MICRORESISTIVITY LOG

Weatherford®

COMPANY	GRAND MESA OPERATING COMPANY
WELL	G & M # 1-25
FIELD	WILDCAT
PROVINCE/COUNTY	LOGAN
COUNTRY/STATE	U.S.A. / KANSAS
LOCATION	1050' FNL & 1290' FWL
	SE SE NW NW

40 Years of Wireline 1970 2010

SEC	TWP	RGE	Other Services
25	12S	32W	MPD/MDN
			MAI/MFE

API Number 15-109-21074
Permit Number

Permanent Datum G.L., Elevation 3004 feet
Log Measured From KB
Drilling Measured From K.B.

Elevations:	feet
KB	3009.00
DF	3007.00
GL	3004.00

Date	15-FEB-2012			
Run Number	ONE			
Depth Driller	4710.00	feet		
Depth Logger	4709.00	feet		
First Reading	4673.00	feet		
Last Reading	3600.00	feet		
Casing Driller	224.00	feet		
Casing Logger	220.00	feet		
Bit Size	7.875	inches		
Hole Fluid Type	CHEMICAL			
Density / Viscosity	9.30 lb/USg	53.00 CP		
PH / Fluid Loss	10.50	6.40 ml/30Min		
Sample Source	FLOWLINE			
Rm @ Measured Temp	1.50 @ 85.0	ohm-m		
Rmf @ Measured Temp	1.20 @ 85.0	ohm-m		
Rmc @ Measured Temp	1.80 @ 85.0	ohm-m		
Source Rmf / Rmc	CALC	CALC		
Rm @ BHT	1.17 @110.0	ohm-m		
Time Since Circulation	5 HOURS			
Max Recorded Temp	110.00	deg F		
Equipment Name	COMPACT			
Equipment / Base	13096	LIB		
Recorded By	A. GIAMBALVO			
Witnessed By	BOB SCHREIBER			
S.O. / JOB #	3534703		LB12-033	

BOREHOLE RECORD

Last Edited: 15-FEB-2012 20:20

Bit Size inches	Depth From feet	Depth To feet
7.875	220.00	4709.00

CASING RECORD

Type	Size inches	Depth From feet	Shoe Depth feet	Weight pounds/ft
SURFACE	8.625	5.00	220.00	24.00

REMARKS

Tools Used: MPD, MCG, MDN, MFE, MAI, MML.
Hardware: MPD: 8 inch profile plate used. MAI and MFE: 0.5 Inch standoffs used. MDN: Dual Bowspring used.
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.
Annular volume with 5.5 inch production casing = 212 cu. ft
Service order #3534703
Rig: Murfin # 24
Engineer: A. Giambalvo
Operator(s): K. Rinehart

5 INCH MAIN

Depth Based Data - Maximum Sampling Increment 10.0cm
Plotted on 29-FEB-2012 07:25
Filename: C:\DOCUME~1\SchefFJL\LOCALS~1\Temp\Weatherfo...\Grand Mesa G & M # 1-25_003.dta
Recorded on 15-FEB-2012 18:05
System Versions: Logged with 11.03.4044 Plotted with 12.01.3513

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

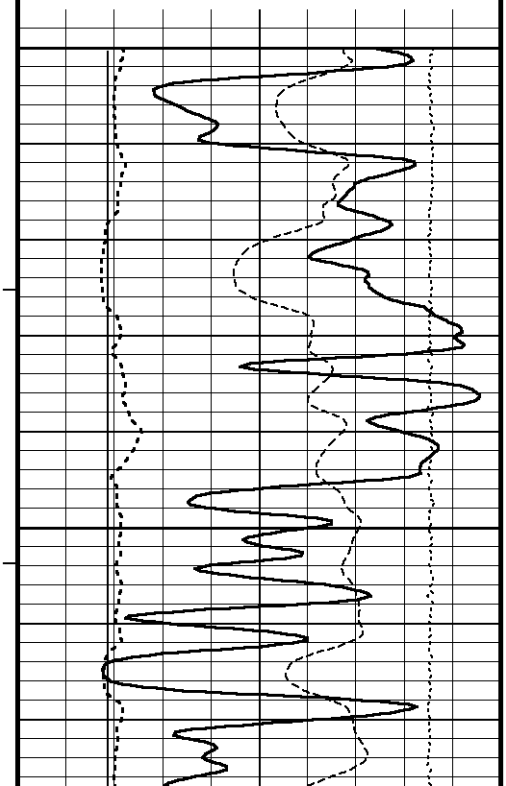
Micro-normal
ohm metres
0 10 20 30 40

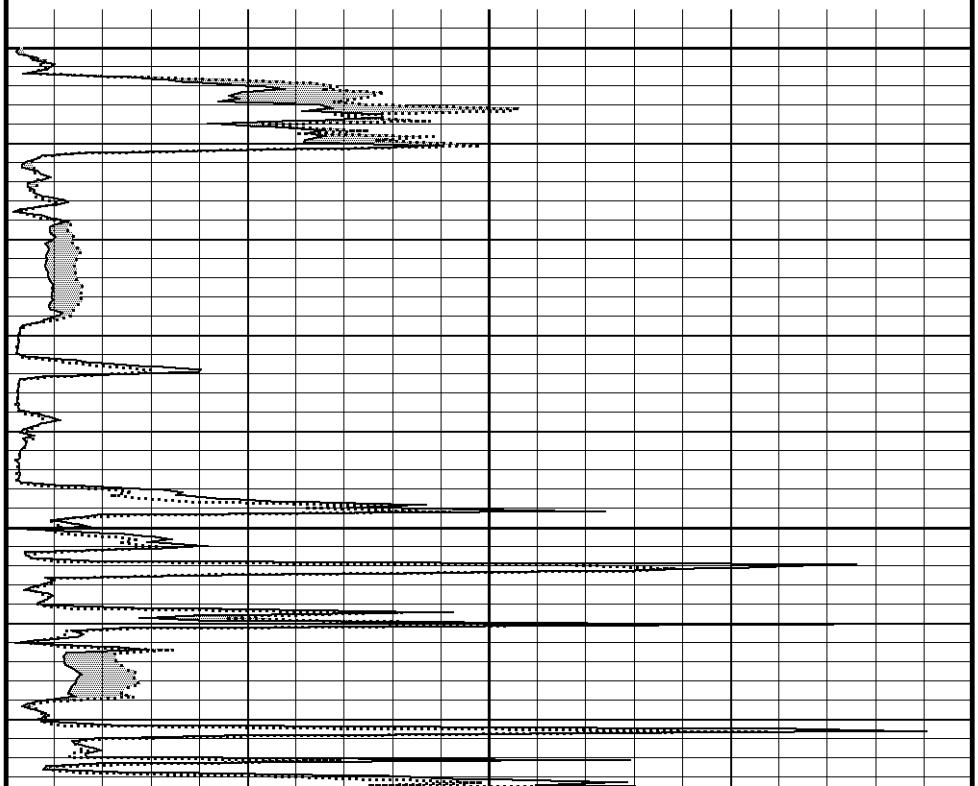
Micro-inverse
ohm metres
0 10 20 30 40

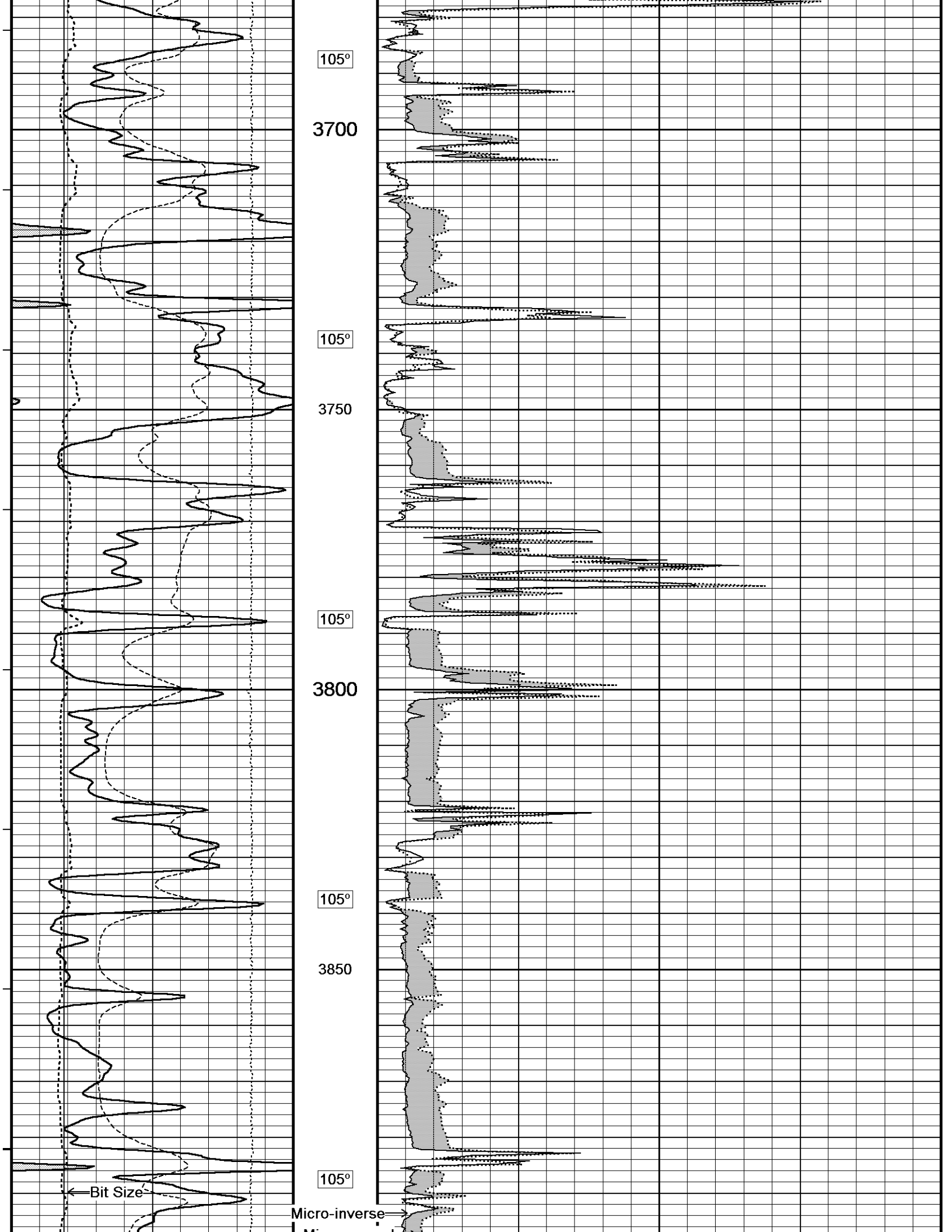
3600

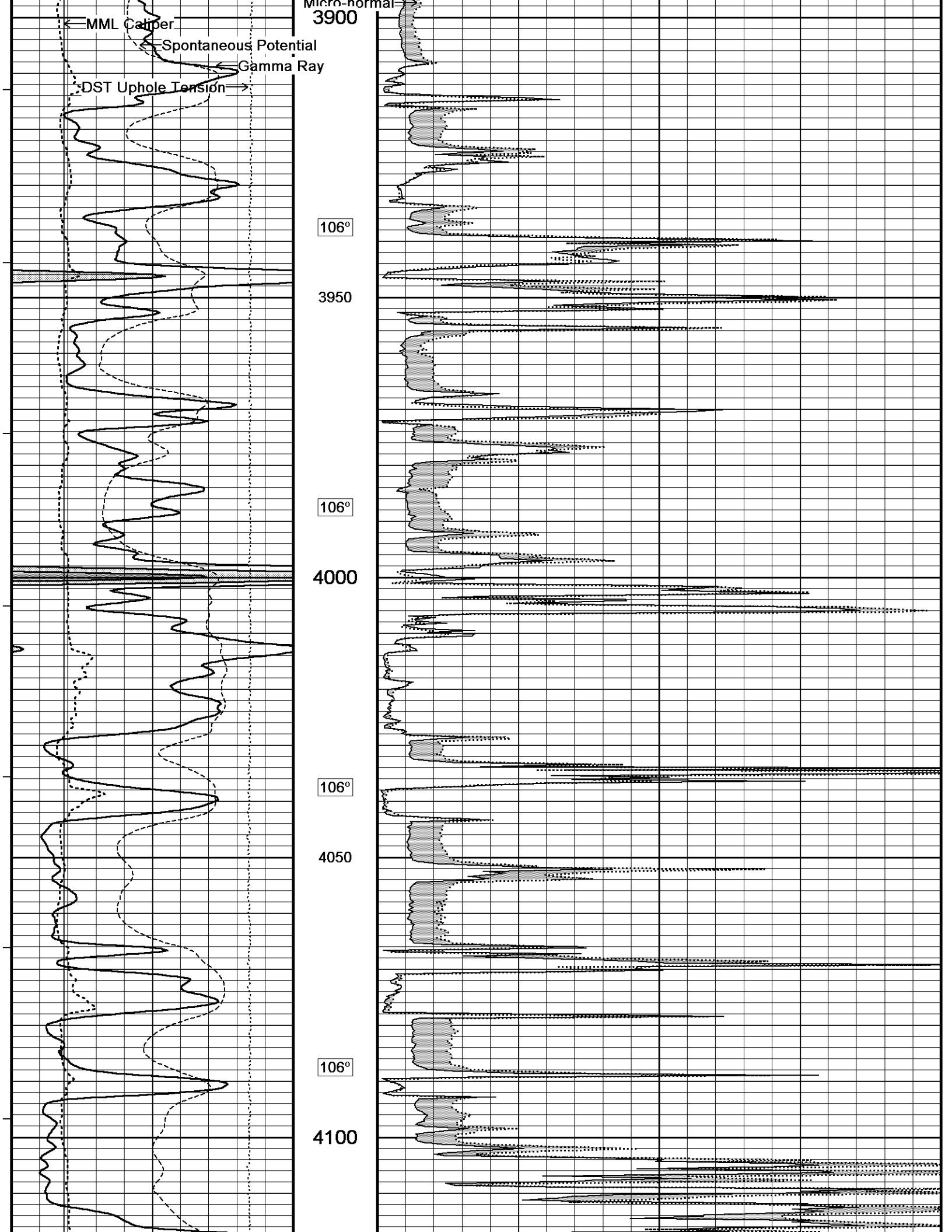
104°

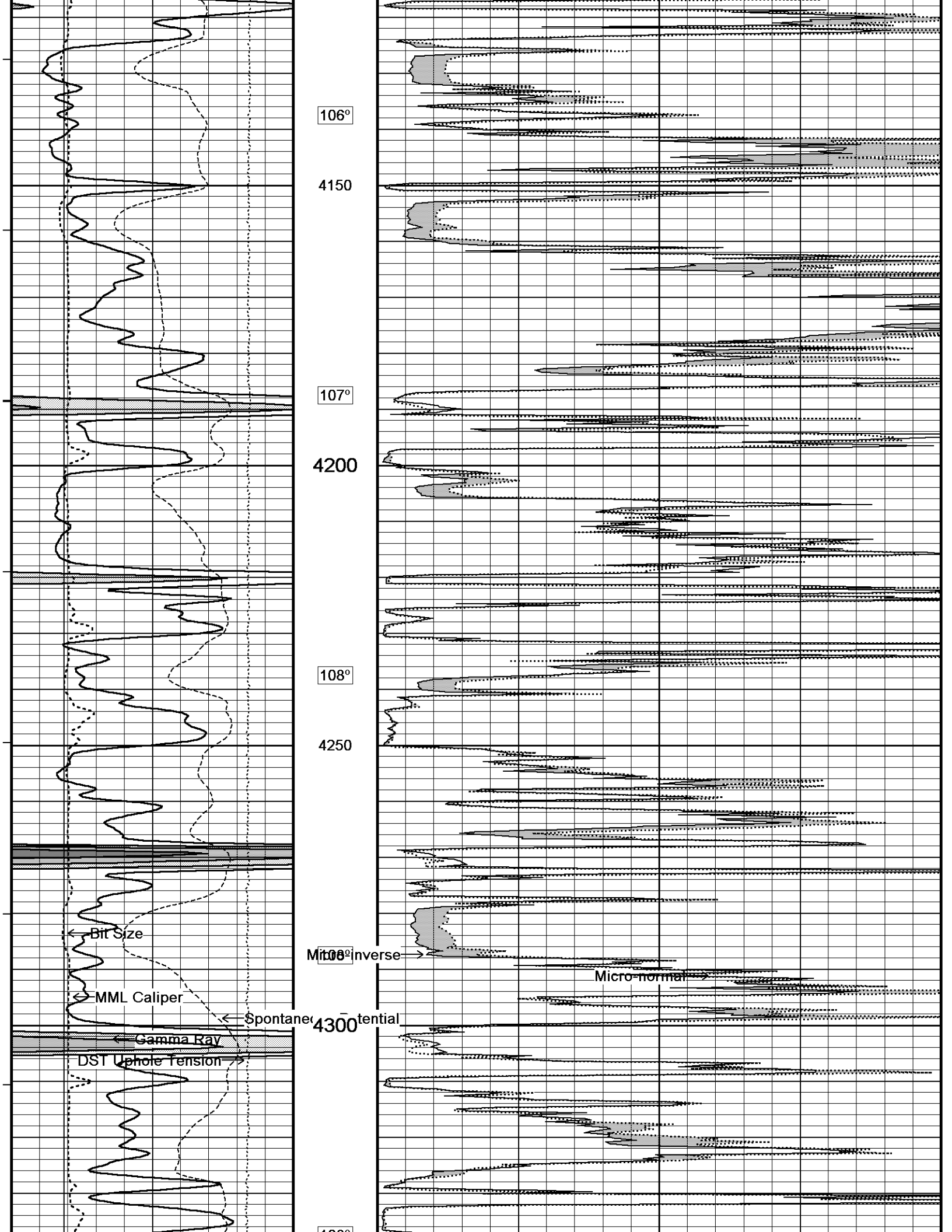
3650

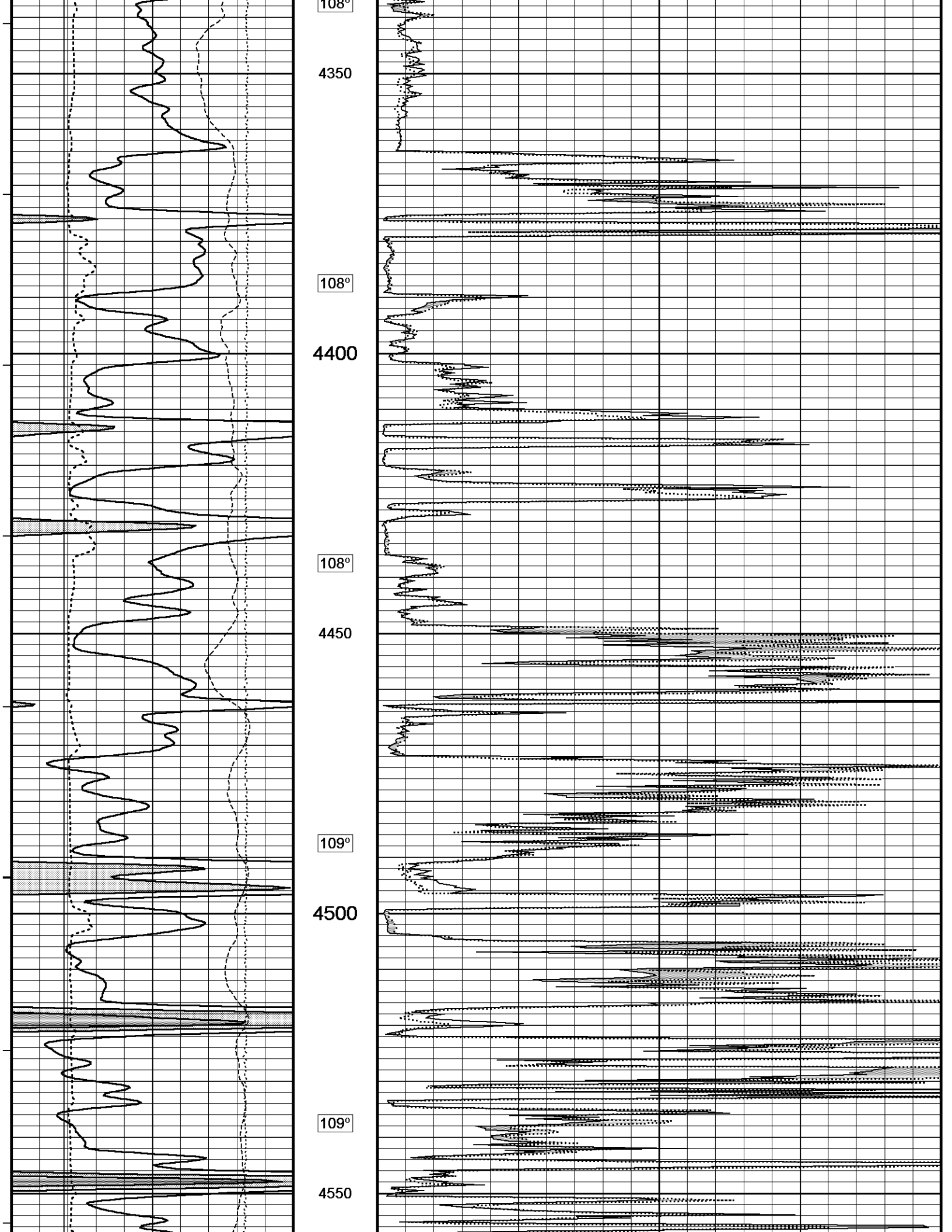


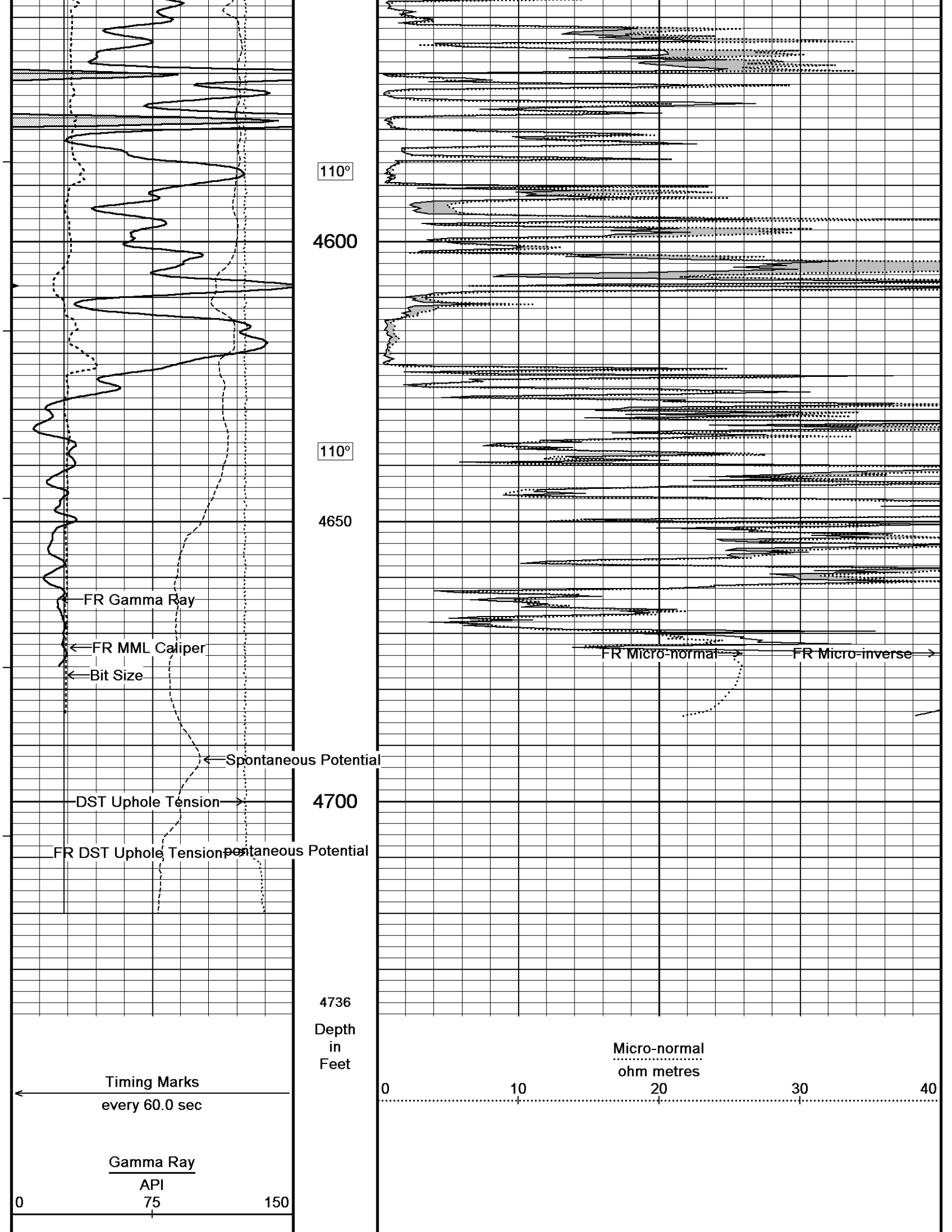



105°
3700
105°
3750
105°
3800
105°
3850
105°
Bit Size
Micro-inverse


Micro-normal
3900
MML Caliber
Spontaneous Potential
Gamma Ray
DST Uphole Tension
106°
3950
106°
4000
106°
4050
106°
4100


106°
4150
107°
4200
108°
4250
Bit Size
Micro-inverse
Micro-normal
MML Caliper
Spontaneous Potential
4300
Gamma Ray
DST Uphole Tension


108°
4350
108°
4400
108°
4450
109°
4500
109°
4550


110°
4600
110°
4650
FR Gamma Ray
FR MML Caliper
Bit Size
FR Micro-normal
FR Micro-inverse
Spontaneous Potential
DST Uphole Tension
4700
FR DST Uphole Tension
pontaneous Potential
4736
Depth
in
Feet
Micro-normal
ohm metres
0
10
20
30
40
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

Borehole Temp in deg F

Replay Scale 1:240

Micro-inverse
ohm metres
0 10 20 30 40

Depth Based Data - Maximum Sampling Increment 10.0cm — Plotted on 29-FEB-2012 07:25
Filename: C:\DOCUME~1\SchefFJL\LOCALS~1\Temp\Weatherfo...\Grand Mesa G & M # 1-25_003.dta — Recorded on 15-FEB-2012 18:05
System Versions: Logged with 11.03.4044 Plotted with 12.01.3513

5 INCH MAIN

REPEAT SECTION

Depth Based Data - Maximum Sampling Increment 10.0cm — Plotted on 29-FEB-2012 07:25
Filename: C:\DOCUME~1\SchefFJL\LOCALS~1\Temp\Weatherfo...\Grand Mesa G & M # 1-25_002.dta — Recorded on 15-FEB-2012 17:38
System Versions: Logged with 11.03.4044 Plotted with 12.01.3513

Timing Marks
every 60.0 sec

Gamma Ray
API
0 75 150

Spontaneous Potential
millivolts
– → | 20 | ← +

MML Caliper
inches
6 11 16

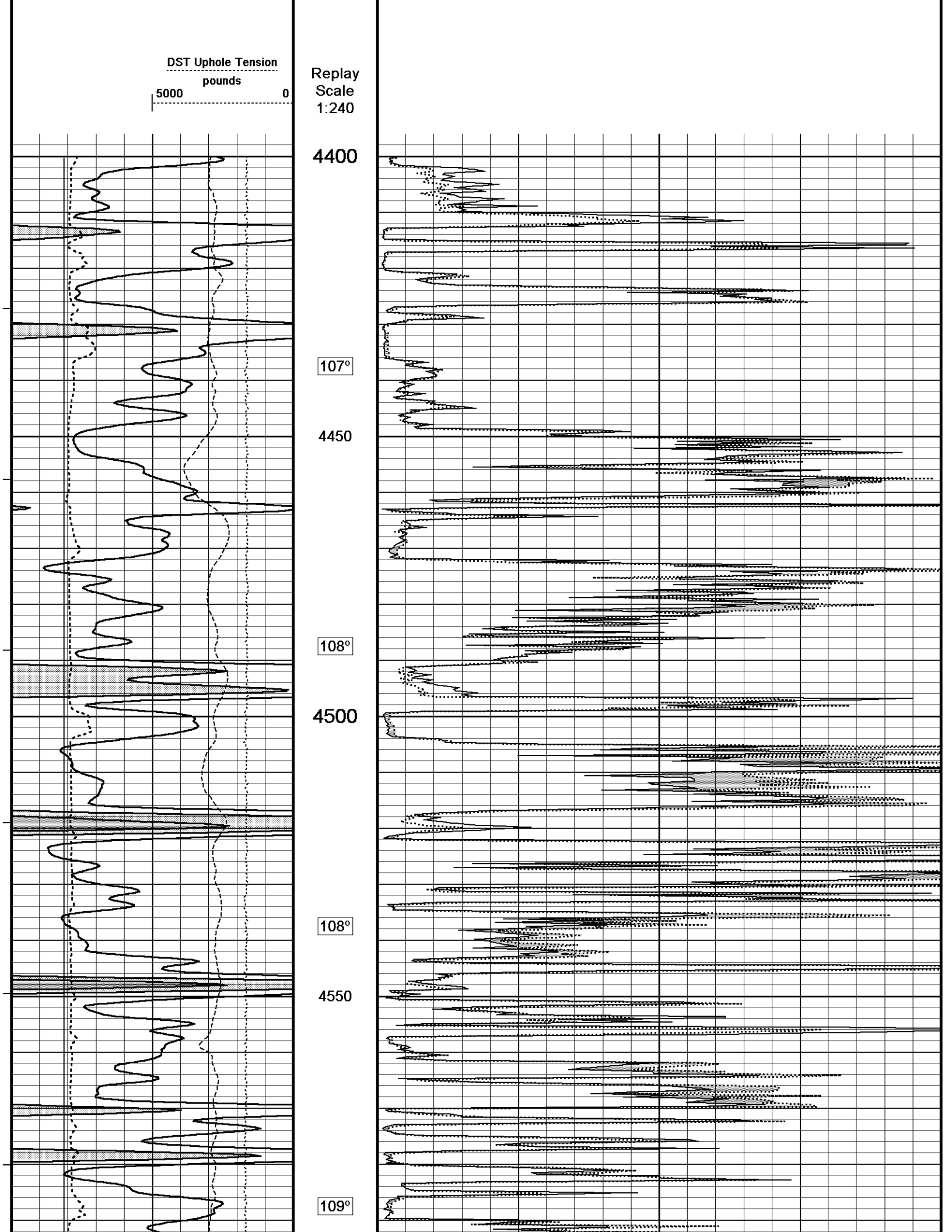
Bit Size
inches
6 11 16

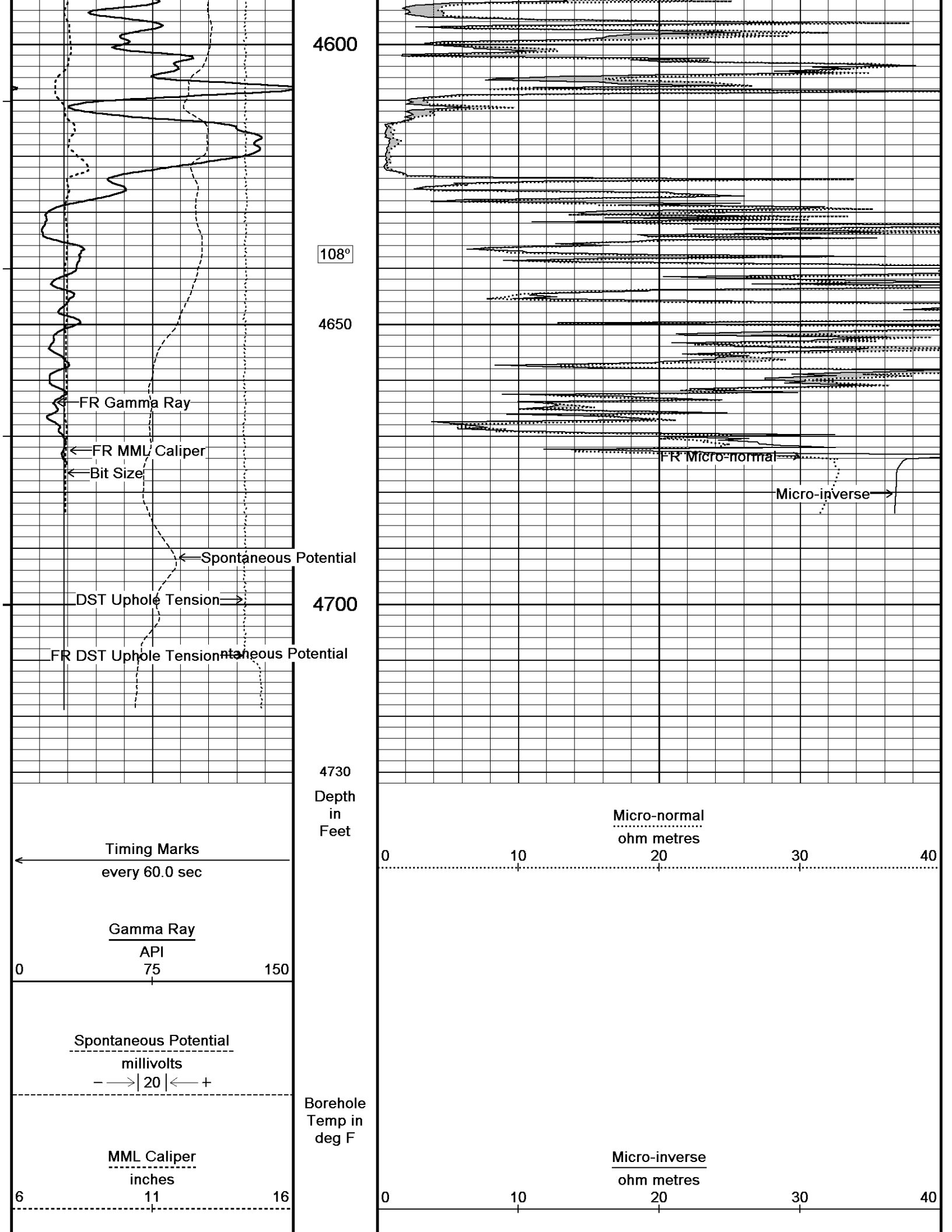
Depth in Feet

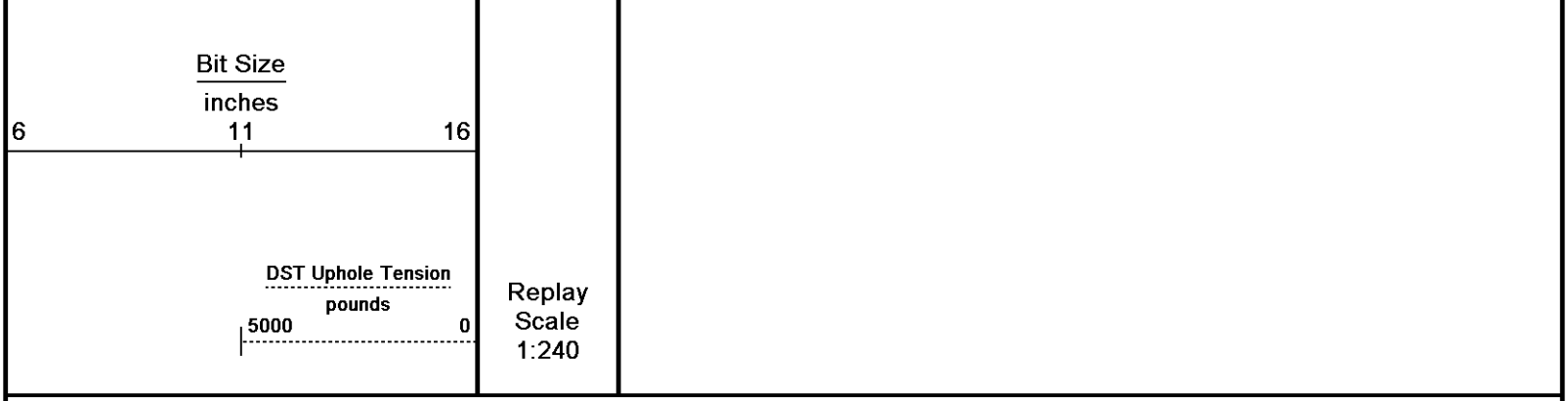
Borehole Temp in deg F

Micro-normal
ohm metres
0 10 20 30 40

Micro-inverse
ohm metres
0 10 20 30 40


DST Uphole Tension
pounds
5000
0
Replay
Scale
1:240
4400
107°
4450
108°
4500
108°
4550
109°


4600
108°
4650
FR Gamma Ray
FR MML Caliper
Bit Size
Spontaneous Potential
DST Uphole Tension
4700
FR DST Uphole Tension
ntaneous Potential
4730
FR Micro-normal
Micro-inverse
Depth in Feet
Micro-normal
ohm metres
0
10
20
30
40
Timing Marks
every 60.0 sec
Gamma Ray
API
0
75
150
Spontaneous Potential
millivolts
− 20 +
Borehole Temp in deg F
MML Caliper
inches
6
11
16
Micro-inverse
ohm metres
0
10
20
30
40



Depth Based Data - Maximum Sampling Increment 10.0cm — Plotted on 29-FEB-2012 07:25
Filename: C:\DOCUME~1\SchefFJL\LOCALS~1\Temp\Weatherfo...\Grand Mesa G & M # 1-25_002.dta — Recorded on 15-FEB-2012 17:38
System Versions: Logged with 11.03.4044 Plotted with 12.01.3513

REPEAT SECTION

BEFORE SURVEY CALIBRATION

C:\DOCUME~1\SchefFJL\LOCALS~1\Temp\Weatherford PreView\0\Grand Mesa G & M # 1-25_003.dta

General Constants All 000

Last Edited on 15-FEB-2012 15:56

General Parameters		
Mud Resistivity	1.500	ohm-metres
Mud Resistivity Temperature	85.000	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	0.610	
RWA Constant M	2.150	

Down-hole Tension Calibration SMS 0

Field Calibration on 23-OCT-2011 04:19

Reading No	Measured	Calibrated (lbs)
1	12734.06	0.00
2	13523.27	454.00

Gamma Calibration MCG-D.K 443

Field Calibration on 15-FEB-2012 09:28

	Measured	Calibrated (API)
Background	80	53
Calibrator (Gross)	765	509
Calibrator (Net)	685	456

Gamma Constants MCG-D.K 443

Last Edited on 15-FEB-2012 15:55

Gamma Calibrator Number	grc141	
Mud Density	1.12	gm/cc
Caliper Source for Processing	Density Caliper	
Tool Position	Eccentred	
Concentration of KCl	0.00	kppm

SP Calibration MCG-D.K 443

Field Calibration on 01-FEB-2012 10:26

	Measured	Calibrated (mV)
Reference 1	100.9	100.0
Reference 2	-98.4	-100.0

High Resolution Temperature Calibration MCG-D.K 443

High Resolution Temperature Calibration MCG-D.K 443

Field Calibration on 12-JAN-2012 09:06

	Measured	Calibrated(Deg F)
Lower	50.00	50.00
Upper	100.00	100.00

High Resolution Temperature Constants MCG-D.K 443

Last Edited on

Pre-filter Length	11

Caliper Calibration MML-A 9

Base Calibration on 06-FEB-2012 09:52
Field Calibration on 15-FEB-2012 09:41

Base Calibration

Reading No	Measured	Calibrator Size (in)
1	15071	5.98
2	18450	7.97
3	21808	9.86
4	25812	11.92
5	0	0.00
6	N/A	N/A

Field Calibration

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

Micro Normal and Micro Inverse Calibration MML-A 9

Base Calibration on 06-FEB-2012 09:39
Field Check on 15-FEB-2012 09:40

Base Calibration

	Measured		Calibrated (ohm-m)	
Channel	Resistor 1	Resistor 2	Resistor 1	Resistor 2
Micro Normal	12.1	59.8	2.6	12.8
Micro Inverse	15.6	78.1	1.7	8.4

Channel	Base Check (ohm-m)	Field Check (ohm-m)
Micro Normal	32.4	32.4
Micro Inverse	16.4	16.4

Micro Normal and Micro Inverse Constants MML-A 9

Last Edited on 09-FEB-2012 13:46

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

Neutron Calibration MDN-A.B 39

Base Calibration on 04-JAN-2012 14:55
Field Check on 15-FEB-2012 09:24

Base Calibration

	Measured		Calibrated (cps)	
	Near	Far	Near	Far
	2756	86	3714	110
Ratio	32.152		33.764	

Field Calibrator at Base

	Calibrated (cps)	
	2384	3432
Ratio	0.695	

Field Check

	Calibrated (cps)	
	2372	3438
Ratio	0.690	

Neutron Constants MDN-A.B 39

Last Edited on 15-FEB-2012 15:55

Neutron Source Id	N-1095	
Neutron Jig Number	NECD117	
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	None	
Formation Pressure	N/A	kpsi
Temperature Source	Constant Value	

Temperature Source	Constant Value	
Temperature	68.00	degrees F
Mud Salinity	0.00	kppm
Formation Fluid Salinity Source	Constant Value	
Formation Fluid Salinity	0.00	kppm
Barite Mud Correction	Not Applied	

FE Calibration MFE-A.A 67

Base Calibration on 06-FEB-2012 10:02
Field Check on 15-FEB-2012 09:36

Base Calibration

	Measured	Calibrated (ohm-m)
Reference 1	0.0	0.0
Reference 2	959.8	126.8
Base Check		280.8
Field Check		280.9

FE Constants MFE-A.A 67

Last Edited on 15-FEB-2012 15:55

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

Induction Calibration MAI-A.A 188

Base Calibration on 04-JAN-2012 13:31
Field Check on 15-FEB-2012 09:38

Base Calibration

Test Loop Calibration

Channel	Measured Low	Measured High	Calibrated (mmho/m) Low	Calibrated (mmho/m) High
1	16.9	470.2	9.3	966.2
2	6.4	377.1	7.6	821.4
3	3.9	257.8	5.2	566.0
4	1.7	135.1	2.6	279.2
Array Temperature		66.3	Deg F	

Channel	Base Check (mmho/m) Low	Base Check (mmho/m) High	Field Check (mmho/m) Low	Field Check (mmho/m) High	
1	0.0	0.0	13.6	3865.9	
2	0.0	0.0	29.9	3582.9	
3	0.0	0.0	27.9	3077.3	
4	0.0	0.0	19.7	2046.0	
Deep	0.0	0.0	17.2	1954.4	
Medium	0.0	0.0	40.2	4112.7	
Shallow	0.0	0.0	44.6	5366.5	
Array Temperature		0.0		68.9	Deg F

Induction Constants MAI-A.A 188

Last Edited on 15-FEB-2012 15:56

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 188

Field Calibration on 12-AUG-2011 22:41

	Measured	Calibrated(Deg F)
Lower	32.00	32.00
Upper	68.00	68.00

High Resolution Temperature Constants MAI-A.A 188

Last Edited on 21-JUN-2011 20:05

Pre-filter Length	11

Caliper Calibration MPD-B 65

Base Calibration on 06-FEB-2012 15:42
Field Calibration on 15-FEB-2012 09:35

Base Calibration

Reading No	Measured	Calibrator Size (in)
1	14246	3.99
2	22911	5.98
3	31473	7.97
4	39776	9.86
5	48992	11.92
6	N/A	N/A

Field Calibration

Measured Caliper (in)	Actual Caliper (in)
5.95	5.98

Photo Density Calibration MPD-B 65

Base Calibration on 06-FEB-2012 16:03
Field Check on 15-FEB-2012 09:33

Density Calibration

Base Calibration	Measured		Calibrated (sdu)	
	Near	Far	Near	Far
Reference 1	58421	27705	59556	30836
Reference 2	23654	2410	24941	2541

Field Check at Base

1233.9	1179.6

Field Check

1227.5	1177.2

PE Calibration

Base Calibration	Measured			Calibrated
	WS	WH	Ratio	Ratio
Background	226	1097		
Reference 1	21385	58213	0.370	0.371
Reference 2	6241	23505	0.268	0.272

Field Check at Base

225.7	1097.3

Field Check

223.2	1088.1

Density Constants MPD-B 65

Last Edited on 15-FEB-2012 15:55

Density Constants MPDB65

Density Source Id	P57072B	
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	1.12	gm/cc
Mud Density Z/A Multiplier	1.11	
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 (ft)
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	

DOWNHOLE EQUIPMENT

C:\DOCUME~1\SchefFJL\LOCALS~1\Temp\Weatherford PreView\0\Grand Mesa G & M # 1-25_003.dta

MCB-A 11B Tension Cablehead
MCB-A 162 LG: 2.18 ft WT: 19.8 lb OD: 2.24 in

MCB-A 11B Tension Cablehead
MCB-A 162 LG: 2.18 ft WT: 19.8 lb OD: 2.24 in

SHA-F Compact Swivel Head Adaptor
SHA-F 88 LG: 2.74 ft WT: 26.5 lb OD: 2.24 in

SHA-F Compact Swivel Head Adaptor
SHA-F 88 LG: 2.74 ft WT: 26.5 lb OD: 2.24 in

Compact Comms Gamma
MCG-D.K 443 LG: 8.70 ft WT: 63.9 lb OD: 2.24 in

Compact Comms Gamma
MCG-D.K 443 LG: 8.70 ft WT: 63.9 lb OD: 2.24 in

Compact Micro-log
MML-A 9 LG: 7.97 ft WT: 81.6 lb OD: 2.24 in

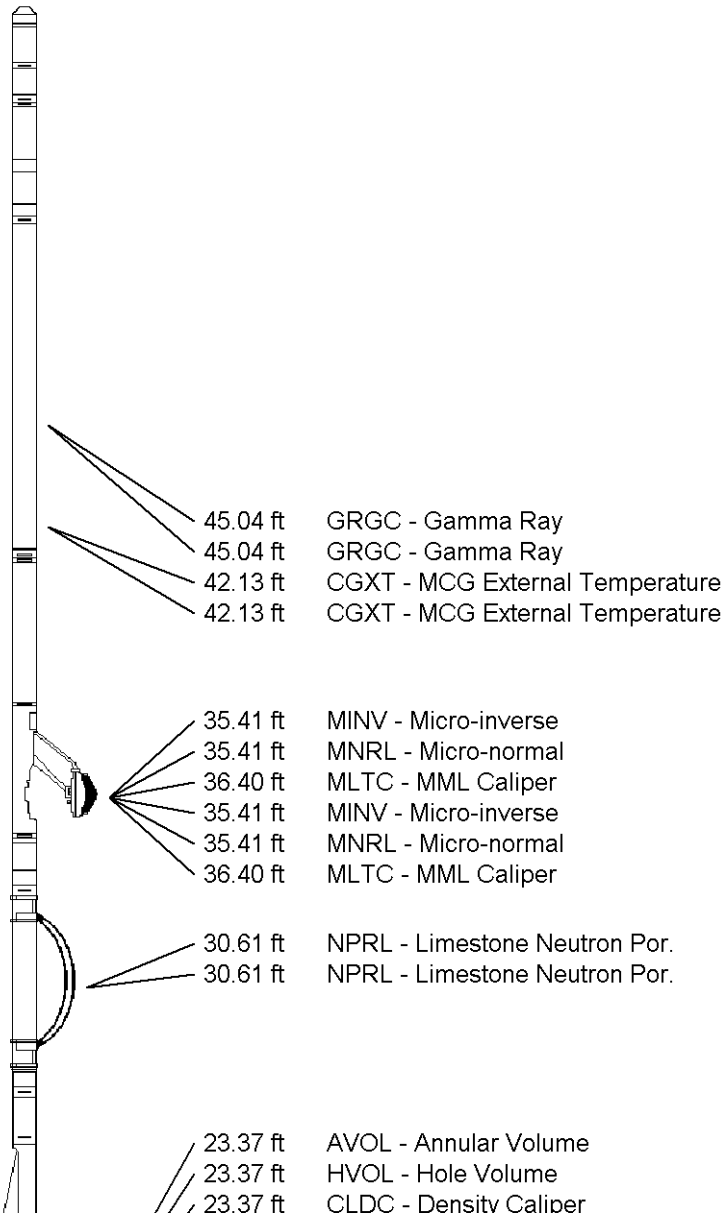
Compact Micro-log
MML-A 9 LG: 7.97 ft WT: 81.6 lb OD: 2.24 in

Compact Neutron
MDN-A.B 39 LG: 5.04 ft WT: 50.7 lb OD: 2.24 in

Compact Neutron
MDN-A.B 39 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 91 LG: 2.17 ft WT: 24.3 lb OD: 2.24 in

SKJ-D.A Compact Knuckle Joint
SKJ-D.A 91 LG: 2.17 ft WT: 24.3 lb OD: 2.24 in

Compact Focussed Electric
MFE-A.A 67 LG: 6.05 ft WT: 48.5 lb OD: 2.24 in

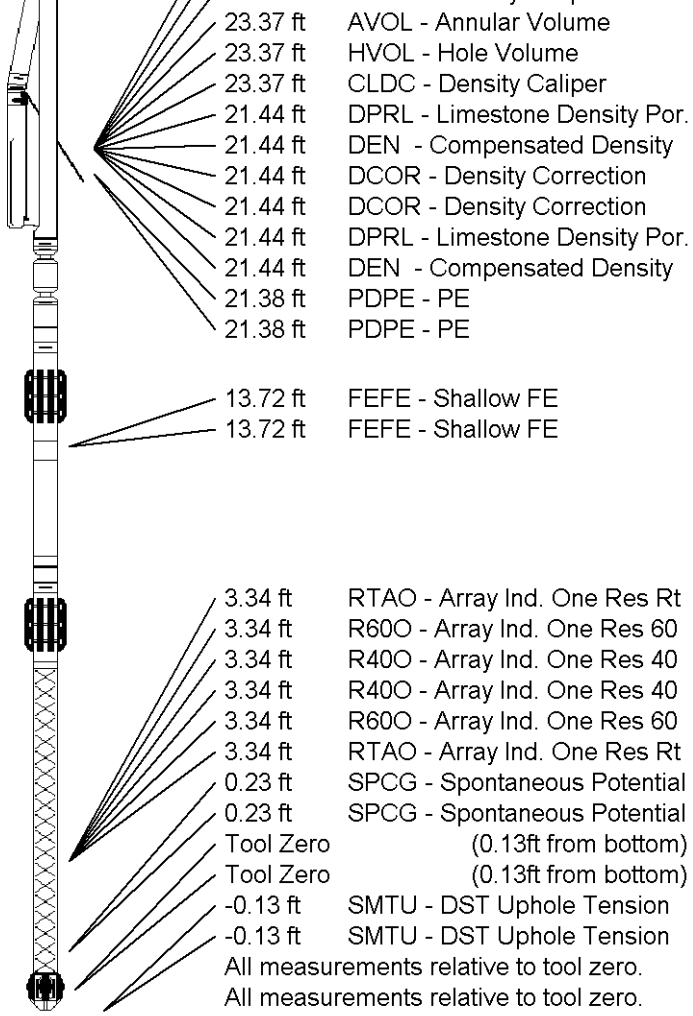
Compact Focussed Electric
MFE-A.A 67 LG: 6.05 ft WT: 48.5 lb OD: 2.24 in

Compact Induction
MAI-A.A 188 LG: 10.81 ft WT: 48.5 lb OD: 2.24 in

Compact Induction
MAI-A.A 188 LG: 10.81 ft WT: 48.5 lb OD: 2.24 in

Total Length: 55.24 ft Weight: 454.2 lb

Total Length: 55.24 ft Weight: 454.2 lb



23.37 ft	AVOL - Annular Volume
23.37 ft	HVOL - Hole Volume
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	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	GRAND MESA OPERATING COMPANY
WELL	G & M # 1-25
FIELD	WILDCAT
PROVINCE/COUNTY	LOGAN
COUNTRY/STATE	U.S.A. / KANSAS

Elevation Kelly Bushing	3009.00	feet	First Reading	4673.00	feet
Elevation Drill Floor	3007.00	feet	Depth Driller	4710.00	feet
Elevation Ground Level	3004.00	feet	Depth Logger	4709.00	feet

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