



Weatherford

MICRORESISTIVITY LOG

COMPANY			O'BRIEN ENERGY RESOURCES CORP.		
WELL			CLAYTON #2-28		
FIELD			SINGLEY		
PROVINCE/COUNTY			MEADE		
COUNTRY/STATE			U.S.A. / KANSAS		
LOCATION			335' FSL & 2281' FWL		
SEC	TWP	RGE	Other Services MPD/MDN		
28	33S	29W			
API Number			15-119-21346		
Permit Number					
Permanent Datum GL, Elevation 2591 feet					
Log Measured From KB					
Drilling Measured From KB					
Date	25-JUL-2013		Elevations: KB 2602.00 DF 2601.00 GL 2591.00		
Run Number	ONE				
Service Order	3539951				
Depth Driller	6400.00		feet		
Depth Logger	6395.00		feet		
First Reading	6362.00		feet		
Last Reading	4000.00		feet		
Casing Driller	1451.00		feet		
Casing Logger	1448.00		feet		
Bit Size	7.875		inches		
Hole Fluid Type	CHEMICAL				
Density / Viscosity	9.30 lb/USg		60.00 CP		
PH / Fluid Loss	9.50		8.40 ml/30Min		
Sample Source	FLOWLINE				
Rm @ Measured Temp	0.81 @ 99.0		ohm-m		
Rmf @ Measured Temp	0.65 @ 99.0		ohm-m		
Rmc @ Measured Temp	0.97 @ 99.0		ohm-m		
Source Rmf / Rmc	CALC	CALC			
Rm @ BHT	0.59 @136.0		ohm-m		
Time Since Circulation	6 HOURS				
Max Recorded Temp	136.00		deg F		
Equipment / Base	13096		LIB		
Recorded By	ADAM SILL				
Witnessed By	ROGER PEARSON		PETER DEBENHAM		
JOB #	LB13-211				

BOREHOLE RECORD

Last Edited: 25-JUL-2013 02:08

Bit Size inches	Depth From feet	Depth To feet
7.875	1451.00	6400.00

CASING RECORD

Type	Size inches	Depth From feet	Shoe Depth feet	Weight pounds/ft
SURFACE	8.625	0.00	1451.00	24.00

REMARKS

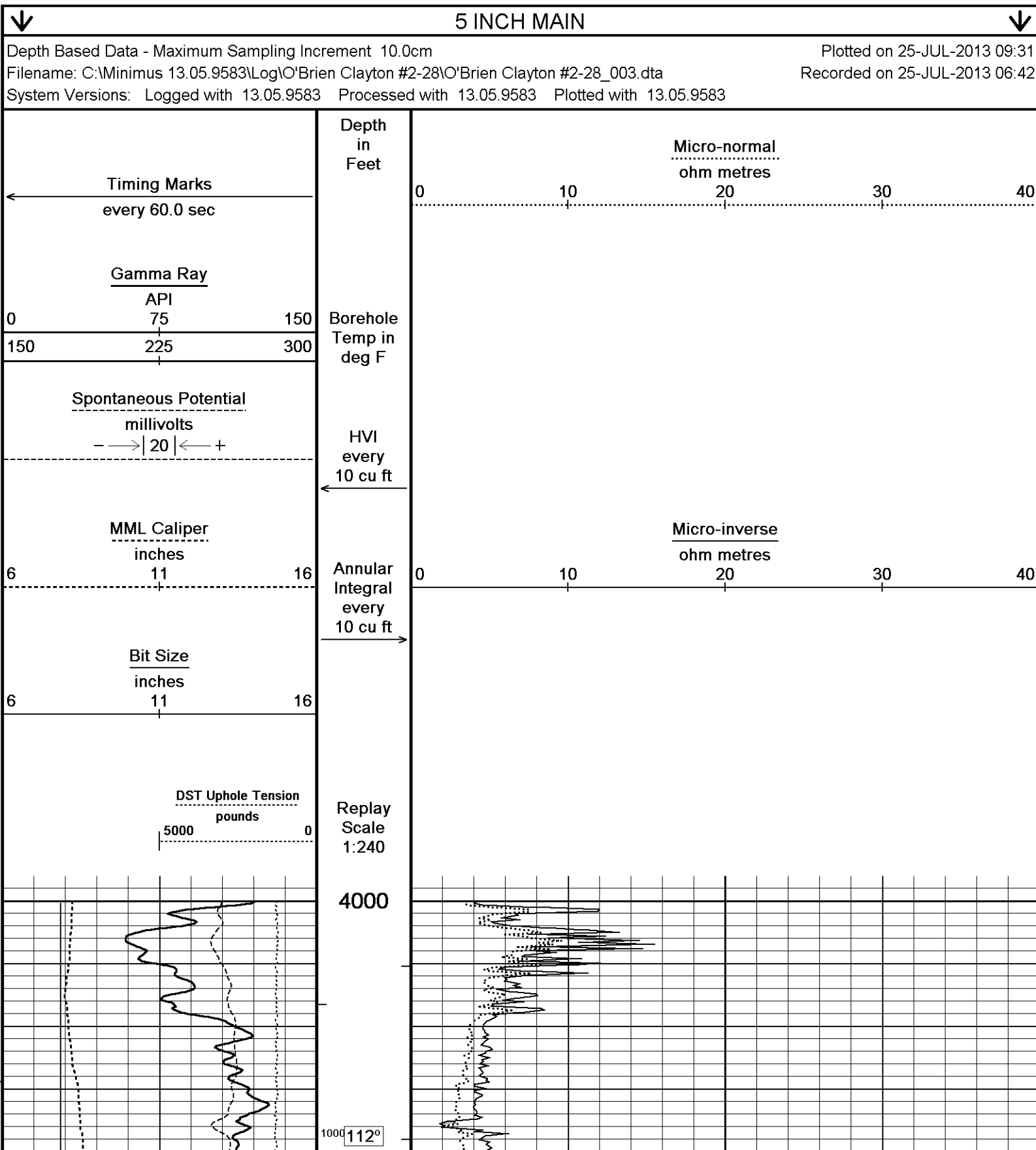
- SOFTWARE ISSUE: WLS 13.05.9583.
- MCG, MML, MDN, MPD, MFE, MAI RUN IN COMBINATION.
 - HARDWARE: DUAL BOWSPRING USED ON MDN.
 - 0.5 INCH STANDOFF USED ON MFE.
 - 0.5 INCH STANDOFF USED ON MAI.
- 2.71 G/CC LIMESTONE DENSITY MATRIX USED TO CALCULATE POROSITY.
- BOREHOLE RUGOSITY, TIGHT PULLS, AND WASHOUTS WILL AFFECT DATA QUALITY.
- ALL INTERVALS LOGGED AND SCALED PER CUSTOMER'S REQUEST.
- TOTAL HOLE VOLUME FROM TD TO SURFACE CASING: 2390 CU. FT.
- ANNULAR HOLE VOLUME WITH 4.5 INCH CASING FROM TD TO 4000 FEET: 755 CU. FT.
- RIG: DUKE #6

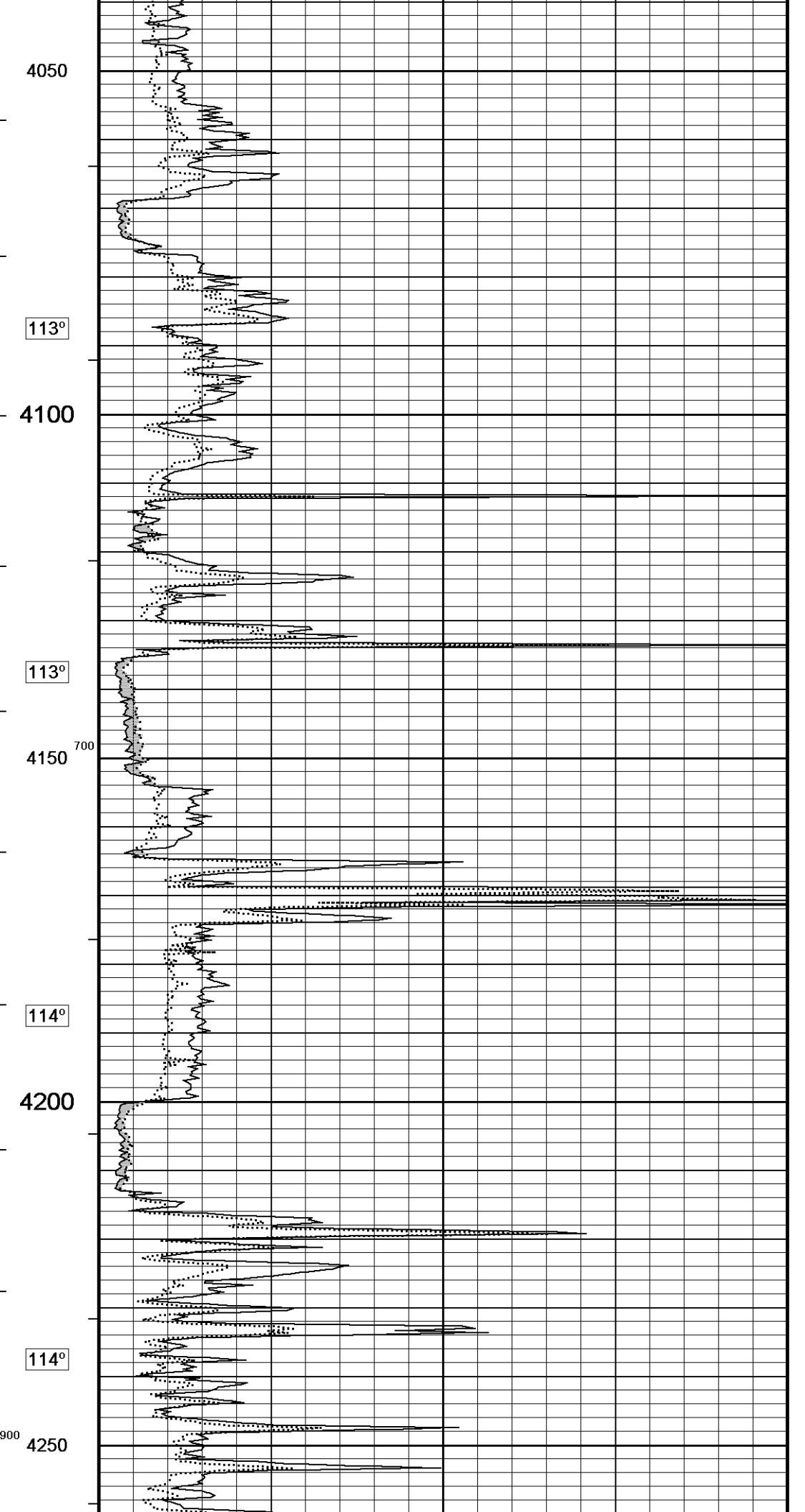
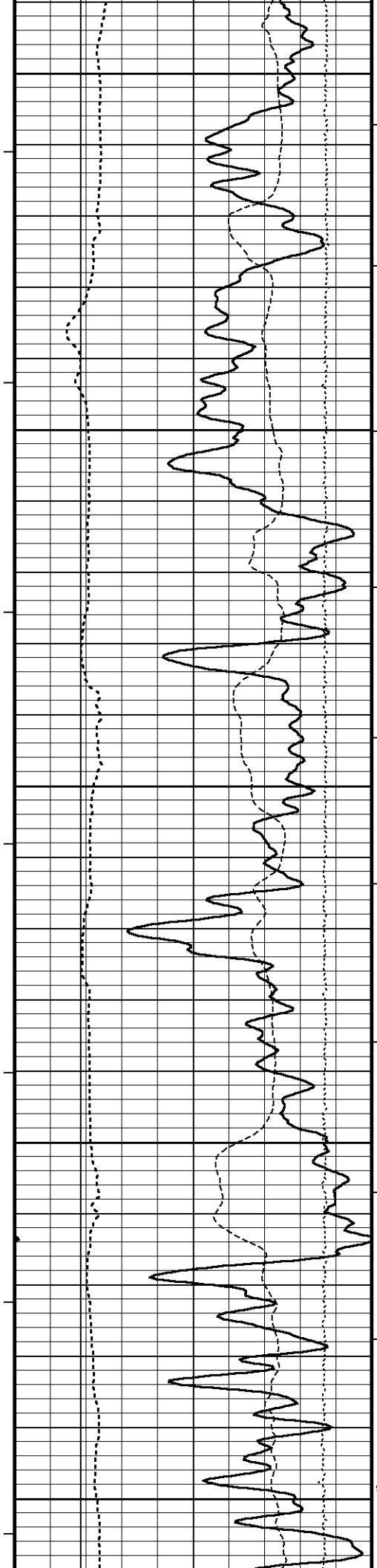
RIO: DORE #0.

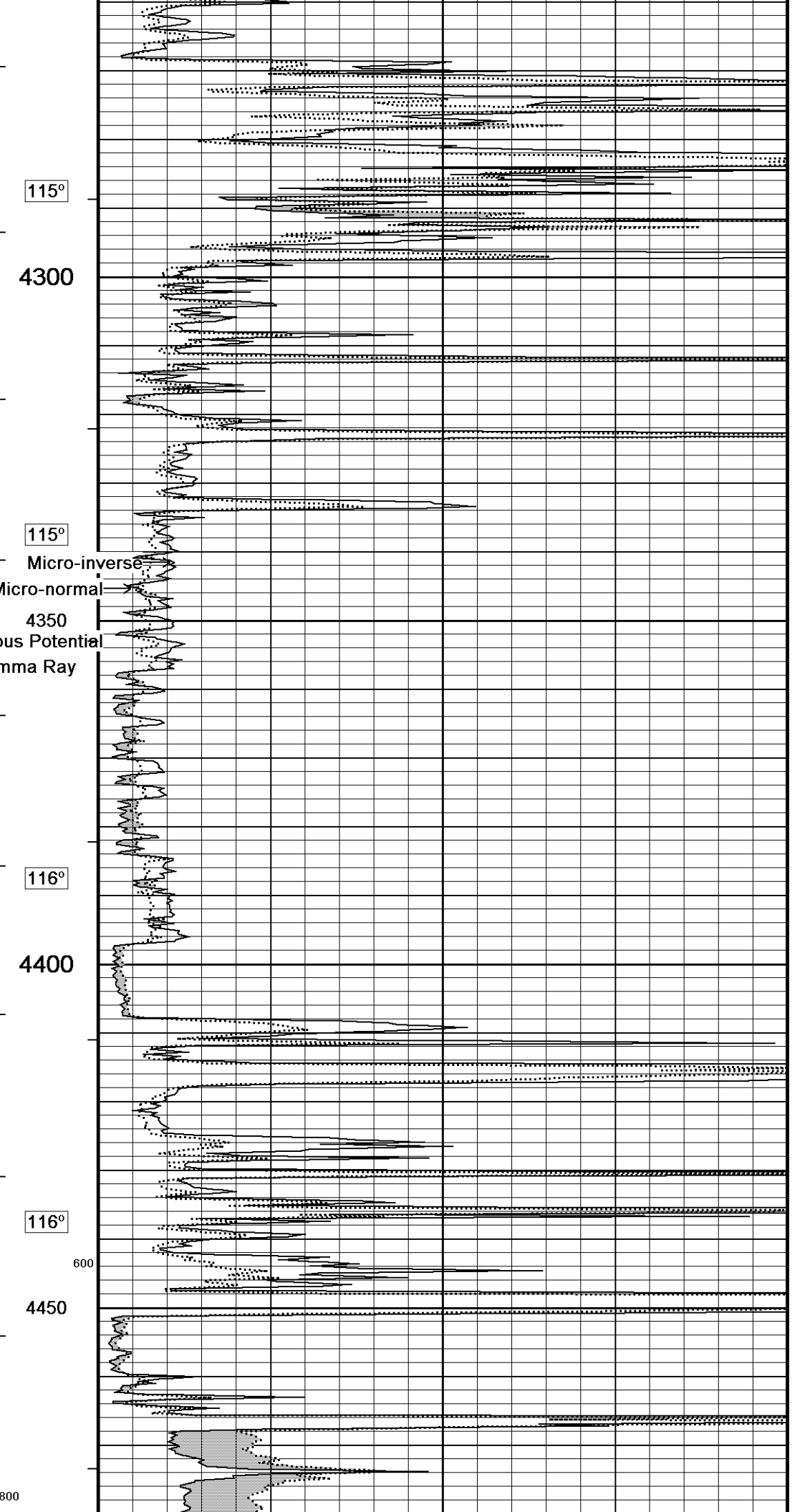
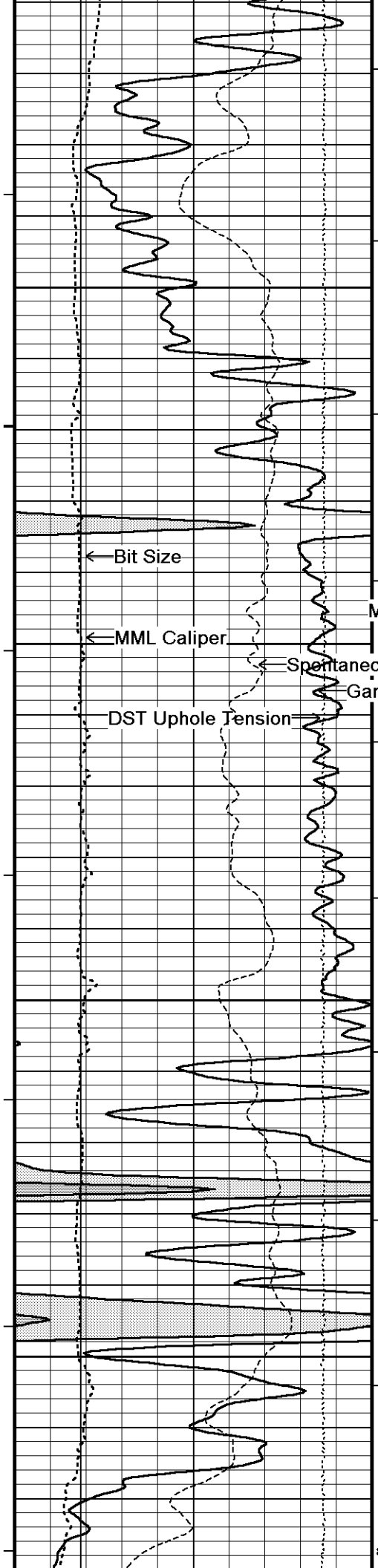
- ENGINEER: A. SILL.

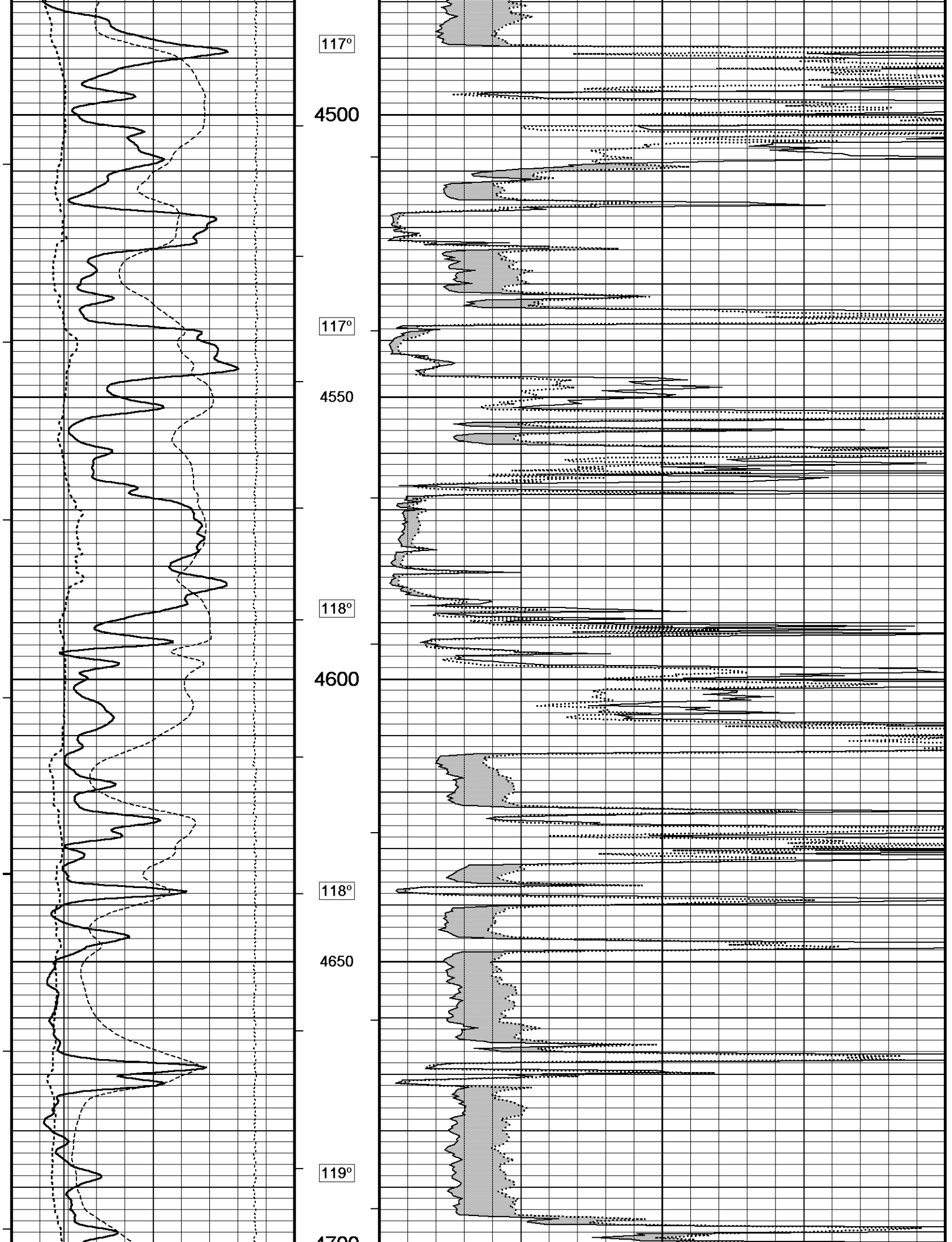
- OPERATOR(S): N. ADAME.

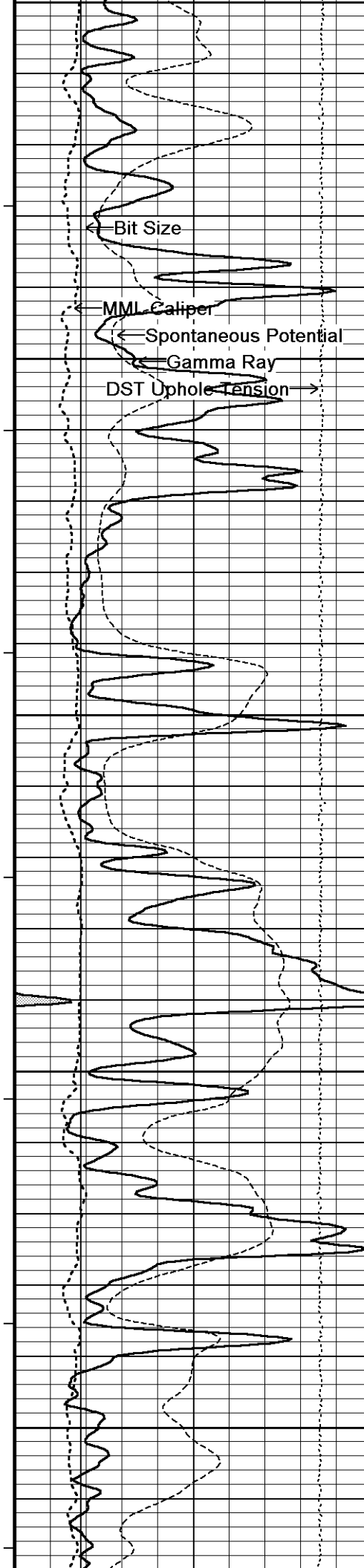
All interpretations are opinions based on inferences from electrical or other measurements and we cannot, and do not, guarantee the accuracy or correctness of any interpretations, and we shall not, except in the case of gross or wilful negligence on our part, be liable or responsible for any loss, costs, 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.







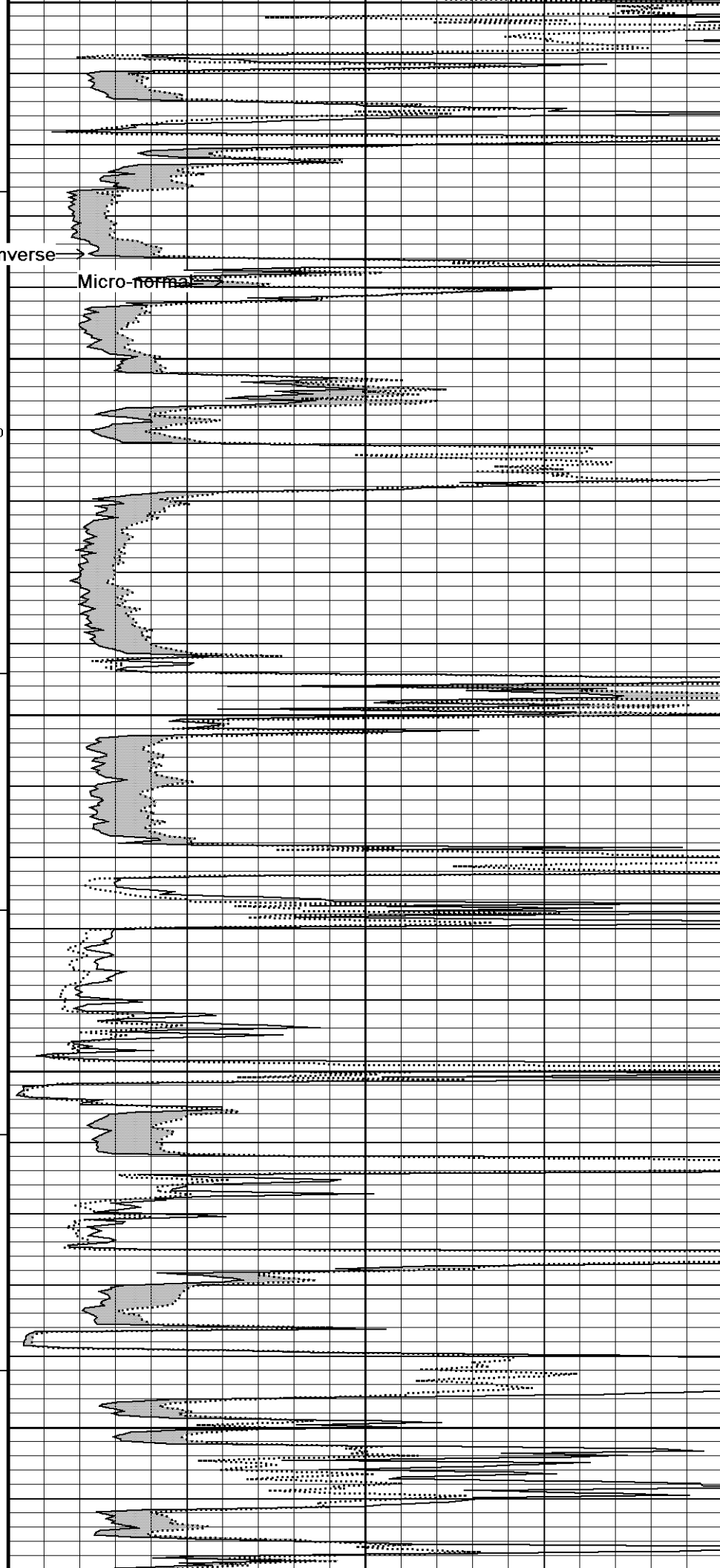


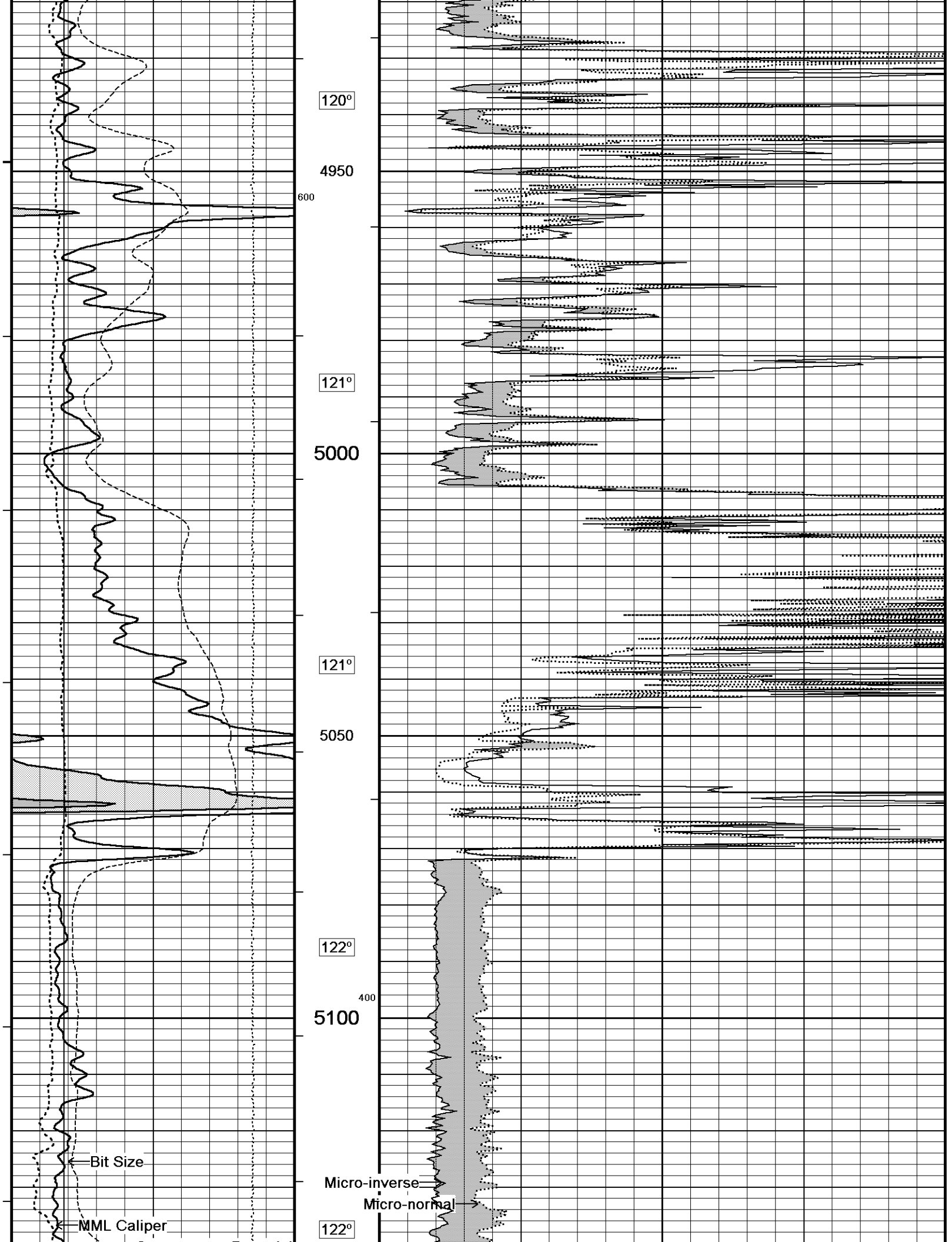


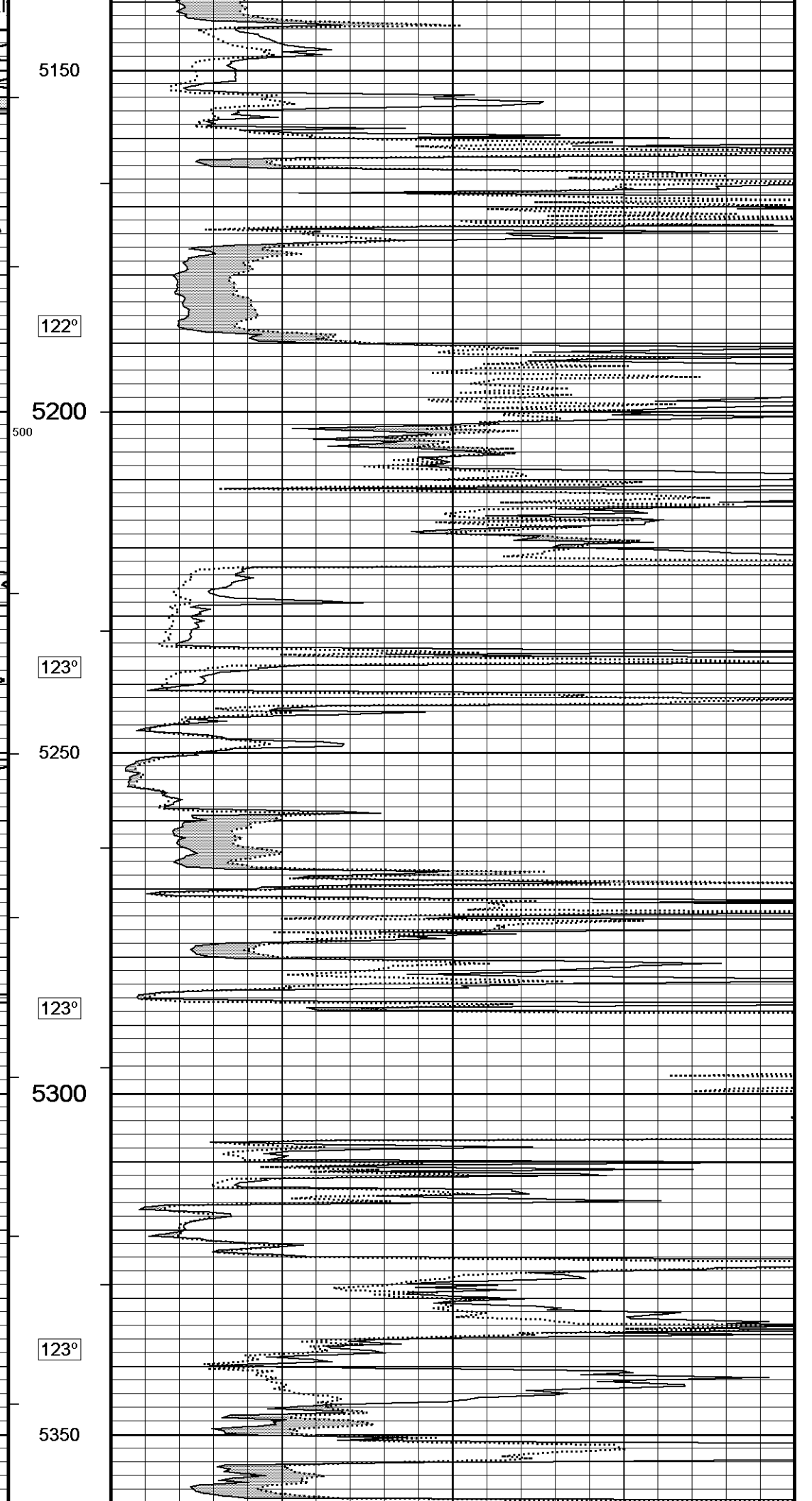
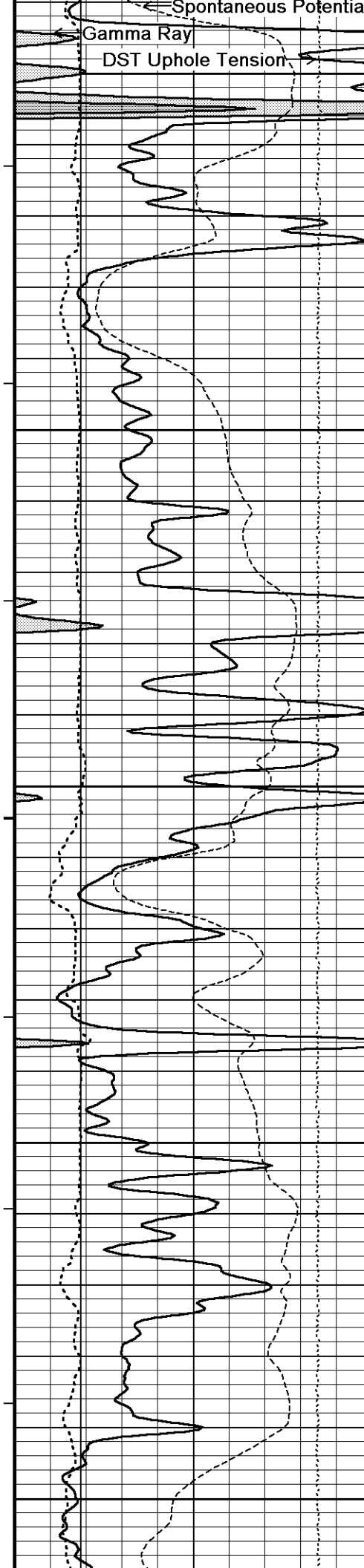
4700
700
119°
4750
500
119°
4800
120°
4850
120°
4900

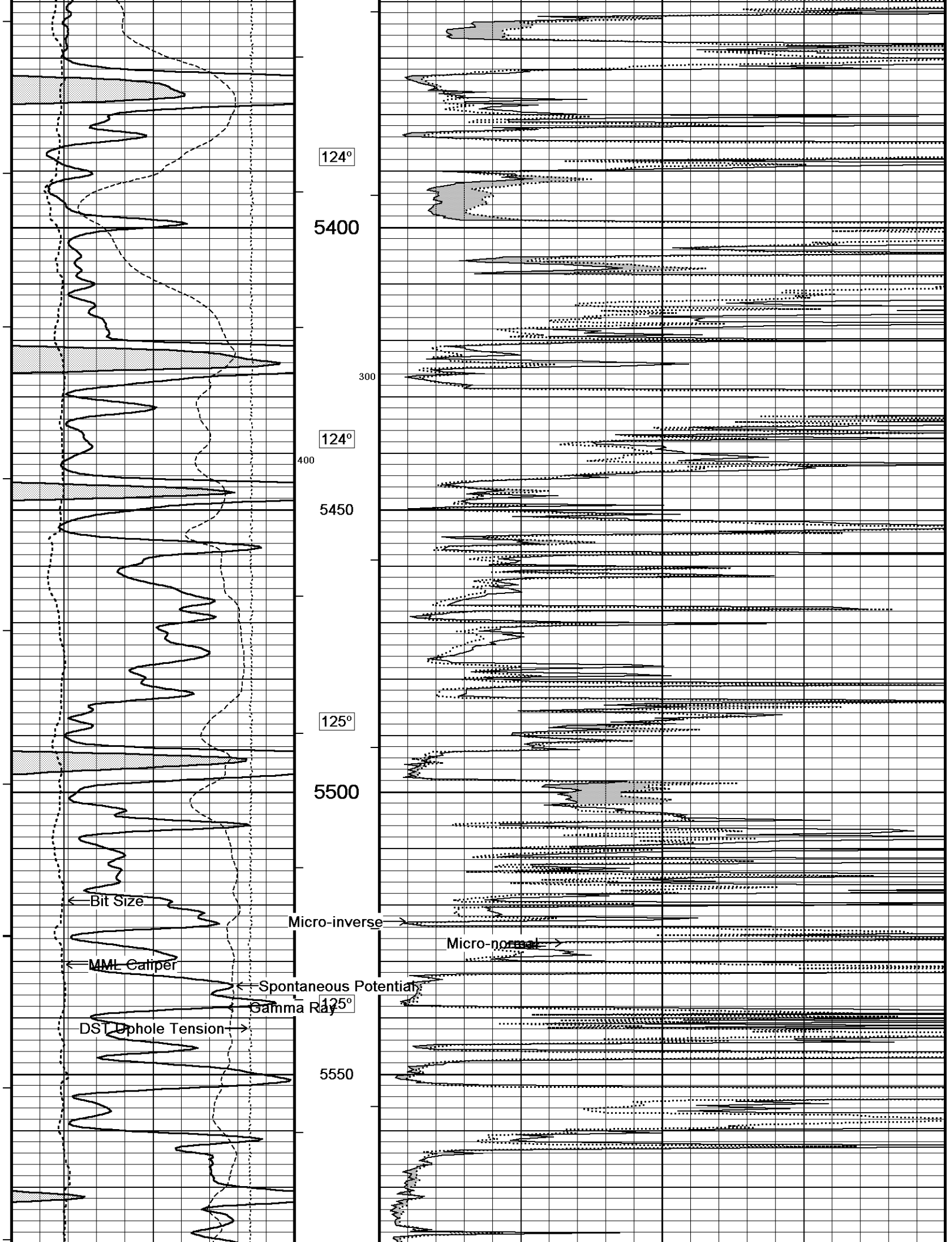
Micro-inverse

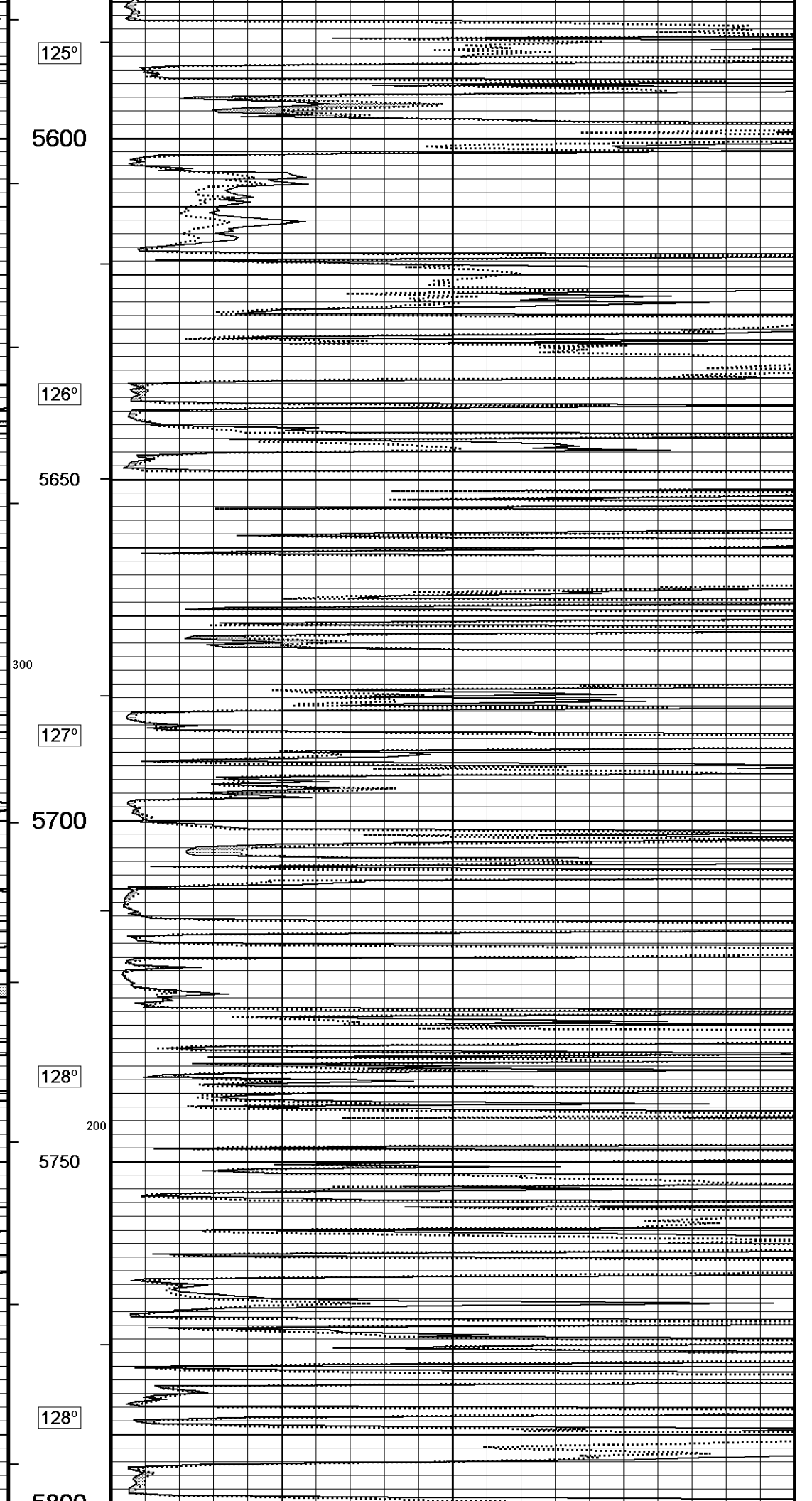
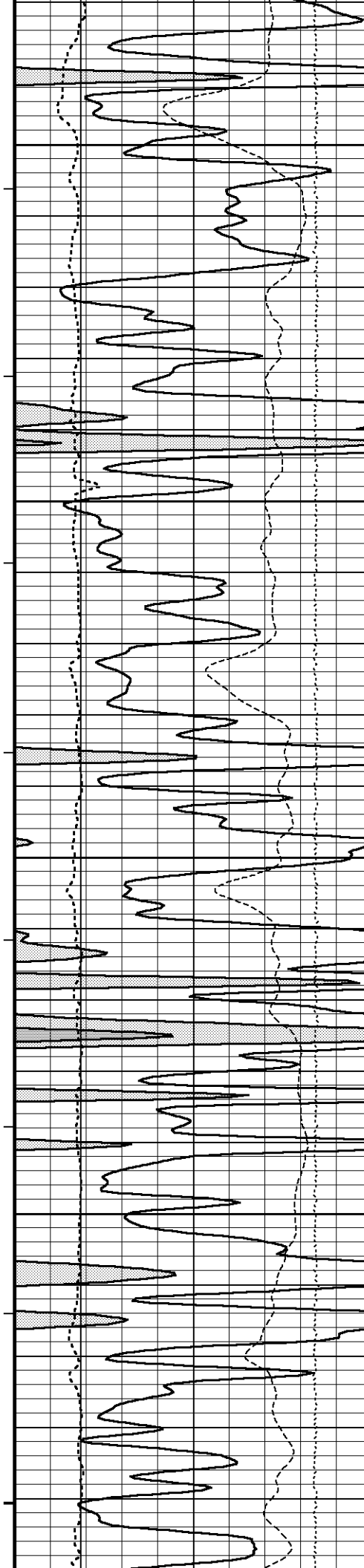
Micro-normal

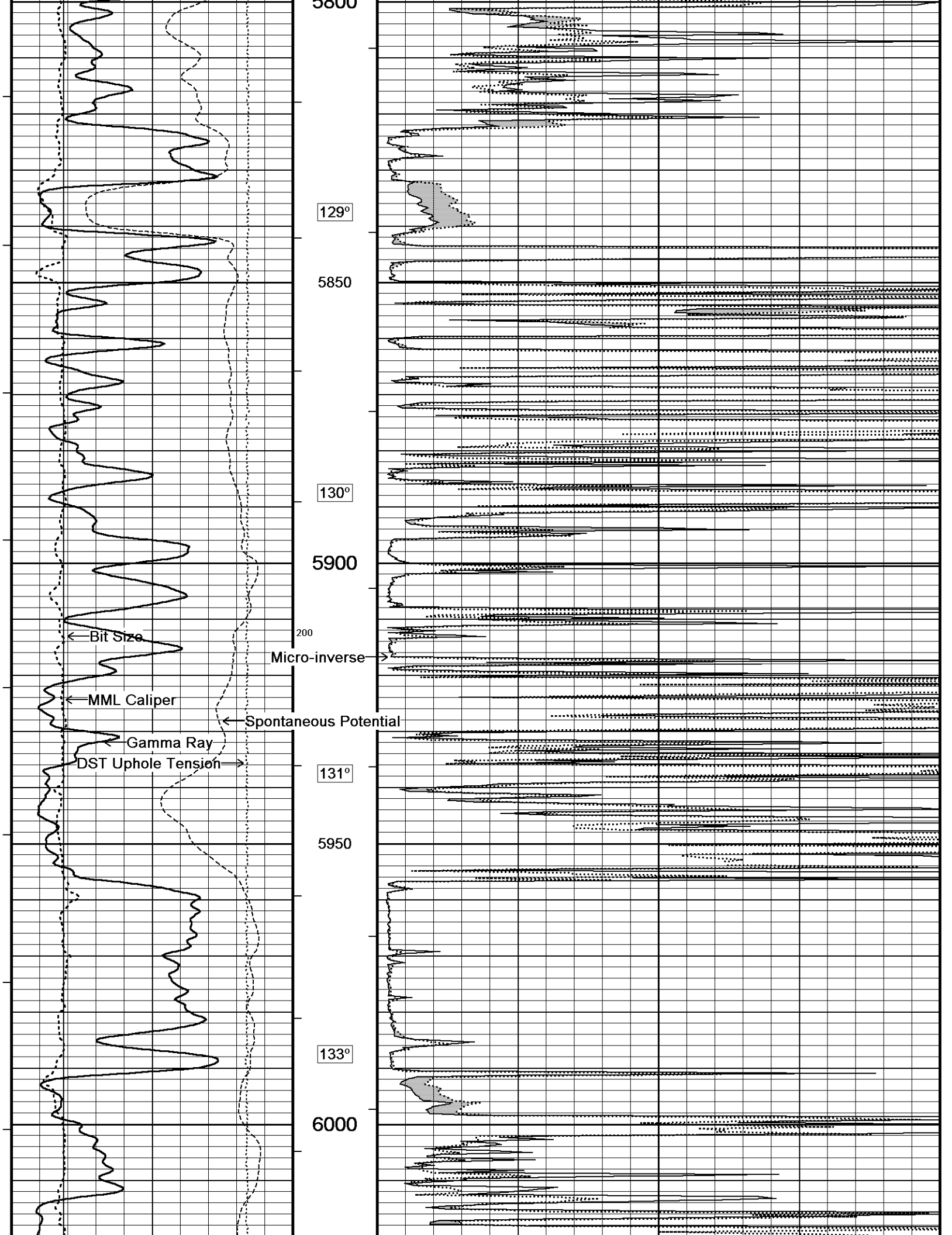


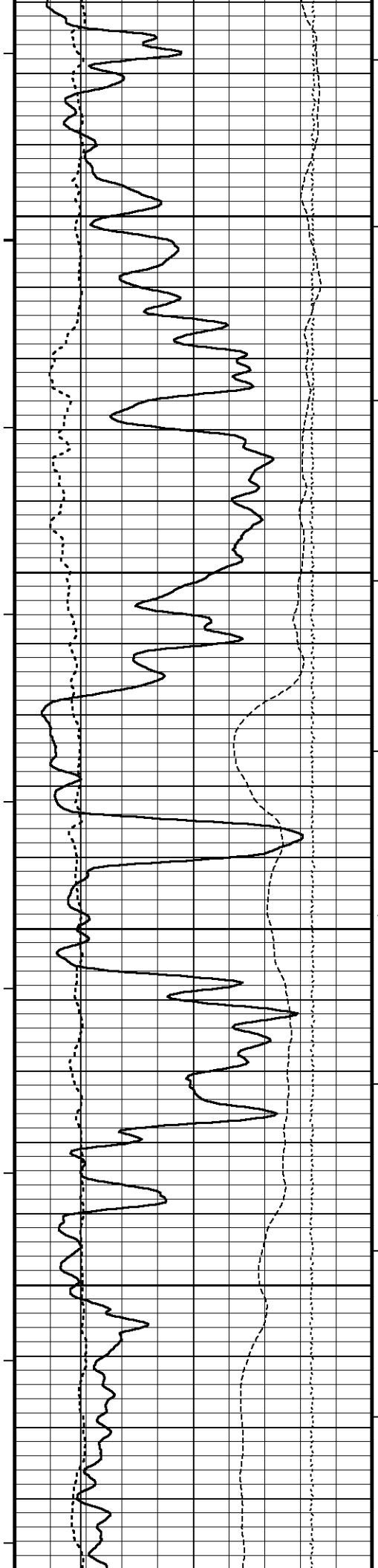












134°

6050

100

136°

6100

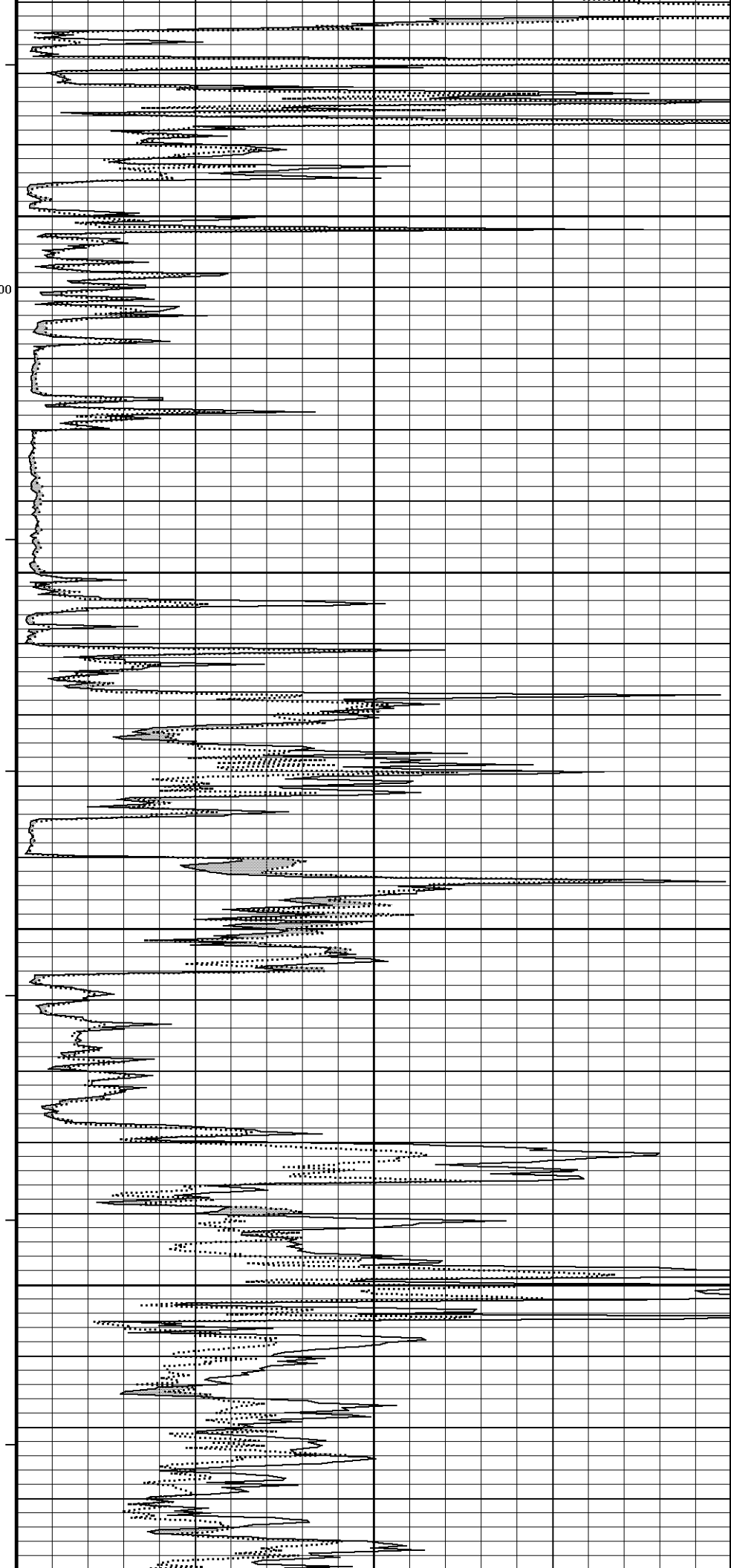
136°

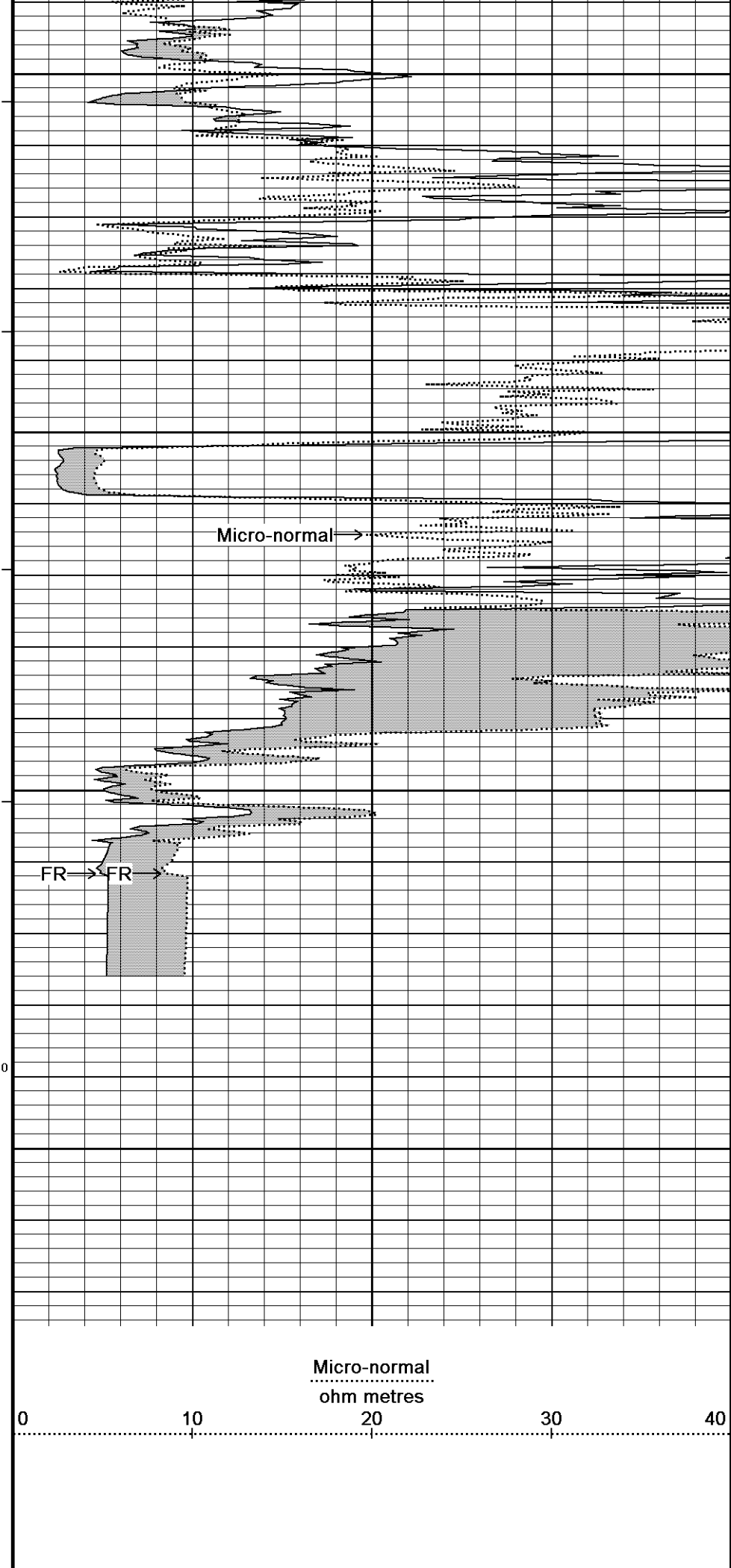
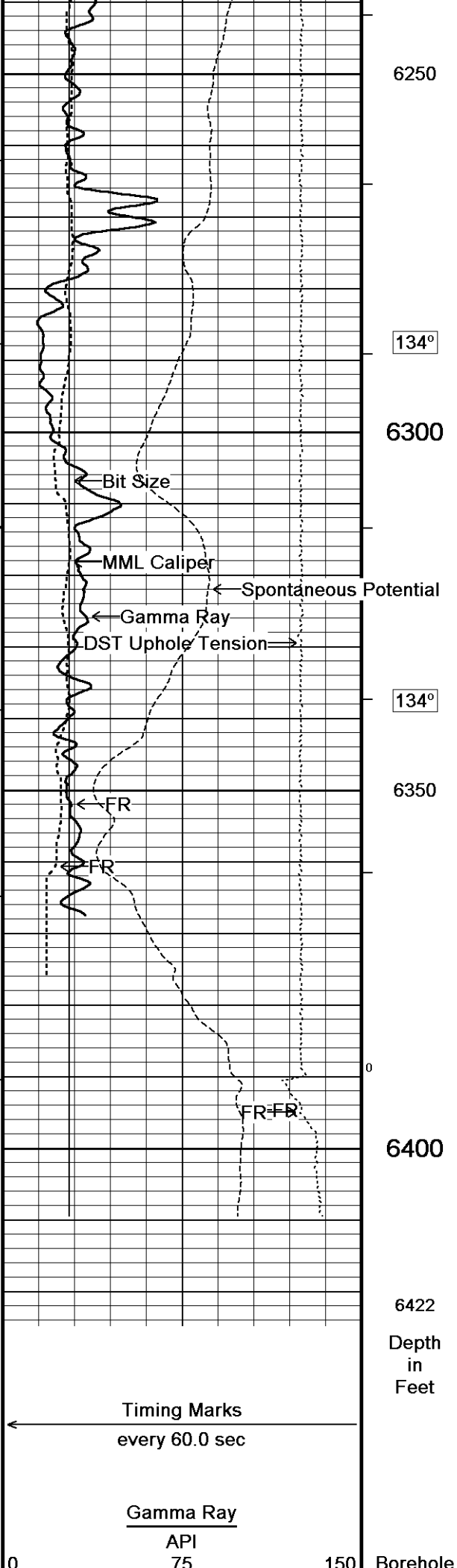
100
6150

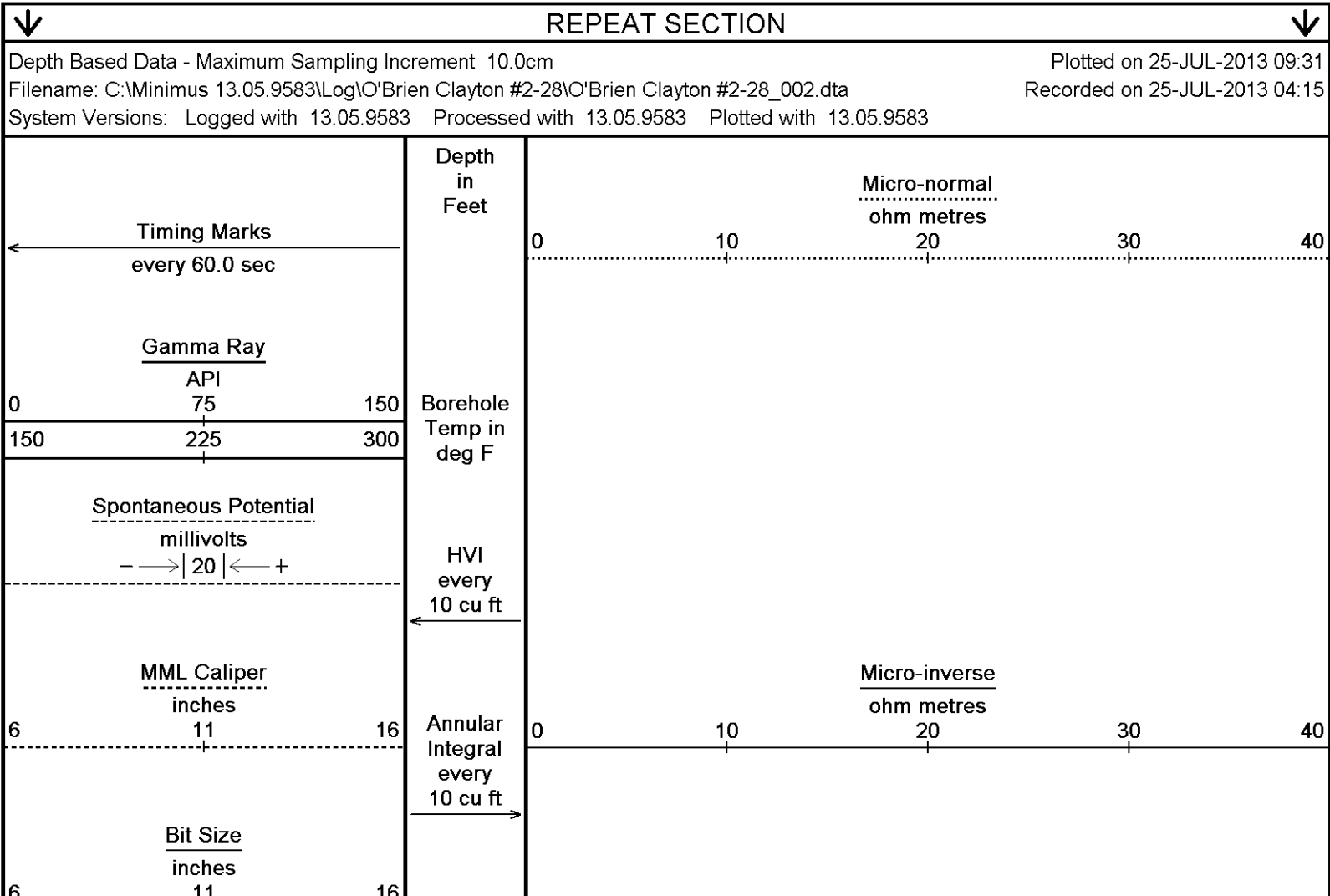
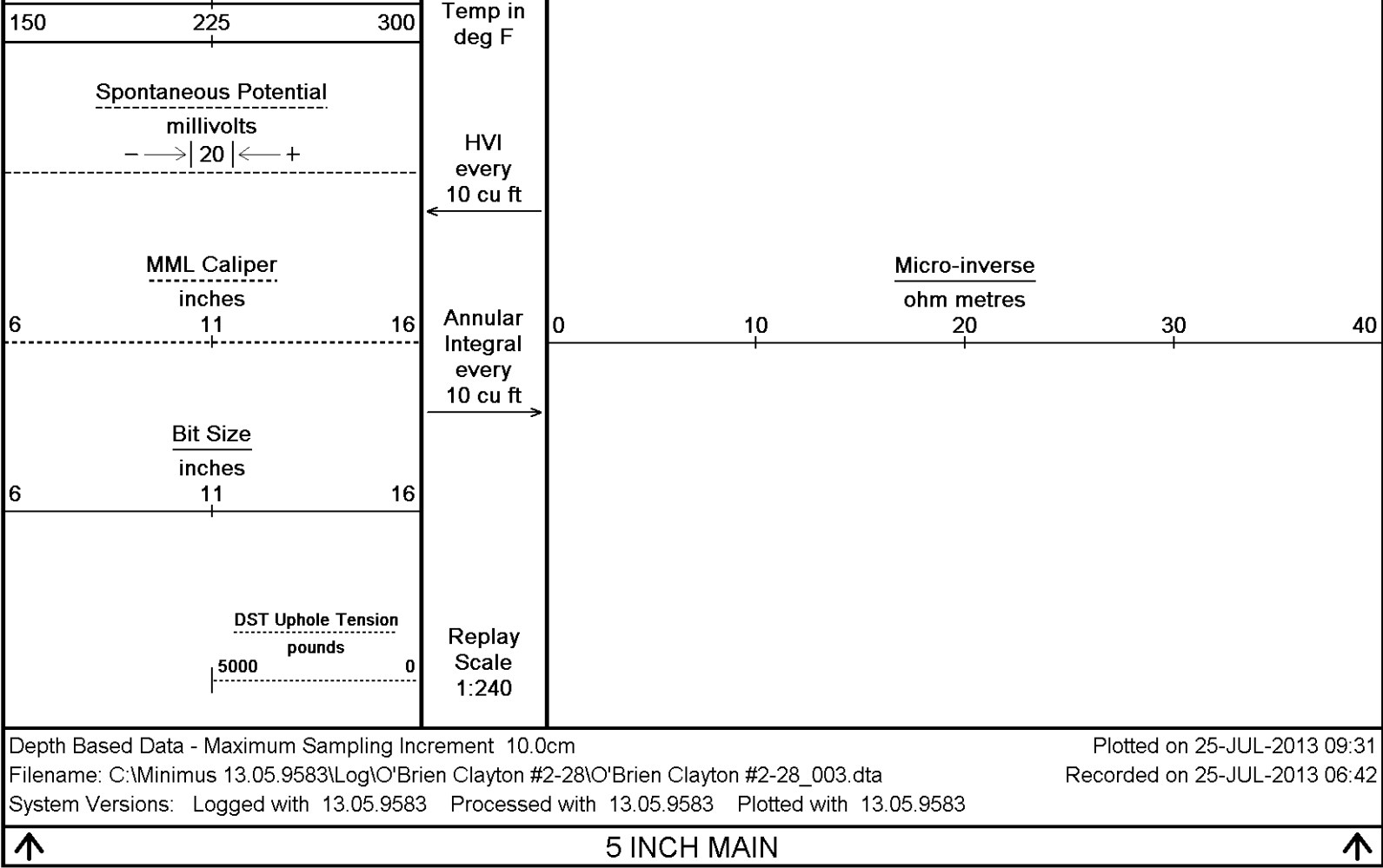
136°

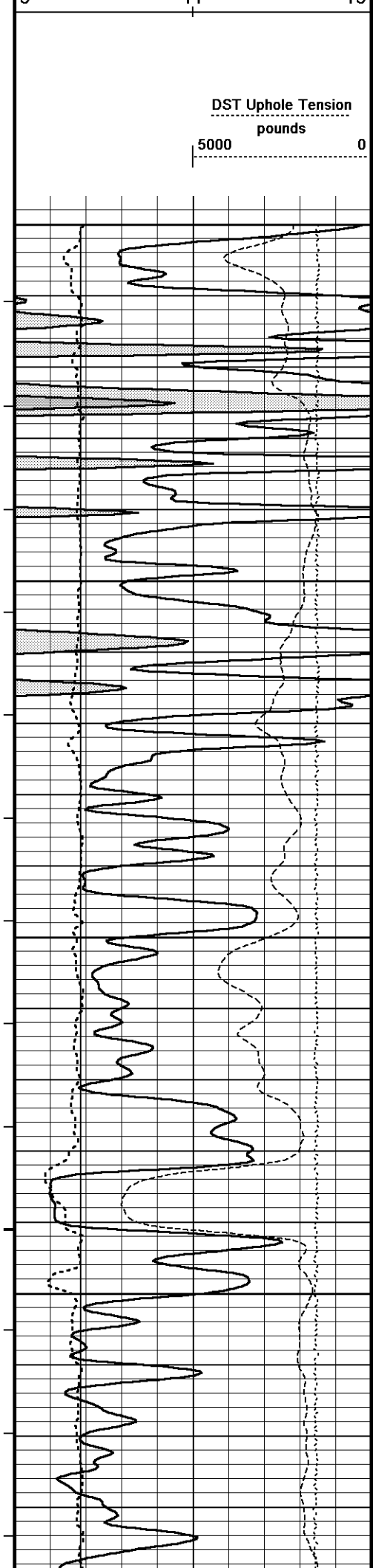
6200

135°









Replay
Scale
1:240

5700

126°

200

5750

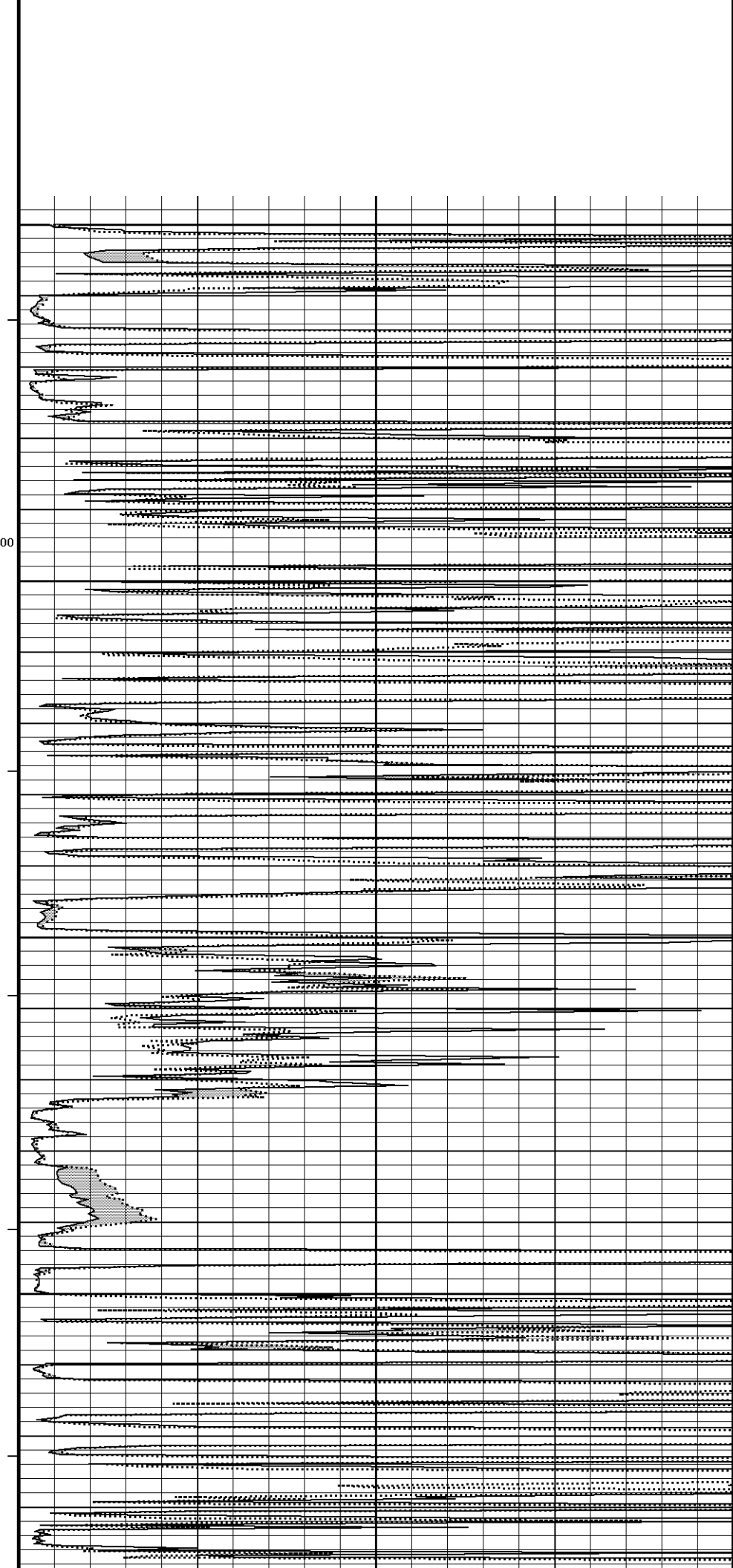
127°

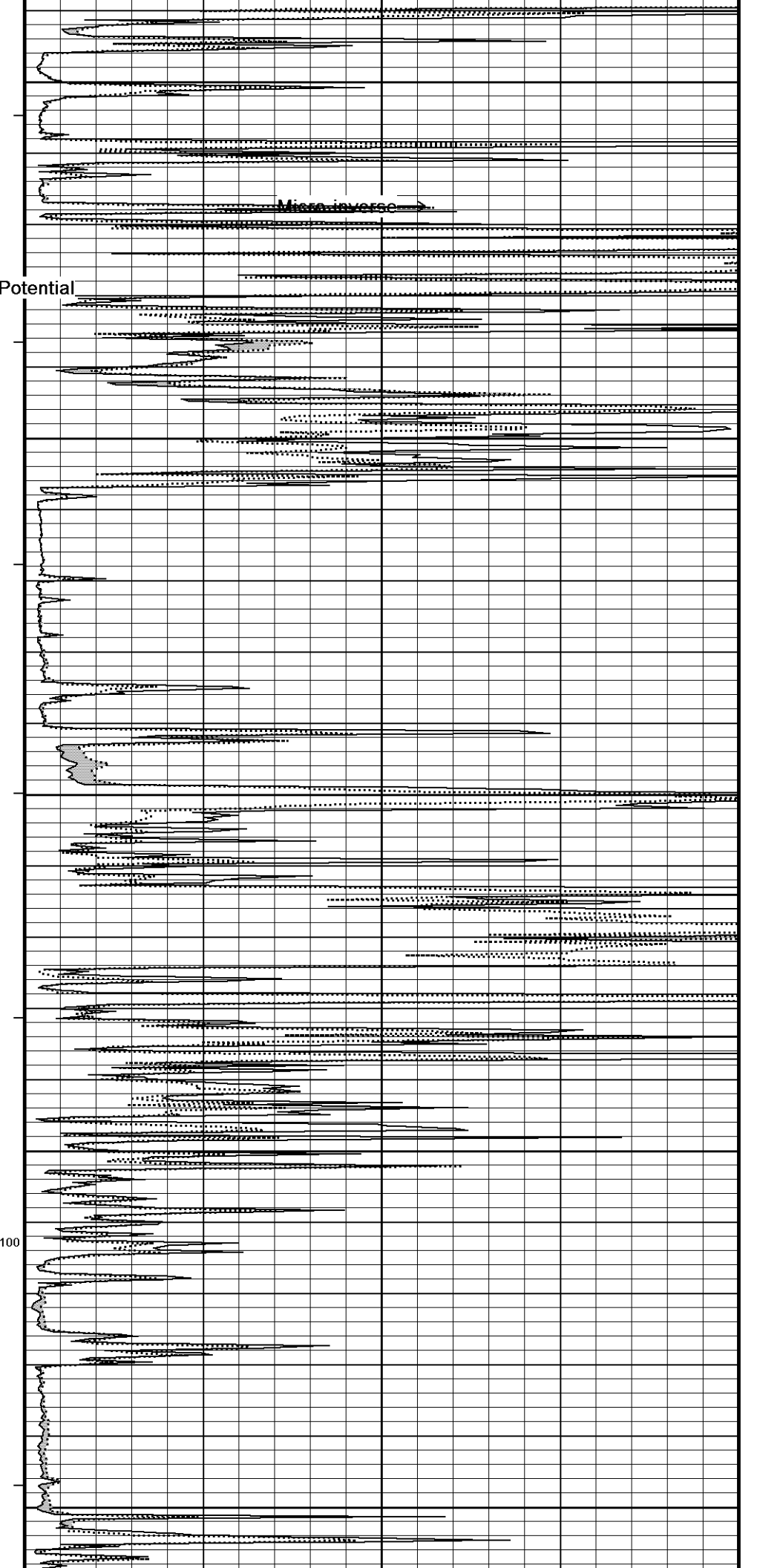
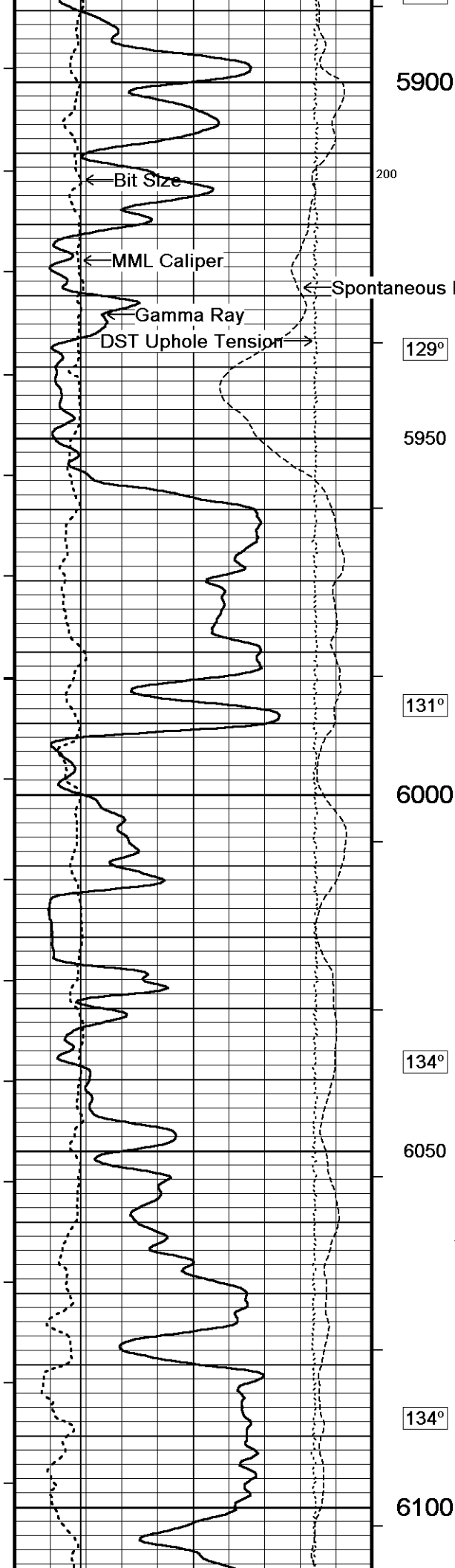
5800

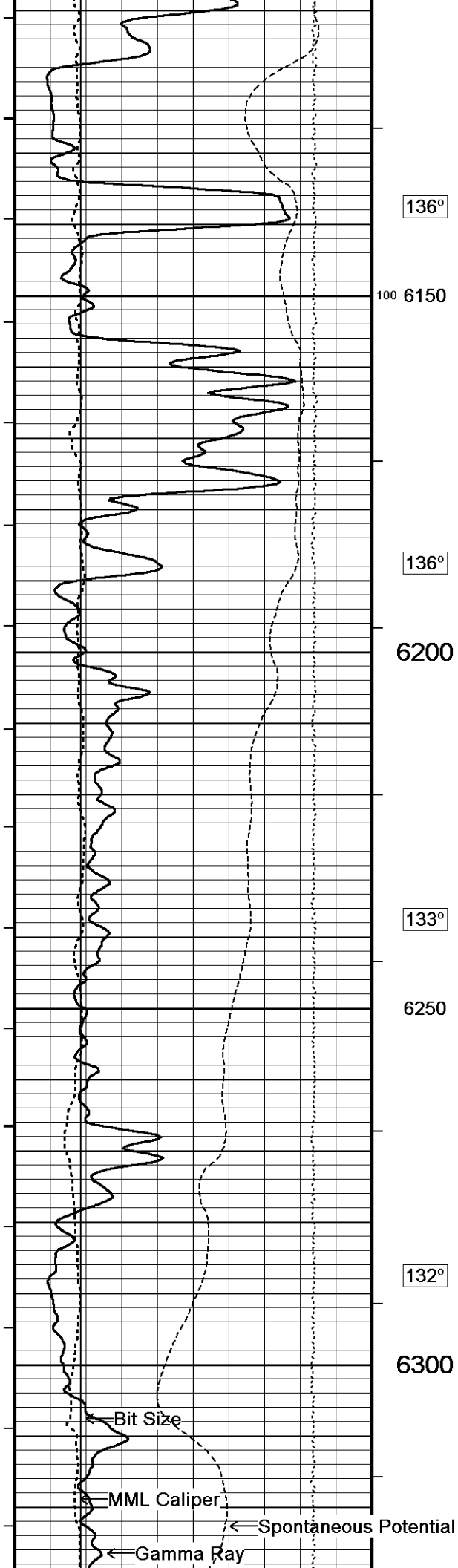
127°

5850

128°







136°

100 6150

136°

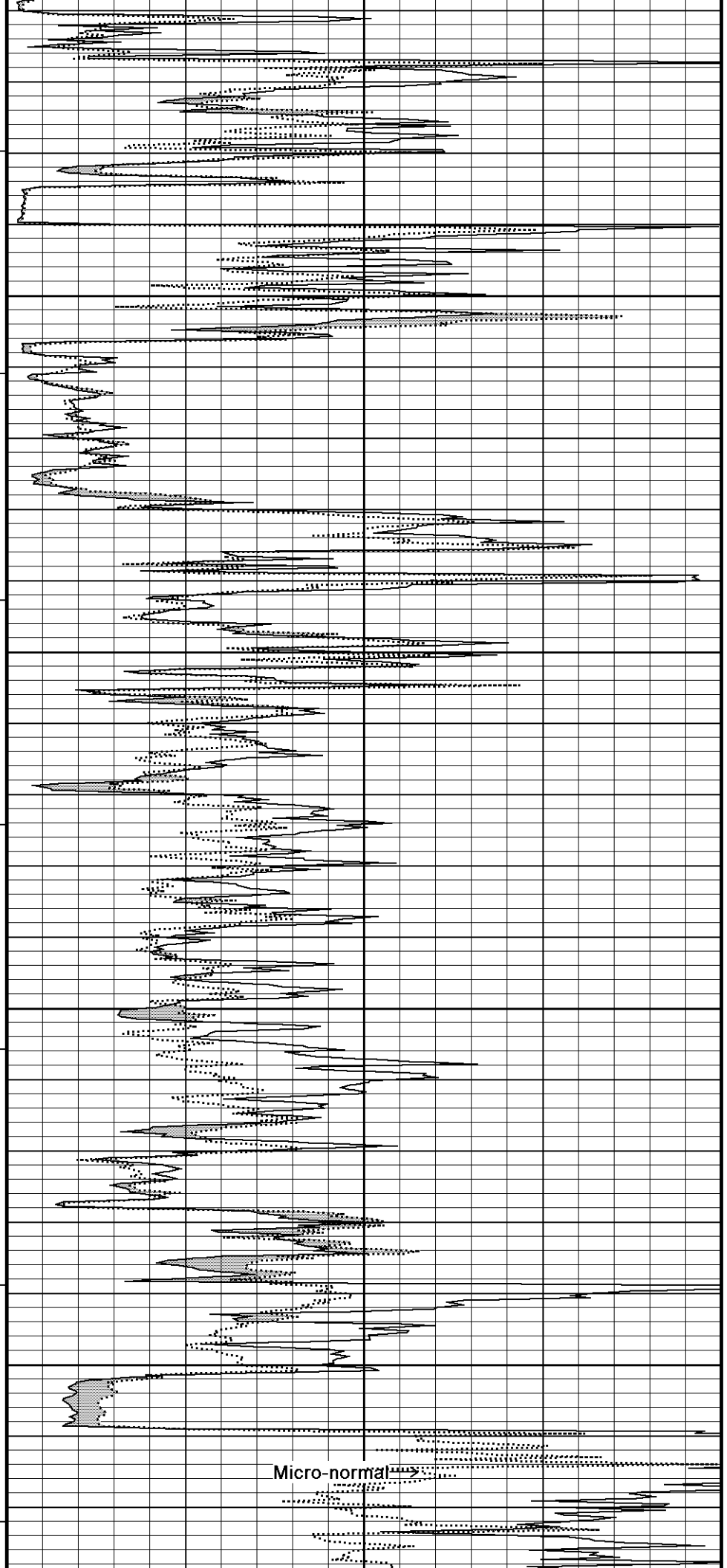
6200

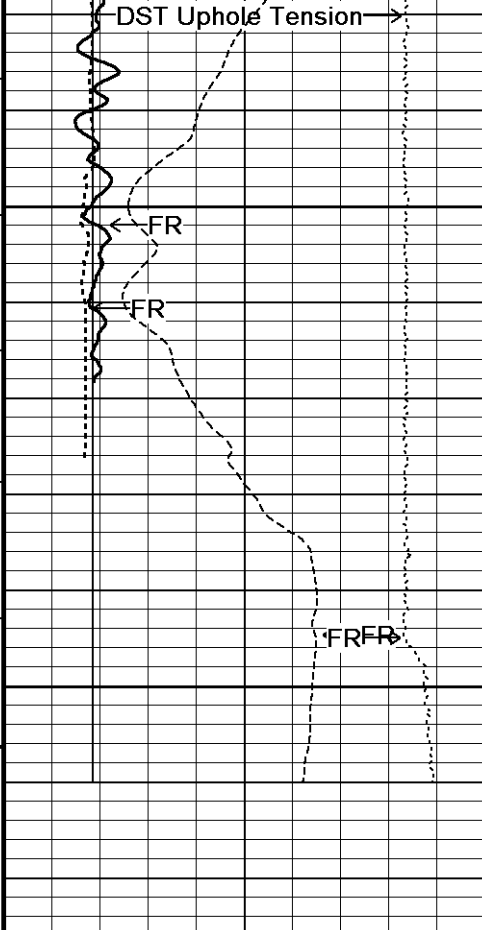
133°

6250

132°

6300





132°

6350

6400

6424
Depth
in
Feet

Timing Marks
every 60.0 sec

Gamma Ray
API
0 75 150
150 225 300

Borehole
Temp in
deg F

Spontaneous Potential
millivolts
- -> | 20 | <- +

HVI
every
10 cu ft

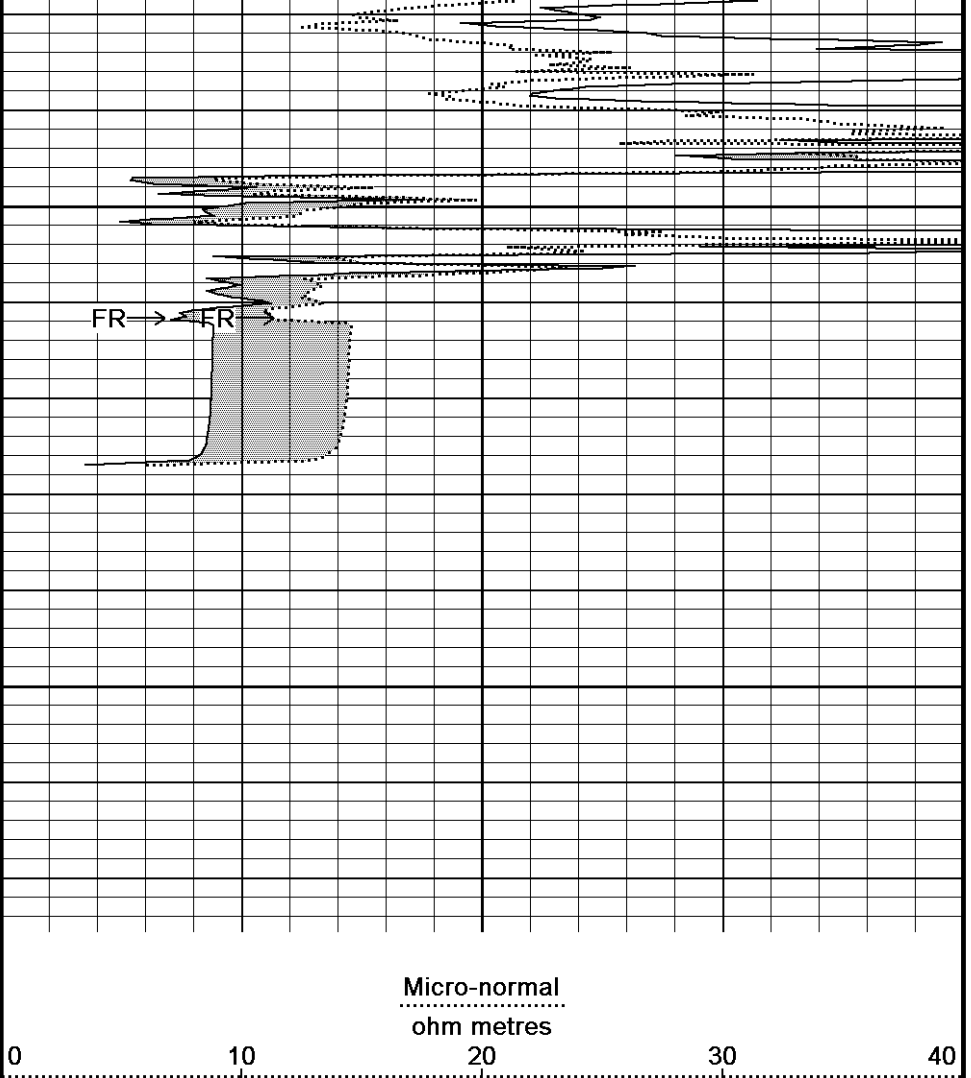
MML Caliper
inches
6 11 16

Annular
Integral
every
10 cu ft

Bit Size
inches
6 11 16

DST Uphole Tension
pounds
5000 0

Replay
Scale
1:240



↑

REPEAT SECTION

↑

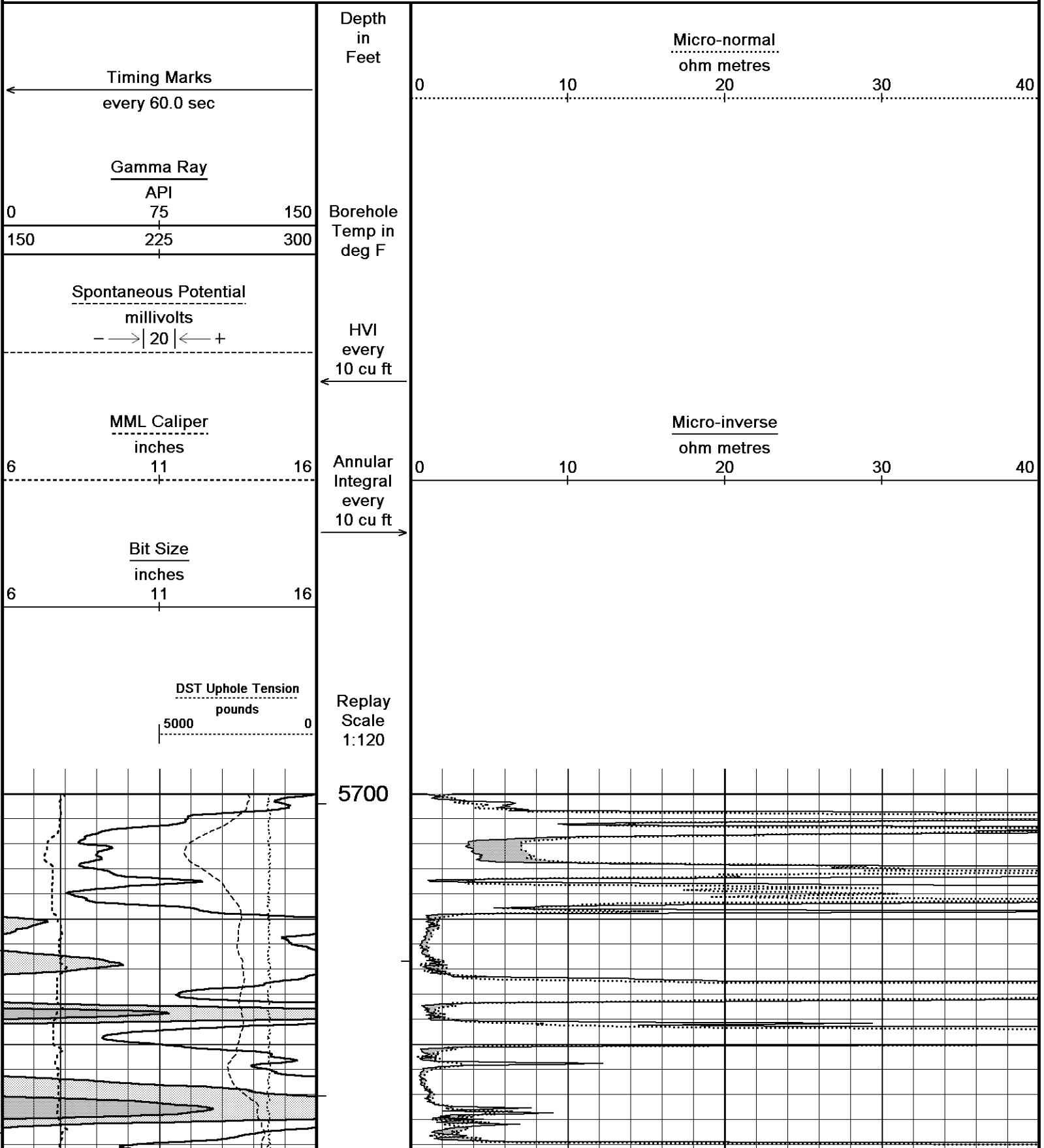
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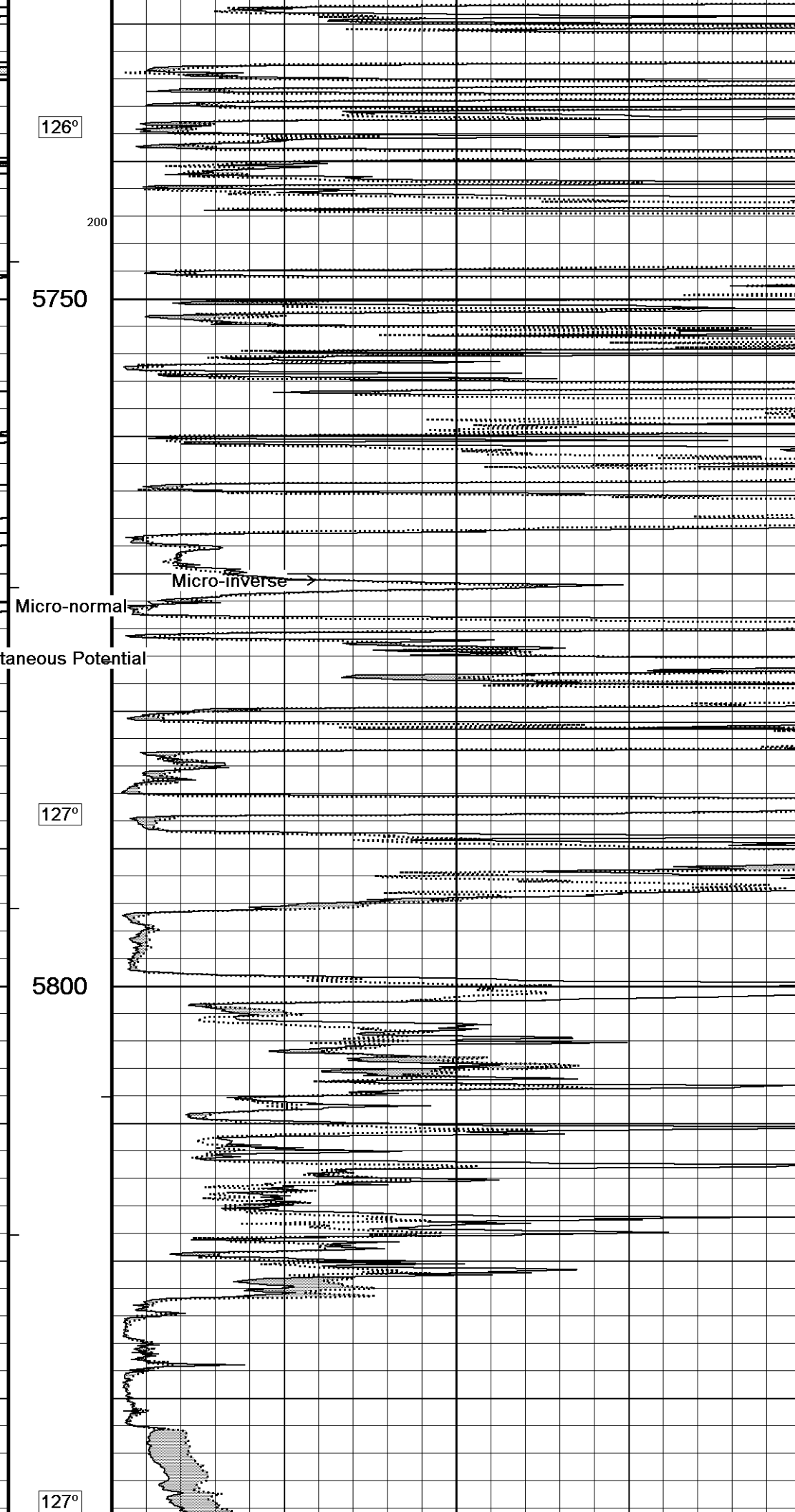
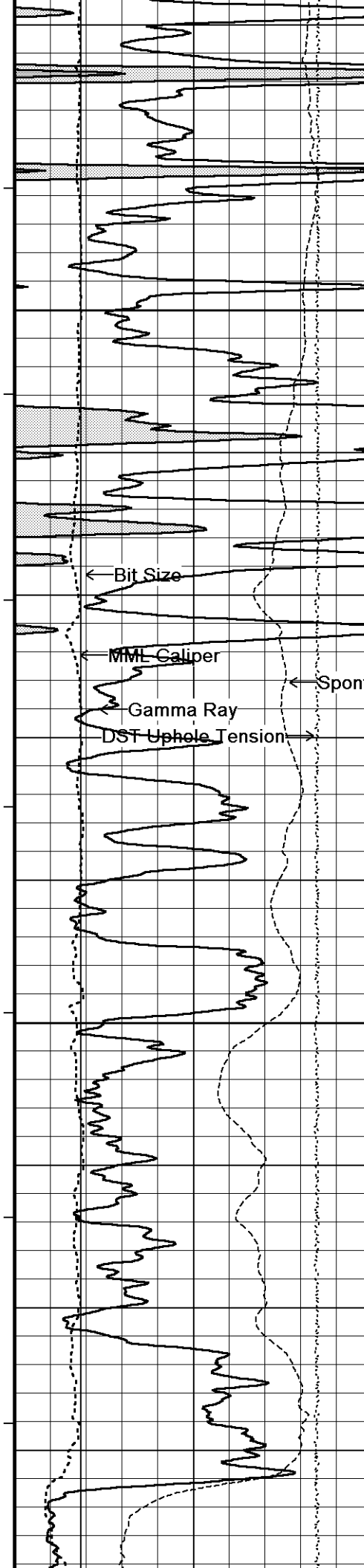
10 INCH HI-RES

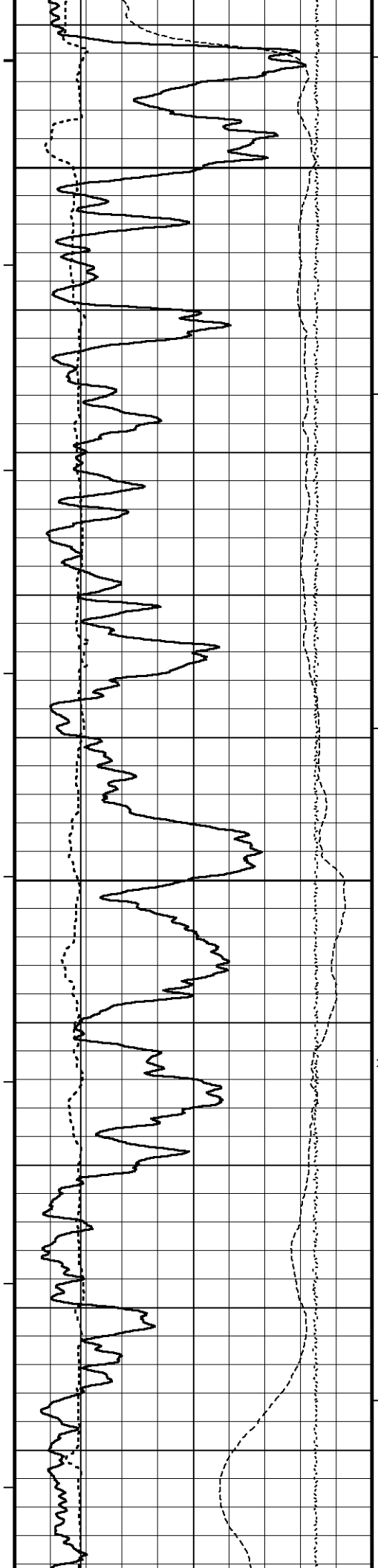
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Depth Based Data - Maximum Sampling Increment 2.5cm
Filename: C:\Minimus 13.05.9583\Log\O'Brien Clayton #2-28\O'Brien Clayton #2-28_001.dta
System Versions: Logged with 13.05.9583 Plotted with 13.05.9583

Plotted on 25-JUL-2013 09:31
Recorded on 25-JUL-2013 04:15







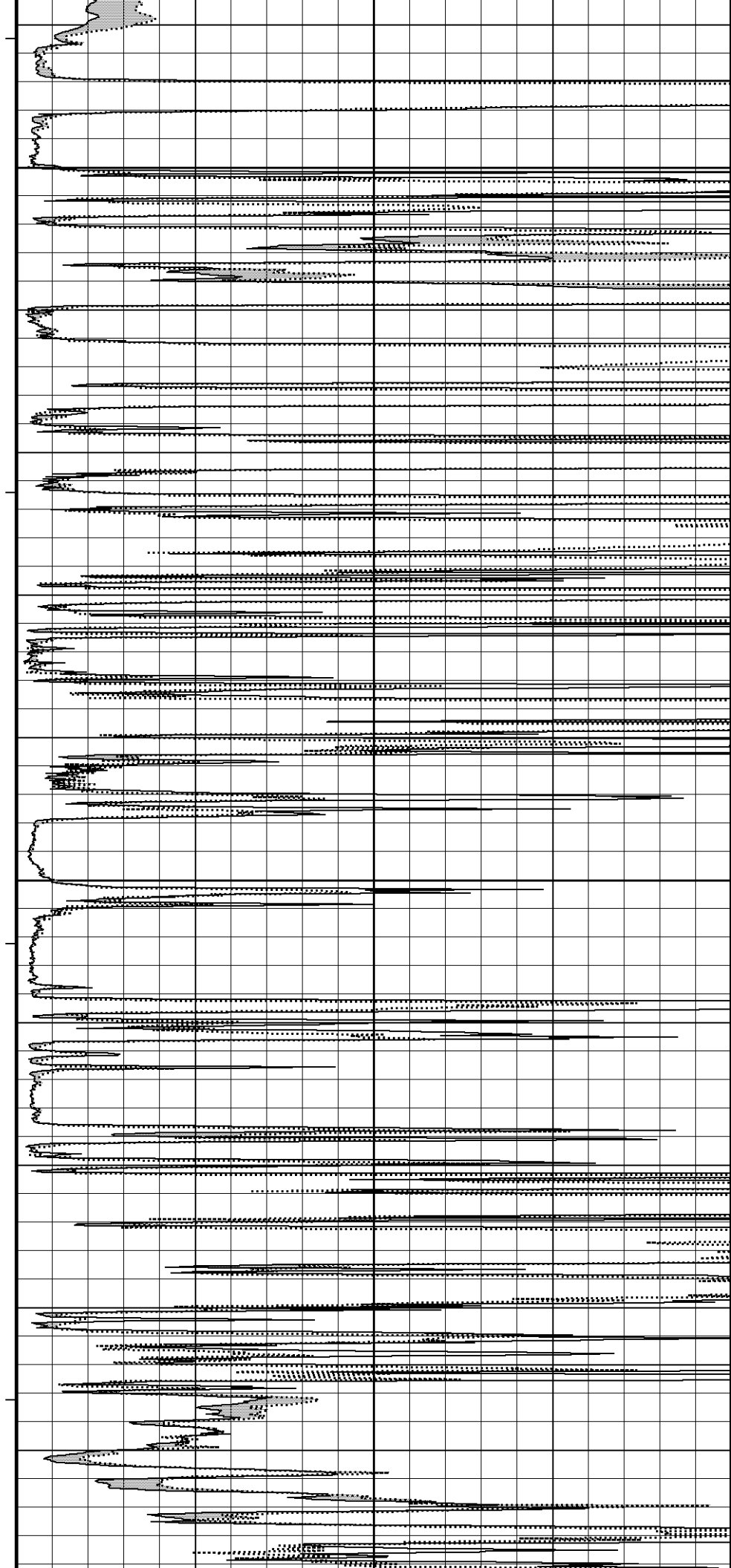
5850

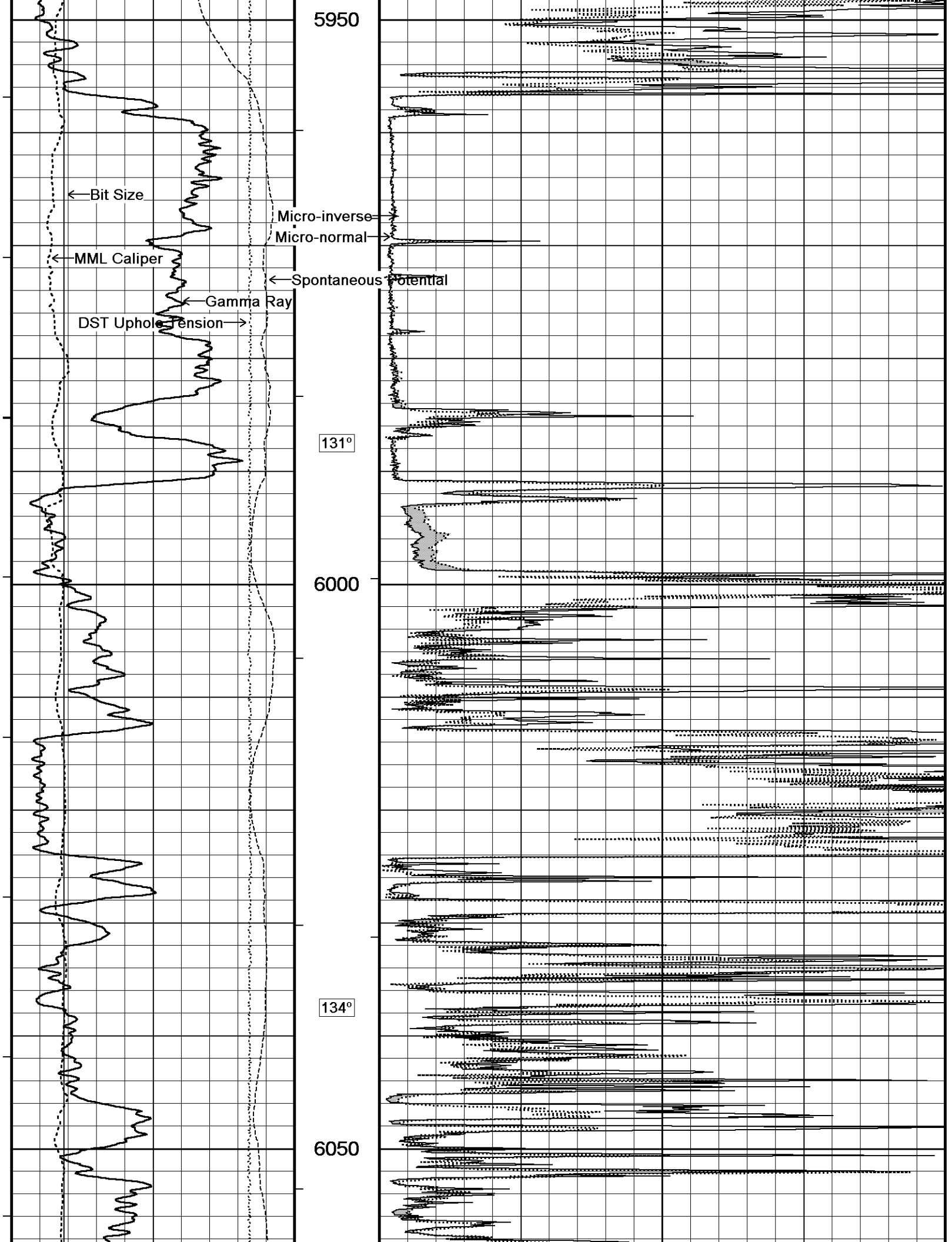
128°

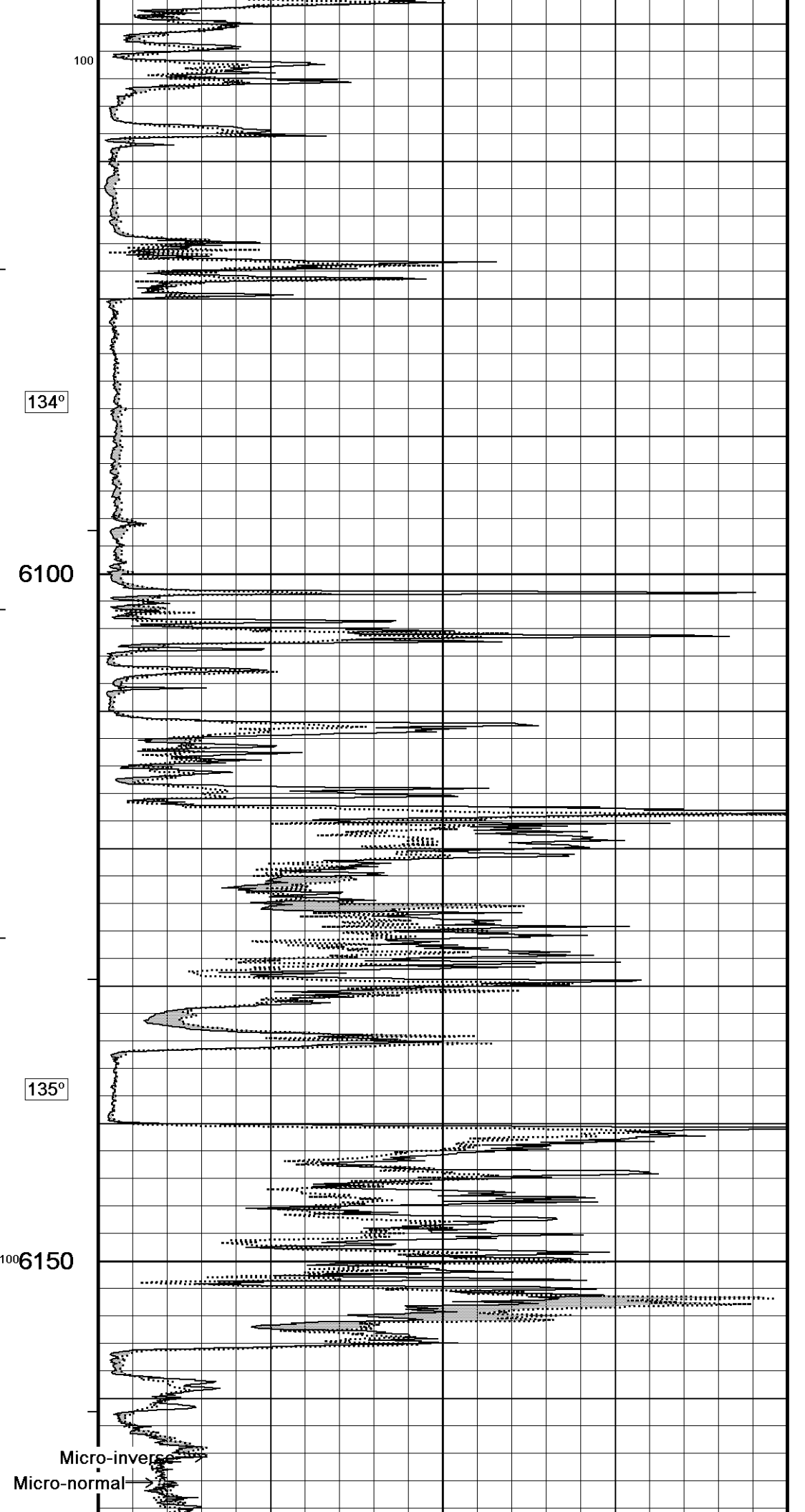
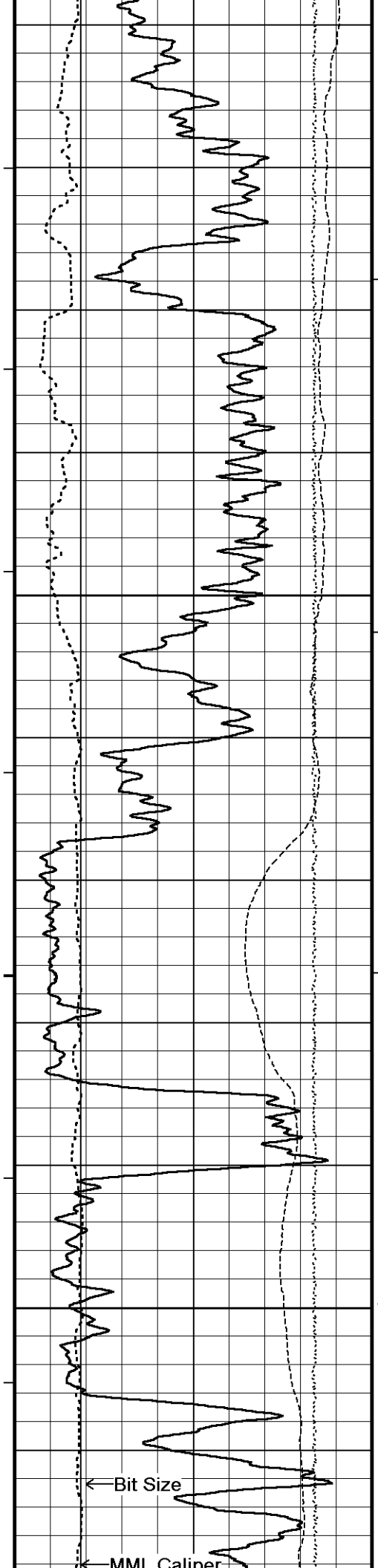
5900

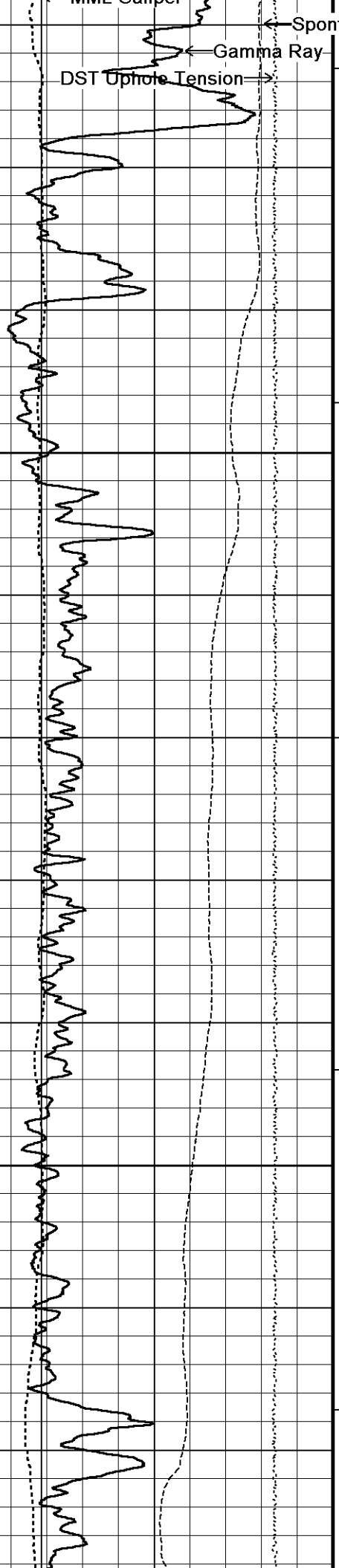
200

129°







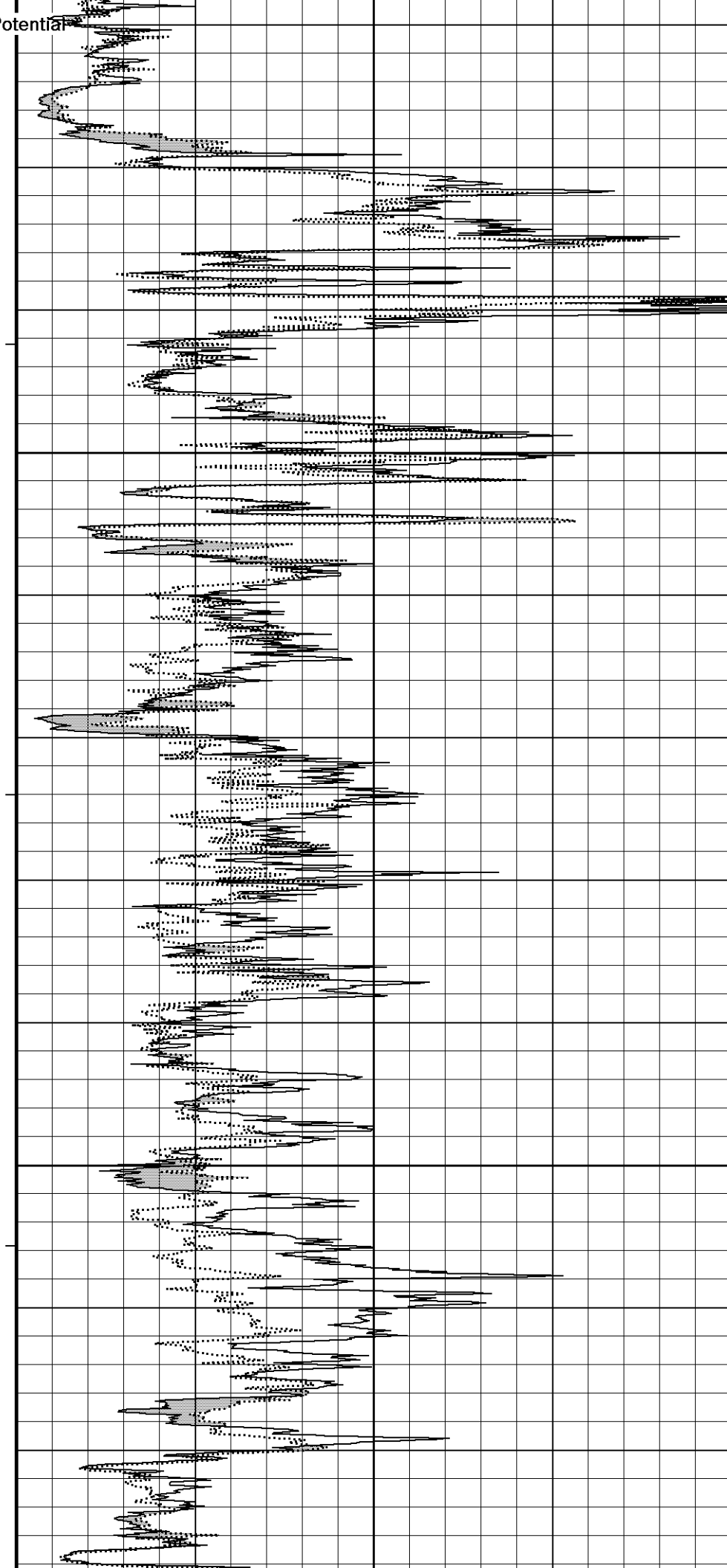


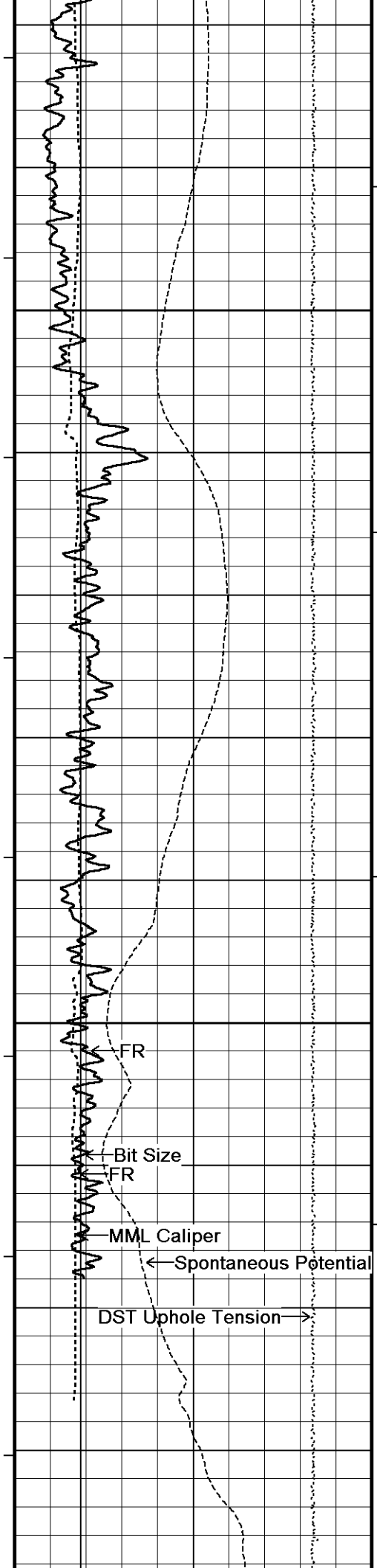
136°

6200

133°

6250





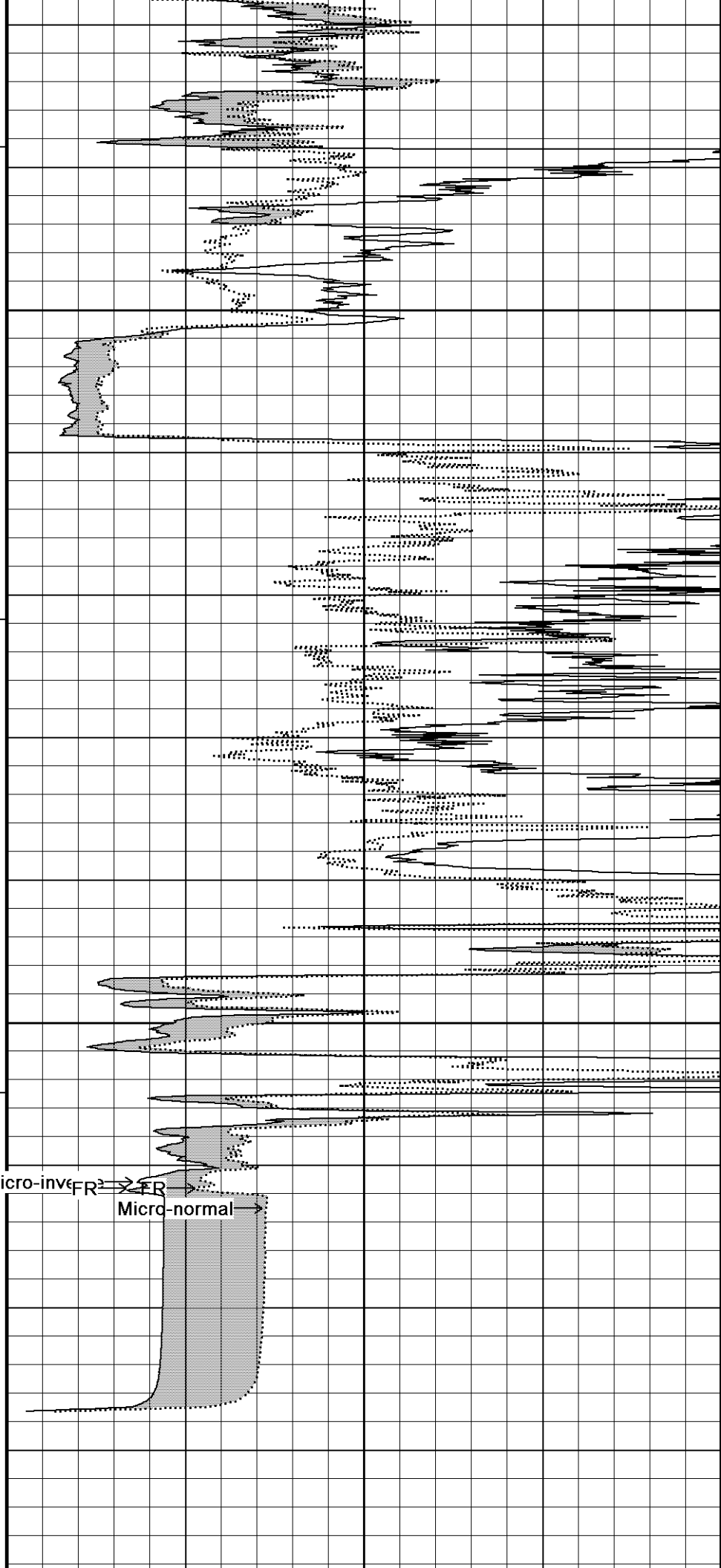
132°

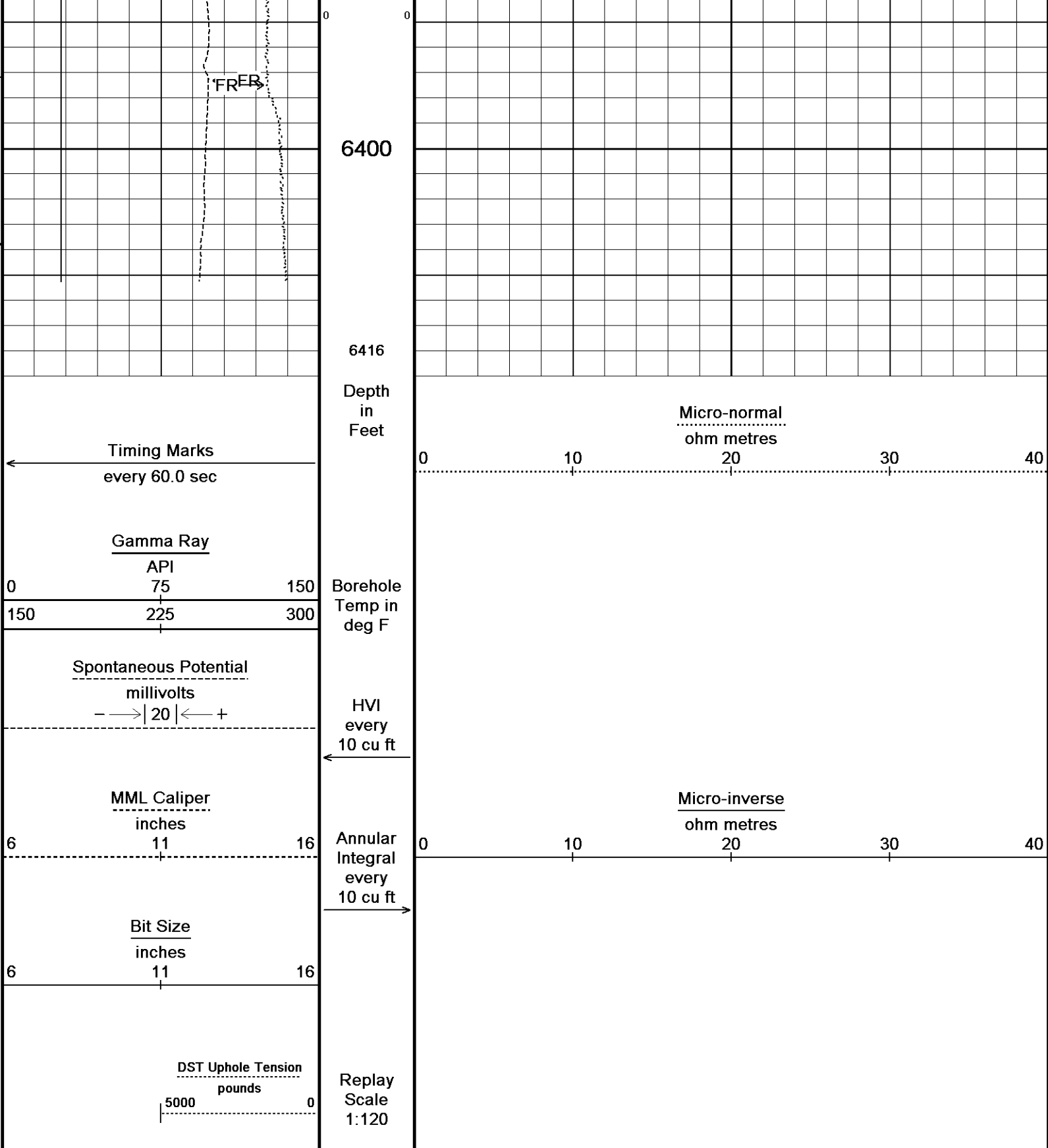
6300

132°

6350

Micro-inverse $\epsilon_{FR}^2 \rightarrow FR \rightarrow$ Micro-normal





Depth Based Data - Maximum Sampling Increment 2.5cm
Filename: C:\Minimus 13.05.9583\Log\O'Brien Clayton #2-28\O'Brien Clayton #2-28_001.dta
System Versions: Logged with 13.05.9583 Plotted with 13.05.9583

10 INCH HI-RES

BEFORE SURVEY CALIBRATION
C:\Minimus 13.05.9583\Log\O'Brien Clayton #2-28\O'Brien Clayton #2-28_002.dta

General Constants All 000
Last Edited on 25-JUL-2013,03:30

General Parameters		
Mud Resistivity	0.810	ohm-metres
Mud Resistivity Temperature	99.000	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. Six Res Rt	
RWA Constant A	0.610	
RWA Constant M	2.150	
SW/APOR Tool Source	0.000	

Down-hole Tension Calibration SMS 0			Field Calibration on 21-JUL-2013 20:00
Reading No	Measured	Calibrated (lbs)	
1	13811.52	0.00	
2	14365.27	471.80	

Gamma Calibration MCG-B 39			Field Calibration on 24-JUL-2013 13:57
	Measured	Calibrated (API)	
Background	68	46	
Calibrator (Gross)	1137	771	
Calibrator (Net)	1070	725	

Gamma Constants MCG-B 39			Last Edited on 25-JUL-2013,02:10
Gamma Calibrator Number	GRC38		
Mud Density	1.12	gm/cc	
Caliper Source for Processing	Density Caliper		
Tool Position	Eccentred		
Concentration of KCl		kppm	
K Mud Type	Chloride		
K Mud Concentration	0.00	%	

SP Calibration MCG-B 39			Field Calibration on 11-JUN-2013,10:13
	Measured	Calibrated (mV)	
Reference 1	105.8	100.0	
Reference 2	-94.3	-100.0	

High Resolution Temperature Calibration MCG-B 39			Field Calibration on 11-JUN-2013,10:13
	Measured	Calibrated(Deg F)	
Lower	50.00	50.00	
Upper	75.00	75.00	

High Resolution Temperature Constants MCG-B 39			Last Edited on 11-JUN-2013,10:13
Pre-filter Length	11		

Caliper Calibration MML-A 3			Base Calibration on 05-JUN-2013 15:43 Field Calibration on 04-JUL-2013 09:18
Base Calibration			
Reading No	Measured	Calibrator Size (in)	
1	14624	5.98	
2	17958	7.97	
3	21263	9.86	
4	25213	11.92	
5	0	0.00	
6	N/A	N/A	
Field Calibration			
	Measured Caliper (in)	Actual Caliper (in)	
	6.11	5.98	

Micro Normal and Micro Inverse Calibration MML-A 3

Base Calibration on 05-JUN-2013 15:36
Field Check on 04-JUL-2013 09:20

Base Calibration

Channel	Measured		Calibrated (ohm-m)	
	Resistor 1	Resistor 2	Resistor 1	Resistor 2
Micro Normal	12.2	60.2	5.0	25.0
Micro Inverse	15.7	78.3	5.0	25.0
Channel	Base Check (ohm-m)		Field Check (ohm-m)	
Micro Normal	63.0		63.0	
Micro Inverse	48.2		48.2	

Micro Normal and Micro Inverse Constants MML-A 3

Last Edited on 25-JUL-2013,02:10

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	N/A inches			

Neutron Calibration MDN-A.B 66

Base Calibration on 22-MAY-2013 15:00
Field Check on 04-JUL-2013 09:34

Base Calibration

	Measured		Calibrated (cps)	
	Near	Far	Near	Far
	3145	98	3714	110
Ratio	32.215		33.764	

Field Calibrator at Base

	Calibrated (cps)	
	1654	2365
Ratio	0.699	

Field Check

	Calibrated (cps)	
	1643	2364
Ratio	0.698	

Neutron Constants MDN-A.B 66

Last Edited on 25-JUL-2013,02:10

Neutron Source Id	P0204NN	
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	None	
Formation Pressure	N/A	kpsi
Temperature Source	Constant Value	
Temperature	68.00	degrees F
Mud Salinity	0.00	kppm
Salinity Correction	Not Applied	
Formation Fluid Salinity Source	None	
Formation Fluid Salinity	N/A	kppm
Barite Mud Correction	Not Applied	

FE Calibration MFE-B.J 353

Base Calibration on 22-MAY-2013 08:22
Field Check on 04-JUL-2013 09:10

Base Calibration

	Measured	Calibrated (ohm-m)
Reference 1	0.0	0.0
Reference 2	964.9	126.8
Base Check		280.9
Field Check		280.8

FE Constants MFE-B.J 353

Last Edited on 25-JUL-2013,02:09

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 167				Base Calibration on 19-APR-2013,13:41	
				Field Check on 04-JUL-2013 09:04	
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			13.1	3839.2	
2			29.6	3477.2	
3			29.1	3053.5	
4			19.8	2082.0	
Deep			18.6	2049.4	
Medium			42.2	3991.9	
Shallow			43.0	5054.3	
Array Temperature			74.2	Deg F	

Induction Constants MAI-A.A 167				Last Edited on 25-JUL-2013,02:09	
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		60.00		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 167				Field Calibration on 02-JUL-2013,03:28	
		Measured	Calibrated (Deg F)		

Lower	50.00	50.00
Upper	75.00	75.00

Last Edited on 02-JUL-2013,03:28

Caliper Calibration MPD-B 64		Base Calibration on 10-JUL-2013 09:51
		Field Calibration on 10-JUL-2013 09:52
Base Calibration		
Reading No	Measured	Calibrator Size (in)
1	15217	3.99
2	24188	5.98
3	32870	7.97
4	41232	9.86
5	50592	11.92
6	N/A	N/A
Field Calibration		
	Measured Caliper (in)	Actual Caliper (in)
	5.93	5.98

Base Calibration on 10-JUL-2013 10:09
Field Check on 10-JUL-2013 10:16

Density Calibration		Measured		Calibrated (sdu)	
Base Calibration		Near	Far	Near	Far
Reference 1		60252	33858	59556	30836
Reference 2		25108	2914	24941	2541
Field Check at Base					
		1163.0	1342.8		
Field Check					
		1165.4	1350.2		
PE Calibration					
Base Calibration		Measured		Calibrated	
	WS	WH	Ratio		Ratio
Background	211	1034			
Reference 1	22924	60048	0.385		0.371
Reference 2	6861	24971	0.278		0.272
Field Check at Base					
	210.7	1033.8			
Field Check					
	209.9	1034.2			

Last Edited on 25-JUL-2013,02:10

[illegible]

0.00
0.00

0.00
0.00

DOWNHOLE EQUIPMENT

C:\Minimus 13.05.9583\Log\O'Brien Clayton #2-28\O'Brien Clayton #2-28_002.dta

3/8" Triple Cone Cable Head (MCB C A)
MCB-C.A 5 LG: 1.58 ft WT: 15.4 lb OD: 2.24 in

Compact Comms Gamma
MCG-B 39 LG: 8.70 ft WT: 63.9 lb OD: 2.24 in

Compact Micro-log
MML-A 3 LG: 7.97 ft WT: 81.6 lb OD: 2.24 in

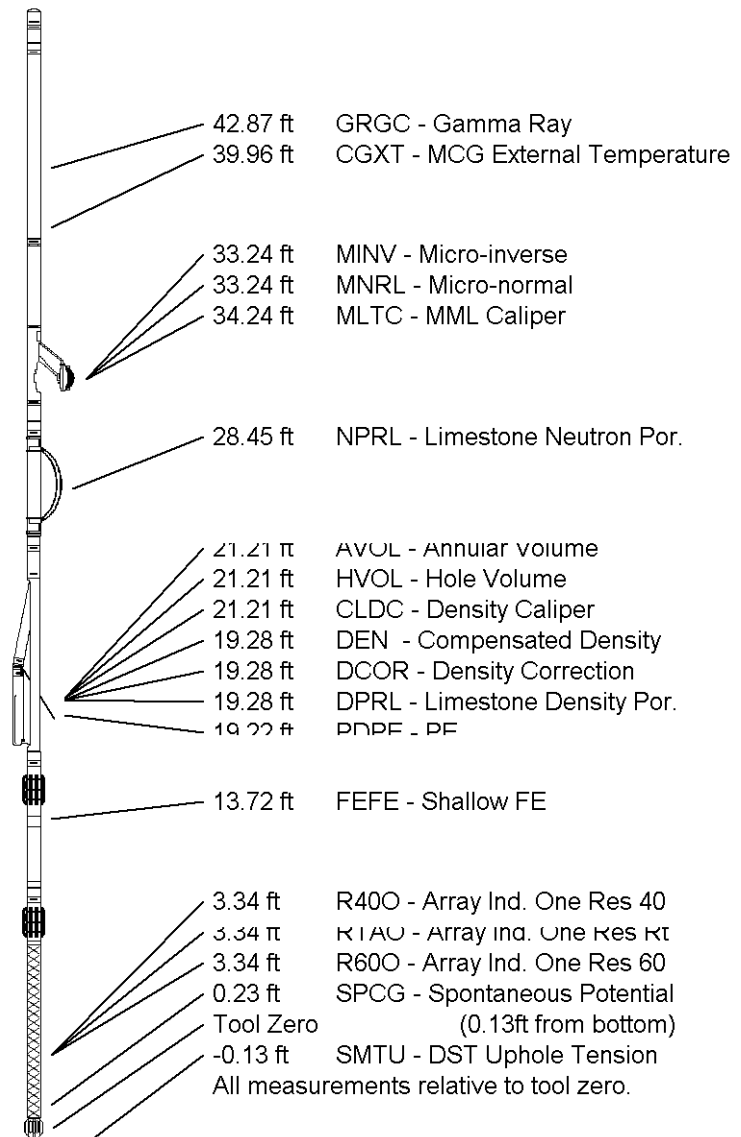
Compact Neutron
MDN-A.B 66 LG: 5.04 ft WT: 50.7 lb OD: 2.24 in

Compact Density/Caliper
MPD-B 64 LG: 9.59 ft WT: 90.4 lb OD: 2.45 in

Compact Focussed Electric
MFE-B.J 353 LG: 6.05 ft WT: 48.5 lb OD: 2.24 in

Compact Induction
MAI-A.A 167 LG: 10.81 ft WT: 48.5 lb OD: 2.24 in

Total Length: 49.73 ft Weight: 399.0 lb



COMPANY	O'BRIEN ENERGY RESOURCES CORP.
WELL	CLAYTON #2-28
FIELD	SINGLEY
PROVINCE/COUNTY	MEADE
COUNTRY/STATE	U.S.A. / KANSAS

Elevation Kelly Bushing	2602.00	feet	First Reading	6362.00	feet
Elevation Drill Floor	2601.00	feet	Depth Driller	6400.00	feet
Elevation Ground Level	2591.00	feet	Depth Logger	6395.00	feet



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MICRORESISTIVITY LOG

