MICRORESISTIVITY LOG

COMPANY	GRAND MESA OPERATING COMPANY
WELL	CAMPBELL 1-33
FIELD	WILDCAT
PROVINCE/COUNTY	GOVE
COUNTRY/STATE	U.S.A. / KANSAS
LOCATION	1300' FSL & 558' FEL
	NW NE SE SE

SEC	TWP	RGE	Other Services
33	13S	31W	MAI/MFE
			MPD/MDN

API Number 15-063-22046
Permit Number

Permanent Datum G.L., Elevation 2919 feet
Log Measured From KB
Drilling Measured From K.B.

Elevations:	feet
KB	2924.00
DF	2923.00
GL	2919.00

Date	16-OCT-2012			
Run Number	ONE			
Depth Driller	4716.00	feet		
Depth Logger	4713.00	feet		
First Reading	4679.00	feet		
Last Reading	3700.00	feet		
Casing Driller	222.00	feet		
Casing Logger	221.00	feet		
Bit Size	7.875	inches		
Hole Fluid Type	CHEMICAL			
Density / Viscosity	9.30 lb/USg	59.00 CP		
PH / Fluid Loss	10.00	8.80 ml/30Min		
Sample Source	FLOWLINE			
Rm @ Measured Temp	0.80 @ 99.0	ohm-m		
Rmf @ Measured Temp	0.64 @ 99.0	ohm-m		
Rmc @ Measured Temp	0.96 @ 99.0	ohm-m		
Source Rmf / Rmc	CALC	CALC		
Rm @ BHT	0.68 @117.0	ohm-m		
Time Since Circulation	4 HOURS			
Max Recorded Temp	117.00	deg F		
Equipment Name	COMPACT			
Equipment / Base	13096	LIB		
Recorded By	LYNN SCOTT			
Witnessed By	KENT MATSON			
S.O. / JOB#	3537892		LB12-276	

BOREHOLE RECORD

Last Edited: 16-OCT-2012 14:06

Bit Size inches	Depth From feet	Depth To feet
7.875	221.00	4713.00

CASING RECORD

Type	Size inches	Depth From feet	Shoe Depth feet	Weight pounds/ft
SURFACE	8.625	0.00	221.00	24.00

REMARKS

Tools Ran: MCG, MML, MDN, MPD, MFE, MAI RAN IN COMBINATION.
2.71 G/CC Limestone Density porosity 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= 1900 cubic feet
Annular hole volume with 5.5 Inch casing= 192 cubic feet
Service order: 3537892
Rig: Murfin #24
Engineer: L. Scott
Operator(s): J. LaPoint, B. Johnson

5 INCH MAIN

Depth Based Data - Maximum Sampling Increment 10.0cm
Plotted on 16-OCT-2012 16:35
Filename: C:\Minimus 13.02.6600\Data\Grand Mesa ...\Grand Mesa Operating Campbell 1-33_002.dta
Recorded on 16-OCT-2012 14:14
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

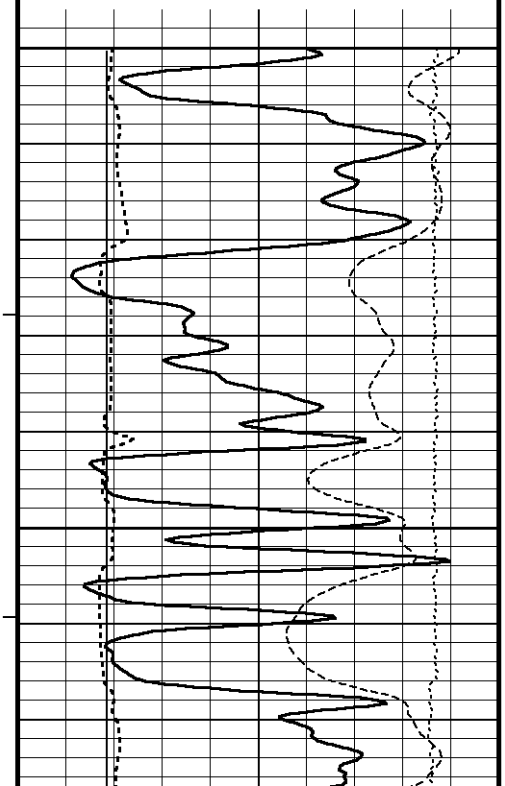
Micro-normal
ohm metres
0 10 20 30 40

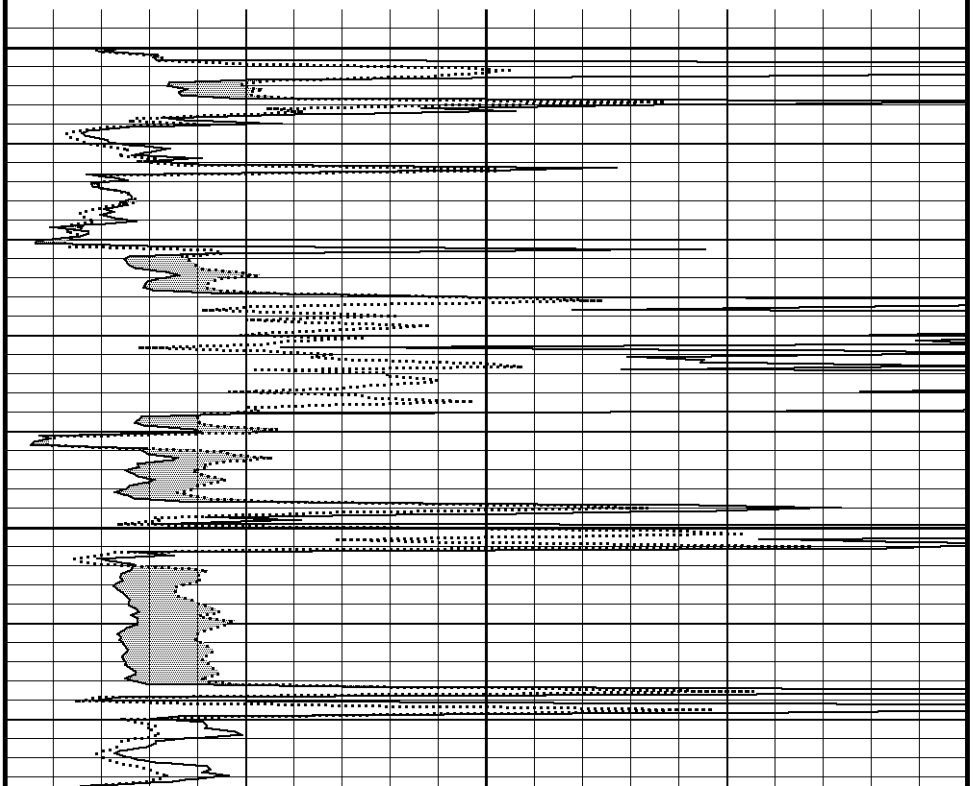
Micro-inverse
ohm metres
0 10 20 30 40

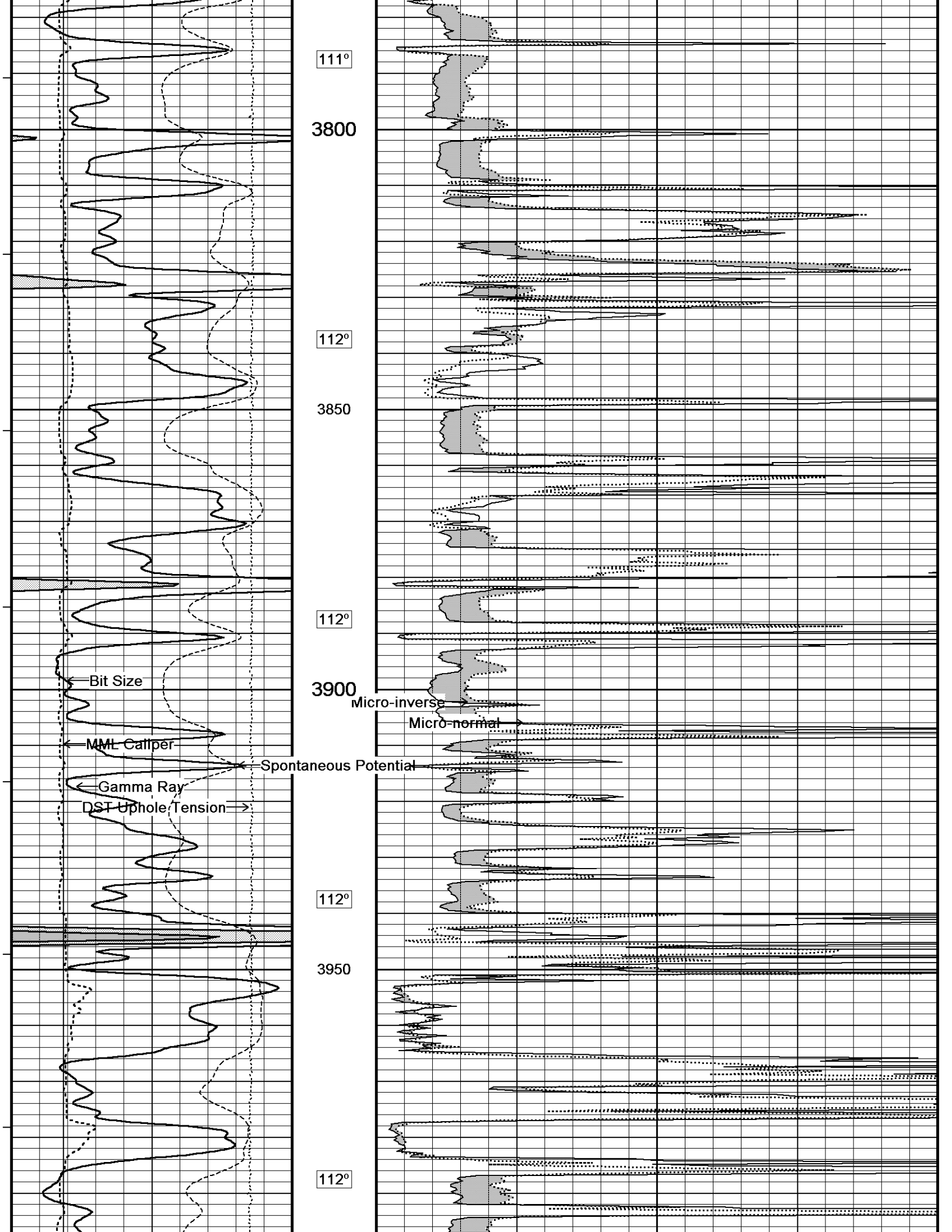
3700

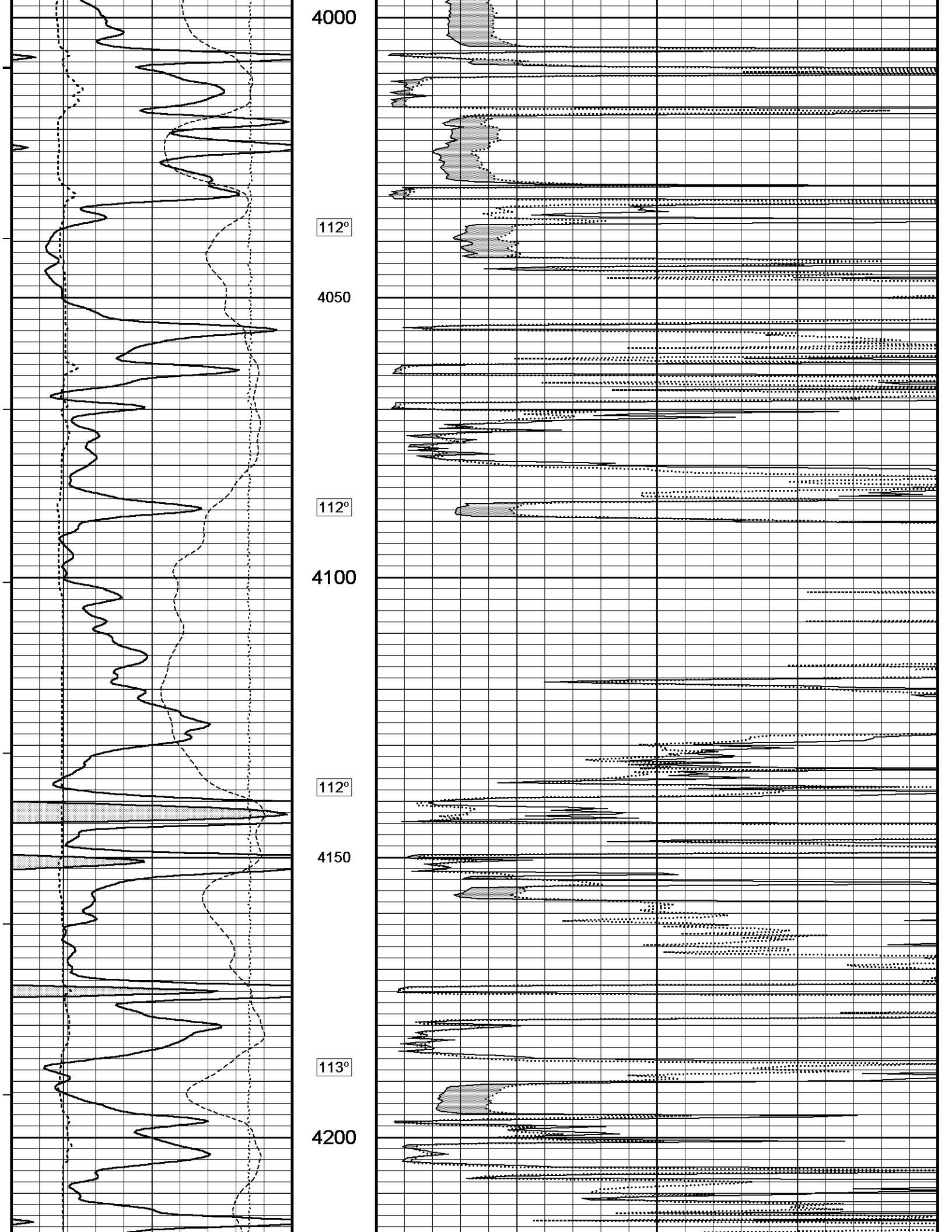
111°

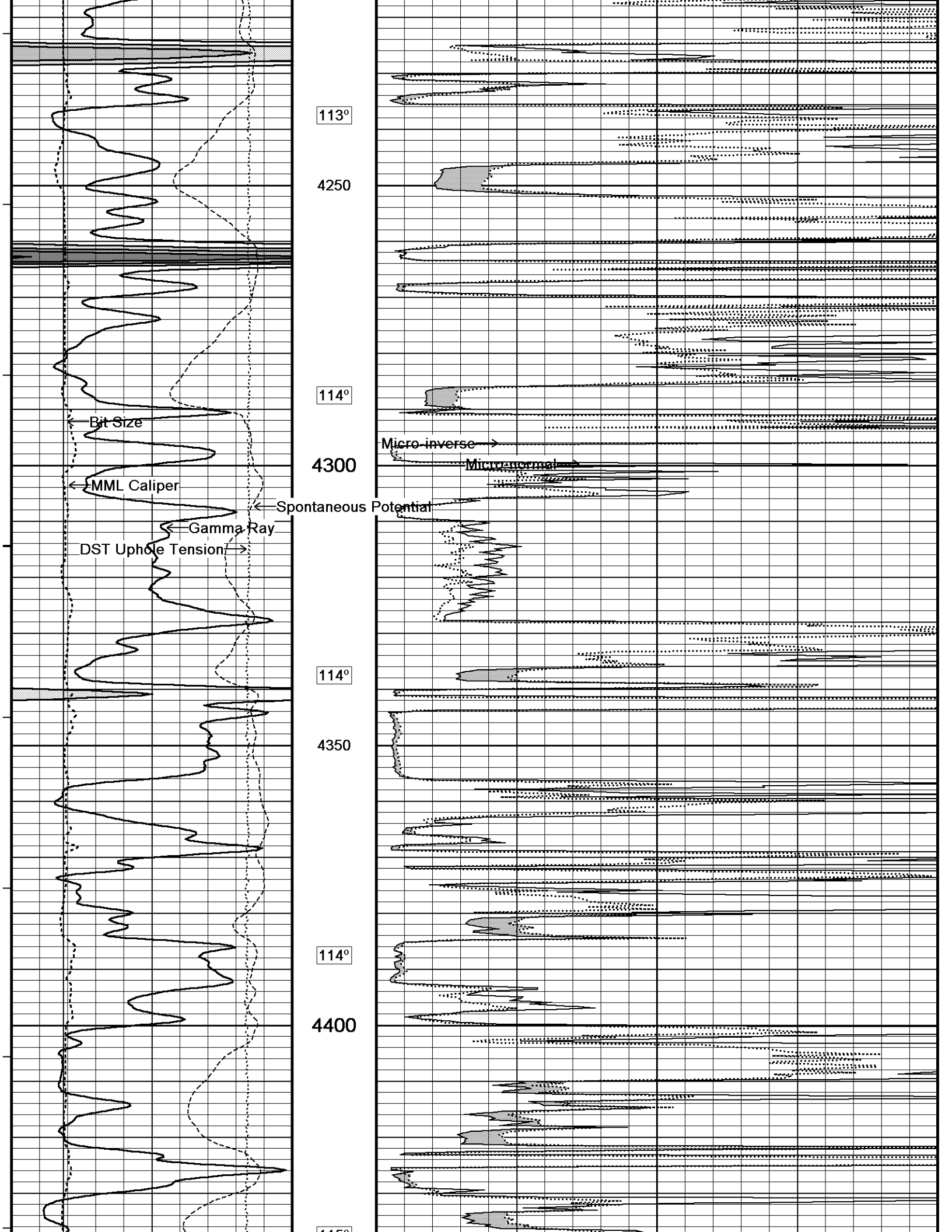
3750

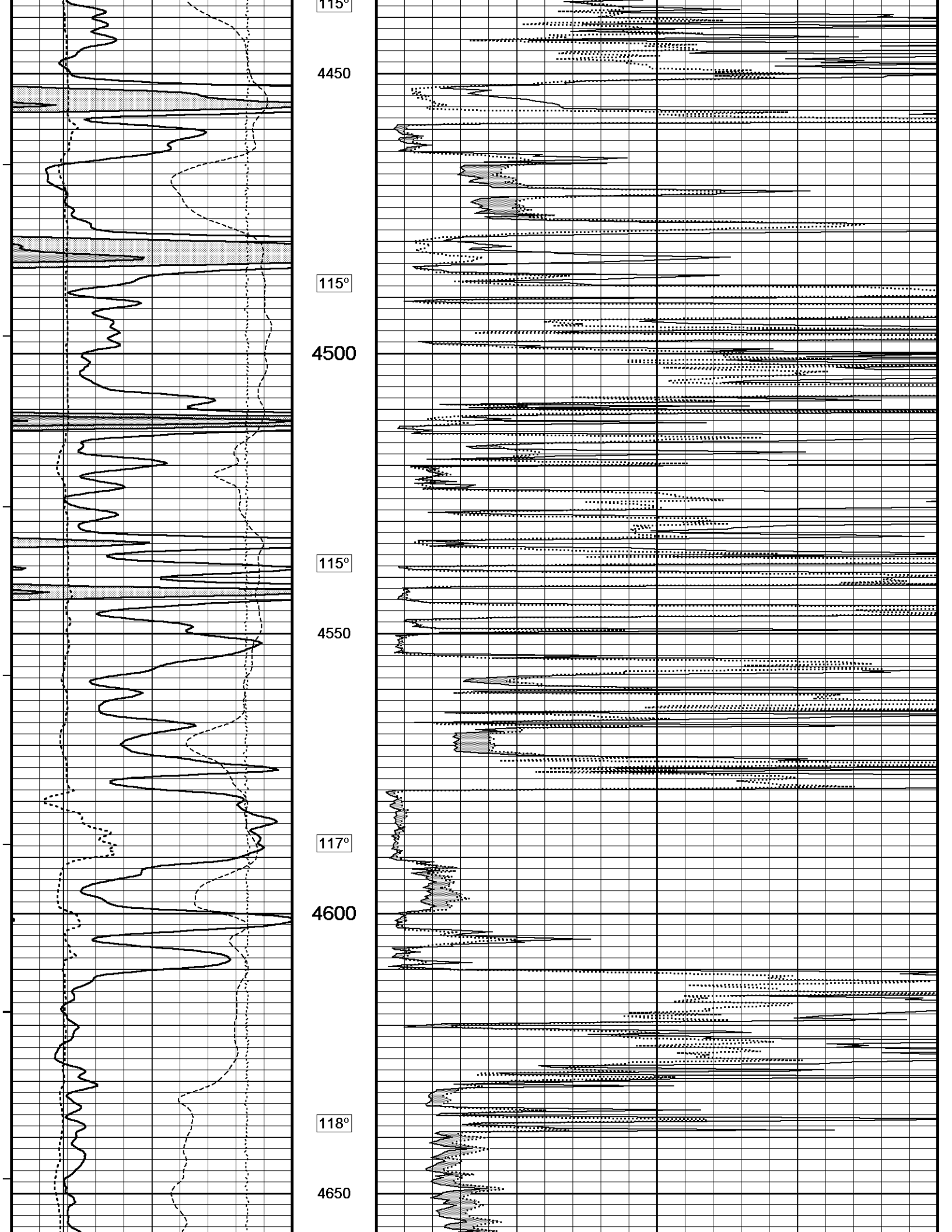


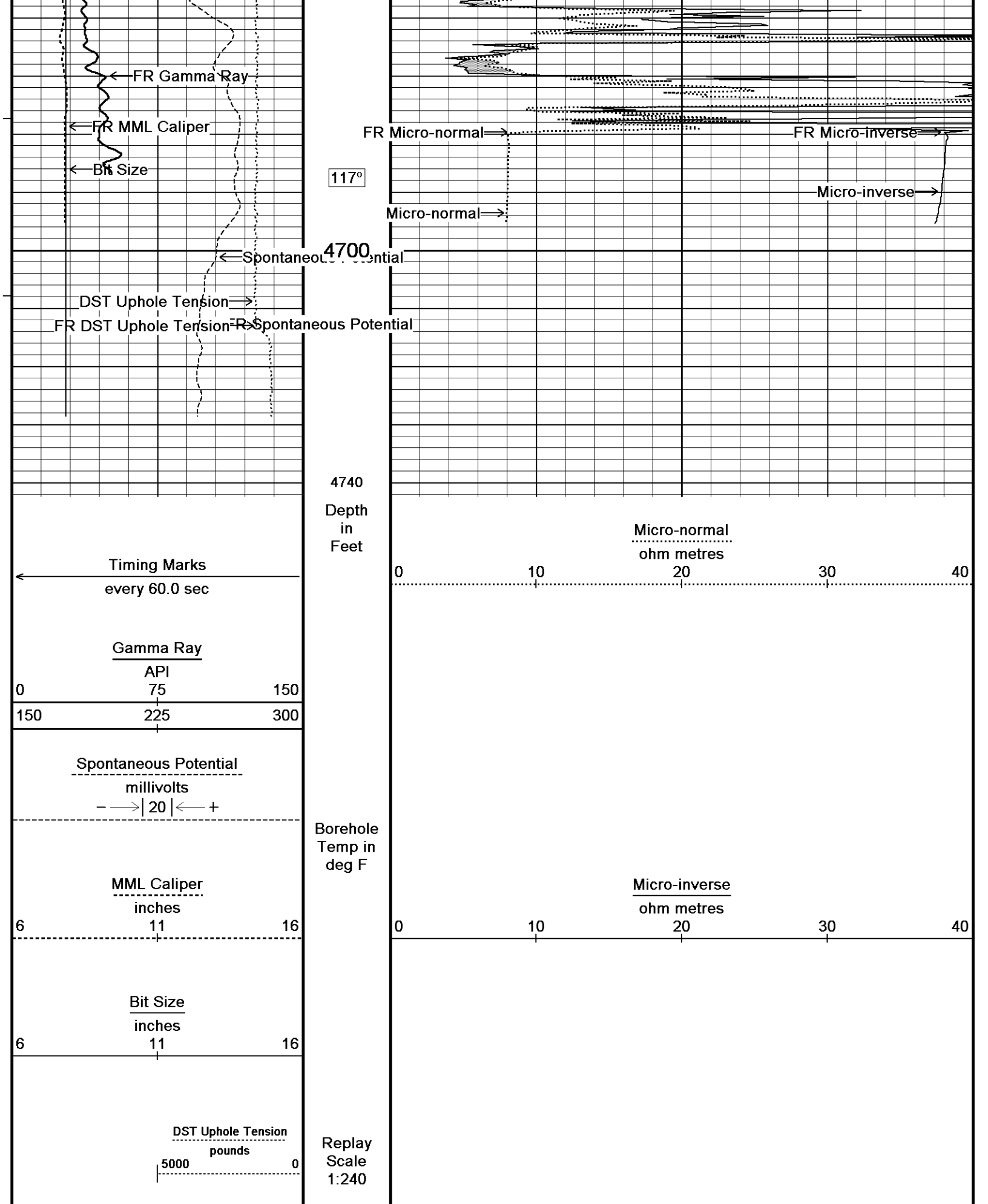



111°
3800
112°
3850
112°
Bit Size
3900
Micro-inverse
Micro-normal
MML Caliper
Spontaneous Potential
Gamma Ray
DST Uphole Tension
112°
3950
112°


4000
112°
4050
112°
4100
112°
4150
113°
4200


113°
4250
114°
Bit Size
Micro-inverse
4300
Micro-normal
MML Caliper
Spontaneous Potential
Gamma Ray
DST Uphole Tension
114°
4350
114°
4400


115°
4450
115°
4500
115°
4550
117°
4600
118°
4650



Depth Based Data - Maximum Sampling Increment 10.0cm
Plotted on 16-OCT-2012 16:35
Filename: C:\Minimus 13.02.6600\Data\Grand Mesa ...\Grand Mesa Operating Campbell 1-33_002.dta
Recorded on 16-OCT-2012 14:14
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 16-OCT-2012 16:35
Filename: C:\Minimus 13.02.6600\Data\Grand Mesa ...\Grand Mesa Operating Campbell 1-33_001.dta
Recorded on 16-OCT-2012 13:50
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

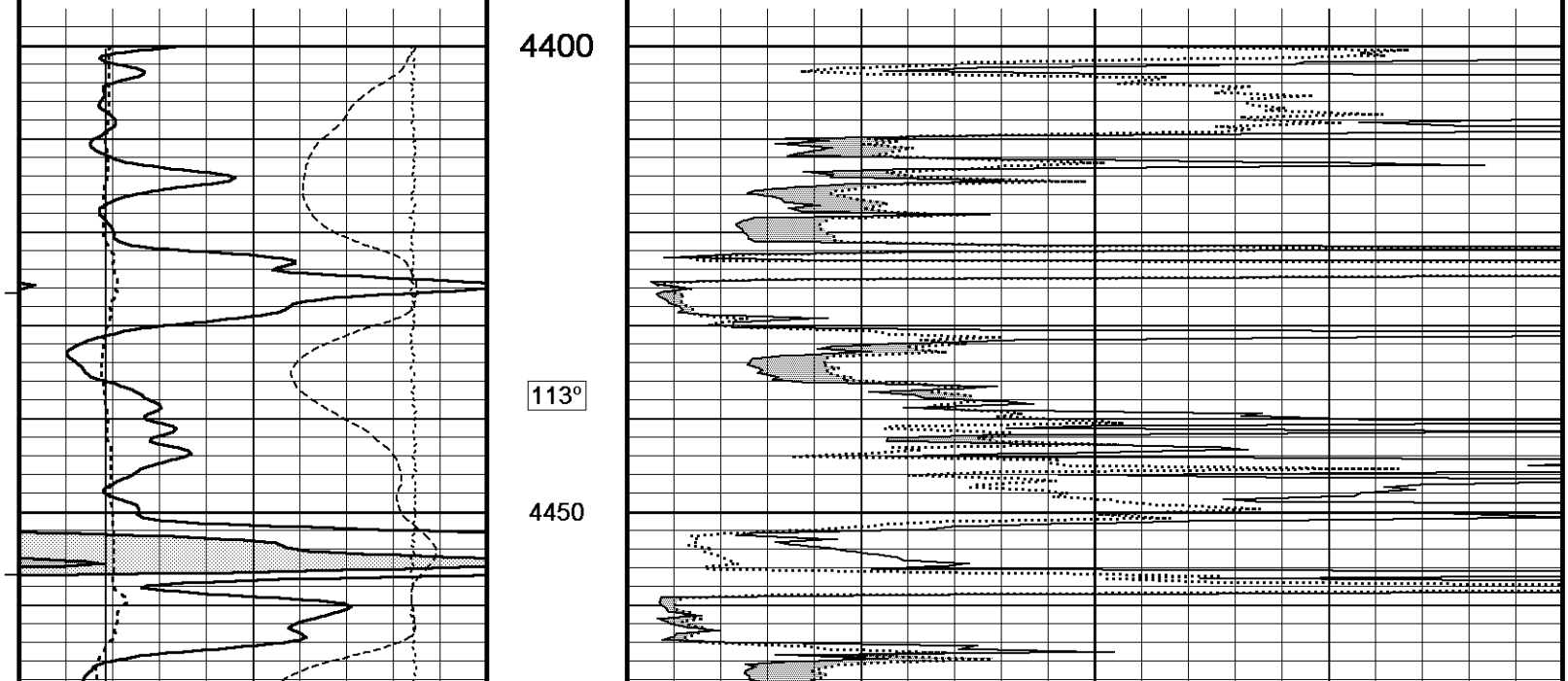
Micro-normal
ohm metres
0 10 20 30 40

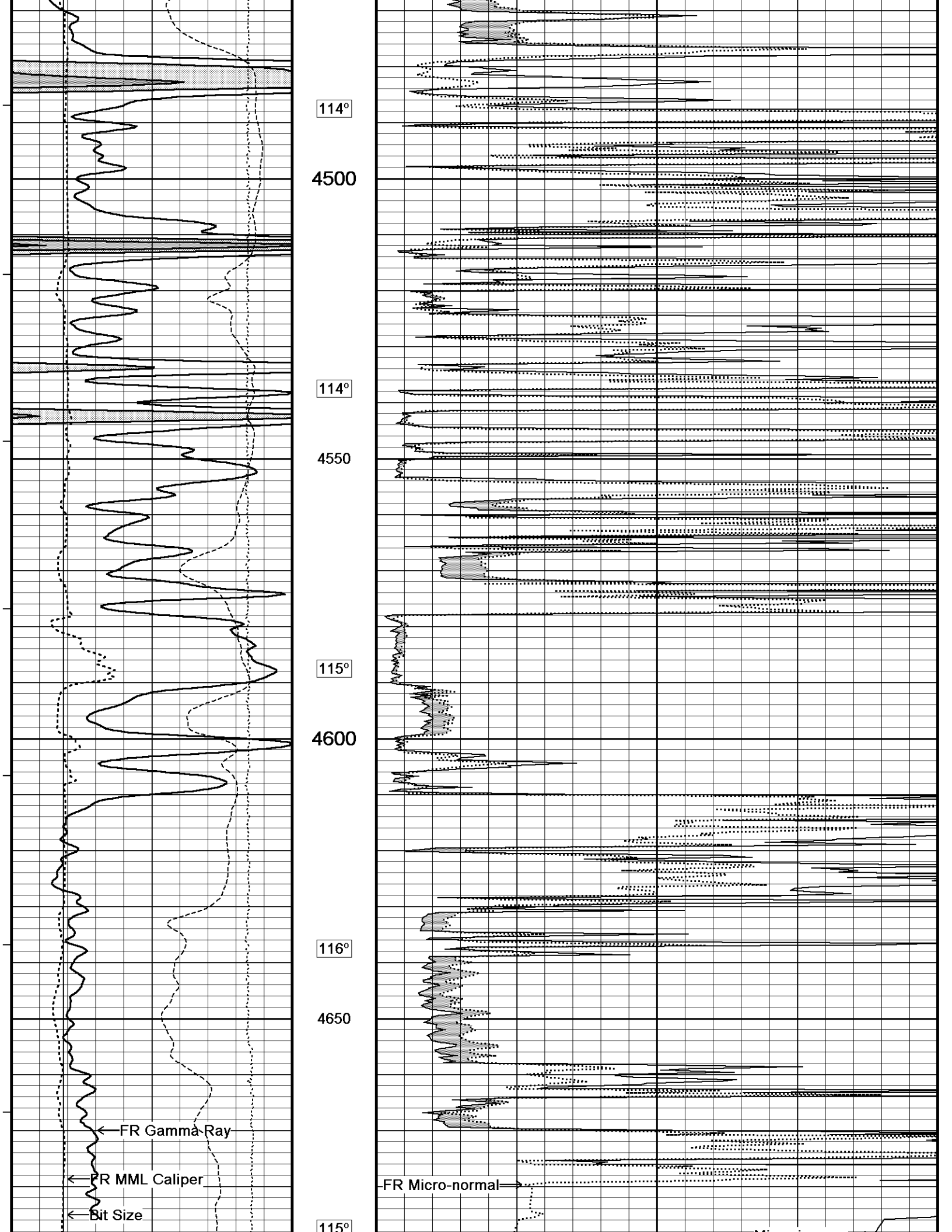
Micro-inverse
ohm metres
0 10 20 30 40

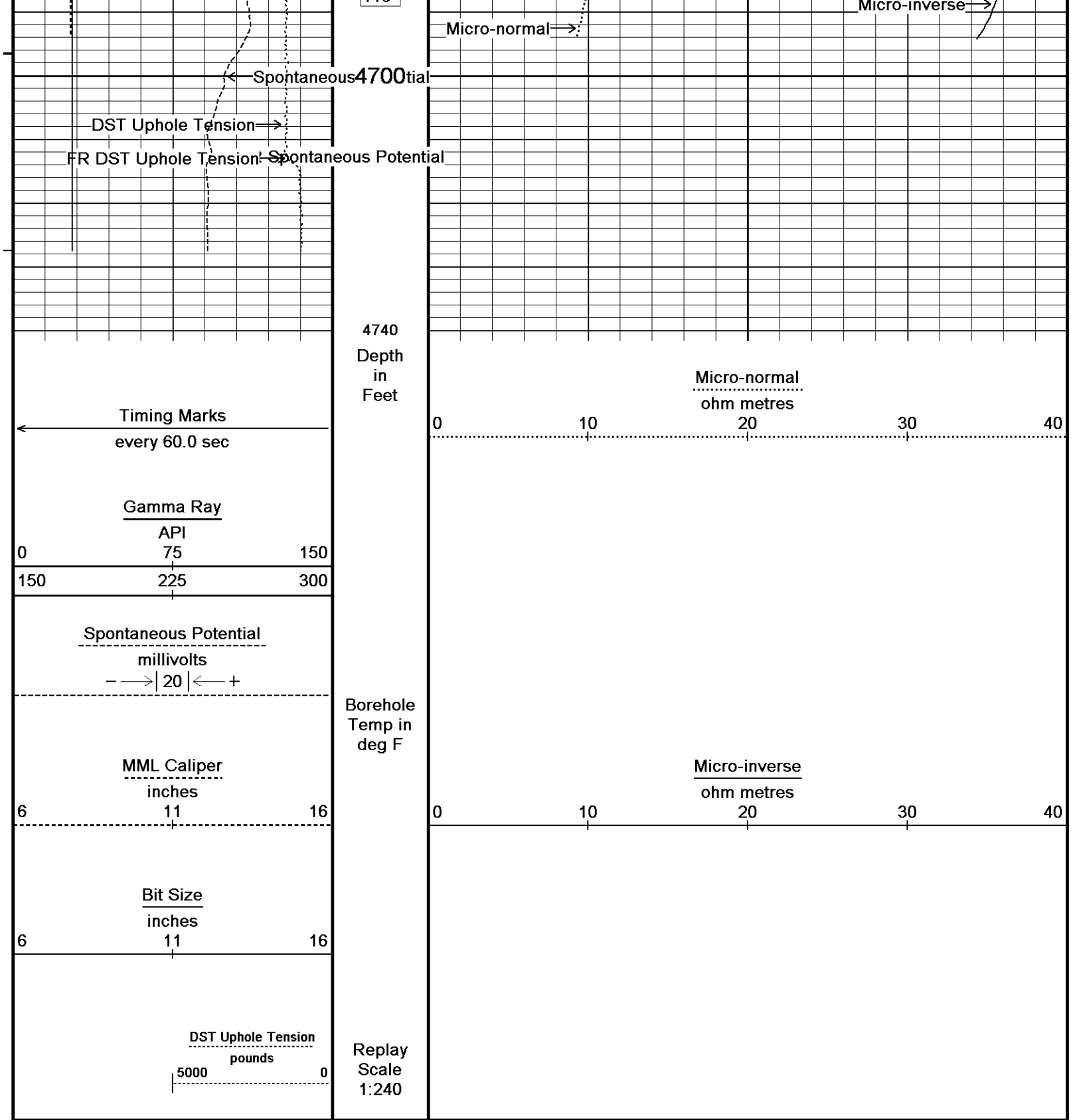
4400

113°

4450




114°
4500
114°
4550
115°
4600
116°
4650
115°
FR Gamma Ray
FR MML Caliper
Bit Size
FR Micro-normal



Depth Based Data - Maximum Sampling Increment 10.0cm — Plotted on 16-OCT-2012 16:35

Filename: C:\Minimus 13.02.6600\Data\Grand Mesa ...\Grand Mesa Operating Campbell 1-33_001.dta — Recorded on 16-OCT-2012 13:50

System Versions: Logged with 13.02.6600 Plotted with 13.02.6600

REPEAT SECTION

BEFORE SURVEY CALIBRATION

C:\Minimus 13.02.6600\Data\Grand Mesa Operating Campbell 1-33\Grand Mesa Operating Campbell 1-33_001.dta

General Constants All 000 — Last Edited on 16-OCT-2012,10:30

General Parameters

Mud Resistivity	0.800	ohm-metres

Mud Resistivity Temperature	99.000	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 10-SEP-2012 04:28

Reading No	Measured	Calibrated (lbs)
1	15456.86	0.00
2	16071.78	384.00

Gamma Calibration MCG-D.K 442

Field Calibration on 14-OCT-2012 02:07

	Measured	Calibrated (API)
Background	69	46
Calibrator (Gross)	1152	771
Calibrator (Net)	1083	725

Gamma Constants MCG-D.K 442

Last Edited on 14-OCT-2012,08:31

Gamma Calibrator Number	GRC38	
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 442

Field Calibration on 17-JUL-2012 16:34

	Measured	Calibrated (mV)
Reference 1	100.2	100.0
Reference 2	-99.9	-100.0

High Resolution Temperature Calibration MCG-D.K 442

Field Calibration on 17-JUL-2012,16:35

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

High Resolution Temperature Constants MCG-D.K 442

Last Edited on

Pre-filter Length	11

Caliper Calibration MML-A 16

Base Calibration on 30-SEP-2012 19:38
Field Calibration on 14-OCT-2012 02:01

Base Calibration

Reading No	Measured	Calibrator Size (in)
1	13888	5.98
2	16946	7.97
3	20169	9.86
4	23996	11.92
5	0	0.00
6	N/A	N/A

Field Calibration

Measured Caliper (in)	Actual Caliper (in)
6.03	5.98

Micro Normal and Micro Inverse Calibration MML-A 16

Base Calibration on 30-SEP-2012 19:42
Field Check on 14-OCT-2012 02:02

Base Calibration

	Measured		Calibrated (ohm-m)	
Channel	Resistor 1	Resistor 2	Resistor 1	Resistor 2

Channel	Resistor 1	Resistor 2	Resistor 1	Resistor 2
Micro Normal	12.2	60.2	5.0	25.0
Micro Inverse	15.6	78.4	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 16

Last Edited on 16-OCT-2012,10:30

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 66

Base Calibration on 10-OCT-2012 14:12
Field Check on 14-OCT-2012 02:13

Base Calibration

	Measured		Calibrated (cps)	
	Near	Far	Near	Far
	3058	95	3714	110
Ratio	32.033		33.764	

Field Calibrator at Base

	Calibrated (cps)	
	1673	2395
Ratio	0.698	

Field Check

	Calibrated (cps)	
	1678	2400
Ratio	0.699	

Neutron Constants MDN-A.B 66

Last Edited on 16-OCT-2012,10:30

Neutron Source Id	P0204NN	
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 353

Base Calibration on 01-OCT-2012 09:16
Field Check on 14-OCT-2012 01:52

Base Calibration

	Measured	Calibrated (ohm-m)
Reference 1	0.0	0.0
Reference 2	965.2	126.8
Base Check		280.7
Field Check		280.9

FE Constants MFE-B.J 353

Last Edited on 16-OCT-2012,10:29

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

High Resolution Temperature Calibration MAI-A.A 167

Field Calibration on 17-JUL-2012,13:53

	Measured	Calibrated(Deg F)
Lower	1.00	33.80
Upper	11.00	51.80

High Resolution Temperature Constants MAI-A.A 167

Last Edited on 17-JUL-2012,13:49

Pre-filter Length	11

Induction Calibration MAI-A.A 167

Base Calibration on 17-JUL-2012,13:55
Field Check on 14-OCT-2012 01:51

Base Calibration

Test Loop Calibration

Channel	Measured Low	Measured High	Calibrated (mmho/m) Low	Calibrated (mmho/m) High
1	17.3	474.2	9.3	966.2
2	6.3	388.4	7.6	821.4
3	3.3	259.4	5.2	566.0
4	1.9	133.0	2.6	279.2

Array Temperature	76.8	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	12.3	3841.0
2	0.0	0.0	29.3	3478.5
3	0.0	0.0	28.9	3054.3
4	0.0	0.0	19.7	2082.6
Deep	0.0	0.0	18.5	2049.7
Medium	0.0	0.0	42.1	3992.9
Shallow	0.0	0.0	42.5	5056.6
Array Temperature	0.0		64.3	Deg F

Induction Constants MAI-A.A 167

Last Edited on 16-OCT-2012,10:29

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

Caliper Calibration MPD-B 64

Base Calibration on 10-OCT-2012 12:35
Field Calibration on 14-OCT-2012 01:53

Base Calibration

Reading No	Measured	Calibrator Size (in)
1	12128	3.99
2	20753	5.98
3	29254	7.97
4	37705	9.86
5	46896	11.92
6	N/A	N/A

Field Calibration

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

Photo Density Calibration MPD-B 64

Base Calibration on 10-OCT-2012 12:54
Field Check on 14-OCT-2012 02:00

Density Calibration

Base Calibration	Measured		Calibrated (sdu)	
	Near	Far	Near	Far
Reference 1	58951	32645	59556	30836
Reference 2	24760	2893	24941	2541

Field Check at Base

1181.6	1375.1

Field Check

1187.9	1371.9

PE Calibration

Base Calibration	Measured			Calibrated
	WS	WH	Ratio	Ratio
Background	215	1053		
Reference 1	22216	58751	0.381	0.371
Reference 2	6718	24623	0.276	0.272

Field Check at Base

215.0	1052.6

Field Check

215.0	1059.8

Density Constants MPD-B 64

Last Edited on 14-OCT-2012,08:30

Density Source Id	18235B	
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)
2.87	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

DOWNHOLE EQUIPMENT

C:\Minimus 13.02.6600\Data\Grand Mesa Operating Campbell 1-33\Grand Mesa Operating Campbell 1-33_001.dta

Compact Comms Gamma
MCG-D.K 442 LG: 8.70 ft WT: 63.9 lb OD: 2.24 in

Compact Micro-log
MML-A 16 LG: 7.97 ft WT: 81.6 lb OD: 2.24 in

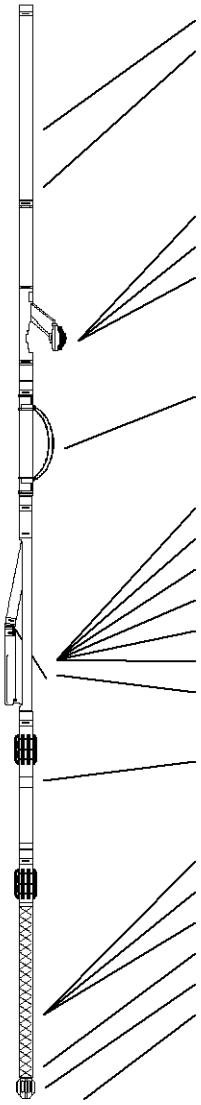
Compact Neutron
MDN-A.B 66 LG: 5.04 ft WT: 50.7 lb OD: 2.24 in

Compact Density/Caliper
MPD-B 64 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: 48.16 ft Weight: 383.6 lb



42.87 ft	GRGC - Gamma Ray
39.96 ft	CGXT - MCG External Temperature
33.24 ft	MINV - Micro-inverse
33.24 ft	MNRL - Micro-normal
34.24 ft	MLTC - MML Caliper
28.45 ft	NPRL - Limestone Neutron Por.
21.21 ft	AVOL - Annular Volume
21.21 ft	HVOL - Hole Volume
21.21 ft	CLDC - Density Caliper
19.28 ft	DEN - Compensated Density
19.28 ft	DCOR - Density Correction
19.28 ft	DPRL - Limestone Density Por.
19.22 ft	PDPE - PE
13.72 ft	FEFE - Shallow FE
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.

COMPANY	GRAND MESA OPERATING COMPANY
WELL	CAMPBELL 1-33
FIELD	WILDCAT
PROVINCE/COUNTY	GOVE
COUNTRY/STATE	U.S.A. / KANSAS

Elevation Kelly Bushing	2924.00	feet	First Reading	4679.00	feet
Elevation Drill Floor	2923.00	feet	Depth Driller	4716.00	feet
Elevation Ground Level	2919.00	feet	Depth Logger	4713.00	feet

Weatherford®

MICRORESISTIVITY LOG