



**Weatherford**

**MICRORESISTIVITY LOG**

COMPANY

GRAND MESA OPERATING COMPANY

WELL

RINGER #1-24

FIELD

WILDCAT

PROVINCE/COUNTY

BARBER

COUNTRY/STATE

U.S.A. / KANSAS

LOCATION

1792' FNL & 1266' FEL

SEC 24

TWP 30S

RGE 12W

Other Services

Latitude

Longitude

API Number

MAI/MFE  
MSS

MPD/MDN

Permanent Datum GL, Elevation 1791 feet

Log Measured From KB, 5.00 feet above Permanent Datum

Drilling Measured From KB

Elevations: feet  
KB 1796.00  
DF 1794.00  
GL 1791.00

Date 24-JUN-2018

Run Number ONE

Service Order 4558-217017166

Depth Driller 4920.00 feet

Depth Logger 4914.00 feet

First Reading 4866.00 feet

Last Reading 2500.00 feet

Casing Driller 217.00 feet

Casing Logger 218.00 feet

Bit Size 7.875 inches

Hole Fluid Type CHEMICAL

Density / Viscosity 9.40 lb/USg 45.00 CP

PH / Fluid Loss 9.00 11.00 ml/30Min

Sample Source FLOWLINE

Rm @ Measured Temp 0.42 @ 75.0 ohm-m

Rmf @ Measured Temp 0.34 @ 75.0 ohm-m

Rmc @ Measured Temp 0.50 @ 75.0 ohm-m

Source Rmf / Rmc CALC CALC

Rm @ BHT 0.25 @ 126.0 ohm-m

Time Since Circulation 5 HOURS

Max Recorded Temp 126.00 deg F

Equipment / Base 13096 LIB

Recorded By ADAM SILL

Witnessed By DAVE BARKER

**BOREHOLE RECORD**

Last Edited: 24-JUN-2018 08:52

Bit Size inches	Depth From feet	Depth To feet
7.875	217.00	4920.00

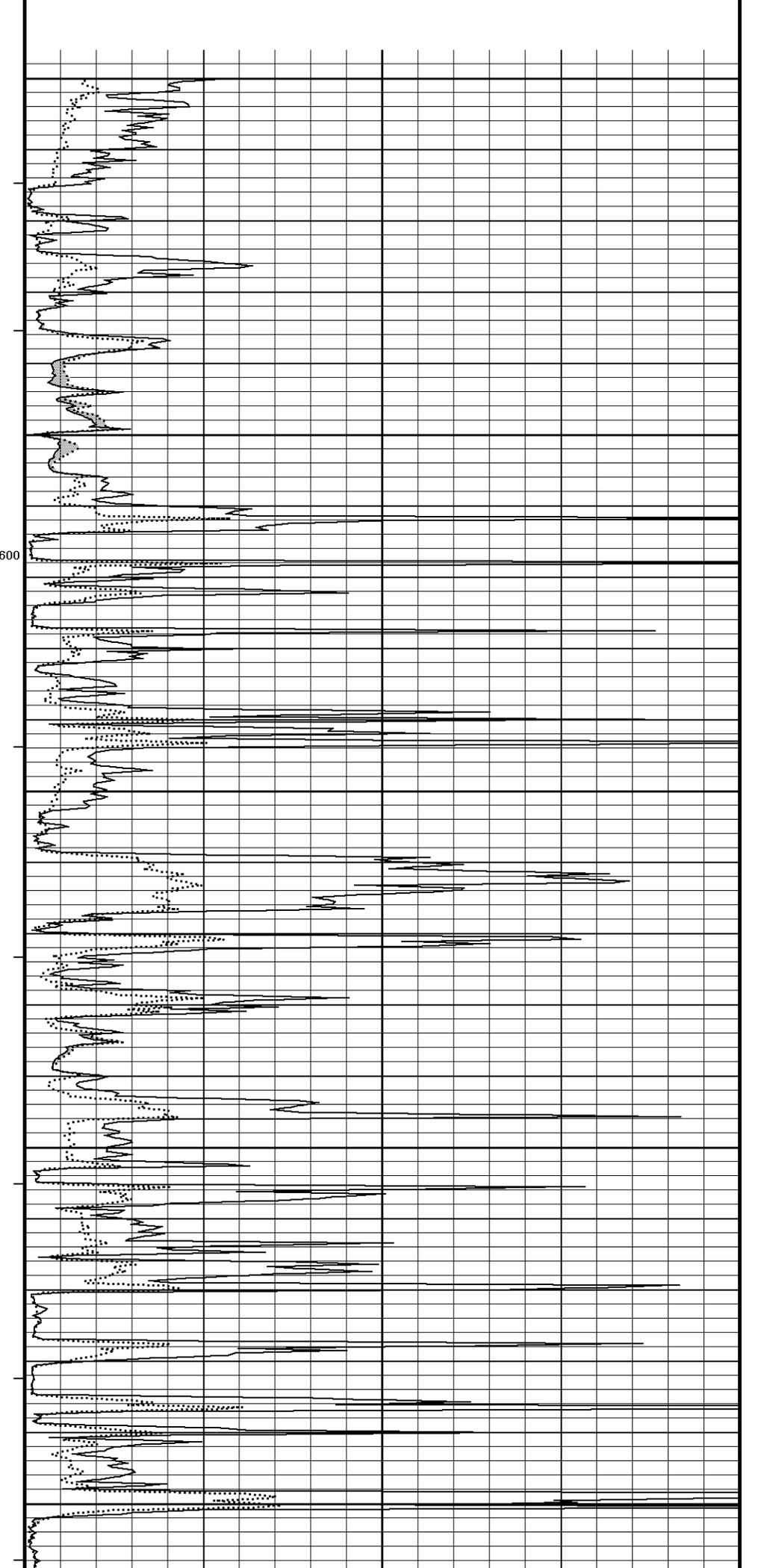
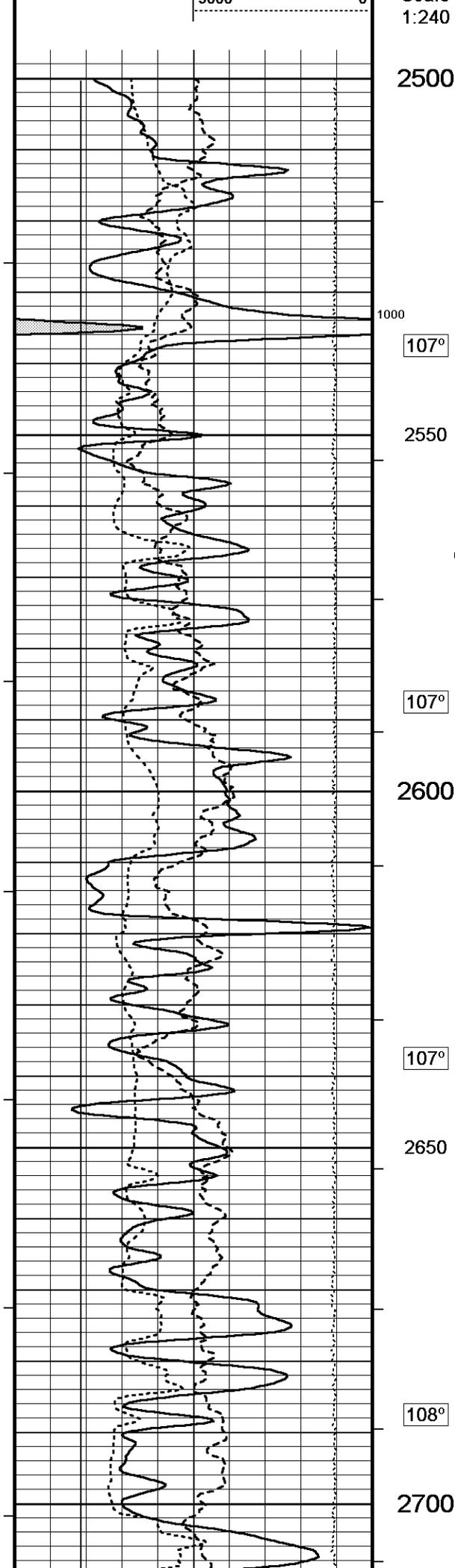
**CASING RECORD**

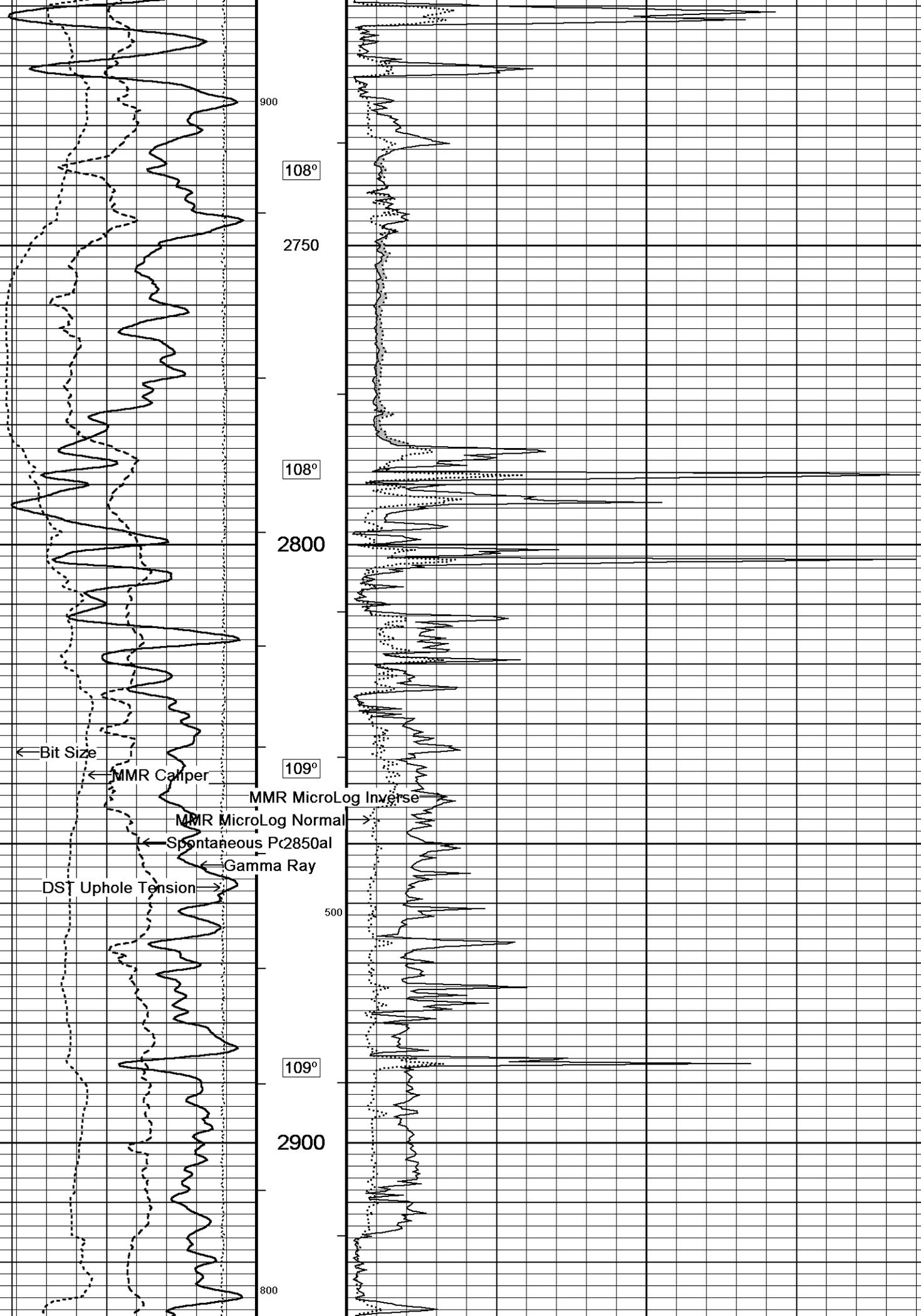
Type	Size inches	Depth From feet	Shoe Depth feet	Weight pounds/ft
SURFACE	8.625	0.00	217.00	24.00

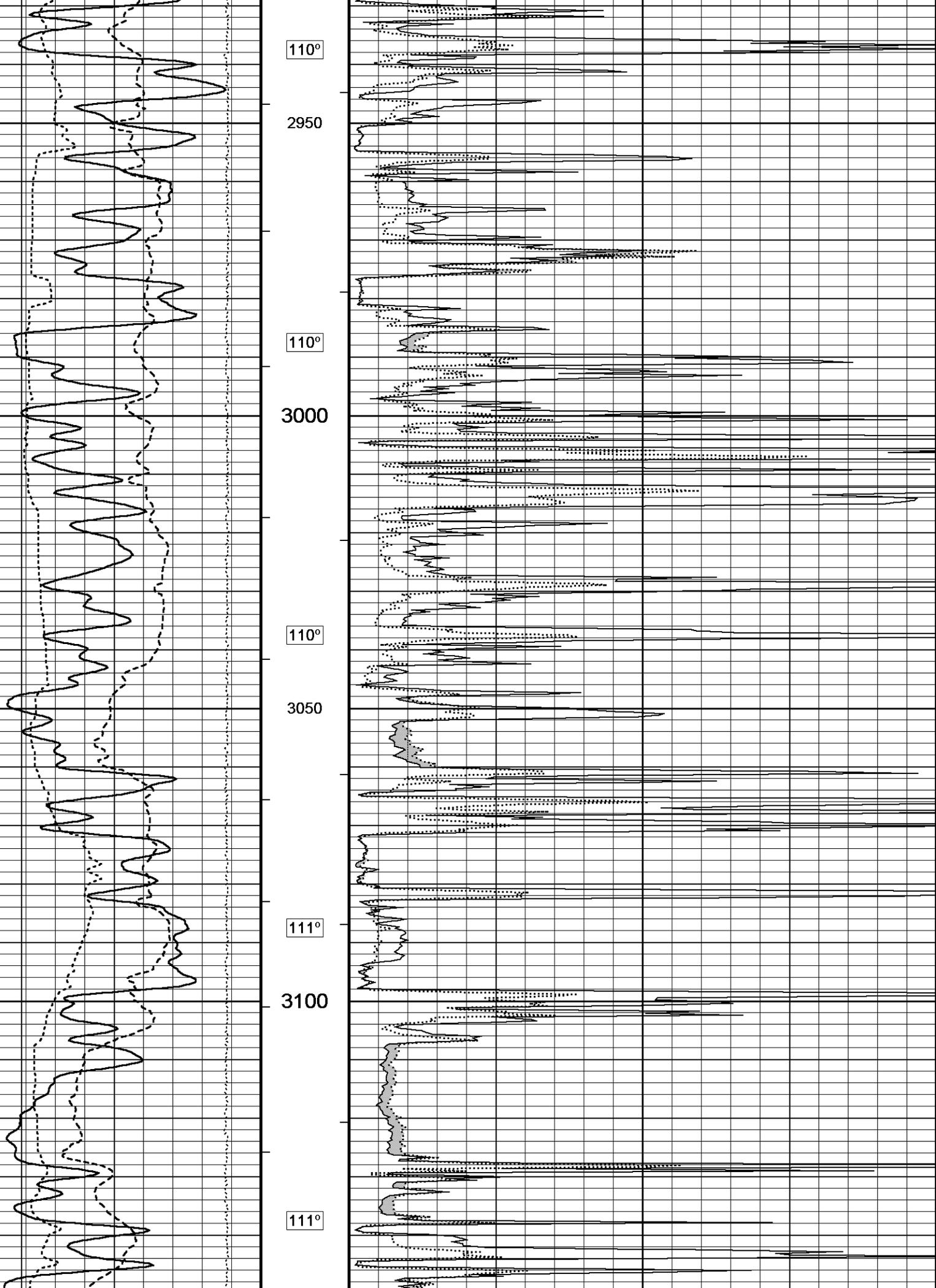
**REMARKS**

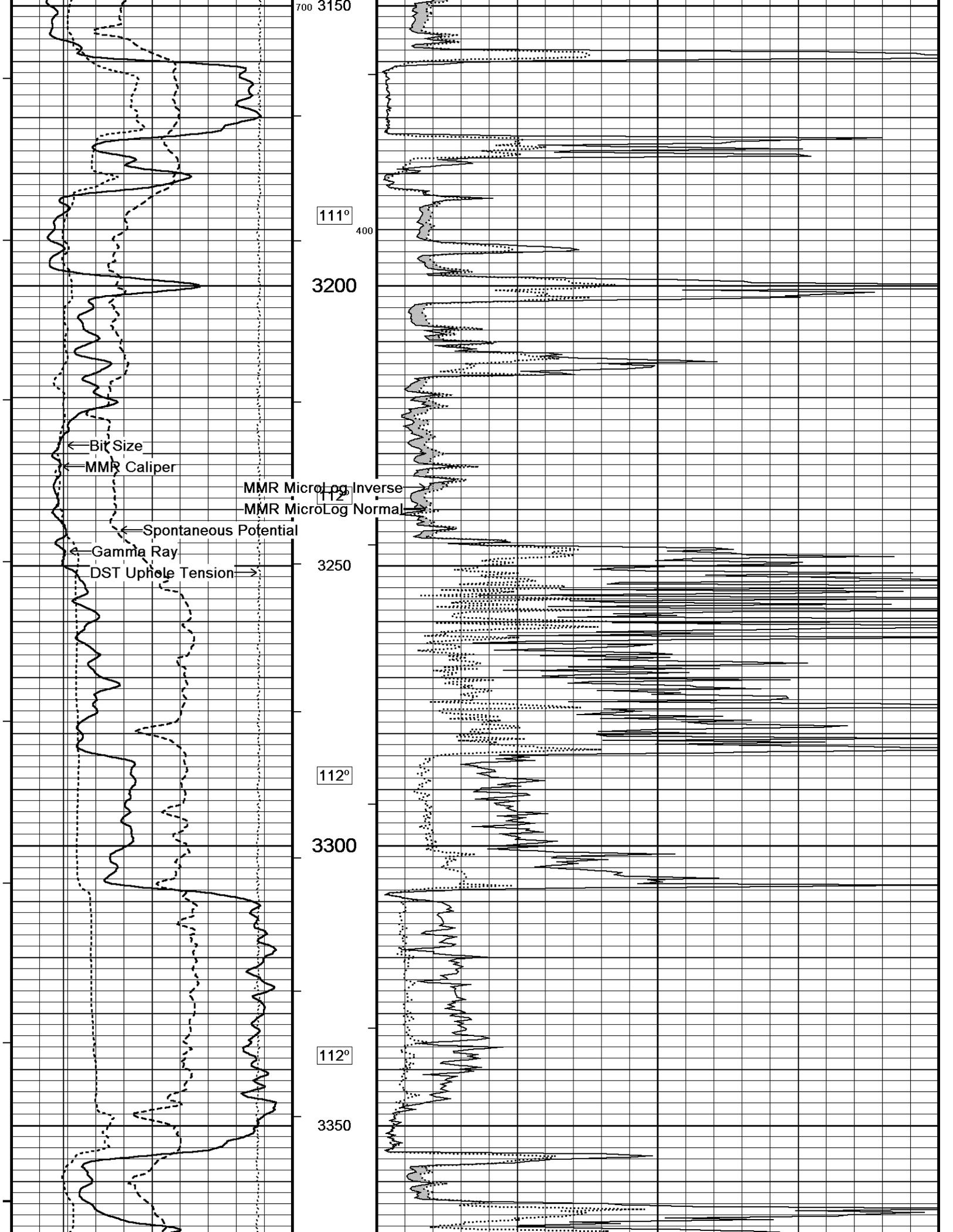
- SOFTWARE ISSUE: WLS 18.01.6830.
- RUN ONE: MCG, MML, MDN, MPD, MFE, MSS, MAI RUN IN COMBINATION.
  - HARDWARE: DUAL BOWSPRING USED ON MDN.
  - 0.5 INCH STANDOFF USED ON MFE.
  - TWO 0.5 INCH STANDOFFS USED ON MSS.
  - 0.5 INCH STANDOFF USED ON MAI.
- 2.71 G/CC LIMESTONE DENSITY MATRIX USED TO CALCULATE 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: 2550 CU.FT.
- ANNULAR HOLE VOLUME WITH 5.5 INCH PRODUCTION CASING FROM TD TO 2500 FEET: 625 CU.FT.

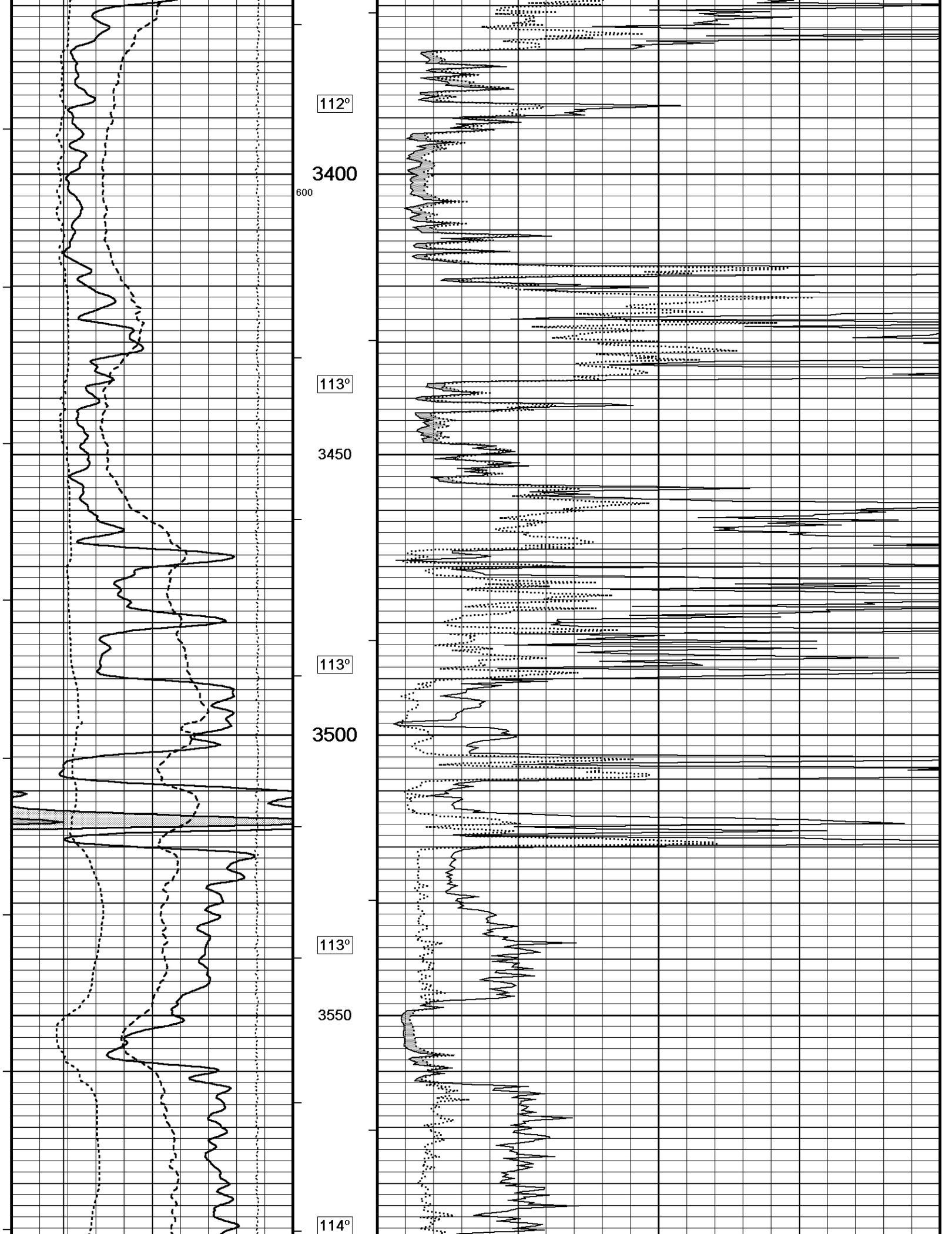


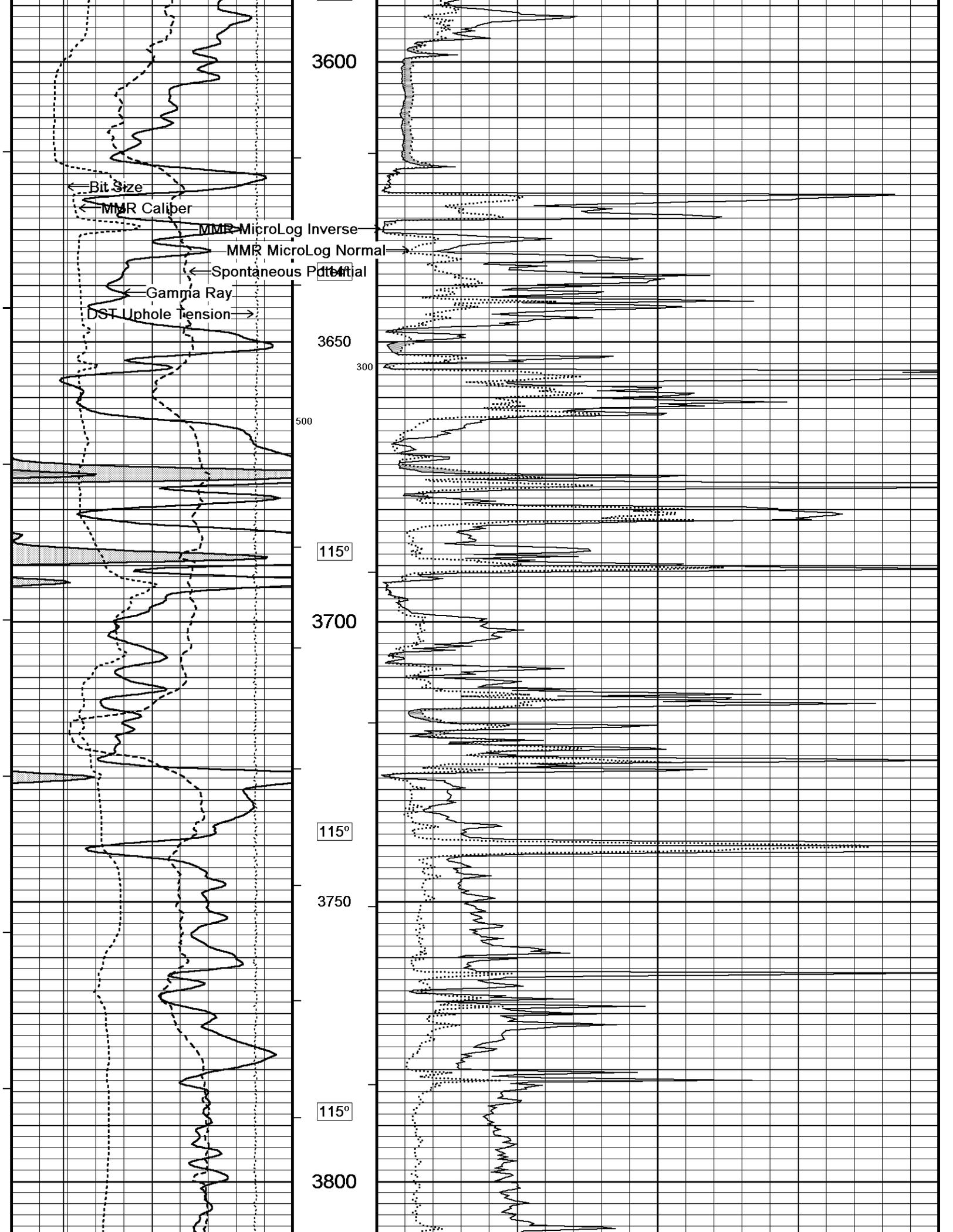


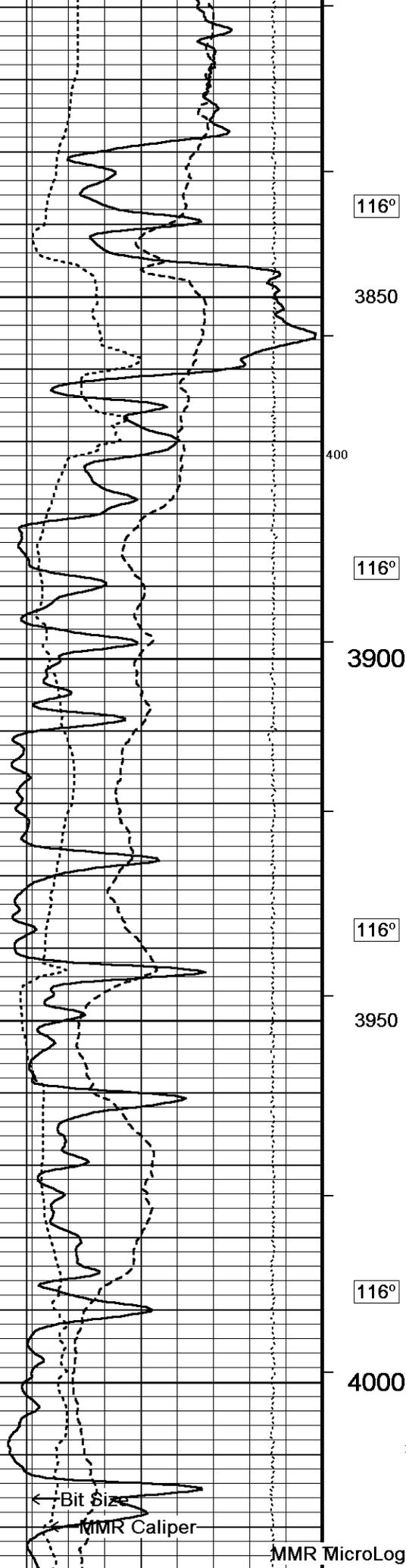












116°

3850

400

116°

3900

116°

3950

116°

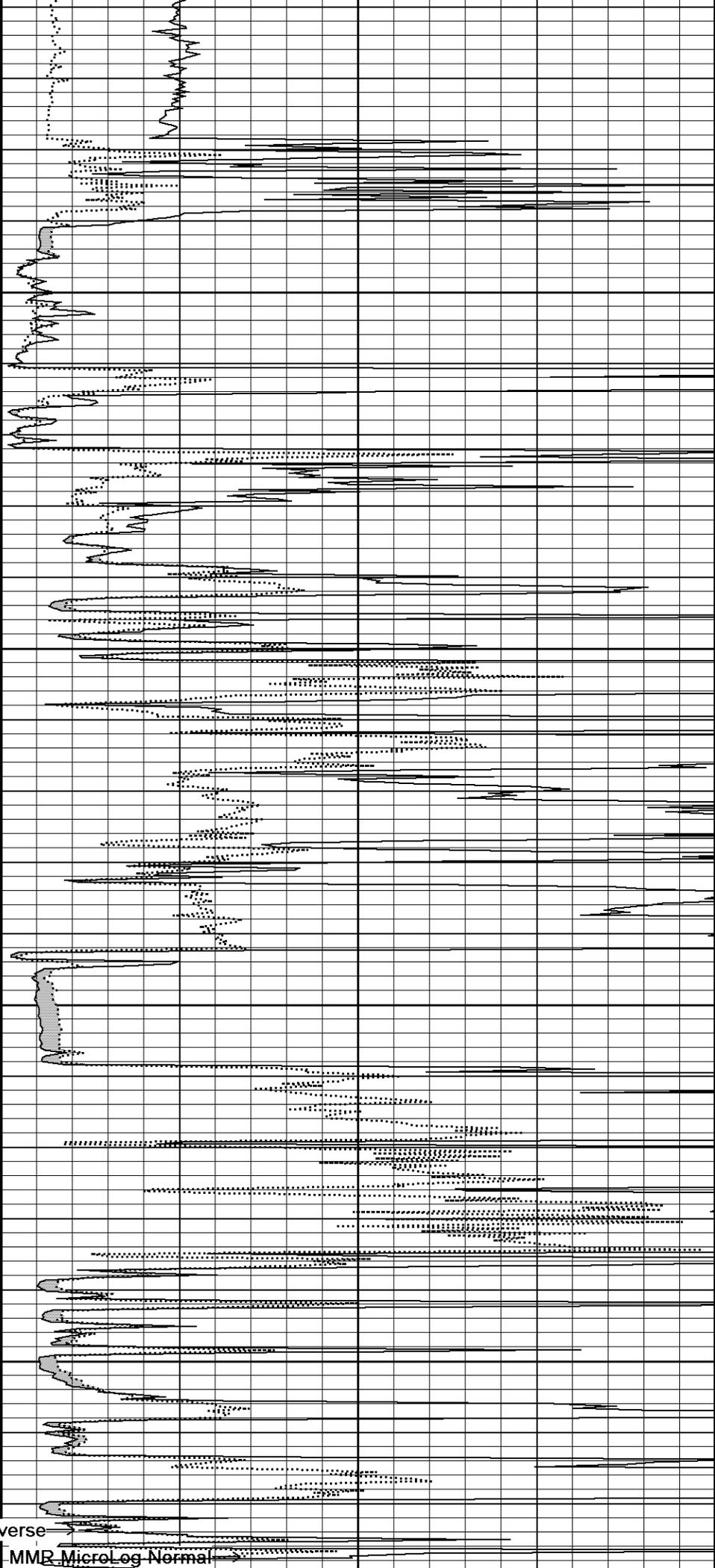
4000

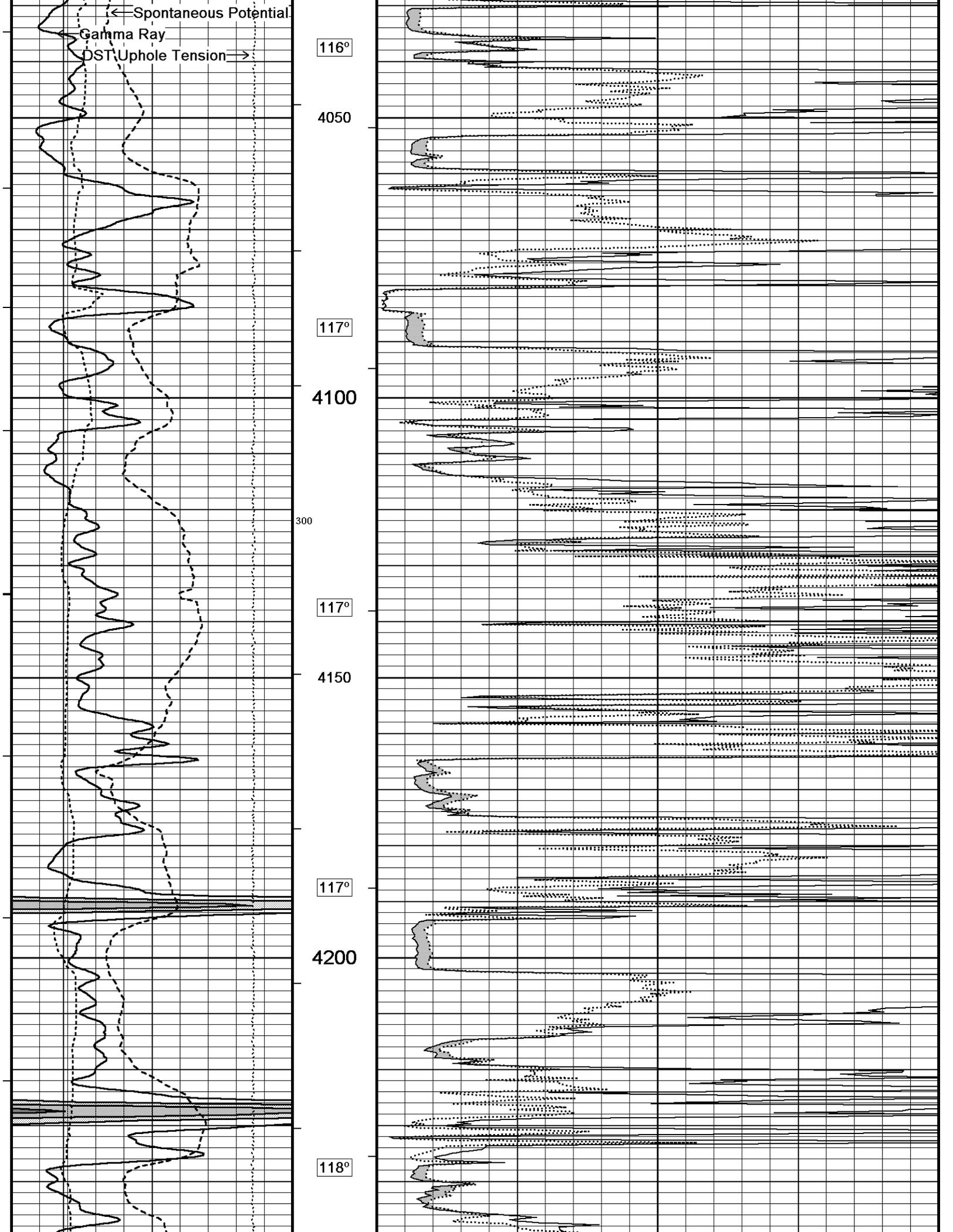
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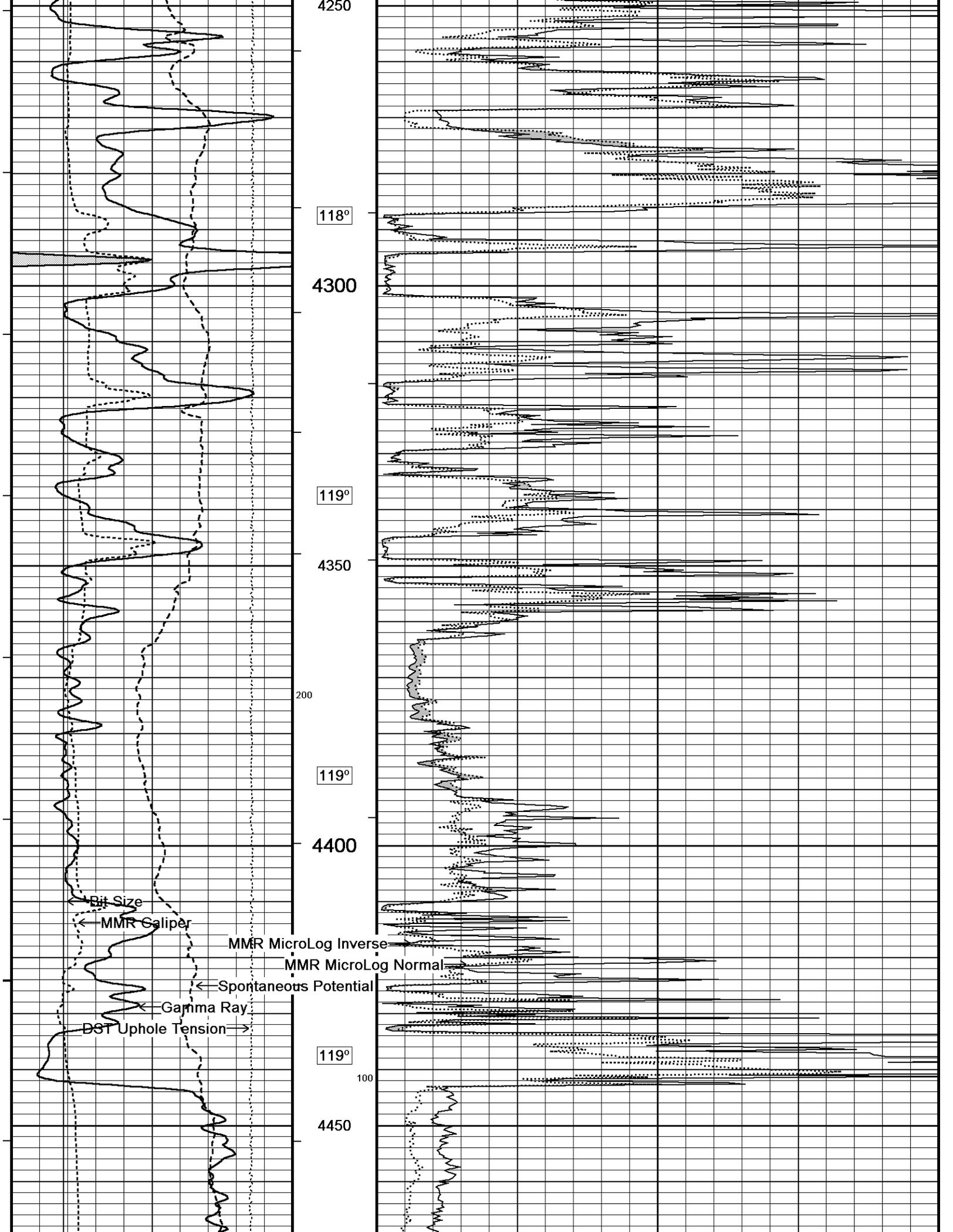
← Bit Size  
× MMR Caliper

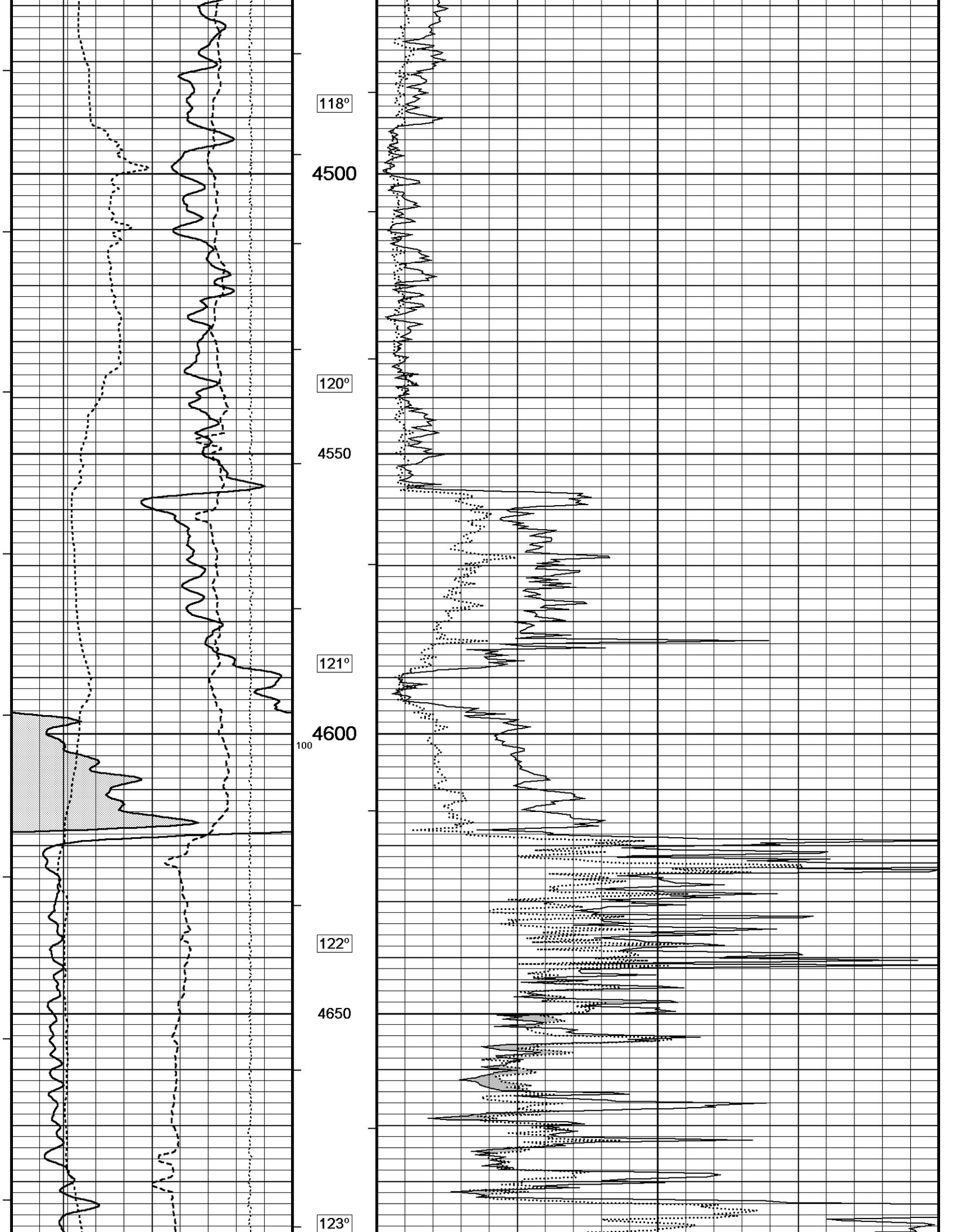
MMR MicroLog Inverse

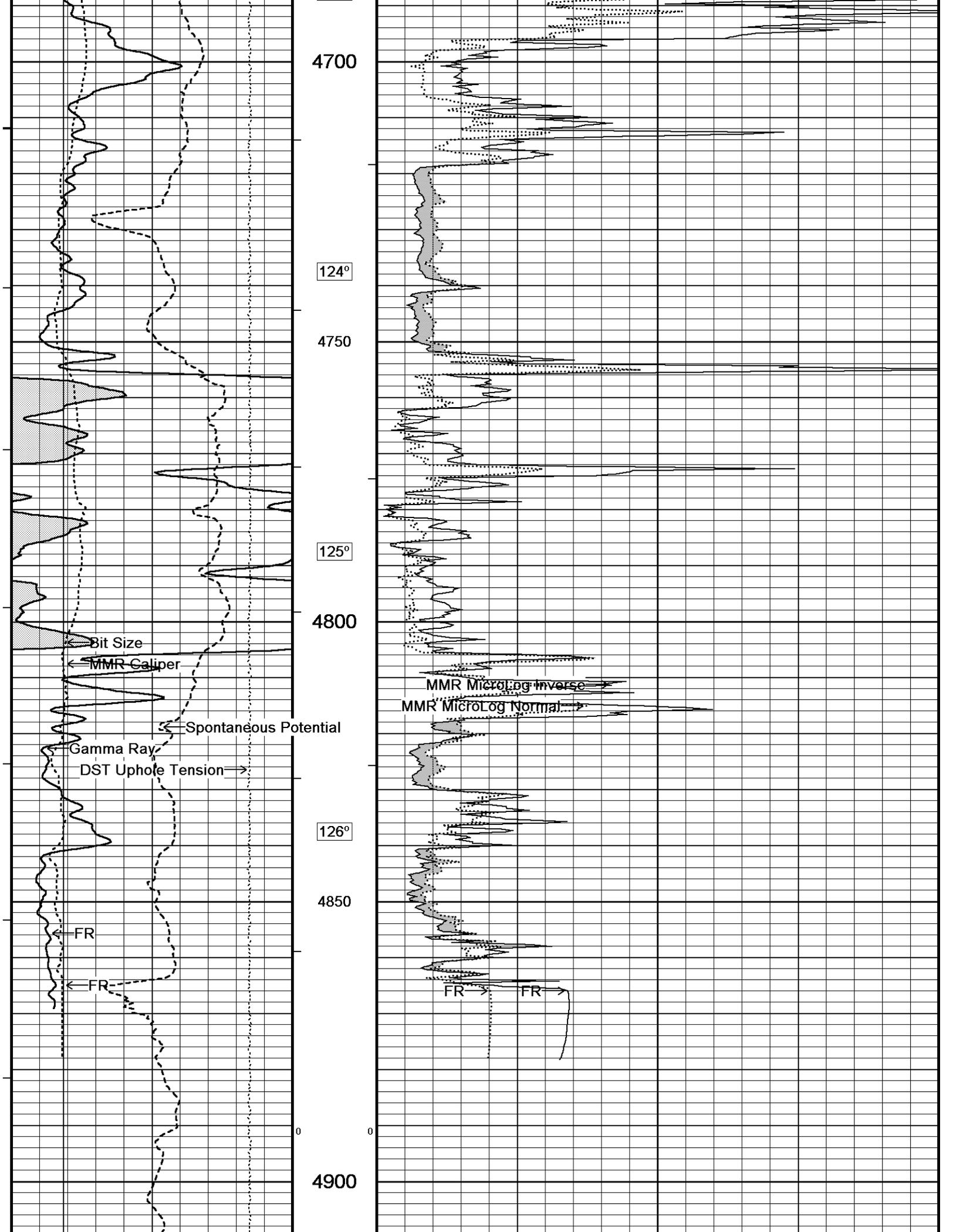
MMR MicroLog Normal →

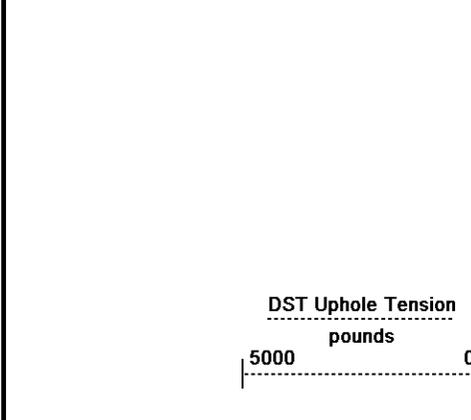
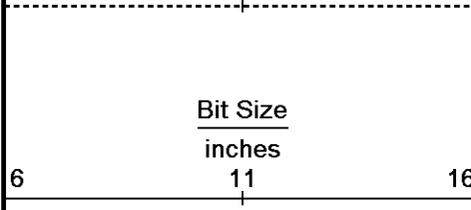
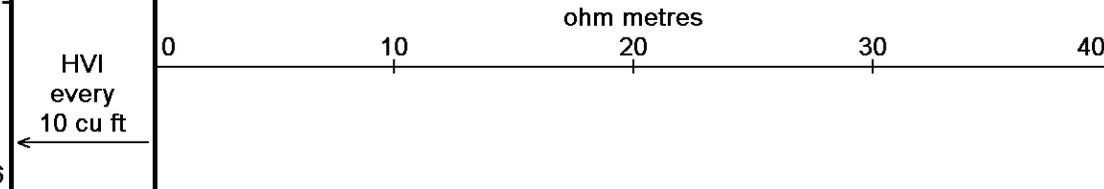
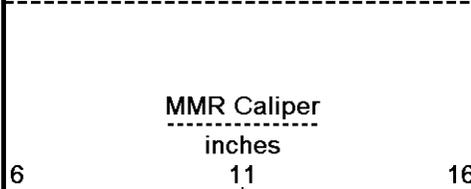
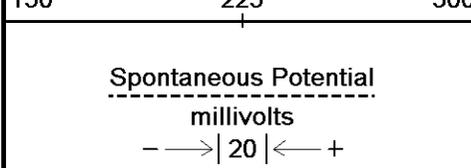
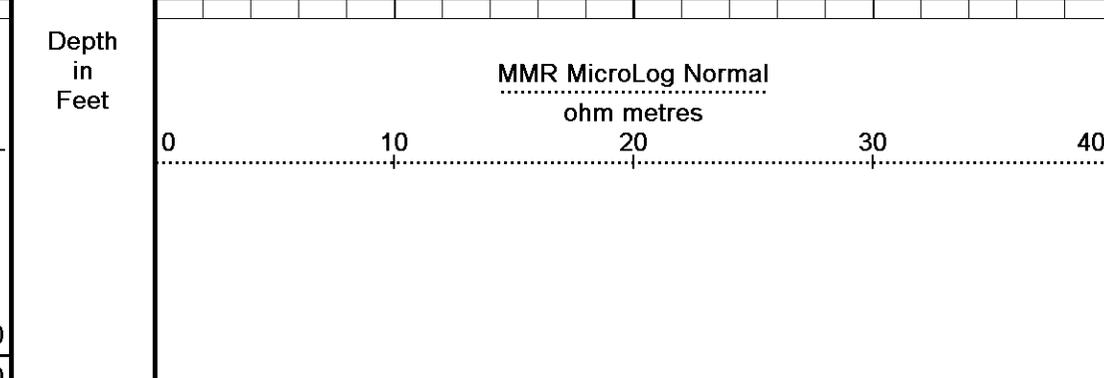
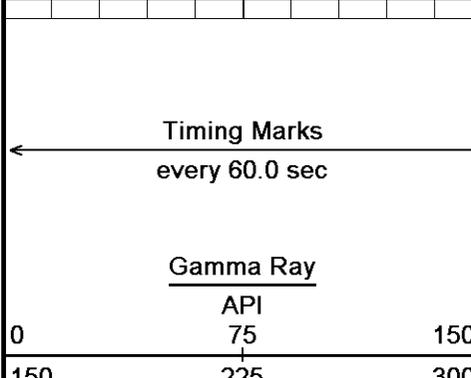
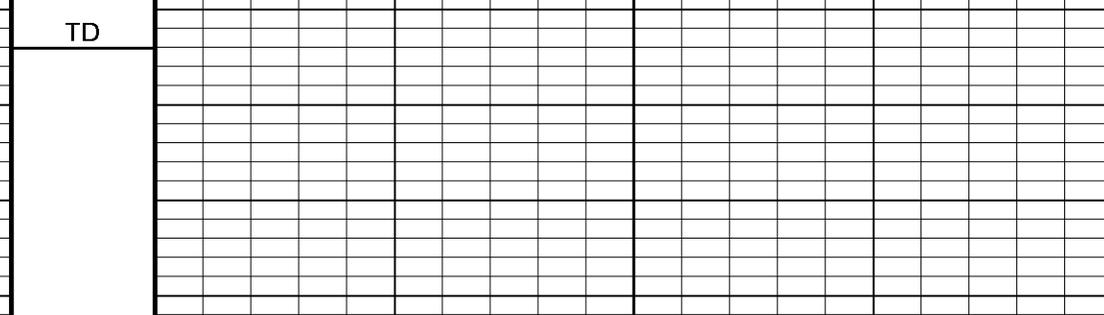
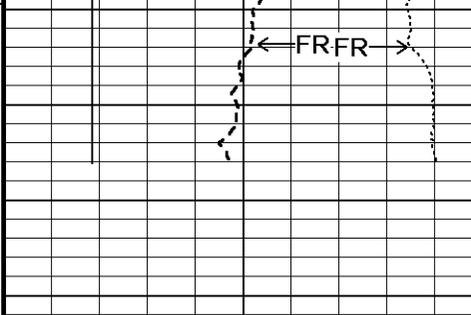












Depth Based Data - Maximum Sampling Increment 10.0cm Plotted on 24-JUN-2018 16:34  
 Filename: C:\Minimus 18.01.6830\Data\Grand Mesa Ringer #1-24\Grand Mesa Ringer #1-24\_003.dta Recorded on 24-JUN-2018 13:00  
 System Versions: Logged with 18.01.6830 Plotted with 18.01.6830

↑ 5 INCH MAIN ↑

↓ REPEAT SECTION ↓

Depth Based Data - Maximum Sampling Increment 10.0cm Plotted on 24-JUN-2018 16:34  
 Filename: C:\Minimus 18.01.6830\Data\Grand Mesa Ringer #1-24\Grand Mesa Ringer #1-24\_002.dta Recorded on 24-JUN-2018 12:12  
 System Versions: Logged with 18.01.6830 Plotted with 18.01.6830

	Depth	
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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

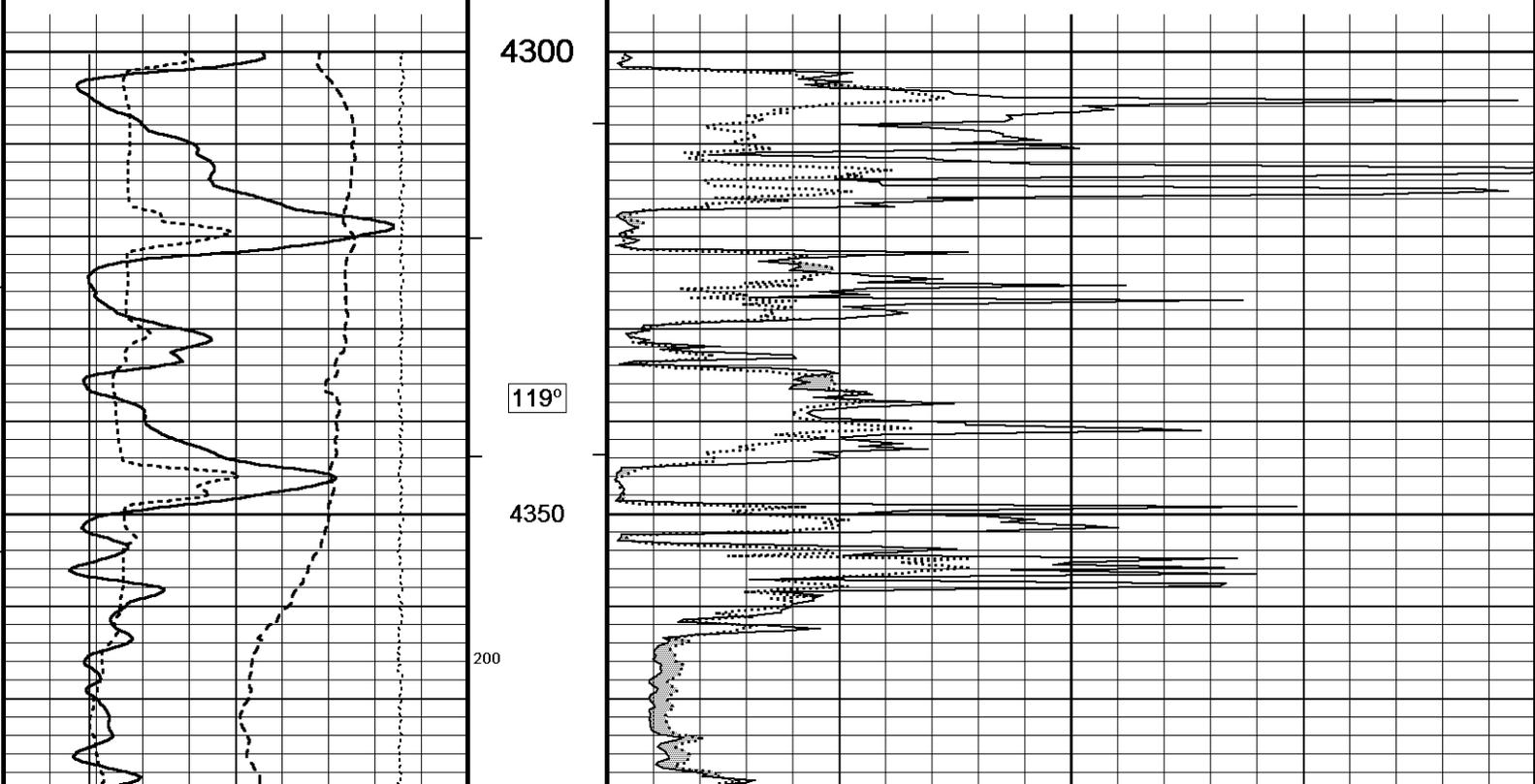
In  
Feet  
Borehole  
Temp in  
deg F  
HVI  
every  
10 cu ft  
Annular  
Integral  
every  
10 cu ft

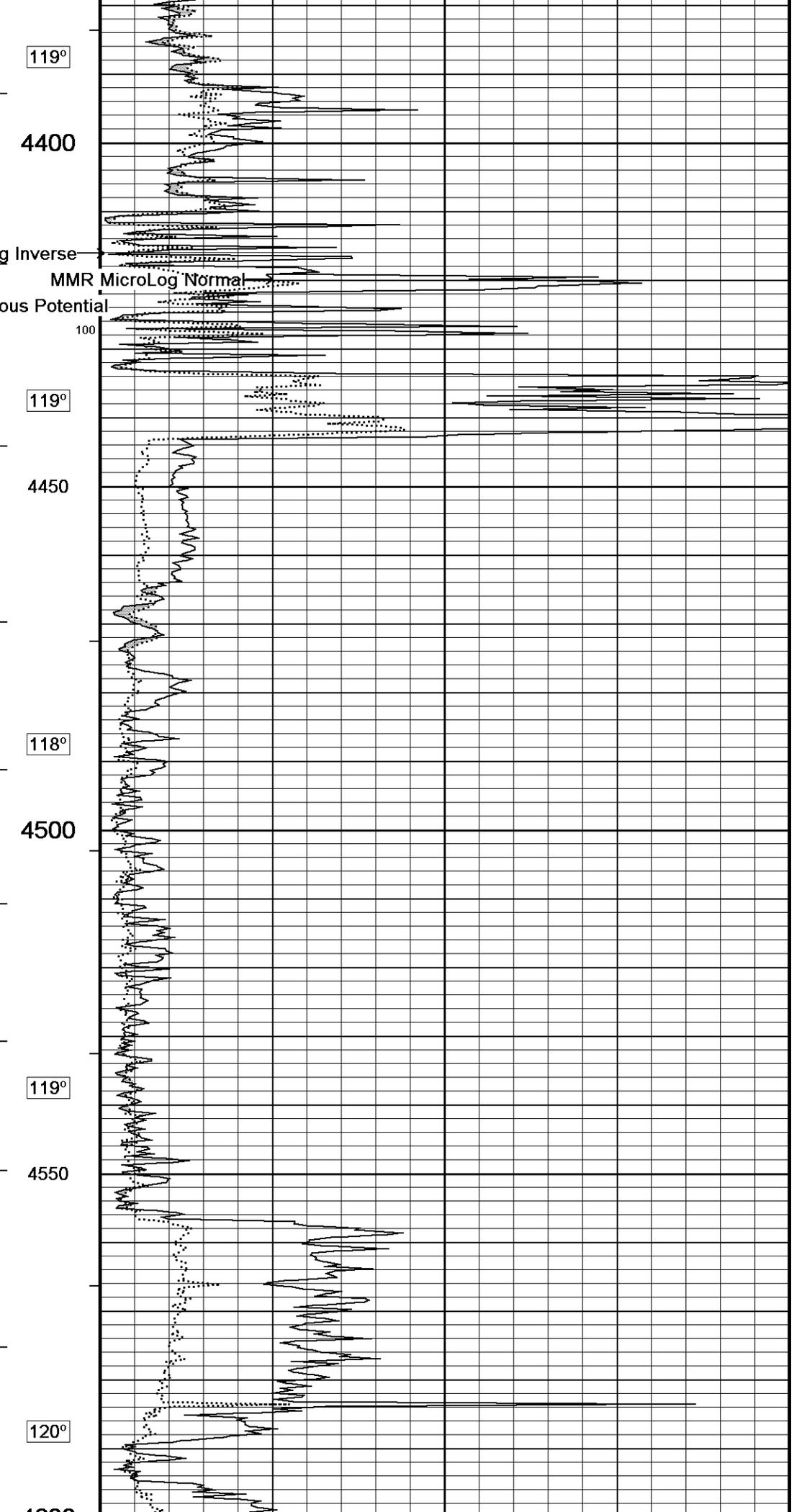
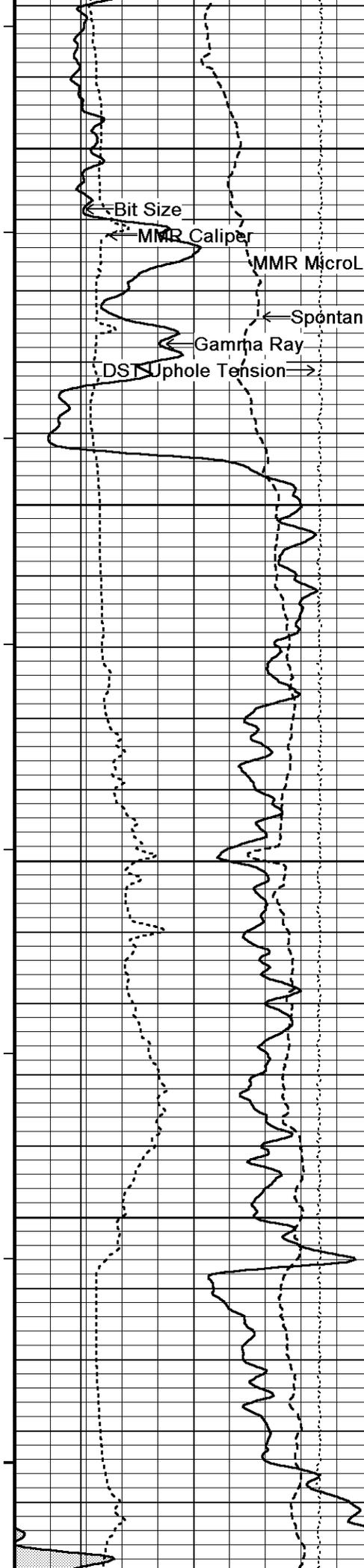
Replay  
Scale  
1:240

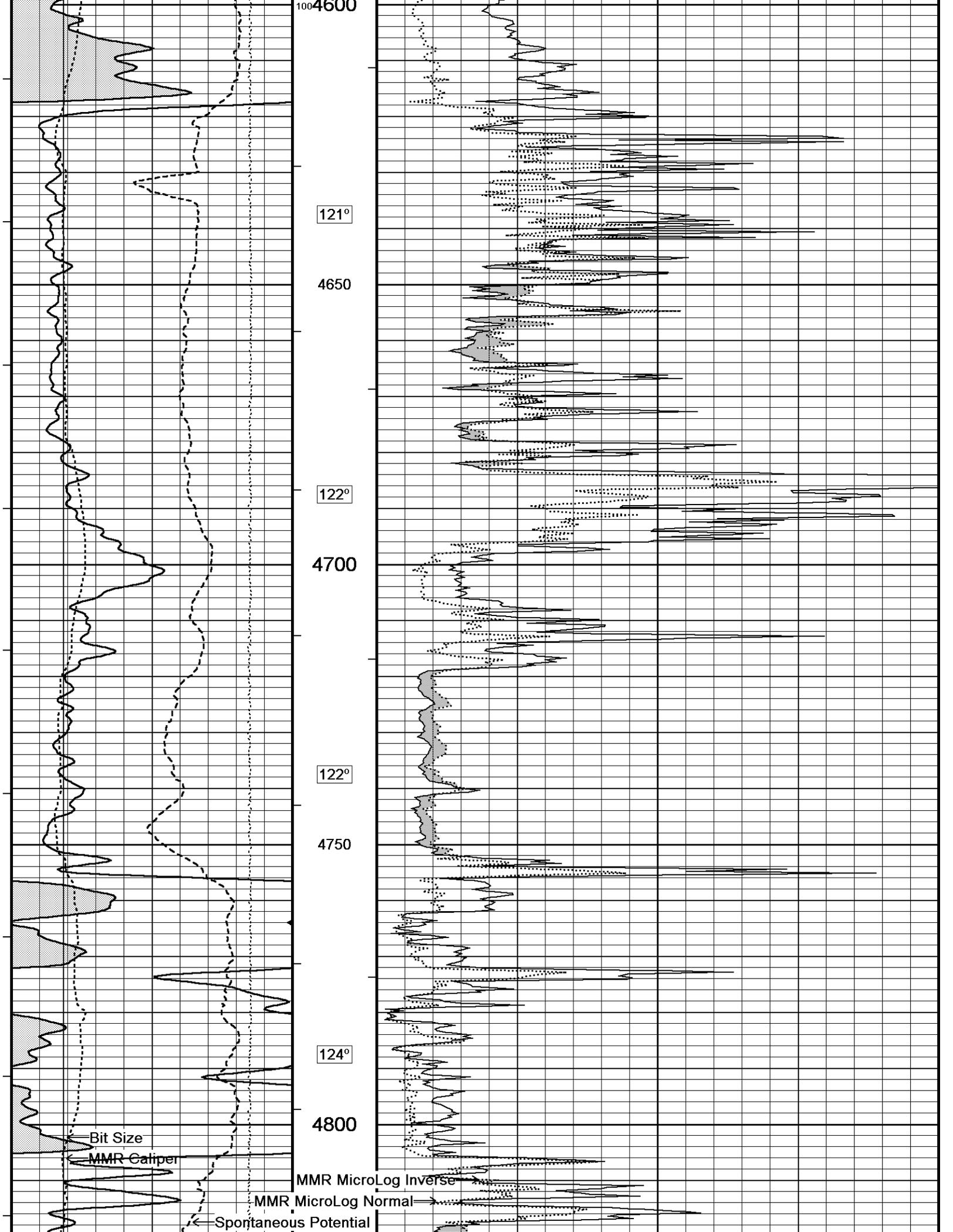
4300  
119°  
4350  
200

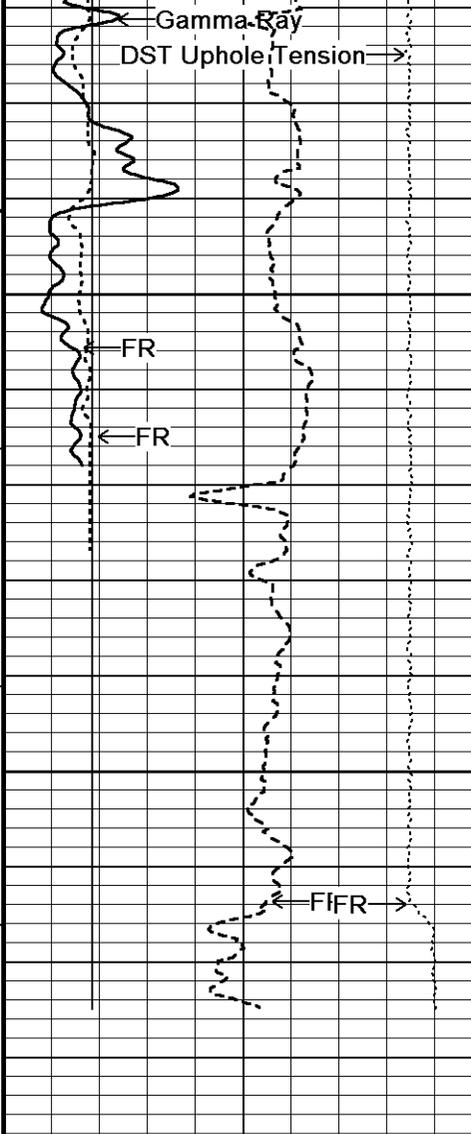
MMR MicroLog Normal  
ohm metres  
0 10 20 30 40

MMR MicroLog Inverse  
ohm metres  
0 10 20 30 40









125°

4850

4900

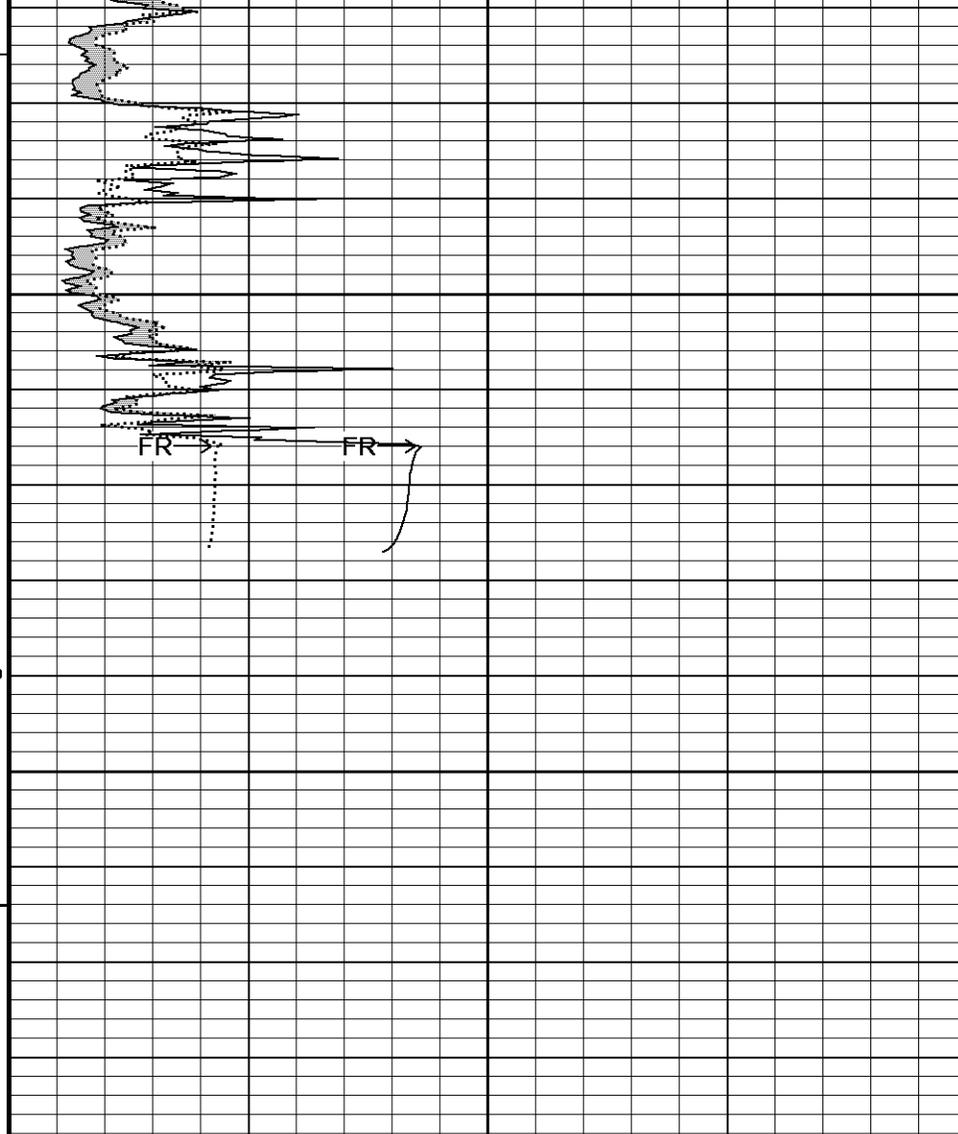
TD

Depth  
in  
Feet

Borehole  
Temp in  
deg F

HVI  
every  
10 cu ft

Annular  
Integral  
every  
10 cu ft



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

0 10 20 30 40

0 10 20 30 40

DST Uphole Tension  
pounds  
5000 0

Replay  
Scale  
1:240

Depth Based Data - Maximum Sampling Increment 10.0cm Plotted on 24-JUN-2018 16:34  
 Filename: C:\Minimus 18.01.6830\Data\Grand Mesa Ringer #1-24\Grand Mesa Ringer #1-24\_002.dta Recorded on 24-JUN-2018 12:12  
 System Versions: Logged with 18.01.6830 Plotted with 18.01.6830

↑ REPEAT SECTION ↑

**BEFORE SURVEY CALIBRATION**

C:\Minimus 18.01.6830\Data\Grand Mesa Ringer #1-24\Grand Mesa Ringer #1-24\_002.dta

General Constants All 000

Last Edited on 24-JUN-2018,11:52

General Parameters

Mud Resistivity	0.420	ohm-metres
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	Deep Induction
RWA Constant A	0.620
RWA Constant M	2.150
SW/APOR Tool Source	0.000

Gamma Calibration MCG-D.A 246

Field Calibration on 24-JUN-2018,09:00

	Measured	Calibrated (API)
Background	57	39
Calibrator (Gross)	734	495
Calibrator (Net)	676	456

Gamma Calibration Tolerances MCG-D.A 246

Ratio 1.483  Counts/API

Gamma Constants MCG-D.A 246

Last Edited on 24-JUN-2018,09:01

Gamma Calibrator Number	MCGGRCC141	
GRC-M Calibrator Jig in Use?	NO	
Inactive Background Jig in Use?	NO	
Mud Density	1.13	gm/cc
Caliper Source for Processing	Density Caliper	
Tool Position	Eccentred	
Potassium Equivalence	Chloride	
K Mud Concentration	0.00	%

High Resolution Temperature Calibration MCG-D.A 246

Field Calibration on 22-JUN-2018,16:25

	Measured	Calibrated(Deg F)
Lower	50.00	50.00

## High Resolution Temperature Constants MCG-D.A 246

Last Edited on 07-JUN-2018,10:42

Pre-filter Length 11

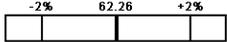
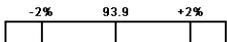
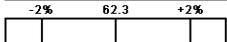
## Micro Normal and Micro Inverse Calibration MMR-B.A 91

Base Calibration on 16-JUN-2018,03:08

Field Check on 24-JUN-2018,09:00

	Resistor 1 (ohm)	Resistor 2 (ohm)		
Base Calibration	10.0	50.0		
	Measured	Calibrated (ohm-m)		
Micro Normal	10.2	49.8	5.1	25.6
Micro Inverse	9.9	49.4	3.4	16.9
Channel	Base Check (ohm-m)	Field Check (ohm-m)		
Micro Normal	93.9	93.9		
Micro Inverse	62.3	62.3		

## Micro Normal &amp; Micro Inverse Calibration Tolerance MMR-B.A 91

Micro Normal Res. 1	10.2		ohm	Micro Normal Res. 2	49.8		ohm
Micro Inverse Res. 1	9.9		ohm	Micro Inverse Res. 2	49.4		ohm
Micro Normal Base Check	93.9		ohm-m				
Micro Inverse Base Check	62.3		ohm-m				
Micro Normal Field Check	93.9		ohm-m				
Micro Inverse Field Check	62.3		ohm-m				

## Micro Normal and Micro Inverse Constants MMR-B.A 91

Last Edited on 13-APR-2018,05:04

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	

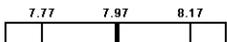
## Caliper Calibration MMR-B.A 91

Base Calibration on 07-JUN-2018 13:30

Field Calibration on 24-JUN-2018,08:59

Base Calibration	Reading No	Measured	Calibrator Size (in)
	1	13946	5.98
	2	17303	7.97
	3	20607	9.86
	4	24616	11.92
	5	0	0.00
	6	N/A	N/A
Field Calibration		Measured Caliper (in)	Actual Caliper (in)
		7.98	7.97

## Caliper Calibration Tolerances MMR-B.A 91

Short Arm Field Cal.	7.98		in
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## Caliper Calibration MPD-C.A 216

Base Calibration on 07-JUN-2018 14:09

Field Calibration on 24-JUN-2018,08:58

Base Calibration	Reading No	Measured	Calibrator Size (in)
	1	14245	3.99
	2	22960	5.98
	3	31650	7.97
	4	39952	9.86
	5	49231	11.92
	6	N/A	N/A
Field Calibration		Measured Caliper (in)	Actual Caliper (in)
		7.98	7.97

# Caliper Calibration Tolerances MPD-C.A 216

Long Arm Field Cal.

7.98 

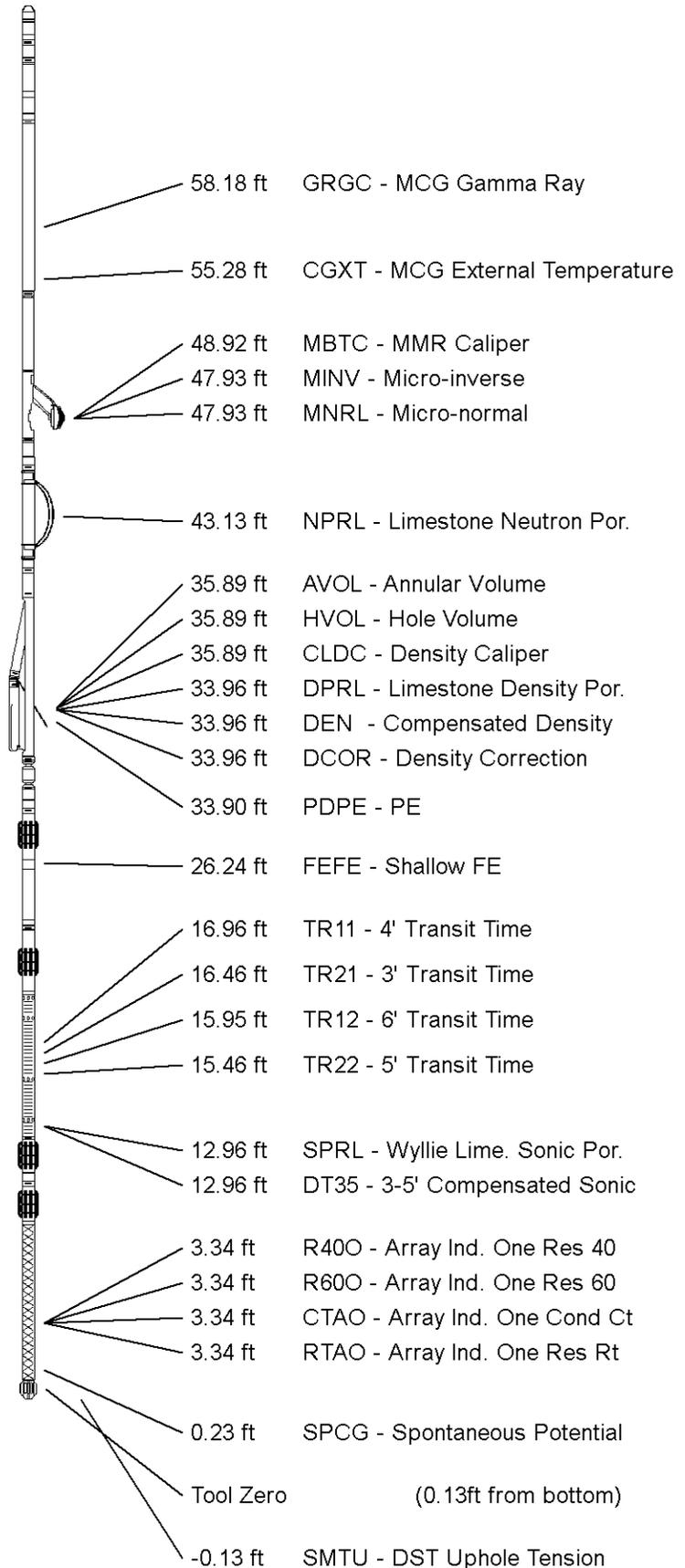
7.57	7.97	8.37
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 in

## DOWNHOLE EQUIPMENT

C:\Minimus 18.01.6830\Data\Grand Mesa Ringer #1-24\Grand Mesa Ringer #1-24\_002.dta

- Cablehead, 11 pin  
CBH-C 0 LG: 2.40 ft WT: 24.3 lb OD: 2.244 in
  
- Compact Swivel Head Adaptor  
SHA-J.B 724 LG: 2.30 ft WT: 22.0 lb OD: 2.244 in
  
- Compact Comms Gamma  
MCG-D.A 246 LG: 8.70 ft WT: 63.9 lb OD: 2.244 in
  
- Compact Micro-Resistivity  
MMR-B.A 91 LG: 8.59 ft WT: 81.6 lb OD: 4.882 in
  
- Compact Neutron  
MDN-B.A 292 LG: 5.04 ft WT: 50.7 lb OD: 2.244 in
  
- Compact Density/Caliper  
MPD-C.A 216 LG: 9.59 ft WT: 90.4 lb OD: 2.913 in
  
- Compact Knuckle Joint  
SKJ-D.A 167 LG: 2.17 ft WT: 24.3 lb OD: 2.244 in
  
- Compact Focussed Electric  
MFE-A.A 135 LG: 6.05 ft WT: 48.5 lb OD: 2.244 in
  
- Compact Sonic  
MSS-C.K 319 LG: 12.52 ft WT: 72.8 lb OD: 2.244 in
  
- Compact Induction  
MAI-A.A 111 LG: 10.81 ft WT: 48.5 lb OD: 2.244 in
  
- Total**      Length: 68.16 ft      Weight: 526.9 lb



All measurements relative to tool zero.

COMPANY	GRAND MESA OPERATING COMPANY		
WELL	RINGER #1-24		
FIELD	WILDCAT		
PROVINCE/COUNTY	BARBER		
COUNTRY/STATE	U.S.A. / KANSAS		

Elevation Kelly Bushing	1796	feet	First Reading	4866.00	feet
Elevation Drill Floor	1794	feet	Depth Driller	4920.00	feet
Elevation Ground Level	1791	feet	Depth Logger	4914.00	feet



**Weatherford**<sup>®</sup>

MICRORESISTIVITY LOG