MICRORESISTIVITY LOG

Weatherford®

COMPANY	SHAKESPEARE OIL COMPANY, INC.
WELL	PETERSON #2-8
FIELD	STRATFORD WEST
PROVINCE/COUNTY	LOGAN
COUNTRY/STATE	U.S.A. / KANSAS
LOCATION	850' FSL & 1750' FWL SW/4 SE NW SE SW

SEC	TWP	RGE	Other Services
8	13S	32W	MPD/MDN MAI/MFE

API Number 15-109-21095
Permit Number

Permanent Datum G.L., Elevation 2971 feet
Log Measured From KB
Drilling Measured From K.B. @ 10 FEET

Elevations:	feet
KB	2981.00
DF	2979.00
GL	2971.00

Date	23-SEP-2012			
Run Number	ONE			
Depth Driller	4680.00	feet		
Depth Logger	4685.00	feet		
First Reading	4652.00	feet		
Last Reading	3800.00	feet		
Casing Driller	226.00	feet		
Casing Logger	222.00	feet		
Bit Size	7.875	inches		
Hole Fluid Type	CHEMICAL			
Density / Viscosity	9.20 lb/USg	48.00 CP		
PH / Fluid Loss	11.00	6.40 ml/30Min		
Sample Source	FLOWLINE			
Rm @ Measured Temp	1.14 @ 93.0	ohm-m		
Rmf @ Measured Temp	0.91 @ 93.0	ohm-m		
Rmc @ Measured Temp	1.37 @ 93.0	ohm-m		
Source Rmf / Rmc	CALC	CALC		
Rm @ BHT	0.92 @115.0	ohm-m		
Time Since Circulation	3 HOURS			
Max Recorded Temp	115.00	deg F		
Equipment Name	COMPACT			
Equipment / Base	13057	LIB		
Recorded By	R. HOFFMAN			
Witnessed By	STEVE DAVIS			
S.O. / JOB#	3538923		LB12-255	

BOREHOLE RECORD

Last Edited: 23-SEP-2012 07:26

Bit Size inches	Depth From feet	Depth To feet
7.875	222.00	4685.00

CASING RECORD

Type	Size inches	Depth From feet	Shoe Depth feet	Weight pounds/ft
SURFACE	8.625	0.00	222.00	24.00

REMARKS

Tools Ran: MCG, MML, MDN, MPD, MFE, MAI.
Hardware Used: MDN Dual Eccentralizer used. MPD 8 inch profile plate used. MFE, and MAI 0.5 inch standoffs used.
2.71 g/cc Limestone Density Matrix used to calculate porosity.
All intervals logged and scaled per customer's request.
Tight pulls, washouts and borehole rugosity will affect data quality.
Annular volume with 5.5 inch production casing= 162 cu. ft.
Service order: #3538923
Rig: Val #7
Engineer: R. Hoffman
Operator(s): K. Rinehart

5 INCH MAIN

Depth Based Data - Maximum Sampling Increment 10.0cm
Plotted on 23-SEP-2012 07:44
Filename: C:\Minimus 13.02.6600\Data\Shakes...\Shakespeare Peterson #2-8 Main spooled section.dta
Recorded on 23-SEP-2012 06:44
System Versions: Logged with 13.02.6600 Plotted with 13.02.6600

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

Replay Scale 1:240

Micro-normal
ohm metres
0 10 20 30 40

Micro-inverse
ohm metres
0 10 20 30 40

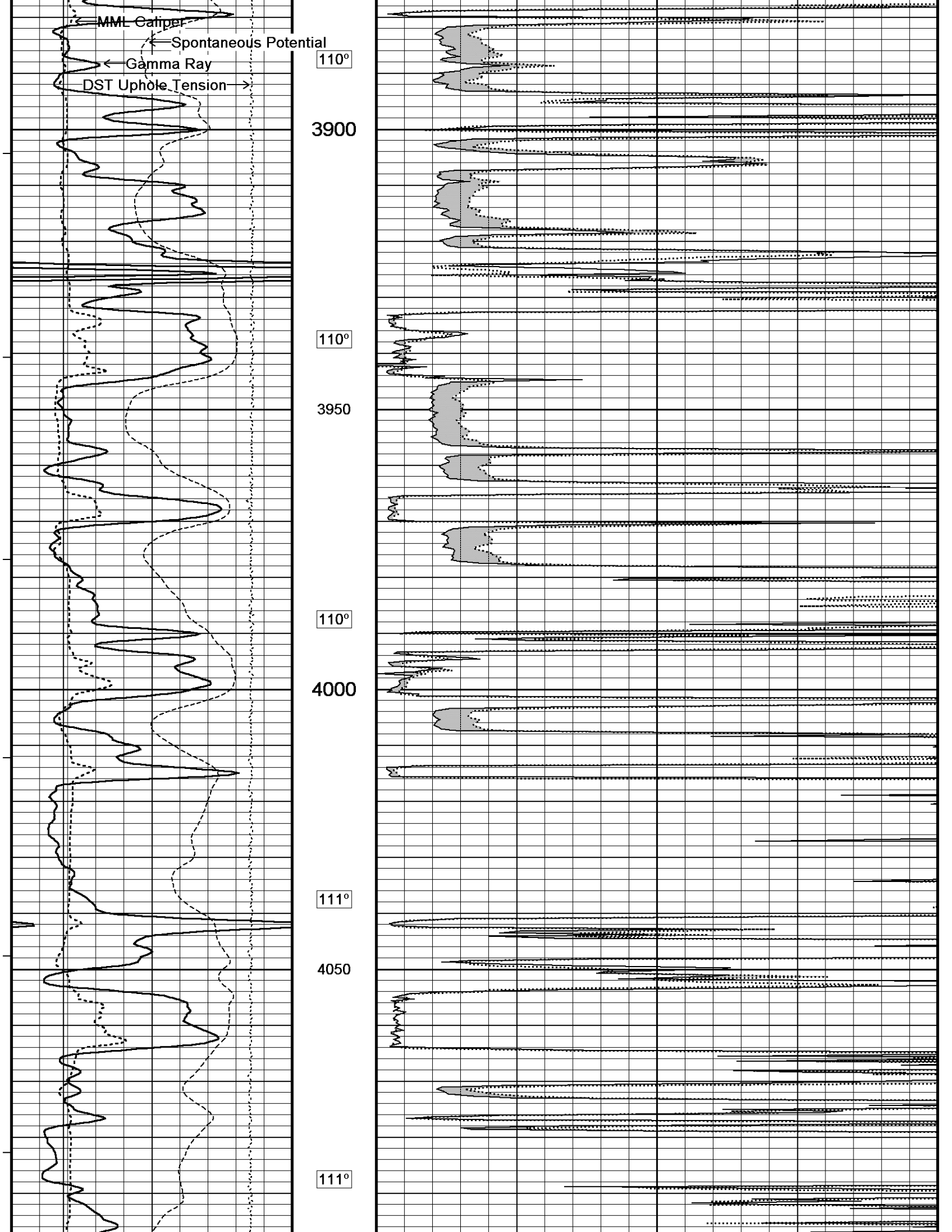
3800

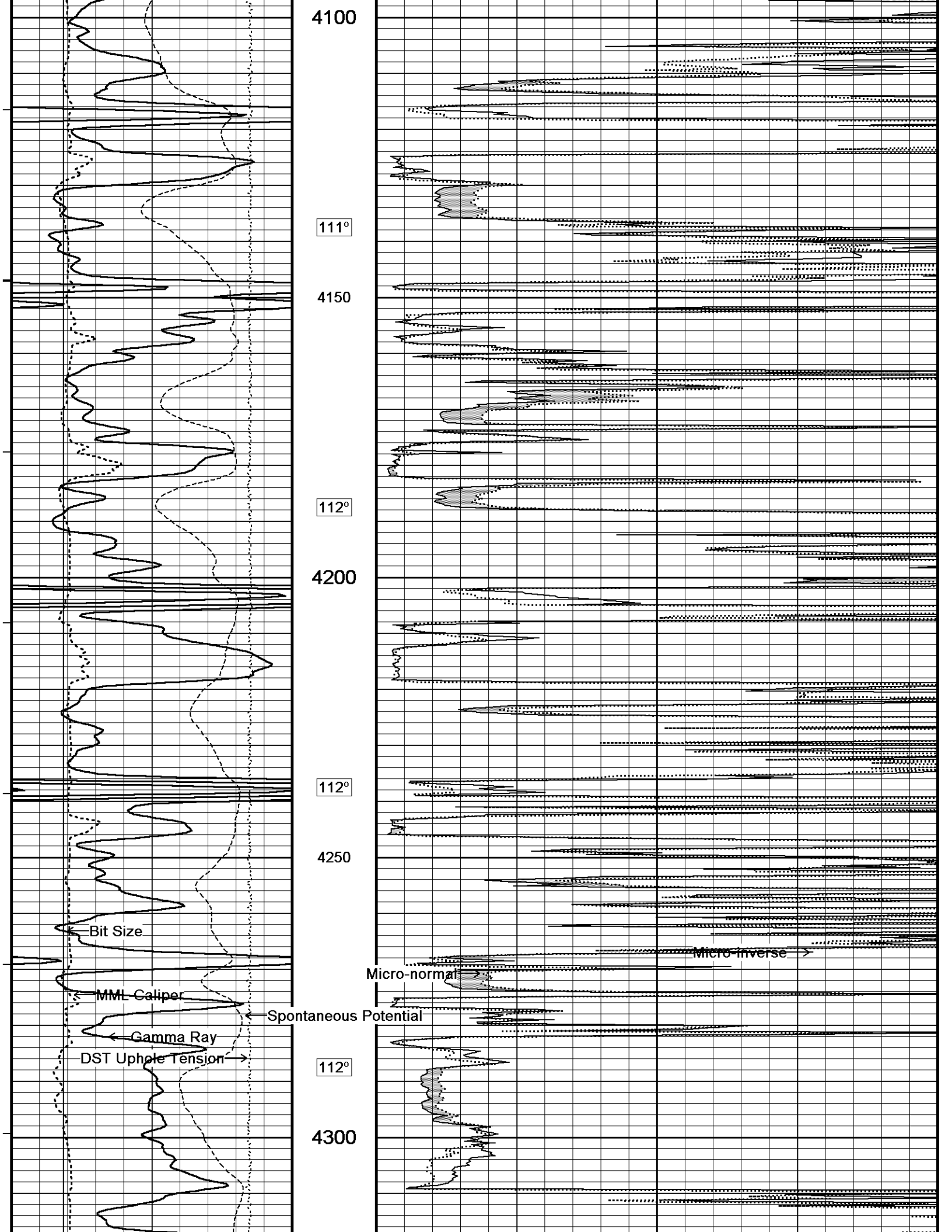
110°

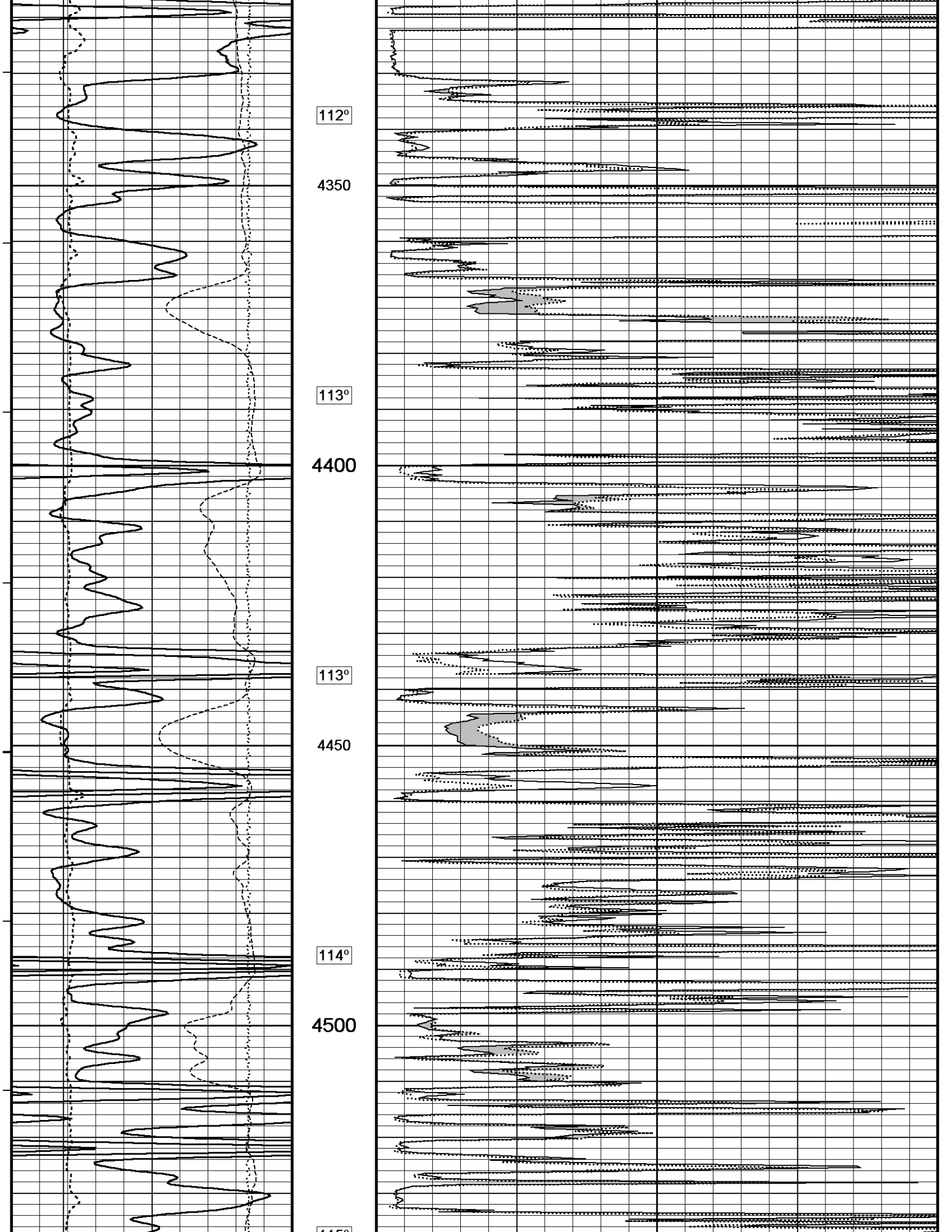
3850

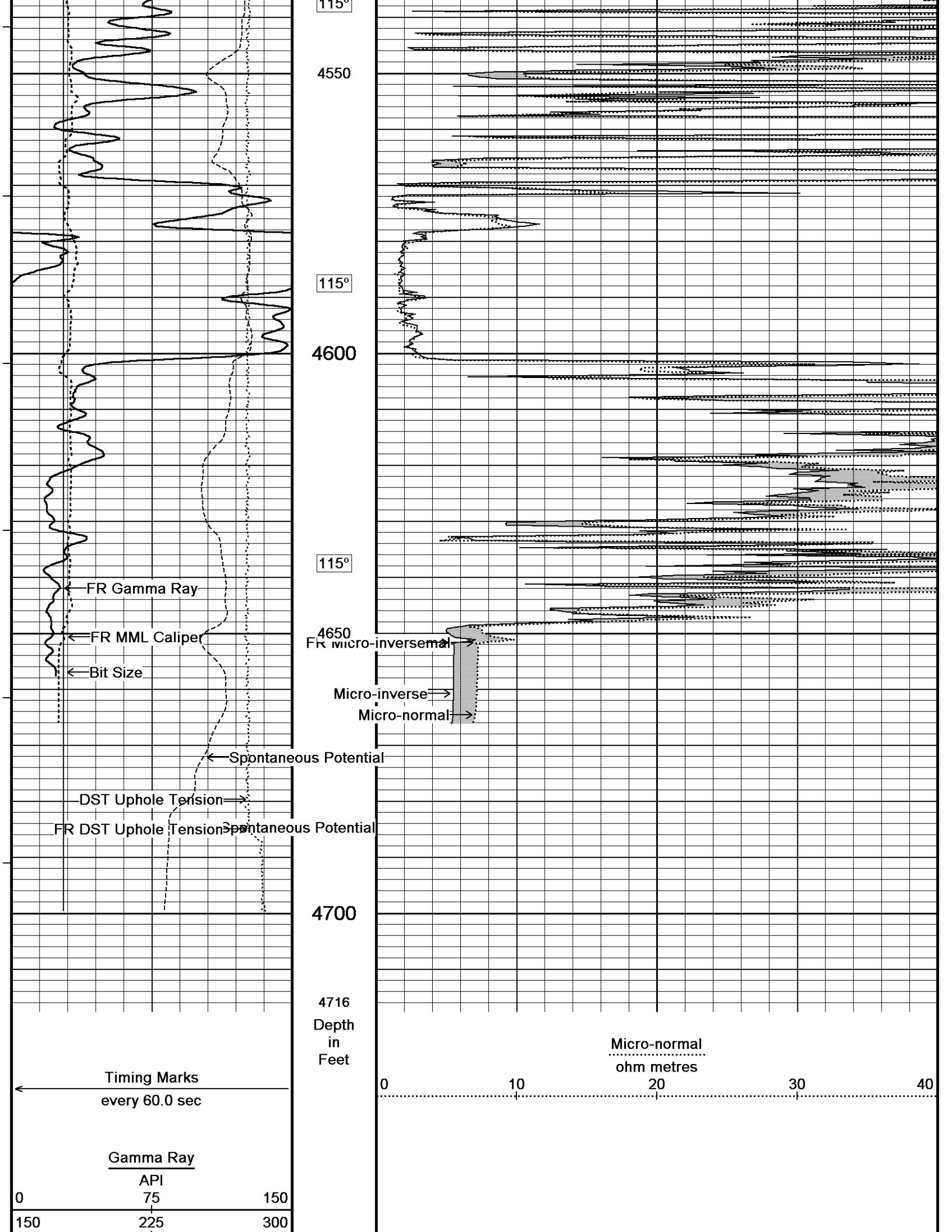
← Bit Size

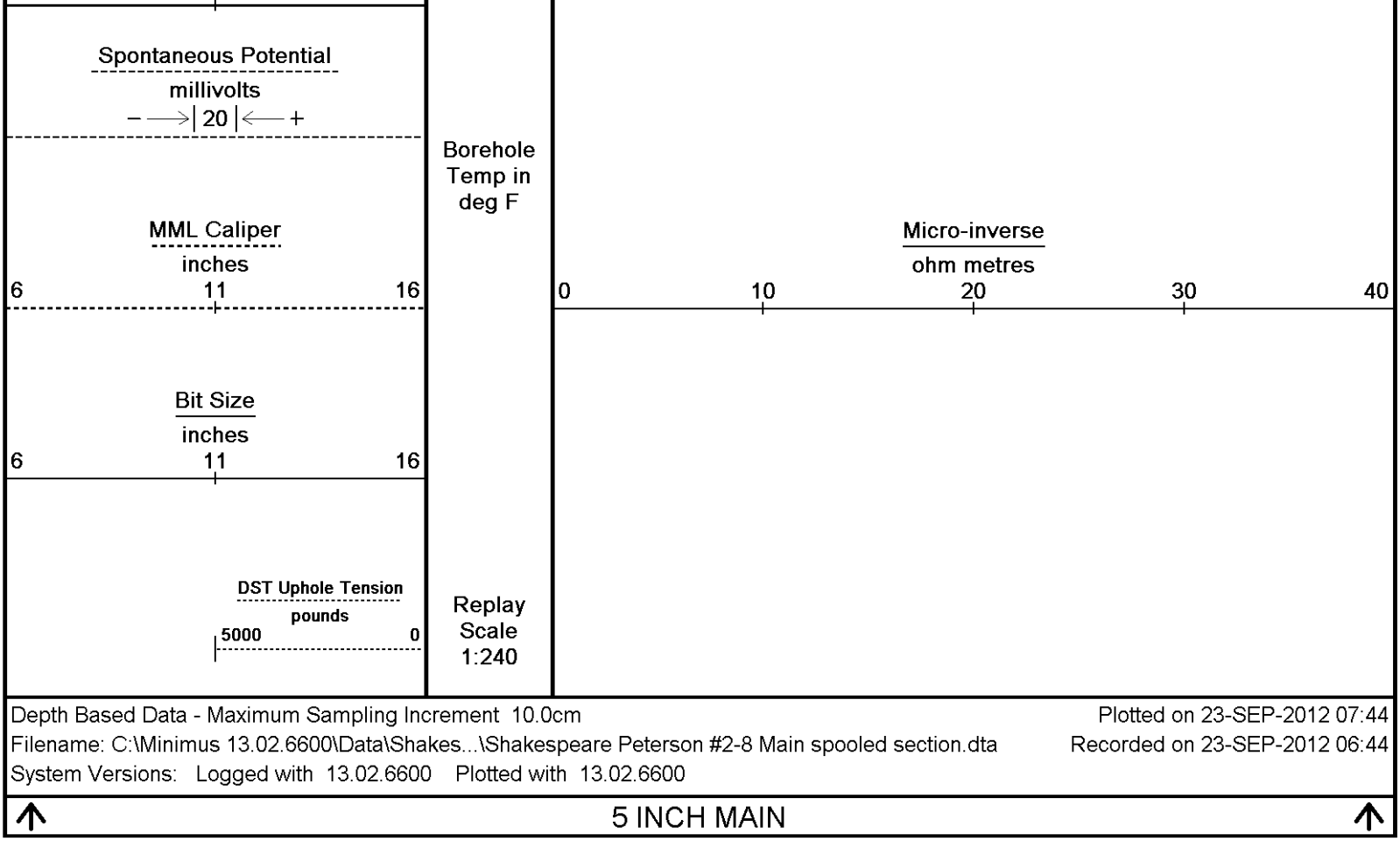
Micro-inverse →


MML Caliper
Spontaneous Potential
Gamma Ray
DST Uphole Tension
110°
3900
110°
3950
110°
4000
111°
4050
111°


4100
111°
4150
112°
4200
112°
4250
Bit Size
MML Caliper
Gamma Ray
DST Uphole Tension
Spontaneous Potential
Micro-normal
Micro-inverse
112°
4300


112°
4350
113°
4400
113°
4450
114°
4500


115°
4550
115°
4600
115°
4650
4700
4716
Depth
in
Feet
FR Gamma Ray
FR MML Caliper
Bit Size
FR Micro-inversemal
Micro-inverse
Micro-normal
Spontaneous Potential
DST Uphole Tension
FR DST Uphole Tension
Spontaneous Potential
Timing Marks
every 60.0 sec
Gamma Ray
API
0
75
150
150
225
300
Micro-normal
ohm metres
0
10
20
30
40



Depth Based Data - Maximum Sampling Increment 10.0cm — Plotted on 23-SEP-2012 07:44
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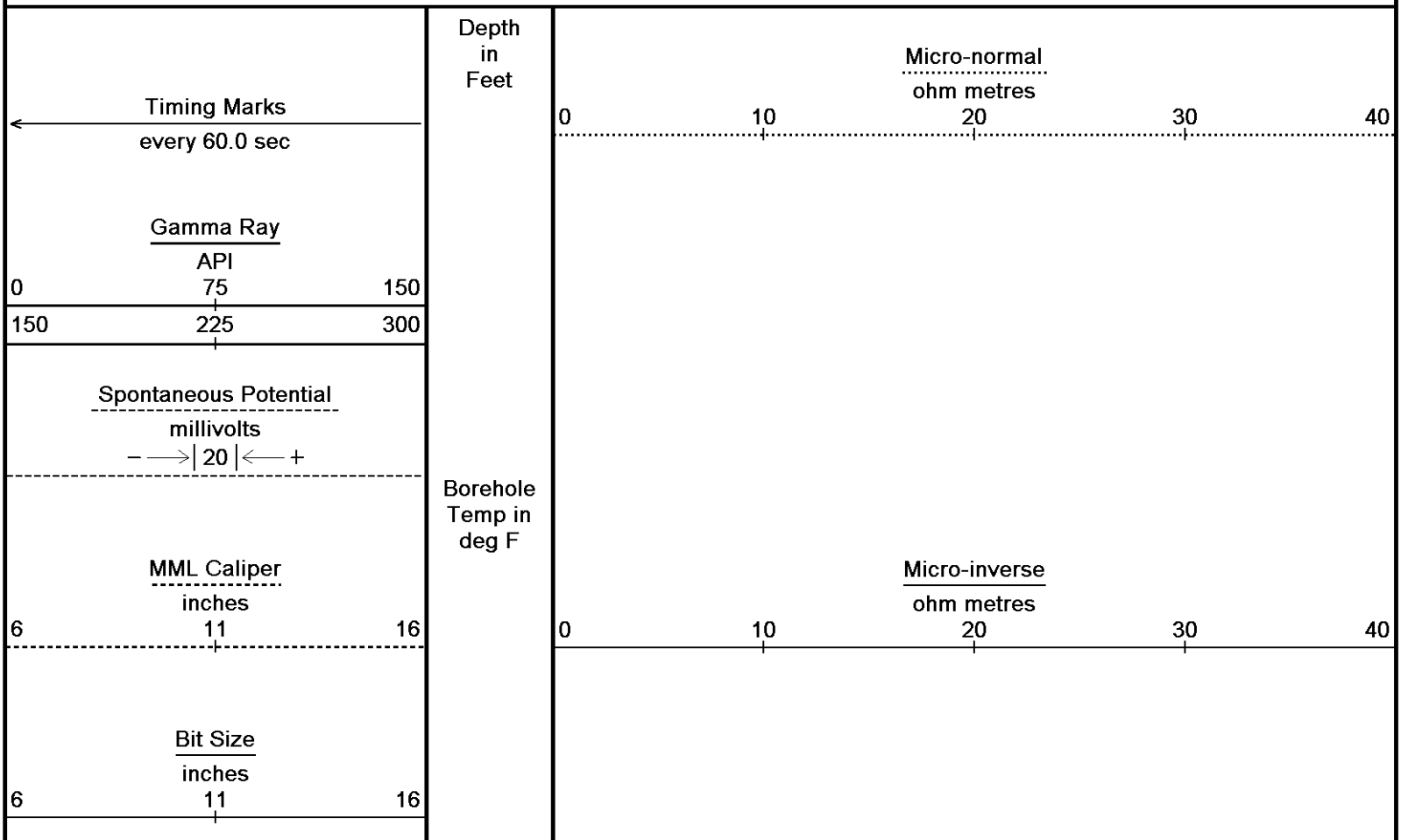
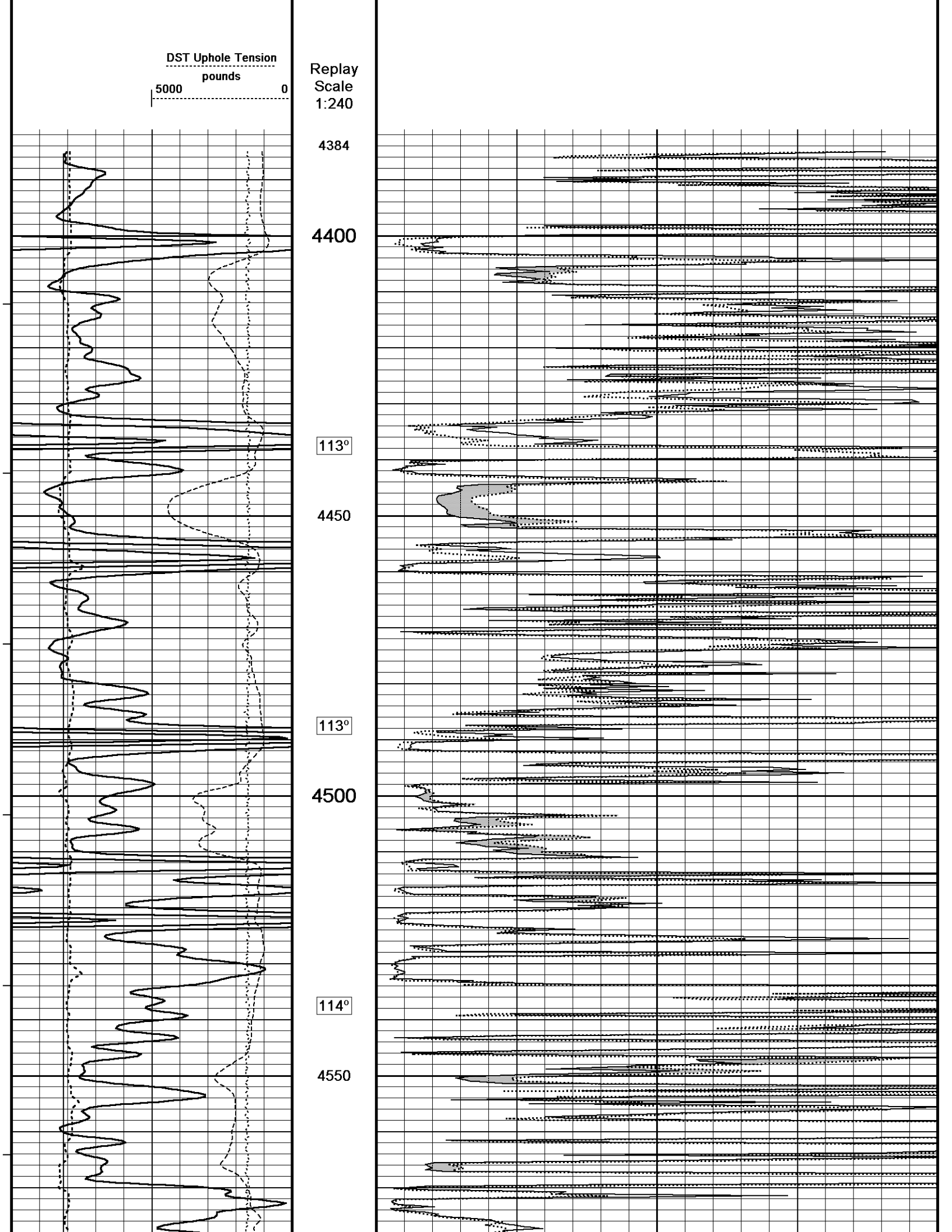
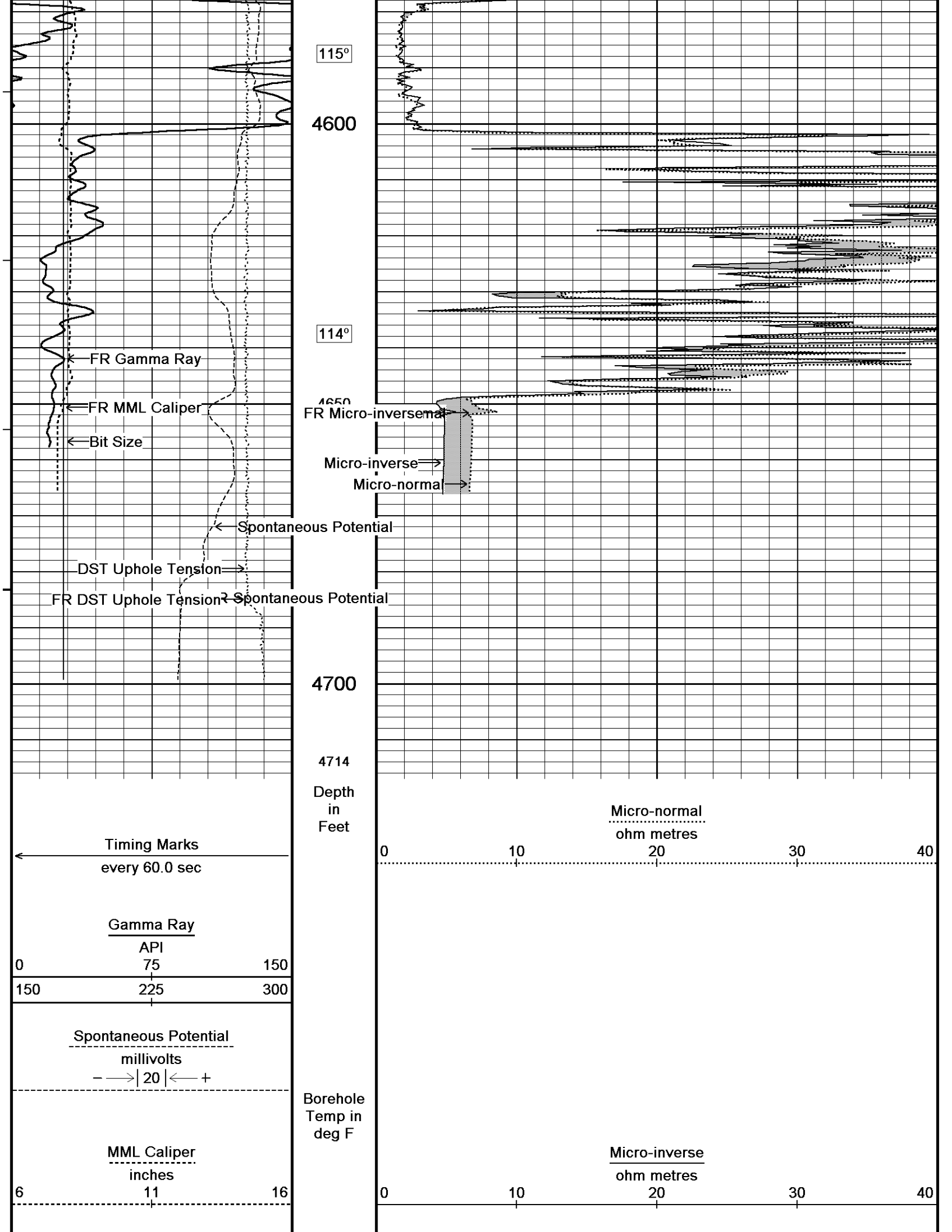
5 INCH MAIN

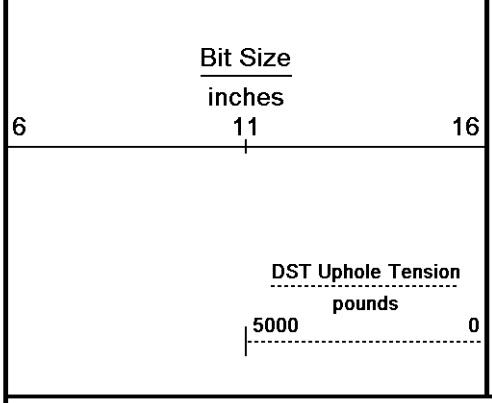
REPEAT SECTION

Depth Based Data - Maximum Sampling Increment 10.0cm — Plotted on 23-SEP-2012 07:44
Filename: C:\Minimus 13.02.6600\Data\Shakespeare Peterso...\Shakespeare Peterson #2-8 Repeat.dta — Recorded on 23-SEP-2012 05:52
System Versions: Logged with 13.02.6600 Plotted with 13.02.6600




DST Uphole Tension
pounds
5000
0
Replay
Scale
1:240
4384
4400
113°
4450
113°
4500
114°
4550


115°
4600
114°
FR Gamma Ray
FR MML Caliper
Bit Size
4650
FR Micro-inverse
Micro-inverse
Micro-normal
Spontaneous Potential
DST Uphole Tension
FR DST Uphole Tension
Spontaneous Potential
4700
4714
Depth
in
Feet
Micro-normal
ohm metres
0
10
20
30
40
Timing Marks
every 60.0 sec
Gamma Ray
API
0
75
150
150
225
300
Spontaneous Potential
millivolts
− 20 +
Borehole
Temp in
deg F
MML Caliper
inches
6
11
16
Micro-inverse
ohm metres
0
10
20
30
40



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REPEAT SECTION

BEFORE SURVEY CALIBRATION

C:\Minimus 13.02.6600\Data\Shakespeare Peterson #2-8\Shakespeare Peterson #2-8 Main spooled section.dta

General Constants All 000

Last Edited on 23-SEP-2012,04:00

General Parameters		
Mud Resistivity	1.140	ohm-metres
Mud Resistivity Temperature	93.000	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	

Gamma Calibration MCG-C 208

Field Calibration on 23-SEP-2012 00:17

	Measured	Calibrated (API)
Background	67	46
Calibrator (Gross)	1106	771
Calibrator (Net)	1039	725

Gamma Constants MCG-C 208

Last Edited on 23-SEP-2012,04:00

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

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 23-SEP-2012 00:13

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)
5.94	5.98

Micro Normal and Micro Inverse Calibration MML-A 4

Base Calibration on 27-AUG-2012 09:21
Field Check on 23-SEP-2012 00:11

Base Calibration

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

Micro Normal and Micro Inverse Constants MML-A 4

Last Edited on 15-SEP-2012,14:38

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

DOWNHOLE EQUIPMENT

C:\Minimus 13.02.6600\Data\Shakespeare Peterson #2-8\Shakespeare Peterson #2-8 Main spooled section.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 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

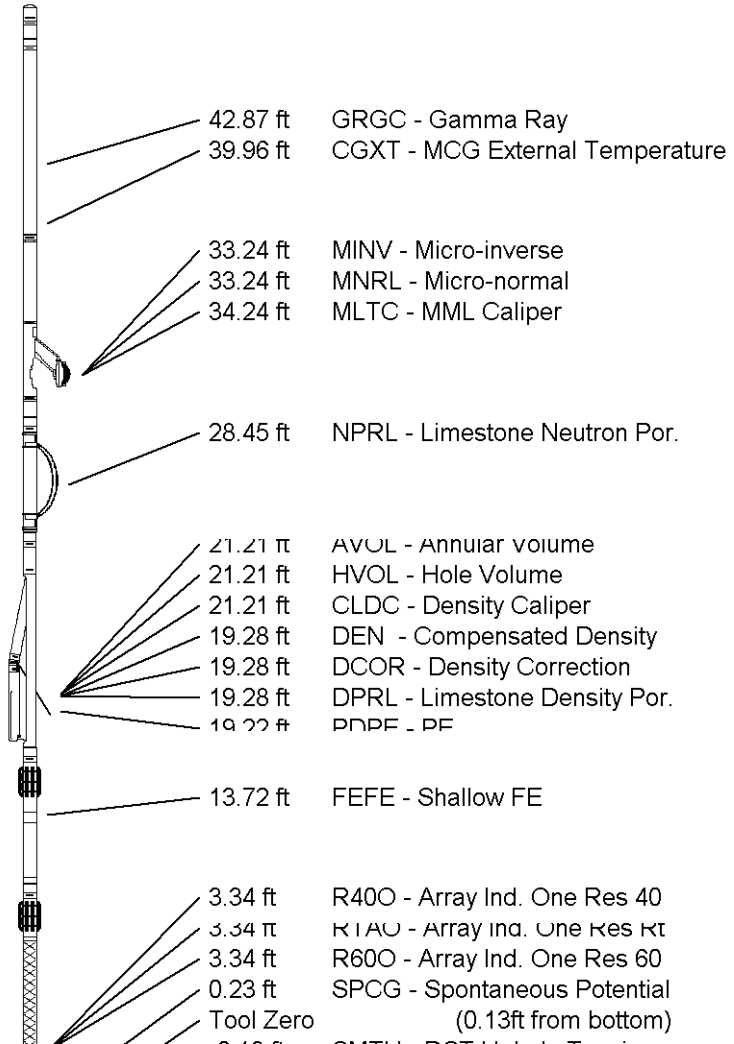
Compact Neutron
MDN-A.B 65 LG: 5.04 ft WT: 50.7 lb OD: 2.24 in

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 Induction
MAI-A.A 45 LG: 10.81 ft WT: 48.5 lb OD: 2.24 in

Total Length: 49.73 ft Weight: 399.0 lb



-0.13 ft SMTU - DST Uphole Tension
All measurements relative to tool zero.

COMPANY	SHAKESPEARE OIL COMPANY, INC.
WELL	PETERSON #2-8
FIELD	STRATFORD WEST
PROVINCE/COUNTY	LOGAN
COUNTRY/STATE	U.S.A. / KANSAS

Elevation Kelly Bushing	2981.00	feet	First Reading	4652.00	feet
Elevation Drill Floor	2979.00	feet	Depth Driller	4680.00	feet
Elevation Ground Level	2971.00	feet	Depth Logger	4685.00	feet

Weatherford®

MICRORESISTIVITY LOG