Weatherford

COMPACT PHOTO DENSITY COMPENSATED NEUTRON MICRORESISTIVITY LOG

COMPANY	SHAKESPEARE OIL. CO., INC.
WELL	CAMPBELL 4-17
FIELD	WILDCAT
PROVINCE/COUNTY	LOGAN
COUNTRY/STATE	U.S.A. / KANSAS
LOCATION	850' FSL & 2000' FEL
PERMIT NUMBER	SE NW SW SE

SEC 17	TWP 13S	RGE 32W	Other Services
Latitude			MAI/MFE MSS
Longitude			
API Number	15-109-21293		

Permanent Datum GL, Elevation 3033 feet	Elevations:	feet
Log Measured From KB	KB	3043.00
Drilling Measured From KB @ 10 FEET	DF	3041.00
	GL	3033.00

Date	11-JUN-2014			
Run Number	ONE			
Service Order	5872-89695834			
Depth Driller	4720.00	feet		
Depth Logger	4716.00	feet		
First Reading	4684.00	feet		
Last Reading	3800.00	feet		
Casing Driller	268.00	feet		
Casing Logger	264.00	feet		
Bit Size	7.875	inches		
Hole Fluid Type	CHEMICAL			
Density / Viscosity	9.30 lb/USg		65.00 CP	
PH / Fluid Loss	10.50		8.80 ml/30Min	
Sample Source	MUDPIT			
Rm @ Measured Temp	0.64 @ 93.0	ohm-m		
Rmf @ Measured Temp	0.51 @ 93.0	ohm-m		
Rmc @ Measured Temp	0.77 @ 93.0	ohm-m		
Source Rmf / Rmc	CALC		CALC	
Rm @ BHT	0.52 @113.0	ohm-m		
Time Since Circulation	5 HOURS			
Max Recorded Temp	113.00	deg F		
Equipment / Base	13244		LIB	
Recorded By	D. COLE			
Witnessed By	T. PRIEST			
JOB #	LB14-178			

BOREHOLE RECORD

Last Edited: 11-JUN-2014 14:01

Bit Size inches	Depth From feet	Depth To feet
7.875	268.00	4720.00

CASING RECORD

Type	Size inches	Depth From feet	Shoe Depth feet	Weight pounds/ft
CASING	8.625	0.00	268.00	24.00

REMARKS

- SOFTWARE ISSUE: WLS 13.08.2113
- TOOLSTRING: MCG, MML, MDN, MPD, MFE, MSS, MAI RUN IN COMBINATION
- HARDWARE:
  - MDN: DUAL BOWSPRING ECCENTRALIZER
  - MFE: 1 X 0.5 INCH STANDOFF
  - MSS: 2 X 0.5 INCH STANDOFF
  - MAI: 2 X 0.5 INCH STANDOFF
- 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 3800 FEET: 370 CU.FT.

- ANNULAR HOLE VOLUME WITH 5.5 INCH PRODUCTION CASING FROM TD TO 3800 FEET: 220 CU.FT.

- RIG: HD DRILLING

- ENGINEER: D. COLE

- OPERATOR: K. RINEHART AND D. ALVARADO

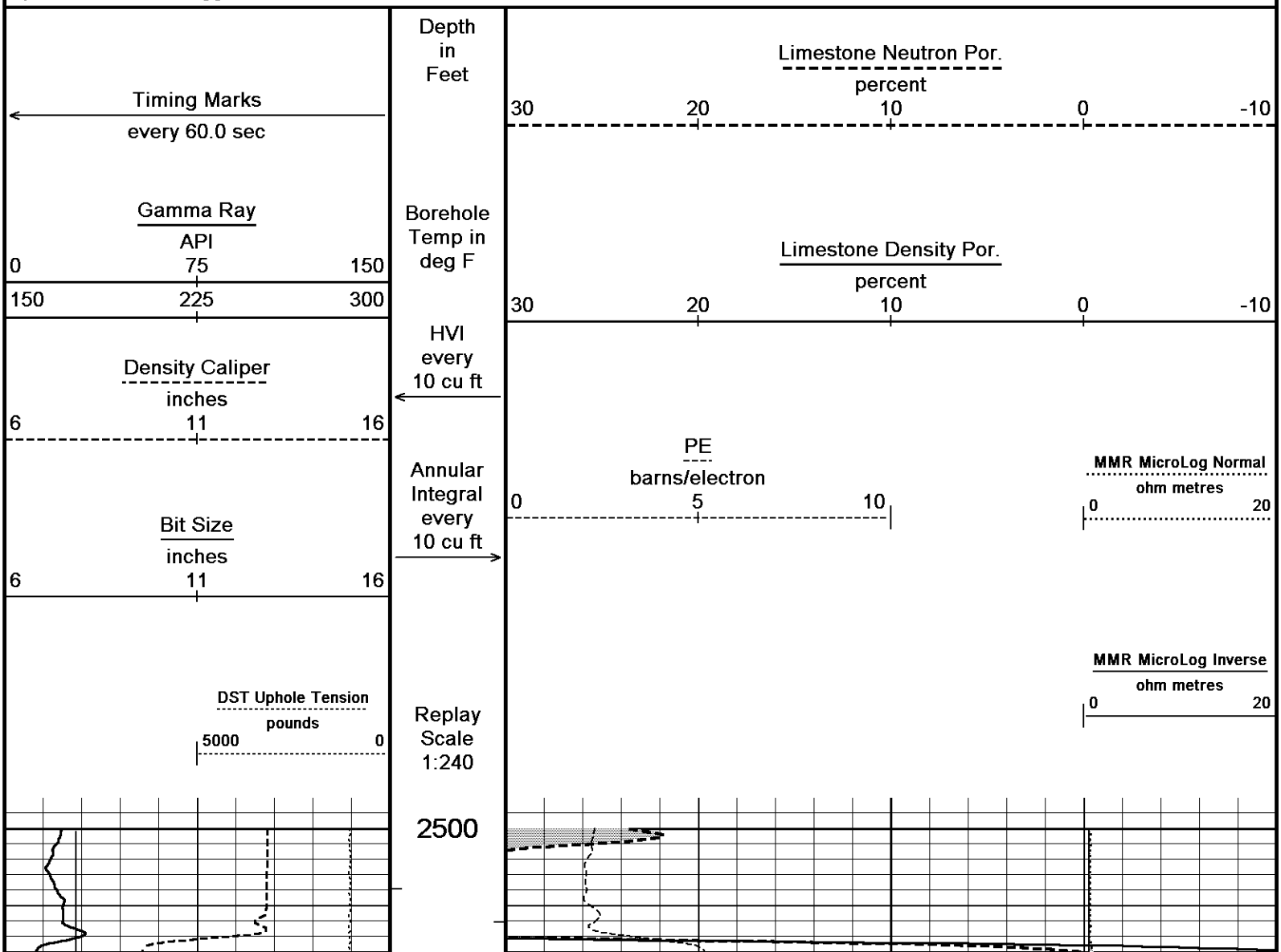
- CHLORIDES: 3500

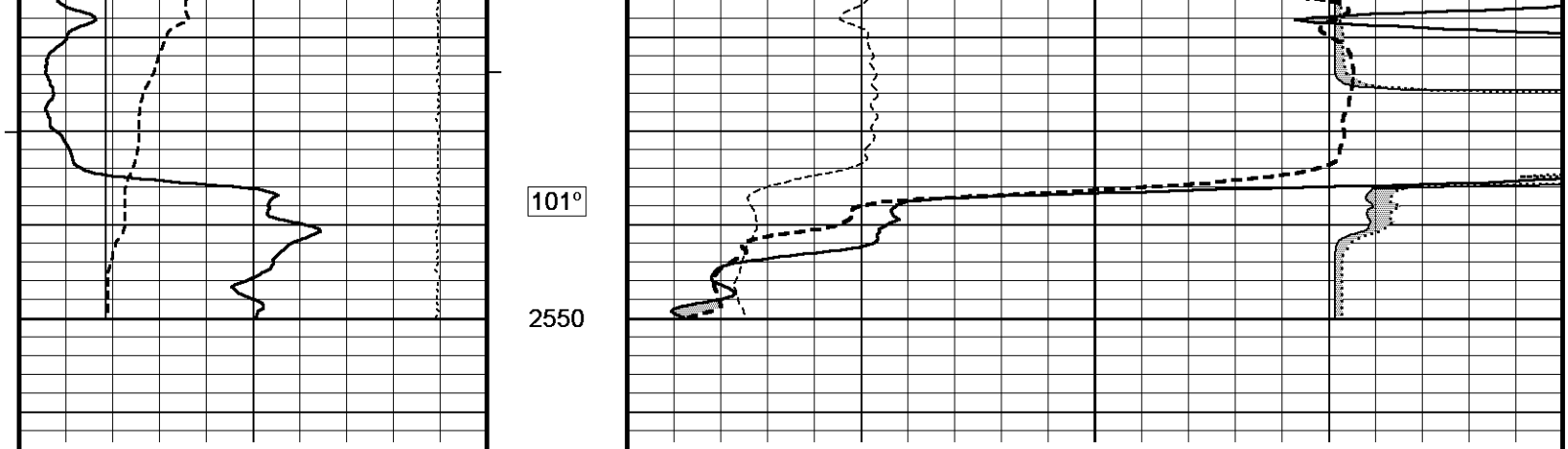
5 INCH LIMESTONE MAIN - ANHYDRITE SECTION

Depth Based Data - Maximum Sampling Increment 10.0cm — Plotted on 11-JUN-2014 20:41

Filename: C:\Minimus 13.08.2113\Logs\SHAKESPEA...\SHAKESPEARE CAMPBELL 4-17 DETAIL2.dta

System Versions: Logged with 13.08.2113 Processed with 13.08.2113 Plotted with 13.08.2113





Depth in Feet

Timing Marks
every 60.0 sec

Limestone Neutron Por.
percent
30 20 10 0 -10

Gamma Ray
API
0 75 150
150 225 300

Borehole Temp in deg F

Limestone Density Por.
percent
30 20 10 0 -10

HVI every 10 cu ft

Density Caliper
inches
6 11 16

PE
barns/electron
0 5 10

Annular Integral every 10 cu ft

MMR MicroLog Normal
ohm metres
0 20

Bit Size
inches
6 11 16

MMR MicroLog Inverse
ohm metres
0 20

DST Uphole Tension
pounds
5000 0

Replay Scale 1:240

Depth Based Data - Maximum Sampling Increment 10.0cm
Plotted on 11-JUN-2014 20:41
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5 INCH LIMESTONE MAIN - ANHYDRITE SECTION

5 INCH LIMESTONE MAIN

Depth Based Data - Maximum Sampling Increment 10.0cm
Plotted on 11-JUN-2014 20:41
Filename: C:\Minimus 13.08.2113\Logs\SHAKESPEA...\SHAKESPEARE CAMPBELL 4-17 DETAIL2.dta
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Depth in Feet

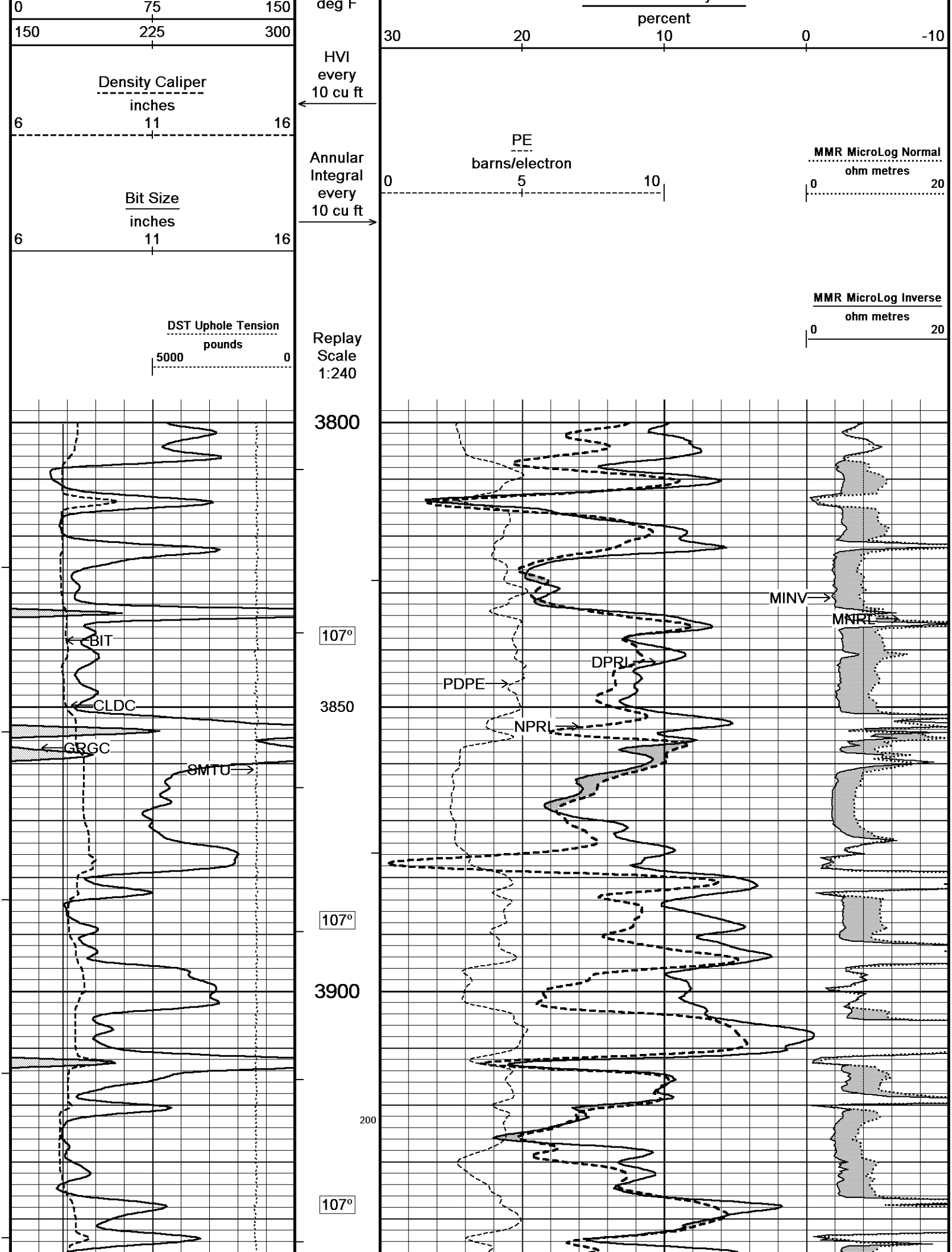
Timing Marks
every 60.0 sec

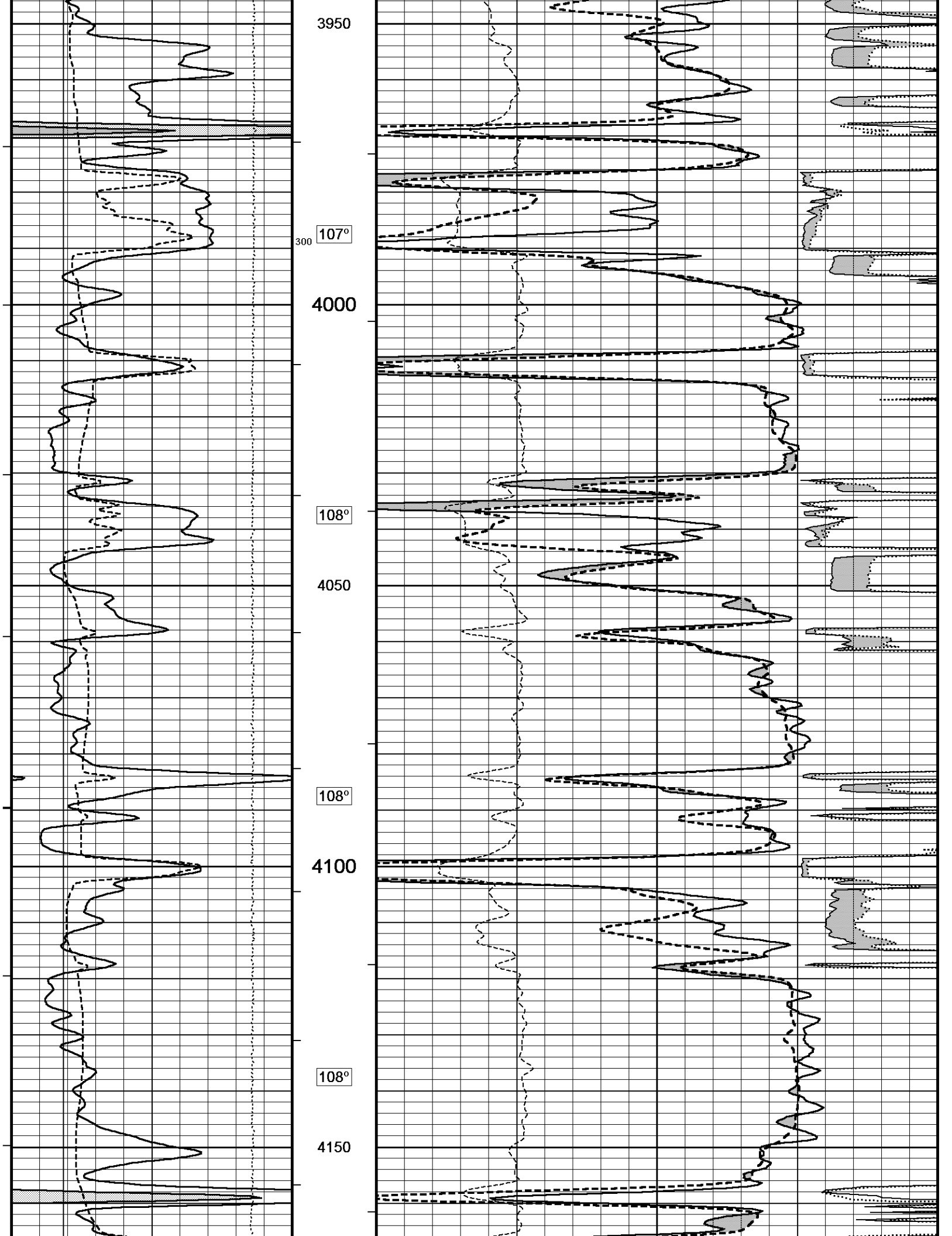
Limestone Neutron Por.
percent
30 20 10 0 -10

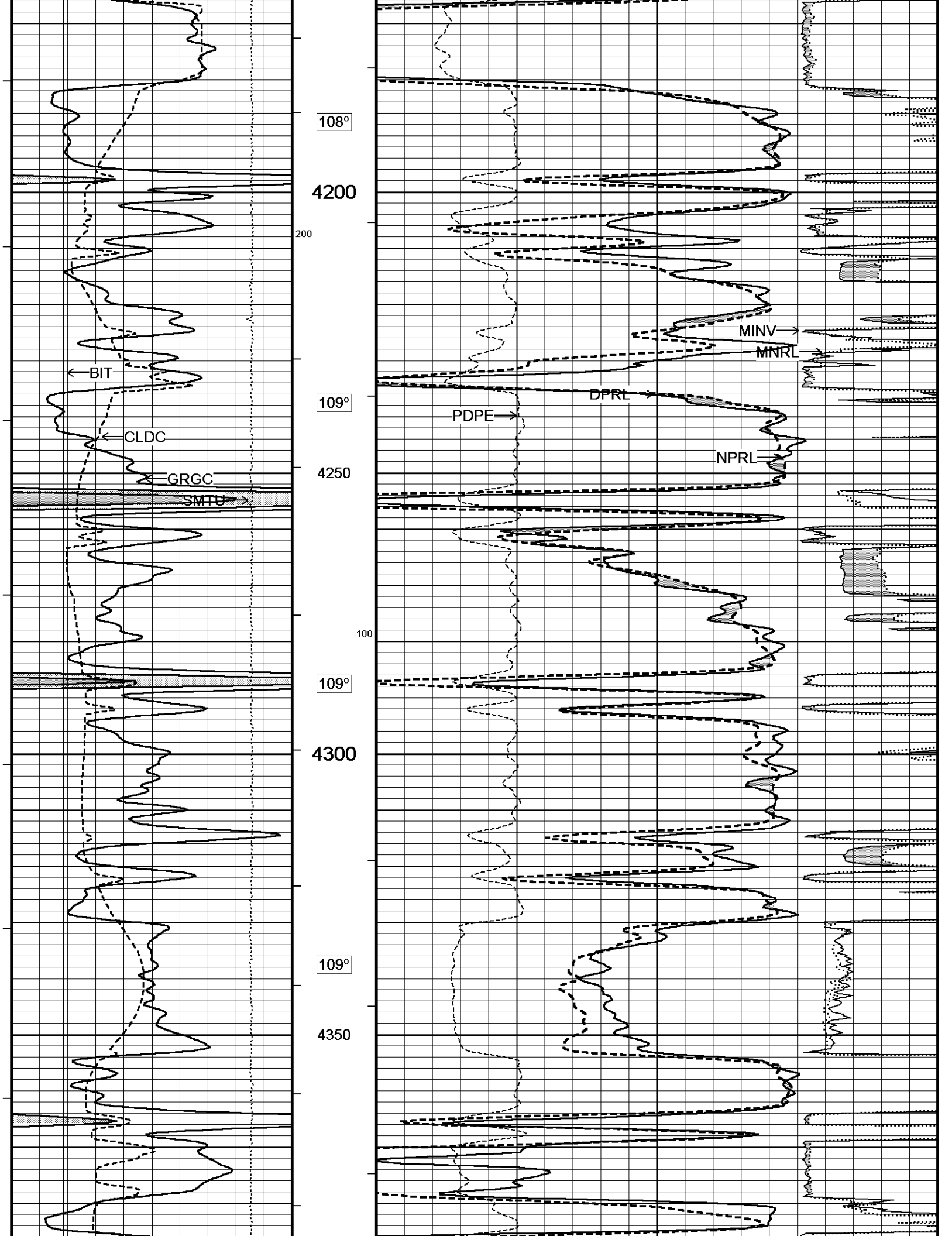
Gamma Ray
API

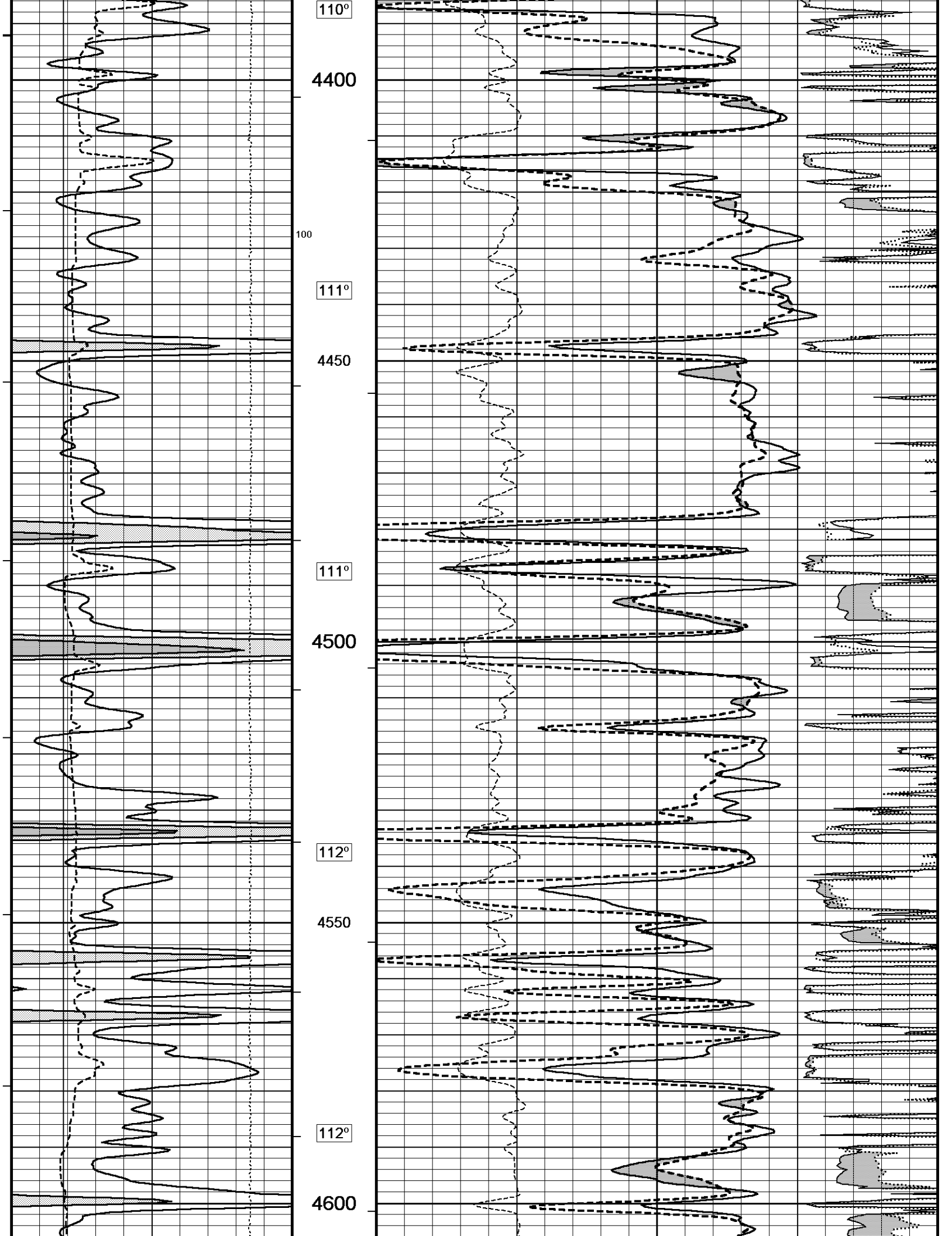
Borehole Temp in

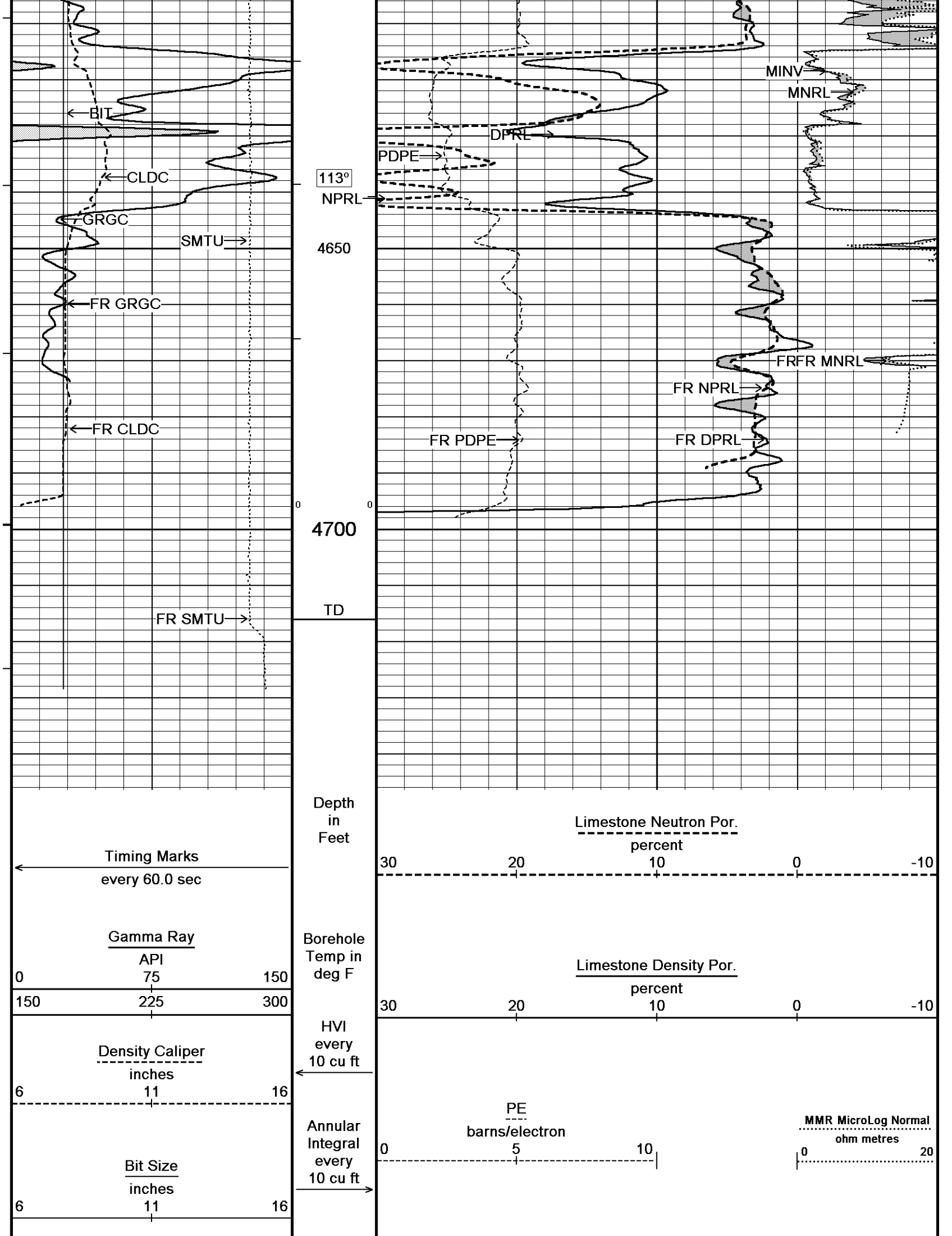
Limestone Density Por.


0
75
150
deg F
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
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
3800
3850
3900
200
107°
107°
107°
BIT
CLDC
GRGC
SMTU
PDPE
DPRL
NPRL
MINV
MNRL


3950
300
107°
4000
108°
4050
108°
4100
108°
4150


108°
4200
200
BIT
109°
CLDC
4250
GRGC
SMTU
100
109°
4300
109°
4350
MINV
MNRL
DPRL
PDPE
NPRL


110°
4400
100
111°
4450
111°
4500
112°
4550
112°
4600


BIT
CLDC
GRGC
SMTU
FR GRGC
FR CLDC
FR SMTU
MINV
MNRL
DPRL
PDPE
113°
NPRL
4650
FRFR MNRL
FR NPRL
FR PDPE
FR DPRL
0
0
4700
TD
Depth in Feet
Timing Marks
every 60.0 sec
Limestone Neutron Por.
percent
30 20 10 0 -10
Gamma Ray
API
0 75 150
150 225 300
Borehole Temp in deg F
Limestone Density Por.
percent
30 20 10 0 -10
HVI every 10 cu ft
Density Caliper
inches
6 11 16
PE
barns/electron
0 5 10
MMR MicroLog Normal
ohm metres
0 20
Annular Integral every 10 cu ft
Bit Size
inches
6 11 16

DST Uphole Tension
pounds
5000 0

Replay Scale 1:240

MMR MicroLog Inverse
ohm metres
0 20

Depth Based Data - Maximum Sampling Increment 10.0cm
Plotted on 11-JUN-2014 20:41
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5 INCH LIMESTONE MAIN

REPEAT SECTION

Depth Based Data - Maximum Sampling Increment 10.0cm
Plotted on 11-JUN-2014 20:41
Filename: C:\Minimus 13.08.2113\Logs\SHAKESPEA...\SHAKESPEARE CAMPBELL 4-17 REPEAT.dta
Recorded on 11-JUN-2014 18:11
System Versions: Logged with 13.08.2113 Processed with 13.08.2113 Plotted with 13.08.2113

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

Depth in Feet

Borehole Temp in deg F

HVI every 10 cu ft

Annular Integral every 10 cu ft

Limestone Neutron Por.
percent
30 20 10 0 -10

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

DST Uphole Tension
pounds
5000 0

Replay Scale 1:240

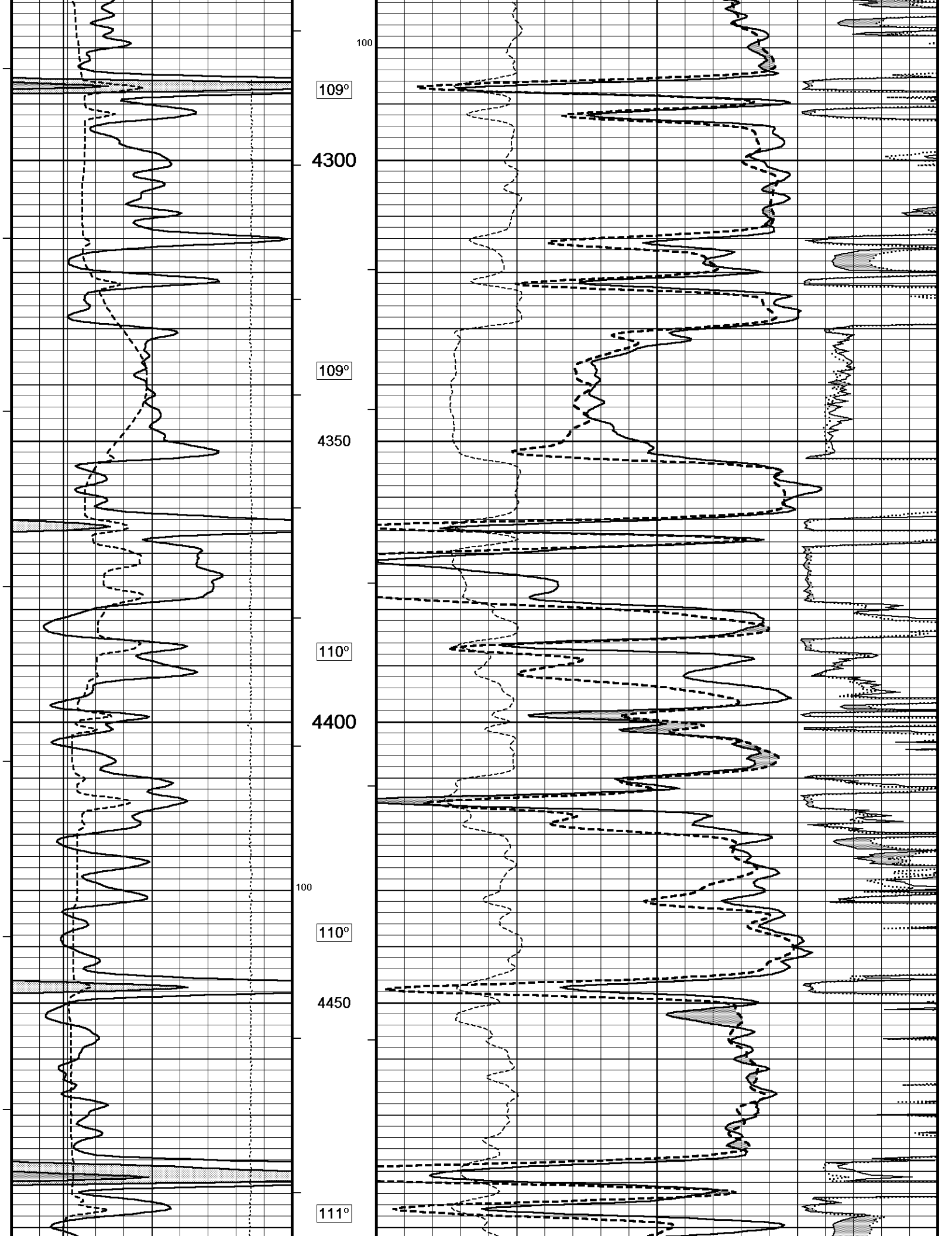
4218

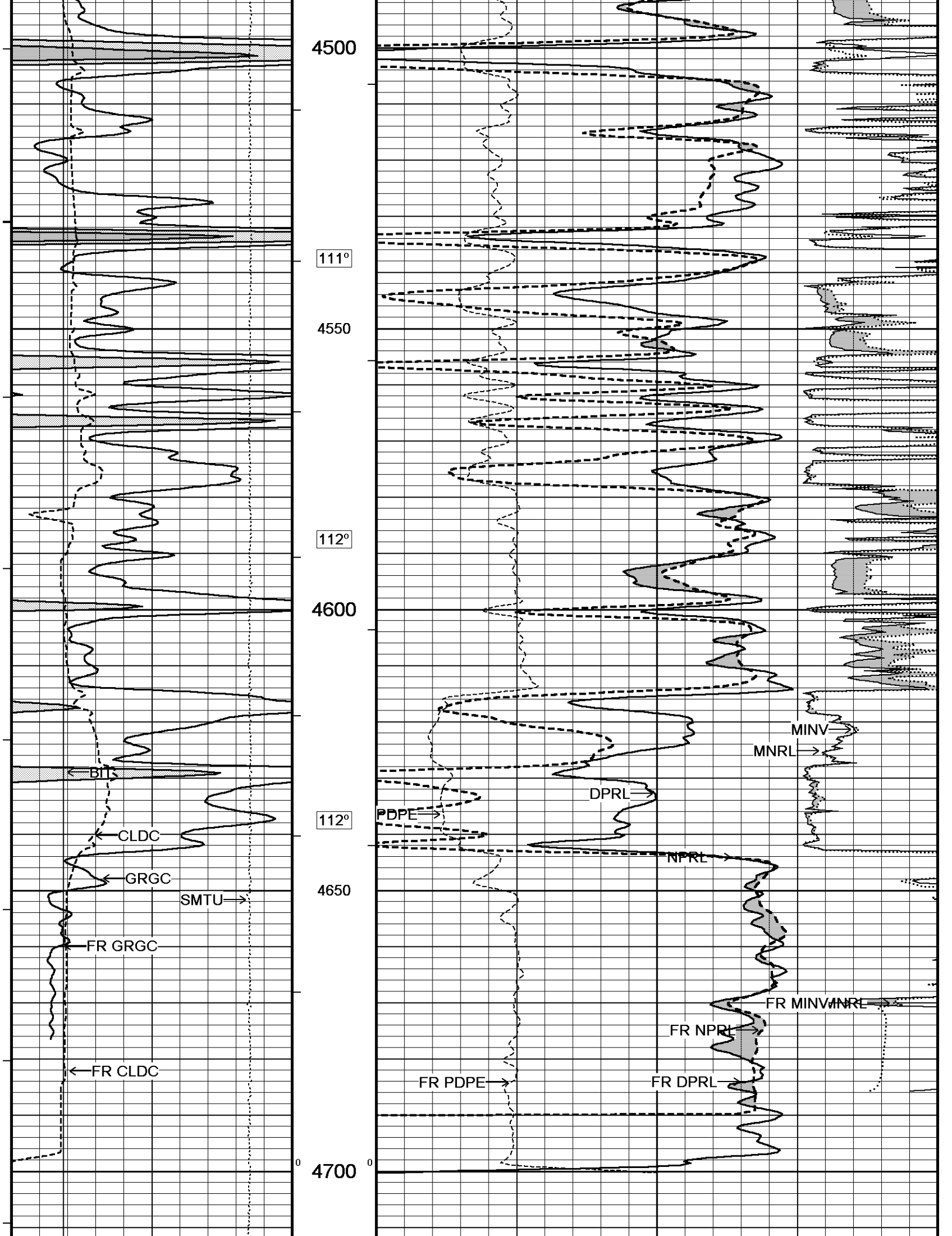
4250

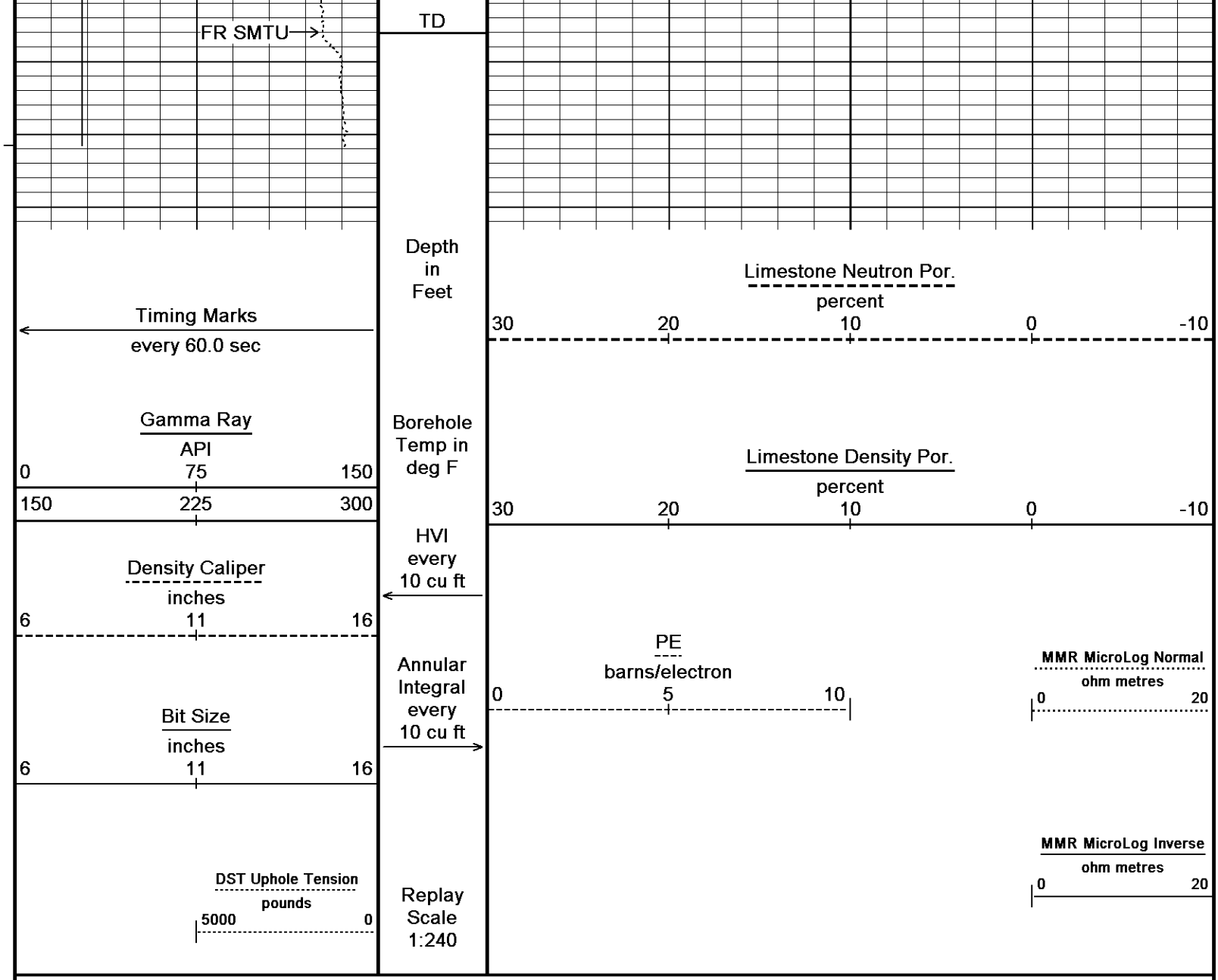
BIT

GRGC

NPRL


100
109°
4300
109°
4350
110°
4400
100
110°
4450
111°


4500
111°
4550
112°
4600
112°
4650
4700
BIT
CLDC
GRGC
SMTU
FR GRGC
FR CLDC
MINV
MNRL
DPRL
PDPE
NPRL
FR MINV/MNRL
FR NPRL
FR PDPE
FR DPRL



Depth Based Data - Maximum Sampling Increment 10.0cm — Plotted on 11-JUN-2014 20:41
Filename: C:\Minimus 13.08.2113\Logs\SHAKESPEA...\SHAKESPEARE CAMPBELL 4-17 REPEAT.dta — Recorded on 11-JUN-2014 18:11
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REPEAT SECTION

5 INCH BULK DENSITY MAIN

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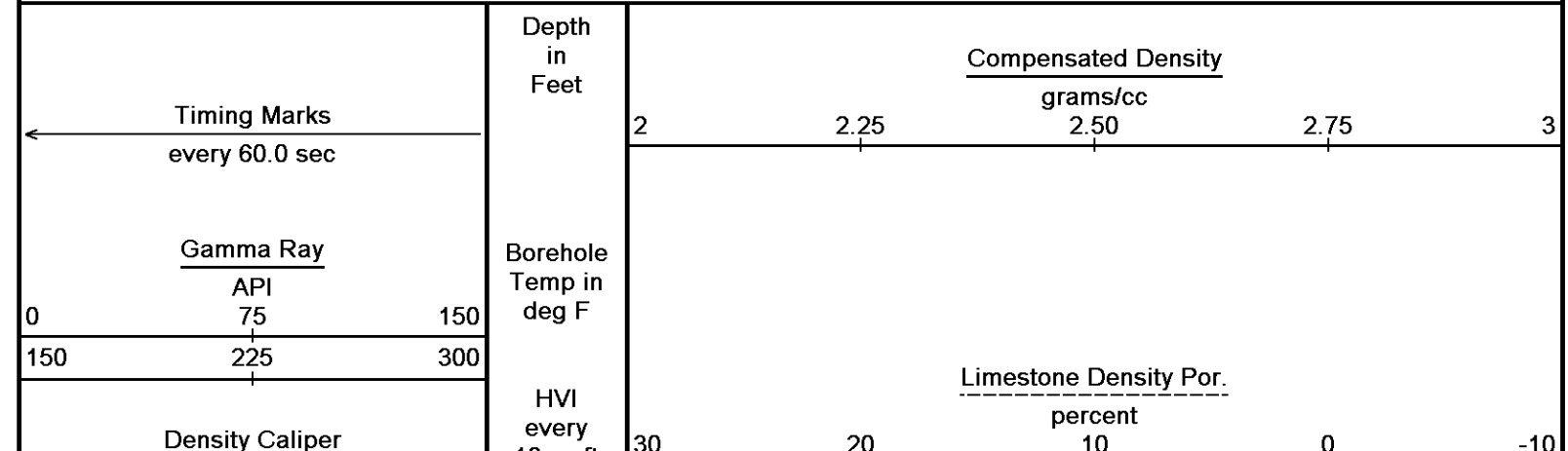
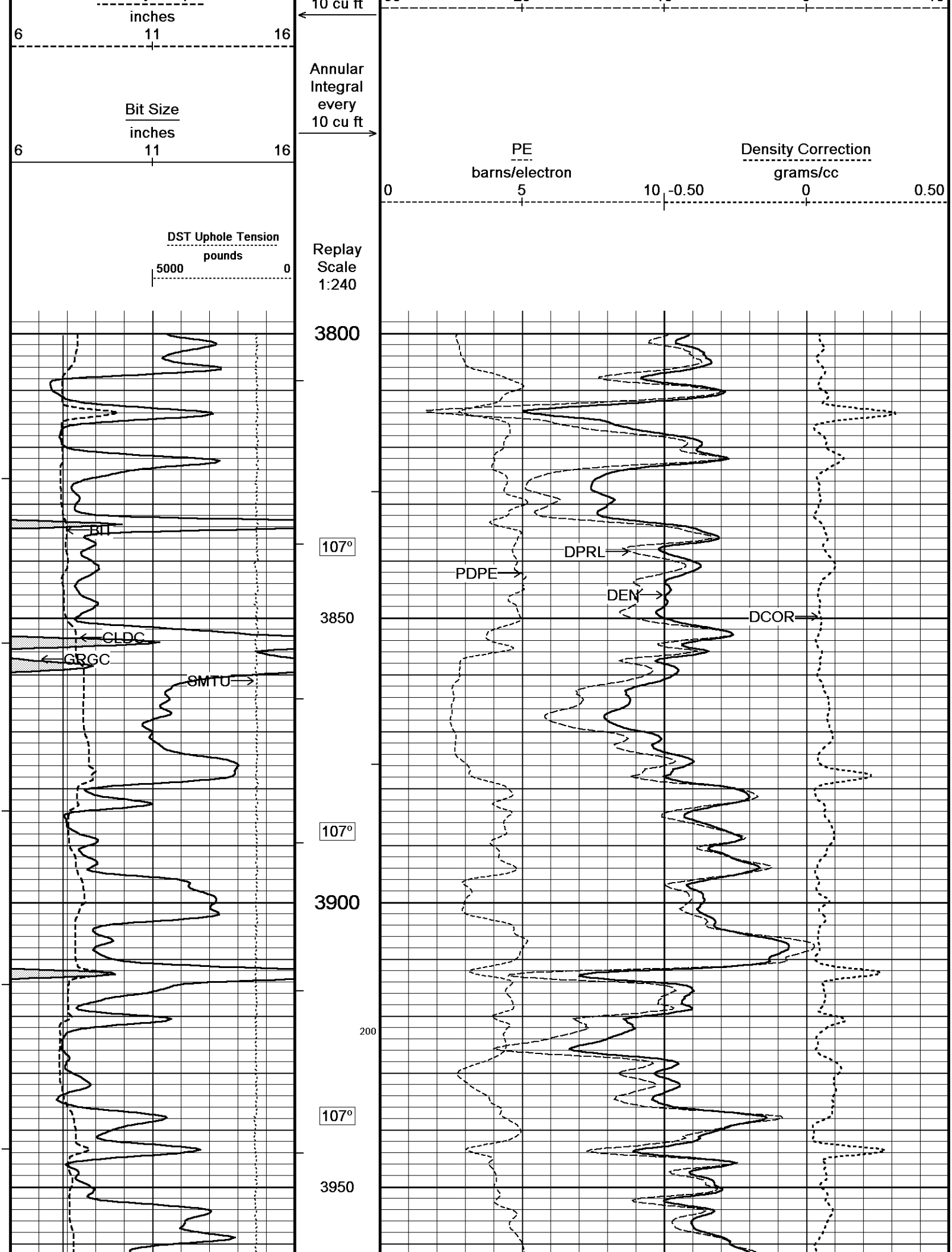
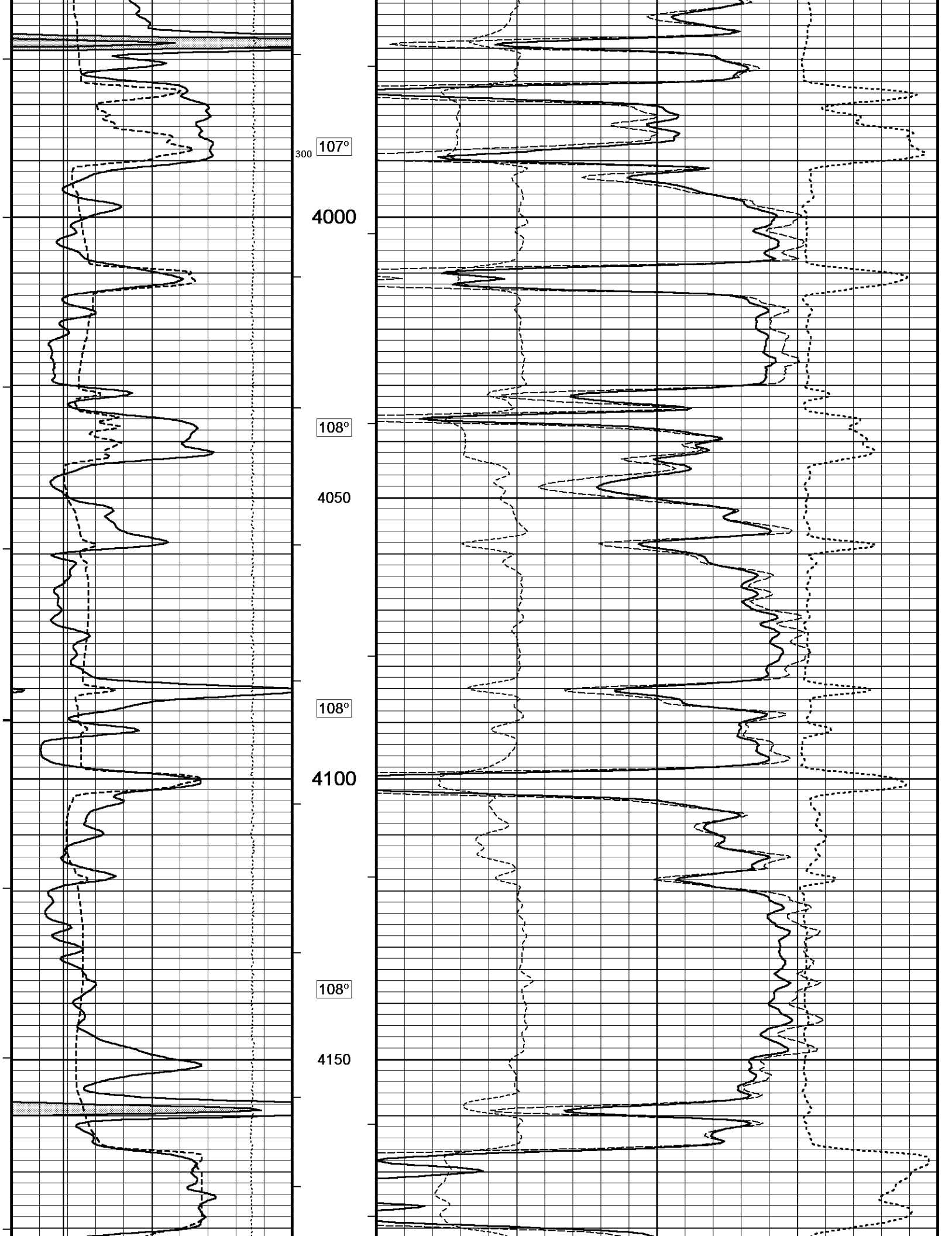
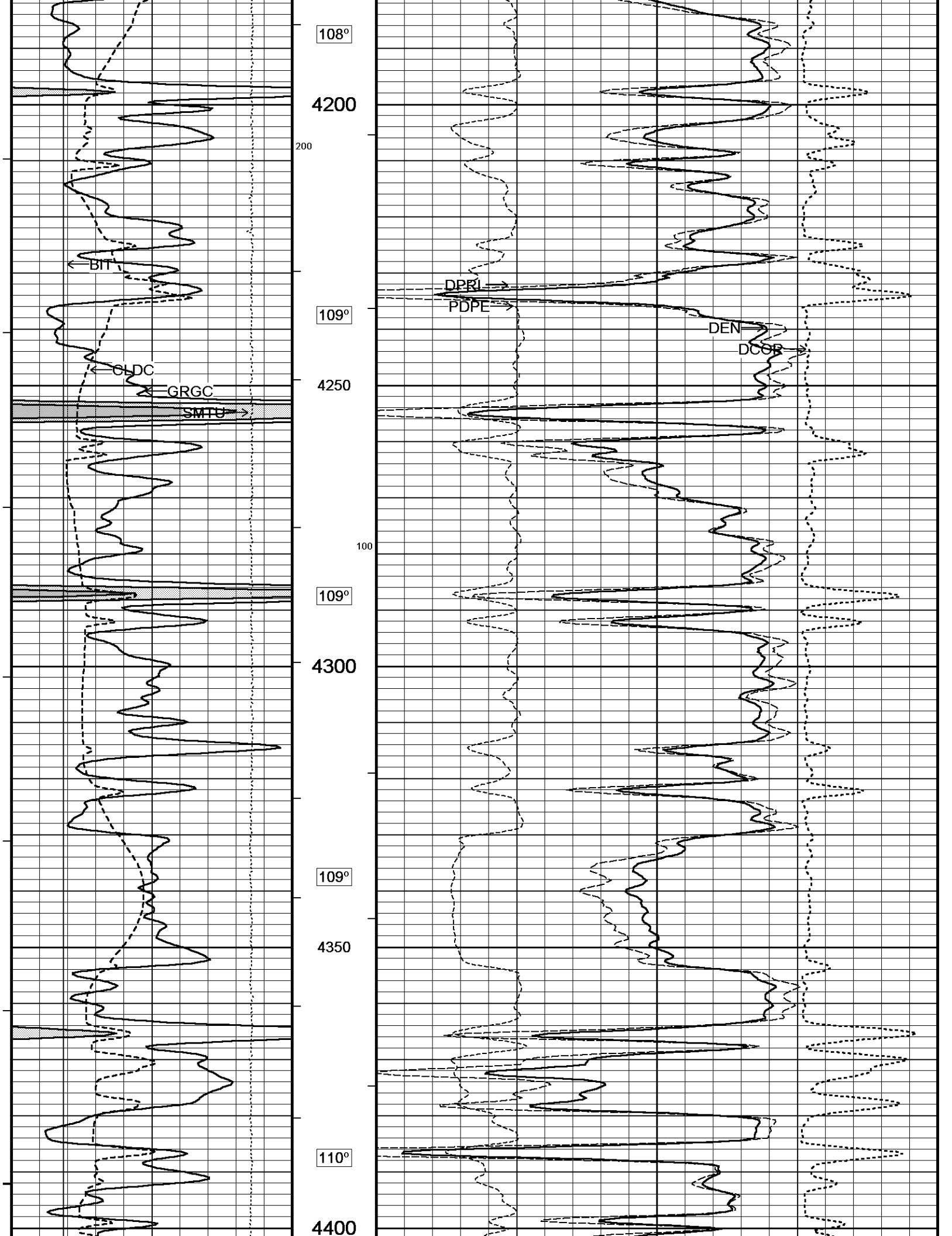
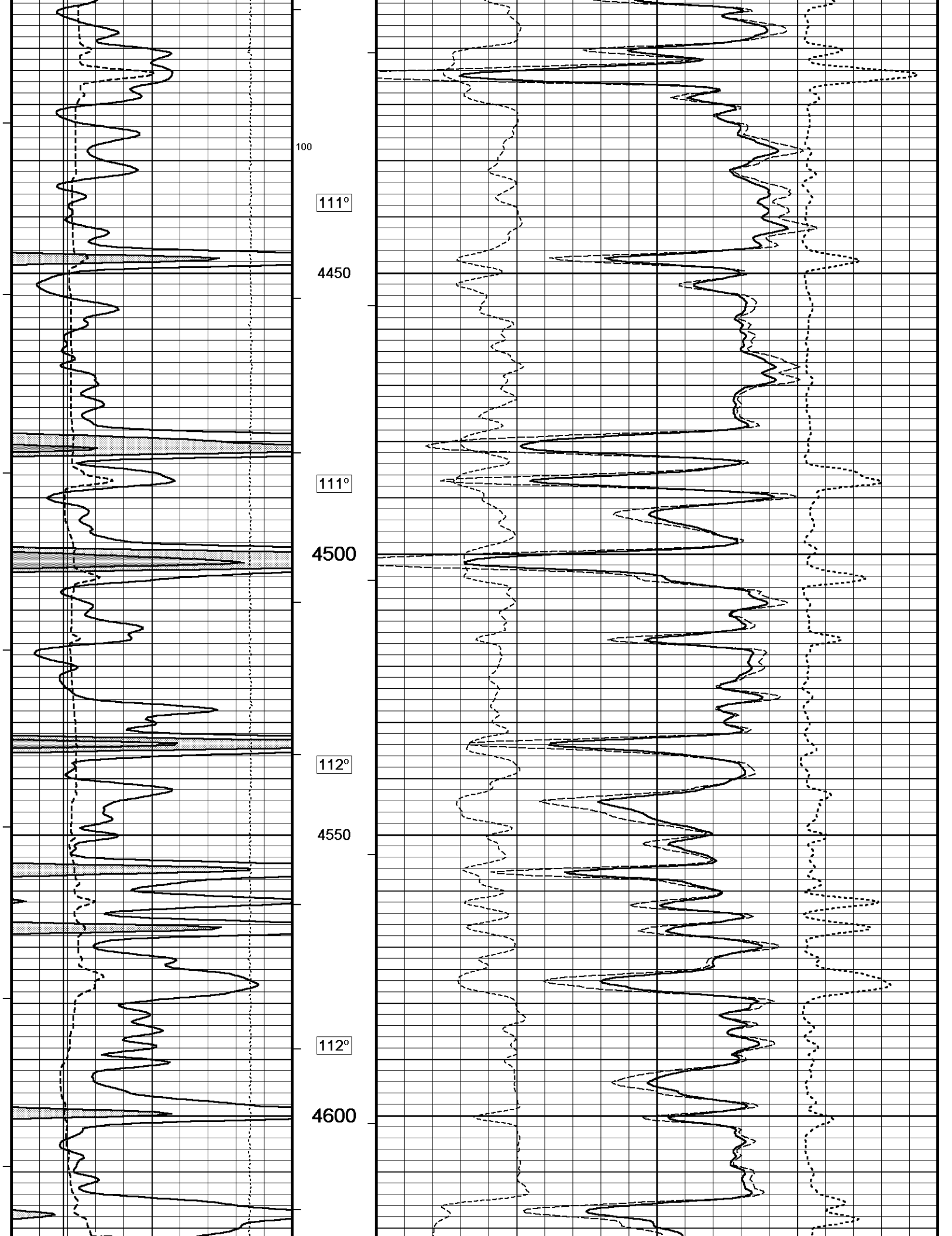
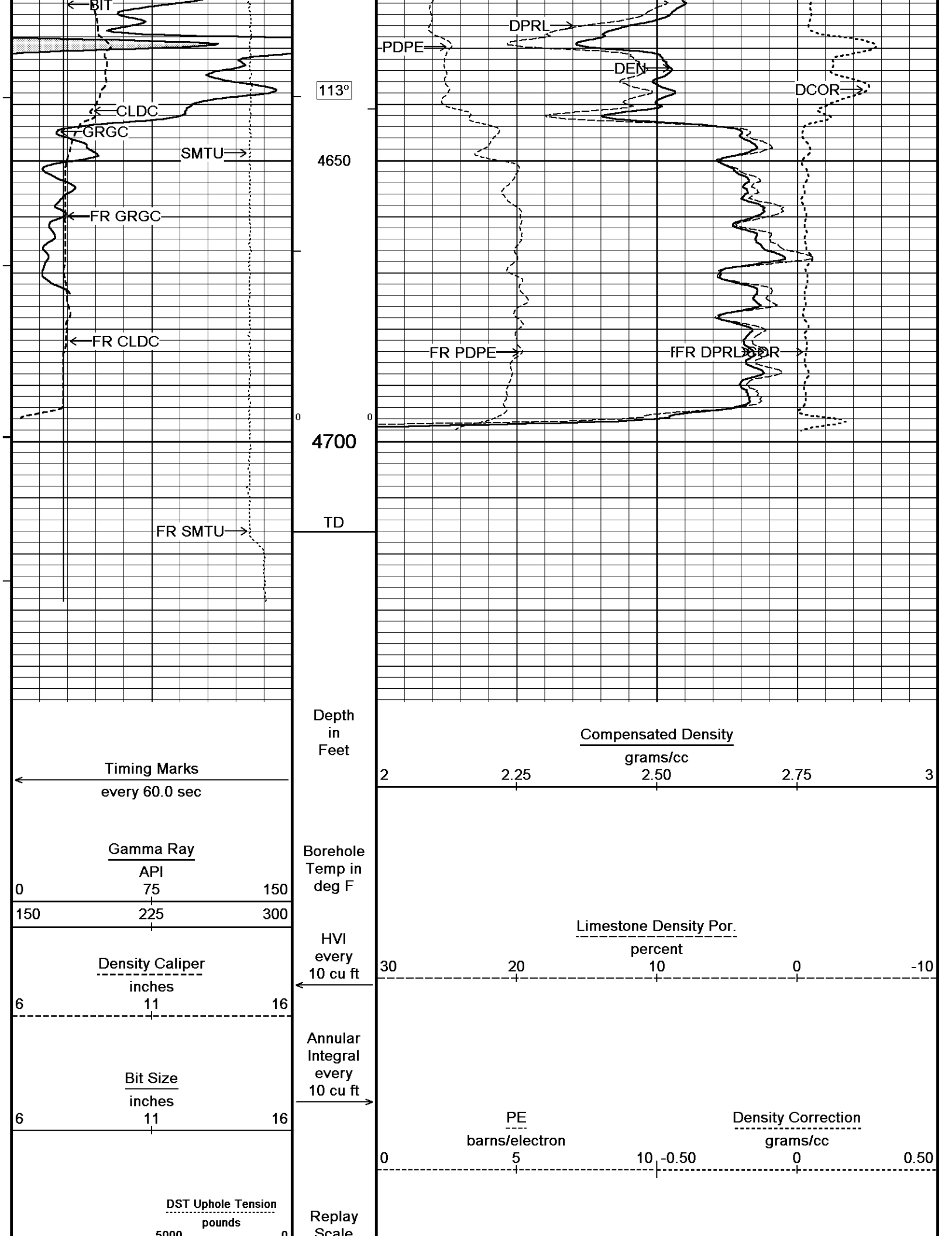



10 cu ft
inches
6
11
16
Annular
Integral
every
10 cu ft
Bit Size
inches
6
11
16
PE
barns/electron
0
5
10
Density Correction
grams/cc
-0.50
0
0.50
DST Uphole Tension
pounds
5000
0
Replay
Scale
1:240
3800
BIT
107°
DPRL
PDPE
DEN
3850
DCOR
CLDC
GRGC
SMTU
107°
3900
200
107°
3950


300
107°
4000
108°
4050
108°
4100
108°
4150


108°
4200
200
BIT
DPRI
PDPE
109°
DEN
DCOR
CLDC
4250
GRGC
SMTU
100
109°
4300
109°
4350
110°
4400


100
111°
4450
111°
4500
112°
4550
112°
4600


BIT
CLDC
GRGC
SMTU
FR GRGC
FR CLDC
FR SMTU
DPRL
PDPE
DEN
DCOR
FR PDPE
FR DPRL
FR DCOR
113°
4650
4700
TD
0
0
Depth in Feet
Timing Marks
every 60.0 sec
Compensated Density
grams/cc
2
2.25
2.50
2.75
3
Gamma Ray
API
0
75
150
Borehole Temp in deg F
150
225
300
Limestone Density Por.
percent
30
20
10
0
-10
HVI every 10 cu ft
Density Caliper
inches
6
11
16
Annular Integral every 10 cu ft
Bit Size
inches
6
11
16
PE
barns/electron
0
5
10
Density Correction
grams/cc
-0.50
0
0.50
DST Uphole Tension
pounds
5000
0
Replay Scale

Depth Based Data - Maximum Sampling Increment 10.0cm — Plotted on 11-JUN-2014 20:41
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5 INCH BULK DENSITY MAIN

REPEAT SECTION

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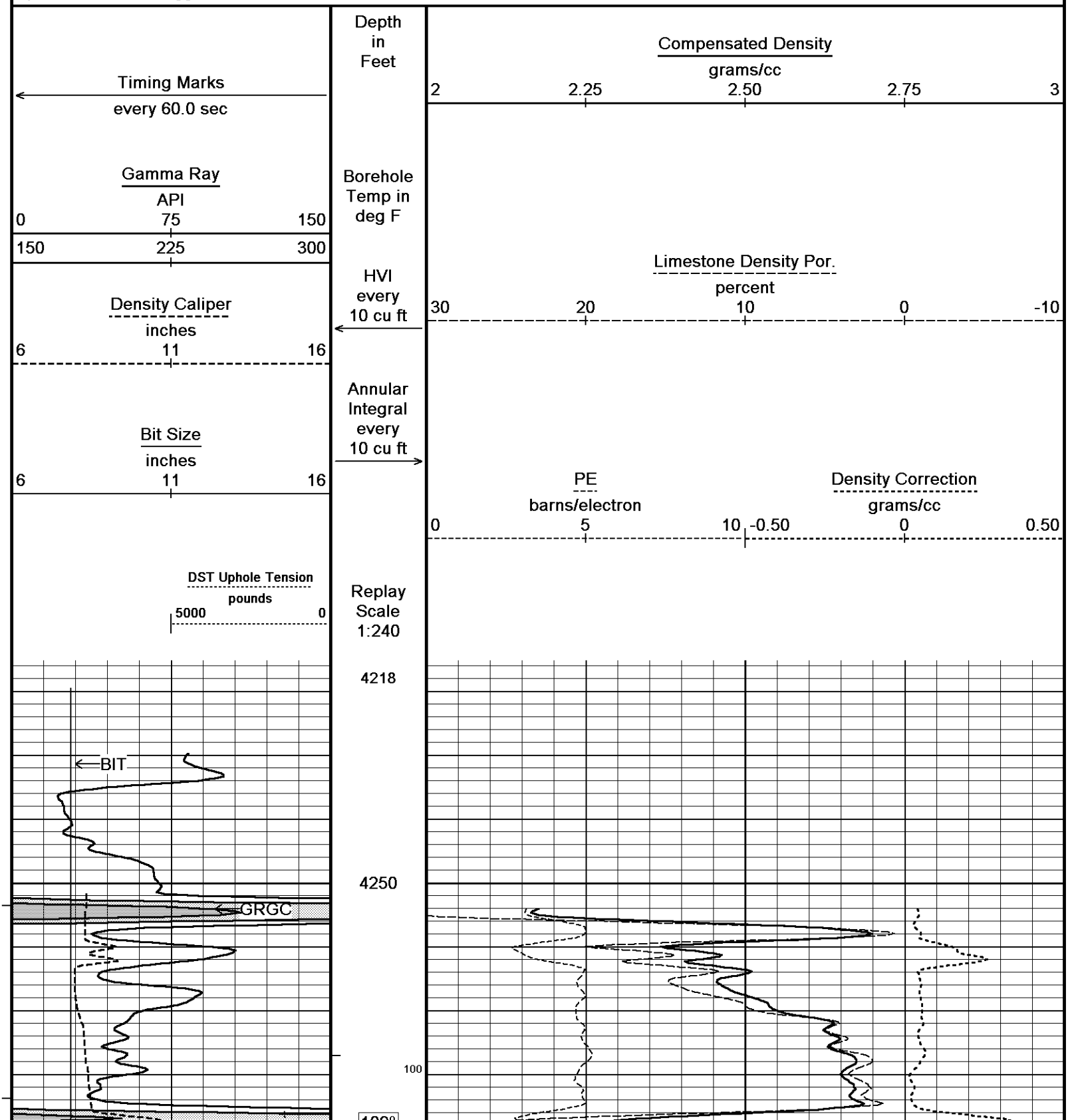
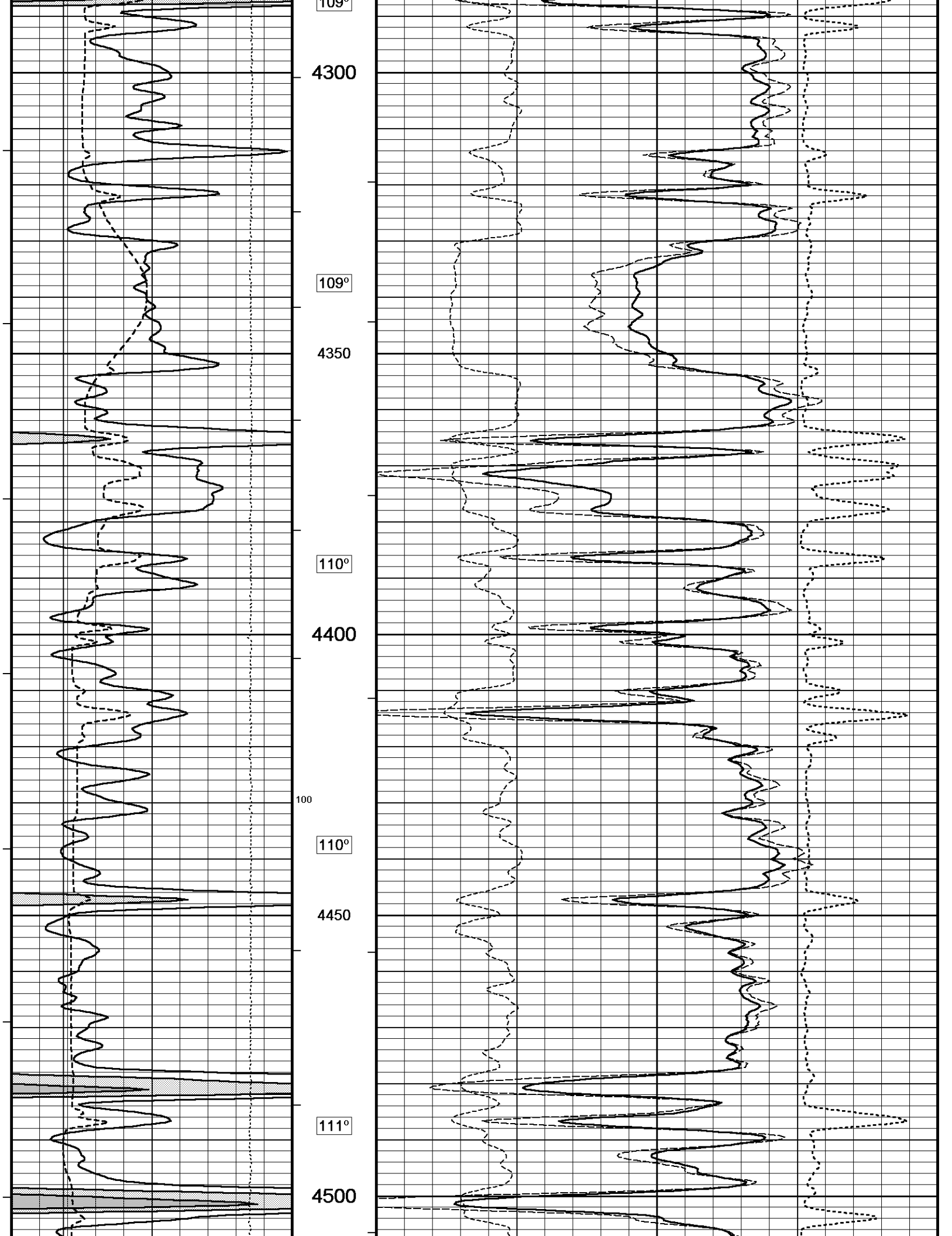
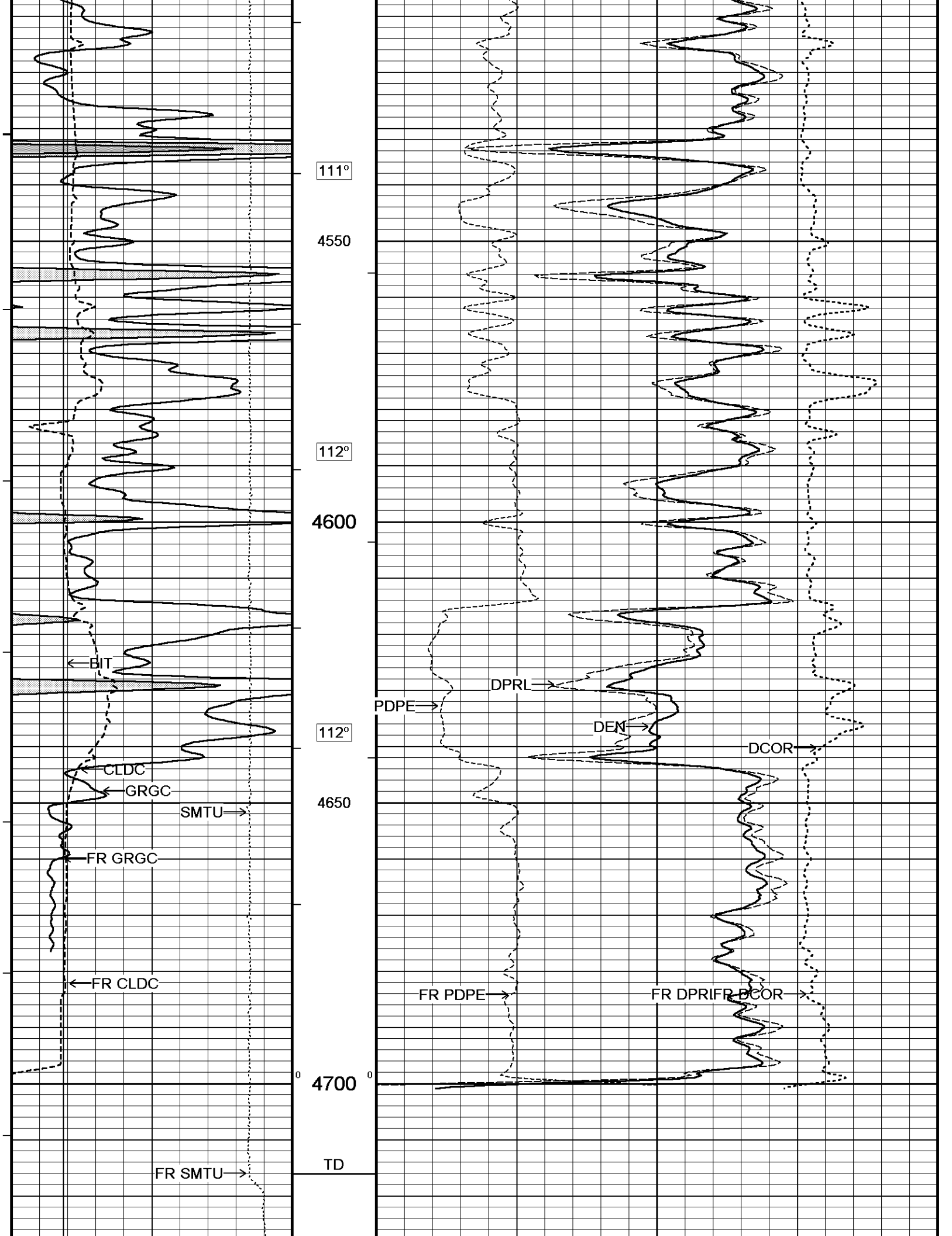
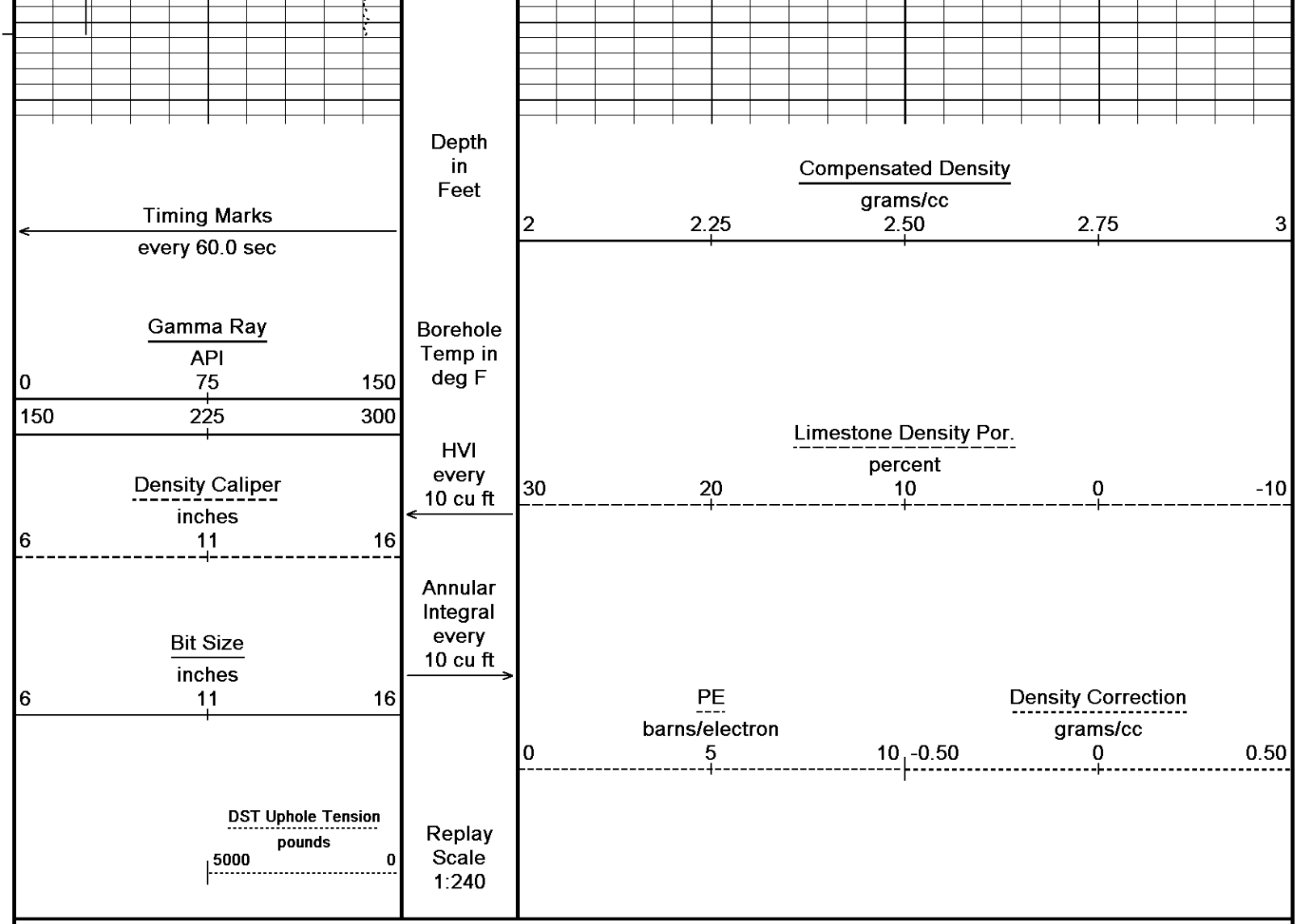



109°
4300
109°
4350
110°
4400
100
110°
4450
111°
4500


111°
4550
112°
4600
BIT
DPRL
PDPE
112°
DEN
DCOR
CLDC
GRGC
4650
SMTU
FR GRGC
FR CLDC
FR PDPE
FR DPRI
FR DCOR
4700
TD
FR SMTU



Depth Based Data - Maximum Sampling Increment 10.0cm — Plotted on 11-JUN-2014 20:41

Filename: C:\Minimus 13.08.2113\Logs\SHAKESPEA...\SHAKESPEARE CAMPBELL 4-17 REPEAT.dta — Recorded on 11-JUN-2014 18:11

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REPEAT SECTION

BEFORE SURVEY CALIBRATION

C:\Minimus 13.08.2113\Logs\SHAKESPEARE CAMPBELL 4-17\SHAKESPEARE CAMPBELL 4-17 REPEAT.dta

General Constants All 000 — Last Edited on 11-JUN-2014,17:41

General Parameters		
Mud Resistivity	0.640	ohm-metres
Mud Resistivity Temperature	93.000	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	MMR Caliper	
Rwa Parameters		
Porosity used	Crossplot Porosity	
Resistivity used	Array Ind. One Res Rt	
RWA Constant A	0.610	
RWA Constant M	2.150	
SW/APOR Tool Source	0.000	

High Resolution Temperature Calibration MCG-C 208

Field Calibration on 23-JAN-2014,17:11

	Measured	Calibrated(Deg F)
Lower	50.00	50.00
Upper	75.00	75.00

High Resolution Temperature Constants MCG-C 208

Last Edited on 23-JAN-2014,17:11

Pre-filter Length	11

Gamma Calibration MCG-C 208

Field Calibration on 04-JUN-2014 10:53

	Measured	Calibrated (API)
Background	68	46
Calibrator (Gross)	1134	771
Calibrator (Net)	1067	725

Gamma Constants MCG-C 208

Last Edited on 10-JUN-2014,13:26

Gamma Calibrator Number	GRC038	
Mud Density	1.11	gm/cc
Caliper Source for Processing	Density Caliper	
Tool Position	Eccentred	
Concentration of KCl		kppm
K Mud Type	Chloride	
K Mud Concentration	0.00	%

Caliper Calibration MPD-D.A 480

Base Calibration on 08-MAY-2014 14:36
Field Calibration on 04-JUN-2014 10:32

Base Calibration

Reading No	Measured	Calibrator Size (in)
1	17491	3.99
2	27463	5.98
3	37484	7.97
4	47415	9.86
5	58518	11.92
6	N/A	N/A

Field Calibration

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

Photo Density Calibration MPD-D.A 480

Base Calibration on 08-MAY-2014 14:53
Field Check on 04-JUN-2014 10:37

Density Calibration

Base Calibration	Measured		Calibrated (sdu)	
	Near	Far	Near	Far
Background	1275	1464		
Reference 1	55908	26147	59556	30836
Reference 2	22982	2651	24941	2541

Field Check at Base

1274.5	1464.0

Field Check

1273.2	1468.7

PE Calibration

Base Calibration	Measured			Calibrated
	WS	WH	Ratio	Ratio
Background	241	1140		
Reference 1	23265	55701	0.422	0.371
Reference 2	6806	22836	0.303	0.272

Field Check at Base

240.7	1139.6

Field Check

237.3	1137.1

Density Constants MPD-D.A 480

Last Edited on 10-JUN-2014,13:26

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	1.11	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 (m)
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 13.08.2113\Logs\SHAKESPEARE CAMPBELL 4-17\SHAKESPEARE CAMPBELL 4-17 REPEAT.dta

Compact Comms Gamma
MCG-C 208 LG: 8.70 ft WT: 63.9 lb OD: 2.244 in

- 56.02 ft GRGC - Gamma Ray
- 53.11 ft CGXT - MCG External Temperature

Compact Micro-Resistivity
MMR-C.A 248 LG: 8.59 ft WT: 81.6 lb OD: 4.882 in

- 45.76 ft MINV - MMR MicroLog Inverse
- 45.76 ft MNRL - MMR MicroLog Normal

Compact Neutron
MDN-B.J 387 LG: 5.04 ft WT: 50.7 lb OD: 2.244 in

- 40.97 ft NPRL - Limestone Neutron Por.

Compact Density/Caliper
MPD-D.A 480 LG: 9.59 ft WT: 90.4 lb OD: 2.449 in

- 33.73 ft CLDC - Density Caliper
- 33.73 ft AVOL - Annular Volume
- 33.73 ft HVOL - Hole Volume
- 31.80 ft DPRL - Limestone Density Por.
- 31.80 ft DEN - Compensated Density
- 31.80 ft DCOR - Density Correction
- 31.74 ft PDPE - PE

Compact Focussed Electric
MFE-A.A 55 LG: 6.05 ft WT: 48.5 lb OD: 2.244 in

- 26.24 ft FEFE - Shallow FE

Compact Sonic
MSS-A.A 73 LG: 12.52 ft WT: 72.8 lb OD: 2.244 in

- 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 DT35 - 3-5' Compensated Sonic
- 12.96 ft SPRL - Wyllie Lime. Sonic Por.

Compact Induction
MAI-A.A 5 LG: 10.81 ft WT: 48.5 lb OD: 2.244 in

- 3.34 ft R40O - Array Ind. One Res 40
- 3.34 ft R60O - Array Ind. One Res 60
- 3.34 ft RTAO - Array Ind. One Res Rt
- 3.34 ft CTAO - Array Ind. One Cond Ct
- 0.23 ft SPCG - Spontaneous Potential
- Tool Zero (0.13ft from bottom)

Total Length: 61.30 ft Weight: 456.4 lb

-0.13 ft SMTU - DST Uphole Tension
All measurements relative to tool zero.

COMPANY	SHAKESPEARE OIL. CO., INC.
WELL	CAMPBELL 4-17
FIELD	WILDCAT
PROVINCE/COUNTY	LOGAN
COUNTRY/STATE	U.S.A. / KANSAS

Elevation Kelly Bushing	3043.00	feet	First Reading	4684.00	feet
Elevation Drill Floor	3041.00	feet	Depth Driller	4720.00	feet
Elevation Ground Level	3033.00	feet	Depth Logger	4716.00	feet

Weatherford®

COMPACT PHOTO DENSITY
COMPENSATED NEUTRON
MICRORESISTIVITY LOG