



Weatherford
LOG

MICRORESISTIVITY LOG

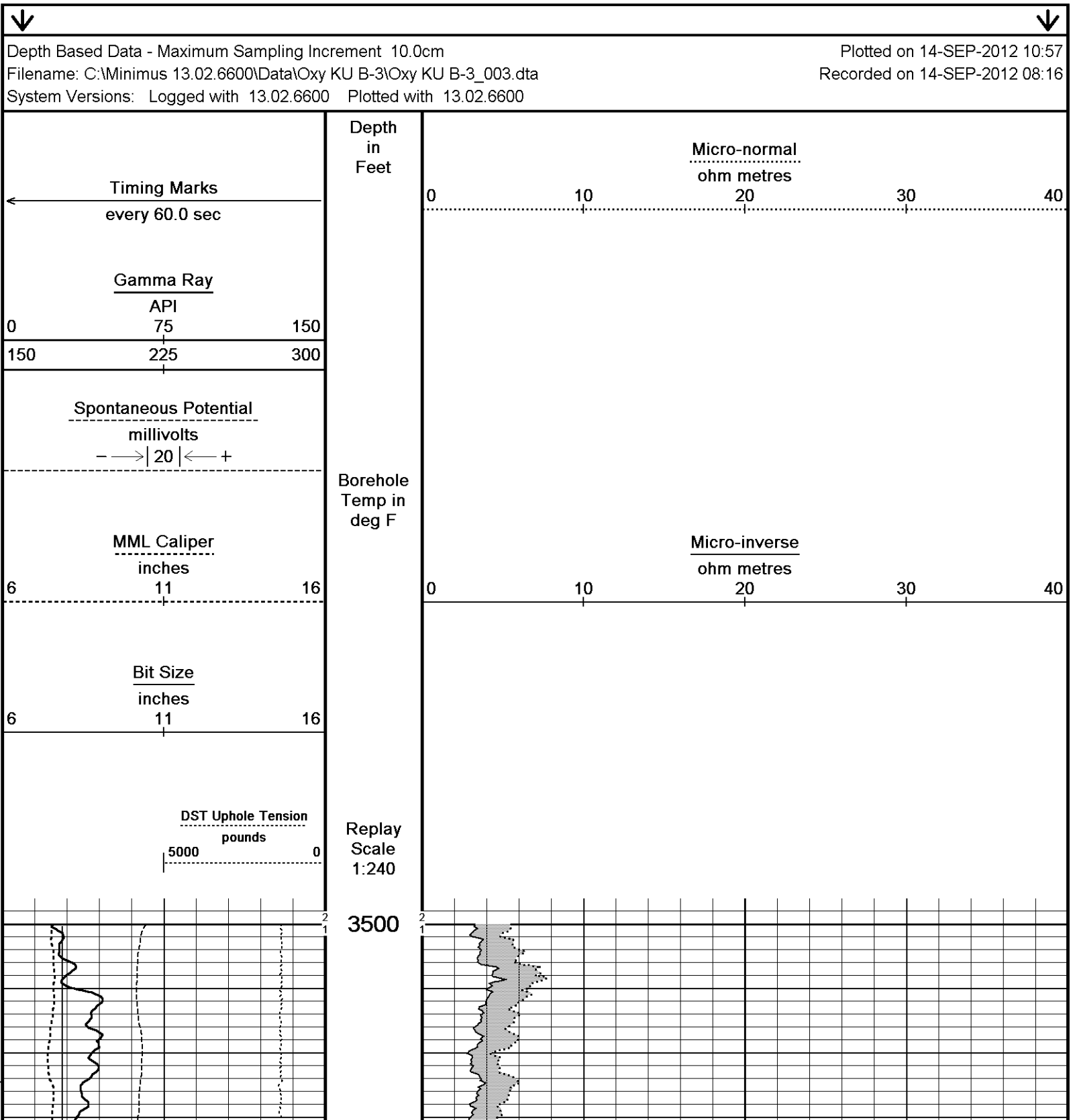
COMPANY				OXY USA, INC.			
WELL				KU B-3			
FIELD				ARROYO			
PROVINCE/COUNTY				STANTON			
COUNTRY/STATE				U.S.A. / KANSAS			
LOCATION				2060' FSL & 2020' FEL			
SEC	TWP	RGE	Other Services		MA/MI/FE		
17	29S	41W	MPD/MDN				
API Number		15-187-21208		MSS			
Permit Number							
Permanent Datum GL, Elevation 3411 feet							
Log Measured From KB							
Drilling Measured From KB							
Date	13-SEP-2012						
Run Number	ONE						
Depth Driller	5850.00			feet			
Depth Logger	5854.00			feet			
First Reading	5808.00			feet			
Last Reading	3500.00			feet			
Casing Driller	1824.00			feet			
Casing Logger	1826.00			feet			
Bit Size	7.875			inches			
Hole Fluid Type	CHEMICAL						
Density / Viscosity	9.20 lb/USg			46.00 CP			
PH / Fluid Loss	11.30			12.00 ml/30Min			
Sample Source	FLOWLINE						
Rm @ Measured Temp	0.81 @ 98.0			ohm-m			
Rmf @ Measured Temp	0.65 @ 98.0			ohm-m			
Rmc @ Measured Temp	0.97 @ 98.0			ohm-m			
Source Rmf / Rmc	CALC		CALC				
Rm @ BHT	0.61 @132.0			ohm-m			
Time Since Circulation	6 HOURS						
Max Recorded Temp	132.00			deg F			
Equipment Name	COMPACT						
Equipment / Base	13057		LIB				
Recorded By	ADAM SILL						
Witnessed By	EARLY ZION						
S.O. # / JOB #	3538920			LB12-249			

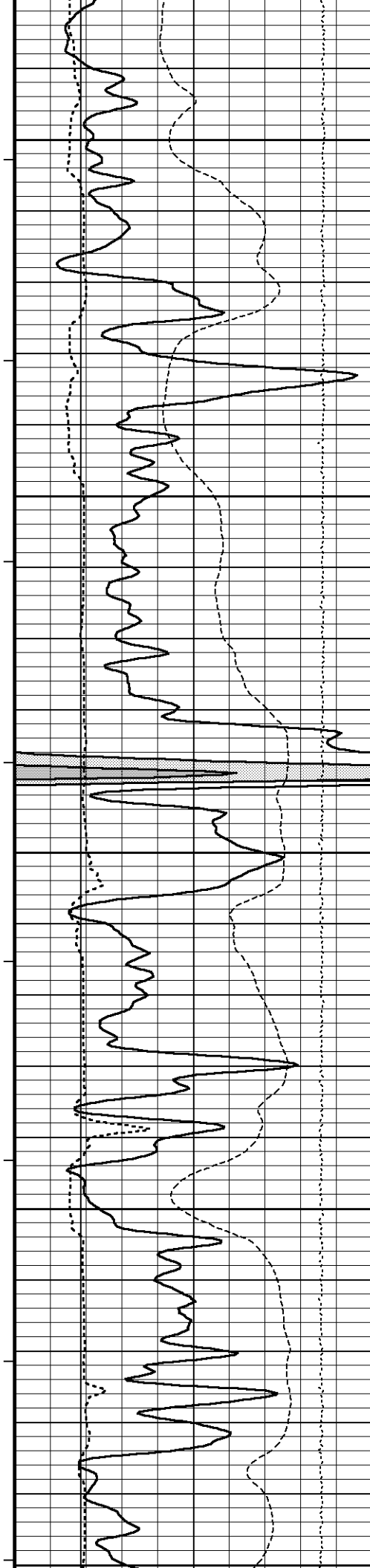
BOREHOLE RECORD				Last Edited: 13-SEP-2012 00:01
Bit Size inches		Depth From feet		Depth To feet
7.875		1824.00		5850.00
CASING RECORD				
Type	Size inches	Depth From feet	Shoe Depth feet	Weight pounds/ft
SURFACE	8.625	0.00	1824.00	24.00

REMARKS
- SOFTWARE ISSUE: WLS 13.02.6600.
- MCG, 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: 1484 CU. FT.
- ANNULAR HOLE VOLUME WITH 5.5 INCH PRODUCTION CASING FROM TD TO SURFACE CASING: 822 CU. FT.

- SERVICE ORDER # 3538920.
- RIG: AZTEC #777.
- ENGINEER: A. SILL.
- OPERATOR(S): B. REEVES.

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.





108°

3550

108°

3600

108°

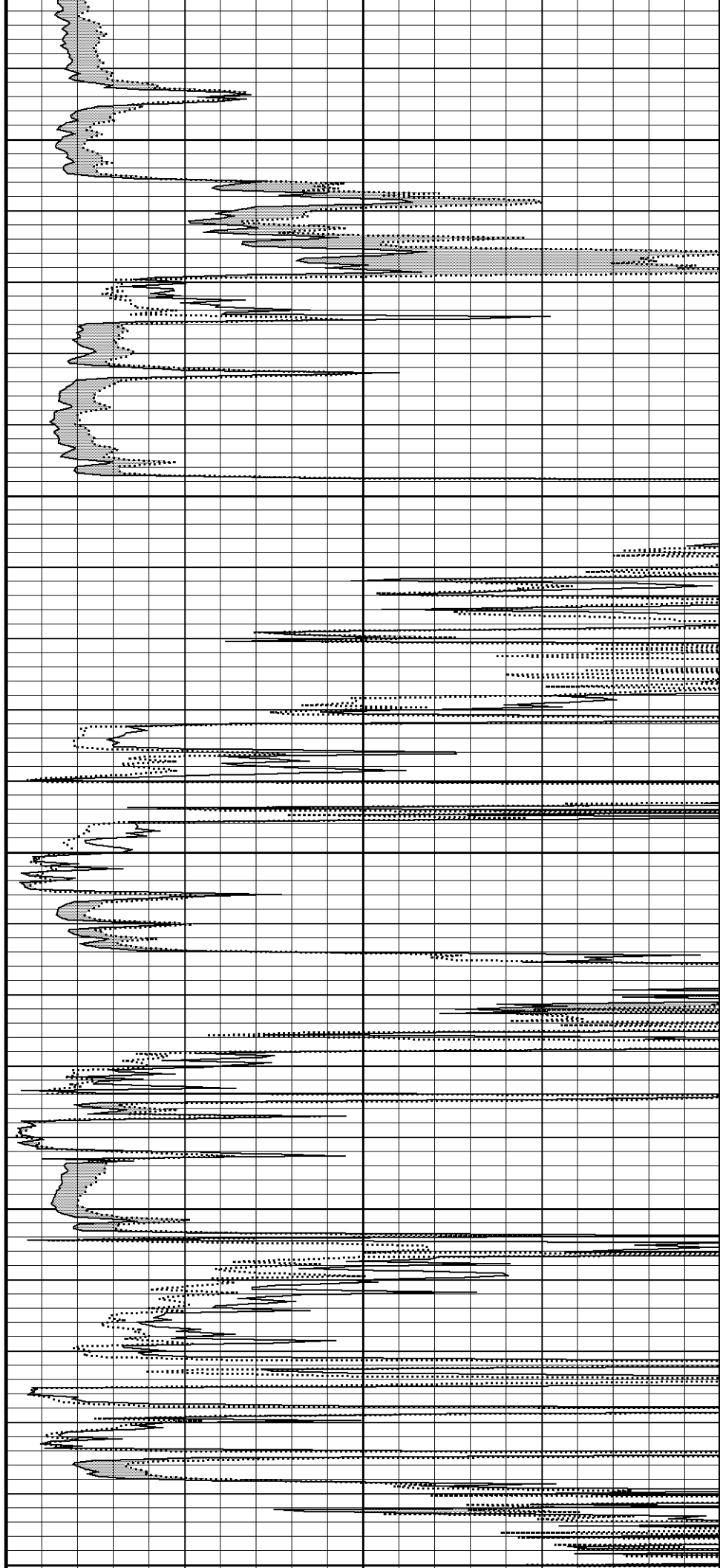
3650

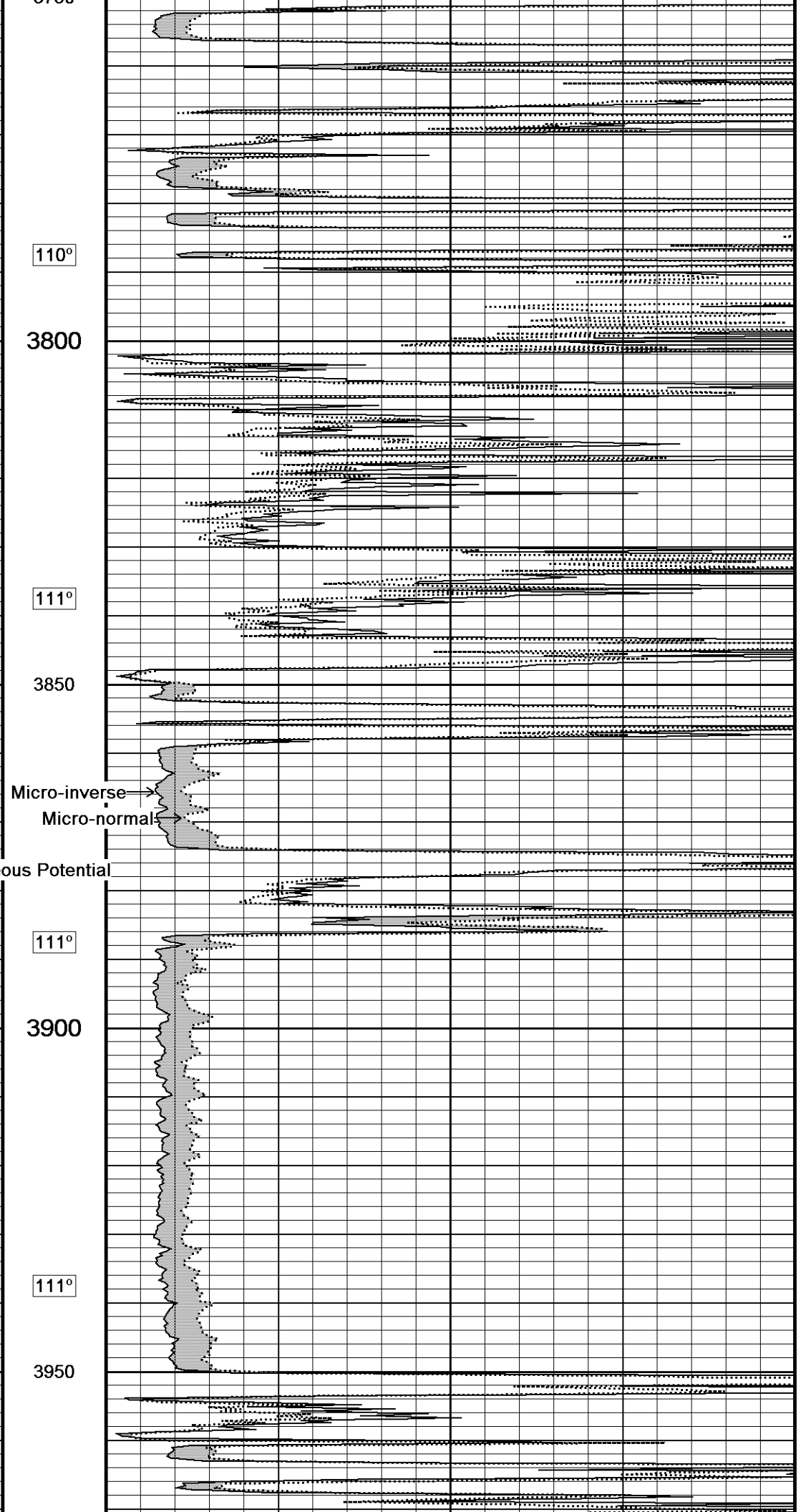
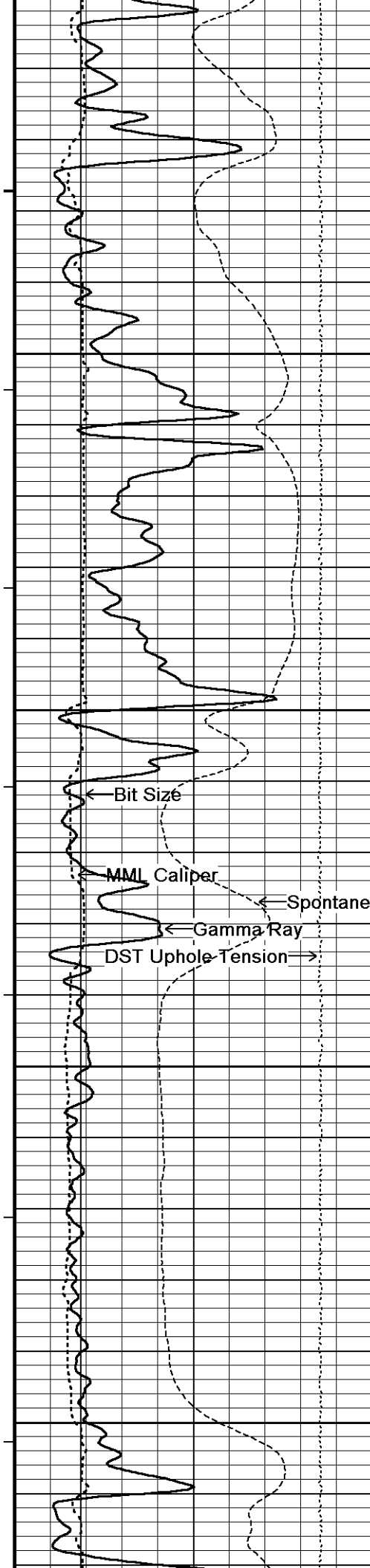
109°

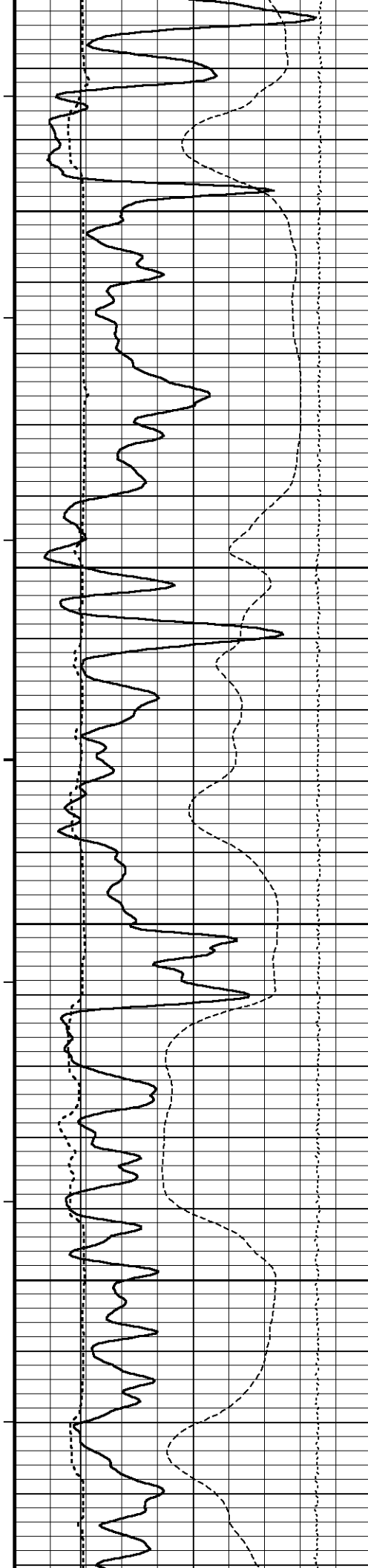
3700

109°

3750







112°

4000

112°

4050

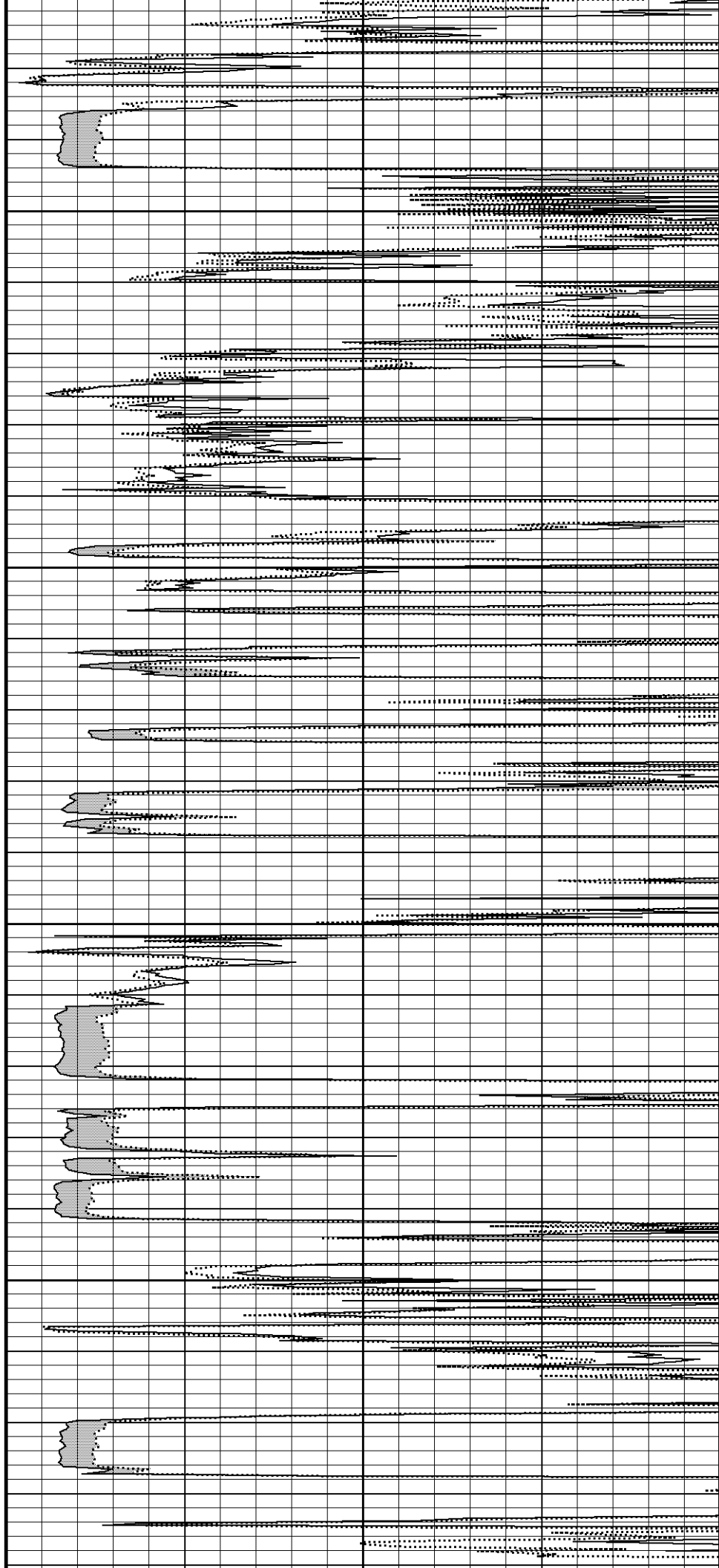
113°

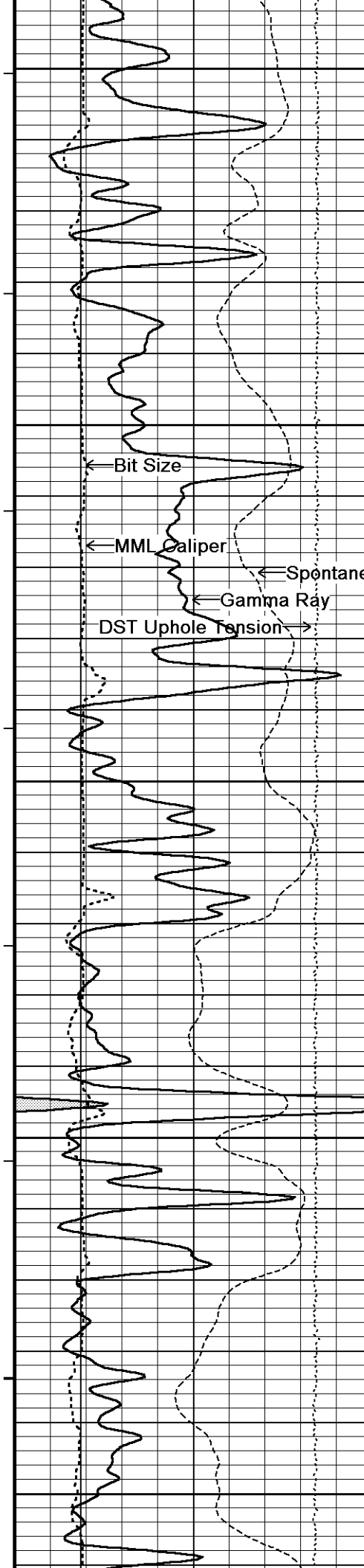
4100

113°

4150

114°





4200

115°

4250

Micro-inverse

Micro-normal

115°

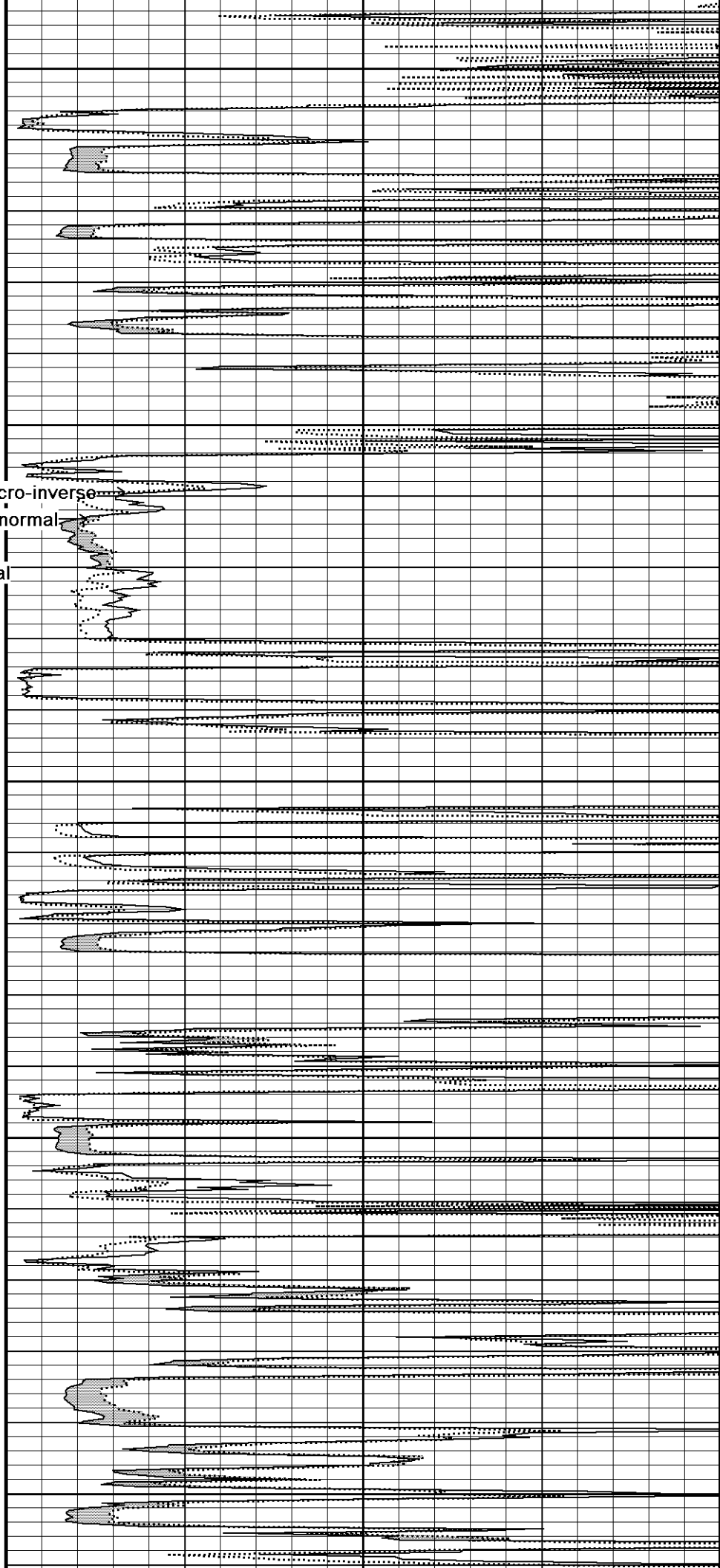
4300

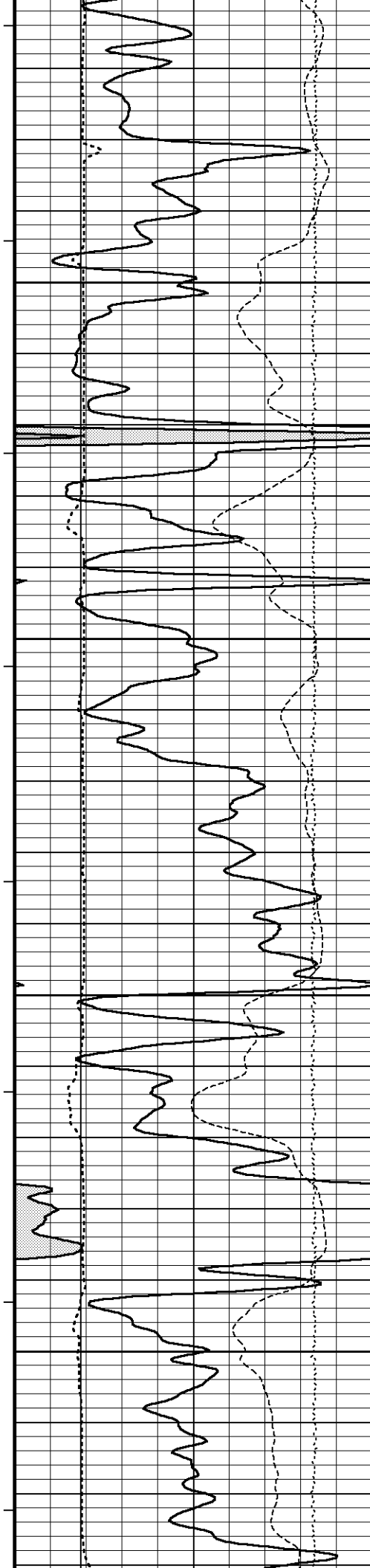
116°

4350

116°

4400





117°

4450

117°

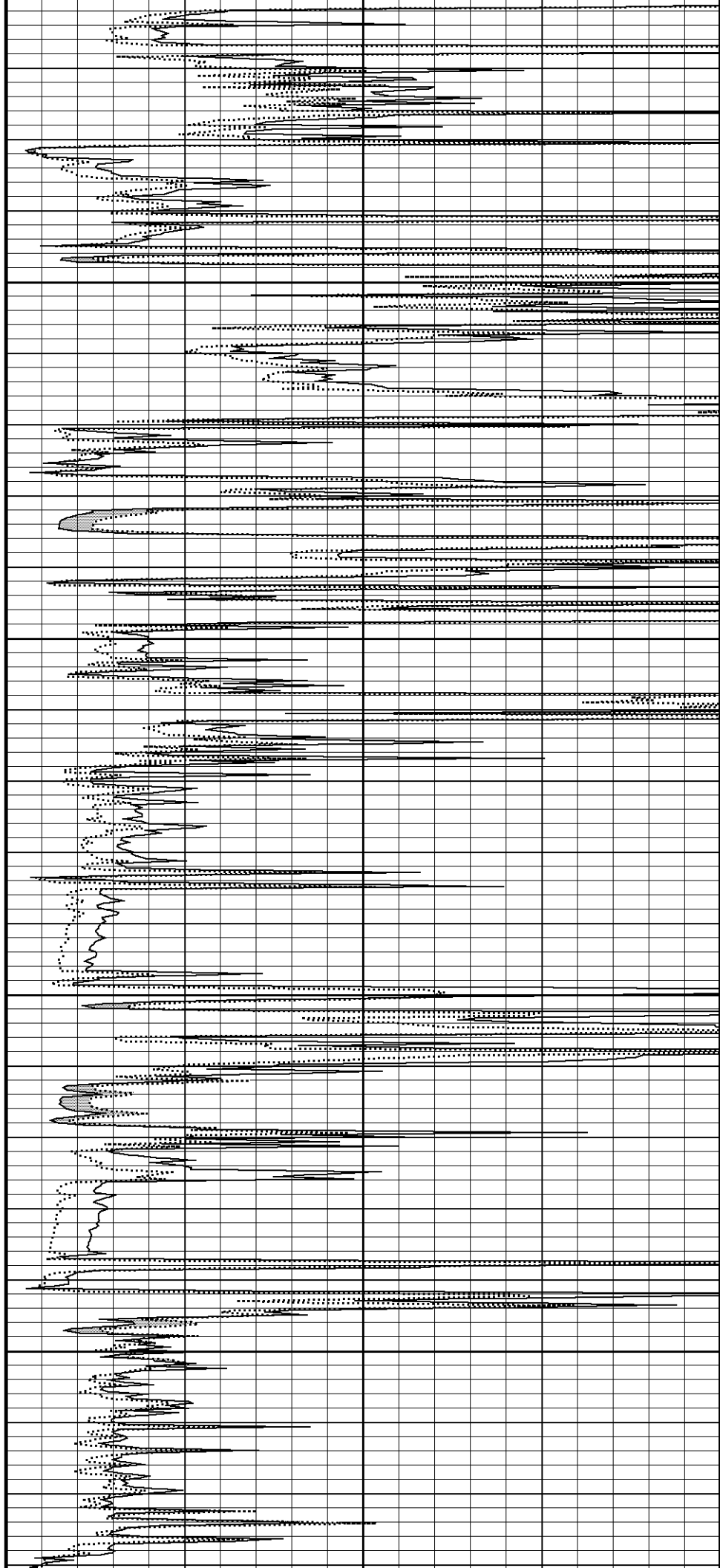
4500

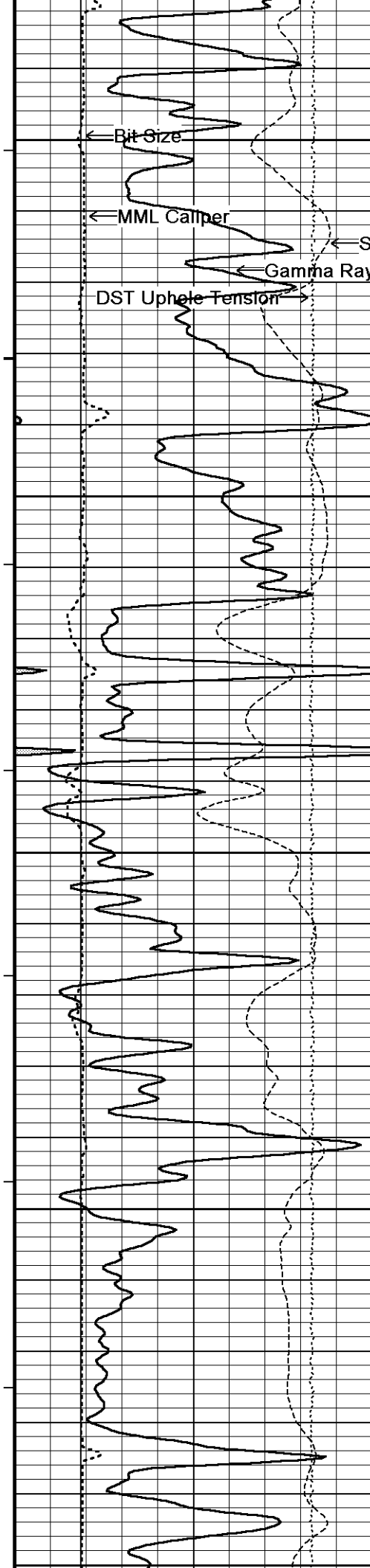
118°

4550

118°

4600





119°

4650

119°

4700

120°

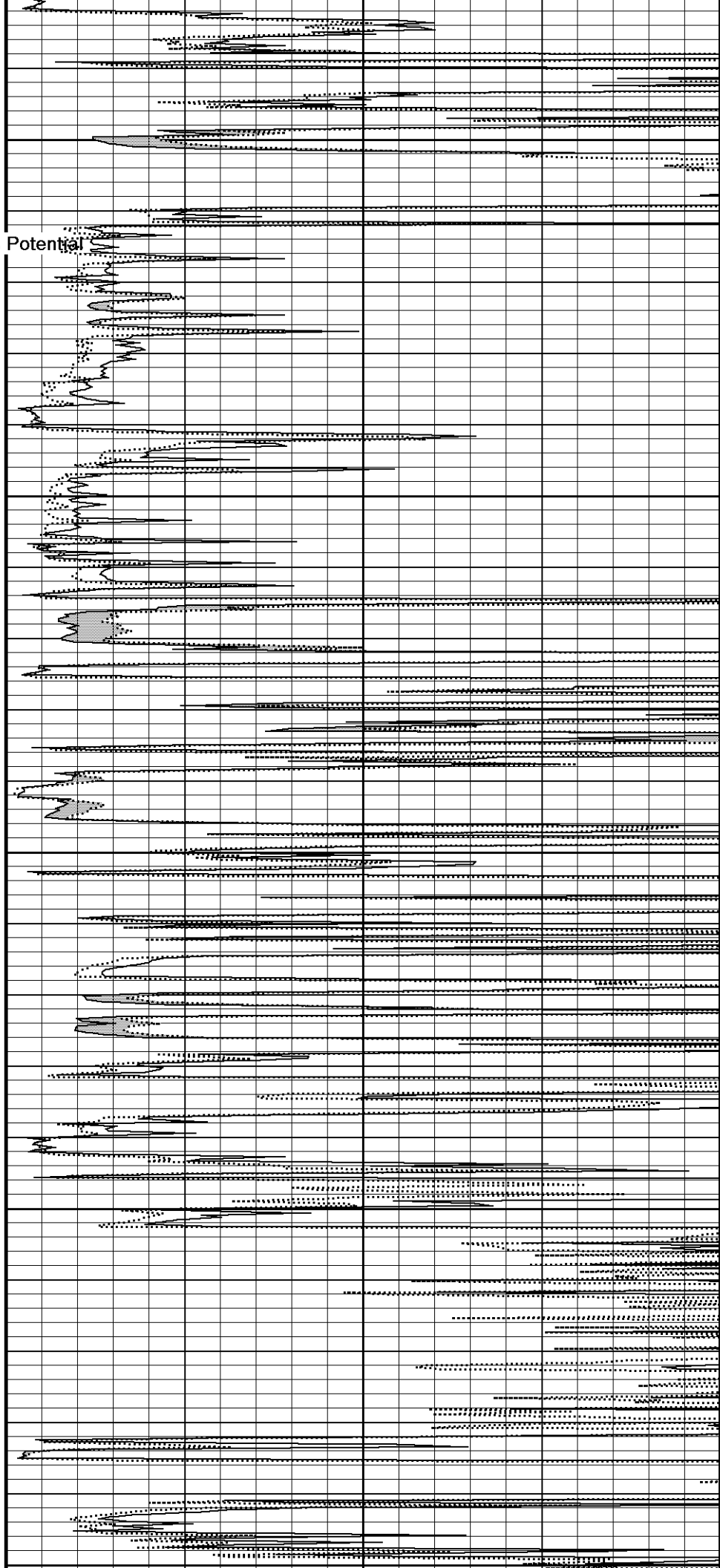
4750

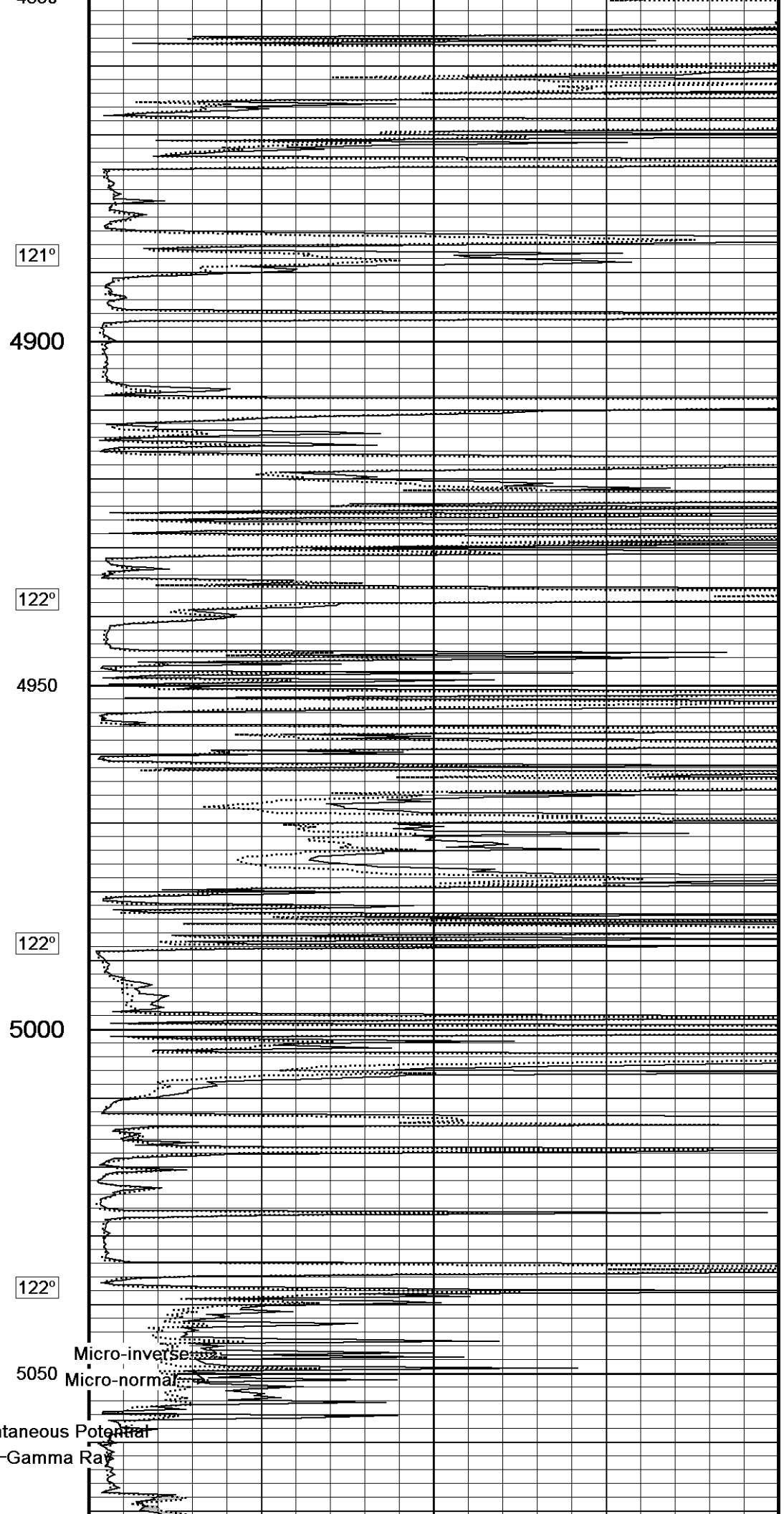
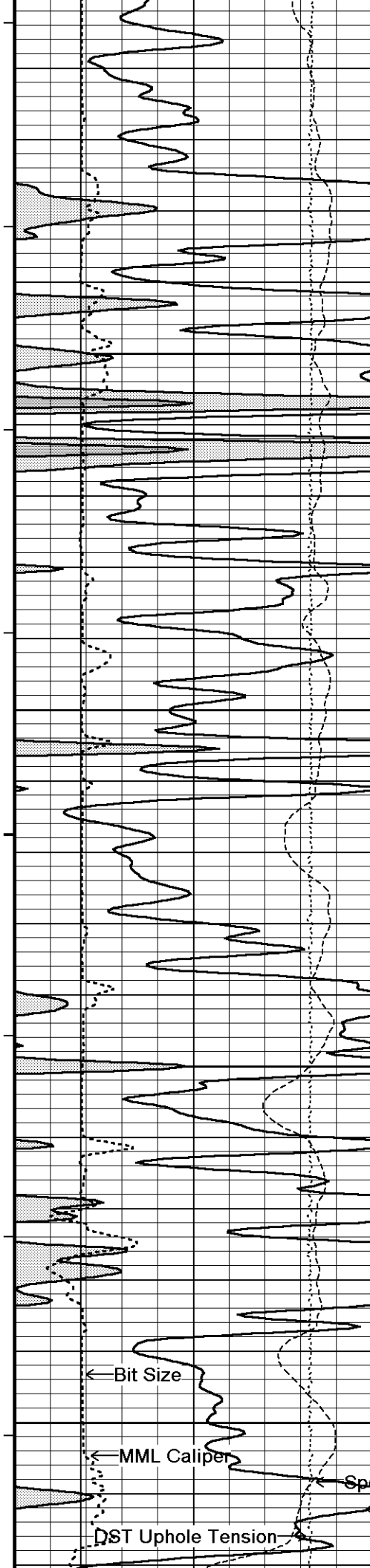
120°

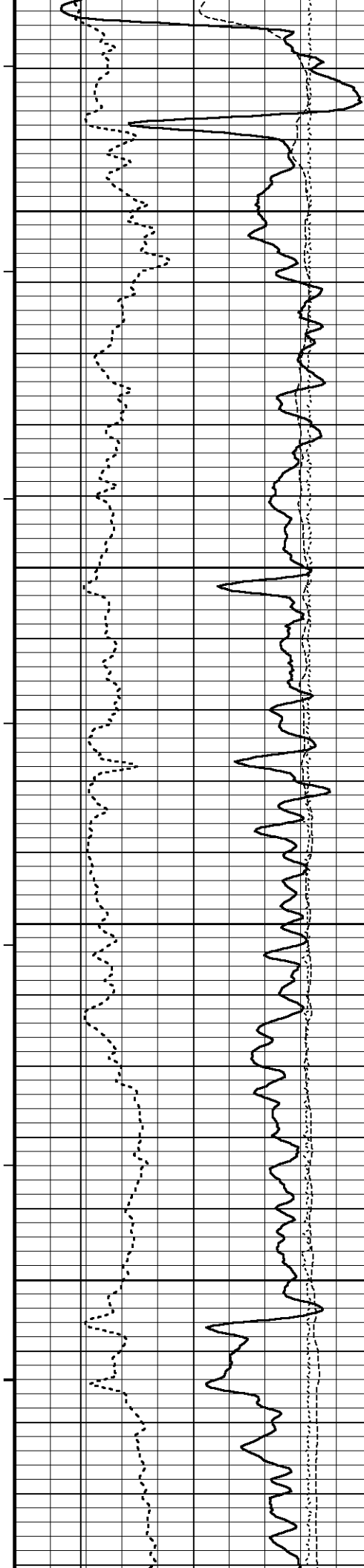
4800

121°

4850







122°

5100

123°

5150

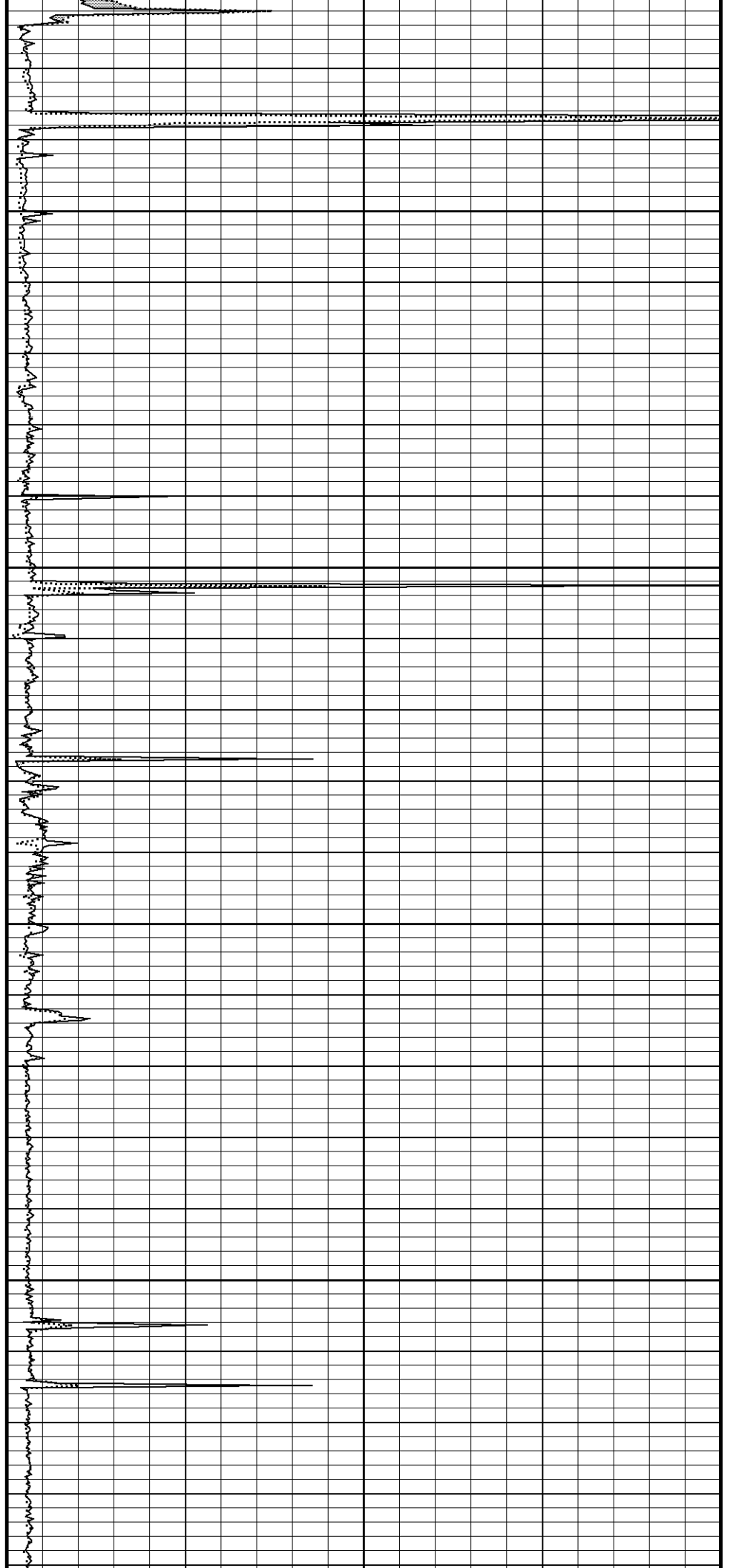
124°

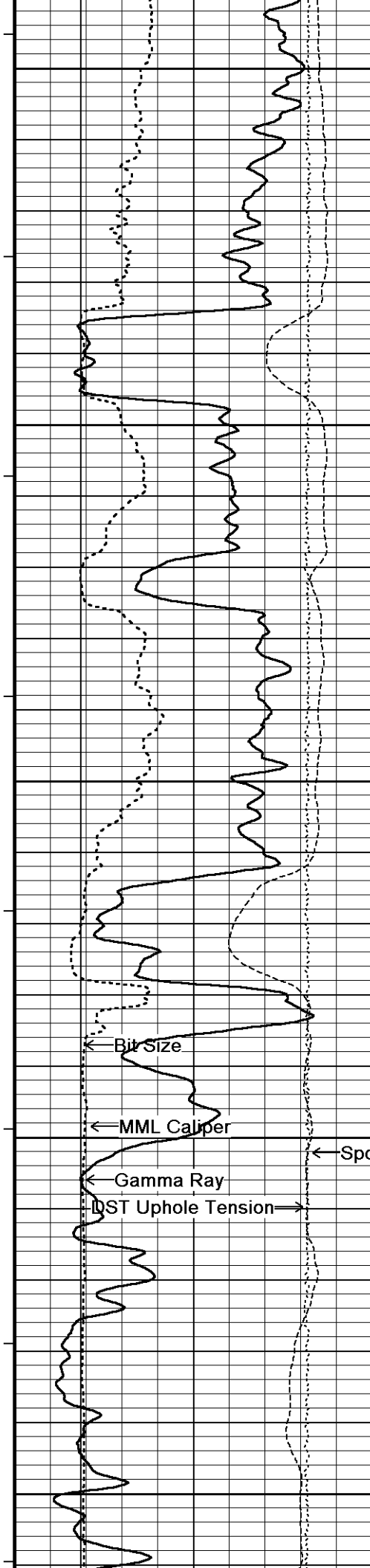
5200

124°

5250

125°





5300

126°

5350

128°

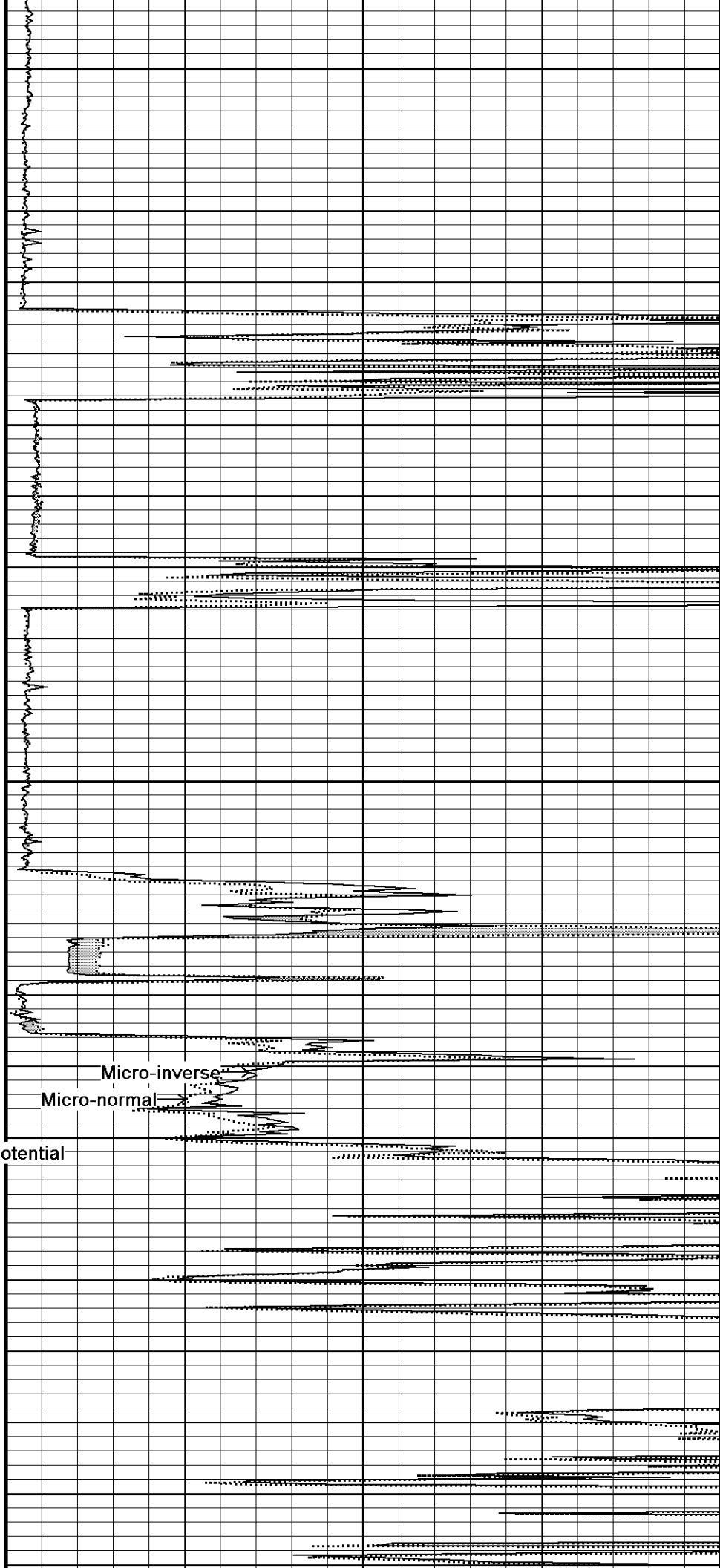
5400

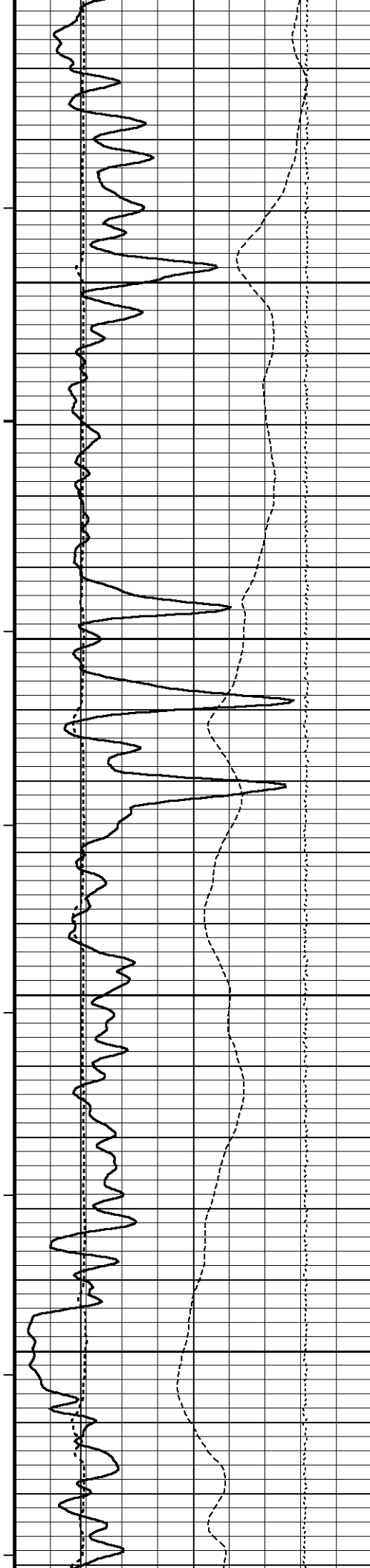
130°

5450
Spontaneous Potential

131°

5500





131°

5550

131°

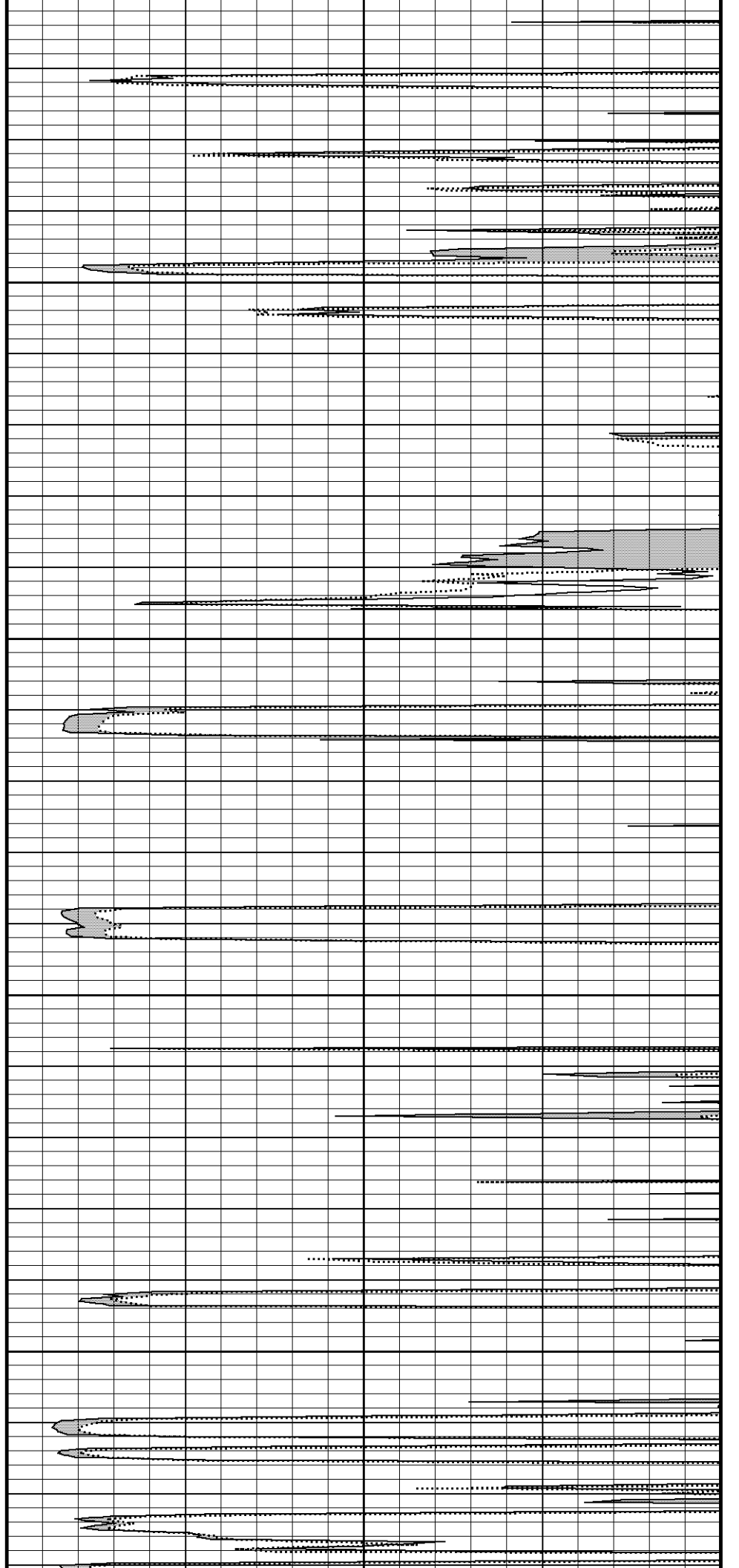
5600

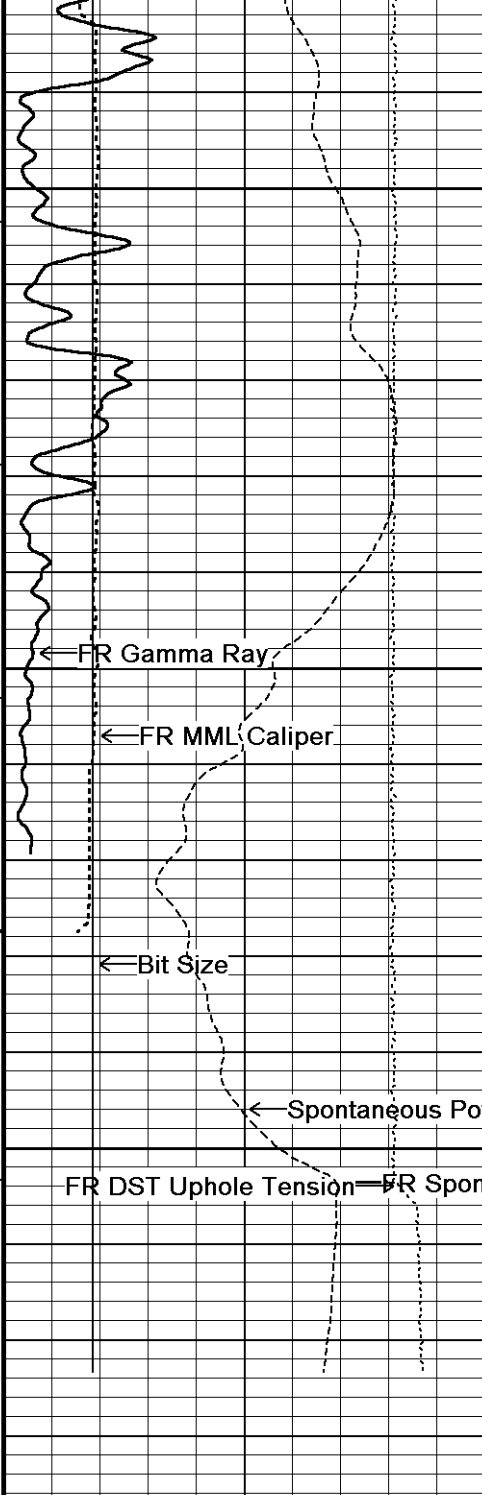
131°

5650

132°

5700





132°

5750

132°

5800

5850

← FR Gamma Ray

← FR MML Caliper

← Bit Size

← Spontaneous Potential

FR DST Uphole Tension — FR Spontaneous Potential

5884

Depth
in
Feet

Timing Marks
every 60.0 sec

Gamma Ray

API

75

225

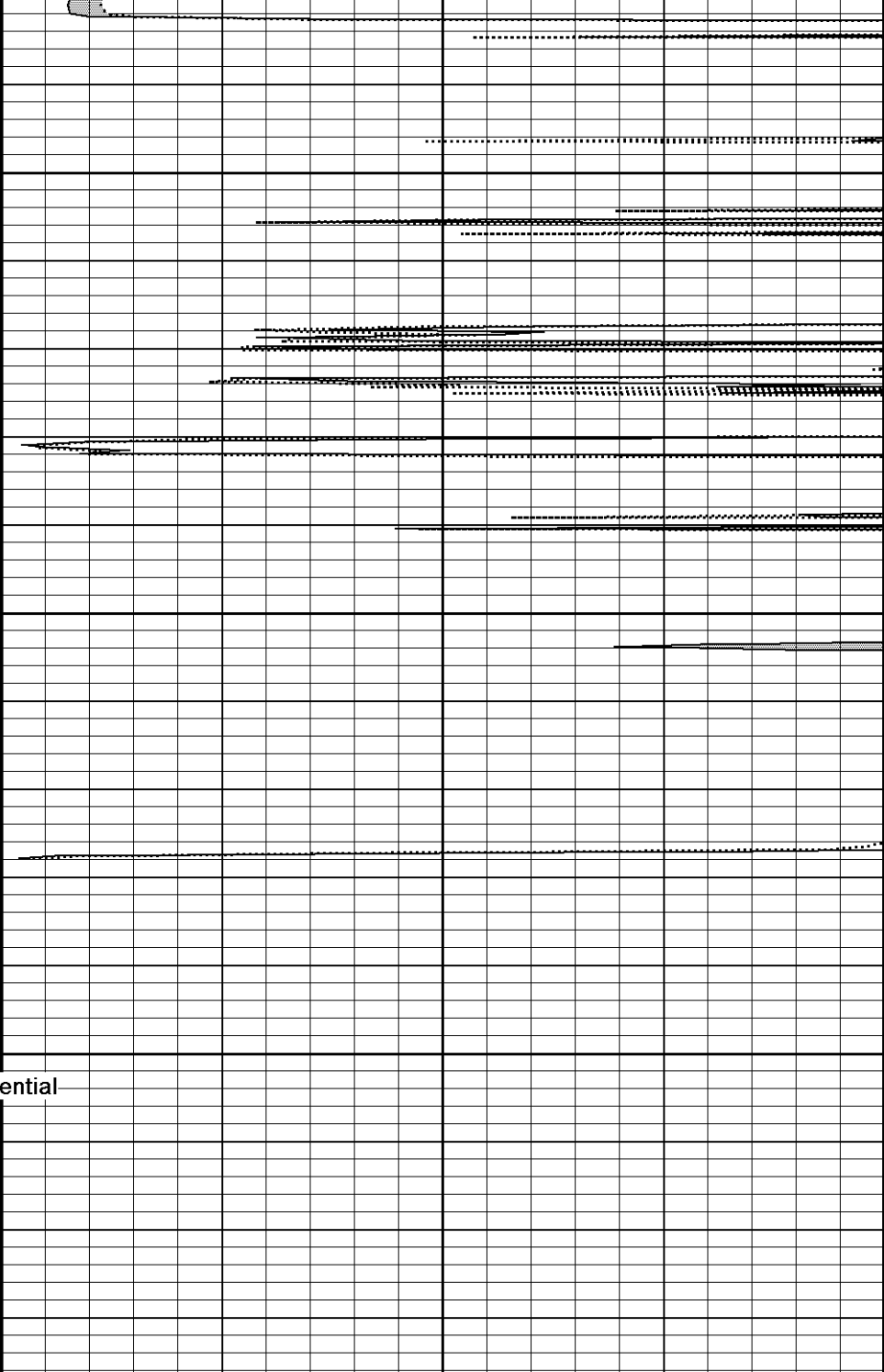
300

Spontaneous Potential

millivolts

— → | 20 | ← +

Borehole
Temp in
deg F



Micro-normal
ohm metres

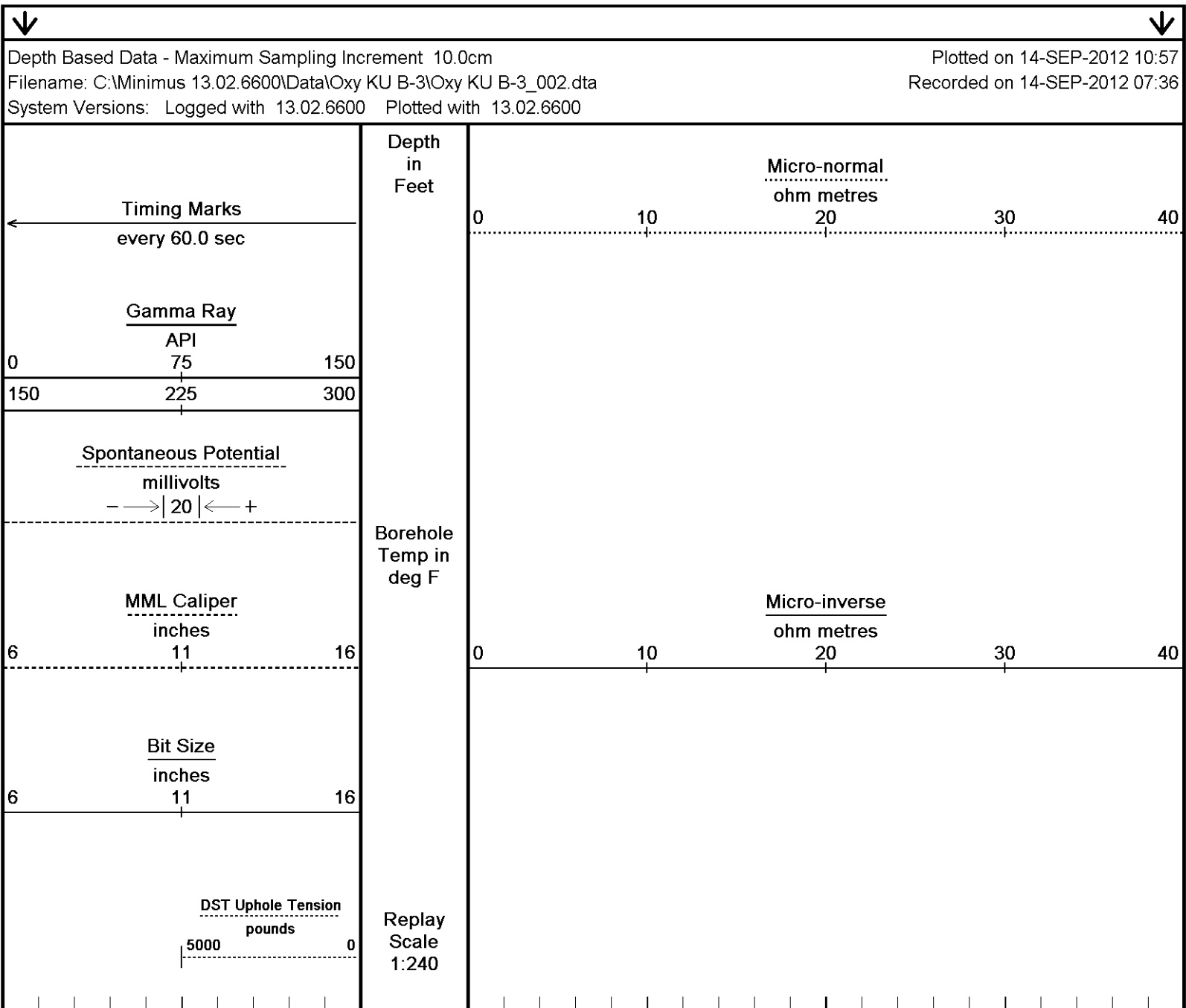
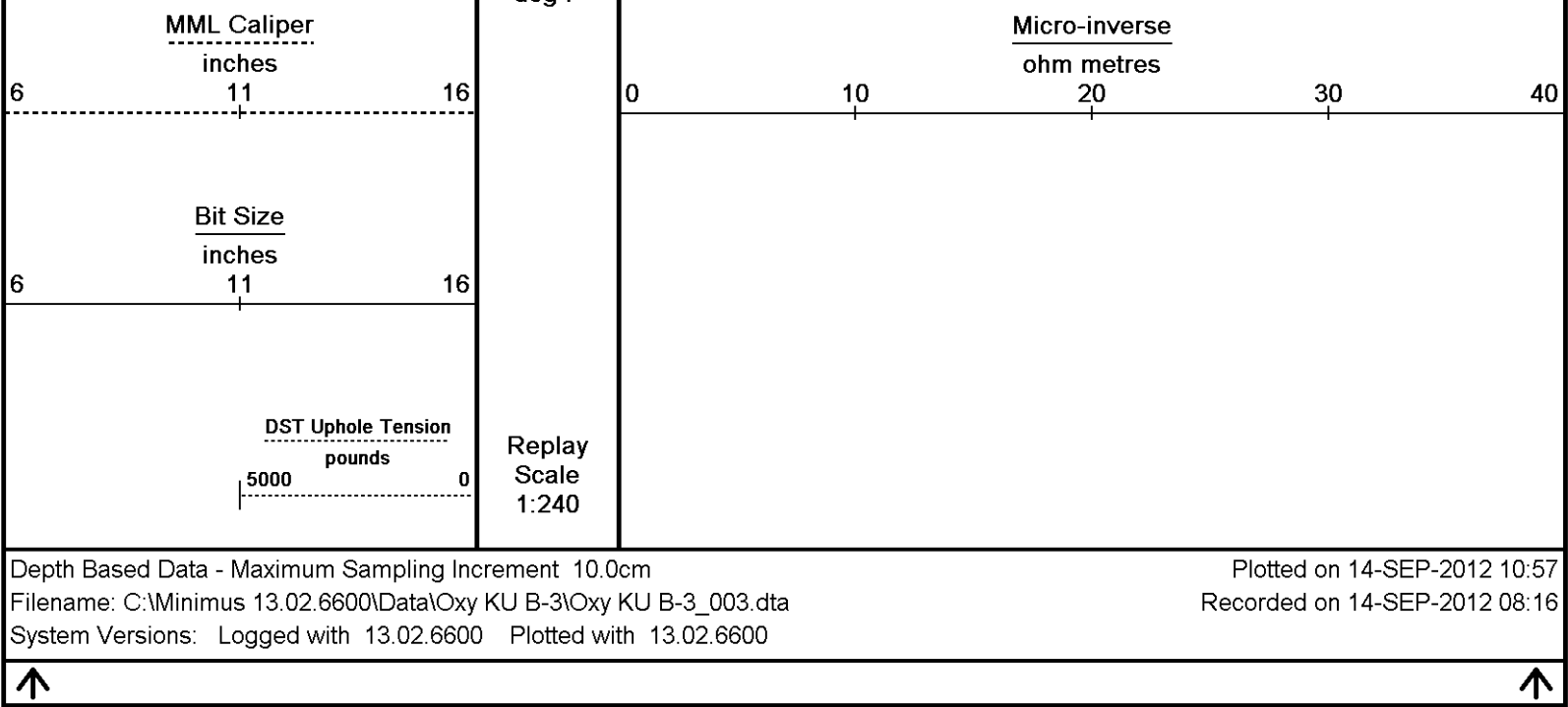
0

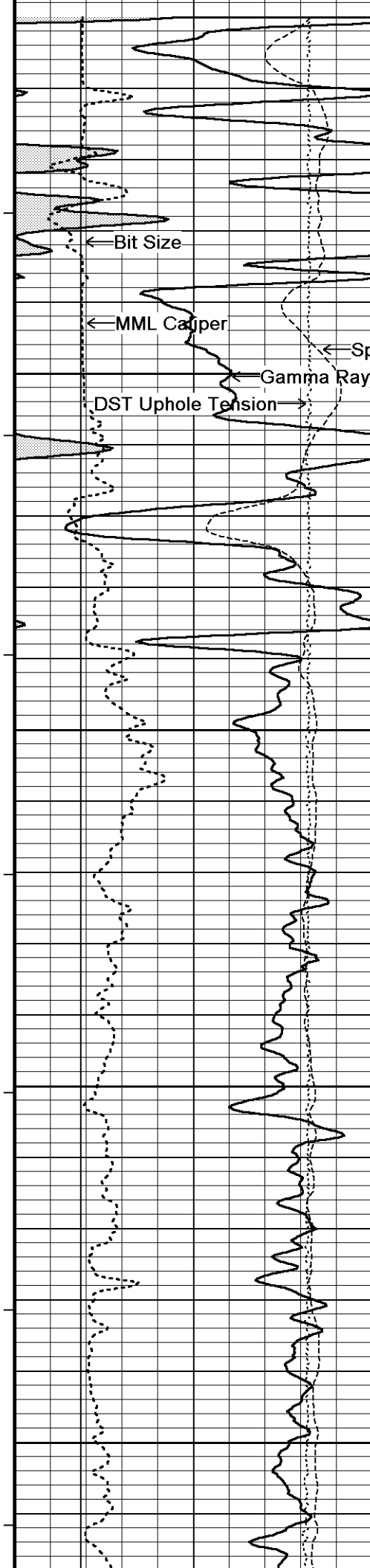
10

20

30

40





5000

122°

Micro-inverse
Micro-normal

5050

122°

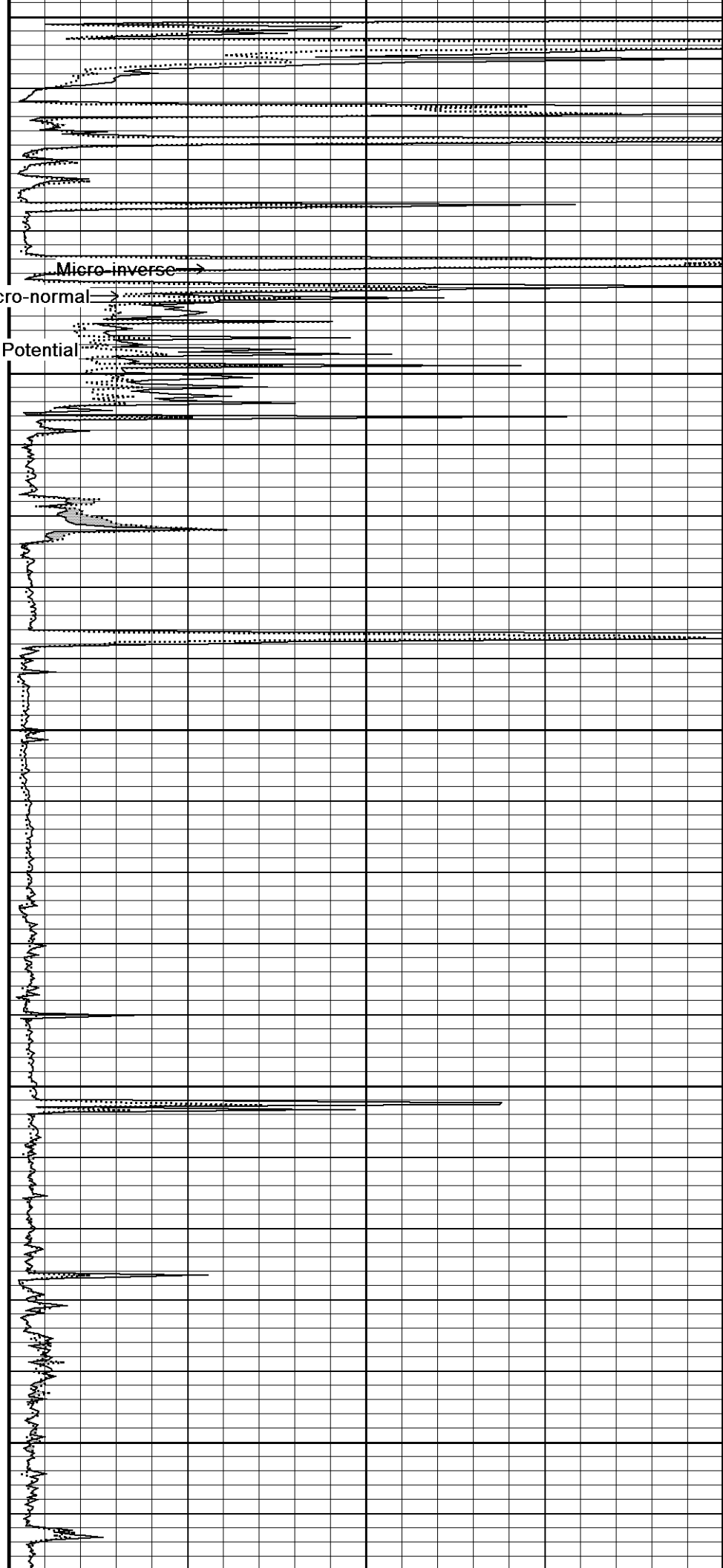
5100

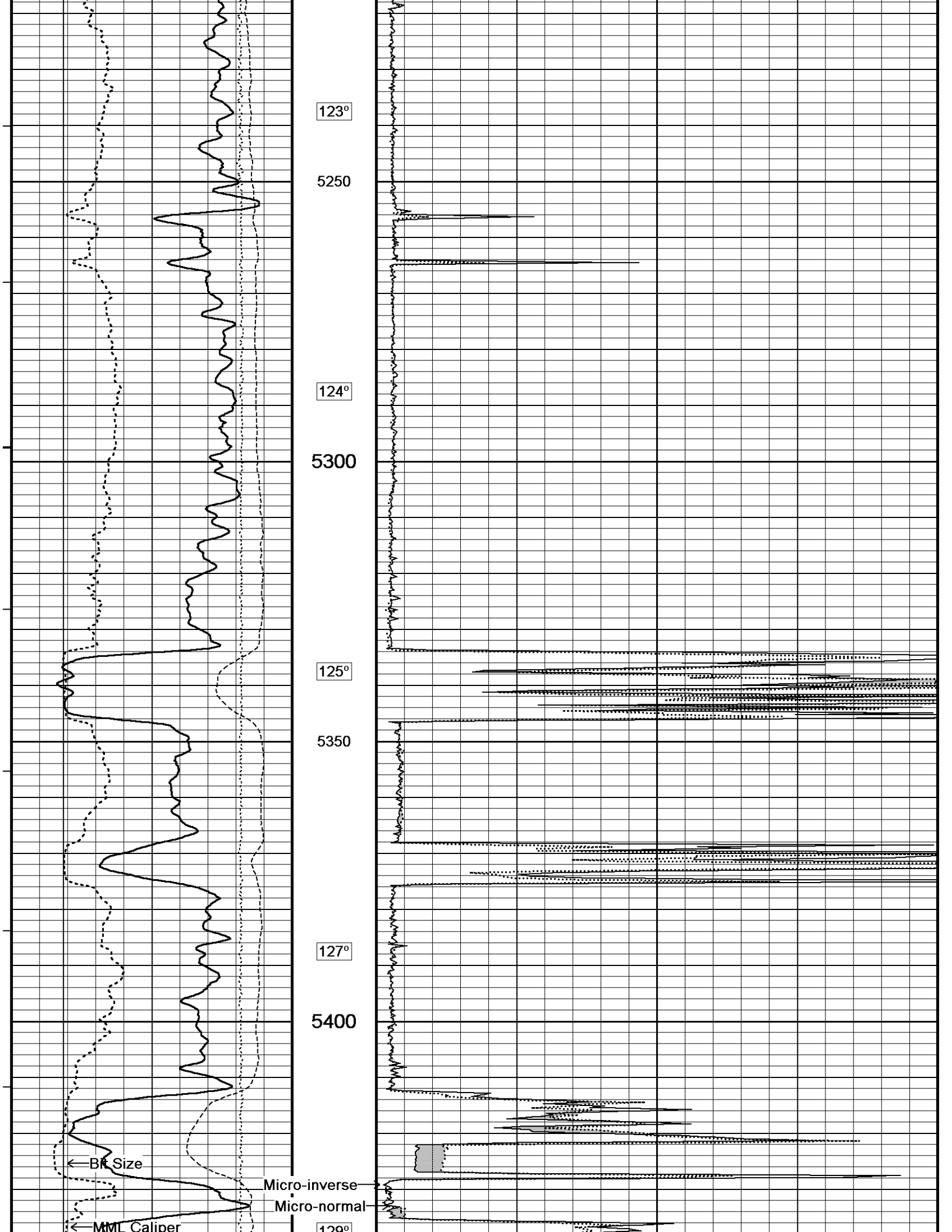
122°

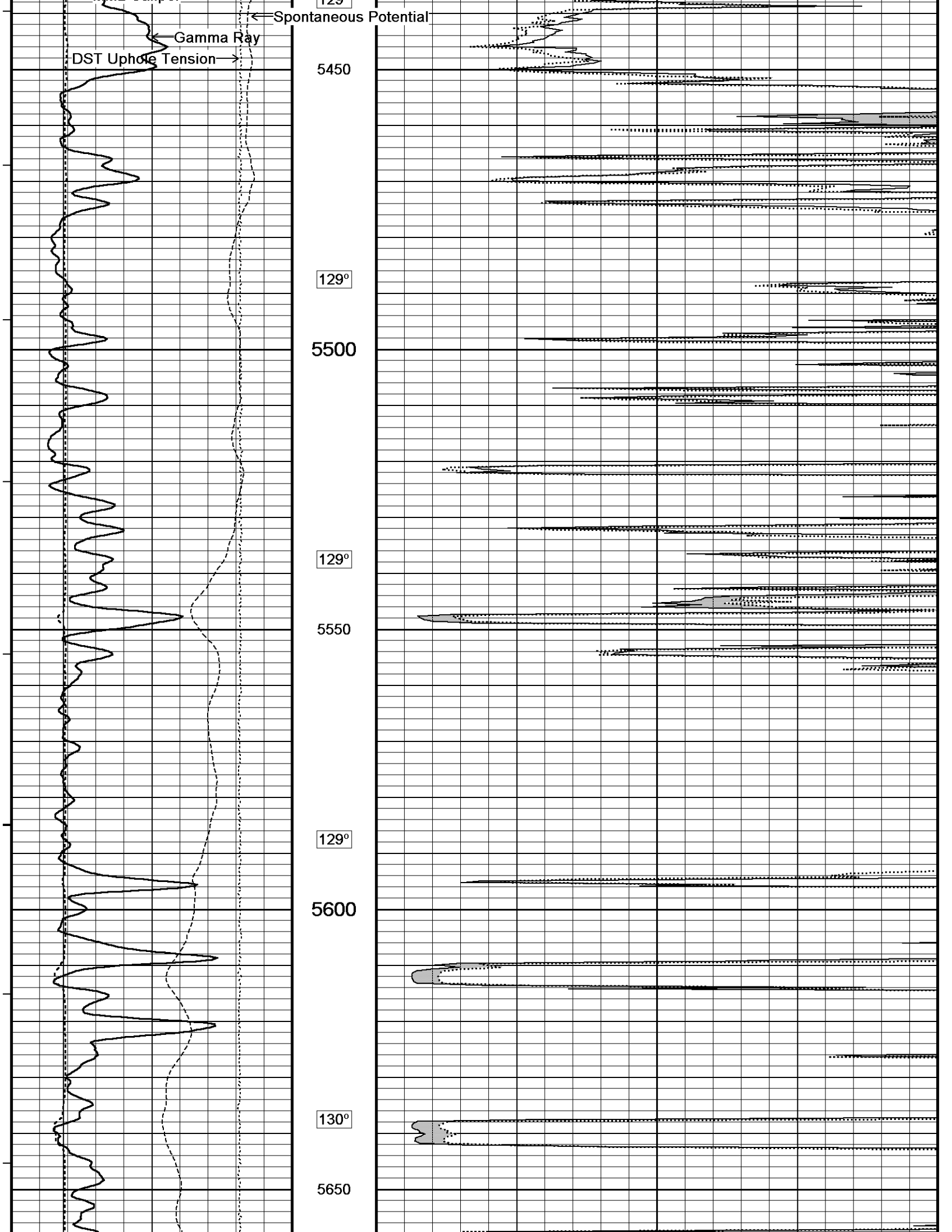
5150

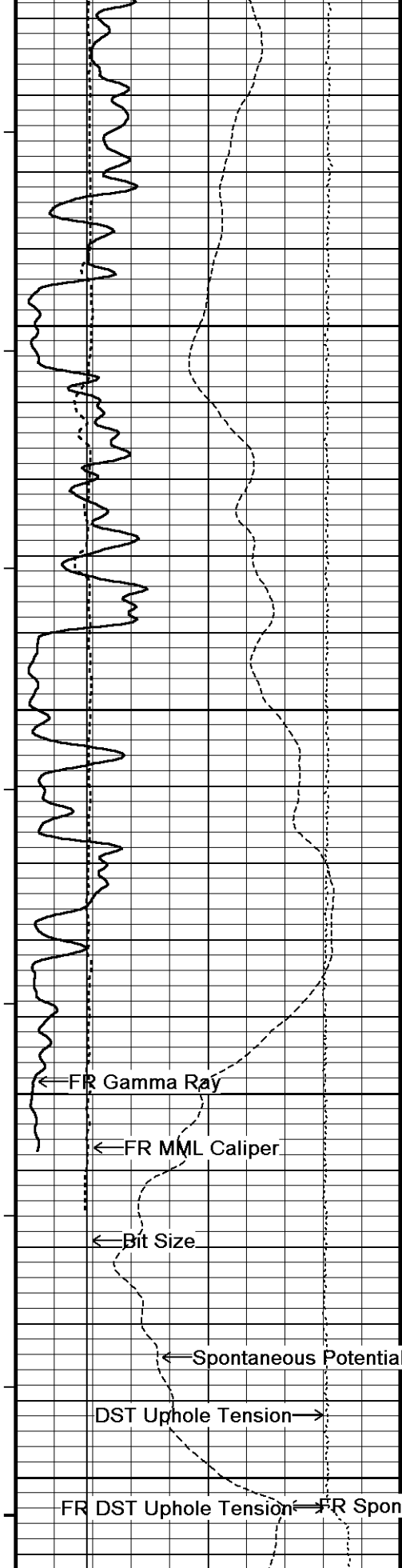
123°

5200









131°

5700

131°

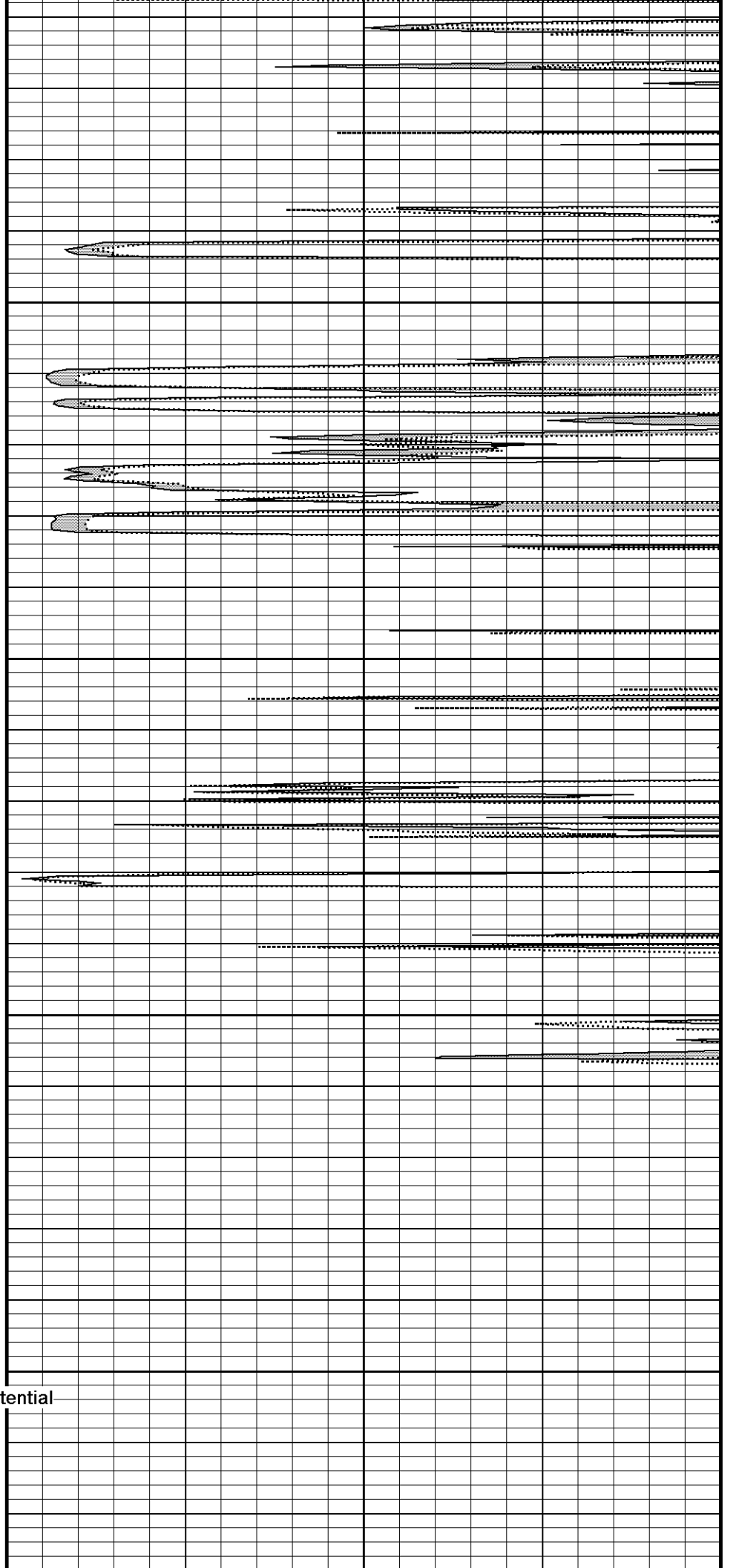
5750

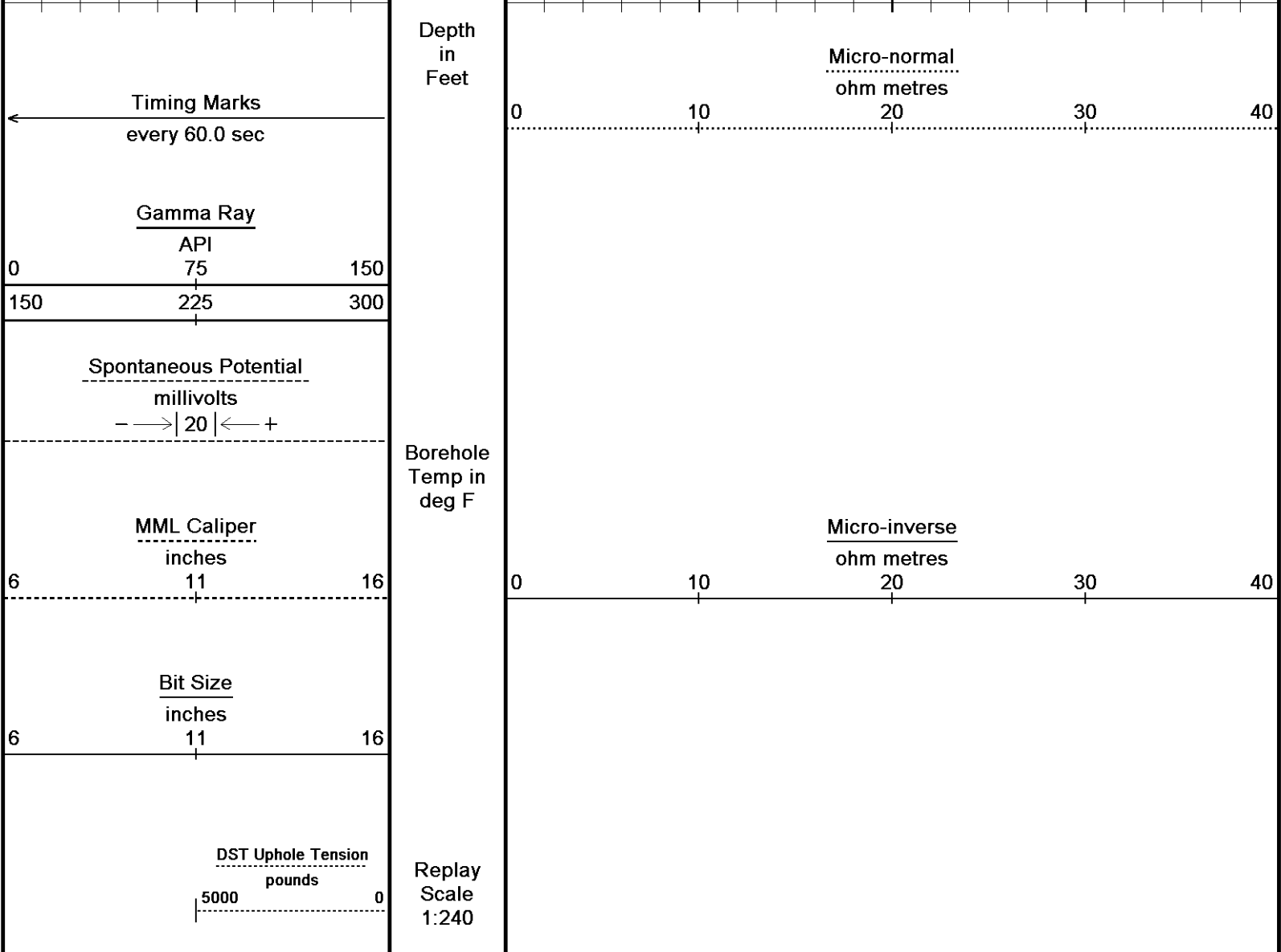
130°

5800

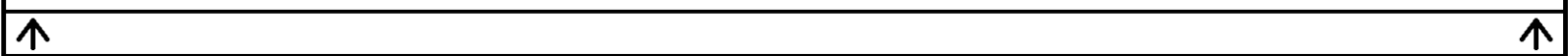
5850

5876





Depth Based Data - Maximum Sampling Increment 10.0cm
 Plotted on 14-SEP-2012 10:57
 Filename: C:\Minimus 13.02.6600\Data\Oxy KU B-3\Oxy KU B-3_002.dta
 Recorded on 14-SEP-2012 07:36
 System Versions: Logged with 13.02.6600 Plotted with 13.02.6600



BEFORE SURVEY CALIBRATION		
C:\Minimus 13.02.6600\Data\Oxy KU B-3\Oxy KU B-3_003.dta		
General Constants All 000		Last Edited on 13-SEP-2012,00:04
General Parameters		
Mud Resistivity	0.810	ohm-metres
Mud Resistivity Temperature	98.000	degrees F
Water Level	0.000	feet
Density/Neutron 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	Base Density Porosity	
Resistivity used	Array Ind. One Res Rt	
RWA Constant A	0.610	
RWA Constant M	2.150	

Down-hole Tension Calibration SMS 0			Field Calibration on 02-SEP-2012 08:42	
Reading No	Measured	Calibrated (lbs)		
1	15850.66	0.00		
2	16330.28	400.00		
Gamma Calibration MCG-C 208			Field Calibration on 11-SEP-2012 09:09	
	Measured	Calibrated (API)		
Background	73	52		
Calibrator (Gross)	1090	777		
Calibrator (Net)	1017	725		
Gamma Constants MCG-C 208			Last Edited on 13-SEP-2012,00:04	
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		
SP Calibration MCG-C 208			Field Calibration on 03-AUG-2012 22:37	
	Measured	Calibrated (mV)		
Reference 1	100.2	101.0		
Reference 2	-101.3	-101.0		
High Resolution Temperature Calibration MCG-C 208			Field Calibration on 03-AUG-2012,16:18	
	Measured	Calibrated(Deg F)		
Lower	50.00	50.00		
Upper	75.00	75.00		
High Resolution Temperature Constants MCG-C 208			Last Edited on	
Pre-filter Length	11			
Caliper Calibration MML-A 4			Base Calibration on 27-AUG-2012 09:13 Field Calibration on 11-SEP-2012 08:52	
Base Calibration				
Reading No	Measured	Calibrator Size (in)		
1	15511	5.98		
2	18793	7.97		
3	22115	9.86		
4	26057	11.92		
5	0	0.00		
6	N/A	N/A		
Field Calibration				
	Measured Caliper (in)	Actual Caliper (in)		
	6.12	5.98		
Micro Normal and Micro Inverse Calibration MML-A 4			Base Calibration on 27-AUG-2012 09:21 Field Check on 11-SEP-2012 08:54	
Base Calibration				
		Measured	Calibrated (ohm-m)	
Channel	Resistor 1	Resistor 2	Resistor 1	Resistor 2
Micro Normal	12.2	60.2	5.0	25.0
Micro Inverse	15.7	78.5	5.0	25.0
Channel	Base Check (ohm-m)		Field Check (ohm-m)	
Micro Normal	62.9		62.9	
Micro Inverse	48.2		48.2	
Micro Normal and Micro Inverse Constants MML-A 4			Last Edited on 13-SEP-2012,00:04	
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 65			Base Calibration on 28-AUG-2012 10:35 Field Check on 11-SEP-2012 09:13	
Base Calibration				

	Measured		Calibrated (cps)	
	Near	Far	Near	Far
	3134	97	3714	110
Ratio	32.240		33.764	
Field Calibrator at Base	Calibrated (cps)			
			1654	2401
Ratio	0.689			
Field Check	Calibrated (cps)			
			1639	2369
Ratio	0.692			

Neutron Constants MDN-A.B 65			Last Edited on 13-SEP-2012,00:04		
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 27-AUG-2012 14:50 Field Check on 11-SEP-2012 09:04	
Base Calibration				
	Measured	Calibrated (ohm-m)		
Reference 1	0.0	0.0		
Reference 2	963.9	126.8		
Base Check		281.2		
Field Check		281.4		

FE Constants MFE-B.J 352			Last Edited on 13-SEP-2012,00:03		
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	

Sonic Constants MSS-C.K 330			Last Edited on 13-SEP-2012,00:03		
Maximum Boundary Contrast	100.00		micro-sec/ft		
Fluid Transit Time	189.00		micro-sec/ft		
Limestone Transit Time	47.50		micro-sec/ft		
Sandstone Transit Time	55.50		micro-sec/ft		
Dolomite Transit Time	43.50		micro-sec/ft		
Sonic used for Porosities	3-5'	Compensated Sonic			
Correction for Sonde Skew	Applied				
Cycle Stretch Algorithm	Applied				
MN3FT	N/A		micro-sec		
MX3FT	N/A		micro-sec		
Hunt-Raymer Constant	83.13		micro-sec/ft		
Sonde Mode	Compensated				
Hole Type	Open Hole				

Sonde Parameters

	Measured	Calibrated			
Offset	N/A	0.0000			
Free Pipe	N/A	N/A			
Peak Amplitude Source		N/A			
Waveform	Start Time (micro-sec)	Width (micro-sec)	Pre Gain	Start Gain	Discriminator (mV)
3'	N/A	N/A	N/A	N/A	N/A
4'	N/A	N/A	N/A	N/A	N/A
5'	N/A	N/A	N/A	N/A	N/A
6'	N/A	N/A	N/A	N/A	N/A

Processed Fixed Gate Parameters

Waveform Used For Processing	N/A				
Start Time (micro-sec)	End Time (micro-sec)	Discriminator (mV)		N/A	
N/A	N/A	N/A		N/A	
N/A	N/A	N/A		N/A	
N/A	N/A	N/A		N/A	
N/A	N/A	N/A		N/A	
N/A	N/A	N/A		N/A	

Full Waveform Parameters

Use 3' Waveform to derive TR	N/A		
Use 4' Waveform to derive TR	N/A		
Use 5' Waveform to derive TR	N/A		
Use 6' Waveform to derive TR	N/A		
3' Waveform Discriminator Level	N/A	mV	
4' Waveform Discriminator Level	N/A	mV	
5' Waveform Discriminator Level	N/A	mV	
6' Waveform Discriminator Level	N/A	mV	
3' Waveform Filter	N/A		
4' Waveform Filter	N/A		
5' Waveform Filter	N/A		
6' Waveform Filter	N/A		
Semblance Level	N/A		
Semblance Window Width	N/A	micro-sec	
Sonic 1 Despiker	N/A	N/A	
Sonic 2 Despiker	N/A	N/A	

Induction Calibration MAI-A.A 45

Base Calibration on 26-JUL-2012,09:22
Field Check on 11-SEP-2012 09:03

Base Calibration

Test Loop Calibration	Measured		Calibrated (mmho/m)	
Channel	Low	High	Low	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)		Field Check (mmho/m)	
	Low	High	Low	High
1	0.0	0.0	19.7	3853.2
2	0.0	0.0	32.2	3630.7
3	0.0	0.0	29.0	3050.6
4	0.0	0.0	18.5	2079.8
Deep	0.0	0.0	16.3	1911.9
Medium	0.0	0.0	42.9	4062.2
Shallow	0.0	0.0	50.3	5485.2

Array Temperature 0.0 75.0 Deg F

Induction Constants MAI-A.A 45

Last Edited on 13-SEP-2012,00:03

Induction Model	RtAP-WBM		
Caliper for Borehole Corr.	Density Caliper		
Hole Size for Borehole Correction	N/A	inches	
Tool Centred	No		

Tool Centred			N/A	
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 26-JUL-2012,09:09
	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
Pre-filter Length	11	

Caliper Calibration MPD-B 31		Base Calibration on 28-AUG-2012 11:03
		Field Calibration on 11-SEP-2012 08:56
Base Calibration		
Reading No	Measured	Calibrator Size (in)
1	18576	3.99
2	27056	5.98
3	35613	7.97
4	44032	9.86
5	53360	11.92
6	N/A	N/A
Field Calibration		
	Measured Caliper (in)	Actual Caliper (in)
	6.01	5.98

Photo Density Calibration MPD-B 31			Base Calibration on 28-AUG-2012 11:22		
			Field Check on 11-SEP-2012 09:01		
Density Calibration					
Base Calibration					
		Measured	Calibrated (sdu)		
		Near	Far	Near	Far
	Reference 1	46103	23728	59556	30836
	Reference 2	19270	1960	24941	2541
Field Check at Base					
		688.3	844.7		
Field Check					
		888.9	850.4		

PE Calibration

Base Calibration

	WS	Measured WH	Ratio	Calibrated Ratio
Background	127	604		
Reference 1	18457	45978	0.404	0.371
Reference 2	5504	19174	0.290	0.272

Field Check at Base

127.0 604.2

Field Check

129.2 603.4

Density Constants MPD-B 31

Last Edited on 13-SEP-2012,00:04

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	1.13
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 (m)
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	0.00
0.00	0.00

DOWNHOLE EQUIPMENT

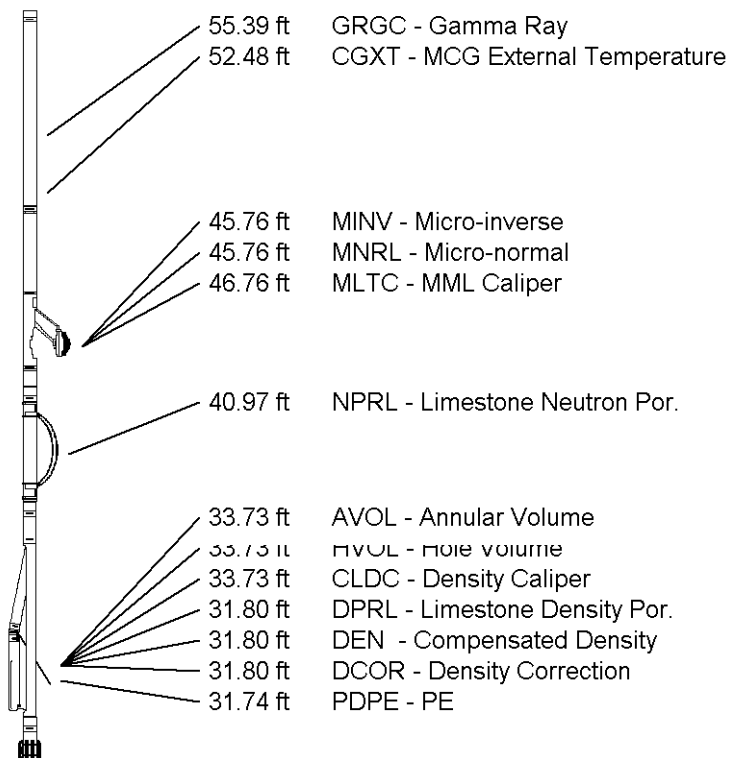
C:\Minimus 13.02.6600\Data\Oxy KU B-3\Oxy KU B-3_003.dta

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

Compact Micro-log
MML-A 4 LG: 7.97 ft WT: 81.6 lb OD: 2.24 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

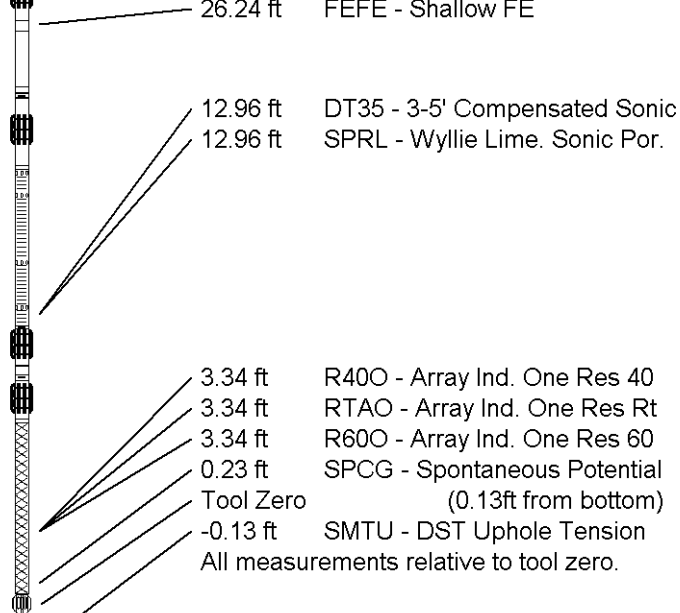


Compact Focussed Electric
MFE-B.J 352 LG: 6.05 ft WT: 48.5 lb OD: 2.24 in

Compact Sonic
MSS-C.K 330 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: 60.68 ft Weight: 456.4 lb



COMPANY	OXY USA, INC.
WELL	KU B-3
FIELD	ARROYO
PROVINCE/COUNTY	STANTON
COUNTRY/STATE	U.S.A. / KANSAS

Elevation Kelly Bushing	3425.00	feet	First Reading	5808.00	feet
Elevation Drill Floor	3423.00	feet	Depth Driller	5850.00	feet
Elevation Ground Level	3411.00	feet	Depth Logger	5854.00	feet



Weatherford®

MICRORESISTIVITY LOG