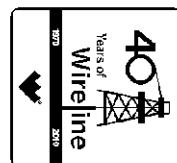




Weatherford

MICRORESISTIVITY LOG



COMPANY	O'BRIEN ENERGY		
WELL	CROOKED CREEK #3-8		
FIELD	ANGELL SOUTH		
PROVINCE/COUNTY	MEADE		
COUNTRY/STATE	UNITED STATES / KANSAS		
LOCATION	660' FSL & 1650' FEL		
SEC	TWP	RGE	Other Services
8	33S	29W	MAI/MFE
API Number	15-119-21291		MPD/MDN
Permit Number			
Permanent Datum G.L., Elevation 2687 feet			Elevations:
Log Measured From K.B. @ 12 FEET above Permanent Datum			KB
Drilling Measured From K.B.			DF
Date	12-MAY-2011		GL
Run Number	ONE		
Depth Driller	6330.00	feet	
Depth Logger	6330.00	feet	
First Reading	6295.00	feet	
Last Reading	4000.00	feet	
Casing Driller	1496.00	feet	
Casing Logger	1496.00	feet	
Bit Size	7.880	inches	
Hole Fluid Type	CHEMICAL		
Density / Viscosity	8.90 lb/USg	53.00 CP	
PH / Fluid Loss	10.50	7.80 ml/30Min	
Sample Source	FLOWLINE		
Rm @ Measured Temp	0.36 @ 91.0	ohm-m	
Rmf @ Measured Temp	0.29 @ 91.0	ohm-m	
Rmc @ Measured Temp	0.43 @ 91.0	ohm-m	
Source Rmf / Rmc	CALC	CALC	
Rm @ BHT	0.27 @120.0	ohm-m	
Time Since Circulation	4 HOURS		
Max Recorded Temp	120.00	deg F	
Equipment Name	COMPACT		
Equipment / Base	13025	LIB	
Recorded By	JUSTIN SCHEFFE		
Witnessed By	ROGER PEARSON		PETER DEBENHAM
S.O.	3529189		

BOREHOLE RECORD

Last Edited: 12-MAY-2011 10:30

Bit Size inches	Depth From feet	Depth To feet
7.880	1496.00	6330.00

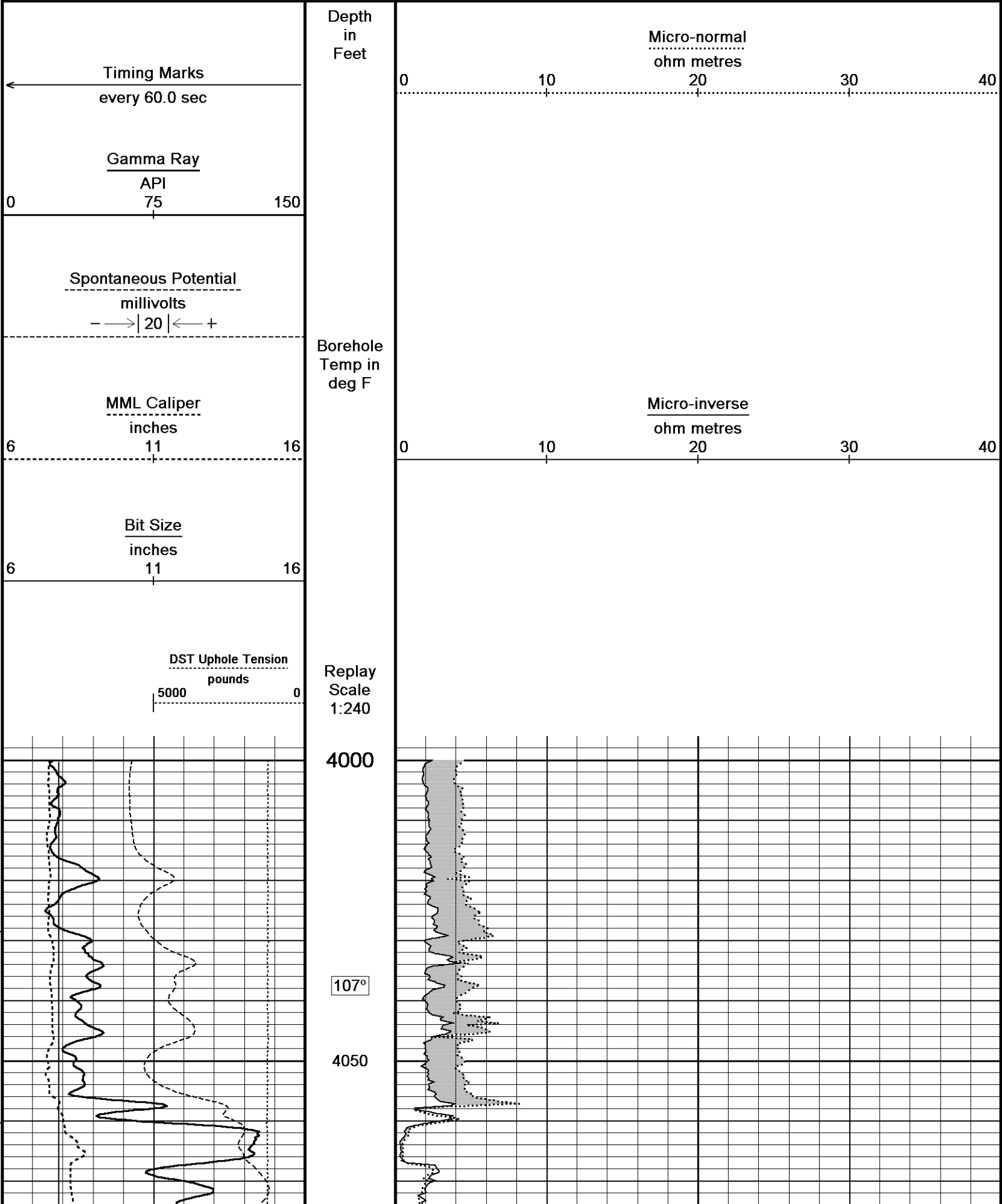
CASING RECORD

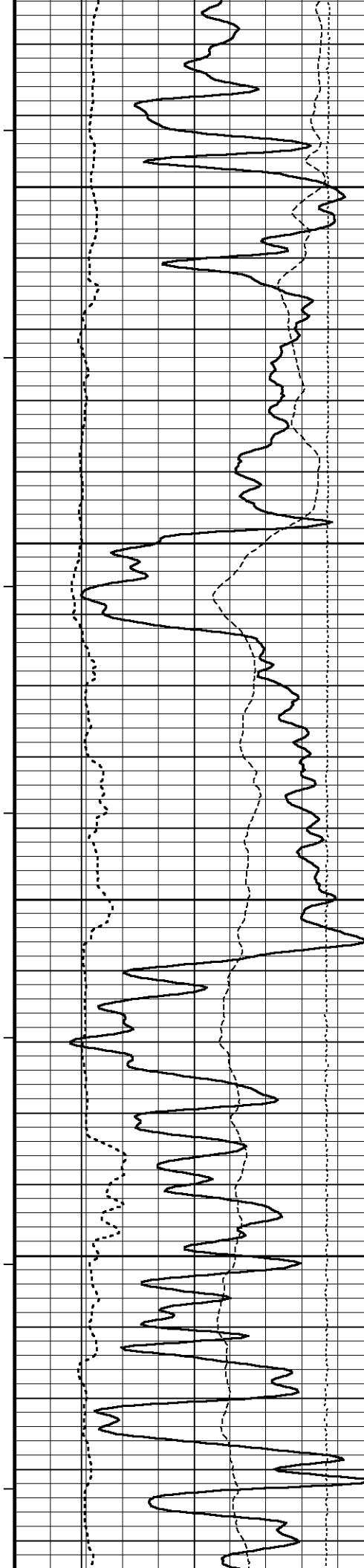
Type	Size inches	Depth From feet	Shoe Depth feet	Weight pounds/ft
SURFACE	8.625	0.00	1496.00	24.00

REMARKS

Tools Run: MAI, MPD, MCG, MDN, MFE, MML,
Hardware: MPD: 8 inch profile plate used. MAI and MFE: 0.5 inch standoffs used. MDN: Dual Eccentralizer used.
2.71 G/CC Limestone density matrix used to calculate porosity.
Borhole rugosity, tight pulls, and washouts will affect data quality.
All intervals logged and scaled per customer's request.
Annular volume with 4.5 inch production casing 560 Cubic Feet
Total hole volume to top of detail section 810 Cubic feet
Service order #3529189
Rig: Duke #6
Engineer: Justin Scheffe
Operator(s): Ken Rinehart

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.





107°

4100

107°

4150

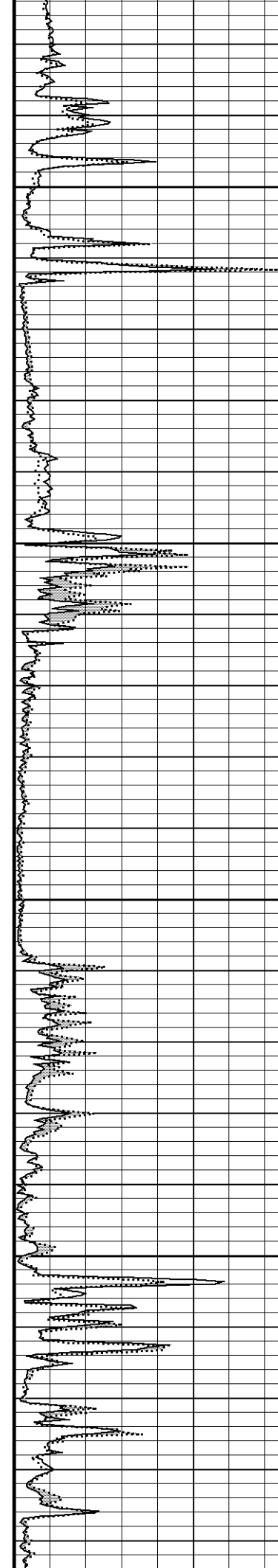
108°

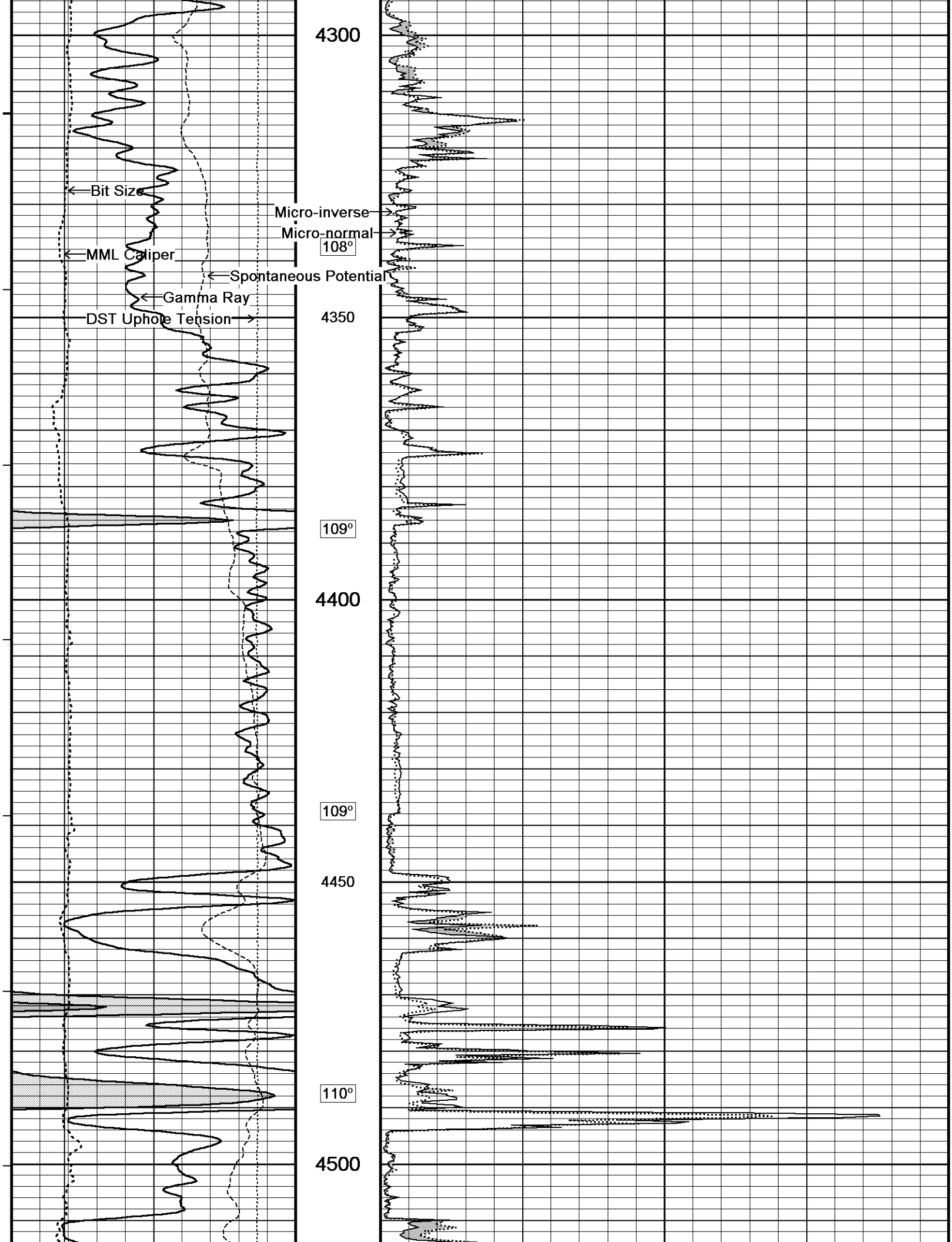
4200

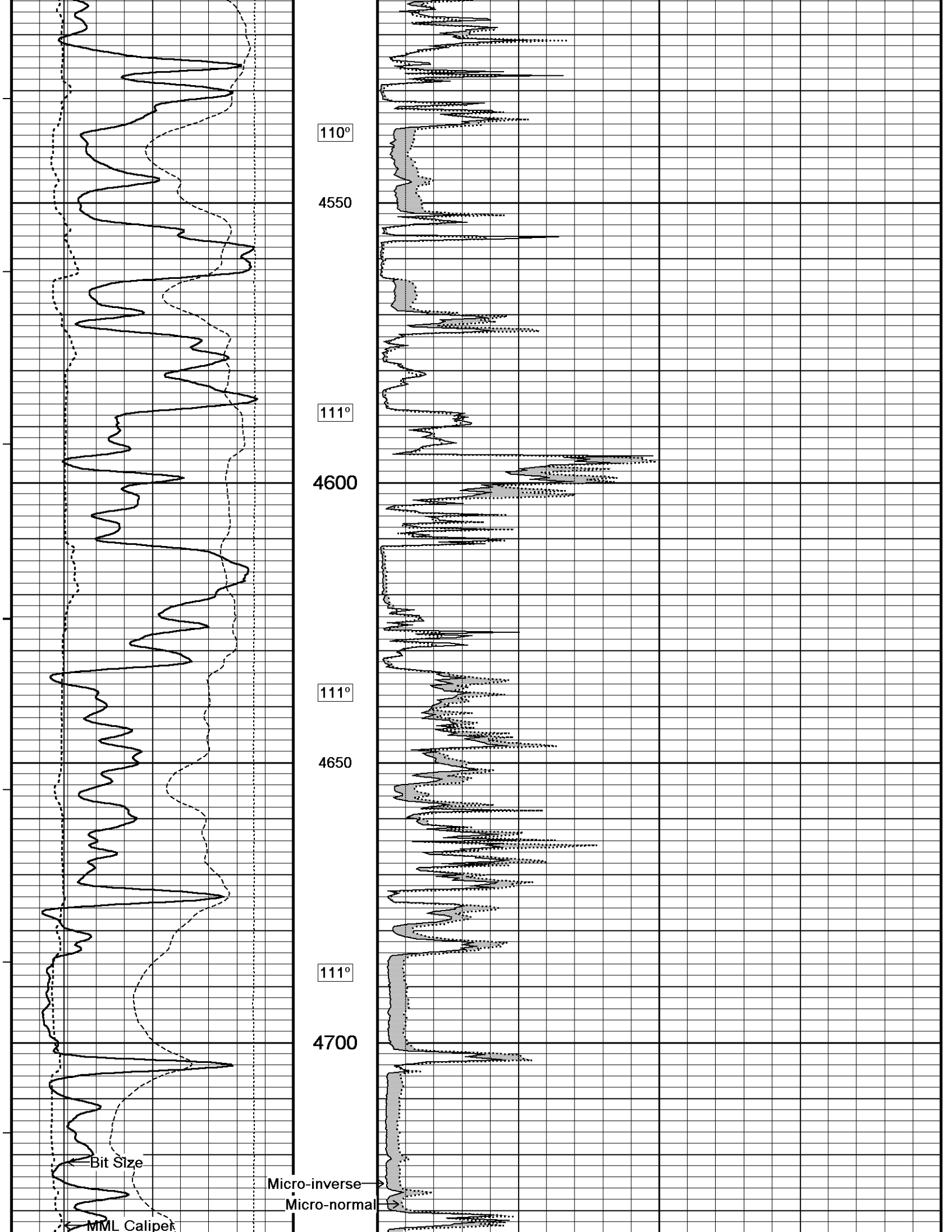
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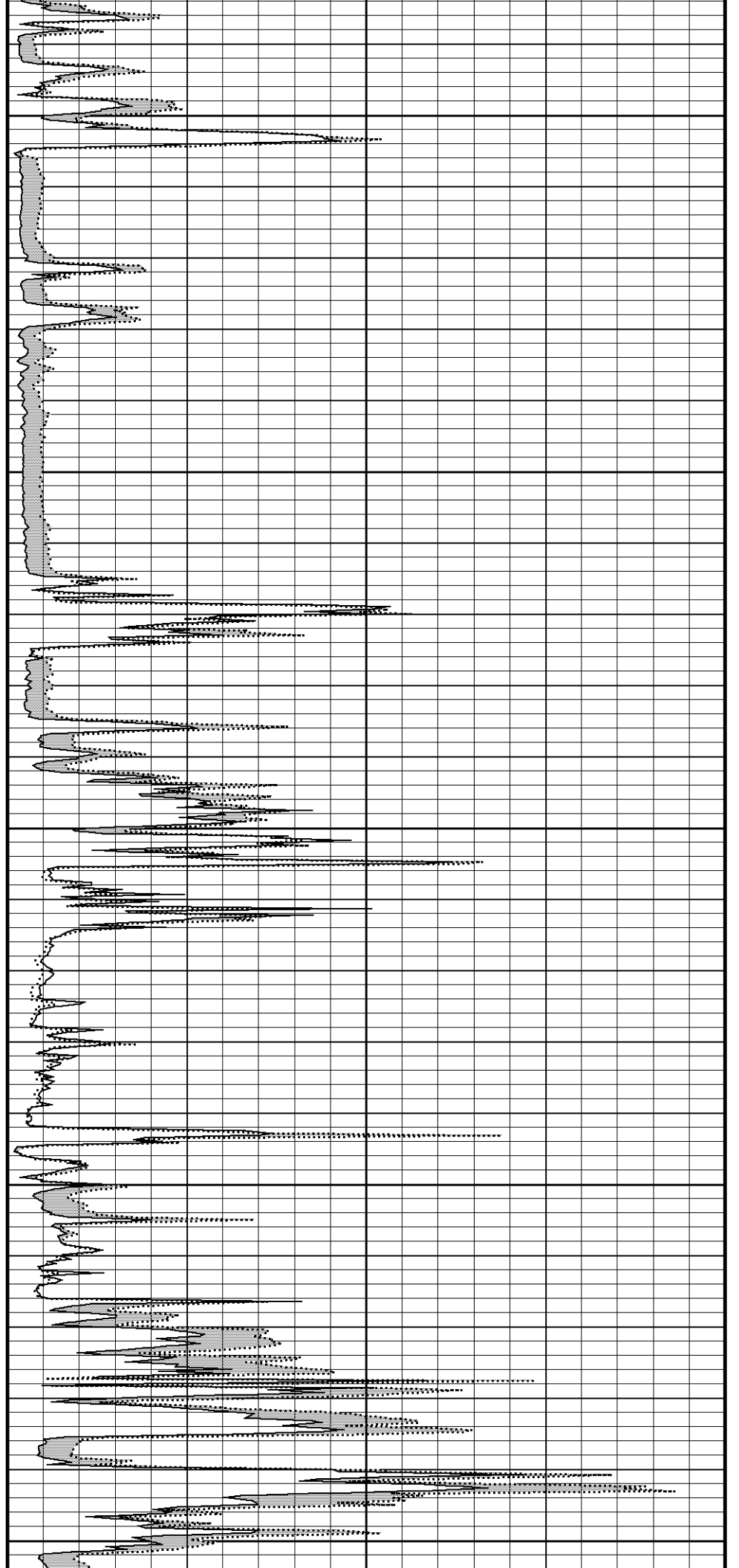
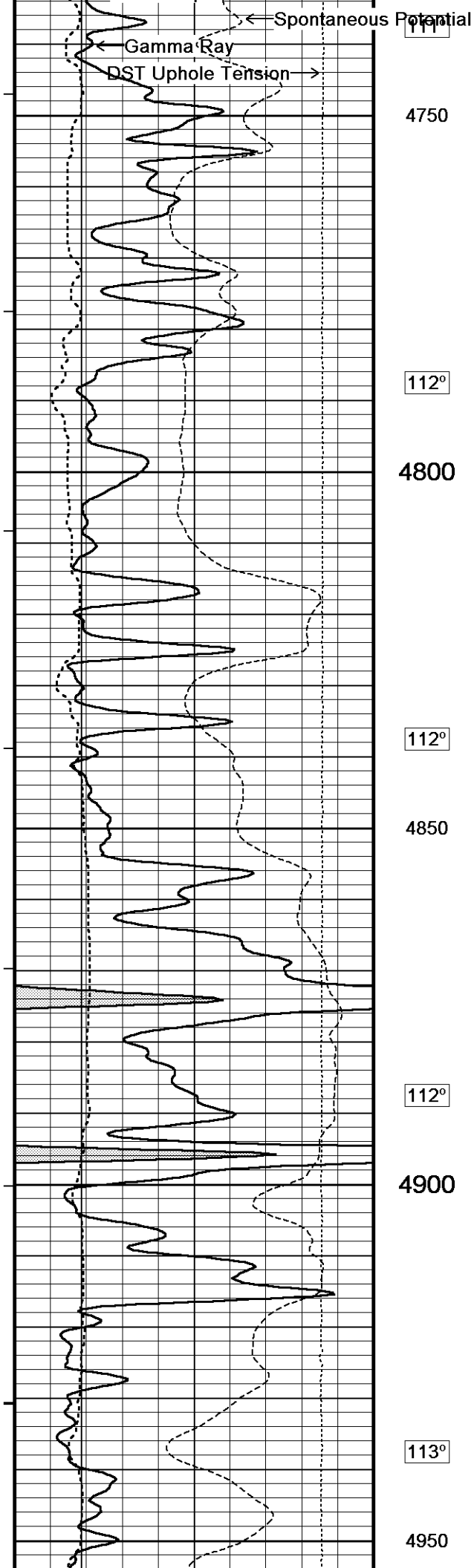
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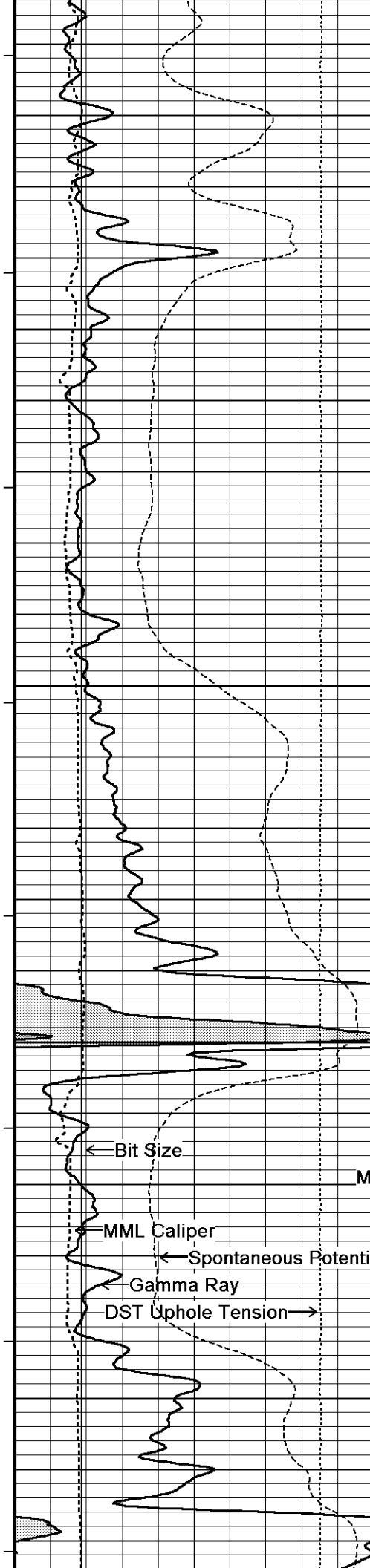
108°











113°

5000

113°

5050

114°

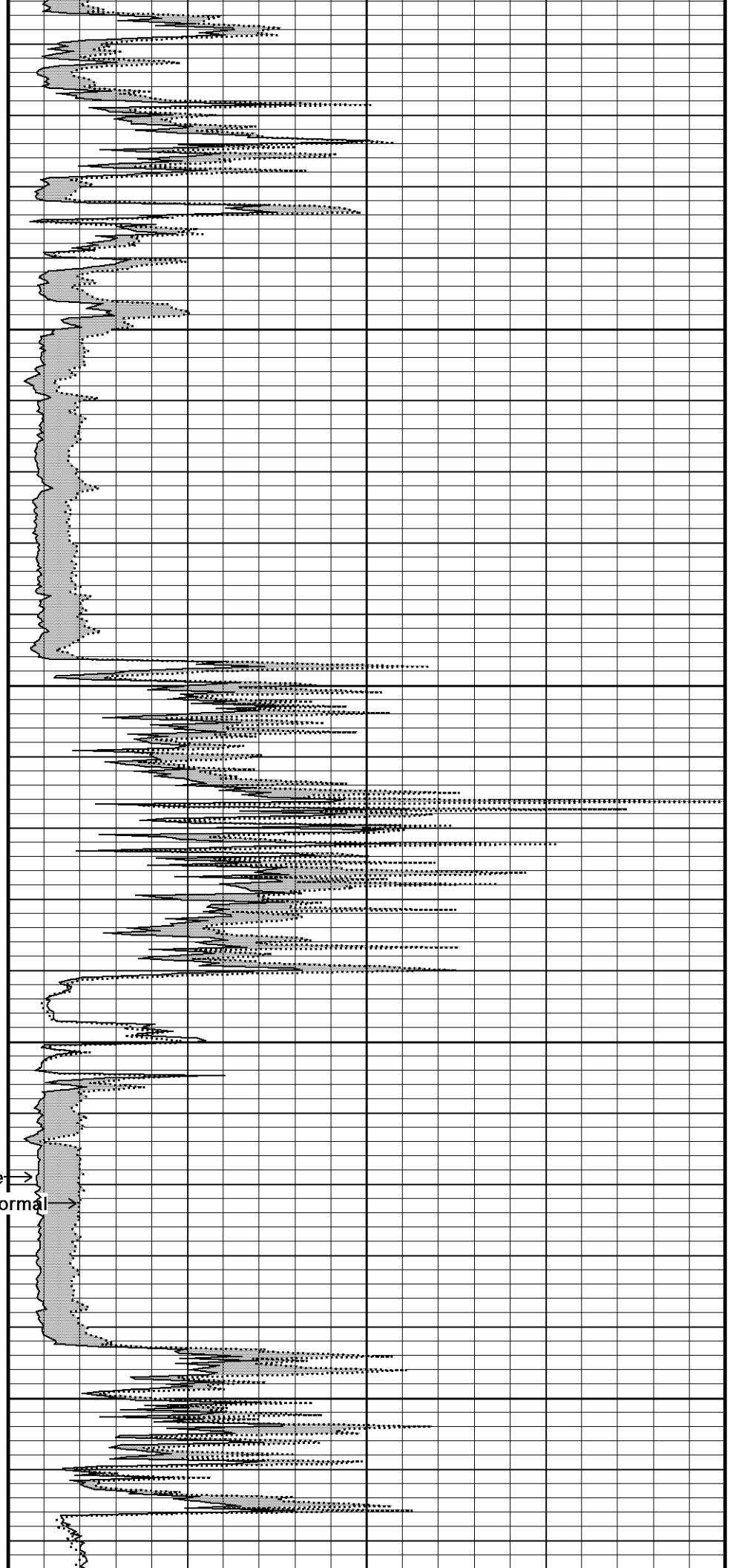
5100

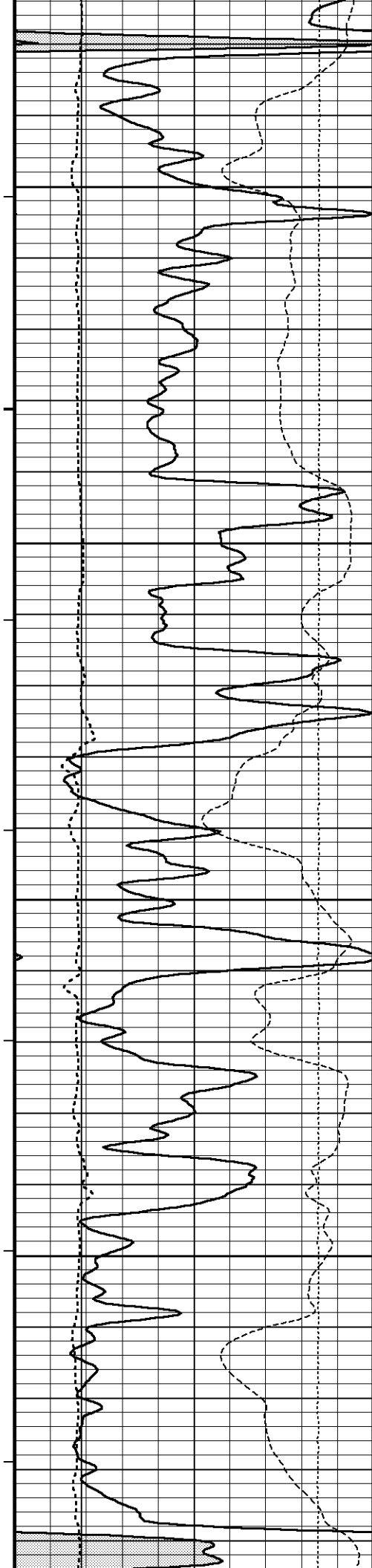
114°

5150

Micro-inverse

Micro-normal





115°

5200

115°

5250

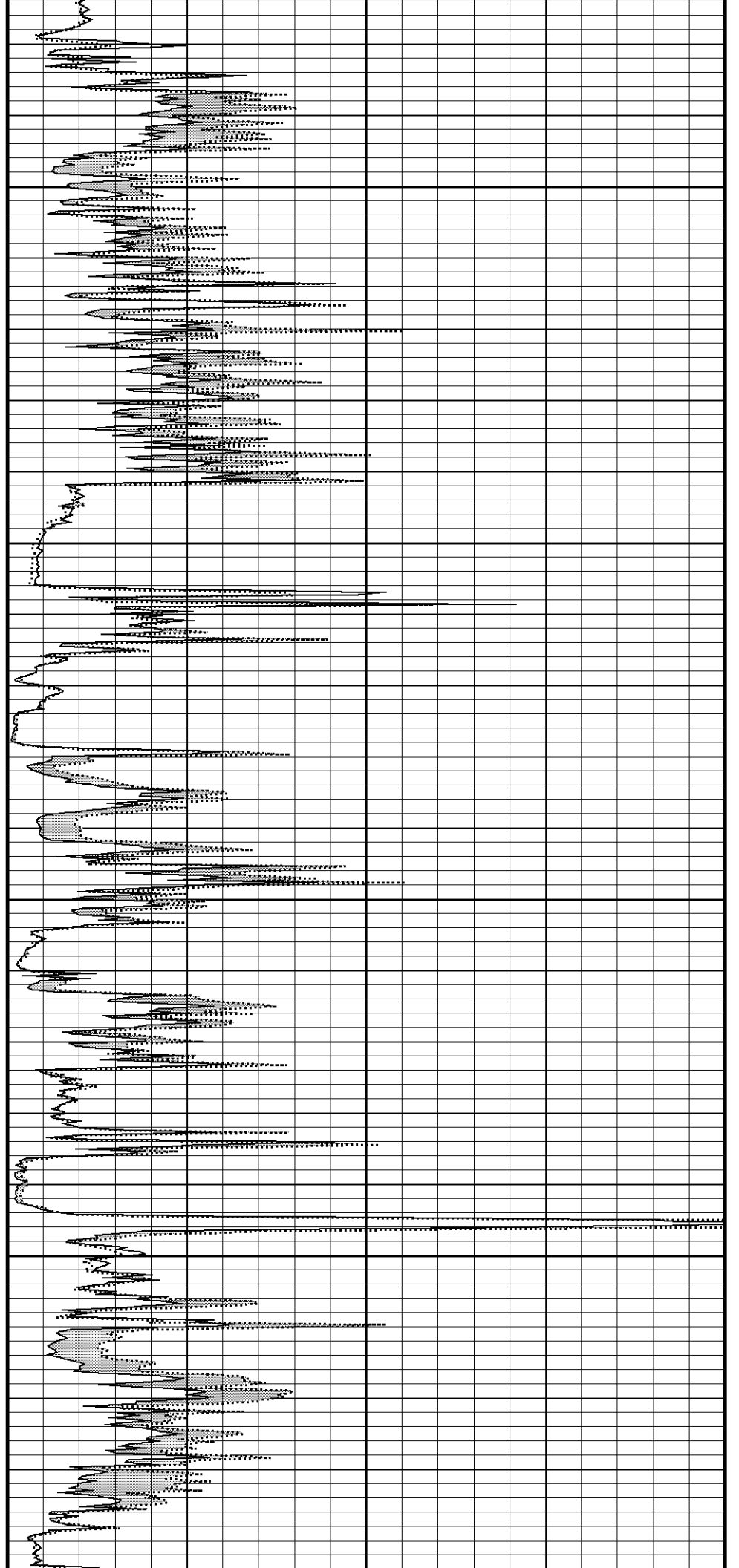
115°

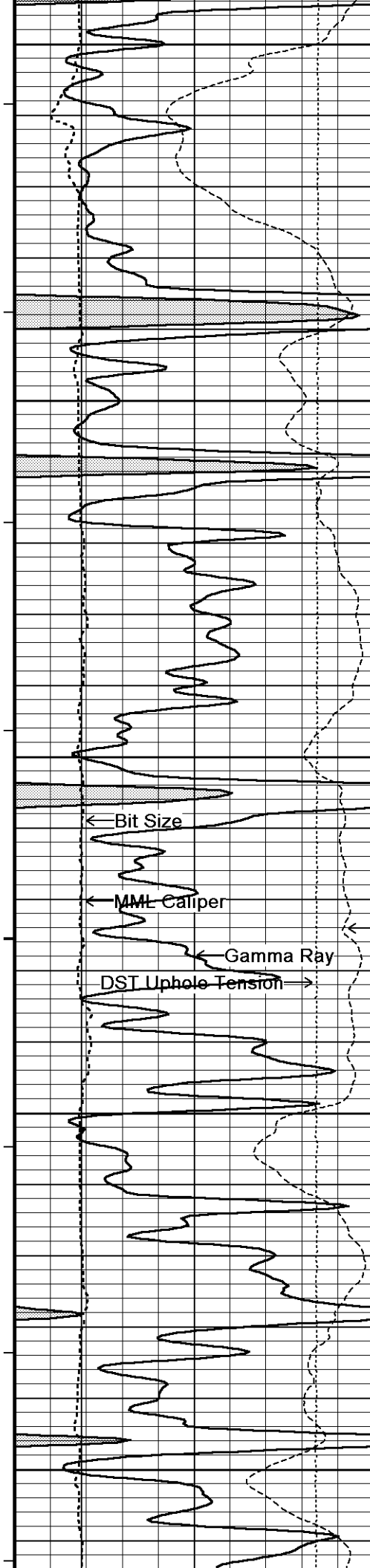
5300

115°

5350

116°





5400

116°

5450

116°

5500

Micro-inverse

Micro-normal

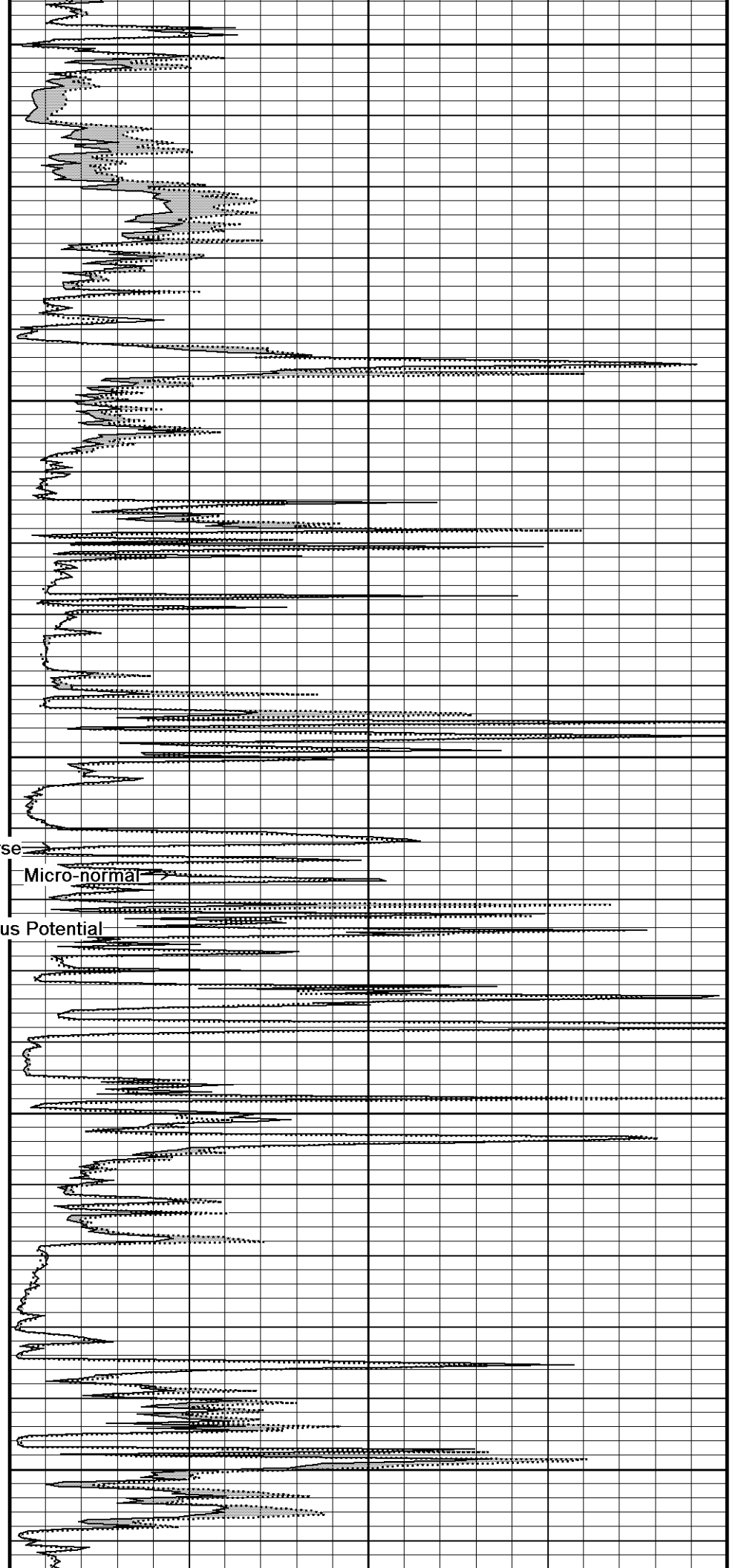
Spontaneous Potential

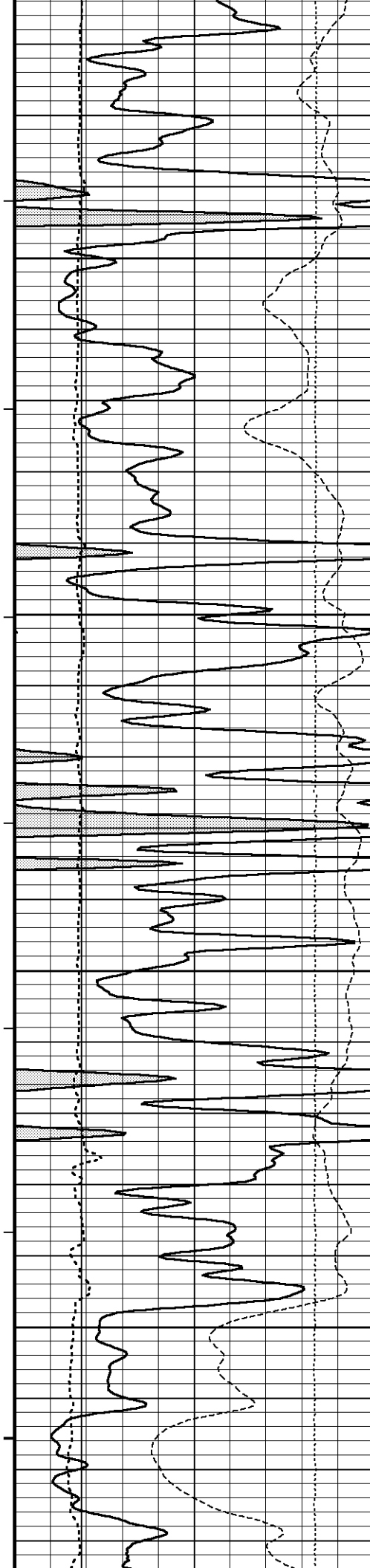
117°

5550

117°

5600





118°

5650

118°

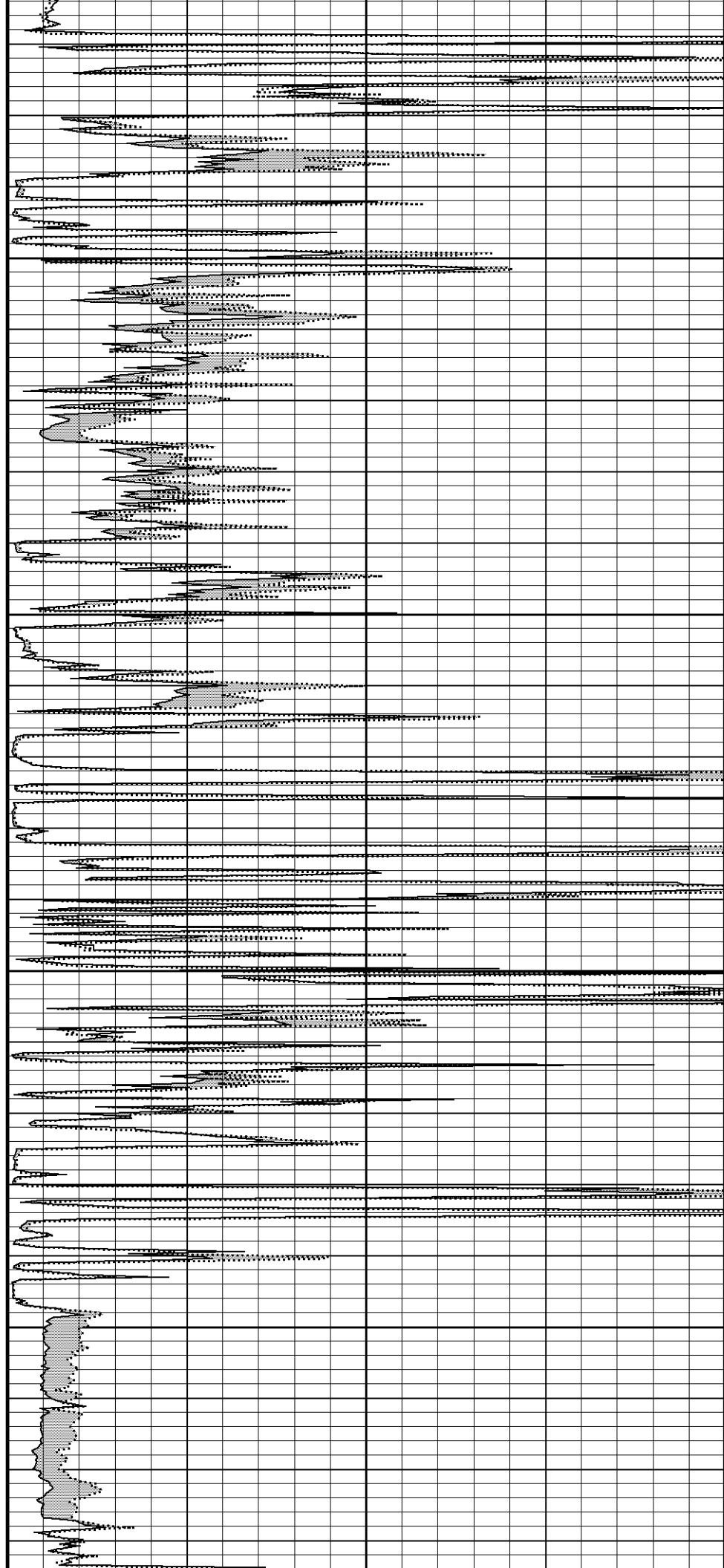
5700

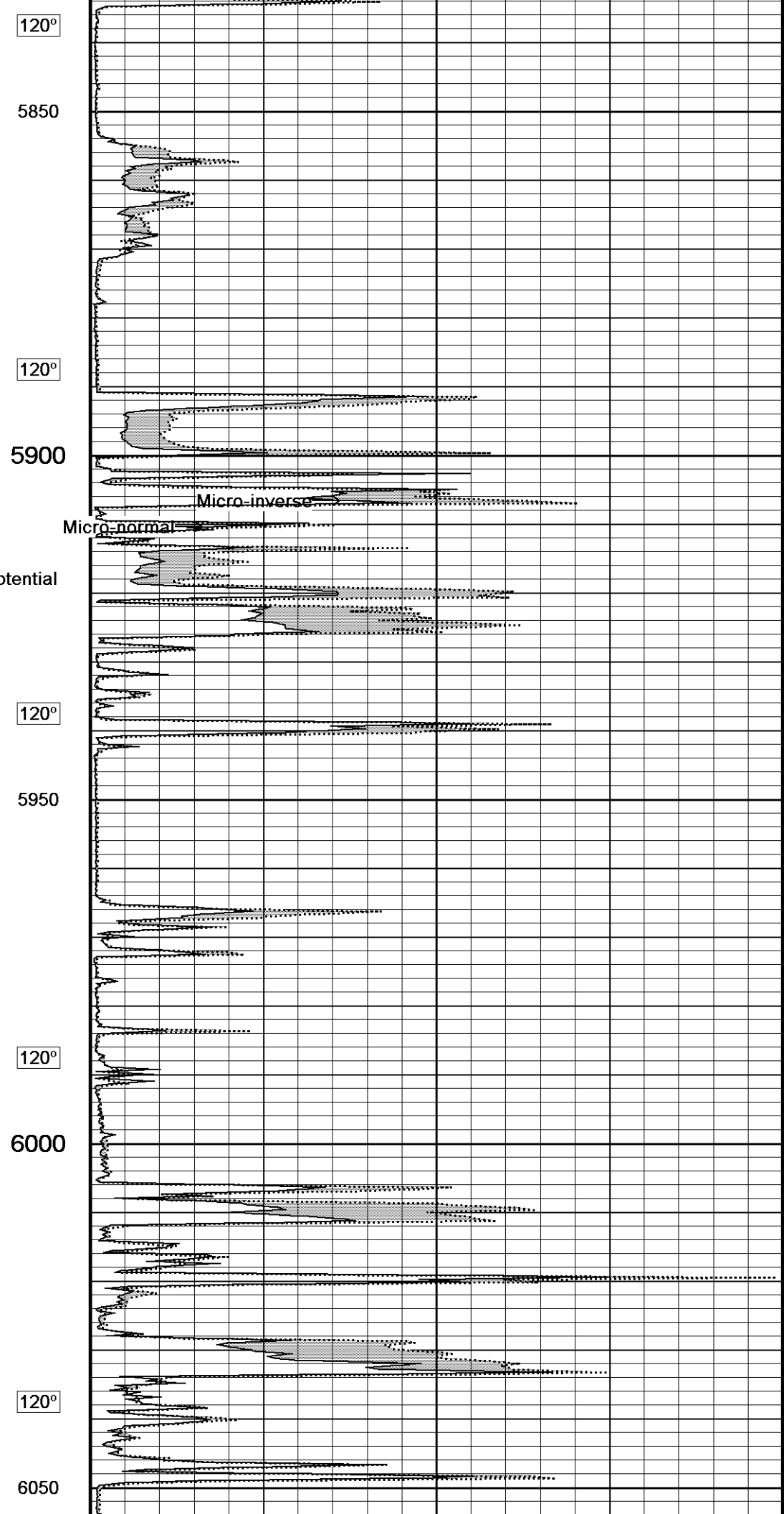
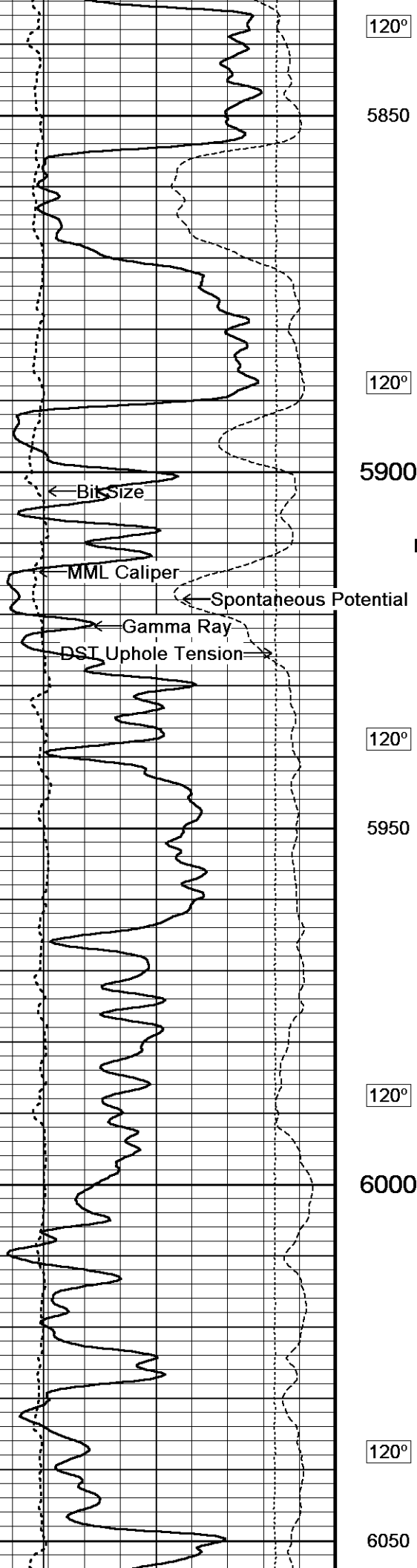
119°

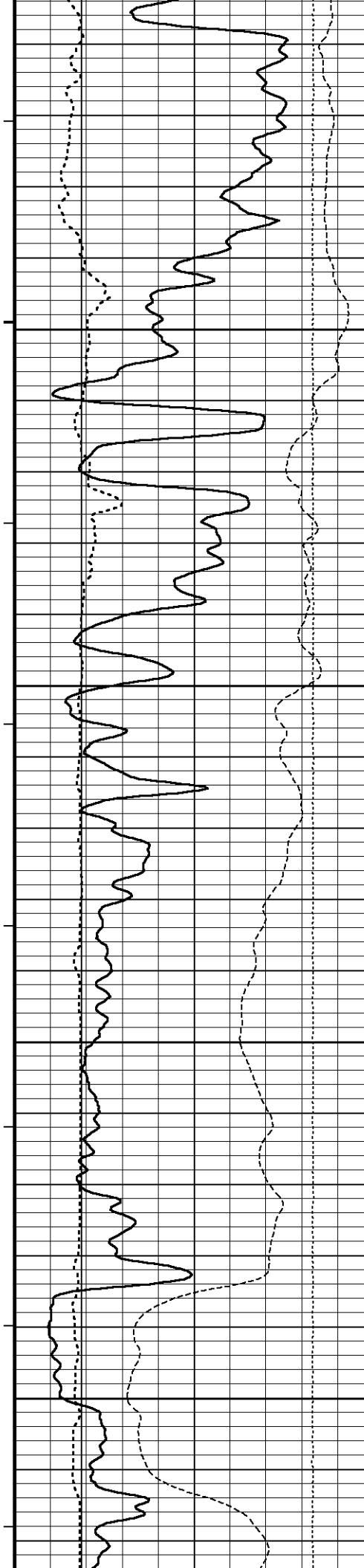
5750

120°

5800







121°

6100

123°

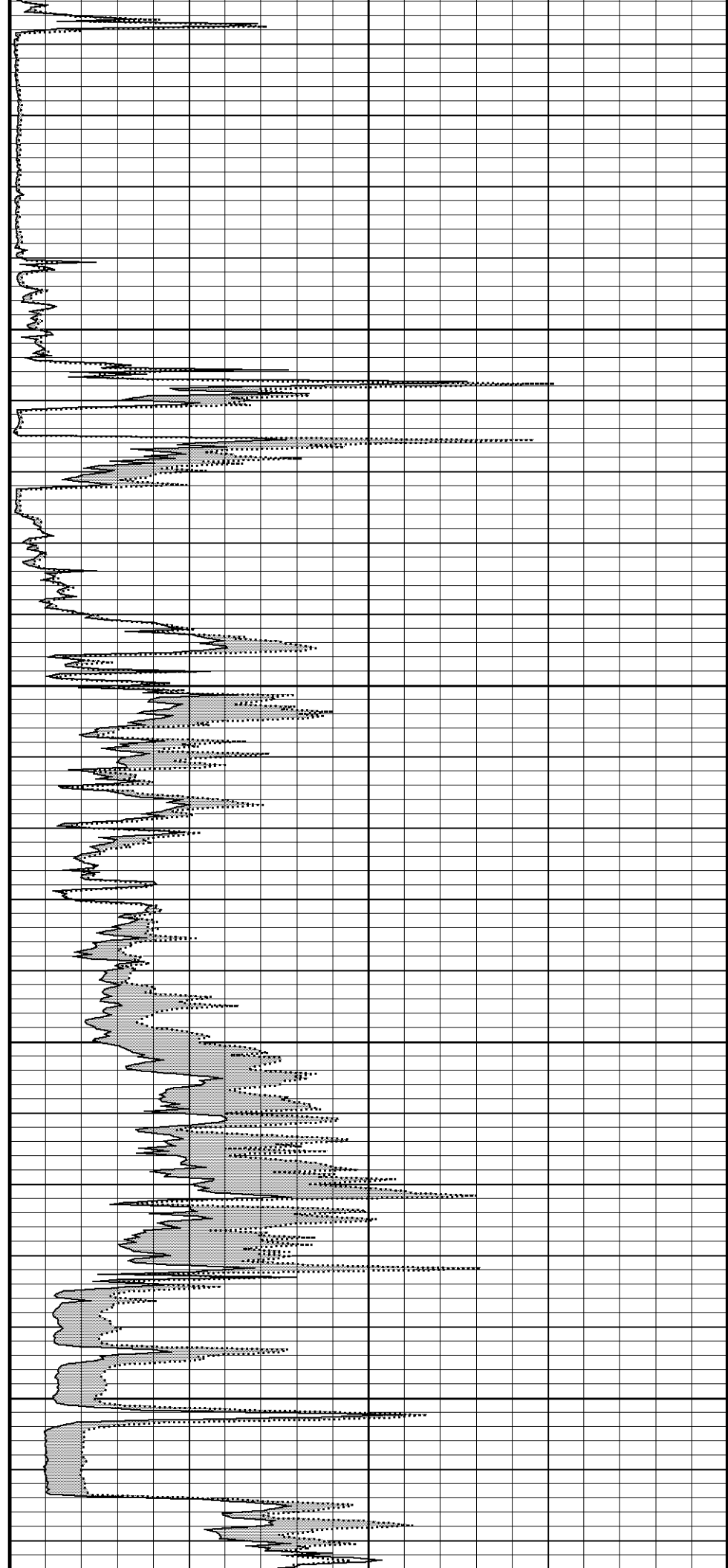
6150

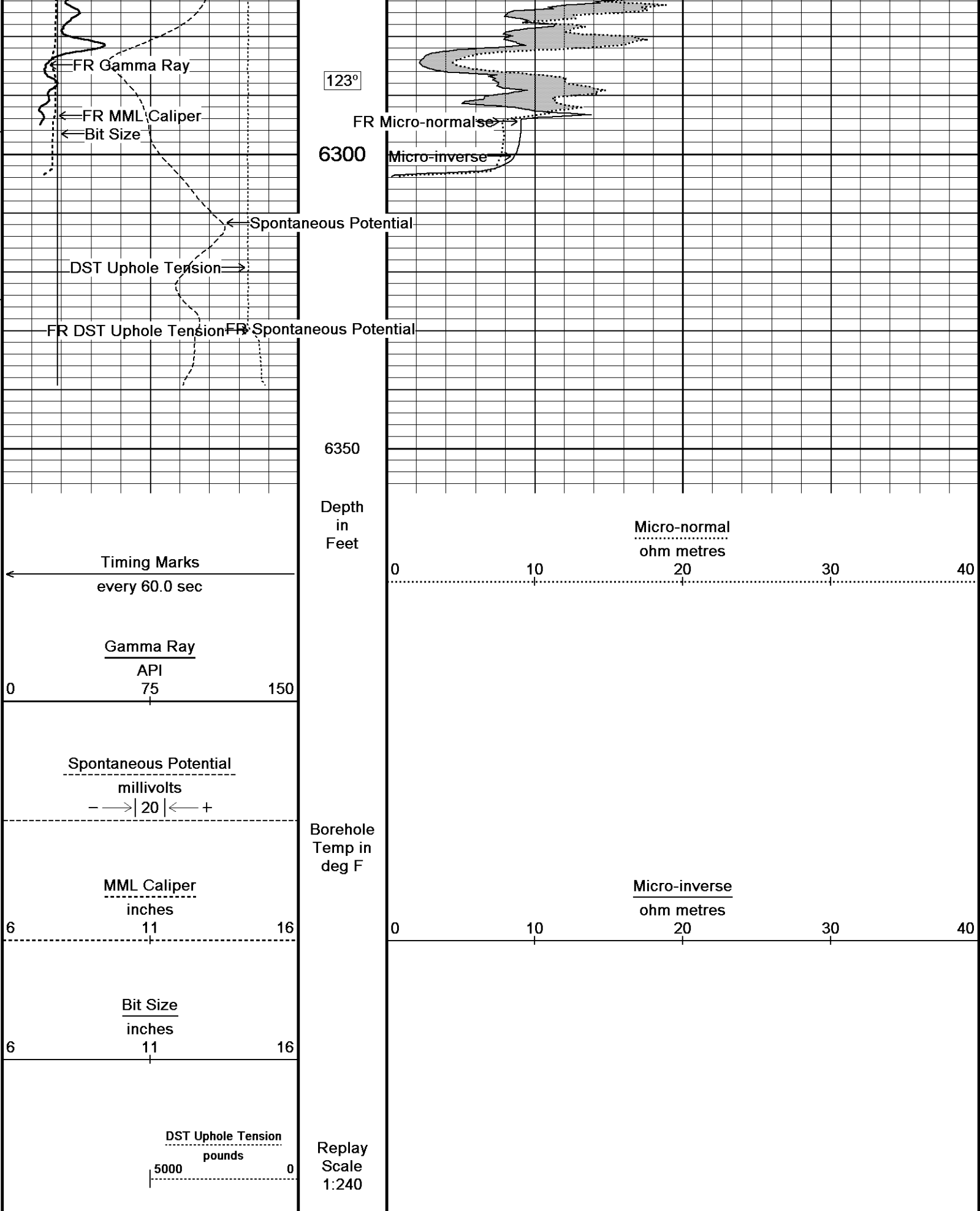
122°

6200

122°

6250







HIGH RESOLUTION 2.67 MATRIX



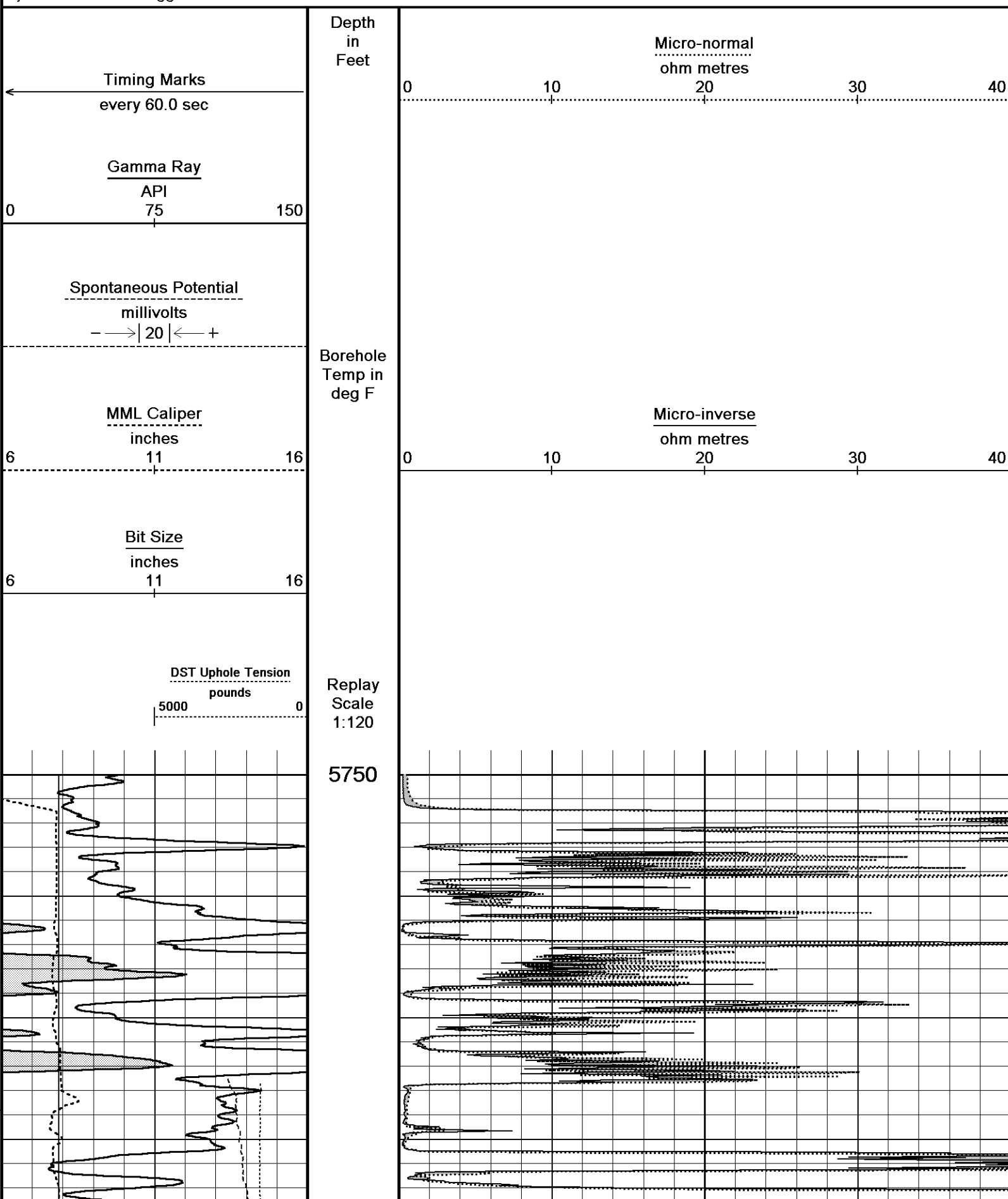
Depth Based Data - Maximum Sampling Increment 2.5cm

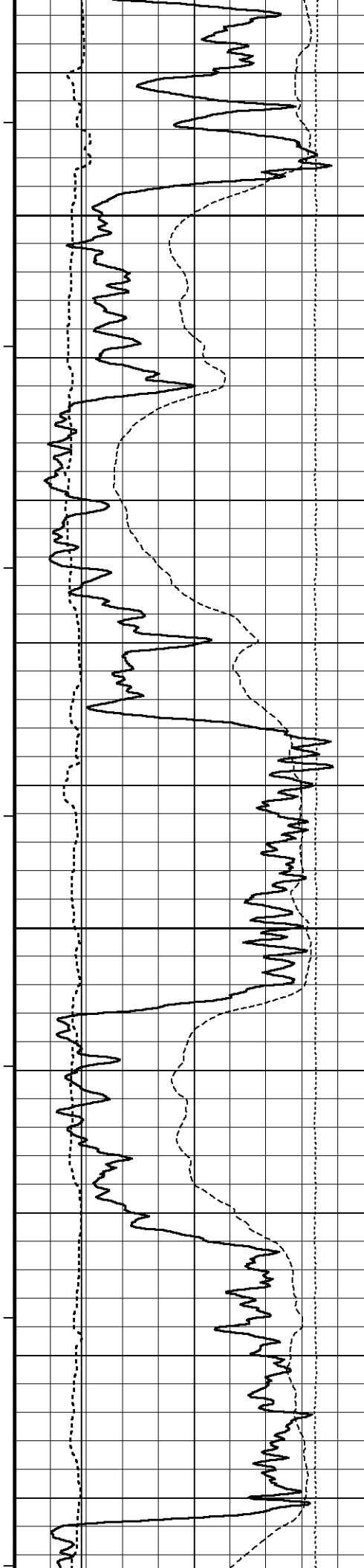
Plotted on 12-MAY-2011 15:08

Filename: C:\DOCUME~1\PES\LOCALS~1\Temp\W... \CROOKED CREEK #3-8 2.67 MATRIX_001.dta

Recorded on 12-MAY-2011 11:37

System Versions: Logged with 11.03.2789 Processed with 11.03.2789 Plotted with 11.02.2164





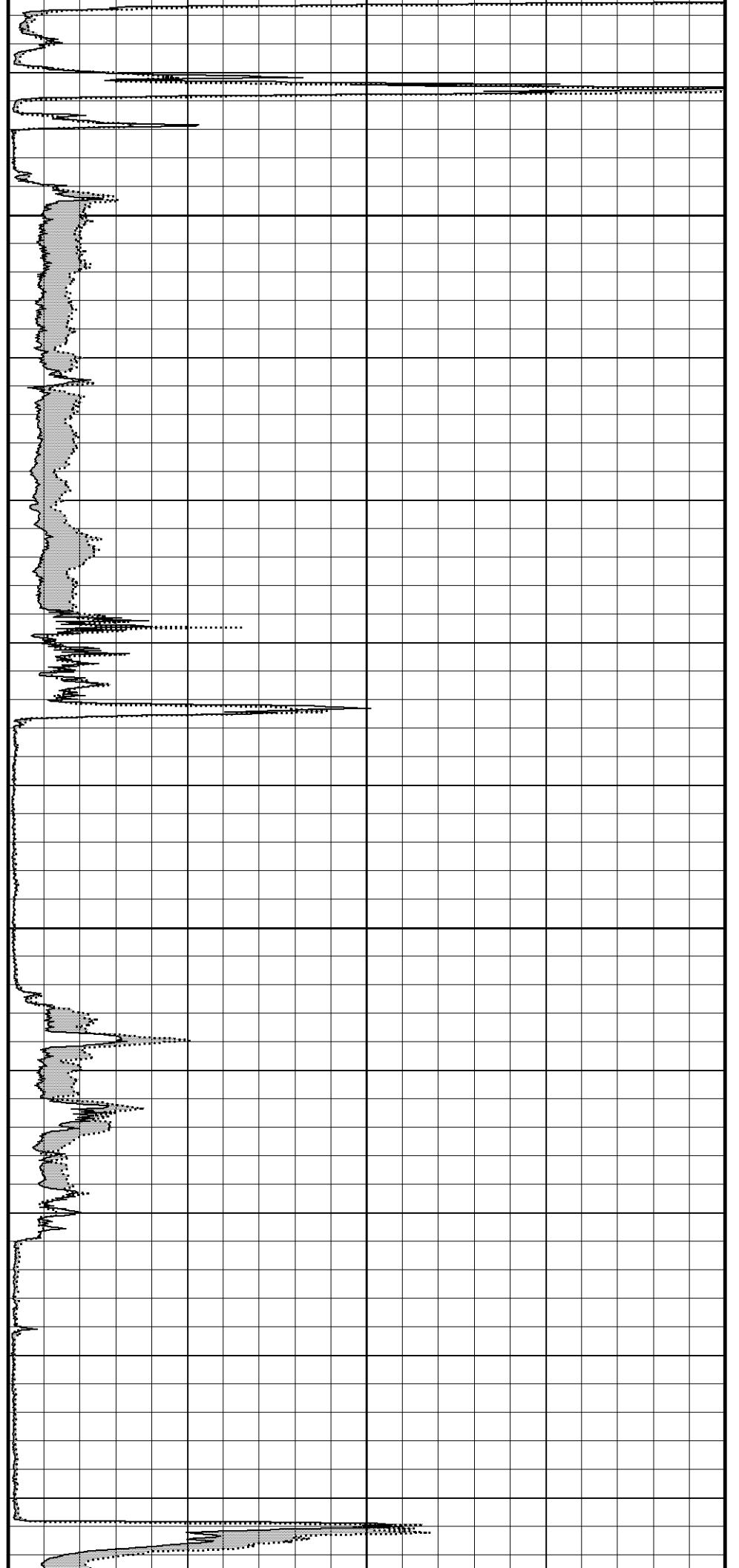
119°

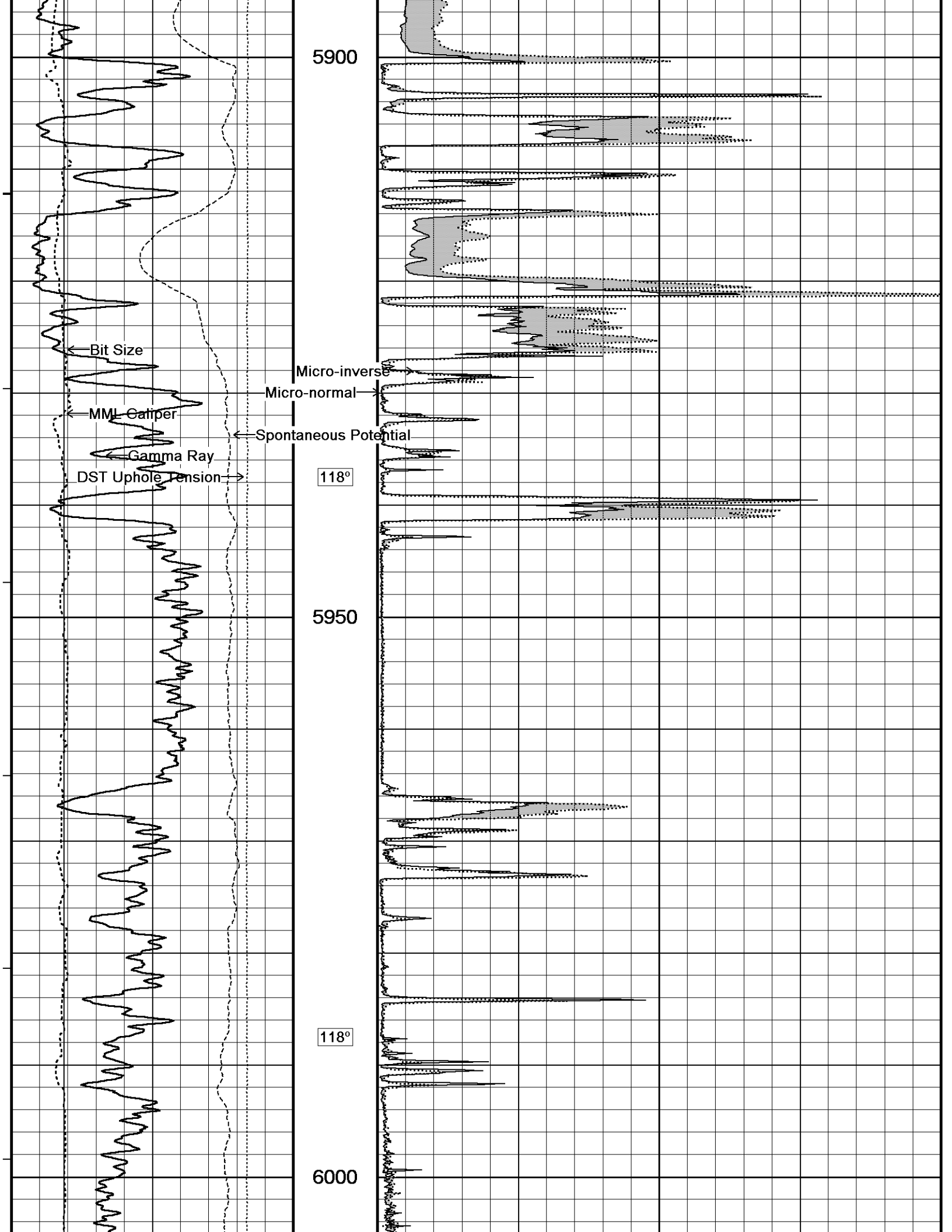
5800

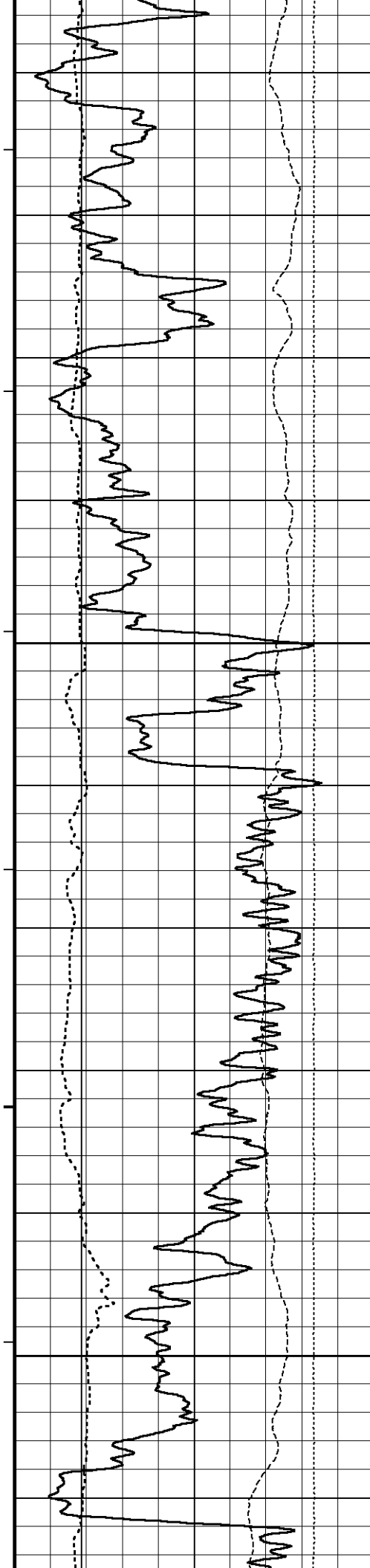
118°

5850

118°





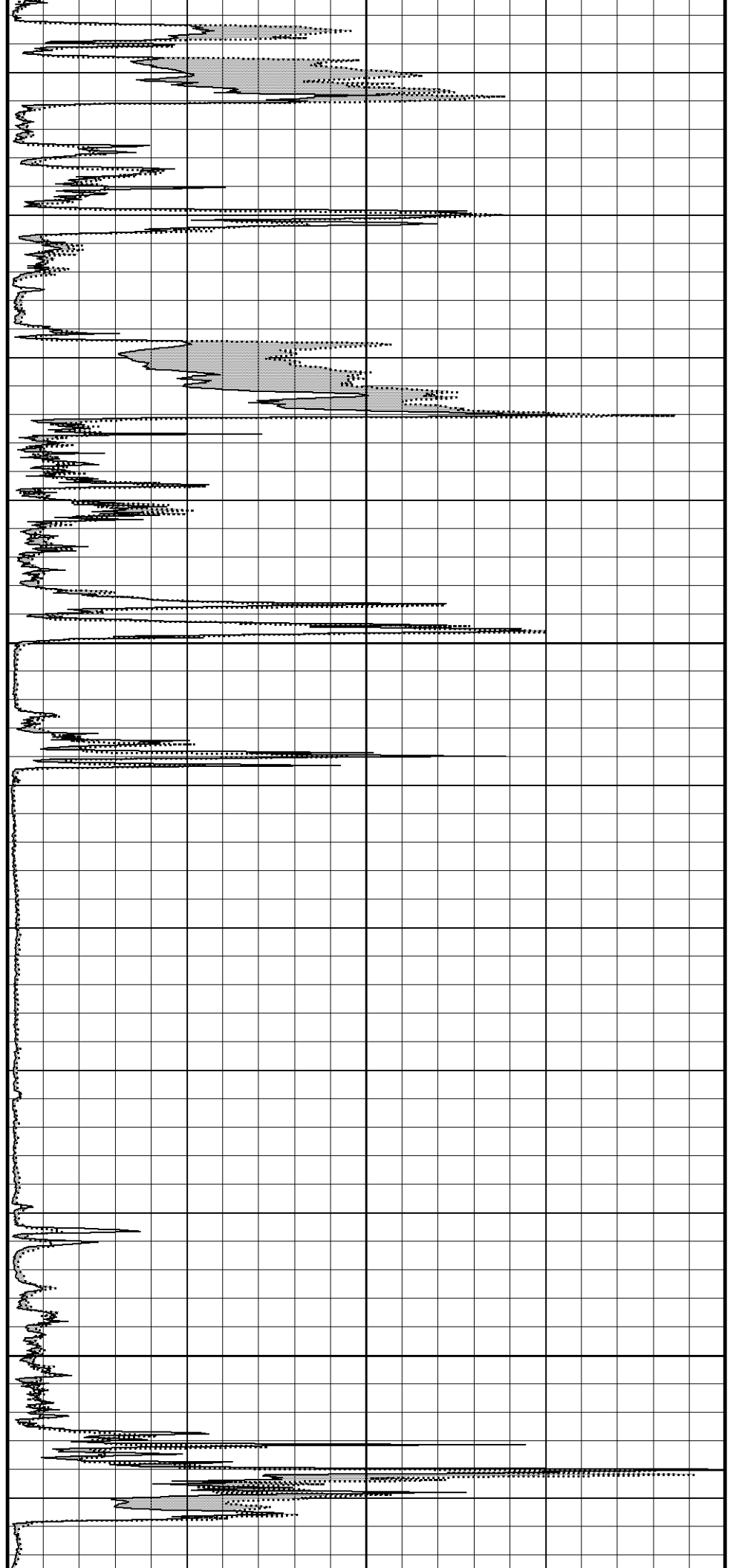


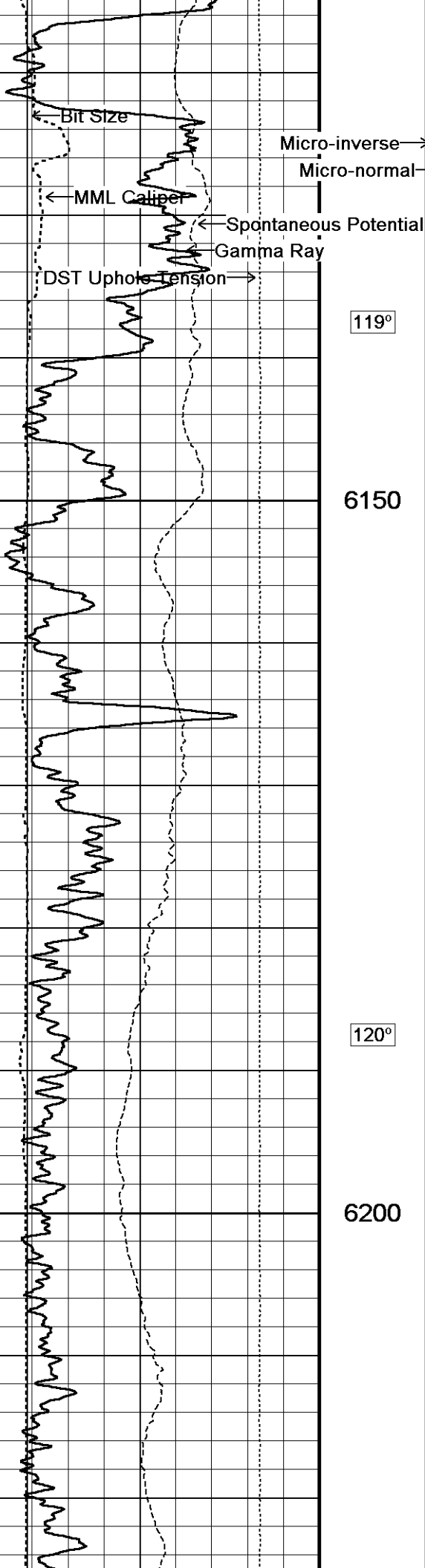
118°

6050

119°

6100



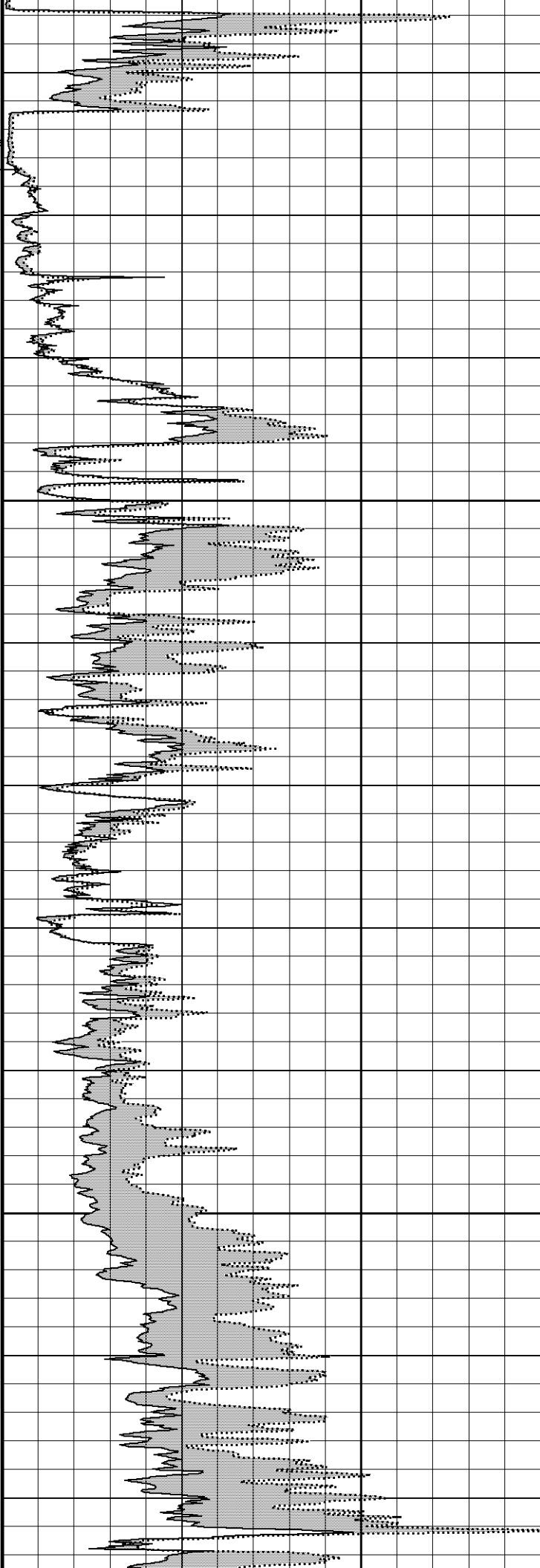


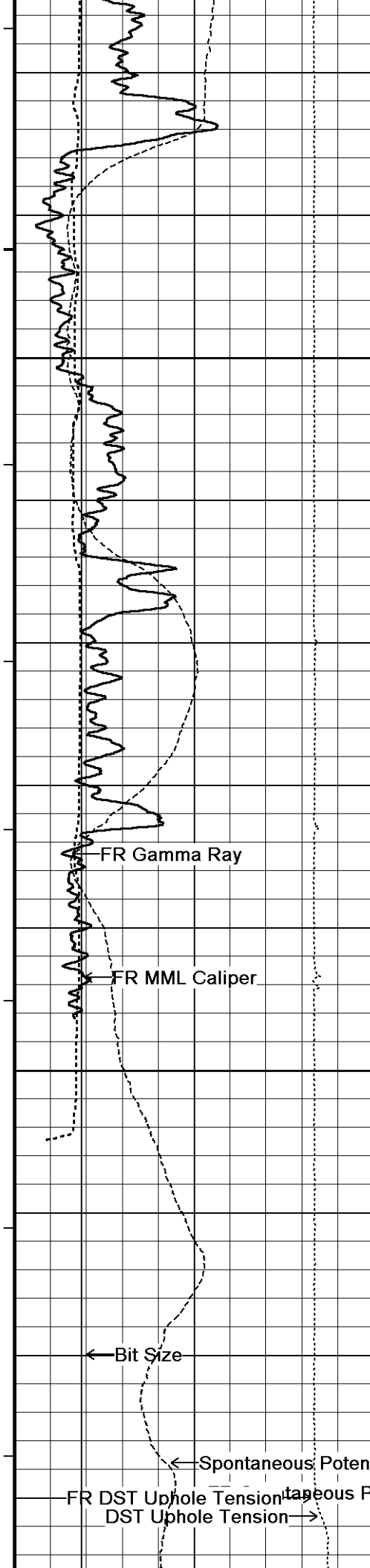
119°

6150

120°

6200





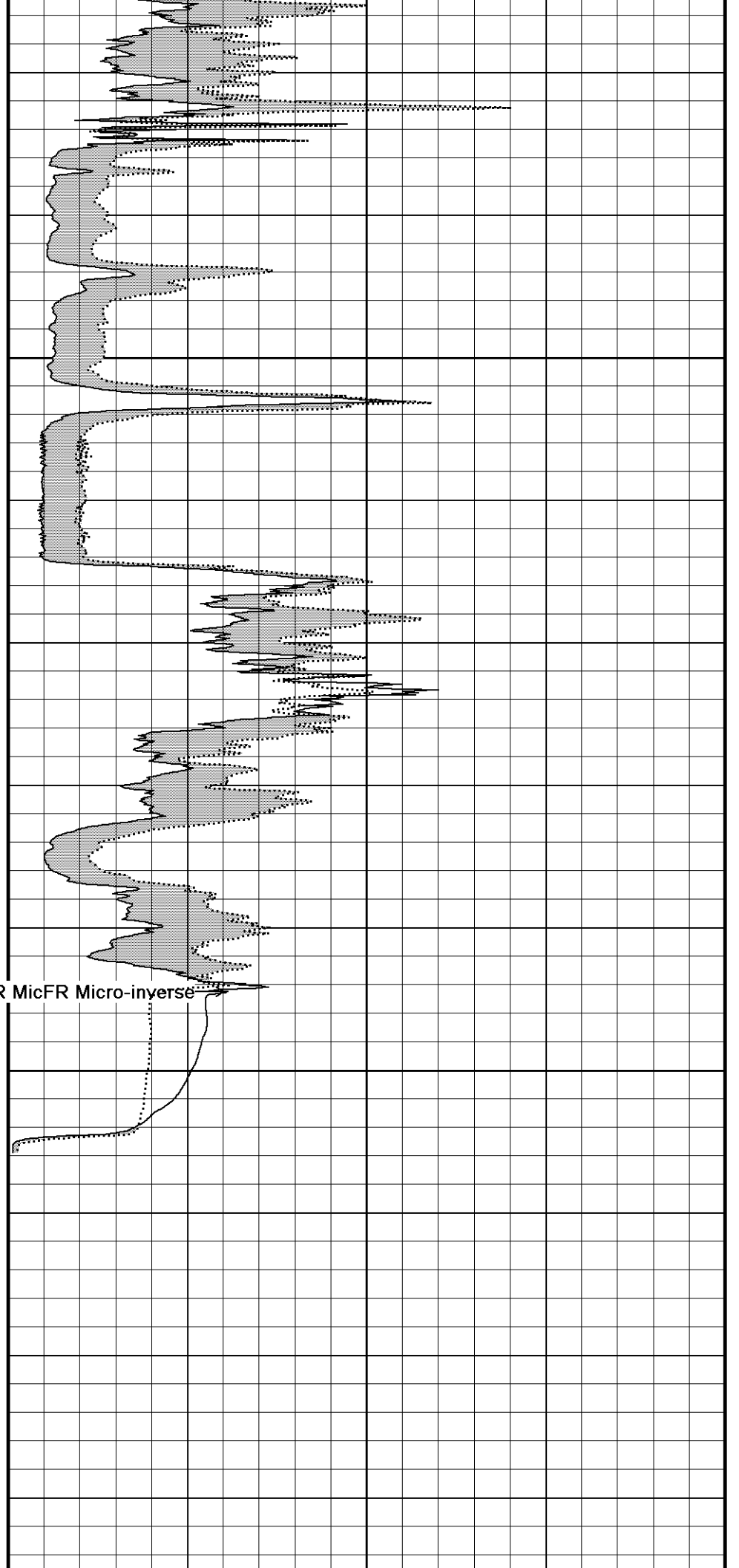
120°

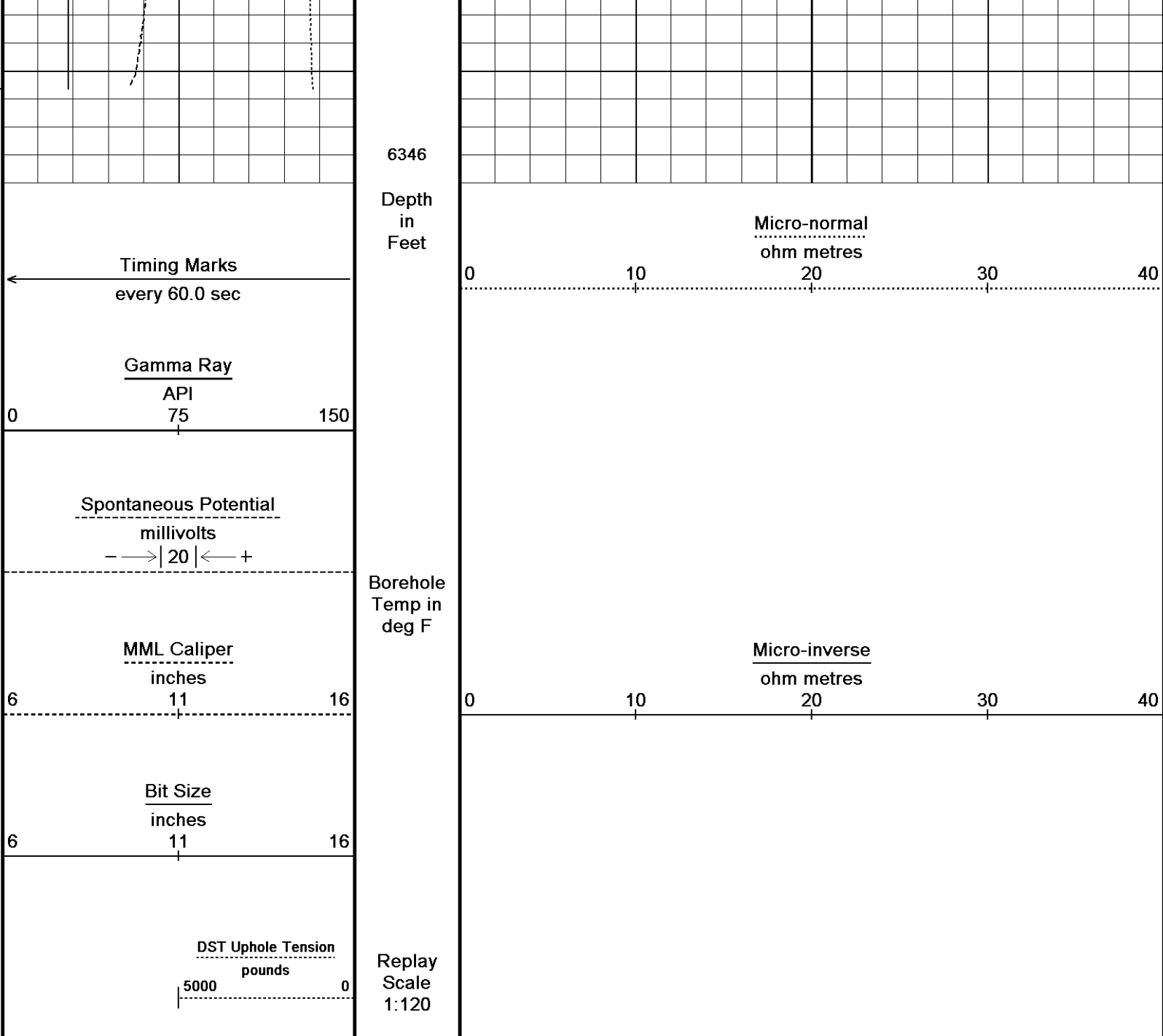
6250

120°

6300

FR MicFR Micro-inverse

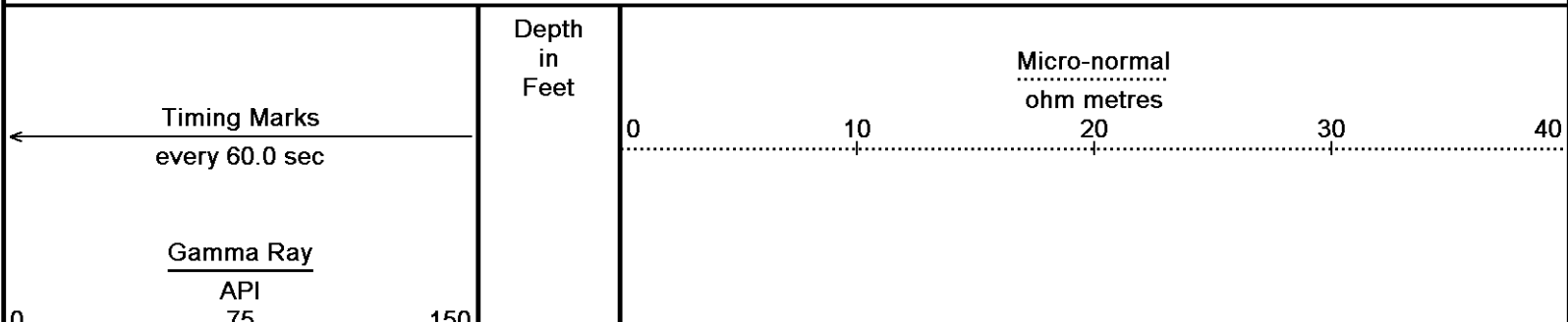


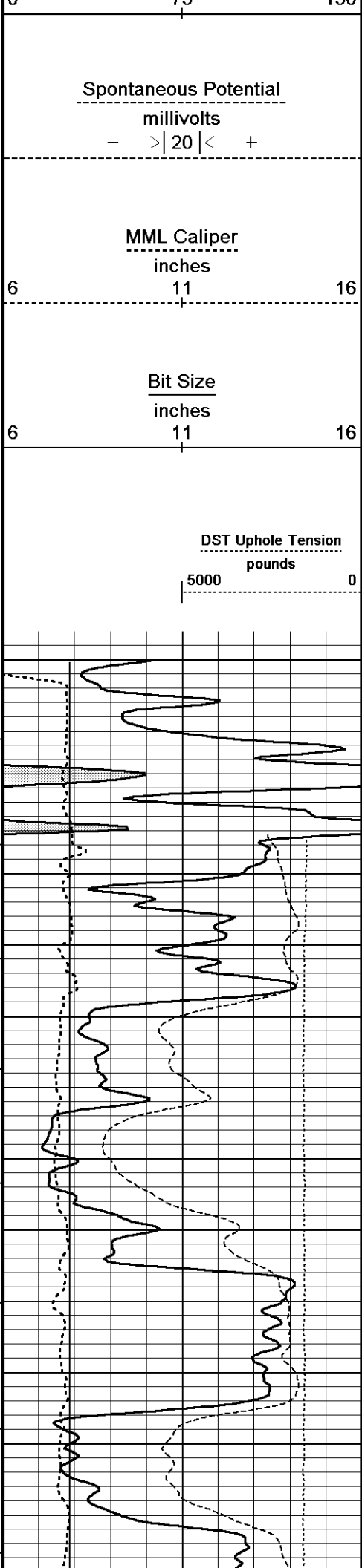


Depth Based Data - Maximum Sampling Increment 2.5cm	Plotted on 12-MAY-2011 15:08
Filename: C:\DOCUME~1\PES\LOCALS~1\Temp\W... \CROOKED CREEK #3-8 2.67 MATRIX_001.dta	Recorded on 12-MAY-2011 11:37
System Versions: Logged with 11.03.2789 Processed with 11.03.2789 Plotted with 11.02.2164	

↑	HIGH RESOLUTION 2.67 MATRIX	↑
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↓	REPEAT SECTION	↓
Depth Based Data - Maximum Sampling Increment 10.0cm		
Filename: C:\DOCUME~1\PES\LOCALS~1\Temp\W... \CROOKED CREEK #3-8 2.67 MATRIX_002.dta		
System Versions: Logged with 11.03.2789 Processed with 11.03.2789 Plotted with 11.02.2164		





Borehole
Temp in
deg F

Replay
Scale
1:240

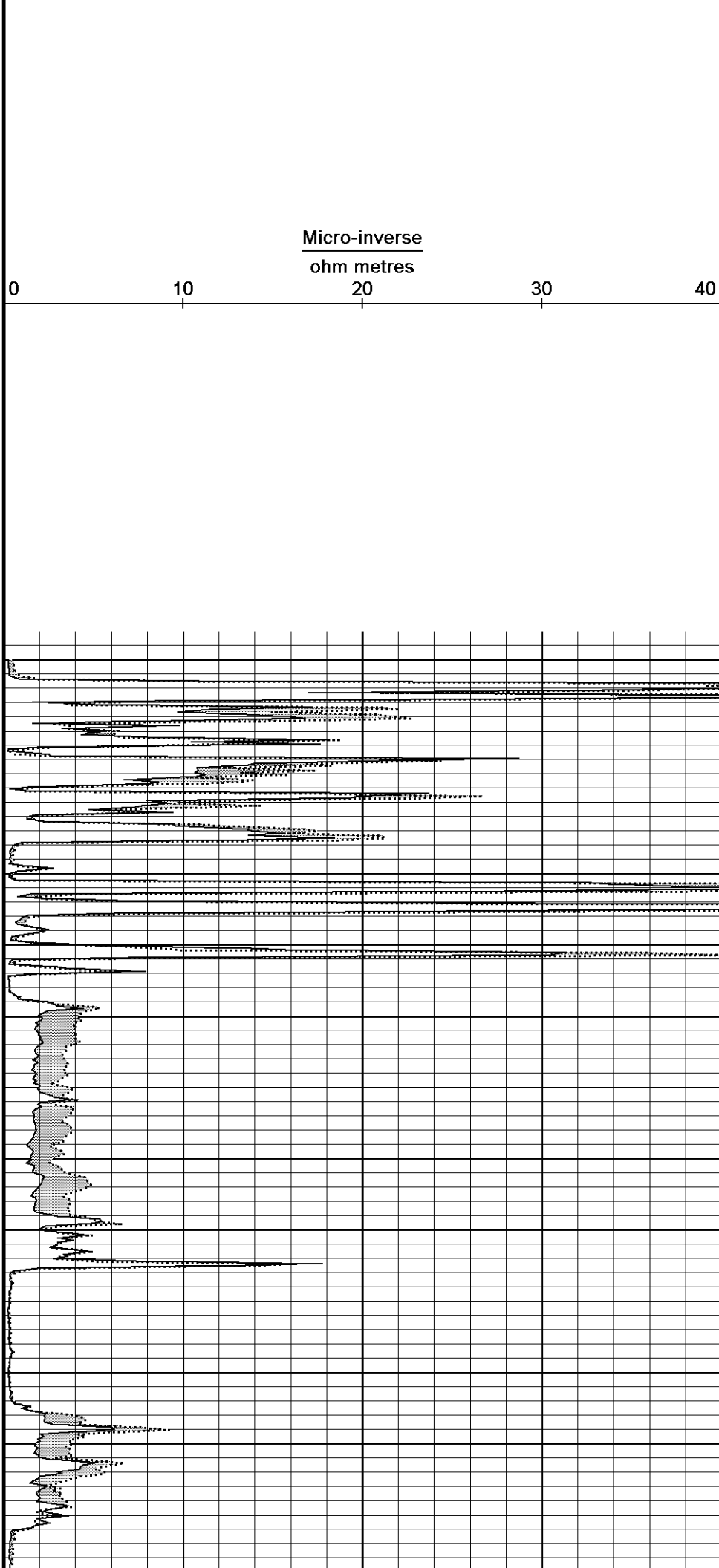
5750

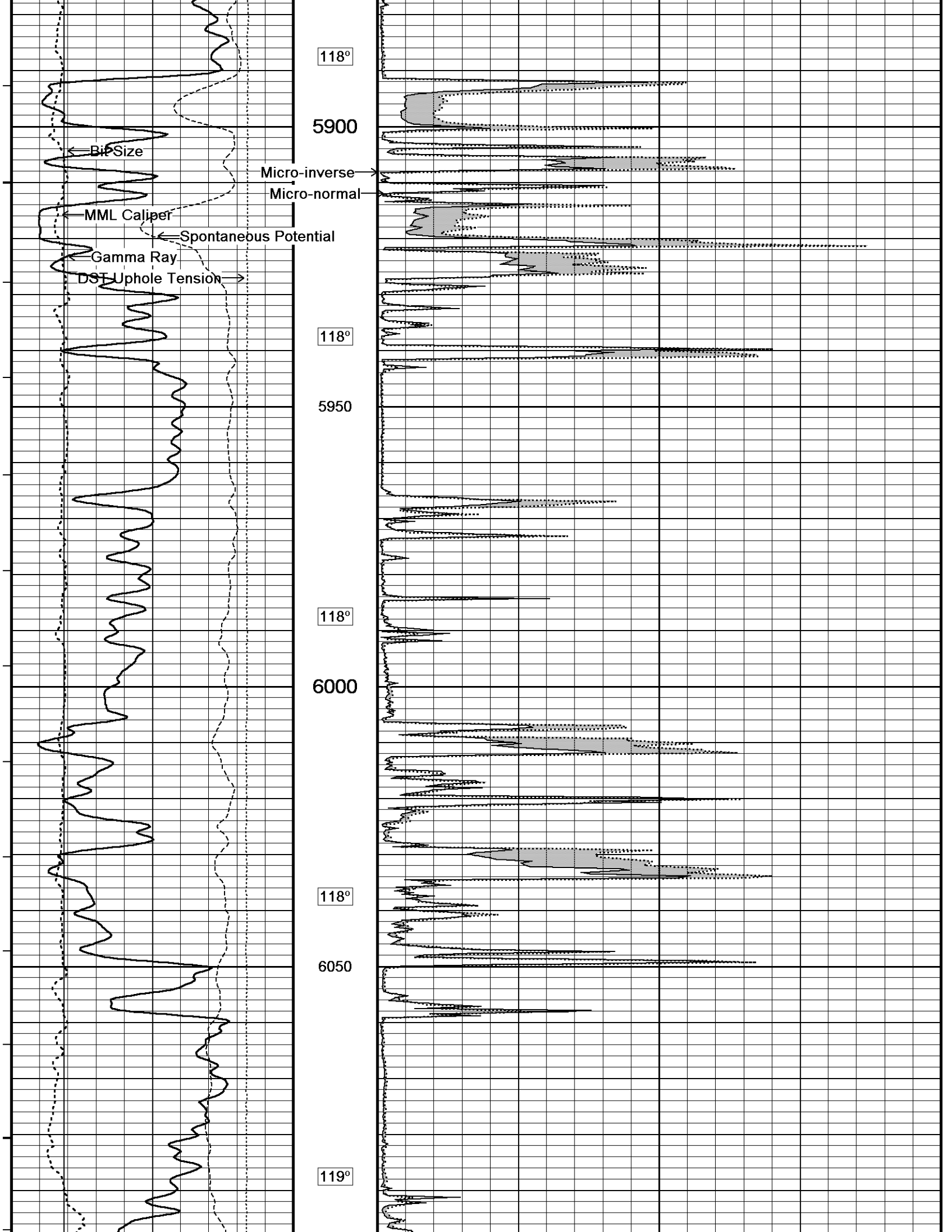
118°

5800

118°

5850





6100

119°

6150

120°

6200

120°

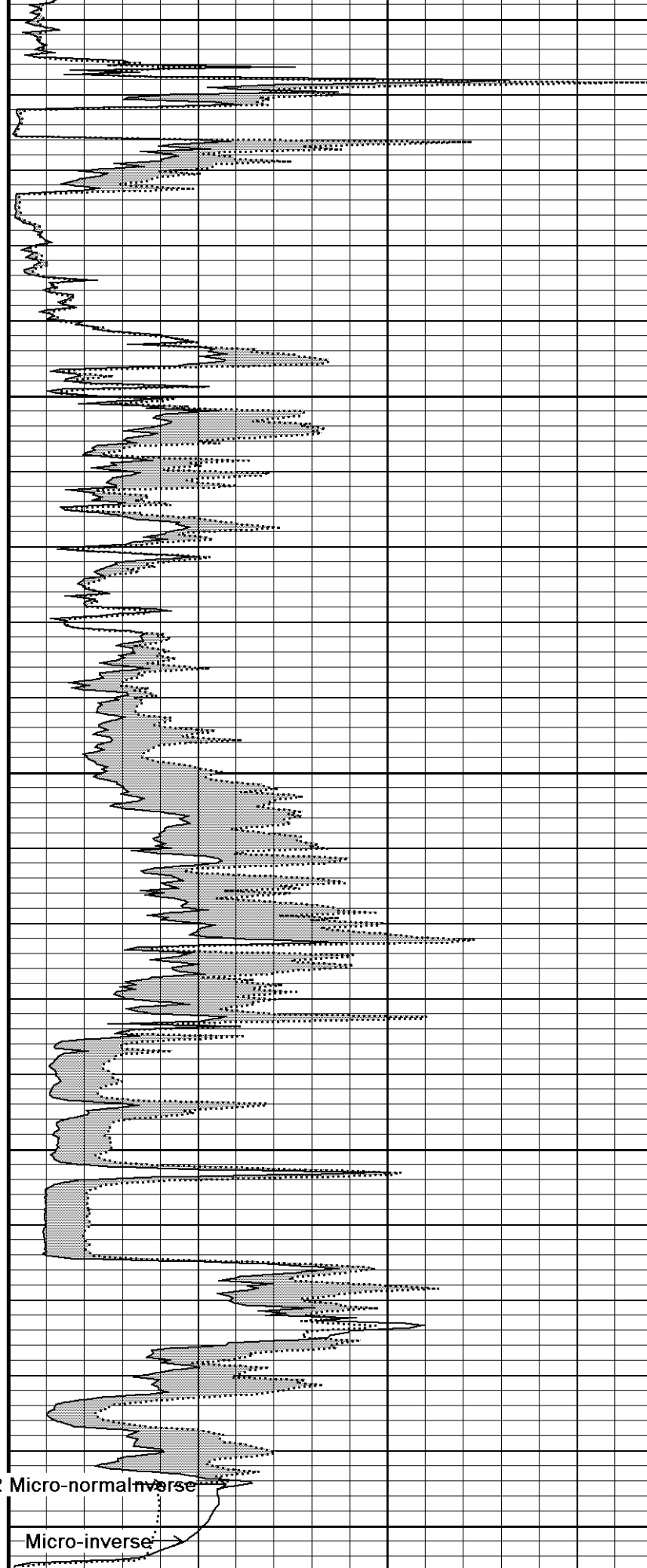
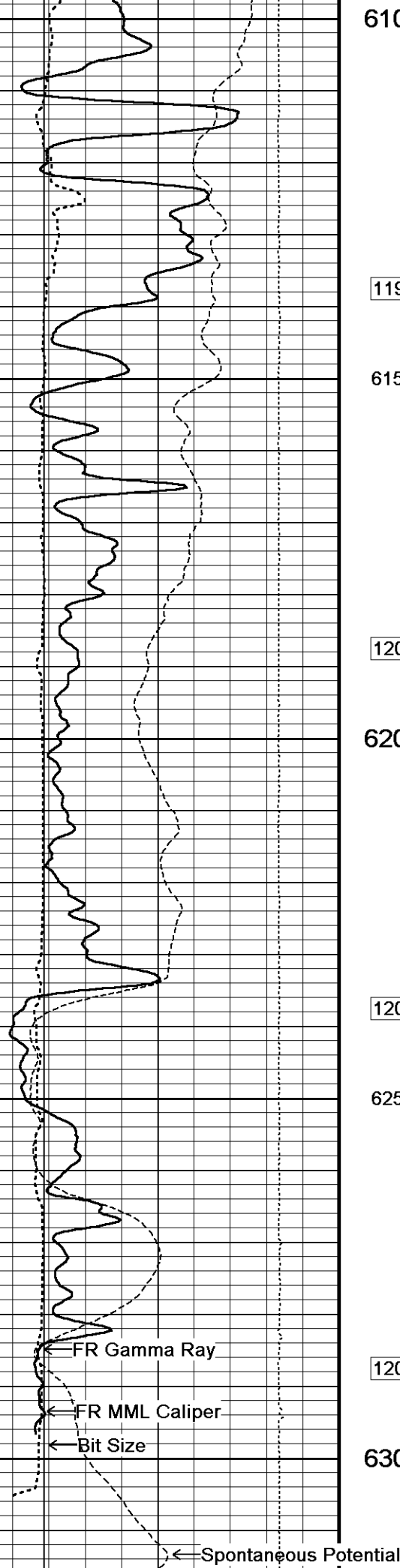
6250

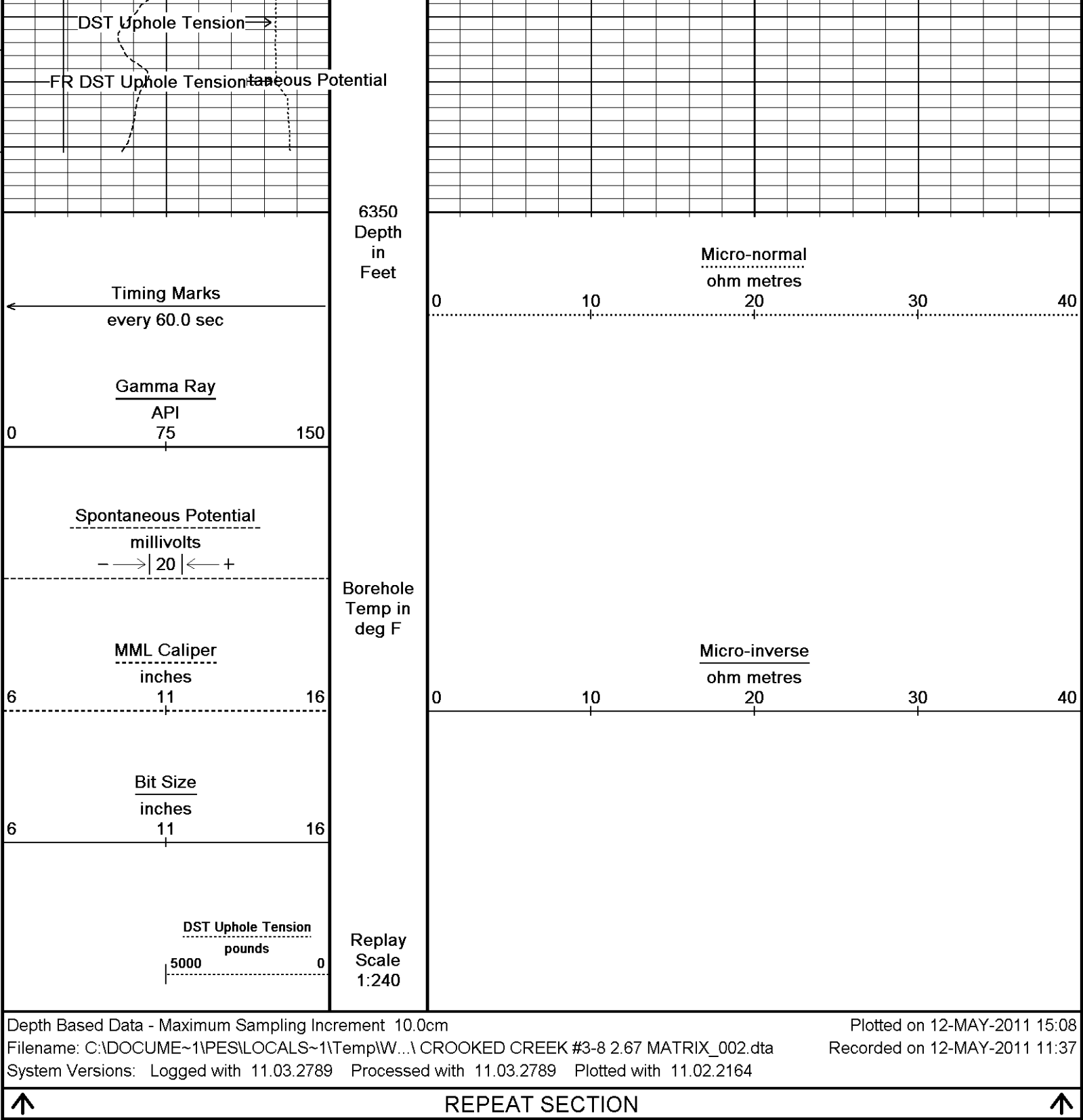
120°

6300

FR Micro-normal

Micro-inverse





BEFORE SURVEY CALIBRATION		
C:\DOCUME~1\PES\LOCALS~1\Temp\Weatherford PreView\0\ CROOKED CREEK #3-8.dta		
General Constants All 000		Last Edited on 12-MAY-2011,14:39
General Parameters		
Mud Resistivity	0.360	ohm-metres
Mud Resistivity Temperature	91.000	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	4.500	inches	
Caliper for Differential Caliper	Density Caliper		
Rwa Parameters			
Porosity used	Base Density Porosity		
Resistivity used	Array Ind. One Res Rt		
RWA Constant A	1.000		
RWA Constant M	2.000		
Down-hole Tension Calibration All 000			
			Field Calibration on 30-JUN-2010
Reading No	Measured	Calibrated (lbs)	
1	14112.01	10.00	
2	15164.79	427.00	
Down-hole Tension Calibration SMS 0			
			Field Calibration on 30-JUN-2010
Reading No	Measured	Calibrated (lbs)	
1	14112.01	10.00	
2	15164.79	427.00	
High Resolution Temperature Calibration MCG-C 139			
			Field Calibration on 03-SEP-2010,11:23
	Measured	Calibrated(Deg F)	
Lower	50.00	50.00	
Upper	75.00	75.00	
High Resolution Temperature Constants MCG-C 139			
			Last Edited on
Pre-filter Length	11		
SP Calibration MCG-C 139			
			Field Calibration on 04-MAR-2011 06:37
	Measured	Calibrated (mV)	
Reference 1	103.7	100.0	
Reference 2	-96.9	-100.0	
Gamma Calibration MCG-C 139			
			Field Calibration on 03-MAY-2011 10:00
	Measured	Calibrated (API)	
Background	65	43	
Calibrator (Gross)	1142	768	
Calibrator (Net)	1077	725	
Gamma Constants MCG-C 139			
			Last Edited on 08-MAY-2011,18:39
Gamma Calibrator Number	grc38		
Mud Density	1.09	gm/cc	
Caliper Source for Processing	Density Caliper		
Tool Position	Eccentred		
Concentration of KCl	0.00	kppm	
Micro Normal and Micro Inverse Calibration MML-A 16			
			Base Calibration on 11-MAR-2011 11:10
			Field Check on 25-APR-2011 20:38
Base Calibration			
		Measured	Calibrated (ohm-m)
Channel	Resistor 1	Resistor 2	Resistor 1 Resistor 2
Micro Normal	12.2	60.2	2.6 12.8
Micro Inverse	15.6	78.3	1.7 8.4
Channel	Base Check (ohm-m)		Field Check (ohm-m)
Micro Normal	32.1		32.1
Micro Inverse	16.3		16.3
Micro Normal and Micro Inverse Constants MML-A 16			
			Last Edited on 11-APR-2011,09:08
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 16			
			Base Calibration on 11-MAR-2011 11:20
			Field Calibration on 03-MAY-2011 09:52

Base Calibration		
Reading No	Measured	Calibrator Size (in)
1	13875	5.98
2	17350	7.97
3	20581	9.86
4	24656	11.92
5	0	0.00
6	N/A	N/A
Field Calibration		
	Measured Caliper (in)	Actual Caliper (in)
	6.05	5.98

Neutron Calibration MDN-A.B 66				Base Calibration on 11-MAR-2011 13:54	
				Field Check on 03-MAY-2011 09:48	
Base Calibration					
		Measured		Calibrated (cps)	
	Near	Far		Near	Far
	3091	97		3714	110
Ratio	31.957			33.764	
Field Calibrator at Base				Calibrated (cps)	
				1660	2371
Ratio				0.700	
Field Check				Calibrated (cps)	
				1651	2372
Ratio				0.696	

Neutron Constants MDN-A.B 66			Last Edited on 08-MAY-2011,18:39		
Neutron Source Id	P58125B				
Neutron Jig Number	5824NE				
Epithermal Neutron	No				
Caliper Source for Processing	Density Caliper				
Stand-off	0.00	inches			
Mud Density	1.09	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			
Formation Fluid Salinity Source	Constant Value				
Formation Fluid Salinity	0.00	kppm			
Barite Mud Correction	Not Applied				

FE Calibration MFE-A.A 52			Base Calibration on 11-MAR-2011 10:55	
			Field Check on 25-APR-2011 20:34	
Base Calibration				
	Measured	Calibrated (ohm-m)		
Reference 1	0.0	0.0		
Reference 2	965.7	126.8		
Base Check		279.9		
Field Check		279.9		

FE Constants MFE-A.A 52				Last Edited on 28-APR-2011,22:25	
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	

High Resolution Temperature Calibration MAI-A.A 167			Field Calibration on 17-JAN-2011,18:32	
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Lower	Measured	Calibrated(Deg F)
Upper	1.00	33.80
	11.00	51.80

High Resolution Temperature Constants MAI-A.A 167	Last Edited on
Pre-filter Length	11

Induction Calibration MAI-A.A 167				Base Calibration on 11-MAR-2011,09:58	
				Field Check on 25-APR-2011 20:33	
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	0.0	0.0	12.0	3842.1	
2	0.0	0.0	29.3	3480.2	
3	0.0	0.0	28.9	3055.9	
4	0.0	0.0	19.7	2083.5	
Deep	0.0	0.0	18.4	2050.7	
Medium	0.0	0.0	42.1	3995.2	
Shallow	0.0	0.0	42.5	5059.1	
Array Temperature		0.0	57.8	Deg F	

Induction Constants MAI-A.A 167				Last Edited on 24-APR-2011,22:39	
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			

Caliper Calibration MPD-B 35

Base Calibration on 11-MAR-2011 11:34
Field Calibration on 03-MAY-2011 09:34

Base Calibration

Reading No	Measured	Calibrator Size (in)
1	17936	3.99
2	28079	5.98
3	38384	7.97
4	48048	9.86
5	59047	11.92
6	N/A	N/A

Field Calibration

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

Photo Density Calibration MPD-B 35

Base Calibration on 11-MAR-2011 11:54
Field Check on 03-MAY-2011 09:41

Density Calibration

Base Calibration	Measured		Calibrated (sdu)	
	Near	Far	Near	Far
Reference 1	57876	27553	59556	30836
Reference 2	23524	2615	24941	2541

Field Check at Base

1175.2 1398.5

Field Check

1175.2 1388.6

PE Calibration

Base Calibration	WS	Measured		Calibrated Ratio
		WH	Ratio	
Background	211	1039		
Reference 1	21426	57673	0.375	0.371
Reference 2	6234	23377	0.270	0.272

Field Check at Base

211.2 1039.0

Field Check

211.0 1039.0

Density Constants MPD-B 35

Last Edited on 08-MAY-2011,18:40

Density Source Id	p50557b
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	1.09 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
0.00	0.00

DOWNHOLE EQUIPMENT

C:\DOCUME~1\PES\LOCALS~1\Temp\Weatherford PreView\0\ CROOKED CREEK #3-8.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-C 139 LG: 8.70 ft WT: 63.9 lb OD: 2.24 in

Compact Micro-log
 MML-A 16 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

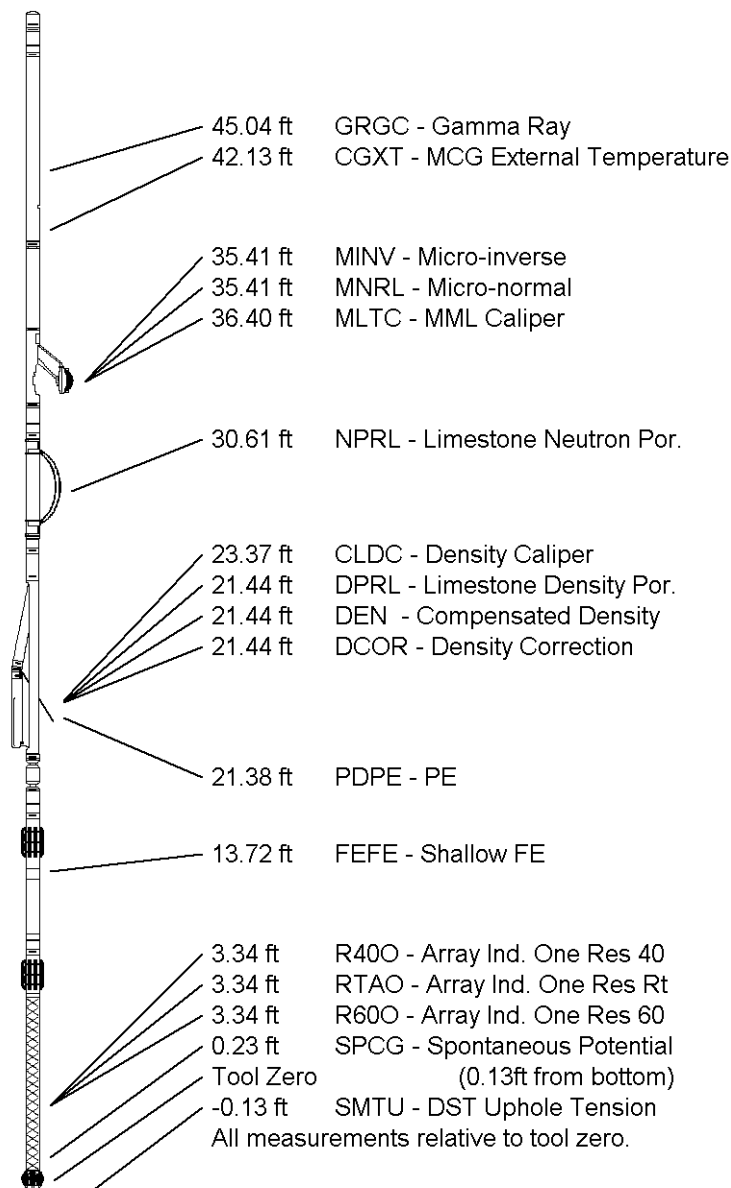
Compact Density/Caliper
 MPD-B 35 LG: 9.59 ft WT: 90.4 lb OD: 2.45 in

SKJ-D.A Compact Knuckle Joint
 SKJ-D.A 36 LG: 2.17 ft WT: 24.3 lb OD: 2.24 in

Compact Focussed Electric
 MFE-A.A 52 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: 51.90 ft Weight: 423.3 lb



COMPANY	O'BRIEN ENERGY
WELL	CROOKED CREEK #3-8
FIELD	ANGELL SOUTH
PROVINCE/COUNTY	MEADE
COUNTRY/STATE	UNITED STATES / KANSAS

Elevation Kelly Bushing	2699.00	feet	First Reading	6295.00	feet
Elevation Drill Floor	2697.00	feet	Depth Driller	6330.00	feet
Elevation Ground Level	2687.00	feet	Depth Logger	6330.00	feet



MICRORESISTIVITY LOG

