



Weatherford

MICRORESISTIVITY LOG

COMPANY										O'BRIEN ENERGY RESOURCES CORP.									
WELL										ANGELL 1-18									
FIELD										ANGELL									
PROVINCE/COUNTY										MEADE									
COUNTRY/STATE										U.S.A. / KANSAS									
LOCATION										2308' FNL & 335' FEL									
SEC 18		TWP 32S		RGE 29W		Other Services				MPD/MDN									
Latitude				37.265008232				MAI/MFE											
Longitude				-100.508511657															
API Number				15-119-21381															
Permanent Datum GL, Elevation 2715 feet																			
Log Measured From KB																			
Drilling Measured From KB @ 12 FEET																			
Date		02-JAN-2015										Elevations:		feet					
Run Number		ONE										KB		2727.00					
Service Order		7036-107375855										DF		2725.00					
Depth Driller		6402.00								feet									
Depth Logger		6396.00								feet									
First Reading		6362.76								feet									
Last Reading		4000.00								feet									
Casing Driller		1487.00								feet									
Casing Logger		1487.00								feet									
Bit Size		7.875								inches									
Hole Fluid Type		WBM																	
Density / Viscosity		9.30		lb/USg		52.00		CP											
PH / Fluid Loss		11.00				5.60		ml/30Min											
Sample Source		MUDPIT																	
Rm @ Measured Temp		1.50 @ 75.0								ohm-m									
Rmf @ Measured Temp		1.20 @ 75.0								ohm-m									
Rmc @ Measured Temp		1.80 @ 75.0								ohm-m									
Source Rmf / Rmc		CALC				CALC													
Rm @ BHT		0.91 @126.0								ohm-m									
Time Since Circulation		5 HOURS																	
Max Recorded Temp		126.00								deg F									
Equipment / Base		13096		LIB															
Recorded By		DEREK CARTER										JAKE HINES							
Witnessed By		ROGER PEARSON																	
JOB #		LB15-001																	

BOREHOLE RECORD

Last Edited: 02-JAN-2015 04:43

Bit Size inches	Depth From feet	Depth To feet
12.250	0.00	1505.00
7.875	1505.00	6402.00

CASING RECORD

Type	Size inches	Depth From feet	Shoe Depth feet	Weight pounds/ft
SURFACE	8.625	0.00	1487.00	24.00

REMARKS

- SOFTWARE ISSUE: WLS 14.05.5280
- TOOL STRING: MCG, MML, MDN, MPD, MFE, MAI RUN IN COMBINATION
- HARDWARE:
 - MDN: DUAL BOWSPRING ECCENTRALIZER
 - MFE: 1 X 0.5 INCH STANDOFF
 - MAI: 2 X 0.5 INCH STANDOFF
- 2.71 G/CC LIMESTONE DENSITY MATRIX USED TO CALCULATE POROSITY
 - REPEAT AND HIGH RESOLUTION SECTIONS PLOTTED ON SANDSTONE MATRIX PER CUSTOMER REQUEST
- BOREHOLE RUGOSITY, TIGHT PULLS, AND WASHOUTS WILL AFFECT DATA QUALITY
- ALL INTERVALS LOGGED AND SCALED PER CUSTOMER'S REQUEST

- HIGH RESOLUTION LOGS REQUESTED FROM TD TO 5500 FT.

- TOTAL HOLE VOLUME FROM TD TO 4000 FT.: 800 CU. FT.

- ANNULAR HOLE VOLUME WITH 4.5 INCH CASING FROM TD TO 4000 FT.: 540 CU. FT.

- SERVICE ORDER # 7036-107375855

- RIG: DUKE DRILLING #9

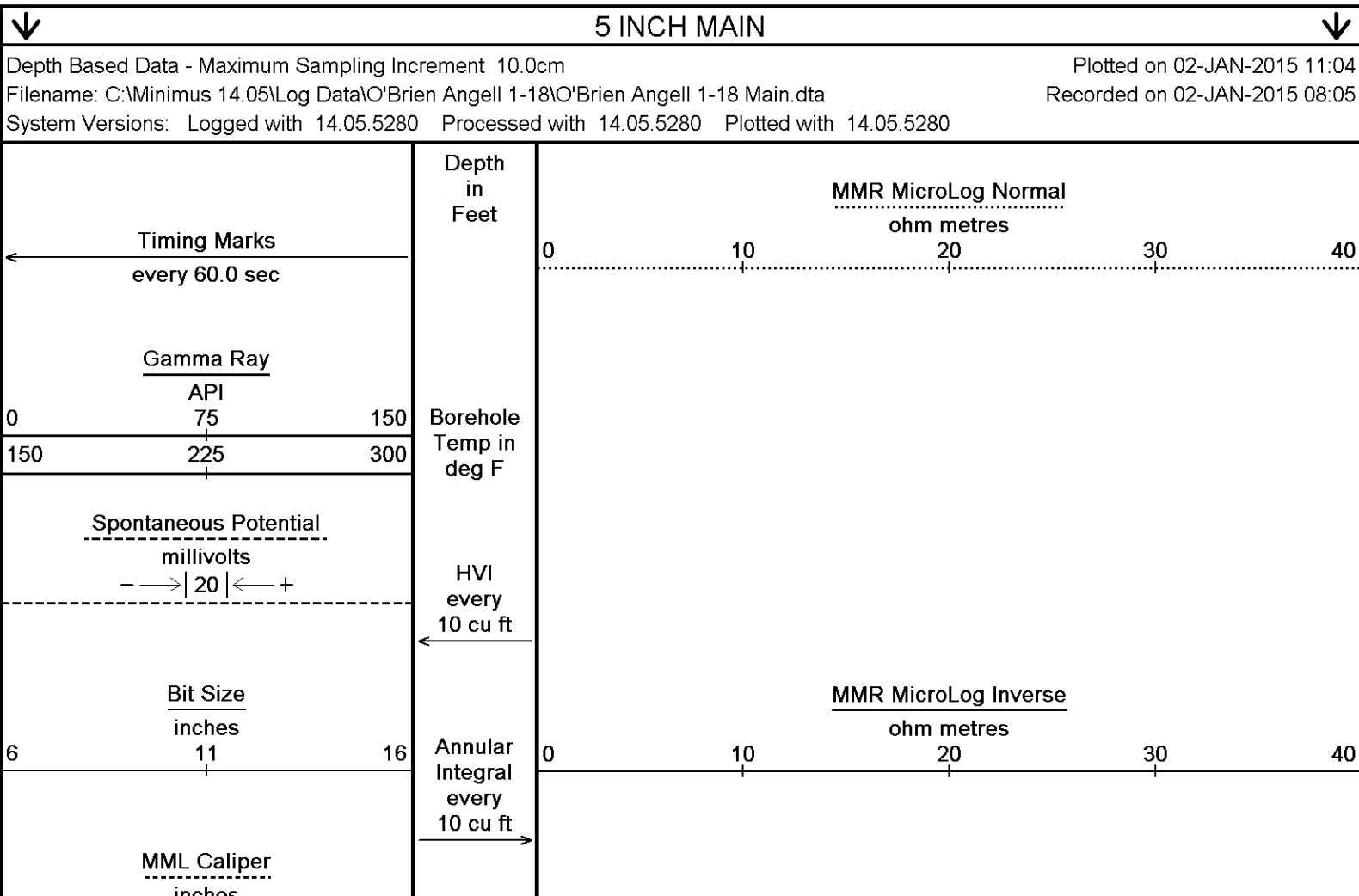
- ENGINEER: DEREK CARTER

- JUNIOR FIELD ENGINEER: JAKE HINES

- OPERATOR: SAM LARES

- TENSION PICKUP ON THE REPEAT PASS WAS AT 6396 FT.; HOWEVER, THE TENSION PICKUP ON THE SUBSEQUENT MAIN PASS WAS 6398 FT.; TENSION DROPPED OFF VERY GRADUALLY WHEN TAGGING TD PRIOR TO THE REPEAT PASS; THIS MIGHT INDICATE THAT THERE WAS MATERIAL IN THE HOLE THAT CAUSED THE DIFFERENCE IN TENSION PICKUP BETWEEN THE TWO PASSES

In interpreting, communicating or providing information and/or making recommendations, either written or oral, as to logs or test or other data, type or amount of material, or Work or other service to be furnished, or manner of performance, or in predicting results to be obtained, the Contractor will give the Company the benefit of the Contractor's best judgment based on its experience and will perform all such Work in a good and workmanlike manner. Any interpretation of test or other data, and any recommendation or reservoir description based upon such interpretations, are opinions based upon inferences from measurements and empirical relationships and assumptions, which inferences and assumptions are not infallible, and with respect to which professional engineers and analysts may differ. ACCORDINGLY ANY INTERPRETATION OR RECOMMENDATION RESULTING FROM THE SERVICES WILL BE AT THE SOLE RISK OF THE COMPANY, AND THE CONTRACTOR CANNOT AND DOES NOT WARRANT THE ACCURACY, CORRECTNESS OR COMPLETENESS OF ANY SUCH INTERPRETATION OR RECOMMENDATION, WHICH INTERPRETATIONS AND RECOMMENDATIONS SHOULD NOT, THEREFORE, UNDER ANY CIRCUMSTANCES BE RELIED UPON AS THE SOLE OR MAIN BASIS FOR ANY DRILLING, COMPLETION, WELL TREATMENT, PRODUCTION OR FINANCIAL DECISION, OR ANY PROCEDURE INVOLVING ANY RISK TO THE SAFETY OF ANY DRILLING ACTIVITY, DRILLING RIG OR ITS CREW OR ANY OTHER INDIVIDUAL. THE COMPANY HAS FULL RESPONSIBILITY FOR ALL DECISIONS CONCERNING THE SERVICES.

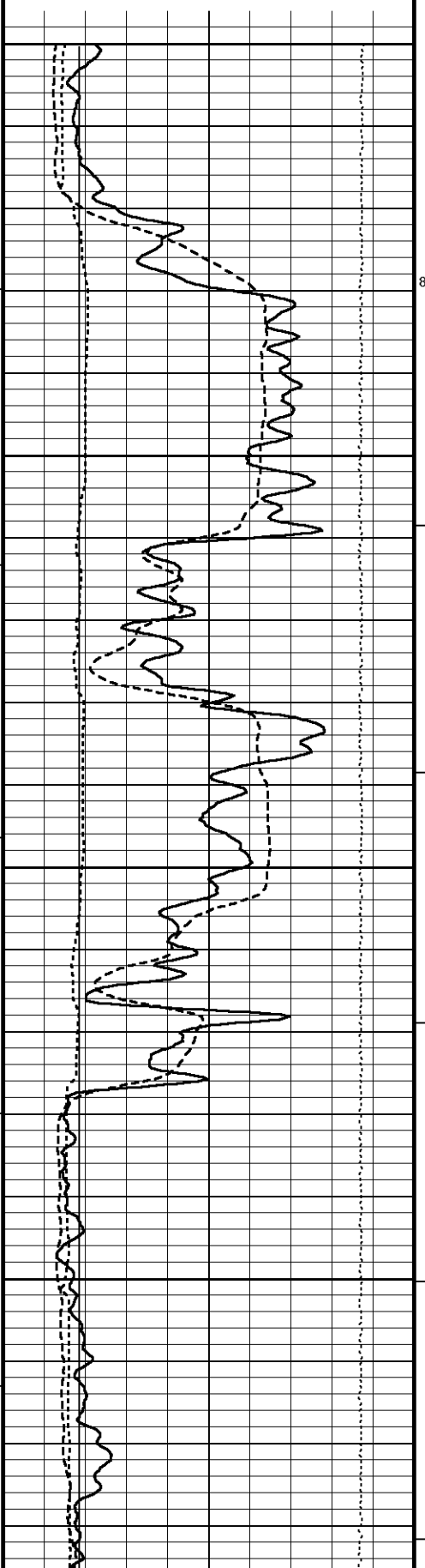


6 11 16

DST Uphole Tension
pounds

5000 0

Replay
Scale
1:240



4000

800

104°

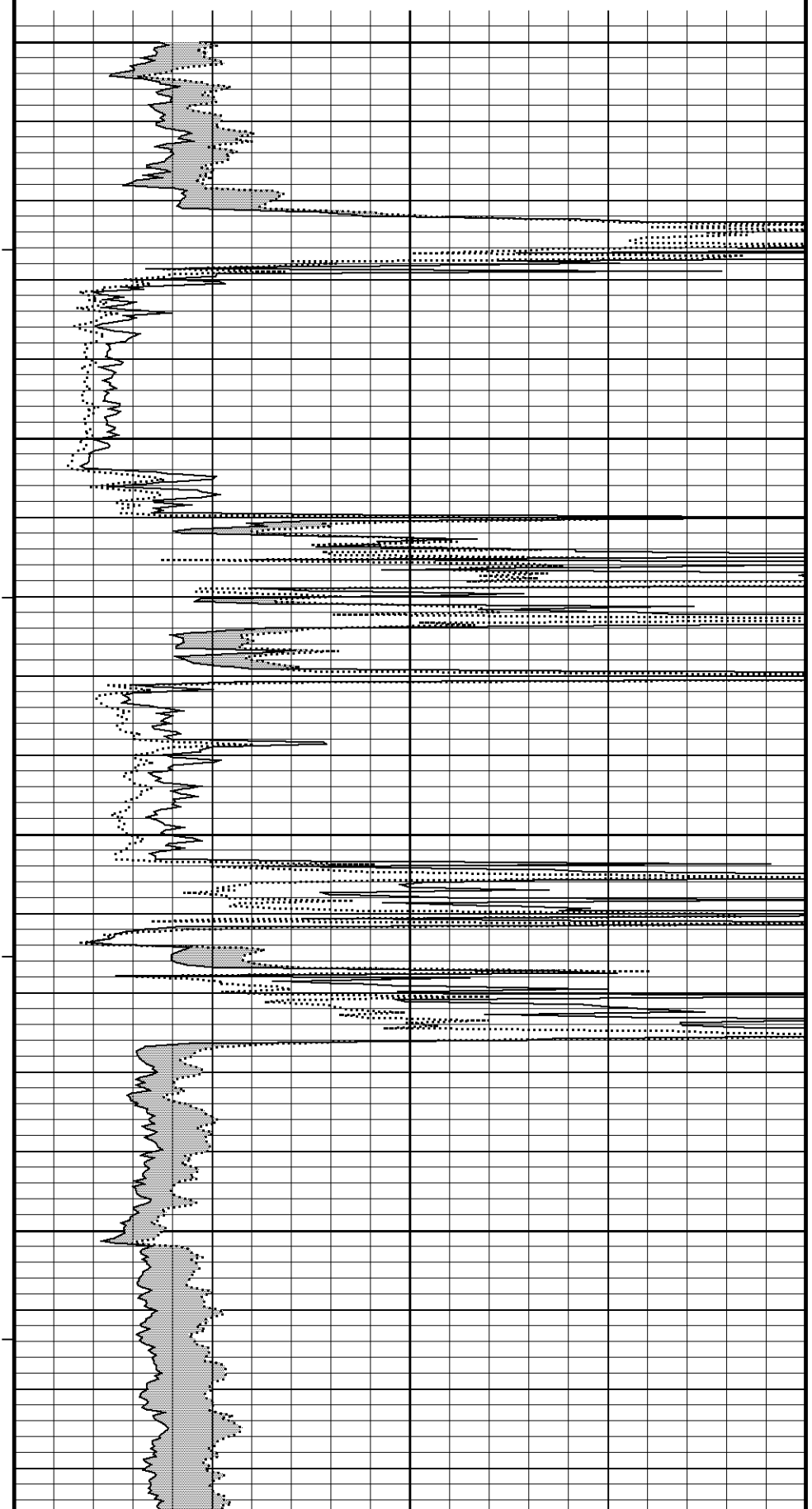
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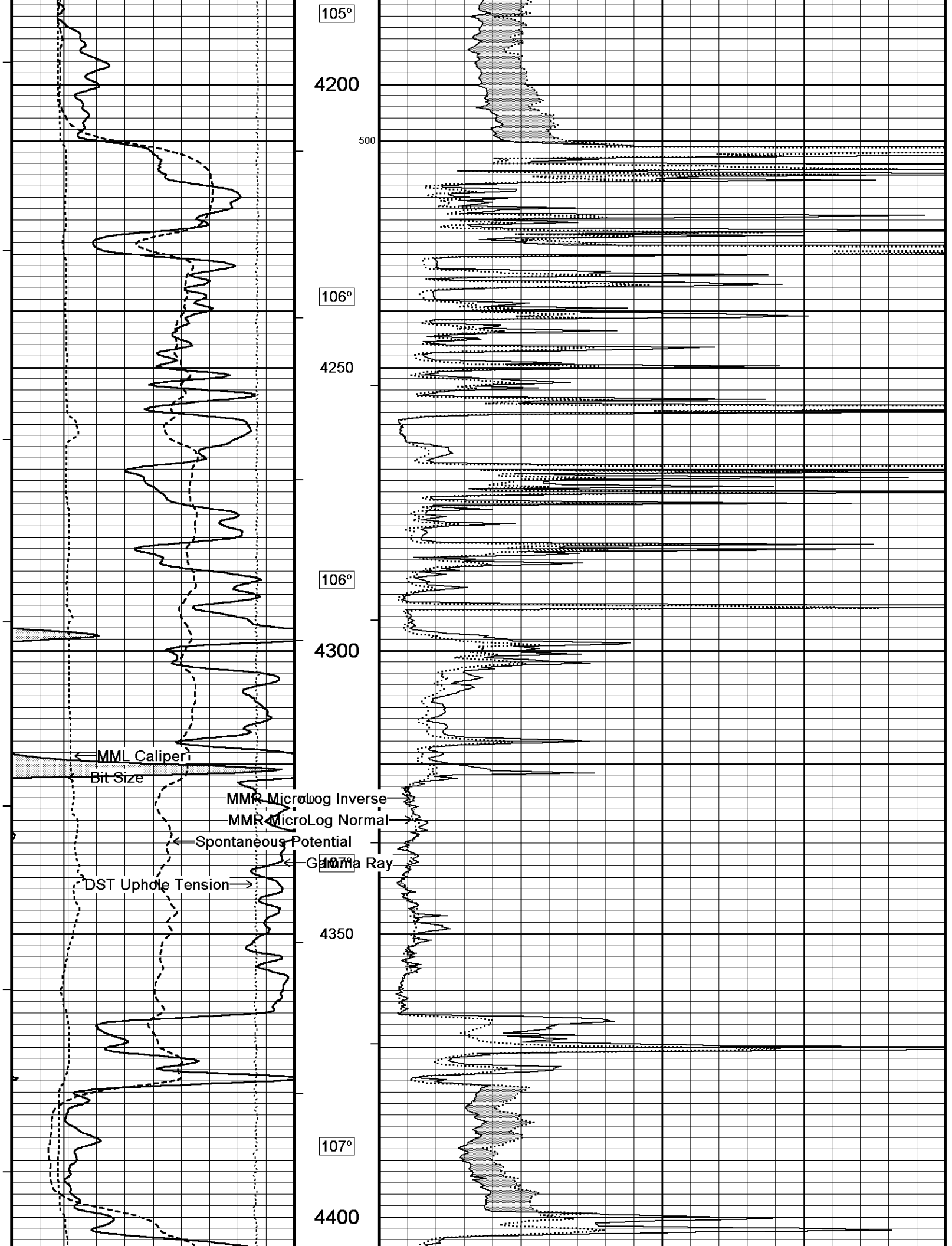
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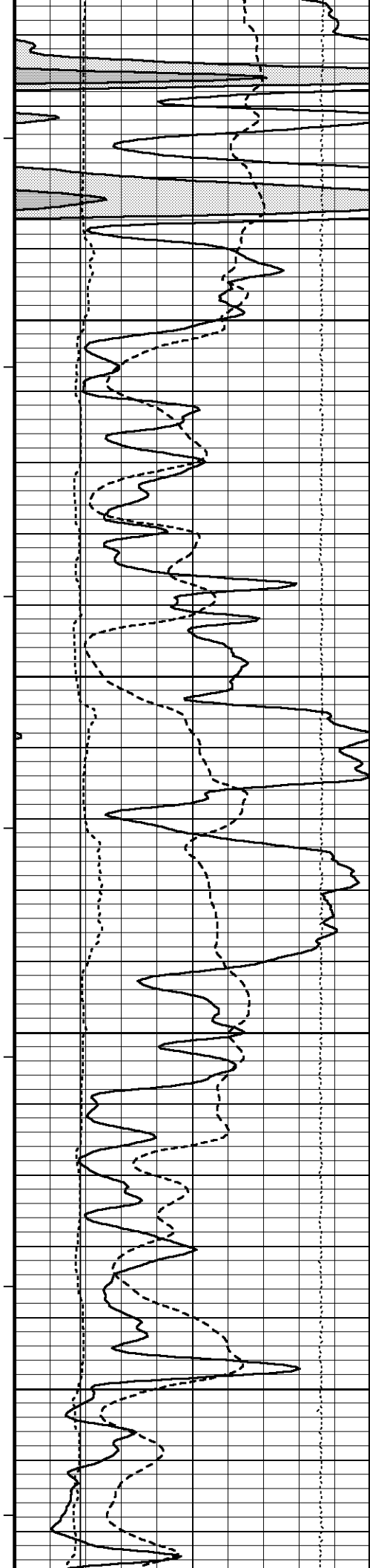
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105°

4150







108°

4450

108°

4500

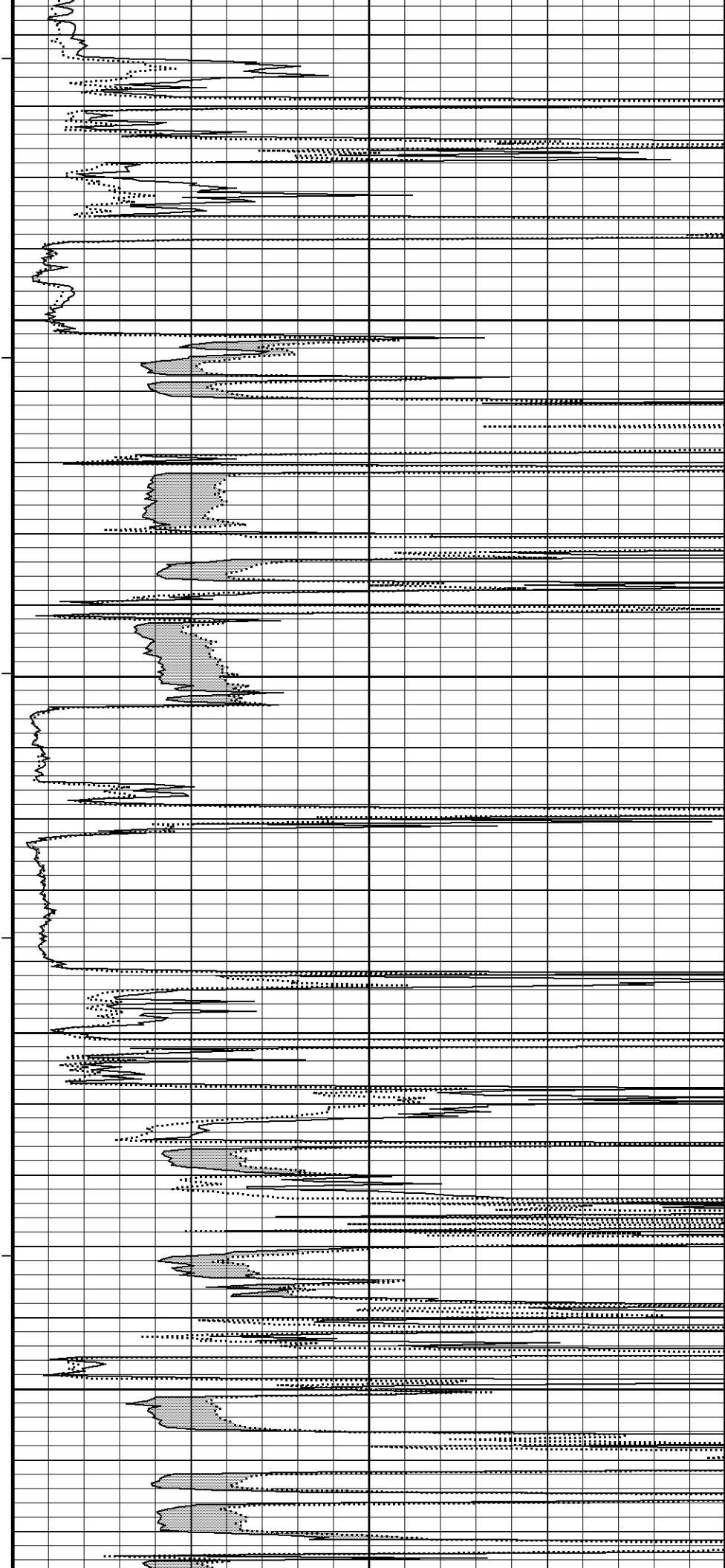
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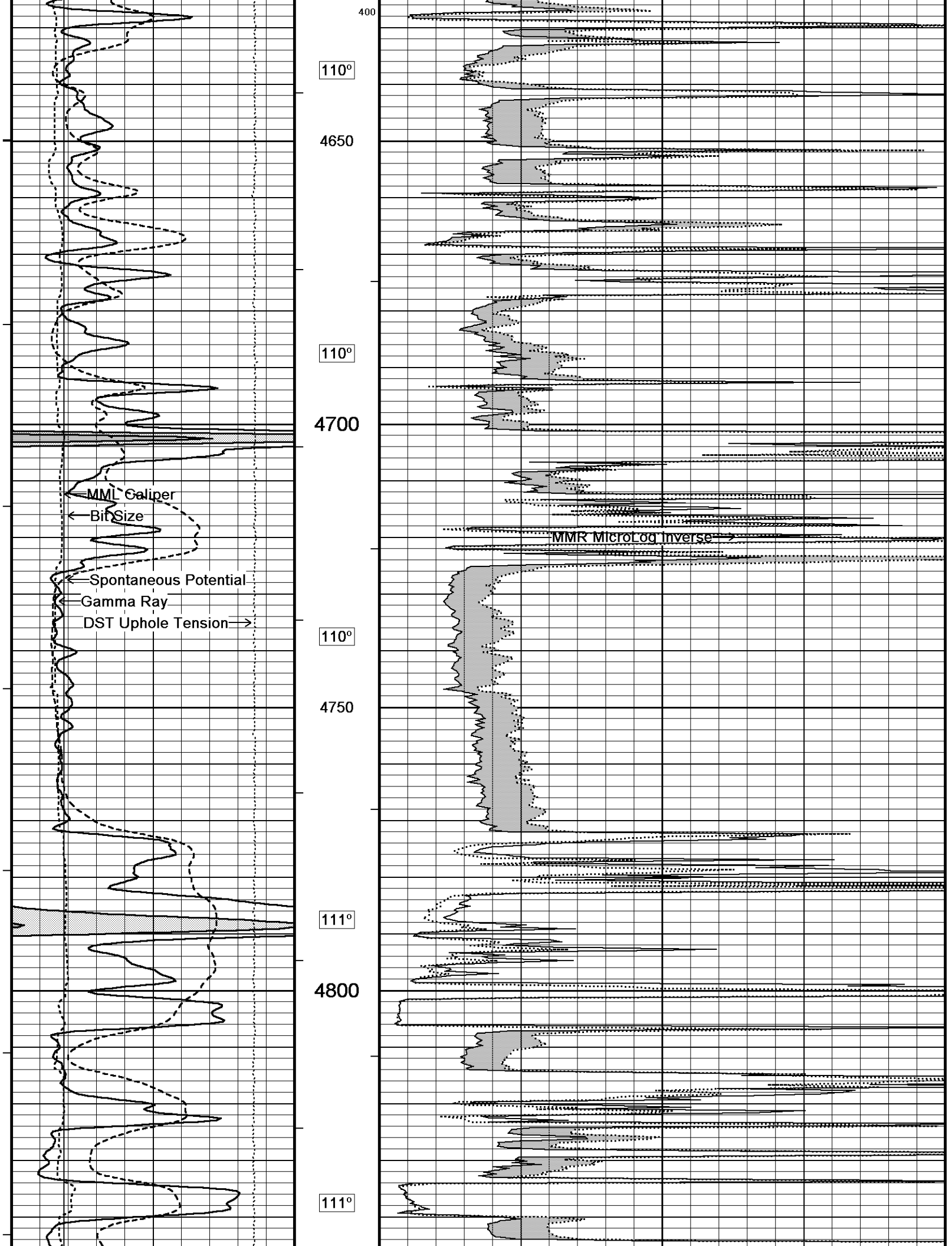
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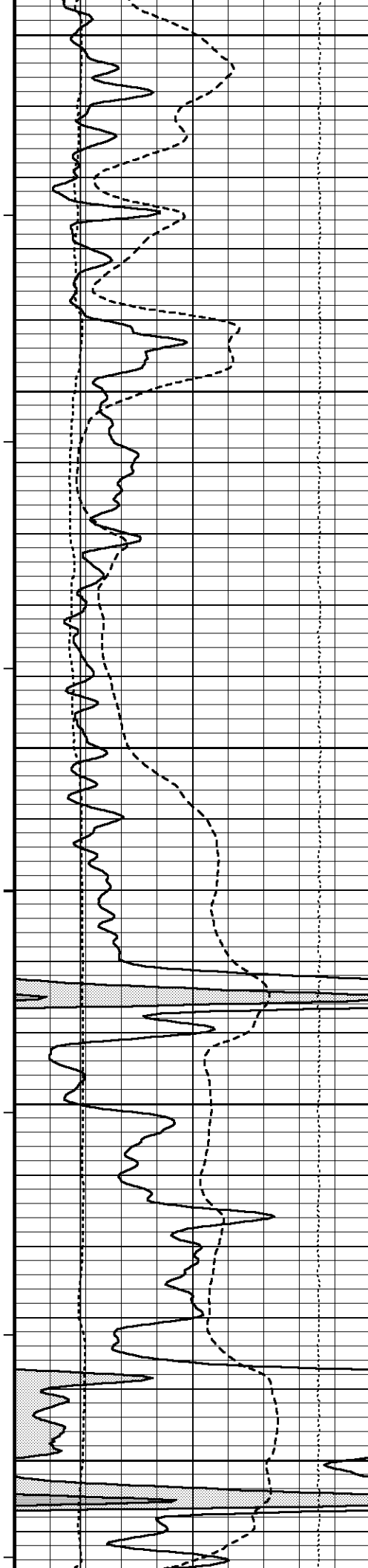
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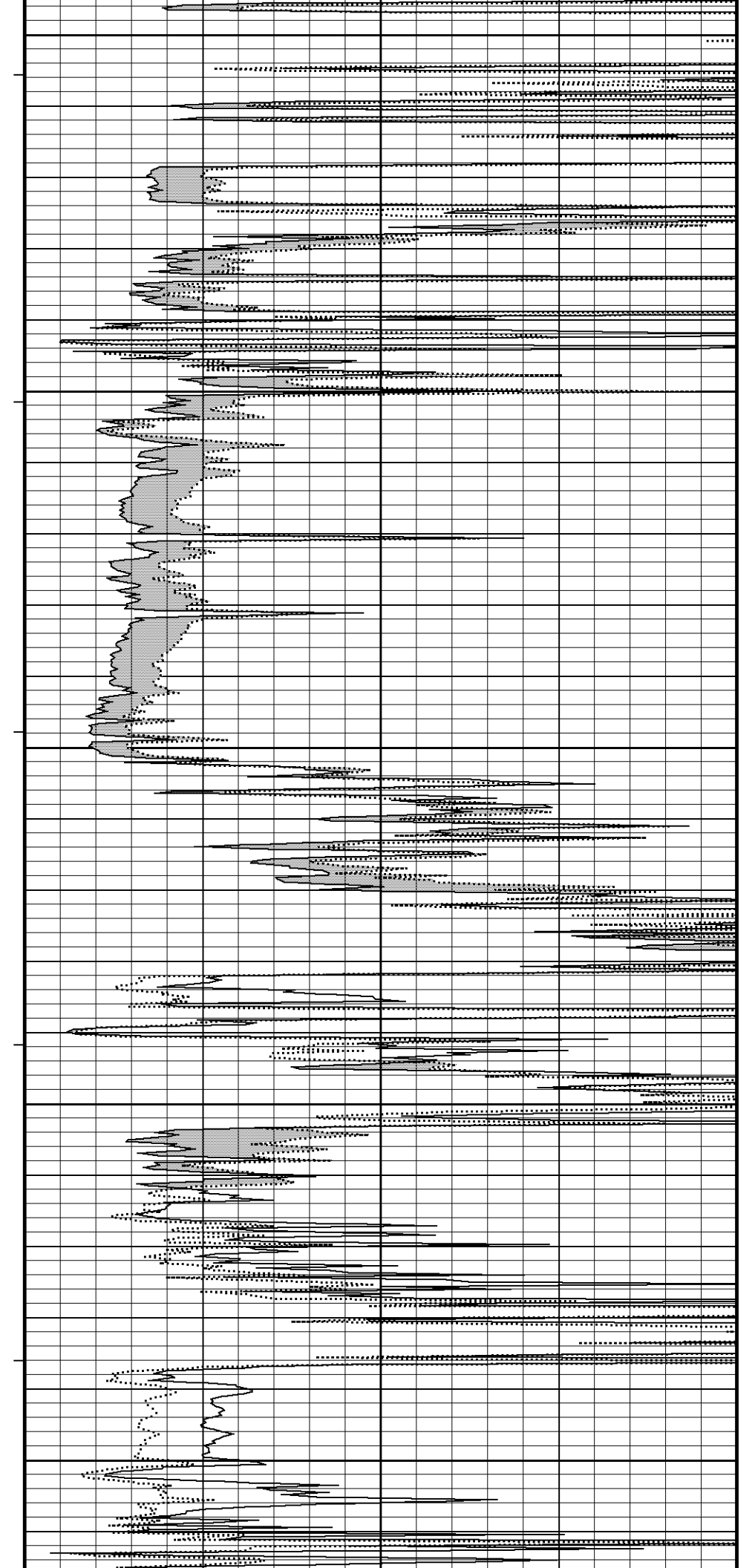
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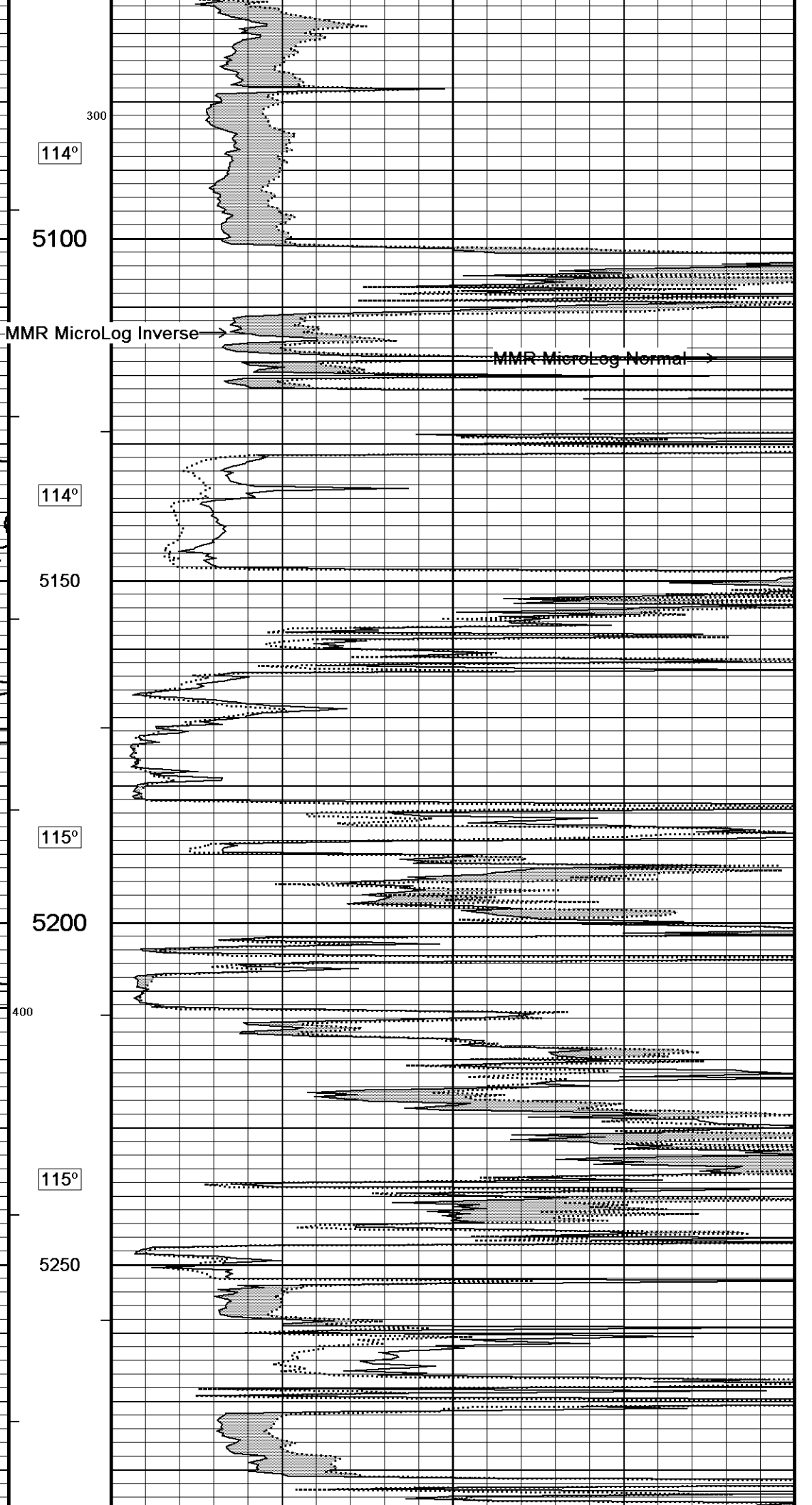
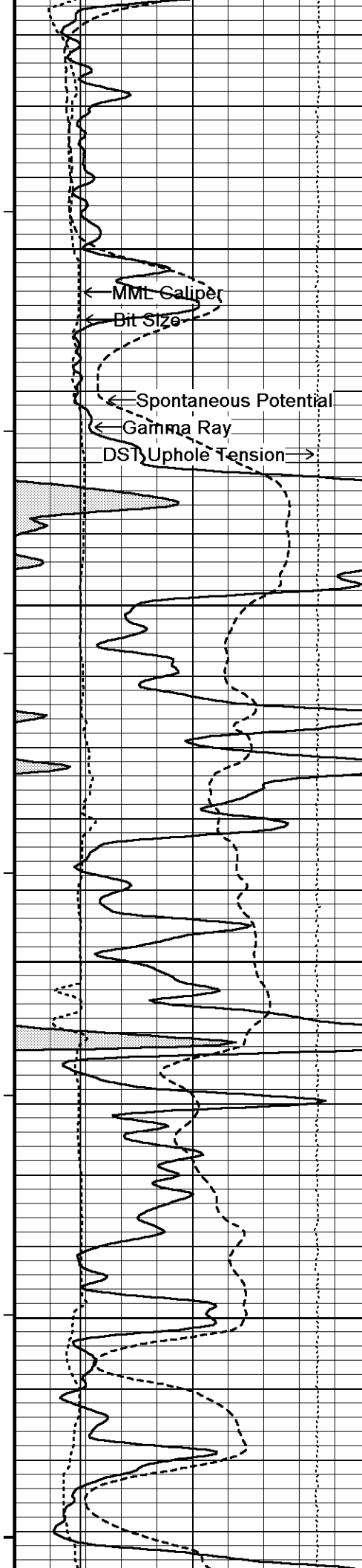


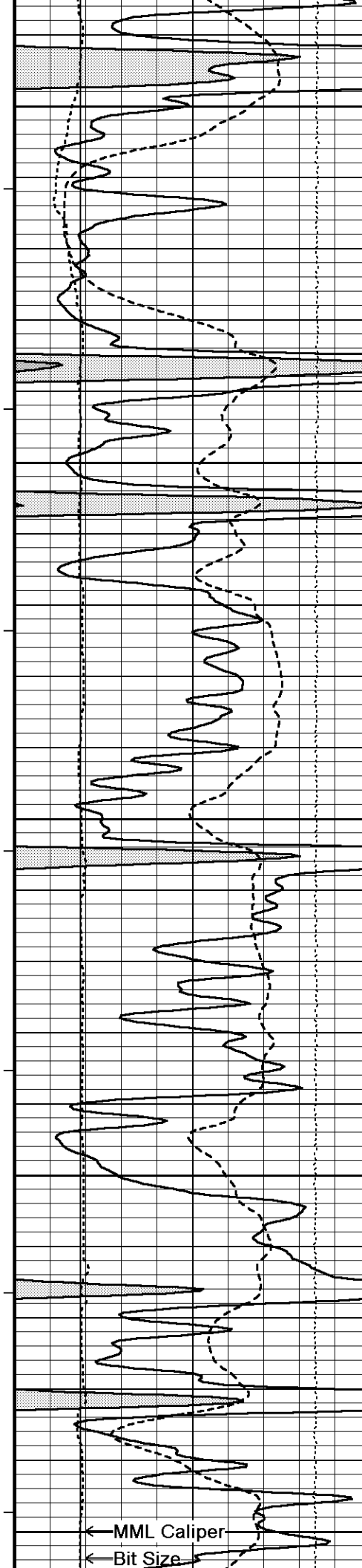




4850
112°
4900
500
112°
4950
112°
5000
113°
5050







116°

5300

116°

5350

117°

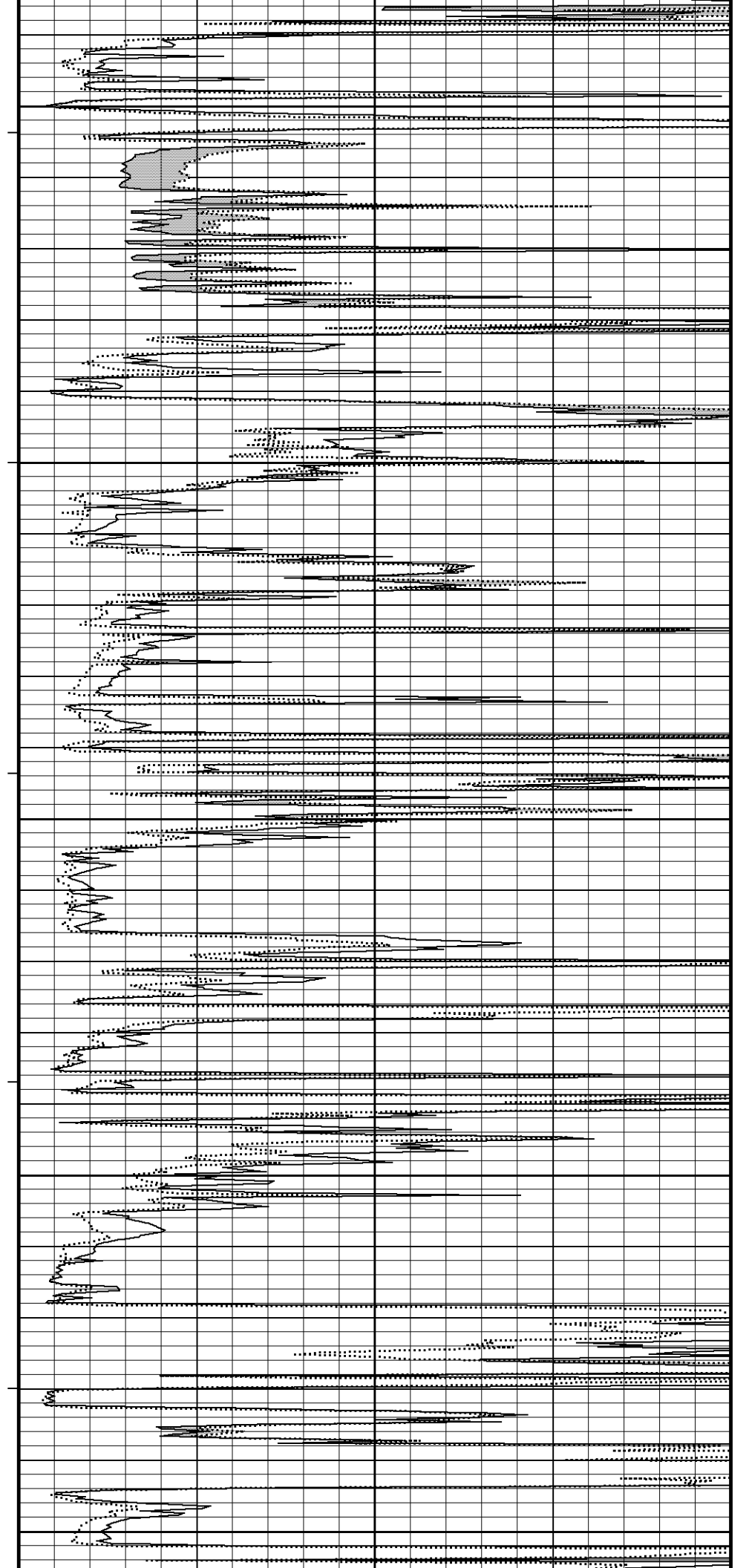
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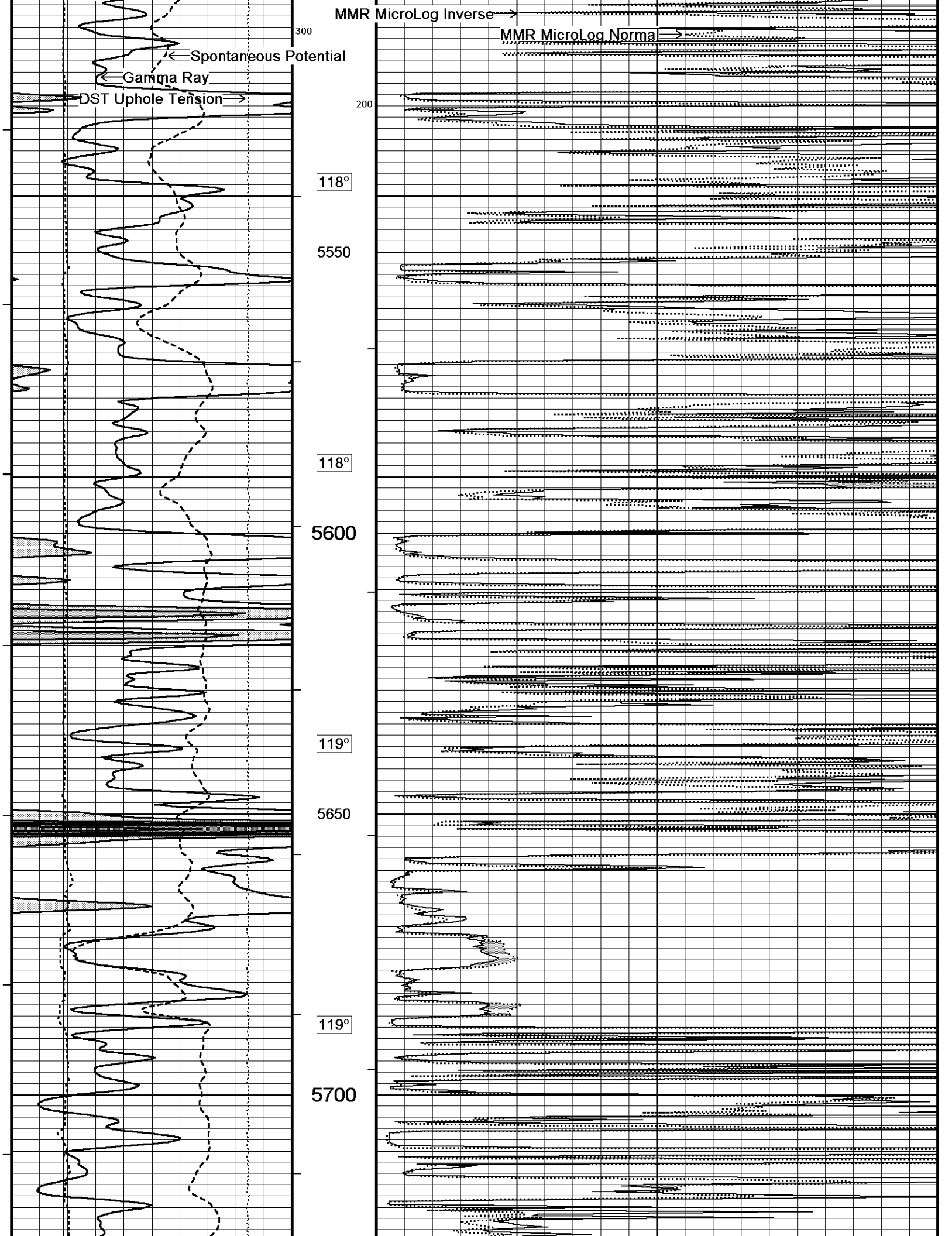
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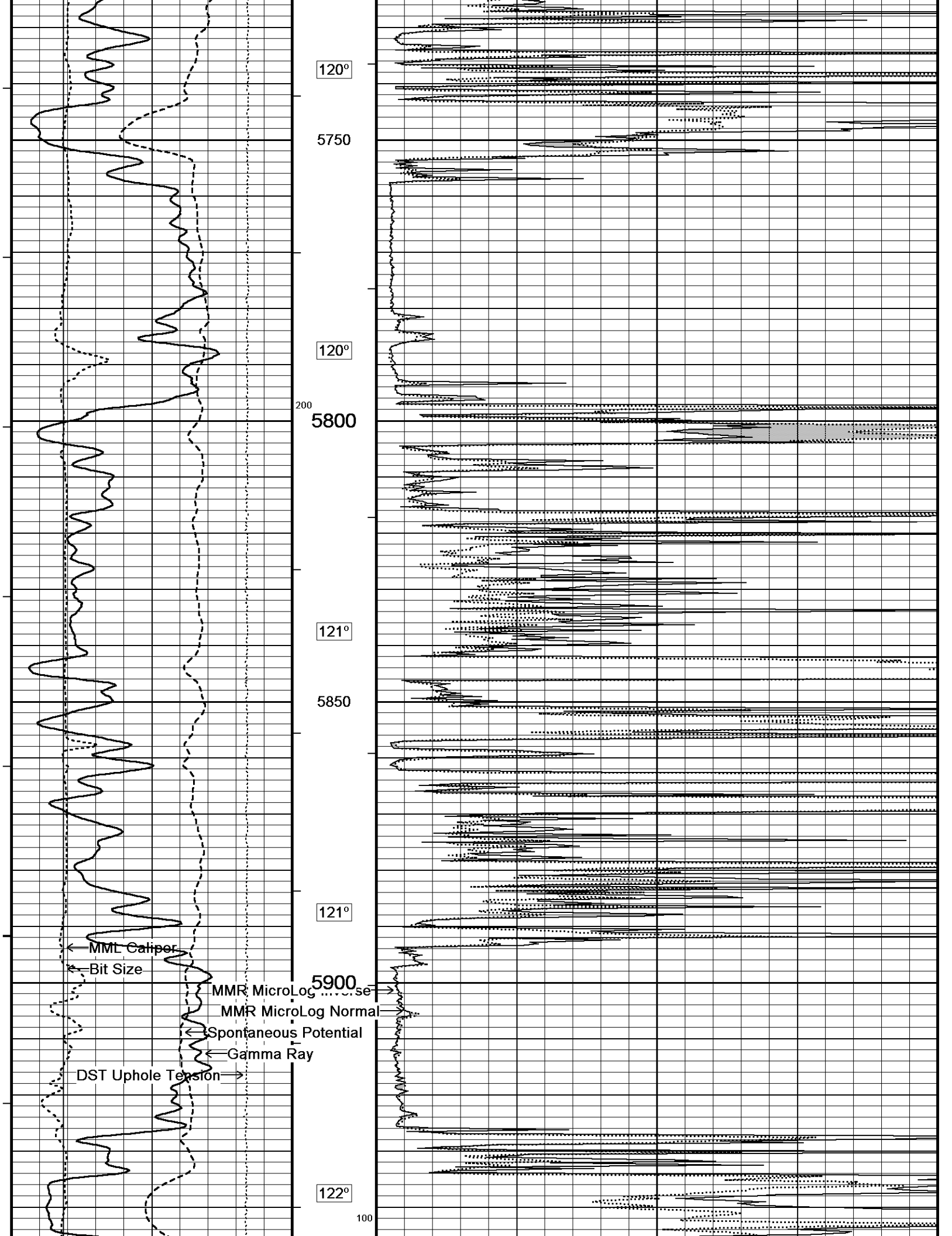
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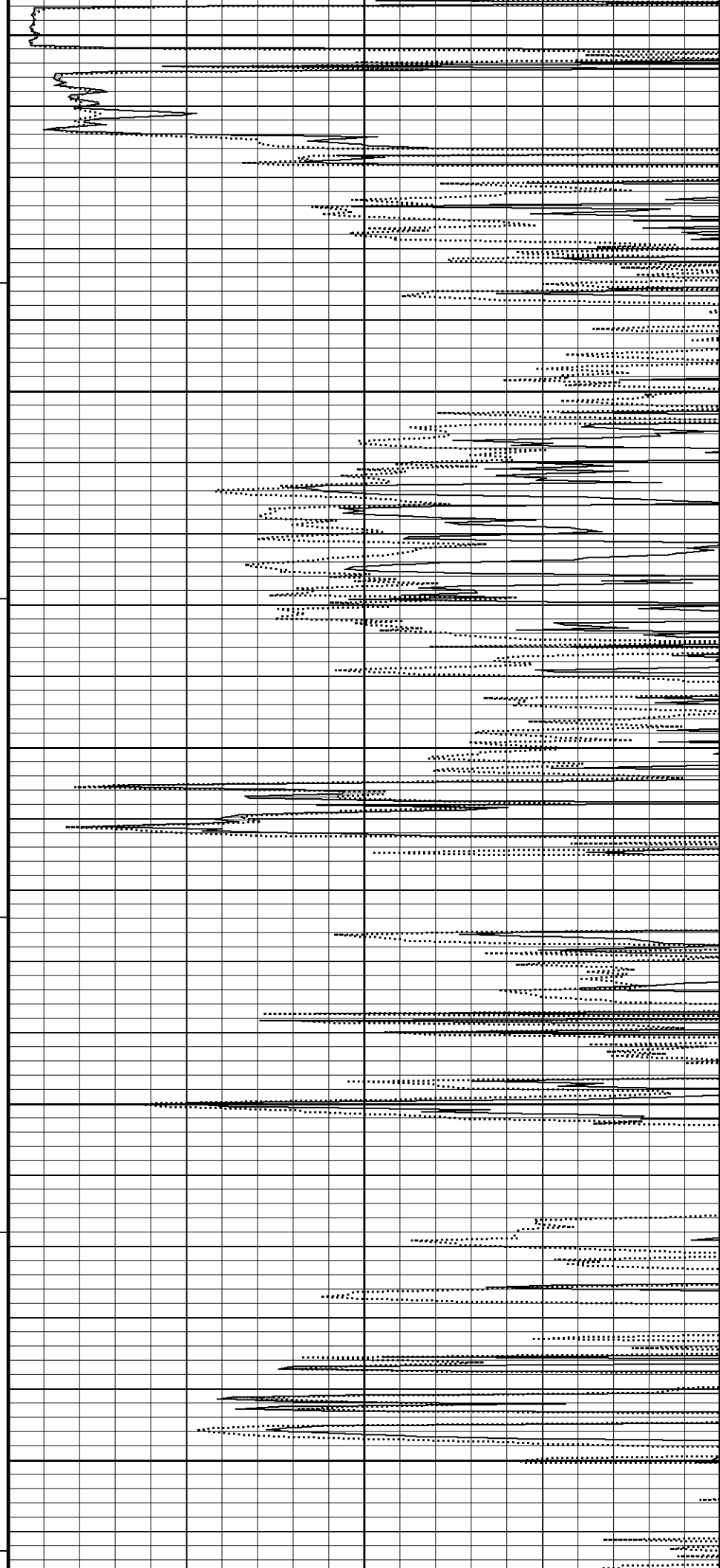
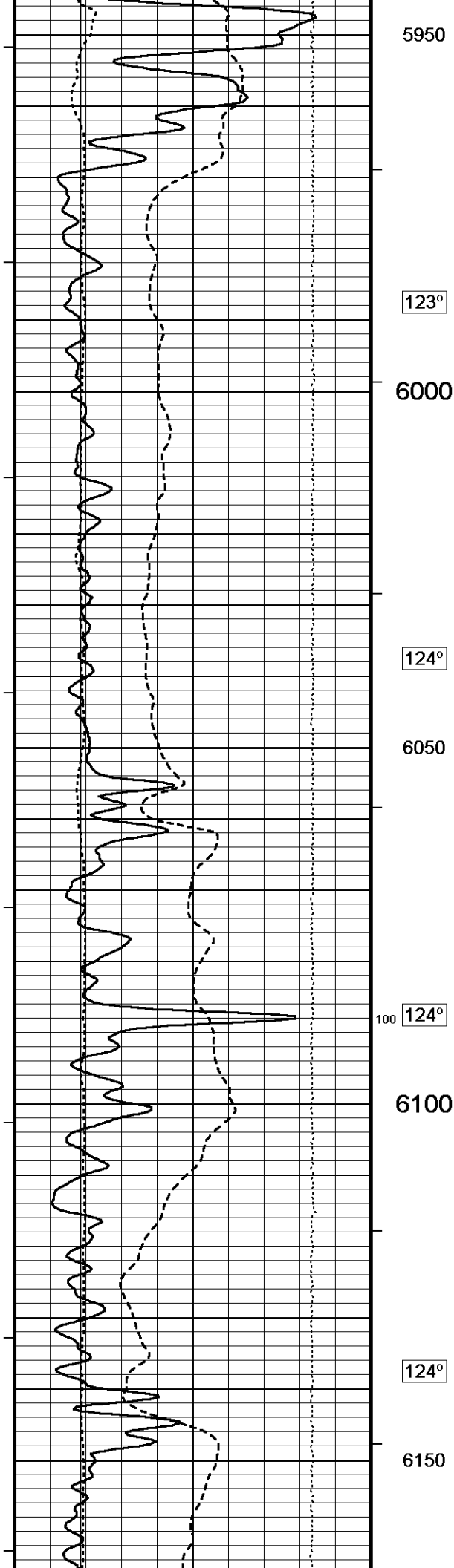
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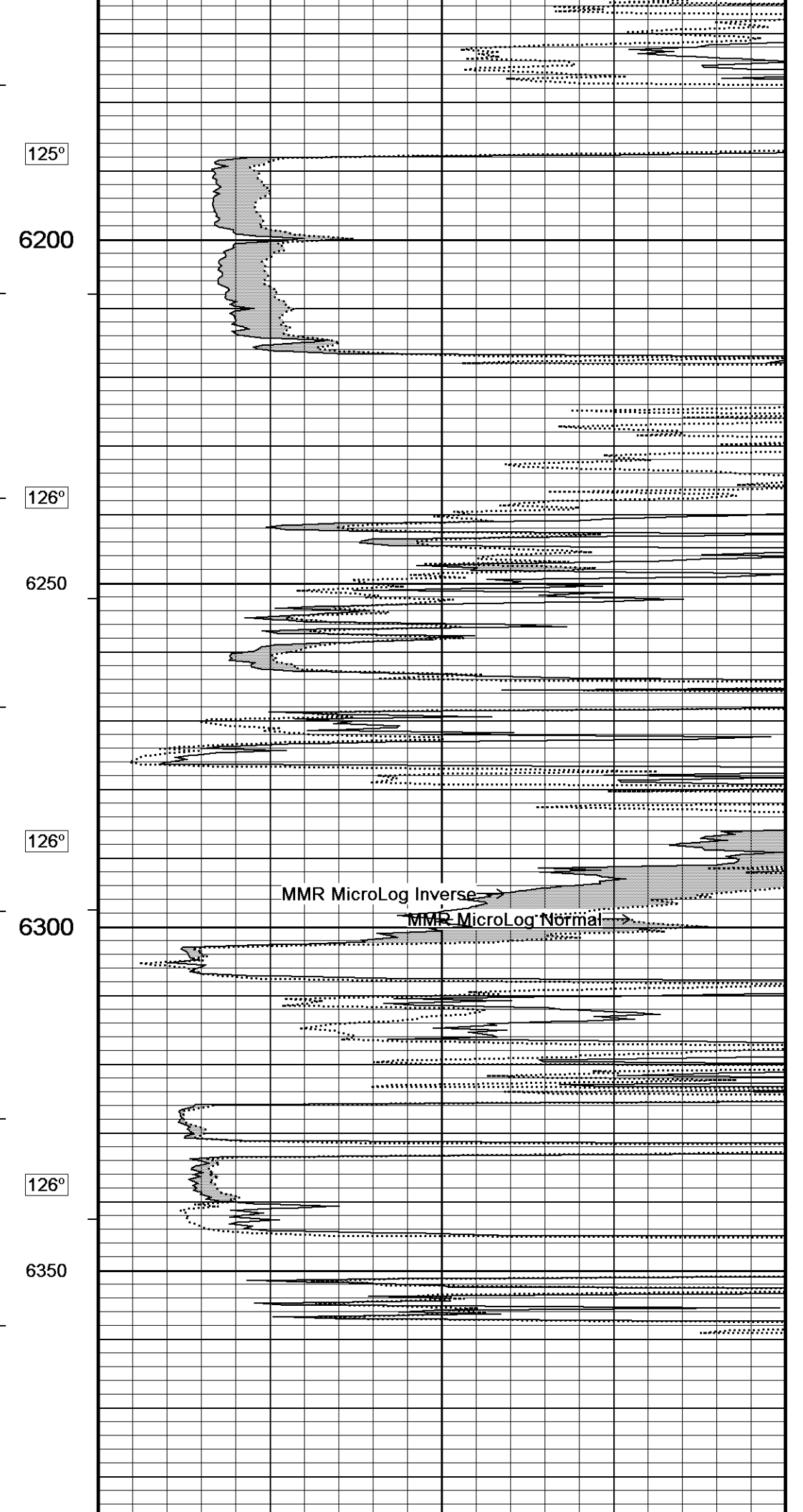
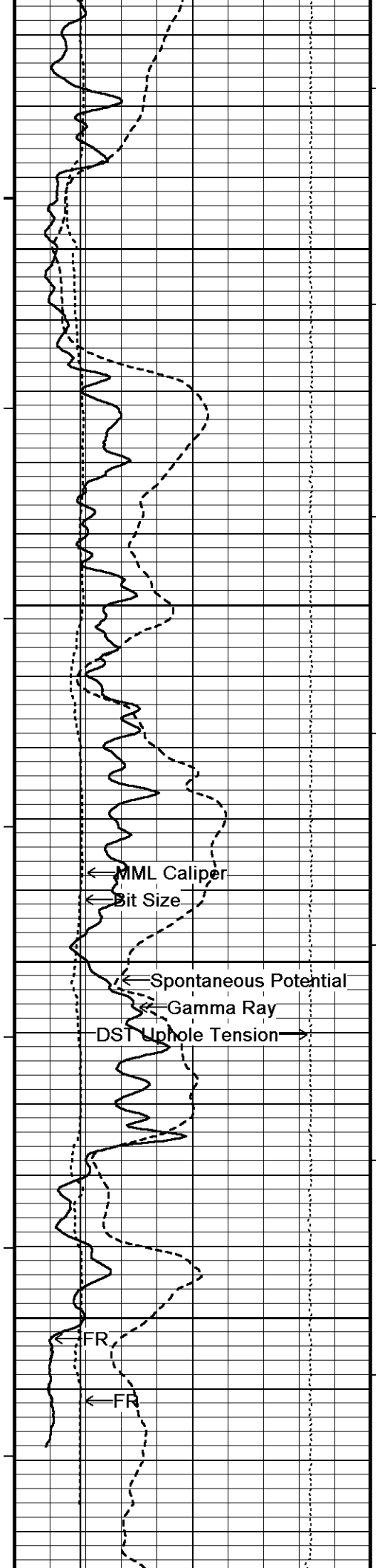
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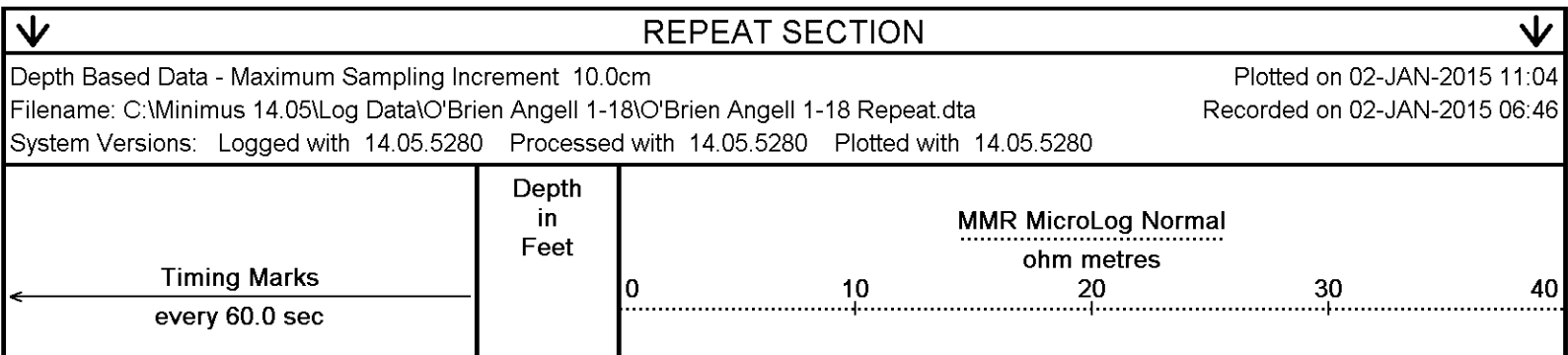
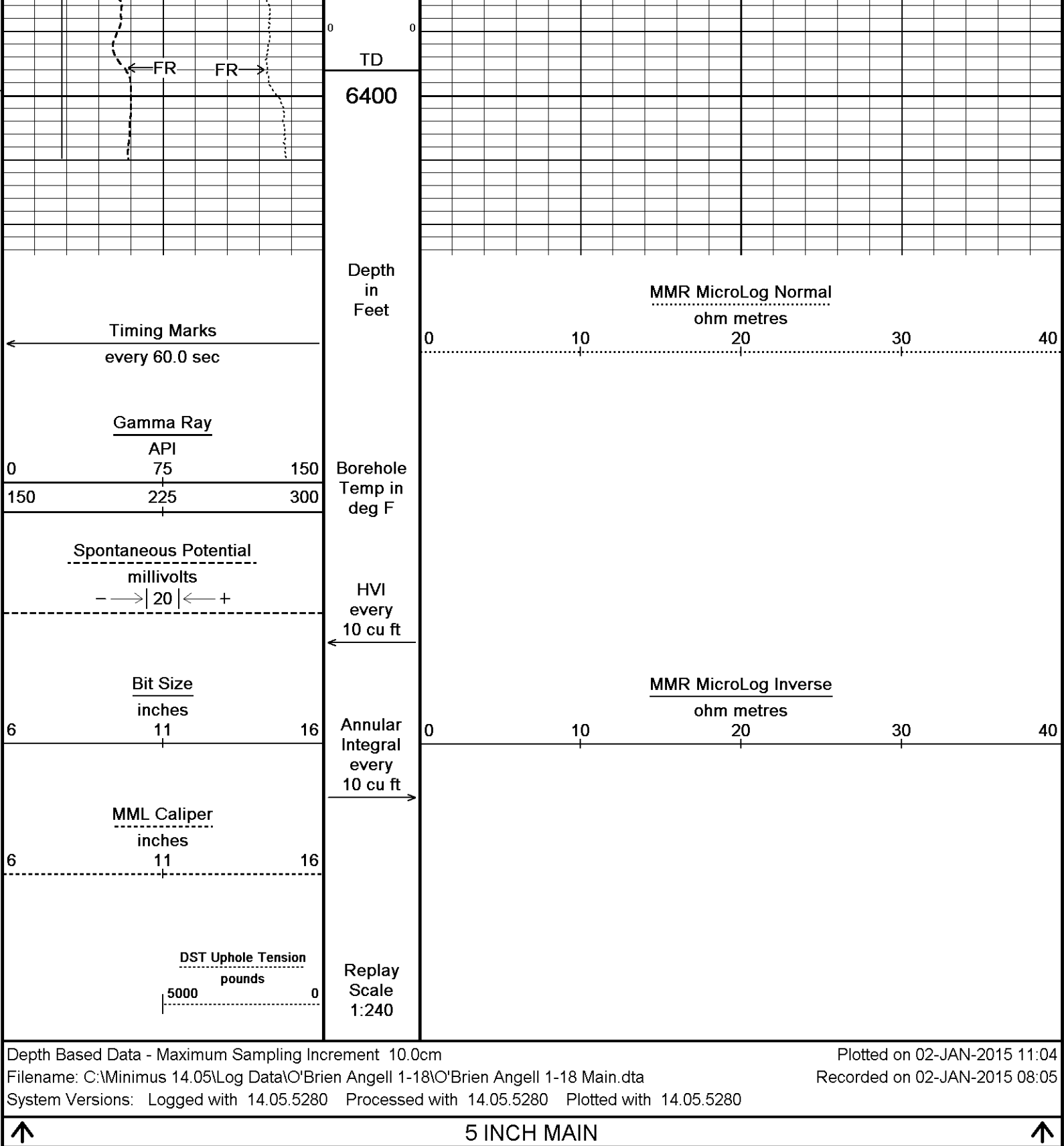


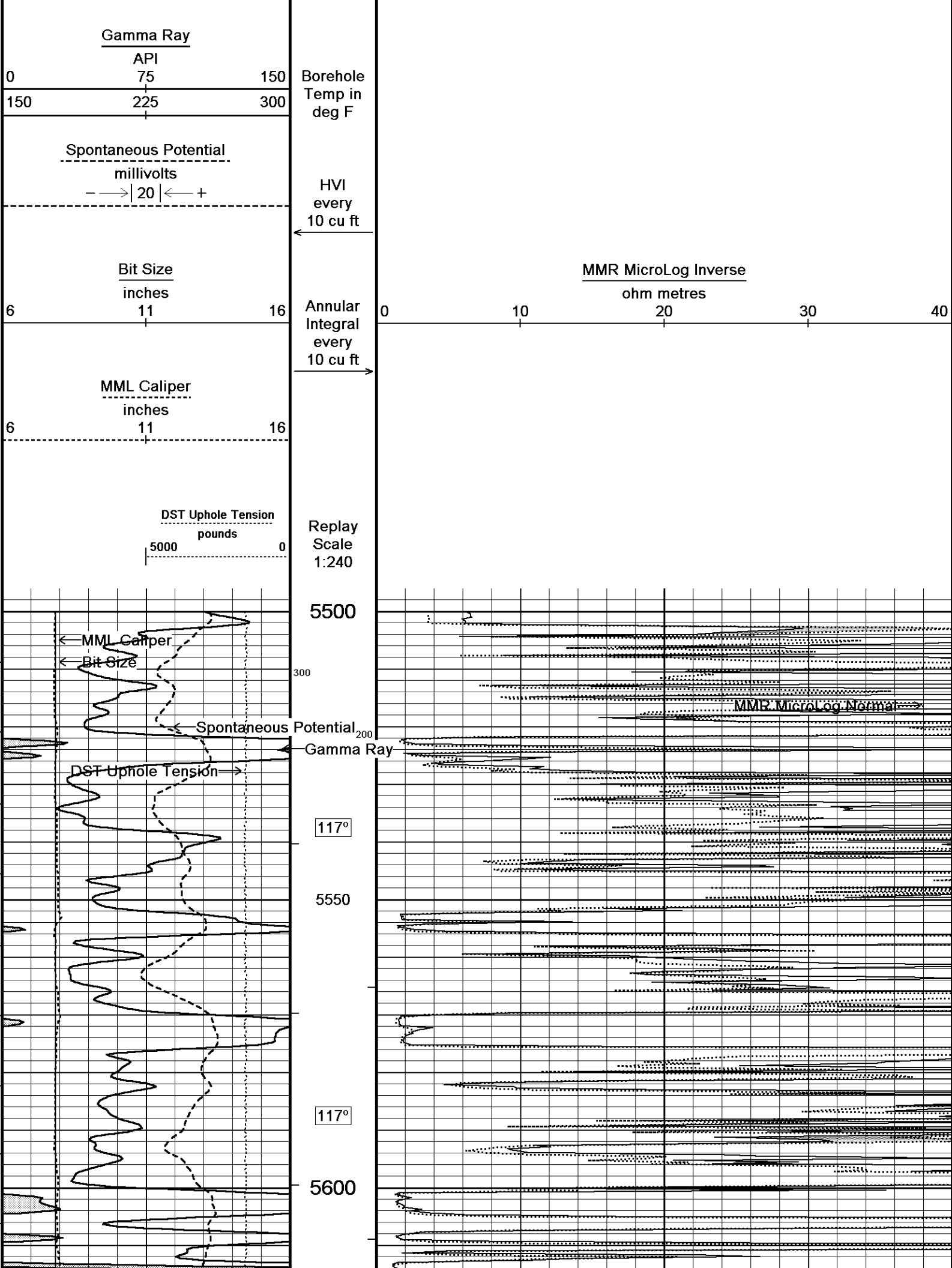


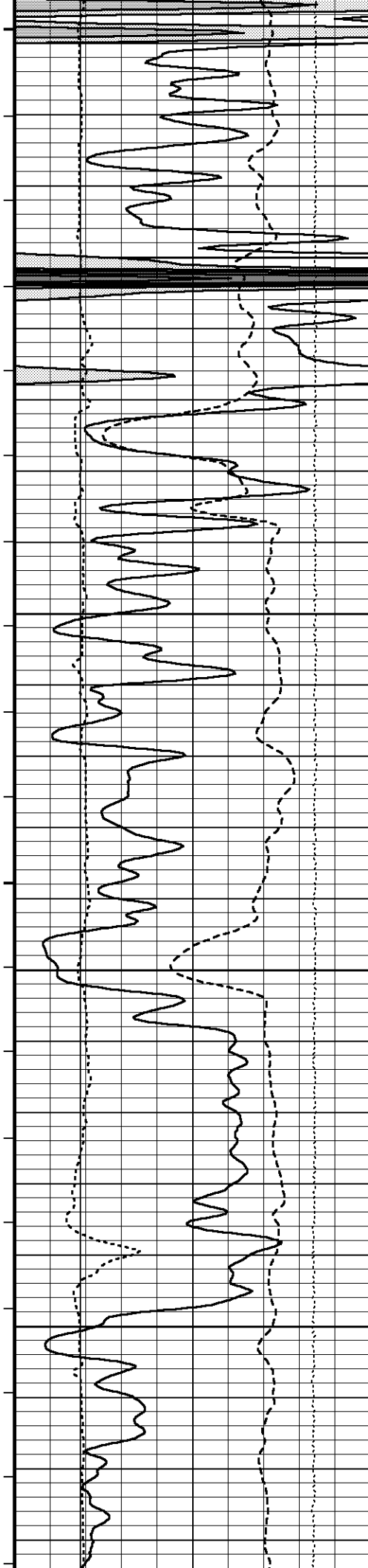












118°

5650

118°

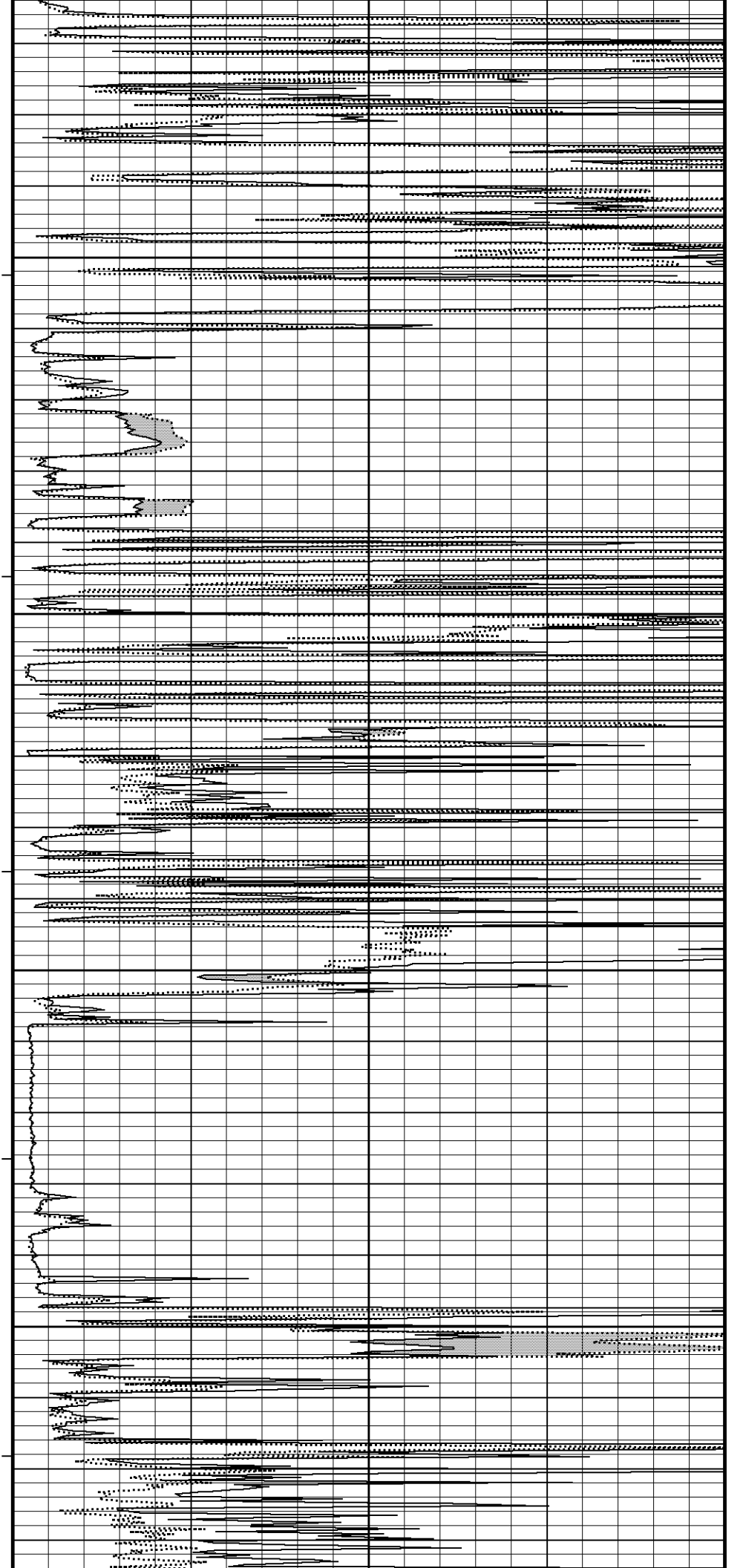
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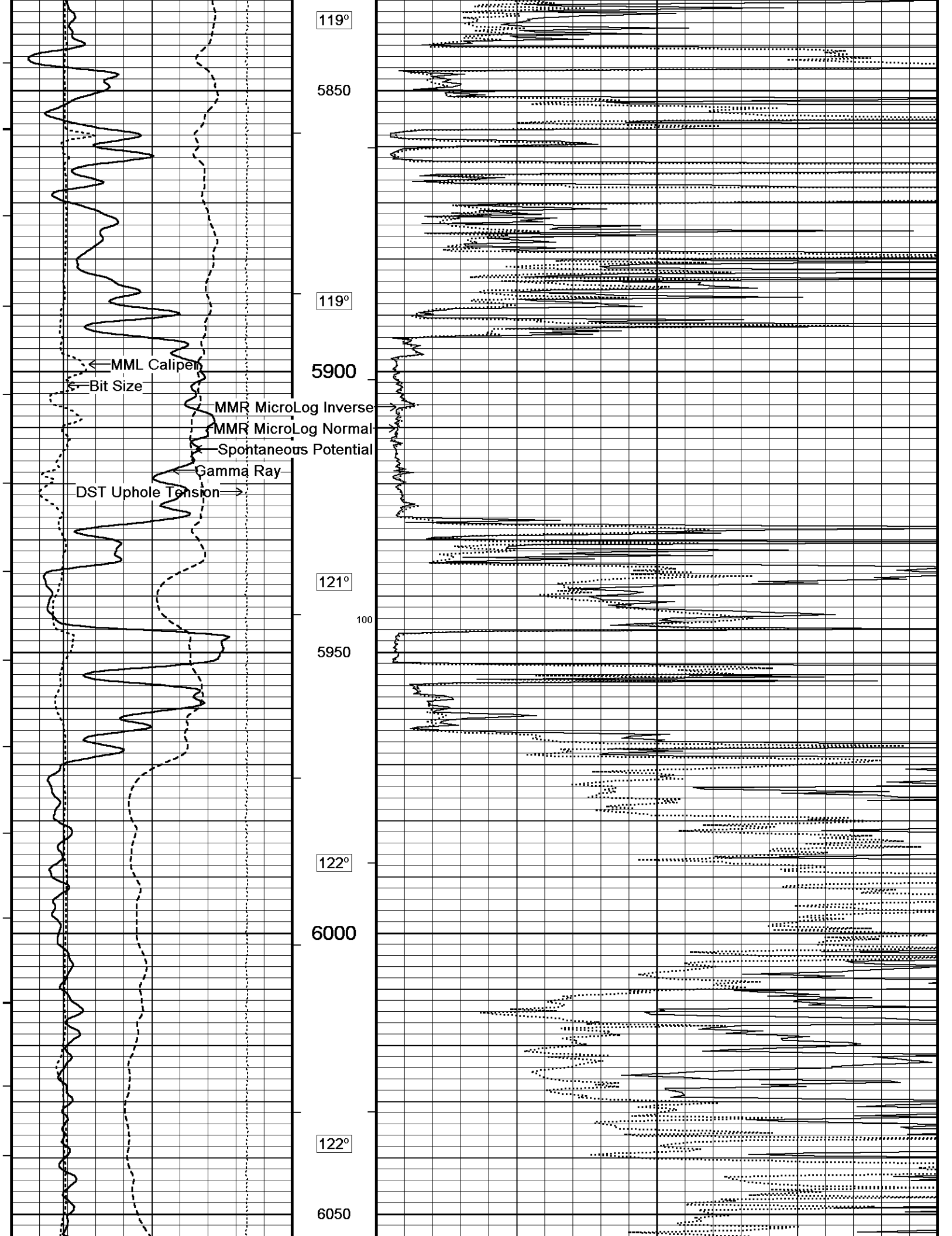
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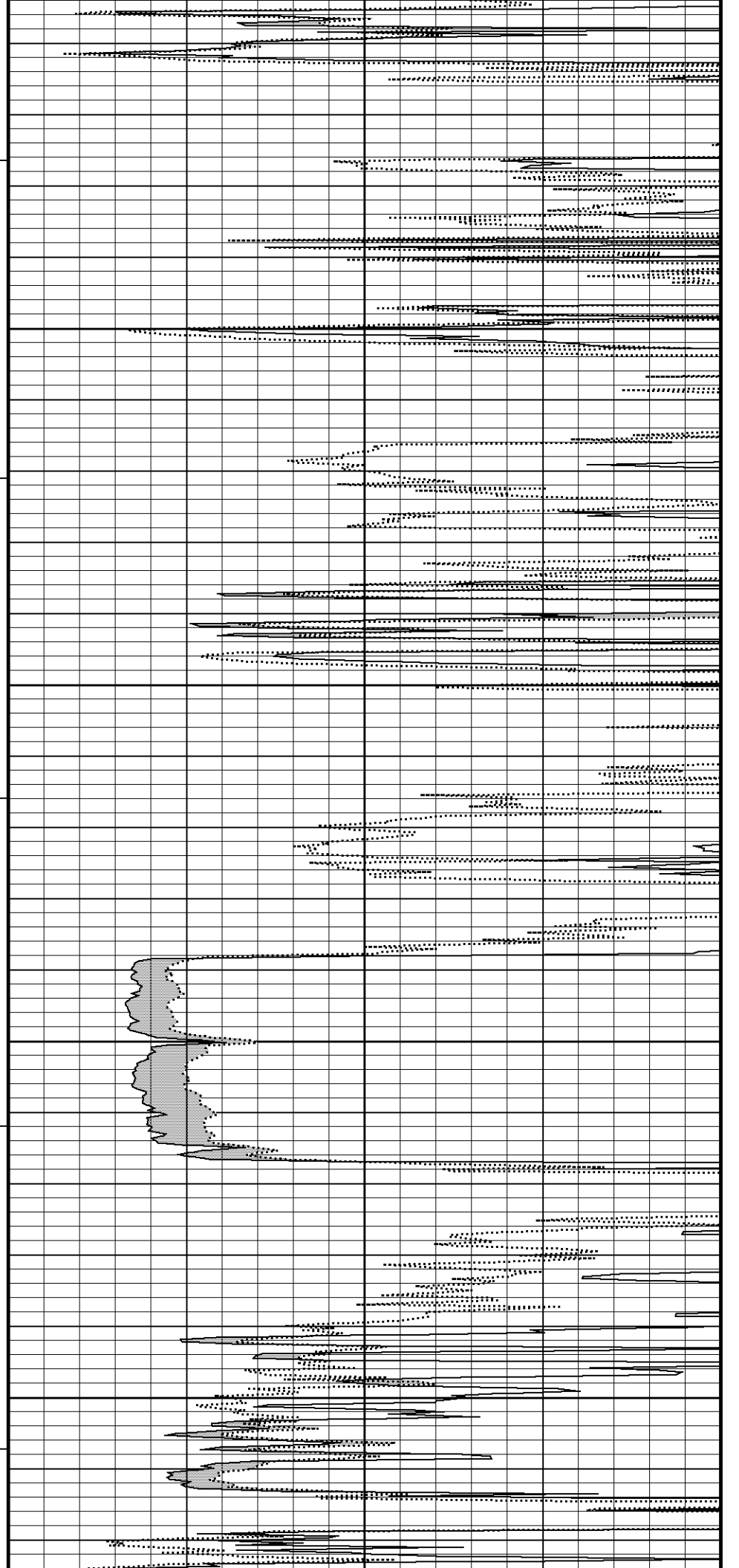
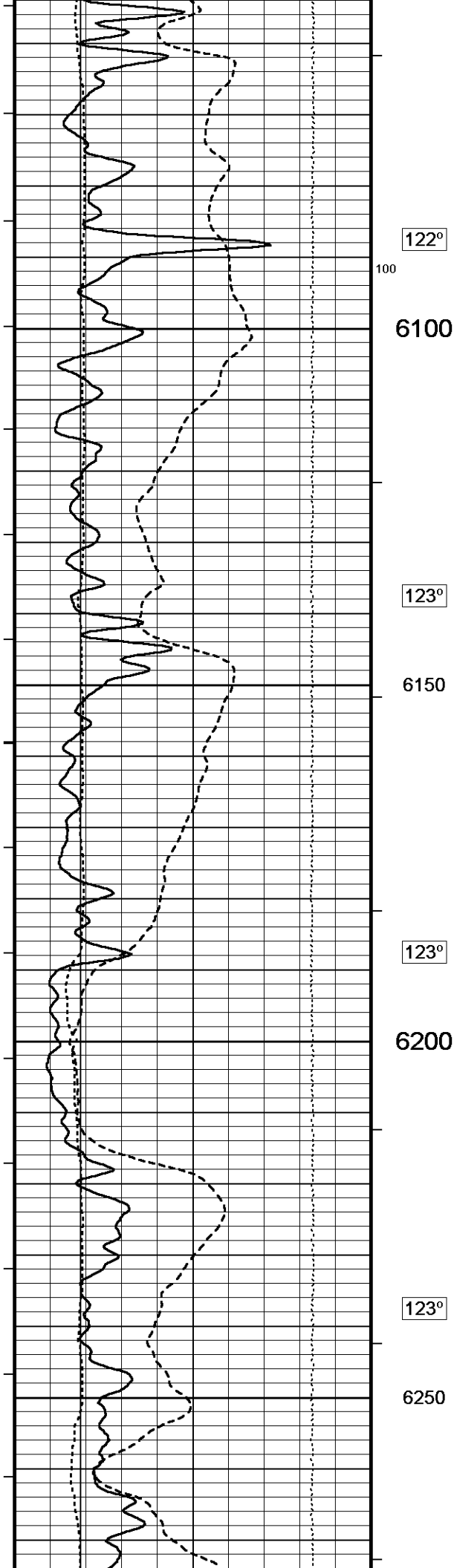
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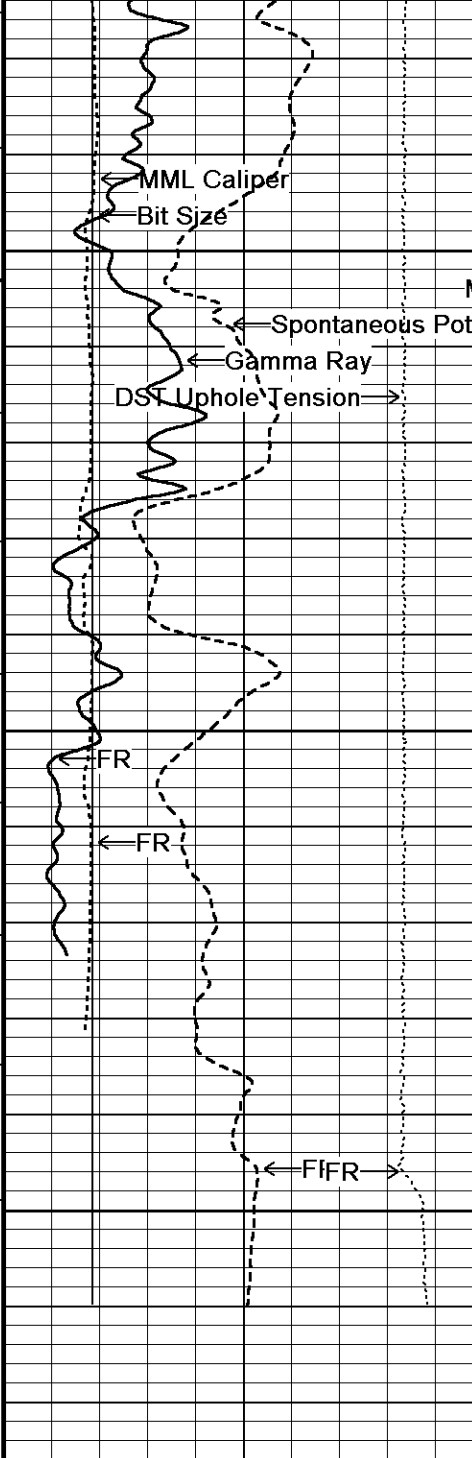
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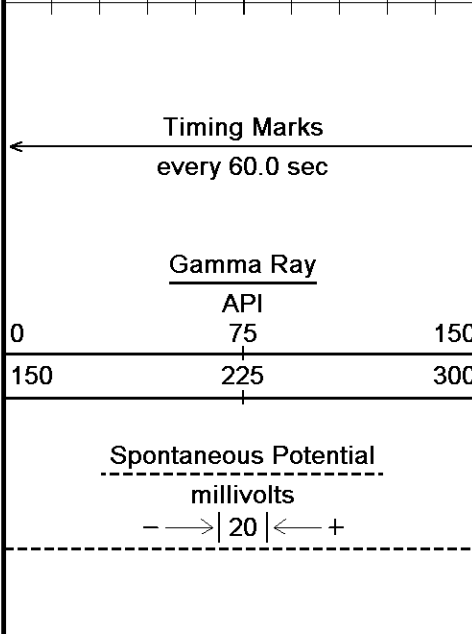
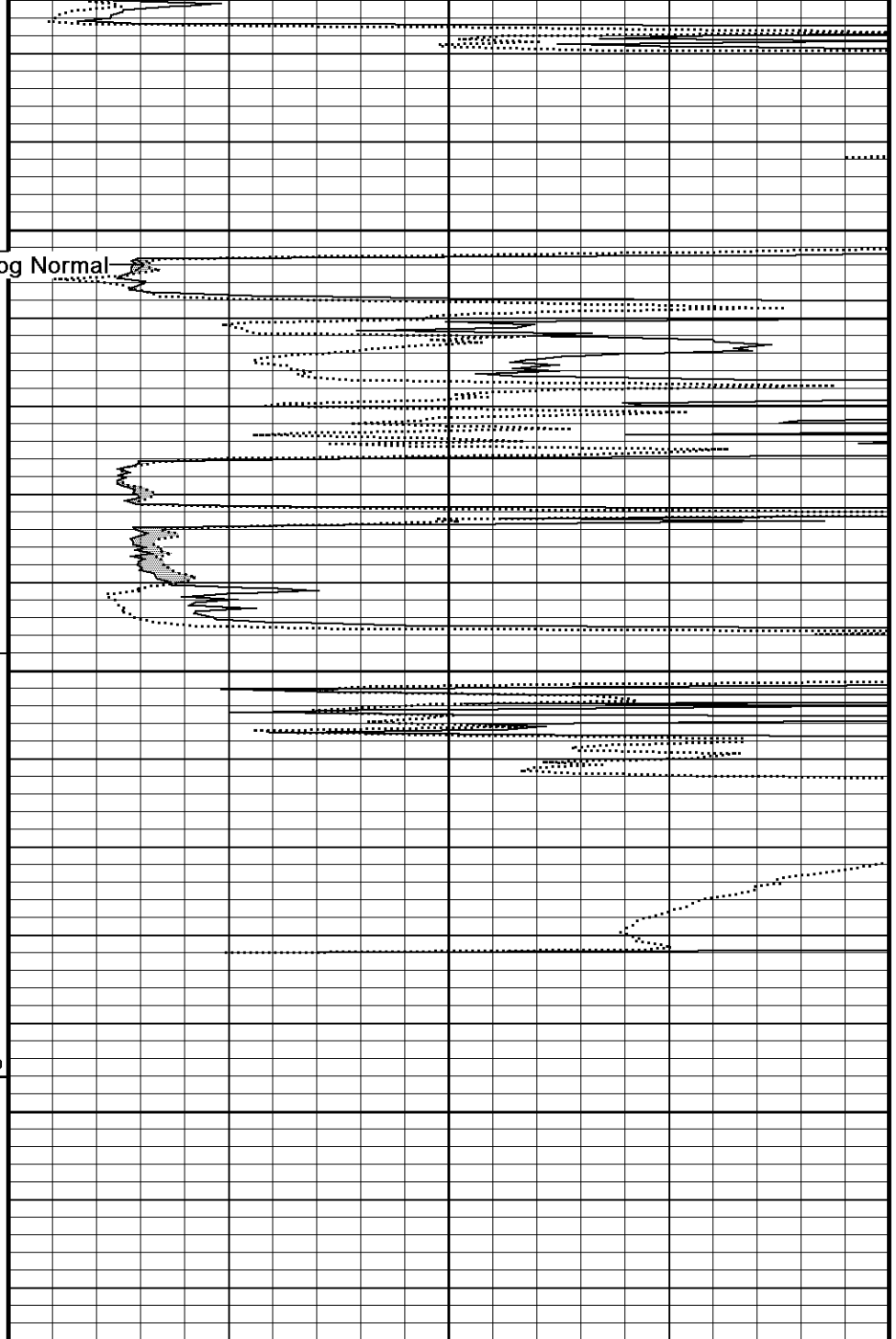








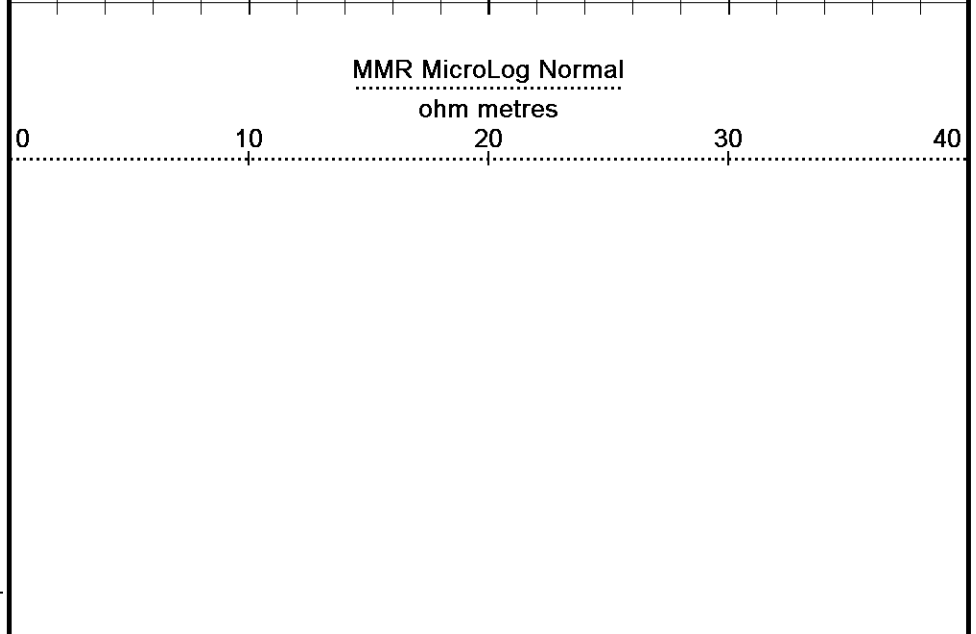
124°
6300
MMR MicroLog Normal
124°
6350
0 TD 0
6400

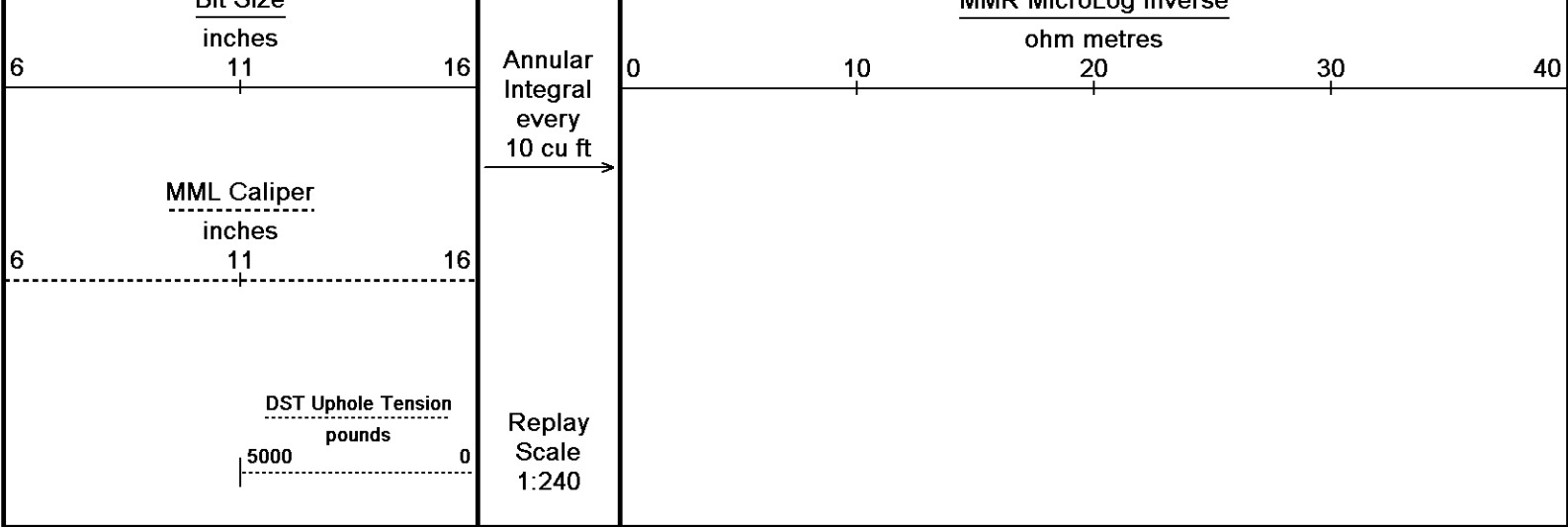


Depth
in
Feet

Borehole
Temp in
deg F

HVI
every
10 cu ft





Depth Based Data - Maximum Sampling Increment 10.0cm
Plotted on 02-JAN-2015 11:04

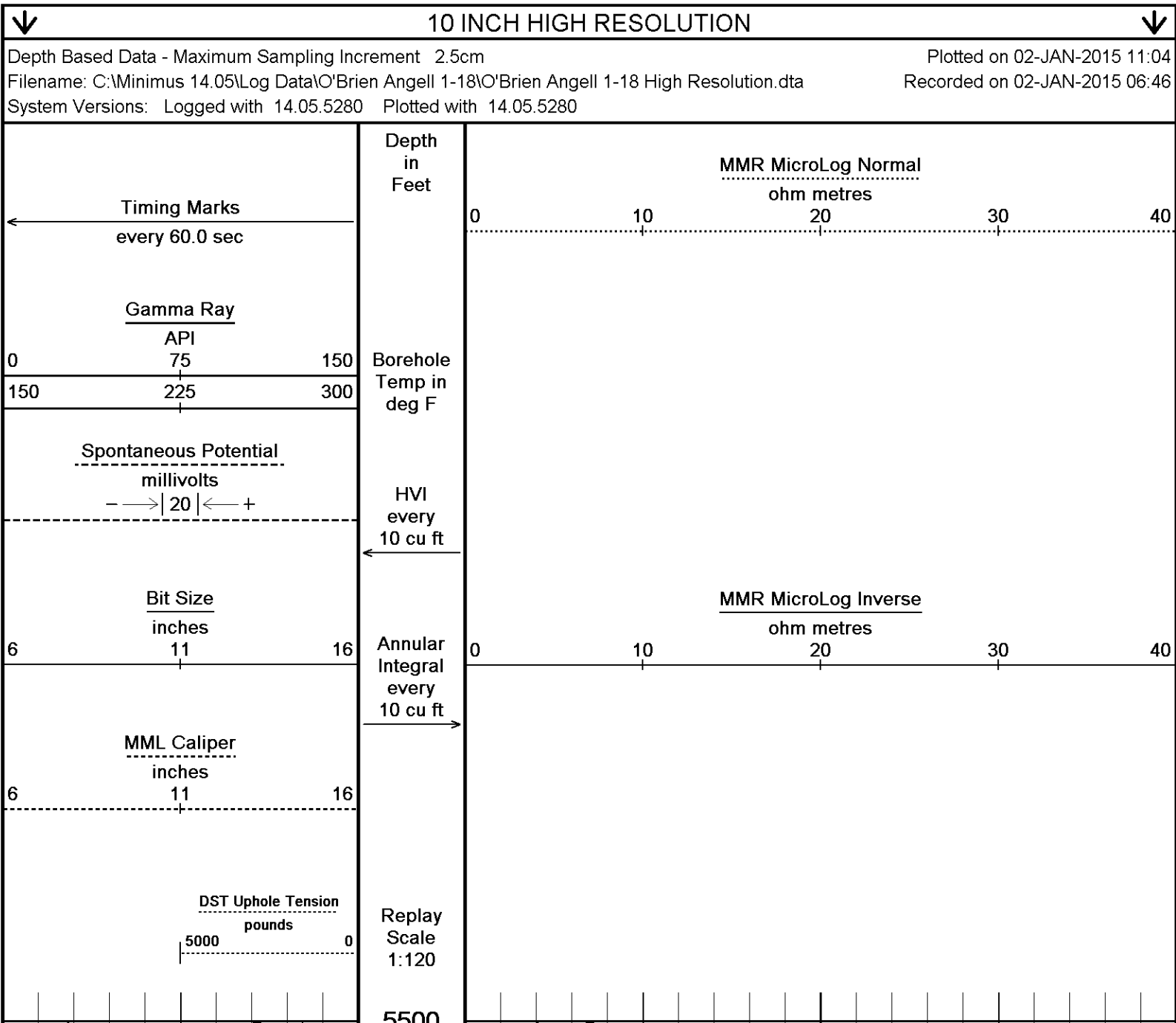
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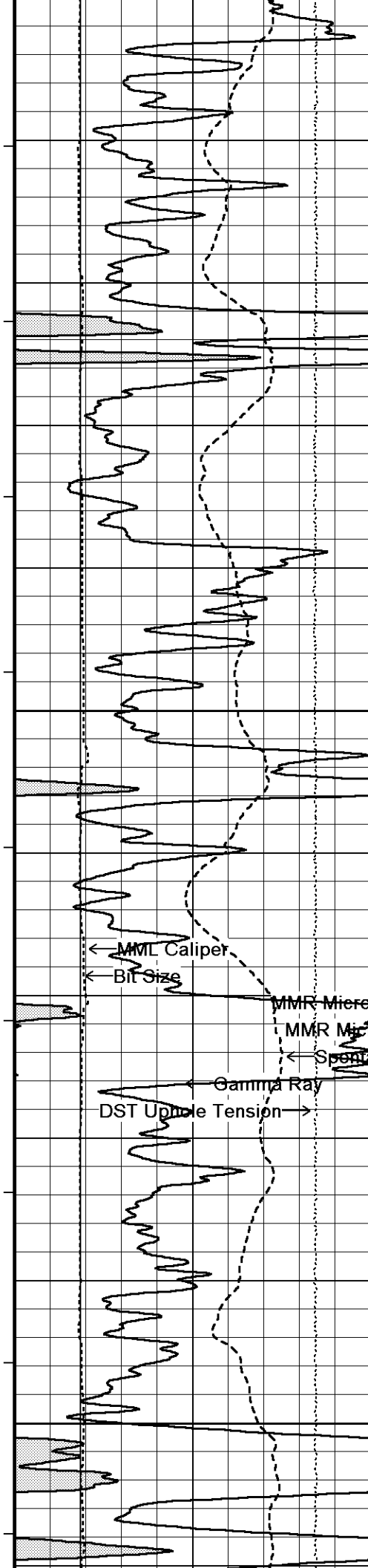
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Logged with 14.05.5280
Processed with 14.05.5280
Plotted with 14.05.5280

↑

REPEAT SECTION

↑





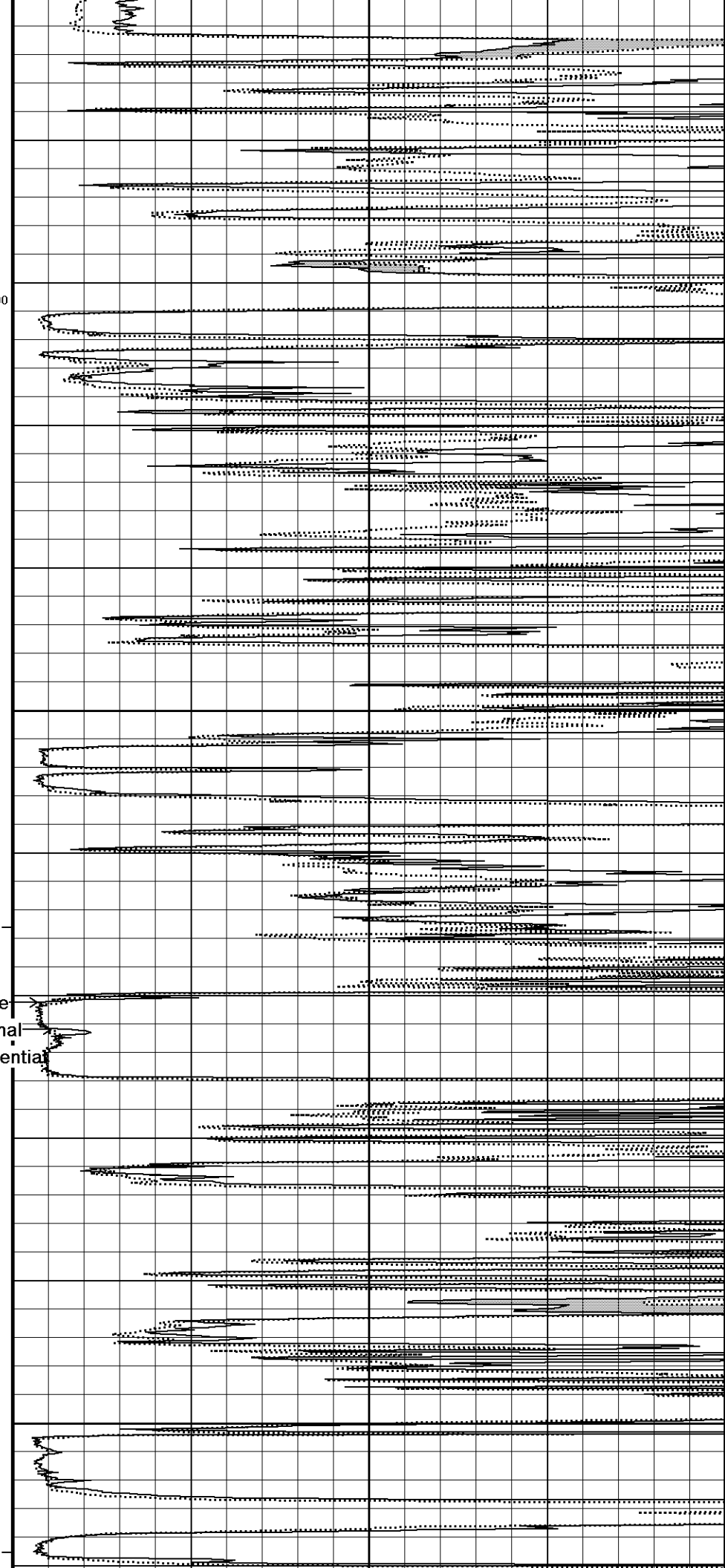
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200
117°
5550
5600

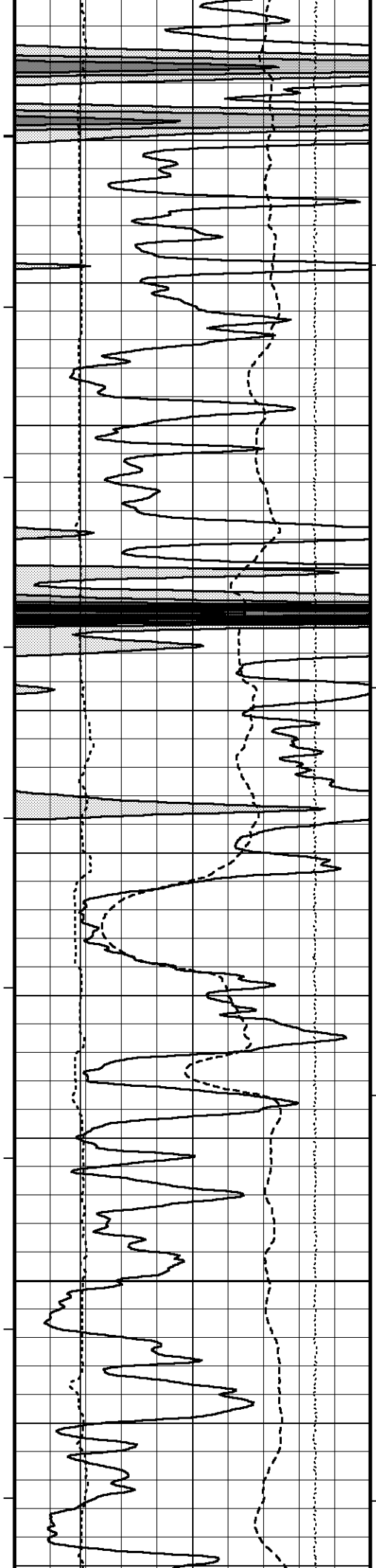
117°

5550

117°

5600



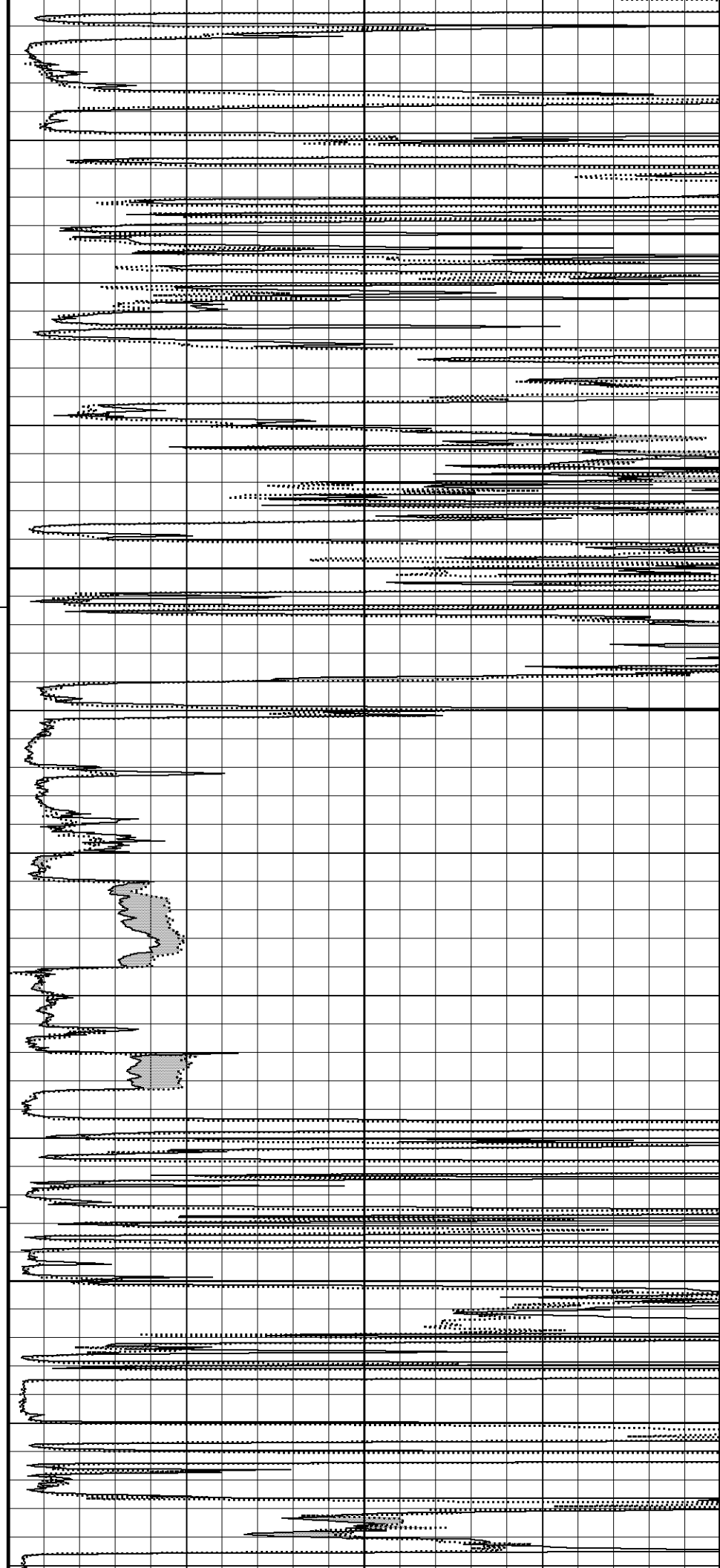


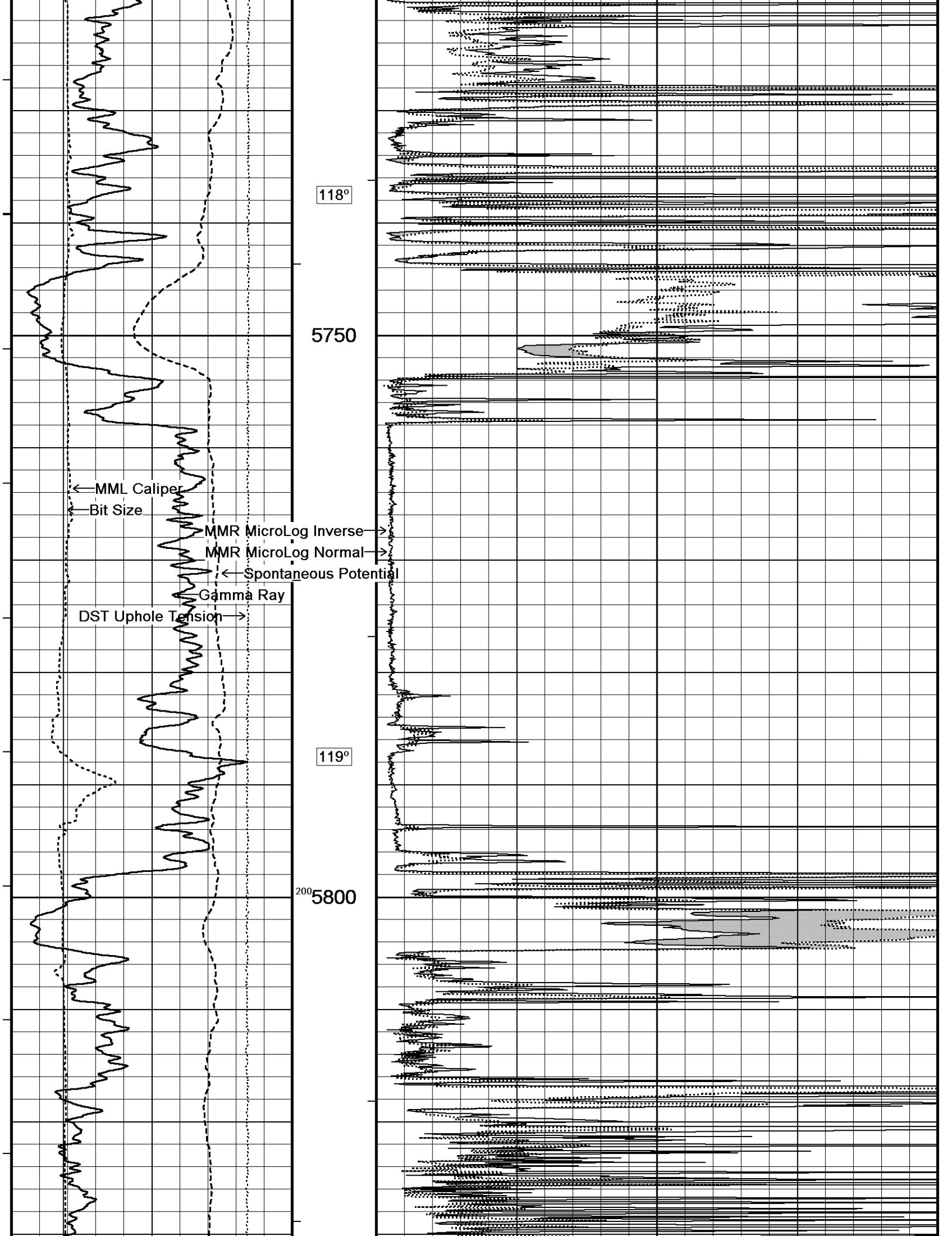
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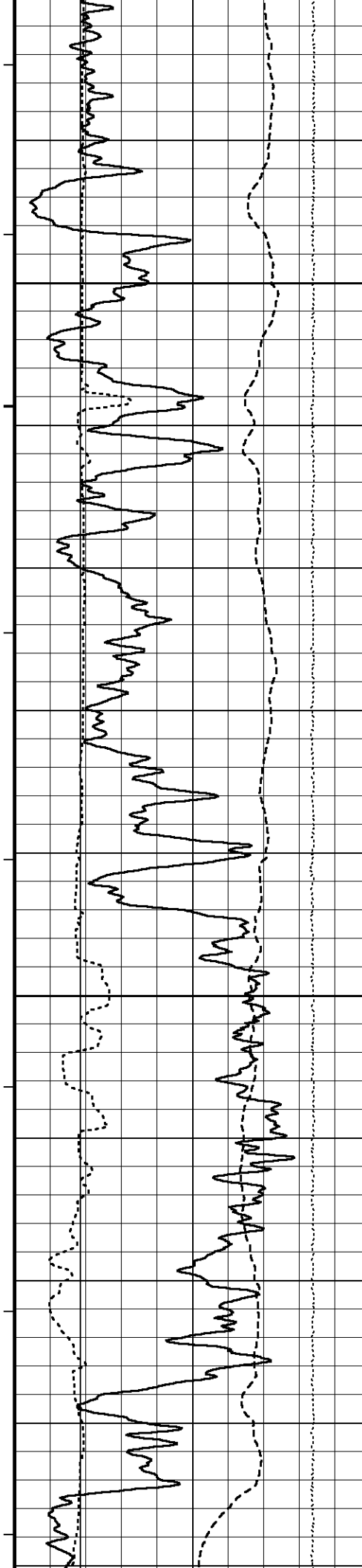
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118°

5700







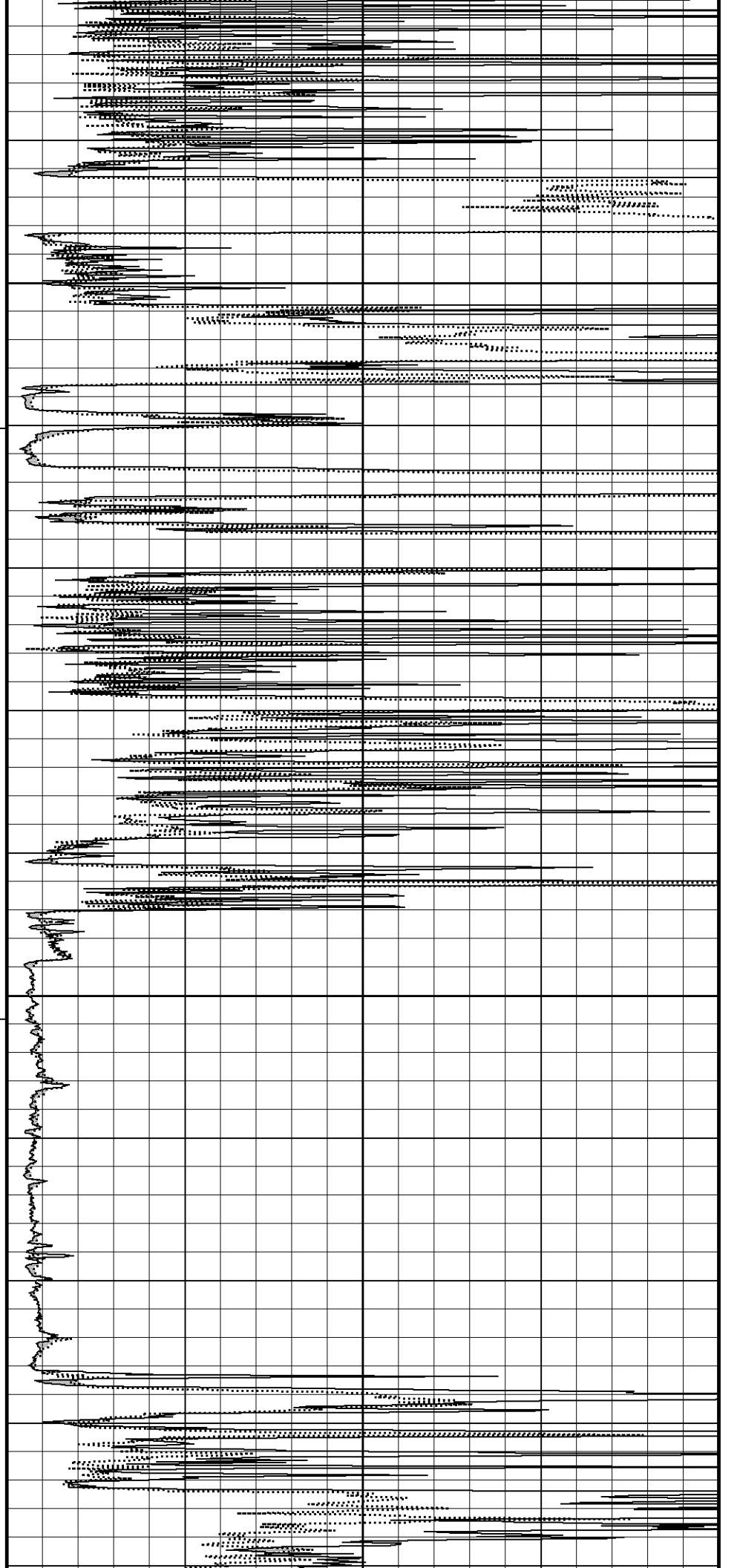
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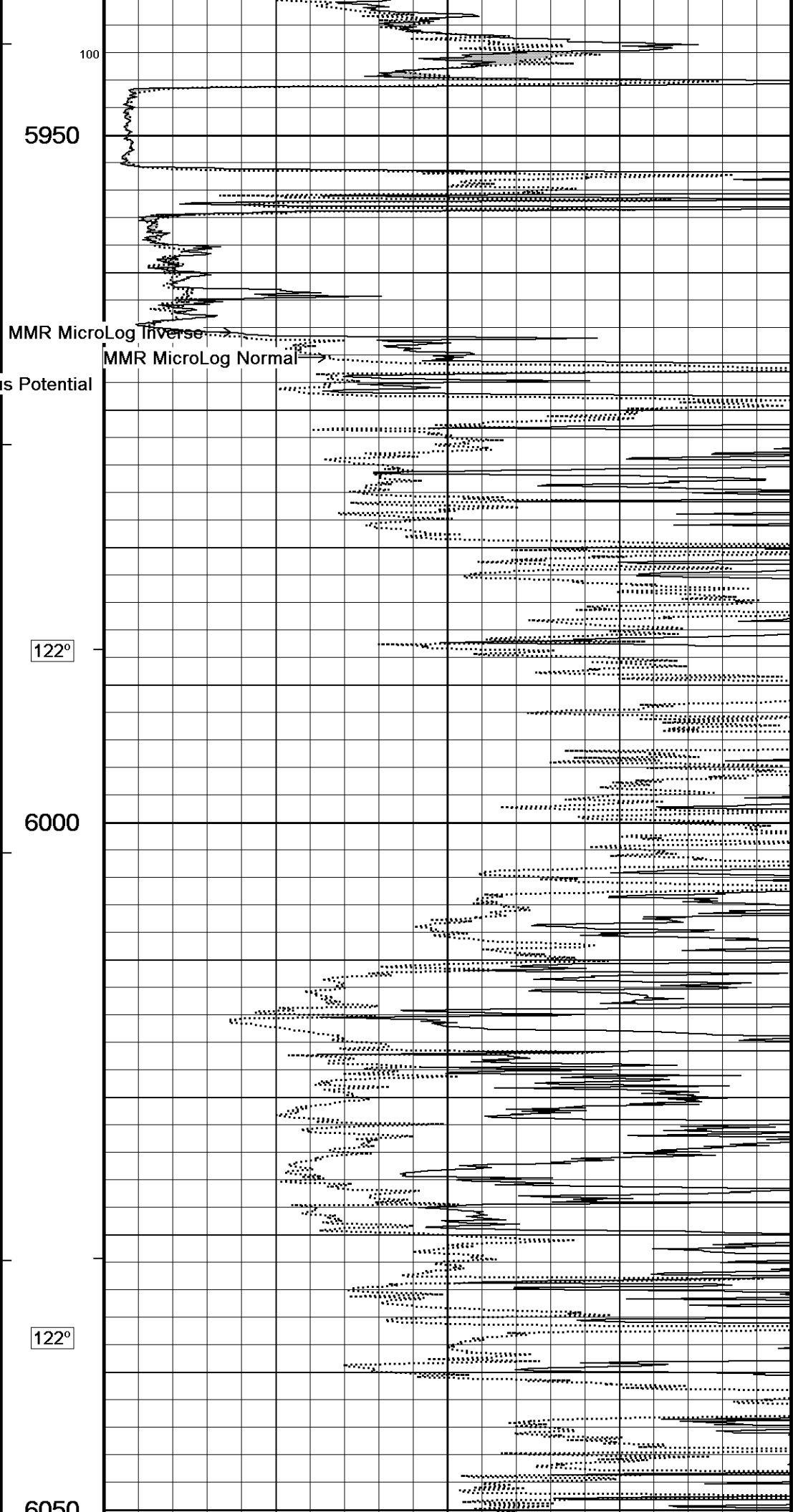
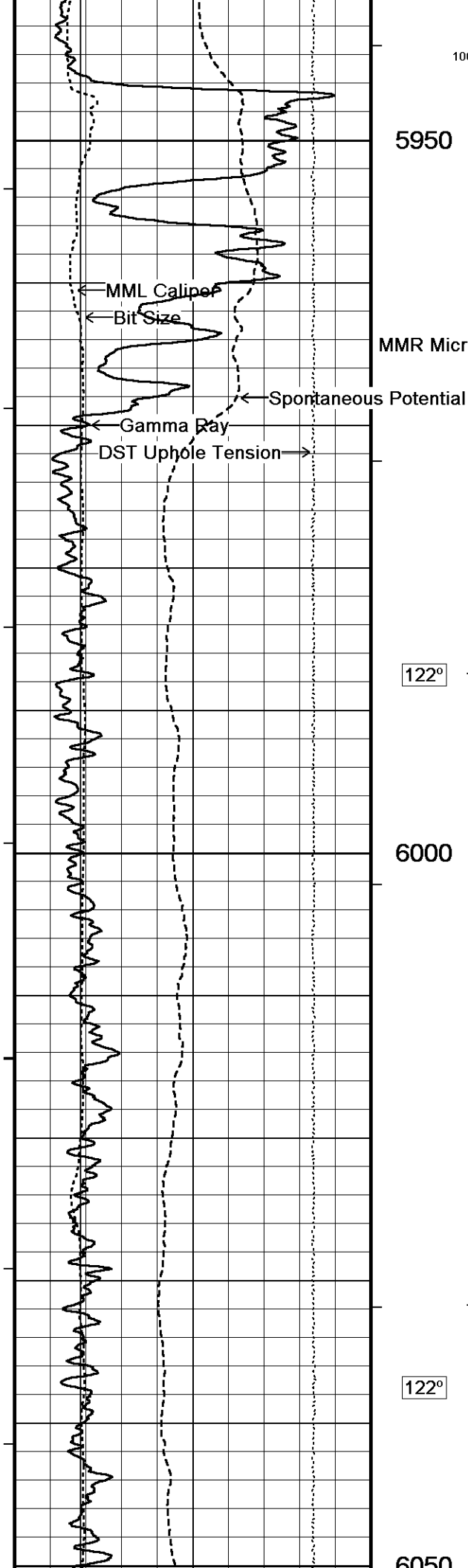
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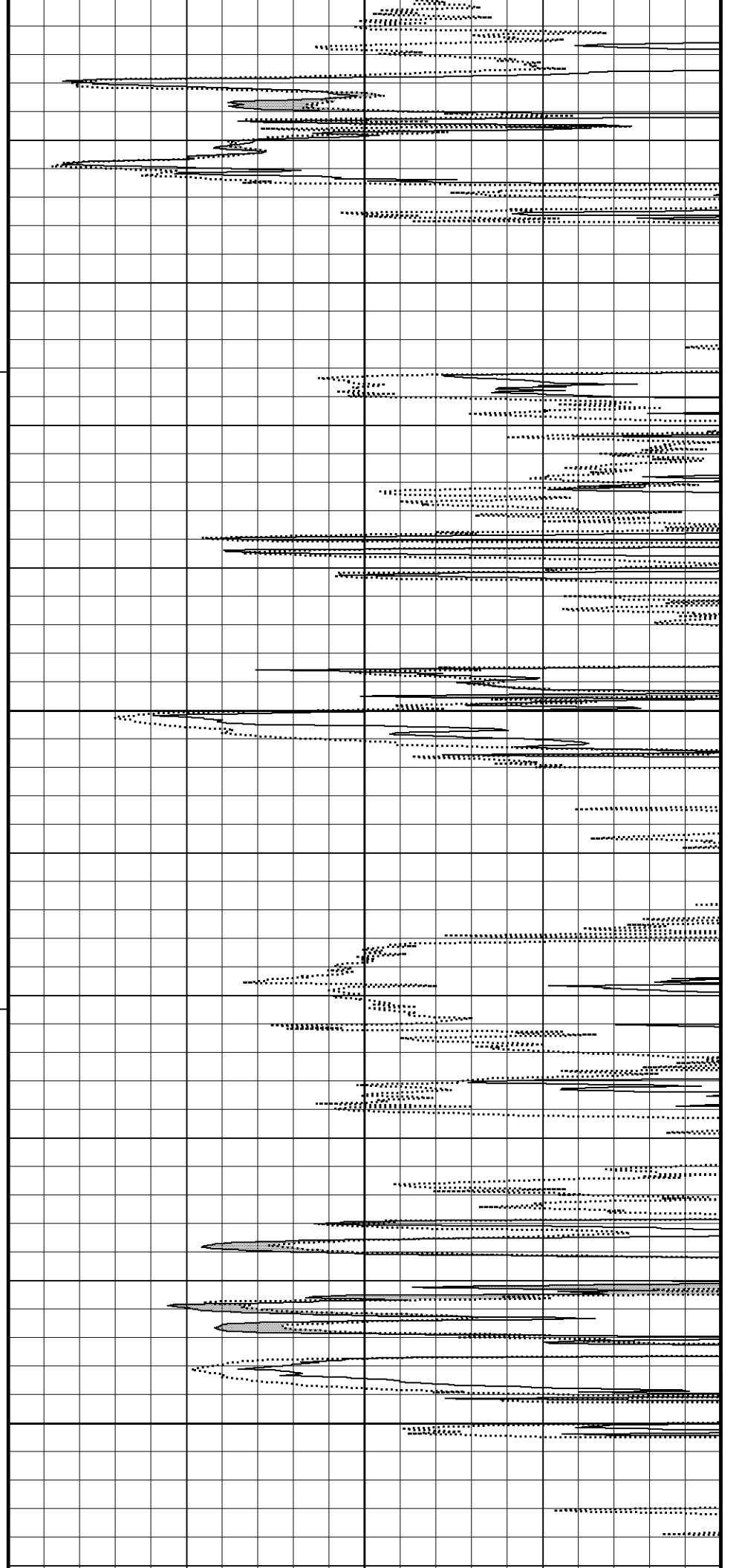
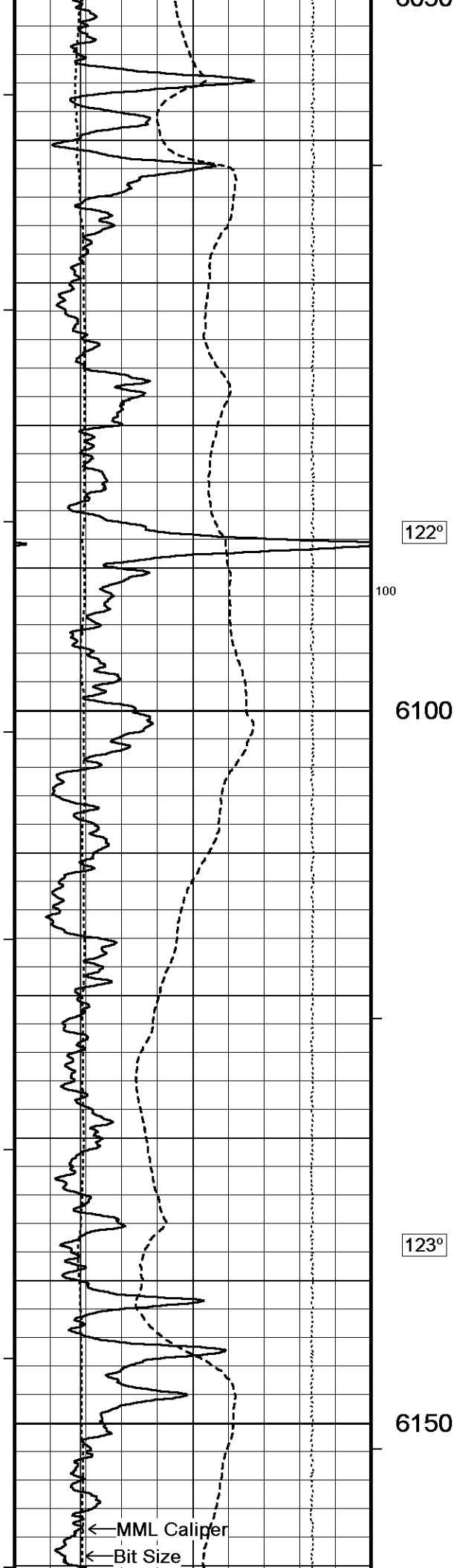
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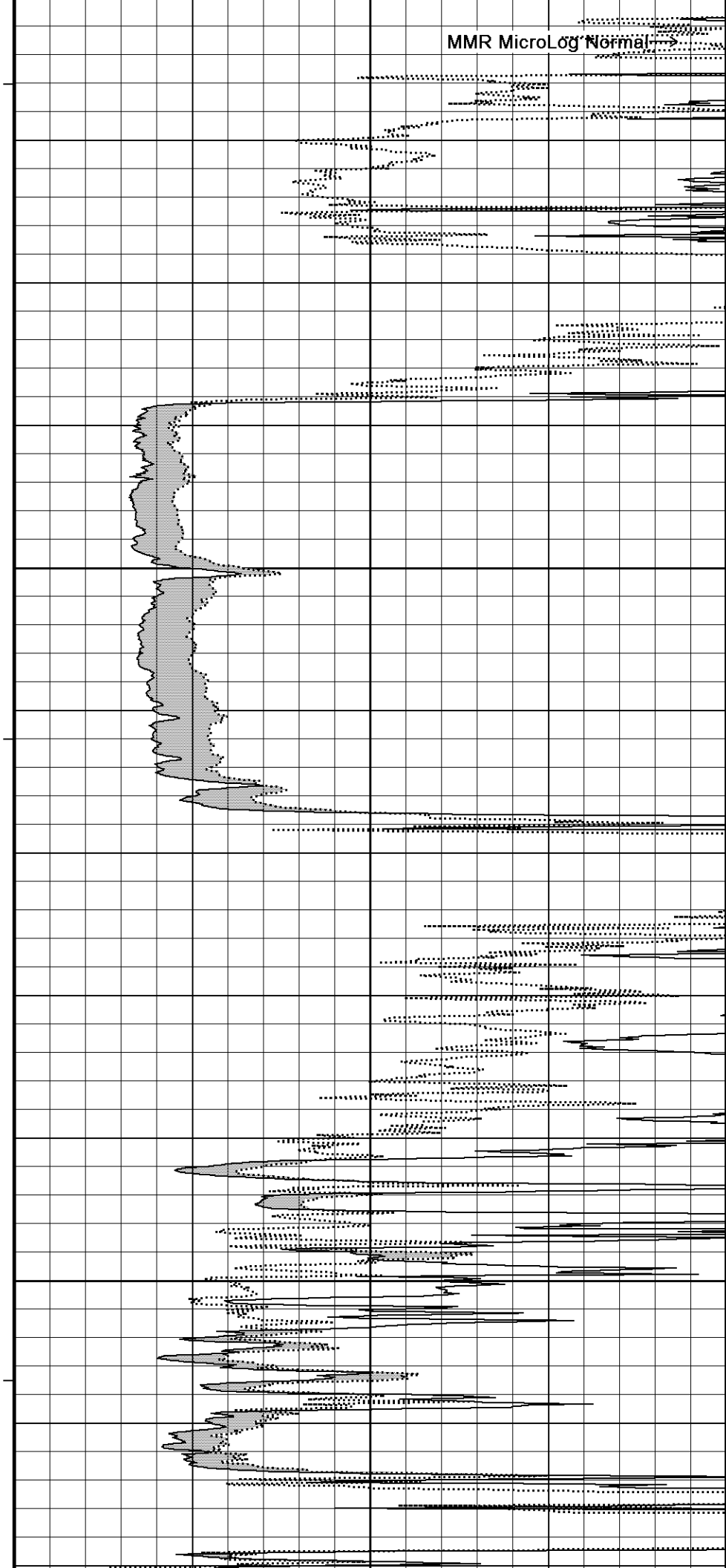
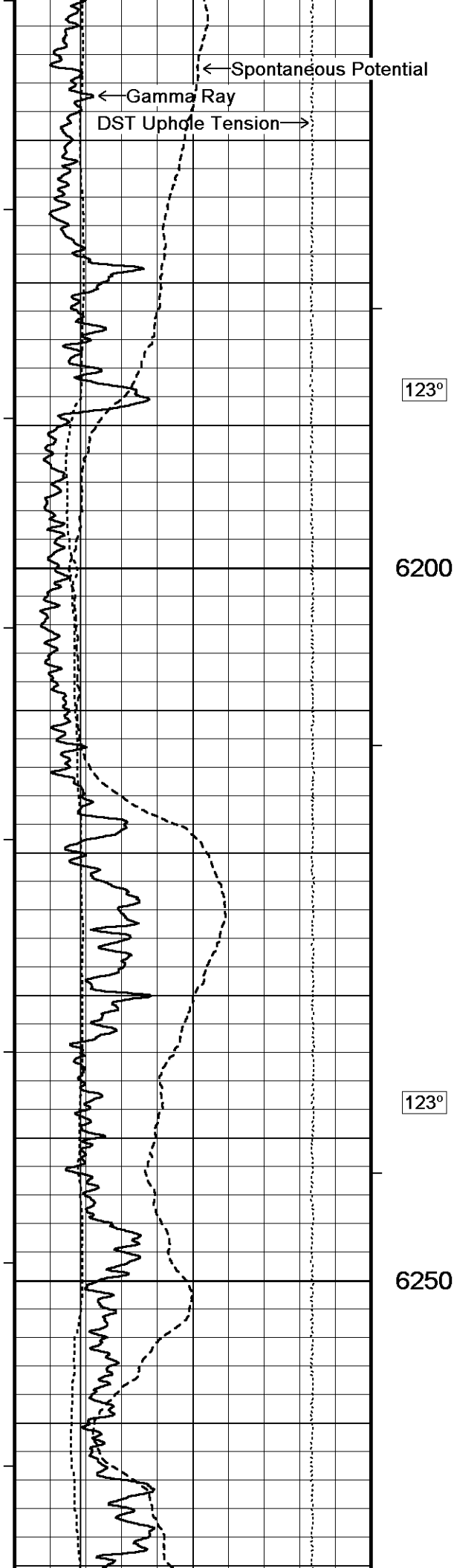
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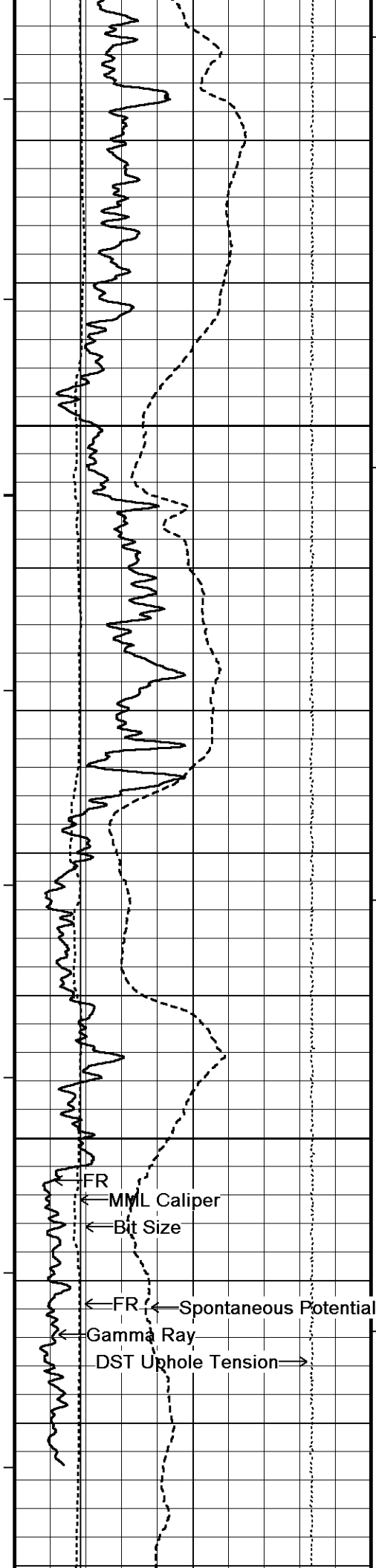
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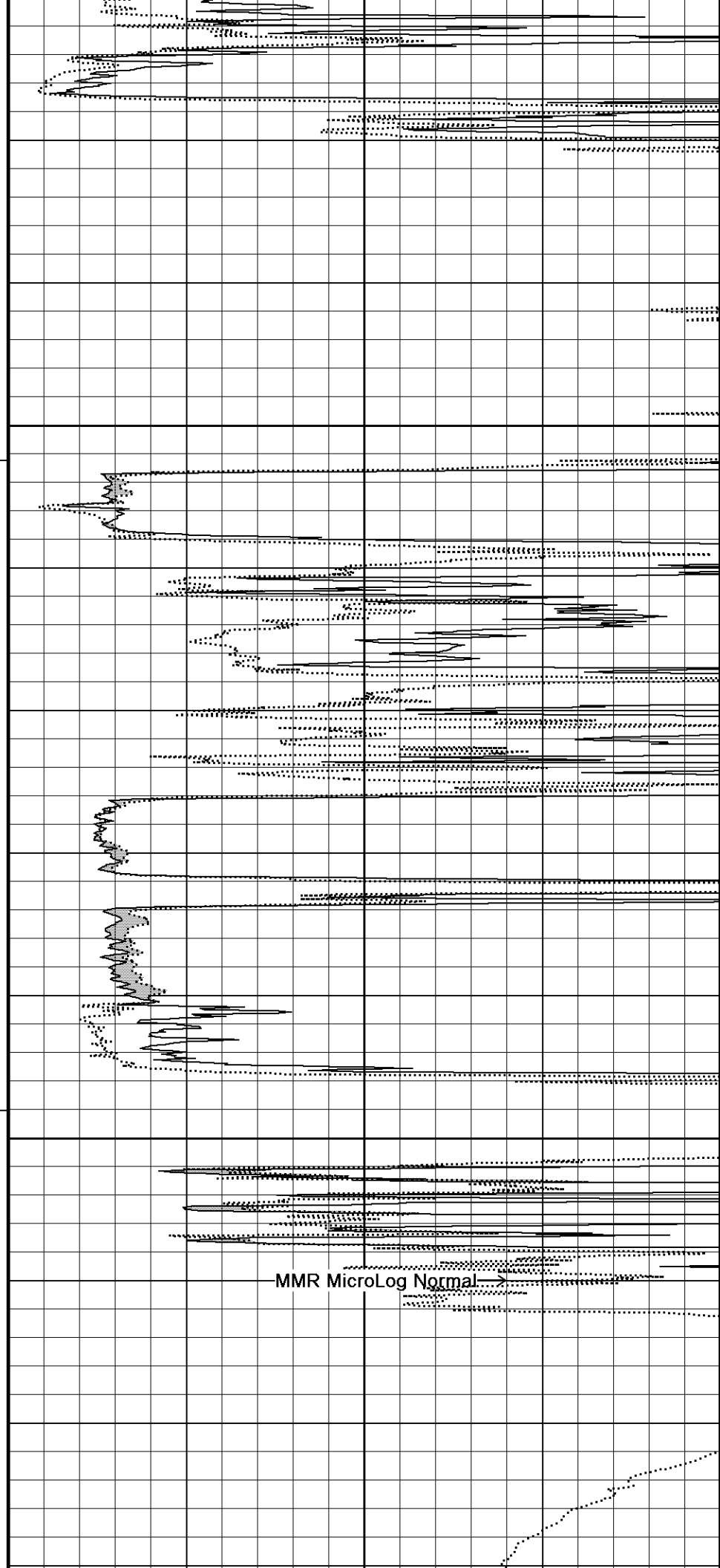


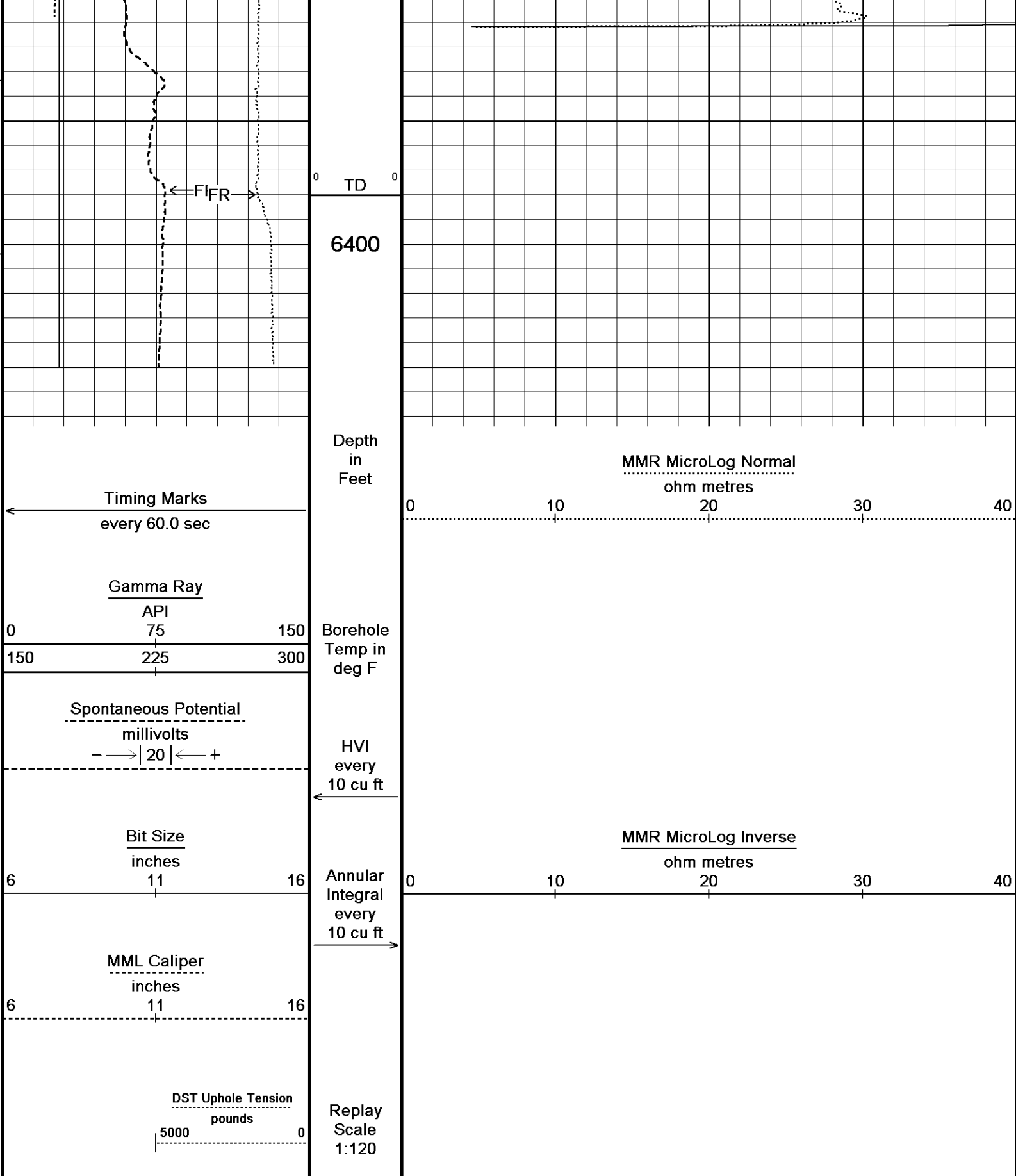
124°

6300

124°

6350





General Constants All 000

Last Edited on 02-JAN-2015,06:07

General Parameters

Mud Resistivity	1.500	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	4.500	inches
Caliper for Differential Caliper	None	

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-B 39

Field Calibration on 21-DEC-2014,10:31

	Measured	Calibrated(Deg F)
Lower	10.00	10.00
Upper	100.00	100.00

High Resolution Temperature Constants MCG-B 39

Last Edited on 28-AUG-2014,01:02

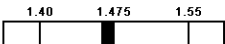
Pre-filter Length	11
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Gamma Calibration MCG-B 39

Field Calibration on 02-JAN-2015 02:38

	Measured	Calibrated (API)
Background	76	52
Calibrator (Gross)	1136	777
Calibrator (Net)	1060	725

Gamma Calibration Tolerances MCG-B 39

Ratio	1.462		Counts/API
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Gamma Constants MCG-B 39

Last Edited on 02-JAN-2015,04:48

Gamma Calibrator Number	GRC038	
GRC-M Calibrator Jig in Use?	NO	
Inactive Background Jig in Use?	NO	
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	%

Micro Normal and Micro Inverse Calibration MML-A 3

Base Calibration on 29-DEC-2014 11:53

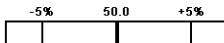
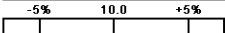
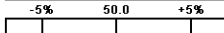
Field Check on 02-JAN-2015 02:11

Base Calibration

		Measured	Calibrated (ohm-m)	
Channel	Resistor 1	Resistor 2	Resistor 1	Resistor 2
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 3

Micro Normal Res. 1	10.1		ohm	Micro Normal Res. 2	50.1		ohm
Micro Inverse Res. 1	10.0		ohm	Micro Inverse Res. 2	49.9		ohm

Micro Inverse Res. 1	10.0		ohm-m
Micro Inverse Res. 2	49.9		ohm-m
Micro Normal Base Check	77.2		ohm-m
Micro Inverse Base Check	51.2		ohm-m
Micro Normal Field Check	77.2		ohm-m
Micro Inverse Field Check	51.2		ohm-m

Micro Normal and Micro Inverse Constants MML-A 3

Last Edited on 02-JAN-2015,04:48

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 3

Base Calibration on 29-DEC-2014 11:46

Field Calibration on 02-JAN-2015 02:10

Base Calibration		
Reading No	Measured	Calibrator Size (in)
1	15234	5.96
2	18498	7.98
3	21740	9.85
4	25668	11.92
5	0	0.00
6	N/A	N/A

Field Calibration

Measured Caliper (in)	Actual Caliper (in)
7.92	7.97

Caliper Calibration Tolerances MML-A 3

Short Arm Field Cal.	7.92		in
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Caliper Calibration MPD-C.A 216

Base Calibration on 09-DEC-2014 13:29

Field Calibration on 02-JAN-2015 02:03

Base Calibration		
Reading No	Measured	Calibrator Size (in)
1	19120	3.99
2	29184	5.98
3	39328	7.97
4	49072	9.86
5	60273	11.92
6	N/A	N/A

Field Calibration

Measured Caliper (in)	Actual Caliper (in)
7.92	7.97

Caliper Calibration Tolerances MPD-C.A 216

Short Arm Field Cal.	7.92		in
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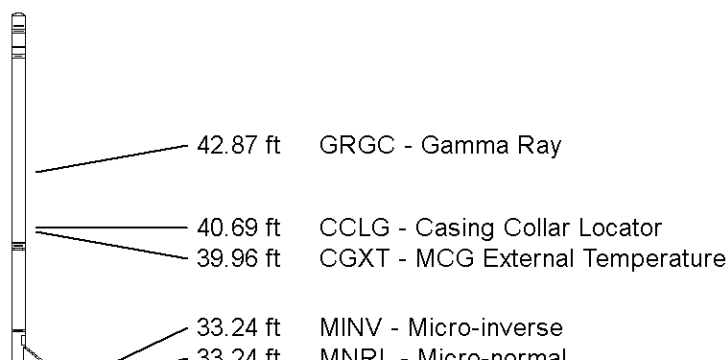
DOWNHOLE EQUIPMENT

C:\Minimus 14.05\Log Data\O'Brien Angell 1-18\O'Brien Angell 1-18 Main.dta

3/8" Triple Cone Cable Head (MCB C A)
MCB-C.A 233 LG: 1.58 ft WT: 15.4 lb OD: 2.240 in

Compact Comms Gamma
MCG-B 39 LG: 8.70 ft WT: 63.9 lb OD: 2.244 in

Compact Micro-log
MML-A 3 LG: 7.97 ft WT: 81.6 lb OD: 2.240 in



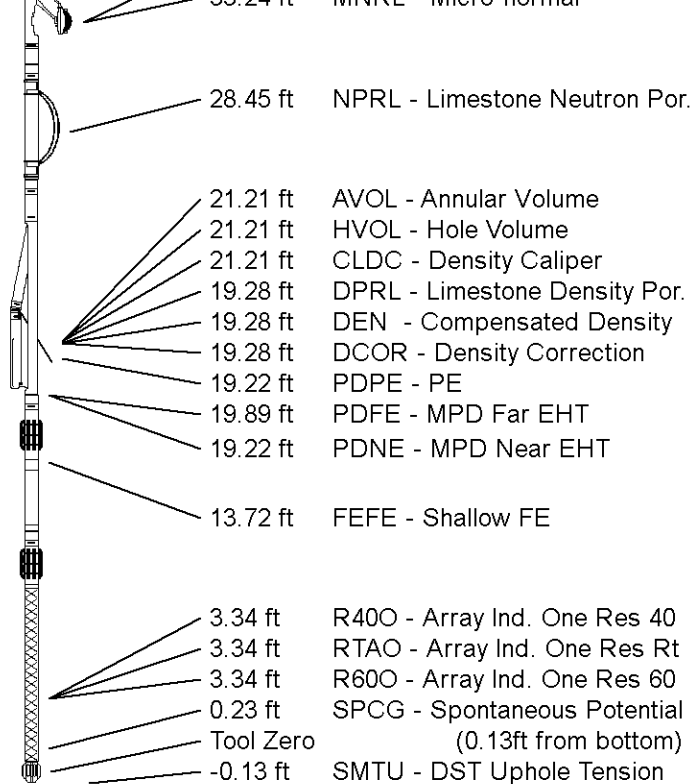
Compact Neutron
MDN-A.B 66 LG: 5.04 ft WT: 50.7 lb OD: 2.244 in

Compact Density/Caliper
MPD-C.A 216 LG: 9.59 ft WT: 90.4 lb OD: 2.449 in

Compact Focussed Electric
MFE-B.J 353 LG: 6.05 ft WT: 48.5 lb OD: 2.244 in

Compact Induction
MAI-A.A 111 LG: 10.81 ft WT: 48.5 lb OD: 2.244 in

Total Length: 49.73 ft Weight: 399.0 lb



COMPANY O'BRIEN ENERGY RESOURCES CORP.
WELL ANGELL 1-18
FIELD ANGELL
PROVINCE/COUNTY MEADE
COUNTRY/STATE U.S.A. / KANSAS

Elevation Kelly Bushing	2727.00	feet	First Reading	6362.76	feet
Elevation Drill Floor	2725.00	feet	Depth Driller	6402.00	feet
Elevation Ground Level	2715.00	feet	Depth Logger	6396.00	feet



Weatherford®

MICRORESISTIVITY LOG