



**Weatherford**<sup>®</sup>

**MICRORESISTIVITY LOG**

COMPANY PETROSANTANDER (USA) INC.  
 WELL ODD WILLIAMS #6  
 FIELD CHRISTABELLE  
 PROVINCE/COUNTY KEARNY  
 COUNTRY/STATE UNITED STATES / KANSAS  
 LOCATION 140' FSL & 1120' FWL  
 SE SE SW SW

SEC 12	TWP 21S	RGE 35W	Other Services MPD/MDN MAIMFE MSS	SGS	Elevations: KB 4004.00 DF 4002.00 GL 3092.00
API Number	15-093-21897		Permit Number	MSS	
Permanent Datum G.L., Elevation 3092 feet					
Log Measured From KB					
Drilling Measured From K.B. @ 12 FEET					

Date	26-SEP-2013				
Run Number	ONE				
Service Order	3541089				
Depth Driller	5000.00 feet				
Depth Logger	5001.00 feet				
First Reading	4954.00 feet				
Last Reading	520.00 feet				
Casing Driller	504.00 feet				
Casing Logger	507.00 feet				
Bit Size	7.880 inches				
Hole Fluid Type	CHEMICAL				
Density / Viscosity	7.00 lb/USg	42.00 CP			
PH / Fluid Loss	42.00	10.60 ml/30Min			
Sample Source	MUDPIT				
Rm @ Measured Temp	1.24 @ 71.0	ohm-m			
Rmf @ Measured Temp	0.99 @ 71.0	ohm-m			
Rmc @ Measured Temp	1.49 @ 71.0	ohm-m			
Source Rmf / Rmc	CALC	CALC			
Rm @ BHT	0.80 @ 110.0	ohm-m			
Time Since Circulation	5 HOURS				
Max Recorded Temp	110.00	deg F			
Equipment / Base	13096	LIB			
Recorded By	W. STAMBAUGH				
Witnessed By	JEFF QUIMBY				
IOB#	LB13-270				

**BOREHOLE RECORD**

Last Edited: 27-SEP-2013 00:50

Bit Size inches	Depth From feet	Depth To feet
7.880	507.00	5001.00

**CASING RECORD**

Type	Size inches	Depth From feet	Shoe Depth feet	Weight pounds/ft
SURFACE	8.625	0.00	507.00	24.00

**REMARKS**

- SOFTWARE ISSUE: WLS 13.05.9583.
- MCG, MDN, MPD, MFE, MAI RUN IN COMBINATION.
  - HARDWARE: DUAL BOWSPRING USED ON MDN.
  - 0.5 INCH STANDOFF USED ON MFE.
  - 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: 1840 CU. FT.
- ANNULAR HOLE VOLUME WITH 5.5 INCH CASING FROM TD TO 504 FEET: 1100 CU. FT.
- RIG: TRINIDAD #216

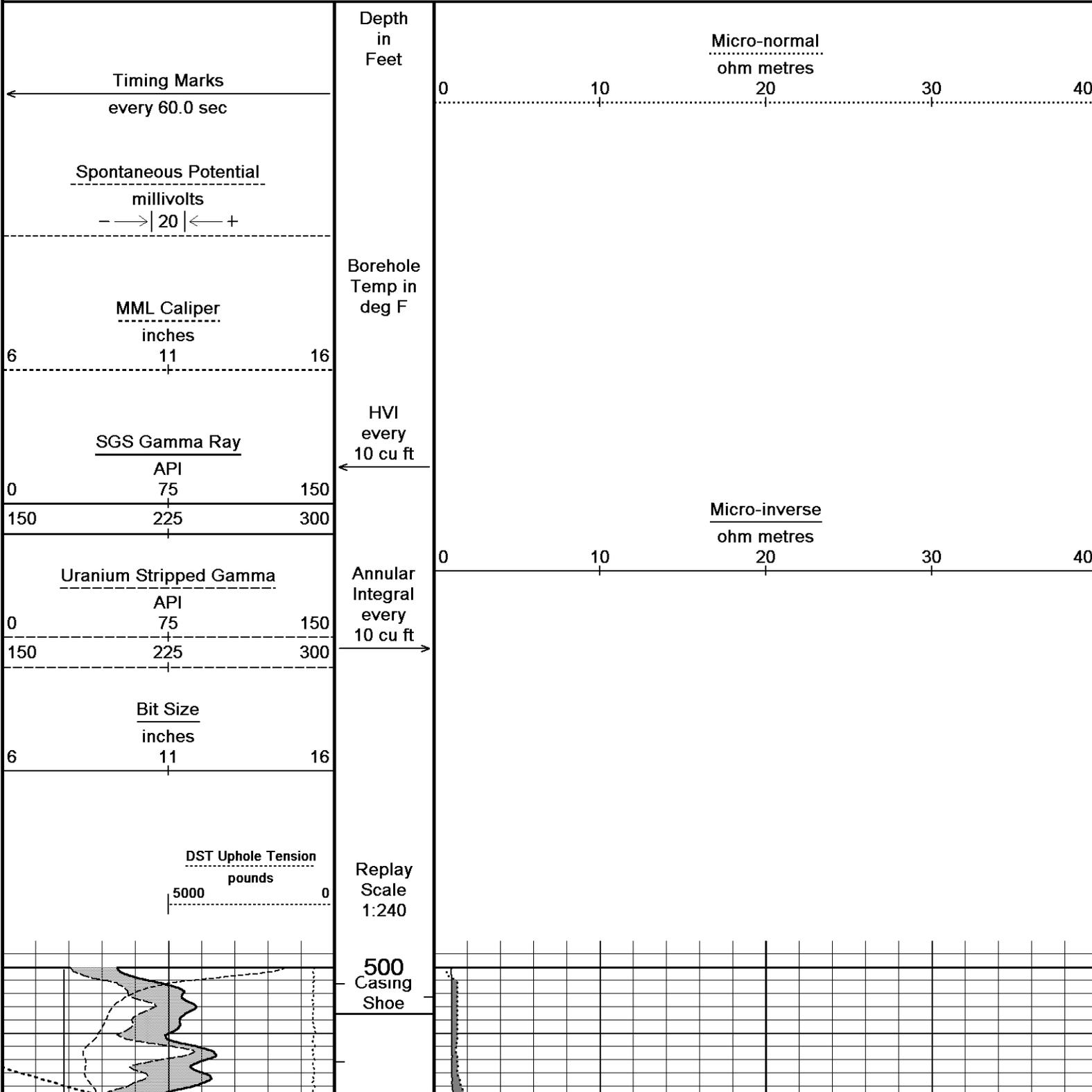
- ENGINEER: W. STAMBAUGH

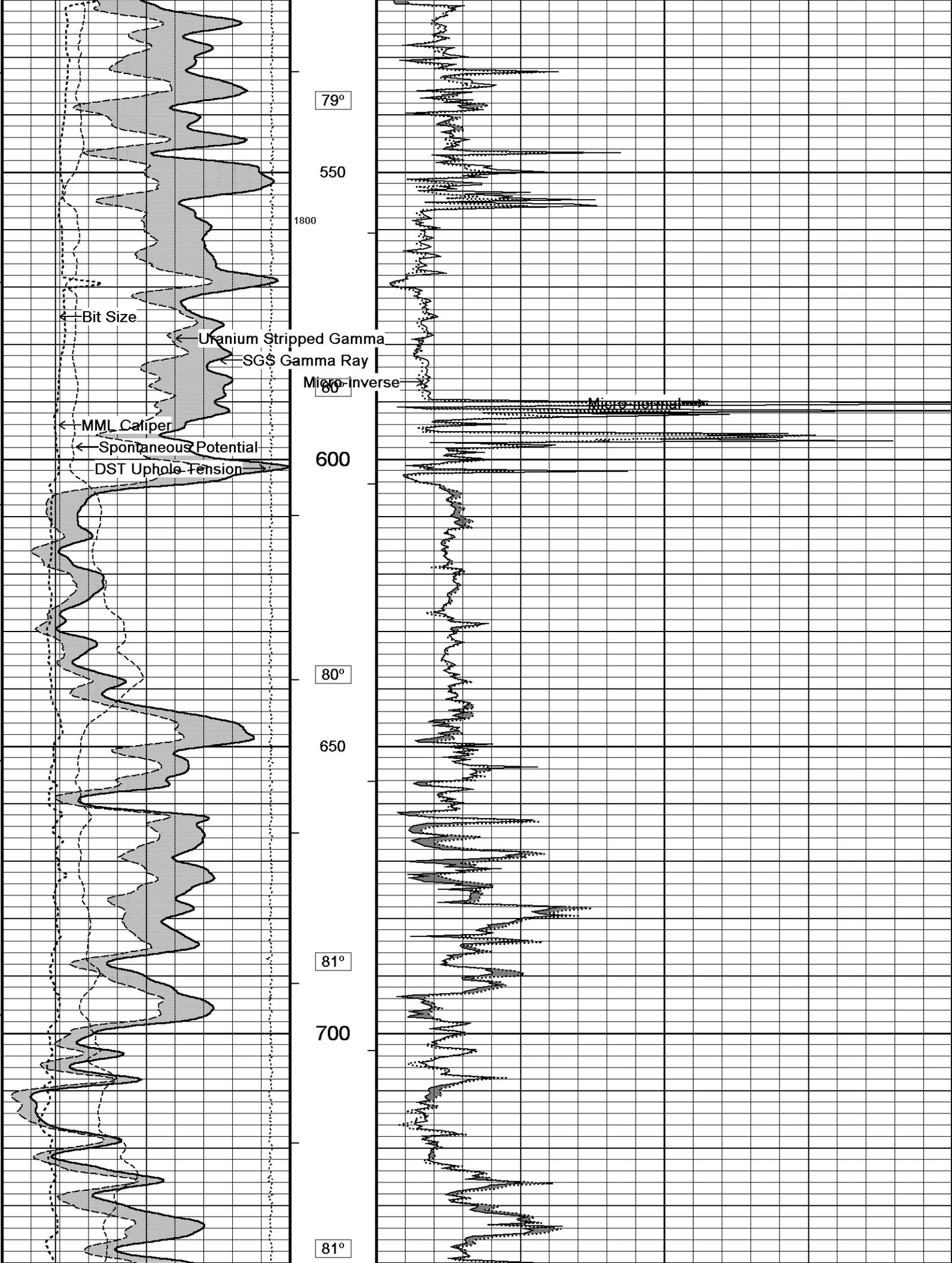
- OPERATOR(S): C. RAMIREZ, J. DUNLAP.

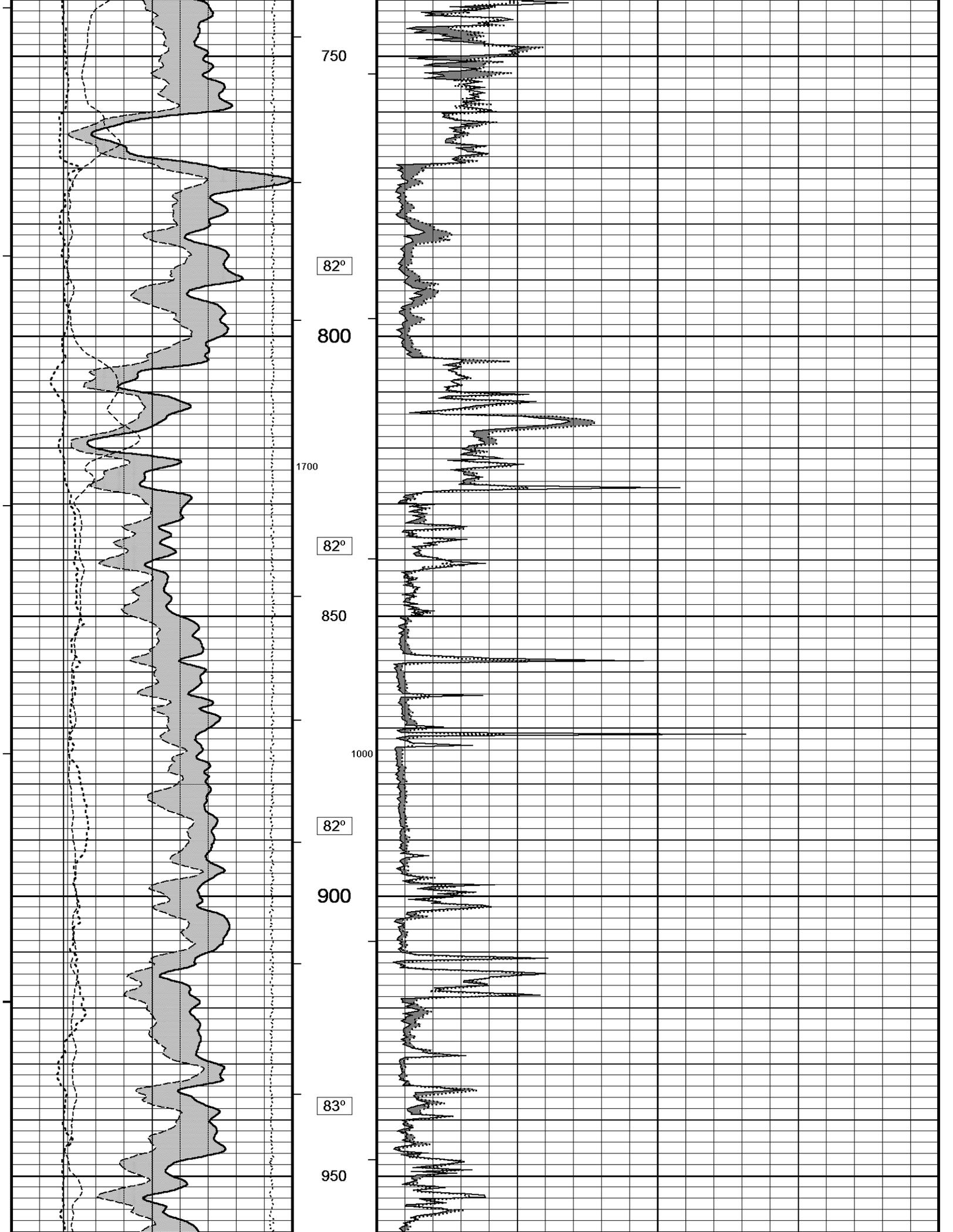
All interpretations are opinions based on inferences from electrical or other measurements and we cannot, and do not, guarantee the accuracy or correctness of any interpretations, and we shall not, except in the case of gross or wilful negligence on our part, be liable or responsible for any loss, costs,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

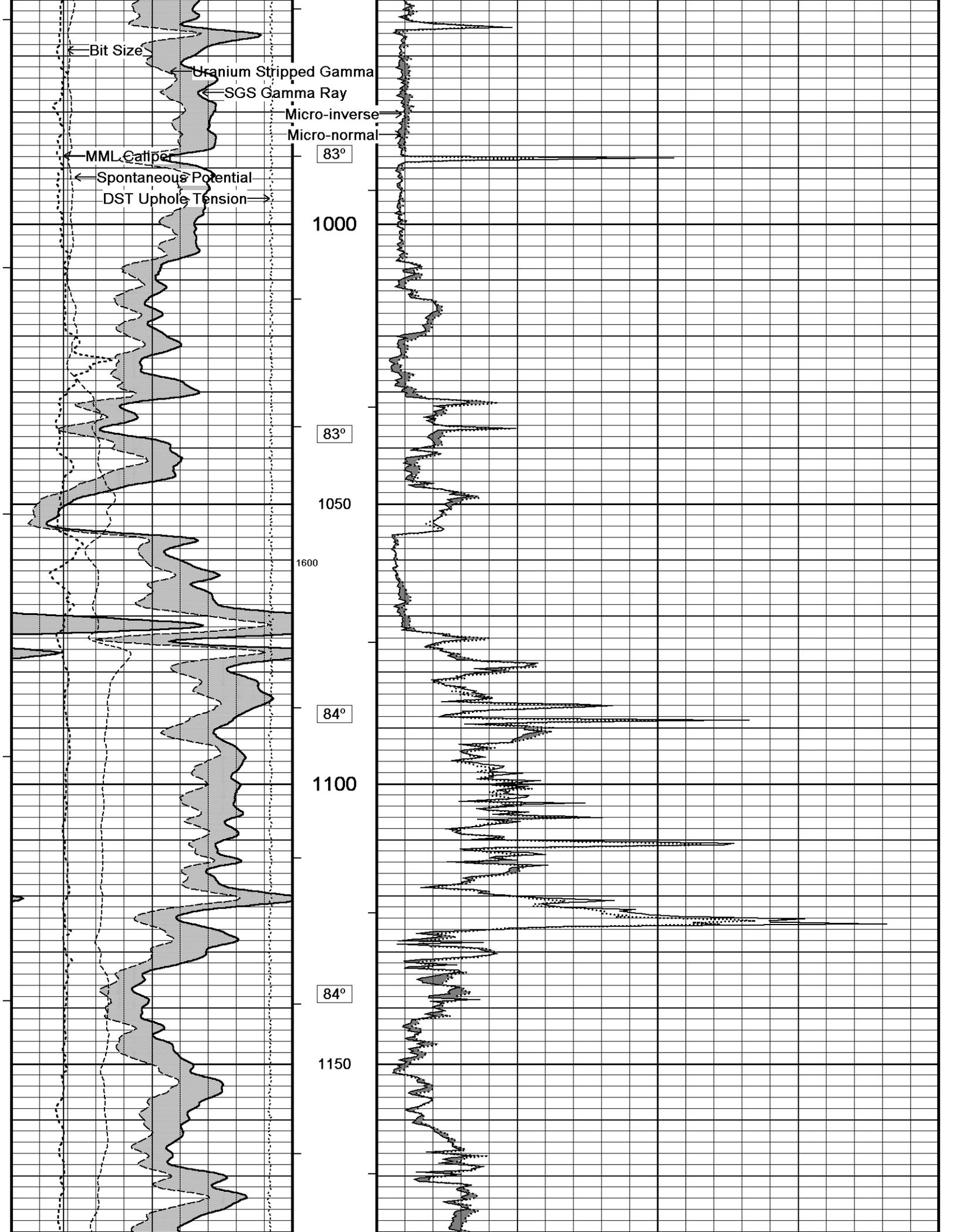
**5 INCH MAIN**

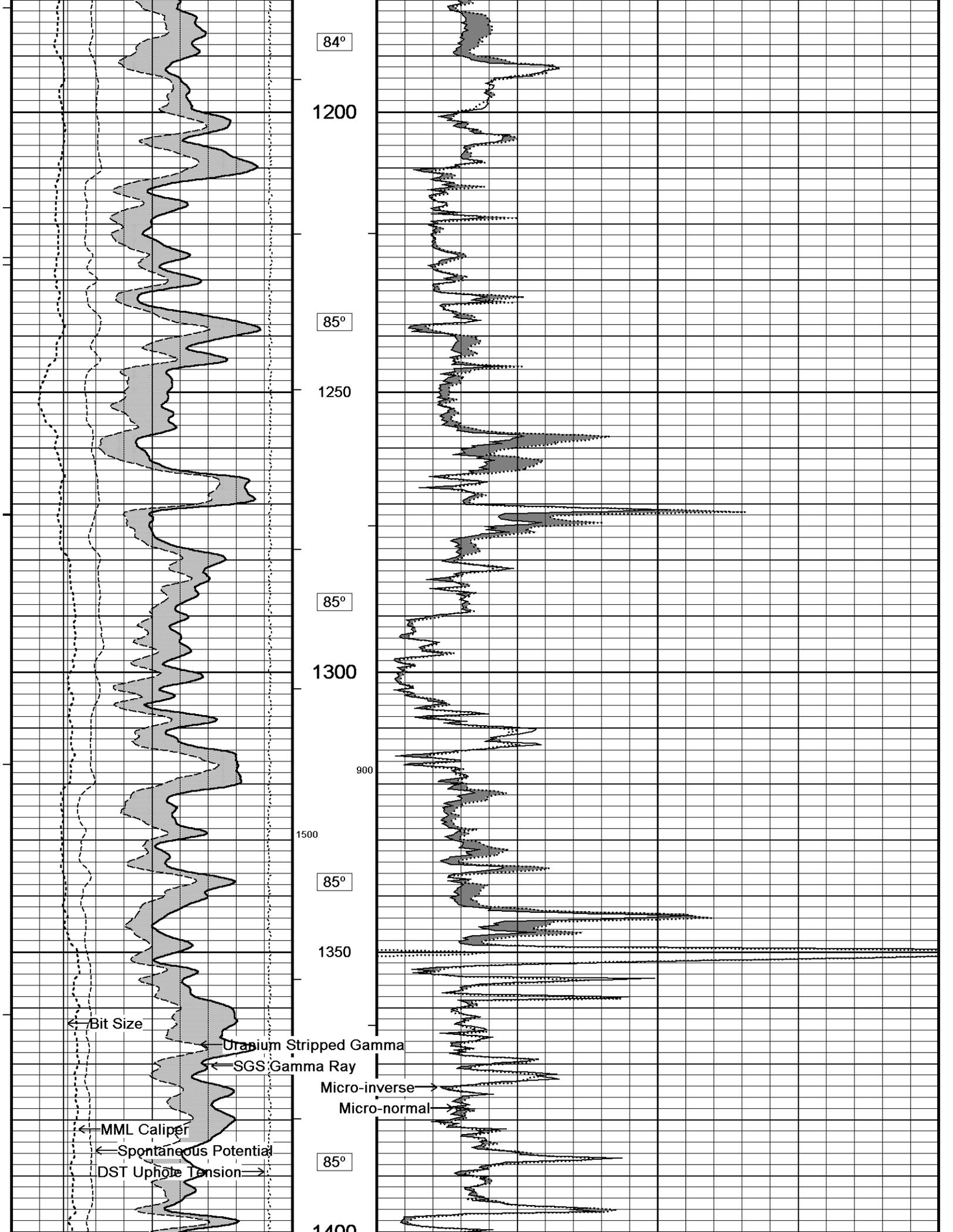
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Filename: C:\Minimus 13.05.9583\Log\PetroSantander Od...\PetroSantander Odd Williams #6 MAIN.dta Recorded on 26-SEP-2013 21:18  
System Versions: Logged with 13.05.9583 Processed with 13.05.9583 Plotted with 13.05.9583

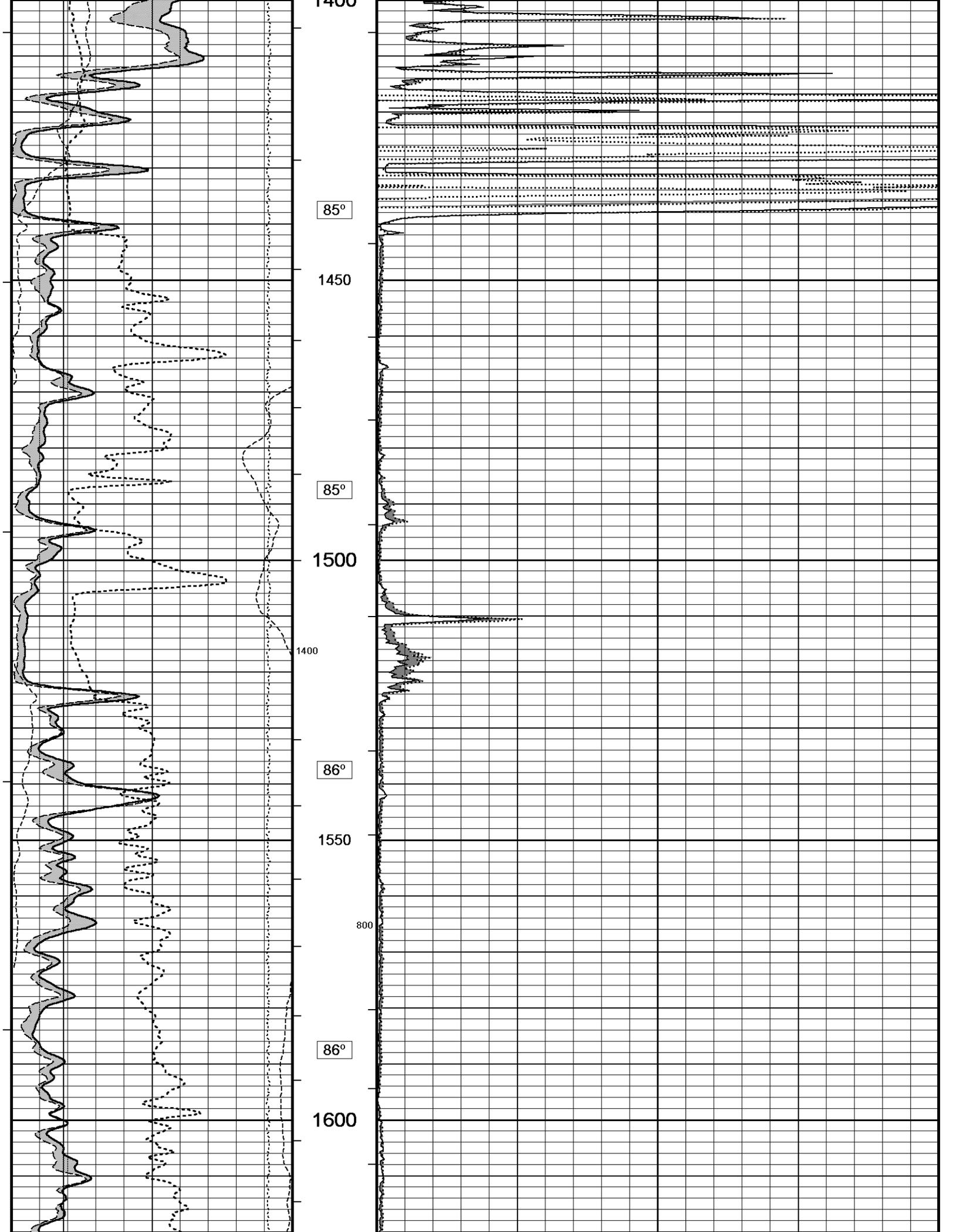


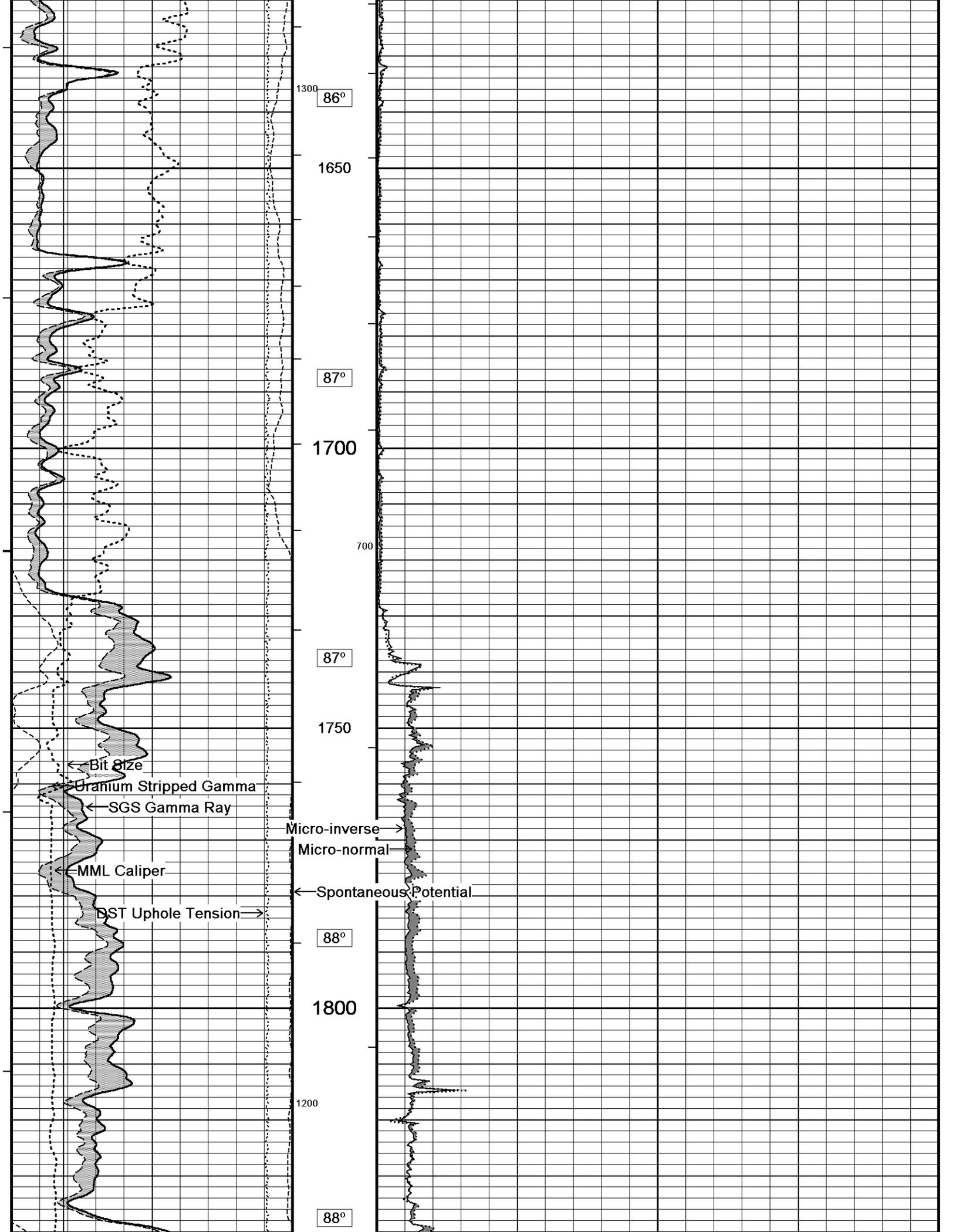


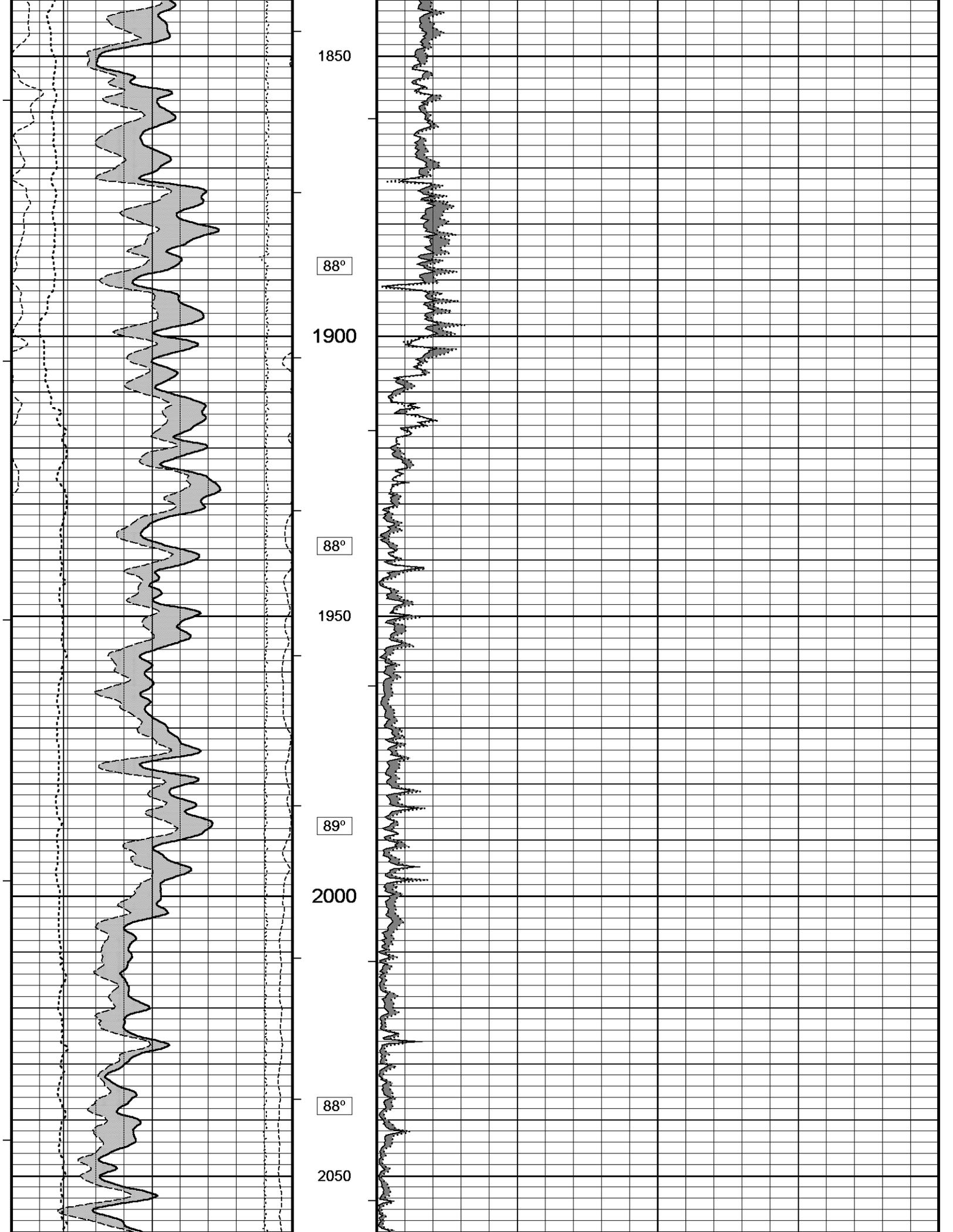


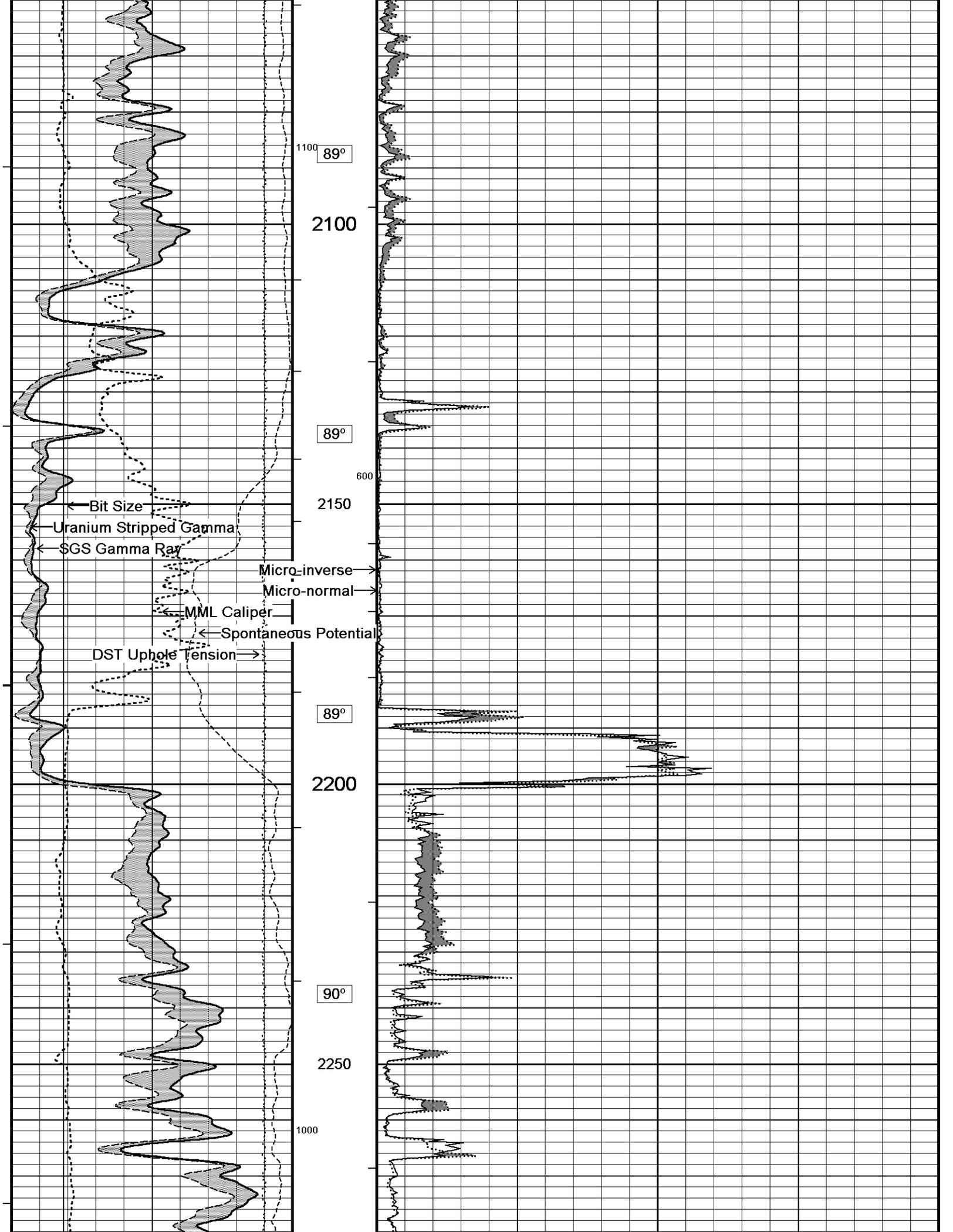


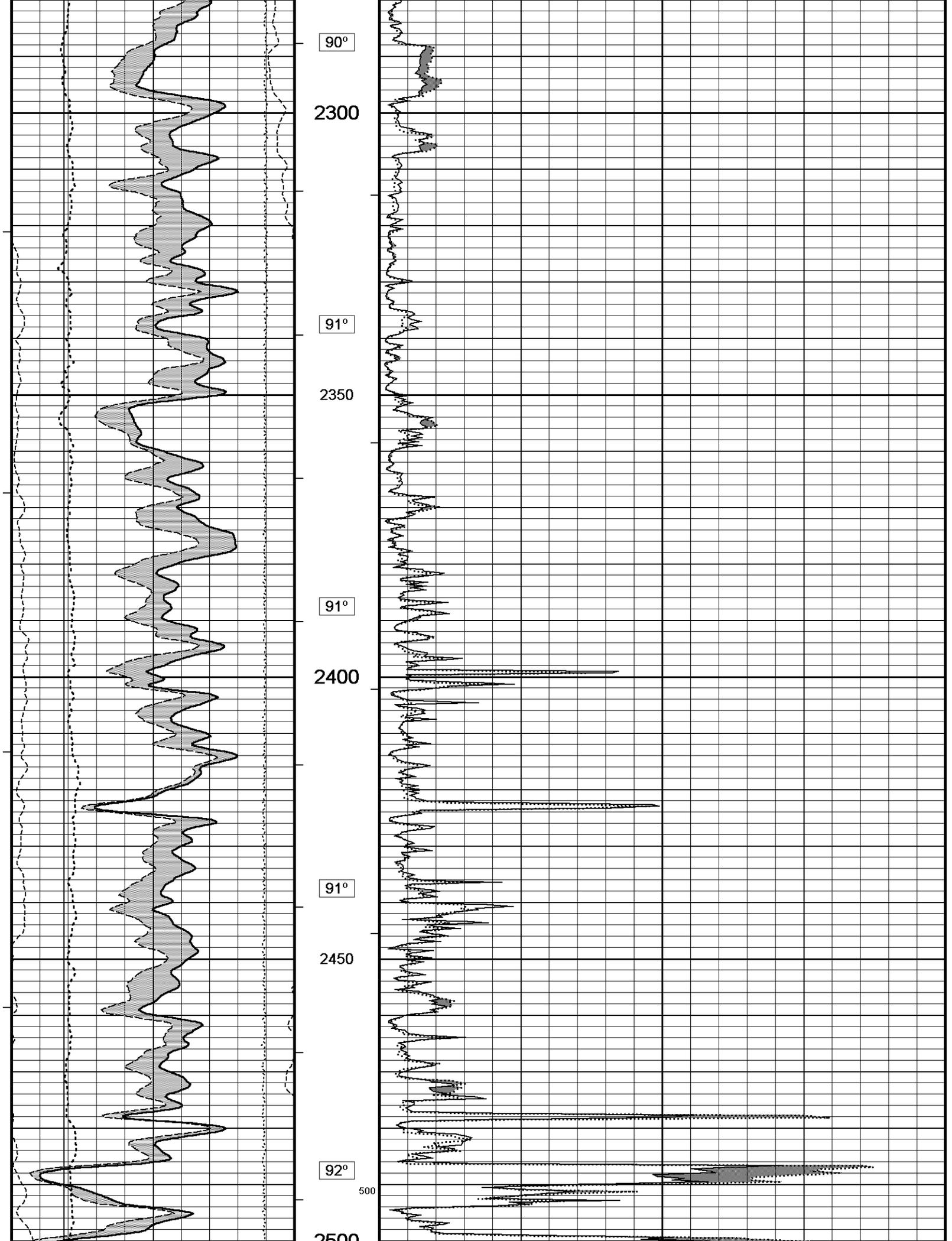


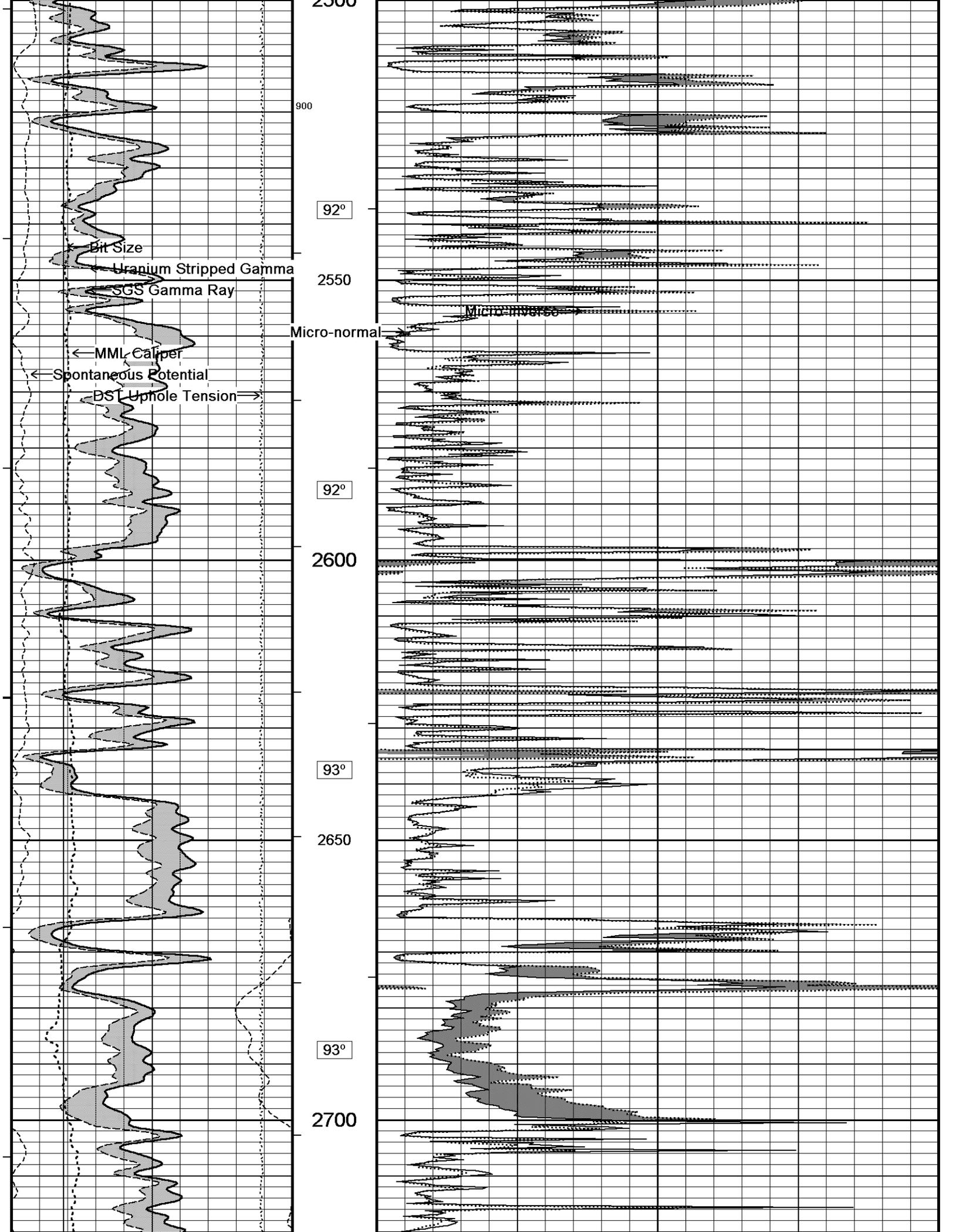


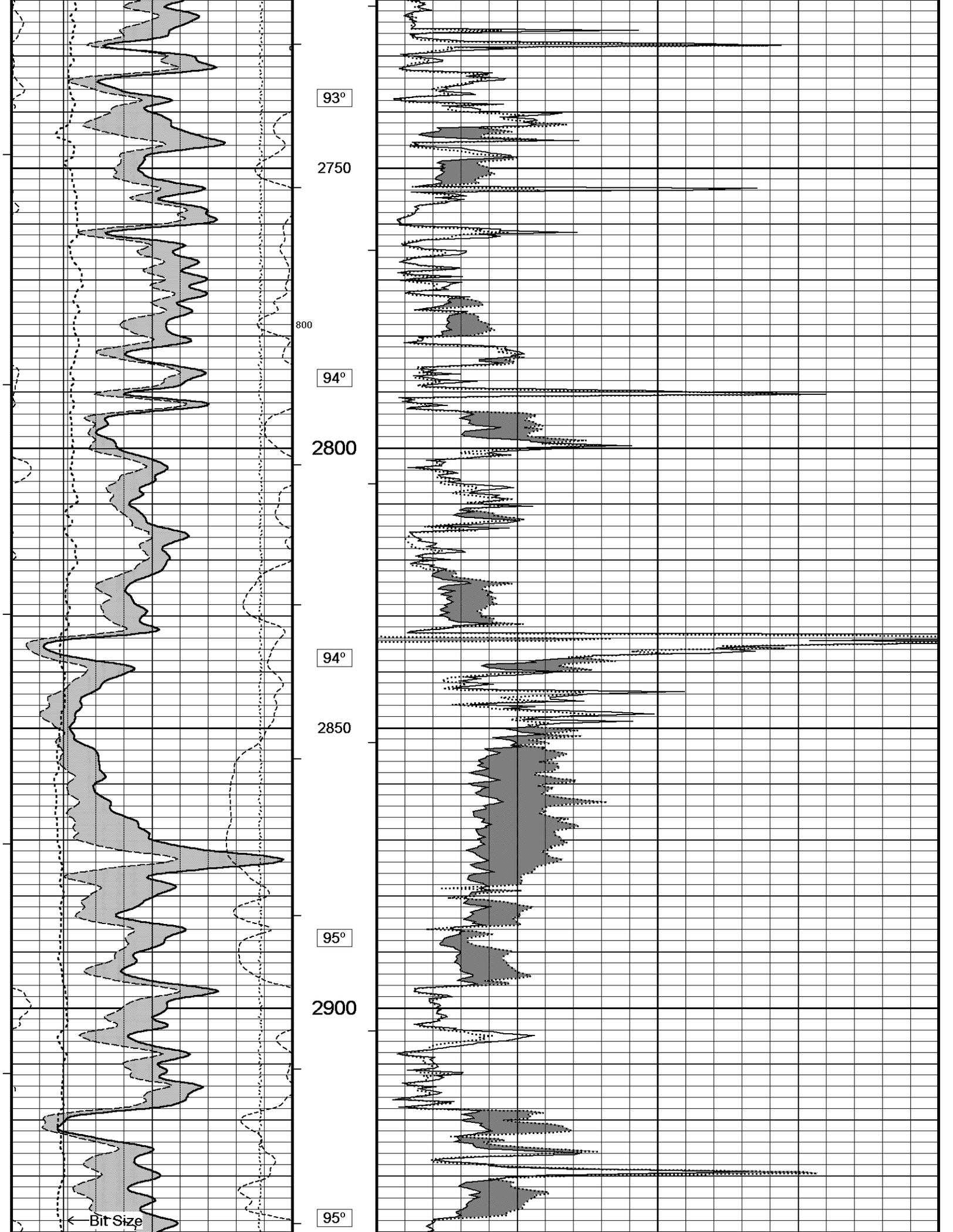


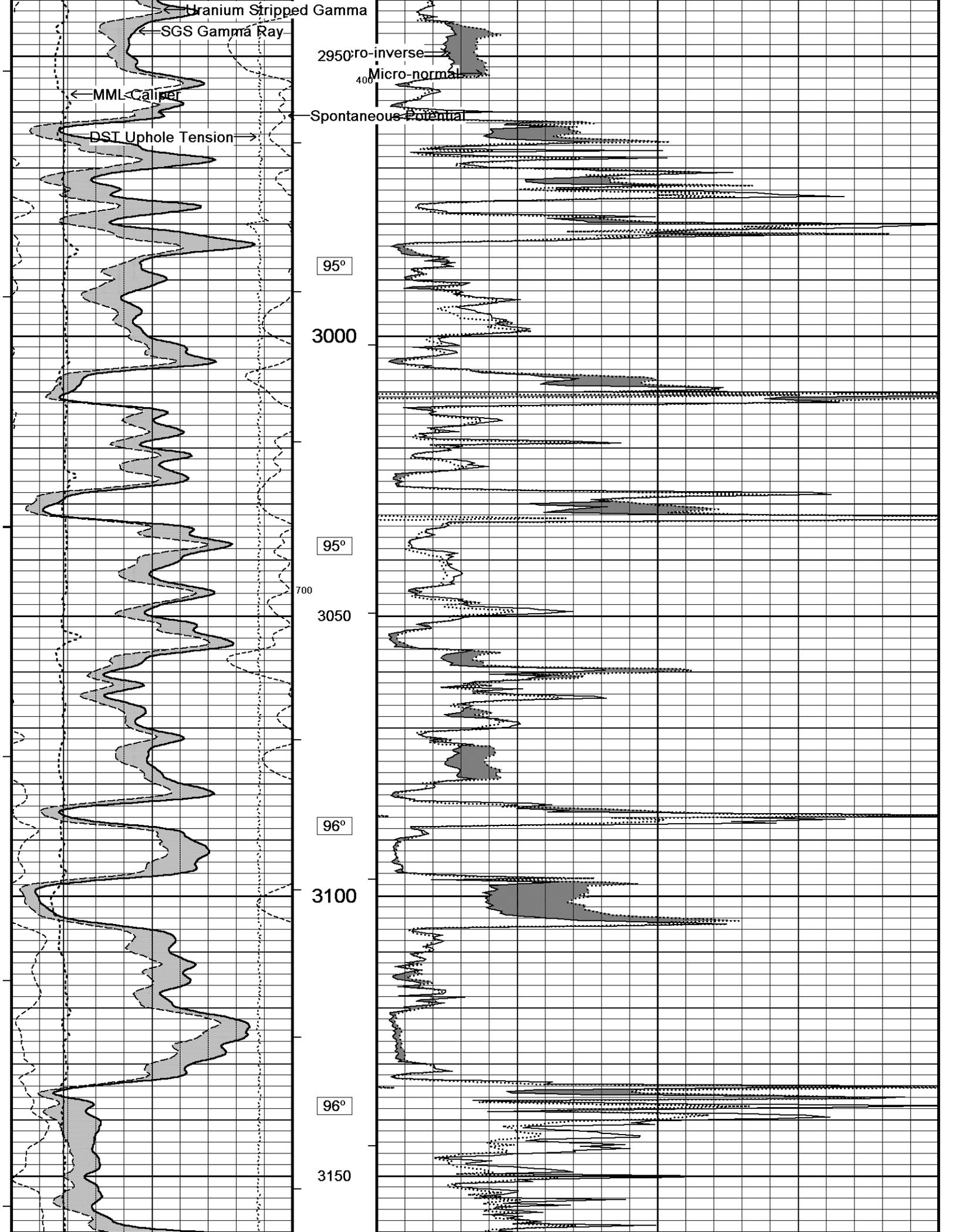


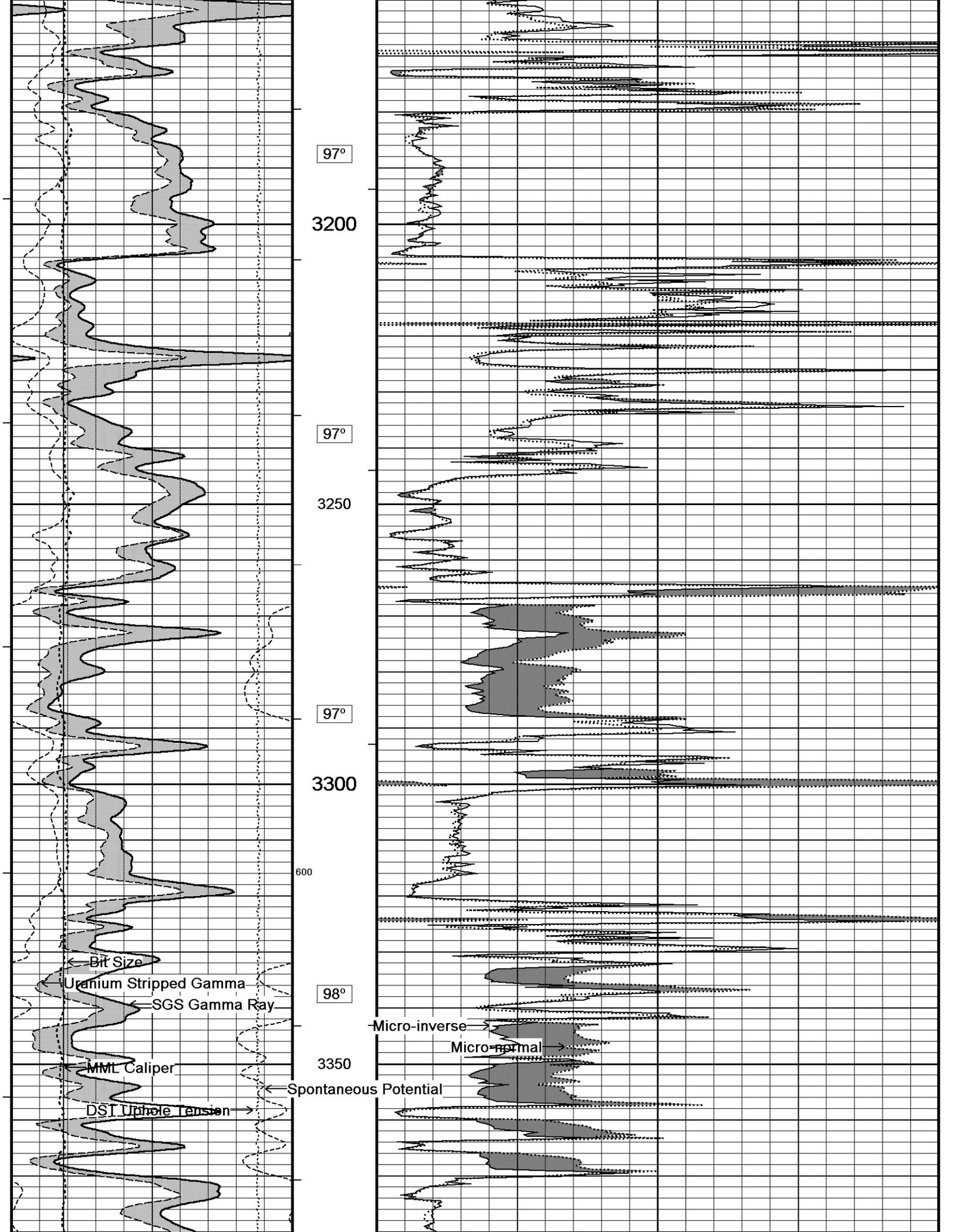


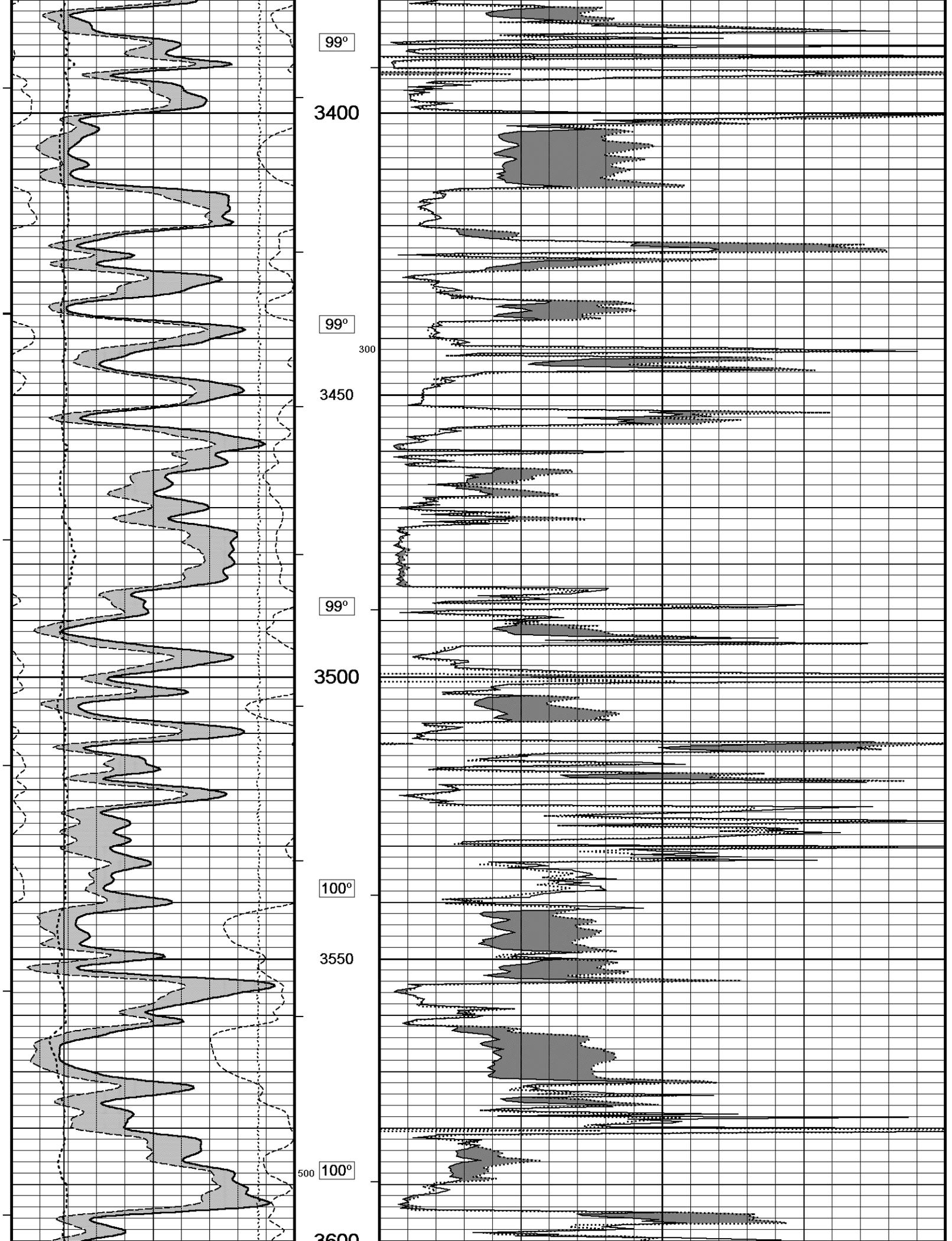


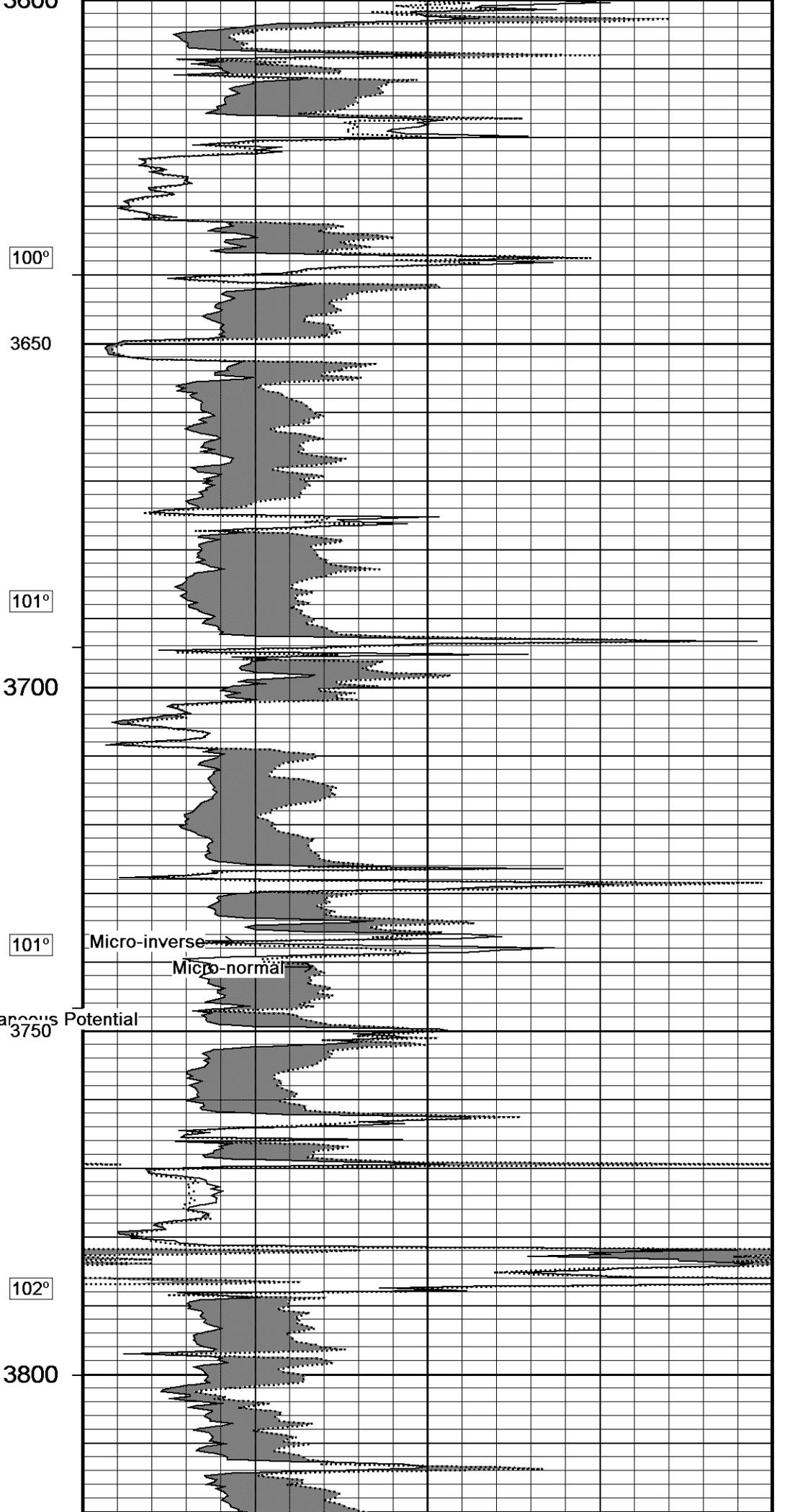
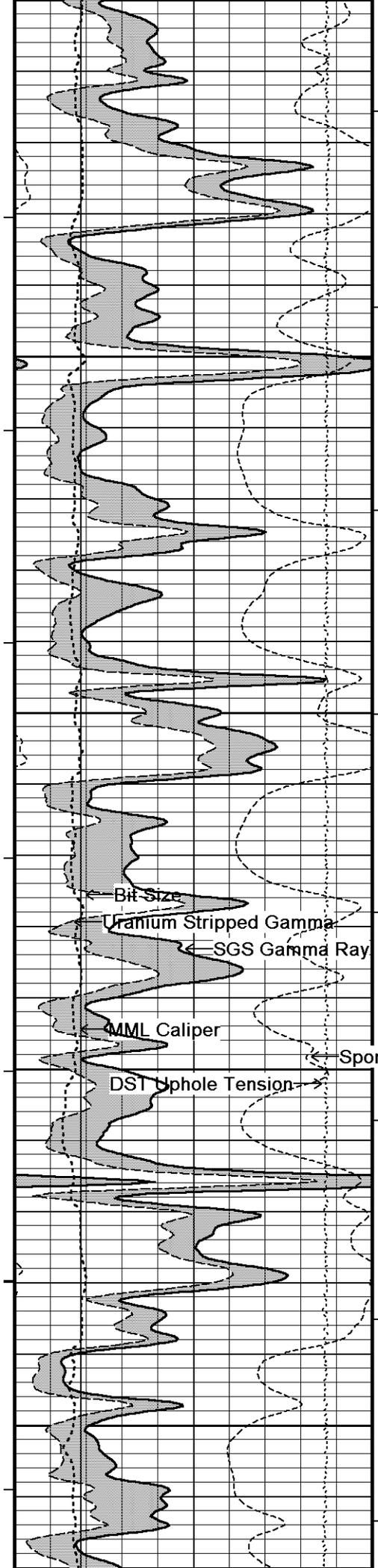


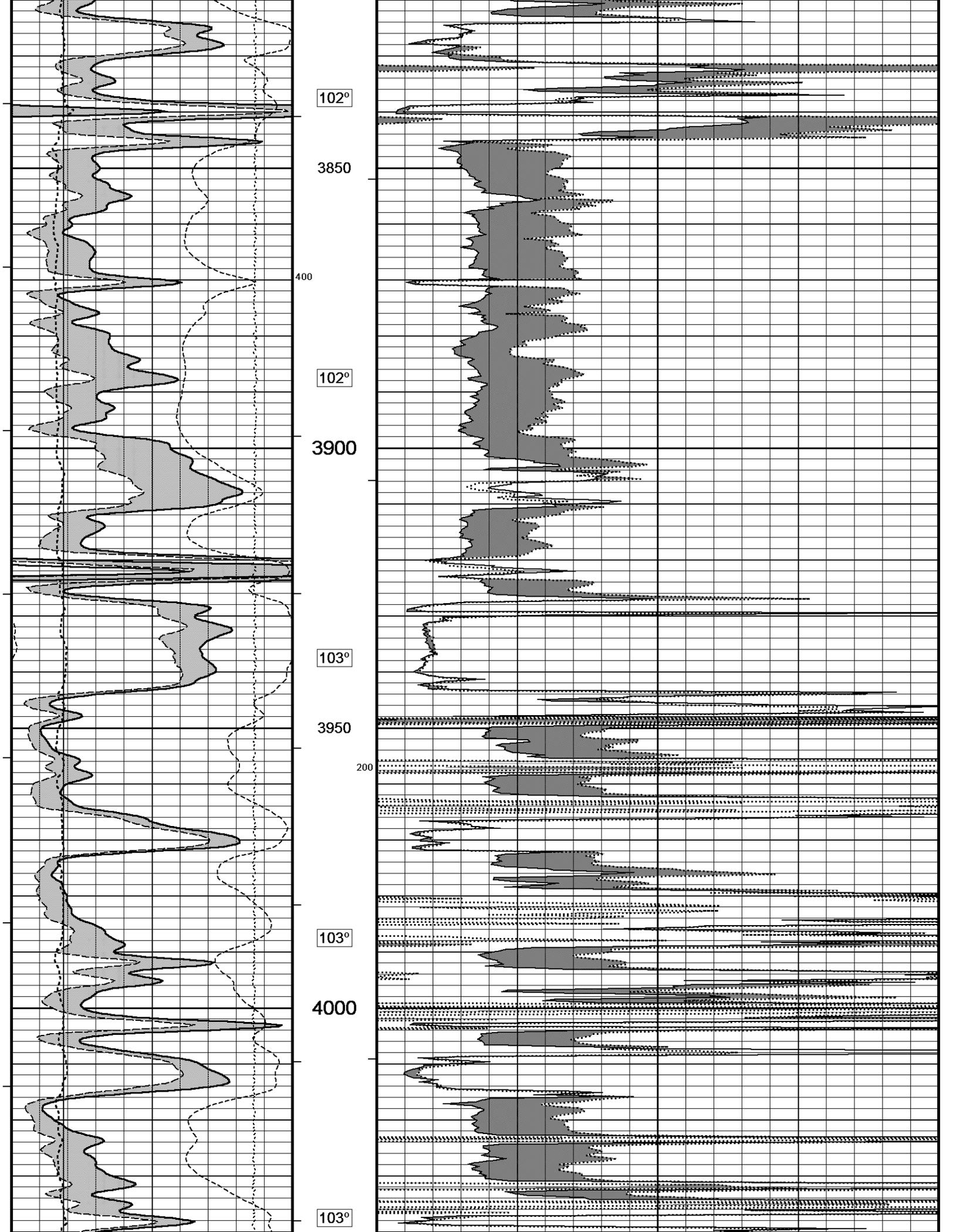


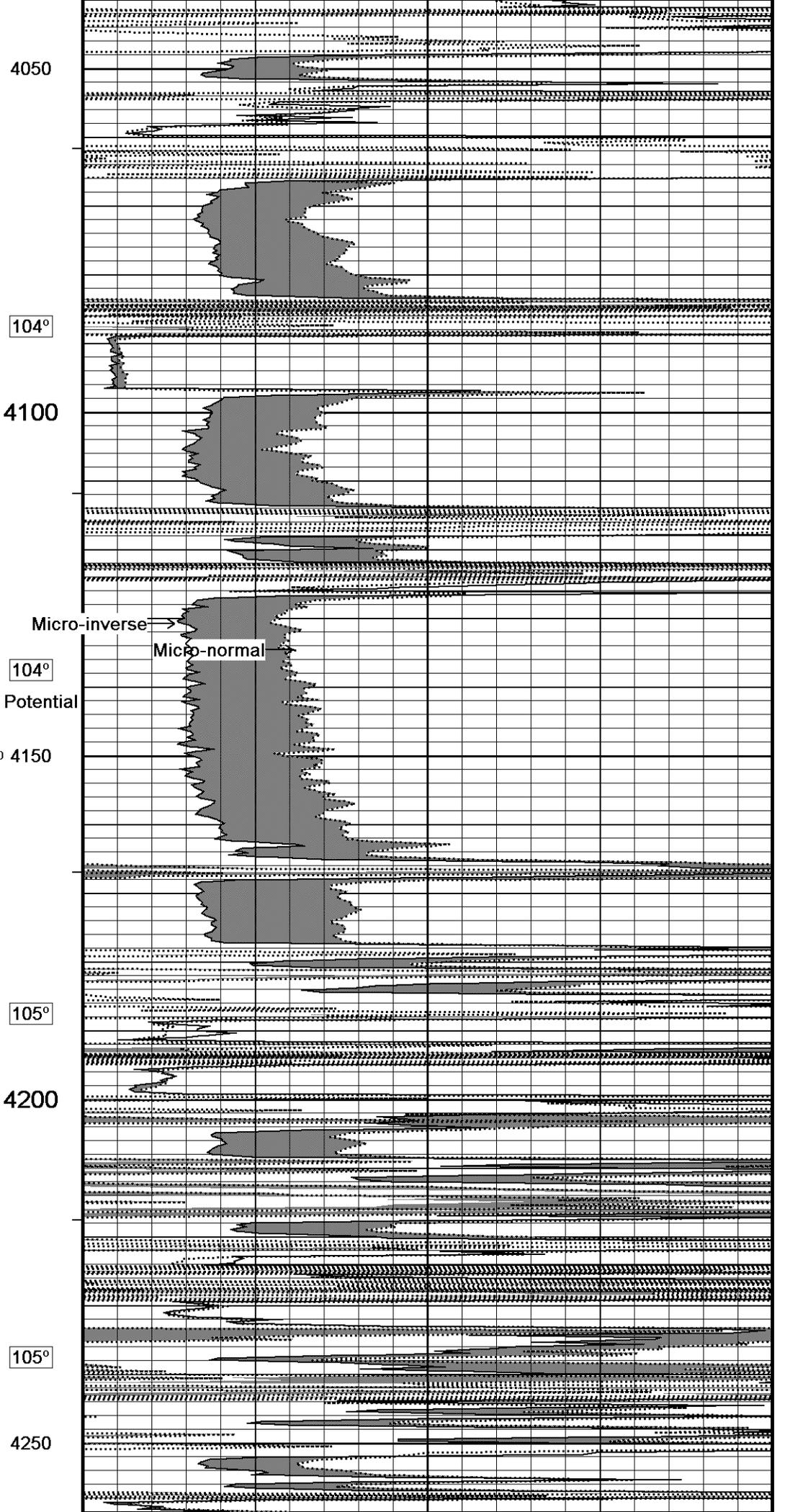
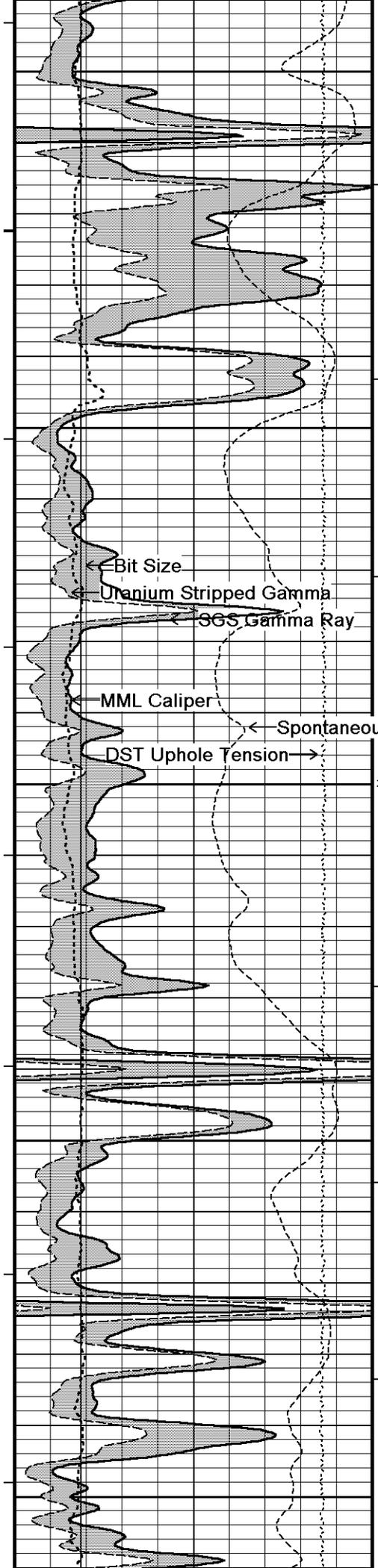


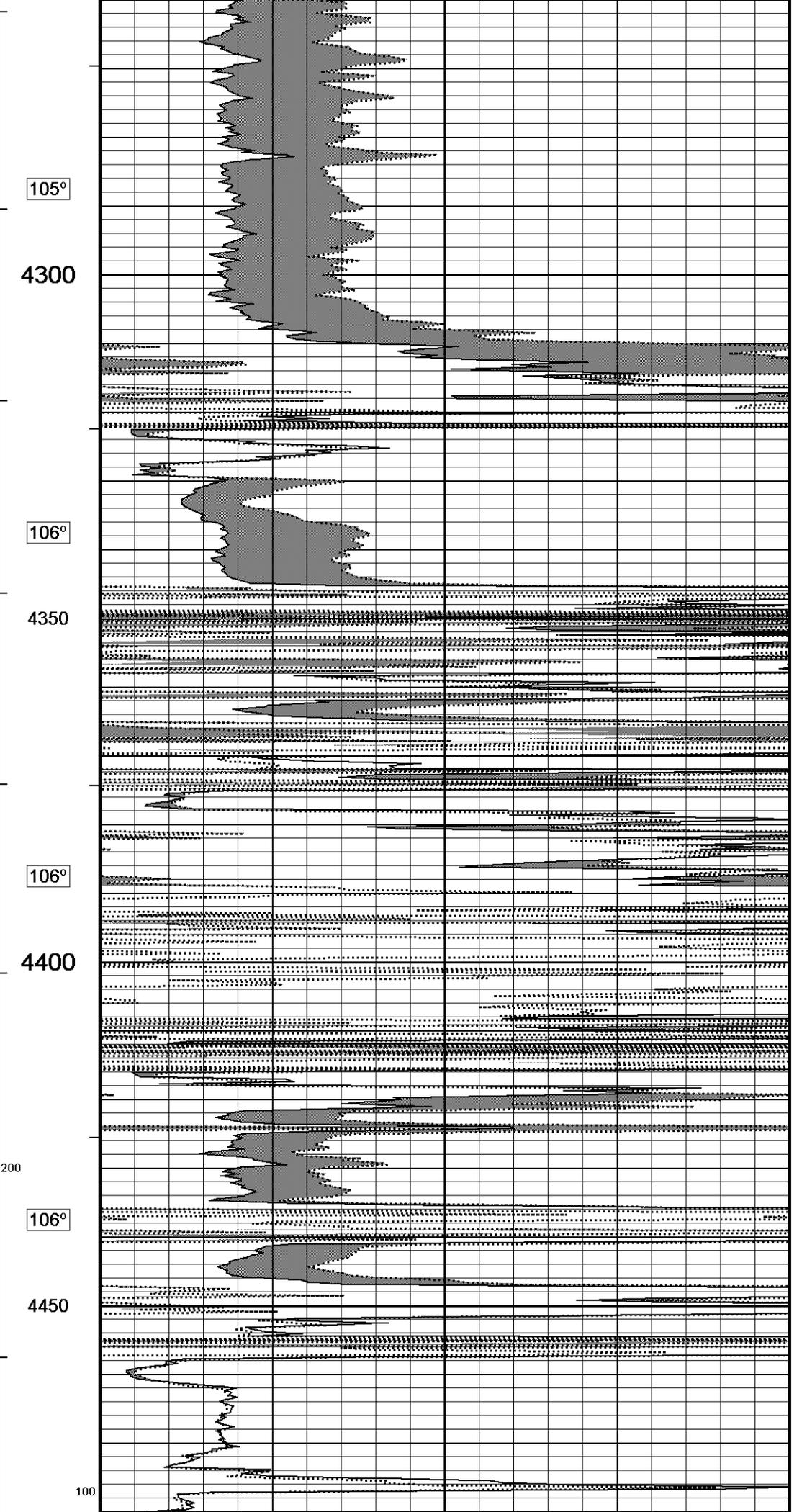
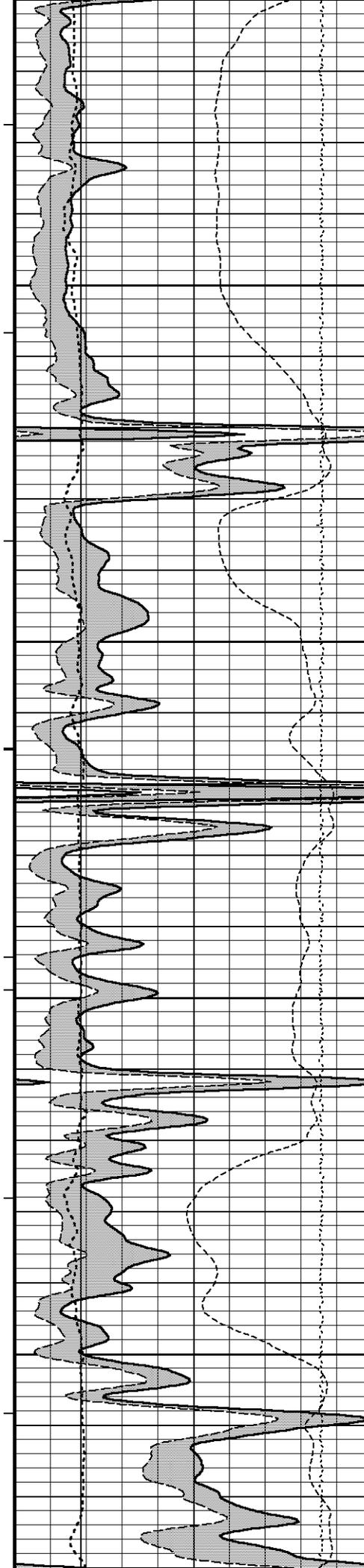


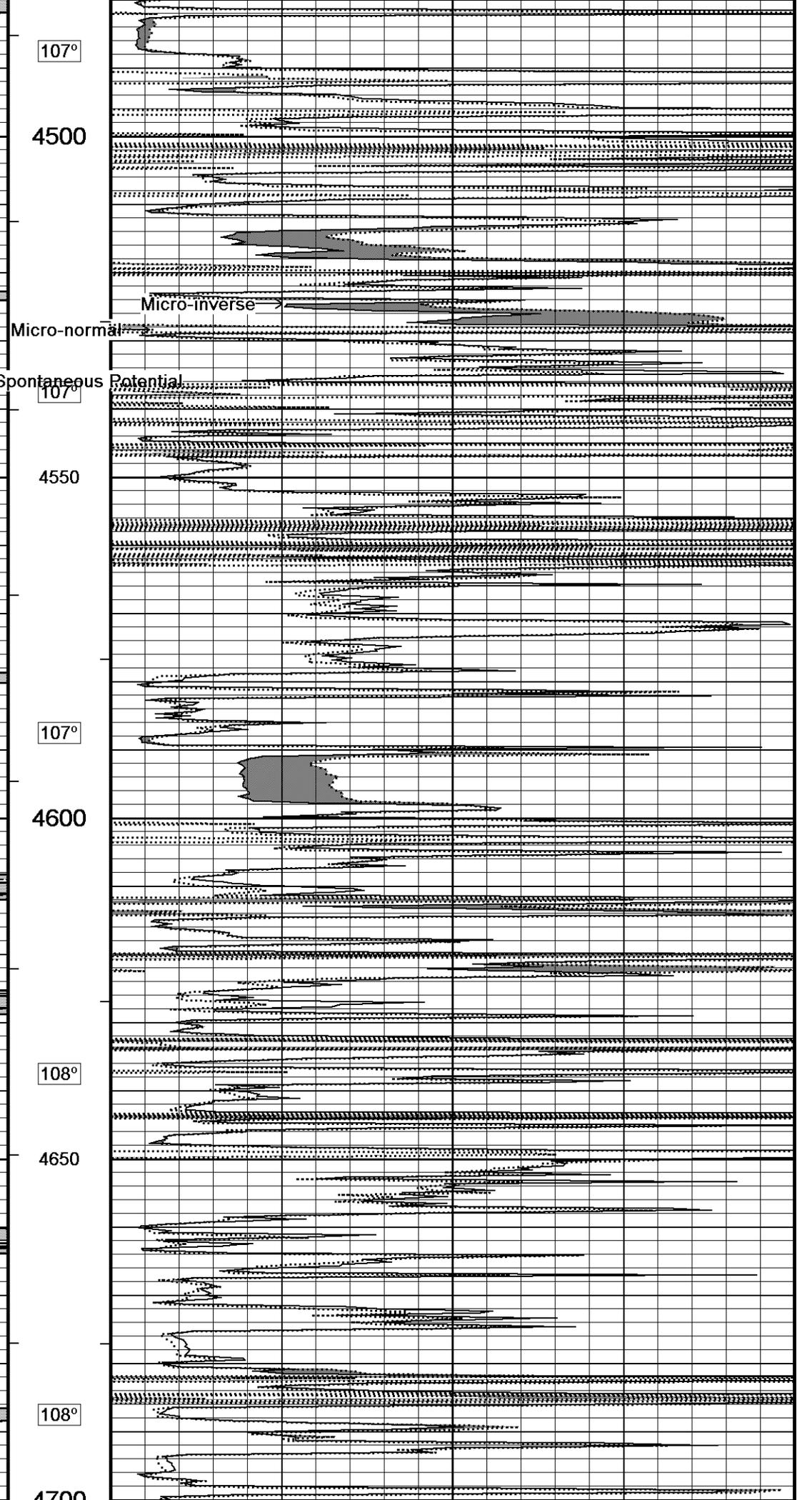
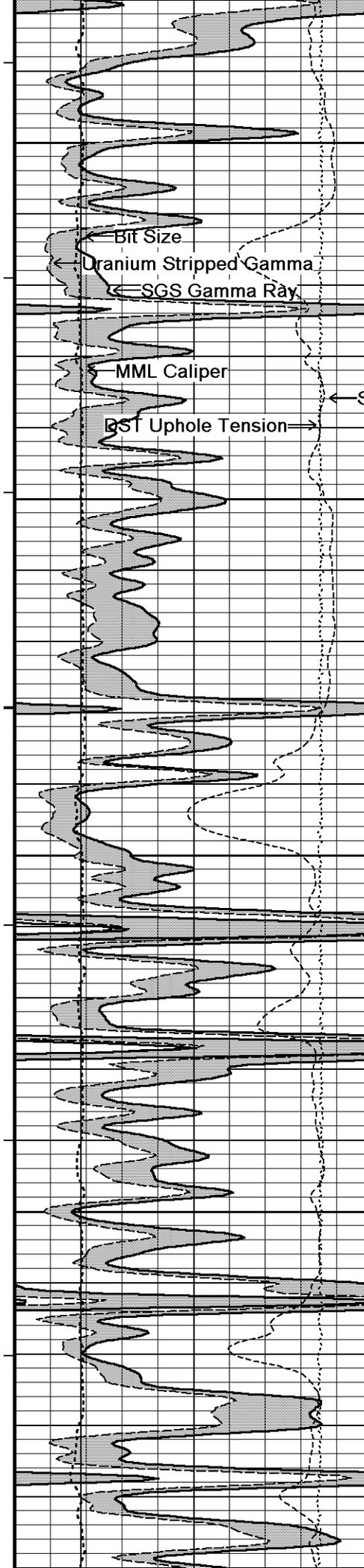


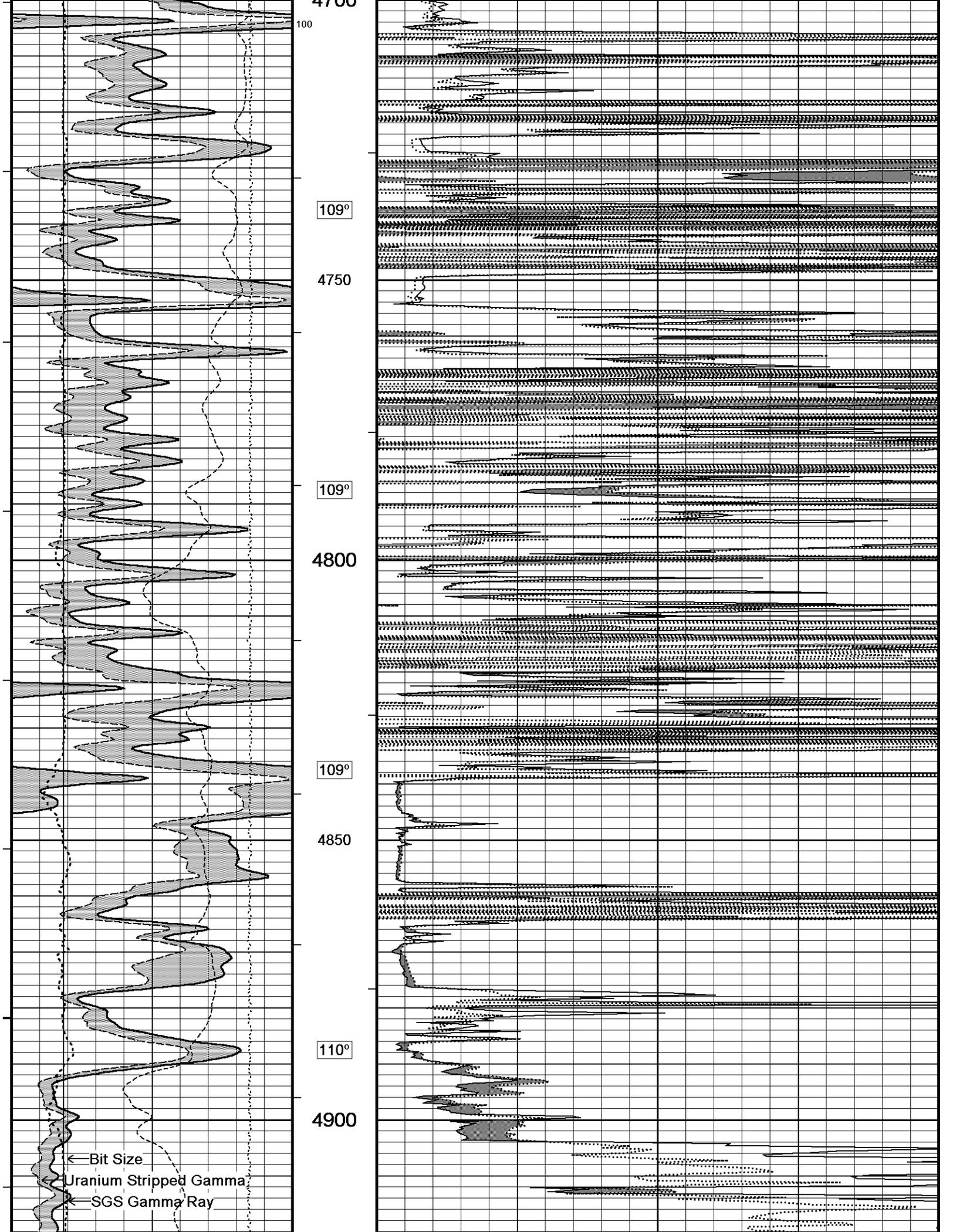


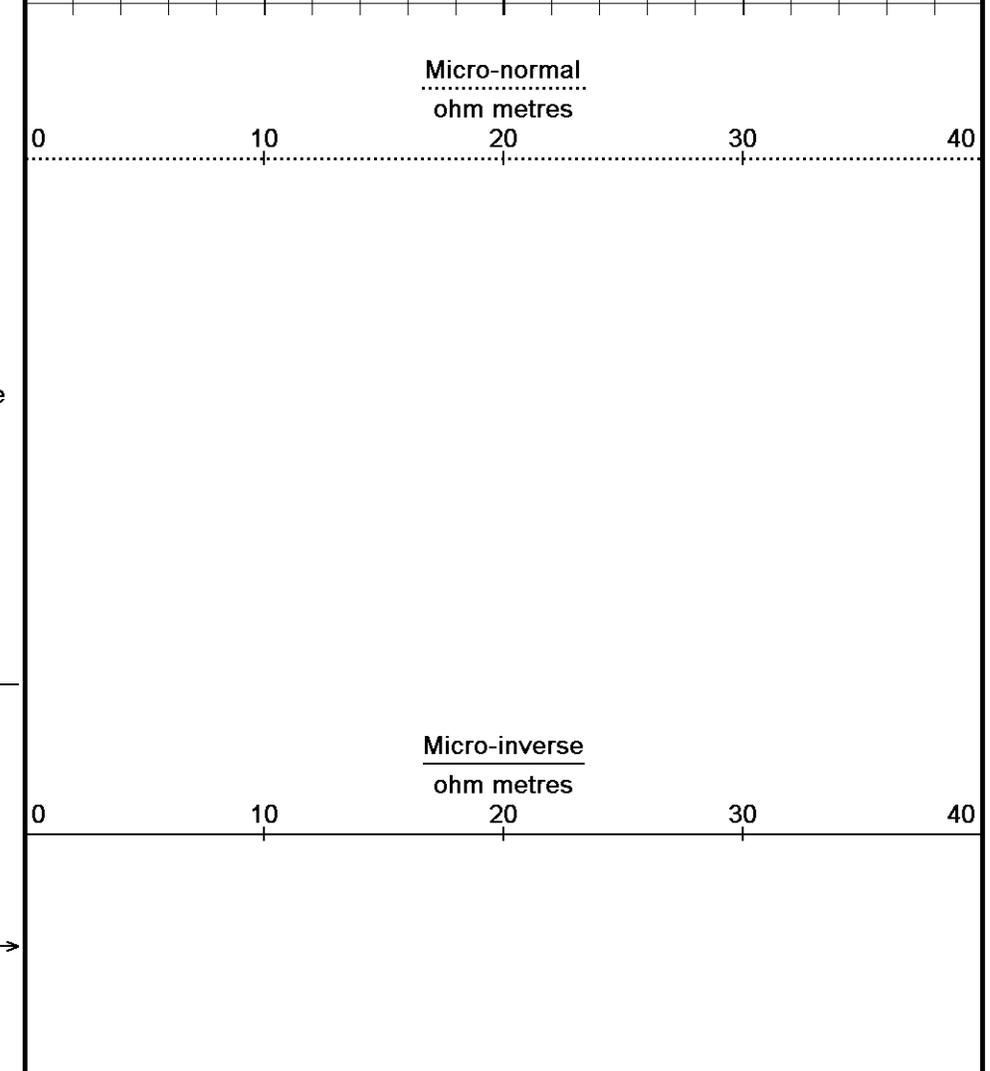
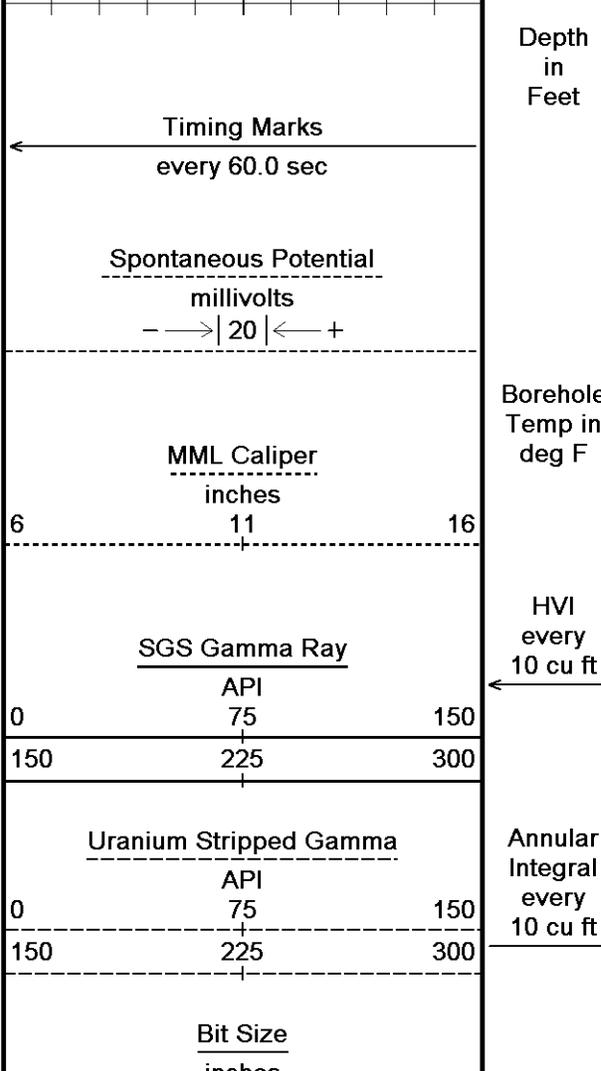
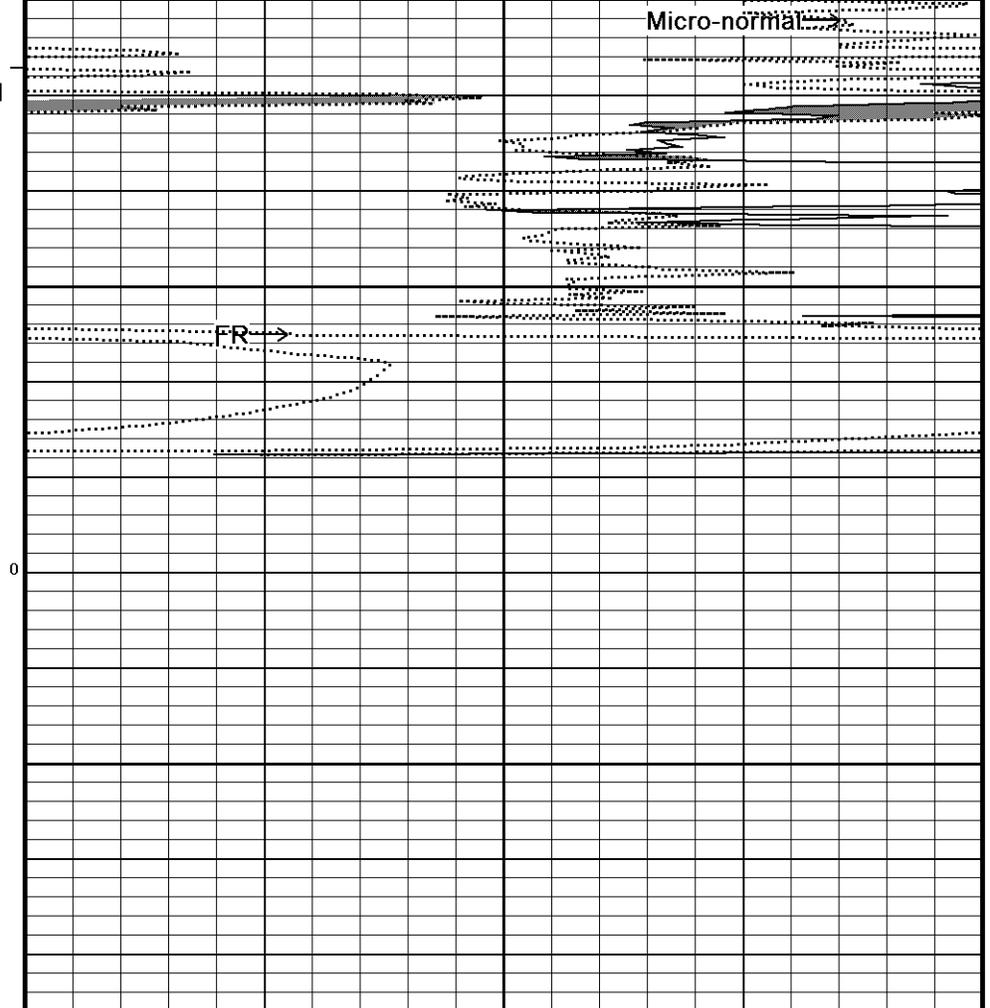
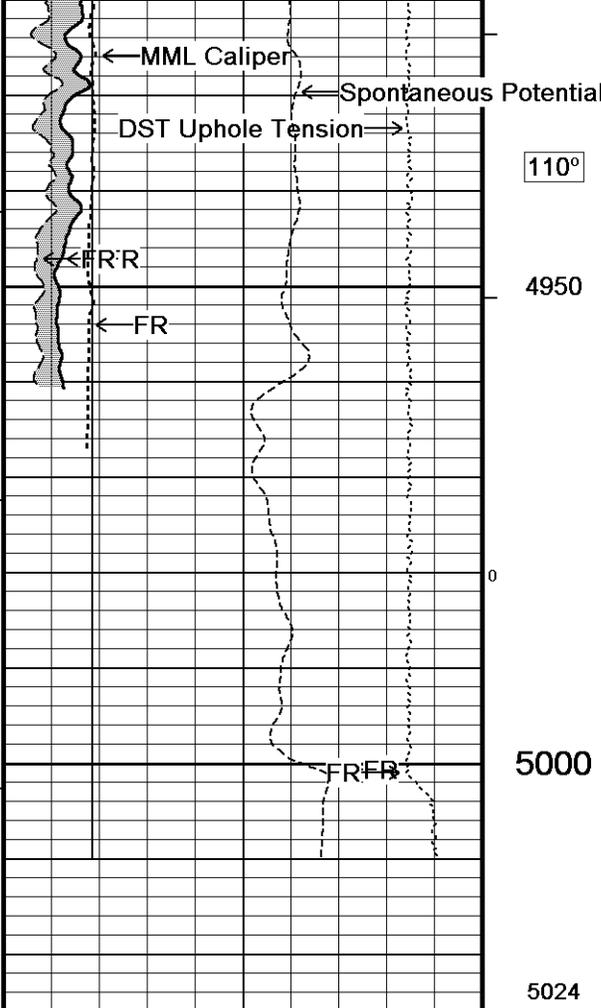




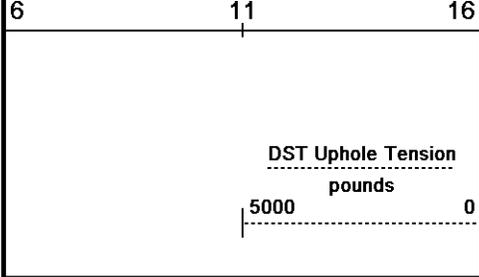








Borehole Temp in deg F  
 HVI every 10 cu ft  
 Annular Integral every 10 cu ft



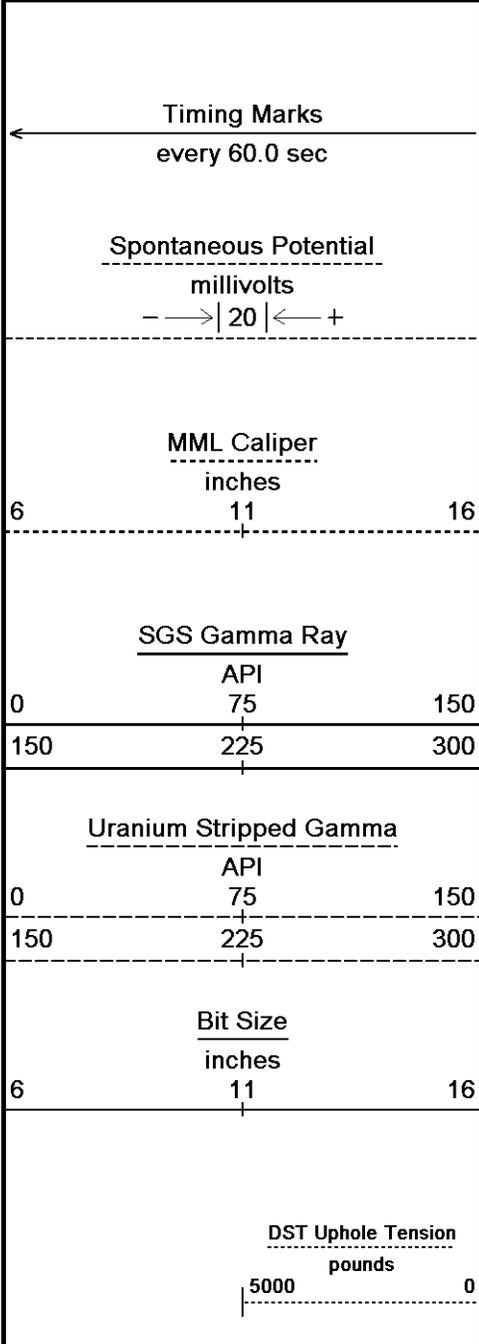
Replay  
Scale  
1:240

Depth Based Data - Maximum Sampling Increment 10.0cm Plotted on 27-SEP-2013 00:52  
 Filename: C:\Minimus 13.05.9583\Log\PetroSantander Od...\PetroSantander Odd Williams #6 MAIN.dta Recorded on 26-SEP-2013 21:18  
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↑ 5 INCH MAIN ↑

↓ REPEAT SECTION ↓

Depth Based Data - Maximum Sampling Increment 10.0cm Plotted on 27-SEP-2013 00:52  
 Filename: C:\Minimus 13.05.9583\Log\PetroSantander...\PetroSantander Odd Williams #6 REPEAT.dta Recorded on 26-SEP-2013 20:48  
 System Versions: Processed with 13.05.9583 Plotted with 13.05.9583



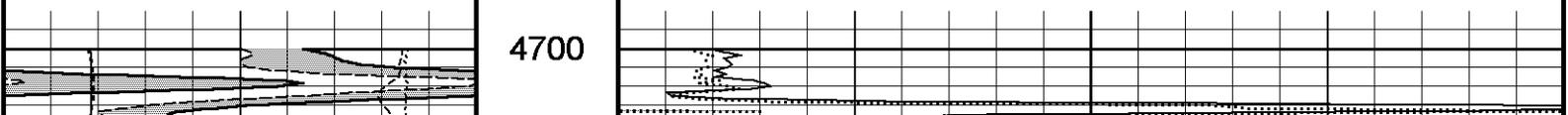
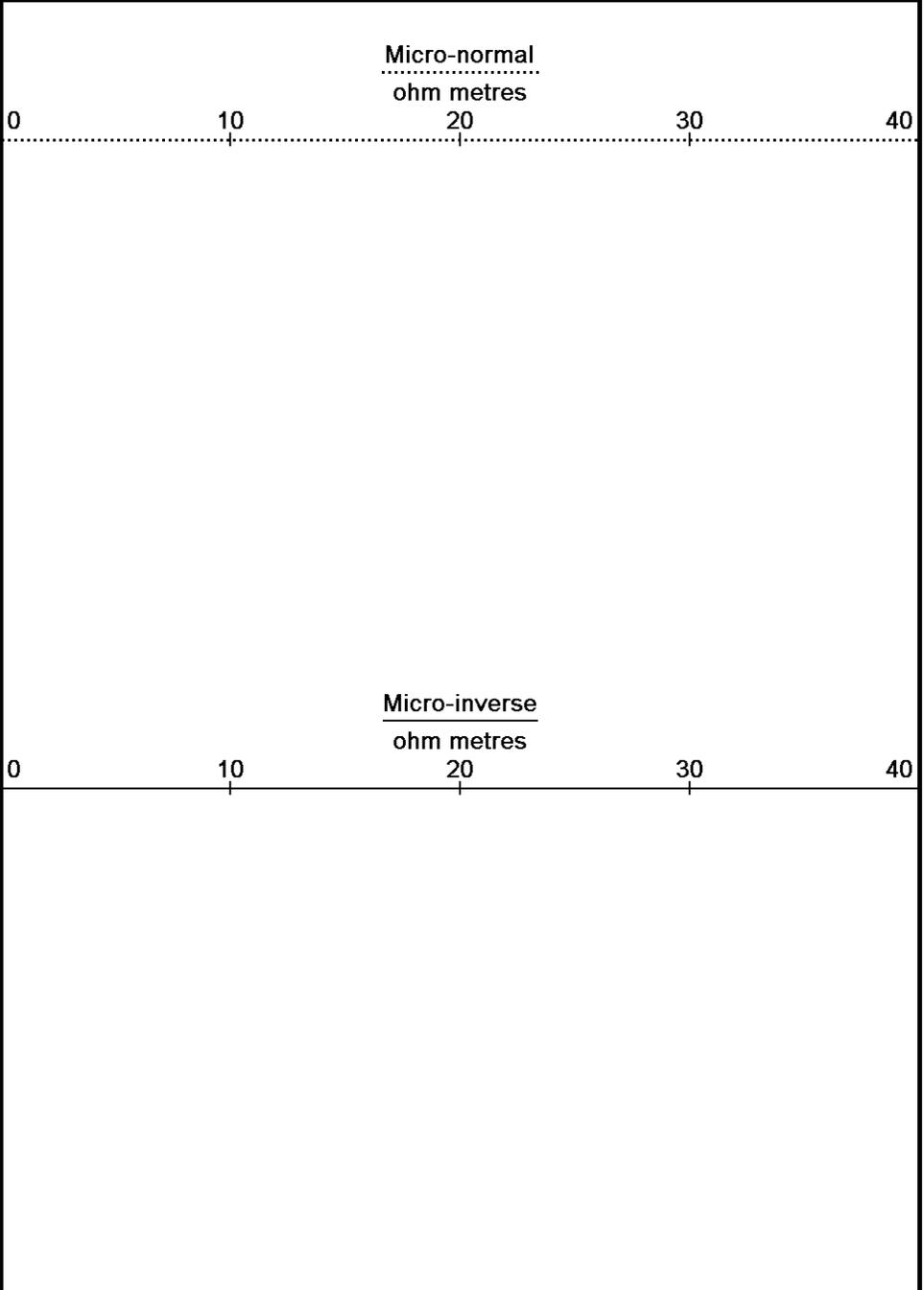
Depth  
in  
Feet

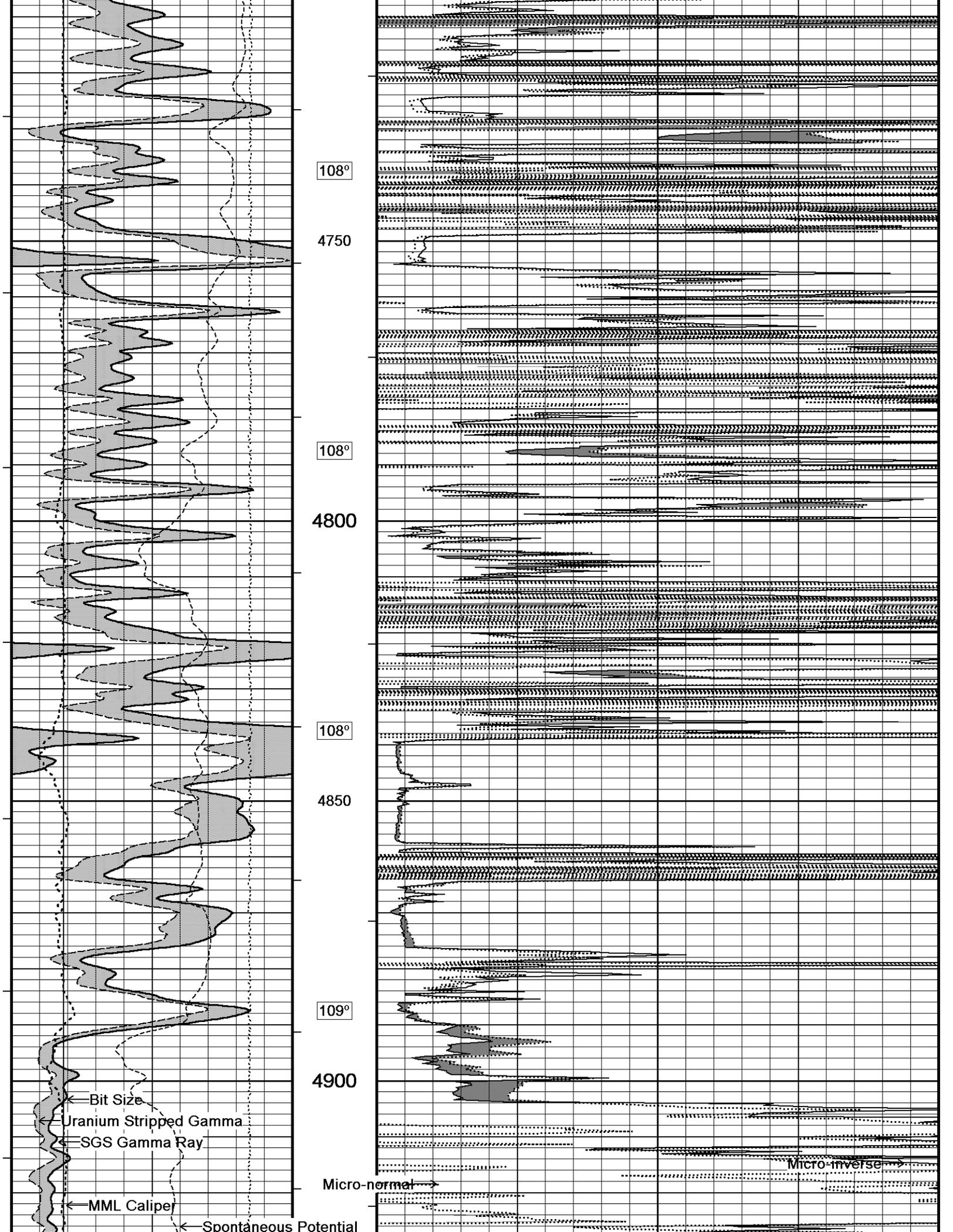
Borehole  
Temp in  
deg F

HVI  
every  
10 cu ft

Annular  
Integral  
every  
10 cu ft

Replay  
Scale  
1:240





108°

4750

108°

4800

108°

4850

109°

4900

Bit Size

Uranium Stripped Gamma

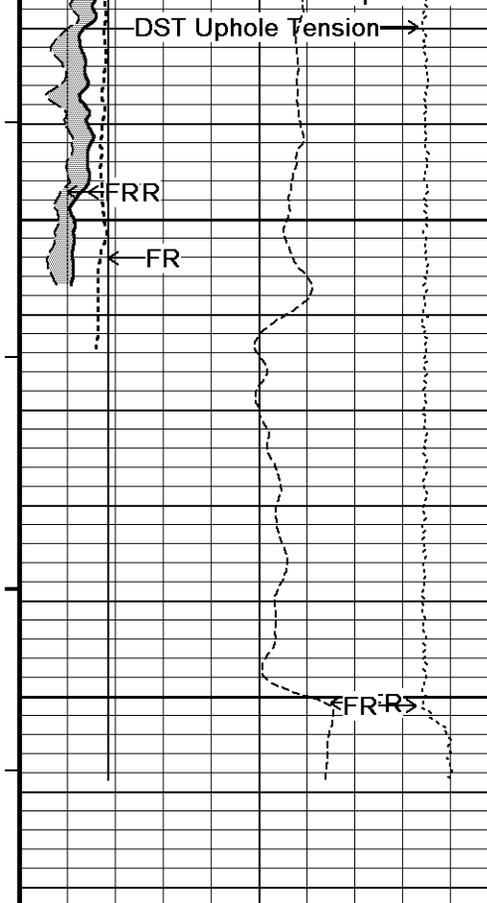
SGS Gamma Ray

MML Caliper

Spontaneous Potential

Micro-normal

Micro-inverse



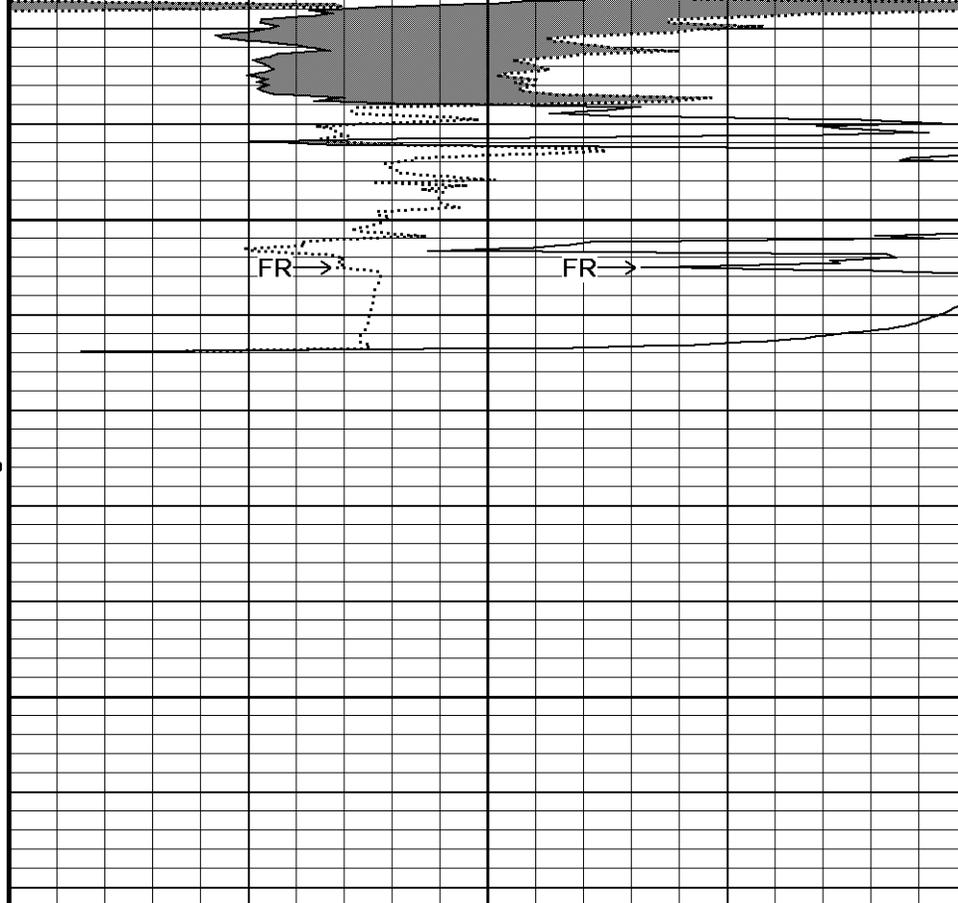
108°

4950

5000

5020

Depth  
in  
Feet



Timing Marks  
every 60.0 sec

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

MML Caliper  
inches

6 11 16

SGS Gamma Ray

API

0 75 150

150 225 300

Uranium Stripped Gamma

API

0 75 150

150 225 300

Bit Size  
inches

6 11 16

Borehole  
Temp in  
deg F

HVI  
every  
10 cu ft

Annular  
Integral  
every  
10 cu ft

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 27-SEP-2013 00:52  
 Filename: C:\Minimus 13.05.9583\Log\PetroSantander Odd Williams #6 REPEAT.dta Recorded on 26-SEP-2013 20:48  
 System Versions: Processed with 13.05.9583 Plotted with 13.05.9583

↑ REPEAT SECTION ↑

BEFORE SURVEY CALIBRATION

C:\Minimus 13.05.9583\Log\PetroSantander Odd Williams #6\PetroSantander Odd Williams #6 MAIN.dta

General Constants All 000 Last Edited on 26-SEP-2013,18:14

General Parameters

Mud Resistivity	0.620	ohm-metres
Mud Resistivity Temperature	91.000	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. Six Res Rt
RWA Constant A	1.000
RWA Constant M	2.000
SW/APOR Tool Source	0.000

High Resolution Temperature Calibration MCG-D.K 469 Field Calibration on 18-AUG-2013,02:35

	Measured	Calibrated(Deg F)
Lower	50.00	50.00
Upper	100.00	100.00

High Resolution Temperature Constants MCG-D.K 469 Last Edited on 18-AUG-2013,02:35

Pre-filter Length	11
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Caliper Calibration MML-A 3 Base Calibration on 15-AUG-2013 08:50  
Field Calibration on 24-SEP-2013 02:46

Base Calibration

Reading No	Measured	Calibrator Size (in)
1	14887	5.98
2	18120	7.97
3	21042	9.86
4	25322	11.92
5	0	0.00
6	N/A	N/A

Field Calibration

Measured Caliper (in)	Actual Caliper (in)
6.02	5.98

Micro Normal and Micro Inverse Calibration MML-A 3 Base Calibration on 15-AUG-2013 09:16  
Field Check on 24-SEP-2013 02:48

Base Calibration

Channel	Measured		Calibrated (ohm-m)	
	Resistor 1	Resistor 2	Resistor 1	Resistor 2
Micro Normal	12.3	60.3	5.0	25.0
Micro Inverse	15.7	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 3

Last Edited on 24-SEP-2013,02:46

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

Caliper Calibration MPD-B 64

Base Calibration on 15-AUG-2013 14:54  
 Field Calibration on 24-SEP-2013 02:31

Base Calibration

Reading No	Measured	Calibrator Size (in)
1	16560	3.99
2	24992	5.98
3	32880	7.97
4	41184	9.86
5	50688	11.92
6	N/A	N/A

Field Calibration

Measured Caliper (in)	Actual Caliper (in)
5.83	5.98

Spectral Gamma Calibration SGS-E.J 150

Base Calibration on 19-APR-2013,17:21  
 Field Calibration on 19-APR-2013,17:21

Base Calibration

Potassium Calibrator

	Gate 1	Gate 2	Gate 3	Gate 4	Gate 5
Background	79.9	23.1	2.2	0.8	1.4
Calibrator (Gross)	204.7	109.8	22.0	0.9	1.3
Calibrator (Net)	124.8	86.7	19.7	0.2	-0.1

Concentrations

K %	U ppm	Th ppm
5.8	0.0	0.0

Uranium Calibrator

	Gate 1	Gate 2	Gate 3	Gate 4	Gate 5
Background	79.9	23.1	2.2	0.8	1.4
Calibrator (Gross)	480.7	164.8	14.5	7.2	4.1
Calibrator (Net)	400.8	141.7	12.3	6.5	2.7

Concentrations

K %	U ppm	Th ppm
0.0	9.8	0.0

Thorium Calibrator

	Gate 1	Gate 2	Gate 3	Gate 4	Gate 5
Background	79.9	23.1	2.2	0.8	1.4
Calibrator (Gross)	397.7	137.8	11.3	6.3	15.0
Calibrator (Net)	317.8	114.7	9.0	5.6	13.6

Concentrations

K %	U ppm	Th ppm
0.0	0.0	44.3

Mixture Calibrator

	Gate 1	Gate 2	Gate 3	Gate 4	Gate 5
Background	79.9	23.1	2.2	0.8	1.4
Calibrator (Gross)	914.0	361.7	43.2	12.9	17.8
Calibrator (Net)	834.0	338.5	41.0	12.1	16.4

Field Calibration

Gamma Ray

	Measured	Calibrated (API)
Background	112	23
Calibrator (Gross)	1354	273
Calibrator (Net)	1242	250

Mixture Calibrator

	Gate 1	Gate 2	Gate 3	Gate 4	Gate 5
Background	79.9	23.1	2.2	0.8	1.4
Calibrator (Gross)	914.0	361.7	43.2	12.9	17.8
Calibrator (Net)	834.0	338.5	41.0	12.1	16.4

Calibrator (Gross)	914.0	361.7	43.2	12.9	17.8
Calibrator (Net)	834.0	338.5	41.0	12.1	16.4

Spectral Gamma Constants SGS-E.J 150

Last Edited on 03-SEP-2013,10:47

Background Calibrator Number	0	
Mixture Calibrator Number	147-1	
Potassium Calibrator Number	148-1	
Uranium Calibrator Number	150-1	
Thorium Calibrator Number	149-1	
Mud Density	1.09	gm/cc
Caliper Source for Processing	Density Caliper	
Tool Position	Eccentred	
Concentration of KCl		kppm
K Mud Type	Chloride	
K Mud Concentration	0.00	%

DOWNHOLE EQUIPMENT

C:\Minimus 13.05.9583\Log\PetroSantander Odd Williams #6\PetroSantander Odd Williams #6 MAIN.dta

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

Compact Comms Gamma  
MCG-D.K 469 LG: 8.70 ft WT: 63.9 lb OD: 2.24 in

Spectral Gamma Ray Sub  
SGS-E.J 150 LG: 7.78 ft WT: 105.8 lb OD: 3.54 in

Compact Micro-log  
MML-A 3 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

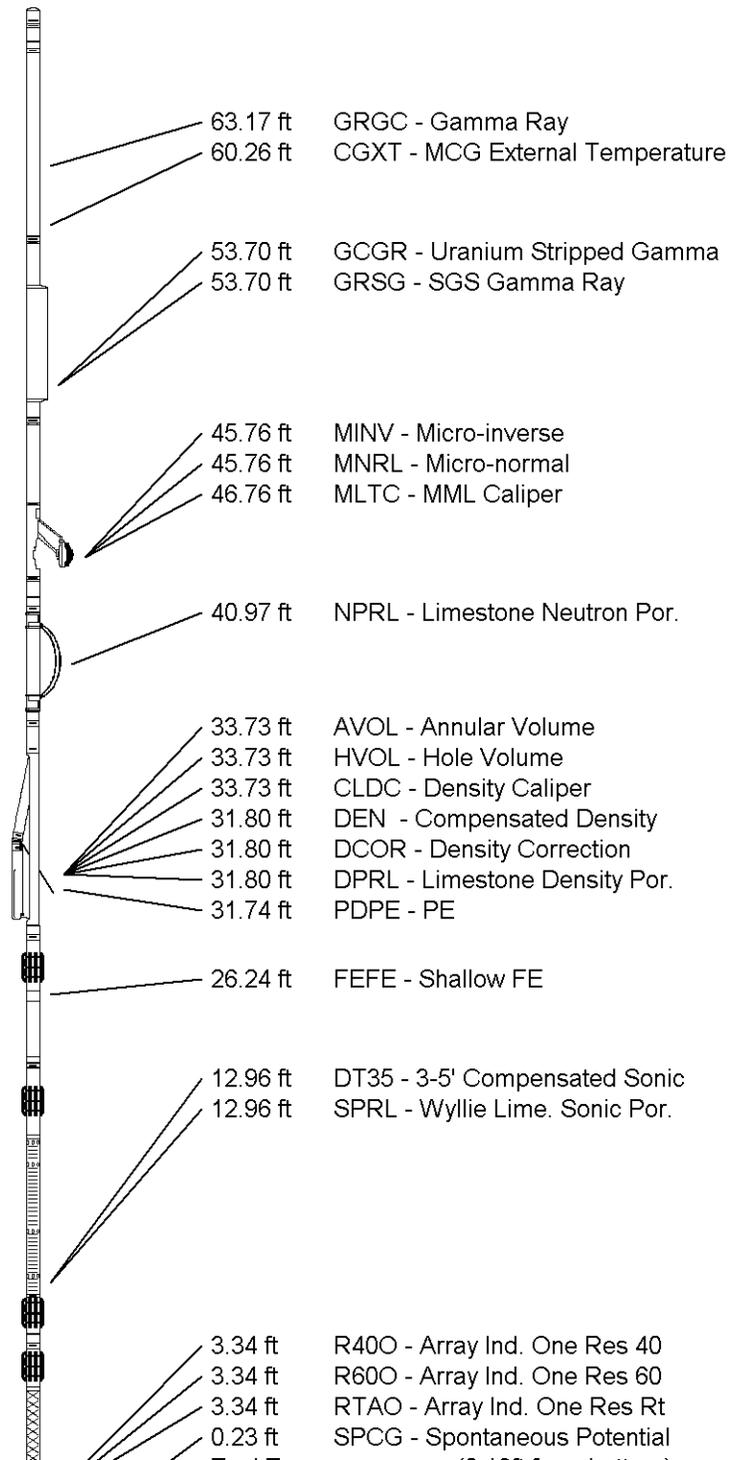
Compact Density/Caliper  
MPD-B 64 LG: 9.59 ft WT: 90.4 lb OD: 2.45 in

Compact Focussed Electric  
MFE-B.J 353 LG: 6.05 ft WT: 48.5 lb OD: 2.24 in

Compact Sonic  
MSS-C.K 330 LG: 12.52 ft WT: 72.8 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: 70.03 ft Weight: 577.6 lb




 Tool Zero (0.13ft from bottom)  
 -0.13 ft SMTU - DSI Upward Tension  
 All measurements relative to tool zero.

COMPANY	PETROSANTANDER (USA) INC.
WELL	ODD WILLIAMS #6
FIELD	CHRISTABELLE
PROVINCE/COUNTY	KEARNY
COUNTRY/STATE	UNITED STATES / KANSAS

Elevation Kelly Bushing	4004.00	feet	First Reading	4954.00	feet
Elevation Drill Floor	4002.00	feet	Depth Driller	5000.00	feet
Elevation Ground Level	3092.00	feet	Depth Logger	5001.00	feet



**Weatherford**<sup>®</sup>

MICRORESISTIVITY LOG