MICRORESISTIVITY LOG

COMPANY	SHAKESPEARE OIL COMPANY
WELL	GLASSMAN #5-35
FIELD	UNNAMED
PROVINCE/COUNTY	LOGAN
COUNTRY/STATE	U.S.A. / KANSAS
LOCATION	335' FNL & 1990' FEL

SEC	TWP	RGE	Other Services
35	12S	32W	MPD/MDN
			MAI/MFE

API Number 15-109-20992
Permit Number

Permanent Datum G.L., Elevation 2984 feet
Log Measured From KB
Drilling Measured From K.B.

Elevations:	feet
KB	2994.00
DF	2992.00
GL	2984.00

Date	04-APR-2011			
Run Number	ONE			
Depth Driller	4700.00	feet		
Depth Logger	4697.00	feet		
First Reading	4662.00	feet		
Last Reading	3500.00	feet		
Casing Driller	225.00	feet		
Casing Logger	225.00	feet		
Bit Size	7.875	inches		
Hole Fluid Type	CHEMICAL			
Density / Viscosity	9.40 lb/USg	54.00 CP		
PH / Fluid Loss	9.60	10.00 ml/30Min		
Sample Source	FLOWLINE			
Rm @ Measured Temp	1.83 @ 55.0	ohm-m		
Rmf @ Measured Temp	1.46 @ 55.0	ohm-m		
Rmc @ Measured Temp	2.20 @ 5.0	ohm-m		
Source Rmf / Rmc	CALC	CALC		
Rm @ BHT	0.89 @113.0	ohm-m		
Time Since Circulation	4 HOURS			
Max Recorded Temp	113.00	deg F		
Equipment Name	COMPACT			
Equipment / Base	13057	LIB		
Recorded By	R.HOFFMAN			
Witnessed By	DON WILLIAMS			
S.O. # / JOB #	3529128		LB11-067	

BOREHOLE RECORD

Last Edited: 04-APR-2011 05:41

Bit Size inches	Depth From feet	Depth To feet
7.875	225.00	4697.00

CASING RECORD

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

REMARKS

Tools Ran: MCG, MML, MDN, MPD, SKJ, 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.
Annular volume with 5.5 inch production casing= 238 cu. ft.
Service order #3529128
Engineer: R. Hoffman
Operator(s): N. Adame, M. Stegman

5 INCH MAIN PASS

Depth Based Data - Maximum Sampling Increment 10.0cm
Plotted on 04-APR-2011 06:13
Filename: C:\Program Files\Weatherford\WLS 11.03\Dat...\Shakespeare Glassman 5-35 Reprocess.dta
Recorded on 04-APR-2011 02:32
System Versions: Processed with 11.03.3274 Plotted with 11.03.3274

Timing Marks
every 60.0 sec

Gamma Ray
API
0 75 150
150 225 300

Spontaneous Potential
millivolts
− 20 +

Density Caliper
inches
6 11 16

Bit Size
inches
6 11 16

DST Uphole Tension
pounds
5000 0
0 -5000

Depth in Feet

Borehole Temp in deg F

Replay Scale 1:240

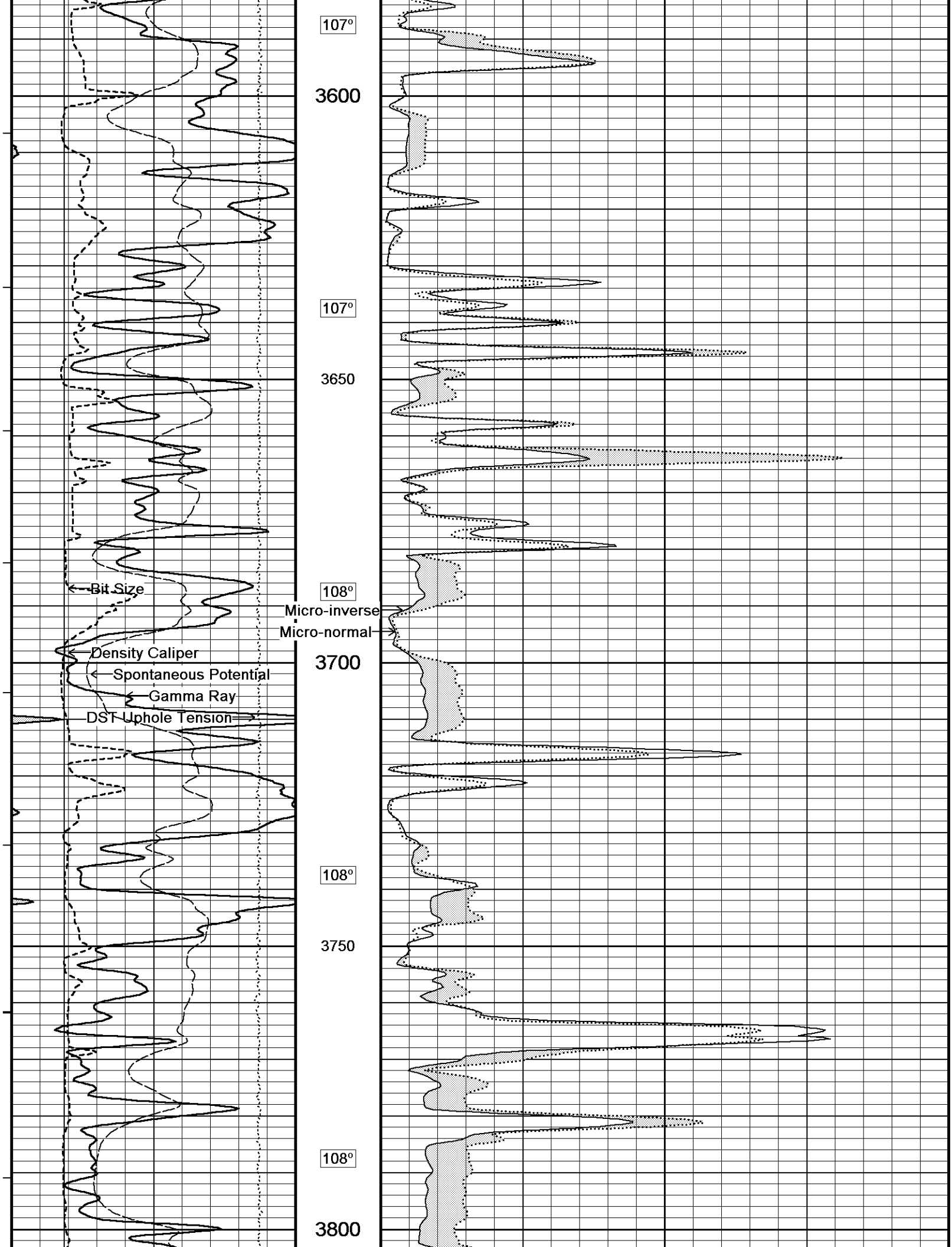
Micro-normal
ohm metres
0 10 20 30 40

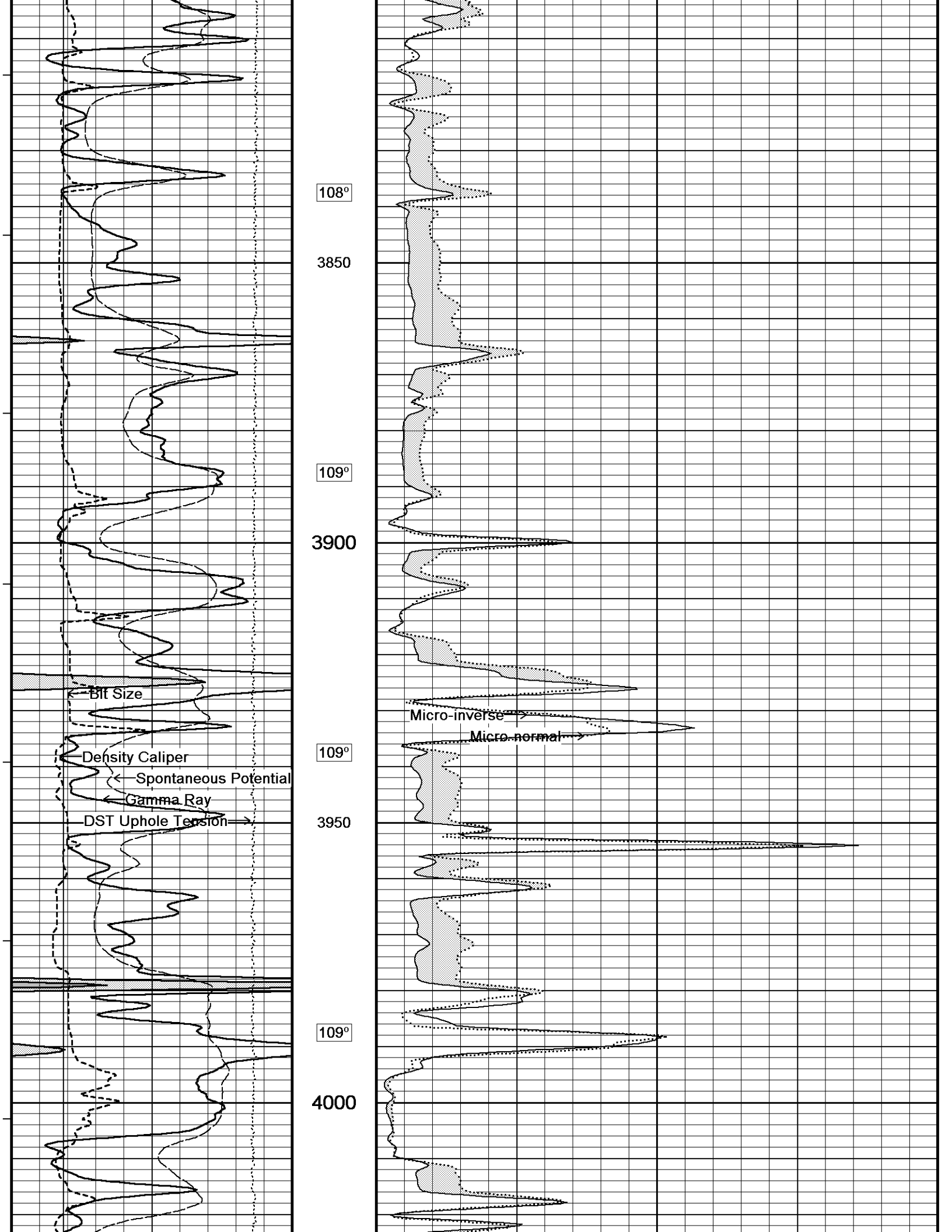
Micro-inverse
ohm metres
0 10 20 30 40

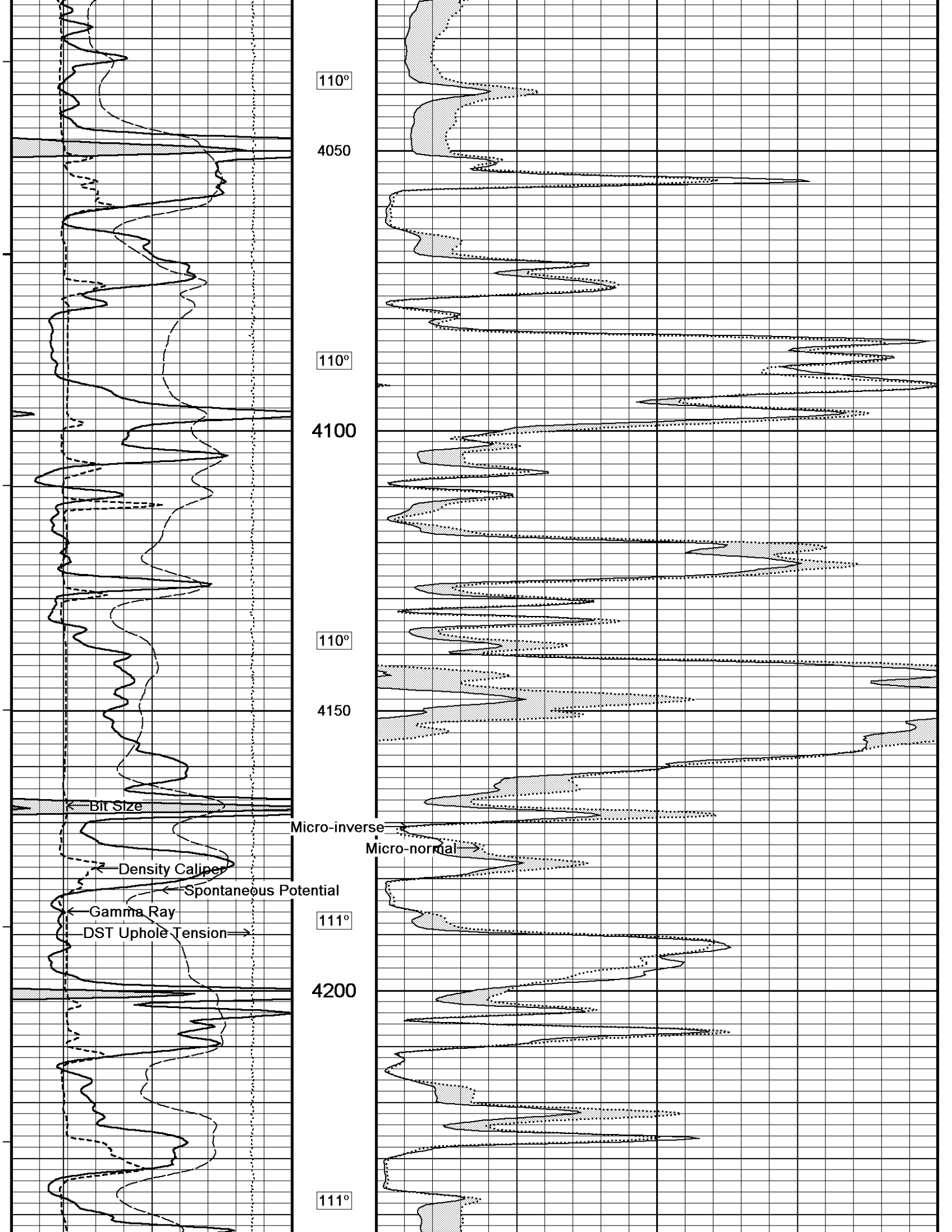
3500

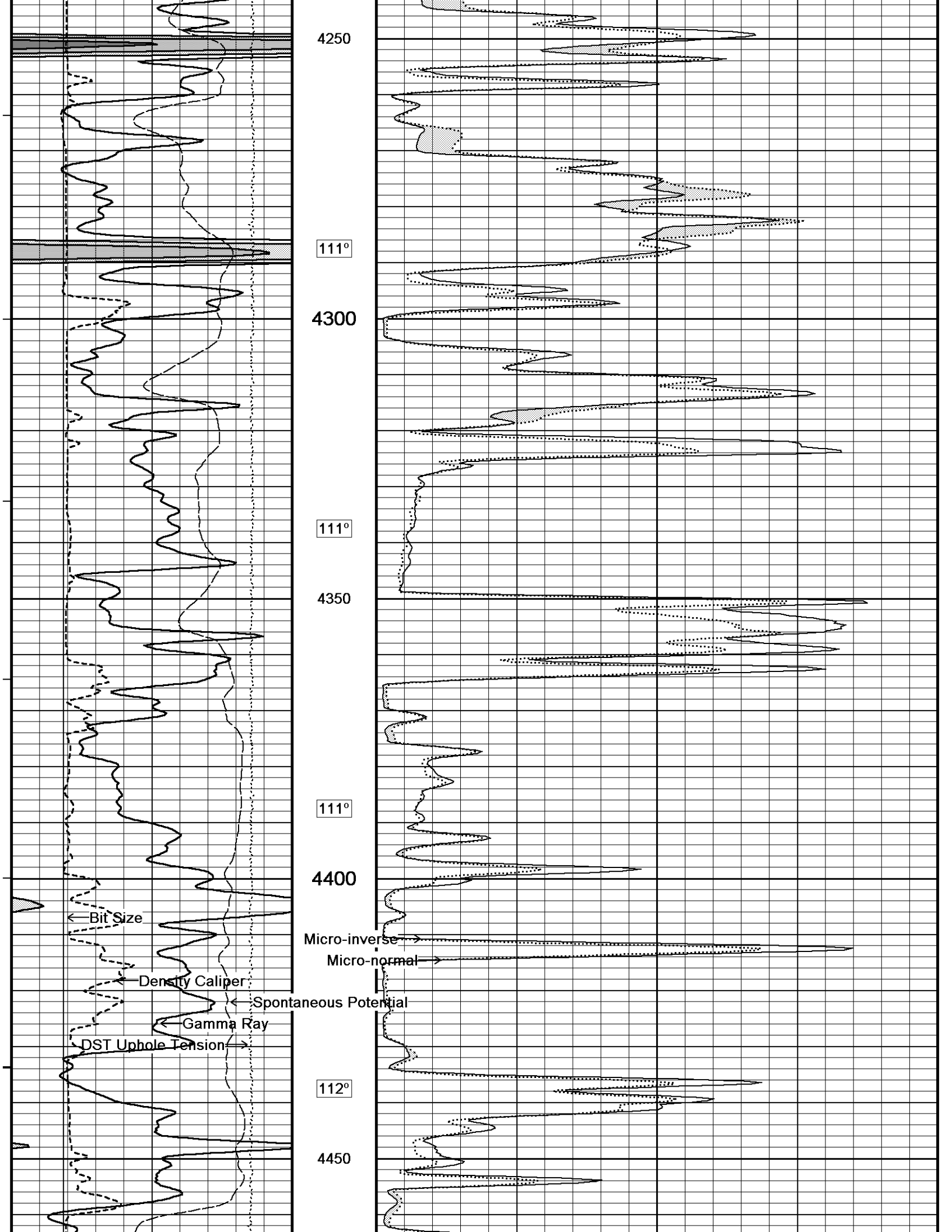
107°

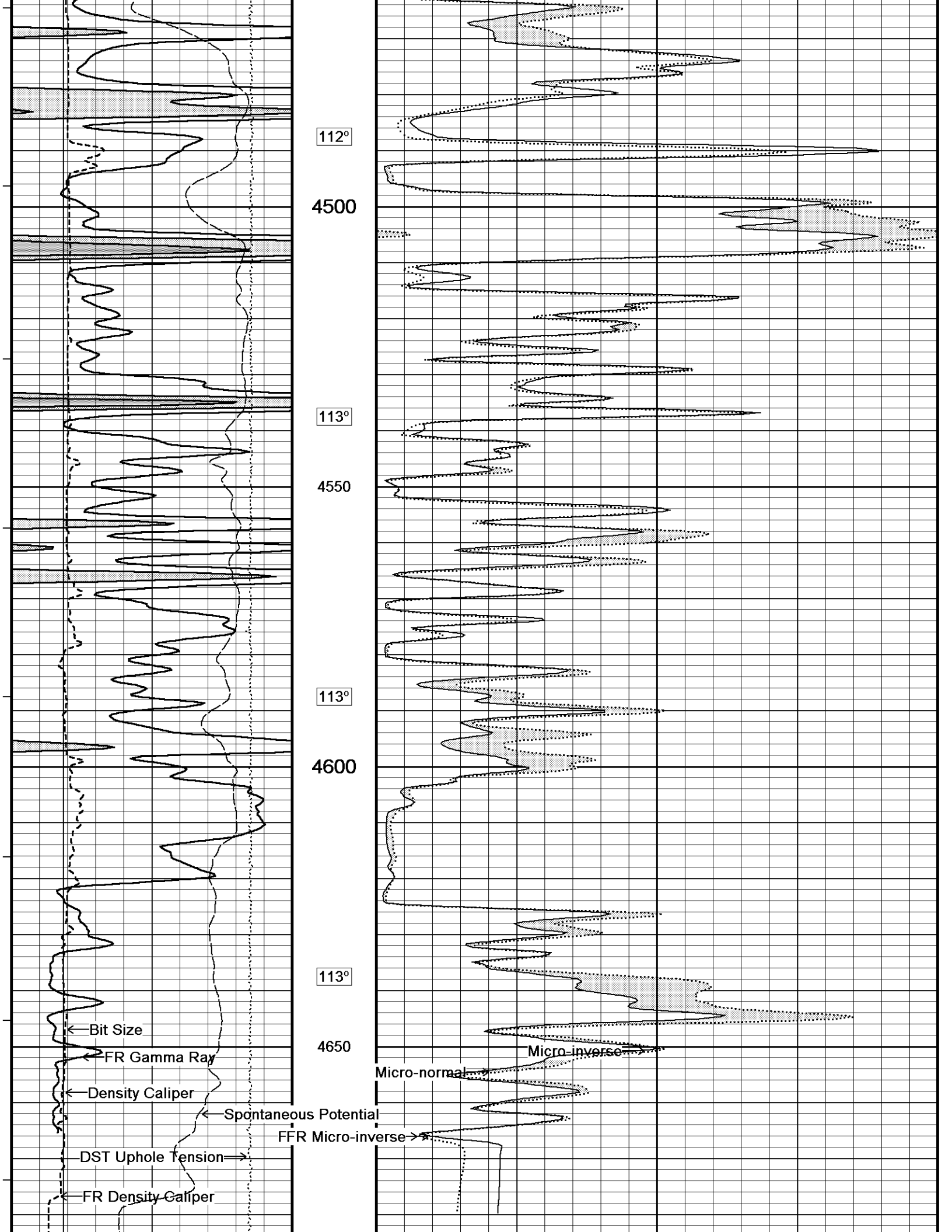
3550

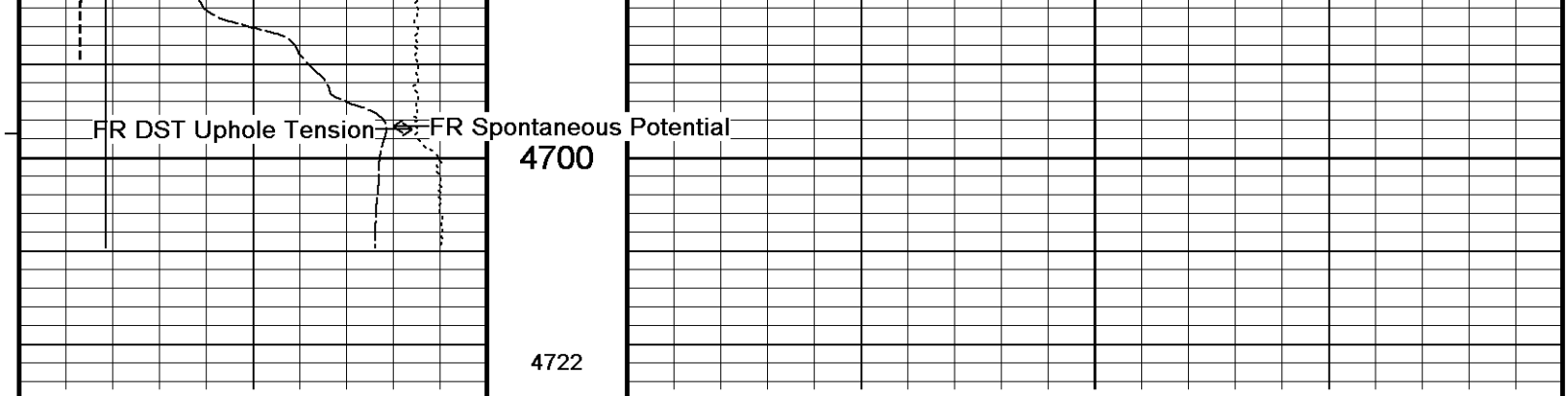

107°
3600
107°
3650
Bit Size
108°
Micro-inverse
Micro-normal
Density Caliper
3700
Spontaneous Potential
Gamma Ray
DST Uphole Tension
108°
3750
108°
3800


108°
3850
109°
3900
Bit Size
Micro-inverse
Micro-normal
109°
Density Caliper
Spontaneous Potential
Gamma Ray
DST Uphole Tension
3950
109°
4000


110°
4050
110°
4100
110°
4150
Bit Size
Micro-inverse
Micro-normal
Density Caliper
Spontaneous Potential
Gamma Ray
DST Uphole Tension
111°
4200
111°


4250
111°
4300
111°
4350
111°
4400
Bit Size
Micro-inverse
Micro-normal
Density Caliper
Spontaneous Potential
Gamma Ray
DST Uphole Tension
112°
4450


112°
4500
113°
4550
113°
4600
113°
4650
Bit Size
FR Gamma Ray
Density Caliper
Spontaneous Potential
DST Uphole Tension
FR Density Caliper
Micro-inverse
Micro-normal
FFR Micro-inverse



4722

Depth in Feet

Timing Marks
every 60.0 sec

Gamma Ray
API
0 75 150
150 225 300

Spontaneous Potential
millivolts
− → | 20 | ← +

Density Caliper
inches
6 11 16

Bit Size
inches
6 11 16

DST Uphole Tension
pounds
5000 0
0 -5000

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

Depth Based Data - Maximum Sampling Increment 10.0cm — Plotted on 04-APR-2011 06:13
Filename: C:\Program Files\Weatherford\WLS 11.03\Dat...\Shakespeare Glassman 5-35 Reprocess.dta — Recorded on 04-APR-2011 02:32
System Versions: Processed with 11.03.3274 Plotted with 11.03.3274

5 INCH MAIN PASS

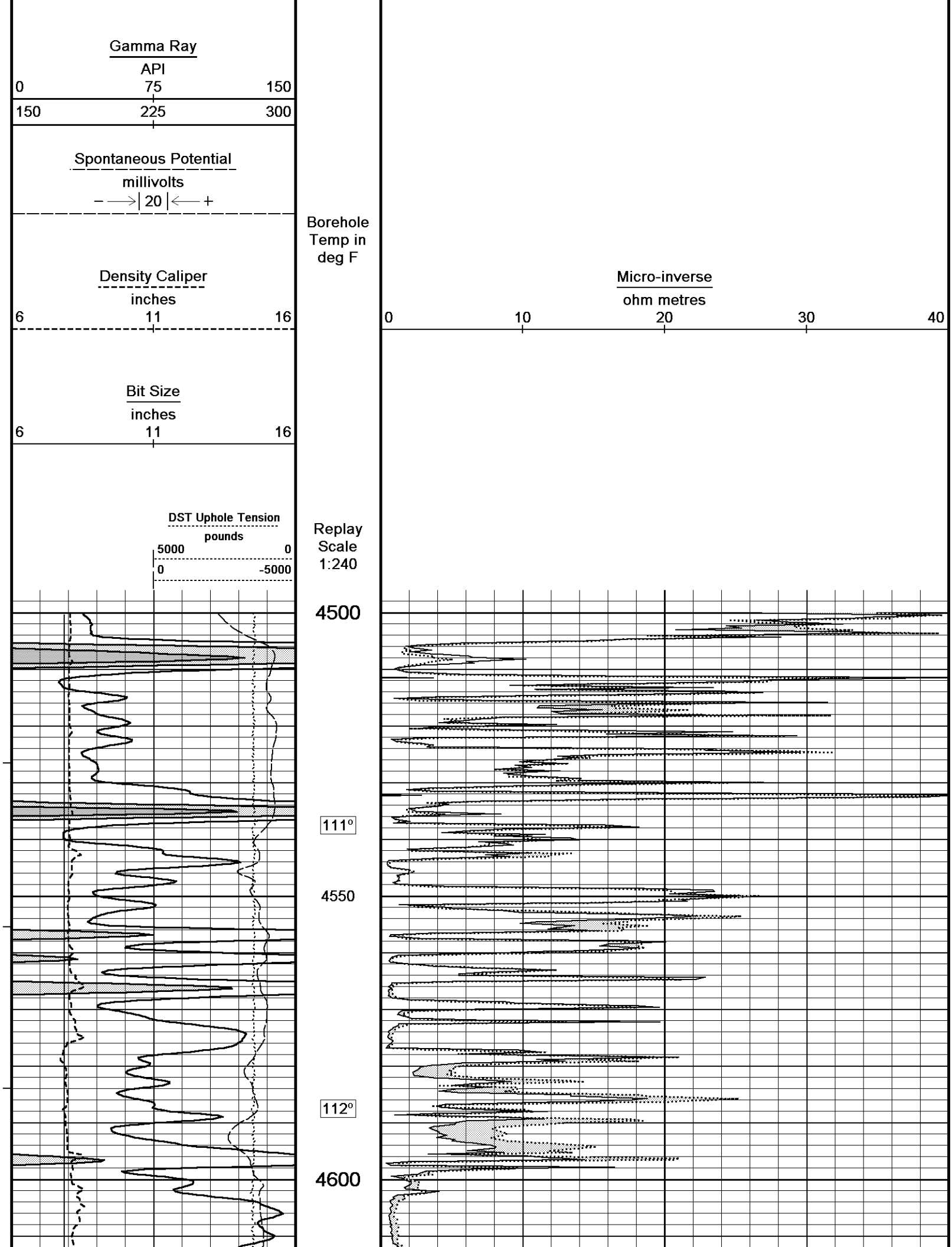
5 INCH REPEAT PASS

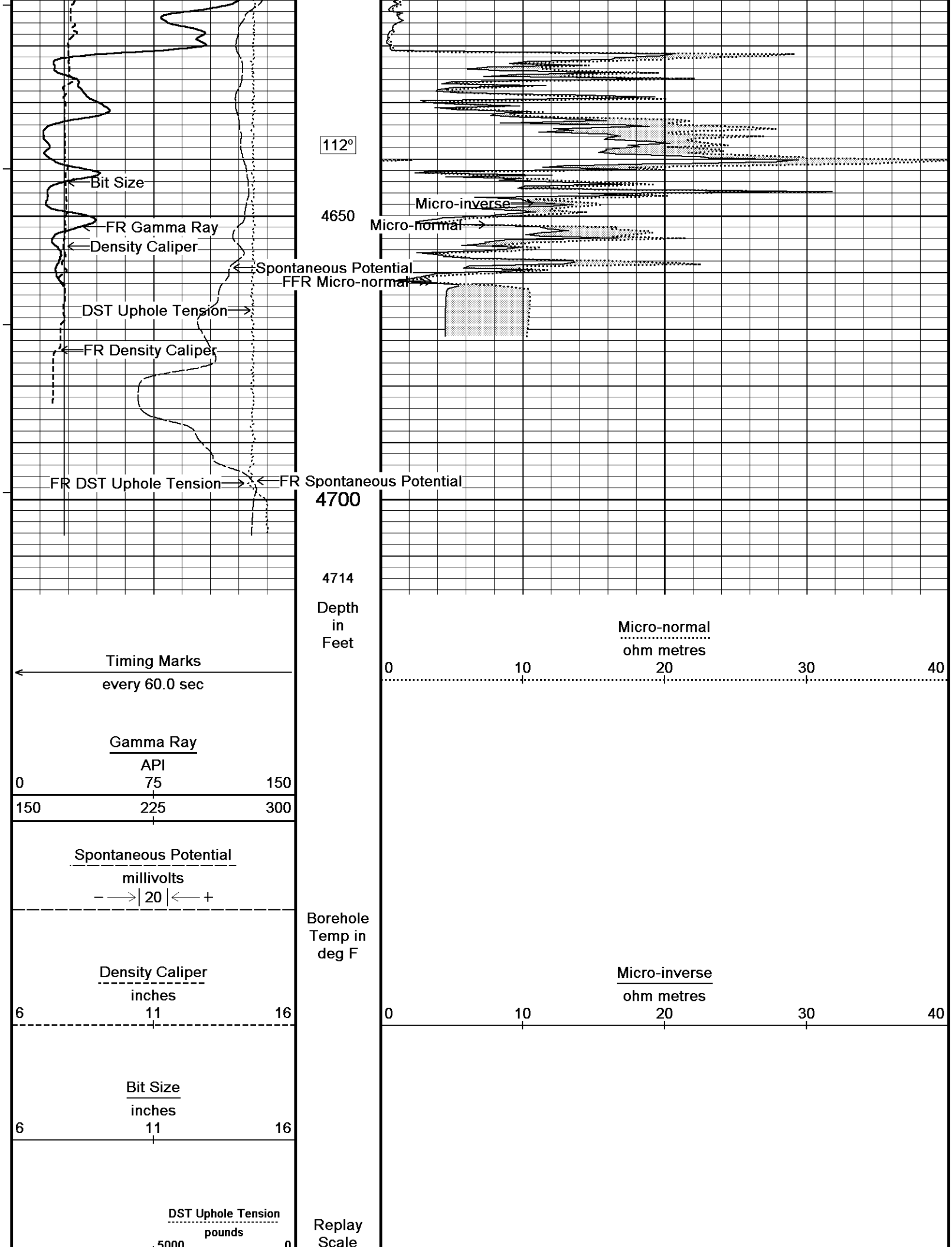
Depth Based Data - Maximum Sampling Increment 10.0cm — Plotted on 04-APR-2011 06:13
Filename: C:\Program Files\Weatherford\WLS 11.03\Data\Sh...\Shakespeare Glassman #5-35_001.dta — Recorded on 04-APR-2011 02:12
System Versions: Logged with 11.03.3274 Plotted with 11.03.3274

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 +
Density Caliper
inches
6
11
16
Bit Size
inches
6
11
16
DST Uphole Tension
pounds
5000
0
0
-5000
Borehole Temp in deg F
Replay Scale 1:240
Micro-inverse
ohm metres
0
10
20
30
40
4500
111°
4550
112°
4600


112°
Bit Size
FR Gamma Ray
Density Caliper
Spontaneous Potential
FFR Micro-normal
DST Uphole Tension
FR Density Caliper
FR DST Uphole Tension
FR Spontaneous Potential
Micro-inverse
Micro-normal
4650
4700
4714
Depth in Feet
Timing Marks
every 60.0 sec
Gamma Ray
API
0
75
150
150
225
300
Spontaneous Potential
millivolts
− 20 +
Density Caliper
inches
6
11
16
Bit Size
inches
6
11
16
DST Uphole Tension
pounds
5000
0
Borehole Temp in deg F
Replay Scale
Micro-normal
ohm metres
0
10
20
30
40
Micro-inverse
ohm metres
0
10
20
30
40

0	-5000

Scale 1:240

Depth Based Data - Maximum Sampling Increment 10.0cm — Plotted on 04-APR-2011 06:13
Filename: C:\Program Files\Weatherford\WLS 11.03\Data\Sh...\Shakespeare Glassman #5-35_001.dta — Recorded on 04-APR-2011 02:12
System Versions: Logged with 11.03.3274 Plotted with 11.03.3274

5 INCH REPEAT PASS

BEFORE SURVEY CALIBRATION

C:\Program Files\Weatherford\WLS 11.03\Data\Shakespeare Glassman #5-35\Shakespeare Glassman #5-35.dta

General Constants All 000

Last Edited on 04-APR-2011,00:33

General Parameters		
Mud Resistivity	1.830	ohm-metres
Mud Resistivity Temperature	55.000	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	1.000	
RWA Constant M	2.000	

High Resolution Temperature Calibration MCG-B 34

Field Calibration on 19-OCT-2009,11:45

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

High Resolution Temperature Constants MCG-B 34

Last Edited on

Pre-filter Length	11	

Gamma Calibration MCG-B 34

Field Calibration on 03-APR-2011 20:44

	Measured	Calibrated (API)
Background	65	46
Calibrator (Gross)	1098	771
Calibrator (Net)	1033	725

Gamma Constants MCG-B 34

Last Edited on 04-APR-2011,00:34

Gamma Calibrator Number	grc38	
Mud Density	1.14	gm/cc
Caliper Source for Processing	Bit Size	
Tool Position	Centred	
Concentration of KCl	0.00	kppm

Micro Normal and Micro Inverse Calibration MML-A 4

Base Calibration on 27-MAR-2011 22:52
Field Check on 03-APR-2011 20:31

Base Calibration

	Measured		Calibrated (ohm-m)	
Channel	Resistor 1	Resistor 2	Resistor 1	Resistor 2
Micro Normal	12.1	60.2	2.6	12.8
Micro Inverse	15.7	78.4	1.7	8.4

Channel	Base Check (ohm-m)	Field Check (ohm-m)
Micro Normal	32.1	32.1
Micro Inverse	16.3	16.3

Micro Normal and Micro Inverse Constants MML-A 4

Last Edited on 30-MAR-2011,02:15

Pad Type	8-12 in Soft Rubber Inflatable 006-9011-159		
Micro Normal K Factor		0.5110	
Micro Inverse K Factor		0.3380	
Standoff Offset		N/A	inches

Caliper Calibration MPD-B 65

Base Calibration on 26-MAR-2011 21:35
Field Calibration on 03-APR-2011 20:30

Base Calibration

Reading No	Measured	Calibrator Size (in)
1	13025	3.99
2	21664	5.98
3	30144	7.97
4	38507	9.86
5	47728	11.92
6	N/A	N/A

Field Calibration

Measured Caliper (in)	Actual Caliper (in)
5.92	5.98

DOWNHOLE EQUIPMENT

C:\Program Files\Weatherford\WLS 11.03\Data\Shakespeare Glassman #5-35\Shakespeare Glassman #5-35.dta

Compact Comms Gamma
MCG-B 34 LG: 8.70 ft WT: 63.9 lb OD: 2.24 in

Compact Comms Gamma
MCG-B 34 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 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 Neutron
MDN-A.B 65 LG: 5.04 ft WT: 50.7 lb OD: 2.24 in

Compact Density/Caliper
MPD-B 65 LG: 9.59 ft WT: 90.4 lb OD: 2.45 in

Compact Density/Caliper
MPD-B 65 LG: 9.59 ft WT: 90.4 lb OD: 2.45 in

SKJ-D.A Compact Knuckle Joint
SKJ-D.A 37 LG: 2.17 ft WT: 24.3 lb OD: 2.24 in

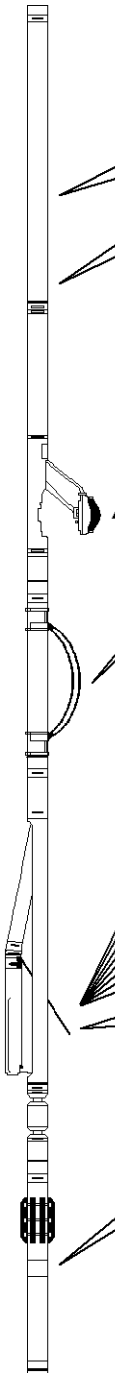
SKJ-D.A Compact Knuckle Joint
SKJ-D.A 37 LG: 2.17 ft WT: 24.3 lb OD: 2.24 in

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

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

Compact Induction
MAI-A.A 178 LG: 10.81 ft WT: 48.5 lb OD: 2.24 in

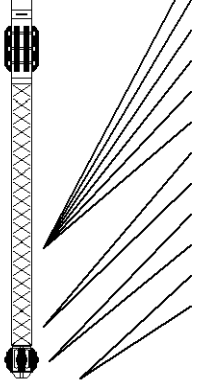
Compact Induction
MAI-A.A 178 LG: 10.81 ft WT: 48.5 lb OD: 2.24 in



45.04 ft	GRGC - Gamma Ray
45.04 ft	GRGC - Gamma Ray
42.13 ft	CGXT - MCG External Temperature
42.13 ft	CGXT - MCG External Temperature
35.41 ft	MINV - Micro-inverse
35.41 ft	MNRL - Micro-normal
36.40 ft	MLTC - MML Caliper
35.41 ft	MINV - Micro-inverse
35.41 ft	MNRL - Micro-normal
36.40 ft	MLTC - MML Caliper
30.61 ft	NPRL - Limestone Neutron Por.
30.61 ft	NPRL - Limestone Neutron Por.
23.37 ft	CLDC - Density Caliper
23.37 ft	CLDC - Density Caliper
21.44 ft	DPRL - Limestone Density Por.
21.44 ft	DEN - Compensated Density
21.44 ft	DCOR - Density Correction
21.44 ft	DCOR - Density Correction
21.44 ft	DPRL - Limestone Density Por.
21.44 ft	DEN - Compensated Density
21.38 ft	PDPE - PE
21.38 ft	PDPE - PE
13.72 ft	FEFE - Shallow FE
13.72 ft	FEFE - Shallow FE
3.34 ft	R40O - Array Ind. One Res 40

MAI-A-A 178 LG: 10.81 ft WT: 48.5 lb OD: 2.24 in

Total	Length: 50.32 ft	Weight: 407.9 lb
Total	Length: 50.32 ft	Weight: 407.9 lb



3.34 ft	R40O - Array Ind. One Res 40
3.34 ft	R60O - Array Ind. One Res 60
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
WELL	GLASSMAN #5-35
FIELD	UNNAMED
PROVINCE/COUNTY	LOGAN
COUNTRY/STATE	U.S.A. / KANSAS

Elevation Kelly Bushing	2994.00	feet	First Reading	4662.00	feet
Elevation Drill Floor	2992.00	feet	Depth Driller	4700.00	feet
Elevation Ground Level	2984.00	feet	Depth Logger	4697.00	feet

Weatherford®

MICRORESISTIVITY LOG

40 Years of Wireline 1970 2010