



Weatherford

MICRORESISTIVITY LOG

COMPANY					GRAND MESA OPERATING COMPANY				
WELL					DBY #5-16				
FIELD					WILDCAT				
PROVINCE/COUNTY					SCOTT				
COUNTRY/STATE					U.S.A. / KANSAS				
LOCATION					1556' FNL & 2119' FEL NE NW SW NE				
SEC	TWP	RGE	Other Services			MAI/MFE			
16	16S	33W	MPD/MDN						
API Number		15-171-20924							
Permit Number									
Permanent Datum G.L., Elevation 2969 feet						Elevations:			
Log Measured From KB						KB 2974.00			
Drilling Measured From K.B.						DF 2973.00			
						GL 2969.00			
Date	21-JAN-2013								
Run Number	ONE								
Service Order	3537849								
Depth Driller	4740.00					feet			
Depth Logger	4740.00					feet			
First Reading	4706.00					feet			
Last Reading	3700.00					feet			
Casing Driller	221.00					feet			
Casing Logger	221.00					inches			
Bit Size	7.875								
Hole Fluid Type	CHEMICAL					lb/USg			
Density / Viscosity	9.20 lb/USg					49.00 CP			
PH / Fluid Loss	10.00					10.00			
Sample Source	FLOWLINE								
Rm @ Measured Temp	0.58 @ 93.0					ohm-m			
Rmf @ Measured Temp	0.46 @ 93.0					ohm-m			
Rmc @ Measured Temp	0.70 @ 93.0					ohm-m			
Source Rmf / Rmc	CALC		CALC						
Rm @ BHT	0.49 @ 112.0					ohm-m			
Time Since Circulation	4 HOURS								
Max Recorded Temp	112.00					deg F			
Equipment / Base	13057		LIB						
Recorded By	LYNN SCOTT								
Witnessed By	KENT MATSON								
IOB#	LB13-019								

BOREHOLE RECORD

Last Edited: 21-JAN-2013 18:46

Bit Size inches	Depth From feet	Depth To feet
7.875	221.00	4740.00

CASING RECORD

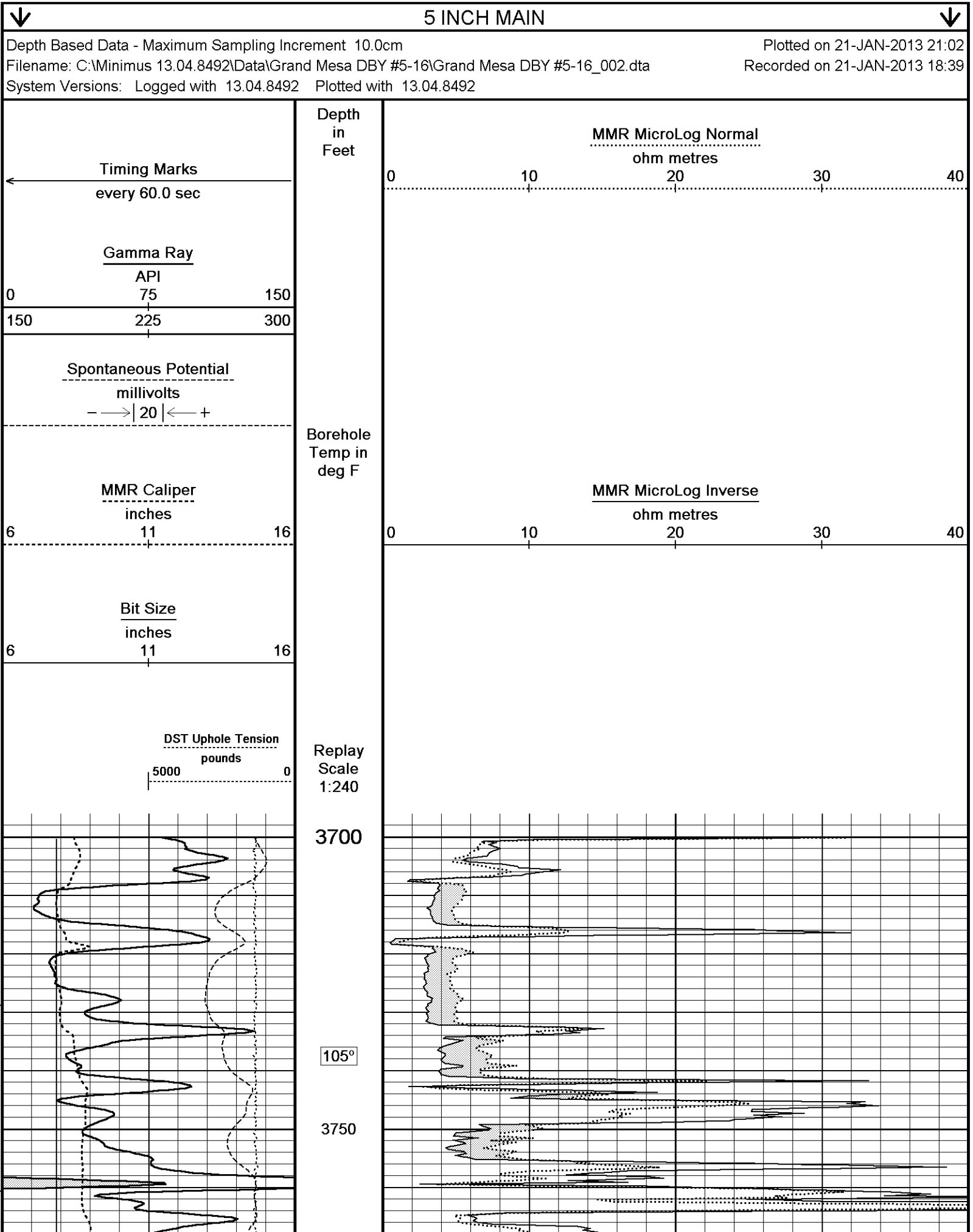
Type	Size inches	Depth From feet	Shoe Depth feet	Weight pounds/ft
SURFACE	8.625	0.00	221.00	24.00

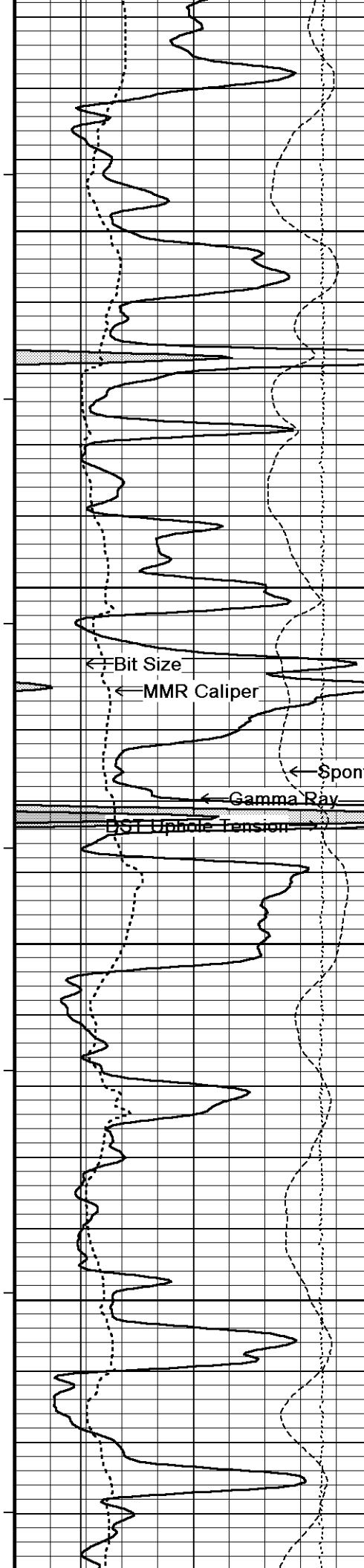
REMARKS

Tools Ran: MCG, MML, MDN, MPD, MFE, MAI ran in combination.
Hardware Used: MDN Dual bowspring used. MPD 8 inch profile plate used. MAI and MFE 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.
Tight pulls, washouts and borehole rugosity will affect data quality.
Total hole volume from TD to Surface Casing= 2354 cu. ft.
Annular volume with 5.5 inch production casing from TD to 3700 ft.= 258 cu. ft.
Service order: #3537849
Rig: Murfin #24
Engineer: L. Scott
Operator(s): B. Reeves

Software duplicates the pH value onto the fluid loss. The fluid loss is 8.0

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





105°

3800

106°

3850

MMR MicroLog Normal

Spontaneous Potential

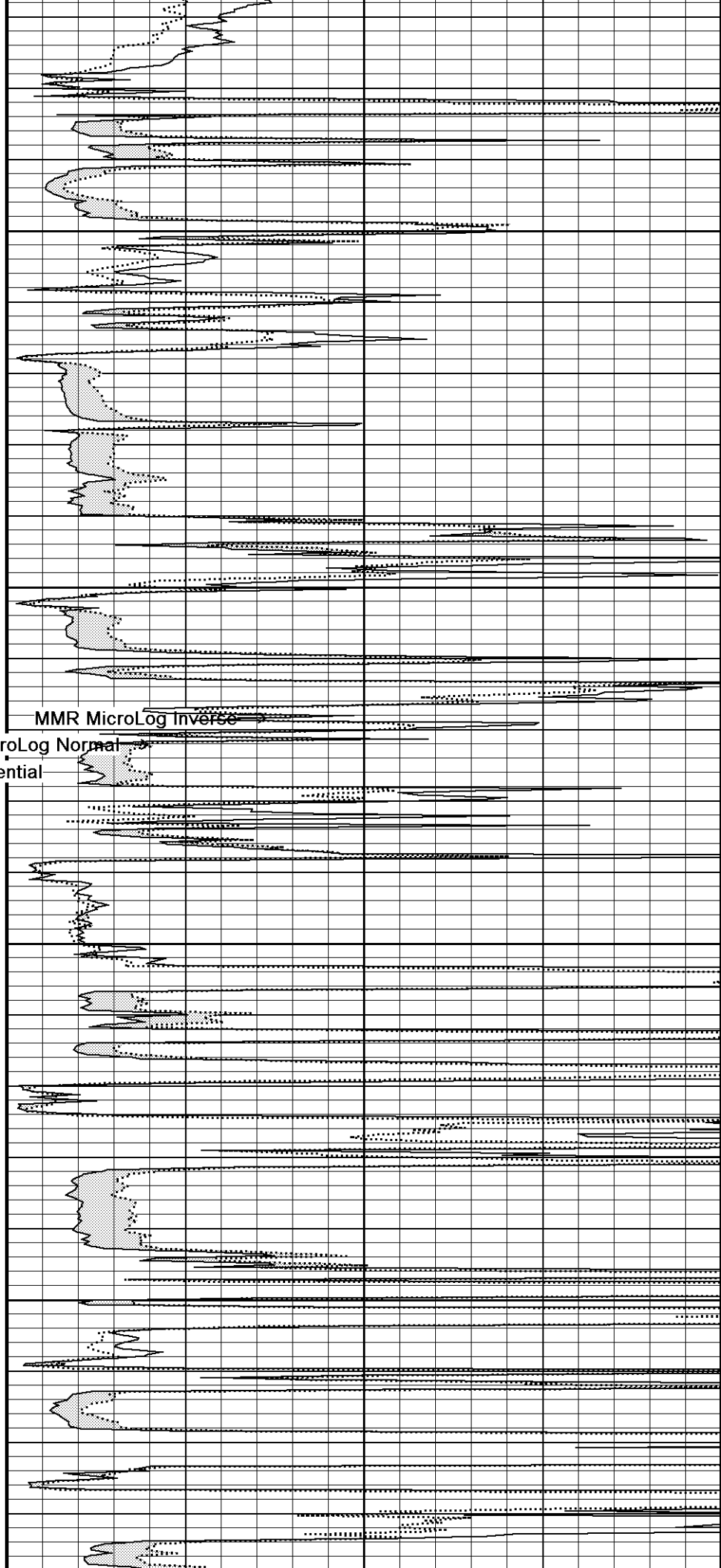
106°

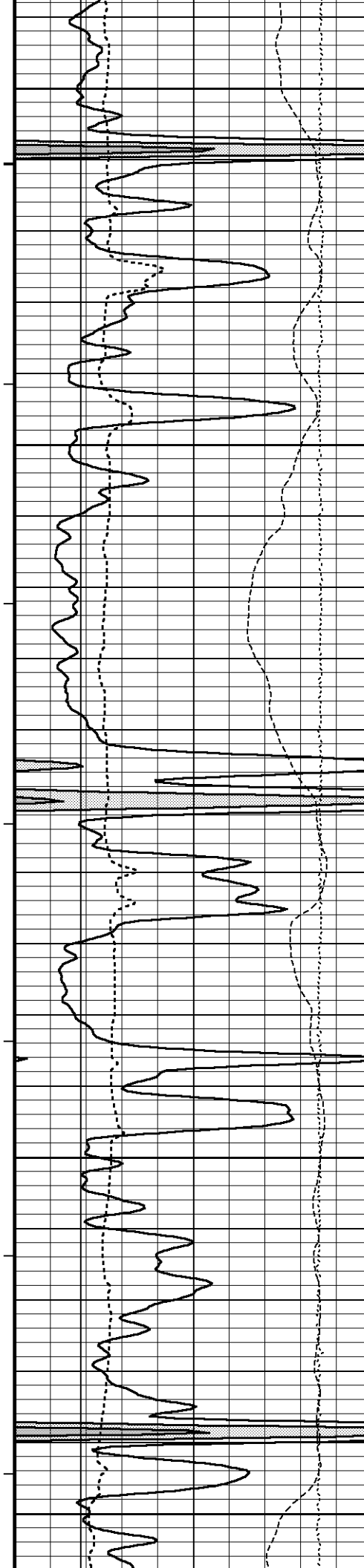
3900

107°

3950

107°





107°

4000

107°

4050

108°

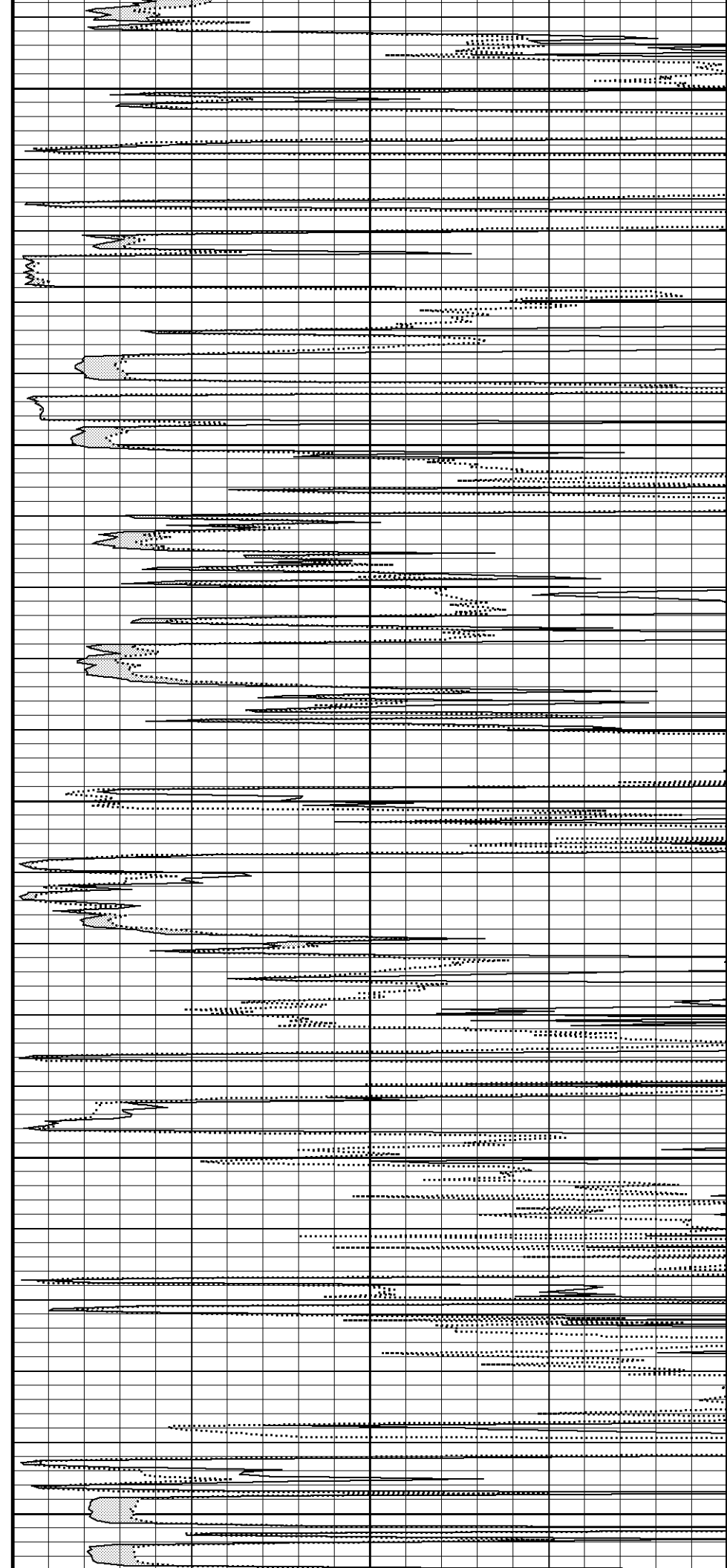
4100

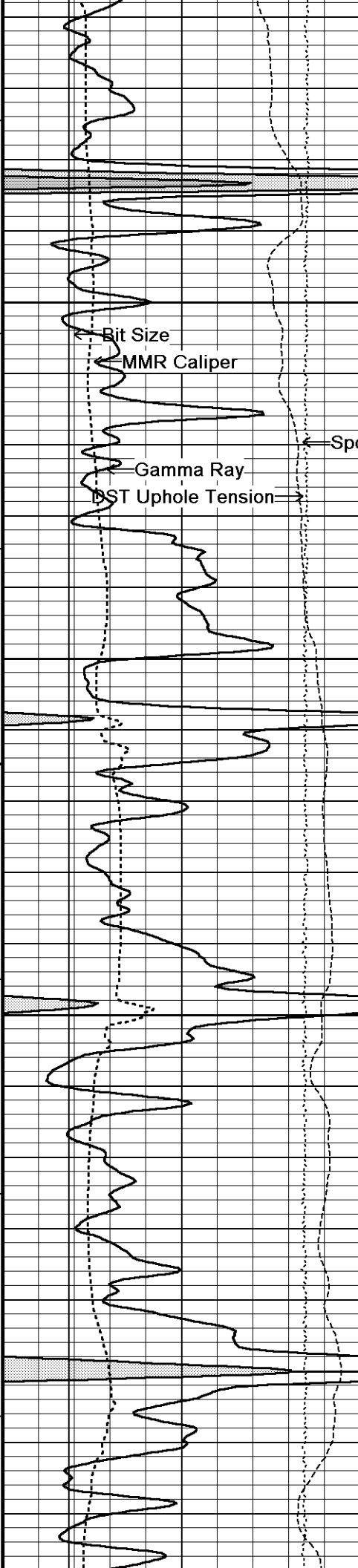
108°

4150

108°

4200





108°

4250

Spontaneous Potential

109°

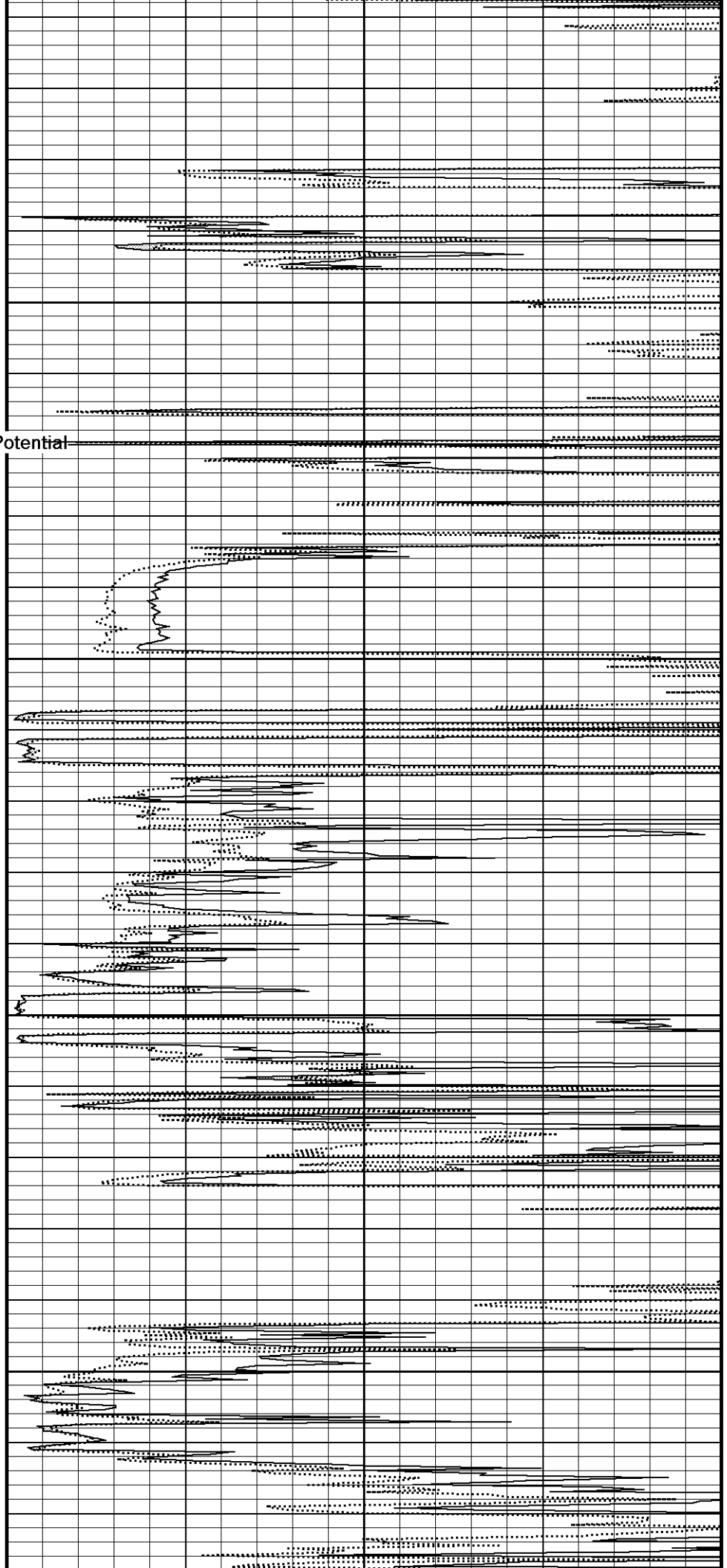
4300

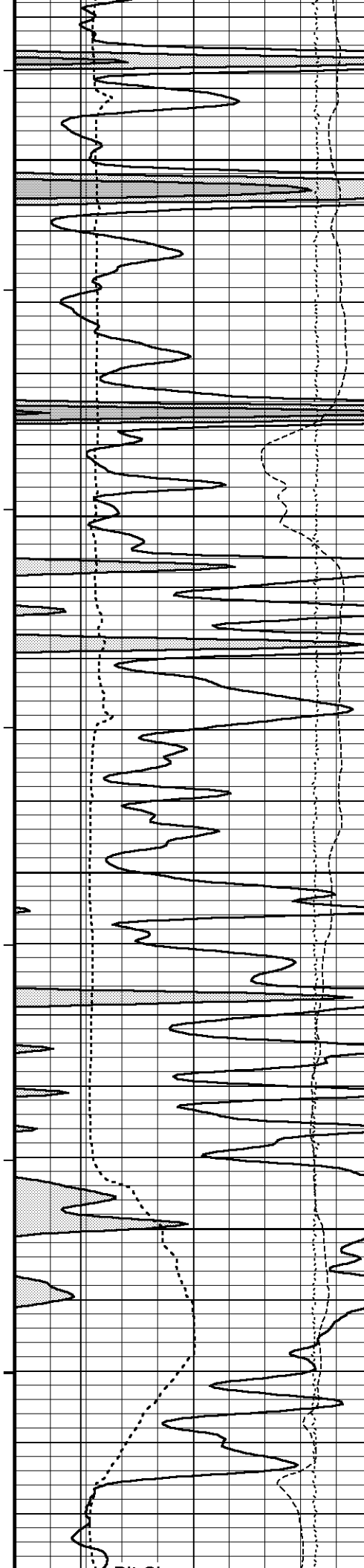
109°

4350

110°

4400





110°

4450

110°

4500

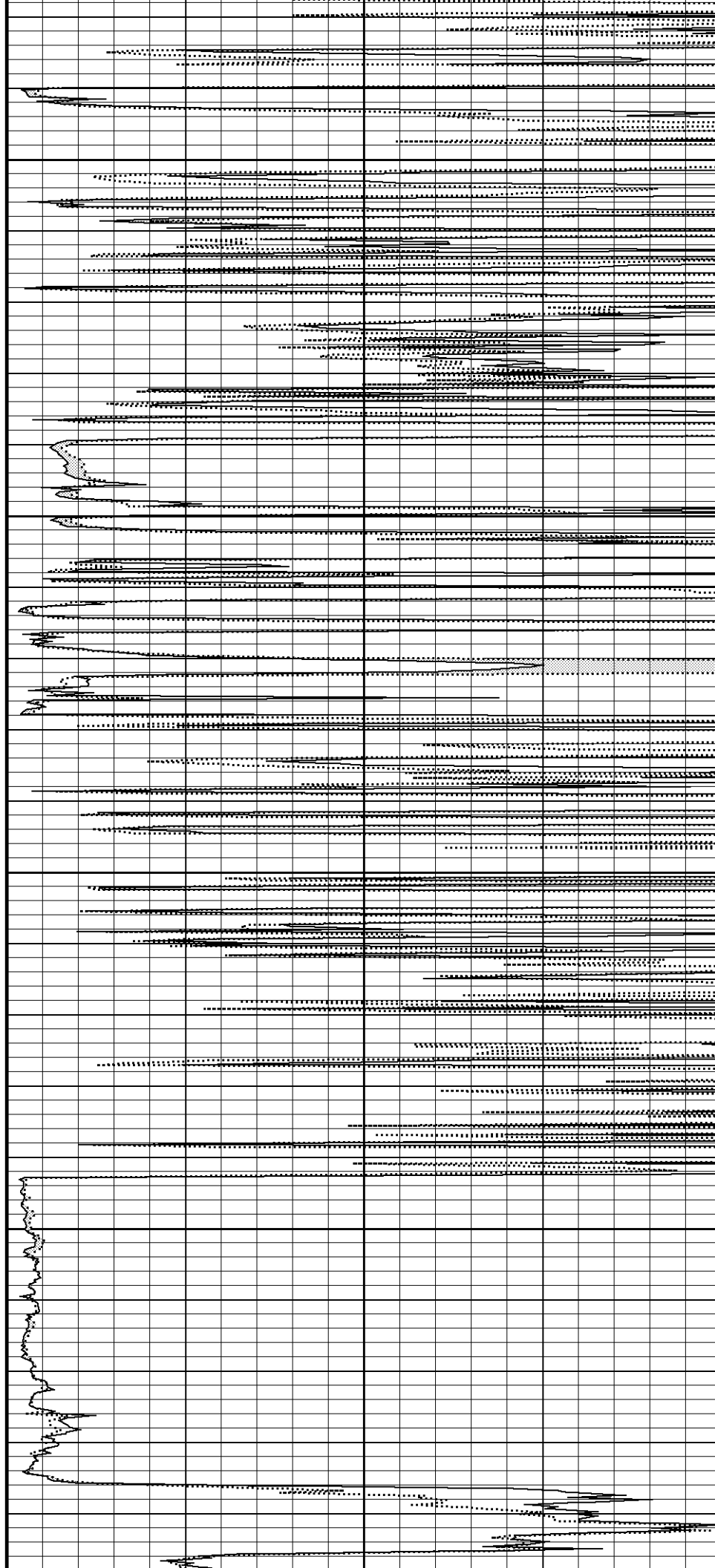
110°

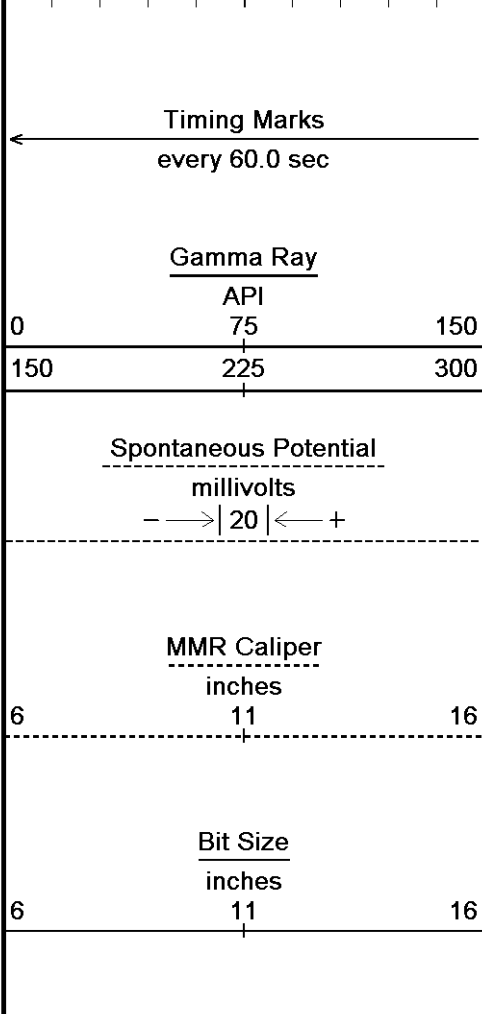
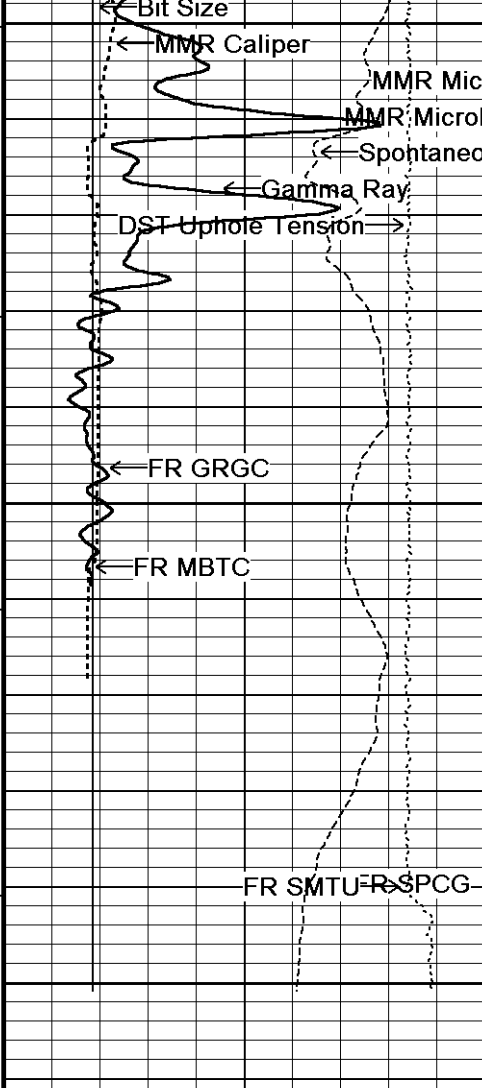
4550

111°

4600

112°





4650

112°

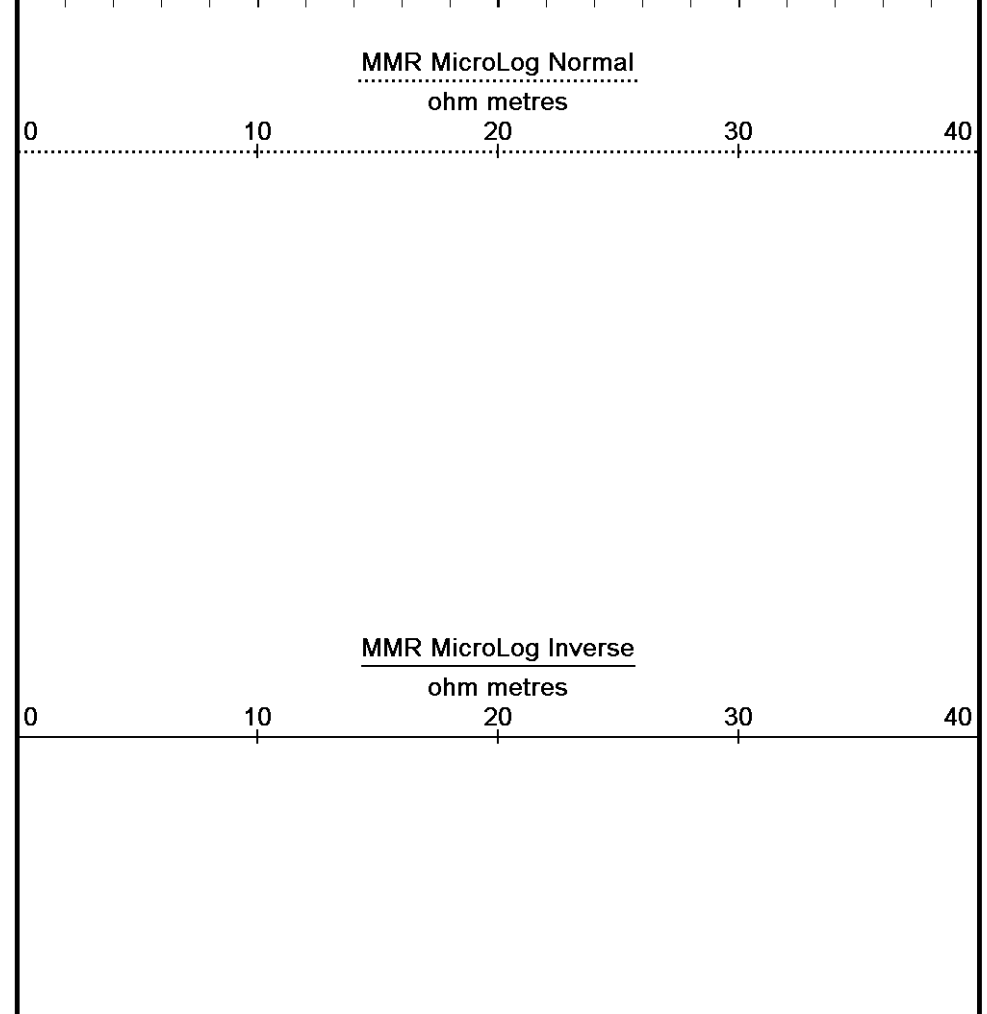
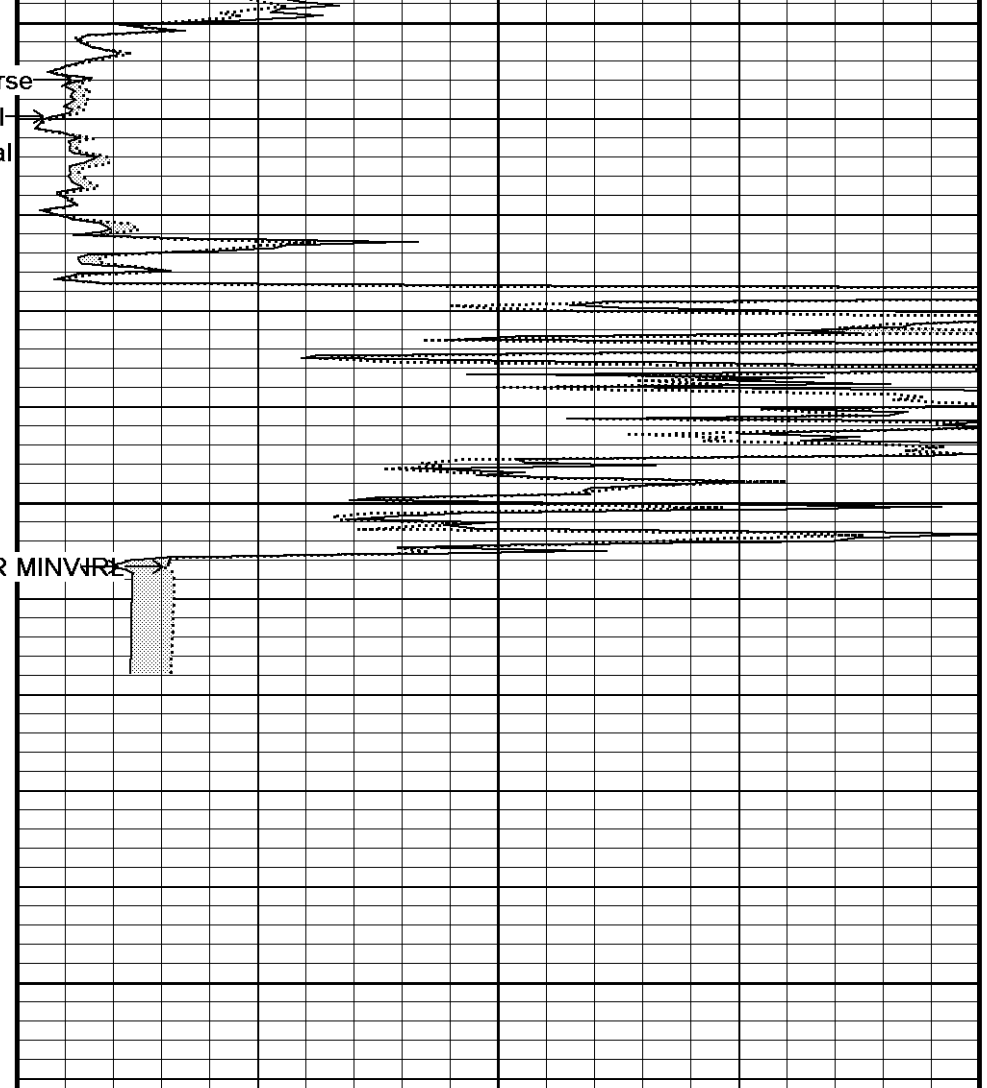
4700

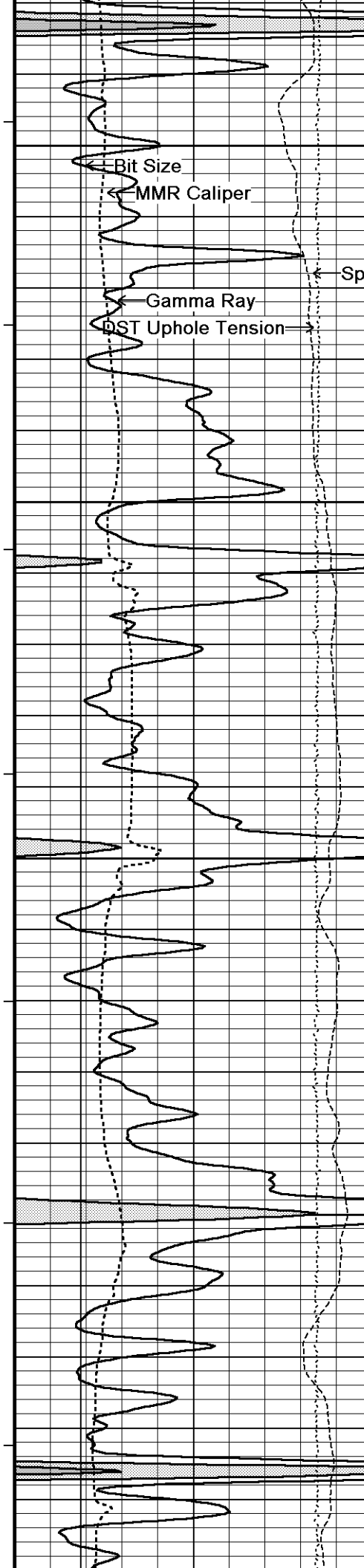
4750

4760

Depth
in
Feet

Borehole
Temp in
deg F





108°

4250

Spontaneous Potential

108°

4300

108°

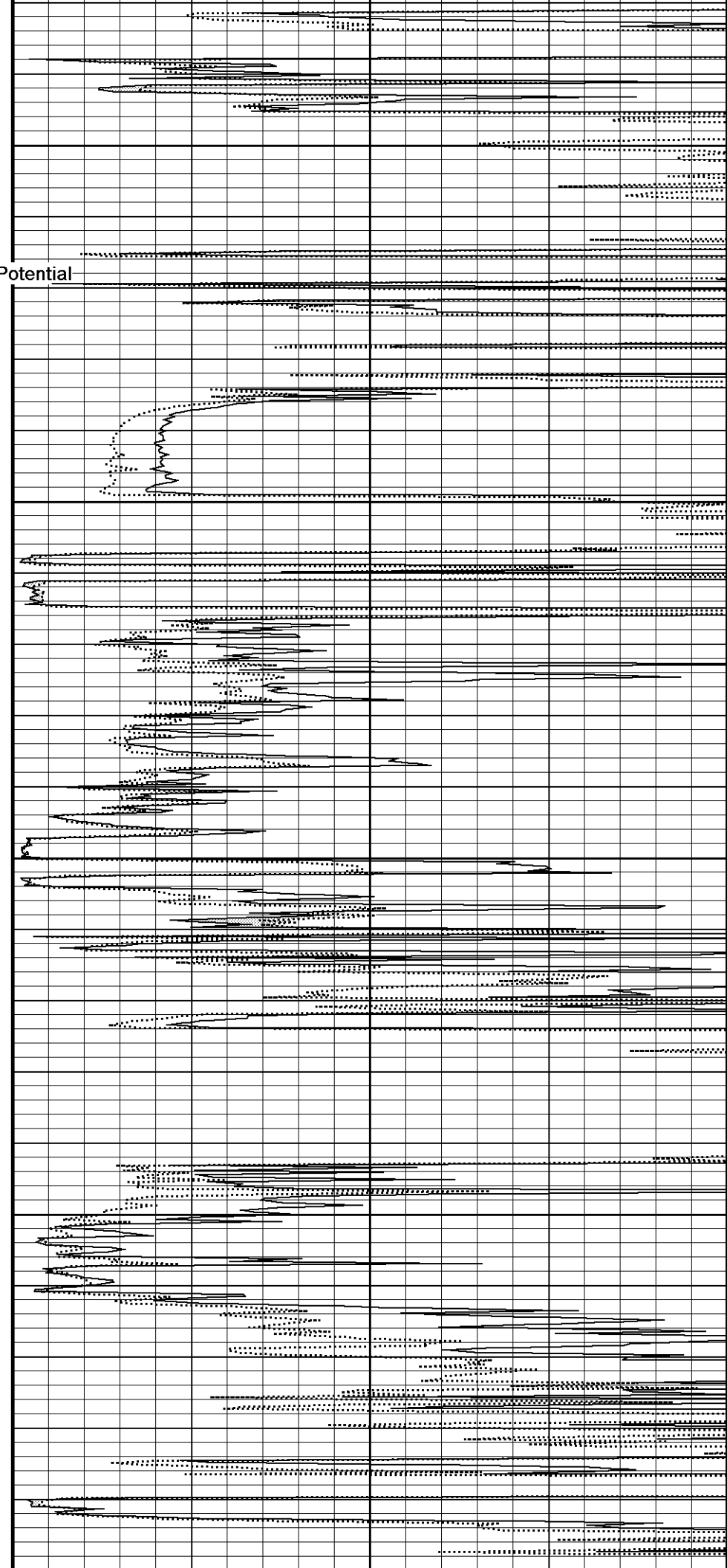
4350

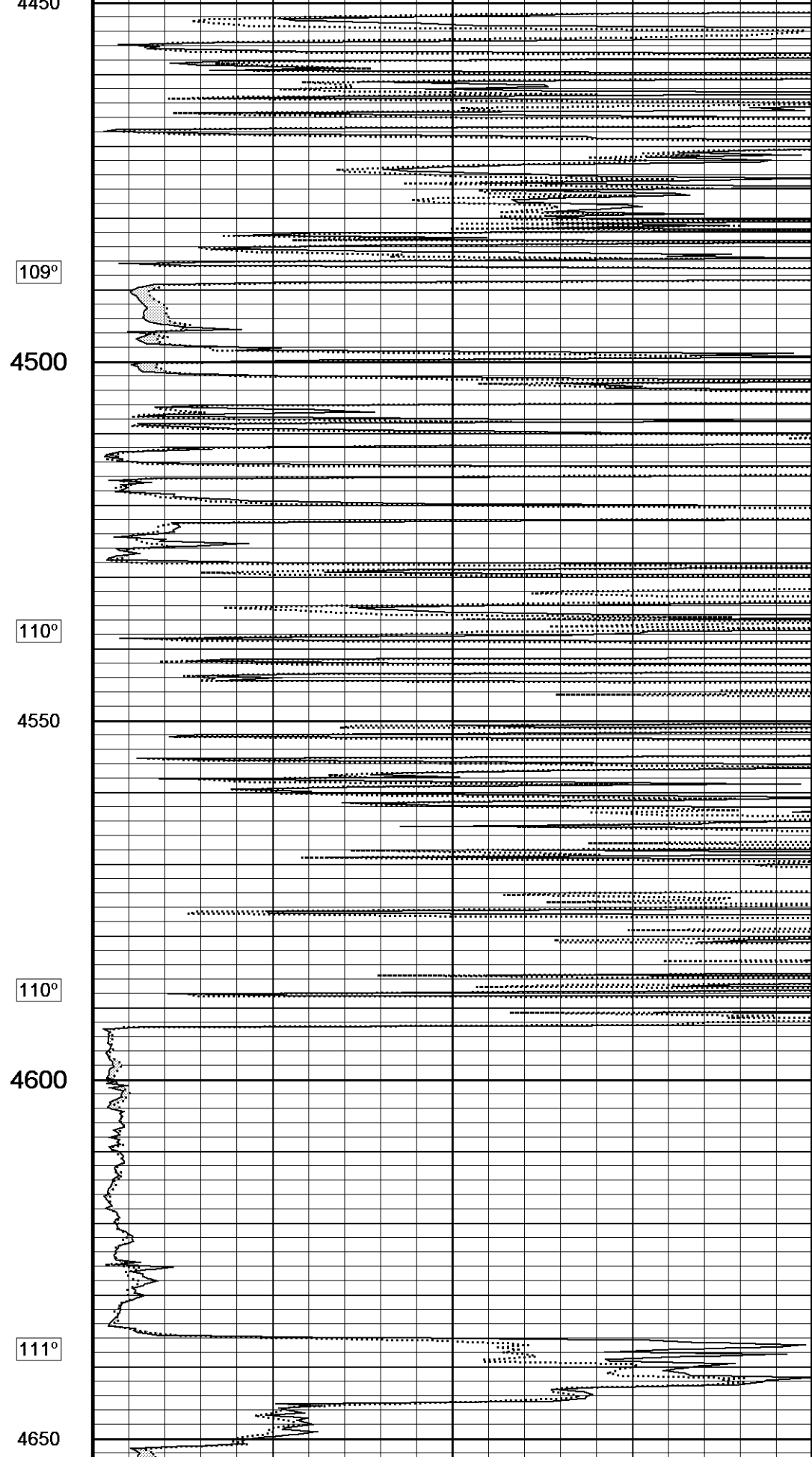
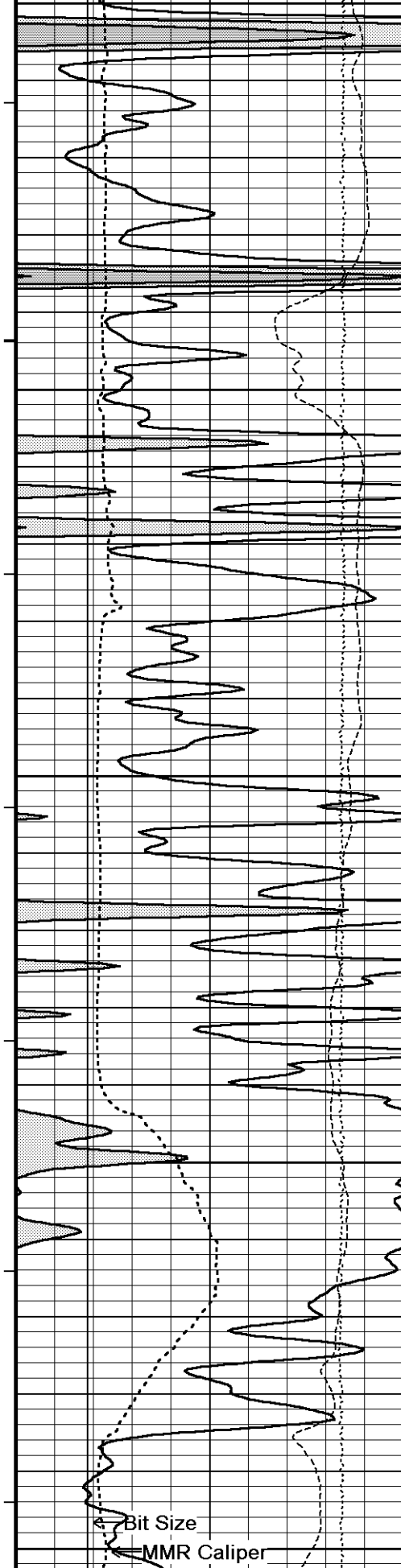
108°

4400

108°

4450





Bit Size

MMR Caliper

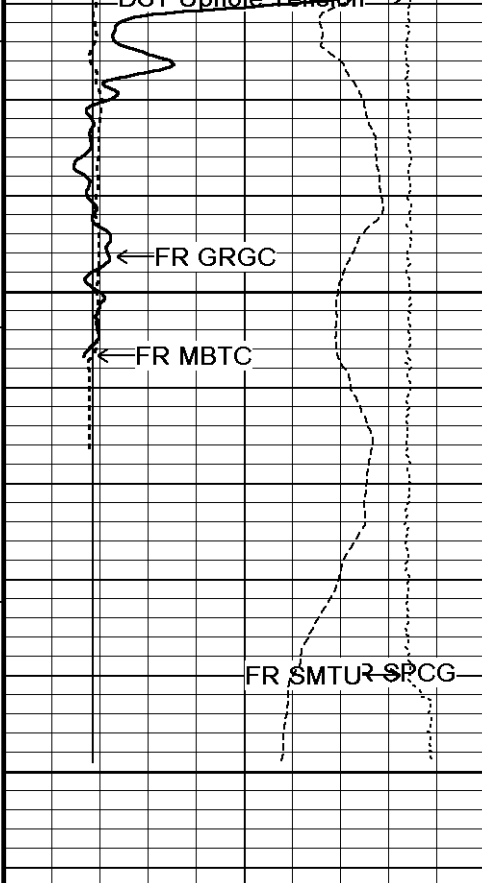
MMR MicroLog Inverse

MMR MicroLog Normal

Spontaneous Potential

Gamma Ray

DST Unhole Tension



110°

4700

FR MINVNR

4750

4760

Depth
in
Feet

← Timing Marks
every 60.0 sec

Gamma Ray
API
0 75 150
150 225 300

Spontaneous Potential
millivolts
- → | 20 | ← +

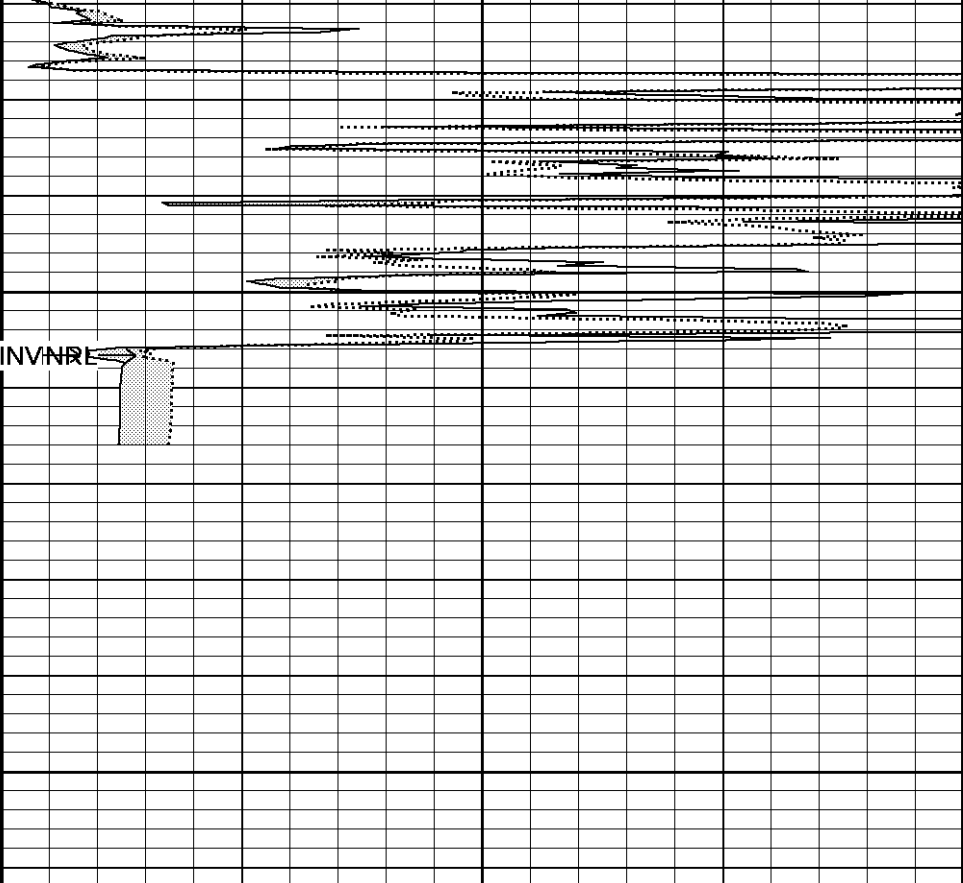
MMR Caliper
inches
6 11 16

Bit Size
inches
6 11 16

DST Uphole Tension
pounds
5000 0

Borehole
Temp in
deg F

Replay
Scale
1:240



MMR MicroLog Normal
ohm metres
0 10 20 30 40

MMR MicroLog Inverse
ohm metres
0 10 20 30 40

↑

REPEAT SECTION

↑

BEFORE SURVEY CALIBRATION

C:\Minimus 13.04.8492\Data\Grand Mesa DBY #5-16\Grand Mesa DBY #5-16_001.dta

General Constants All 000			Last Edited on 21-JAN-2013,15:01
General Parameters			
Mud Resistivity	0.580	ohm-metres	
Mud Resistivity Temperature	93.000	degrees F	
Water Level	0.000	feet	
Borehole Fluid 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	1.000		
RWA Constant M	2.000		

Down-hole Tension Calibration SMS 0		Field Calibration on 18-JAN-2013 01:57	
Reading No	Measured	Calibrated (lbs)	
1	15220.96	0.00	
2	15827.69	390.00	

SP Calibration MCG-C 208		Field Calibration on 27-DEC-2012 10:06	
	Measured	Calibrated (mV)	
Reference 1	100.9	100.0	
Reference 2	-100.6	-100.0	

High Resolution Temperature Calibration MCG-C 208		Field Calibration on 05-NOV-2012,14:26	
	Measured	Calibrated(Deg F)	
Lower	50.00	50.00	
Upper	75.00	75.00	

High Resolution Temperature Constants MCG-C 208		Last Edited on 05-NOV-2012,14:25	
Pre-filter Length	11		

Gamma Calibration MCG-C 208		Field Calibration on 20-JAN-2013 14:04	
	Measured	Calibrated (API)	
Background	71	50	
Calibrator (Gross)	1115	775	
Calibrator (Net)	1044	725	

Gamma Constants MCG-C 208		Last Edited on 20-JAN-2013,16:54	
Gamma Calibrator Number	GR38		
Mud Density	1.10	gm/cc	
Caliper Source for Processing	Density Caliper		
Tool Position	Eccentred		
Concentration of KCl	0.00	kppm	

Micro Laterolog Calibration MMR-A 11		Base Calibration on 31-DEC-1999 00:00	
Base Calibration		Field Check on 31-DEC-1999 00:00	
	Measured	Calibrated (ohm-m)	
	Ref 1	Ref 1	Ref 2
	0.0	0.0	0.0

Base Check (ohm-m)	Field Check (ohm-m)
0.0	0.0

Micro Laterolog Constants MMR-A 11

Last Edited on 12-NOV-2012,01:59

Pad Type	6 in Solid Nylon B23059
Micro Laterolog K Factor	0.0128
Standoff Offset	0.0000 inches

Mudcake Thickness Correction Constants

Mud Cake Source	Constant Value
Mud Cake Thickness	0.4000 inches
Mud Cake Thickness Caliper	N/A
Mud Cake Resistivity	0.1500 ohm-m
Mud Cake Resistivity Temp.	68.00 Deg F
Mud Cake Resistivity Source	Constant Value
Temp. Source Rmc Correc.	N/A

Caliper Calibration MMR-A 11

Base Calibration on 16-JAN-2013 10:32
Field Calibration on 20-JAN-2013 13:49

Base Calibration		
Reading No	Measured	Calibrator Size (in)
1	13881	5.98
2	17138	7.97
3	20398	9.86
4	24351	11.92
5	0	0.00
6	N/A	N/A

Field Calibration	Measured Caliper (in)	Actual Caliper (in)
	5.98	5.98

Micro Normal and Micro Inverse Calibration MMR-A 11

Base Calibration on 16-JAN-2013 10:36
Field Check on 20-JAN-2013 13:50

Base Calibration				
		Measured	Calibrated (ohm-m)	
Channel	Resistor 1	Resistor 2	Resistor 1	Resistor 2
Micro Normal	12.3	59.9	5.0	25.0
Micro Inverse	15.5	77.5	5.0	25.0
Channel	Base Check (ohm-m)		Field Check (ohm-m)	
Micro Normal	76.3		76.3	
Micro Inverse	58.7		58.7	

Micro Normal and Micro Inverse Constants MMR-A 11

Last Edited on 05-NOV-2012,13:54

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	0.0000 inches

Neutron Calibration MDN-A.B 65

Base Calibration on 13-DEC-2012 16:03
Field Check on 20-JAN-2013 14:00

Base Calibration				
		Measured	Calibrated (cps)	
	Near	Far	Near	Far
	2945	91	3714	110
Ratio	32.377		33.764	
Field Calibrator at Base			Calibrated (cps)	
			1743	2519
Ratio			0.692	
Field Check			Calibrated (cps)	
			1729	2508
Ratio			0.691	

Neutron Constants MDN-A.B 65

Last Edited on 21-JAN-2013,15:01

Neutron Source Id	PN-521
Neutron Jig Number	5824NE
Epithermal Neutron	No

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 16-JAN-2013 10:20

Field Check on 20-JAN-2013 13:39

Base Calibration

	Measured	Calibrated (ohm-m)
Reference 1	0.0	0.0
Reference 2	964.3	126.8
Base Check		281.2
Field Check		281.4

FE Constants MFE-B.J 352

Last Edited on 21-JAN-2013,15:01

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 45

Base Calibration on 26-JUL-2012,09:22

Field Check on 20-JAN-2013 13:34

Base Calibration

Test Loop Calibration	Measured		Calibrated (mmho/m)	
Channel	Low	High	Low	High
1	14.4	472.6	9.3	966.2
2	5.7	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			18.5	3849.8
2			31.7	3628.2
3			28.6	3048.8
4			18.3	2079.0
Deep			16.1	1911.2
Medium			42.5	4059.5
Shallow			49.5	5480.8

Array Temperature 61.2 Deg F

Induction Constants MAI-A.A 45

Last Edited on 21-JAN-2013,15:01

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	0.0000	Temperature Corr	0.0000
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			
	Measured	Calibrated(Deg F)	Field Calibration on 13-DEC-2012,10:54
Lower	50.00	50.00	
Upper	75.00	75.00	
High Resolution Temperature Constants MAI-A.A 45			
Pre-filter Length	11		Last Edited on 13-DEC-2012,10:53
Caliper Calibration MPD-B 31			
Base Calibration			Base Calibration on 13-DEC-2012 14:11
Reading No	Measured	Calibrator Size (in)	Field Calibration on 20-JAN-2013 13:40
1	15472	3.99	
2	24160	5.98	
3	32703	7.97	
4	41008	9.86	
5	50231	11.92	
6	N/A	N/A	
Field Calibration			
	Measured Caliper (in)	Actual Caliper (in)	
	5.97	5.98	
Photo Density Calibration MPD-B 31			
Density Calibration			Base Calibration on 13-DEC-2012 14:32
Base Calibration			Field Check on 20-JAN-2013 13:48
	Measured	Calibrated (sdu)	
	Near Far	Near Far	
Reference 1	46489 23675	59556 30836	
Reference 2	18873 1941	24941 2541	
Field Check at Base	683.9 844.6		
Field Check	684.3 844.8		
PE Calibration			
Base Calibration			
	WS WH Ratio	Calibrated Ratio	
Background	126 608		

Background	120	600		
Reference 1	18821	46368	0.409	0.371
Reference 2	5566	18789	0.299	0.272

Field Check at Base		
	125.8	608.0

Field Check		
	126.2	608.8

Density Constants MPD-B 31

Last Edited on 20-JAN-2013,16:54

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	1.10	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	0.00	
0.00	0.00	

DOWNHOLE EQUIPMENT

C:\Minimus 13.04.8492\Data\Grand Mesa DBY #5-16\Grand Mesa DBY #5-16_001.dta

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

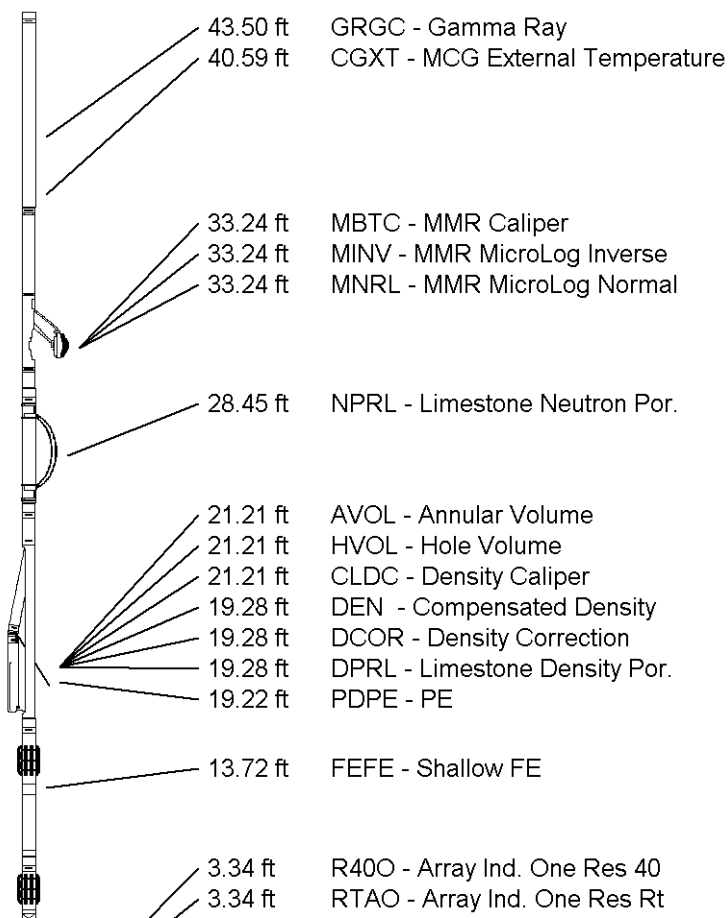
Compact Micro-Resistivity
MMR-A 11 LG: 8.59 ft WT: 81.6 lb OD: 4.88 in

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

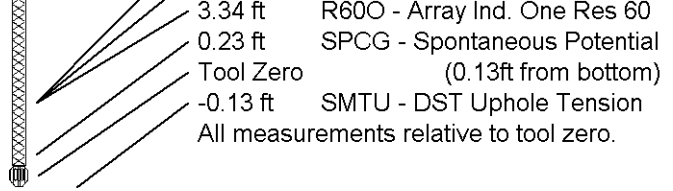
Compact Density/Caliper
MPD-B 31 LG: 9.59 ft WT: 90.4 lb OD: 2.45 in

Compact Focussed Electric
MFE-B.J 352 LG: 6.05 ft WT: 48.5 lb OD: 2.24 in

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



Total Length: 48.78 ft Weight: 383.6 lb



COMPANY	GRAND MESA OPERATING COMPANY
WELL	DBY #5-16
FIELD	WILDCAT
PROVINCE/COUNTY	SCOTT
COUNTRY/STATE	U.S.A. / KANSAS

Elevation Kelly Bushing	2974.00	feet	First Reading	4706.00	feet
Elevation Drill Floor	2973.00	feet	Depth Driller	4740.00	feet
Elevation Ground Level	2969.00	feet	Depth Logger	4740.00	feet



Weatherford®

MICRORESISTIVITY LOG