MICRORESISTIVITY LOG

COMPANY	MURFIN DRILLING COMPANY INC.
WELL	ROGUE #10-25
FIELD	WILDCAT
PROVINCE/COUNTY	LINCOLN
COUNTRY/STATE	U.S.A. / COLORADO
LOCATION	2299' FSL & 1647' FEL

SEC 25	TWP 9S	RGE 56W	Other Services
Latitude			MAI/MFE MPD/MDN
Longitude			MSS
API Number	05-073-06736		

Permanent Datum GL, Elevation 5303 feet
Log Measured From KB, 13.00 feet above Permanent Datum
Drilling Measured From KB

Elevations:	feet
KB	5316.00
DF	5314.00
GL	5303.00

Date	07-FEB-2018			
Run Number	ONE			
Service Order	4558-205041941			
Depth Driller	8187.00	feet		
Depth Logger	7776.00	feet		
First Reading	7728.00	feet		
Last Reading	4200.00	feet		
Casing Driller	475.00	feet		
Casing Logger	478.00	feet		
Bit Size	7.875	inches		
Hole Fluid Type	CHEMICAL			
Density / Viscosity	9.20 lb/USg	80.00 CP		
PH / Fluid Loss	8.50	8.50 ml/30Min		
Sample Source	FLOWLINE			
Rm @ Measured Temp	1.39 @ 75.0	ohm-m		
Rmf @ Measured Temp	1.11 @ 75.0	ohm-m		
Rmc @ Measured Temp	1.67 @ 75.0	ohm-m		
Source Rmf / Rmc	CALC	CALC		
Rm @ BHT	0.62 @168.0	ohm-m		
Time Since Circulation	6 HOURS			
Max Recorded Temp	168.00	deg F		
Equipment / Base	13244	LIB		
Recorded By	ADAM SILL			
Witnessed By	GREGG SMITH			

BOREHOLE RECORD

Last Edited: 07-FEB-2018 12:40

Bit Size inches	Depth From feet	Depth To feet
7.875	475.00	8187.00

CASING RECORD

Type	Size inches	Depth From feet	Shoe Depth feet	Weight pounds/ft
SURFACE	8.625	0.00	475.00	24.00

REMARKS

- SOFTWARE ISSUE: WLS 17.05.6573.

- RUN ONE: MCG, MML, MDN, MPD, MFE, MSS, MAI RUN 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: 3682 CU.FT.

- ANNULAR HOLE VOLUME WITH 5.5 INCH PRODUCTION CASING FROM TD TO 4200 FEET: 685 CU.FT.

- RIG: MURFIN #25.

- ENGINEER: A. SILL.

- OPERATOR: B. TOVAR.

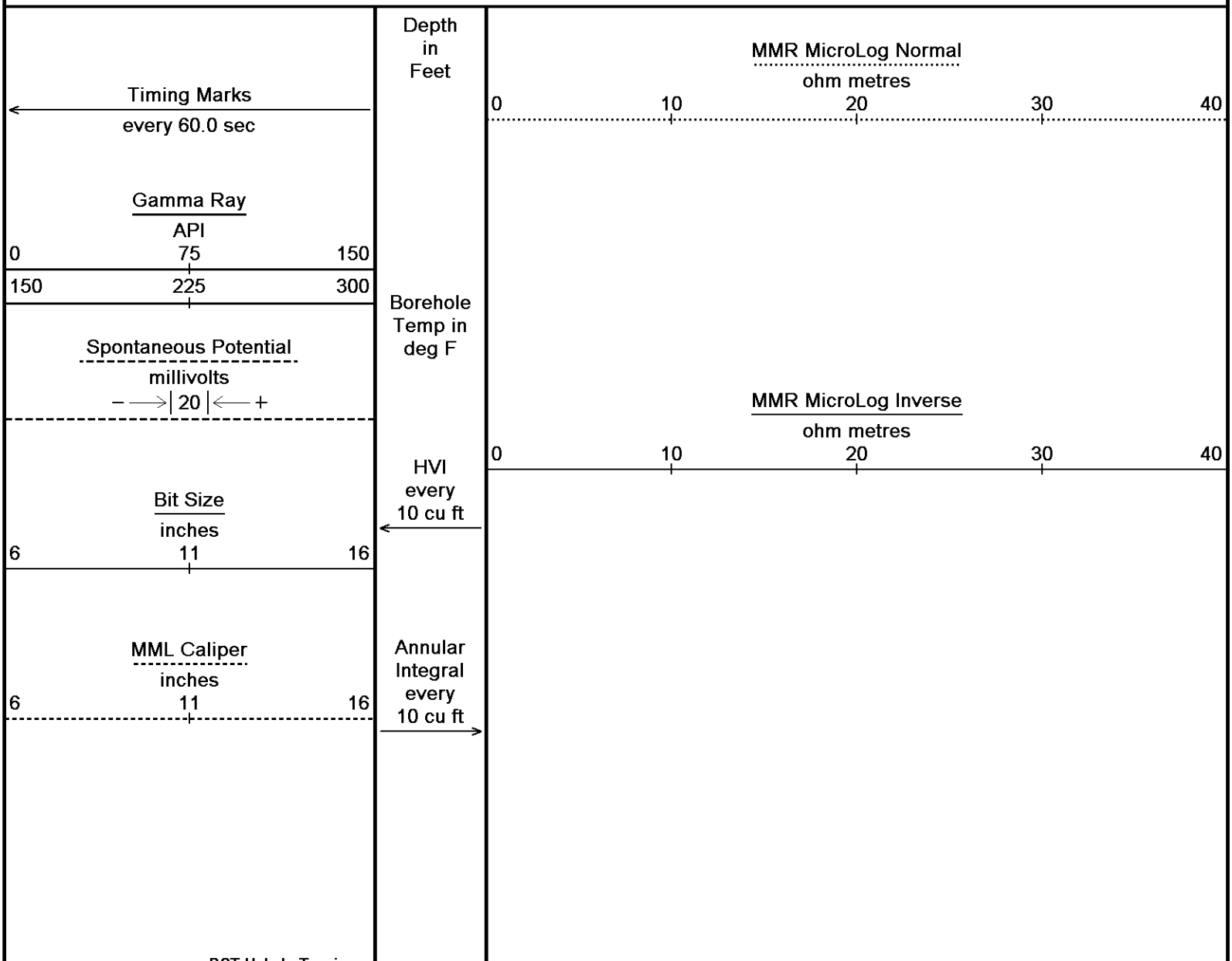
**** BRIDGED OFF AT 7776 FEET AND WAS INSTRUCTED TO LOG OUT FROM THERE WITHOUT A REPEAT SECTION. ****

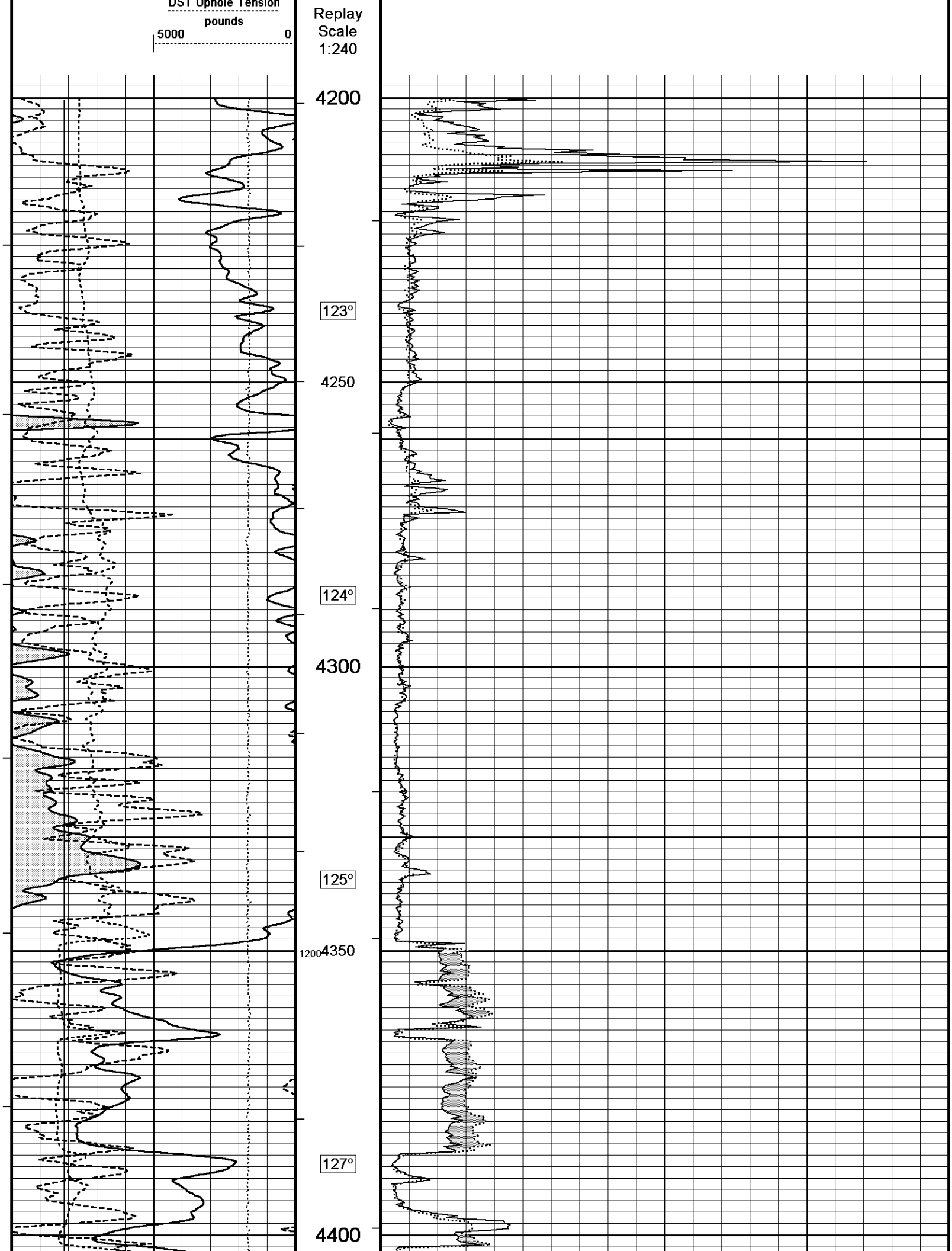
5 INCH MAIN

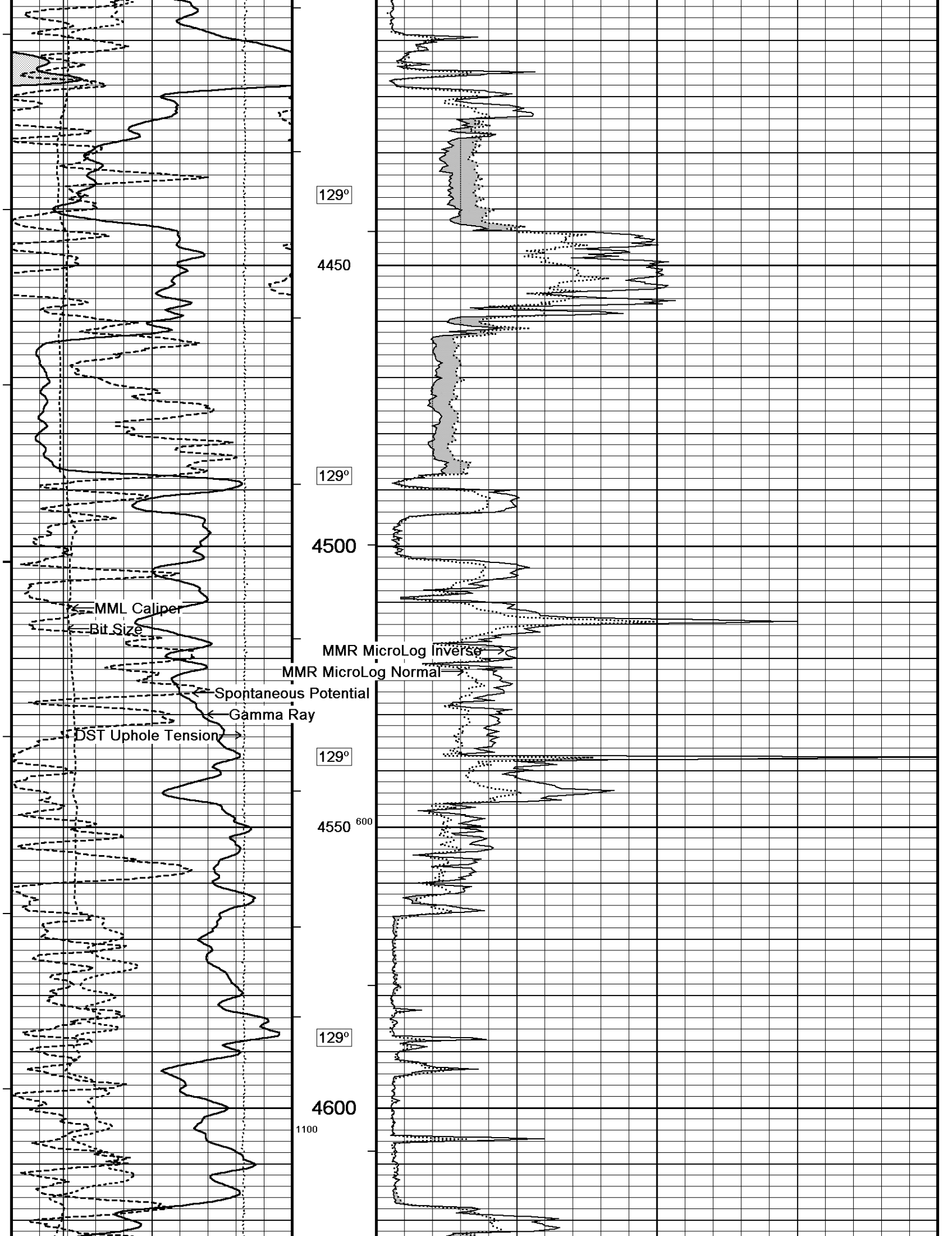
Depth Based Data - Maximum Sampling Increment 10.0cm — Plotted on 08-FEB-2018 02:36

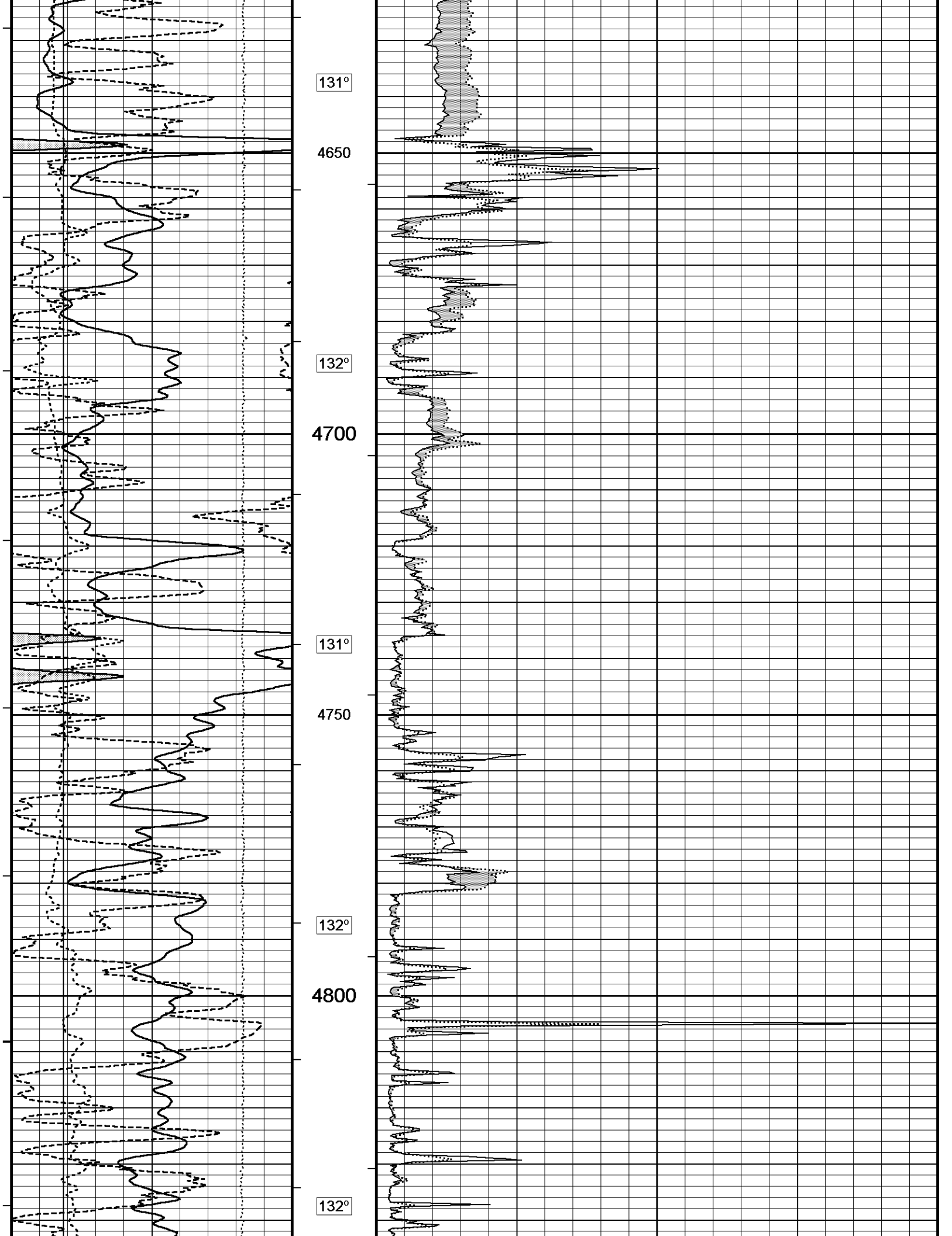
Filename: C:\Minimus 17.05.6573\Logs\Murfin Rogue #10-25\Murfin Rogue #10-25_003.dta — Recorded on 07-FEB-2018 21:28

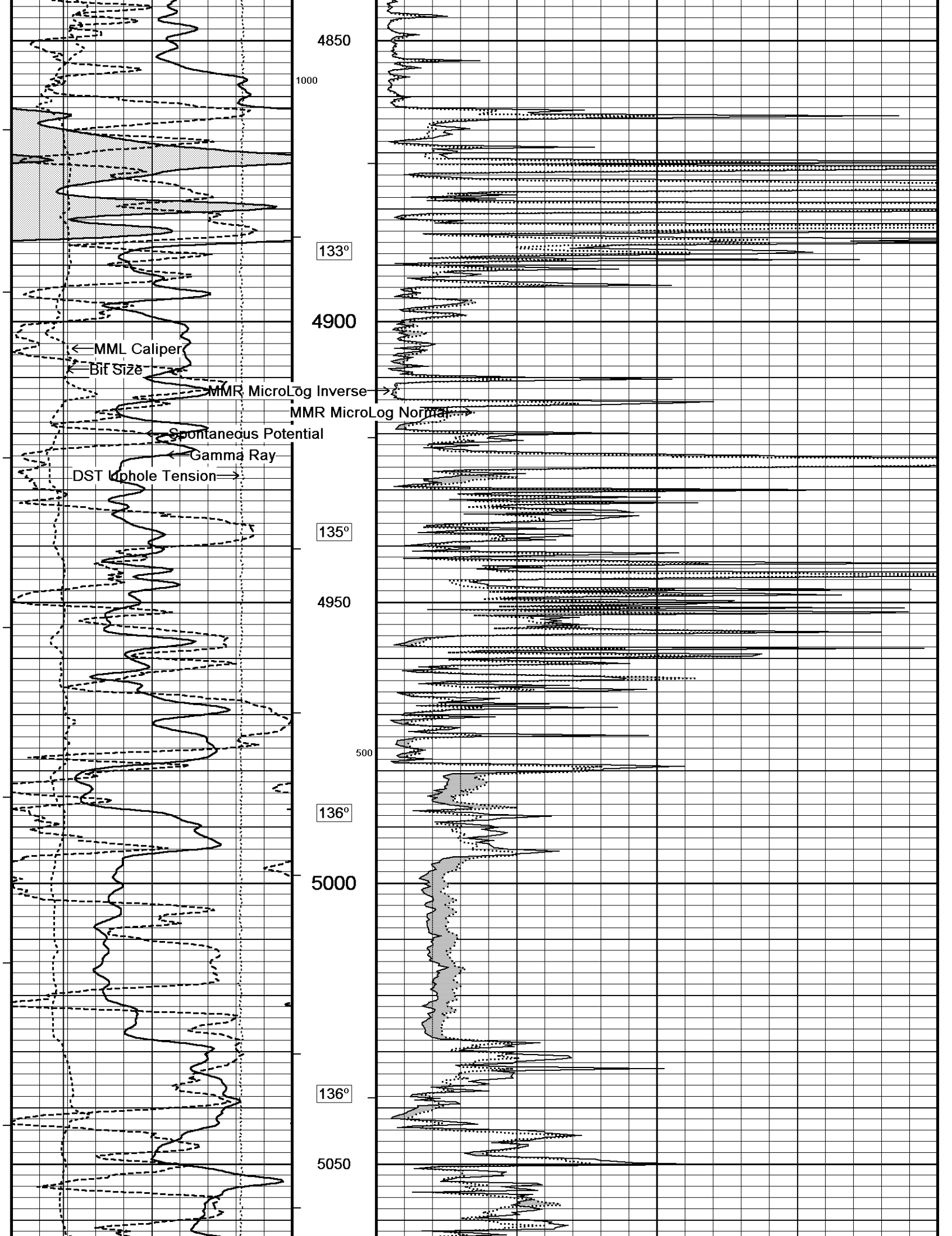
System Versions: Logged with 17.05.6573 Plotted with 17.05.6573

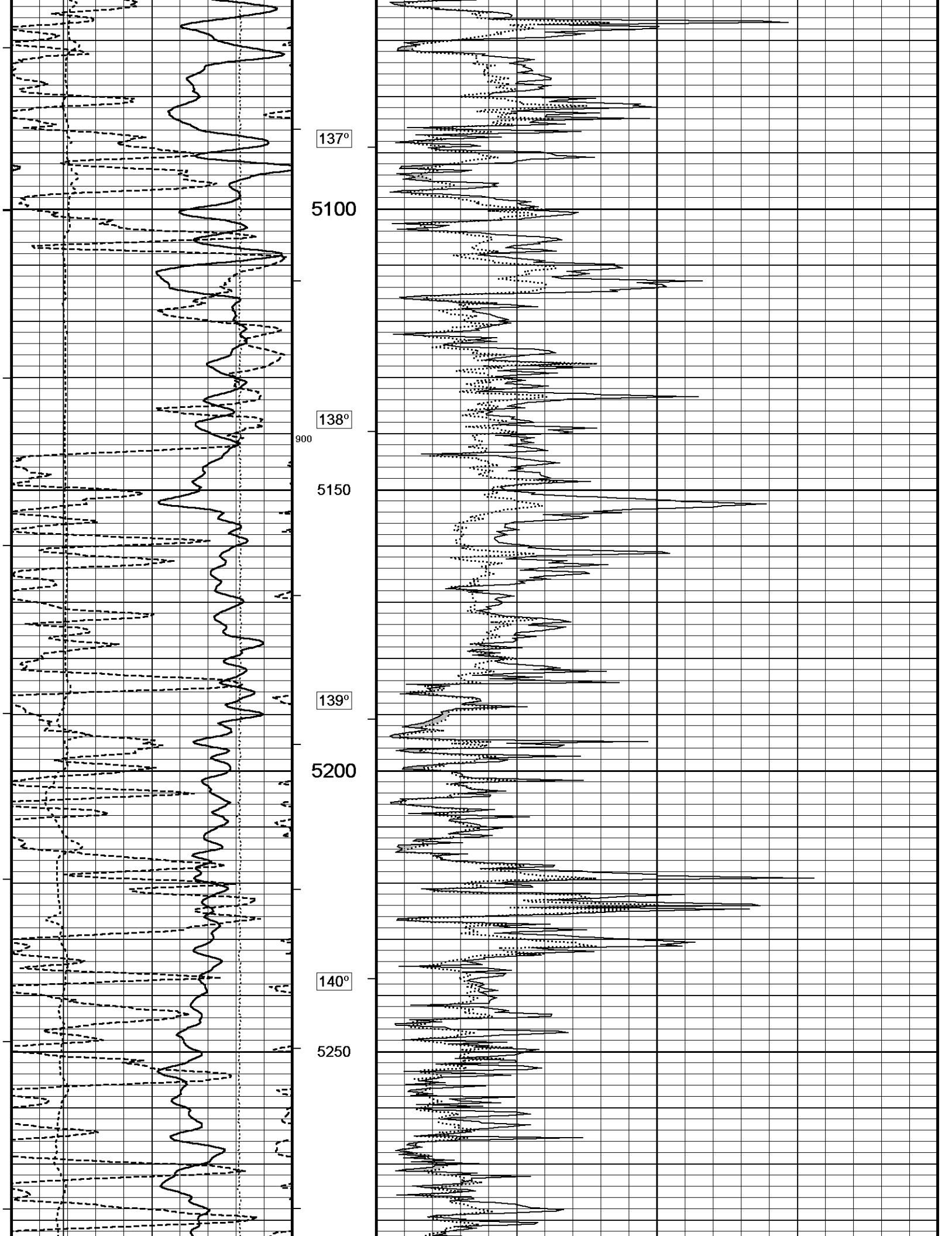


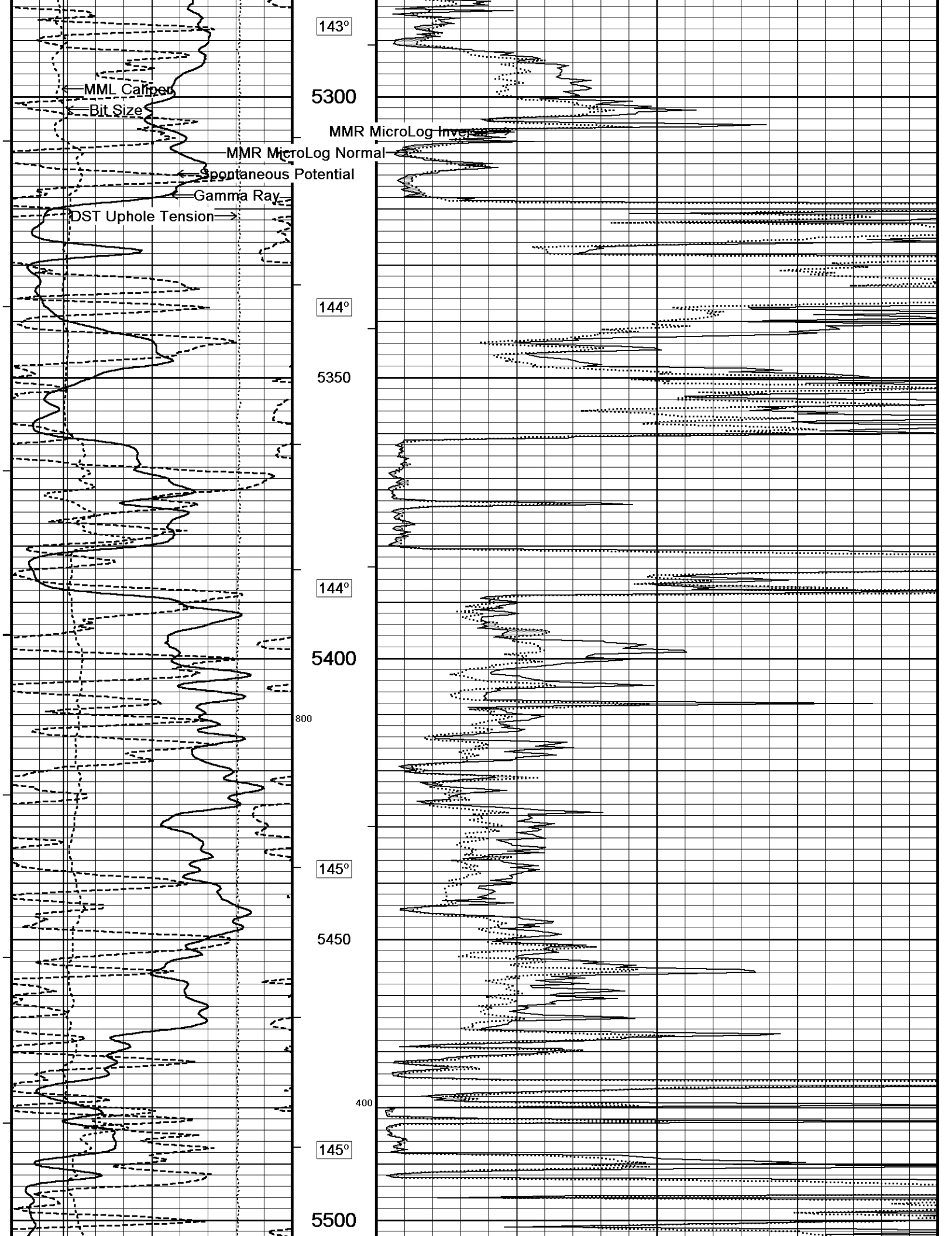

DST Upnole Tension
pounds
5000
0
Replay
Scale
1:240
4200
123°
4250
124°
4300
125°
1200
4350
127°
4400

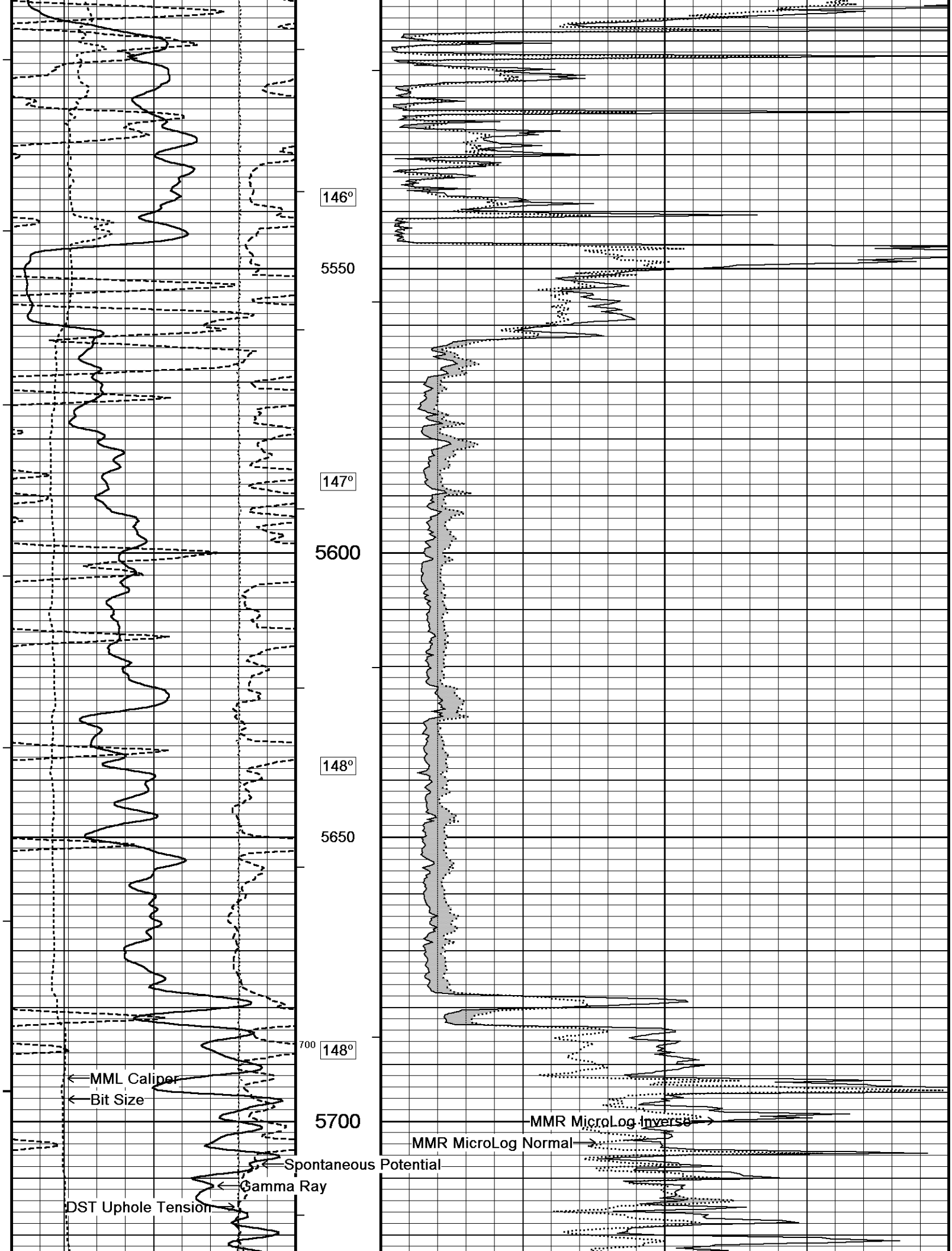

129°
4450
129°
4500
MML Caliper
Bit Size
MMR MicroLog Inverse
MMR MicroLog Normal
Spontaneous Potential
Gamma Ray
DST Uphole Tension
129°
4550
600
129°
4600
1100

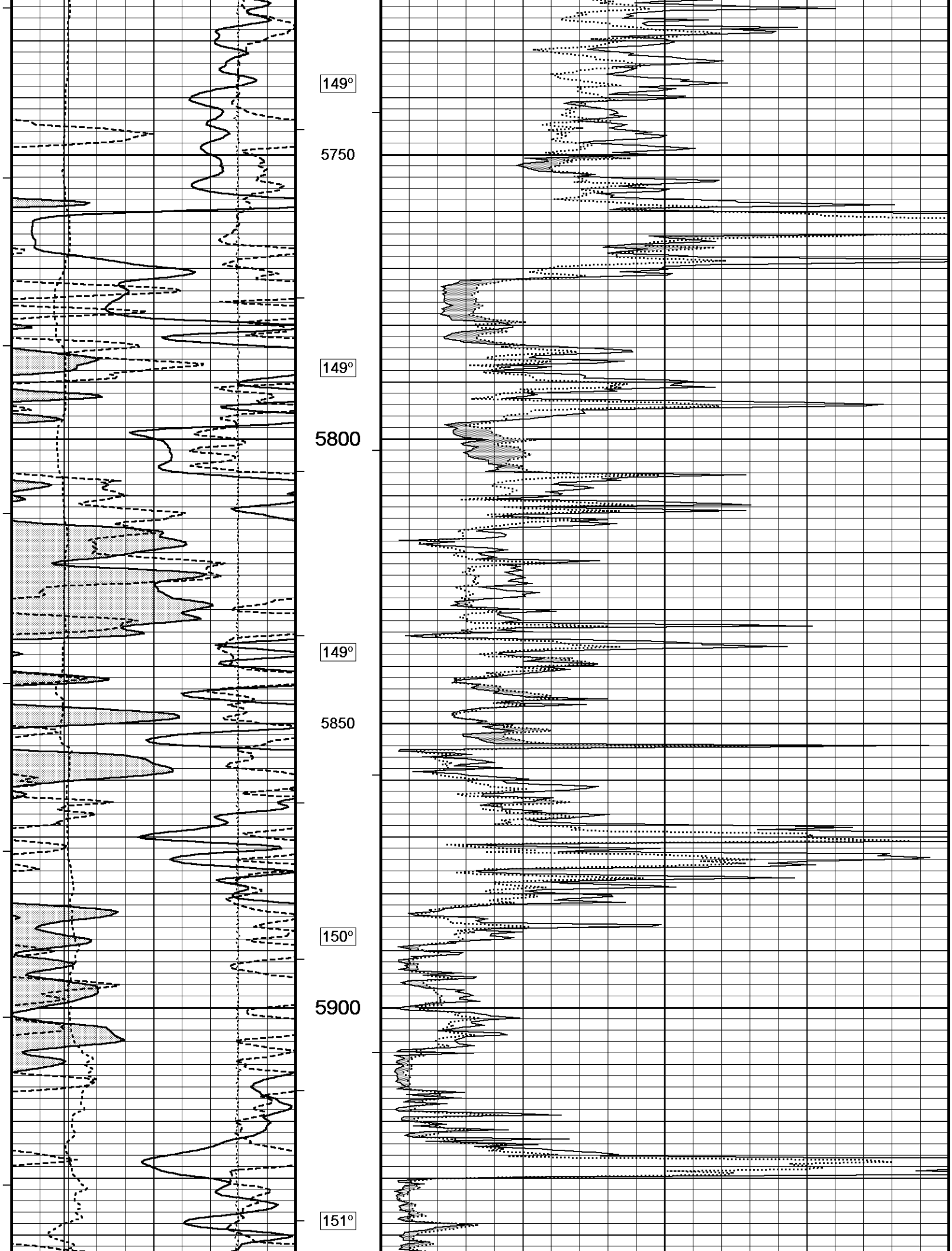

131°
4650
132°
4700
131°
4750
132°
4800
132°

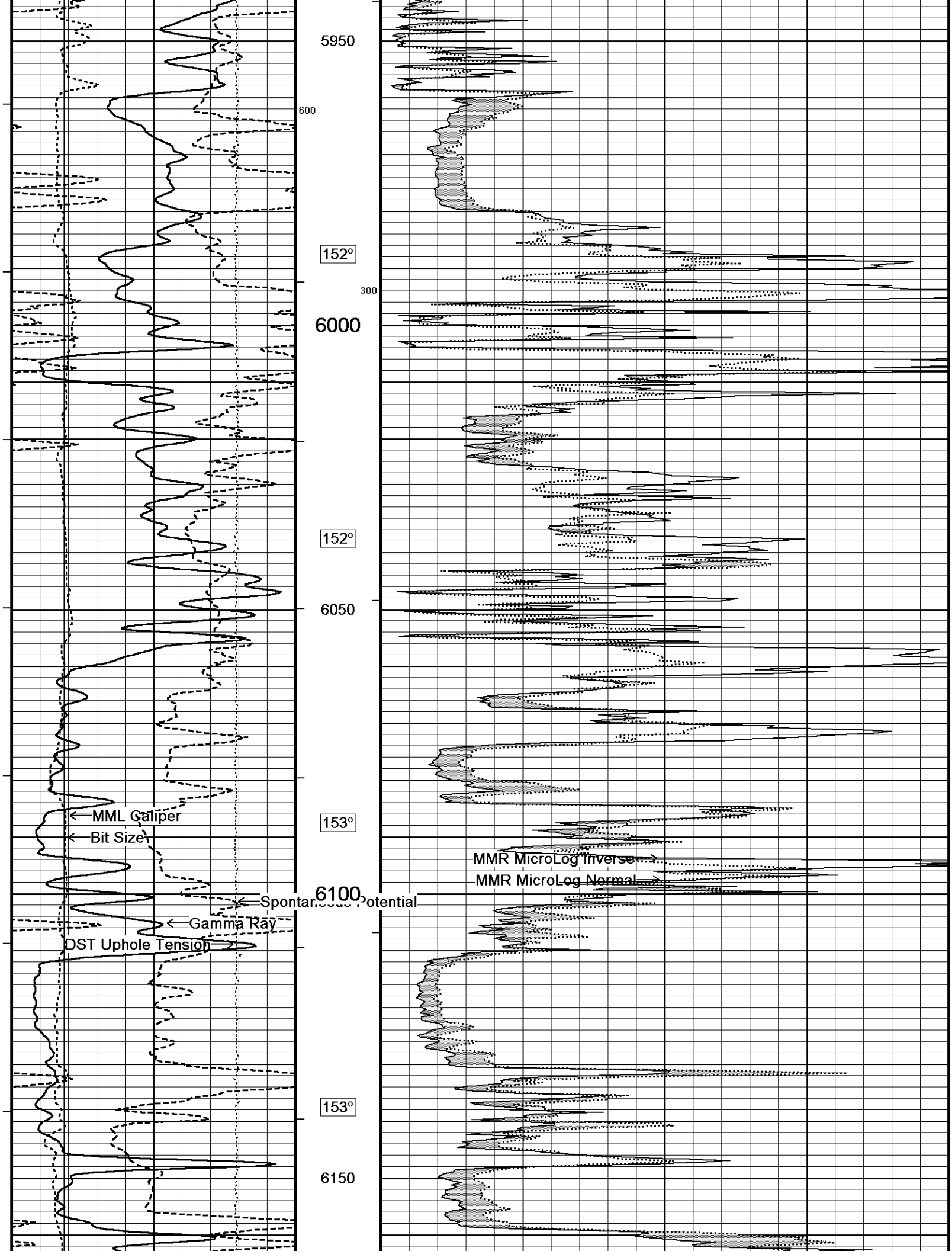

4850
1000
133°
4900
MML Caliper
Bit Size
MMR MicroLog Inverse
MMR MicroLog Normal
Spontaneous Potential
Gamma Ray
DST Uphole Tension
135°
4950
500
136°
5000
136°
5050

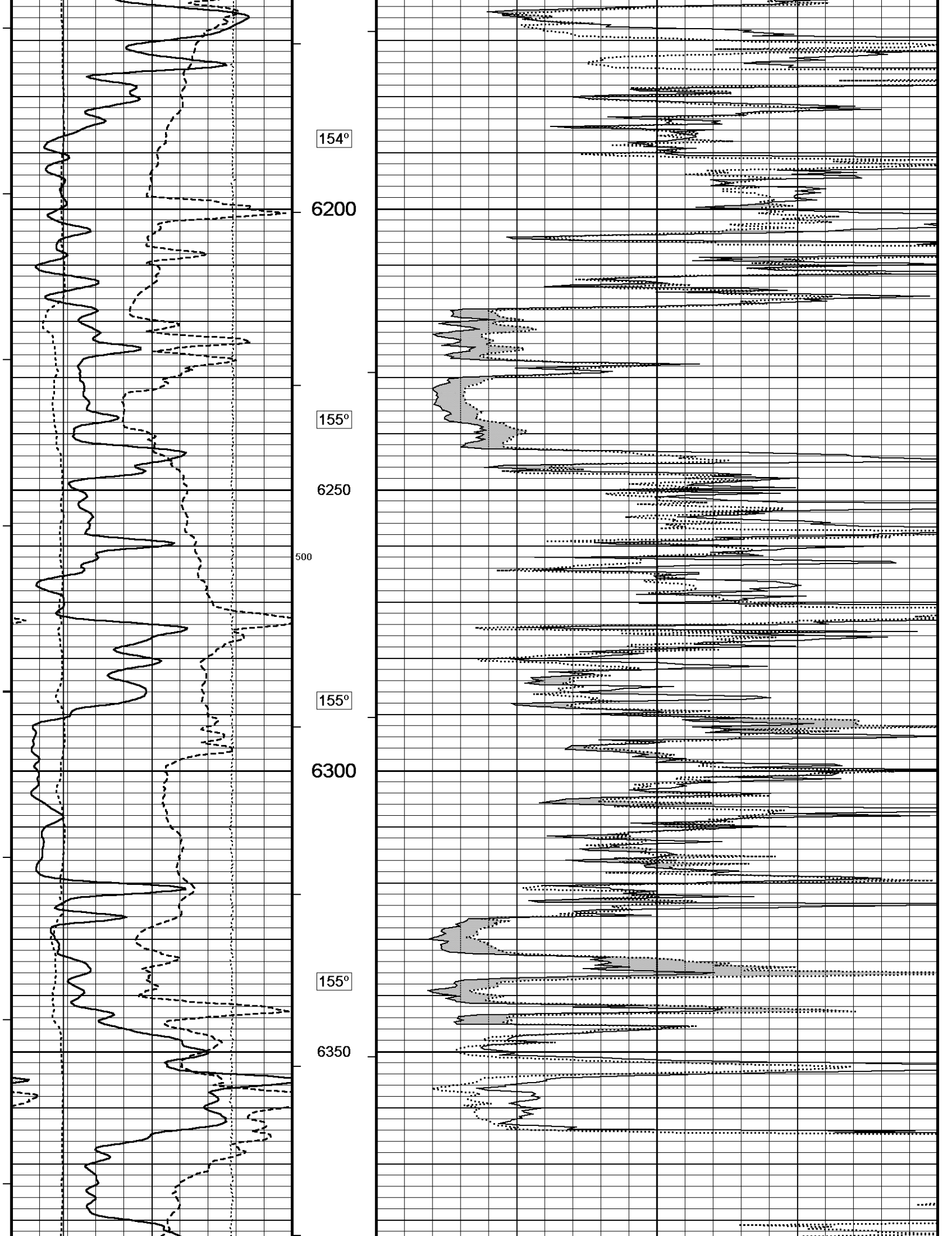

137°
5100
138°
900
5150
139°
5200
140°
5250

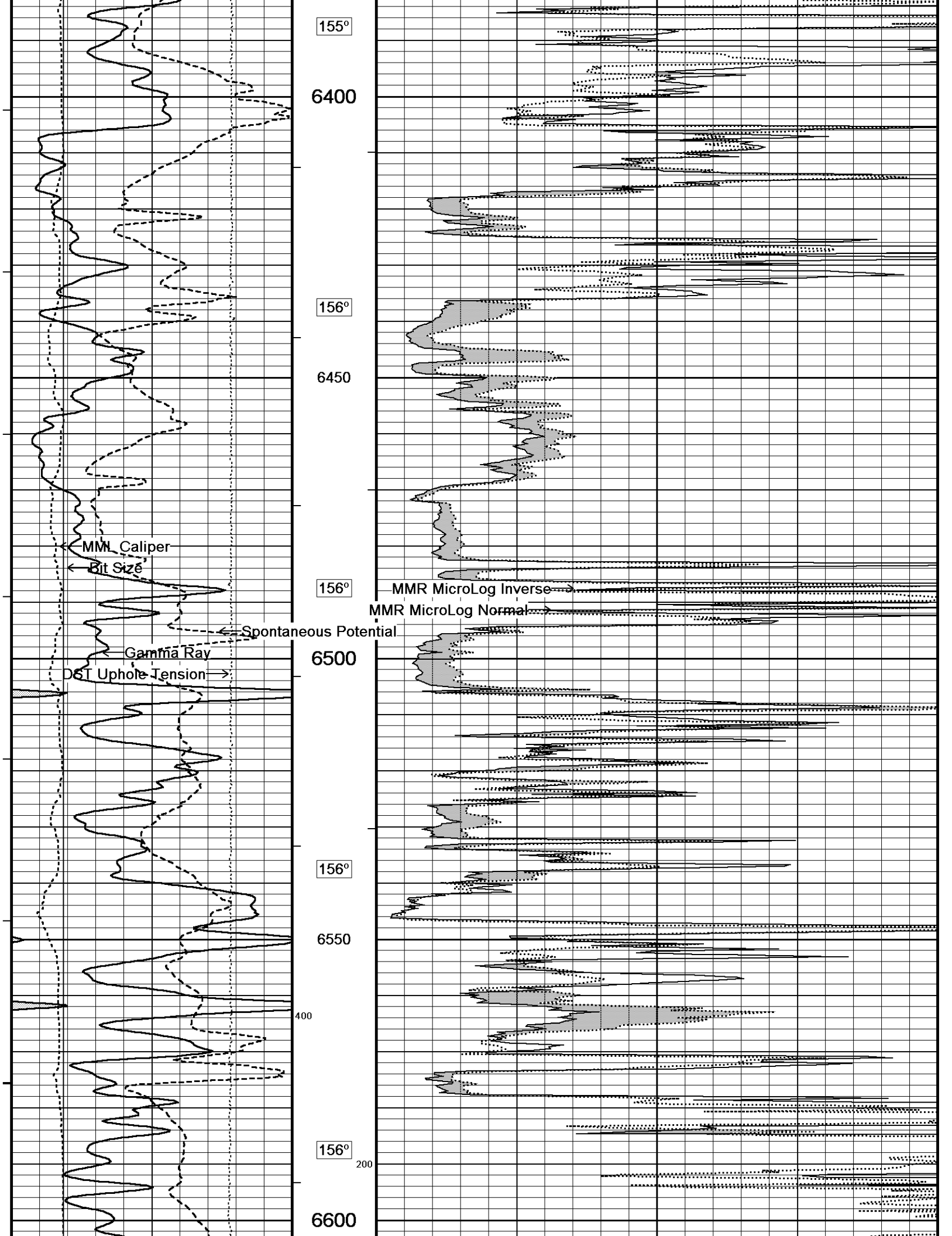

MML Caliper
Bit Size
MMR MicroLog Inverse
MMR MicroLog Normal
Spontaneous Potential
Gamma Ray
DST Uphole Tension
143°
5300
144°
5350
144°
5400
800
145°
5450
400
145°
5500

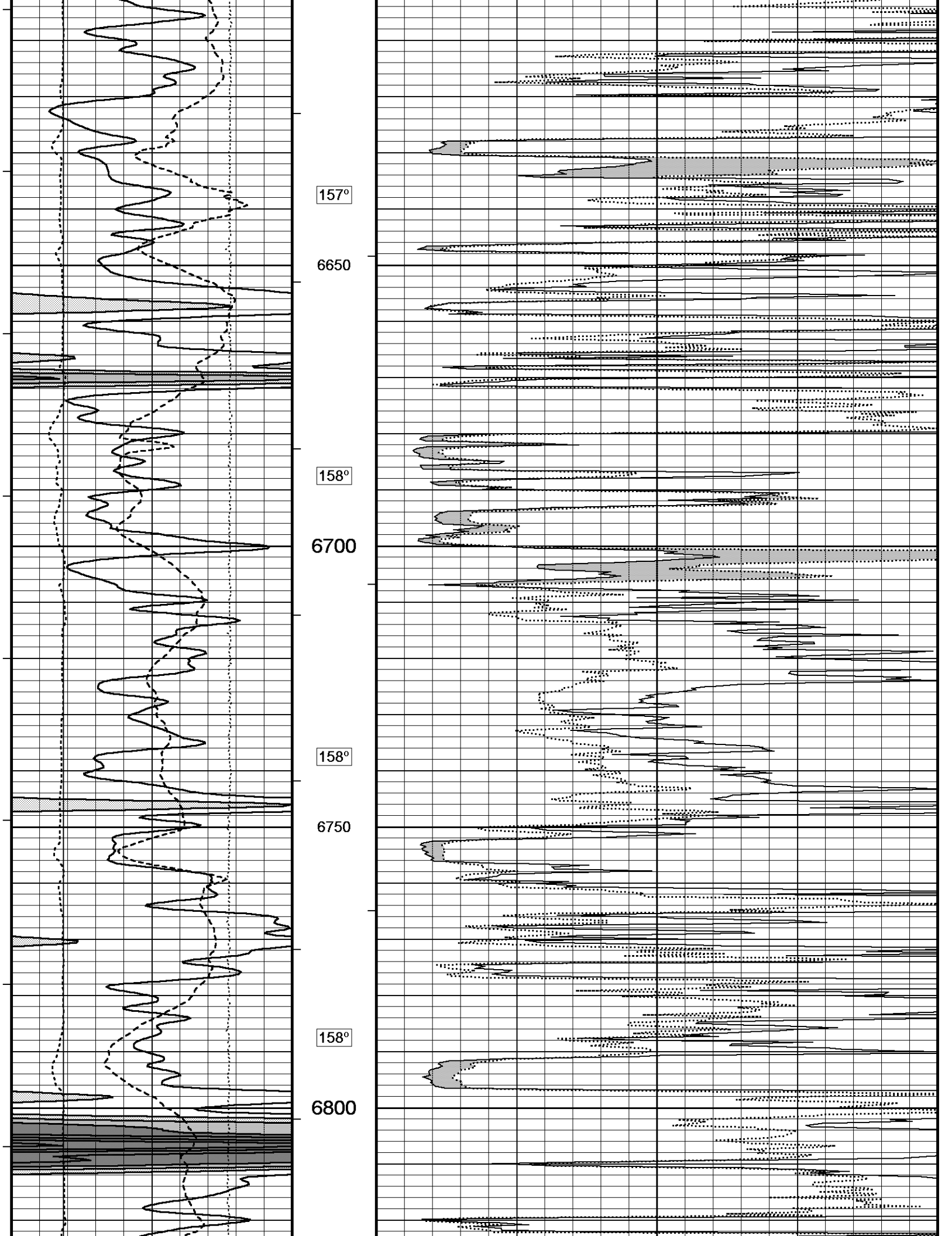

146°
5550
147°
5600
148°
5650
700
148°
MML Caliper
Bit Size
5700
MMR MicroLog Inverse
MMR MicroLog Normal
Spontaneous Potential
Gamma Ray
DST Uphole Tension

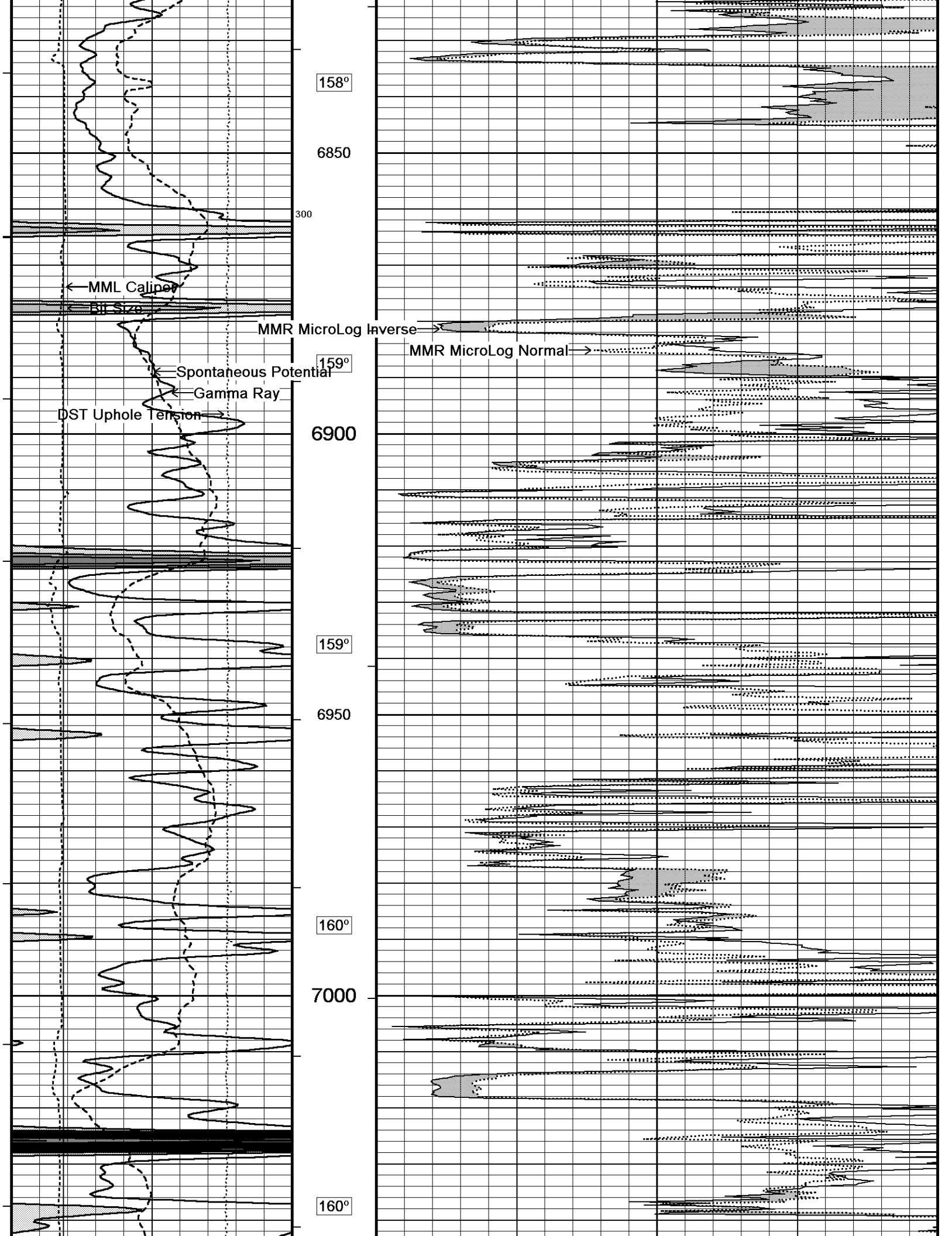

149°
5750
149°
5800
149°
5850
150°
5900
151°

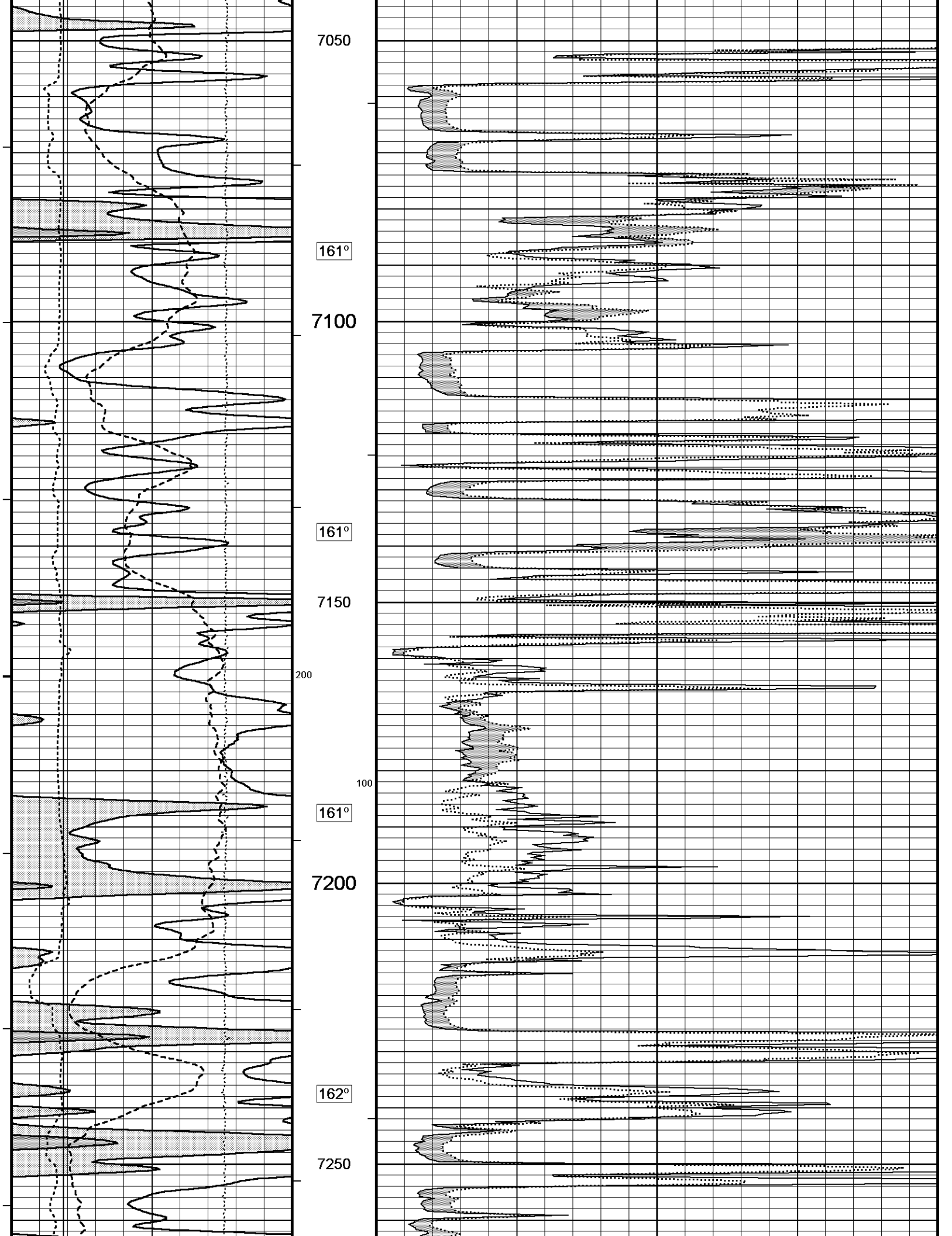

5950
600
152°
300
6000
152°
6050
MML Caliper
Bit Size
153°
MMR MicroLog Inverse
MMR MicroLog Normal
6100
Spontaneous Potential
Gamma Ray
DST Uphole Tension
153°
6150

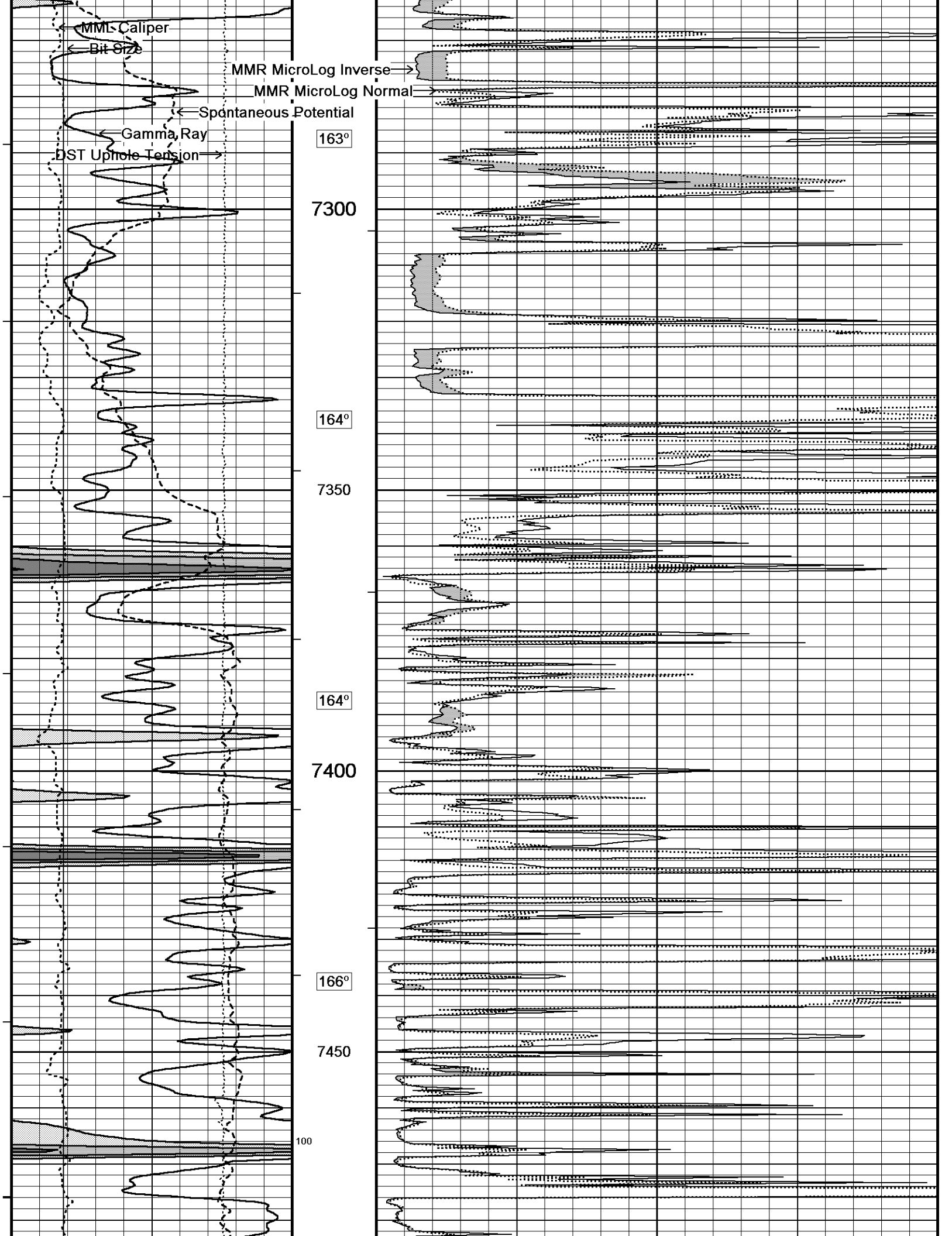

154°
6200
155°
6250
500
155°
6300
155°
6350

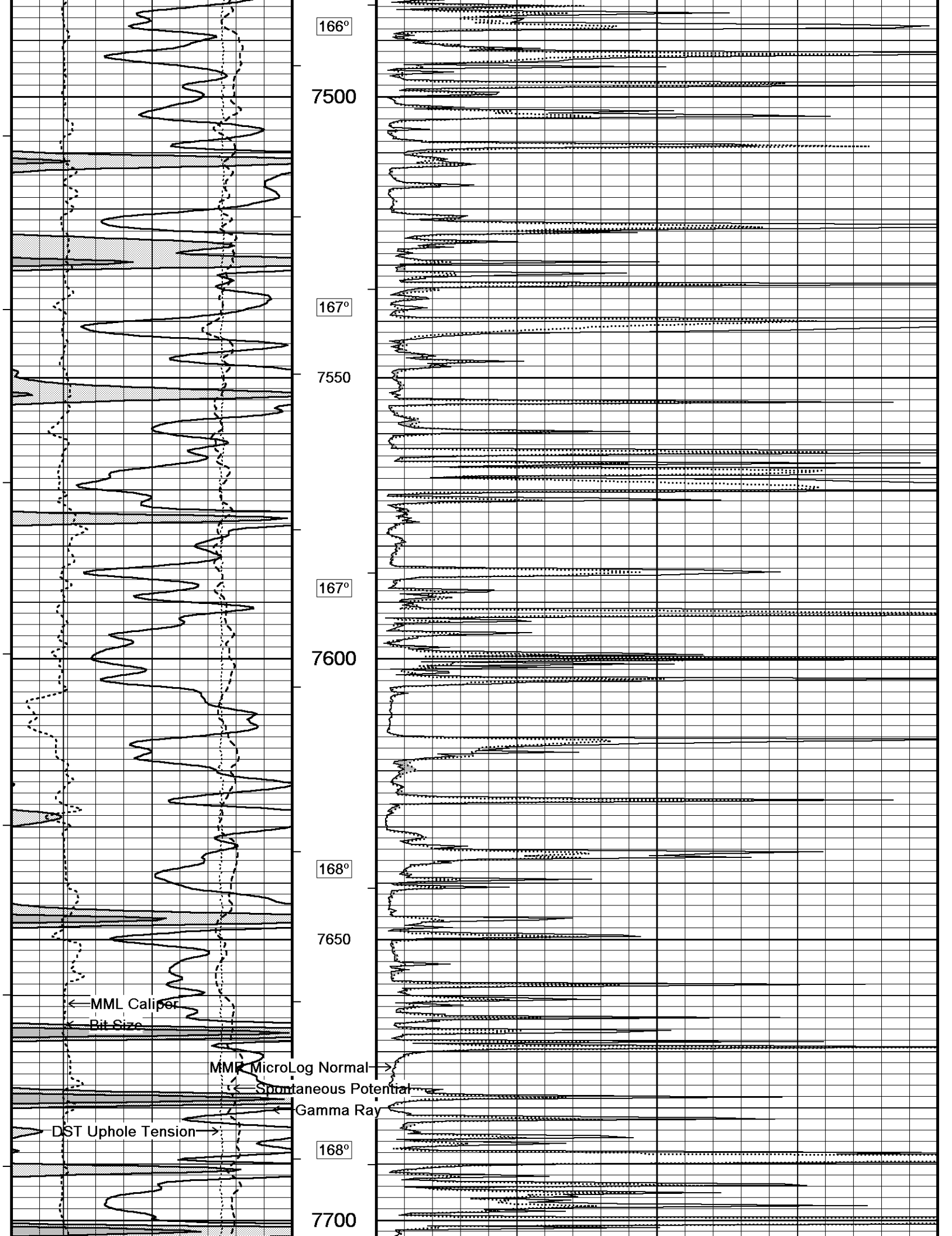

155°
6400
156°
6450
MMR Caliper
Bit Size
156°
MMR MicroLog Inverse
MMR MicroLog Normal
Spontaneous Potential
Gamma Ray
6500
DST Uphole Tension
156°
6550
400
156°
200
6600

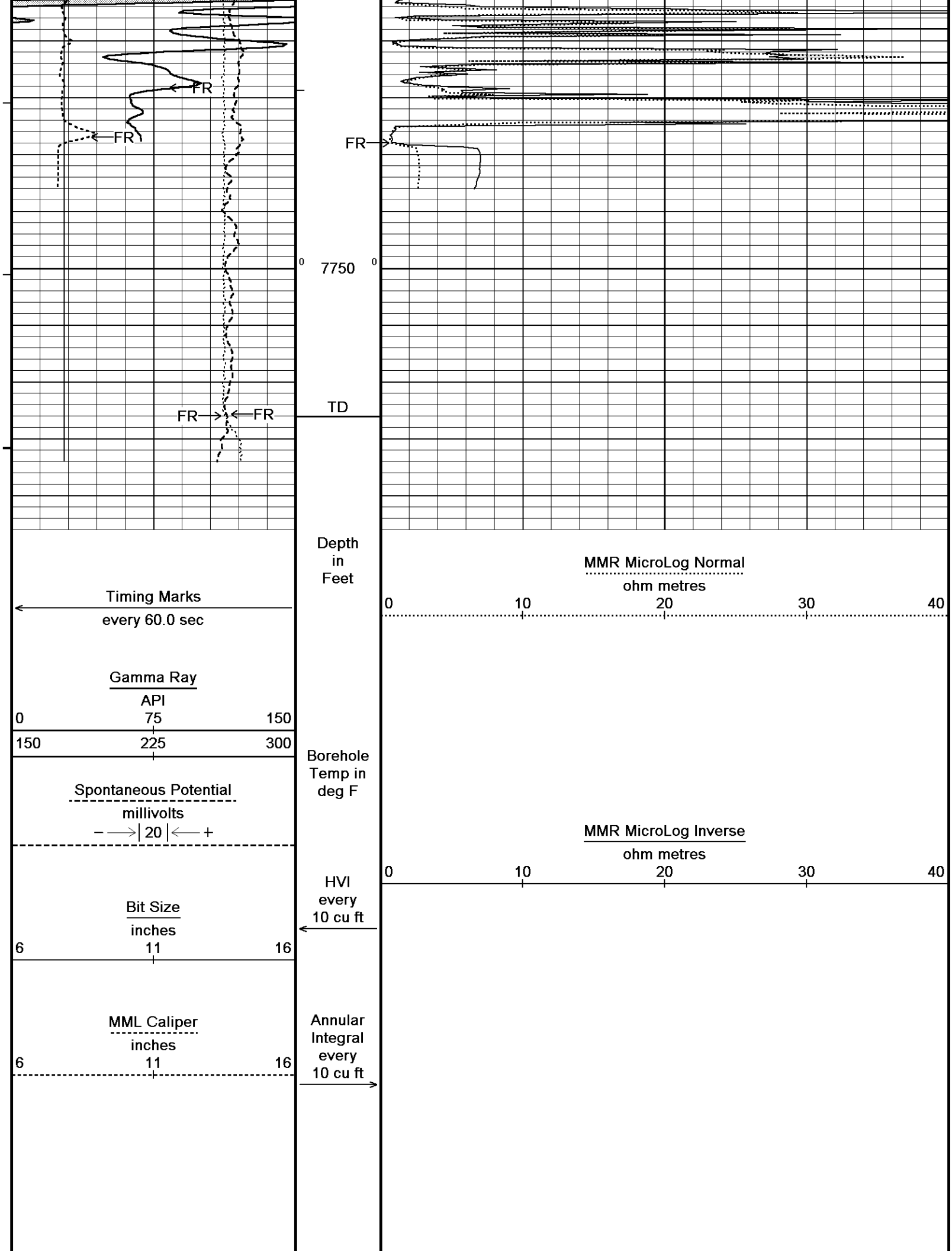

157°
6650
158°
6700
158°
6750
158°
6800


158°
6850
300
MML Caliper
Bit Size
MMR MicroLog Inverse
MMR MicroLog Normal
159°
Spontaneous Potential
Gamma Ray
DST Uphole Tension
6900
159°
6950
160°
7000
160°


7050
161°
7100
161°
7150
200
100
161°
7200
162°
7250


MML Caliper
Bit Size
MMR MicroLog Inverse
MMR MicroLog Normal
Spontaneous Potential
Gamma Ray
DST Uphole Tension
163°
7300
164°
7350
164°
7400
166°
7450
100


166°
7500
167°
7550
167°
7600
168°
7650
168°
7700
MML Caliper
Bit Size
MMR MicroLog Normal
Spontaneous Potential
Gamma Ray
DST Uphole Tension


FR
FR
FR
FR
FR
0
7750
0
TD
Depth
in
Feet
Timing Marks
every 60.0 sec
MMR MicroLog Normal
ohm metres
0
10
20
30
40
Gamma Ray
API
0
75
150
150
225
300
Borehole
Temp in
deg F
Spontaneous Potential
millivolts
– 20 +
MMR MicroLog Inverse
ohm metres
0
10
20
30
40
HVI
every
10 cu ft
Bit Size
inches
6
11
16
MML Caliper
inches
6
11
16
Annular
Integral
every
10 cu ft

DST Uphole Tension
pounds
5000 0

Replay Scale 1:240

Depth Based Data - Maximum Sampling Increment 10.0cm — Plotted on 08-FEB-2018 02:36
Filename: C:\Minimus 17.05.6573\Logs\Murfin Rogue #10-25\Murfin Rogue #10-25_003.dta — Recorded on 07-FEB-2018 21:28
System Versions: Logged with 17.05.6573 Plotted with 17.05.6573

5 INCH MAIN

BEFORE SURVEY CALIBRATION

C:\Minimus 17.05.6573\Logs\Murfin Rogue #10-25\Murfin Rogue #10-25_003.dta

General Constants All 000

Last Edited on 07-FEB-2018,12:18

General Parameters		
Mud Resistivity	1.390	ohm-metres
Mud Resistivity Temperature	75.000	degrees F
Water Level	0.000	feet
Borehole Fluid Processing	Wet Hole	
Hole/Annular Volume and Differential Caliper Parameters		
HVOL Method	Single Caliper	
HVOL Caliper 1	Density Caliper	
HVOL Caliper 2	N/A	
Annular Volume Diameter	5.500	inches
Caliper for Differential Caliper	Density Caliper	
Rwa Parameters		
Porosity used	Crossplot Porosity	
Resistivity used	Array Ind. One Res Rt	
RWA Constant A	0.620	
RWA Constant M	2.150	
SW/APOR Tool Source	0.000	

Gamma Calibration MCG-C 123

Field Calibration on 06-FEB-2018,21:03

	Measured	Calibrated (API)
Background	90	64
Calibrator (Gross)	737	520
Calibrator (Net)	646	456

Gamma Calibration Tolerances MCG-C 123

Ratio 1.417 (1.40 – 1.475 – 1.55) Counts/API

Gamma Constants MCG-C 123

Last Edited on 07-FEB-2018,10:21

Gamma Calibrator Number	MCGGRCC141	
GRC-M Calibrator Jig in Use?	NO	
Inactive Background Jig in Use?	NO	
Mud Density	1.10	gm/cc
Caliper Source for Processing	Density Caliper	
Tool Position	Eccentred	
Potassium Equivalence	Chloride	
K Mud Concentration	0.00	%

High Resolution Temperature Calibration MCG-C 123

Field Calibration on 22-JAN-2018,19:40

	Measured	Calibrated(Deg F)
Lower	50.00	50.00
Upper	100.00	100.00

High Resolution Temperature Constants MCG-C 123

Last Edited on 22-SEP-2015,11:43

Pre-filter Length	11

Caliper Calibration MML-A 2

Base Calibration on 22-JAN-2018 18:14
Field Calibration on 06-FEB-2018 20:52

Base Calibration

Reading No	Measured	Calibrator Size (in)
1	14648	5.98
2	18039	7.97
3	21382	9.86
4	25098	11.92
5	0	0.00
6	N/A	N/A

Field Calibration

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

Caliper Calibration Tolerances MML-A 2

Short Arm Field Cal. 7.97 (7.77 | 7.97 | 8.17) in

Micro Normal and Micro Inverse Calibration MML-A 2

Base Calibration on 22-JAN-2018 18:24
Field Check on 06-FEB-2018 20:54

	Resistor 1 (ohm)	Resistor 2 (ohm)
	10.0	50.0

Base Calibration

	Measured		Calibrated (ohm-m)	
Micro Normal	10.1	50.1	5.1	25.6
Micro Inverse	10.0	49.9	3.4	16.9

Channel	Base Check (ohm-m)	Field Check (ohm-m)
Micro Normal	77.2	77.2
Micro Inverse	51.2	51.2

Micro Normal & Micro Inverse Calibration Tolerance MML-A 2

Micro Normal Res. 1 10.1 (-5% | 10.0 | +5%) ohm
Micro Inverse Res. 1 10.0 (-5% | 10.0 | +5%) ohm
Micro Normal Res. 2 50.1 (-5% | 50.0 | +5%) ohm
Micro Inverse Res. 2 49.9 (-5% | 50.0 | +5%) ohm

Micro Normal Base Check 77.2 (-2% | 77.01 | +2%) ohm-m
Micro Inverse Base Check 51.2 (-2% | 51.12 | +2%) ohm-m

Micro Normal Field Check 77.2 (-2% | 77.2 | +2%) ohm-m
Micro Inverse Field Check 51.2 (-2% | 51.2 | +2%) ohm-m

Micro Normal and Micro Inverse Constants MML-A 2

Last Edited on 07-FEB-2018,10:21

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 MPD-C.A 271

Base Calibration on 22-JAN-2018 20:14
Field Calibration on 06-FEB-2018 20:57

Base Calibration

Reading No	Measured	Calibrator Size (in)
1	13926	3.99
2	23856	5.98
3	33858	7.97
4	43568	9.86
5	54687	11.92
6	N/A	N/A

Field Calibration

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

Caliper Calibration Tolerances MPD-C.A 271

Short Arm Field Cal. 7.97 (7.77 | 7.97 | 8.17) in

DOWNHOLE EQUIPMENT

C:\Minimus 17.05.6573\Logs\Murfin Rogue #10-25\Murfin Rogue #10-25_003.dta

C:\Minimus 11.55.3\Logs\Murfin Rogue #10-25\Murfin Rogue #10-25_000.dta

Cablehead, 11 pin
CBH-C 0 LG: 2.40 ft WT: 24.3 lb OD: 2.244 in

Compact Swivel Head Adaptor
SHA-F 48 LG: 2.74 ft WT: 26.5 lb OD: 2.244 in

Compact Comms Gamma
MCG-C 123 LG: 8.70 ft WT: 63.9 lb OD: 2.244 in

Compact Micro-log
MML-A 2 LG: 7.97 ft WT: 81.6 lb OD: 2.244 in

Compact Neutron
MDN-A.B 114 LG: 5.04 ft WT: 50.7 lb OD: 2.244 in

Compact Density/Caliper
MPD-C.A 271 LG: 9.59 ft WT: 90.4 lb OD: 2.449 in

Compact Knuckle Joint
SKJ-E.B 732 LG: 2.17 ft WT: 24.3 lb OD: 2.244 in

Compact Focussed Electric
MFE-A.A 135 LG: 6.05 ft WT: 48.5 lb OD: 2.244 in

Compact Sonic
MSS-A.A 126 LG: 12.52 ft WT: 72.8 lb OD: 2.244 in

Compact Induction
MAI-A.A 45 LG: 10.81 ft WT: 48.5 lb OD: 2.244 in

Total Length: 67.98 ft Weight: 531.3 lb

57.56 ft	GRGC - MCG Gamma Ray
54.65 ft	CGXT - MCG External Temperature
48.92 ft	MLTC - MML Caliper
47.93 ft	MINV - Micro-inverse
47.93 ft	MNRL - Micro-normal
43.13 ft	NPRL - Limestone Neutron Por.
35.89 ft	AVOL - Annular Volume
35.89 ft	HVOL - Hole Volume
35.89 ft	CLDC - Density Caliper
33.96 ft	DPRL - Limestone Density Por.
33.96 ft	DEN - Compensated Density
33.96 ft	DCOR - Density Correction
33.90 ft	PDPE - PE
26.24 ft	FEFE - Shallow FE
16.96 ft	TR11 - 4' Transit Time
16.46 ft	TR21 - 3' Transit Time
15.95 ft	TR12 - 6' Transit Time
15.46 ft	TR22 - 5' Transit Time
12.96 ft	SPRL - Wyllie Lime. Sonic Por.
12.96 ft	DT35 - 3-5' Compensated Sonic
3.34 ft	R40O - Array Ind. One Res 40
3.34 ft	R60O - Array Ind. One Res 60
3.34 ft	CTAO - Array Ind. One Cond Ct
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	MURFIN DRILLING COMPANY INC.
WELL	ROGUE #10-25
FIELD	WILDCAT
PROVINCE/COUNTY	LINCOLN

COUNTRY/STATE			U.S.A. / COLORADO		
Elevation Kelly Bushing	5316	feet	First Reading	7728.00	feet
Elevation Drill Floor	5314	feet	Depth Driller	8187.00	feet
Elevation Ground Level	5303	feet	Depth Logger	7776.00	feet

Weatherford®

MICRORESISTIVITY LOG