MICRORESISTIVITY LOG

COMPANY	SHAKESPEARE OIL CO., INC.
WELL	PARSONS #2-27
FIELD	WILDCAT
PROVINCE/COUNTY	GOVE
COUNTRY/STATE	U.S.A. / KANSAS
LOCATION	2480' FNL & 1100' FWL

SEC	TWP	RGE	Other Services
27	13S	31W	MPD/MDN MAI/MFE
			MSS

API Number 15-063-22039
Permit Number

Permanent Datum GL, Elevation 2838 feet
Log Measured From KB
Drilling Measured From KB

Elevations:	feet
KB	2848.00
DF	2846.00
GL	2838.00

Date	28-SEP-2012			
Run Number	ONE			
Depth Driller	4630.00	feet		
Depth Logger	4629.00	feet		
First Reading	4583.00	feet		
Last Reading	3629.00	feet		
Casing Driller	225.00	feet		
Casing Logger	222.00	feet		
Bit Size	7.875	inches		
Hole Fluid Type	CHEMICAL			
Density / Viscosity	9.40 lb/USg	49.00 CP		
PH / Fluid Loss	10.50	6.40 ml/30Min		
Sample Source	FLOWLINE			
Rm @ Measured Temp	0.74 @ 89.0	ohm-m		
Rmf @ Measured Temp	0.59 @ 89.0	ohm-m		
Rmc @ Measured Temp	0.89 @ 89.0	ohm-m		
Source Rmf / Rmc	CALC	CALC		
Rm @ BHT	0.56 @119.0	ohm-m		
Time Since Circulation	4 HOURS			
Max Recorded Temp	119.00	deg F		
Equipment Name	COMPACT			
Equipment / Base	13057	LIB		
Recorded By	ADAM SILL			
Witnessed By	TIM PRIEST			
S.O. # / JOB #	3538930		LB12-262	

BOREHOLE RECORD

Last Edited: 28-SEP-2012 19:20

Bit Size inches	Depth From feet	Depth To feet
7.875	225.00	4630.00

CASING RECORD

Type	Size inches	Depth From feet	Shoe Depth feet	Weight pounds/ft
SURFACE	8.625	0.00	225.00	24.00

REMARKS

- SOFTWARE ISSUE: WLS 13.02.6600.
- MCG, MML, MDN, MPD, MFE, MSS, MAI RAN 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 SURFACE CASING: 1968 CU. FT.
- ANNULAR HOLE VOLUME WITH 5.5 INCH PRODUCTION CASING FROM TD TO 3629 FEET: 237 CU. FT.

- SERVICE ORDER # 3538930.

- RIG: H-D DRILLING #2.

- ENGINEER: A. SILL.

- OPERATOR(S): M. STEGMAN.

5 INCH MAIN

Depth Based Data - Maximum Sampling Increment 10.0cm — Plotted on 28-SEP-2012 22:35

Filename: C:\Minimus 13.02.6600\Data\Shakespeare Parsons #...\Shakespeare Parsons #2-27_002.dta — Recorded on 28-SEP-2012 20:00

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

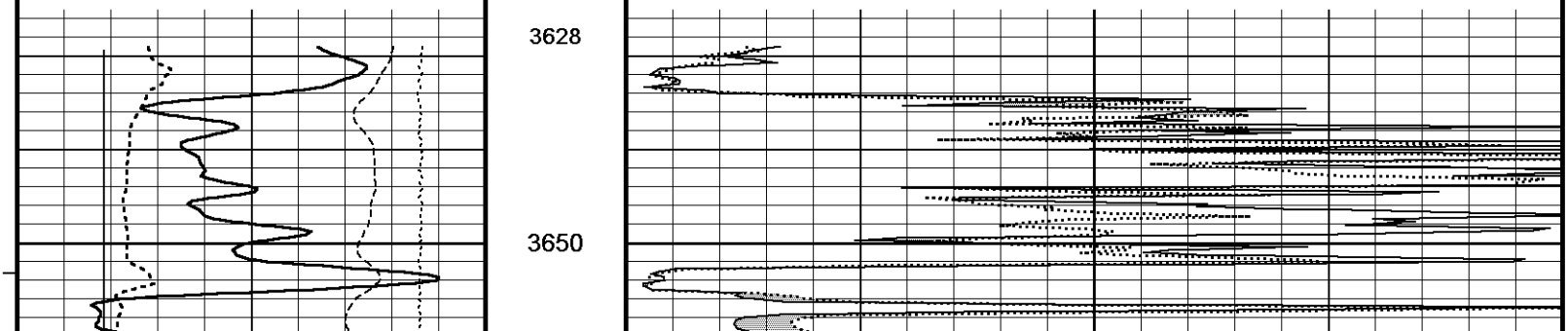
Depth in Feet

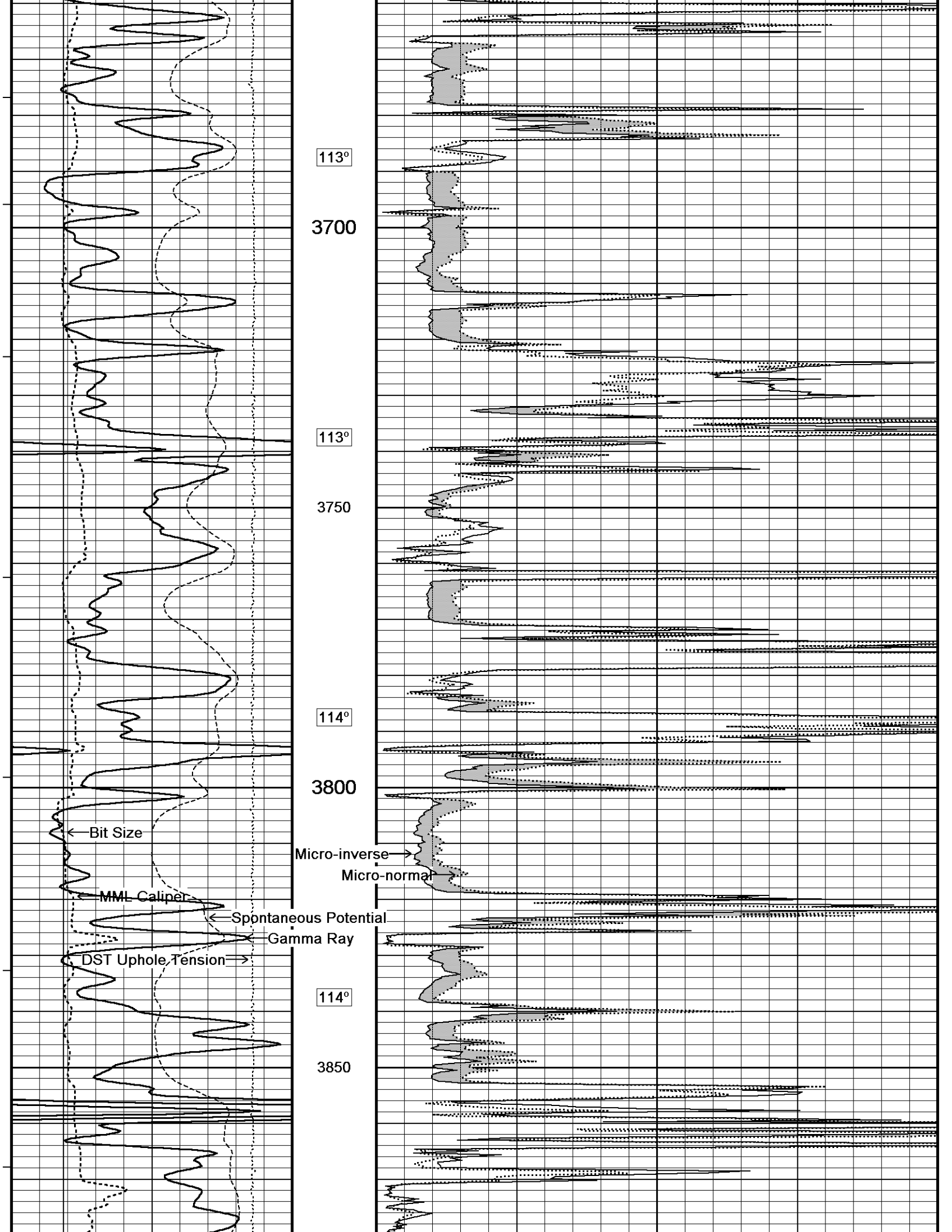
Borehole Temp in deg F

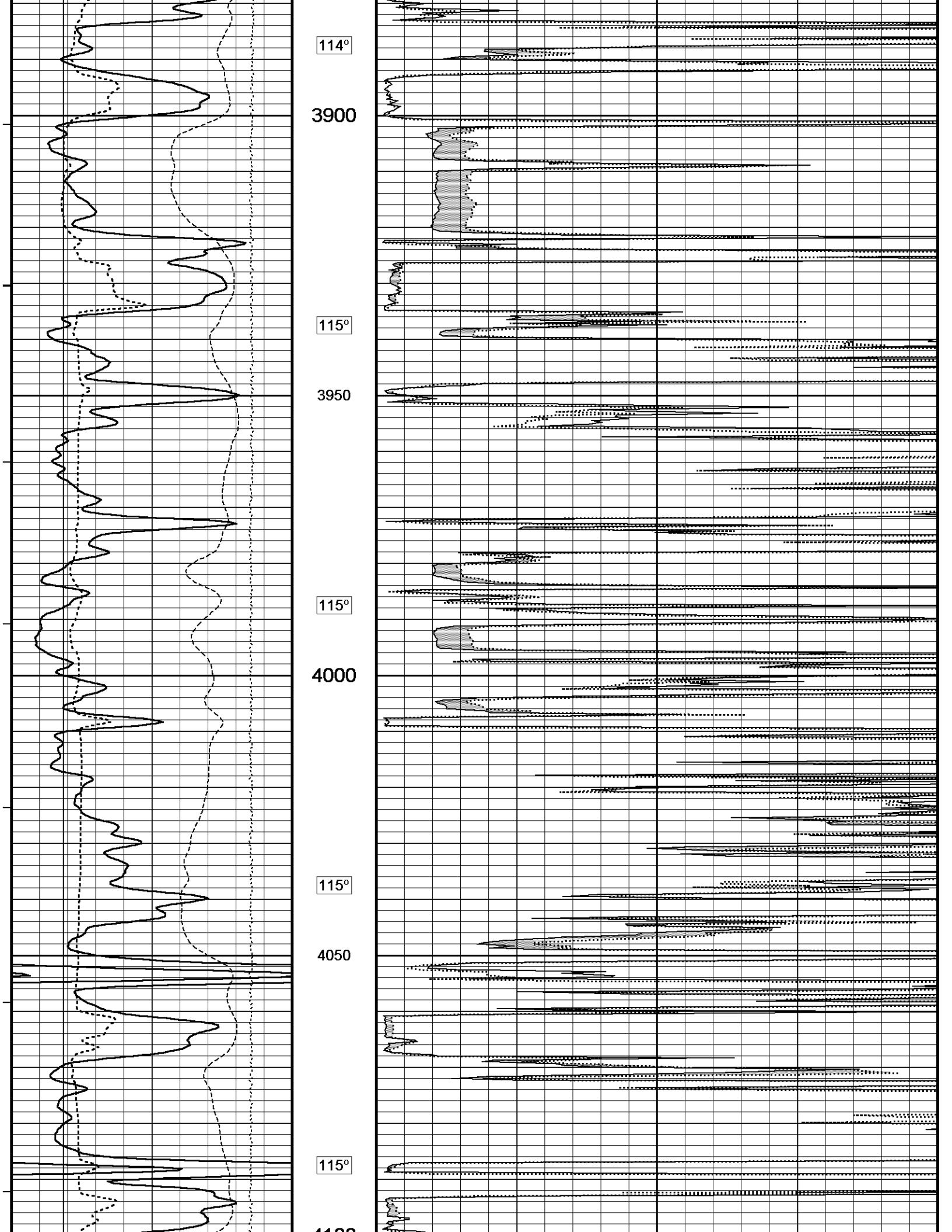
Replay Scale 1:240

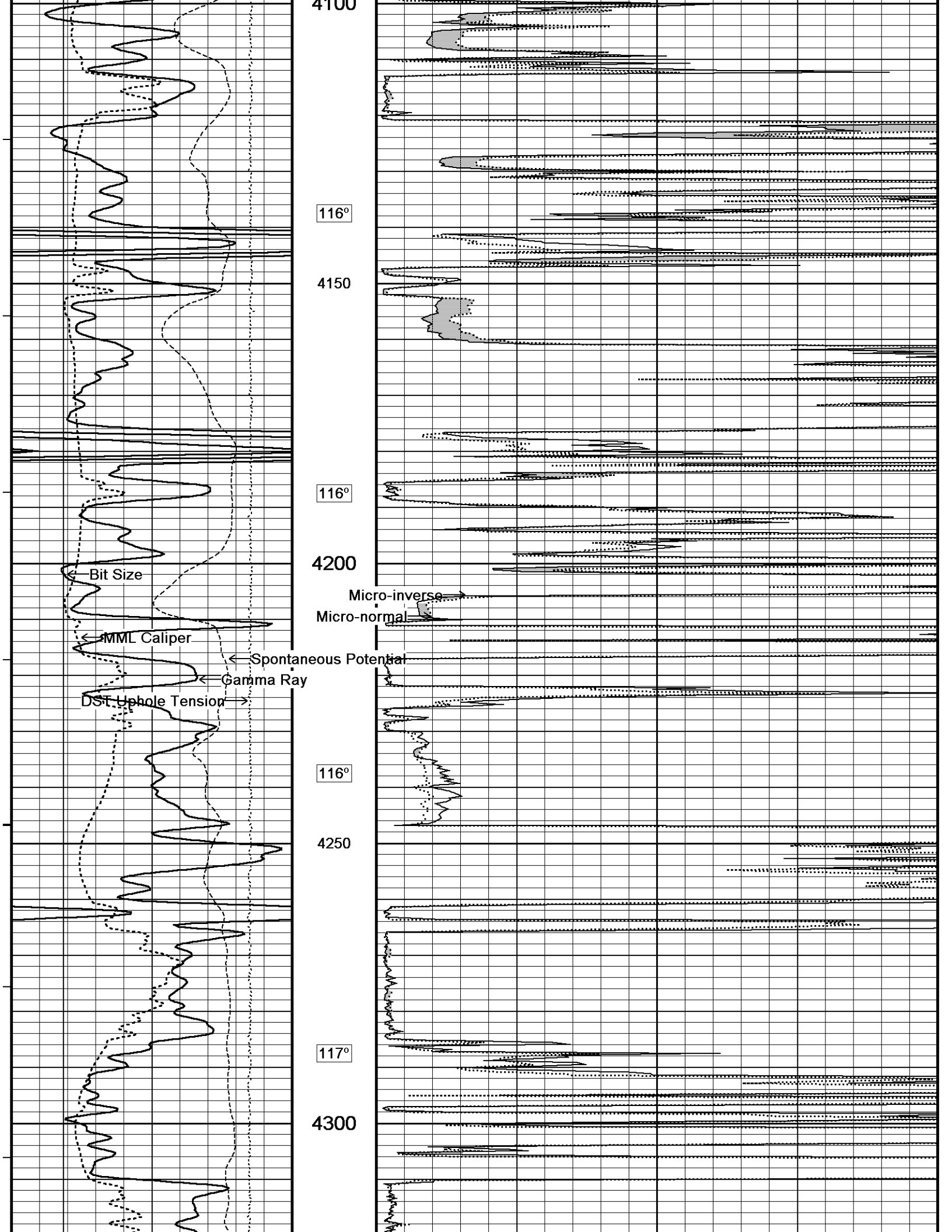
Micro-normal
ohm metres
0 10 20 30 40

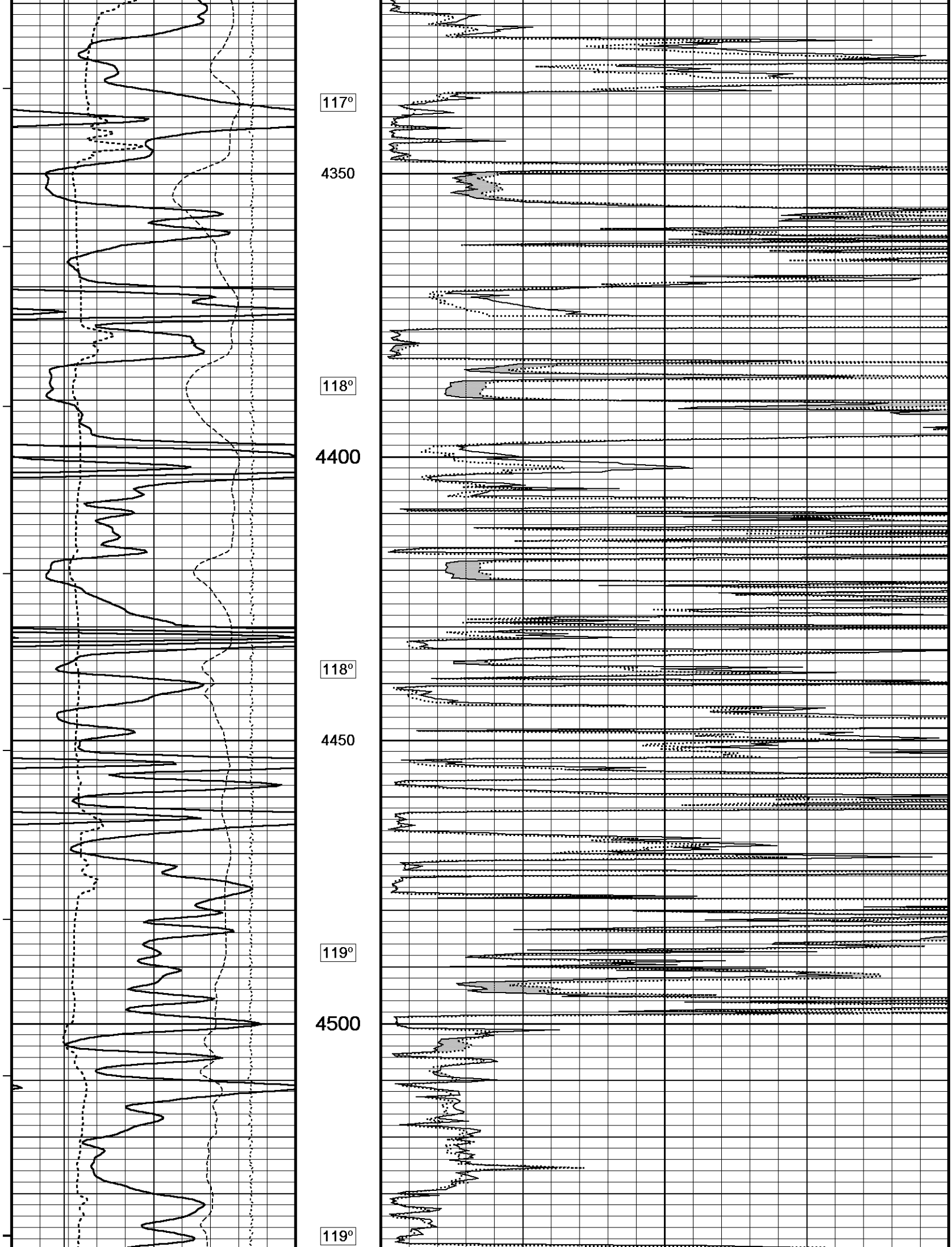
Micro-inverse
ohm metres
0 10 20 30 40

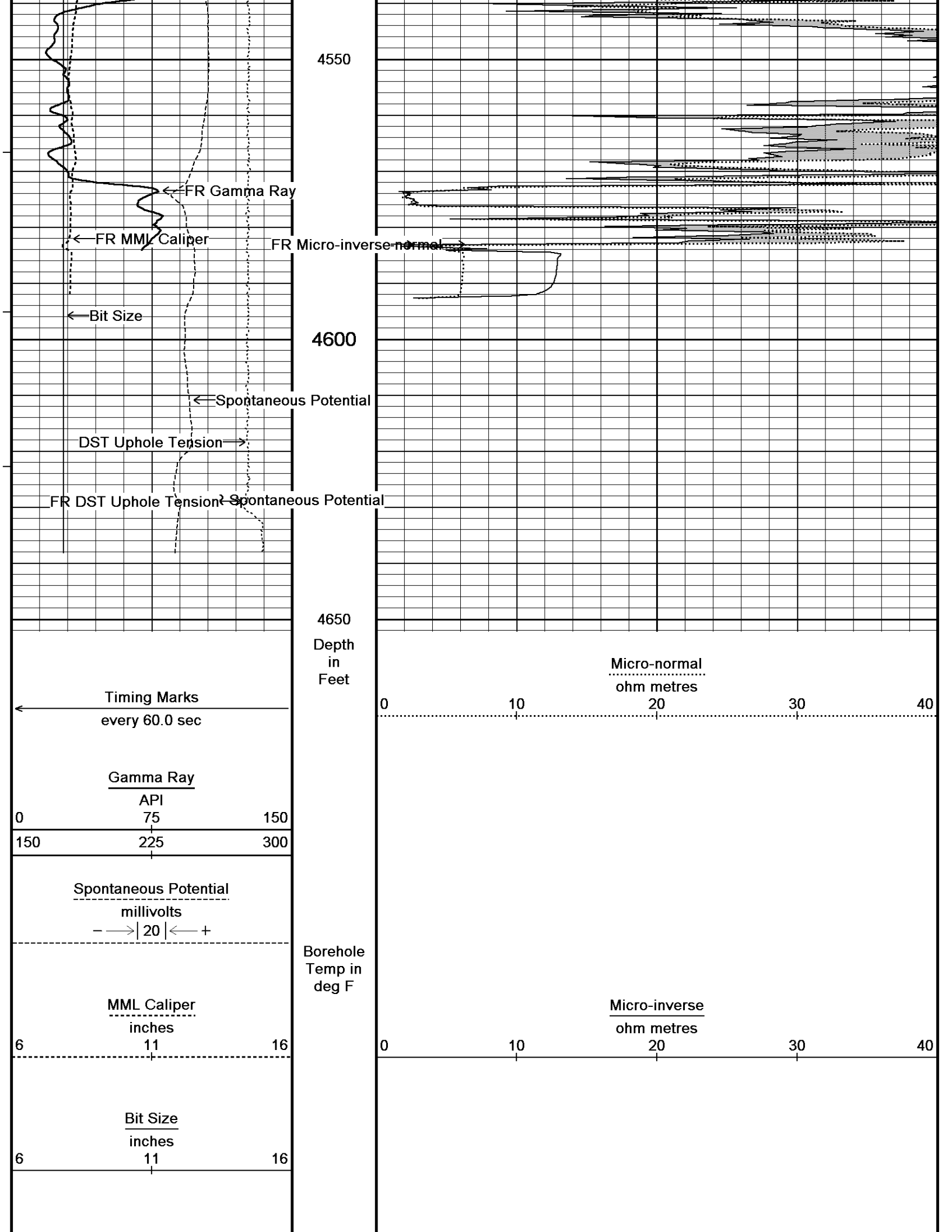



113°
3700
113°
3750
114°
3800
Bit Size
Micro-inverse
Micro-normal
MML Caliper
Spontaneous Potential
Gamma Ray
DST Uphole Tension
114°
3850


114°
3900
115°
3950
115°
4000
115°
4050
115°


4100
116°
4150
116°
4200
Bit Size
Micro-inverse
Micro-normal
MML Caliper
Spontaneous Potential
Gamma Ray
DST Uphole Tension
116°
4250
117°
4300


117°
4350
118°
4400
118°
4450
119°
4500
119°


4550
FR Gamma Ray
FR MML Caliper
FR Micro-inverse-normal
Bit Size
4600
Spontaneous Potential
DST Uphole Tension
FR DST Uphole Tension
Spontaneous Potential
4650
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
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 28-SEP-2012 22:35
Filename: C:\Minimus 13.02.6600\Data\Shakespeare Parsons #...\Shakespeare Parsons #2-27_002.dta
Recorded on 28-SEP-2012 20:00
System Versions: Logged with 13.02.6600 Plotted with 13.02.6600

5 INCH MAIN

REPEAT SECTION

Depth Based Data - Maximum Sampling Increment 10.0cm
Plotted on 28-SEP-2012 22:35
Filename: C:\Minimus 13.02.6600\Data\Shakespeare Parsons #...\Shakespeare Parsons #2-27_001.dta
Recorded on 28-SEP-2012 19:37
System Versions: Logged with 13.02.6600 Plotted with 13.02.6600

Depth
in
Feet

Timing Marks
every 60.0 sec

Micro-normal
ohm metres
0 10 20 30 40

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

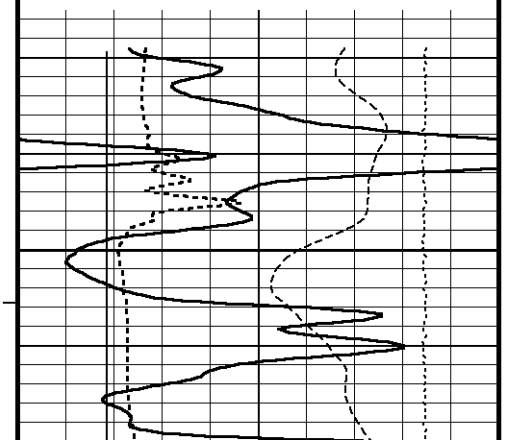
Bit Size
inches
6 11 16

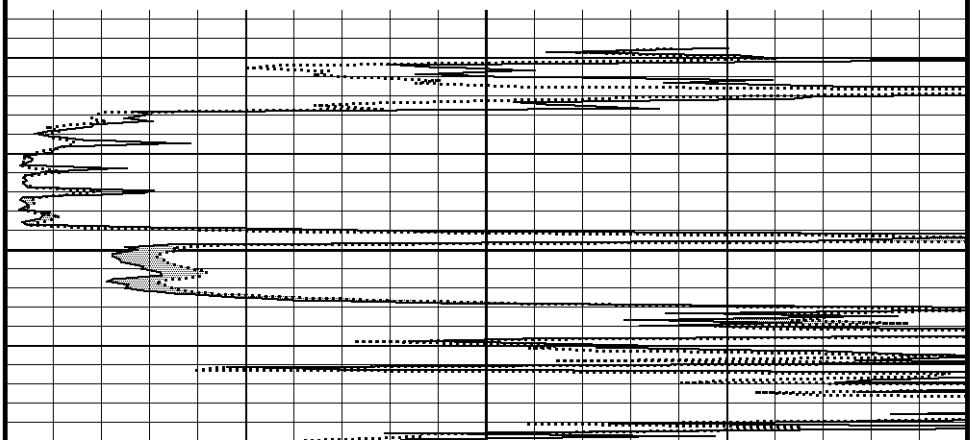
DST Uphole Tension
pounds
5000 0

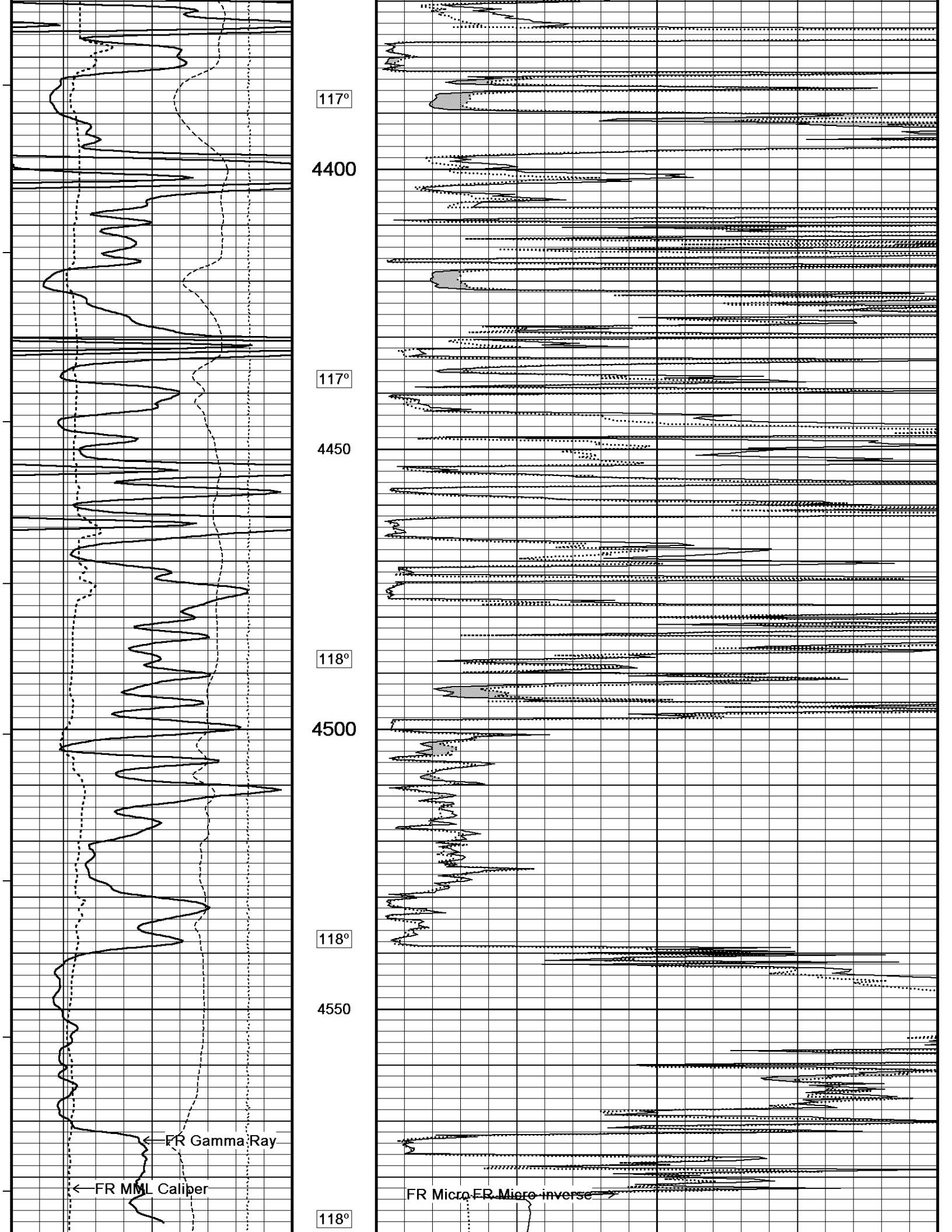
Replay
Scale
1:240

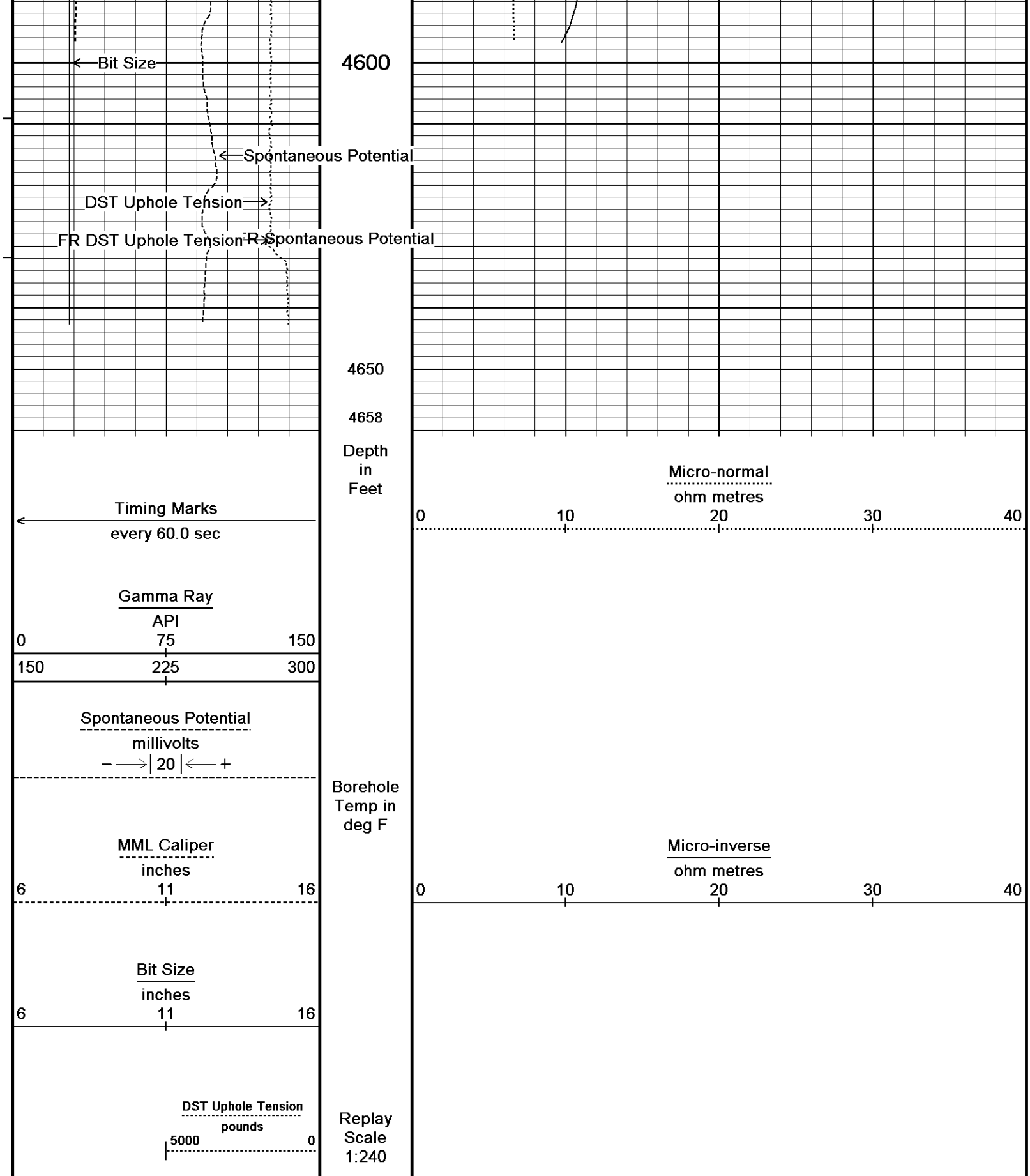
4328

4350






117°
4400
117°
4450
118°
4500
118°
4550
118°
FR Gamma Ray
FR MML Caliper
FR Micro FR Micro inverse



Depth Based Data - Maximum Sampling Increment 10.0cm

Plotted on 28-SEP-2012 22:35

Filename: C:\Minimus 13.02.6600\Data\Shakespeare Parsons #...\Shakespeare Parsons #2-27_001.dta

Recorded on 28-SEP-2012 19:37

System Versions: Logged with 13.02.6600 Plotted with 13.02.6600

REPEAT SECTION

BEFORE SURVEY CALIBRATION

General Constants All 000

Last Edited on 28-SEP-2012,18:18

General Parameters		
Mud Resistivity	0.740	ohm-metres
Mud Resistivity Temperature	89.000	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. Four Res Rt	
RWA Constant A	0.610	
RWA Constant M	2.150	

Down-hole Tension Calibration SMS 0

Field Calibration on 27-SEP-2012 04:09

Reading No	Measured	Calibrated (lbs)
1	13701.85	0.00
2	13742.18	500.00

Gamma Calibration MCG-C 208

Field Calibration on 28-SEP-2012 11:20

	Measured	Calibrated (API)
Background	70	49
Calibrator (Gross)	1103	774
Calibrator (Net)	1033	725

Gamma Constants MCG-C 208

Last Edited on 28-SEP-2012,18:18

Gamma Calibrator Number	GR38	
Mud Density	1.13	gm/cc
Caliper Source for Processing	Density Caliper	
Tool Position	Eccentred	
Concentration of KCl	0.00	kppm

SP Calibration MCG-C 208

Field Calibration on 03-AUG-2012 22:37

	Measured	Calibrated (mV)
Reference 1	100.2	101.0
Reference 2	-101.3	-101.0

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 28-SEP-2012 11:02

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)
	5.98	5.98

5.98 5.98

Micro Normal and Micro Inverse Calibration MML-A 4

Base Calibration on 27-AUG-2012 09:21
Field Check on 28-SEP-2012 11:04

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	62.9
Micro Inverse	48.2	48.2

Micro Normal and Micro Inverse Constants MML-A 4

Last Edited on 28-SEP-2012,18:18

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-A.B 65

Base Calibration on 28-AUG-2012 10:35
Field Check on 28-SEP-2012 11:25

Base Calibration

	Measured Near	Measured Far	Calibrated (cps) Near	Calibrated (cps) Far
	3134	97	3714	110
Ratio	32.240		33.764	

Field Calibrator at Base

	Calibrated (cps)	
	1654	2401
Ratio	0.689	

Field Check

	Calibrated (cps)	
	1646	2367
Ratio	0.695	

Neutron Constants MDN-A.B 65

Last Edited on 28-SEP-2012,18:18

Neutron Source Id	PN-521	
Neutron Jig Number	5824NE	
Epithermal Neutron	No	
Caliper Source for Processing	Density Caliper	
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
Salinity Correction	Not Applied	
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 27-AUG-2012 14:50
Field Check on 28-SEP-2012 11:01

Base Calibration

	Measured	Calibrated (ohm-m)
Reference 1	0.0	0.0
Reference 2	963.9	126.8
Base Check		281.2
Field Check		281.4

FE Constants MFE-B.J 352

Last Edited on 28-SEP-2012,18:17

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

Sonic Constants MSS-A.A 126

Last Edited on 27-JUL-2012,20:15

Maximum Boundary Contrast	100.00	micro-sec/ft
Fluid Transit Time	189.00	micro-sec/ft
Limestone Transit Time	47.50	micro-sec/ft
Sandstone Transit Time	55.50	micro-sec/ft
Dolomite Transit Time	43.50	micro-sec/ft
Sonic used for Porosities	3-5' Compensated	
Correction for Sonde Skew	Applied	
Cycle Stretch Algorithm	Applied	
MN3FT	0.00	micro-sec
MX3FT	1500.00	micro-sec
Hunt-Raymer Constant	83.13	micro-sec/ft
Sonde Mode	Compensated	
Hole Type	Open Hole	

Sonde Parameters

	Measured	Calibrated
Offset	0.0000	0.0000
Free Pipe	0.0000	0.0000

Peak Amplitude Source 0

Waveform	Start Time (micro-sec)	Width (micro-sec)	Pre Gain	Start Gain	Discriminator (mV)
3'	N/A	N/A	N/A	N/A	N/A
4'	N/A	N/A	N/A	N/A	N/A
5'	N/A	N/A	N/A	N/A	N/A
6'	N/A	N/A	N/A	N/A	N/A

Processed Fixed Gate Parameters

Waveform Used For Processing N/A

Start Time (micro-sec)	End Time (micro-sec)	Discriminator (mV)	Depth (ft)
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	0.00
0.00	0.00	0.00	

Full Waveform Parameters

Use 3' Waveform to derive TR	No	
Use 4' Waveform to derive TR	No	
Use 5' Waveform to derive TR	No	
Use 6' Waveform to derive TR	No	
3' Waveform Discriminator Level	0.30	mV
4' Waveform Discriminator Level	0.30	mV
5' Waveform Discriminator Level	0.15	mV
6' Waveform Discriminator Level	0.15	mV
3' Waveform Filter	0	
4' Waveform Filter	0	
5' Waveform Filter	0	
6' Waveform Filter	0	
Semblance Level	0.50	
Semblance Window Width	120.00	micro-sec
Sonic 1 Despiker	100.00	micro-sec/ft
Sonic 2 Despiker	100.00	micro-sec/ft

Induction Calibration MAI-A.A 45

Base Calibration on 26-JUL-2012,09:22
Field Check on 28-SEP-2012 10:57

Base Calibration

Test Loop Calibration Channel	Measured Low	Measured High	Calibrated (mmho/m) Low	Calibrated (mmho/m) High
1	14.4	472.6	9.3	966.2
2	5.7	374.0	7.6	821.4

2	3.7	374.0	7.6	821.4
3	3.4	261.2	5.2	566.0
4	2.5	133.9	2.6	279.2

Array Temperature 78.4 Deg F

Channel	Base Check (mmho/m)		Field Check (mmho/m)	
	Low	High	Low	High
1	0.0	0.0	18.7	3851.6
2	0.0	0.0	31.7	3629.4
3	0.0	0.0	28.6	3049.5
4	0.0	0.0	18.3	2079.3
Deep	0.0	0.0	16.1	1911.4
Medium	0.0	0.0	42.5	4060.7
Shallow	0.0	0.0	49.6	5482.9
Array Temperature	0.0		66.0	Deg F

Induction Constants MAI-A.A 45

Last Edited on 28-SEP-2012,18:17

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 45

Field Calibration on 26-JUL-2012,09:09

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

High Resolution Temperature Constants MAI-A.A 45

Last Edited on

Pre-filter Length	11

Caliper Calibration MPD-B 31

Base Calibration on 28-AUG-2012 11:03
Field Calibration on 28-SEP-2012 11:10

Base Calibration

Reading No	Measured	Calibrator Size (in)
1	18576	3.99

2	27056	5.98
3	35613	7.97
4	44032	9.86
5	53360	11.92
6	N/A	N/A

Field Calibration

Measured Caliper (in)	Actual Caliper (in)
6.00	5.98

Photo Density Calibration MPD-B 31

Base Calibration on 28-AUG-2012 11:22
Field Check on 28-SEP-2012 11:09

Density Calibration

Base Calibration	Measured		Calibrated (sdu)	
	Near	Far	Near	Far
Reference 1	46103	23728	59556	30836
Reference 2	19270	1960	24941	2541

Field Check at Base

688.3	844.7

Field Check

685.2	846.0

PE Calibration

Base Calibration	Measured			Calibrated
	WS	WH	Ratio	Ratio
Background	127	604		
Reference 1	18457	45978	0.404	0.371
Reference 2	5504	19174	0.290	0.272

Field Check at Base

127.0	604.2

Field Check

125.7	598.4

Density Constants MPD-B 31

Last Edited on 28-SEP-2012,18:18

Density Source Id	254	
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	1.13	gm/cc
Mud Density Z/A Multiplier	1.13	
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	

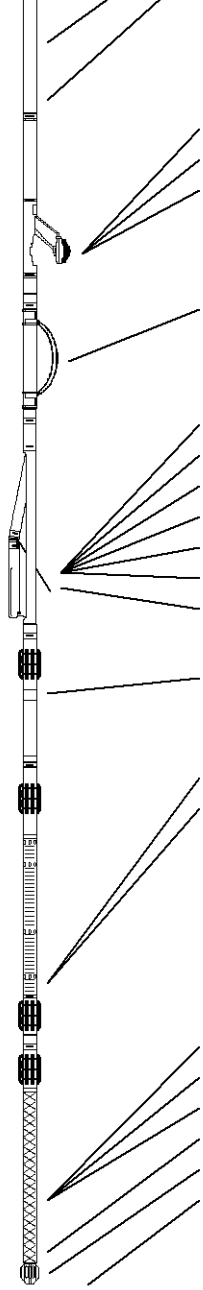
Matrix density (gm/cc)	Depth (m)
2.71	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00

DOWNHOLE EQUIPMENT

C:\Minimus 13.02.6600\Data\Shakespeare Parsons #2-27\Shakespeare Parsons #2-27_001.dta

Compact Comms Gamma
MCG-C 208 LG: 8.70 ft WT: 63.9 lb OD: 2.24 in

55.39 ft GRGC - Gamma Ray
52.48 ft CGXT - MCG External Temperature



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

45.76 ft MINV - Micro-inverse
45.76 ft MNRL - Micro-normal
46.76 ft MLTC - MML Caliper

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

40.97 ft NPRL - Limestone Neutron Por.

Compact Density/Caliper
MPD-B 31 LG: 9.59 ft WT: 90.4 lb OD: 2.45 in

33.73 ft AVOL - Annular Volume
33.73 ft HVOL - Hole Volume
33.73 ft CLDC - Density Caliper
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: 2.24 in

26.24 ft FEFE - Shallow FE

Compact Sonic
MSS-A.A 126 LG: 12.52 ft WT: 72.8 lb OD: 2.24 in

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

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

3.34 ft R40O - Array Ind. One Res 40
3.34 ft RTAO - Array Ind. One Res Rt
3.34 ft R60O - Array Ind. One Res 60
0.23 ft SPCG - Spontaneous Potential
Tool Zero (0.13ft from bottom)
-0.13 ft SMTU - DST Uphole Tension
All measurements relative to tool zero.

Total Length: 60.68 ft Weight: 456.4 lb

COMPANY	SHAKESPEARE OIL CO., INC.
WELL	PARSONS #2-27
FIELD	WILDCAT
PROVINCE/COUNTY	GOVE
COUNTRY/STATE	U.S.A. / KANSAS

Elevation Kelly Bushing	2848.00	feet	First Reading	4583.00	feet
Elevation Drill Floor	2846.00	feet	Depth Driller	4630.00	feet
Elevation Ground Level	2838.00	feet	Depth Logger	4629.00	feet

Weatherford®

MICRORESISTIVITY LOG