MICRORESISTIVITY LOG

COMPANY	SHAKESPEARE OIL COMPANY INC.
WELL	K OTTLEY #1-14
FIELD	WILDCAT
PROVINCE/COUNTY	LOGAN
COUNTRY/STATE	U.S.A. / KANSAS
LOCATION	2298' FSL & 800' FWL

SEC	TWP	RGE	Other Services
14	14S	32W	MPD/MDN
			MAI/MFE

API Number 15-109-21091
Permit Number

Permanent Datum G.L., Elevation 2819 feet
Log Measured From KB
Drilling Measured From K.B. @ 5FT

Elevations:	feet
KB	2824.00
DF	2822.00
GL	2819.00

Date	06-JUN-2012			
Run Number	ONE			
Depth Driller	4570.00	feet		
Depth Logger	4570.00	feet		
First Reading	4537.00	feet		
Last Reading	3700.00	feet		
Casing Driller	219.00	feet		
Casing Logger	219.00	feet		
Bit Size	7.875	inches		
Hole Fluid Type	CHEMICAL			
Density / Viscosity	9.10 lb/USg	58.00 CP		
PH / Fluid Loss	10.00	8.80 ml/30Min		
Sample Source	FLOWLINE			
Rm @ Measured Temp	0.78 @ 93.0	ohm-m		
Rmf @ Measured Temp	0.62 @ 93.0	ohm-m		
Rmc @ Measured Temp	0.94 @ 93.0	ohm-m		
Source Rmf / Rmc	CALC	CALC		
Rm @ BHT	0.63 @115.0	ohm-m		
Time Since Circulation	4 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 #	3534586		LB12-141	

BOREHOLE RECORD

Last Edited: 06-JUN-2012 15:50

Bit Size inches	Depth From feet	Depth To feet
7.875	219.00	4570.00

CASING RECORD

Type	Size inches	Depth From feet	Shoe Depth feet	Weight pounds/ft
SURFACE	8.625	0.00	219.00	24.00

REMARKS

Tools Ran: MCG, MML, MDN, MPD, SKJ, MFE, MAI.
Hardware Used: MDN Dual Eccentralizer used. MPD 8 inch profile plate used. MFE, MSS 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.
Annular volume with 5.5 inch production casing calculated from TD to 3700 ft = 175 cu. ft.
Service order #3534586
Rig: WW Drilling Rig #2
Engineer: R. Hoffman
Operator(s): M. Stegman

5 INCH MAIN PASS

5 INCH MAIN PASS

Depth Based Data - Maximum Sampling Increment 10.0cm
Plotted on 06-JUN-2012 18:36
Filename: C:\Minimus 11.03.4044\Data\Shakespeare K Ottley #1...\Shakespeare K Ottley #1-14_002.dta
Recorded on 06-JUN-2012 15:58
System Versions: Logged 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

2250

103°

2300

2320

Depth In

Micro-normal
ohm metres
0 10 20 30 40

Micro-inverse
ohm metres
0 10 20 30 40

Micro-normal

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

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0 10 20 30 40

Micro-inverse
ohm metres
0 10 20 30 40

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Timing Marks
every 60.0 sec

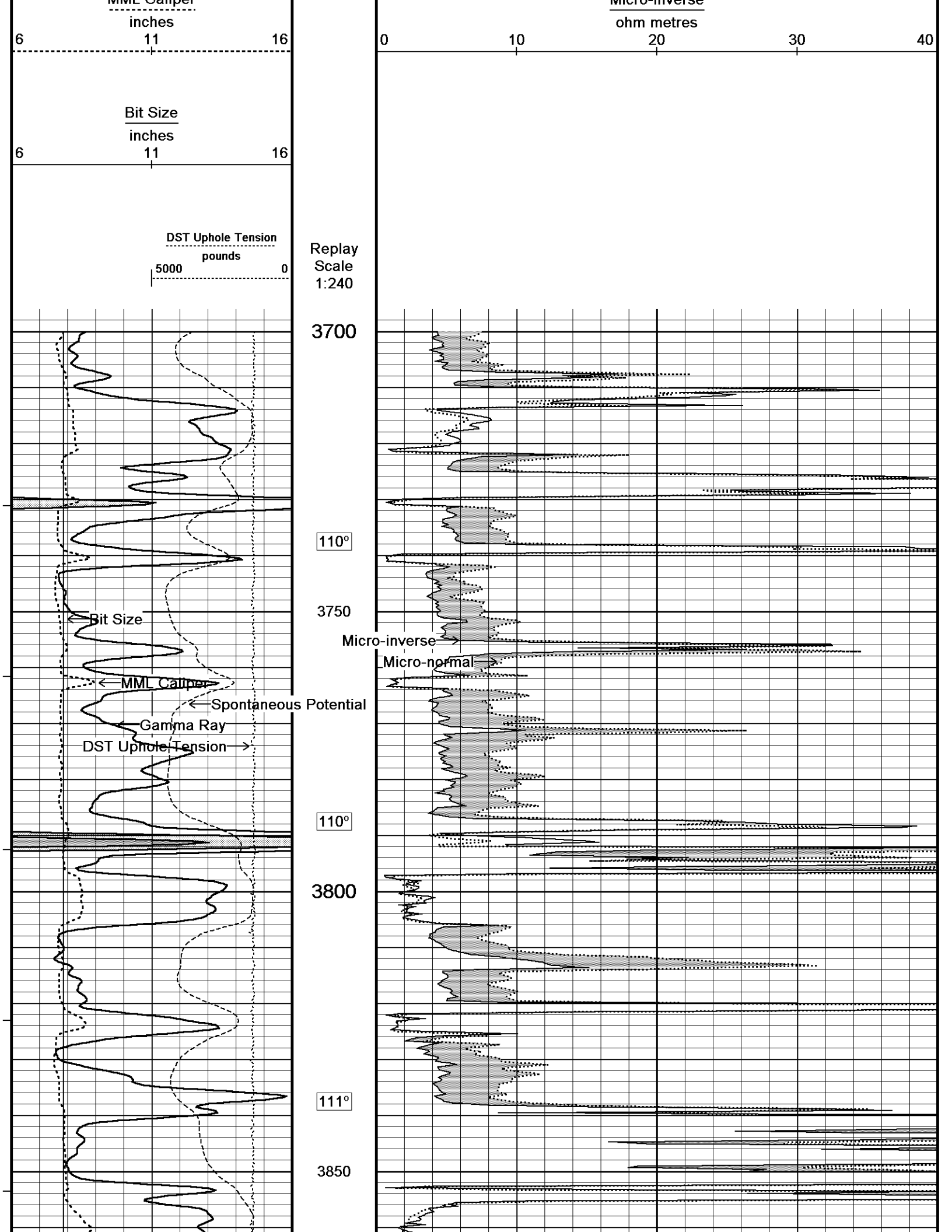
Gamma Ray
API
0 75 150

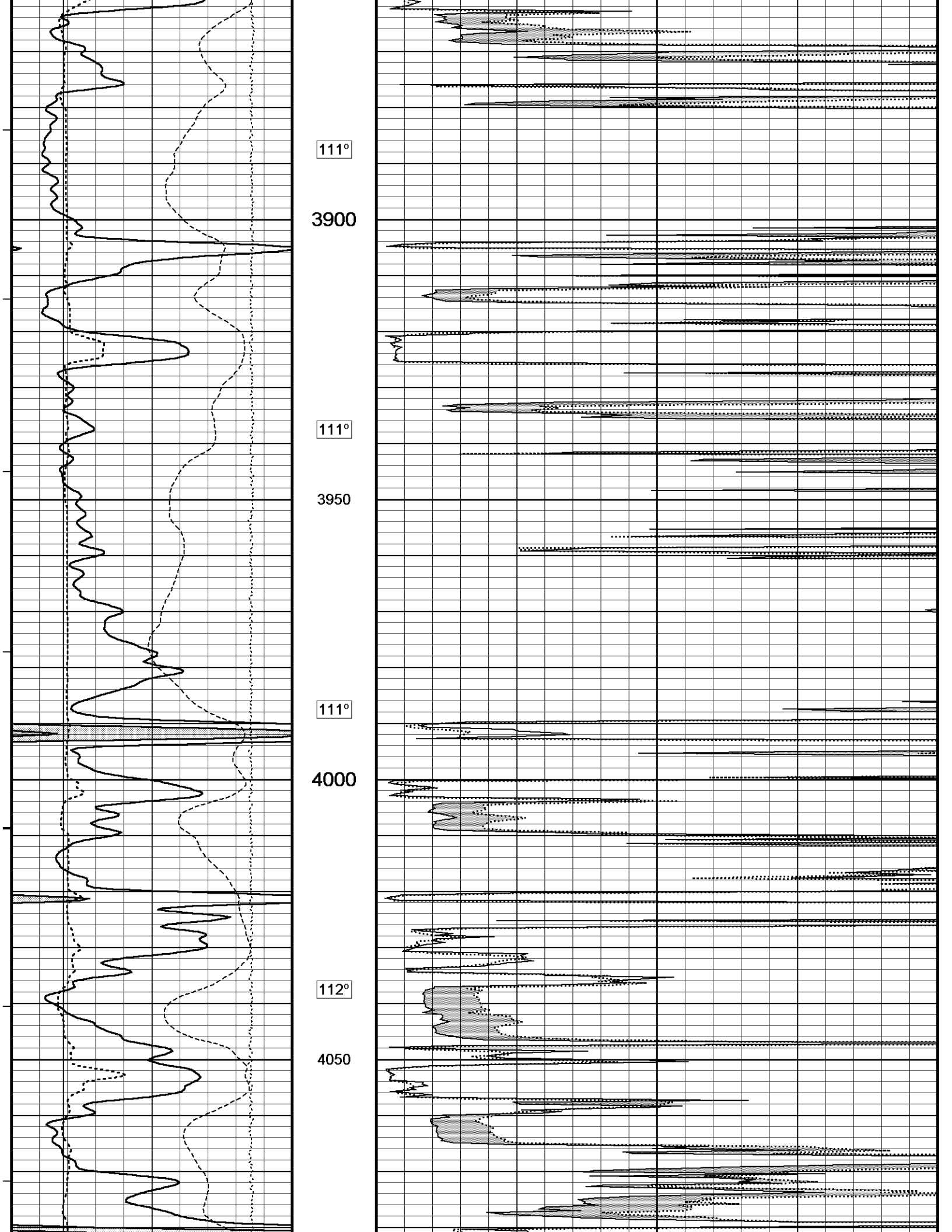
Spontaneous Potential
millivolts
− → | 20 | ← +

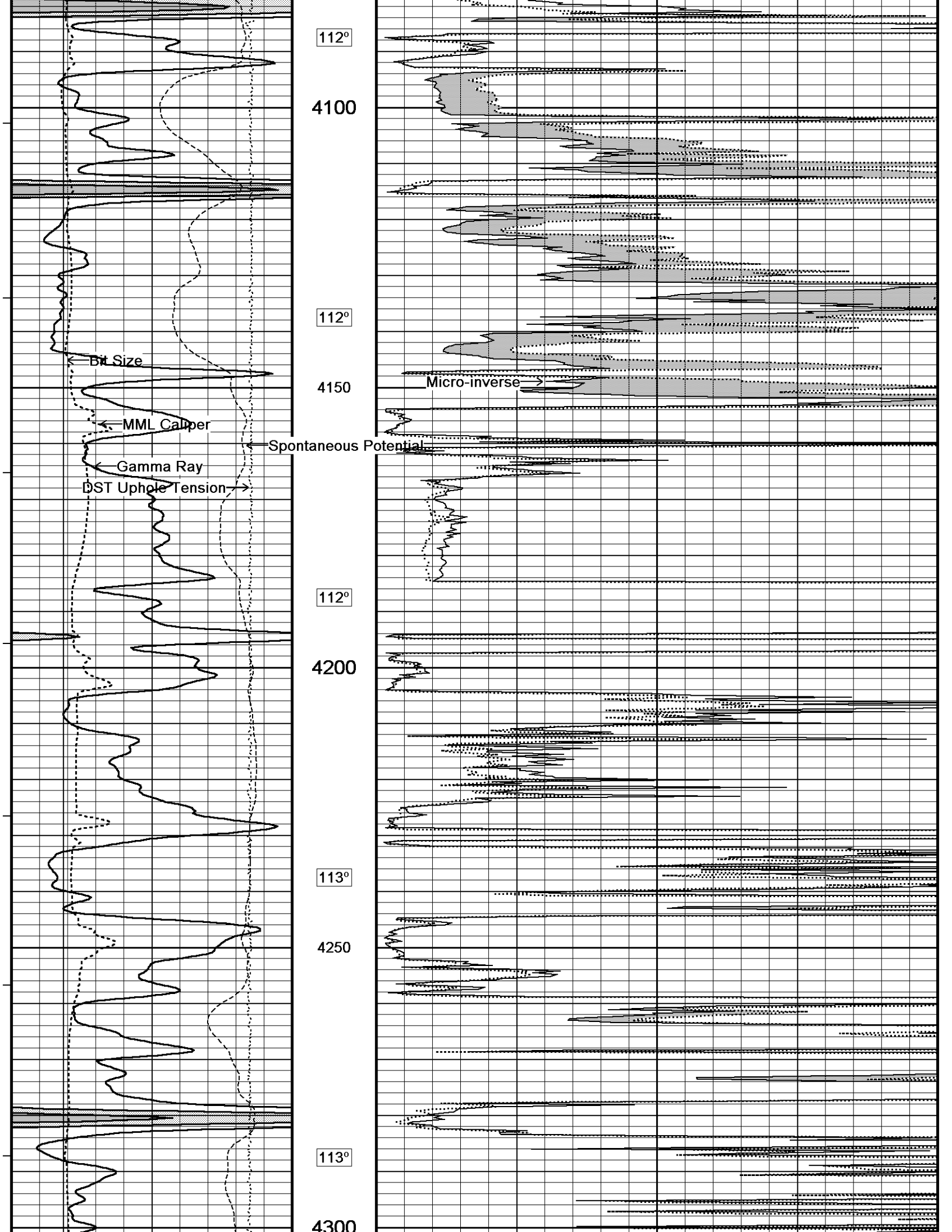
Depth in Feet

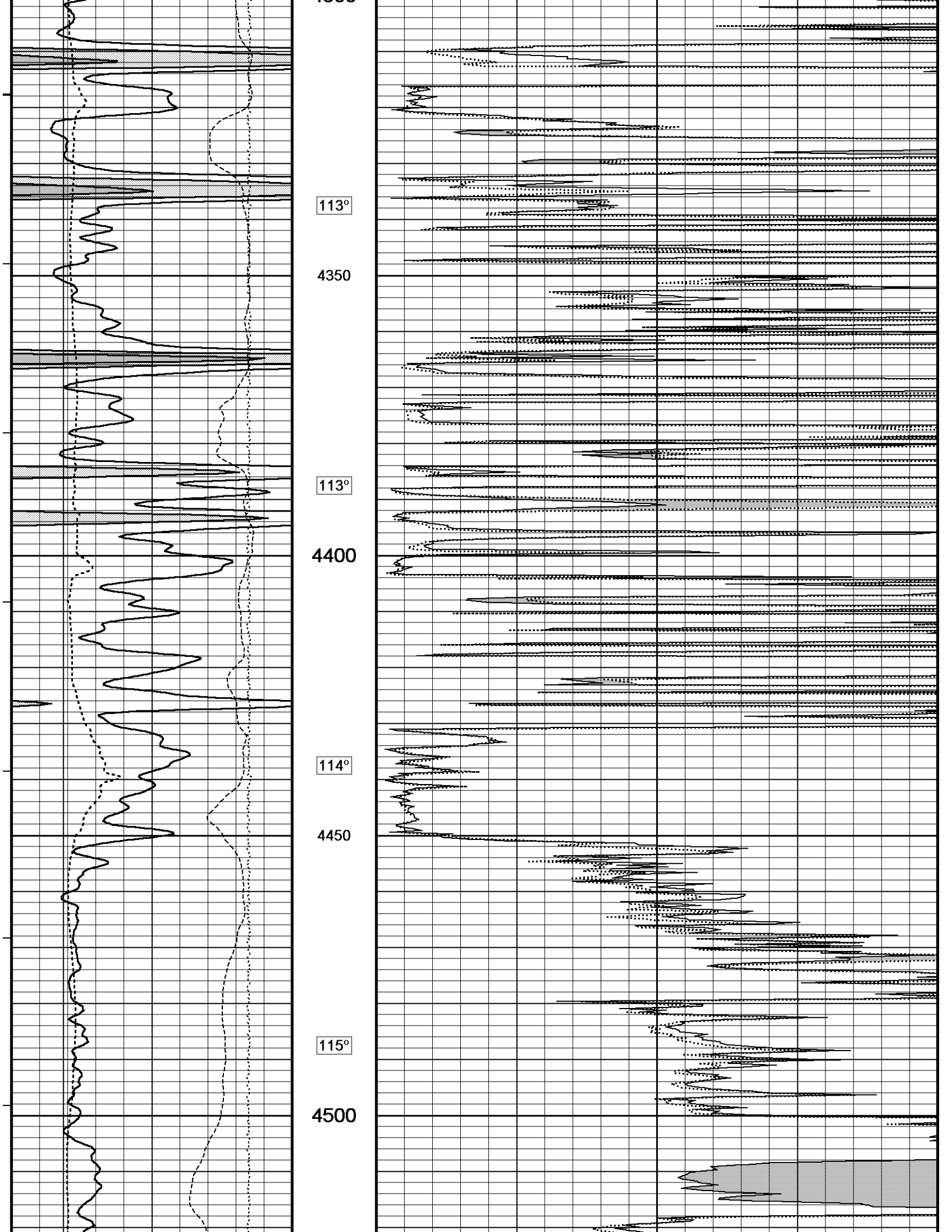
Borehole Temp in deg F

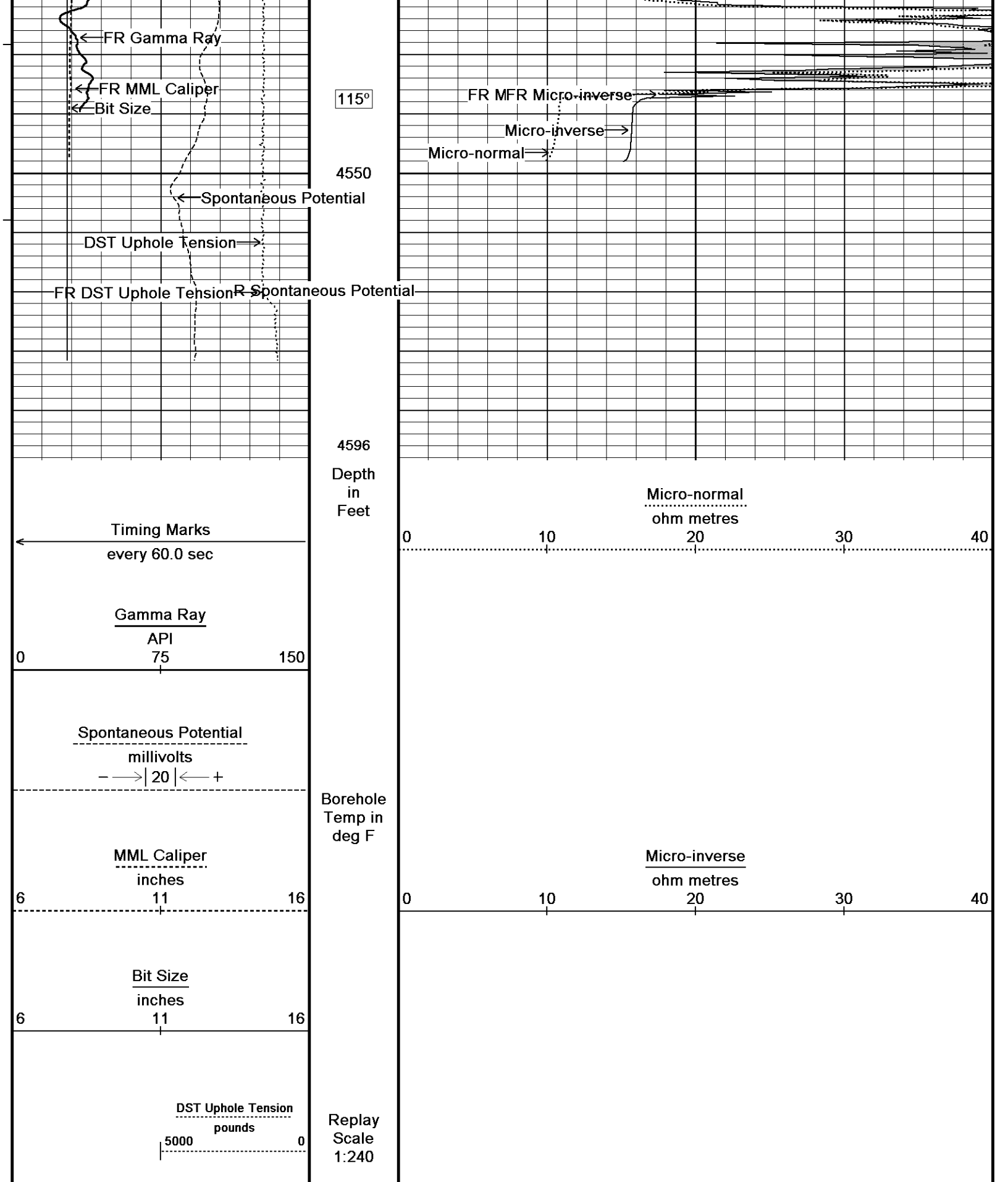
Micro-normal
ohm metres
0 10 20 30 40


MML Caliper
inches
6
11
16
Bit Size
inches
6
11
16
DST Uphole Tension
pounds
5000
0
Replay
Scale
1:240
Micro-inverse
ohm metres
0
10
20
30
40
3700
110°
3750
3800
111°
3850
Bit Size
MML Caliper
Spontaneous Potential
Gamma Ray
DST Uphole Tension
Micro-inverse
Micro-normal


111°
3900
111°
3950
111°
4000
112°
4050


112°
4100
112°
Bit Size
4150
Micro-inverse
MML Caliper
Spontaneous Potential
Gamma Ray
DST Uphole Tension
112°
4200
113°
4250
113°
4300


113°
4350
113°
4400
114°
4450
115°
4500



Depth Based Data - Maximum Sampling Increment 10.0cm
Plotted on 06-JUN-2012 18:36
Filename: C:\Minimus 11.03.4044\Data\Shakespeare K Ottley #1...\Shakespeare K Ottley #1-14_002.dta
Recorded on 06-JUN-2012 15:58
System Versions: Logged with 11.03.4044 Plotted with 11.03.4044

5 INCH MAIN PASS

5 INCH REPEAT PASS

Depth Based Data - Maximum Sampling Increment 10.0cm
Plotted on 06-JUN-2012 18:36
Filename: C:\Minimus 11.03.4044\Data\Shakespeare K Ottley #1...\Shakespeare K Ottley #1-14_001.dta
Recorded on 06-JUN-2012 15:42
System Versions: Logged 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

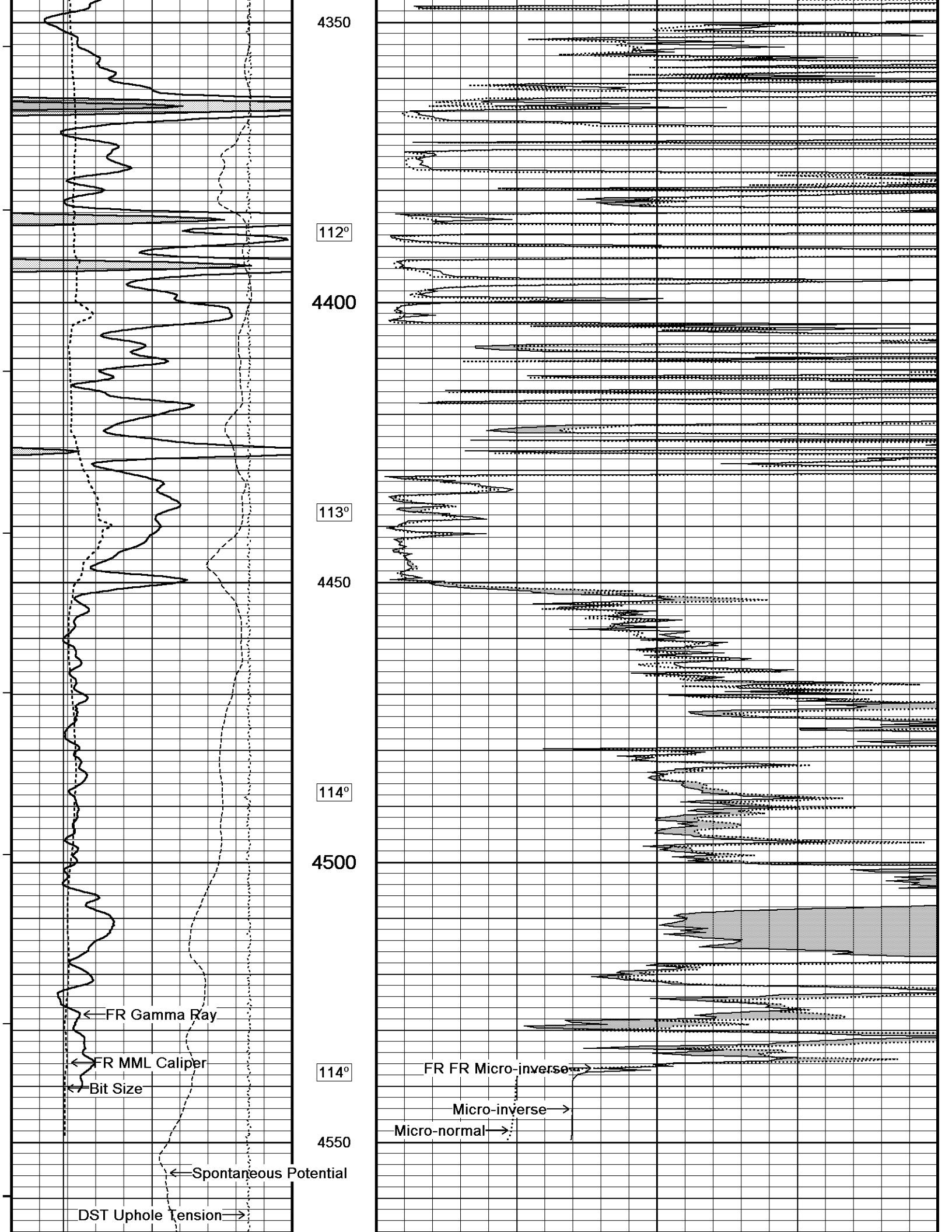
Micro-normal
ohm metres
0 10 20 30 40

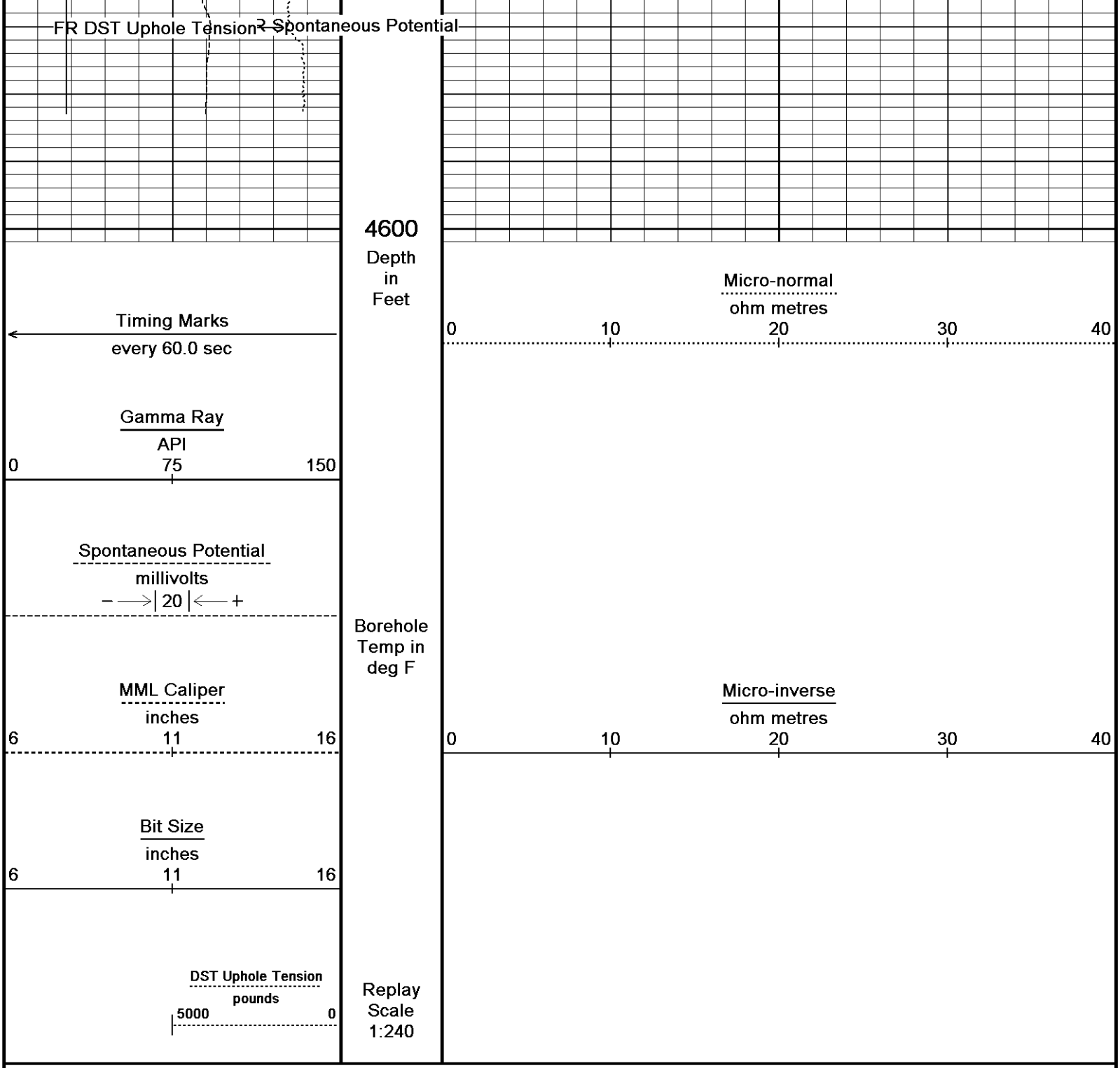
Micro-inverse
ohm metres
0 10 20 30 40

4268

4300

112°


4350
112°
4400
113°
4450
114°
4500
114°
4550
FR Gamma Ray
FR MML Caliper
Bit Size
Spontaneous Potential
DST Uphole Tension
FR FR Micro-inverse
Micro-inverse
Micro-normal



Depth Based Data - Maximum Sampling Increment 10.0cm — Plotted on 06-JUN-2012 18:36

Filename: C:\Minimus 11.03.4044\Data\Shakespeare K Ottley #1...\Shakespeare K Ottley #1-14_001.dta — Recorded on 06-JUN-2012 15:42

System Versions: Logged with 11.03.4044 Plotted with 11.03.4044

5 INCH REPEAT PASS

BEFORE SURVEY CALIBRATION

C:\Minimus 11.03.4044\Data\Shakespeare K Ottley #1-14\Shakespeare K Ottley #1-14_002.dta

General Constants All 000 — Last Edited on 06-JUN-2012,14:34

General Parameters

Mud Resistivity	0.780	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 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. Four Res Rt	
RWA Constant A	0.610	
RWA Constant M	2.150	

Gamma Calibration MCG-C 84

Field Calibration on 06-JUN-2012 09:18

	Measured	Calibrated (API)
Background	73	49
Calibrator (Gross)	1142	774
Calibrator (Net)	1069	725

Gamma Constants MCG-C 84

Last Edited on 06-JUN-2012,14:34

Gamma Calibrator Number	GR38	
Mud Density	1.09	gm/cc
Caliper Source for Processing	Density Caliper	
Tool Position	Eccentred	
Concentration of KCl	0.00	kppm

High Resolution Temperature Calibration MCG-C 84

Field Calibration on 28-MAY-2012,07:32

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

High Resolution Temperature Constants MCG-C 84

Last Edited on

Pre-filter Length	11

Caliper Calibration MML-A 16

Base Calibration on 23-MAY-2012 11:59
Field Calibration on 06-JUN-2012 09:11

Base Calibration

Reading No	Measured	Calibrator Size (in)
1	14501	5.98
2	17771	7.97
3	21107	9.86
4	24905	11.92
5	0	0.00
6	N/A	N/A

Field Calibration

Measured Caliper (in)	Actual Caliper (in)
6.01	5.98

Micro Normal and Micro Inverse Calibration MML-A 16

Base Calibration on 23-MAY-2012 12:04
Field Check on 06-JUN-2012 09:13

Base Calibration

	Measured		Calibrated (ohm-m)	
Channel	Resistor 1	Resistor 2	Resistor 1	Resistor 2
Micro Normal	12.2	60.2	5.0	25.0
Micro Inverse	15.6	78.3	5.0	25.0

Channel	Base Check (ohm-m)	Field Check (ohm-m)
Micro Normal	62.9	62.9
Micro Inverse	48.2	48.2

Micro Normal and Micro Inverse Constants MML-A 16

Last Edited on 06-JUN-2012,09:11

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

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

Compact Comms Gamma
MCG-C 84 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 Micro-log
MML-A 16 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 Neutron
MDN-A.B 65 LG: 5.04 ft WT: 50.7 lb OD: 2.24 in

Compact Density/Caliper
MPD-B 59 LG: 9.59 ft WT: 90.4 lb OD: 2.45 in

Compact Density/Caliper
MPD-B 59 LG: 9.59 ft WT: 90.4 lb OD: 2.45 in

Compact Focussed Electric
MFE-A.A 55 LG: 6.05 ft WT: 48.5 lb OD: 2.24 in

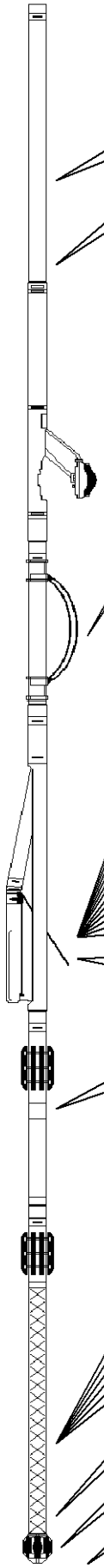
Compact Focussed Electric
MFE-A.A 55 LG: 6.05 ft WT: 48.5 lb OD: 2.24 in

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

Compact Induction
MAI-A.A 45 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



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.
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	SHAKESPEARE OIL COMPANY INC.
WELL	K OTTLEY #1-14
FIELD	WILDCAT

FIELD	WILDCAT
PROVINCE/COUNTY	LOGAN
COUNTRY/STATE	U.S.A. / KANSAS

Elevation Kelly Bushing	2824.00	feet	First Reading	4537.00	feet
Elevation Drill Floor	2822.00	feet	Depth Driller	4570.00	feet
Elevation Ground Level	2819.00	feet	Depth Logger	4570.00	feet

Weatherford®

MICRORESISTIVITY LOG