



**Weatherford**

**COMPACT PHOTO DENSITY  
COMPENSATED NEUTRON  
MICRORESISTIVITY LOG**

COMPANY

**GRAND MESA OPERATING COMPANY**

WELL

**BUZZ'S BOAT #14**

FIELD

**WILDCAT**

PROVINCE/COUNTY **WASHINGTON**

COUNTRY/STATE **U.S.A. / COLORADO**

LOCATION **620' FSL & 2262' FWL**

SEC 24 TWP 5S RGE 54W

Other Services  
MAI/MFE

MSS

Latitude

Longitude

API Number 05-121-11053

Permanent Datum GL, Elevation 5152 feet

Log Measured From KB

Drilling Measured From KB @ 19 FEET

Date 09-NOV-2016

Run Number ONE

Service Order 4558-165852107

Depth Driller 8254.00 feet

Depth Logger 8260.00 feet

First Reading 8228.00 feet

Last Reading 327.00 feet

Casing Driller 330.00 feet

Casing Logger 327.00 feet

Bit Size 7.875 inches

Hole Fluid Type CHEMICAL

Density / Viscosity 9.30 lb/USg 74.00 CP

PH / Fluid Loss 10.00 7.20 ml/30Min

Sample Source FLOWLINE

Rm @ Measured Temp 1.19 @ 75.0 ohm-m

Rmf @ Measured Temp 0.95 @ 75.0 ohm-m

Rmc @ Measured Temp 1.43 @ 75.0 ohm-m

Source Rmf / Rmc CALC CALC

Rm @ BHT 0.47 @ 191.0 ohm-m

Time Since Circulation 5 HOURS

Max Recorded Temp 191.00 deg F

Equipment / Base 13096 OKC

Recorded By ADAM SILL

Witnessed By KENT MATSON

Elevations:  
KB 5171.00  
DF 5169.00  
GL 5152.00

**BOREHOLE RECORD**

Last Edited: 09-NOV-2016 05:42

Bit Size  
inches

7.875

Depth From  
feet

330.00

Depth To  
feet

8254.00

**CASING RECORD**

Type

Size  
inches

8.625

Depth From  
feet

0.00

Shoe Depth  
feet

330.00

Weight  
pounds/ft

24.00

**REMARKS**

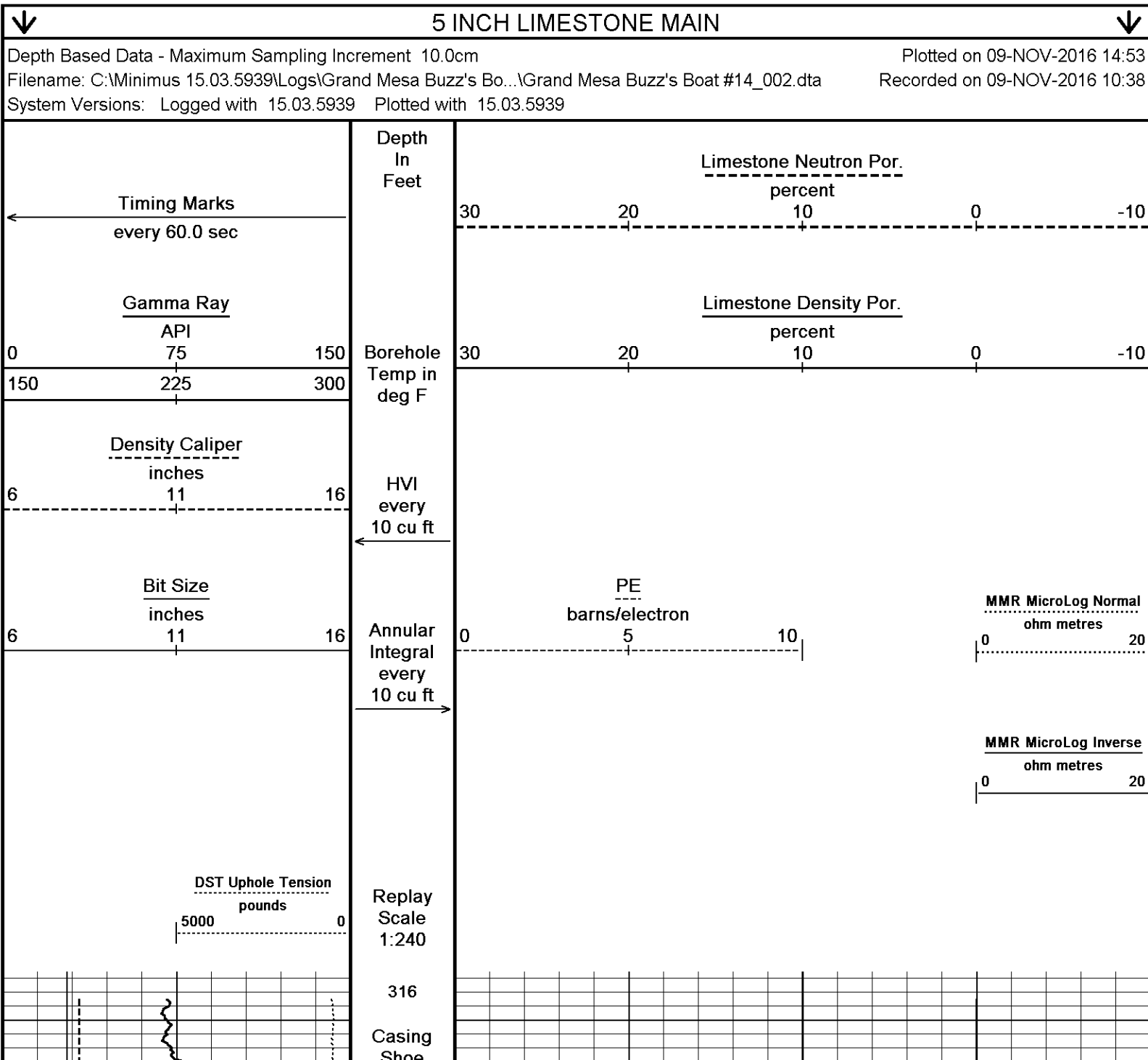
- SOFTWARE ISSUE: WLS 15.03.5939.
- RUN ONE: MCG, MML, MDN, MPD, MFE, MSS, MAI RUN IN COMBINATION.
  - HARDWARE: DUAL BOWSPRING USED ON MDN.
  - 0.5 INCH STANDOFF USED ON MFE.
  - TWO 0.5 INCH STANDOFFS USED ON MSS.
  - 0.5 INCH STANDOFF USED ON MAI.
- 2.71 G/CC LIMESTONE DENSITY MATRIX USED TO CALCULATE 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: 3310 CU.FT.
- ANNULAR HOLE VOLUME WITH 5.5 INCH PRODUCTION CASING FROM TD TO SURFACE CASING: 2003 CU.FT.

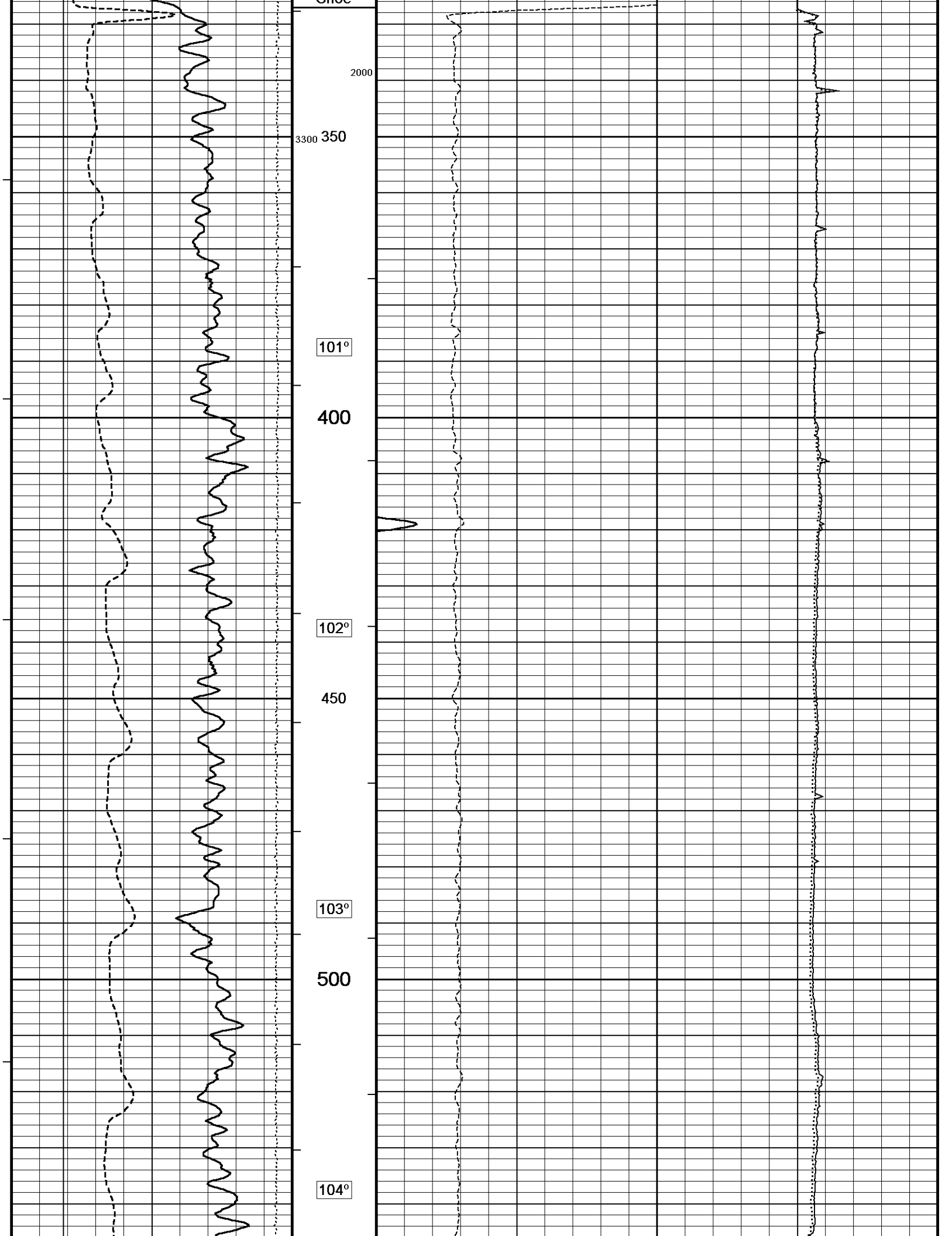
- RIG: WW DRILLING #20.

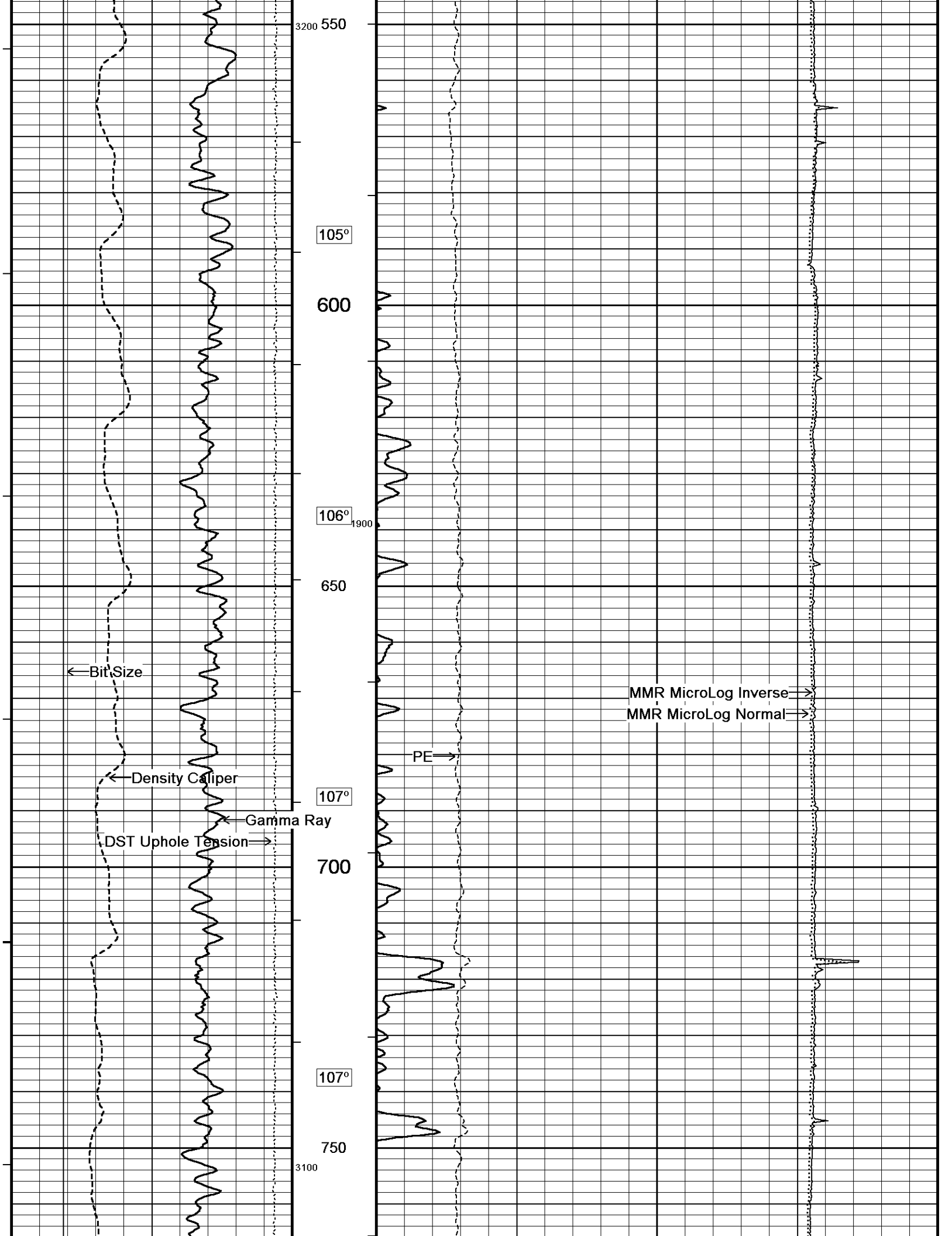
- ENGINEER: A. SILL.

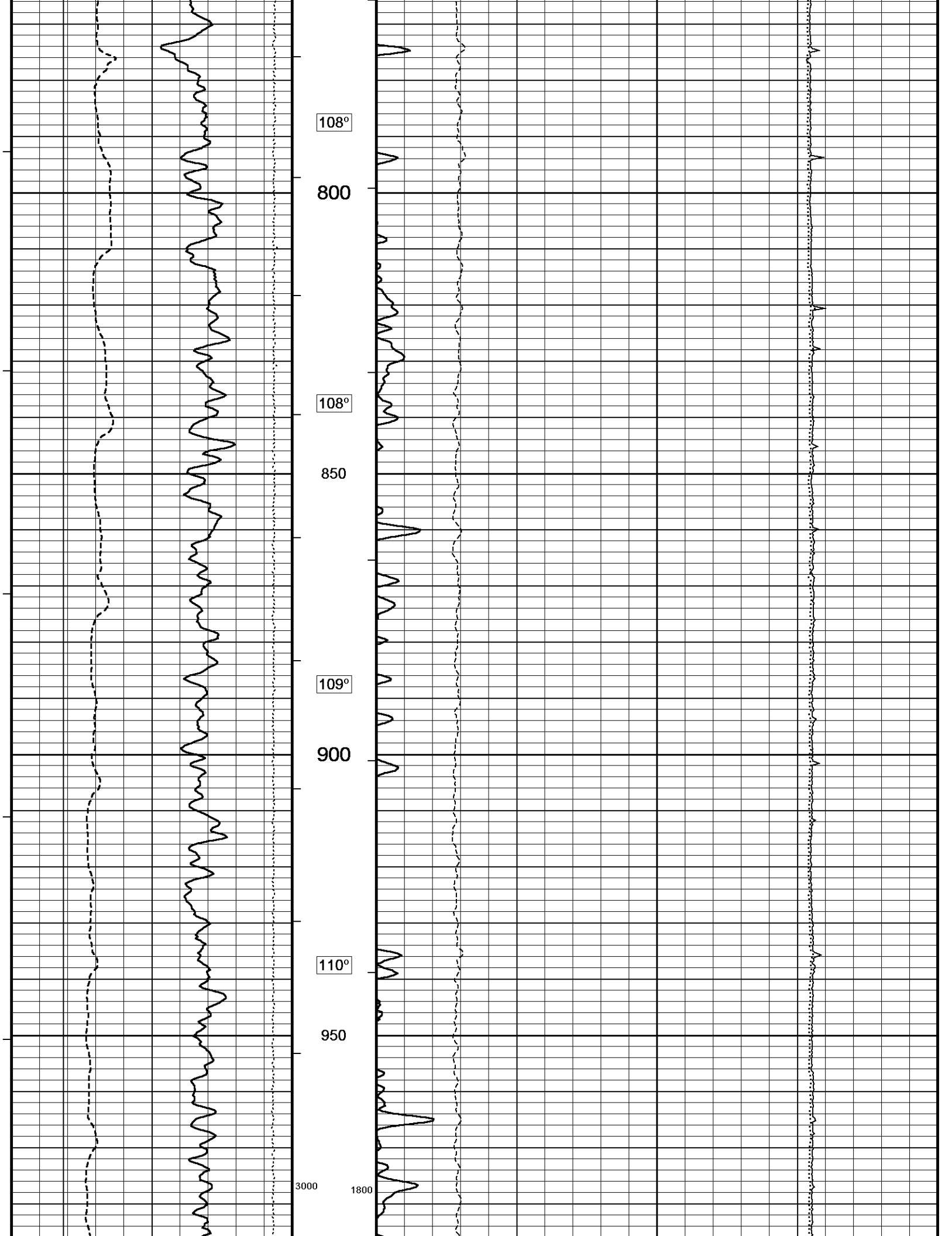
- OPERATOR: B. TOVAR.

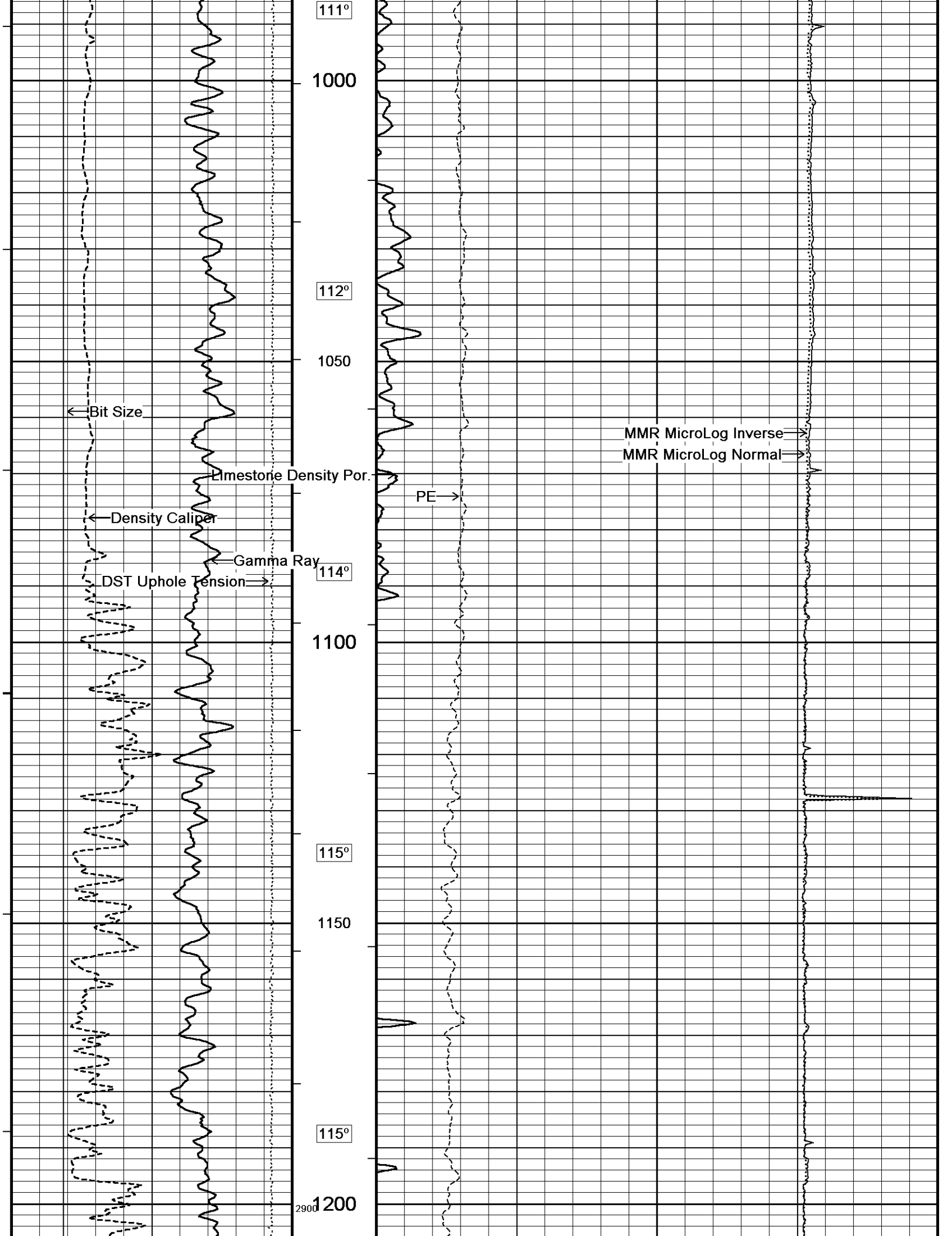
In interpreting, communicating or providing information and/or making recommendations, either written or oral, as to logs or test or other data, type or amount of material, or Work or other service to be furnished, or manner of performance, or in predicting results to be obtained, the Contractor will 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.

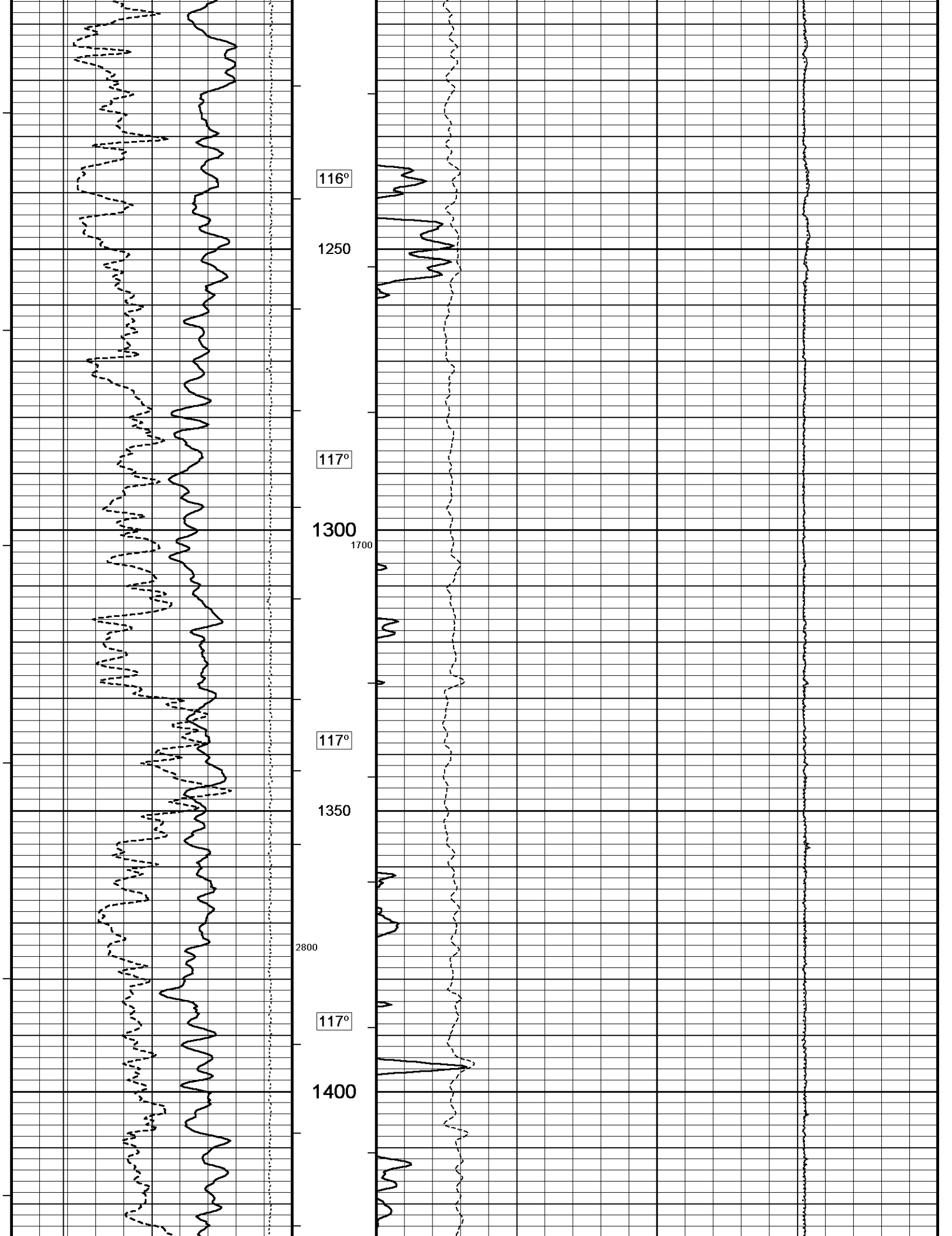


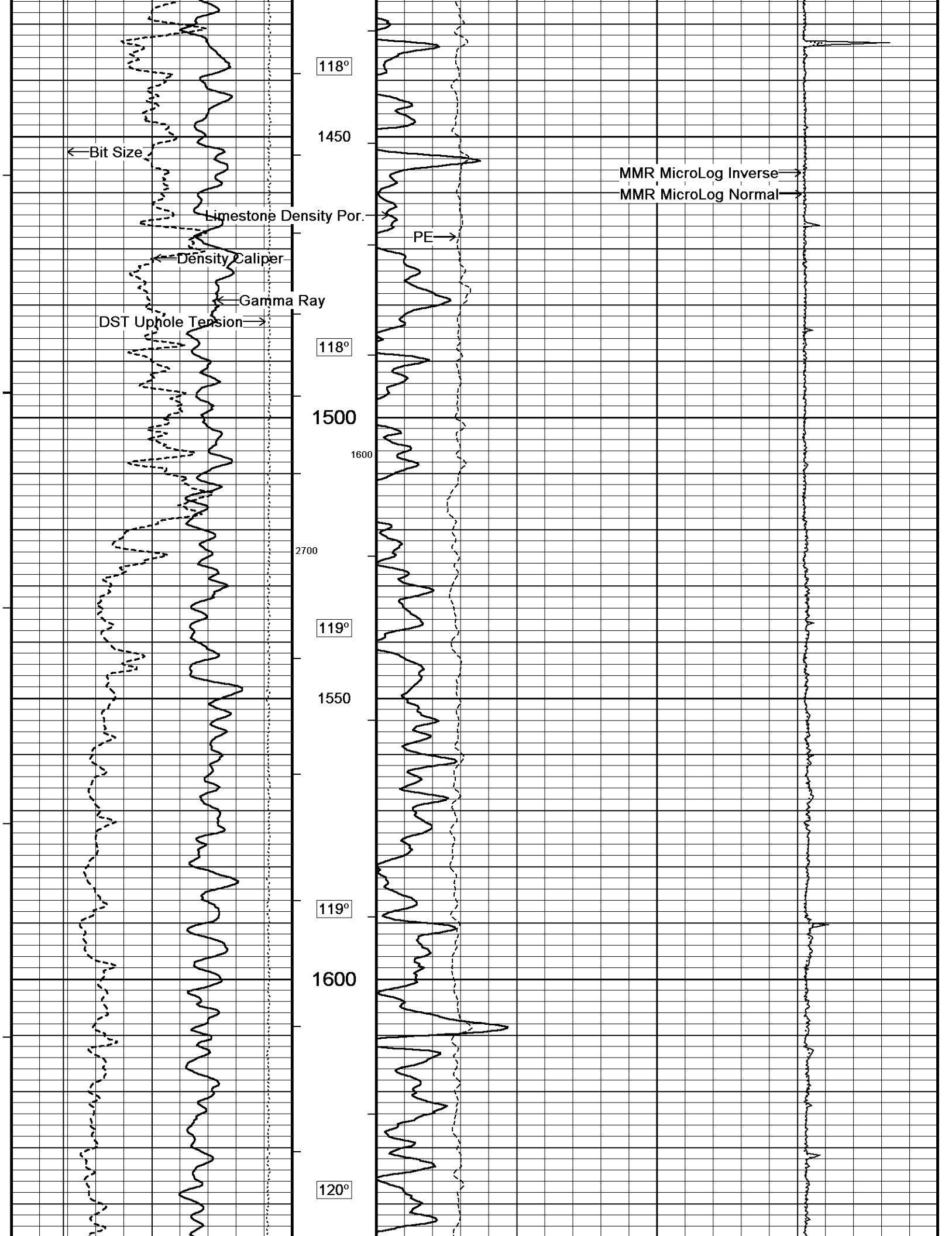




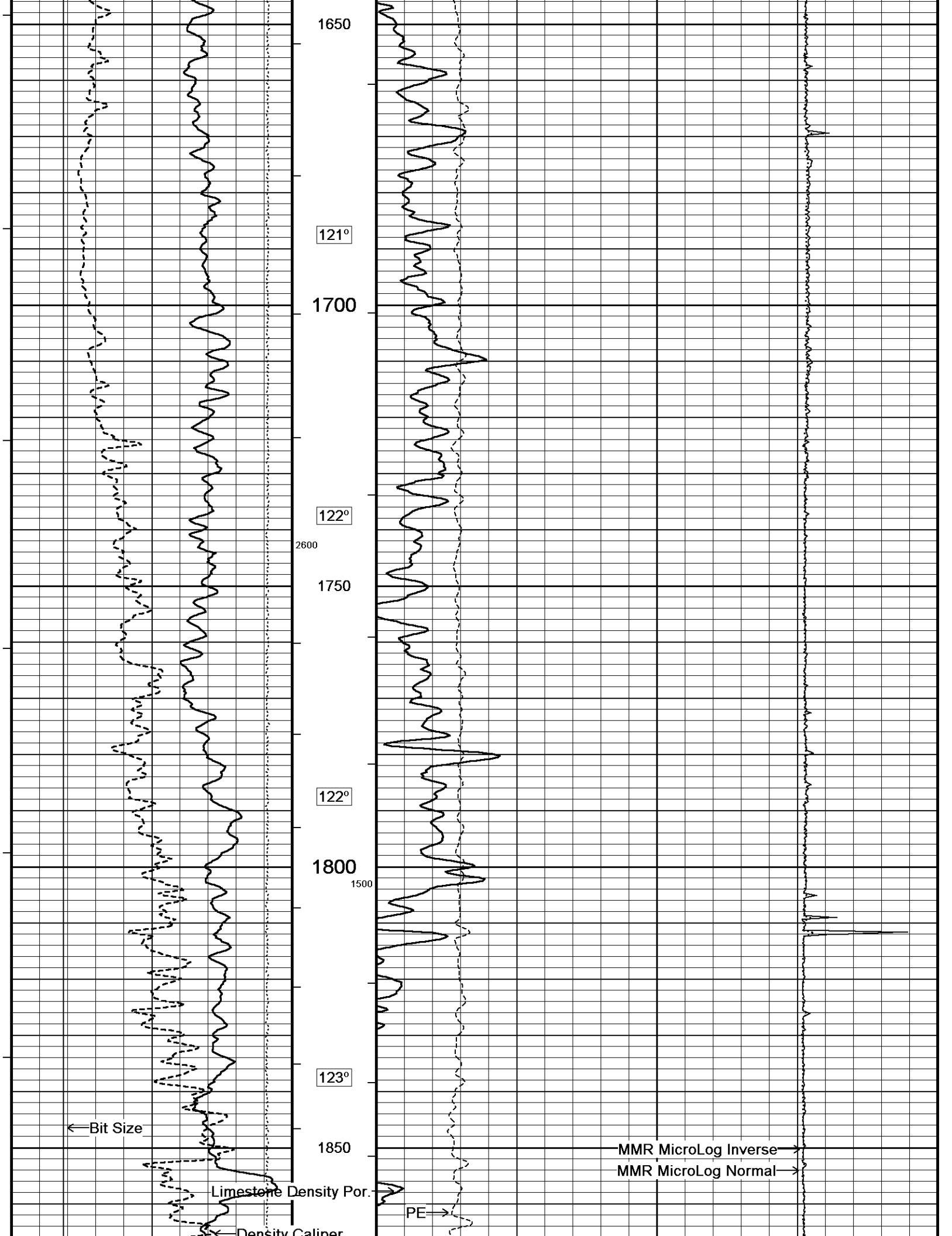


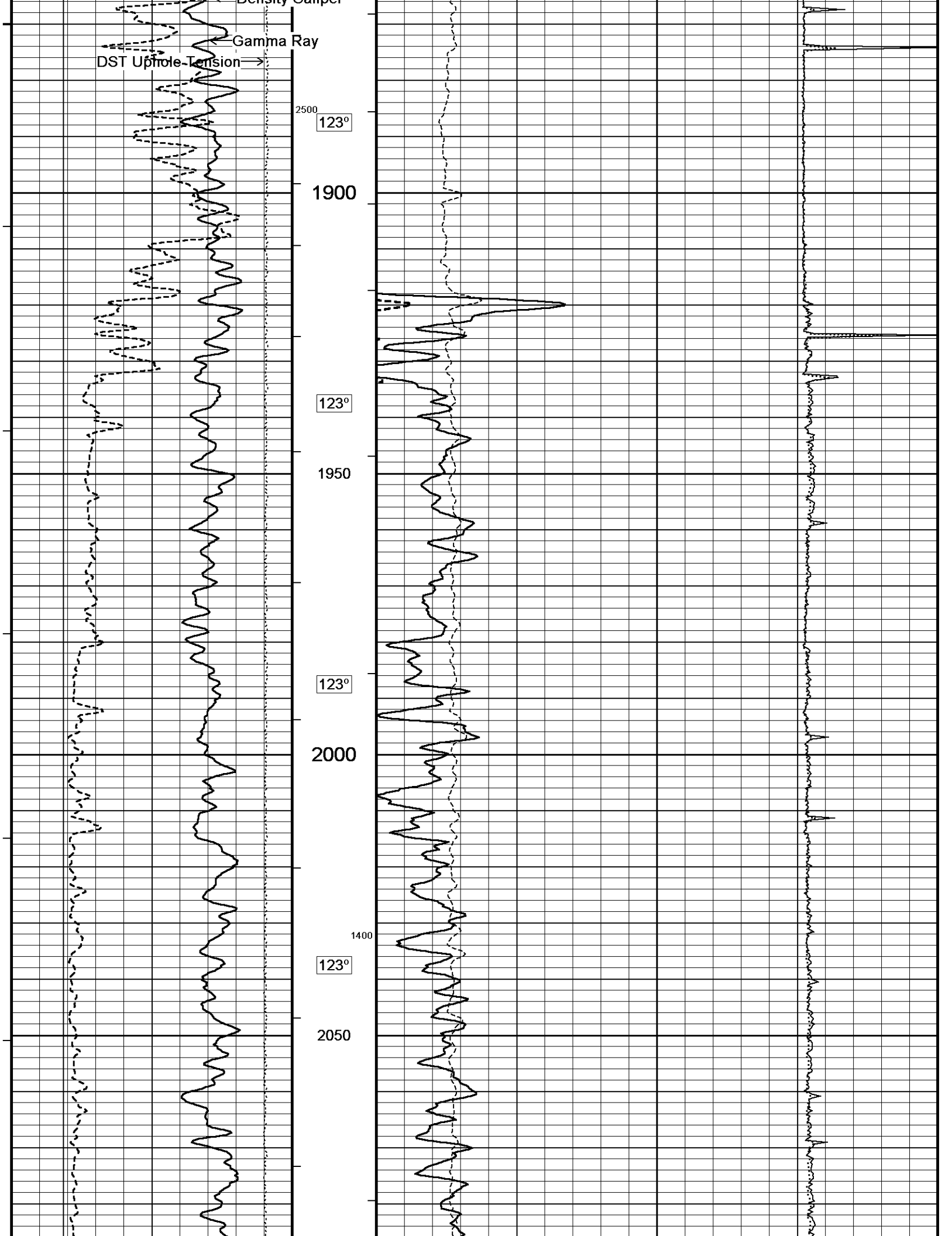


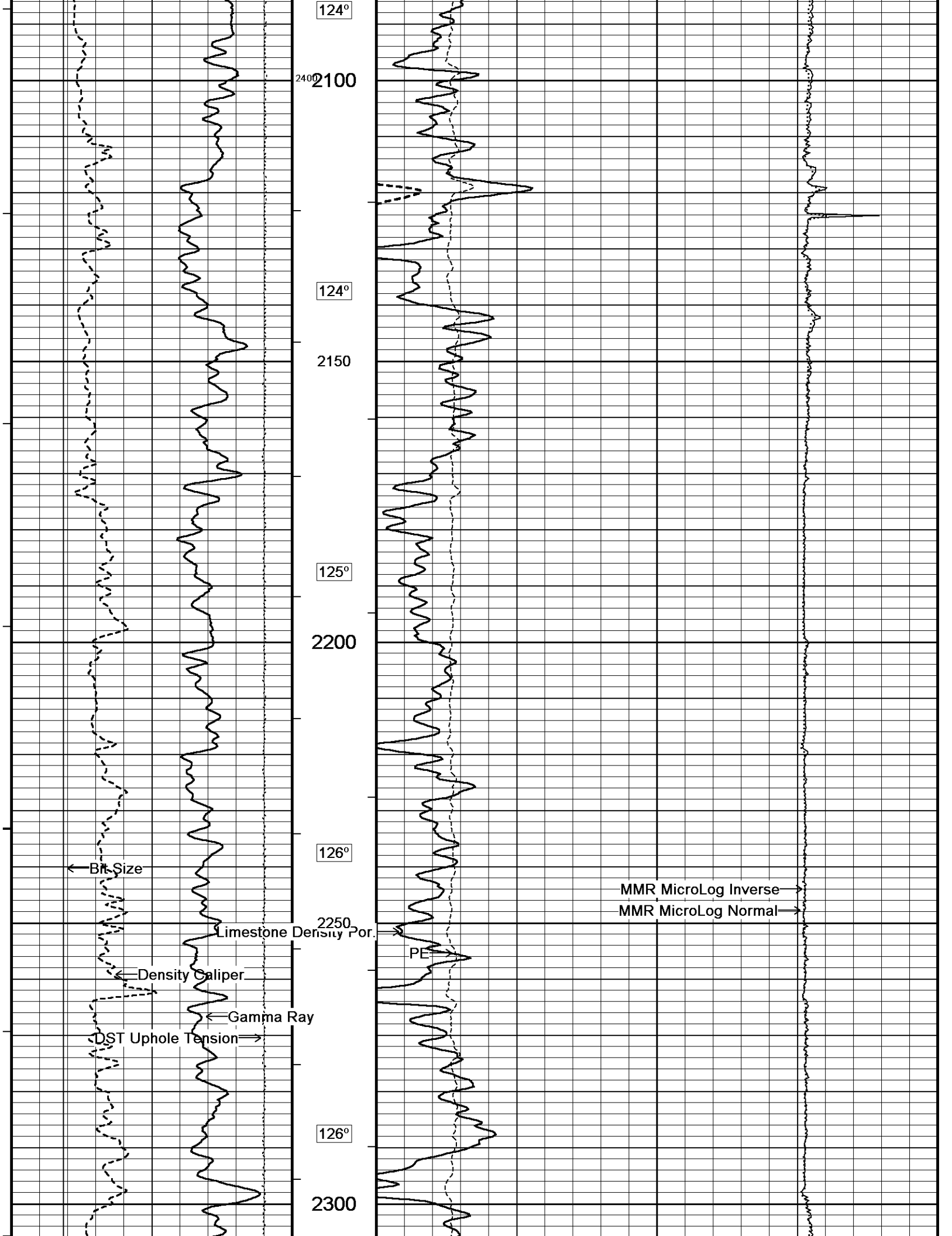


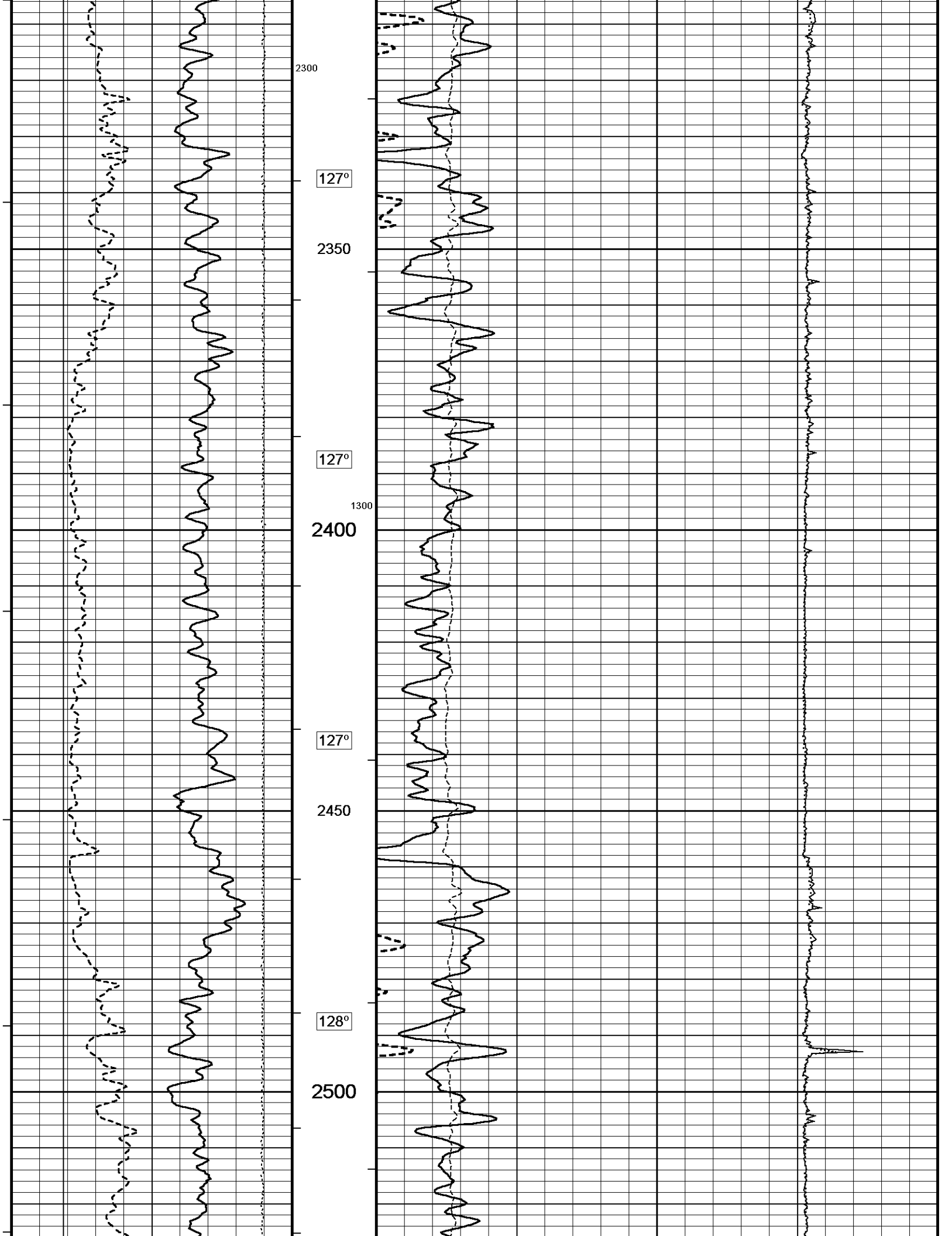


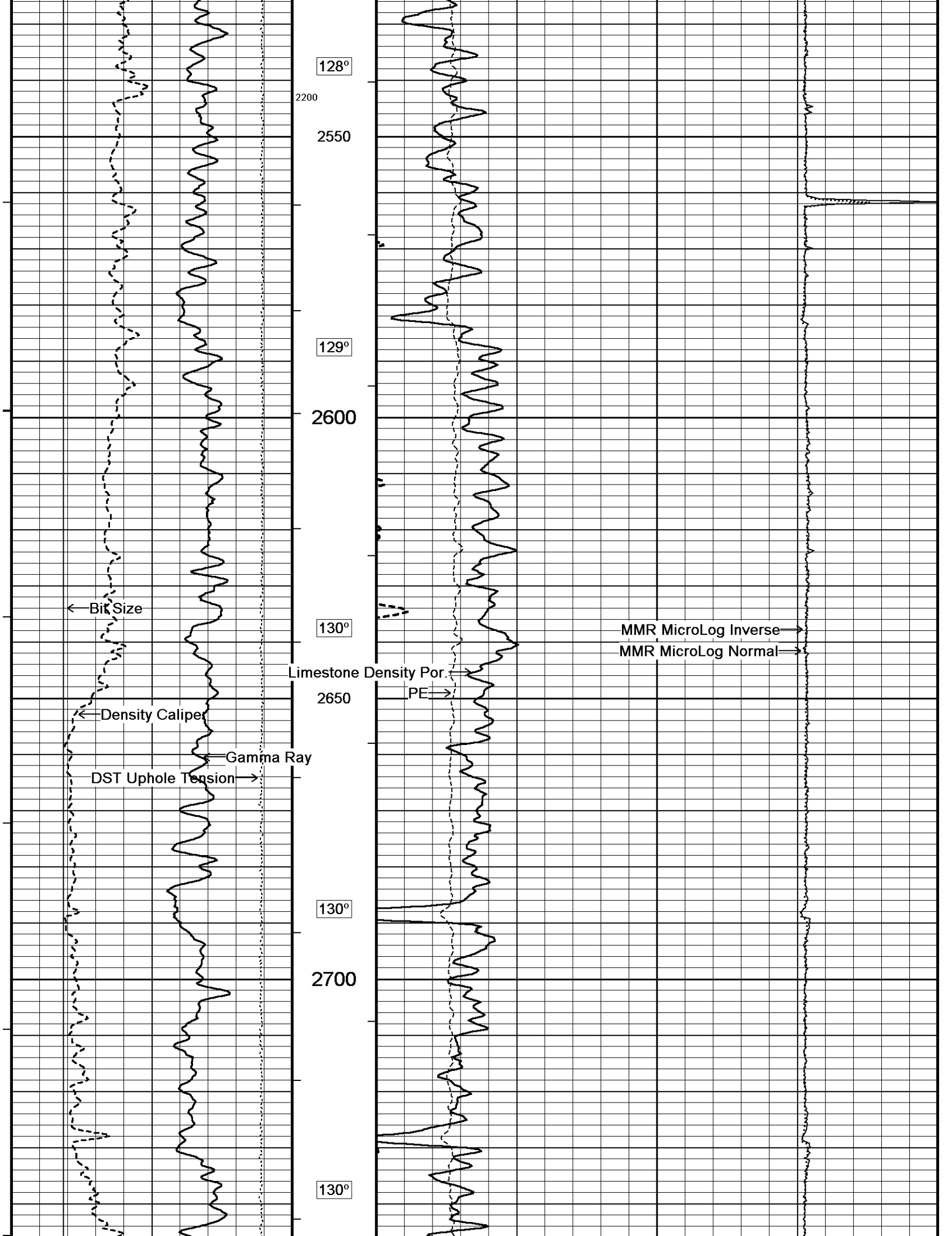


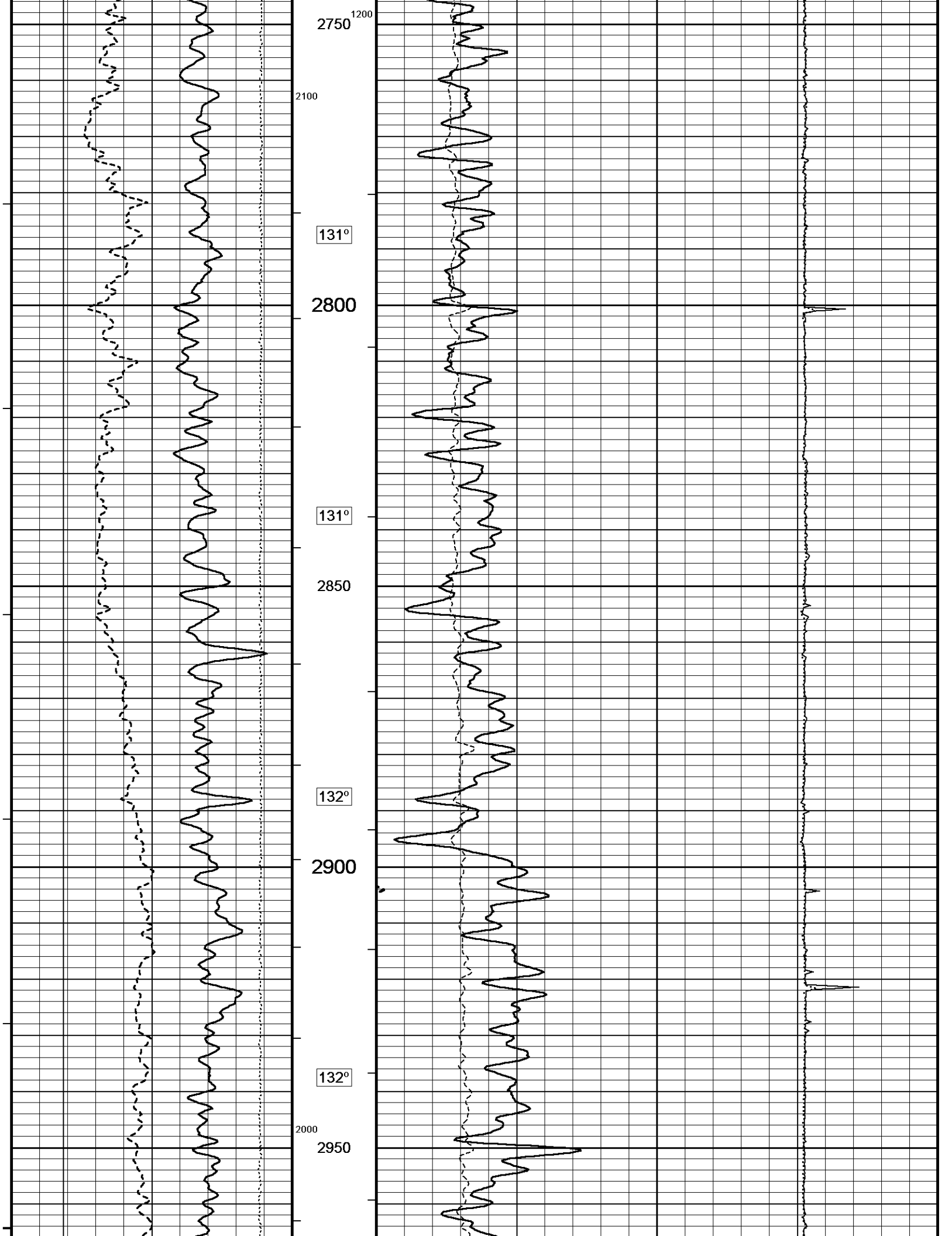


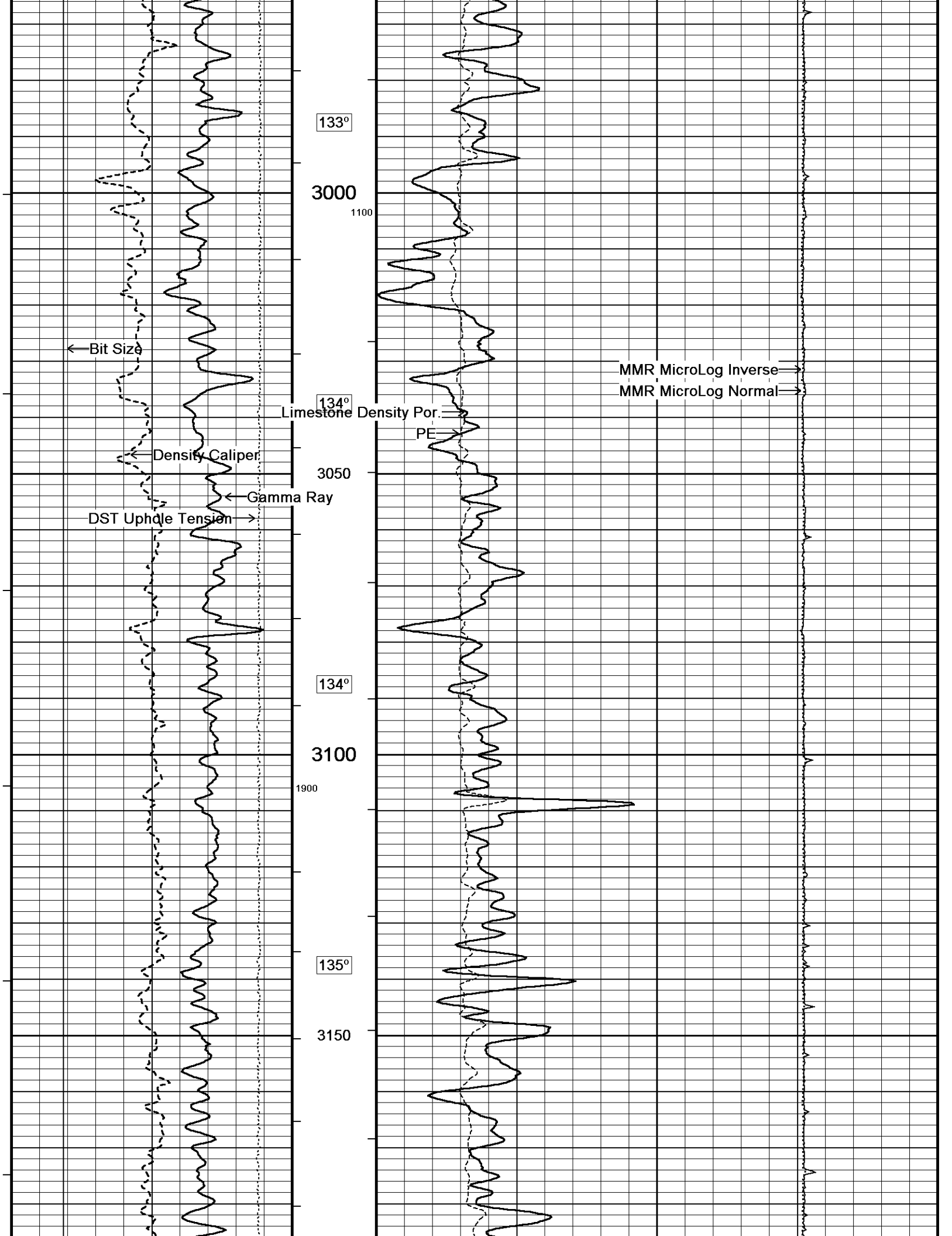


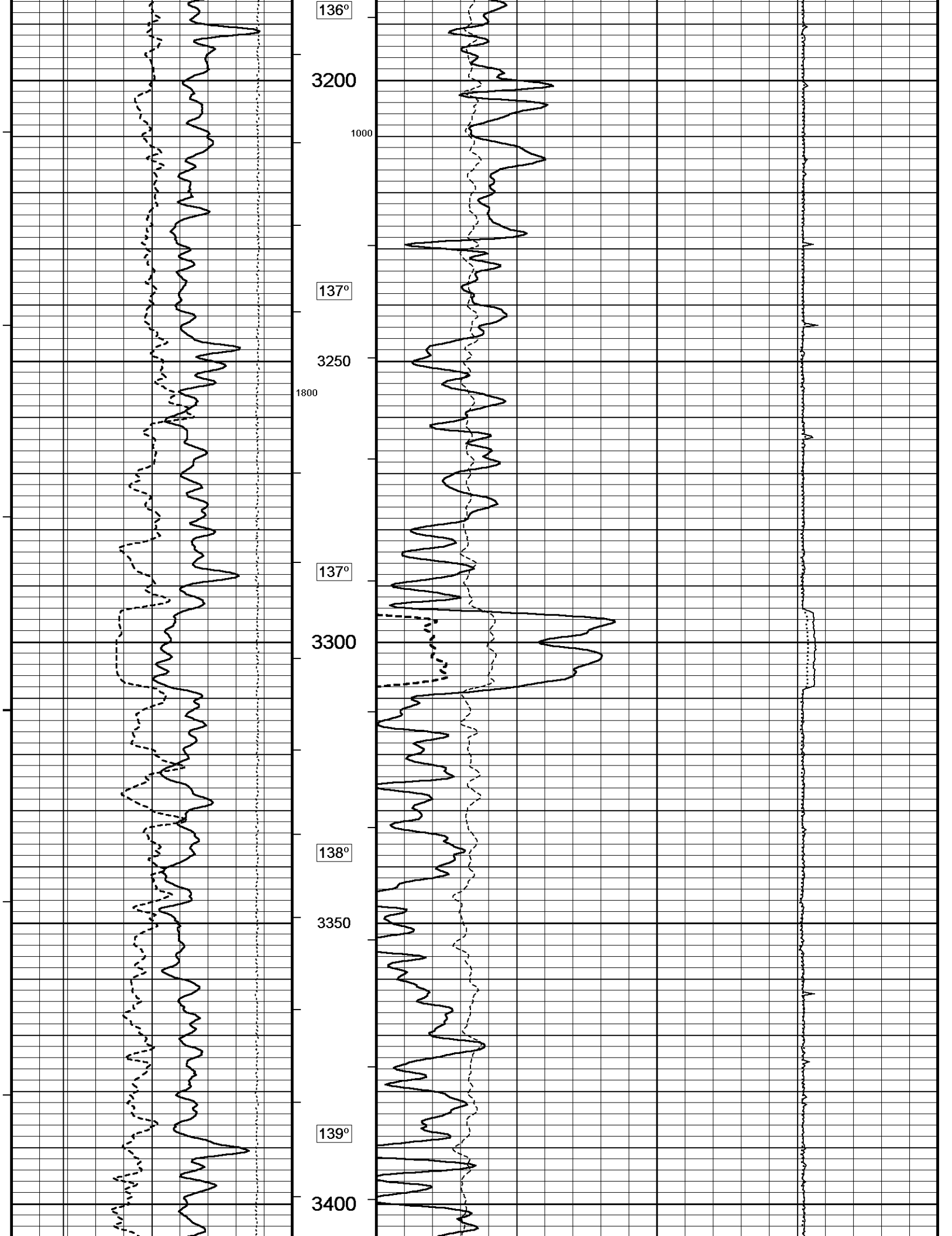




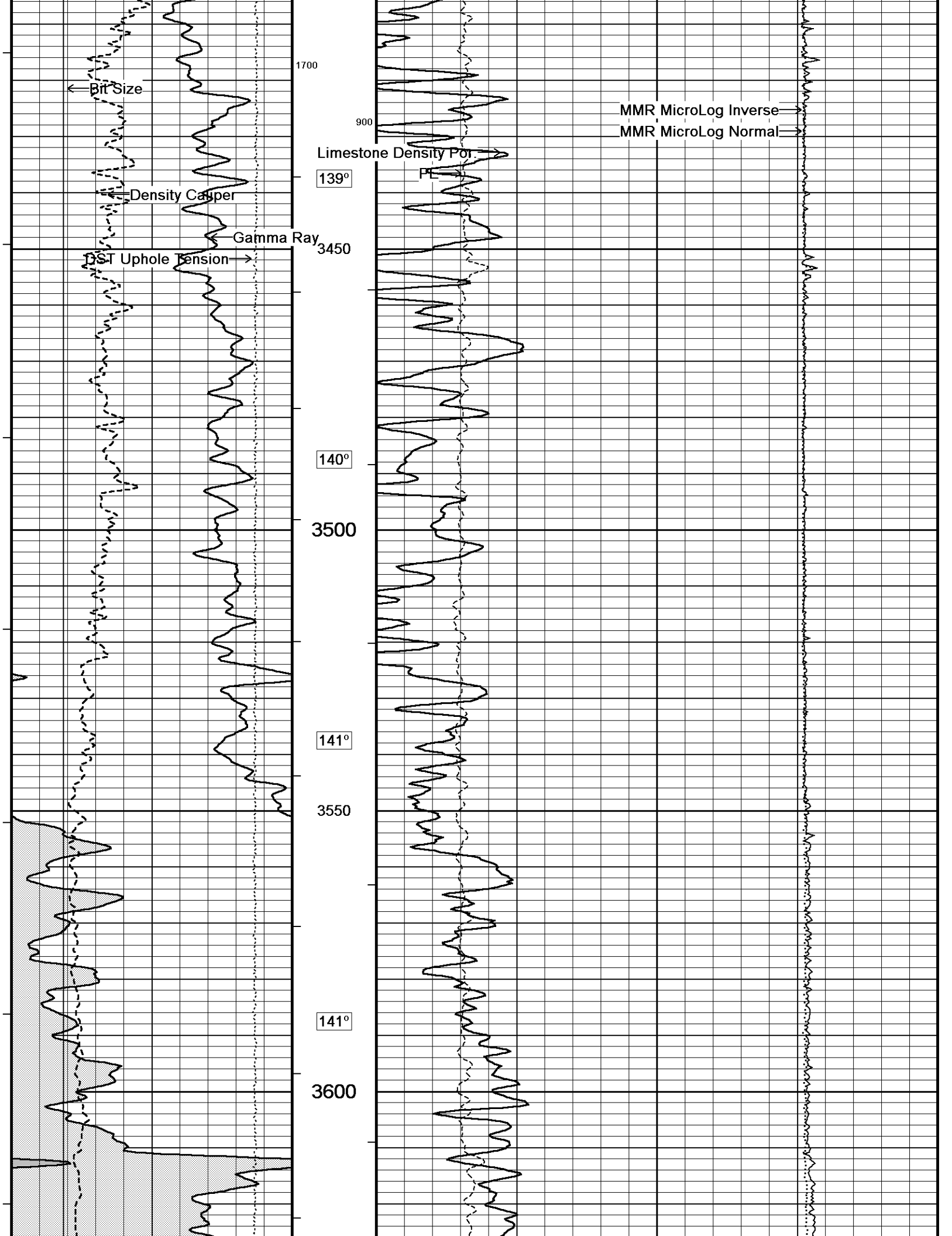


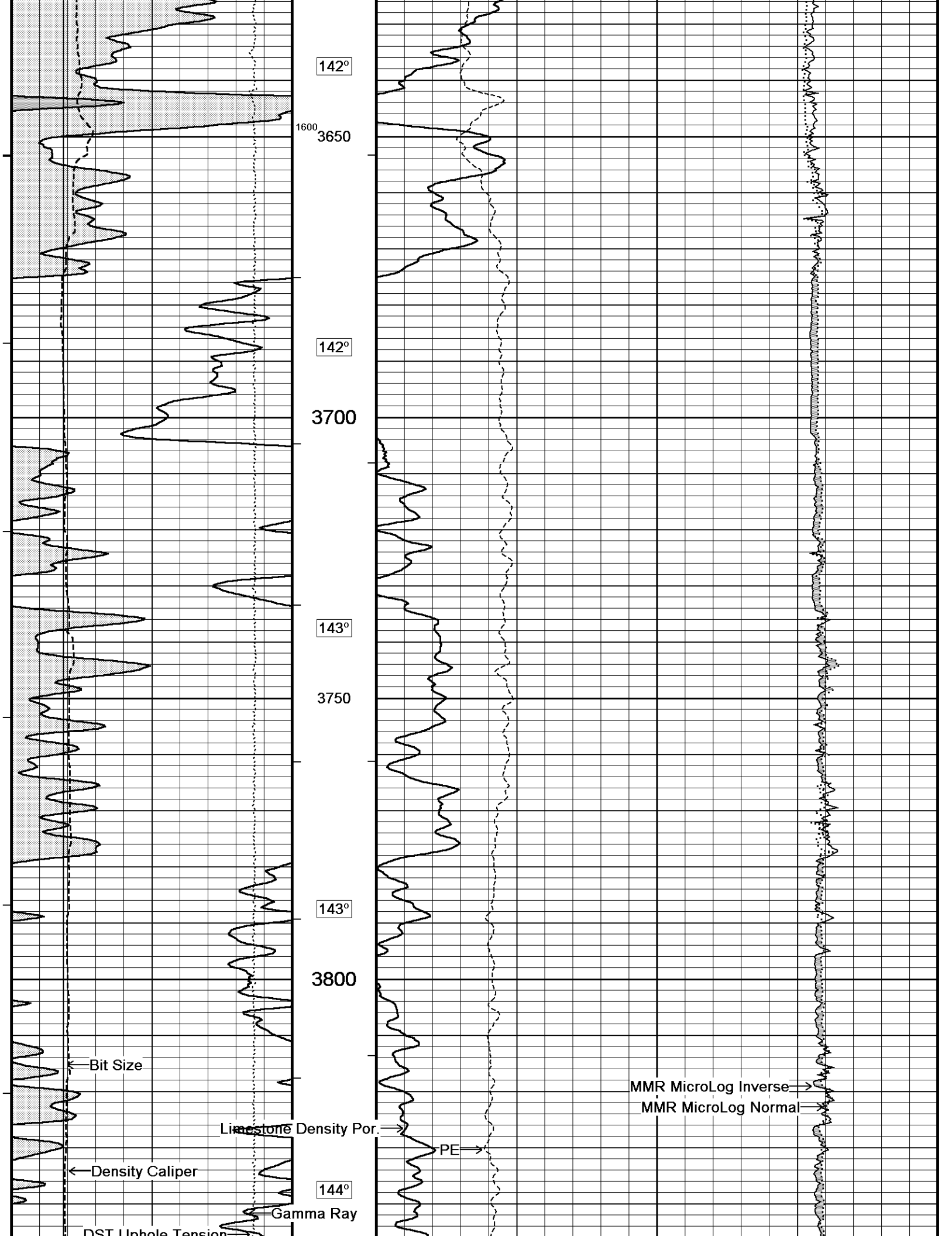


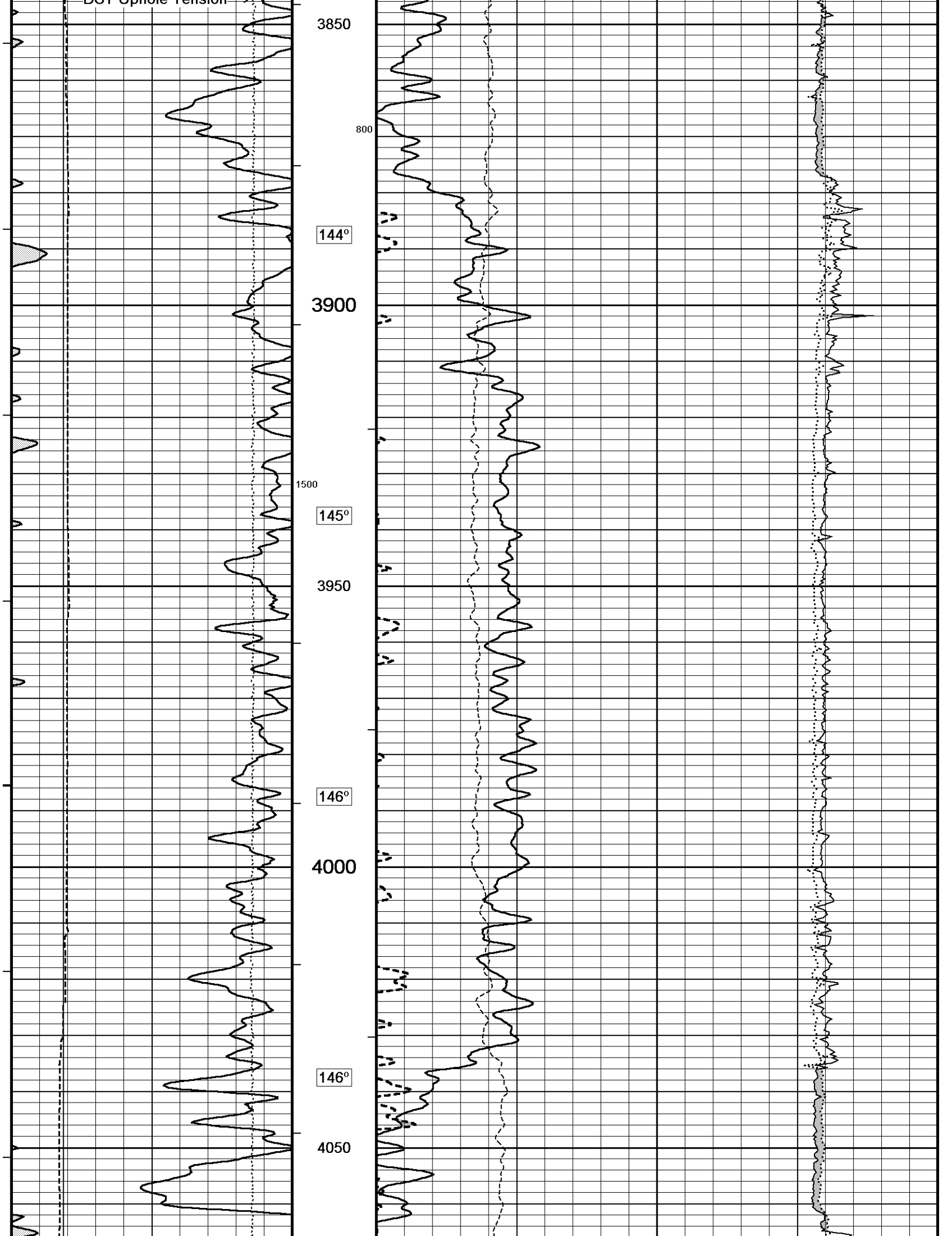


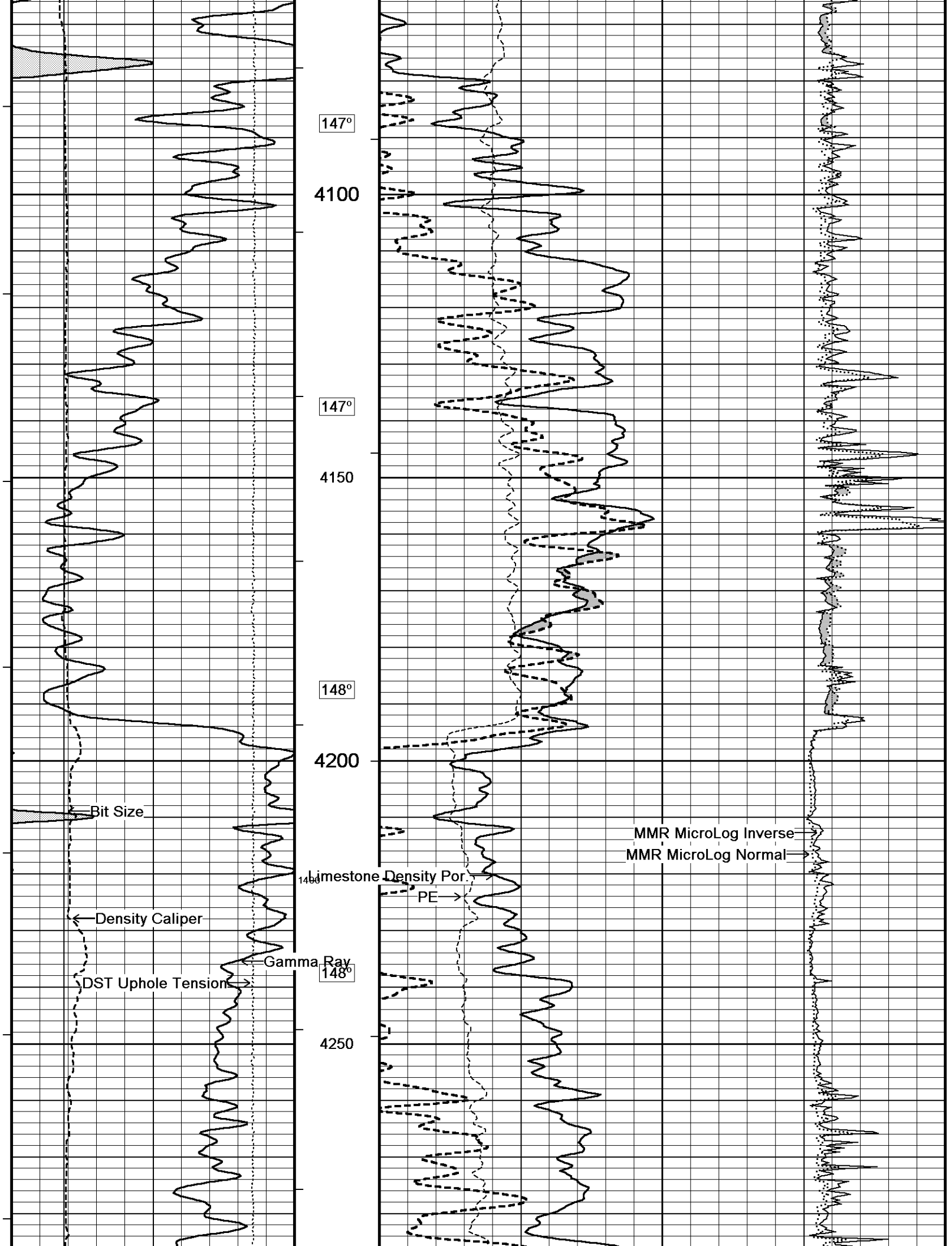


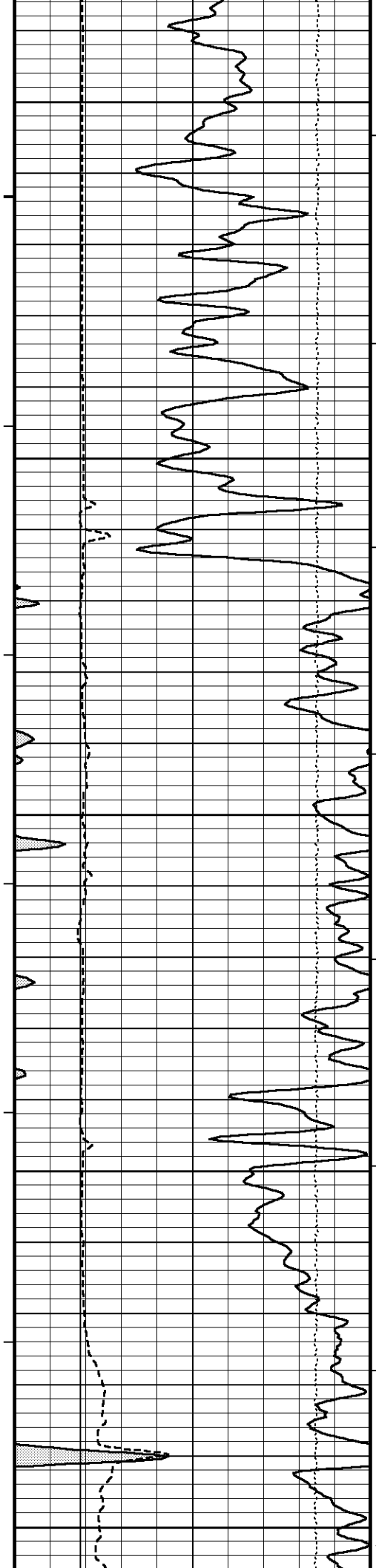




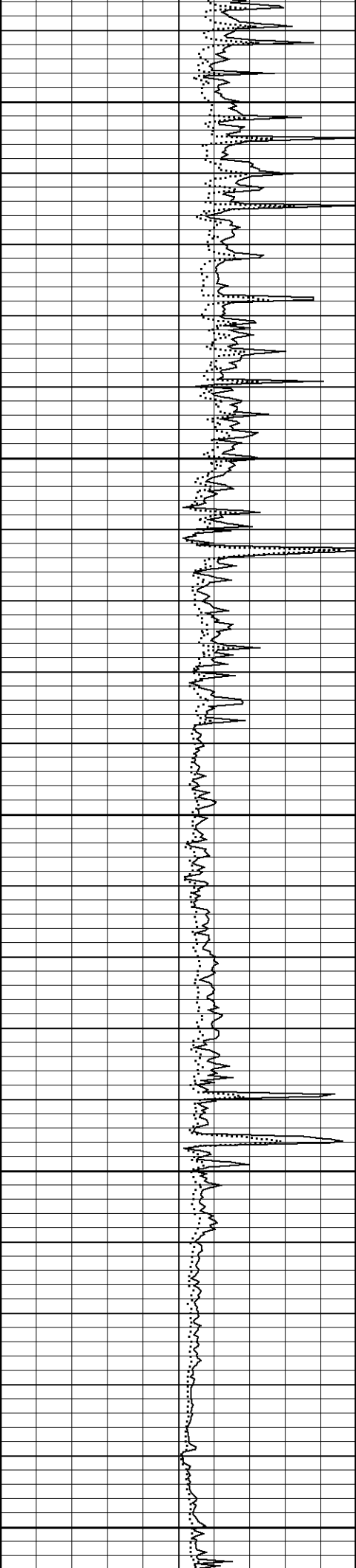
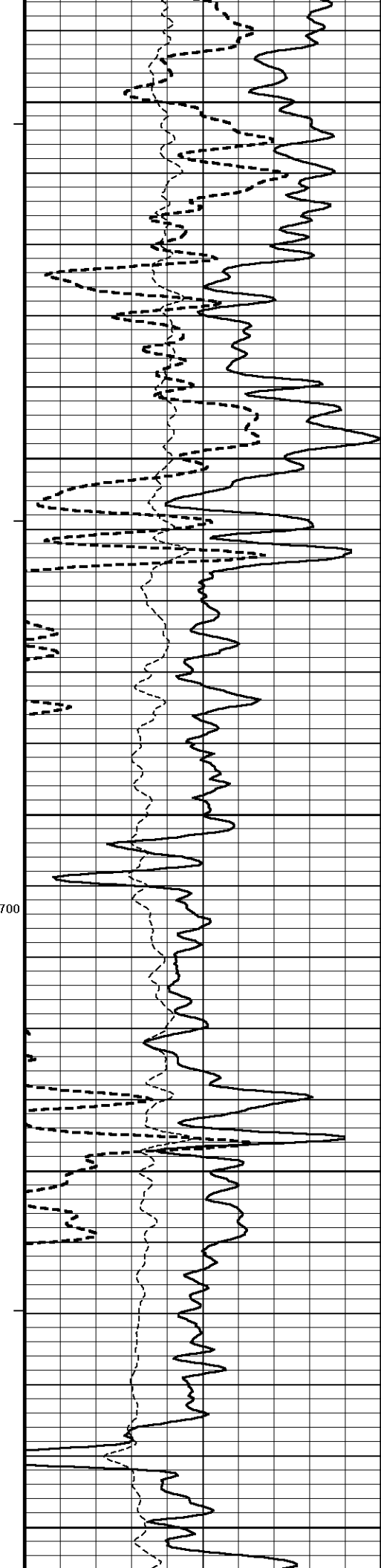


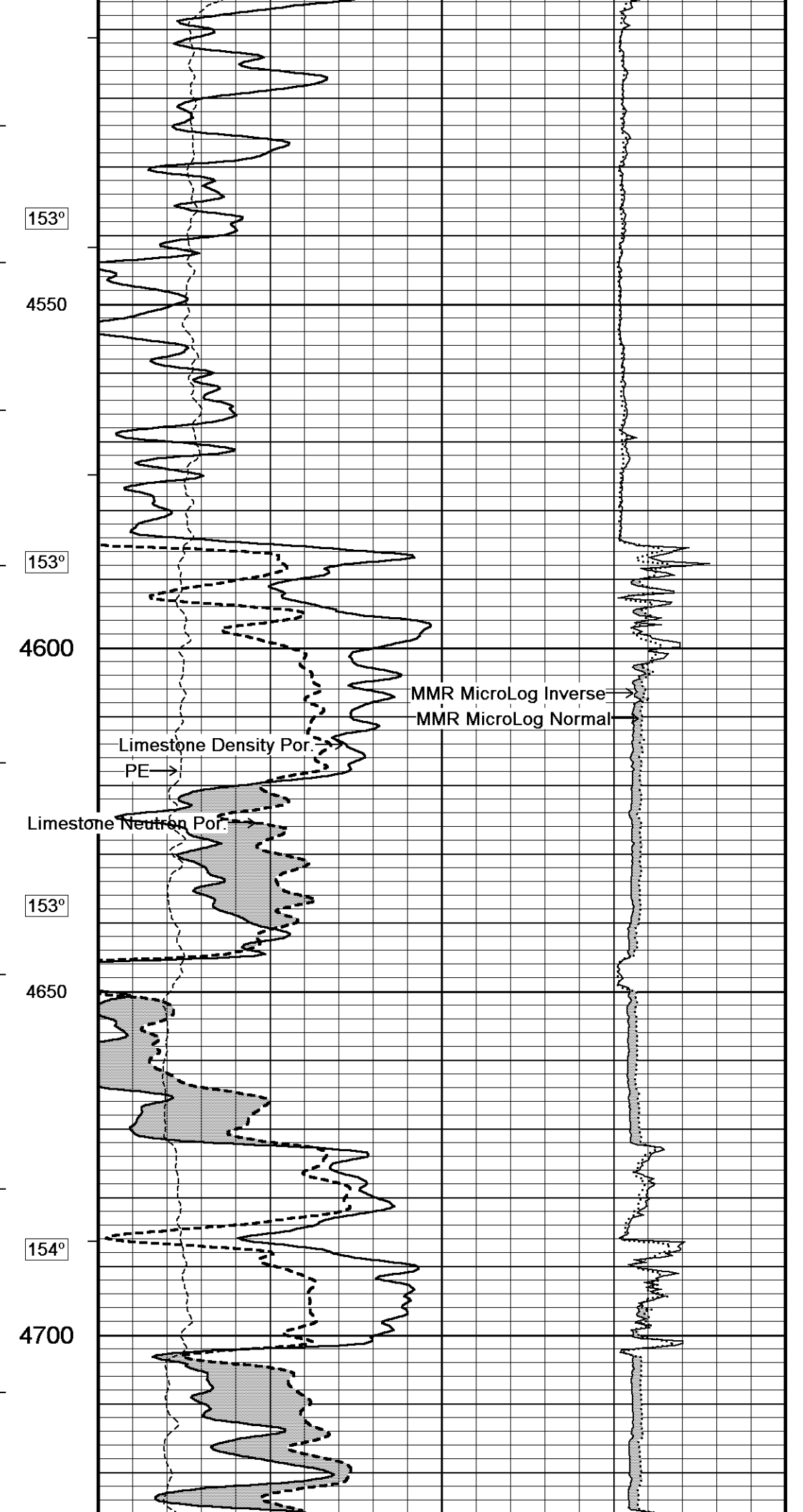
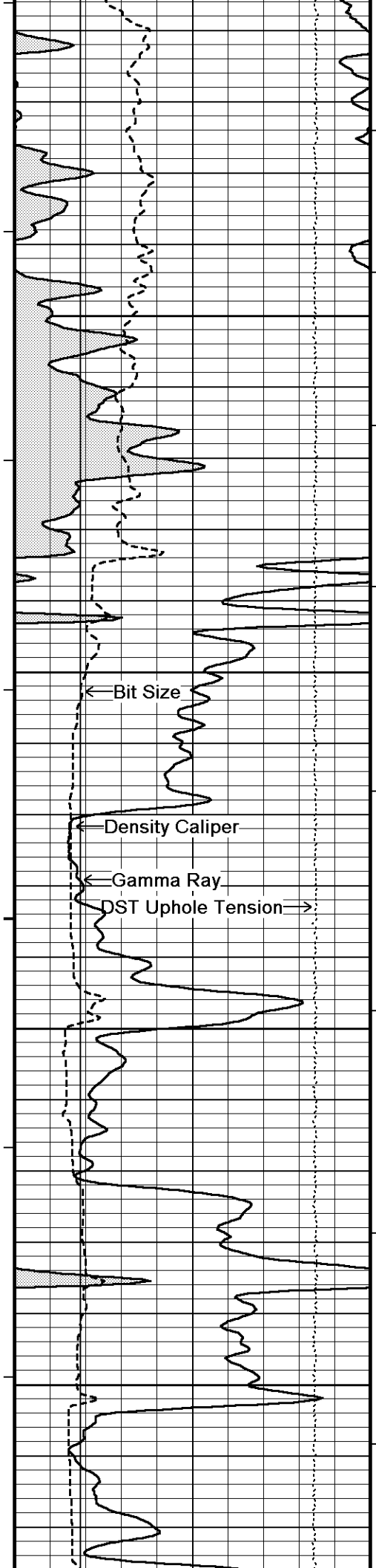


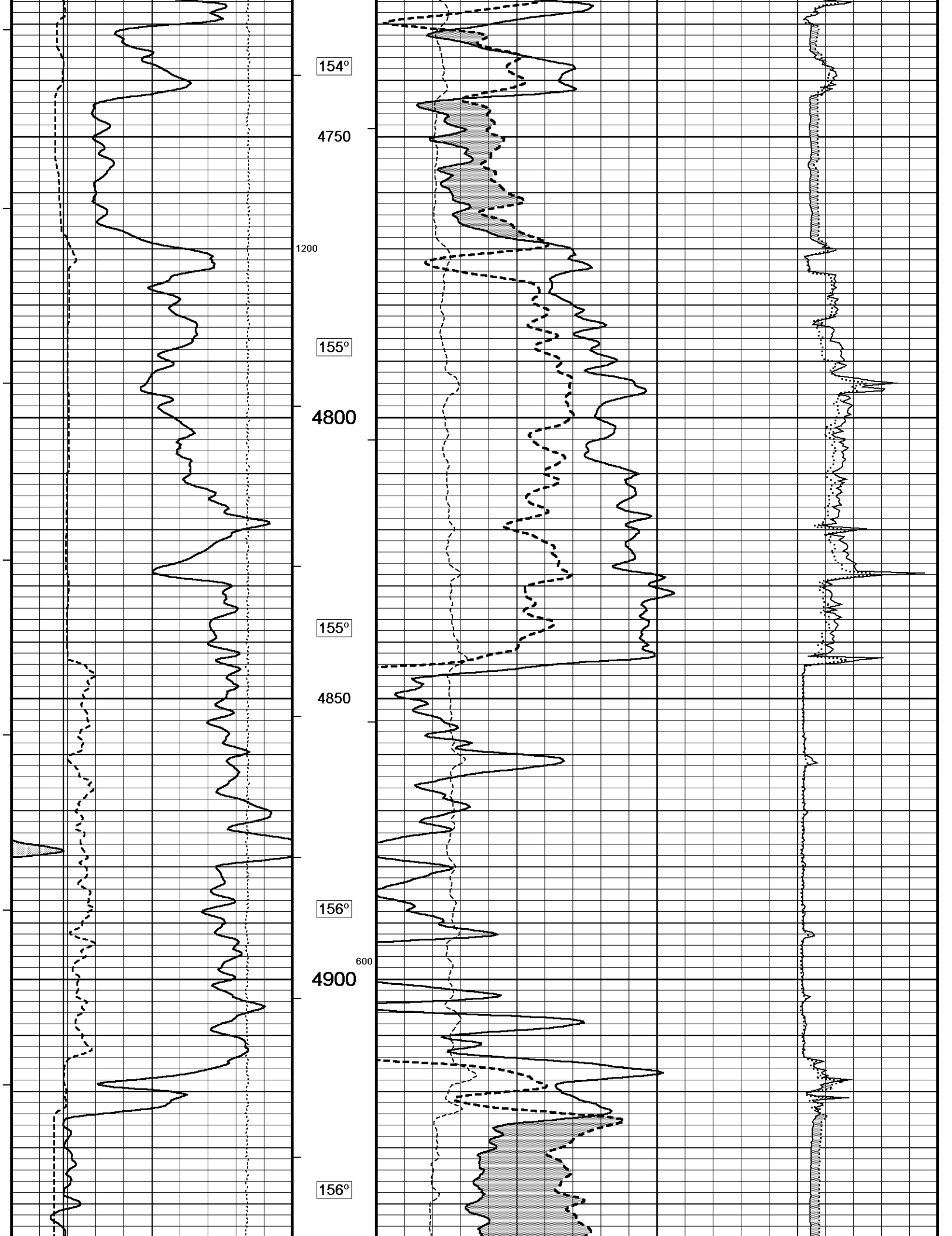


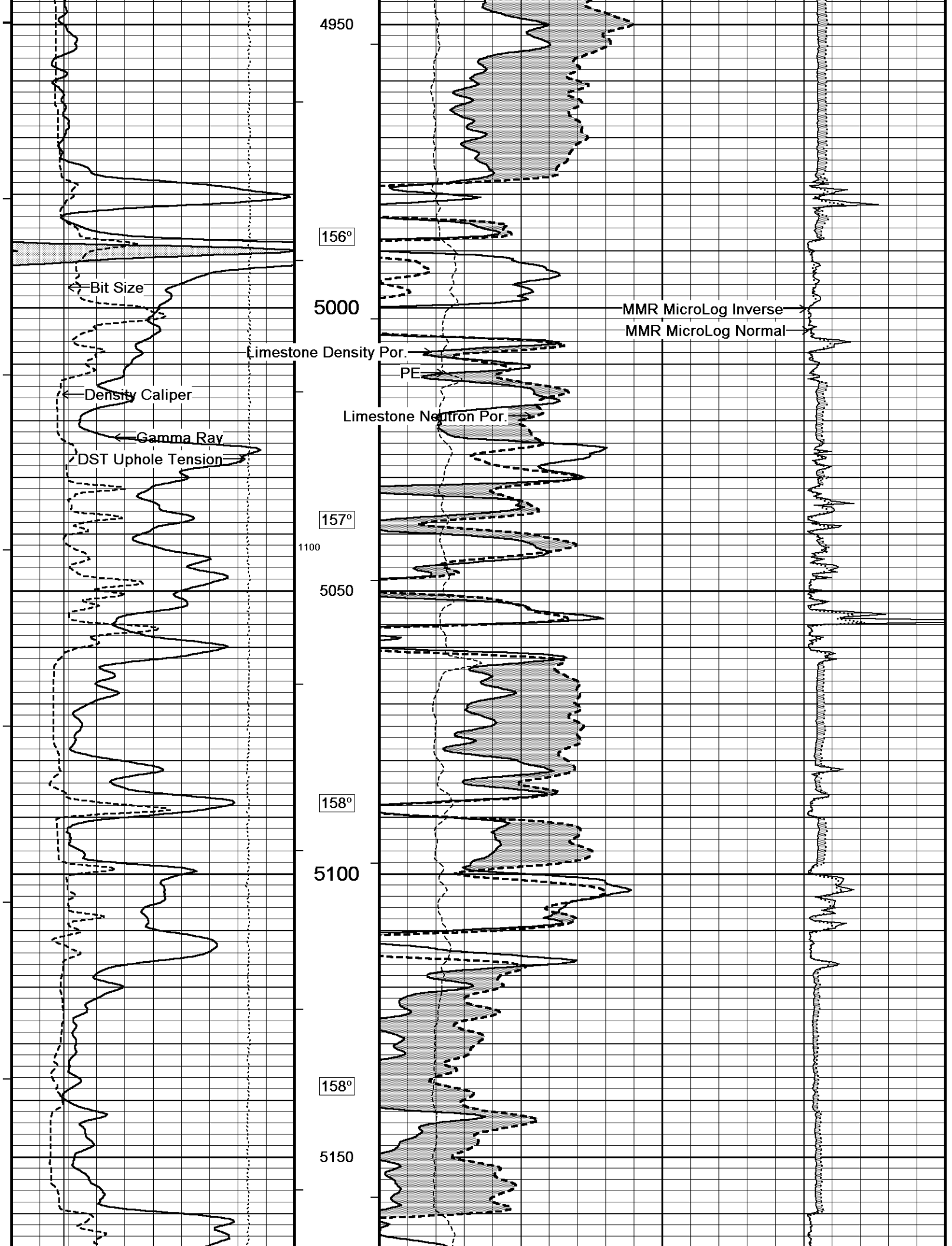


149°  
4300  
149°  
4350  
150°  
4400  
700  
151°  
4450  
152°  
4500  
1300

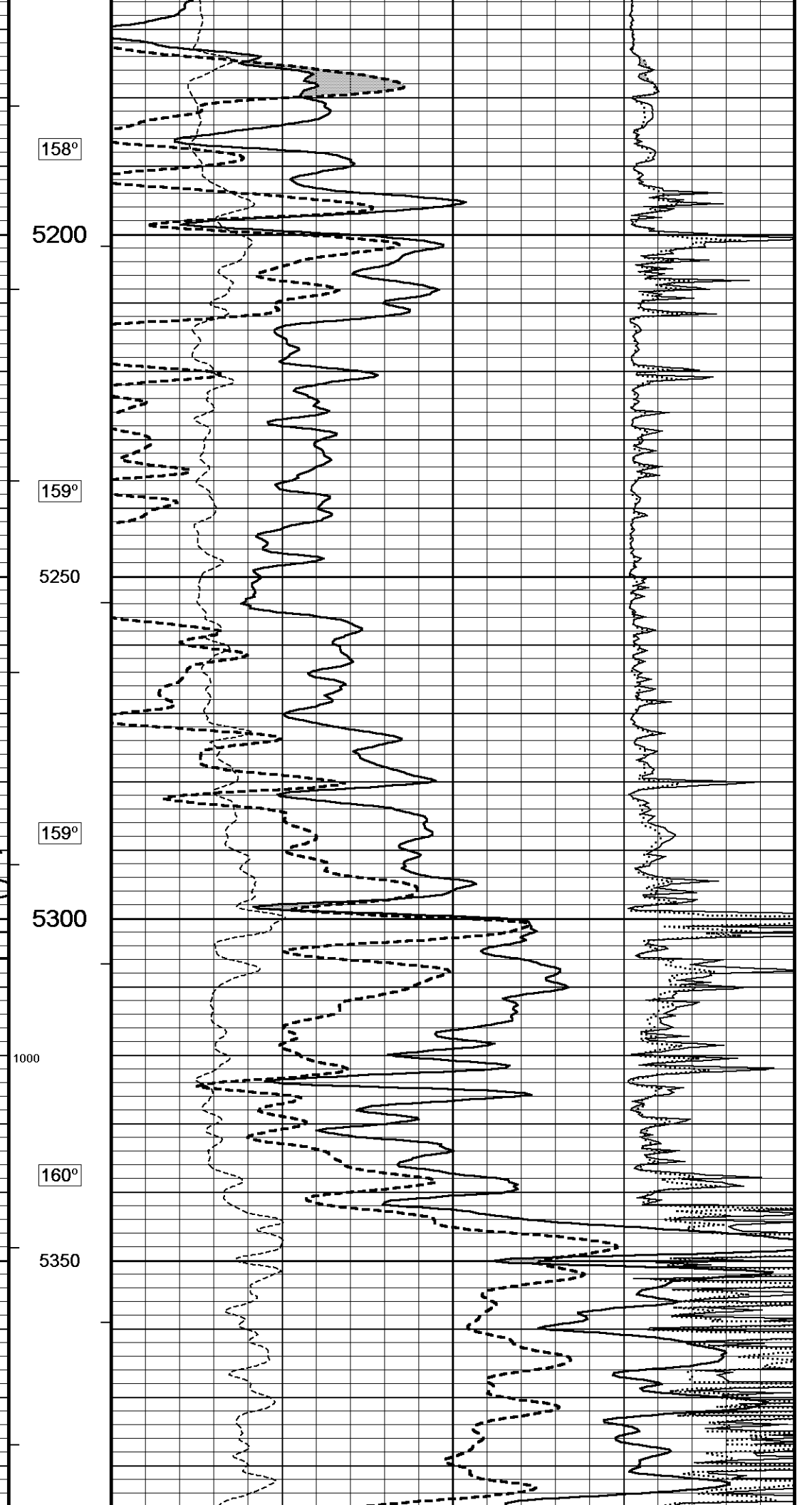
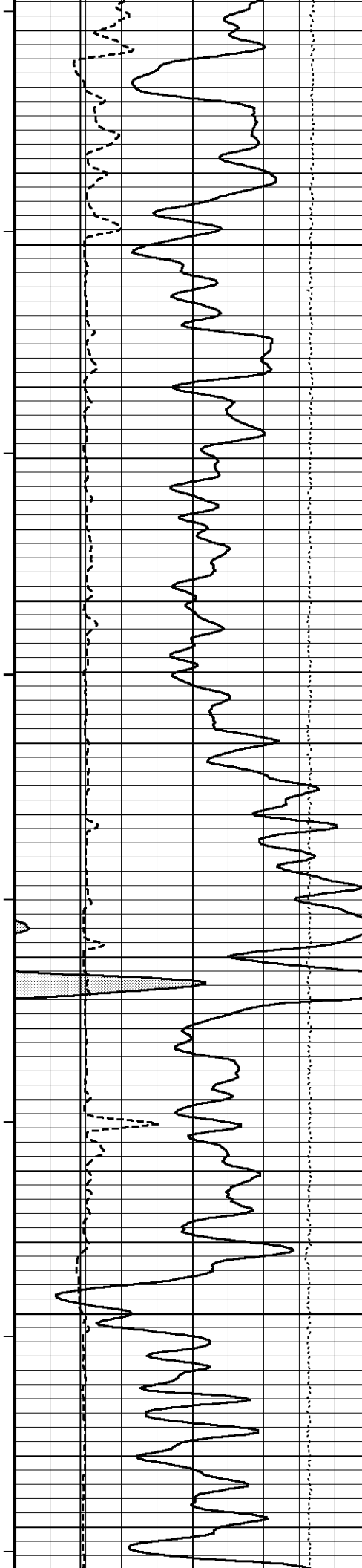


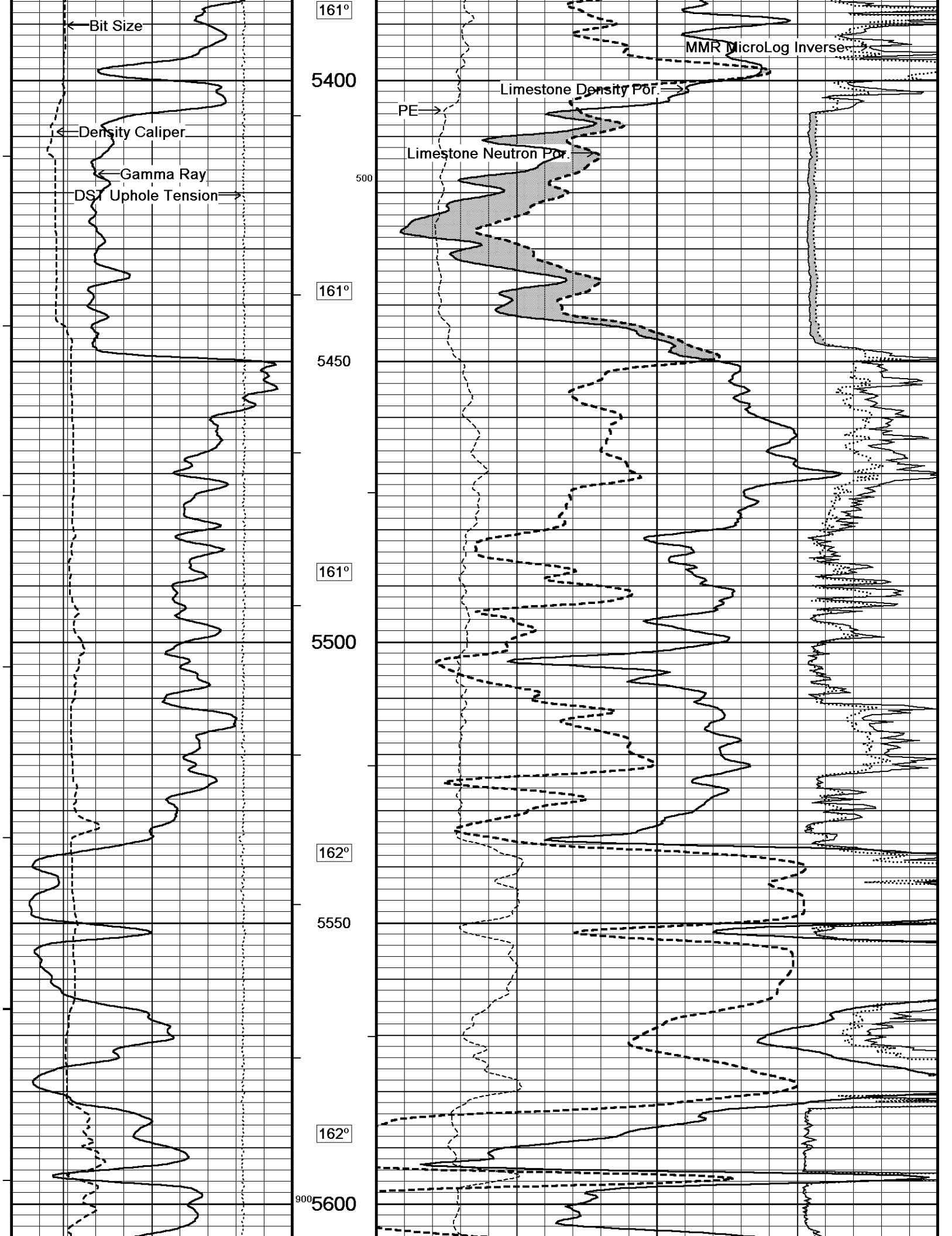


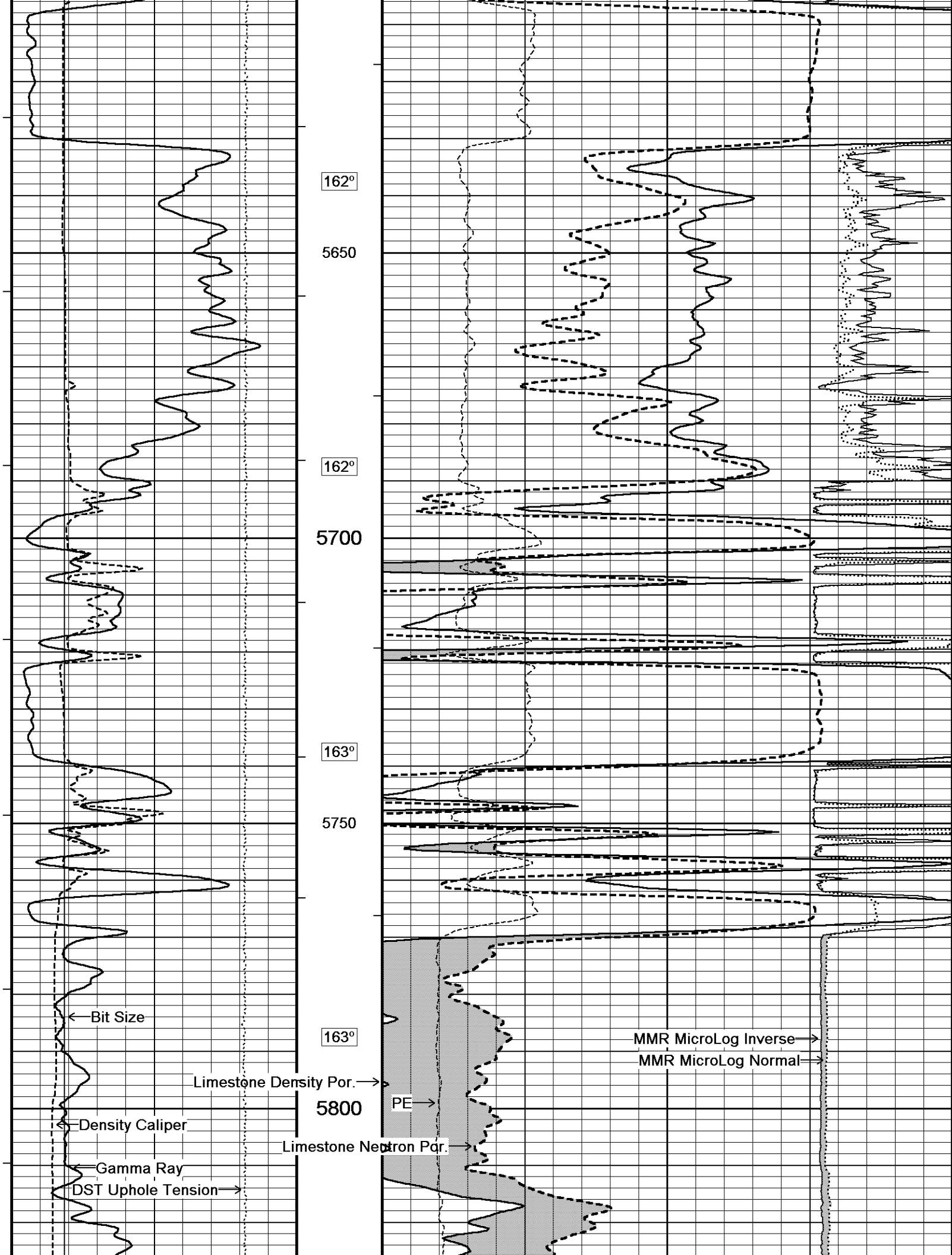


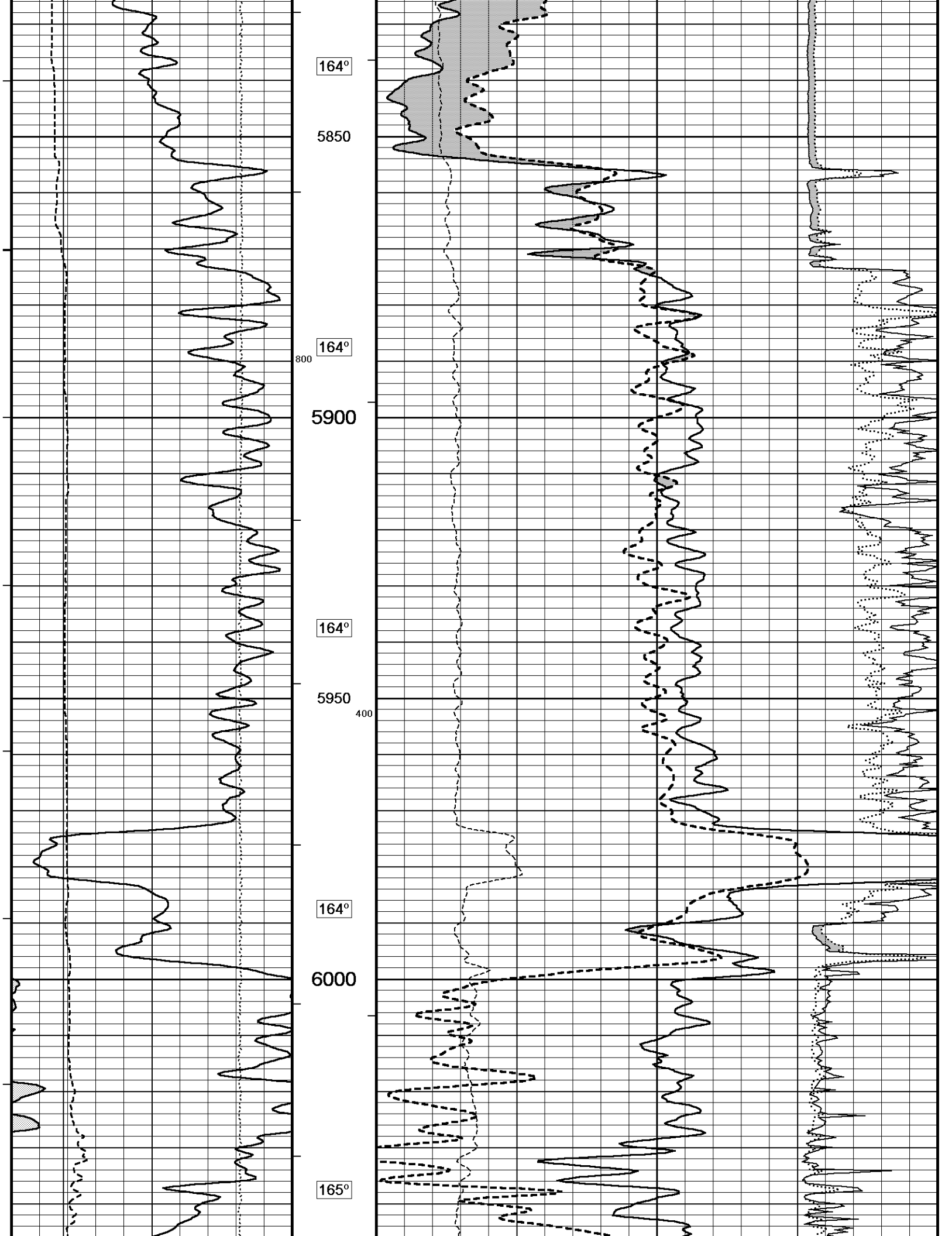


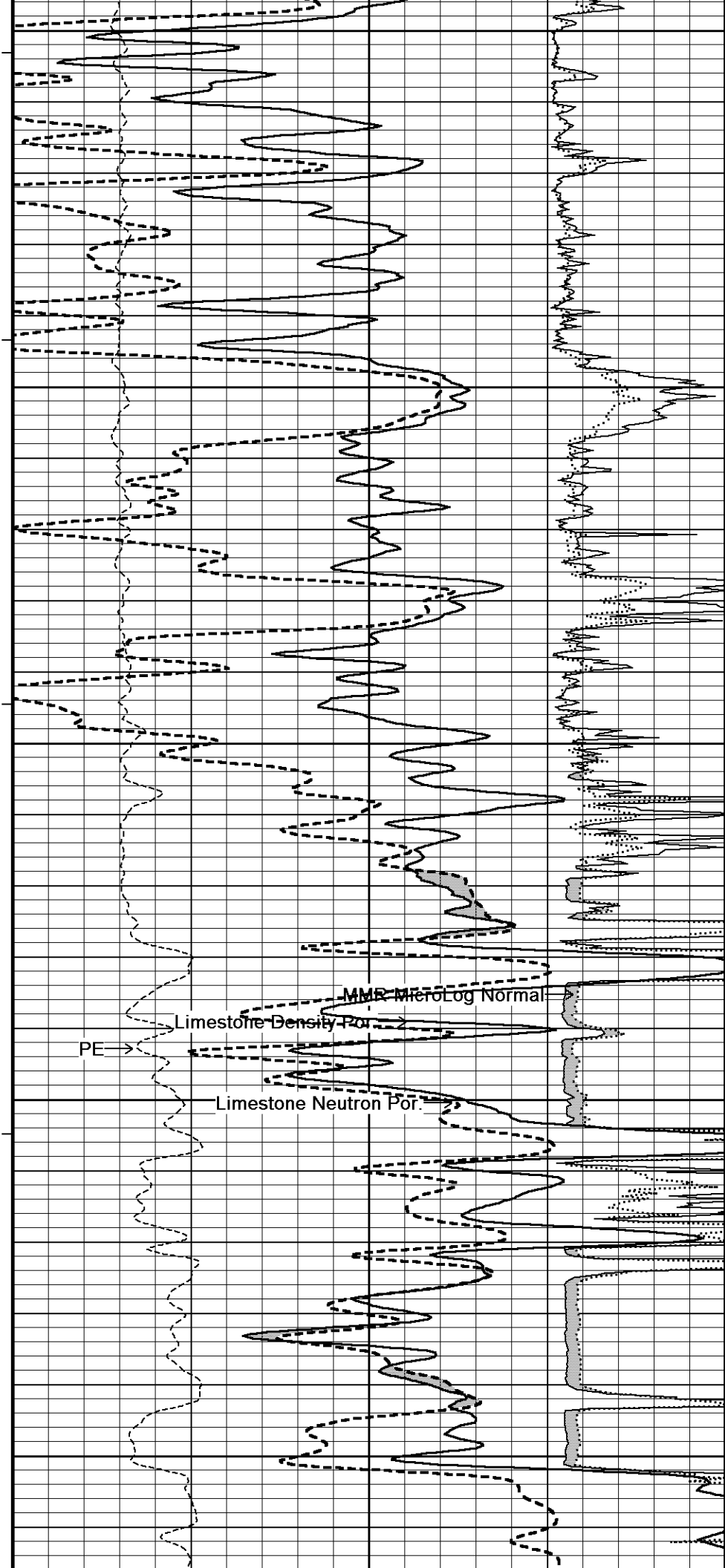
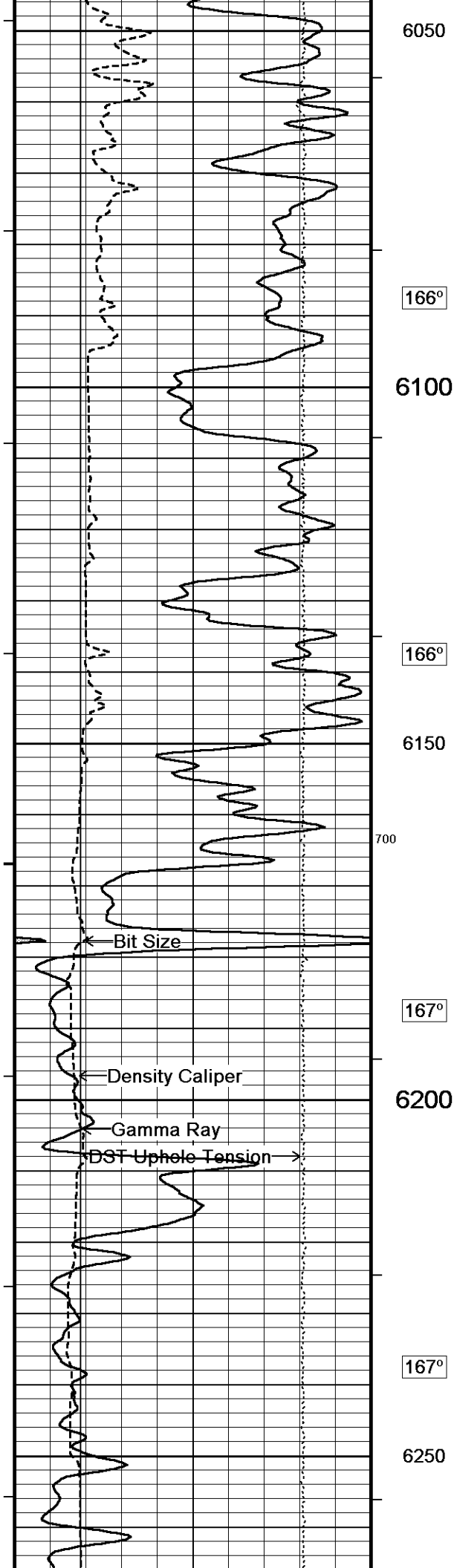


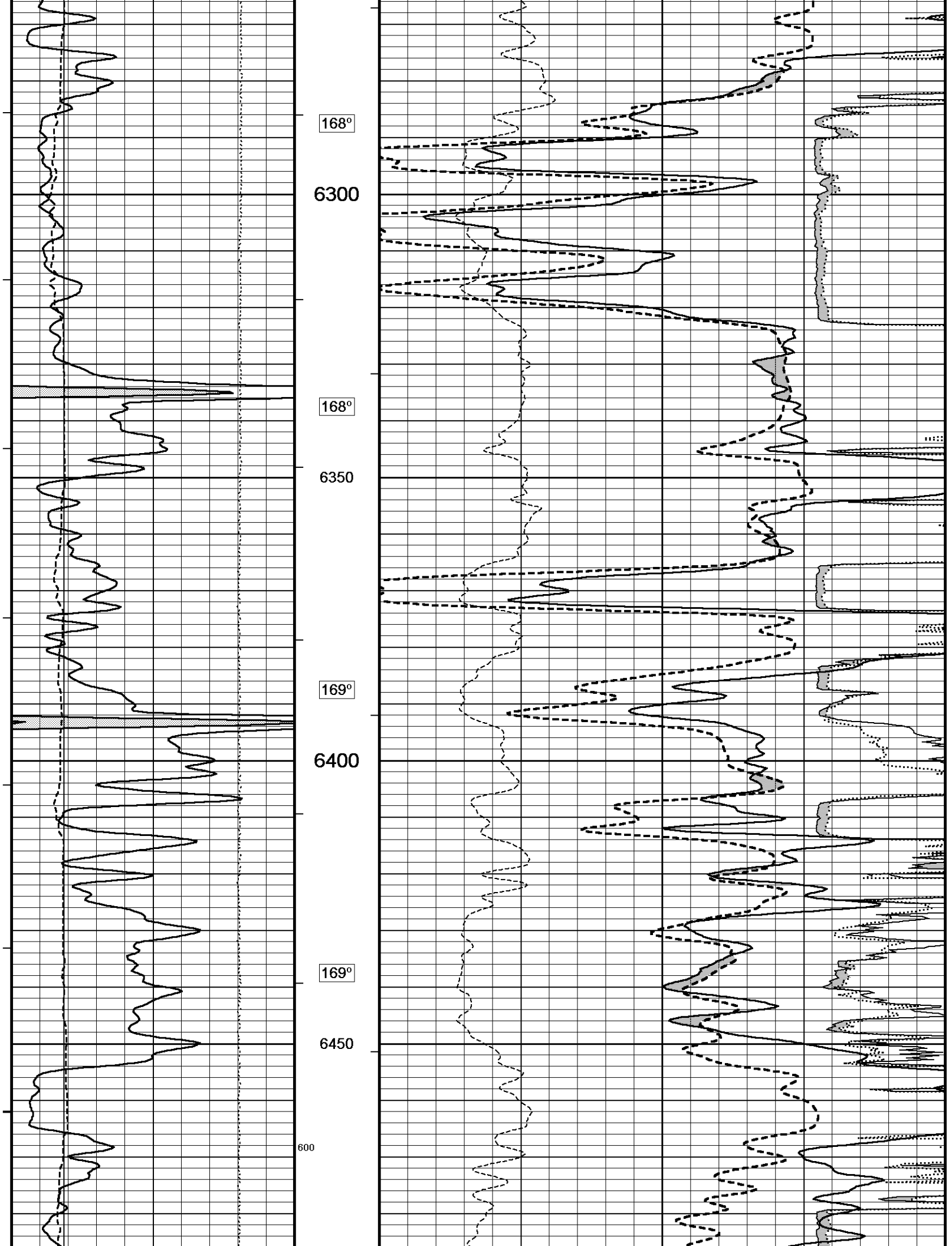


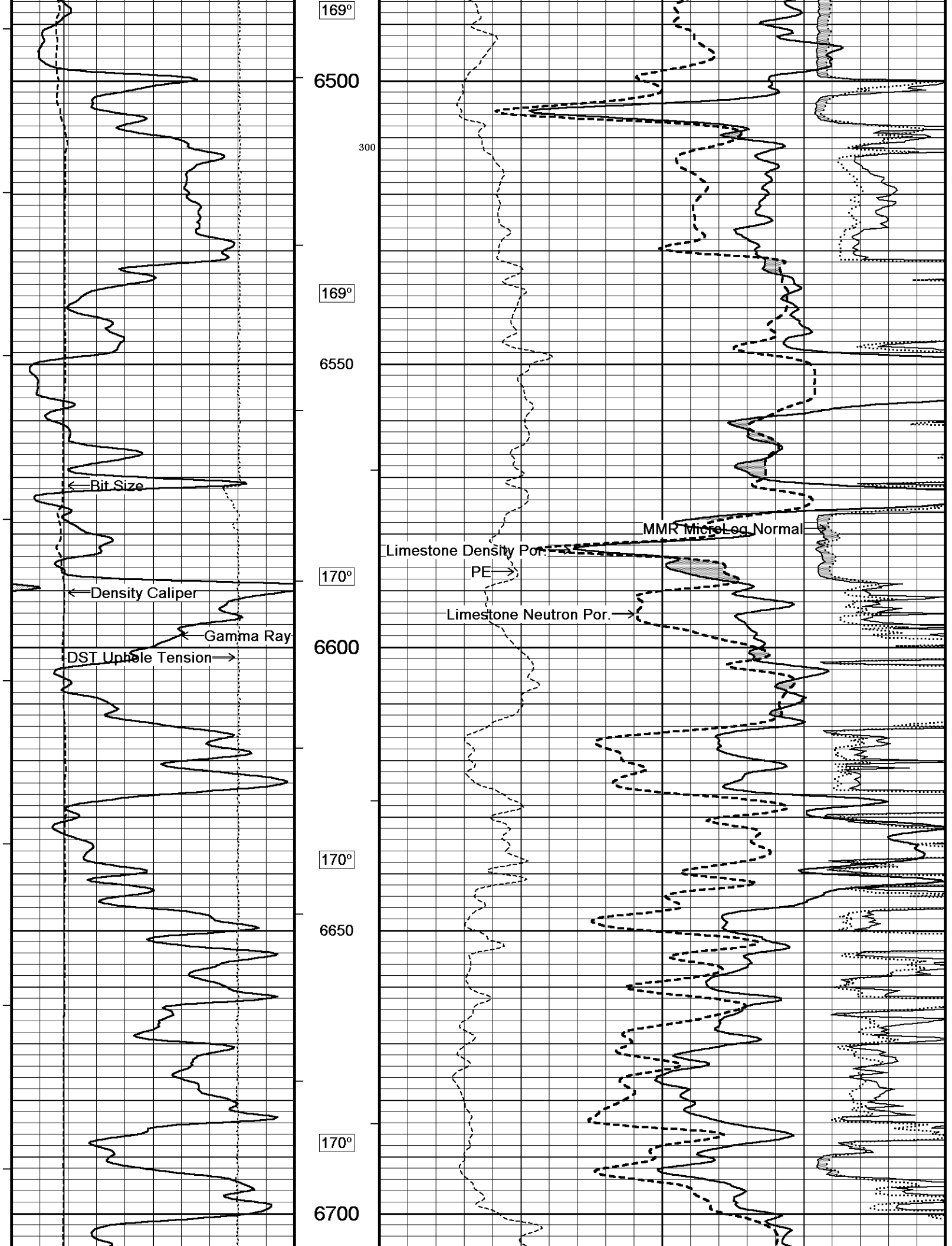


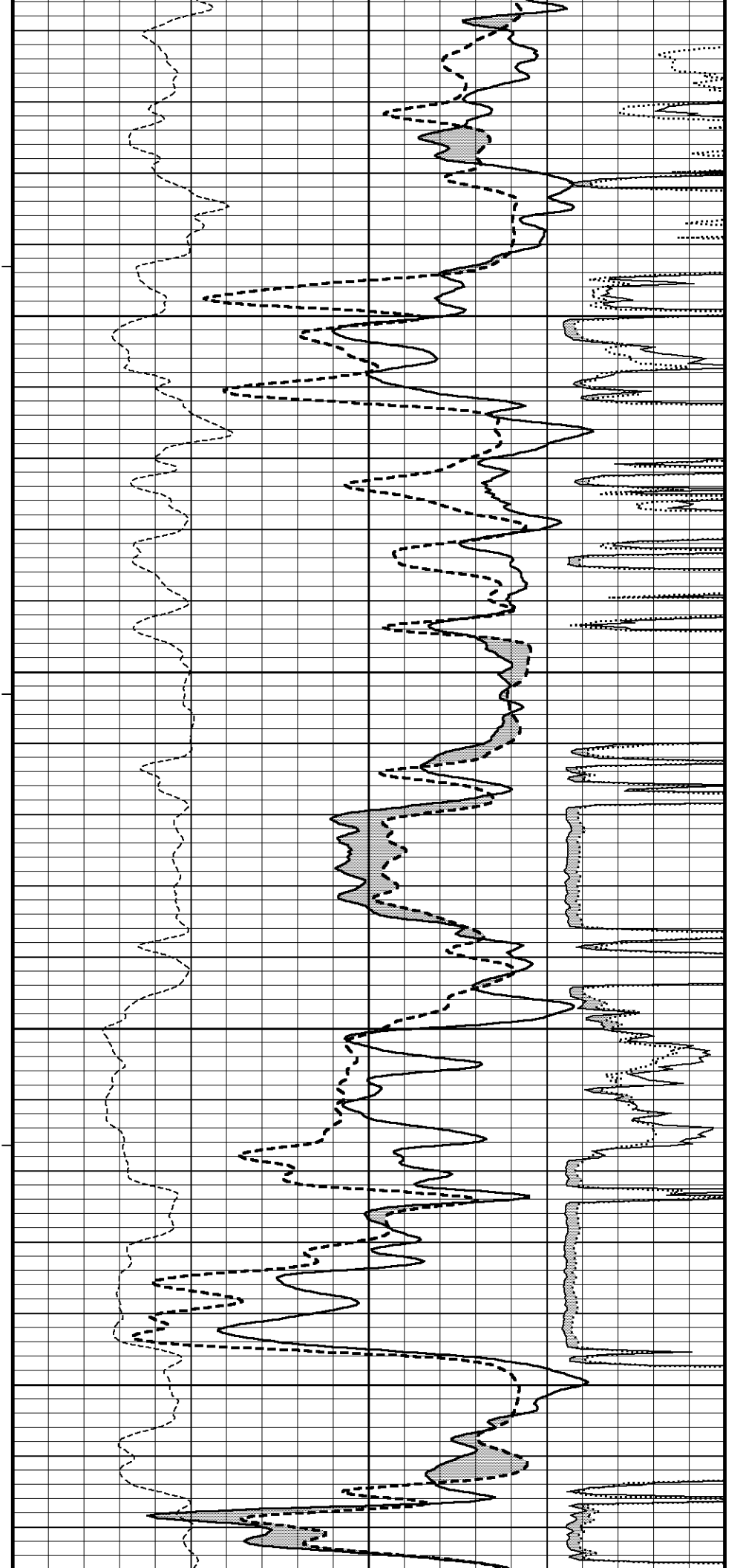
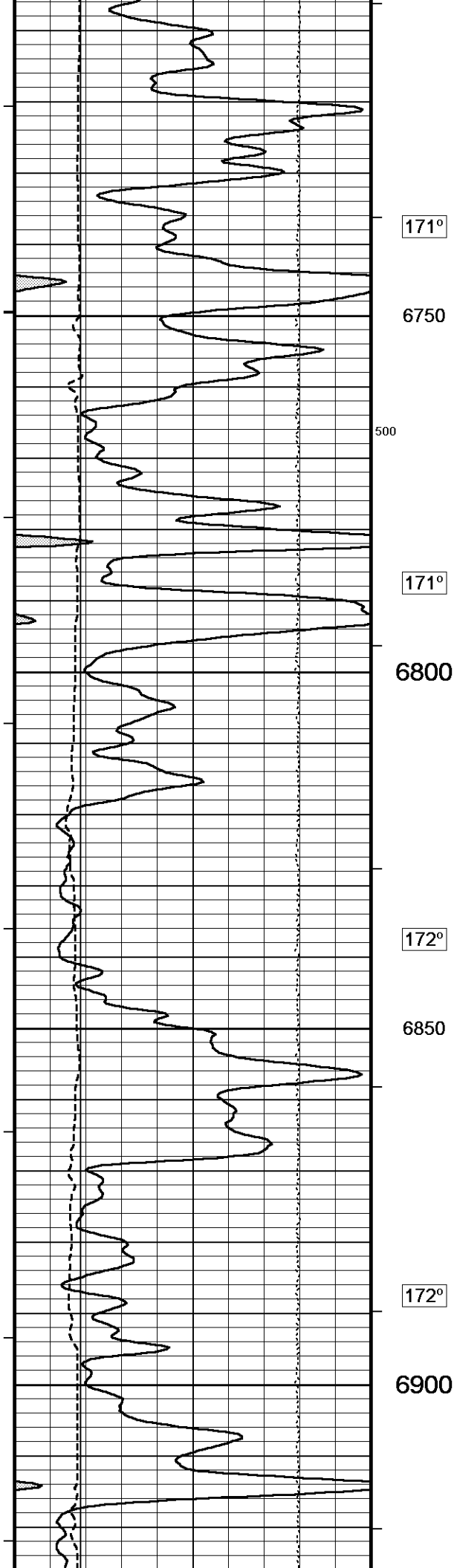




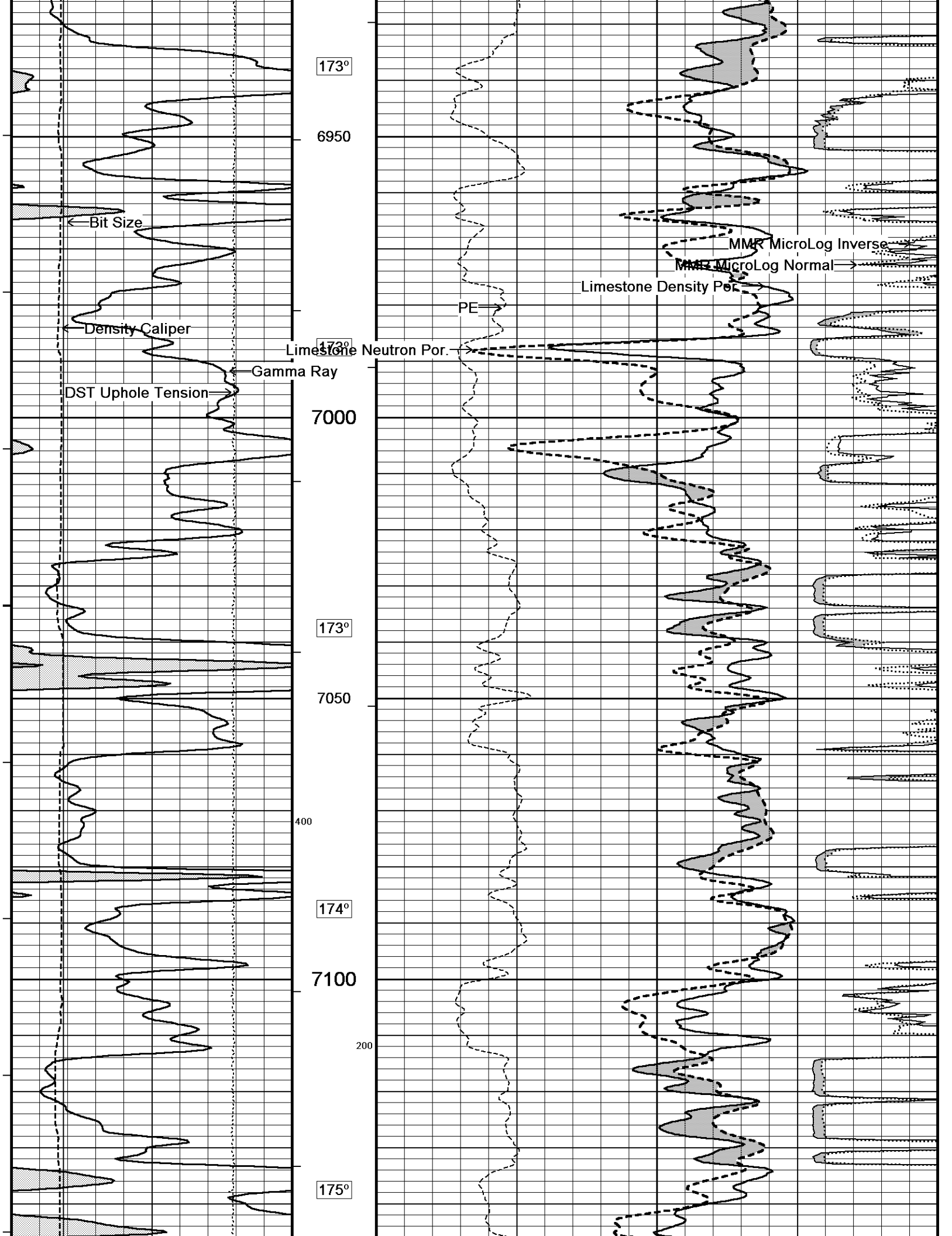


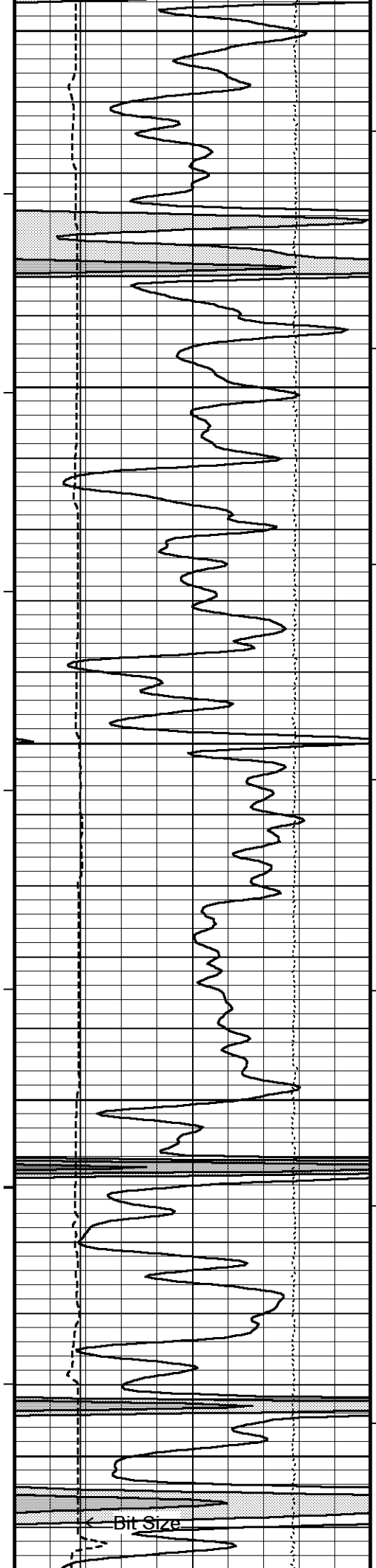












7150

175°

7200

176°

7250

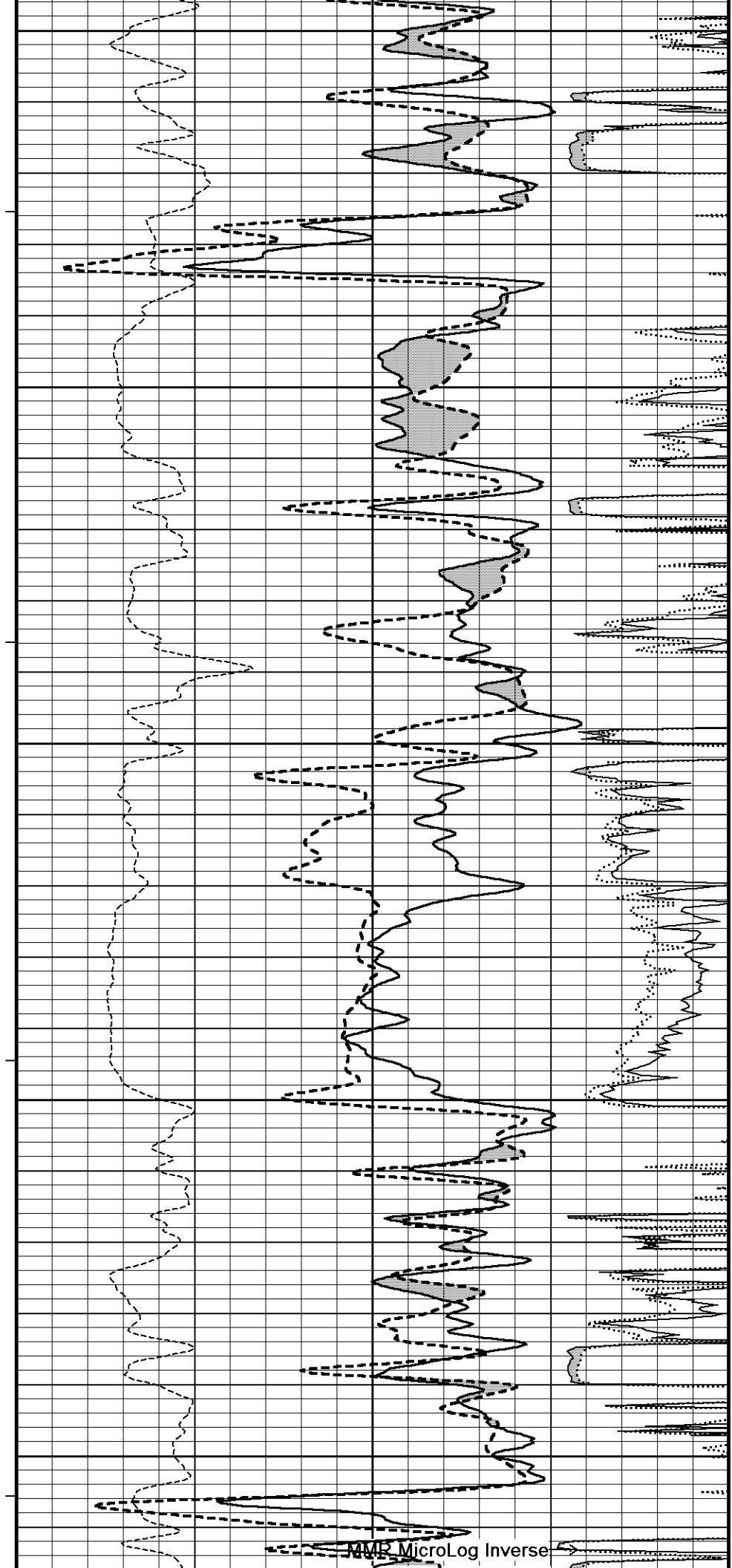
176°

7300

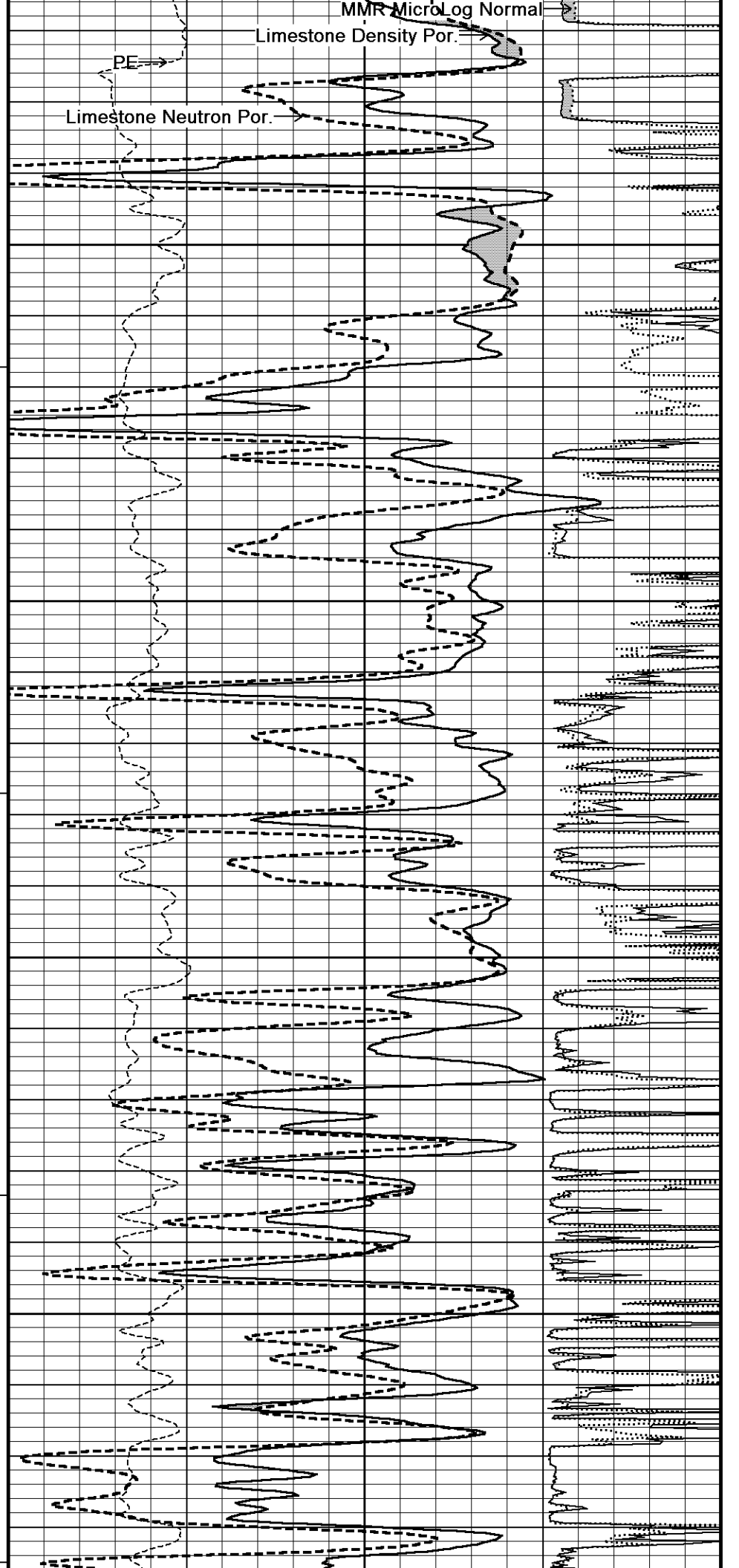
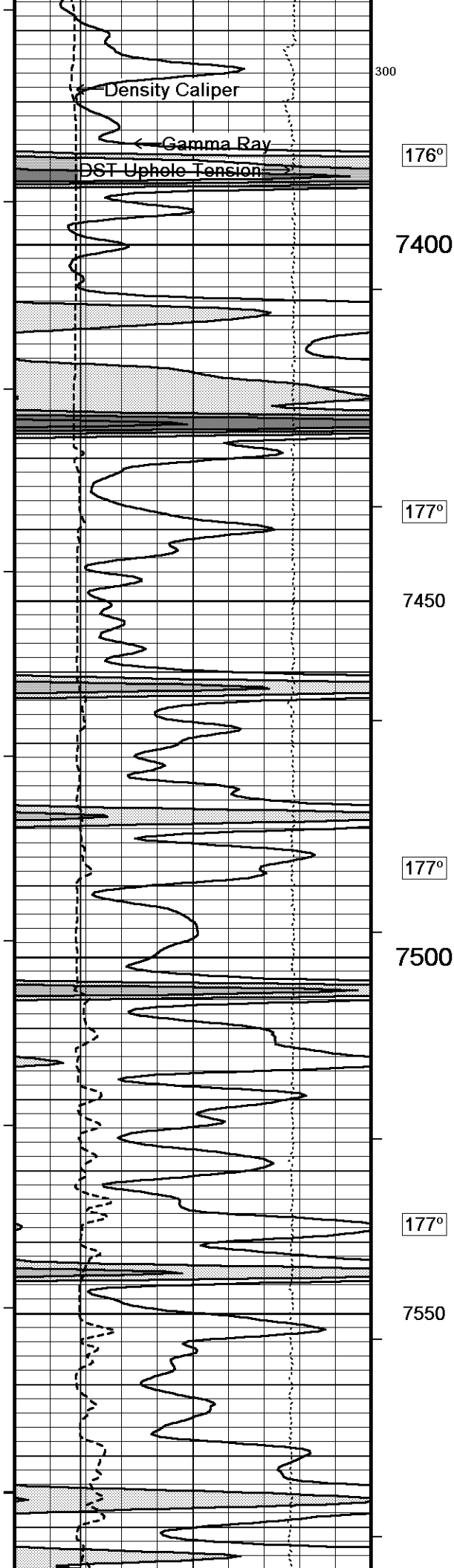
176°

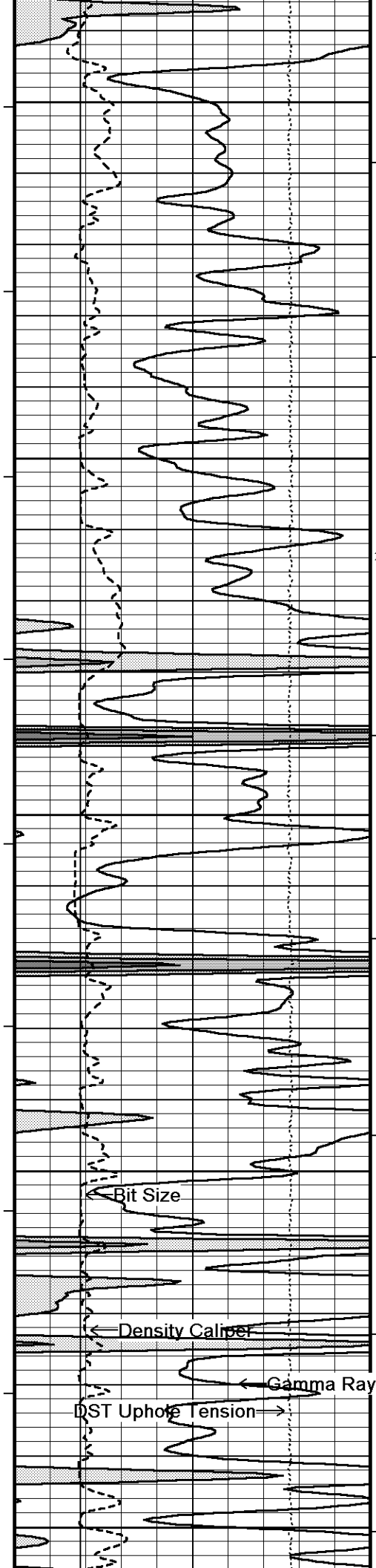
7350

Bit Size

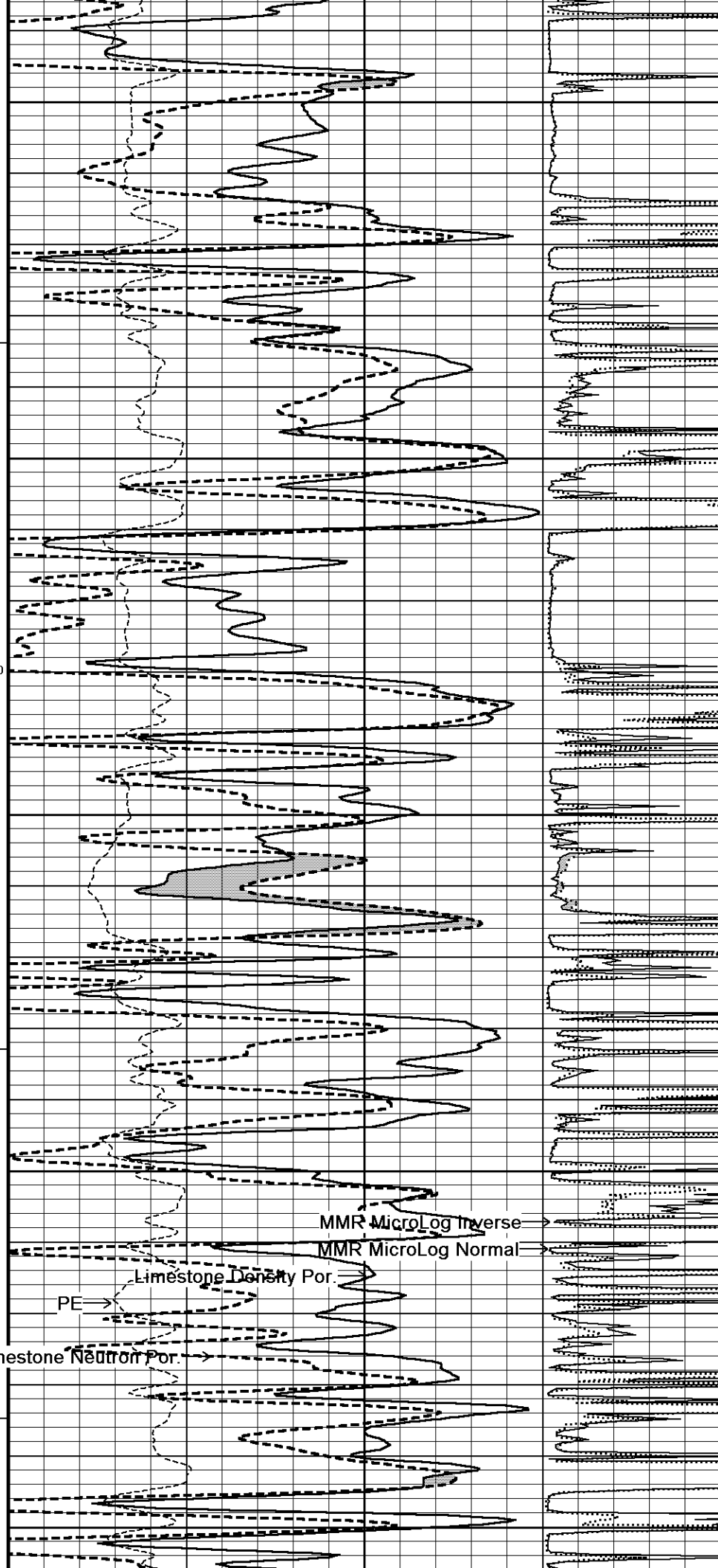


MMR MicroLog Inverse

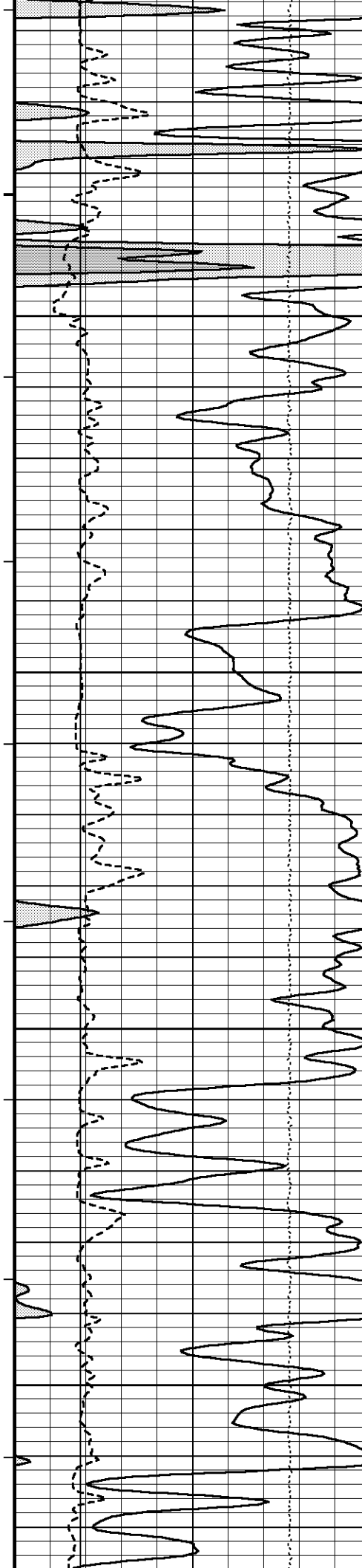




177°  
7600  
178°  
7650  
200  
100  
179°  
7700  
179°  
7750  
7800



MMR MicroLog Inverse  
MMR MicroLog Normal  
Limestone Density Por.  
PE  
Limestone Neutron Por.



180°

7850

182°

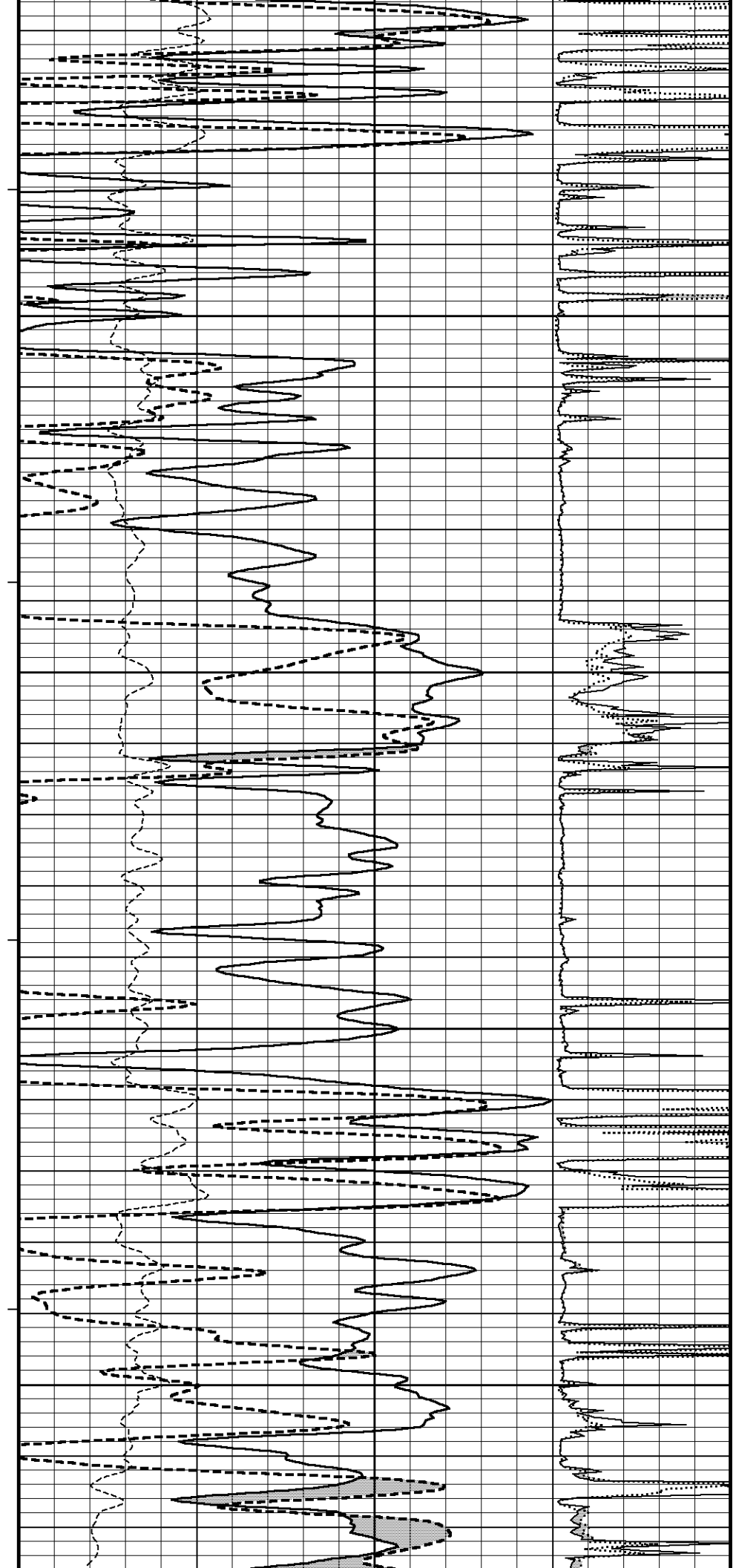
7900

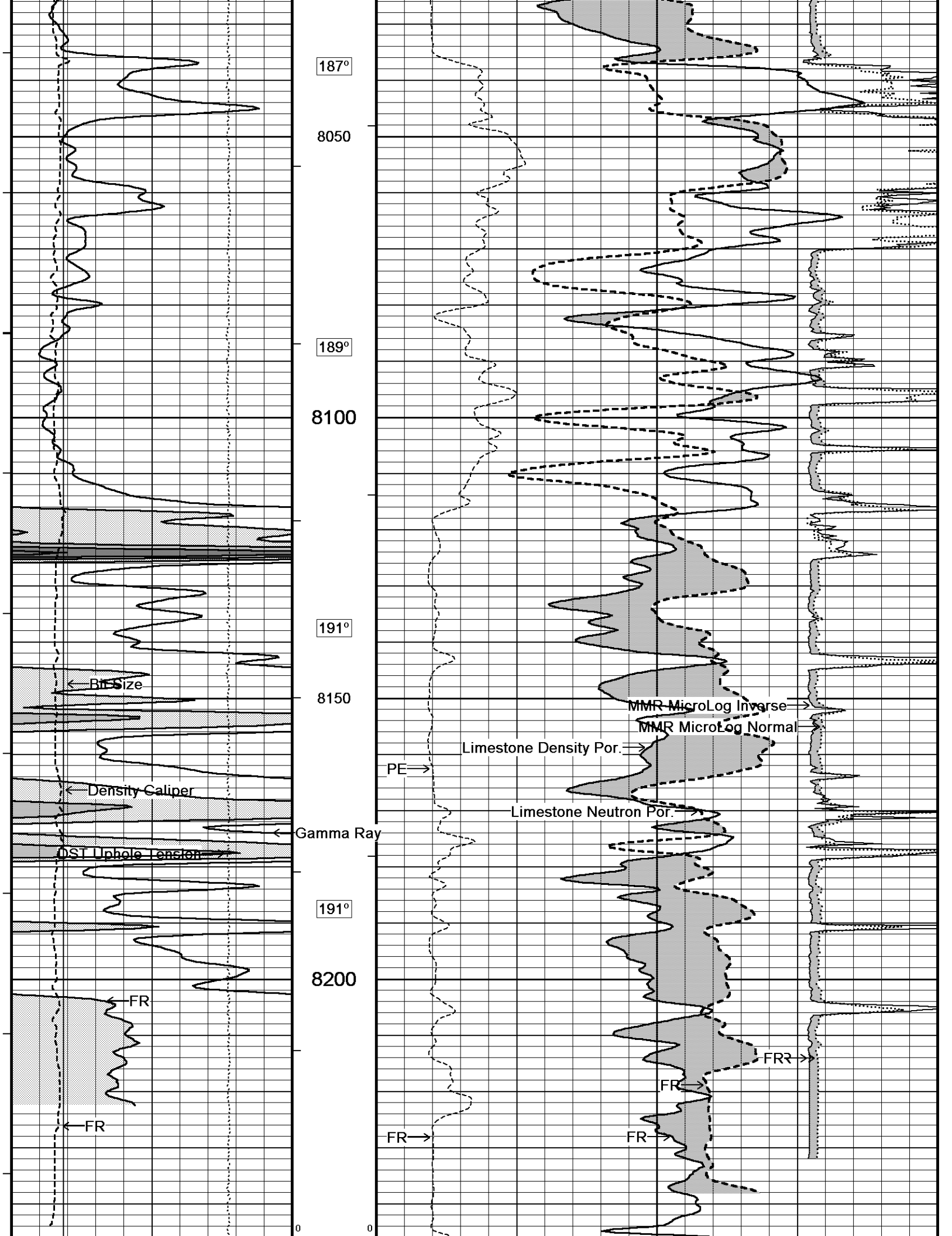
183°

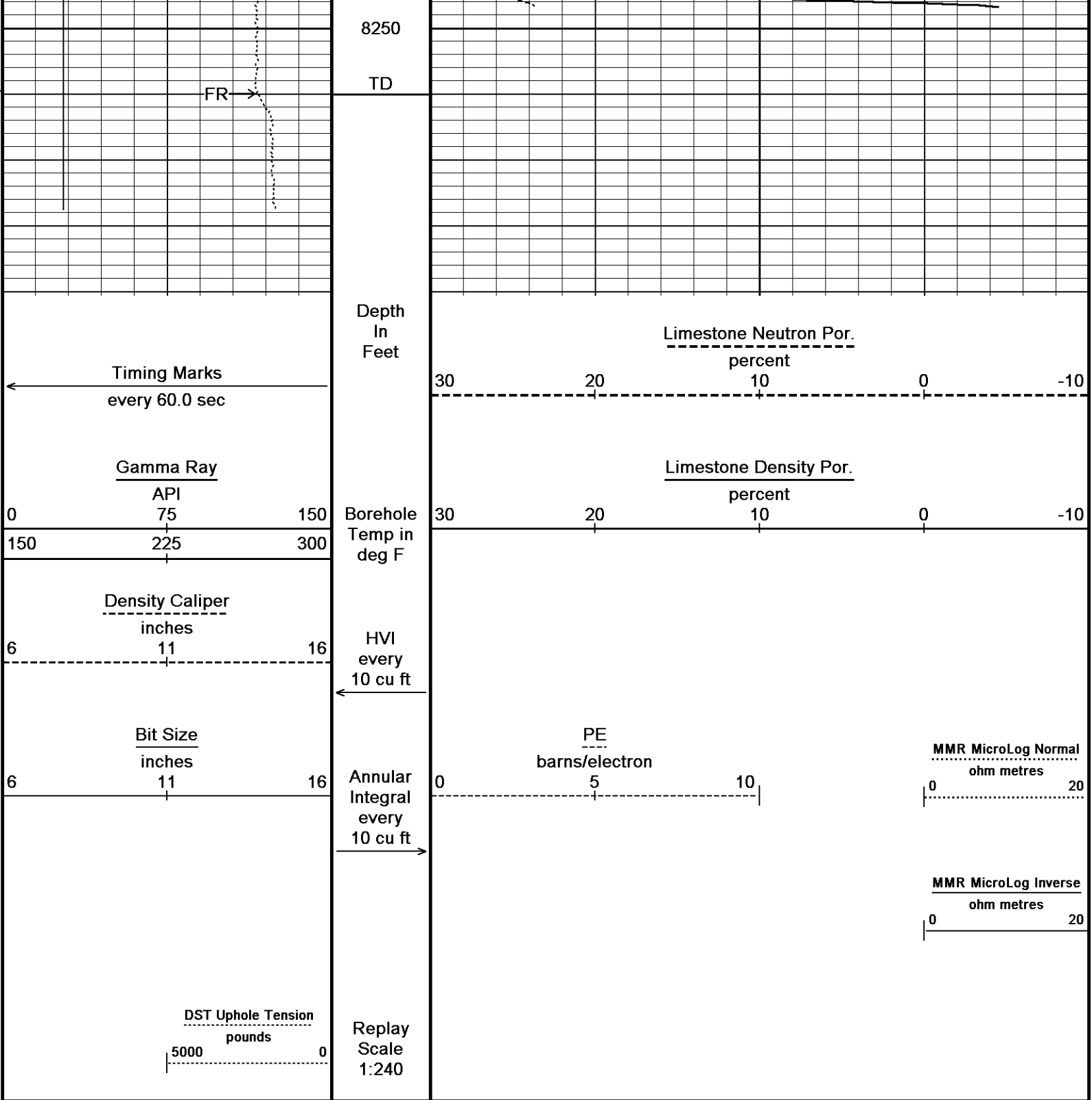
7950

186°

8000







Depth Based Data - Maximum Sampling Increment 10.0cm		Plotted on 09-NOV-2016 14:53
Filename: C:\Minimus 15.03.5939\Logs\Grand Mesa Buzz's Bo...\Grand Mesa Buzz's Boat #14_002.dta		Recorded on 09-NOV-2016 10:38
System Versions: Logged with 15.03.5939 Plotted with 15.03.5939		
5 INCH LIMESTONE MAIN		

REPEAT SECTION		
Depth Based Data - Maximum Sampling Increment 10.0cm		Plotted on 09-NOV-2016 14:53
Filename: C:\Minimus 15.03.5939\Logs\Grand Mesa Buzz's Bo...\Grand Mesa Buzz's Boat #14_001.dta		Recorded on 09-NOV-2016 09:14
System Versions: Logged with 15.03.5939 Plotted with 15.03.5939		



every 60.0 sec

Gamma Ray

API

75

225

0 150 150 300

Density Caliper

inches

11

6 16

Bit Size

inches

11

6 16

DST Uphole Tension

pounds

5000

0

Borehole  
Temp in  
deg F

HVI  
every  
10 cu ft

Annular  
Integral  
every  
10 cu ft

Replay  
Scale  
1:240

6900

171°

6950

172°

7000

Limestone Density Por.

percent

30 20 10 0 -10

PE

barns/electron

0 5 10

MMR MicroLog Normal

ohm metres

0 20

MMR MicroLog Inverse

ohm metres

0 20

← Bit Size

← Density Caliper

← DST Uphole Tension

← Gamma Ray

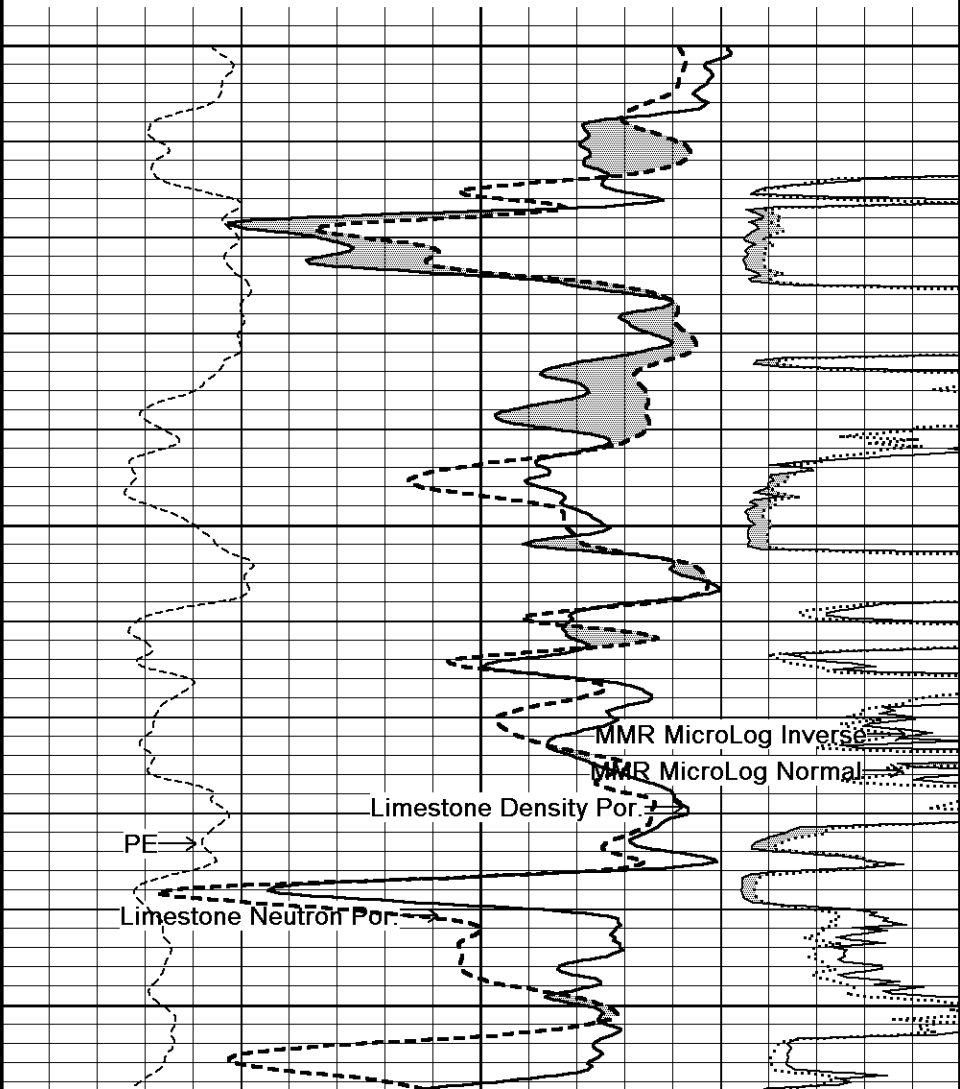
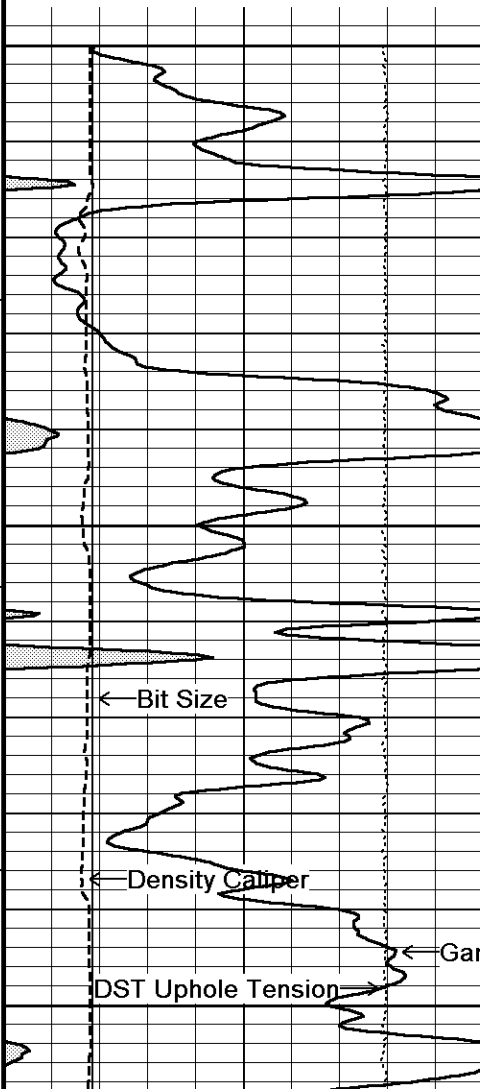
PE →

Limestone Density Por. →

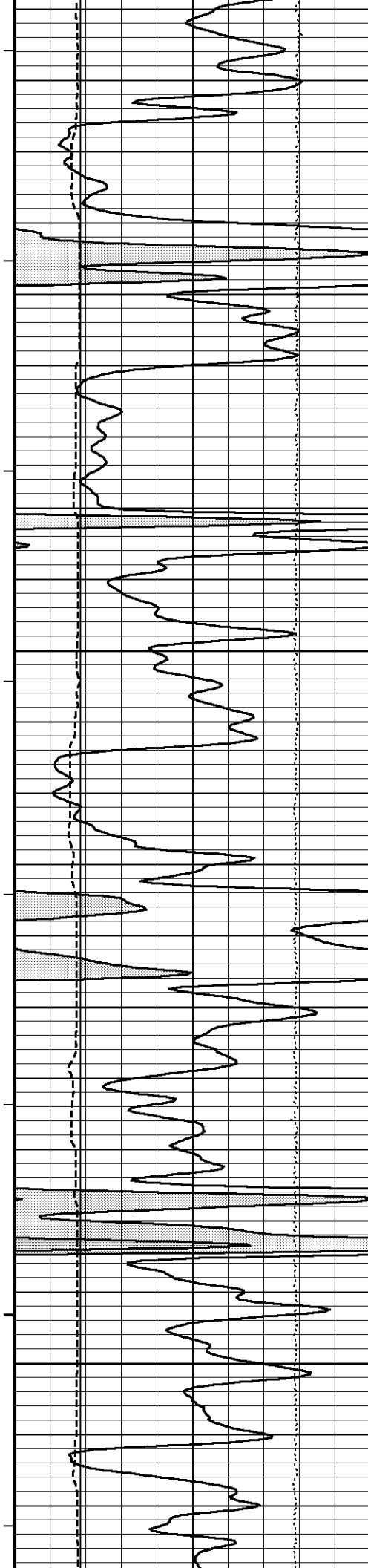
Limestone Neutron Por. →

MMR MicroLog Inverse →

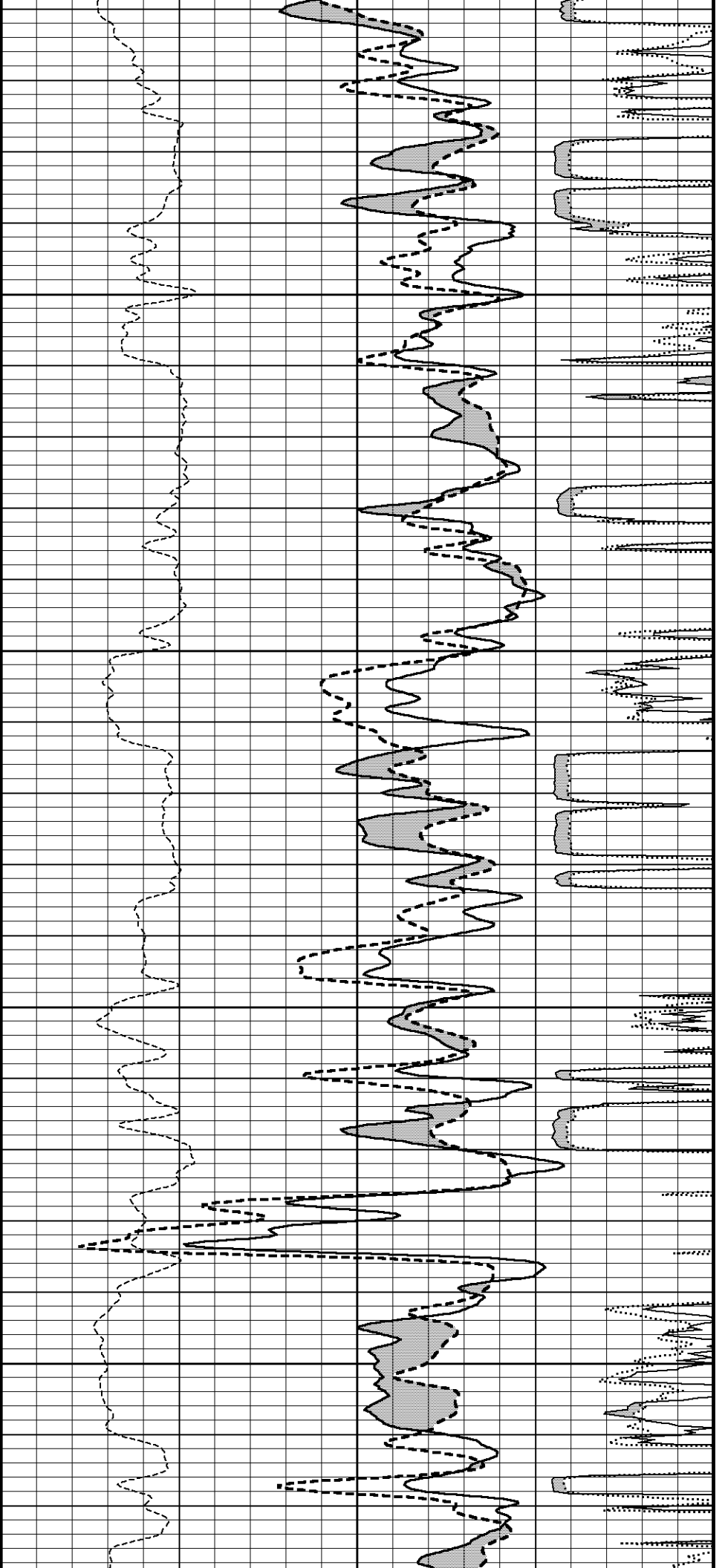
MMR MicroLog Normal →

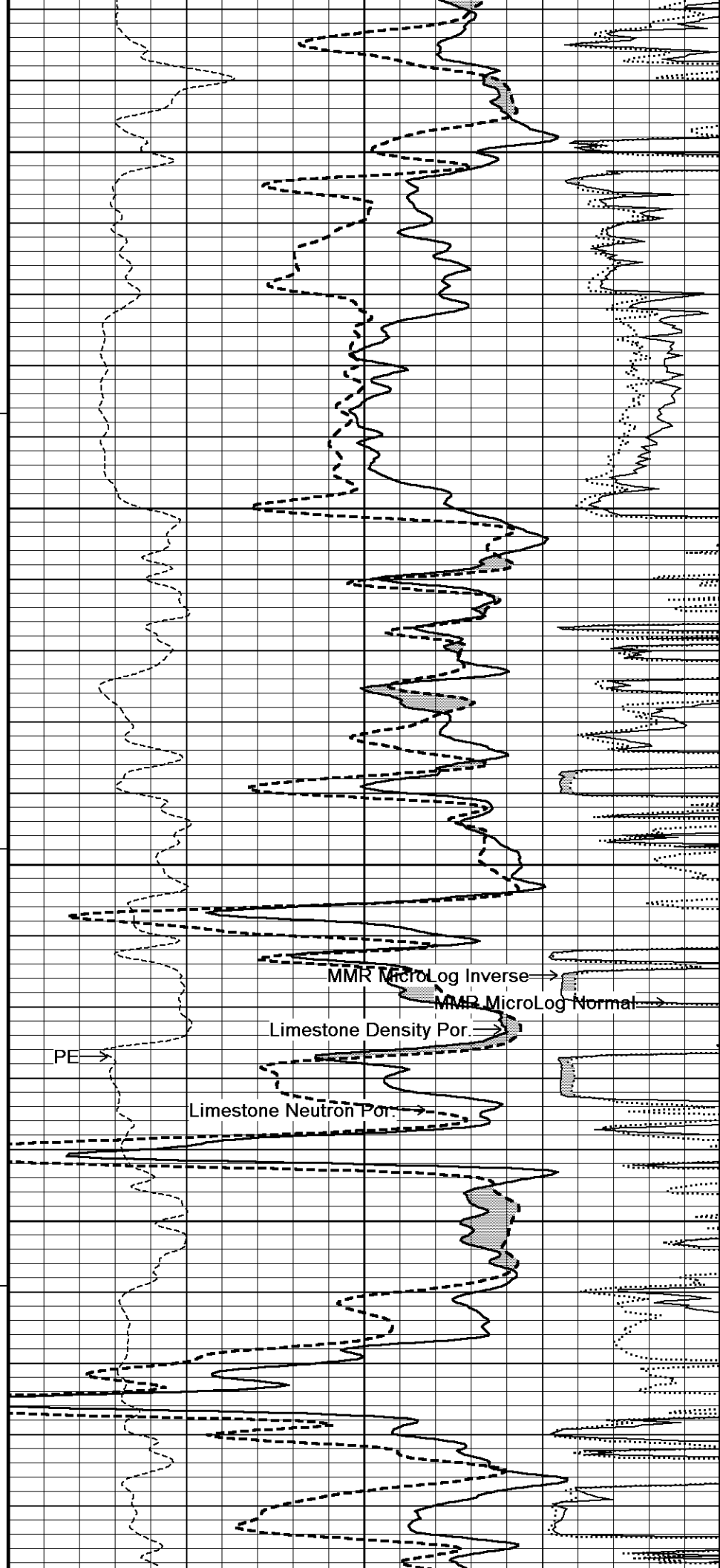
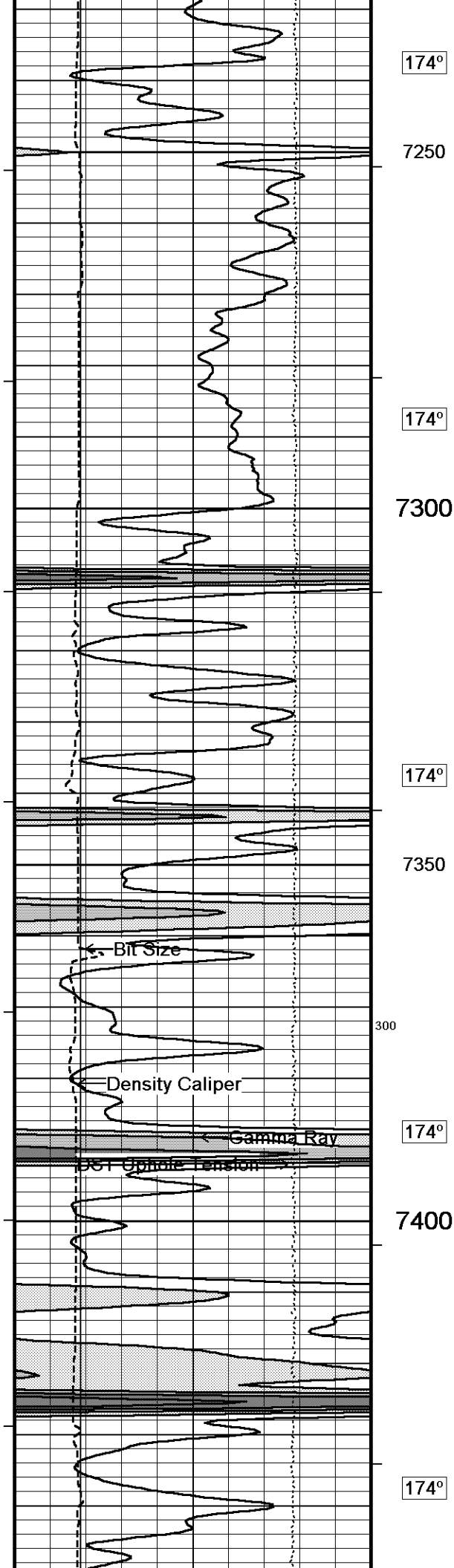


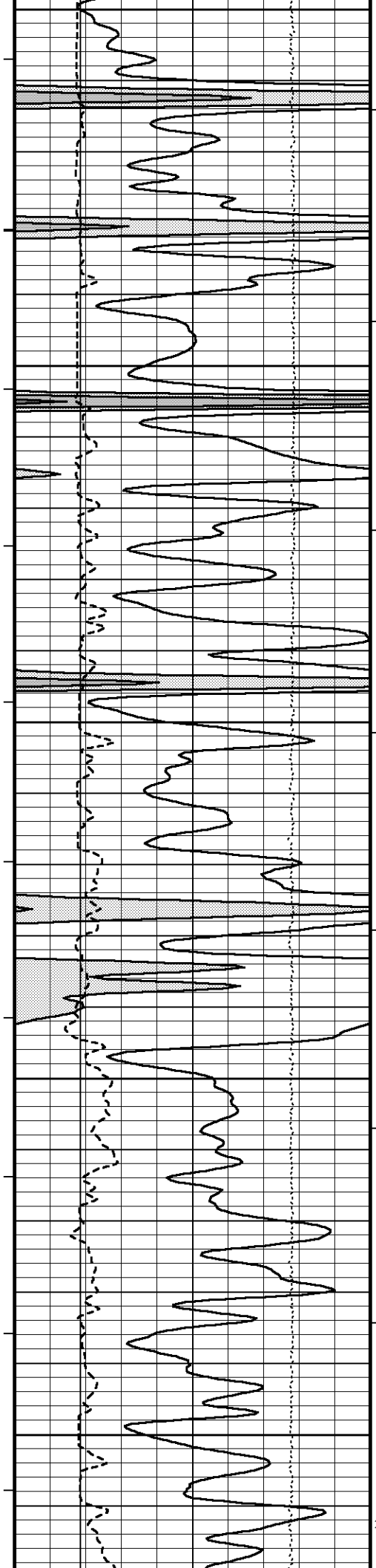




172°  
7050  
400  
173°  
7100  
200  
173°  
7150  
174°  
7200







7450

175°

7500

175°

7550

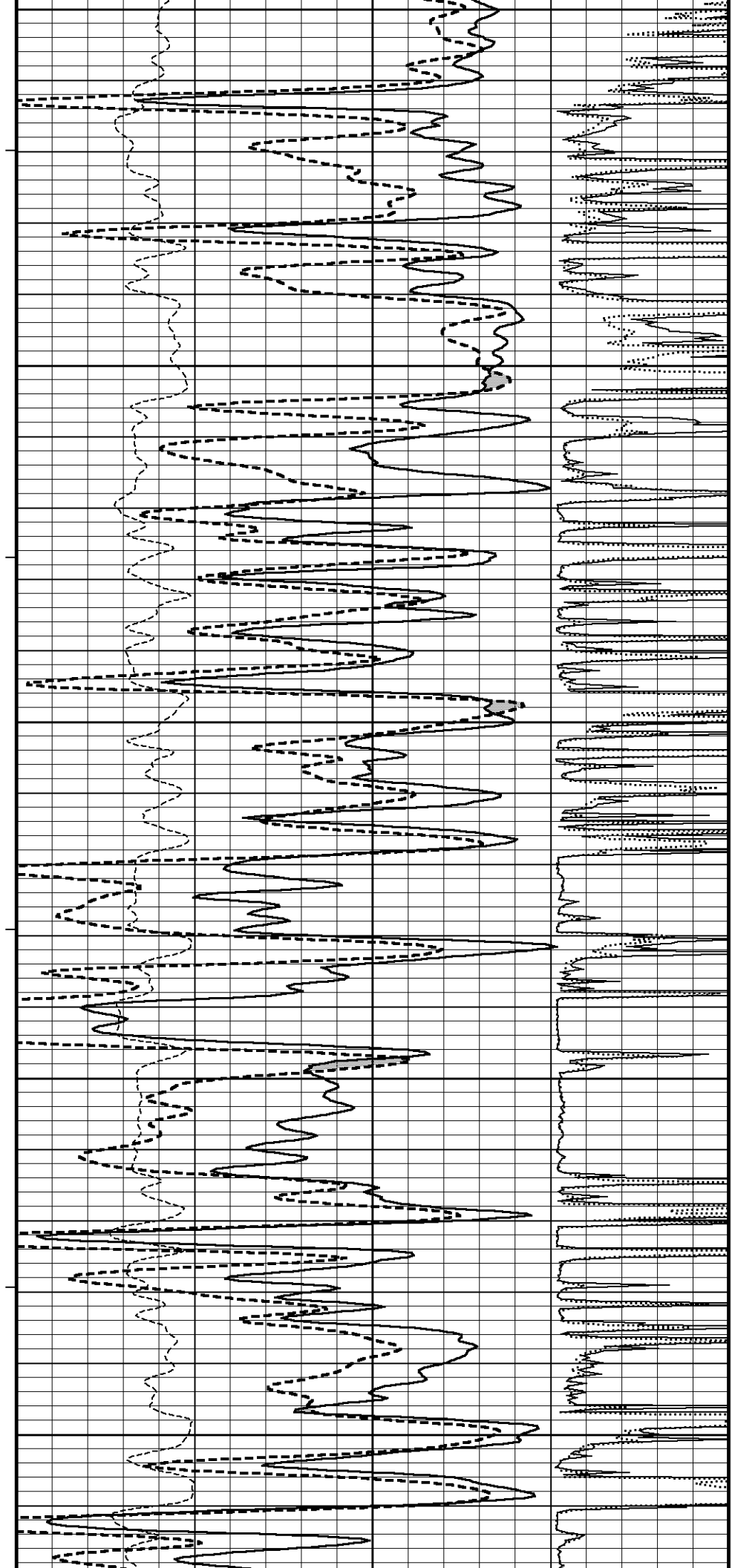
175°

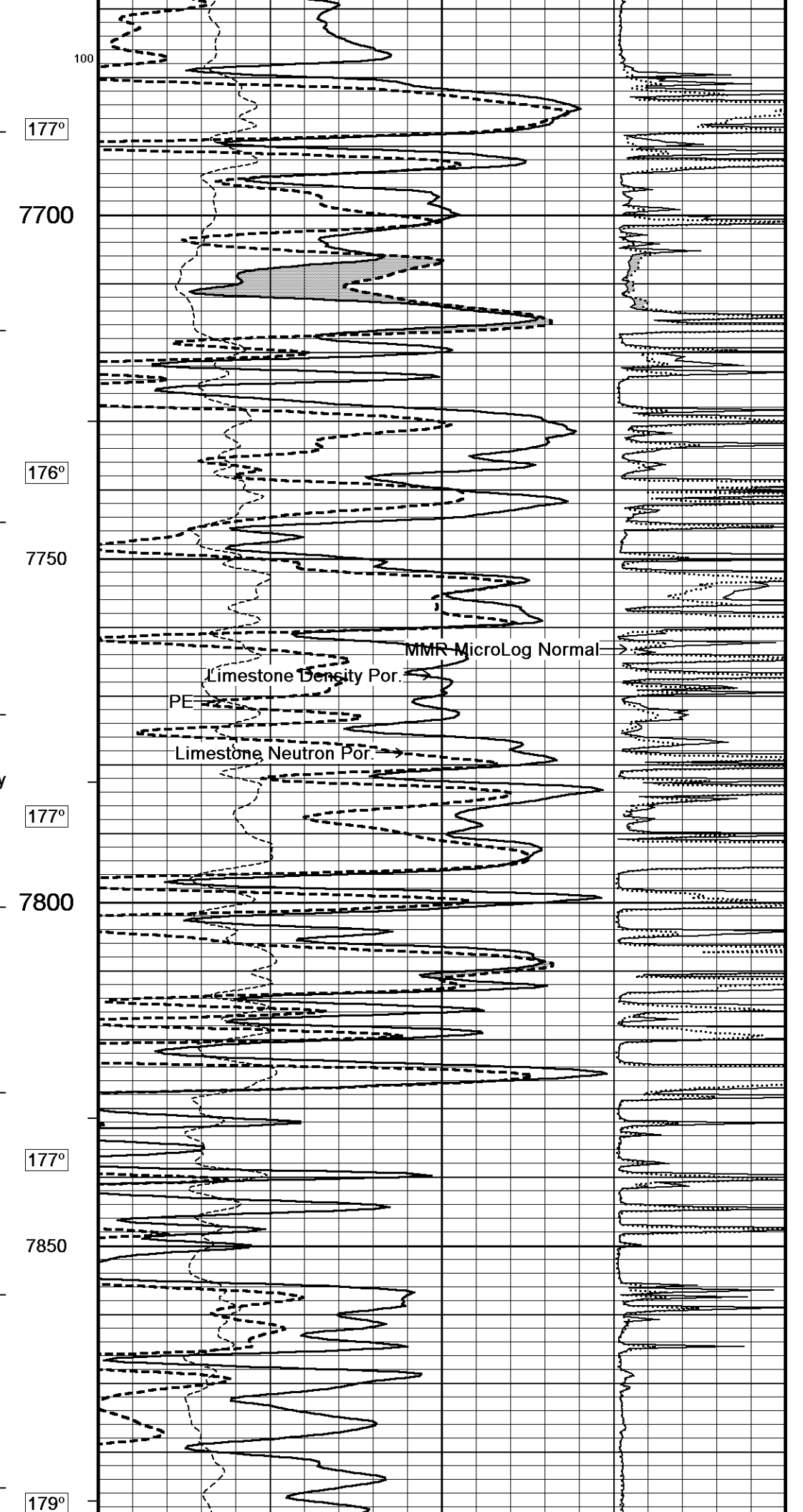
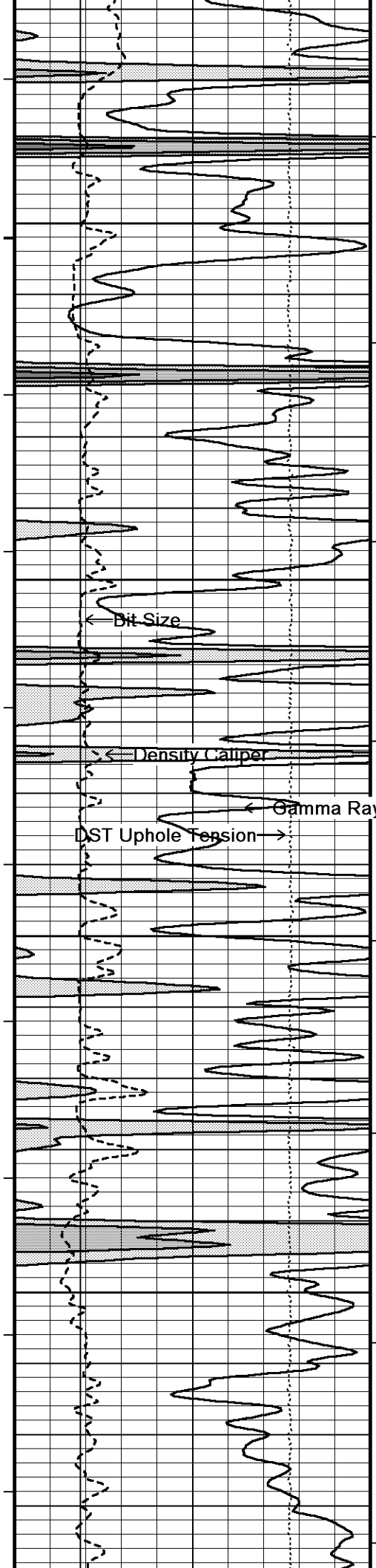
7600

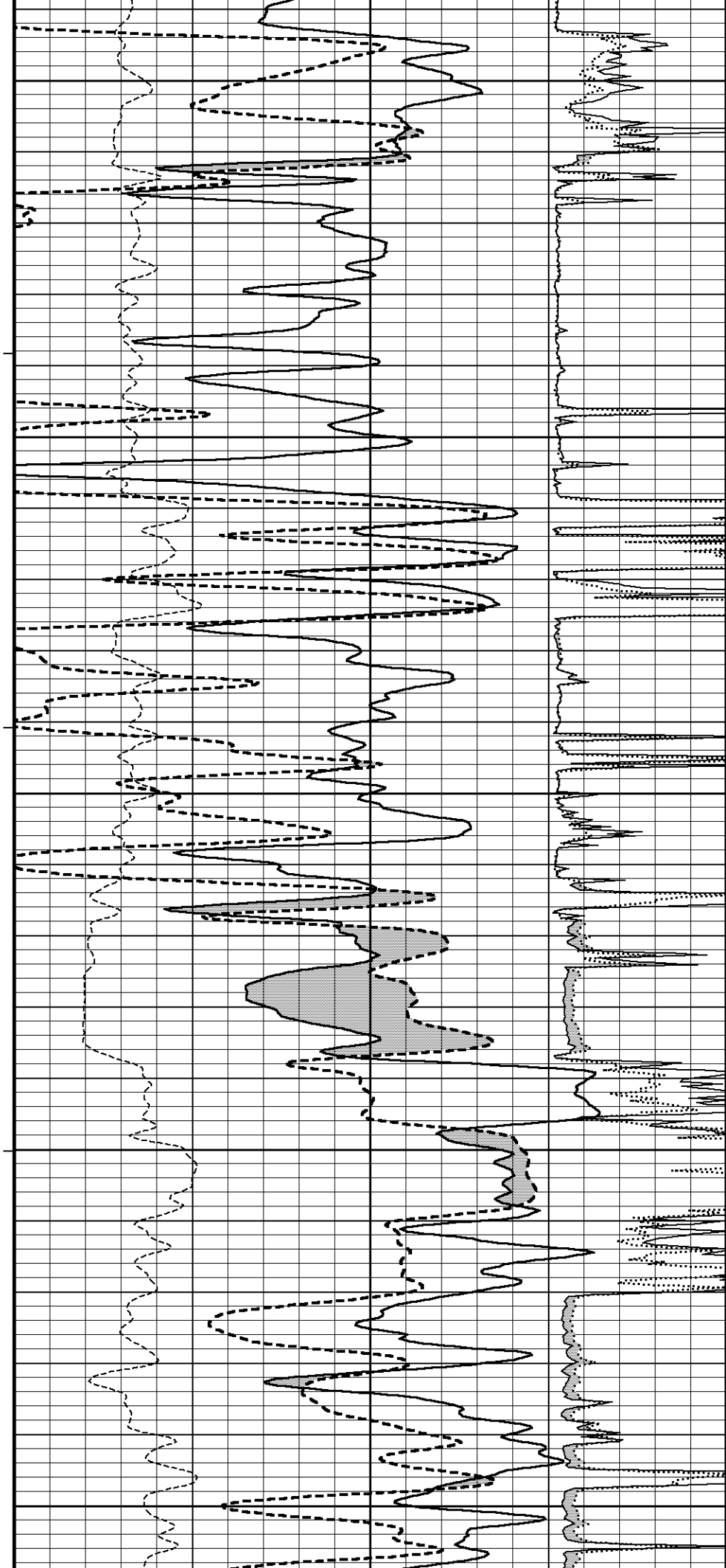
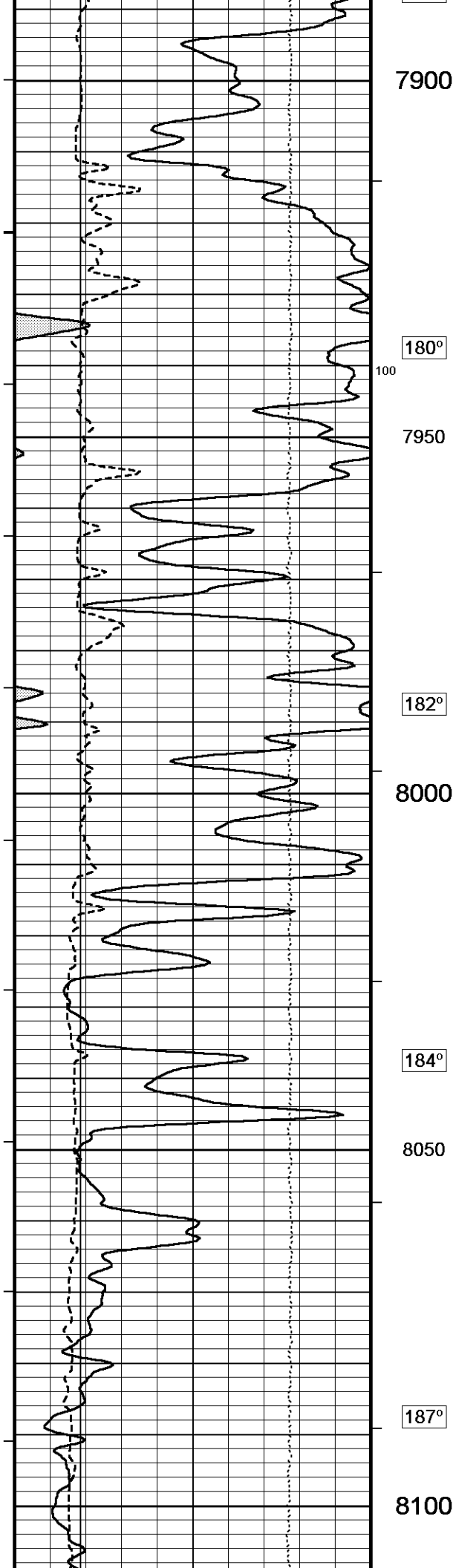
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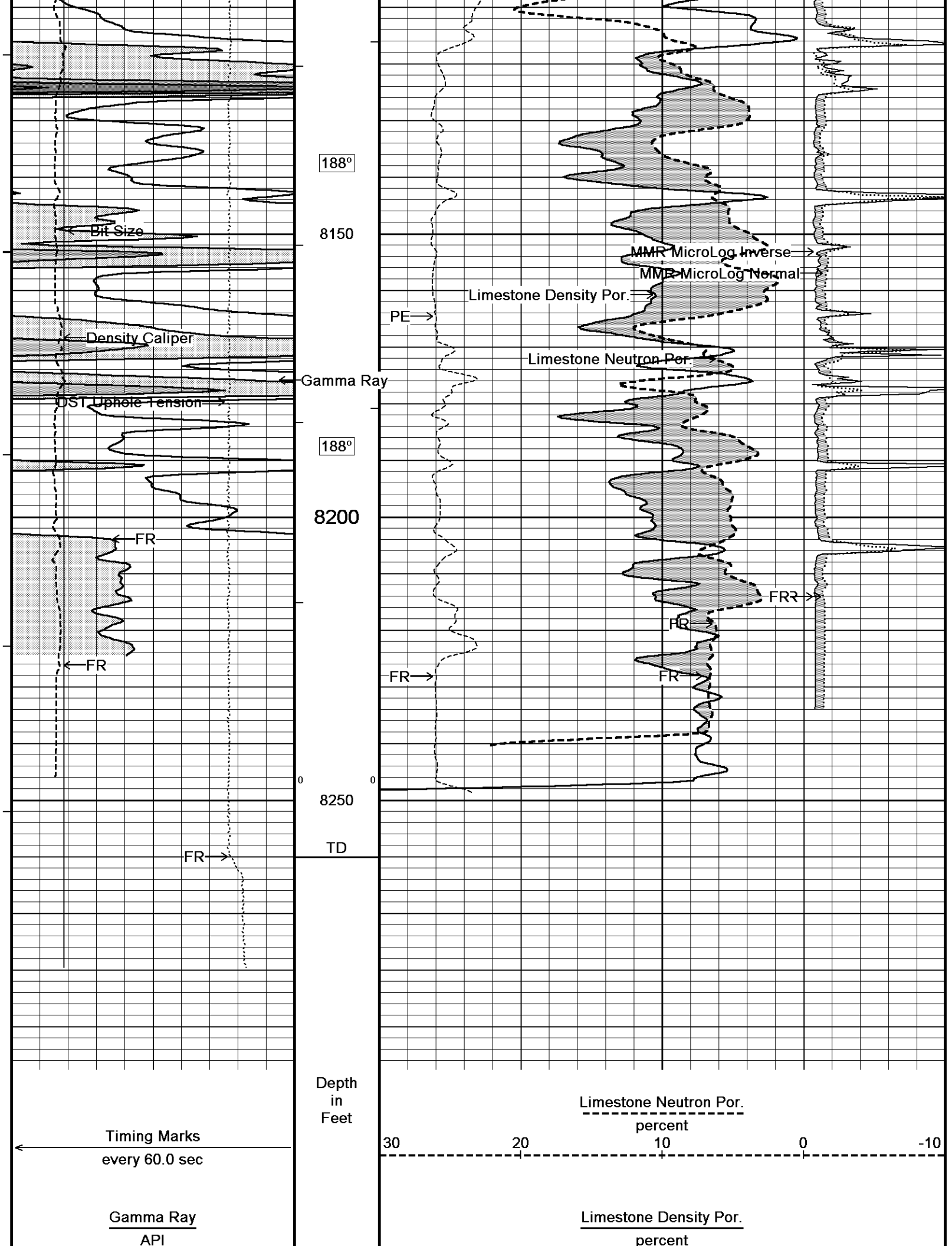
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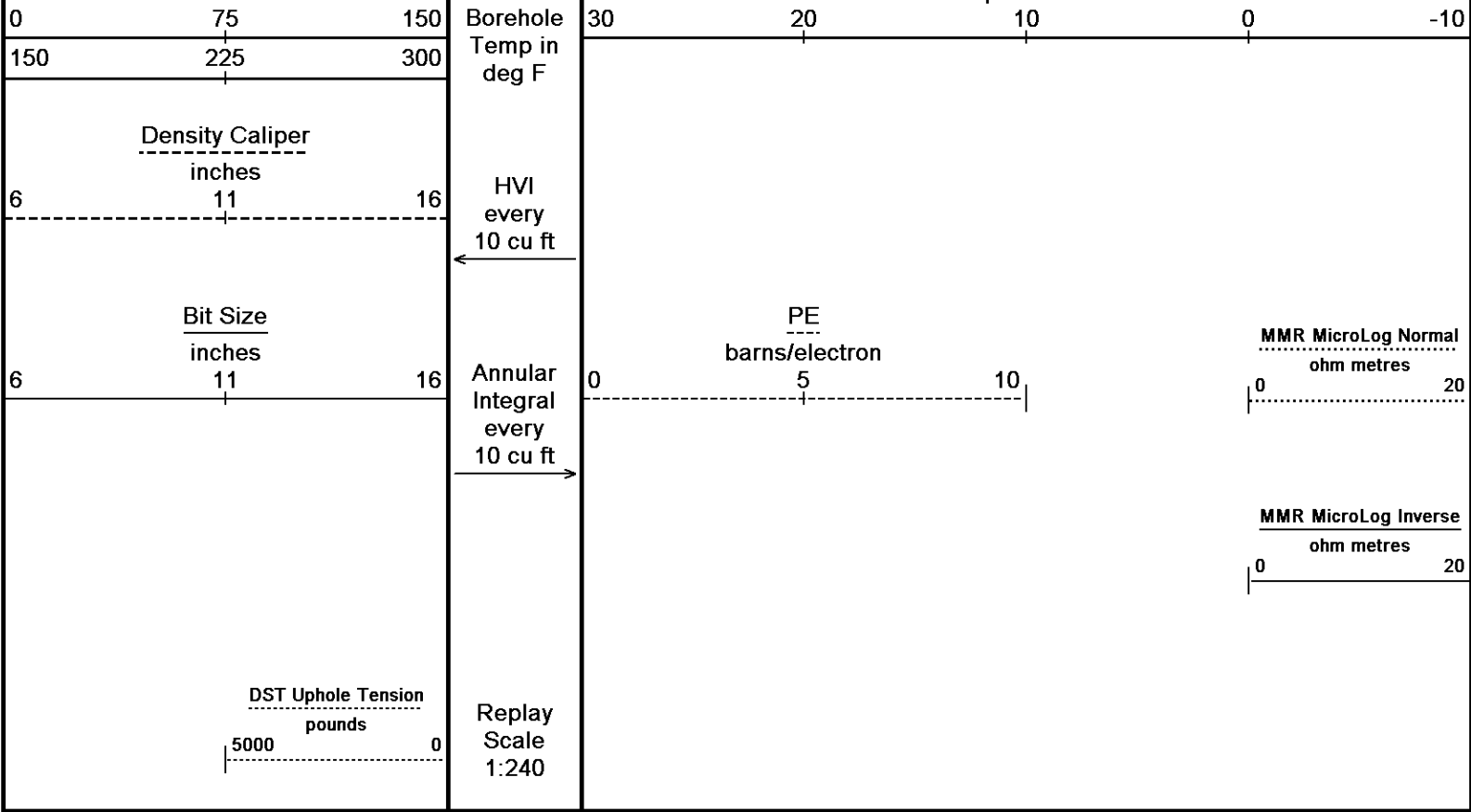
200











Depth Based Data - Maximum Sampling Increment 10.0cm

Plotted on 09-NOV-2016 14:53

Filename: C:\Minimus 15.03.5939\Logs\Grand Mesa Buzz's Bo...\Grand Mesa Buzz's Boat #14\_001.dta

Recorded on 09-NOV-2016 09:14

System Versions: Logged with 15.03.5939 Plotted with 15.03.5939

↑

REPEAT SECTION

↑

↓

5 INCH BULK DENSITY MAIN

↓

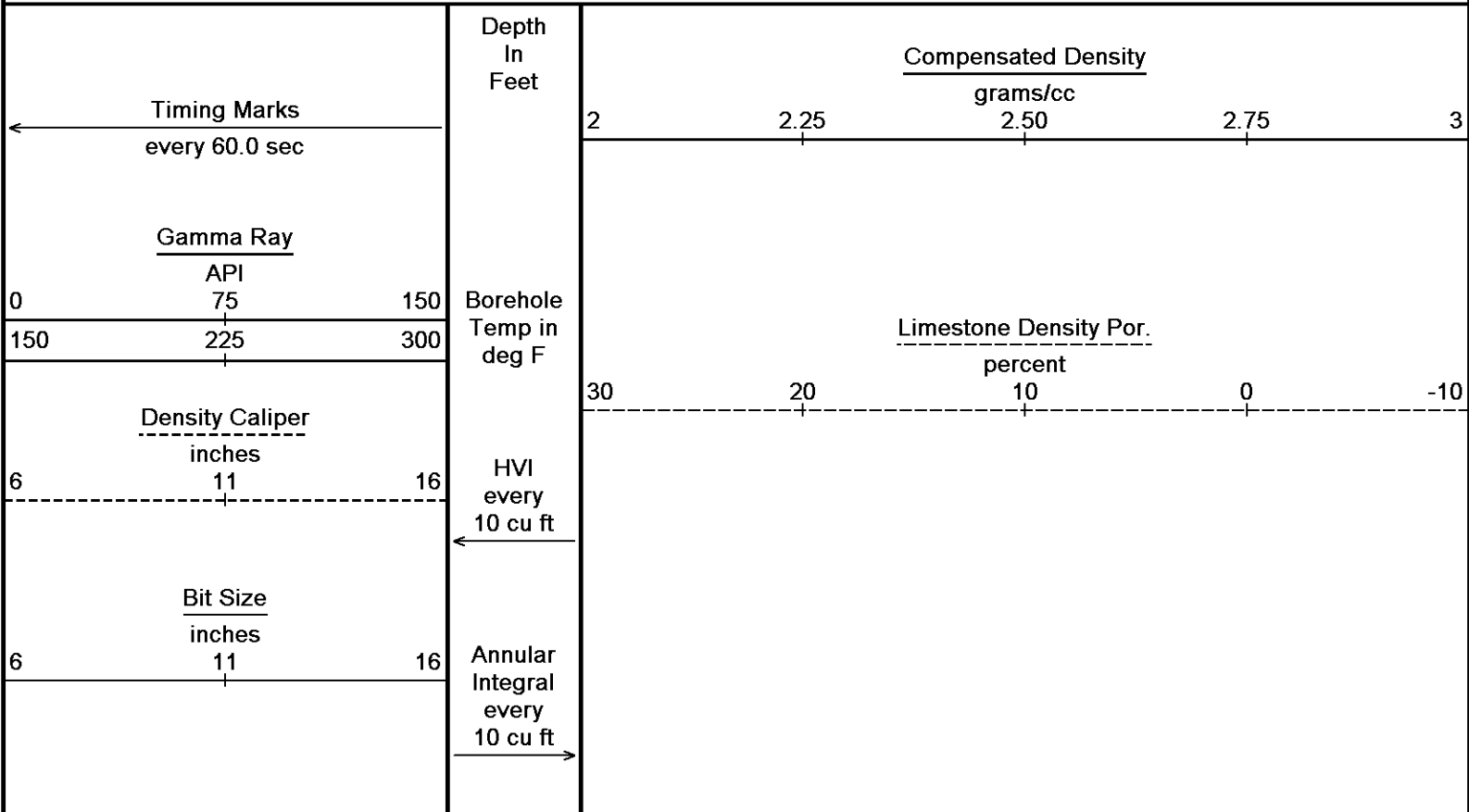
Depth Based Data - Maximum Sampling Increment 10.0cm

Plotted on 09-NOV-2016 14:53

Filename: C:\Minimus 15.03.5939\Logs\Grand Mesa Buzz's Bo...\Grand Mesa Buzz's Boat #14\_002.dta

Recorded on 09-NOV-2016 10:38

System Versions: Logged with 15.03.5939 Plotted with 15.03.5939



DST Uphole Tension  
pounds  
5000 0

Replay  
Scale  
1:240

316  
Casing  
Shoe

2000

3300 350

101°

400

102°

450

103°

500

PE  
barns/electron

Density Correction  
grams/cc

0

5

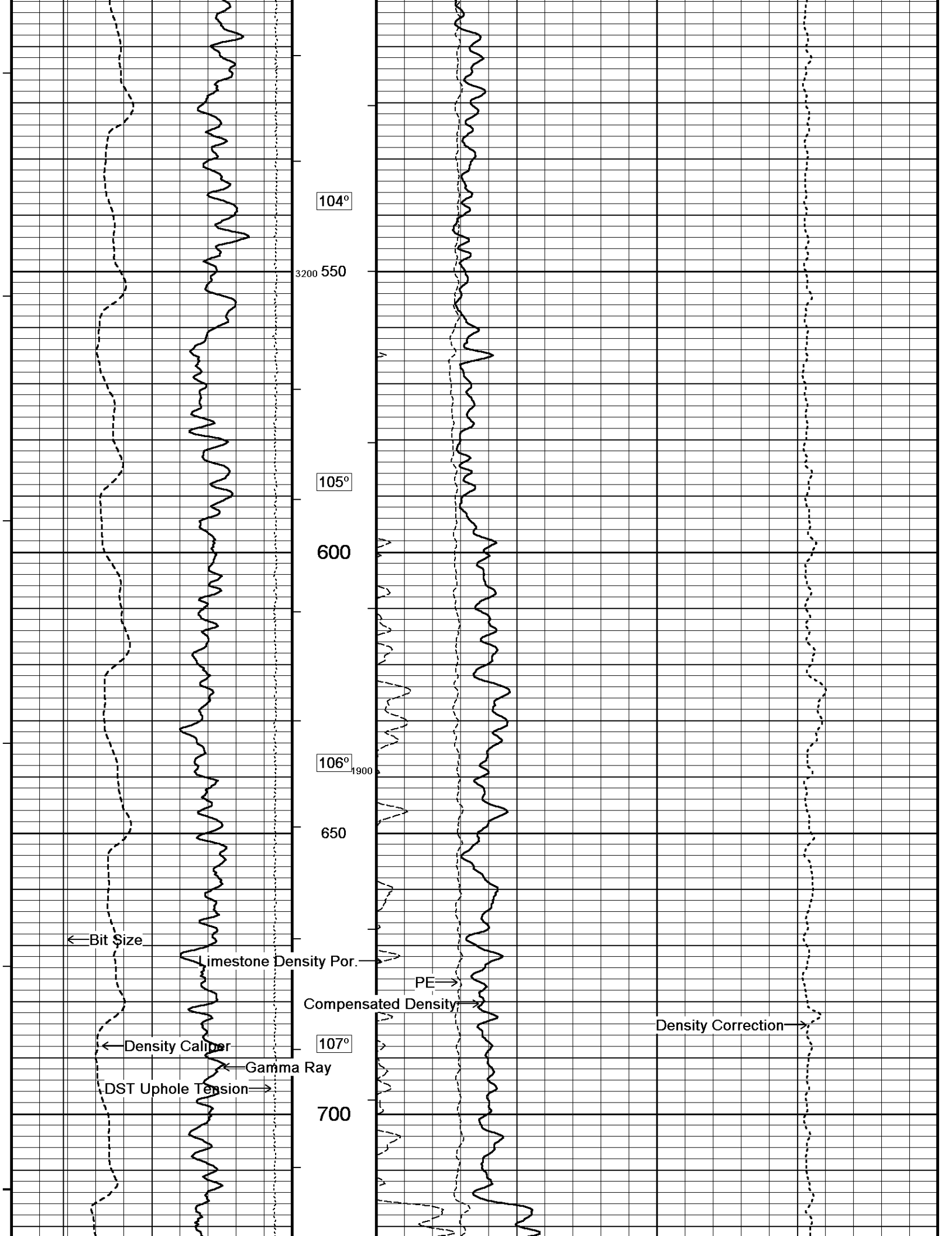
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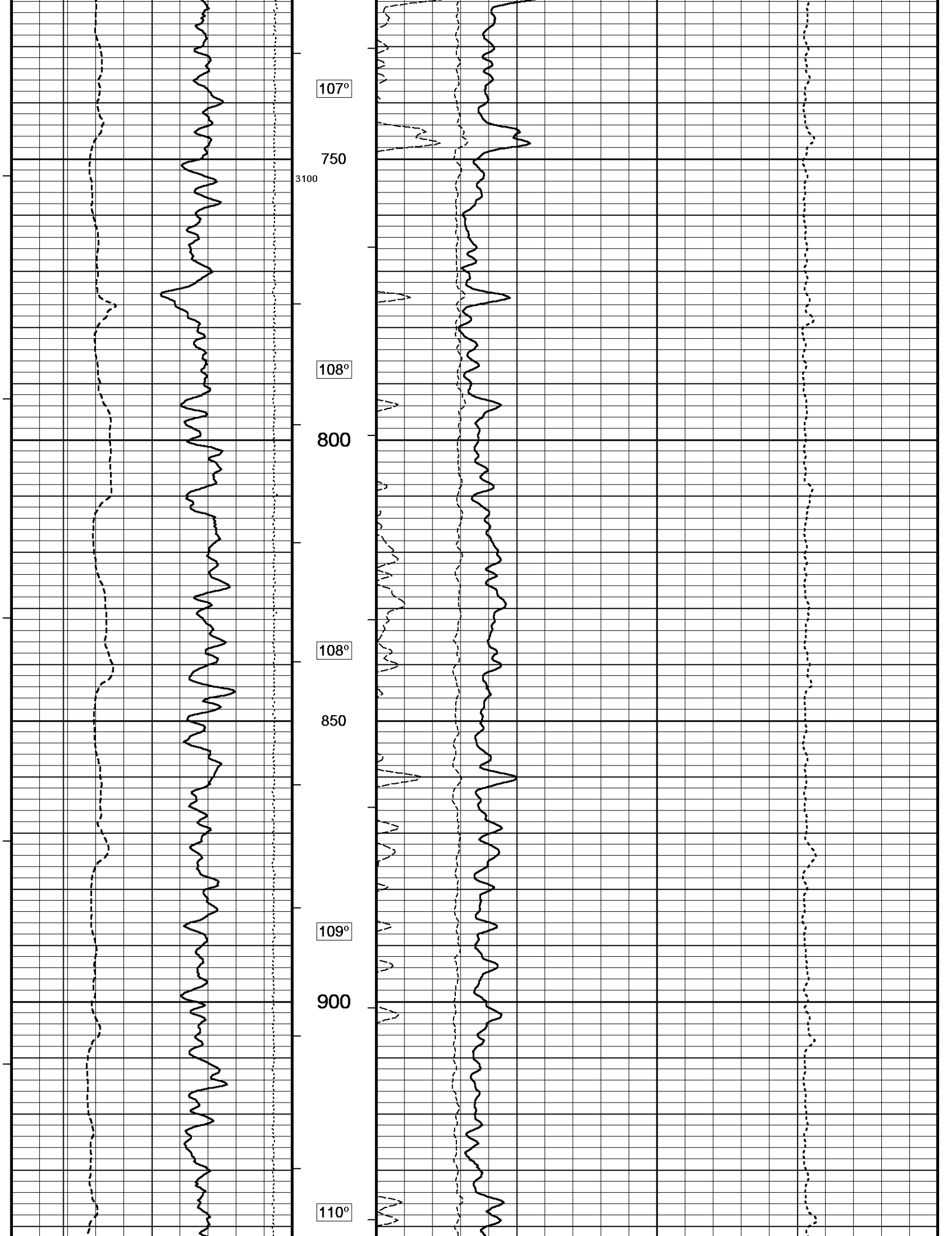
-0.50

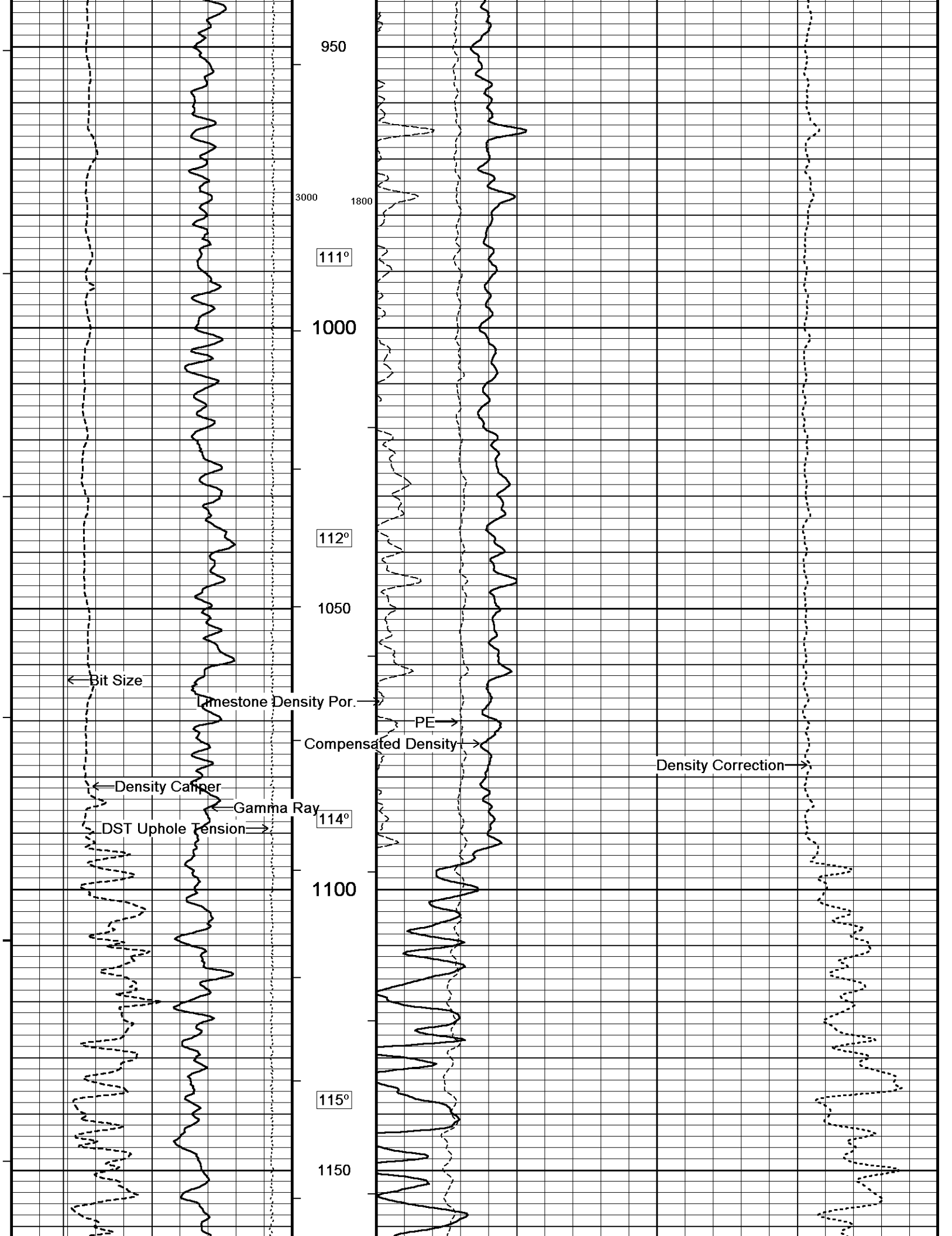
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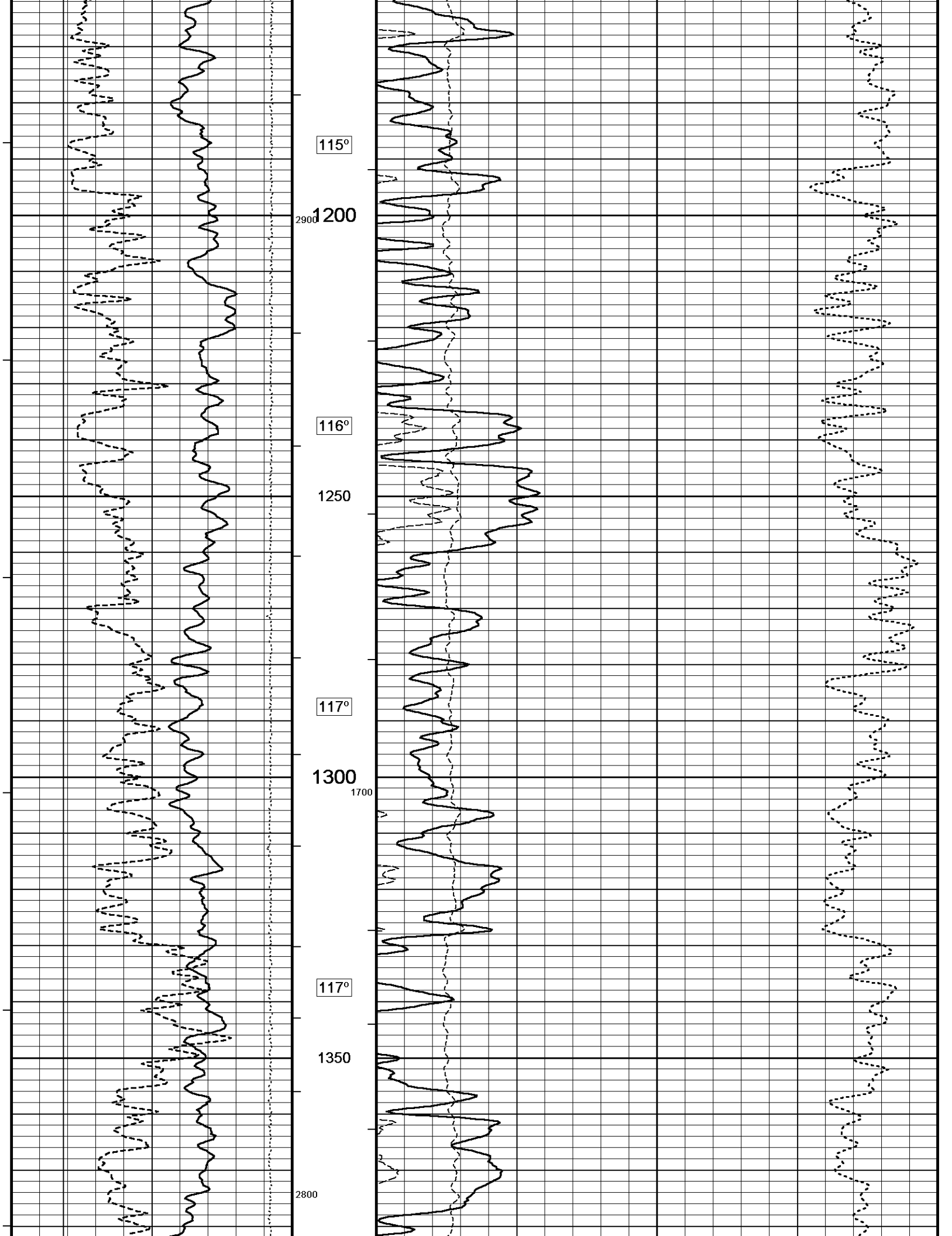
0.50

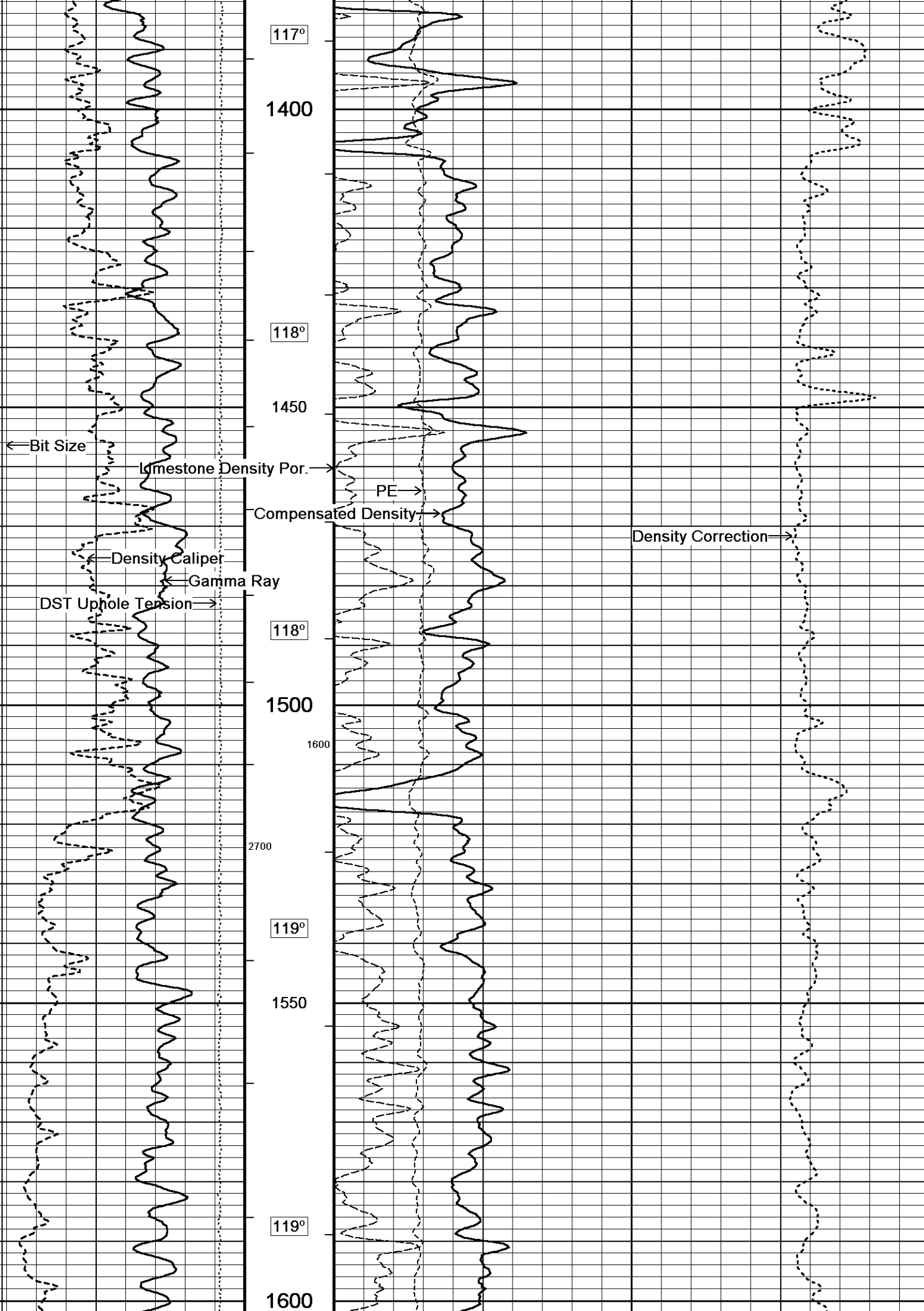


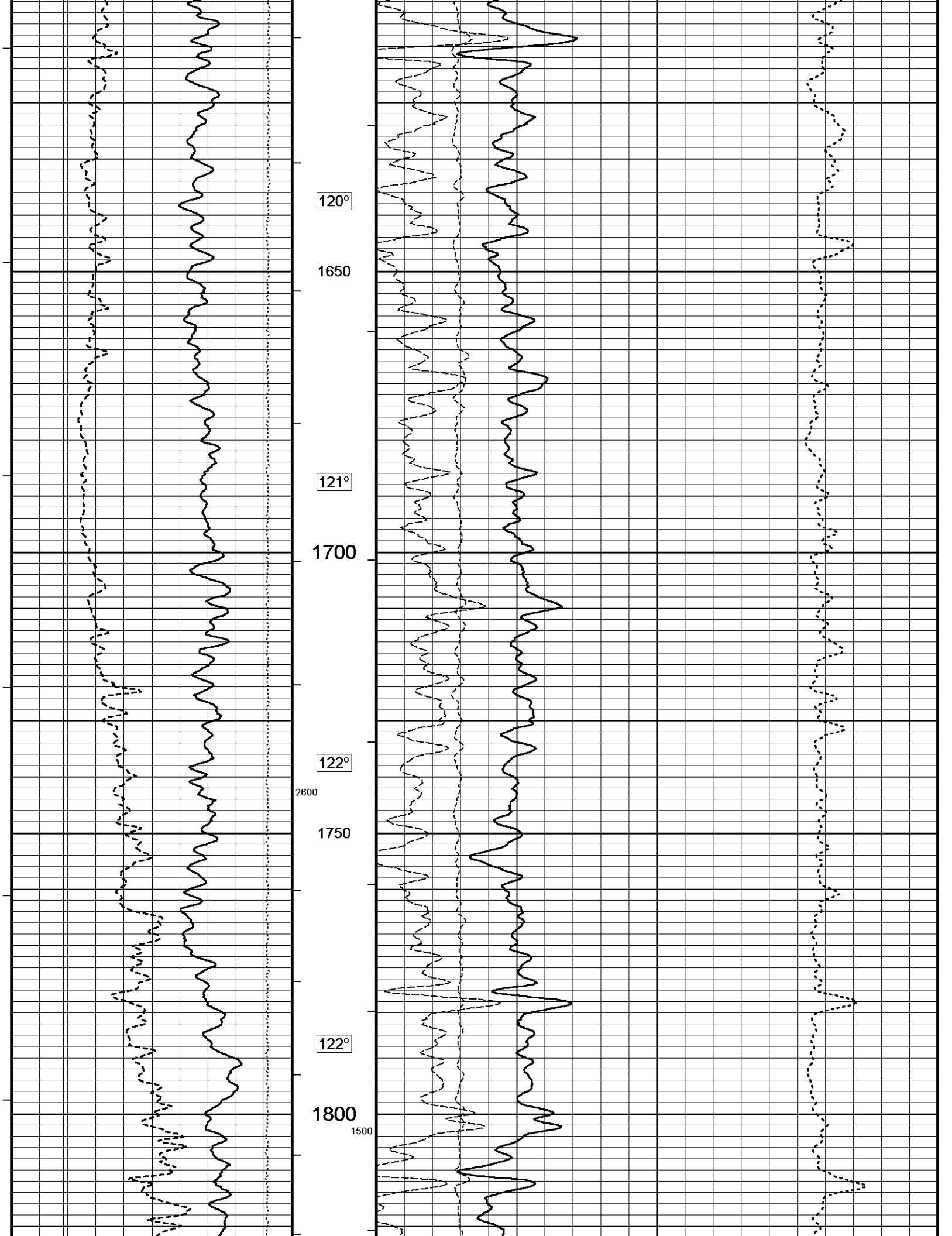


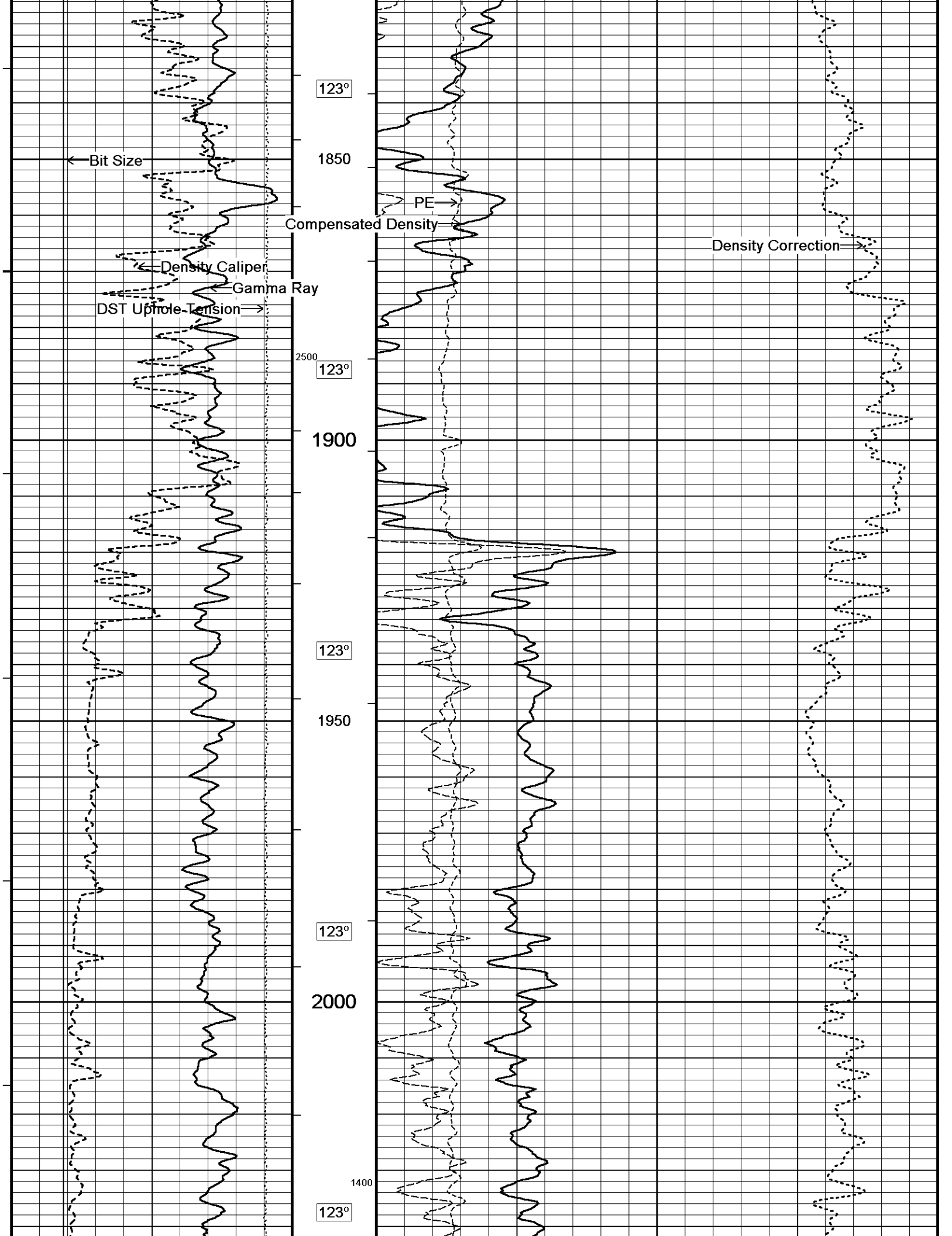


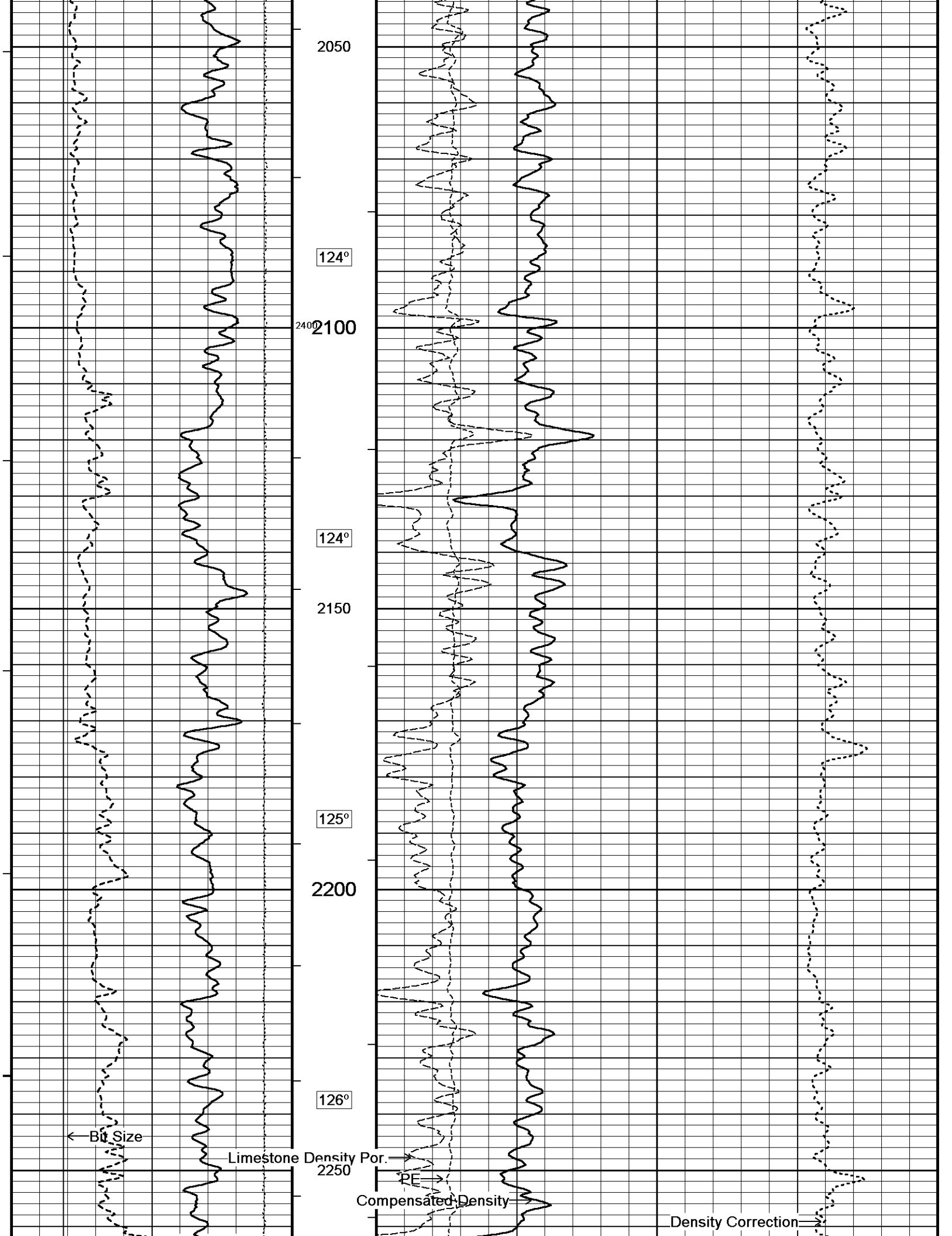




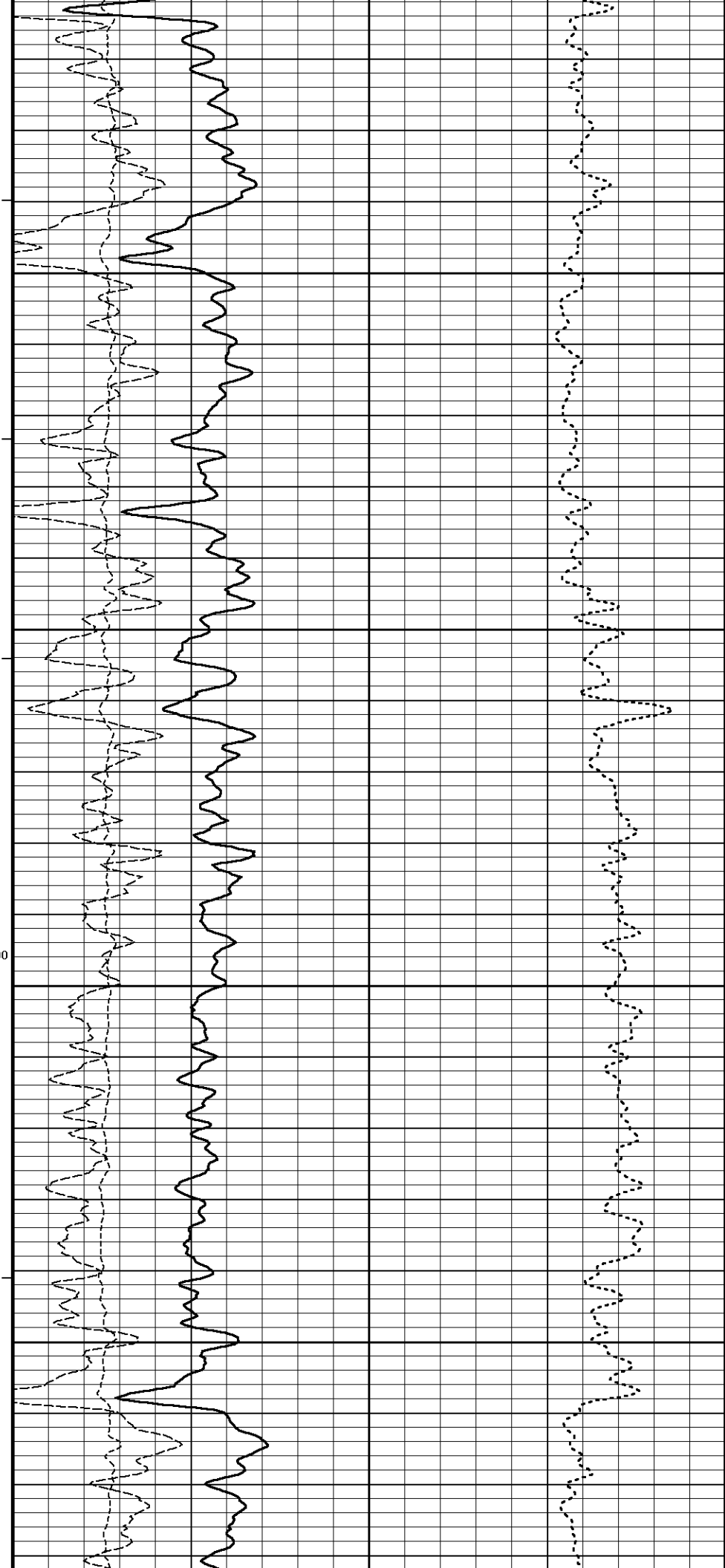
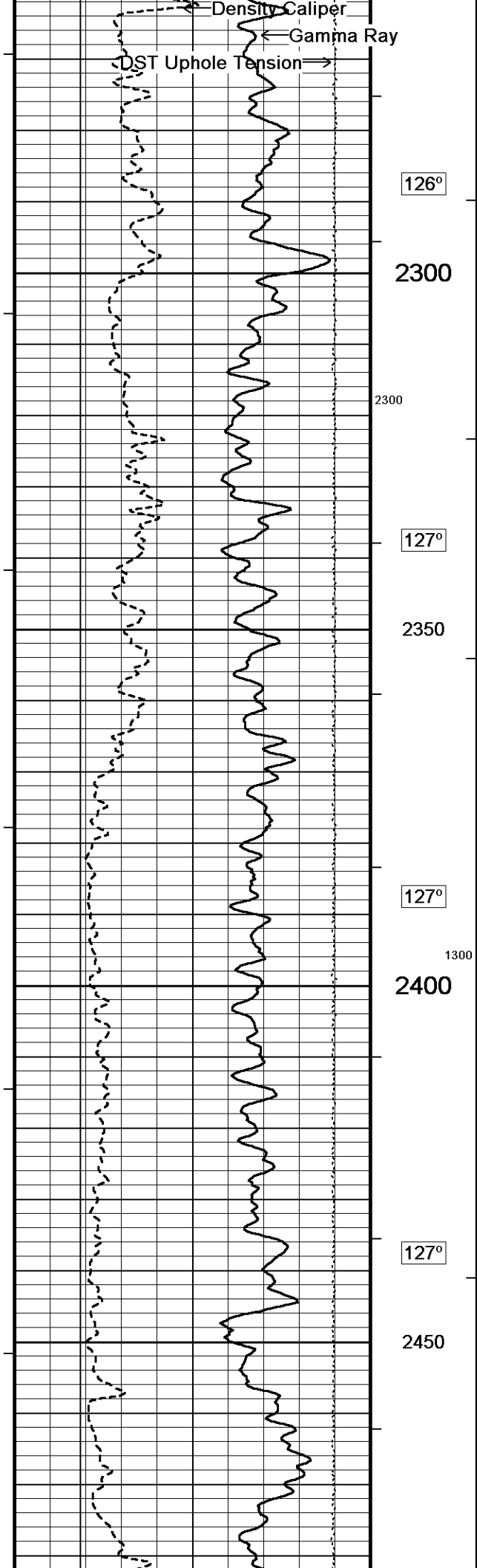


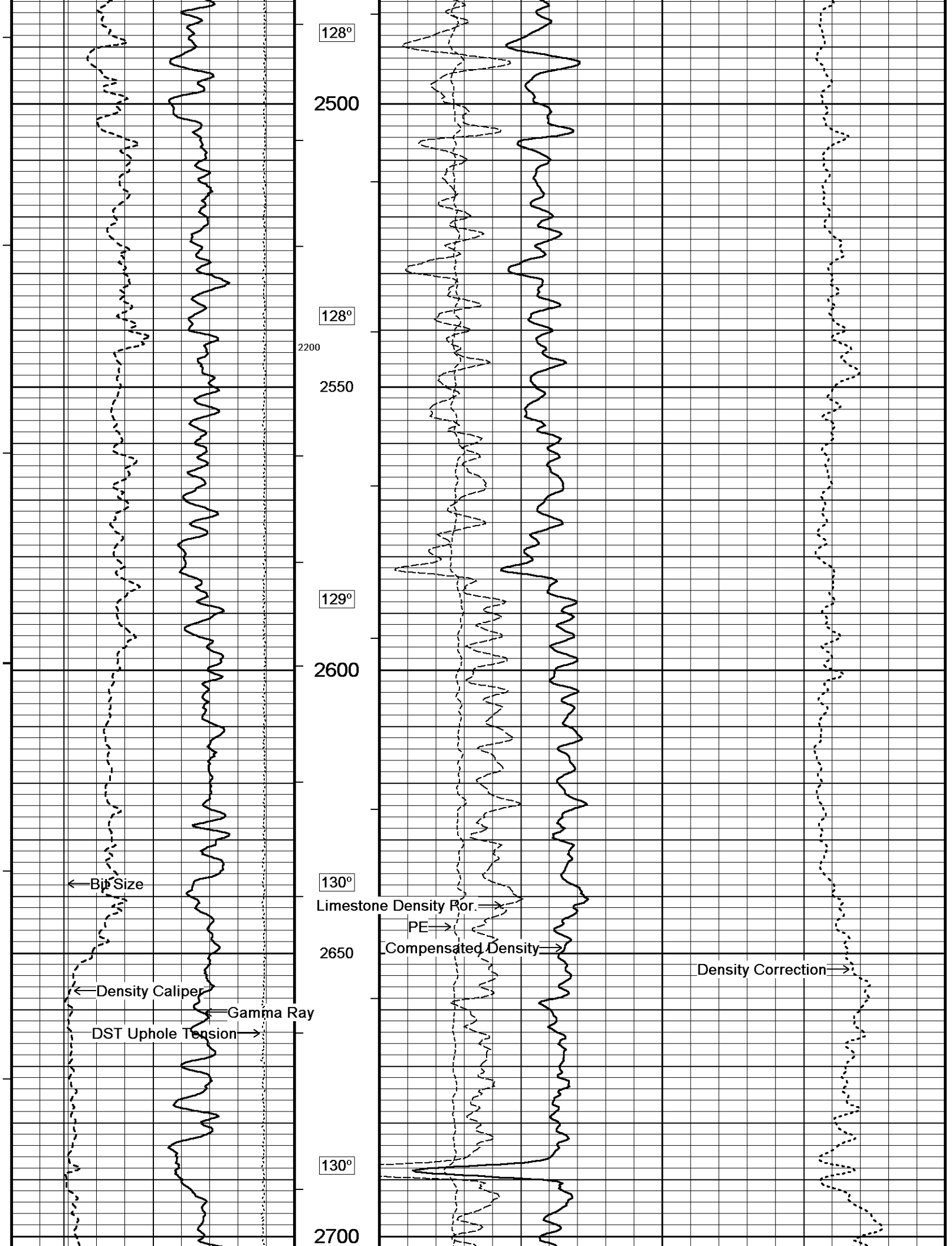


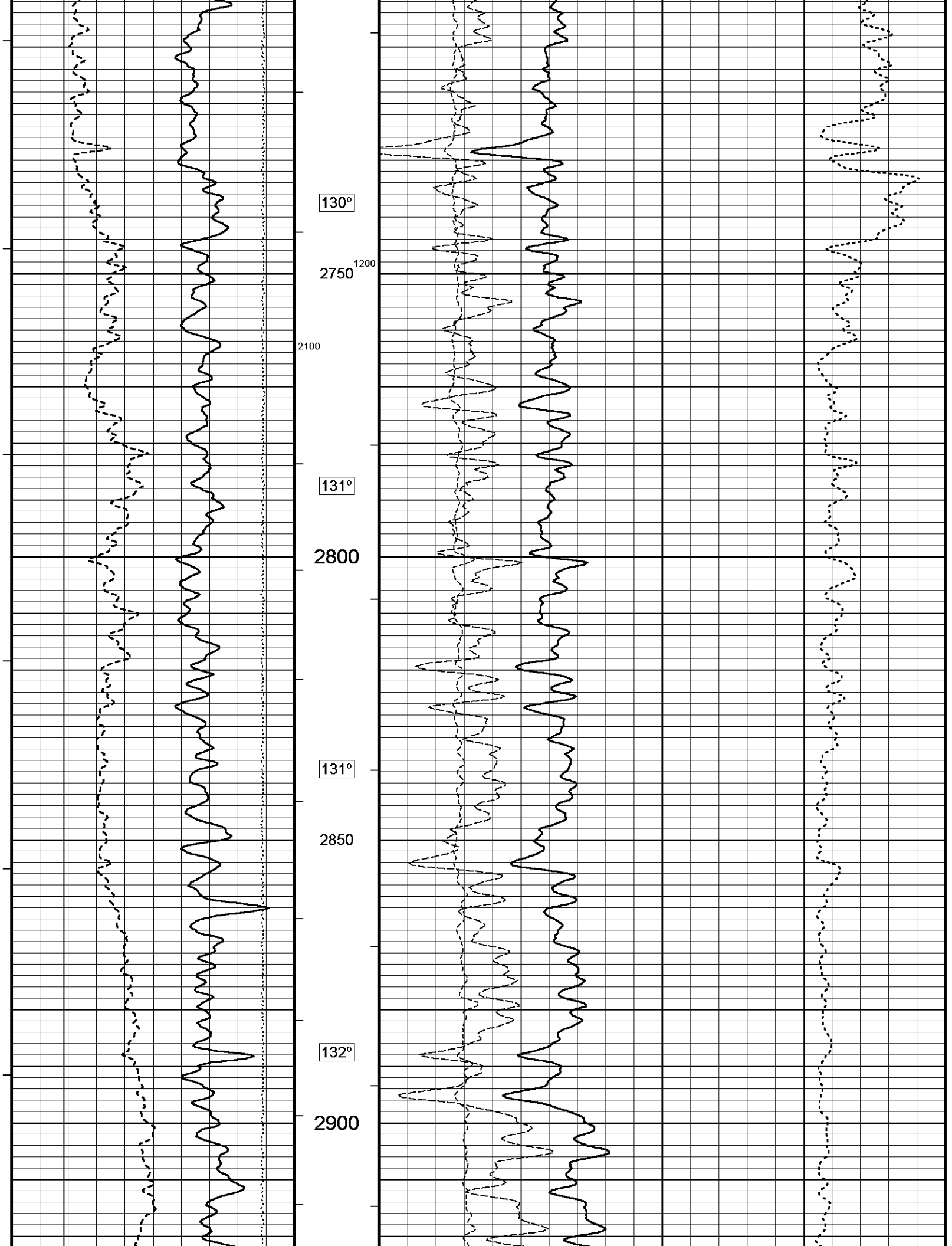


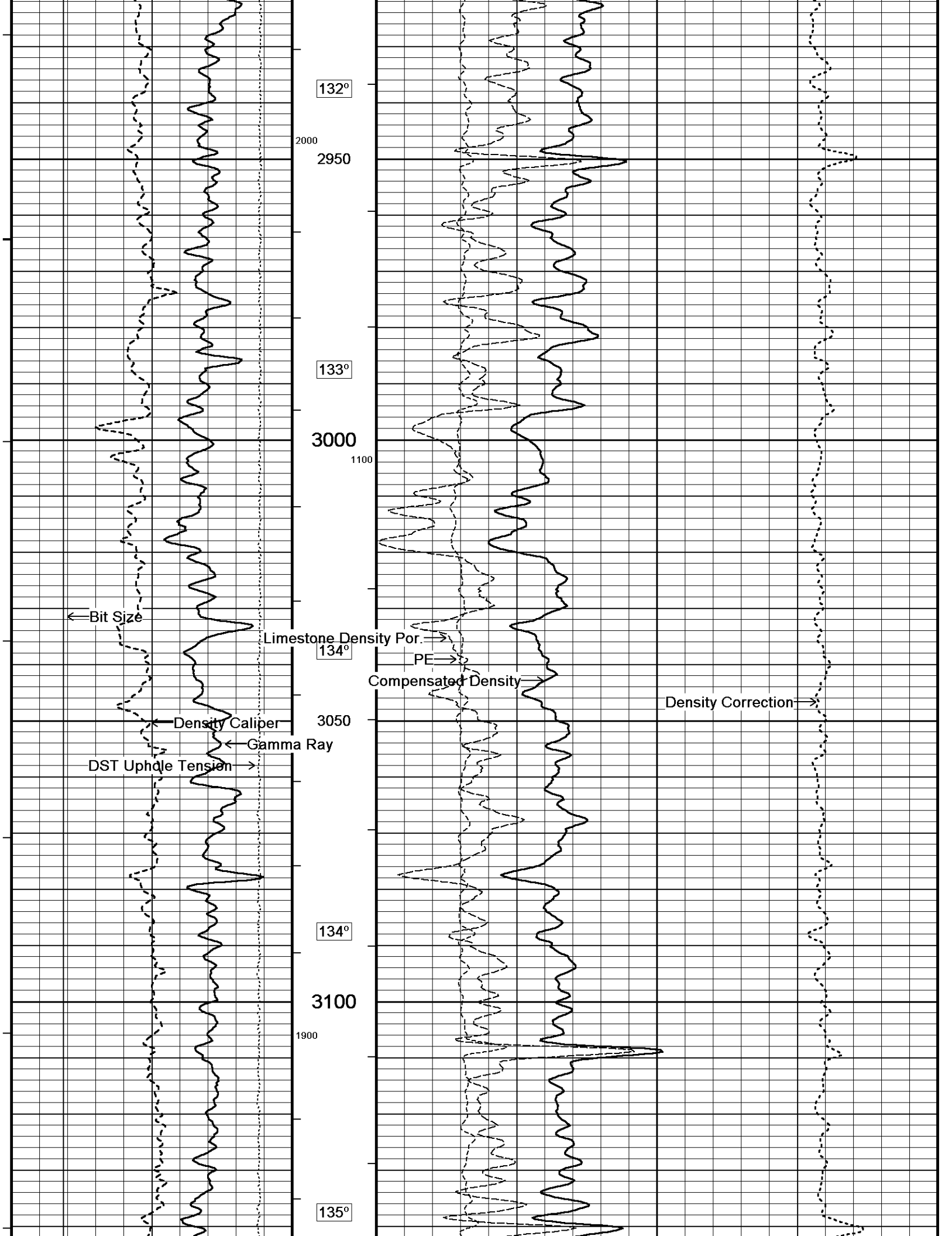


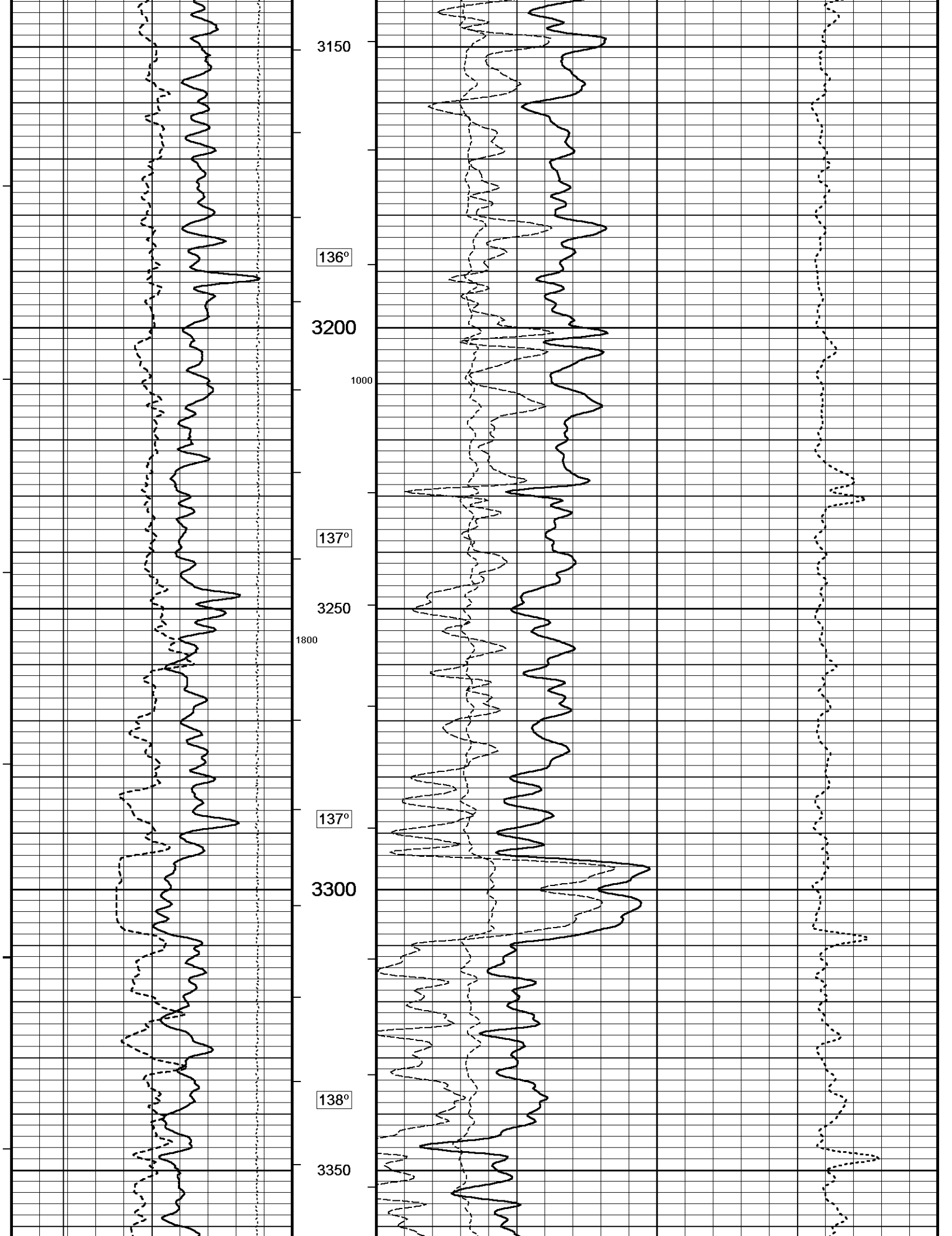


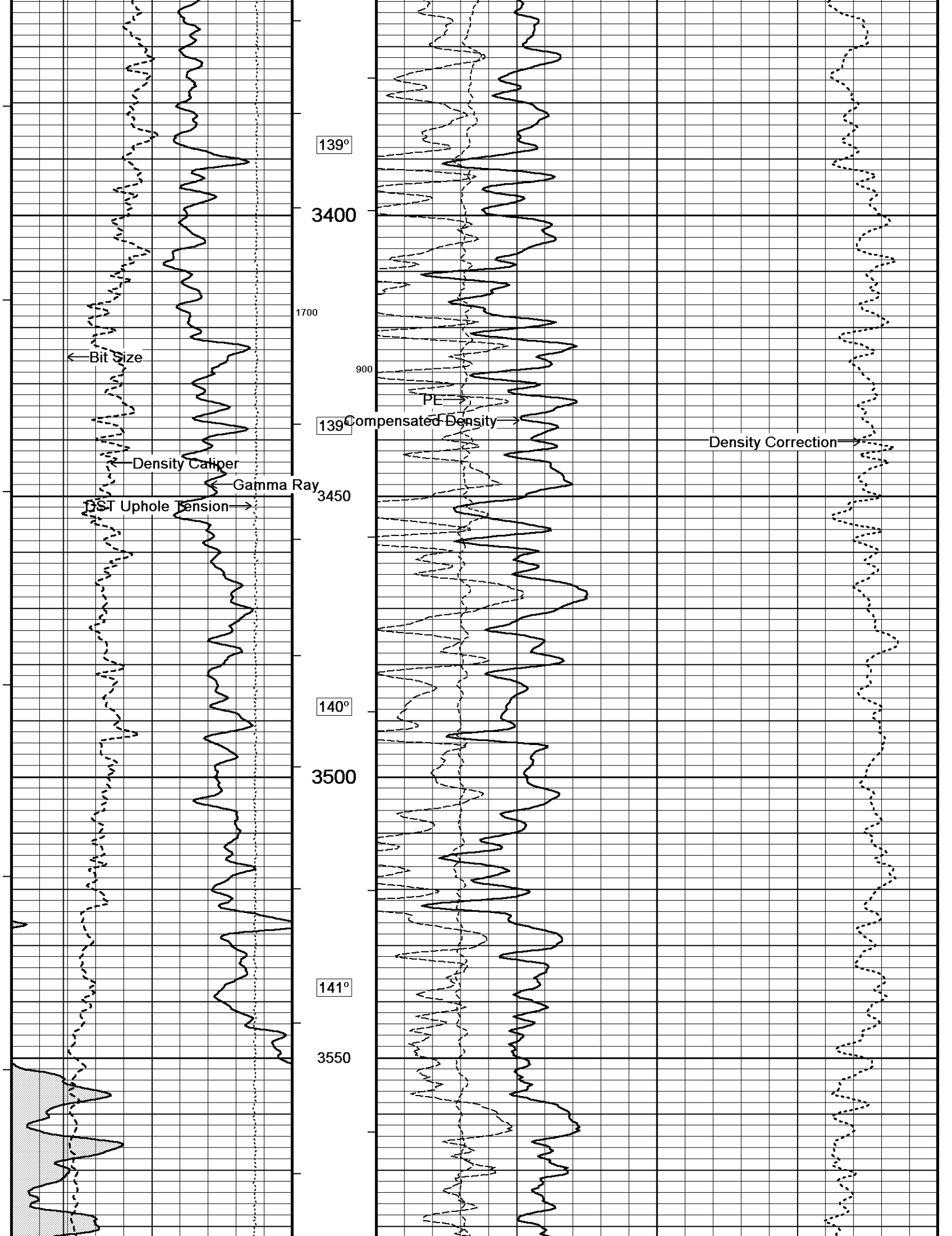


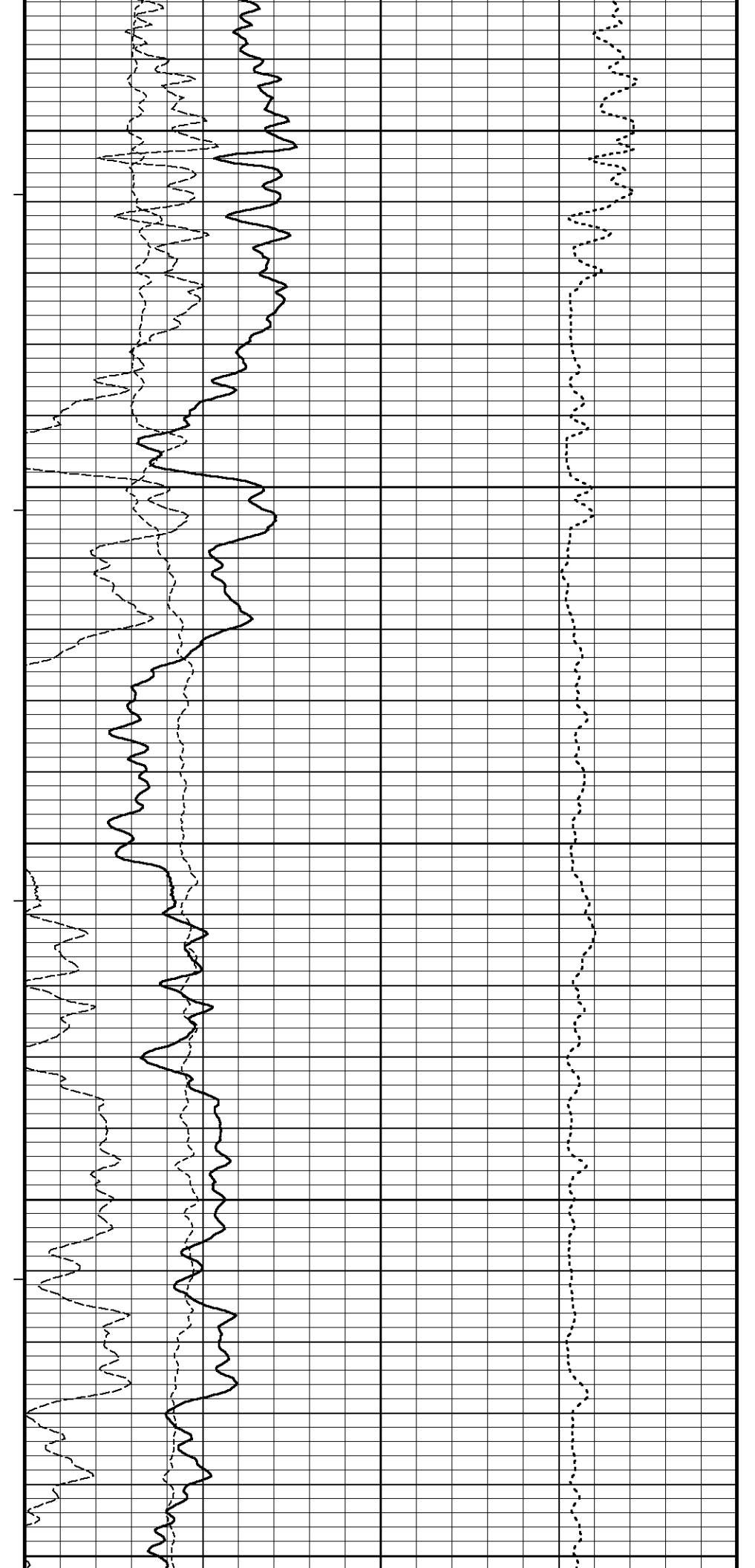
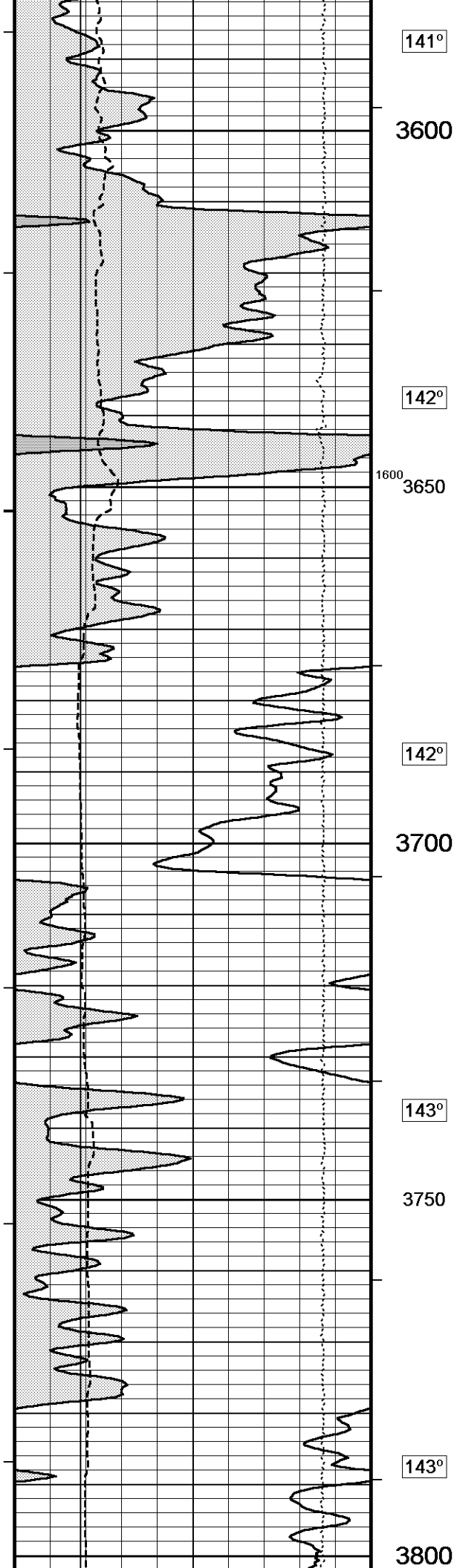


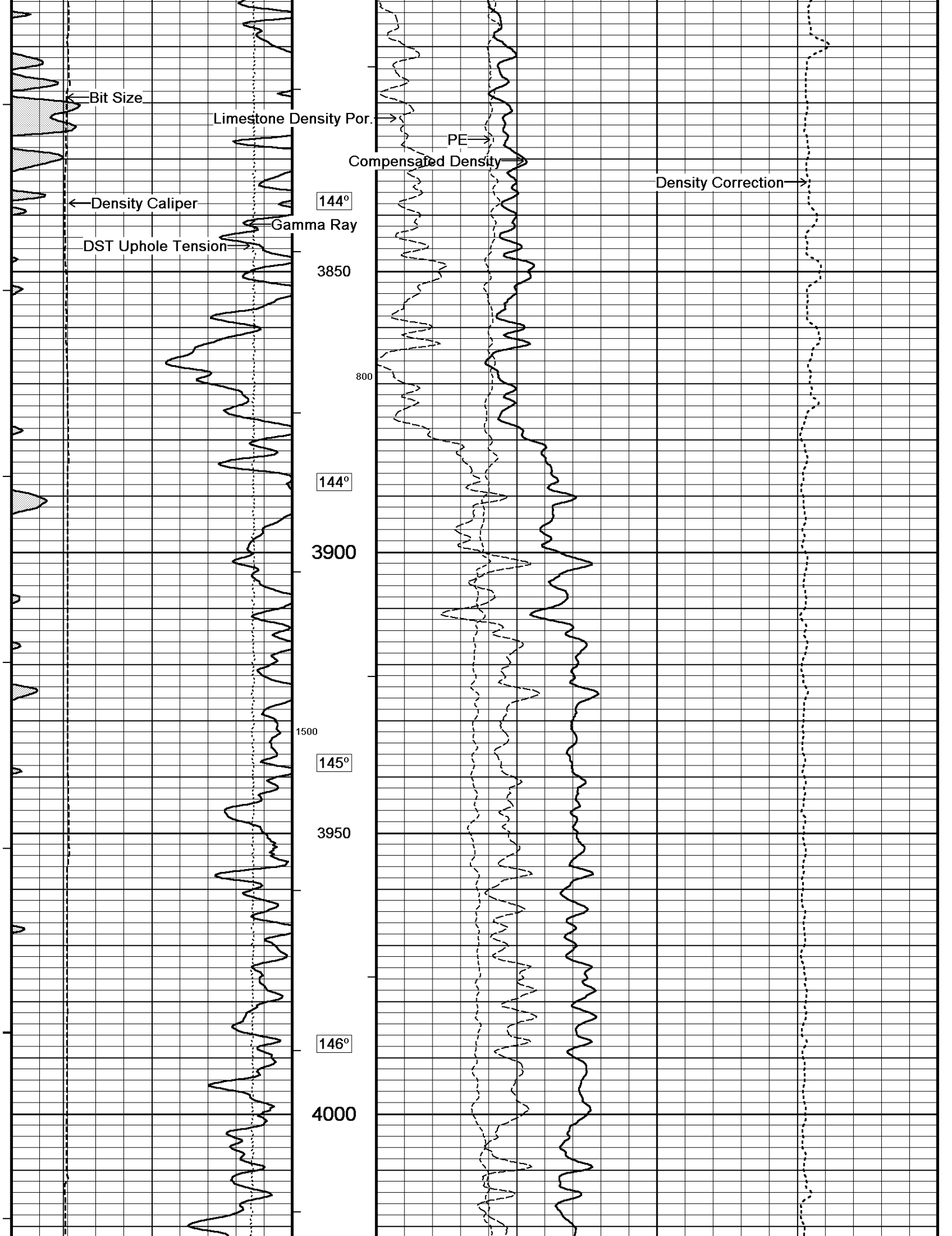




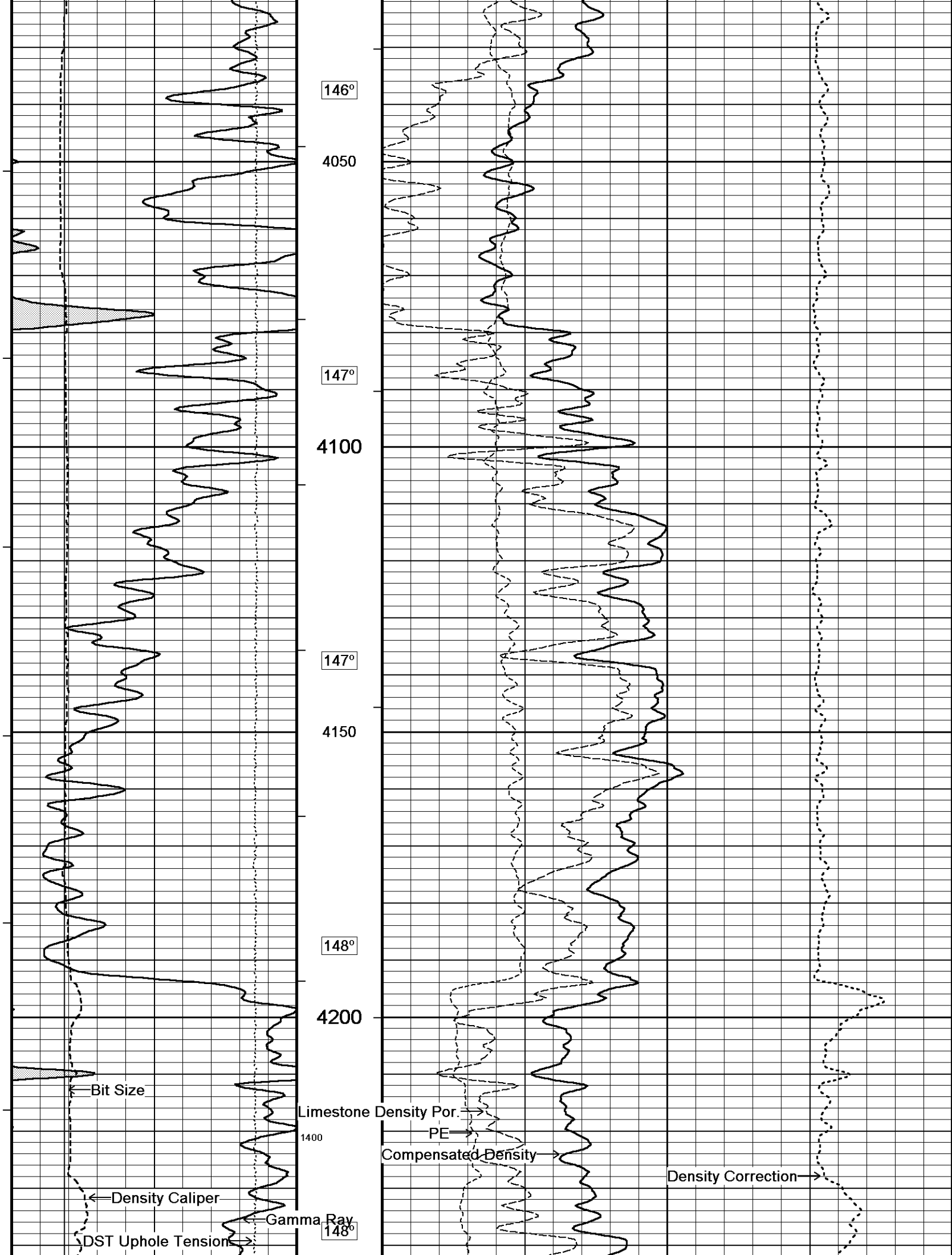


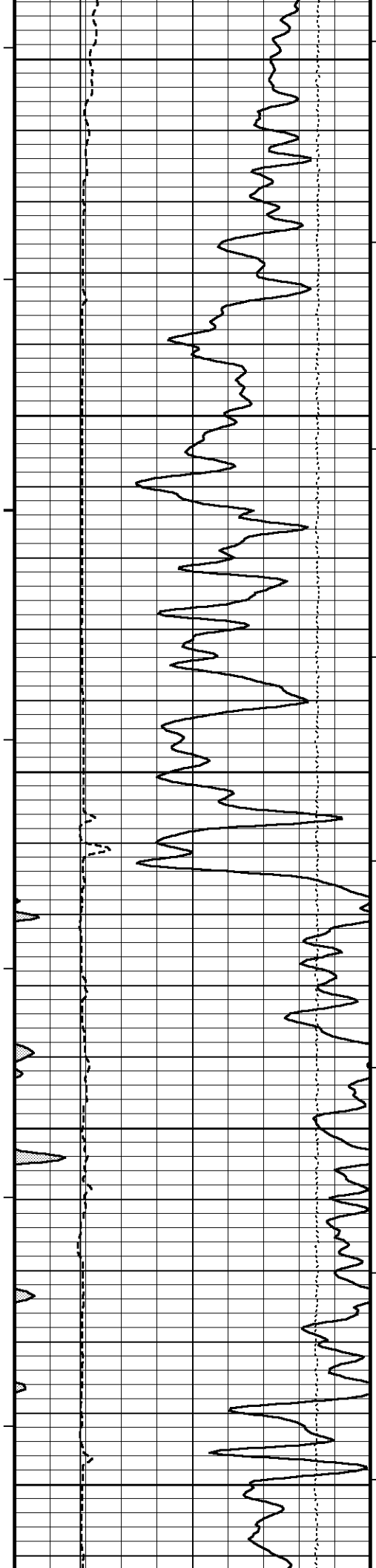












4250

149°

4300

149°

4350

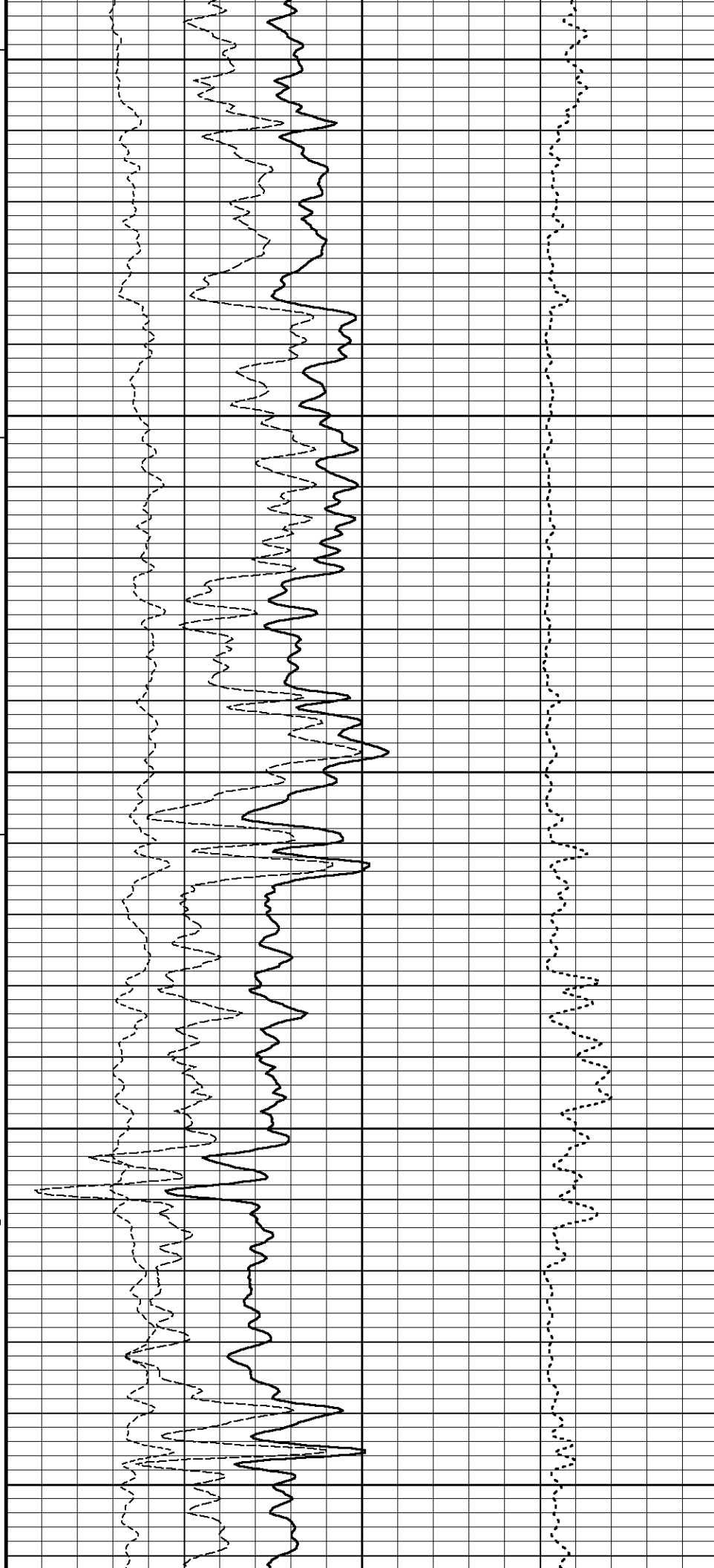
150°

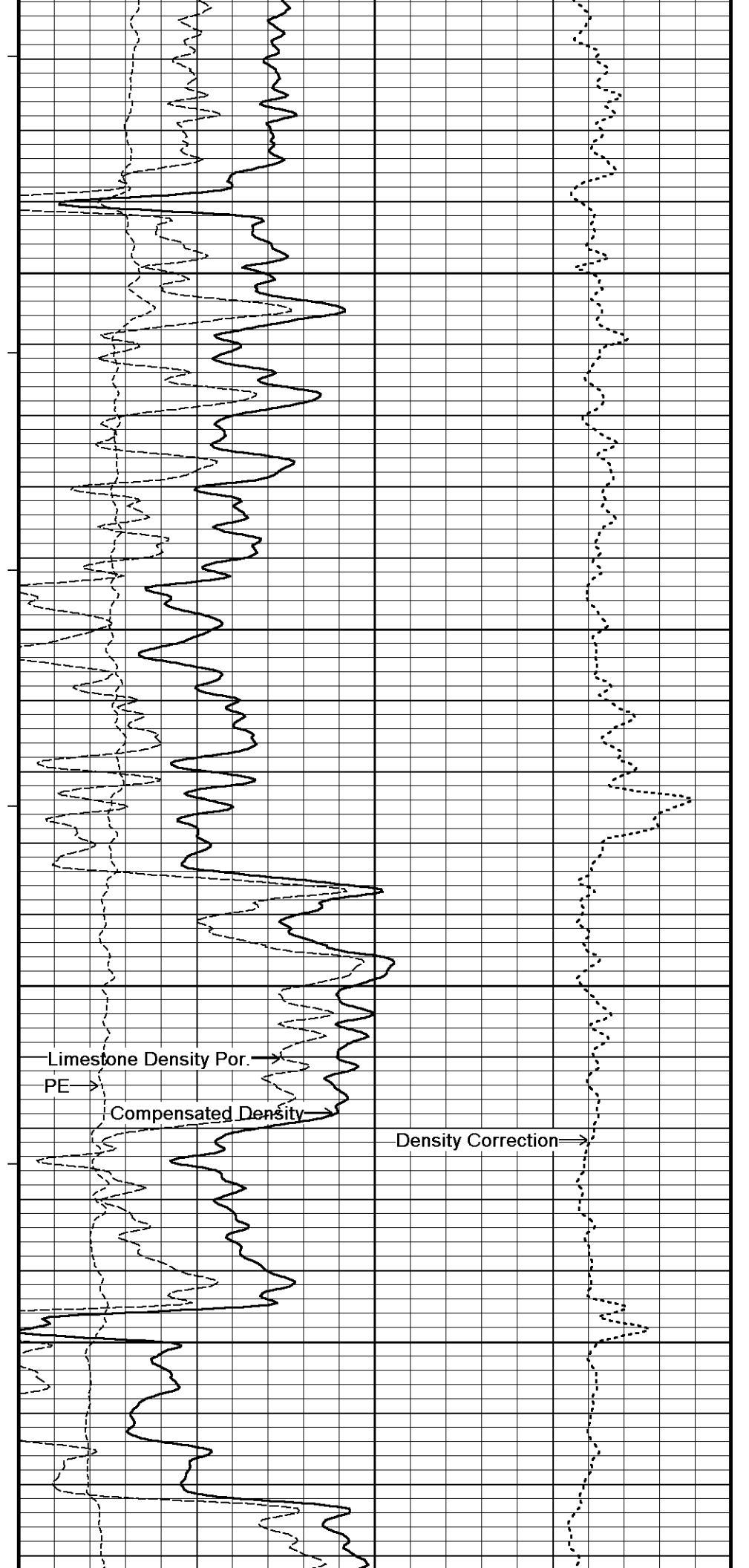
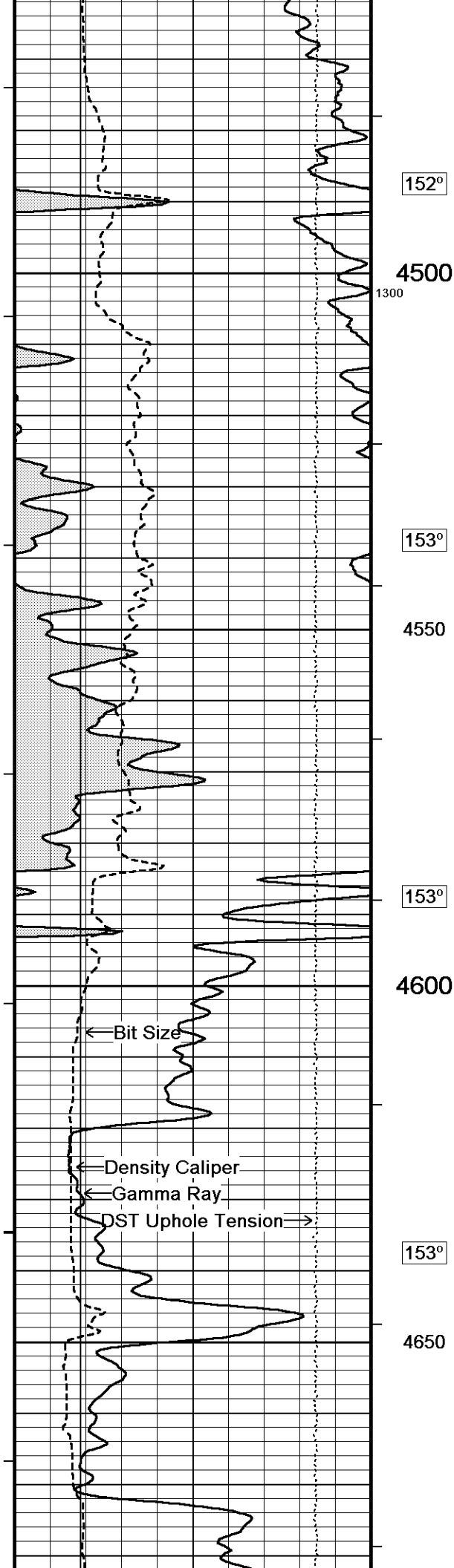
4400

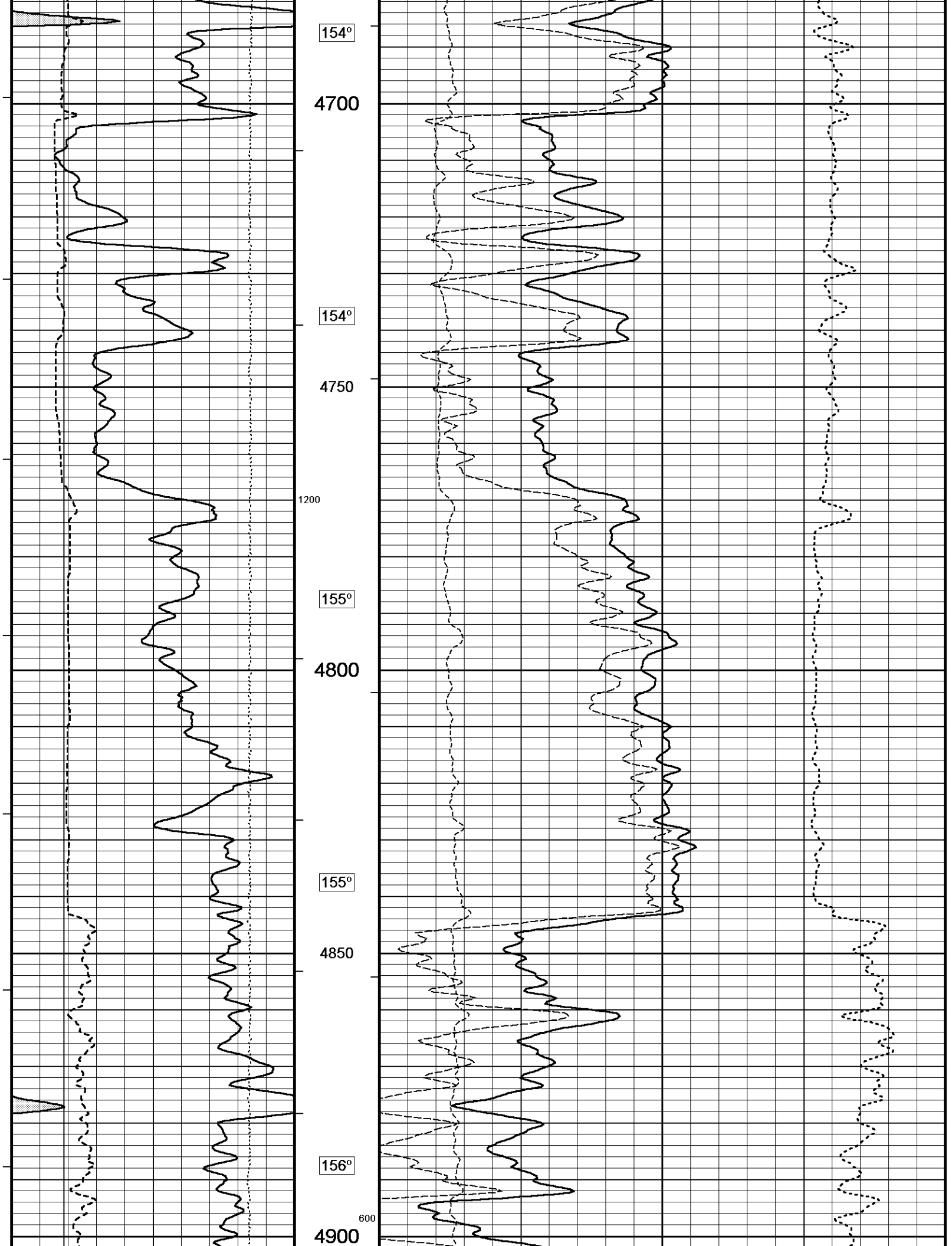
700

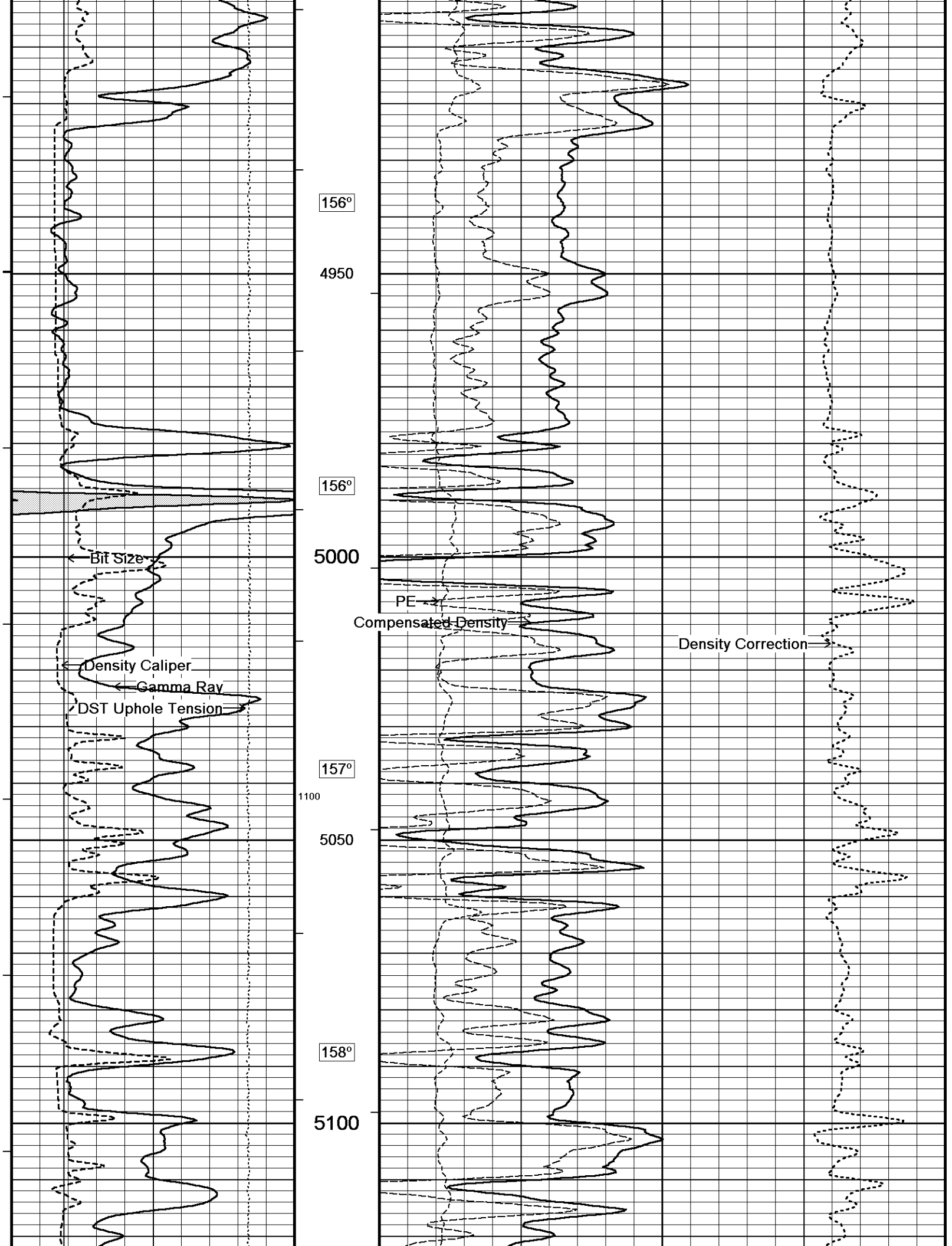
151°

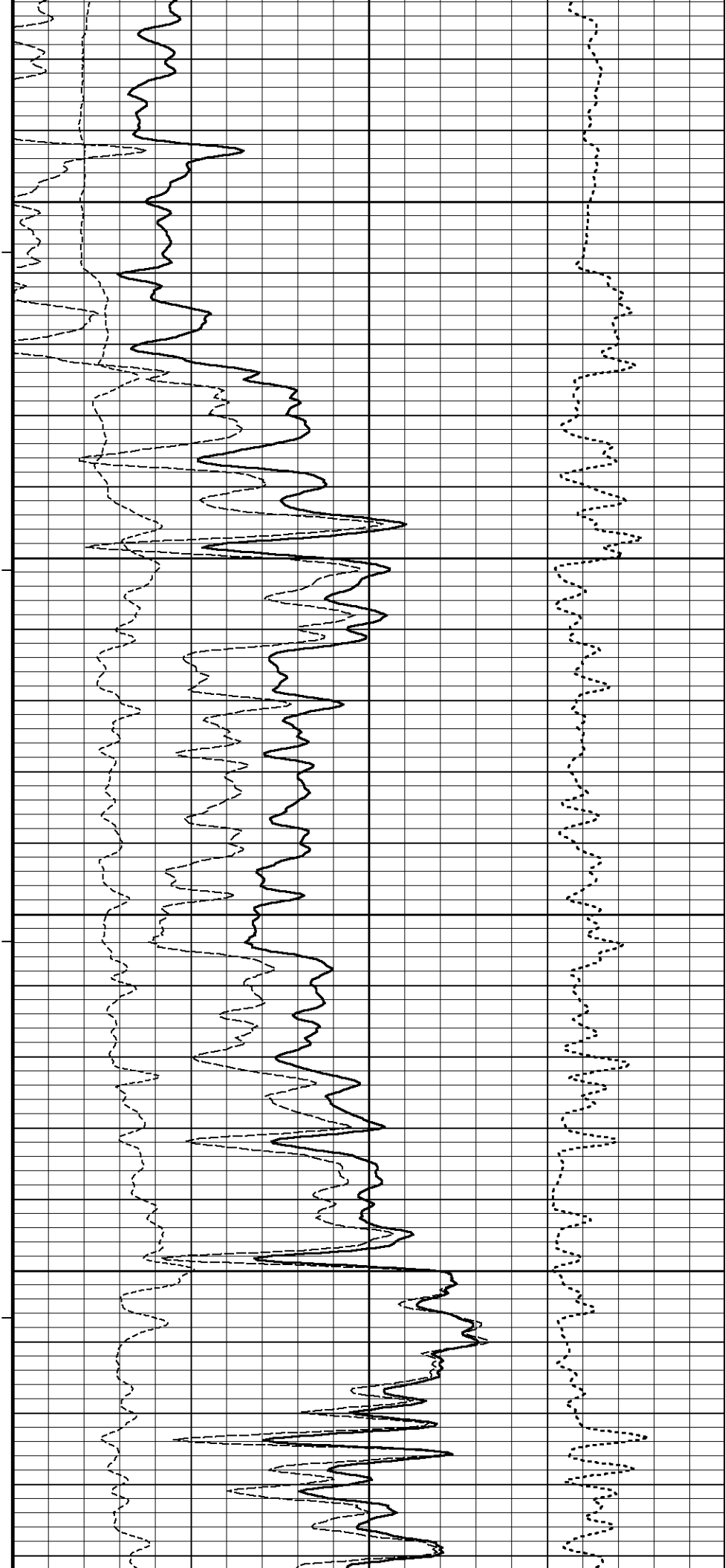
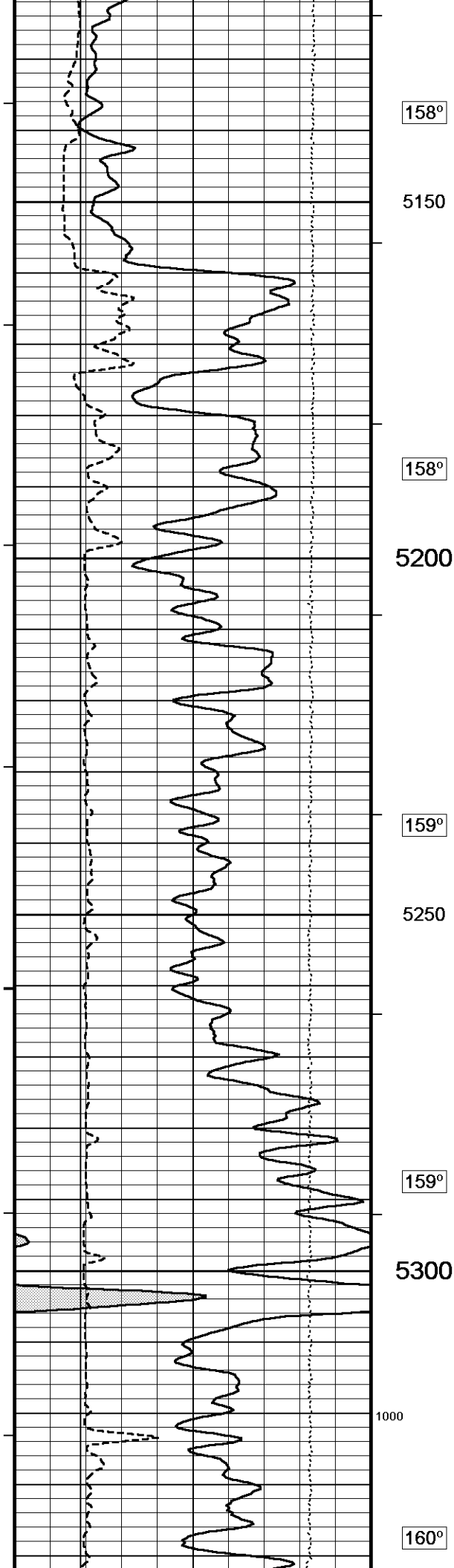
4450

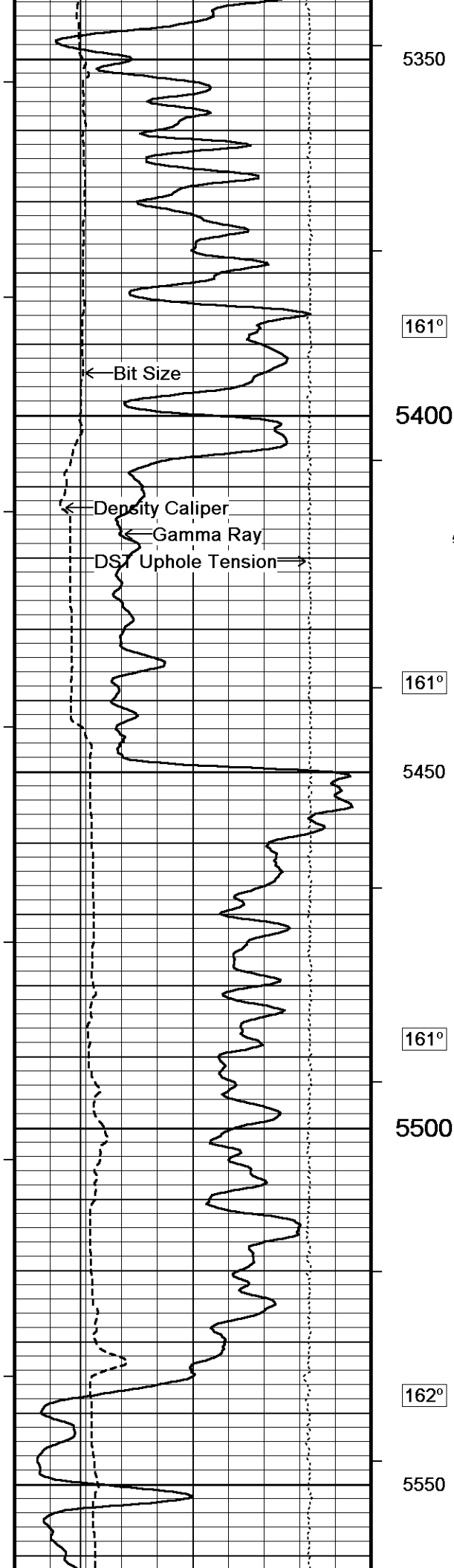












5350

161°

5400

161°

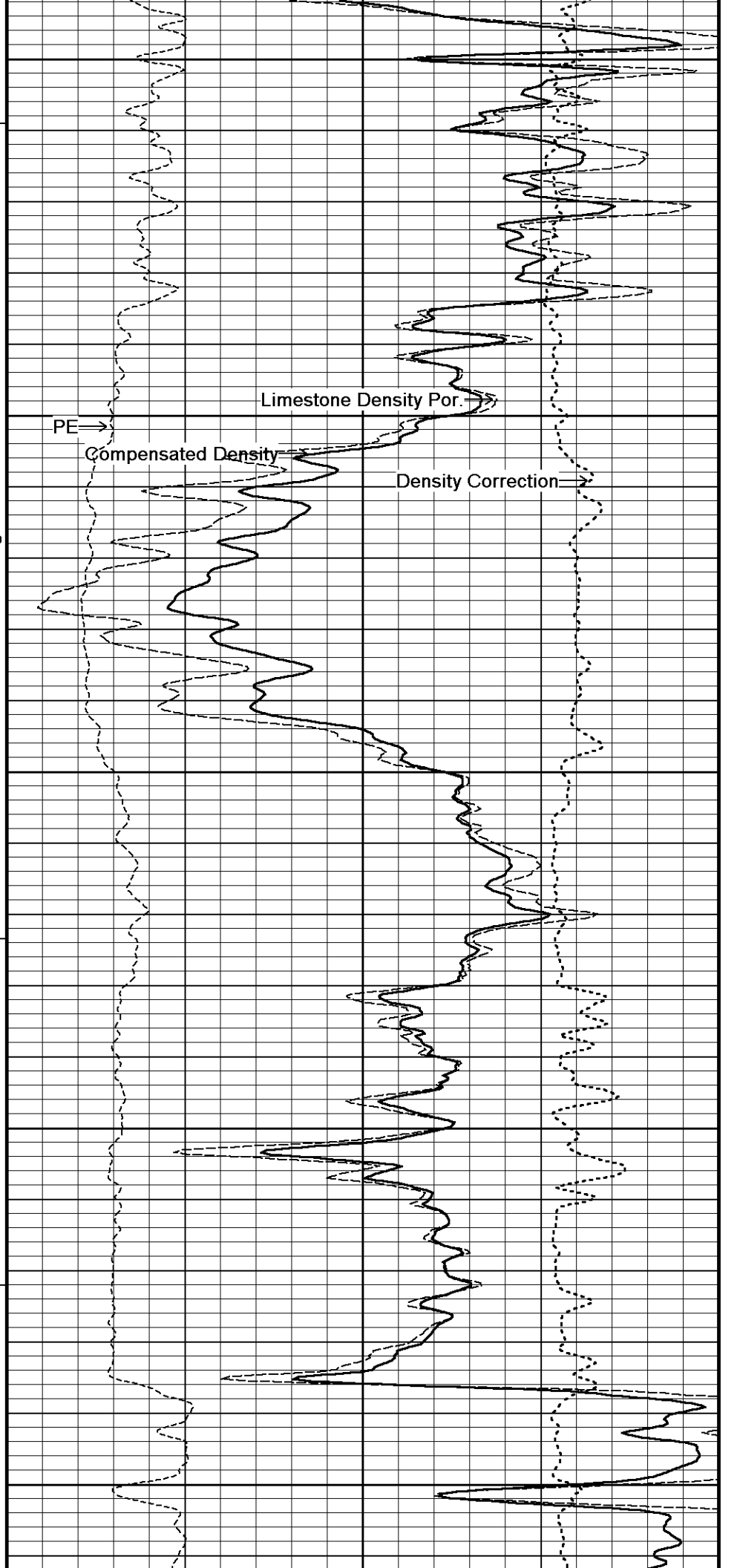
5450

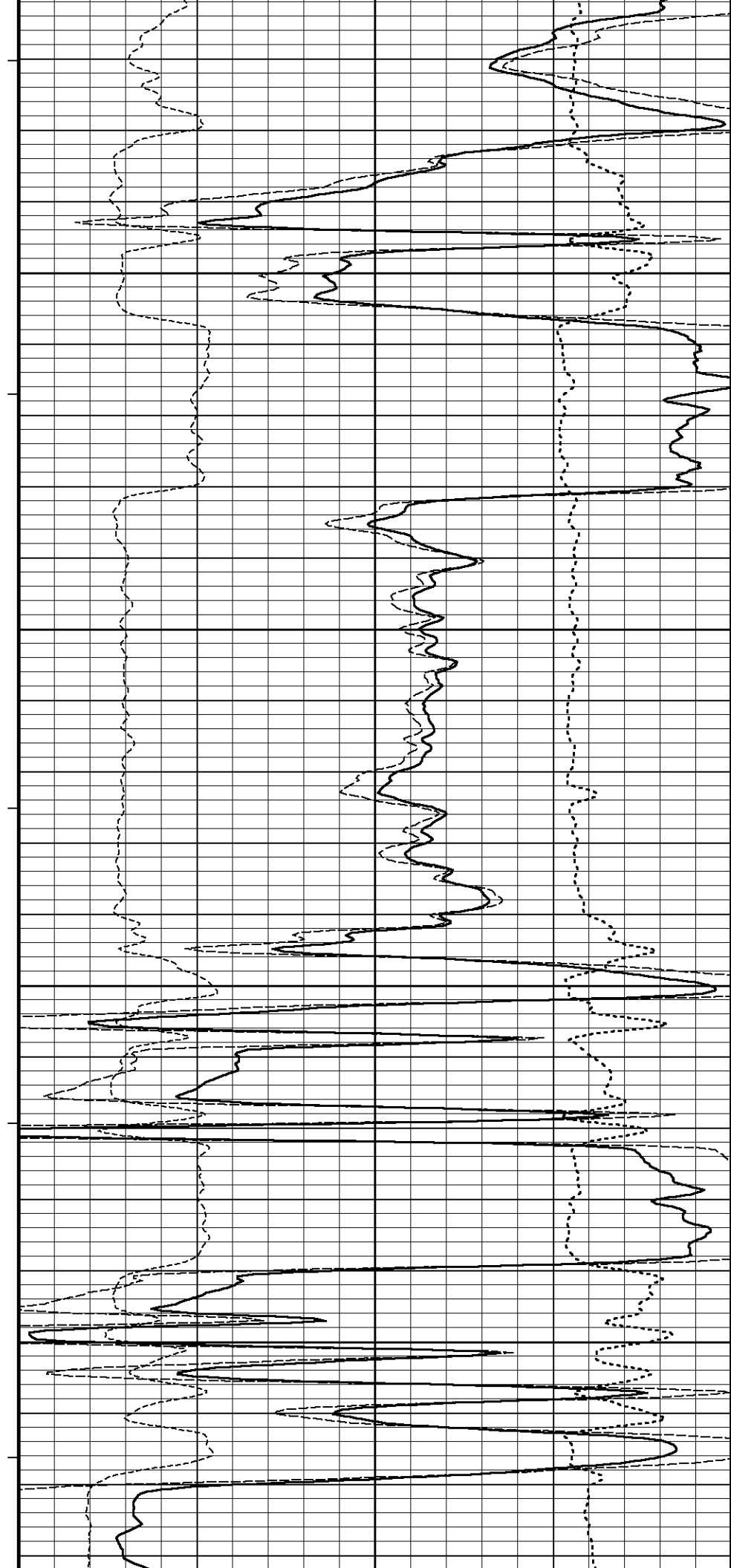
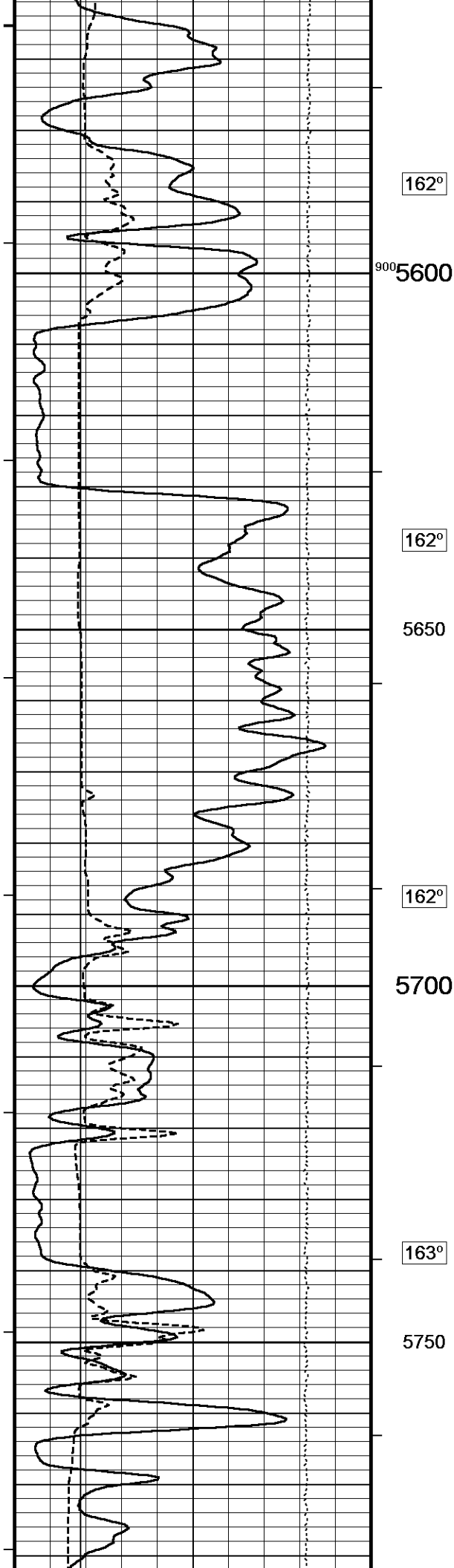
161°

5500

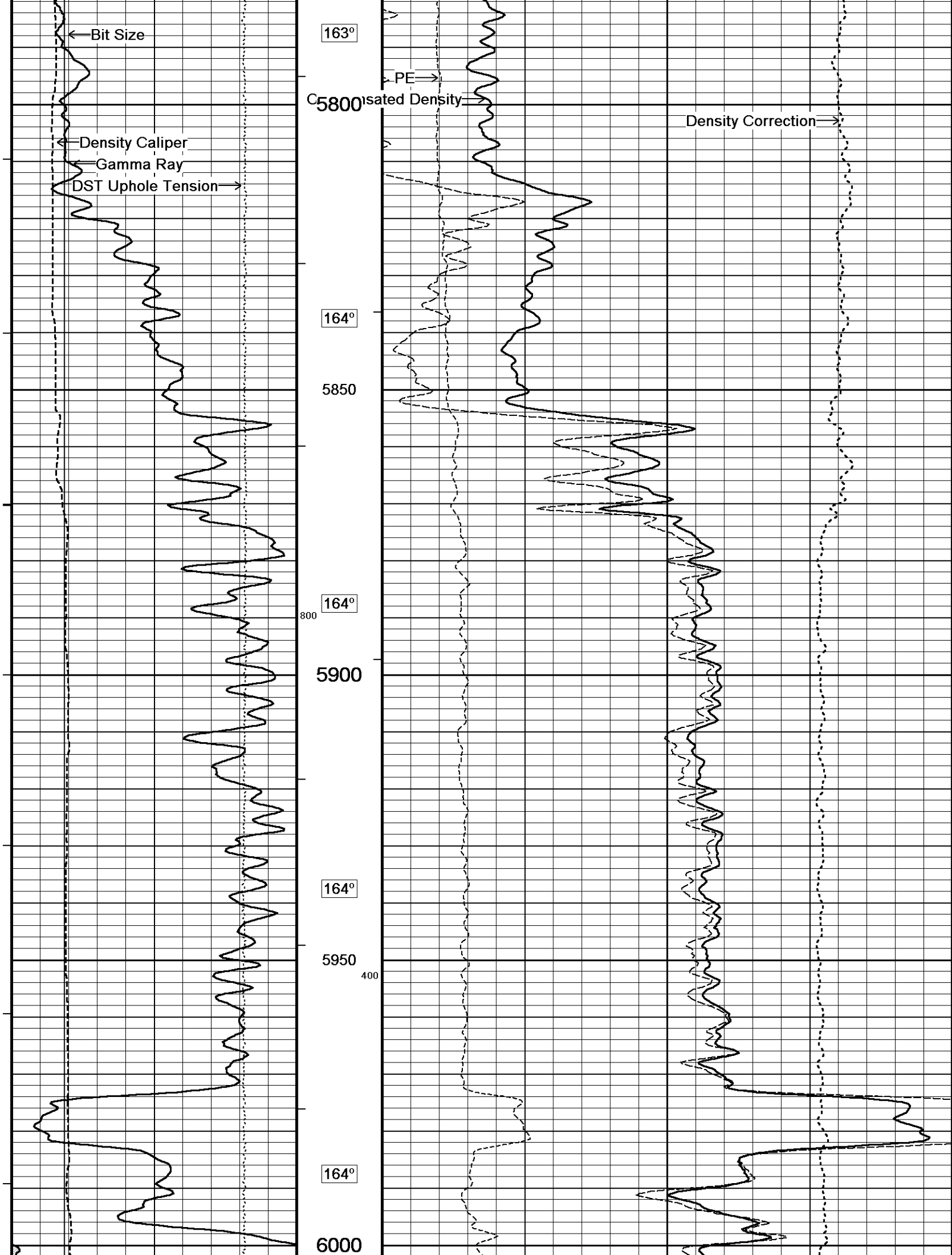
162°

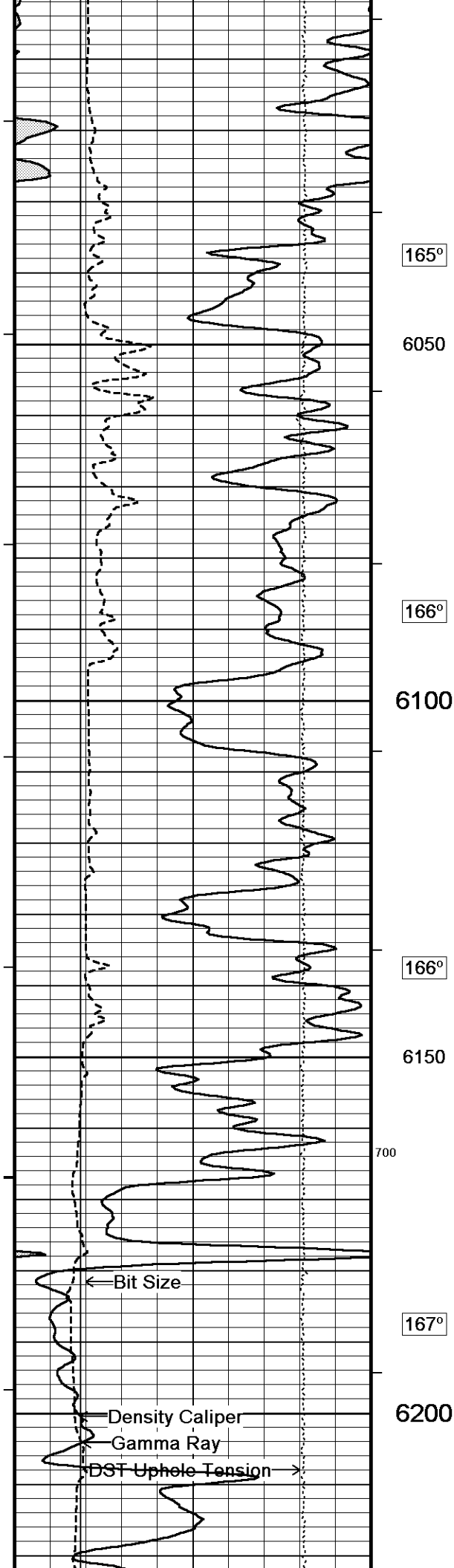
5550











165°

6050

166°

6100

166°

6150

700

167°

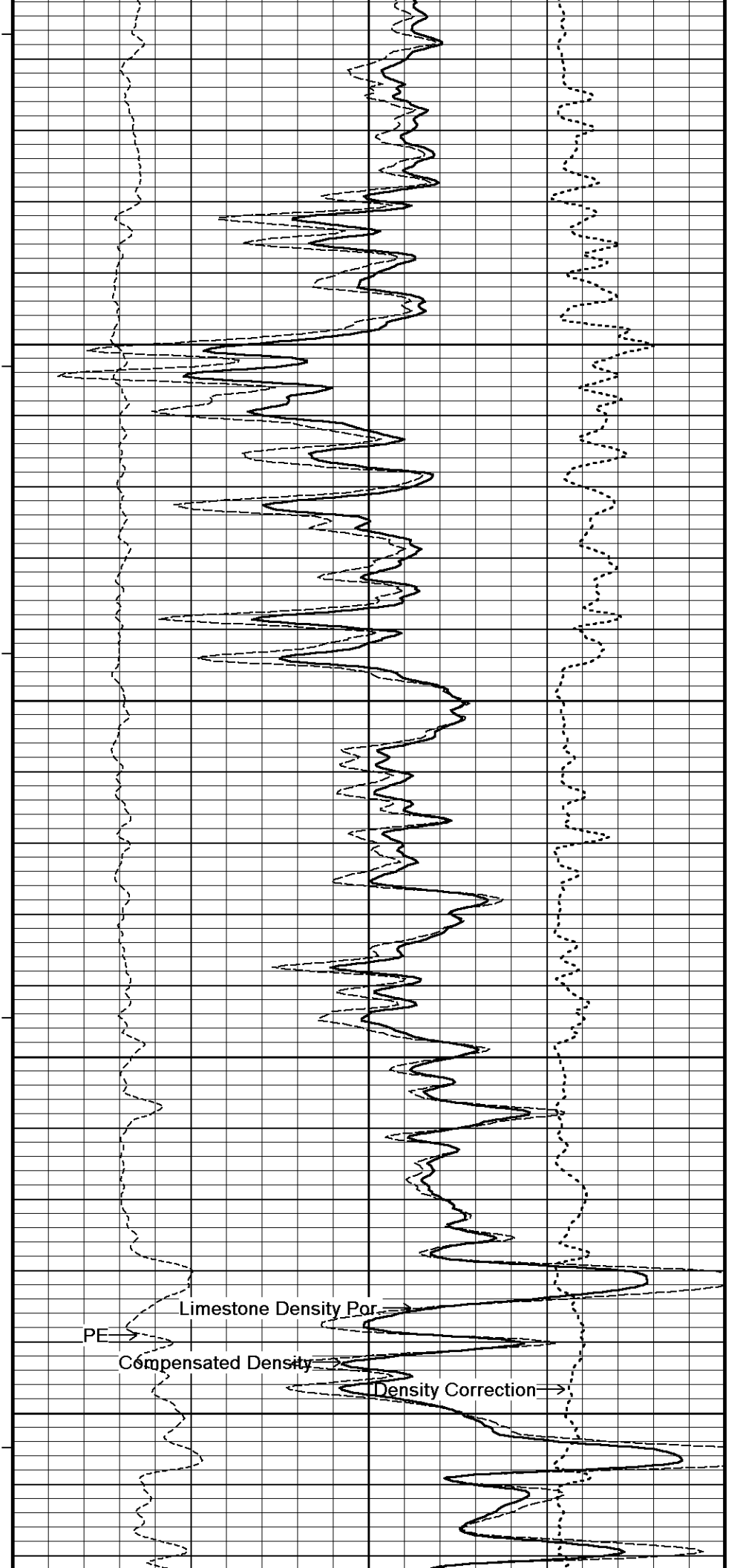
6200

← Bit Size

Density Caliper

Gamma Ray

DST Uphole Tension →

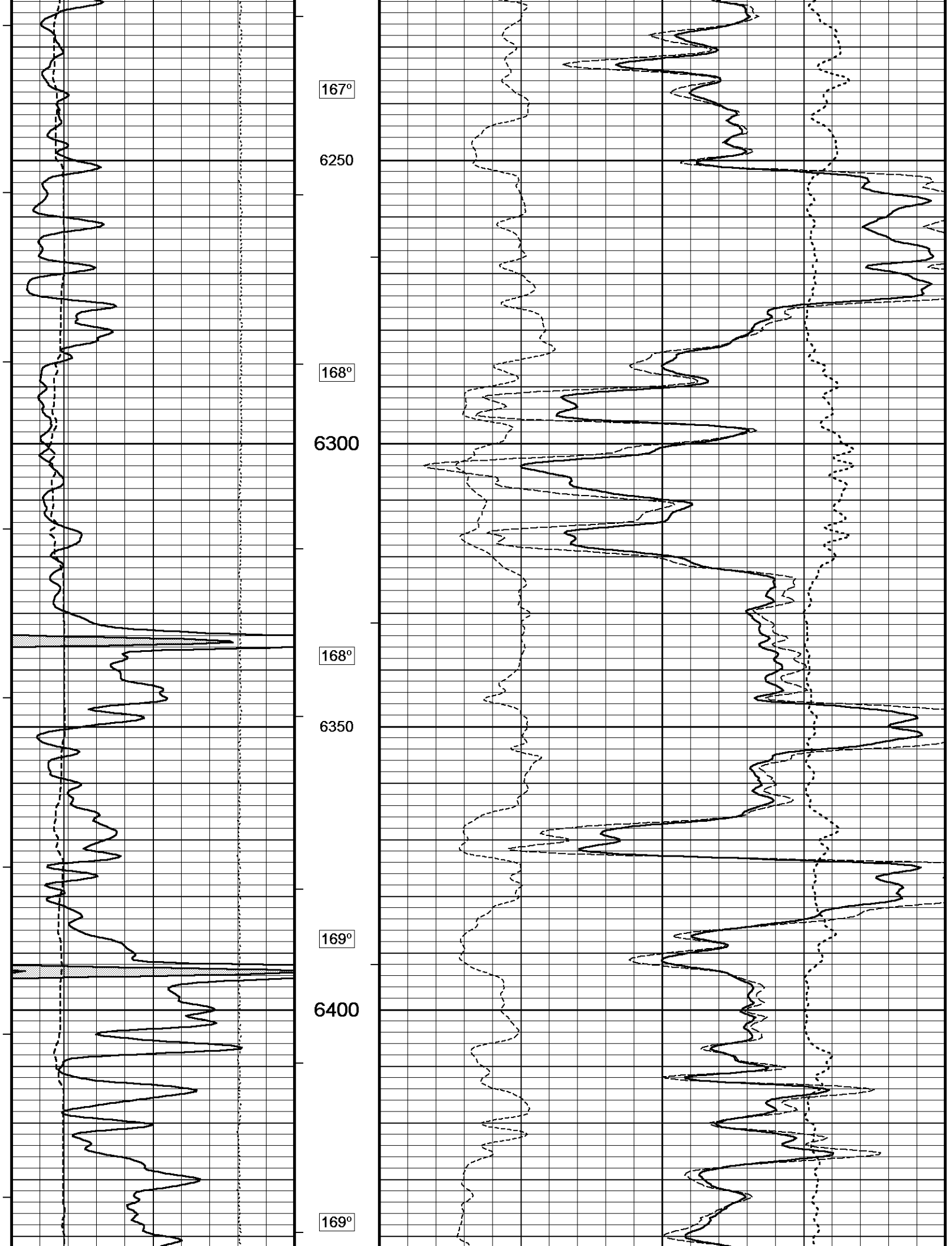


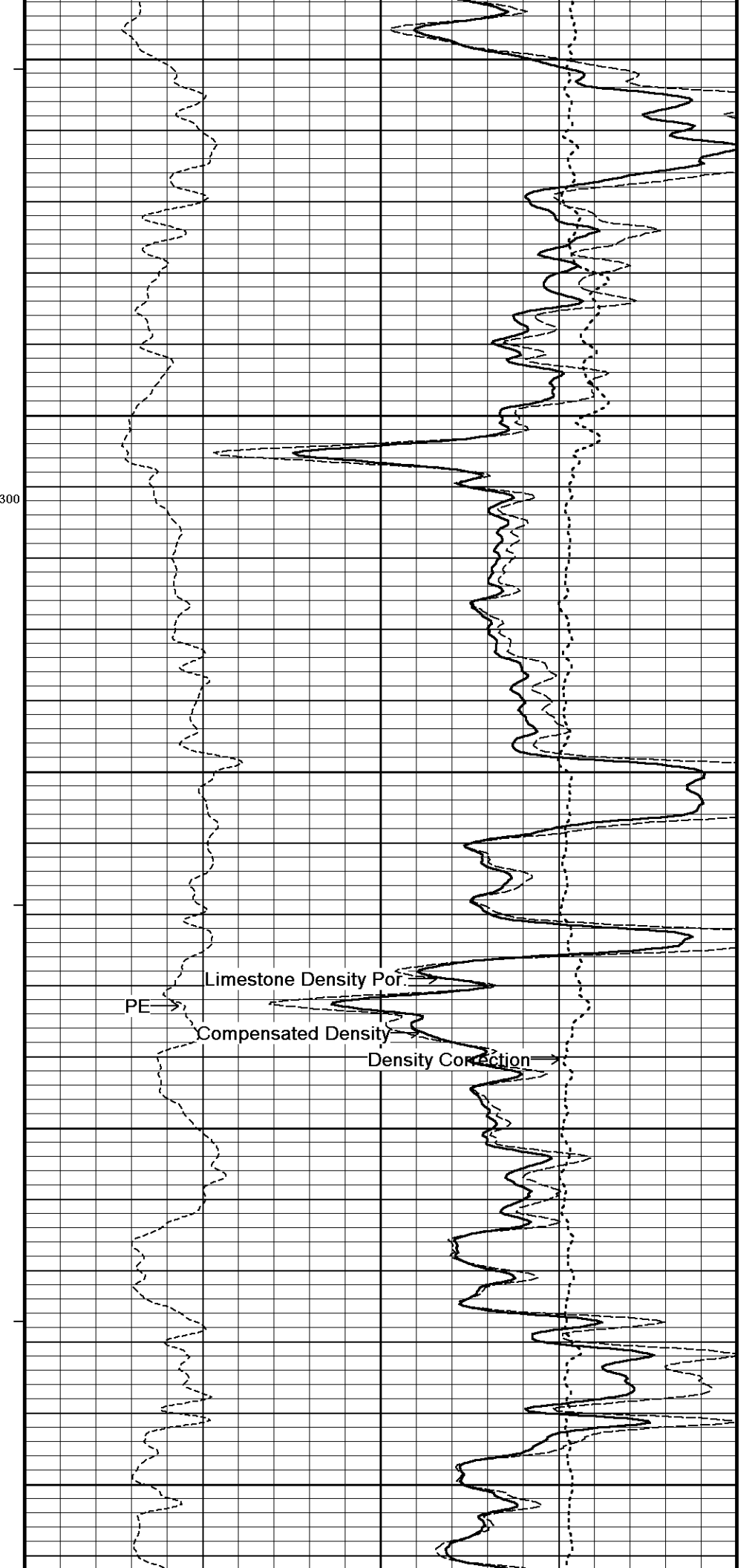
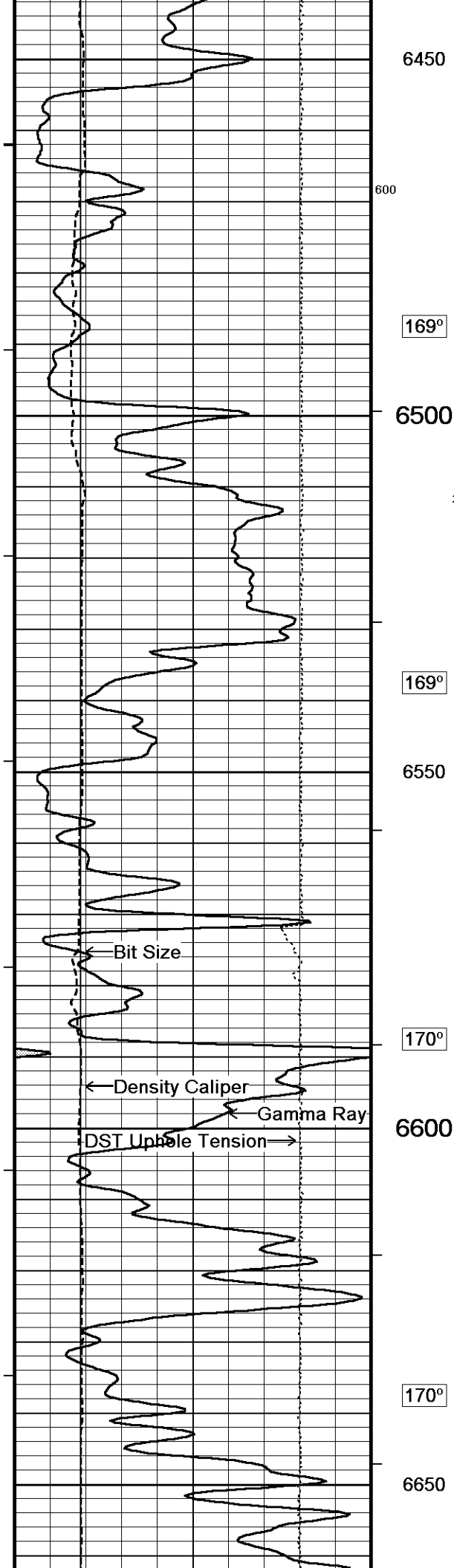
PE →

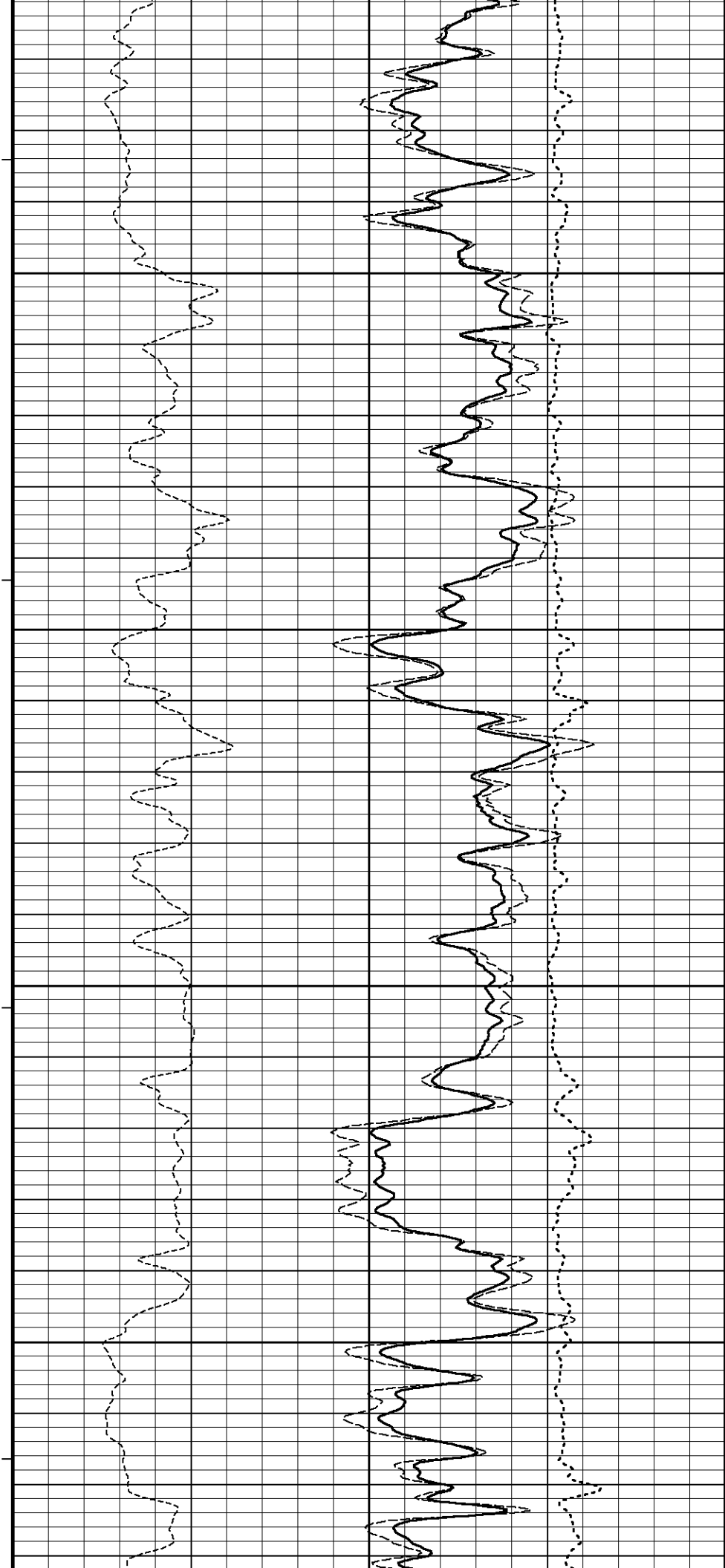
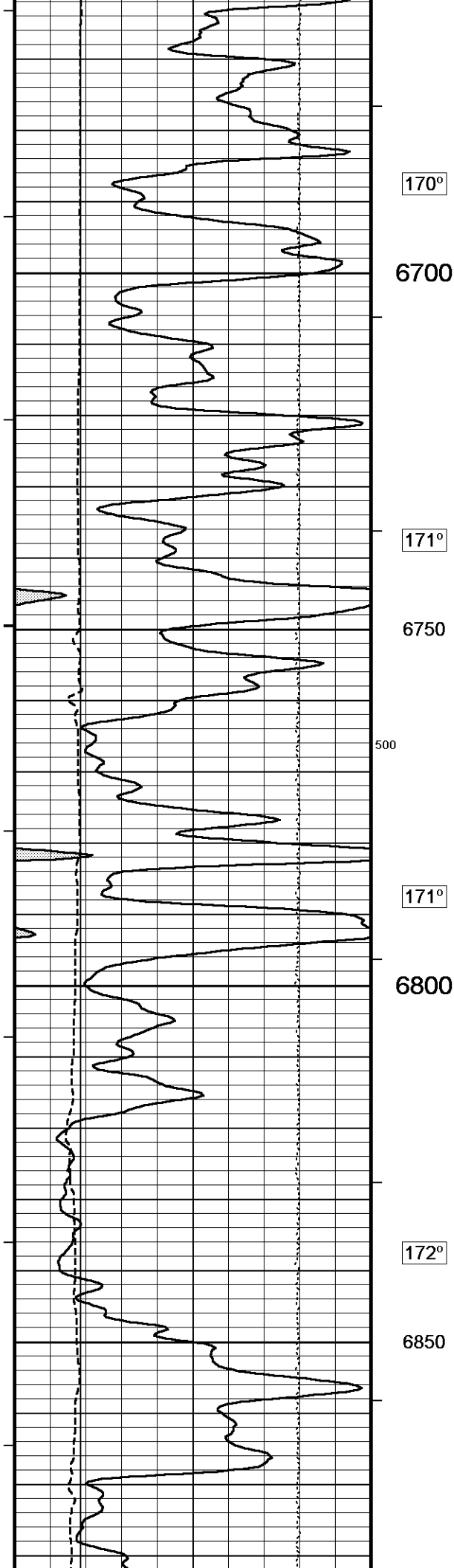
Limestone Density Por →

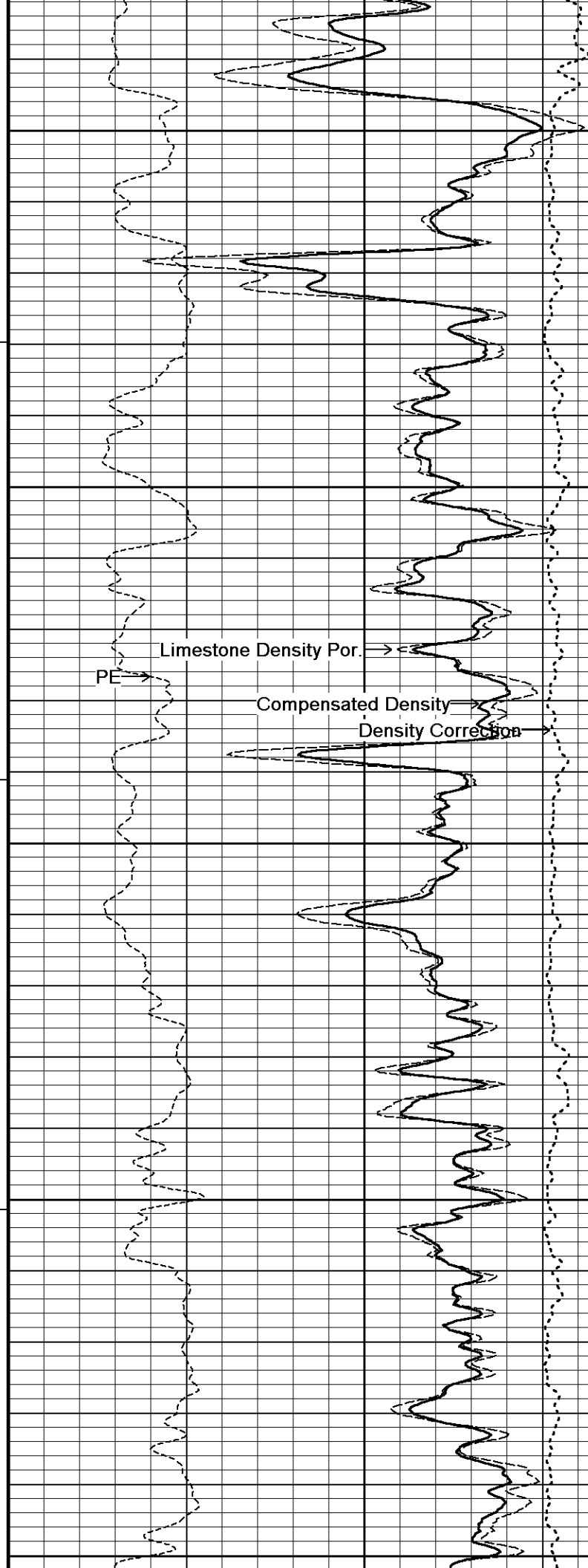
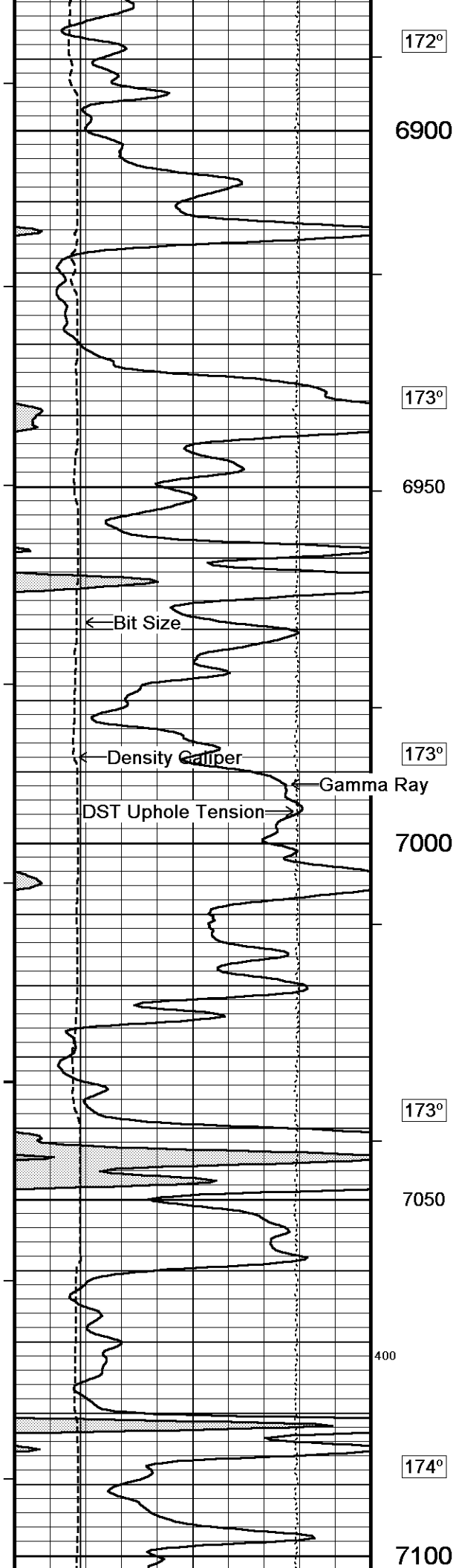
Compensated Density →

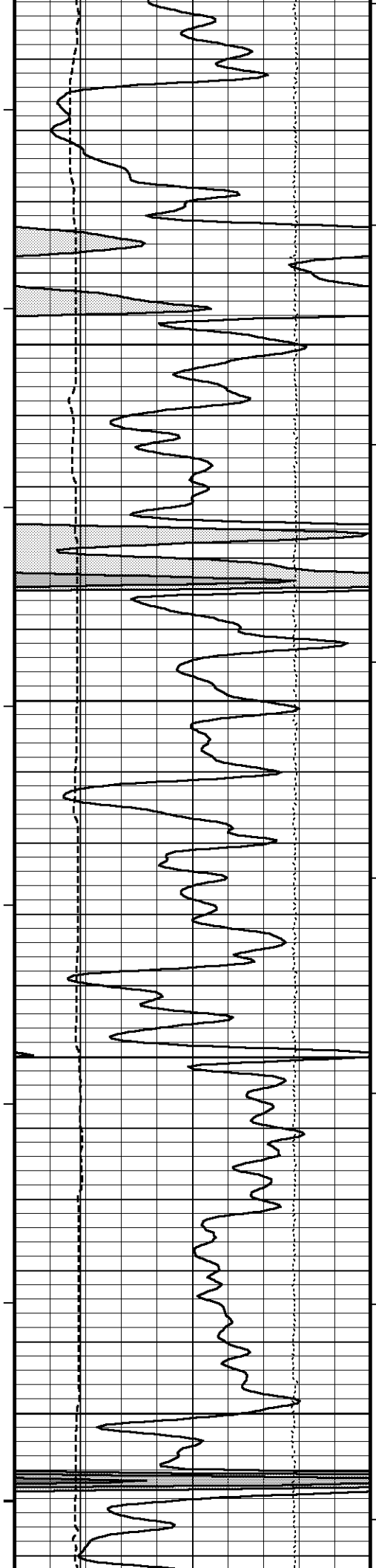
Density Correction →











175°

7150

175°

7200

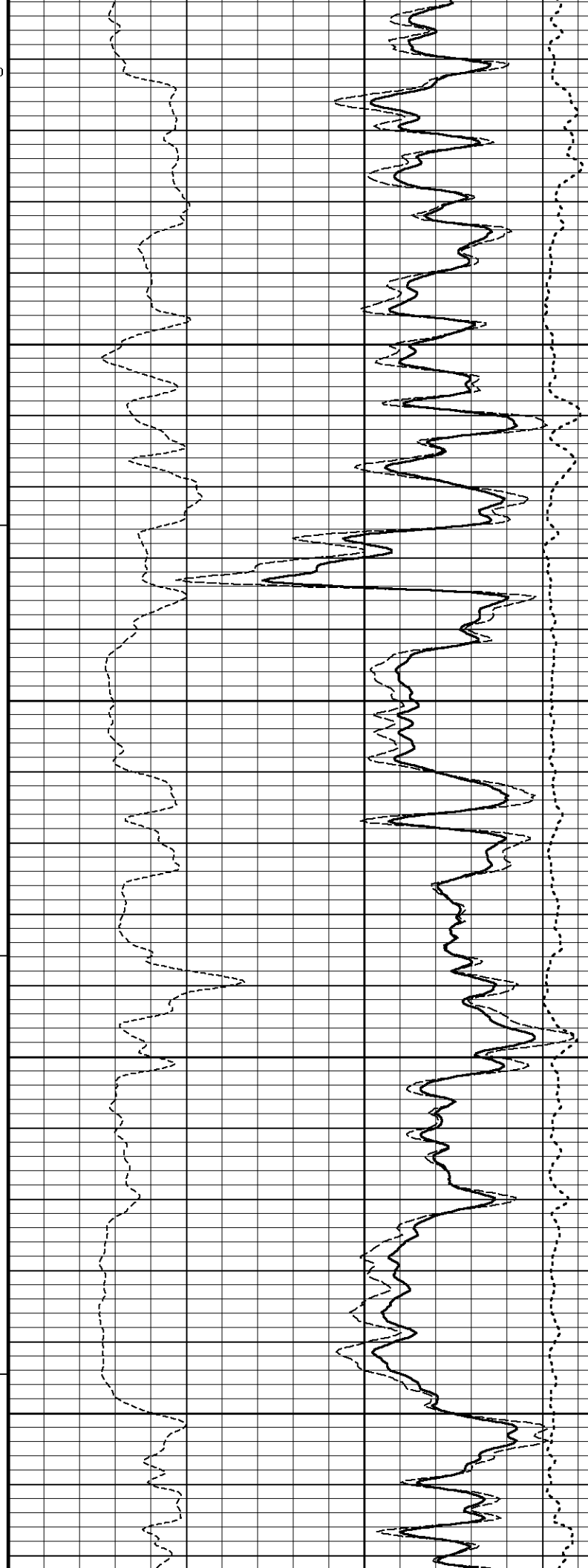
176°

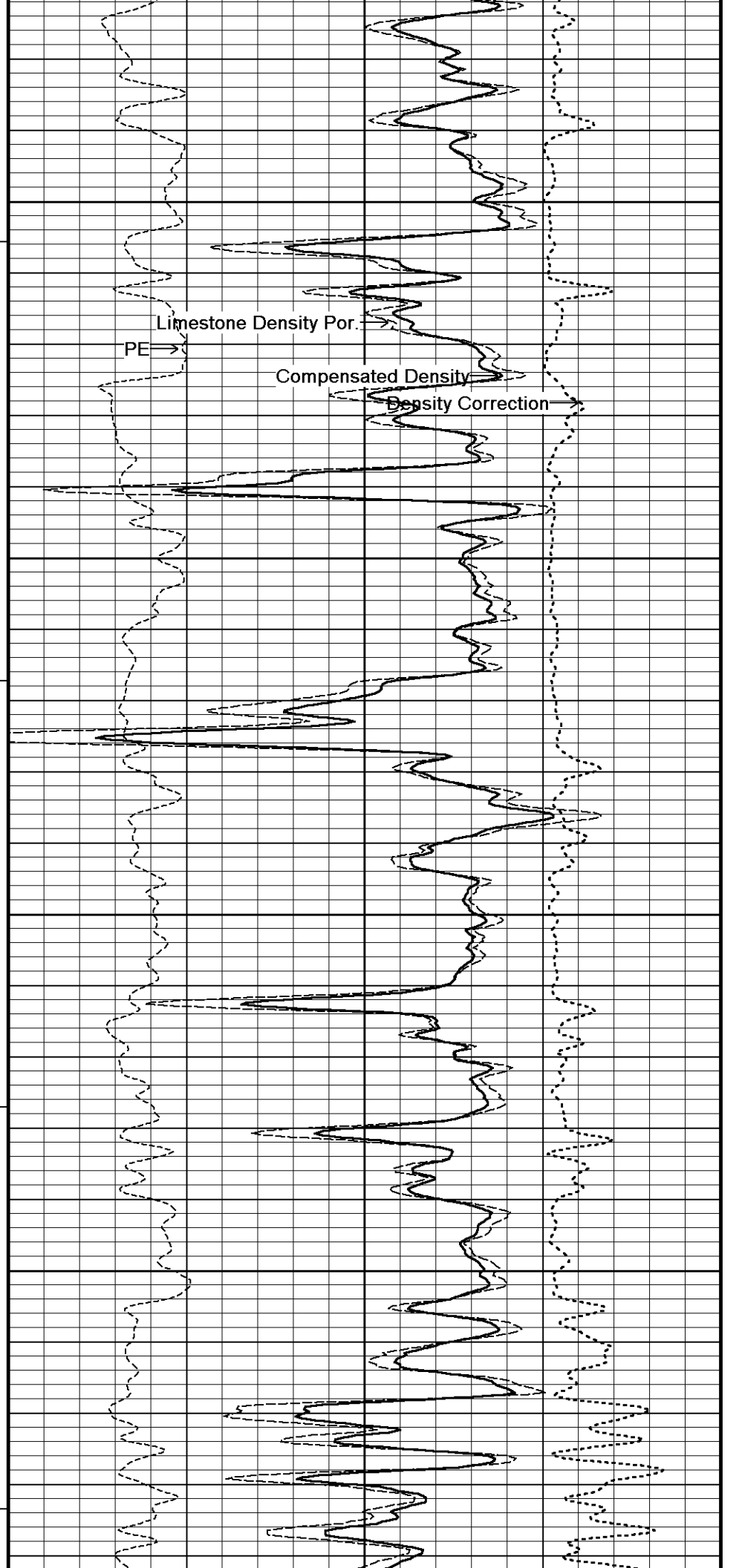
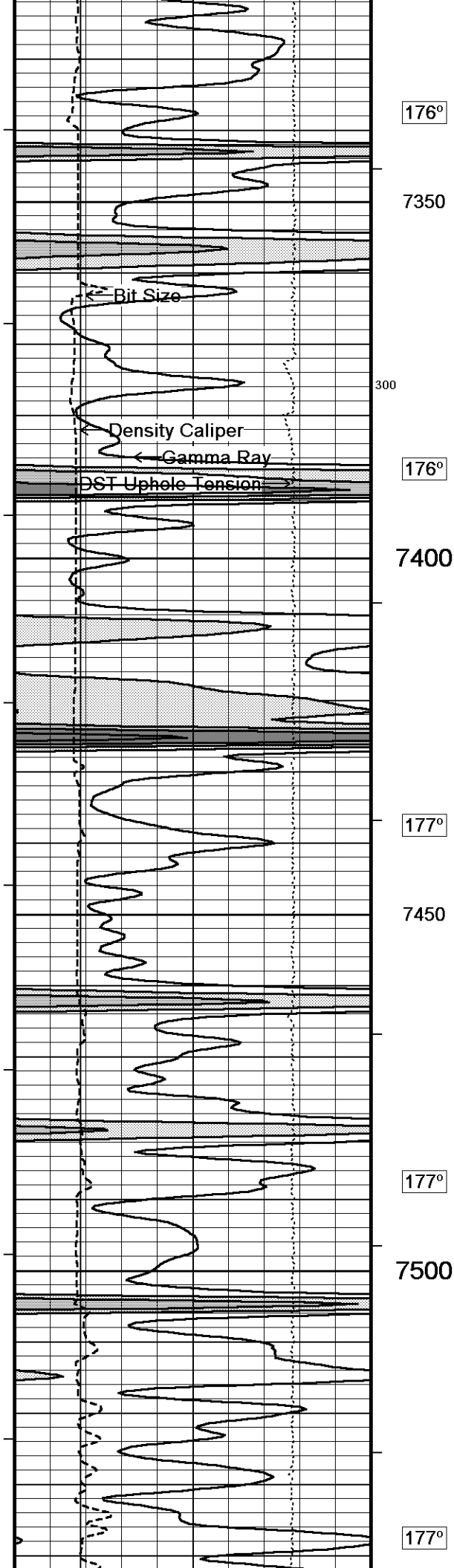
7250

176°

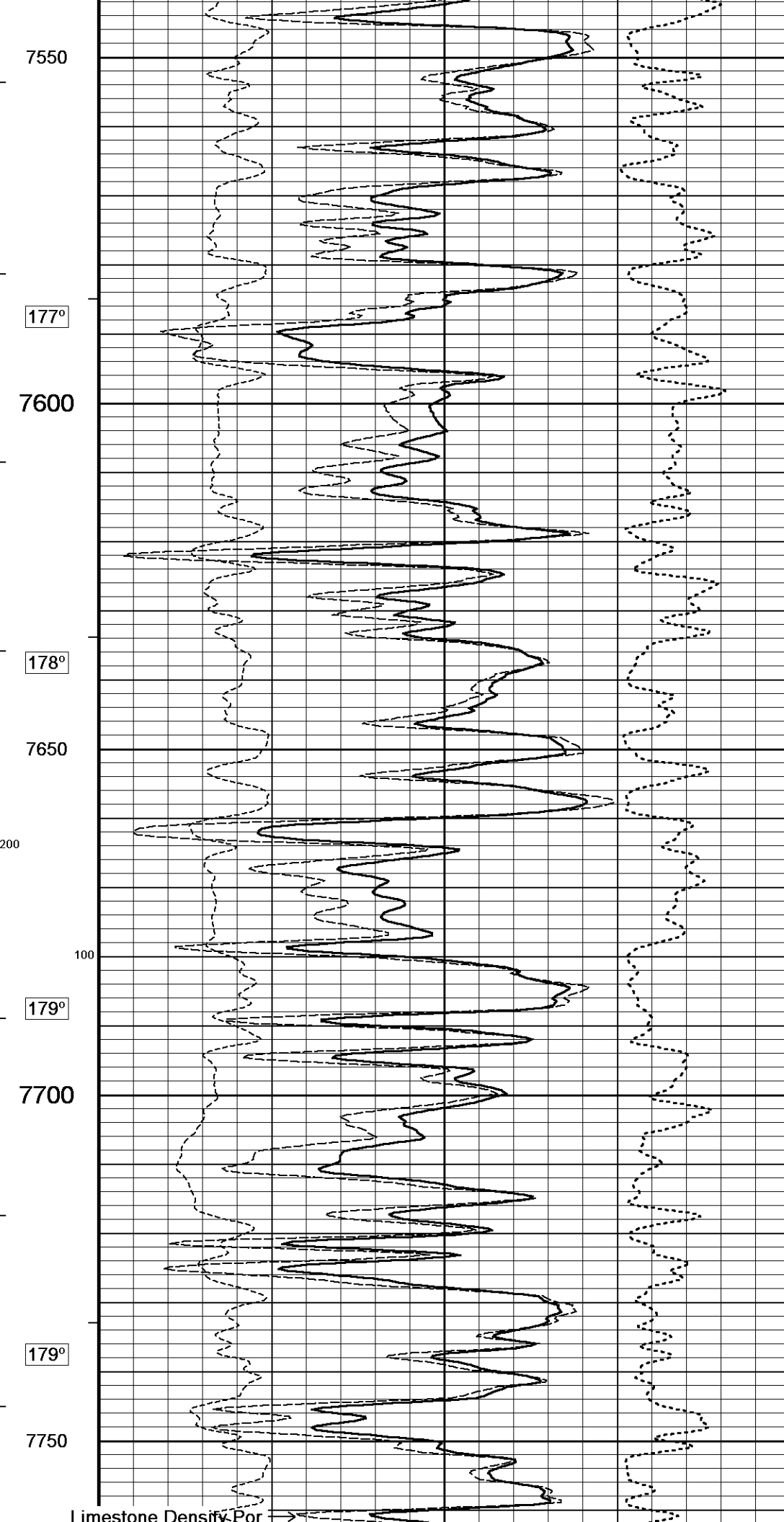
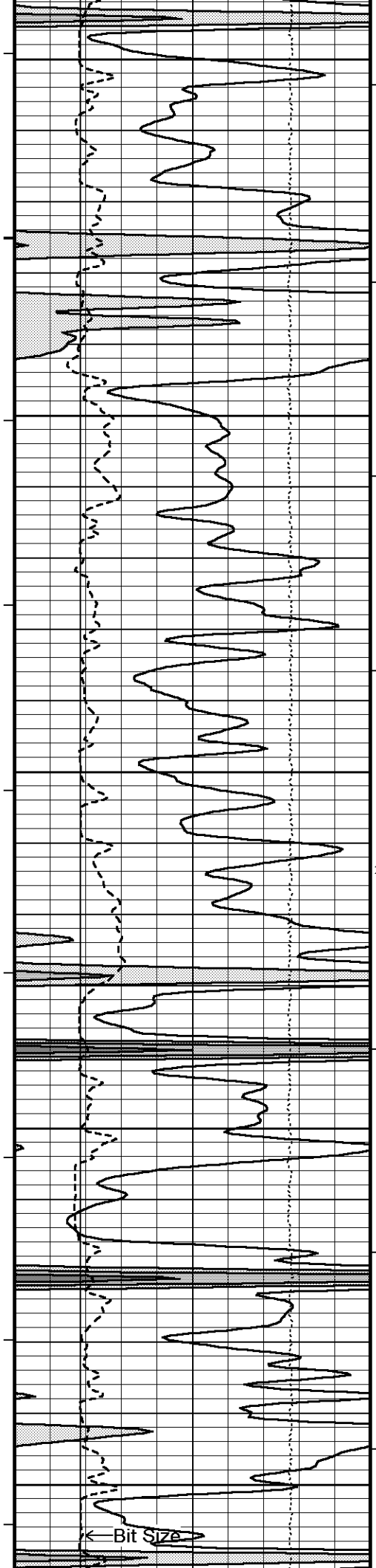
7300

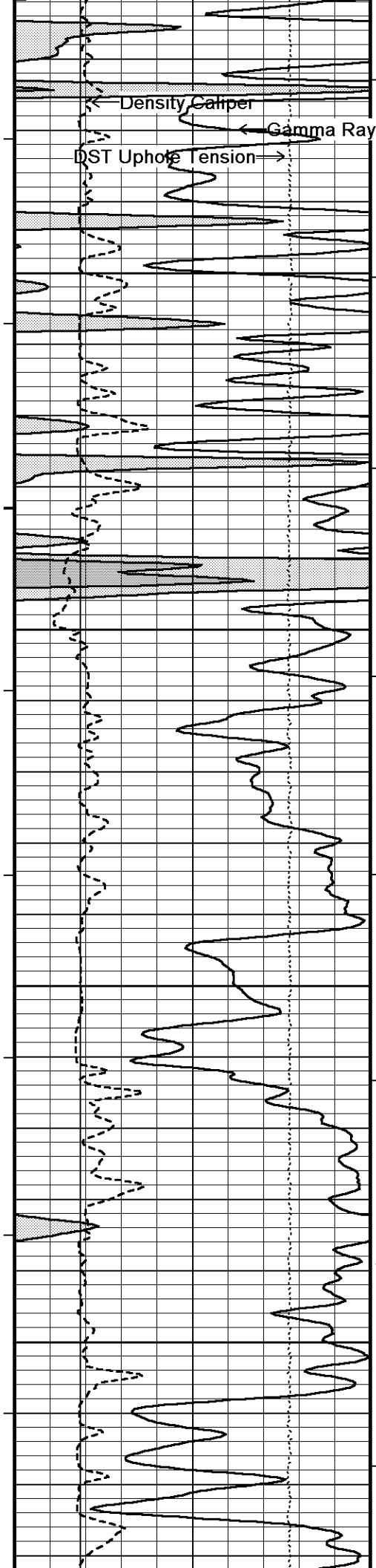
200



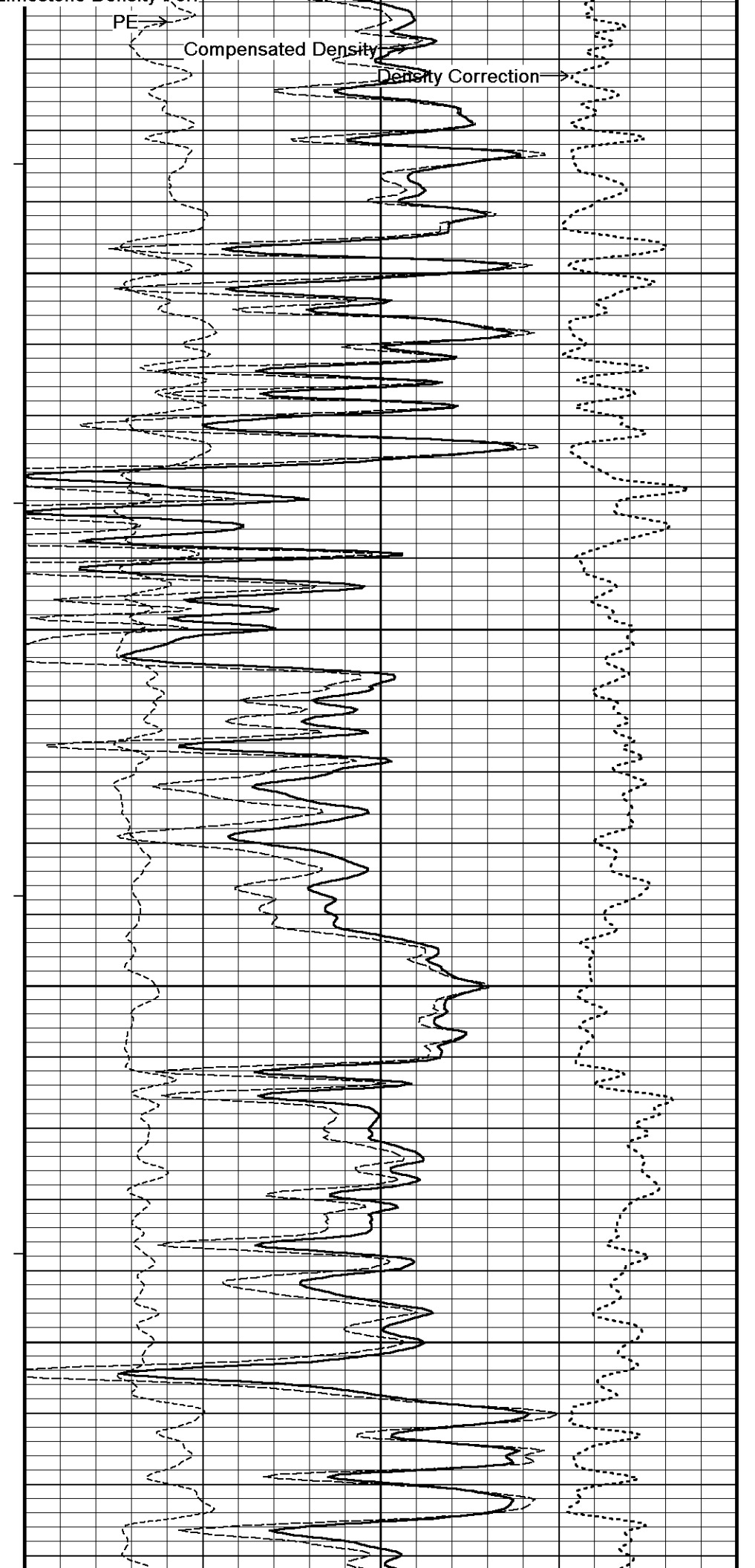


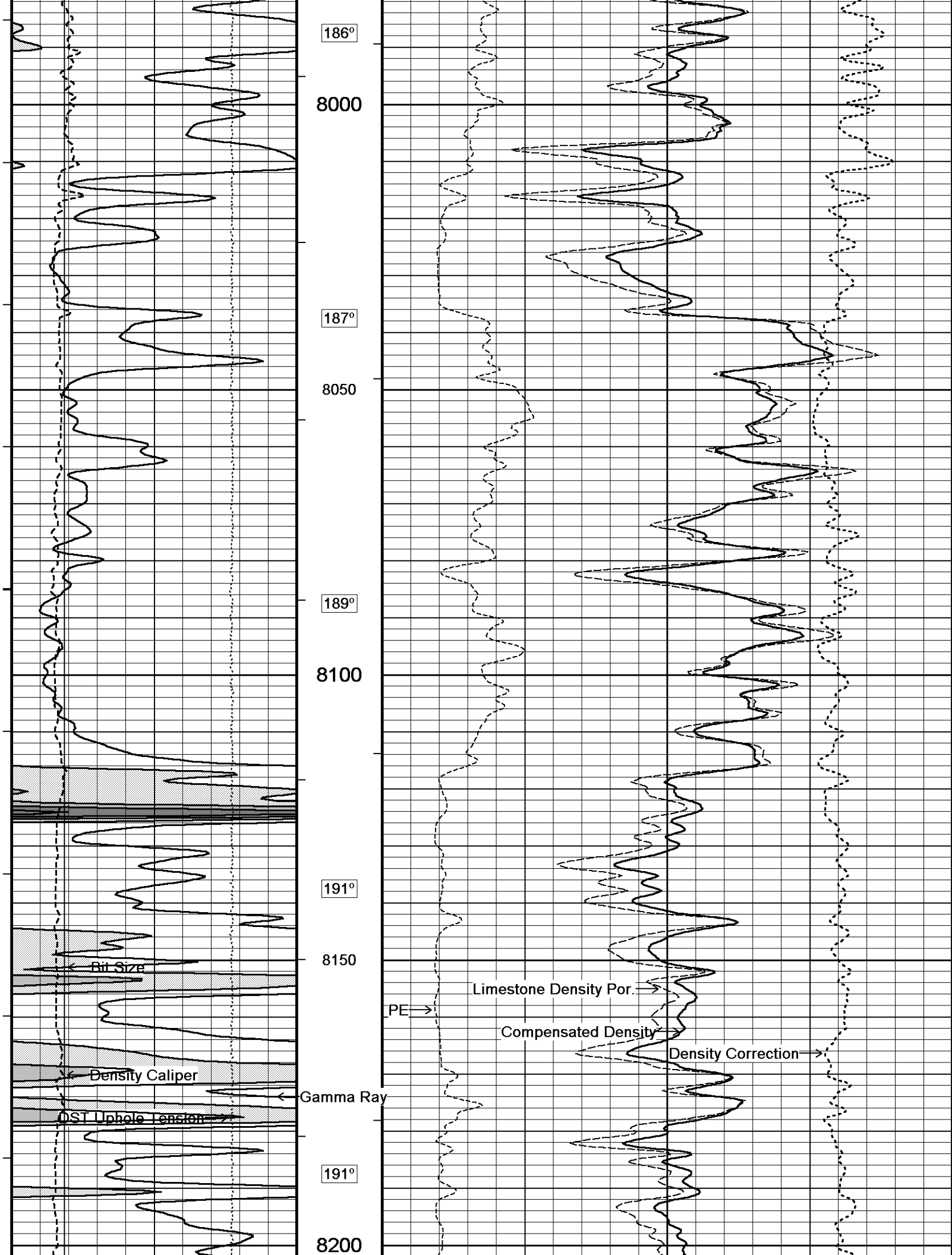


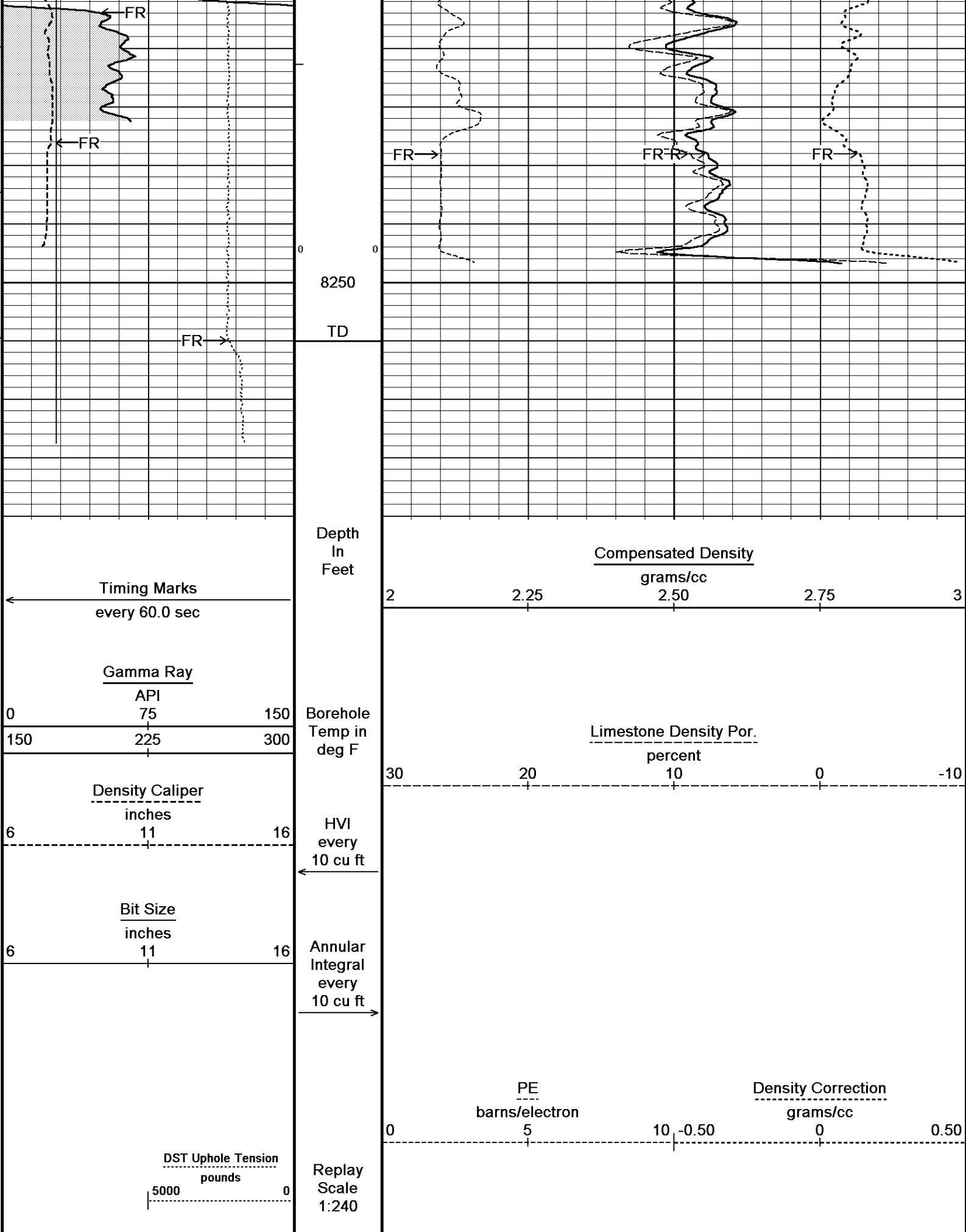




179°  
7800  
180°  
7850  
182°  
7900  
183°  
7950







REPEAT SECTION

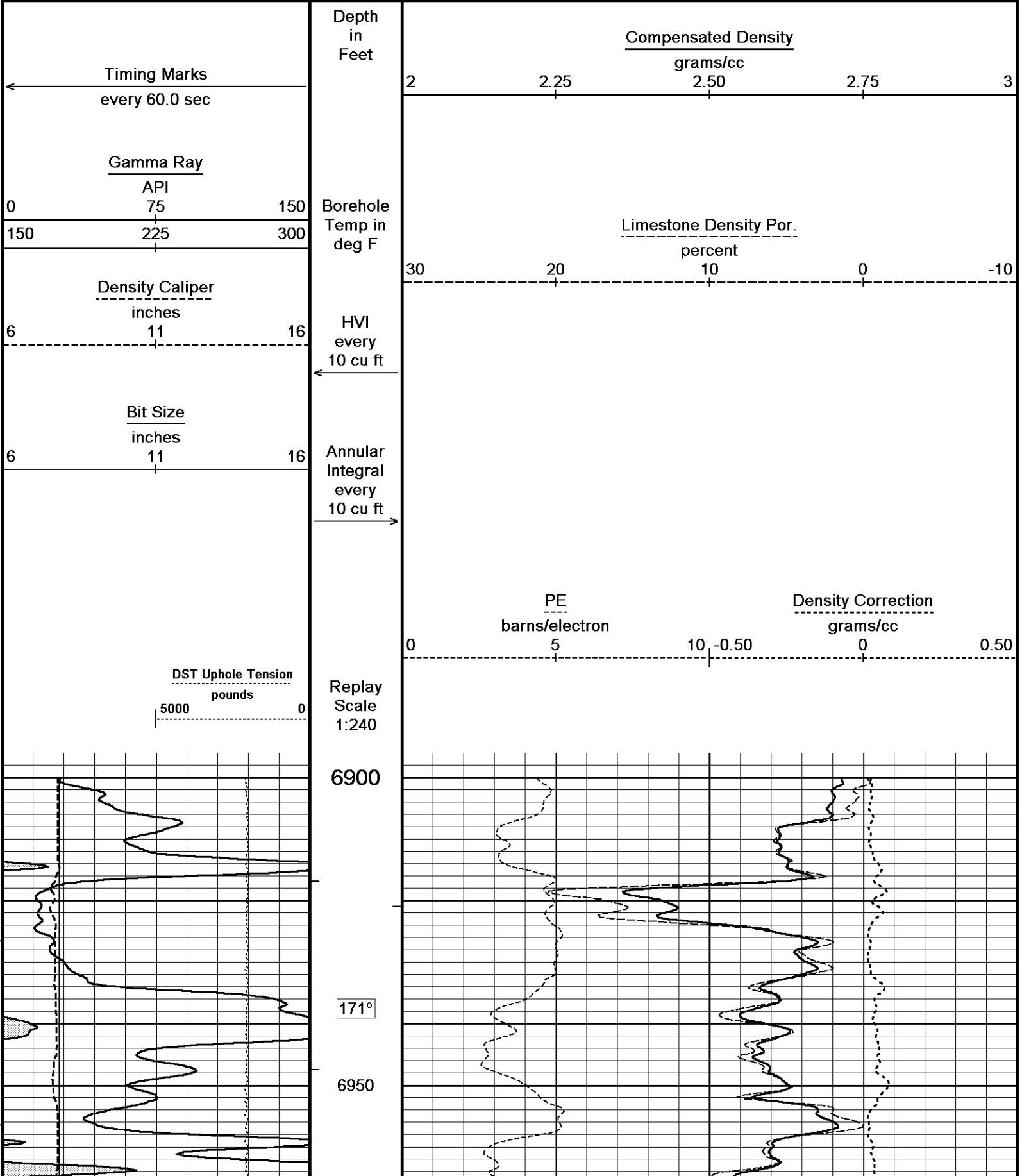
Depth Based Data - Maximum Sampling Increment 10.0cm

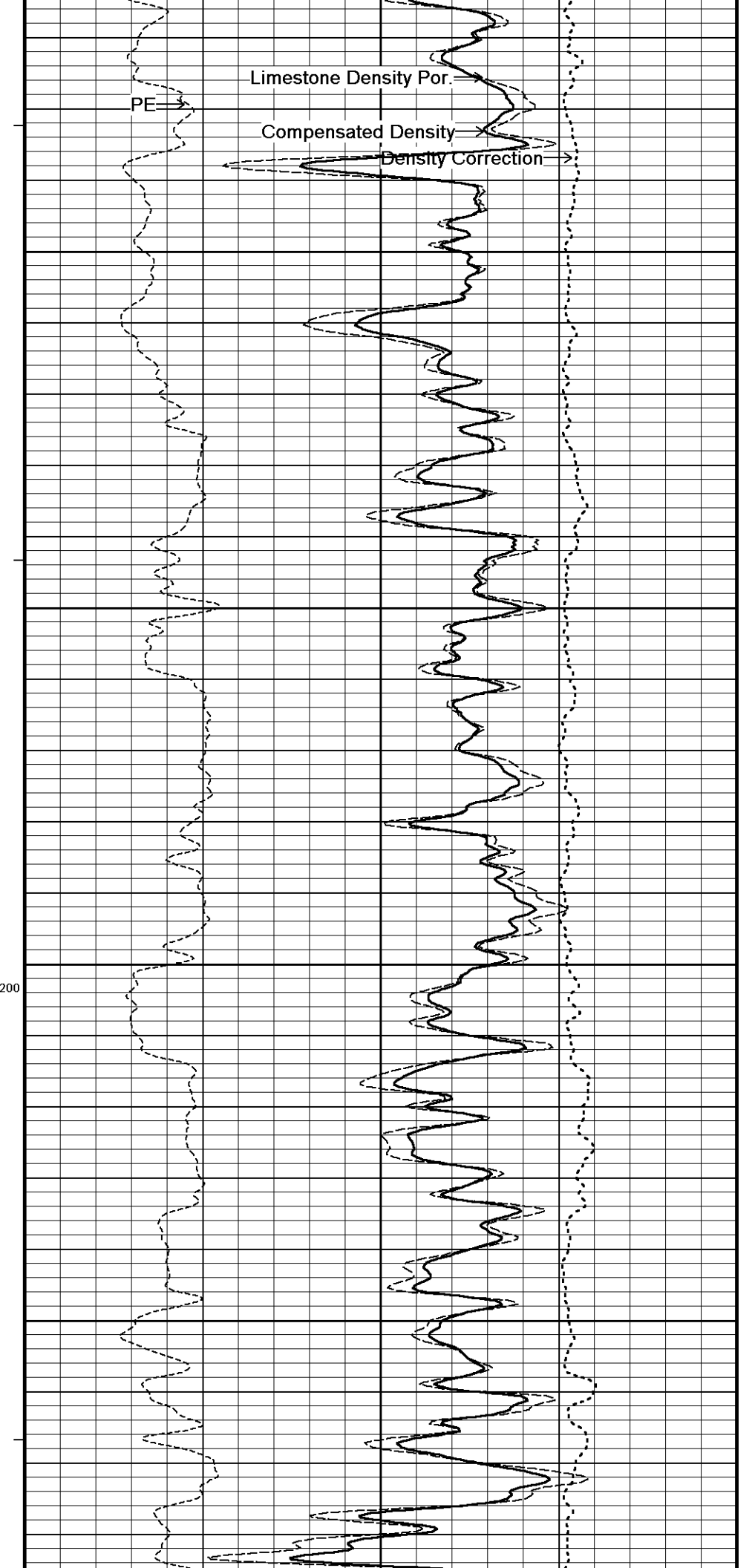
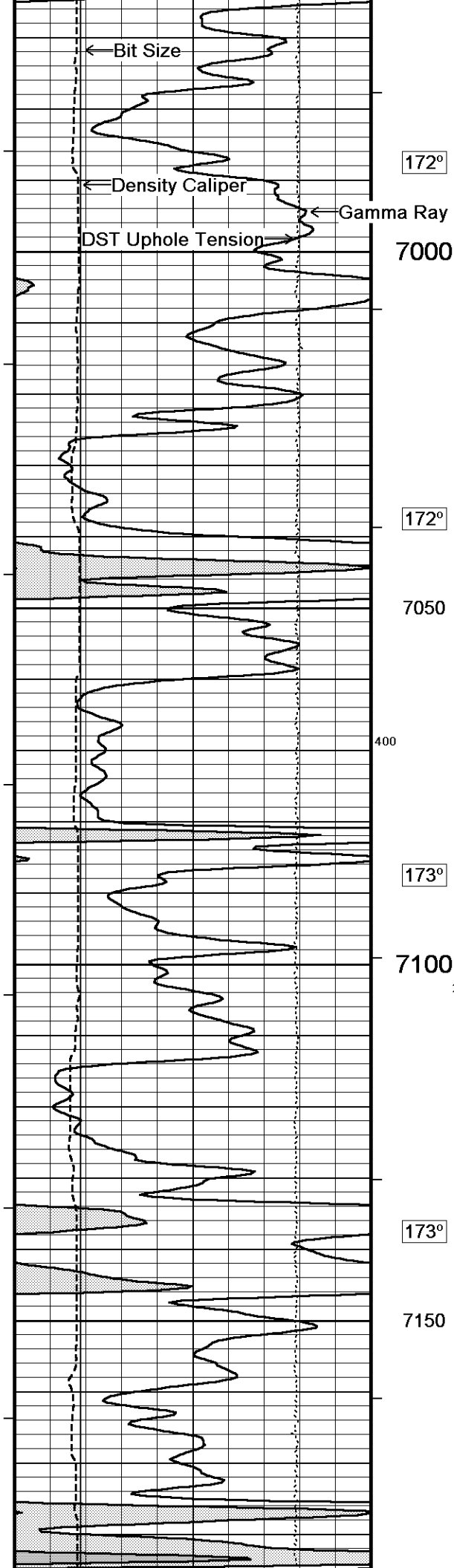
Plotted on 09-NOV-2016 14:53

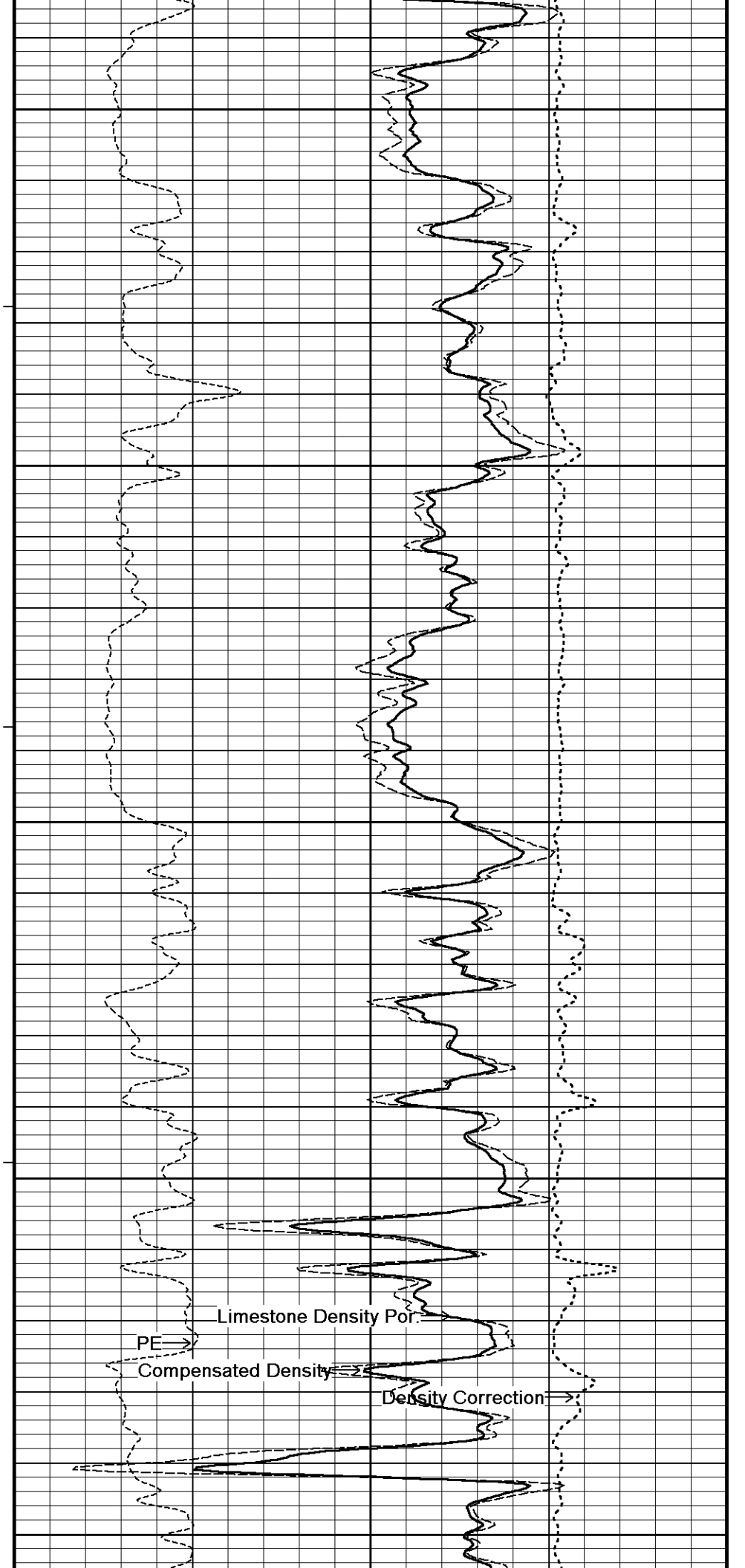
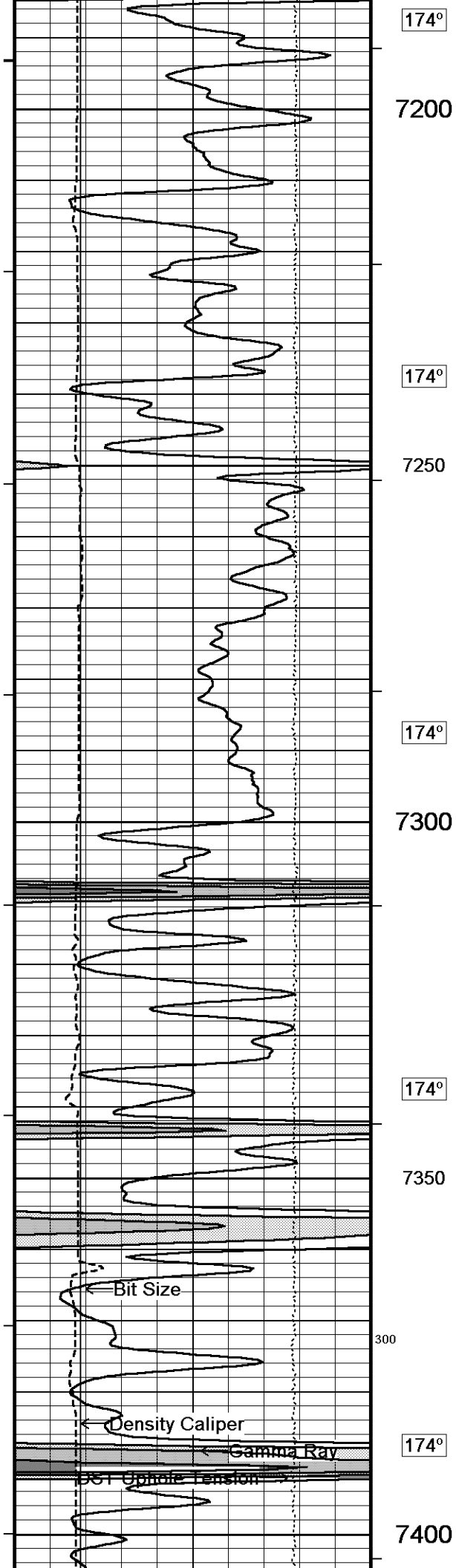
Filename: C:\Minimus 15.03.5939\Logs\Grand Mesa Buzz's Bo...\Grand Mesa Buzz's Boat #14\_001.dta

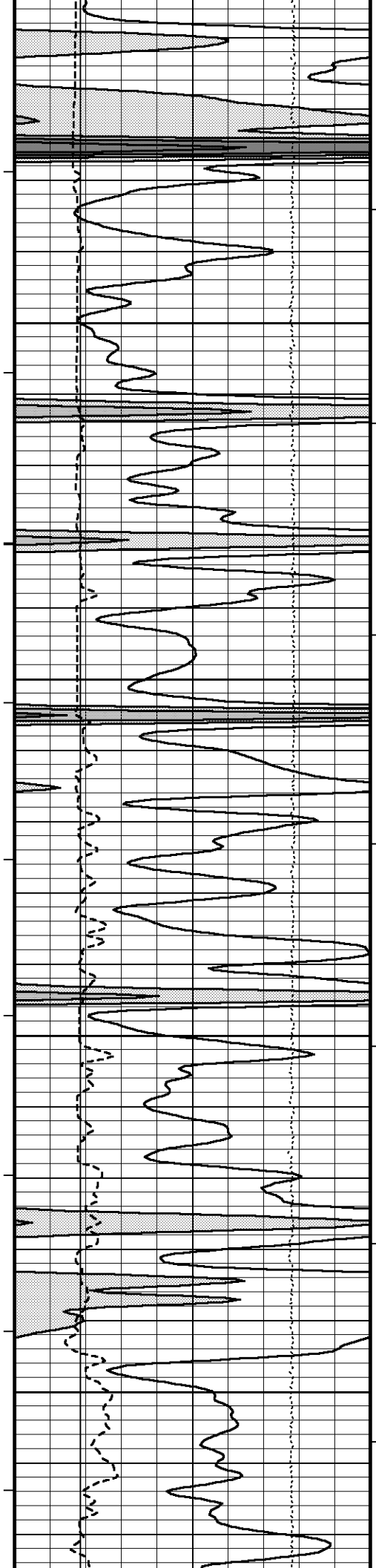
Recorded on 09-NOV-2016 09:14

System Versions: Logged with 15.03.5939 Plotted with 15.03.5939









174°

7450

175°

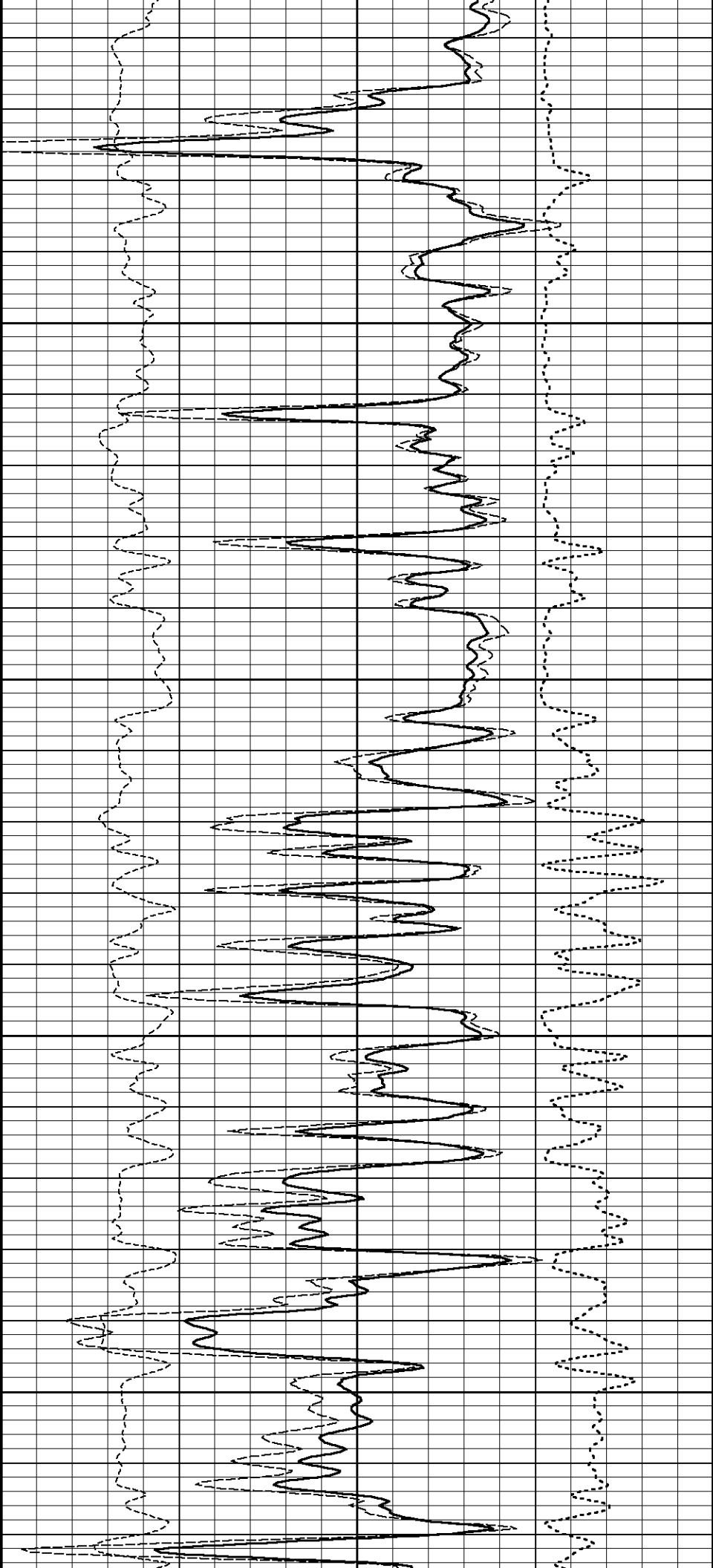
7500

175°

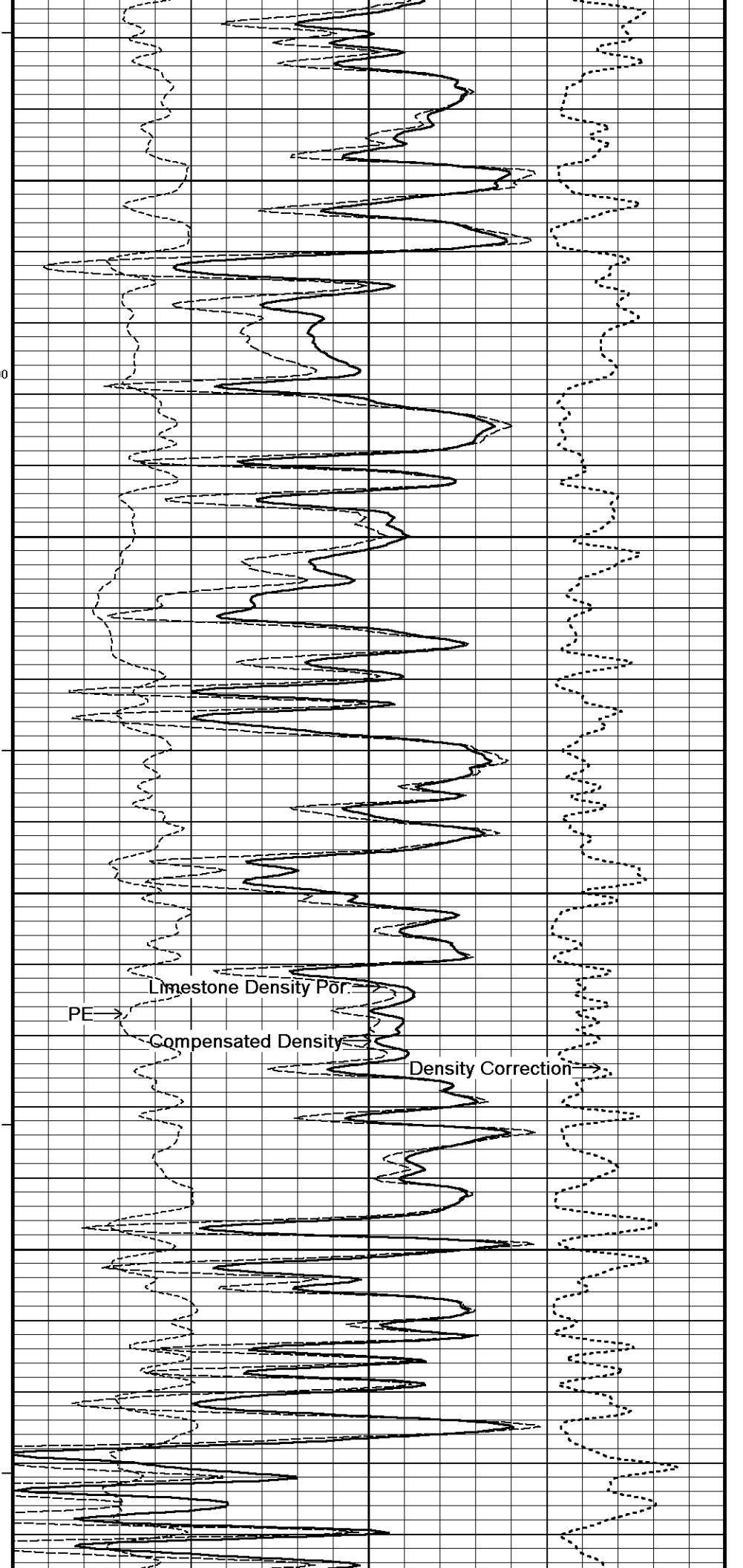
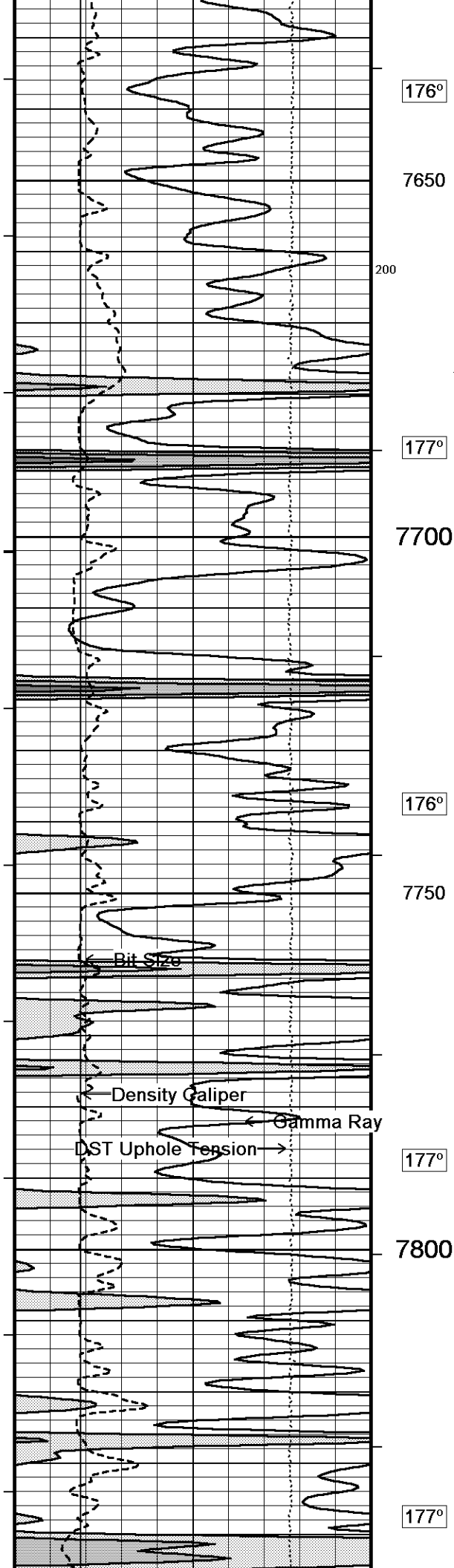
7550

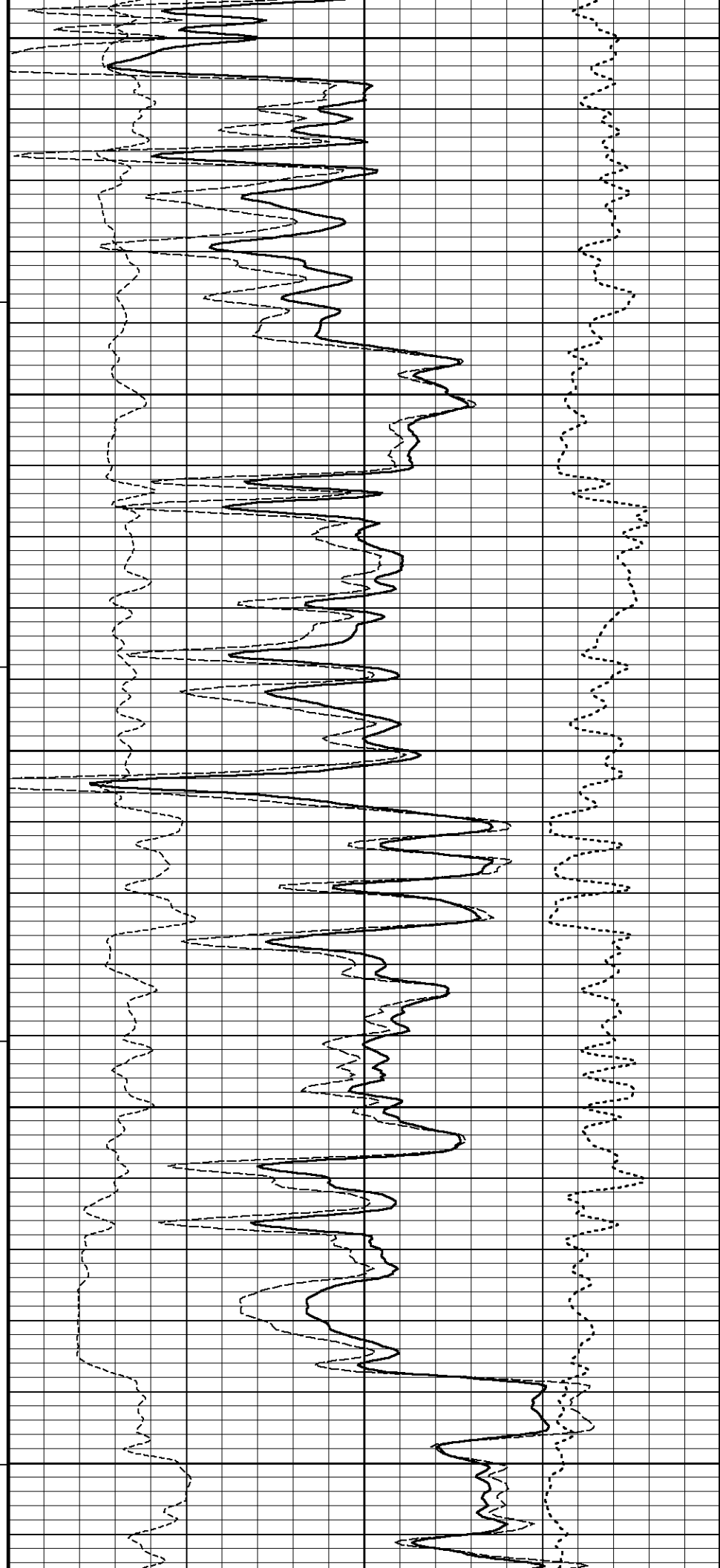
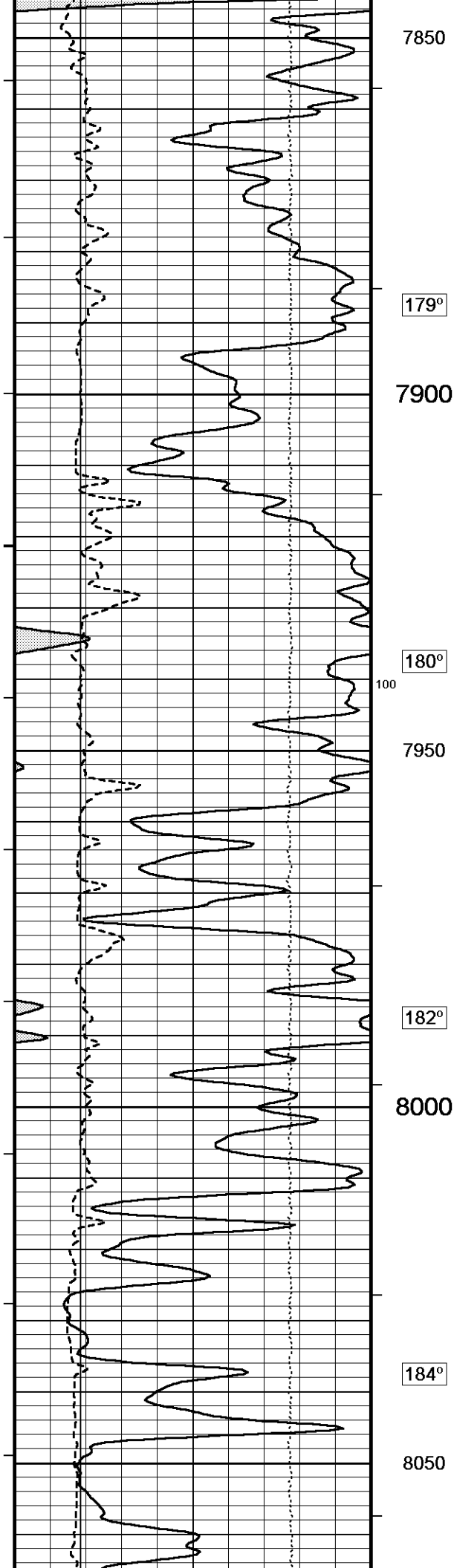
175°

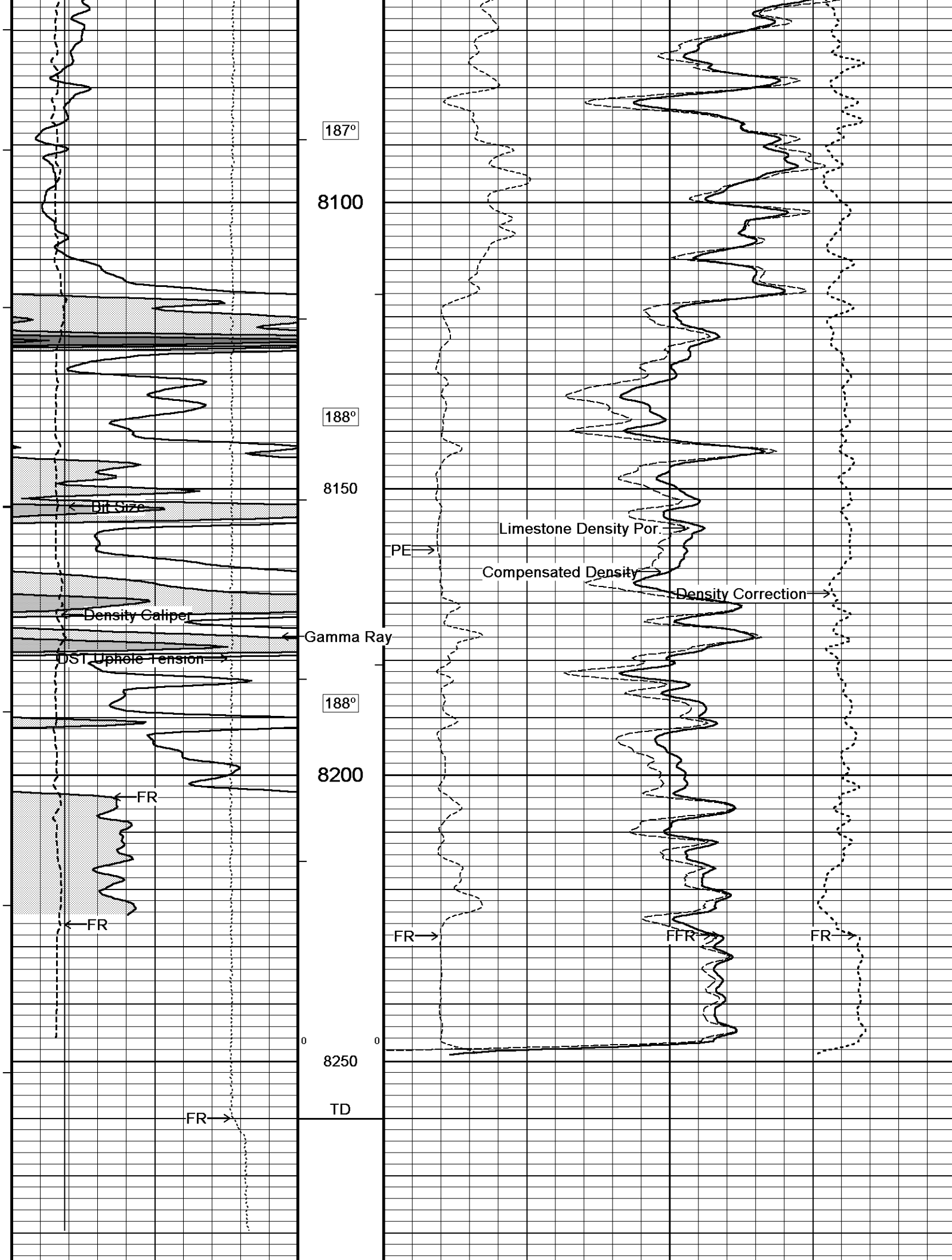
7600

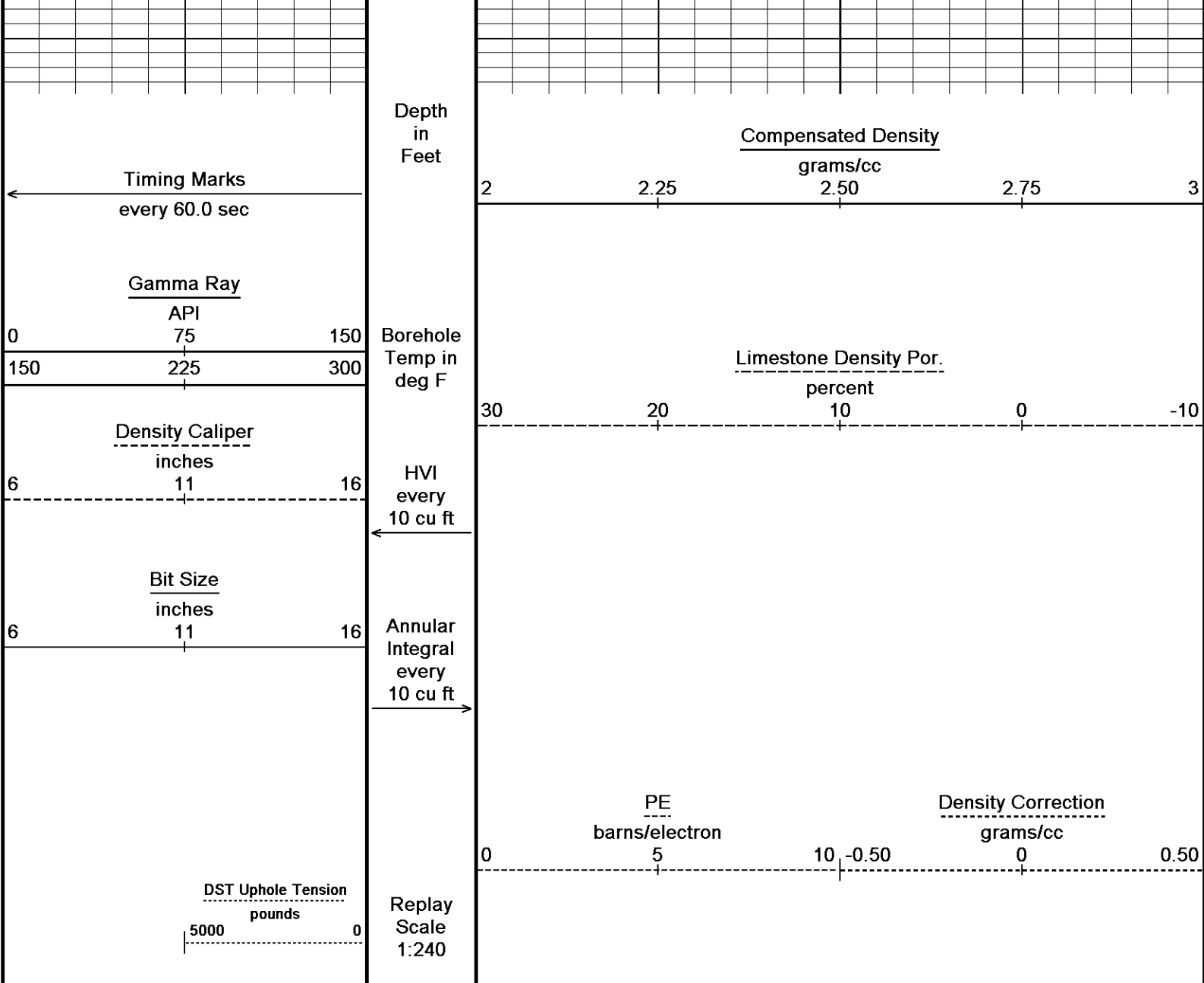












Depth Based Data - Maximum Sampling Increment 10.0cm

Plotted on 09-NOV-2016 14:53

Filename: C:\Minimus 15.03.5939\Logs\Grand Mesa Buzz's Boat #14\_001.dta

Recorded on 09-NOV-2016 09:14

System Versions: Logged with 15.03.5939 Plotted with 15.03.5939

↑

REPEAT SECTION

↑

BEFORE SURVEY CALIBRATION		
C:\Minimus 15.03.5939\Logs\Grand Mesa Buzz's Boat #14\Grand Mesa Buzz's Boat #14_001.dta		
General Constants All 000		Last Edited on 09-NOV-2016,08:22
General Parameters		
Mud Resistivity	1.190	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	None	
Rwa Parameters		
Porosity used	Limestone Density Por	

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 24-JUL-2016 15:20
Reading No	Measured	Calibrated (lbs)	
1	15235.81	0.00	
2	16026.61	481.00	

Gamma Calibration MCG-C 123			Field Calibration on 08-NOV-2016 22:41
	Measured	Calibrated (API)	
Background	73	51	
Calibrator (Gross)	728	507	
Calibrator (Net)	656	456	

Gamma Calibration Tolerances MCG-C 123		
Ratio	1.438	Counts/API

Gamma Constants MCG-C 123			Last Edited on 09-NOV-2016,05:46
Gamma Calibrator Number	MCGGRCC141		
GRC-M Calibrator Jig in Use?	NO		
Inactive Background Jig in Use?	NO		
Mud Density	1.12	gm/cc	
Caliper Source for Processing	Density Caliper		
Tool Position	Eccentred		
Potassium Equivalence	Chloride		
K Mud Concentration	0.00	%	

High Resolution Temperature Calibration MCG-C 123			Field Calibration on 31-OCT-2015,17:05
	Measured	Calibrated(Deg F)	
Lower	50.00	50.00	
Upper	100.00	100.00	

High Resolution Temperature Constants MCG-C 123			Last Edited on 22-SEP-2015,11:43
Pre-filter Length	11		

SP Calibration MCG-C 123			Field Calibration on 14-JUL-2016 12:06
	Measured	Calibrated (mV)	
Reference 1	101.2	100.6	
Reference 2	-99.1	-99.9	

Micro Normal and Micro Inverse Calibration MMR-C.A 247					Base Calibration on 28-AUG-2016 19:13 Field Check on 08-NOV-2016 22:26	
Base Calibration						
		Measured		Calibrated (ohm-m)		
Channel	Resistor 1	Resistor 2	Resistor 1	Resistor 2		
Micro Normal	10.2	49.9	5.1	25.6		
Micro Inverse	10.0	49.5	3.4	16.9		
Channel		Base Check (ohm-m)		Field Check (ohm-m)		
Micro Normal		93.6		93.6		
Micro Inverse		62.2		62.2		

Micro Normal & Micro Inverse Calibration Tolerance MMR-C.A 247									
Micro Normal Res. 1	10.2	<div><div>-5%</div><div>10.0</div><div>+5%</div></div>	ohm	Micro Normal Res. 2	49.9	<div><div>-5%</div><div>50.0</div><div>+5%</div></div>	ohm		
Micro Inverse Res. 1	10.0	<div><div>-5%</div><div>10.0</div><div>+5%</div></div>	ohm	Micro Inverse Res. 2	49.5	<div><div>-5%</div><div>50.0</div><div>+5%</div></div>	ohm		
Micro Normal Base Check	93.6	<div><div>-2%</div><div>93.19</div><div>+2%</div></div>	ohm-m						
Micro Inverse Base Check	62.2	<div><div>-2%</div><div>62.11</div><div>+2%</div></div>	ohm-m						
Micro Normal Field Check	93.6	<div><div>-2%</div><div>93.6</div><div>+2%</div></div>	ohm-m						
Micro Inverse Field Check	62.2	<div><div>-2%</div><div>62.2</div><div>+2%</div></div>	ohm-m						

## Micro Normal and Micro Inverse Constants MMR-C.A 247

Last Edited on 26-JUN-2016,15:44

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-C.A 247

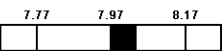
Base Calibration on 28-AUG-2016 19:08

Field Calibration on 08-NOV-2016 22:25

Base Calibration		
Reading No	Measured	Calibrator Size (in)
1	14869	5.98
2	18207	7.97
3	21411	9.86
4	25389	11.92
5	0	0.00
6	N/A	N/A

Field Calibration	Measured Caliper (in)	Actual Caliper (in)
	8.04	7.97

## Caliper Calibration Tolerances MMR-C.A 247

Short Arm Field Cal. 8.04  in

## Micro-Resistivity Caliper Constants MMR-C.A 247

Last Edited on

Sonde Configuration Resistivity Mode

## Neutron Calibration MDN-A.B 66

Base Calibration on 22-MAY-2016,18:15

Field Check on 08-NOV-2016 22:46

Base Calibration	Measured	Calibrated (cps)
	Near Far	Near Far
Ratio	3116 97	3714 110
	32.277	33.764

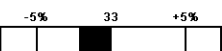
  

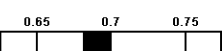
Field Calibrator at Base	Calibrated (cps)
Ratio	2061 3028
	0.681


  

Field Check	Calibrated (cps)
Ratio	2161 3088
	0.700

## Neutron Calibration Tolerances MDN-A.B 66

Ratio 32.277 

Base Check 0.681 

Field Check 0.700 

## Neutron Constants MDN-A.B 66

Last Edited on 09-NOV-2016,05:46

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	knpm

Mud Salinity	0.00	ppm
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 28-AUG-2016 18:58 Field Check on 08-NOV-2016 22:14	
Base Calibration			
	Measured	Calibrated (ohm-m)	
Reference 1	0.0	0.0	
Reference 2	963.3	126.8	
Base Check		281.3	
Field Check		281.6	

FE Calibration Tolerances MFE-B.J 352			
Reference 2	963.3	<div><div></div><div></div><div></div><div></div><div></div></div>	ohm
Base Check	281.3	<div><div></div><div></div><div></div><div></div><div></div></div>	ohm-m
Field Check	281.6	<div><div></div><div></div><div></div><div></div><div></div></div>	ohm-m

FE Constants MFE-B.J 352		Last Edited on 09-NOV-2016,05:46	
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-A.A 55			Last Edited on 09-NOV-2016,05:46		
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

# Full Waveform Parameters

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

## Induction Calibration MAI-A.A 111

Base Calibration on 05-AUG-2014,09:34  
Field Check on 08-NOV-2016 22:13

### Base Calibration

Test Loop Calibration	Measured		Calibrated (mmho/m)	
Channel	Low	High	Low	High
1	17.6	473.6	9.3	966.2
2	6.4	385.9	7.6	821.4
3	3.2	264.0	5.2	566.0
4	2.1	135.5	2.6	279.2
Array Temperature	23.0		Deg F	

Test Loop Calibration Verified 22-MAY-2016,17:59

Channel	Base Check (mmho/m)		Field Check (mmho/m)		
	Low	High	Low	High	
1	12.1	3873.0	10.7	3868.1	
2	29.8	3528.1	28.6	3523.9	
3	29.1	3021.3	28.1	3017.8	
4	19.1	2058.5	18.5	2056.2	
Deep	17.7	1962.1	17.1	1959.8	
Medium	43.1	3976.4	41.8	3971.7	
Shallow	44.4	5232.7	42.6	5226.4	
Array Temperature	65.8		62.1		Deg F

## Induction Calibration Tolerances MAI-A.A 111

Low Conductivity 1	17.6		mmho/m	High Conductivity 1	473.6		mmho/m
Low Conductivity 2	6.4		mmho/m	High Conductivity 2	385.9		mmho/m
Low Conductivity 3	3.2		mmho/m	High Conductivity 3	264.0		mmho/m
Low Conductivity 4	2.1		mmho/m	High Conductivity 4	135.5		mmho/m
Background Vx 1	0.0		mmho/m	Phase Check Loop 1	0.0		%
Background Vx 2	0.0		mmho/m	Phase Check Loop 2	0.0		%
Background Vx 3	0.0		mmho/m	Phase Check Loop 3	0.0		%
Background Vx 4	0.0		mmho/m	Phase Check Loop 4	0.0		%

## Induction Constants MAI-A.A 111

Last Edited on 09-NOV-2016,05:45

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: Temperature Corrected		
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	

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-A.A 111			Field Calibration on 24-NOV-2014,10:23
	Measured	Calibrated(Deg F)	
Lower	10.00	10.00	
Upper	100.00	100.00	

High Resolution Temperature Constants MAI-A.A 111		Last Edited on 26-JUN-2014,15:06
Pre-filter Length	11	

Photo Density Calibration MPD-B 104					Base Calibration on 28-AUG-2016 20:24
					Field Check on 08-NOV-2016 22:23
Density Calibration					
Base Calibration		Measured		Calibrated (sdu)	
	Near	Far	Near	Far	
Background	1145	1339			
Reference 1	49665	24007	59556	30836	
Reference 2	20032	2442	24941	2541	
Field Check at Base					
	1144.9	1338.6			
Field Check					
	1139.6	1323.0			
PE Calibration					
Base Calibration		Measured		Calibrated	
	WS	WH	Ratio	Ratio	
Background	211	1021			

Background	211	1021		
Reference 1	20773	49486	0.424	0.371
Reference 2	5807	19899	0.296	0.272

#### Field Check at Base

211.3	1021.2
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#### Field Check

207.9	1017.4
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### Photo Density Calibration Tolerances MPD-B 104

Near Density Ratio 2.57

-5%	2.52	+5%
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Far Density Ratio 20.54

-5%	21.00	+5%
-----	-------	-----

PE Calibration 0.119

0.089	0.110	0.131
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Near Den. Field Check 1139.6

-3%	1144.9	+3%
-----	--------	-----

Far Den. Field Check 1323.0

-3%	1338.6	+3%
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PE WS Field Check 207.9

-6%	211.3	+6%
-----	-------	-----

PE WH Field Check 1017.4

-6%	1021.2	+6%
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### Density Constants MPD-B 104

Last Edited on 09-NOV-2016,05:46

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	1.12	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 104

Base Calibration on 28-AUG-2016 19:51  
Field Calibration on 08-NOV-2016 22:17

Base Calibration		
Reading No	Measured	Calibrator Size (in)
1	13646	3.99
2	22688	5.98
3	31297	7.97
4	39521	9.86
5	48608	11.92
6	N/A	N/A

#### Field Calibration

Measured Caliper (in)	Actual Caliper (in)
8.01	7.97

### Caliper Calibration Tolerances MPD-B 104

Short Arm Field Cal. 8.01

7.77	7.97	8.17
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## DOWNHOLE EQUIPMENT

C:\Minimus 15.03.5939\Logs\Grand Mesa Buzz's Boat #14\Grand Mesa Buzz's Boat #14\_001.dta

Cablehead, 11 pin  
CBH-CA 176 LG: 2.40 ft WT: 24.3 lb OD: 2.244 in



Compact Comms Gamma  
MCG-C 123 LG: 8.70 ft WT: 63.9 lb OD: 2.244 in

Compact Micro-Resistivity  
MMR-C.A 247 LG: 8.59 ft WT: 81.6 lb OD: 4.882 in

Compact Neutron  
MDN-A.B 66 LG: 5.04 ft WT: 50.7 lb OD: 2.244 in

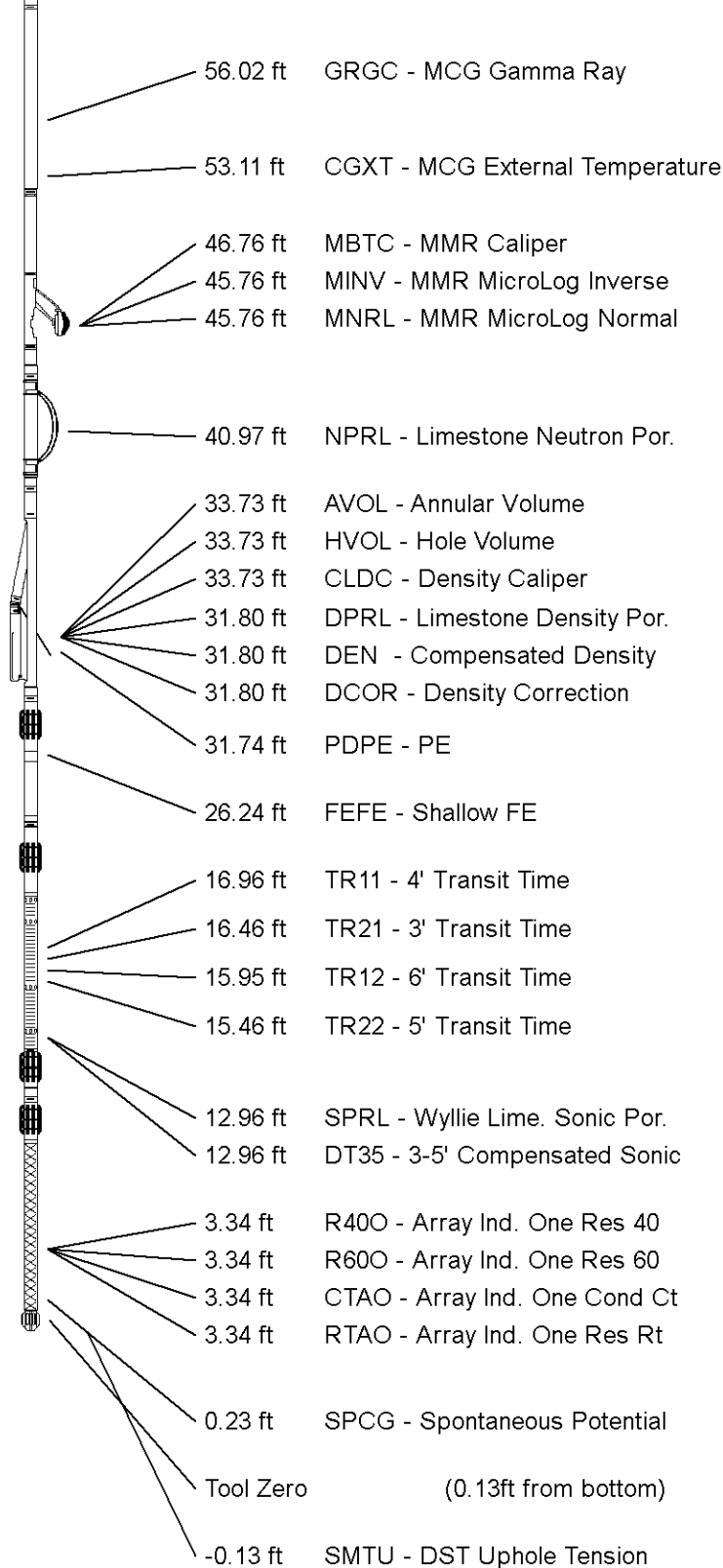
Compact Density/Caliper  
MPD-B 104 LG: 9.59 ft WT: 90.4 lb OD: 2.449 in

Compact Focussed Electric  
MFE-B.J 352 LG: 6.05 ft WT: 48.5 lb OD: 2.244 in

Compact Sonic  
MSS-A.A 55 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: 63.70 ft Weight: 480.6 lb



All measurements relative to tool zero.

COMPANY	GRAND MESA OPERATING COMPANY
WELL	BUZZ'S BOAT #14
FIELD	WILDCAT
PROVINCE/COUNTY	WASHINGTON
COUNTRY/STATE	U.S.A. / COLORADO

Elevation Kelly Bushing	5171.00	feet	First Reading	8228.00	feet
Elevation Drill Floor	5169.00	feet	Depth Driller	8254.00	feet
Elevation Ground Level	5152.00	feet	Depth Logger	8260.00	feet



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COMPACT PHOTO DENSITY  
COMPENSATED NEUTRON  
MICRORESISTIVITY LOG