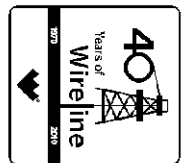




Weatherford

ARRAY INDUCTION SHALLOW FOCUSED ELECTRIC LOG



COMPANY		M & M EXPLORATION, INC.	
WELL		Z-BAR # 20-14	
FIELD		AETNA GAS AREA	
PROVINCE/COUNTY		BARBER	
COUNTRY/STATE		U.S.A. / KANSAS	
LOCATION		910' FSL & 1480' FWL, SW/4	
SEC	TWP	RGE	Other Services
20	34S	14W	MDN/MPD
API Number	15-007-23702		MML
Permit Number			
Permanent Datum G.L., Elevation 1538 feet			Elevations: feet
Log Measured From KB			KB 1550.00
Drilling Measured From K.B. @ 12 FEET			DF 1548.00
			GL 1538.00
Date	03-AUG-2011		
Run Number	ONE		
Depth Driller	4950.00		feet
Depth Logger	4946.00		feet
First Reading	4943.00		feet
Last Reading	905.00		feet
Casing Driller	905.00		feet
Casing Logger	905.00		feet
Bit Size	7.875		inches
Hole Fluid Type	CHEMICAL		
Density / Viscosity	9.20 lb/USg	50.00 CP	
PH / Fluid Loss	10.00	7.90 ml/30Min	
Sample Source	FLOWLINE		
Rm @ Measured Temp	0.43 @ 78.0		ohm-m
Rmf @ Measured Temp	0.34 @ 78.0		ohm-m
Rmc @ Measured Temp	0.52 @ 78.0		ohm-m
Source Rmf / Rmc	CALC	CALC	
Rm @ BHT	0.28 @ 123.0		ohm-m
Time Since Circulation	5 HOURS		
Max Recorded Temp	123.00		deg F
Equipment Name	COMPACT		
Equipment / Base	13057	LIB	
Recorded By	A. GIAMBALVO		W. STAMBAUGH
Witnessed By	BETH BROCK		
S.O. / JOB #	353114		LB11-186

BOREHOLE RECORD

Last Edited: 04-AUG-2011 09:31

Bit Size inches	Depth From feet	Depth To feet
7.875	905.00	4946.00

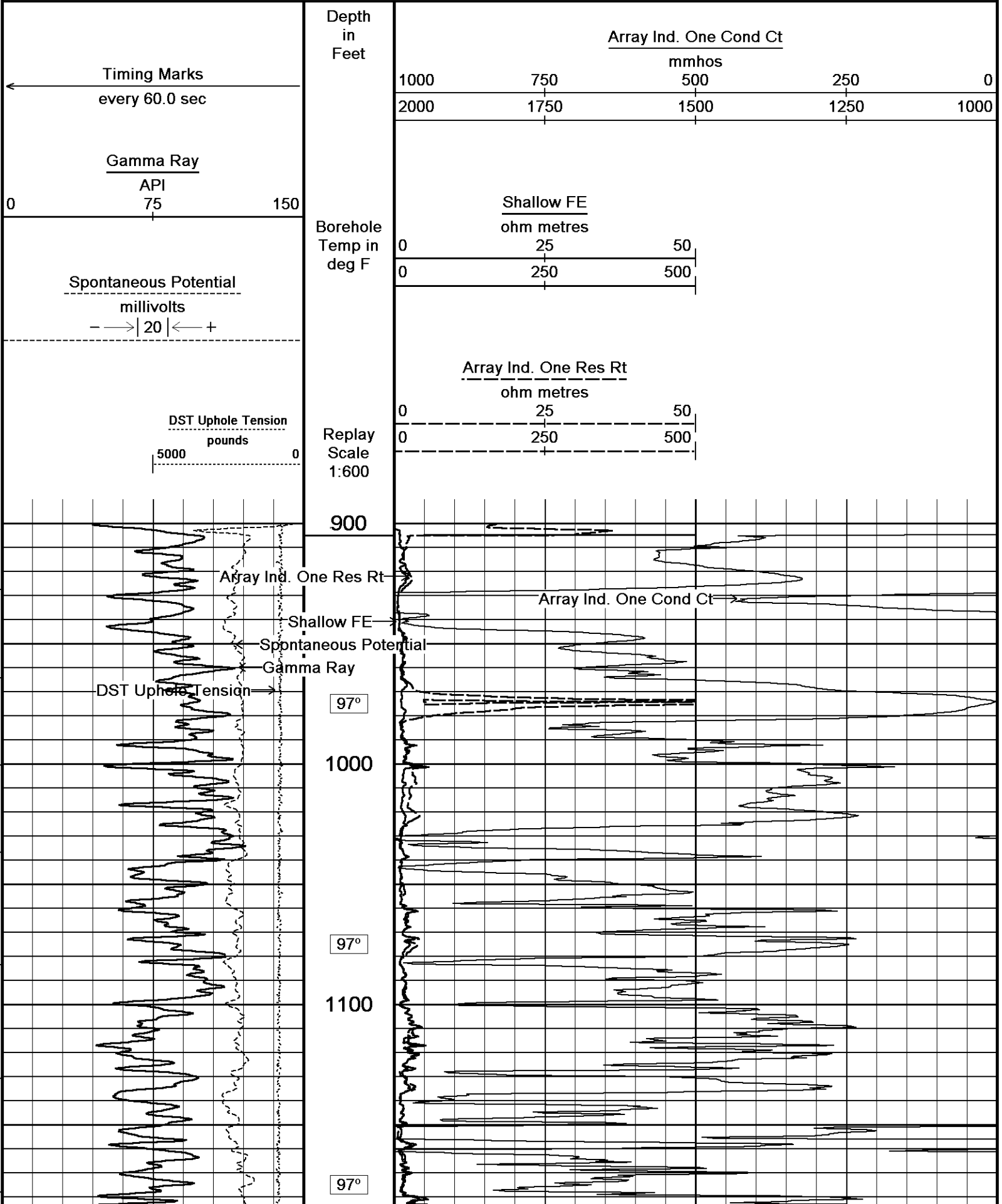
CASING RECORD

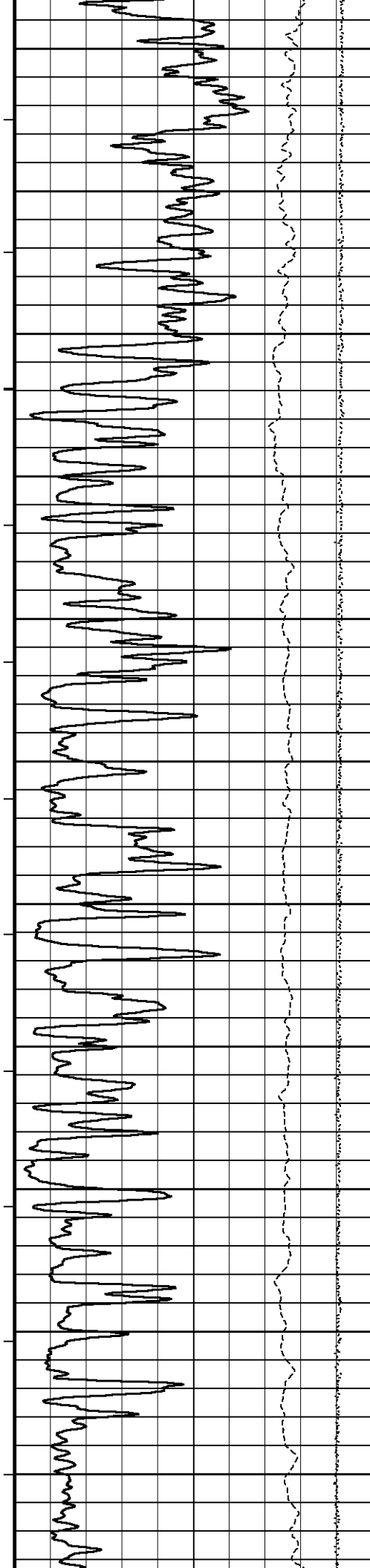
Type	Size inches	Depth From feet	Shoe Depth feet	Weight pounds/ft
SURFACE	8.625	0.00	905.00	24.00

REMARKS

Tools Ran: MCG, MML, MDN, MPD, SKJ, MFE, MAI.
Hardware Used: MDN Dual Eccentralizer used. MPD 8 inch profile plate used. MFE and MAI 0.5 inch standoffs used.
2.71 g/cc Limestone Density Matrix used to calculate porosity.
All intervals logged and scaled per customer's request.
MML caliper closed during repeat section from 4692 to 4702.
MPD caliper closed during repeat section from 4702 to 4713.
Annular volume with 4.5 inch production casing from TD to 3800 = 260 cu. ft.
Service order #353114
Rig: Southwind Drilling #70
Engineer: A. Giambalvo, W. Stambaugh
Operator(s): B. Reeves, N. Adame

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.





1200

97°

1300

98°

1400

98°

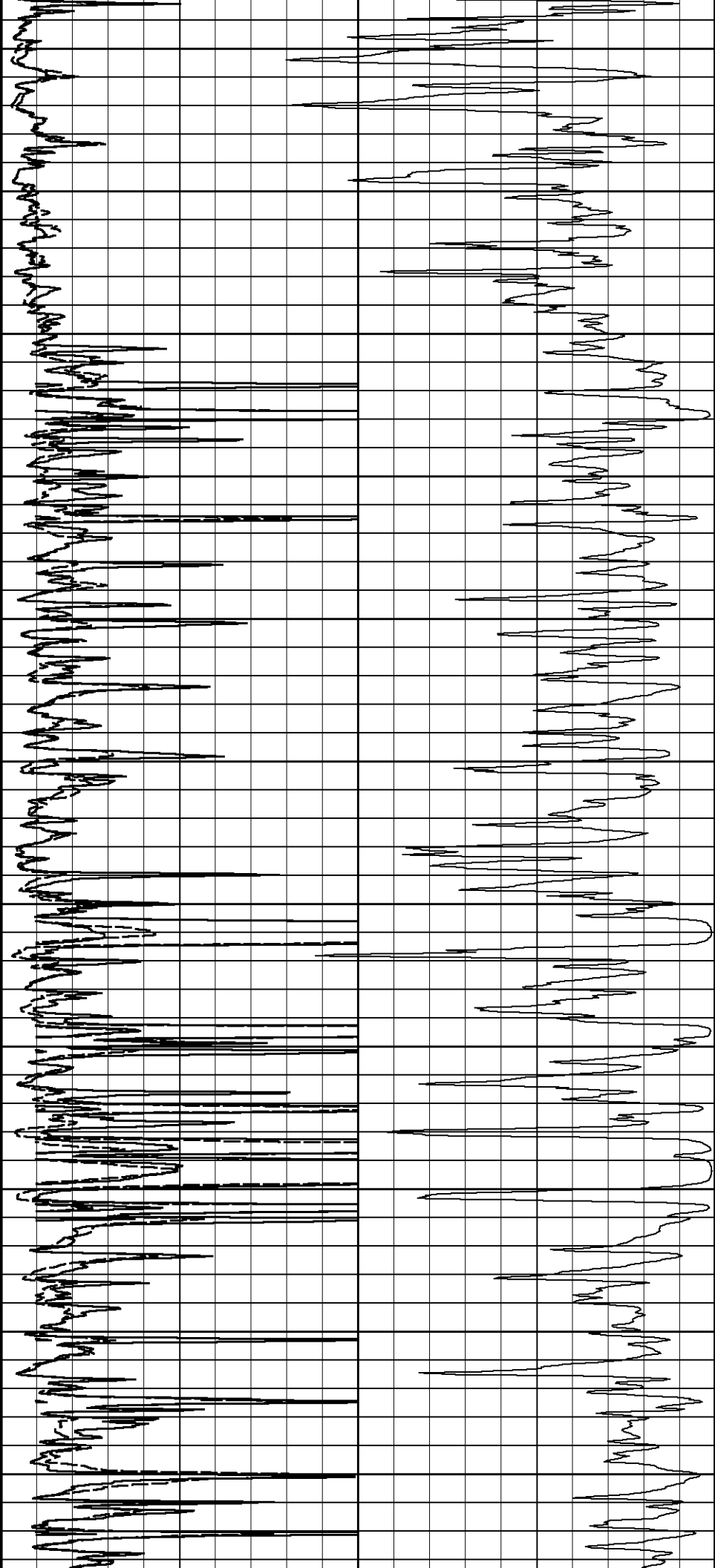
1500

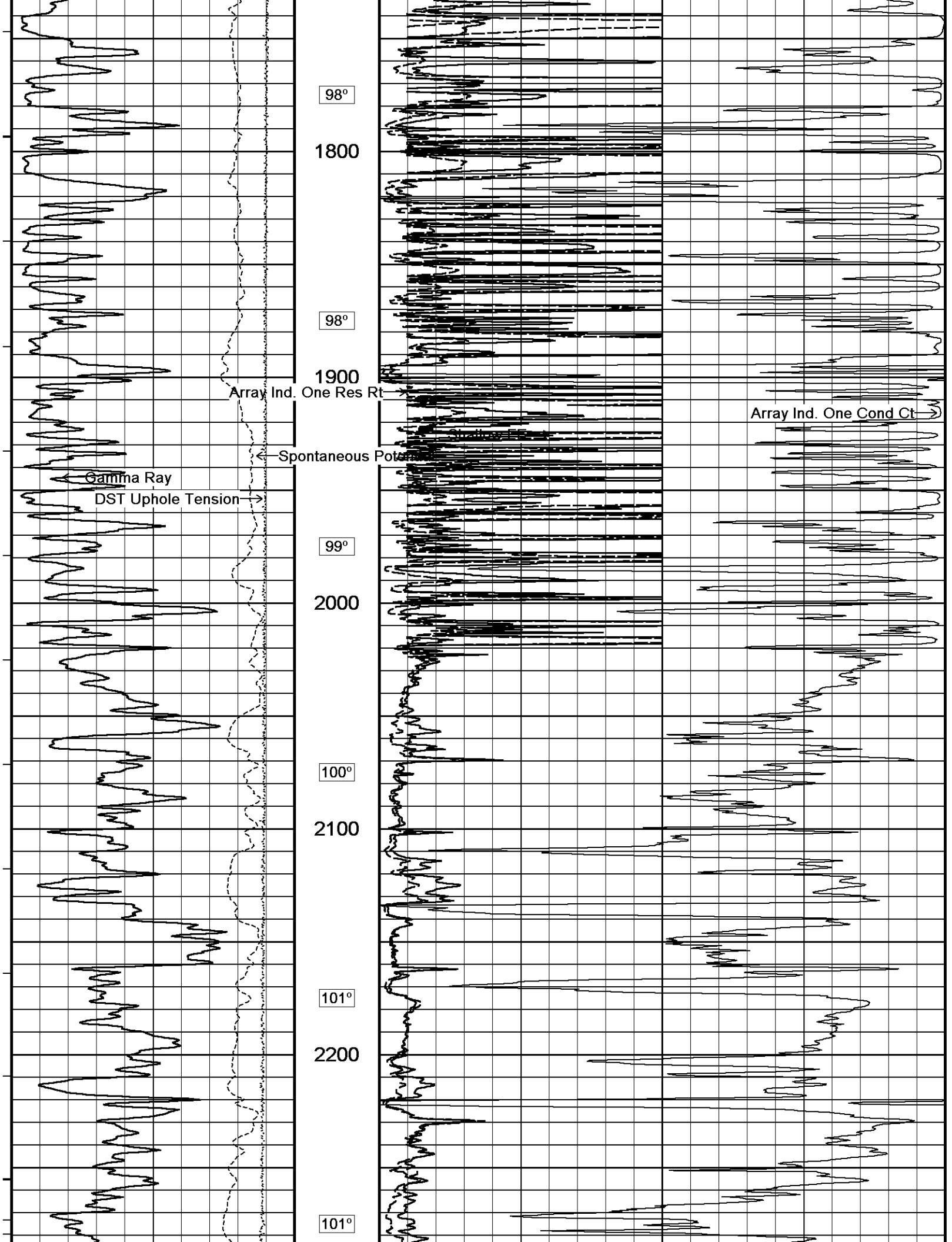
98°

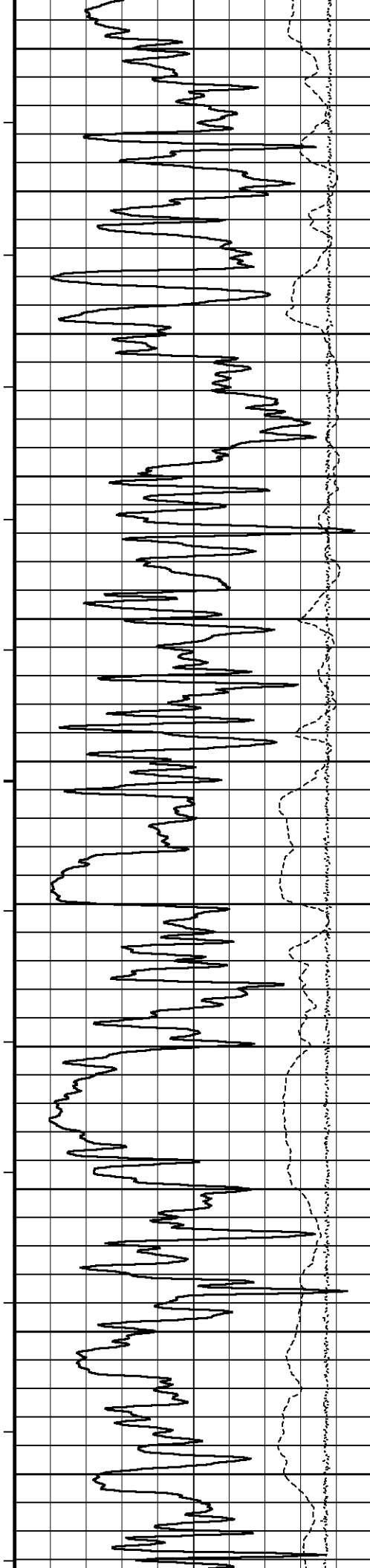
1600

98°

1700







2300

102°

2400

103°

2500

103°

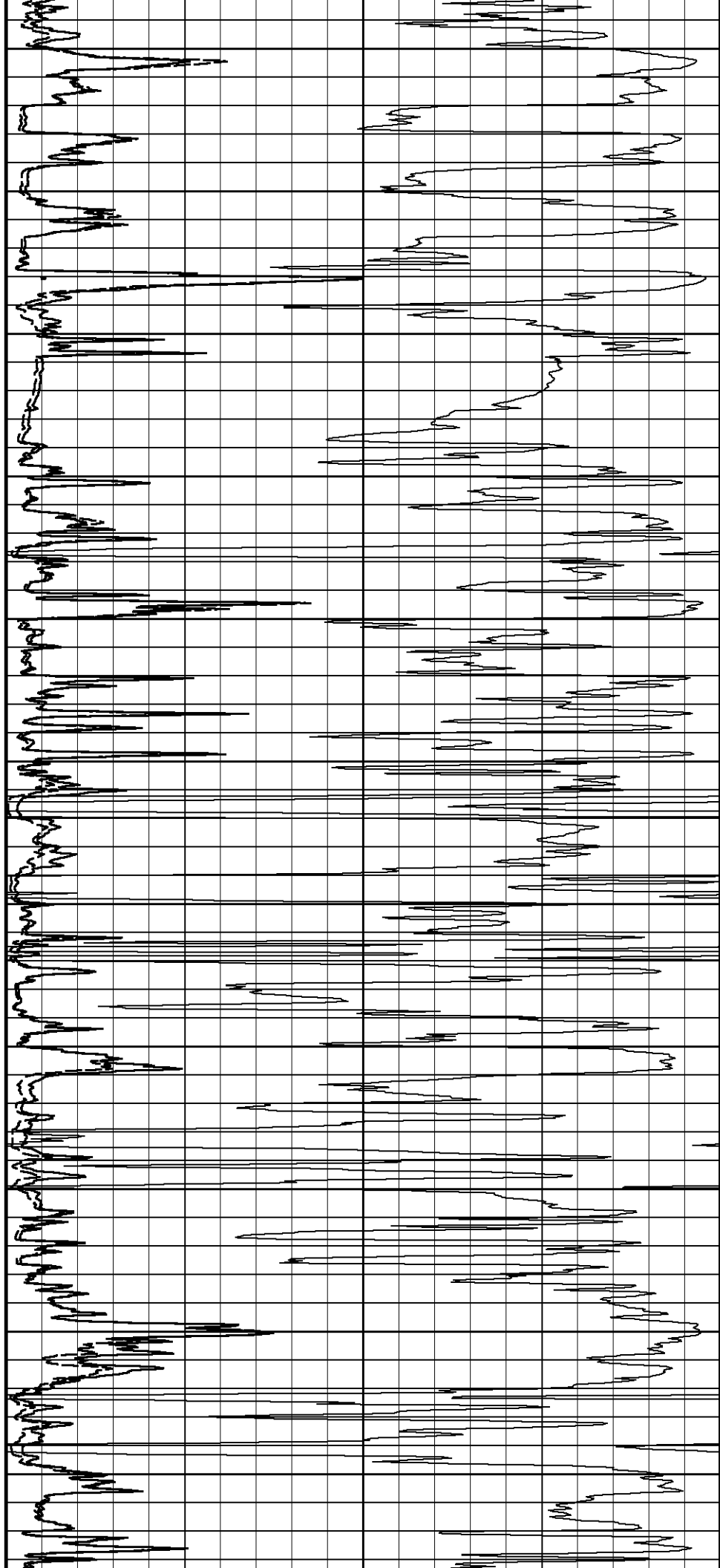
2600

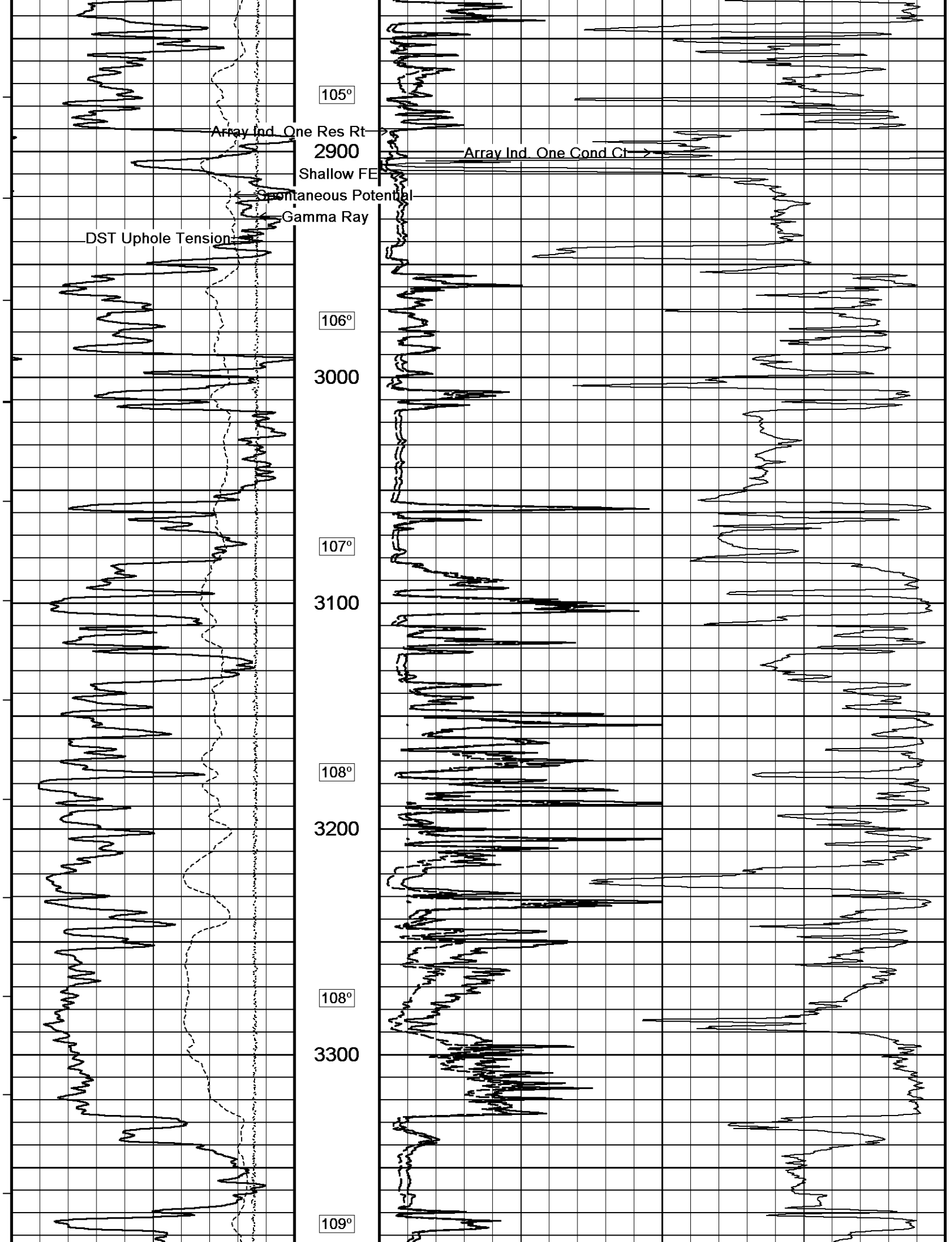
103°

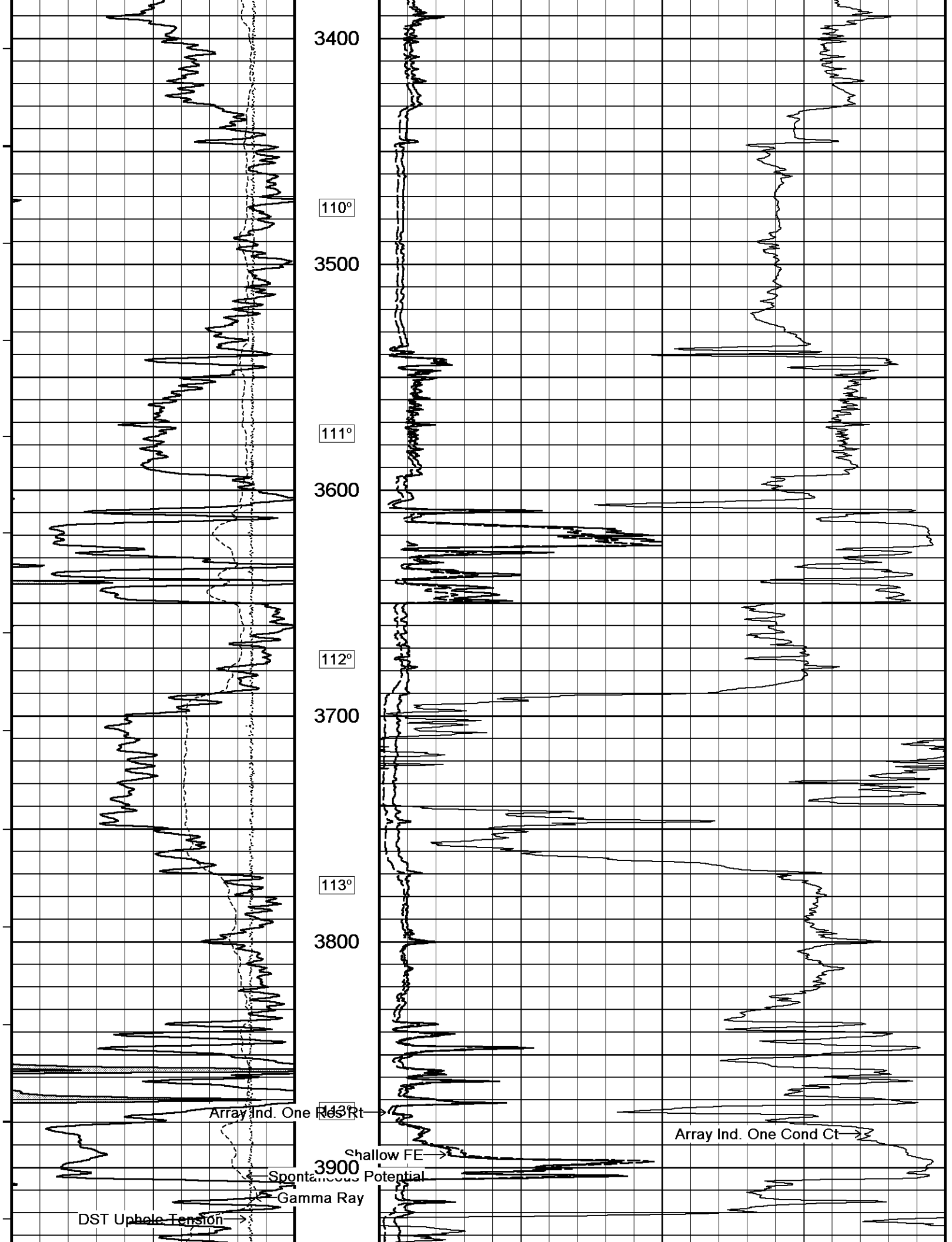
2700

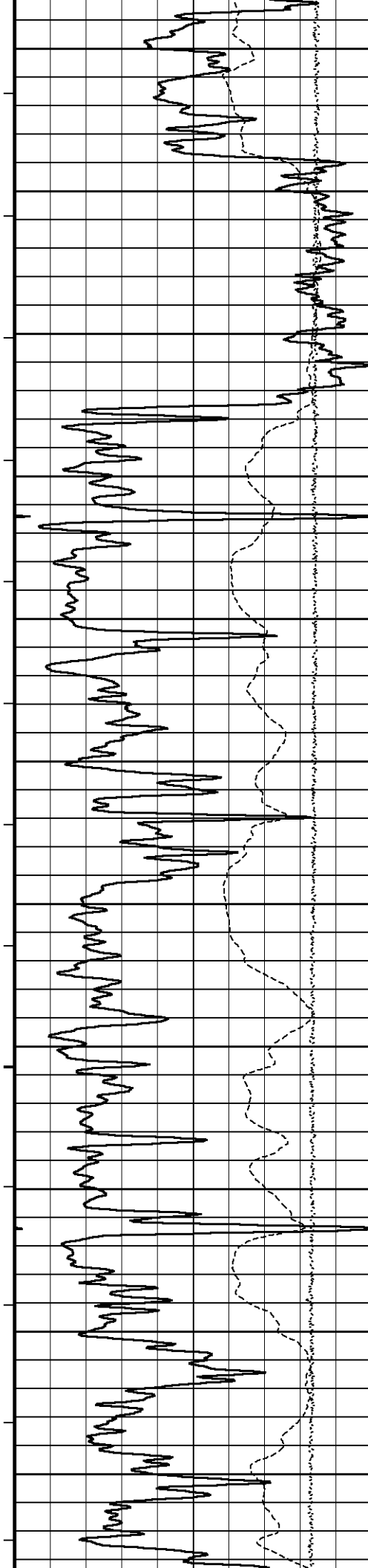
104°

2800









114°

4000

114°

4100

115°

4200

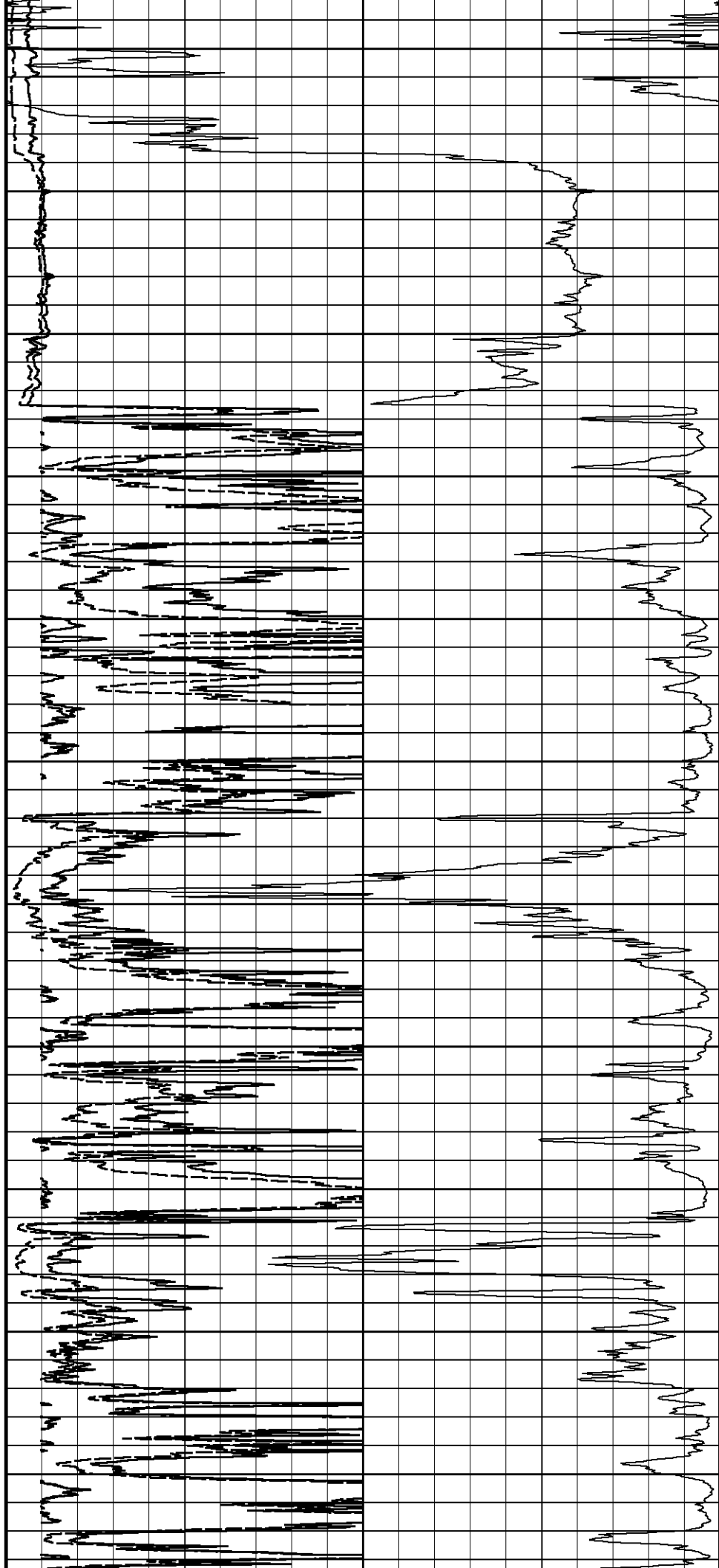
116°

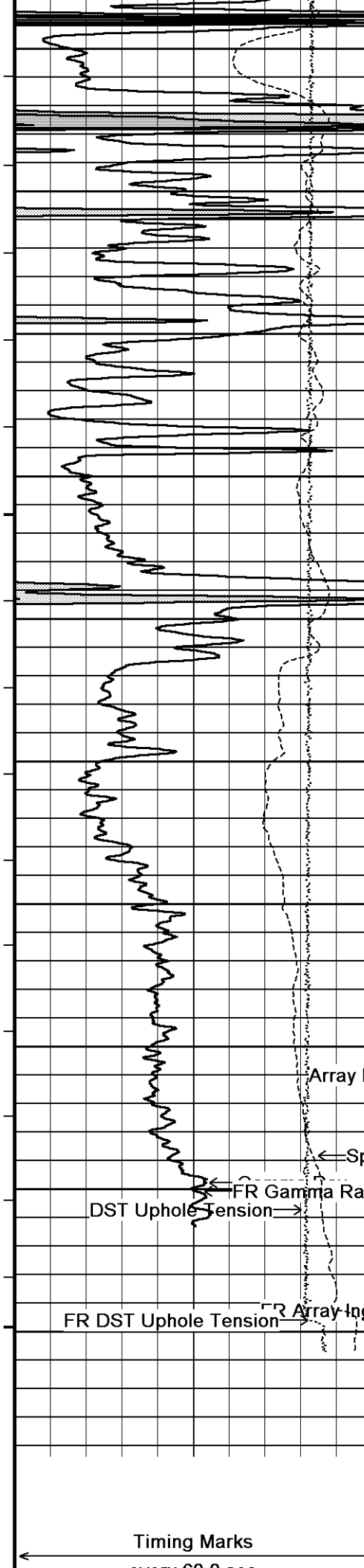
4300

116°

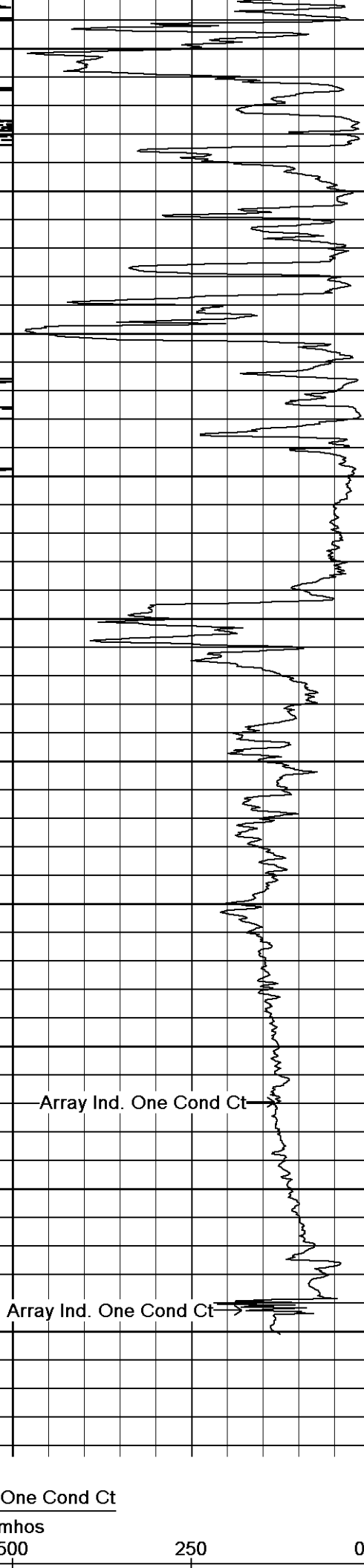
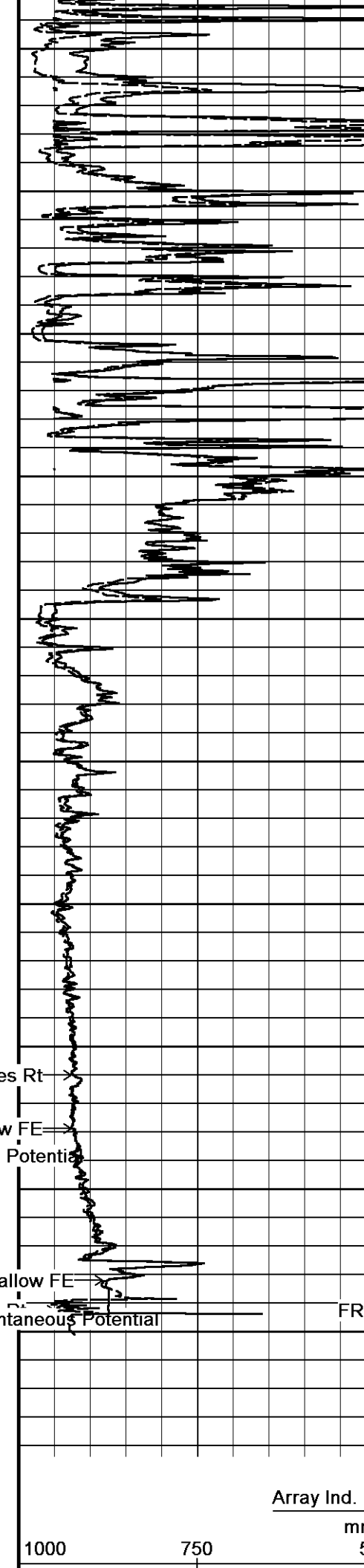
4400

117°





4500
118°
4600
118°
4700
119°
4800
4900
Depth in Feet



1000 750 500 250 0
mmhos
Array Ind. One Cond Ct

every 60.0 sec

Gamma Ray

API

75

0

150

Spontaneous Potential

millivolts

- —> | 20 | <— +

DST Uphole Tension

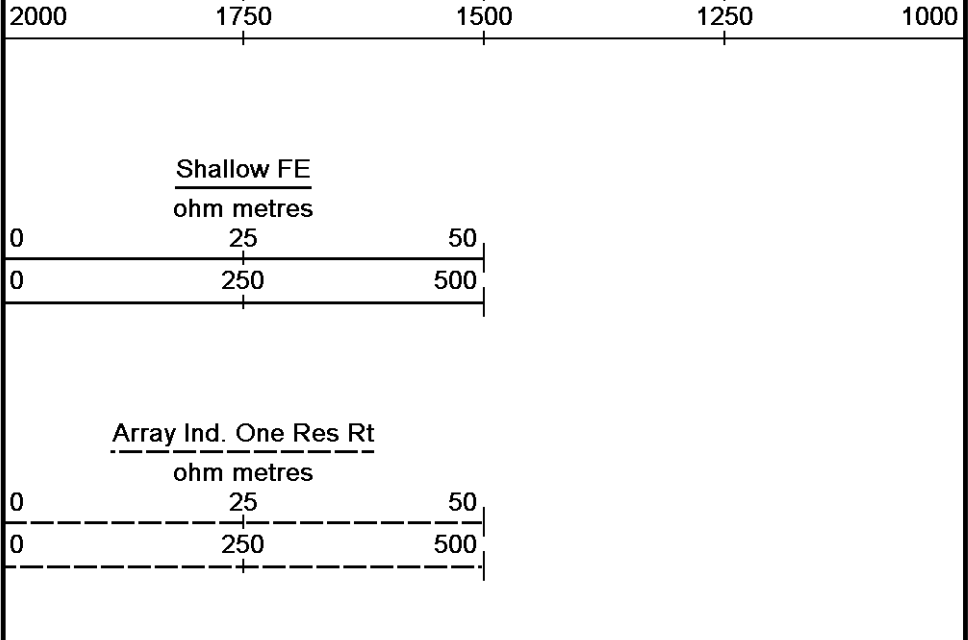
pounds

5000

0

Borehole
Temp in
deg F

Replay
Scale
1:600

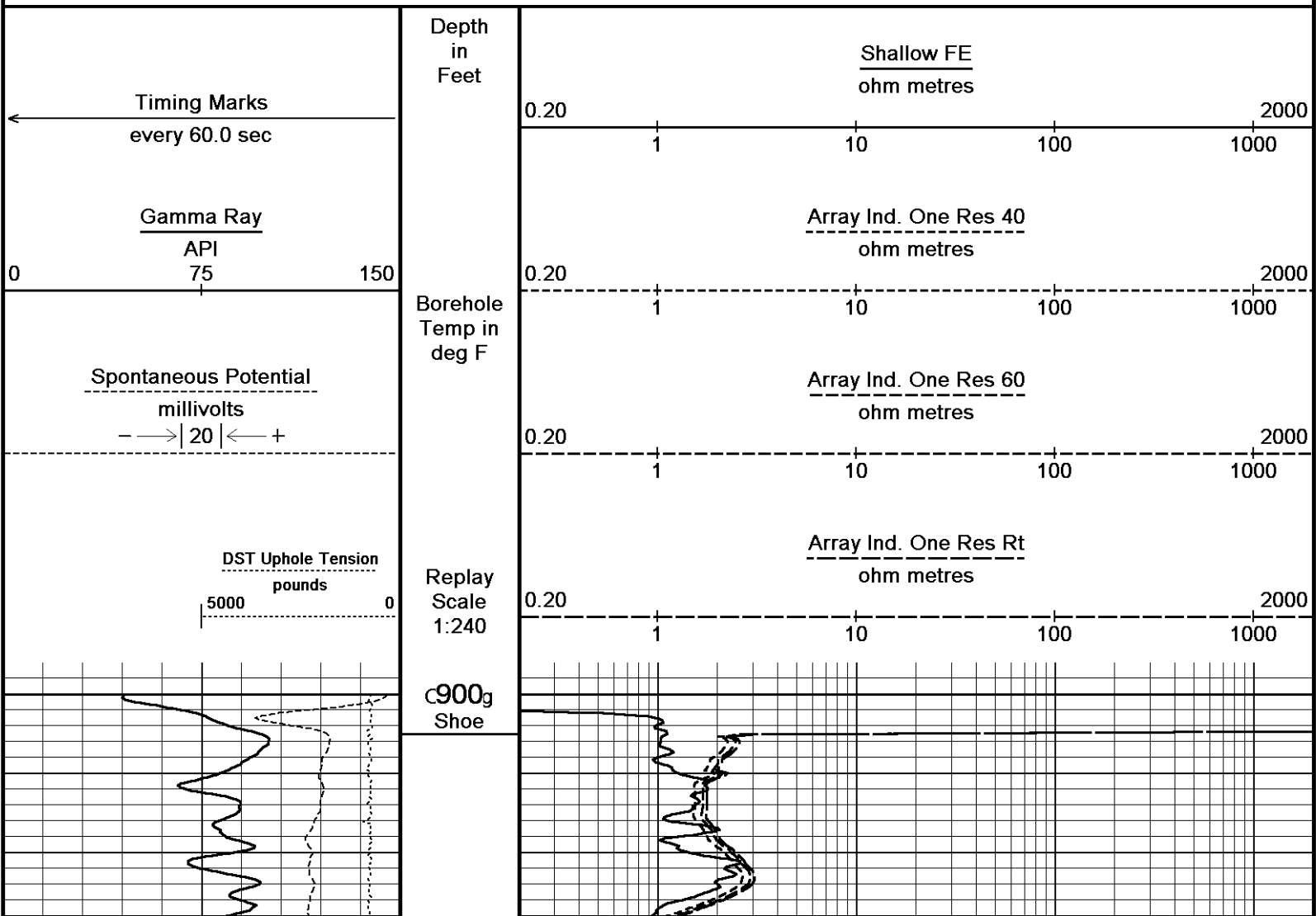


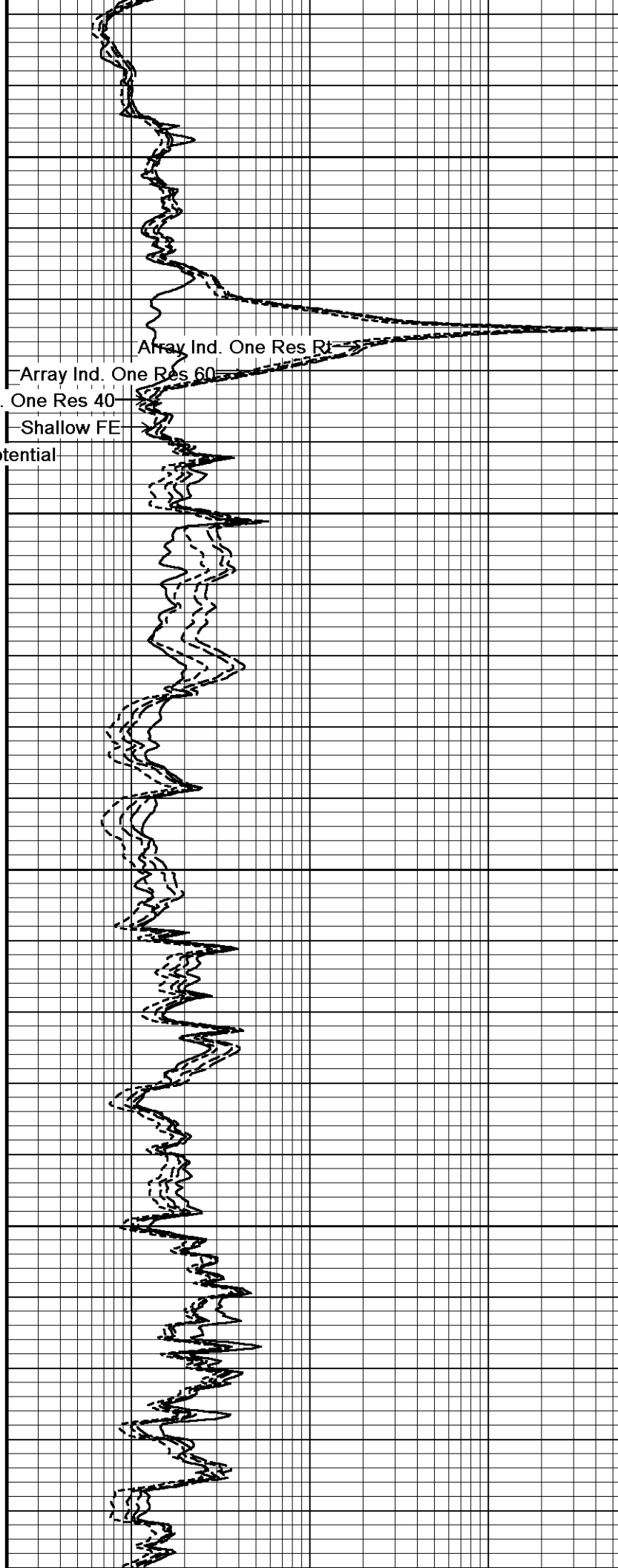
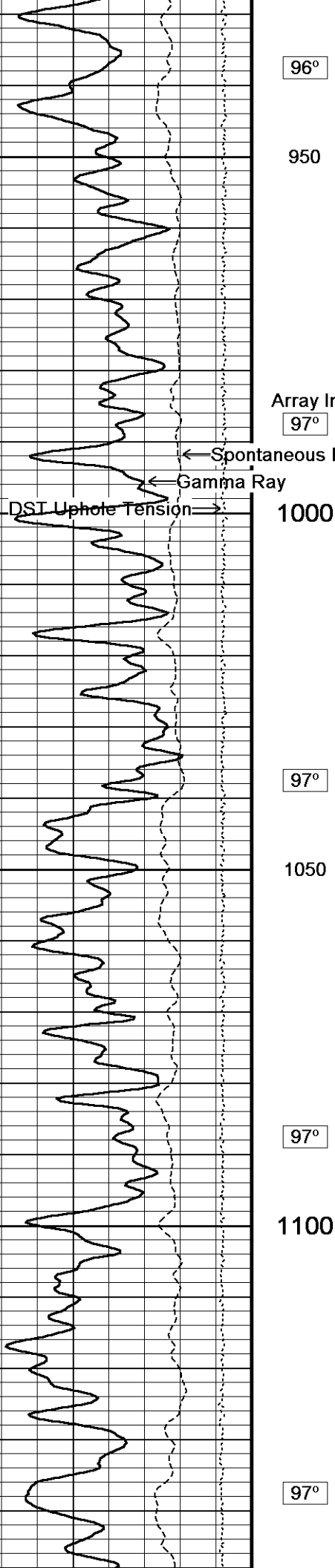
Depth Based Data - Maximum Sampling Increment 10.0cm
Filename: C:\Minimus 11.02.3186\Data\M&M Z-Bar #20-14\M&M Z-Bar #20-14_003.dta
System Versions: Logged with 11.03.4044 Plotted with 11.03.4044

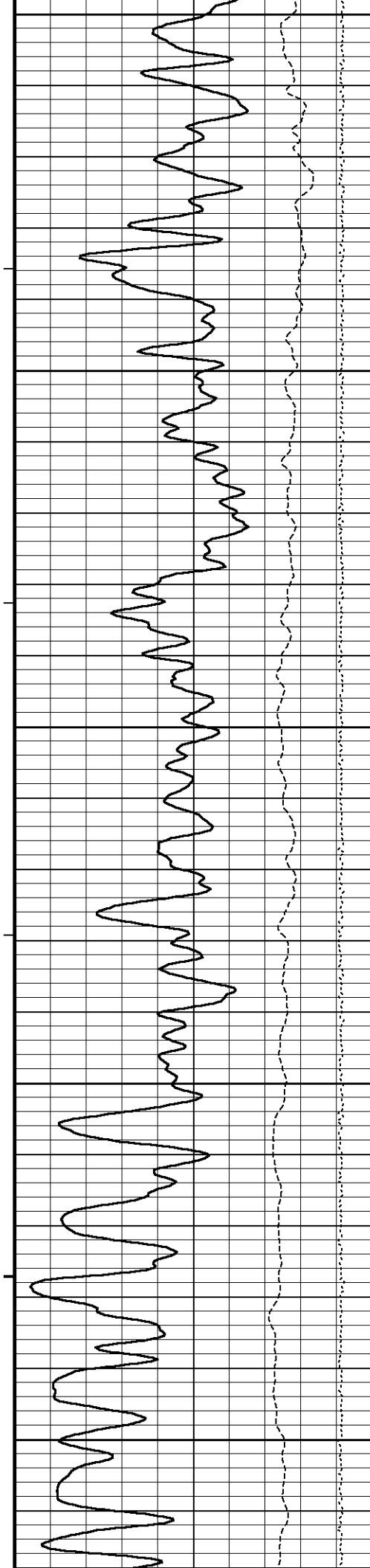
↑ 2 INCH MAIN PASS ↑

↓ 5 INCH MAIN PASS ↓

Depth Based Data - Maximum Sampling Increment 10.0cm
Filename: C:\Minimus 11.02.3186\Data\M&M Z-Bar #20-14\M&M Z-Bar #20-14_003.dta
System Versions: Logged with 11.03.4044 Plotted with 11.03.4044







1150

97°

1200

97°

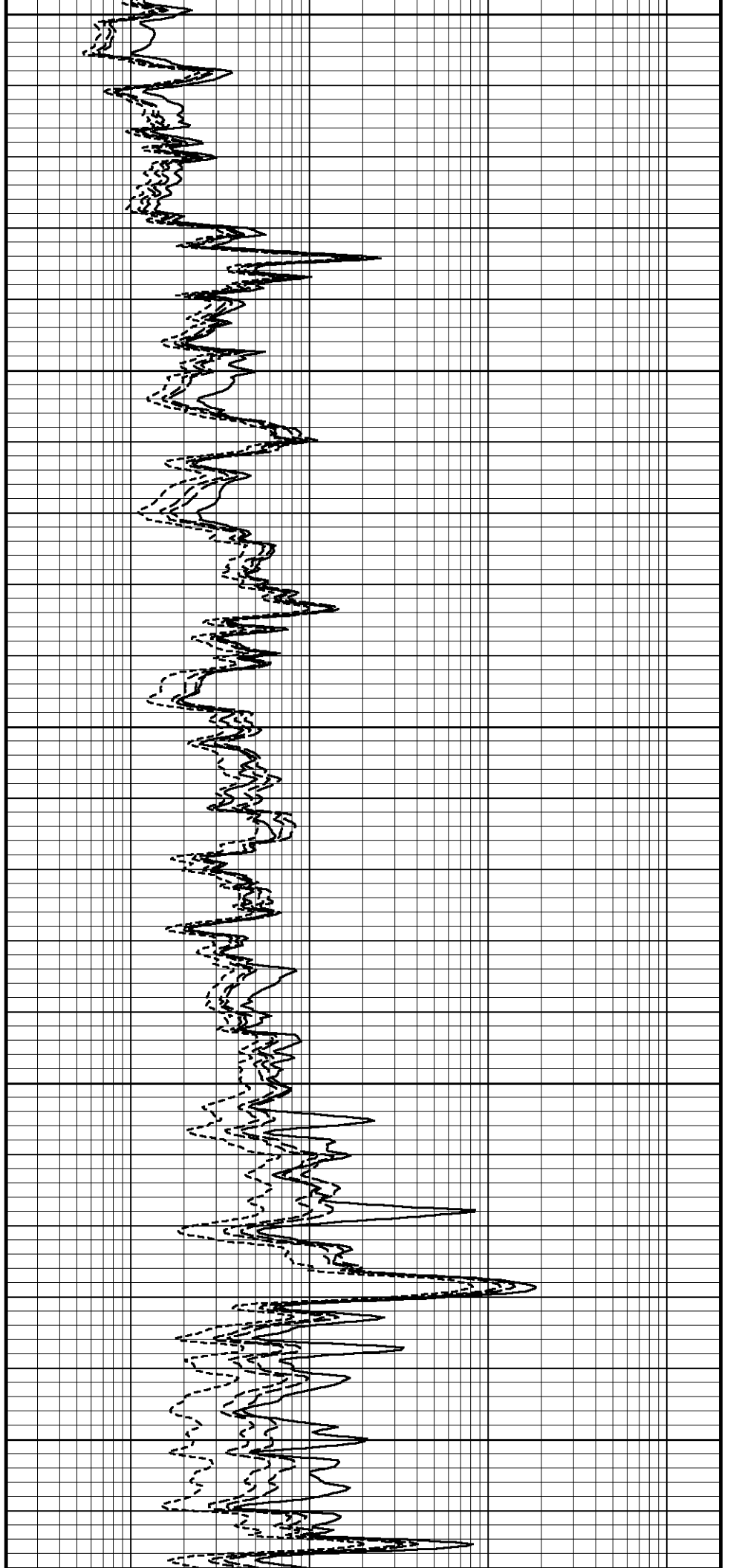
1250

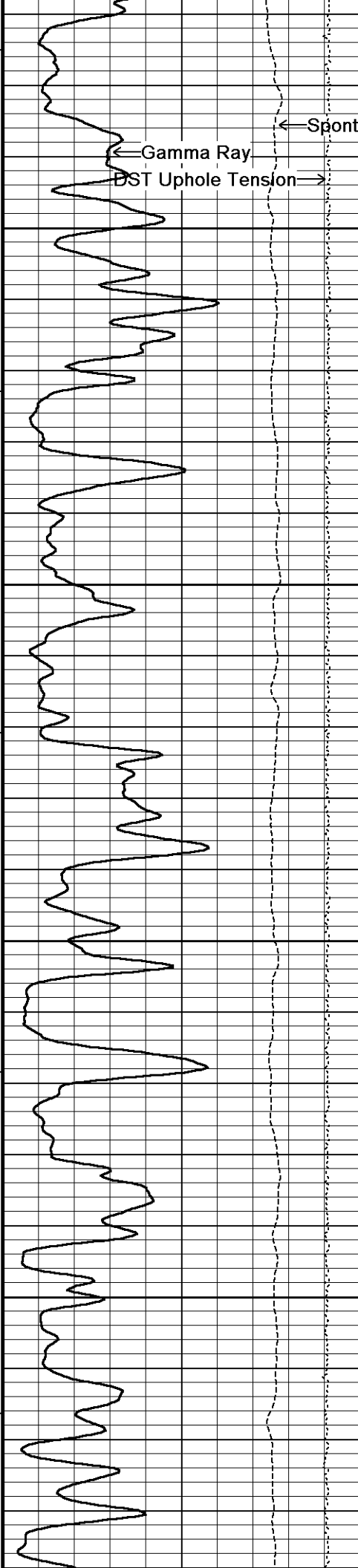
97°

1300

98°

1350





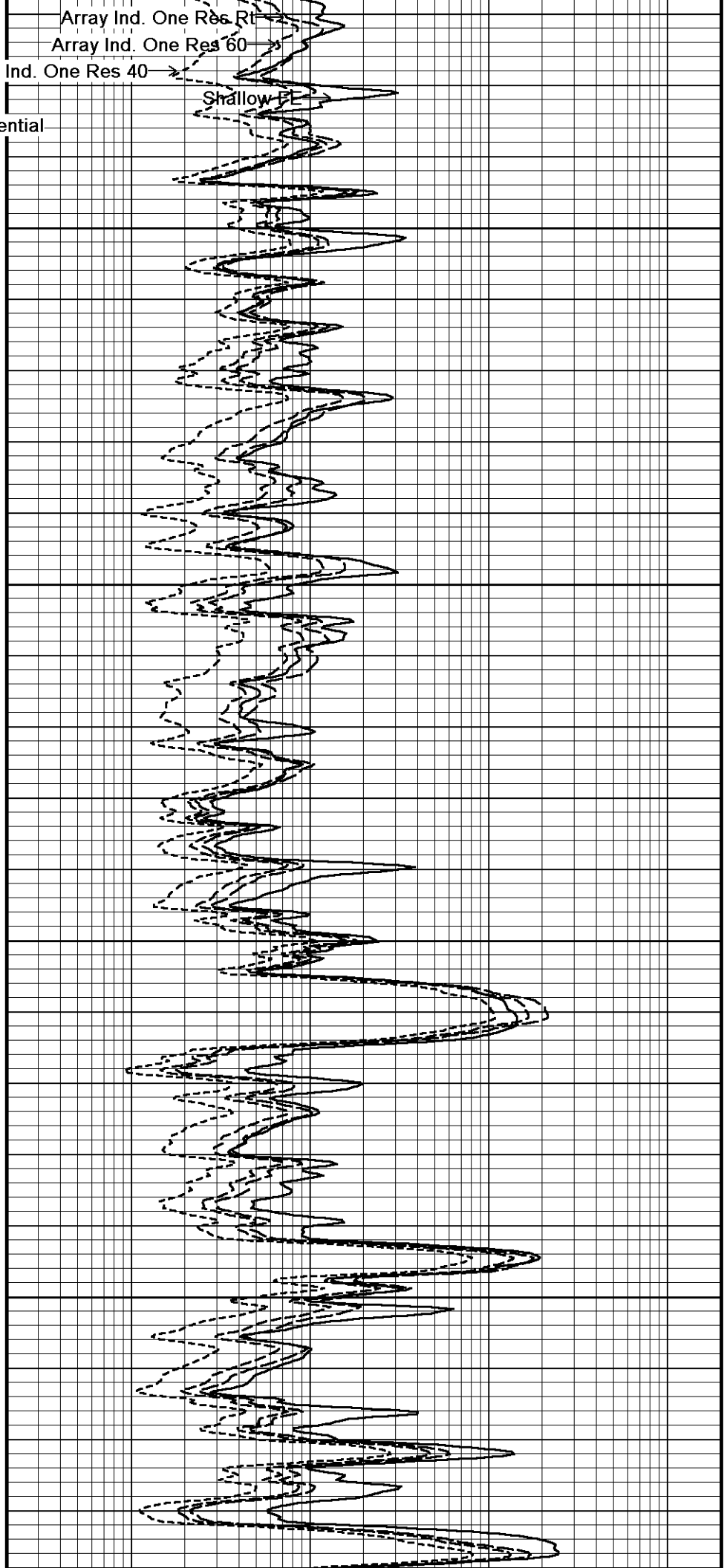
98°
1400
98°
1450
98°
1500
98°
1550
98°

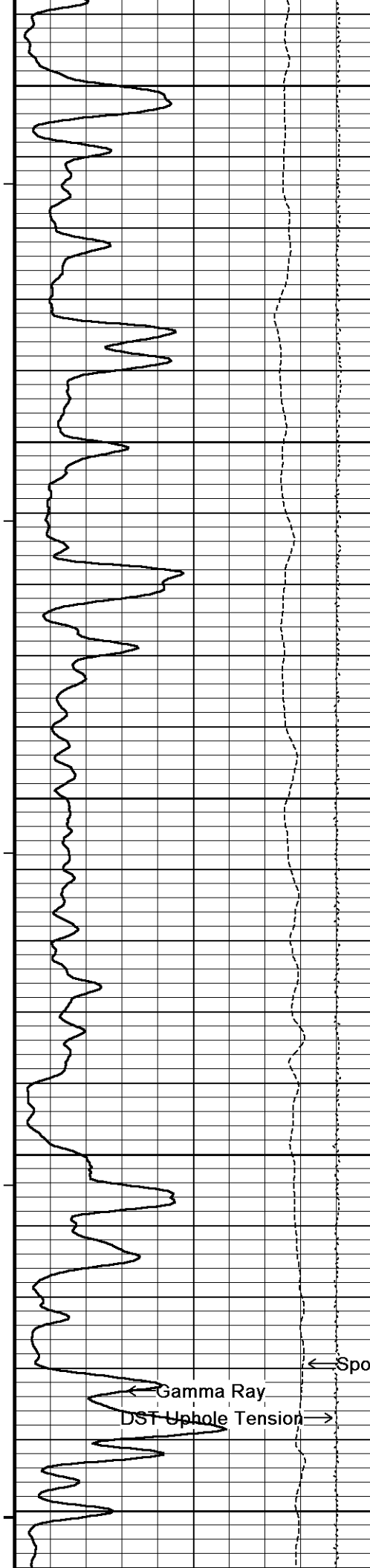
Array Ind. One Res 60
Array Ind. One Res 40

Shallow FI

Spontaneous Potential

Gamma Ray
DST Uphole Tension





1600

98°

1650

98°

1700

98°

1750

Array Ind. One Res 31

Array Ind. One Res 66

Array Ind. One Res 40

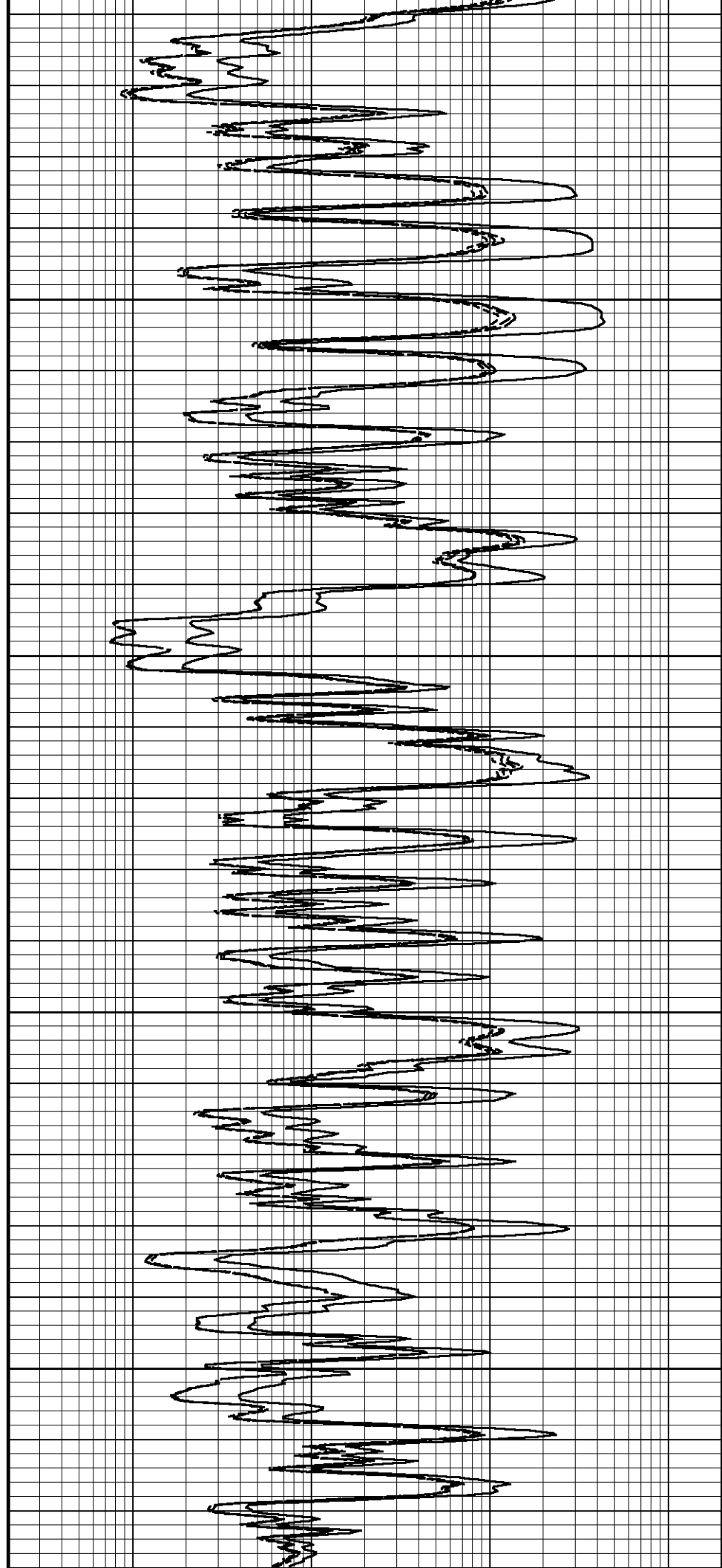
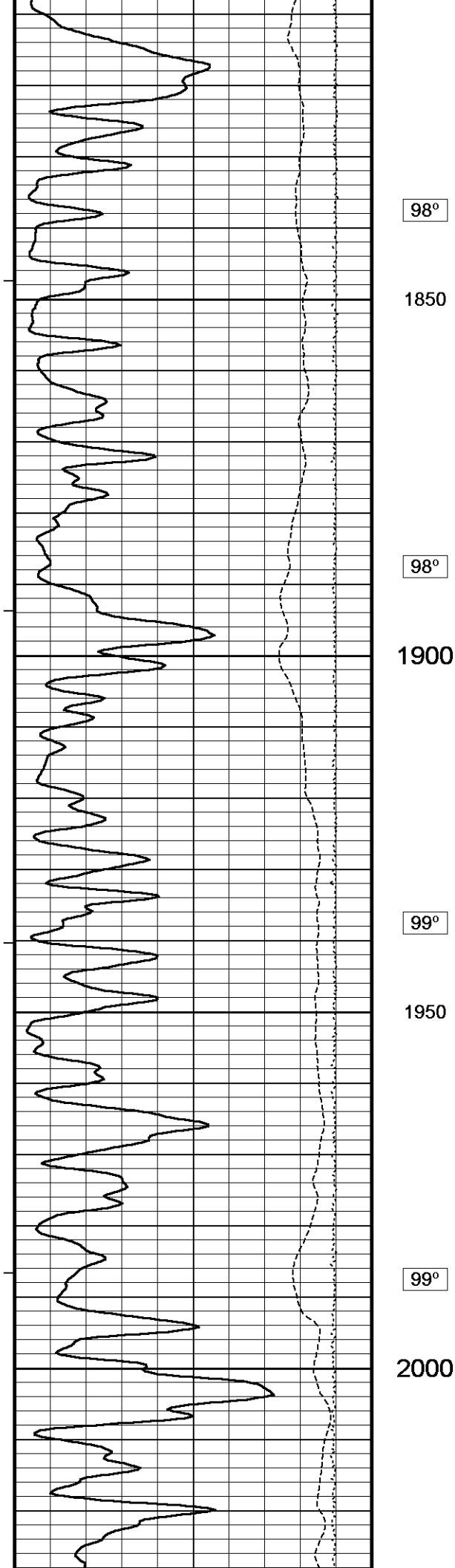
Shallow PE

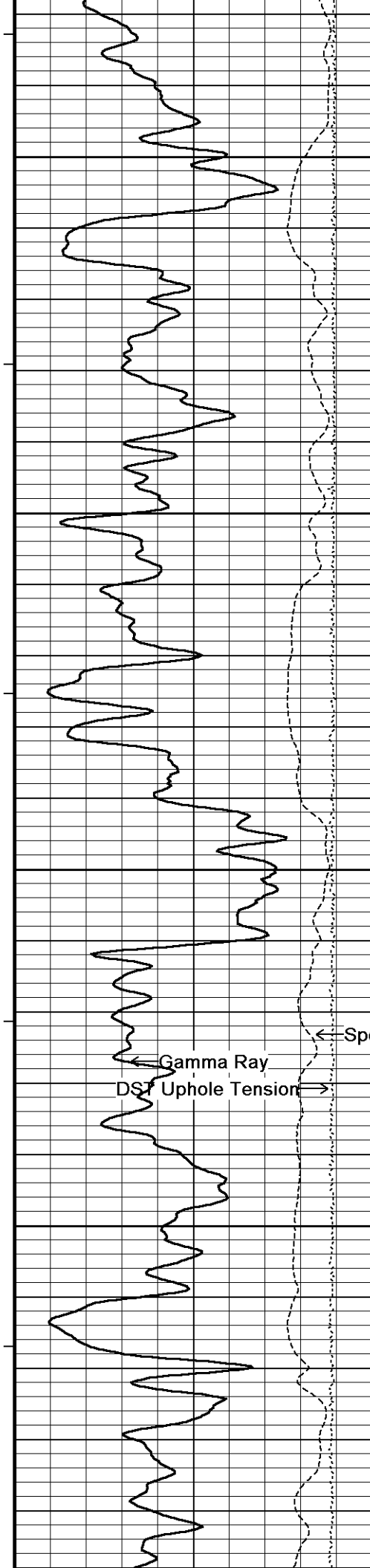
← Spontaneous Potential

← Gamma Ray
DST Uphole Tension →

98°

1800





99°

2050

100°

2100

100°

2150

101°

2200

101°

Array Ind. One Res Rt

Array Ind. One Res 60

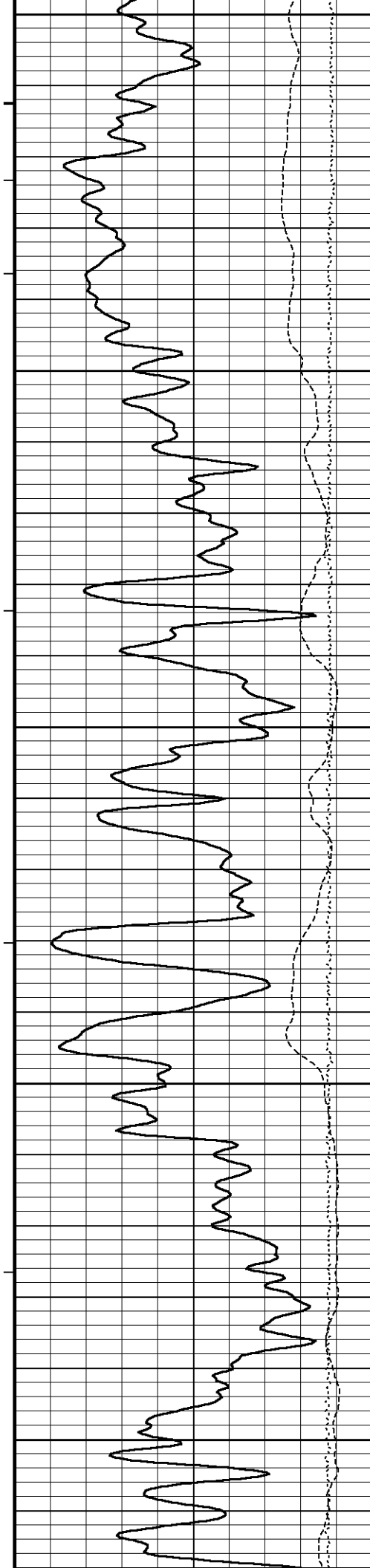
Array Ind. One Res 40

Shallow FF

← Spontaneous Potential

Gamma Ray

DST Uphole Tension →



2250

101°

2300

102°

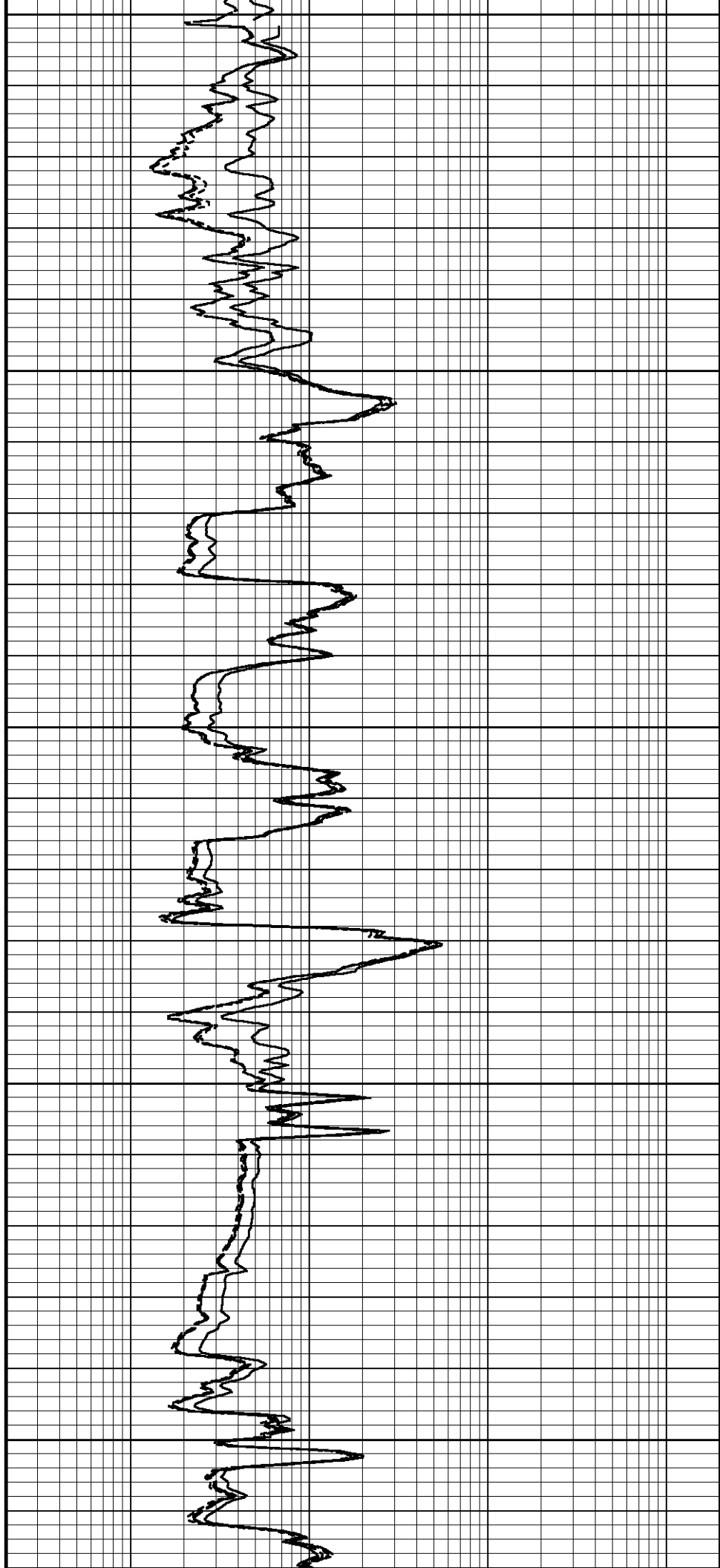
2350

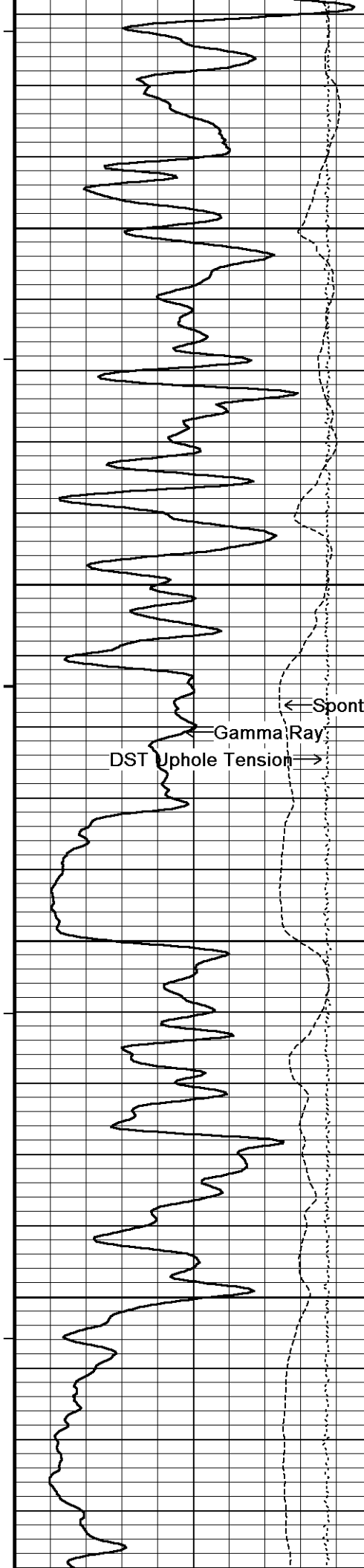
102°

2400

103°

2450





103°

2500

103°

2550

← Spontaneous Potential

Gamma Ray

DST Uphole Tension →

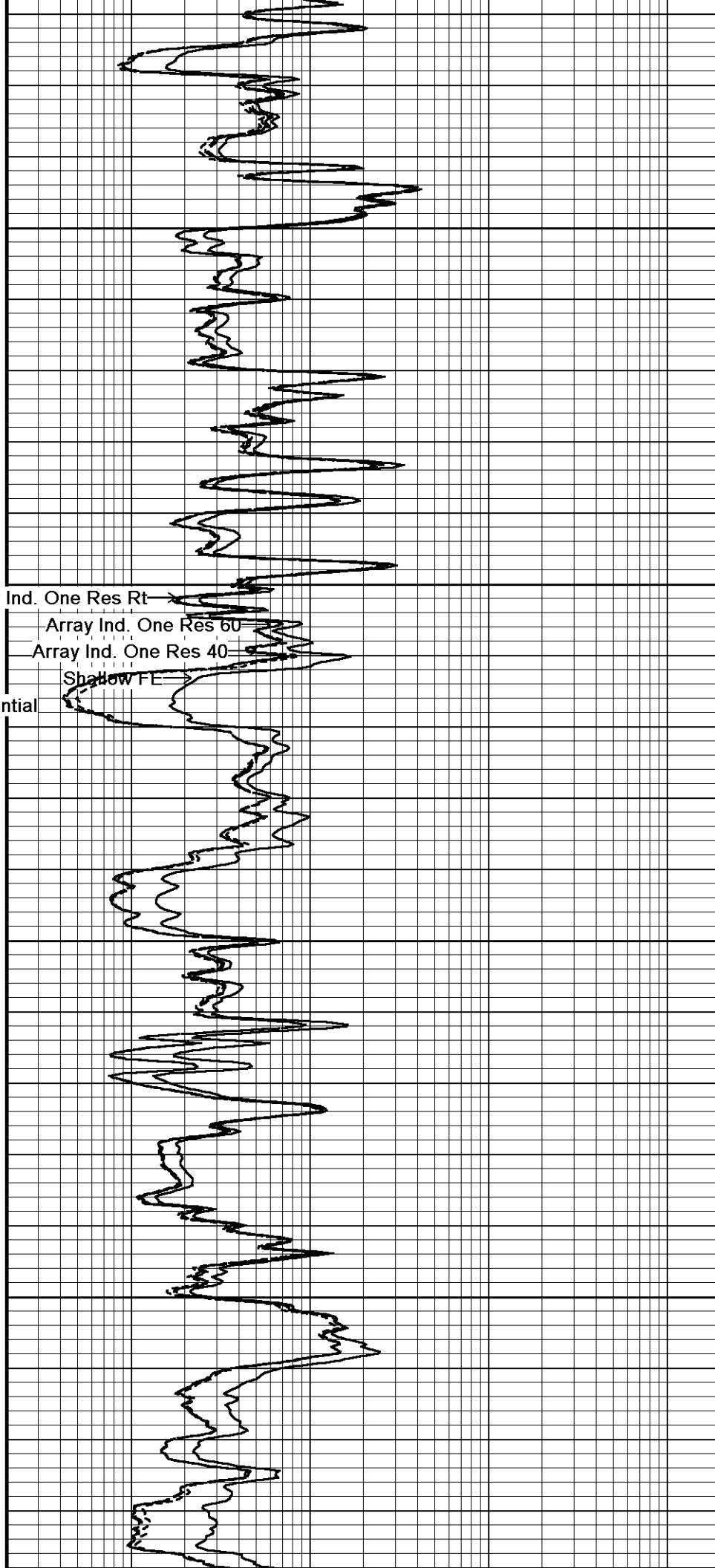
103°

2600

103°

2650

103°

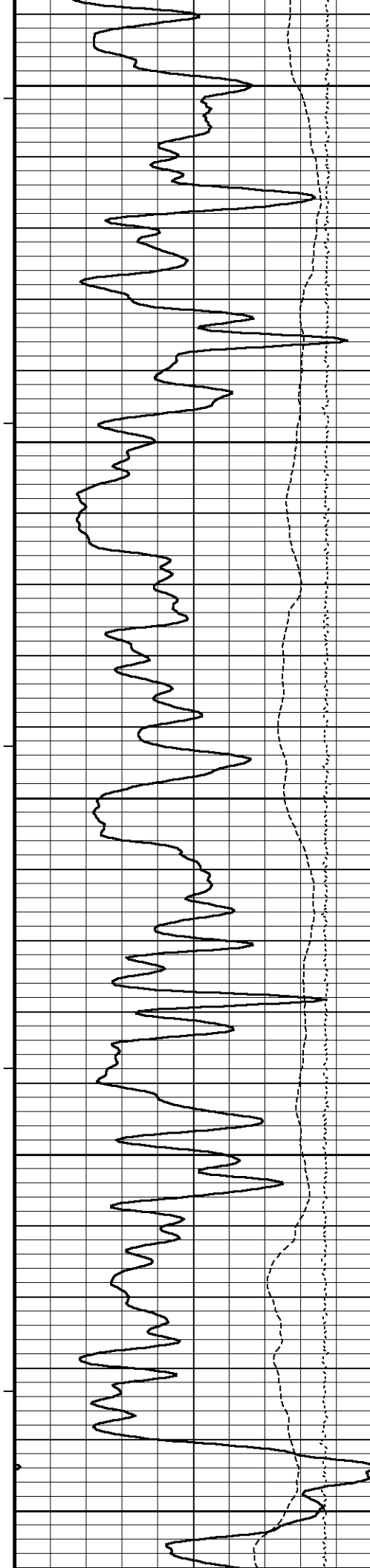


Array Ind. One Res Rt →

Array Ind. One Res 60

Array Ind. One Res 40

Shallow FE



103°

2700

104°

2750

104°

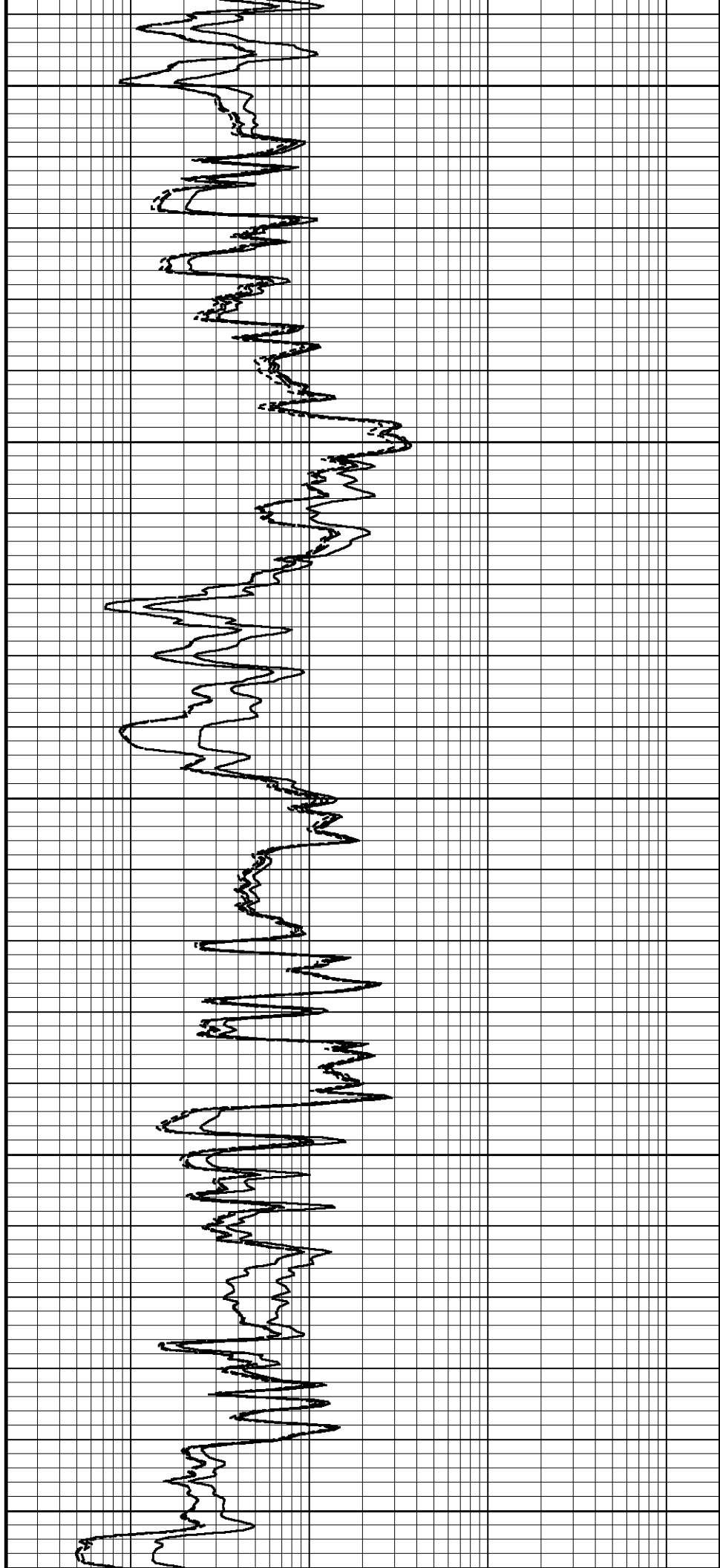
2800

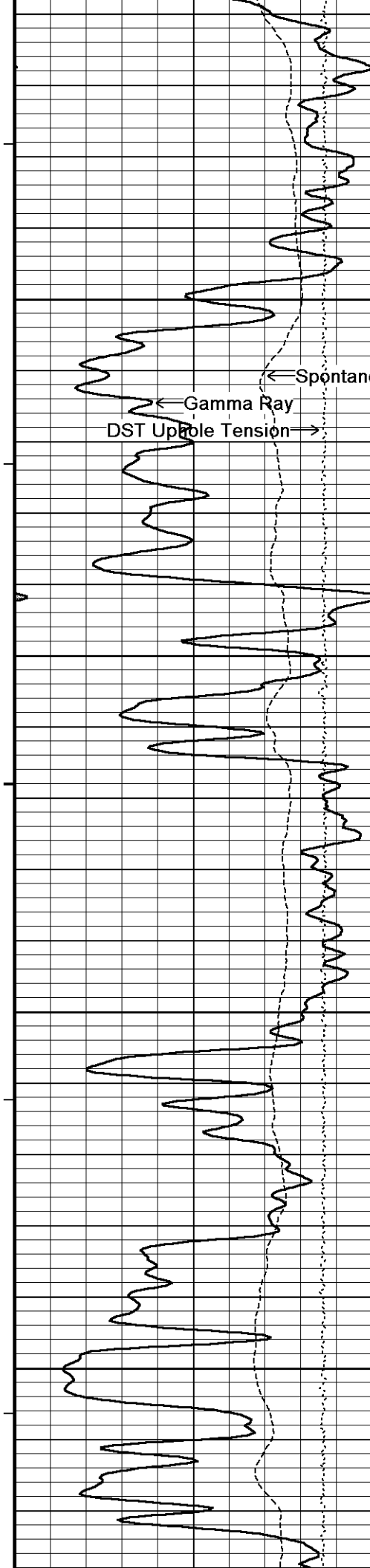
105°

2850

105°

2900





106°

Array Ind. One Res Rt

2950 Array Ind. One Res 60

Array Ind. One Res 40

Shallow F

Spontaneous Potential

Gamma Ray

DST Up

106°

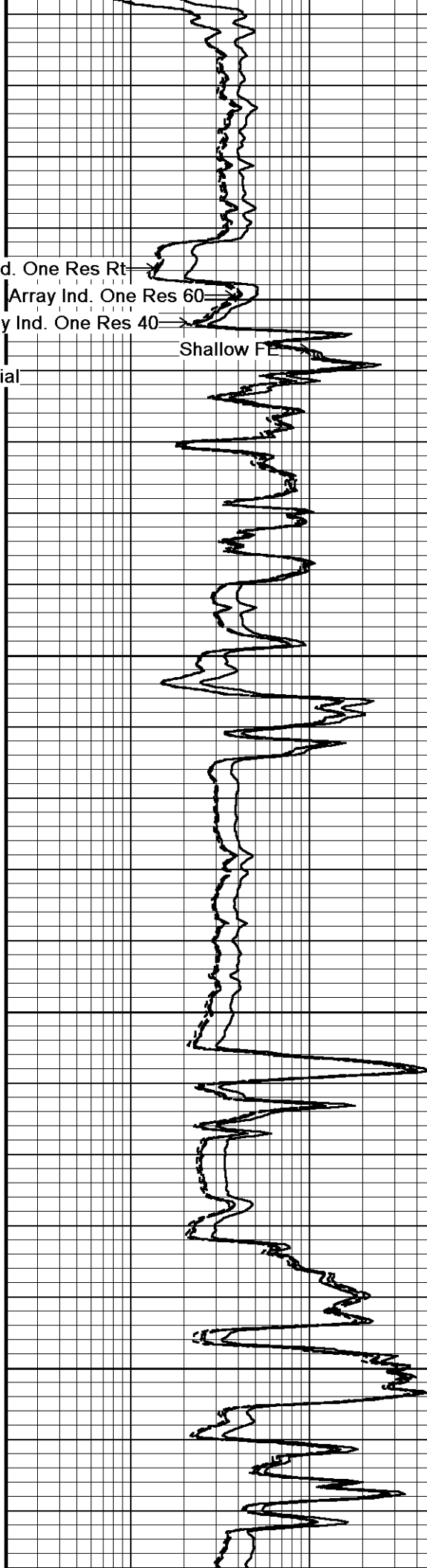
3000

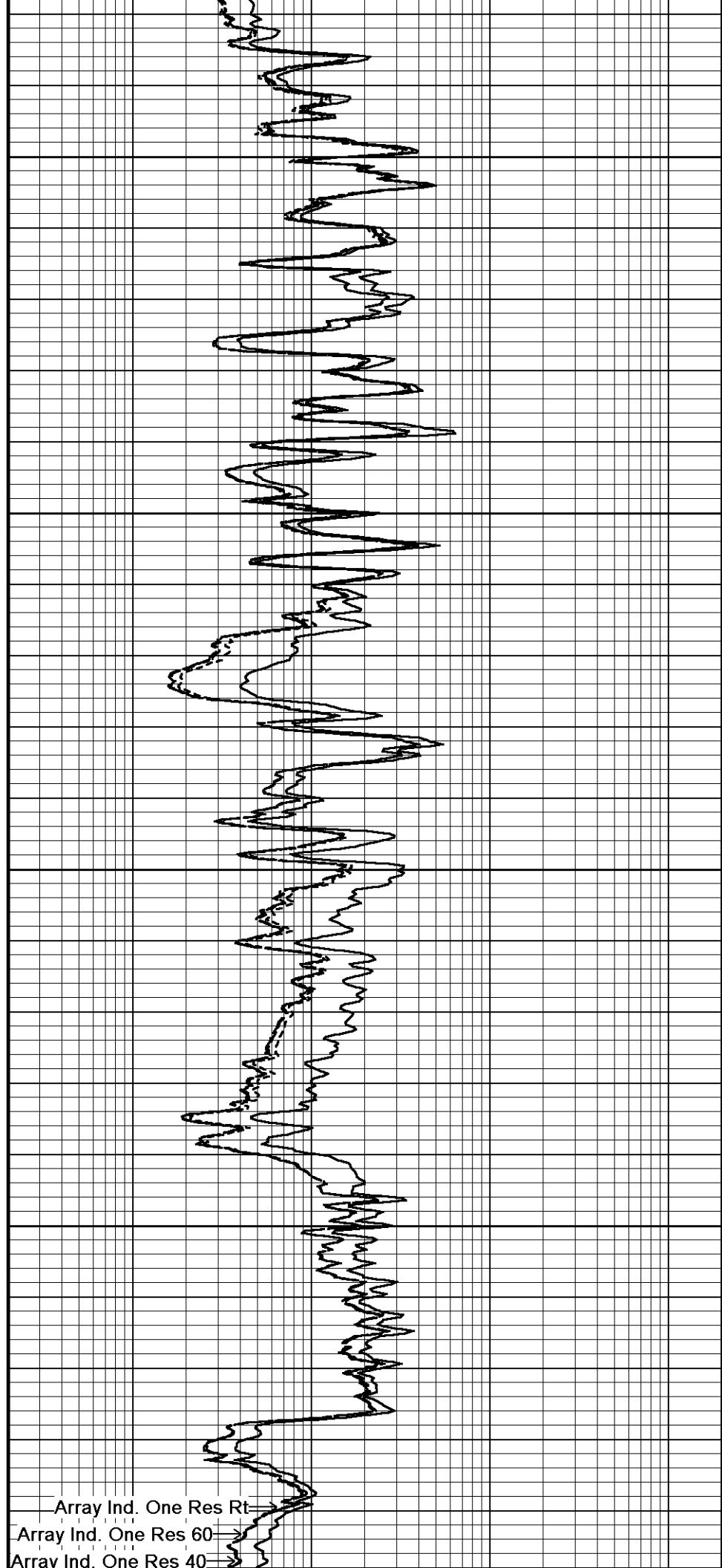
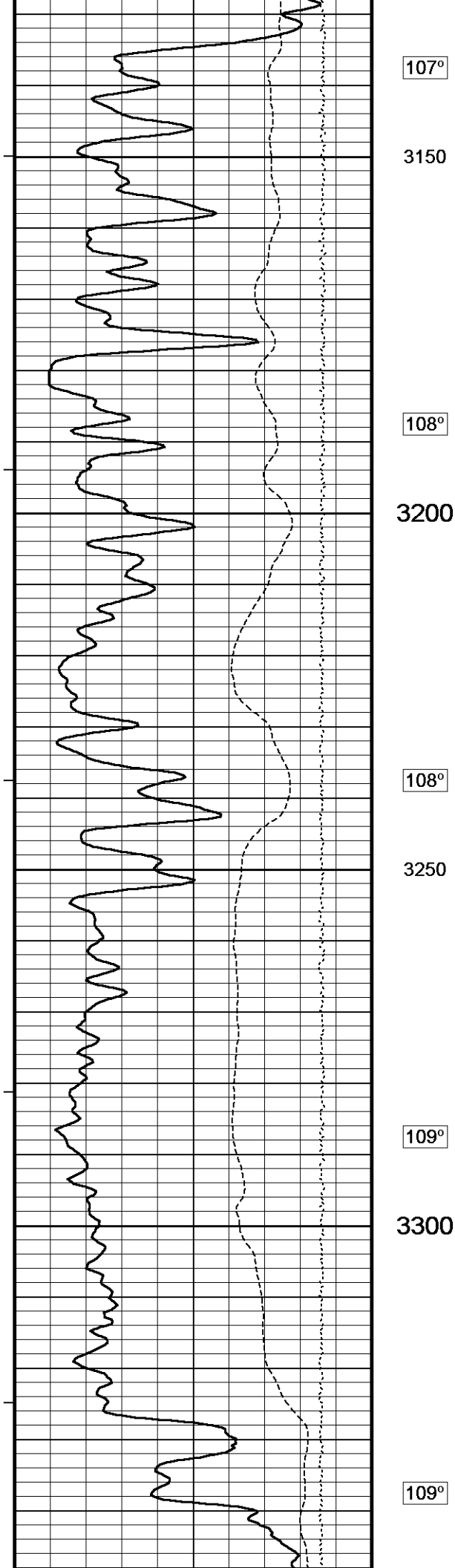
107°

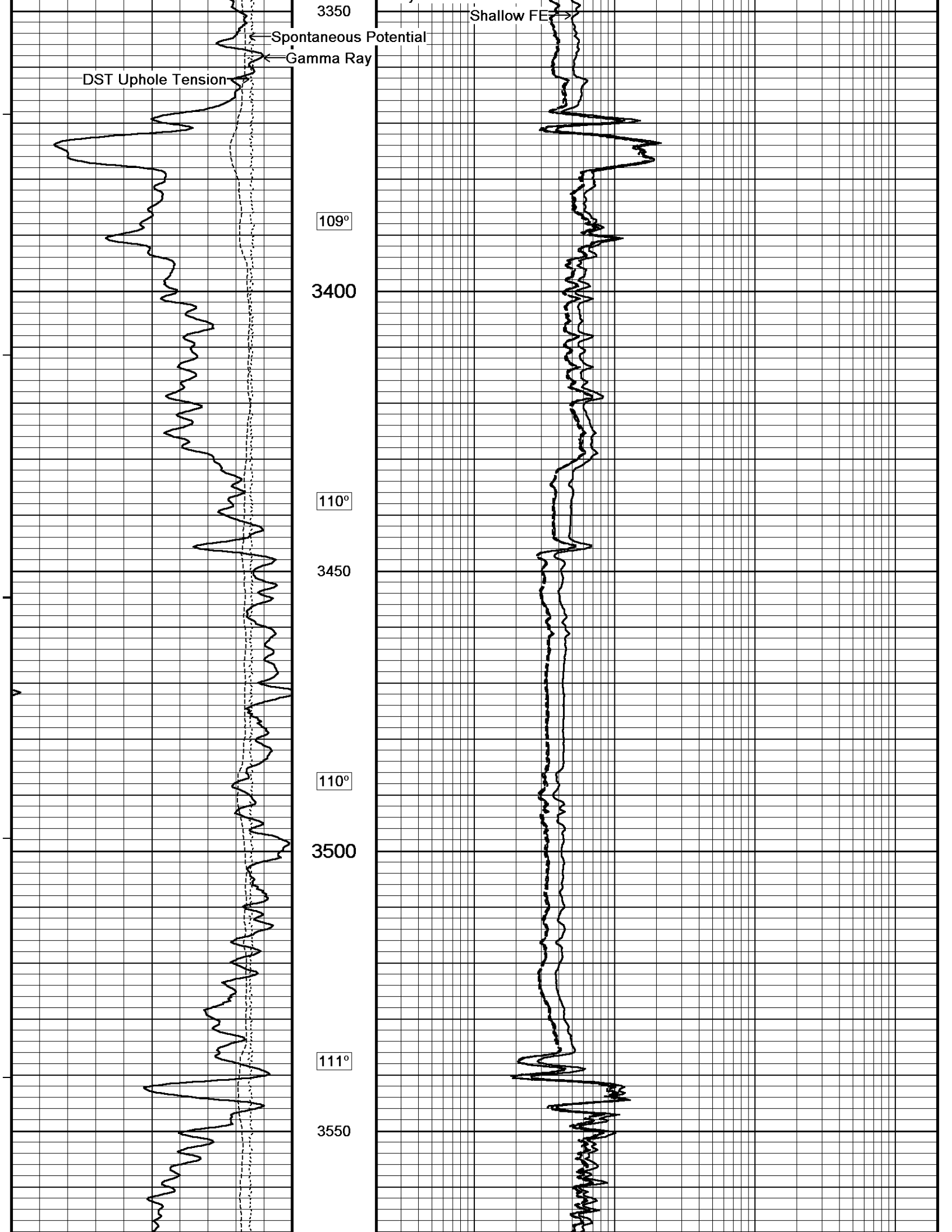
3050

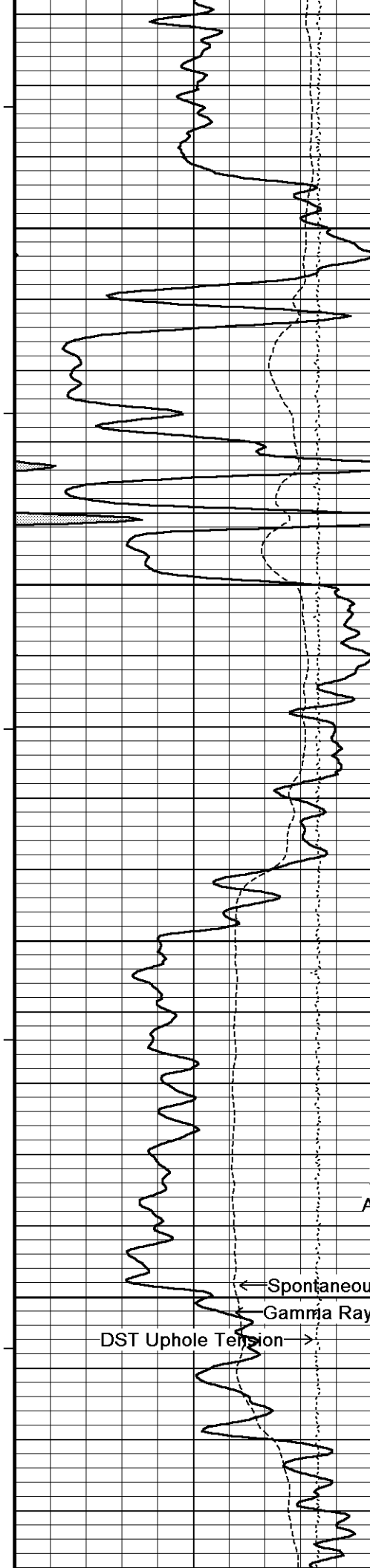
107°

3100









111°

3600

111°

3650

112°

3700

Array Ind. One Res Rt

Array Ind. One Res 60

Array Ind. One Res 40

Shallow EE

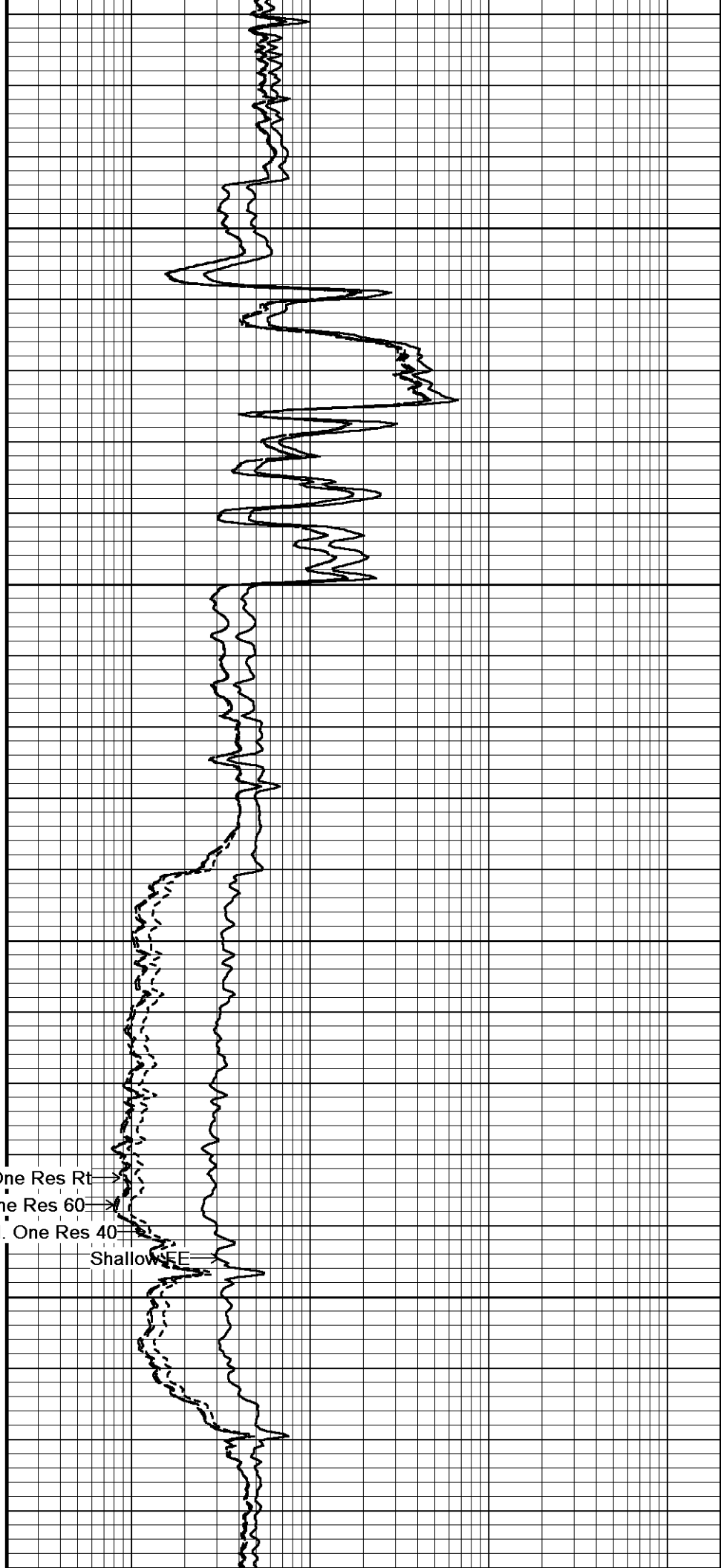
← Spontaneous Potential

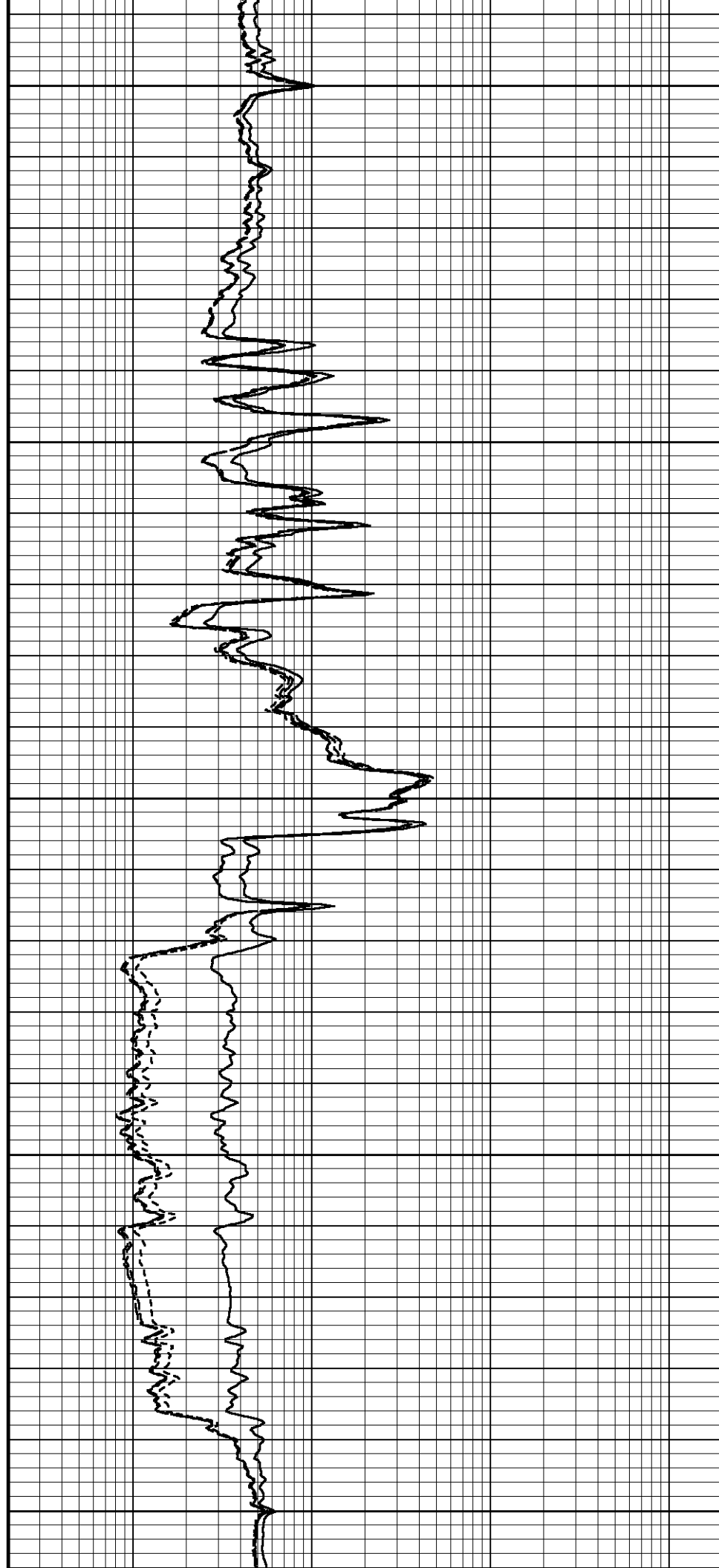
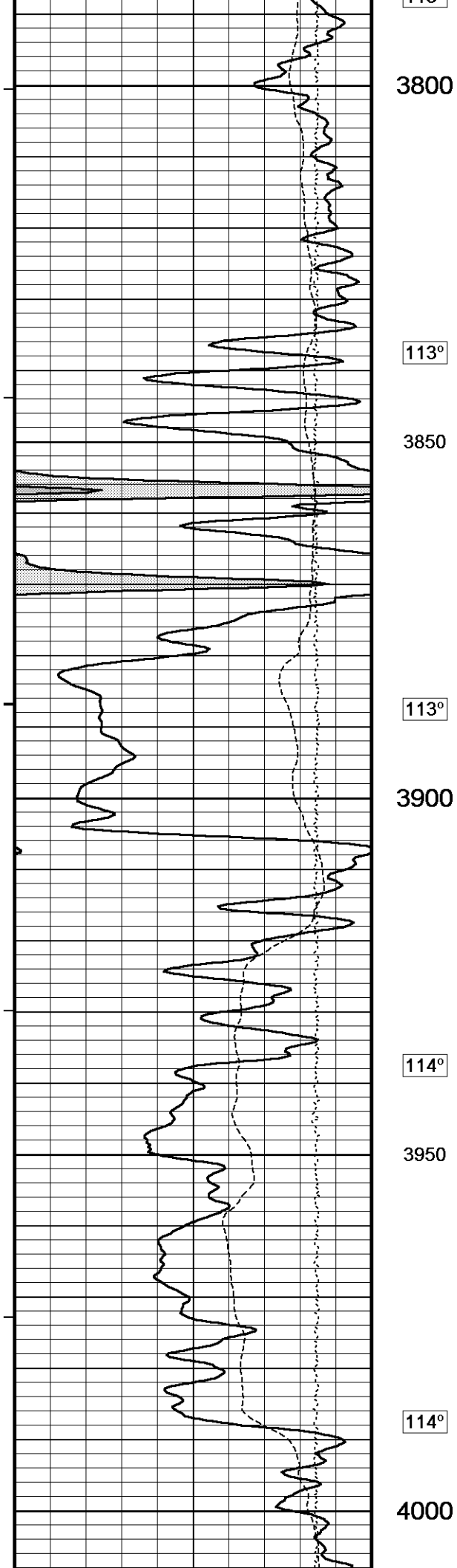
Gamma Ray

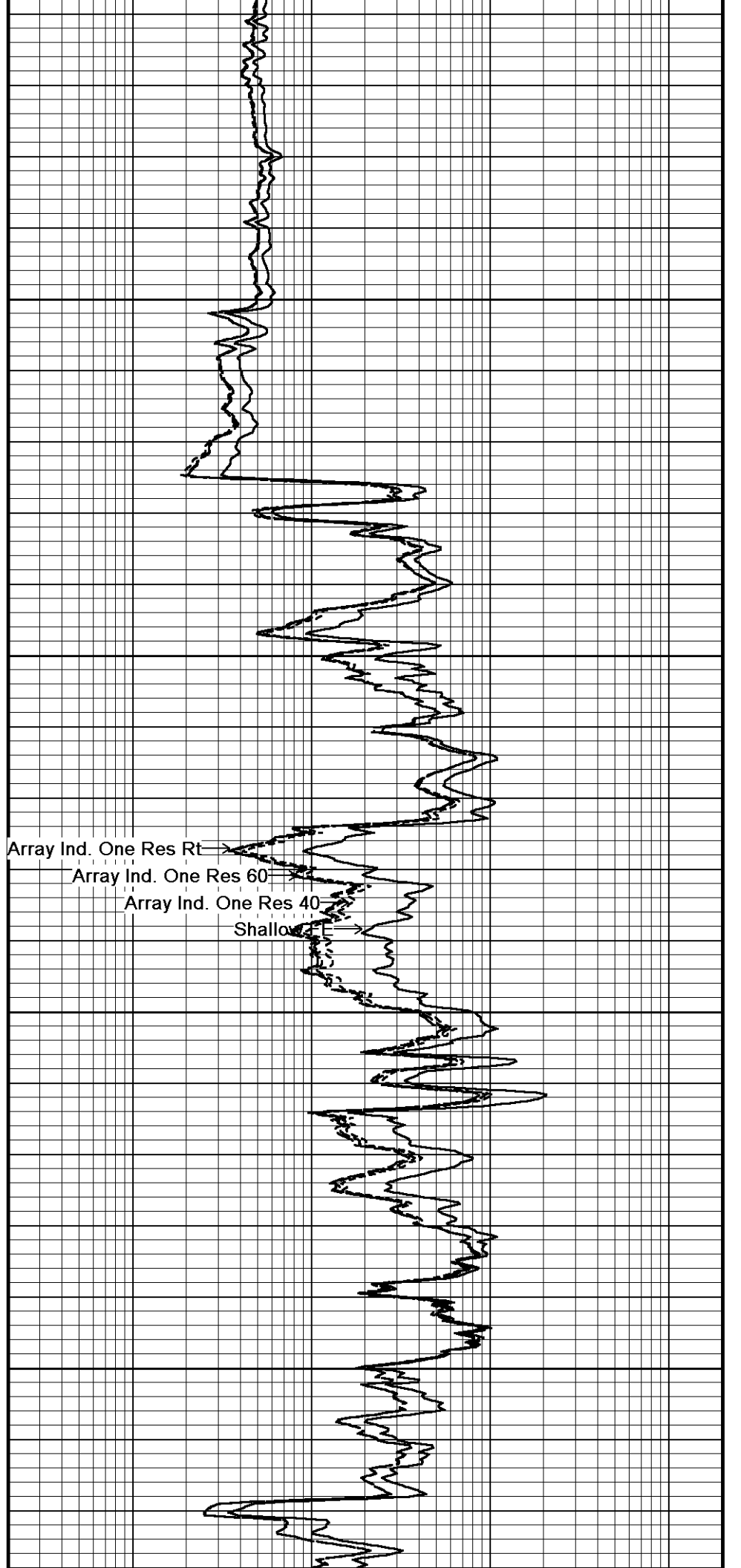
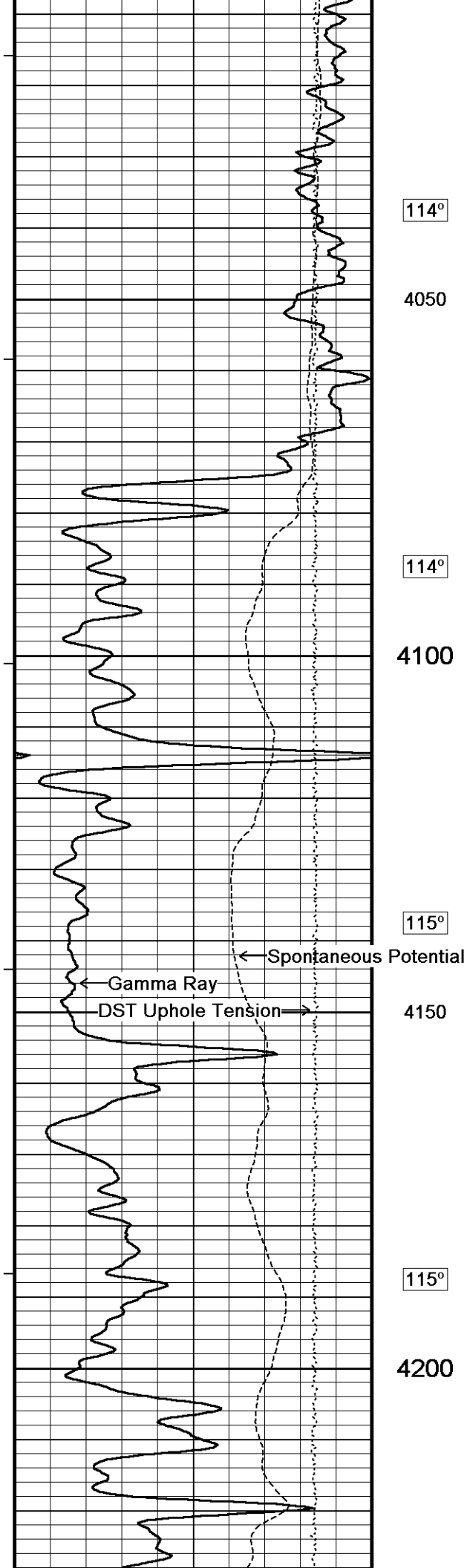
DST Uphole Tension →

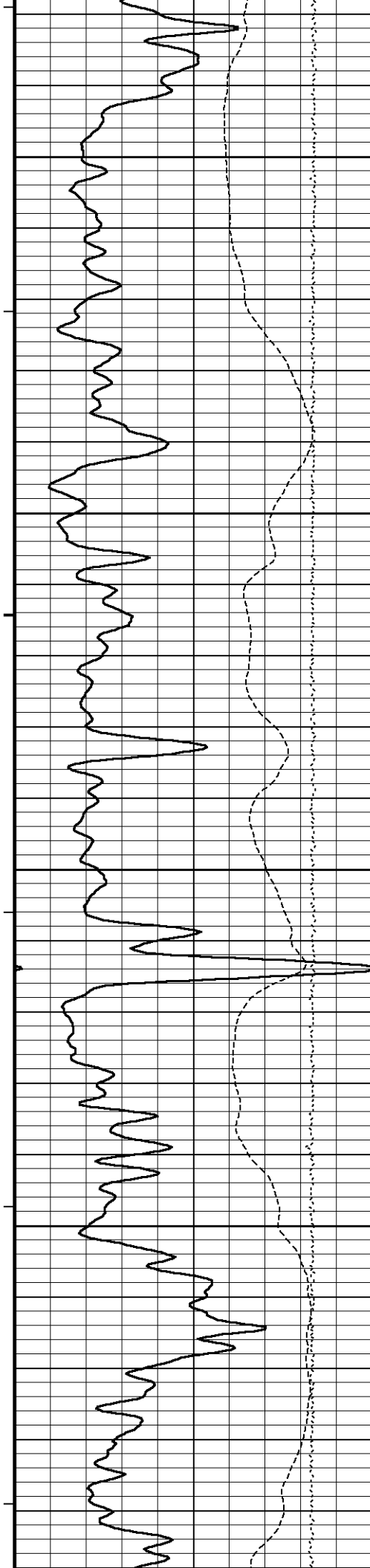
3750

113°









115°

4250

116°

4300

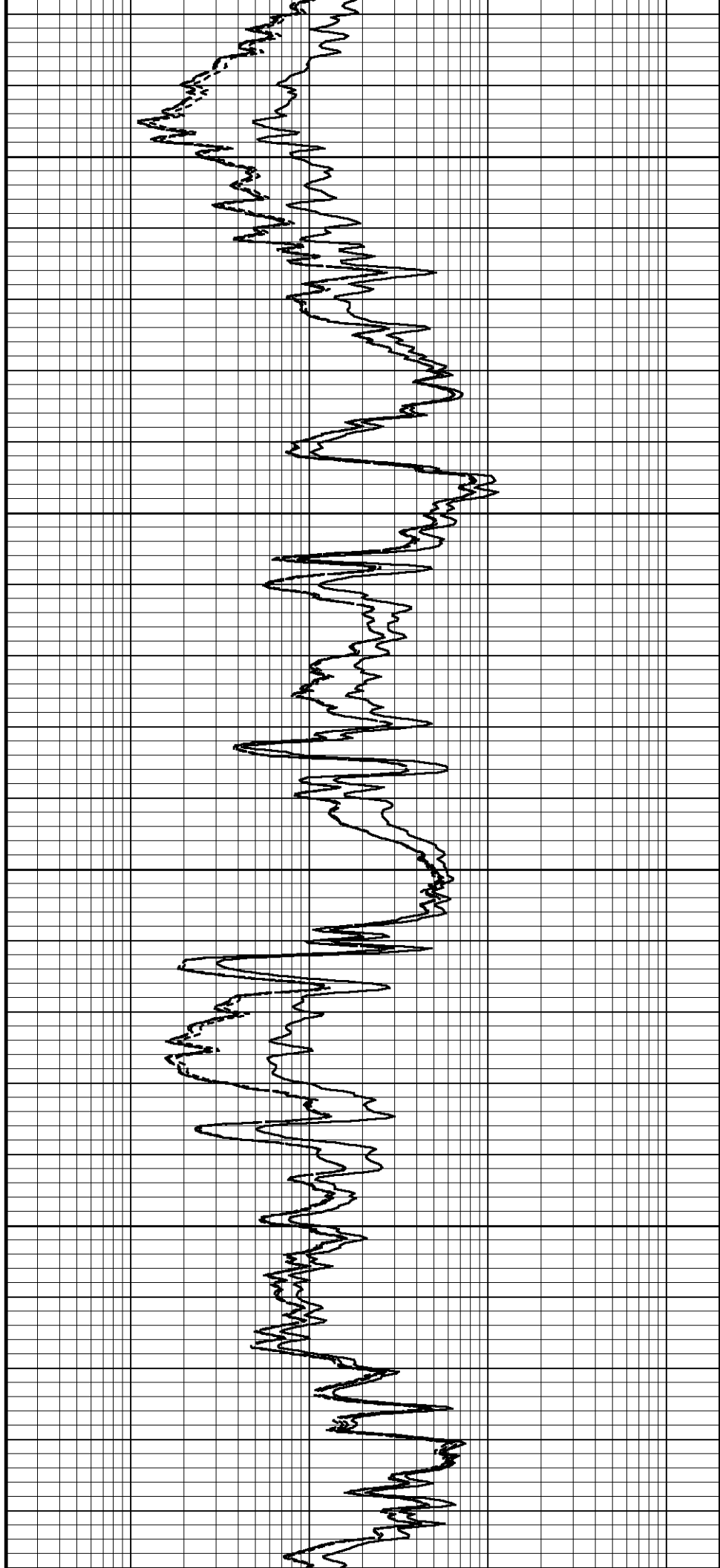
116°

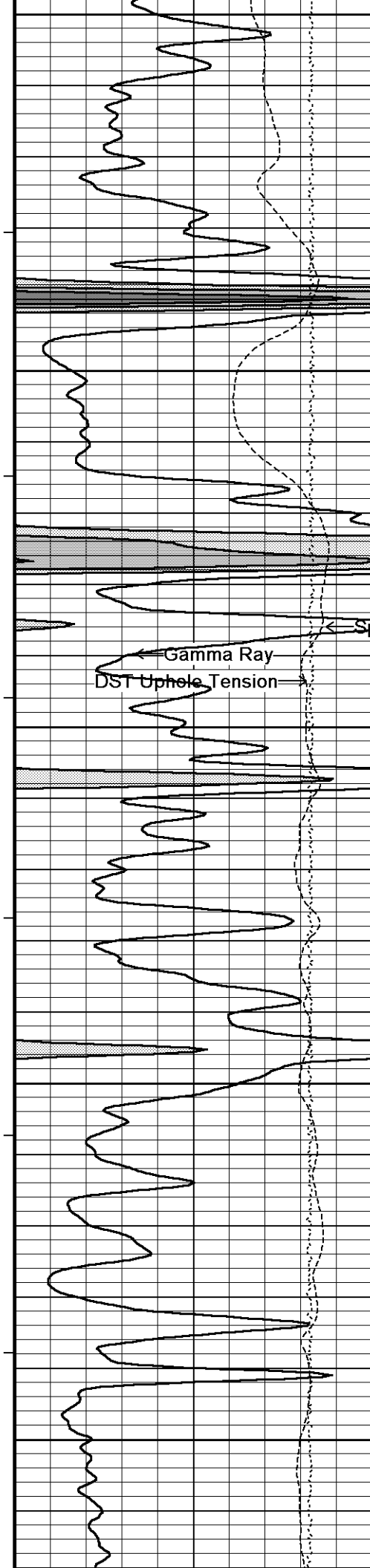
4350

116°

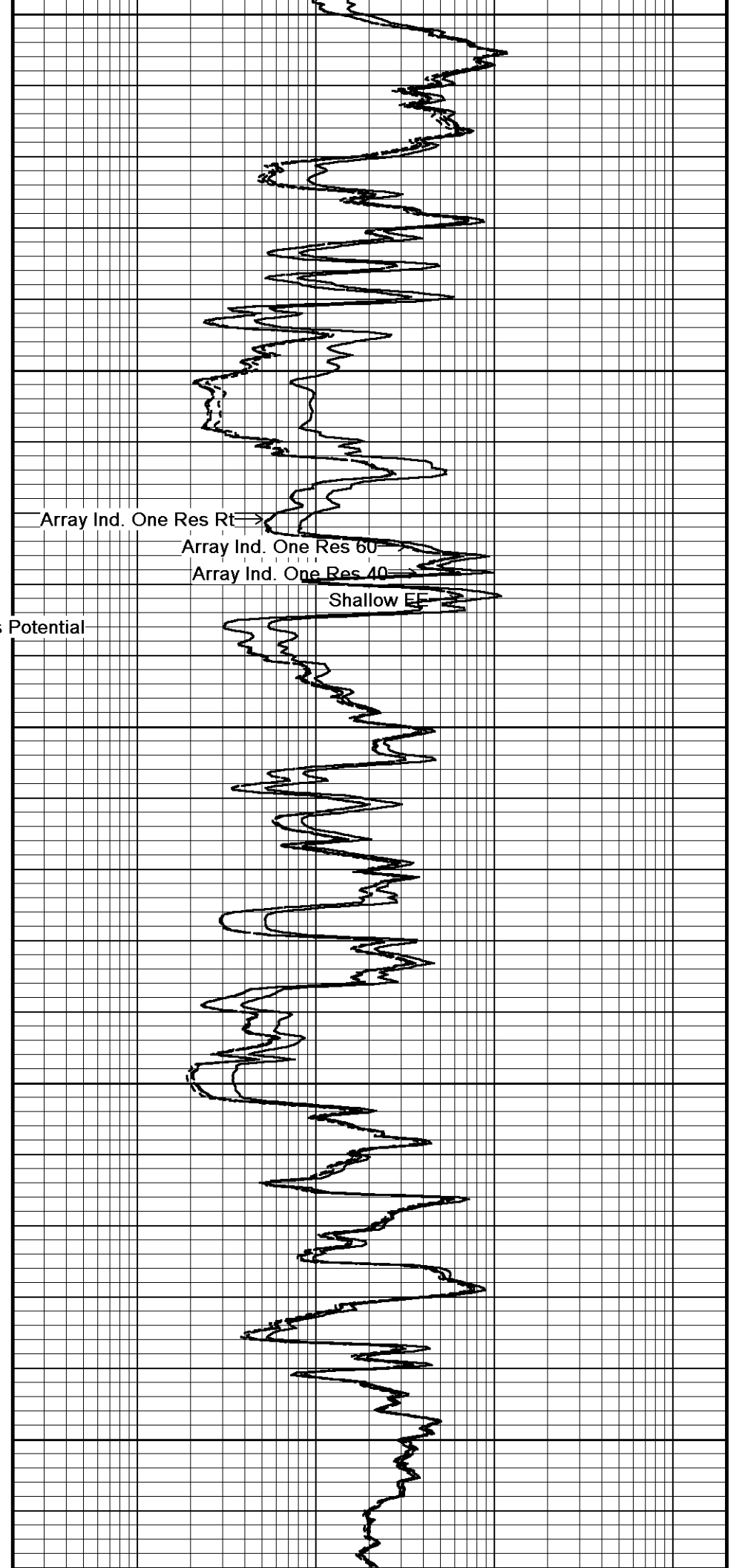
4400

117°



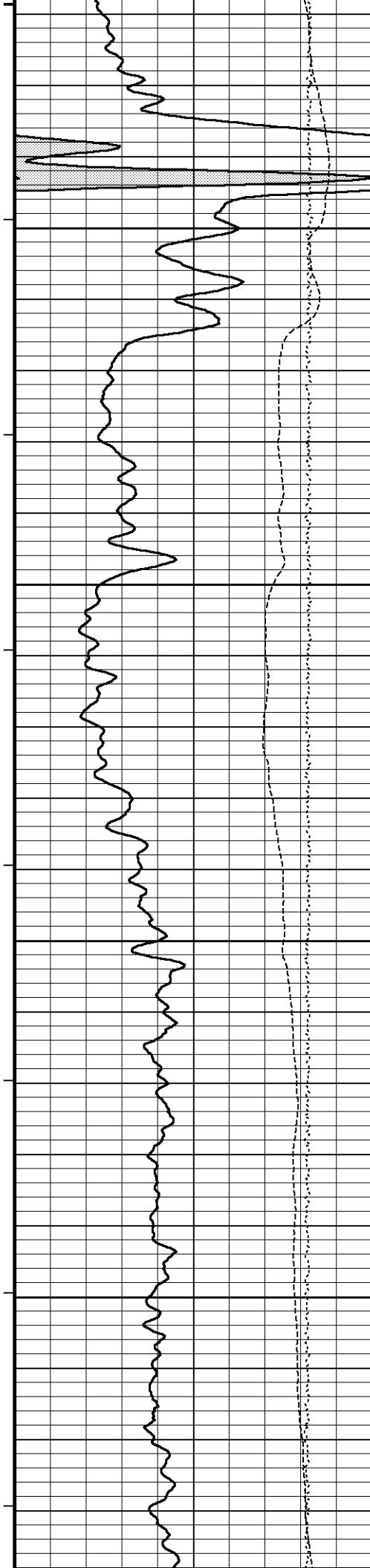


4450
117°
4500
117°
4550
118°
4600
118°
4650



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

Gamma Ray
DST Up
Spontaneous Potential



118°

4700

119°

4750

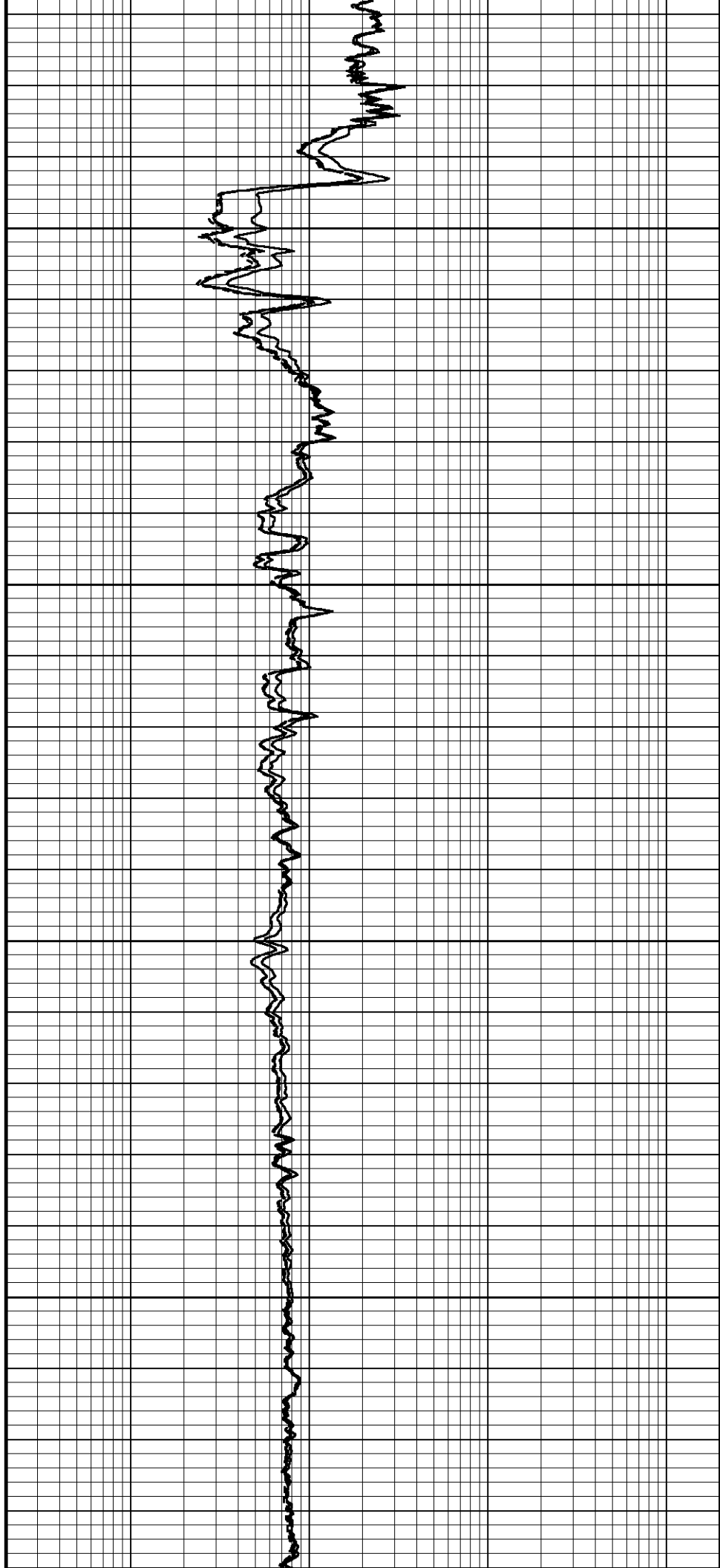
119°

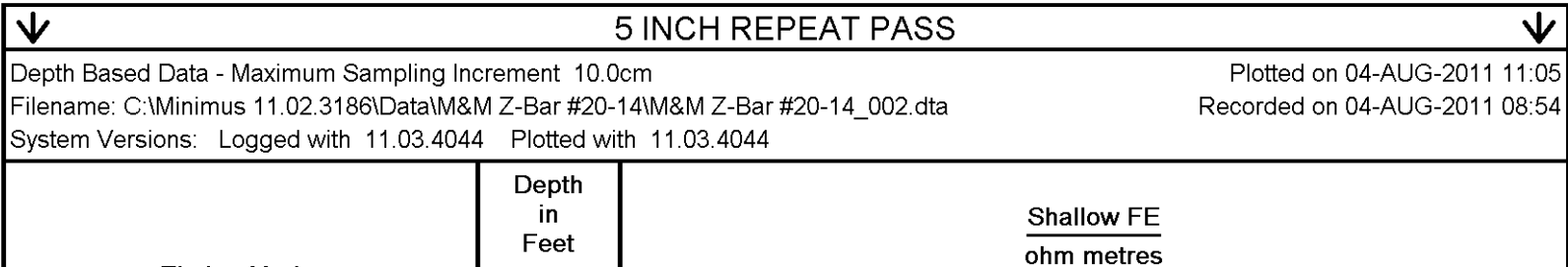
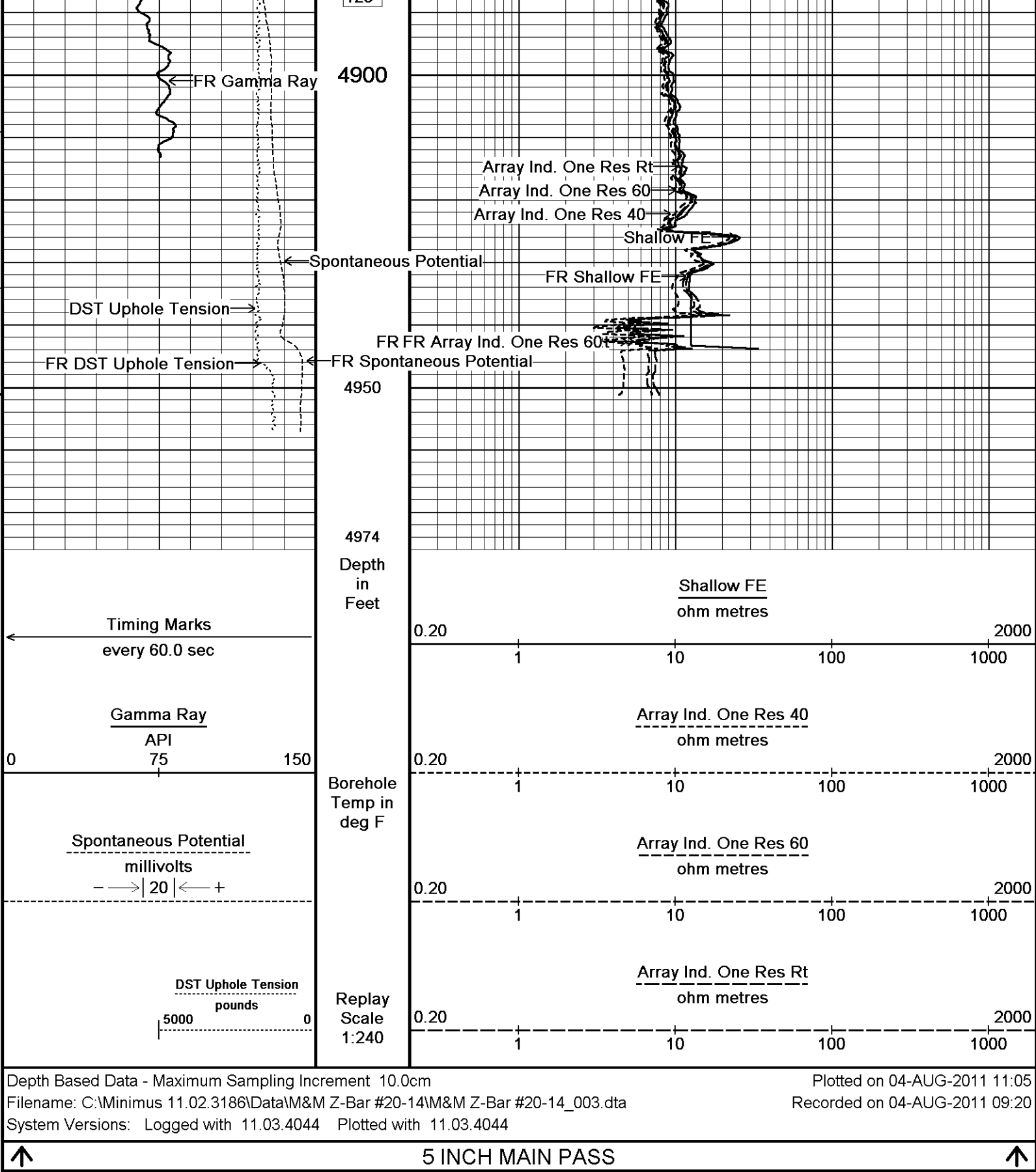
4800

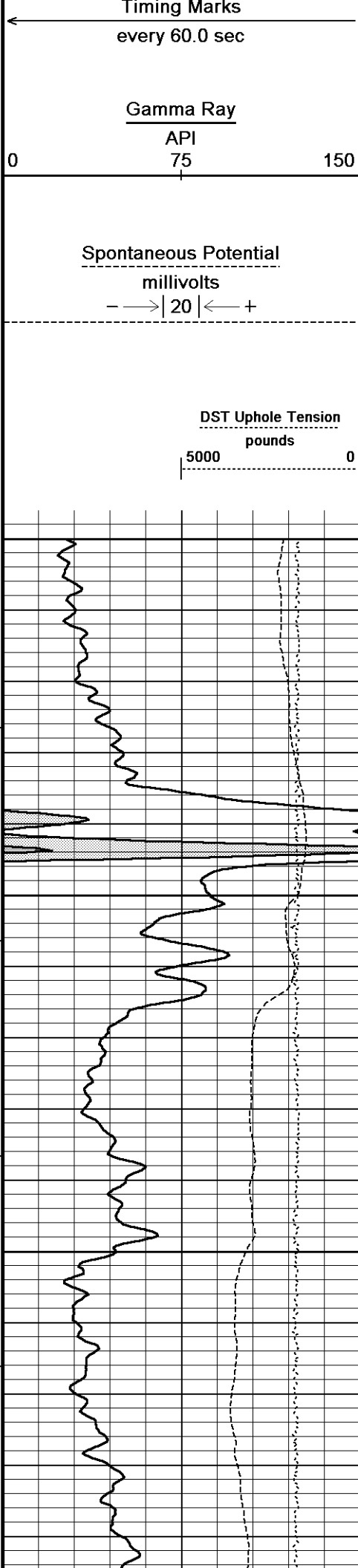
121°

4850

123°







Borehole
Temp in
deg F

Replay
Scale
1:240

4650

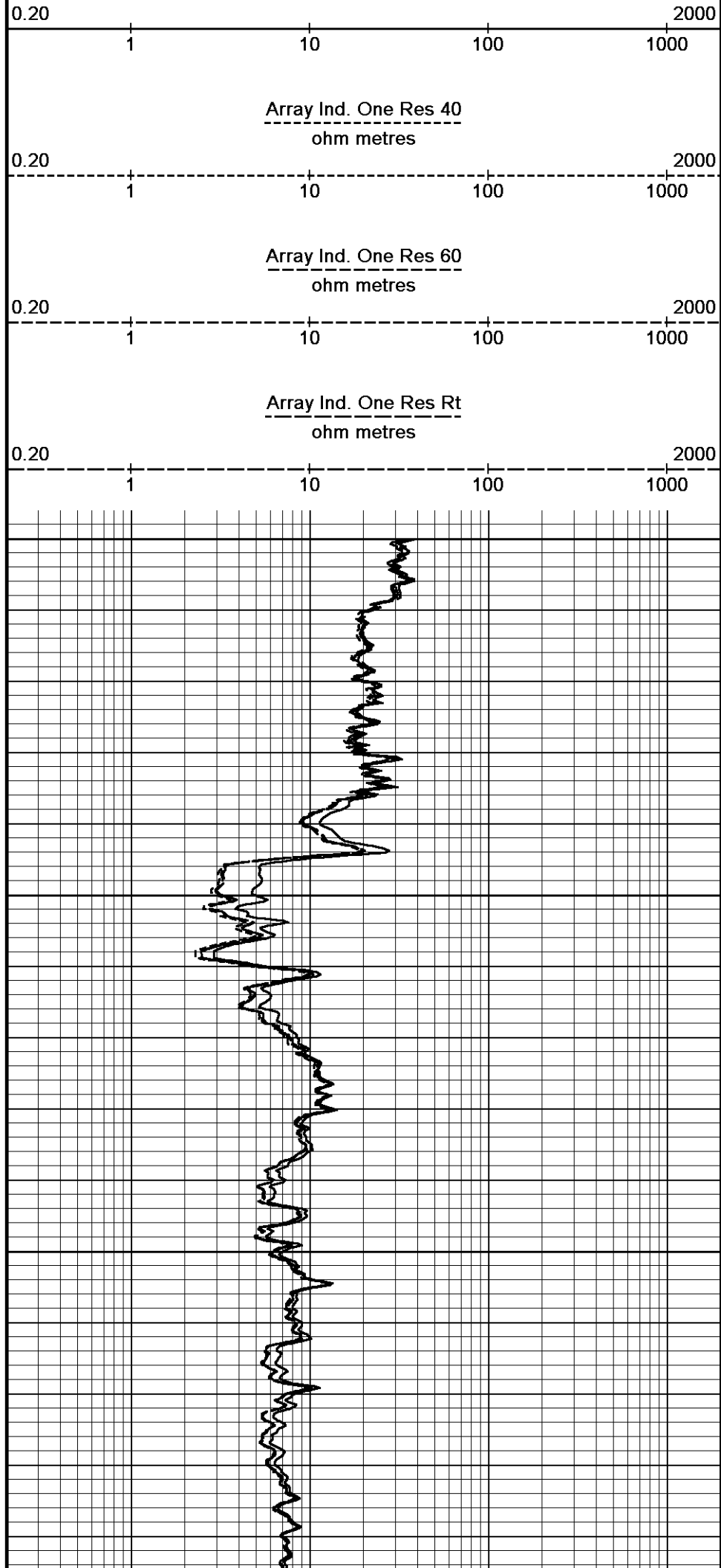
117°

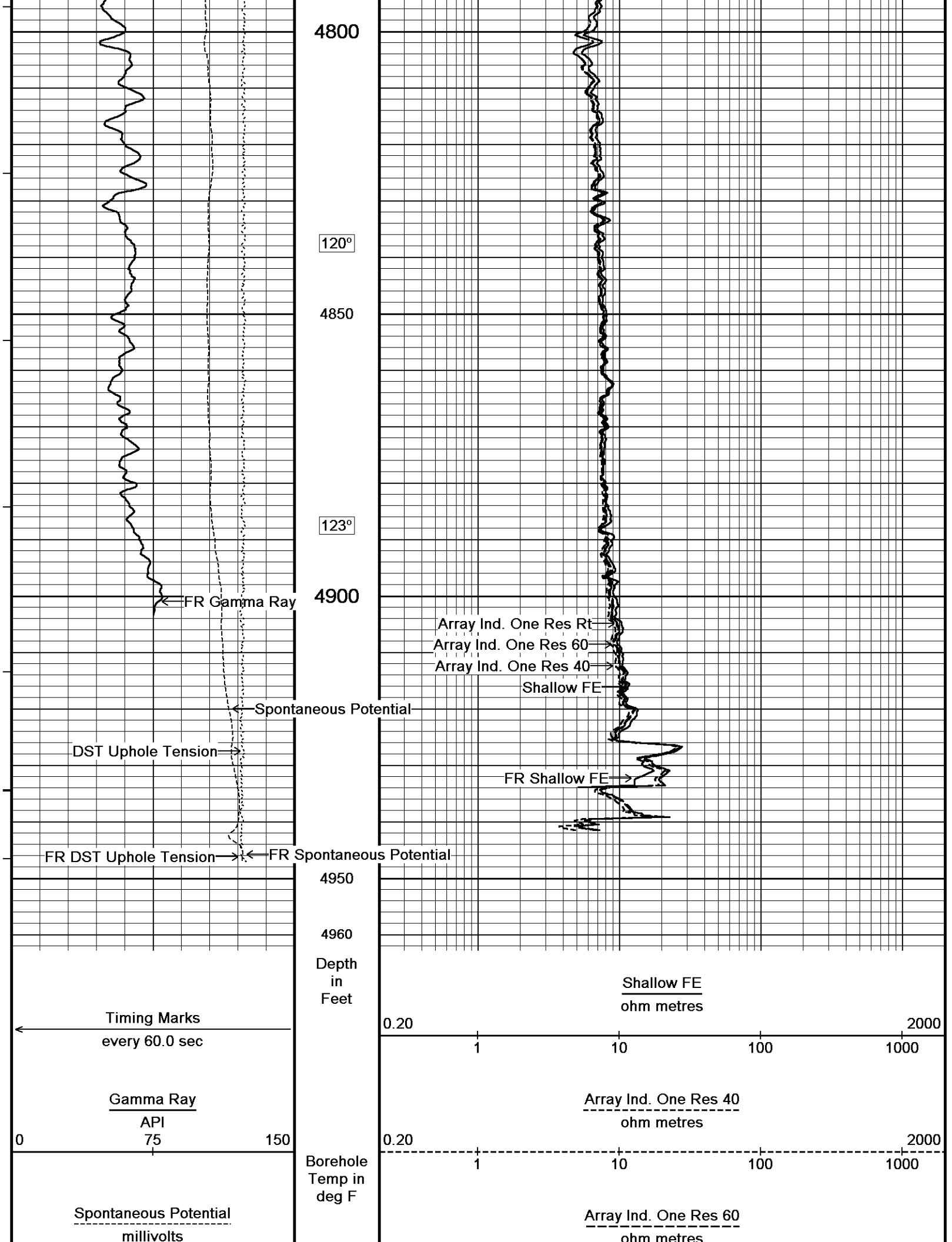
4700

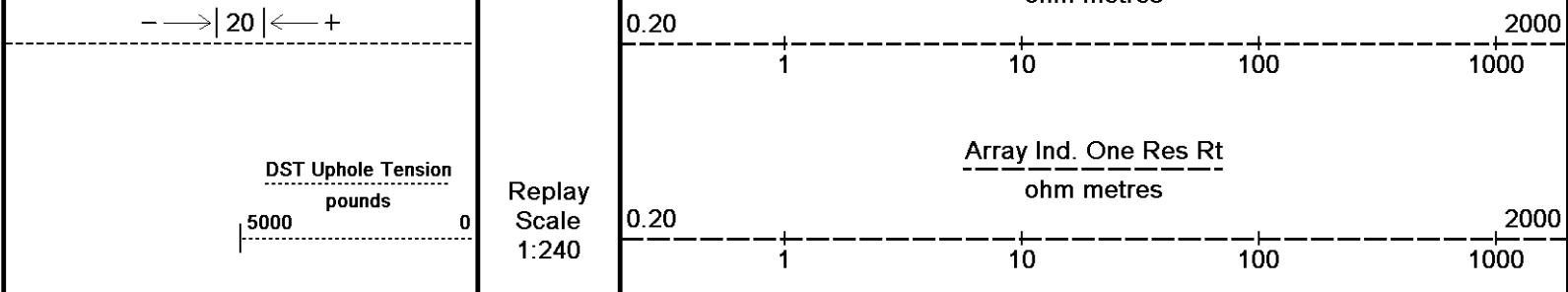
117°

4750

118°







Depth Based Data - Maximum Sampling Increment 10.0cm
 Filename: C:\Minimus 11.02.3186\Data\M&M Z-Bar #20-14\M&M Z-Bar #20-14_002.dta
 System Versions: Logged with 11.03.4044 Plotted with 11.03.4044

5 INCH REPEAT PASS

BEFORE SURVEY CALIBRATION

C:\Minimus 11.02.3186\Data\M&M Z-Bar #20-14\M&M Z-Bar #20-14_003.dta

General Constants All 000			Last Edited on 03-AUG-2011,22:47		
General Parameters					
Mud Resistivity	0.430		ohm-metres		
Mud Resistivity Temperature	78.000		degrees F		
Water Level	0.000		feet		
Density/Neutron 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. One Res Rt				
RWA Constant A	0.610				
RWA Constant M	2.150				

Down-hole Tension Calibration All 000		Field Calibration on 30-JUN-2010	
Reading No	Measured	Calibrated (lbs)	
1	14112.01	10.00	
2	15164.79	427.00	

Gamma Calibration MCG-B 34		Field Calibration on 02-AUG-2011 15:04	
	Measured	Calibrated (API)	
Background	75	52	
Calibrator (Gross)	1127	777	
Calibrator (Net)	1052	725	

Gamma Constants MCG-B 34		Last Edited on 03-AUG-2011,22:32	
Gamma Calibrator Number	grc38		
Mud Density	1.10	gm/cc	
Caliper Source for Processing	Density Caliper		
Tool Position	Eccentred		
Concentration of KCl	0.00	kppm	

SP Calibration MCG-B 34		Field Calibration on 03-AUG-2011,09:32	
	Measured	Calibrated (mV)	
Reference 1	103.5	100.0	
Reference 2	-96.9	-100.0	

High Resolution Temperature Calibration MCG-B 34		Field Calibration on 03-AUG-2011,22:33	
	Measured	Calibrated(Deg F)	
Lower	50.00	50.00	

High Resolution Temperature Constants MCG-B 34

Last Edited on

Pre-filter Length

11

Micro Normal and Micro Inverse Calibration MML-A 4

Base Calibration on 03-AUG-2011 09:42

Field Check on 03-AUG-2011 09:46

Base Calibration

Channel	Measured		Calibrated (ohm-m)	
	Resistor 1	Resistor 2	Resistor 1	Resistor 2
Micro Normal	12.2	60.2	2.6	12.8
Micro Inverse	15.7	78.4	1.7	8.4

Channel	Base Check (ohm-m)	Field Check (ohm-m)
Micro Normal	32.1	32.1
Micro Inverse	16.3	16.3

Micro Normal and Micro Inverse Constants MML-A 4

Last Edited on 03-AUG-2011,09:33

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 4

Base Calibration on 03-AUG-2011 09:53

Field Calibration on 03-AUG-2011 09:56

Base Calibration

Reading No	Measured	Calibrator Size (in)
1	15121	5.98
2	18479	7.97
3	21774	9.86
4	25719	11.92
5	0	0.00
6	N/A	N/A

Field Calibration

Measured Caliper (in)	Actual Caliper (in)
6.02	5.98

Neutron Calibration MDN-A.B 65

Base Calibration on 02-AUG-2011 18:50

Field Check on 02-AUG-2011 19:10

Base Calibration

	Measured		Calibrated (cps)	
	Near	Far	Near	Far
	3295	104	3714	110
Ratio	31.664		33.764	

Field Calibrator at Base

	Calibrated (cps)
	1576 2237
Ratio	0.704

Field Check

	Calibrated (cps)
	1574 2253
Ratio	0.699

Neutron Constants MDN-A.B 65

Last Edited on 03-AUG-2011,22:34

Neutron Source Id	757
Neutron Jig Number	5824NE
Epithermal Neutron	No
Caliper Source for Processing	Density Caliper
Stand-off	0.50 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
Formation Fluid Salinity Source	Constant Value

Formation Fluid Salinity	0.00	kppm
Barite Mud Correction	Not Applied	
FE Calibration MFE-A.A 55		Base Calibration on 03-AUG-2011 10:09 Field Check on 03-AUG-2011 10:18
Base Calibration		
	Measured	Calibrated (ohm-m)
Reference 1	0.0	0.0
Reference 2	952.6	126.8
Base Check		281.5
Field Check		281.5
FE Constants MFE-A.A 55		Last Edited on 03-AUG-2011,22:36
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 03-AUG-2011,10:43 Field Check on 03-AUG-2011 11:36
Base Calibration		
Test Loop Calibration		
	Measured	Calibrated (mmho/m)
Channel	Low High	Low 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)	Field Check (mmho/m)
	Low High	Low High
1	0.0 0.0	14.7 3859.8
2	0.0 0.0	30.1 3498.2
3	0.0 0.0	29.4 3069.4
4	0.0 0.0	19.9 2085.0
Deep	0.0 0.0	18.8 2051.5
Medium	0.0 0.0	42.5 4021.4
Shallow	0.0 0.0	43.8 5096.4
Array Temperature	0.0	100.9 Deg F
Induction Constants MAI-A.A 45		Last Edited on 03-AUG-2011,22:48
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		

High Resolution Temperature Calibration MAI-A.A 45			Field Calibration on 04-AUG-2011,07:54	
	Measured		Calibrated(Deg F)	
Lower	50.00		50.00	
Upper	100.00		100.00	

High Resolution Temperature Constants MAI-A.A 45			Last Edited on	
Pre-filter Length		11		

Photo Density Calibration MPD-B 31			Base Calibration on 02-AUG-2011 16:24	
			Field Check on 02-AUG-2011 16:30	
Density Calibration				
Base Calibration		Measured		Calibrated (sdu)
	Near	Far	Near	Far
Reference 1	48081	24805	59556	30836
Reference 2	19867	2025	24941	2541
Field Check at Base				
	707.3	871.8		
Field Check				
	706.1	874.7		
PE Calibration				
Base Calibration		Measured		Calibrated
	WS	WH	Ratio	Ratio
Background	131	626		
Reference 1	19081	47953	0.400	0.371
Reference 2	5693	19772	0.291	0.272
Field Check at Base				
	131.3	626.1		
Field Check				
	128.5	617.5		

Density Constants MPD-B 31			Last Edited on 03-AUG-2011,22:35	
Density Source Id		254		
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		1.10	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 (ft)		
2.71		0.00		
0.00		0.00		
0.00		0.00		

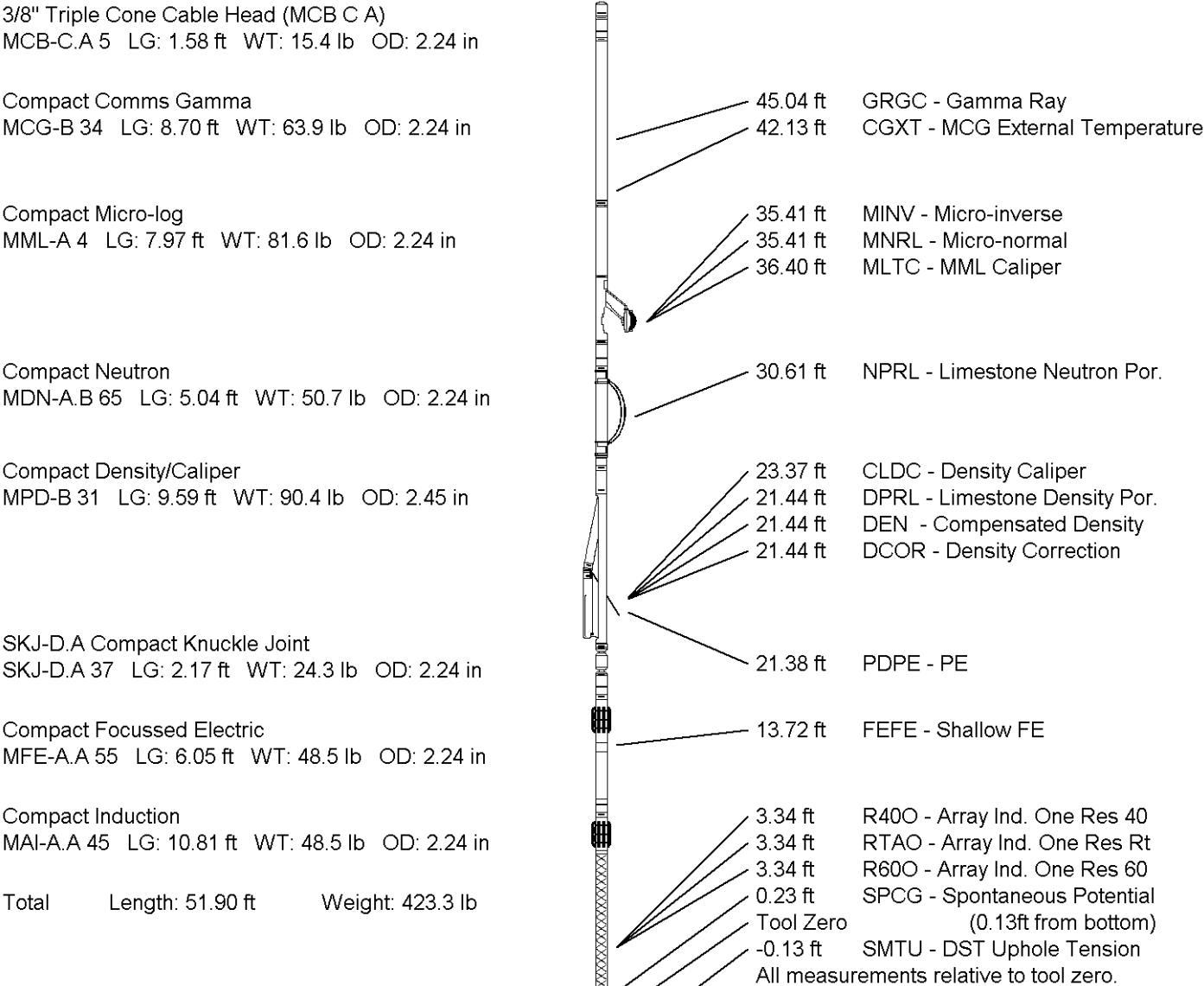
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00

Caliper Calibration MPD-B 31			Base Calibration on 02-AUG-2011 15:38
			Field Calibration on 02-AUG-2011 15:48
Base Calibration			
Reading No	Measured	Calibrator Size (in)	
1	16208	3.99	
2	24815	5.98	
3	33539	7.97	
4	41984	9.86	
5	51072	11.92	
6	N/A	N/A	
Field Calibration			
	Measured Caliper (in)	Actual Caliper (in)	
	5.95	5.98	

Down-hole Tension Calibration SMS 0			Field Calibration on 05-JUN-2011 04:37
Reading No	Measured	Calibrated (lbs)	
1	13499.89	0.00	
2	14983.70	496.00	

DOWNHOLE EQUIPMENT

C:\Minimus 11.02.3186\Data\M&M Z-Bar #20-14\M&M Z-Bar #20-14_003.dta



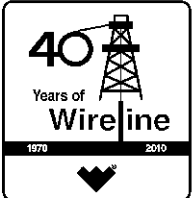
COMPANY M & M EXPLORATION, INC.
WELL Z-BAR # 20-14
FIELD AETNA GAS AREA
PROVINCE/COUNTY BARBER
COUNTRY/STATE U.S.A. / KANSAS

Elevation Kelly Bushing	1550.00	feet	First Reading	4943.00	feet
Elevation Drill Floor	1548.00	feet	Depth Driller	4950.00	feet
Elevation Ground Level	1538.00	feet	Depth Logger	4946.00	feet



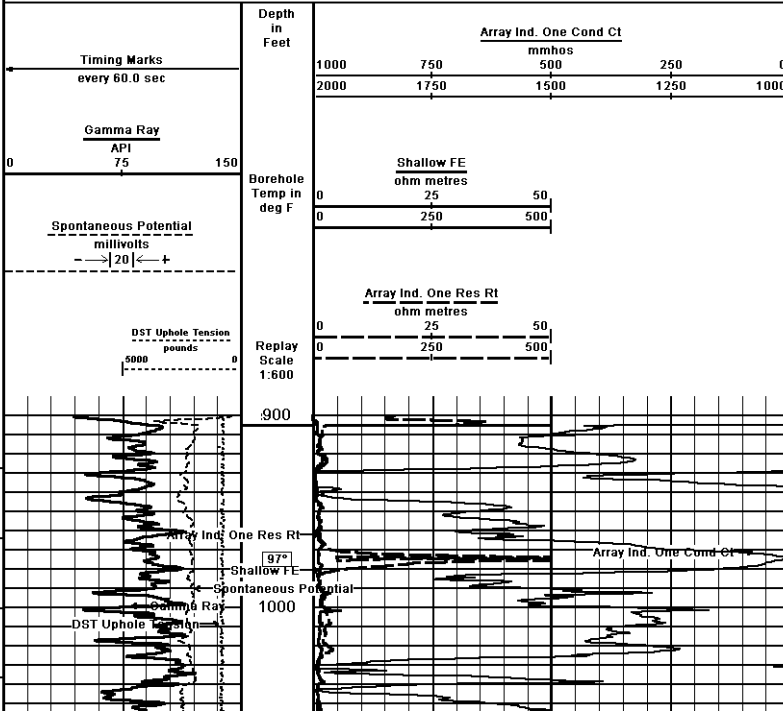
Weatherford[®]

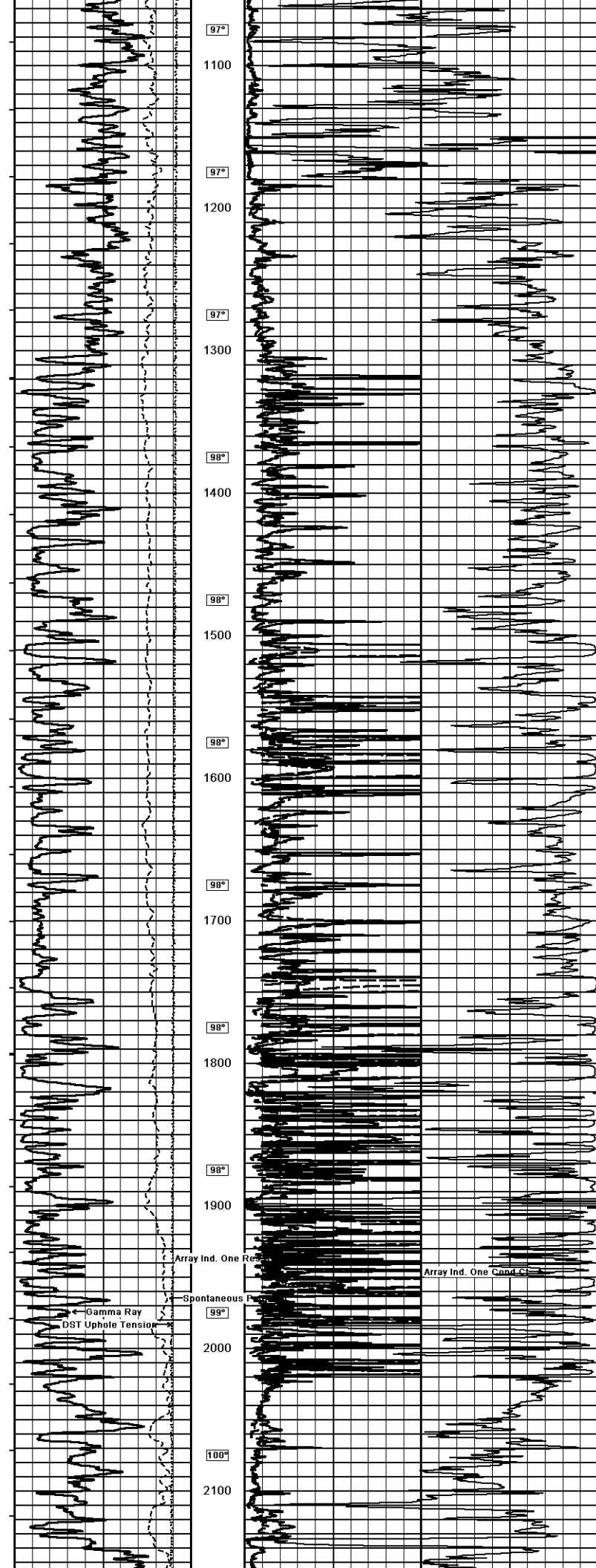
ARRAY INDUCTION
SHALLOW FOCUSED
ELECTRIC LOG

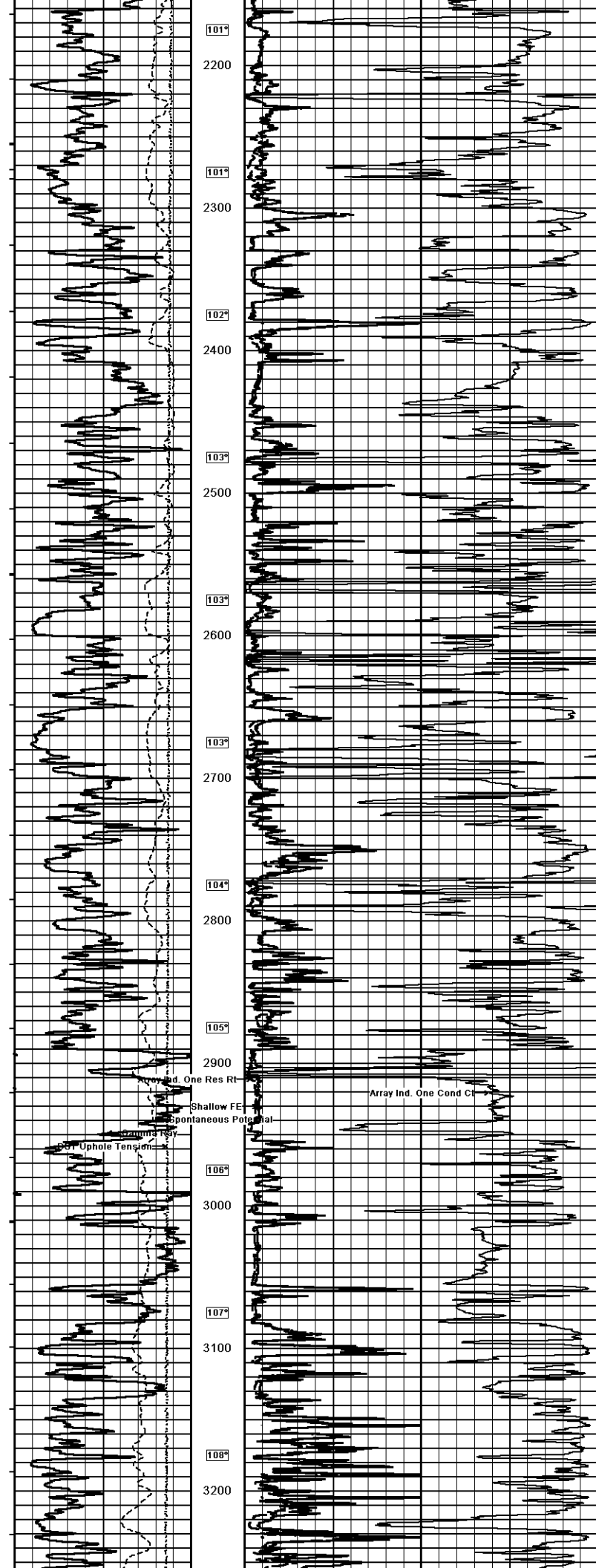


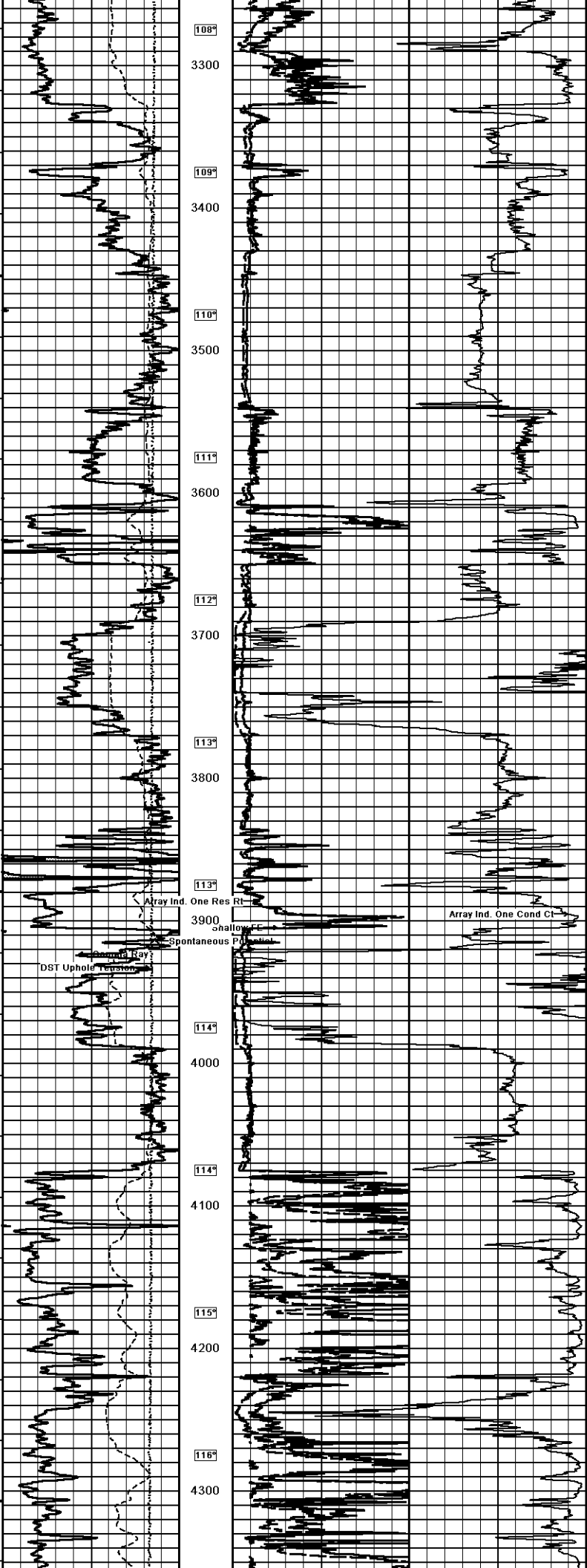
Weatherford		ARRAY INDUCTION SHALLOW FOCUSED ELECTRIC LOG	
COMPANY M & M EXPLORATION, INC.			
WELL Z-BAR # 20-14			
FIELD AETNA GAS AREA			
PROVINCE/COUNTY BARBER			
COUNTRY/STATE U.S.A. / KANSAS			
LOCATION 910' FSL & 1480' FWL, SW/4			
SEC	TIME	DATE	CHIEF SERVICES
20	34S	14W	MD/NM/PD
PERMITS	15-007-23702		MML
Permanent Datum G.L. Elevation 1538 feet			
Log Measured From KB @ 12 FEET			
Drilling Measured From KB @ 12 FEET			
Date 03-AUG-2011			
Run Number	ONE		
Depth Driller	4950.00	feet	
Depth Logger	4946.00	feet	
First Reading	4943.00	feet	
Last Reading	905.00	feet	
Casing Driller	905.00	feet	
Casing Logger	905.00	feet	
Bit Size	7.875	inches	
Hole Fluid Type	CHEMICAL		
Density/Viscosity	9.20 lb/lb	50.00 CP	
PH/Fluid Loss	10.00	7.90 ml/30min	
Sample Source	FLOWLINE		
Rim @ Measured Temp	0.43 @ 78.0	ohm-m	
Rim @ Measured Temp	0.34 @ 78.0	ohm-m	
Rim @ Measured Temp	0.52 @ 78.0	ohm-m	
Source Rim Temp	CALC		
Rim @ BHT	0.28 @ 23.0	ohm-m	
Time Since Circulation	5 HOURS		
Max Recorded Temp	123.00	deg F	
Equipment Name	COMPACT		
Equipment Base	13057		
Recorded By	A. GAMBAYO		
Witnessed By	BETH BROCK		
S/O / JOB #	353114		
			LEF11-186

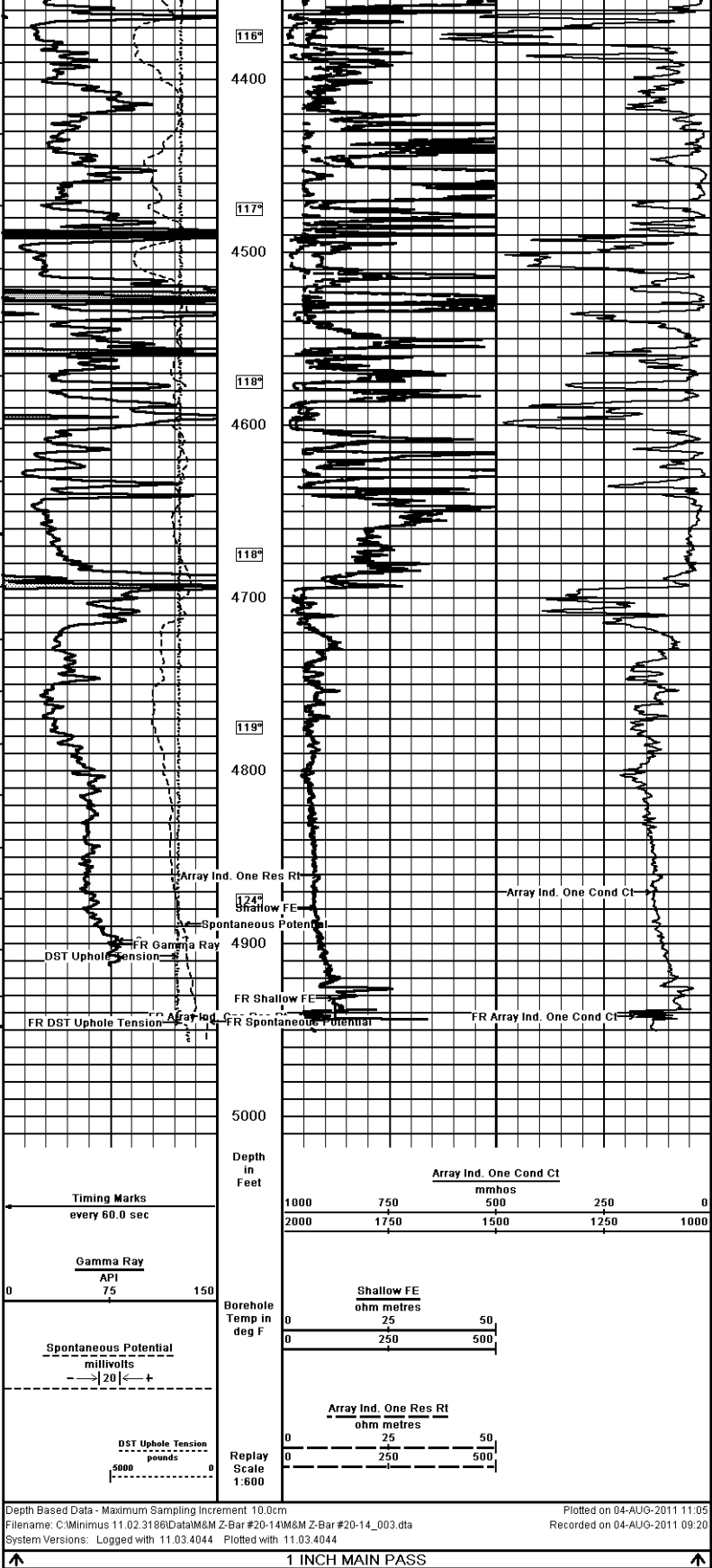
1 INCH MAIN PASS
Depth Based Data - Maximum Sampling Increment 10.0cm
Plotted on 04-AUG-2011 11:05
Filename: C:\Minimus 11.02.3186\data\M&M Z-Bar #20-14\M&M Z-Bar #20-14_003.dta
Recorded on 04-AUG-2011 09:20
System Versions: Logged with 11.03.4044 Plotted with 11.03.4044











COMPANY

WELL

FIELD

PROVINCE/COUNTY

COUNTRY/STATE

M & M EXPLORATION, INC.

Z-BAR # 20-14

AETNA GAS AREA

BARBER

U.S.A. / KANSAS

Elevation Kelly Bushing	1550.00	feet	First Reading	4943.00	feet
Elevation Drill Floor	1548.00	feet	Depth Driller	4950.00	feet
Elevation Ground Level	1538.00	feet	Depth Logger	4946.00	feet



ARRAY INDUCTION
SHALLOW FOCUSED
ELECTRIC LOG



