



**Weatherford**

**MICRORESISTIVITY LOG**

COMPANY

MURFIN DRILLING COMPANY, INC.

WELL

COLUMBINE #8-24

FIELD

WILDCAT

PROVINCE/COUNTY LINCOLN

COUNTRY/STATE

U.S.A. / COLORADO

LOCATION

2040' FNL & 600' FEL

SEC 24

TWP 9S

RGE 56W

Other Services

Latitude

MAI/MFE

MSS

MSS

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Elevations:  
KB 5393.00  
DF 5391.00  
GL 5380.00

**BOREHOLE RECORD**

Last Edited: 15-NOV-2018 20:38

Bit Size  
inches

7.875

Depth From  
feet

455.00

Depth To  
feet

8574.00

**CASING RECORD**

Type

Size  
inches

8.625

Depth From  
feet

0.00

Shoe Depth  
feet

455.00

Weight  
pounds/ft

24.00

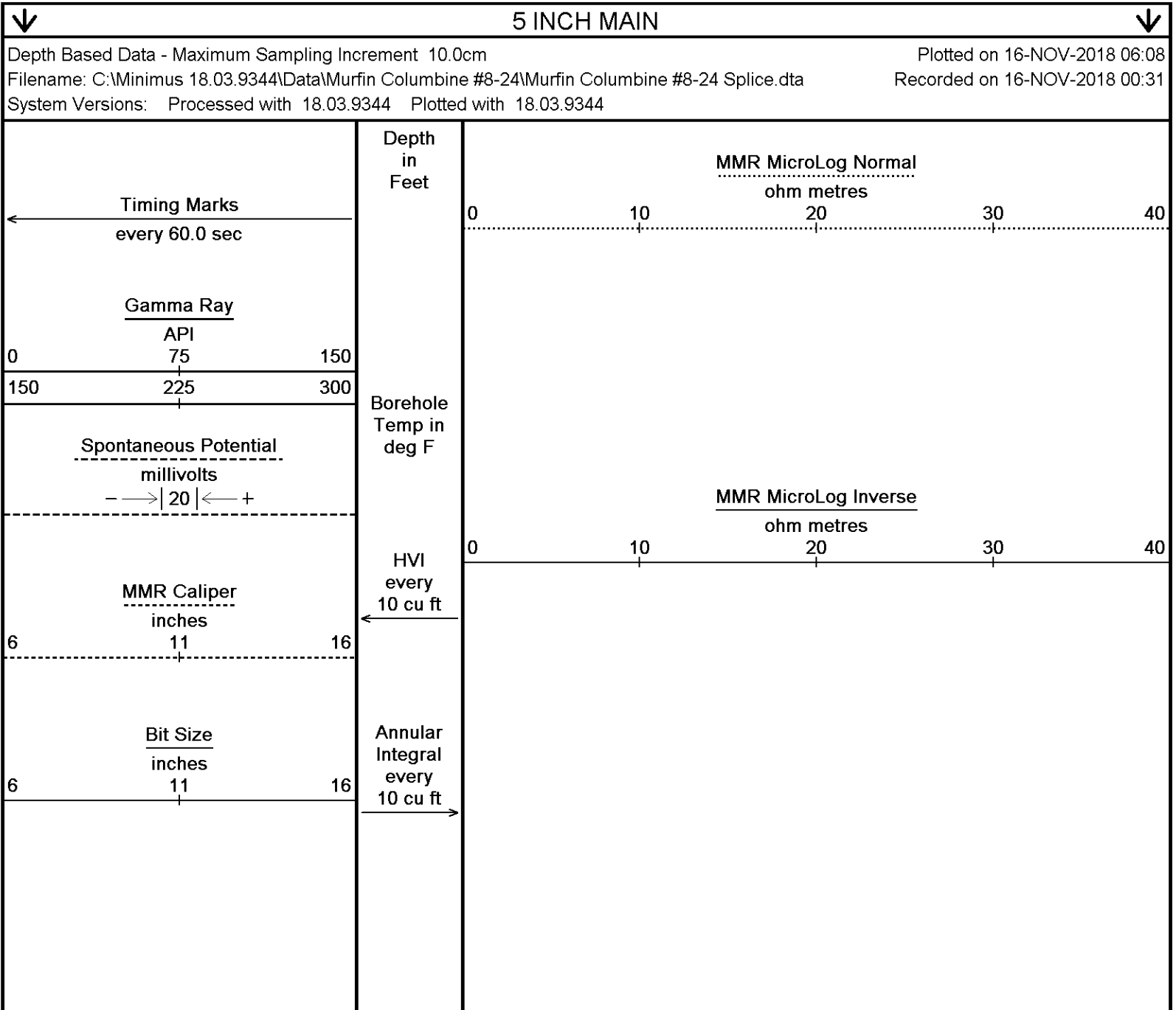
**REMARKS**

- SOFTWARE ISSUE: WLS 18.03.9344.
- 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: 4041 CU.FT.
- ANNULAR HOLE VOLUME WITH 5.5 INCH PRODUCTION CASING FROM TD TO 4200 FEET: 913 CU.FT.

- RIG: MURFIN #25.
- ENGINEER: A. SILL.
- OPERATOR: B. TOVAR, B. COPELAND.

\*\*\*\* CALIPERS WERE CLOSED BETWEEN 5725 FEET AND 5900 FEET AS PER CUSTOMER'S REQUEST, DUE TO HOLE CONDITIONS THROUGH THAT INTERVAL. TOOL READINGS MAY NOT BE ACCURATE THOUGH THIS INTERVAL. \*\*\*\*

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.



DST Uphole Tension  
pounds  
5000 0

Replay  
Scale  
1:240

4200

1600

137°

4250

900

138°

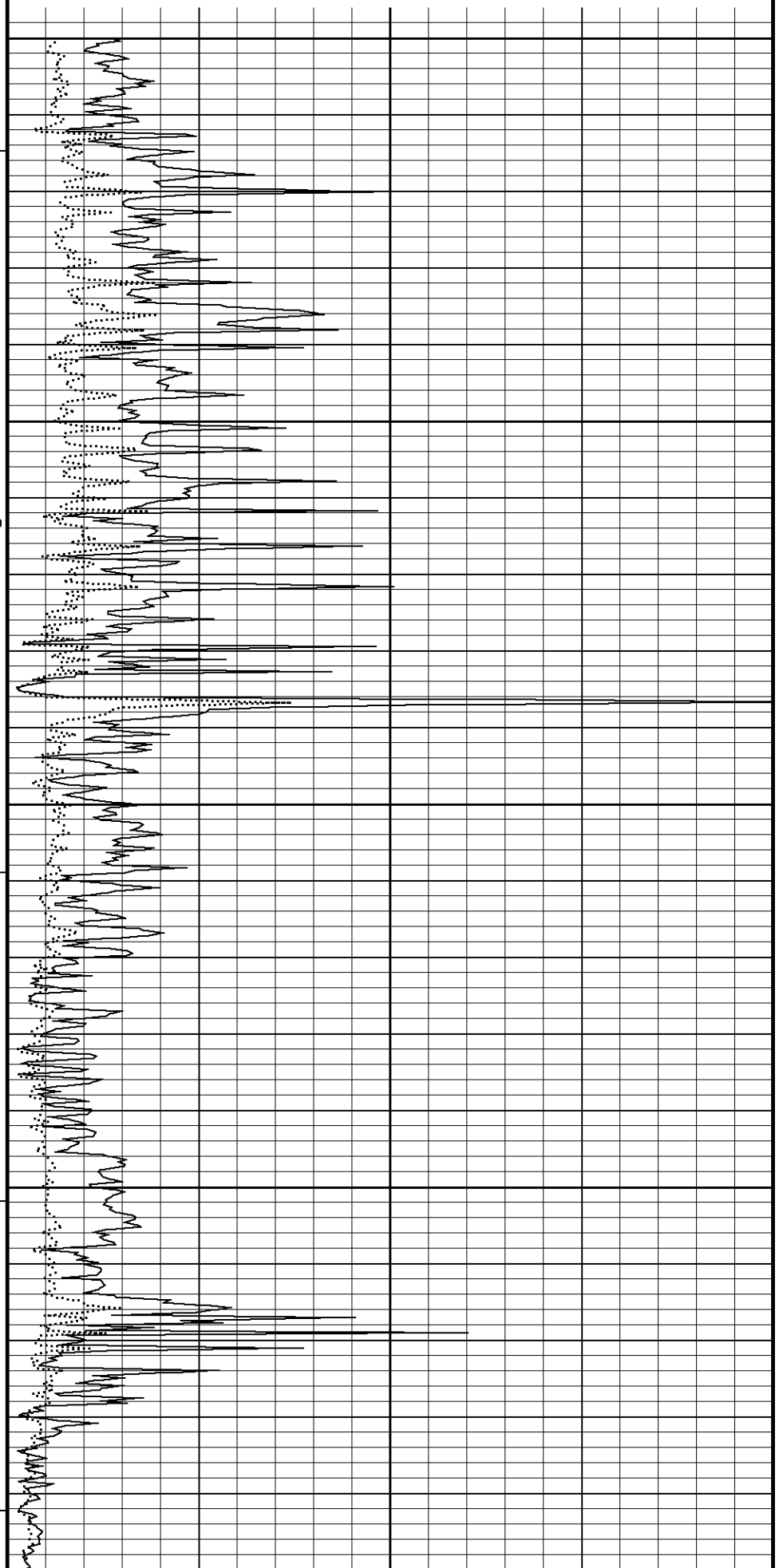
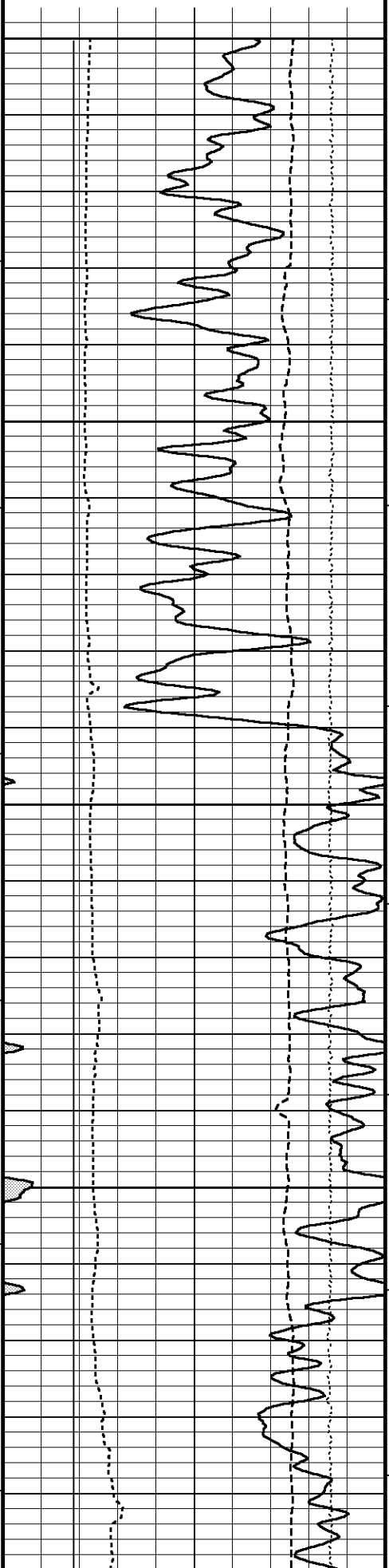
4300

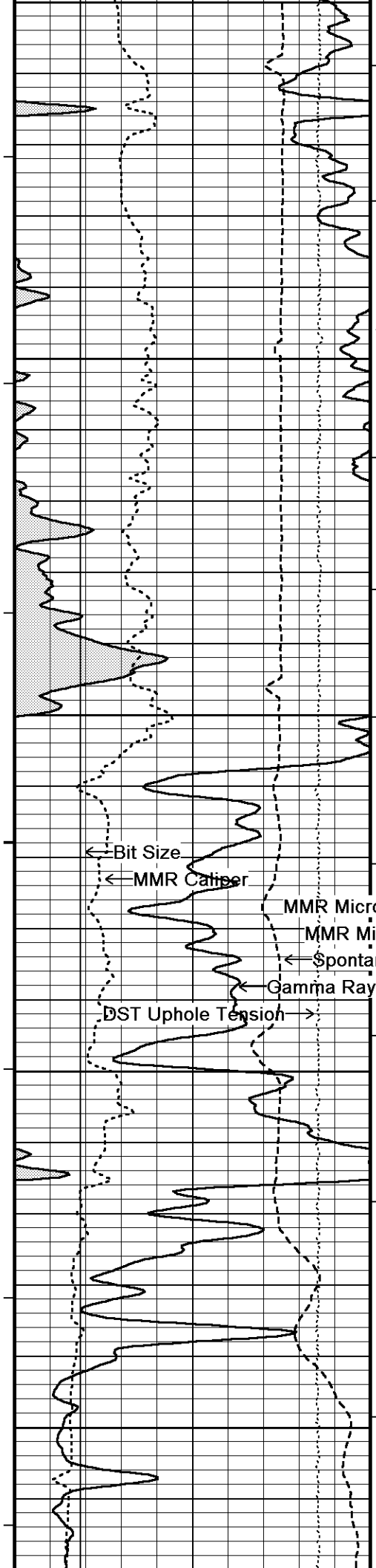
138°

4350

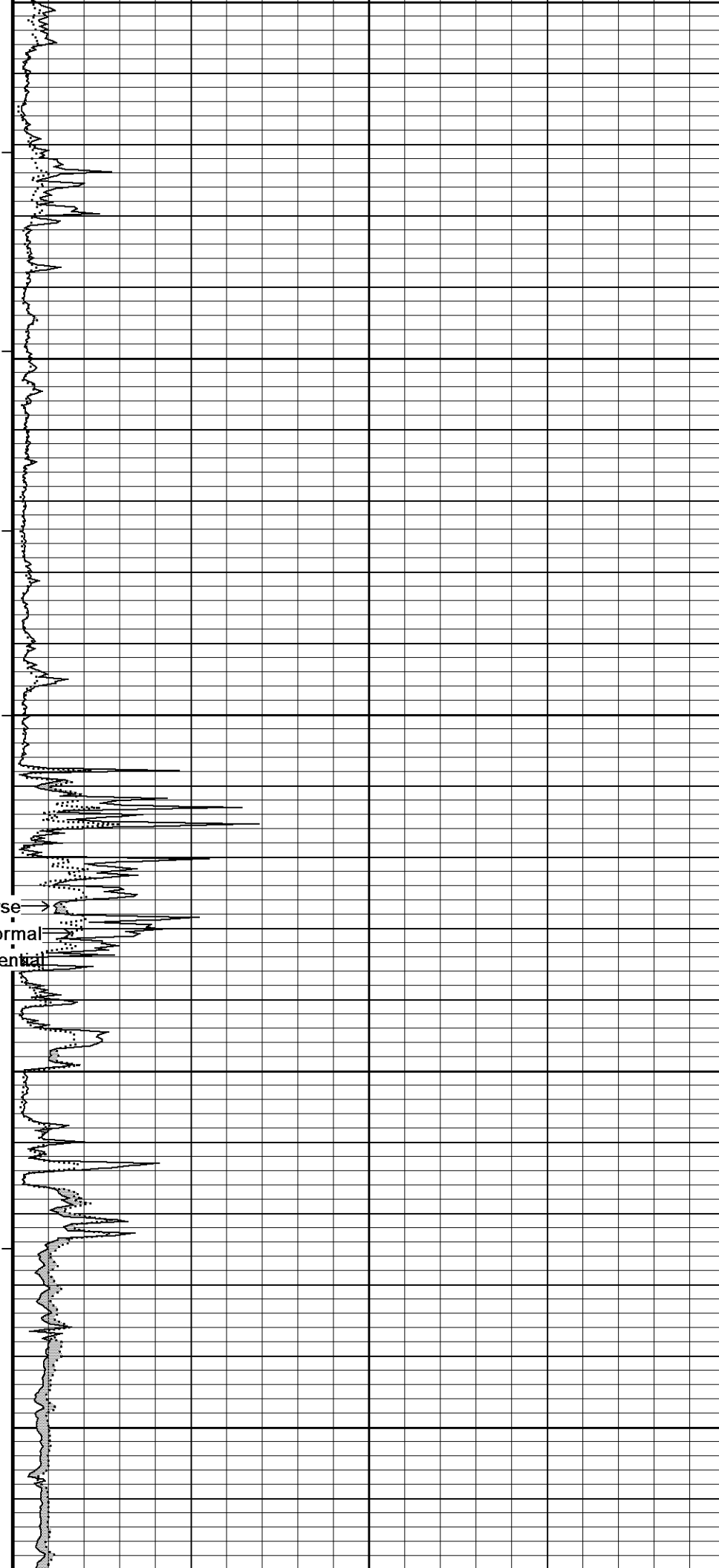
139°

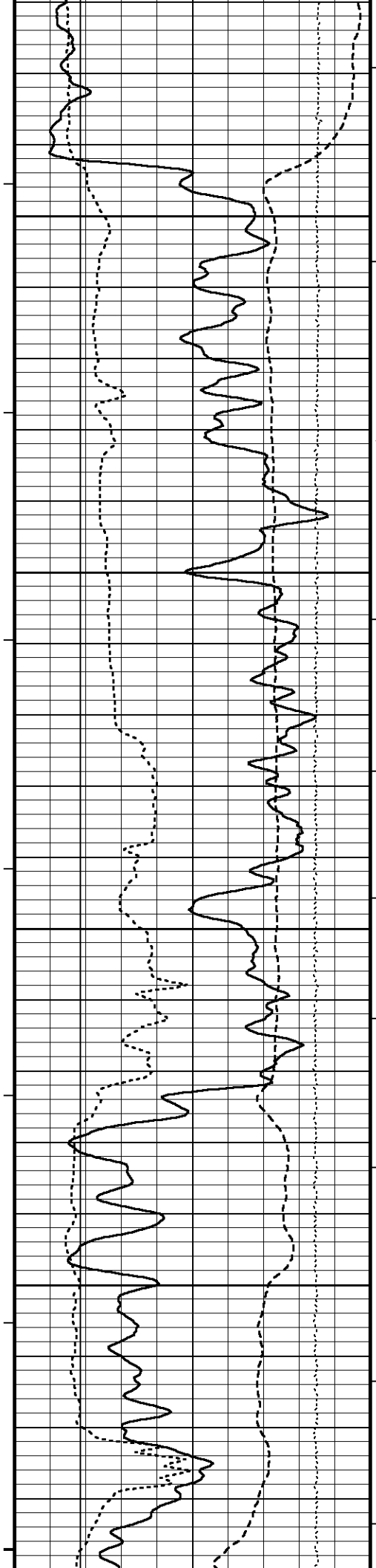
4400





4400  
139°  
1500  
4450  
140°  
4500  
141°  
4550  
141°  
4600





142° 800

4650

1400

143°

4700

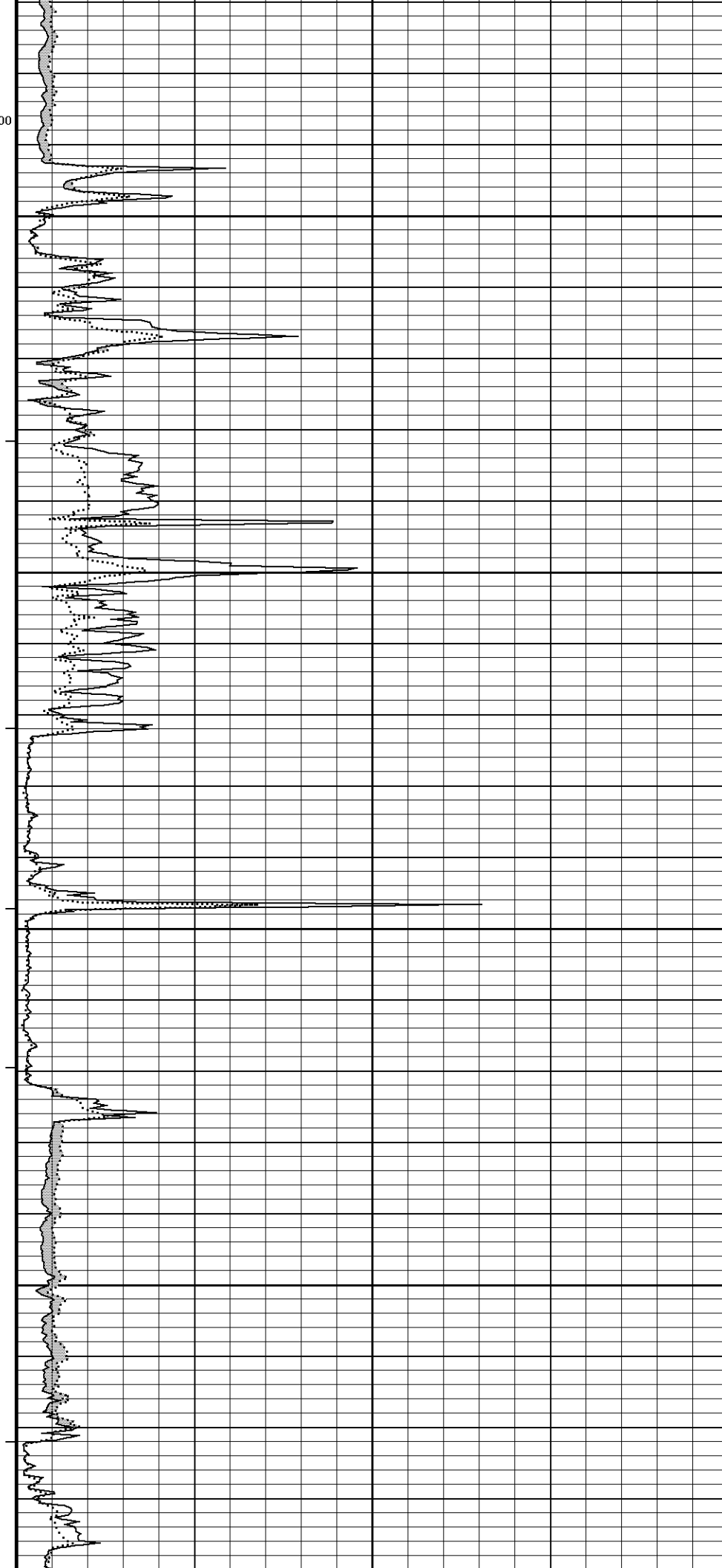
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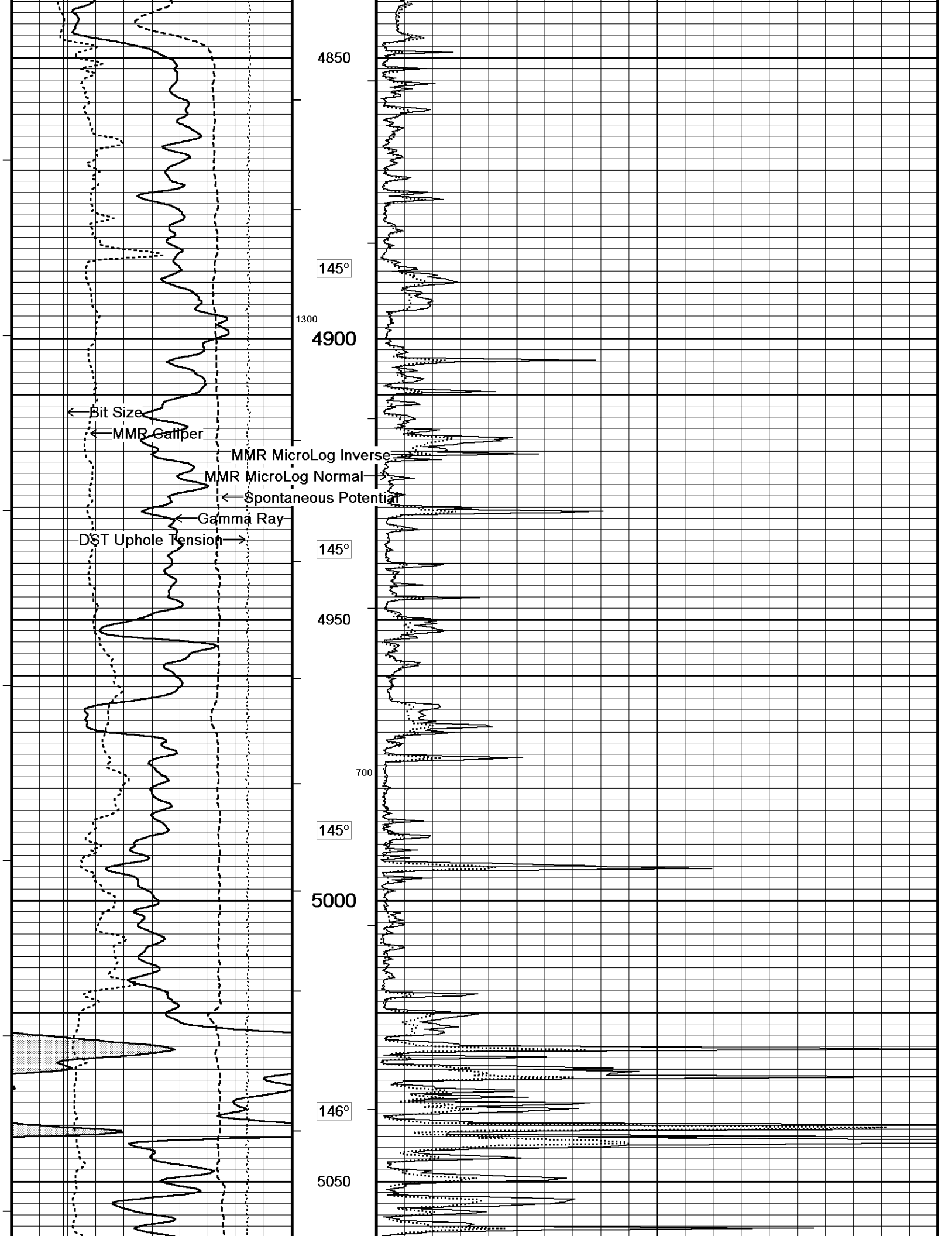
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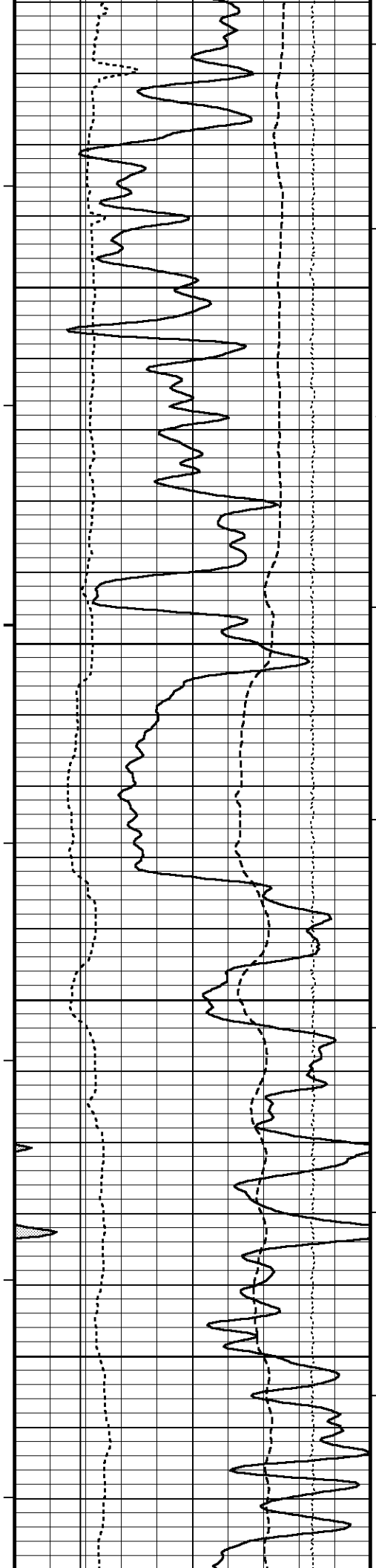
144°

4800

144°







147°

5100

1200

148°

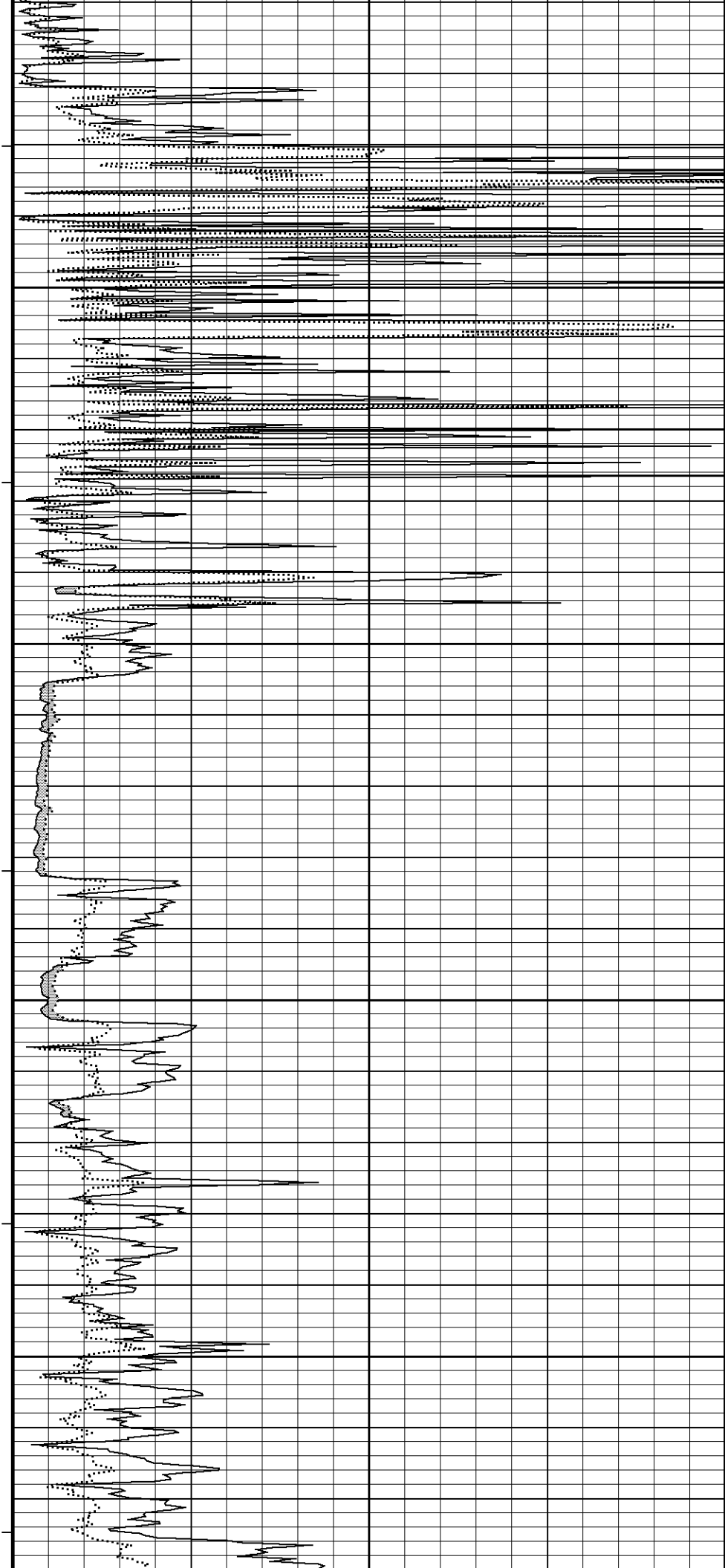
5150

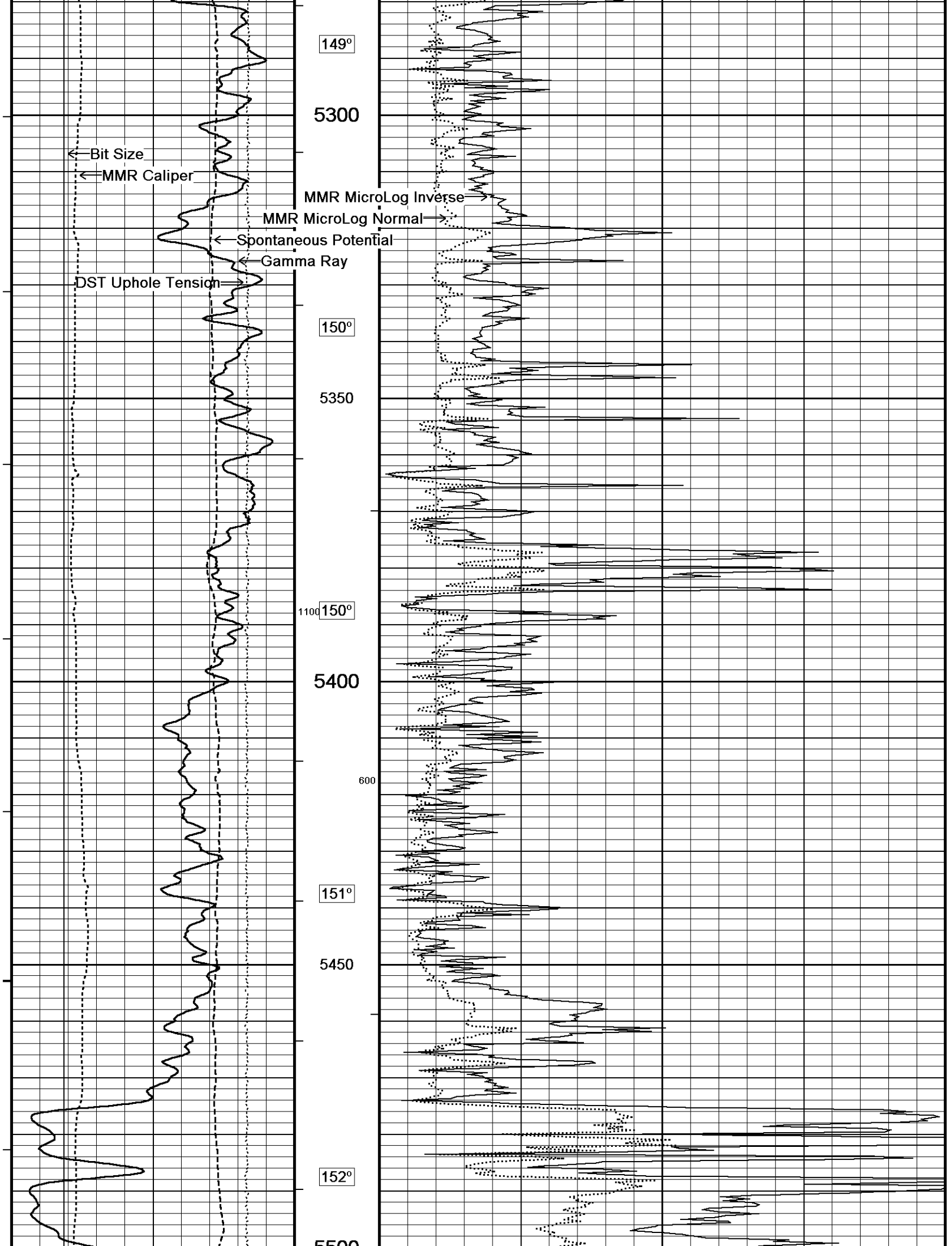
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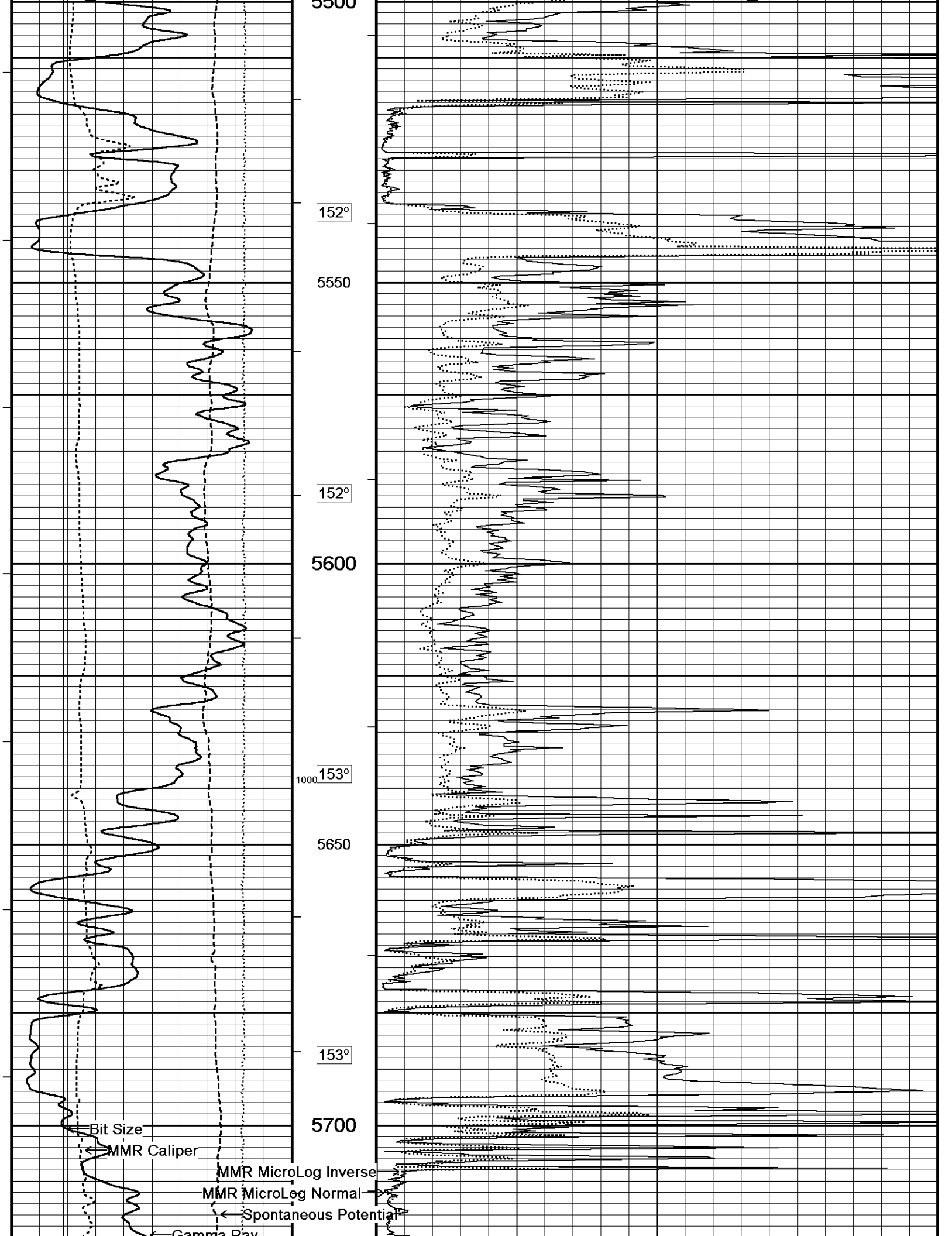
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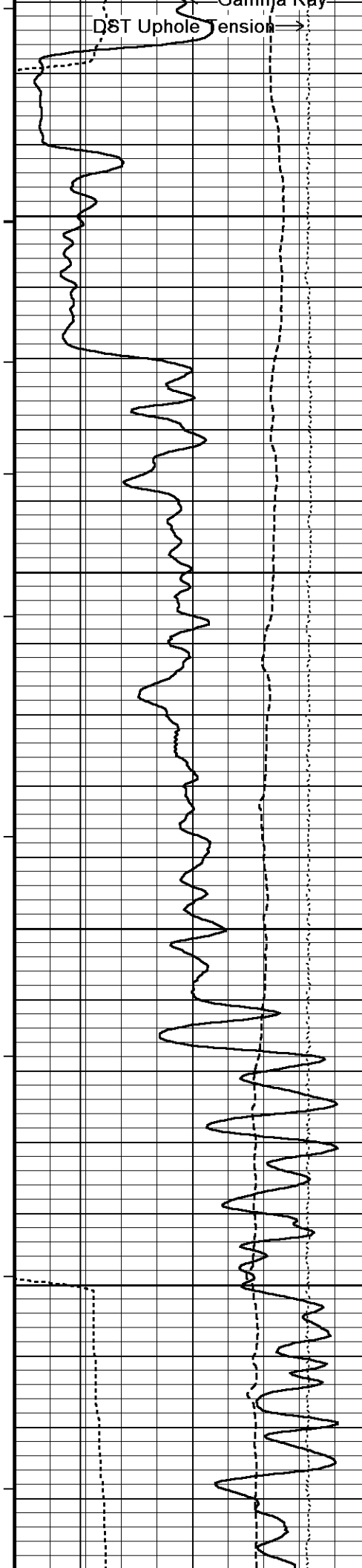
149°

5250









153°

5750

154°

5800

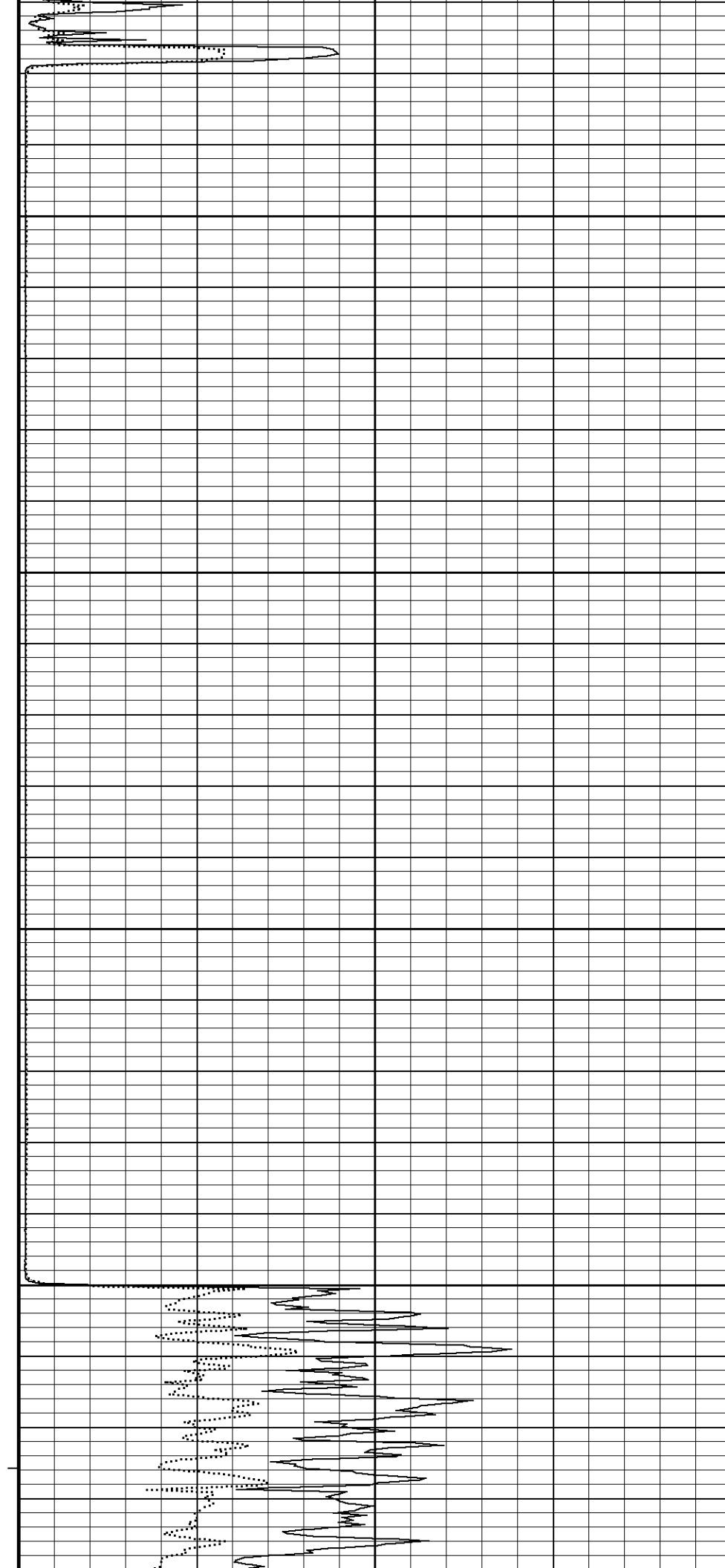
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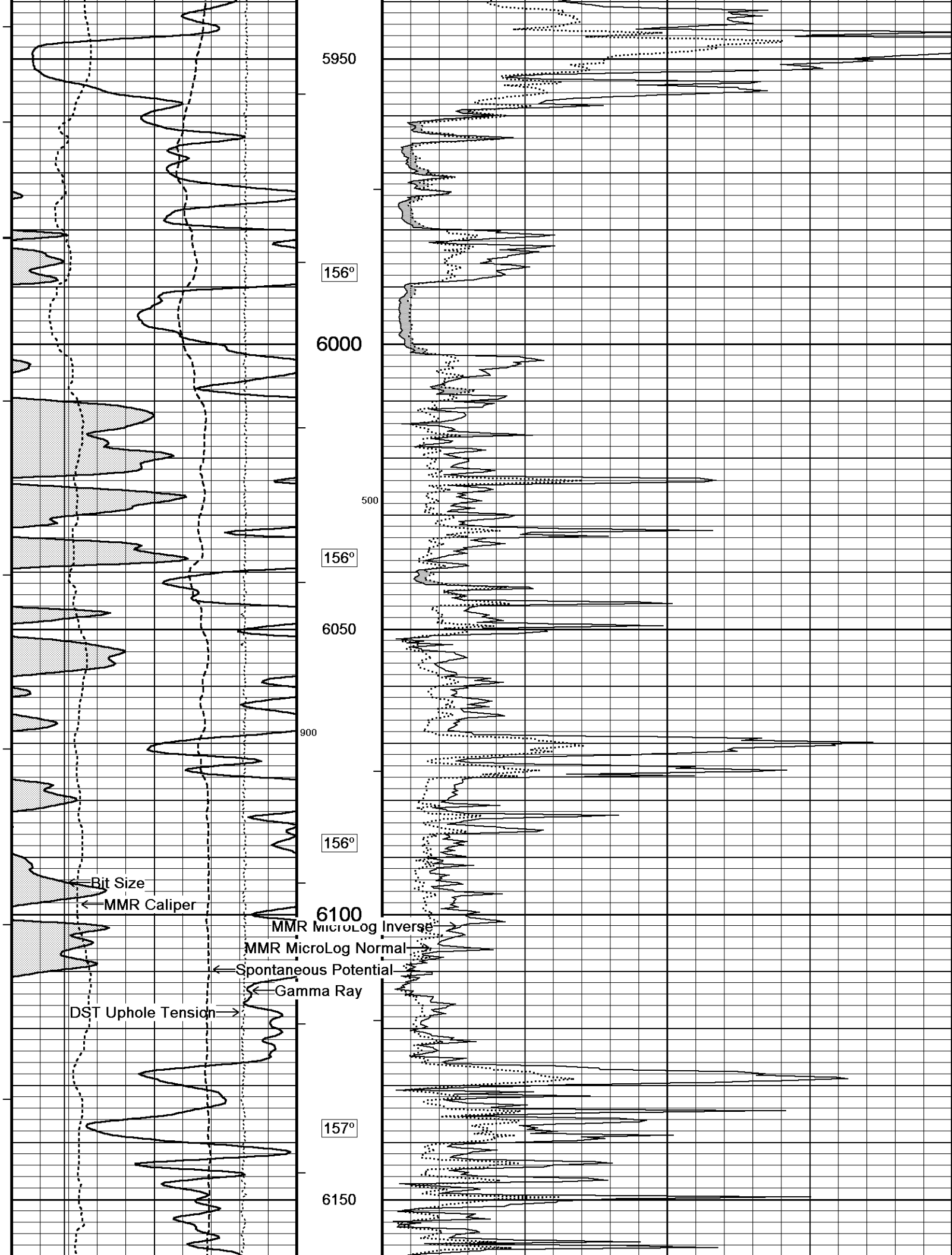
5850

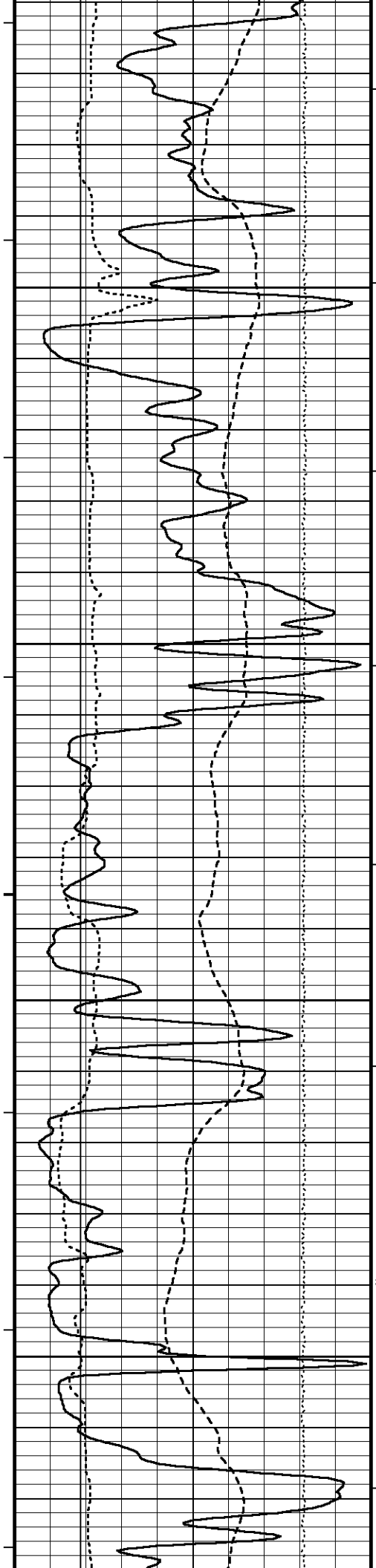
156°

5900

156°







158°

6200

158°

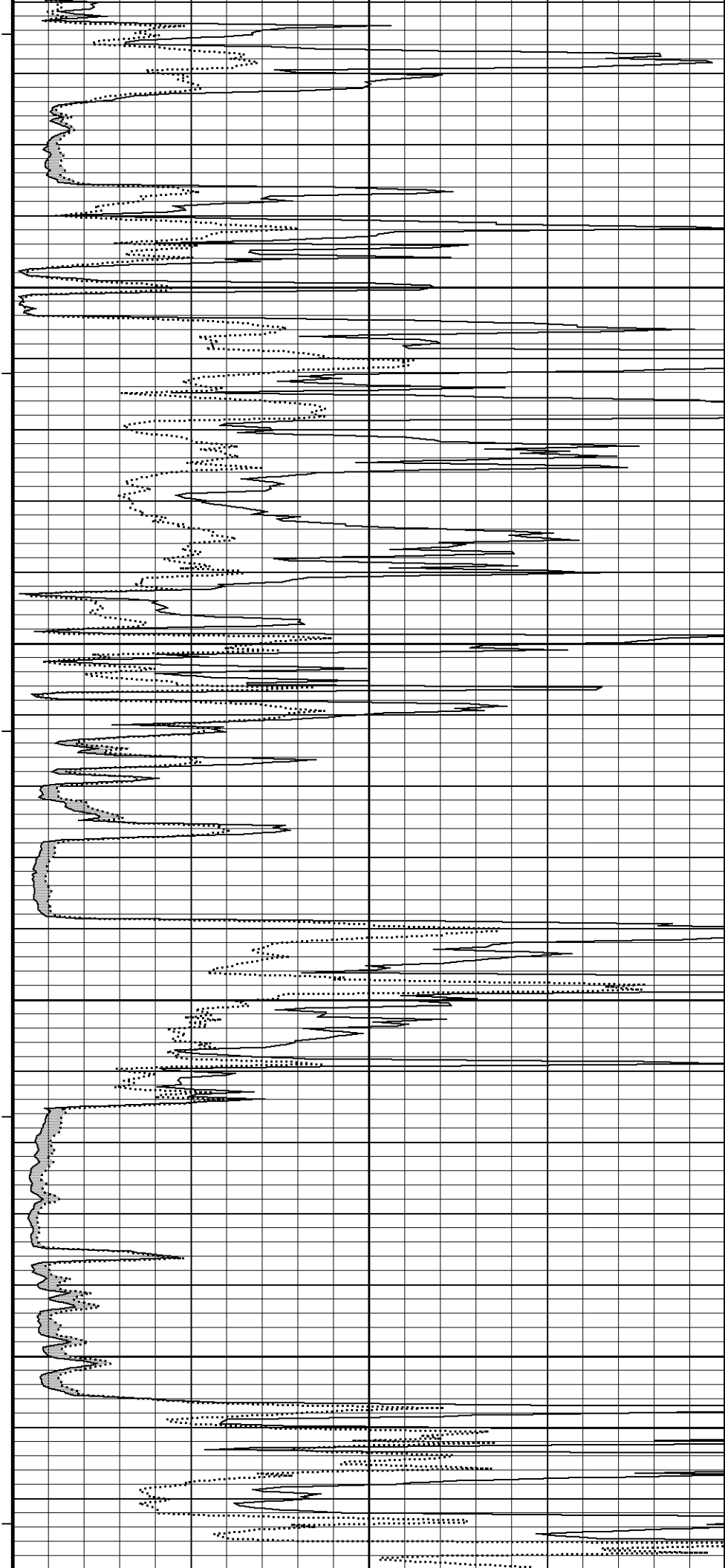
6250

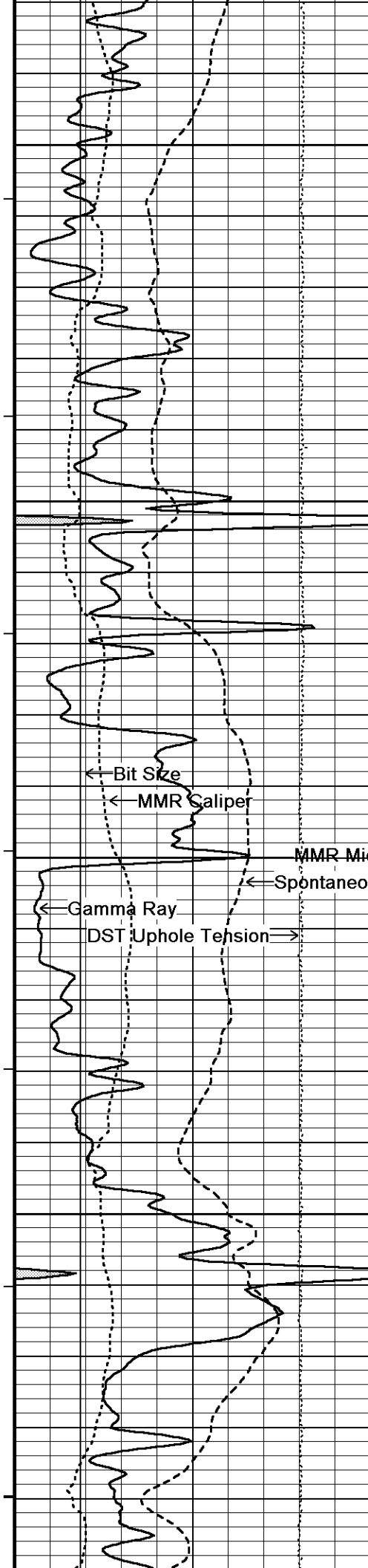
159°

6300

159°  
800

6350





159°

6400

160°

6450

160°

6500

161°

6550

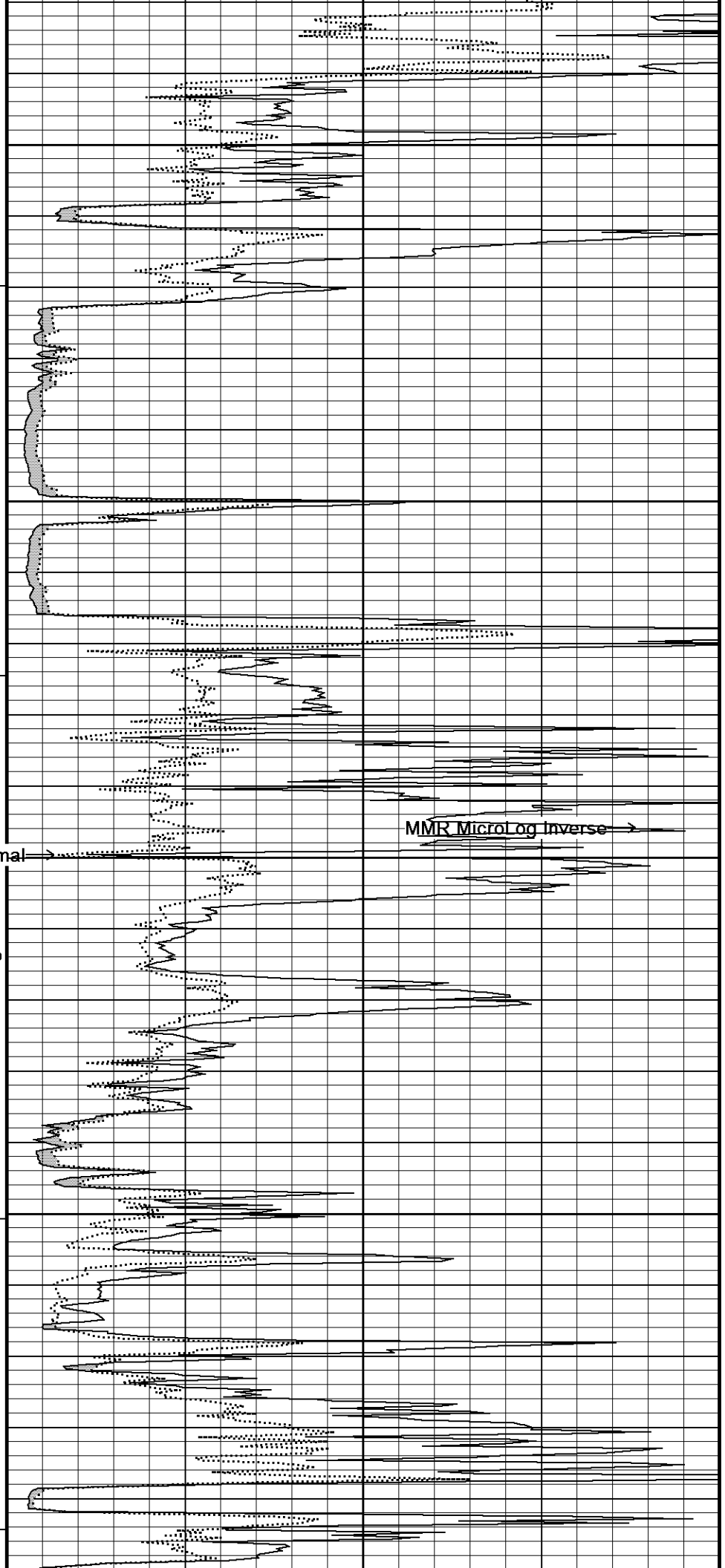
161°

6600

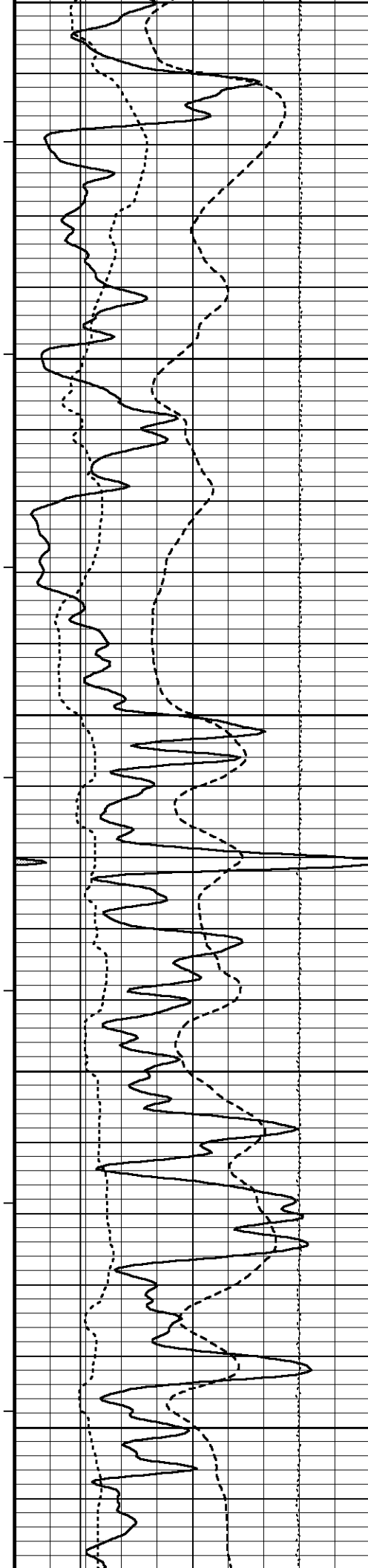
← Bit Size  
← MMR Saliper

MMR Microformal  
← Spontaneous Potential

← Gamma Ray  
DST Uphole Tension →



MMR Microlog Inverse →



6600

161°

6650

162°

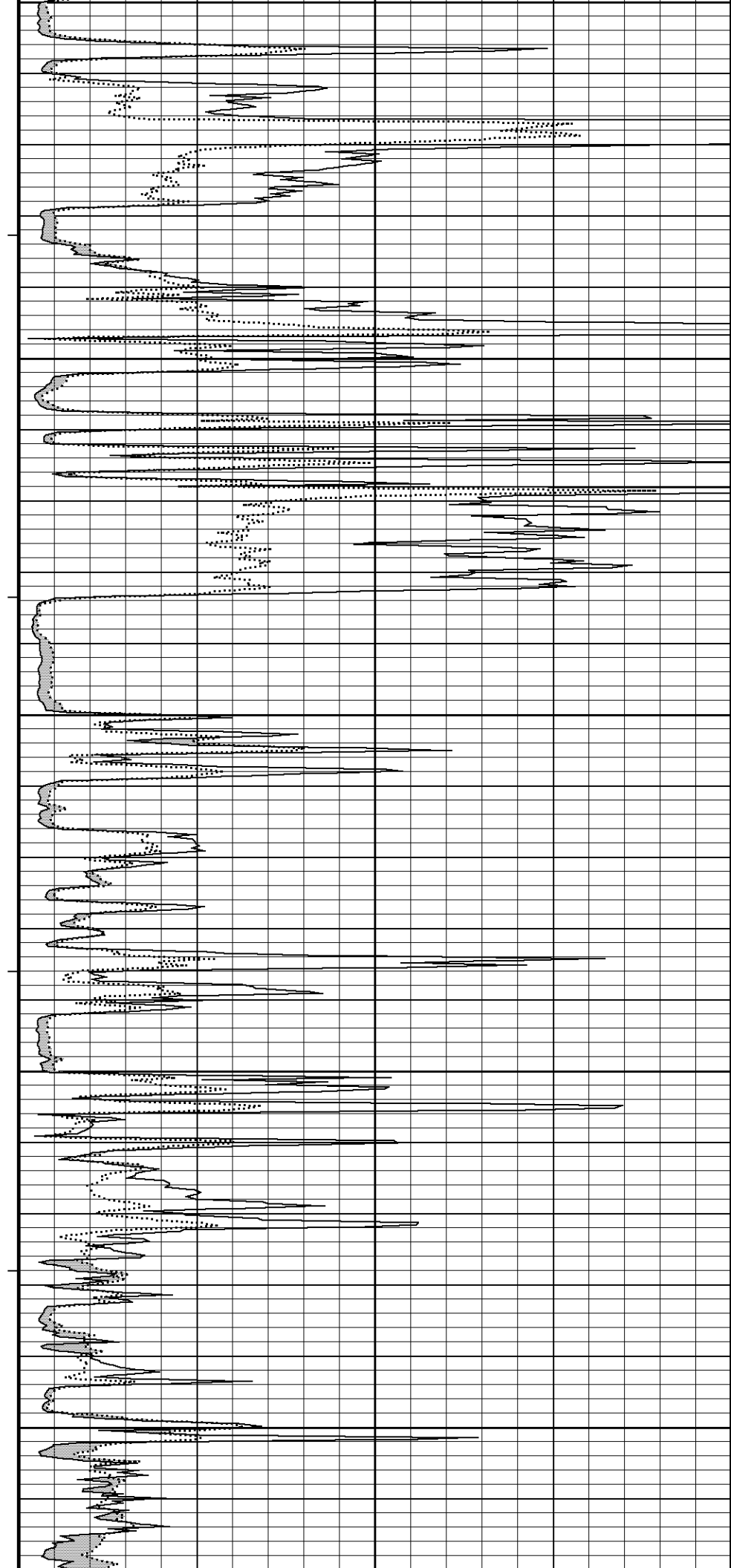
6700

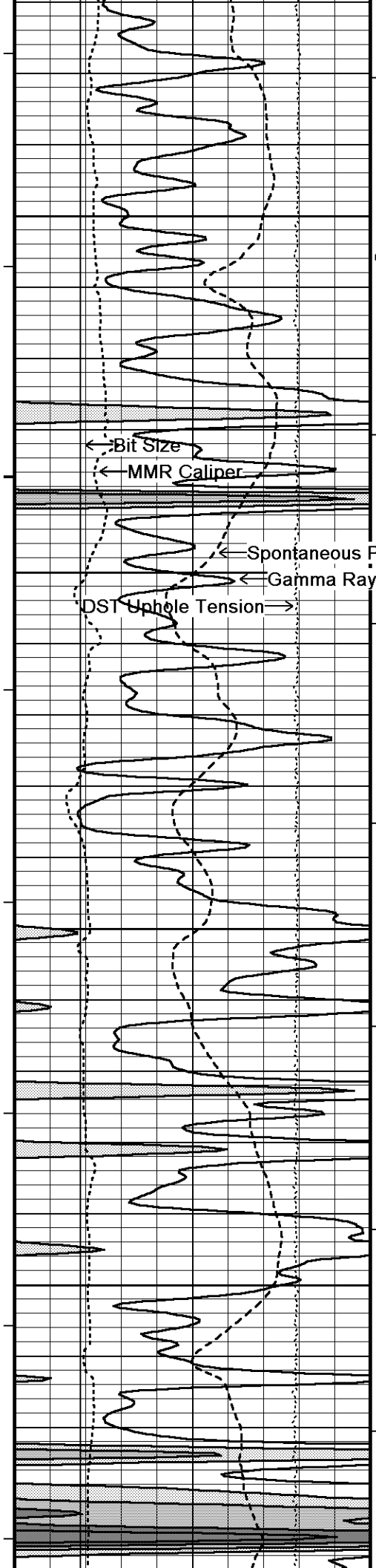
162°

6750

162°

6800





162°

6850

600

163°

MMR MicroLog Normal

6900

164°

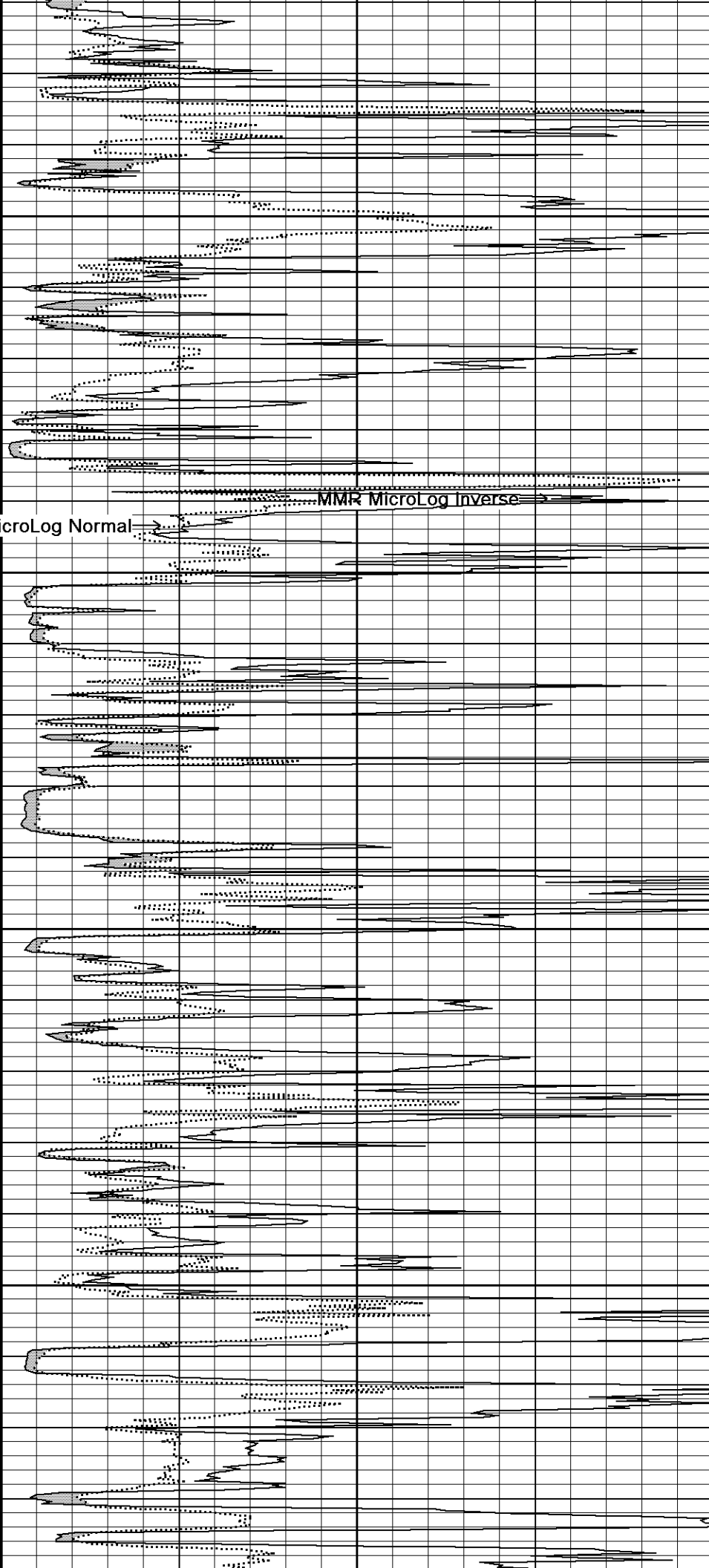
6950

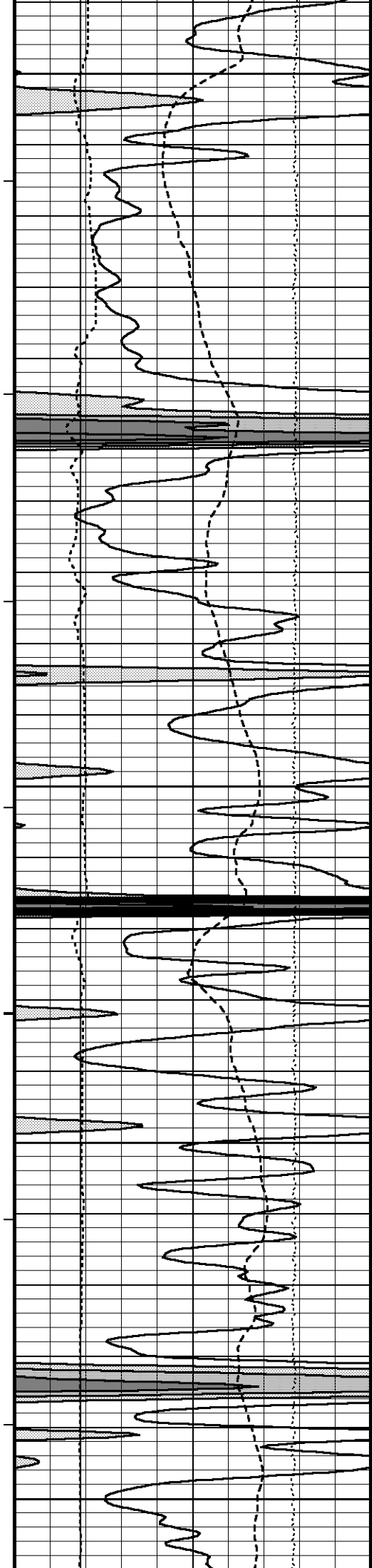
300

164°

7000

164°





7050

165°

7100

500 166°

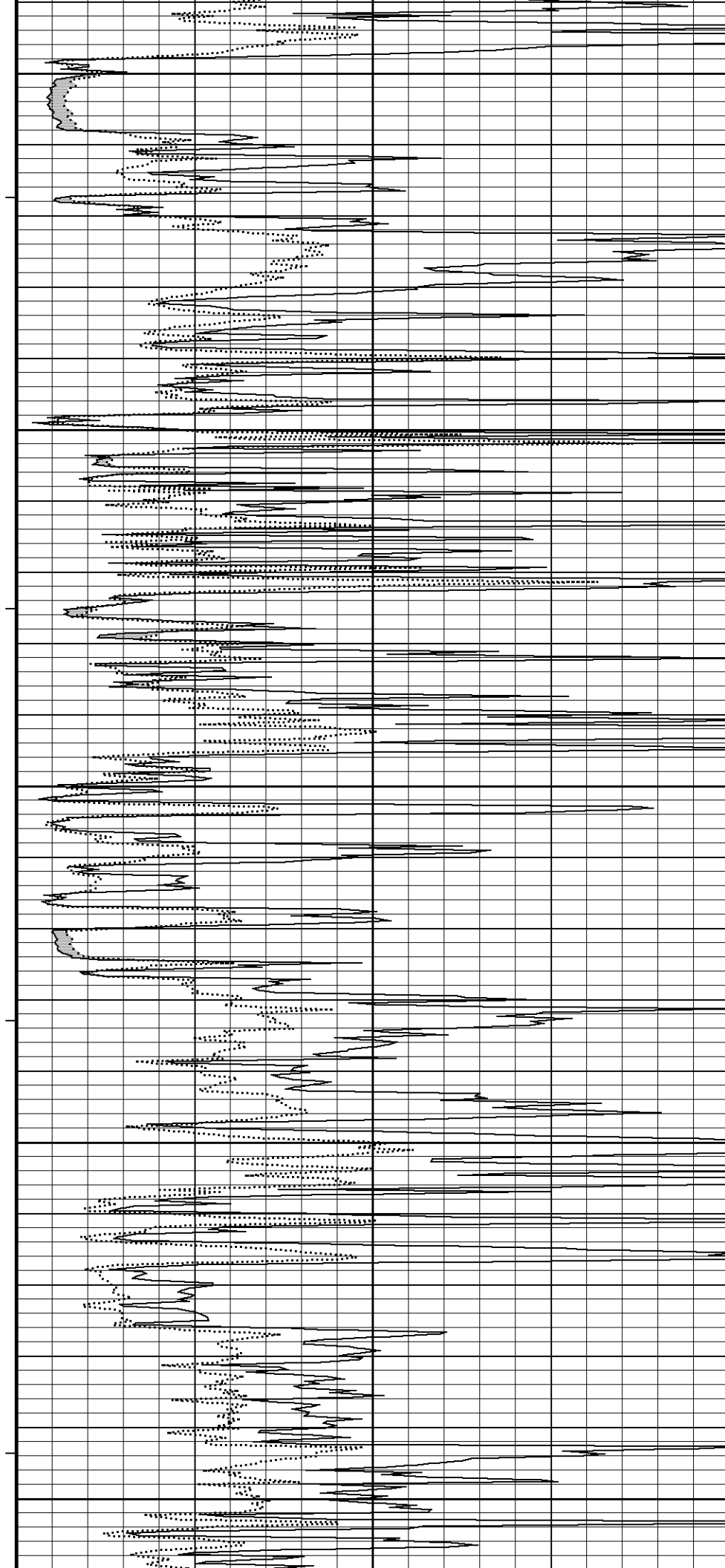
7150

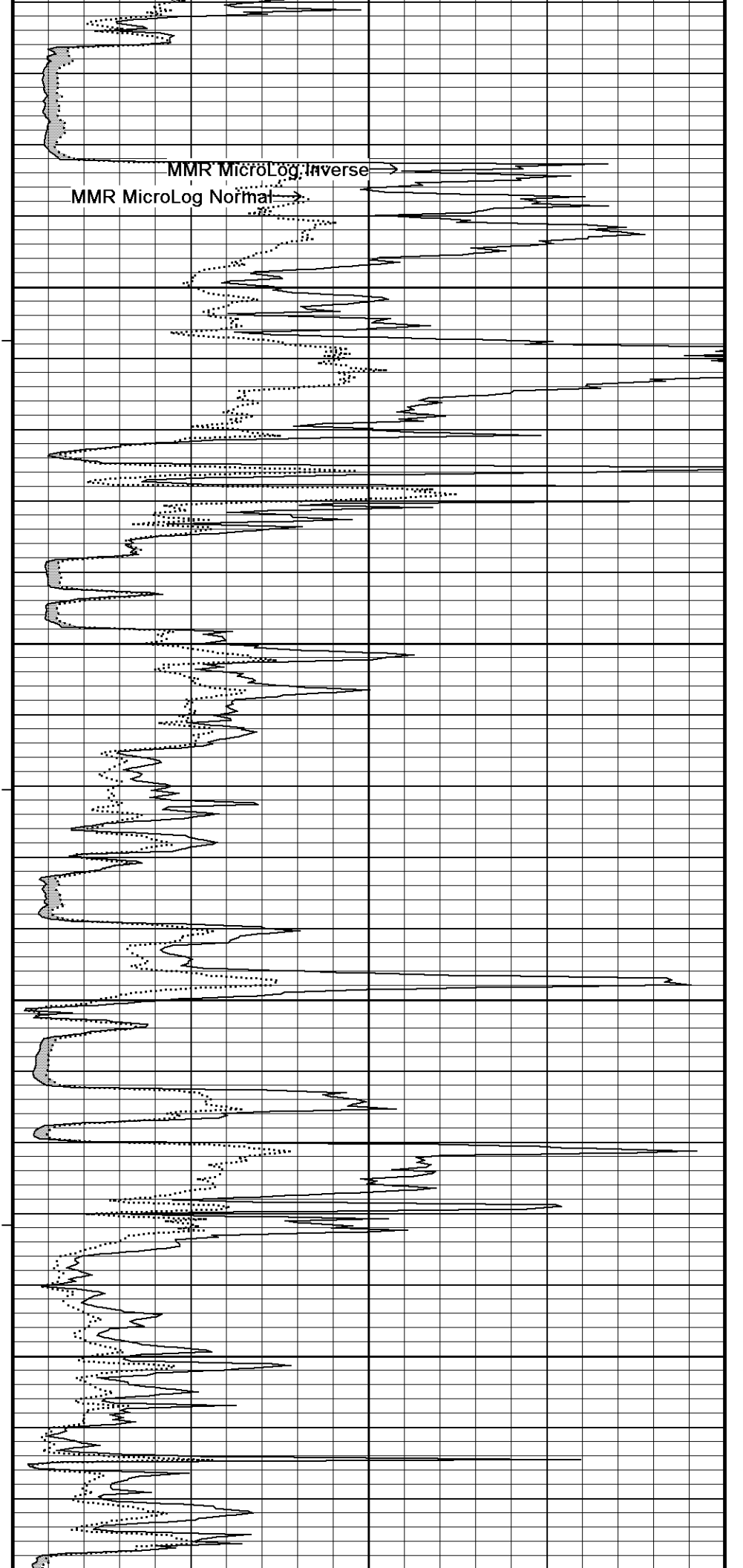
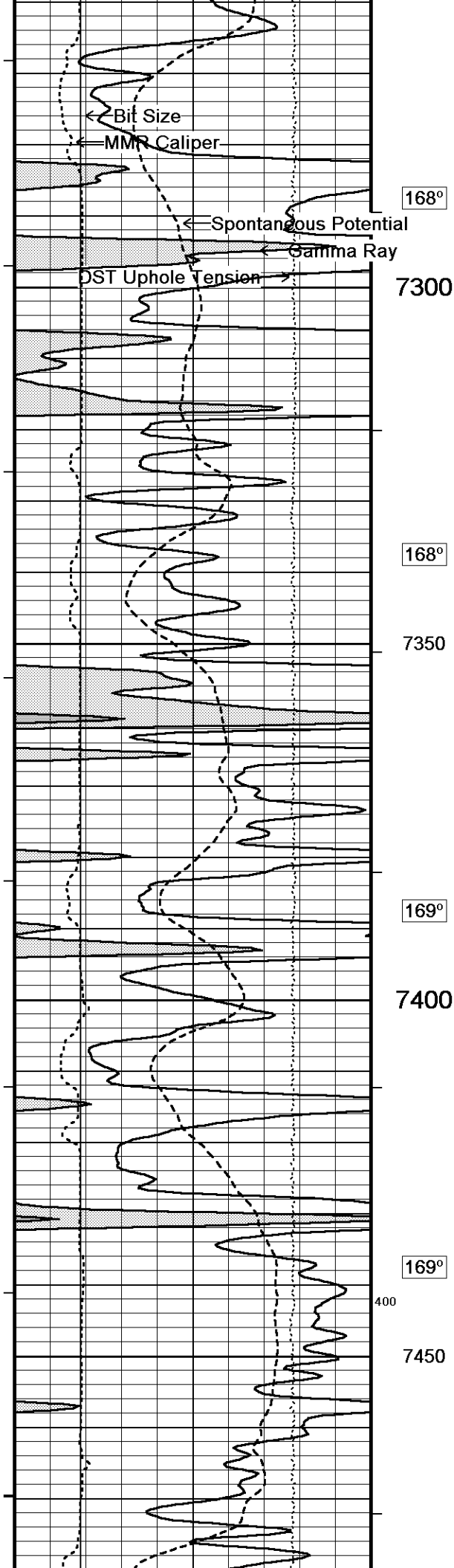
166°

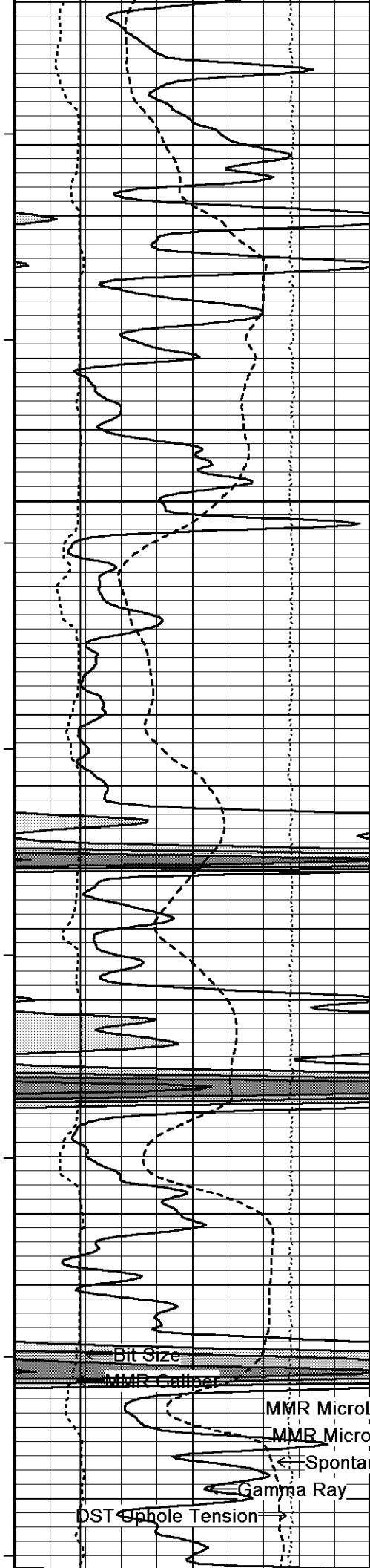
7200

167°

7250







170°

7500

171°

7550

200

171°

7600

172°

7650

MMR MicroLog Inverse

MMR MicroLog Normal

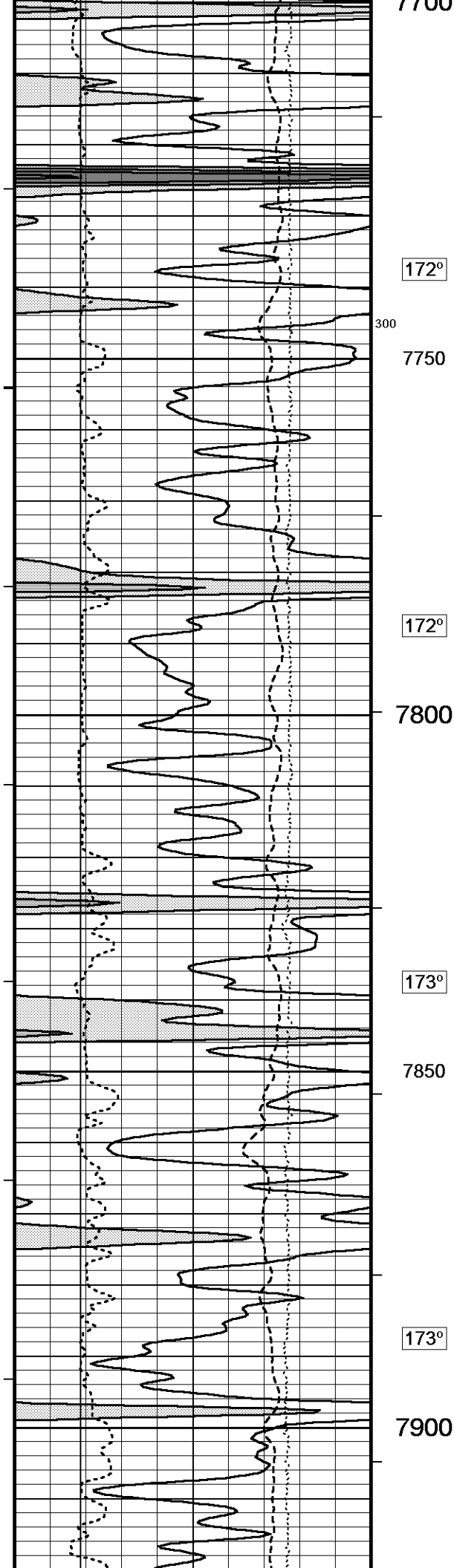
Spontaneous Potential

Gamma Ray

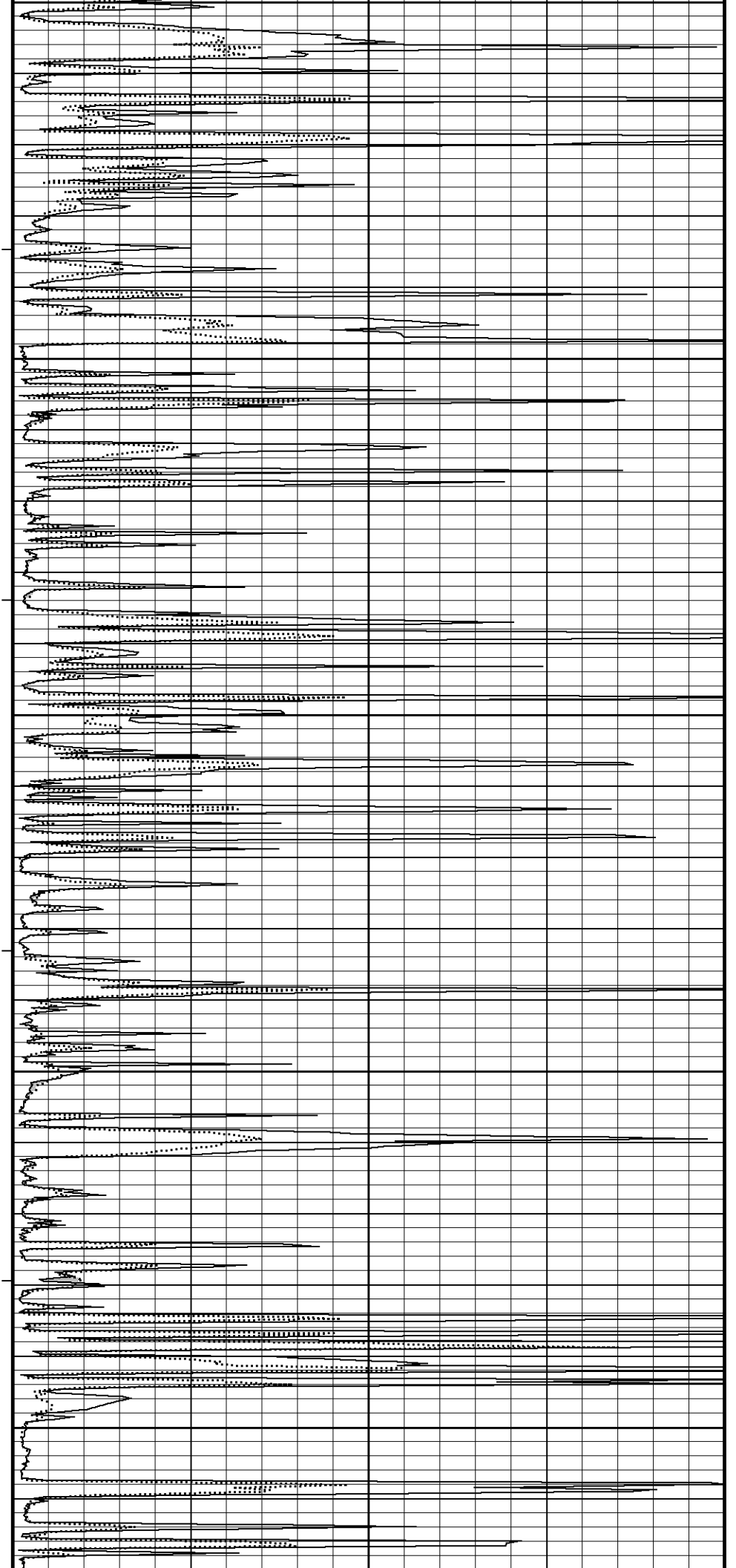
DST Casing Tension

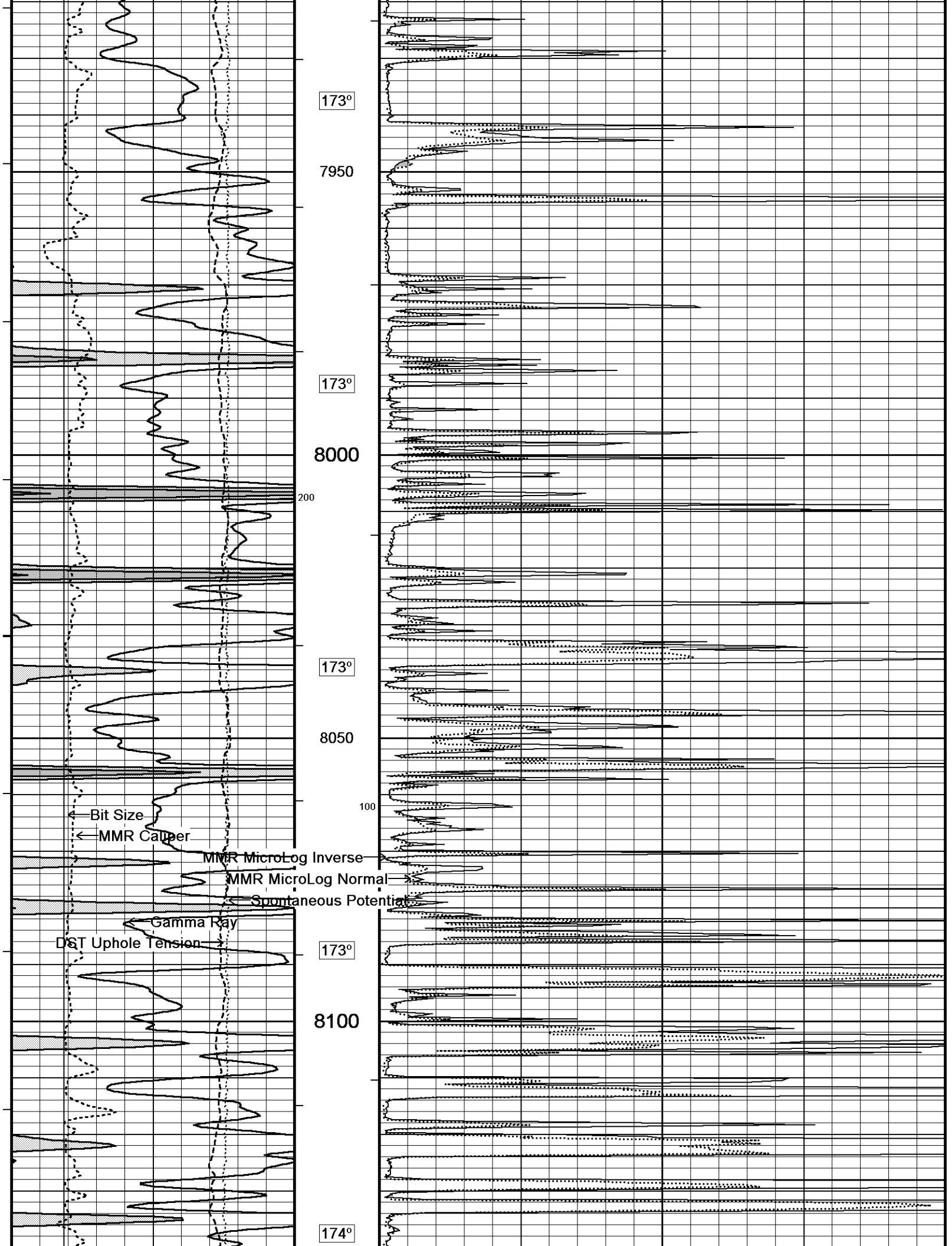
172°

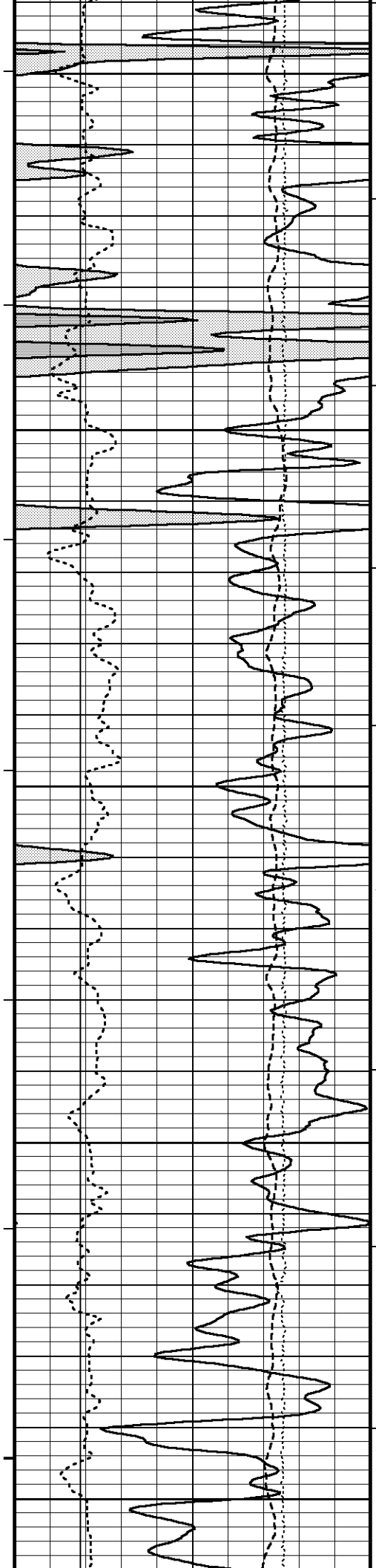
7700



7700  
172°  
300  
7750  
172°  
7800  
173°  
7850  
173°  
7900







8150

174°

8200

175°

8250

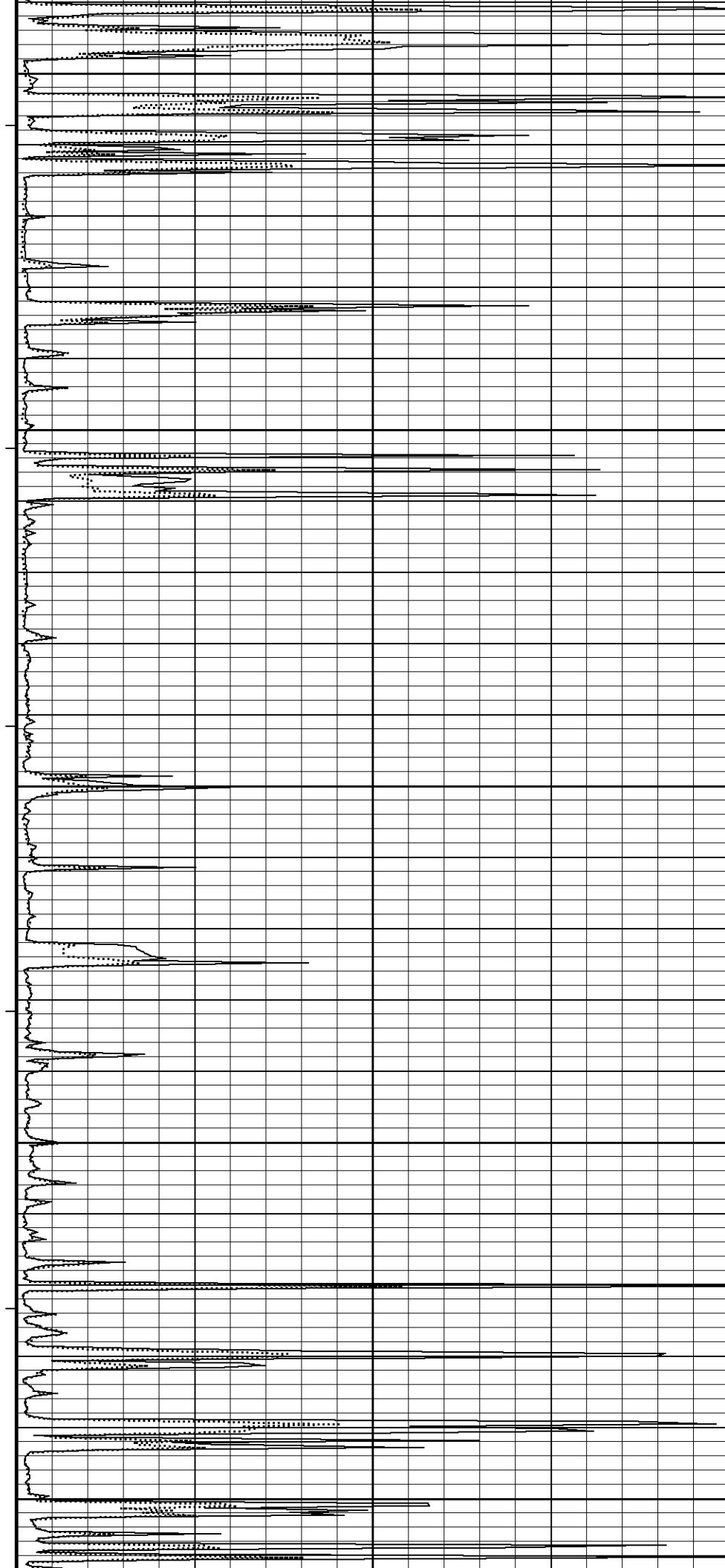
100

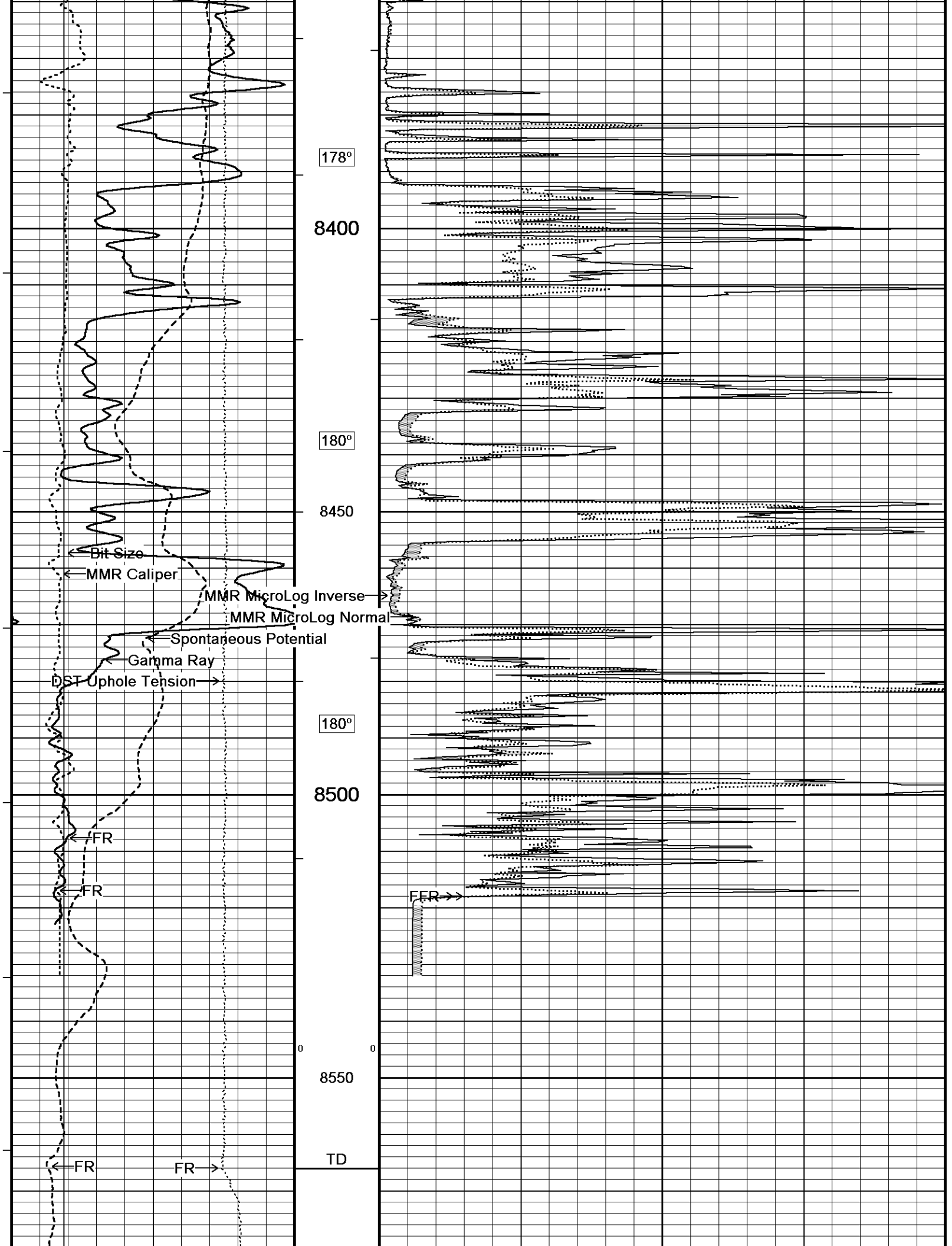
176°

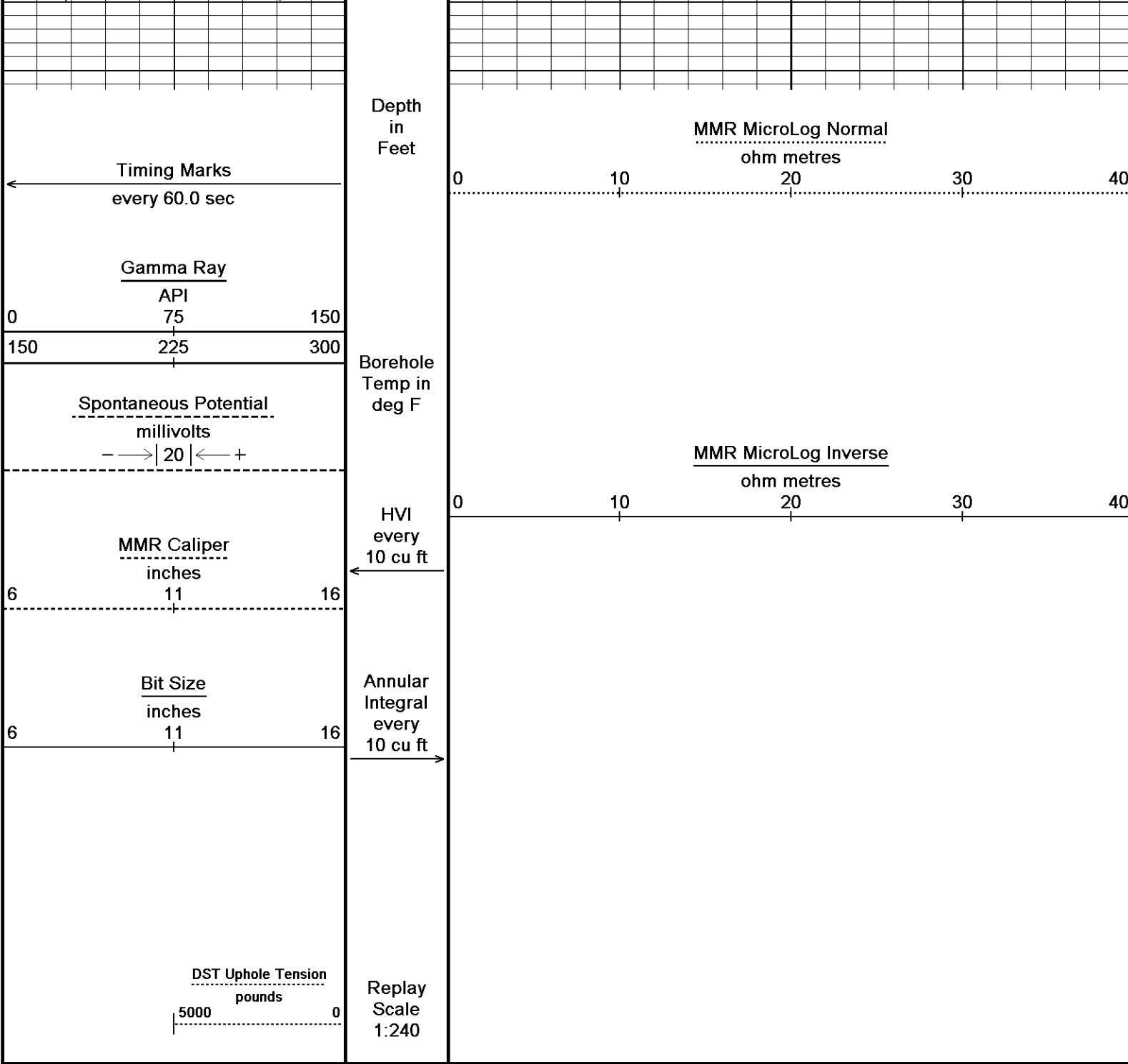
8300

177°

8350



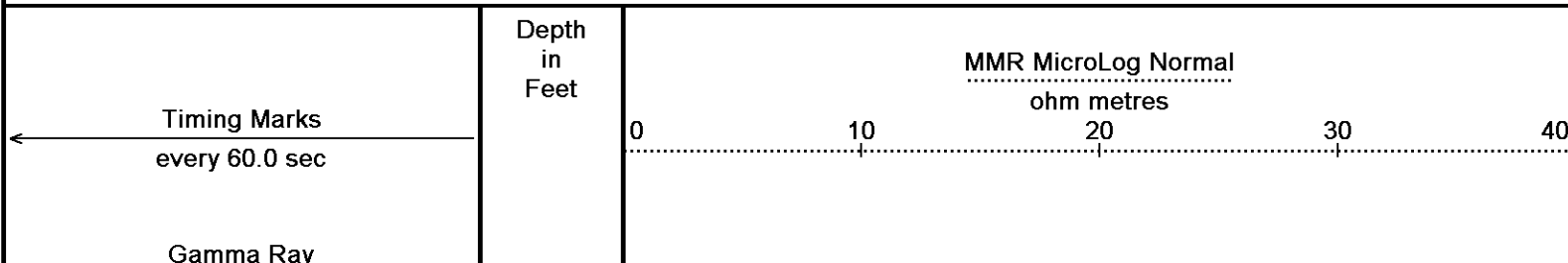


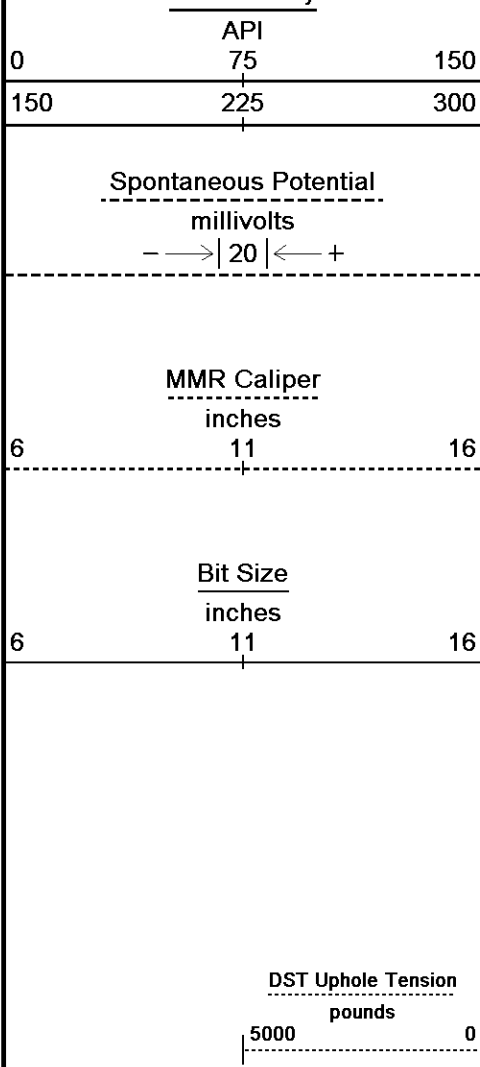


Depth Based Data - Maximum Sampling Increment 10.0cm	Plotted on 16-NOV-2018 06:08
Filename: C:\Minimus 18.03.9344\Data\Murfin Columbine #8-24\Murfin Columbine #8-24 Splice.dta	Recorded on 16-NOV-2018 00:31
System Versions: Processed with 18.03.9344 Plotted with 18.03.9344	

↑	5 INCH MAIN	↑
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↓	REPEAT SECTION	↓
Depth Based Data - Maximum Sampling Increment 10.0cm	Plotted on 16-NOV-2018 06:08	
Filename: C:\Minimus 18.03.9344\Data\Murfin Columbine #8-24\Murfin Columbine #8-24_002.dta	Recorded on 16-NOV-2018 00:04	
System Versions: Logged with 18.03.9344 Plotted with 18.03.9344		



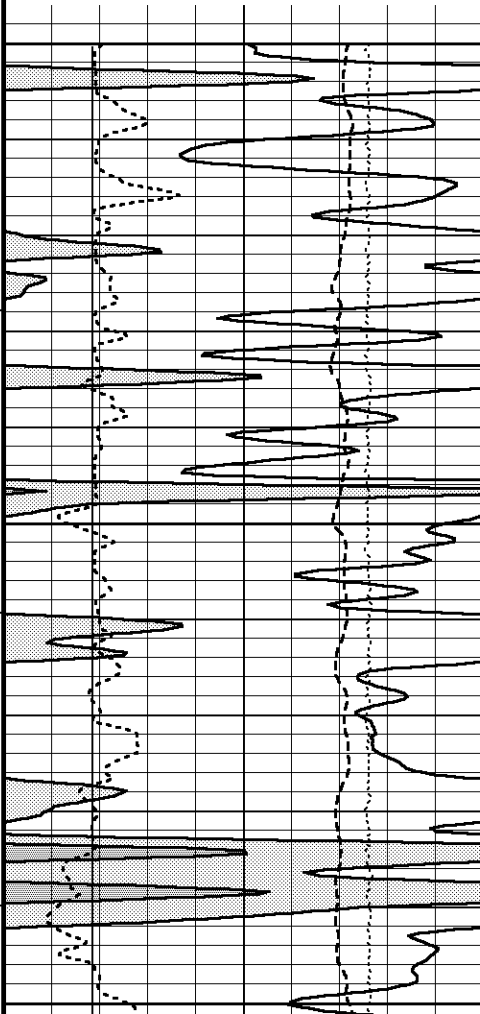


Borehole  
Temp in  
deg F

HVI  
every  
10 cu ft

Annular  
Integral  
every  
10 cu ft

Replay  
Scale  
1:240



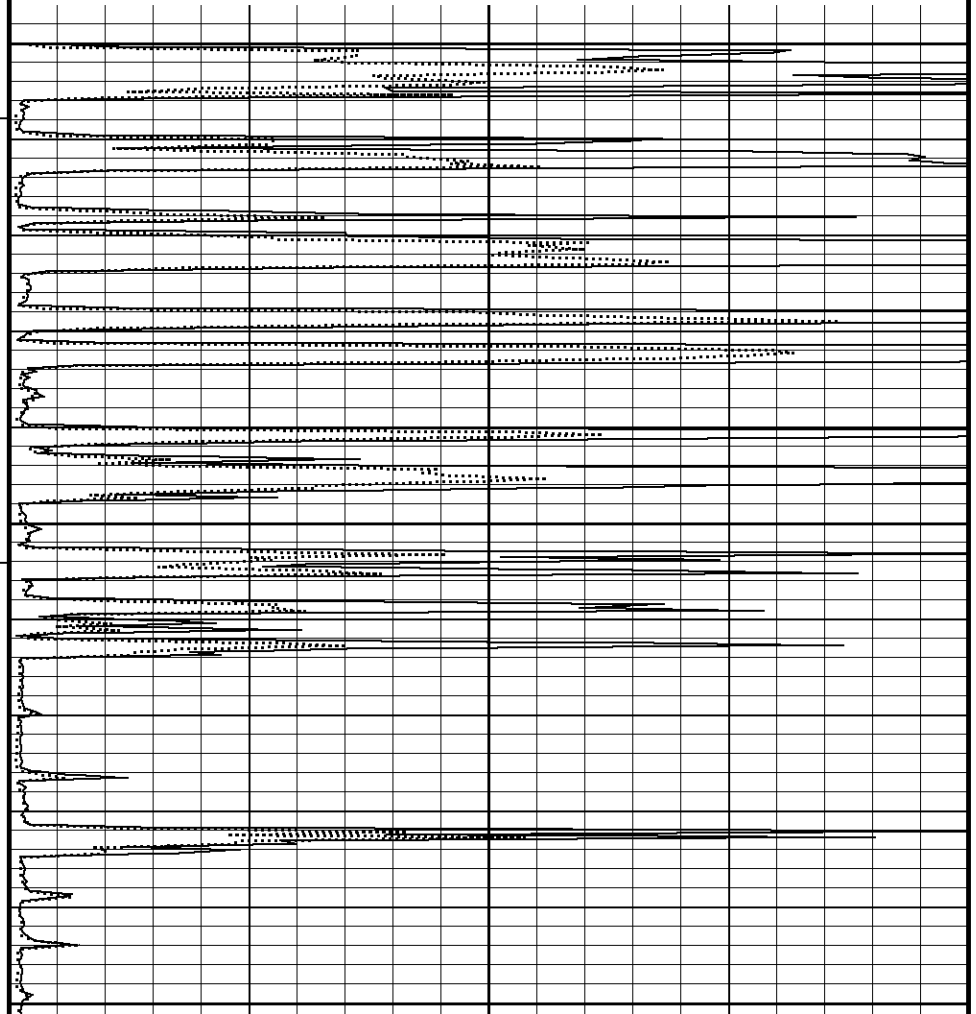
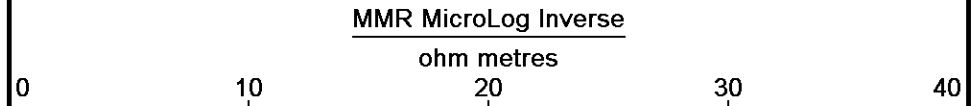
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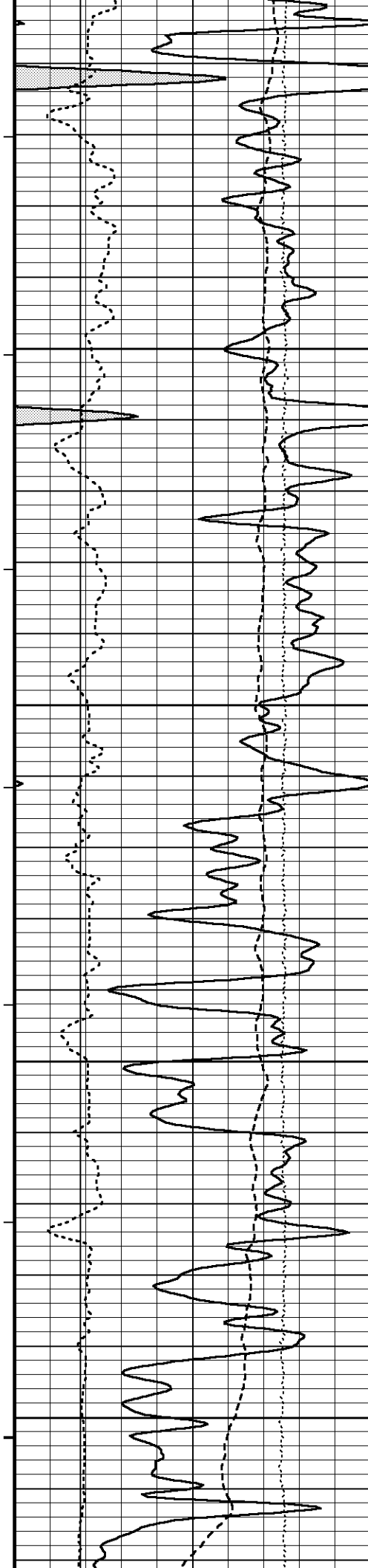
172°

8150

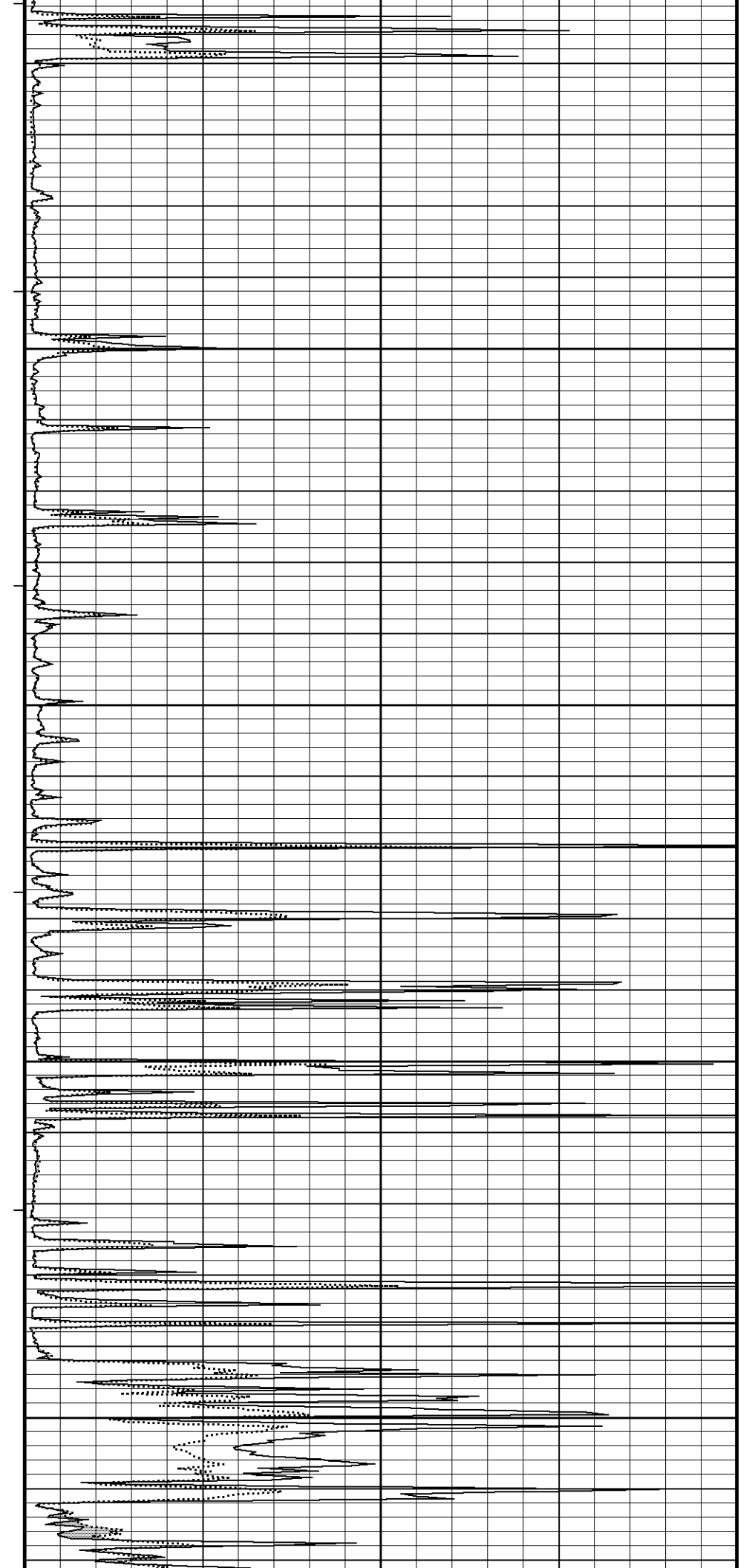
173°

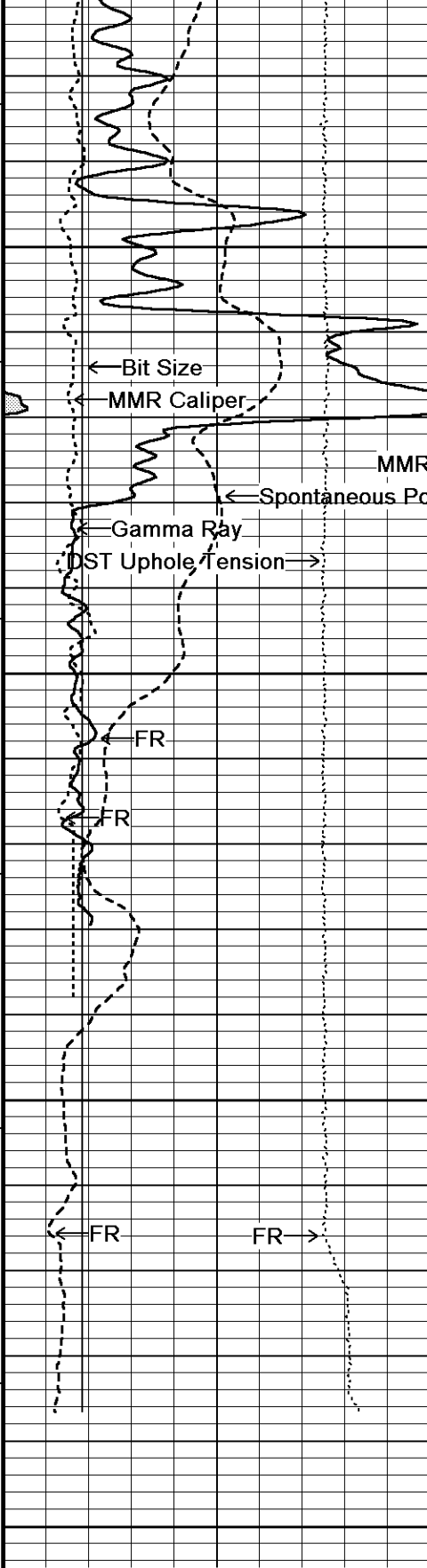
8200





173°  
8250  
100  
174°  
8300  
175°  
8350  
176°  
8400





178°

8450

179°

8500

8550

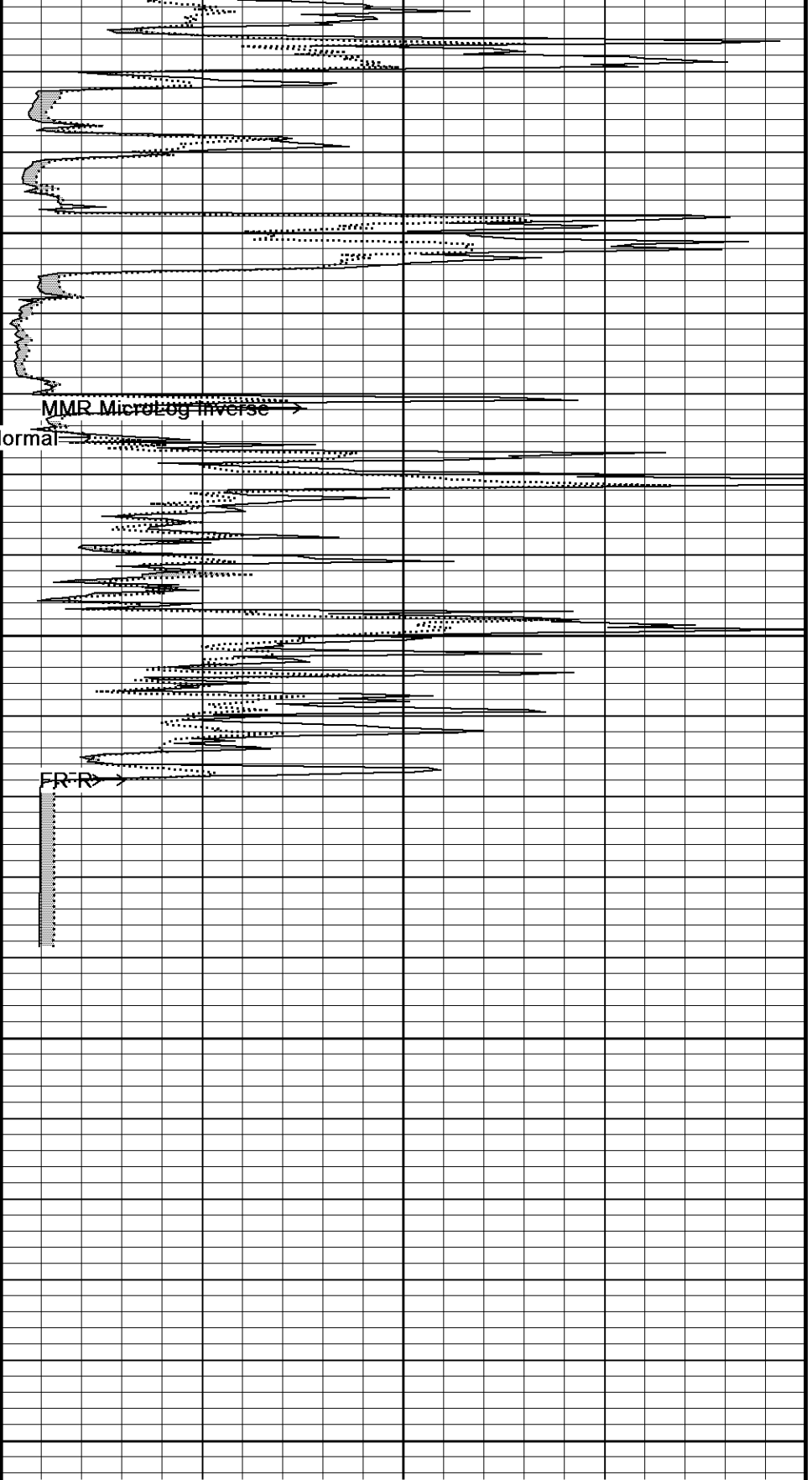
TD

8600

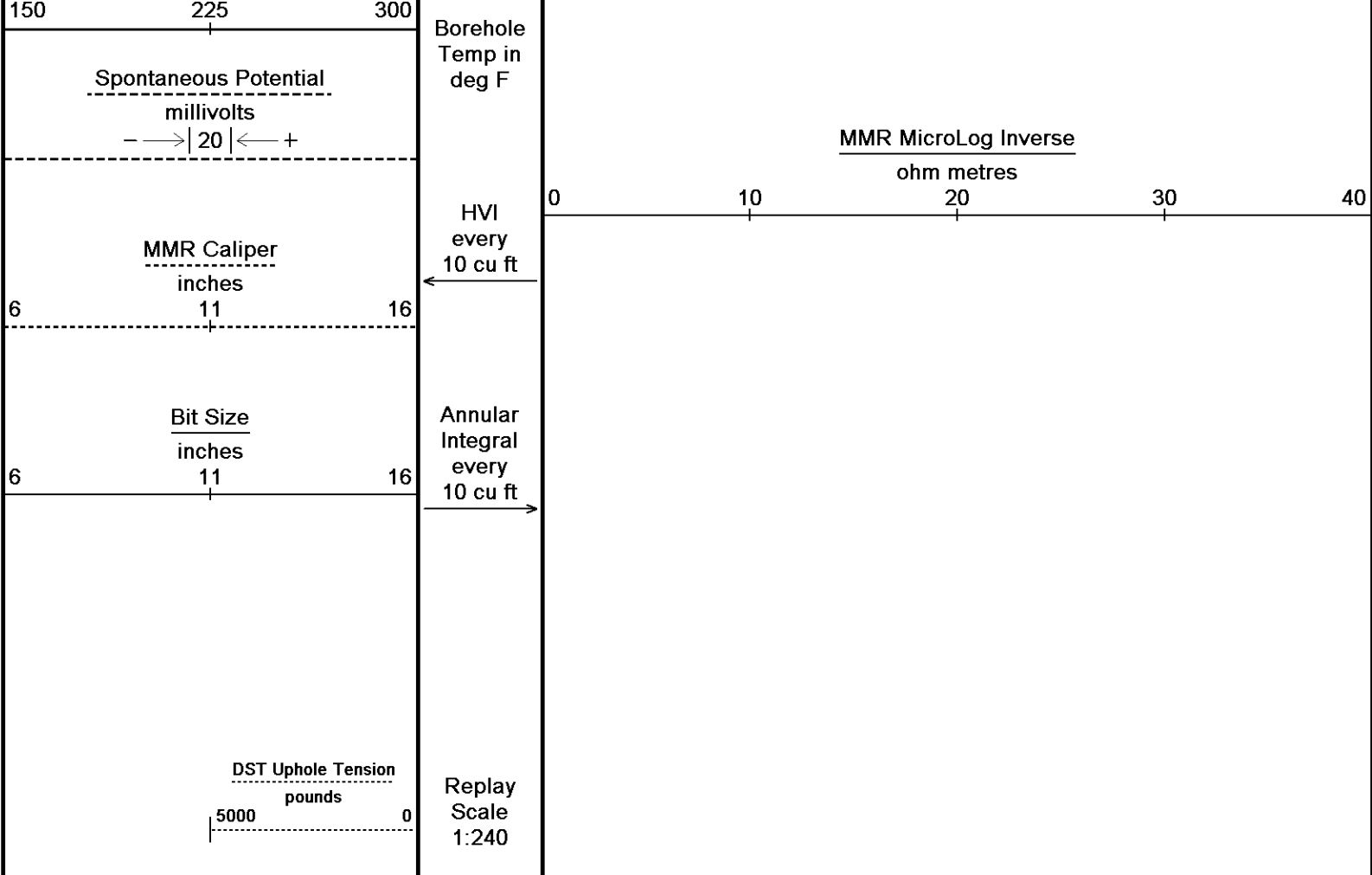
Depth  
in  
Feet

← Timing Marks  
every 60.0 sec

Gamma Ray  
API  
0 75 150



MMR MicroLog Normal  
ohm metres  
0 10 20 30 40



Depth Based Data - Maximum Sampling Increment 10.0cmPlotted on 16-NOV-2018 06:08

Filename: C:\Minimus 18.03.9344\Data\Murfin Columbine #8-24\Murfin Columbine #8-24\_002.dtaRecorded on 16-NOV-2018 00:04

System Versions: Logged with 18.03.9344Plotted with 18.03.9344

↑REPEAT SECTION↑

BEFORE SURVEY CALIBRATION		
C:\Minimus 18.03.9344\Data\Murfin Columbine #8-24\Murfin Columbine #8-24_002.dta		
General Constants All 000		Last Edited on 15-NOV-2018,23:03
General Parameters		
Mud Resistivity	0.850	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	Array Ind. Two Res Rt	
RWA Constant A	0.620	
RWA Constant M	2.150	
SW/APOR Tool Source	0.000	
Down-hole Tension Calibration SMS 0		Field Calibration on 15-NOV-2018 22:34
Reading No	Measured	Calibrated (lbs)
1	15808.85	0.00
2	17295.28	527.00

SP Calibration MCG-D.K 443			Field Calibration on 12-OCT-2018,05:20				
Reference 1	Measured	103.5	Calibrated (mV)	100.0			
Reference 2		-96.9		-100.1			
High Resolution Temperature Calibration MCG-D.K 443			Field Calibration on 12-OCT-2018,05:20				
Lower	Measured	50.00	Calibrated(Deg F)	50.00			
Upper		212.00		212.00			
High Resolution Temperature Constants MCG-D.K 443			Last Edited on 12-OCT-2018,05:20				
Pre-filter Length	11						
Gamma Calibration MCG-D.K 443			Field Calibration on 14-NOV-2018 17:02				
Background	Measured	73	Calibrated (API)	51			
Calibrator (Gross)		728		507			
Calibrator (Net)		655		456			
Gamma Calibration Tolerances MCG-D.K 443							
Ratio	1.436	<div><div></div><div></div><div></div><div></div><div></div></div>	Counts/API				
Gamma Constants MCG-D.K 443			Last Edited on 15-NOV-2018,20:40				
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	%					
Micro Normal and Micro Inverse Calibration MMR-B.A 91			Base Calibration on 14-NOV-2018 16:15 Field Check on 14-NOV-2018 16:19				
	Resistor 1 (ohm)	Resistor 2 (ohm)					
	10.0	50.0					
Base Calibration							
	Measured	Calibrated (ohm-m)					
Micro Normal	10.3	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 & Micro Inverse Calibration Tolerance MMR-B.A 91							
Micro Normal Res. 1	10.3	<div><div></div><div></div><div></div><div></div><div></div></div>	ohm	Micro Normal Res. 2	49.8	<div><div></div><div></div><div></div><div></div><div></div></div>	ohm
Micro Inverse Res. 1	9.9	<div><div></div><div></div><div></div><div></div><div></div></div>	ohm	Micro Inverse Res. 2	49.4	<div><div></div><div></div><div></div><div></div><div></div></div>	ohm
Micro Normal Base Check	93.9	<div><div></div><div></div><div></div><div></div><div></div></div>	ohm-m				
Micro Inverse Base Check	62.3	<div><div></div><div></div><div></div><div></div><div></div></div>	ohm-m				
Micro Normal Field Check	93.9	<div><div></div><div></div><div></div><div></div><div></div></div>	ohm-m				
Micro Inverse Field Check	62.3	<div><div></div><div></div><div></div><div></div><div></div></div>	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 14-NOV-2018 16:08				

## Base Calibration

Reading No	Measured	Calibrator Size (in)
1	14000	5.98
2	17358	7.97
3	20707	9.86
4	24750	11.92
5	0	0.00
6	N/A	N/A

## Field Calibration

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

## Caliper Calibration Tolerances MMR-B.A 91

Short Arm Field Cal.	7.97	<div><div></div><div></div><div></div><div></div></div>	in
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## Micro-Resistivity Caliper Constants MMR-B.A 91

Sonde Configuration	Resistivity Mode
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## Micro Laterolog Calibration MMR-B.A 91

Base Calibration on 31-DEC-1999 00:00

Field Check on 31-DEC-1999 00:00

Base Calibration	Resistor 1 (ohm)		Resistor 2 (ohm)	
	0.0		0.0	
	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-B.A 91

Pad Type	6 in Solid Nylon B23059		
Standoff Offset	0.0000	inches	
Micro Laterolog K Factor	0.0128		
Micro Laterolog Rm K Factor	N/A		
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.	20.00	Degrees C	
Mud Cake Resistivity Source	Constant Value		
Temp. for Rmc Corr.	MCG External Temperature		

## Neutron Calibration MDN-B.A 292

Base Calibration on 25-OCT-2018,14:15

Field Check on 14-NOV-2018 17:08

## Base Calibration

Ratio	Measured		Calibrated (cps)	
	Near	Far	Near	Far
	2910	91	3714	110
	31.871		33.764	

## Field Calibrator at Base

Ratio	Calibrated (cps)	
	2207	3209
	0.688	

## Field Check

Ratio	Calibrated (cps)	
	2170	3165
	0.686	

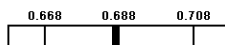
## Neutron Calibration Tolerances MDN-B.A 292

Ratio	31.871	<div><div></div><div></div><div></div><div></div></div>
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Base Check	0.688	<div><div></div><div></div><div></div><div></div></div>
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Field Check

0.686



## Neutron Constants MDN-B.A 292

Last Edited on 15-NOV-2018,20:40

Neutron Source Id	P0204NN	
Neutron Jig Number	NJ5736	
Air Hole Processing	Legacy	
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 25-OCT-2018 13:00

Field Check on 14-NOV-2018 16:37

	Resistor 1 (ohm)	Resistor 2 (ohm)
	0.0	1000.0
Base Calibration		
	Measured	Calibrated (ohm-m)
Reference 1	0.0	0.0
Reference 2	963.2	126.8
Base Check		281.4
Field Check		281.4

## FE Calibration Tolerances MFE-B.J 352

Reference 2	963.2		ohm
Base Check	281.4		ohm-m
Field Check	281.4		ohm-m

## FE Constants MFE-B.J 352

Last Edited on 15-NOV-2018,20:39

Running Mode	No Sleeve	
MFE K Factor	0.1268	
Borehole Correction Constants		
Sonde Position	0.5	inches
Hole Size Source	Density Caliper	
Hole Size Constant Value	N/A	inches
Rm Source	Global Value: Temperature Corrected	
Temp. for Rm Corr.	MCG External Temperature	

## Sonic Constants MSS-C.K 319

Last Edited on 08-JUL-2018,09:57

Maximum Boundary Contrast	70.00	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	
Correction for Sonde Skew	Applied	
Cycle Stretch Algorithm	Applied	
MN3FT	0.00	micro-sec
MX3FT	1500.00	micro-sec
Hunt-Raymer Constant	83.13	micro-sec/ft

Sonde Mode  
Hole Type

Compensated  
Open Hole

Sonde Parameters

	Measured	Calibrated
Offset		0.0000
Free Pipe	0.0000	

Peak Amplitude Source

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)	Depth (ft)	
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	0.00	0.00	0.00	

Full Waveform Parameters

Use 3' Waveform to derive TR	No
Use 4' Waveform to derive TR	No
Use 5' Waveform to derive TR	No
Use 6' Waveform to derive TR	No
3' Waveform Discriminator Level	0.30 mV
4' Waveform Discriminator Level	0.30 mV
5' Waveform Discriminator Level	0.15 mV
6' Waveform Discriminator Level	0.15 mV

Waveform Discriminator Filter	Not Applied	
Semblance Window Width	150.00	micro-sec
Semblance Processing Enabled	Yes	
Tracking Boxes Enabled In Processing	Yes	

Induction Calibration MAI-B.J 390

Factory Loop Calibration 25-OCT-2018 13:24

Field Check on 14-NOV-2018 16:35

Factory Loop Calibration

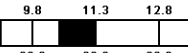
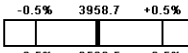
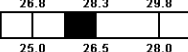
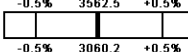


High Conductivity Reference Resistor	3.3 ohm
Low Conductivity Reference Resistor	333.3 ohm

Array	Measured Signal (unitless)		Reference Conductivity (mmho/m)		Calibration	
	Low	High	Low	High	Gain	Offset
1 (near)	16.8	458.6	9.3	966.2	2.166	-27.2
2	6.3	377.7	7.6	821.4	2.191	-6.2
3	3.8	258.6	5.2	566.0	2.200	-3.0
4 (far)	1.9	132.3	2.6	279.2	2.121	-1.4
Array Temperature	77.9		Deg F			

Tool Checks

Array	Factory Reference (mmho/m)		Before Survey (mmho/m)		
	Low	High	Low	High	
1 (near)	11.3	3958.7	10.4	3957.3	
2	28.3	3562.5	27.6	3561.2	
3	26.5	3060.2	25.8	3059.6	
4 (far)	18.8	2087.1	18.3	2086.7	
Array Temperature	61.2		65.5		Deg F

Induction Check Tolerances MAI-B.J 390

Low Array 1	10.4		mmho/m	High Array 1	3957.3		mmho/m
Low Array 2	27.6		mmho/m	High Array 2	3561.2		mmho/m
Low Array 3	25.0		mmho/m	High Array 3	3060.2		mmho/m

Low Array 3	25.8	<div><div></div><div></div><div></div><div></div><div></div></div>	mmho/m	High Array 3	3059.6	<div><div></div><div></div><div></div><div></div><div></div></div>	mmho/m
Low Array 4	18.3	<div><div></div><div></div><div></div><div></div><div></div></div>	mmho/m	High Array 4	2086.7	<div><div></div><div></div><div></div><div></div><div></div></div>	mmho/m

Induction Constants MAI-B.J 390				Last Edited on 15-NOV-2018,20:39	
Induction Model		RtAP-WBM			
Borehole Correction Constants					
Tool Centred		No			
Hole Size Source		Density Caliper			
Hole Size Constant Value		N/A		inches	
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	
Rm Source		Global Value: Constant Temperature			
Temp. for Rm Corr.		N/A			
Borehole Correction Method		Default			
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	
Symmetrised Receiver Gains					
Receiver 1		1.00			
Receiver 2		1.00			
Receiver 3		1.00			
Receiver 4		1.00			
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-B.J 390			Field Calibration on 15-MAY-2018,12:48
	Measured	Calibrated(Deg F)	
Lower	10.00	10.00	
Upper	100.00	100.00	

High Resolution Temperature Constants MAI-B.J 390		Last Edited on 06-MAR-2018,13:01	
Pre-filter Length	11		

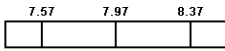
Caliper Calibration MPD-C.A 216			Base Calibration on 25-OCT-2018 13:33 Field Calibration on 14-NOV-2018 16:41	
Base Calibration				
Reading No		Measured	Calibrator Size (in)	
1		15197	3.99	
2		23984	5.98	
3		32561	7.97	
4		40928	9.86	
5		50160	11.92	

## Field Calibration

Measured Caliper (in)  
7.97

Actual Caliper (in)  
7.97

## Caliper Calibration Tolerances MPD-C.A 216

Long Arm Field Cal. 7.97  in

## Photo Density Calibration MPD-C.A 216

Base Calibration on 25-OCT-2018 13:50

Field Check on 14-NOV-2018 16:47

## Density Calibration

## Base Calibration

## Measured

## Calibrated (sdu)

Near

Far

Near

Far

Background

1004

1211

Reference 1

49178

24022

59556

30836

Reference 2

19804

2279

24941

2541

## Field Check at Base

1003.7

1210.8

## Field Check

995.0

1181.9

## PE Calibration

## Base Calibration

## Measured

## Calibrated

WS

WH

Ratio

Ratio

Background

184

904

Reference 1

20688

49027

0.426

0.371

Reference 2

5715

19697

0.294

0.272

## Field Check at Base

183.9

904.0

## Field Check

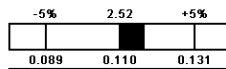
181.4

892.8

## Photo Density Calibration Tolerances MPD-C.A 216

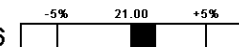
Near Density Ratio

2.56



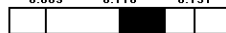
Far Density Ratio

21.36



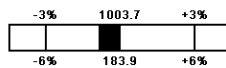
PE Calibration

0.123



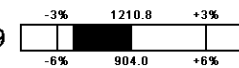
Near Den. Field Check

995.0



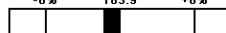
Far Den. Field Check

1181.9



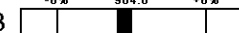
PE WS Field Check

181.4



PE WH Field Check

892.8



## Density Constants MPD-C.A 216

Last Edited on 15-NOV-2018,20:40

Density Source Id

P50557B

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

1.13

gm/cc

Mud Density Type

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

Precision Enhanced Density Processing

Applied

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 18.03.9344\Data\Murfin Columbine #8-24\Murfin Columbine #8-24\_002.dta

Cablehead, 11 pin  
CBH-CB 264 LG: 2.40 ft WT: 24.3 lb OD: 2.244 in

Compact Swivel Head Adaptor  
SHA-J.B 595 LG: 2.30 ft WT: 22.0 lb OD: 2.244 in

Compact Comms Gamma  
MCG-D.K 443 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

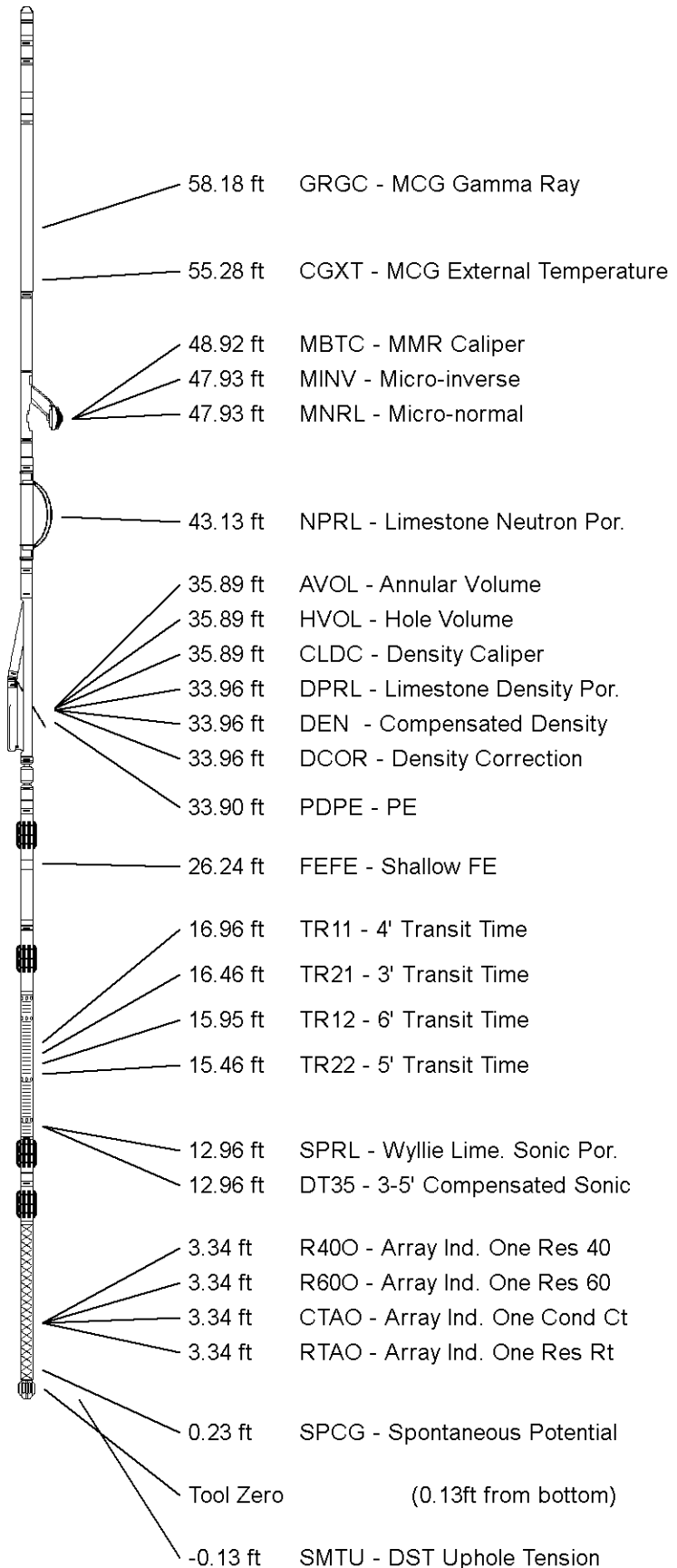
Compact Knuckle Joint  
SKJ-D.A 167 LG: 2.17 ft WT: 24.3 lb OD: 2.244 in

Compact Focussed Electric  
MFE-B.J 352 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-B.J 390 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	MURFIN DRILLING COMPANY, INC.		
WELL	COLUMBINE #8-24		
FIELD	WILDCAT		
PROVINCE/COUNTY	LINCOLN		
COUNTRY/STATE	U.S.A. / COLORADO		

Elevation Kelly Bushing	5393	feet	First Reading	8518.00	feet
Elevation Drill Floor	5391	feet	Depth Driller	8574.00	feet
Elevation Ground Level	5380	feet	Depth Logger	8566.00	feet

  
**Weatherford**<sup>®</sup>

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