MICRORESISTIVITY LOG

COMPANY	O'BRIEN ENERGY RESOURCES CORP.
WELL	CLAYTON #1-33
FIELD	MOHLER
PROVINCE/COUNTY	MEADE
COUNTRY/STATE	U.S.A. / KANSAS
LOCATION	990' FNL & 1650' FEL SE SW NE

SEC	TWP	RGE	Other Services
33	33S	29W	MPD/MDN MAI/MFE

API Number 15-119-21334
Permit Number

Permanent Datum G.L., Elevation 2566 feet
Log Measured From KB
Drilling Measured From K.B.

Elevations:	feet
KB	2578.00
DF	2577.00
GL	2566.00

Date	20-JAN-2013		
Run Number	ONE		
Service Order	3537848		
Depth Driller	6413.00	feet	
Depth Logger	6412.00	feet	
First Reading	6378.00	feet	
Last Reading	4000.00	feet	
Casing Driller	1480.00	feet	
Casing Logger	1480.00	inches	
Bit Size	7.875		
Hole Fluid Type	CHEMICAL	lb/USg	
Density / Viscosity	9.20 lb/USg	55.00 CP	
PH / Fluid Loss	9.50	9.50	
Sample Source	FLOWLINE		
Rm @ Measured Temp	0.96 @ 84.0	ohm-m	
Rmf @ Measured Temp	0.77 @ 84.0	ohm-m	
Rmc @ Measured Temp	1.15 @ 84.0	ohm-m	
Source Rmf / Rmc	CALC	CALC	
Rm @ BHT	0.65 @124.0	ohm-m	
Time Since Circulation	5 HOURS		
Max Recorded Temp	124.00	deg F	
Equipment / Base	13057	LIB	
Recorded By	LYNN SCOTT		
Witnessed By	PETER DEBENHAM	ROGER PEARSON	
JOB#	LB13-017		

BOREHOLE RECORD

Last Edited: 20-JAN-2013 18:36

Bit Size inches	Depth From feet	Depth To feet
7.875	1480.00	6412.00

CASING RECORD

Type	Size inches	Depth From feet	Shoe Depth feet	Weight pounds/ft
SURFACE	8.625	0.00	1480.00	24.00

REMARKS

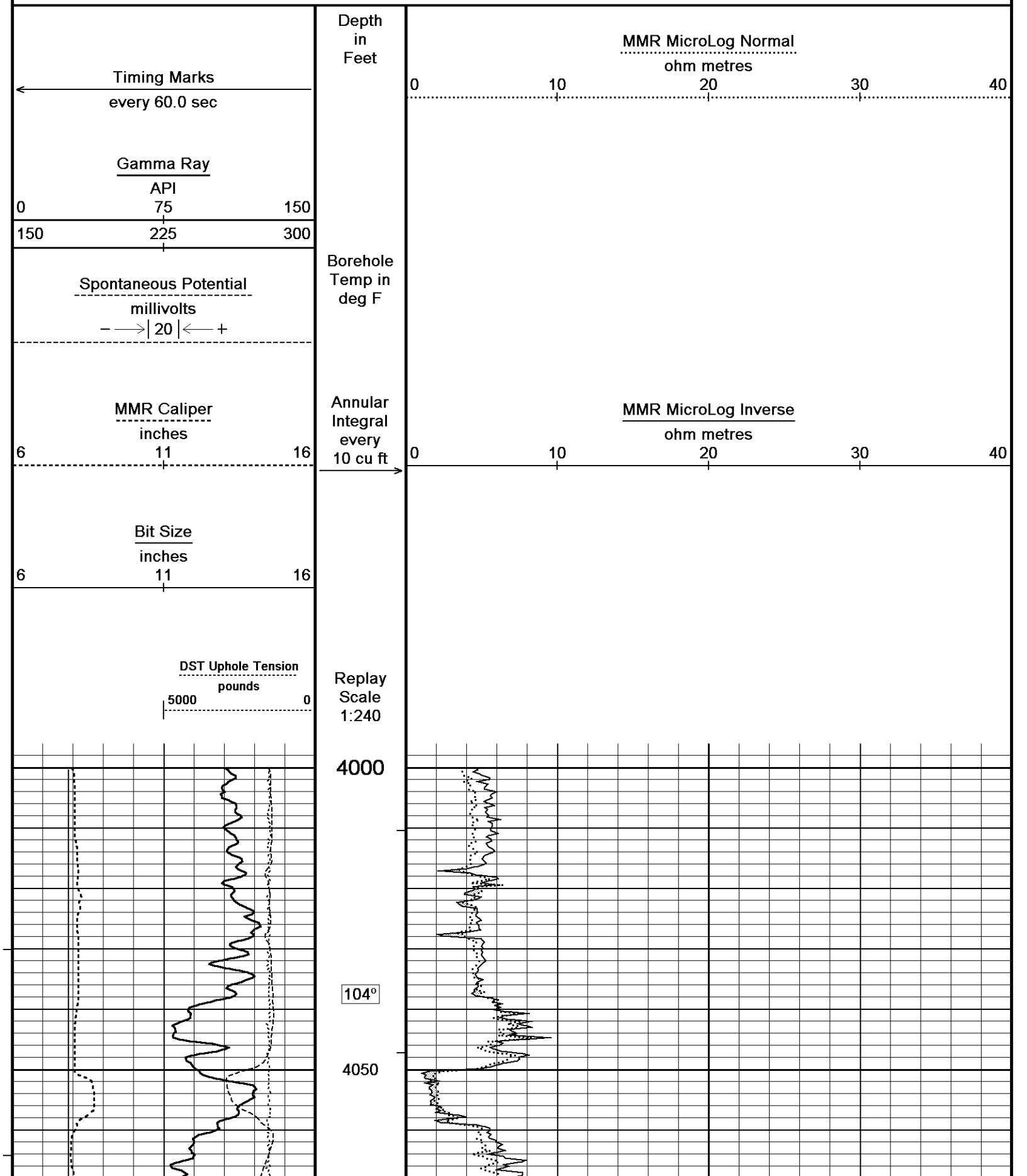
Tools Ran: MCG, MML, MDN, MPD, MFE, MAI ran in combination.
Hardware Used: MDN Dual bowspring used. MPD 8 inch profile plate used. MAI and MFE 0.5 Inch standoffs used.
2.71 g/cc Limestone Density Matrix used to calculate porosity.
All intervals logged and scaled per customer's request.
Tight pulls, washouts and borehole rugosity will affect data quality.
Total hole volume from TD to Surface Casing= 1917 cu. ft.
Annular volume with 4.5 inch production casing from TD to 4000 ft.= 573 cu. ft.
Service order: #3537848
Rig: Duke #6
Engineer: L. Scott
Operator(s): B. Reeves

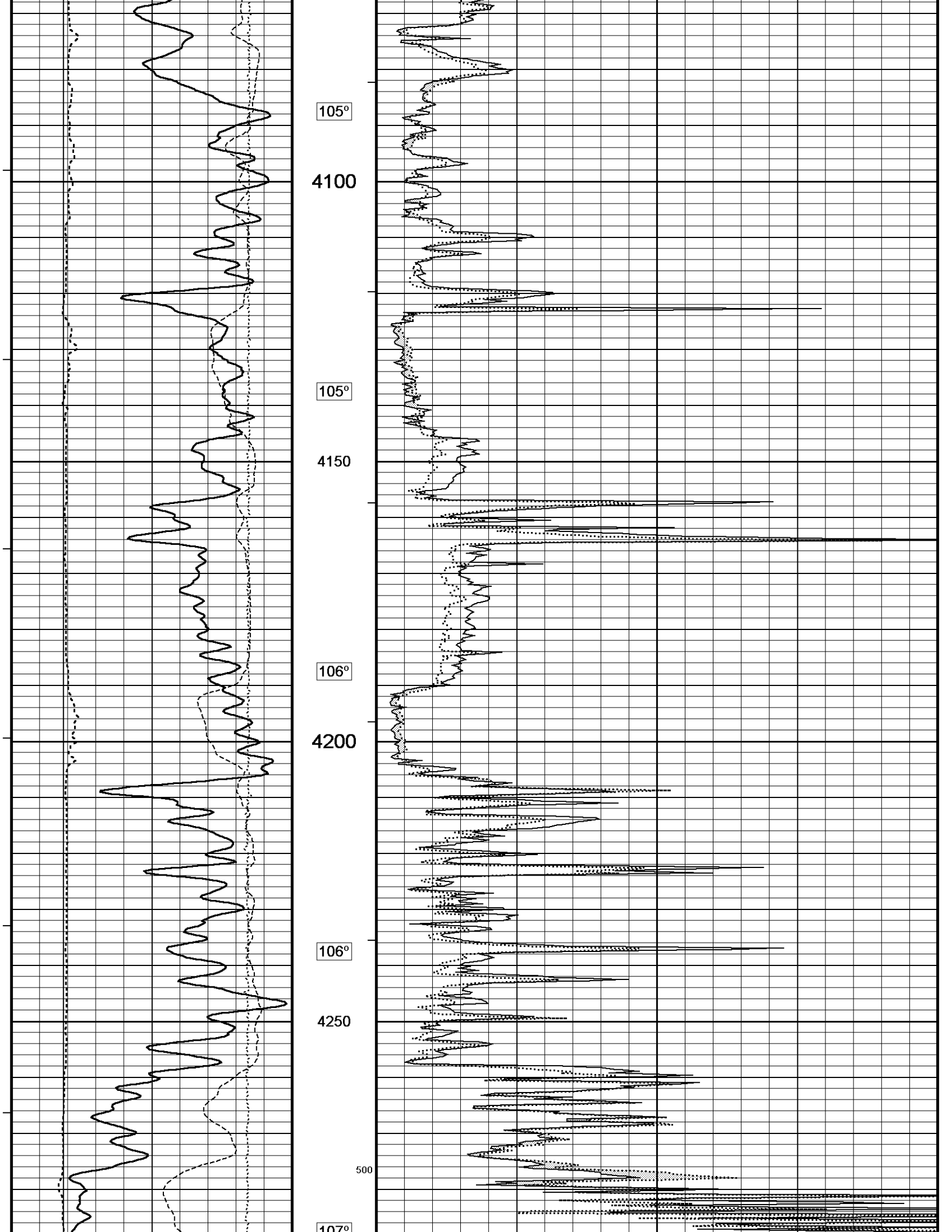
Software duplicates the pH onto the fluid loss. The fluid loss is 6.0.

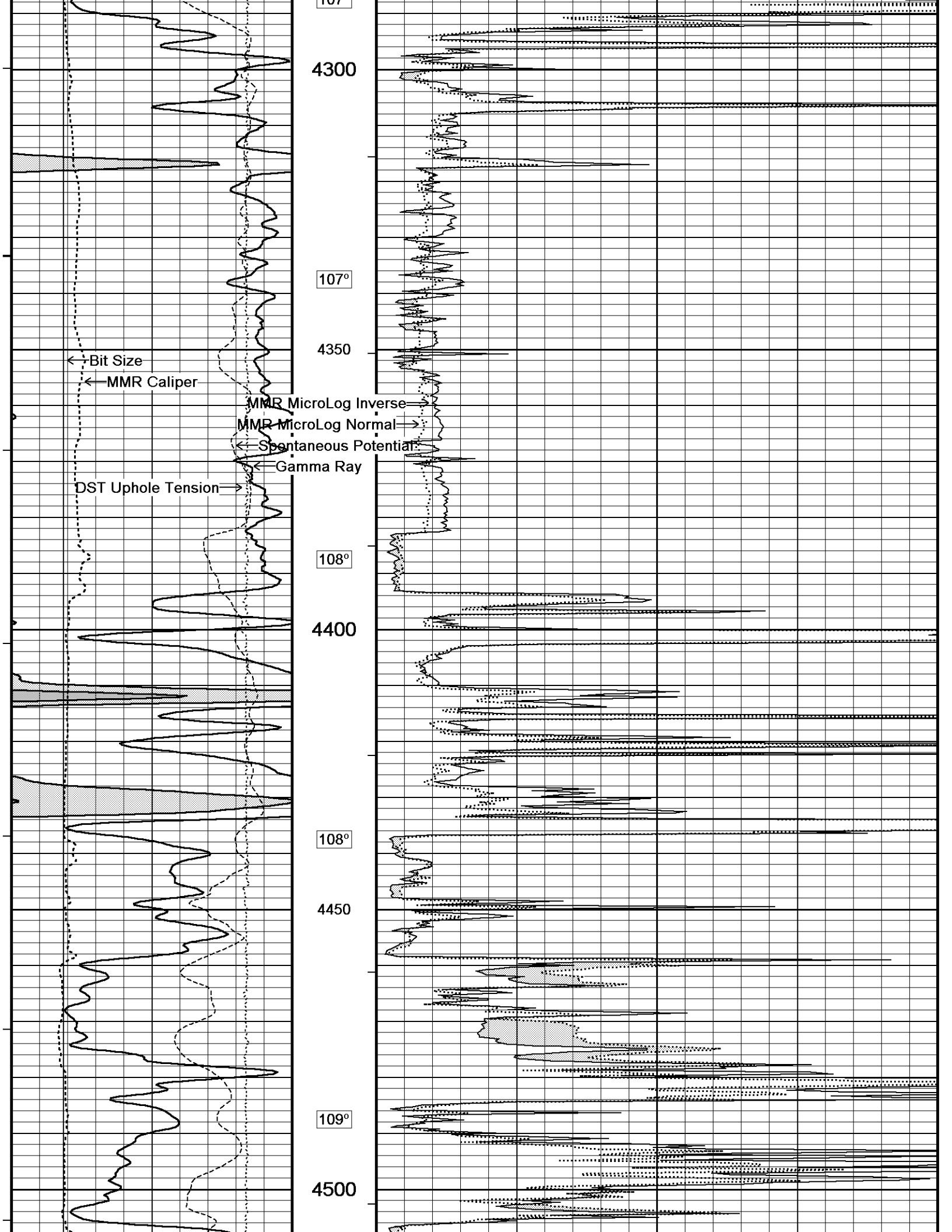
employees. These interpretations are also subject to our general terms and conditions in our price schedule.

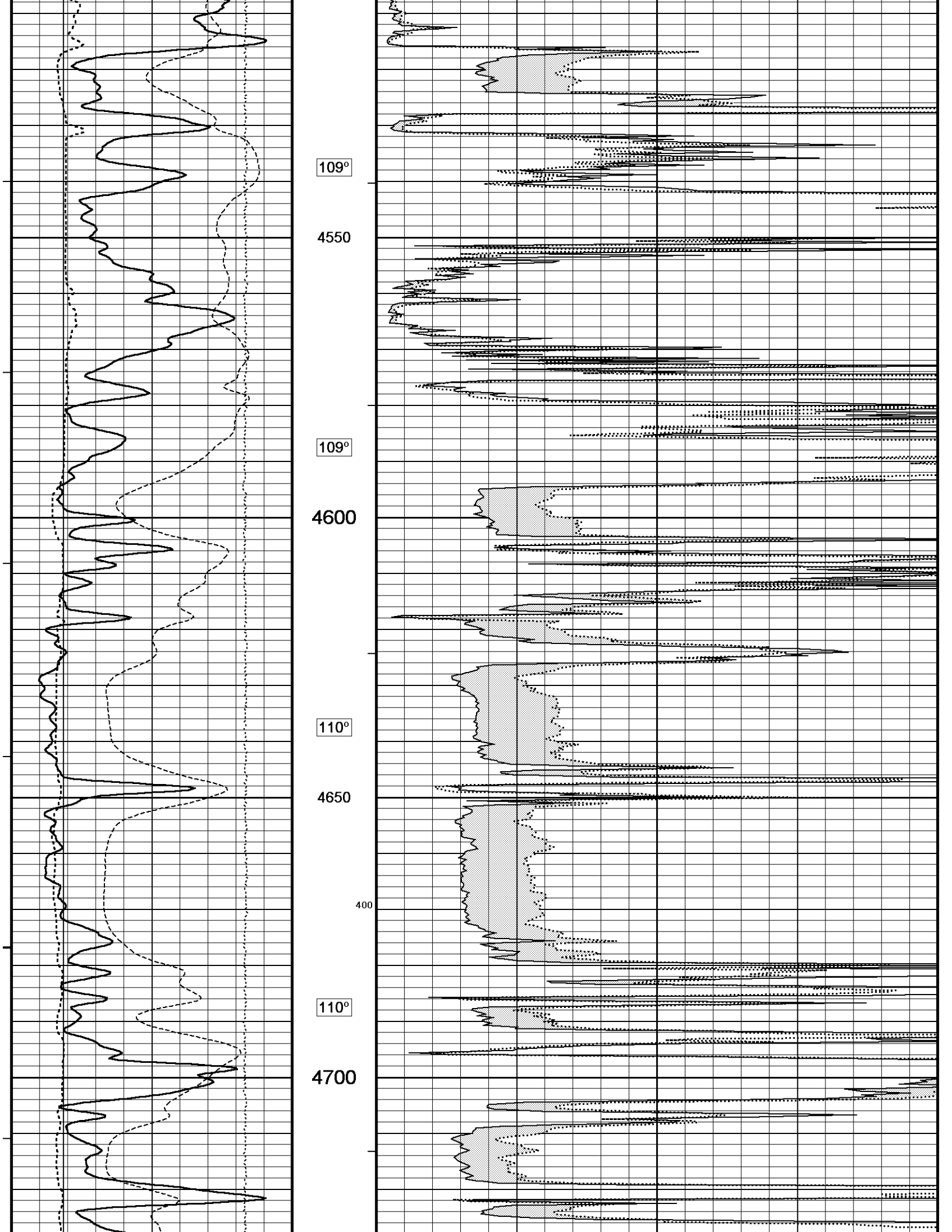
5 INCH MAIN

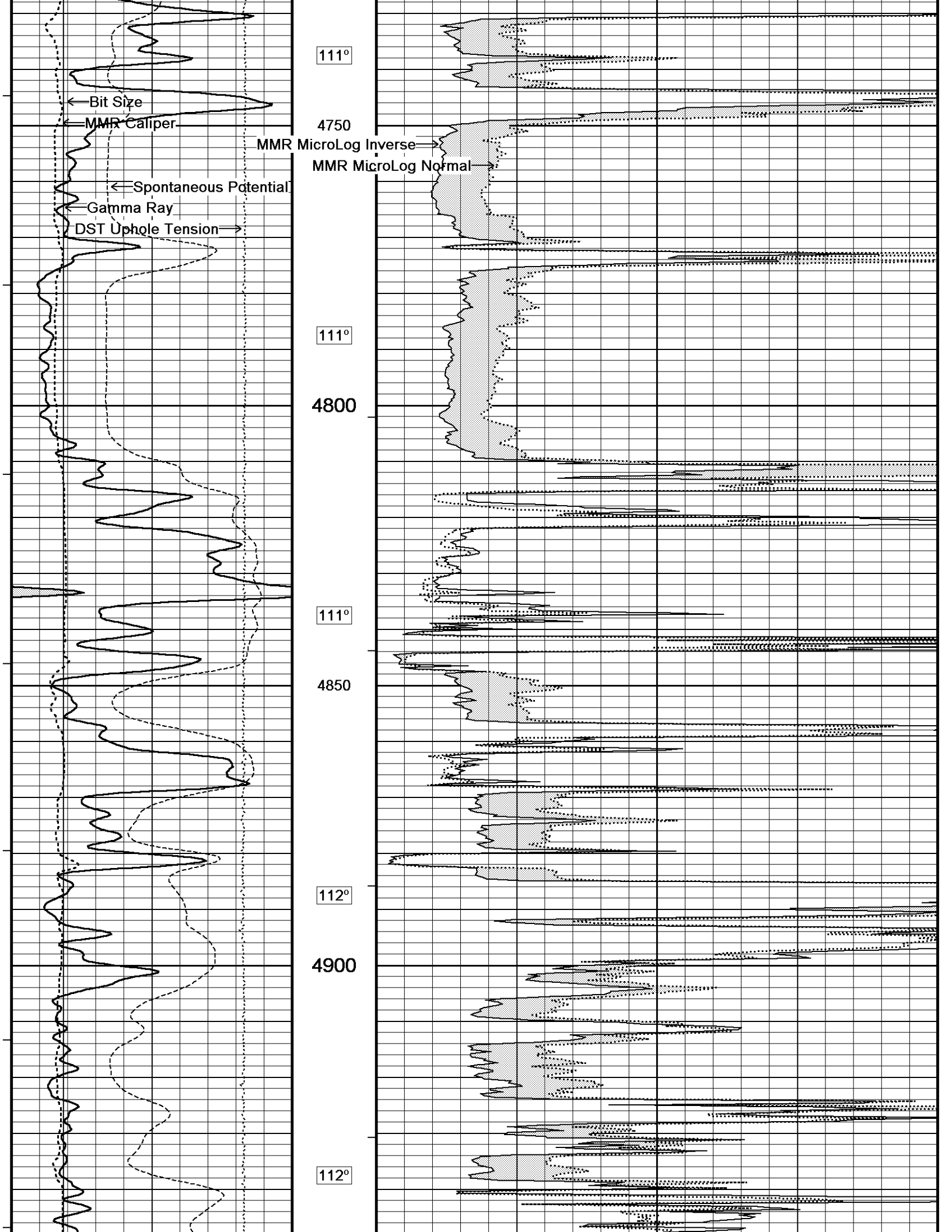
Depth Based Data - Maximum Sampling Increment 10.0cm
Plotted on 20-JAN-2013 21:57
Filename: C:\Minimus 13.04.8492\Data\O'Brien Clayton #1-33\O'Brien Clayton 1-33_003.dta
Recorded on 20-JAN-2013 19:23
System Versions: Logged with 13.04.8492 Processed with 13.04.8492 Plotted with 13.04.8492

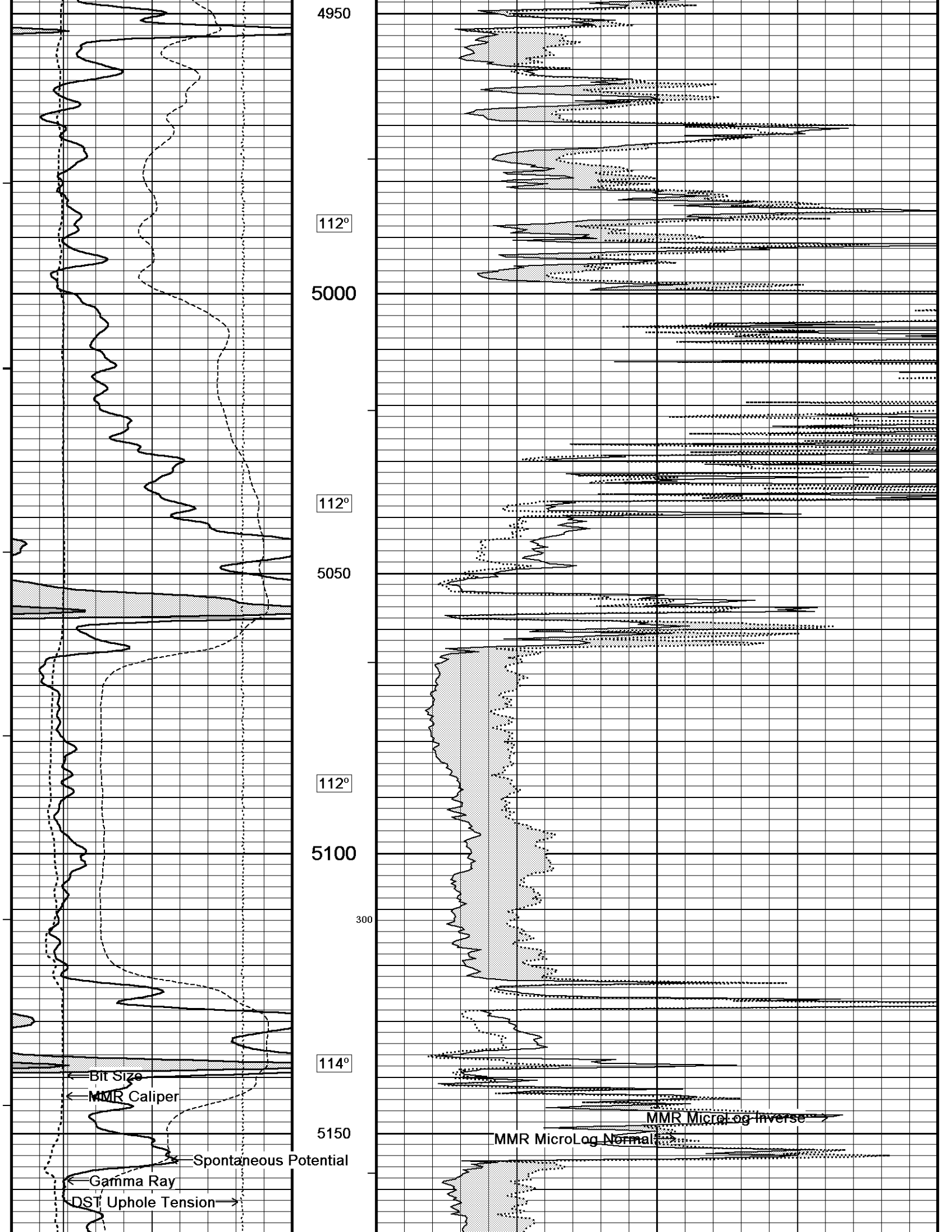


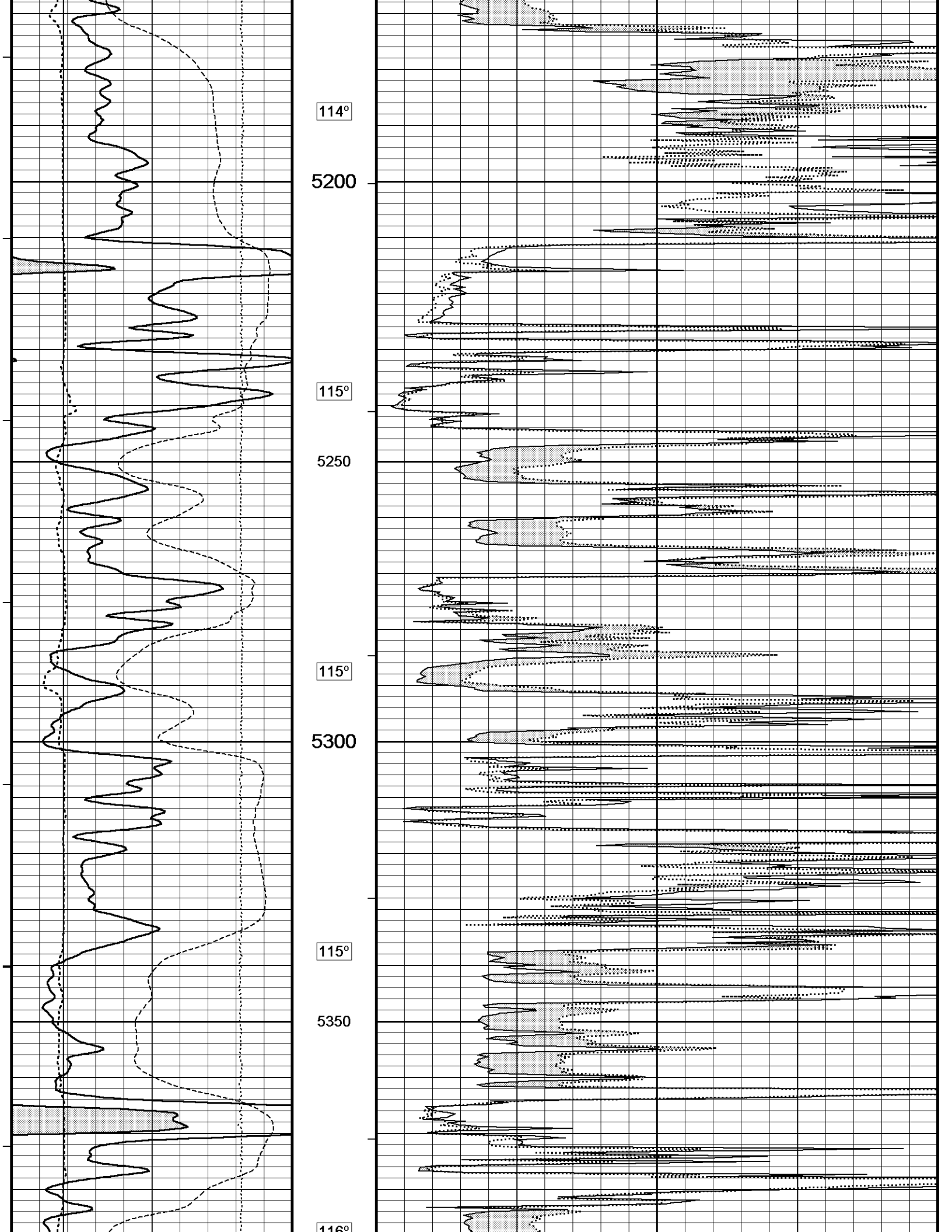

105°
4100
105°
4150
106°
4200
106°
4250
500
107°

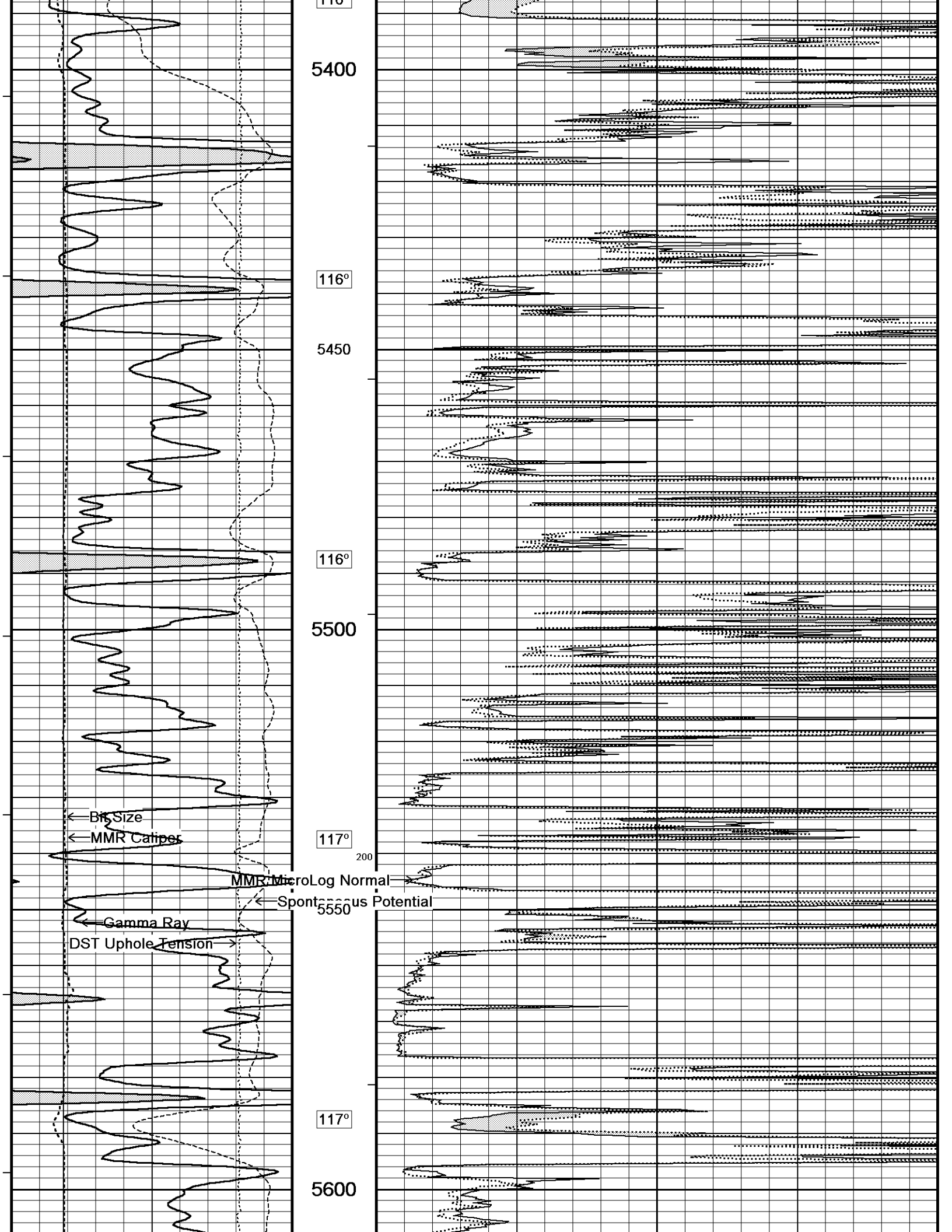

4300
107°
4350
Bit Size
MMR Caliper
MMR MicroLog Inverse
MMR MicroLog Normal
Spontaneous Potential
Gamma Ray
DST Uphole Tension
108°
4400
108°
4450
109°
4500

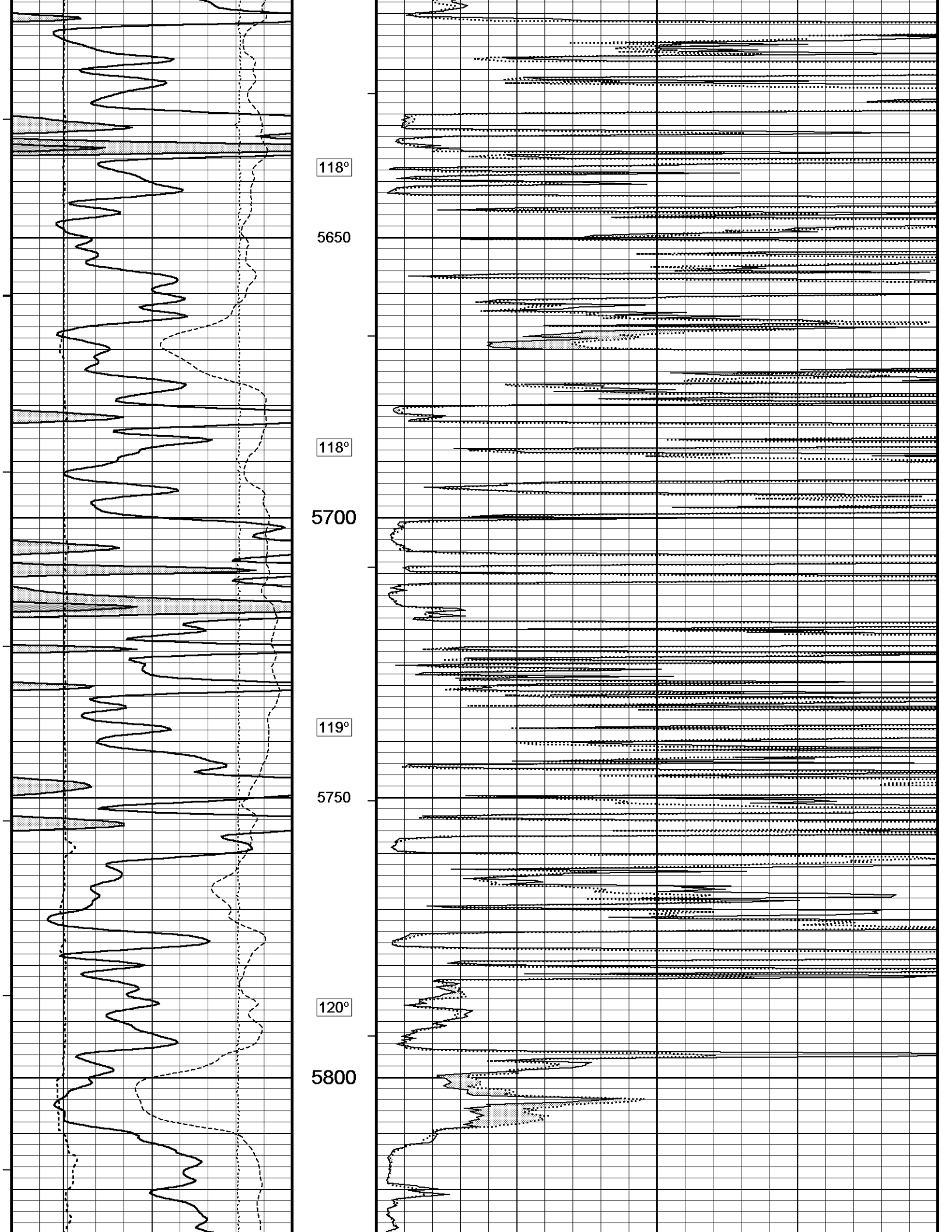

109°
4550
109°
4600
110°
4650
400
110°
4700

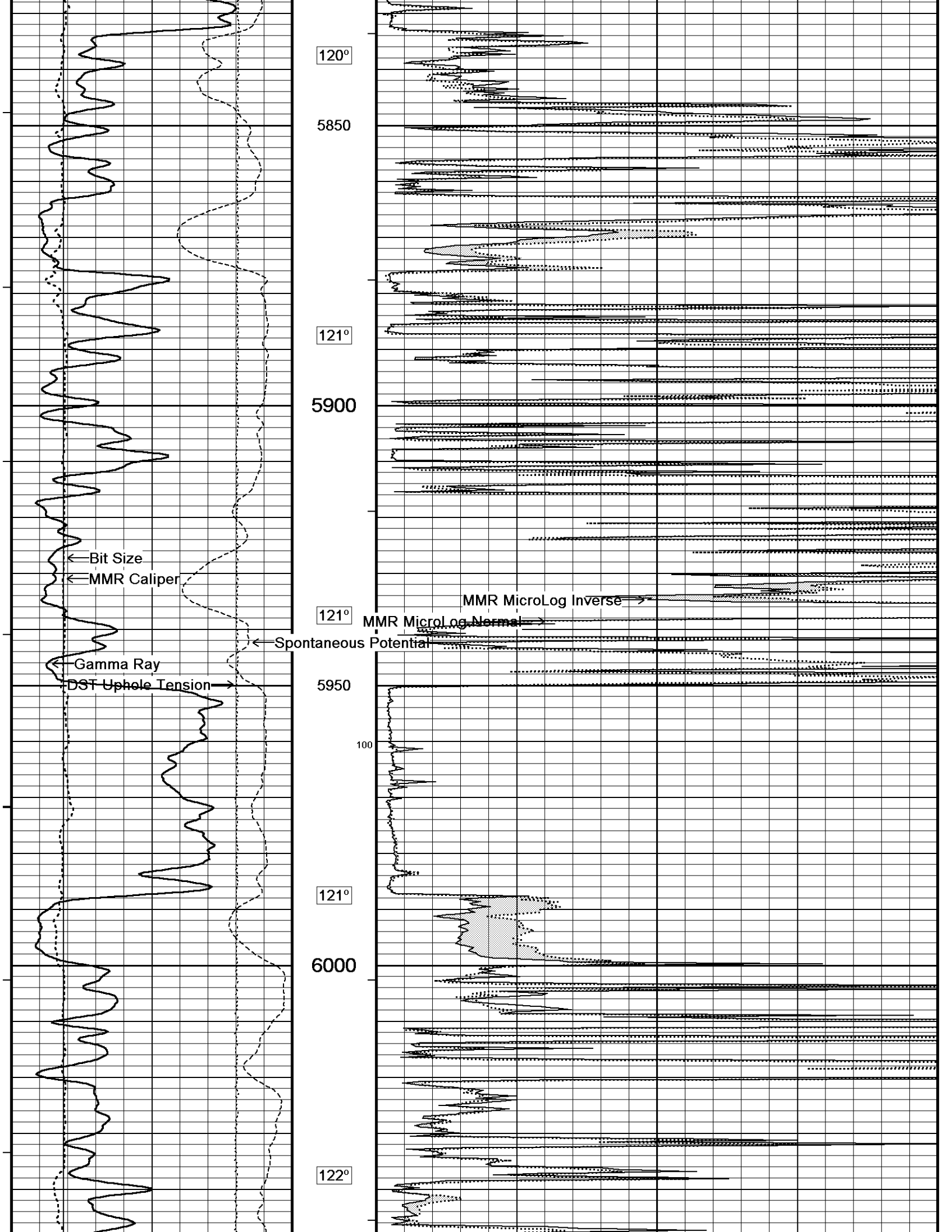

Bit Size
MMR Caliper
Spontaneous Potential
Gamma Ray
DST Uphole Tension
MMR MicroLog Inverse
MMR MicroLog Normal
111°
4750
111°
4800
111°
4850
112°
4900
112°

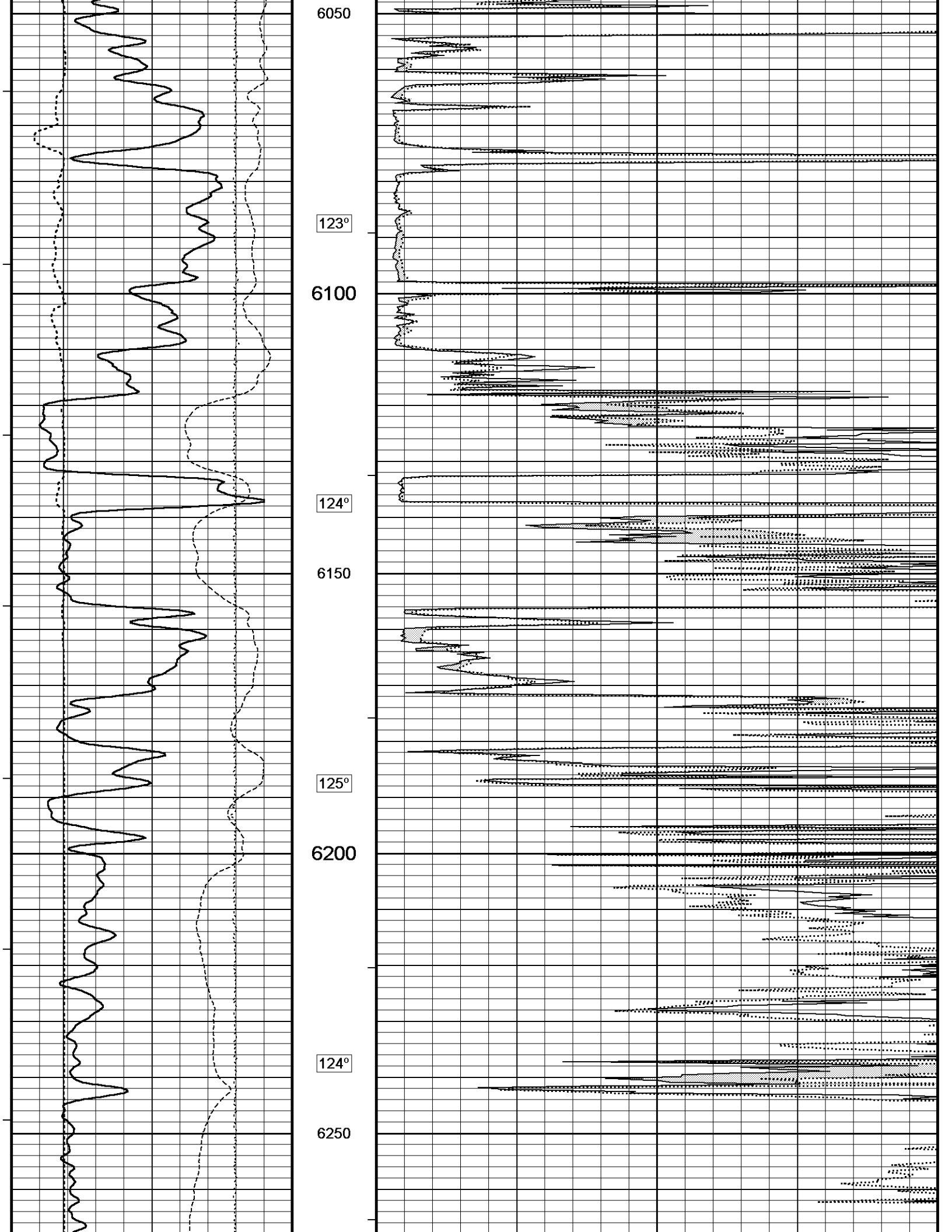

4950
112°
5000
112°
5050
112°
5100
300
114°
5150
Bit Size
MMR Caliper
Spontaneous Potential
Gamma Ray
DST Uphole Tension
MMR MicroLog Inverse
MMR MicroLog Normal


114°
5200
115°
5250
115°
5300
115°
5350
116°


5400
116°
5450
116°
5500
117°
200
5550
117°
5600
Bit Size
MMR Caliper
MMR MicroLog Normal
Spontaneous Potential
Gamma Ray
DST Uphole Tension


118°
5650
118°
5700
119°
5750
120°
5800


120°
5850
121°
5900
Bit Size
MMR Caliper
MMR MicroLog Inverse
121°
MMR MicroLog Normal
Spontaneous Potential
Gamma Ray
DST Uphole Tension
5950
100
121°
6000
122°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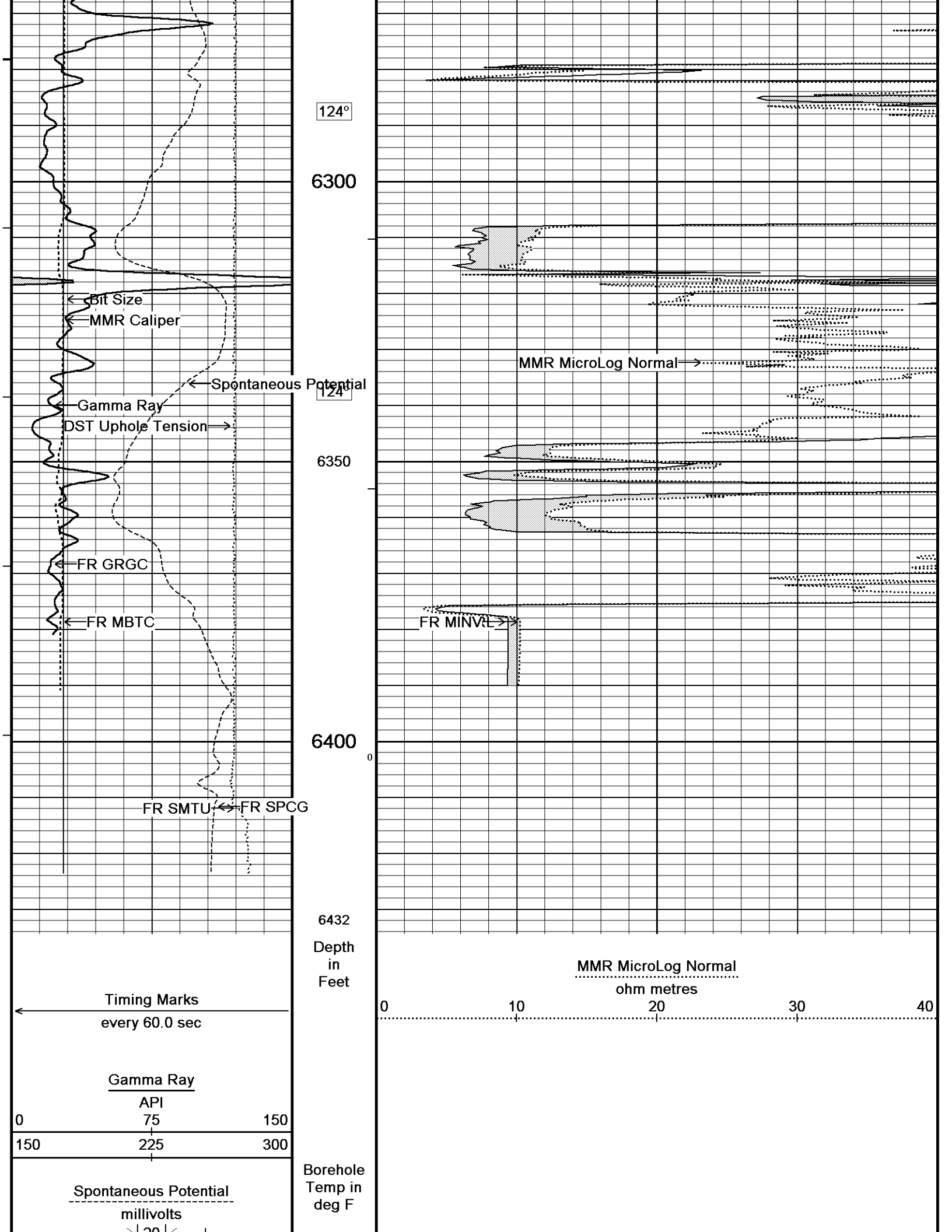
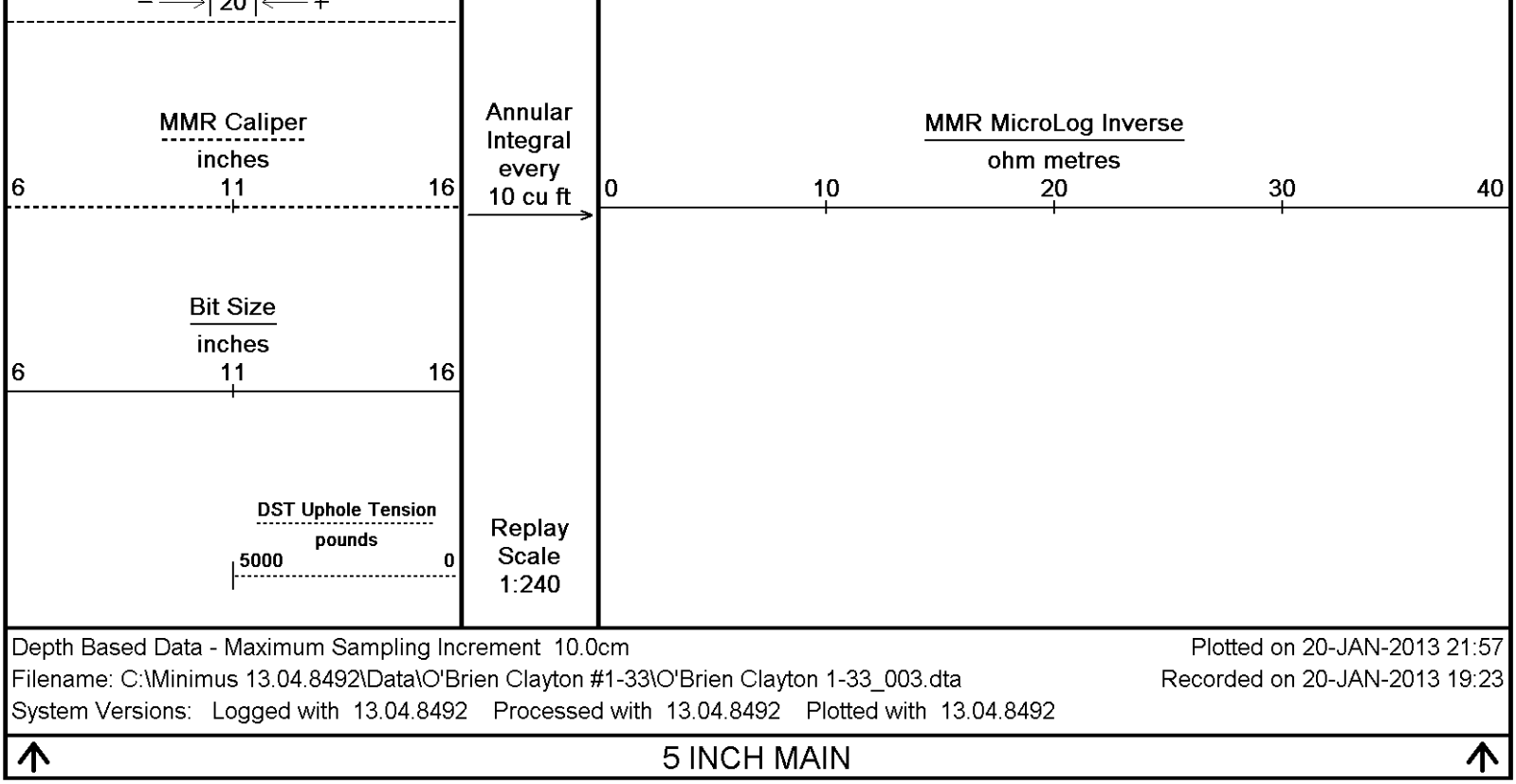
123°
6100
124°
6150
125°
6200
124°
6250


124°
6300
Bit Size
MMR Caliper
MMR MicroLog Normal
Spontaneous Potential
124°
Gamma Ray
DST Uphole Tension
6350
FR GRGC
FR MBTC
FR MINVL
6400
FR SMTU
FR SPCG
6432
Depth in Feet
Timing Marks
every 60.0 sec
Gamma Ray
API
0
75
150
150
225
300
Spontaneous Potential
millivolts
Borehole Temp in deg F
MMR MicroLog Normal
ohm metres
0
10
20
30
40

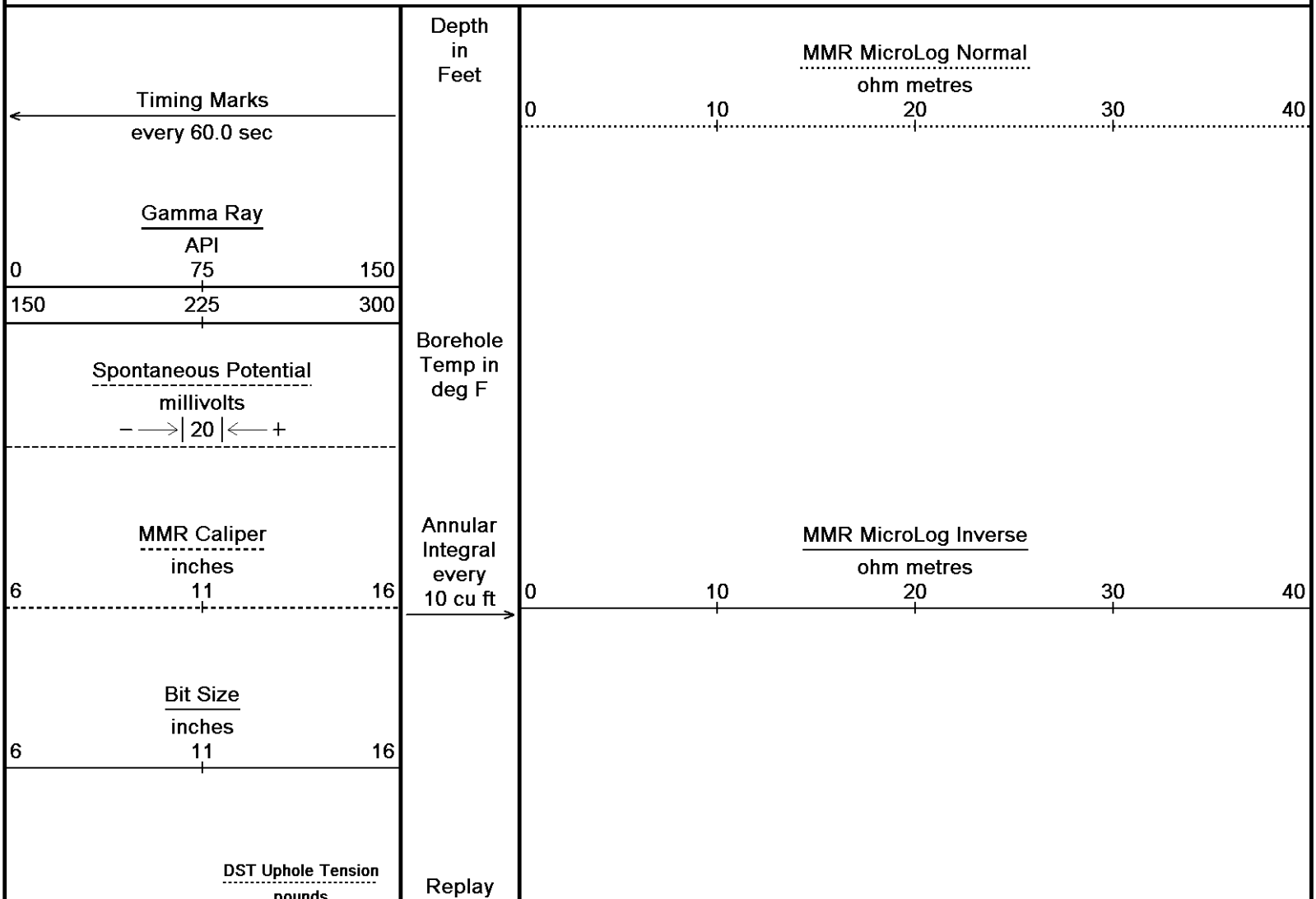


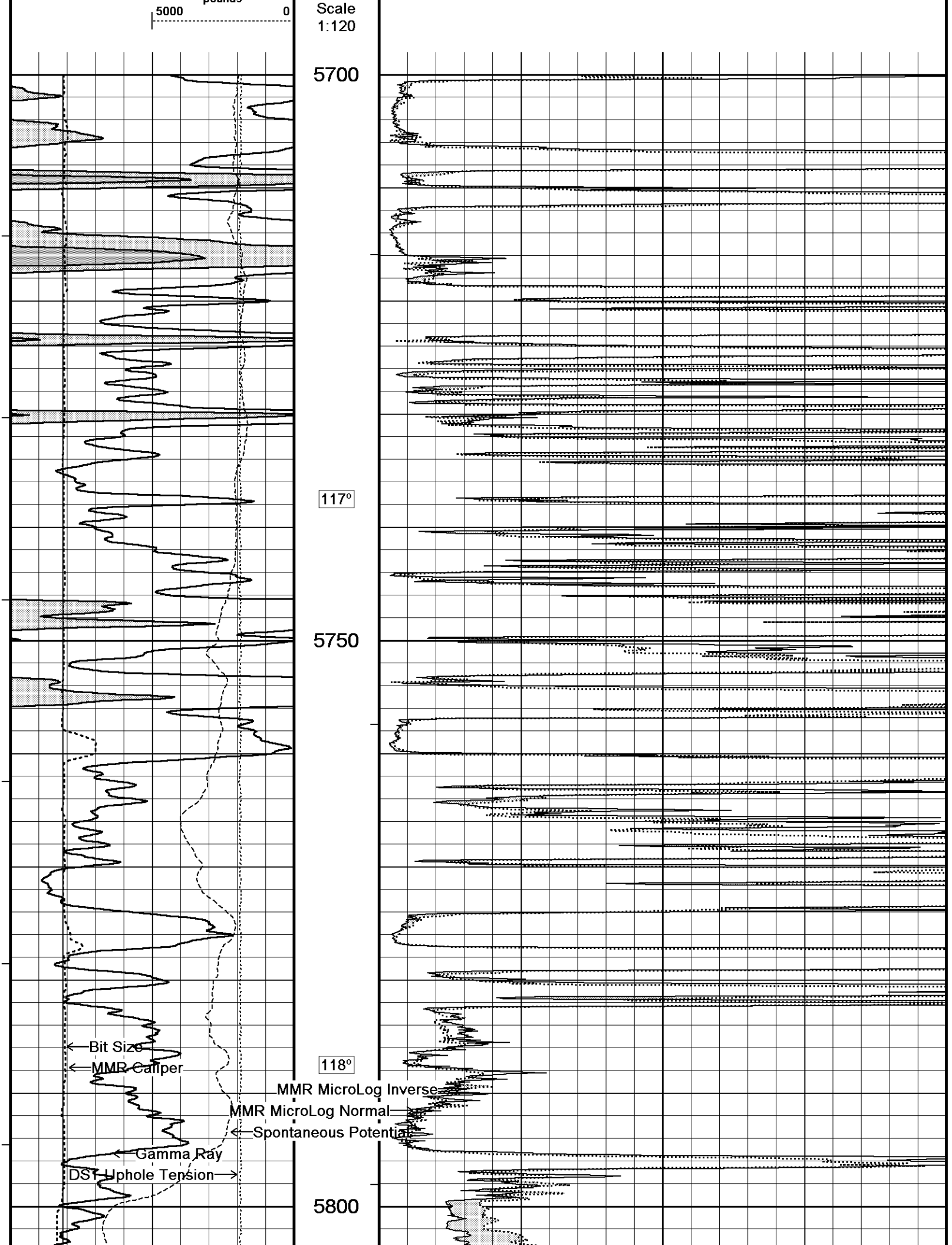
Depth Based Data - Maximum Sampling Increment 10.0cm — Plotted on 20-JAN-2013 21:57
Filename: C:\Minimus 13.04.8492\Data\O'Brien Clayton #1-33\O'Brien Clayton 1-33_003.dta — Recorded on 20-JAN-2013 19:23
System Versions: Logged with 13.04.8492 Processed with 13.04.8492 Plotted with 13.04.8492

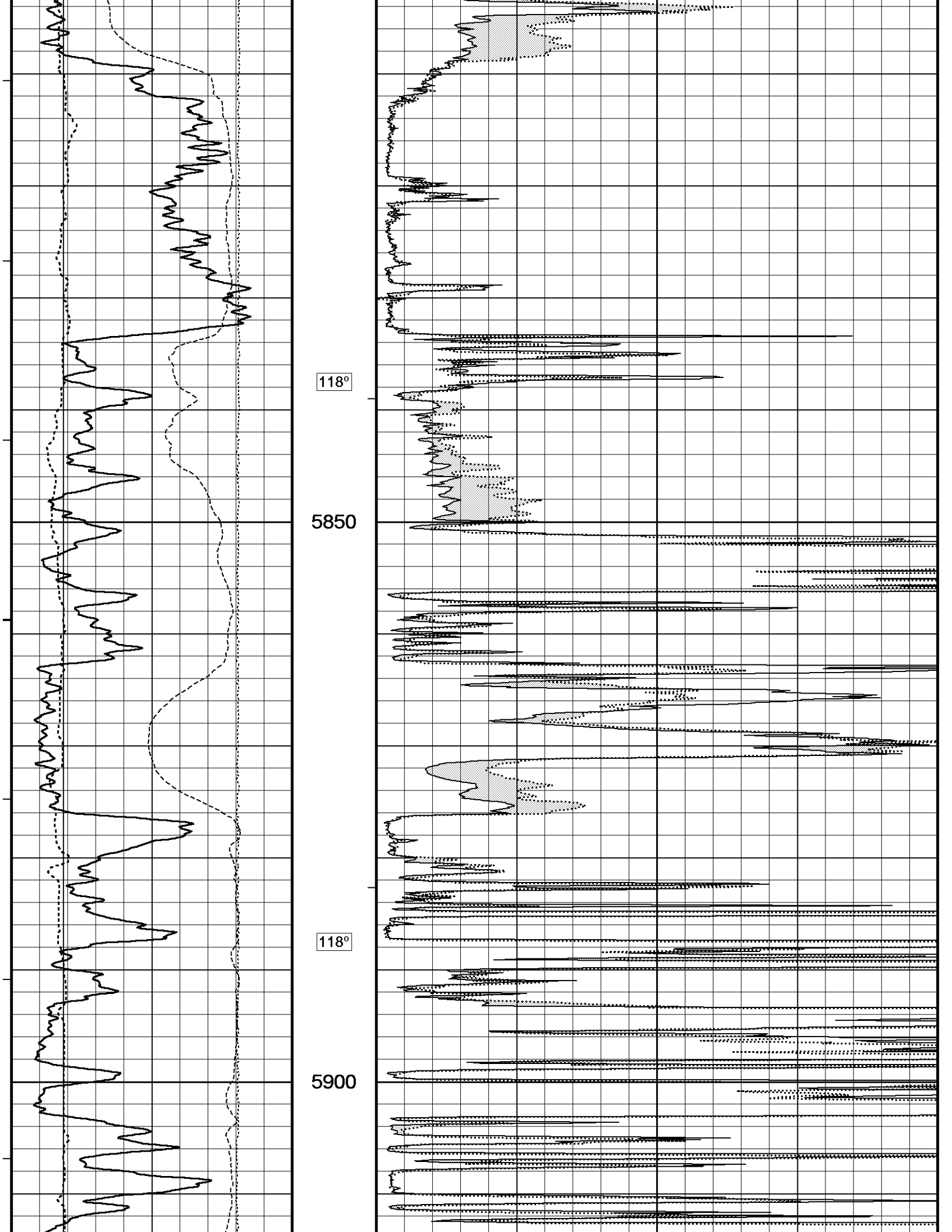
5 INCH MAIN

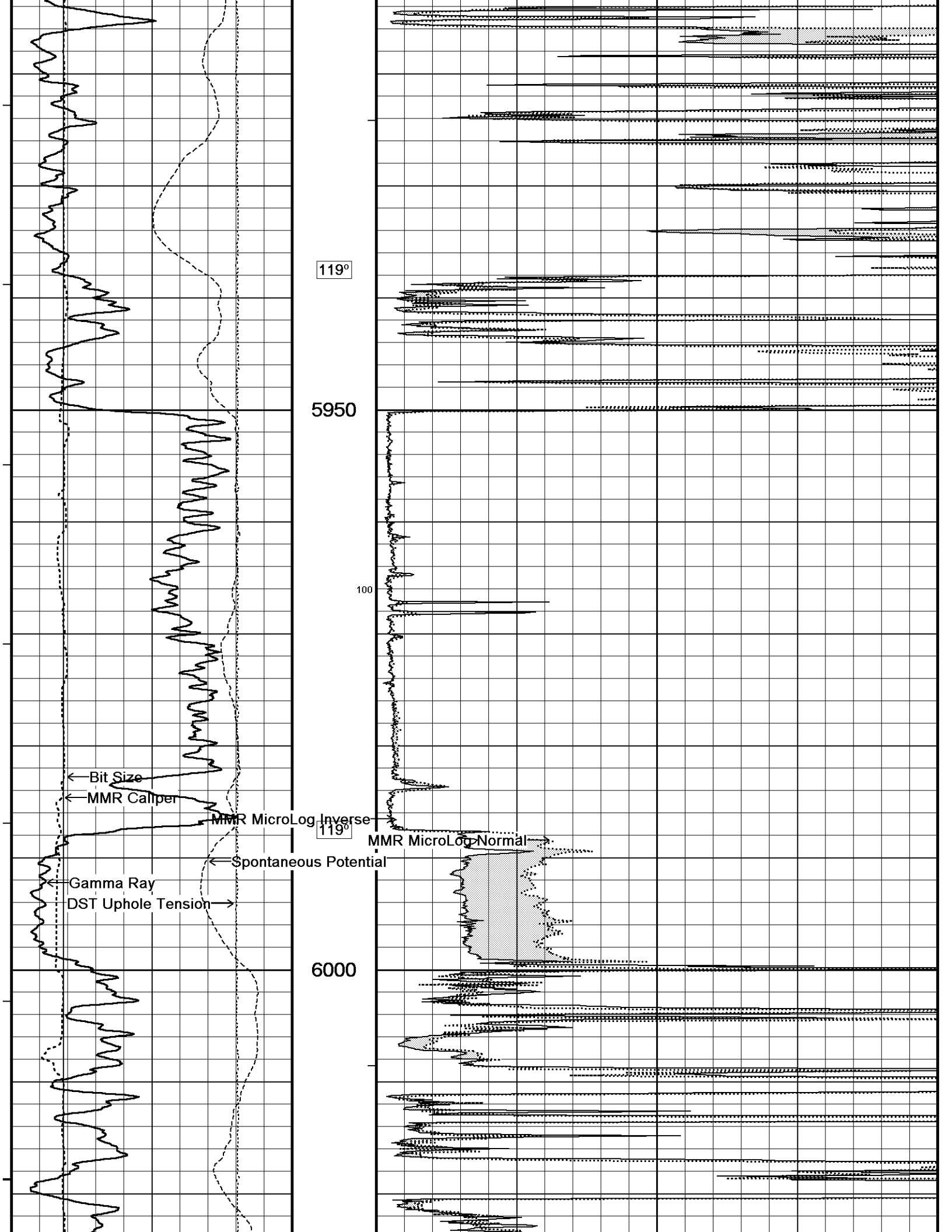
10 INCH HI-RES

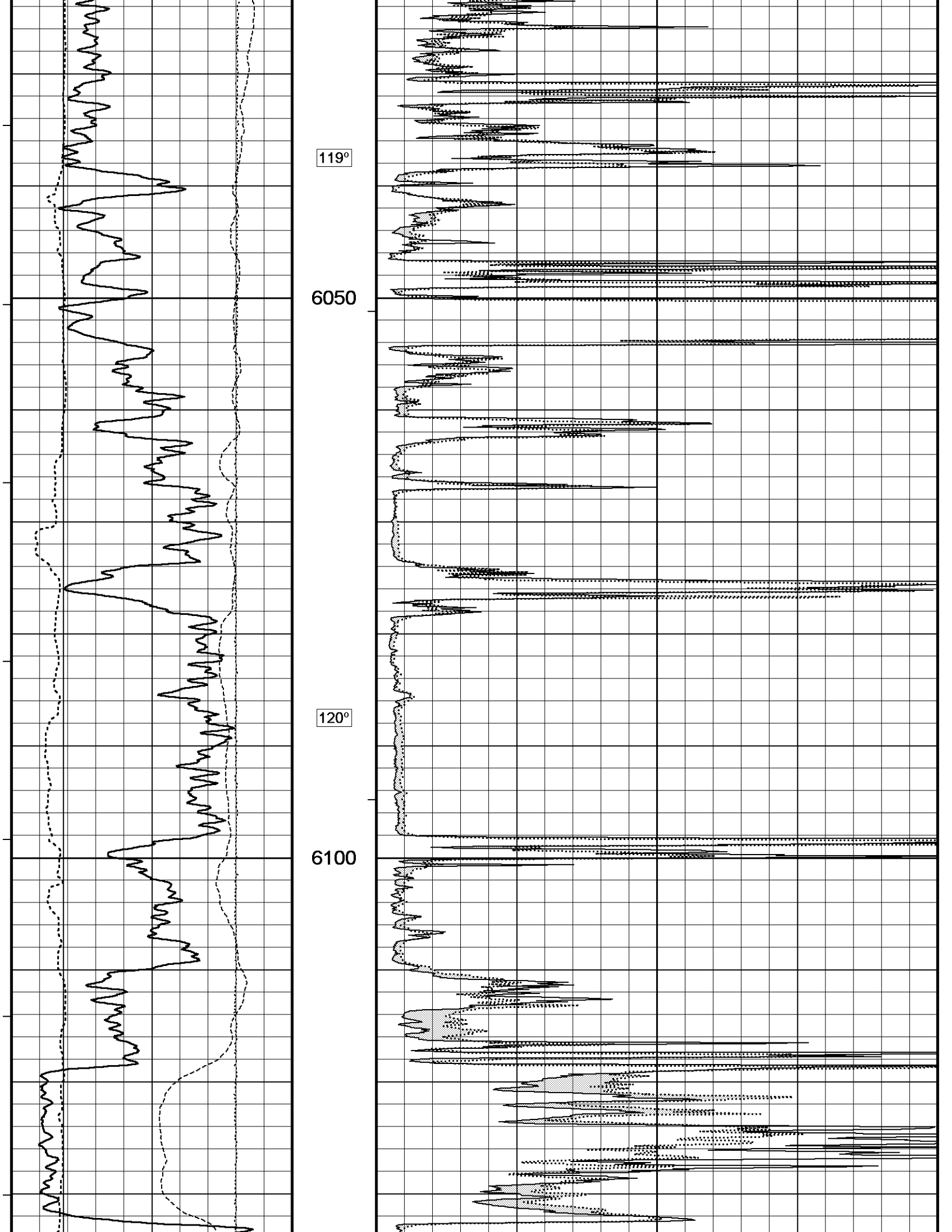
Depth Based Data - Maximum Sampling Increment 2.5cm — Plotted on 20-JAN-2013 21:57
Filename: C:\Minimus 13.04.8492\Data\O'Brien Clayton #1-33\O'Brien Clayton 1-33_001.dta — Recorded on 20-JAN-2013 18:24
System Versions: Logged with 13.04.8492 Plotted with 13.04.8492

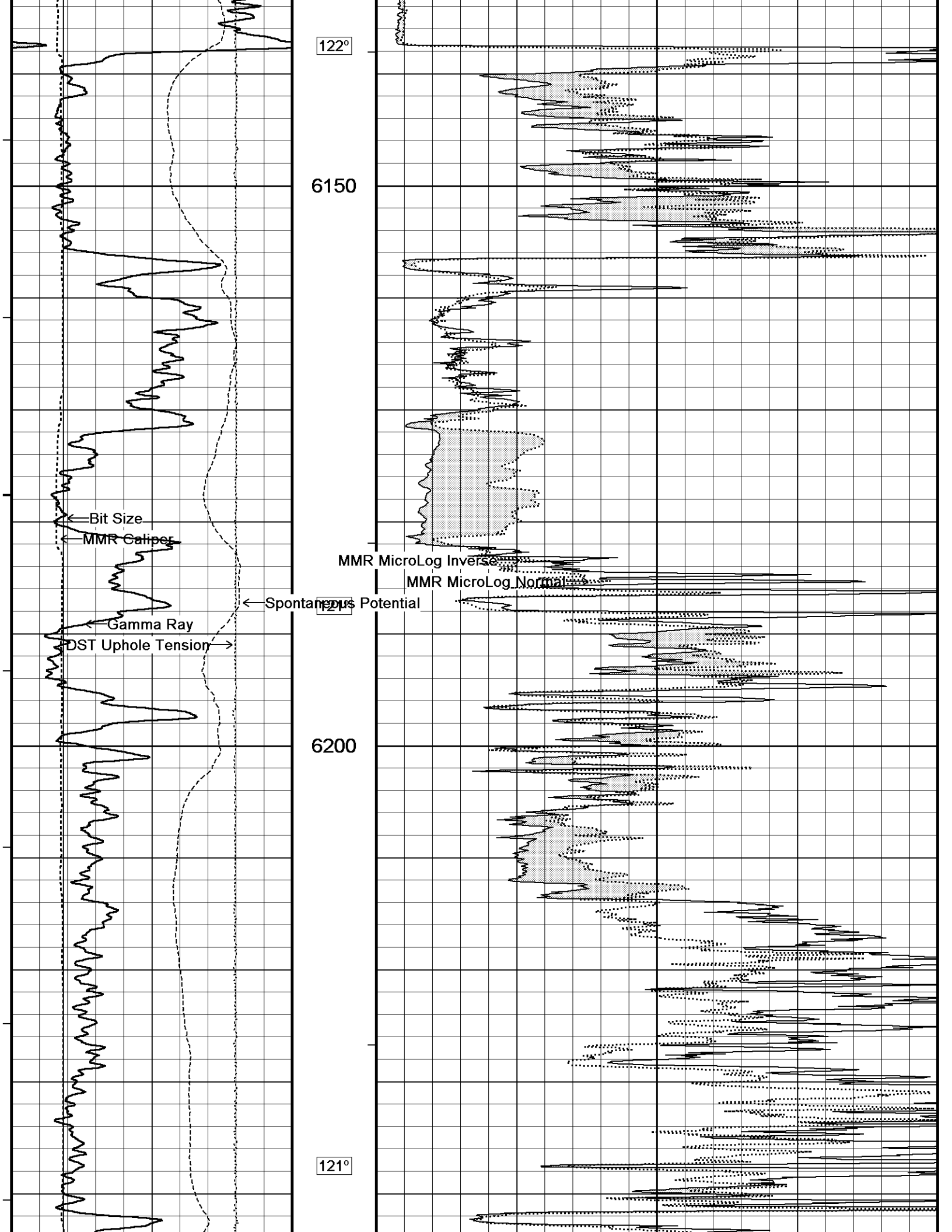


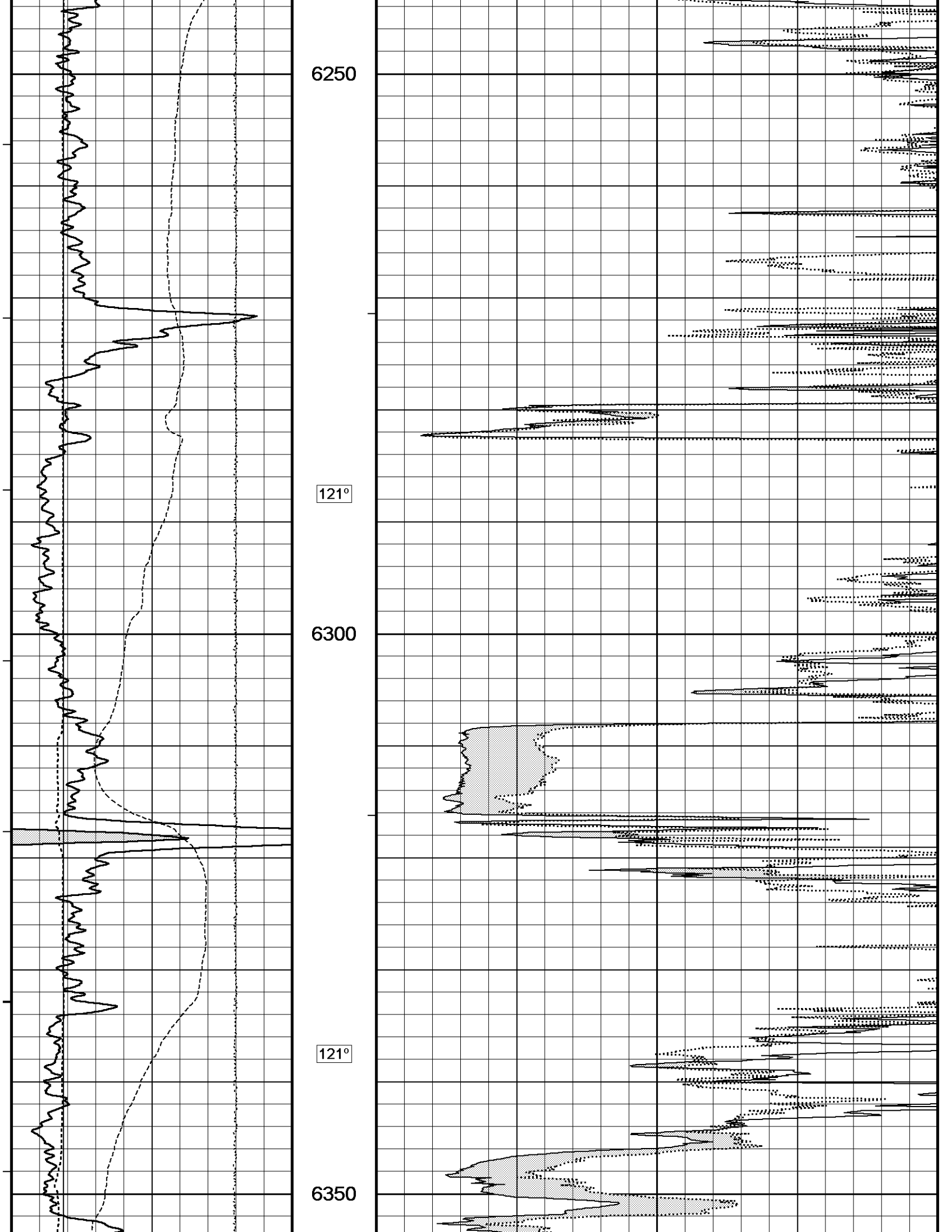

pounds
5000
0
Scale
1:120
5700
117°
5750
118°
5800
Bit Size
MMR Caliper
MMR MicroLog Inverse
MMR MicroLog Normal
Spontaneous Potential
Gamma Ray
DST Uphole Tension

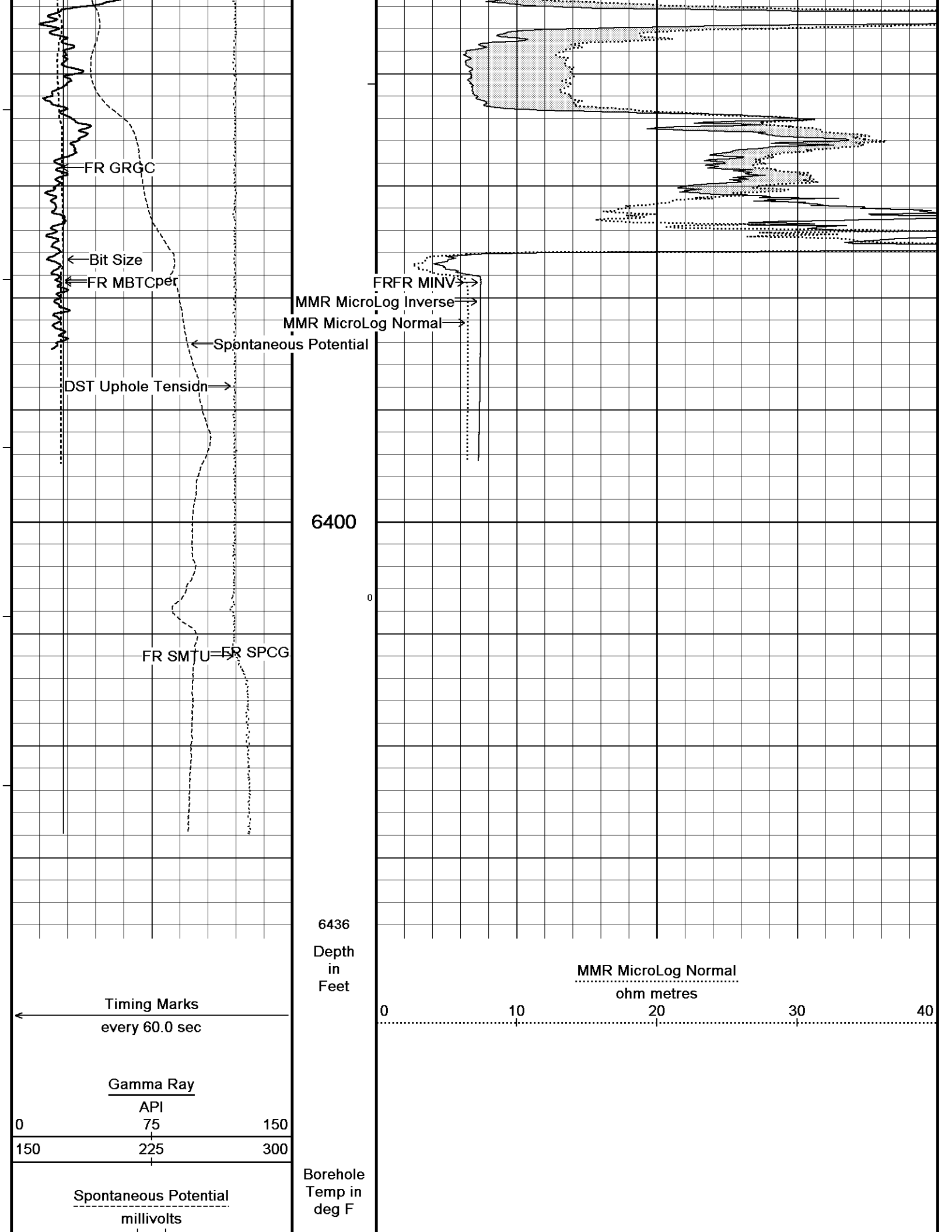

118°
5850
118°
5900

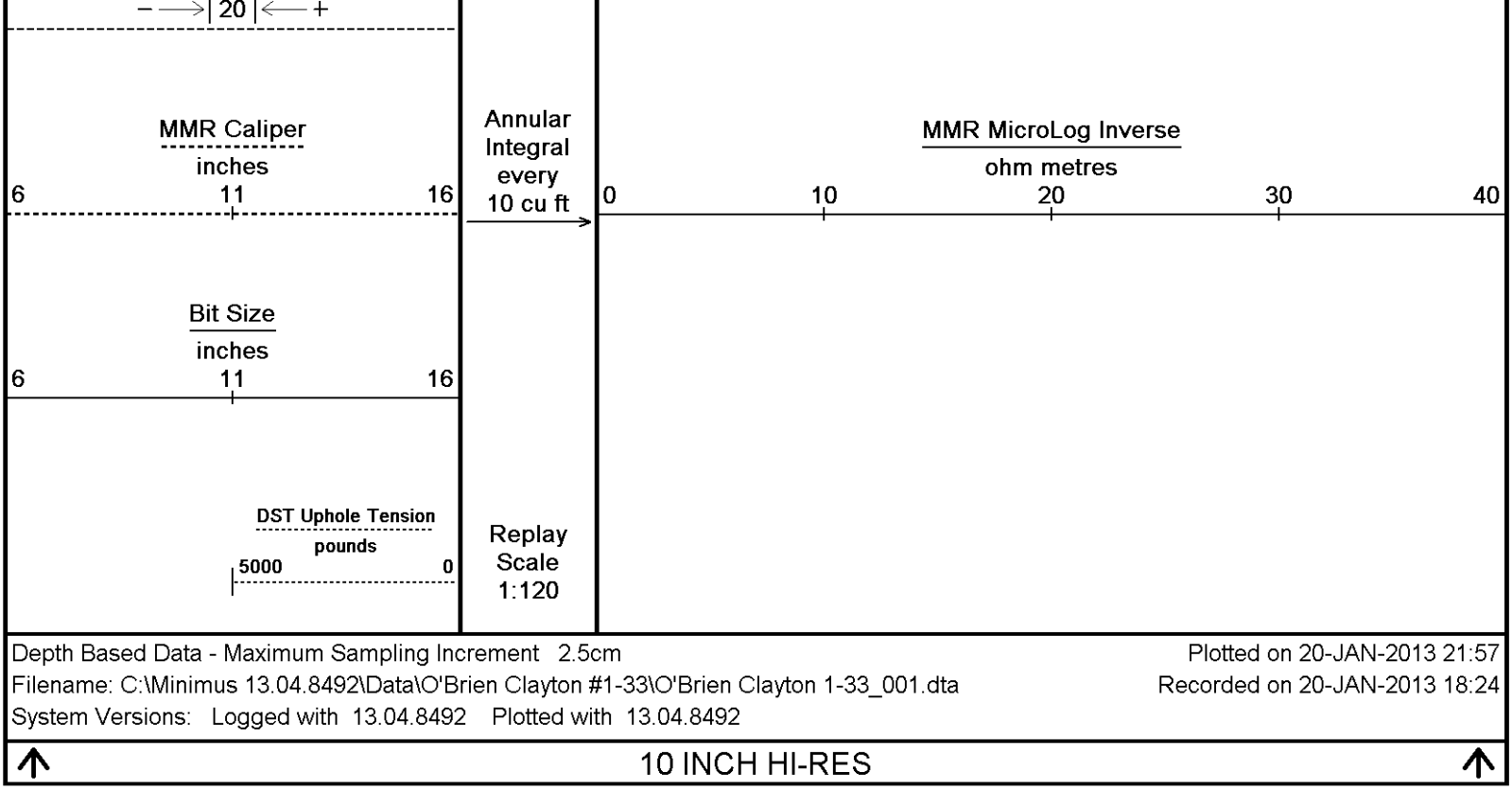

119°
5950
100
Bit Size
MMR Caliper
MMR MicroLog Inverse
119°
MMR MicroLog Normal
Spontaneous Potential
Gamma Ray
DST Uphole Tension
6000


119°
6050
120°
6100


122°
6150
Bit Size
MMR Caliper
MMR MicroLog Inverse
MMR MicroLog Normal
Spontaneous Potential
121
Gamma Ray
DST Uphole Tension
6200
121°


6250
121°
6300
121°
6350


FR GRGC
Bit Size
FR MBTCper
Spontaneous Potential
DST Uphole Tension
FR SMTU
FR SPCG
FRFR MINV
MMR MicroLog Inverse
MMR MicroLog Normal
6400
0
6436
Depth
in
Feet
Timing Marks
every 60.0 sec
Gamma Ray
API
0
75
150
150
225
300
Spontaneous Potential
millivolts
Borehole
Temp in
deg F
MMR MicroLog Normal
ohm metres
0
10
20
30
40

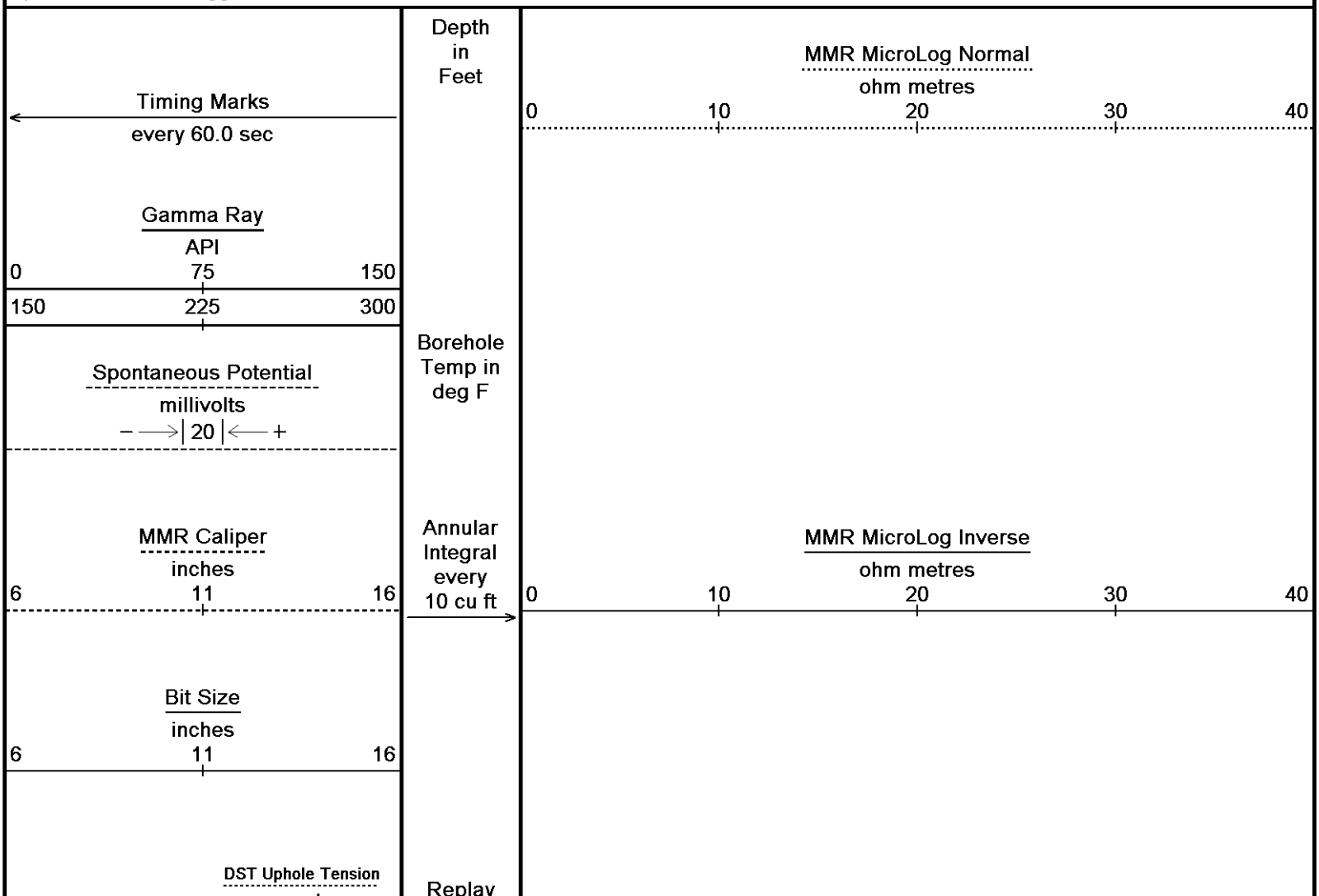


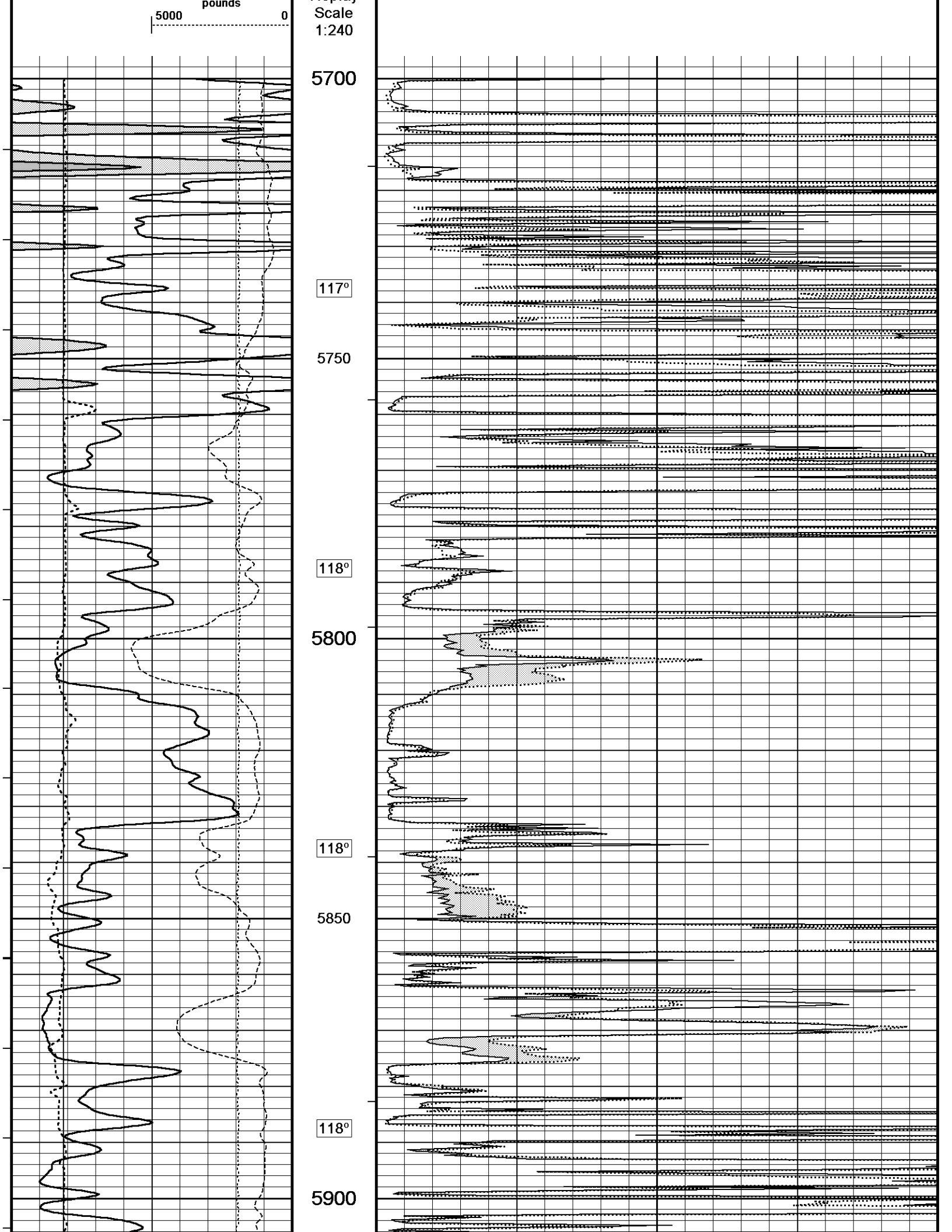
Depth Based Data - Maximum Sampling Increment 2.5cm — Plotted on 20-JAN-2013 21:57
Filename: C:\Minimus 13.04.8492\Data\O'Brien Clayton #1-33\O'Brien Clayton 1-33_001.dta — Recorded on 20-JAN-2013 18:24
System Versions: Logged with 13.04.8492 Plotted with 13.04.8492

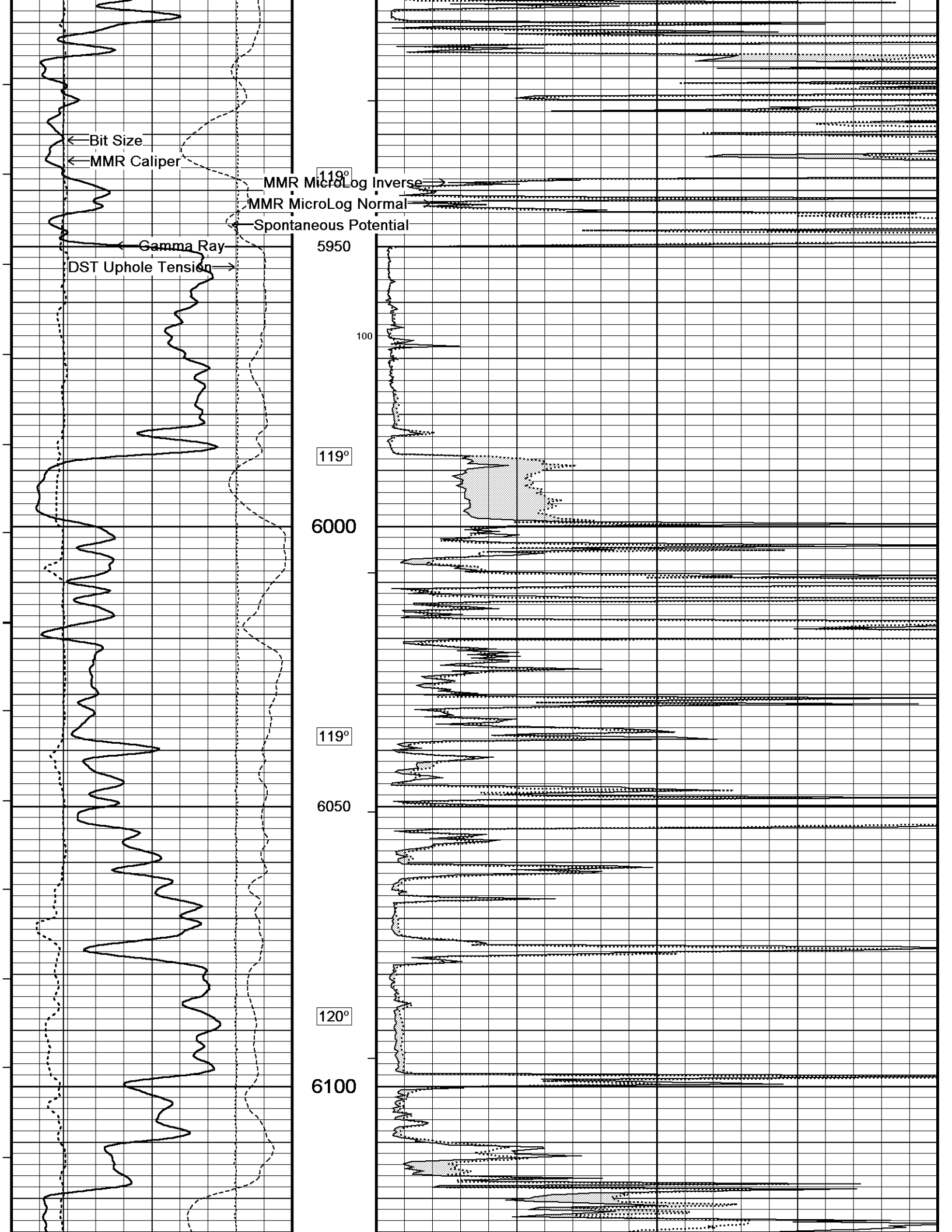
10 INCH HI-RES

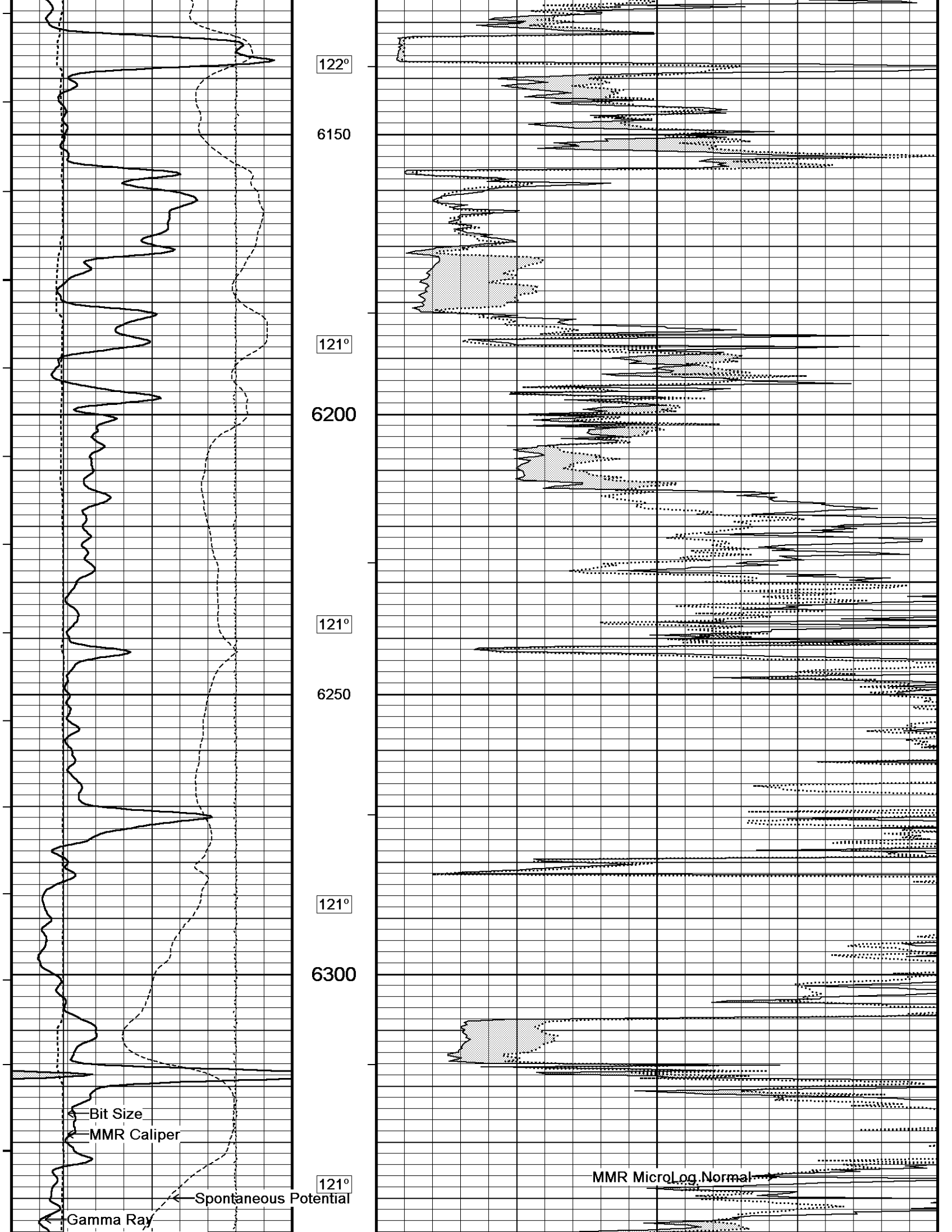
REPEAT SECTION

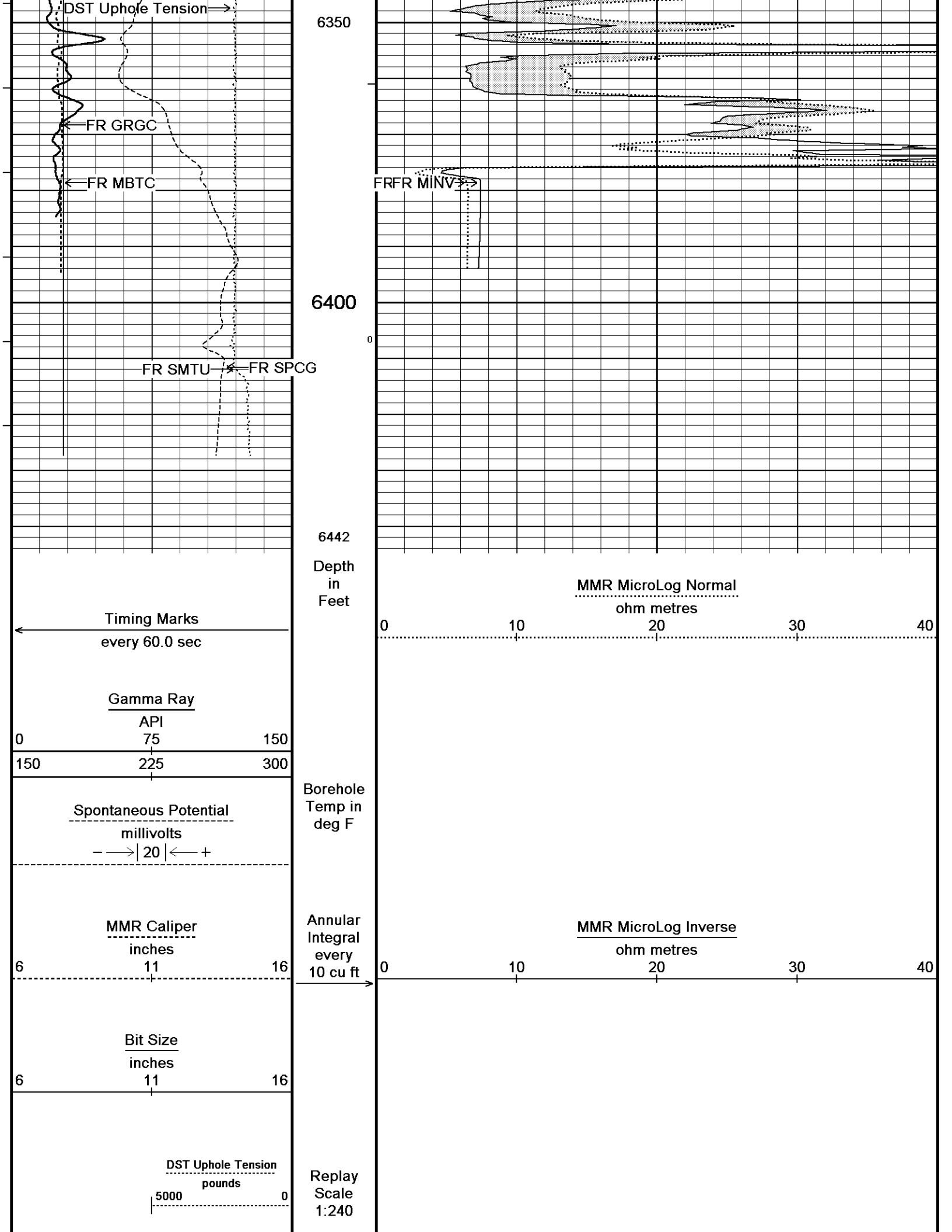
Depth Based Data - Maximum Sampling Increment 10.0cm — Plotted on 20-JAN-2013 21:57
Filename: C:\Minimus 13.04.8492\Data\O'Brien Clayton #1-33\O'Brien Clayton 1-33_002.dta — Recorded on 20-JAN-2013 18:24
System Versions: Logged with 13.04.8492 Processed with 13.04.8492 Plotted with 13.04.8492




pounds
5000
0
Scale
1:240
5700
117°
5750
118°
5800
118°
5850
118°
5900


Bit Size
MMR Caliper
Gamma Ray
DST Uphole Tension
119°
MMR MicroLog Inverse
MMR MicroLog Normal
Spontaneous Potential
5950
100
119°
6000
119°
6050
120°
6100


122°
6150
121°
6200
121°
6250
121°
6300
121°
Bit Size
MMR Caliper
Spontaneous Potential
Gamma Ray
MMR MicroLog Normal


DST Uphole Tension
FR GRGC
FR MBTC
FR SMTU
FR SPCG
6350
6400
6442
FRFR MINV
0
Depth
in
Feet
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
Borehole
Temp in
deg F
Annular
Integral
every
10 cu ft
Replay
Scale
1:240
MMR MicroLog Normal
ohm metres
0
10
20
30
40
MMR MicroLog Inverse
ohm metres
0
10
20
30
40

Depth Based Data - Maximum Sampling Increment 10.0cm — Plotted on 20-JAN-2013 21:57
Filename: C:\Minimus 13.04.8492\Data\O'Brien Clayton #1-33\O'Brien Clayton 1-33_002.dta — Recorded on 20-JAN-2013 18:24
System Versions: Logged with 13.04.8492 Processed with 13.04.8492 Plotted with 13.04.8492

REPEAT SECTION

BEFORE SURVEY CALIBRATION

C:\Minimus 13.04.8492\Data\O'Brien Clayton #1-33\O'Brien Clayton 1-33_002.dta

General Constants All 000

Last Edited on 20-JAN-2013,16:54

General Parameters		
Mud Resistivity	0.960	ohm-metres
Mud Resistivity Temperature	84.000	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	Density Caliper	
Rwa Parameters		
Porosity used	Base Density Porosity	
Resistivity used	Array Ind. Four Res Rt	
RWA Constant A	1.000	
RWA Constant M	2.000	

Down-hole Tension Calibration SMS 0

Field Calibration on 18-JAN-2013 01:57

Reading No	Measured	Calibrated (lbs)
1	15220.96	0.00
2	15827.69	390.00

SP Calibration MCG-C 208

Field Calibration on 27-DEC-2012 10:06

	Measured	Calibrated (mV)
Reference 1	100.9	100.0
Reference 2	-100.6	-100.0

High Resolution Temperature Calibration MCG-C 208

Field Calibration on 05-NOV-2012,14:26

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

High Resolution Temperature Constants MCG-C 208

Last Edited on 05-NOV-2012,14:25

Pre-filter Length	11

Gamma Calibration MCG-C 208

Field Calibration on 20-JAN-2013 14:04

	Measured	Calibrated (API)
Background	71	50
Calibrator (Gross)	1115	775
Calibrator (Net)	1044	725

Gamma Constants MCG-C 208

Last Edited on 20-JAN-2013,16:54

Gamma Calibrator Number	GR38	
Mud Density	1.10	gm/cc
Caliper Source for Processing	Density Caliper	
Tool Position	Eccentred	
Concentration of KCl	0.00	kppm

Micro Laterolog Calibration MMR-A 11

Base Calibration on 31-DEC-1999 00:00
Field Check on 31-DEC-1999 00:00

Base Calibration

	Measured		Calibrated (ohm-m)	
	Ref 1	Ref 2	Ref 1	Ref 2

0.0	0.0	0.0	0.0

Base Check (ohm-m)	Field Check (ohm-m)
0.0	0.0

Micro Laterolog Constants MMR-A 11

Last Edited on 12-NOV-2012,01:59

Pad Type	6 in Solid Nylon B23059	
Micro Laterolog K Factor	0.0128	
Standoff Offset	0.0000	inches

Mudcake Thickness Correction Constants

Mud Cake Source	Constant Value	
Mud Cake Thickness	0.4000	inches
Mud Cake Thickness Caliper	N/A	
Mud Cake Resistivity	0.1500	ohm-m
Mud Cake Resistivity Temp.	68.00	Deg F
Mud Cake Resistivity Source	Constant Value	
Temp. Source Rmc Correc.	N/A	

Caliper Calibration MMR-A 11

Base Calibration on 16-JAN-2013 10:32
Field Calibration on 20-JAN-2013 13:49

Base Calibration

Reading No	Measured	Calibrator Size (in)
1	13881	5.98
2	17138	7.97
3	20398	9.86
4	24351	11.92
5	0	0.00
6	N/A	N/A

Field Calibration

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

Micro Normal and Micro Inverse Calibration MMR-A 11

Base Calibration on 16-JAN-2013 10:36
Field Check on 20-JAN-2013 13:50

Base Calibration

	Measured		Calibrated (ohm-m)	
Channel	Resistor 1	Resistor 2	Resistor 1	Resistor 2
Micro Normal	12.3	59.9	5.0	25.0
Micro Inverse	15.5	77.5	5.0	25.0

Channel	Base Check (ohm-m)	Field Check (ohm-m)
Micro Normal	76.3	76.3
Micro Inverse	58.7	58.7

Micro Normal and Micro Inverse Constants MMR-A 11

Last Edited on 05-NOV-2012,13:54

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

Neutron Calibration MDN-A.B 65

Base Calibration on 13-DEC-2012 16:03
Field Check on 20-JAN-2013 14:00

Base Calibration

	Measured		Calibrated (cps)	
	Near	Far	Near	Far
	2945	91	3714	110
Ratio	32.377		33.764	

Field Calibrator at Base	Calibrated (cps)	
	1743	2519
Ratio	0.692	

Field Check	Calibrated (cps)	
	1729	2508
Ratio	0.691	

Neutron Constants MDN-A.B 65

Last Edited on 20-JAN-2013,13:56

Neutron Source Id	PN-521	

Neutron Source Id	PN-521	
Neutron Jig Number	5824NE	
Epithermal Neutron	No	
Caliper Source for Processing	Density Caliper	
Stand-off	0.00	inches
Mud Density	1.00	gm/cc
Limestone Sigma	7.10	cu
Sandstone Sigma	4.26	cu
Dolomite Sigma	4.70	cu
Formation Pressure Source	Constant Value	
Formation Pressure	0.00	kpsi
Temperature Source	Constant Value	
Temperature	68.00	degrees F
Mud Salinity	0.00	kppm
Salinity Correction	Not Applied	
Formation Fluid Salinity Source	Constant Value	
Formation Fluid Salinity	0.00	kppm
Barite Mud Correction	Not Applied	

FE Calibration MFE-B.J 352

Base Calibration on 16-JAN-2013 10:20
Field Check on 20-JAN-2013 13:39

Base Calibration

	Measured	Calibrated (ohm-m)
Reference 1	0.0	0.0
Reference 2	964.3	126.8
Base Check		281.2
Field Check		281.4

FE Constants MFE-B.J 352

Last Edited on 20-JAN-2013,16:54

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 26-JUL-2012,09:22
Field Check on 20-JAN-2013 13:34

Base Calibration

Test Loop Calibration

Channel	Measured Low	Measured High	Calibrated (mmho/m) Low	Calibrated (mmho/m) 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 78.4 Deg F

Channel	Base Check (mmho/m) Low	Base Check (mmho/m) High	Field Check (mmho/m) Low	Field Check (mmho/m) High
1			18.5	3849.8
2			31.7	3628.2
3			28.6	3048.8
4			18.3	2079.0
Deep			16.1	1911.2
Medium			42.5	4059.5
Shallow			49.5	5480.8

Array Temperature 61.2 Deg F

Induction Constants MAI-A.A 45

Last Edited on 20-JAN-2013,16:55

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 13-DEC-2012,10:54

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

High Resolution Temperature Constants MAI-A.A 45

Last Edited on 13-DEC-2012,10:53

Pre-filter Length	11

Caliper Calibration MPD-B 31

Base Calibration on 13-DEC-2012 14:11
Field Calibration on 20-JAN-2013 13:40

Base Calibration

Reading No	Measured	Calibrator Size (in)
1	15472	3.99
2	24160	5.98
3	32703	7.97
4	41008	9.86
5	50231	11.92
6	N/A	N/A

Field Calibration

Measured Caliper (in)	Actual Caliper (in)
5.97	5.98

Photo Density Calibration MPD-B 31

Base Calibration on 13-DEC-2012 14:32
Field Check on 20-JAN-2013 13:48

Density Calibration

Base Calibration	Measured		Calibrated (sdu)	
	Near	Far	Near	Far
Reference 1	46489	23675	59556	30836
Reference 2	18873	1941	24941	2541

Field Check at Base

683.9	844.6

Field Check

684.3	844.8

PE Calibration

Base Calibration	Measured	Calibrated

Base Calibration	Measured			Calibrated
	WS	WH	Ratio	Ratio
Background	126	608		
Reference 1	18821	46368	0.409	0.371
Reference 2	5566	18789	0.299	0.272
Field Check at Base	125.8	608.0		
Field Check	126.2	608.8		

Density Constants MPD-B 31

Last Edited on 20-JAN-2013,16:54

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	

DOWNHOLE EQUIPMENT

C:\Minimus 13.04.8492\Data\O'Brien Clayton #1-33\O'Brien Clayton 1-33_002.dta

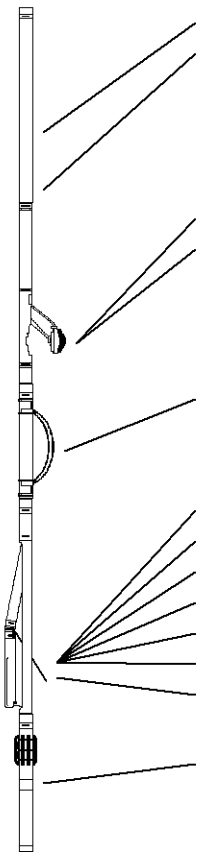
Compact Comms Gamma
MCG-C 208 LG: 8.70 ft WT: 63.9 lb OD: 2.24 in

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

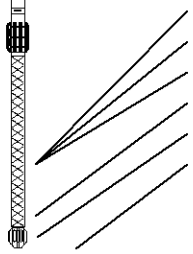
Compact Focussed Electric
MFE-B.J 352 LG: 6.05 ft WT: 48.5 lb OD: 2.24 in



43.50 ft	GRGC - Gamma Ray
40.59 ft	CGXT - MCG External Temperature
33.24 ft	MINV - MMR MicroLog Inverse
33.24 ft	MNRL - MMR MicroLog Normal
28.45 ft	NPRL - Limestone Neutron Por.
21.21 ft	AVOL - Annular Volume
21.21 ft	HVOL - Hole Volume
21.21 ft	CLDC - Density Caliper
19.28 ft	DPRL - Limestone Density Por.
19.28 ft	DEN - Compensated Density
19.28 ft	DCOR - Density Correction
19.22 ft	PDPE - PE
13.72 ft	FEFE - Shallow FE

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

Total Length: 48.78 ft Weight: 383.6 lb



3.34 ft	R40O - Array Ind. One Res 40
3.34 ft	R60O - Array Ind. One Res 60
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	O'BRIEN ENERGY RESOURCES CORP.
WELL	CLAYTON #1-33
FIELD	MOHLER
PROVINCE/COUNTY	MEADE
COUNTRY/STATE	U.S.A. / KANSAS

Elevation Kelly Bushing	2578.00	feet	First Reading	6378.00	feet
Elevation Drill Floor	2577.00	feet	Depth Driller	6413.00	feet
Elevation Ground Level	2566.00	feet	Depth Logger	6412.00	feet

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MICRORESISTIVITY LOG