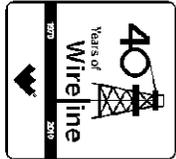




# Weatherford

## MICRORESISTIVITY LOG

COMPANY **O'BRIEN ENERGY RESOURCES CORP.**  
 WELL **EAGLE # 1-10**  
 FIELD **NOVINGER SOUTHWEST**  
 PROVINCE/COUNTY **MEADE**  
 COUNTRY/STATE **U.S.A. / KANSAS**  
 LOCATION **660' FNL & 1980' FWL**



SEC **10** TWP **34S** RGE **30W** Other Services  
 API Number **15-119-21298** MPD/MDN  
 Permit Number **MAI/MFE**

Permanent Datum G.L., Elevation 2681 feet  
 Log Measured From **KB** Elevations: **KB 2693.00**  
 Drilling Measured From **K.B. @ 12 FEET** **DF 2691.00**  
**GL 2681.00**

Date	13-OCT-2011
Run Number	ONE
Depth Driller	6300.00 feet
Depth Logger	6292.00 feet
First Reading	6256.00 feet
Last Reading	2500.00 feet
Casing Driller	1505.00 feet
Casing Logger	1500.00 feet
Bit Size	7.875 inches
Hole Fluid Type	CHEMICAL
Density / Viscosity	9.10 lb/USg 60.00 CP
PH / Fluid Loss	11.00 6.80 ml/30Min
Sample Source	MML DOWNHOLE
Rm @ Measured Temp	0.90 @ 82.0 ohm-m
Rmf @ Measured Temp	0.72 @ 82.0 ohm-m
Rmc @ Measured Temp	1.08 @ 82.0 ohm-m
Source Rmf / Rmc	CALC CALC
Rm @ BHT	0.60 @125.0 ohm-m
Time Since Circulation	5 HOURS
Max Recorded Temp	126.00 deg F
Equipment Name	COMPACT
Equipment / Base	13096 LIB
Recorded By	A. GIAMBALVO
Witnessed By	ROGER PEARSON
S.O. / JOB #	3531163

BOREHOLE RECORD			Last Edited: 13-OCT-2011 18:11
Bit Size inches	Depth From feet	Depth To feet	
7.875	1500.00	6292.00	

CASING RECORD				
Type	Size inches	Depth From feet	Shoe Depth feet	Weight pounds/ft
SURFACE	8.625	0.00	1500.00	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 = 888 Cubic Feet  
 Service order #3531163  
 Rig: Duke #6  
 Engineer: A. Giambalvo, W. Stambaugh  
 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.

5 INCH MAIN

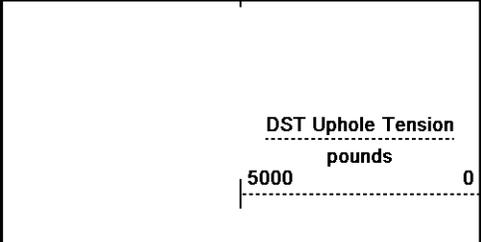
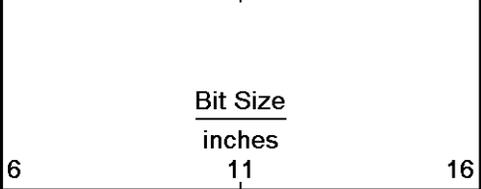
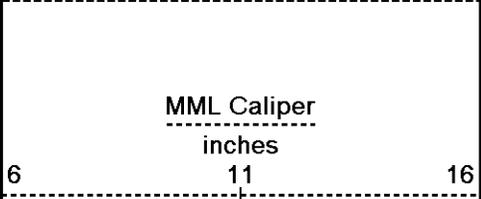
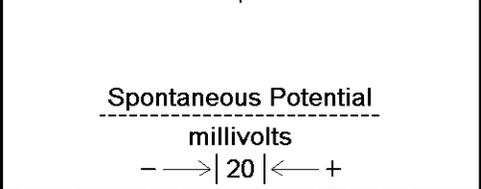
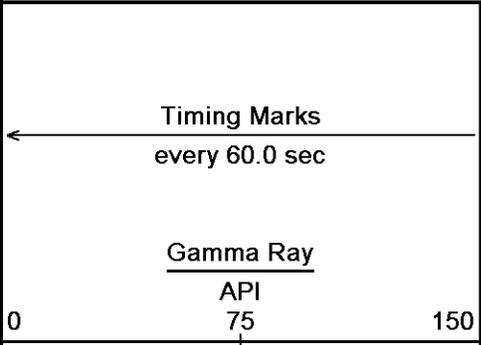
Depth Based Data - Maximum Sampling Increment 10.0cm

Plotted on 29-DEC-2011 10:38

Filename: C:\Users\Joe\AppData\Local\Temp\Weatherford PreView\O'Brien Eagle # 1-10\_004.dta

Recorded on 13-OCT-2011 15:17

System Versions: Logged with 11.03.4044 Plotted with 12.01.3513



Depth in Feet

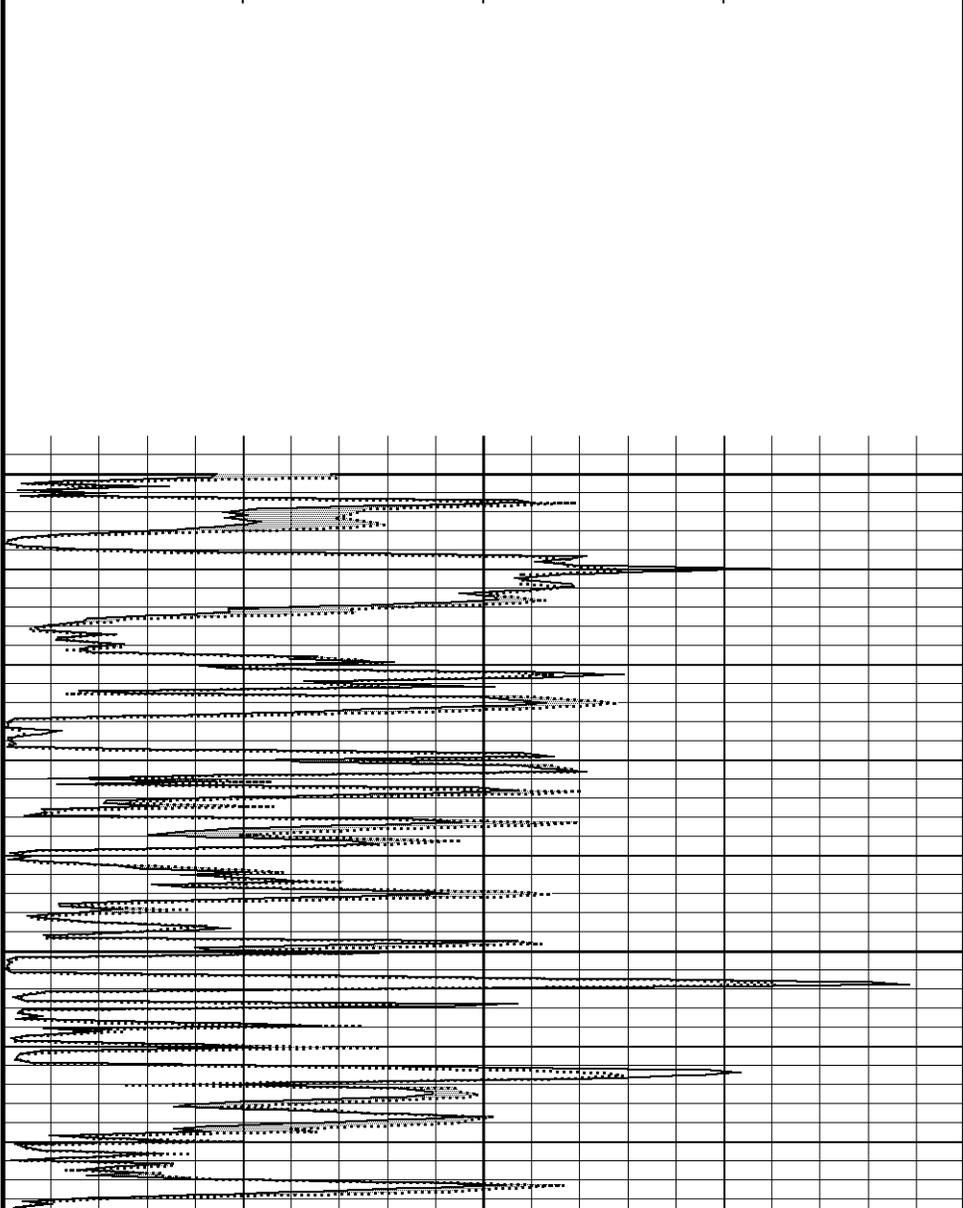
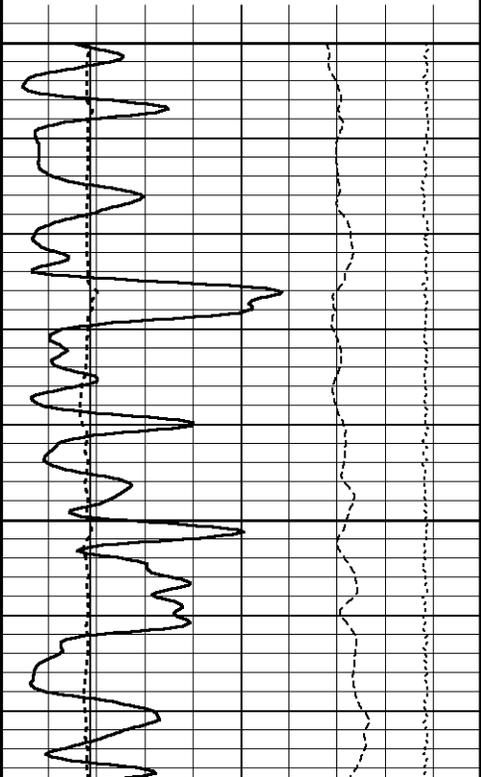
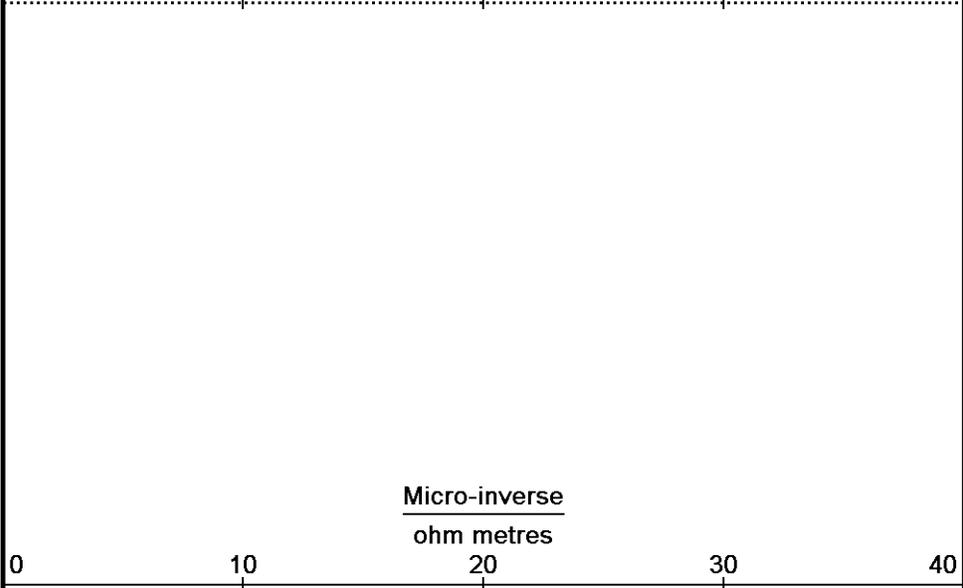
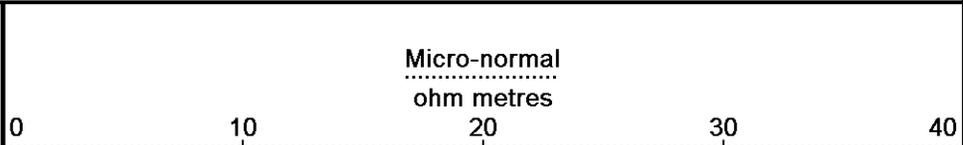
Borehole Temp in deg F

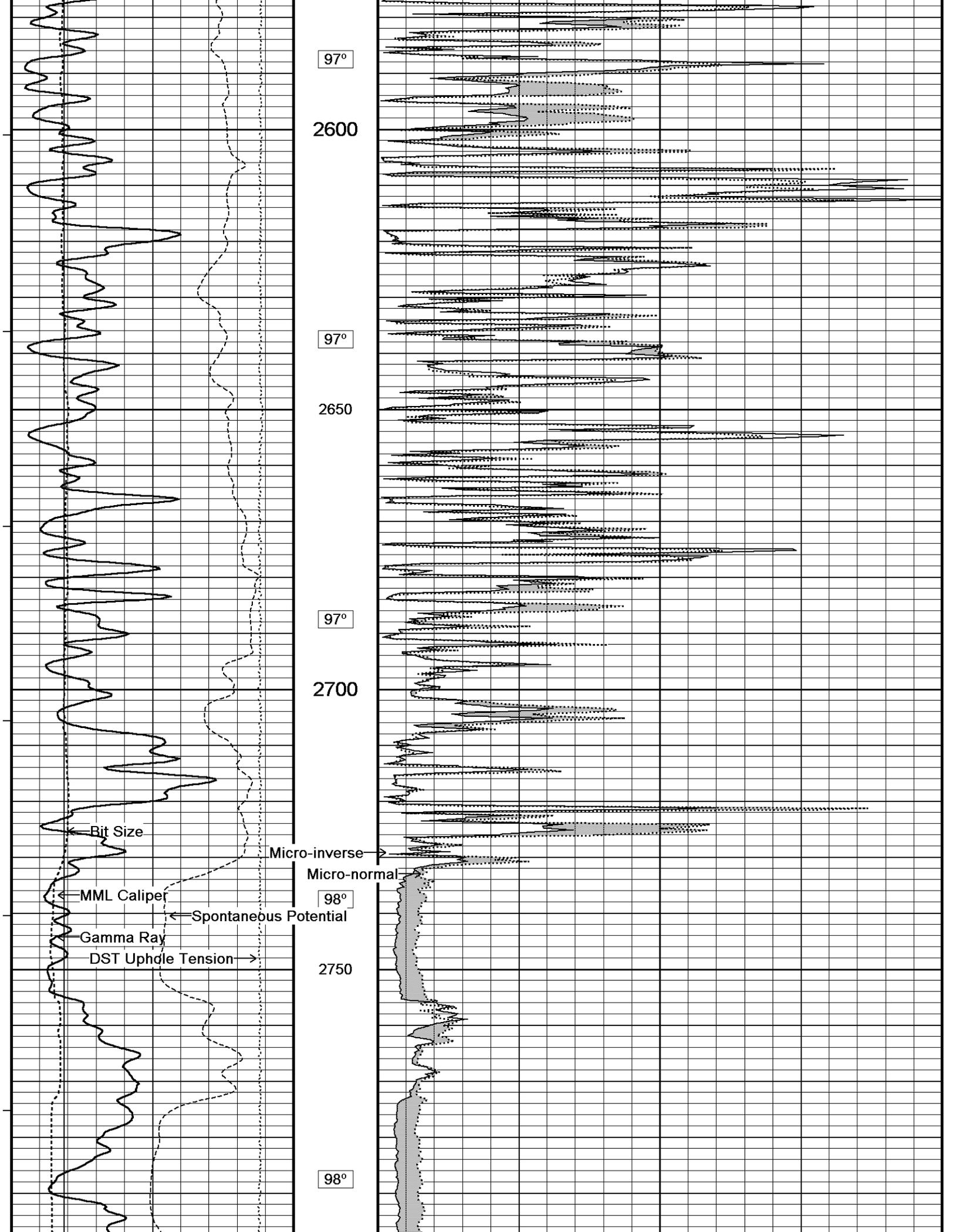
Replay Scale 1:240

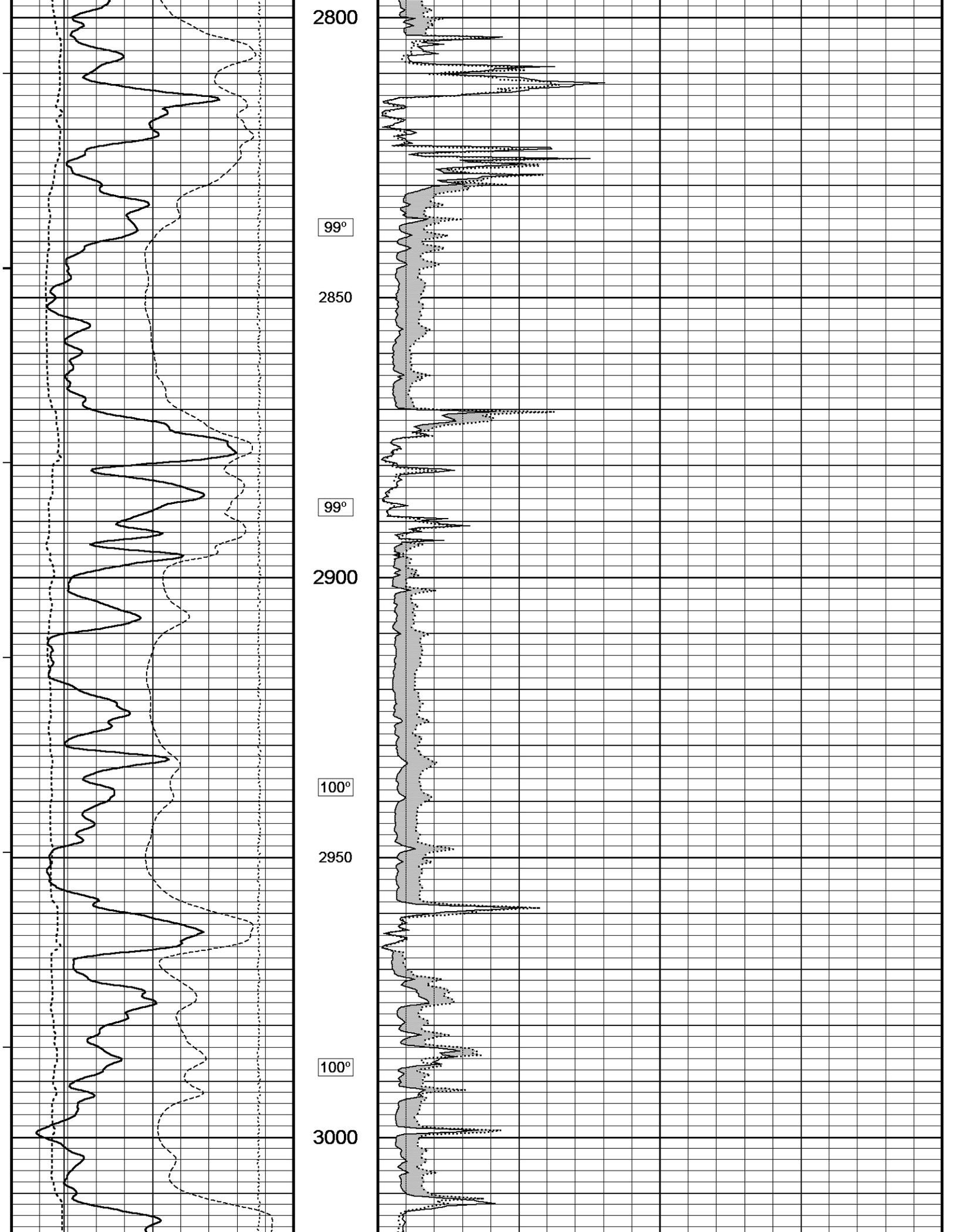
2500

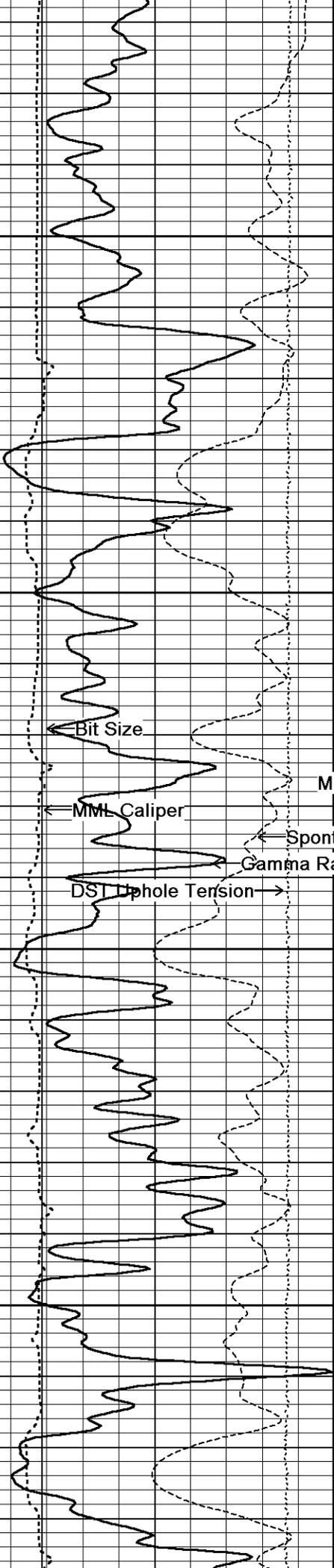
96°

2550









100°

3050

101°

3100

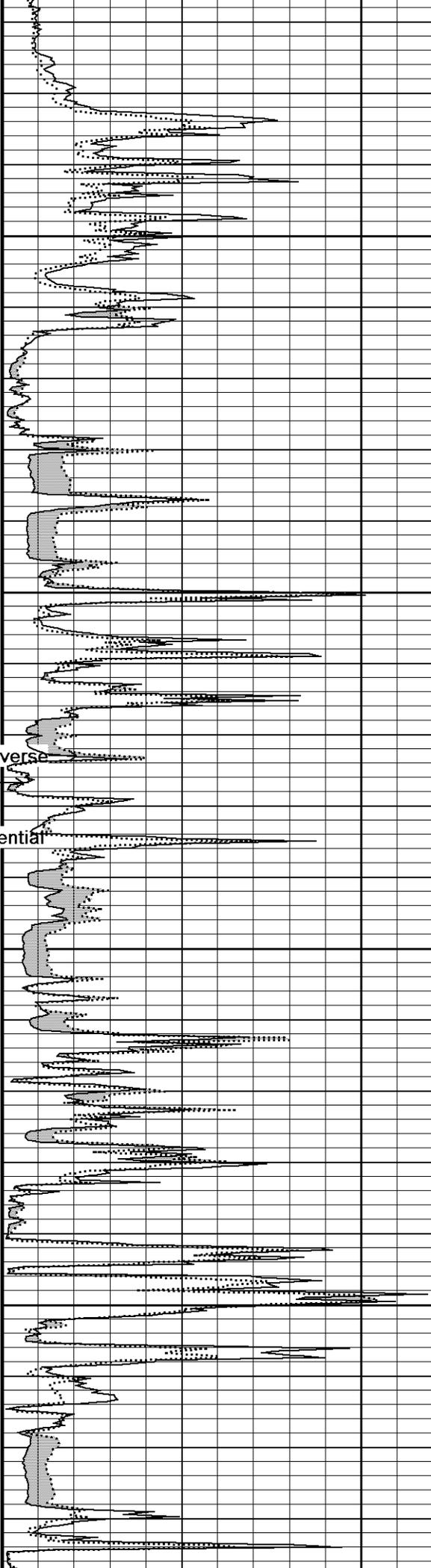
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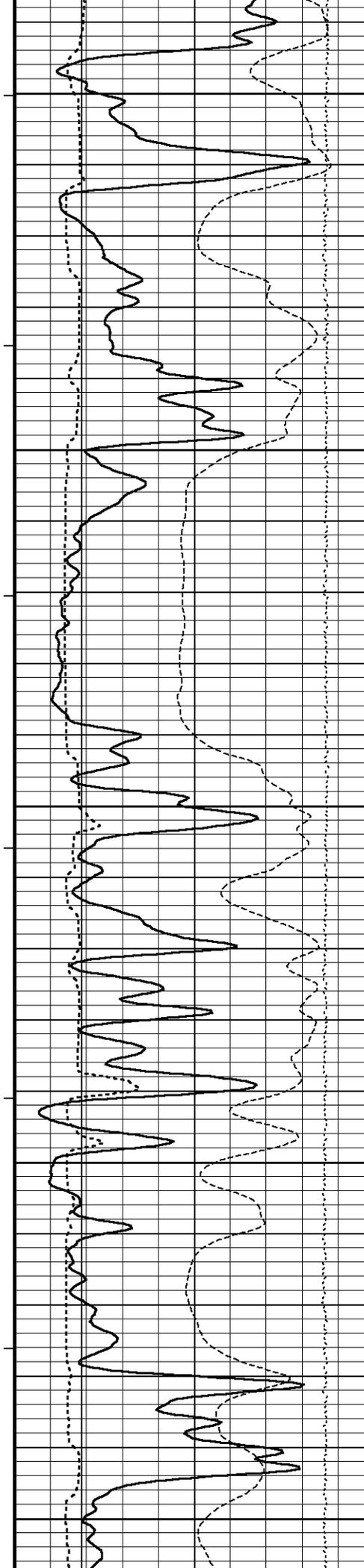
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101°

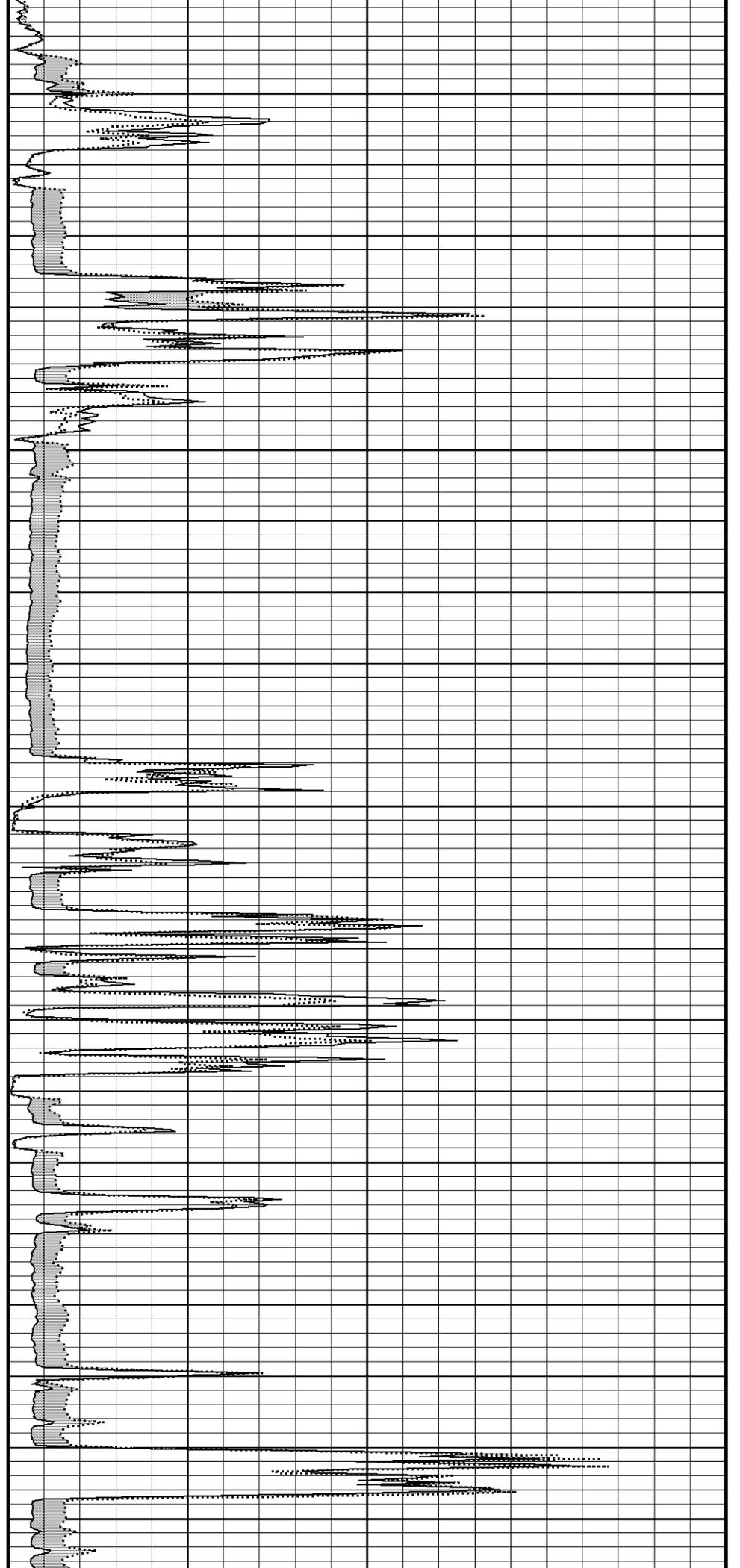
3200

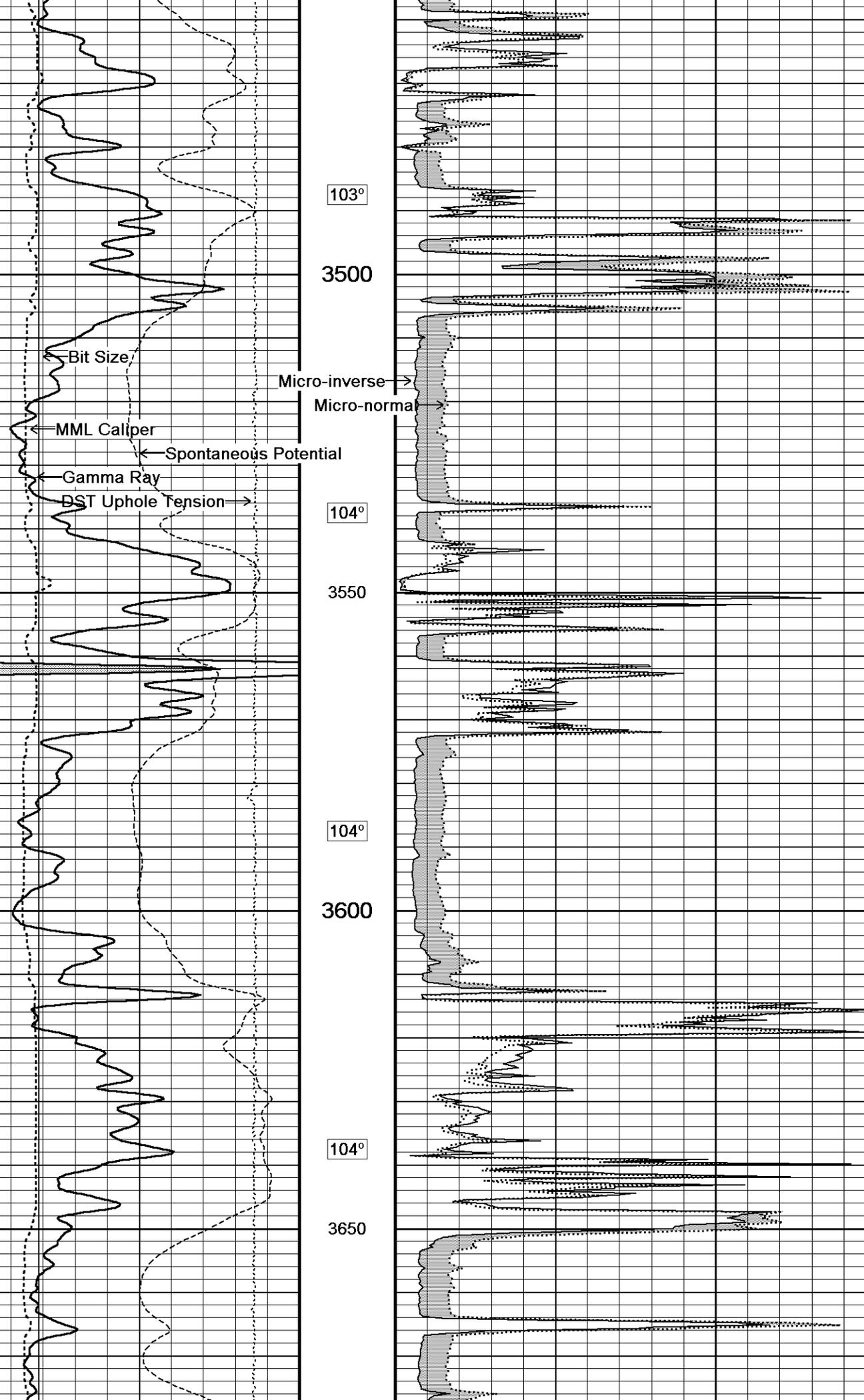
100°

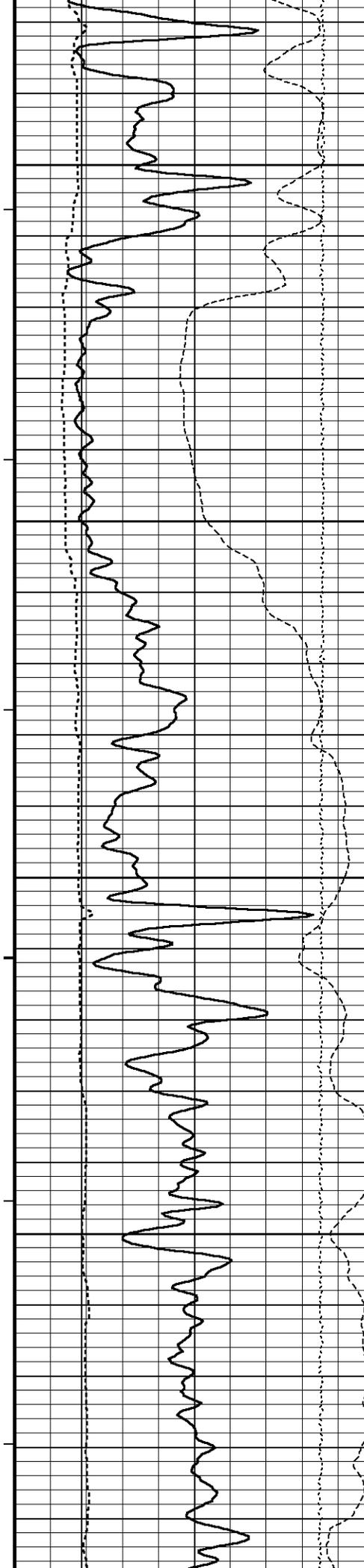




102°  
3250  
102°  
3300  
102°  
3350  
103°  
3400  
103°  
3450







105°

3700

105°

3750

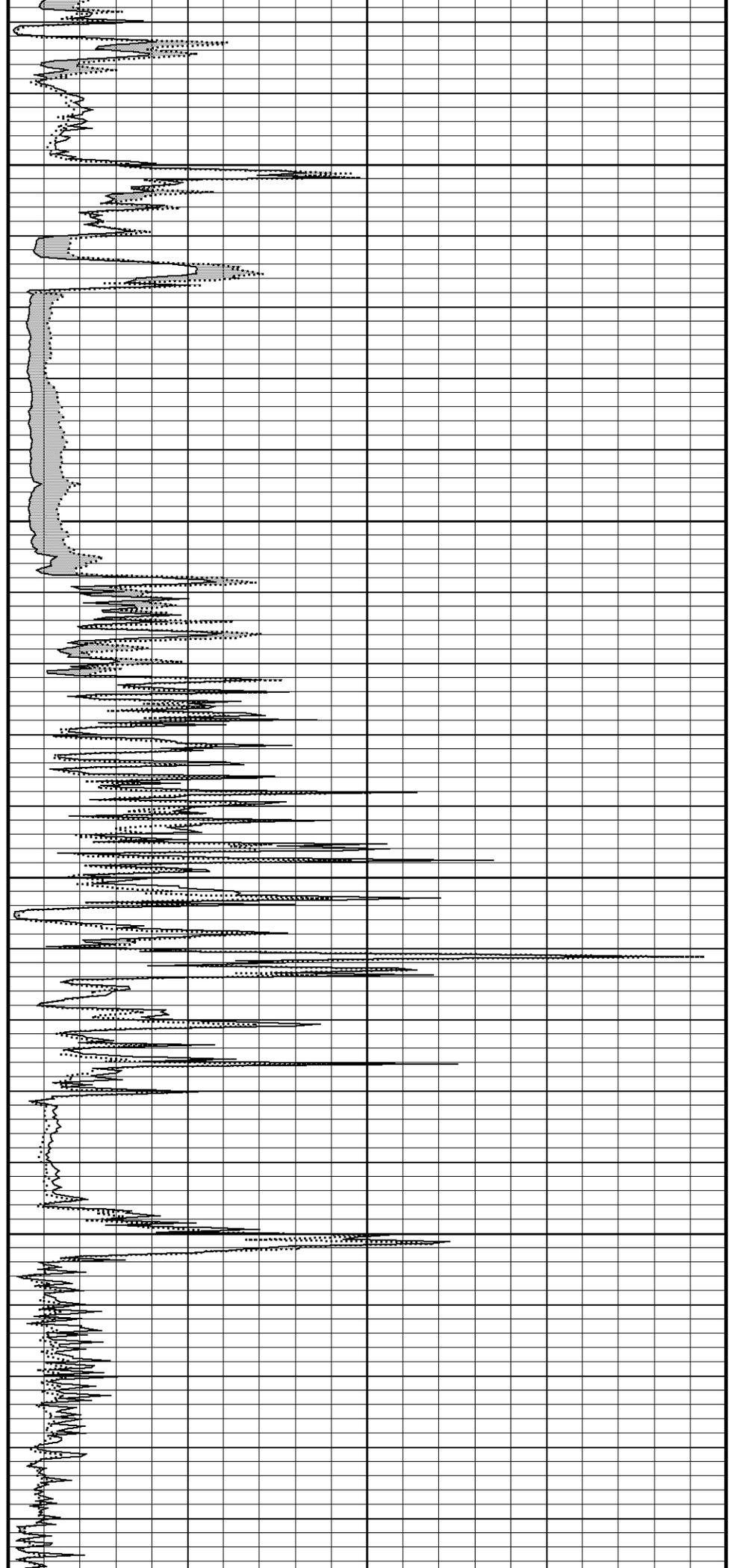
106°

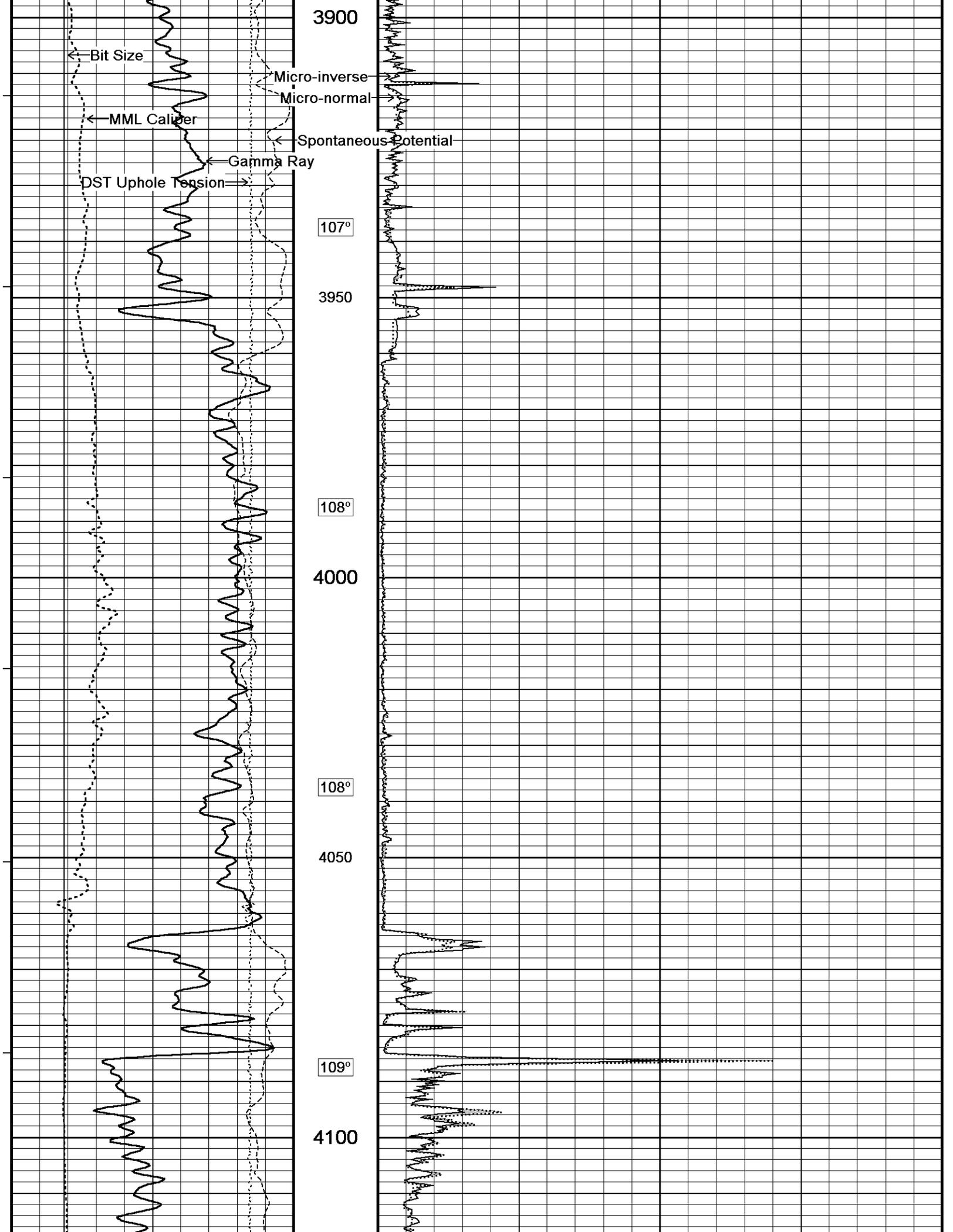
3800

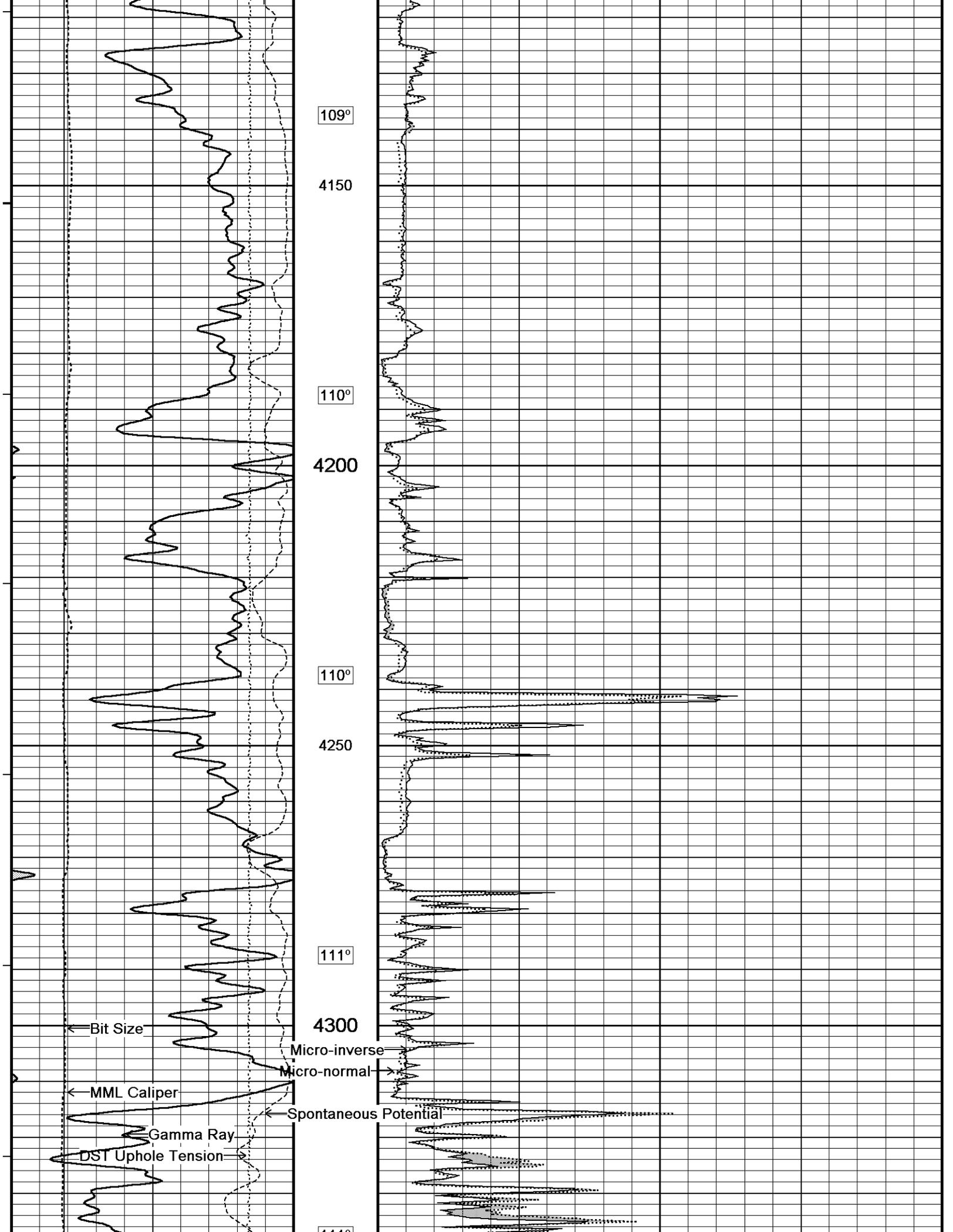
106°

3850

107°







109°

4150

110°

4200

110°

4250

111°

4300

4400

← Bit Size

← MML Caliper

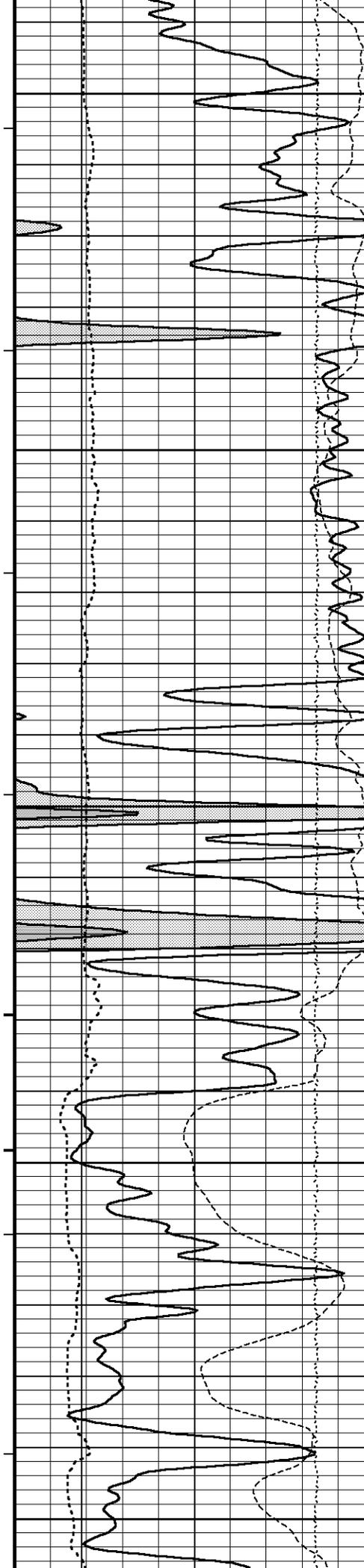
Gamma Ray

DST Uphole Tension

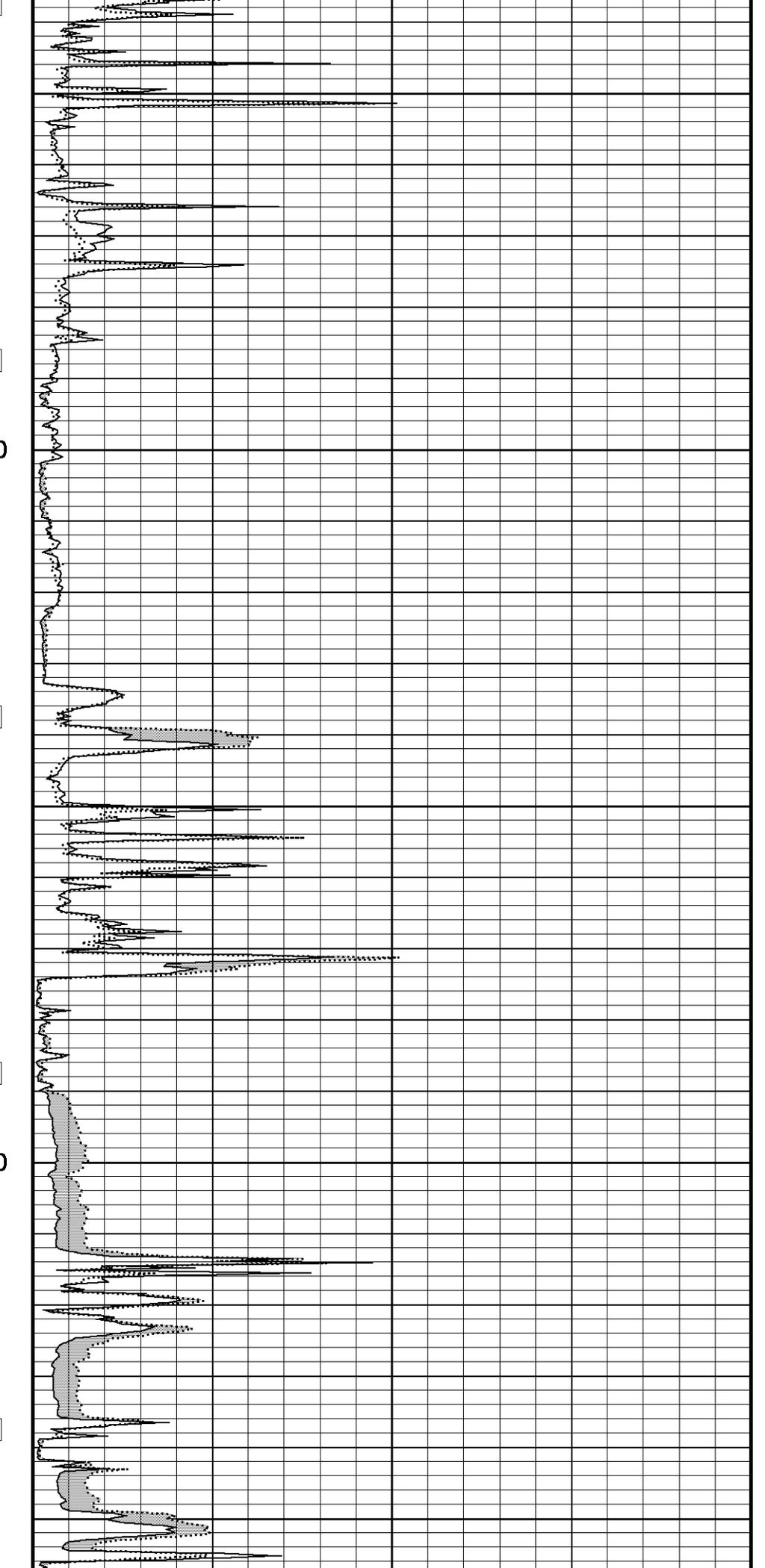
Micro-inverse

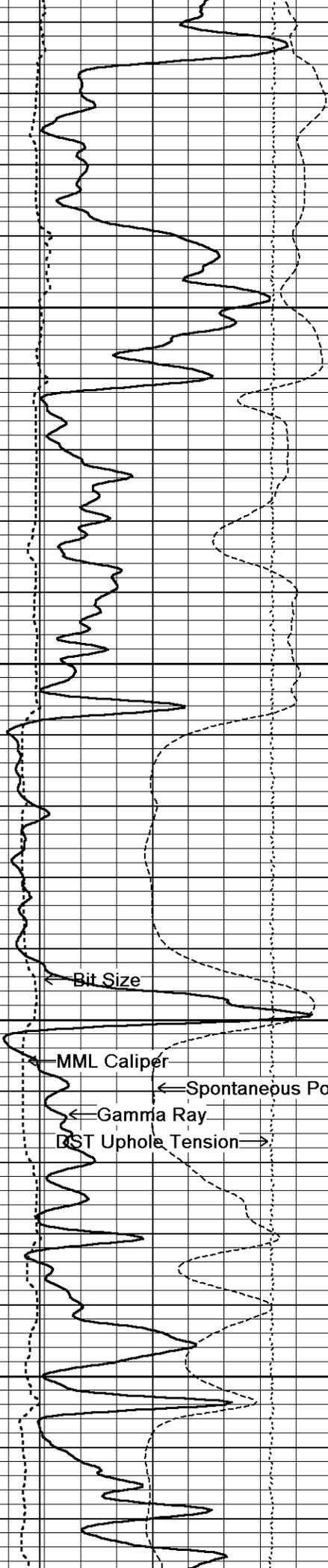
Micro-normal

← Spontaneous Potential



111°  
4350  
112°  
4400  
112°  
4450  
112°  
4500  
113°  
4550





113°

4600

114°

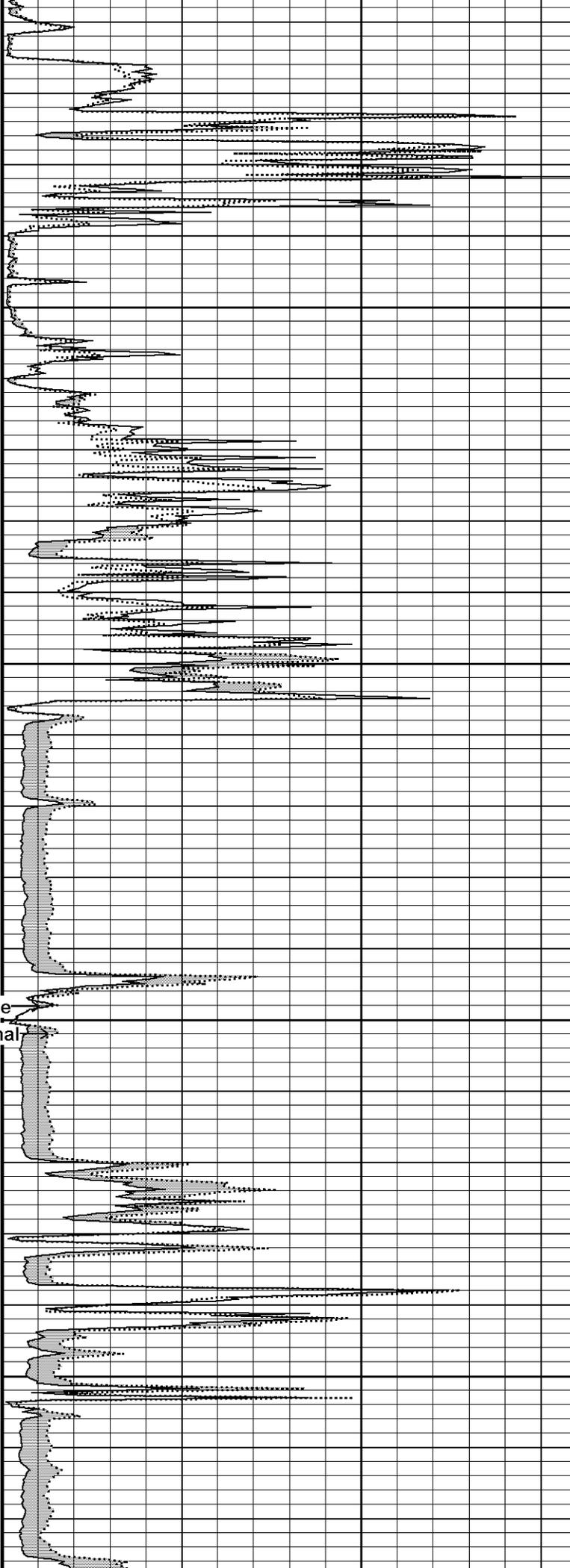
4650

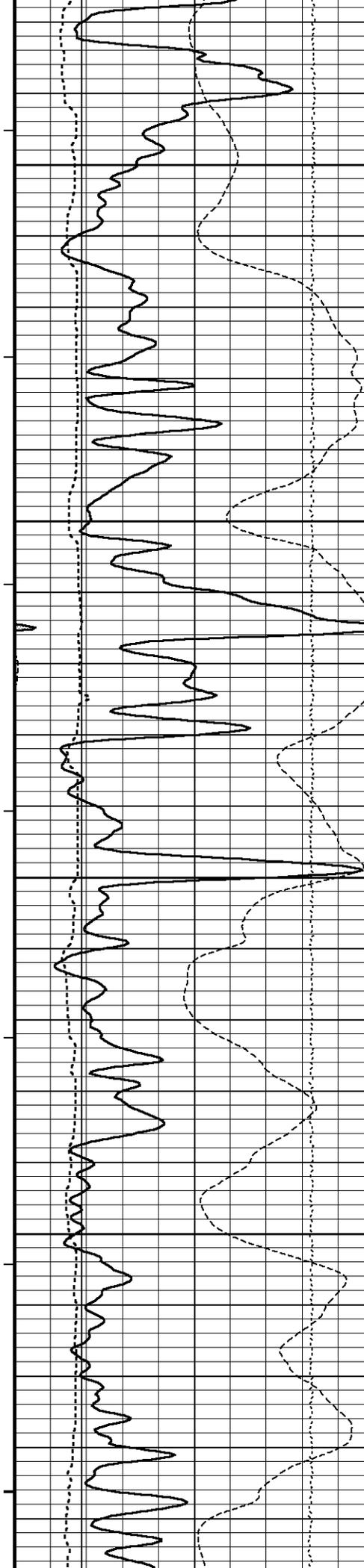
114°

4700  
Micro-inverse  
Micro-normal

114°

4750





115°

4800

115°

4850

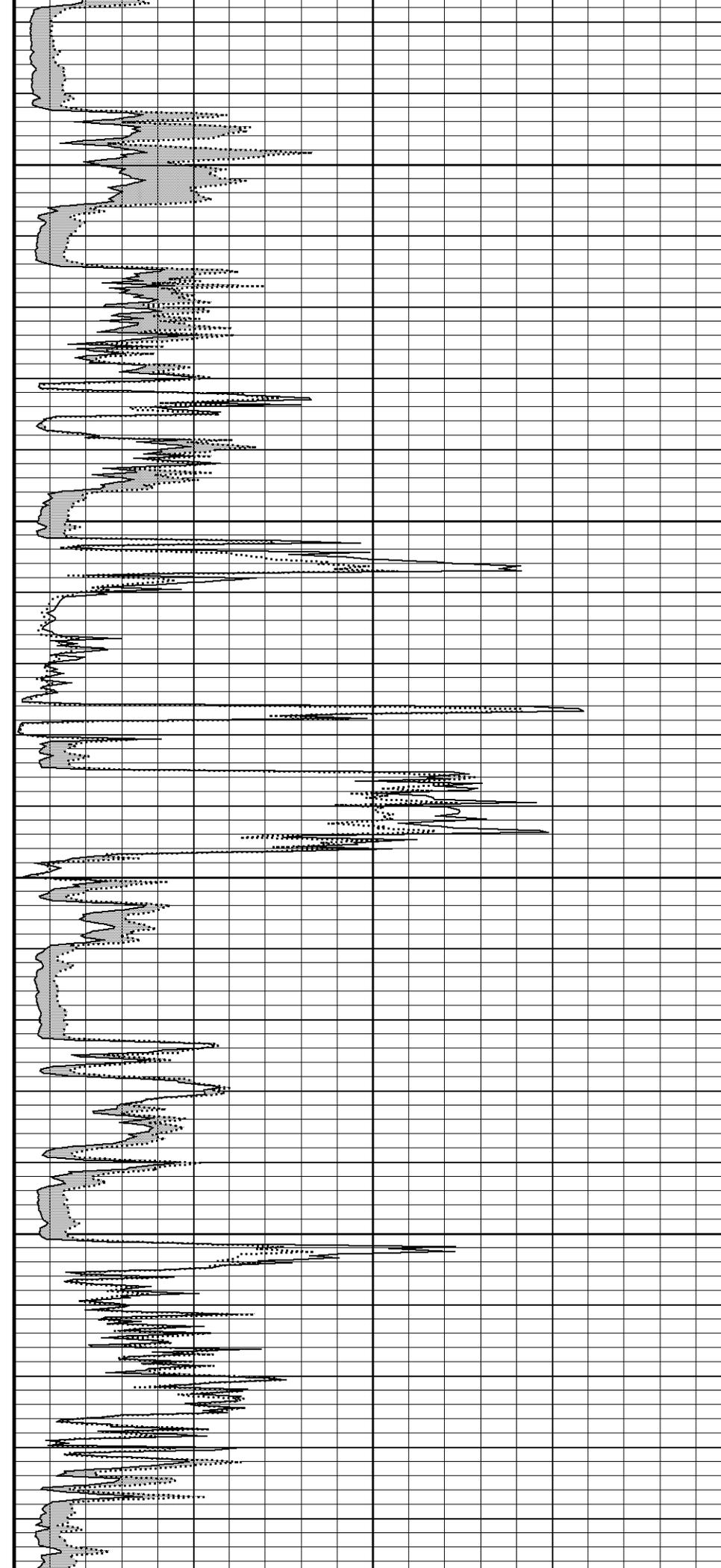
115°

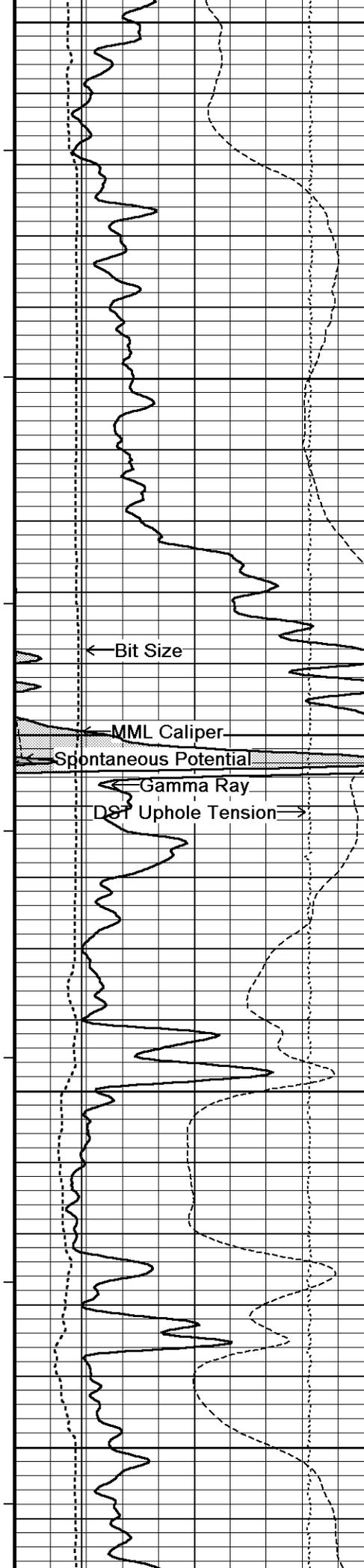
4900

115°

4950

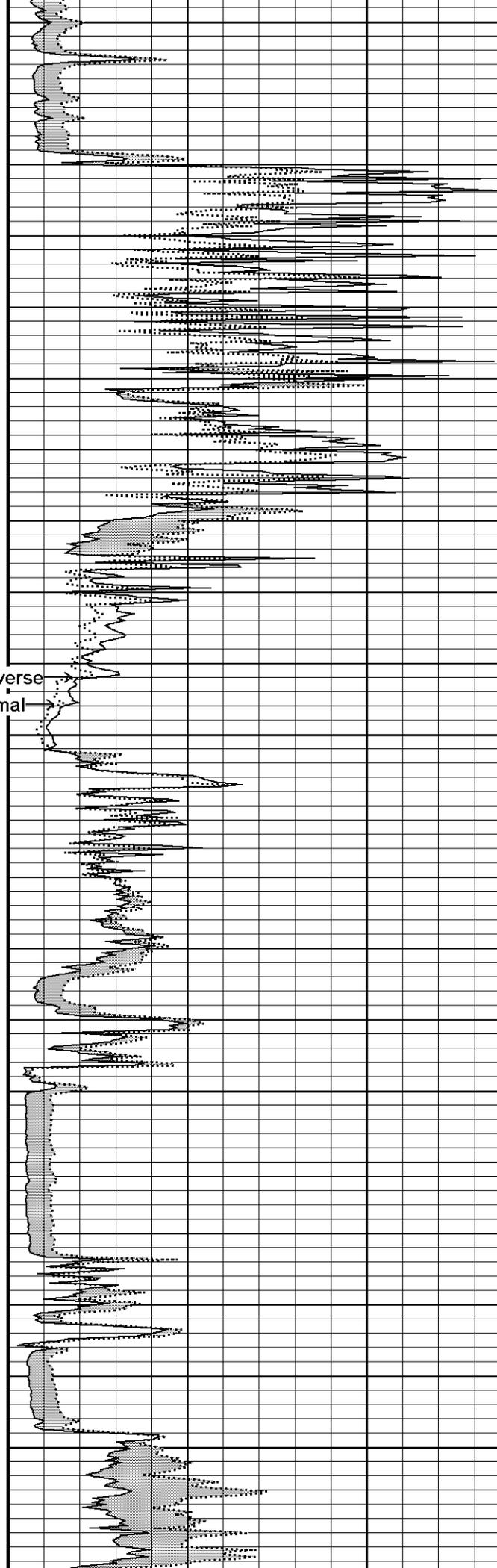
116°

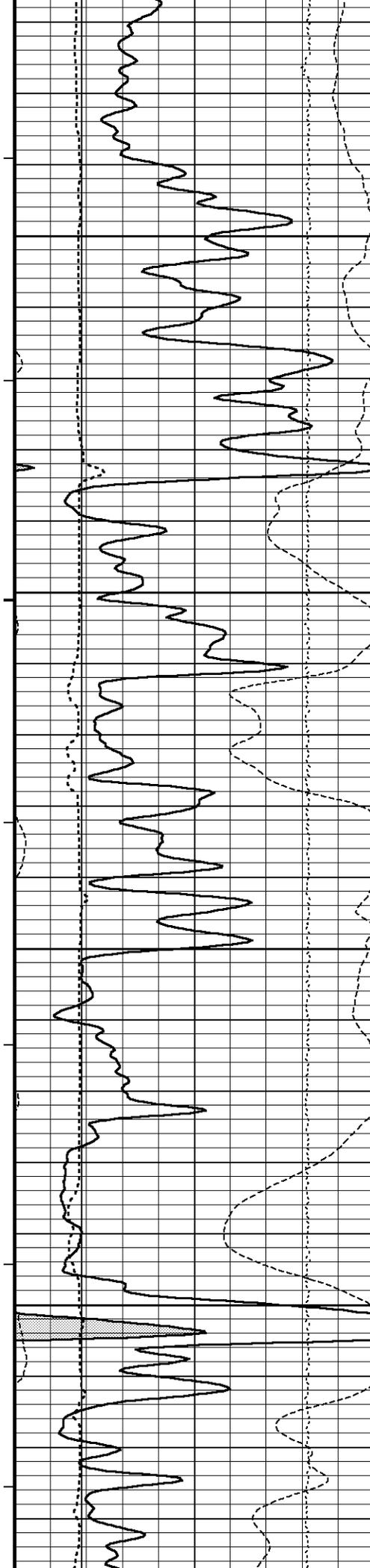




5000  
116°  
5050  
116°  
5100  
117°  
5150  
117°  
5200

Micro-inverse  
Micro-normal





118°

5250

118°

5300

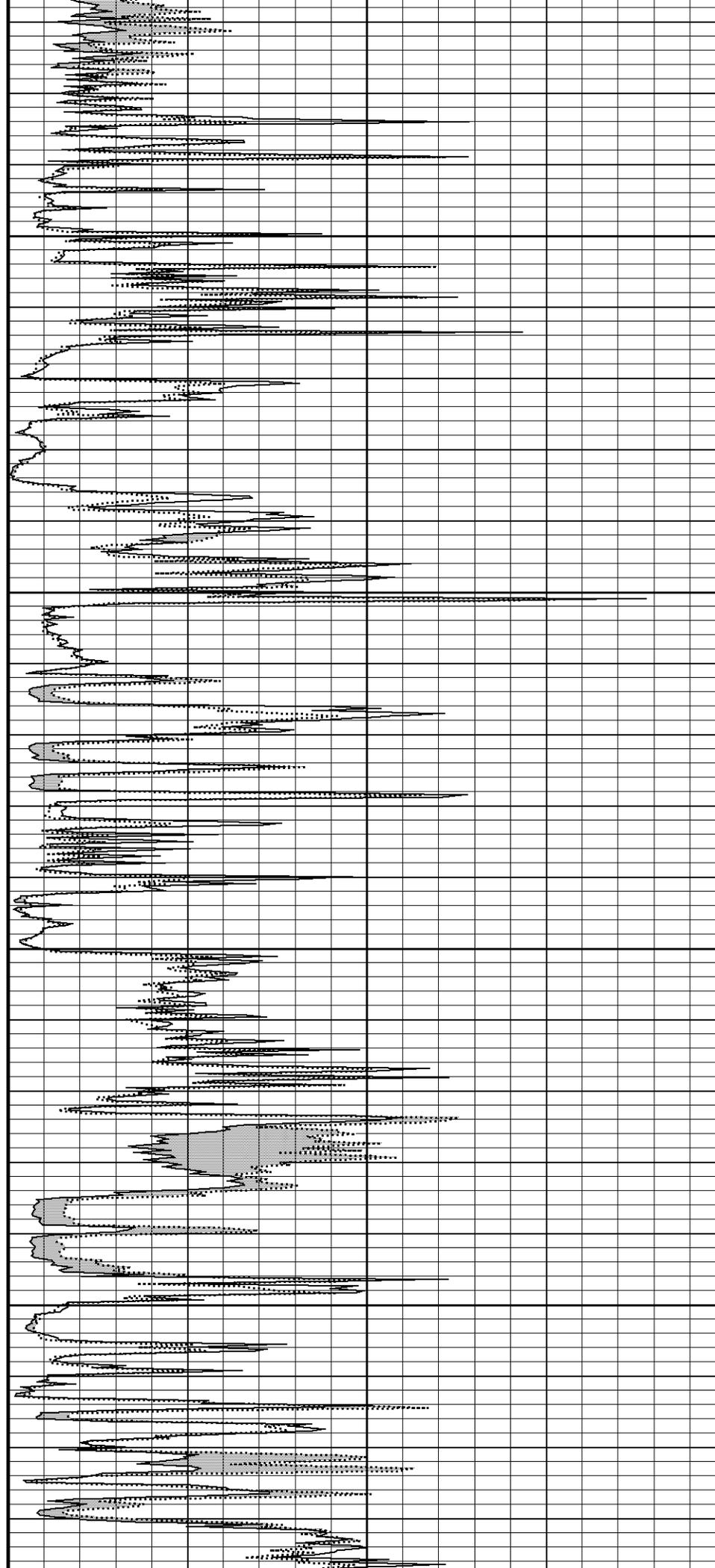
119°

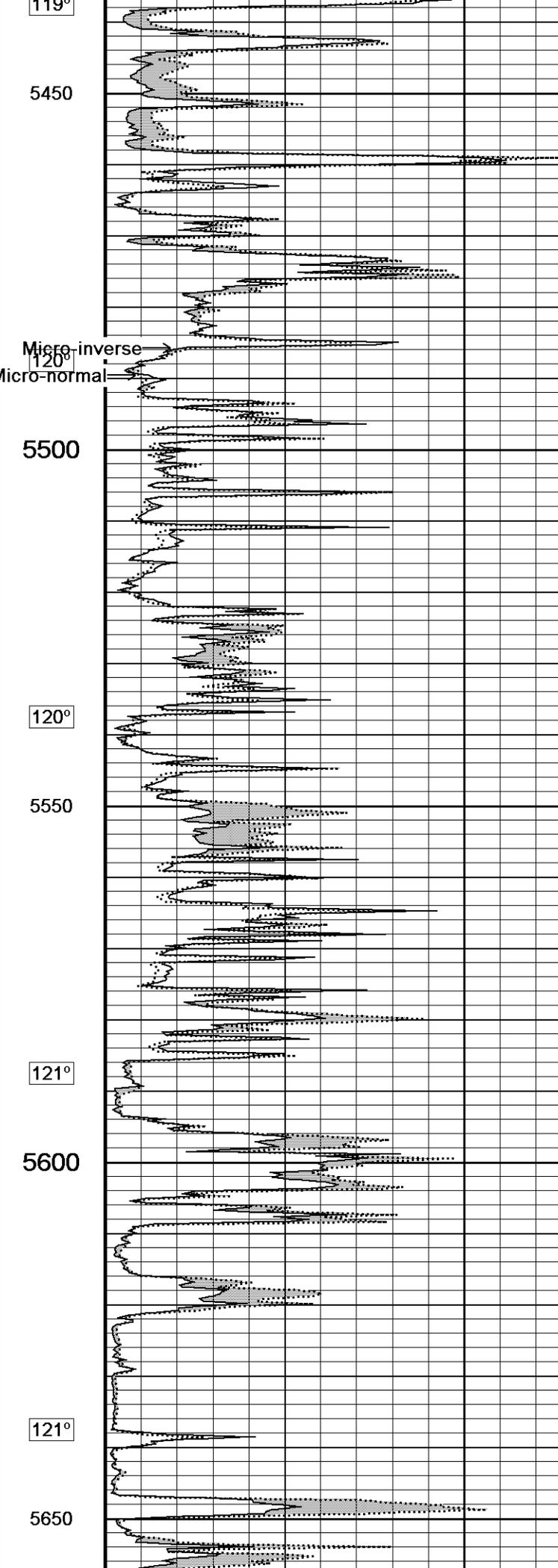
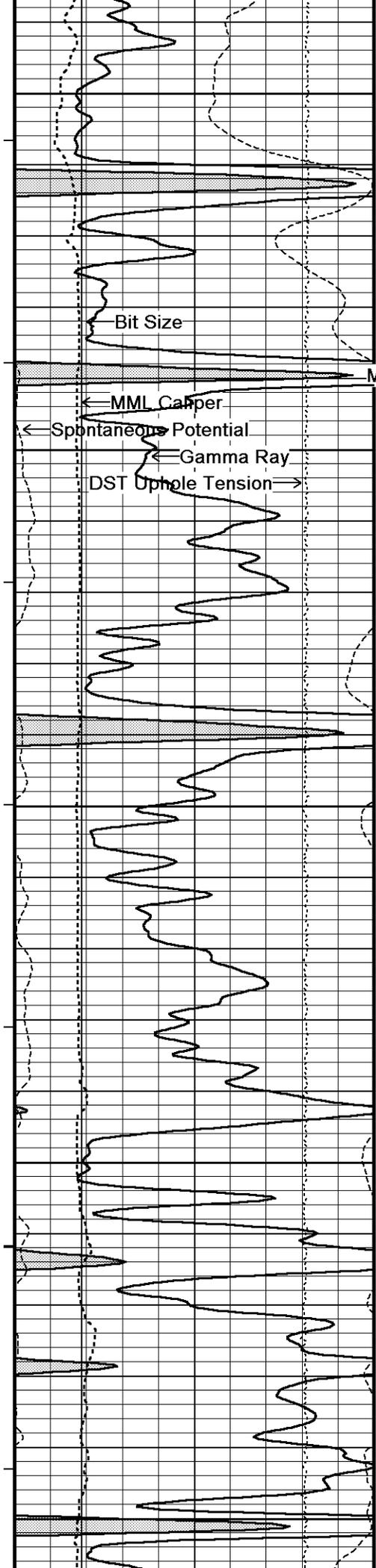
5350

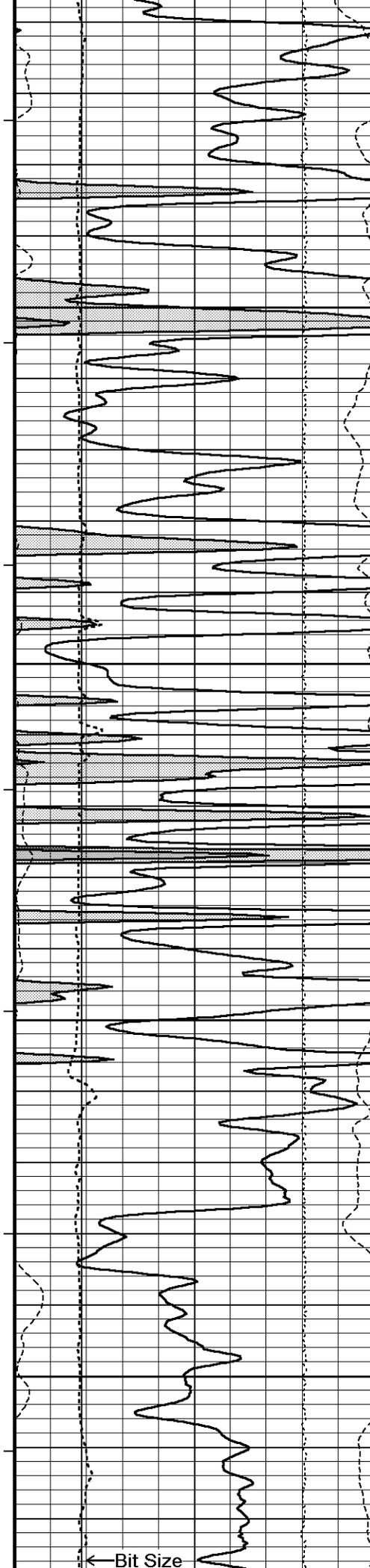
119°

5400

119°







121°

5700

122°

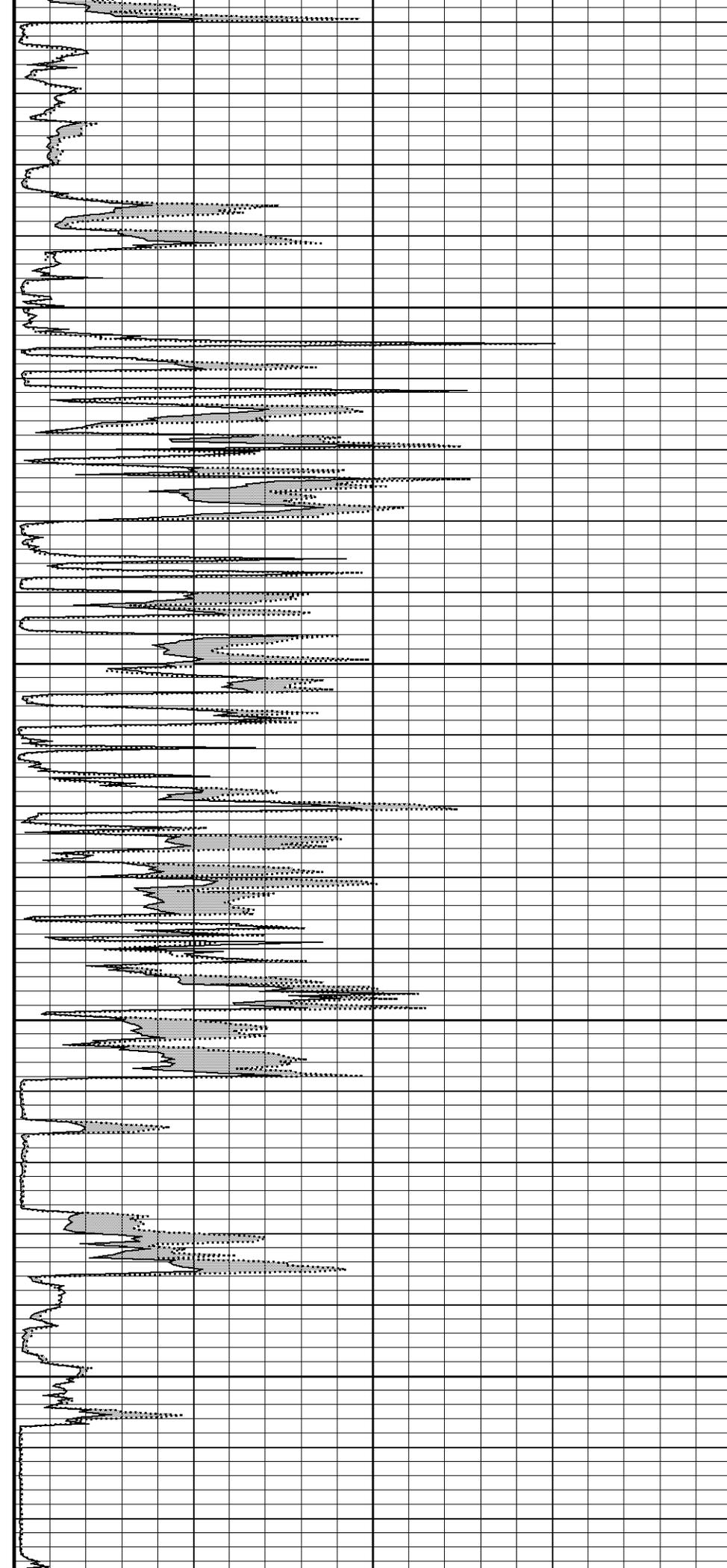
5750

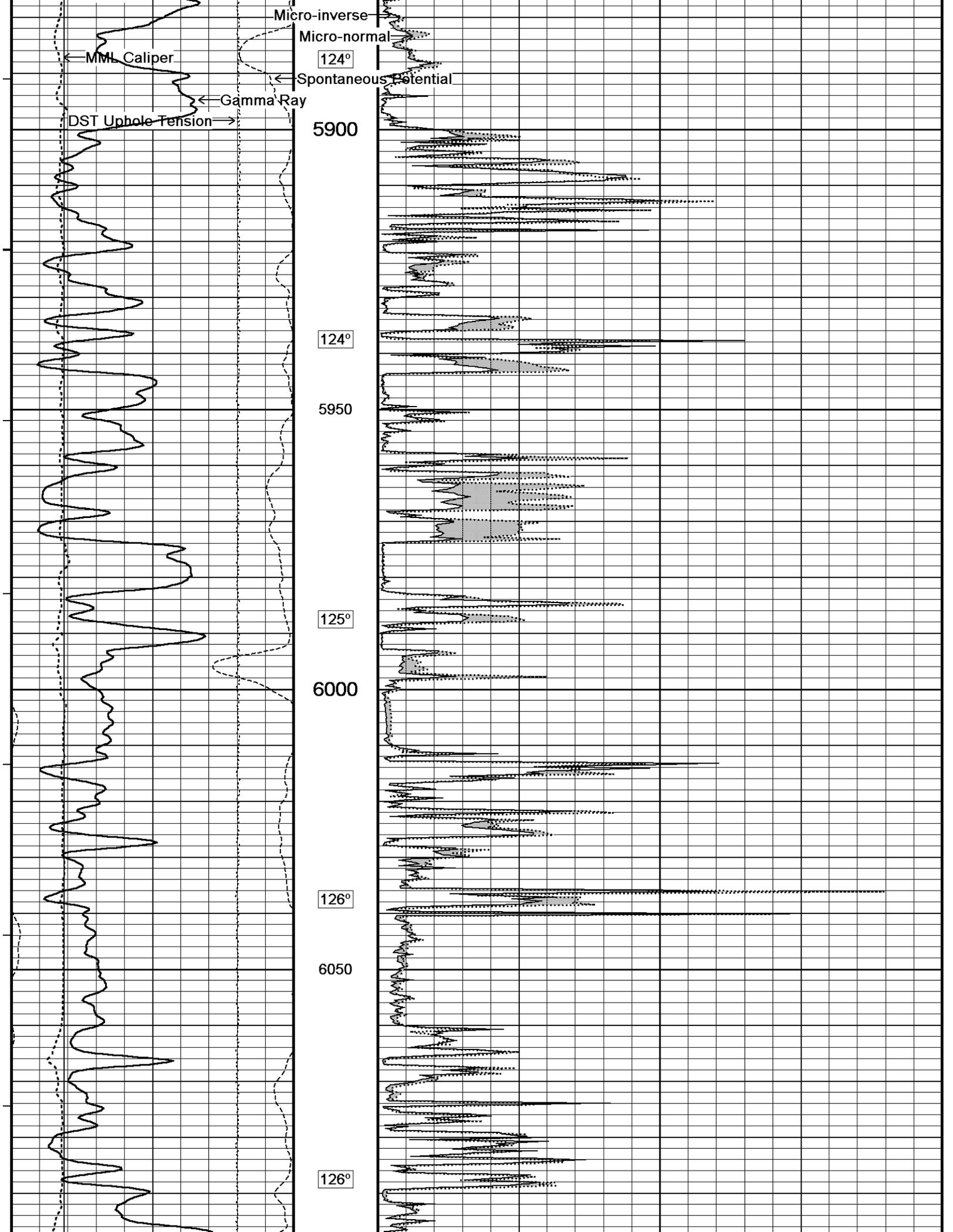
123°

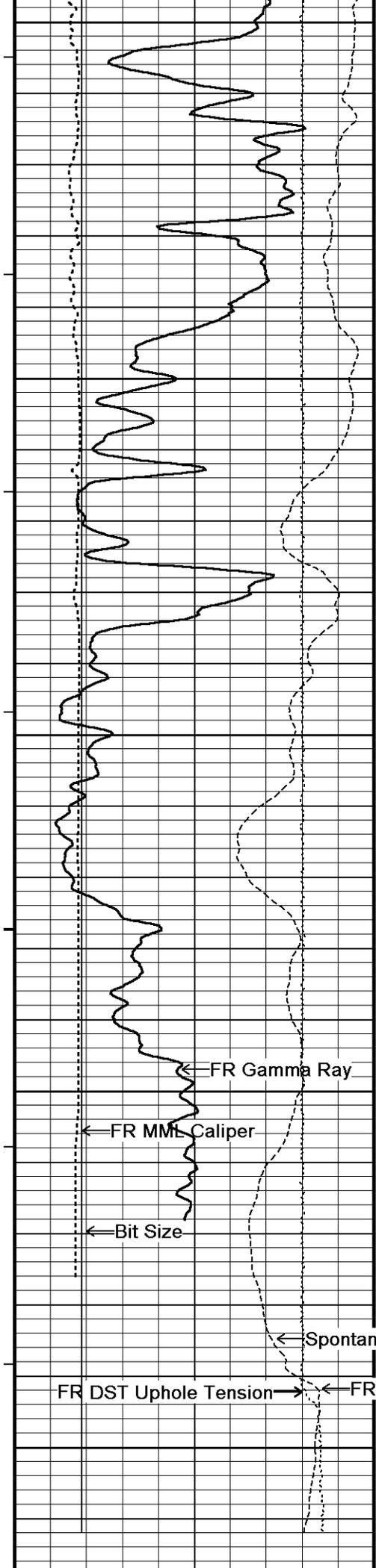
5800

123°

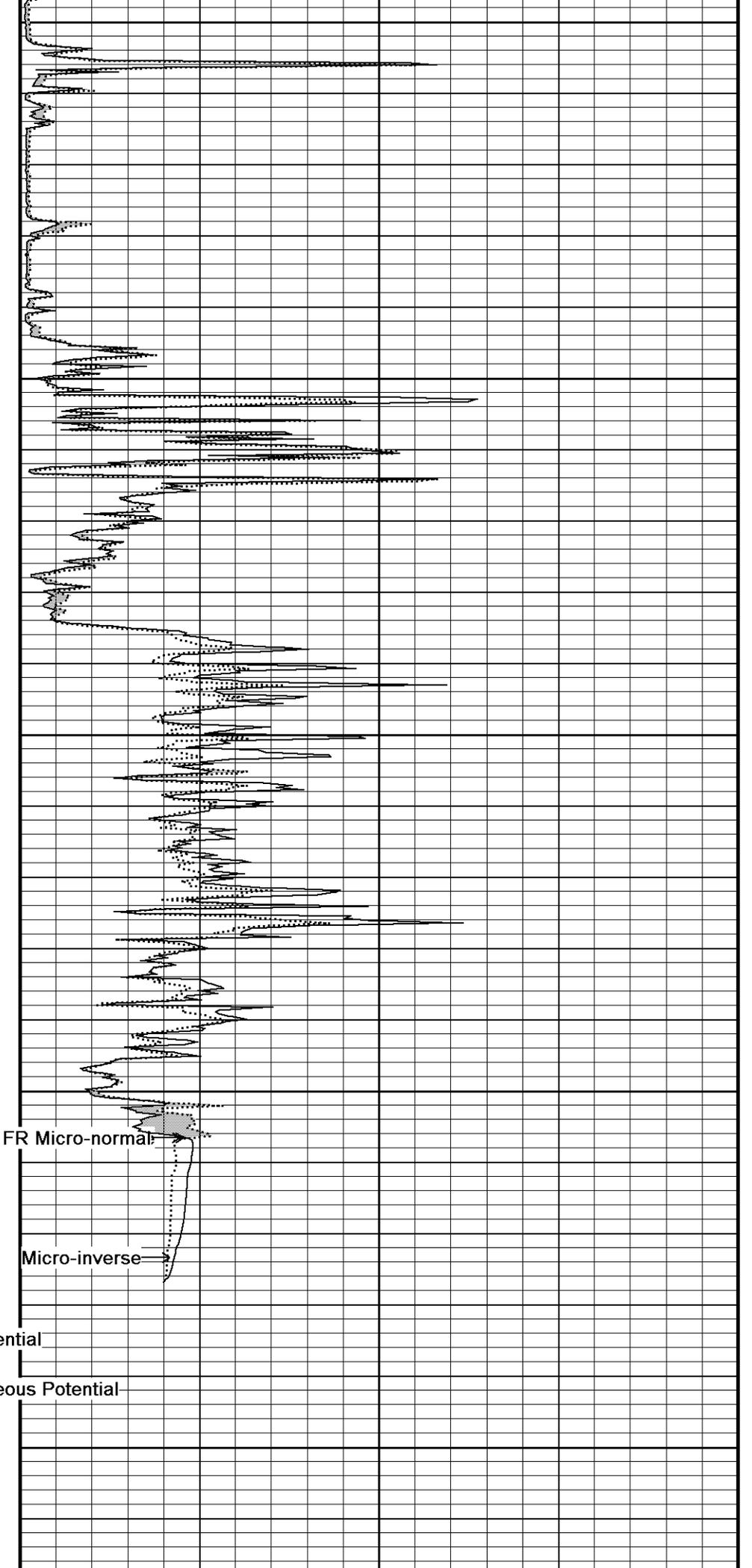
5850







6100  
127°  
6150  
126°  
6200  
125°  
6250  
6300



← FR Gamma Ray

← FR MML Caliper

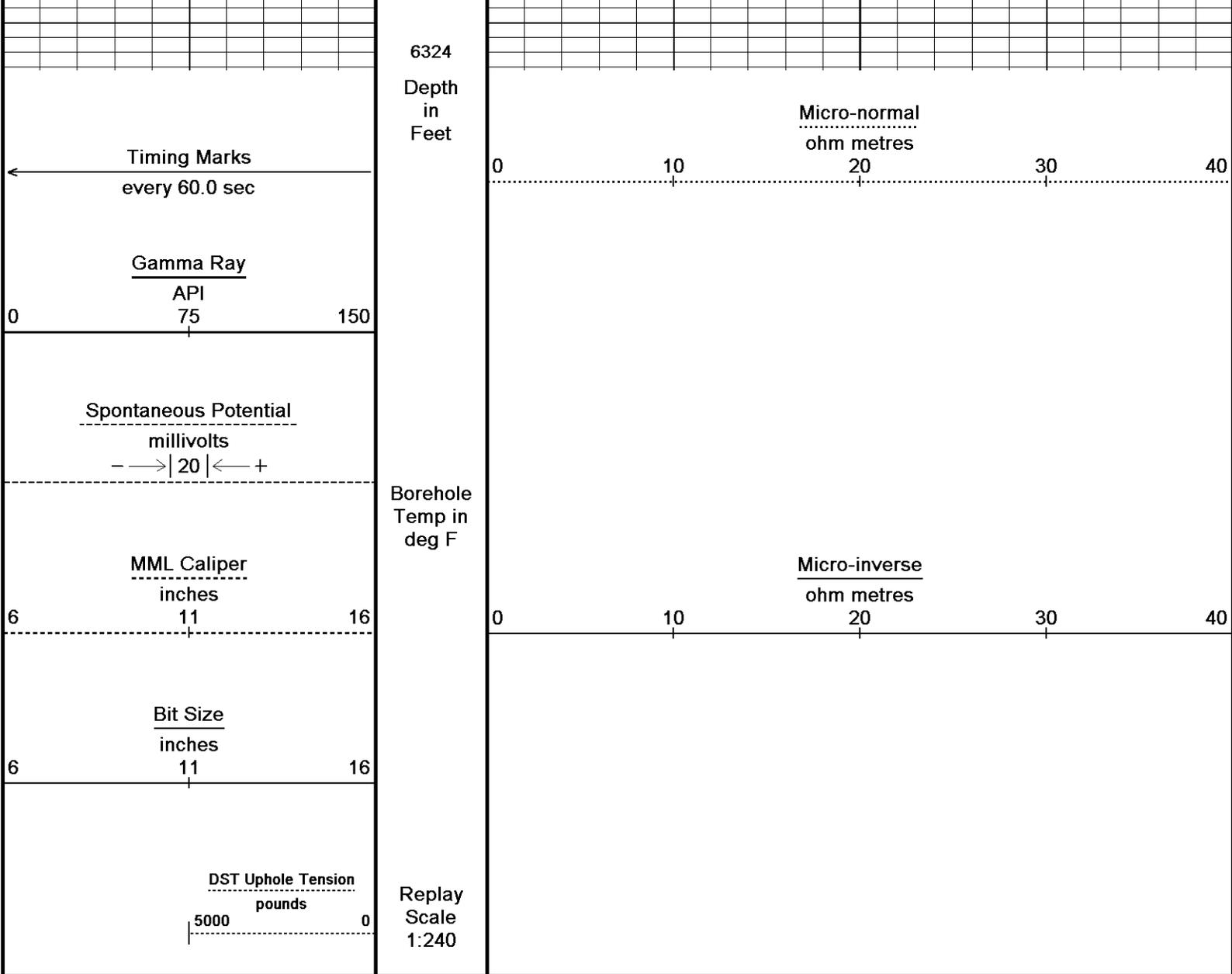
← Bit Size

← Spontaneous Potential

FR DST Uphole Tension → ← FR Spontaneous Potential

FR Micro-normal →

Micro-inverse →

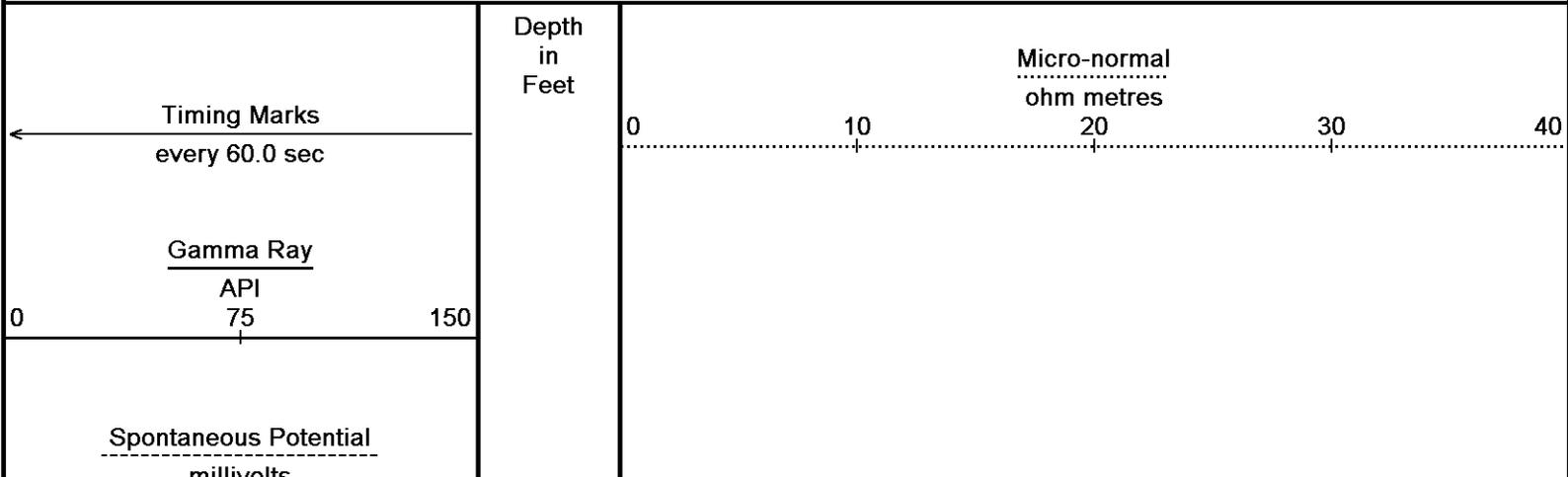


Depth Based Data - Maximum Sampling Increment 10.0cm Plotted on 29-DEC-2011 10:38  
 Filename: C:\Users\Joe\AppData\Local\Temp\Weatherford PreView\0\O'Brien Eagle # 1-10\_004.dta Recorded on 13-OCT-2011 15:17  
 System Versions: Logged with 11.03.4044 Plotted with 12.01.3513

↑ 5 INCH MAIN ↑

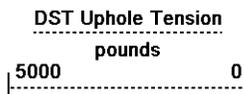
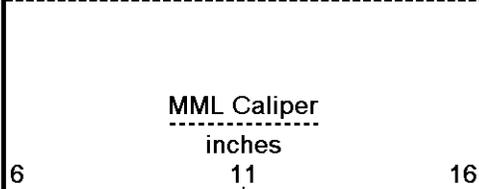
↓ 10 INCH HI-RES ↓

Depth Based Data - Maximum Sampling Increment 2.5cm Plotted on 29-DEC-2011 10:38  
 Filename: C:\Users\Joe\AppData\Local\Temp\Weatherford PreView\0\O'Brien Eagle # 1-10\_003.dta Recorded on 13-OCT-2011 14:48  
 System Versions: Logged with 11.03.4044 Plotted with 12.01.3513



millivolts

—>|20|←+

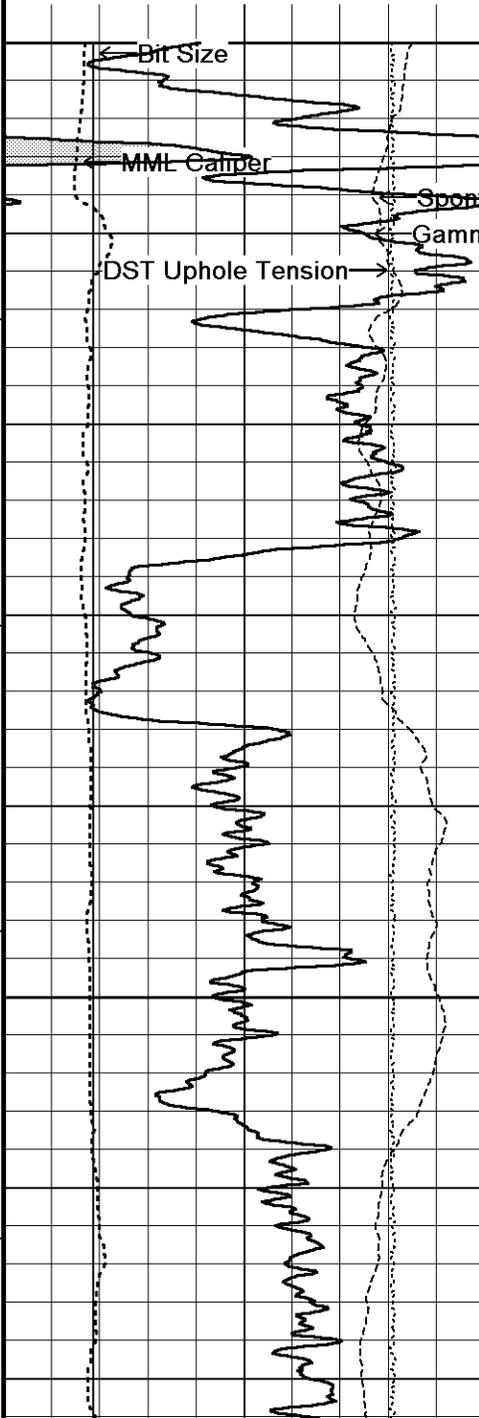


Borehole Temp in deg F

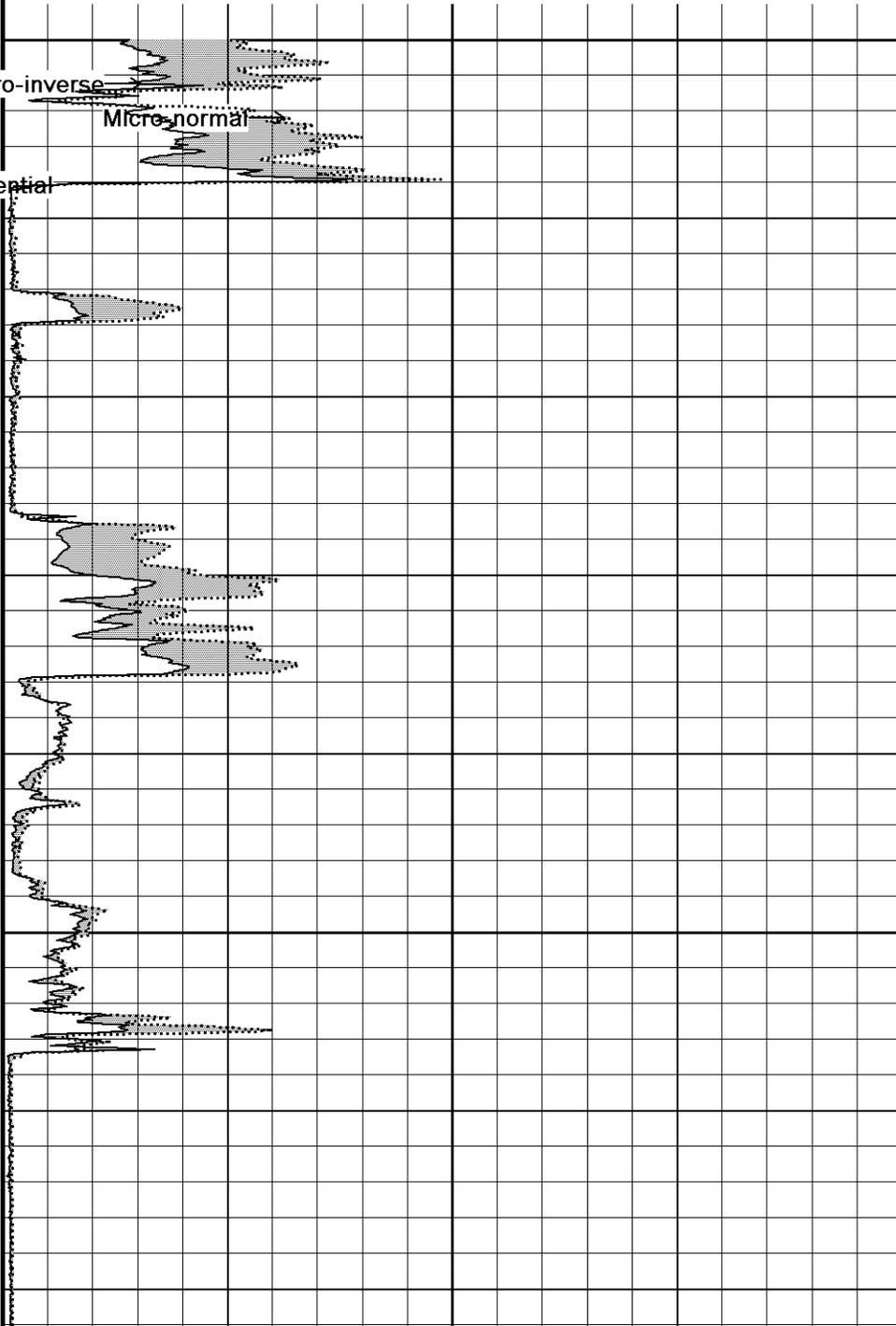
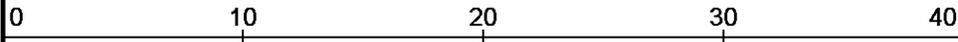
Replay Scale 1:120

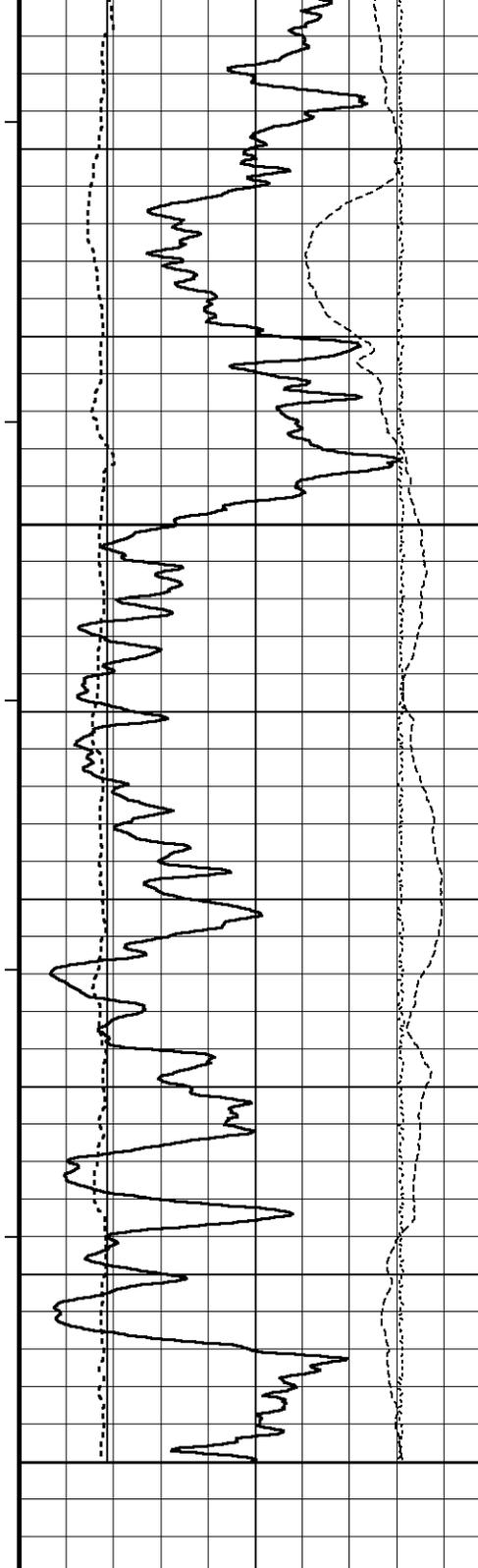
5800

5850



Micro-inverse ohm metres

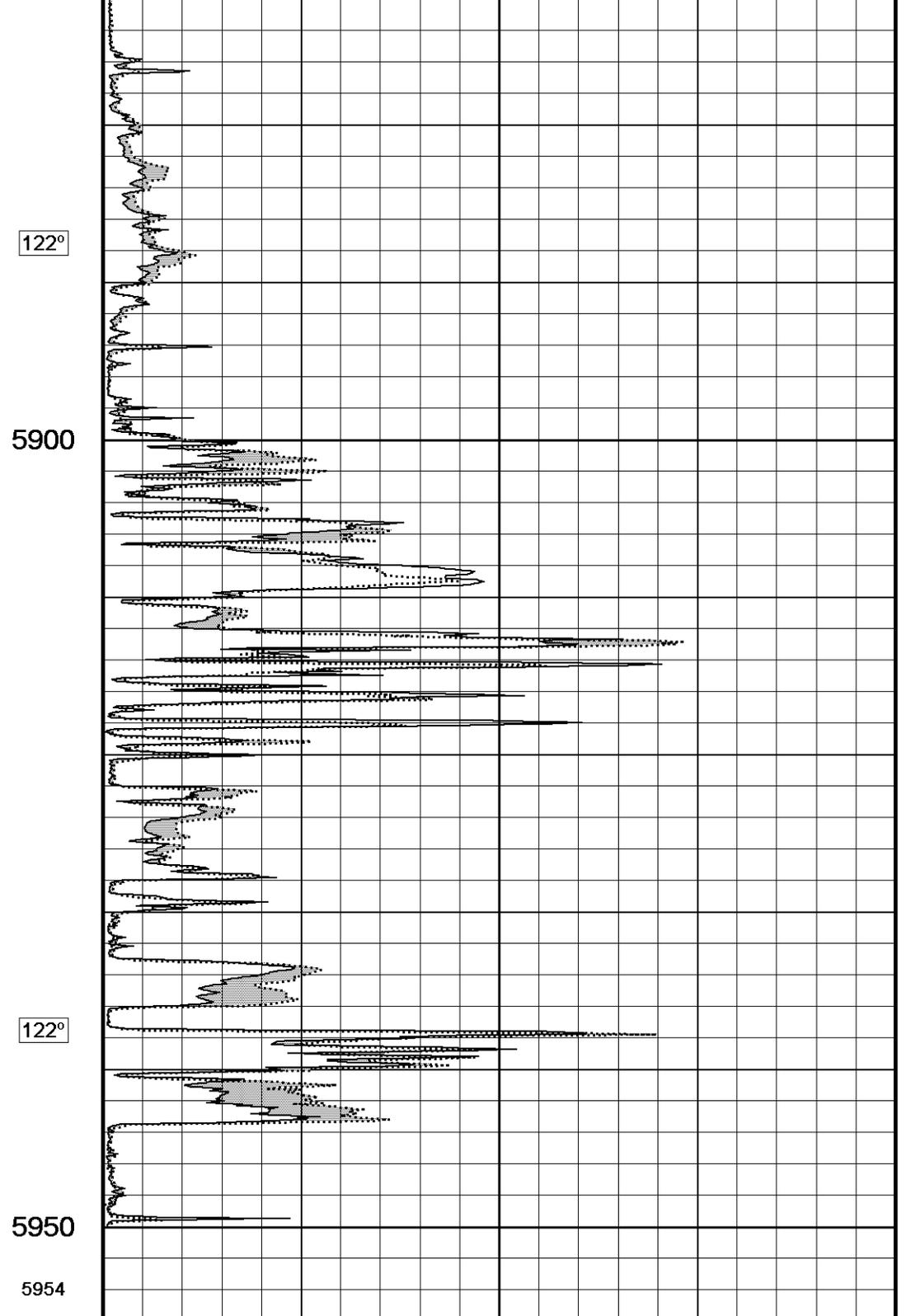




← Timing Marks every 60.0 sec

Gamma Ray  
API  
0 75 150

Spontaneous Potential  
millivolts



122°

5900

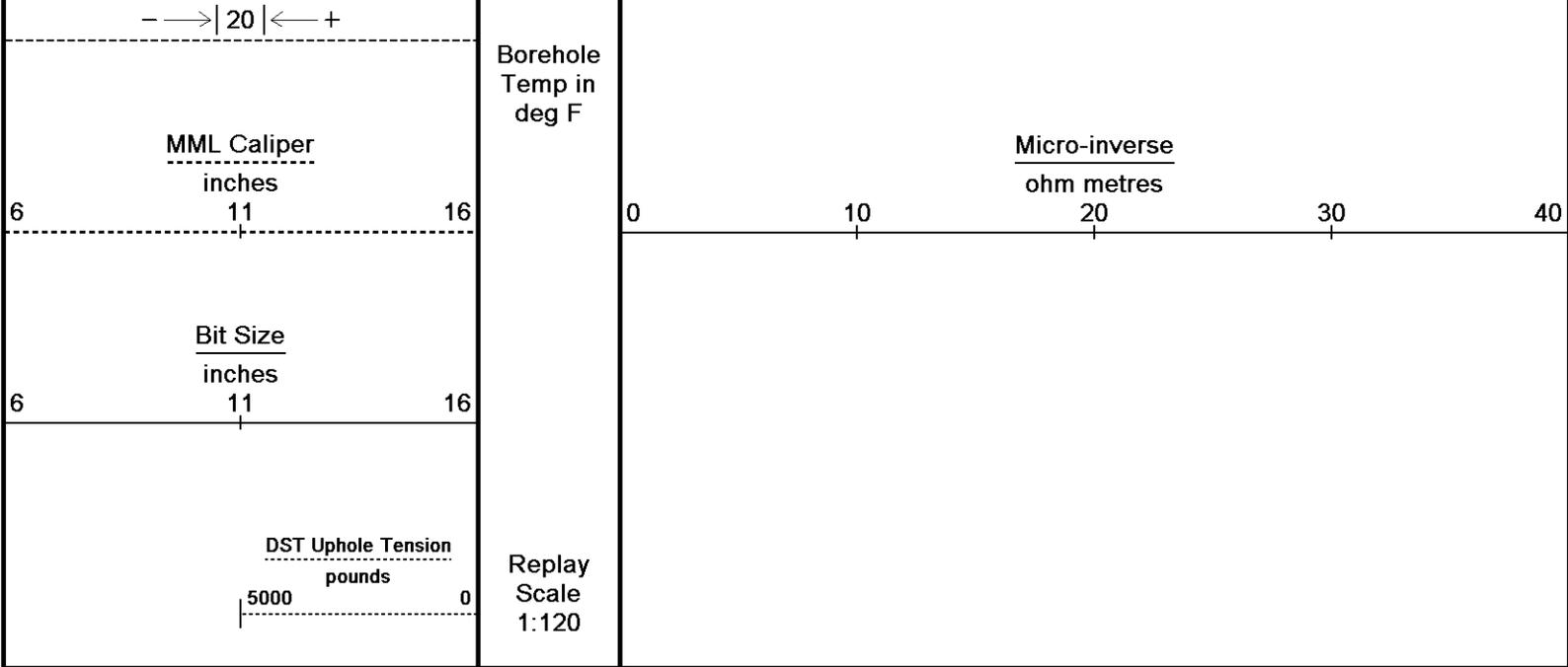
122°

5950

5954

Depth in Feet

Micro-normal  
ohm metres  
0 10 20 30 40

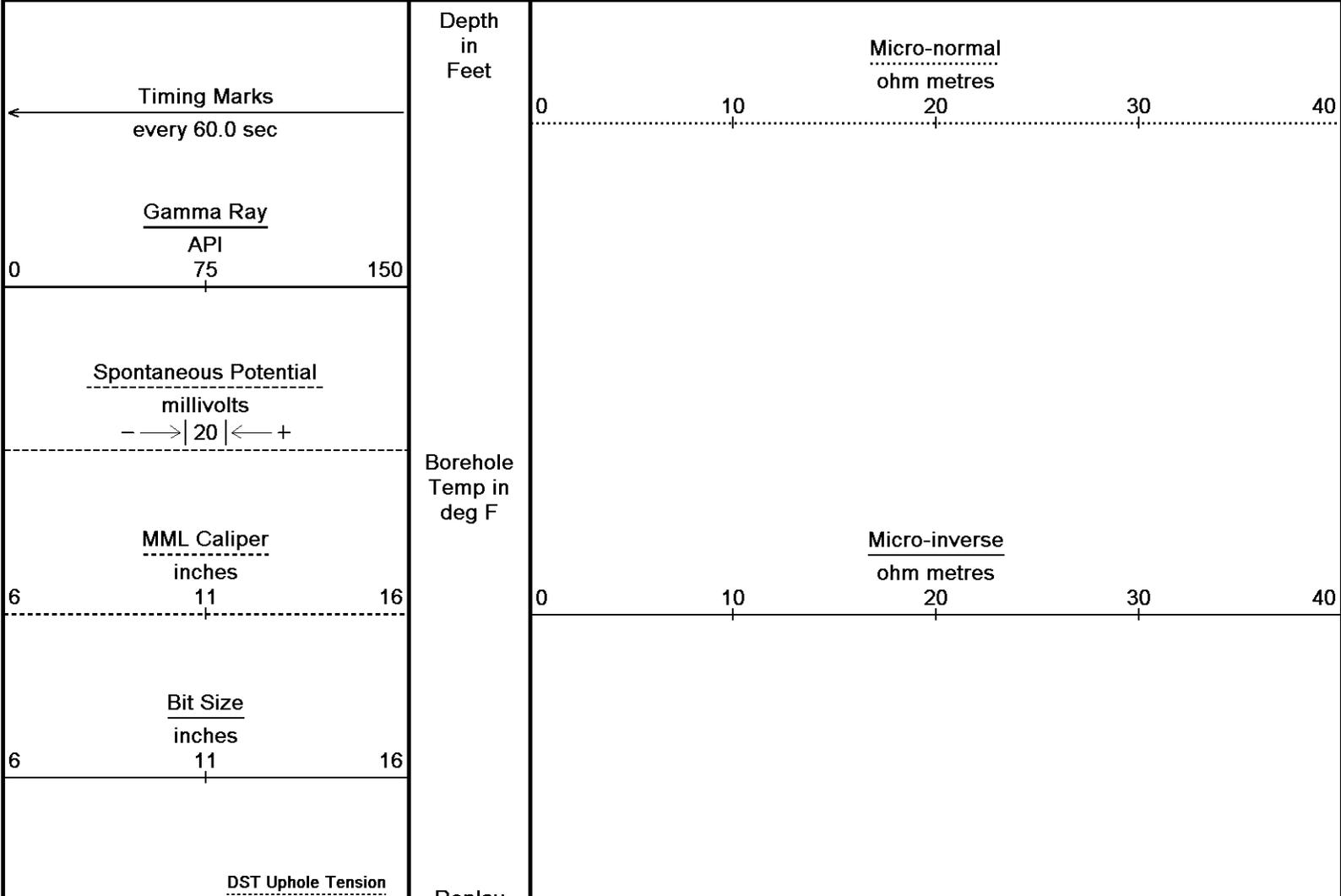


Depth Based Data - Maximum Sampling Increment 2.5cm  
 Plotted on 29-DEC-2011 10:38  
 Filename: C:\Users\Joe\AppData\Local\Temp\Weatherford PreView\O'Brien Eagle # 1-10\_003.dta  
 Recorded on 13-OCT-2011 14:48  
 System Versions: Logged with 11.03.4044 Plotted with 12.01.3513

↑ 10 INCH HI-RES ↑

↓ REPEAT SECTION ↓

Depth Based Data - Maximum Sampling Increment 10.0cm  
 Plotted on 29-DEC-2011 10:38  
 Filename: C:\Users\Joe\AppData\Local\Temp\Weatherford PreView\O'Brien Eagle # 1-10\_002.dta  
 Recorded on 13-OCT-2011 14:35  
 System Versions: Logged with 11.03.4044 Plotted with 12.01.3513



5000 pounds 0

Replay  
Scale  
1:240

6000

124°

6050

125°

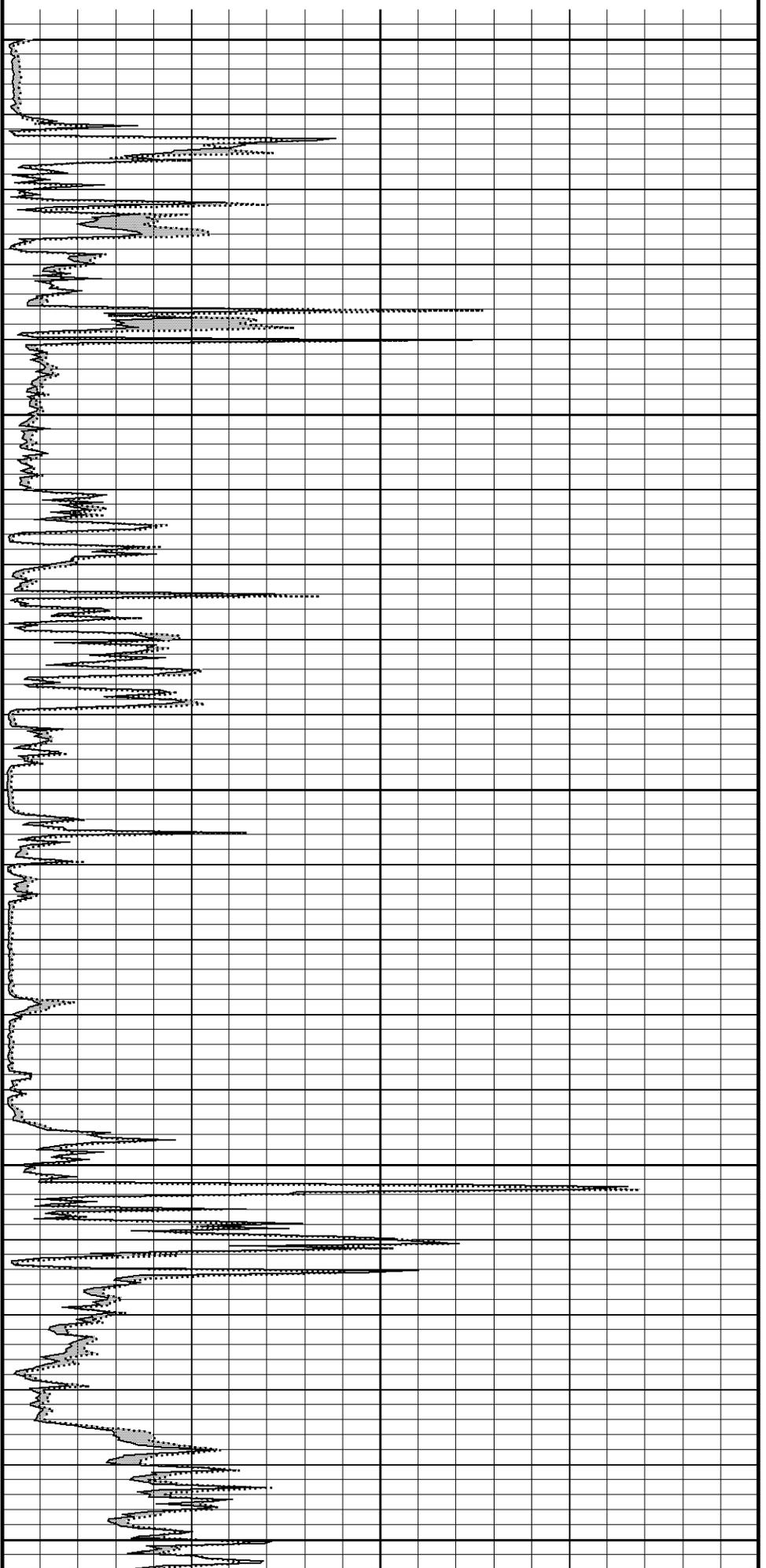
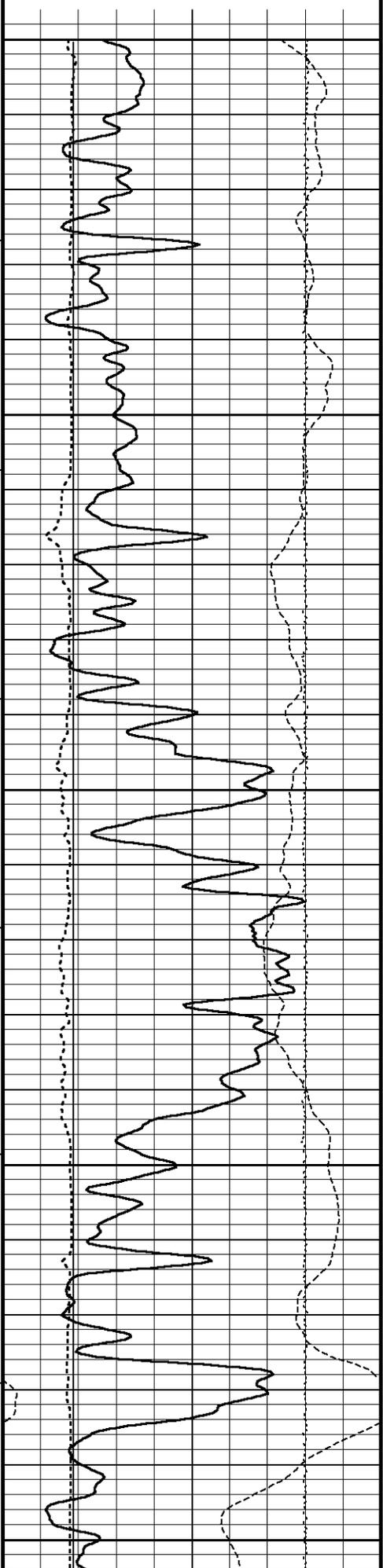
6100

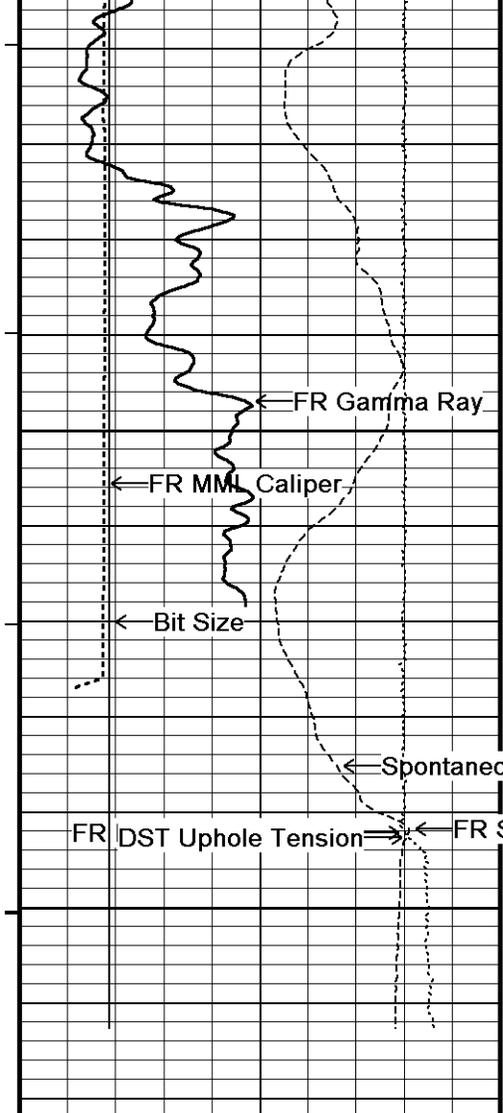
126°

6150

126°

6200





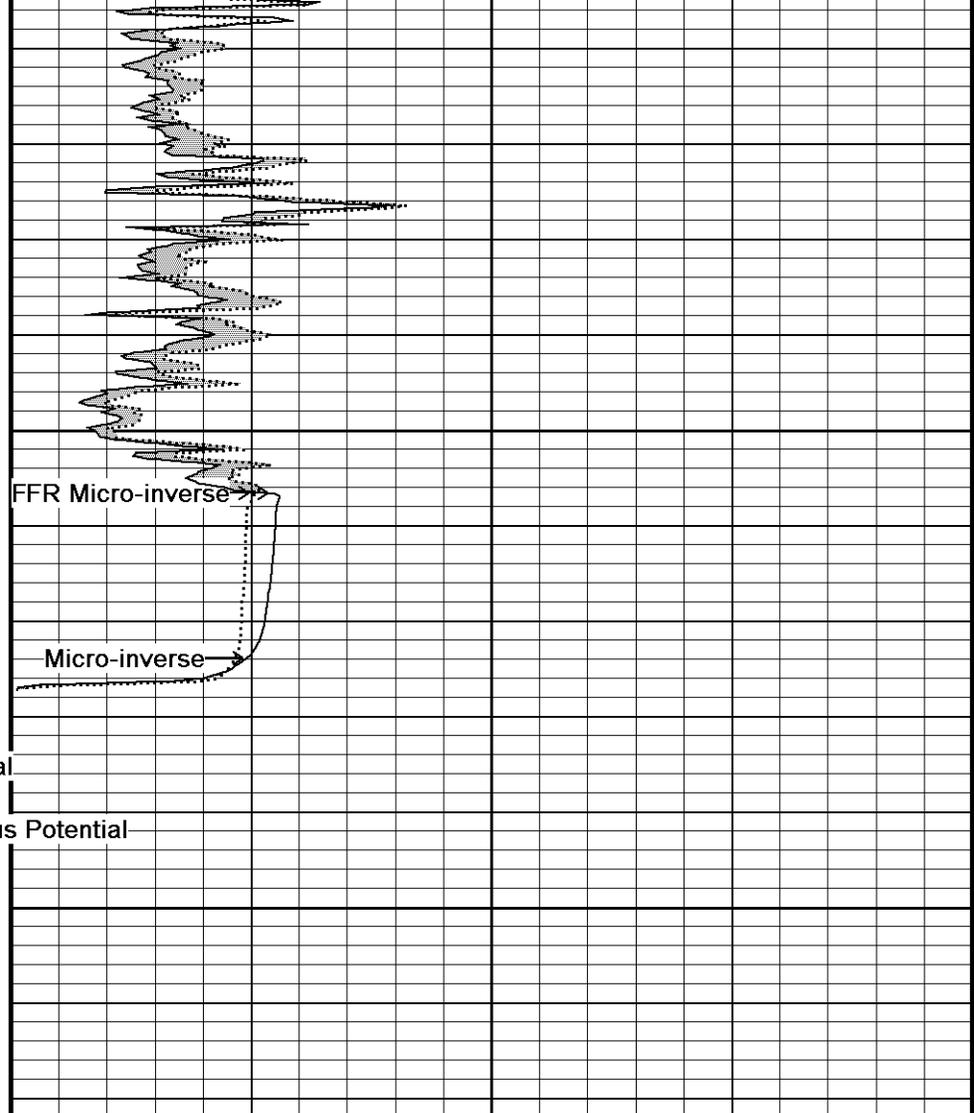
125°

6250

6300

6320

Depth in Feet



Timing Marks every 60.0 sec

Gamma Ray API

0 75 150

Spontaneous Potential millivolts

- -> | 20 | <- +

MML Caliper inches

6 11 16

Bit Size inches

6 11 16

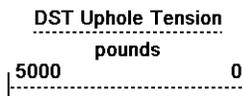
Micro-normal ohm metres

0 10 20 30 40

Borehole Temp in deg F

Micro-inverse ohm metres

0 10 20 30 40



Replay  
Scale  
1:240

Depth Based Data - Maximum Sampling Increment 10.0cm

Plotted on 29-DEC-2011 10:38

Filename: C:\Users\Joe\AppData\Local\Temp\Weatherford PreView\0\O'Brien Eagle # 1-10\_002.dta

Recorded on 13-OCT-2011 14:35

System Versions: Logged with 11.03.4044 Plotted with 12.01.3513

↑ REPEAT SECTION ↑

### BEFORE SURVEY CALIBRATION

C:\Users\Joe\AppData\Local\Temp\Weatherford PreView\0\O'Brien Eagle # 1-10\_004.dta

**General Constants All 000**

Last Edited on 13-OCT-2011 15:01

**General Parameters**

Mud Resistivity	0.900	ohm-metres
Mud Resistivity Temperature	82.000	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. Four Res Rt	
RWA Constant A	1.000	
RWA Constant M	2.000	

**Down-hole Tension Calibration SMS 0**

Field Calibration on 28-JUL-2011 17:55

Reading No	Measured	Calibrated (lbs)
1	12257.67	0.00
2	13806.99	650.00

**Gamma Calibration MCG-C 84**

Field Calibration on 13-OCT-2011 10:38

	Measured	Calibrated (API)
Background	74	51
Calibrator (Gross)	1125	776
Calibrator (Net)	1052	725

**Gamma Constants MCG-C 84**

Last Edited on 13-OCT-2011 15:01

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

**SP Calibration MCG-C 84**

Field Calibration on 28-DEC-2010 11:28

	Measured	Calibrated (mV)
Reference 1	100.3	100.0
Reference 2	-99.7	-100.0

**High Resolution Temperature Calibration MCG-C 84**

Field Calibration on 24-JUN-2010 14:02

	Measured	Calibrated (Deg F)
Lower	50.00	50.00
Upper	75.00	75.00

**High Resolution Temperature Constants MCG-C 84**

Last Edited on

## Micro Normal and Micro Inverse Calibration MML-A 9

Base Calibration on 06-SEP-2011 11:42  
Field Check on 13-OCT-2011 10:46

## Base Calibration

Channel	Measured		Calibrated (ohm-m)	
	Resistor 1	Resistor 2	Resistor 1	Resistor 2
Micro Normal	12.1	59.5	2.6	12.8
Micro Inverse	15.6	77.7	1.7	8.4

Channel	Base Check (ohm-m)	Field Check (ohm-m)
Micro Normal	32.5	32.5
Micro Inverse	16.4	16.4

## Micro Normal and Micro Inverse Constants MML-A 9

Last Edited on 13-OCT-2011 14:39

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 9

Base Calibration on 06-SEP-2011 11:51  
Field Calibration on 13-OCT-2011 10:43

## Base Calibration

Reading No	Measured	Calibrator Size (in)
1	14909	5.98
2	18394	7.97
3	21677	9.86
4	25490	11.92
5	0	0.00
6	N/A	N/A

## Field Calibration

Measured Caliper (in)	Actual Caliper (in)
6.11	5.98

## Neutron Calibration MDN-A.B 39

Base Calibration on 13-SEP-2011 12:16  
Field Check on 13-OCT-2011 10:53

## Base Calibration

	Measured		Calibrated (cps)	
	Near	Far	Near	Far
Ratio	2859	90	3714	110
	31.838		33.764	

## Field Calibrator at Base

Calibrated (cps)
2315
3367
0.688

## Field Check

Calibrated (cps)
2302
3331
0.691

## Neutron Constants MDN-A.B 39

Last Edited on 13-OCT-2011 14:39

Neutron Source Id	N1095		
Neutron Jig Number	NECD117		
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	
Formation Fluid Salinity Source	Constant Value		
Formation Fluid Salinity	0.00	kppm	
Barite Mud Correction	Not Applied		

## FE Calibration MFE-A.A 67

Base Calibration on 06-SEP-2011 12:02

## Base Calibration

	Measured	Calibrated (ohm-m)
Reference 1	0.0	0.0
Reference 2	960.5	126.8
Base Check		280.8
Field Check		280.7

## FE Constants MFE-A.A 67

Last Edited on 13-OCT-2011 15:02

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 188

Field Calibration on 12-AUG-2011 22:41

	Measured	Calibrated(Deg F)
Lower	32.00	32.00
Upper	68.00	68.00

## High Resolution Temperature Constants MAI-A.A 188

Last Edited on 21-JUN-2011 20:05

Pre-filter Length	11
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## Induction Calibration MAI-A.A 188

Base Calibration on 25-JUL-2011 15:59

Field Check on 13-OCT-2011 11:06

## Base Calibration

Test Loop Calibration		Measured	Calibrated (mmho/m)	
Channel	Low	High	Low	High
1	16.5	472.3	9.3	966.2
2	6.0	378.3	7.6	821.4
3	3.5	260.7	5.2	566.0
4	1.1	135.1	2.6	279.2
Array Temperature		82.2	Deg F	

Channel	Base Check (mmho/m)		Field Check (mmho/m)	
	Low	High	Low	High
1	0.0	0.0	14.3	3847.2
2	0.0	0.0	30.8	3568.5
3	0.0	0.0	28.4	3039.9
4	0.0	0.0	21.0	2038.1
Deep	0.0	0.0	18.1	1923.1
Medium	0.0	0.0	40.2	4054.1
Shallow	0.0	0.0	45.3	5360.3
Array Temperature		0.0	66.9	Deg F

## Induction Constants MAI-A.A 188

Last Edited on 13-OCT-2011 15:02

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 64

Base Calibration on 07-SEP-2011 16:24  
Field Calibration on 13-OCT-2011 11:02

Base Calibration

Reading No	Measured	Calibrator Size (in)
1	12081	3.99
2	21120	5.98
3	29684	7.97
4	38065	9.86
5	47376	11.92
6	N/A	N/A

Field Calibration

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

Photo Density Calibration MPD-B 64

Base Calibration on 07-SEP-2011 16:45  
Field Check on 13-OCT-2011 10:59

Density Calibration

Base Calibration	Measured		Calibrated (sdu)	
	Near	Far	Near	Far
Reference 1	59610	30619	59556	30836
Reference 2	23960	2758	24941	2541

Field Check at Base

1212.8	1410.1
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Field Check

1212.1	1398.5
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PE Calibration

Base Calibration	Measured			Calibrated
	WS	WH	Ratio	Ratio
Background	221	1085		
Reference 1	22948	59410	0.390	0.371
Reference 2	6634	23822	0.282	0.272

Field Check at Base

221.4	1084.8
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Field Check

219.1	1082.0
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Density Constants MPD-B 64

Last Edited on 13-OCT-2011 15:01

Density Source Id	P57072B
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	0.00	

### DOWNHOLE EQUIPMENT

C:\Users\Joe\AppData\Local\Temp\Weatherford PreView\0\O'Brien Eagle # 1-10\_004.dta

Compact Comms Gamma  
MCG-C 84 LG: 8.70 ft WT: 63.9 lb OD: 2.24 in

Compact Micro-log  
MML-A 9 LG: 7.97 ft WT: 81.6 lb OD: 2.24 in

Compact Neutron  
MDN-A.B 39 LG: 5.04 ft WT: 50.7 lb OD: 2.24 in

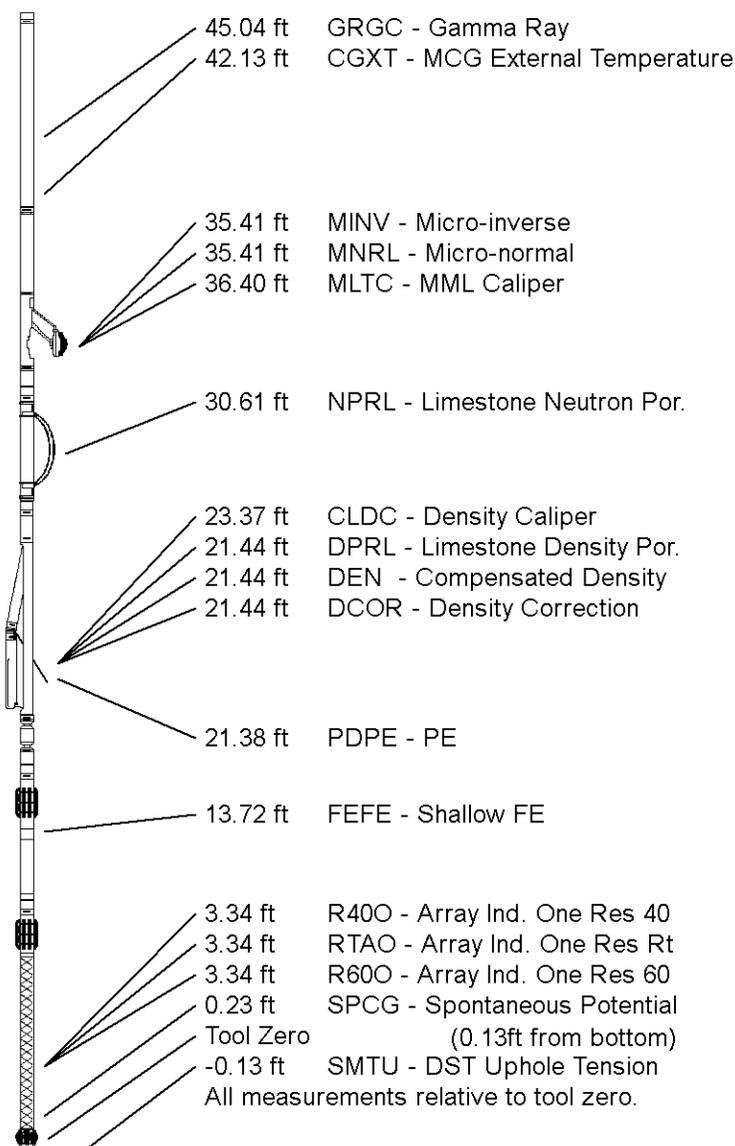
Compact Density/Caliper  
MPD-B 64 LG: 9.59 ft WT: 90.4 lb OD: 2.45 in

SKJ-D.A Compact Knuckle Joint  
SKJ-D.A 91 LG: 2.17 ft WT: 24.3 lb OD: 2.24 in

Compact Focussed Electric  
MFE-A.A 67 LG: 6.05 ft WT: 48.5 lb OD: 2.24 in

Compact Induction  
MAI-A.A 188 LG: 10.81 ft WT: 48.5 lb OD: 2.24 in

Total Length: 50.32 ft Weight: 407.9 lb



COMPANY

O'BRIEN ENERGY RESOURCES CORP.

WELL

EAGLE # 1-10

FIELD

NOVINGER SOUTHWEST

PROVINCE/COUNTY

MEADE

PROVINCE/COUNTY MEADE  
COUNTRY/STATE U.S.A. / KANSAS

Elevation Kelly Bushing	2693.00	feet	First Reading	6256.00	feet
Elevation Drill Floor	2691.00	feet	Depth Driller	6300.00	feet
Elevation Ground Level	2681.00	feet	Depth Logger	6292.00	feet



**Weatherford**<sup>®</sup>

MICRORESISTIVITY LOG

