MICRORESISTIVITY LOG

COMPANY	O'BRIEN ENERGY RESOURCES CORP.
WELL	ARDREY #1-2
FIELD	ARDREY
PROVINCE/COUNTY	CLARK
COUNTRY/STATE	U.S.A. / KANSAS
LOCATION	660' FNL & 2066' FWL
	W2 E2 NE NW

SEC	TWP	RGE	Other Services
2	31S	24W	MPD/MDN MAI/MFE

API Number 15-025-21541
Permit Number

Permanent Datum G.L., Elevation 2529 feet
Log Measured From KB
Drilling Measured From K.B.

Elevations:	feet
KB	2541.00
DF	2539.00
GL	2529.00

Date	12-JUN-2012			
Run Number	ONE			
Depth Driller	5700.00	feet		
Depth Logger	5696.00	feet		
First Reading	5662.00	feet		
Last Reading	4400.00	feet		
Casing Driller	730.00	feet		
Casing Logger	731.00	feet		
Bit Size	7.875	inches		
Hole Fluid Type	CHEMICAL			
Density / Viscosity	9.30 lb/USg	48.00 CP		
PH / Fluid Loss	11.00	11.60 ml/30Min		
Sample Source	FLOWLINE			
Rm @ Measured Temp	0.52 @ 86.0	ohm-m		
Rmf @ Measured Temp	0.42 @ 86.0	ohm-m		
Rmc @ Measured Temp	0.62 @ 86.0	ohm-m		
Source Rmf / Rmc	CALC	CALC		
Rm @ BHT	0.37 @120.0	ohm-m		
Time Since Circulation	4 HOURS			
Max Recorded Temp	120.00	deg F		
Equipment Name	COMPACT			
Equipment / Base	13096	LIB		
Recorded By	L. SCOTT			
Witnessed By	ROGER PEARSON		PETER DEBENHAM	
S.O.# / JOB#	3534544		3534544	

BOREHOLE RECORD

Last Edited: 12-JUN-2012 05:44

Bit Size inches	Depth From feet	Depth To feet
7.875	731.00	5696.00

CASING RECORD

Type	Size inches	Depth From feet	Shoe Depth feet	Weight pounds/ft
SURFACE	8.625	0.00	731.00	24.00

REMARKS

Tools Run: MAI, MPD, MCG, MDN, MML, MFE
Hardware: MPD: 8 inch profile plate used. MAI and MFE: 0.5 Inch standoffs used. MDN: Dual Eccentraliser 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= 362 cu. ft.
Total hole volume from TD to Surface Casing= 2427cu. ft.
Service order #3534544
Rig: Duke Rig # 1
Engineer: L. Scott
Operator(s): K. Rinehart, J. LaPoint

5 INCH MAIN

Depth Based Data - Maximum Sampling Increment 10.0cm
Plotted on 12-JUN-2012 07:51
Filename: C:\Minimus 11_03_4044\Data\O'Brien Ardrey 1-2\O'Brien Ardrey 1-2_003.dta
Recorded on 12-JUN-2012 05:13
System Versions: Logged with 11.03.4044 Processed with 11.03.4044 Plotted with 11.03.4044

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

DST Uphole Tension
pounds
5000 0

Depth in Feet

Borehole Temp in deg F

Replay Scale 1:240

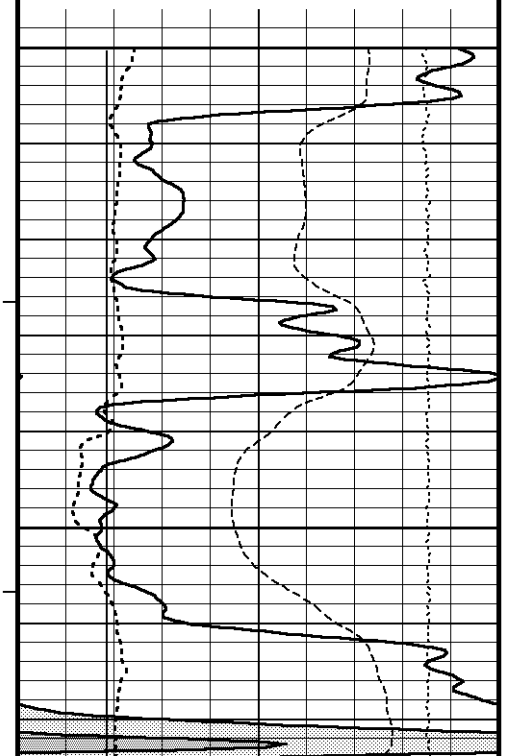
Micro-normal
ohm metres
0 10 20 30 40

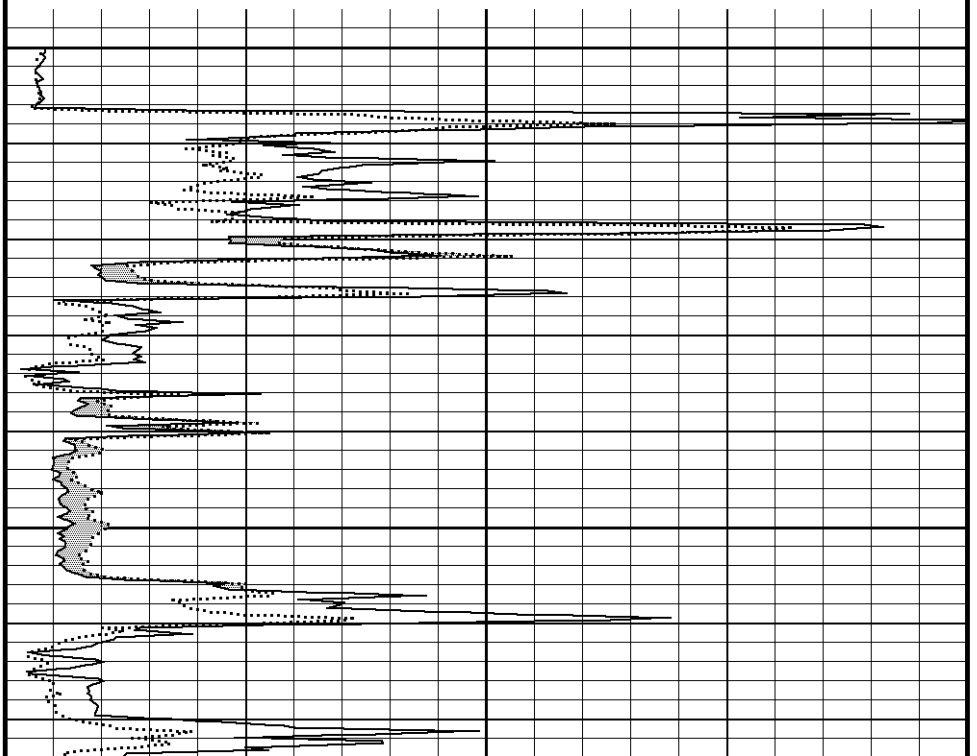
Micro-inverse
ohm metres
0 10 20 30 40

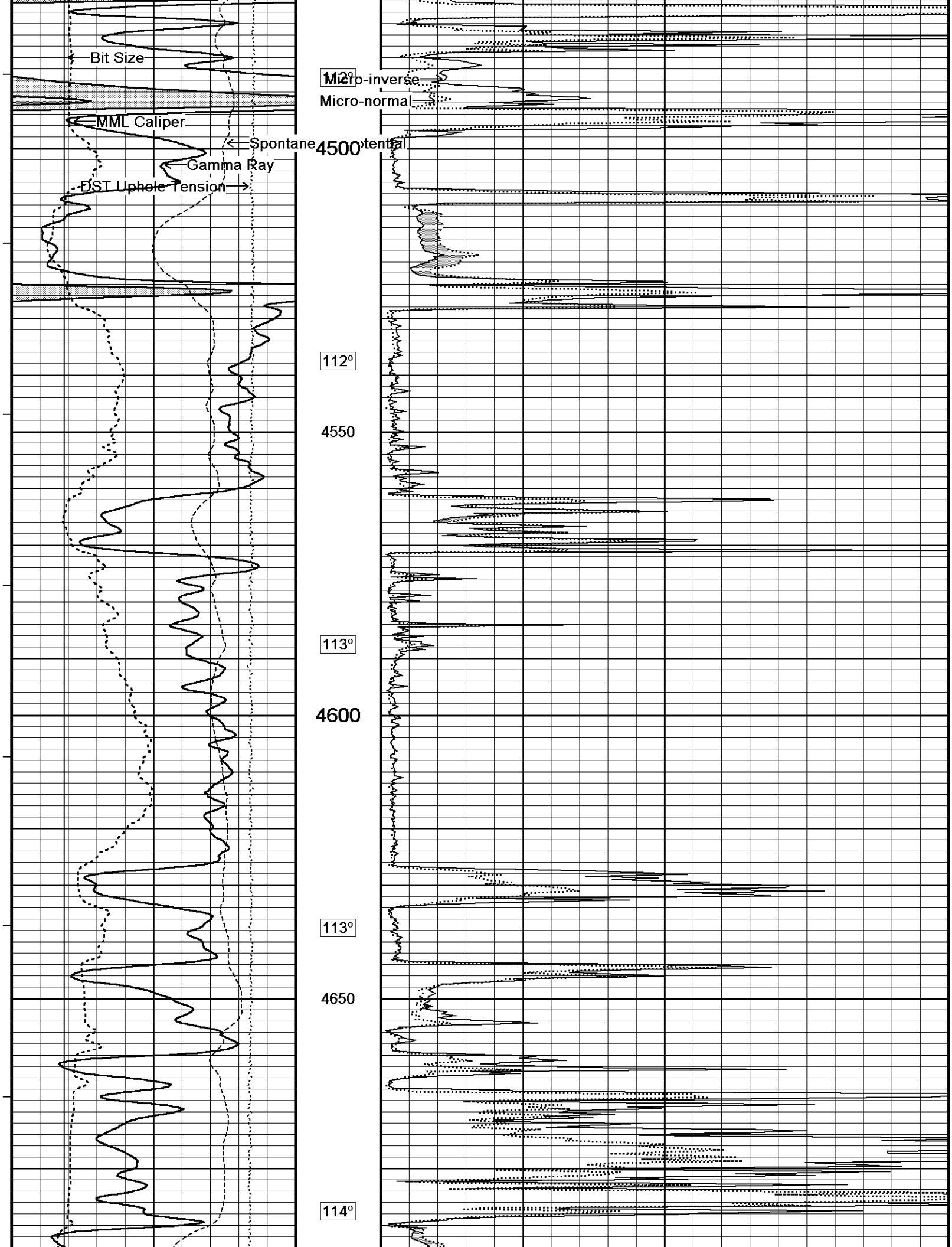
4400

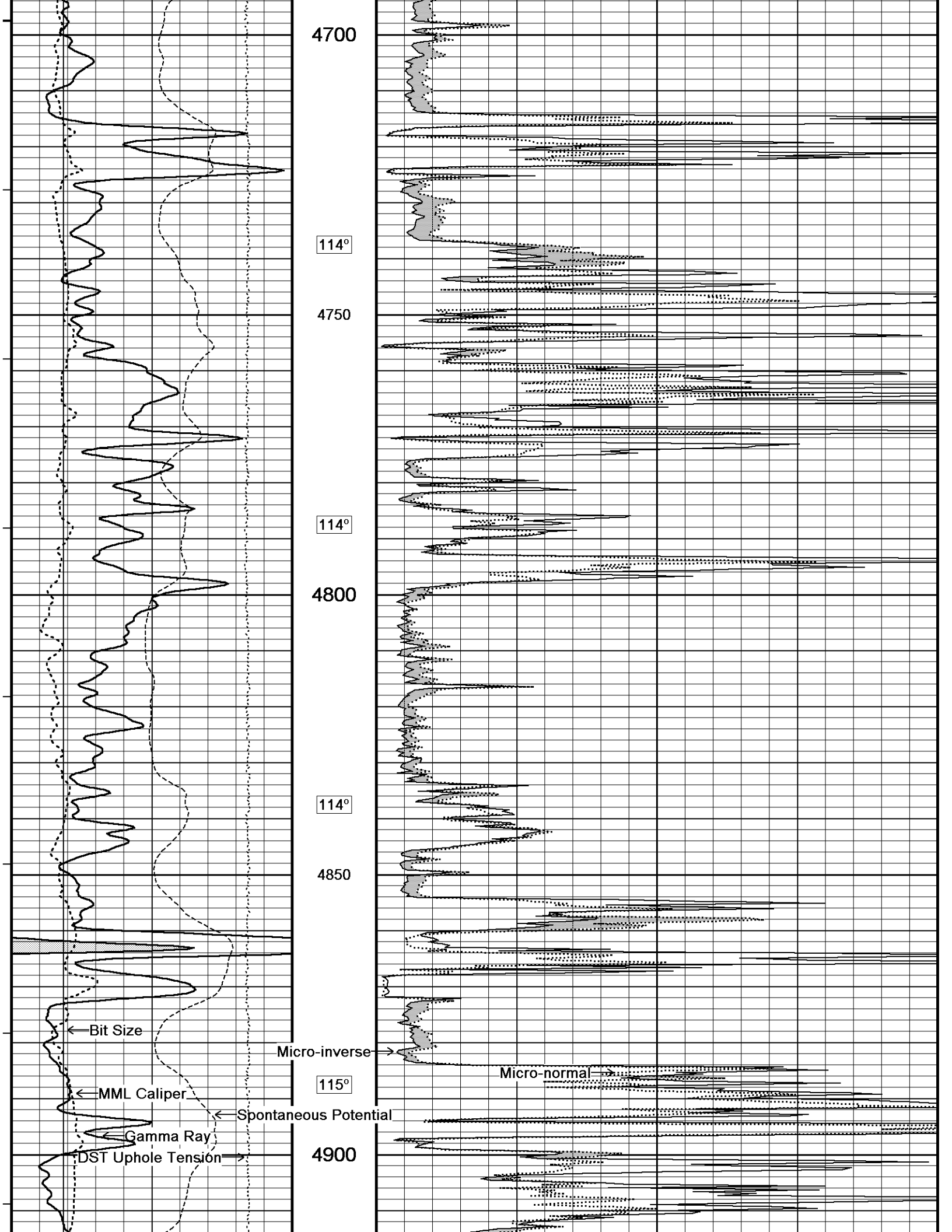
112°

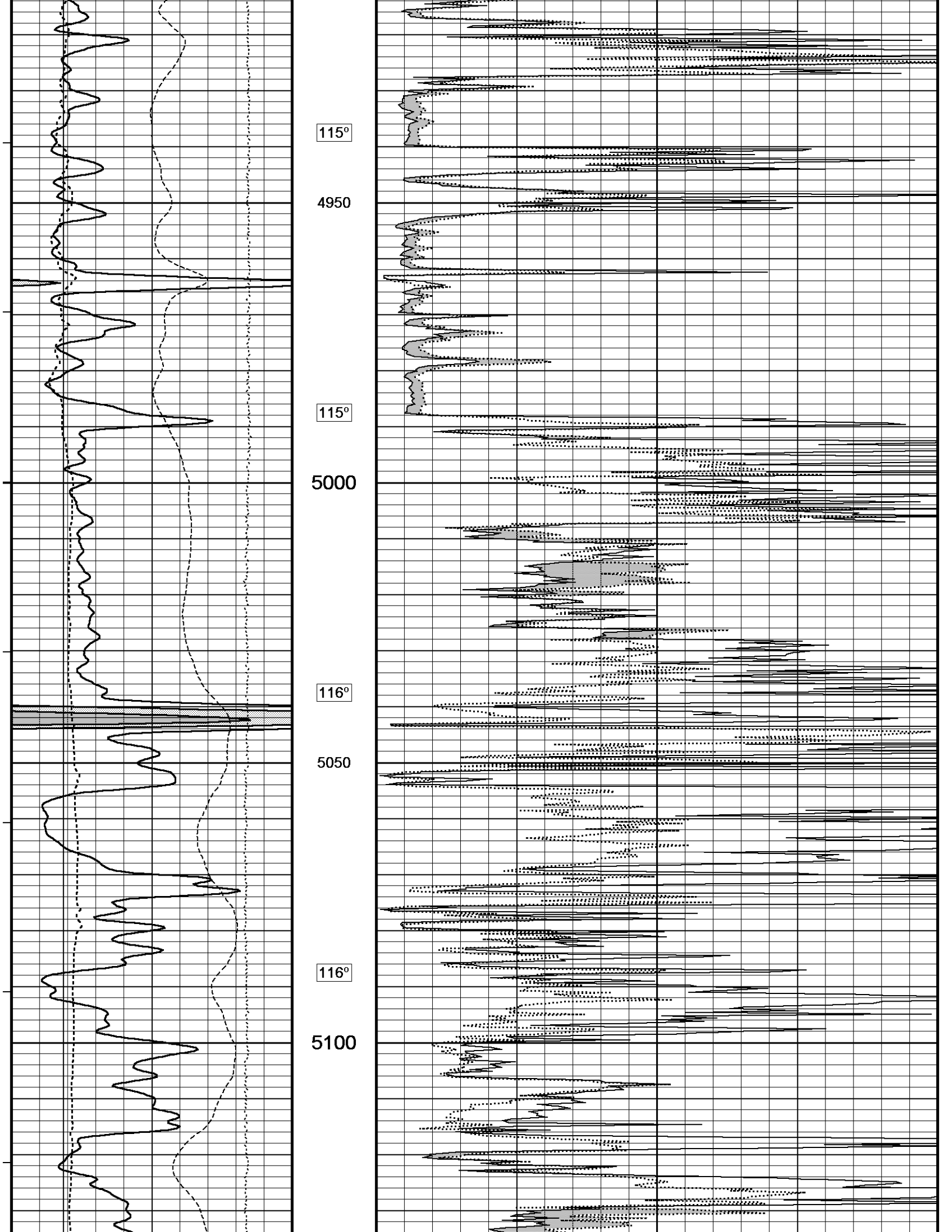
4450

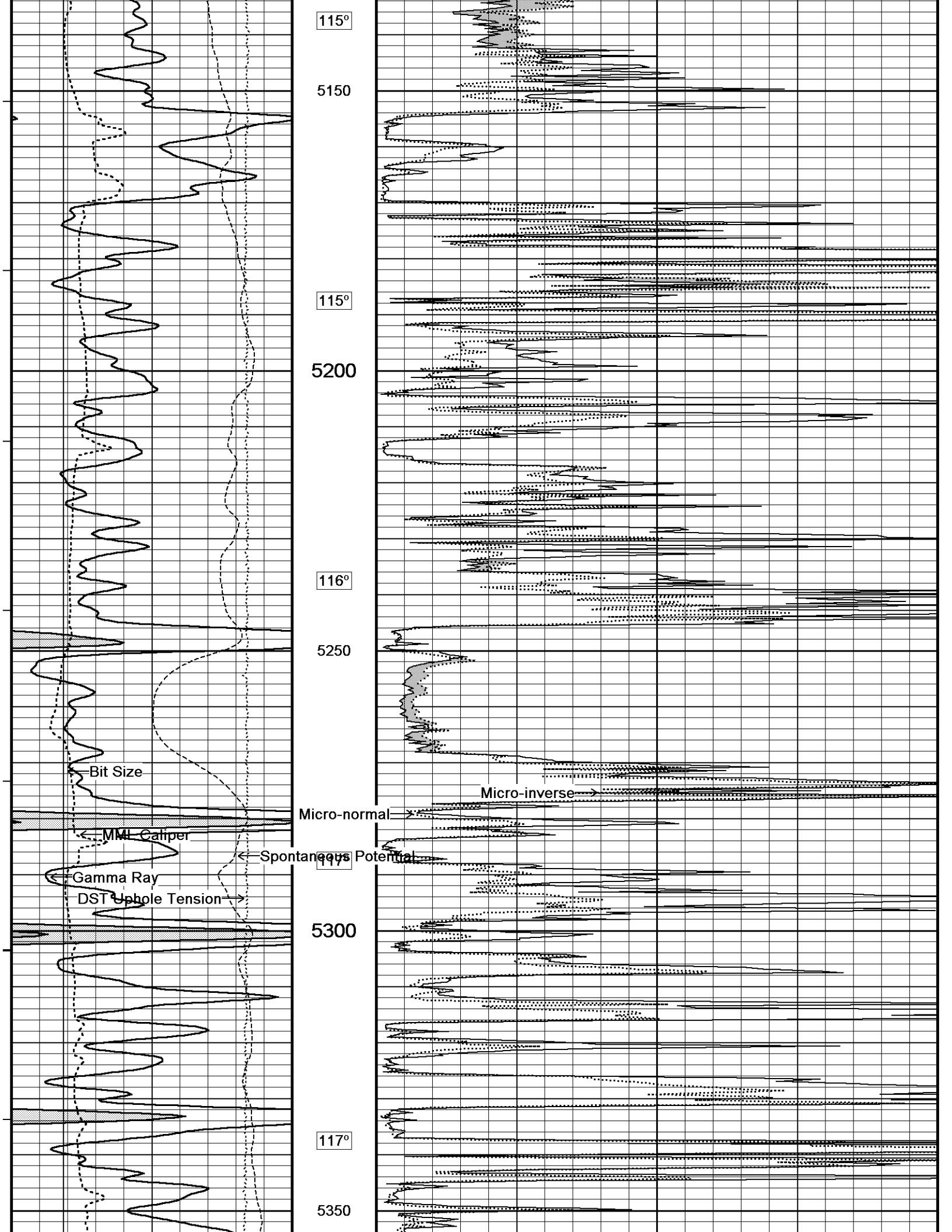


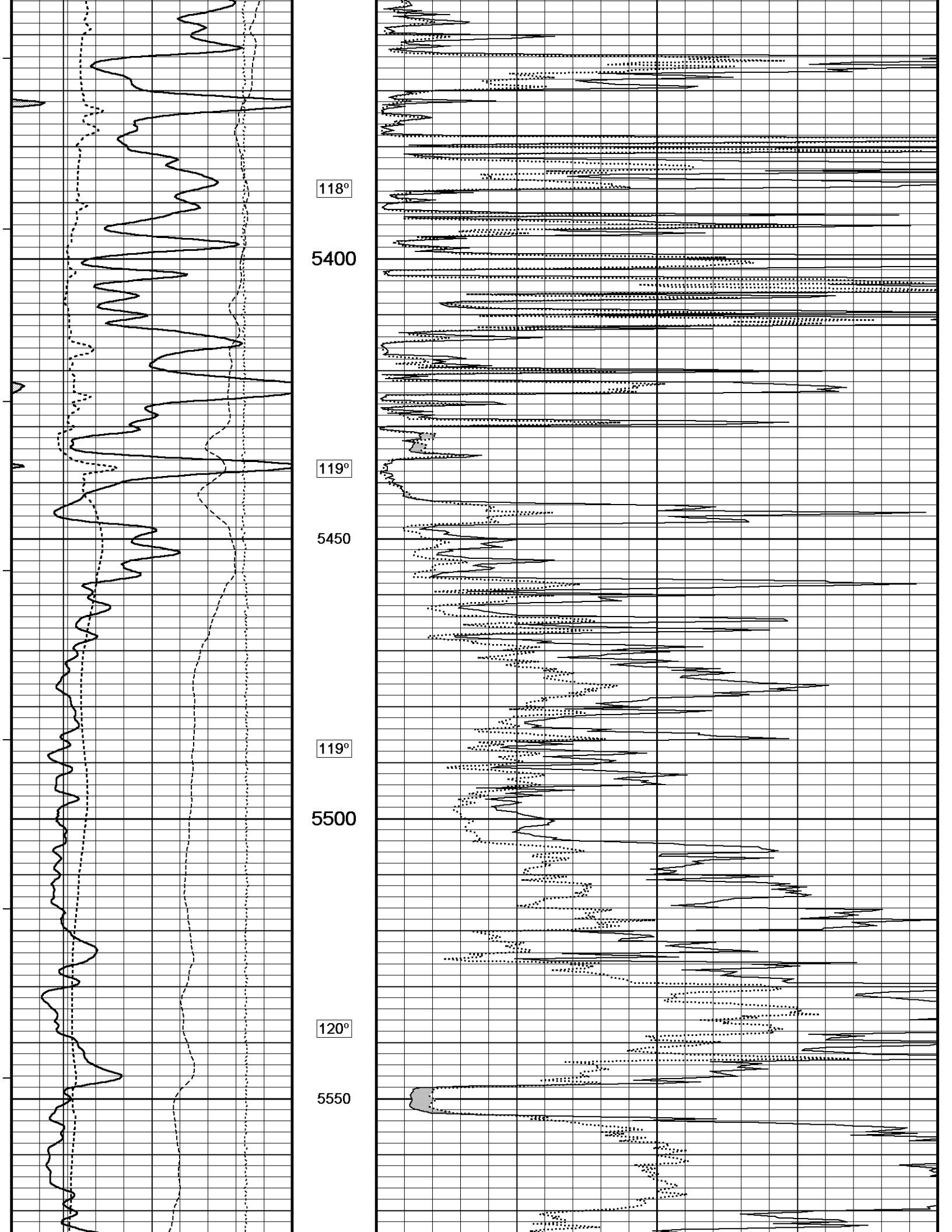


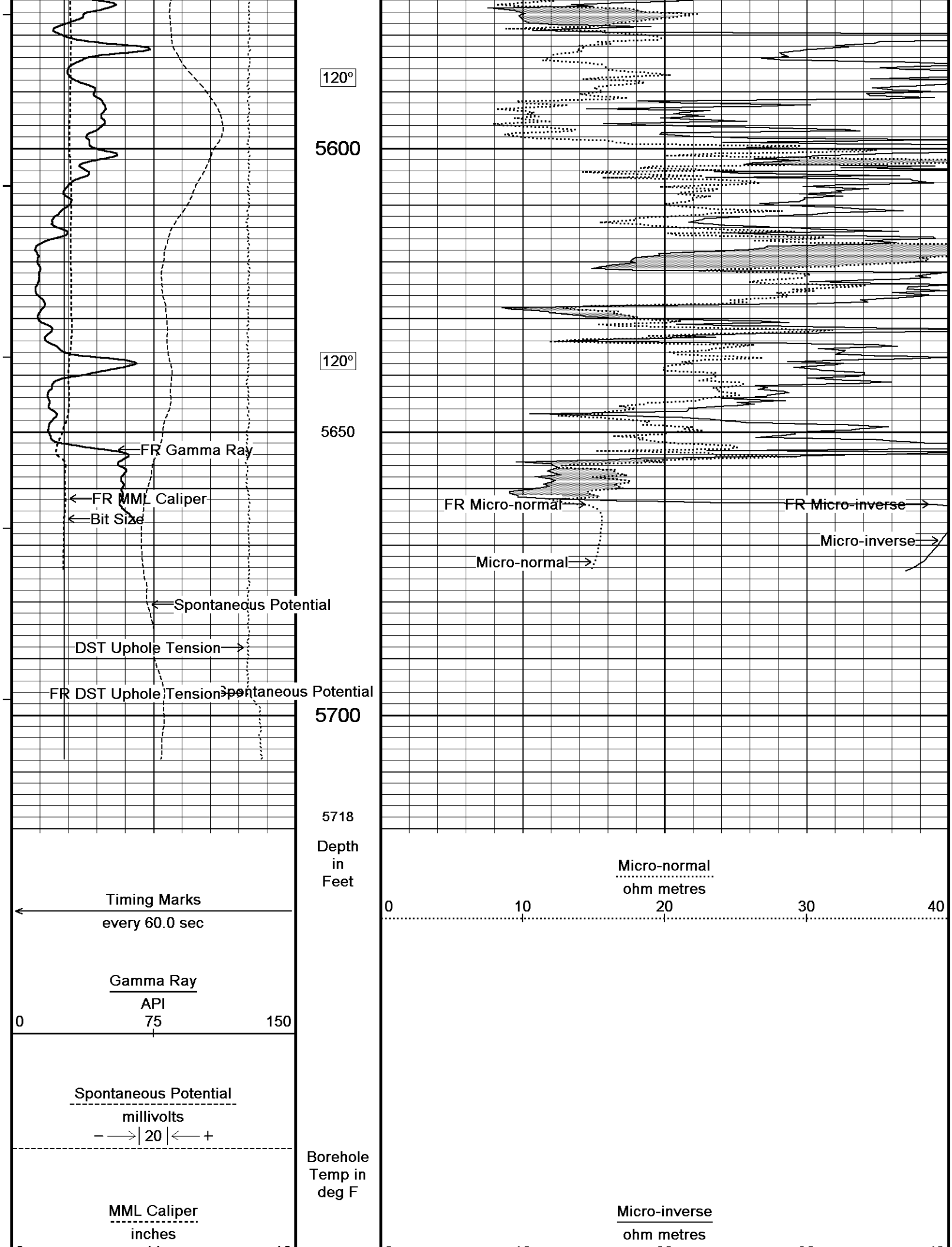

Bit Size
MML Caliper
Spontaneous Potential
Gamma Ray
DST Uphole Tension
112°
Micro-inverse
Micro-normal
4500
112°
4550
113°
4600
113°
4650
114°


4700
114°
4750
114°
4800
114°
4850
Bit Size
Micro-inverse
Micro-normal
115°
MML Caliper
Spontaneous Potential
Gamma Ray
DST Uphole Tension
4900


115°
4950
115°
5000
116°
5050
116°
5100


115°
5150
115°
5200
116°
5250
Bit Size
Micro-inverse
Micro-normal
MML Caliper
Spontaneous Potential
117°
Gamma Ray
DST Uphole Tension
5300
117°
5350


118°
5400
119°
5450
119°
5500
120°
5550


120°
5600
120°
5650
FR Gamma Ray
FR MML Caliper
Bit Size
Spontaneous Potential
DST Uphole Tension
FR DST Uphole Tension
Spontaneous Potential
5700
5718
Depth in Feet
FR Micro-normal
FR Micro-inverse
Micro-inverse
Micro-normal
Micro-normal
ohm metres
0
10
20
30
40
Timing Marks
every 60.0 sec
Gamma Ray
API
0
75
150
Spontaneous Potential
millivolts
− 20 +
Borehole Temp in deg F
MML Caliper
inches
Micro-inverse
ohm metres

6 11 16

0 10 20 30 40

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 12-JUN-2012 07:51
Filename: C:\Minimus 11_03_4044\Data\O'Brien Ardrey 1-2\O'Brien Ardrey 1-2_003.dta — Recorded on 12-JUN-2012 05:13
System Versions: Logged with 11.03.4044 Processed with 11.03.4044 Plotted with 11.03.4044

5 INCH MAIN

10 INCH HI-RES

Depth Based Data - Maximum Sampling Increment 2.5cm — Plotted on 12-JUN-2012 07:51
Filename: C:\Minimus 11_03_4044\Data\O'Brien Ardrey 1-2\O'Brien Ardrey 1-2_001.dta — Recorded on 12-JUN-2012 04:40
System Versions: Logged with 11.03.4044 Plotted with 11.03.4044

Depth
in
Feet

Timing Marks
every 60.0 sec

Micro-normal
ohm metres
0 10 20 30 40

Gamma Ray
API
0 75 150

Spontaneous Potential
millivolts
− → | 20 | ← +

Borehole
Temp in
deg F

MML Caliper
inches
6 11 16

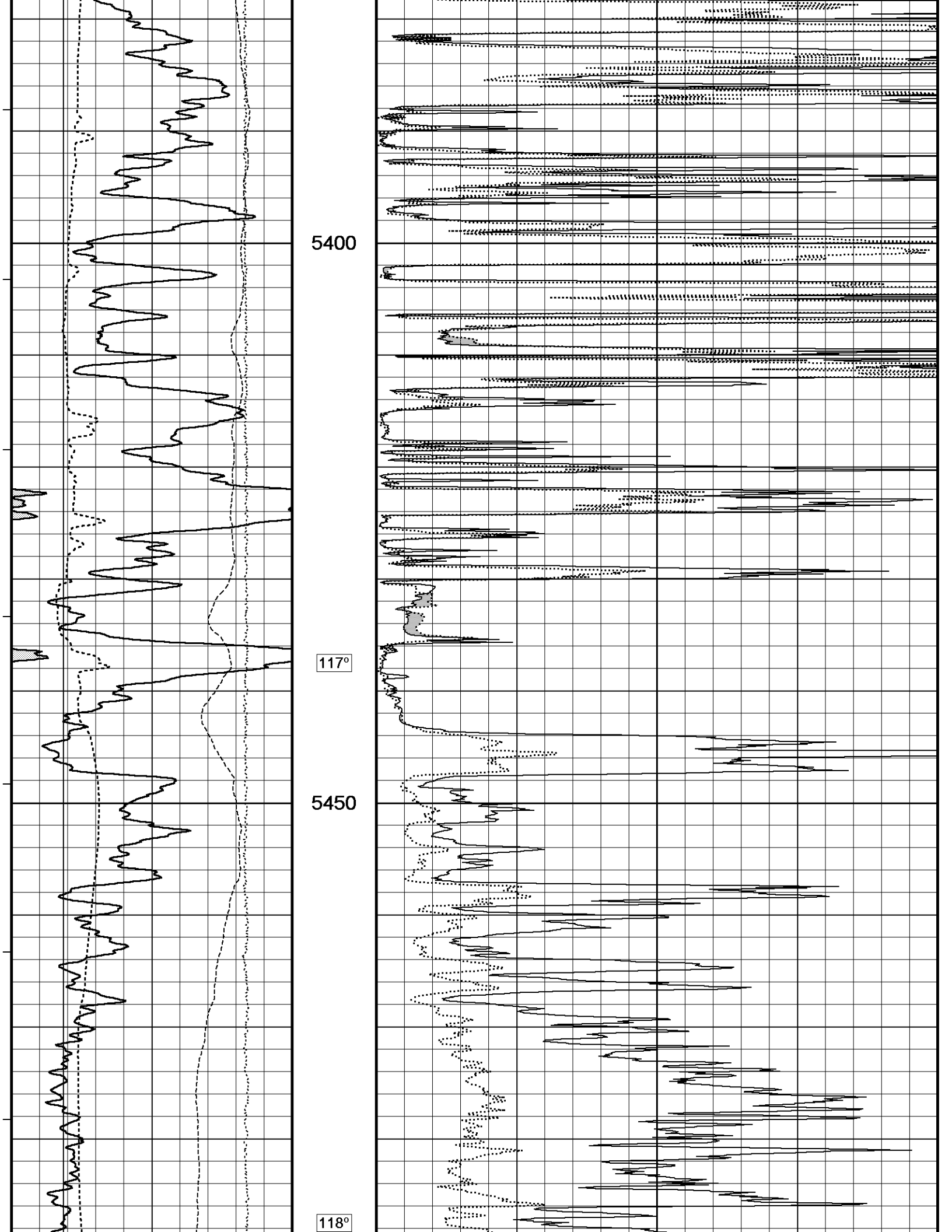
Micro-inverse
ohm metres
0 10 20 30 40

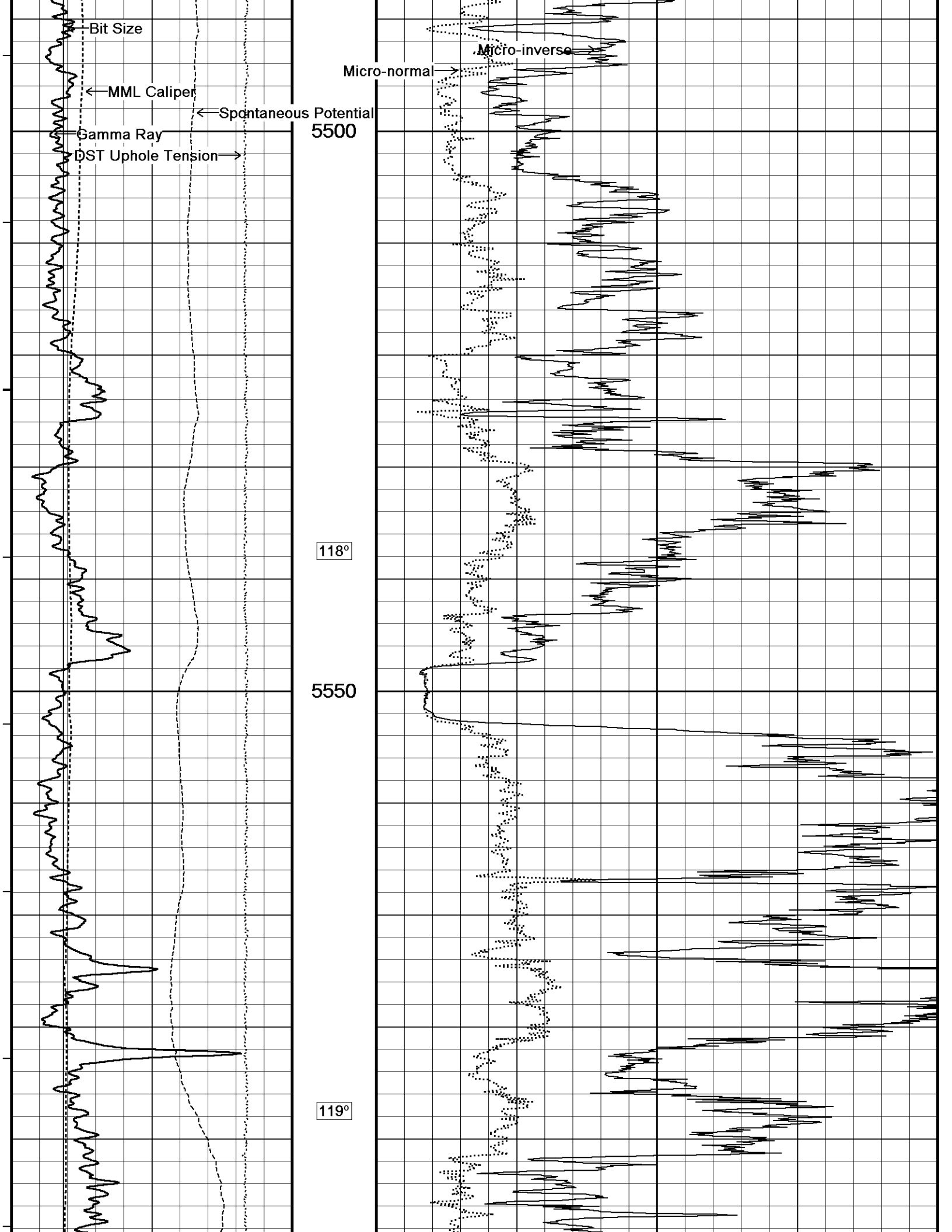
Bit Size
inches
6 11 16

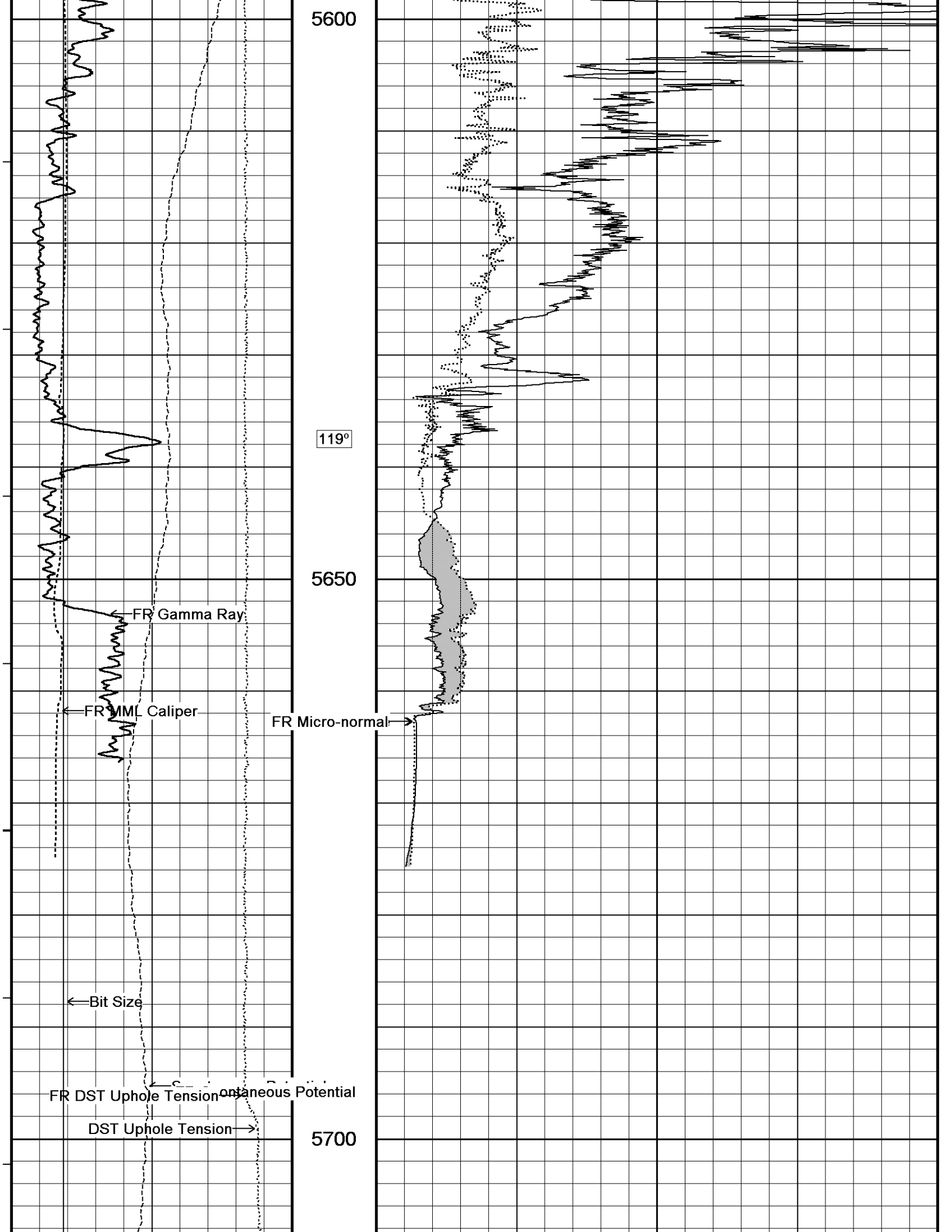
DST Uphole Tension
pounds
5000 0

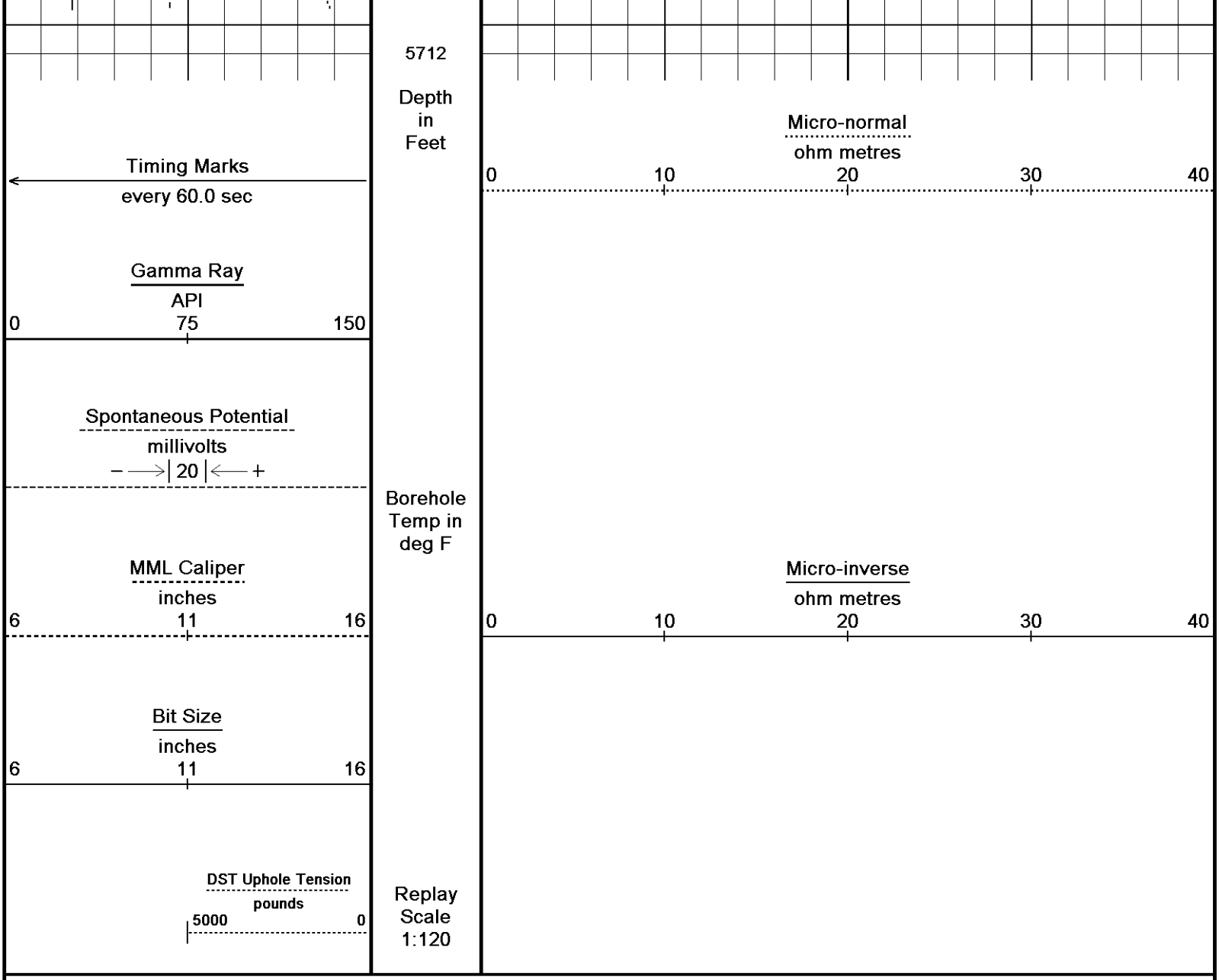
Replay
Scale
1:120

5374


5400
117°
5450
118°


Bit Size
MML Caliper
Spontaneous Potential
Gamma Ray
DST Uphole Tension
Micro-inverse
Micro-normal
5500
118°
5550
119°


5600
119°
5650
FR Gamma Ray
FR MML Caliper
FR Micro-normal
Bit Size
FR DST Uphole Tension
ontaneous Potential
DST Uphole Tension
5700

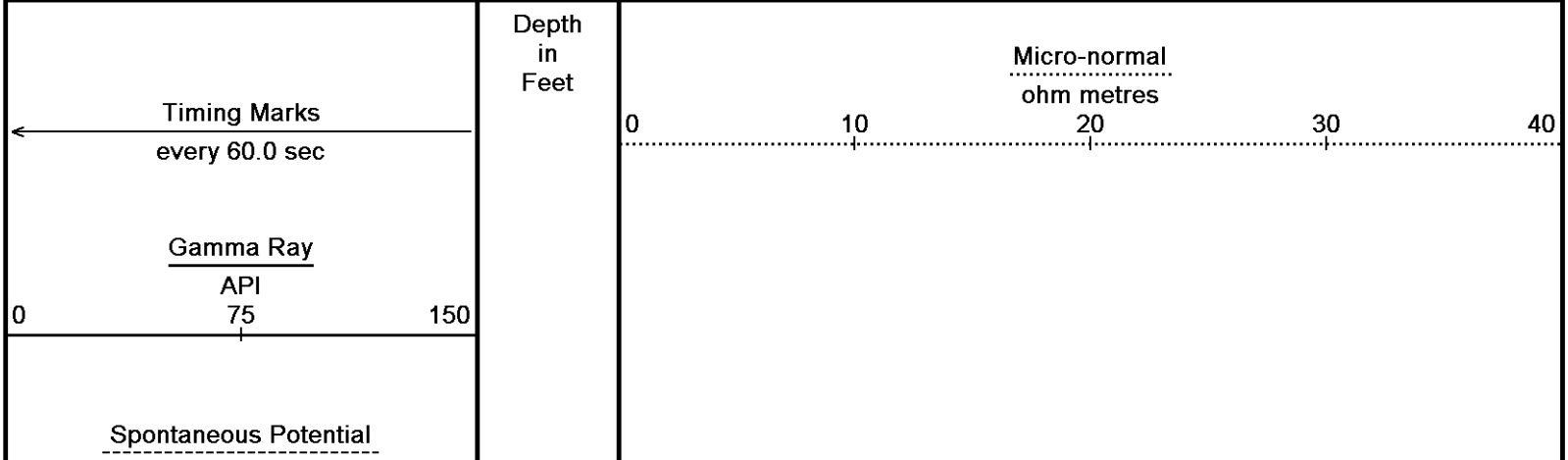


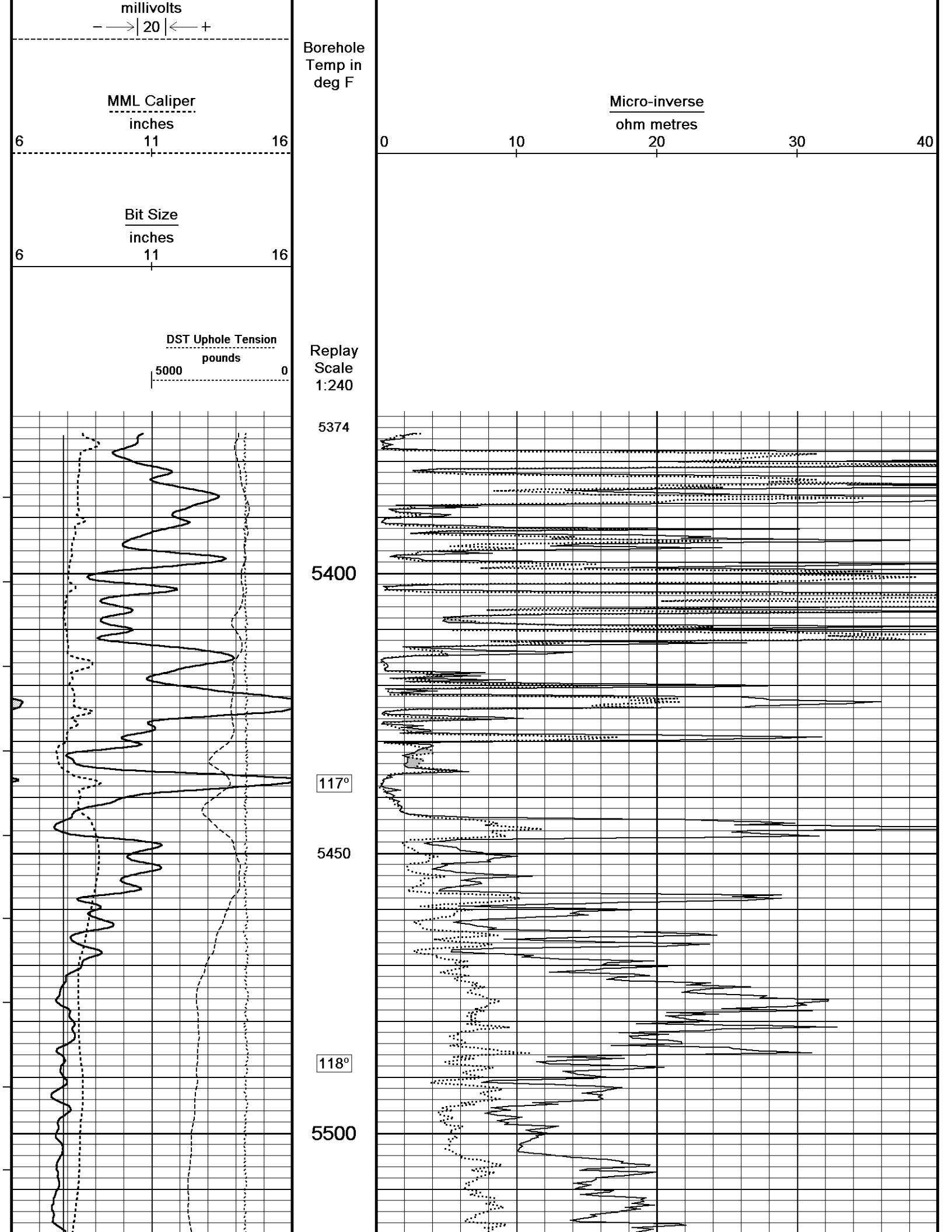
Depth Based Data - Maximum Sampling Increment 2.5cm — Plotted on 12-JUN-2012 07:51
Filename: C:\Minimus 11_03_4044\Data\O'Brien Ardrey 1-2\O'Brien Ardrey 1-2_001.dta — Recorded on 12-JUN-2012 04:40
System Versions: Logged with 11.03.4044 Plotted with 11.03.4044

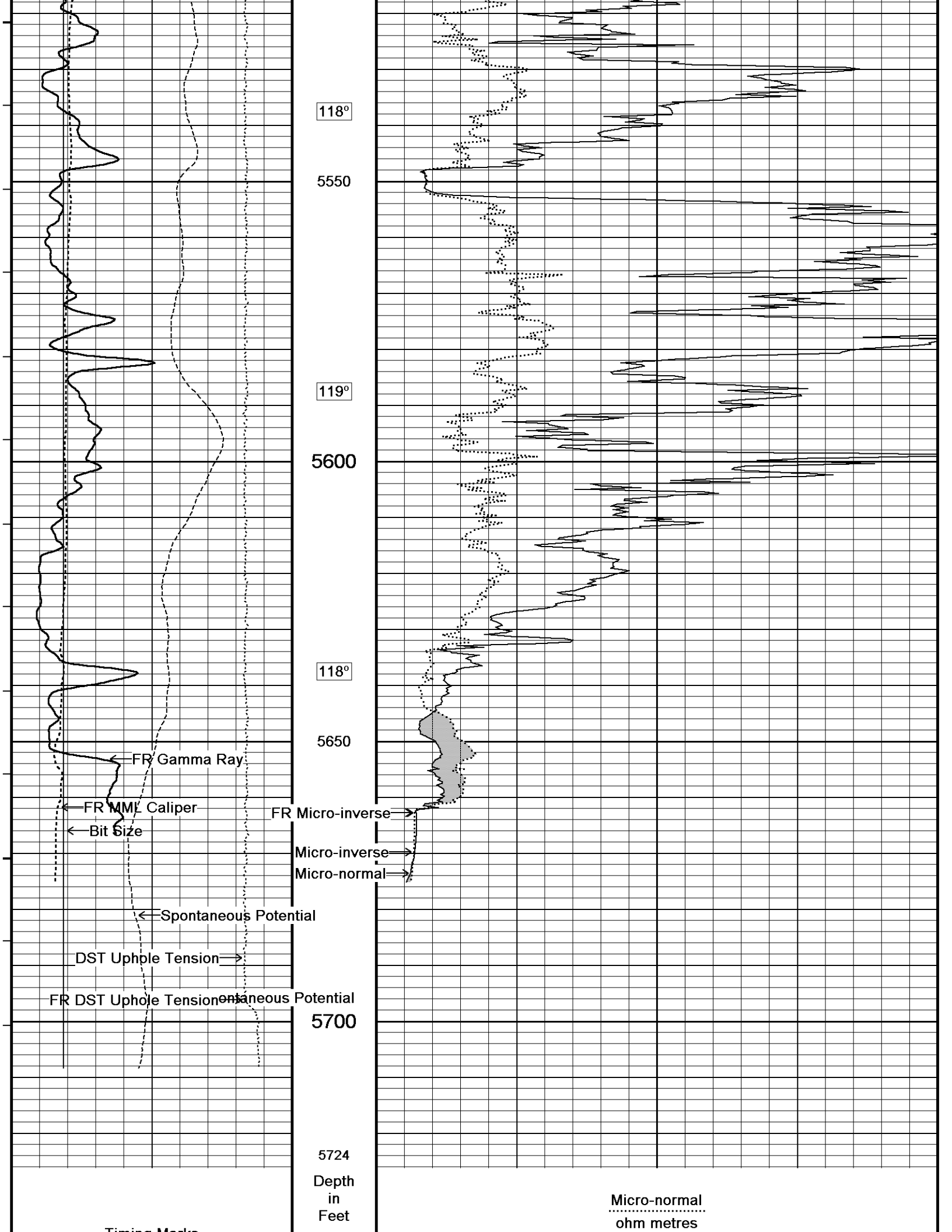
10 INCH HI-RES

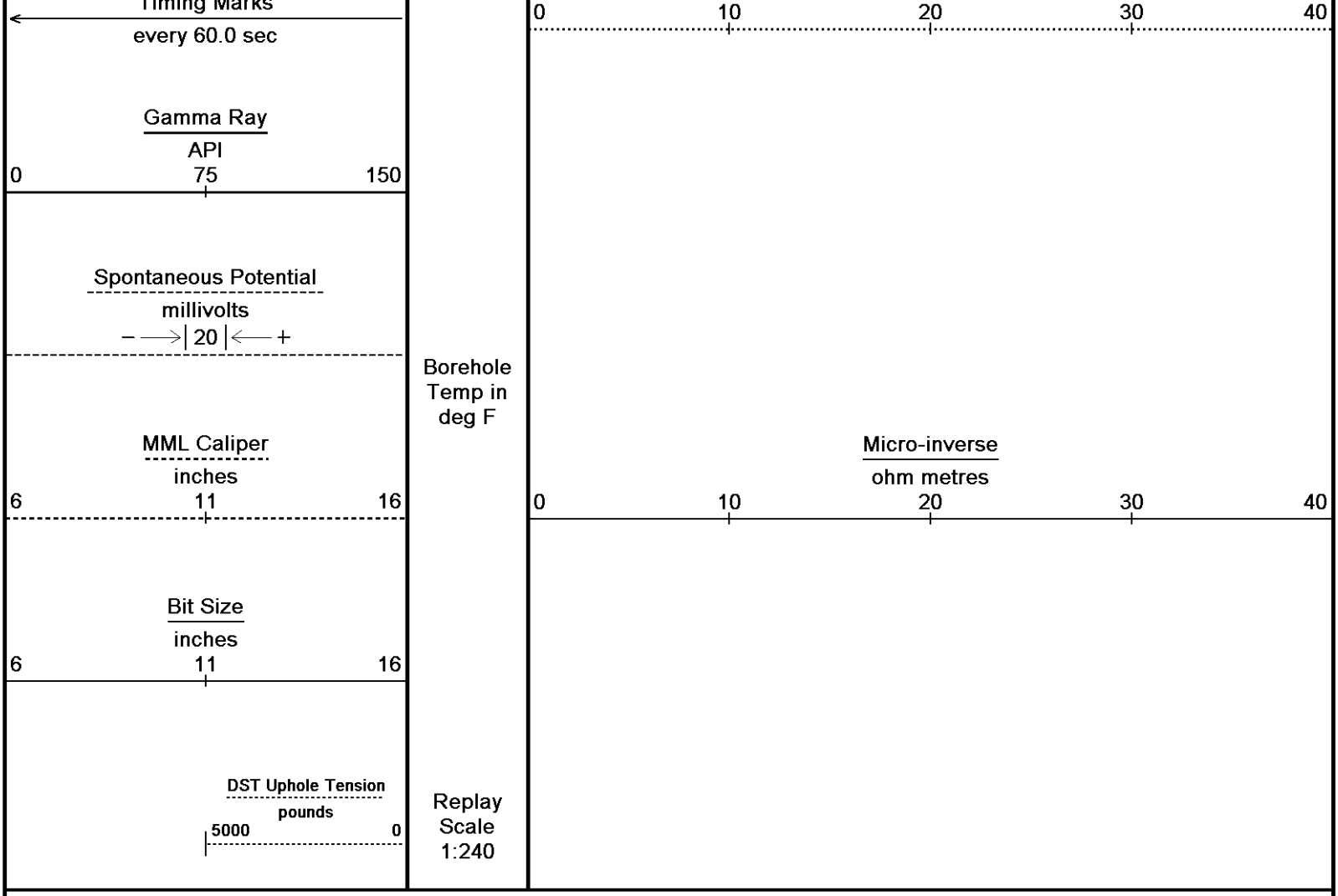
REPEAT SECTION

Depth Based Data - Maximum Sampling Increment 10.0cm — Plotted on 12-JUN-2012 07:51
Filename: C:\Minimus 11_03_4044\Data\O'Brien Ardrey 1-2\O'Brien Ardrey 1-2_002.dta — Recorded on 12-JUN-2012 04:40
System Versions: Logged with 11.03.4044 Processed with 11.03.4044 Plotted with 11.03.4044




millivolts
– → | 20 | ← +
Borehole Temp in deg F
MML Caliper
inches
6
11
16
Bit Size
inches
6
11
16
Micro-inverse
ohm metres
0
10
20
30
40
DST Uphole Tension
pounds
5000
0
Replay Scale 1:240
5374
5400
117°
5450
118°
5500


118°
5550
119°
5600
118°
5650
FR Gamma Ray
FR MML Caliper
Bit Size
FR Micro-inverse
Micro-inverse
Micro-normal
Spontaneous Potential
DST Uphole Tension
FR DST Uphole Tension
ontaneous Potential
5700
5724
Depth
in
Feet
Micro-normal
ohm metres



Depth Based Data - Maximum Sampling Increment 10.0cm — Plotted on 12-JUN-2012 07:51

Filename: C:\Minimus 11_03_4044\Data\O'Brien Ardrey 1-2\O'Brien Ardrey 1-2_002.dta — Recorded on 12-JUN-2012 04:40

System Versions: Logged with 11.03.4044 Processed with 11.03.4044 Plotted with 11.03.4044

REPEAT SECTION

BEFORE SURVEY CALIBRATION

C:\Minimus 11_03_4044\Data\O'Brien Ardrey 1-2\O'Brien Ardrey 1-2.dta

General Constants All 000

Last Edited on 12-JUN-2012,00:57

General Parameters		
Mud Resistivity	0.520	ohm-metres
Mud Resistivity Temperature	86.000	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 SMS 0

Field Calibration on 11-JUN-2012 07:01

Reading No	Measured	Calibrated (lbs)
1	12381.30	0.00

2	13456.91	626.10

Gamma Calibration MCG-B 39

Field Calibration on 11-JUN-2012 22:28

	Measured	Calibrated (API)
Background	71	48
Calibrator (Gross)	1152	773
Calibrator (Net)	1081	725

Gamma Constants MCG-B 39

Last Edited on 12-JUN-2012,00:58

Gamma Calibrator Number	GRC038	
Mud Density	1.12	gm/cc
Caliper Source for Processing	Density Caliper	
Tool Position	Eccentred	
Concentration of KCl	0.00	kppm

SP Calibration MCG-B 39

Field Calibration on 24-MAY-2012 10:26

	Measured	Calibrated (mV)
Reference 1	103.4	100.0
Reference 2	-97.4	-100.0

High Resolution Temperature Calibration MCG-B 39

Field Calibration on 02-APR-2012,14:03

	Measured	Calibrated(Deg F)
Lower	50.00	50.00
Upper	100.00	100.00

High Resolution Temperature Constants MCG-B 39

Last Edited on

Pre-filter Length	11

Caliper Calibration MML-A 4

Base Calibration on 15-MAY-2012 17:25
Field Calibration on 11-JUN-2012 22:21

Base Calibration

Reading No	Measured	Calibrator Size (in)
1	15117	5.98
2	18514	7.97
3	21781	9.86
4	25834	11.92
5	0	0.00
6	N/A	N/A

Field Calibration

Measured Caliper (in)	Actual Caliper (in)
6.15	5.98

Micro Normal and Micro Inverse Calibration MML-A 4

Base Calibration on 15-MAY-2012 17:31
Field Check on 11-JUN-2012 22:22

Base Calibration

	Measured		Calibrated (ohm-m)	
Channel	Resistor 1	Resistor 2	Resistor 1	Resistor 2
Micro Normal	12.2	60.3	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	62.8	62.8
Micro Inverse	48.2	48.2

Micro Normal and Micro Inverse Constants MML-A 4

Last Edited on 05-JUN-2012,09:46

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-B.J 387

Base Calibration on 15-MAY-2012 16:34
Field Check on 11-JUN-2012 22:34

Base Calibration

	Measured		Calibrated (cps)	
	Near	Far	Near	Far
	2995	90	3714	110
Ratio	33.447		33.764	

Field Calibrator at Base	Calibrated (cps)	
	1667	2508
Ratio	0.664	

Field Check	Calibrated (cps)	
	1684	2520
Ratio	0.668	

Neutron Constants MDN-B.J 387

Last Edited on 11-JUN-2012,22:29

Neutron Source Id	P0204NN	
Neutron Jig Number	5824NE	
Epithermal Neutron	No	
Caliper Source for Processing	Bit Size	
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
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 15-MAY-2012 17:11
Field Check on 11-JUN-2012 21:59

Base Calibration

	Measured	Calibrated (ohm-m)
Reference 1	0.0	0.0
Reference 2	963.4	126.8
Base Check		281.4
Field Check		281.5

FE Constants MFE-B.J 352

Last Edited on 11-JUN-2012,21:57

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

Induction Calibration MAI-A.A 178

Base Calibration on 15-MAY-2012,14:15
Field Check on 11-JUN-2012 21:57

Base Calibration

Test Loop Calibration

Channel	Measured Low	Measured High	Calibrated (mmho/m) Low	Calibrated (mmho/m) High
1	17.6	484.7	9.3	966.2
2	6.2	391.4	7.6	821.4
3	4.0	264.5	5.2	566.0
4	2.3	135.1	2.6	279.2

Array Temperature 77.0 Deg F

Channel	Base Check (mmho/m) Low	Base Check (mmho/m) High	Field Check (mmho/m) Low	Field Check (mmho/m) High
1	0.0	0.0	12.8	3763.7
2	0.0	0.0	29.7	3467.4
3	0.0	0.0	27.2	3014.2
4	0.0	0.0	18.8	2064.9
Deep	0.0	0.0	15.9	1995.4
Medium	0.0	0.0	40.1	3955.3
Shallow	0.0	0.0	45.4	5082.5

Array Temperature	0.0	83.1	Deg F

Induction Constants MAI-A.A 178

Last Edited on 11-JUN-2012,21:58

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 178

Field Calibration on 0C4030110004,

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

High Resolution Temperature Constants MAI-A.A 178

Last Edited on 0C4060522000,

Pre-filter Length	11

Caliper Calibration MPD-B 35

Base Calibration on 15-MAY-2012 15:38
Field Calibration on 11-JUN-2012 22:00

Base Calibration

Reading No	Measured	Calibrator Size (in)
1	21260	3.99
2	31424	5.98
3	41761	7.97
4	51280	9.86
5	61536	11.92
6	N/A	N/A

Field Calibration

Measured Caliper (in)	Actual Caliper (in)
5.95	5.98

Photo Density Calibration MPD-B 35

Base Calibration on 15-MAY-2012 15:56
Field Check on 11-JUN-2012 22:19

Density Calibration

Base Calibration	Measured		Calibrated (sdu)	
	Near	Far	Near	Far
Reference 1	62707	32170	59556	30836

Reference 2	26808	2860	24941	2541

Field Check at Base

1145.6 1360.5

Field Check

1139.6 1353.5

PE Calibration

Base Calibration	WS	Measured WH	Ratio	Calibrated Ratio
Background	206	1009		
Reference 1	23065	62504	0.372	0.371
Reference 2	7038	26659	0.266	0.272

Field Check at Base

206.0 1009.0

Field Check

204.7 1004.2

Density Constants MPD-B 35

Last Edited on 12-JUN-2012,00:58

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	1.12	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

DOWNHOLE EQUIPMENT

C:\Minimus 11_03_4044\Data\O'Brien Ardrey 1-2\O'Brien Ardrey 1-2.dta

Compact Comms Gamma
MCG-B 39 LG: 8.70 ft WT: 63.9 lb OD: 2.24 in

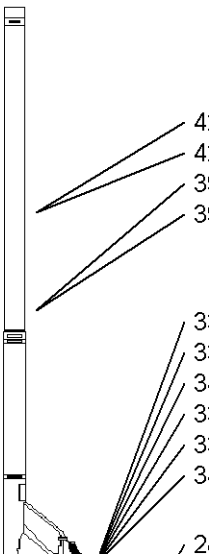
Compact Comms Gamma
MCG-B 39 LG: 8.70 ft WT: 63.9 lb OD: 2.24 in

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

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

Compact Neutron
MDN-B.J 387 LG: 5.04 ft WT: 50.7 lb OD: 2.24 in

Compact Neutron



42.87 ft	GRGC - Gamma Ray
42.87 ft	GRGC - Gamma Ray
39.96 ft	CGXT - MCG External Temperature
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
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.

MDN-B.J 387 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

Compact Density/Caliper
MPD-B 35 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

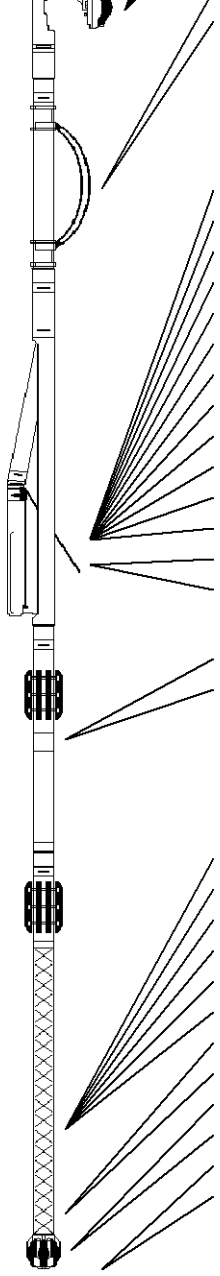
Compact Focussed Electric
MFE-B.J 352 LG: 6.05 ft WT: 48.5 lb OD: 2.24 in

Compact Induction
MAI-A.A 178 LG: 10.81 ft WT: 48.5 lb OD: 2.24 in

Compact Induction
MAI-A.A 178 LG: 10.81 ft WT: 48.5 lb OD: 2.24 in

Total Length: 48.16 ft Weight: 383.6 lb

Total Length: 48.16 ft Weight: 383.6 lb



28.45 ft	NPRL - Limestone Neutron Por.
21.21 ft	HVOL - Hole Volume
21.21 ft	CLDC - Density Caliper
21.21 ft	AVOL - Annular Volume
21.21 ft	HVOL - Hole Volume
21.21 ft	CLDC - Density Caliper
21.21 ft	AVOL - Annular Volume
19.28 ft	DPRL - Limestone Density Por.
19.28 ft	DEN - Compensated Density
19.28 ft	DCOR - Density Correction
19.28 ft	DCOR - Density Correction
19.28 ft	DPRL - Limestone Density Por.
19.28 ft	DEN - Compensated Density
19.22 ft	PDPE - PE
19.22 ft	PDPE - PE
13.72 ft	FEFE - Shallow FE
13.72 ft	FEFE - Shallow FE
3.34 ft	RTAO - Array Ind. One Res Rt
3.34 ft	R60O - Array Ind. One Res 60
3.34 ft	R40O - Array Ind. One Res 40
3.34 ft	R40O - Array Ind. One Res 40
3.34 ft	R60O - Array Ind. One Res 60
3.34 ft	RTAO - Array Ind. One Res Rt
0.23 ft	SPCG - Spontaneous Potential
0.23 ft	SPCG - Spontaneous Potential
Tool Zero	(0.13ft from bottom)
Tool Zero	(0.13ft from bottom)
-0.13 ft	SMTU - DST Uphole Tension
-0.13 ft	SMTU - DST Uphole Tension

All measurements relative to tool zero.
All measurements relative to tool zero.

COMPANY	O'BRIEN ENERGY RESOURCES CORP.
WELL	ARDREY #1-2
FIELD	ARDREY
PROVINCE/COUNTY	CLARK
COUNTRY/STATE	U.S.A. / KANSAS

Elevation Kelly Bushing	2541.00	feet	First Reading	5662.00	feet
Elevation Drill Floor	2539.00	feet	Depth Driller	5700.00	feet
Elevation Ground Level	2529.00	feet	Depth Logger	5696.00	feet

Weatherford®

MICRORESISTIVITY LOG

40 Years of Wireline 1970 2010