MICRORESISTIVITY LOG

COMPANY	SHAKESPEARE OIL CO., INC
WELL	JANZEN 6-36
FIELD	PENCE EAST
PROVINCE/COUNTY	SCOTT
COUNTRY/STATE	U.S.A. / KANSAS
LOCATION	950' FNL & 450' FWL NE SW NW NW

SEC 36	TWP 16S	RGE 34W	Other Services
Latitude			MPD/MDN MML
Longitude			MAI/MFE
API Number	15-171-21043		MSS

Permanent Datum GL, Elevation 3104 feet
Log Measured From KB
Drilling Measured From KB @ 12 FEET

Elevations:	feet
KB	3116.00
DF	3114.00
GL	3104.00

Date	08-APRI-2014			
Run Number	ONE			
Service Order	5872-84189232			
Depth Driller	4850.00	feet		
Depth Logger	4849.00	feet		
First Reading	4803.00	feet		
Last Reading	3850.00	feet		
Casing Driller	264.00	feet		
Casing Logger	267.00	feet		
Bit Size	7.875	inches		
Hole Fluid Type	CHEM			
Density / Viscosity	9.30 lb/USg	45.00 CP		
PH / Fluid Loss	10.00	8.80 ml/30Min		
Sample Source	PIT			
Rm @ Measured Temp	0.40 @ 86.0	ohm-m		
Rmf @ Measured Temp	0.32 @ 86.0	ohm-m		
Rmc @ Measured Temp	0.48 @ 86.0	ohm-m		
Source Rmf / Rmc	CALC	CALC		
Rm @ BHT	0.31 @109.0	ohm-m		
Time Since Circulation	4 HRS			
Max Recorded Temp	109.00	deg F		
Equipment / Base	13057	LIB		
Recorded By	D. COLE			
Witnessed By	M. HERNDON			
JOB #	LB 14-108			

BOREHOLE RECORD

Last Edited: 08-APR-2014 22:54

Bit Size inches	Depth From feet	Depth To feet
7.875	264.00	4850.00

CASING RECORD

Type	Size inches	Depth From feet	Shoe Depth feet	Weight pounds/ft
CASING	8.625	0.00	264.00	24.00

REMARKS

- SOFTWARE ISSUE: WLS 13.08.211.
- RUN ONE: MCG, MML, MDN, MPD, MFE, MSS, MAI RUN IN COMBINATION.
  - HARDWARE: DUAL BOWSPRING USED ON MDN.
  0.5 INCH STANDOFF USED ON MFE.
  TWO 0.5 INCH STANDOFFS USED ON MSS.
  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 3850 FEET: 340 CU.FT.
- ANNULAR HOLE VOLUME WITH 5.5 INCH PRODUCTION CASING FROM TD TO 3850 FEET: 180 CU.FT.

- RIG: SOUTHWIND 70

- ENGINEER: D. COLE.

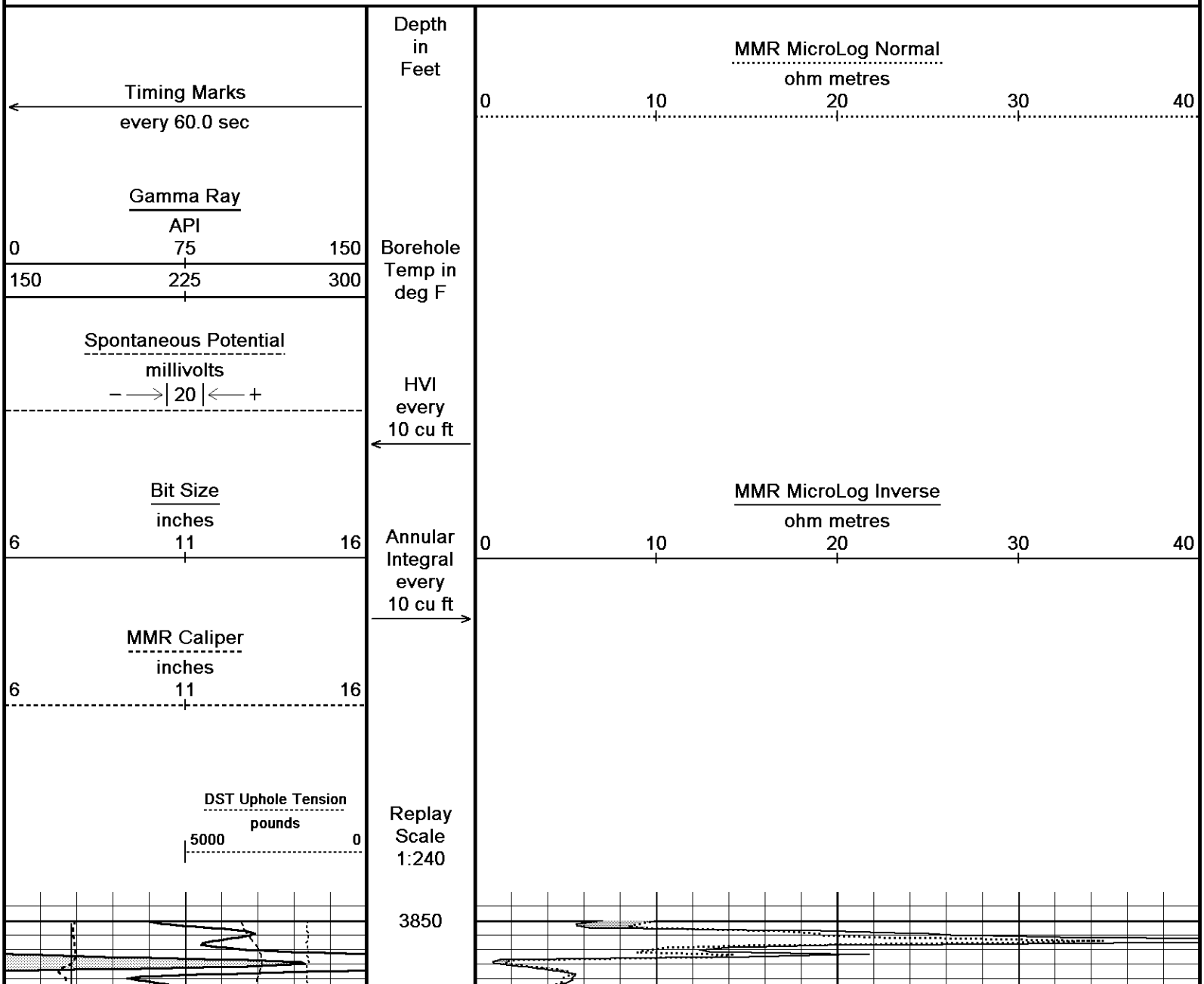
- OPERATOR: J. DUNLAP

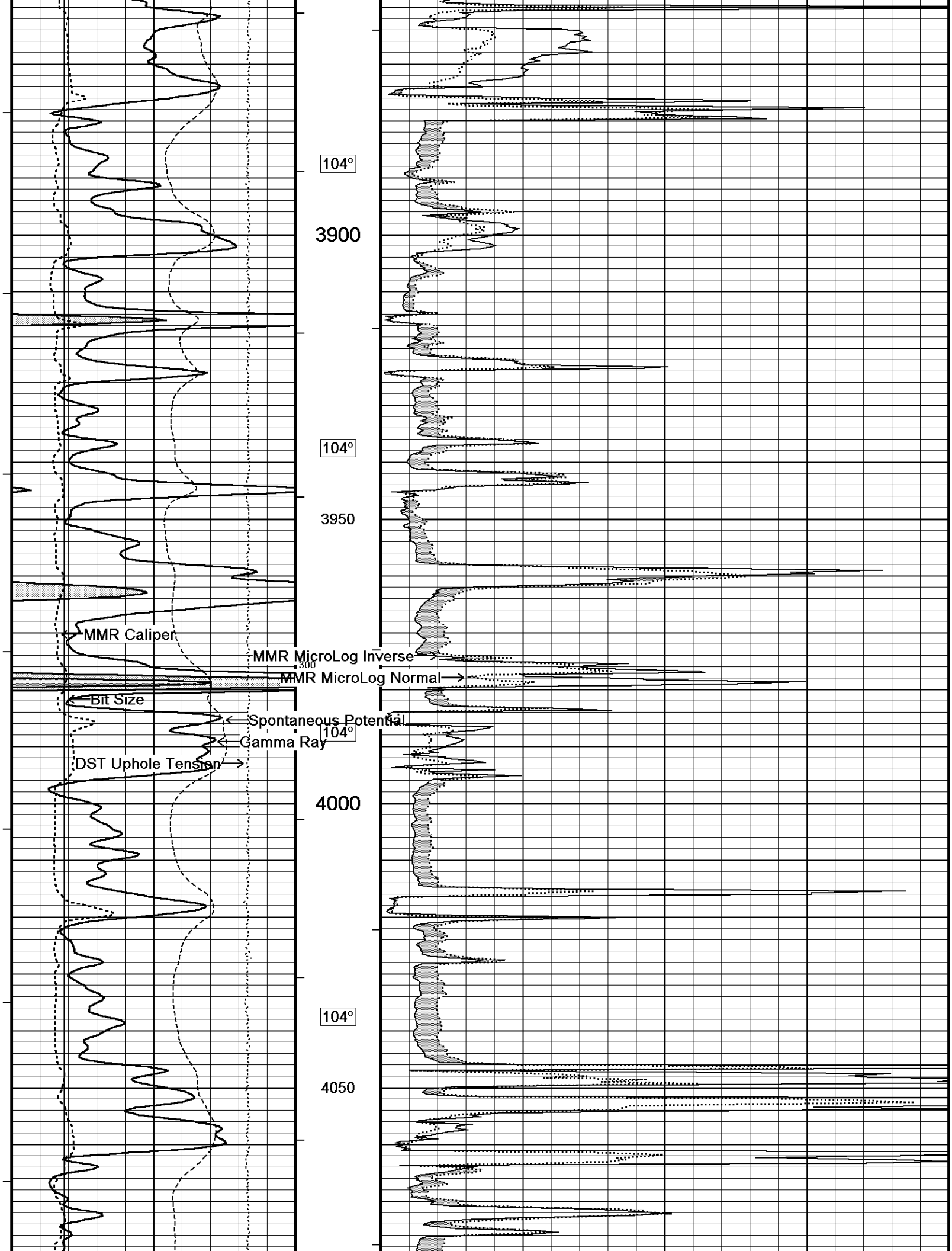
5 INCH MAIN

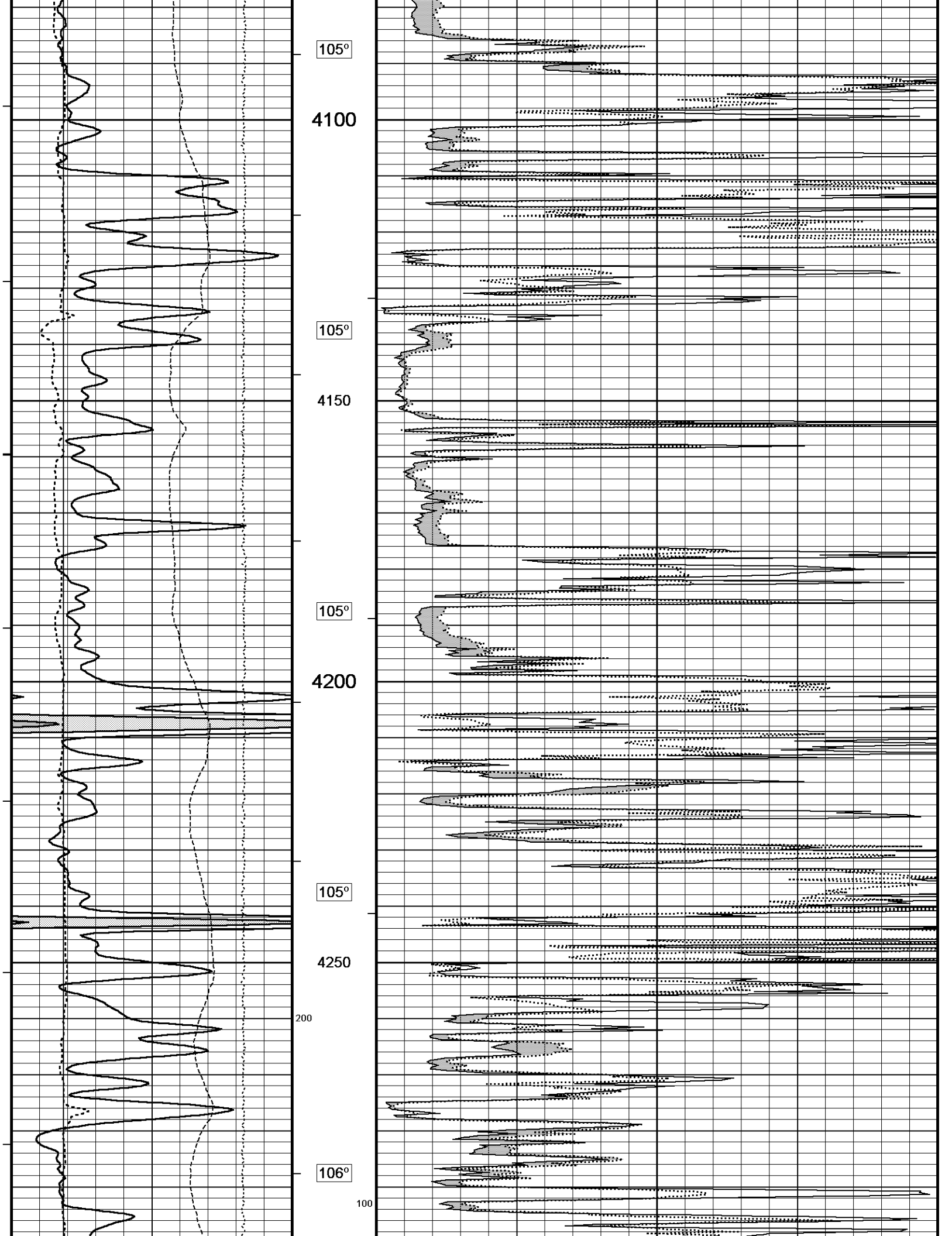
Depth Based Data - Maximum Sampling Increment 10.0cm — Plotted on 09-APR-2014 04:28

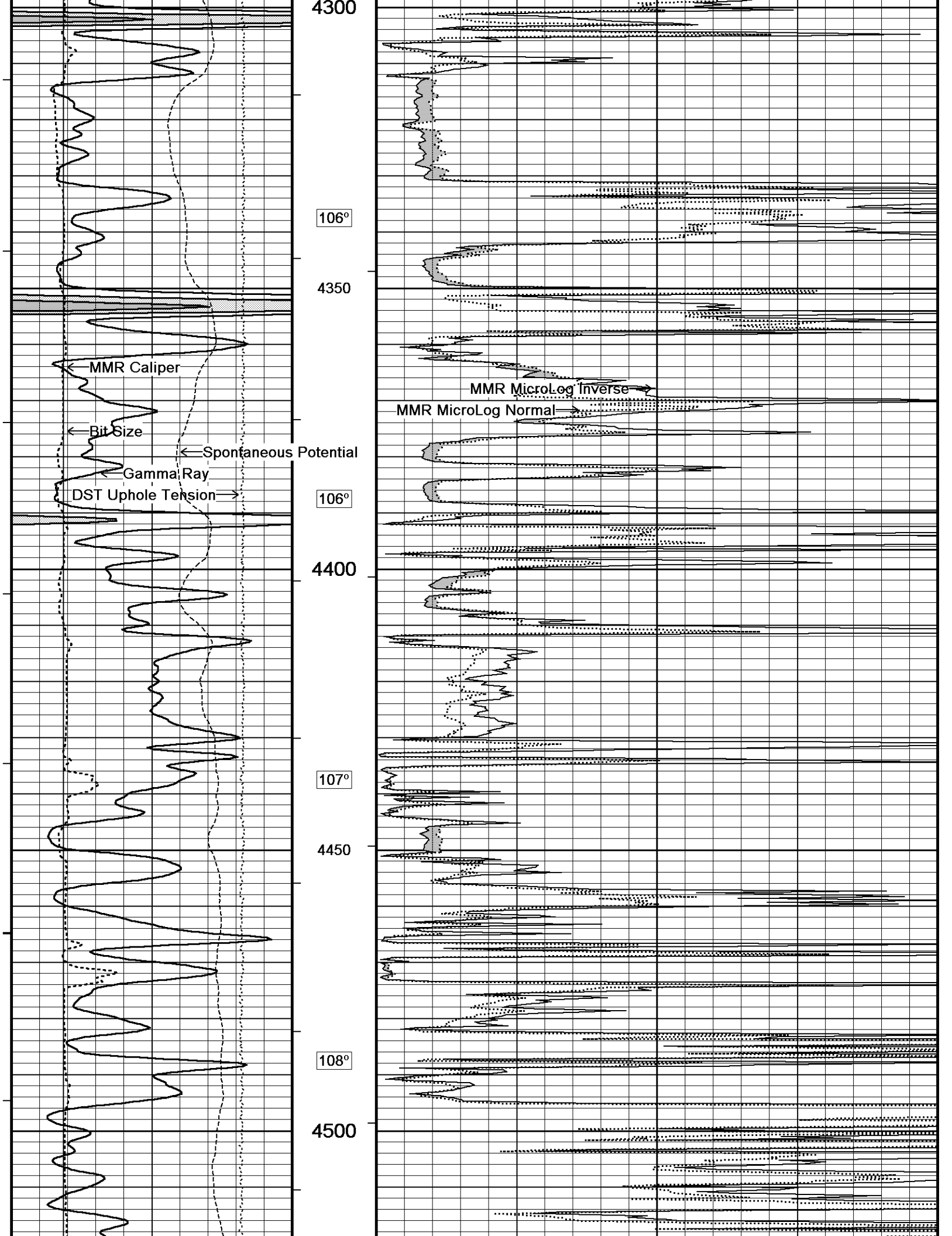
Filename: C:\Minimus 13.08.2113\Logs\SHAKESPEARE JA...\SHAKESPEARE JANZEN 6-36 MAIN.dta — Recorded on 09-APR-2014 01:07

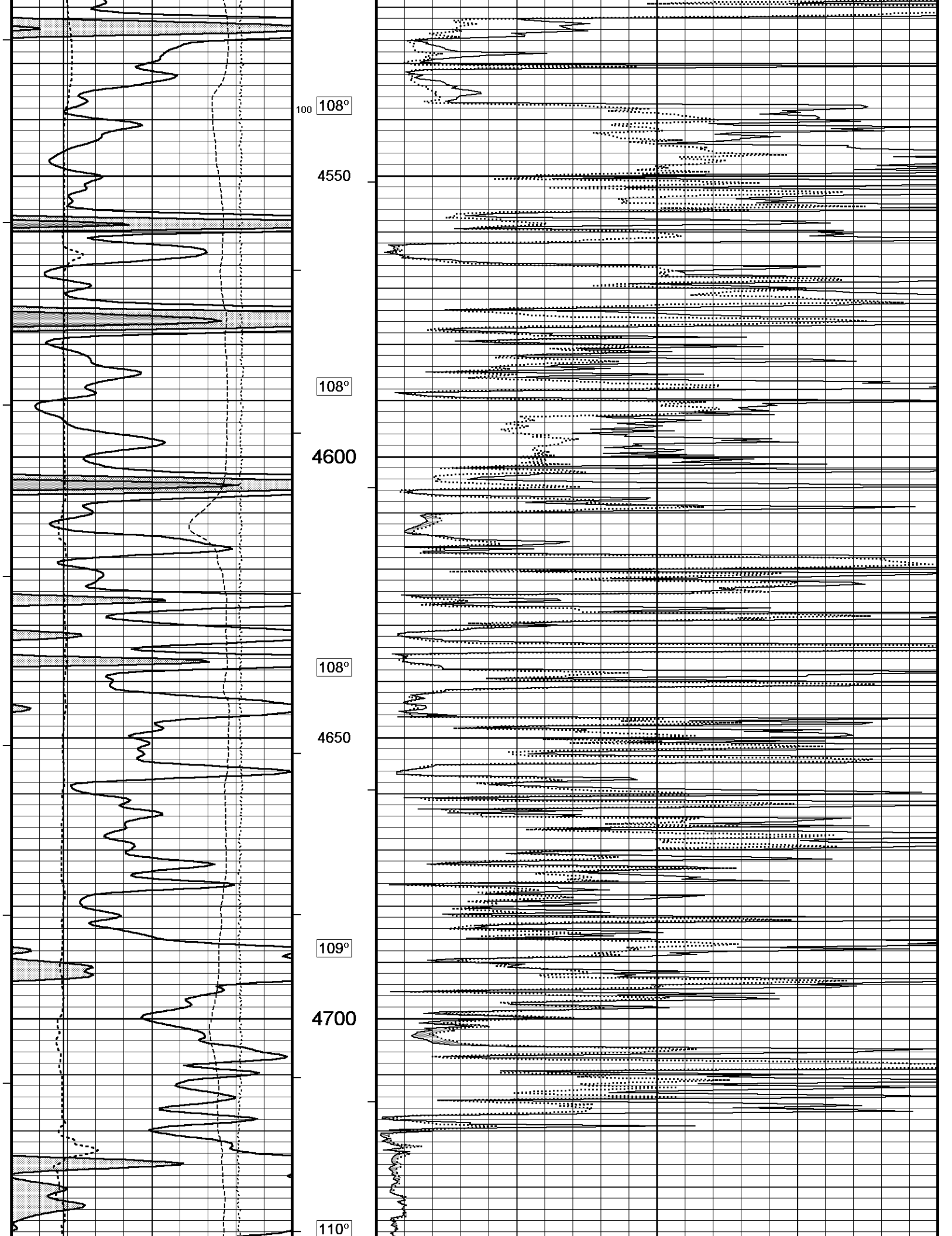
System Versions: Logged with 13.08.2113 Processed with 13.08.2113 Plotted with 13.08.2113

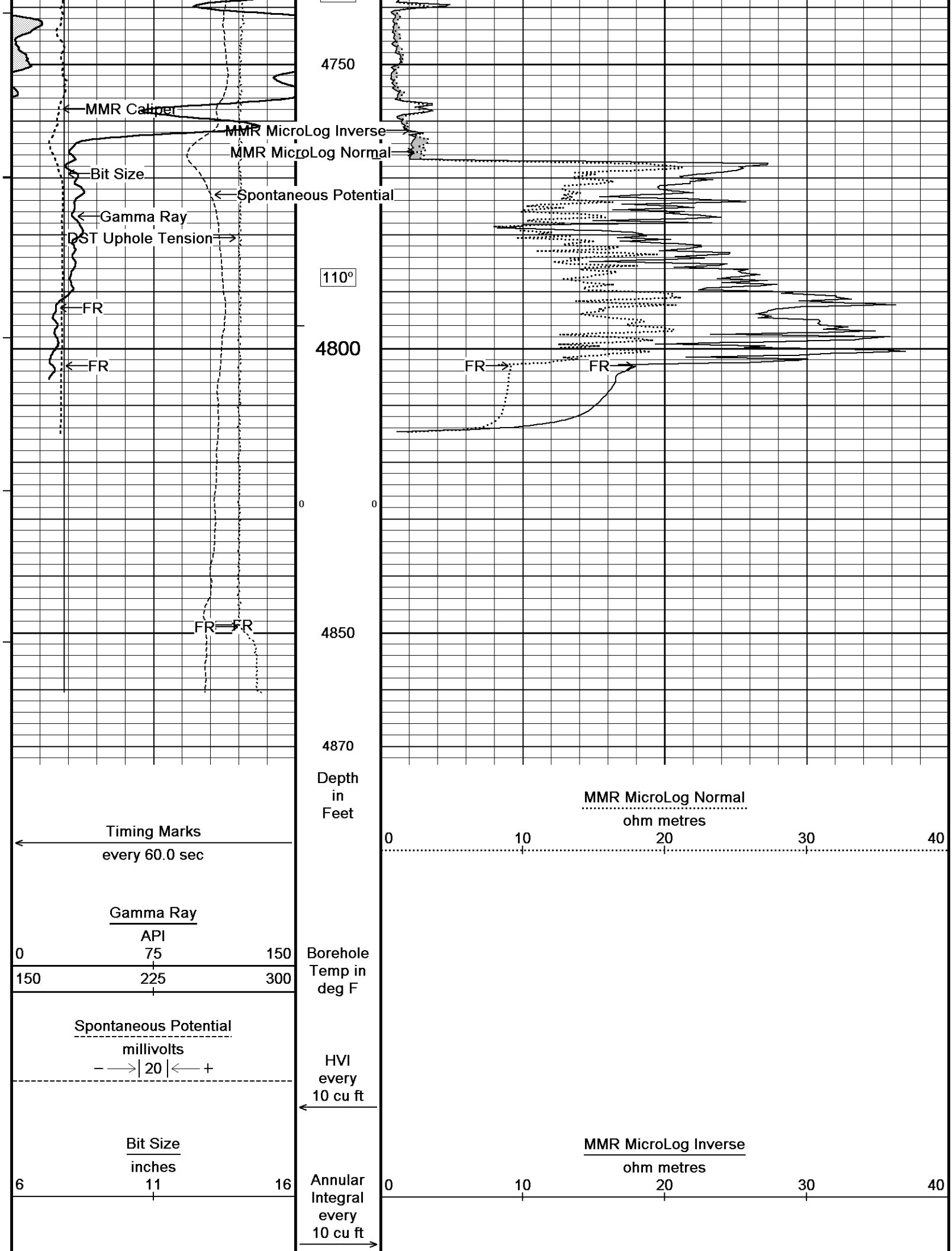



104°
3900
104°
3950
MMR Caliper
MMR MicroLog Inverse
300
MMR MicroLog Normal
Bit Size
Spontaneous Potential
104°
Gamma Ray
DST Uphole Tension
4000
104°
4050


105°
4100
105°
4150
105°
4200
105°
4250
200
106°
100


4300
106°
4350
MMR Caliper
MMR MicroLog Inverse
MMR MicroLog Normal
Bit Size
Spontaneous Potential
Gamma Ray
DST Uphole Tension
106°
4400
107°
4450
108°
4500


100
108°
4550
108°
4600
108°
4650
109°
4700
110°


4750
MMR Caliper
MMR MicroLog Inverse
MMR MicroLog Normal
Bit Size
Spontaneous Potential
Gamma Ray
DST Uphole Tension
110°
FR
4800
FR
FR
FR
0
0
FR
FR
4850
4870
Depth in Feet
MMR MicroLog Normal
ohm metres
0
10
20
30
40
Timing Marks
every 60.0 sec
Gamma Ray
API
0
75
150
Borehole Temp in deg F
150
225
300
Spontaneous Potential
millivolts
− 20 +
HVI every 10 cu ft
Bit Size
inches
6
11
16
Annular Integral every 10 cu ft
MMR MicroLog Inverse
ohm metres
0
10
20
30
40

MMR Caliper
inches
6 11 16

DST Uphole Tension
pounds
5000 0

Replay
Scale
1:240

Depth Based Data - Maximum Sampling Increment 10.0cm — Plotted on 09-APR-2014 04:28
Filename: C:\Minimus 13.08.2113\Logs\SHAKESPEARE JA...\SHAKESPEARE JANZEN 6-36 MAIN.dta — Recorded on 09-APR-2014 01:07
System Versions: Logged with 13.08.2113 Processed with 13.08.2113 Plotted with 13.08.2113

5 INCH MAIN

REPEAT SECTION

Depth Based Data - Maximum Sampling Increment 10.0cm — Plotted on 09-APR-2014 04:28
Filename: C:\Minimus 13.08.2113\Logs\SHAKESPEARE...\SHAKESPEARE JANZEN 6-36 REPEAT.dta — Recorded on 09-APR-2014 00:37
System Versions: Logged with 13.08.2113 Processed with 13.08.2113 Plotted with 13.08.2113

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

Bit Size
inches
6 11 16

Annular
Integral
every
10 cu ft

MMR Caliper
inches
6 11 16

DST Uphole Tension
pounds
5000 0

Replay
Scale
1:240

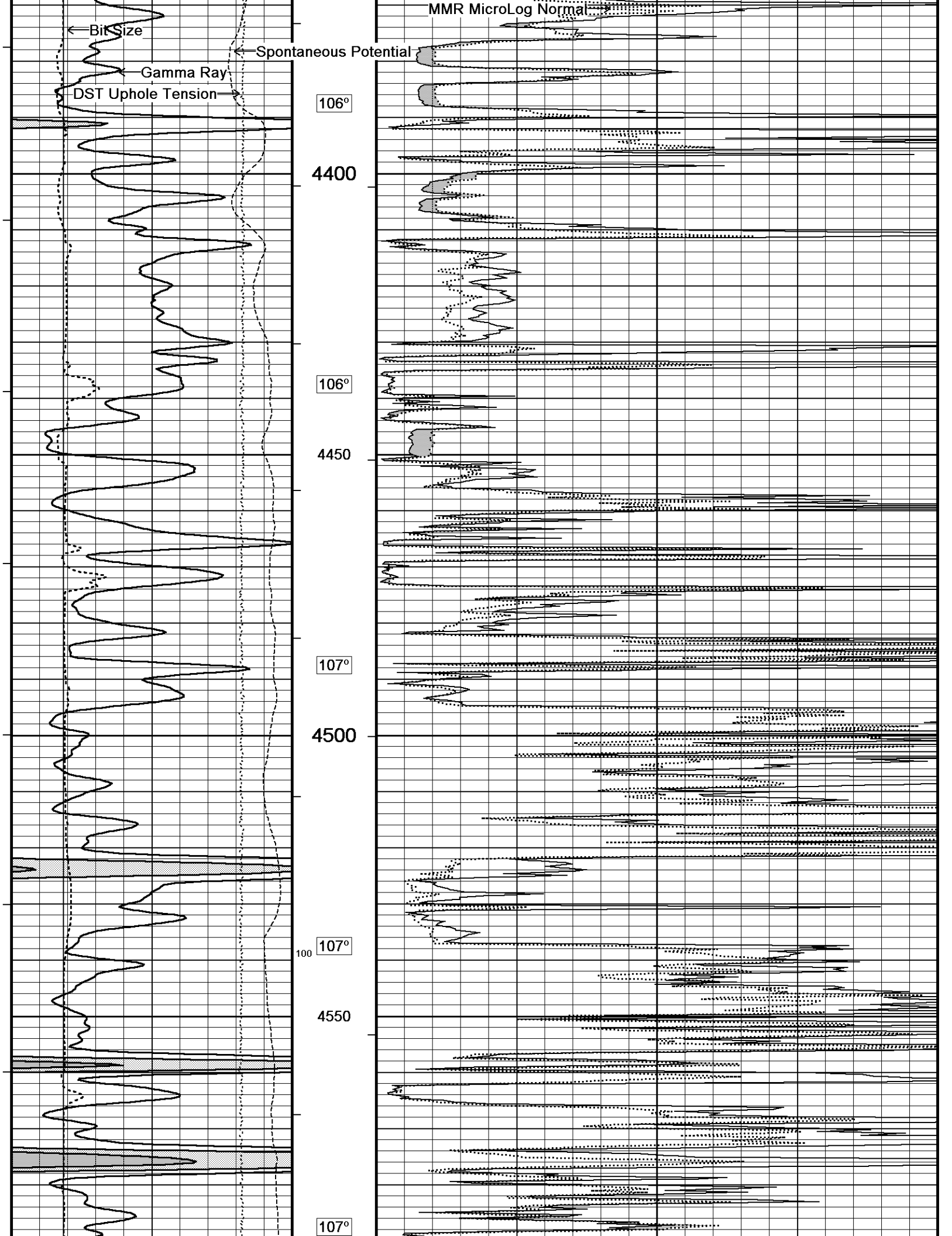
4350

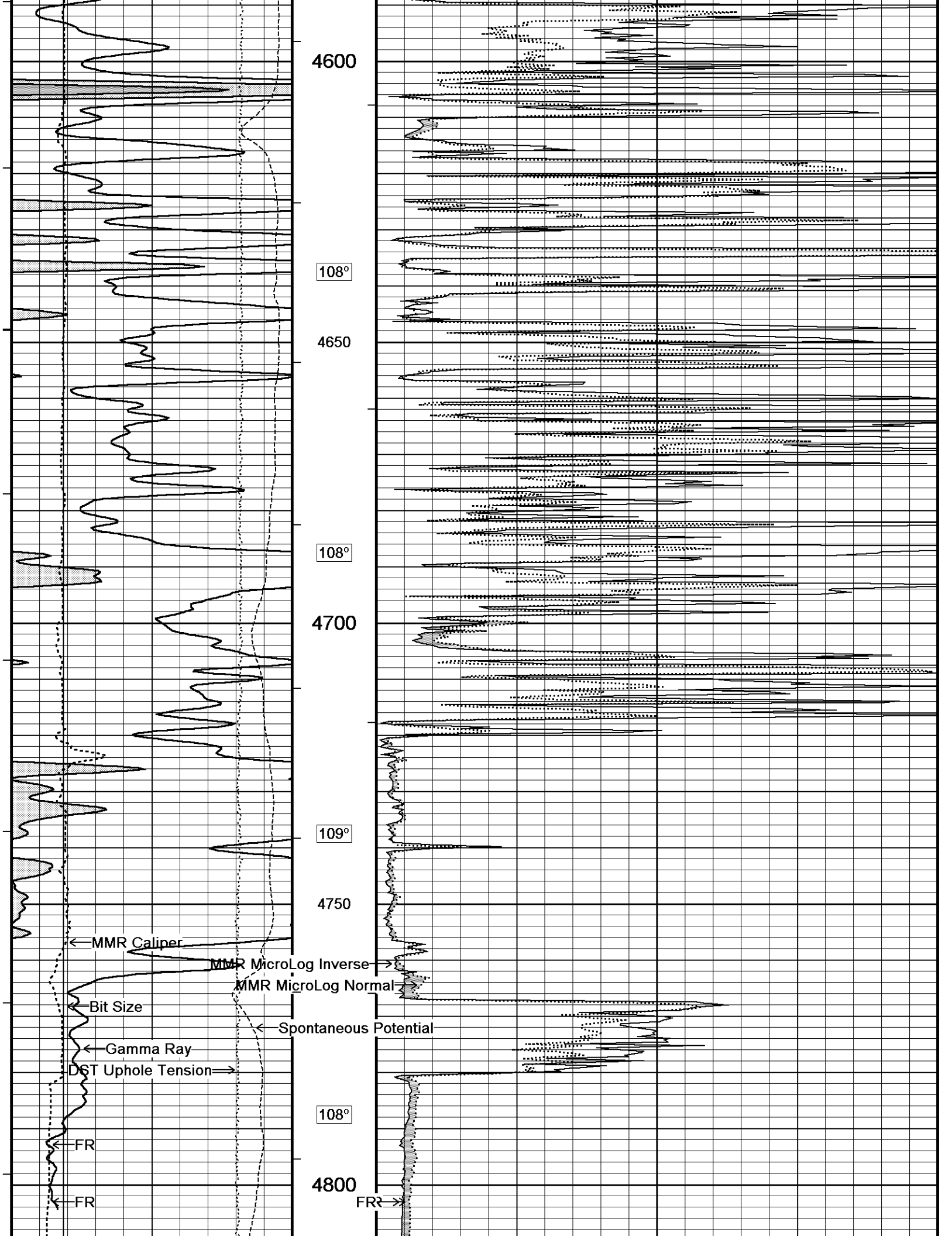
MMR Caliper

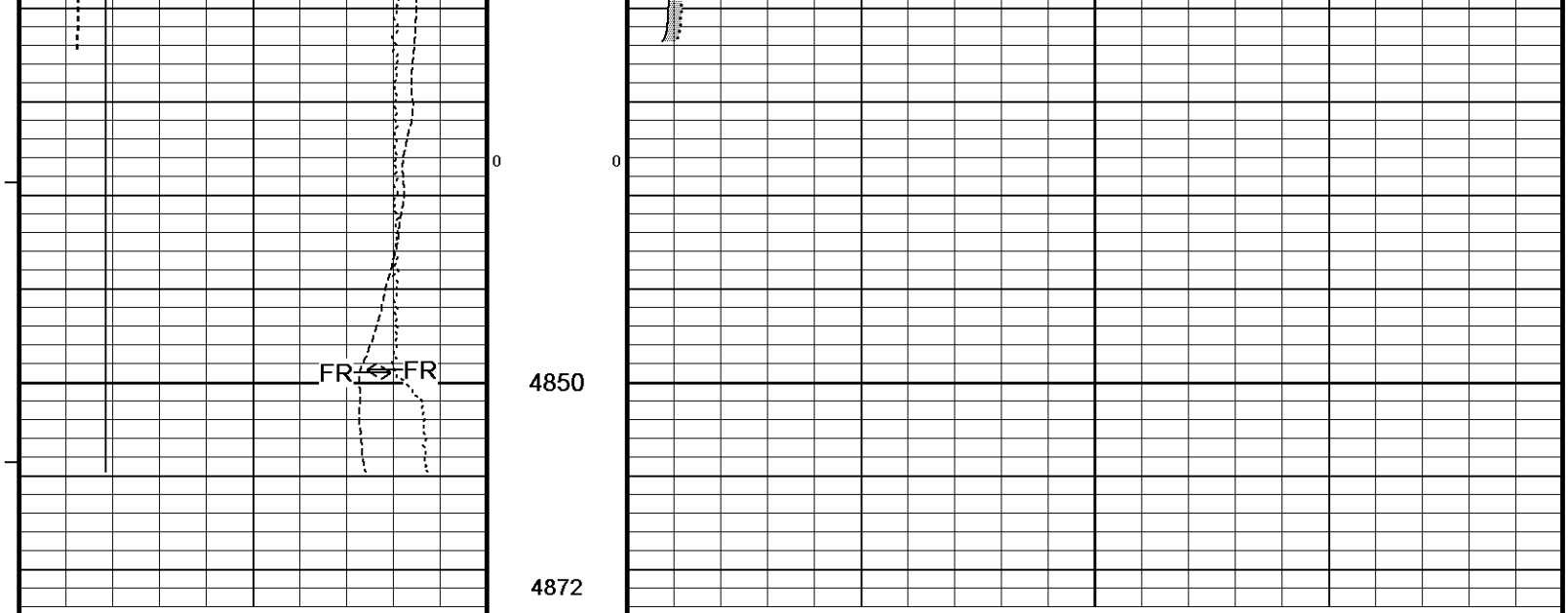
MMR MicroLog Normal
ohm metres
0 10 20 30 40

MMR MicroLog Inverse
ohm metres
0 10 20 30 40

MMR MicroLog Inverse


Bit Size
Spontaneous Potential
Gamma Ray
DST Uphole Tension
MMR MicroLog Normal
106°
4400
106°
4450
107°
4500
100
107°
4550
107°


4600
108°
4650
108°
4700
109°
4750
MMR Caliper
MMR MicroLog Inverse
MMR MicroLog Normal
Bit Size
Spontaneous Potential
Gamma Ray
DST Uphole Tension
108°
FR
4800
FR
FR



4872

Depth in Feet

Timing Marks
every 60.0 sec

Gamma Ray
API
0 75 150
150 225 300

Spontaneous Potential
millivolts
– → | 20 | ← +

Bit Size
inches
6 11 16

MMR Caliper
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

MMR MicroLog Normal
ohm metres
0 10 20 30 40

MMR MicroLog Inverse
ohm metres
0 10 20 30 40

Depth Based Data - Maximum Sampling Increment 10.0cm
Plotted on 09-APR-2014 04:28
Filename: C:\Minimus 13.08.2113\Logs\SHAKESPEARE...\SHAKESPEARE JANZEN 6-36 REPEAT.dta
Recorded on 09-APR-2014 00:37
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REPEAT SECTION

BEFORE SURVEY CALIBRATION
C:\Minimus 13.08.2113\Logs\SHAKESPEARE JANZEN 6-36\SHAKESPEARE JANZEN 6-36 REPEAT.dta

General Constants All 000

Last Edited on 09-APR-2014,00:05

General Parameters		
Mud Resistivity	0.400	ohm-metres
Mud Resistivity Temperature	86.000	degrees F
Water Level	0.000	feet
Borehole Fluid Processing	Water Level Switch	
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	MMR 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	
SW/APOR Tool Source	0.000	

Gamma Calibration MCG-D.K 443

Field Calibration on 05-APR-2014 15:02

	Measured	Calibrated (API)
Background	73	49
Calibrator (Gross)	1158	774
Calibrator (Net)	1085	725

Gamma Constants MCG-D.K 443

Last Edited on 09-APR-2014,00:06

Gamma Calibrator Number	GRC38	
Mud Density	1.11	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 443

Field Calibration on 05-MAR-2014,20:50

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

High Resolution Temperature Constants MCG-D.K 443

Last Edited on 05-MAR-2014,20:50

Pre-filter Length	11

Micro Normal and Micro Inverse Calibration MMR-B.A 98

Base Calibration on 24-MAR-2014 13:44
Field Check on 24-MAR-2014 13:47

Base Calibration

	Measured		Calibrated (ohm-m)	
Channel	Resistor 1	Resistor 2	Resistor 1	Resistor 2
Micro Normal	11.7	59.5	5.0	25.0
Micro Inverse	15.5	77.1	5.0	25.0

Channel	Base Check (ohm-m)	Field Check (ohm-m)
Micro Normal	76.2	76.2
Micro Inverse	59.1	59.1

Micro Normal and Micro Inverse Constants MMR-B.A 98

Last Edited on 24-MAR-2014,13:47

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	0.0000	inches

Caliper Calibration MMR-B.A 98

Base Calibration on 24-MAR-2014 13:55
Field Calibration on 24-MAR-2014 13:56

Base Calibration

Reading No	Measured	Calibrator Size (in)
1	13755	5.96
2	17246	7.99

2	17246	7.99
3	20613	9.94
4	24335	11.90
5	0	0.00
6	N/A	N/A

Field Calibration

Measured Caliper (in)	Actual Caliper (in)
9.94	9.94

Caliper Calibration MPD-B 31

Base Calibration on 02-APR-2014 10:39
Field Calibration on 05-APR-2014 14:29

Base Calibration

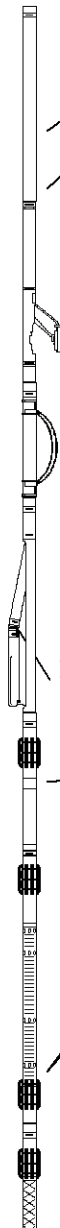
Reading No	Measured	Calibrator Size (in)
1	18192	3.99
2	27035	5.98
3	35696	7.97
4	44016	9.86
5	53216	11.92
6	N/A	N/A

Field Calibration

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

DOWNHOLE EQUIPMENT

C:\Minimus 13.08.2113\Logs\SHAKESPEARE JANZEN 6-36\SHAKESPEARE JANZEN 6-36 REPEAT.dta



Compact Comms Gamma
MCG-D.K 443 LG: 8.70 ft WT: 63.9 lb OD: 2.244 in

- 56.02 ft GRGC - Gamma Ray
- 53.11 ft CGXT - MCG External Temperature

Compact Micro-Resistivity
MMR-B.A 98 LG: 8.59 ft WT: 81.6 lb OD: 4.882 in

- 45.76 ft MINV - MMR MicroLog Inverse
- 45.76 ft MNRL - MMR MicroLog Normal

Compact Neutron
MDN-A.B 65 LG: 5.04 ft WT: 50.7 lb OD: 2.244 in

- 40.97 ft NPRL - Limestone Neutron Por.

Compact Density/Caliper
MPD-B 31 LG: 9.59 ft WT: 90.4 lb OD: 2.449 in

- 33.73 ft CLDC - Density Caliper
- 33.73 ft AVOL - Annular Volume
- 33.73 ft HVOL - Hole Volume
- 31.80 ft DPRL - Limestone Density Por.
- 31.80 ft DEN - Compensated Density
- 31.80 ft DCOR - Density Correction
- 31.74 ft PDPE - PE

Compact Focussed Electric
MFE-B.J 352 LG: 6.05 ft WT: 48.5 lb OD: 2.244 in

- 26.24 ft FEFE - Shallow FE

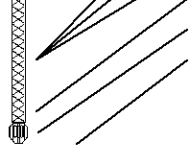
Compact Sonic
MSS-A.A 126 LG: 12.52 ft WT: 72.8 lb OD: 2.244 in

- 12.96 ft SPRL - Wyllie Lime. Sonic Por.
- 12.96 ft DT35 - 3-5' Compensated Sonic

Compact Induction
MAI-A.A 158 LG: 10.81 ft WT: 48.5 lb OD: 2.244 in

- 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

Total	Length: 61.30 ft	Weight: 456.4 lb



0.25 ft SPCG - Spontaneous Potential
Tool Zero (0.13ft from bottom)
-0.13 ft SMTU - DST Uphole Tension
All measurements relative to tool zero.

COMPANY	SHAKESPEARE OIL CO., INC
WELL	JANZEN 6-36
FIELD	PENCE EAST
PROVINCE/COUNTY	SCOTT
COUNTRY/STATE	U.S.A. / KANSAS

Elevation Kelly Bushing	3116.00	feet	First Reading	4803.00	feet
Elevation Drill Floor	3114.00	feet	Depth Driller	4850.00	feet
Elevation Ground Level	3104.00	feet	Depth Logger	4849.00	feet

Weatherford®

MICRORESISTIVITY LOG