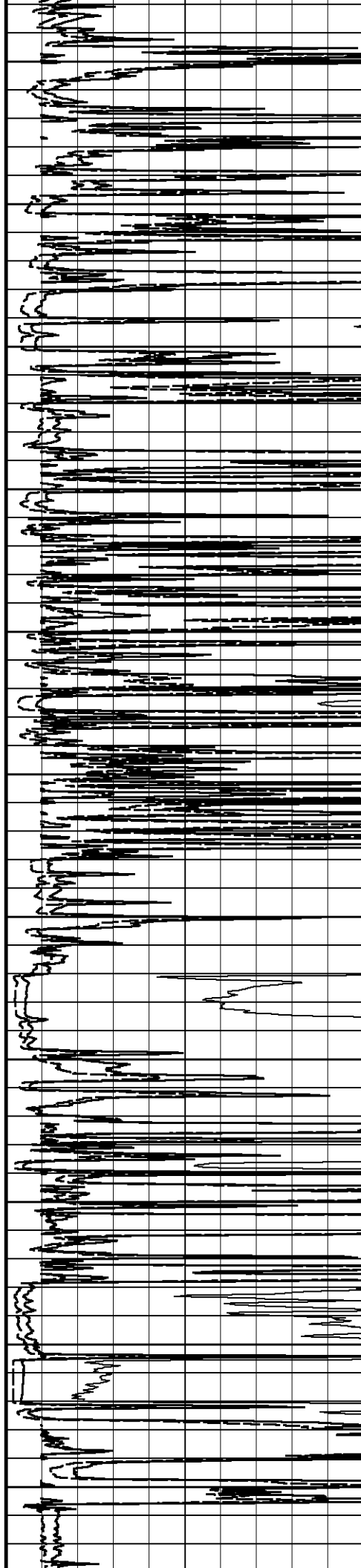
5800

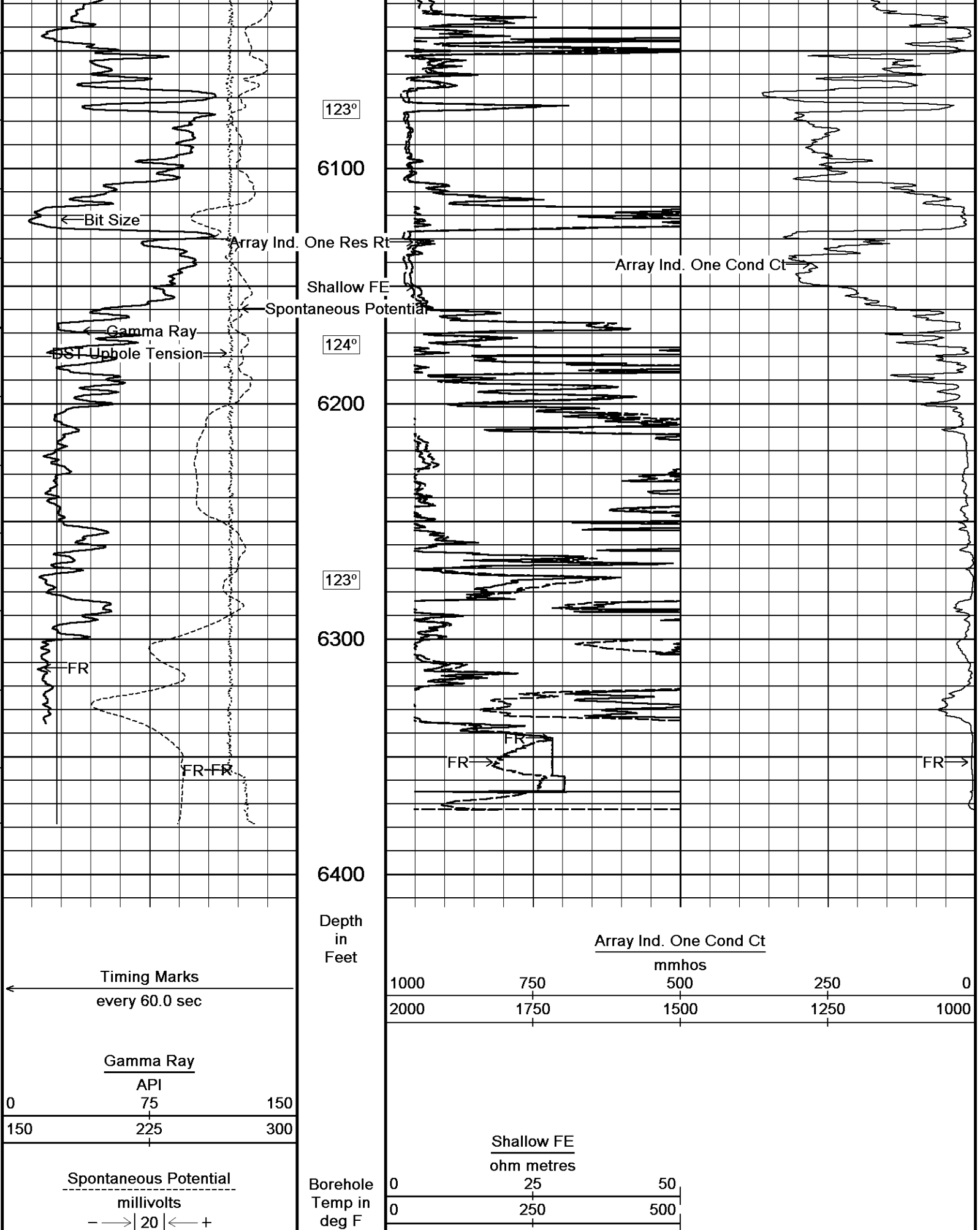
122°

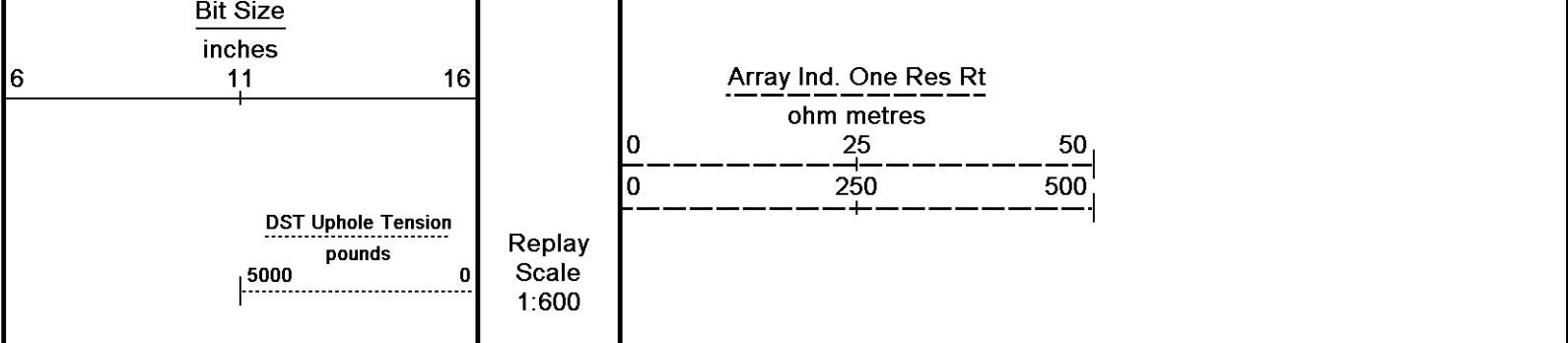
5900

123°

6000







Depth Based Data - Maximum Sampling Increment 10.0cm

Plotted on 22-DEC-2013 18:01

Filename: C:\Minimus 13.05.9583\Logs\O'BRIEN VA...\Copy of Copy(2) of O'BRIEN VAIL 6-30 MAIN.dta

Recorded on 22-DEC-2013 15:39

System Versions: Logged with 13.05.9583 Processed with 13.05.9583 Plotted with 13.05.9583

↑

2 INCH MAIN

↑

↓

5 INCH MAIN

↓

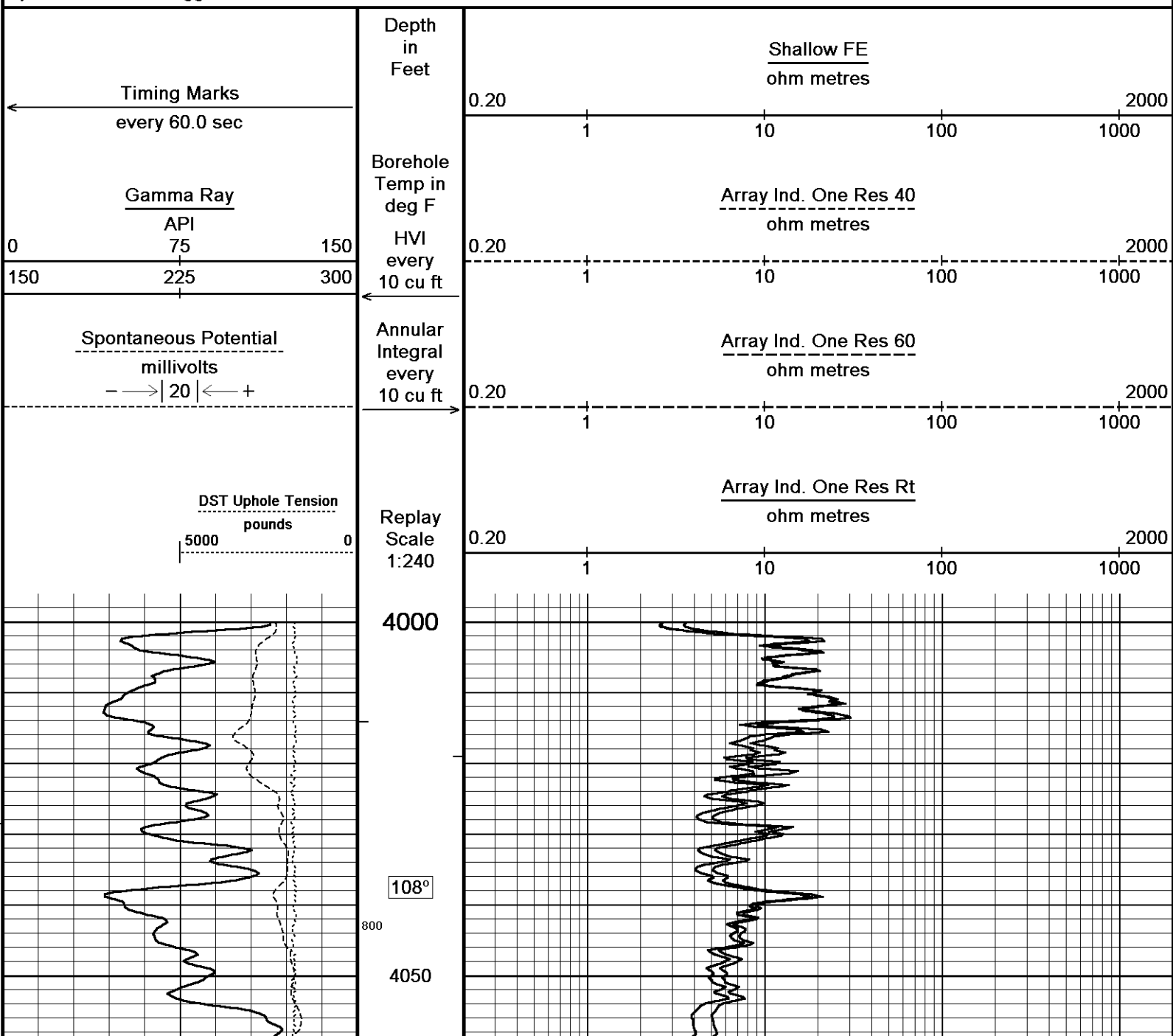
Depth Based Data - Maximum Sampling Increment 10.0cm

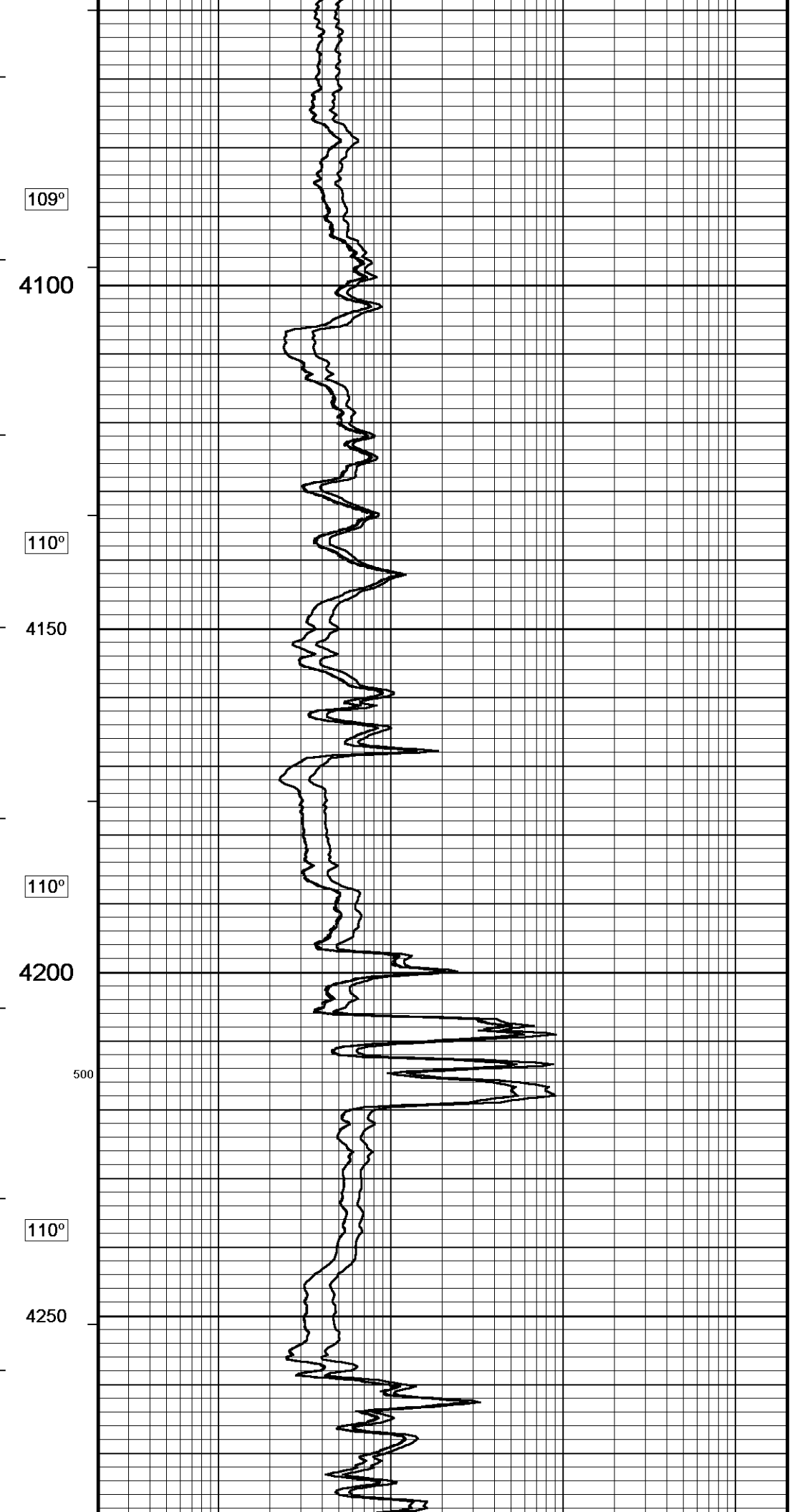
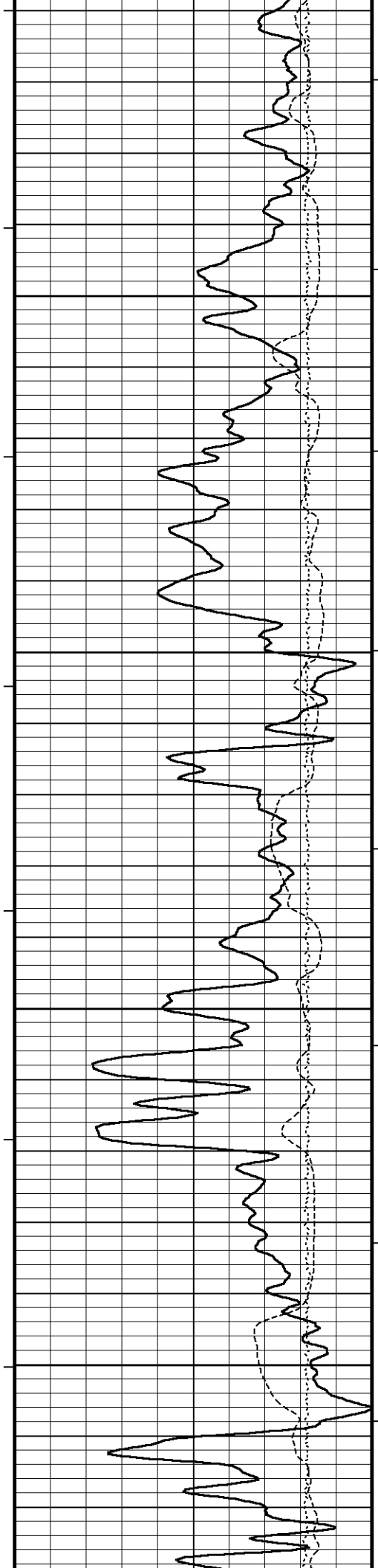
Plotted on 22-DEC-2013 18:01

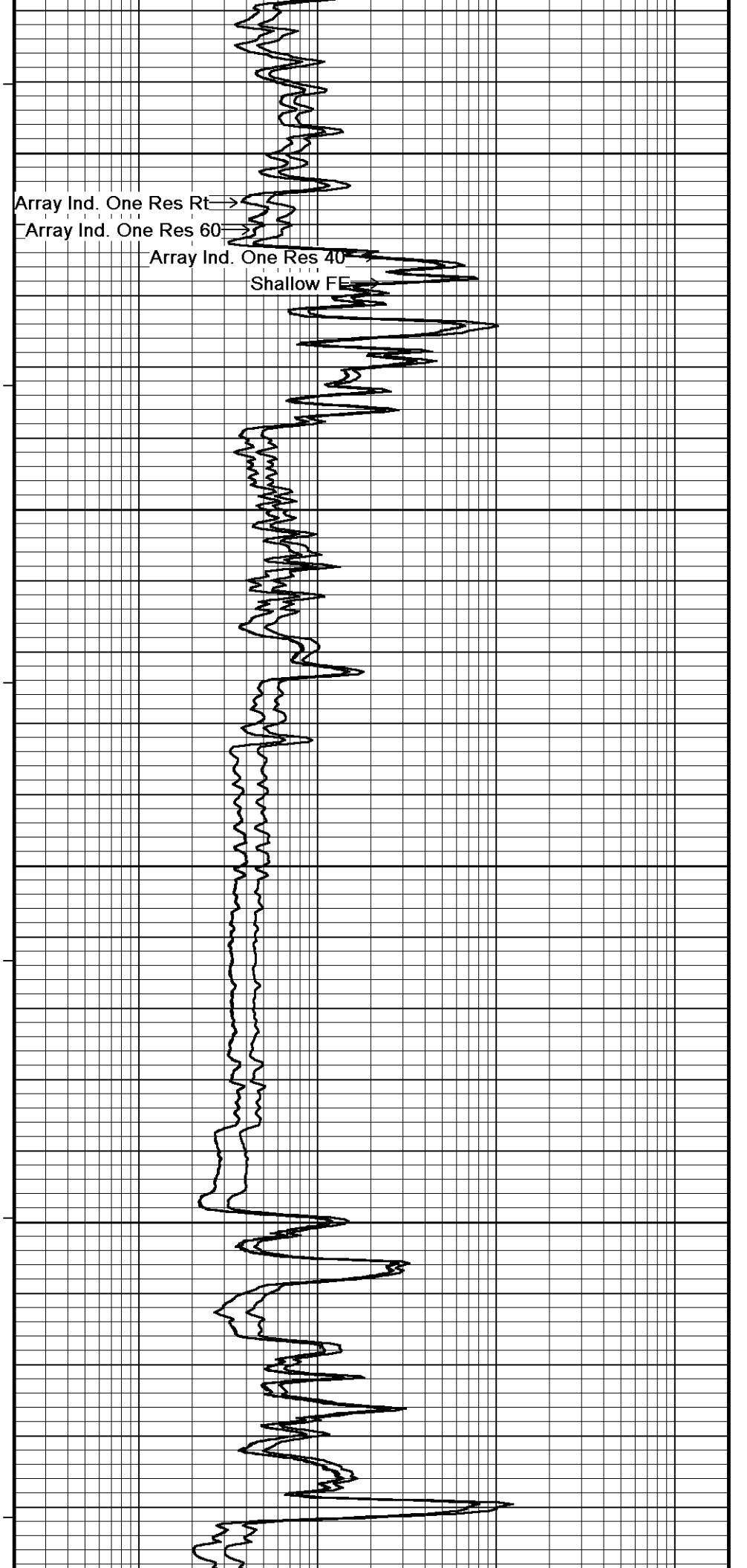
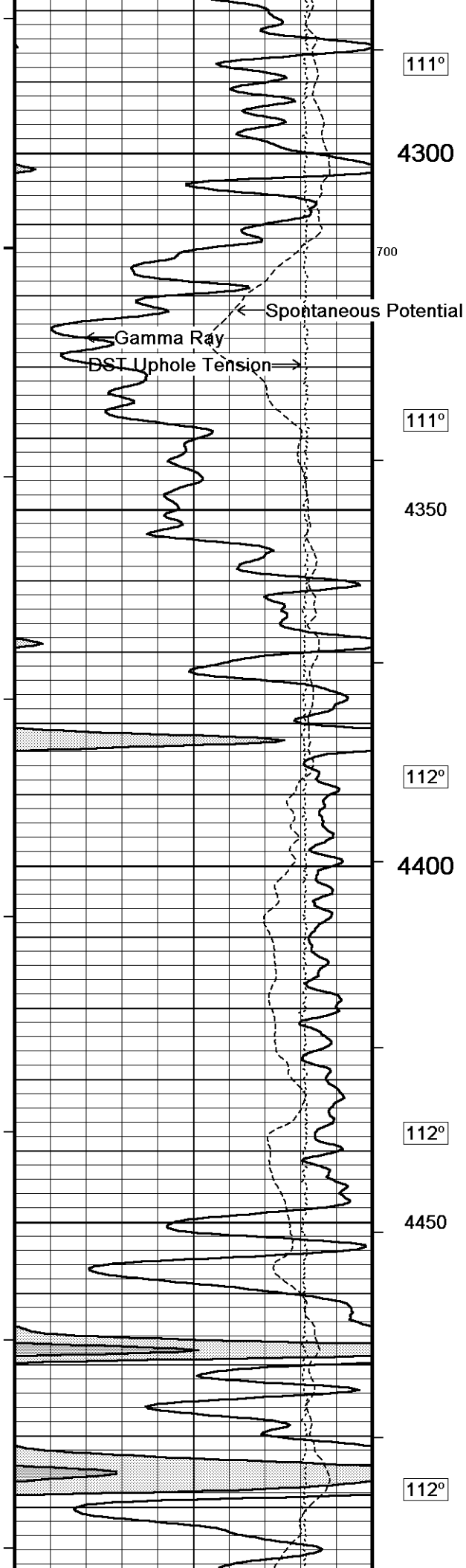
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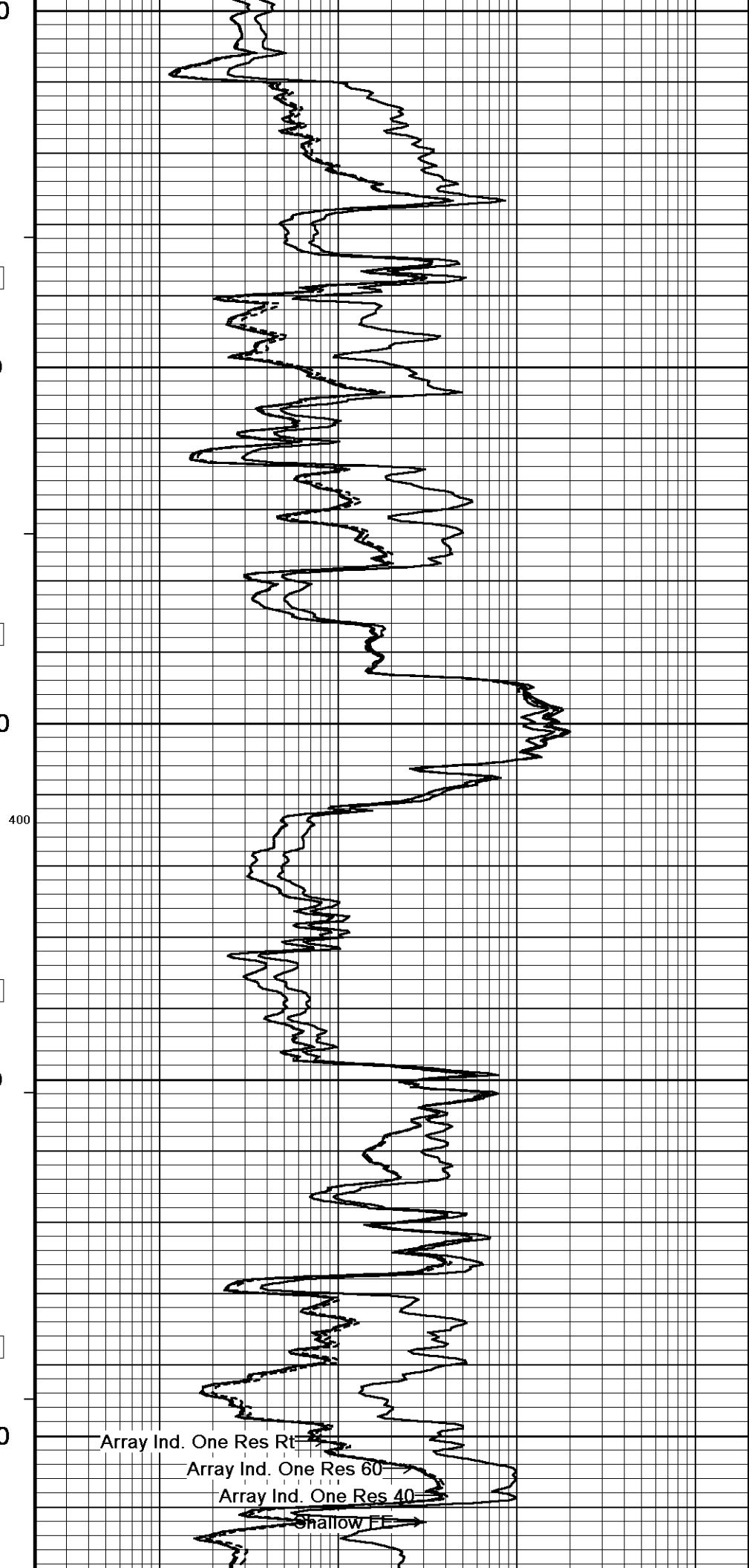
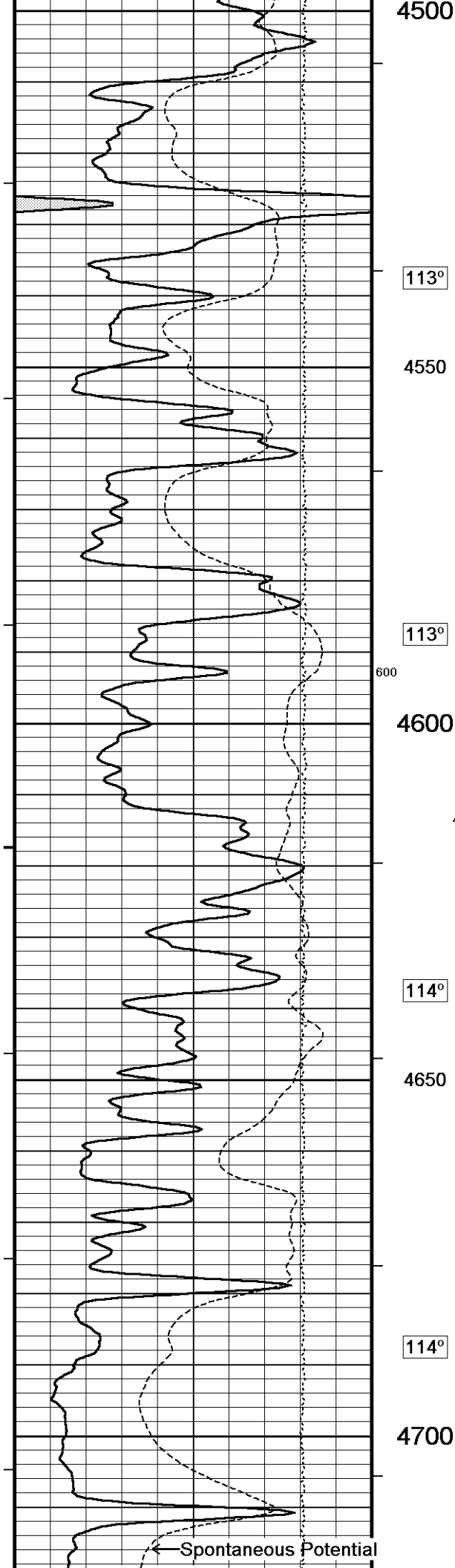
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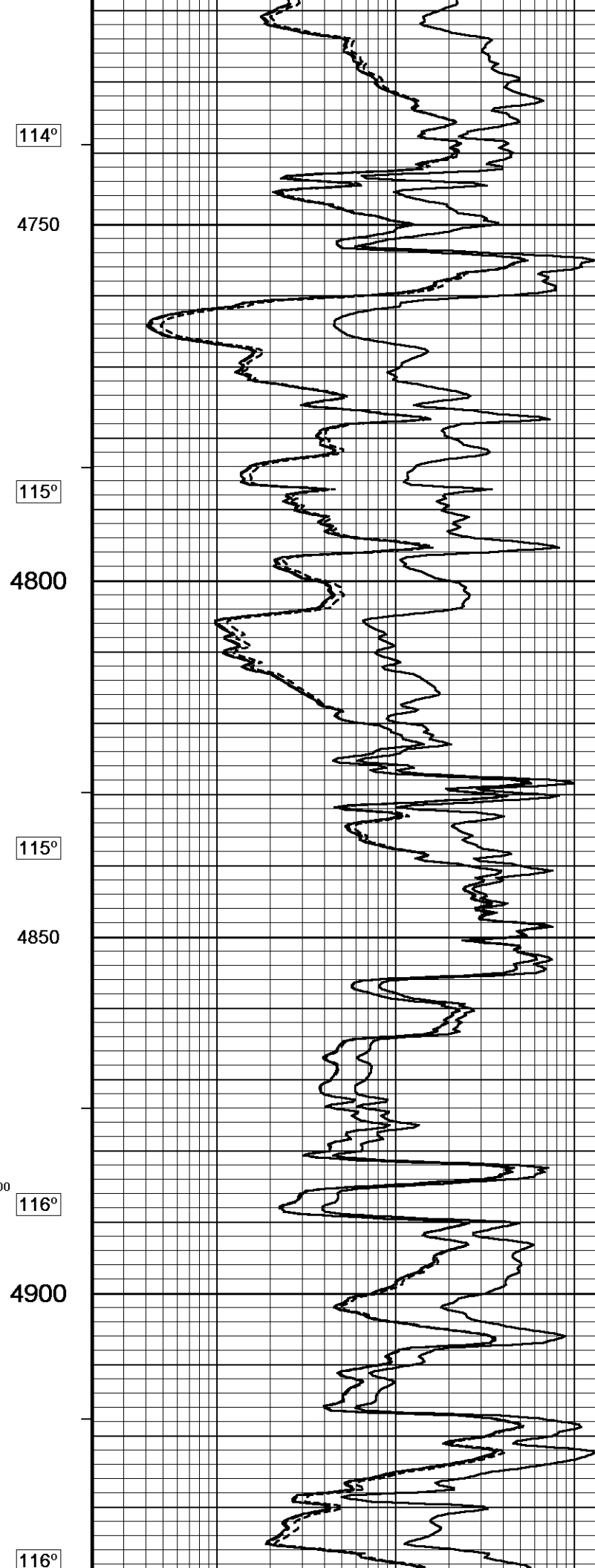
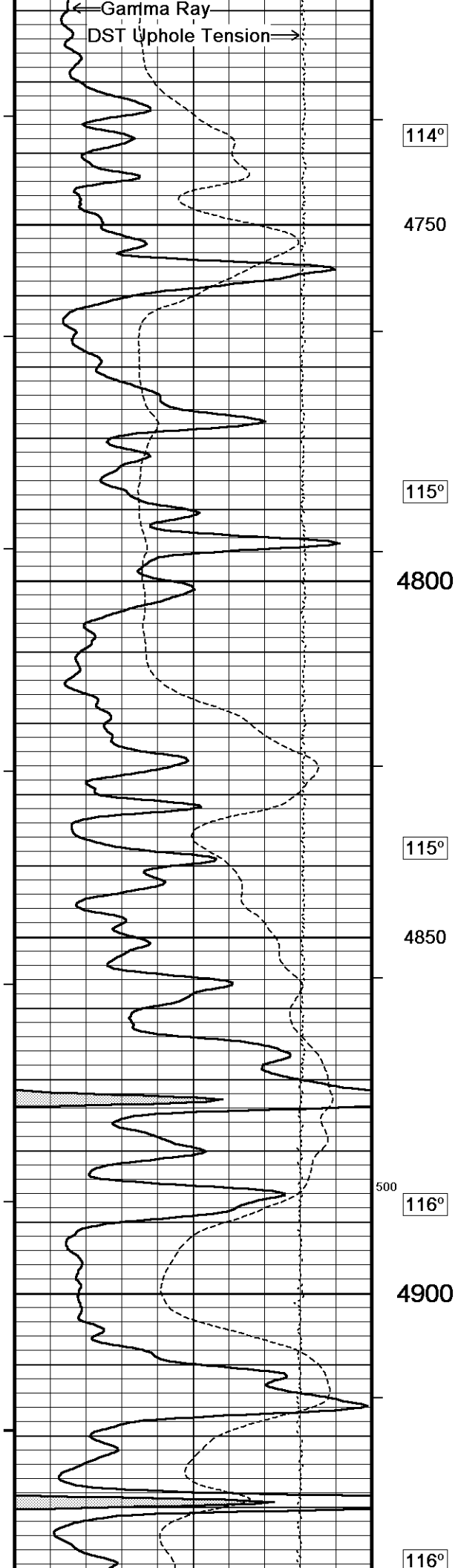
System Versions: Logged with 13.05.9583 Processed with 13.05.9583 Plotted with 13.05.9583

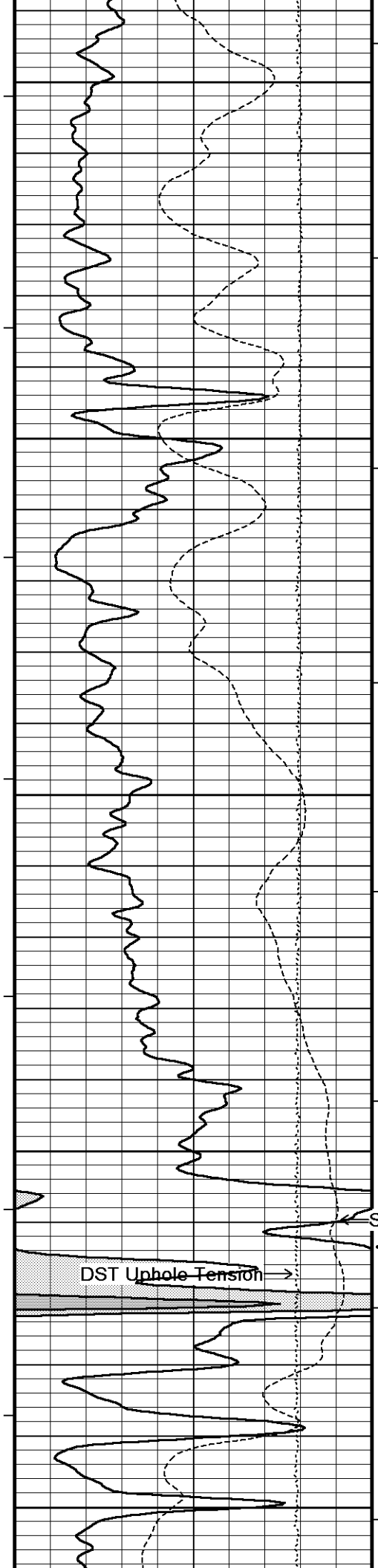




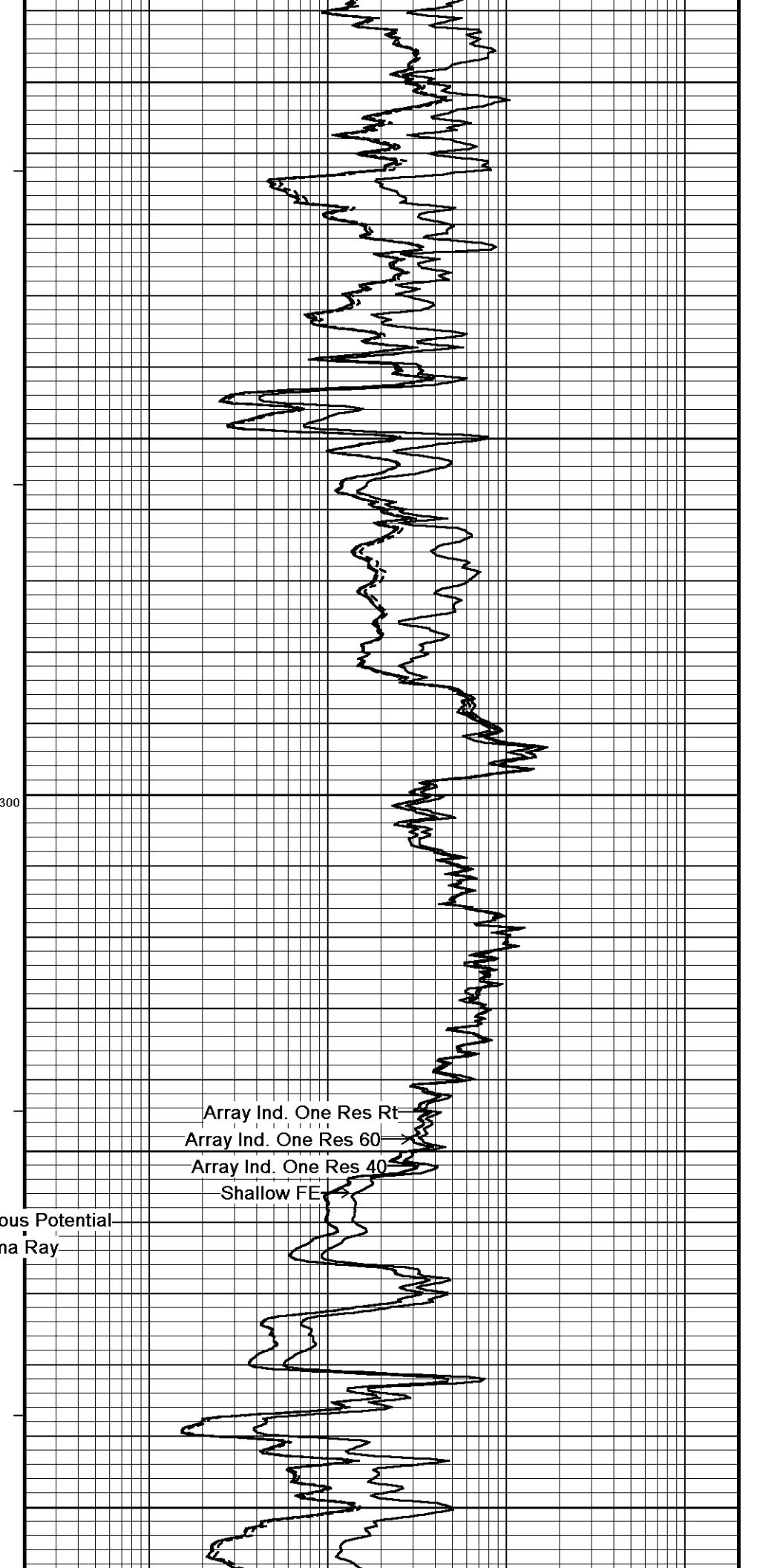








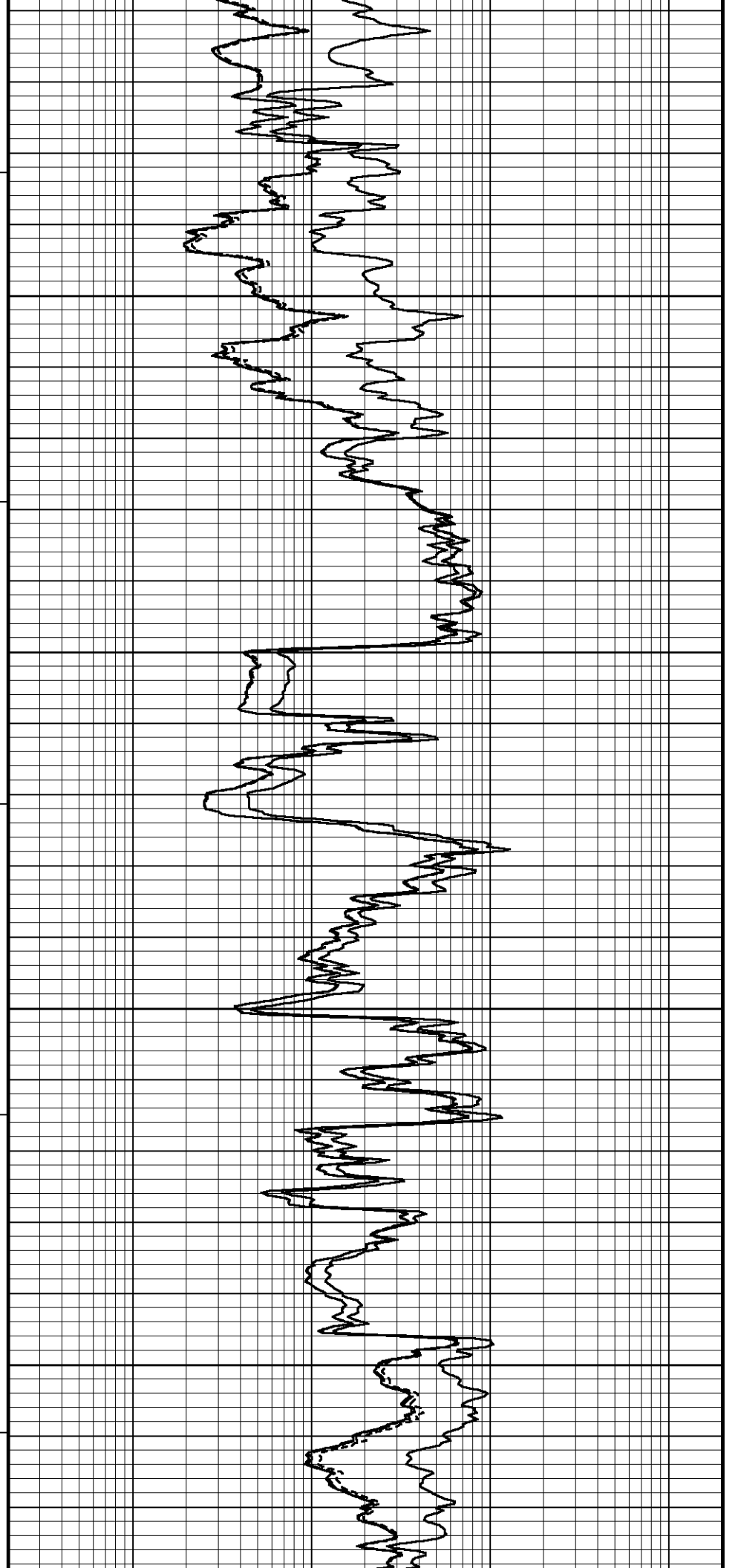
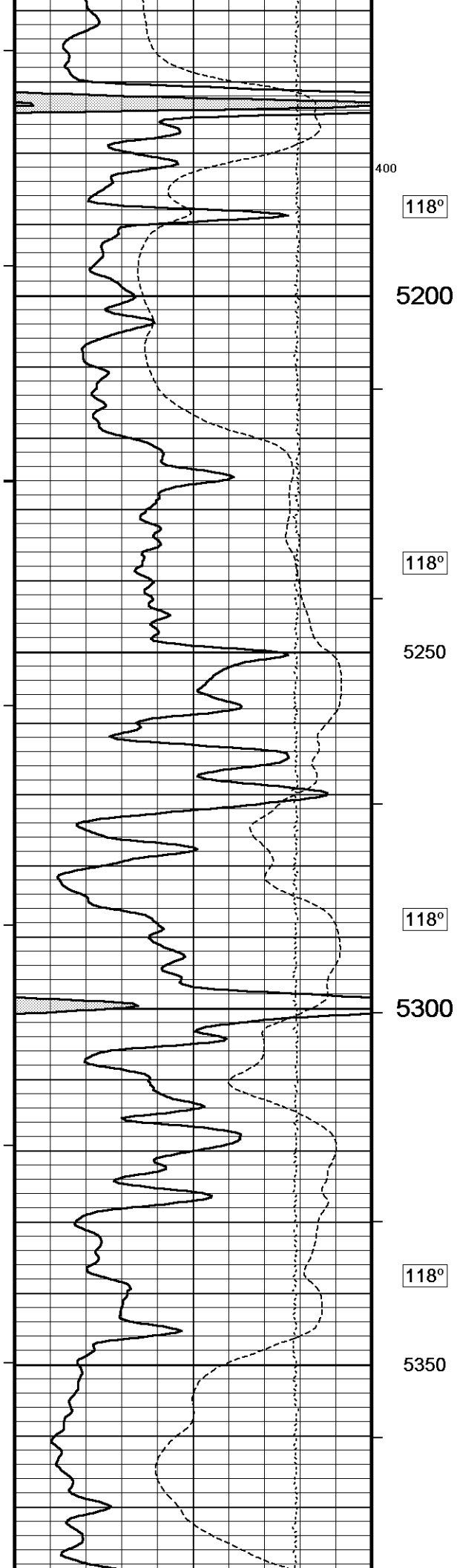
4950
116°
5000
116°
5050
5100
117°
5150

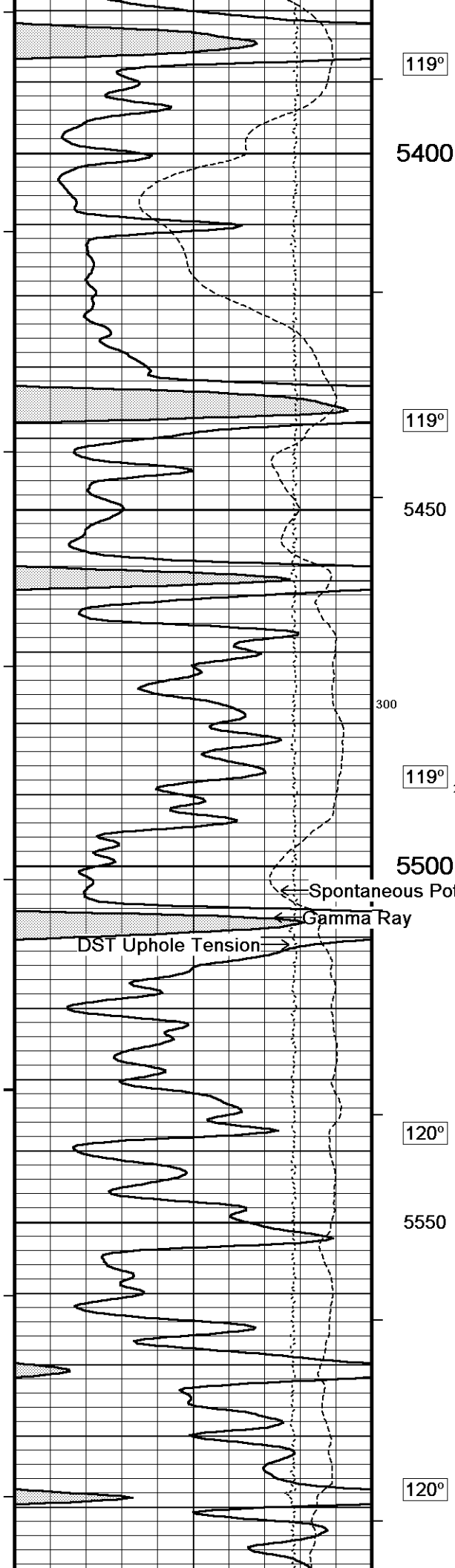


Array Ind. One Res Rt
Array Ind. One Res 60
Array Ind. One Res 40
Shallow FE

← Spontaneous Potential
← Gamma Ray

DST Uphole Tension →





119°

5400

119°

5450

119°

5500

120°

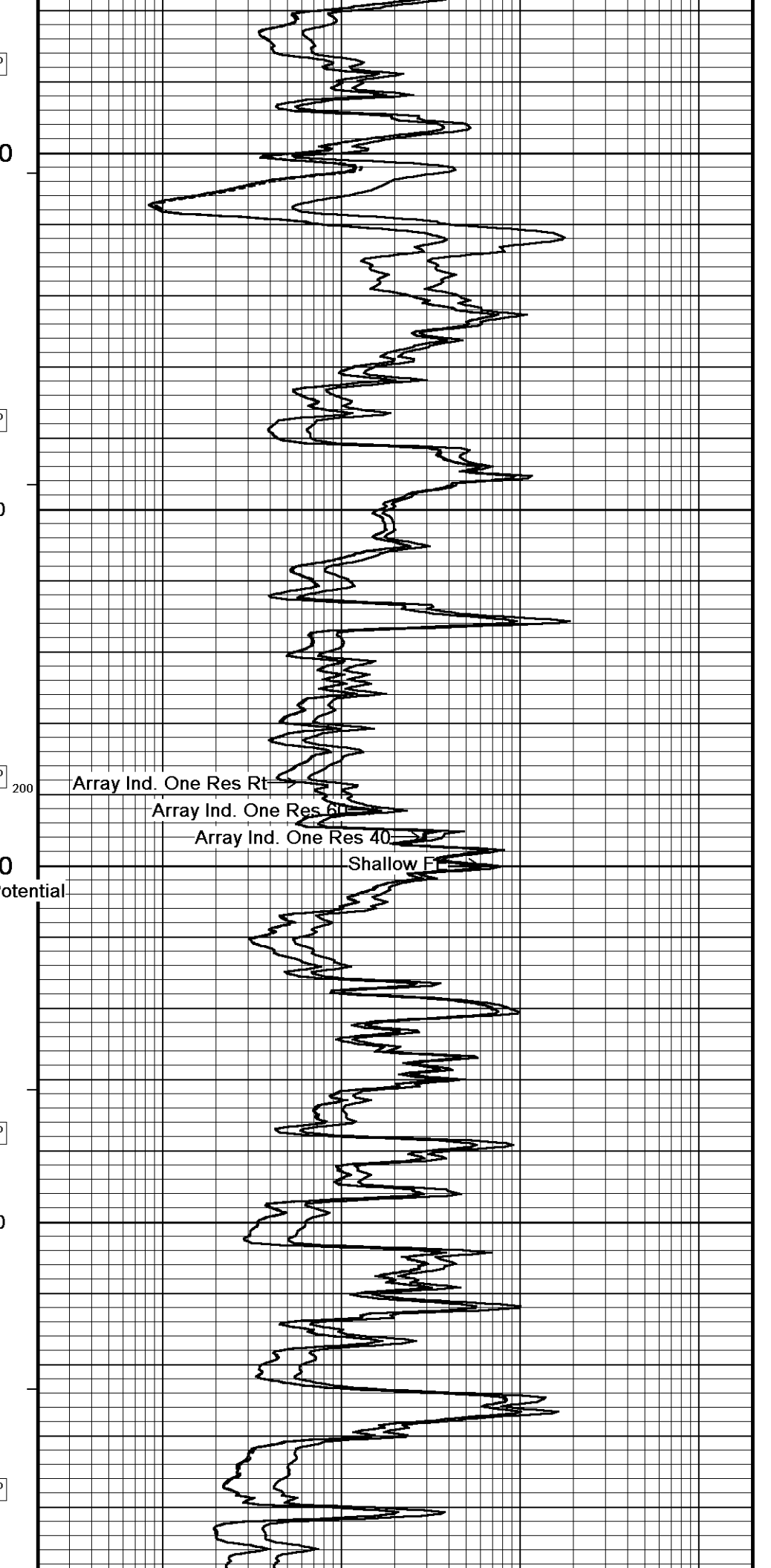
5550

120°

Spontaneous Potential

Gamma Ray

DST Uphole Tension

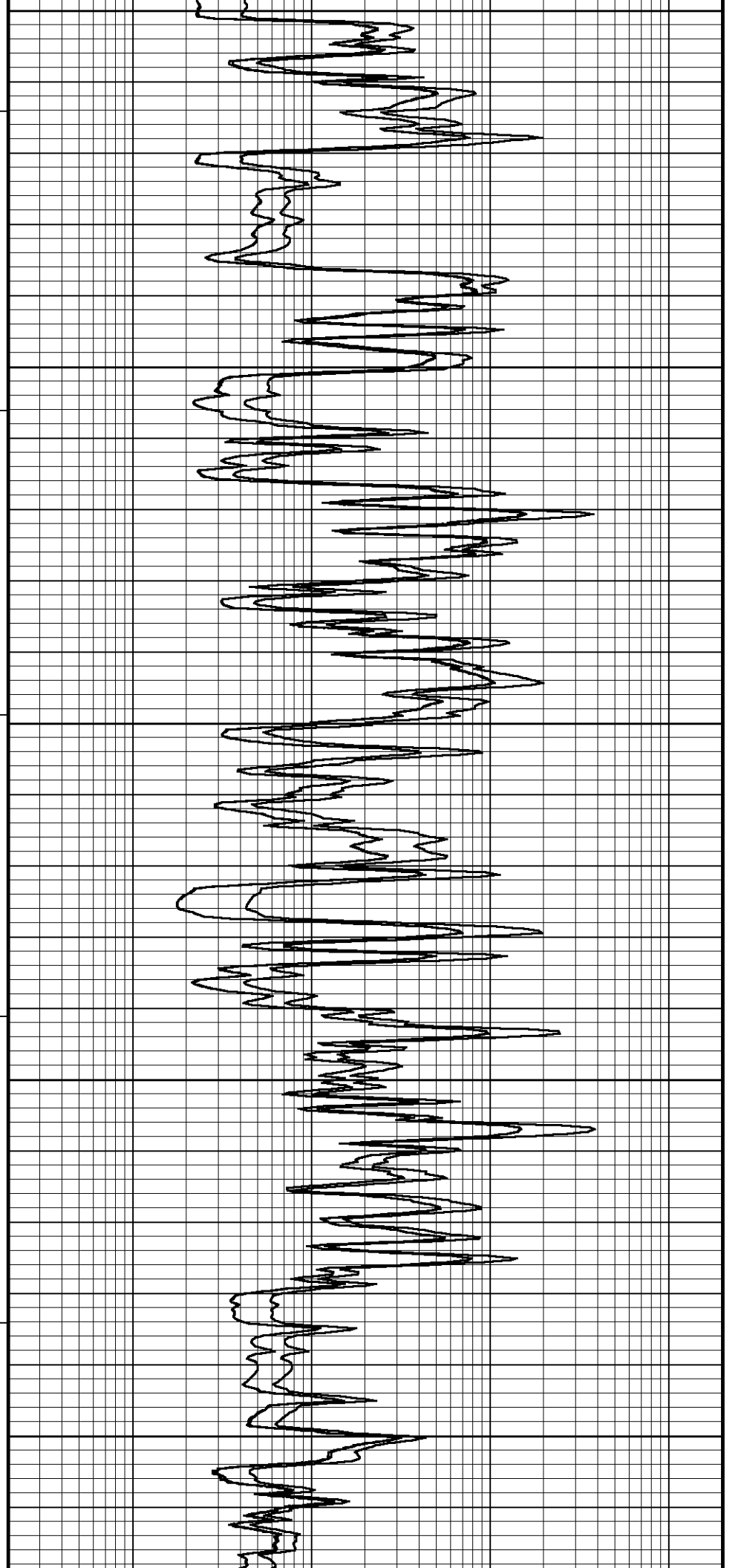
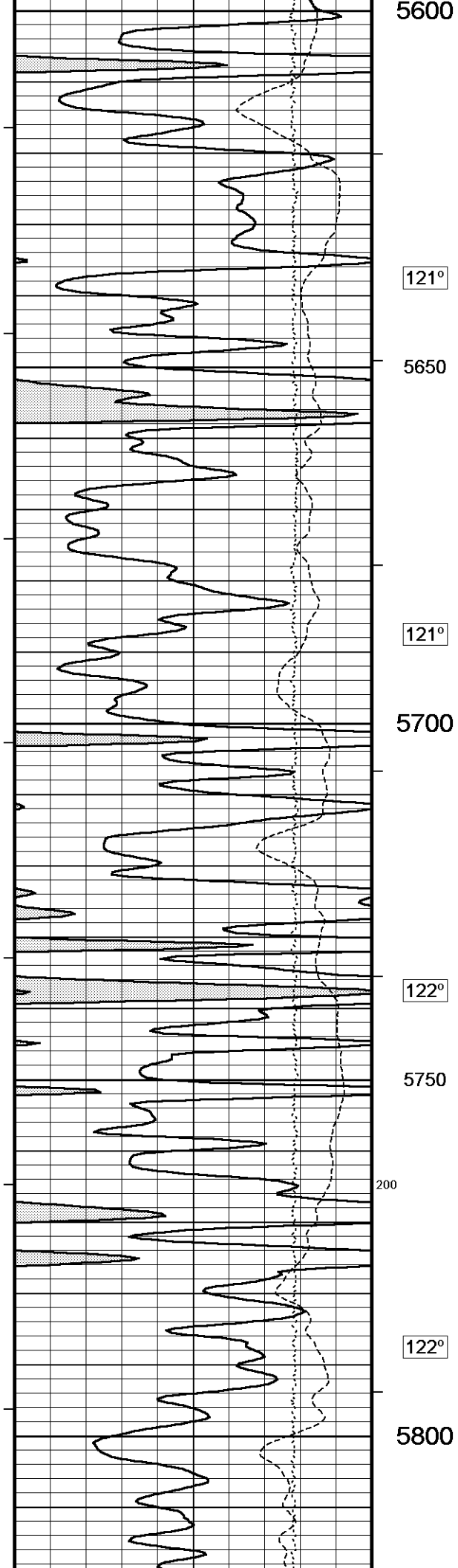


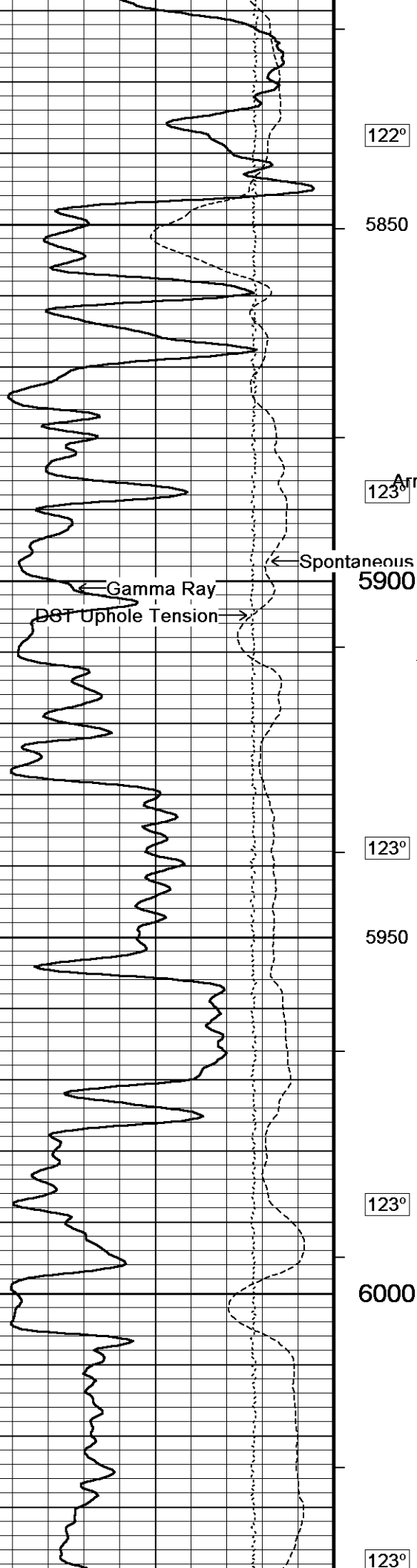
Array Ind. One Res Rt

Array Ind. One Res 60

Array Ind. One Res 40

Shallow Fm.





122°

5850

123°

5900

100

123°

5950

123°

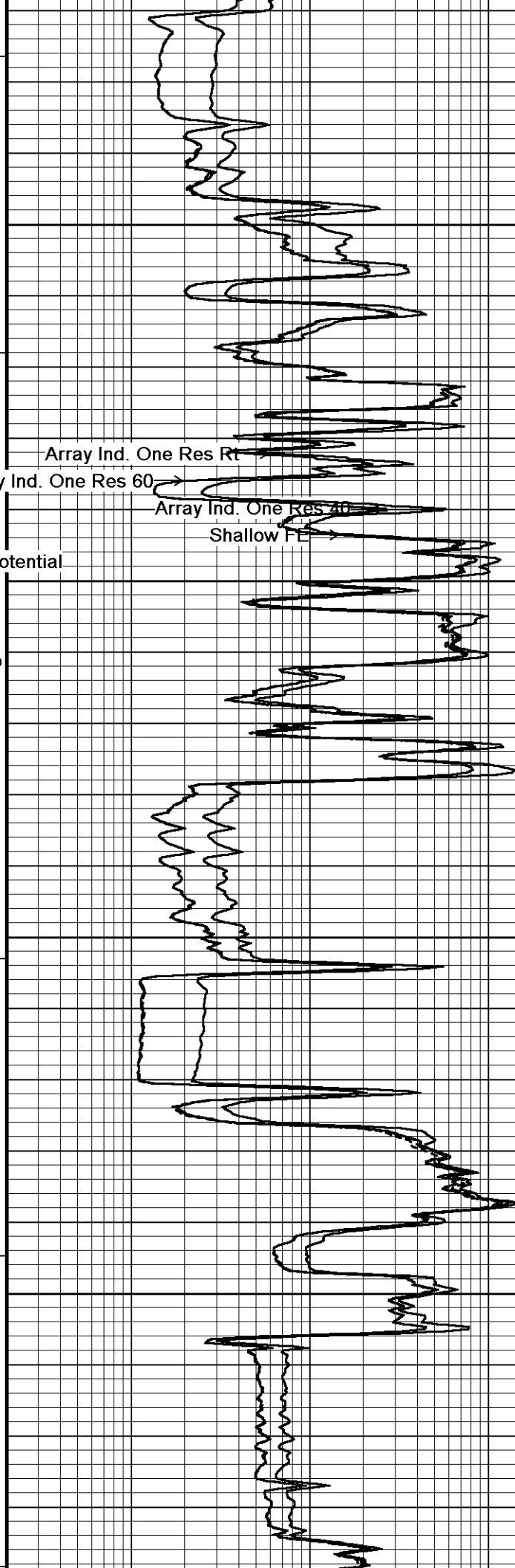
6000

123°

← Spontaneous Potential

← Gamma Ray

← DST Uphole Tension →

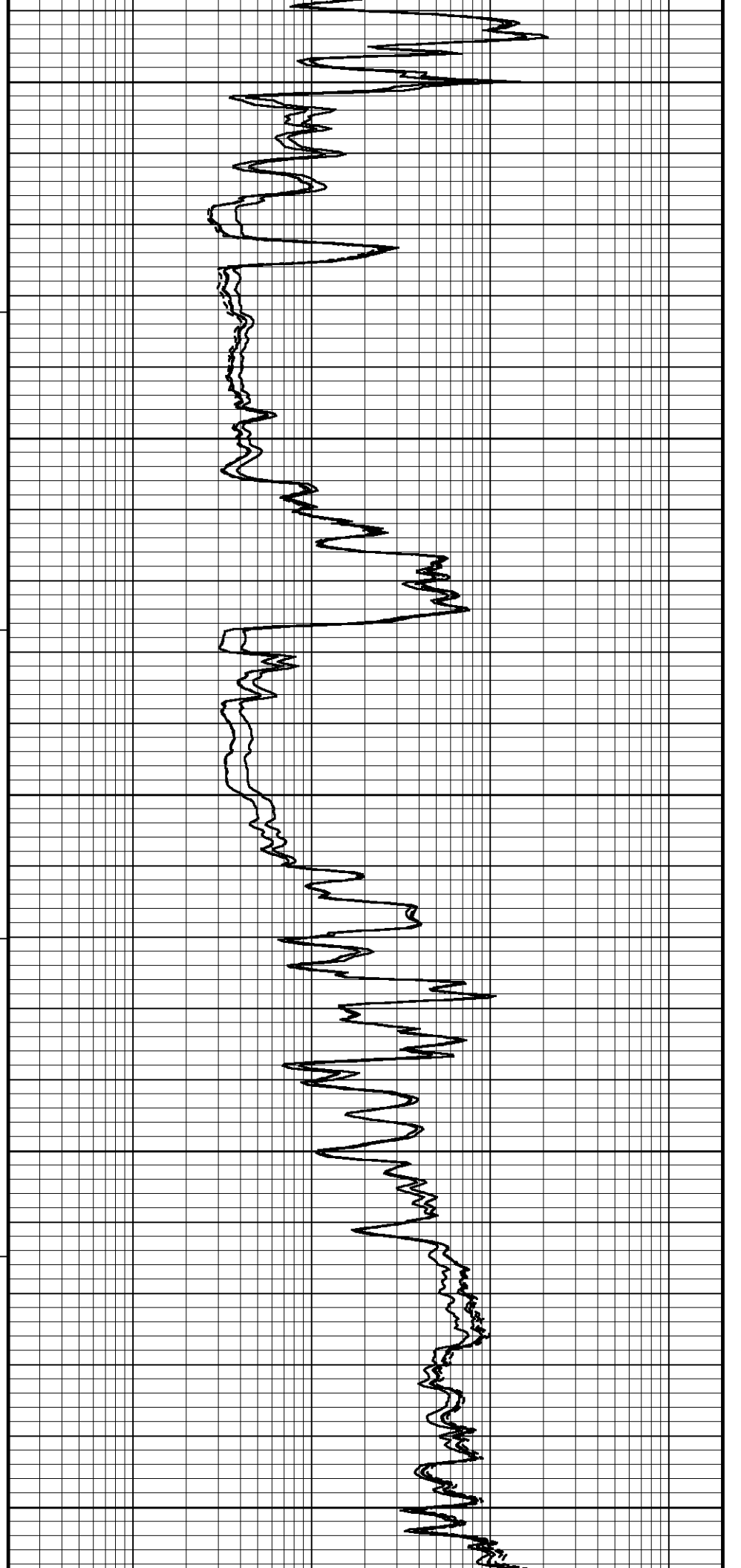
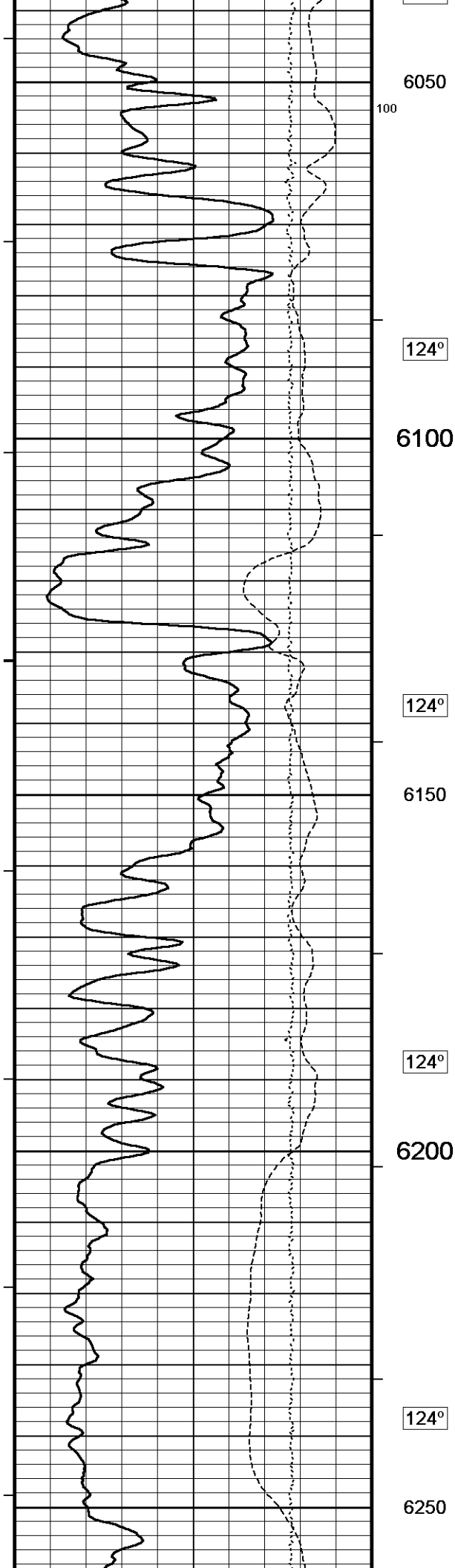


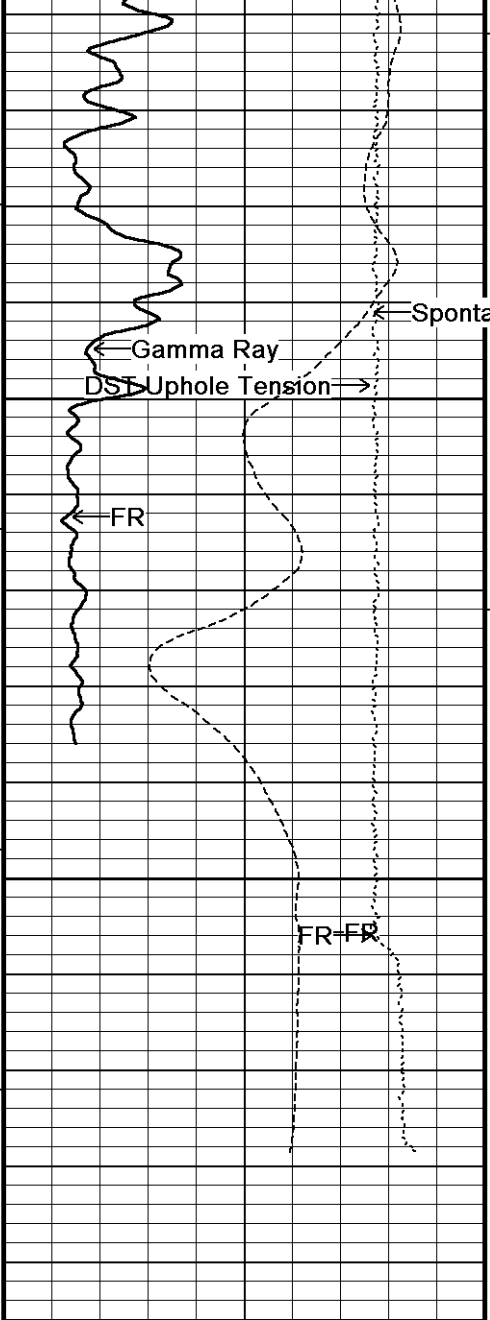
Array Ind. One Res Rt →

Array Ind. One Res 60 →

Array Ind. One Res 40 →

Shallow FE →





123°

Spontaneous Potential

6300

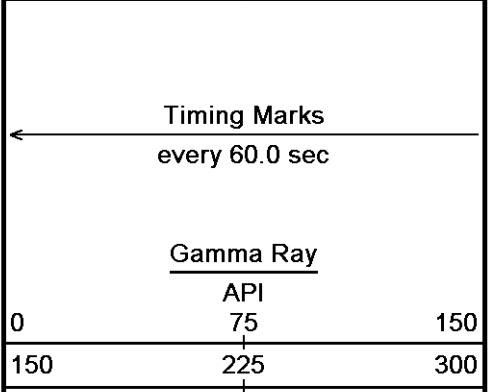
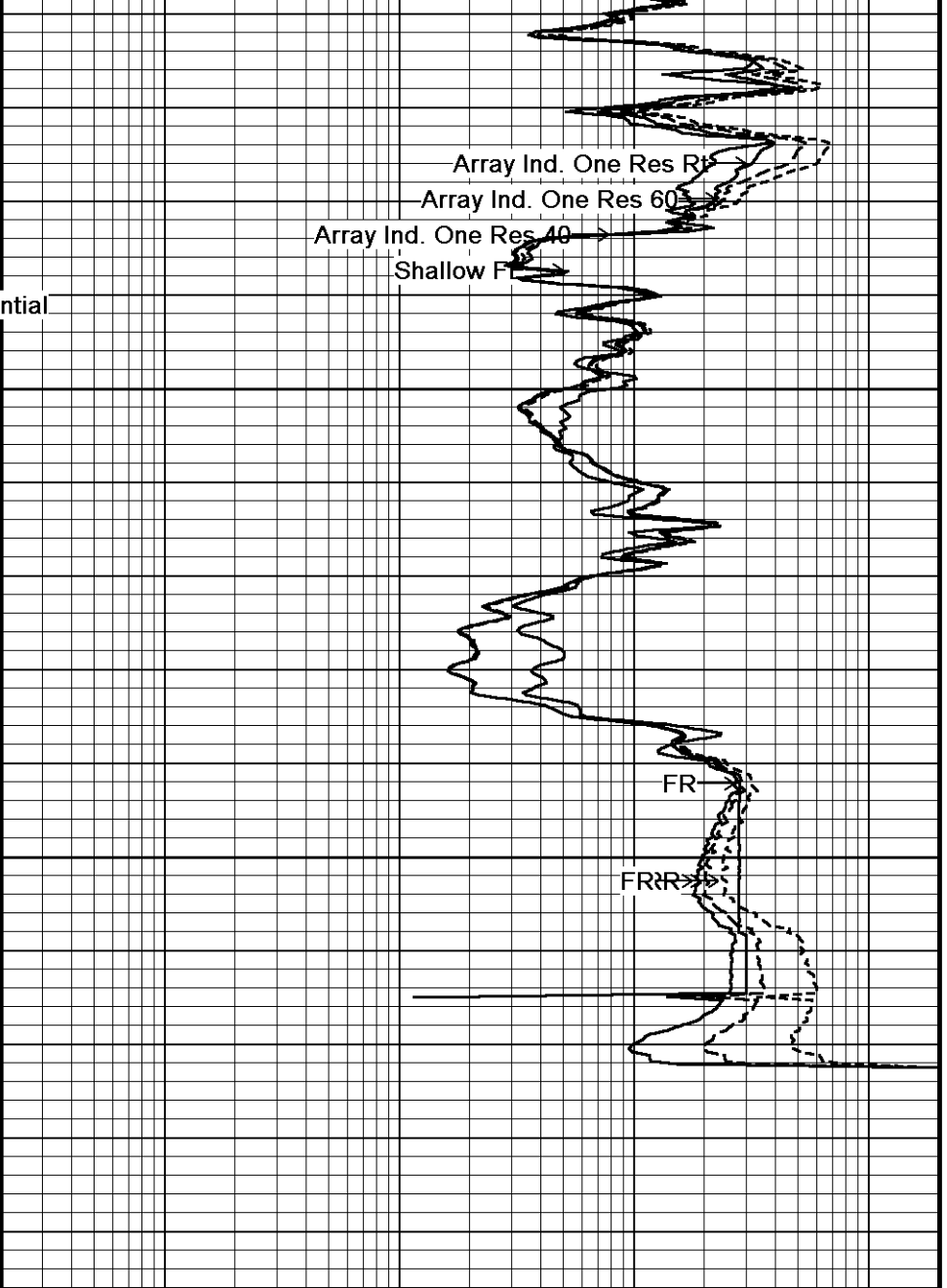
121°

6350

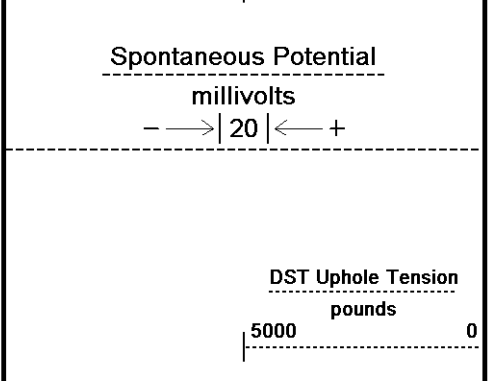
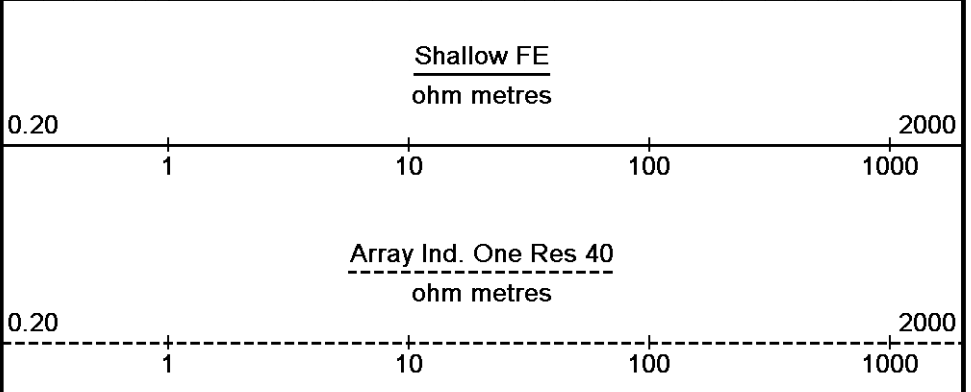
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6394

Depth in Feet

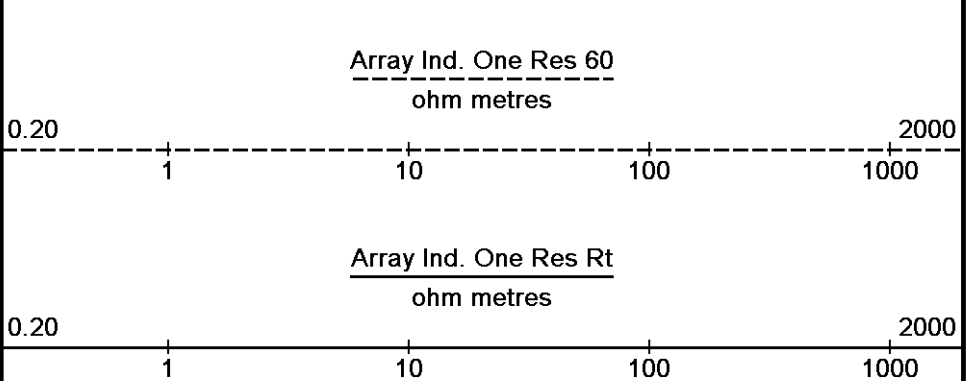


Borehole Temp in deg F
HVI every 10 cu ft



Annular Integral every 10 cu ft

Replay Scale 1:240



↑

5 INCH MAIN

↑

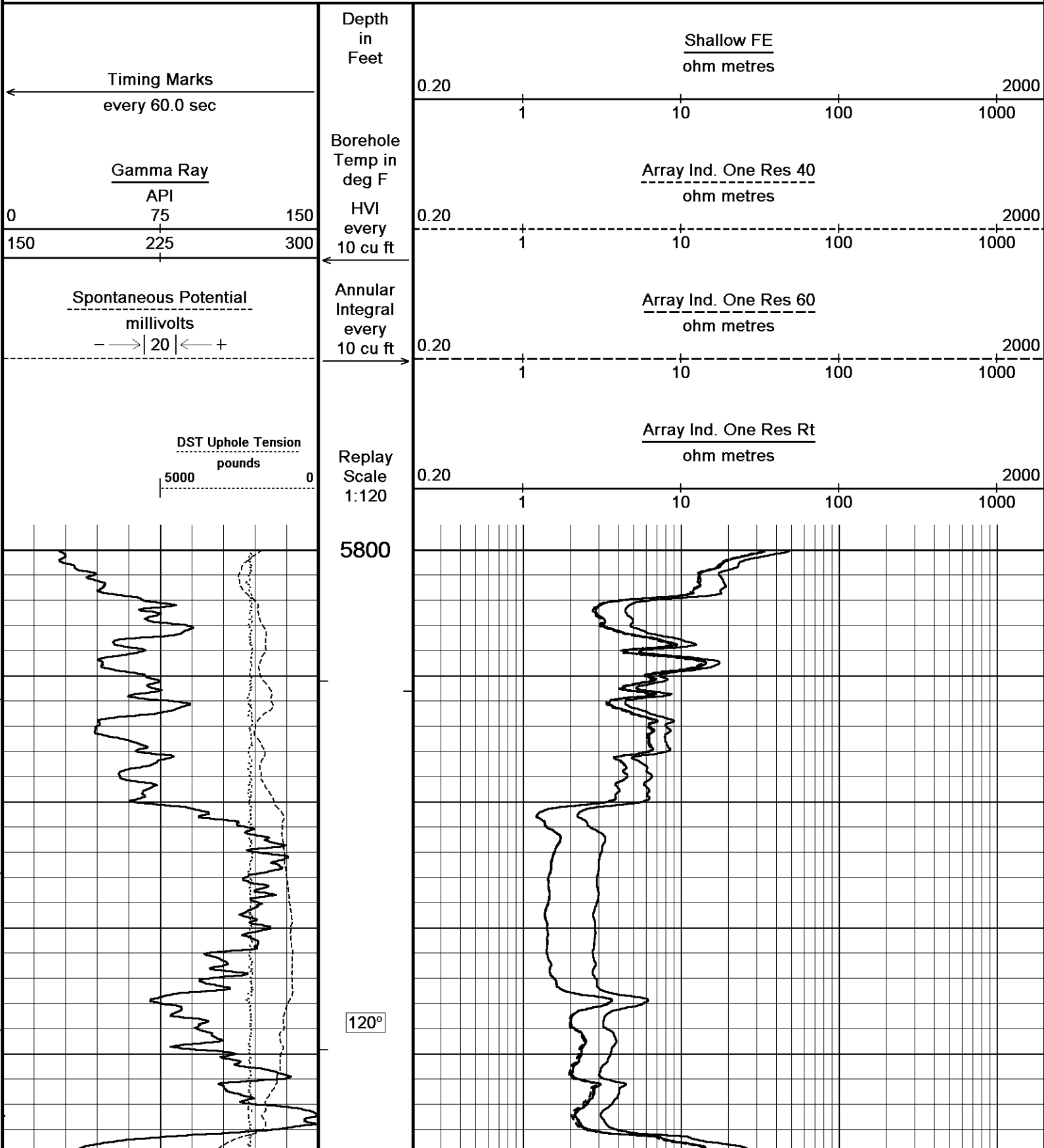
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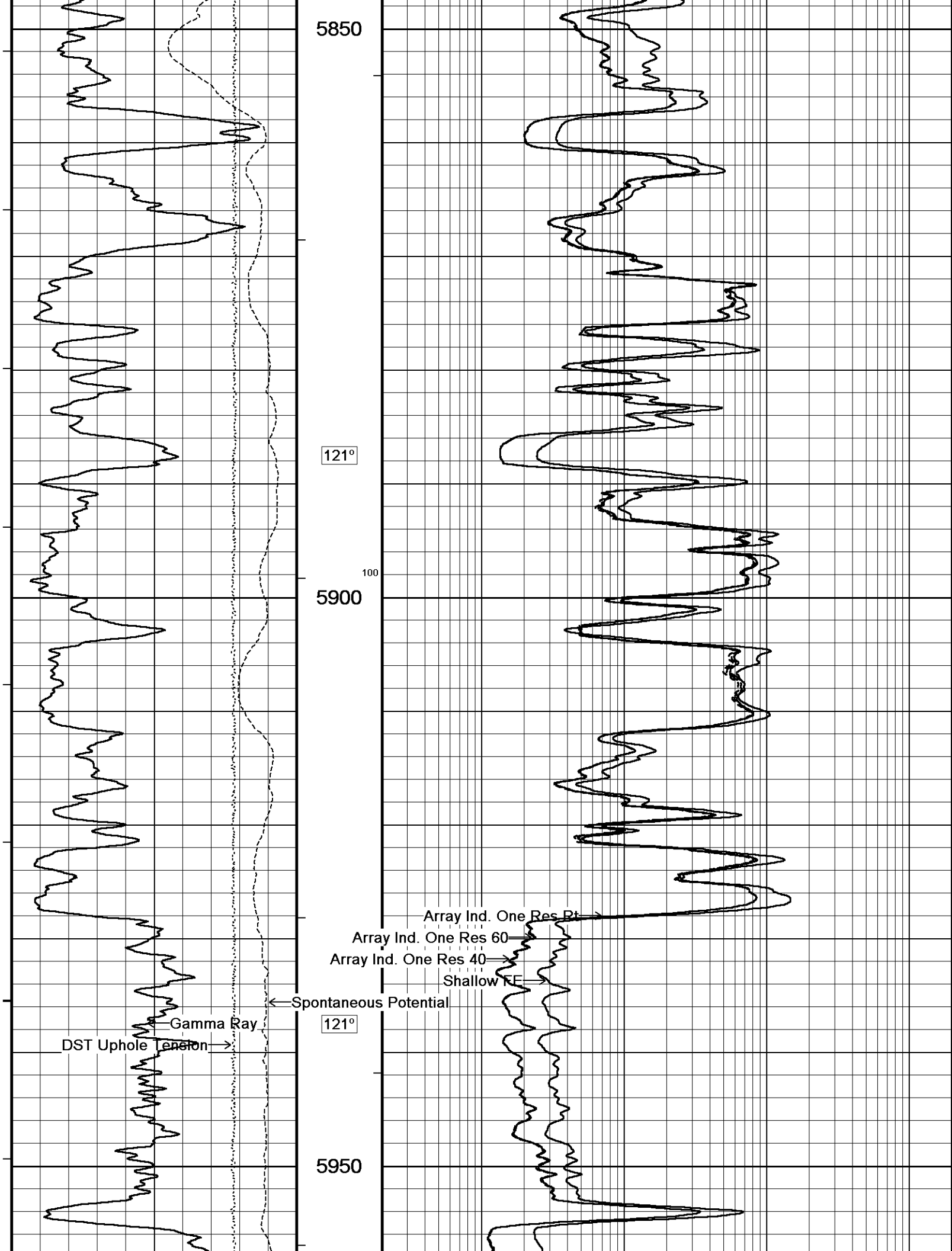
10 INCH HI-RES

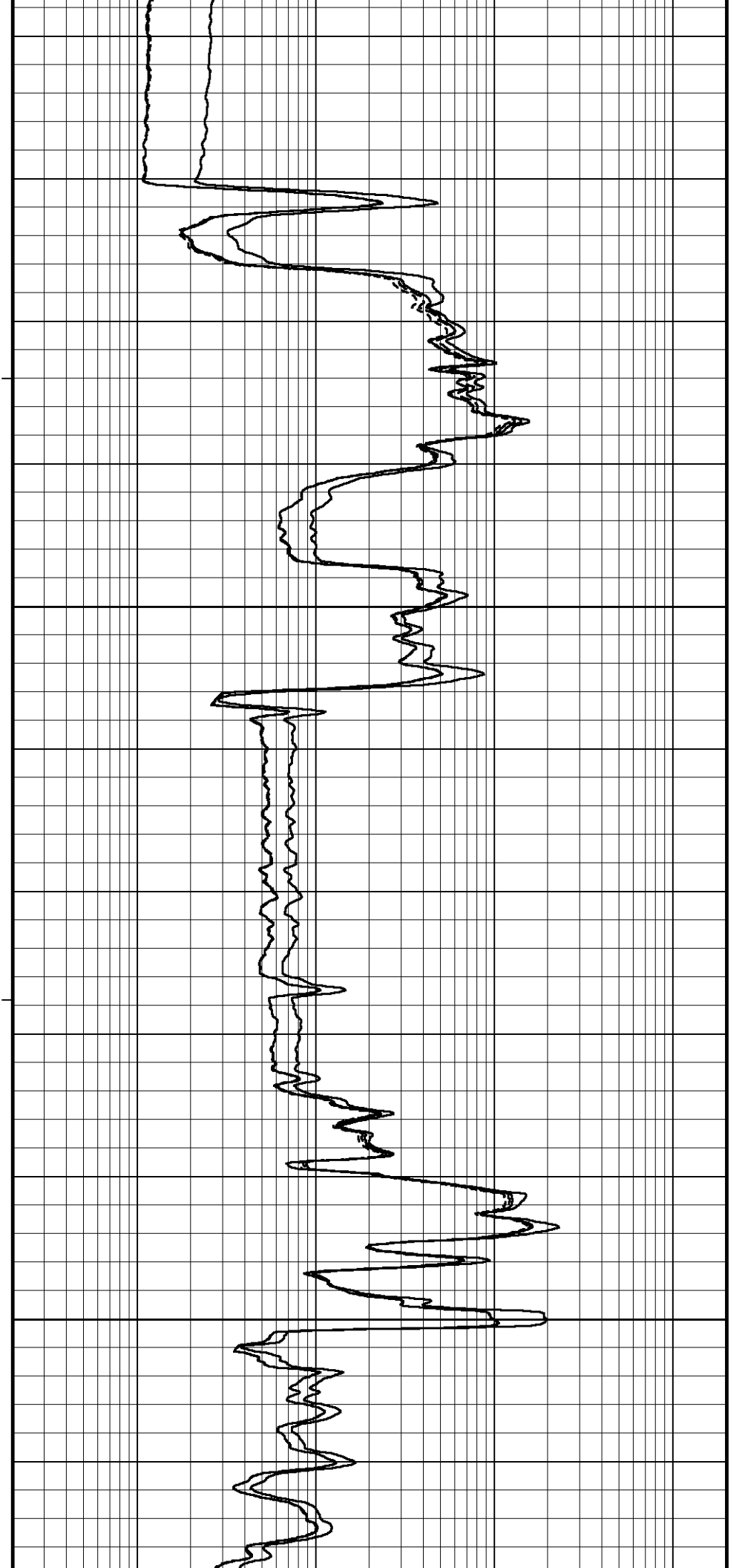
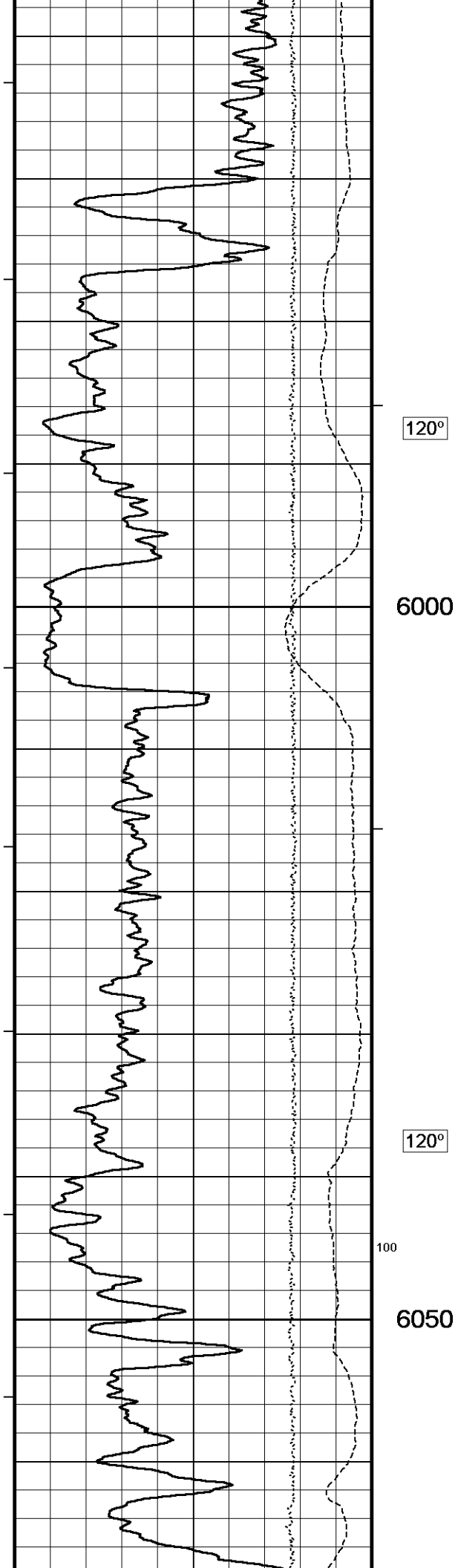
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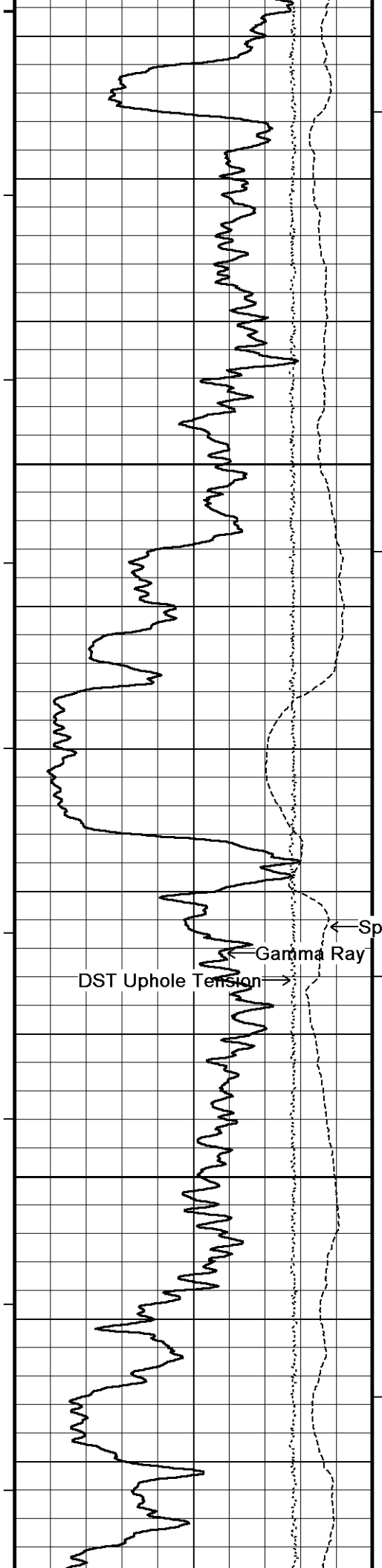
Depth Based Data - Maximum Sampling Increment 2.5cm
Filename: C:\Minimus 13.05.9583\Logs\O'BRIEN VAIL 6-30\O'BRIEN VAIL 6-30 HIGH RES.dta
System Versions: Logged with 13.05.9583 Processed with 13.05.9583 Plotted with 13.05.9583

Plotted on 22-DEC-2013 18:01
Recorded on 22-DEC-2013 14:20







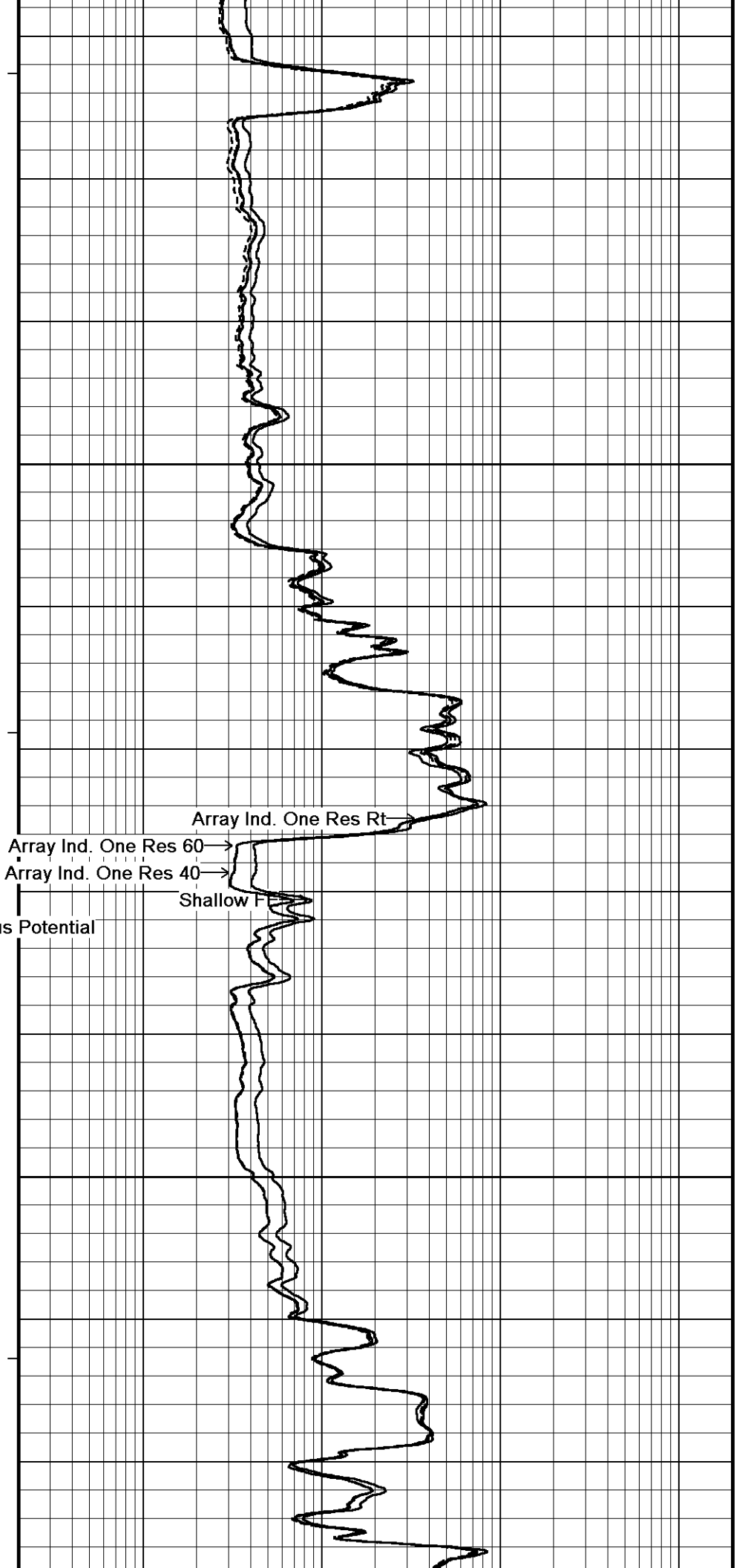


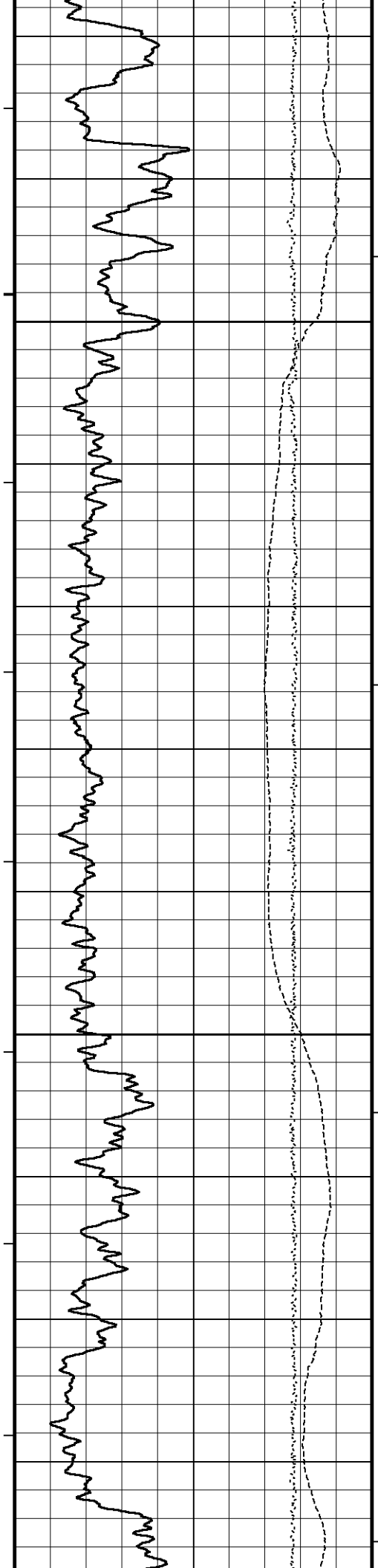
121°

6100

121°

6150





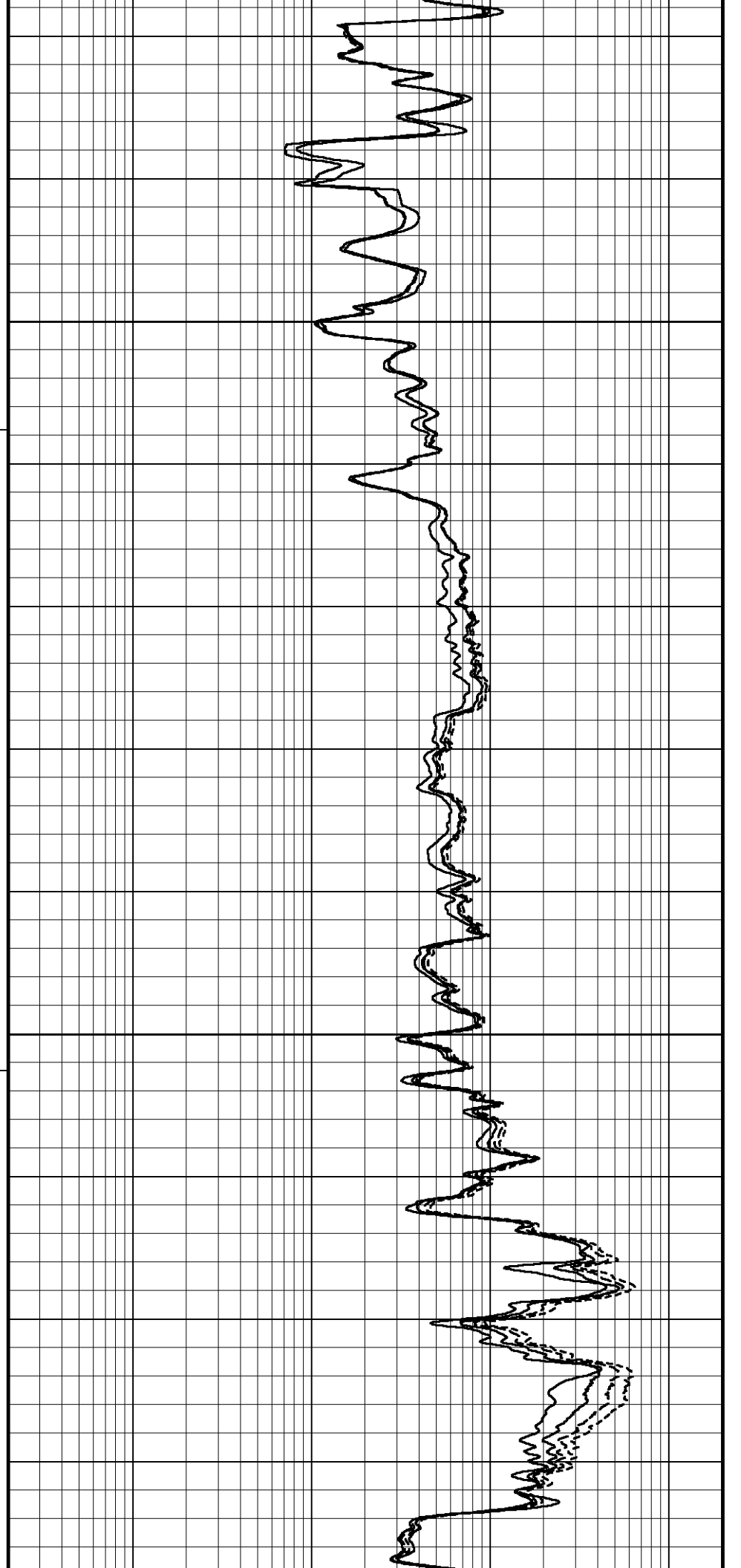
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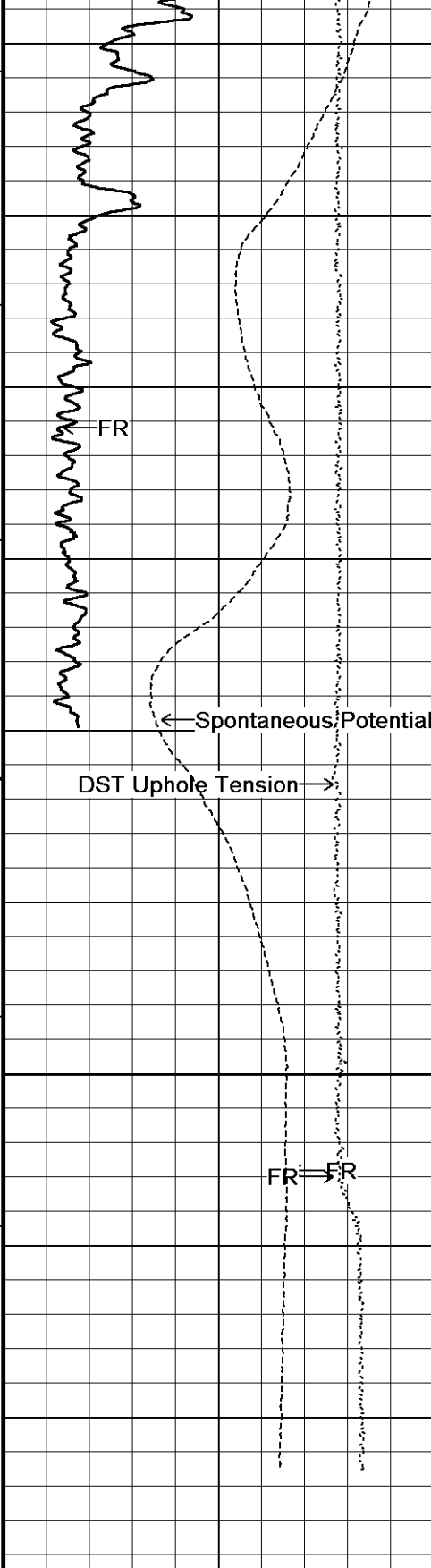
6200

121°

6250

1210



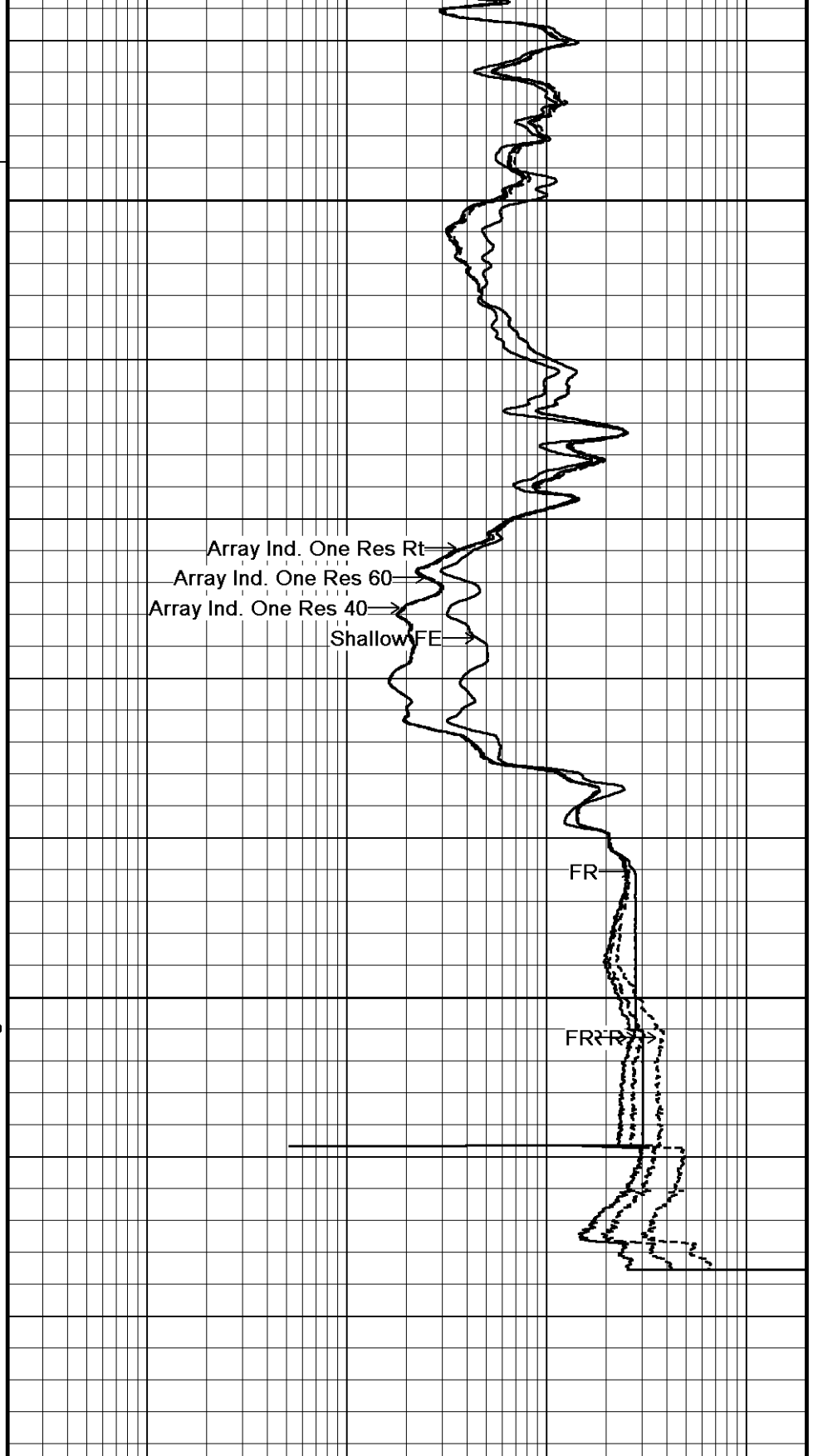


Timing Marks
every 60.0 sec

Gamma Ray
API
0 75 150

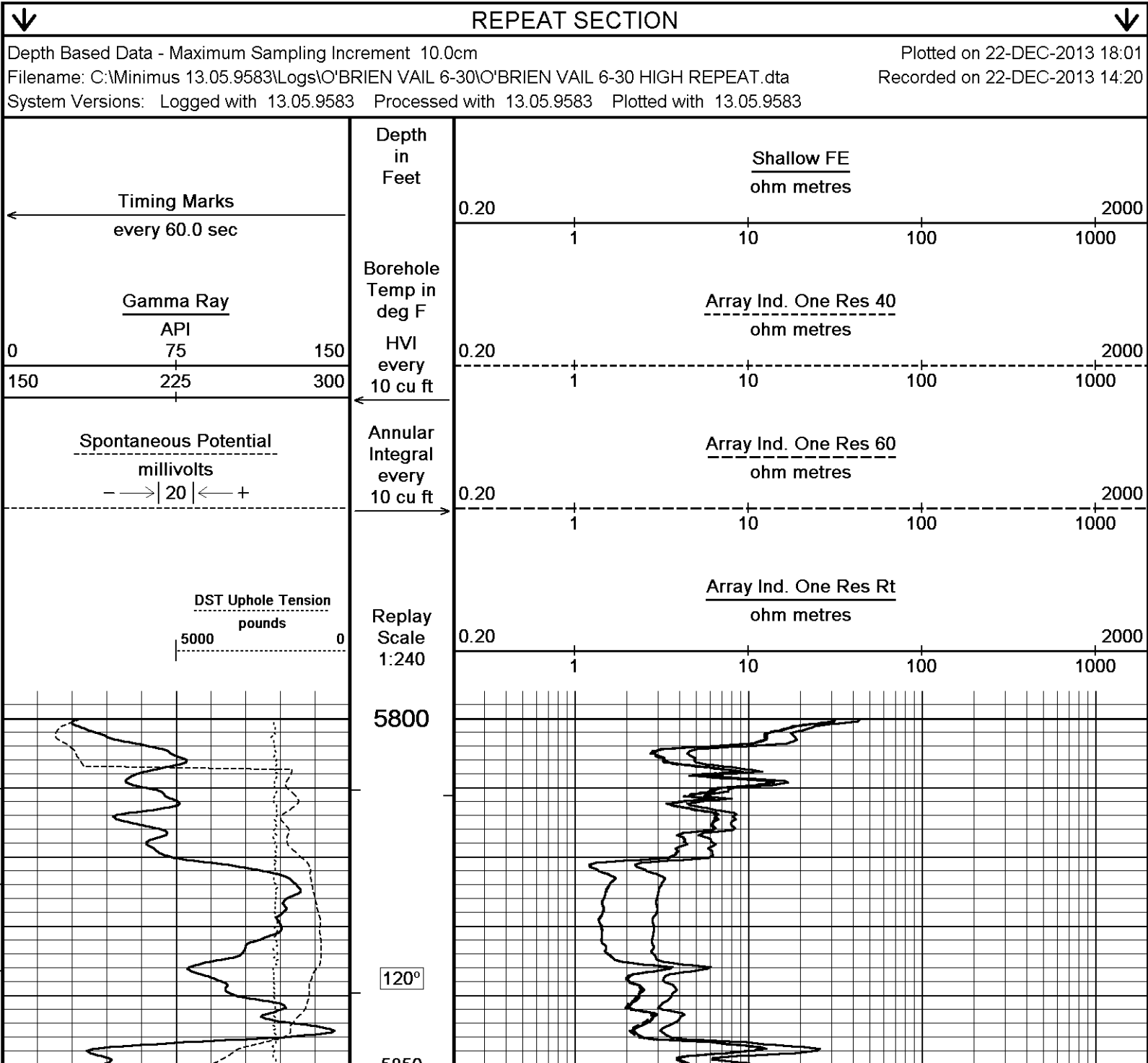
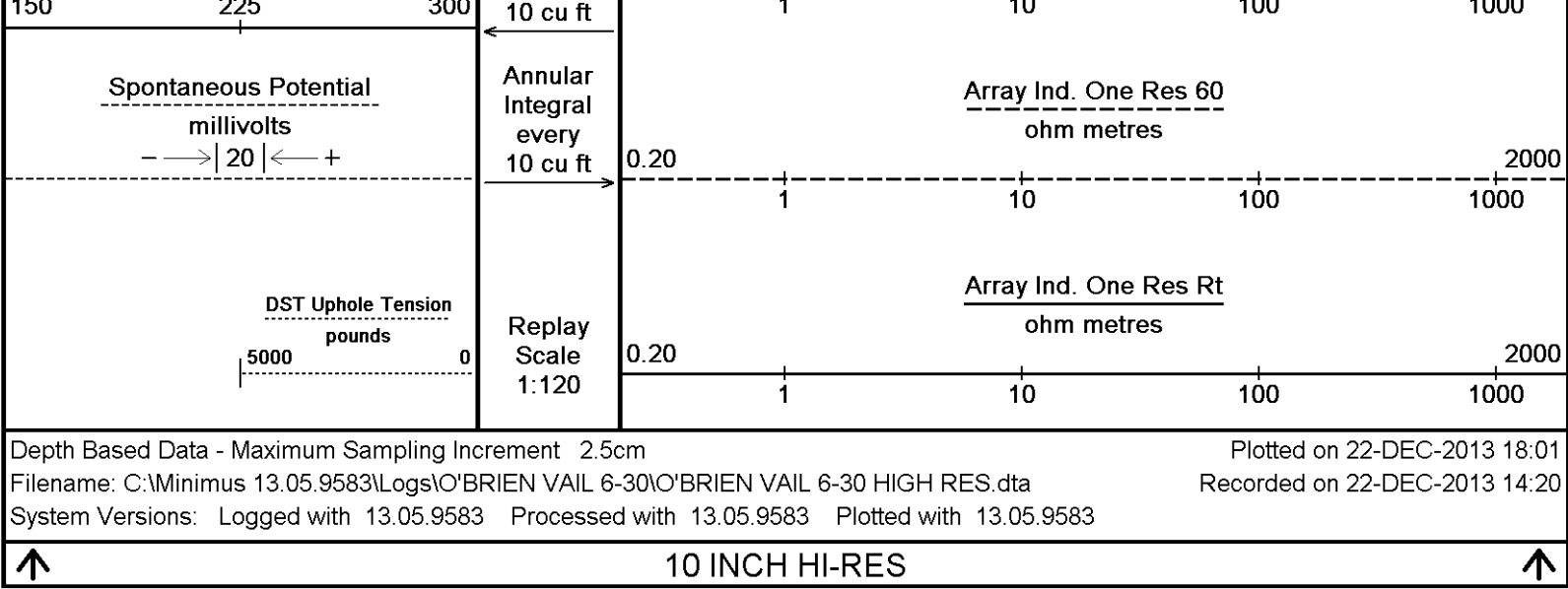
6300
6350
6378
Depth
in
Feet

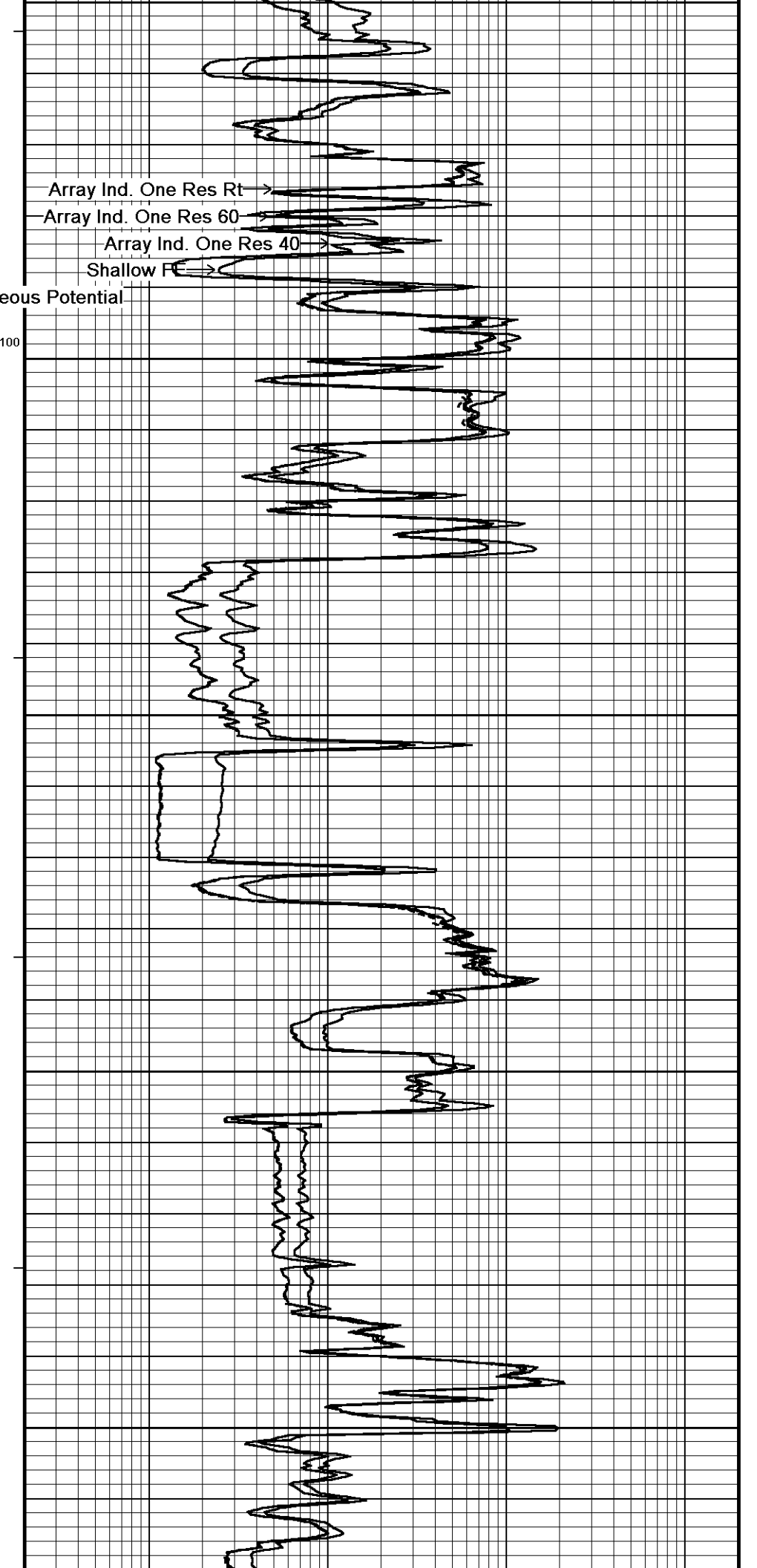
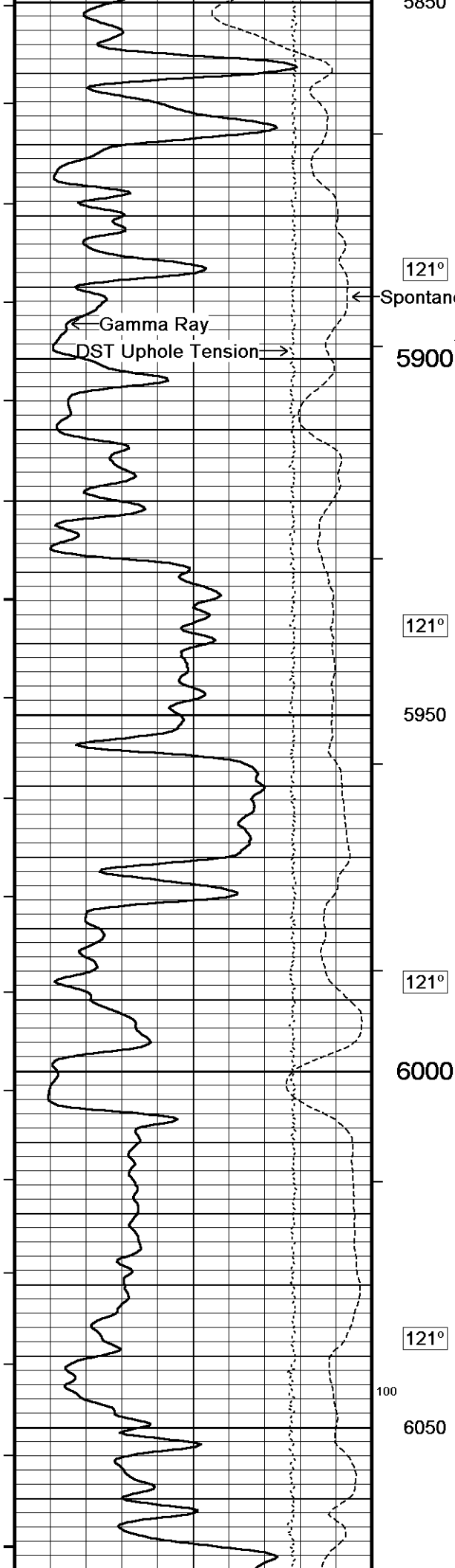
Borehole
Temp in
deg F
HVI
every

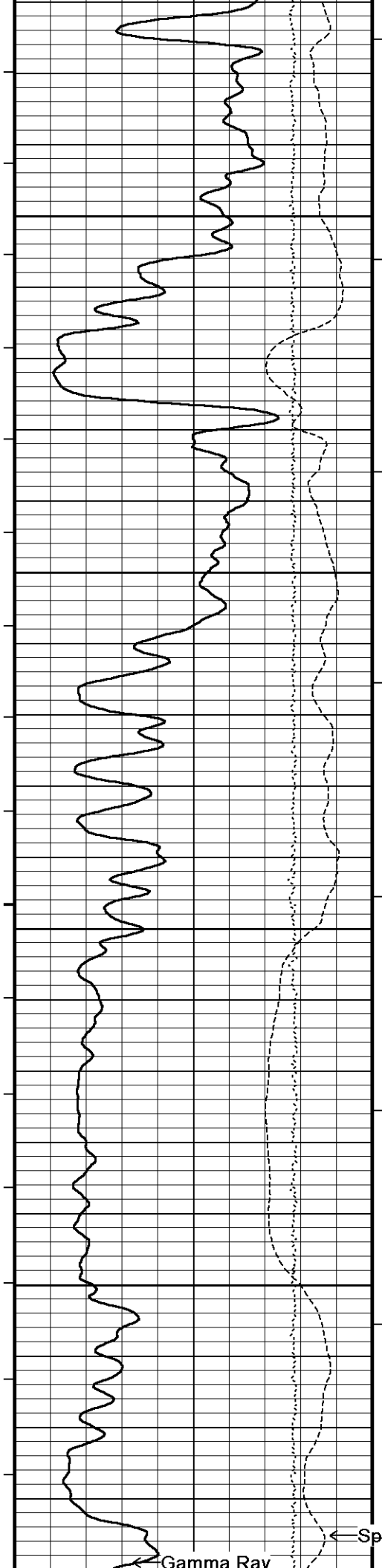


Shallow FE
ohm metres
0.20 1 10 100 1000 2000

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







121°

6100

121°

6150

121°

6200

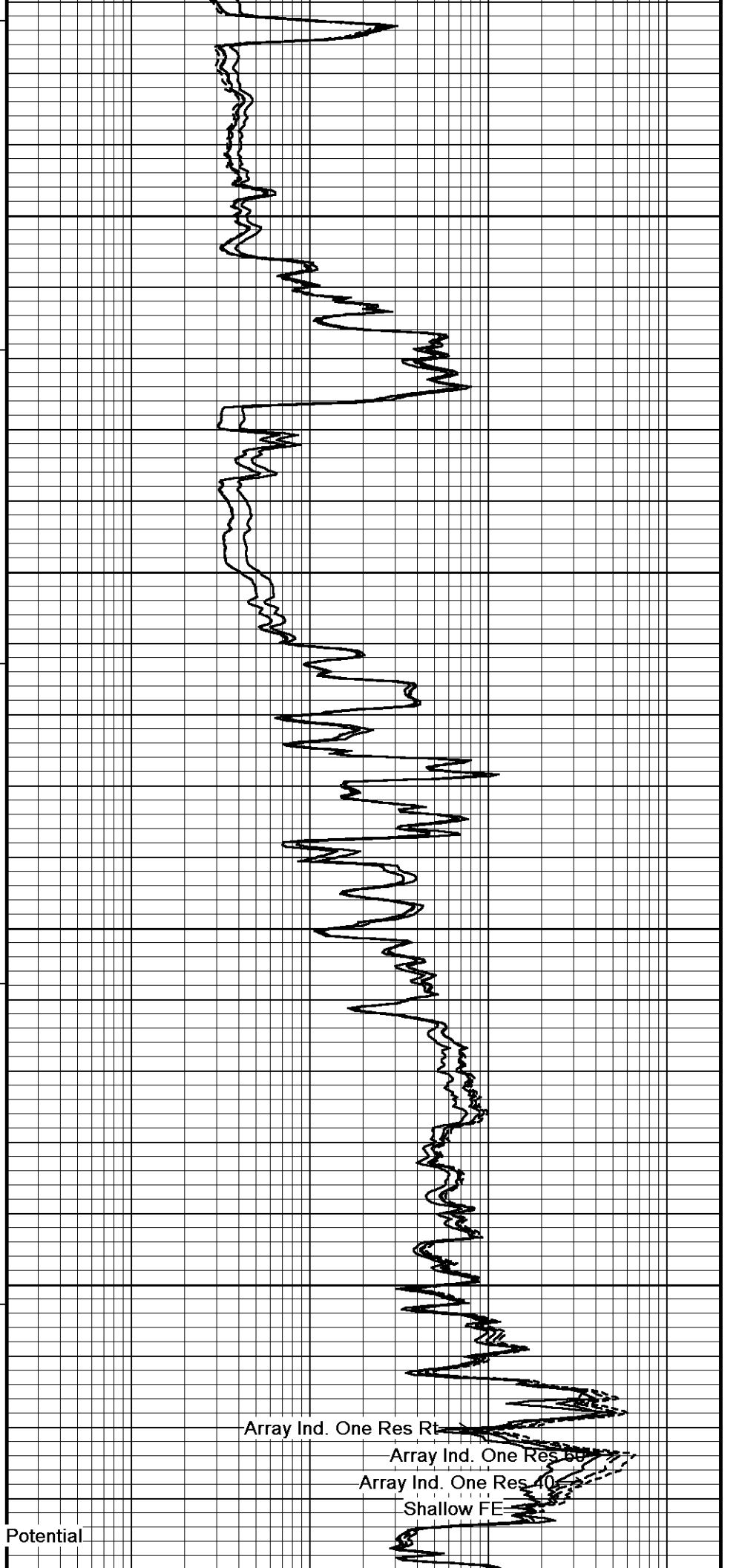
121°

6250

← Spontaneous Potential

← Gamma Ray

121°

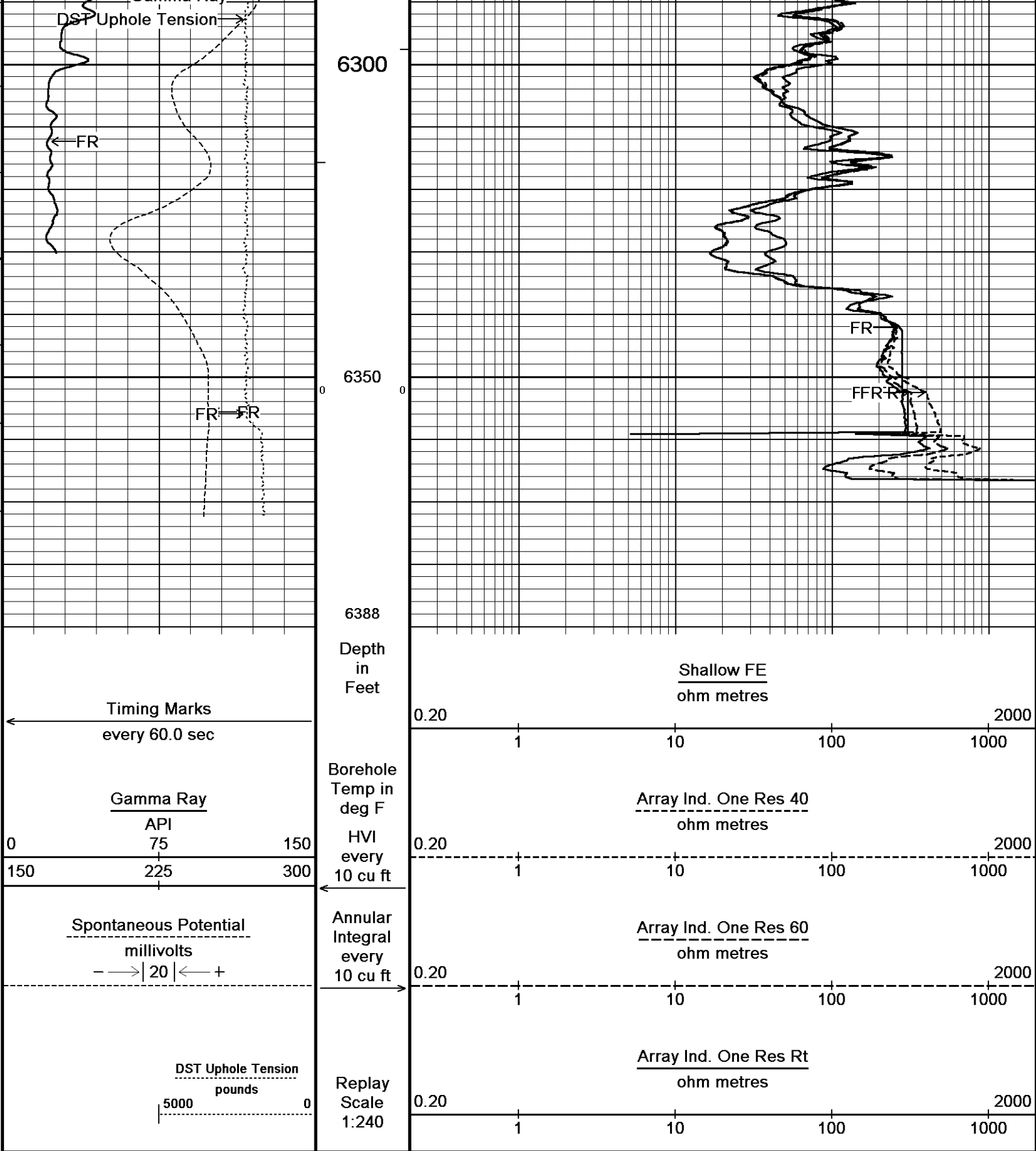


Array Ind. One Res Rt

Array Ind. One Res 60

Array Ind. One Res 40

Shallow FE



Depth Based Data - Maximum Sampling Increment 10.0cm

Plotted on 22-DEC-2013 18:01

Filename: C:\Minimus 13.05.9583\Logs\O'BRIEN VAIL 6-30\O'BRIEN VAIL 6-30 HIGH REPEAT.dta

Recorded on 22-DEC-2013 14:20

System Versions: Logged with 13.05.9583 Processed with 13.05.9583 Plotted with 13.05.9583

↑ REPEAT SECTION ↑

BEFORE SURVEY CALIBRATION

C:\Minimus 13.05.9583\Logs\O'BRIEN VAIL 6-30\O'BRIEN VAIL 6-30 HIGH REPEAT.dta

General Constants All 000

Last Edited on 22-DEC-2013,13:43

General Parameters			
Mud Resistivity	0.500	ohm-metres	
Mud Resistivity Temperature	90.000	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	MMR Caliper		
Rwa Parameters			
Porosity used	Base Density 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-D.K 442			
	Measured	Calibrated(Deg F)	Field Calibration on 29-OCT-2013,14:34
Lower	50.00	50.00	
Upper	75.00	75.00	
High Resolution Temperature Constants MCG-D.K 442			
Pre-filter Length	11		Last Edited on 29-OCT-2013,14:34
Gamma Calibration MCG-D.K 442			
	Measured	Calibrated (API)	Field Calibration on 22-DEC-2013 10:12
Background	73	48	
Calibrator (Gross)	1166	773	
Calibrator (Net)	1093	725	
Gamma Constants MCG-D.K 442			
			Last Edited on 17-DEC-2013,10:46
Gamma Calibrator Number	GRC38		
Mud Density	1.10	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 352			
			Base Calibration on 08-NOV-2013 11:12 Field Check on 22-DEC-2013 09:54
Base Calibration			
	Measured	Calibrated (ohm-m)	
Reference 1	0.0	0.0	
Reference 2	964.9	126.8	
Base Check		281.1	
Field Check		281.2	
FE Constants MFE-B.J 352			
			Last Edited on 22-DEC-2013,13:27
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	
Induction Calibration MAI-A.A 45			
			Base Calibration on 21-MAY-2013,16:47 Field Check on 22-DEC-2013 09:52
Base Calibration			
Test Loop Calibration	Measured	Calibrated (mmho/m)	

Channel	Low	High	Low	High
1	14.4	472.6	9.3	966.2
2	5.7	374.0	7.6	821.4
3	3.4	261.2	5.2	566.0
4	2.5	133.9	2.6	279.2
Array Temperature	0.0		Deg F	
Channel	Base Check (mmho/m)		Field Check (mmho/m)	
	Low	High	Low	High
1			18.6	3850.2
2			31.8	3628.2
3			28.7	3048.4
4			18.4	2078.6
Deep			16.1	1910.7
Medium			42.6	4059.2
Shallow			49.7	5481.2
Array Temperature			61.3	Deg F

Induction Constants MAI-A.A 45

Last Edited on 22-DEC-2013,13:27

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 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		

Caliper Calibration MPD-B 31

Base Calibration on 20-NOV-2013 10:19

Field Calibration on 22-DEC-2013 10:00

Base Calibration		
Reading No	Measured	Calibrator Size (in)
1	18720	3.99
2	27472	5.98
3	36127	7.97
4	44368	9.86
5	53568	11.92
6	N/A	N/A

Field Calibration

DOWNHOLE EQUIPMENT

C:\Minimus 13.05.9583\Logs\O'BRIEN VAIL 6-30\O'BRIEN VAIL 6-30 HIGH REPEAT.dta

CBH-C, Cablehead, 11 pin

CBH-CA 170 LG: 2.40 ft WT: 24.3 lb OD: 2.24 in

Compact Comms Gamma

MCG-D.K 442 LG: 8.70 ft WT: 63.9 lb OD: 2.24 in

Compact Micro-Resistivity

MMR-A 11 LG: 8.59 ft WT: 81.6 lb OD: 4.88 in

Compact Neutron

MDN-A.B 65 LG: 5.04 ft WT: 50.7 lb OD: 2.24 in

Compact Density/Caliper

MPD-B 31 LG: 9.59 ft WT: 90.4 lb OD: 2.45 in

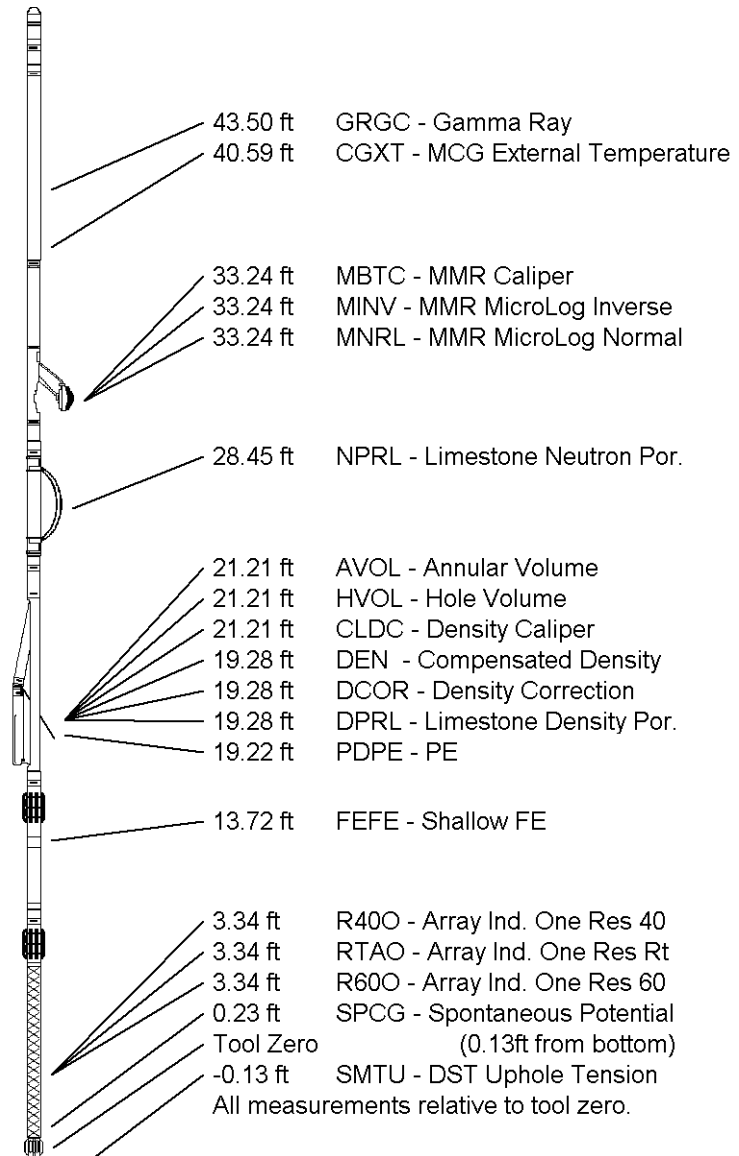
Compact Focussed Electric

MFE-B.J 352 LG: 6.05 ft WT: 48.5 lb OD: 2.24 in

Compact Induction

MAI-A.A 45 LG: 10.81 ft WT: 48.5 lb OD: 2.24 in

Total Length: 51.18 ft Weight: 407.9 lb



COMPANY

O'BRIEN ENERGY RESOURCES CORP.

WELL

VAIL 6-30

FIELD

SINGLEY

PROVINCE/COUNTY

MEADE

COUNTRY/STATE

U.S.A. / KANSAS

Elevation Kelly Bushing	2659.00	feet
Elevation Drill Floor	2657.00	feet
Elevation Ground Level	2647.00	feet

First Reading	6353.00	feet
Depth Driller	6360.00	feet
Depth Logger	6356.00	feet



Weatherford®

ARRAY INDUCTION
SHALLOW FOCUSED
ELECTRIC LOG

1 INCH MAIN

Depth Based Data - Maximum Sampling Increment 10.0cm
 Filename: C:\Minimus 13.05.9583\Logs\O'BRIEN VAIL 6-30\Copy(2) of O'BRIEN VAIL 6-30 MAIN.dta
 System Versions: Logged with 13.05.9583 Processed with 13.05.9583 Plotted with 13.05.9583

Plotted on 22-DEC-2013 18:01
 Recorded on 22-DEC-2013 15:39

Timing Marks every 60.0 sec		Depth in Feet	Array Ind. One Cond Ct mmhos	
			1000	750
Gamma Ray API			2000	1750
0	75	150	1500	1250
150	225	300		1000
Spontaneous Potential millivolts		Borehole Temp in deg F	Shallow FE ohm metres	
- - - - -> 20 <- - - - -		0	25	50
		0	250	500
Bit Size inches		Array Ind. One Res Rt ohm metres		
6	11	16	0	25
			0	250
			0	500
DST Uphole Tension pounds		Replay Scale 1:600		
5000		Casing (1480)		
0		1500		
		95°		
		1600		
		97°		
		1700		
		97°		
		1800		
		96°		
		1900		

