

**Weatherford****MICRORESISTIVITY LOG**

COMPANY				GRAND MESA OPERATING COMPANY			
WELL				Q-R #1-17			
FIELD				Q-B			
PROVINCE/COUNTY				GOVE			
COUNTRY/STATE				U.S.A. / KANSAS			
LOCATION				2598' FNL & 2087' FEL			
				SE SW SW NE			
SEC	TWP	RGE	Other Services				
17	11S	26W	MA/MFE				
API Number		15-063-22048		MPD/MDN			
Permit Number							
Permanent Datum G.L., Elevation 2647 feet							
Log Measured From KB							
Drilling Measured From K.B.							
Date	17-OCT-2012				Elevations:		
Run Number	ONE				KB		
Depth Driller	4669.00				feet		
Depth Logger	4669.00				feet		
First Reading	4635.00				feet		
Last Reading	3600.00				feet		
Casing Driller	262.00				feet		
Casing Logger	263.00				feet		
Bit Size	7.875				inches		
Hole Fluid Type	CHEMICAL						
Density / Viscosity	9.30 lb/USg		68.00 CP				
PH / Fluid Loss	10.50		7.80 ml/30Min				
Sample Source	FLOWLINE						
Rm @ Measured Temp	0.98 @ 92.0				ohm-m		
Rmf @ Measured Temp	0.82 @ 92.0				ohm-m		
Rmc @ Measured Temp	1.22 @ 92.0				ohm-m		
Source Rmf / Rmc	CALC		CALC				
Rm @ BHT	0.79 @115.0		ohm-m				
Time Since Circulation	4 HOURS						
Max Recorded Temp	115.00		deg F				
Equipment Name	COMPACT						
Equipment / Base	13096		LIB				
Recorded By	L. SCOTT						
Witnessed By	BOB SCHREIBER						
S.O. / JOB#	3537893				LB12-278		

BOREHOLE RECORD

Last Edited: 17-OCT-2012 12:08

Bit Size inches	Depth From feet	Depth To feet
7.875	263.00	4669.00

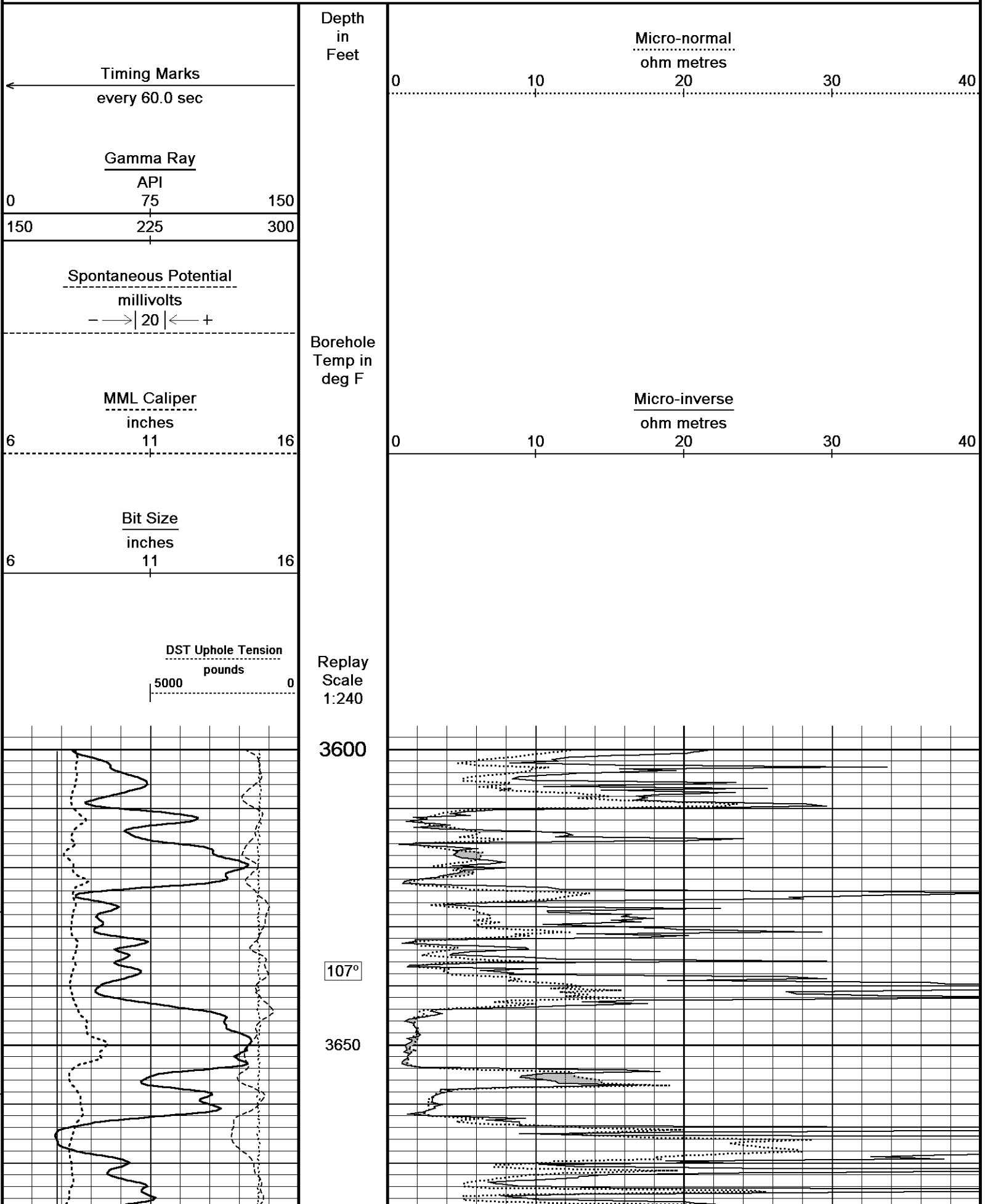
CASING RECORD

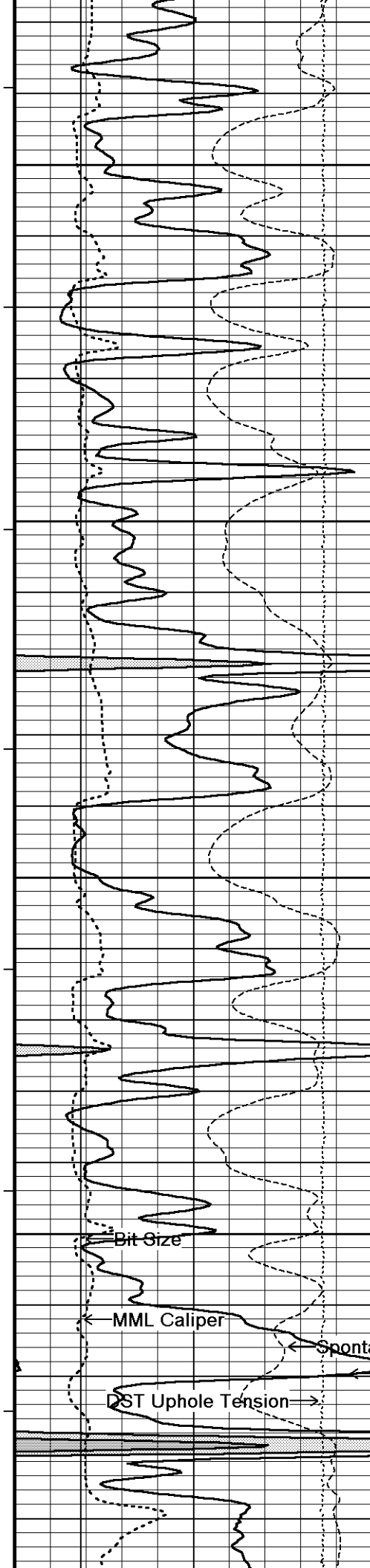
Type	Size inches	Depth From feet	Shoe Depth feet	Weight pounds/ft
SURFACE	8.625	0.00	263.00	24.00

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= 1928 cubic feet
Annular hole volume with 5.5 Inch casing from TD to 3600ft.= 213 cubic feet
Service order: 3537893
Rig: Murfin #8
Engineer: L. Scott
Operator(s): J. LaPoint, N. Adame

All interpretations are opinions based on inferences from electrical or other measurements and we cannot, and do not, guarantee the accuracy or correctness of any interpretations, and we shall not, except in the case of gross or wilful negligence on our part, be liable or responsible for any loss, costs, damages or expenses incurred or sustained by anyone resulting from any interpretation made by any of our officers, agents or employees. These interpretations are also subject to our general terms and conditions in our price schedule.





108°

3700

108°

3750

108°

3800

108°

3850

108°

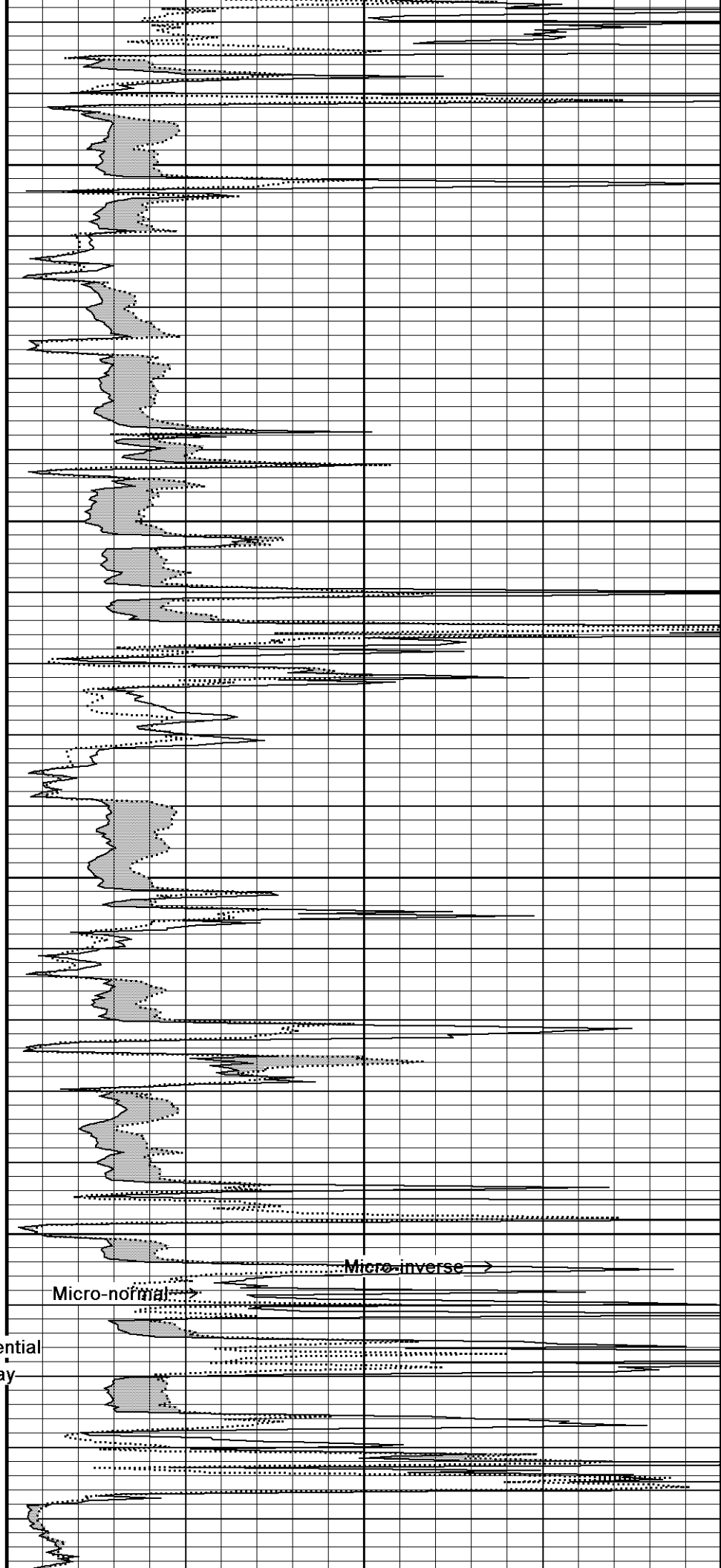
Bit Size

MML Caliper

Spontaneous Potential

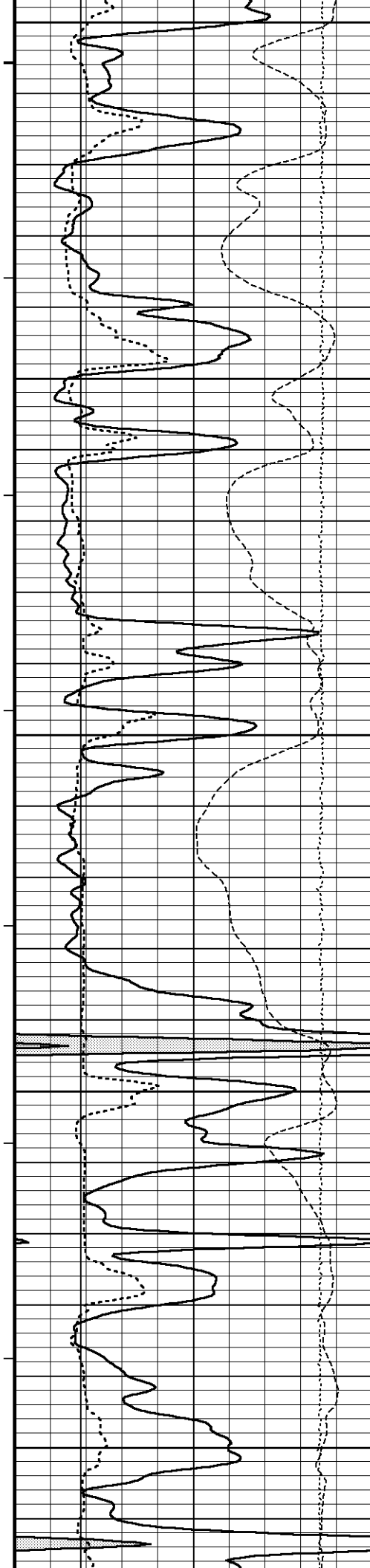
Gamma Ray

DST Uphole Tension



Micro-normal

Micro-inverse



3900

108°

3950

108°

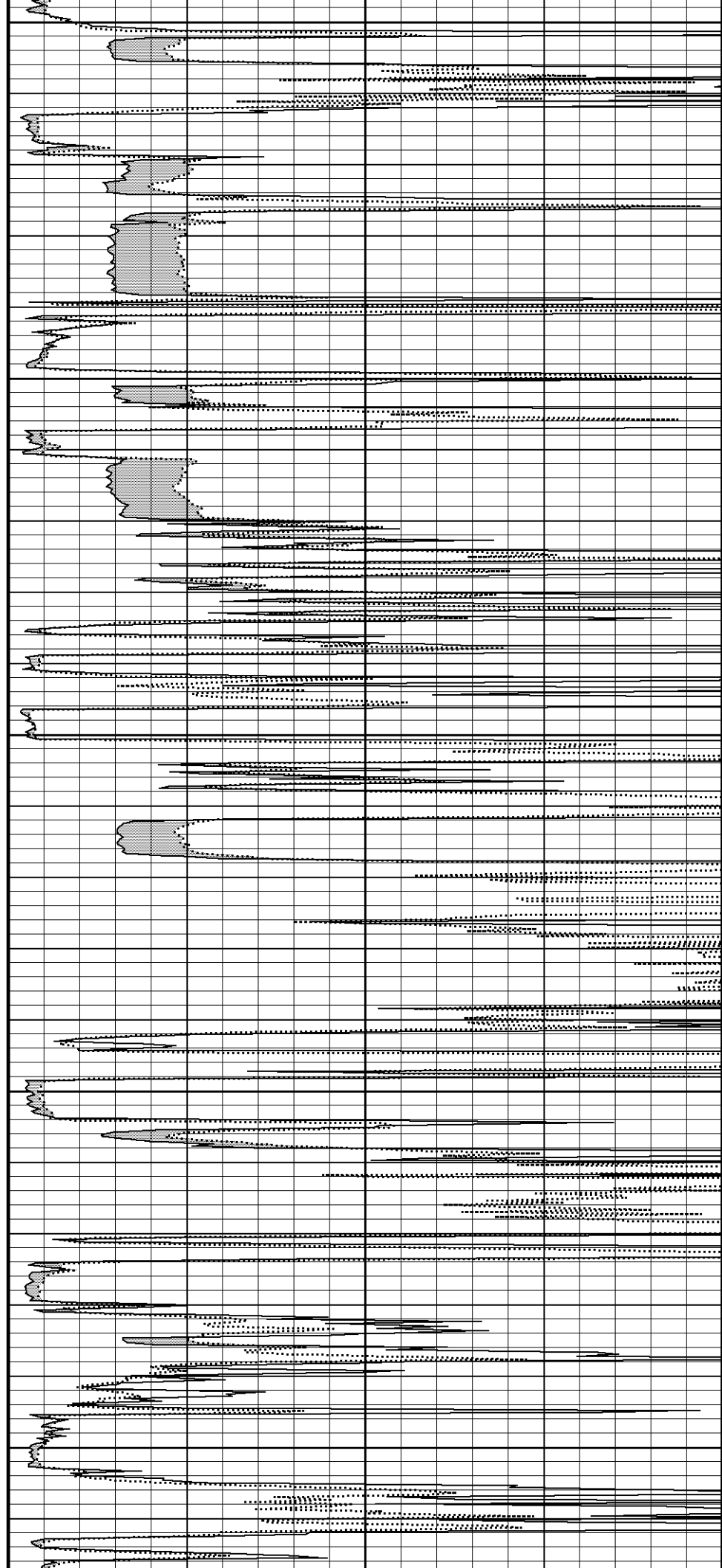
4000

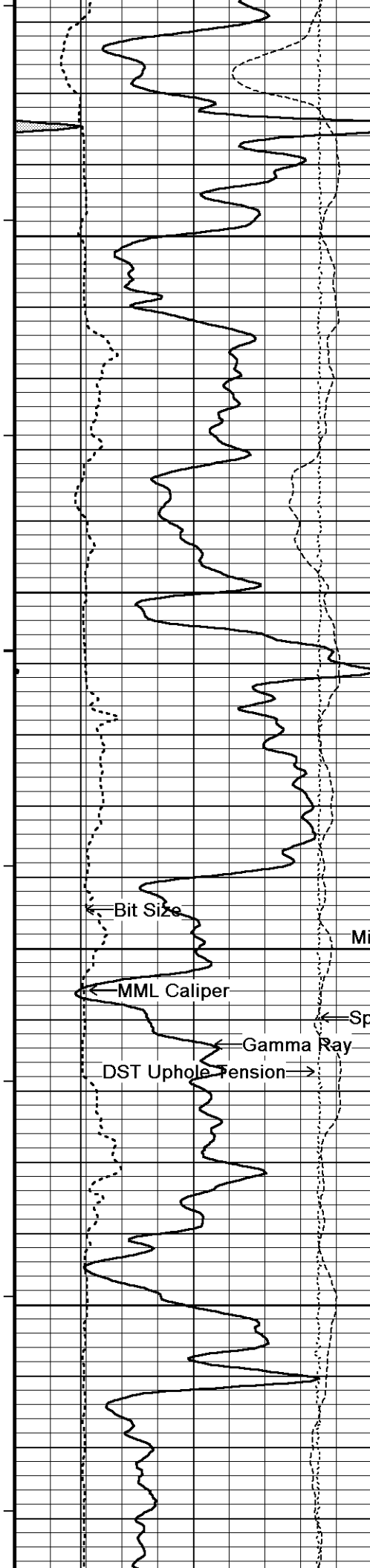
109°

4050

109°

4100





110°

4150

110°

4200

111°

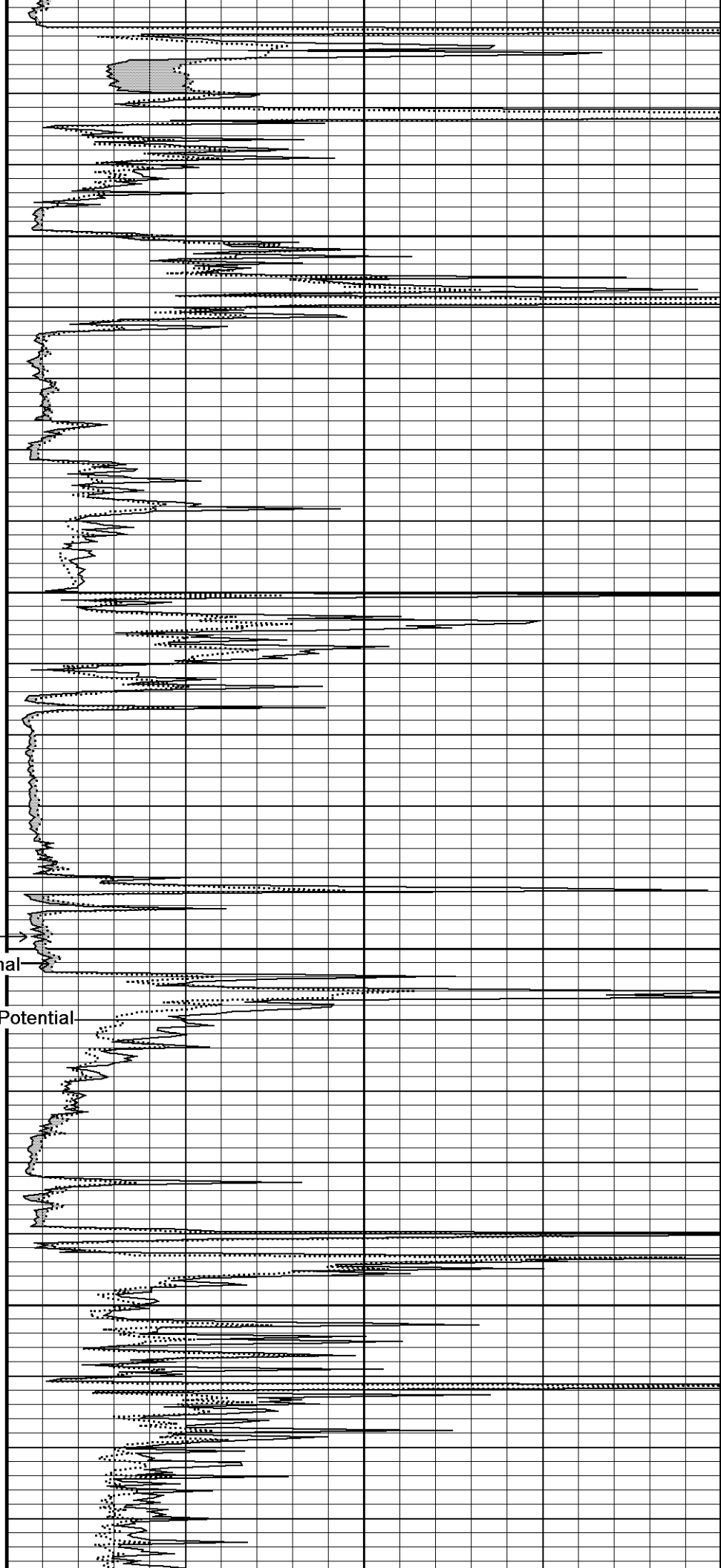
4250

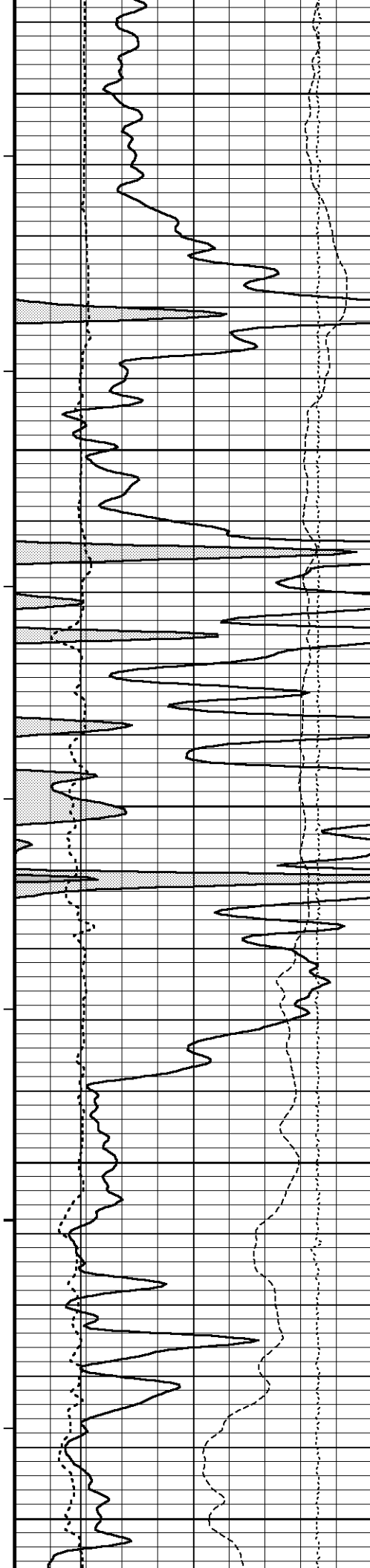
111°

4300

4400

Micro-inverse
Micro-normal
Spontaneous Potential





111°

4350

111°

4400

112°

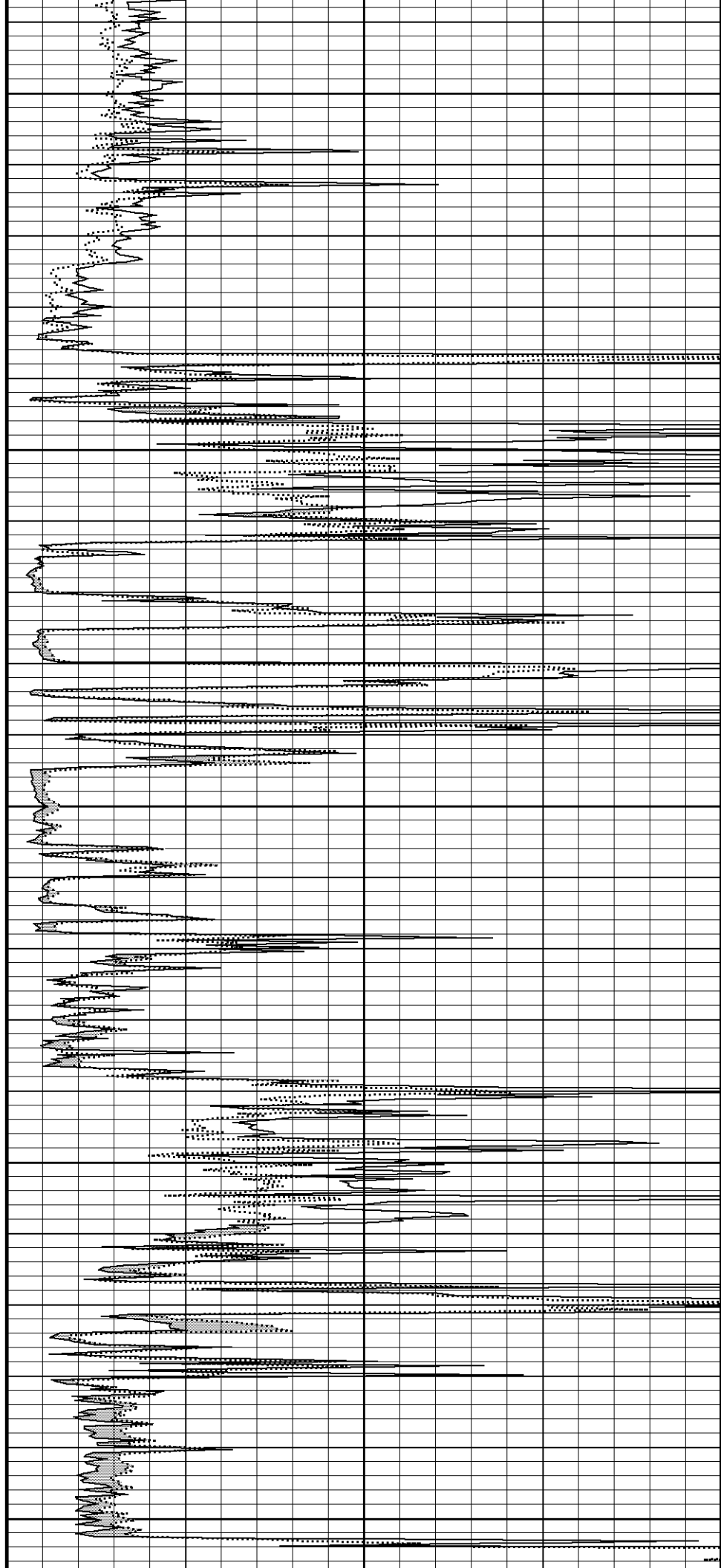
4450

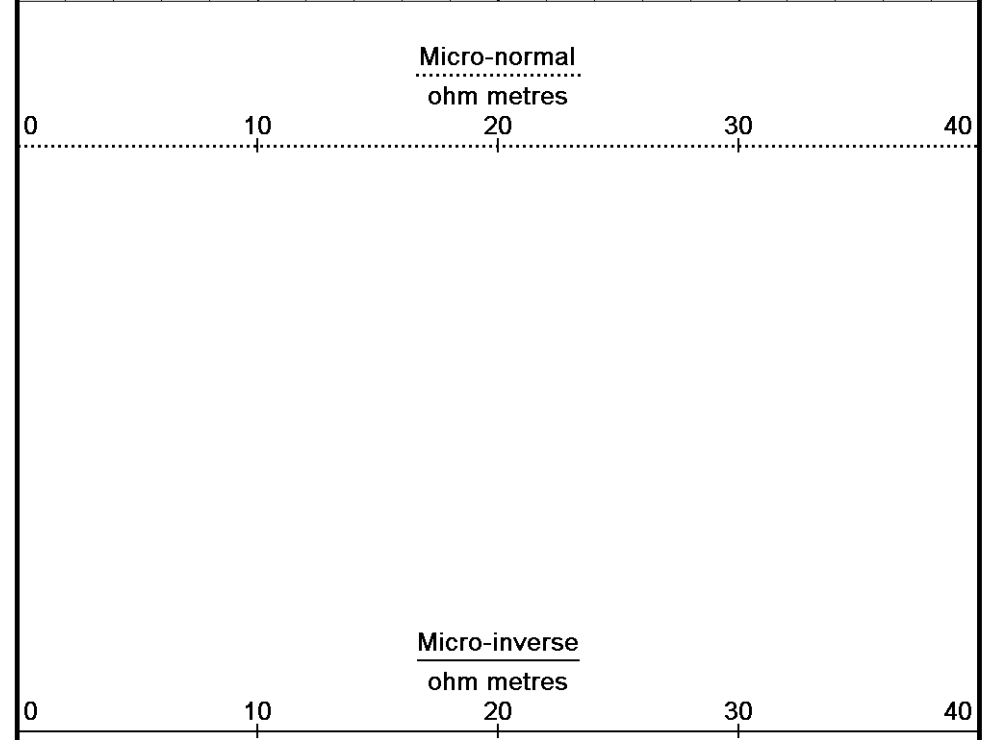
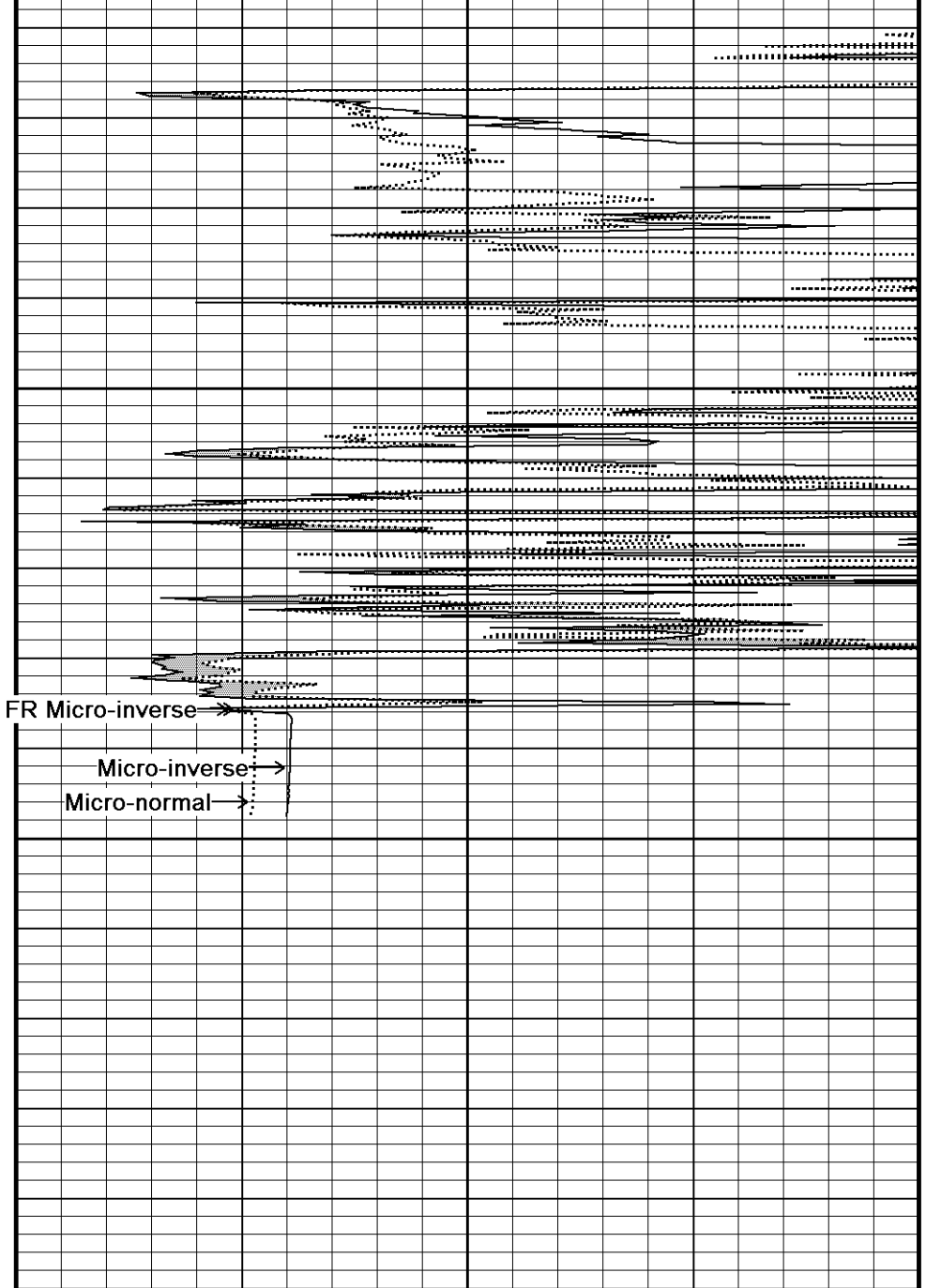
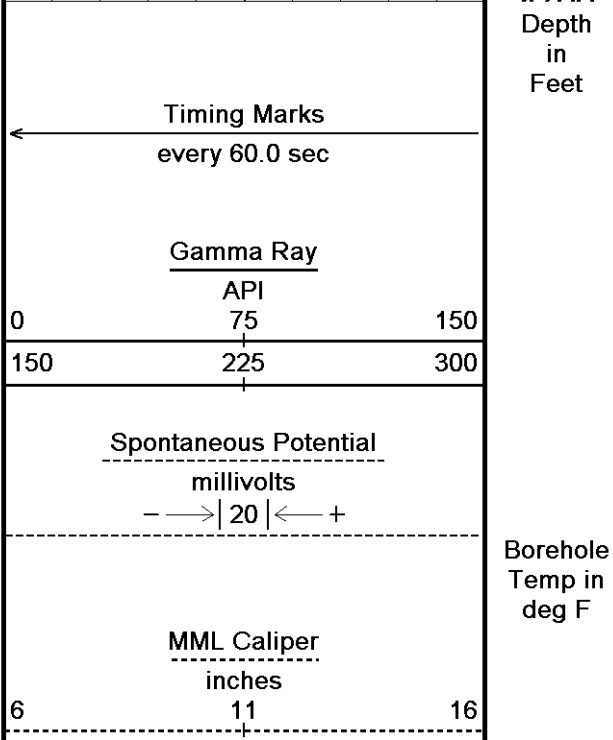
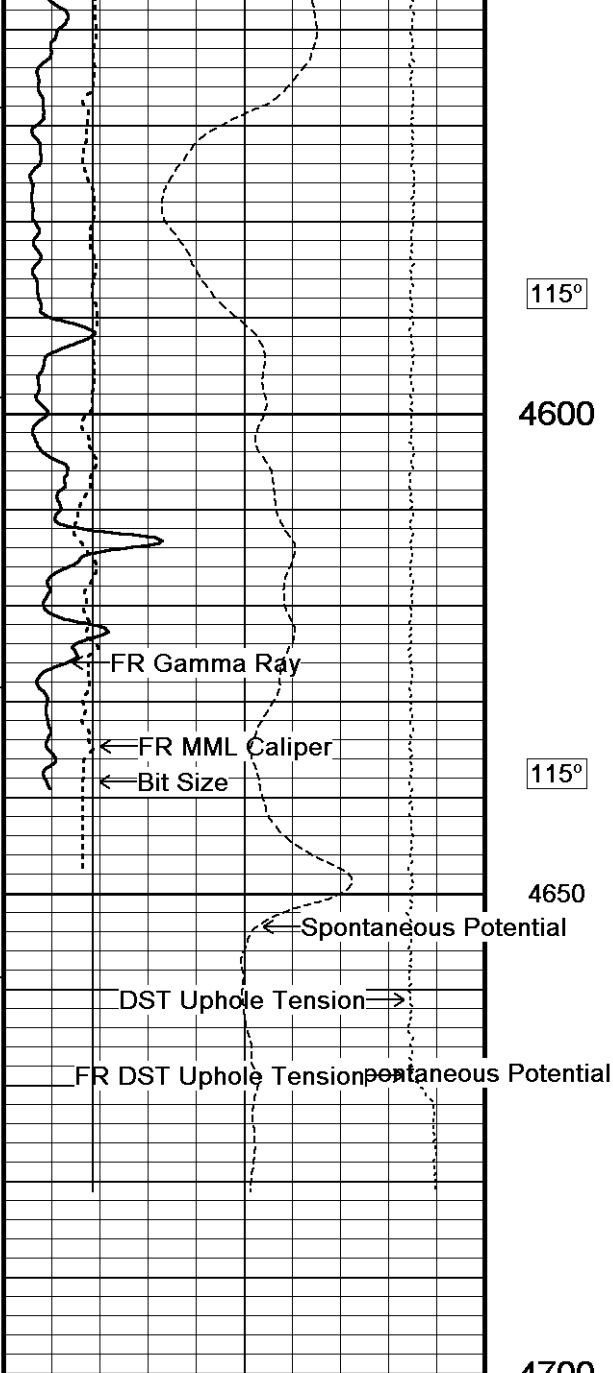
113°

4500

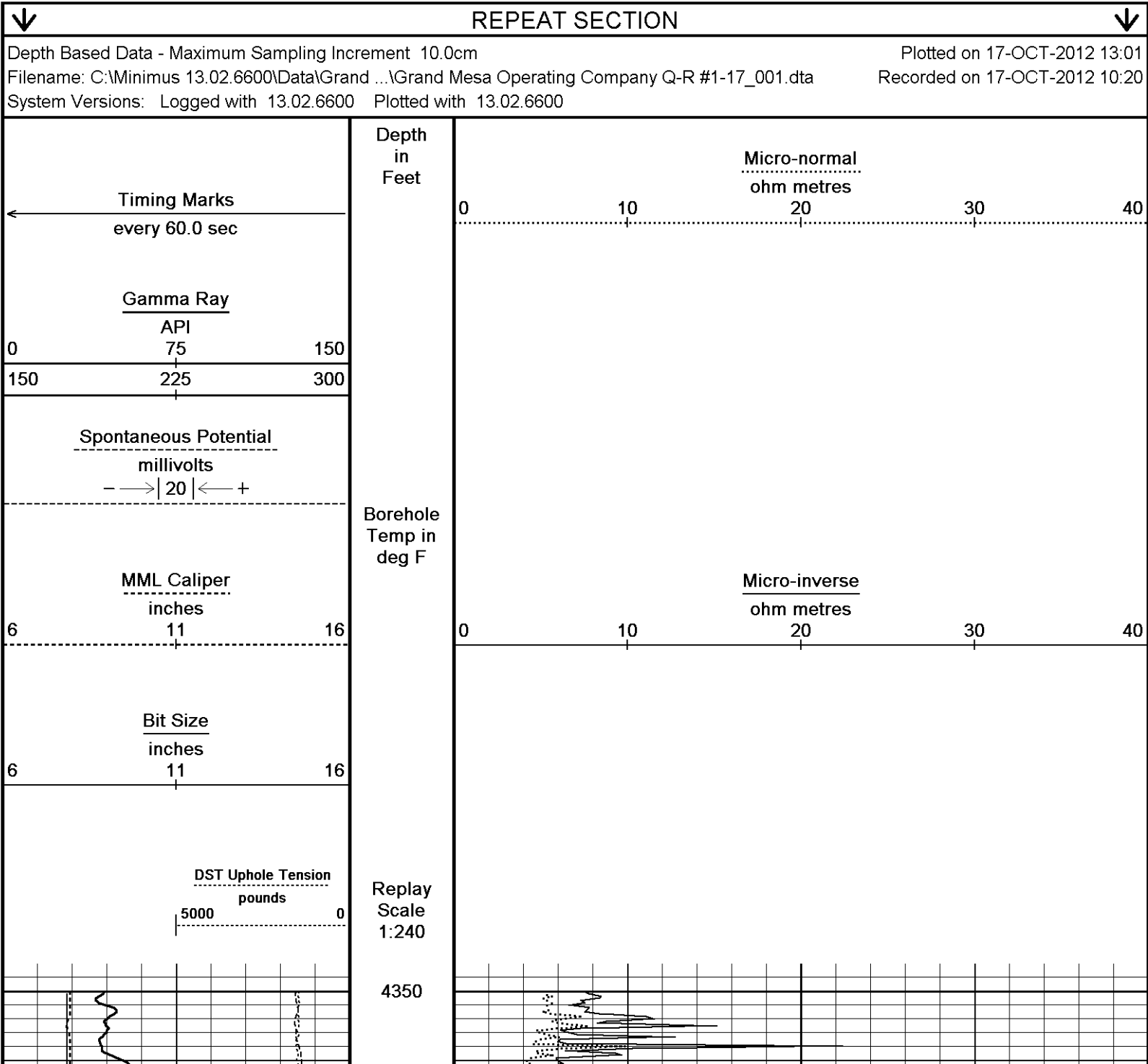
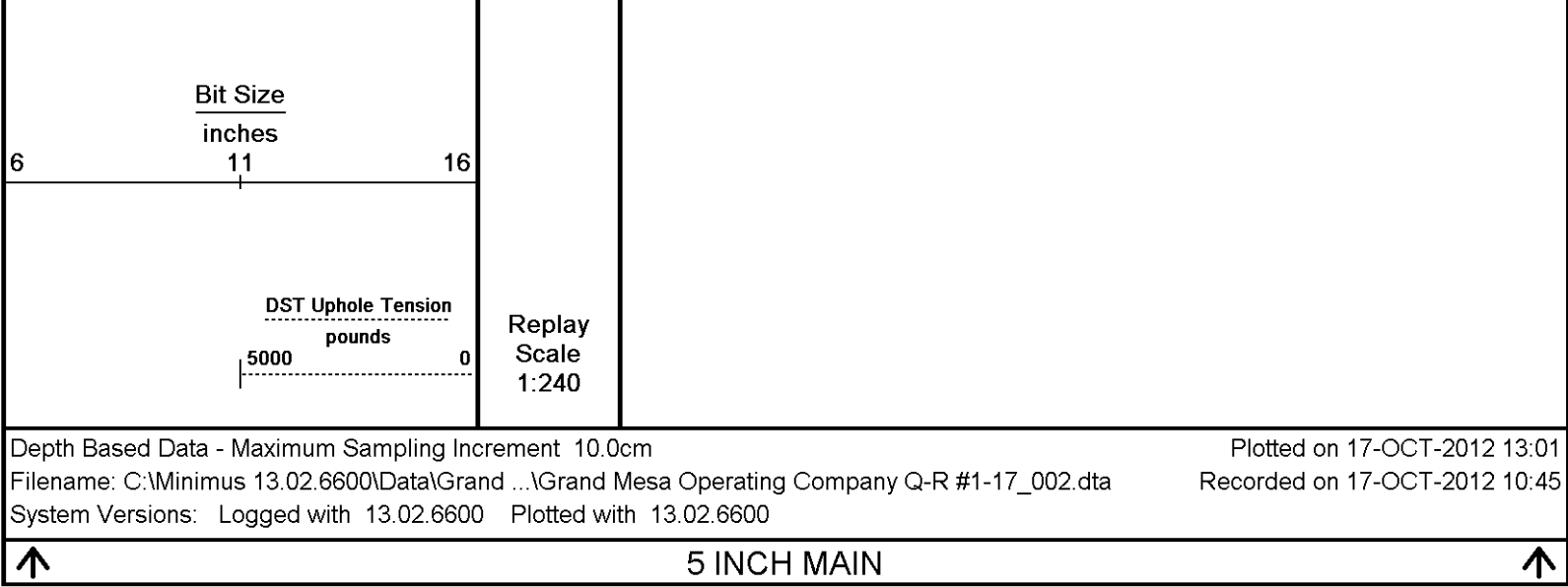
114°

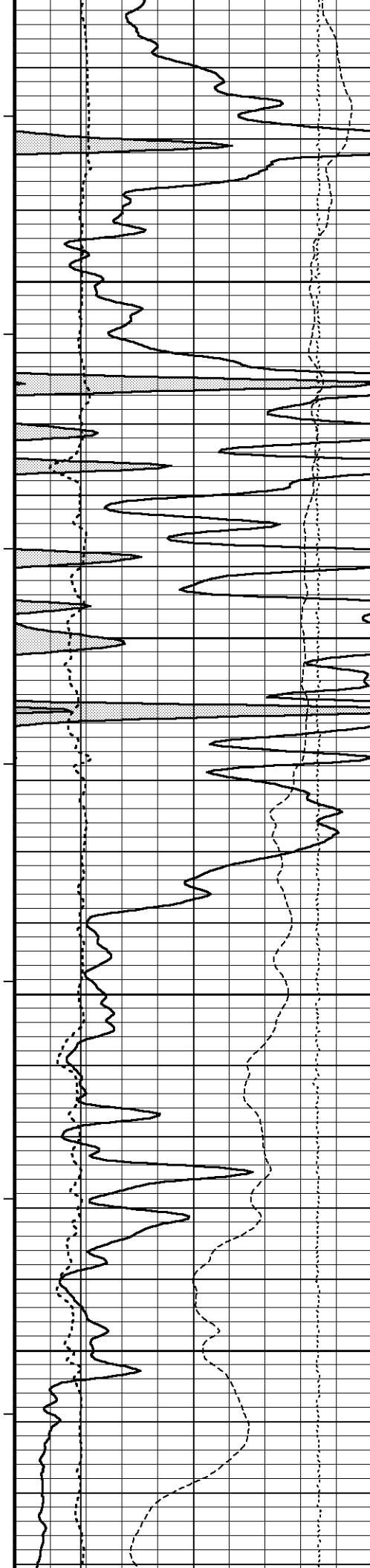
4550





Borehole
Temp in
deg F





110°

4400

111°

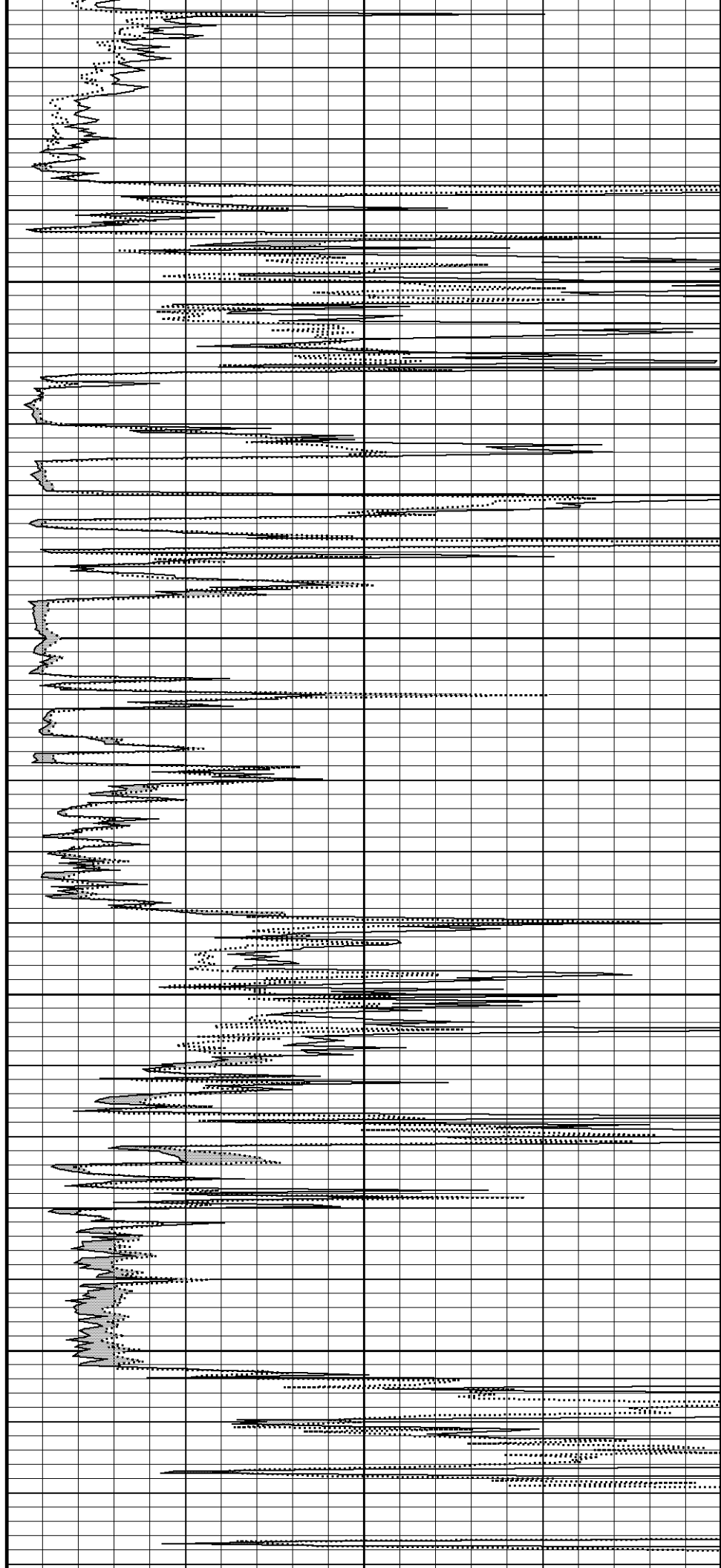
4450

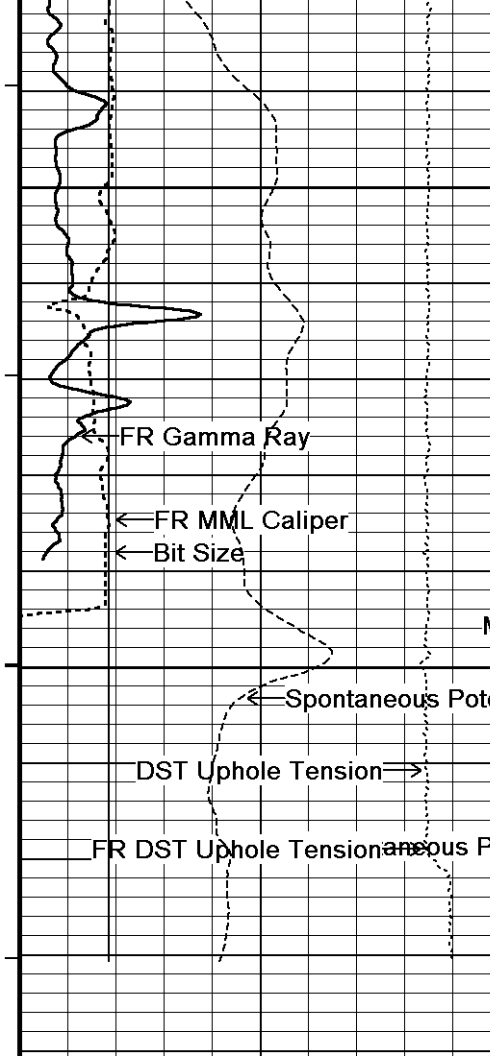
111°

4500

112°

4550





113°

4600

113°

4650

4690

Depth
in
Feet

Timing Marks
every 60.0 sec

Gamma Ray

API		
0	75	150
150	225	300

Spontaneous Potential

millivolts
- - -> | 20 | < - - +

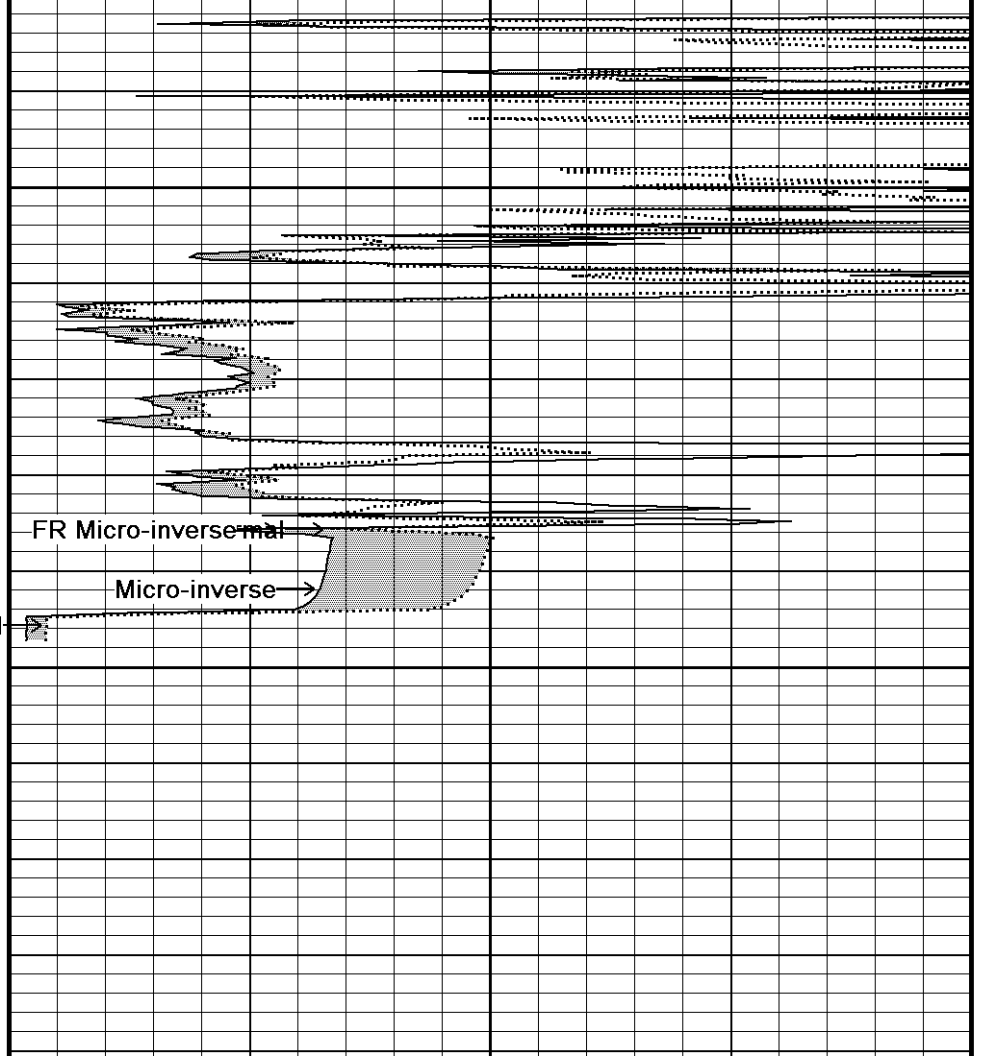
MML Caliper

inches		
6	11	16

Bit Size

inches		
6	11	16

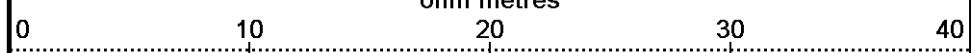
Borehole
Temp in
deg F



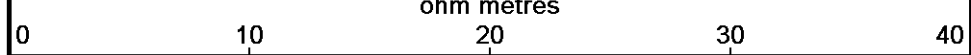
FR Micro-inverse normal

Micro-inverse

Micro-normal
ohm metres



Micro-inverse
ohm metres



DS1 Up-hole Tension
pounds
5000 0

Replay
Scale
1:240

Depth Based Data - Maximum Sampling Increment 10.0cm
Plotted on 17-OCT-2012 13:01
Filename: C:\Minimus 13.02.6600\Data\Grand ...Grand Mesa Operating Company Q-R #1-17_001.dta
Recorded on 17-OCT-2012 10:20
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 Q-R #17\Grand Mesa Operating Company Q-R #1-17_001.dta

General Constants All 000

Last Edited on 17-OCT-2012,08:05

General Parameters

Mud Resistivity	0.980	ohm-metres
Mud Resistivity Temperature	92.000	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
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Caliper Calibration MML-A 16

Base Calibration on 30-SEP-2012 19:38

Caliper Calibration MML-A 16			Base Calibration on 08-SEP-2012 19:00 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		
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 17-OCT-2012,08:04	
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 17-OCT-2012,08:04		
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	
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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 17-OCT-2012,08:03	
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	Low	High	Calibrated (mmho/m)
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)		Field Check (mmho/m)
	Low	High	Low 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 17-OCT-2012,08:03	
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

	Near	Far	Near	Far
Reference 1	58951	32645	59556	30836
Reference 2	24760	2893	24941	2541

Field Check at Base

1181.6	1375.1
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Field Check

1187.9	1371.9
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PE Calibration

Base Calibration

	WS	Measured WH	Ratio	Calibrated 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
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Field Check

215.0	1059.8
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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	
0.00	0.00	

DOWNHOLE EQUIPMENT

C:\Minimus 13.02.6600\Data\Grand Mesa Operating Q-R #17\Grand Mesa Operating Company Q-R #1-17_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

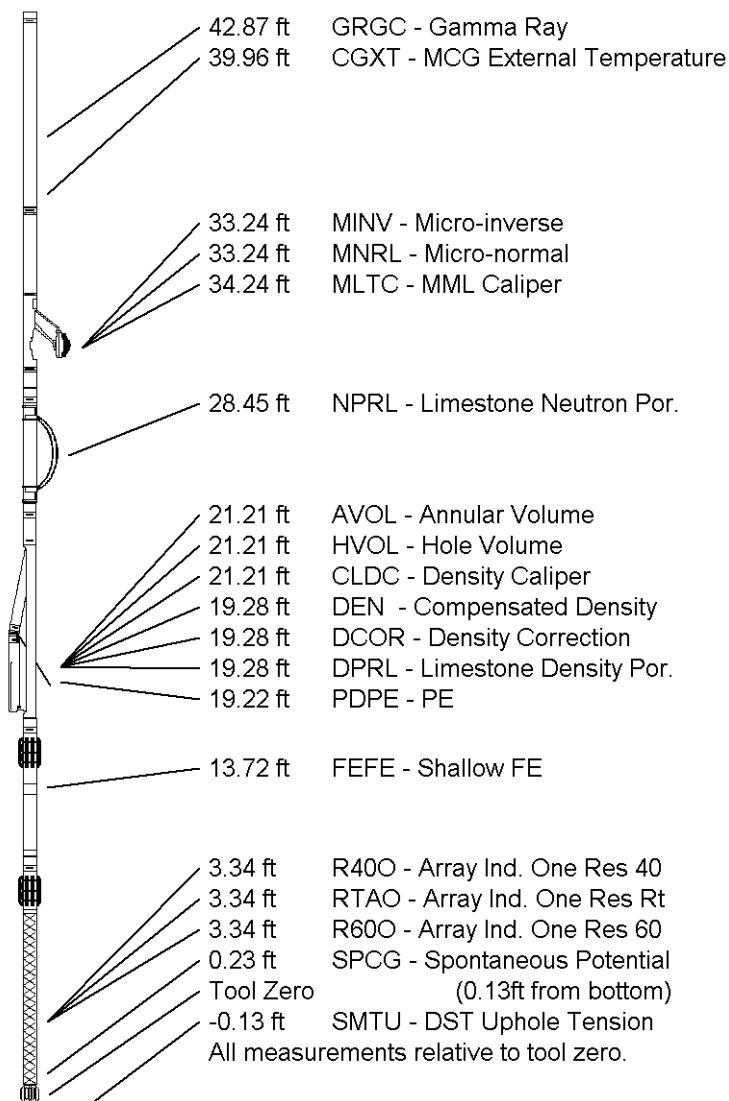
Compact Neutron
MDN-A.B 66 LG: 5.04 ft WT: 50.7 lb OD: 2.24 in

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



COMPANY

GRAND MESA OPERATING COMPANY

WELL

Q-R #1-17

FIELD

Q-B

PROVINCE/COUNTY

GOVE

COUNTRY/STATE

U.S.A. / KANSAS

Elevation Kelly Bushing	2652.00	feet	First Reading	4635.00	feet
Elevation Drill Floor	2651.00	feet	Depth Driller	4669.00	feet
Elevation Ground Level	2647.00	feet	Depth Logger	4669.00	feet



Weatherford®

MICRORESISTIVITY LOG