



Weatherford

MICRORESISTIVITY LOG

COMPANY

McELVAIN ENERGY, INC.

WELL

GUSTAFSON #11-6

FIELD

DUSSAULT

PROVINCE/COUNTY

GRAHAM

COUNTRY/STATE

U.S.A. / KANSAS

LOCATION

1914' FNL & 2357' FWL

SEC

TWP

11

RGE

22W

Other Services

MPD/MDN

MSS

MAI/MFE

API Number

15-065-23996

Permit Number

Permanent Datum GL, Elevation 2324 feet

Log Measured From KB

Drilling Measured From KB

Elevations:

KB

DF

GL

2334.00

2332.00

2324.00

Date

26-FEB-2014

Run Number

ONE

Service Order

4558-80590102

Depth Driller

4065.00

Depth Logger

4063.00

First Reading

4017.00

Last Reading

307.00

Casing Driller

303.00

Casing Logger

307.00

Bit Size

7.875

Hole Fluid Type

CHEMICAL

Density / Viscosity

9.20 lb/USg

PH / Fluid Loss

10.50

Sample Source

FLOWLINE

Rm @ Measured Temp

1.28 @ 76.0

Rmf @ Measured Temp

1.02 @ 76.0

Rmc @ Measured Temp

1.54 @ 76.0

Source Rmf / Rmc

CALC

Rm @ BHT

0.90 @ 108.0

Time Since Circulation

4 HOURS

Max Recorded Temp

108.00

Equipment / Base

13057

Recorded By

ADAM SILL

Witnessed By

TOM FLOWERS

LIB

JEFFREY RANDLE

LB14-055

BOREHOLE RECORD

Last Edited: 26-FEB-2014 10:31

Bit Size inches	Depth From feet	Depth To feet
7.875	303.00	4065.00

CASING RECORD

Type	Size inches	Depth From feet	Shoe Depth feet	Weight pounds/ft
SURFACE	8.625	0.00	303.00	24.00

REMARKS

- SOFTWARE ISSUE: WLS 13.05.9583.
- RUN 1: MCG, MML, MDN, MPD, MFE, MSS, MAI RUN IN COMBINATION.
 - HARDWARE: DUAL ECCENTRALISER USED ON MDN
 - 0.5 INCH STANDOFF USED ON MFE.
 - TWO 0.5 INCH STANDOFFS 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: 1571 CU. FT.
- ANNULAR HOLE VOLUME WITH 5.5 INCH PRODUCTION CASING FROM TD TO SURFACE CASING: 954 CU. FT.

- RIG: VAL #6

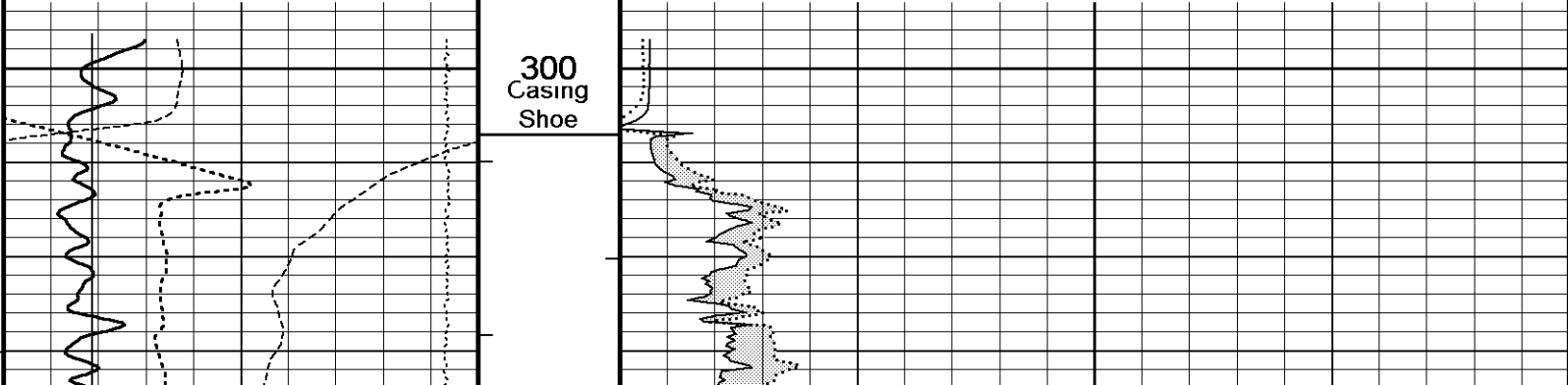
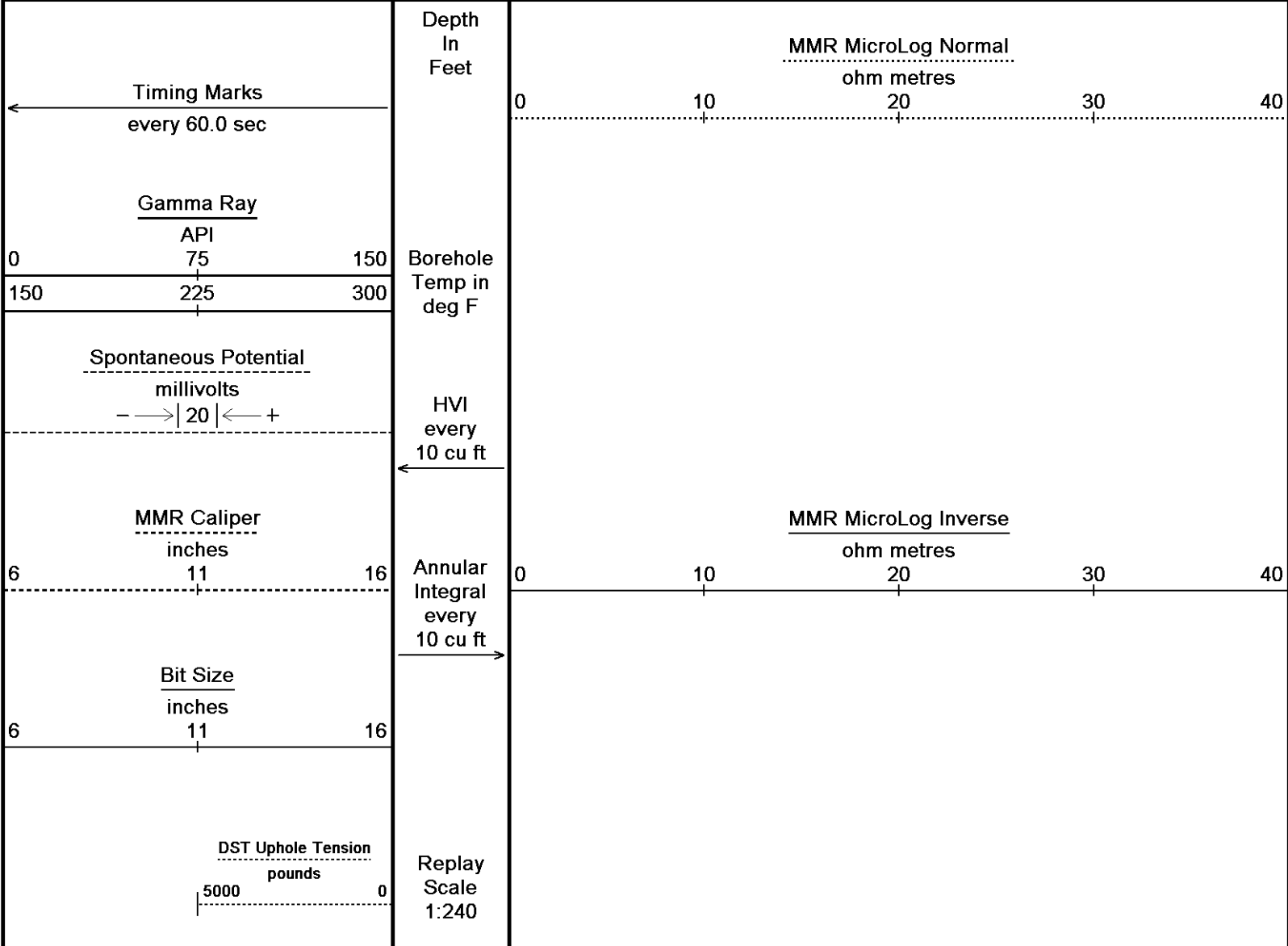
- ENGINEER: A. SILL, J. RANDLE.

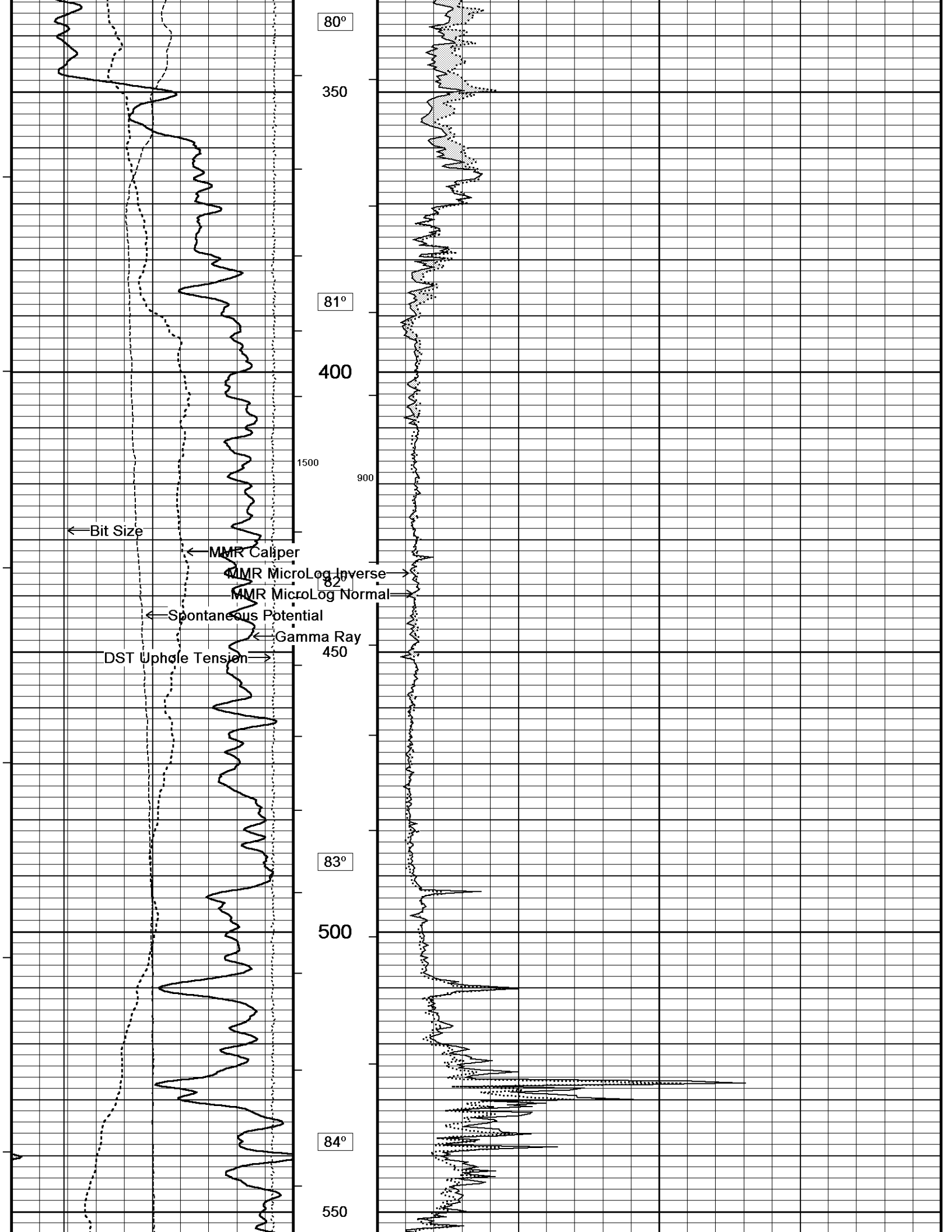
- OPERATOR(S): J. DUNLAP.

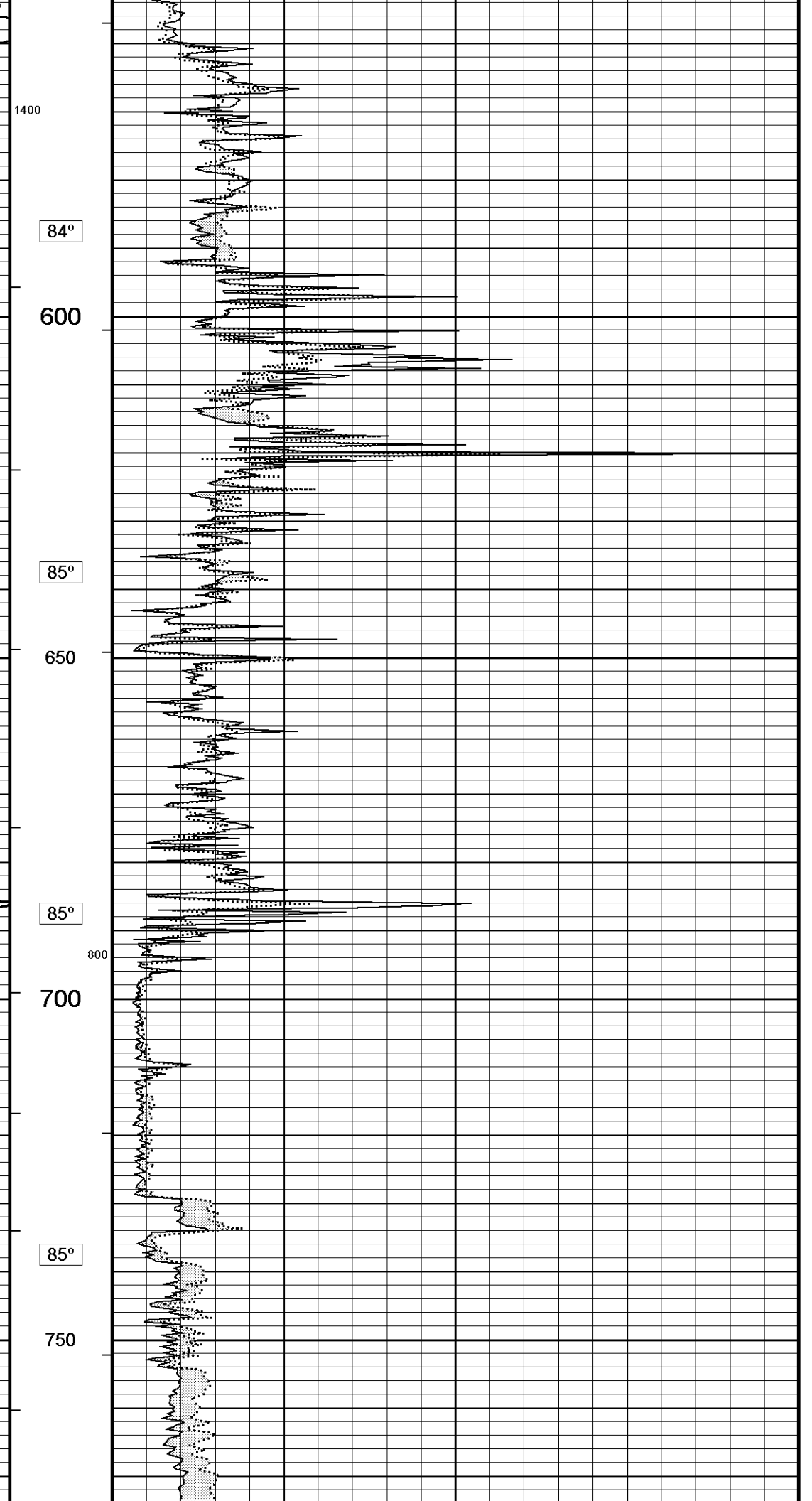
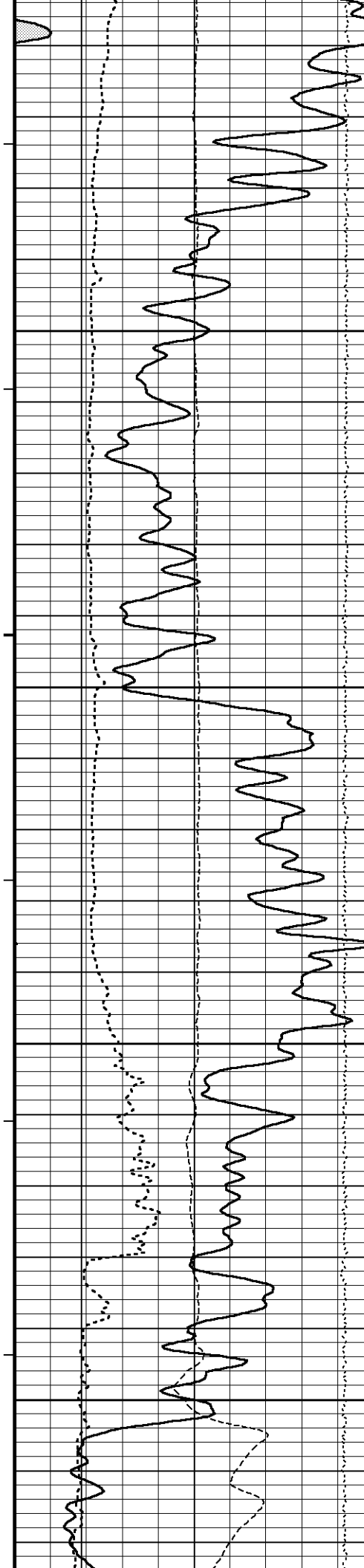
All interpretations are opinions based on inferences from electrical or other measurements and we cannot, and do not, guarantee the accuracy or correctness of any interpretations, and we shall not, except in the case of gross or wilful negligence on our part, be liable or responsible for any loss, costs, 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.

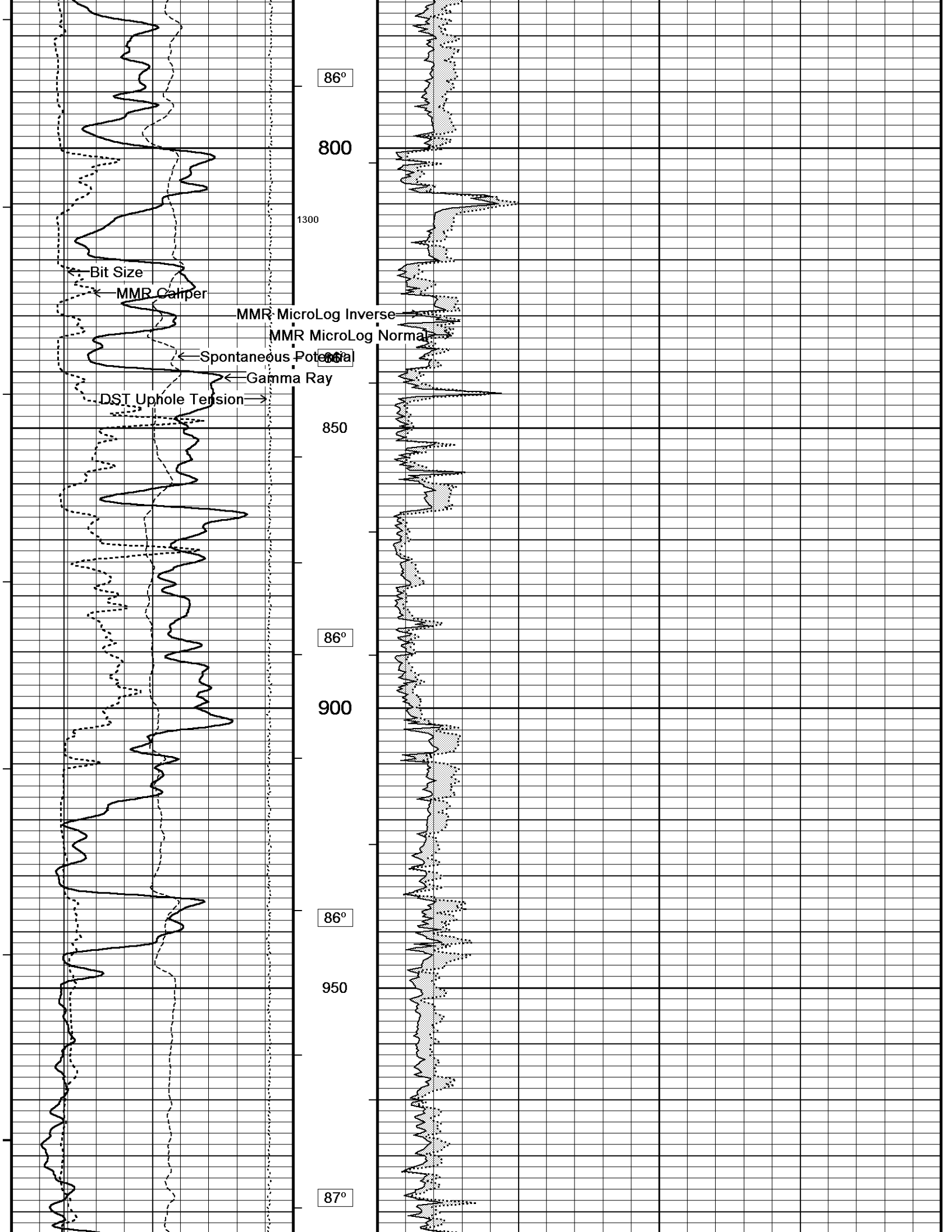
5 INCH MAIN

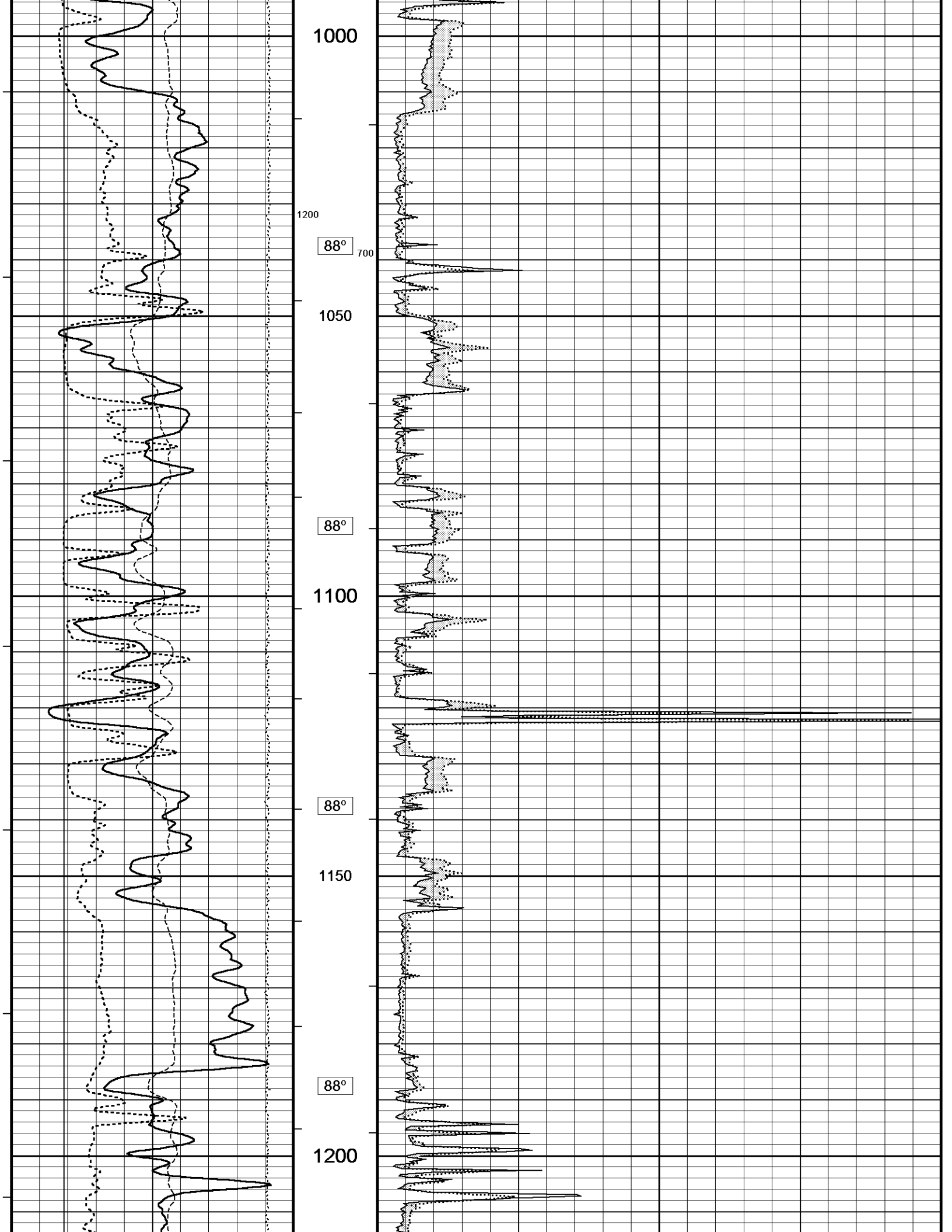
Depth Based Data - Maximum Sampling Increment 10.0cm Plotted on 28-JUL-2014 08:43
Filename: C:\Users\mrigby\AppData\Local\Temp\Weatherford Pre...\McElvain Gustafson #11-6_003.dta Recorded on 26-FEB-2014 12:38
System Versions: Logged with 13.05.9583 Plotted with 13.06.9284

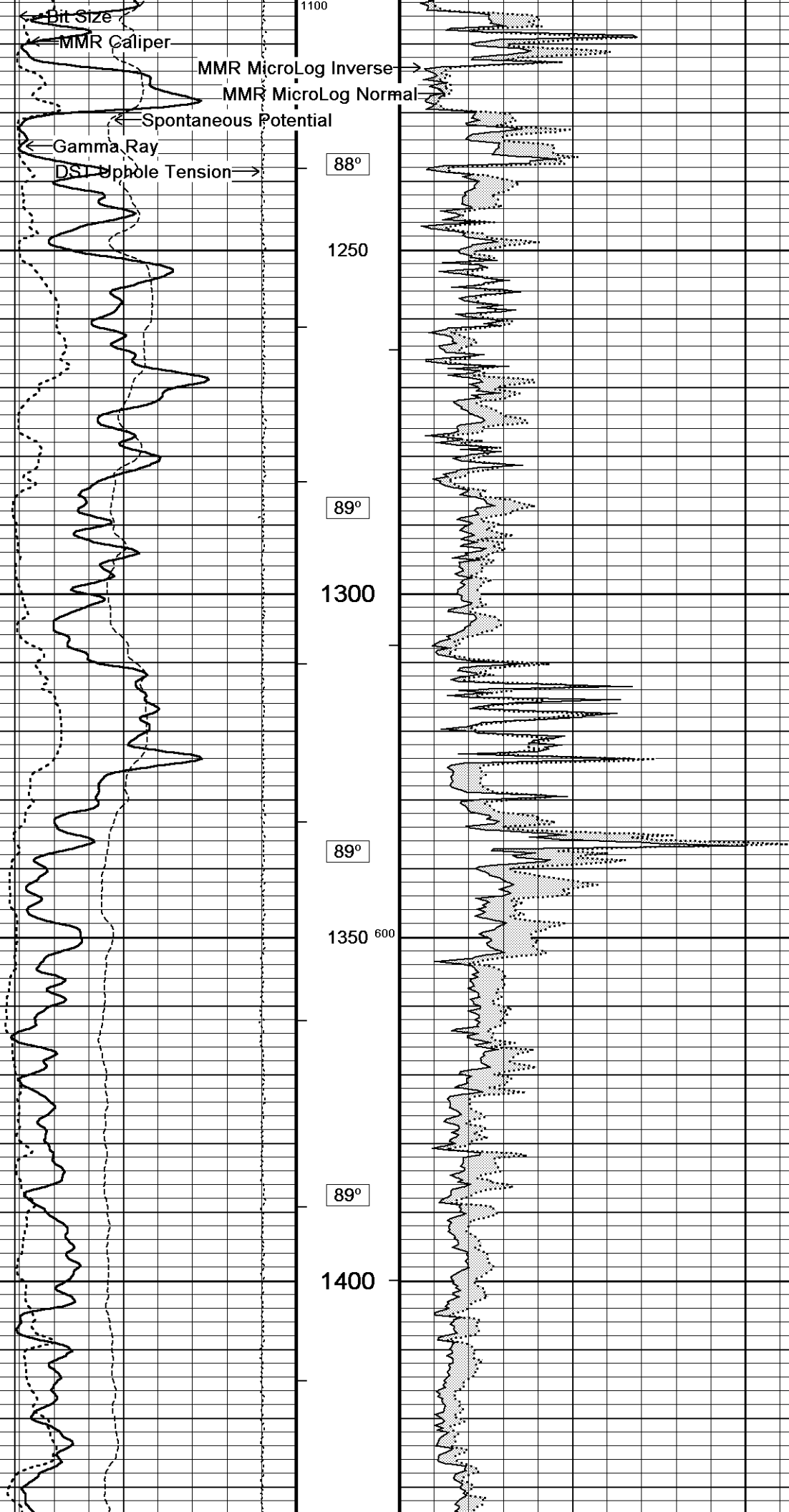












1100

88°

1250

89°

1300

89°

1350 ⁶⁰⁰

89°

1400

Bit Size

MMR Caliper

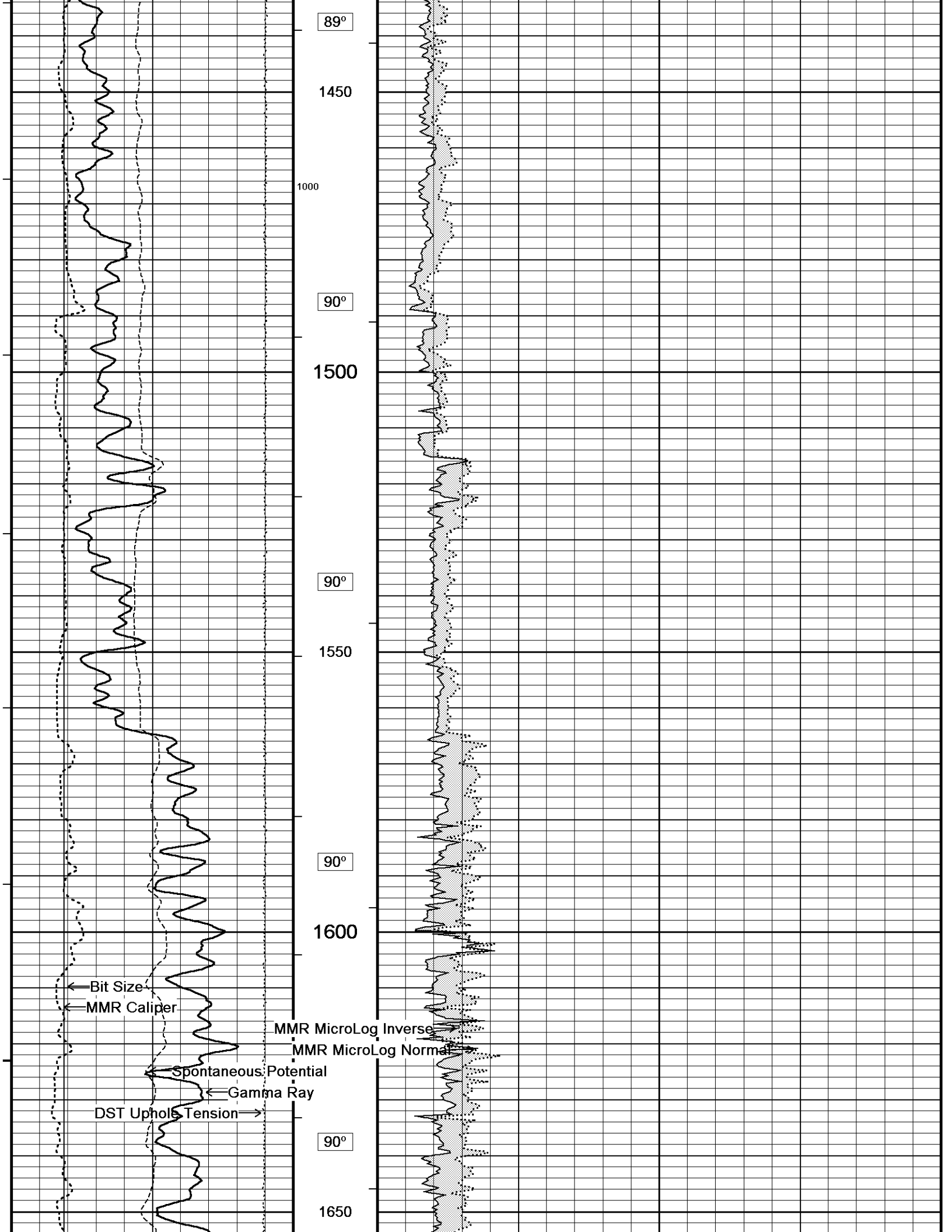
MMR MicroLog Inverse

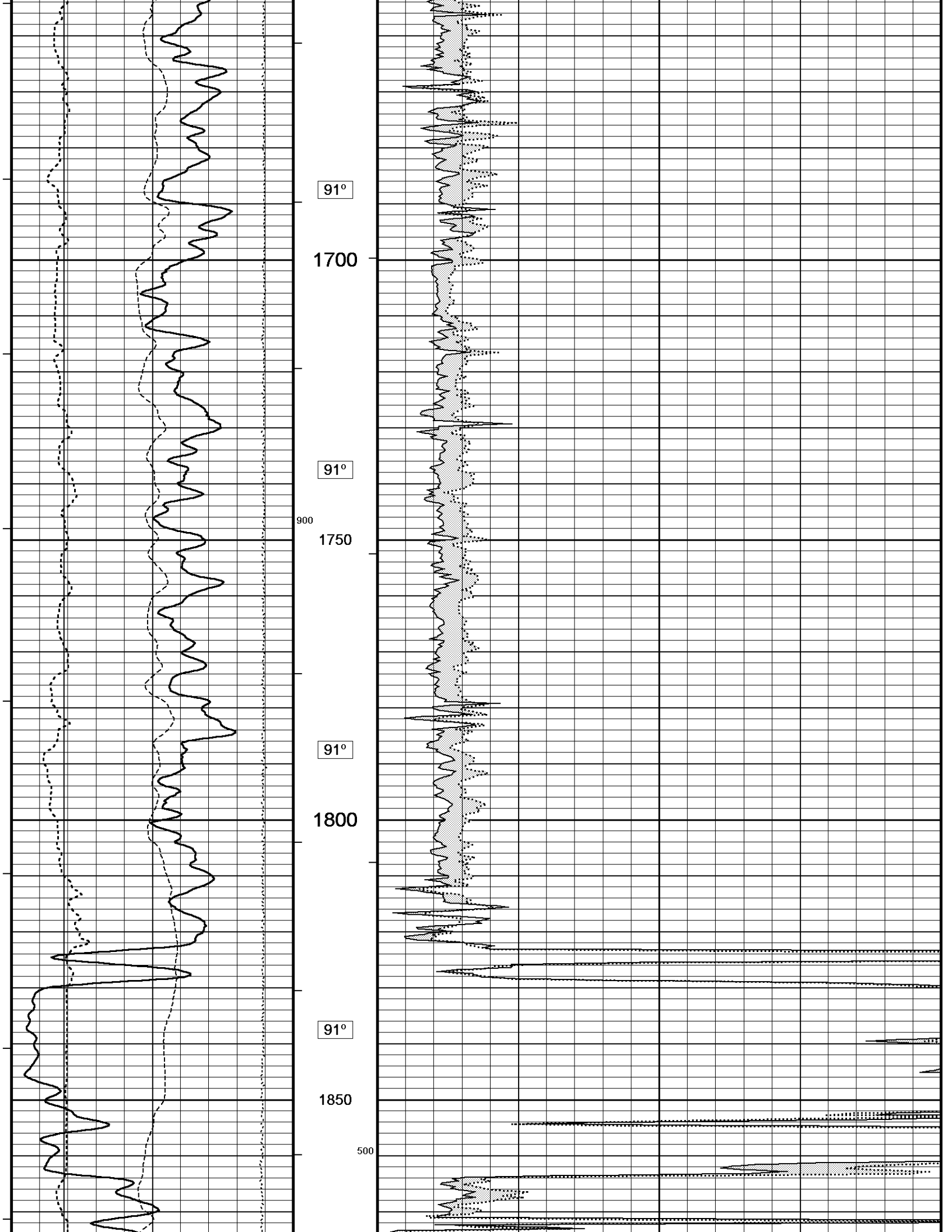
MMR MicroLog Normal

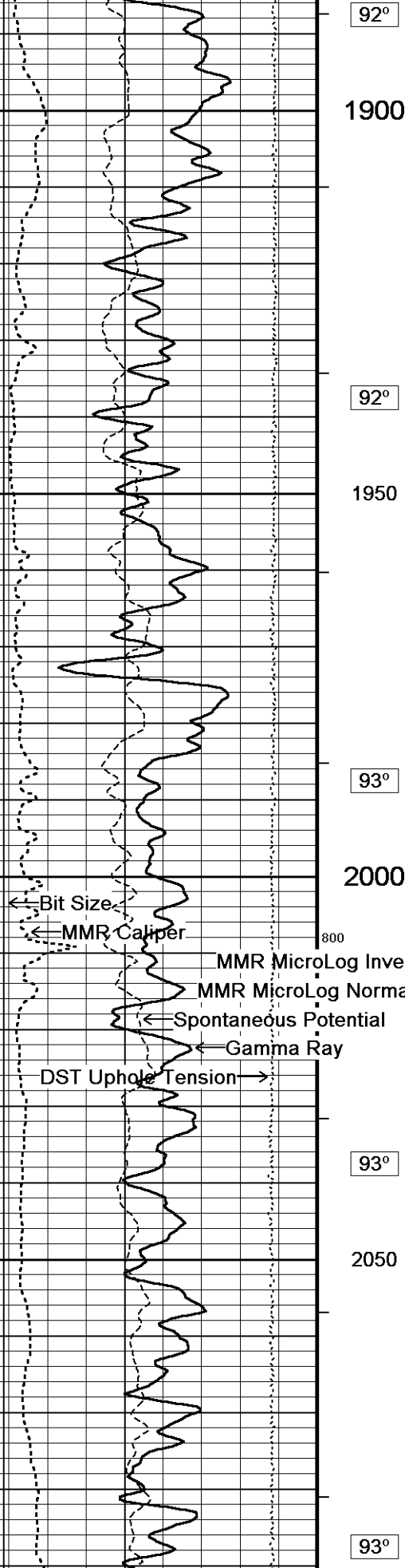
Spontaneous Potential

Gamma Ray

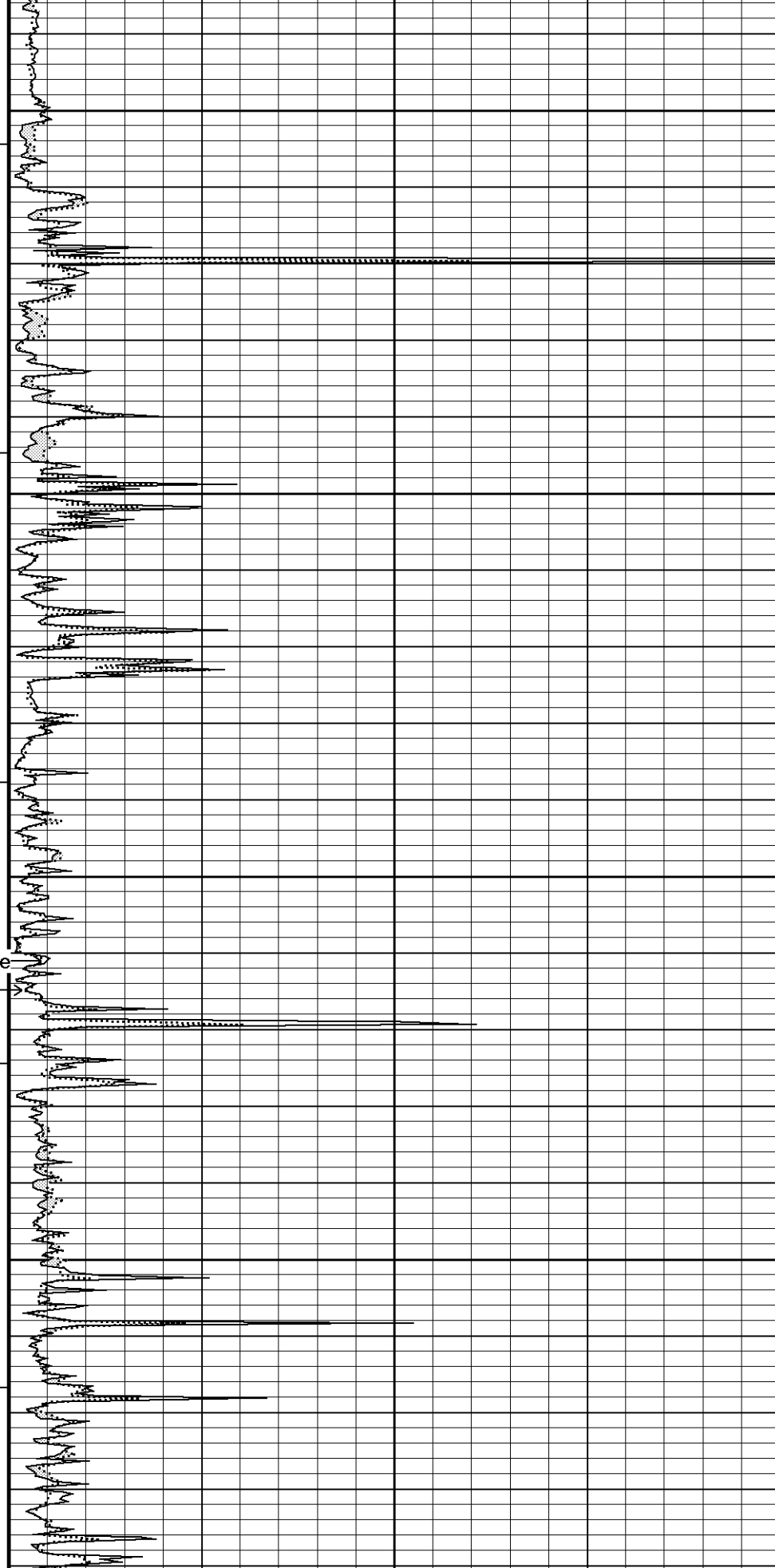
DST Uphole Tension

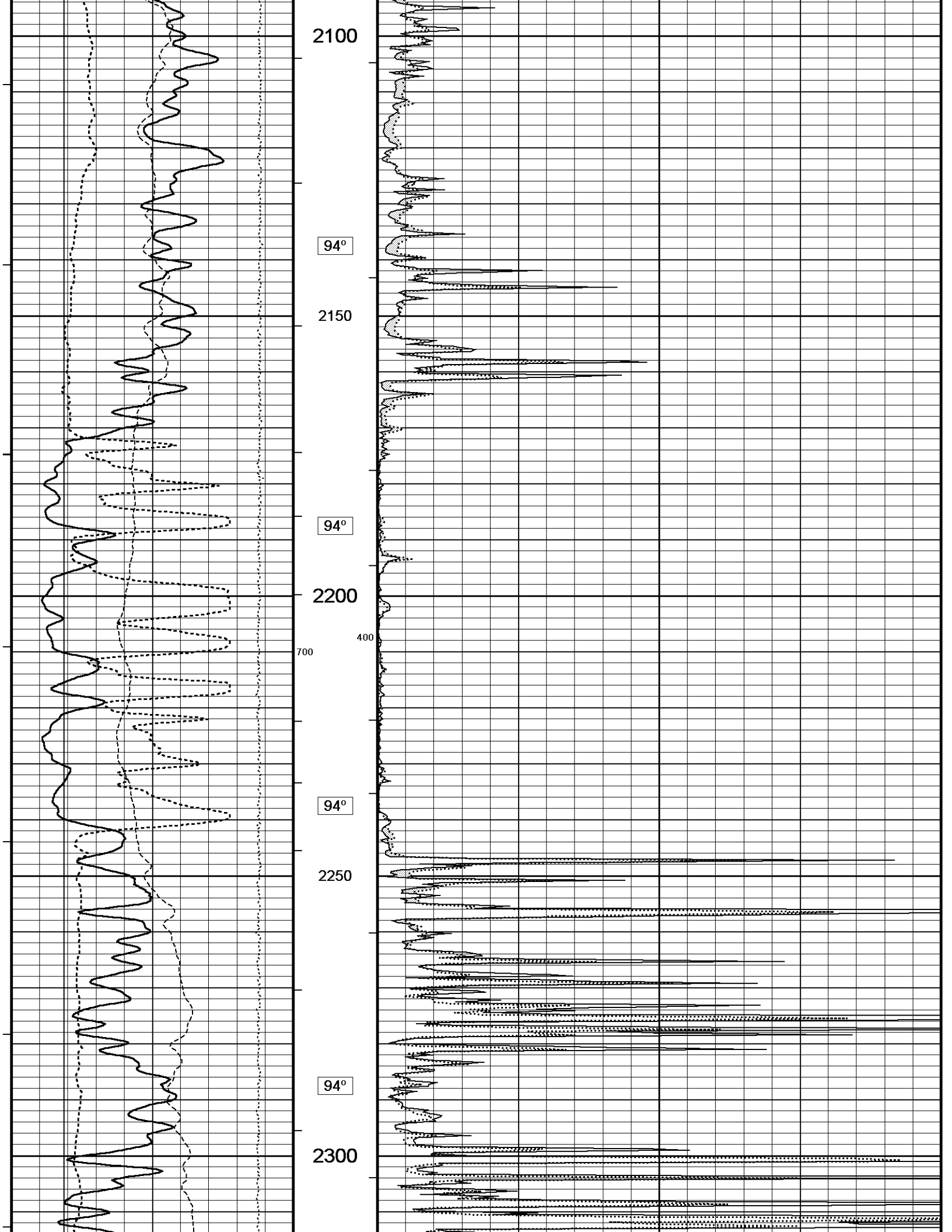


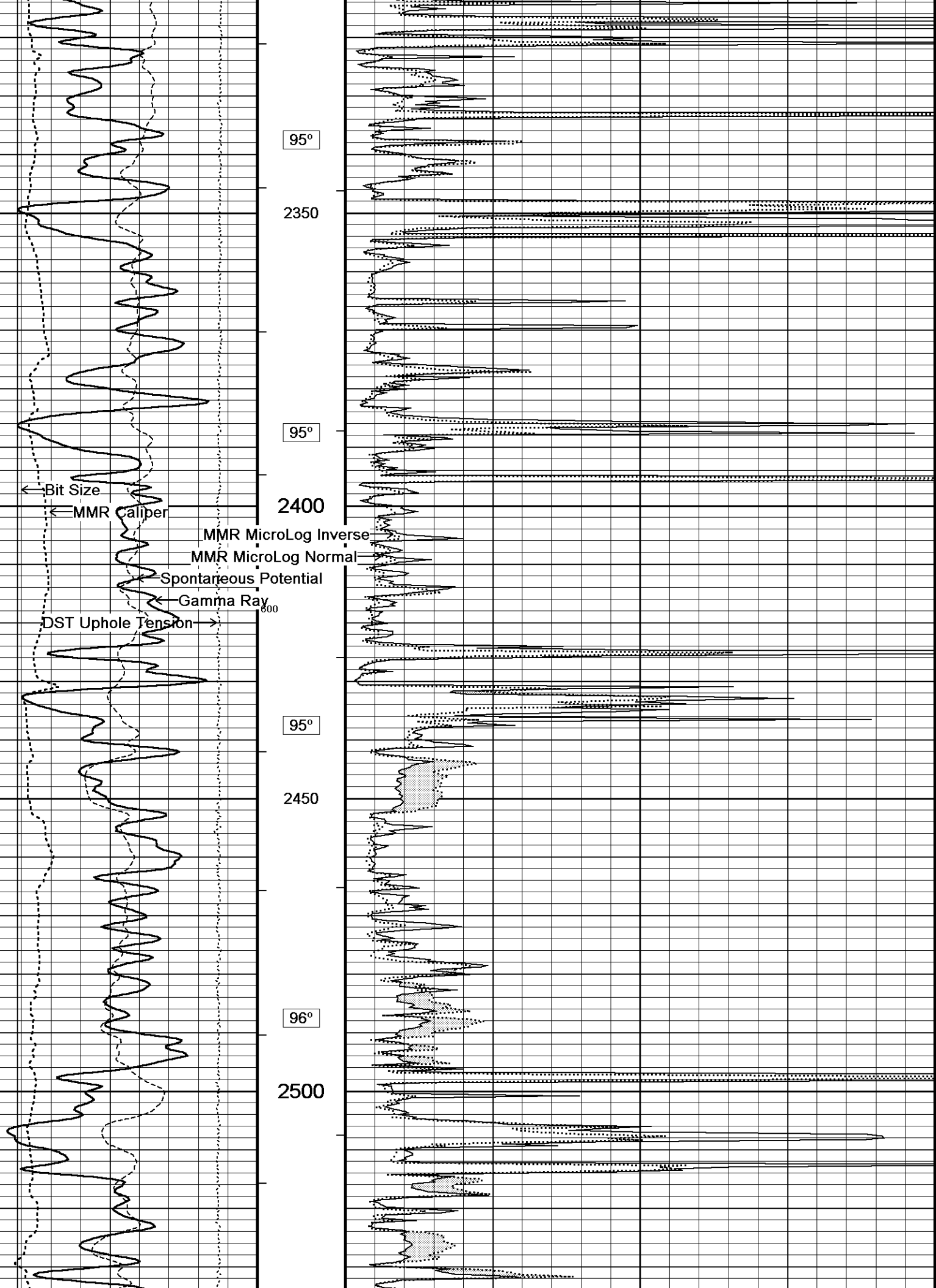


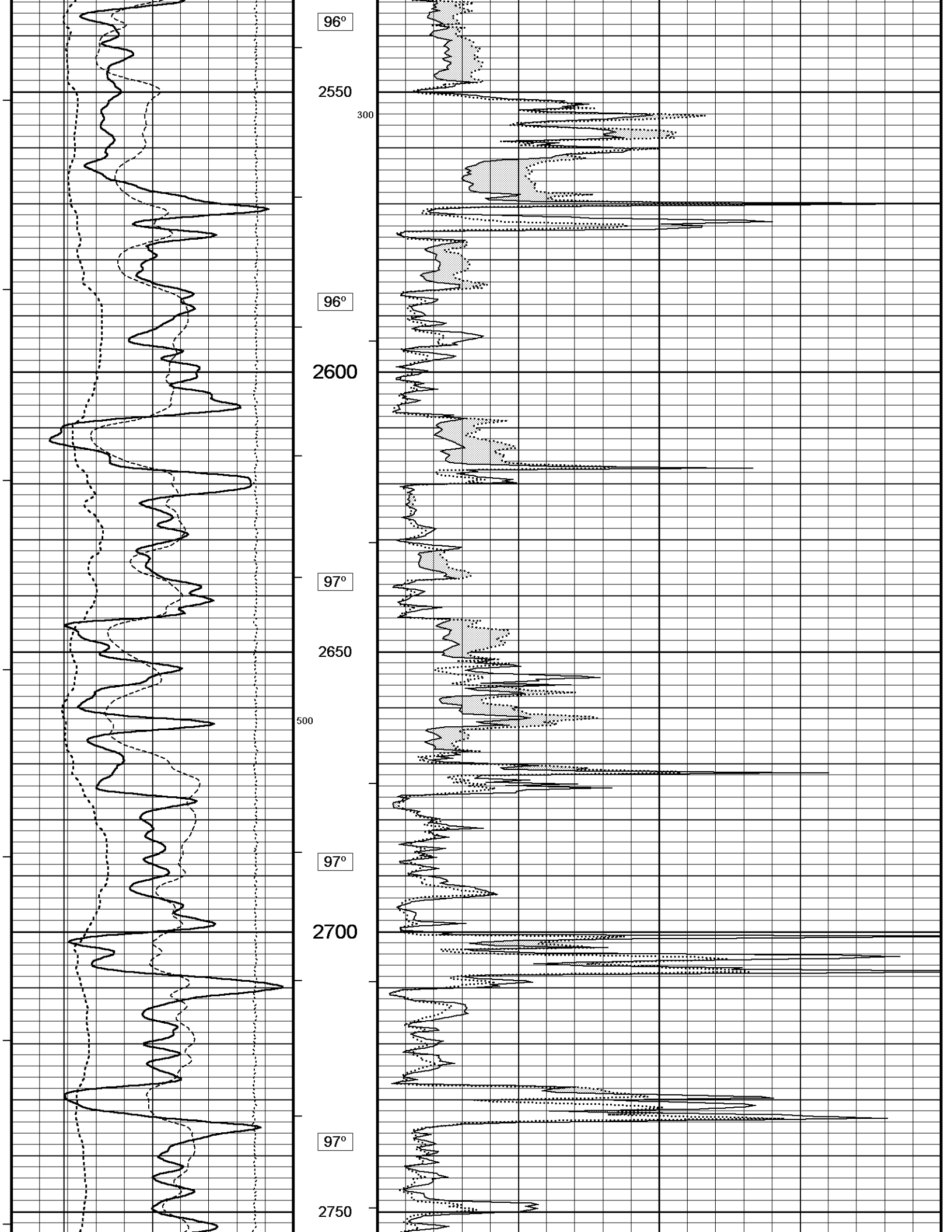


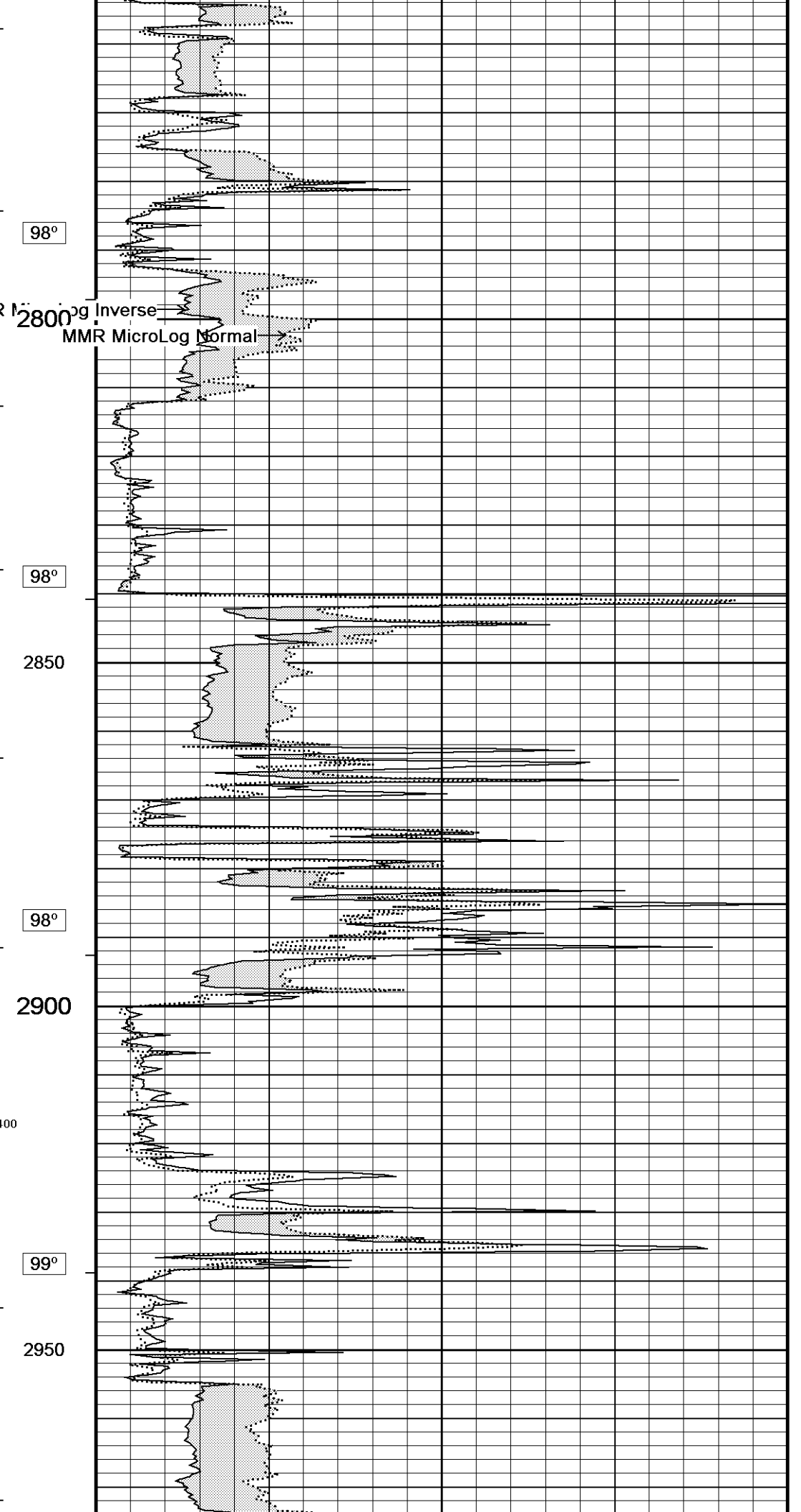
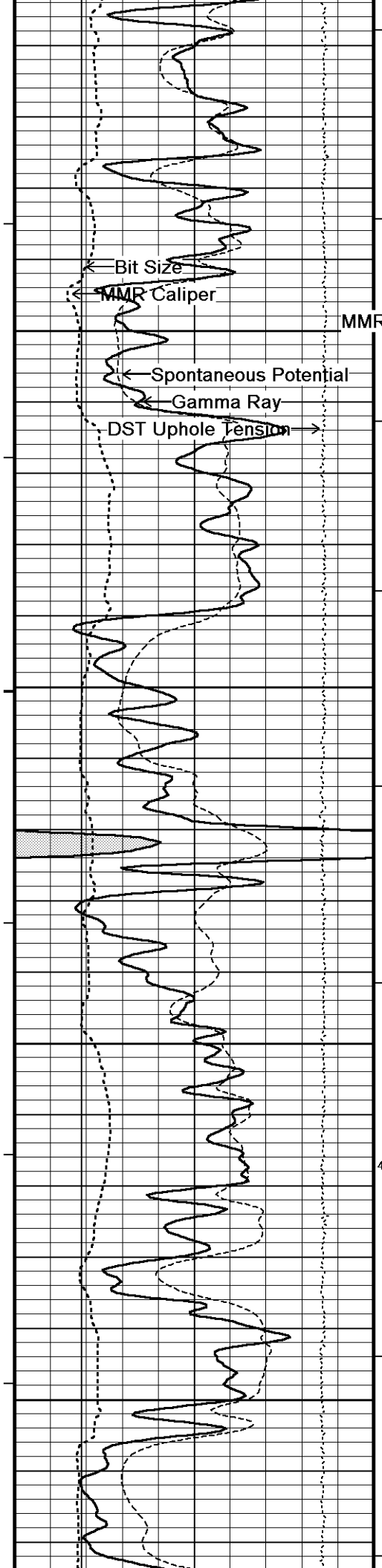
92°
1900
92°
1950
93°
2000
800
93°
2050
93°











Bit Size
MMR Caliper
Spontaneous Potential
Gamma Ray
DST Uphole Tension

MMR 2800 Inverse
MMR MicroLog Normal

98°

98°

2850

98°

2900

400

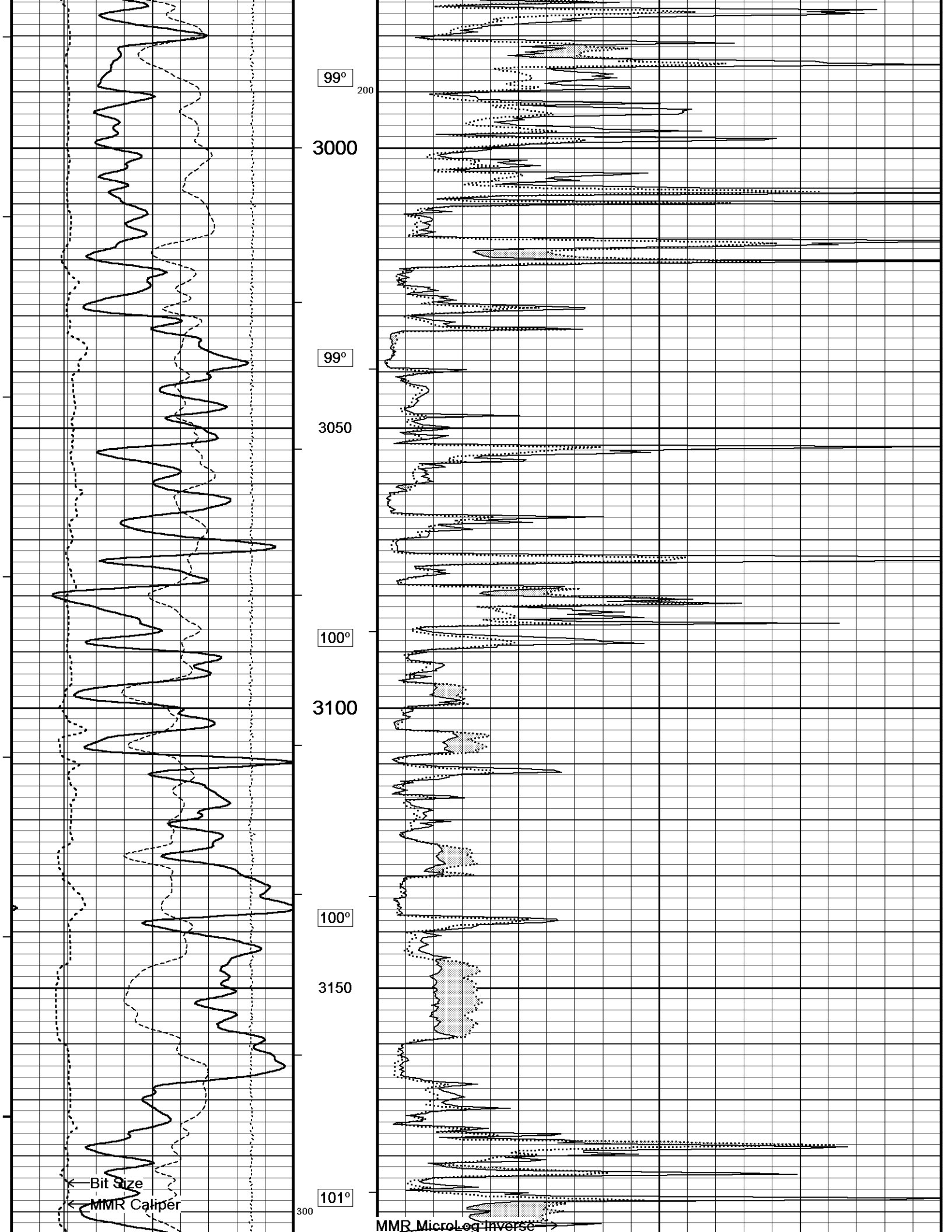
99°

2950

99° 200
3000
99° 3050
100° 3100
100° 3150
101° 300

← Bit Size
← MMR Caliper

MMR MicroLog Inverse →



MMR Microlog Normal

← Spontaneous P3200I

← Gamma Ray

DST Uphole Tension →

101°

3250

101°

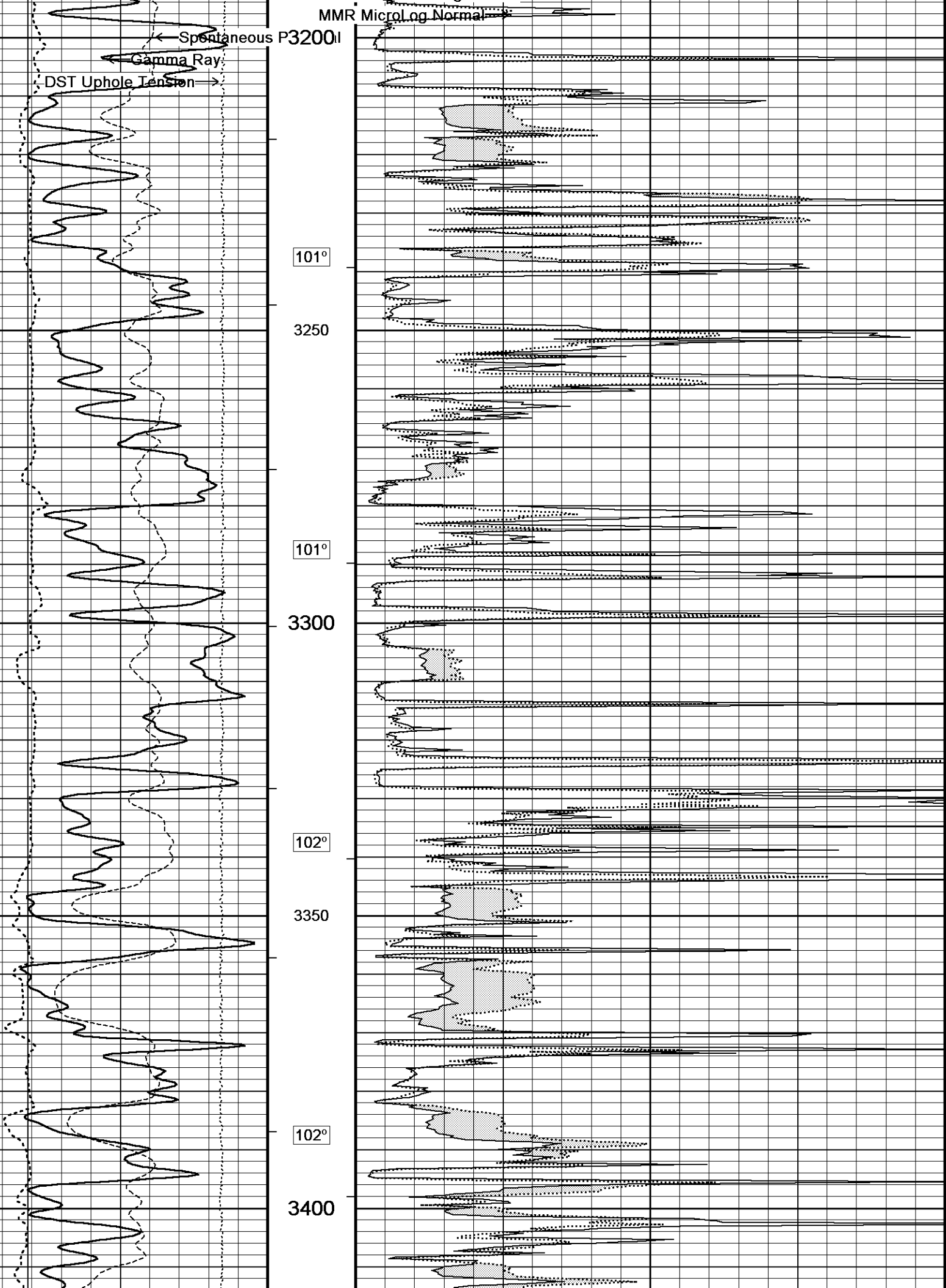
3300

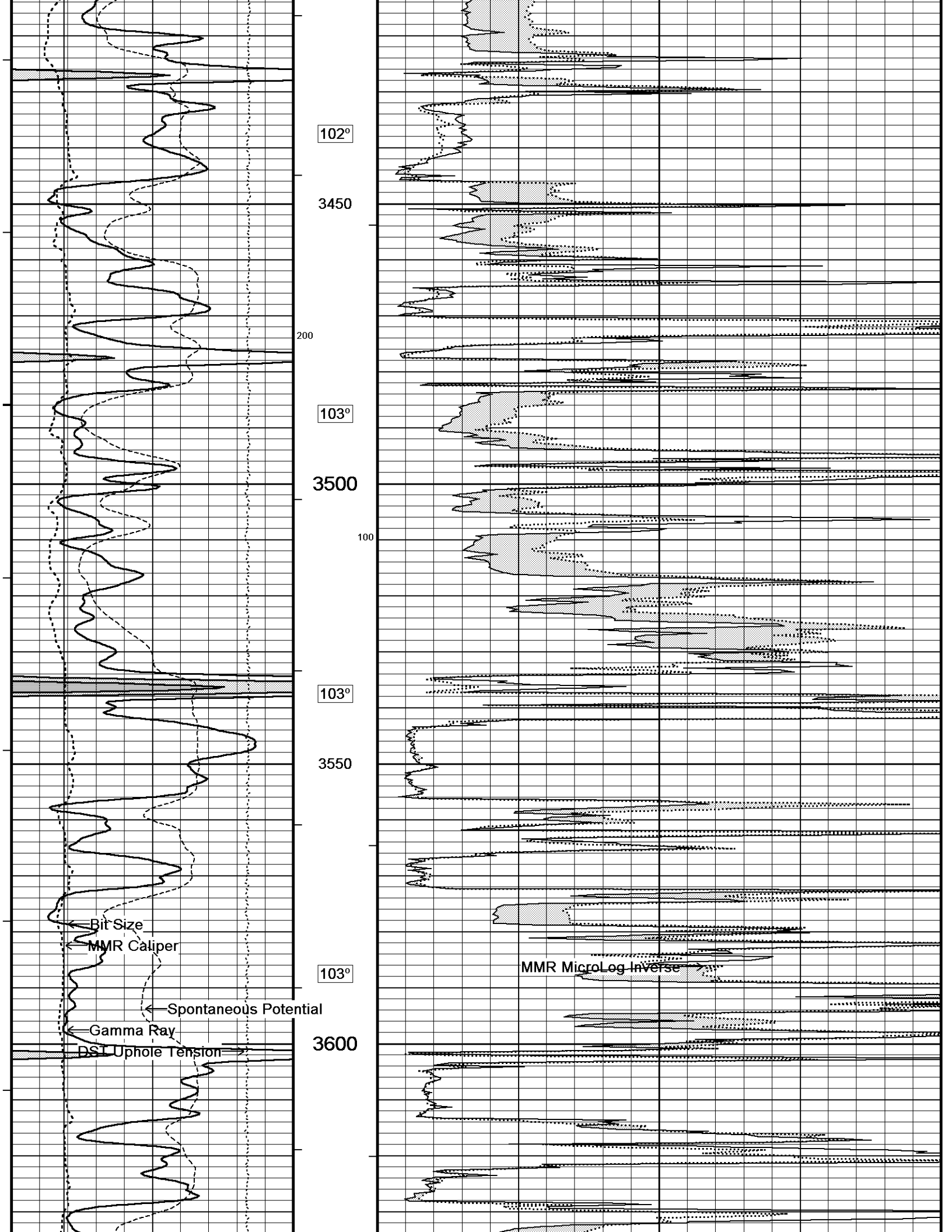
102°

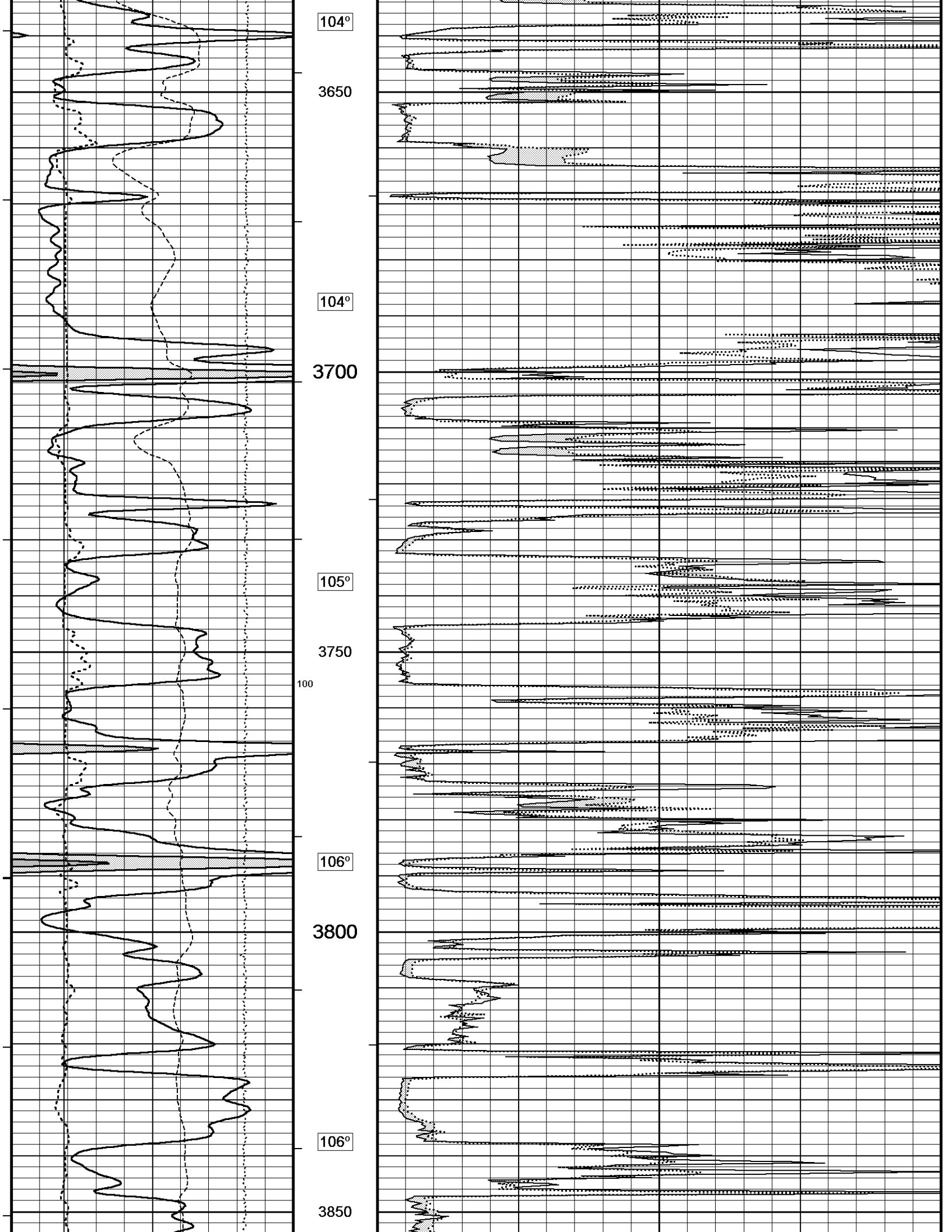
3350

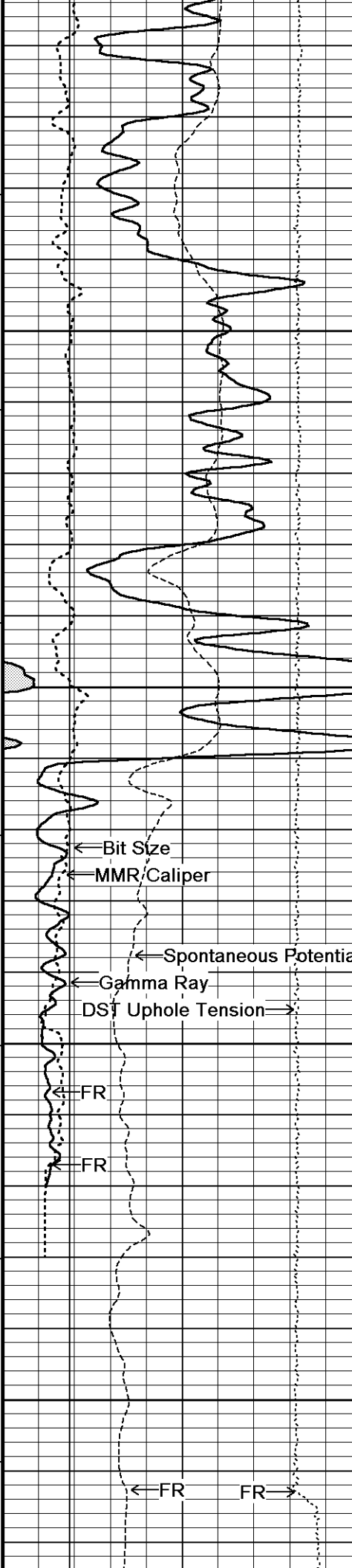
102°

3400

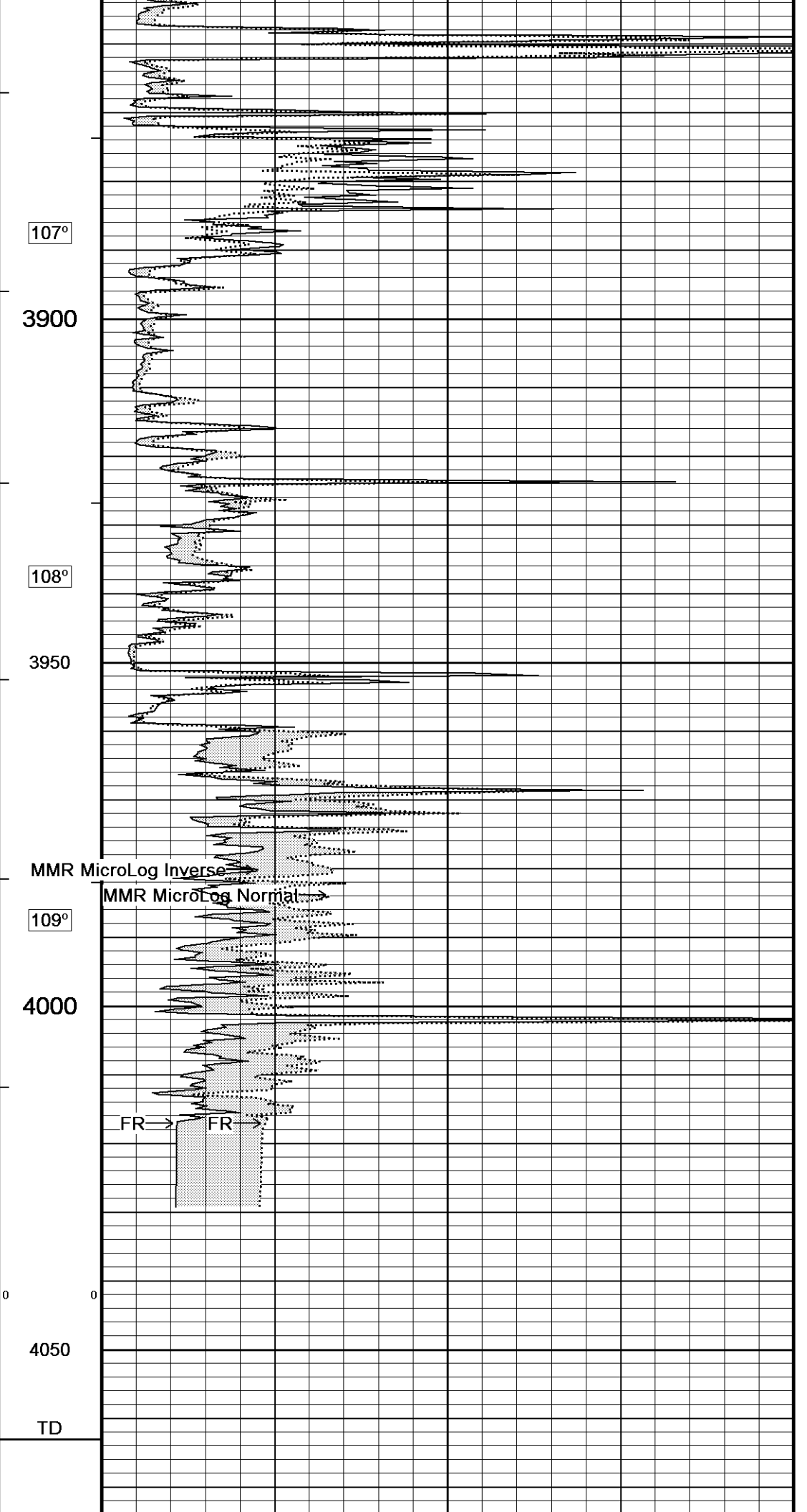


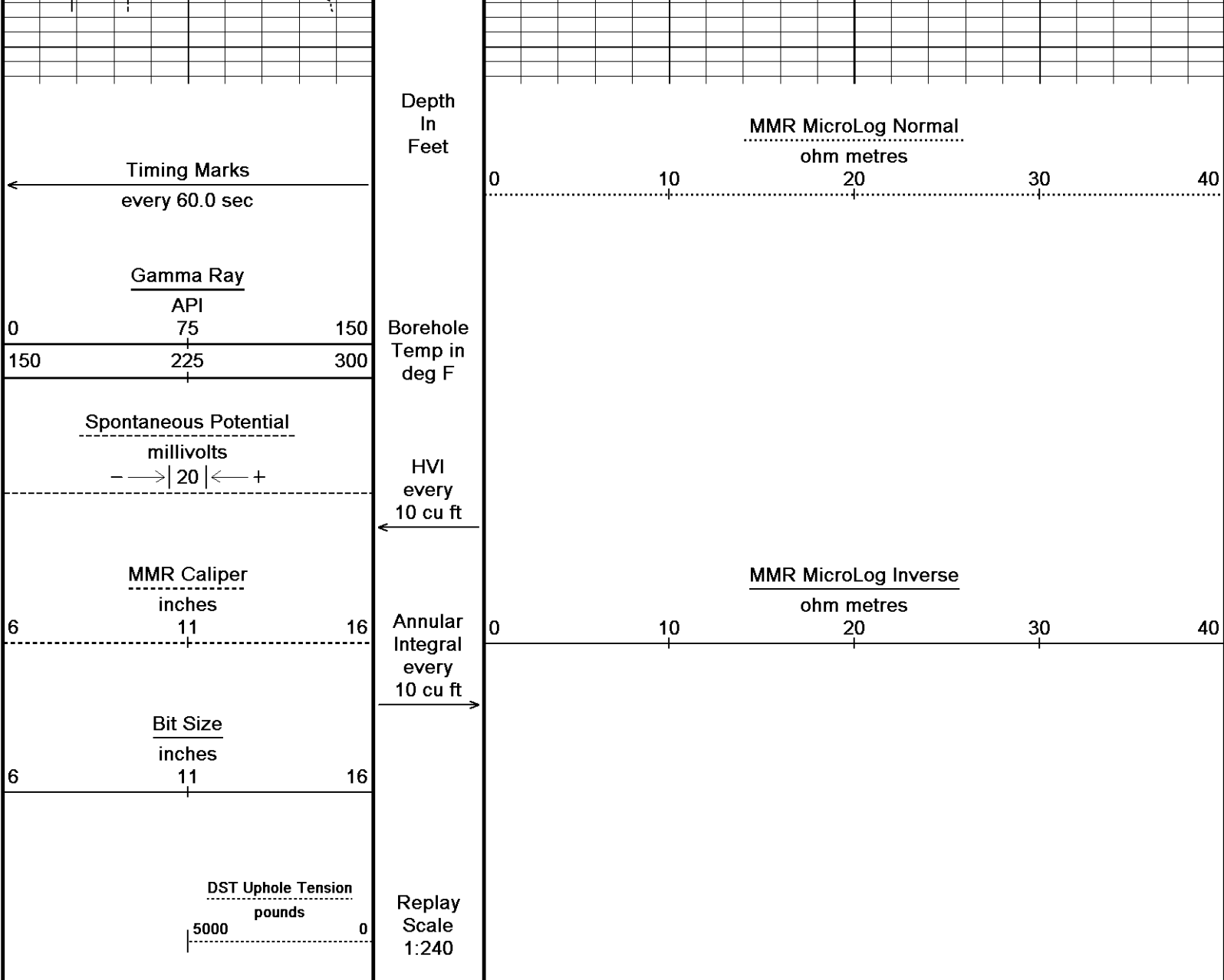






107°
 3900
 108°
 3950
 109°
 4000
 4050
 TD



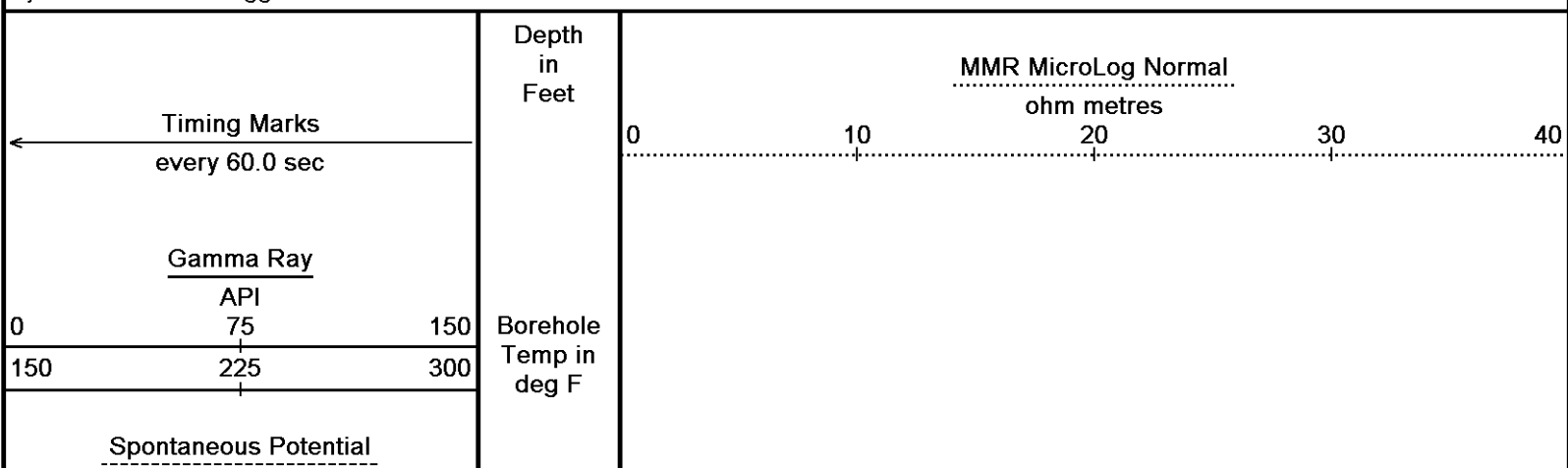


Depth Based Data - Maximum Sampling Increment 10.0cm Plotted on 28-JUL-2014 08:43
 Filename: C:\Users\mrigby\AppData\Local\Temp\Weatherford Pre...\McElvain Gustafson #11-6_003.dta Recorded on 26-FEB-2014 12:38
 System Versions: Logged with 13.05.9583 Plotted with 13.06.9284

↑ 5 INCH MAIN ↑

↓ 10 INCH HIGH RESOLUTION ↓

Depth Based Data - Maximum Sampling Increment 2.5cm Plotted on 28-JUL-2014 08:43
 Filename: C:\Users\mrigby\AppData\Local\Temp\Weatherford Pre...\McElvain Gustafson #11-6_001.dta Recorded on 26-FEB-2014 11:27
 System Versions: Logged with 13.05.9583 Plotted with 13.06.9284



millivolts
- -> | 20 | <- +

HVI
every
10 cu ft
←

MMR Caliper
inches
6 11 16

MMR MicroLog Inverse
ohm metres
0 10 20 30 40

Annular
Integral
every
10 cu ft
→

Bit Size
inches
6 11 16

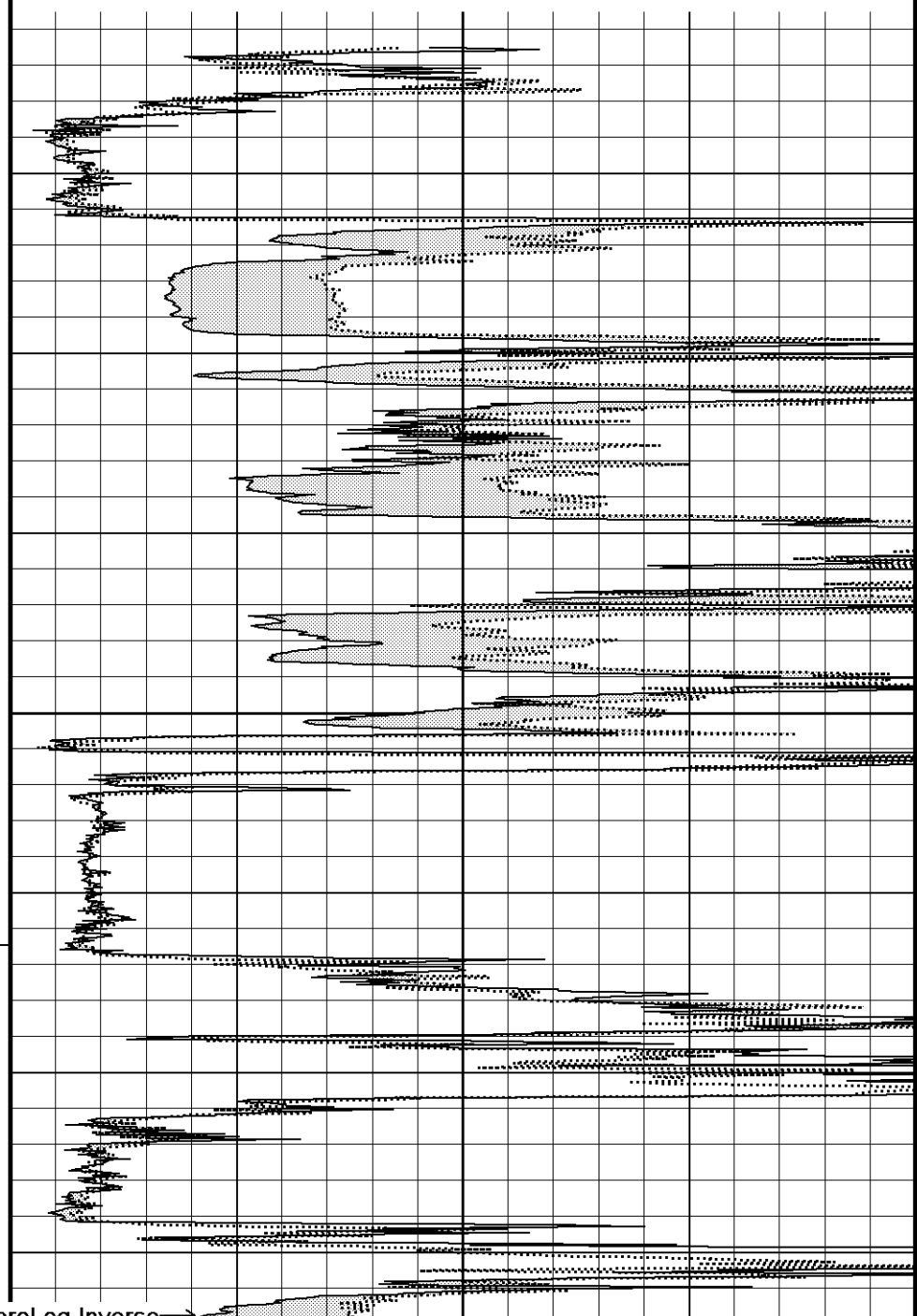
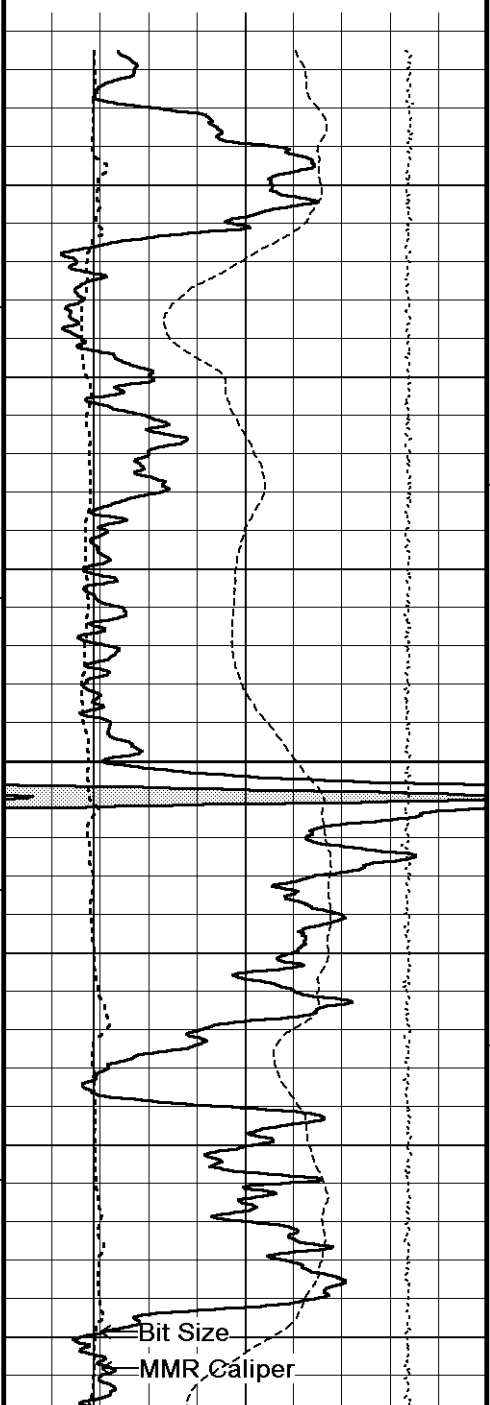
DST Uphole Tension
pounds
5000 0

Replay
Scale
1:120

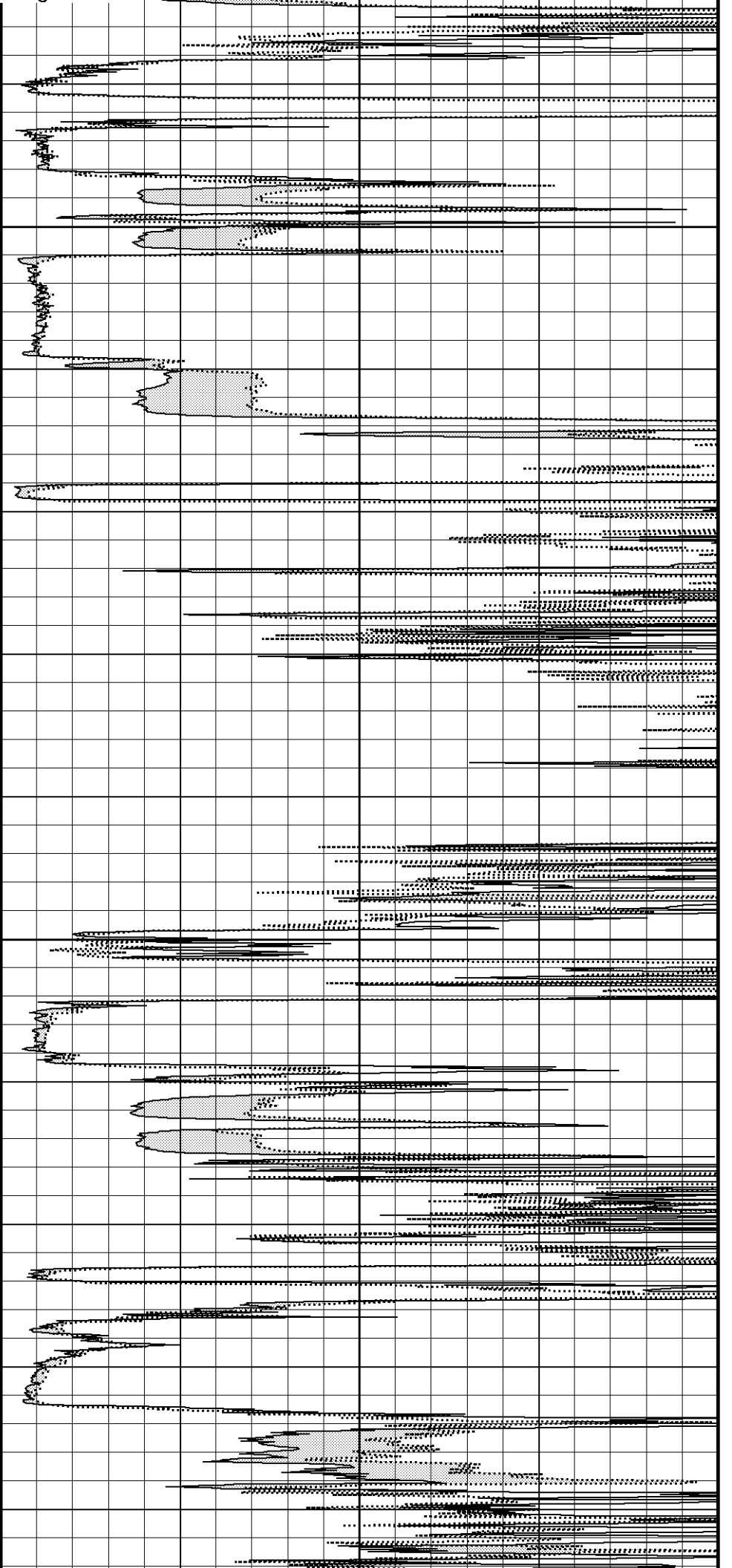
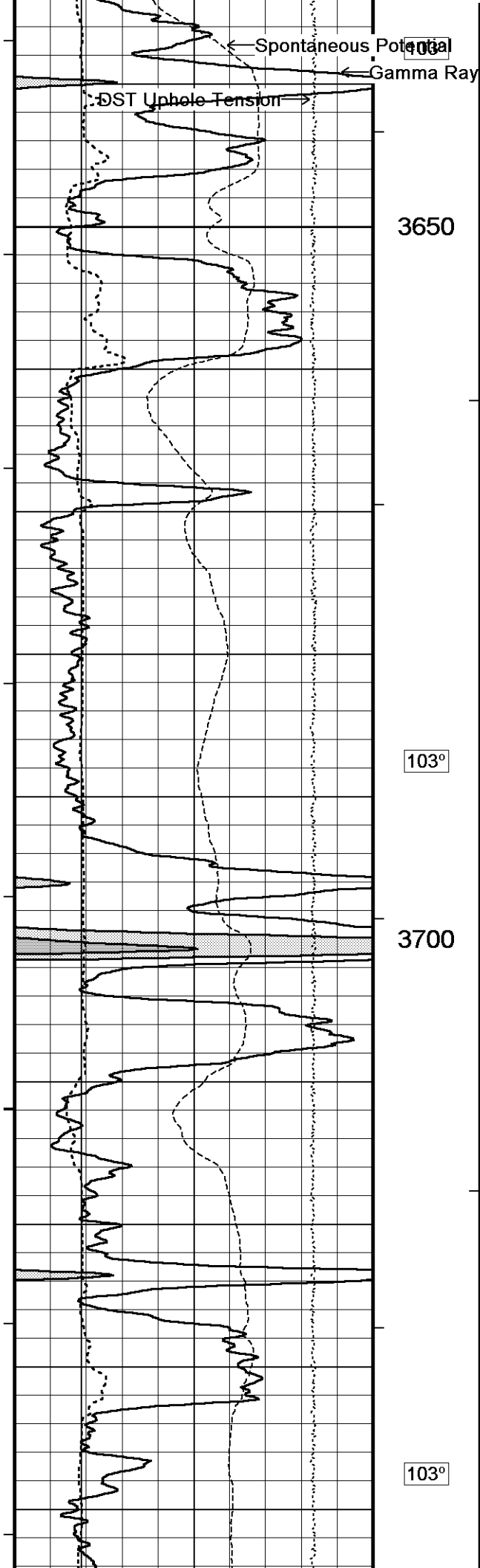
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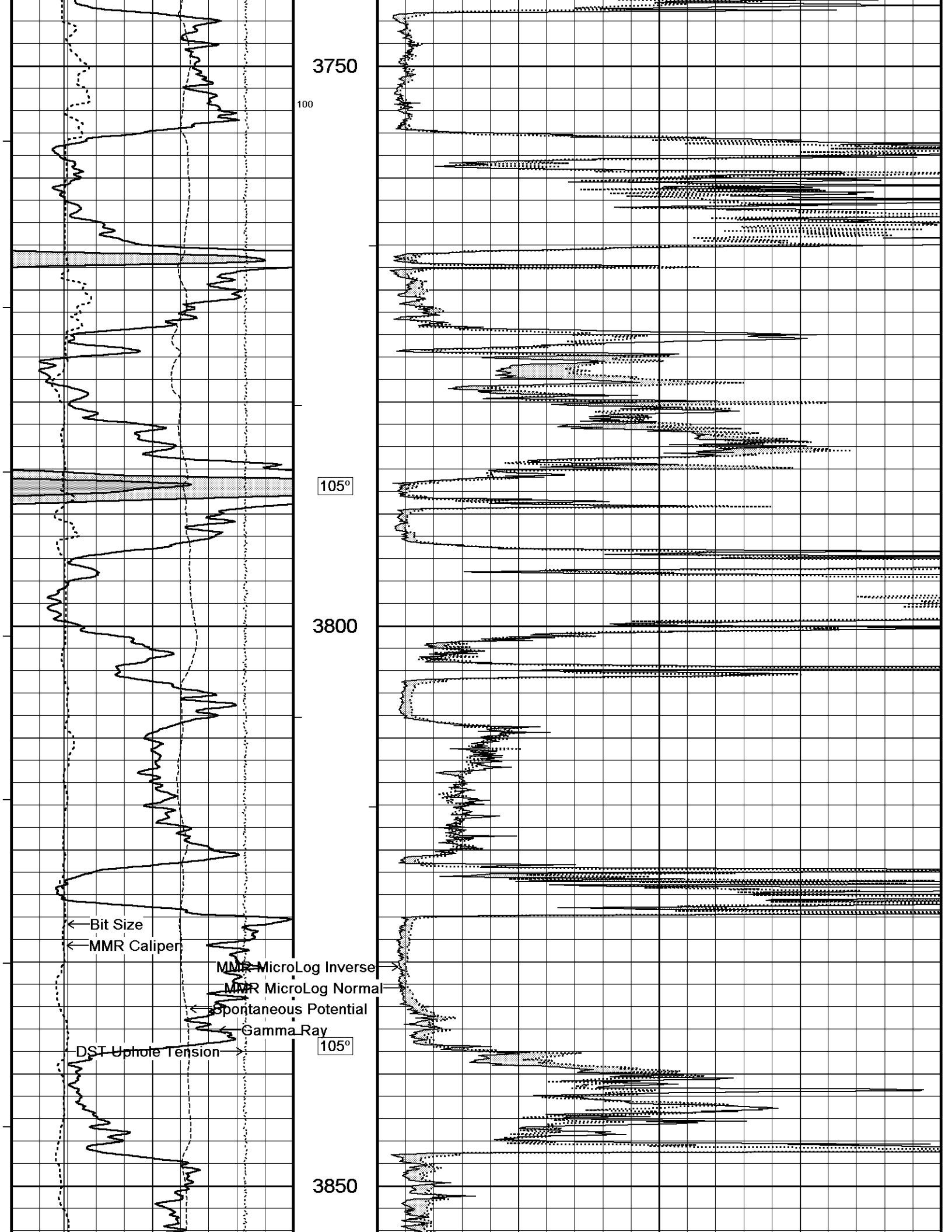
3600

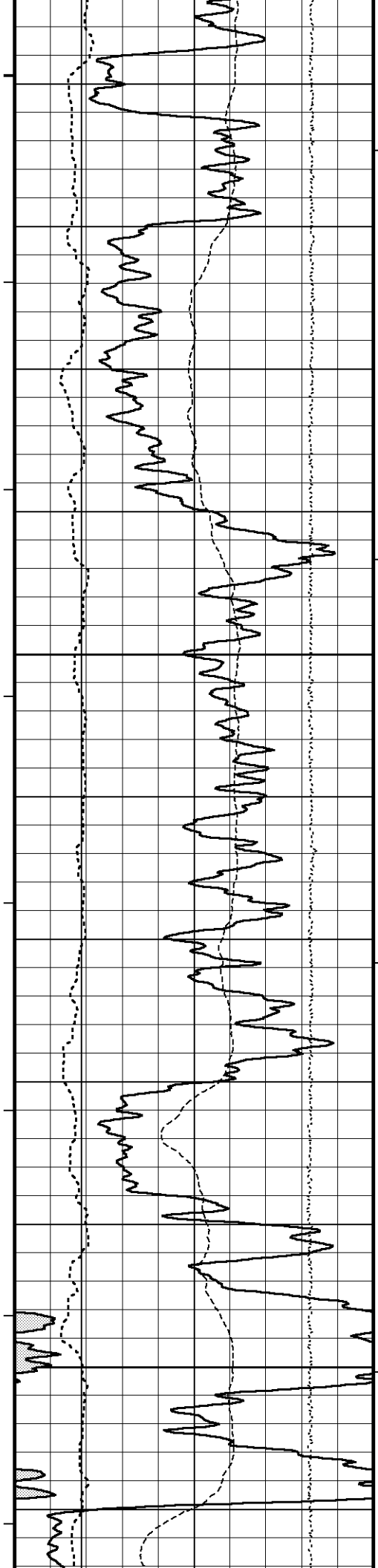
MMR MicroLog Inverse →



Bit Size
MMR Caliper





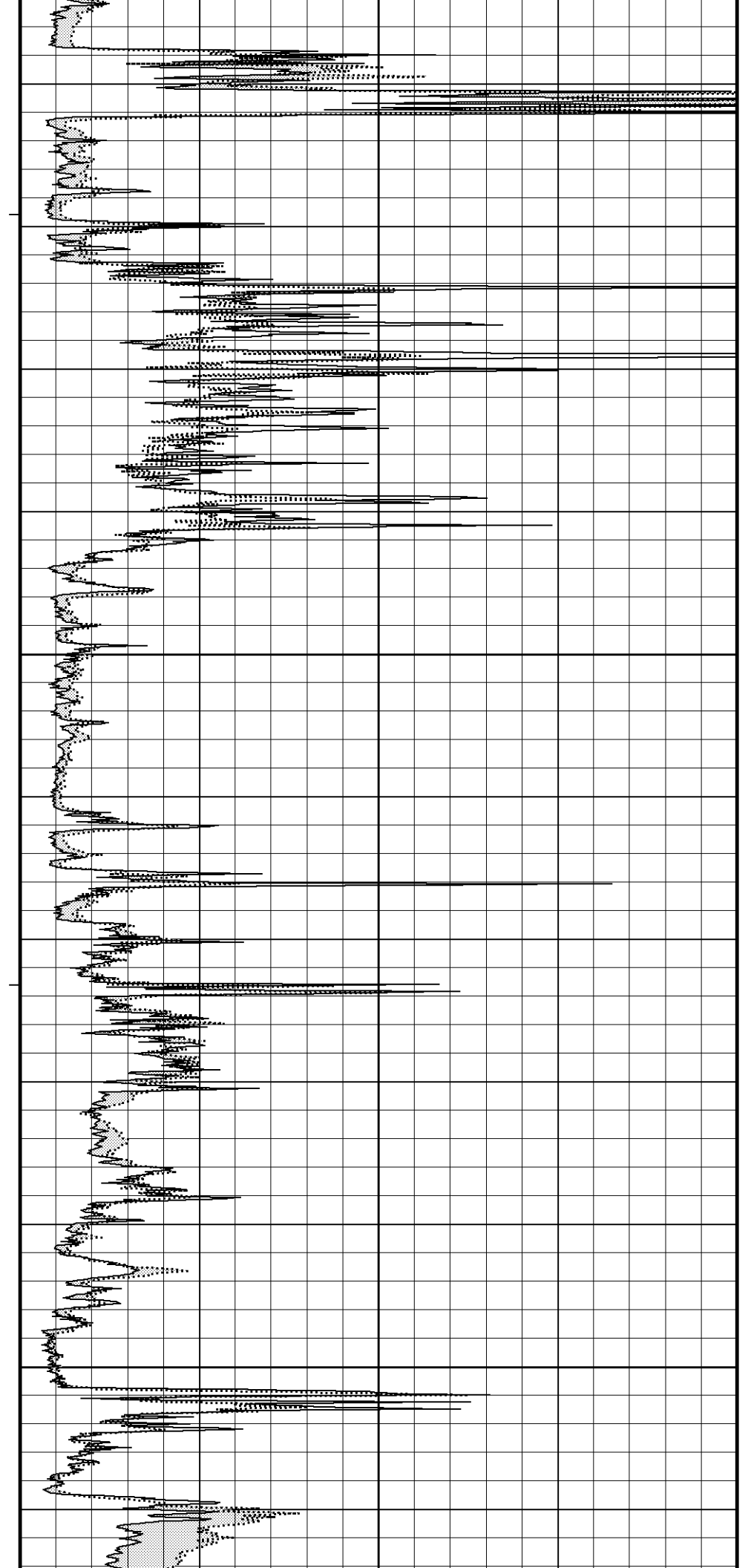


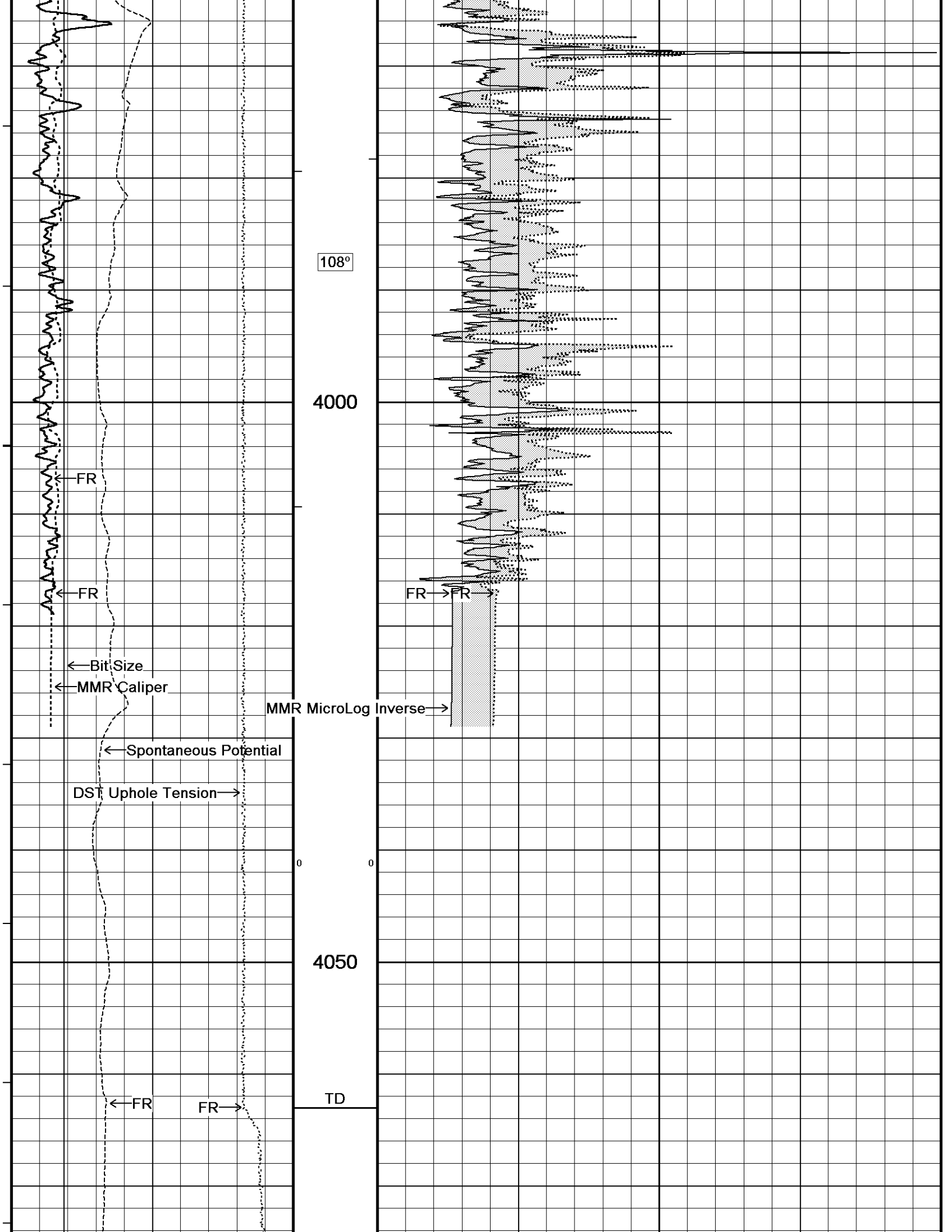
106°

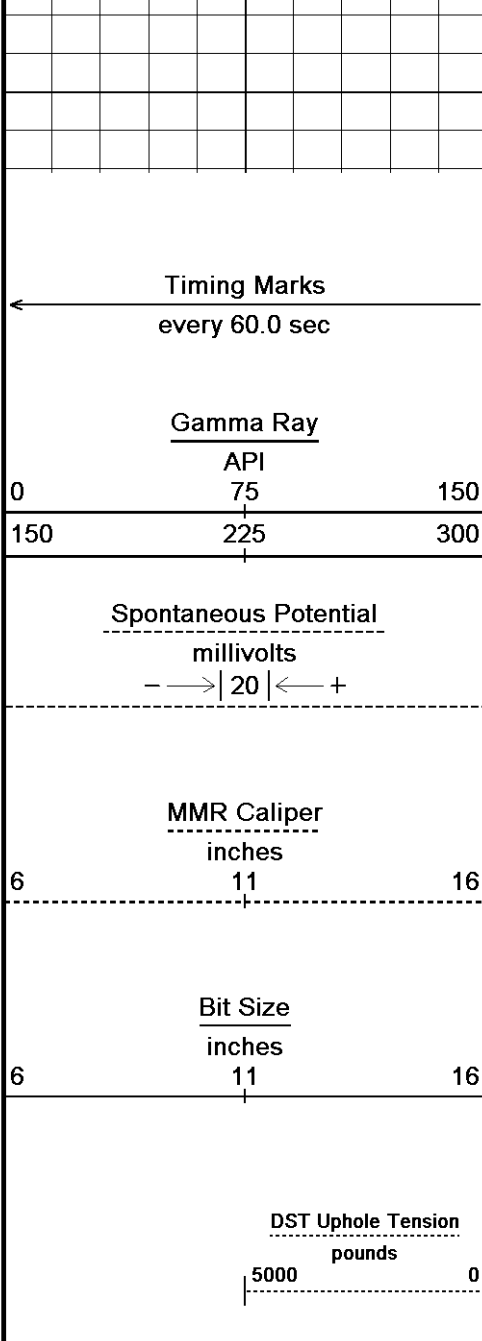
3900

107°

3950







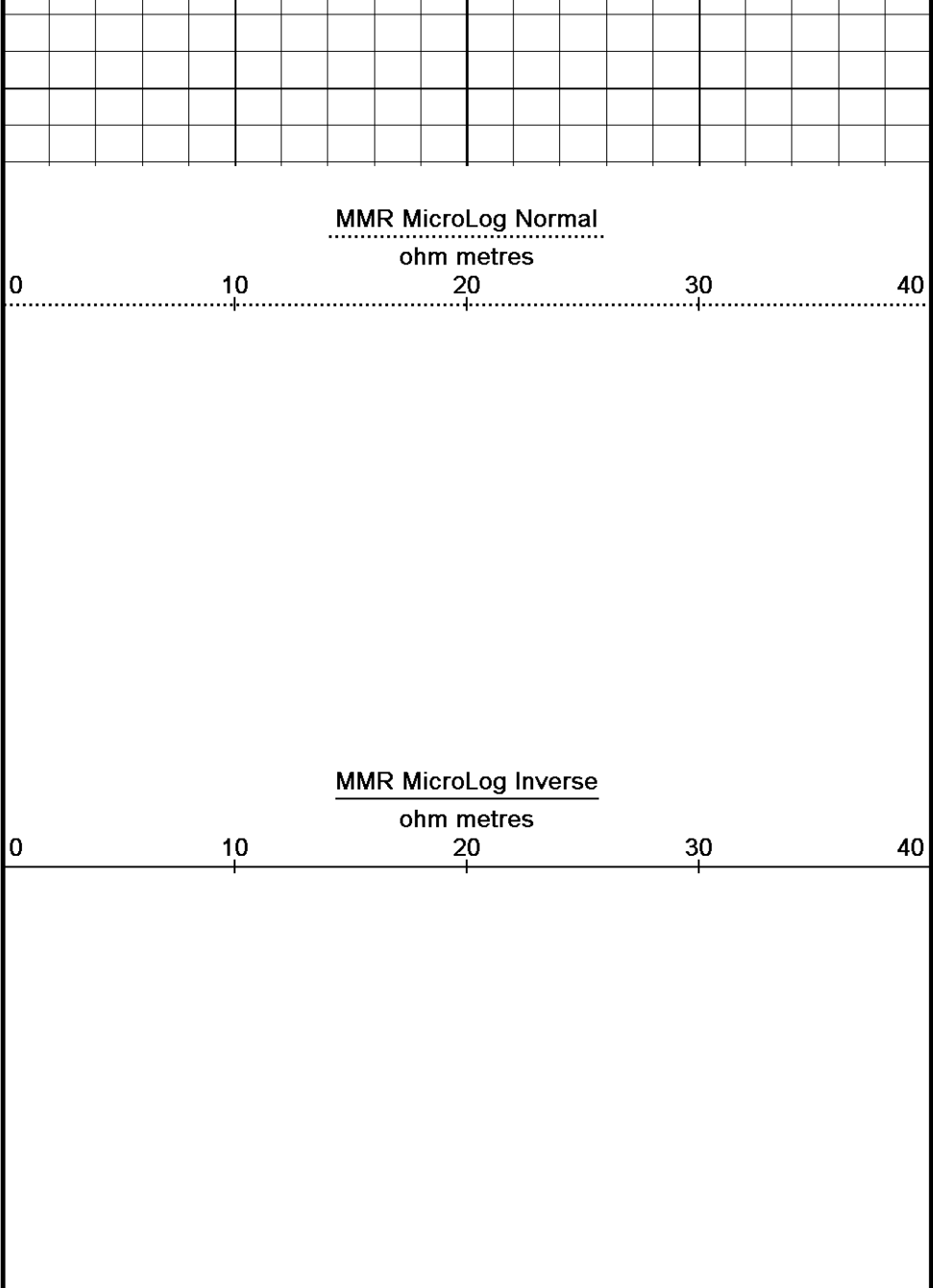
Depth
in
Feet

Borehole
Temp in
deg F

HVI
every
10 cu ft

Annular
Integral
every
10 cu ft

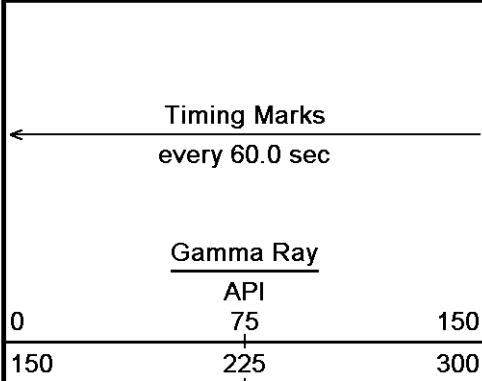
Replay
Scale
1:120



Depth Based Data - Maximum Sampling Increment 2.5cm Plotted on 28-JUL-2014 08:43
 Filename: C:\Users\mrigby\AppData\Local\Temp\Weatherford Pre...\McElvain Gustafson #11-6_001.dta Recorded on 26-FEB-2014 11:27
 System Versions: Logged with 13.05.9583 Plotted with 13.06.9284

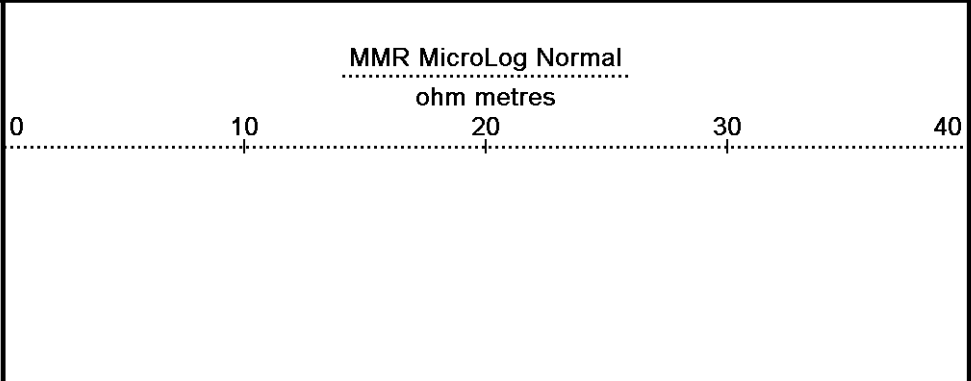
↑ 10 INCH HIGH RESOLUTION ↑

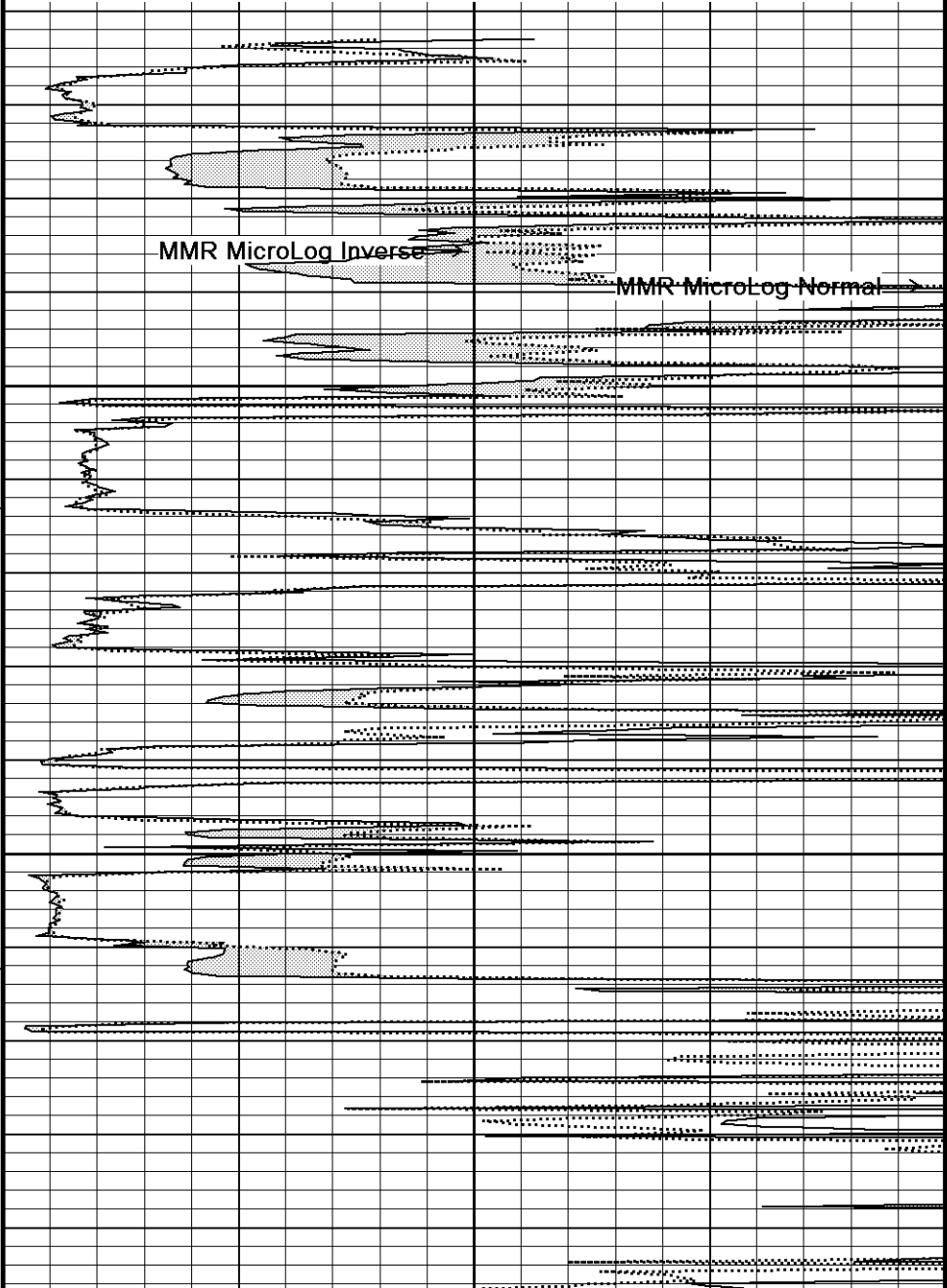
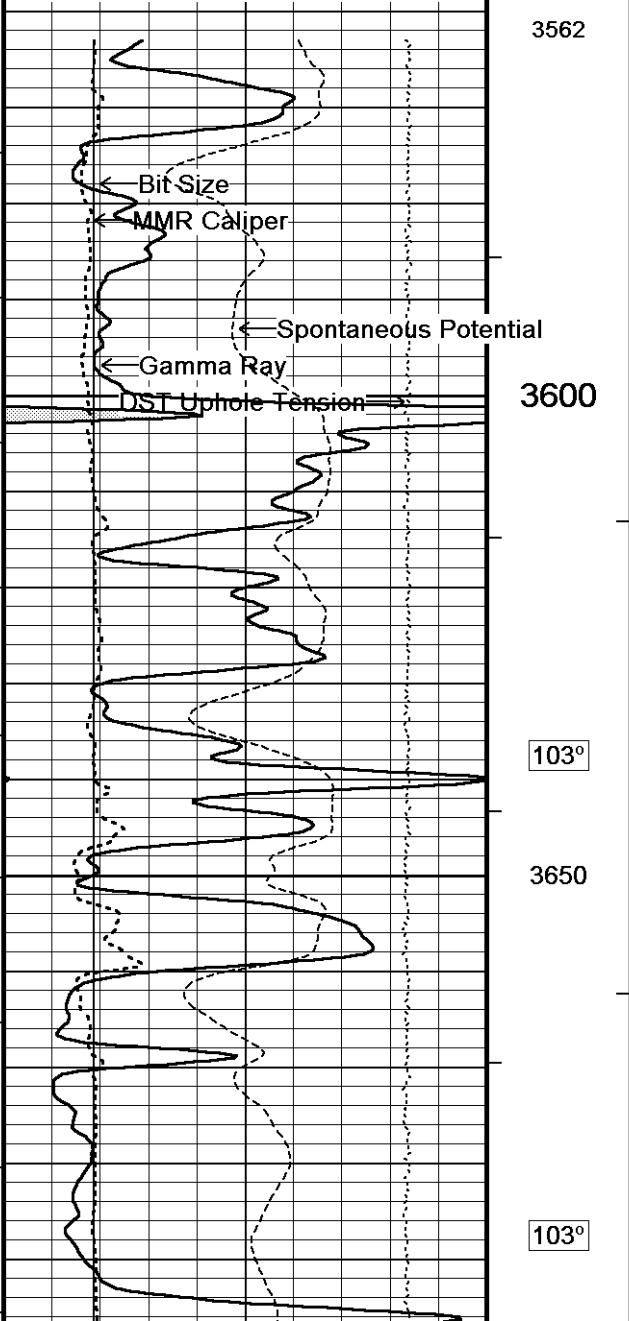
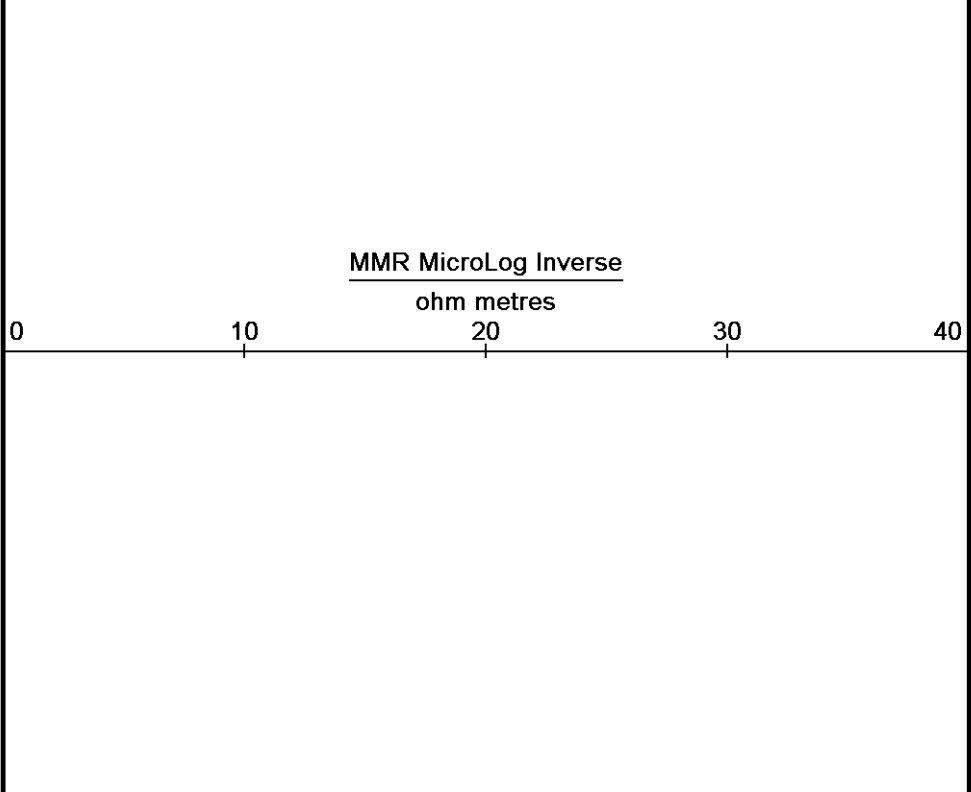
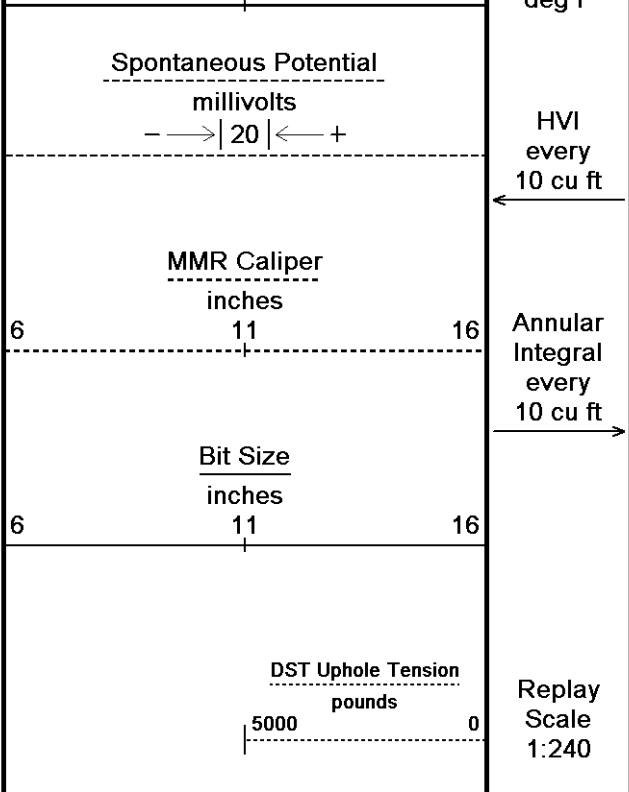
↓ REPEAT SECTION ↓
 Depth Based Data - Maximum Sampling Increment 10.0cm Plotted on 28-JUL-2014 08:43
 Filename: C:\Users\mrigby\AppData\Local\Temp\Weatherford Pre...\McElvain Gustafson #11-6_002.dta Recorded on 26-FEB-2014 11:27
 System Versions: Logged with 13.05.9583 Processed with 13.05.9583 Plotted with 13.06.9284

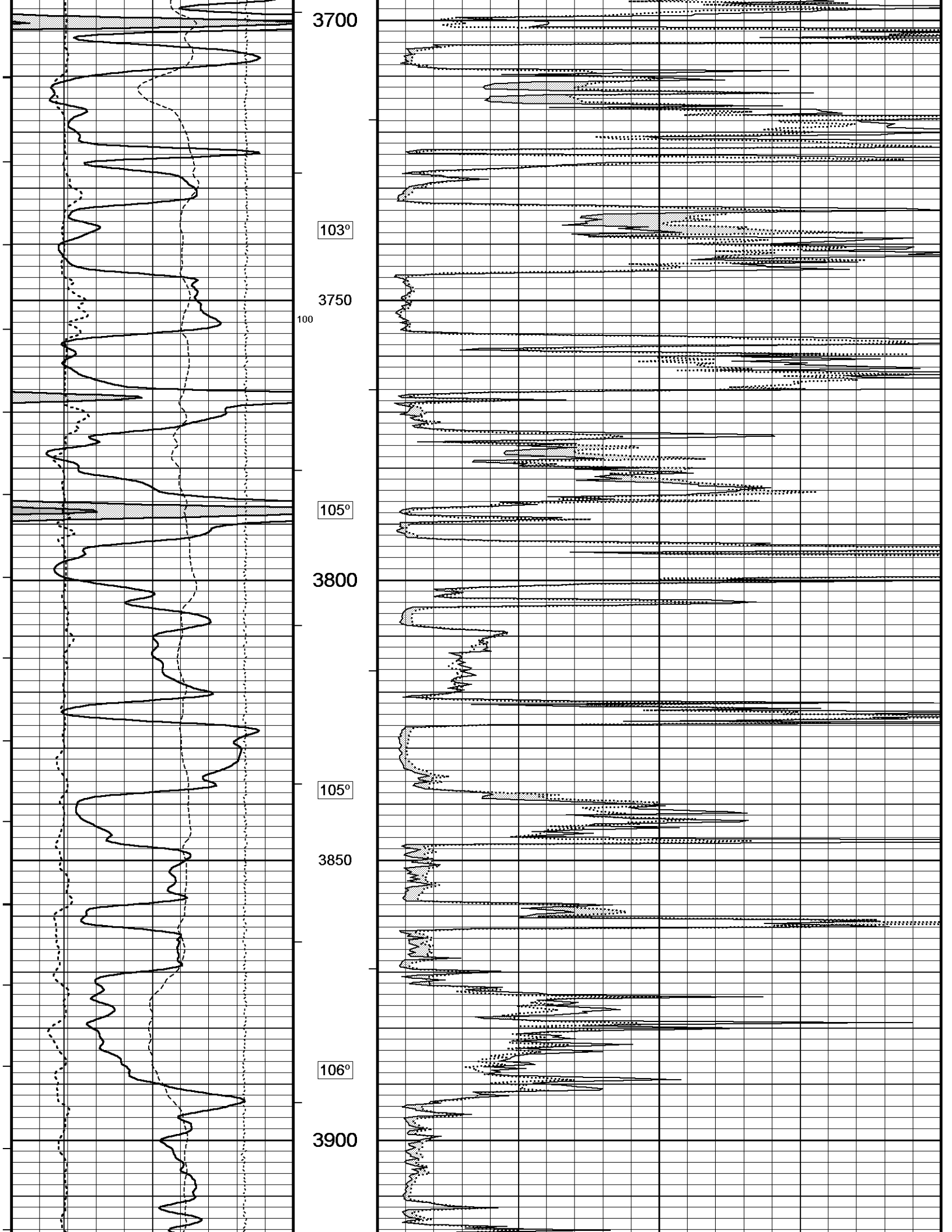


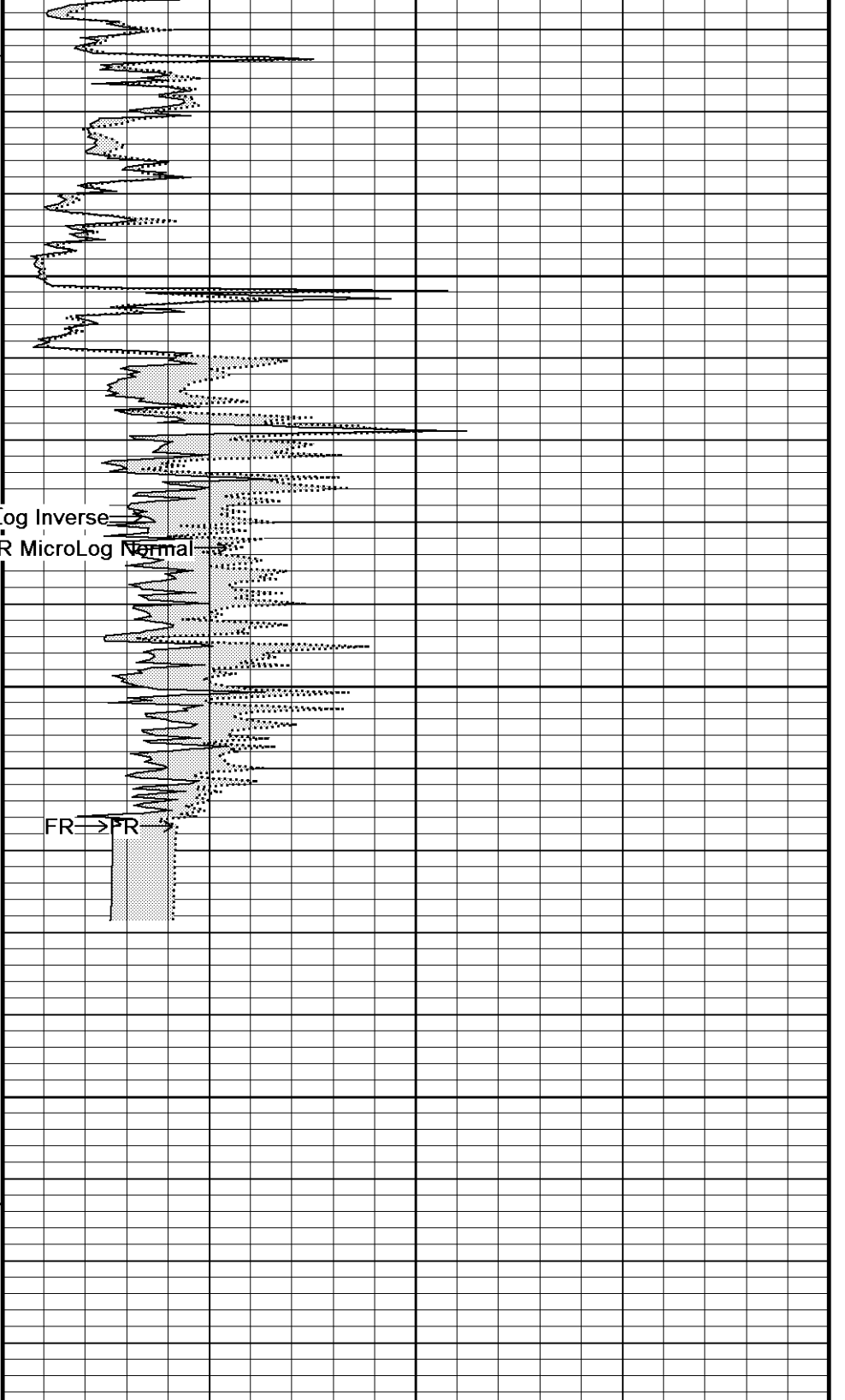
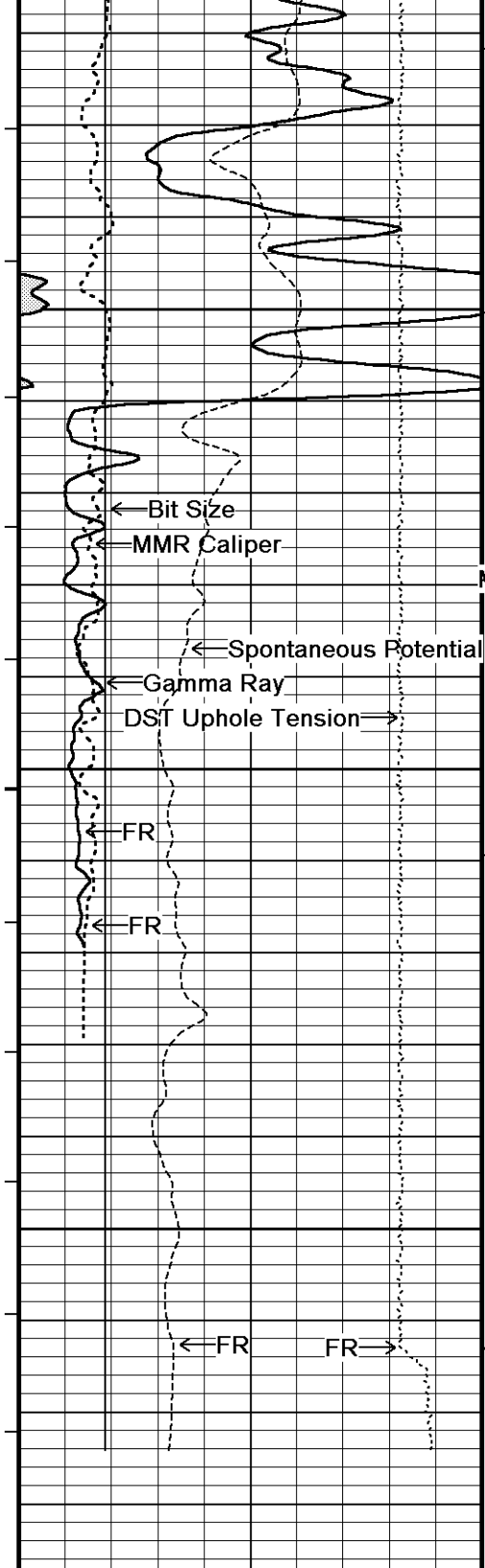
Depth
in
Feet

Borehole
Temp in
deg F





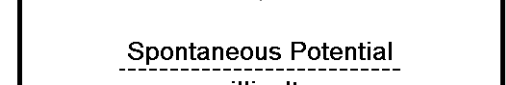
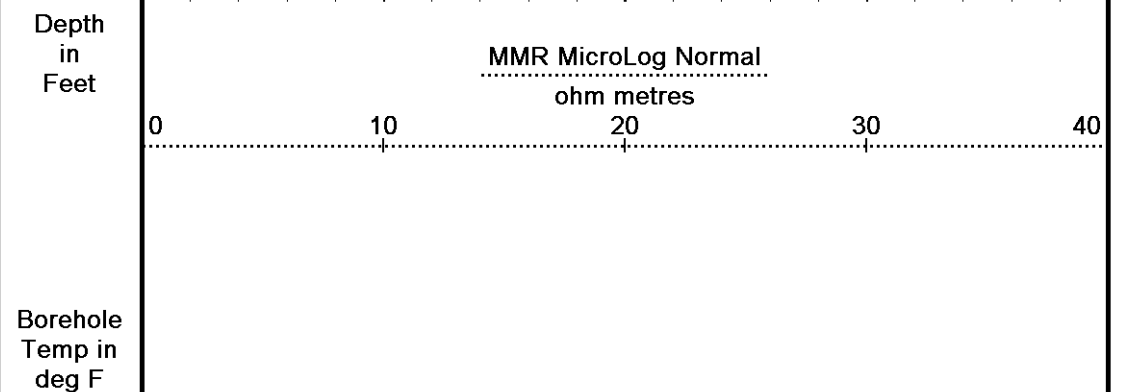


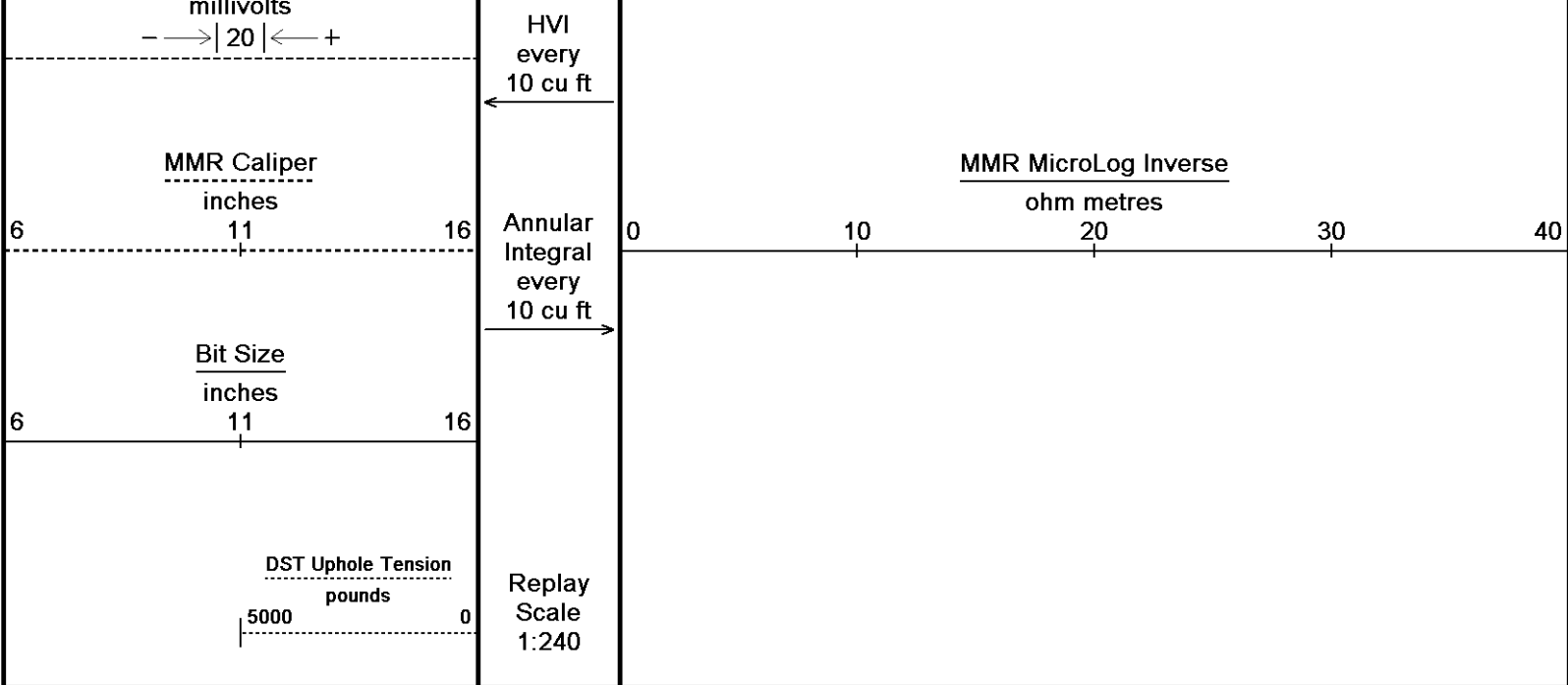


Timing Marks every 60.0 sec

Gamma Ray			
API			
0	75	150	
150	225	300	

Borehole Temp in deg F





Depth Based Data - Maximum Sampling Increment 10.0cm
 Plotted on 28-JUL-2014 08:43
 Filename: C:\Users\mrigby\AppData\Local\Temp\Weatherford PreView\0\McElvain Gustafson #11-6_002.dta
 Recorded on 26-FEB-2014 11:27
 System Versions: Logged with 13.05.9583 Processed with 13.05.9583 Plotted with 13.06.9284

↑ REPEAT SECTION ↑

BEFORE SURVEY CALIBRATION

C:\Users\mrigby\AppData\Local\Temp\Weatherford PreView\0\McElvain Gustafson #11-6_002.dta

General Constants All 000		Last Edited on 26-FEB-2014,10:56
General Parameters		
Mud Resistivity	1.280	ohm-metres
Mud Resistivity Temperature	76.000	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	MMR 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	
SW/APOR Tool Source	0.000	

Down-hole Tension Calibration SMS 0			Field Calibration on 19-JAN-2014 09:34
Reading No	Measured	Calibrated (lbs)	
1	15482.72	0.00	
2	16610.36	408.00	

High Resolution Temperature Calibration MCG-C 84			Field Calibration on 21-AUG-2013,11:52
	Measured	Calibrated(Deg F)	
Lower	11.00	11.00	
Upper	111.00	111.00	

High Resolution Temperature Constants MCG-C 84		Last Edited on 21-AUG-2013,11:52
Pre-filter Length	11	

SP Calibration MCG-C 84

Field Calibration on 21-AUG-2013 12:25

	Measured	Calibrated (mV)
Reference 1	105.4	100.7
Reference 2	-96.3	-100.8

Gamma Calibration MCG-C 84

Field Calibration on 26-FEB-2014 02:09

	Measured	Calibrated (API)
Background	66	44
Calibrator (Gross)	1141	769
Calibrator (Net)	1076	725

Gamma Constants MCG-C 84

Last Edited on 26-FEB-2014,10:33

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	%

Micro Laterolog Calibration MMR-A 11

Base Calibration on 31-DEC-1999 00:00
Field Check on 31-DEC-1999 00:00

Base Calibration	Measured		Calibrated (ohm-m)	
	Ref 1	Ref 2	Ref 1	Ref 2
	0.0	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

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		
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.	MCG External Temperature	

Caliper Calibration MMR-A 11

Base Calibration on 20-JAN-2014 14:07
Field Calibration on 26-FEB-2014 01:47

Base Calibration	Reading No	Measured	Calibrator Size (in)
	1	14089	5.98
	2	17229	7.97
	3	20490	9.86
	4	24430	11.92
	5	0	0.00
	6	N/A	N/A
Field Calibration			
		Measured Caliper (in)	Actual Caliper (in)
		8.06	7.97

Micro Normal and Micro Inverse Calibration MMR-A 11

Base Calibration on 20-JAN-2014 13:46
Field Check on 26-FEB-2014 01:43

Base Calibration	Channel	Measured		Calibrated (ohm-m)	
		Resistor 1	Resistor 2	Resistor 1	Resistor 2
	Micro Normal	12.2	59.7	5.0	25.0
	Micro Inverse	15.5	77.5	5.0	25.0
Field Check					
	Channel	Base Check (ohm-m)		Field Check (ohm-m)	
	Micro Normal	76.5		76.5	

Micro Normal and Micro Inverse Constants MMR-A 11

Last Edited on 18-APR-2013,13:52

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 20-JAN-2014 15:06
Field Check on 26-FEB-2014 02:00

Base Calibration

	Measured		Calibrated (cps)	
	Near	Far	Near	Far
Ratio	2981	92	3714	110
	32.404		33.764	

Field Calibrator at Base

	Calibrated (cps)	
	Near	Far
Ratio	1702	2459
	0.692	

Field Check

	Calibrated (cps)	
	Near	Far
Ratio	1723	2472
	0.697	

Neutron Constants MDN-A.B 65

Last Edited on 26-FEB-2014,10:33

Neutron Source Id PN-521
 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 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 17-JAN-2014 13:04
Field Check on 26-FEB-2014 01:42

Base Calibration

	Measured	Calibrated (ohm-m)
Reference 1	9.9	1.3
Reference 2	962.7	126.8
Base Check		281.7
Field Check		282.0

FE Constants MFE-B.J 352

Last Edited on 26-FEB-2014,10:32

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

Sonic Constants MSS-A.A 126

Last Edited on 26-FEB-2014,10:32

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

High Resolution Temperature Calibration MAI-A.A 45

Field Calibration on 29-OCT-2013,14:20

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

High Resolution Temperature Constants MAI-A.A 45

Last Edited on 29-OCT-2013,14:20

Pre-filter Length	11
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Induction Calibration MAI-A.A 45

Base Calibration on 21-MAY-2013,16:47
Field Check on 26-FEB-2014 01:34

Base Calibration		Measured		Calibrated (mmho/m)	
Test Loop Calibration	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 0.0 Deg F

Channel	Base Check (mmho/m)		Field Check (mmho/m)	
	Low	High	Low	High
1			18.2	3849.6
2			31.6	3627.9
3			28.6	3048.4
4			18.3	2078.6
Deep			16.0	1910.8
Medium			42.5	4059.1
Shallow			49.5	5480.5
Array Temperature			56.6	Deg F

Induction Constants MAI-A.A 45

Last Edited on 26-FEB-2014,10:32

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	

Photo Density Calibration MPD-B 31

Base Calibration on 20-JAN-2014 16:43

Field Check on 26-FEB-2014 01:41

Density Calibration	Measured		Calibrated (sdu)	
	Near	Far	Near	Far
Base Calibration				
Reference 1	43628	22294	59556	30836
Reference 2	17956	1856	24941	2541
Field Check at Base				
	665.1	818.8		
Field Check				
	664.5	823.8		

PE Calibration

Base Calibration	Measured	Calibrated
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	WS	WH	Ratio	Ratio
Background	124	593		
Reference 1	17926	43516	0.415	0.371
Reference 2	5248	17873	0.297	0.272

Field Check at Base	123.9	593.3
Field Check	123.3	588.1

Density Constants MPD-B 31

Last Edited on 26-FEB-2014,10:32

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

Caliper Calibration MPD-B 31

Base Calibration on 24-FEB-2014 03:42
Field Calibration on 26-FEB-2014 01:36

Base Calibration		
Reading No	Measured	Calibrator Size (in)
1	18272	3.99
2	26496	5.98
3	35155	7.97
4	43472	9.86
5	52816	11.92
6	N/A	N/A
Field Calibration		
	Measured Caliper (in)	Actual Caliper (in)
	7.94	7.97

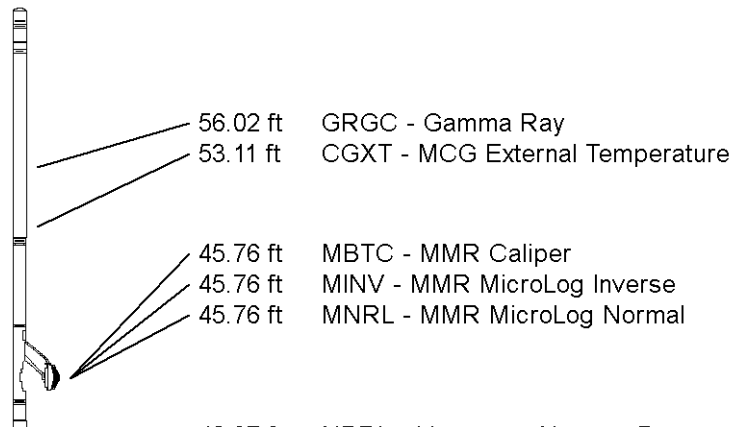
DOWNHOLE EQUIPMENT

C:\Users\mrigby\AppData\Local\Temp\Weatherford PreView\0\McElvain Gustafson #11-6_002.dta

3/8" Triple Cone Cable Head (MCB C A)
MCB-C.A 5 LG: 1.58 ft WT: 15.4 lb OD: 2.24 in

Compact Comms Gamma
MCG-C 84 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

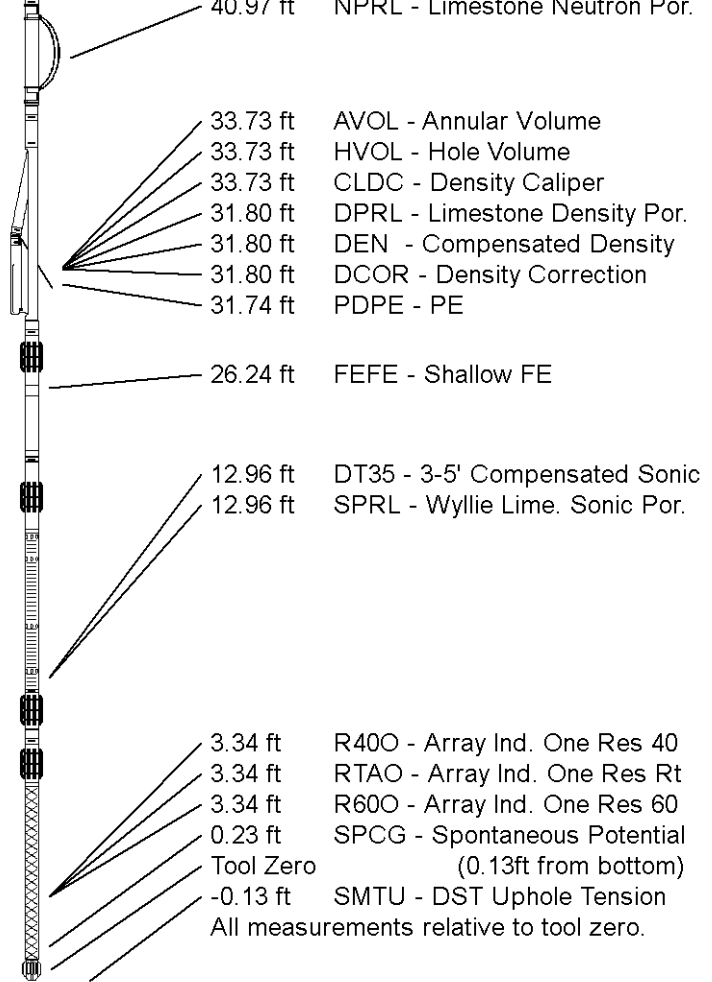
Compact Density/Caliper
MPD-B 31 LG: 9.59 ft WT: 90.4 lb OD: 2.45 in

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

Compact Sonic
MSS-A.A 126 LG: 12.52 ft WT: 72.8 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: 62.88 ft Weight: 471.8 lb



COMPANY McELVAIN ENERGY, INC.
WELL GUSTAFSON #11-6
FIELD DUSSAULT
PROVINCE/COUNTY GRAHAM
COUNTRY/STATE U.S.A. / KANSAS

Elevation Kelly Bushing	2334.00	feet	First Reading	4017.00	feet
Elevation Drill Floor	2332.00	feet	Depth Driller	4065.00	feet
Elevation Ground Level	2324.00	feet	Depth Logger	4063.00	feet



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