MICRORESISTIVITY LOG

COMPANY	SHAKESPEARE OIL CO.
WELL	CAMPBELL #3-17
FIELD	WILDCAT
PROVINCE/COUNTY	LOGAN
COUNTRY/STATE	U.S.A. / KANSAS
LOCATION	1855' FSL & 1726' FEL

SEC	TWP	RGE	Other Services
17	13S	32W	MPD/MDN
			MAI/MFE

API Number 15-109-21218
Permit Number

Permanent Datum G.L., Elevation 3029 feet
Log Measured From KB
Drilling Measured From K.B. @ 10 FEET

Elevations:	feet
KB	3039.00
DF	3037.00
GL	3029.00

Date	25-NOV-2013			
Run Number	ONE			
Service Order	3547649			
Depth Driller	4715.00	feet		
Depth Logger	4710.00	feet		
First Reading	4577.00	feet		
Last Reading	3715.00	feet		
Casing Driller	227.00	feet		
Casing Logger	222.00	feet		
Bit Size	7.875	inches		
Hole Fluid Type	CHEMICAL			
Density / Viscosity	9.10 lb/USg		44.00 CP	
PH / Fluid Loss	10.00		8.00 ml/30Min	
Sample Source	FLOWLINE			
Rm @ Measured Temp	0.97 @ 81.0	ohm-m		
Rmf @ Measured Temp	0.77 @ 81.0	ohm-m		
Rmc @ Measured Temp	1.16 @ 81.0	ohm-m		
Source Rmf / Rmc	CALC		CALC	
Rm @ BHT	0.77 @109.0	ohm-m		
Time Since Circulation	4 HOURS			
Max Recorded Temp	109.00	deg F		
Equipment / Base	13096		LIB	
Recorded By	R.HOFFMAN			
Witnessed By	TIM PRIEST			
JOB #	LB13-335			

BOREHOLE RECORD

Last Edited: 25-NOV-2013 04:00

Bit Size inches	Depth From feet	Depth To feet
7.875	227.00	4715.00

CASING RECORD

Type	Size inches	Depth From feet	Shoe Depth feet	Weight pounds/ft
SURFACE	8.625	0.00	227.00	24.00

REMARKS

- SOFTWARE ISSUE: WLS 13.05.9583.
- MCG, MML, MDN, MPD, MFE, MAI RUN IN COMBINATION.
  - HARDWARE: DUAL BOWSPRING 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: 1871 CU. FT.
- ANNULAR HOLE VOLUME WITH 5.5 INCH CASING FROM TD TO SURFACE CASING:248 CU. FT.
- SERVICE ORDER # 3547649

- SERVICE ORDER # 00 1 3 19

- RIG: HD DRILLING #2.

- ENGINEER: ROB HOFFMAN

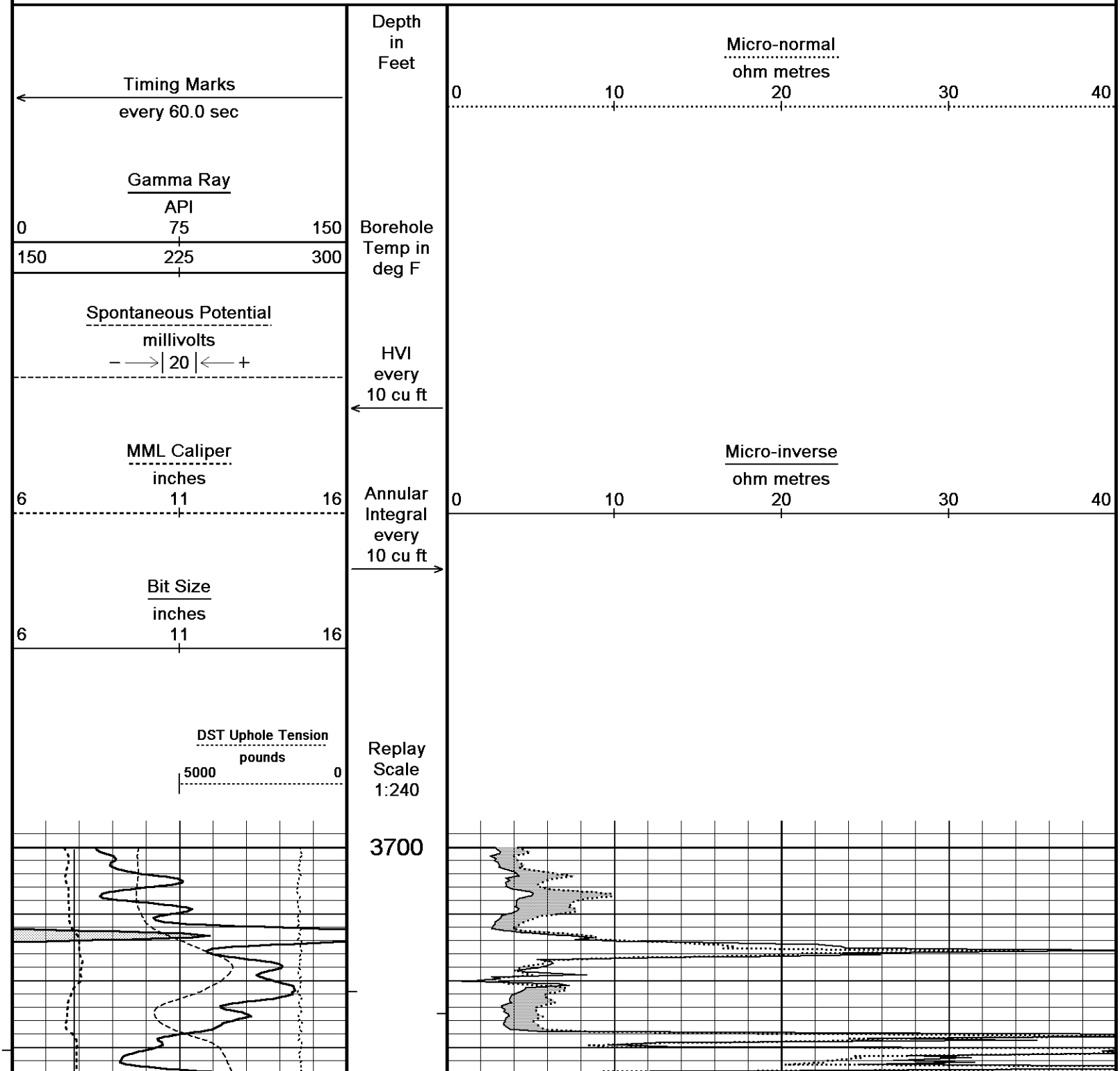
- OPERATOR(S): J. DUNLAP, S. MENDEZ

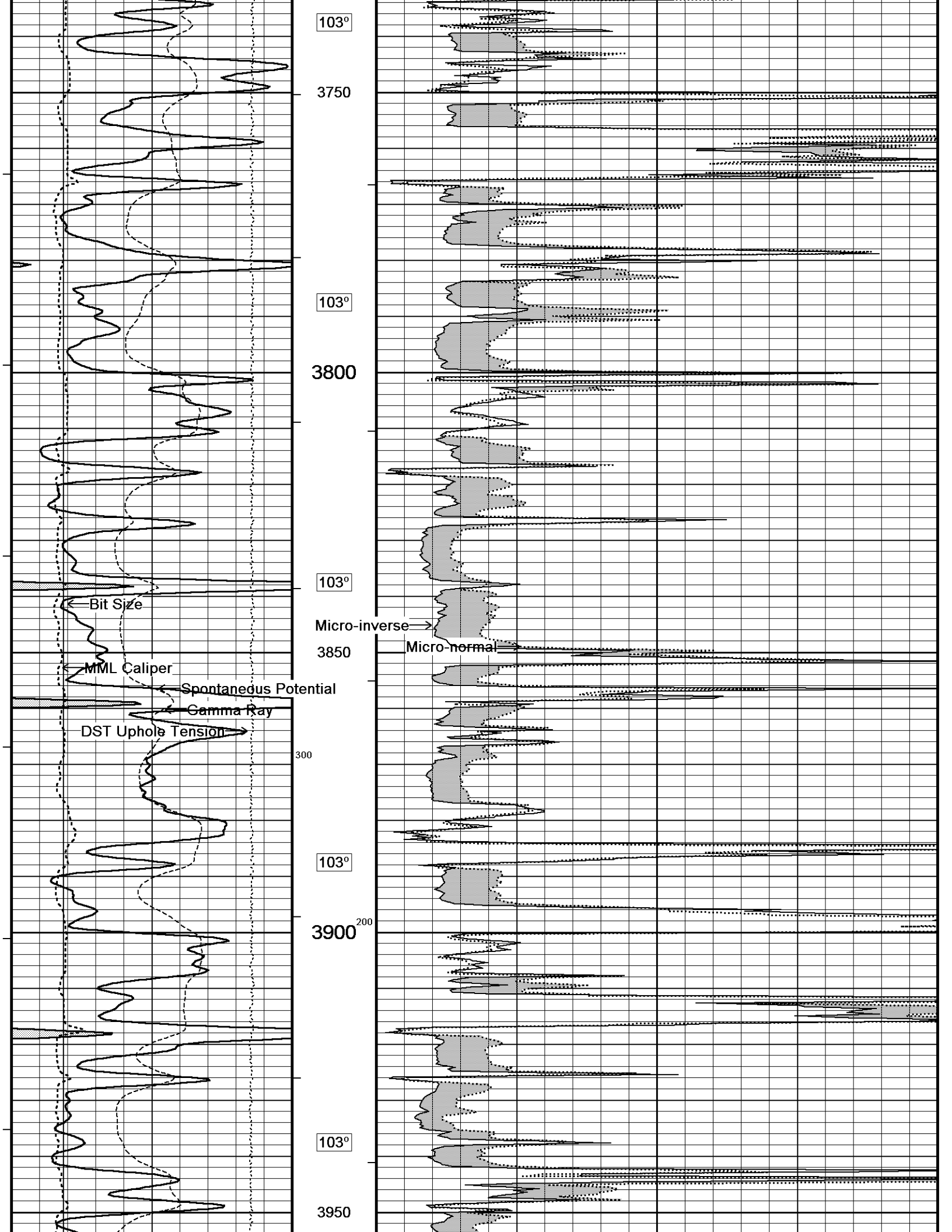
5 INCH MAIN

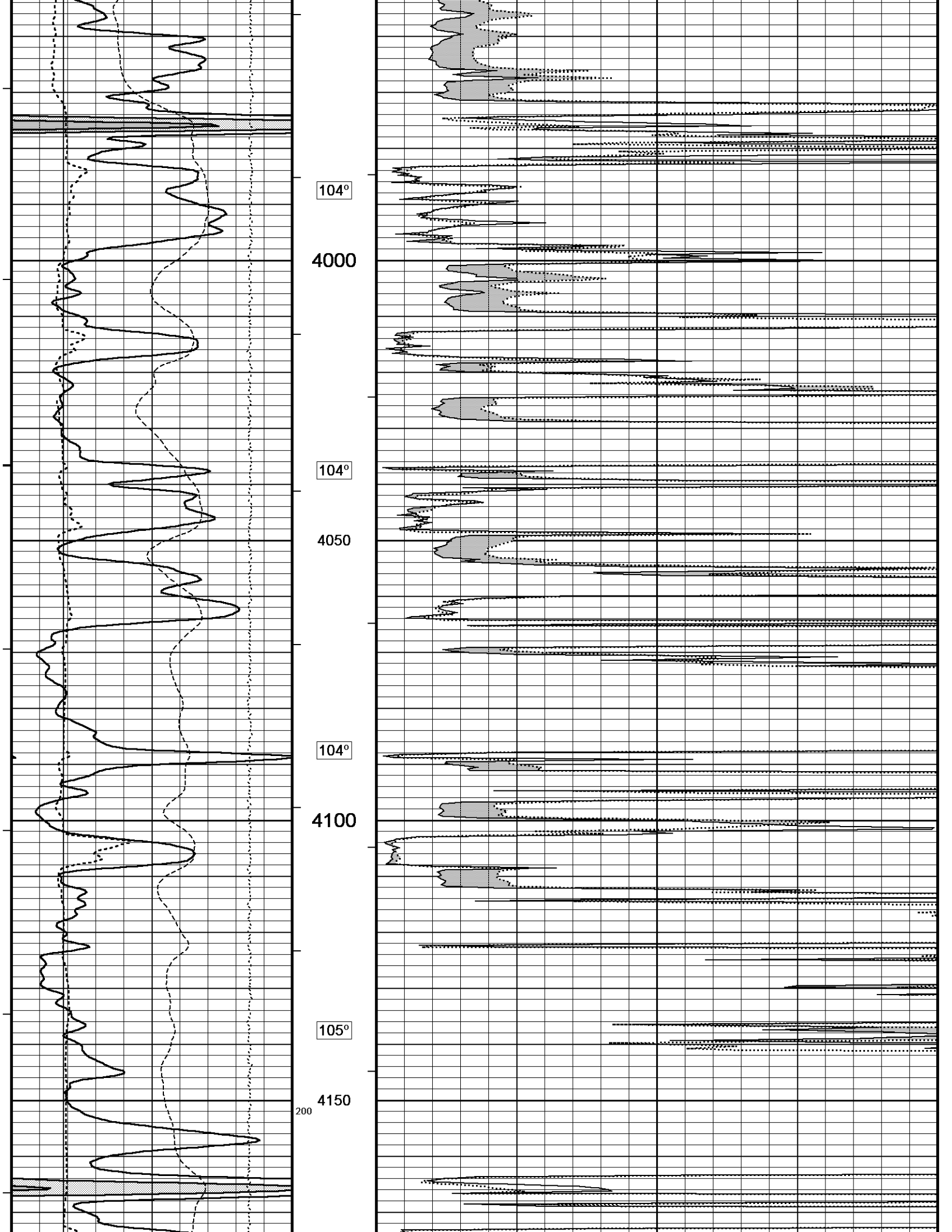
Depth Based Data - Maximum Sampling Increment 10.0cm — Plotted on 25-NOV-2013 09:18

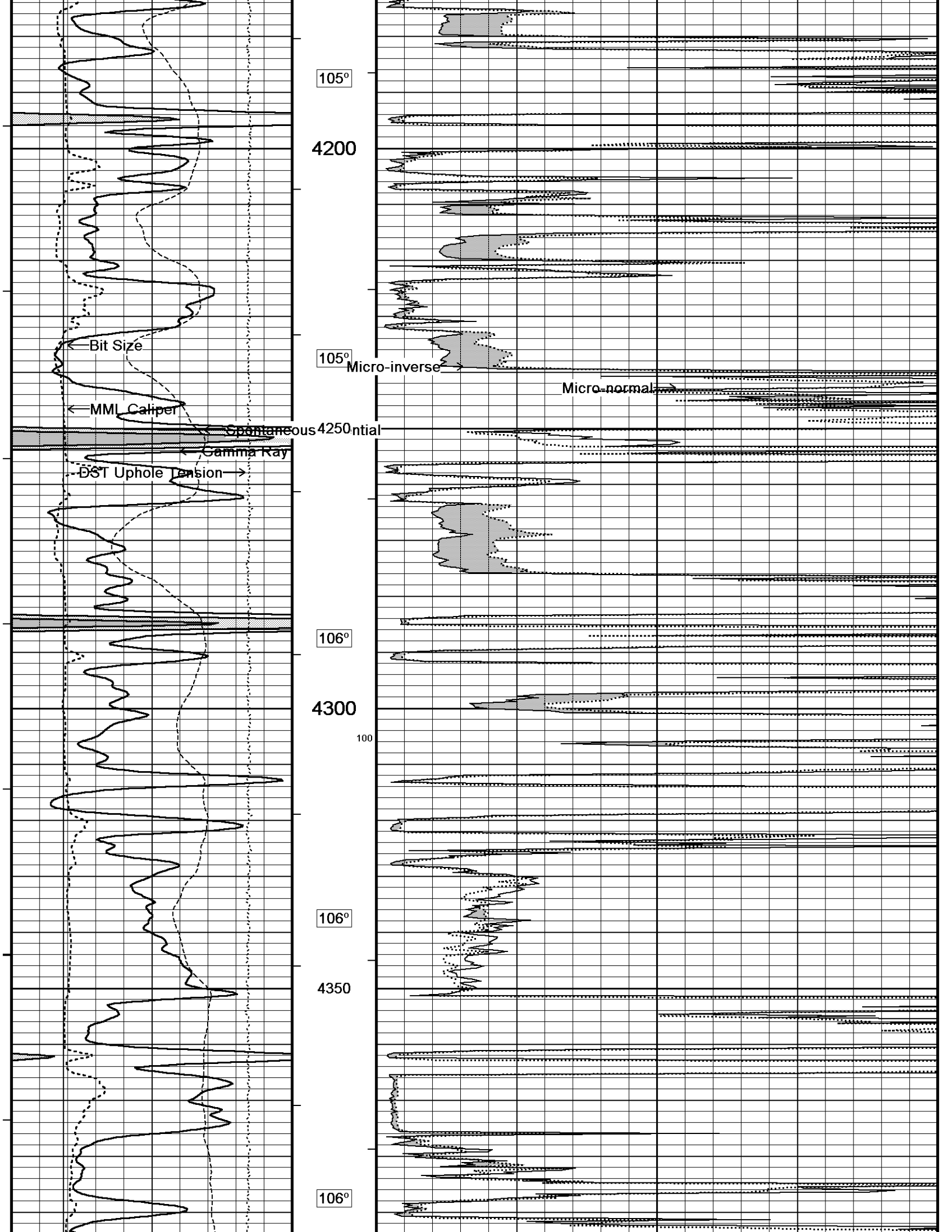
Filename: C:\Minimus 13.05.9583\Log\Shake...\Shakespeare Campbell #3-17 Main spooled section.dta — Recorded on 25-NOV-2013 07:17

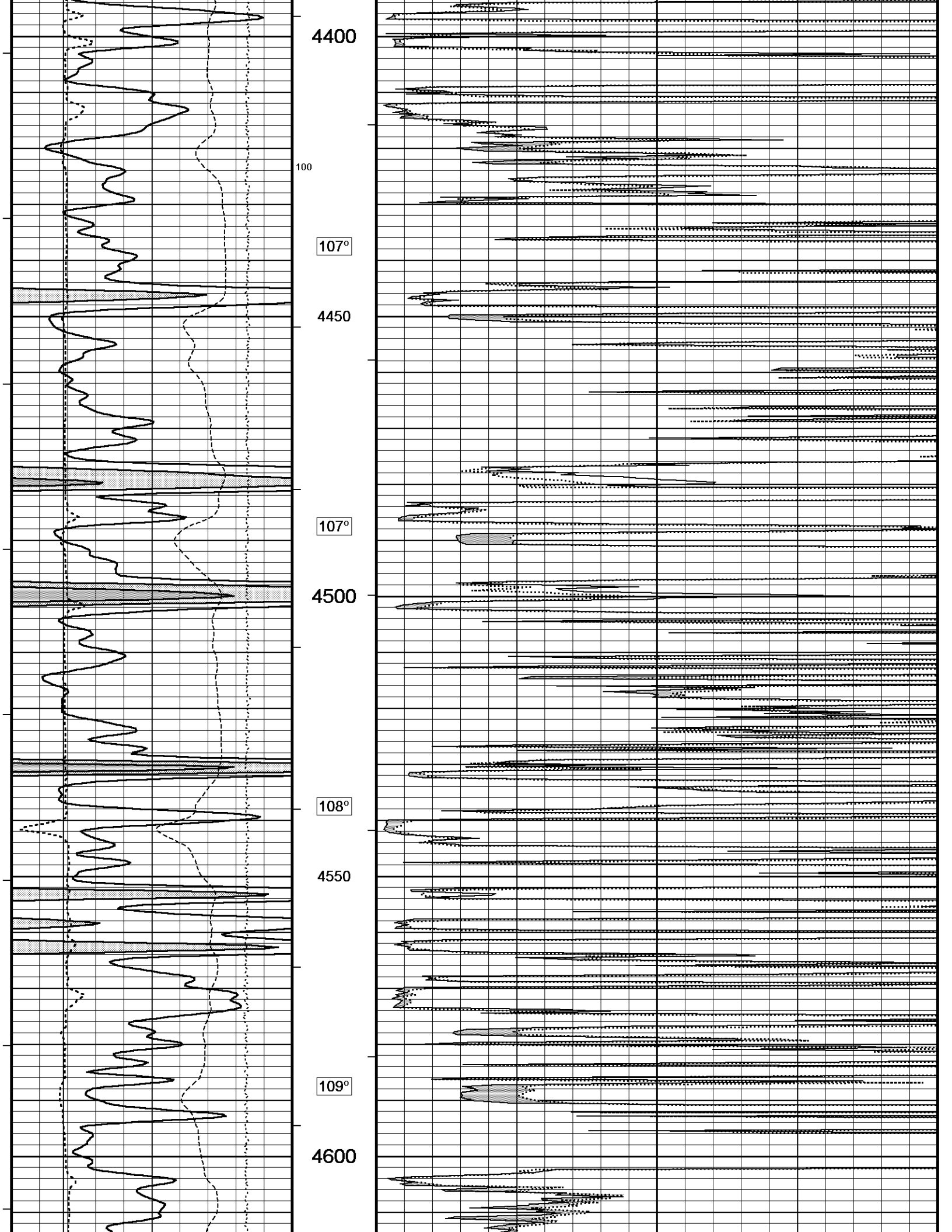
System Versions: Logged with 13.05.9583 Plotted with 13.05.9583

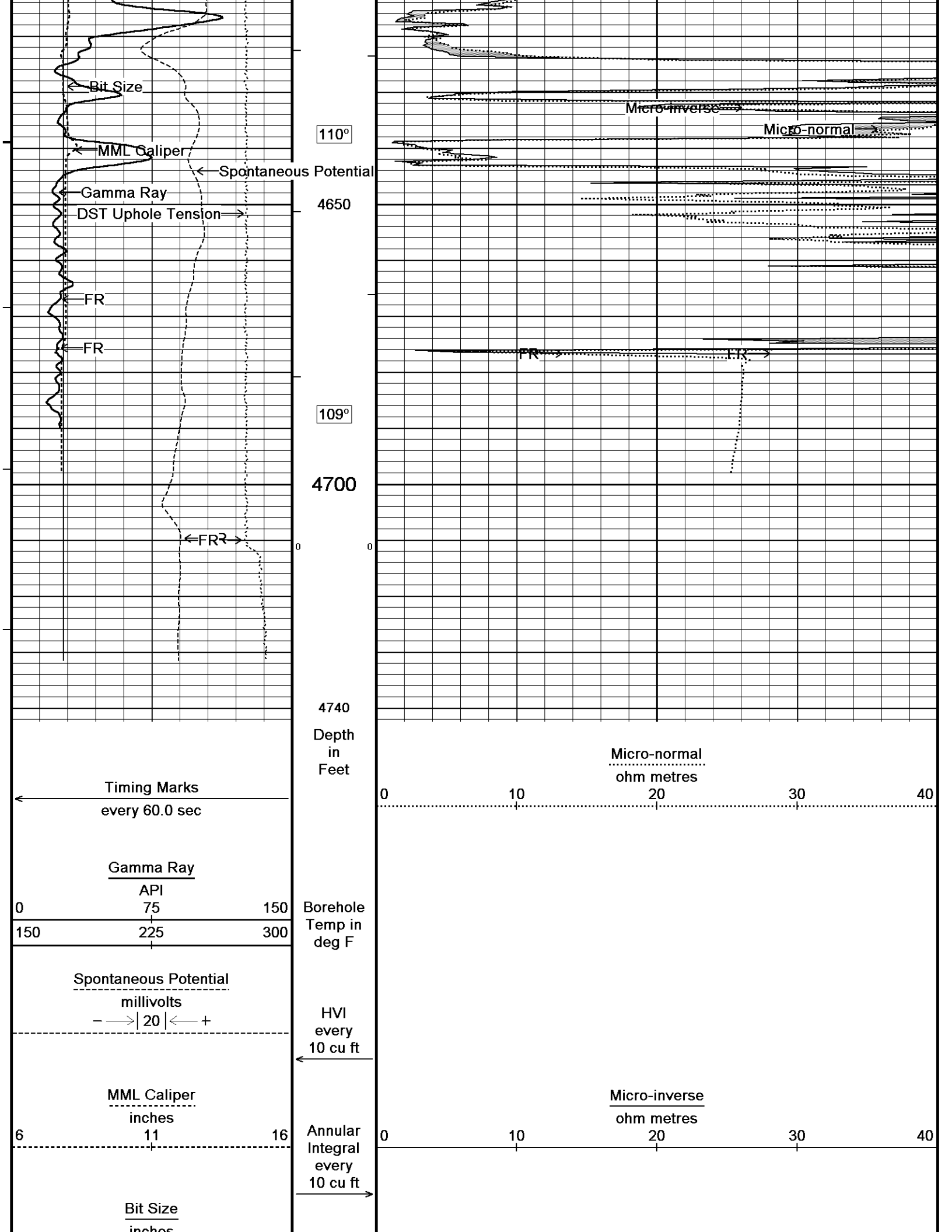



103°
3750
103°
3800
103°
Bit Size
Micro-inverse
Micro-normal
3850
MML Caliper
Spontaneous Potential
Gamma Ray
DST Uphole Tension
300
103°
3900
200
103°
3950


104°
4000
104°
4050
104°
4100
105°
4150
200


105°
4200
105°
Bit Size
Micro-inverse
Micro-normal
MML Caliper
Spontaneous
4250
ntial
Gamma Ray
DST Uphole Tension
106°
4300
100
106°
4350
106°


4400
100
107°
4450
107°
4500
108°
4550
109°
4600


Bit Size
MML Caliper
Spontaneous Potential
Gamma Ray
DST Uphole Tension
FR
FR
FR
FR
Micro-inverse
Micro-normal
FR
FR
110°
4650
109°
4700
4740
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
Spontaneous Potential
millivolts
– 20 +
HVI every 10 cu ft
MML Caliper
inches
6
11
16
Annular Integral every 10 cu ft
Bit Size
inches
Micro-normal
ohm metres
0
10
20
30
40
Micro-inverse
ohm metres
0
10
20
30
40

6 11 16

DST Uphole Tension
pounds
5000 0

Replay
Scale
1:240

Depth Based Data - Maximum Sampling Increment 10.0cm — Plotted on 25-NOV-2013 09:18
Filename: C:\Minimus 13.05.9583\Log\Shake...\Shakespeare Campbell #3-17 Main spooled section.dta — Recorded on 25-NOV-2013 07:17
System Versions: Logged with 13.05.9583 Plotted with 13.05.9583

5 INCH MAIN

REPEAT SECTION

Depth Based Data - Maximum Sampling Increment 10.0cm — Plotted on 25-NOV-2013 09:18
Filename: C:\Minimus 13.05.9583\Log\Shakespeare Camp...\Shakespeare Campbell #3-17 Repeat.dta — Recorded on 25-NOV-2013 06:17
System Versions: Logged with 13.05.9583 Plotted with 13.05.9583

Timing Marks
every 60.0 sec

Depth
in
Feet

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

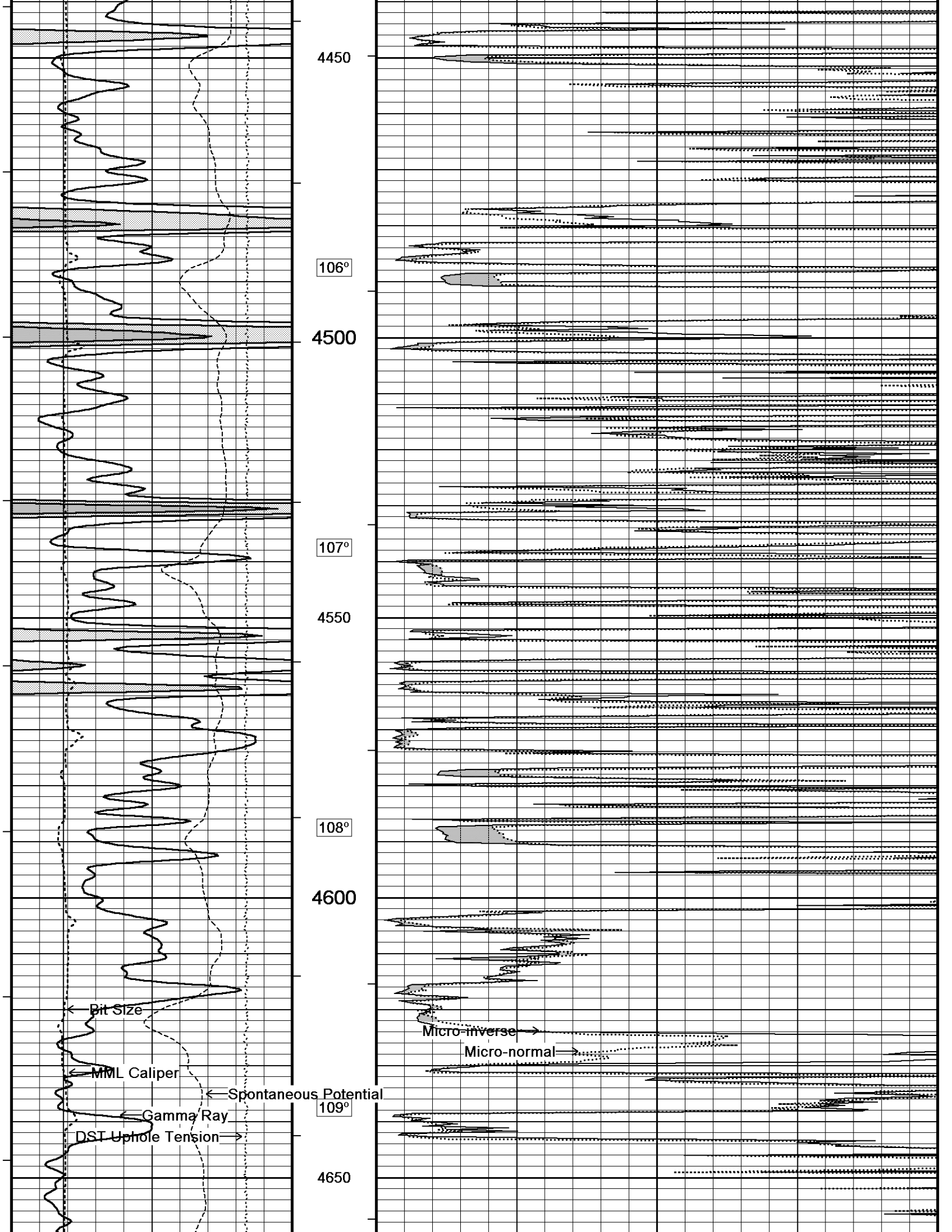
Annular
Integral
every
10 cu ft

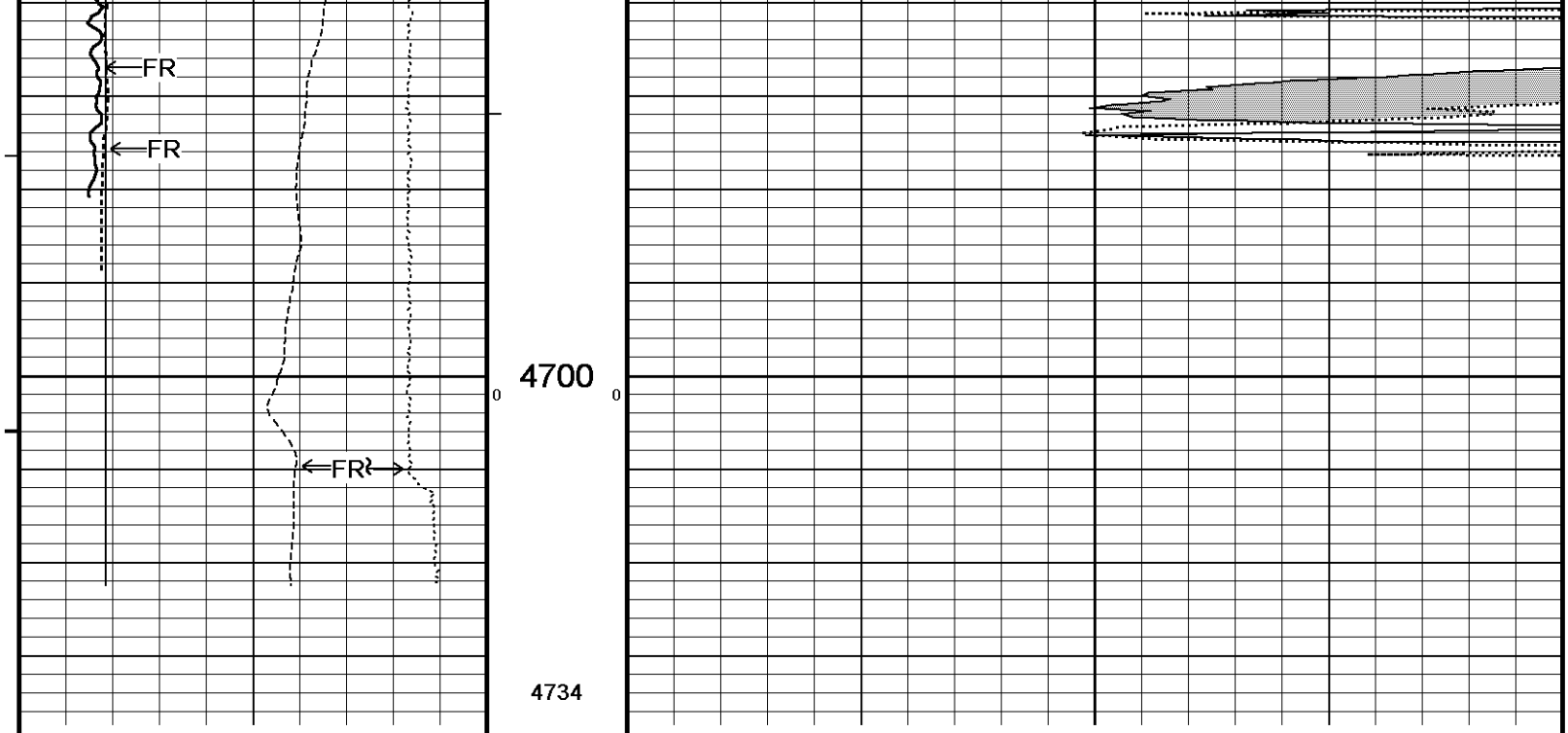
Bit Size
inches
6 11 16

DST Uphole Tension
pounds
5000 0

Replay
Scale
1:240

100 4414


4450
106°
4500
107°
4550
108°
4600
109°
4650
Bit Size
MML Caliper
Spontaneous Potential
Gamma Ray
DST Uphole Tension
Micro-inverse
Micro-normal



4734

Depth in Feet

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

Borehole Temp in deg F

HVI every 10 cu ft

Annular Integral every 10 cu ft

Replay Scale 1:240

Micro-normal
ohm metres
0 10 20 30 40

Micro-inverse
ohm metres
0 10 20 30 40

Depth Based Data - Maximum Sampling Increment 10.0cm
Plotted on 25-NOV-2013 09:18
Filename: C:\Minimus 13.05.9583\Log\Shakespeare Camp...\Shakespeare Campbell #3-17 Repeat.dta
Recorded on 25-NOV-2013 06:17
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REPEAT SECTION

BEFORE SURVEY CALIBRATION

C:\Minimus 13.05.9583\Log\Shakespeare Campbell 3-17\Shakespeare Campbell #3-17 Main spooled section.dta

General Constants All 000

Last Edited on 24-NOV-2013,16:40

General Parameters		
Mud Resistivity	1.280	ohm-metres
Mud Resistivity Temperature	94.000	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	4.500	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	

Gamma Calibration MCG-B 39

Field Calibration on 24-NOV-2013 13:13

	Measured	Calibrated (API)
Background	69	47
Calibrator (Gross)	1146	772
Calibrator (Net)	1077	725

Gamma Constants MCG-B 39

Last Edited on 25-NOV-2013,04:05

Gamma Calibrator Number	GRC38	
Mud Density	1.09	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-B 39

Field Calibration on 30-JUL-2013,09:41

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

High Resolution Temperature Constants MCG-B 39

Last Edited on 30-JUL-2013,09:41

Pre-filter Length	11

Caliper Calibration MML-A 3

Base Calibration on 23-NOV-2013 19:41
Field Calibration on 24-NOV-2013 13:02

Base Calibration

Reading No	Measured	Calibrator Size (in)
1	15082	5.98
2	18325	7.97
3	21622	9.86
4	25597	11.92
5	0	0.00
6	N/A	N/A

Field Calibration

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

Micro Normal and Micro Inverse Calibration MML-A 3

Base Calibration on 23-NOV-2013 17:02
Field Check on 24-NOV-2013 13:00

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	78.3	5.0	25.0

Channel	Base Check (ohm-m)	Field Check (ohm-m)
Micro Normal	63.0	63.0
Micro Inverse	48.3	48.3

Micro Normal and Micro Inverse Constants MML-A 3

Last Edited on 24-NOV-2013,16:39

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

Caliper Calibration MPD-C.A 216

Base Calibration on 03-NOV-2013 23:03
Field Calibration on 24-NOV-2013 12:54

Base Calibration

Reading No	Measured	Calibrator Size (in)
1	16494	4.01
2	26560	5.96
3	36690	7.98
4	46752	9.95
5	57360	11.91
6	N/A	N/A

Field Calibration

Measured Caliper (in)	Actual Caliper (in)
5.96	5.98

DOWNHOLE EQUIPMENT

C:\Minimus 13.05.9583\Log\Shakespeare Campbell 3-17\Shakespeare Campbell #3-17 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-B 39 LG: 8.70 ft WT: 63.9 lb OD: 2.24 in

Compact Micro-log
MML-A 3 LG: 7.97 ft WT: 81.6 lb OD: 2.24 in

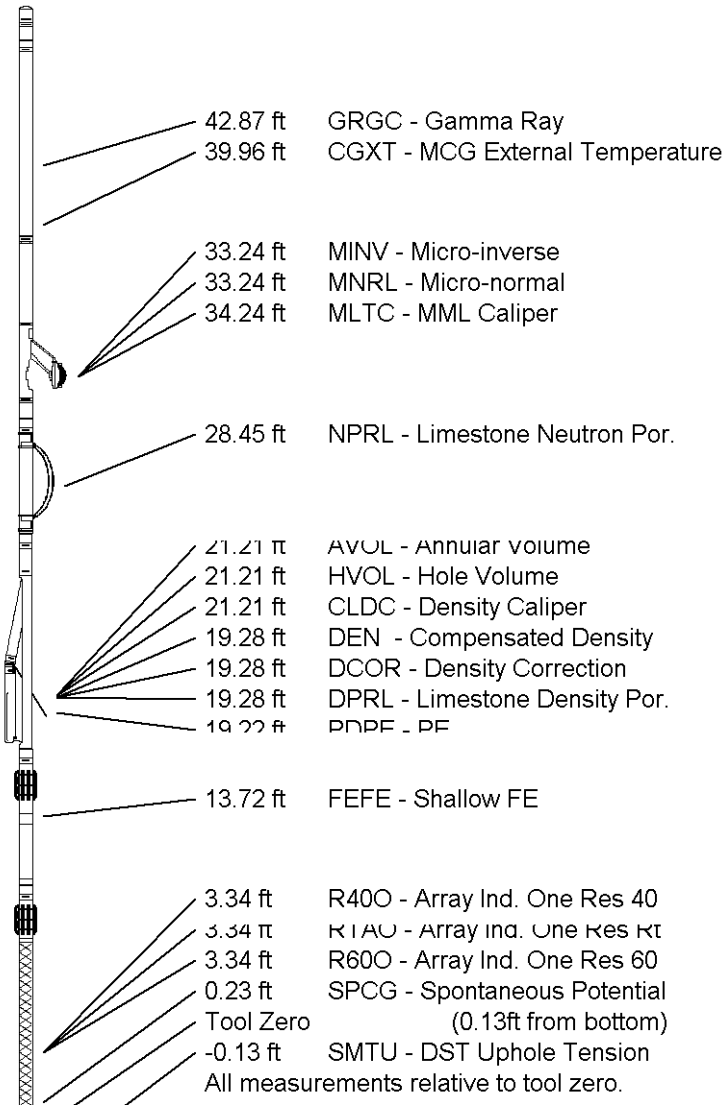
Compact Neutron
MDN-A.B 66 LG: 5.04 ft WT: 50.7 lb OD: 2.24 in

Compact Density/Caliper
MPD-C.A 216 LG: 9.59 ft WT: 90.4 lb OD: 2.45 in

Compact Focussed Electric
MFE-B.J 353 LG: 6.05 ft WT: 48.5 lb OD: 2.24 in

Compact Induction
MAI-A.A 167 LG: 10.81 ft WT: 48.5 lb OD: 2.24 in

Total Length: 49.73 ft Weight: 399.0 lb



COMPANY	SHAKESPEARE OIL CO.
WELL	CAMPBELL #3-17
FIELD	WILDCAT
PROVINCE/COUNTY	LOGAN
COUNTRY/STATE	U.S.A. / KANSAS

Elevation Kelly Bushing	3039.00	feet	First Reading	4577.00	feet
Elevation Drill Floor	3037.00	feet	Depth Driller	4715.00	feet
Elevation Ground Level	3029.00	feet	Depth Logger	4710.00	feet

Weatherford®

MICRORESISTIVITY LOG