MICRORESISTIVITY LOG

COMPANY	MCELVAIN ENERGY, INC.
WELL	PRICE 14-5
FIELD	LIANOS SE
PROVINCE/COUNTY	SHERMAN
COUNTRY/STATE	U.S.A. / KANSAS
LOCATION	1717' FNL & 388' FWL SE NW SW NW

SEC	TWP	RGE	Other Services
14	6S	37W	MPD/MDN SGS
API Number 15-181-20597			MAI/MFE
Permit Number			MSS

Permanent Datum GL, Elevation 3441 feet	Elevations:	feet
Log Measured From KB	KB	3452.00
Drilling Measured From KB @ 11 FEET	DF	3450.00
	GL	3441.00

Date	23-NOV-2013			
Run Number	ONE			
Service Order	3547622			
Depth Driller	5082.00	feet		
Depth Logger	5078.00	feet		
First Reading	5032.00	feet		
Last Reading	331.00	feet		
Casing Driller	352.00	feet		
Casing Logger	351.00	feet		
Bit Size	7.875	inches		
Hole Fluid Type	CHEMICAL			
Density / Viscosity	9.30 lb/USg	50.00 CP		
PH / Fluid Loss	10.50	8.00 ml/30Min		
Sample Source	FLOW LINE			
Rm @ Measured Temp	1.60 @ 49.0	ohm-m		
Rmf @ Measured Temp	1.28 @ 49.0	ohm-m		
Rmc @ Measured Temp	1.92 @ 49.0	ohm-m		
Source Rmf / Rmc	CALC	CALC		
Rm @ BHT	0.60 @130.0	ohm-m		
Time Since Circulation	3 HRS			
Max Recorded Temp	130.00	deg F		
Equipment / Base	13057	LIB		
Recorded By	J. LAPOINT		R. HOFFMAN	
Witnessed By	L. NICHOLSON			
JOB #	LB 13-331			

BOREHOLE RECORD

Last Edited: 24-NOV-2013 07:12

Bit Size inches	Depth From feet	Depth To feet
7.875	351.00	5078.00

CASING RECORD

Type	Size inches	Depth From feet	Shoe Depth feet	Weight pounds/ft
SURFACE	8.625	0.00	351.00	24.00

REMARKS

- SOFTWARE ISSUE: WLS 13.05.9583.
- MCG, SGS, MML, MDN, MPD, MFE, MSS, MAI RAN 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: 1847 CU. FT.
- ANNULAR HOLE VOLUME WITH 5.5 INCH PRODUCTION CASING FROM TD TO SURFACE CASING: 1071 CU. FT.

- RIG: H2 DRILLING

- ENGINEER: J. LAPOINT AND R. HOFFMAN

- OPERATOR(S): K. RINEHART AND C. RAMIREZ

- LCM: 8 LBS/PBL

5 INCH MAIN

Depth Based Data - Maximum Sampling Increment 10.0cm
Plotted on 24-NOV-2013 08:32
Filename: C:\Minimus 13.05.9583\Logs\McElvain Price 14-5\McElvain Price 14-5 Main.dta
Recorded on 24-NOV-2013 02:52
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 | ← +

Bit Size
inches
6 11 16

DST Uphole Tension
pounds
5000 0

Depth In Feet

Borehole Temp in deg F

HVI every 10 cu ft

Annular Integral every 10 cu ft

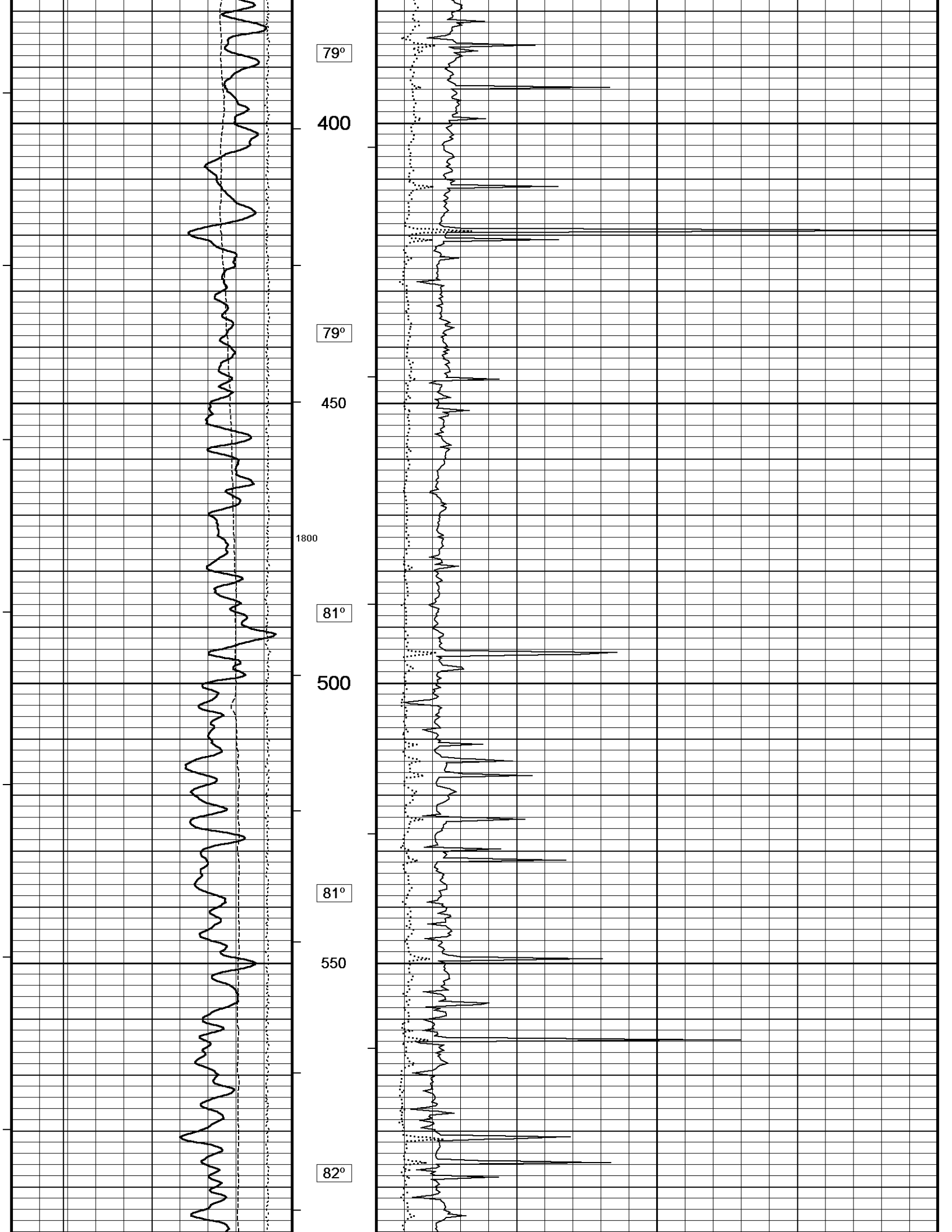
Replay Scale 1:240

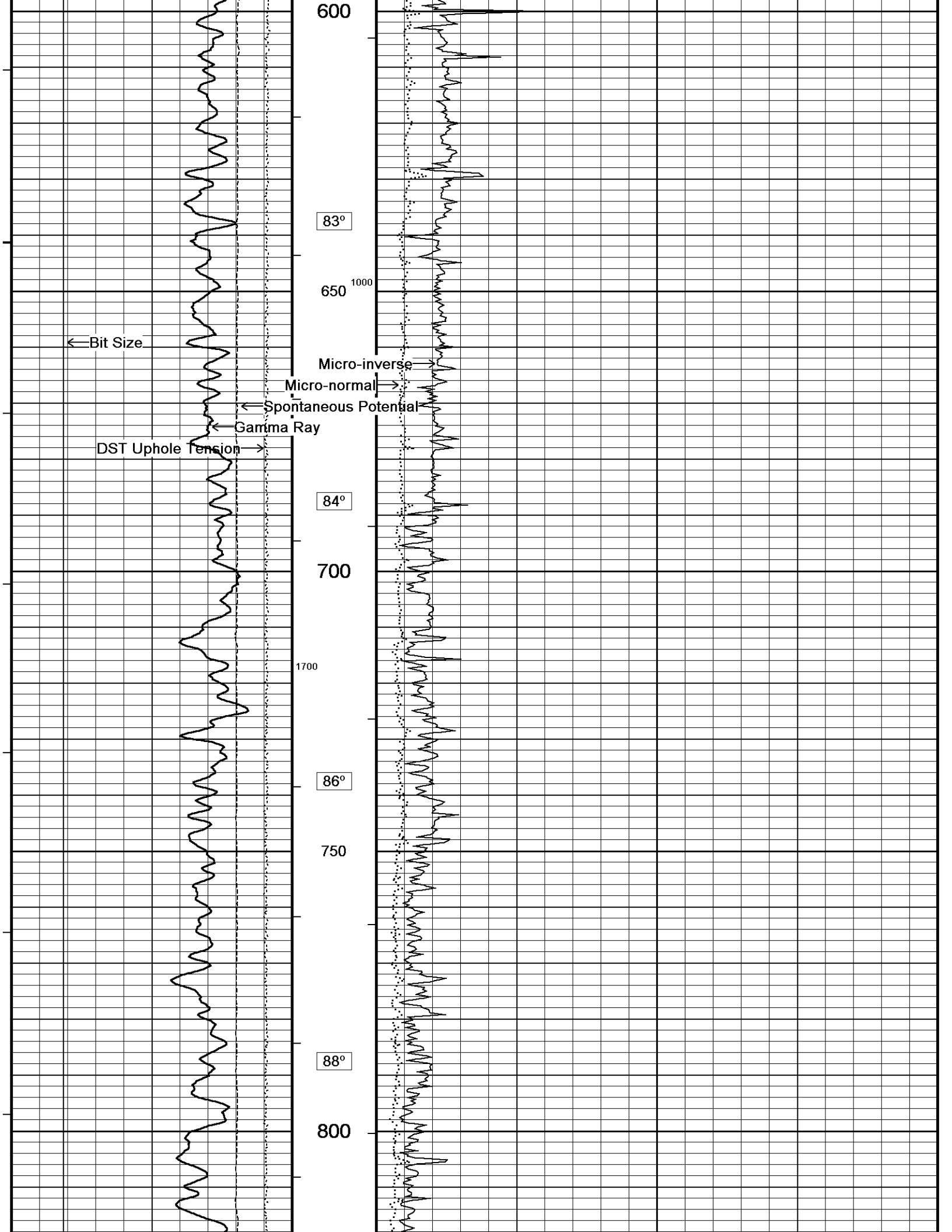
330

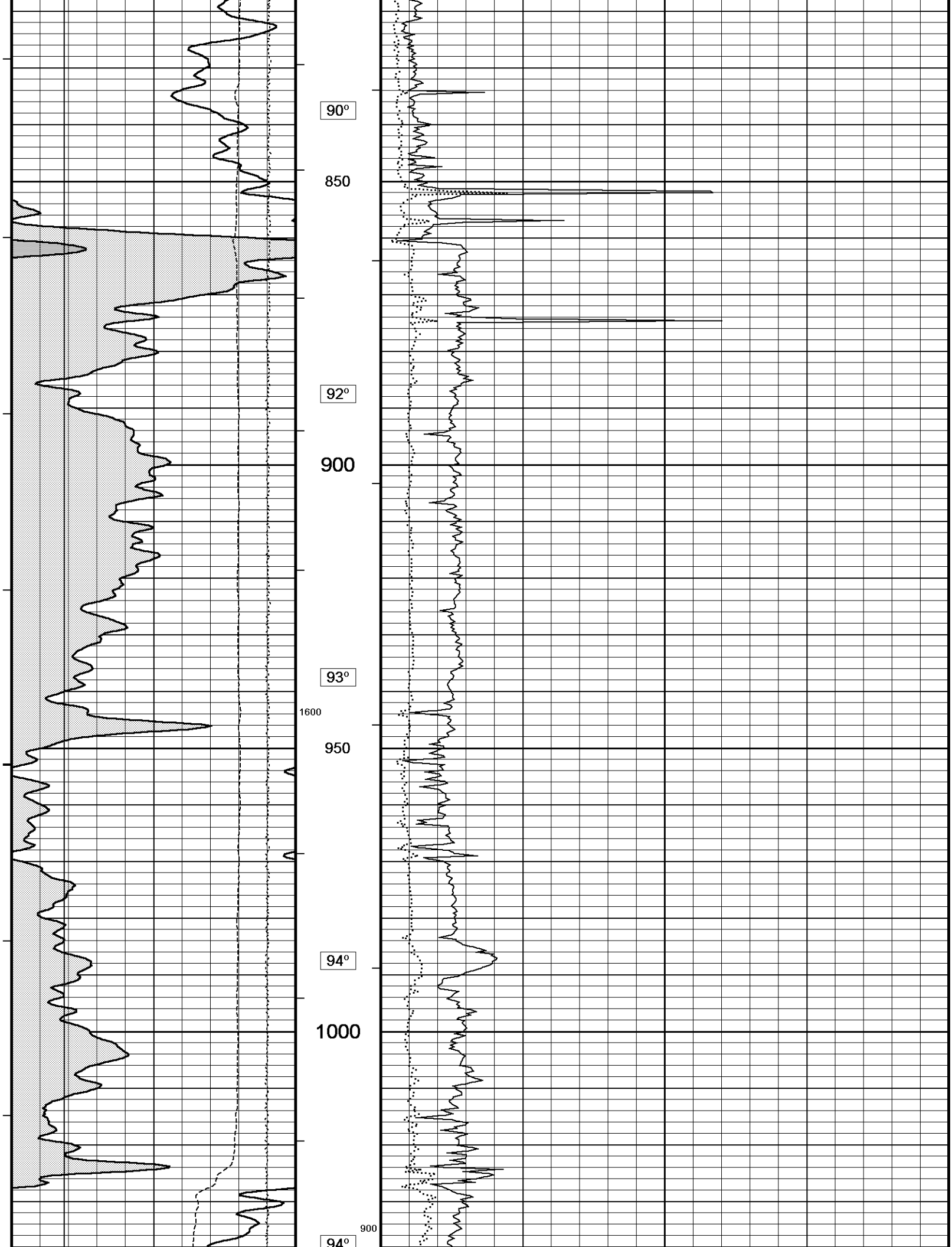
Casing
350

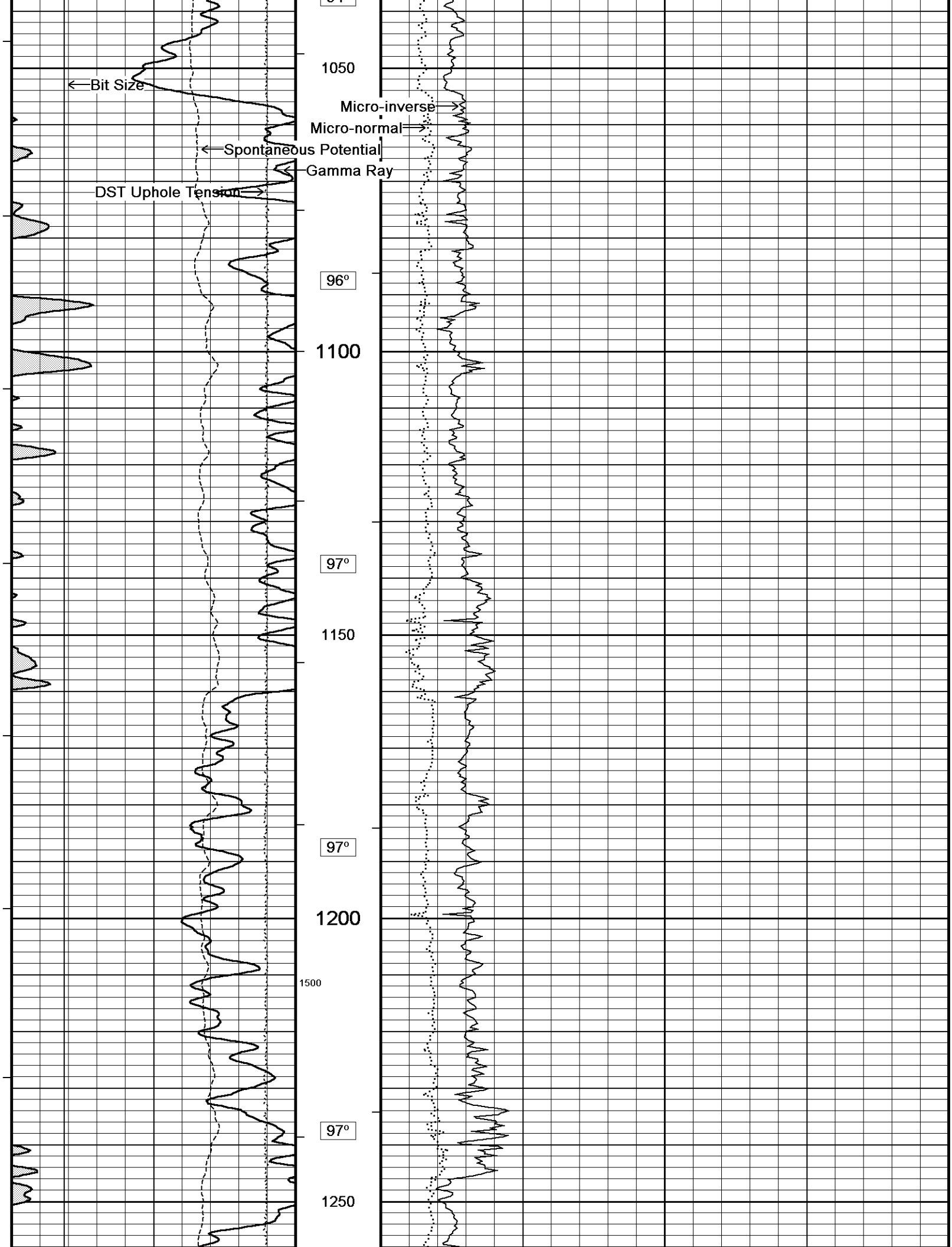
Micro-normal
ohm metres
0 10 20 30 40

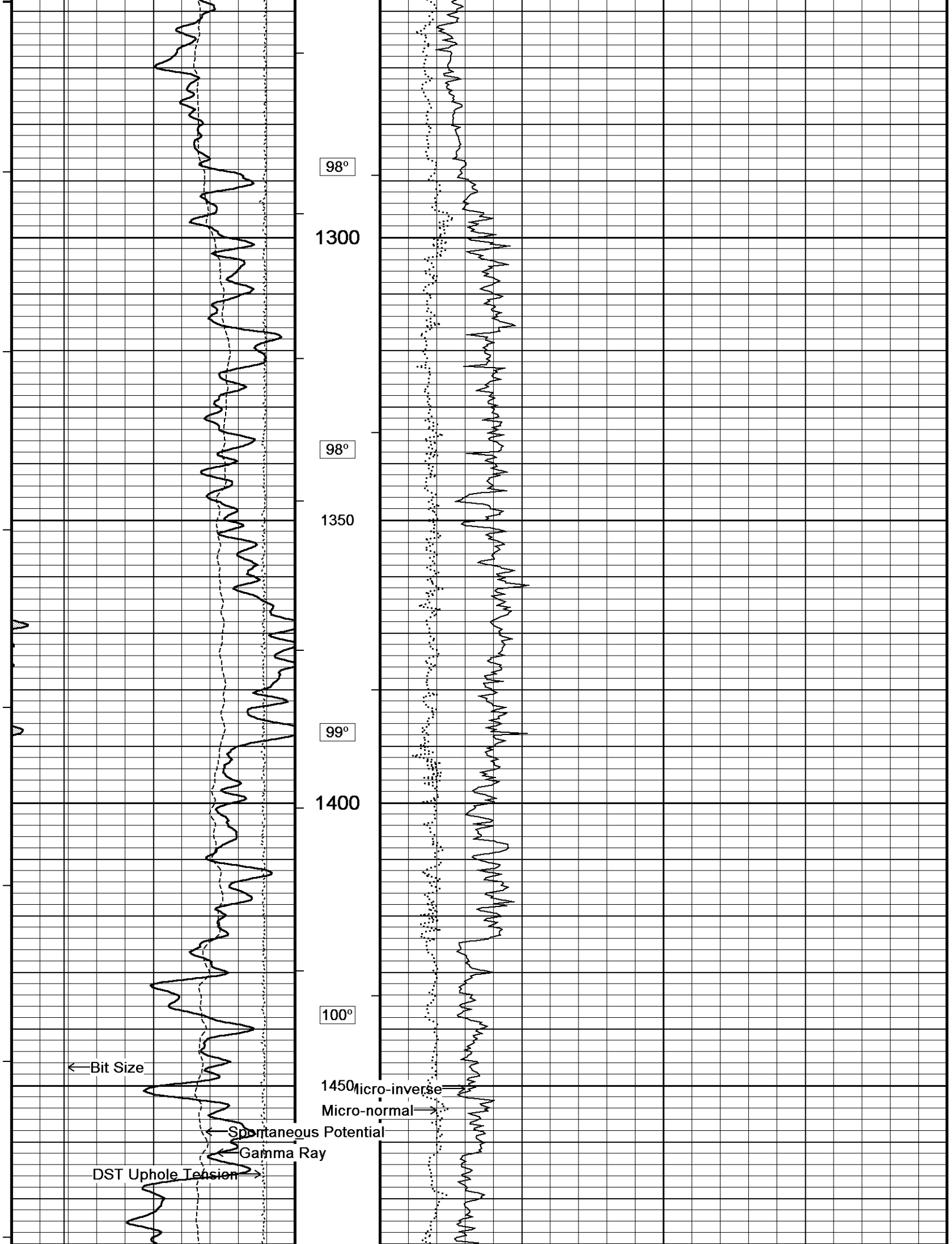
Micro-inverse
ohm metres
0 5 10 15 20

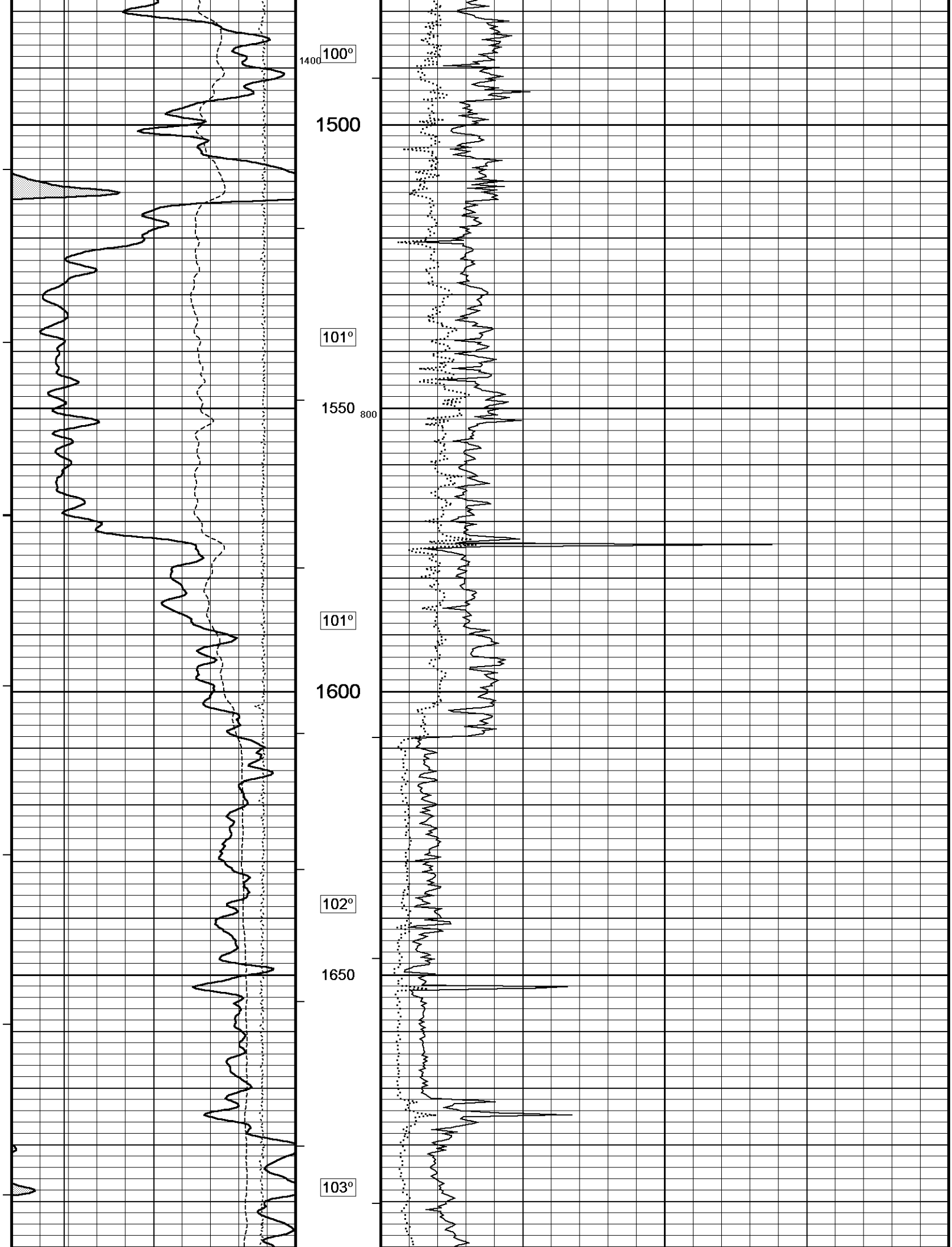

79°
400
79°
450
1800
81°
500
81°
550
82°

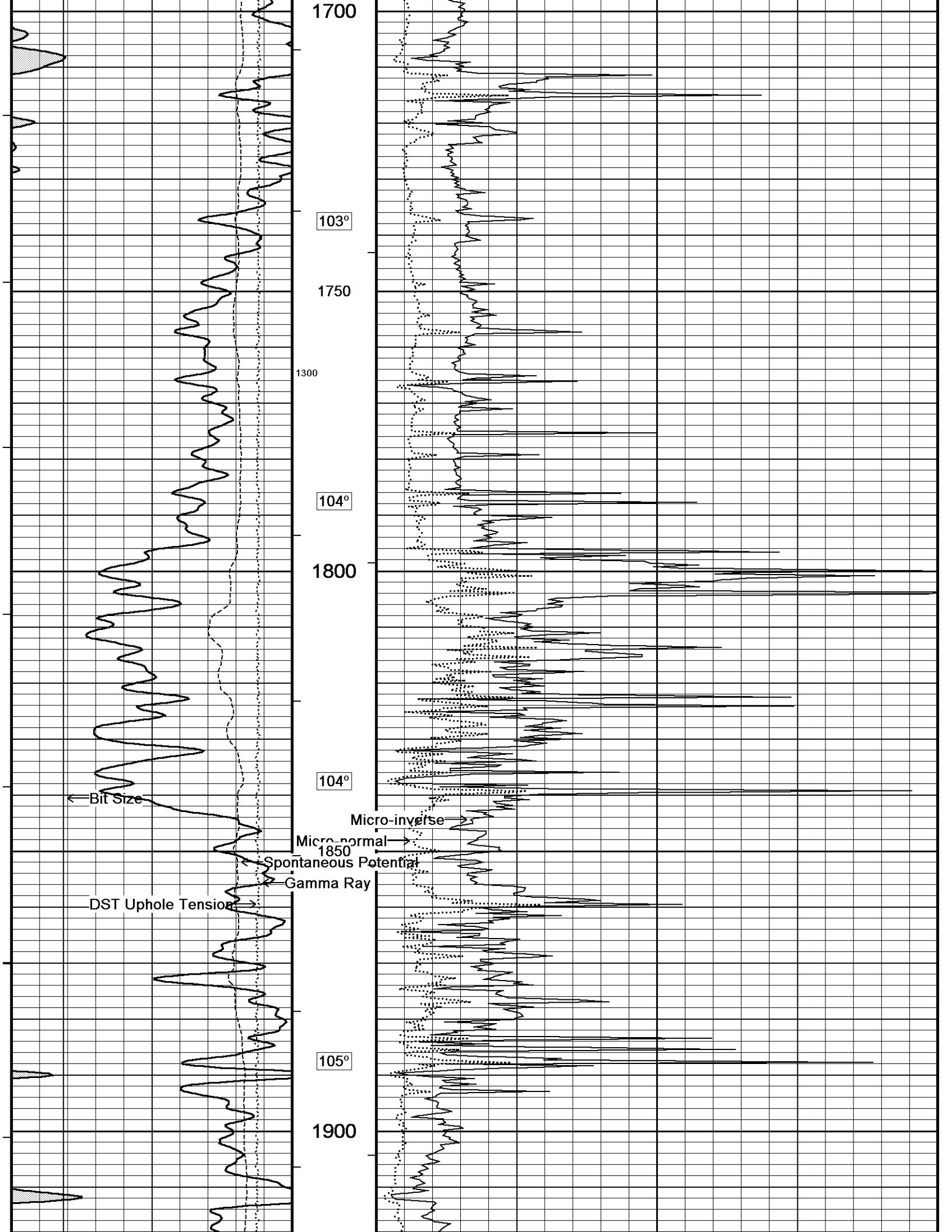

600
83°
650
1000
Bit Size
Micro-inverse
Micro-normal
Spontaneous Potential
Gamma Ray
DST Uphole Tension
84°
700
1700
86°
750
88°
800

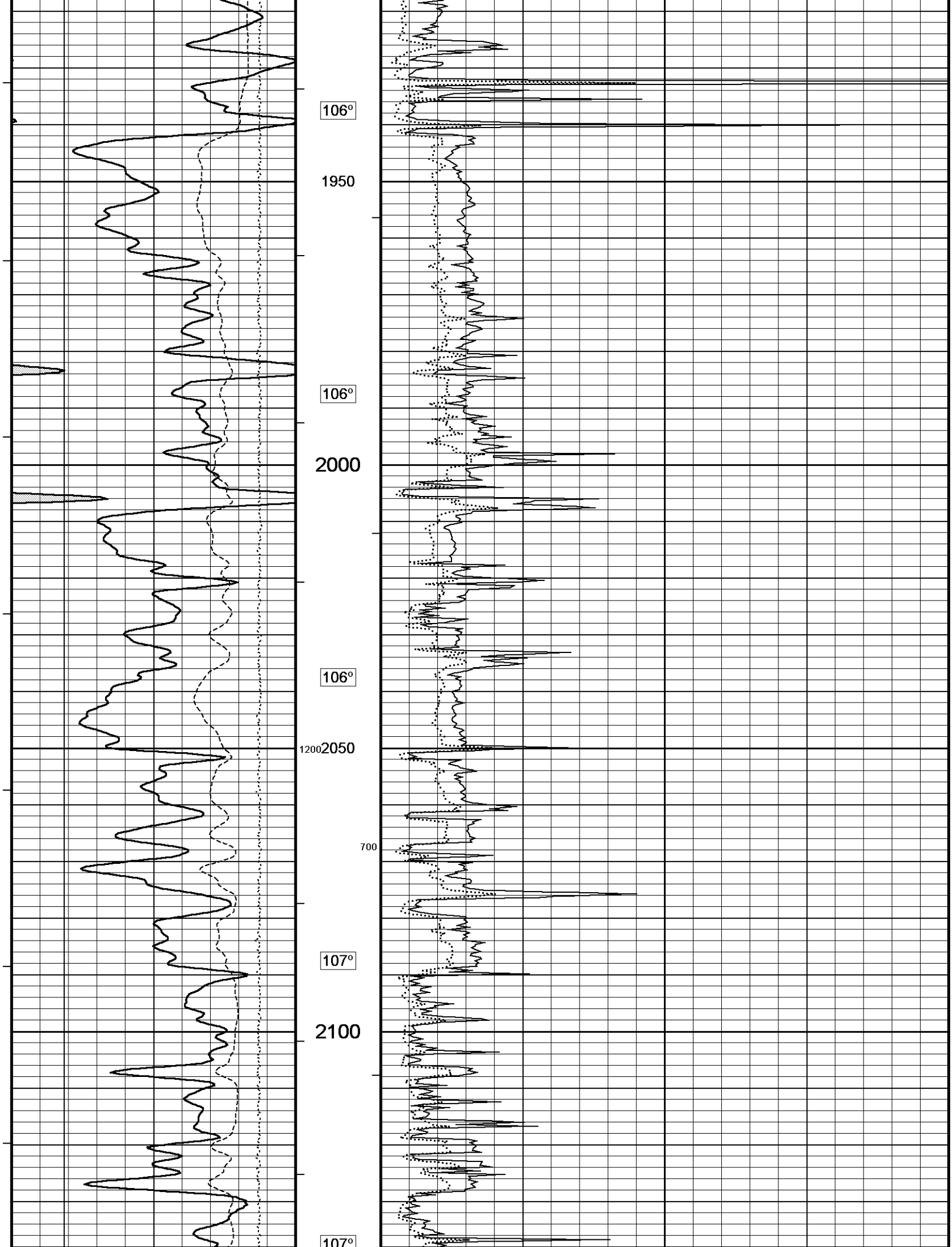

90°
850
92°
900
93°
1600
950
94°
1000
900
94°

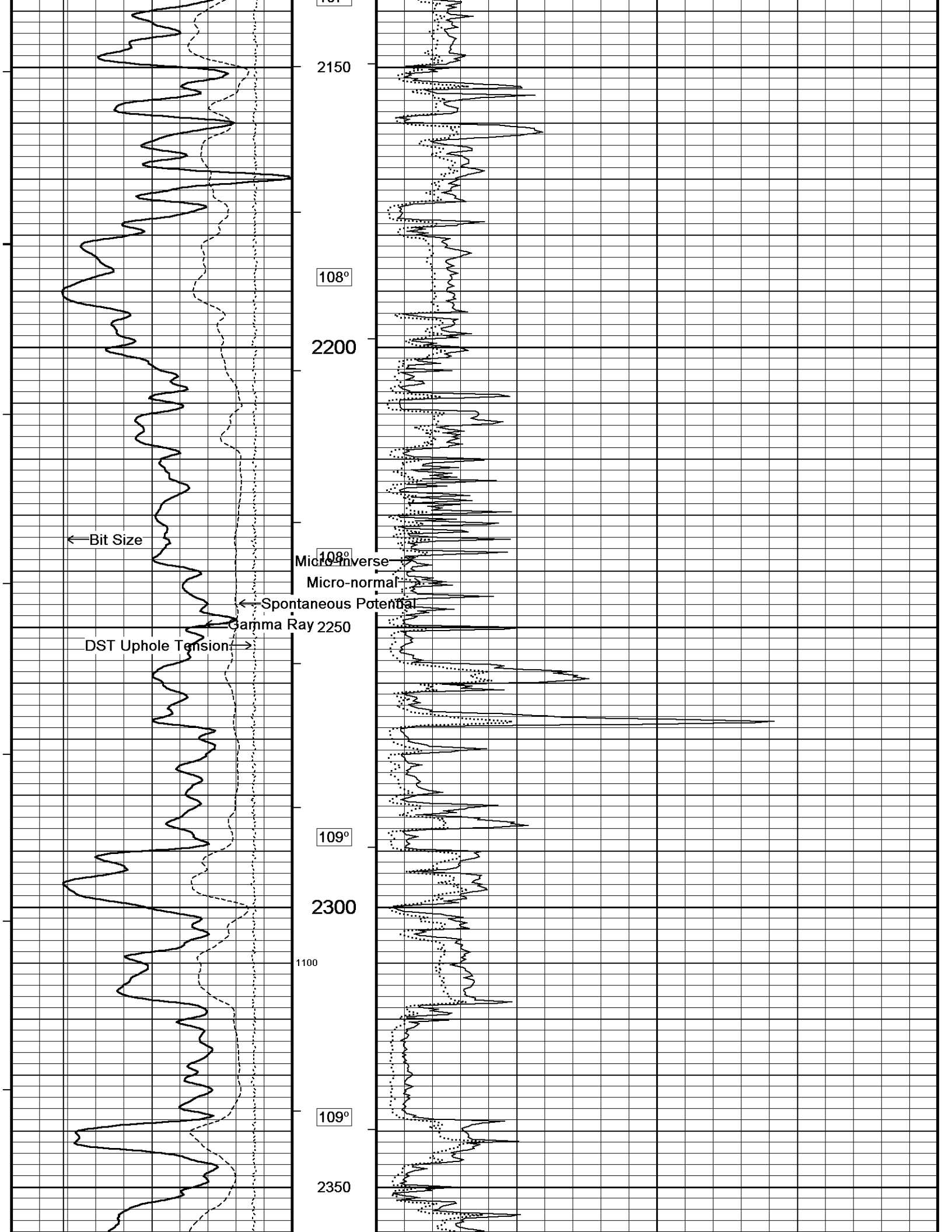

1050
Bit Size
Micro-inverse
Micro-normal
Spontaneous Potential
Gamma Ray
DST Uphole Tension
96°
1100
97°
1150
97°
1200
1500
97°
1250

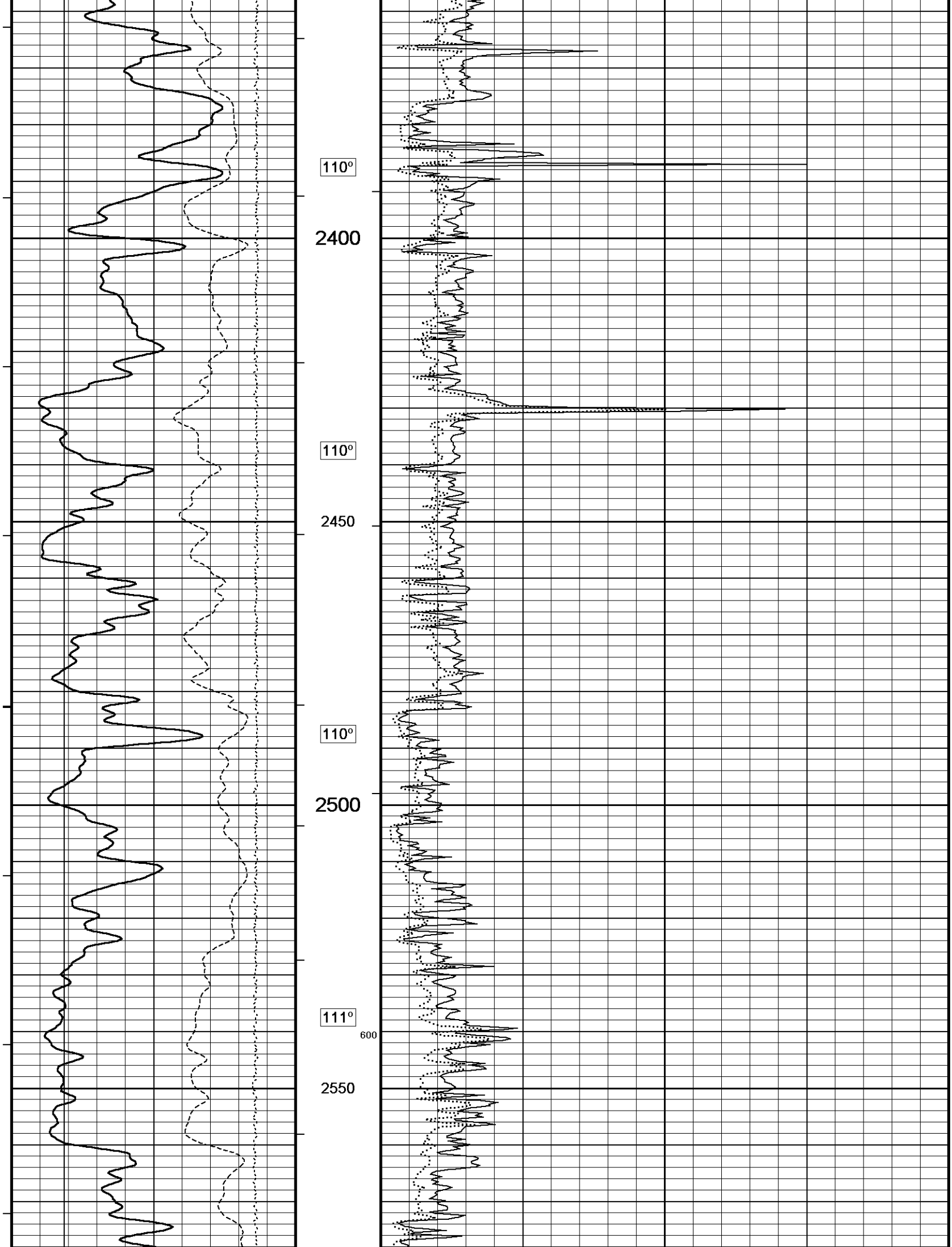

98°
1300
98°
1350
99°
1400
100°
Bit Size
1450
Micro-inverse
Micro-normal
Spontaneous Potential
Gamma Ray
DST Uphole Tension

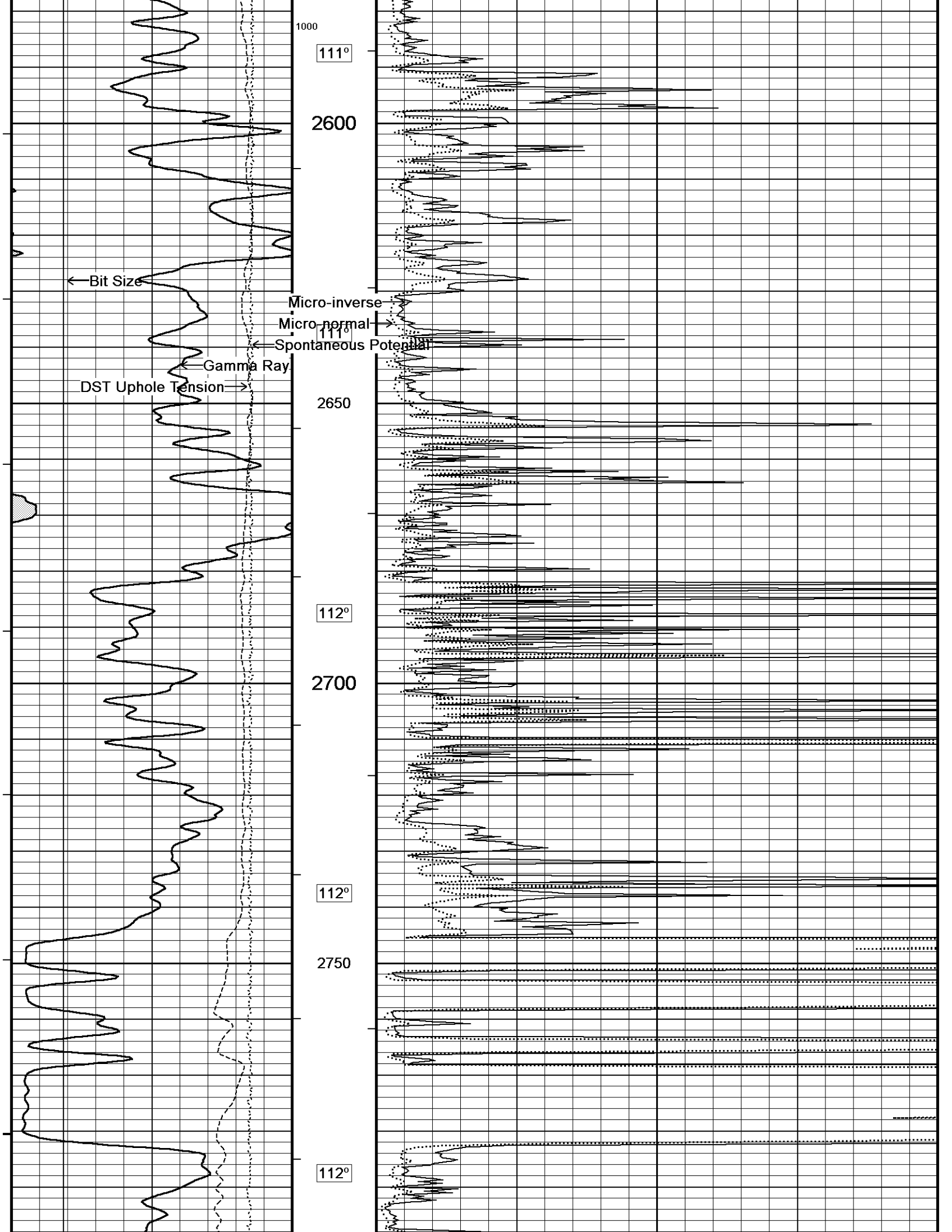

1400
100°
1500
101°
1550
800
101°
1600
102°
1650
103°

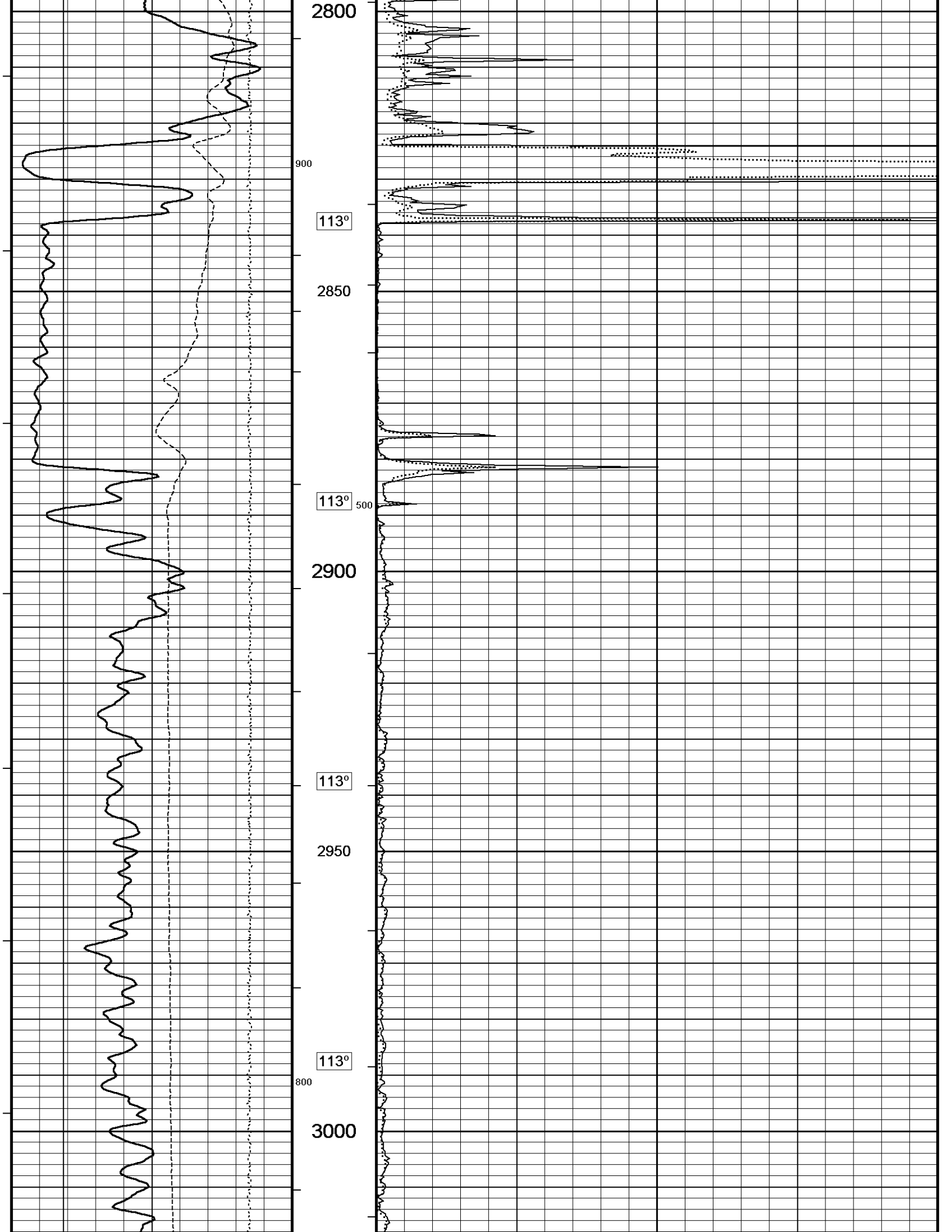

1700
103°
1750
1300
104°
1800
104°
Bit Size
Micro-inverse
Micro-normal
1850
Spontaneous Potential
Gamma Ray
DST Uphole Tension
105°
1900

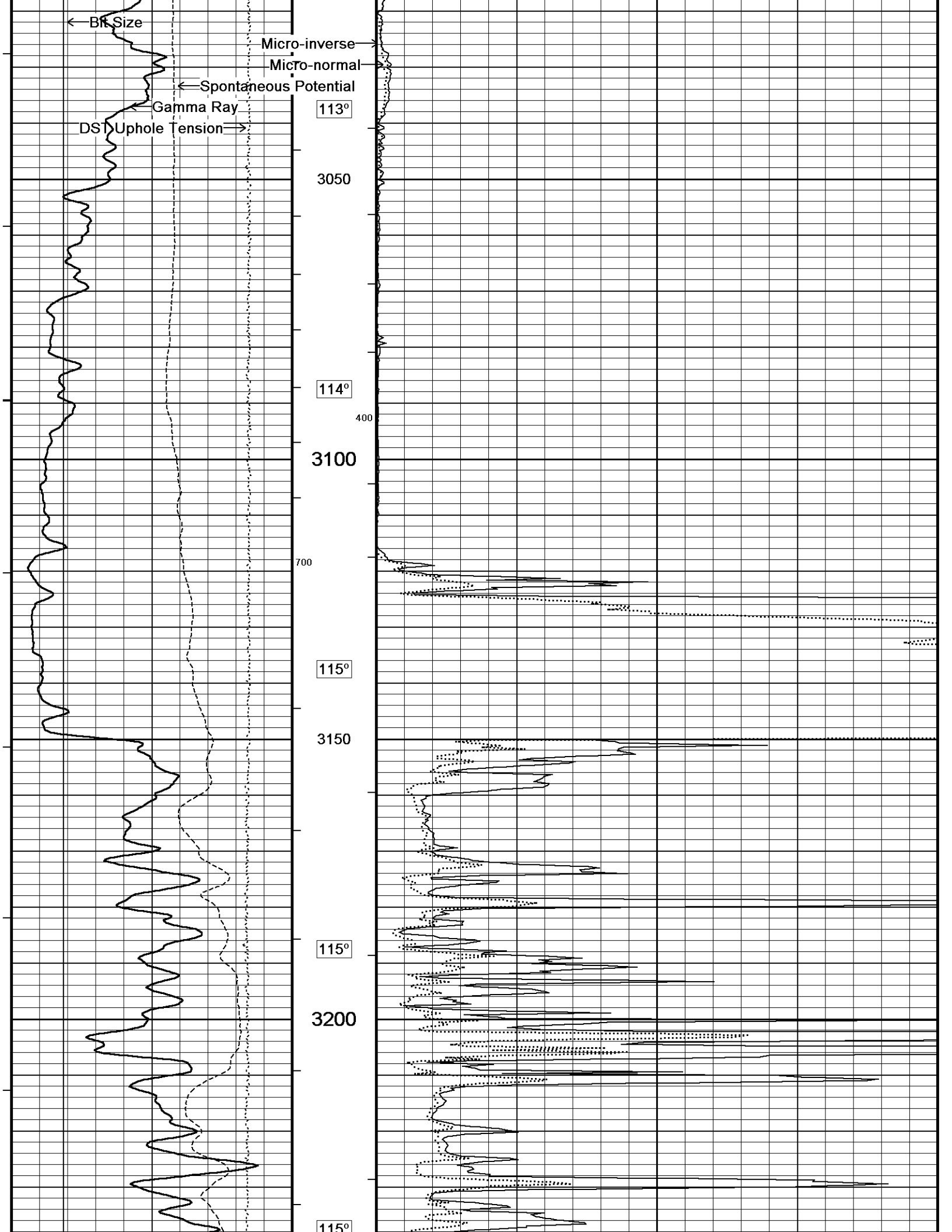

106°
1950
106°
2000
106°
1200
2050
700
107°
2100
107°

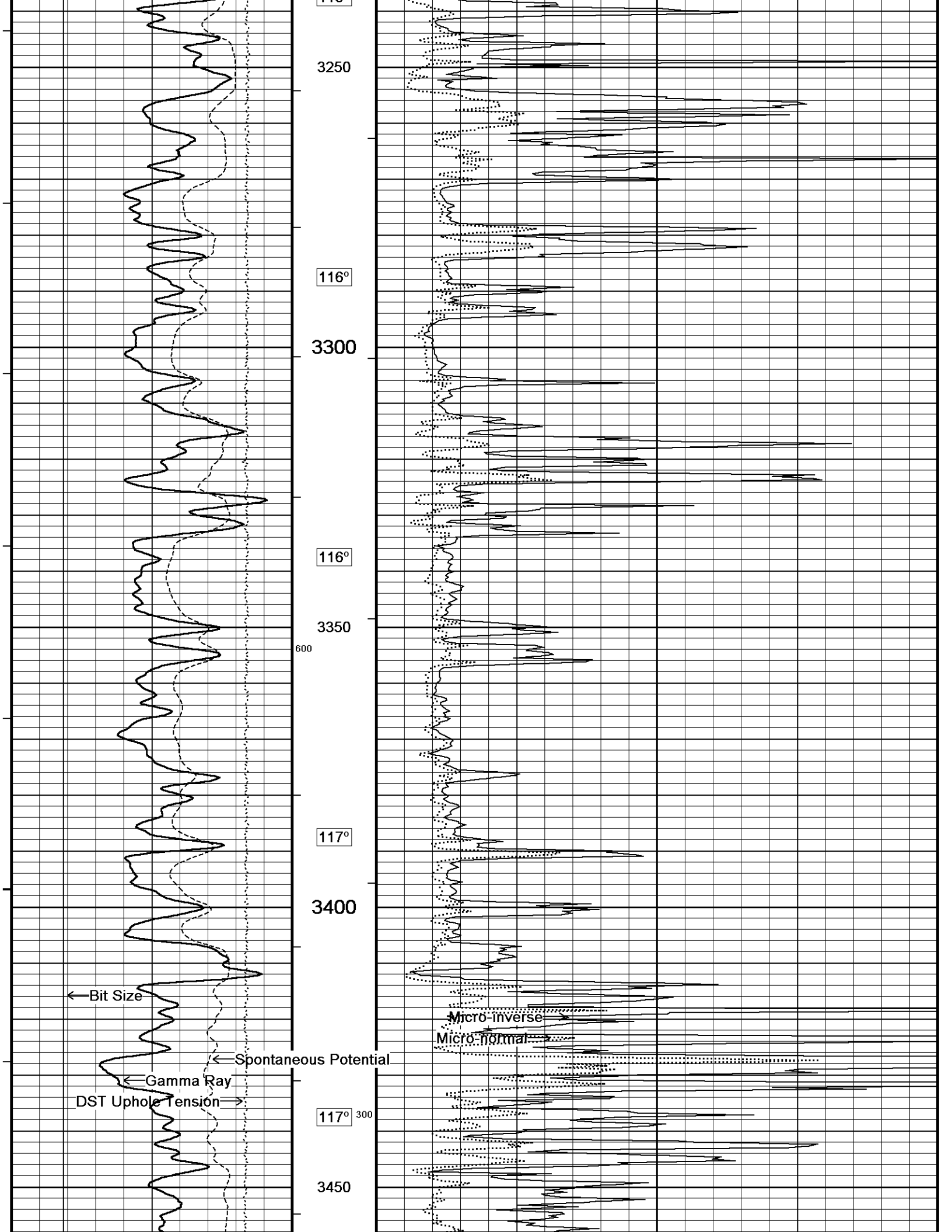

2150
108°
2200
Bit Size
108°
Micro-inverse
Micro-normal
Spontaneous Potential
Gamma Ray
2250
DST Uphole Tension
109°
2300
1100
109°
2350

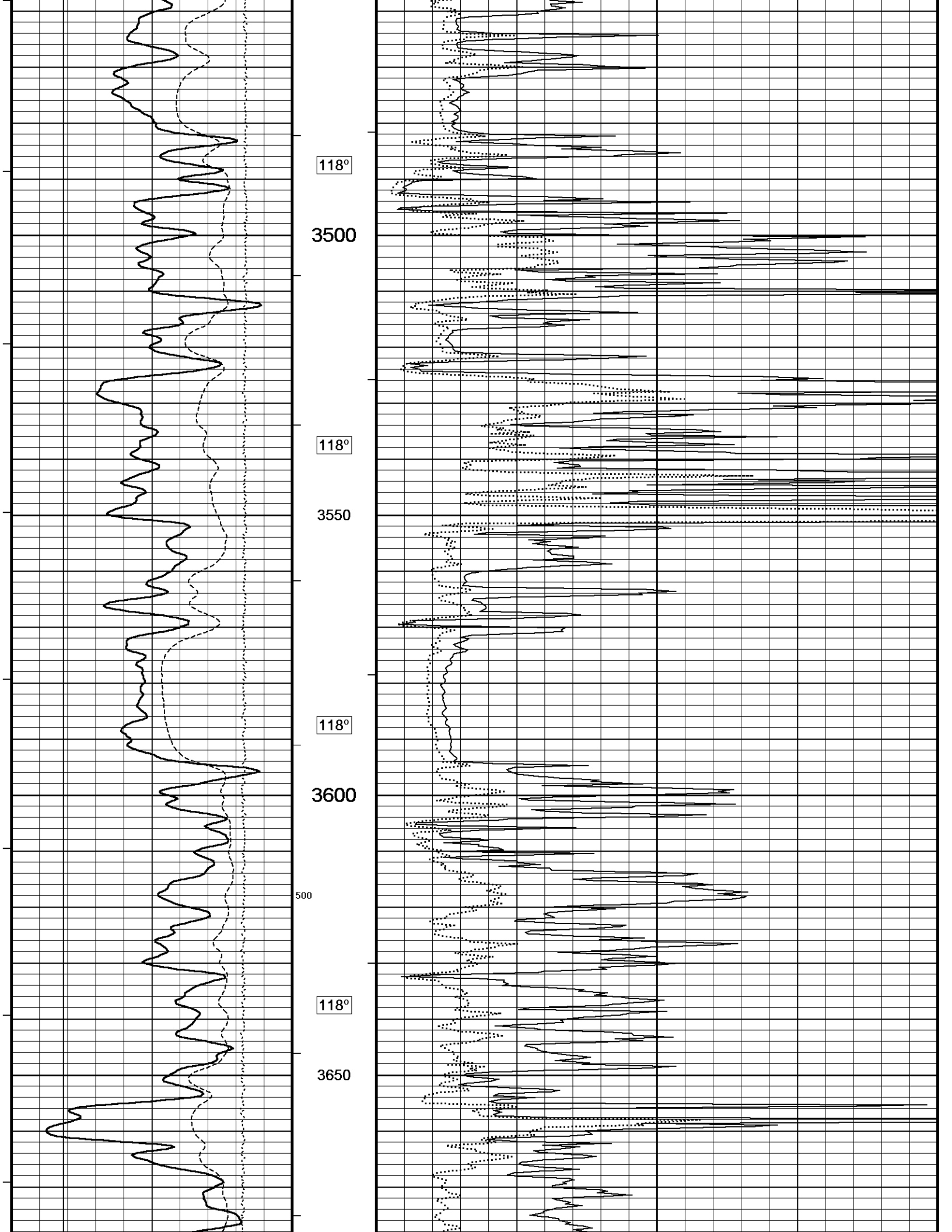

110°
2400
110°
2450
110°
2500
111°
600
2550

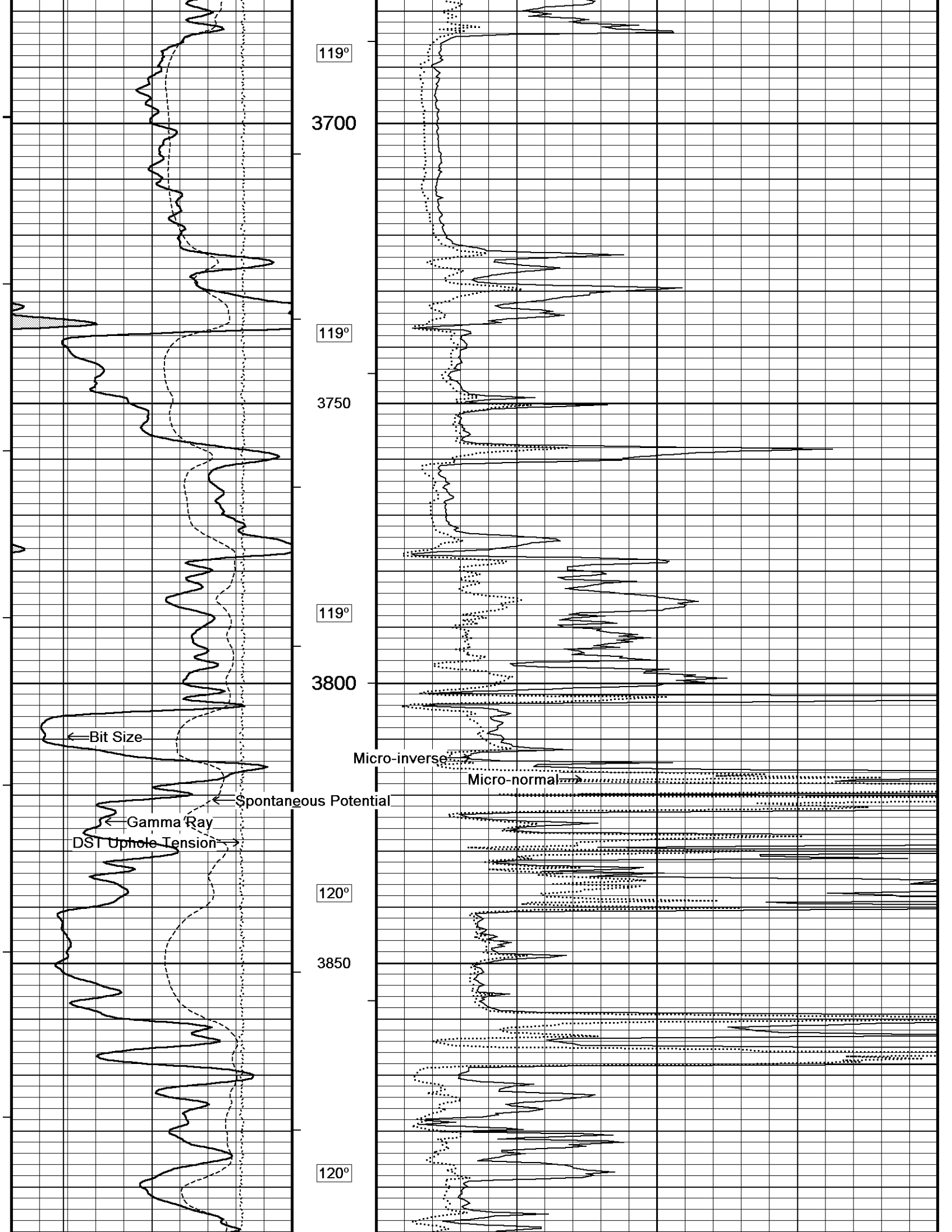

1000
111°
2600
Bit Size
Micro-inverse
Micro-normal
111°
Spontaneous Potential
Gamma Ray
DST Uphole Tension
2650
112°
2700
112°
2750
112°

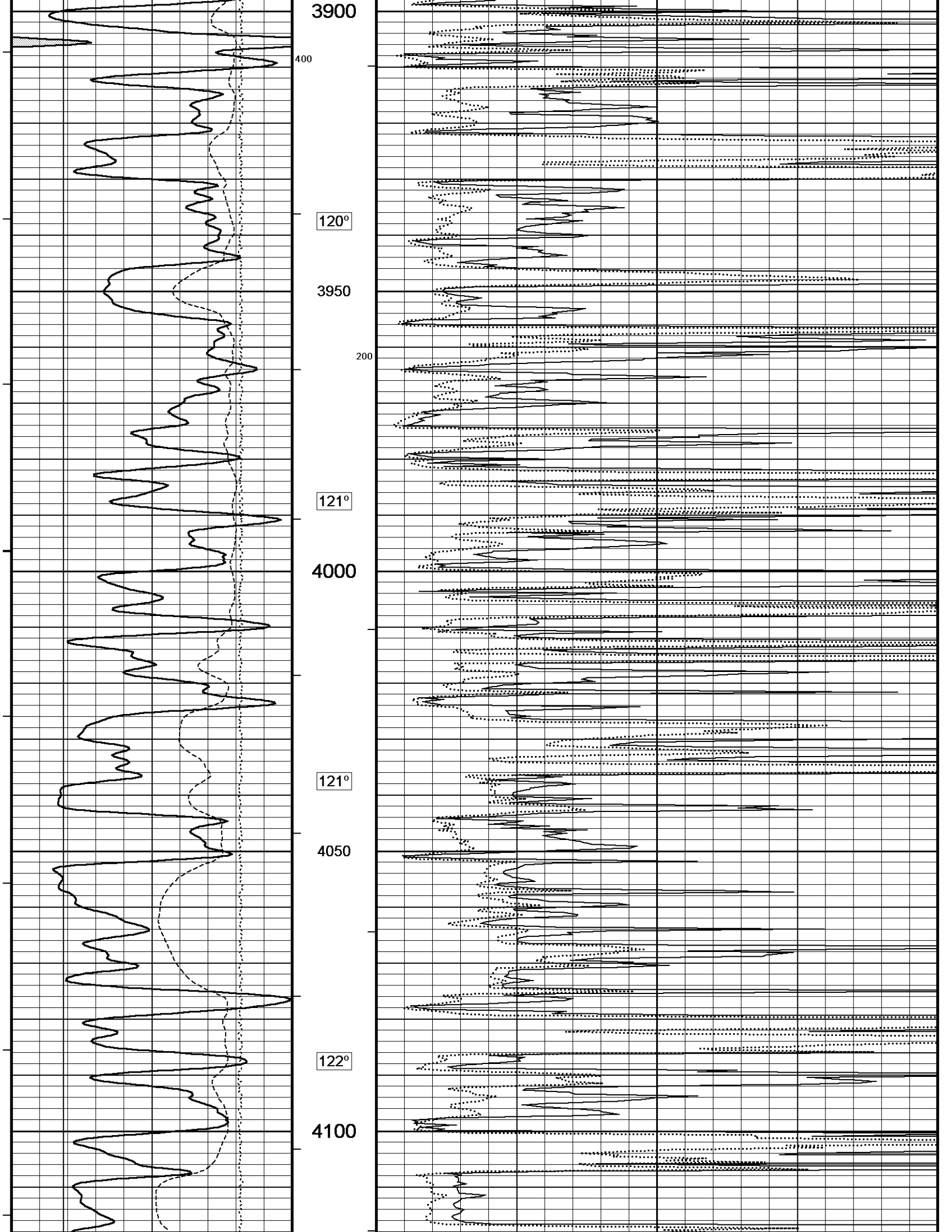

2800
900
113°
2850
113°
500
2900
113°
2950
800
113°
3000

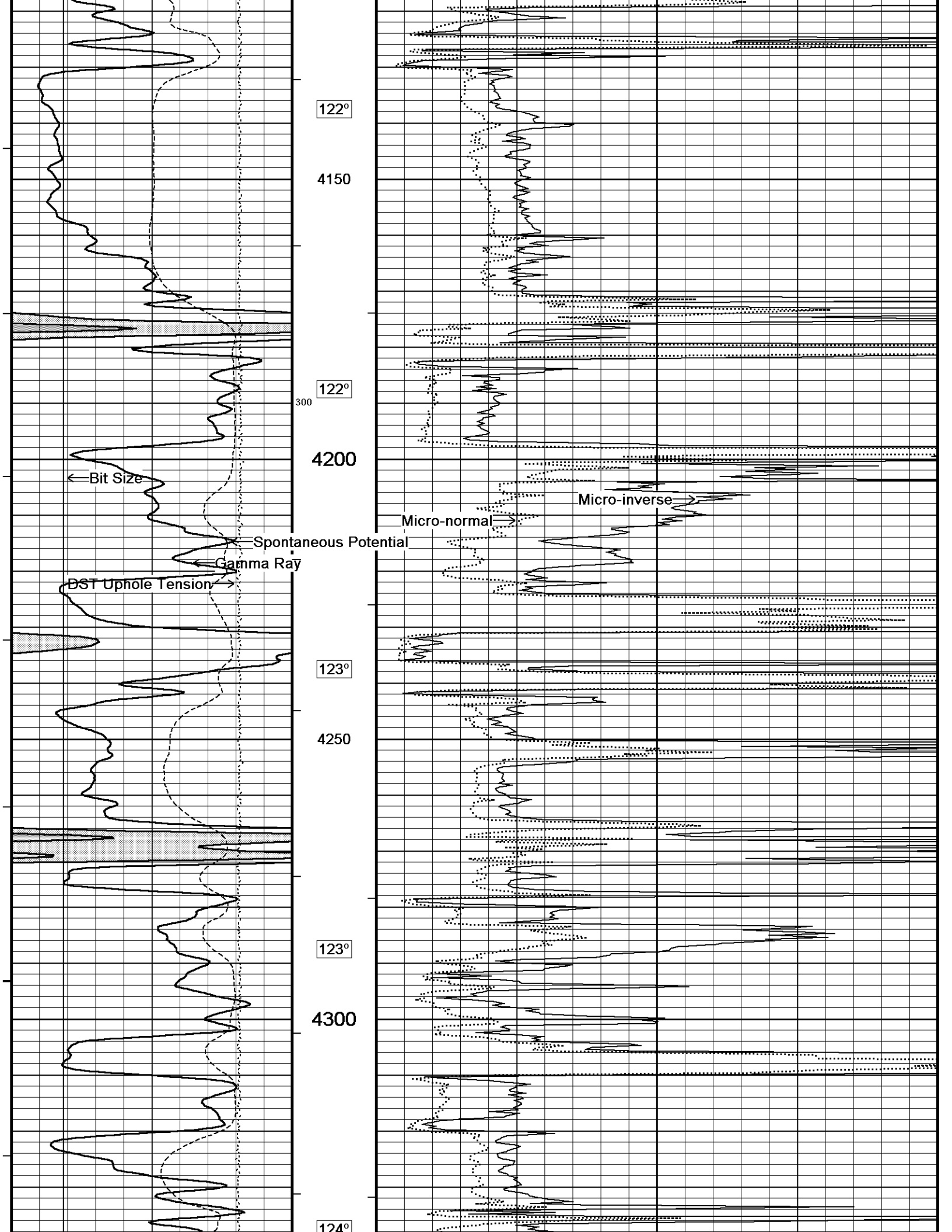

Bit Size
Micro-inverse
Micro-normal
Spontaneous Potential
Gamma Ray
DST Uphole Tension
113°
3050
114°
400
3100
700
115°
3150
115°
3200
115°

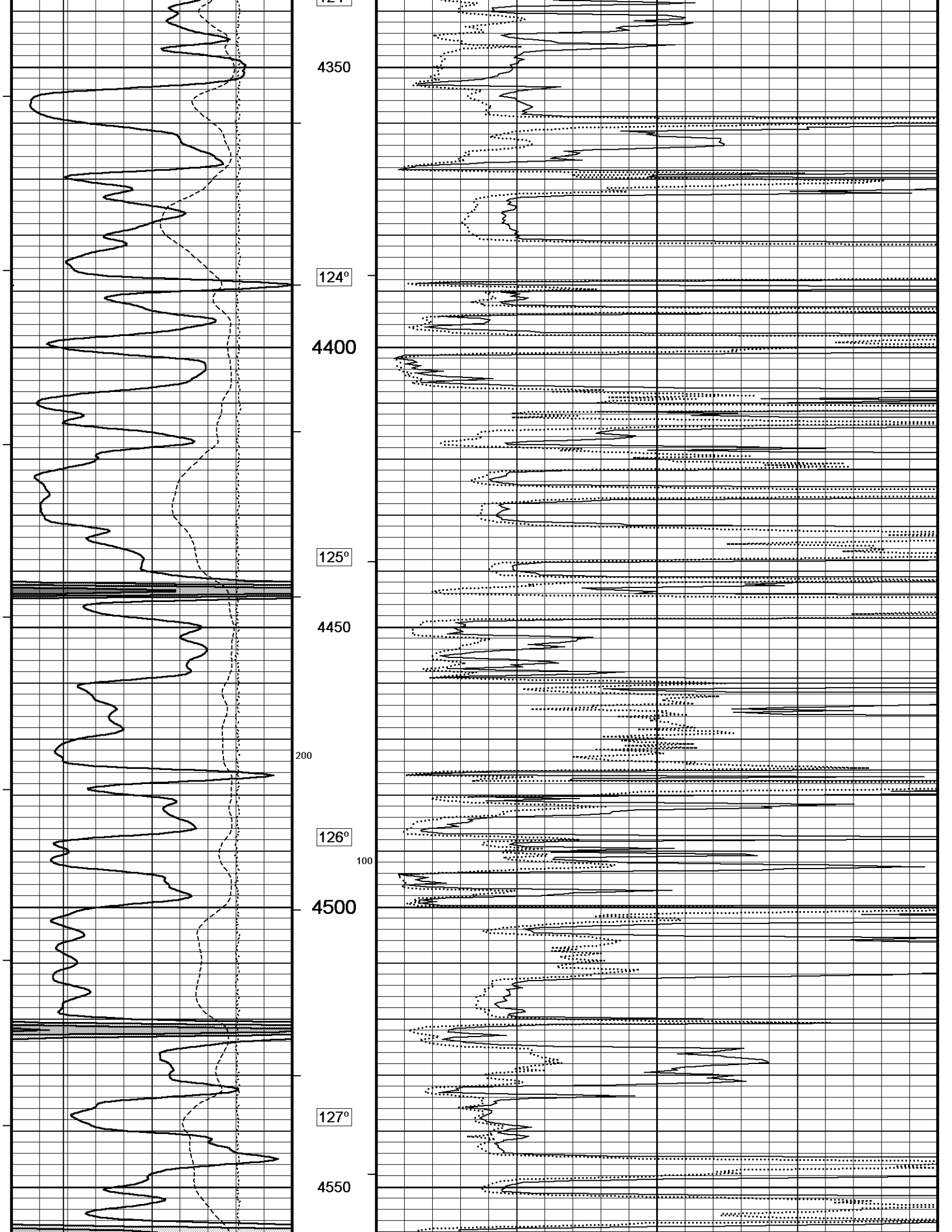

3250
116°
3300
116°
3350
600
117°
3400
Bit Size
Micro-inverse
Micro-normal
Spontaneous Potential
Gamma Ray
DST Uphole Tension
117° 300
3450

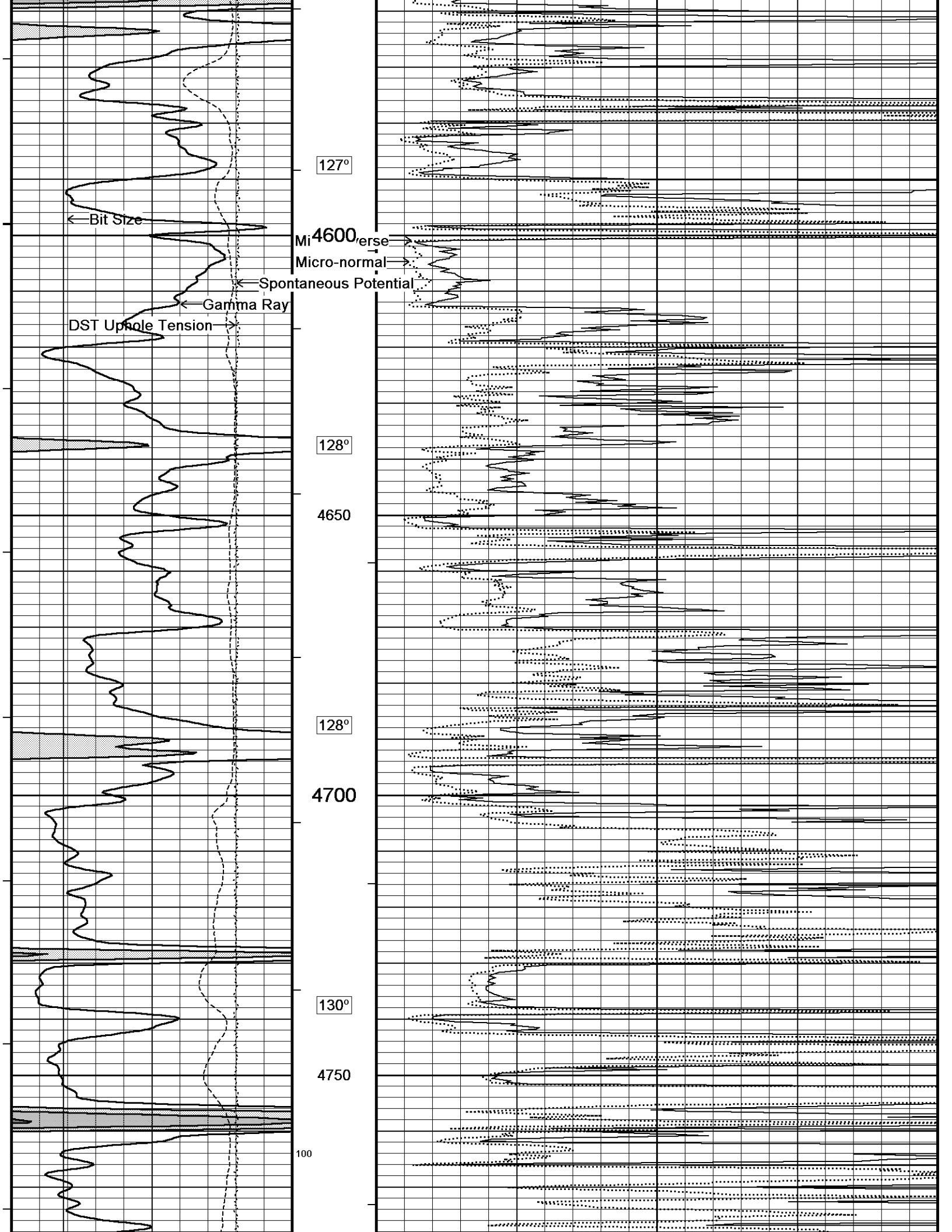

118°
3500
118°
3550
118°
3600
500
118°
3650

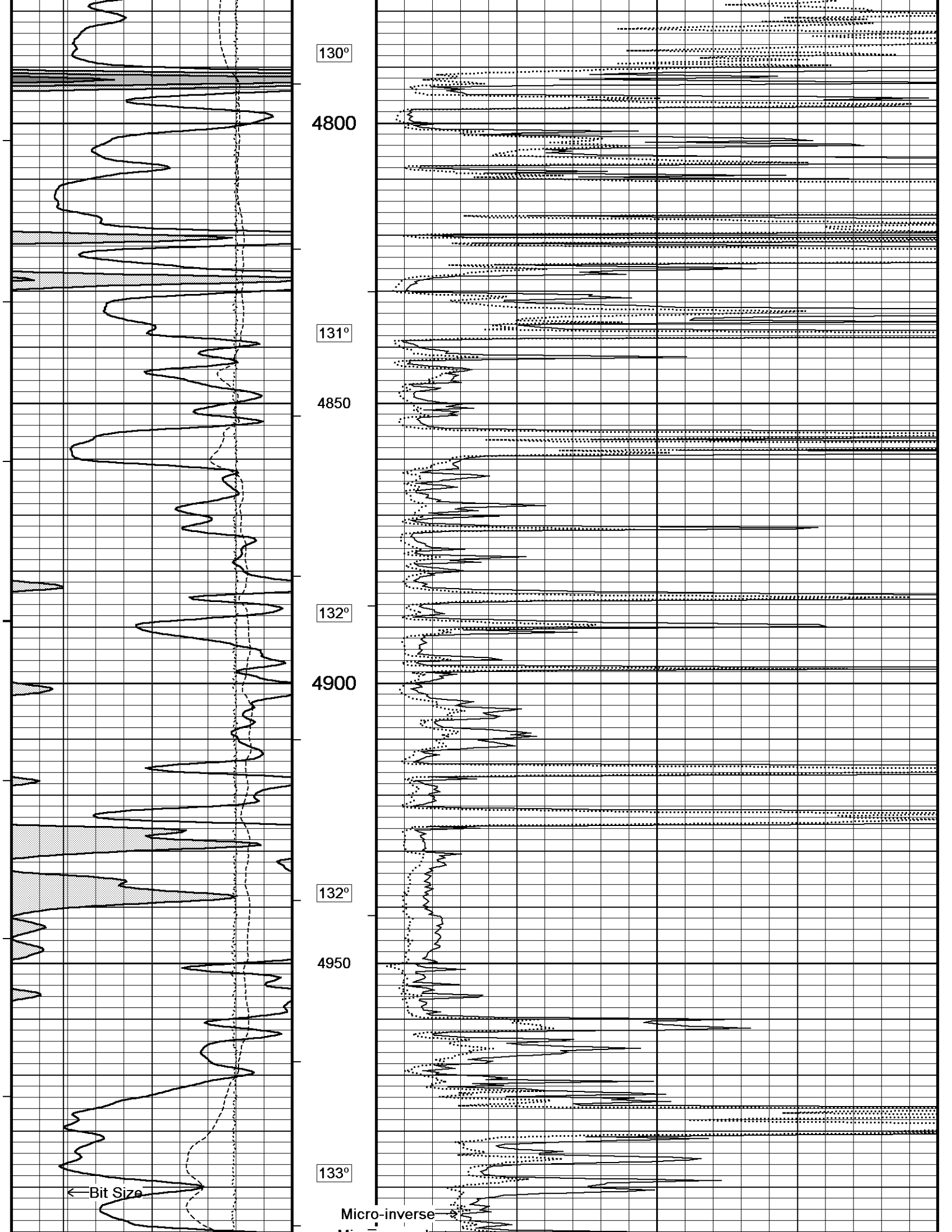

119°
3700
119°
3750
119°
3800
120°
3850
120°
Bit Size
Micro-inverse
Micro-normal
Spontaneous Potential
Gamma Ray
DST Uphole Tension

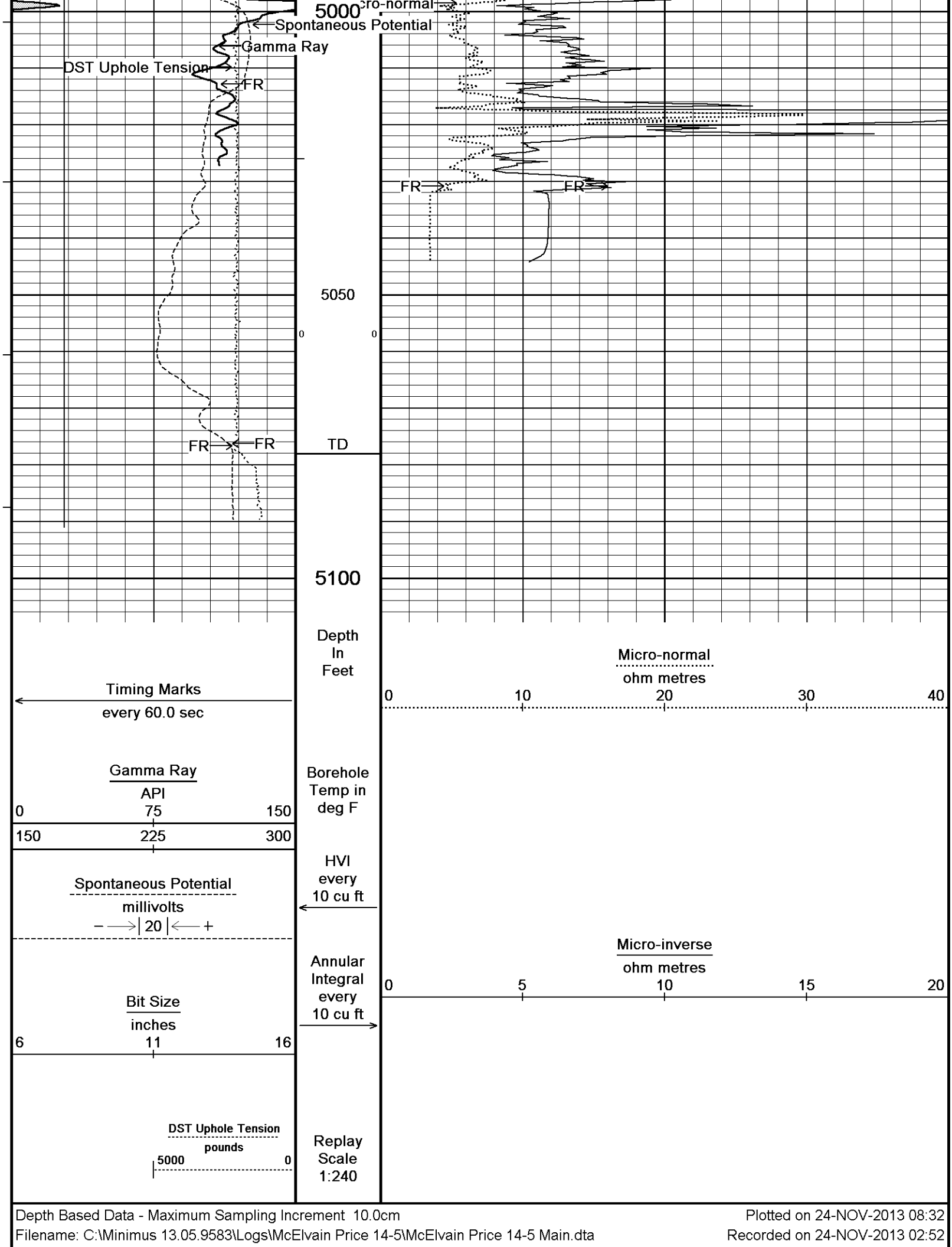

3900
400
120°
3950
200
121°
4000
121°
4050
122°
4100


122°
4150
122°
300
4200
Bit Size
Micro-inverse
Micro-normal
Spontaneous Potential
Gamma Ray
DST Uphole Tension
123°
4250
123°
4300
124°


4350
124°
4400
125°
4450
200
126°
100
4500
127°
4550


127°
Bit Size
Mi
4600
erse
Micro-normal
Spontaneous Potential
Gamma Ray
DST Uphole Tension
128°
4650
128°
4700
130°
4750
100


130°
4800
131°
4850
132°
4900
132°
4950
133°
←Bit Size
Micro-inverse



Depth Based Data - Maximum Sampling Increment 10.0cm

Plotted on 24-NOV-2013 08:32

Filename: C:\Minimus 13.05.9583\Logs\McElvain Price 14-5\McElvain Price 14-5 Main.dta

Recorded on 24-NOV-2013 02:52

System Versions: Logged with 13.05.9583 Plotted with 13.05.9583

5 INCH MAIN

HI-RES

Depth Based Data - Maximum Sampling Increment 2.5cm
Plotted on 24-NOV-2013 08:32
Filename: C:\Minimus 13.05.9583\Logs\McElvain Price 14-5\McElvain Price 14-5 High Res.dta
Recorded on 24-NOV-2013 01:03
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 +

MMR Caliper
inches
6 11 16

Bit Size
inches
6 11 16

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

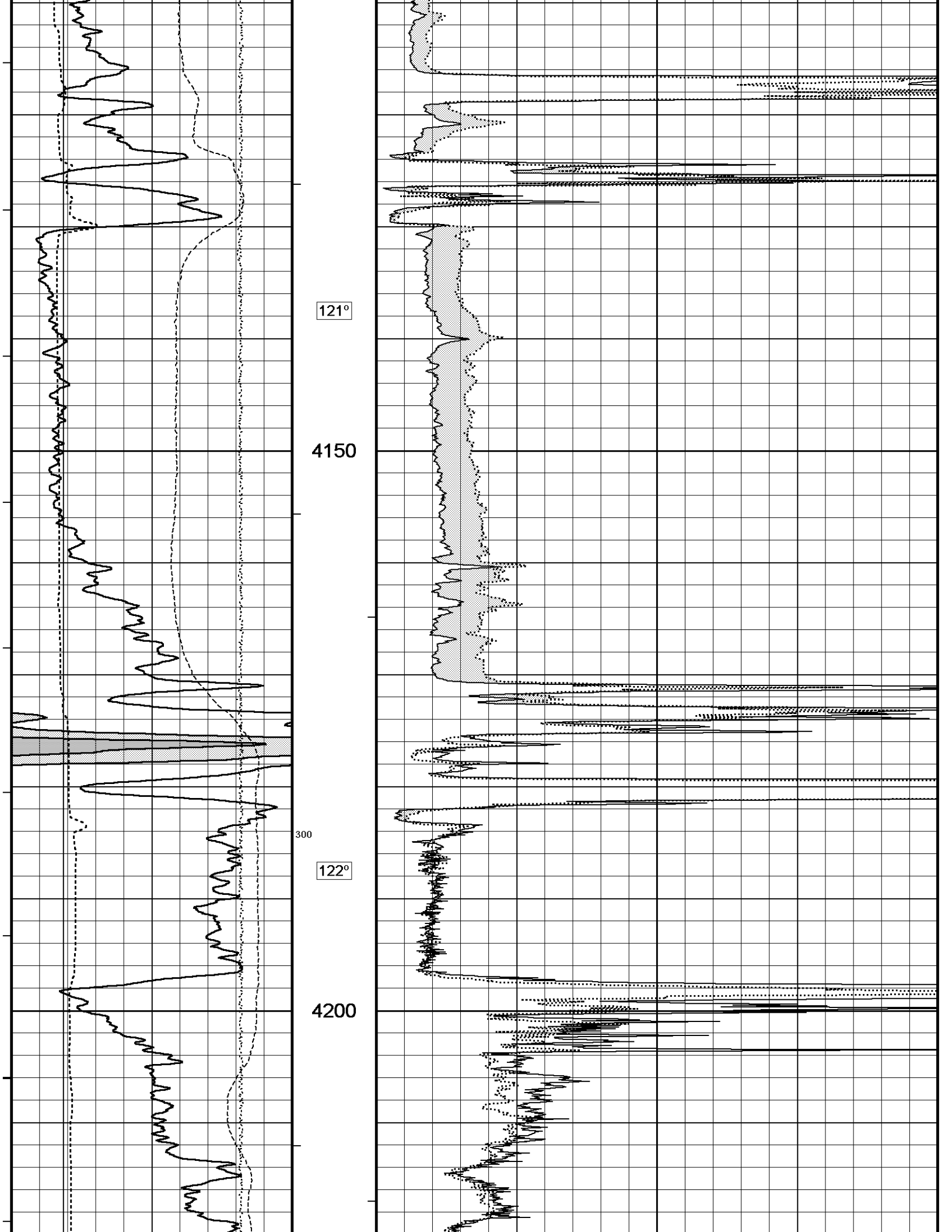
Replay Scale 1:120

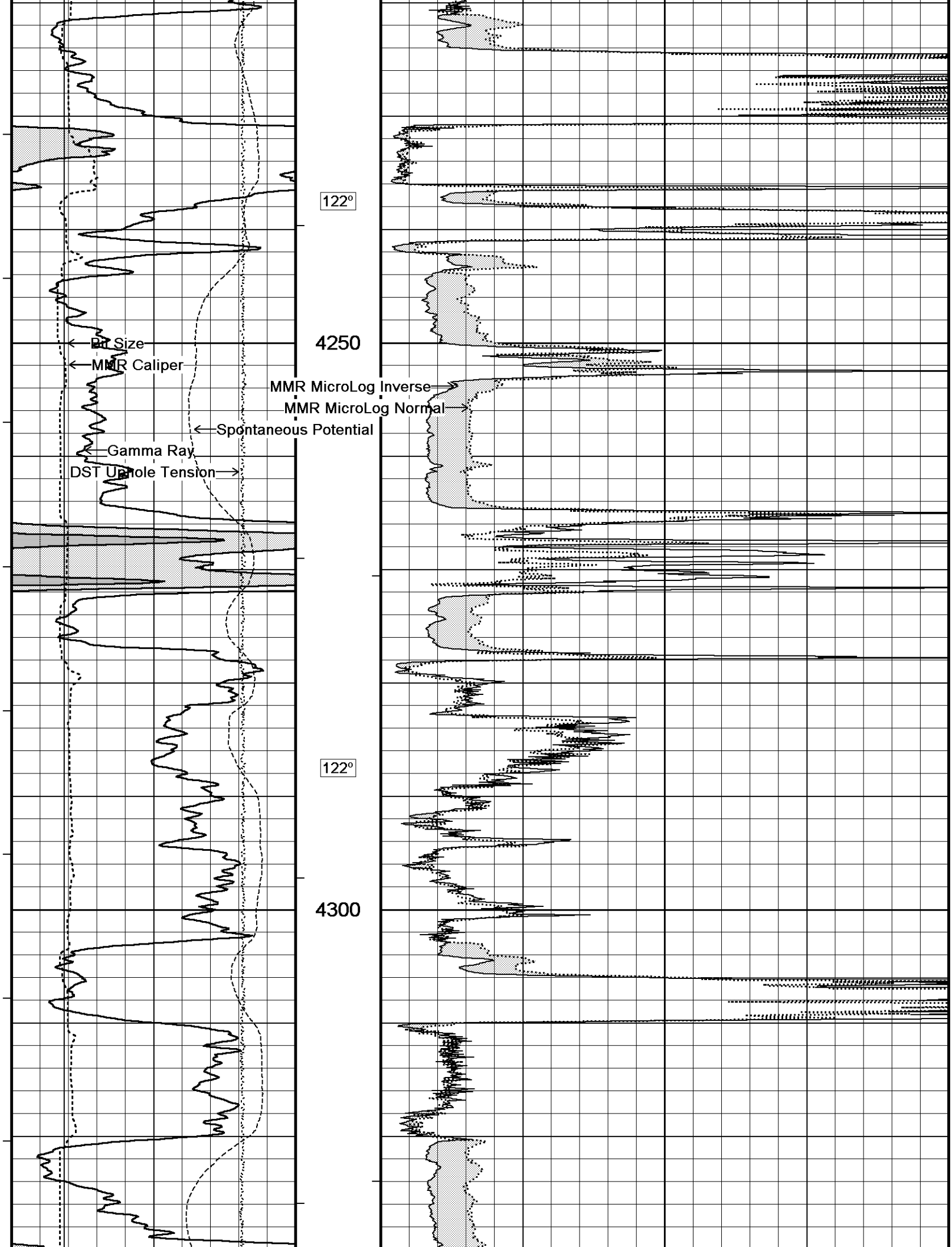
MMR MicroLog Normal
ohm metres
0 10 20 30 40

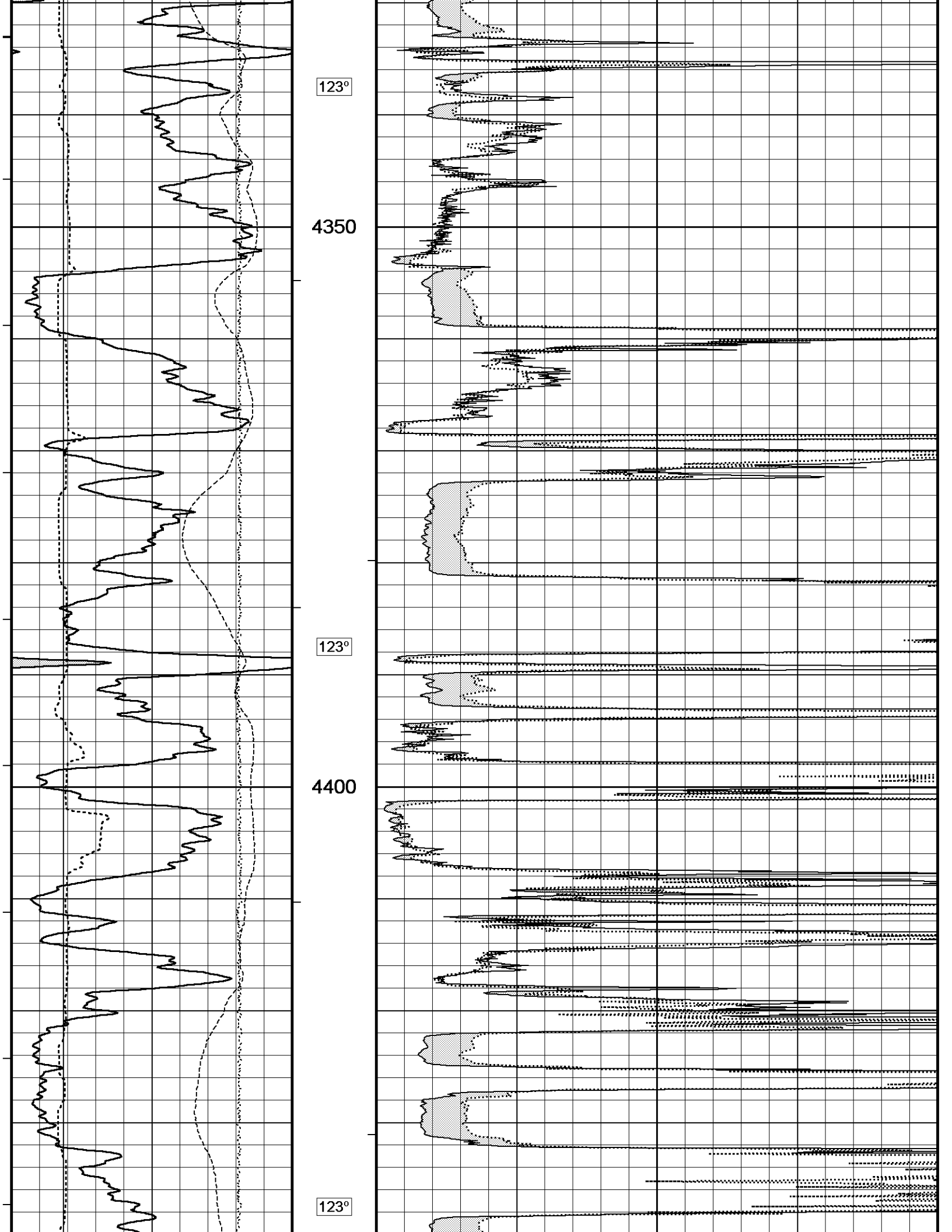
MMR MicroLog Inverse
ohm metres
0 10 20 30 40

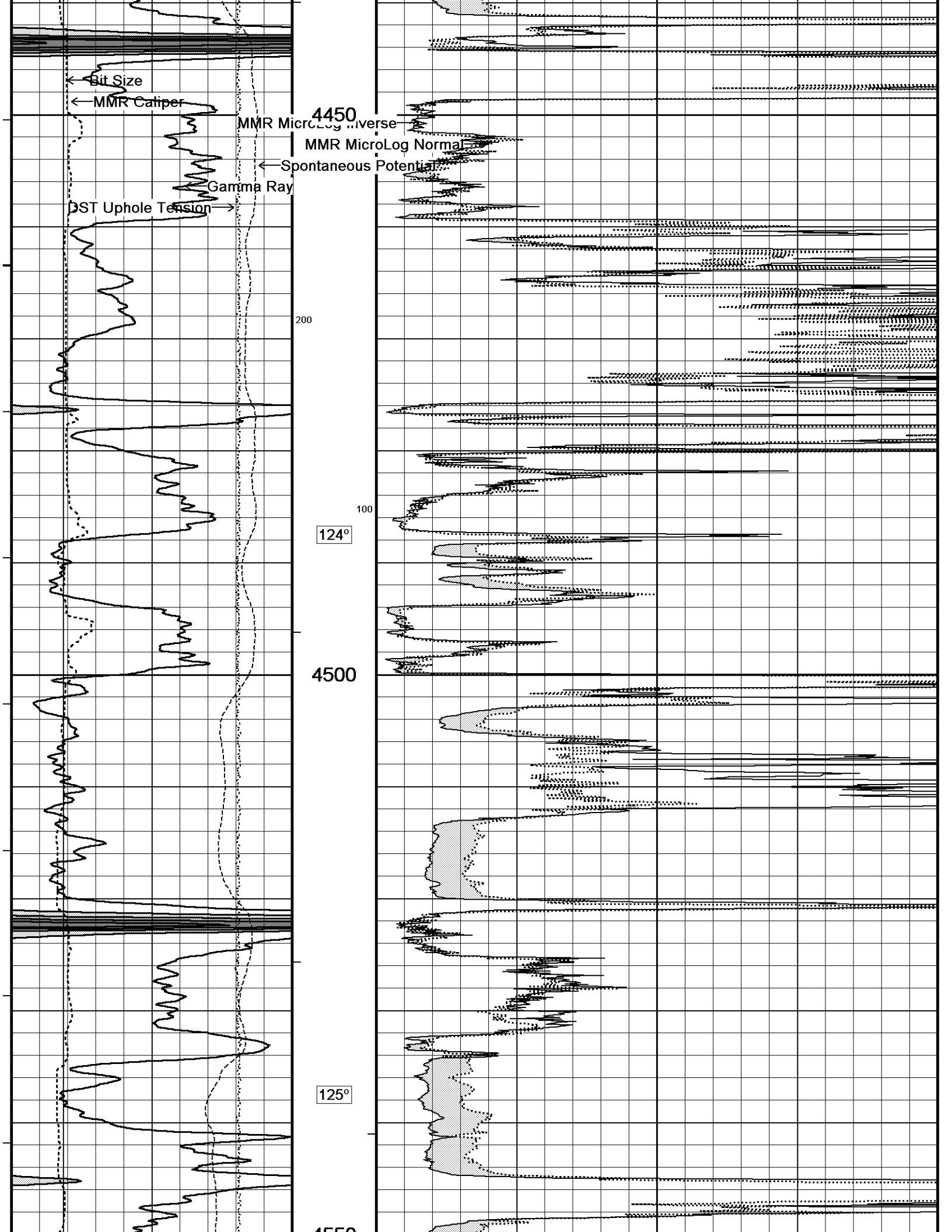
4078

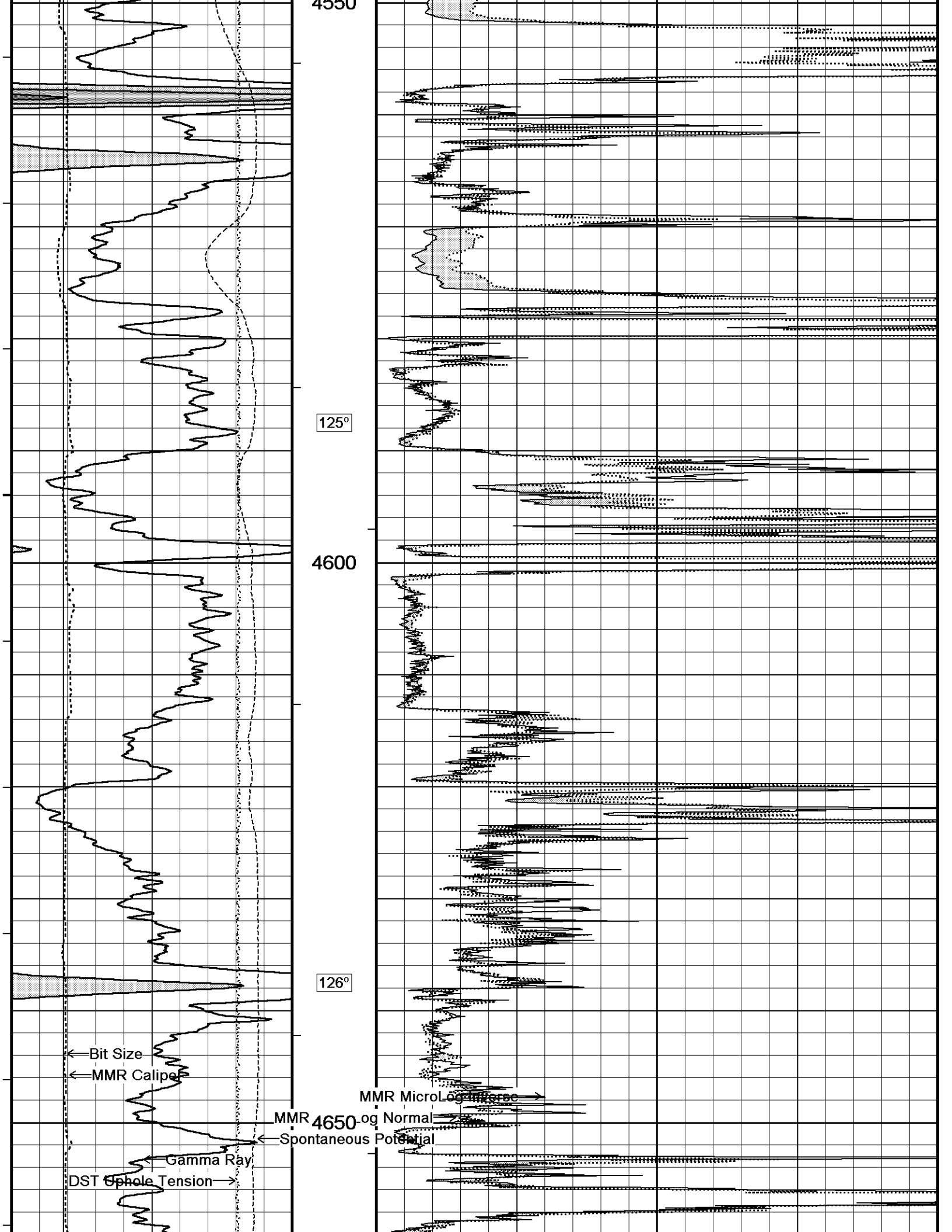
4100

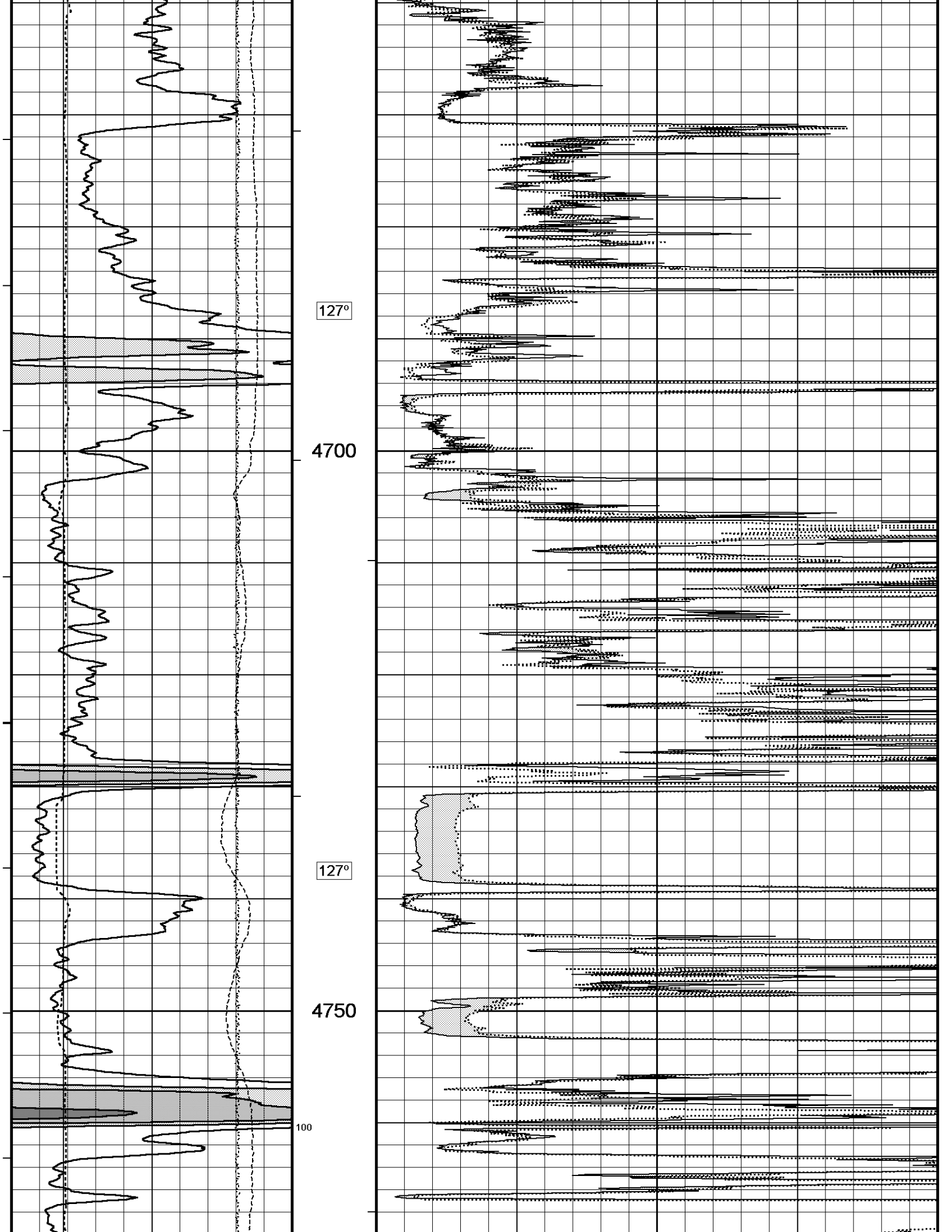

121°
4150
300
122°
4200

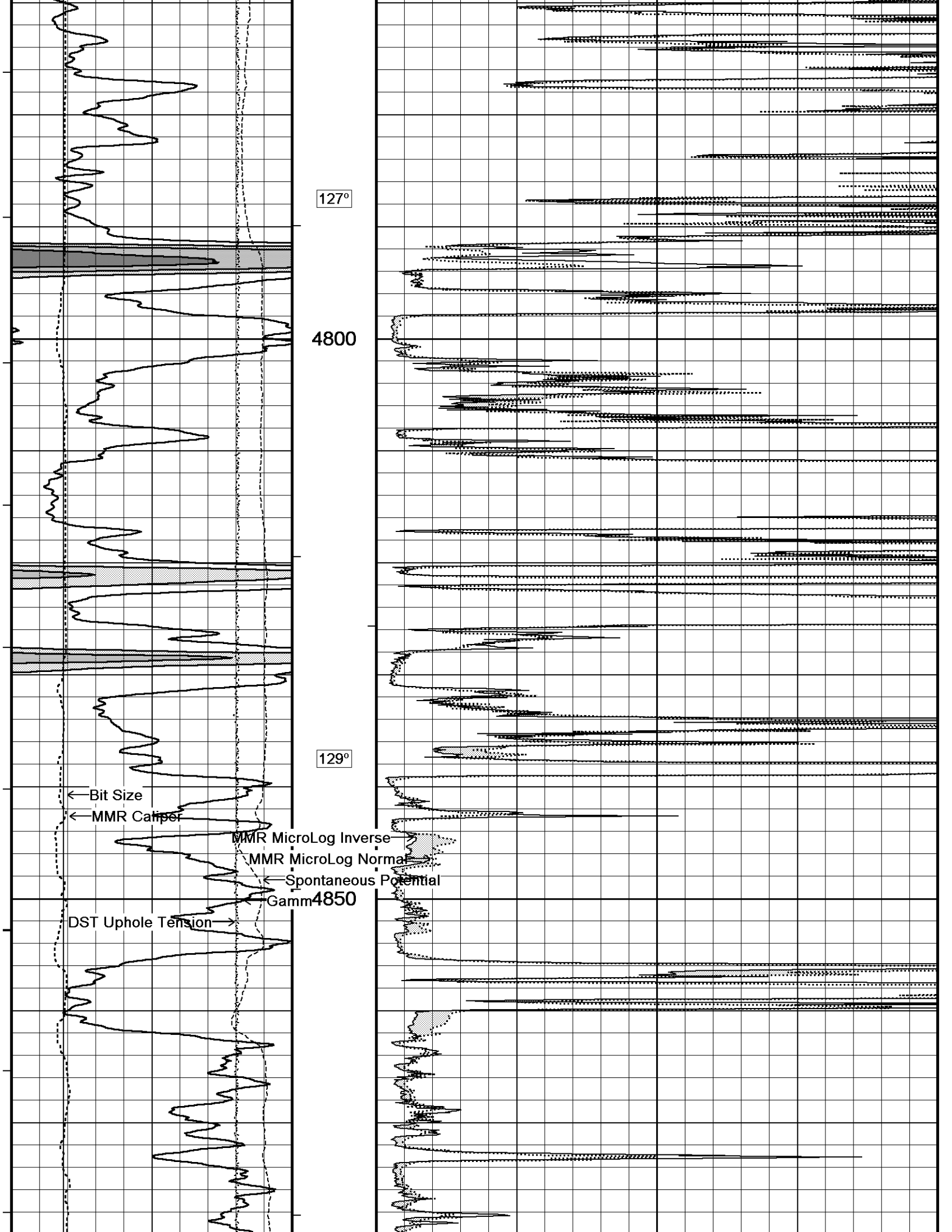

122°
4250
Bit Size
MMR Caliper
MMR MicroLog Inverse
MMR MicroLog Normal
Spontaneous Potential
Gamma Ray
DST Uphole Tension
122°
4300

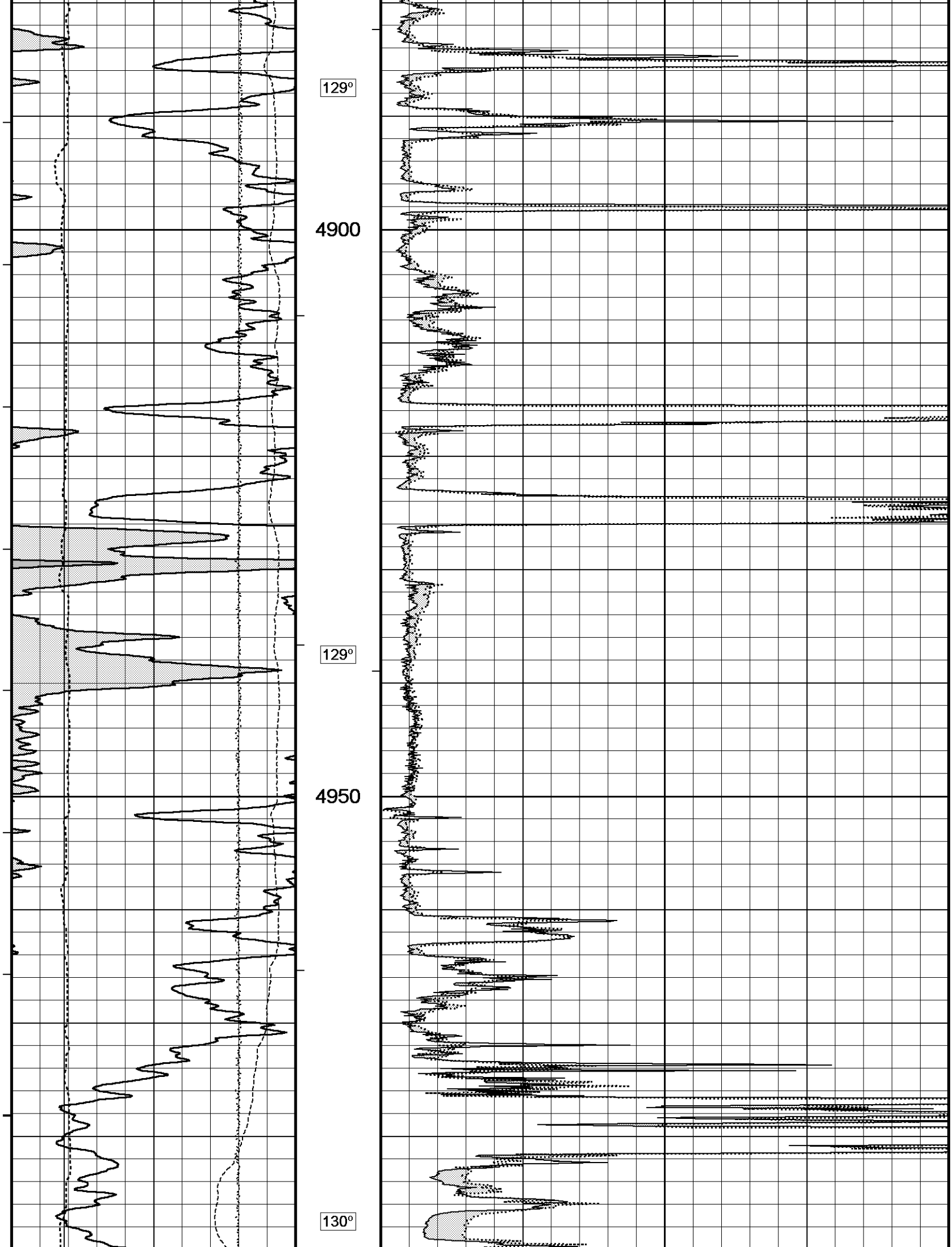

123°
4350
123°
4400
123°

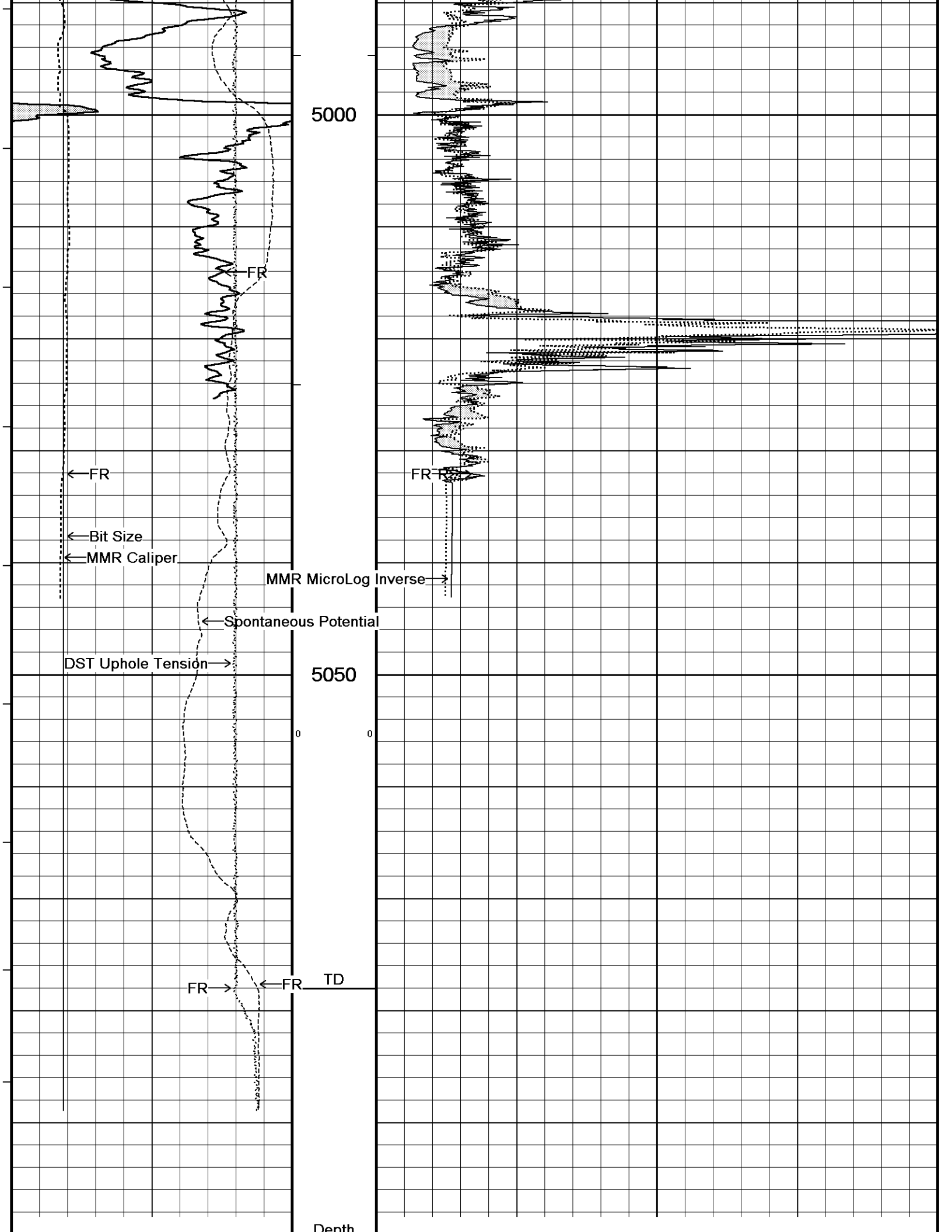

Bit Size
MMR Caliper
MMR MicroLog Inverse
MMR MicroLog Normal
Spontaneous Potential
Gamma Ray
DST Uphole Tension
4450
200
100
124°
4500
125°

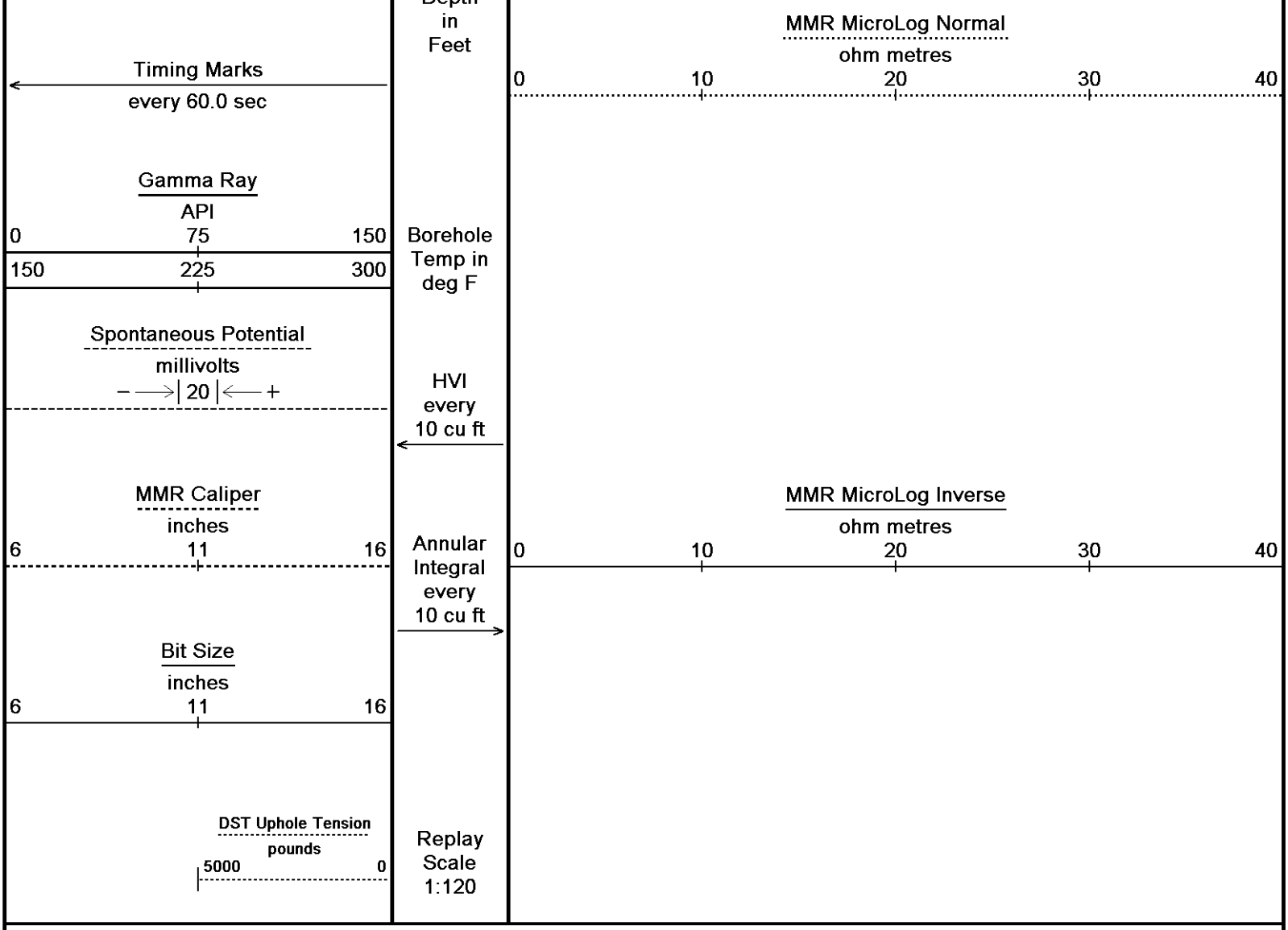

4550
125°
4600
126°
←Bit Size
←MMR Caliper
MMR MicroLog Inverse→
MMR
4650
←Spontaneous Potential
←Gamma Ray
DST Uphole Tension→


127°
4700
127°
4750
100


127°
4800
129°
Bit Size
MMR Caliper
MMR MicroLog Inverse
MMR MicroLog Normal
Spontaneous Potential
Gamm
4850
DST Uphole Tension


129°
4900
129°
4950
130°


5000
FR
FR
FR
Bit Size
MMR Caliper
MMR MicroLog Inverse
Spontaneous Potential
DST Uphole Tension
5050
0
0
FR
FR
TD
Depth

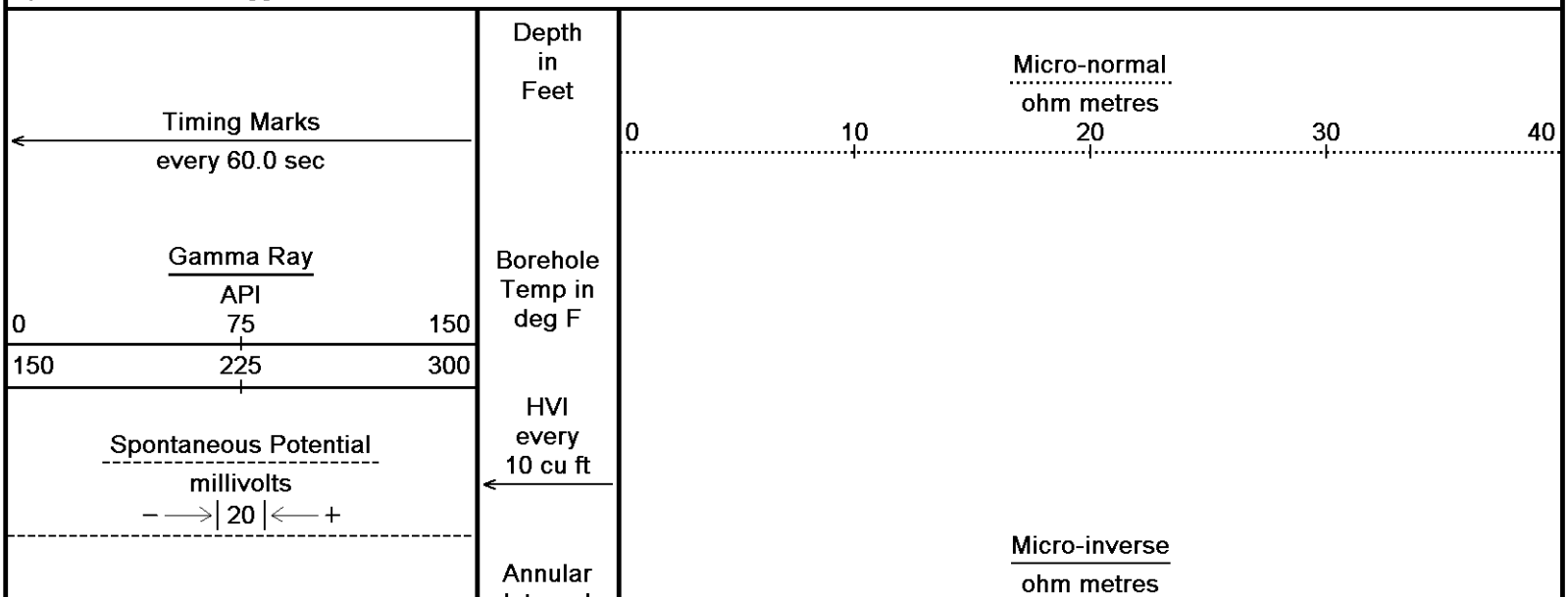


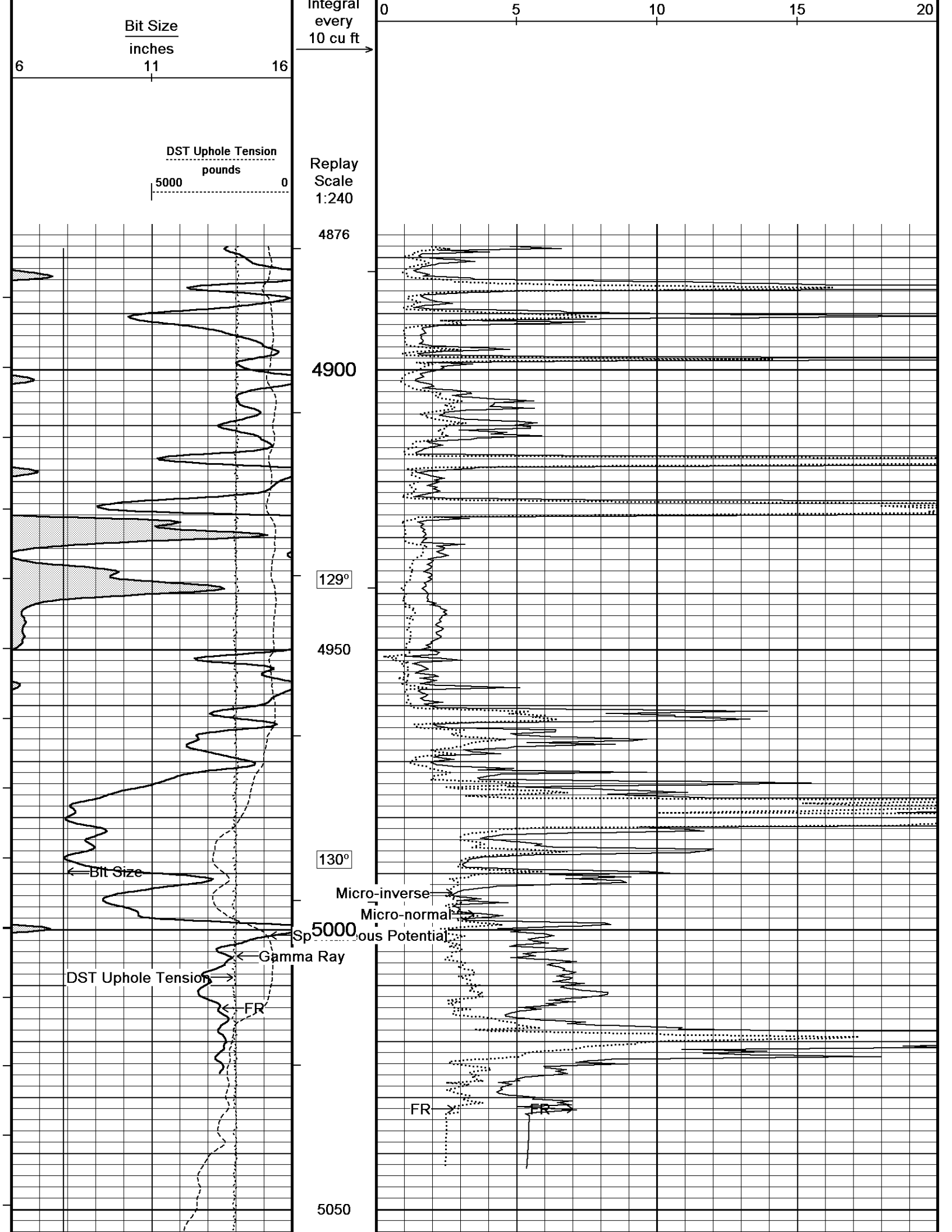
Depth Based Data - Maximum Sampling Increment 2.5cm
Plotted on 24-NOV-2013 08:32
Filename: C:\Minimus 13.05.9583\Logs\McElvain Price 14-5\McElvain Price 14-5 High Res.dta
Recorded on 24-NOV-2013 01:03
System Versions: Logged with 13.05.9583 Plotted with 13.05.9583

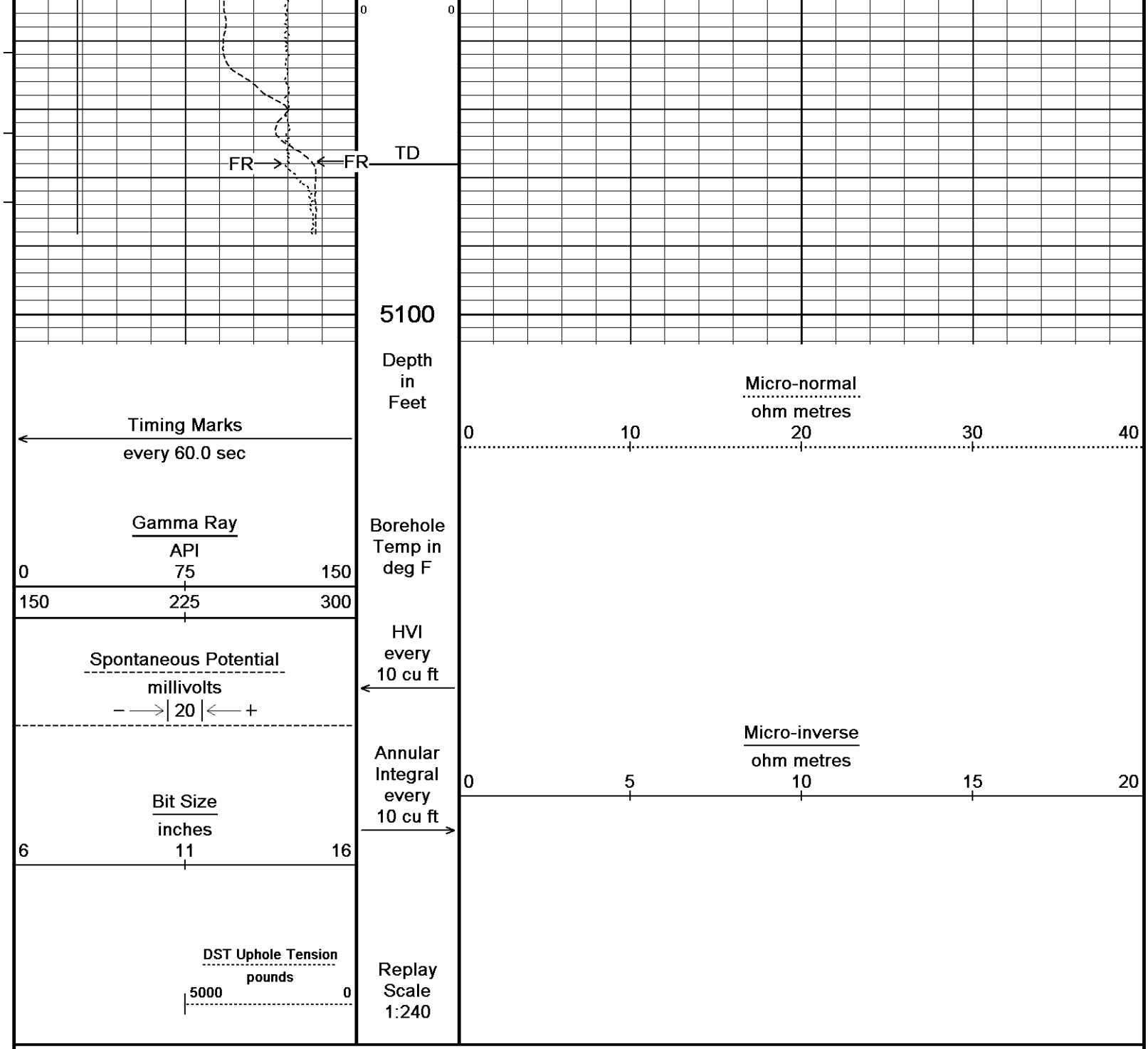
HI-RES

REPEAT SECTION

Depth Based Data - Maximum Sampling Increment 10.0cm
Plotted on 24-NOV-2013 08:32
Filename: C:\Minimus 13.05.9583\Logs\McElvain Price 14-5\McElvain Price 14-5 Repeat.dta
Recorded on 24-NOV-2013 01:03
System Versions: Logged with 13.05.9583 Processed with 13.05.9583 Plotted with 13.05.9583




Bit Size
inches
6
11
16
Integral
every
10 cu ft
0
5
10
15
20
DST Uphole Tension
pounds
5000
0
Replay
Scale
1:240
4876
4900
129°
4950
130°
5000
5050
Bit Size
Micro-inverse
Micro-normal
Spontaneous Potential
Gamma Ray
DST Uphole Tension
FR
FR
FR



Depth Based Data - Maximum Sampling Increment 10.0cm — Plotted on 24-NOV-2013 08:32

Filename: C:\Minimus 13.05.9583\Logs\McElvain Price 14-5\McElvain Price 14-5 Repeat.dta — Recorded on 24-NOV-2013 01:03

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\McElvain Price 14-5\McElvain Price 14-5 Repeat.dta

General Constants All 000 — Last Edited on 23-NOV-2013,18:00

General Parameters		
Mud Resistivity	1.600	ohm-metres
Mud Resistivity Temperature	49.000	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	MMR Caliper	

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-D.K 442

Field Calibration on 29-OCT-2013,14:34

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

High Resolution Temperature Constants MCG-D.K 442

Last Edited on 29-OCT-2013,14:34

Pre-filter Length	11

Gamma Calibration MCG-D.K 442

Field Calibration on 21-NOV-2013 09:45

	Measured	Calibrated (API)
Background	72	48
Calibrator (Gross)	1151	773
Calibrator (Net)	1079	725

Gamma Constants MCG-D.K 442

Last Edited on 23-NOV-2013,18:00

Gamma Calibrator Number	GRC38	
Mud Density	1.11	gm/cc
Caliper Source for Processing	Density Caliper	
Tool Position	Eccentred	
Concentration of KCl		kppm
K Mud Type	Chloride	
K Mud Concentration	0.00	%

Micro Normal and Micro Inverse Calibration MMR-A 11

Base Calibration on 08-NOV-2013 10:46
Field Check on 21-NOV-2013 09:36

Base Calibration

	Measured		Calibrated (ohm-m)	
Channel	Resistor 1	Resistor 2	Resistor 1	Resistor 2
Micro Normal	12.1	58.6	5.0	25.0
Micro Inverse	15.4	76.2	5.0	25.0

Channel	Base Check (ohm-m)	Field Check (ohm-m)
Micro Normal	78.1	78.1
Micro Inverse	59.8	59.8

Micro Normal and Micro Inverse Constants MMR-A 11

Last Edited on 18-APR-2013,13:52

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	0.0000	inches

Caliper Calibration MPD-B 31

Base Calibration on 20-NOV-2013 10:19
Field Calibration on 20-NOV-2013 10:21

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

Measured Caliper (in)	Actual Caliper (in)
7.90	7.97

DOWNHOLE EQUIPMENT

C:\Minimus 13.05.9583\Logs\McElvain Price 14-5\McElvain Price 14-5 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

Spectral Gamma Ray Sub
SGS-E.J 150 LG: 7.78 ft WT: 105.8 lb OD: 3.54 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 Sonic
MSS-A.A 55 LG: 12.52 ft WT: 72.8 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: 71.47 ft Weight: 586.4 lb

63.79 ft	GRGC - Gamma Ray
60.89 ft	CGXT - MCG External Temperature
54.33 ft	GCGR - Uranium Stripped Gamma
54.33 ft	GRSG - SGS Gamma Ray
45.76 ft	MINV - MMR MicroLog Inverse
45.76 ft	MNRL - MMR MicroLog Normal
40.97 ft	NPRL - Limestone Neutron Por.
33.73 ft	AVOL - Annular Volume
33.73 ft	HVOL - Hole Volume
33.73 ft	CLDC - Density Caliper
31.80 ft	DPRL - Limestone Density Por.
31.80 ft	DEN - Compensated Density
31.80 ft	DCOR - Density Correction
31.74 ft	PDPE - PE
26.24 ft	FEFE - Shallow FE
12.96 ft	DT35 - 3-5' Compensated Sonic
12.96 ft	SPRL - Wyllie Lime. Sonic Por.
3.34 ft	R60O - Array Ind. One Res 60
3.34 ft	R40O - Array Ind. One Res 40
3.34 ft	RTAO - Array Ind. One Res Rt
0.23 ft	SPCG - Spontaneous Potential
Tool Zero	(0.13ft from bottom)
-0.13 ft	SMTU - DST Uphole Tension

All measurements relative to tool zero.

COMPANY	MCELVAIN ENERGY, INC.
WELL	PRICE 14-5
FIELD	LIANOS SE
PROVINCE/COUNTY	SHERMAN
COUNTRY/STATE	U.S.A. / KANSAS

Elevation Kelly Bushing	3452.00	feet	First Reading	5032.00	feet

Elevation Drill Floor	3450.00	feet	Depth Driller	5082.00	feet
Elevation Ground Level	3441.00	feet	Depth Logger	5078.00	feet

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