Weatherford

MICRORESISTIVITY LOG

COMPANY	McCOY PETROLEUM CORPORATION
WELL	PATTERSON-O'BRATE 'A' #2-17
FIELD	WILDCAT
PROVINCE/COUNTY	MEADE
COUNTRY/STATE	U.S.A. / KANSAS
LOCATION	1980' FNL & 1980' FWL

SEC 17	TWP 30S	RGE 30W	Other Services
Latitude			MAI/MFE MPD/MDN
Longitude			
API Number	15-119-21364		

Permanent Datum GL, Elevation 2814 feet
Log Measured From KB
Drilling Measured From KB

Elevations:	feet
KB	2825.00
DF	2823.00
GL	2814.00

Date	28-APR-2014			
Run Number	ONE			
Service Order	4558-85851716			
Depth Driller	5700.00	feet		
Depth Logger	5700.00	feet		
First Reading	5667.00	feet		
Last Reading	4000.00	feet		
Casing Driller	1827.00	feet		
Casing Logger	1826.00	feet		
Bit Size	7.875	inches		
Hole Fluid Type	CHEMICAL			
Density / Viscosity	9.20 lb/USg	56.00 CP		
PH / Fluid Loss	10.50	8.80 ml/30Min		
Sample Source	FLOWLINE			
Rm @ Measured Temp	0.99 @ 79.0	ohm-m		
Rmf @ Measured Temp	0.79 @ 79.0	ohm-m		
Rmc @ Measured Temp	1.19 @ 79.0	ohm-m		
Source Rmf / Rmc	CALC	CALC		
Rm @ BHT	0.65 @121.0	ohm-m		
Time Since Circulation	5 HOURS			
Max Recorded Temp	121.00	deg F		
Equipment / Base	13096	LIB		
Recorded By	ADAM SILL			
Witnessed By	DAVE WILLIAMS			
JOB #	LB14-130			

BOREHOLE RECORD

Last Edited: 28-APR-2014 02:56

Bit Size inches	Depth From feet	Depth To feet
7.875	1827.00	5700.00

CASING RECORD

Type	Size inches	Depth From feet	Shoe Depth feet	Weight pounds/ft
SURFACE	8.625	0.00	1827.00	24.00

REMARKS

- SOFTWARE ISSUE: WLS 13.08.2113
- TOOL STRING: MCG, MML, MDN, MPD, MFE, MAI RUN IN COMBINATION
- HARDWARE: DUAL BOWSPRING ECCENTRALIZER 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: 1510 CU. FT.
- ANNULAR HOLE VOLUME WITH 5.5 INCH CASING FROM TD TO 4000 FEET: 289 CU. FT.

- RIG: STERLING #2.

- ENGINEER: A. SILL.

- OPERATORS: J. LaPOINT.

5 INCH MAIN

Depth Based Data - Maximum Sampling Increment 10.0cm — Plotted on 28-APR-2014 07:45

Filename: C:\Minimus 13.08.2113\Log Data\McCoy Patter...\McCoy Patterson-O'Brate 'A' #2-17_003.dta — Recorded on 28-APR-2014 05:47

System Versions: Logged with 13.08.2113 Plotted with 13.08.2113

Timing Marks
every 60.0 sec

Gamma Ray
API
0 75 150
150 225 300

Spontaneous Potential
millivolts
– → | 20 | ← +

MML Caliper
inches
6 11 16

Bit Size
inches
6 11 16

DST Uphole Tension
pounds
5000 0

Depth in Feet

Borehole Temp in deg F

HVI every 10 cu ft

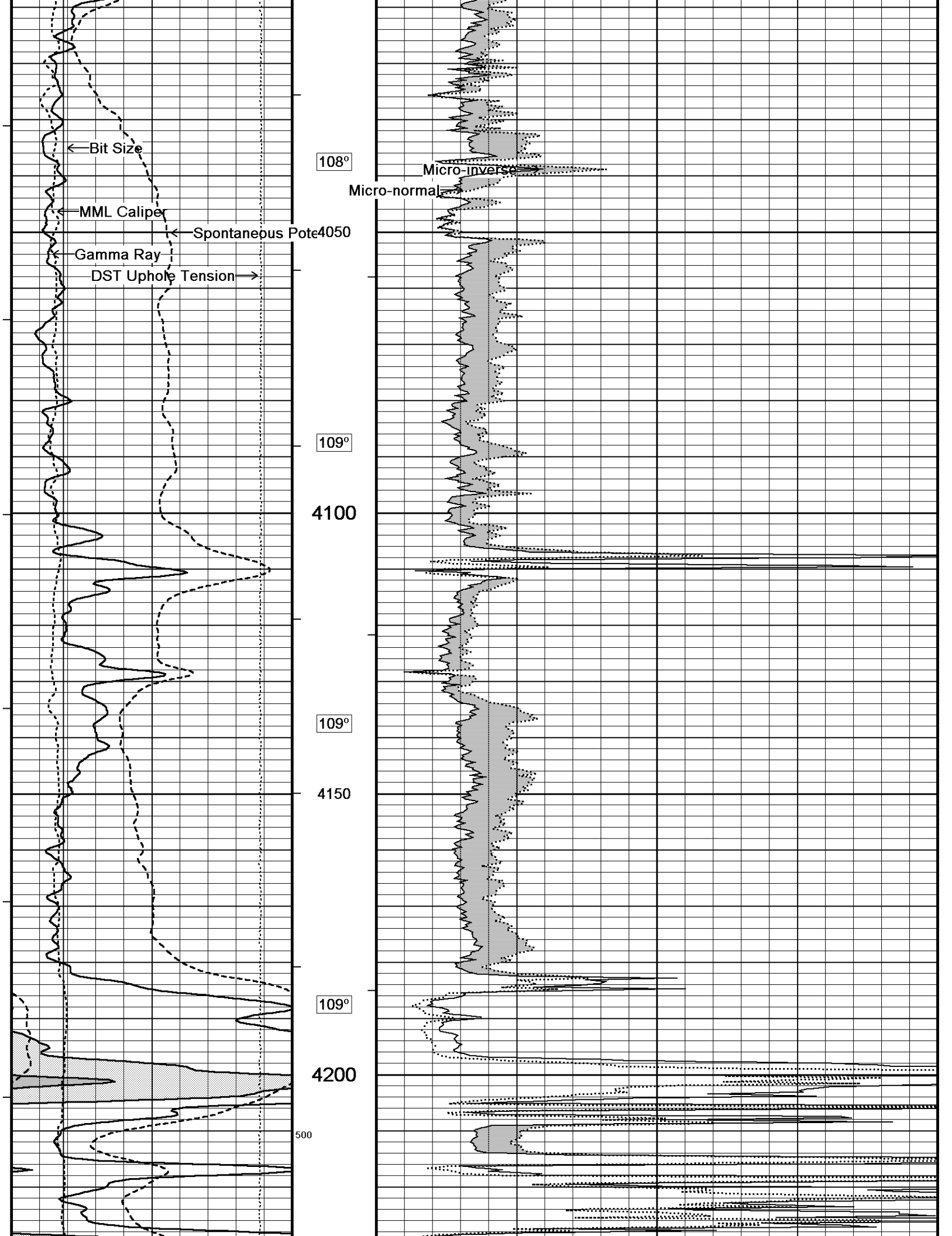
Annular Integral every 10 cu ft

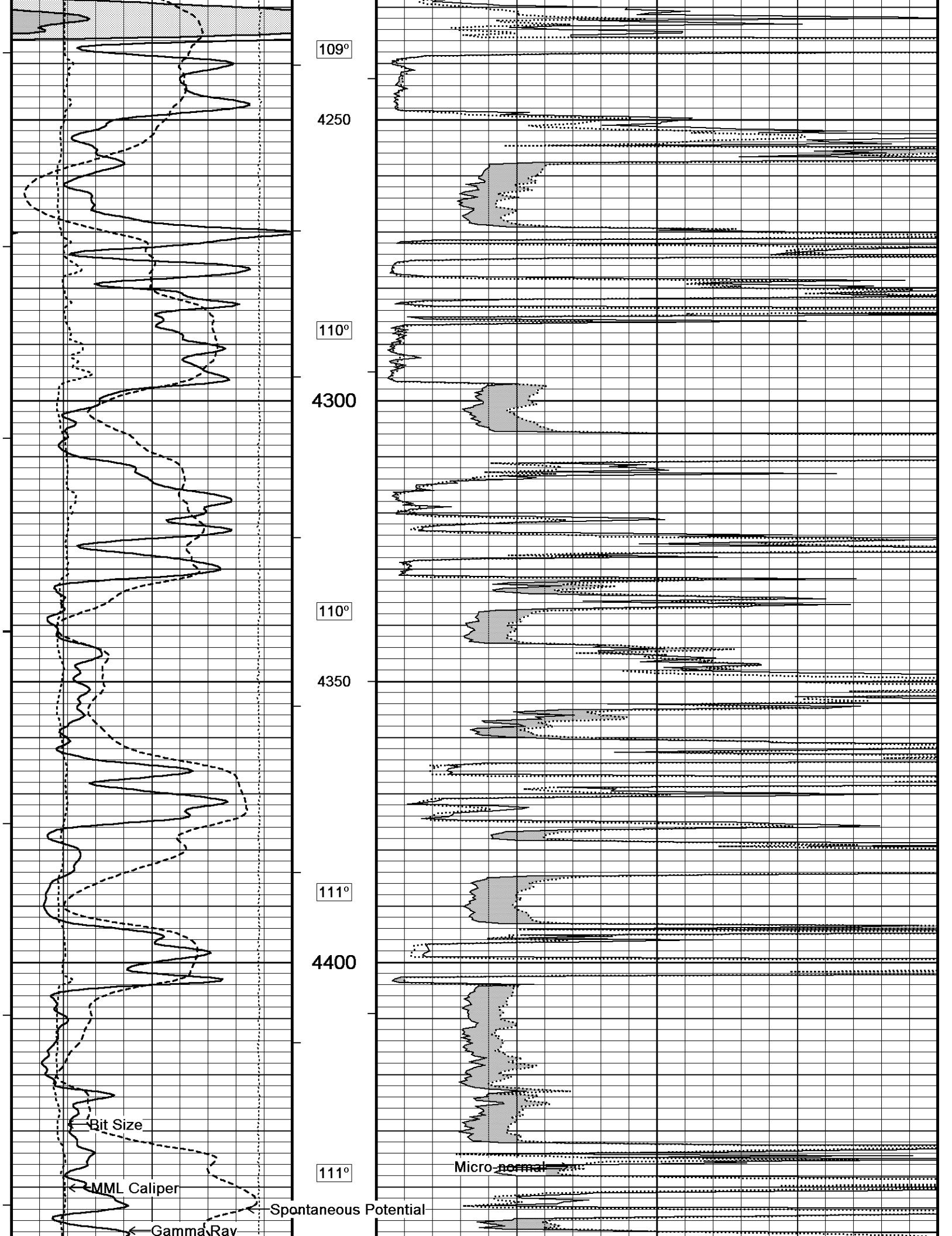
Replay Scale 1:240

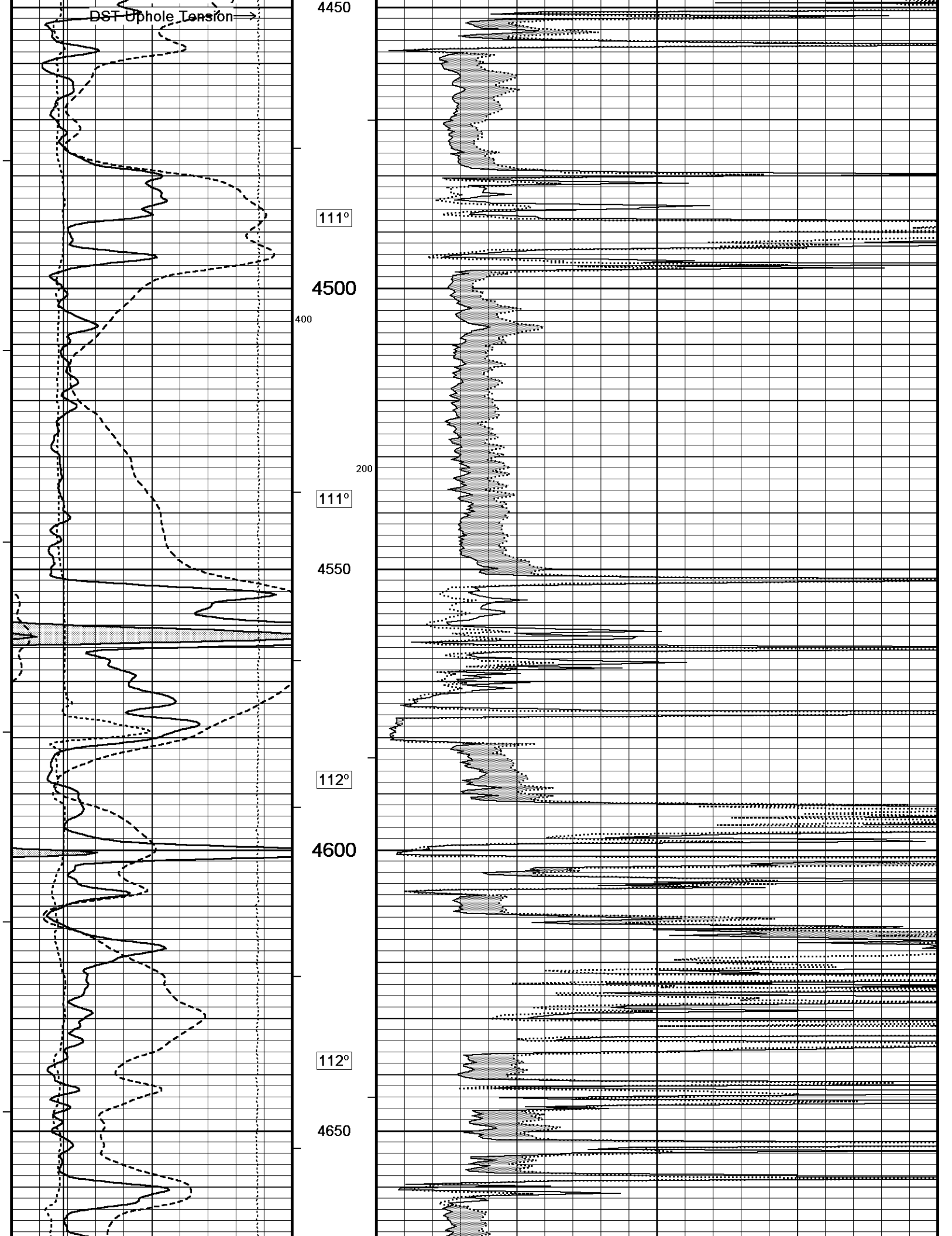
4000

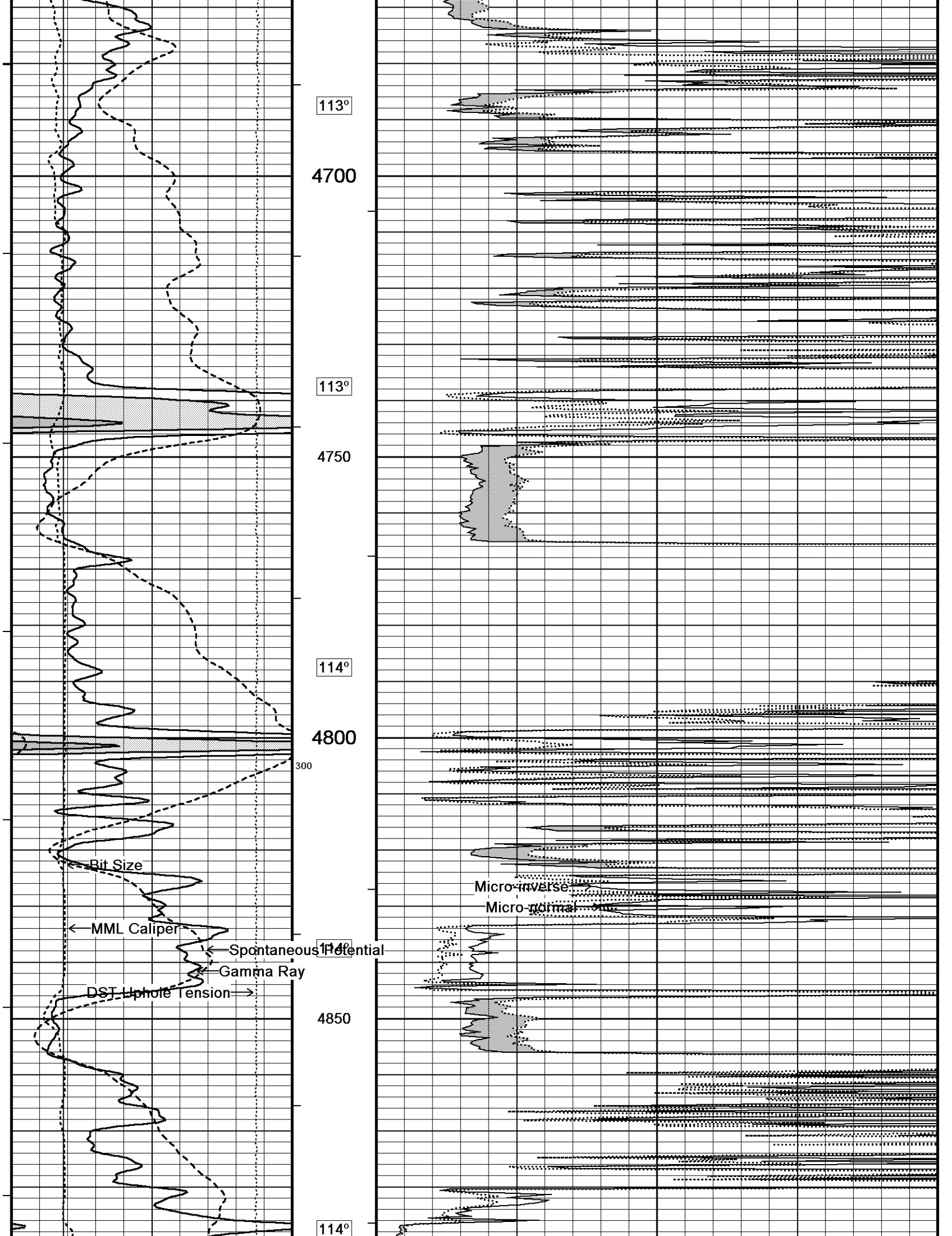
Micro-normal
ohm metres
0 10 20 30 40

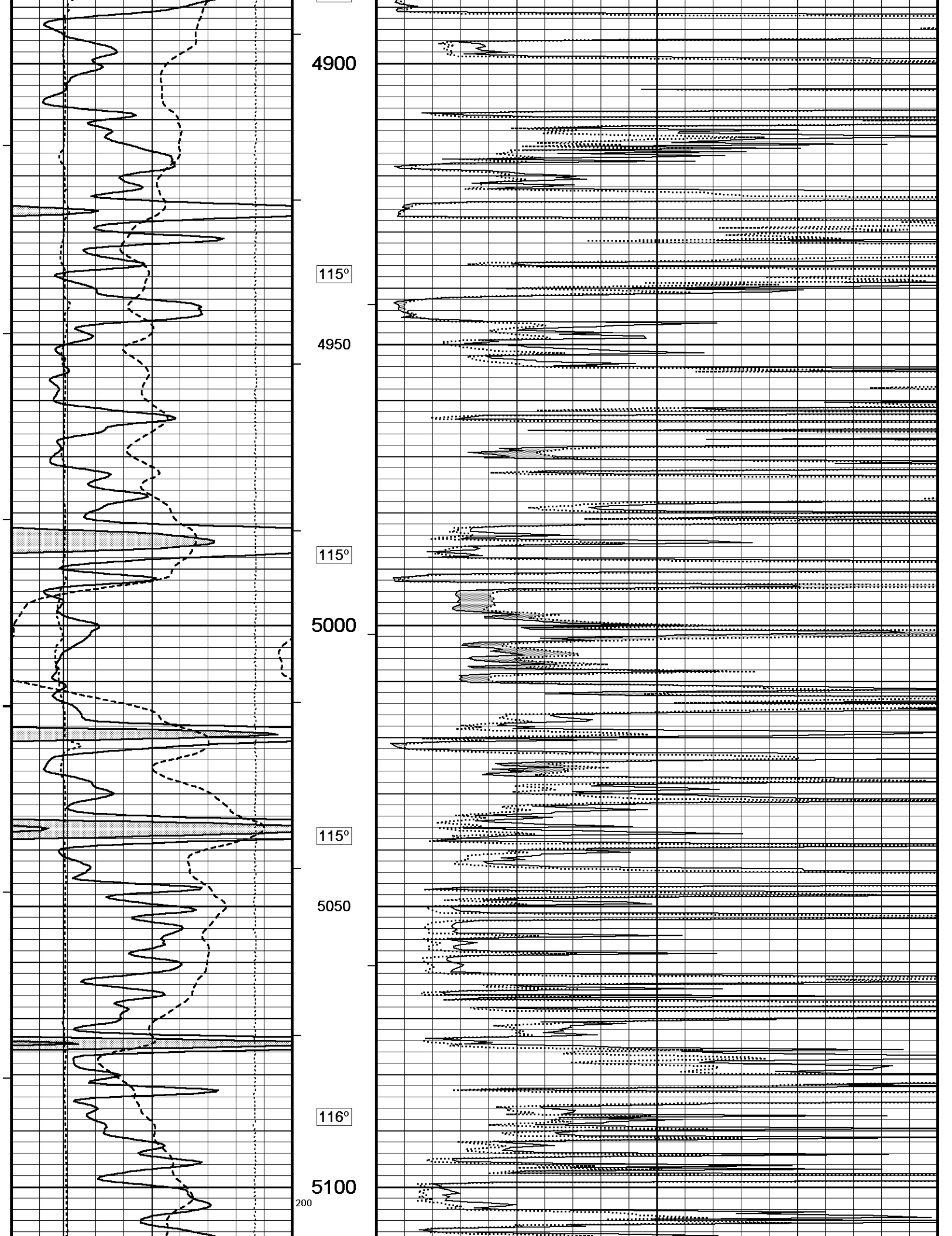
Micro-inverse
ohm metres
0 10 20 30 40

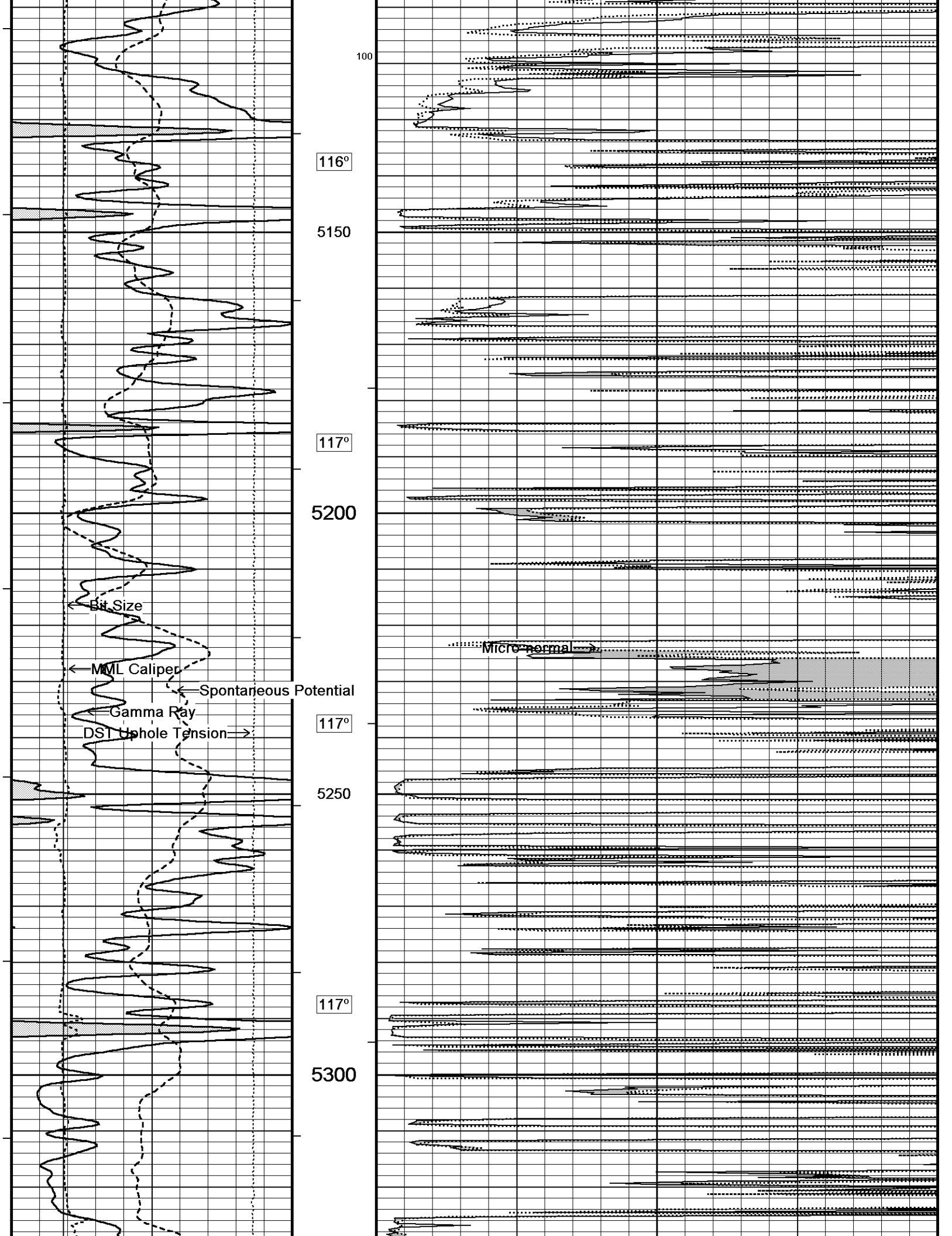

Bit Size
MML Caliper
Spontaneous Pote
Gamma Ray
DST Uphole Tension
Micro-inverse
Micro-normal
108°
109°
109°
109°
4050
4100
4150
4200
500

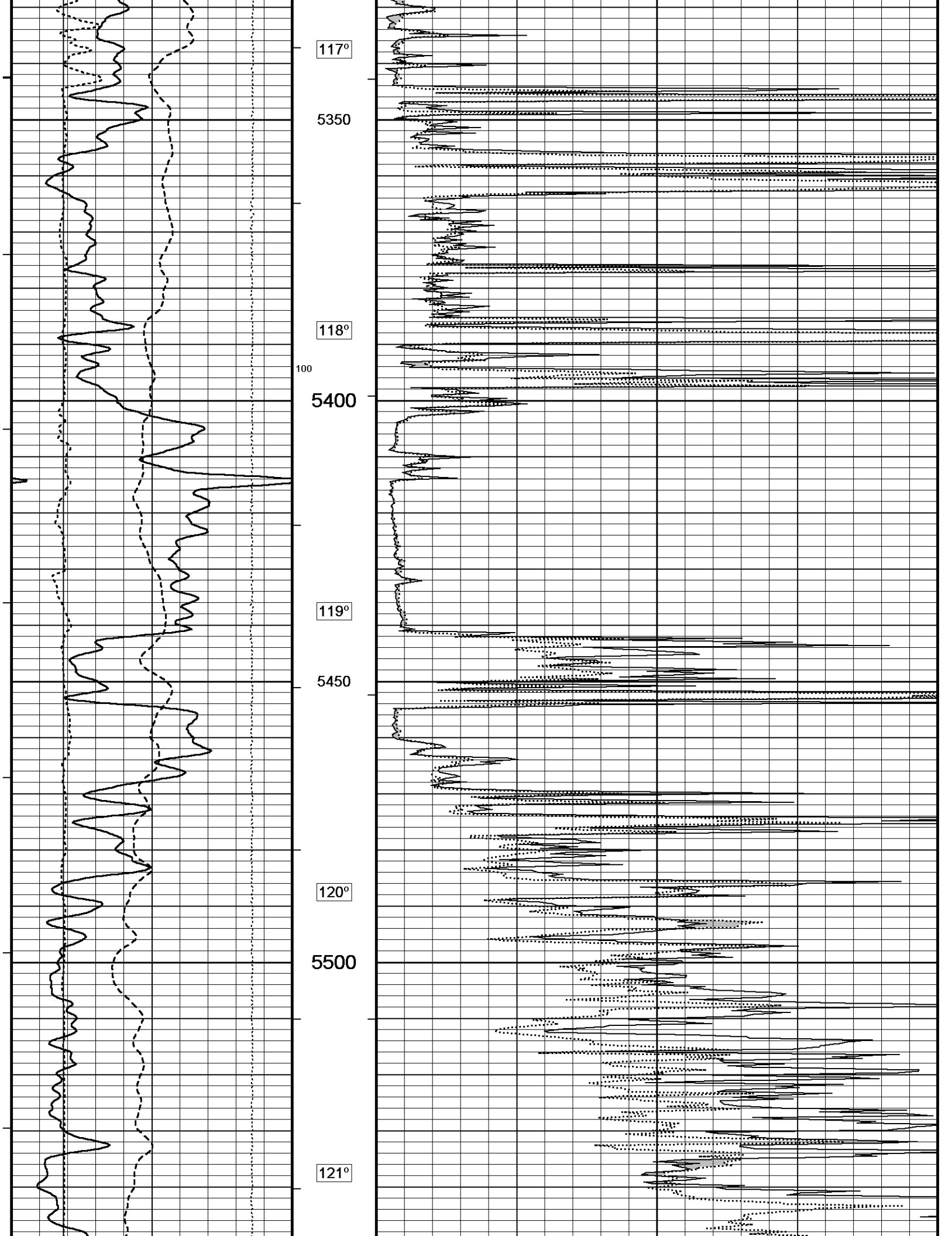

109°
4250
110°
4300
110°
4350
111°
4400
111°
Bit Size
MML Caliper
Spontaneous Potential
Gamma Ray
Micro-normal

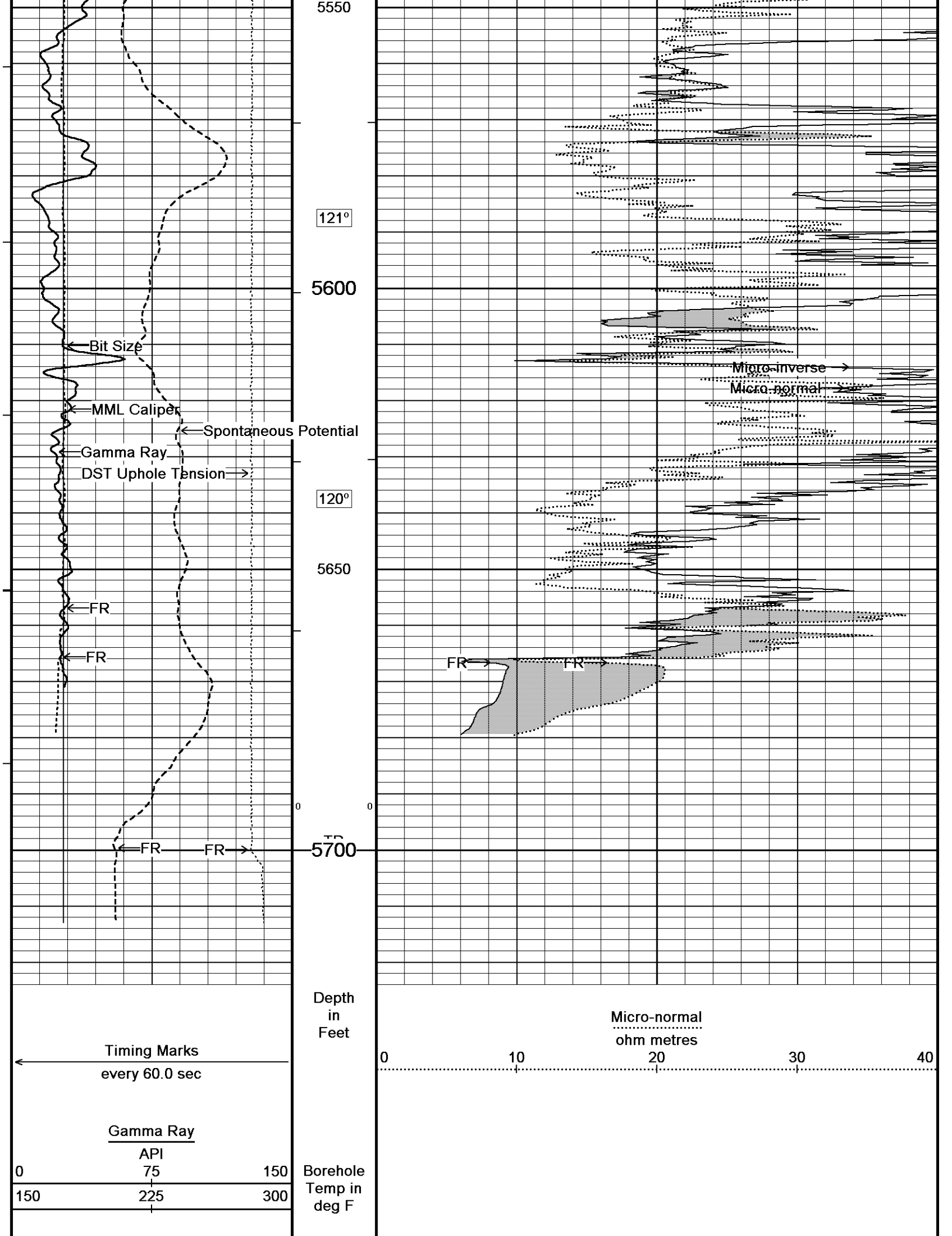

DST Uphole Tension
4450
111°
4500
400
200
111°
4550
112°
4600
112°
4650

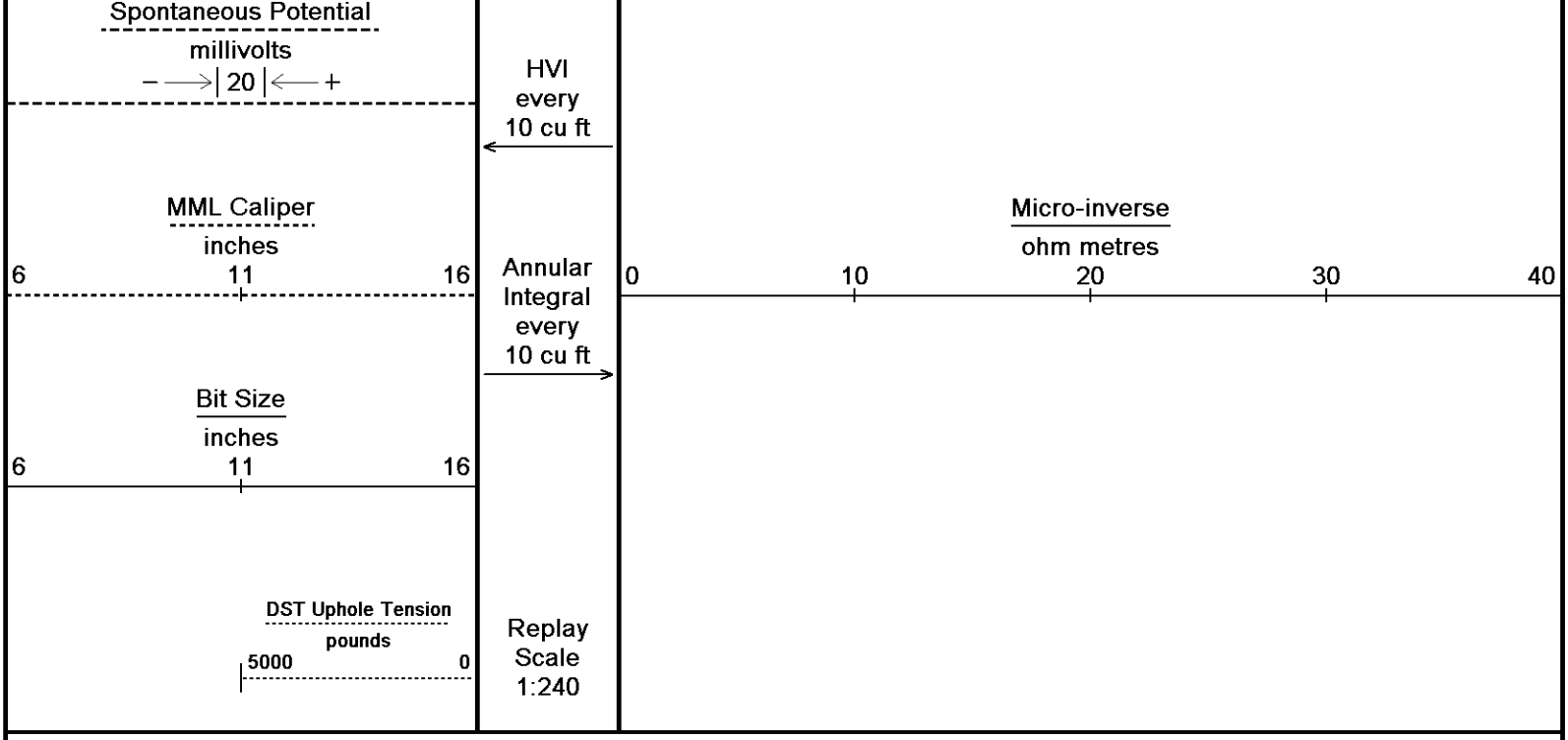

113°
4700
113°
4750
114°
4800
300
Bit Size
MML Caliper
Spontaneous Potential
Gamma Ray
DST Uphole Tension
Micro-inverse
Micro-normal
114°
4850
114°


4900
115°
4950
115°
5000
115°
5050
116°
5100
200


100
116°
5150
117°
5200
Bit Size
Micro-normal
MML Caliper
Spontaneous Potential
Gamma Ray
DST Uphole Tension
117°
5250
117°
5300


117°
5350
118°
100
5400
119°
5450
120°
5500
121°


5550
121°
5600
Bit Size
MML Caliper
Spontaneous Potential
Gamma Ray
DST Uphole Tension
120°
5650
FR
FR
FR
FR
FR
5700
Micro-inverse
Micro-normal
FR
FR
0
0
Depth
in
Feet
Timing Marks
every 60.0 sec
Gamma Ray
API
0
75
150
150
225
300
Borehole
Temp in
deg F
Micro-normal
ohm metres
0
10
20
30
40

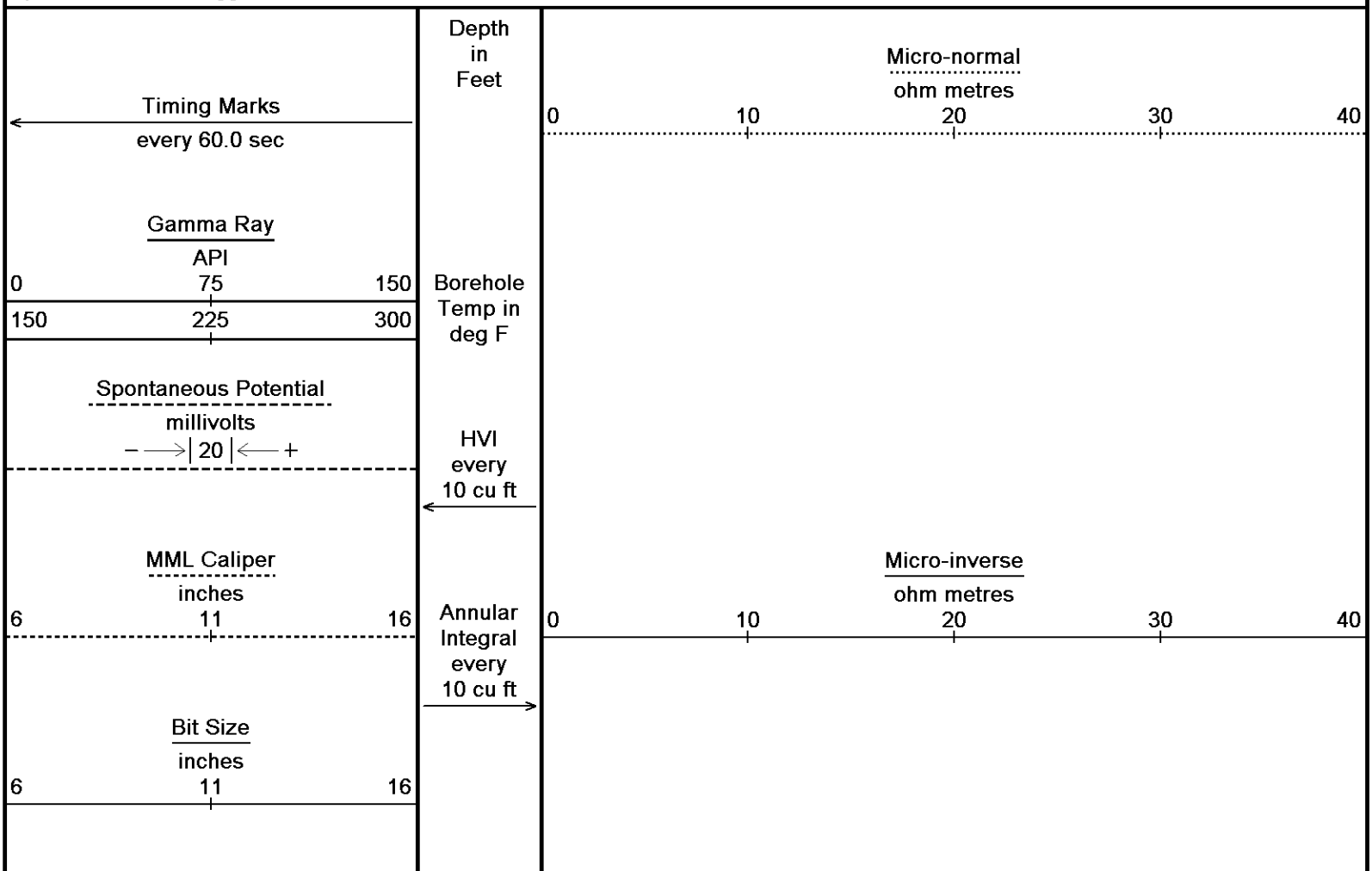


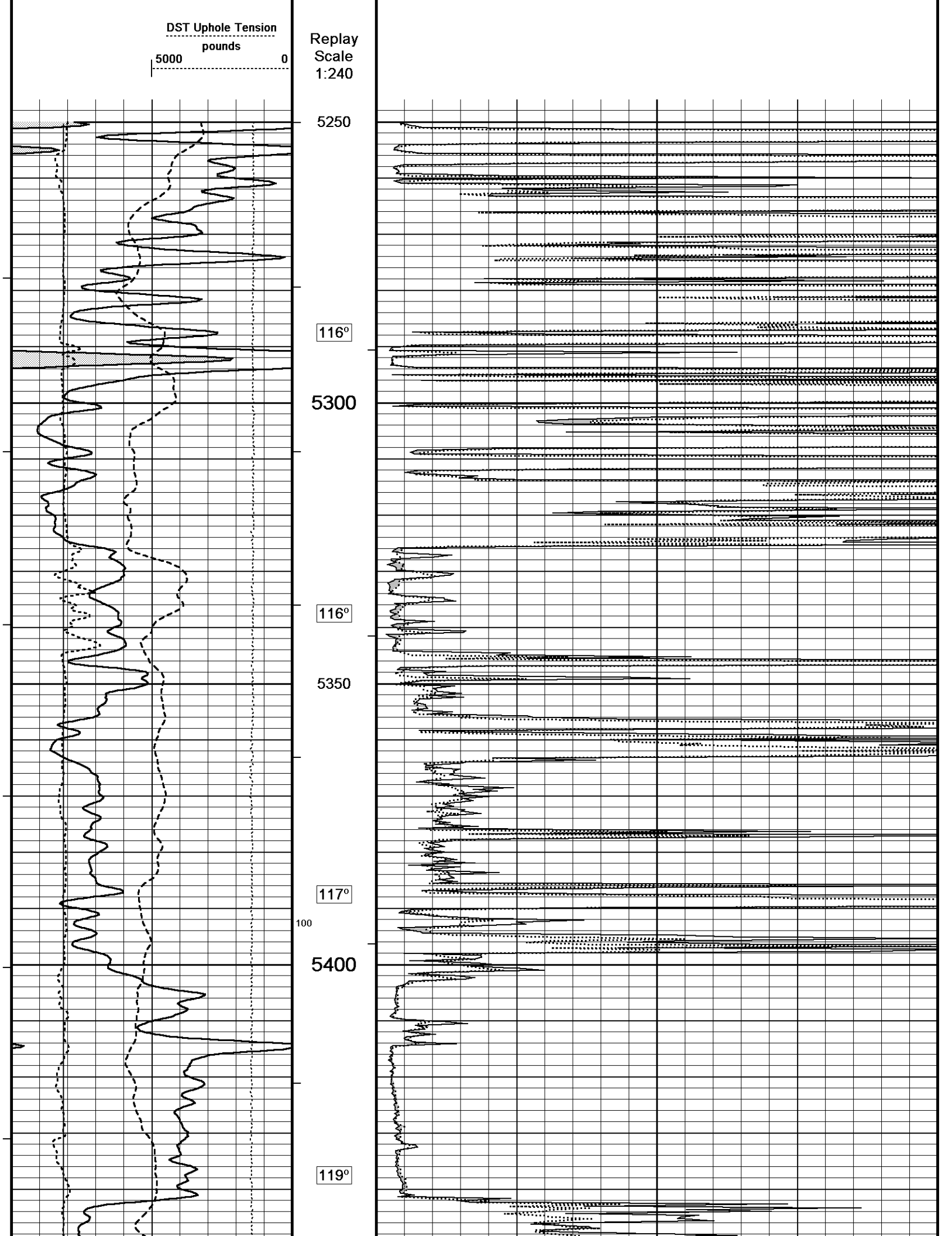
Depth Based Data - Maximum Sampling Increment 10.0cm — Plotted on 28-APR-2014 07:45
Filename: C:\Minimus 13.08.2113\Log Data\McCoy Patter...\McCoy Patterson-O'Brate 'A' #2-17_003.dta — Recorded on 28-APR-2014 05:47
System Versions: Logged with 13.08.2113 Plotted with 13.08.2113

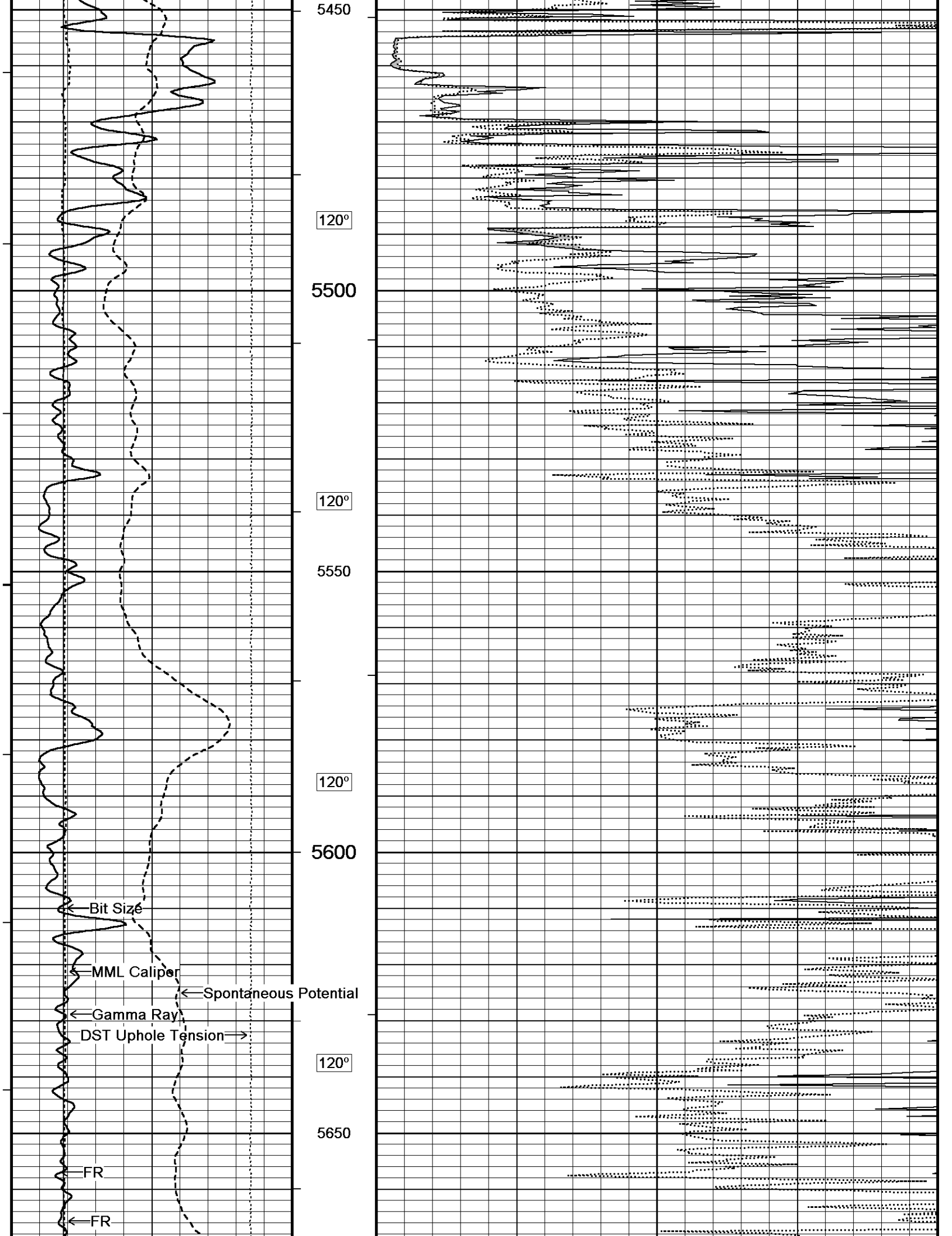
5 INCH MAIN

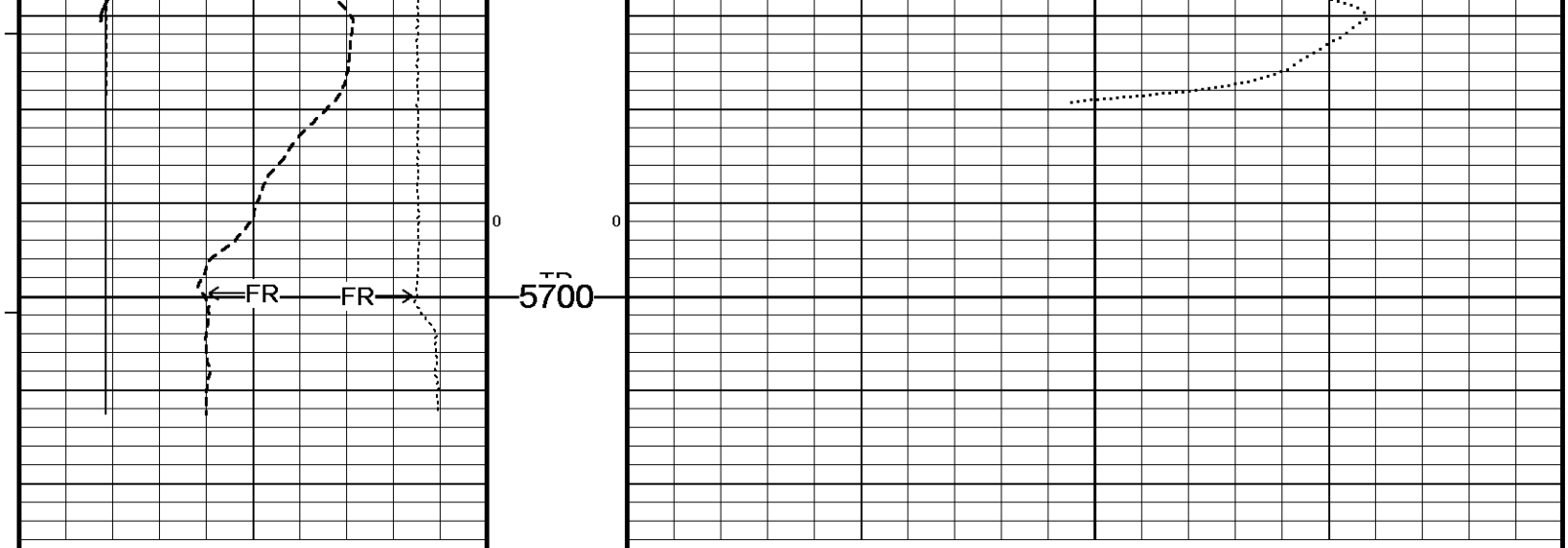
REPEAT SECTION

Depth Based Data - Maximum Sampling Increment 10.0cm — Plotted on 28-APR-2014 07:45
Filename: C:\Minimus 13.08.2113\Log Data\McCoy Patter...\McCoy Patterson-O'Brate 'A' #2-17_002.dta — Recorded on 28-APR-2014 05:22
System Versions: Logged with 13.08.2113 Plotted with 13.08.2113




DST Uphole Tension
pounds
5000
0
Replay
Scale
1:240
5250
116°
5300
116°
5350
117°
100
5400
119°


5450
120°
5500
120°
5550
120°
5600
Bit Size
MML Caliper
Spontaneous Potential
Gamma Ray
DST Uphole Tension
120°
5650
FR
FR



Depth in Feet

Timing Marks
every 60.0 sec

Micro-normal
ohm metres
0 10 20 30 40

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

Micro-inverse
ohm metres
0 10 20 30 40

Annular Integral every 10 cu ft

Bit Size
inches
6 11 16

DST Uphole Tension
pounds
5000 0

Replay Scale 1:240

Depth Based Data - Maximum Sampling Increment 10.0cm
Plotted on 28-APR-2014 07:45
Filename: C:\Minimus 13.08.2113\Log Data\McCoy Patter...\McCoy Patterson-O'Brate 'A' #2-17_002.dta
Recorded on 28-APR-2014 05:22
System Versions: Logged with 13.08.2113 Plotted with 13.08.2113

REPEAT SECTION

BEFORE SURVEY CALIBRATION

C:\Minimus 13.08.2113\Log Data\McCoy Patterson-O'Brate 'A' #2-17\McCoy Patterson-O'Brate 'A' #2-17_002.dta

General Constants All 000
Last Edited on 28-APR-2014,04:44

General Parameters

General Parameters

Mud Resistivity	0.990	ohm-metres
Mud Resistivity Temperature	79.000	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	5.500	inches
Caliper for Differential Caliper	MML Caliper	

Rwa Parameters

Porosity used	Crossplot Porosity
Resistivity used	Array Ind. One Res Rt
RWA Constant A	1.000
RWA Constant M	2.000
SW/APOR Tool Source	0.000

Down-hole Tension Calibration SMS 0

Field Calibration on 28-APR-2014 04:29

Reading No	Measured	Calibrated (lbs)
1	15715.05	0.00
2	16399.64	408.00

Gamma Calibration MCG-D.K 469

Field Calibration on 28-APR-2014 01:21

	Measured	Calibrated (API)
Background	63	41
Calibrator (Gross)	1157	766
Calibrator (Net)	1094	725

Gamma Constants MCG-D.K 469

Last Edited on 28-APR-2014,03:02

Gamma Calibrator Number	GRC038	
Mud Density	1.10	gm/cc
Caliper Source for Processing	Density Caliper	
Tool Position	Eccentred	
Concentration of KCl		kppm
K Mud Type	Chloride	
K Mud Concentration	0.00	%

High Resolution Temperature Calibration MCG-D.K 469

Field Calibration on 18-APR-2014,19:10

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

High Resolution Temperature Constants MCG-D.K 469

Last Edited on 25-APR-2014,03:00

Pre-filter Length	11

SP Calibration MCG-D.K 469

Field Calibration on 17-APR-2014 09:58

	Measured	Calibrated (mV)
Reference 1	100.1	99.9
Reference 2	-99.0	-100.0

Caliper Calibration MML-A 3

Base Calibration on 25-MAR-2014 11:38
Field Calibration on 28-APR-2014 01:05

Base Calibration

Reading No	Measured	Calibrator Size (in)
1	14836	5.98
2	18178	7.97
3	21362	9.86
4	25372	11.92
5	0	0.00
6	N/A	N/A

Field Calibration

Measured Caliper (in)	Actual Caliper (in)
8.01	7.97

Micro Normal and Micro Inverse Calibration MML-A 3

Base Calibration on 25-MAR-2014 11:48
Field Check on 28-APR-2014 01:07

Base Calibration

Channel	Measured Resistor 1	Measured Resistor 2	Calibrated (ohm-m) Resistor 1	Calibrated (ohm-m) Resistor 2
Micro Normal	10.0	50.0	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	77.3	77.3
Micro Inverse	51.2	51.2

Micro Normal and Micro Inverse Constants MML-A 3

Last Edited on 28-APR-2014,03:02

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

Neutron Calibration MDN-A.B 66

Base Calibration on 24-MAR-2014 14:50
Field Check on 28-APR-2014 01:27

Base Calibration

	Measured Near	Measured Far	Calibrated (cps) Near	Calibrated (cps) Far
	3064	94	3714	110
Ratio	32.437		33.764	

Field Calibrator at Base

	Calibrated (cps)	
	1641	2431
Ratio	0.675	

Field Check

	Calibrated (cps)	
	1667	2436
Ratio	0.686	

Neutron Constants MDN-A.B 66

Last Edited on 28-APR-2014,03:02

Neutron Source Id	P0204NN	
Neutron Jig Number	5824NE	
Epithermal Neutron		
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-A.A 135

Base Calibration on 25-MAR-2014 12:07
Field Check on 28-APR-2014 00:57

Base Calibration

	Measured	Calibrated (ohm-m)
Reference 1	0.0	0.0
Reference 2	963.6	126.8
Base Check		281.2
Field Check		281.2

FE Constants MFE-A.A 135

Last Edited on 28-APR-2014,03:01

Running Mode	No Sleeve	
MFE K Factor	0.1268	
Caliper Source for FE correction	Density Caliper	
Caliper Value for FE correction	N/A	inches

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 22-FEB-2014,14:07
Field Check on 28-APR-2014 00:55

Base Calibration

Test Loop Calibration

Channel	Measured Low	Measured High	Calibrated (mmho/m) Low	Calibrated (mmho/m) High
1	17.3	474.2	9.3	967.1
2	6.3	388.4	7.6	822.1
3	3.3	259.4	5.2	566.5
4	1.9	133.0	2.6	279.5

Array Temperature 76.8 Deg F

Channel	Base Check (mmho/m) Low	Base Check (mmho/m) High	Field Check (mmho/m) Low	Field Check (mmho/m) High
1			12.3	3842.5
2			29.4	3480.1
3			29.0	3055.8
4			19.8	2083.6
Deep			18.5	2050.8
Medium			42.2	3994.8
Shallow			42.7	5058.6

Array Temperature 62.5 Deg F

Induction Constants MAI-A.A 167

Last Edited on 28-APR-2014,03:01

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	

High Resolution Temperature Calibration MAI-A.A 167

Field Calibration on 18-APR-2014,18:52

	Measured	Calibrated(Deg F)

Lower	10.00	10.00
Upper	100.00	100.00

High Resolution Temperature Constants MAI-A.A 167

Last Edited on 18-APR-2014,18:52

Pre-filter Length	11

Caliper Calibration MPD-D.A 482

Base Calibration on 10-APR-2014 12:34
Field Calibration on 28-APR-2014 00:59

Base Calibration

Reading No	Measured	Calibrator Size (in)
1	16267	3.99
2	26446	5.98
3	36593	7.97
4	46367	9.86
5	57395	11.92
6	N/A	N/A

Field Calibration

Measured Caliper (in)	Actual Caliper (in)
7.94	7.97

Photo Density Calibration MPD-D.A 482

Base Calibration on 24-MAR-2014 13:51
Field Check on 28-APR-2014 01:04

Density Calibration

Base Calibration	Measured		Calibrated (sdu)	
	Near	Far	Near	Far
Background	1244	1407		
Reference 1	59945	29818	59556	30836
Reference 2	25150	2828	24941	2541

Field Check at Base

1243.8	1406.7

Field Check

1237.9	1409.9

PE Calibration

Base Calibration	Measured			Calibrated
	WS	WH	Ratio	Ratio
Background	235	1114		
Reference 1	26220	59734	0.443	0.371
Reference 2	7692	25010	0.312	0.272

Field Check at Base

235.0	1114.4

Field Check

235.4	1109.7

Density Constants MPD-D.A 482

Last Edited on 28-APR-2014,03:02

Density Source Id	18235B	
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	1.11	
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 (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

DOWNHOLE EQUIPMENT

C:\Minimus 13.08.2113\Log Data\McCoy Patterson-O'Brate 'A' #2-17\McCoy Patterson-O'Brate 'A' #2-17_002.dta

CBH-C, Cablehead, 11 pin
CBH-C 0 LG: 2.40 ft WT: 24.3 lb OD: 2.244 in

Compact Comms Gamma
MCG-D.K 469 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

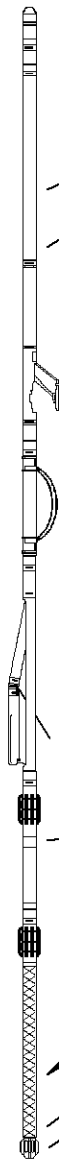
Compact Neutron
MDN-A.B 66 LG: 5.04 ft WT: 50.7 lb OD: 2.244 in

Compact Density/Caliper
MPD-D.A 482 LG: 9.59 ft WT: 90.4 lb OD: 2.449 in

Compact Focussed Electric
MFE-A.A 135 LG: 6.05 ft WT: 48.5 lb OD: 2.244 in

Compact Induction
MAI-A.A 167 LG: 10.81 ft WT: 48.5 lb OD: 2.244 in

Total Length: 50.55 ft Weight: 407.9 lb



42.87 ft	GRGC - Gamma Ray
39.96 ft	CGXT - MCG External Temperature
33.24 ft	MINV - Micro-inverse
33.24 ft	MNRL - Micro-normal
34.24 ft	MLTC - MML Caliper
28.45 ft	NPRL - Limestone Neutron Por.
21.21 ft	CLDC - Density Caliper
21.21 ft	AVOL - Annular Volume
21.21 ft	HVOL - Hole Volume
19.28 ft	DEN - Compensated Density
19.28 ft	DCOR - Density Correction
19.28 ft	DPRL - Limestone Density Por.
19.22 ft	PDPE - PE
13.72 ft	FEFE - Shallow FE
3.34 ft	R40O - Array Ind. One Res 40
3.34 ft	RTAO - Array Ind. One Res Rt
3.34 ft	R60O - Array Ind. One Res 60
0.23 ft	SPCG - Spontaneous Potential
Tool Zero	(0.13ft from bottom)
-0.13 ft	SMTU - DST Uphole Tension

All measurements relative to tool zero.

COMPANY	McCOY PETROLEUM CORPORATION
WELL	PATTERSON-O'BRATE 'A' #2-17
FIELD	WILDCAT
PROVINCE/COUNTY	MEADE
COUNTRY/STATE	U.S.A. / KANSAS

Elevation Kelly Bushing	2825.00	feet	First Reading	5667.00	feet
Elevation Drill Floor	2823.00	feet	Depth Driller	5700.00	feet
Elevation Ground Level	2814.00	feet	Depth Logger	5700.00	feet

Weatherford®

MICRORESISTIVITY LOG