



Weatherford[®]

MICRORESISTIVITY LOG

COMPANY	CMX, INC.		
WELL	BARTENDER #3		
FIELD	STRANATHAN		
PROVINCE/COUNTY	BARBER		
COUNTRY/STATE	U.S.A. / KANSAS		
LOCATION	660' FNL & 2310' FEL		
SEC 18	TWP 35S	RGE 11W	Other Services
Latitude			MAI/MFE
Longitude			MSS
API Number	15-007-24211		
Permanent Datum GL, Elevation	1374 feet		
Log Measured From	KB		
Drilling Measured From	KB @ 13 FEET		
Date	12-SEP-2014		
Run Number	ONE		
Service Order	7606-97671138		
Depth Driller	5275.00	feet	
Depth Logger	5272.00	feet	
First Reading	5226.24	feet	
Last Reading	3600.00	feet	
Casing Driller	1028.00	feet	
Casing Logger	1028.00	feet	
Bit Size	7.875	inches	
Hole Fluid Type	CHEMICAL		
Density / Viscosity	9.20 lb/USg	61.00 CP	
PH / Fluid Loss	10.80	7.20 ml/30Min	
Sample Source	MUD PIT		
Rm @ Measured Temp	0.84 @ 75.0	ohm-m	
Rmf @ Measured Temp	0.67 @ 75.0	ohm-m	
Rmc @ Measured Temp	1.0 @ 75.0	ohm-m	
Source Rmf / Rmc	CALC	CALC	
Rm @ BHT	0.53 @ 121.0	ohm-m	
Time Since Circulation	3 HOURS		
Max Recorded Temp	121.00	deg F	
Equipment / Base	13057	LIB	
Recorded By	BEN WELDIN		
Witnessed By	LEAH KASTEN		
JOB #	LB14-272		

Elevations:	feet
KB	1387.00
DF	1385.00
GL	1374.00

MPD/MDN

BOREHOLE RECORD

Last Edited: 12-SEP-2014 00:02

Bit Size inches	Depth From feet	Depth To feet
12.250	0.00	1028.00
7.875	1028.00	5275.00

CASING RECORD

Type	Size inches	Depth From feet	Shoe Depth feet	Weight pounds/ft
SURFACE	8.625	0.00	1028.00	24.00

REMARKS

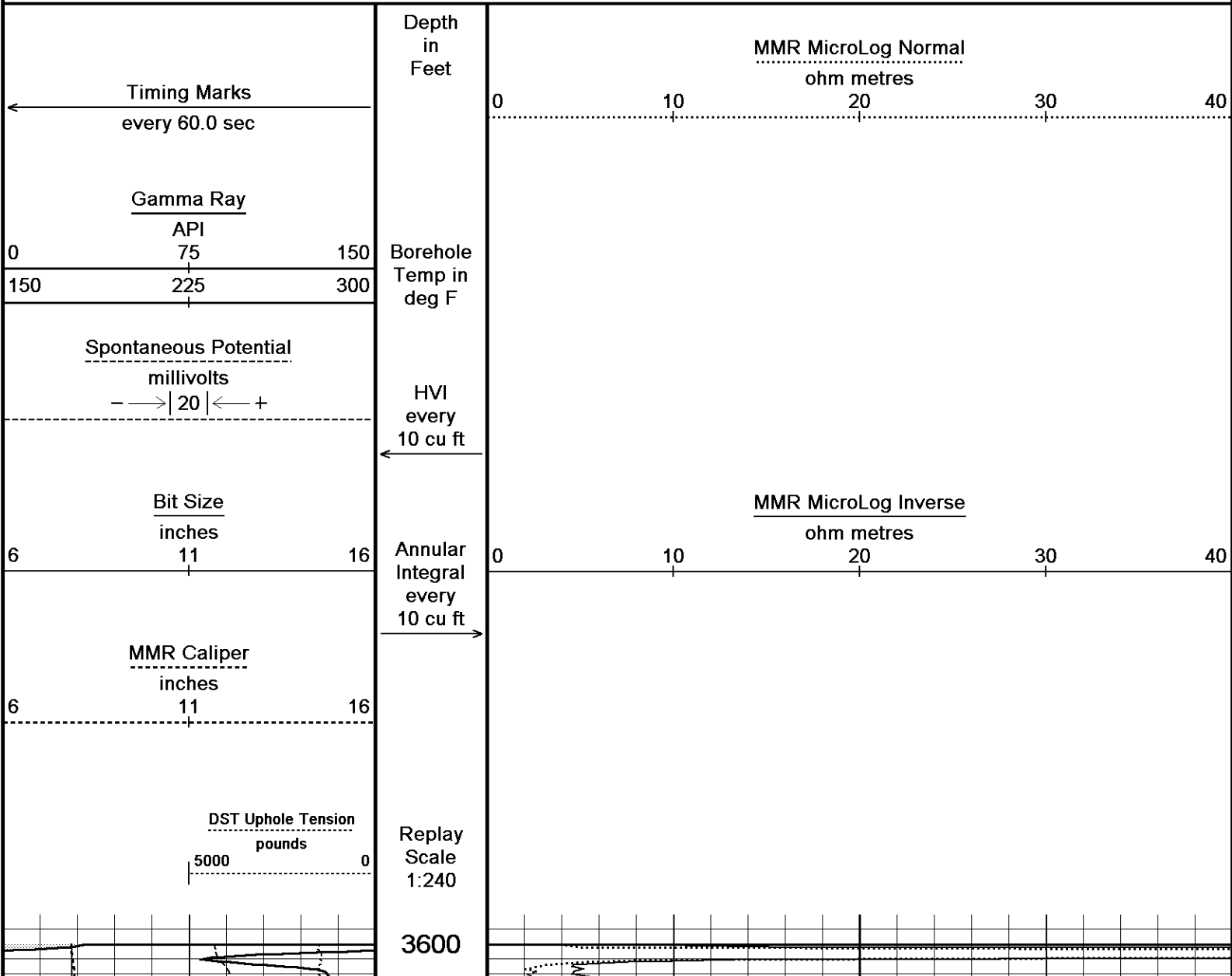
- SOFTWARE ISSUE: WLS 13.08.2113.
- RUN ONE: MCG, MML, MDN, MPD, MFE, MAI RUN IN COMBINATION.
 - HARDWARE: DUAL BOWSPRING USED ON MDN.
 - 0.5 INCH STANDOFF USED ON MFE.
 - TWO 0.5 INCH STANDOFF USED ON MSS.
 - 0.5 INCH STANDOFF USED ON MAI.
- 2.71 G/CC LIMESTONE DENSITY MATRIX USED TO CALCULATE POROSITY.
- BOREHOLE RUGOSITY, TIGHT PULLS, AND WASHOUTS WILL AFFECT DATA QUALITY.
- ALL INTERVALS LOGGED AND SCALED PER CUSTOMER'S REQUEST.
- TOTAL HOLE VOLUME FROM TD TO SURFACE CASING: 1860 CU.FT.
- ANNUAL HOLE VOLUME WITH 5.5 INCH PRODUCTION CASING FROM TD TO SURFACE CASING: 1160 CU.FT.

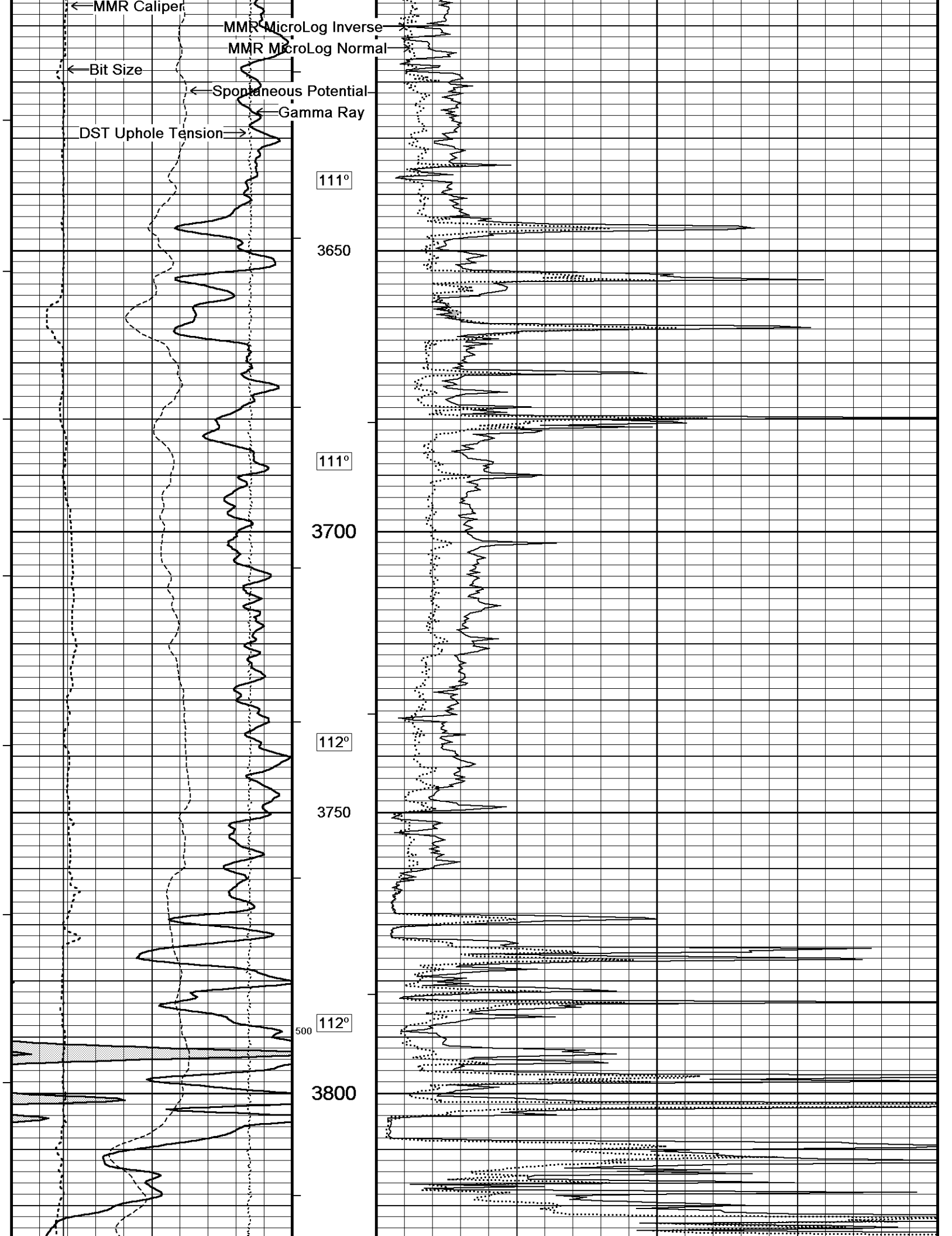
- RIG: DUKE DRILLING RIG #7
 - ENGINEER: BEN WELDIN
 - OPERATOR: KEN RINEHART

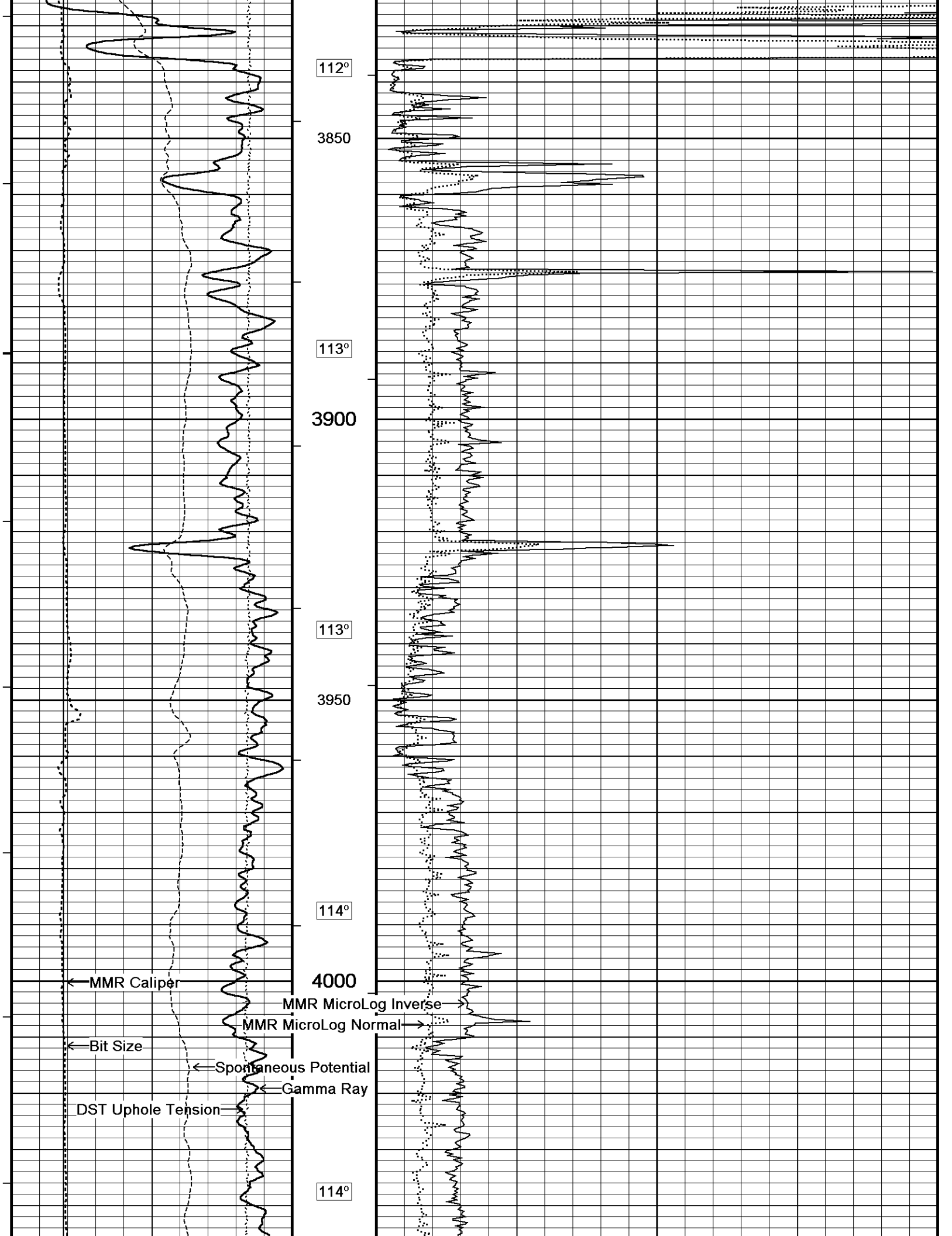
In interpreting, communicating or providing information and/or making recommendations, either written or oral, as to logs or test or other data, type or amount of material, or Work or other service to be furnished, or manner of performance, or in predicting results to be obtained, the Contractor will give the Company the benefit of the Contractor's best judgment based on its experience and will perform all such Work in a good and workmanlike manner. Any interpretation of test or other data, and any recommendation or reservoir description based upon such interpretations, are opinions based upon inferences from measurements and empirical relationships and assumptions, which inferences and assumptions are not infallible, and with respect to which professional engineers and analysts may differ. ACCORDINGLY ANY INTERPRETATION OR RECOMMENDATION RESULTING FROM THE SERVICES WILL BE AT THE SOLE RISK OF THE COMPANY, AND THE CONTRACTOR CANNOT AND DOES NOT WARRANT THE ACCURACY, CORRECTNESS OR COMPLETENESS OF ANY SUCH INTERPRETATION OR RECOMMENDATION, WHICH INTERPRETATIONS AND RECOMMENDATIONS SHOULD NOT, THEREFORE, UNDER ANY CIRCUMSTANCES BE RELIED UPON AS THE SOLE OR MAIN BASIS FOR ANY DRILLING, COMPLETION, WELL TREATMENT, PRODUCTION OR FINANCIAL DECISION, OR ANY PROCEDURE INVOLVING ANY RISK TO THE SAFETY OF ANY DRILLING ACTIVITY, DRILLING RIG OR ITS CREW OR ANY OTHER INDIVIDUAL. THE COMPANY HAS FULL RESPONSIBILITY FOR ALL DECISIONS CONCERNING THE SERVICES.

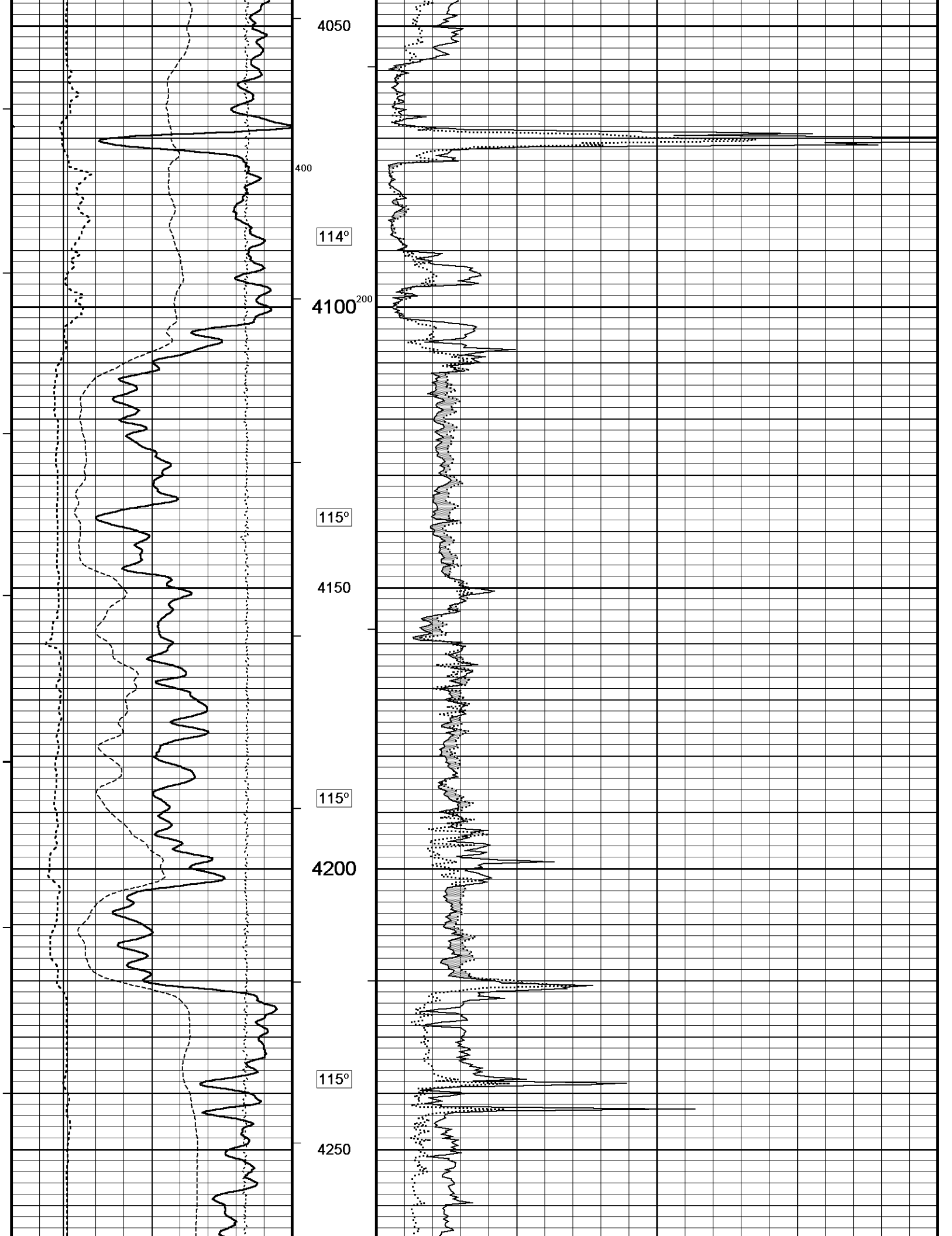
5 INCH MAIN

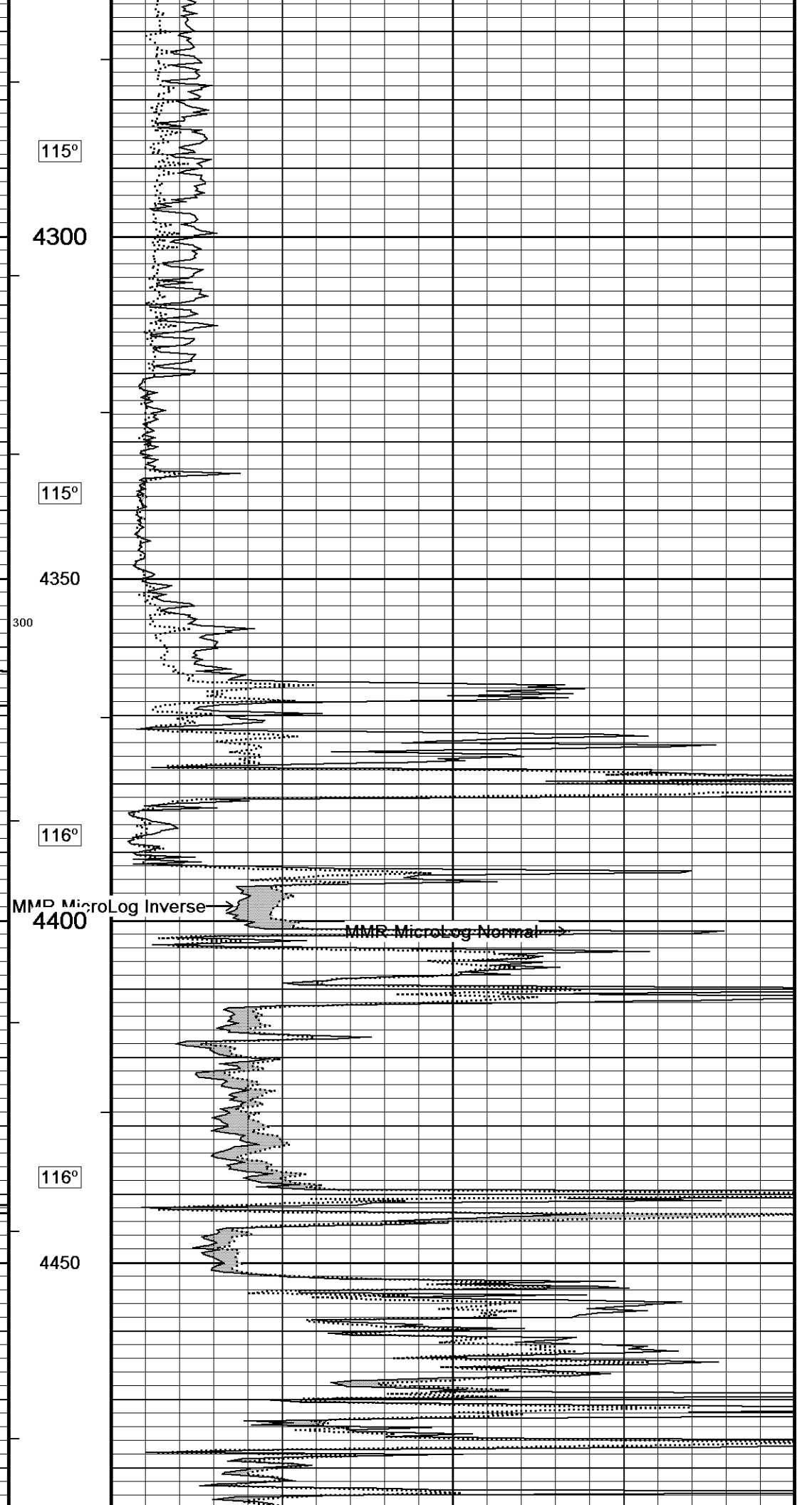
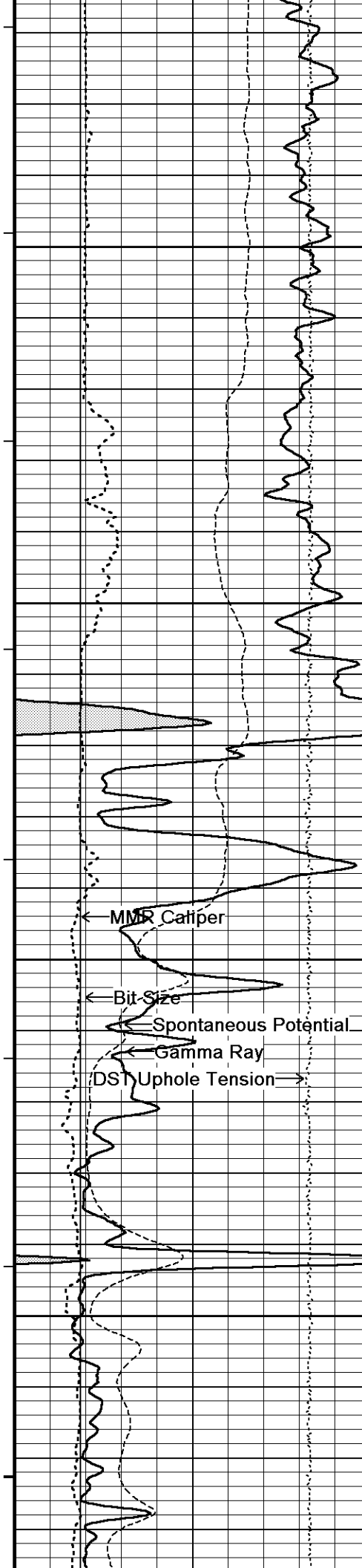
Depth Based Data - Maximum Sampling Increment 10.0cm Plotted on 12-SEP-2014 05:13
 Filename: C:\Minimus 13.08\Data\CMX Bartender #3\CMX Bartender #3 Main.dta Recorded on 12-SEP-2014 02:41
 System Versions: Logged with 13.08.2113 Plotted with 13.08.2113

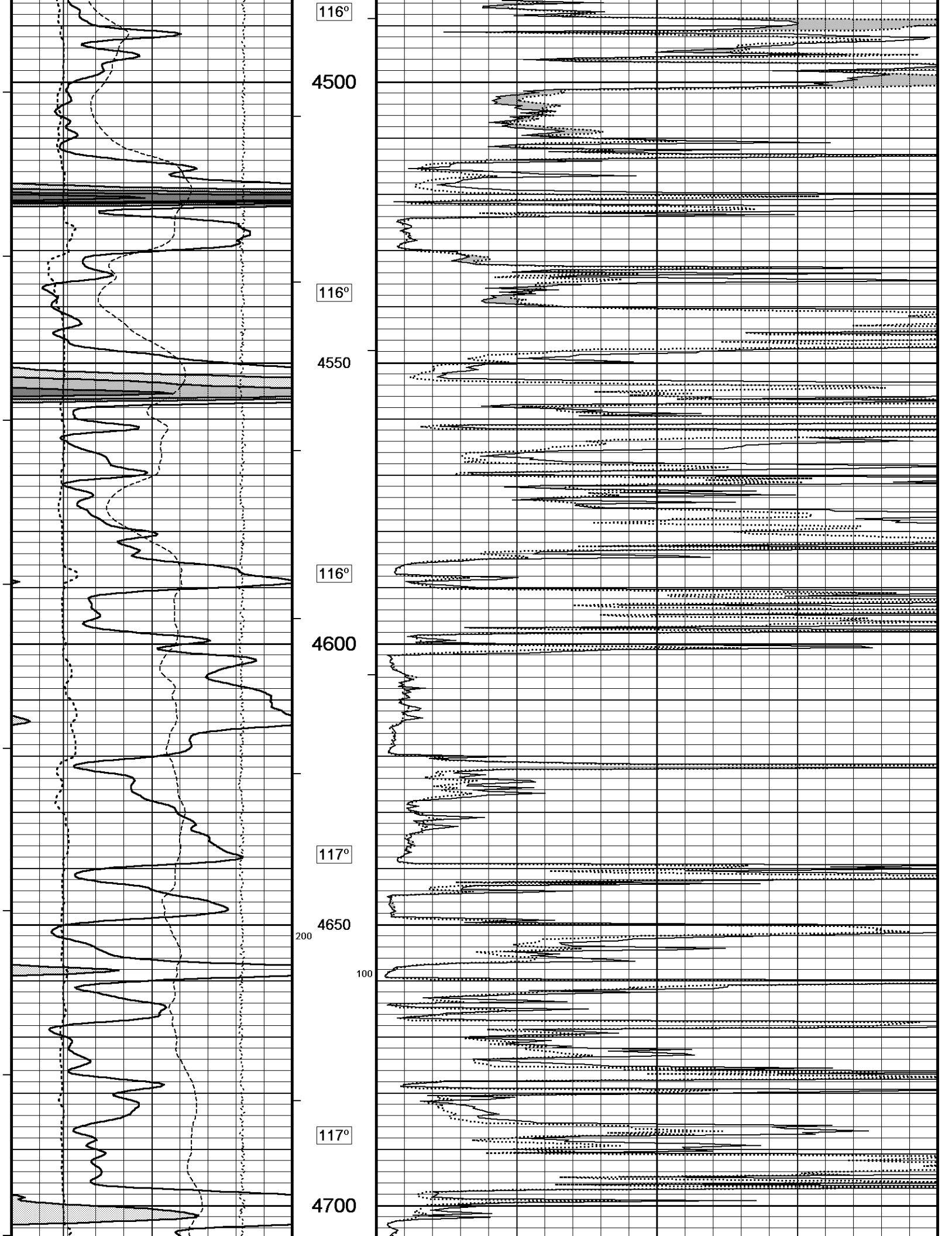


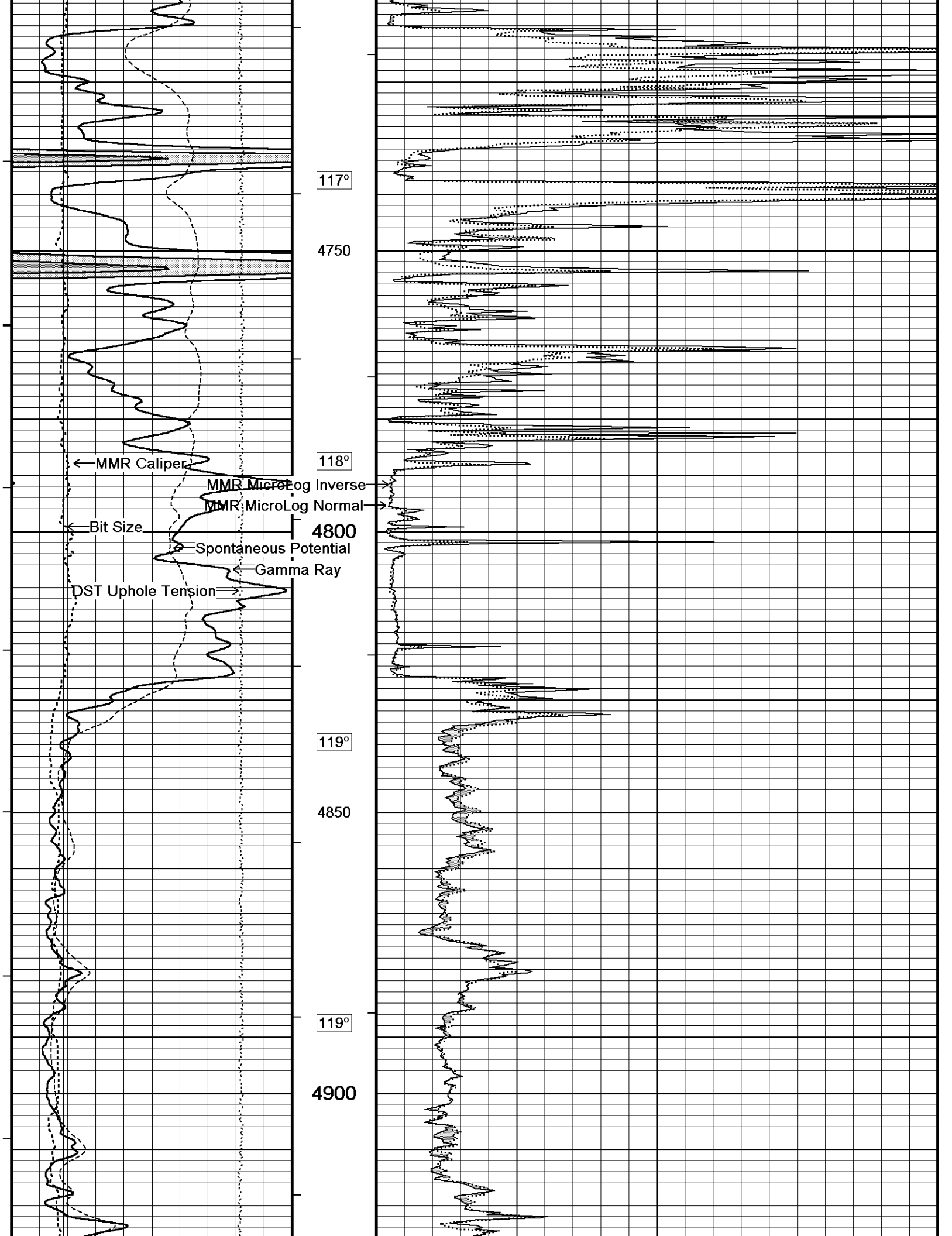


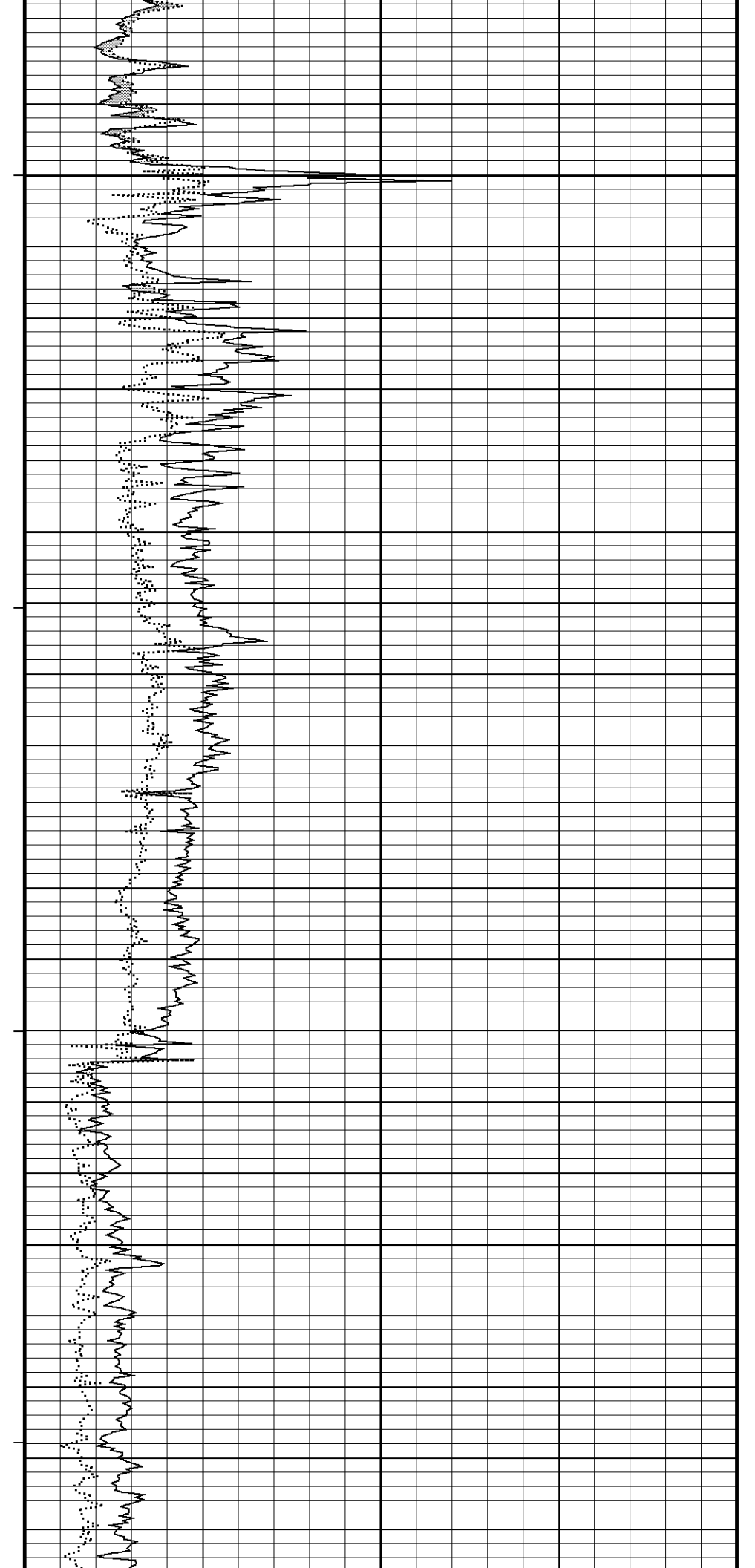
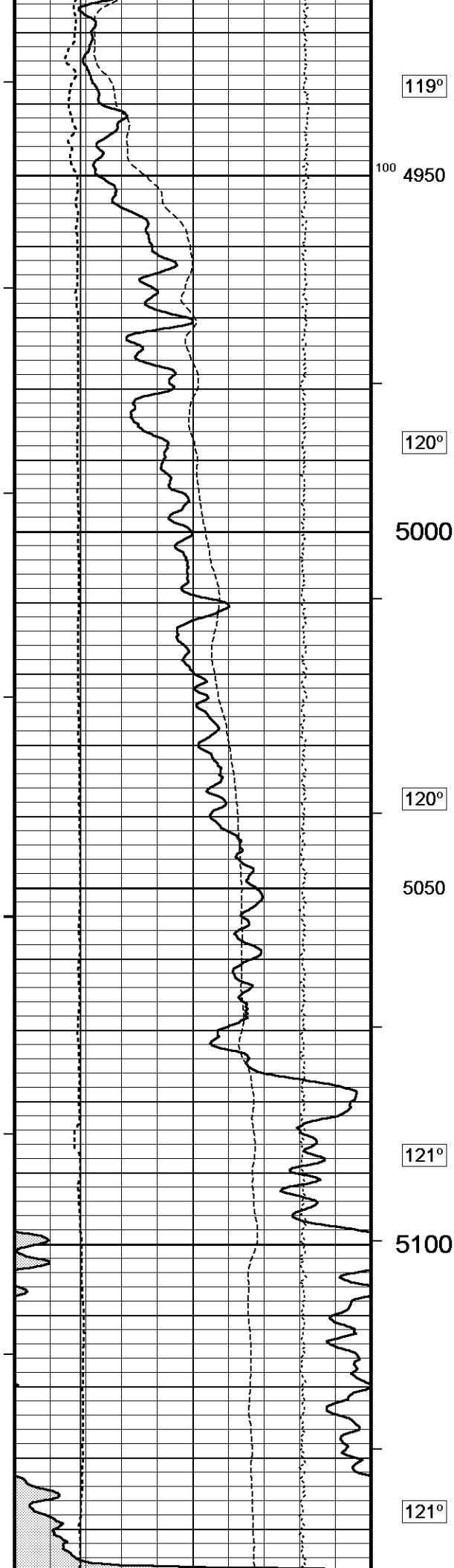


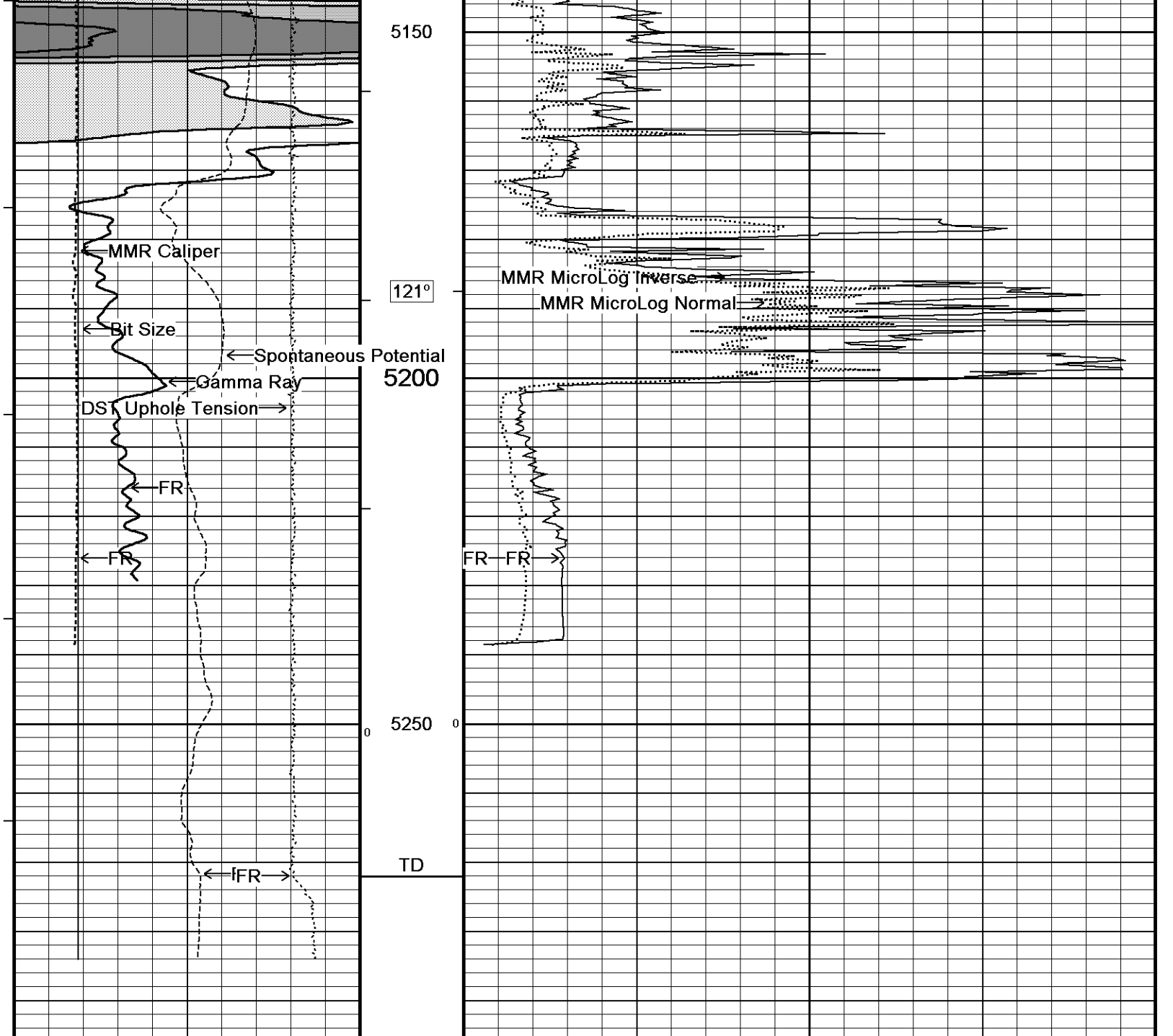












Timing Marks
every 60.0 sec

Gamma Ray

API	
0	150
75	
Borehole Temp in deg F	
150	300
225	

Spontaneous Potential
millivolts
- - -> | 20 | < - - - +

Bit Size

Depth
in
Feet

Borehole
Temp in
deg F

HVI
every
10 cu ft

TD

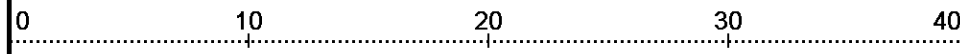
121°

5150

5200

5250

MMR MicroLog Normal
ohm metres



MMR MicroLog Inverse

MMR MicroLog Inverse
MMR MicroLog Normal

FR - FR

MMR Caliper

Bit Size

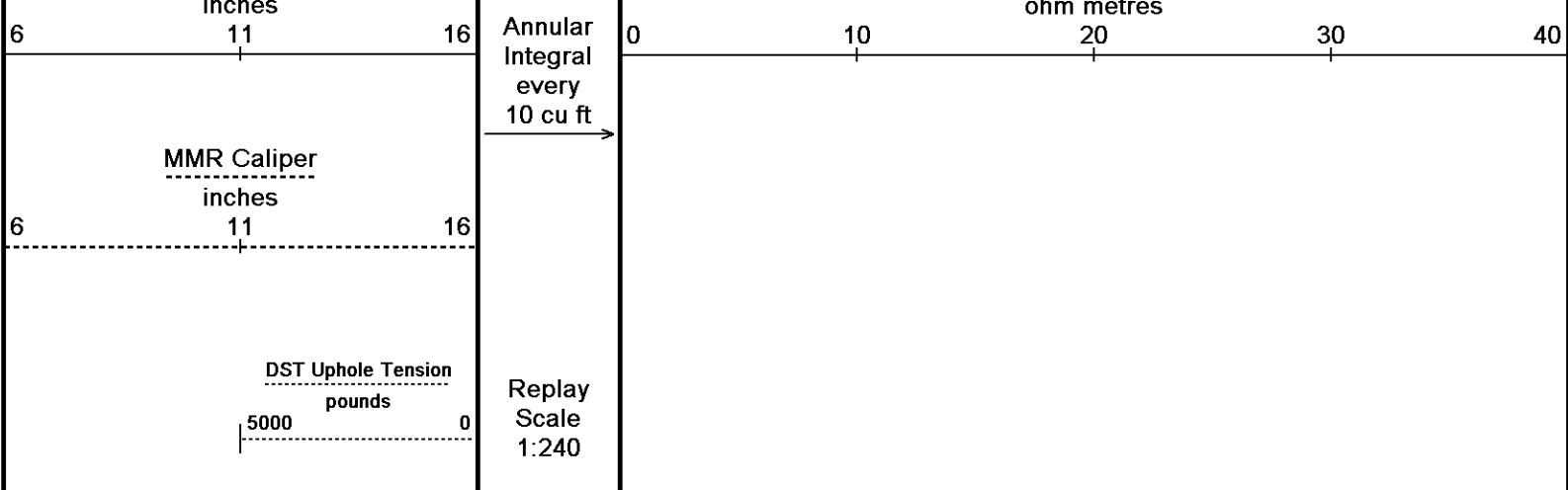
Spontaneous Potential

Gamma Ray

DST Uphole Tension

FR

FR

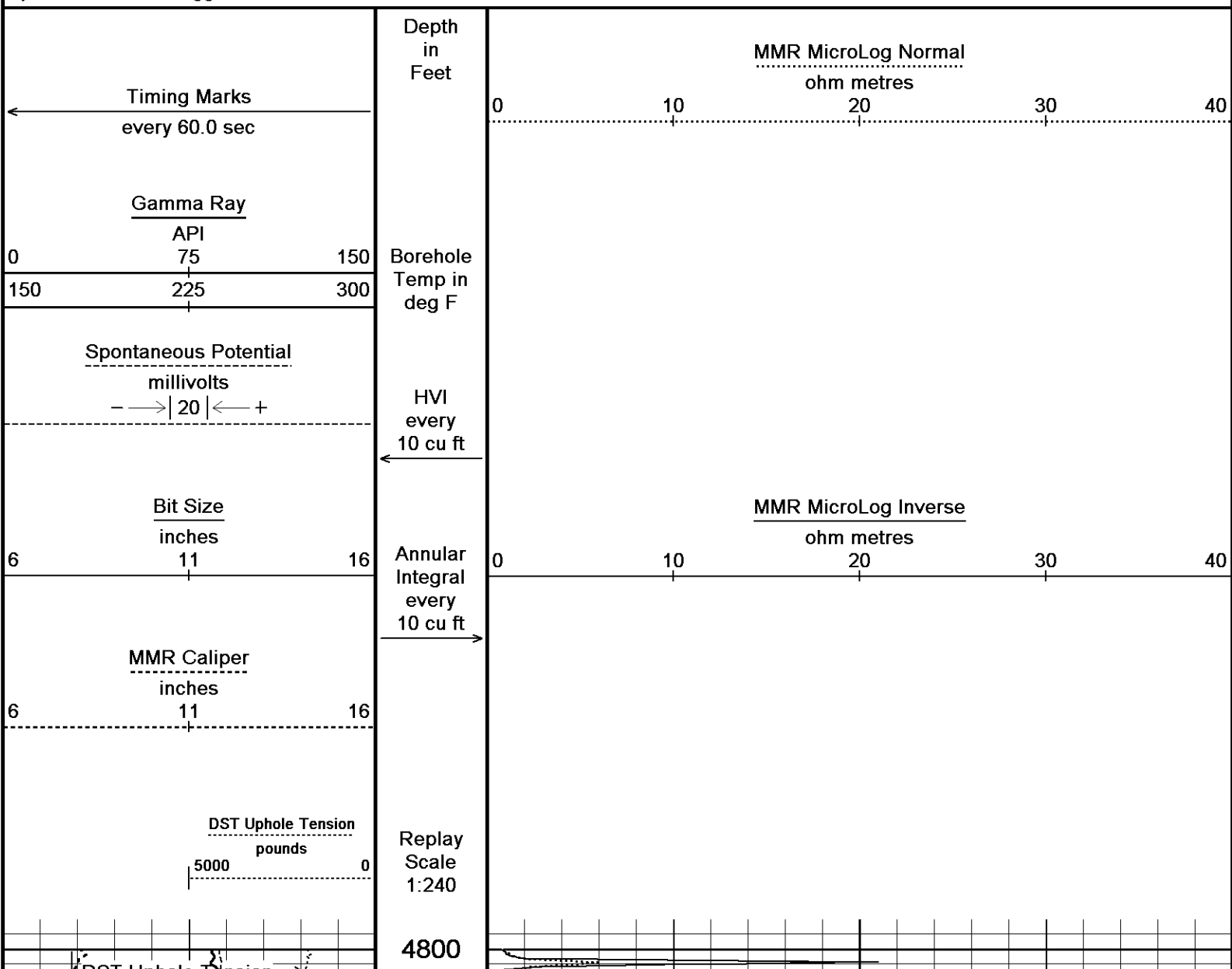


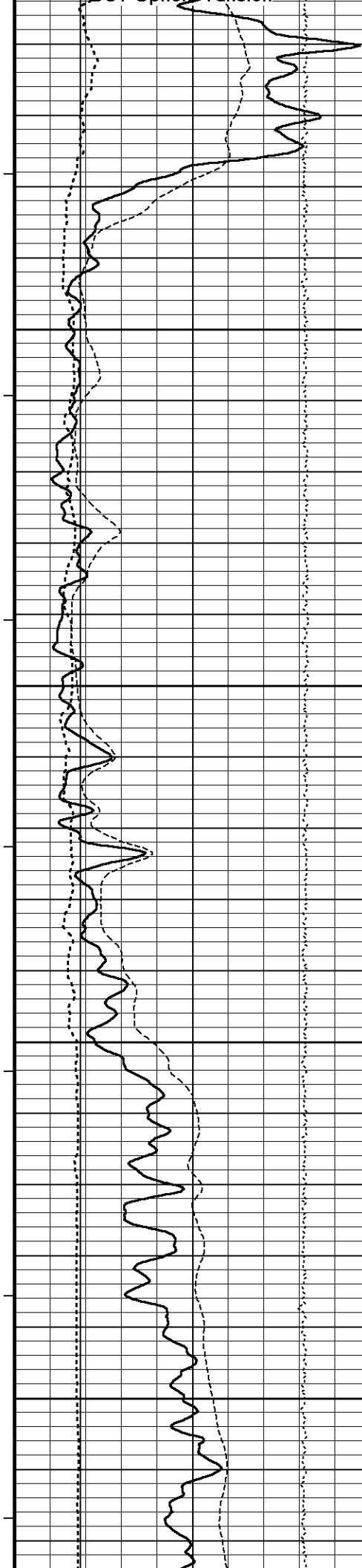
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↑ **5 INCH MAIN** ↑

↓ **REPEAT SECTION** ↓

Depth Based Data - Maximum Sampling Increment 10.0cm Plotted on 12-SEP-2014 05:13
 Filename: C:\Minimus 13.08\Data\CMX Bartender #3\CMX Bartender #3 Repeat.dta Recorded on 12-SEP-2014 02:17
 System Versions: Logged with 13.08.2113 Plotted with 13.08.2113





118°

4850

118°

4900

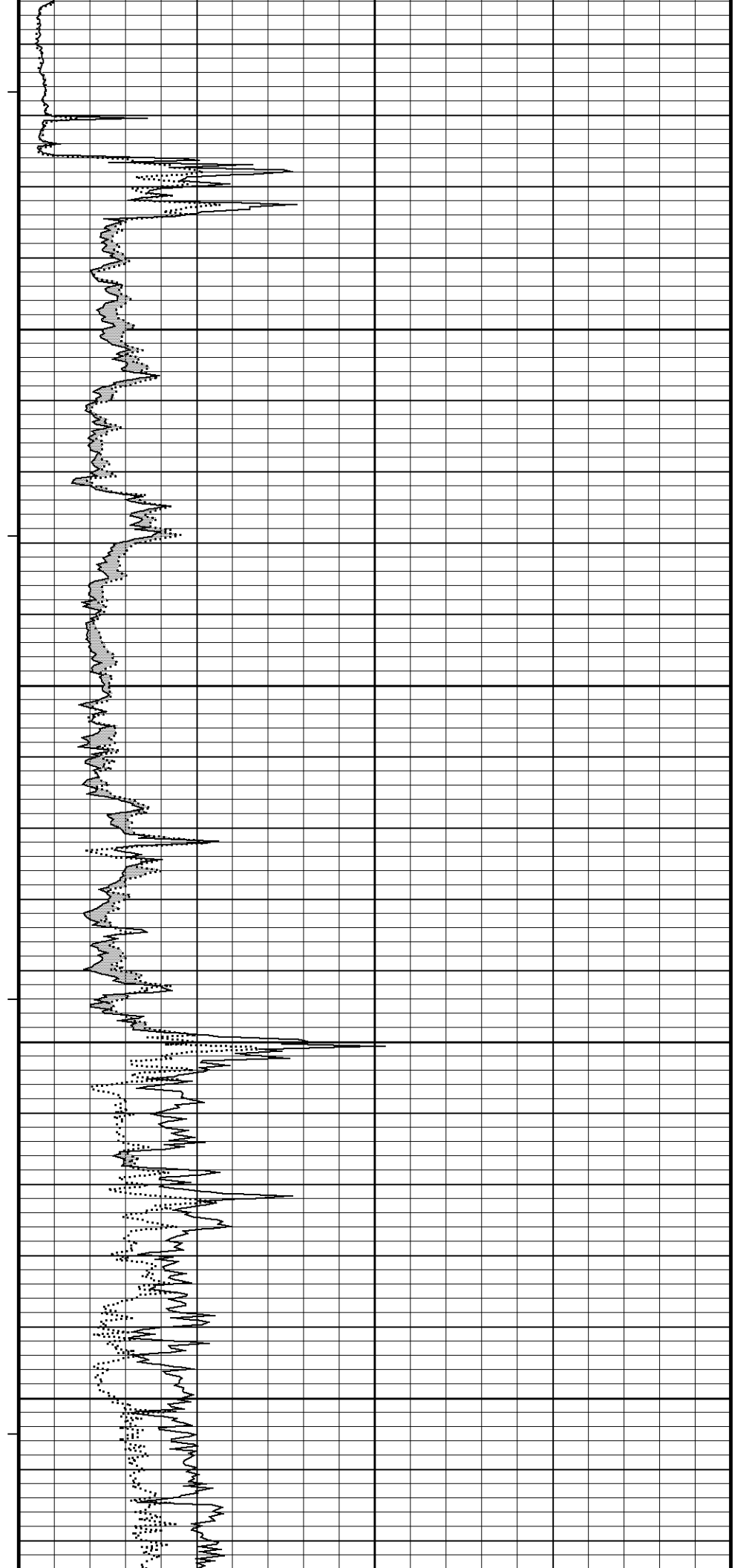
118°

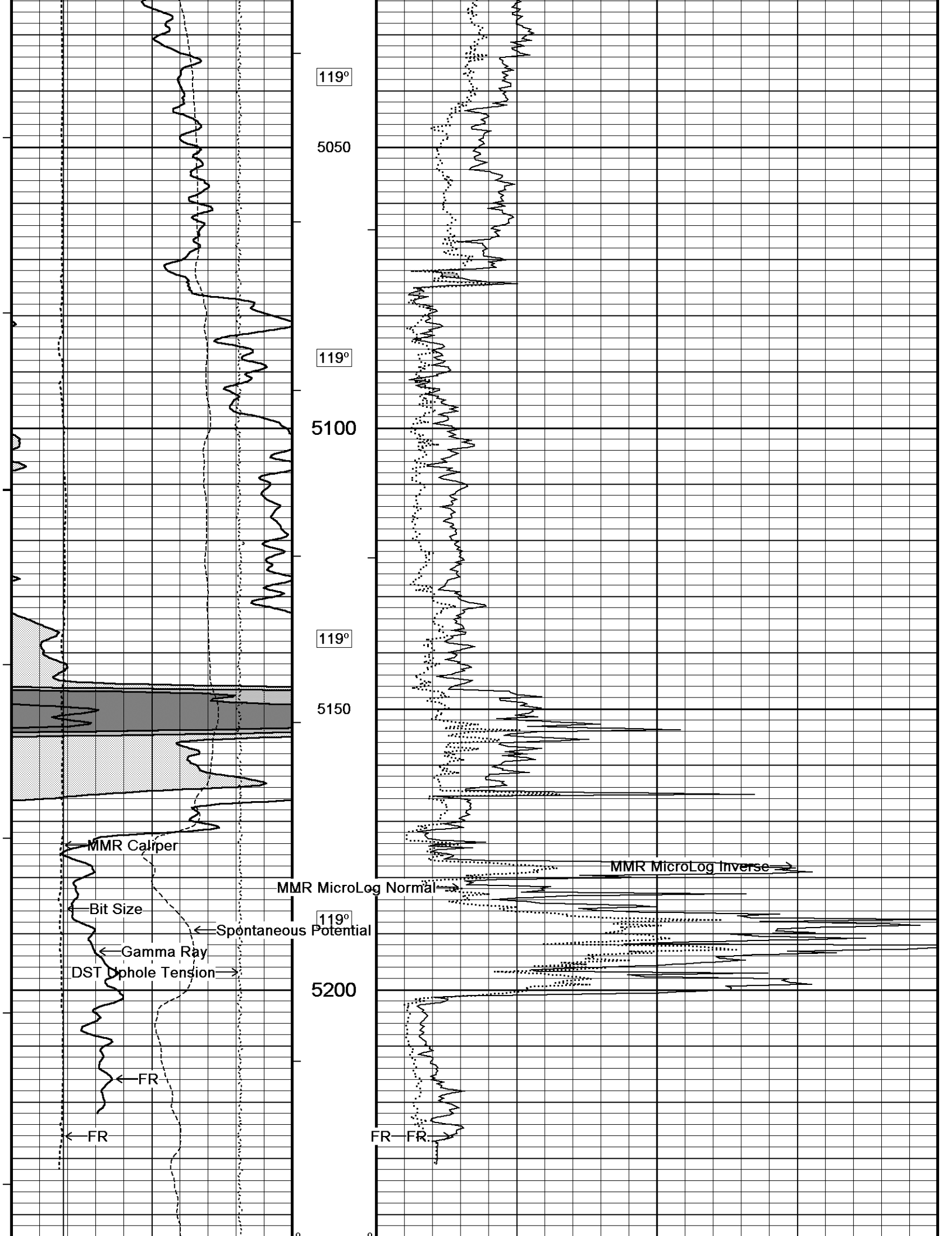
100

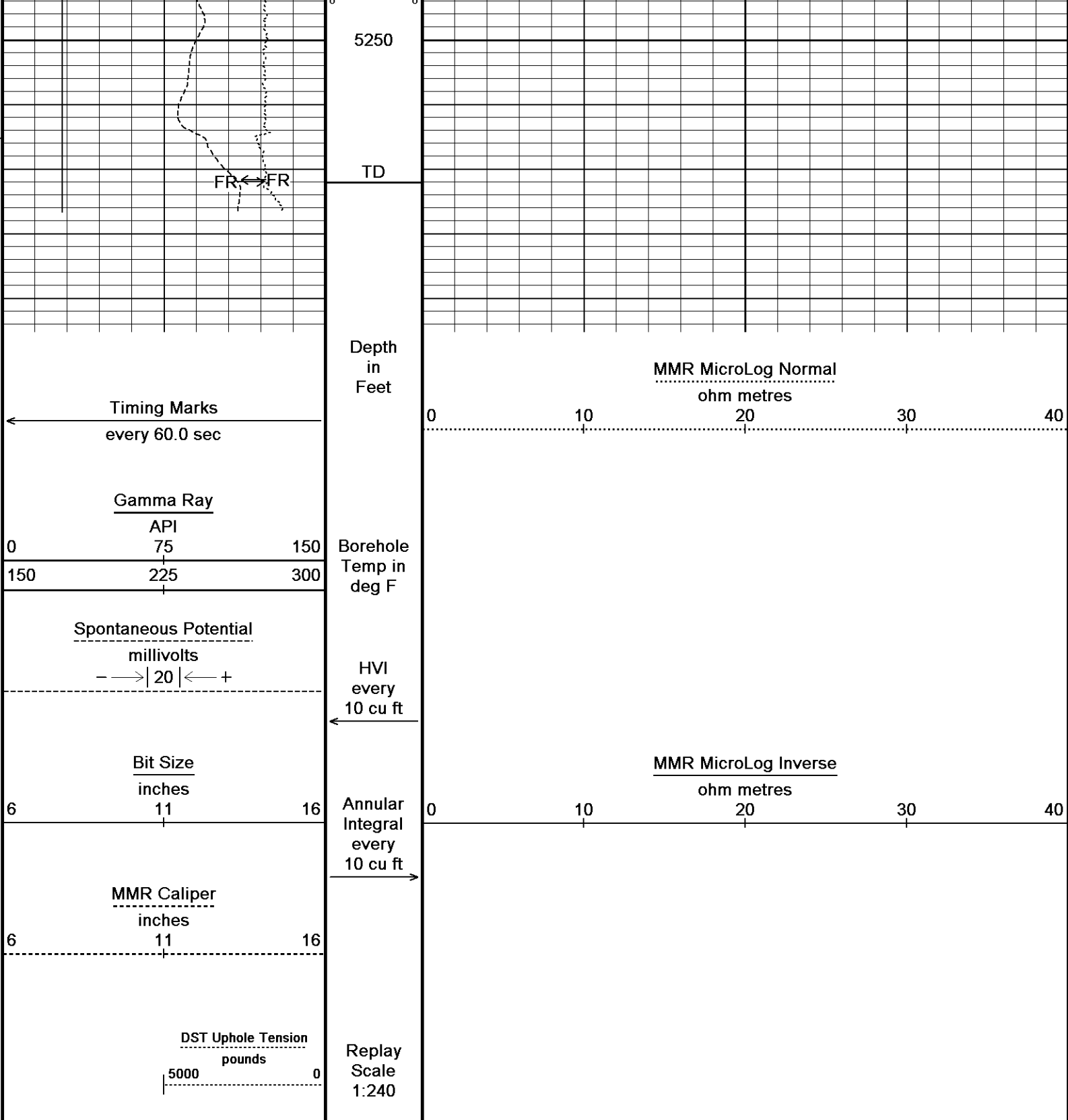
4950

118°

5000







Depth Based Data - Maximum Sampling Increment 10.0cm
 Plotted on 12-SEP-2014 05:13
 Filename: C:\Minimus 13.08\Data\CMX Bartender #3\CMX Bartender #3 Repeat.dta
 Recorded on 12-SEP-2014 02:17
 System Versions: Logged with 13.08.2113 Plotted with 13.08.2113

↑ REPEAT SECTION ↑

BEFORE SURVEY CALIBRATION
 C:\Minimus 13.08\Data\CMX Bartender #3\CMX Bartender #3 Main.dta

General Constants All 000
 Last Edited on 12-SEP-2014,01:56

General Parameters
 Mud Resistivity 0.840 ohm-metres
 Mud Resistivity Temperature 75.000 degrees F

Mud Resistivity Temperature	75.000	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	Crossplot Porosity	
Resistivity used	Array Ind. One Res Rt	
RWA Constant A	0.610	
RWA Constant M	2.150	
SW/APOR Tool Source	0.000	

Down-hole Tension Calibration SMS 0

Field Calibration on 12-SEP-2014 01:35

Reading No	Measured	Calibrated (lbs)
1	15613.96	0.00
2	16231.98	445.00

High Resolution Temperature Calibration MCG-D.K 443

Field Calibration on 05-MAR-2014,20:50

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

High Resolution Temperature Constants MCG-D.K 443

Last Edited on 22-JUL-2014,11:40

Pre-filter Length	11
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SP Calibration MCG-D.K 443

Field Calibration on 25-AUG-2014 09:05

	Measured	Calibrated (mV)
Reference 1	101.9	100.8
Reference 2	-99.4	-100.9

Gamma Calibration MCG-D.K 443

Field Calibration on 30-AUG-2014 17:02

	Measured	Calibrated (API)
Background	73	48
Calibrator (Gross)	1170	773
Calibrator (Net)	1097	725

Gamma Constants MCG-D.K 443

Last Edited on 12-SEP-2014,00:00

Gamma Calibrator Number	GRC38	
Mud Density	1.10	gm/cc
Caliper Source for Processing	Density Caliper	
Tool Position	Eccentred	
Concentration of KCl		kppm
K Mud Type	Chloride	
K Mud Concentration	0.00	%

Caliper Calibration MMR-A 11

Base Calibration on 02-SEP-2014 13:09

Field Calibration on 10-SEP-2014 04:19

Base Calibration		
Reading No	Measured	Calibrator Size (in)
1	13952	5.98
2	17258	7.97
3	20482	9.86
4	24471	11.92
5	0	0.00
6	N/A	N/A

Field Calibration

Measured Caliper (in)	Actual Caliper (in)
7.99	7.97

Micro Normal and Micro Inverse Calibration MMR-A 11

Base Calibration on 02-SEP-2014 13:17

Field Check on 10-SEP-2014 04:18

Base Calibration

Channel	Measured		Calibrated (ohm-m)	
	Resistor 1	Resistor 2	Resistor 1	Resistor 2
Micro Normal	10.1	49.3	5.1	25.6
Micro Inverse	9.8	48.9	3.4	16.9
Channel	Base Check (ohm-m)		Field Check (ohm-m)	
Micro Normal	94.8		94.8	
Micro Inverse	63.0		63.0	

Micro Normal and Micro Inverse Constants MMR-A 11

Last Edited on 10-JUL-2014,16:35

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	0.0000	inches	

Neutron Calibration MDN-A.B 65

Base Calibration on 07-AUG-2014 14:53

Field Check on 11-SEP-2014 14:59

Base Calibration	Measured		Calibrated (cps)	
	Near	Far	Near	Far
Ratio	3171	98	3714	110
	32.202		33.764	
Field Calibrator at Base			Calibrated (cps)	
Ratio			1639	2378
			0.689	
Field Check			Calibrated (cps)	
Ratio			1632	2350
			0.695	

Neutron Constants MDN-A.B 65

Last Edited on 11-SEP-2014,23:58

Neutron Source Id	PN-521		
Neutron Jig Number	5824NE		
Epithermal Neutron			
Caliper Source for Processing	Bit Size		
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	68.00	degrees F	
Mud Salinity	0.00	kppm	
Salinity Correction	Not Applied		
Formation Fluid Salinity Source	None		
Formation Fluid Salinity	N/A		kppm
Barite Mud Correction	Not Applied		

FE Calibration MFE-B.J 352

Base Calibration on 02-SEP-2014 14:11

Field Check on 10-SEP-2014 04:17

Base Calibration	Measured		Calibrated (ohm-m)	
	Reference 1	Reference 2	Reference 1	Reference 2
	0.0	963.0	0.0	126.8
Base Check			281.7	
Field Check			281.7	

FE Constants MFE-B.J 352

Last Edited on 11-SEP-2014,23:57

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	MCC External Temperature		

Temp. for Rim Corr. MCG External Temperature 0.5 inches

Sonic Constants MSS-A.A 73

Last Edited on 11-SEP-2014,23:57

Maximum Boundary Contrast	100.00	micro-sec/ft
Fluid Transit Time	189.00	micro-sec/ft
Limestone Transit Time	47.50	micro-sec/ft
Sandstone Transit Time	55.50	micro-sec/ft
Dolomite Transit Time	43.50	micro-sec/ft
Sonic used for Porosities	3-5' Compensated Sonic	
Correction for Sonde Skew	Applied	
Cycle Stretch Algorithm	Applied	
MN3FT	N/A	micro-sec
MX3FT	N/A	micro-sec
Hunt-Raymer Constant	83.13	micro-sec/ft

Sonde Mode Compensated
Hole Type Open Hole

Sonde Parameters

	Measured	Calibrated
Offset	N/A	0.0000
Free Pipe	N/A	N/A
Peak Amplitude Source		N/A

Waveform	Start Time (micro-sec)	Width (micro-sec)	Pre Gain	Start Gain	Discriminator (mV)
3'	N/A	N/A	N/A	N/A	N/A
4'	N/A	N/A	N/A	N/A	N/A
5'	N/A	N/A	N/A	N/A	N/A
6'	N/A	N/A	N/A	N/A	N/A

Processed Fixed Gate Parameters

Waveform Used For Processing	N/A			
Start Time (micro-sec)	End Time (micro-sec)	Discriminator (mV)	N/A	
N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A

Full Waveform Parameters

Use 3' Waveform to derive TR	N/A	
Use 4' Waveform to derive TR	N/A	
Use 5' Waveform to derive TR	N/A	
Use 6' Waveform to derive TR	N/A	
3' Waveform Discriminator Level	N/A	mV
4' Waveform Discriminator Level	N/A	mV
5' Waveform Discriminator Level	N/A	mV
6' Waveform Discriminator Level	N/A	mV
3' Waveform Filter	N/A	
4' Waveform Filter	N/A	
5' Waveform Filter	N/A	
6' Waveform Filter	N/A	
Semblance Level	N/A	
Semblance Window Width	N/A	micro-sec
Sonic 1 Despiker	N/A	N/A
Sonic 2 Despiker	N/A	N/A

Induction Calibration MAI-A.A 45

Base Calibration on 10-JUL-2014,11:31
Field Check on 11-SEP-2014 14:37

Base Calibration

Test Loop Calibration Channel	Measured		Calibrated (mmho/m)	
	Low	High	Low	High
1	14.5	473.5	9.3	966.2
2	5.2	373.4	7.6	821.4
3	2.8	260.6	5.2	566.0
4	1.6	132.2	2.6	279.2

Array Temperature

86.2

Deg F

Channel	Base Check (mmho/m)		Field Check (mmho/m)	
	Low	High	Low	High
1			18.6	3843.3
2			32.9	3630.2
3			30.0	3049.3
4			20.5	2093.3
Deep			17.9	1920.2
Medium			43.3	4049.5
Shallow			50.0	5472.9
Array Temperature			68.0	Deg F

Induction Constants MAI-A.A 45

Last Edited on 11-SEP-2014,23:57

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 Constants MAI-A.A 45

Last Edited on

Pre-filter Length	11
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Caliper Calibration MPD-B 104

Base Calibration on 12-AUG-2014 21:09
Field Calibration on 11-SEP-2014 14:38

Base Calibration		
Reading No	Measured	Calibrator Size (in)
1	12248	3.99
2	21021	5.98
3	29619	7.97
4	37847	9.86
5	46921	11.92
6	N/A	N/A

Field Calibration

Measured Caliper (in)	Actual Caliper (in)
7.96	7.97

Density Calibration	Measured		Calibrated (sdu)	
	Near	Far	Near	Far
Base Calibration				
Background	1200	1392		
Reference 1	43233	21553	59556	30836
Reference 2	17877	2370	24941	2541

Field Check at Base
1200.4 1392.3

Field Check
1193.8 1387.1

PE Calibration	Base Calibration	Measured		Calibrated Ratio
		WS	WH	
			Ratio	
Background	220	1078		
Reference 1	18382	43065	0.433	0.371
Reference 2	5186	17746	0.298	0.272

Field Check at Base
219.8 1078.1

Field Check
219.3 1072.4

Density Constants MPD-B 104

Last Edited on 11-SEP-2014,23:57

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

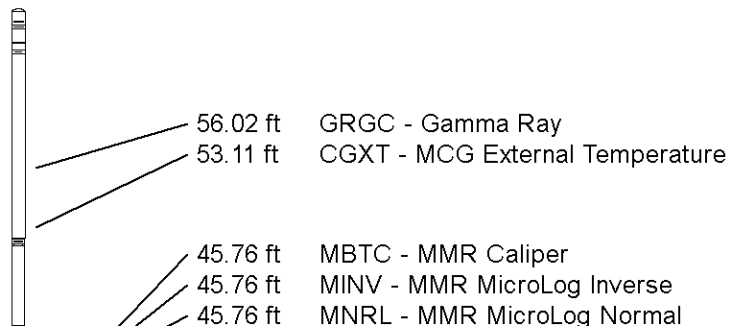
DOWNHOLE EQUIPMENT

C:\Minimus 13.08\Data\CMX Bartender #3\CMX Bartender #3 Main.dta

3/8" Triple Cone Cable Head (MCB C A)
MCB-C.A 5 LG: 1.58 ft WT: 15.4 lb OD: 2.244 in

Compact Comms Gamma
MCG-D.K 443 LG: 8.70 ft WT: 63.9 lb OD: 2.240 in

Compact Micro-Resistivity
MMR-A 11 LG: 8.59 ft WT: 81.6 lb OD: 4.882 in



Compact Neutron
MDN-A.B 65 LG: 5.04 ft WT: 50.7 lb OD: 2.240 in

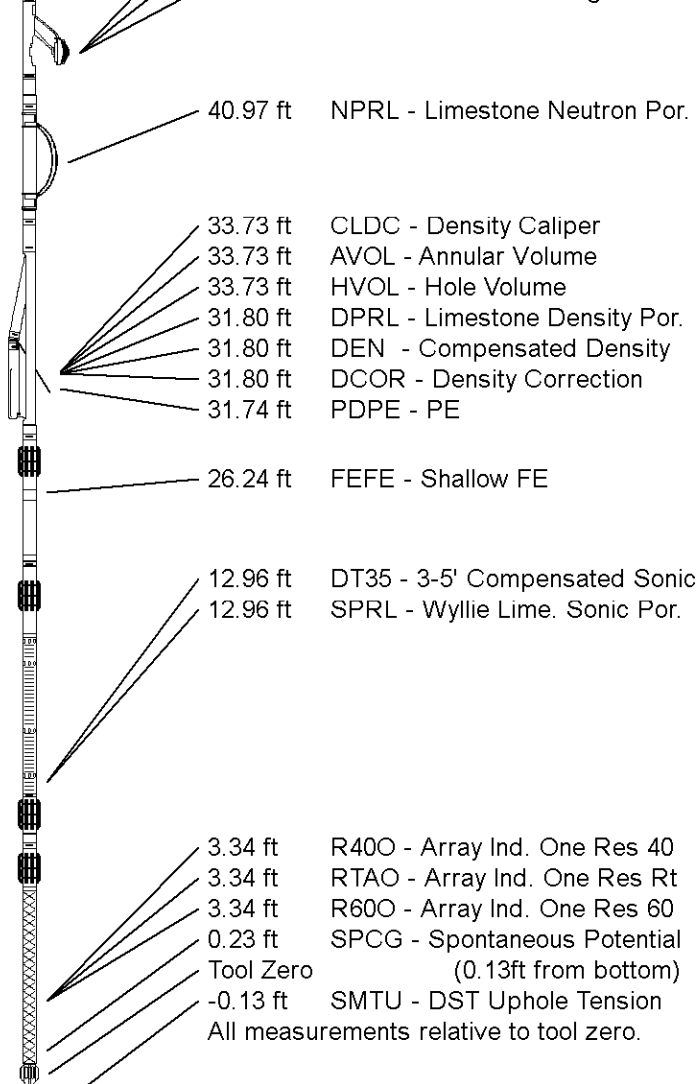
Compact Density/Caliper
MPD-B 104 LG: 9.59 ft WT: 90.4 lb OD: 2.449 in

Compact Focussed Electric
MFE-B.J 352 LG: 6.05 ft WT: 48.5 lb OD: 2.240 in

Compact Sonic
MSS-A.A 73 LG: 12.52 ft WT: 72.8 lb OD: 2.244 in

Compact Induction
MAI-A.A 45 LG: 10.81 ft WT: 48.5 lb OD: 2.240 in

Total Length: 62.88 ft Weight: 471.8 lb



COMPANY CMX, INC.
WELL BARTENDER #3
FIELD STRANATHAN
PROVINCE/COUNTY BARBER
COUNTRY/STATE U.S.A. / KANSAS

Elevation Kelly Bushing	1387.00	feet	First Reading	5226.24	feet
Elevation Drill Floor	1385.00	feet	Depth Driller	5275.00	feet
Elevation Ground Level	1374.00	feet	Depth Logger	5272.00	feet



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