Weatherford

COMPACT PHOTO DENSITY COMPENSATED NEUTRON MICRORESISTIVITY LOG

COMPANY	O'BRIEN ENERGY RESOURCES CORP.
WELL	PREEDY #3-4
FIELD	ANGELL SOUTHEAST
PROVINCE/COUNTY	MEADE
COUNTRY/STATE	U.S.A. / KANSAS
LOCATION	1980' FSL & 2305' FEL

SEC 3	TWP 33S	RGE 29W	Other Services
Latitude			MAI/MFE
Longitude			
API Number	15-119-21425		

Permanent Datum GL, Elevation 2668 feet
Log Measured From KB, 13.00 feet above Permanent Datum
Drilling Measured From KB

Elevations:	feet
KB	2681.00
DF	2679.00
GL	2668.00

Date	07-SEP-2018			
Run Number	ONE			
Service Order	4558-223534615			
Depth Driller	6350.00	feet		
Depth Logger	6351.00	feet		
First Reading	6330.00	feet		
Last Reading	4000.00	feet		
Casing Driller	1528.00	feet		
Casing Logger	1530.00	feet		
Bit Size	7.875	inches		
Hole Fluid Type	CHEMICAL			
Density / Viscosity	9.10 lb/USg	58.00 CP		
PH / Fluid Loss	10.50	7.20 ml/30Min		
Sample Source	FLOWLINE			
Rm @ Measured Temp	1.18 @ 75.0	ohm-m		
Rmf @ Measured Temp	0.94 @ 75.0	ohm-m		
Rmc @ Measured Temp	1.42 @ 75.0	ohm-m		
Source Rmf / Rmc	CALC	CALC		
Rm @ BHT	0.69 @129.0	ohm-m		
Time Since Circulation	5 HOURS			
Max Recorded Temp	129.00	deg F		
Equipment / Base	13096	LIB		
Recorded By	ADAM SILL			
Witnessed By	CASEY COATS		PETE DEBENHAM	

Last Edited: 07-SEP-2018 15:29

BOREHOLE RECORD

Bit Size inches	Depth From feet	Depth To feet
7.875	1528.00	6350.00

CASING RECORD

Type	Size inches	Depth From feet	Shoe Depth feet	Weight pounds/ft
SURFACE	8.625	0.00	1528.00	24.00

REMARKS

- SOFTWARE ISSUE: WLS 18.01.6830.
- RUN ONE: MCG, MML, MDN, MPD, MFE, MAI RUN IN COMBINATION.
  - HARDWARE: DUAL BOWSPRING USED ON MDN.
  0.5 INCH STANDOFF USED ON MFE.
  0.5 INCH STANDOFF USED ON MAI.
- 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 2150 FEET: 1455 CU.FT.
- ANNULAR HOLE VOLUME WITH 4.5 INCH PRODUCTION CASING FROM TD TO 4000 FEET: 533 CU.FT.
- RIG: DUKE #7.
- ENGINEER: A. SILL

- OPERATOR: B. TOVAR, B. COPELAND.

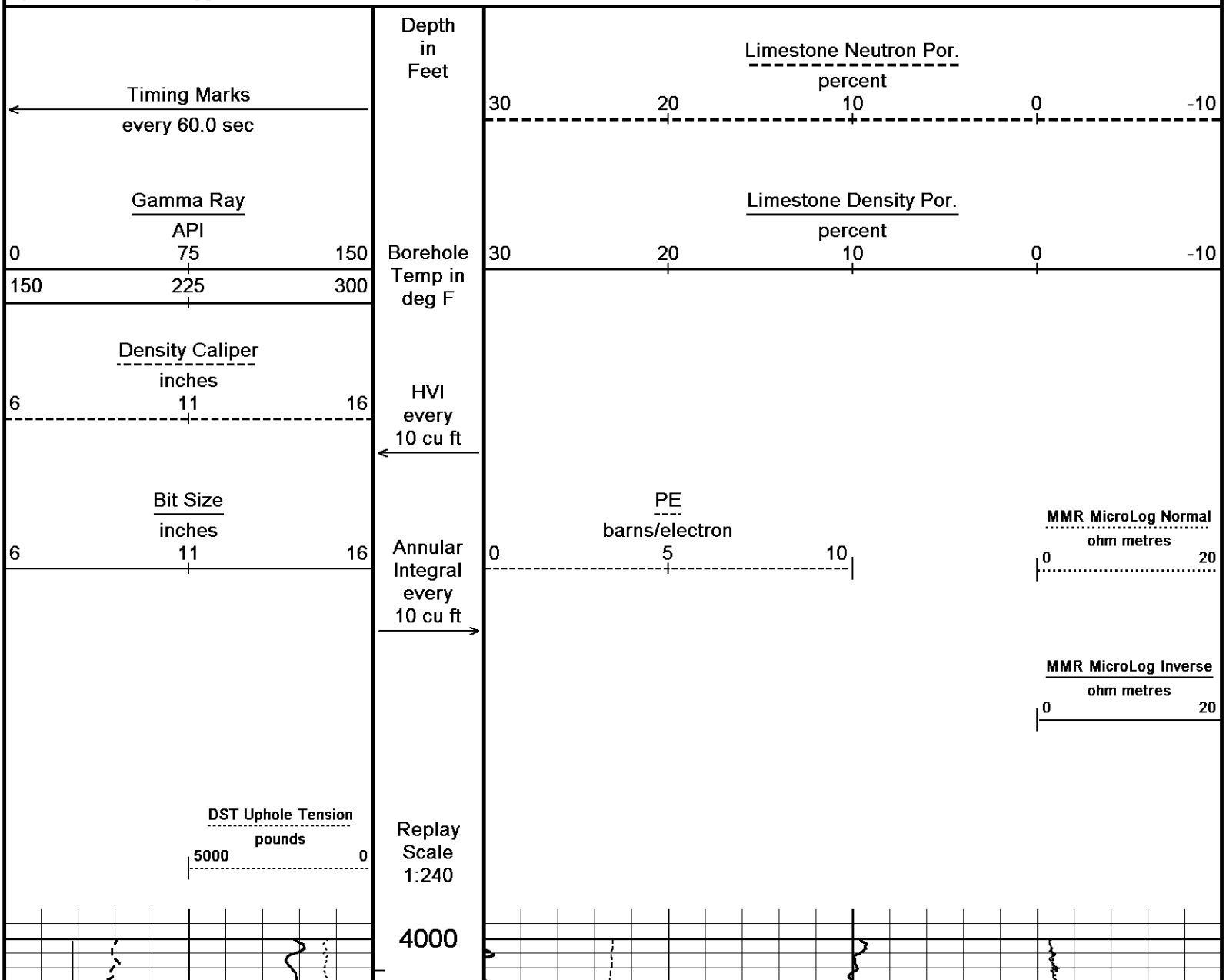
**** PULLED TIGHT SEVERAL TIMES FROM 2130 FEET TO 2100 FEET. HAD TO CLOSE CALIPERS TO PULL THROUGH THE TIGHT SPOTS. ONCE THROUGH THE TIGHT SPOTS THE DECISION WAS MADE TO KEEP CALIPERS CLOSED TO HELP AVOID ANY FURTHER TIGHT PULLS. ****

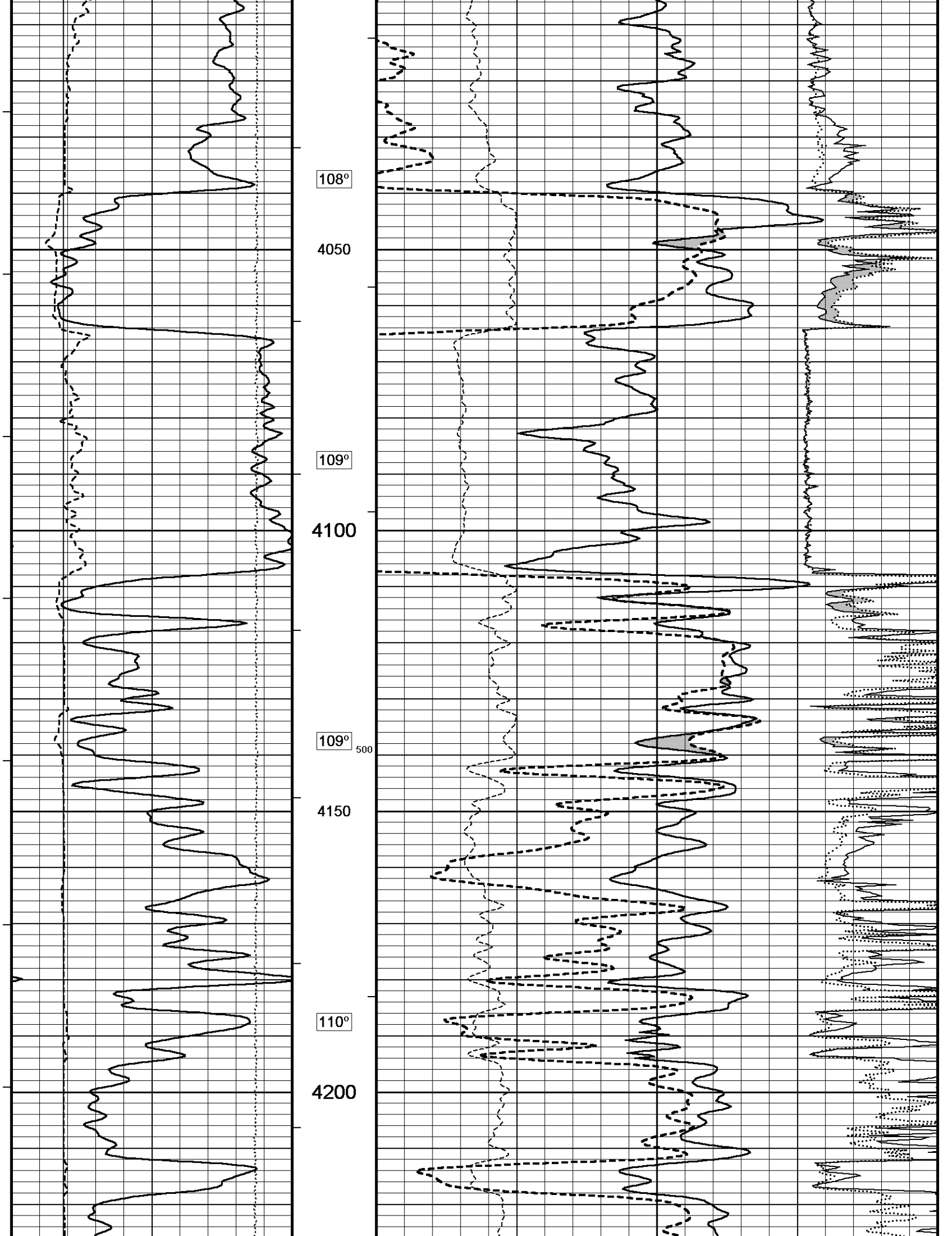
5 INCH MAIN LIMESTONE

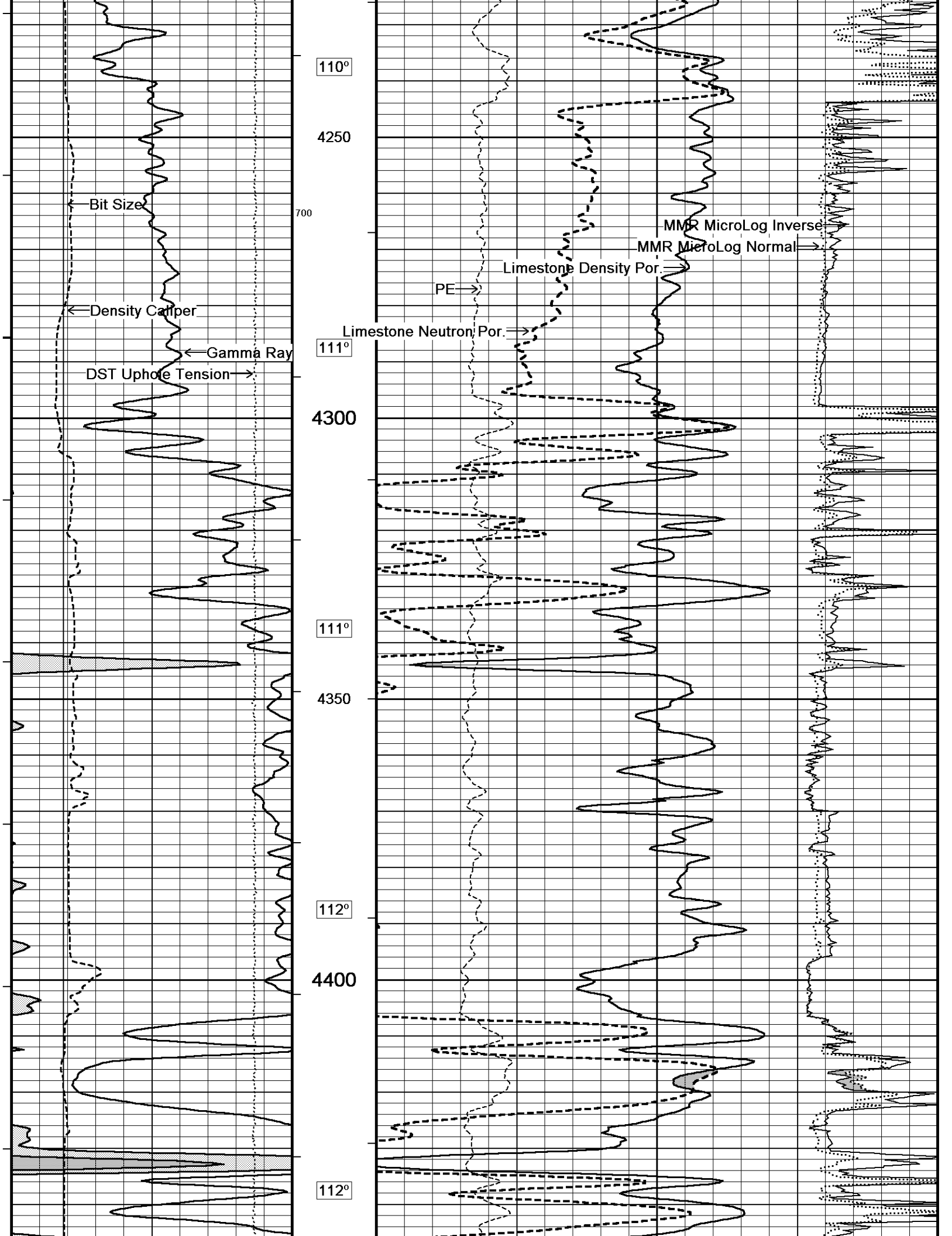
Depth Based Data - Maximum Sampling Increment 10.0cm — Plotted on 07-SEP-2018 23:02

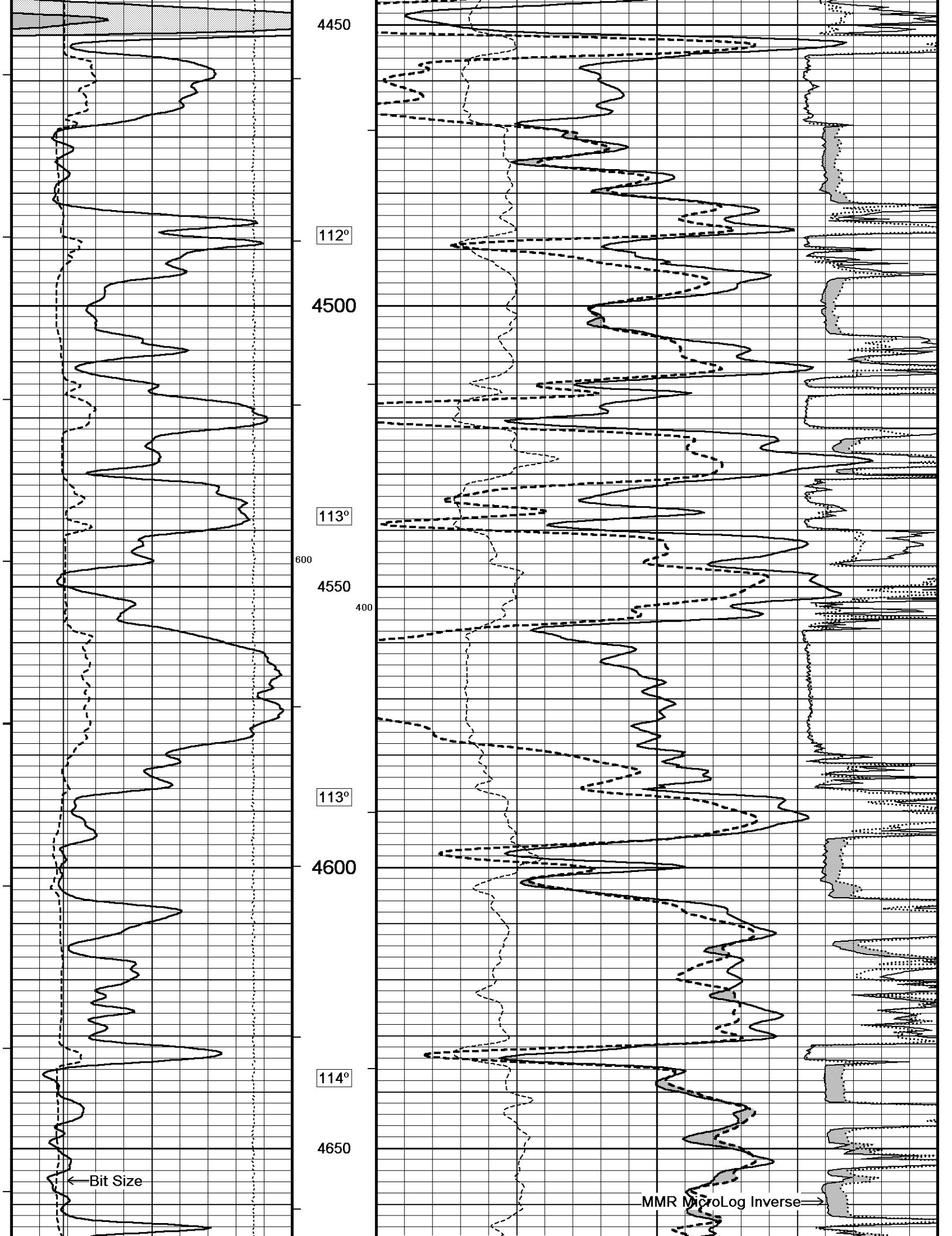
Filename: C:\Minimus 18.01.6830\Data\O'Brien Preedy #3-4\O'Brien Preedy #3-4_003.dta — Recorded on 07-SEP-2018 18:49

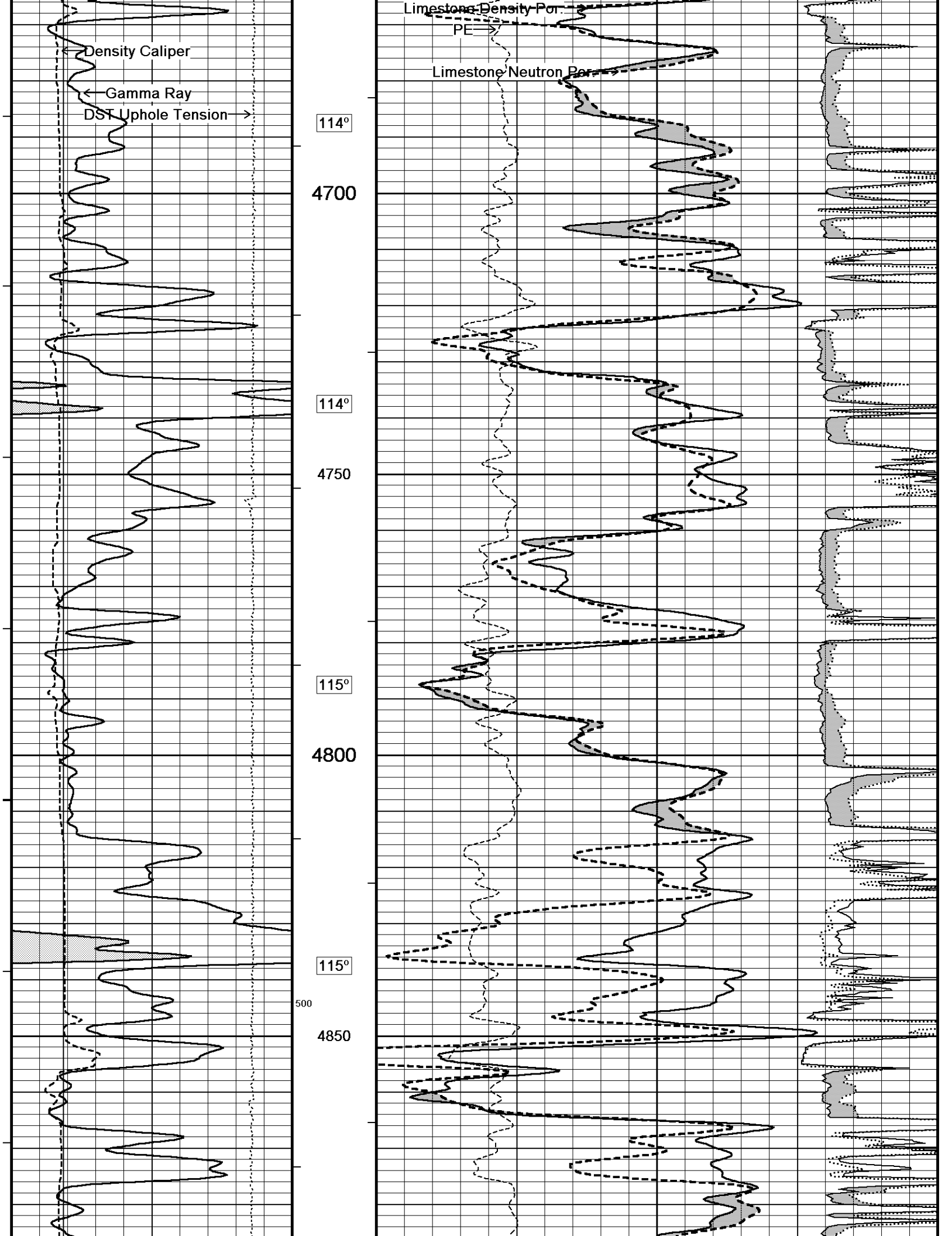
System Versions: Logged with 18.01.6830 Processed with 18.01.6830 Plotted with 18.01.6830

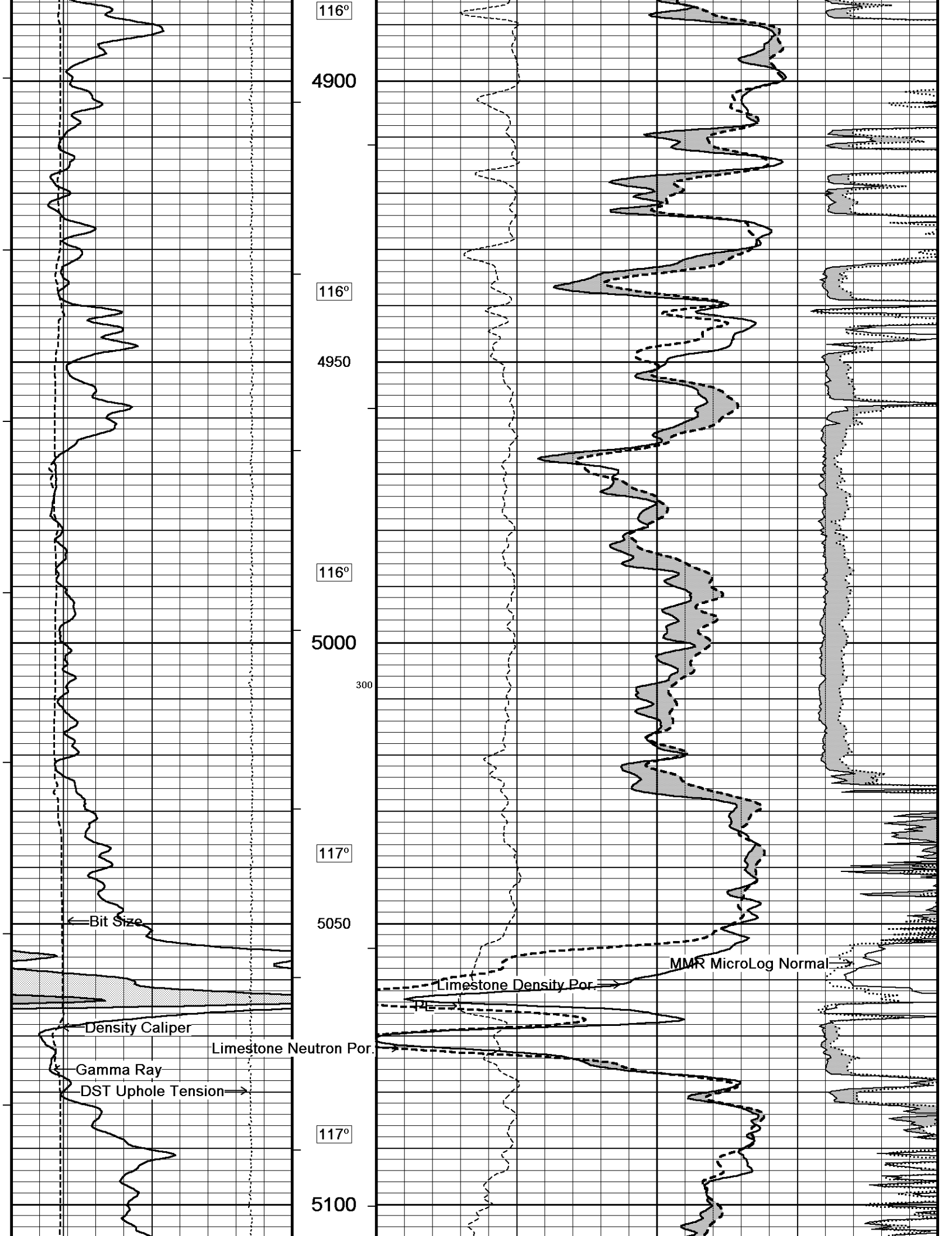


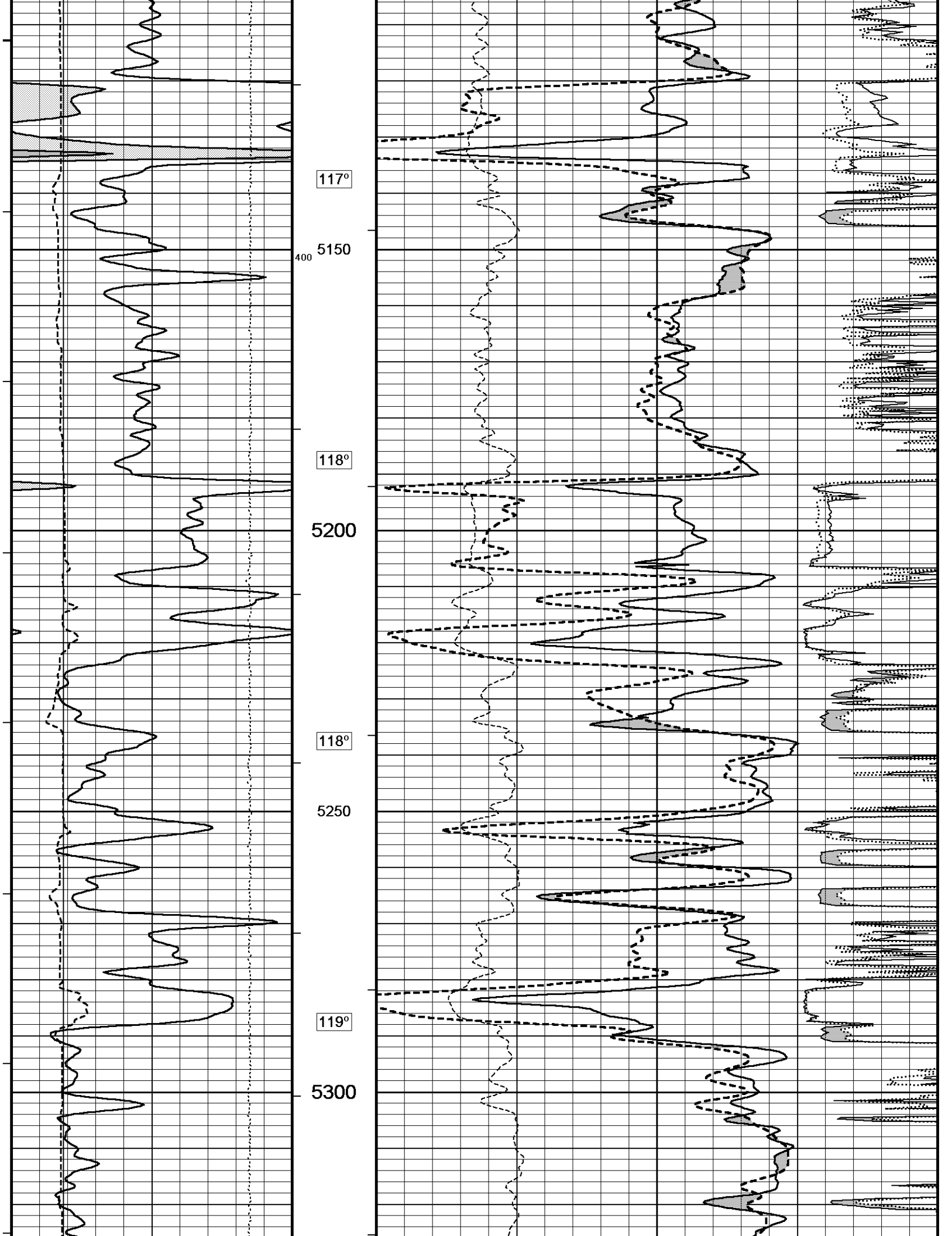

108°
4050
109°
4100
109°
500
4150
110°
4200

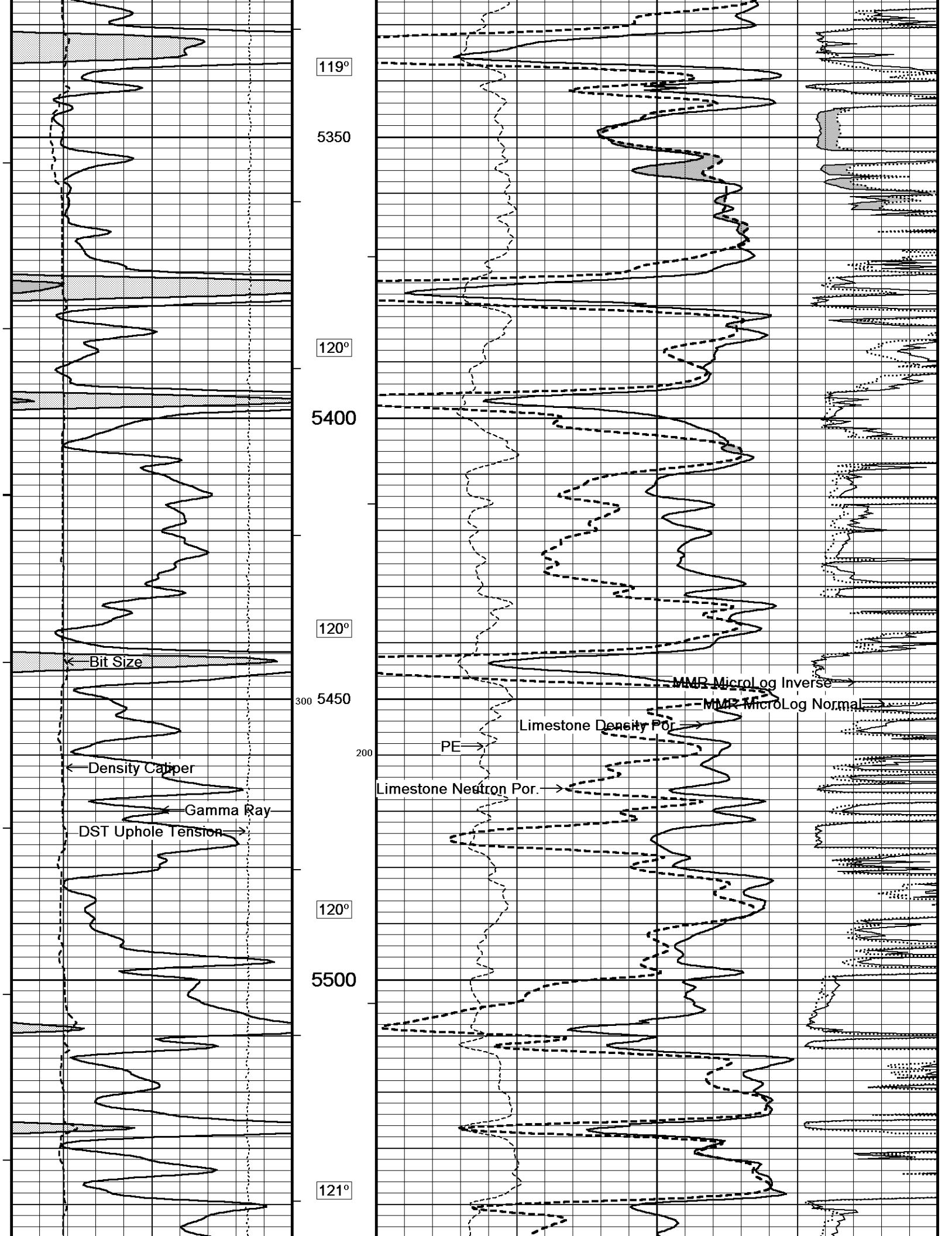

110°
4250
Bit Size
700
MMR MicroLog Inverse
MMR MicroLog Normal
Limestone Density Por.
PE
Density Caliper
Limestone Neutron Por.
111°
Gamma Ray
DST Uphole Tension
4300
111°
4350
112°
4400
112°

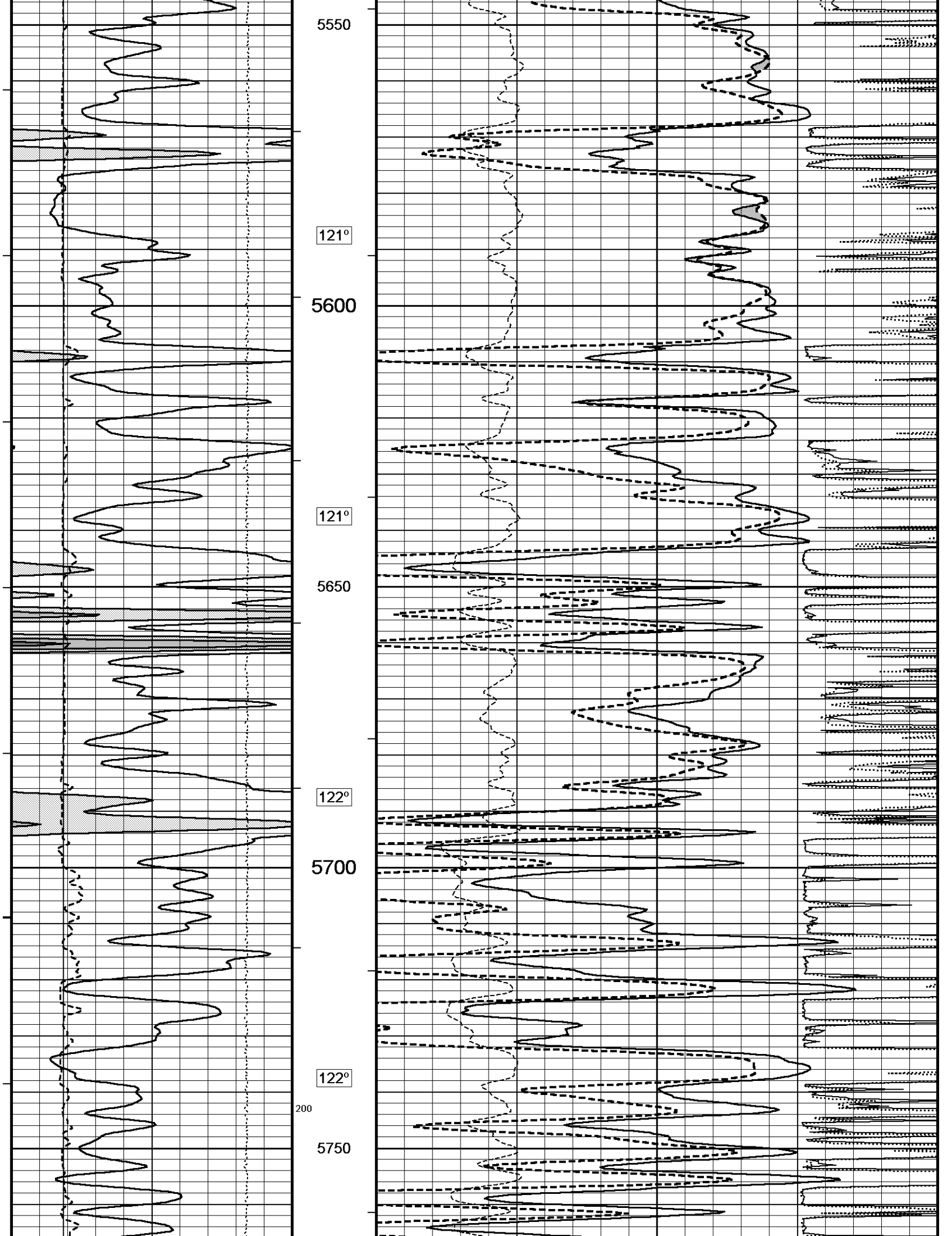

4450
112°
4500
113°
600
4550
400
113°
4600
114°
4650
←Bit Size
MMR MicroLog Inverse→

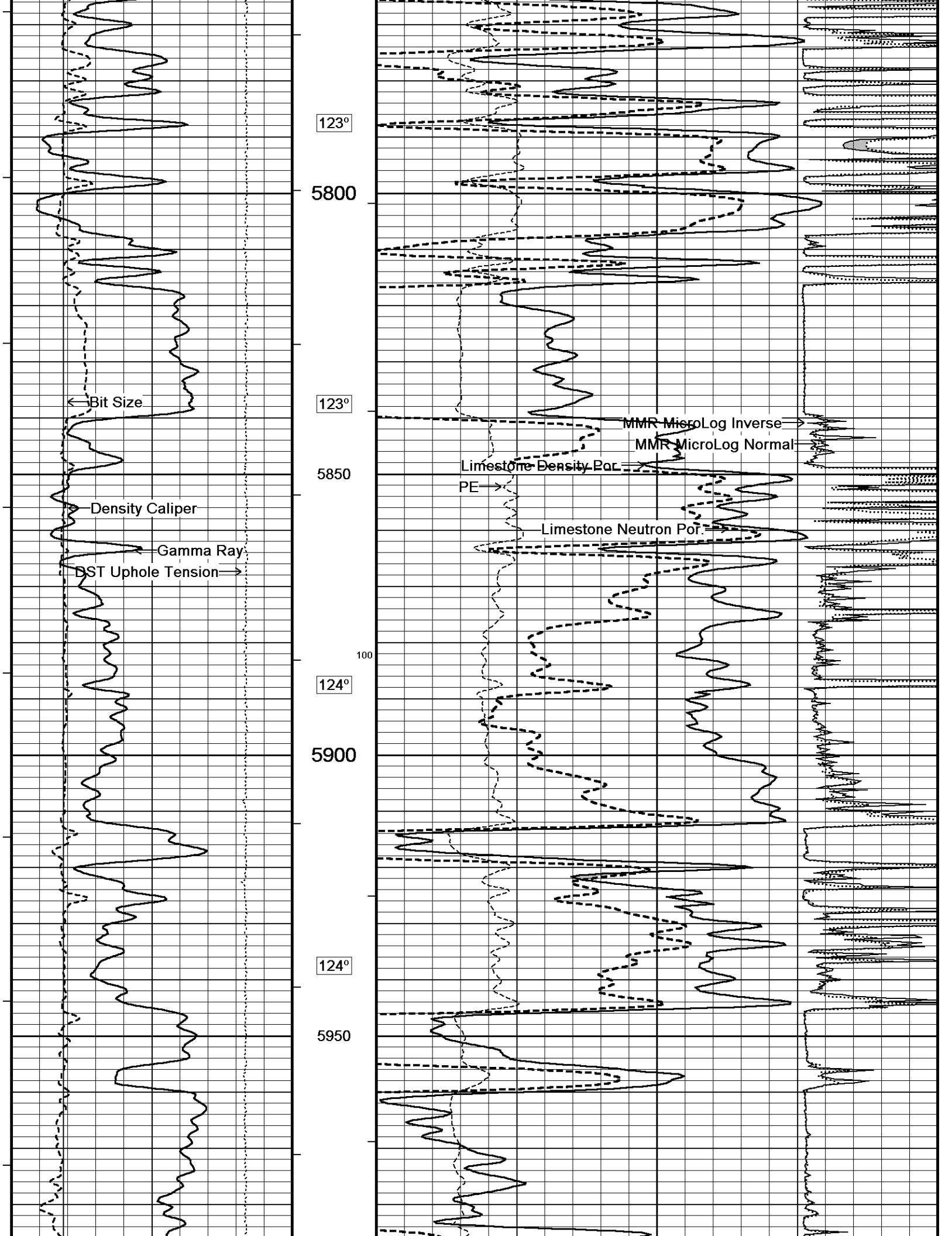

Limestone Density Por.
PE
Limestone Neutron Por.
Density Caliper
Gamma Ray
DST Uphole Tension
114°
4700
114°
4750
115°
4800
115°
500
4850

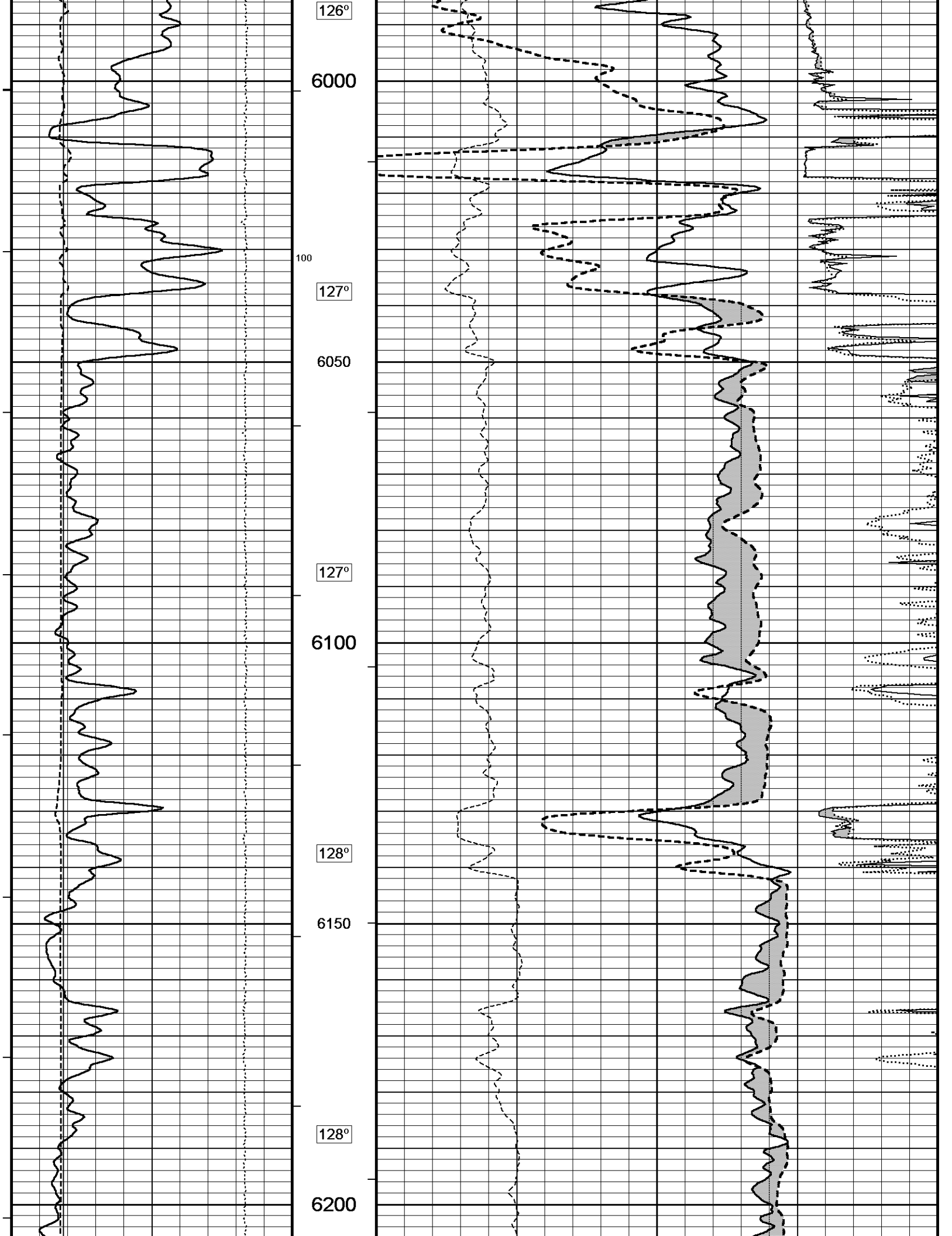

116°
4900
116°
4950
116°
5000
300
117°
5050
117°
5100
Bit Size
Density Caliper
Gamma Ray
DST Uphole Tension
Limestone Neutron Por.
Limestone Density Por.
MMR MicroLog Normal

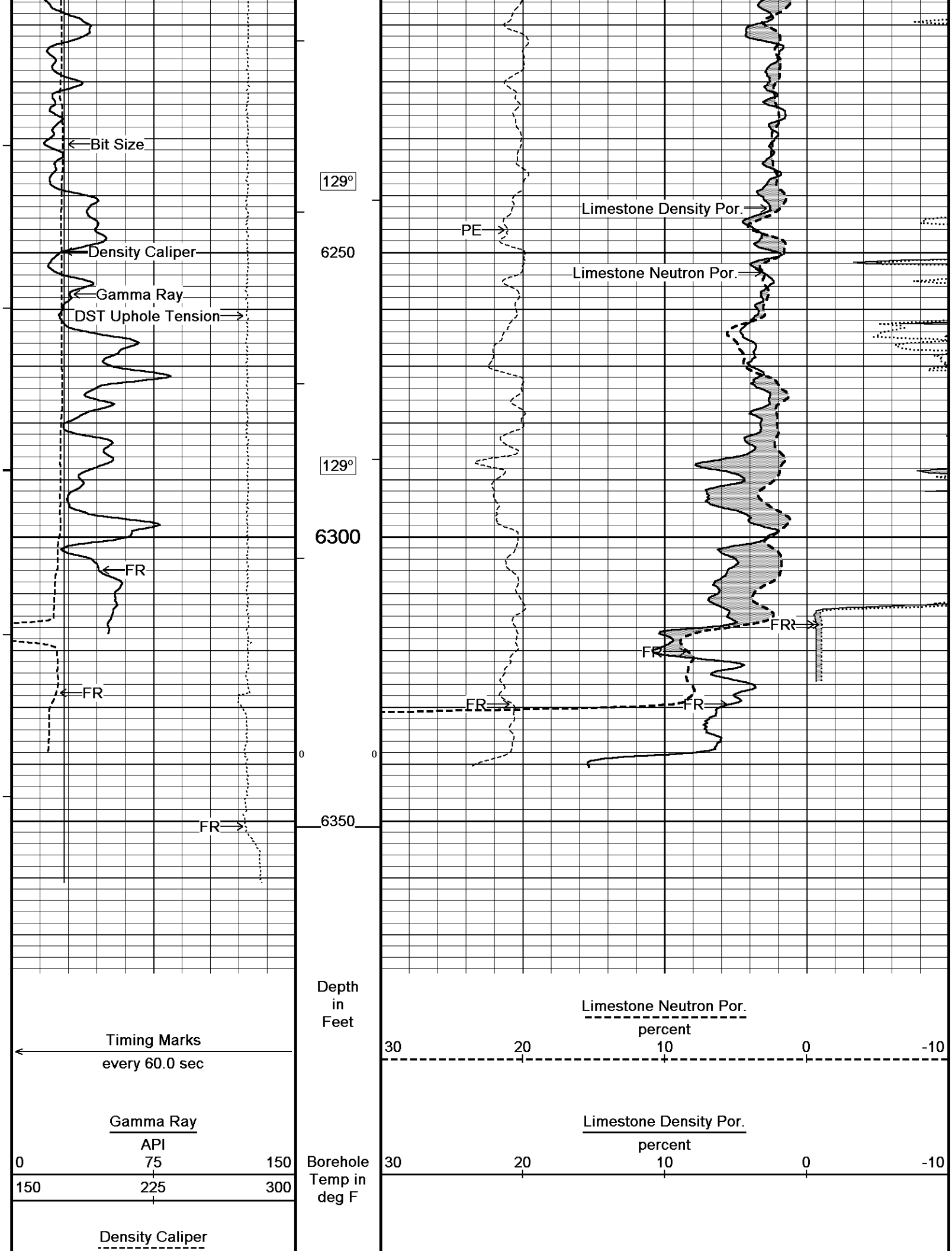

117°
400
5150
118°
5200
118°
5250
119°
5300

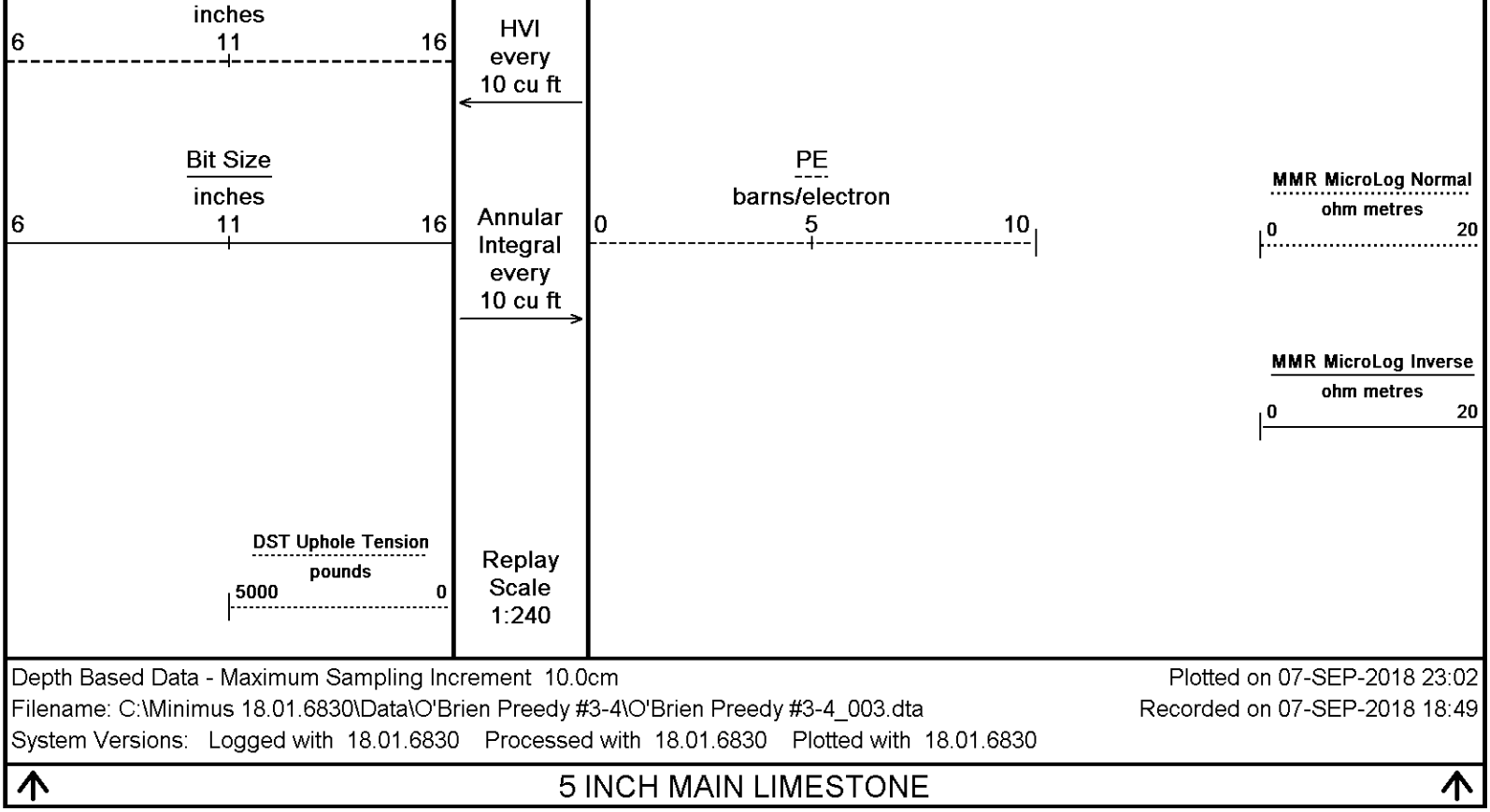

119°
5350
120°
5400
120°
Bit Size
300
5450
Density Caliper
Gamma Ray
DST Uphole Tension
120°
5500
121°
MMR MicroLog Inverse
MMR MicroLog Normal
Limestone Density Por.
PE
200
Limestone Neutron Por.


5550
121°
5600
121°
5650
122°
5700
122°
200
5750


123°
5800
123°
Bit Size
MMR MicroLog Inverse
MMR MicroLog Normal
Limestone Density Por.
5850
PE
Density Caliper
Limestone Neutron Por.
Gamma Ray
DST Uphole Tension
100
124°
5900
124°
5950


126°
6000
100
127°
6050
127°
6100
128°
6150
128°
6200


Bit Size
Density Caliper
Gamma Ray
DST Uphole Tension
FR
FR
FR
129°
6250
129°
6300
6350
PE
Limestone Density Por.
Limestone Neutron Por.
FR
FR
FR
FR
0
0
Depth
in
Feet
Timing Marks
every 60.0 sec
Gamma Ray
API
0
75
150
150
225
300
Density Caliper
Borehole
Temp in
deg F
Limestone Neutron Por.
percent
30
20
10
0
-10
Limestone Density Por.
percent
30
20
10
0
-10



Depth Based Data - Maximum Sampling Increment 10.0cm — Plotted on 07-SEP-2018 23:02
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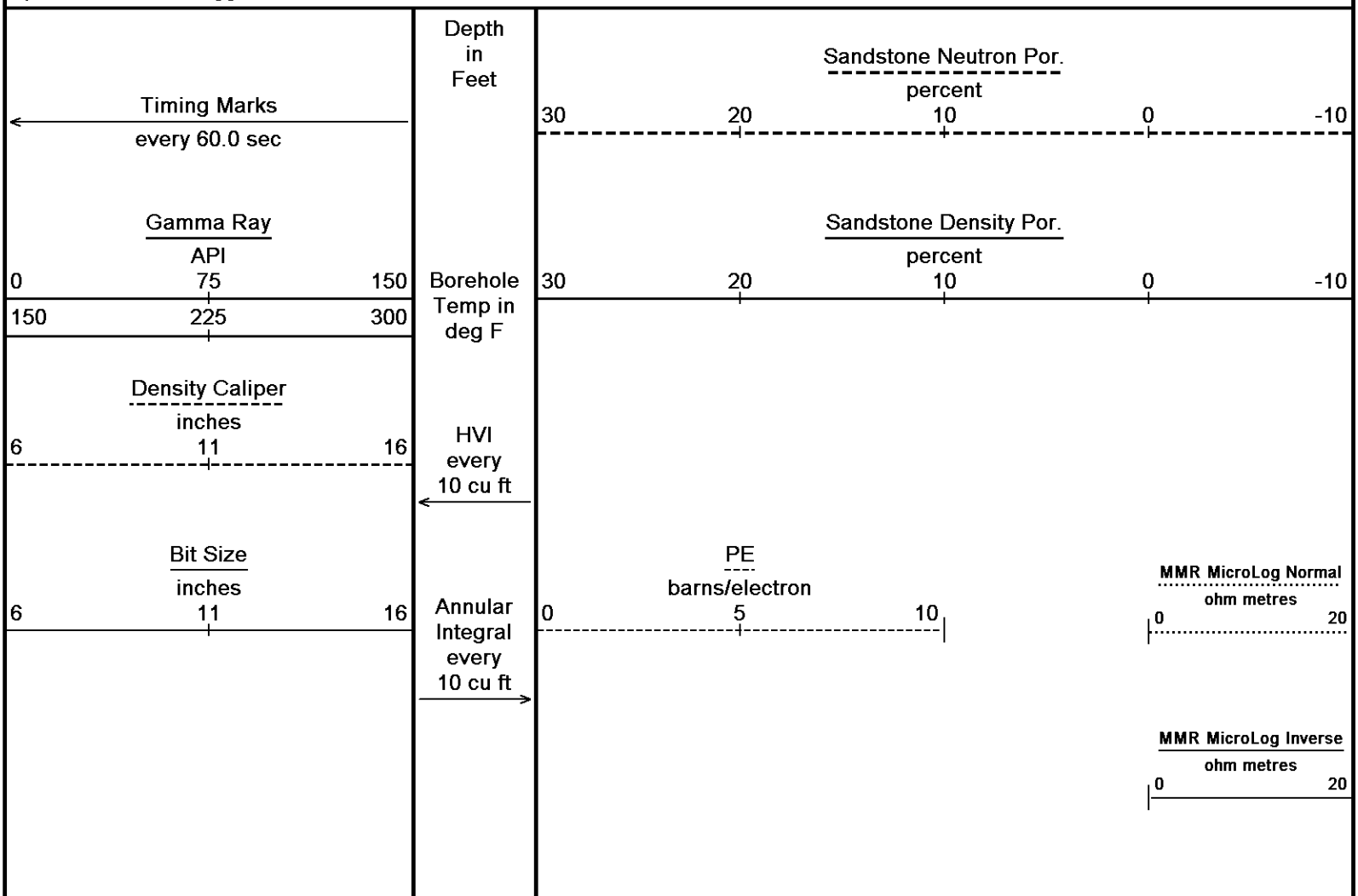
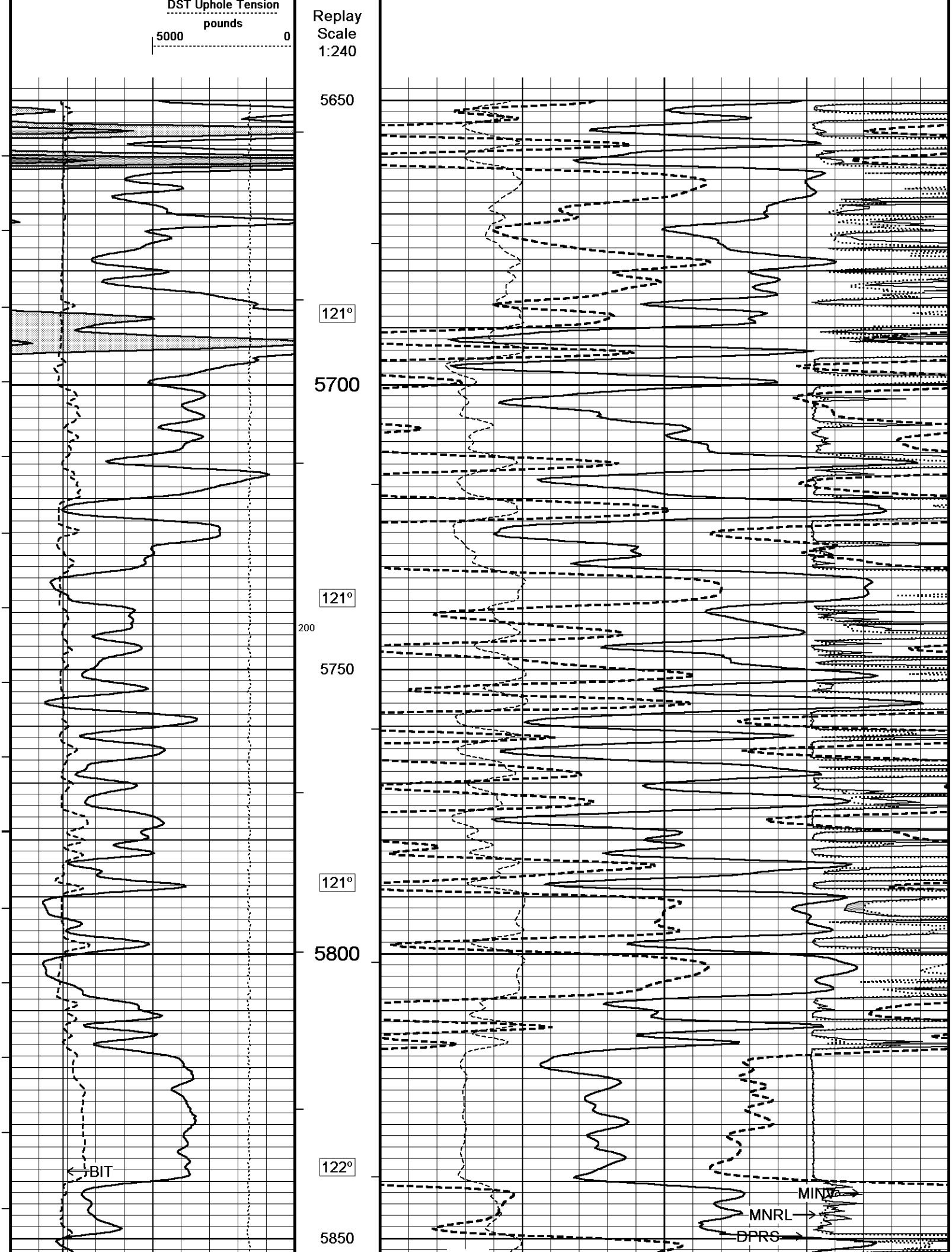
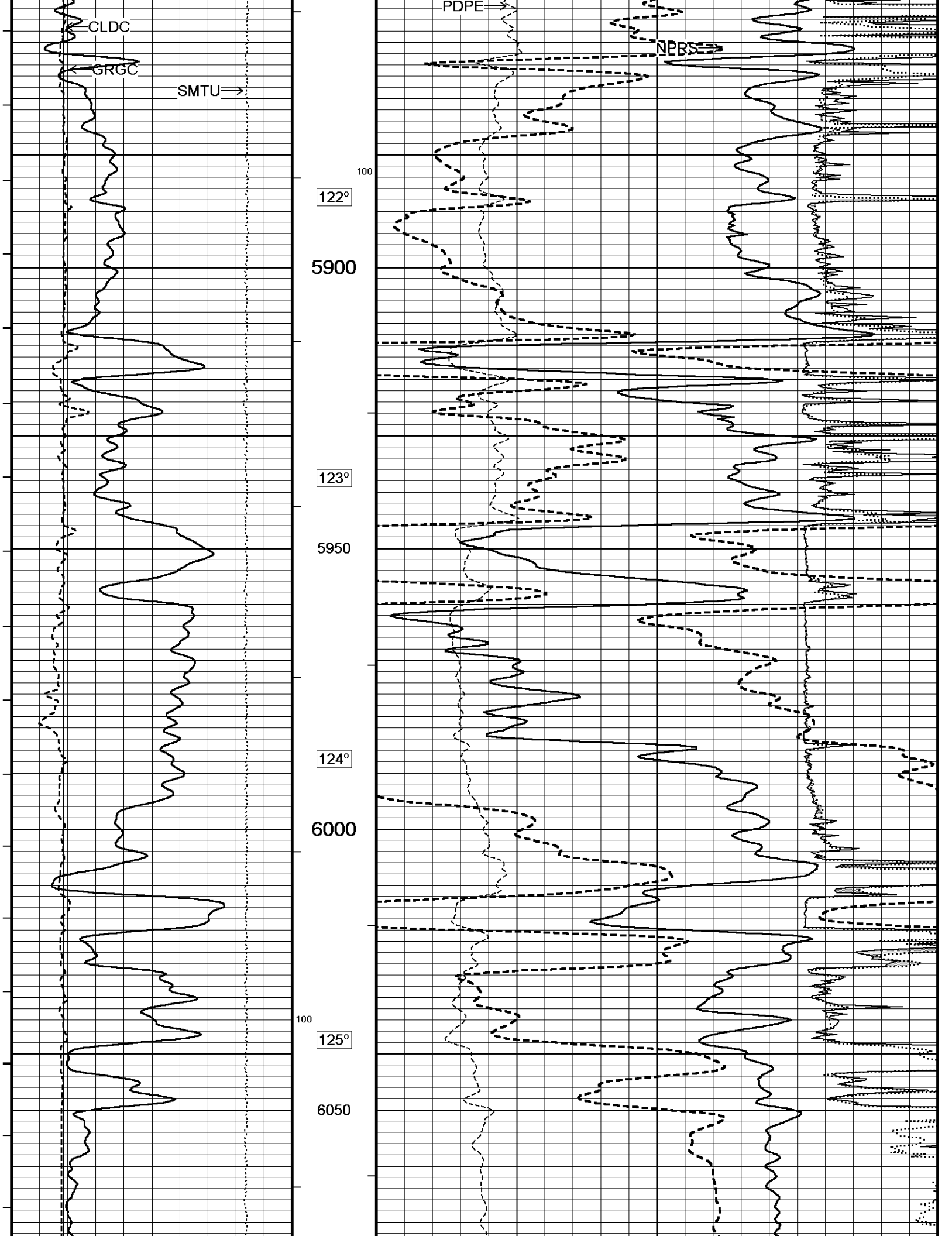
5 INCH MAIN LIMESTONE

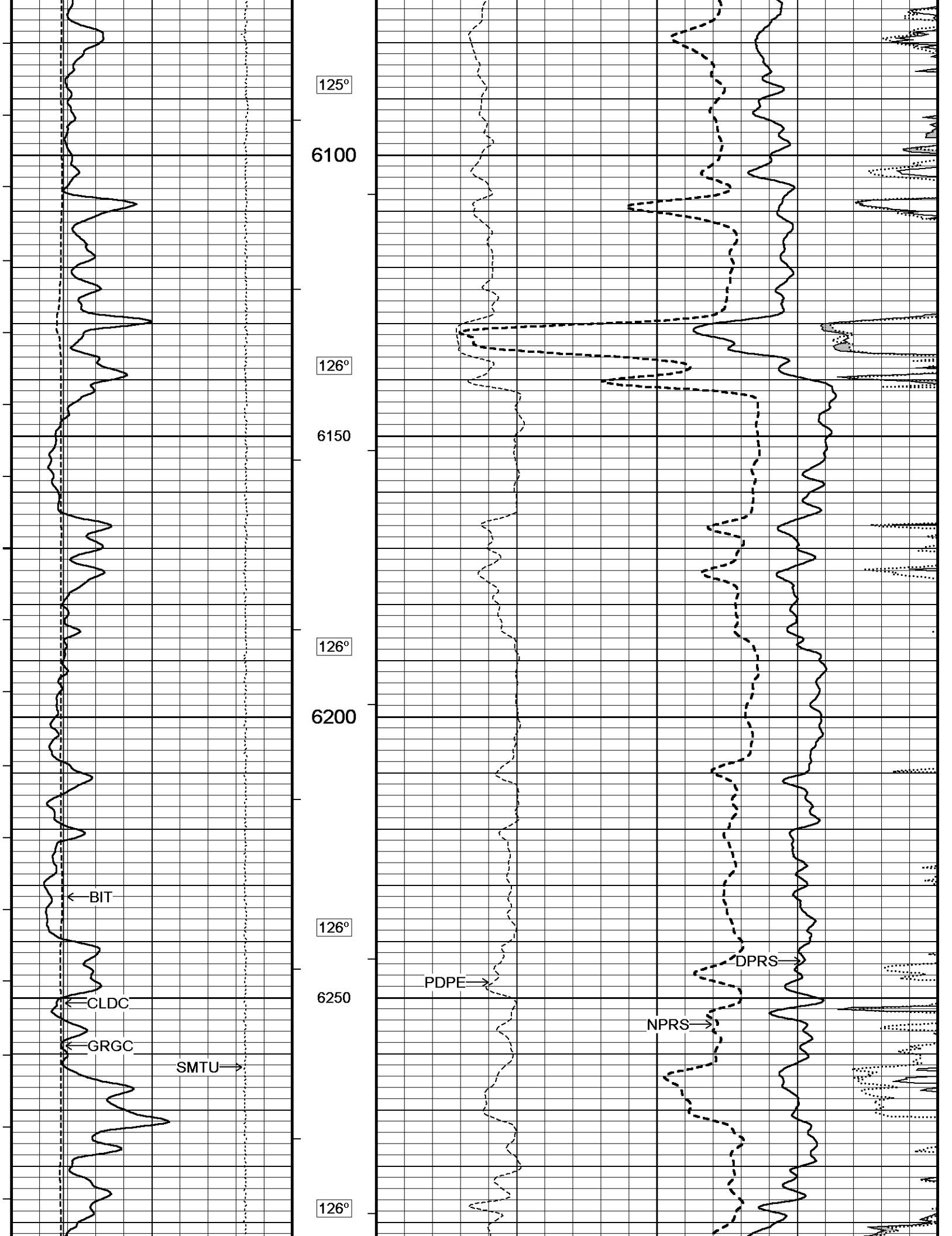
REPEAT SECTION SANDSTONE

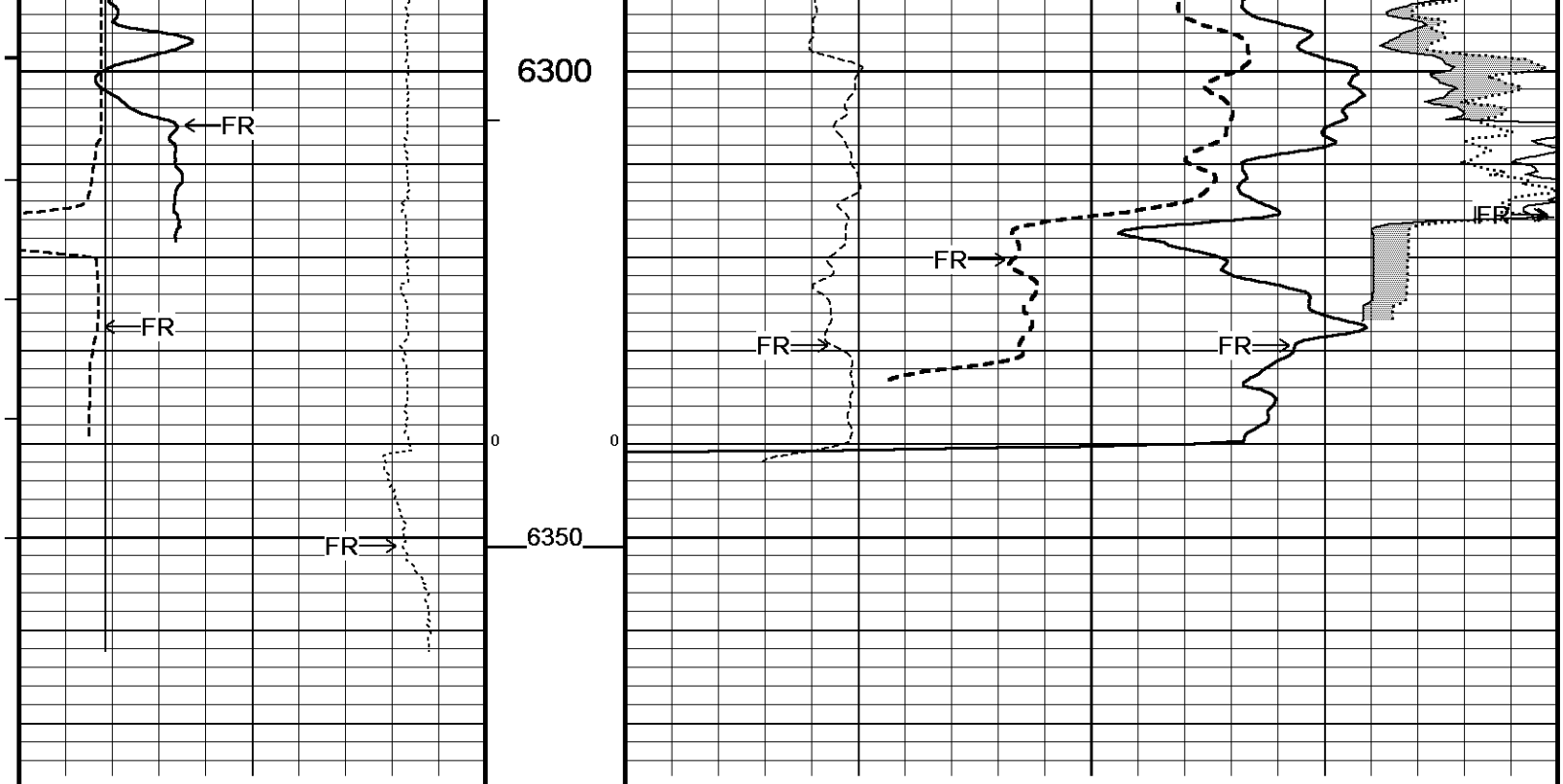
Depth Based Data - Maximum Sampling Increment 10.0cm — Plotted on 07-SEP-2018 23:02
Filename: C:\Minimus 18.01.6830\Data\O'Brien Preedy #3-4\O'Brien Preedy #3-4_002.dta — Recorded on 07-SEP-2018 17:09
System Versions: Logged with 18.01.6830 Processed with 18.01.6830 Plotted with 18.01.6830




DST Uphole Tension
pounds
5000
0
Replay
Scale
1:240
5650
121°
5700
121°
200
5750
121°
5800
122°
5850
BIT
MINV
MNRL
DPRS


CLDC
GRGC
SMTU
PDPE
NPBS
100
122°
5900
123°
5950
124°
6000
100
125°
6050


125°
6100
126°
6150
126°
126°
6200
126°
6250
126°
BIT
CLDC
GRGC
SMTU
PDPE
DPRS
NPRS



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

HVI every 10 cu ft

Annular Integral every 10 cu ft

Replay Scale 1:240

Sandstone Neutron Por.
percent
30 20 10 0 -10

Sandstone 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

Depth Based Data - Maximum Sampling Increment 10.0cm
Filename: C:\Minimus 18.01.6830\Data\O'Brien Preedy #3-4\O'Brien Preedy #3-4_002.dta
System Versions: Logged with 18.01.6830 Processed with 18.01.6830 Plotted with 18.01.6830

Plotted on 07-SEP-2018 23:02
Recorded on 07-SEP-2018 17:09

REPEAT SECTION SANDSTONE

REPEAT SECTION SANDSTONE

REPEAT SECTION DOLOMITE

Depth Based Data - Maximum Sampling Increment 10.0cm
Plotted on 07-SEP-2018 23:02
Filename: C:\Minimus 18.01.6830\Data\O'Brien Preedy #3-4\O'Brien Preedy #3-4_002.dta
Recorded on 07-SEP-2018 17:09
System Versions: Logged with 18.01.6830 Processed with 18.01.6830 Plotted with 18.01.6830

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

Dolomite Neutron Por.
percent
30 20 10 0 -10

Dolomite Density Por.
percent
30 20 10 0 -10

PE
barns/electron
0 5 10

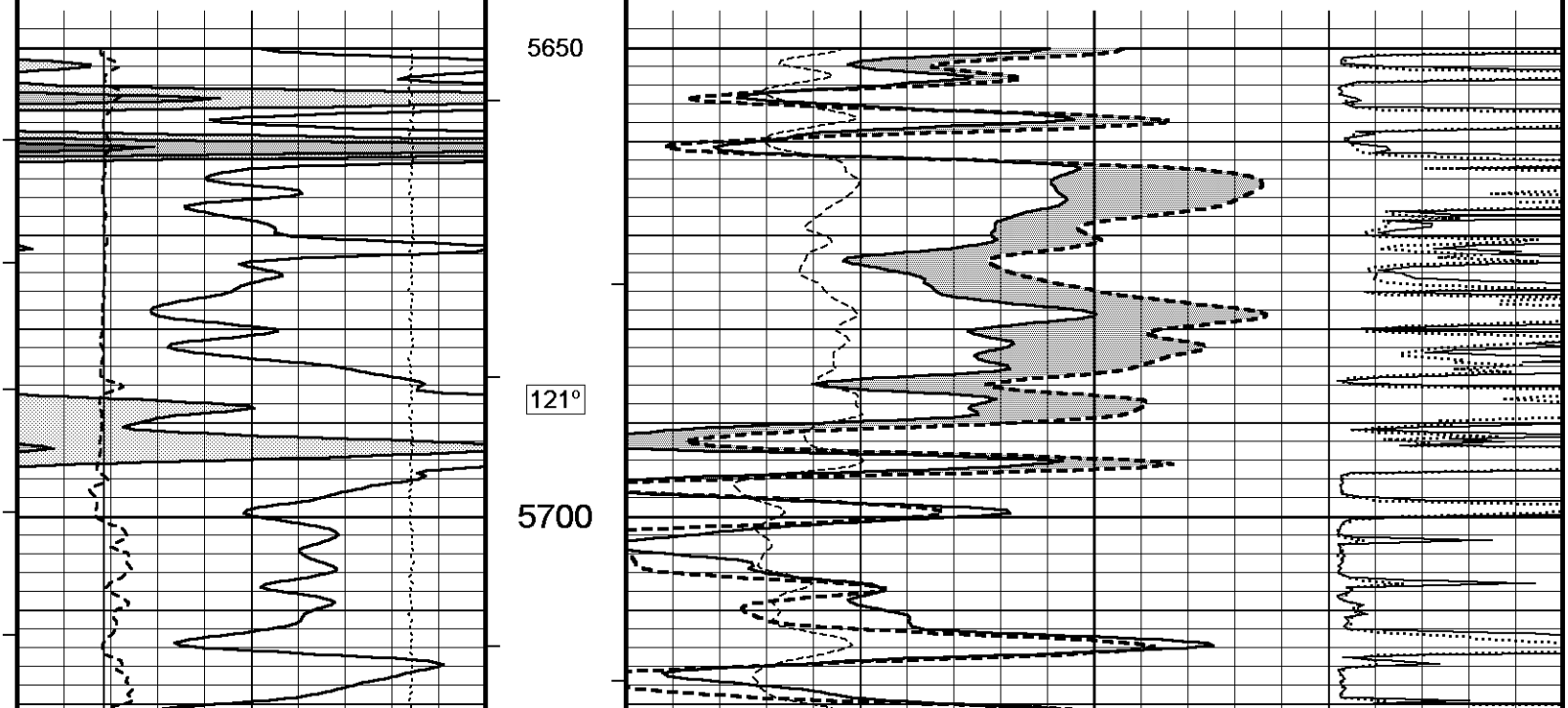
MMR MicroLog Normal
ohm metres
0 20

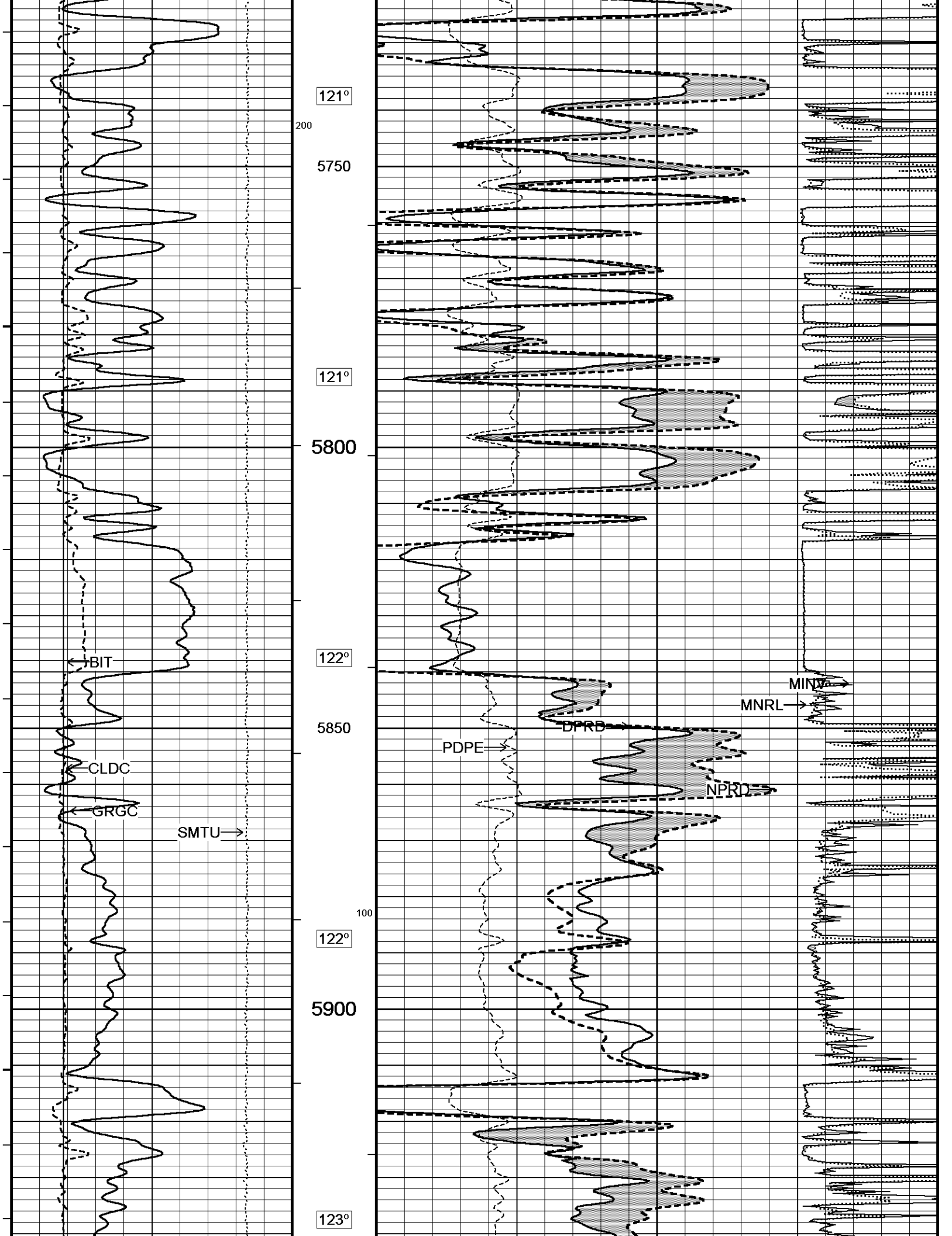
MMR MicroLog Inverse
ohm metres
0 20

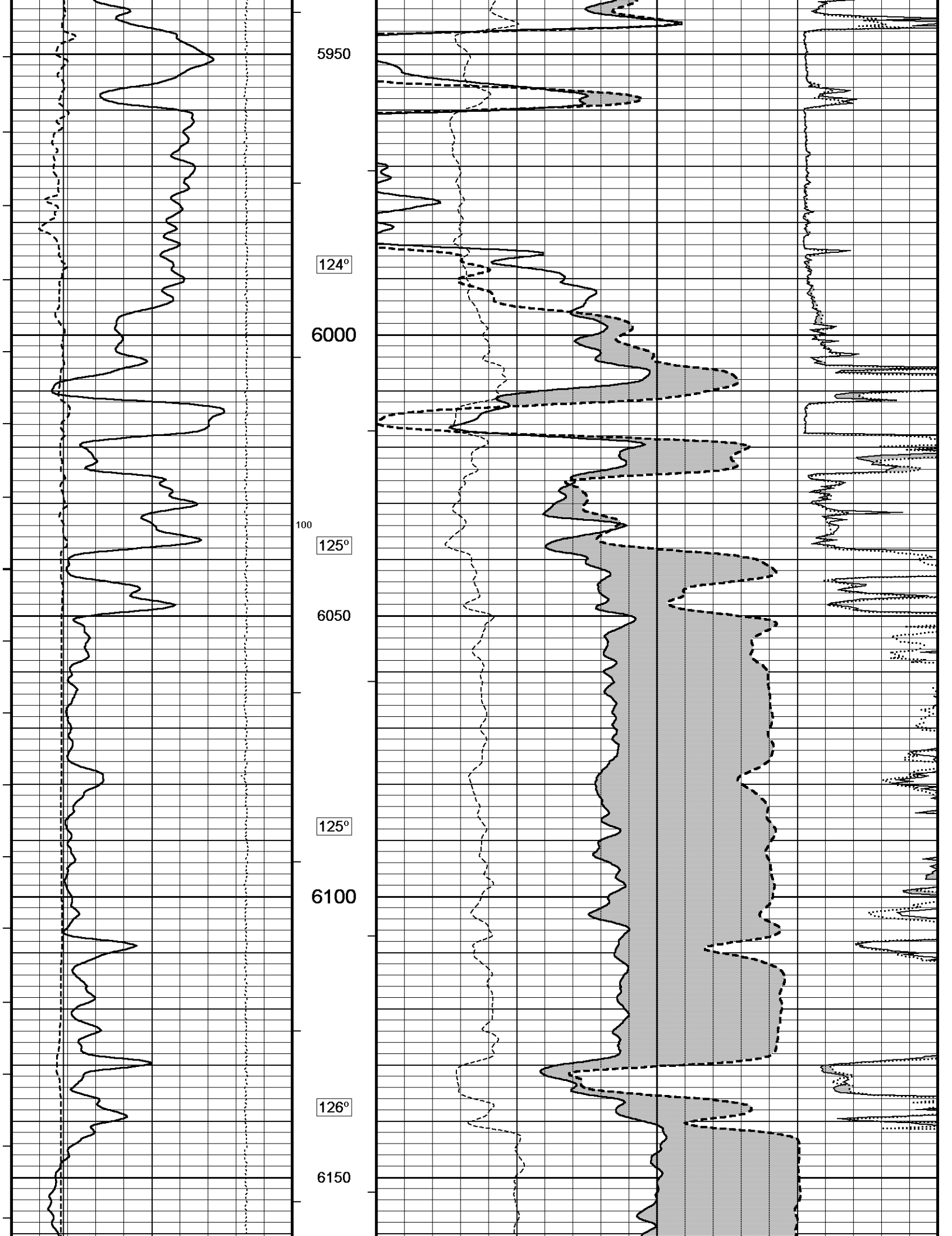
5650

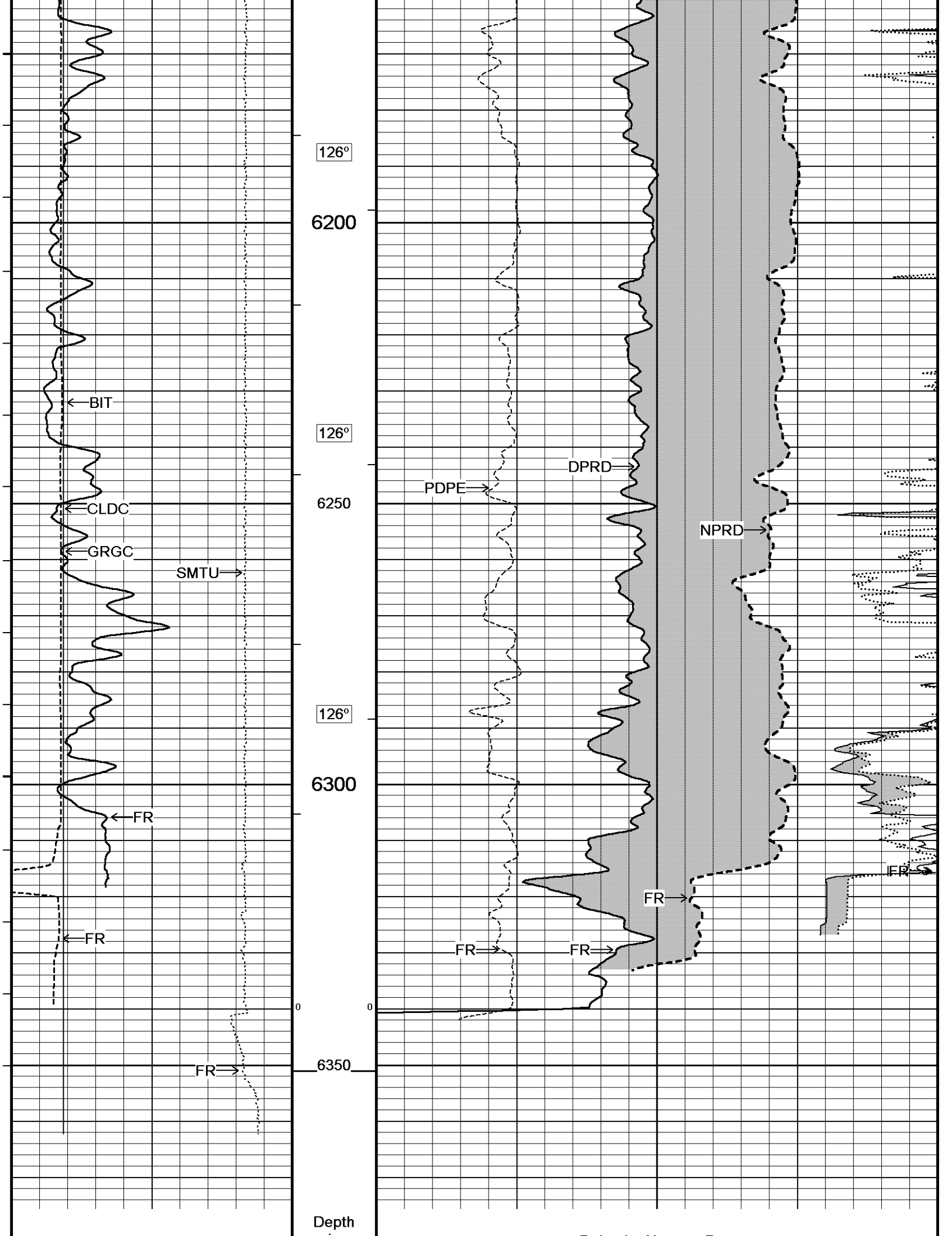
121°

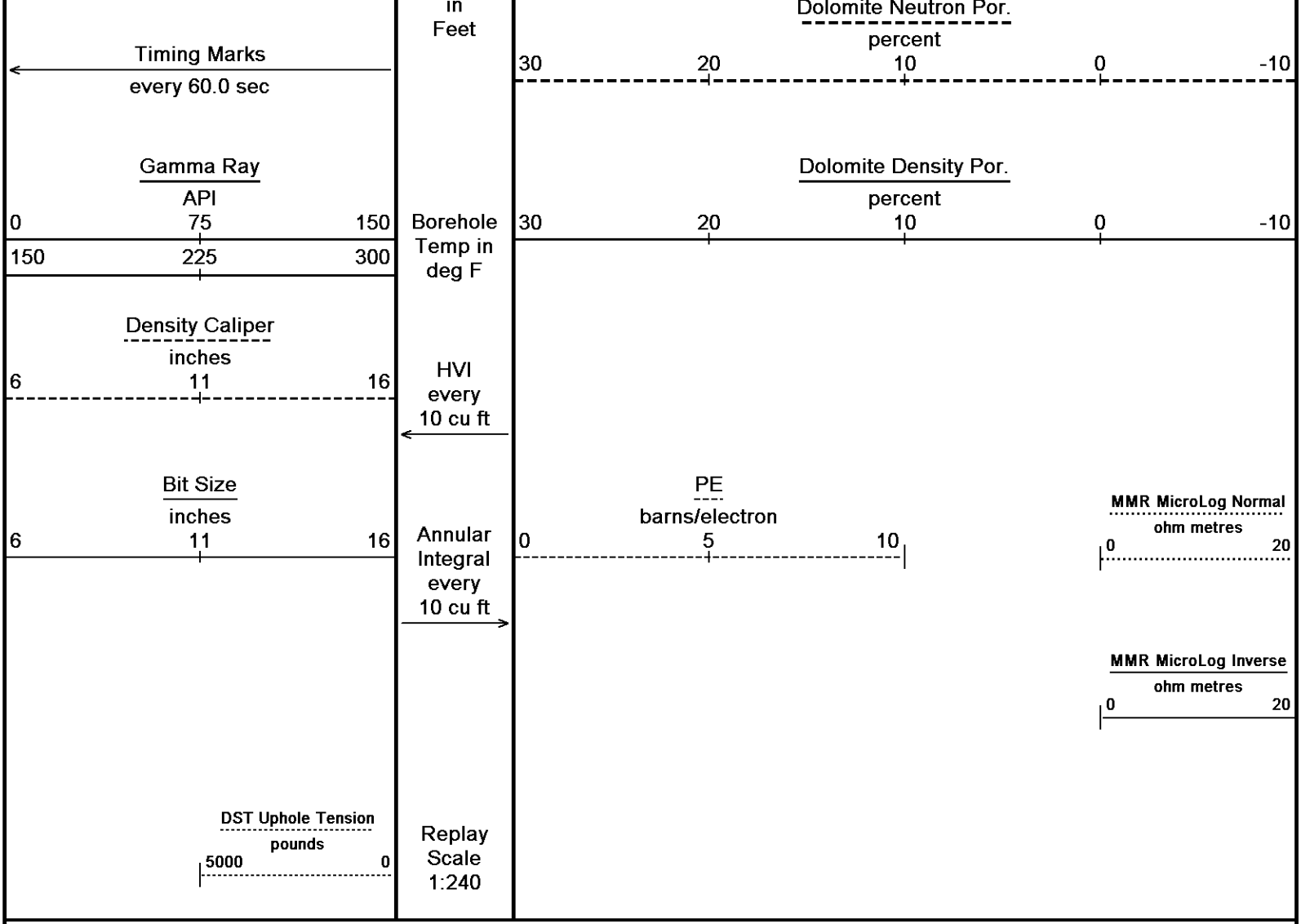
5700




121°
200
5750
121°
5800
122°
BIT
5850
CLDC
GRGC
SMTU
PDPE
DPRD
MINV
MNRL
NPRD
100
122°
5900
123°


5950
124°
6000
100
125°
6050
125°
6100
126°
6150


126°
6200
126°
6250
126°
6300
6350
BIT
CLDC
GRGC
SMTU
FR
FR
FR
PDPE
DPRD
NPRD
FR
FR
FR
FR
0
0
Depth

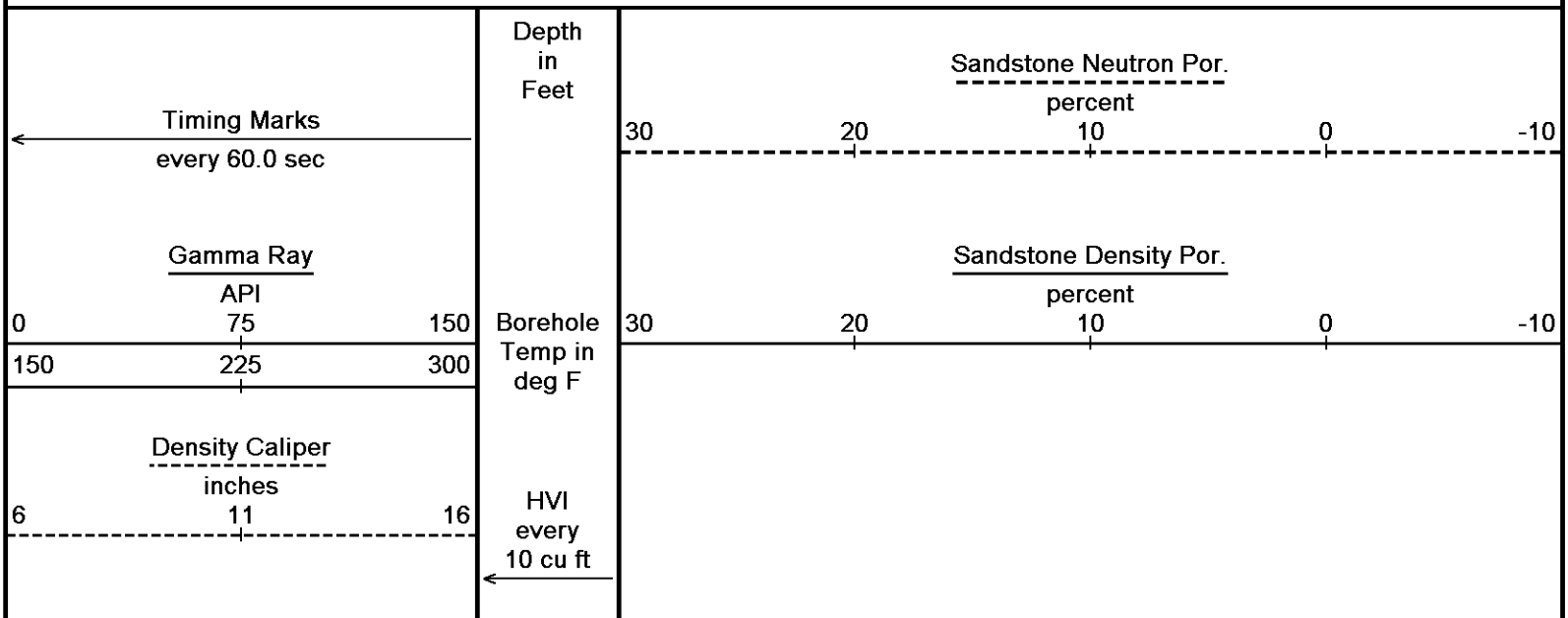


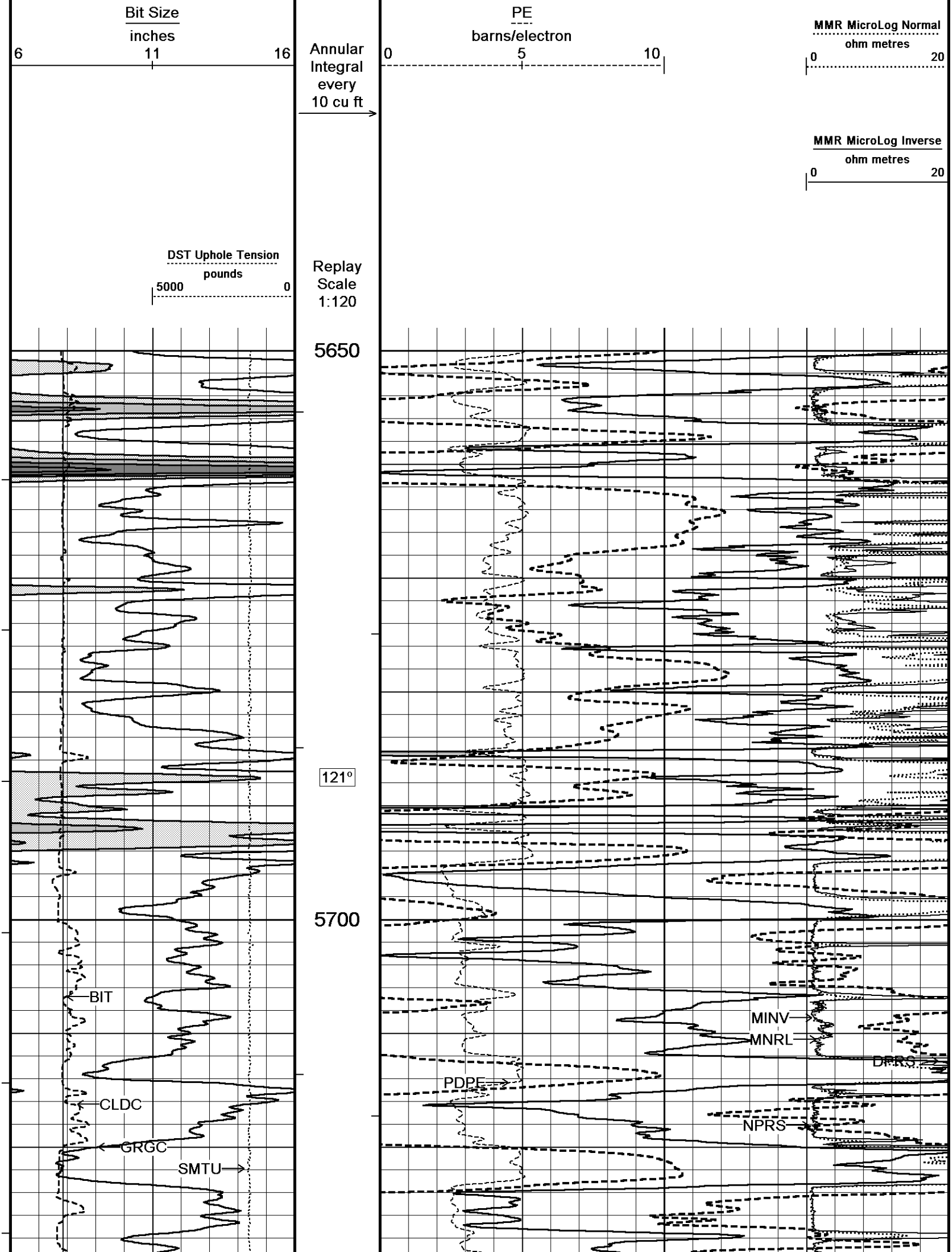
Depth Based Data - Maximum Sampling Increment 10.0cm — Plotted on 07-SEP-2018 23:02
Filename: C:\Minimus 18.01.6830\Data\O'Brien Preedy #3-4\O'Brien Preedy #3-4_002.dta — Recorded on 07-SEP-2018 17:09
System Versions: Logged with 18.01.6830 Processed with 18.01.6830 Plotted with 18.01.6830

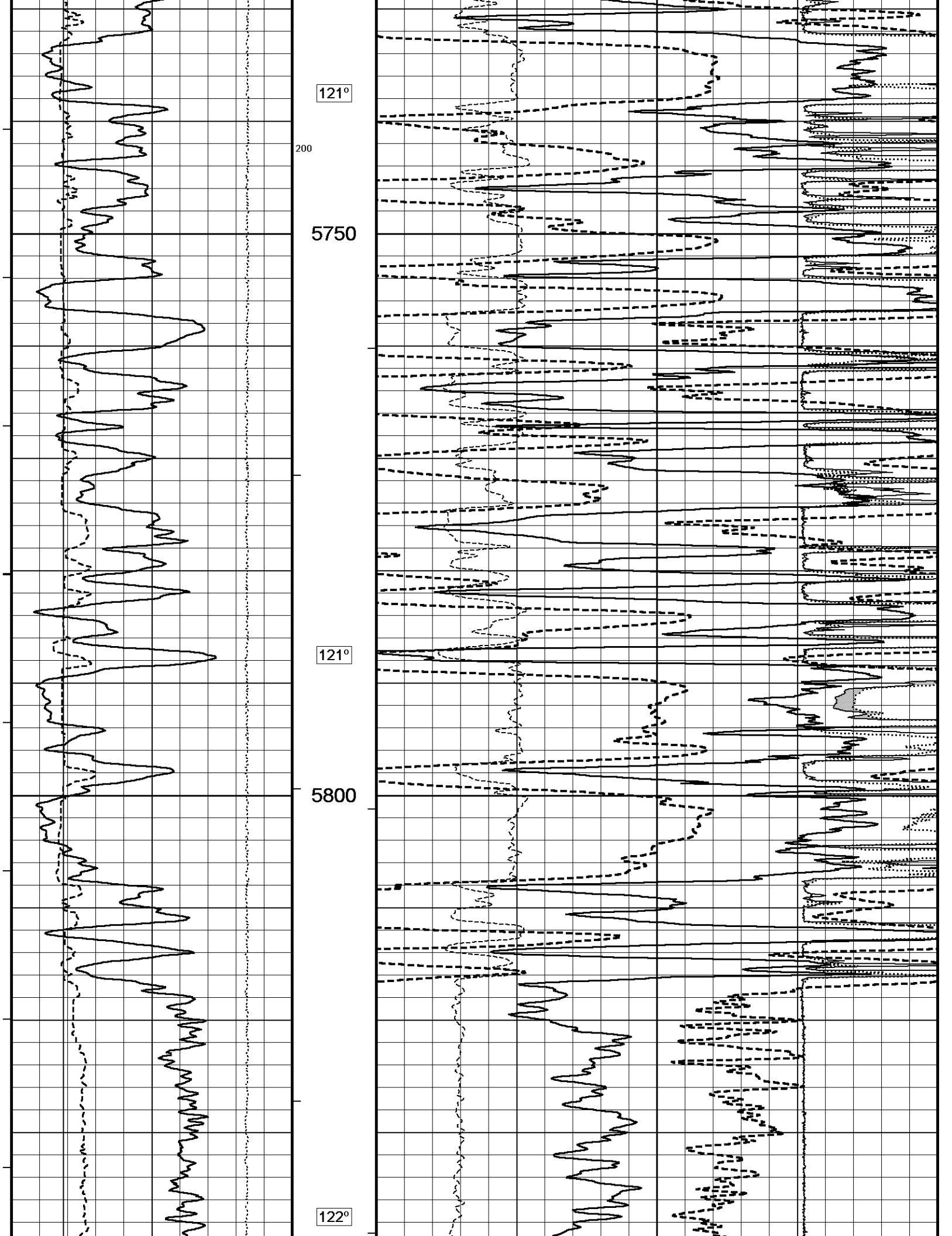
REPEAT SECTION DOLOMITE

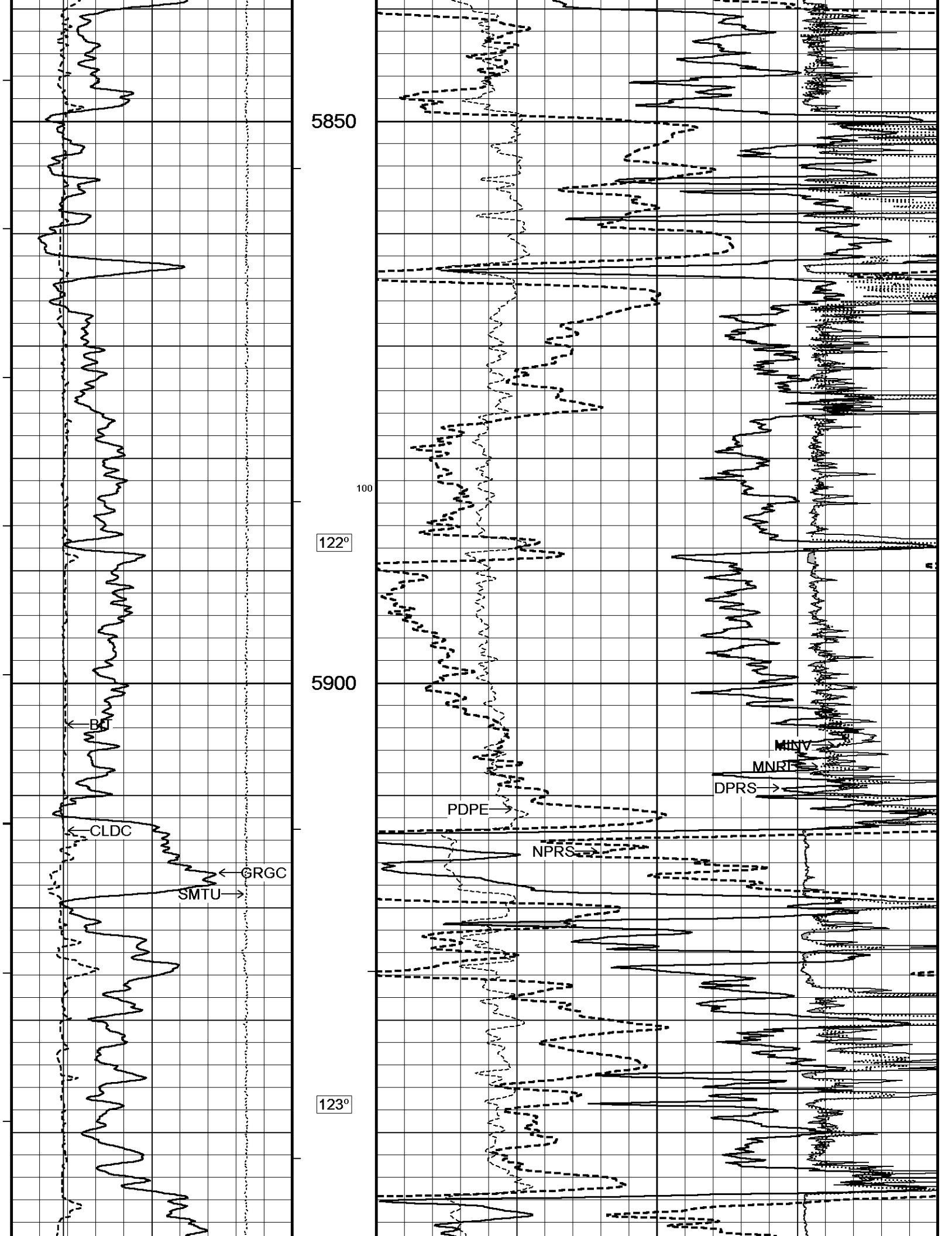
10 INCH HIGH RESOLUTION SANDSTONE

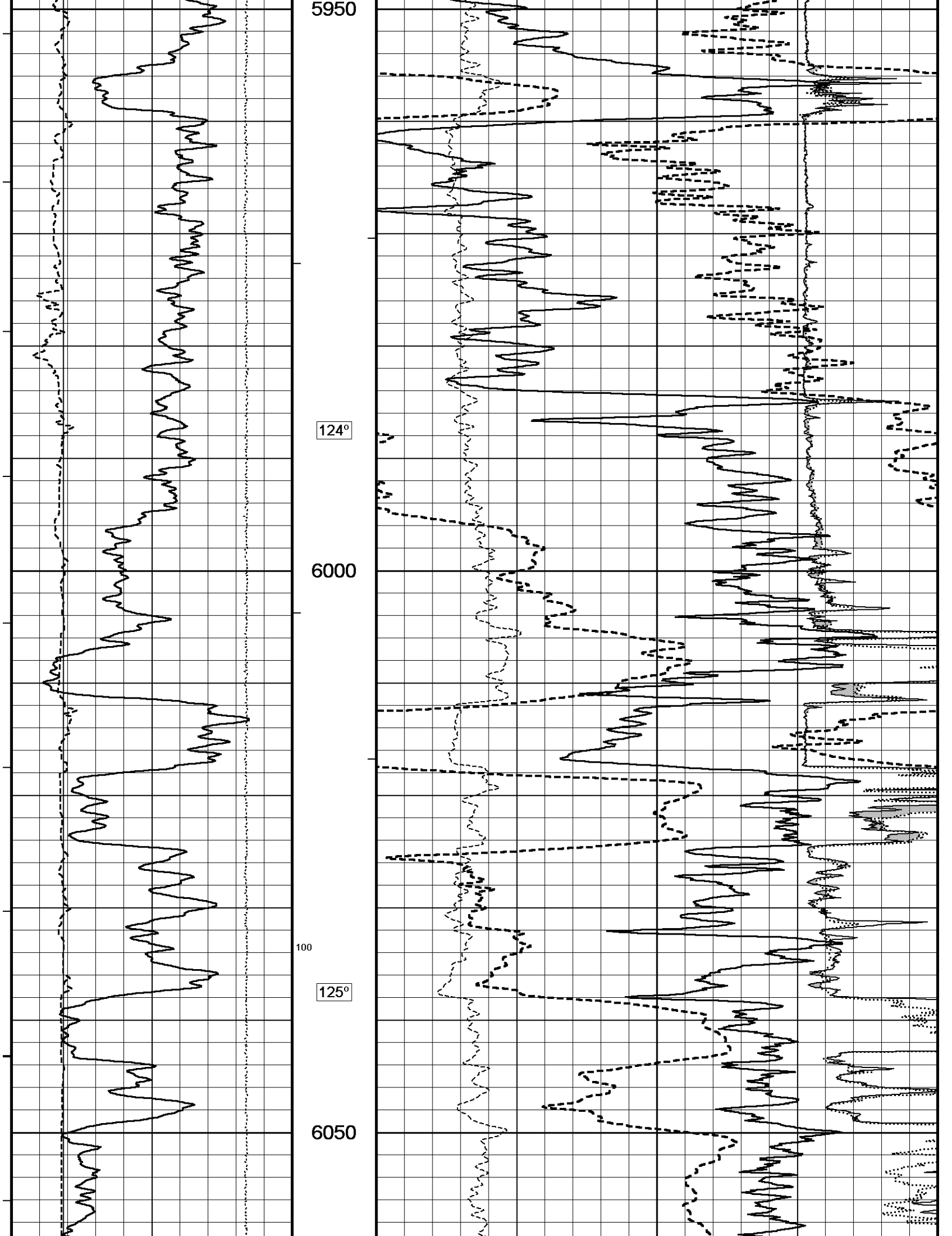
Depth Based Data - Maximum Sampling Increment 2.5cm — Plotted on 07-SEP-2018 23:02
Filename: C:\Minimus 18.01.6830\Data\O'Brien Preedy #3-4\O'Brien Preedy #3-4_001.dta — Recorded on 07-SEP-2018 17:09
System Versions: Logged with 18.01.6830 Plotted with 18.01.6830

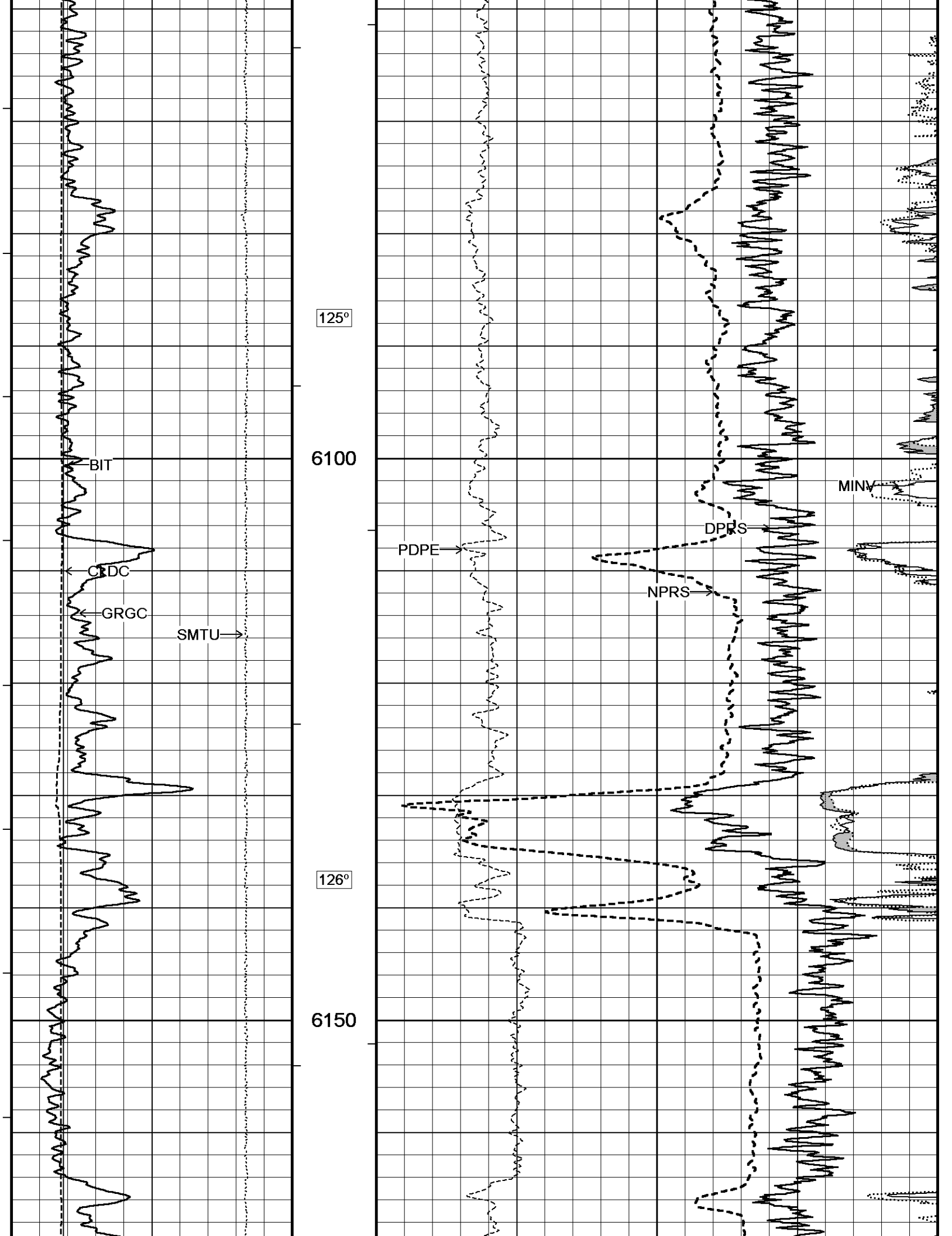


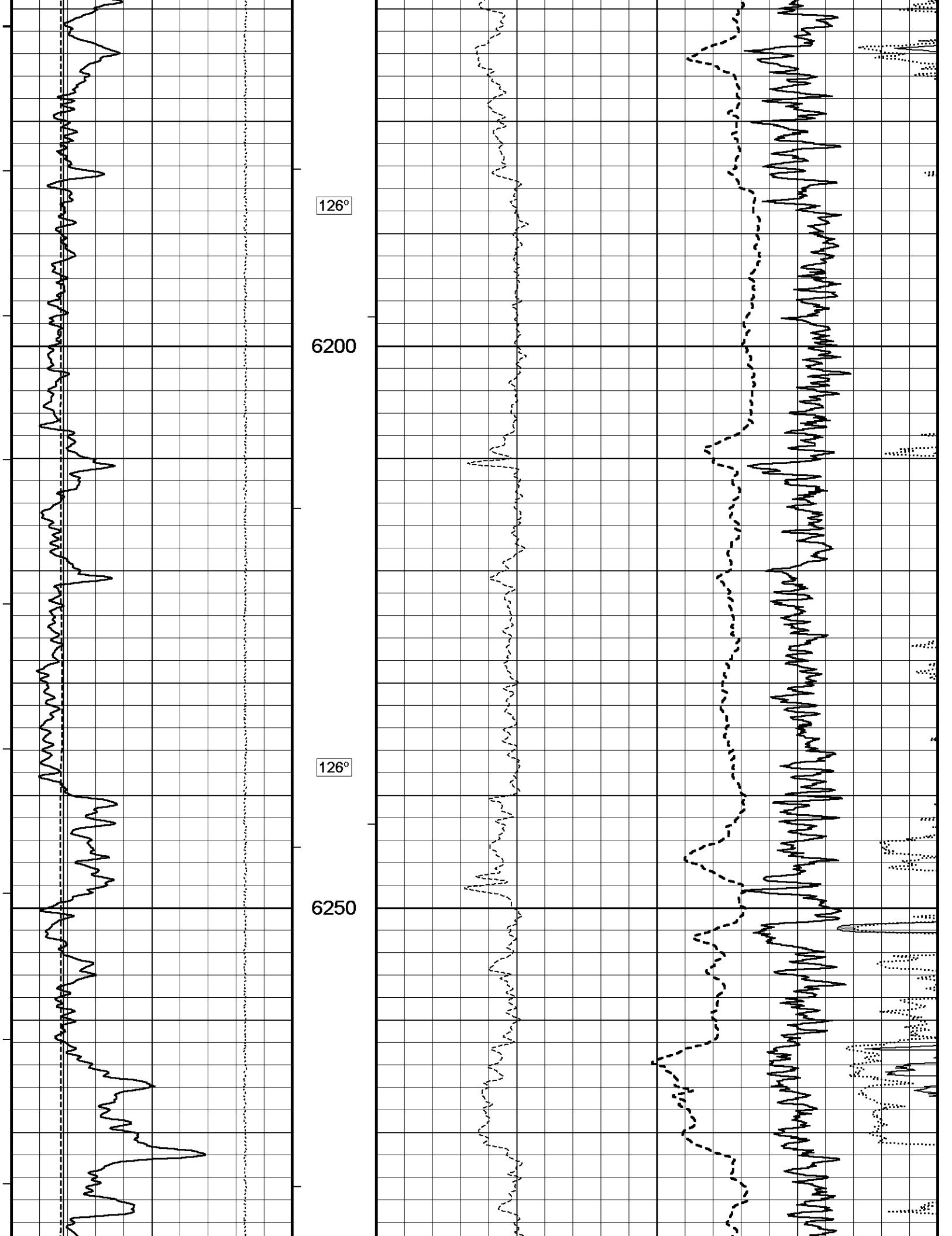

Bit Size
inches
6
11
16
Annular Integral every 10 cu ft
PE
barns/electron
0
5
10
MMR MicroLog Normal
ohm metres
0
20
MMR MicroLog Inverse
ohm metres
0
20
DST Uphole Tension
pounds
5000
0
Replay Scale 1:120
5650
121°
5700
BIT
CLDC
GRGC
SMTU
PDPE
MINV
MNRL
DPRS
NPRS

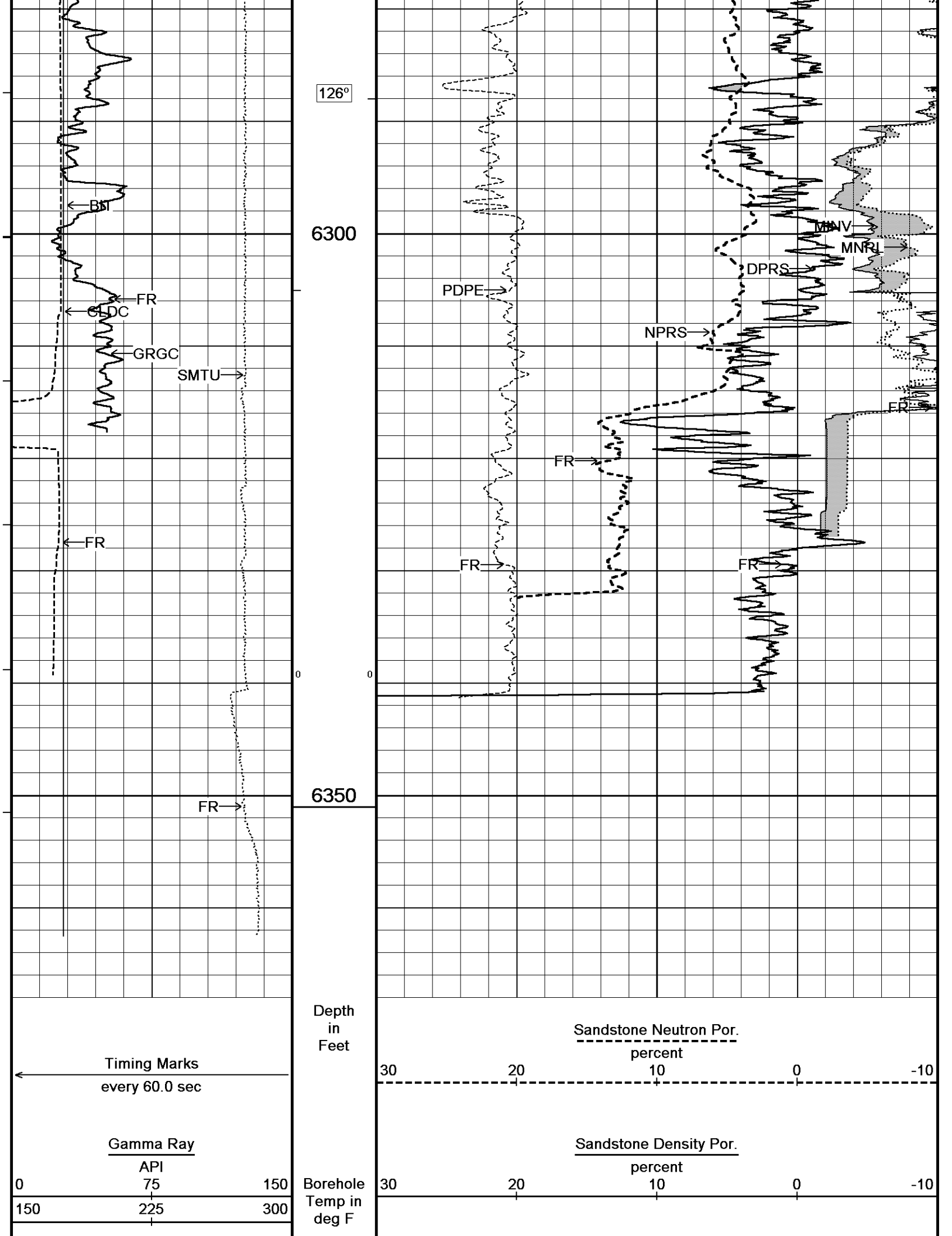

121°
200
5750
121°
5800
122°


5850
100
122°
5900
BIT
CLDC
GRGC
SMTU
PDPE
NPRS
MNRI
DPRS
123°


5950
124°
6000
100
125°
6050


125°
6100
BIT
CDC
GRGC
SMTU
PDPE
DPRS
NPRS
MINV
126°
6150


126°
6200
126°
6250


126°
6300
6350
BIT
FR
CLDC
GRGC
SMTU
FR
FR
PDPE
NPRS
DPRS
MNRL
MINV
FR
FR
FR
FR
0
0
Timing Marks
every 60.0 sec
Depth
in
Feet
Sandstone Neutron Por.
percent
30
20
10
0
-10
Gamma Ray
API
0
75
150
Sandstone Density Por.
percent
30
20
10
0
-10
150
225
300
Borehole
Temp in
deg F

Density Caliper
inches
6 11 16

Bit Size
inches
6 11 16

DST Uphole Tension
pounds
5000 0

HVI
every
10 cu ft

Annular
Integral
every
10 cu ft

Replay
Scale
1:120

PE
barns/electron
0 5 10

MMR MicroLog Normal
ohm metres
0 20

MMR MicroLog Inverse
ohm metres
0 20

Depth Based Data - Maximum Sampling Increment 2.5cm
Plotted on 07-SEP-2018 23:02
Filename: C:\Minimus 18.01.6830\Data\O'Brien Preedy #3-4\O'Brien Preedy #3-4_001.dta
Recorded on 07-SEP-2018 17:09
System Versions: Logged with 18.01.6830 Plotted with 18.01.6830

10 INCH HIGH RESOLUTION SANDSTONE

10 INCH HIGH RESOLUTION DOLOMITE

Depth Based Data - Maximum Sampling Increment 2.5cm
Plotted on 07-SEP-2018 23:02
Filename: C:\Minimus 18.01.6830\Data\O'Brien Preedy #3-4\O'Brien Preedy #3-4_001.dta
Recorded on 07-SEP-2018 17:09
System Versions: Logged with 18.01.6830 Plotted with 18.01.6830

Depth
in
Feet

Timing Marks
every 60.0 sec

Dolomite Neutron Por.
percent
30 20 10 0 -10

Gamma Ray
API
0 75 150
150 225 300

Dolomite Density Por.
percent
30 20 10 0 -10

Borehole
Temp in
deg F

Density Caliper
inches
6 11 16

Bit Size
inches
6 11 16

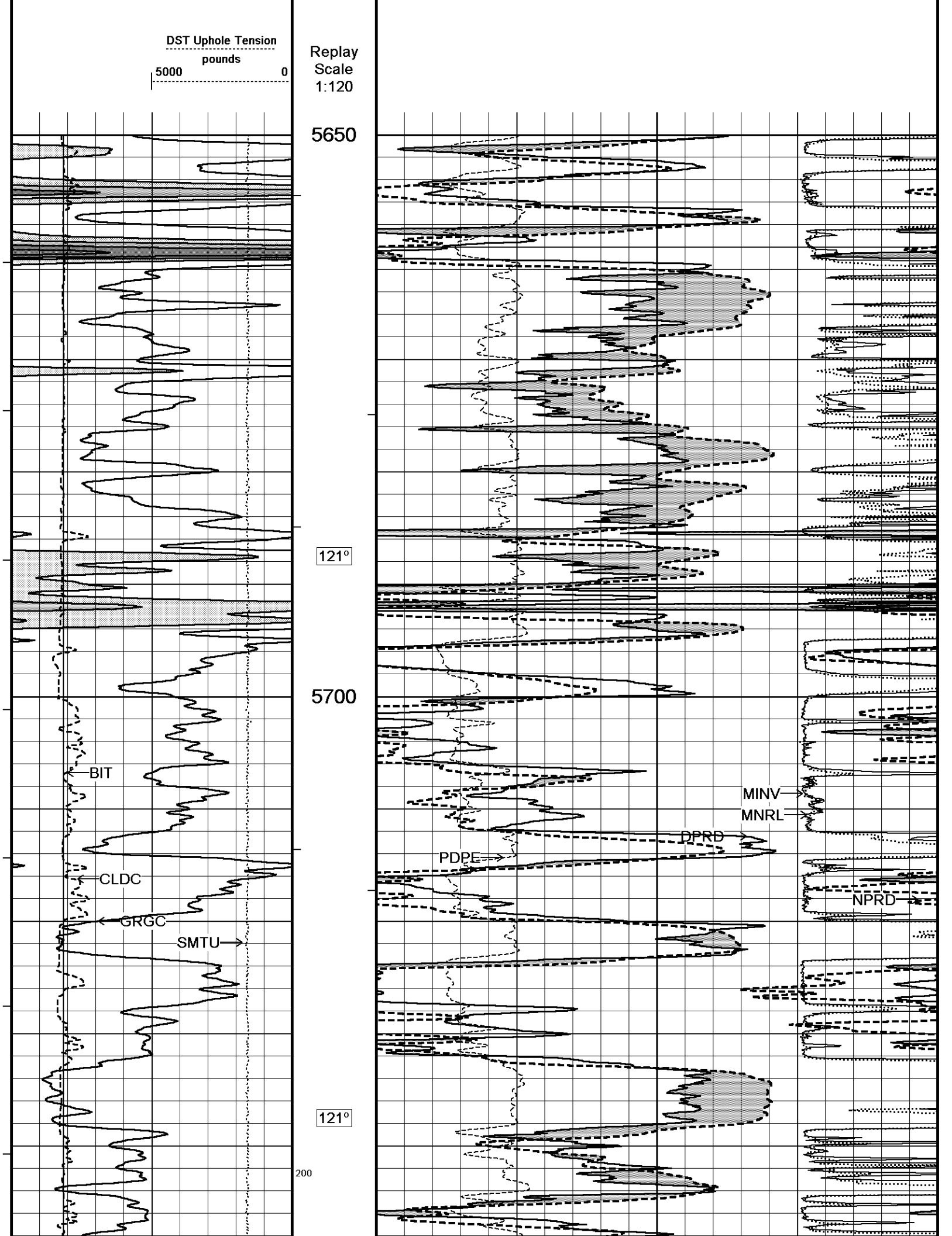
HVI
every
10 cu ft

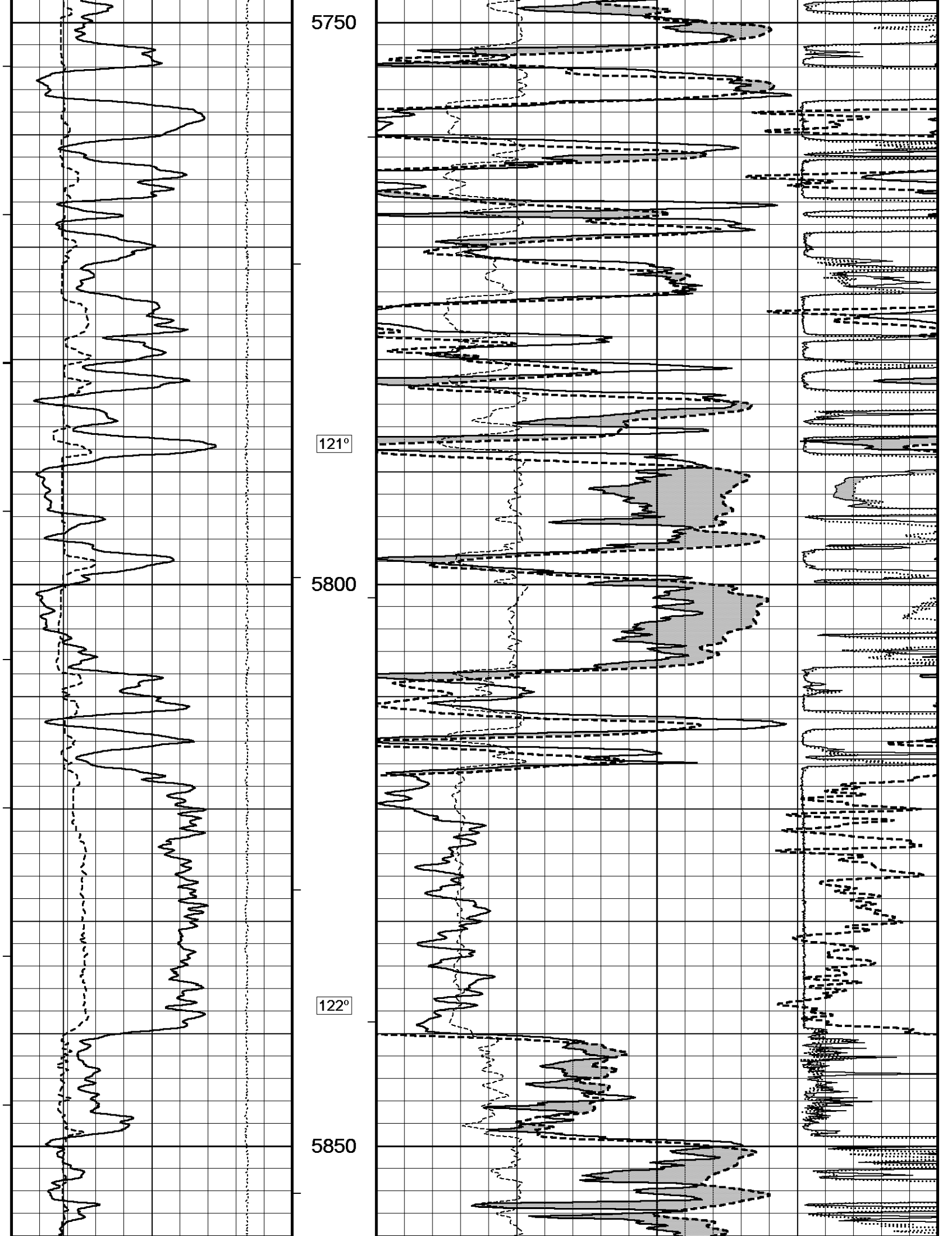
Annular
Integral
every
10 cu ft

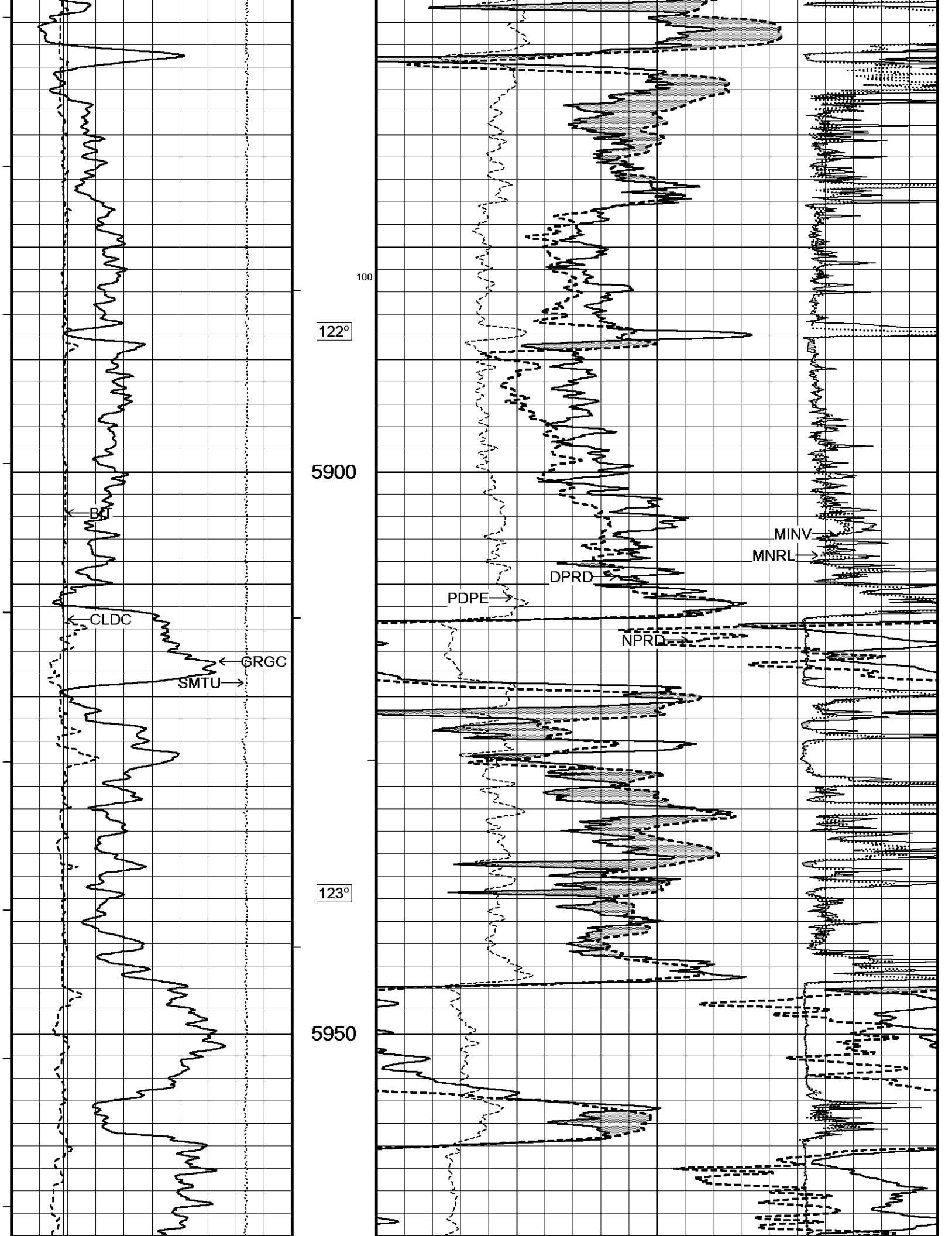
PE
barns/electron
0 5 10

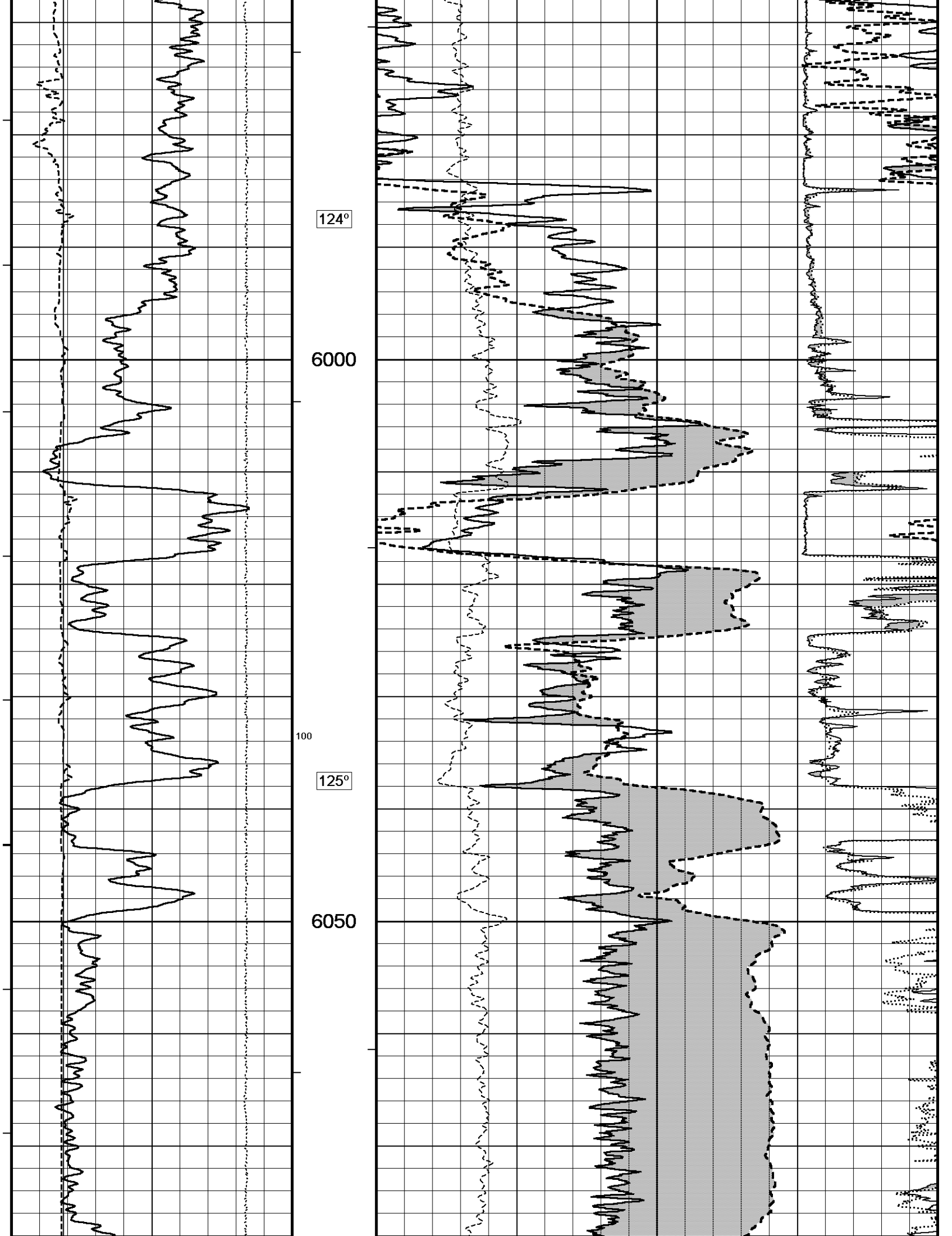
MMR MicroLog Normal
ohm metres
0 20

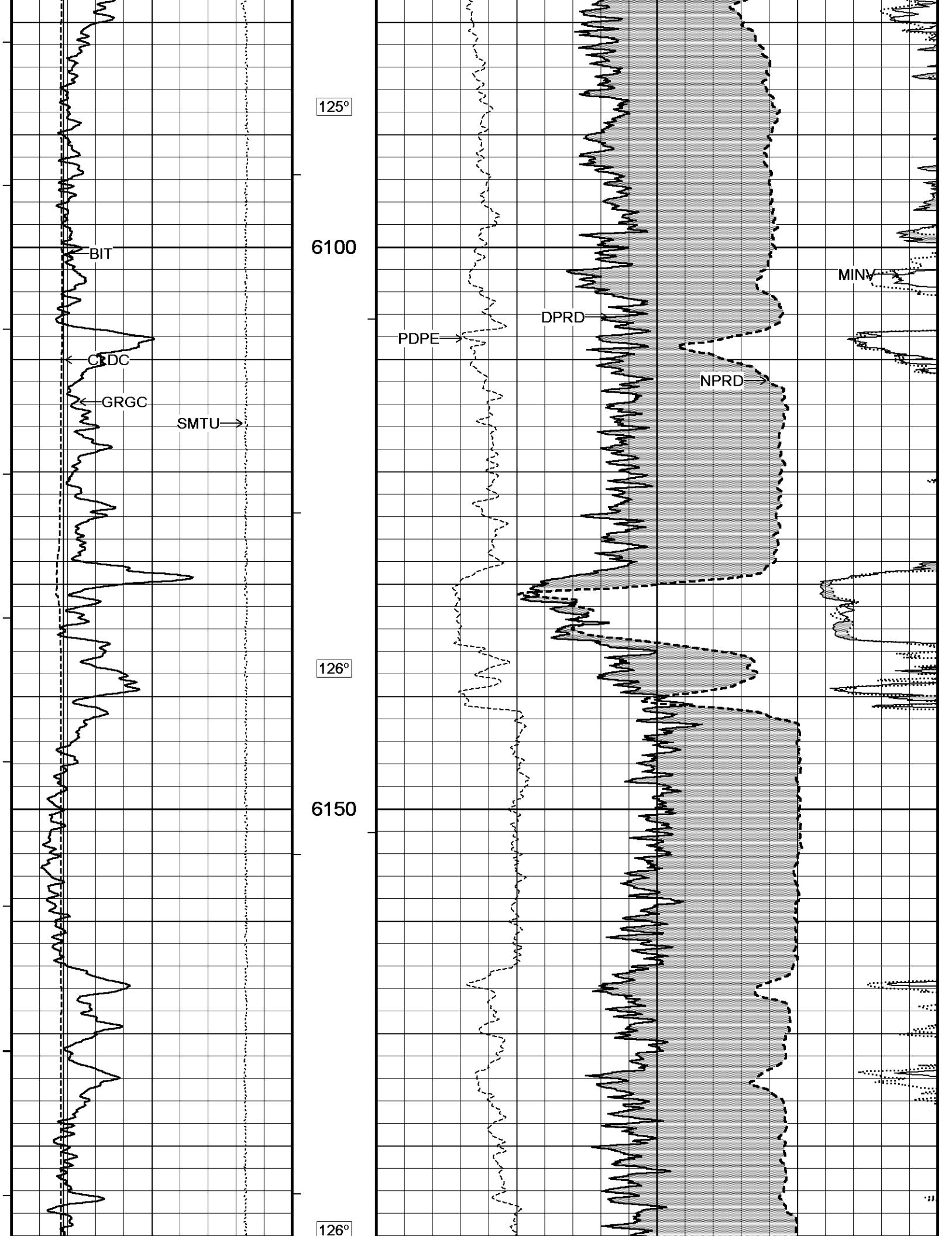
MMR MicroLog Inverse
ohm metres
0 20

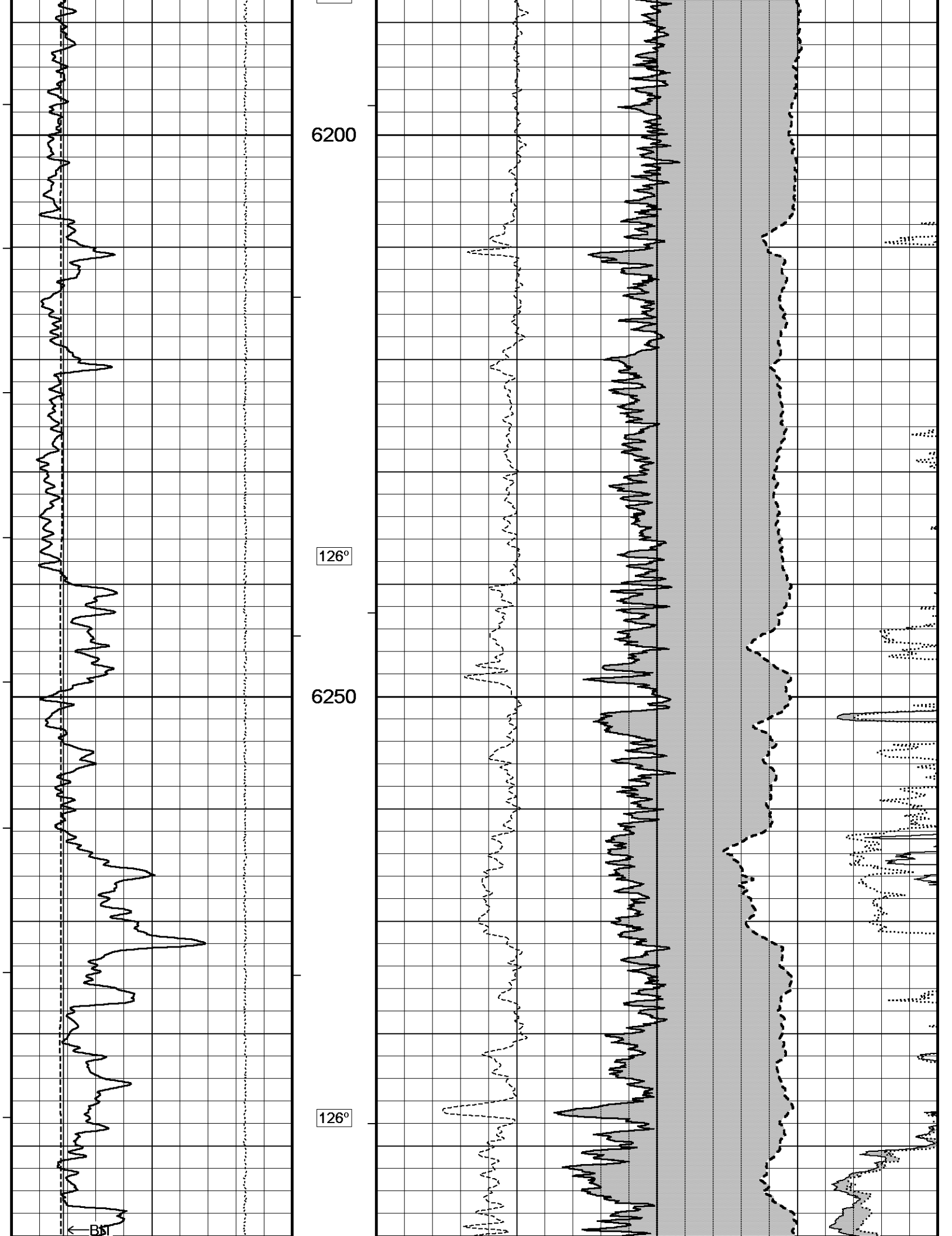

DST Uphole Tension
pounds
5000
0
Replay
Scale
1:120
5650
121°
5700
121°
200
BIT
CLDC
GRGC
SMTU
MINV
MNRL
DPRD
PDPE
NPRD

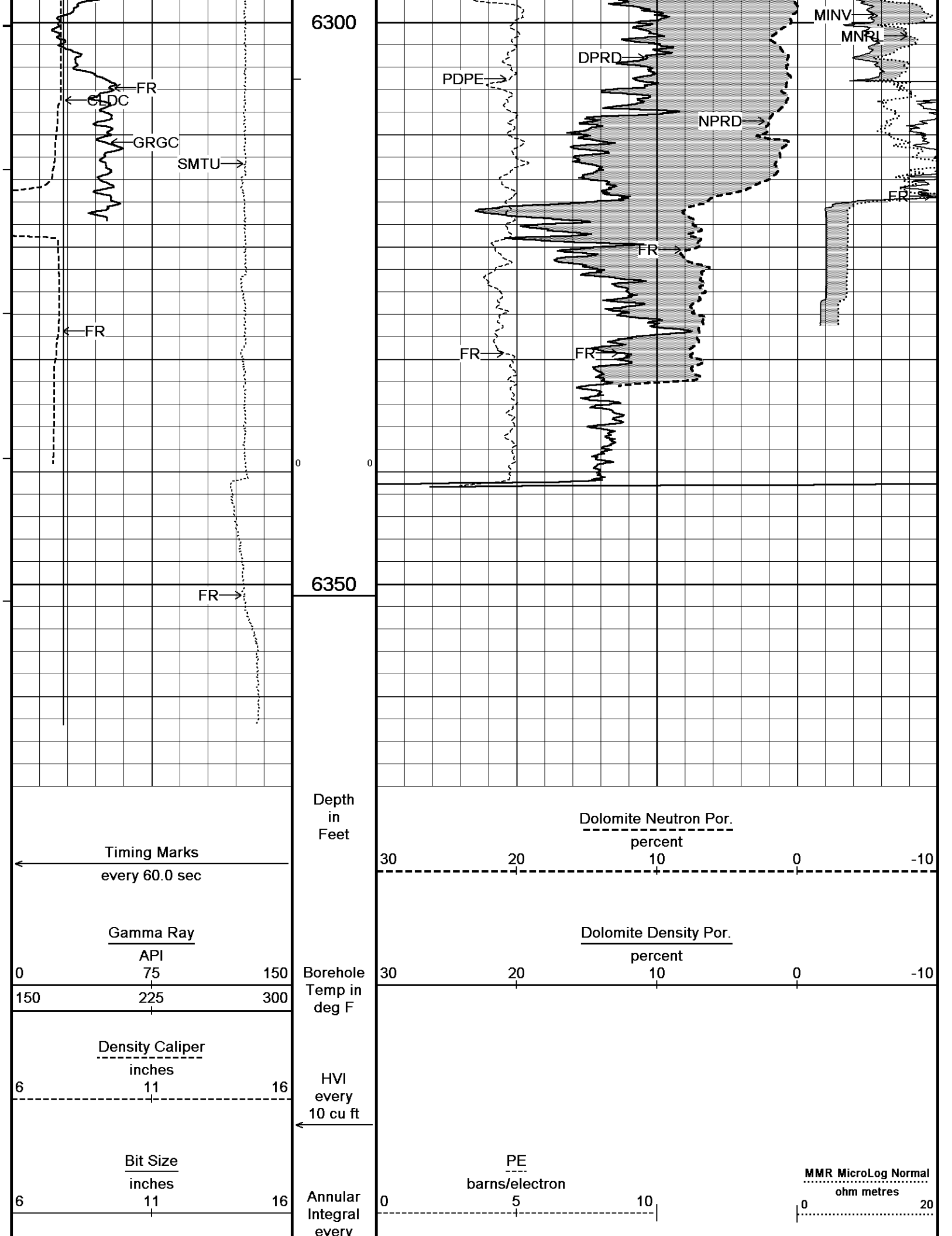

5750
121°
5800
122°
5850


100
122°
5900
BIT
CLDC
GRGC
SMTU
PDPE
DPRD
NPRD
MINV
MNRL
123°
5950


124°
6000
100
125°
6050


125°
6100
BIT
CRDC
GRGC
SMTU
PDPE
DPRD
NPRD
MINV
126°
6150
126°


6200
126°
6250
126°
BIT


6300
6350
FR
CLDC
GRGC
SMTU
FR
FR
DPRD
PDPE
NPRD
FR
FR
FR
MINV
MNRL
FR
0
0
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
Borehole
Temp in
deg F
HVI
every
10 cu ft
Annular
Integral
every
Dolomite Neutron Por.
percent
30
20
10
0
-10
Dolomite Density Por.
percent
30
20
10
0
-10
PE
barns/electron
0
5
10
MMR MicroLog Normal
ohm metres
0
20

10 cu ft

MMR MicroLog Inverse
ohm metres
0 20

DST Uphole Tension
pounds
5000 0

Replay
Scale
1:120

Depth Based Data - Maximum Sampling Increment 2.5cm — Plotted on 07-SEP-2018 23:02
Filename: C:\Minimus 18.01.6830\Data\O'Brien Preedy #3-4\O'Brien Preedy #3-4_001.dta — Recorded on 07-SEP-2018 17:09
System Versions: Logged with 18.01.6830 Plotted with 18.01.6830

10 INCH HIGH RESOLUTION DOLOMITE

5 INCH MAIN BULK DENSITY LIMESTONE

Depth Based Data - Maximum Sampling Increment 10.0cm — Plotted on 07-SEP-2018 23:02
Filename: C:\Minimus 18.01.6830\Data\O'Brien Preedy #3-4\O'Brien Preedy #3-4_003.dta — Recorded on 07-SEP-2018 18:49
System Versions: Logged with 18.01.6830 Processed with 18.01.6830 Plotted with 18.01.6830

Timing Marks
every 60.0 sec

Depth
in
Feet

Compensated Density
grams/cc
2 2.25 2.50 2.75 3

Gamma Ray
API
0 75 150
150 225 300

Borehole
Temp in
deg F

Limestone Density Por.
percent
30 20 10 0 -10

Density Caliper
inches
6 11 16

HVI
every
10 cu ft

Bit Size
inches
6 11 16

Annular
Integral
every
10 cu ft

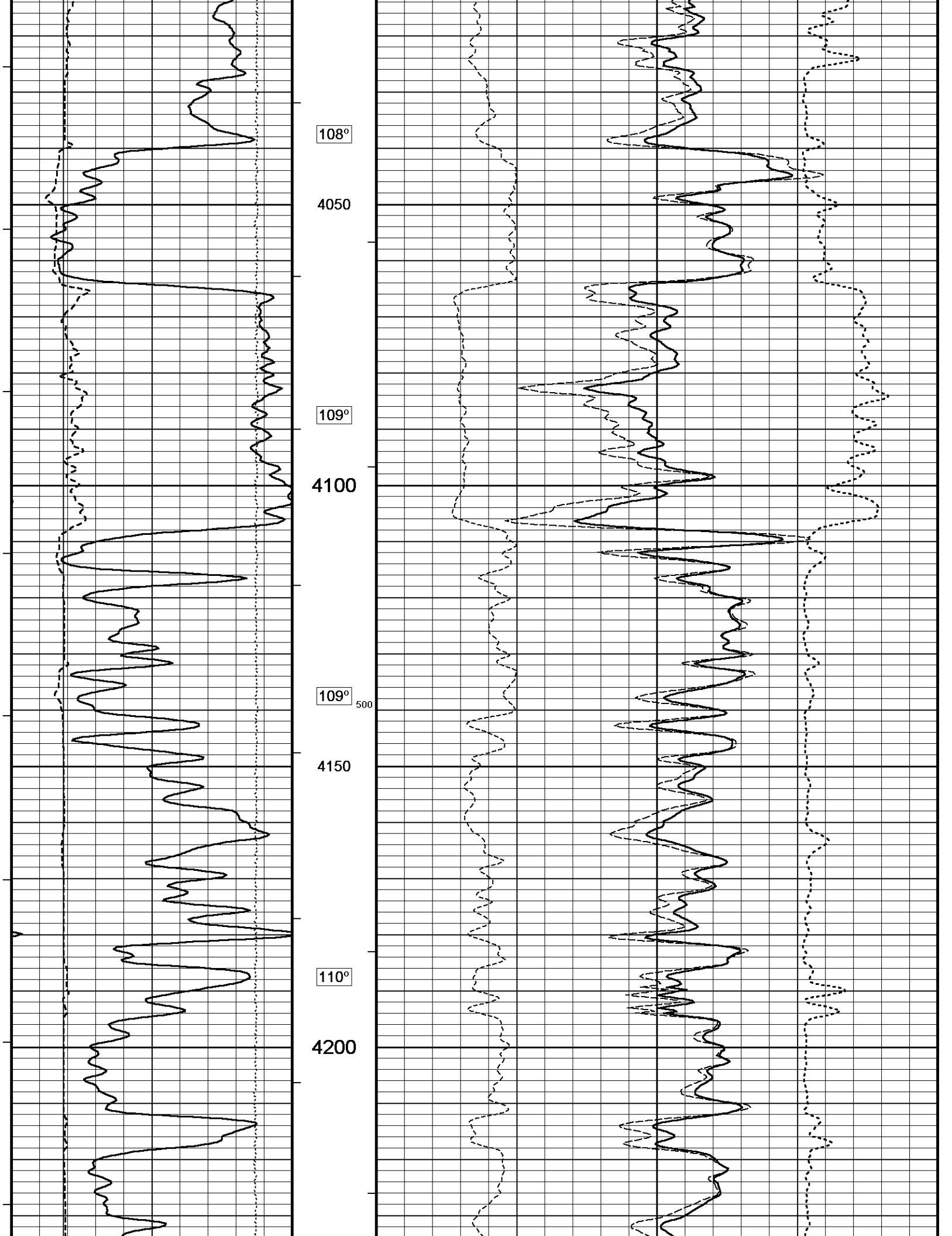
PE
barns/electron
0 5 10

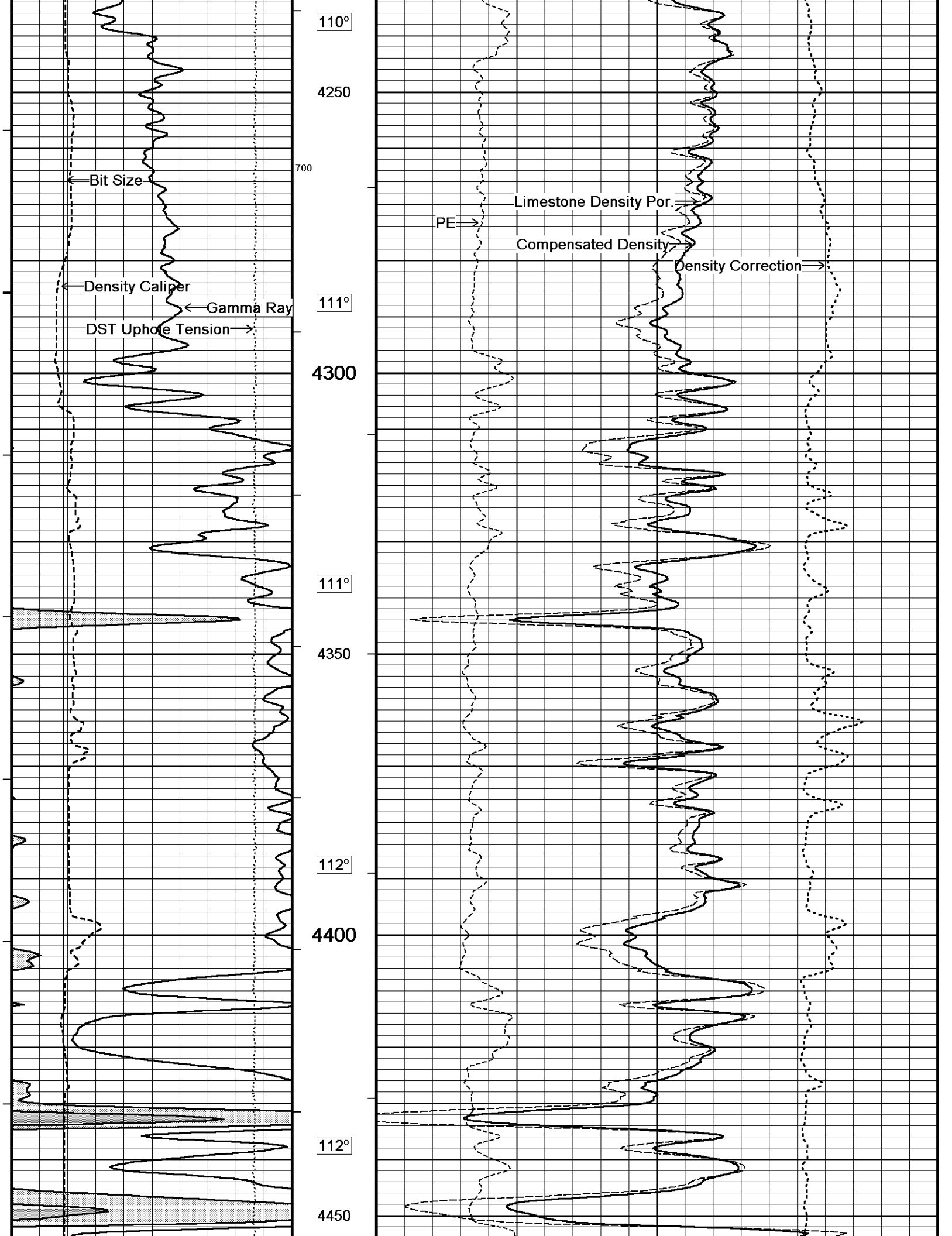
Density Correction
grams/cc
-0.50 0 0.50

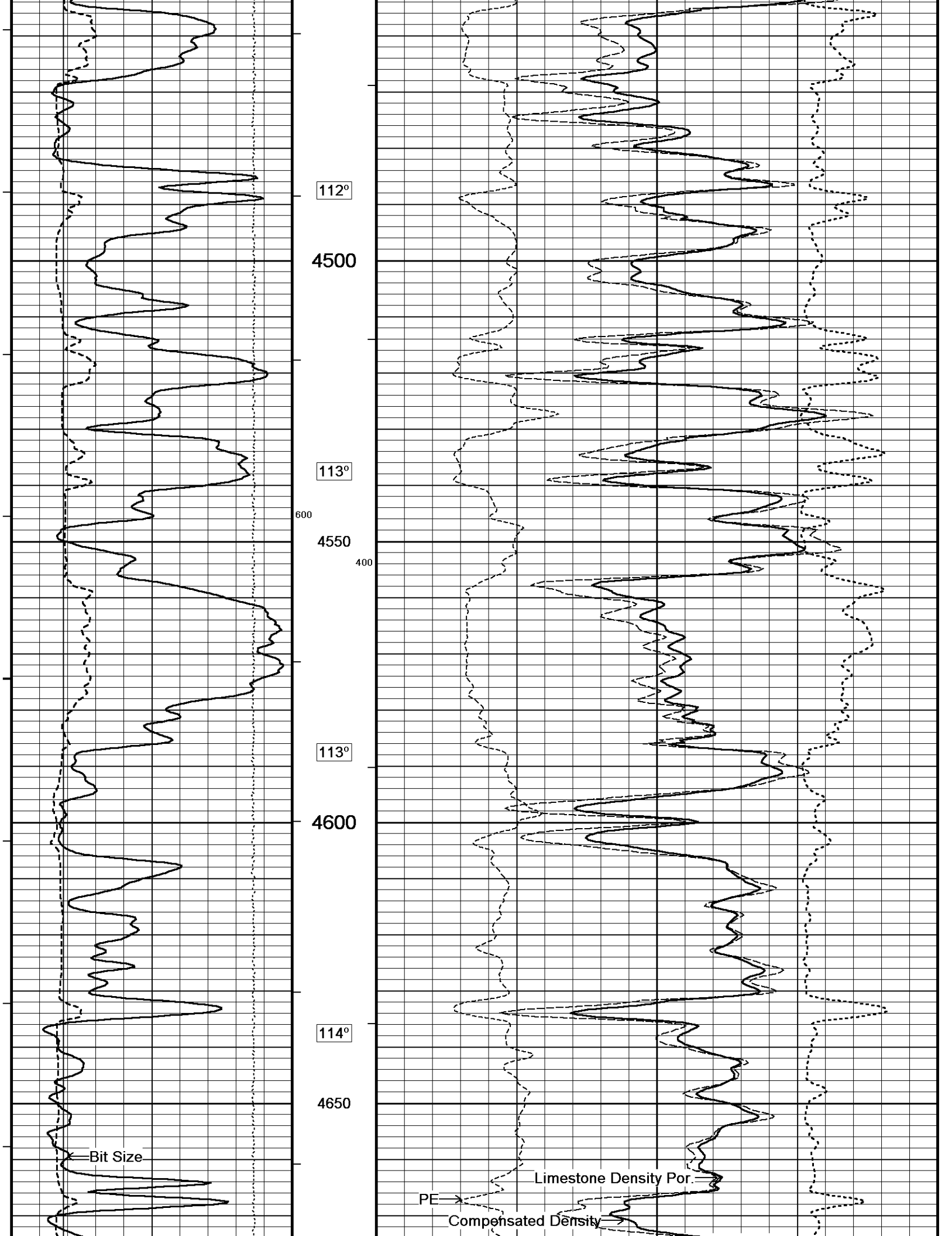
DST Uphole Tension
pounds
5000 0

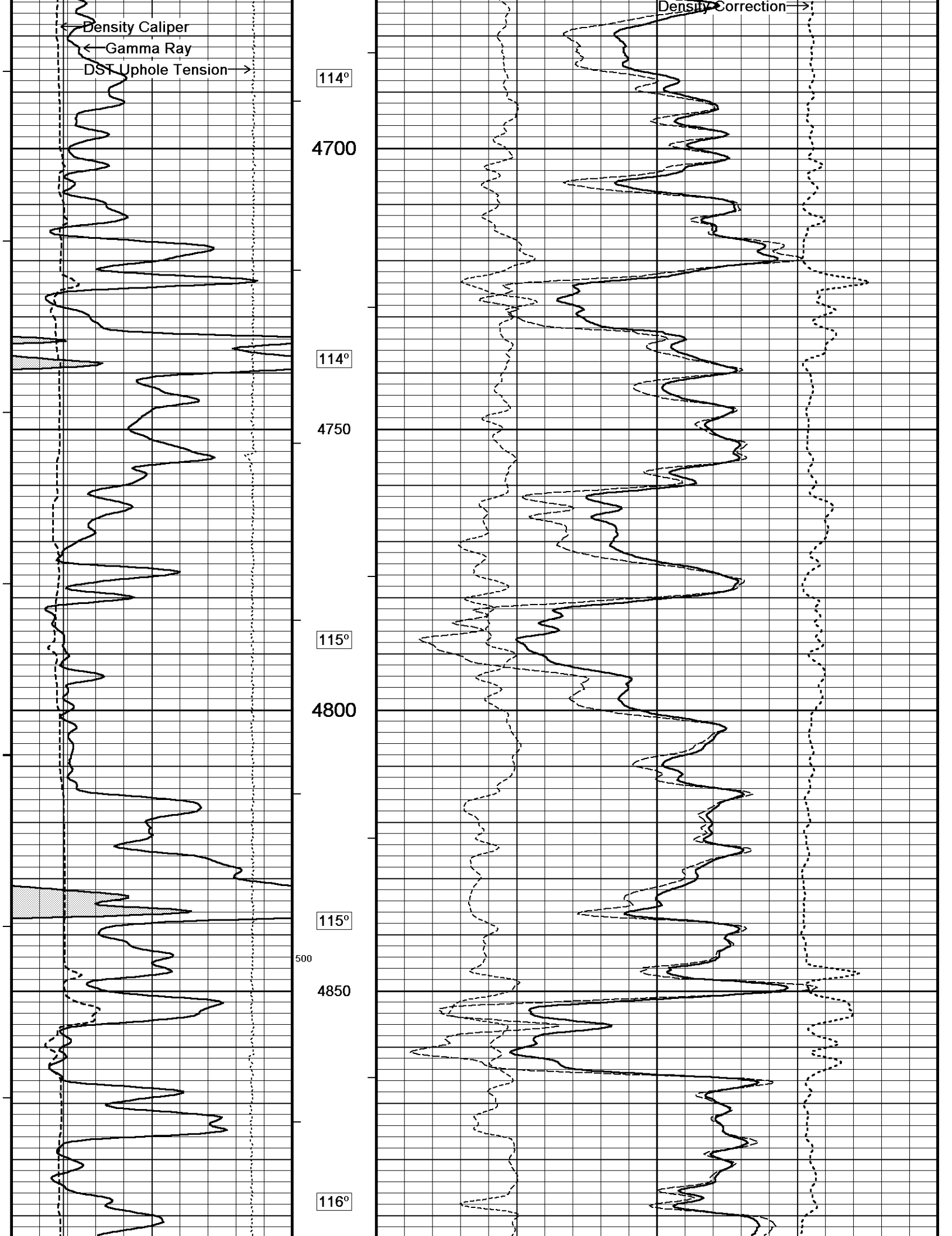
Replay
Scale
1:240

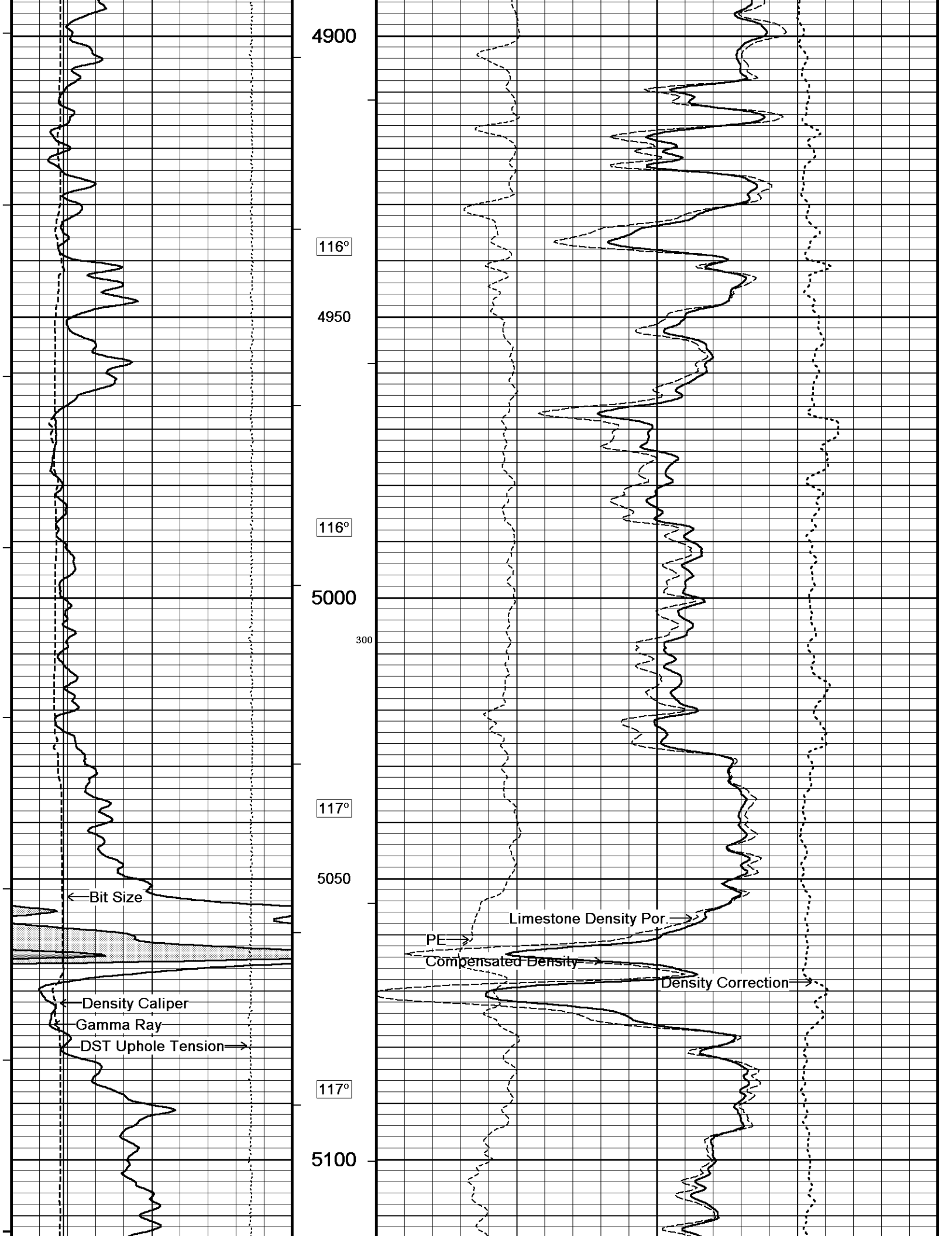
4000

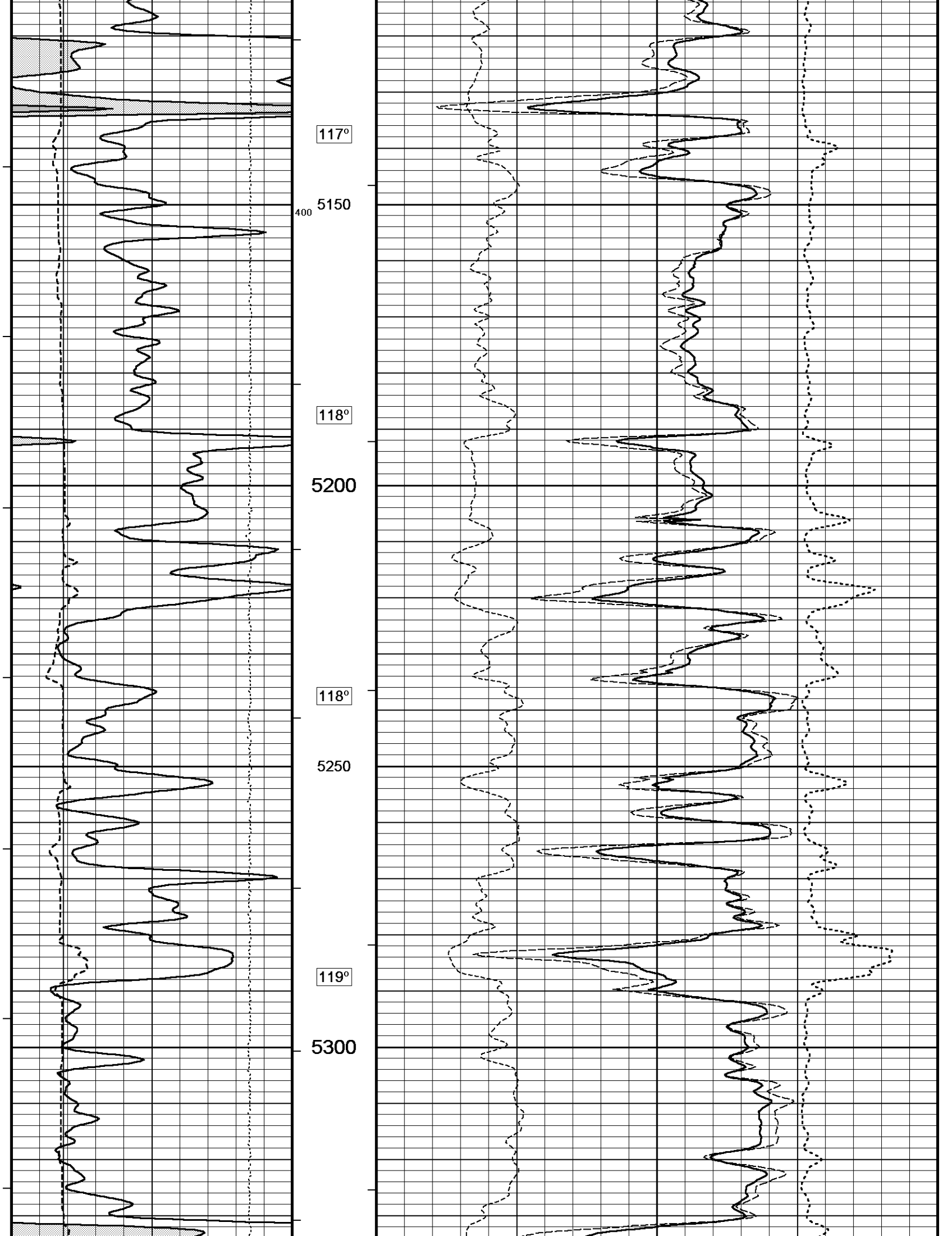

108°
4050
109°
4100
109°
500
4150
110°
4200

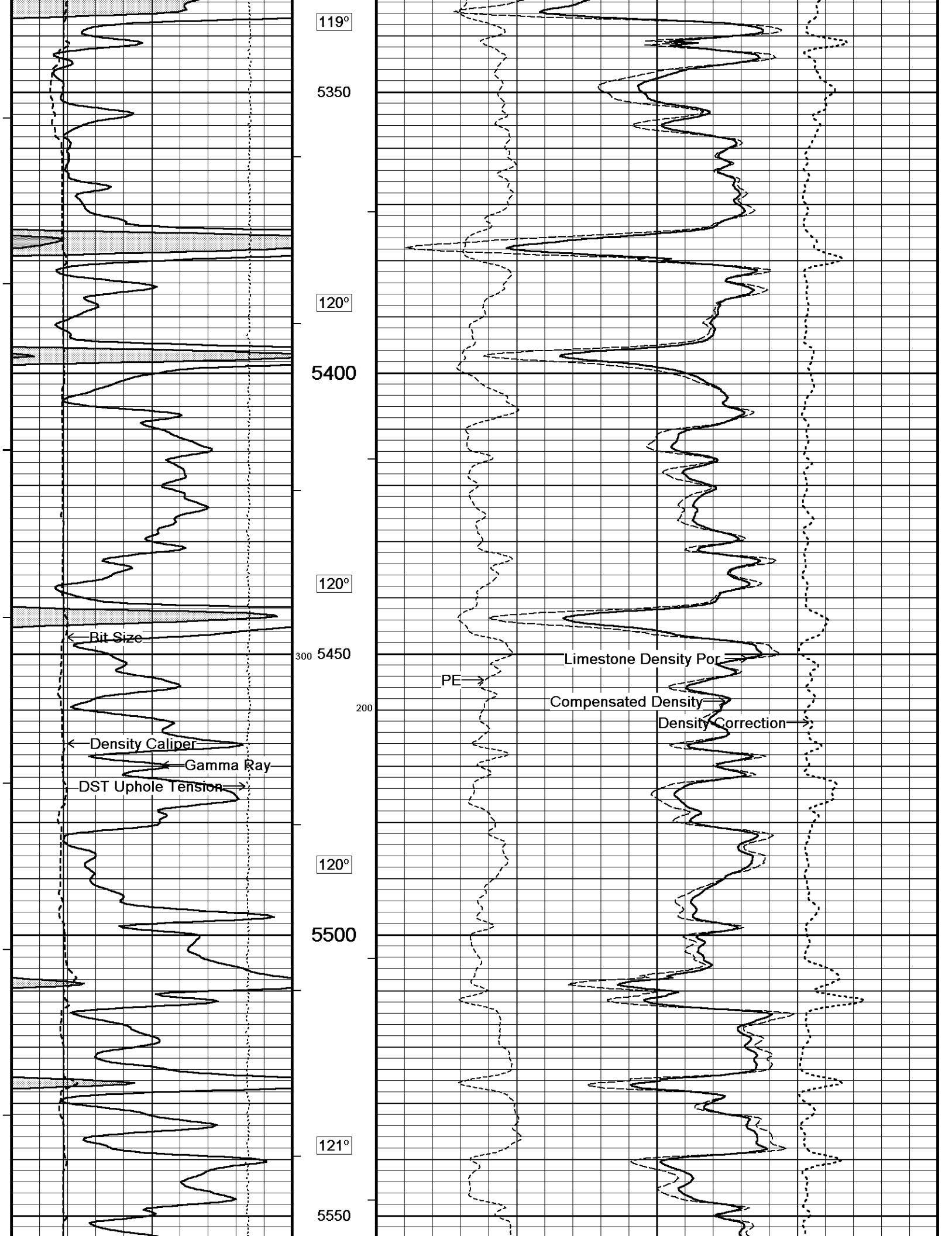

110°
4250
700
Bit Size
Limestone Density Por.
PE
Compensated Density
Density Correction
Density Caliper
Gamma Ray
111°
DST Uphole Tension
4300
111°
4350
112°
4400
112°
4450

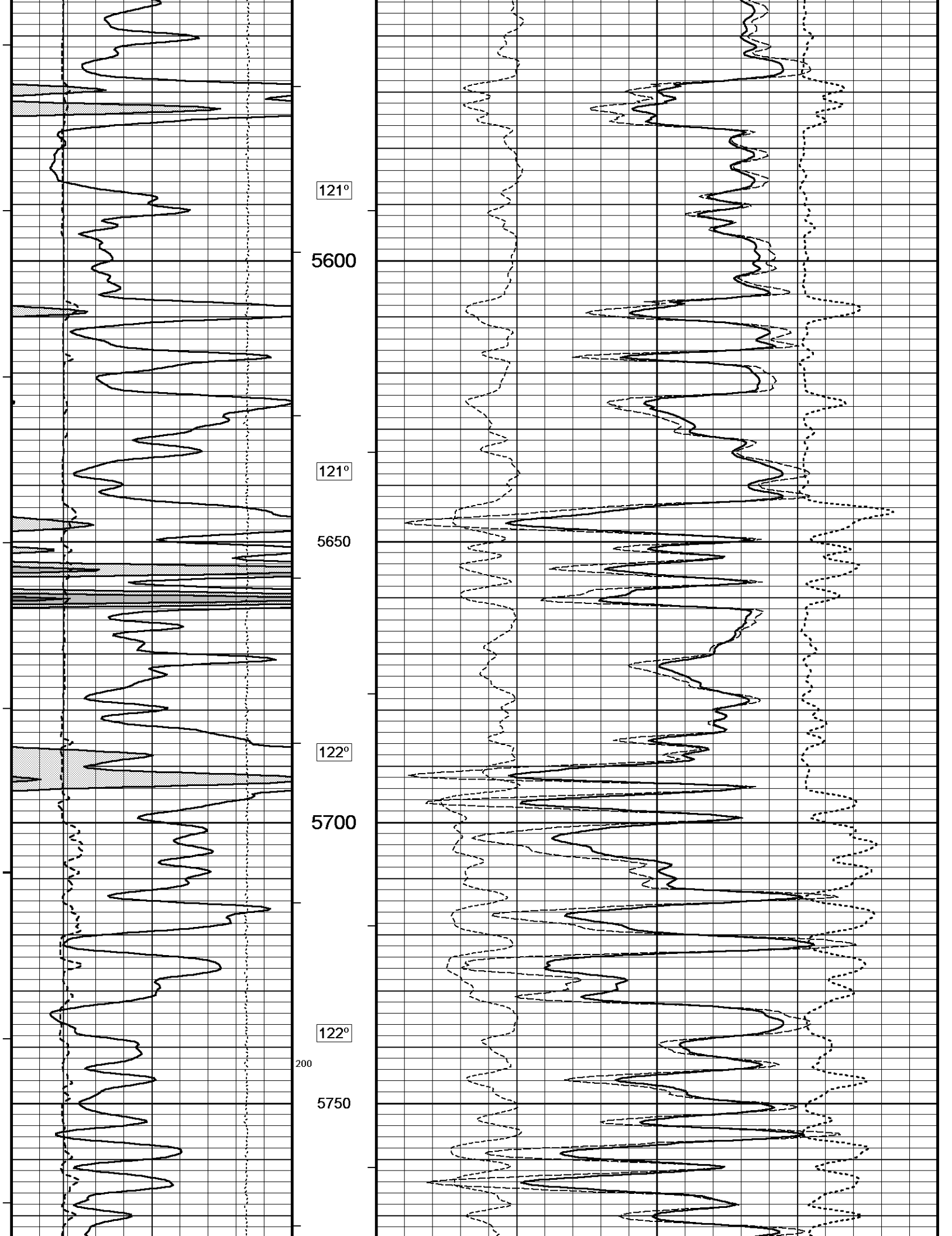

112°
4500
113°
600
4550
400
113°
4600
114°
4650
Bit Size
Limestone Density Por.
PE
Compensated Density

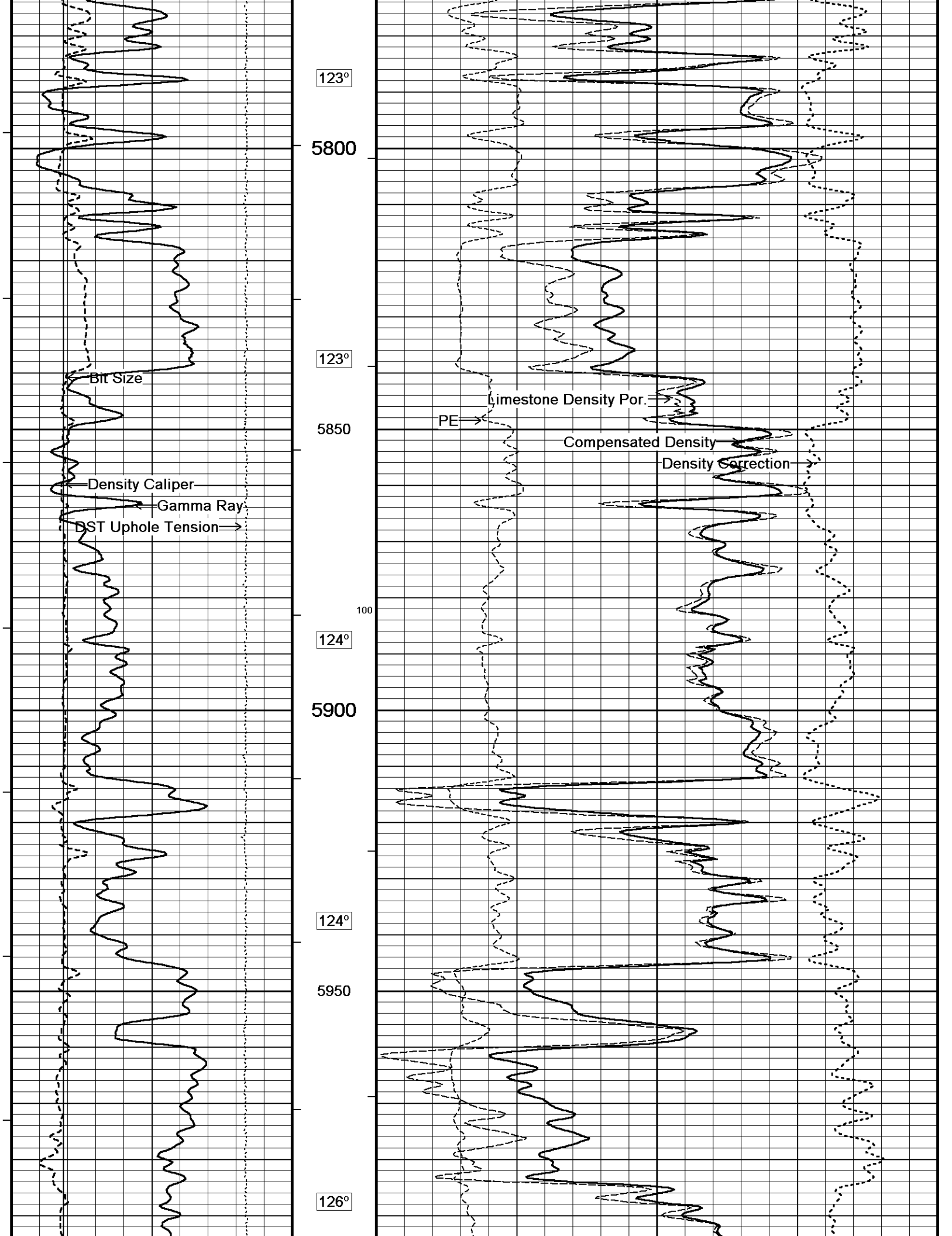

Density Caliper
Gamma Ray
DST Uphole Tension
Density Correction
114°
4700
114°
4750
115°
4800
115°
500
4850
116°

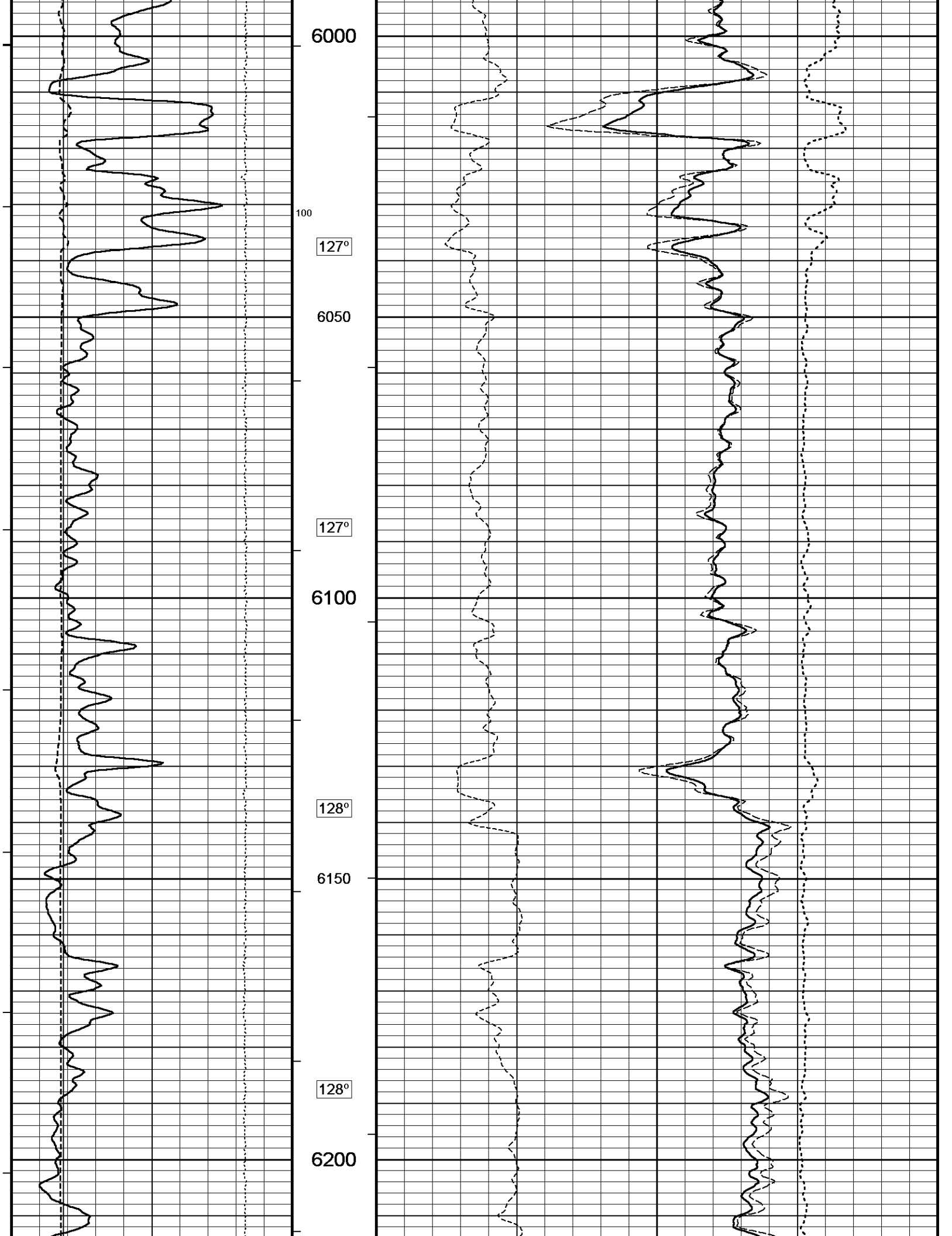

4900
116°
4950
116°
5000
300
117°
5050
Bit Size
Limestone Density Por.
PE
Compensated Density
Density Correction
Density Caliper
Gamma Ray
DST Uphole Tension
117°
5100

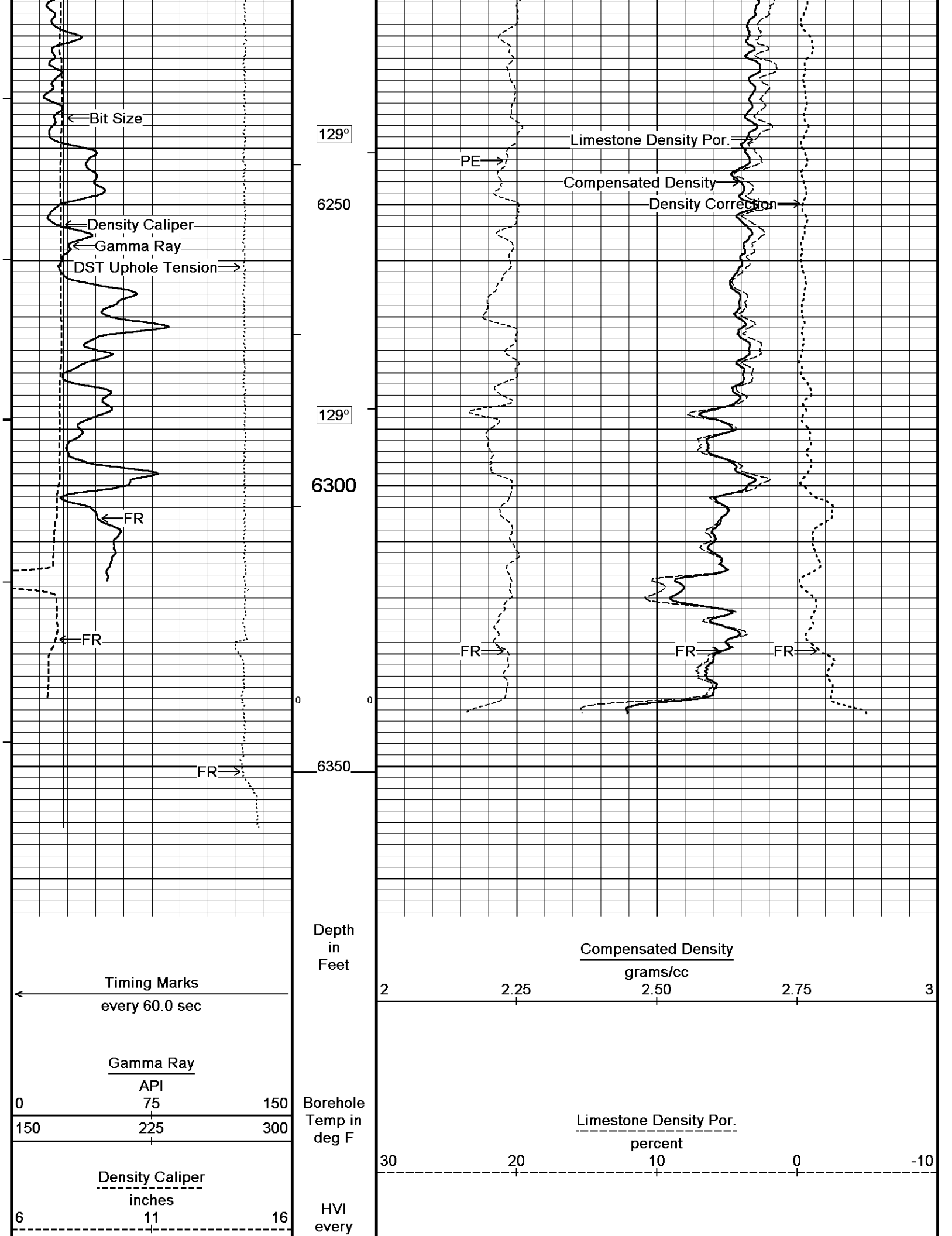

117°
400
5150
118°
5200
118°
5250
119°
5300

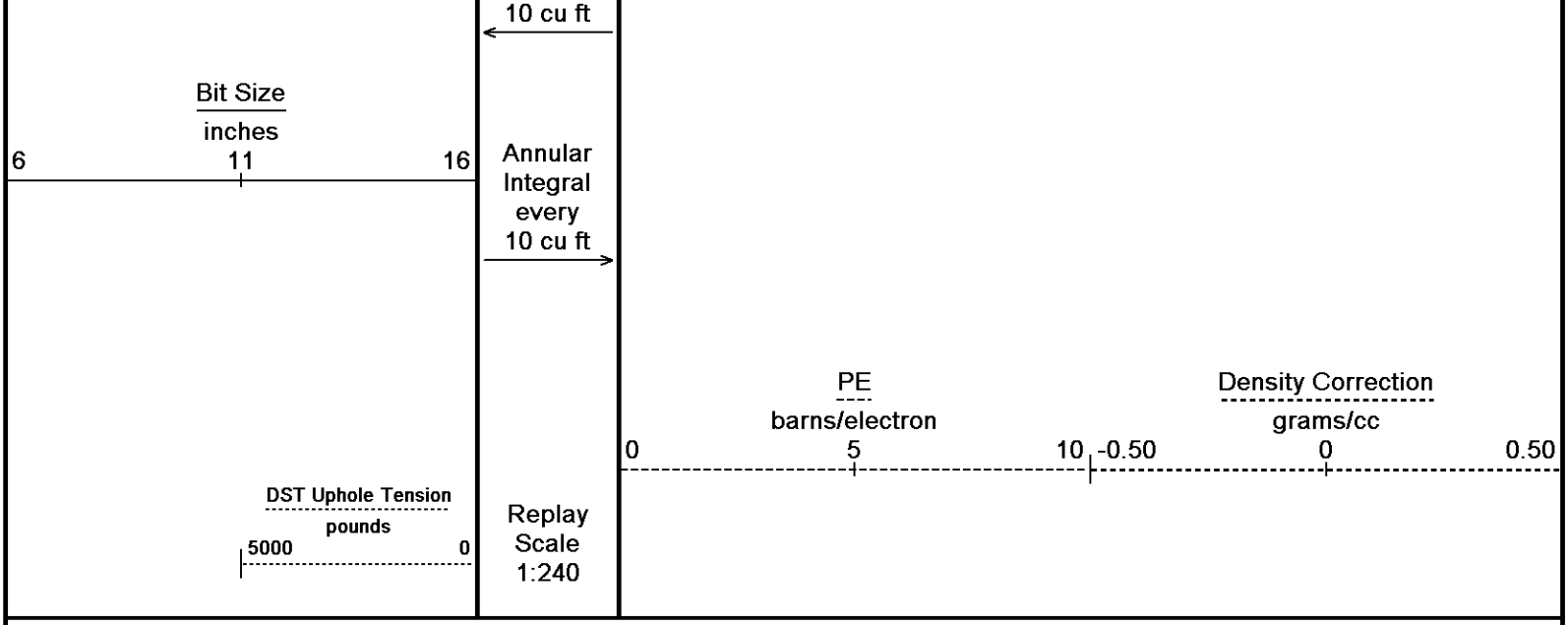

119°
5350
120°
5400
120°
Bit Size
300
5450
Limestone Density Por
PE
200
Compensated Density
Density Correction
Density Caliper
Gamma Ray
DST Uphole Tension
120°
5500
121°
5550


121°
5600
121°
5650
122°
5700
122°
200
5750


123°
5800
123°
Bit Size
Limestone Density Por.
PE
5850
Compensated Density
Density Correction
Density Caliper
Gamma Ray
DST Uphole Tension
100
124°
5900
124°
5950
126°


6000
100
127°
6050
127°
6100
128°
6150
128°
6200


Bit Size
Density Caliper
Gamma Ray
DST Uphole Tension
FR
FR
FR
129°
6250
129°
6300
6350
PE
Limestone Density Por.
Compensated Density
Density Correction
FR
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
HVI
every
Borehole Temp in deg F
Compensated Density
grams/cc
2
2.25
2.50
2.75
3
Limestone Density Por.
percent
30
20
10
0
-10

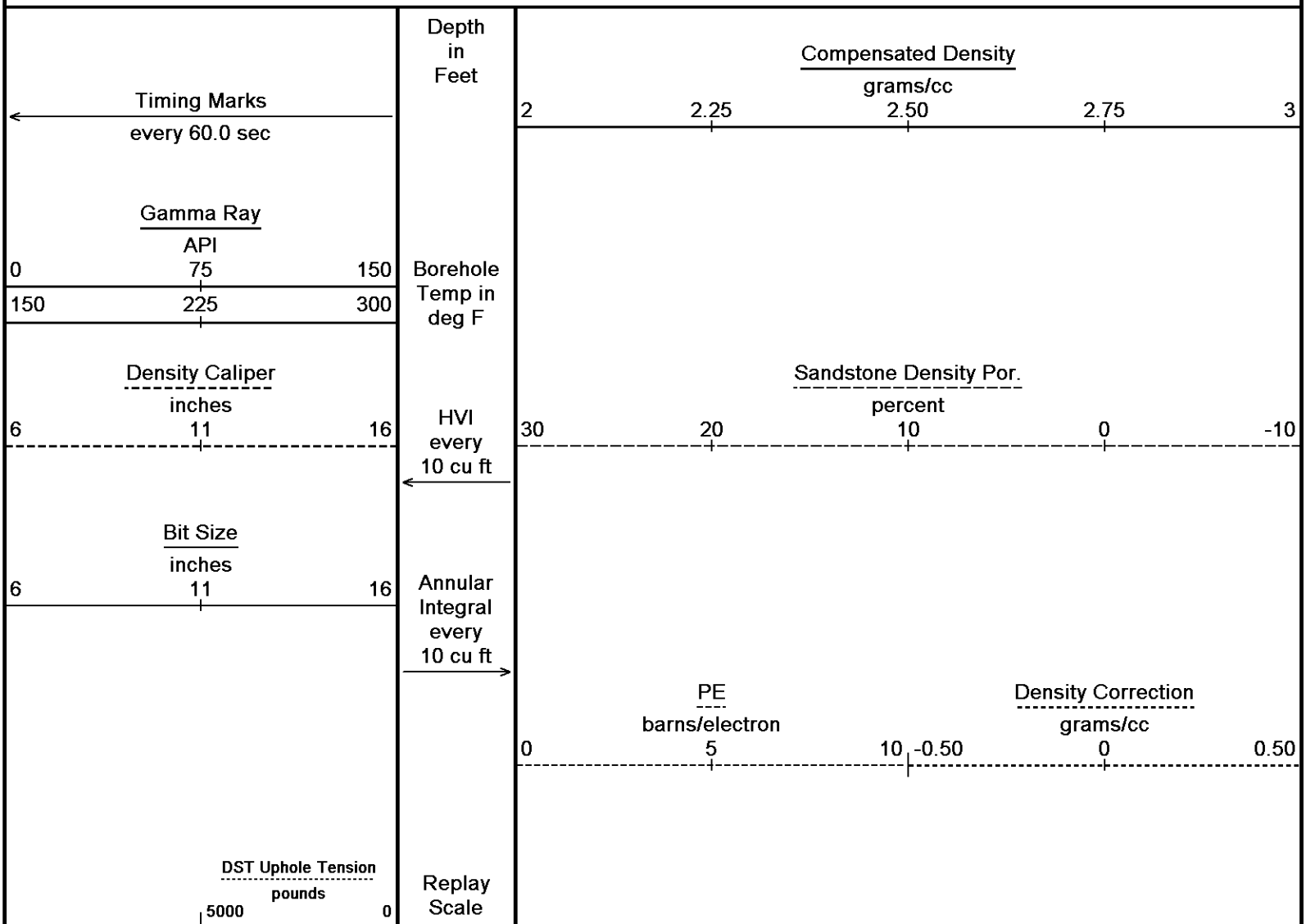


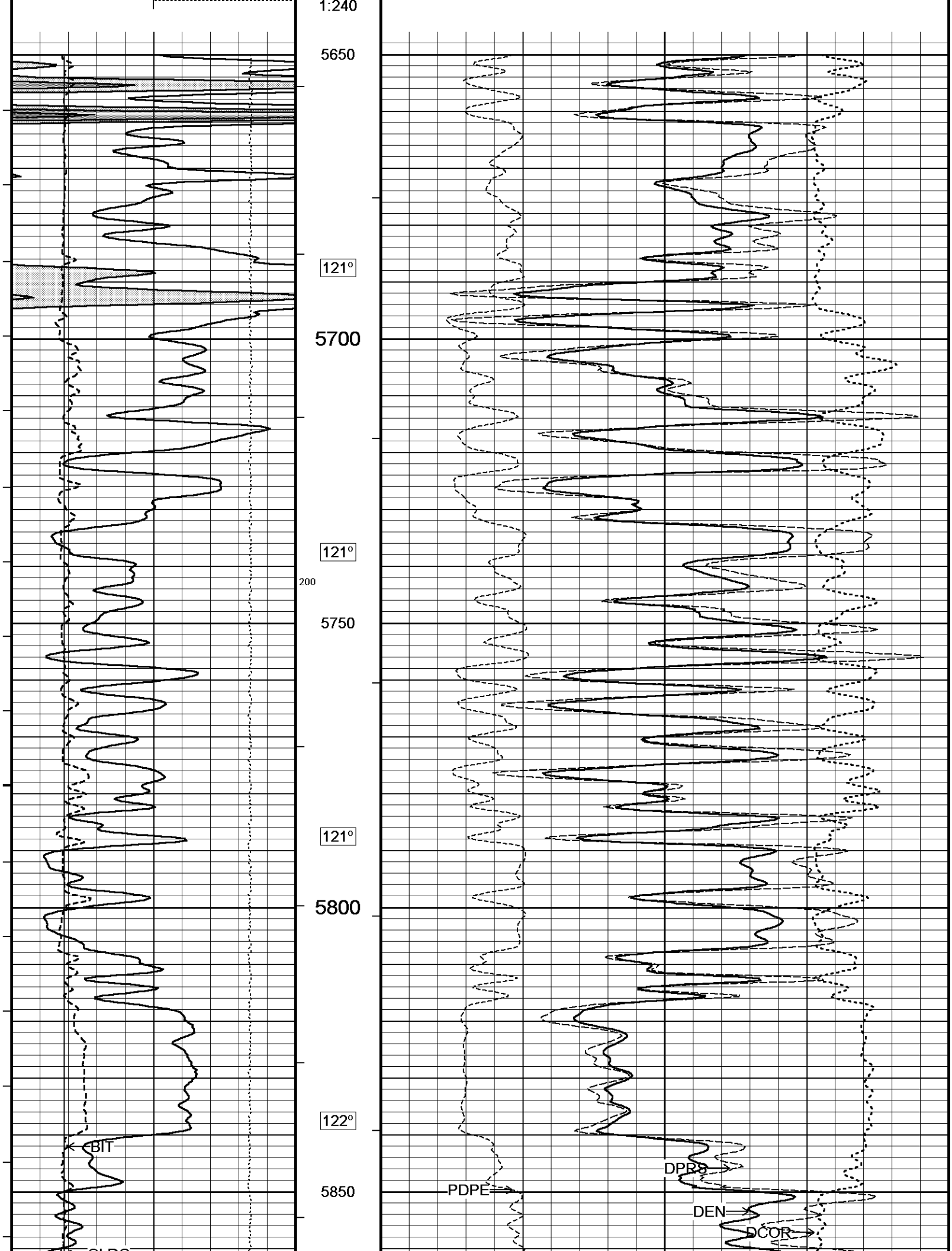
Depth Based Data - Maximum Sampling Increment 10.0cm — Plotted on 07-SEP-2018 23:02
Filename: C:\Minimus 18.01.6830\Data\O'Brien Preedy #3-4\O'Brien Preedy #3-4_003.dta — Recorded on 07-SEP-2018 18:49
System Versions: Logged with 18.01.6830 Processed with 18.01.6830 Plotted with 18.01.6830

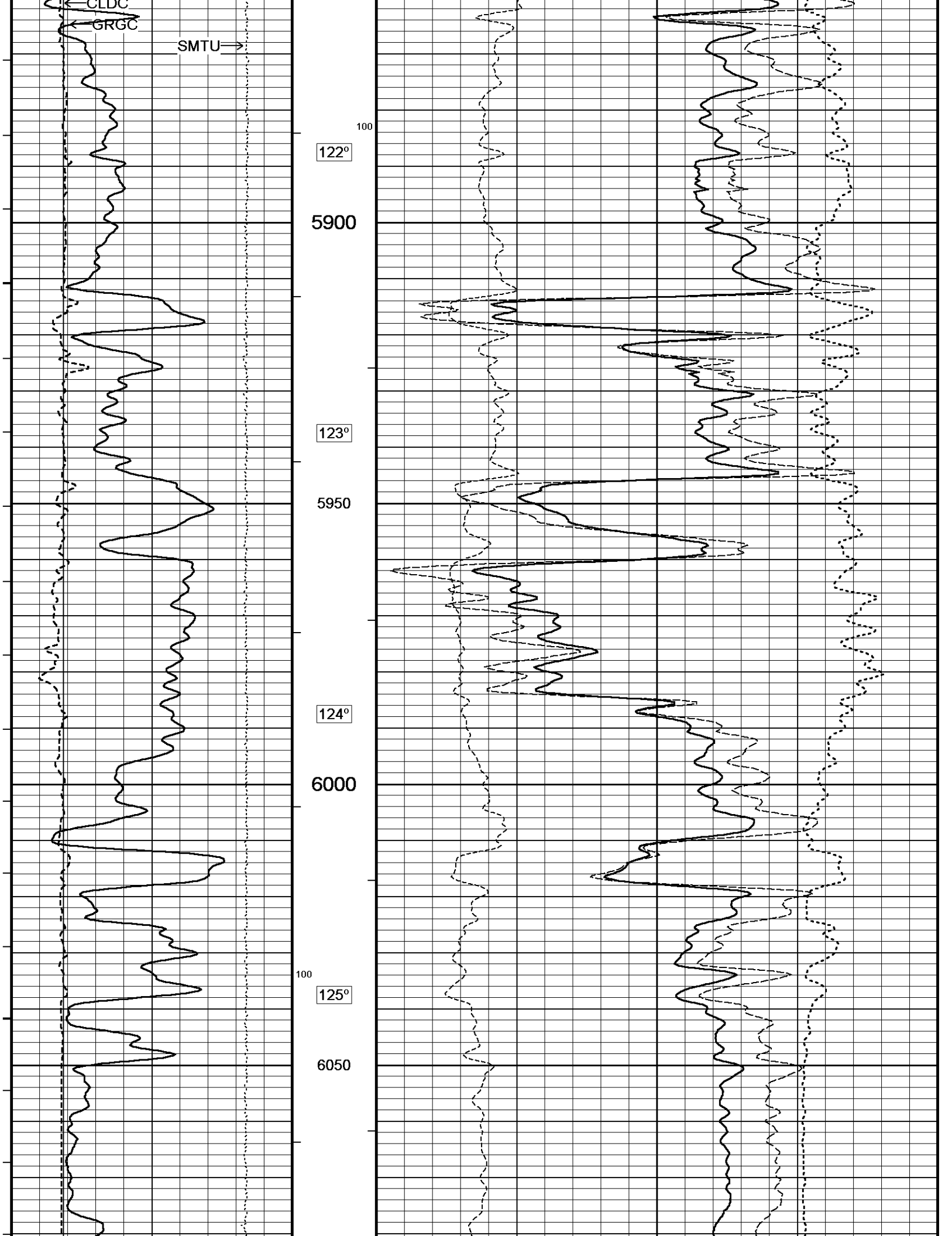
5 INCH MAIN BULK DENSITY LIMESTONE

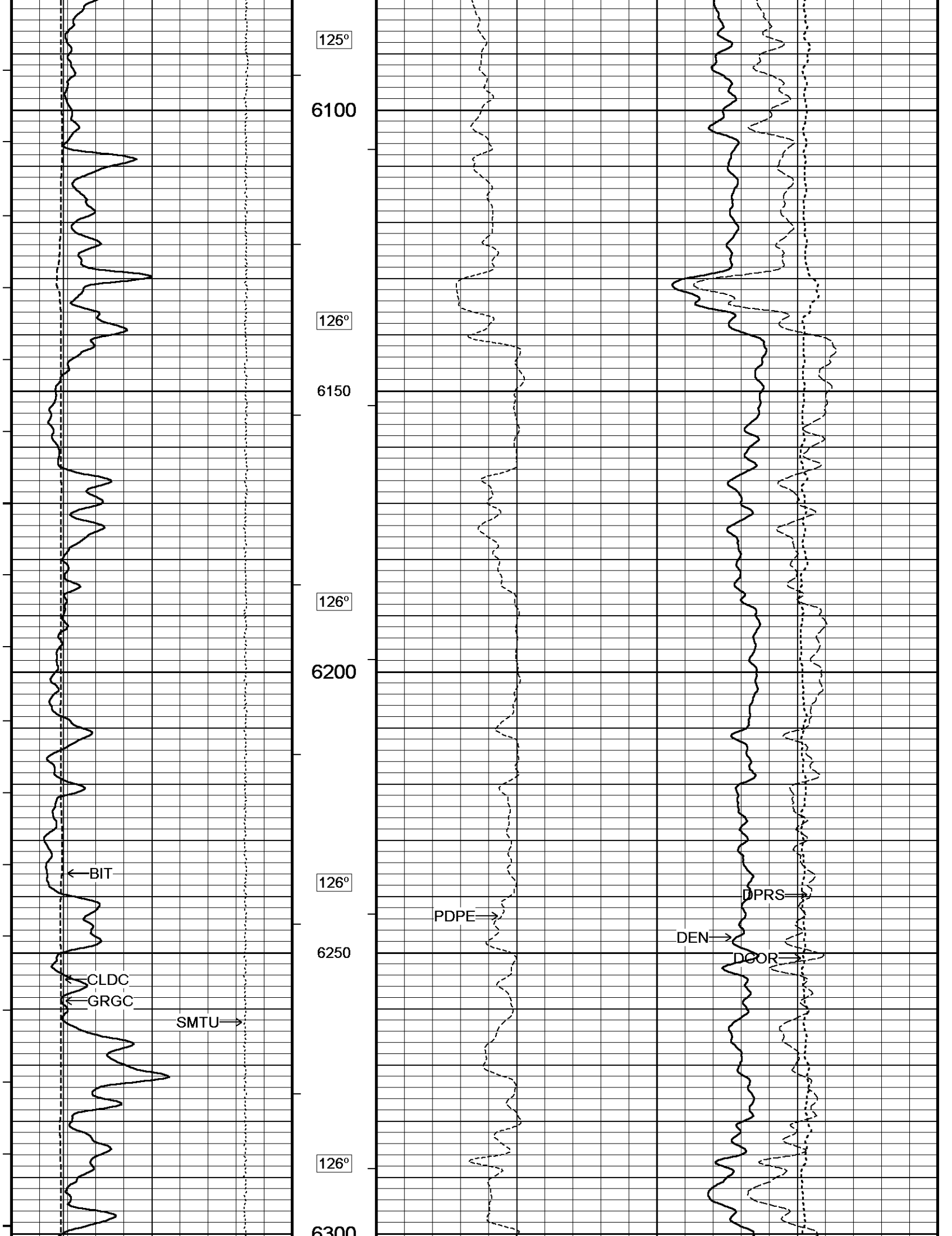
REPEAT SECTION BULK DENSITY SANDSTONE

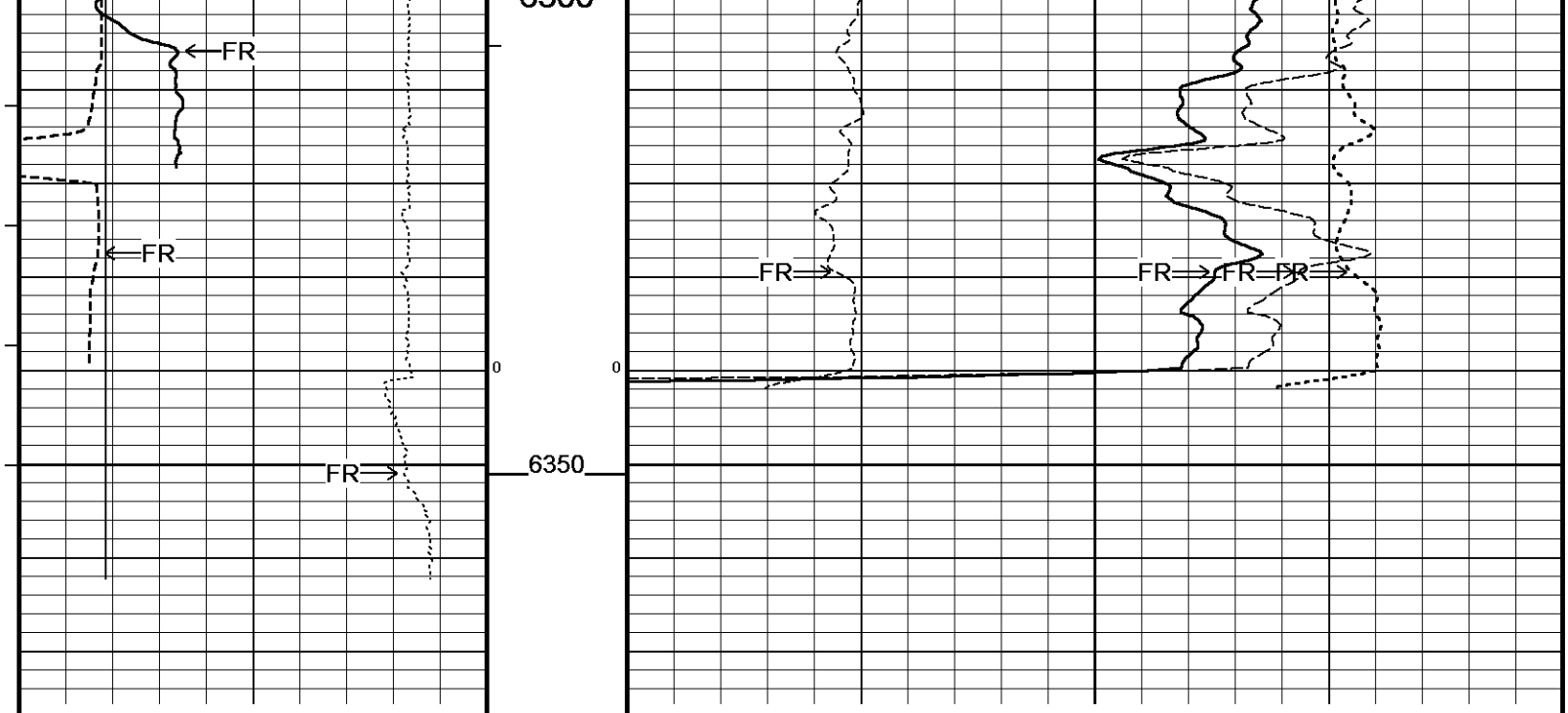
Depth Based Data - Maximum Sampling Increment 10.0cm — Plotted on 07-SEP-2018 23:02
Filename: C:\Minimus 18.01.6830\Data\O'Brien Preedy #3-4\O'Brien Preedy #3-4_002.dta — Recorded on 07-SEP-2018 17:09
System Versions: Logged with 18.01.6830 Processed with 18.01.6830 Plotted with 18.01.6830




1:240
5650
121°
5700
121°
200
5750
121°
5800
122°
BIT
5850
PDPE
DPRS
DEN
DCOR


CLDC
GRGC
SMTU
100
122°
5900
123°
5950
124°
6000
100
125°
6050


125°
6100
126°
6150
126°
6200
126°
6250
126°
6300
BIT
CLDC
GRGC
SMTU
PDPE
DPRS
DEN
DCOR



6350

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

Sandstone 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 07-SEP-2018 23:02
Filename: C:\Minimus 18.01.6830\Data\O'Brien Preedy #3-4\O'Brien Preedy #3-4_002.dta
Recorded on 07-SEP-2018 17:09
System Versions: Logged with 18.01.6830 Processed with 18.01.6830 Plotted with 18.01.6830

REPEAT SECTION BULK DENSITY SANDSTONE

10 INCH HIGH RESOLUTION BULK DENSITY SANDSTONE

Depth Based Data - Maximum Sampling Increment 2.5cm
Plotted on 07-SEP-2018 23:02
Filename: C:\Minimus 18.01.6830\Data\O'Brien Preedy #3-4\O'Brien Preedy #3-4_001.dta
Recorded on 07-SEP-2018 17:09
System Versions: Logged with 18.01.6830 Plotted with 18.01.6830

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 1:120

Vectar Processed Density
grams/cc
2 2.25 2.50 2.75 3

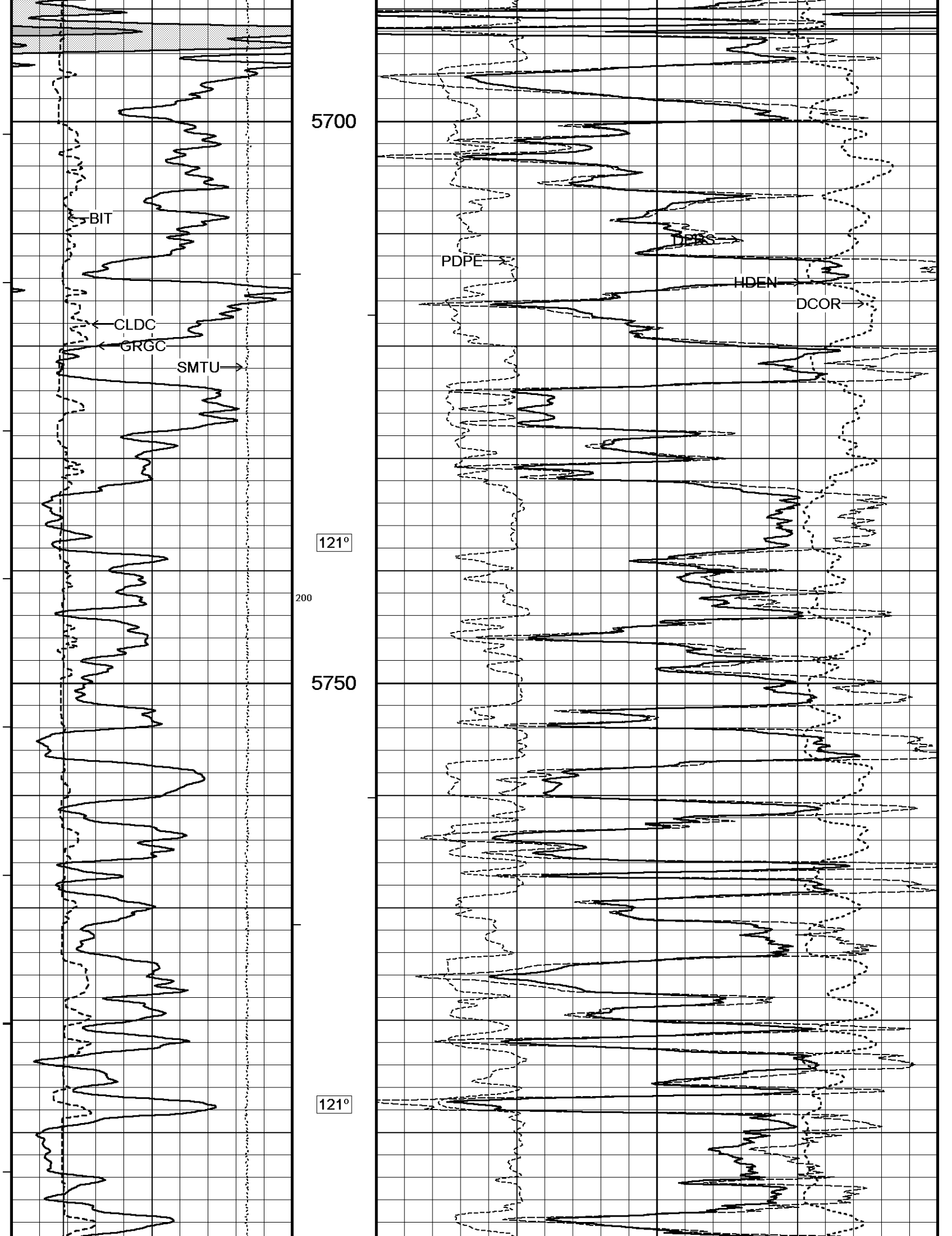
Sandstone Density Por.
percent
30 20 10 0 -10

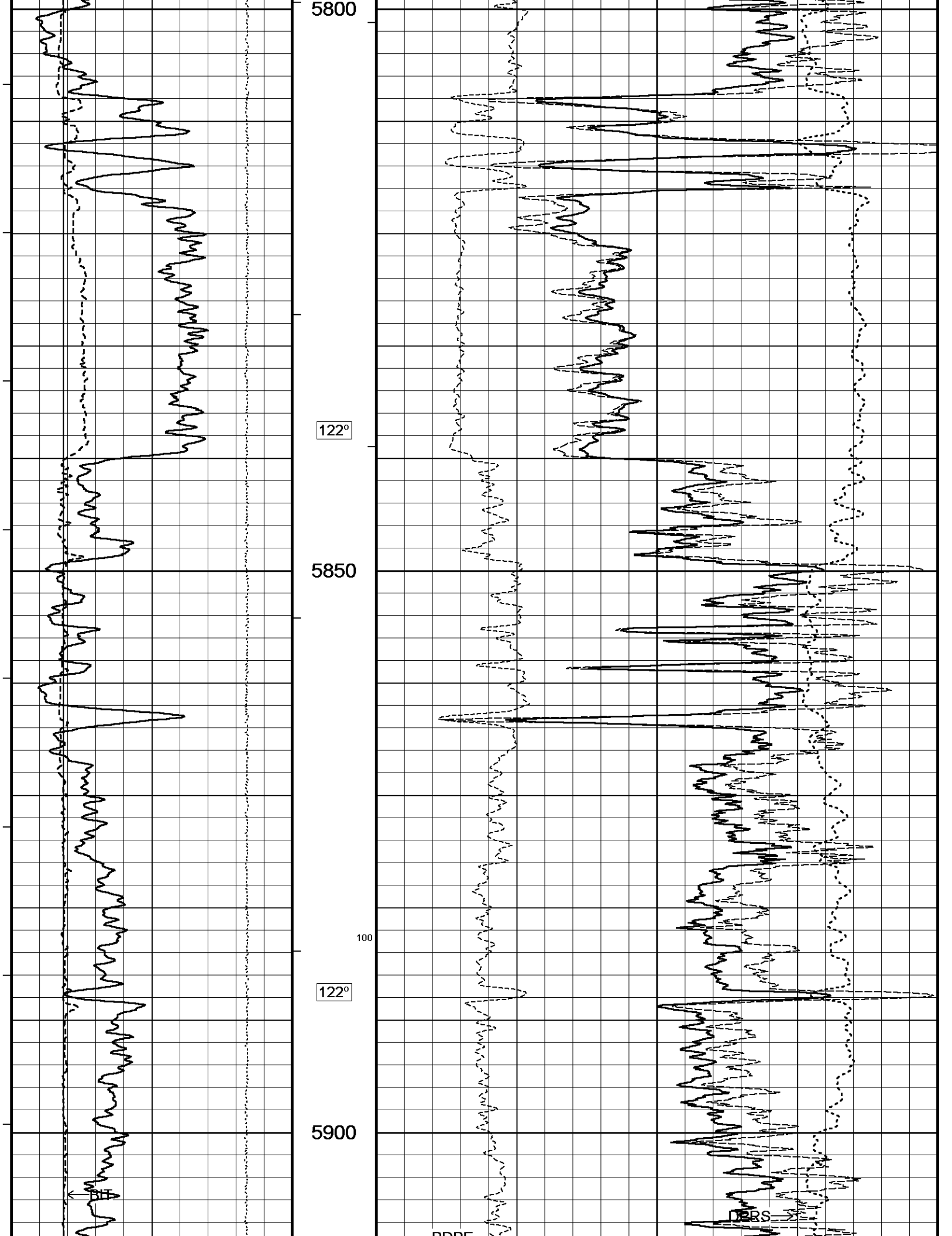
PE
barns/electron
0 5 10

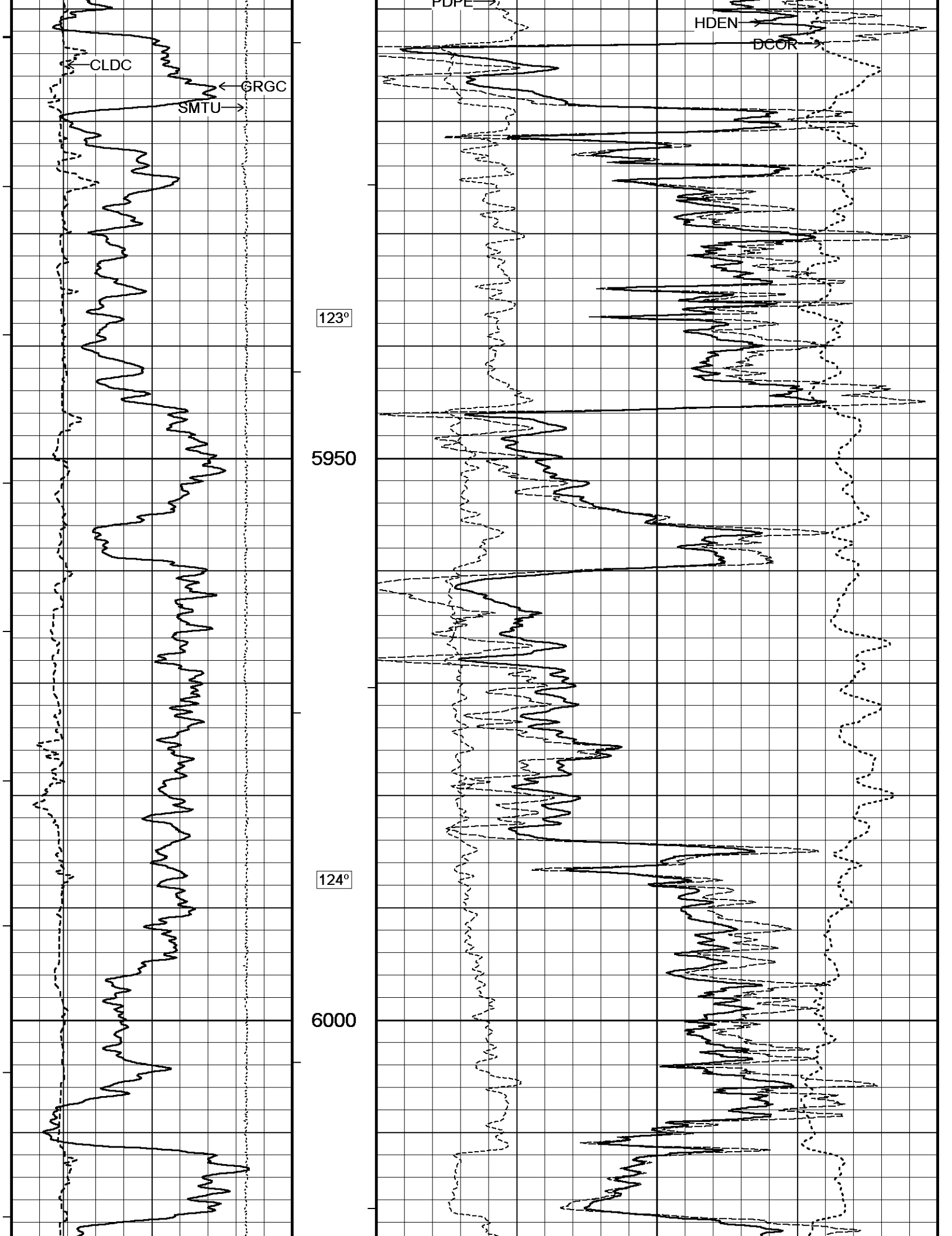
Density Correction
grams/cc
-0.50 0 0.50

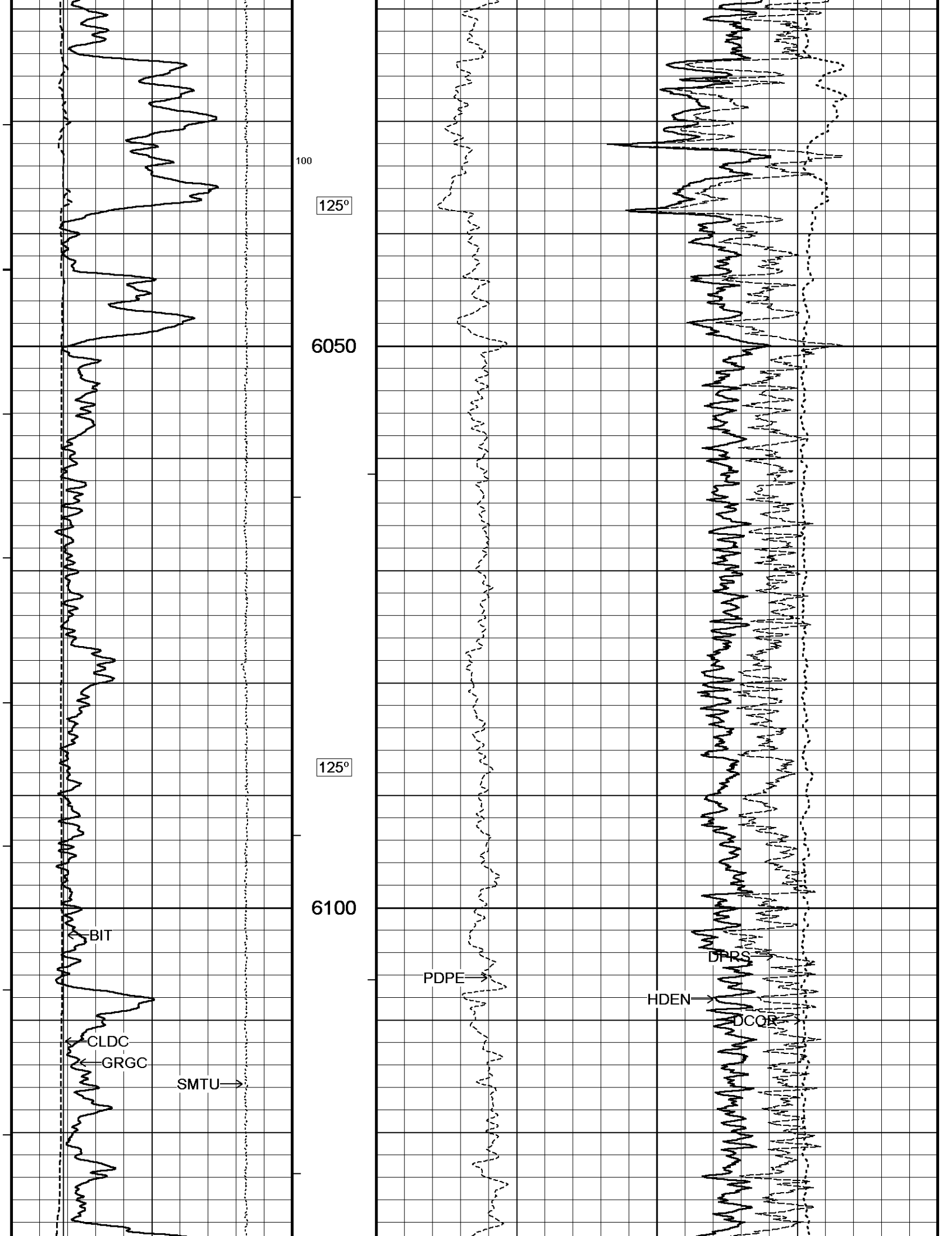
5650

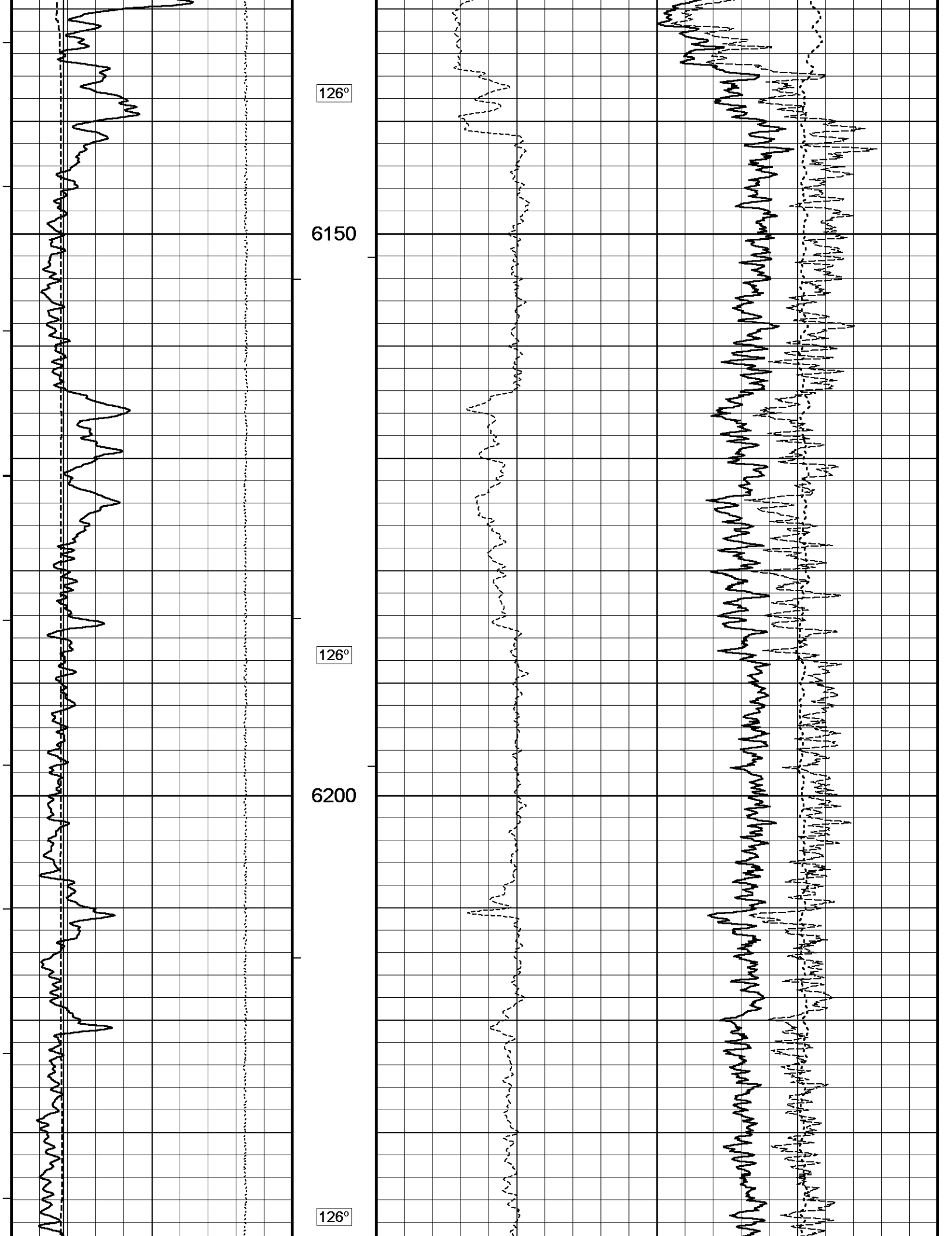
121°

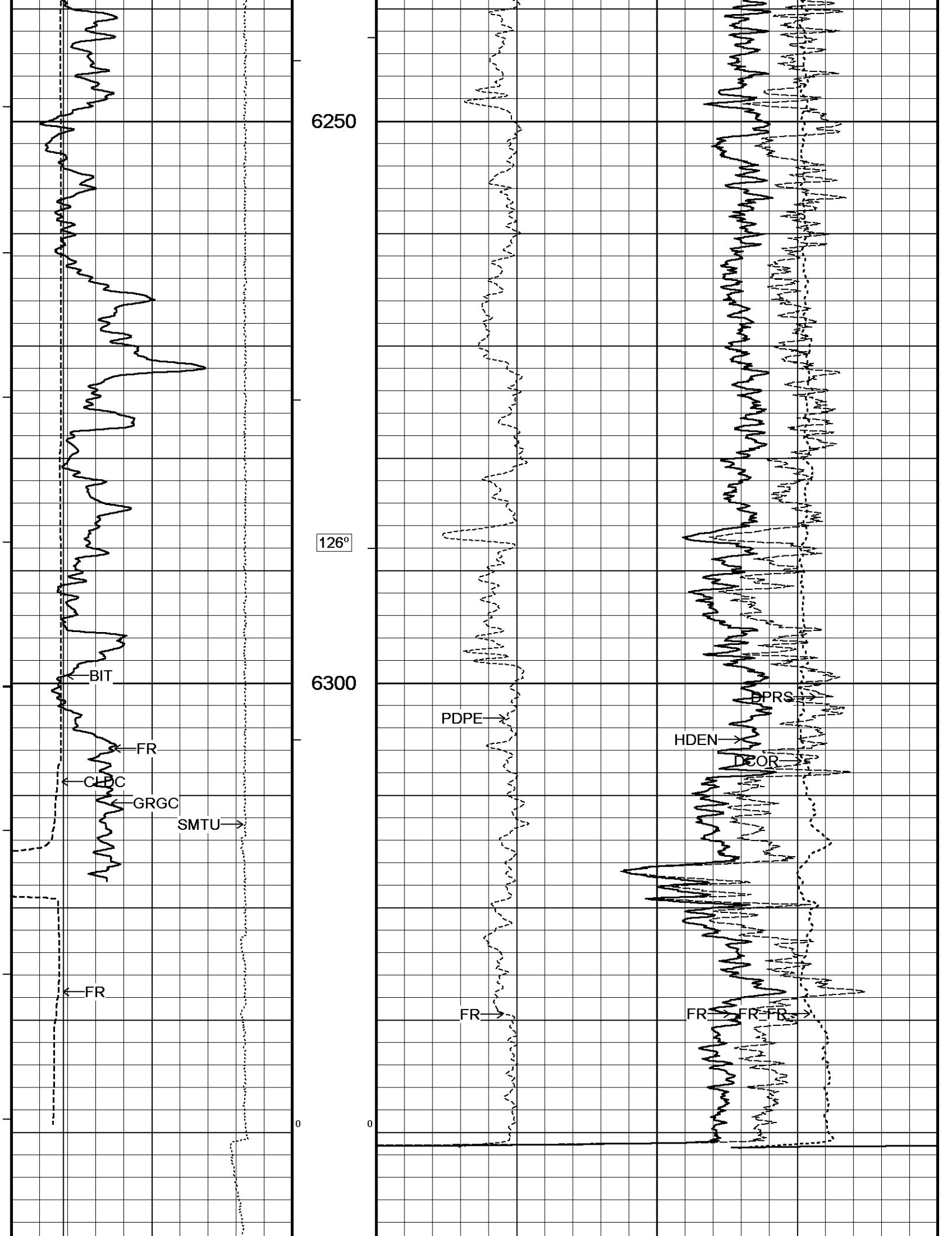

5700
BIT
PDPE
HDEN
DCOR
CLDC
GRGC
SMTU
121°
200
5750
121°

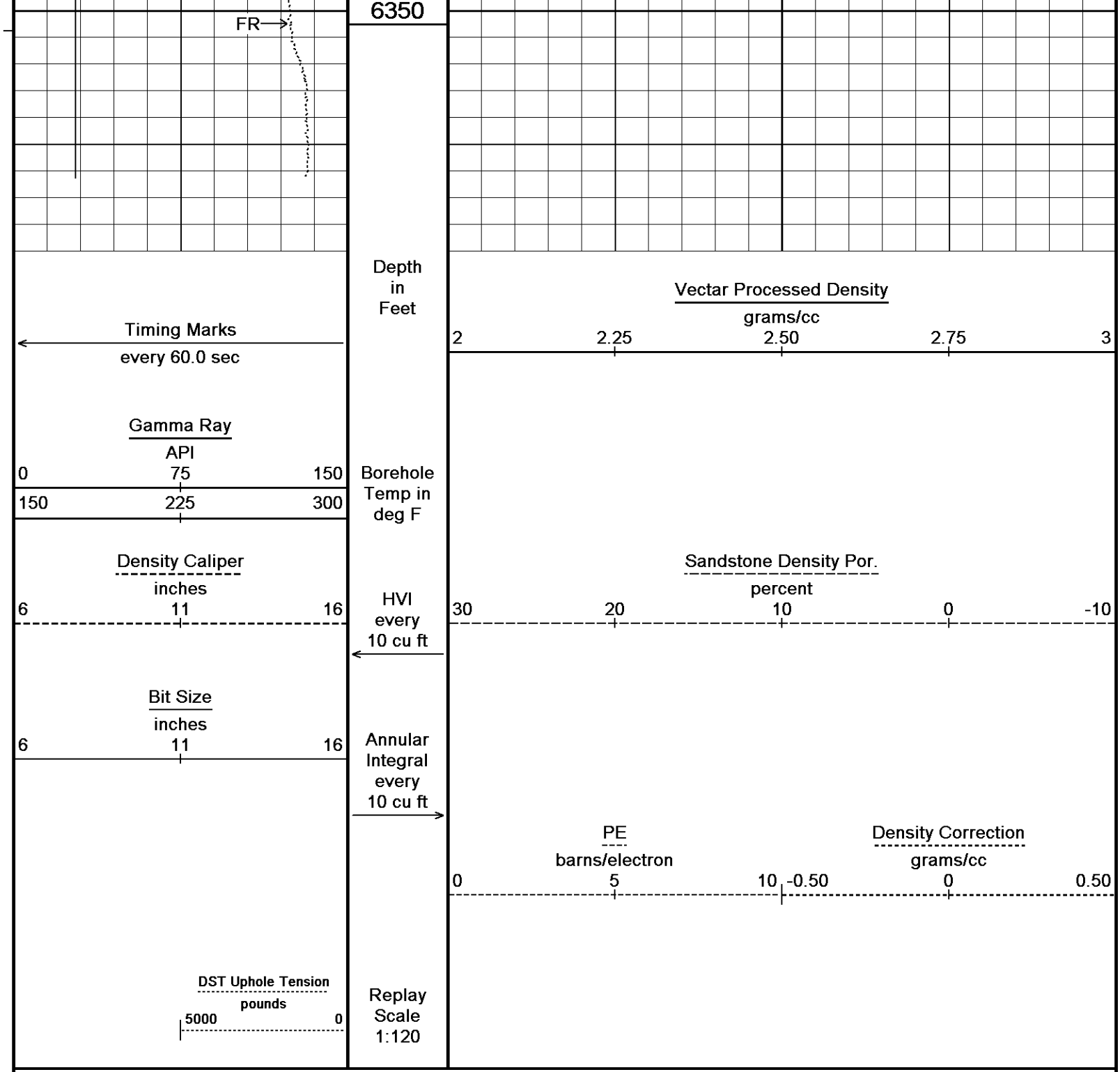

5800
122°
5850
100
122°
5900
BIT
DERS


CLDC
GRGC
SMTU
PDPE
HDEN
DCOR
123°
5950
124°
6000


100
125°
6050
125°
6100
BIT
CLDC
GRGC
SMTU
PDPE
DPRS
HDEN
DCOR


126°
6150
126°
6200
126°


6250
126°
6300
BIT
FR
CLDC
GRGC
SMTU
FR
0
PDPE
FR
0
DPRS
HDEN
DCOR
FR
FR
FR



Depth Based Data - Maximum Sampling Increment 2.5cm
Plotted on 07-SEP-2018 23:02
Filename: C:\Minimus 18.01.6830\Data\O'Brien Preedy #3-4\O'Brien Preedy #3-4_001.dta
Recorded on 07-SEP-2018 17:09
System Versions: Logged with 18.01.6830 Plotted with 18.01.6830

10 INCH HIGH RESOLUTION BULK DENSITY SANDSTONE

BEFORE SURVEY CALIBRATION

C:\Minimus 18.01.6830\Data\O'Brien Preedy #3-4\O'Brien Preedy #3-4_002.dta

General Constants All 000

Last Edited on 07-SEP-2018,16:38

General Parameters

Mud Resistivity	1.180	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	4.500	inches
Caliper for Differential Caliper	Density Caliper	

Rwa Parameters

Porosity used	Crossplot Porosity
Resistivity used	Array Ind. Two Res Rt
RWA Constant A	0.620
RWA Constant M	2.150
SW/APOR Tool Source	0.000

Down-hole Tension Calibration SMS 0

Field Calibration on 06-SEP-2018 14:13

Reading No	Measured	Calibrated (lbs)
1	14944.57	0.00
2	15736.14	527.00

Gamma Calibration MCG-D.A 246

Field Calibration on 06-SEP-2018,04:31

	Measured	Calibrated (API)
Background	107	75
Calibrator (Gross)	763	531
Calibrator (Net)	656	456

Gamma Calibration Tolerances MCG-D.A 246

Ratio 1.438 (1.40 – 1.475 – 1.55) Counts/API

Gamma Constants MCG-D.A 246

Last Edited on 07-SEP-2018,15:32

Gamma Calibrator Number	MCGGRCC141	
GRC-M Calibrator Jig in Use?	NO	
Inactive Background Jig in Use?	NO	
Mud Density	1.09	gm/cc
Caliper Source for Processing	Density Caliper	
Tool Position	Eccentred	
Potassium Equivalence	Chloride	
K Mud Concentration	0.00	%

High Resolution Temperature Calibration MCG-D.A 246

Field Calibration on 01-AUG-2018,13:29

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

High Resolution Temperature Constants MCG-D.A 246

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

Pre-filter Length	11

SP Calibration MCG-D.A 246

Field Calibration on 01-AUG-2018,13:35

	Measured	Calibrated (mV)
Reference 1	103.5	100.0
Reference 2	-96.9	-100.1

Caliper Calibration MML-A 7

Base Calibration on 07-SEP-2018 12:58
Field Calibration on 07-SEP-2018 13:00

Base Calibration

Reading No	Measured	Calibrator Size (in)
1	14194	5.98
2	17673	7.97
3	20976	9.86
4	25017	11.92
5	0	0.00
6	N/A	N/A

Field Calibration

Measured Caliper (in)	Actual Caliper (in)
7.98	7.97

Caliper Calibration Tolerances MML-A 7

Short Arm Field Cal.	7.98	7.77 7.97 8.17	in

Micro Normal and Micro Inverse Calibration MML-A 7

Base Calibration on 07-SEP-2018 13:13
Field Check on 07-SEP-2018 13:16

	Resistor 1 (ohm)		Resistor 2 (ohm)	
	10.0		50.0	
Base Calibration				
		Measured	Calibrated (ohm-m)	
Micro Normal	10.2	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	10.2	-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% 76.54 +2%	ohm-m			
Micro Inverse Base Check	51.0	-2% 50.95 +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 07-SEP-2018,15:32

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

Neutron Calibration MDN-B.A 292

Base Calibration on 02-SEP-2018,10:44
Field Check on 06-SEP-2018,04:24

Base Calibration

	Measured		Calibrated (cps)	
	Near	Far	Near	Far
	2951	93	3714	110
Ratio	31.695		33.764	

Field Calibrator at Base

	Calibrated (cps)	
	2190	3136
Ratio	0.698	

Field Check

	Calibrated (cps)	
	2180	3125
Ratio	0.698	

Neutron Calibration Tolerances MDN-B.A 292

Ratio	31.695	-5% 33 +5%
Base Check	0.698	0.65 0.7 0.75
Field Check	0.698	0.678 0.698 0.718

Neutron Constants MDN-B.A 292

Last Edited on 07-SEP-2018,15:32

Neutron Source Id	P0204NN	
Neutron Jig Number	NJ5736	
Air Hole Processing	Legacy	
Caliper Source for Processing	Density Caliper	
Stand-off	0.00	inches
Mud Density	1.00	gm/cc
Limestone Sigma	7.10	cu
Sandstone Sigma	4.26	cu
Dolomite Sigma	4.70	cu

Formation Pressure Source	None	
Formation Pressure	N/A	kpsi
Temperature Source	Constant Value	
Temperature	68.00	degrees F
Mud Salinity	0.00	kppm
Salinity Correction	Not Applied	
Formation Fluid Salinity Source	None	
Formation Fluid Salinity	N/A	kppm
Barite Mud Correction	Not Applied	

FE Calibration MFE-A.A 135

Base Calibration on 02-SEP-2018,10:12
Field Check on 06-SEP-2018,04:16

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

Base Calibration

	Measured	Calibrated (ohm-m)
Reference 1	0.0	0.0
Reference 2	962.9	126.8
Base Check		281.0
Field Check		281.1

FE Calibration Tolerances MFE-A.A 135

Reference 2	962.9	-3% 980.0 +3%	ohm
Base Check	281.0	-2% 277.0 +2%	ohm-m
Field Check	281.1	-2% 281.0 +2%	ohm-m

FE Constants MFE-A.A 135

Last Edited on 07-SEP-2018,15:32

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	

High Resolution Temperature Calibration MAI-A.A 111

Field Calibration on 01-AUG-2018,13:29

	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

Induction Calibration MAI-A.A 111

Factory Loop Calibration 09-AUG-2018 16:18
Field Check on 06-SEP-2018,04:15

Factory Loop Calibration

High Conductivity Reference Resistor	3.3	ohm
Low 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	0.000	0.0
2	6.4	385.9	7.6	821.4	0.000	0.0
3	3.2	264.0	5.2	566.0	0.000	0.0
4 (far)	2.1	135.5	2.6	279.2	0.000	0.0

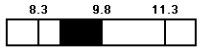
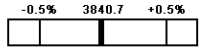
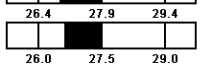
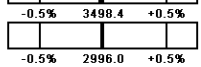
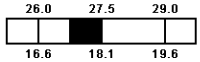
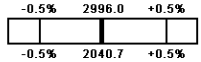
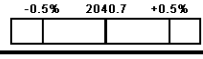
Array Temperature	23.0	Deg F

Tool Checks

	Factory Reference (mmho/m)		Before Survey (mmho/m)	
Array	Low	High	Low	High

1 (near)	9.8	3840.7	8.8	3839.2	
2	27.9	3498.4	27.0	3497.5	
3	27.5	2996.0	26.7	2994.9	
4 (far)	18.1	2040.7	17.6	2040.3	
Array Temperature		87.9		85.9	Deg F

Induction Check Tolerances MAI-A.A 111

Low Array 1	8.8		mmho/m	High Array 1	3839.2	 mmho/m
Low Array 2	27.0		mmho/m	High Array 2	3497.5	 mmho/m
Low Array 3	26.7		mmho/m	High Array 3	2994.9	 mmho/m
Low Array 4	17.6		mmho/m	High Array 4	2040.3	 mmho/m

Induction Constants MAI-A.A 111

Last Edited on 07-SEP-2018,15:31

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.	Borehole Temp. Unfilt.	
Borehole Correction Method	Default	
Squasher Start	0.0020	mhos/metre
Squasher Offset	N/A	mhos/metre

Borehole Normalisation

DRM1	0.0000	DRC1	0.0000
DRM2	0.0000	DRC2	0.0000
MRM1	0.0000	MRC1	0.0000
MRM2	0.0000	MRC2	0.0000
SRM1	0.0000	SRC1	0.0000
SRM2	0.0000	SRC2	0.0000

Calibration Site Corrections

Channel 1	0.00	mmhos/metre
Channel 2	0.00	mmhos/metre
Channel 3	0.00	mmhos/metre
Channel 4	0.00	mmhos/metre

Symmetrised Receiver Gains

Receiver 1	1.00
Receiver 2	1.00
Receiver 3	1.00
Receiver 4	1.00

Apparent Porosity and Water Saturation Constants

Archie Constant (A)	1.00	
Cementation Exponent (M)	2.00	
Saturation Exponent (N)	2.00	
Saturation of Water for Apor	100.00	percent
Resistivity of Water for Apor and Sw	0.05	ohm-m
Resistivity of Mud Filtrate for Sw	0.00	ohm-m
Source for Rt	0.00	
Source for Rxo	0.00	

Caliper Calibration MPD-C.A 216

Base Calibration on 02-SEP-2018,10:42
Field Calibration on 06-SEP-2018,04:16

Base Calibration

Reading No	Measured	Calibrator Size (in)
1	14688	3.99
2	23495	5.98

3	32176	7.97
4	40480	9.86
5	49713	11.92
6	N/A	N/A

Field Calibration

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

Caliper Calibration Tolerances MPD-C.A 216

Long Arm Field Cal.	7.97	7.57	7.97	8.37 in

Photo Density Calibration MPD-C.A 216

Base Calibration on 02-SEP-2018,10:27
Field Check on 06-SEP-2018,04:18

Density Calibration

Base Calibration	Measured Near	Measured Far	Calibrated (sdu) Near	Calibrated (sdu) Far
Background	1002	1196		
Reference 1	49599	24164	59556	30836
Reference 2	19816	2269	24941	2541

Field Check at Base

Near	Far
1002.2	1196.2

Field Check

Near	Far
1009.6	1208.8

PE Calibration

Base Calibration	WS	Measured WH	Measured Ratio	Calibrated Ratio
Background	183	902		
Reference 1	21103	49447	0.431	0.371
Reference 2	5778	19707	0.298	0.272

Field Check at Base

WS	WH
183.1	901.7

Field Check

WS	WH
187.2	908.2

Photo Density Calibration Tolerances MPD-C.A 216

Near Density Ratio	2.58	-5%	2.52	+5%		
PE Calibration	0.125	0.089	0.110	0.131		
Far Density Ratio	21.41	-5%	21.00	+5%		
Near Den. Field Check	1009.6	-3%	1002.2	+3%		
PE WS Field Check	187.2	-6%	183.1	+6%		
Far Den. Field Check	1208.8	-3%	1196.2	+3%		
PE WH Field Check	908.2	-6%	901.7	+6%		

Density Constants MPD-C.A 216

Last Edited on 07-SEP-2018,15:32

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	1.09	gm/cc
Mud Density Type		
Mud Filtrate Density	1.00	gm/cc
Dry Hole Mud Filtrate Density	1.00	gm/cc
DNCT	0.00	gm/cc
CRCT	0.00	gm/cc
Density Z/A Correction	Hybrid	
Precision Enhanced Density Processing	Applied	

Matrix Density (gm/cc)	Depth (ft)
2.71	0.00
0.00	0.00
0.00	

0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00

DOWNHOLE EQUIPMENT

C:\Minimus 18.01.6830\Data\O'Brien Preedy #3-4\O'Brien Preedy #3-4_002.dta

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

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

Compact Comms Gamma
MCG-D.A 246 LG: 8.70 ft WT: 63.9 lb OD: 2.244 in

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

Compact Neutron
MDN-B.A 292 LG: 5.04 ft WT: 50.7 lb OD: 2.244 in

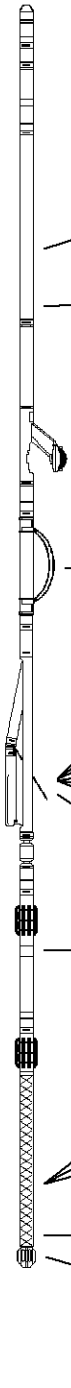
Compact Density/Caliper
MPD-C.A 216 LG: 9.59 ft WT: 90.4 lb OD: 2.913 in

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

Compact Focussed Electric
MFE-A.A 135 LG: 6.05 ft WT: 48.5 lb OD: 2.240 in

Compact Induction
MAI-A.A 111 LG: 10.81 ft WT: 48.5 lb OD: 2.240 in

Total Length: 55.02 ft Weight: 454.2 lb



45.04 ft	GRGC - MCG Gamma Ray
42.13 ft	CGXT - MCG External Temperature
36.40 ft	MLTC - MML Caliper
35.41 ft	MINV - Micro-inverse
35.41 ft	MNRL - Micro-normal
30.61 ft	NPRL - Limestone Neutron Por.
23.37 ft	AVOL - Annular Volume
23.37 ft	HVOL - Hole Volume
23.37 ft	CLDC - Density Caliper
21.44 ft	DEN - Compensated Density
21.44 ft	DCOR - Density Correction
21.44 ft	DPRL - Limestone Density Por.
21.38 ft	PDPE - PE
13.72 ft	FEFE - Shallow FE
3.34 ft	R40O - Array Ind. One Res 40
3.34 ft	RTAO - Array Ind. One Res Rt
3.34 ft	R60O - Array Ind. One Res 60
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	O'BRIEN ENERGY RESOURCES CORP.
WELL	PREEDY #3-4
FIELD	ANGELL SOUTHEAST
PROVINCE/COUNTY	MEADE
COUNTRY/STATE	U.S.A. / KANSAS

Elevation Kelly Bushing	2681	feet	First Reading	6330.00	feet
Elevation Drill Floor	2679	feet	Depth Driller	6350.00	feet
Elevation Ground Level	2668	feet	Depth Logger	6351.00	feet

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COMPACT PHOTO DENSITY
COMPENSATED NEUTRON
MICRORESISTIVITY LOG