Weatherford

COMPENSATED NEUTRON
COMPACT PHOTO DENSITY

COMPANY	K3 OIL & GAS OPERATING COMPANY
WELL	SORENSON #4-3
FIELD	WILDCAT
PROVINCE/COUNTY	LINCOLN
COUNTRY/STATE	U.S.A. / COLORADO
LOCATION	650' FNL & 650' FWL

SEC 3	TWP 16S	RGE 55W	Other Services
Latitude			MAI/MFE MML
Longitude			MSS
API Number	05-073-06727		

Permanent Datum GL, Elevation 5030 feet
Log Measured From KB, 18.00 feet above Permanent Datum
Drilling Measured From KB

Elevations:	feet
KB	5048.00
DF	5046.00
GL	5030.00

Date	08-NOV-2017			
Run Number	ONE			
Service Order	4558-197333139			
Depth Driller	7550.00	feet		
Depth Logger	7550.00	feet		
First Reading	7518.00	feet		
Last Reading	2500.00	feet		
Casing Driller	496.00	feet		
Casing Logger	496.00	feet		
Bit Size	7.875	inches		
Hole Fluid Type	CHEMICAL			
Density / Viscosity	9.40 lb/USg	83.00 CP		
PH / Fluid Loss	10.00	7.20 ml/30Min		
Sample Source	FLOWLINE			
Rm @ Measured Temp	1.76 @ 75.0	ohm-m		
Rmf @ Measured Temp	1.41 @ 75.0	ohm-m		
Rmc @ Measured Temp	2.11 @ 75.0	ohm-m		
Source Rmf / Rmc	CALC	CALC		
Rm @ BHT	0.74 @178.0	ohm-m		
Time Since Circulation	5 HOURS			
Max Recorded Temp	178.00	deg F		
Equipment / Base	13096	LIB		
Recorded By	ADAM SILL			
Witnessed By	RANDY SAY		JOHN MARVIN	
Witnessed By	SUSAN RAINBOLT			

BOREHOLE RECORD

Last Edited: 08-NOV-2017 09:44

Bit Size inches	Depth From feet	Depth To feet
7.875	496.00	7550.00

CASING RECORD

Type	Size inches	Depth From feet	Shoe Depth feet	Weight pounds/ft
SURFACE	13.375	0.00	496.00	48.00

REMARKS

- SOFTWARE ISSUE: WLS 17.03.9700.

- 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: 2712 CU.FT.

- ANNULAR HOLE VOLUME WITH 5.5 INCH PRODUCTION CASING FROM TD TO 2500 FEET: 914 CU.FT.

- RIG: WW DRILLING #20.

- ENGINEER: A. SILL.

- OPERATOR: B. TOVAR, J. HOLCOMB.

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.

5 INCH LIMESTONE MAIN

Depth Based Data - Maximum Sampling Increment 10.0cm
Plotted on 09-NOV-2017 05:15
Filename: C:\Minimus 17.03.9700\Data\K3 Sorenson #4-3\K3 Sorenson #4-3_003.dta
Recorded on 09-NOV-2017 00:16
System Versions: Logged with 17.03.9700 Plotted with 17.03.9700

Timing Marks
every 60.0 sec

Gamma Ray
API
0 75 150
150 225 300

Density Caliper
inches
6 11 16

Bit Size
inches
6 11 16

DST Uphole Tension
pounds
5000 0

Depth in Feet

Borehole Temp in deg F

HVI every 10 cu ft

Annular Integral every 10 cu ft

Replay Scale 1:240

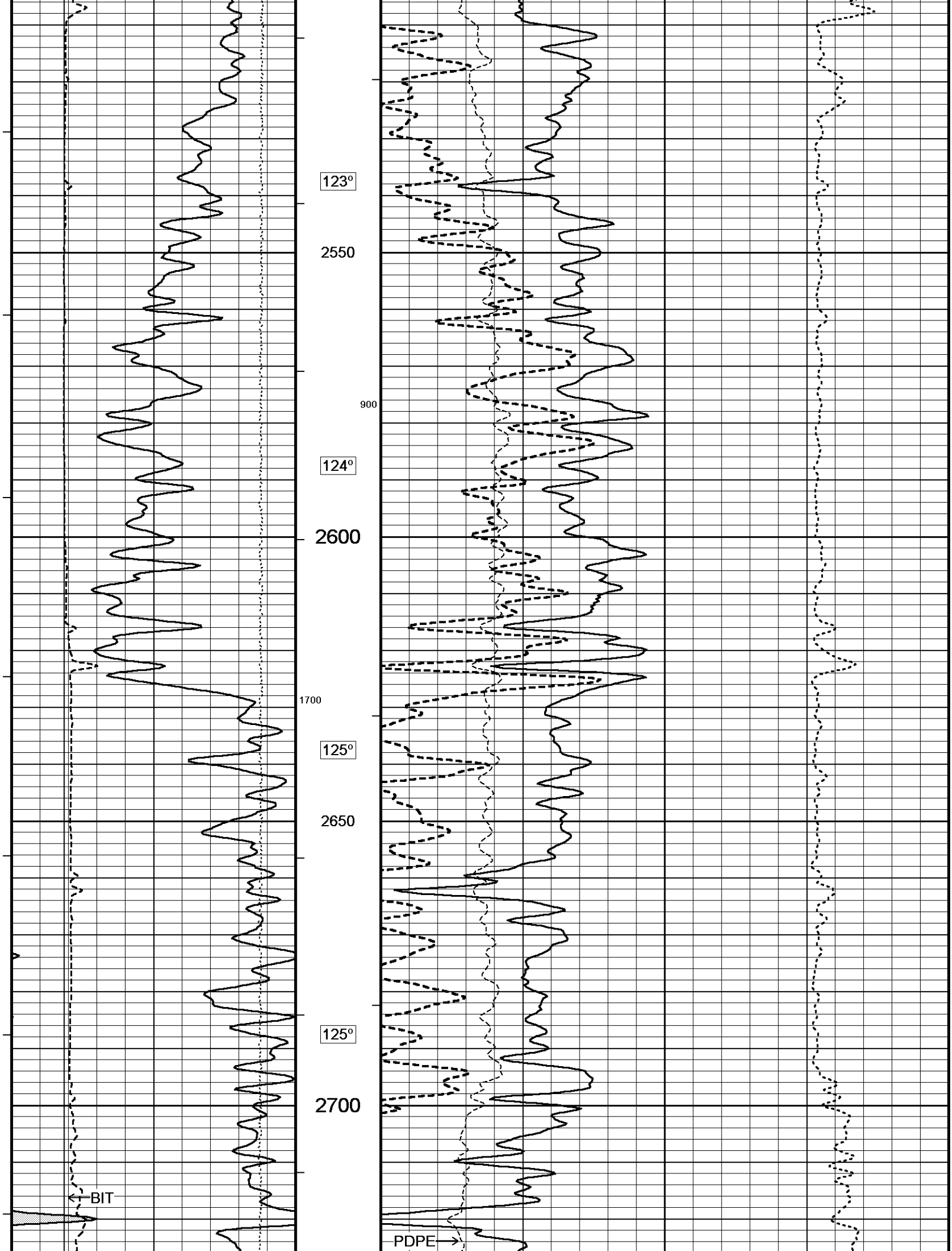
2500

Limestone Neutron Por.
percent
30 20 10 0 -10

Limestone Density Por.
percent
30 20 10 0 -10

PE
barns/electron
0 5 10

Density Correction
grams/cc
-0.50 0 0.50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1700
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2650
125°
2700
BIT
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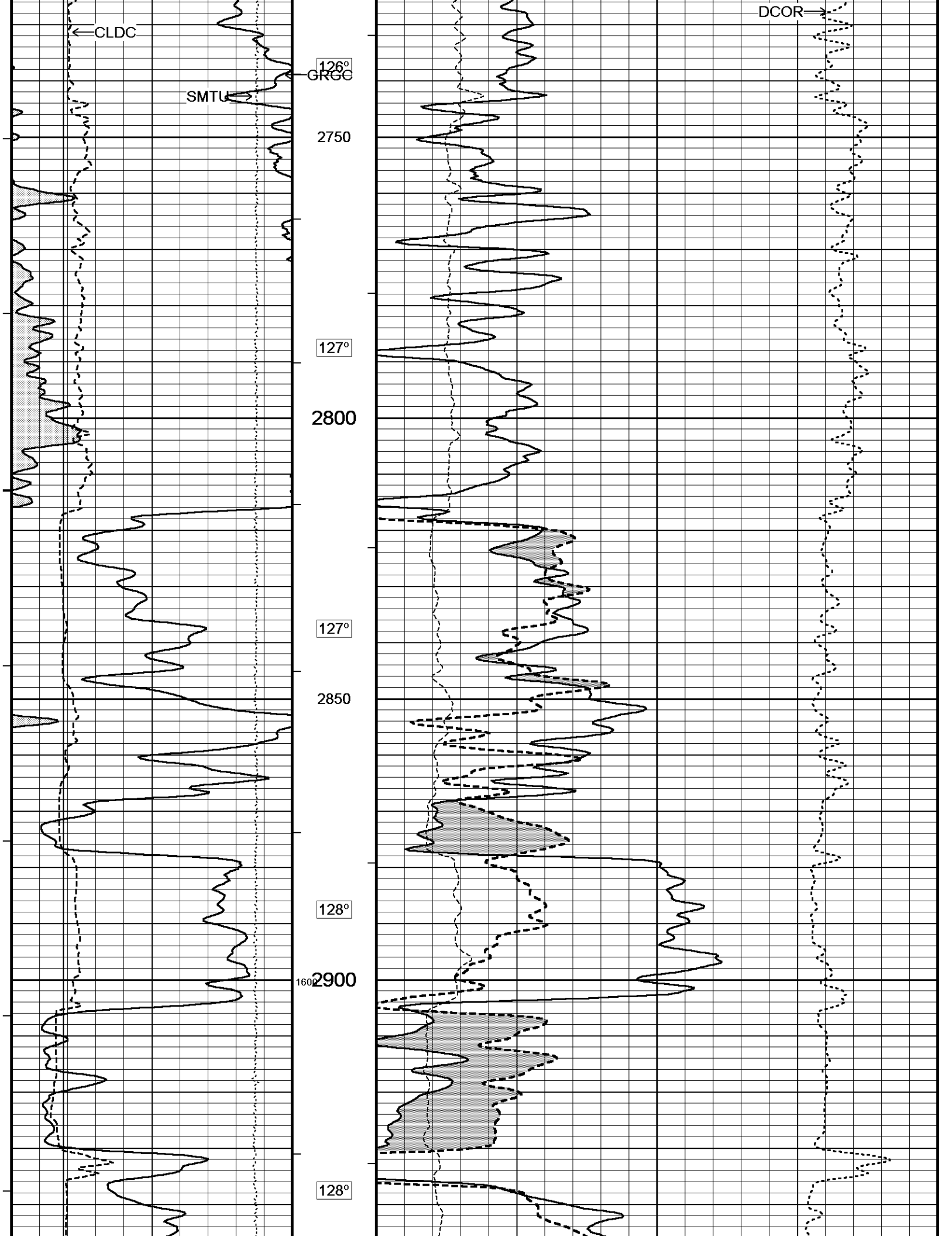
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SMTU
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GRGC
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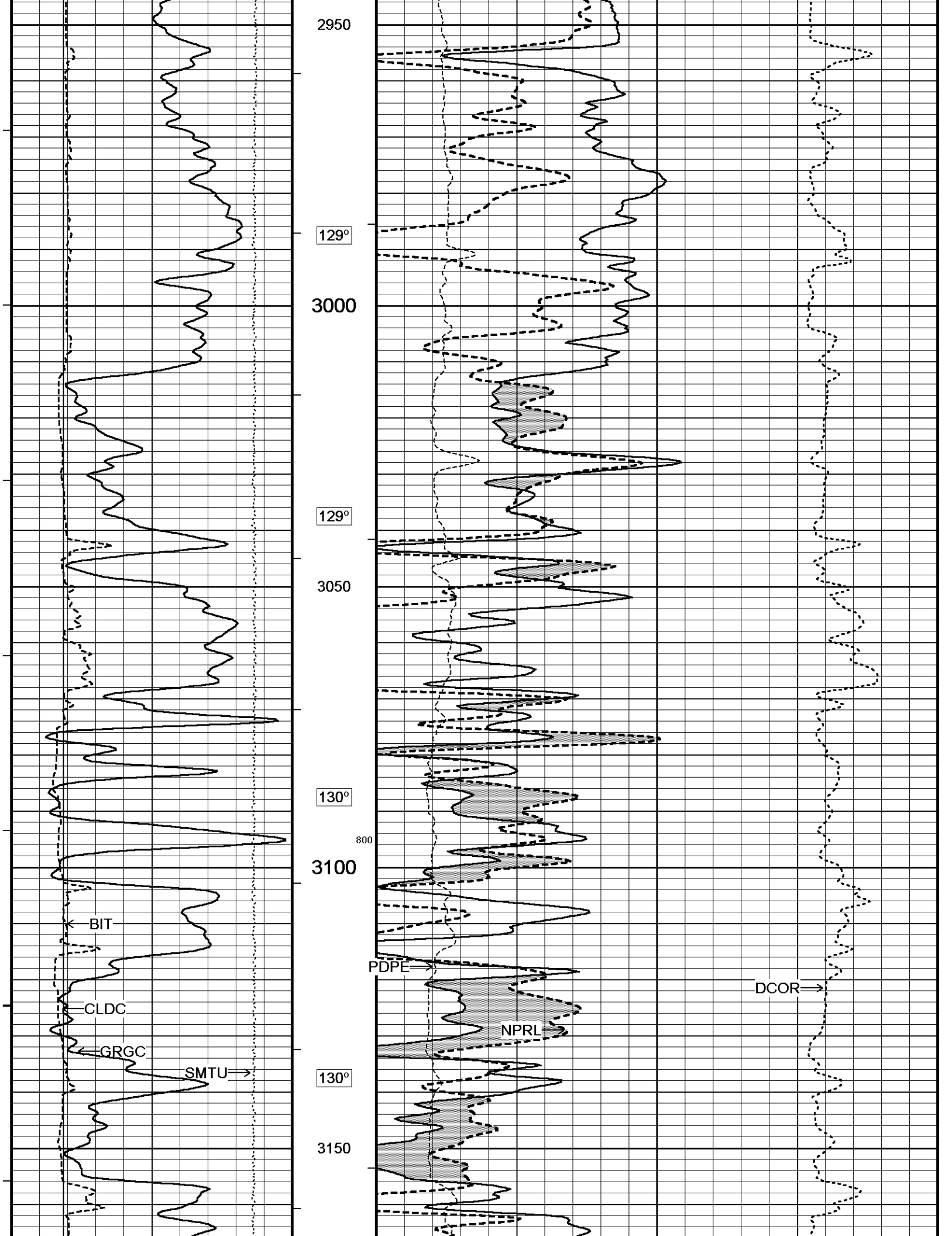
128°
1600
2900
128°
DCOR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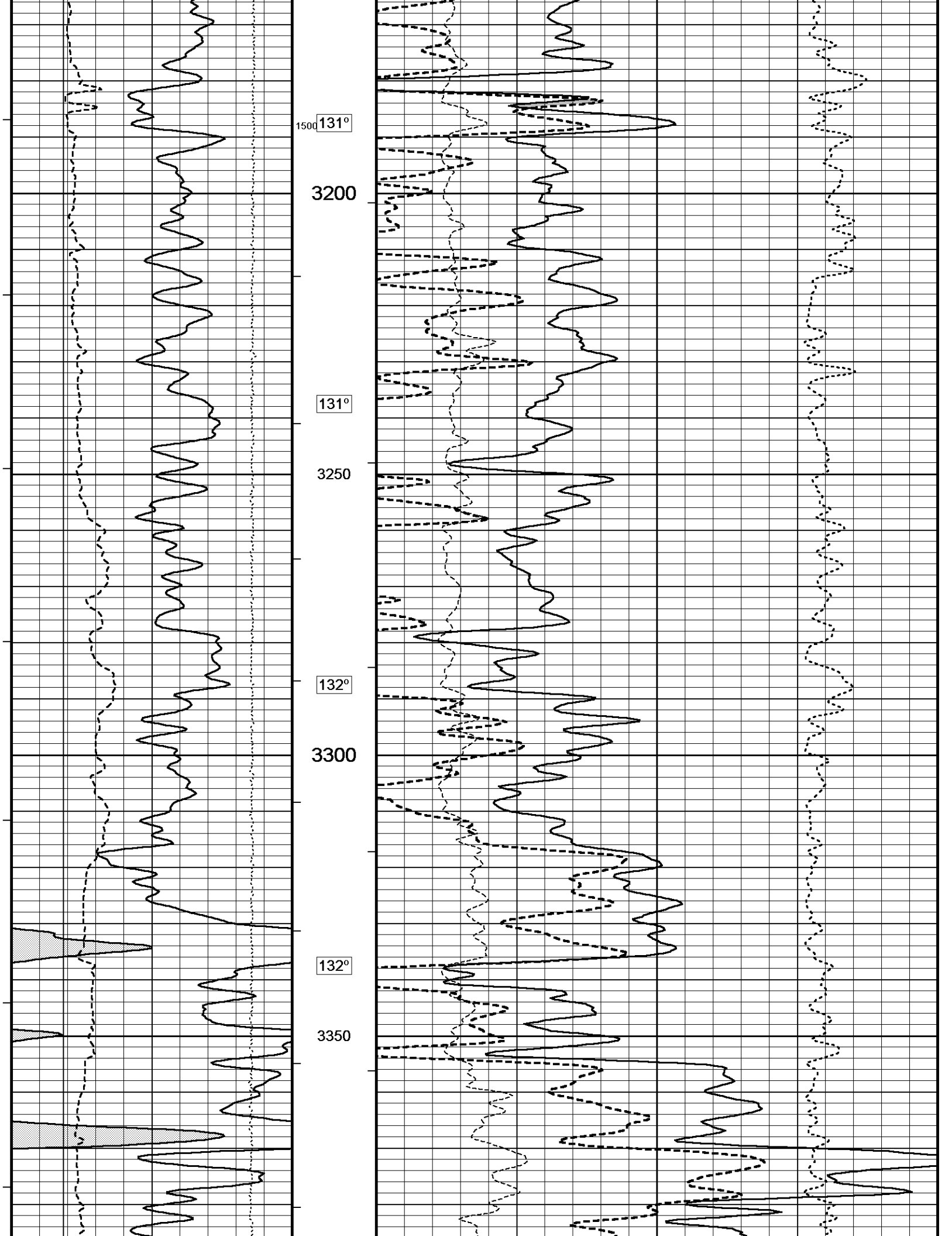
DCOR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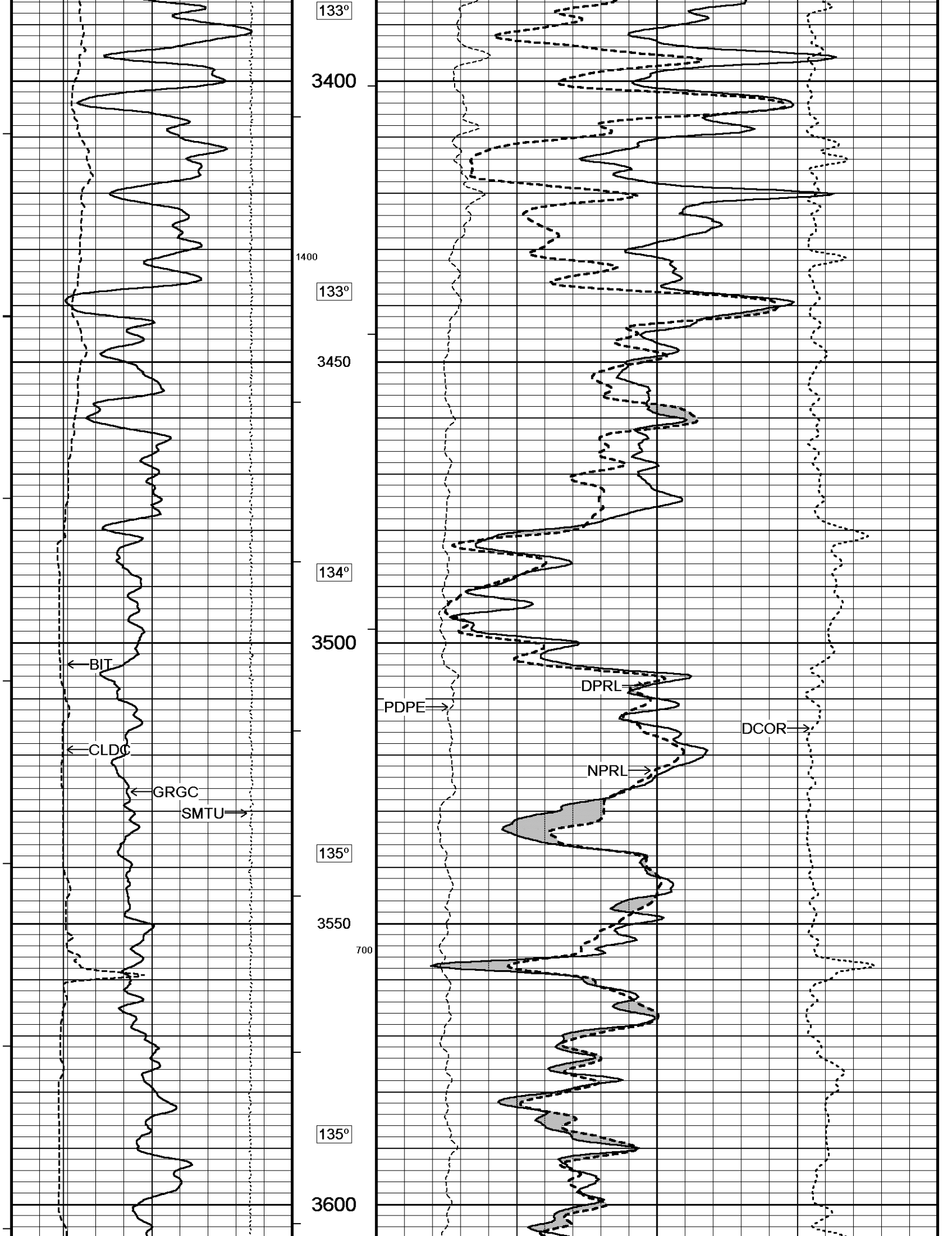
131°
3250
132°
3300
132°
3350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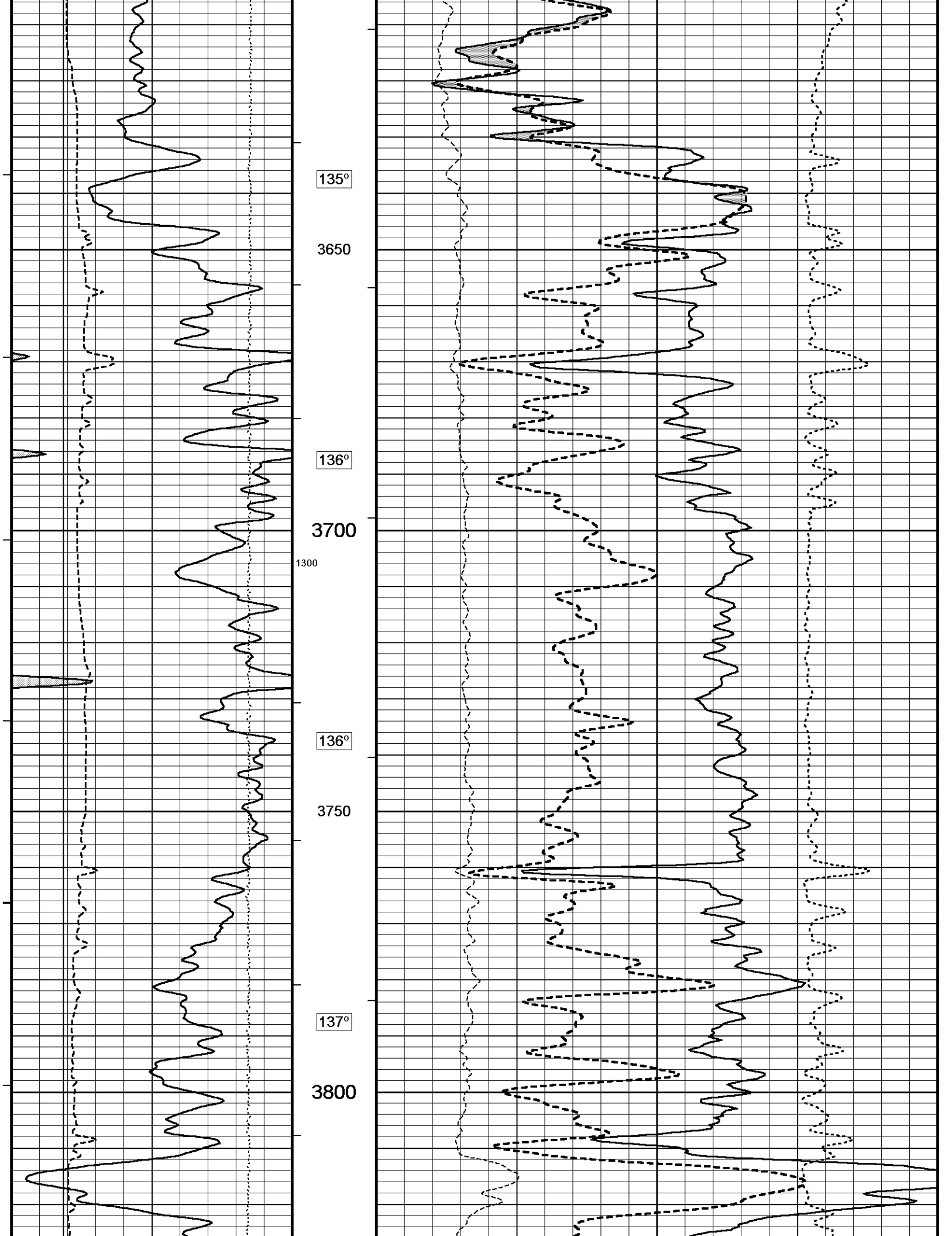
3550
700
135°
3600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1300
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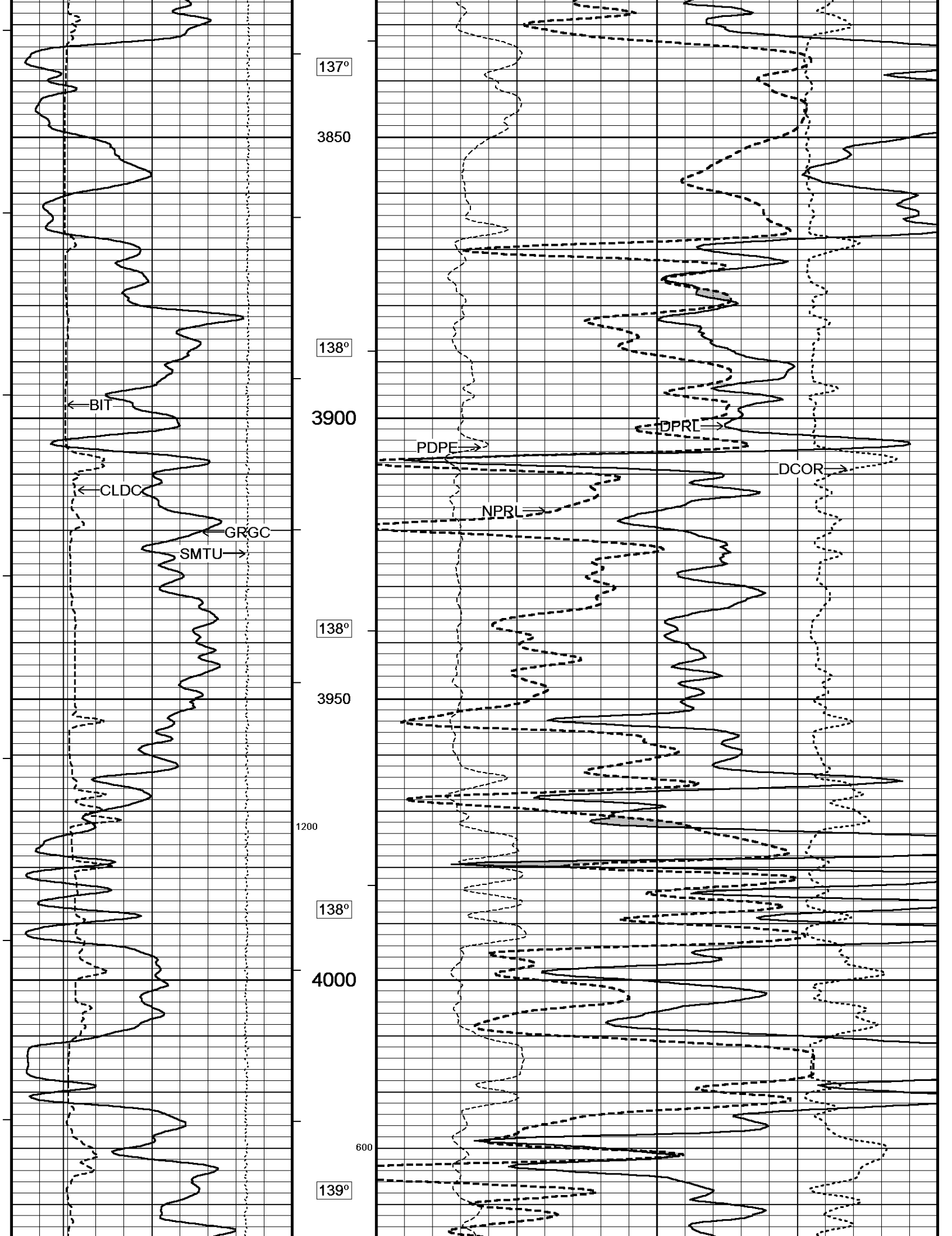
3800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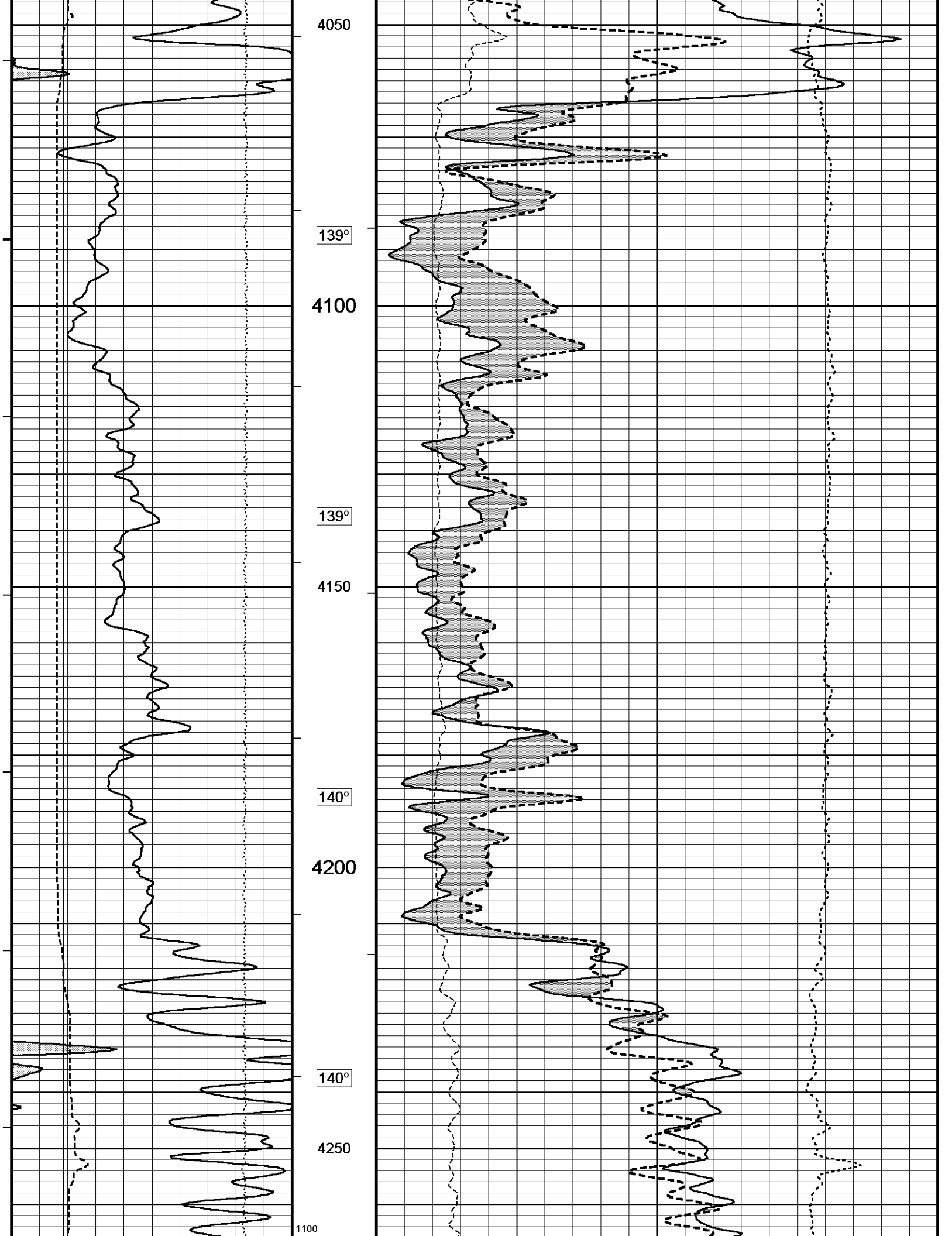
138°
4000
600
139°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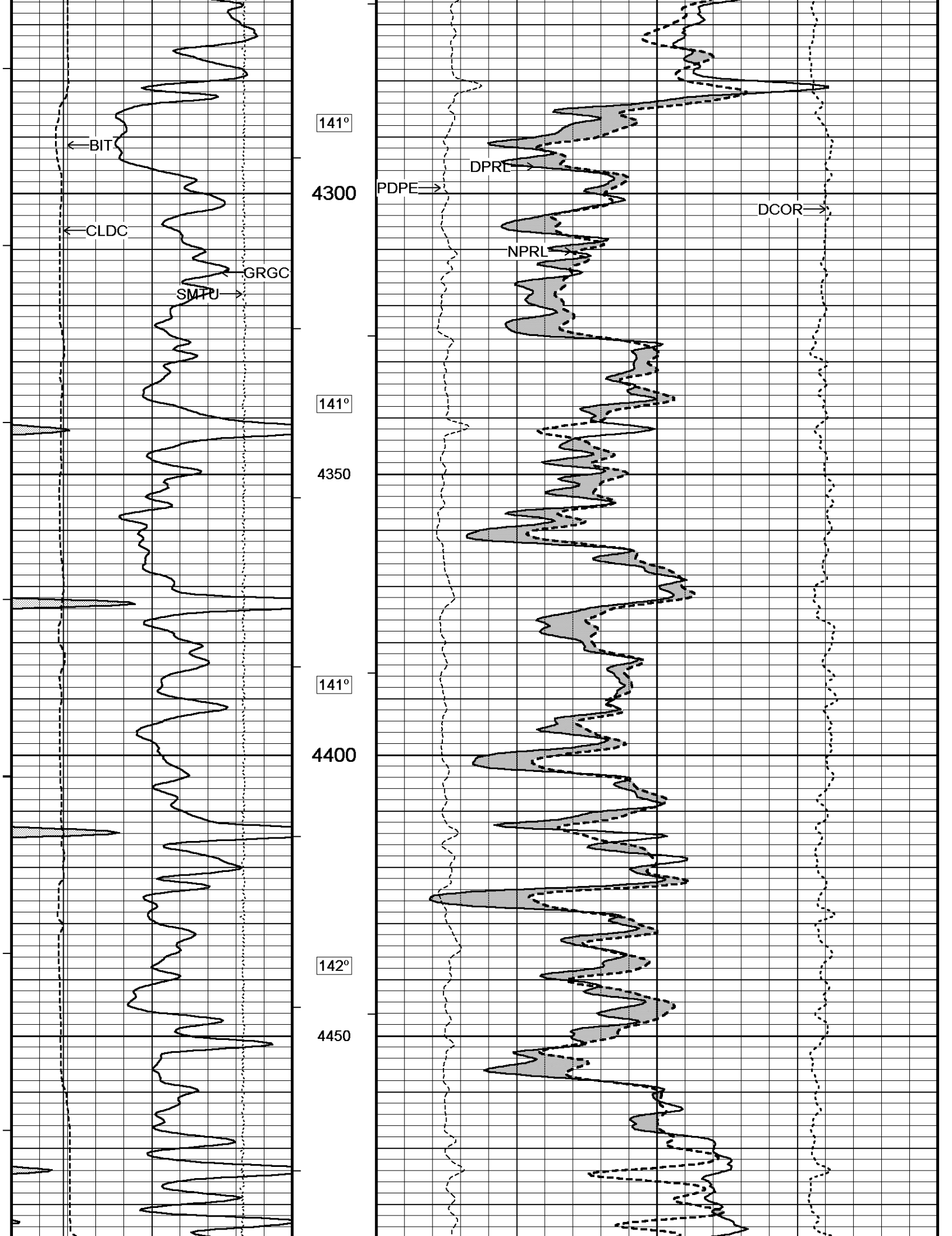
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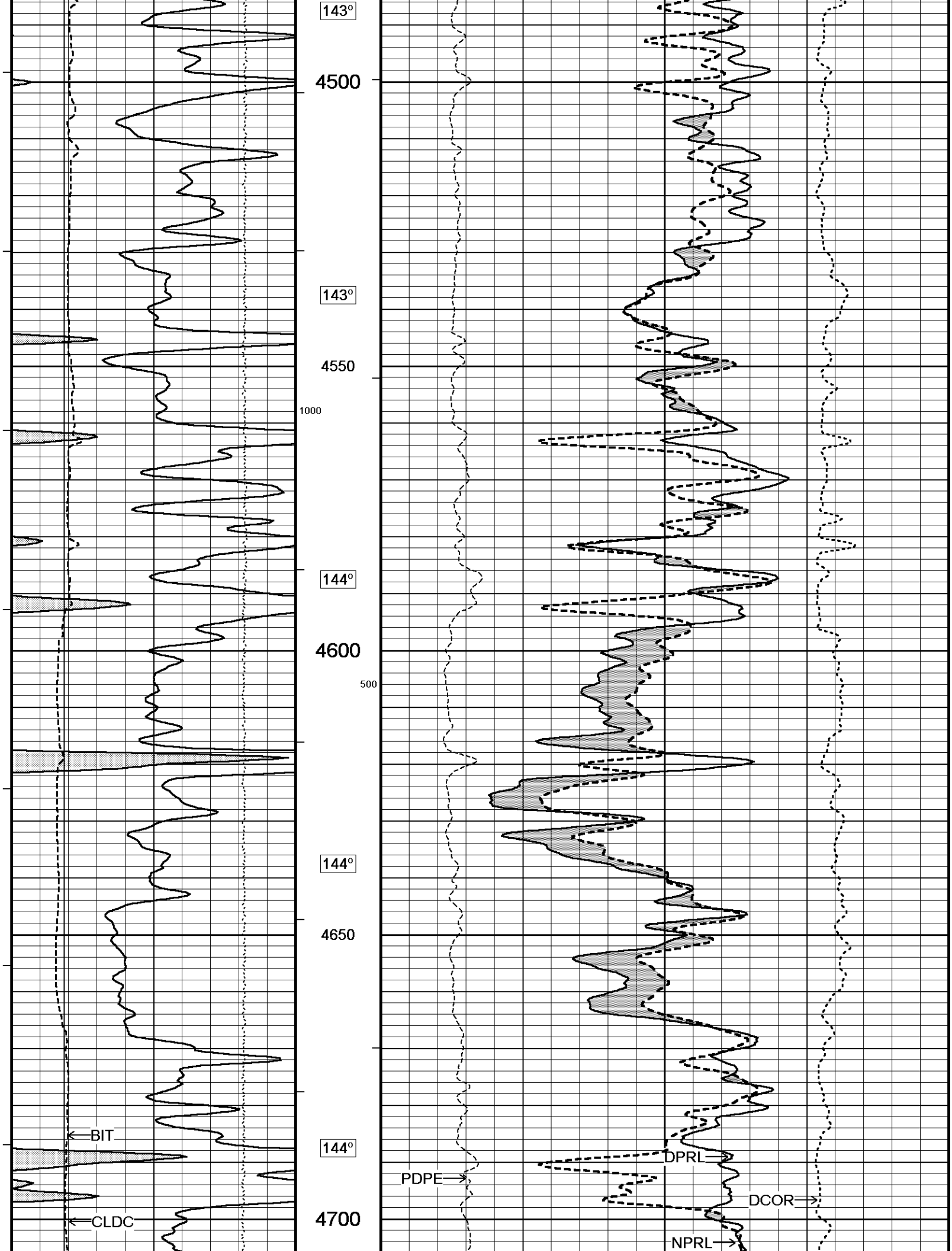
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500
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144°
4700
BIT
CLDC
PDPE
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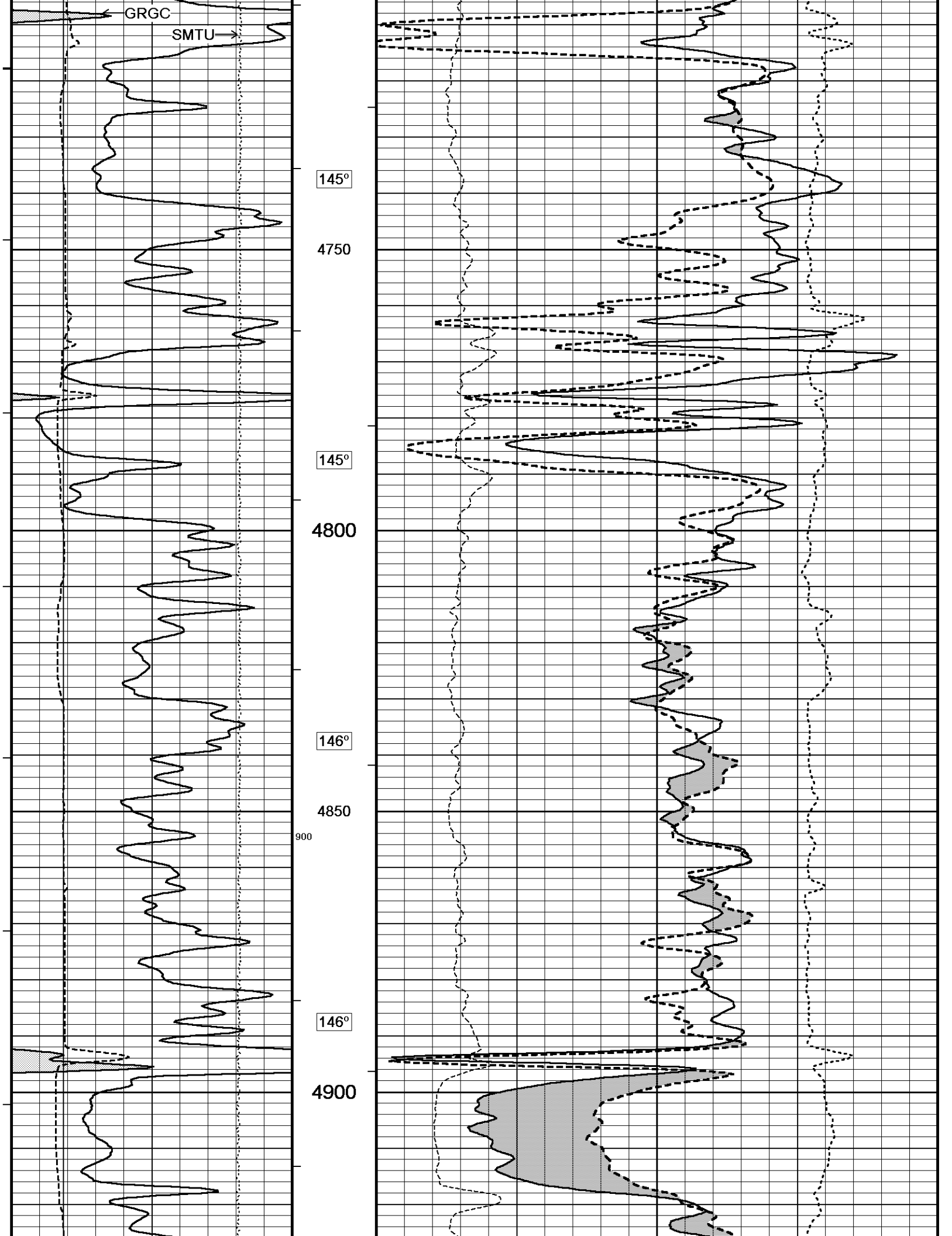
DCOR
NPRL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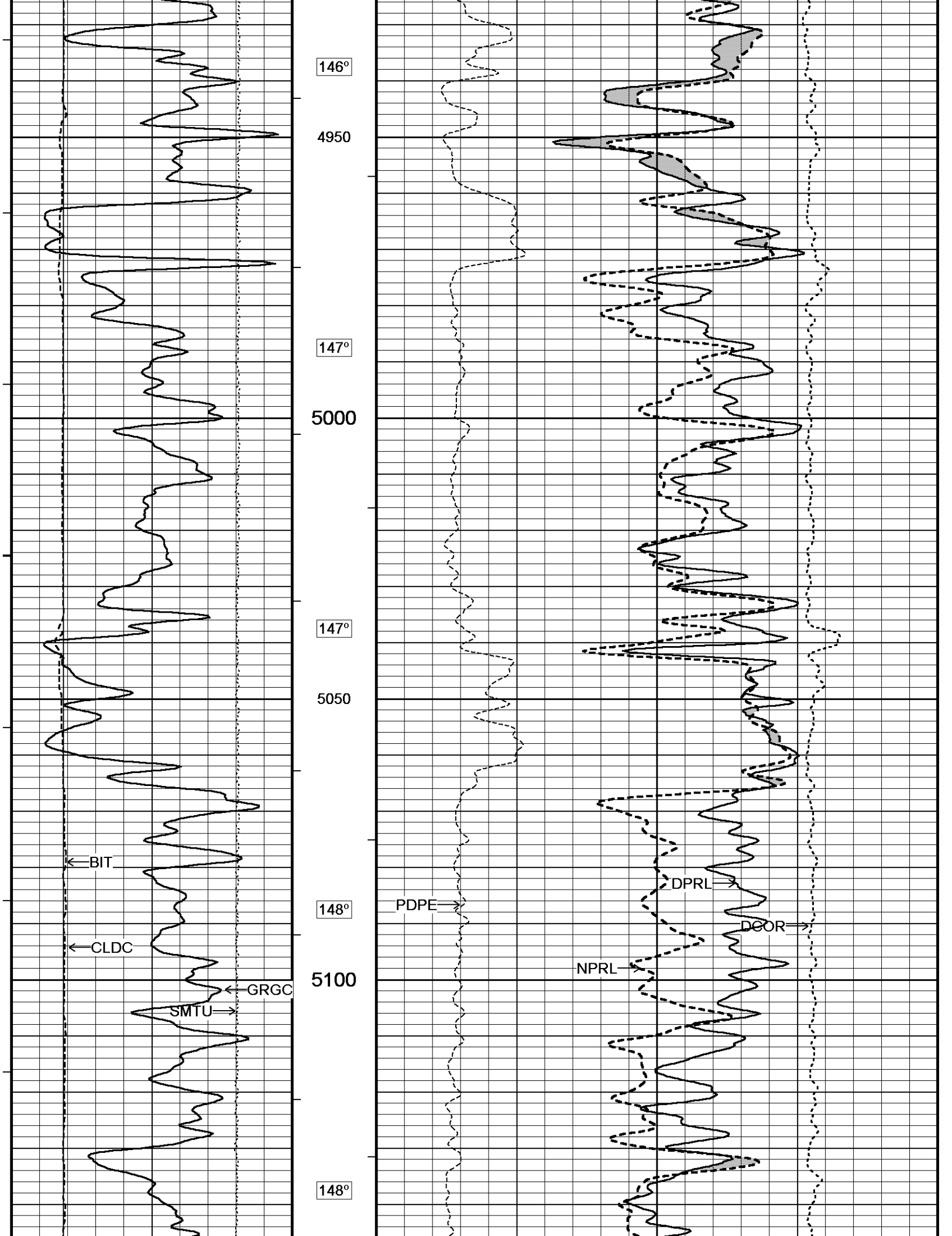
900
146°
4900


146°
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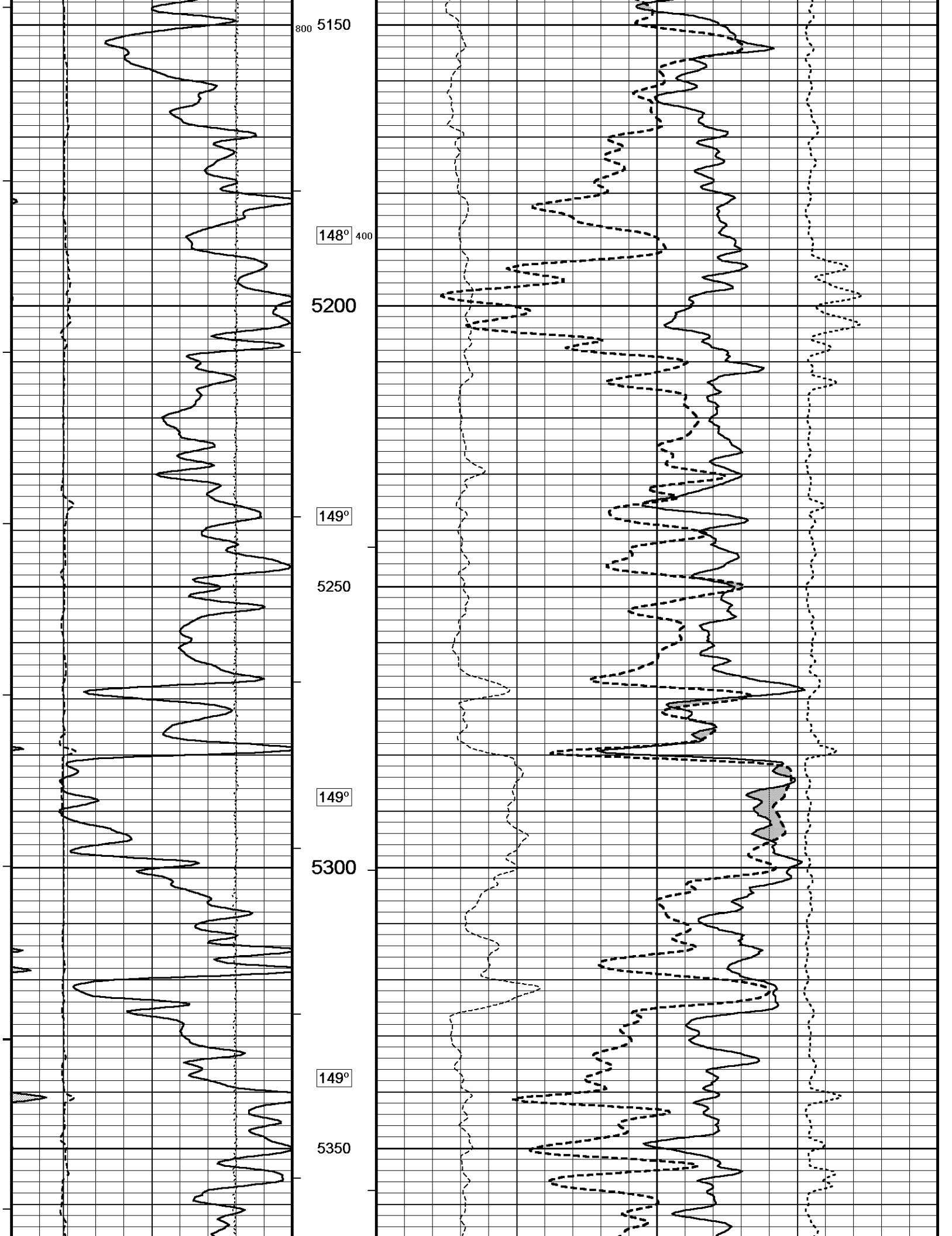
147°
5000
147°
5050
148°
5100
148°
BIT
CLDC
GRGC
SMTU
PDPE
DPRL
DCOR
NPRL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149°
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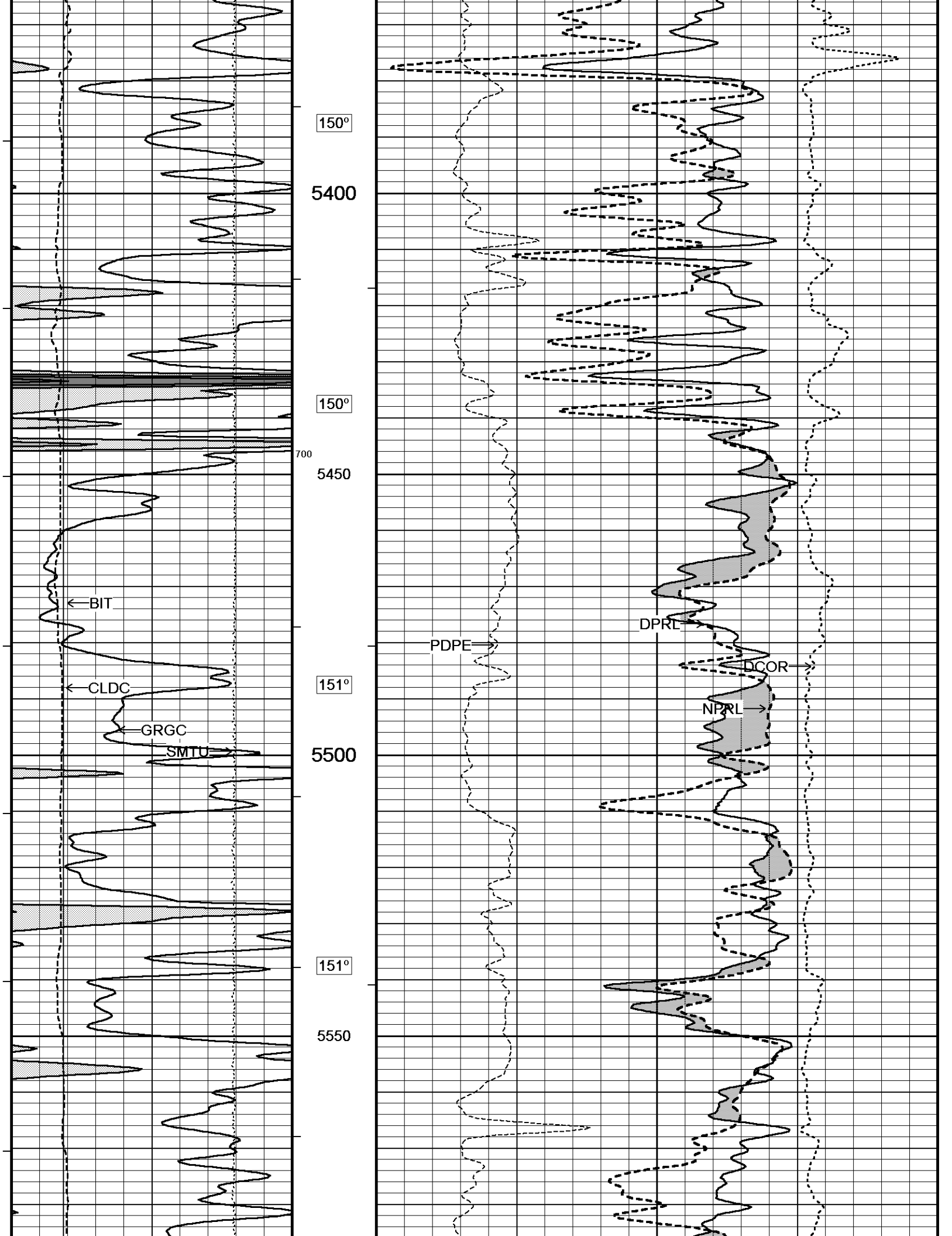
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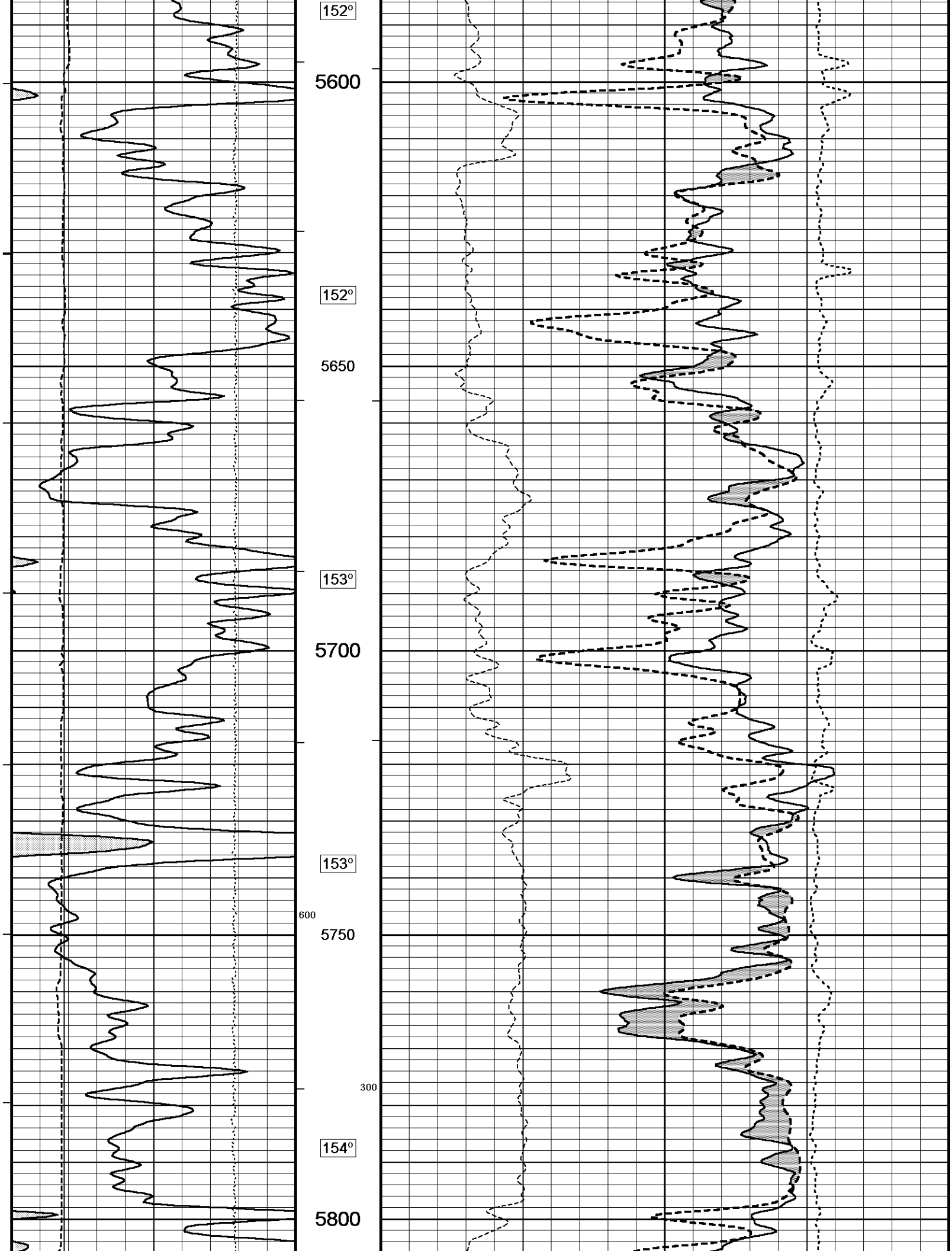
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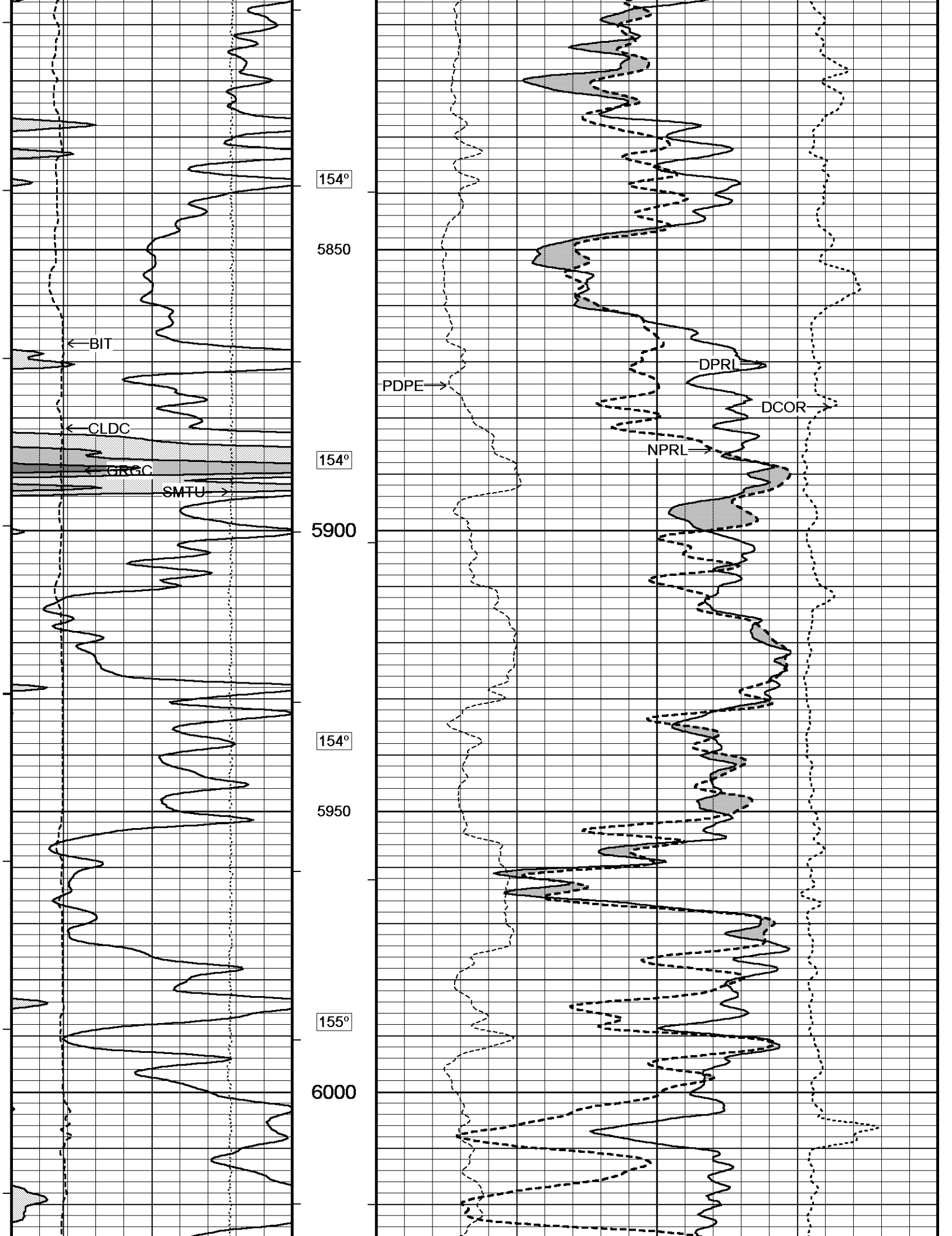
154°
5850
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PDPE
DCOR
CLDC
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SMTU
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154°
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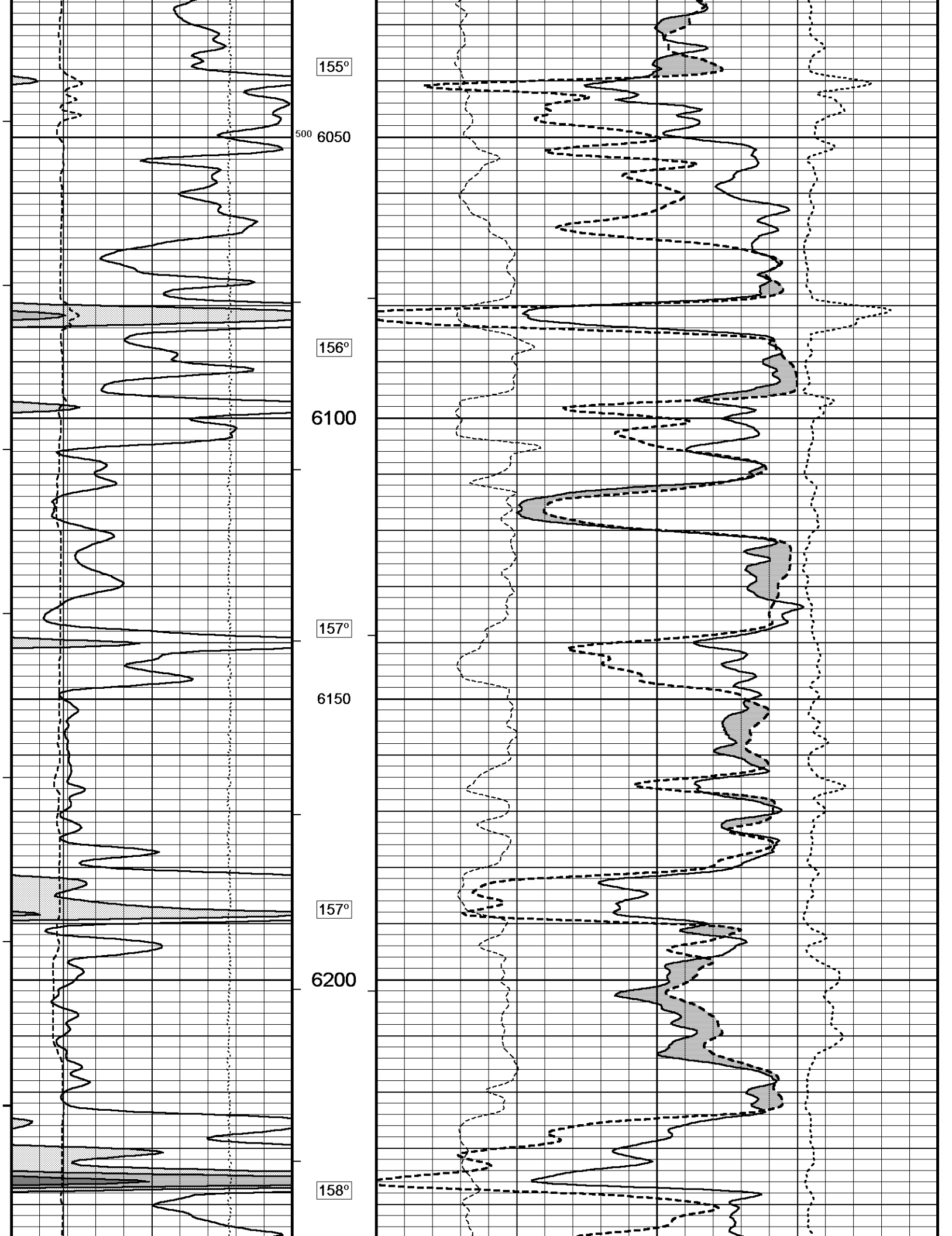
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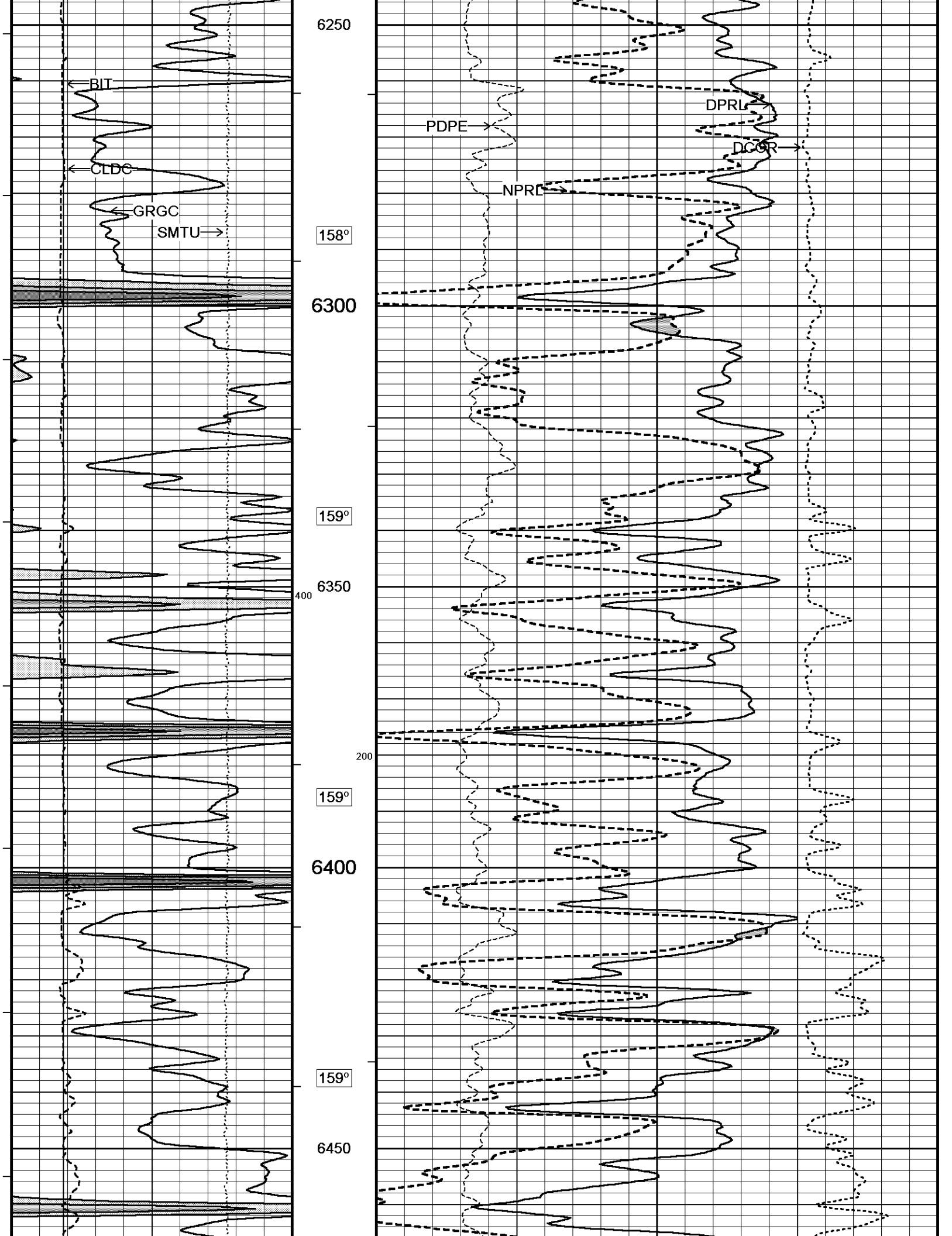
158°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159°
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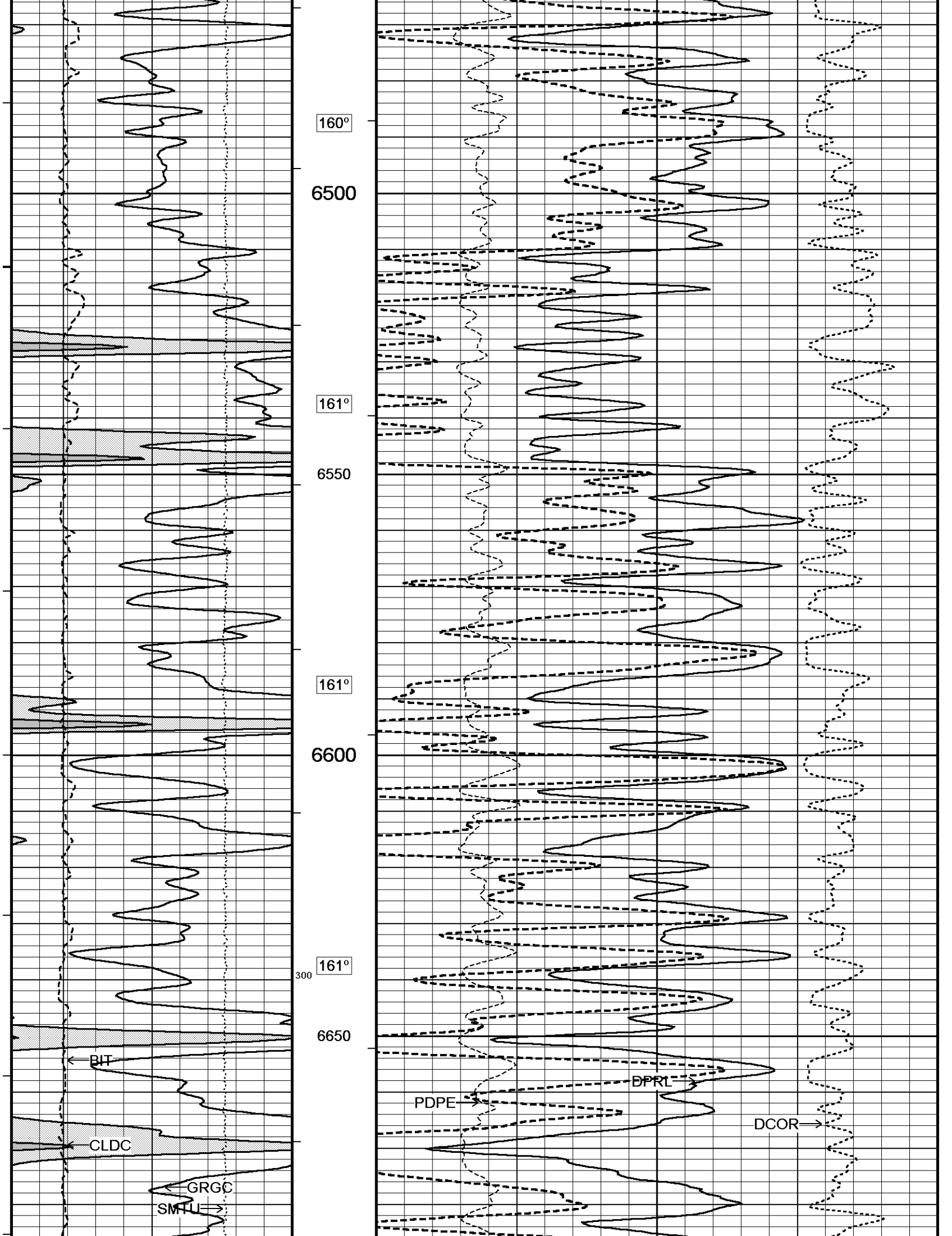
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161°
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161°
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BIT
CLDC
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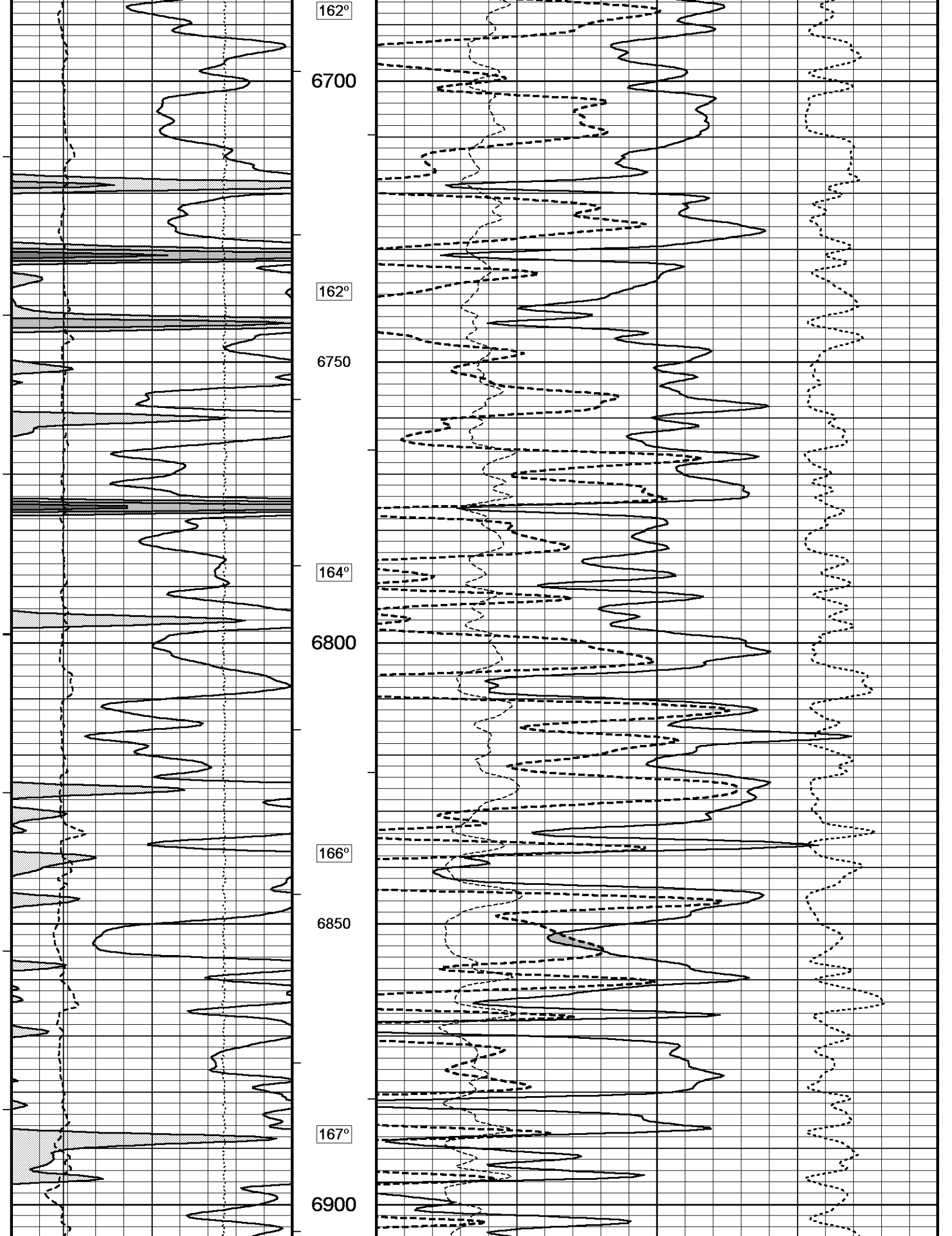
SMTU
PDPE
DPRL
DCOR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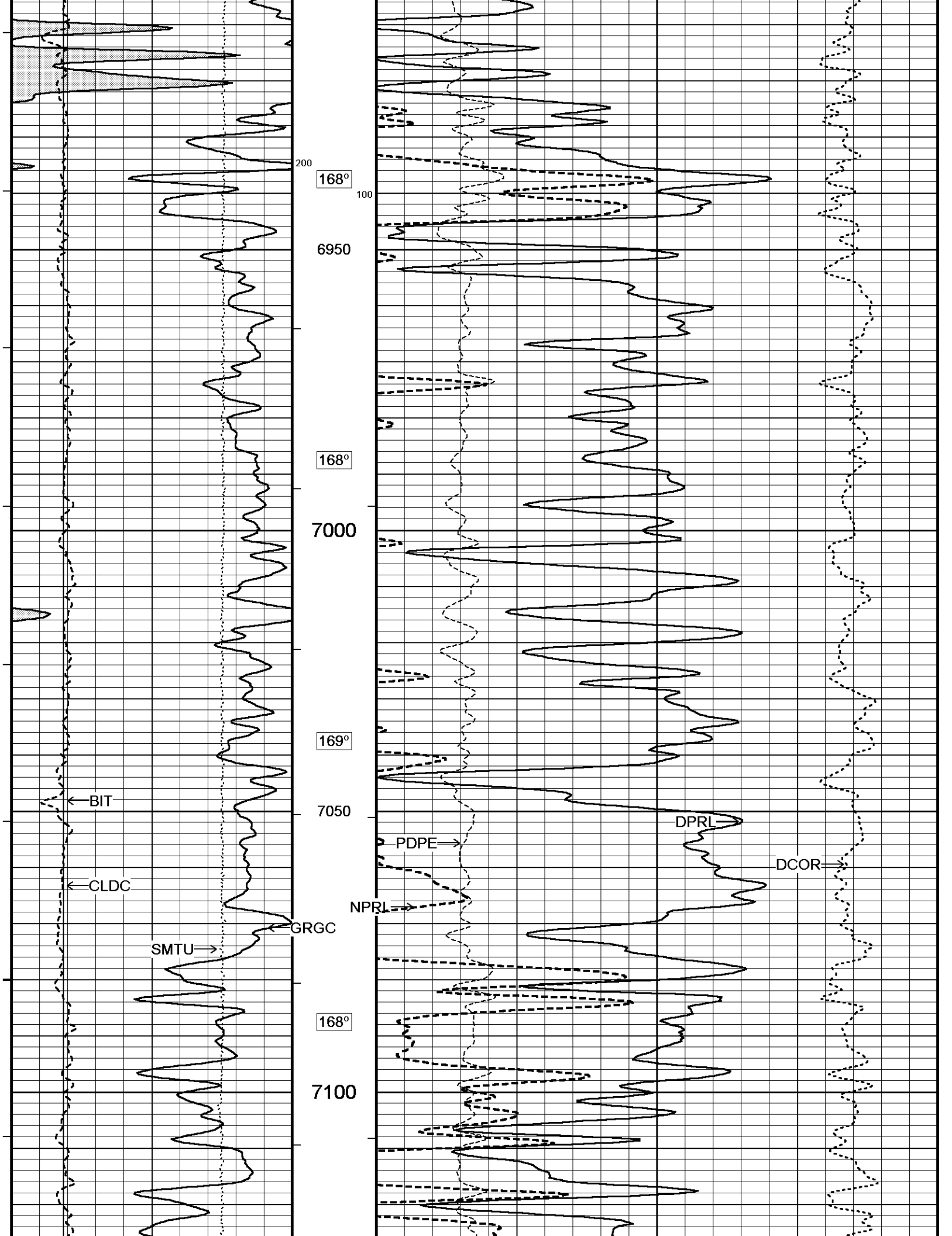
6850
167°
6900


200
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NPRL
DPRL
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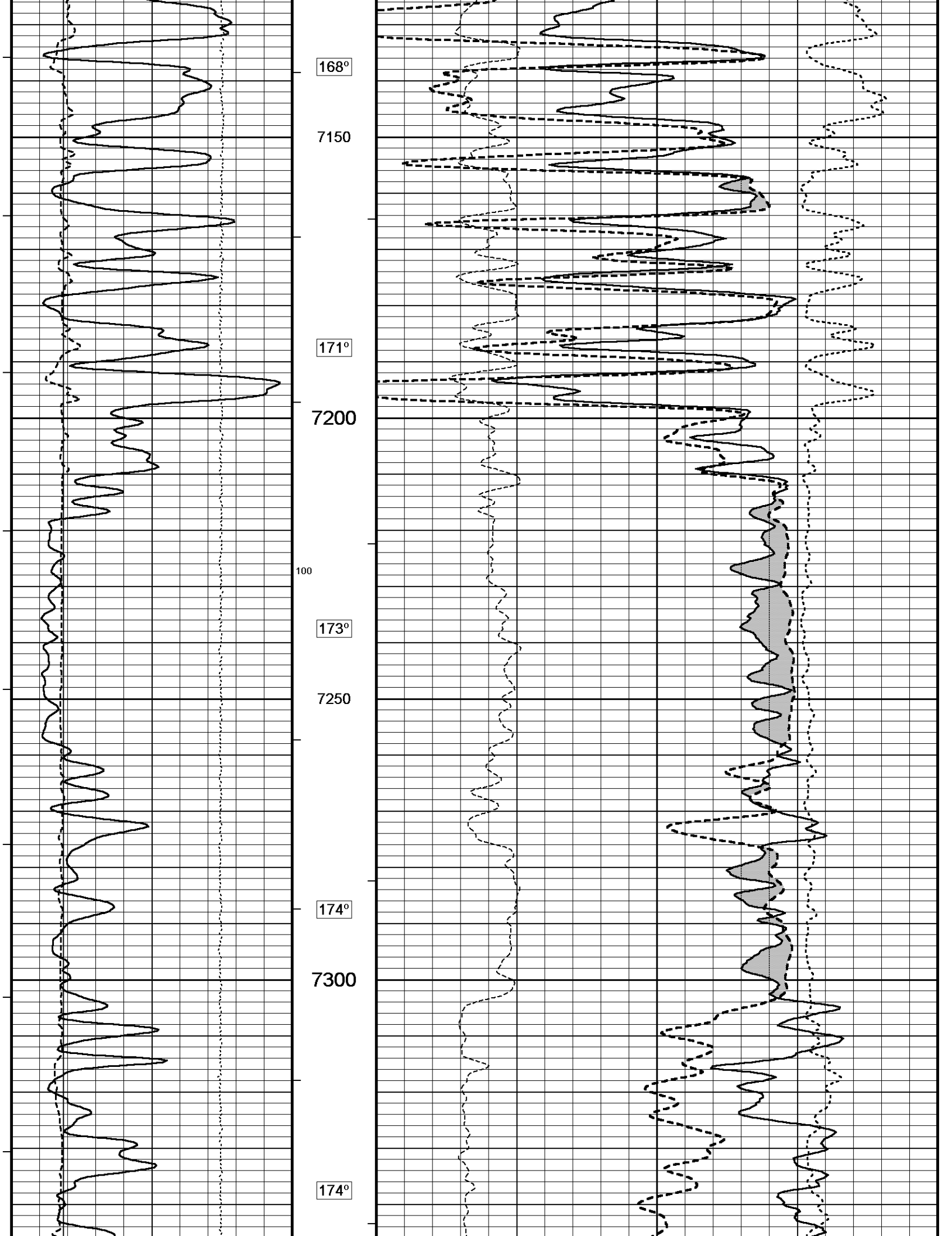
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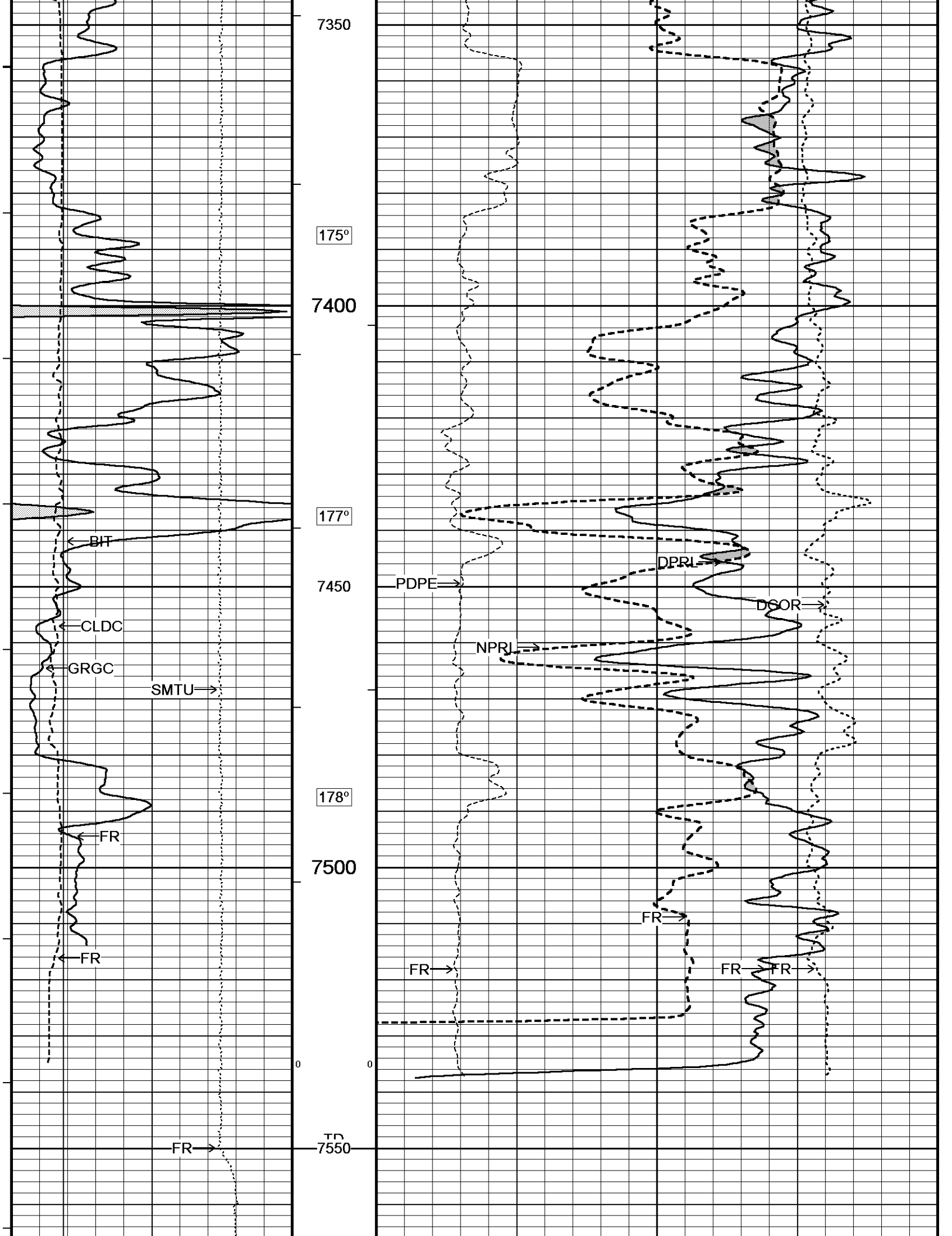
174°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177°
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FR
FR
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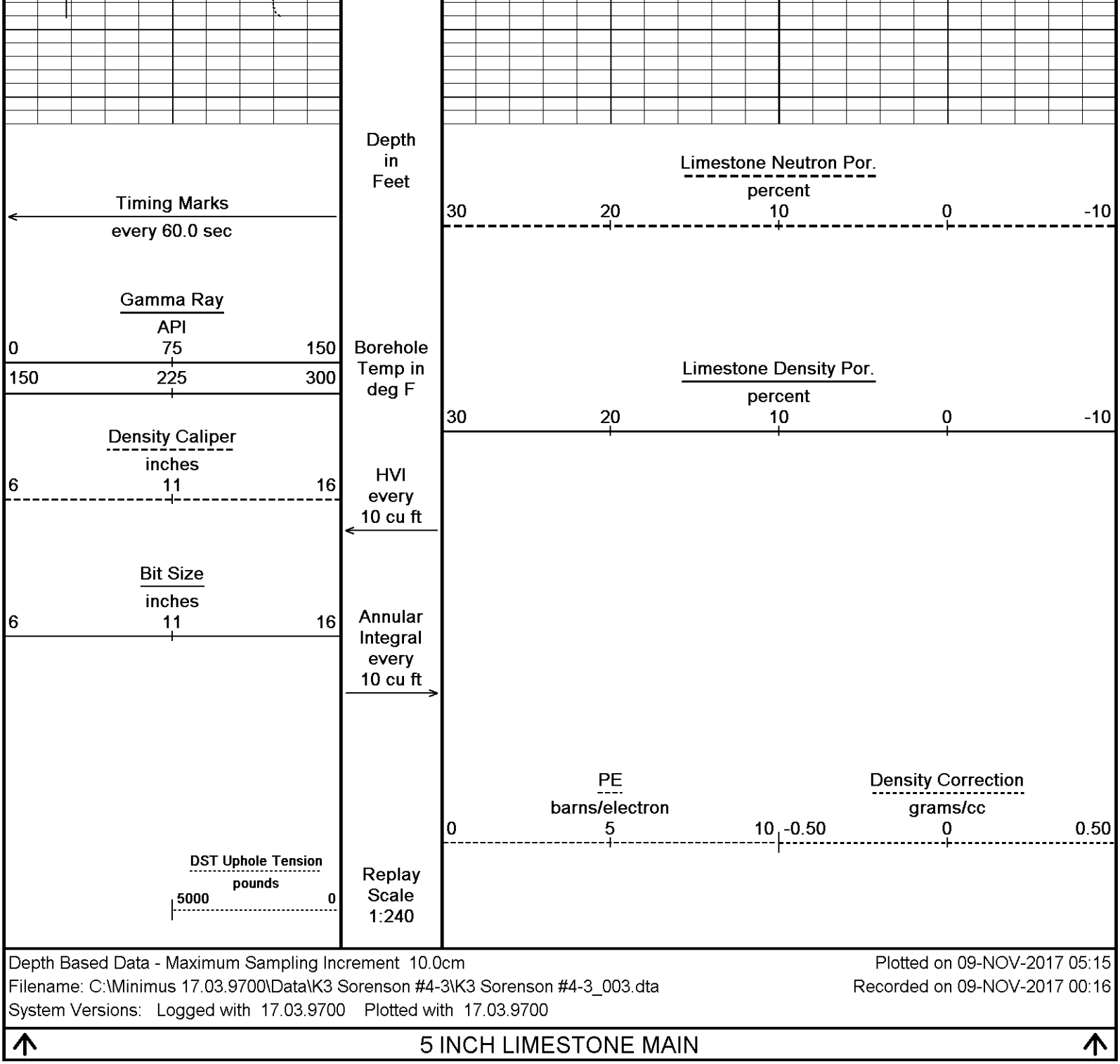
FR
FR
FR
TD
7550

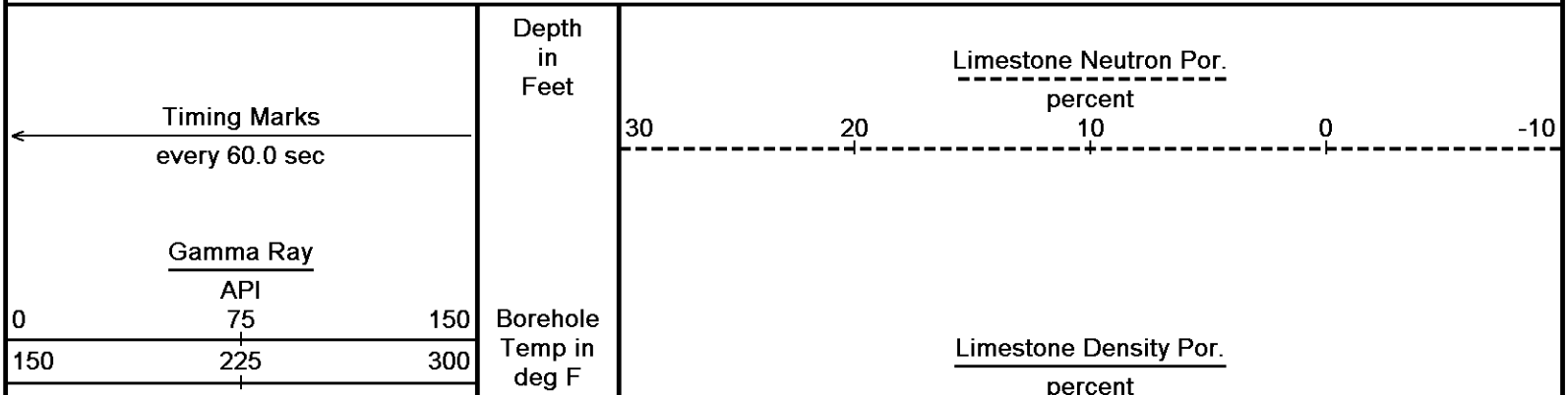


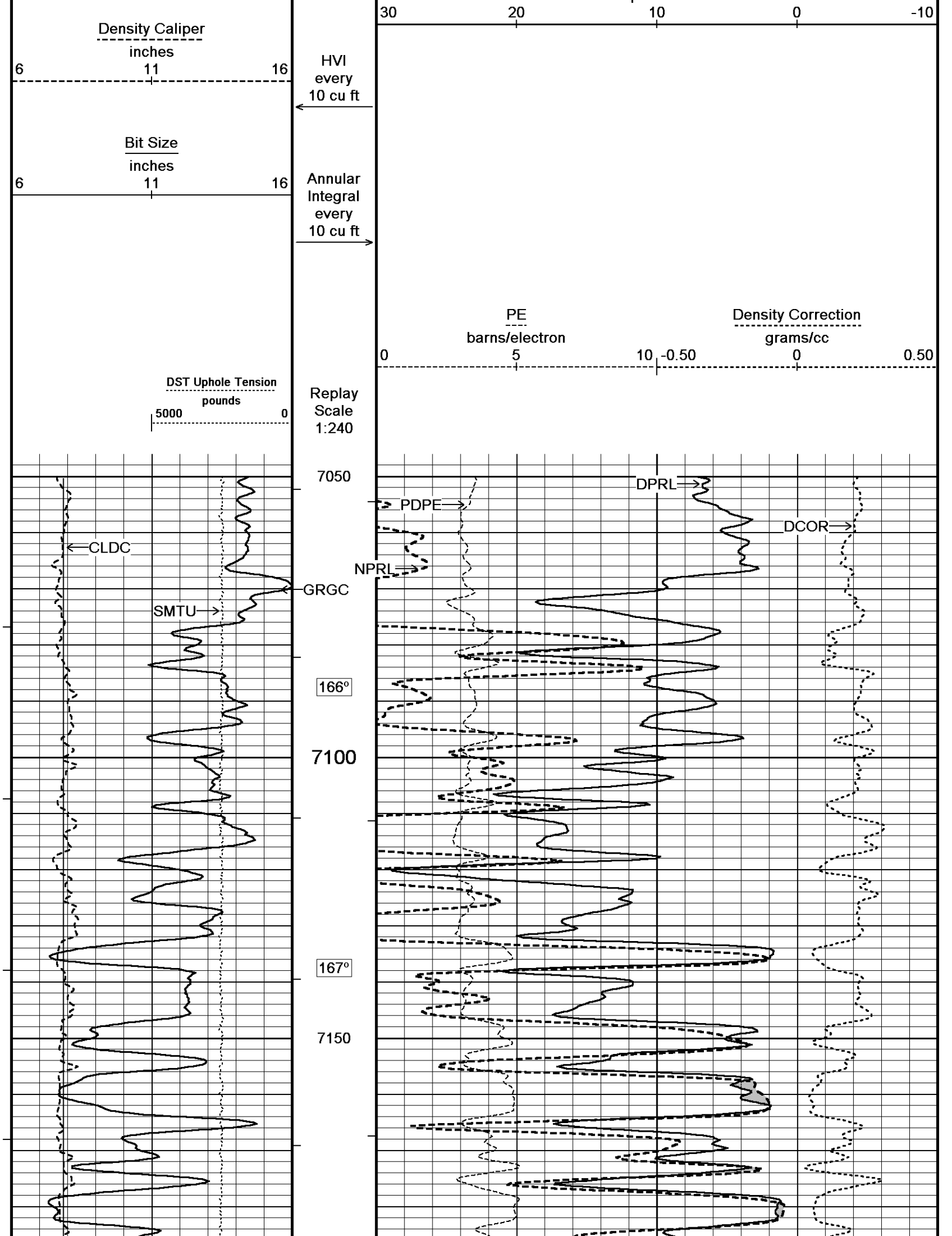
Depth Based Data - Maximum Sampling Increment 10.0cm — Plotted on 09-NOV-2017 05:15
Filename: C:\Minimus 17.03.9700\Data\K3 Sorenson #4-3\K3 Sorenson #4-3_003.dta — Recorded on 09-NOV-2017 00:16
System Versions: Logged with 17.03.9700 Plotted with 17.03.9700

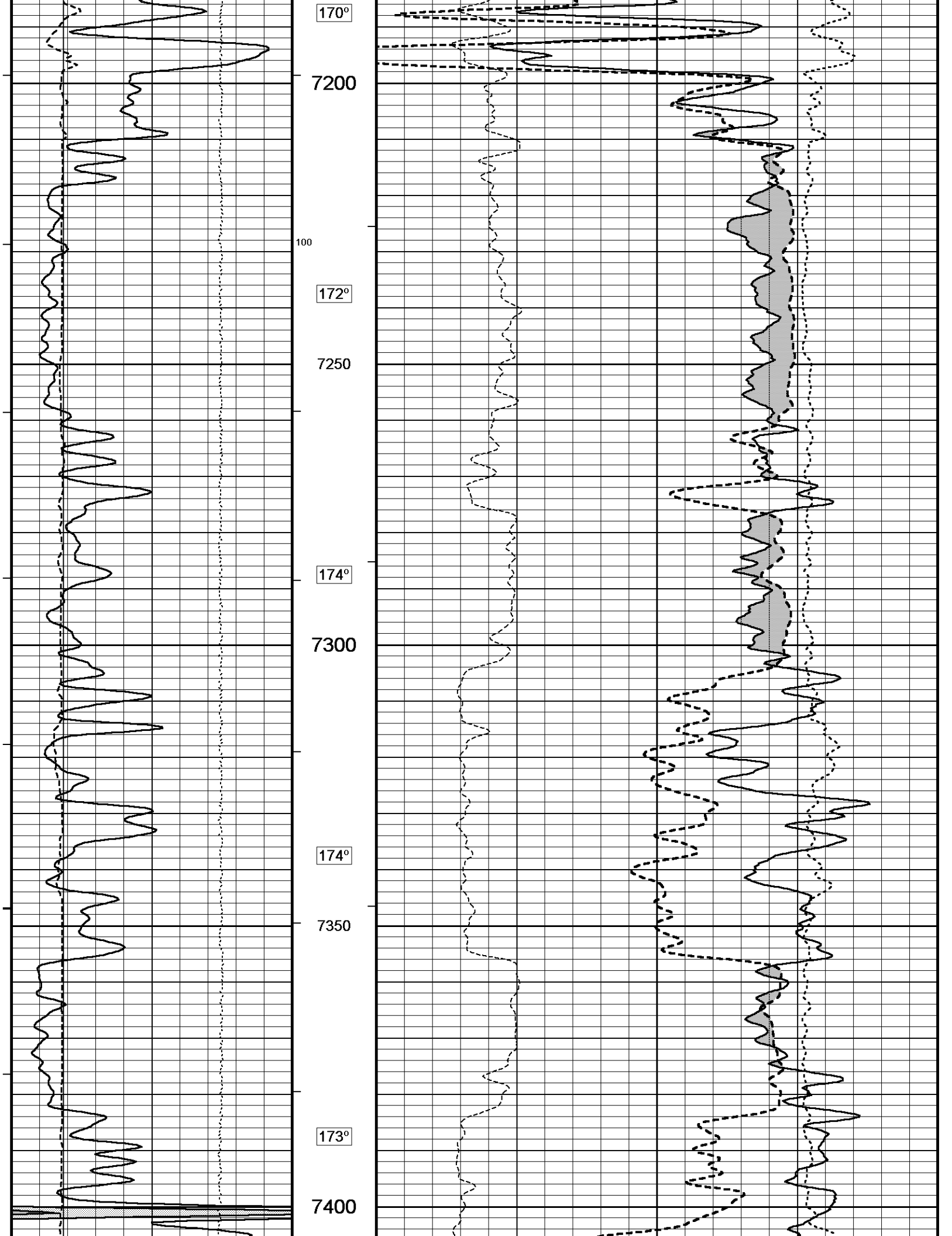
5 INCH LIMESTONE MAIN

REPEAT SECTION

Depth Based Data - Maximum Sampling Increment 10.0cm — Plotted on 09-NOV-2017 05:15
Filename: C:\Minimus 17.03.9700\Data\K3 Sorenson #4-3\K3 Sorenson #4-3_002.dta — Recorded on 08-NOV-2017 23:42
System Versions: Logged with 17.03.9700 Plotted with 17.03.9700




Density Caliper
inches
6
11
16
HVI
every
10 cu ft
Bit Size
inches
6
11
16
Annular
Integral
every
10 cu ft
30
20
10
0
-10
PE
barns/electron
0
5
10
Density Correction
grams/cc
-0.50
0
0.50
DST Uphole Tension
pounds
5000
0
Replay
Scale
1:240
7050
CLDC
GRGC
SMTU
166°
7100
167°
7150
PDPE
DPRL
NPRL
DCOR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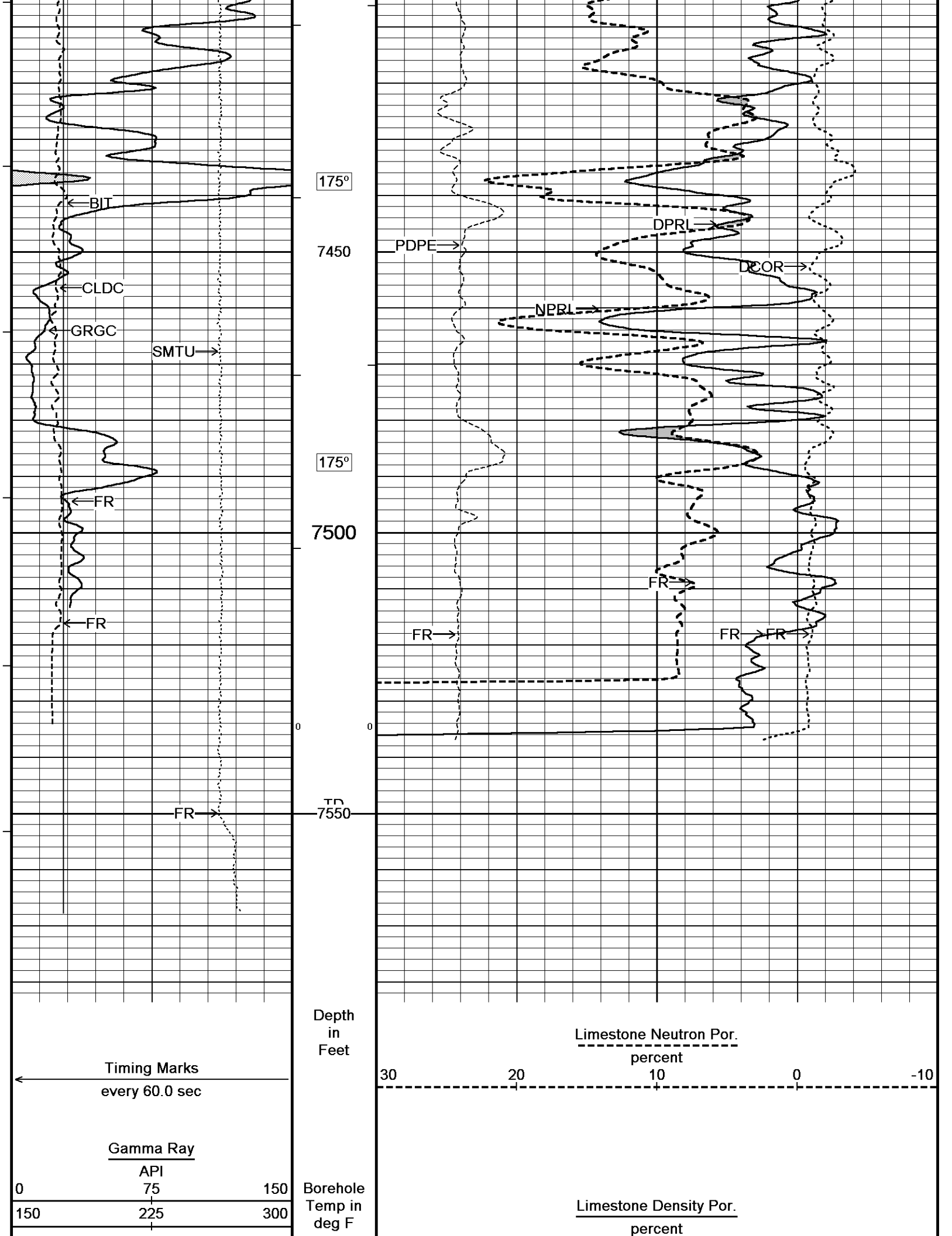
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175°
7450
175°
7500
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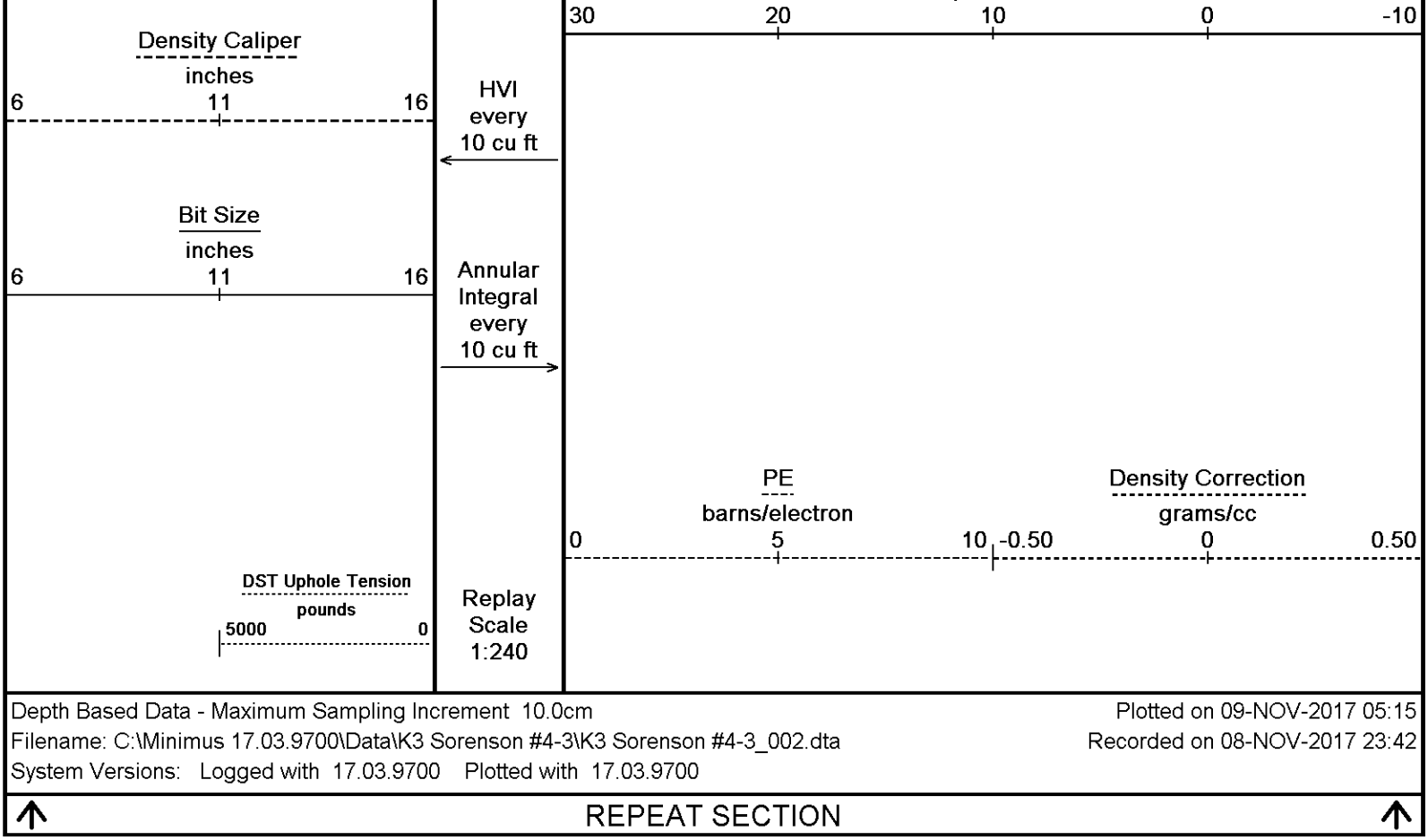
TD
7550
PDPE
DPRL
DCOR
NPRL
FR
FR
FR
FR
Timing Marks
every 60.0 sec
Gamma Ray
API
0
75
150
150
225
300
Depth
in
Feet
Borehole
Temp in
deg F
Limestone Neutron Por.
percent
30
20
10
0
-10
Limestone Density Por.
percent



Depth Based Data - Maximum Sampling Increment 10.0cm — Plotted on 09-NOV-2017 05:15
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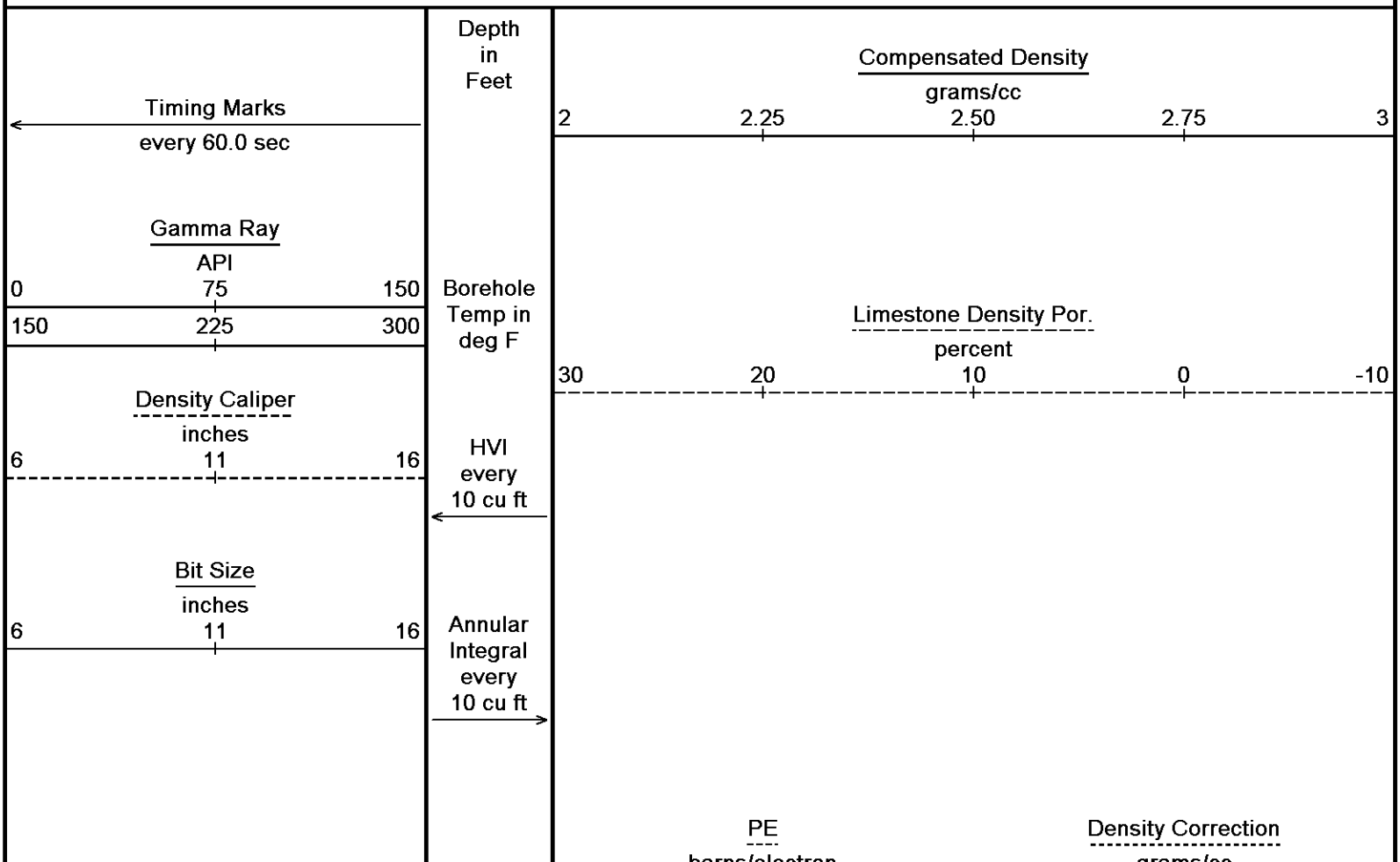
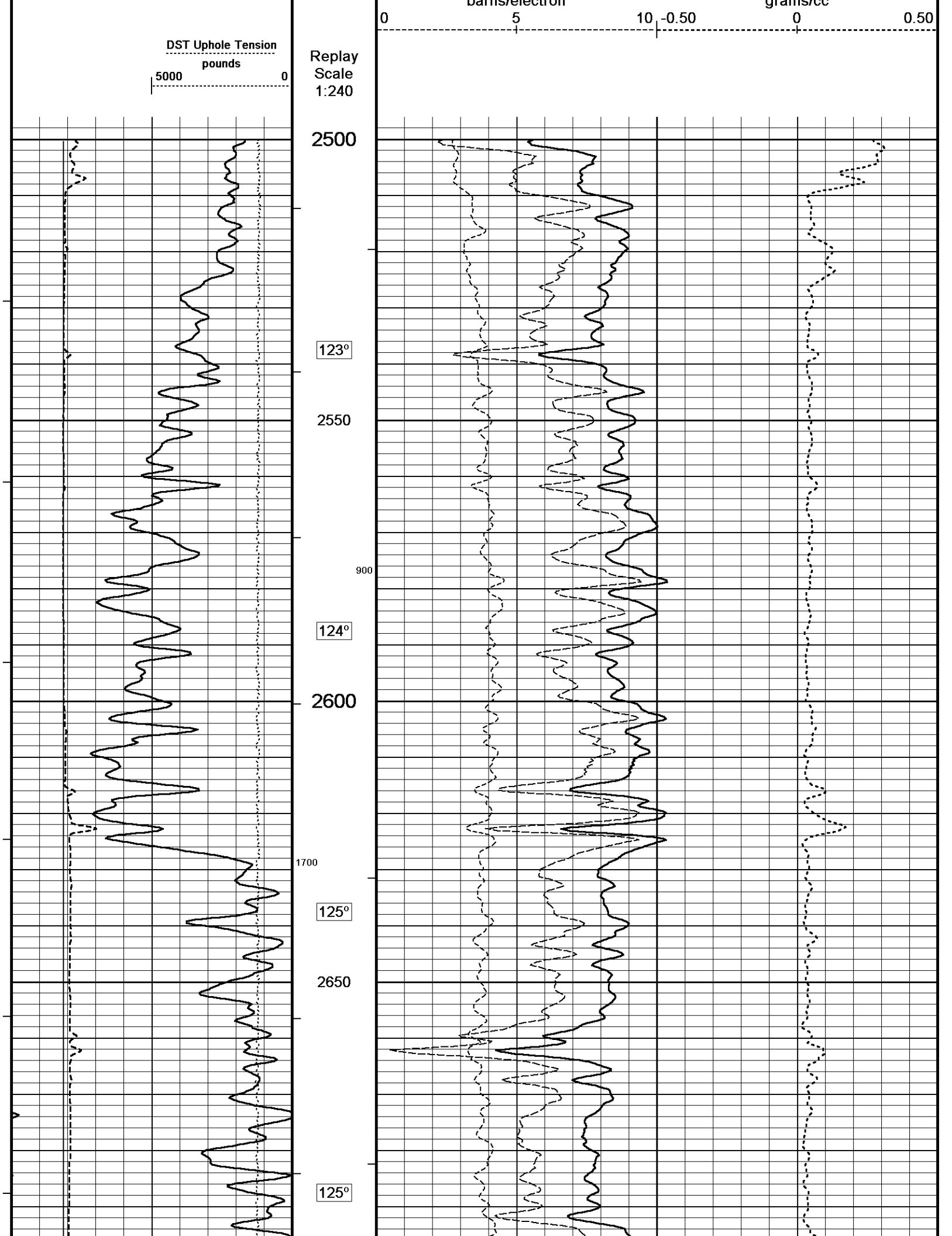
System Versions: Logged with 17.03.9700 Plotted with 17.03.9700

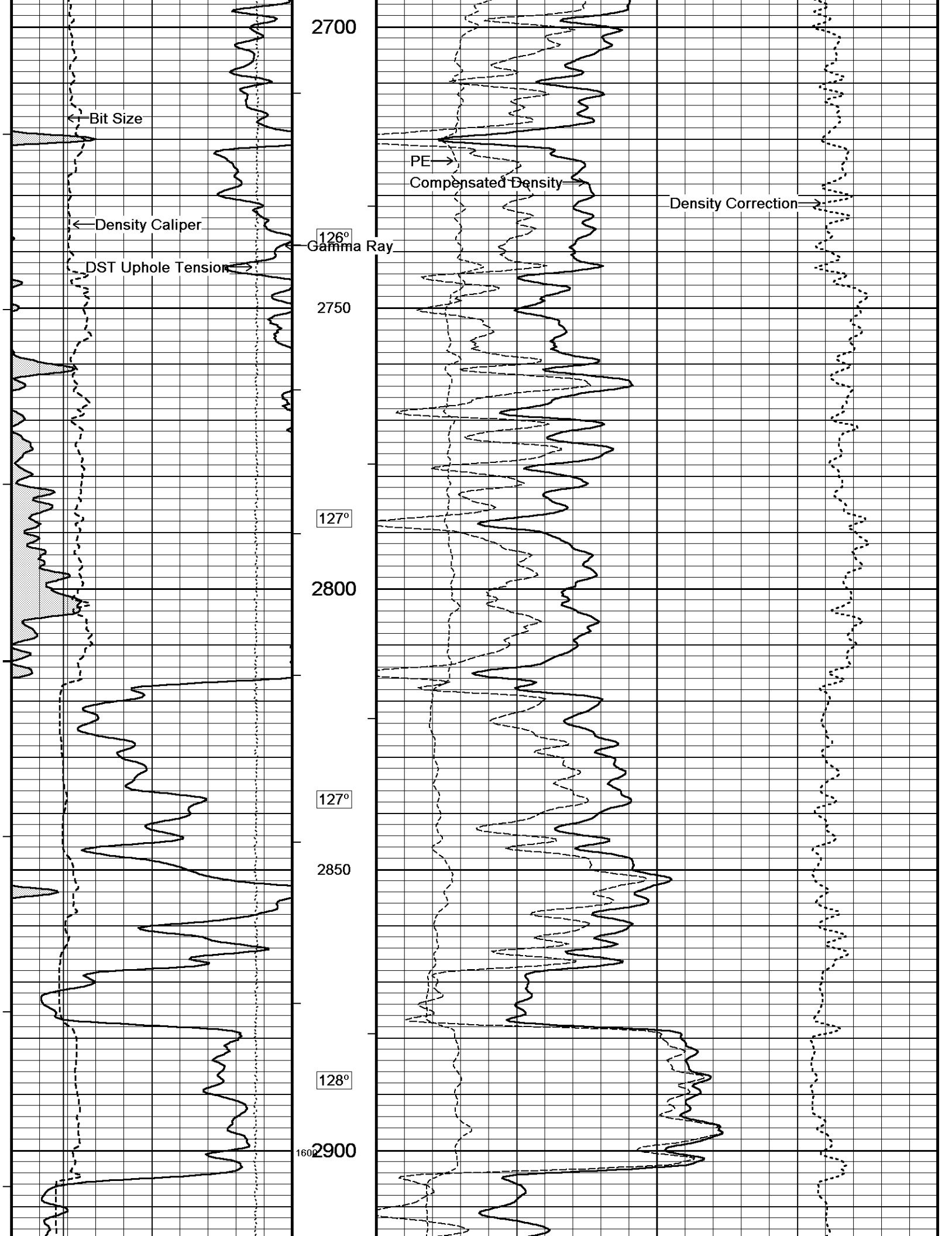
REPEAT SECTION

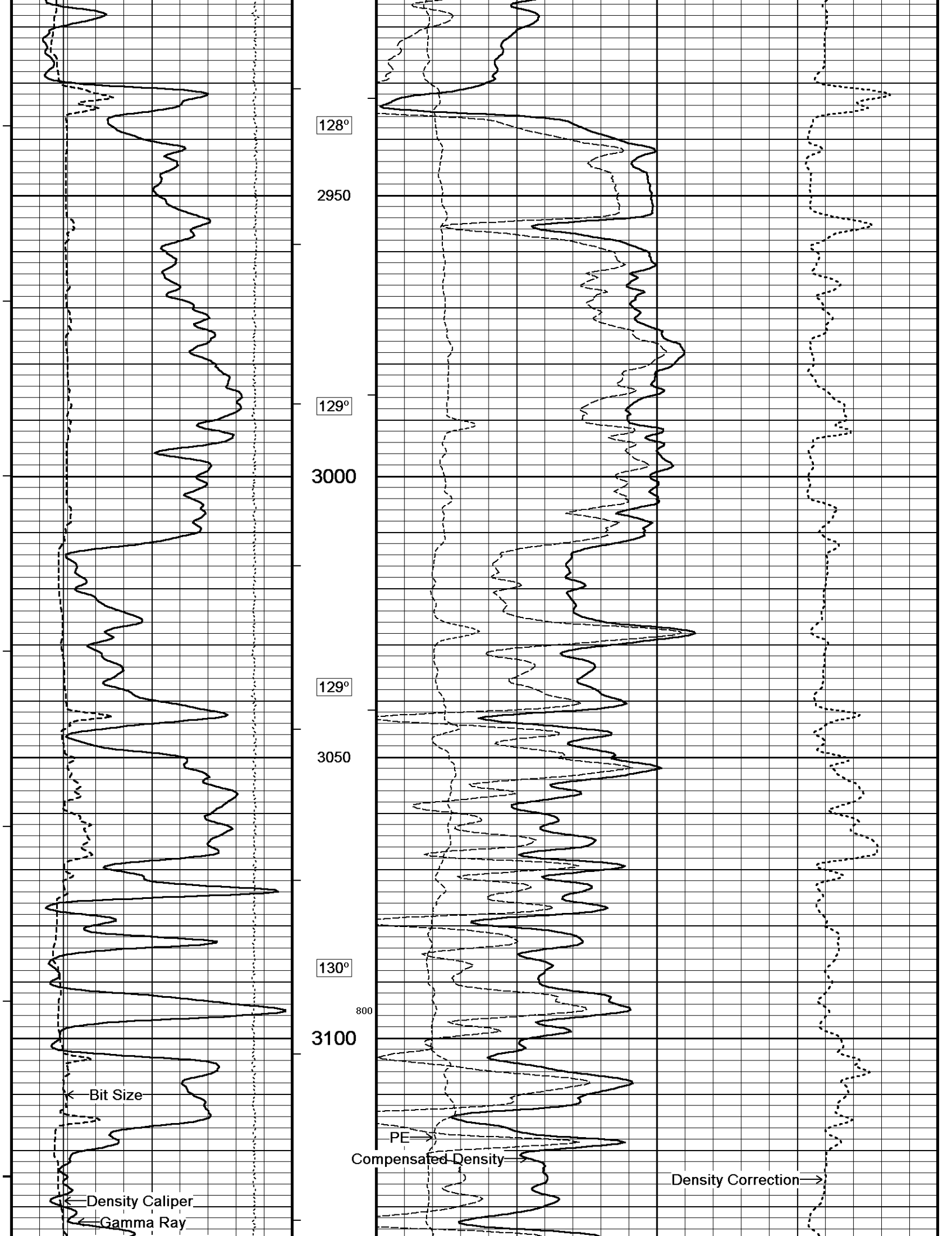
5 INCH BULK DENSITY MAIN

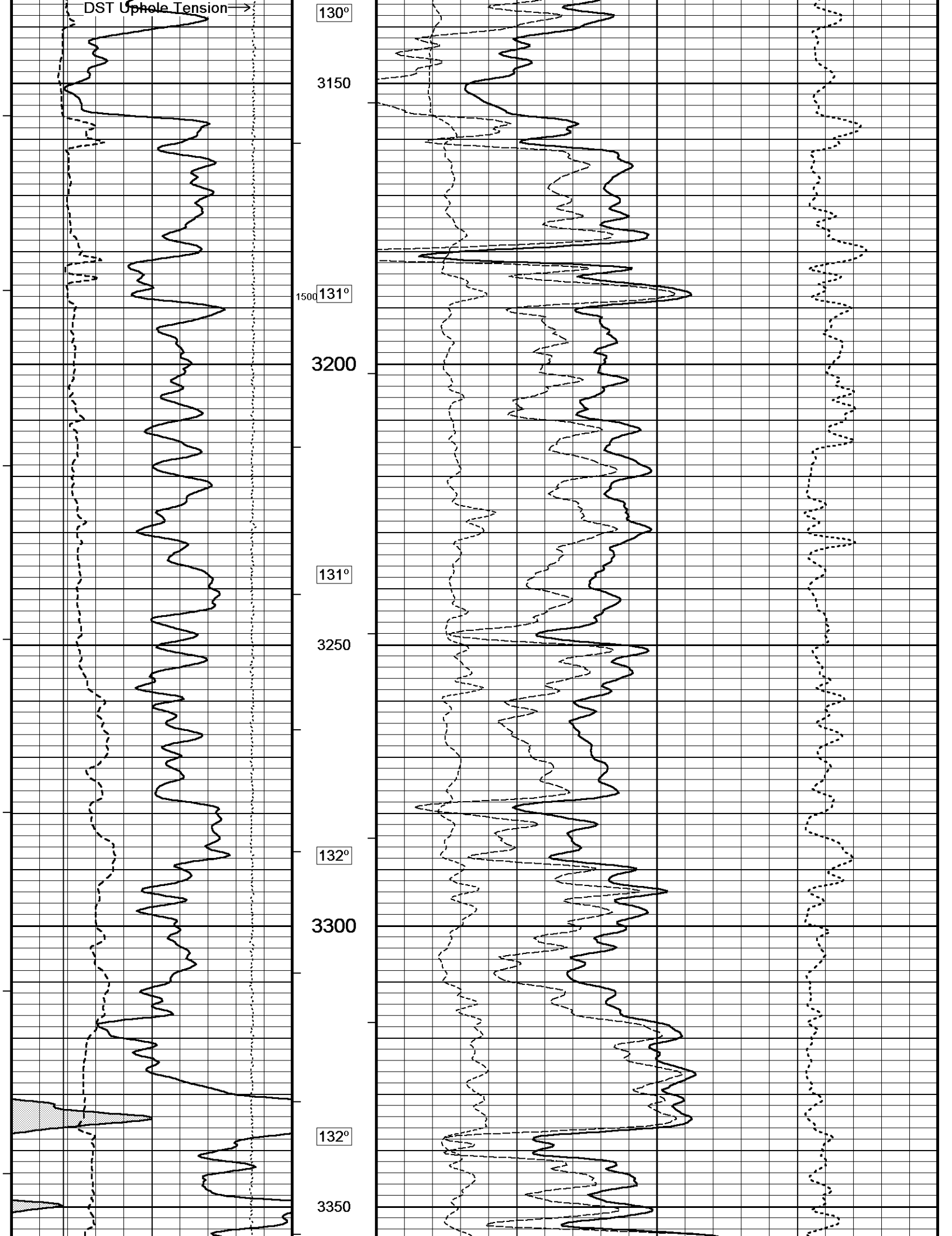
Depth Based Data - Maximum Sampling Increment 10.0cm — Plotted on 09-NOV-2017 05:15
Filename: C:\Minimus 17.03.9700\Data\K3 Sorenson #4-3\K3 Sorenson #4-3_003.dta — Recorded on 09-NOV-2017 00:16
System Versions: Logged with 17.03.9700 Plotted with 17.03.9700

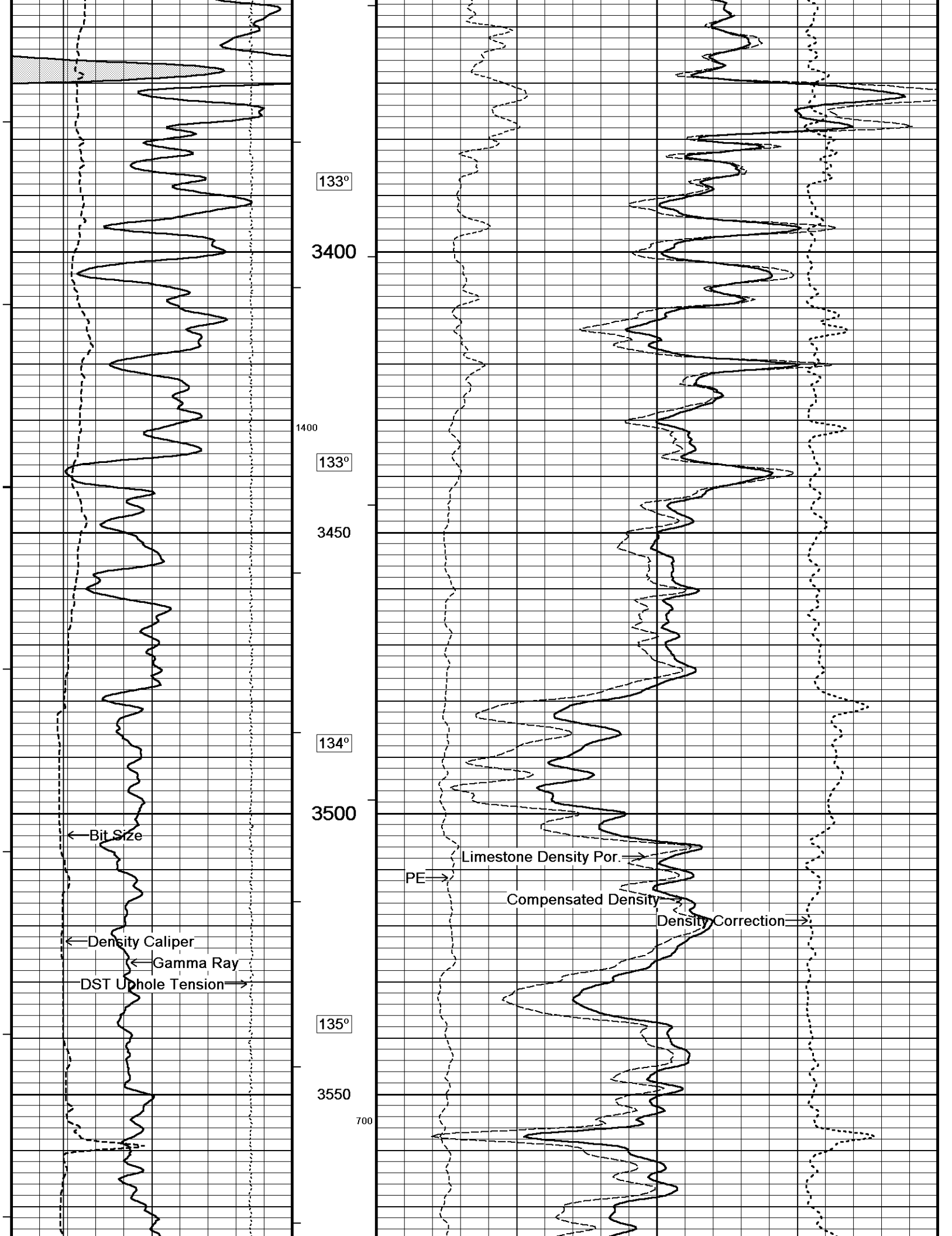


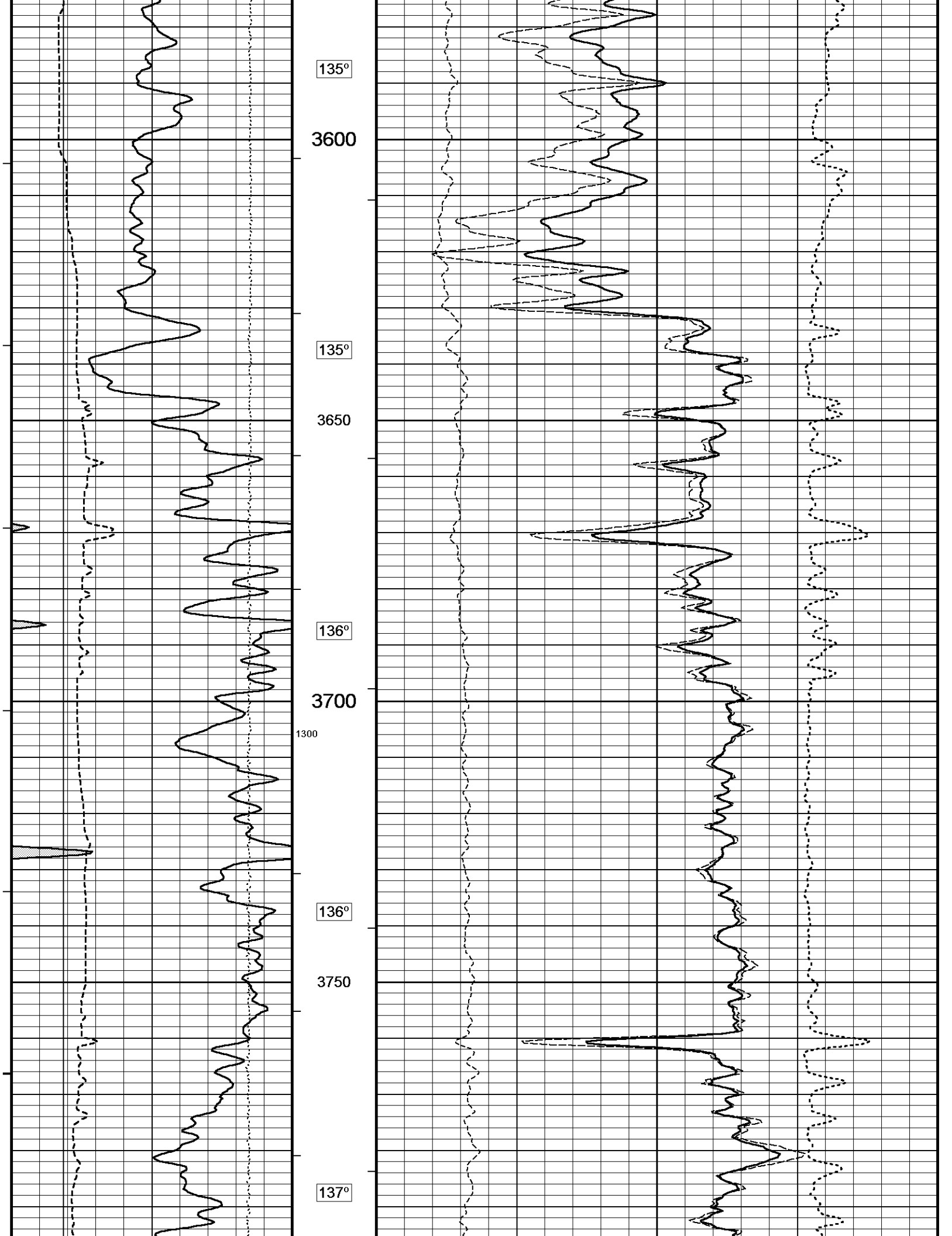

DST Uphole Tension
pounds
5000
0
Replay
Scale
1:240
2500
123°
2550
900
124°
2600
1700
125°
2650
125°
barns/electron
0
5
10
-0.50
grams/cc
0
0.50

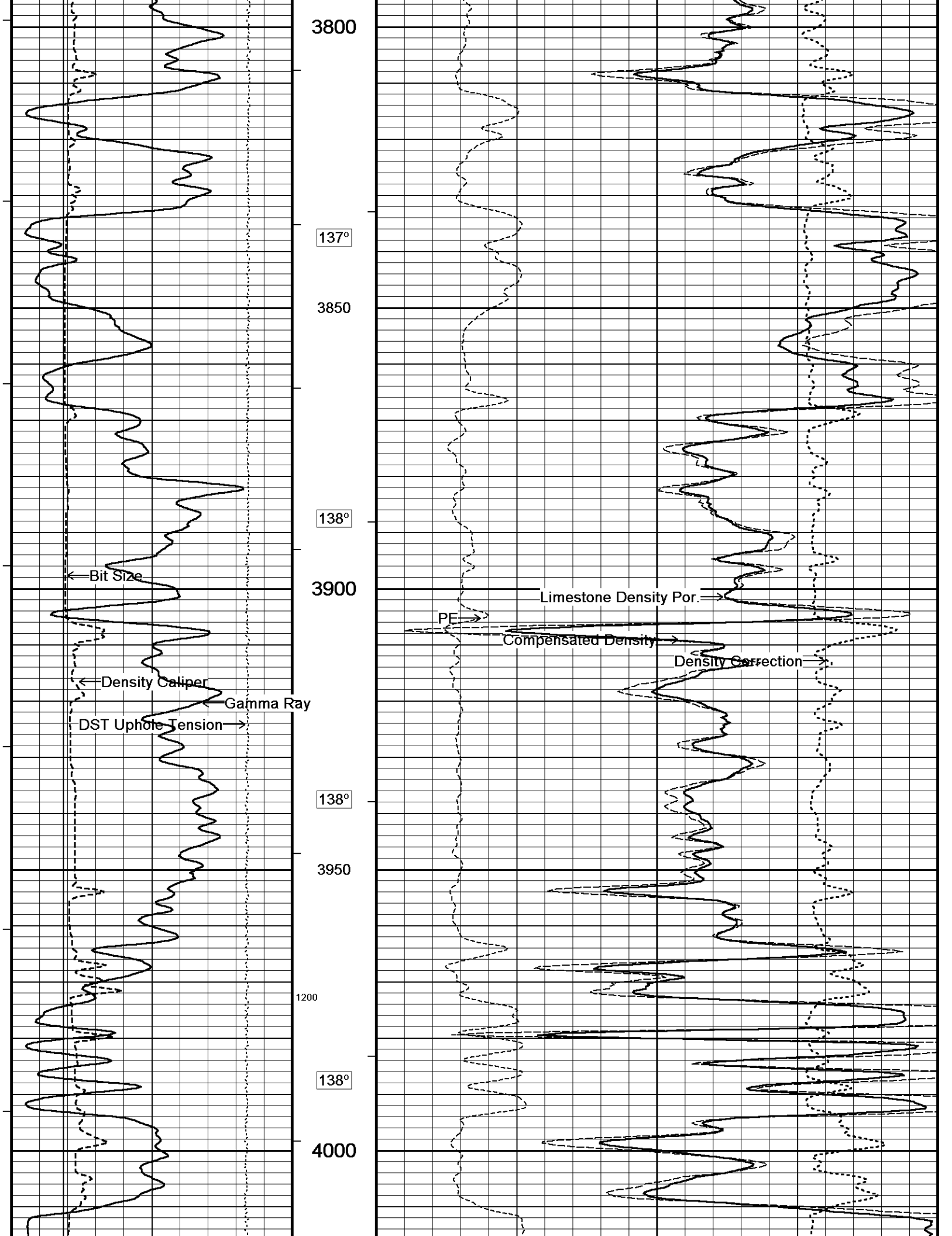

2700
Bit Size
Density Caliper
DST Uphole Tension
126°
Gamma Ray
PE
Compensated Density
Density Correction
2750
127°
2800
127°
2850
128°
2900
1600

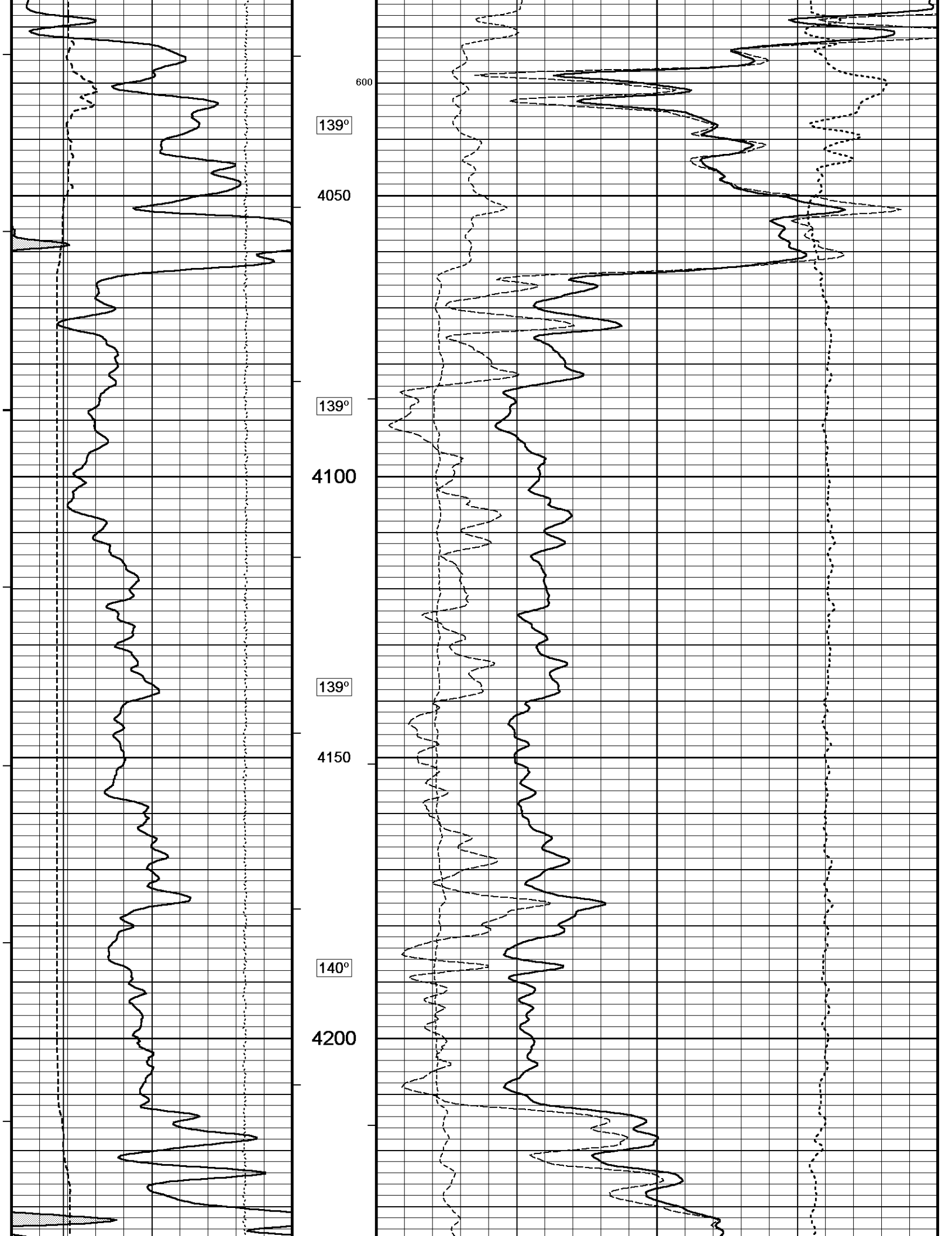

128°
2950
129°
3000
129°
3050
130°
800
3100
Bit Size
Density Caliper
Gamma Ray
PE
Compensated Density
Density Correction

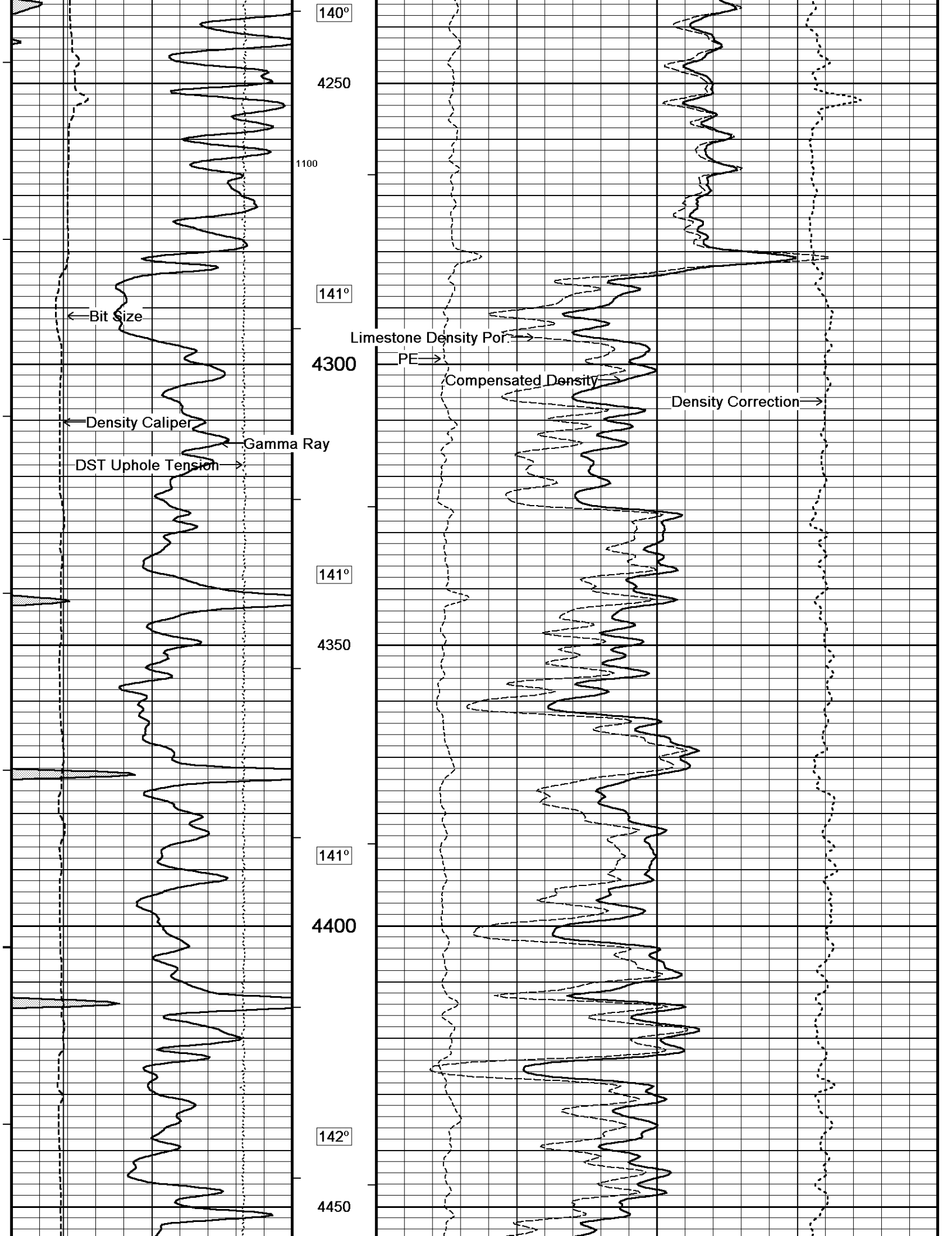

DST Uphole Tension
130°
3150
1500
131°
3200
131°
3250
132°
3300
132°
3350

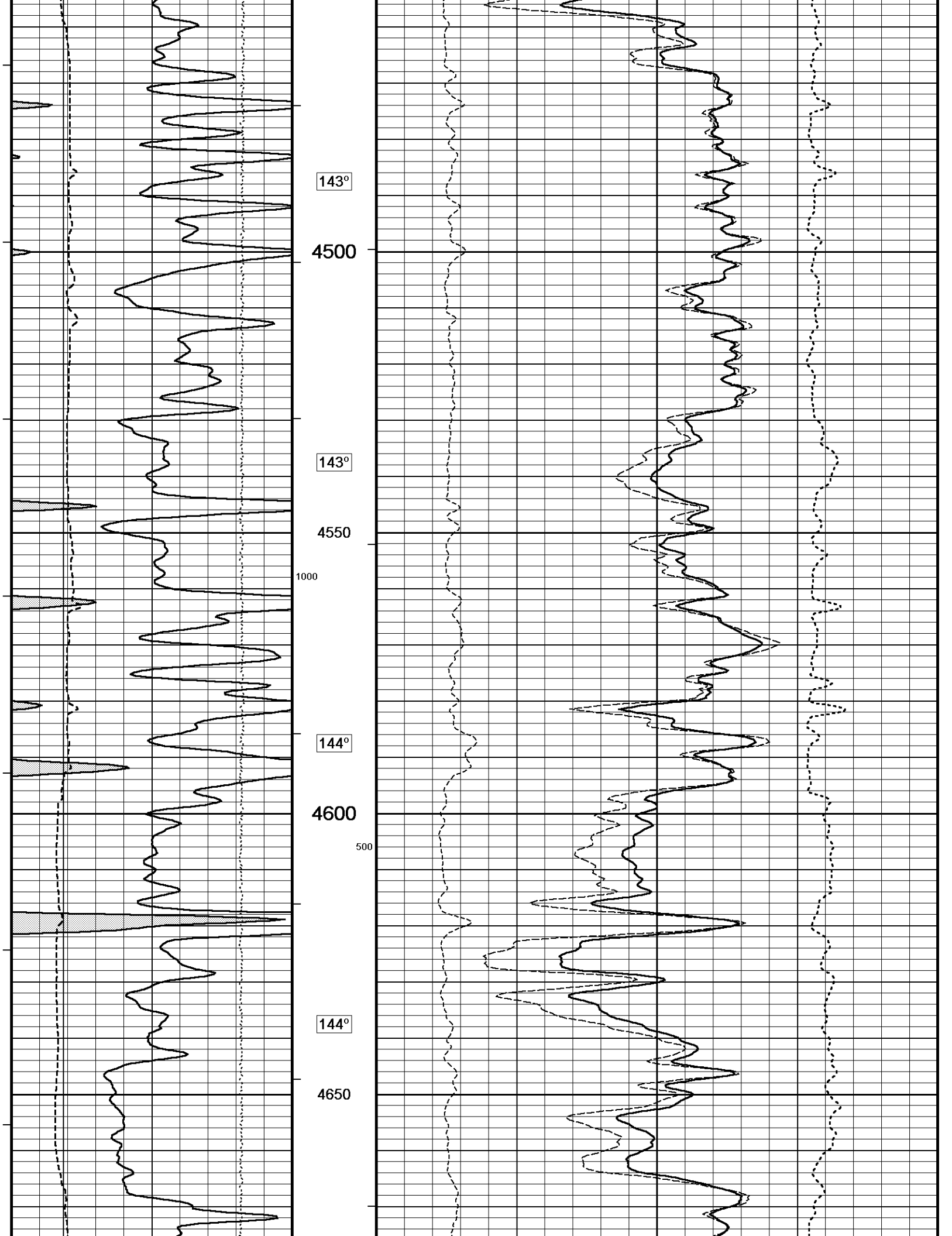

133°
3400
1400
133°
3450
134°
3500
Bit Size
Limestone Density Por.
PE
Compensated Density
Density Correction
Density Caliper
Gamma Ray
DST Uphole Tension
135°
3550
700

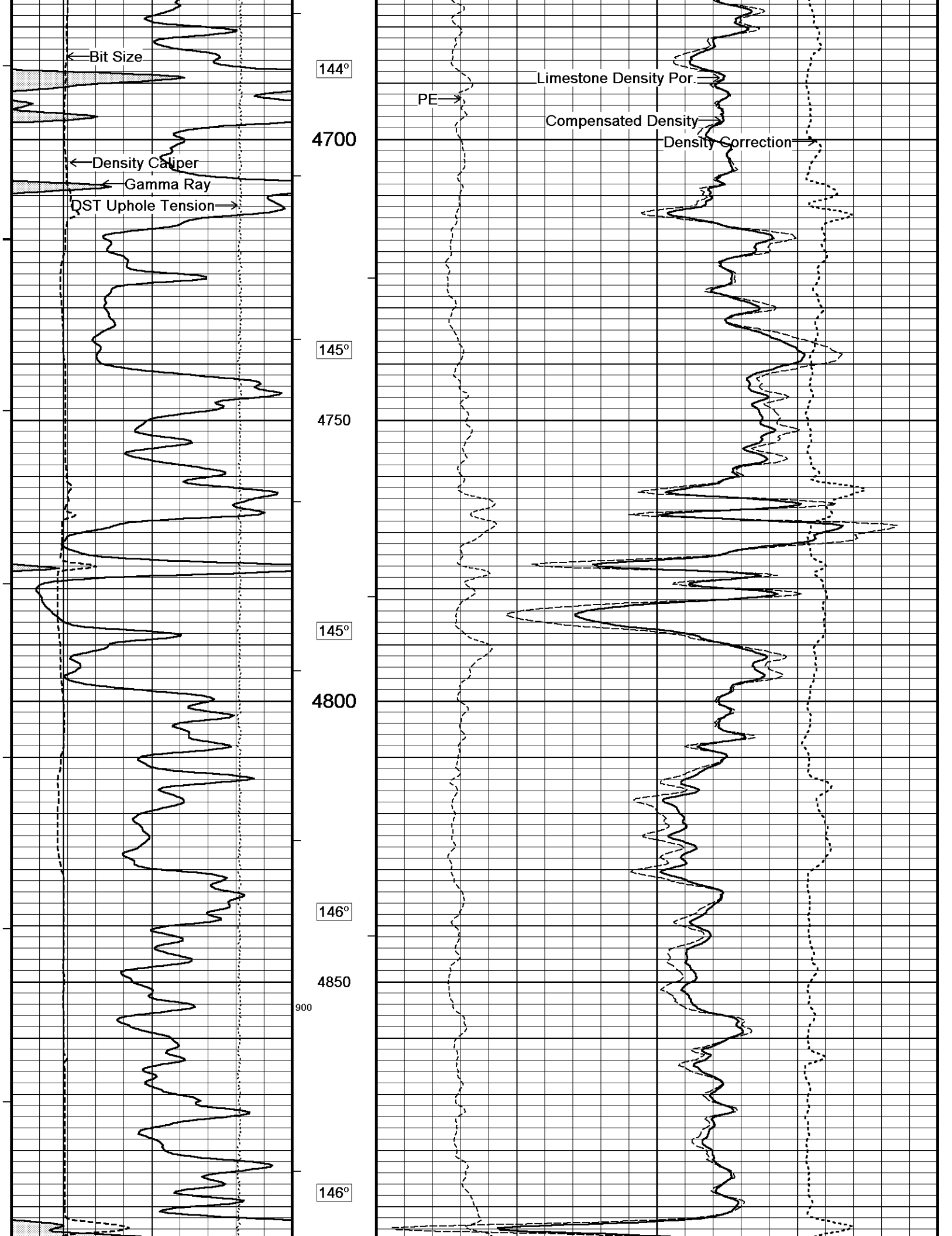

135°
3600
135°
3650
136°
3700
1300
136°
3750
137°

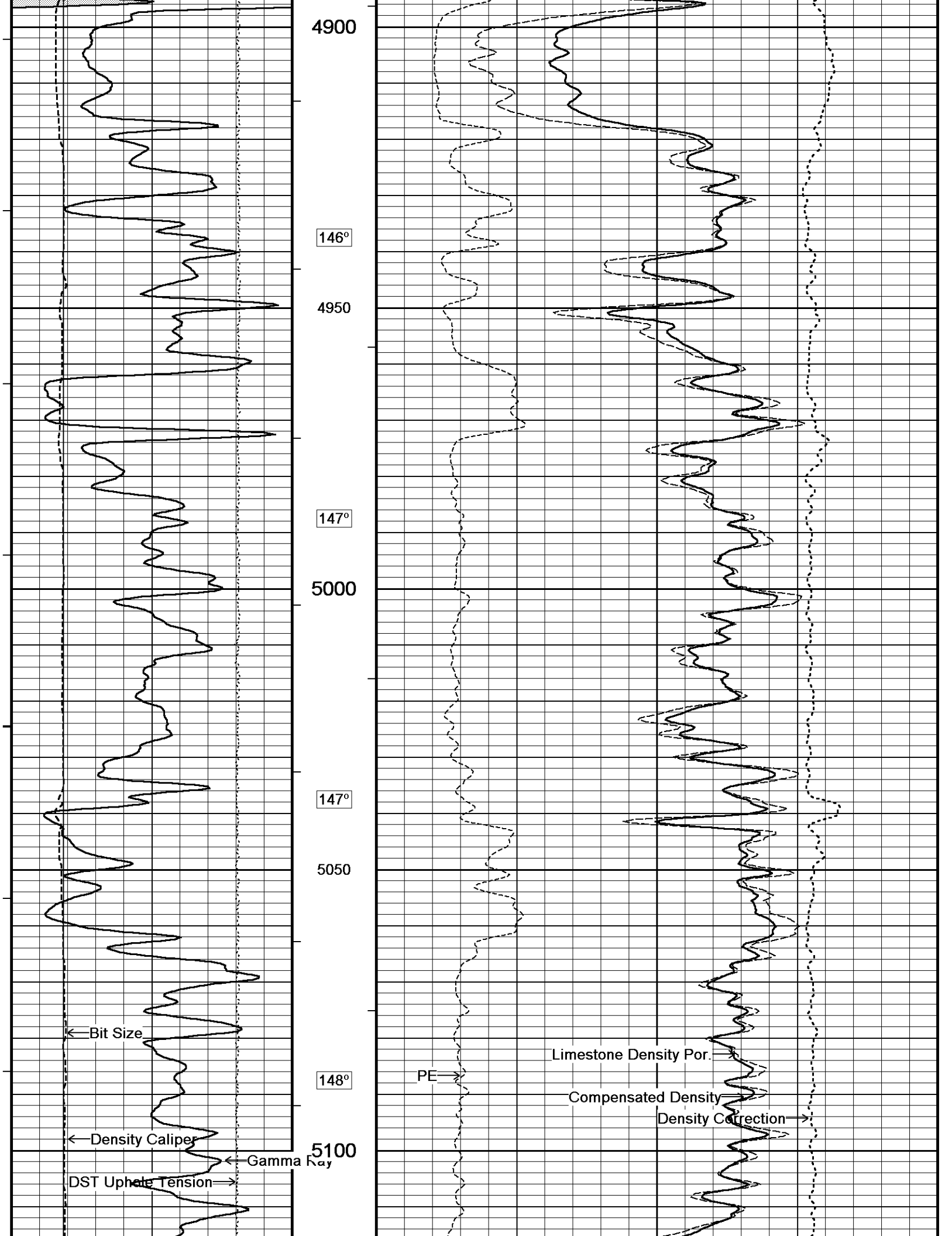

3800
137°
3850
138°
Bit Size
3900
Limestone Density Por.
PE
Compensated Density
Density Correction
Density Caliper
Gamma Ray
DST Uphole Tension
138°
3950
1200
138°
4000

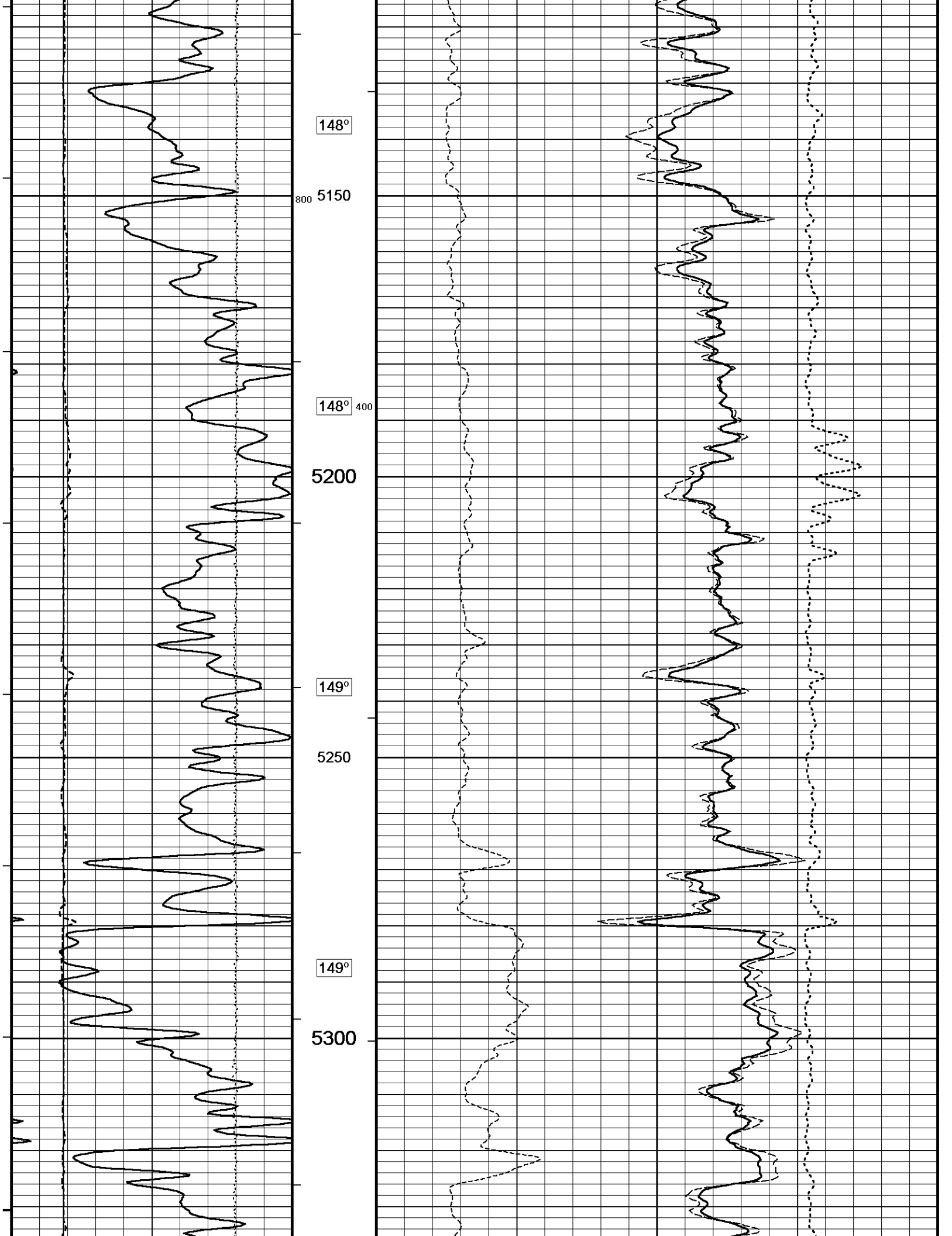

600
139°
4050
139°
4100
139°
4150
140°
4200

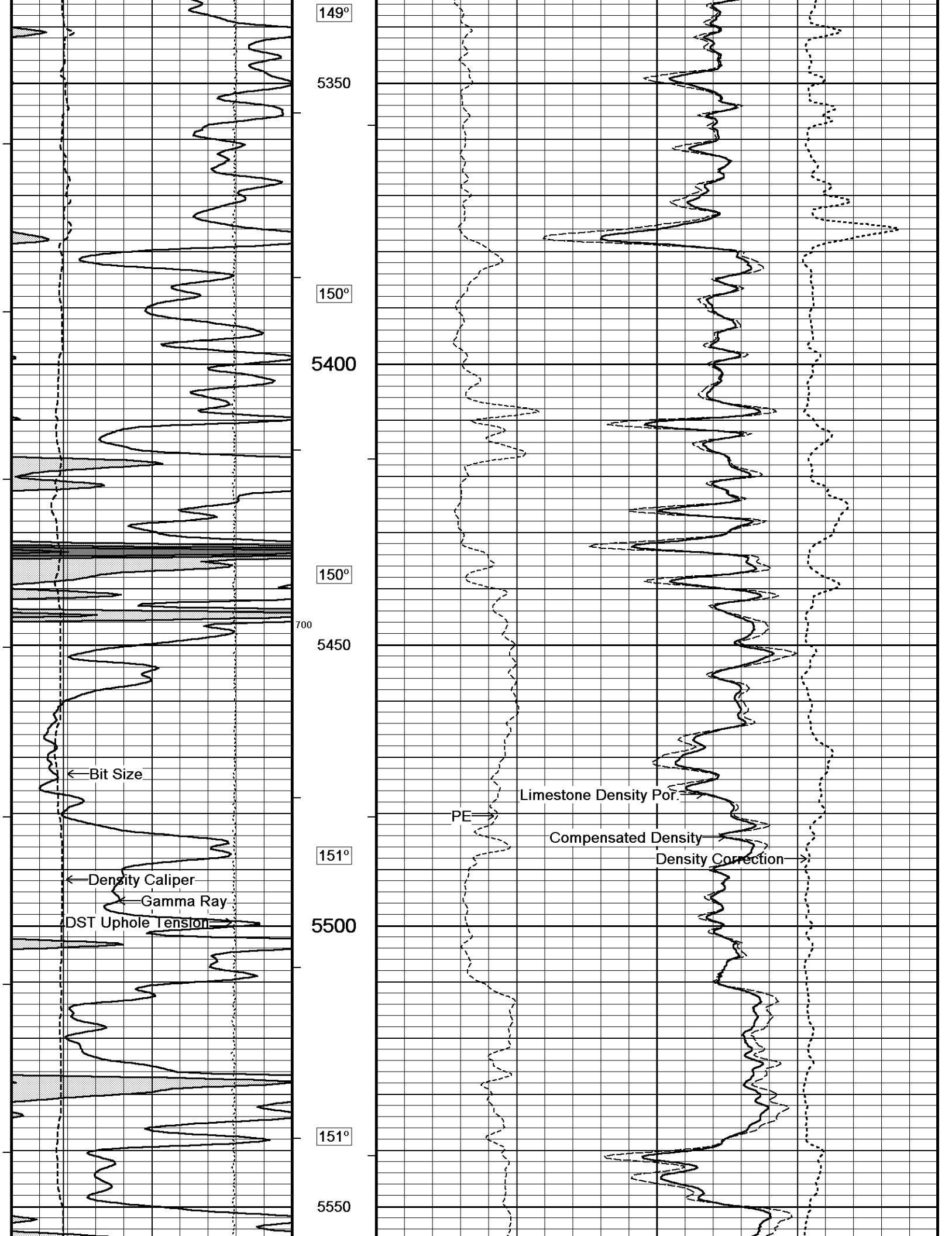

140°
4250
1100
141°
Bit Size
Limestone Density Por
PE
4300
Compensated Density
Density Correction
Density Caliper
Gamma Ray
DST Uphole Tension
141°
4350
141°
4400
142°
4450

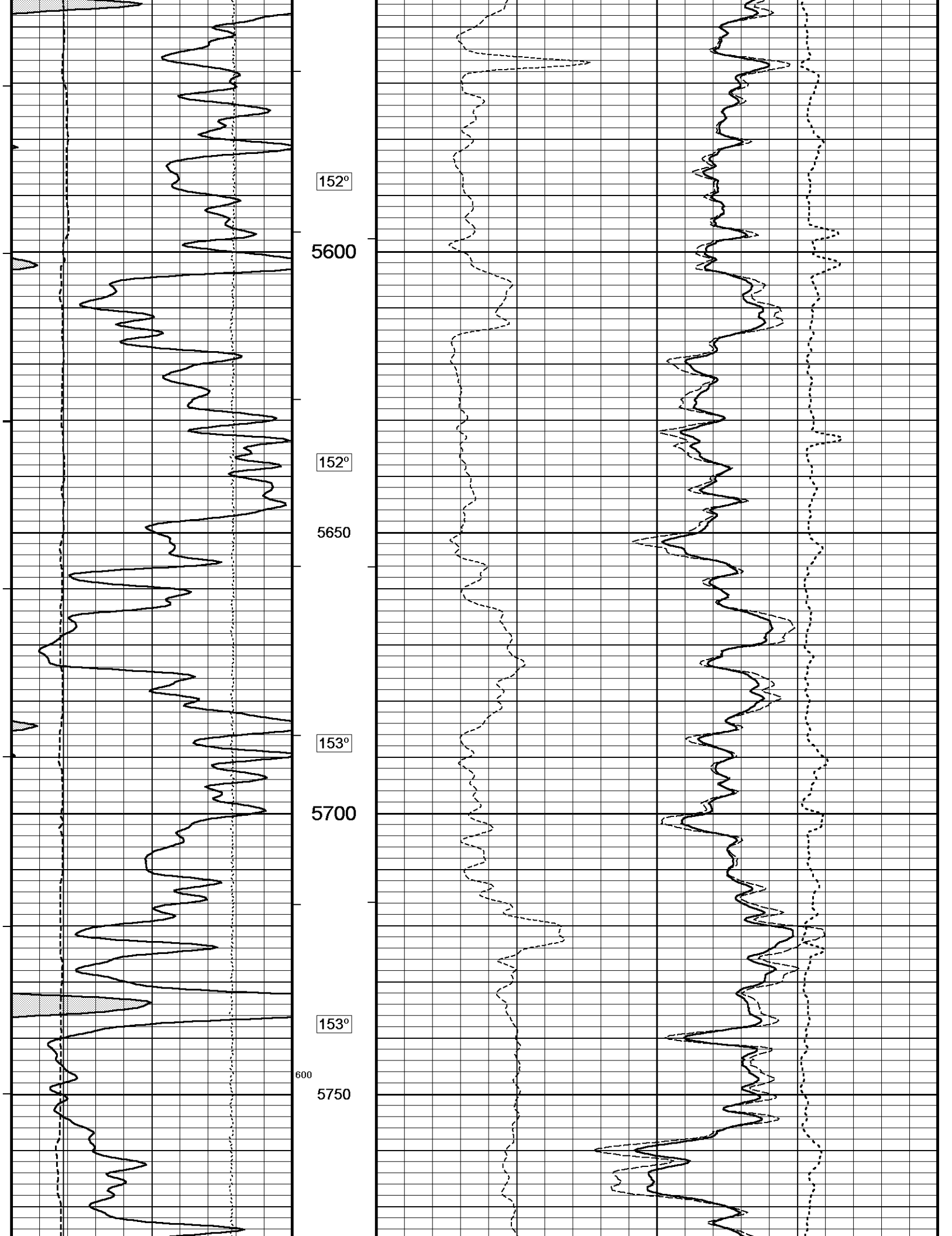

143°
4500
143°
4550
1000
144°
4600
500
144°
4650

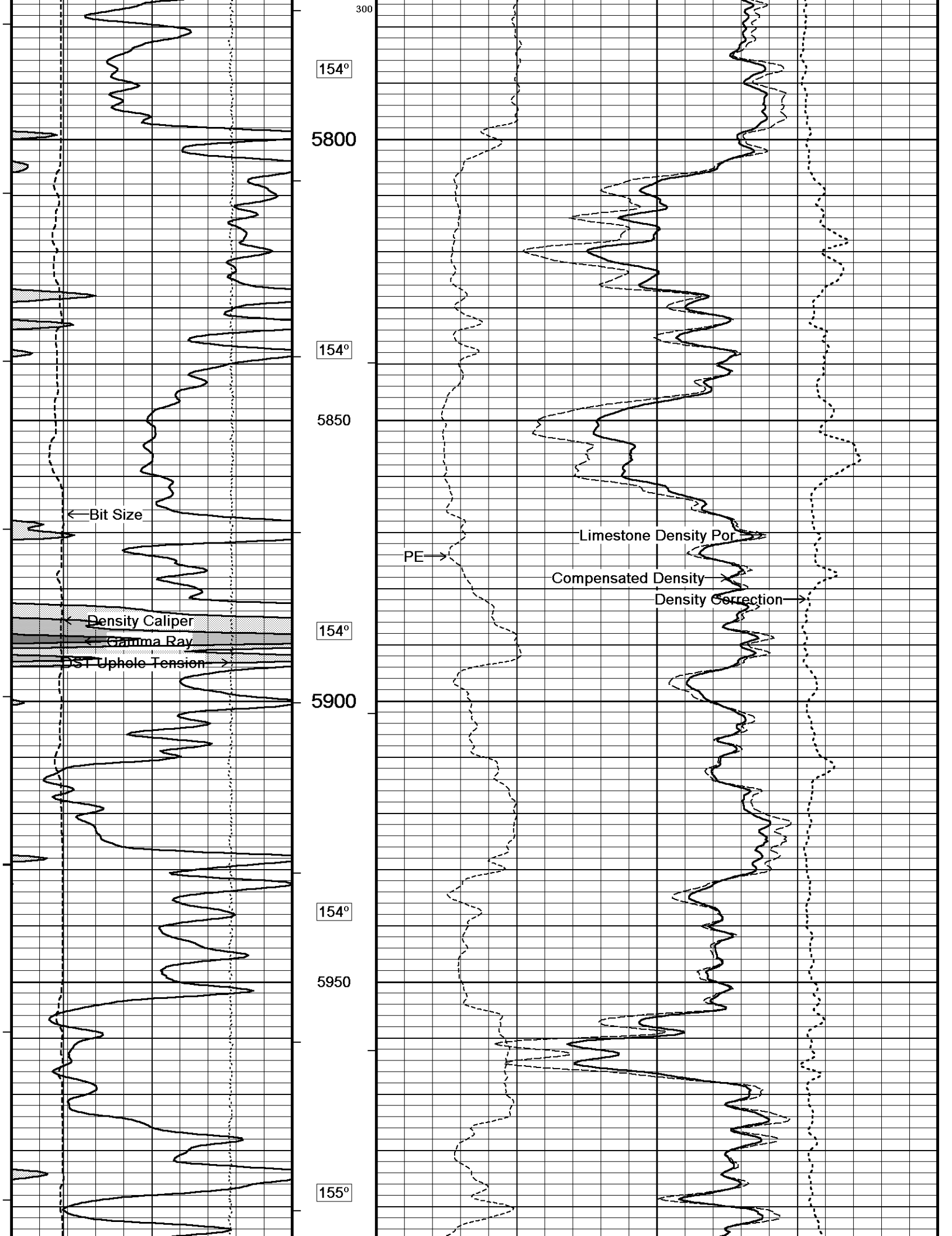

Bit Size
144°
4700
Density Caliper
Gamma Ray
DST Uphole Tension
145°
4750
145°
4800
146°
4850
900
146°
PE
Limestone Density Por.
Compensated Density
Density Correction

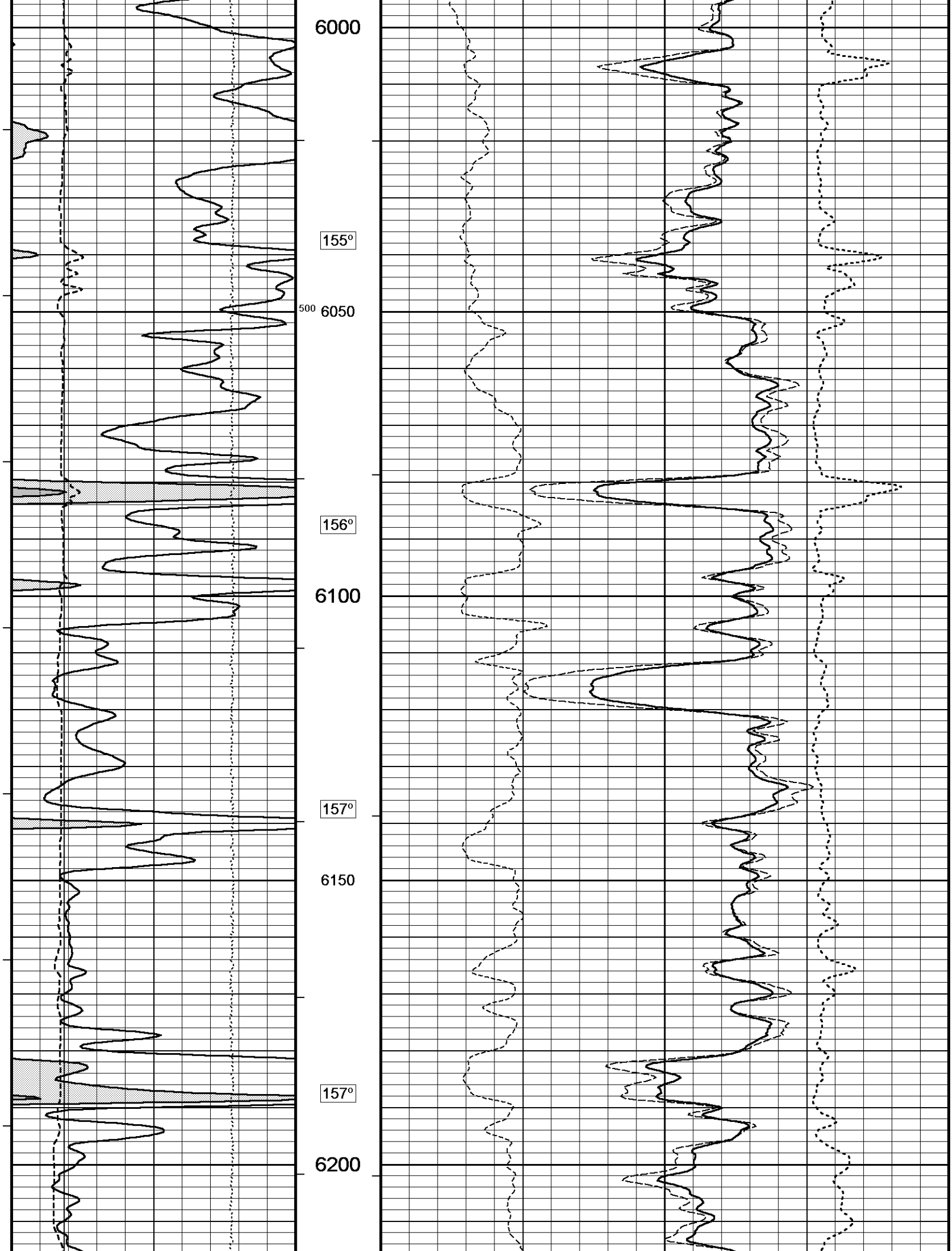

4900
146°
4950
147°
5000
147°
5050
148°
5100
Bit Size
Density Caliper
Gamma Ray
DST Uphole Tension
PE
Limestone Density Por.
Compensated Density
Density Correction

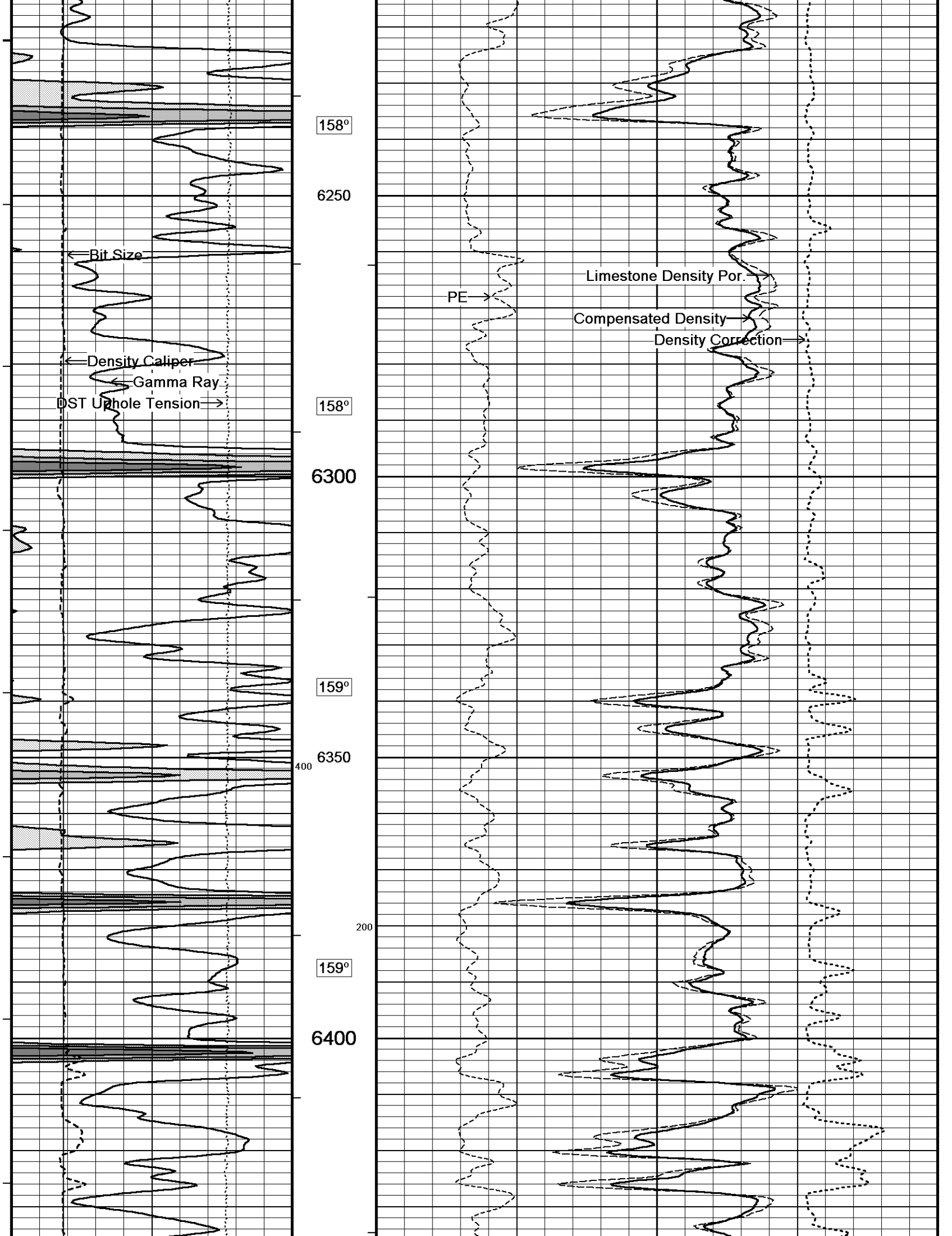

148°
800
5150
148°
400
5200
149°
5250
149°
5300

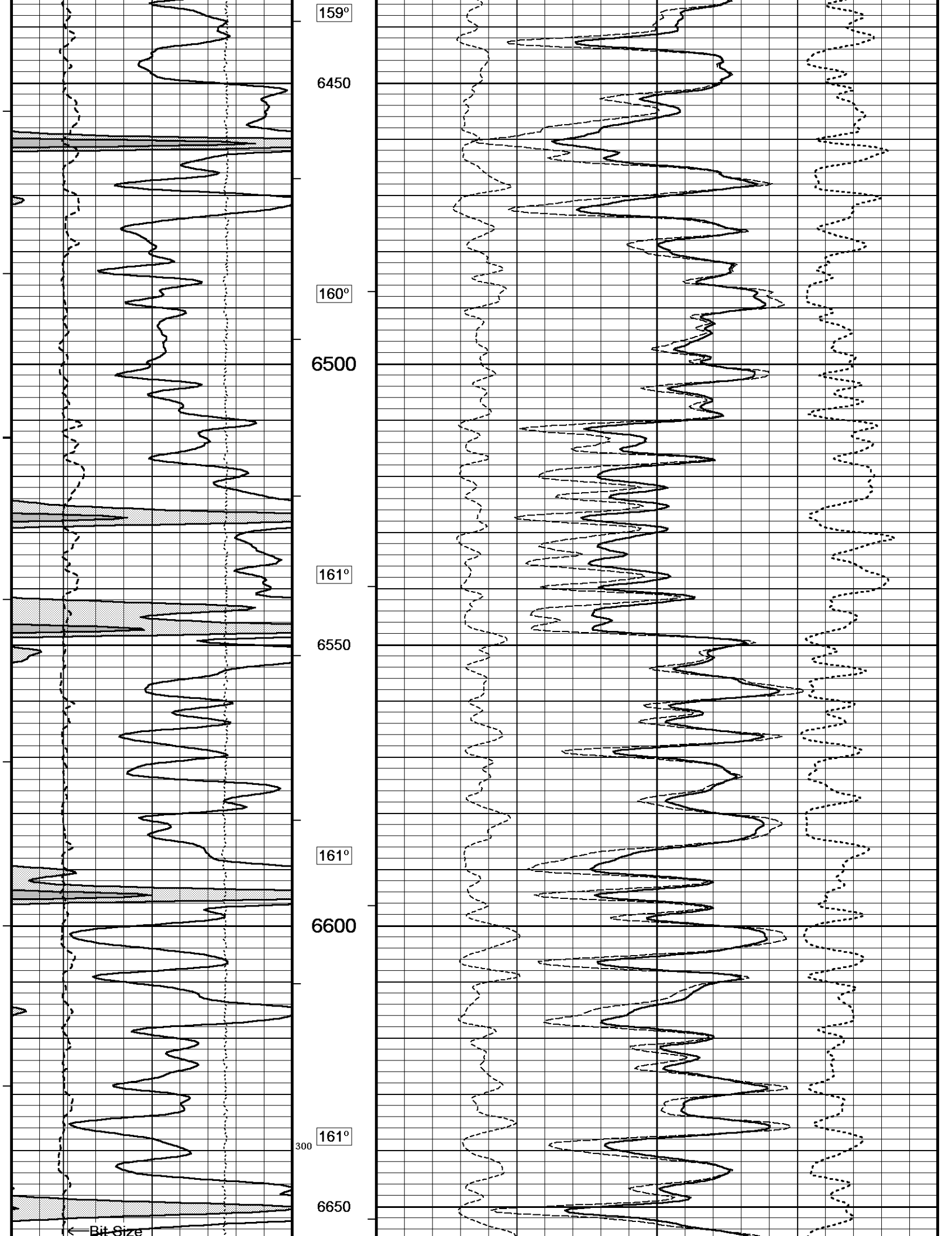

149°
5350
150°
5400
150°
700
5450
Bit Size
Limestone Density Por.
PE
Compensated Density
Density Correction
151°
Density Caliper
Gamma Ray
DST Uphole Tension
5500
151°
5550

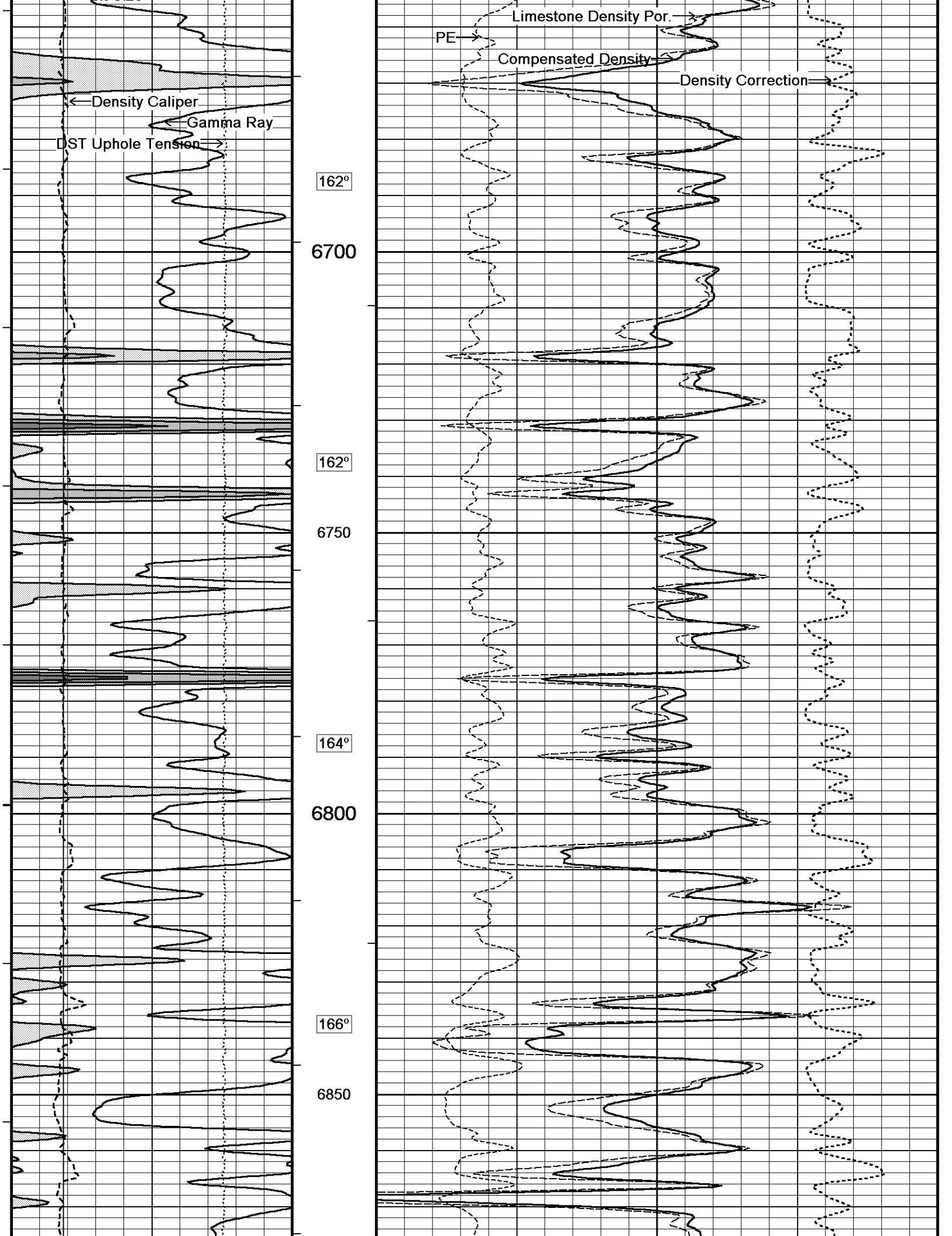

152°
5600
152°
5650
153°
5700
153°
600
5750

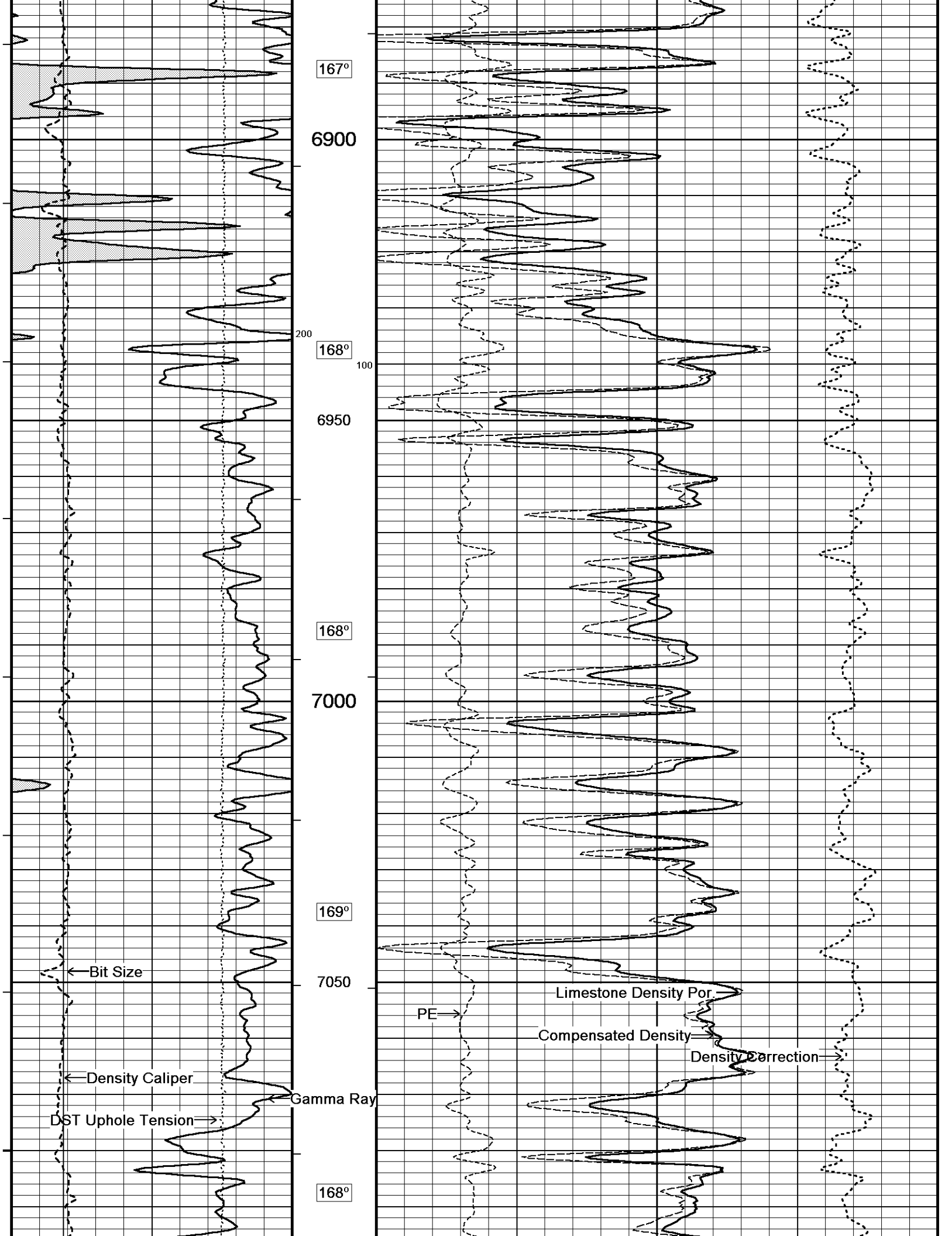

300
154°
5800
154°
5850
Bit Size
Limestone Density Por
PE
Compensated Density
Density Correction
Density Caliper
Gamma Ray
DST Uphole Tension
154°
5900
154°
5950
155°

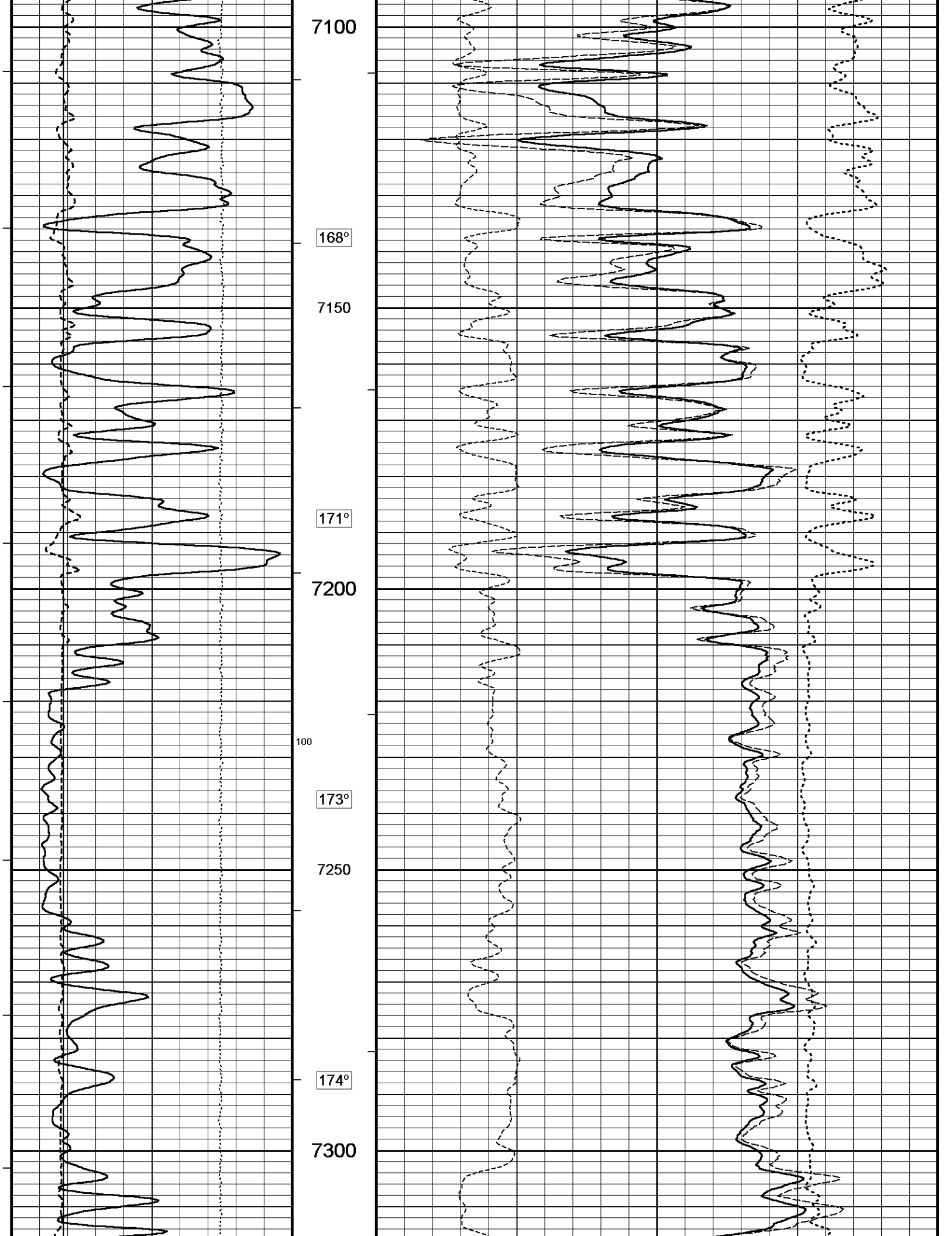

6000
155°
500
6050
156°
6100
157°
6150
157°
6200

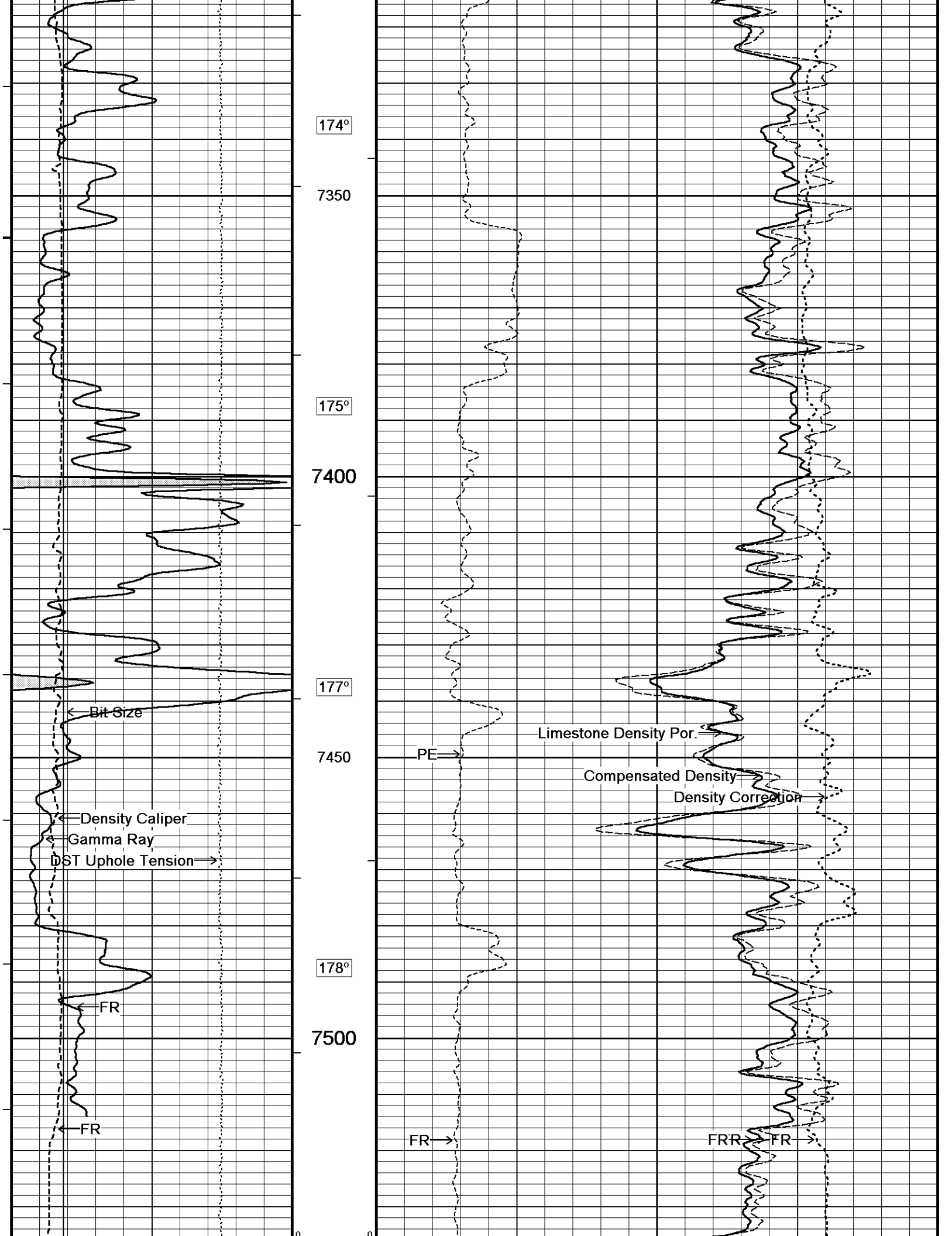

158°
6250
Bit Size
Limestone Density Por.
PE
Compensated Density
Density Correction
Density Caliper
Gamma Ray
DST Uphole Tension
158°
6300
159°
6350
400
200
159°
6400

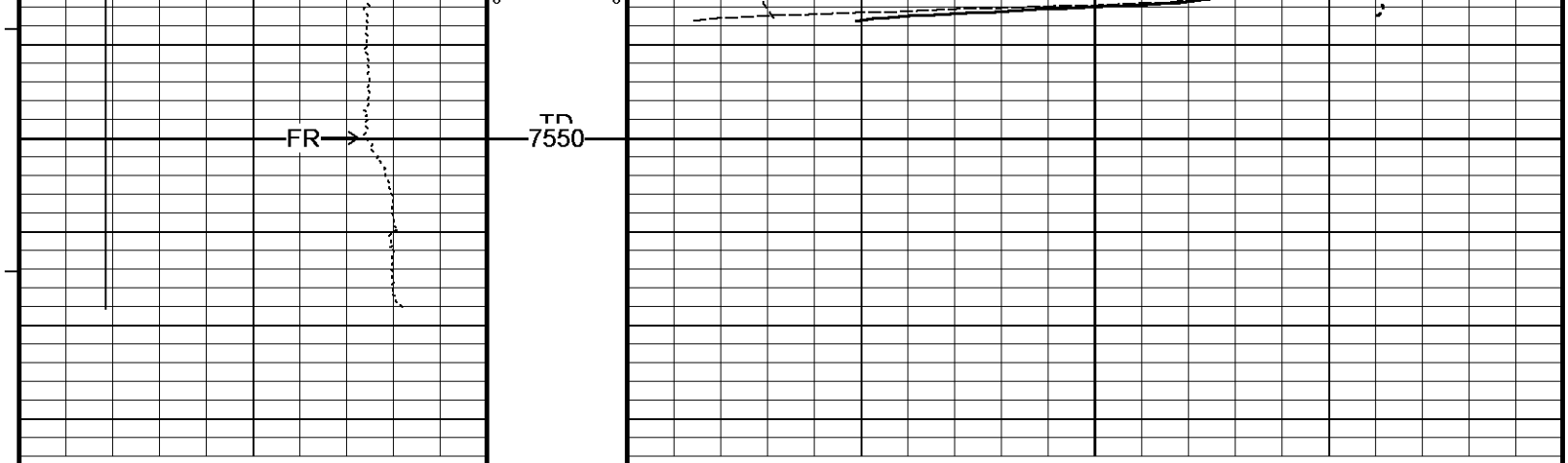

159°
6450
160°
6500
161°
6550
161°
6600
161°
300
6650
Bit Size


Limestone Density Por.
PE
Compensated Density
Density Correction
Density Caliper
Gamma Ray
DST Uphole Tension
162°
6700
162°
6750
164°
6800
166°
6850


167°
6900
200
168°
100
6950
168°
7000
169°
7050
168°
Bit Size
Density Caliper
Gamma Ray
DST Uphole Tension
PE
Limestone Density Por
Compensated Density
Density Correction


7100
168°
7150
171°
7200
100
173°
7250
174°
7300


174°
7350
175°
7400
177°
7450
178°
7500
Bit Size
Density Caliper
Gamma Ray
DST Uphole Tension
FR
FR
PE
FR
Limestone Density Por.
Compensated Density
Density Correction
FR
FR



Depth in Feet

Timing Marks
every 60.0 sec

Gamma Ray
API
0 75 150
150 225 300

Density Caliper
inches
6 11 16

Bit Size
inches
6 11 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

Compensated Density
grams/cc
2 2.25 2.50 2.75 3

Limestone Density Por.
percent
30 20 10 0 -10

PE
barns/electron
0 5 10

Density Correction
grams/cc
-0.50 0 0.50

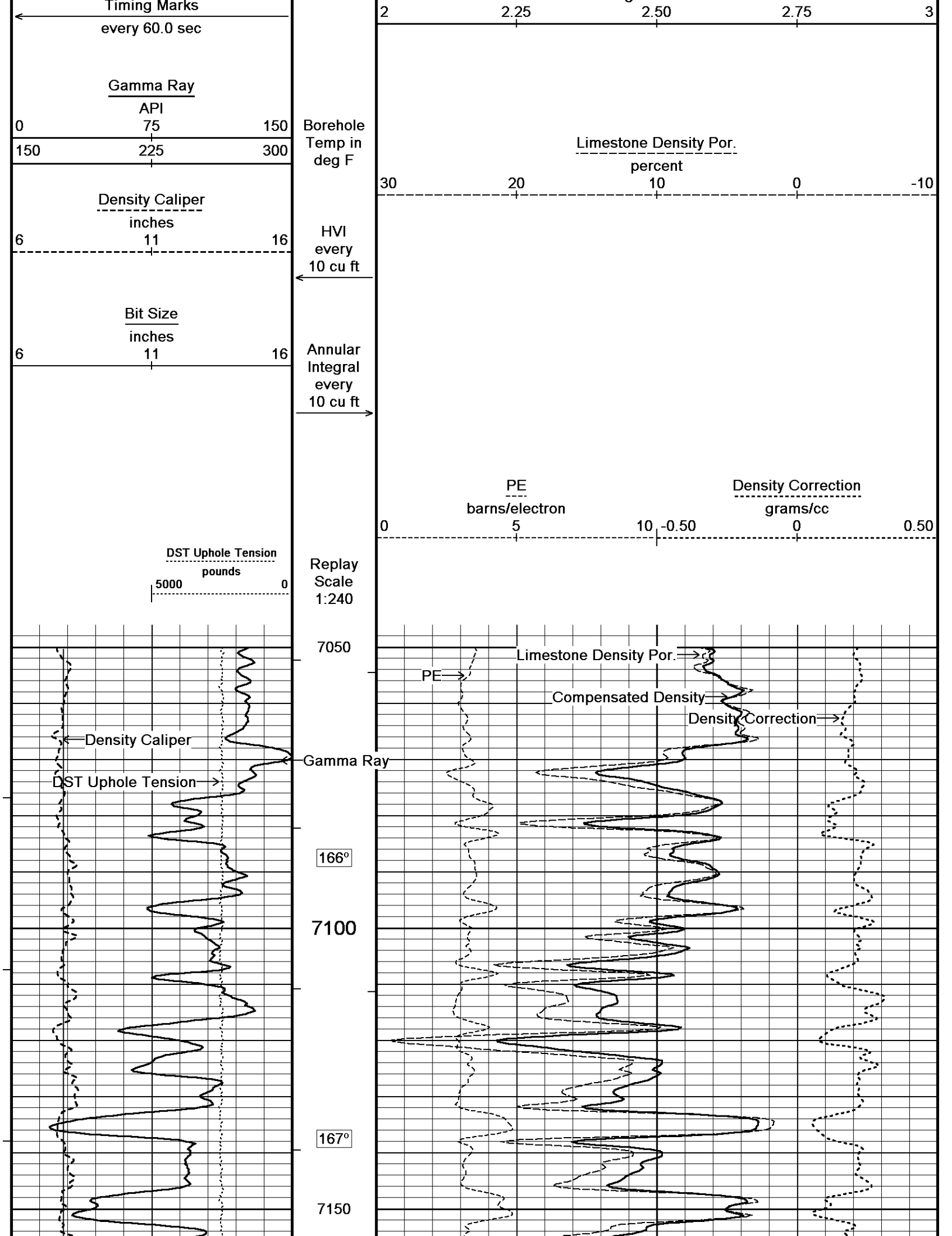
Depth Based Data - Maximum Sampling Increment 10.0cm
Plotted on 09-NOV-2017 05:15
Filename: C:\Minimus 17.03.9700\Data\K3 Sorenson #4-3\K3 Sorenson #4-3_003.dta
Recorded on 09-NOV-2017 00:16
System Versions: Logged with 17.03.9700 Plotted with 17.03.9700

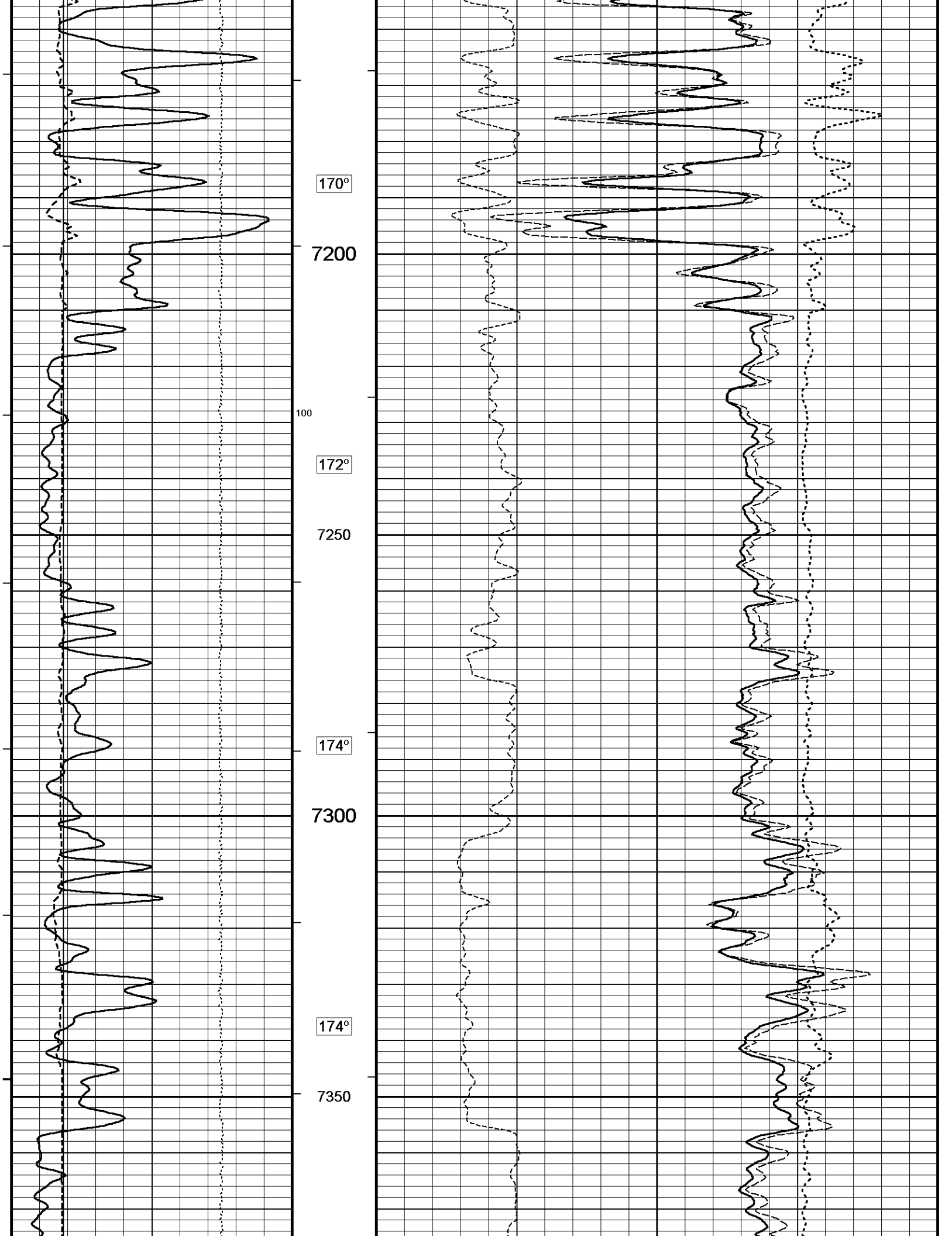
5 INCH BULK DENSITY MAIN

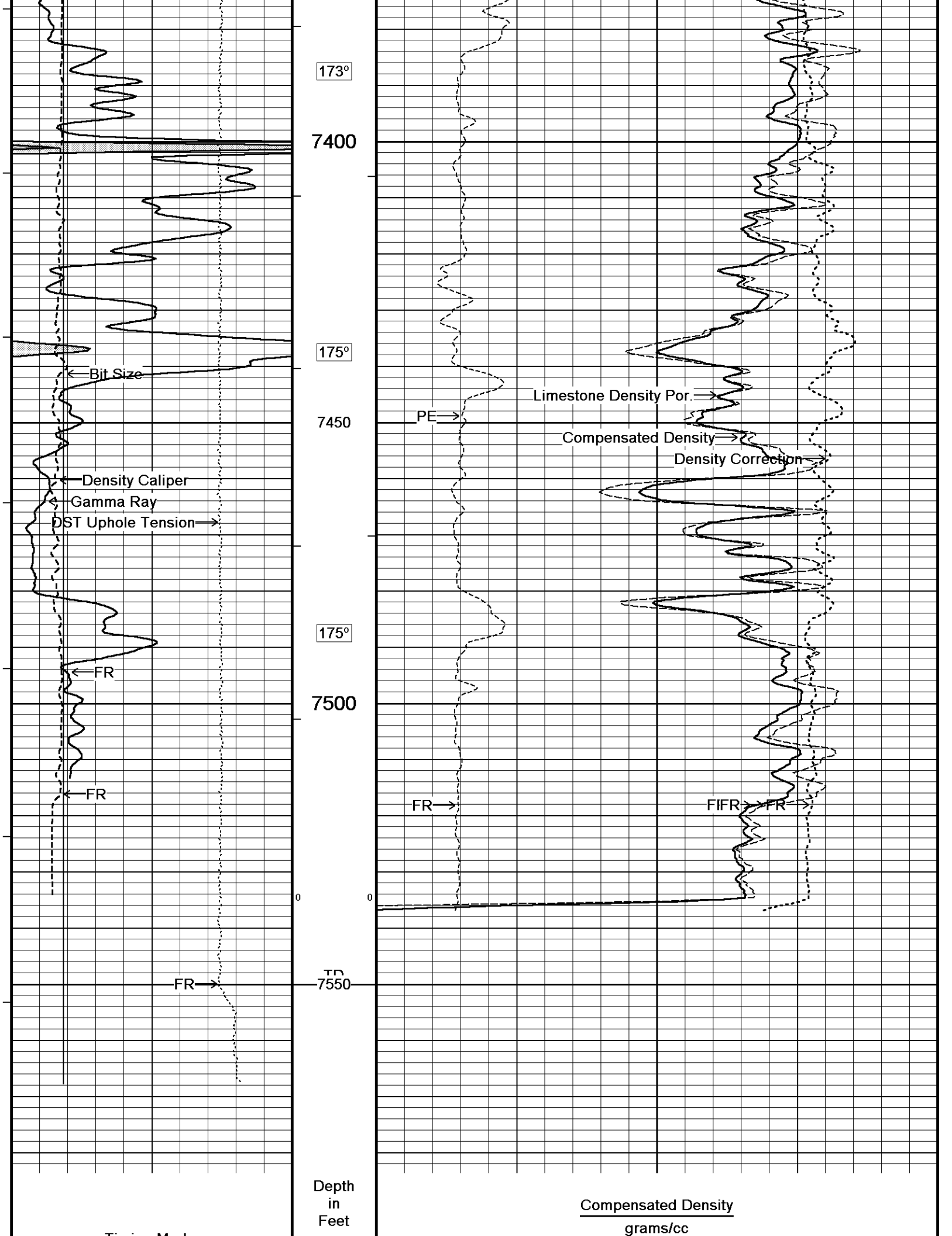
REPEAT SECTION

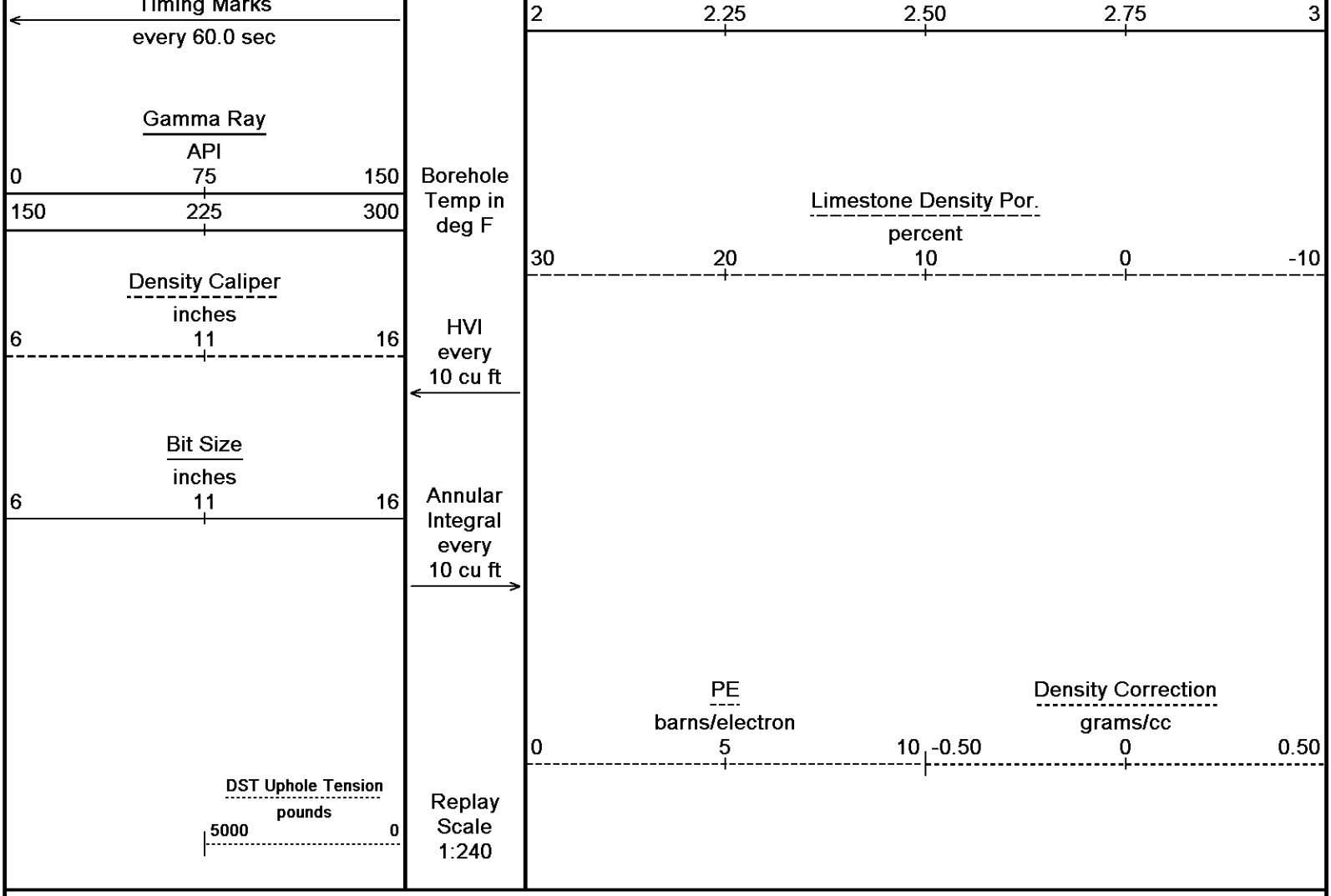
Depth Based Data - Maximum Sampling Increment 10.0cm
Plotted on 09-NOV-2017 05:15
Filename: C:\Minimus 17.03.9700\Data\K3 Sorenson #4-3\K3 Sorenson #4-3_002.dta
Recorded on 08-NOV-2017 23:42
System Versions: Logged with 17.03.9700 Plotted with 17.03.9700

Depth in Feet
Compensated Density
grams/cc


Timing Marks
every 60.0 sec
Gamma Ray
API
0
75
150
150
225
300
Density Caliper
inches
6
11
16
Bit Size
inches
6
11
16
Borehole Temp in deg F
HVI every 10 cu ft
Annular Integral every 10 cu ft
DST Uphole Tension
pounds
5000
0
Replay Scale 1:240
2
2.25
2.50
2.75
3
Limestone Density Por.
percent
30
20
10
0
-10
PE
barns/electron
0
5
10
Density Correction
grams/cc
-0.50
0
0.50
7050
7100
7150
166°
167°
Density Caliper
Gamma Ray
DST Uphole Tension
Limestone Density Por.
PE
Compensated Density
Density Correction


170°
7200
100
172°
7250
174°
7300
174°
7350


173°
7400
175°
Bit Size
7450
Density Caliper
Gamma Ray
DST Uphole Tension
175°
FR
7500
FR
FR
7550
TD
Depth
in
Feet
Limestone Density Por.
PE
Compensated Density
Density Correction
FR
FIFR
FR
0
0
Compensated Density
grams/cc



Depth Based Data - Maximum Sampling Increment 10.0cm — Plotted on 09-NOV-2017 05:15

Filename: C:\Minimus 17.03.9700\Data\K3 Sorenson #4-3\K3 Sorenson #4-3_002.dta — Recorded on 08-NOV-2017 23:42

System Versions: Logged with 17.03.9700 Plotted with 17.03.9700

REPEAT SECTION

BEFORE SURVEY CALIBRATION

C:\Minimus 17.03.9700\Data\K3 Sorenson #4-3\K3 Sorenson #4-3_002.dta

General Constants All 000

Last Edited on 08-NOV-2017,09:45

General Parameters		
Mud Resistivity	1.760	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	Crossplot Porosity	
Resistivity used	Array Ind. One 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 03-NOV-2017 15:03

Reading No	Measured	Calibrated (lbs)

1	-64.04	0.00
2	-2337.74	481.00

Gamma Calibration MCG-C 84

Field Calibration on 05-NOV-2017 09:45

	Measured	Calibrated (API)
Background	97	67
Calibrator (Gross)	758	523
Calibrator (Net)	661	456

Gamma Calibration Tolerances MCG-C 84

Ratio	1.449	1.40 1.475 1.55	Counts/API

Gamma Constants MCG-C 84

Last Edited on 08-NOV-2017,07:35

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	%

SP Calibration MCG-C 84

Field Calibration on 27-OCT-2017,07:20

	Measured	Calibrated (mV)
Reference 1	104.4	100.1
Reference 2	-95.8	-100.1

High Resolution Temperature Calibration MCG-C 84

Field Calibration on 27-OCT-2017,07:21

	Measured	Calibrated(Deg F)
Lower	50.00	50.00
Upper	212.00	212.00

High Resolution Temperature Constants MCG-C 84

Last Edited on 30-AUG-2017,13:52

Pre-filter Length	11

Micro Normal and Micro Inverse Calibration MML-A 7

Base Calibration on 23-OCT-2017 14:05
Field Check on 03-NOV-2017 15:31

	Resistor 1 (ohm)	Resistor 2 (ohm)
	10.0	50.0

Base Calibration

	Measured		Calibrated (ohm-m)	
Micro Normal	10.1	50.4	5.1	25.6
Micro Inverse	10.0	50.1	3.4	16.9

Channel	Base Check (ohm-m)	Field Check (ohm-m)
Micro Normal	76.7	76.7
Micro Inverse	51.0	51.0

Micro Normal & Micro Inverse Calibration Tolerance MML-A 7

Micro Normal Res. 1	10.1	-5% 10.0 +5%	ohm	Micro Normal Res. 2	50.4	-5% 50.0 +5% ohm
Micro Inverse Res. 1	10.0	-5% 10.0 +5%	ohm	Micro Inverse Res. 2	50.1	-5% 50.0 +5% ohm

Micro Normal Base Check	76.7	-2% 76.57 +2%	ohm-m
Micro Inverse Base Check	51.0	-2% 50.96 +2%	ohm-m
Micro Normal Field Check	76.7	-2% 76.7 +2%	ohm-m
Micro Inverse Field Check	51.0	-2% 51.0 +2%	ohm-m

Micro Normal and Micro Inverse Constants MML-A 7

Last Edited on 08-NOV-2017,07:35

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	N/A	inches

Standoff Offset N/A inches

Caliper Calibration MML-A 7

Base Calibration on 23-OCT-2017 13:59
Field Calibration on 03-NOV-2017 15:29

Base Calibration

Reading No	Measured	Calibrator Size (in)
1	14085	5.98
2	17580	7.97
3	20846	9.86
4	24750	11.92
5	0	0.00
6	N/A	N/A

Field Calibration

Measured Caliper (in)	Actual Caliper (in)
8.11	8.10

Caliper Calibration Tolerances MML-A 7

		7.90	8.10	8.30	
Short Arm Field Cal.	8.11				in

Neutron Calibration MDN-A.B 114

Base Calibration on 25-OCT-2017 16:20
Field Check on 05-NOV-2017 09:48

Base Calibration

	Measured Near	Measured Far	Calibrated (cps) Near	Calibrated (cps) Far
	3039	94	3714	110
Ratio	32.458		33.764	

Field Calibrator at Base

	Calibrated (cps)	
	2150	3142
Ratio	0.684	

Field Check

	Calibrated (cps)	
	2141	3120
Ratio	0.686	

Neutron Calibration Tolerances MDN-A.B 114

		-5%	33	+5%
Ratio	32.458			

		0.65	0.7	0.75
Base Check	0.684			

		0.664	0.684	0.704
Field Check	0.686			

Neutron Constants MDN-A.B 114

Last Edited on 08-NOV-2017,07:35

Neutron Source Id	P0204NN	
Neutron Jig Number	NJ5736	
Air Hole Processing	Modified Ratio	
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 23-OCT-2017 13:20
Field Check on 06-NOV-2017 11:50

Resistor 1 (ohm)	Resistor 2 (ohm)
0.0	1000.0

Base Calibration

	Measured	Calibrated (ohm-m)
Reference 1	0.0	0.0
Reference 2	963.8	126.8
Base Check		281.3
Field Check		281.2

FE Calibration Tolerances MFE-B.J 352

Reference 2	963.8	-3% 980.0 +3%	ohm
Base Check	281.3	-2% 277.0 +2%	ohm-m
Field Check	281.2	-2% 281.3 +2%	ohm-m

FE Constants MFE-B.J 352

Last Edited on 08-NOV-2017,07:34

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 08-NOV-2017,07:34

Maximum Boundary Contrast	100.00	micro-sec/ft
Fluid Transit Time	189.00	micro-sec/ft
Limestone Transit Time	47.50	micro-sec/ft
Sandstone Transit Time	55.50	micro-sec/ft
Dolomite Transit Time	43.50	micro-sec/ft
Sonic used for Porosities	3-5' Compensated Sonic	
Correction for Sonde Skew	Applied	
Cycle Stretch Algorithm	Applied	
MN3FT	N/A	micro-sec
MX3FT	N/A	micro-sec
Hunt-Raymer Constant	83.13	micro-sec/ft
Sonde Mode	Compensated	
Hole Type	Open Hole	

Sonde Parameters

	Measured	Calibrated
Offset	N/A	0.0000
Free Pipe	N/A	N/A

Peak Amplitude Source: N/A

Waveform	Start Time (micro-sec)	Width (micro-sec)	Pre Gain	Start Gain	Discriminator (mV)
3'	N/A	N/A	N/A	N/A	N/A
4'	N/A	N/A	N/A	N/A	N/A
5'	N/A	N/A	N/A	N/A	N/A
6'	N/A	N/A	N/A	N/A	N/A

Processed Fixed Gate Parameters

Waveform Used For Processing: N/A

Start Time (micro-sec)	End Time (micro-sec)	Discriminator (mV)	N/A
N/A	N/A	N/A	
N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A
N/A	N/A	N/A	

Full Waveform Parameters

Use 3' Waveform to derive TR	N/A
Use 4' 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
Waveform Discriminator Filter	N/A	
Semblance Window Width	N/A	micro-sec
Sonic Despiker	N/A	N/A

High Resolution Temperature Calibration MAI-A.A 111

Field Calibration on 01-OCT-2017,14:58

	Measured	Calibrated(Deg F)
Lower	50.00	50.00
Upper	212.00	212.00

High Resolution Temperature Constants MAI-A.A 111

Last Edited on 26-JUN-2014,15:06

Pre-filter Length	11

Induction Calibration MAI-A.A 111

Factory Loop Calibration 03-NOV-2017 04:57
Field Check on 05-NOV-2017 09:34

Factory Loop Calibration

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

	Measured Signal (unitless)		Reference Conductivity (mmho/m)		Calibration	
Array	Low	High	Low	High	Gain	Offset
1 (near)	17.6	473.6	9.3	966.2	0.0	0.0
2	6.4	385.9	7.6	821.4	0.0	0.0
3	3.2	264.0	5.2	566.0	0.0	0.0
4 (far)	2.1	135.5	2.6	279.2	0.0	0.0

Array Temperature 23.0 Deg F

Tool Checks

	Factory Reference (mmho/m)		Before Survey (mmho/m)		
Array	Low	High	Low	High	
1 (near)	10.7	3840.6	10.6	3840.6	
2	28.8	3498.9	28.7	3499.1	
3	28.2	2996.4	28.1	2996.7	
4 (far)	18.5	2041.3	18.5	2041.9	
Array Temperature	65.6		63.9		Deg F

Induction Check Tolerances MAI-A.A 111

Low Array 1	10.6	9.2 / 10.7 / 12.2	mmho/m	High Array 1	3840.6	3839.1 / 3840.6 / 3842.1 mmho/m
Low Array 2	28.7	27.3 / 28.8 / 30.3	mmho/m	High Array 2	3499.1	3497.4 / 3498.9 / 3500.4 mmho/m
Low Array 3	28.1	26.7 / 28.2 / 29.7	mmho/m	High Array 3	2996.7	2994.9 / 2996.4 / 2997.9 mmho/m
Low Array 4	18.5	17.0 / 18.5 / 20.0	mmho/m	High Array 4	2041.9	2039.8 / 2041.3 / 2042.8 mmho/m

Induction Constants MAI-A.A 111

Last Edited on 08-NOV-2017,07:34

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	
Borehole Correction Method	Default	
Squashes Start	0.0020	mhos/metre

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	

Photo Density Calibration MPD-C.A 216

Base Calibration on 23-OCT-2017 14:37
Field Check on 06-NOV-2017 11:49

Density Calibration

Base Calibration	Measured Near	Measured Far	Calibrated (sdu) Near	Calibrated (sdu) Far
Background	1025	1218		
Reference 1	51146	24580	59556	30836
Reference 2	20383	2310	24941	2541

Field Check at Base

	1024.7	1217.9

Field Check

	1021.0	1211.5

PE Calibration

Base Calibration	Measured WS	Measured WH	Ratio	Calibrated Ratio
Background	187	916		
Reference 1	21227	50978	0.420	0.371
Reference 2	5863	20269	0.293	0.272

Field Check at Base

	187.1	916.4

Field Check

	185.7	907.5

Photo Density Calibration Tolerances MPD-C.A 216

Near Density Ratio	2.59	-5% 2.52 +5%	Far Density Ratio	21.38	-5% 21.00 +5%
PE Calibration	0.118	0.089 0.110 0.131			
Near Den. Field Check	1021.0	-3% 1024.7 +3%	Far Den. Field Check	1211.5	-3% 1217.9 +3%
PE WS Field Check	185.7	-6% 187.1 +6%	PE WH Field Check	907.5	-6% 916.4 +6%

Density Constants MPD-C.A 216

Last Edited on 08-NOV-2017 07:35

Density Constants MPD-C.A 216

Last Edited on 06-NOV-2017,07:55

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	Not 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	

Caliper Calibration MPD-C.A 216

Base Calibration on 23-OCT-2017 14:16
Field Calibration on 06-NOV-2017 12:00

Base Calibration

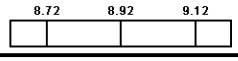
Reading No	Measured	Calibrator Size (in)
1	16832	3.99
2	27040	5.98
3	37135	7.97
4	46864	9.86
5	58032	11.92
6	N/A	N/A

Field Calibration

Measured Caliper (in)	Actual Caliper (in)
8.92	8.92

Caliper Calibration Tolerances MPD-C.A 216

Short Arm Field Cal. 8.92 in



DOWNHOLE EQUIPMENT

C:\Minimus 17.03.9700\Data\K3 Sorenson #4-3\K3 Sorenson #4-3_002.dta

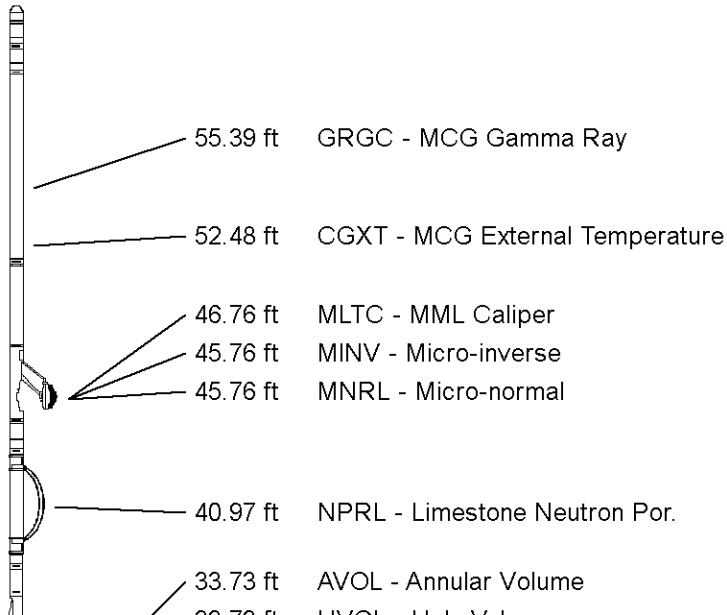
Cablehead, 11 pin
CBH-C 0 LG: 2.40 ft WT: 24.3 lb OD: 2.244 in

Compact Comms Gamma
MCG-C 84 LG: 8.70 ft WT: 63.9 lb OD: 2.244 in

Compact Micro-log
MML-A 7 LG: 7.97 ft WT: 81.6 lb OD: 2.244 in

Compact Neutron
MDN-A.B 114 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: 2.449 in

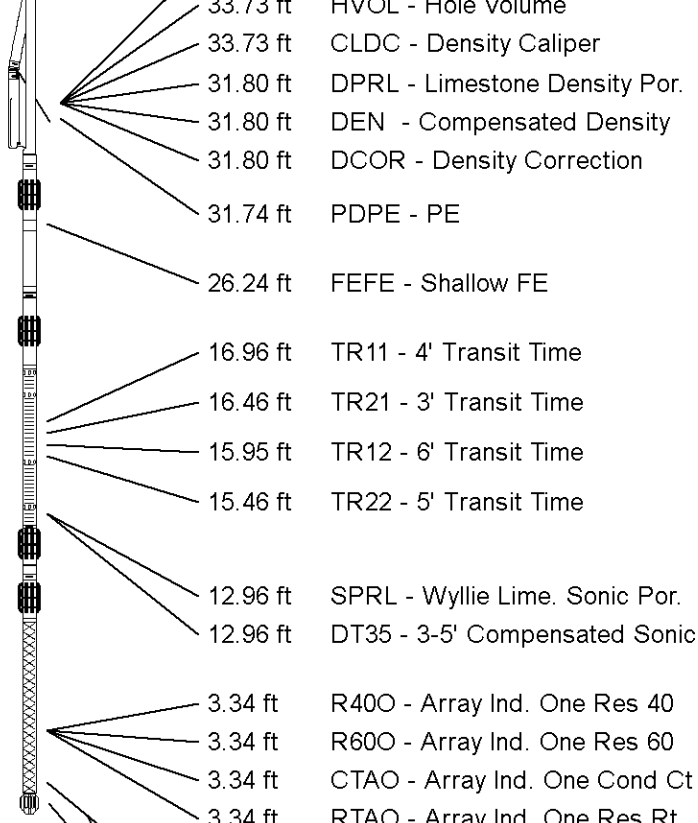


Compact Focussed Electric
MFE-B.J 352 LG: 6.05 ft WT: 48.5 lb OD: 2.244 in

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: 63.07 ft Weight: 480.6 lb



33.73 ft	HVOL - Hole Volume
33.73 ft	CLDC - Density Caliper
31.80 ft	DPRL - Limestone Density Por.
31.80 ft	DEN - Compensated Density
31.80 ft	DCOR - Density Correction
31.74 ft	PDPE - PE
26.24 ft	FEFE - Shallow FE
16.96 ft	TR11 - 4' Transit Time
16.46 ft	TR21 - 3' Transit Time
15.95 ft	TR12 - 6' Transit Time
15.46 ft	TR22 - 5' Transit Time
12.96 ft	SPRL - Wyllie Lime. Sonic Por.
12.96 ft	DT35 - 3-5' Compensated Sonic
3.34 ft	R40O - Array Ind. One Res 40
3.34 ft	R60O - Array Ind. One Res 60
3.34 ft	CTAO - Array Ind. One Cond Ct
3.34 ft	RTAO - Array Ind. One Res Rt
0.23 ft	SPCG - Spontaneous Potential
Tool Zero	(0.13ft from bottom)
-0.13 ft	SMTU - DST Uphole Tension

All measurements relative to tool zero.

COMPANY	K3 OIL & GAS OPERATING COMPANY
WELL	SORENSON #4-3
FIELD	WILDCAT
PROVINCE/COUNTY	LINCOLN
COUNTRY/STATE	U.S.A. / COLORADO

Elevation Kelly Bushing	5048	feet	First Reading	7518.00	feet
Elevation Drill Floor	5046	feet	Depth Driller	7550.00	feet
Elevation Ground Level	5030	feet	Depth Logger	7550.00	feet

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COMPENSATED NEUTRON
COMPACT PHOTO DENSITY