Weatherford®

COMPACT PHOTO DENSITY
COMPENSATED NEUTRON
MICRO RESISITIVITY LOG

COMPANY	GRAND MESA OPERATING COMPANY, INC
WELL	GREG #1-26
FIELD	WILDCAT
PROVINCE/COUNTY	LOGAN
COUNTRY/STATE	U.S.A. / KANSAS
LOCATION	1084' FNL & 358' FWL

40 Years of Wireline 1970 2010

SEC	TWP	RGE	Other Services
26	12S	32W	MAI/MFE

API Number 15-109-20955
Permit Number

Permanent Datum G.L., Elevation 3018 feet
Log Measured From K.B. @ 5 FEET above Permanent Datum
Drilling Measured From K.B.

Elevations:	feet
KB	3023.00
DF	3022.00
GL	3018.00

Date	28-NOV-2010		
Run Number	ON		
Depth Driller	4720.00 feet		
Depth Logger	4717.00 feet		
First Reading	4695.00 feet		
Last Reading	3700.00 feet		
Casing Driller	222.00 feet		
Casing Logger	221.00 feet		
Bit Size	7.875 inches		
Hole Fluid Type	CHEMICAL		
Density / Viscosity	9.40 lb/USg	48.00 CP	
PH / Fluid Loss	10.00	8.00 ml/30Min	
Sample Source	FLOWLINE		
Rm @ Measured Temp	1.41 @ 79.0 ohm-m		
Rmf @ Measured Temp	1.13 @ 79.0 ohm-m		
Rmc @ Measured Temp	1.69 @ 79.0 ohm-m		
Source Rmf / Rmc	CALC	CALC	
Rm @ BHT	1.02 @110.0 ohm-m		
Time Since Circulation	4 HOURS		
Max Recorded Temp	110.00 deg F		
Equipment Name	COMPACT		
Equipment / Base	13096	LIB	
Recorded By	LYNN SCOTT		
Witnessed By	STEVE CARL		
S.O.# / JOB#	3524629	LB10-301	

BOREHOLE RECORD

Last Edited: 28-NOV-2010 13:37

Bit Size inches	Depth From feet	Depth To feet
7.875	221.00	4717.00

CASING RECORD

Type	Size inches	Depth From feet	Shoe Depth feet	Weight pounds/ft
SURFACE	8.625	0.00	221.00	24.00

REMARKS

Tools Run: MAI, MPD, MCG, MDN, MML, MFE, SKJ
Hardware: MPD: 8 inch profile plate used. MAI and MFE: 0.5 Inch standoffs used. MDN: Dual Eccentraliser used.
2.71 G/CC Limestone density matrix used to calculate porosity.
Borhole rugosity, tight pulls, and washouts will affect data quality.
All intervals logged and scaled per customer's request.
Annular volume with 4.5 inch production casing=254 cu. ft.
Service order #3524629
Rig: Murfin #24
Engineer: L. Scott
Operator(s): K. Rinehart

5 Inch Main

Depth Based Data - Maximum Sampling Increment 10.0cm
Filename: C:\Minimus 11_01\Data\Grand Mesa Greg 1-26\GRAND MESA GREG 1-26_002.dta
System Versions: Logged with 11.01.2198 Plotted with 11.01.2198

Plotted on 28-NOV-2010 14:18
Recorded on 28-NOV-2010 12:13

Timing Marks
every 60.0 sec

Gamma Ray
API
0 75 150
150 225 300

MML Caliper
inches
6 11 16

Density Caliper
inches
6 11 16

Bit Size
inches
6 11 16

DST Uphole Tension
pounds
5000 0
0 -5000

Depth in Feet

Borehole Temp in deg F

HVI every 10 cu ft

Annular Integral every 10 cu ft

Replay Scale 1:240

Limestone Density Por.
percent
30 20 10 0 -10

Limestone Neutron Por.
percent
30 20 10 0 -10

PE
barns/electron
0 5 10

Density Correction
grams/cc
-0.25 0 0.25

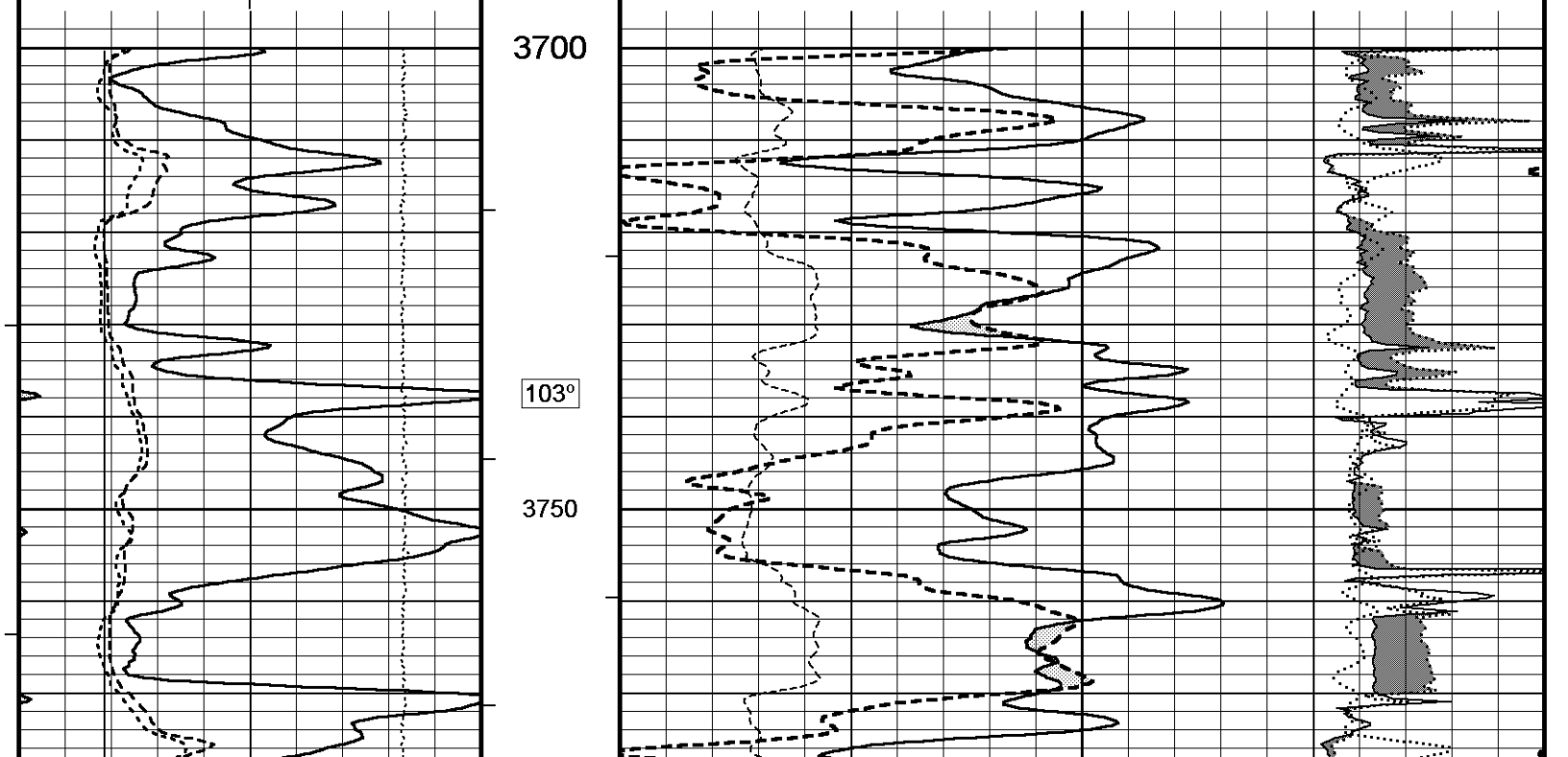
Micro-normal
ohm metres
0 10

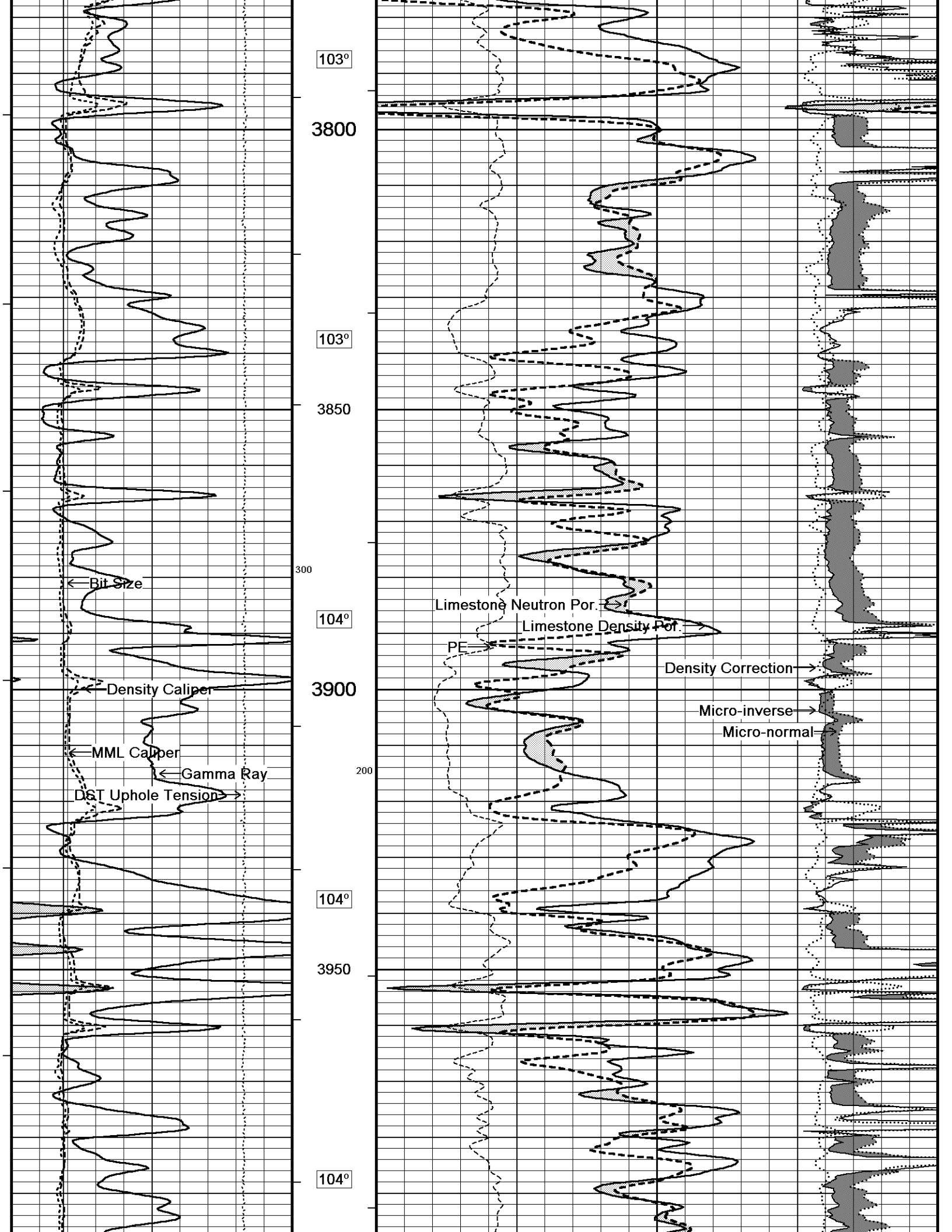
Micro-inverse
ohm metres
0 10

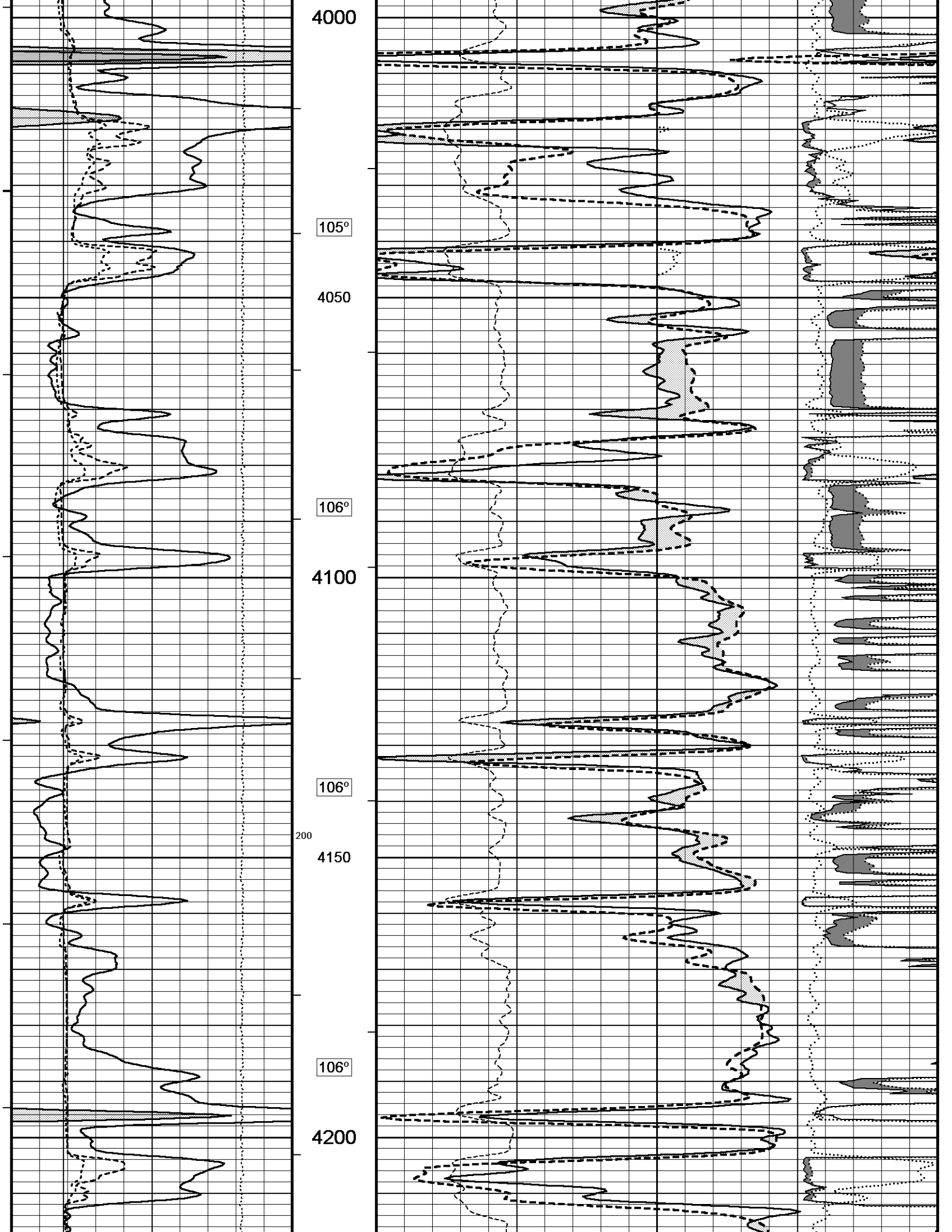
3700

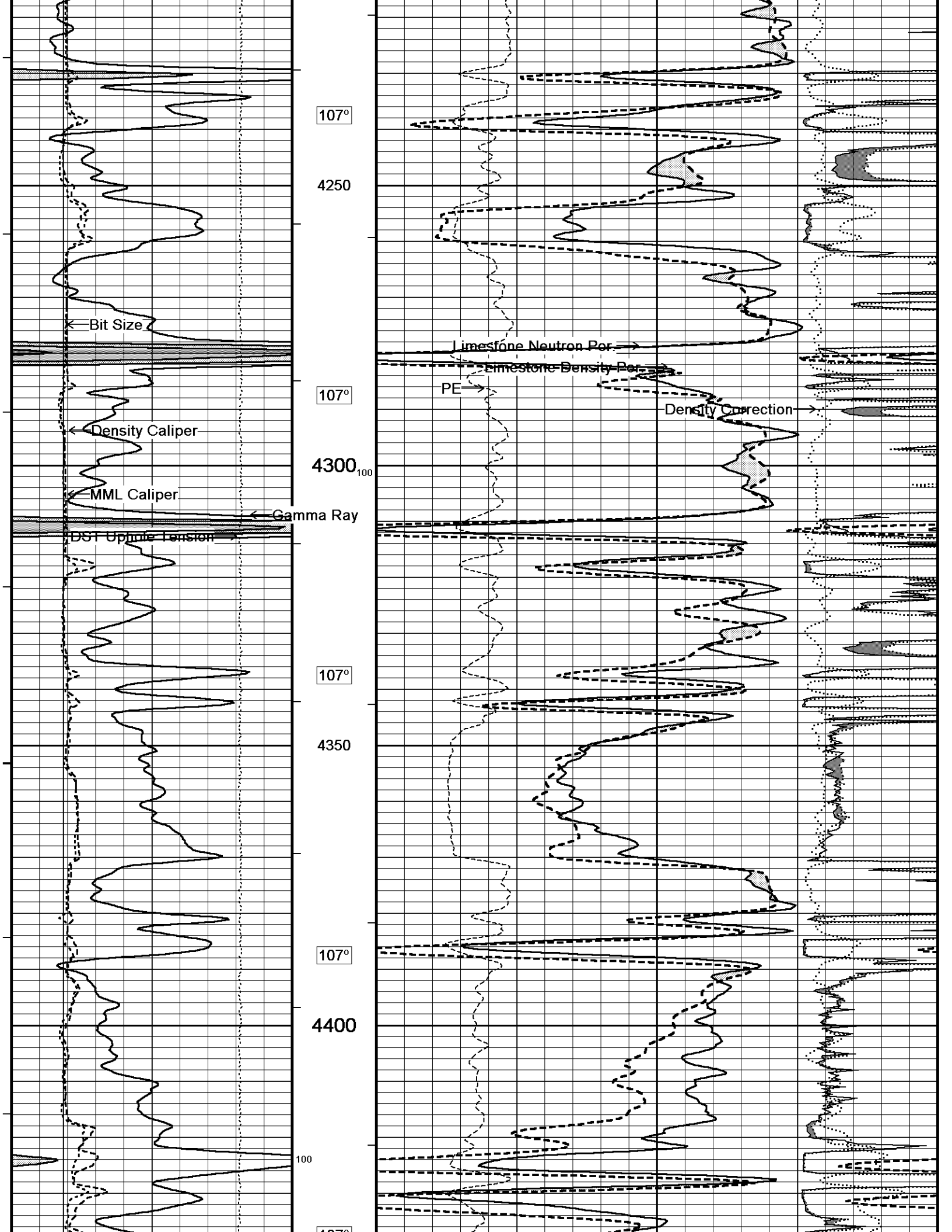
103°

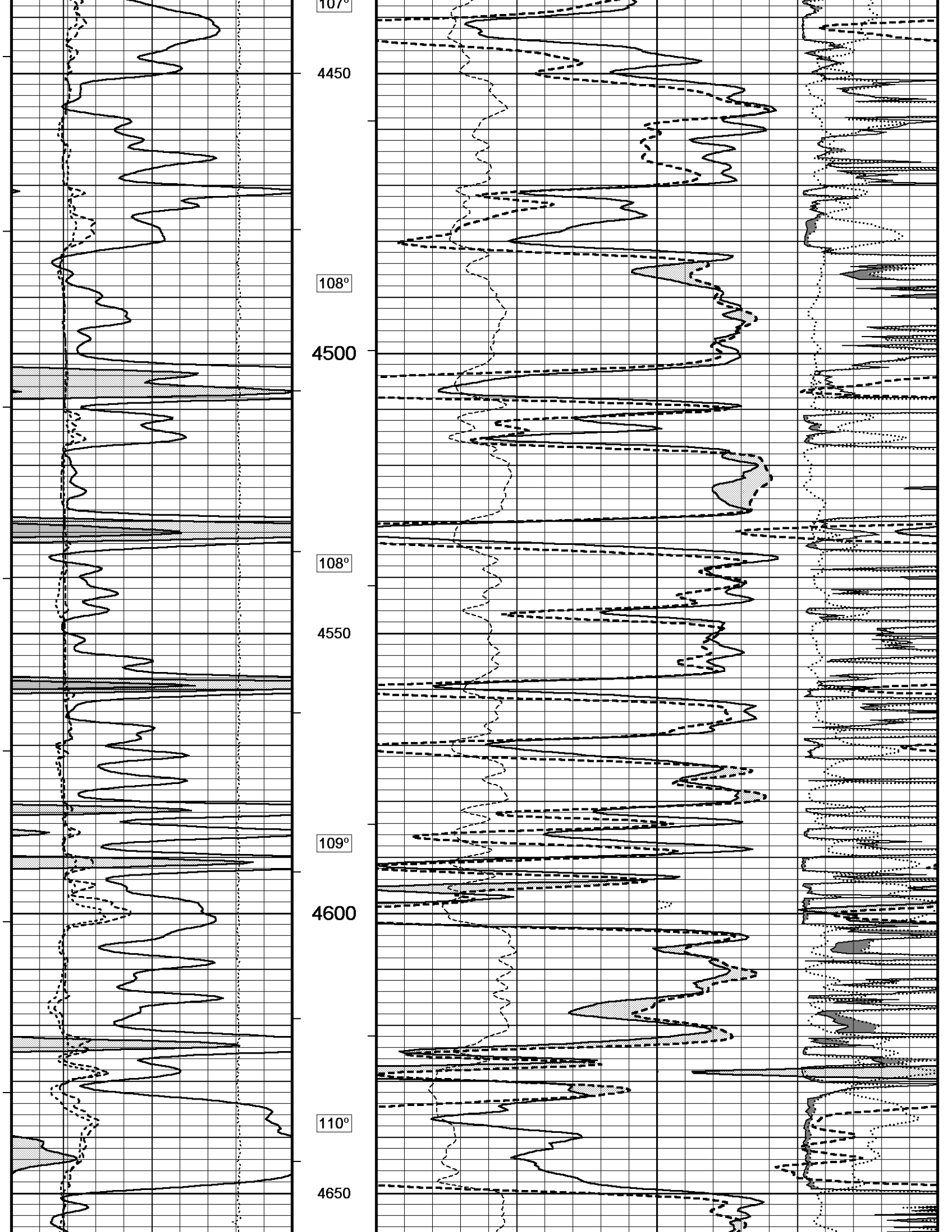
3750

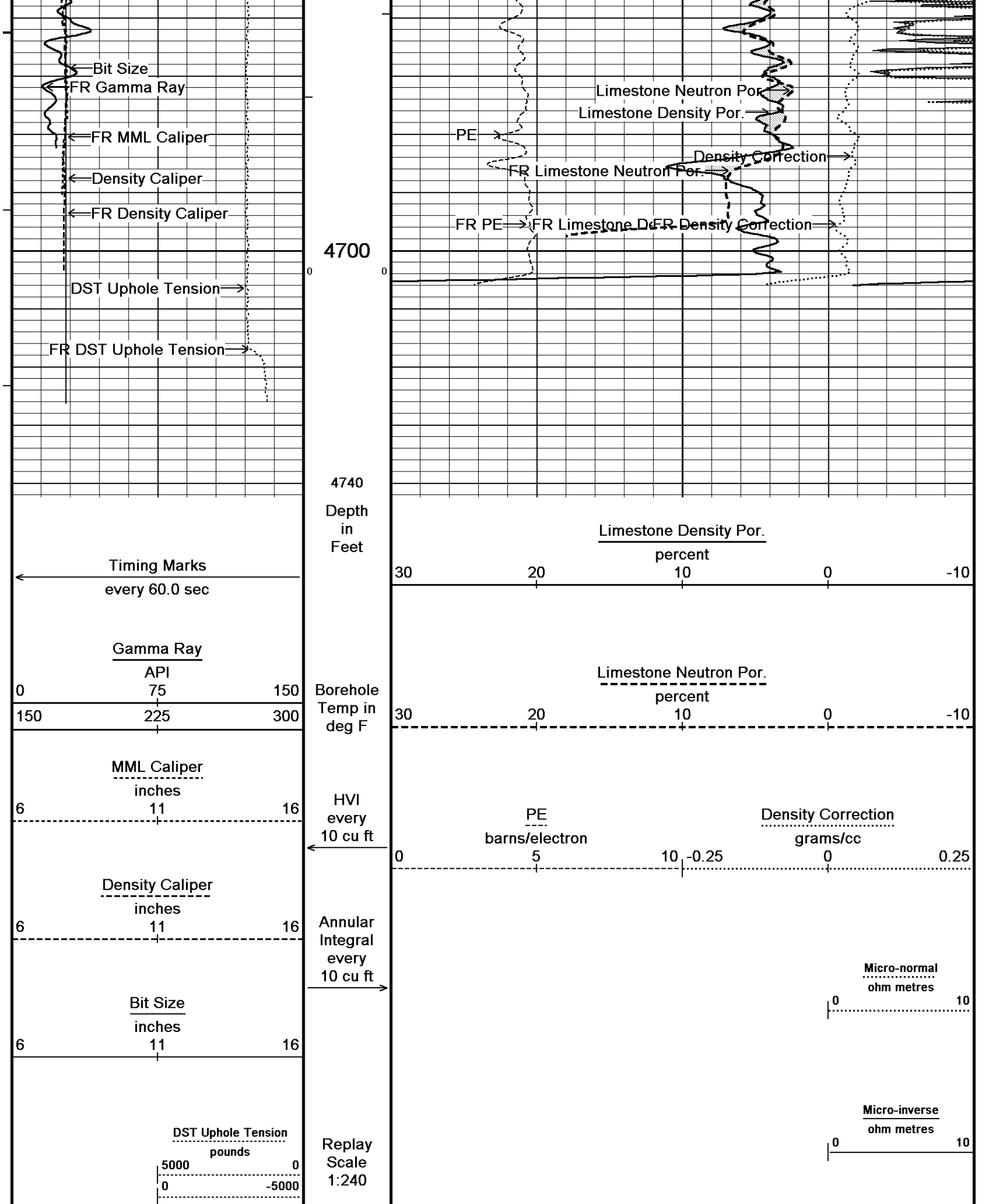



103°
3800
103°
3850
300
Bit Size
104°
Limestone Neutron Por.
Limestone Density Por.
PE
Density Correction
Density Caliper
3900
Micro-inverse
Micro-normal
MML Caliper
Gamma Ray
200
DST Uphole Tension
104°
3950
104°


4000
105°
4050
106°
4100
106°
200
4150
106°
4200


107°
4250
Bit Size
Limestone Neutron Por
Limestone Density Por
PE
107°
Density Correction
Density Caliper
4300
100
MML Caliper
Gamma Ray
DST Uphole Tension
107°
4350
107°
4400
100


107°
4450
108°
4500
108°
4550
109°
4600
110°
4650



Depth Based Data - Maximum Sampling Increment 10.0cm
Plotted on 28-NOV-2010 14:18
Filename: C:\Minimus 11_01\Data\Grand Mesa Greg 1-26\GRAND MESA GREG 1-26_002.dta
Recorded on 28-NOV-2010 12:13
System Versions: Logged with 11.01.2198 Plotted with 11.01.2198

5 Inch Main

Repeat Section

Depth Based Data - Maximum Sampling Increment 10.0cm
Plotted on 28-NOV-2010 14:18
Filename: C:\Minimus 11_01\Data\Grand Mesa Greg 1-26\GRAND MESA GREG 1-26_001.dta
Recorded on 28-NOV-2010 11:52
System Versions: Logged with 11.01.2198 Plotted with 11.01.2198

Timing Marks
every 60.0 sec

Gamma Ray
API
0 75 150
150 225 300

MML Caliper
inches
6 11 16

Density Caliper
inches
6 11 16

Bit Size
inches
6 11 16

DST Uphole Tension
pounds
5000 0
0 -5000

Depth in Feet

Borehole Temp in deg F

HVI every 10 cu ft

Annular Integral every 10 cu ft

Replay Scale 1:240

4400

100

106°

4450

Limestone Density Por.
percent
30 20 10 0 -10

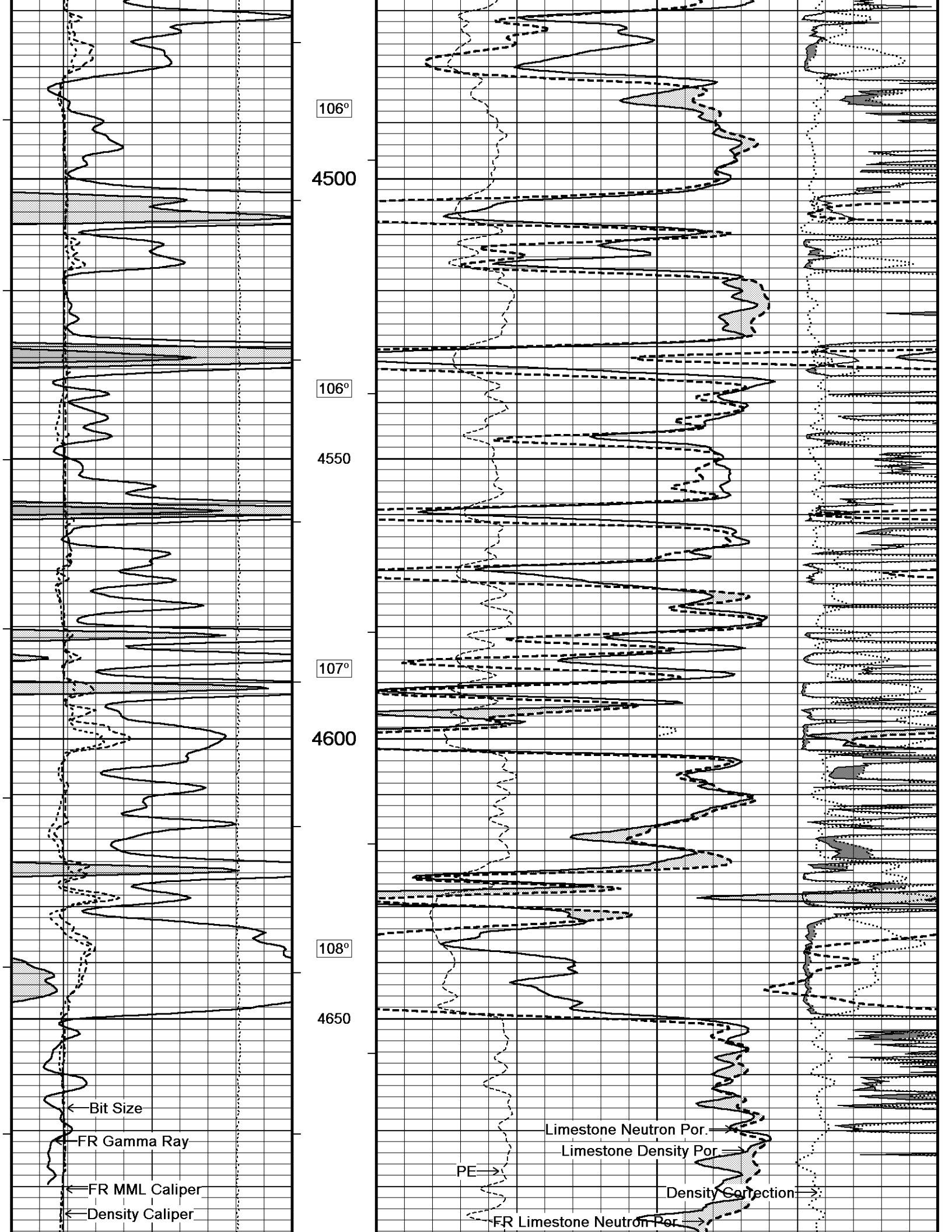
Limestone Neutron Por.
percent
30 20 10 0 -10

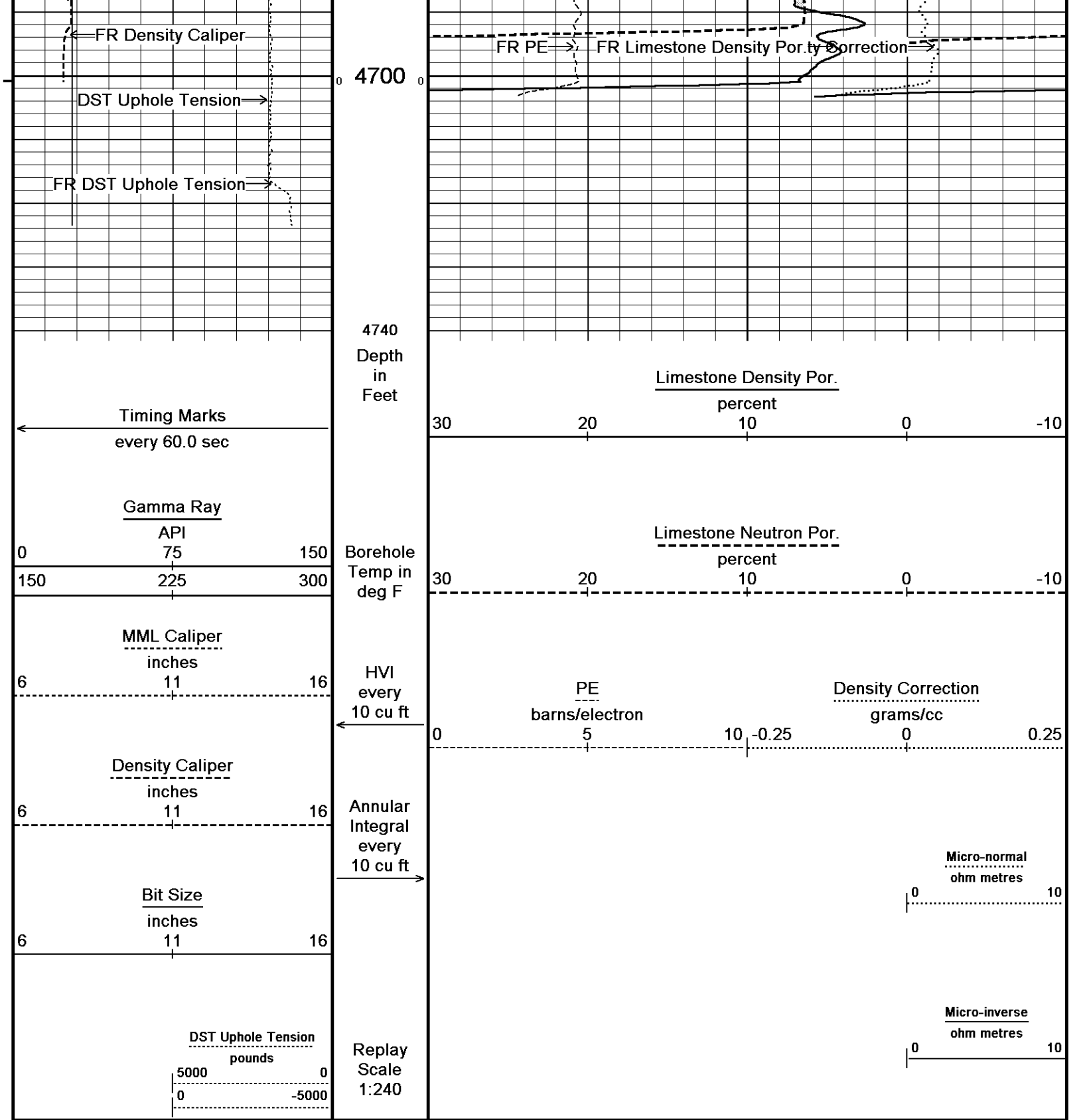
PE
barns/electron
0 5 10

Density Correction
grams/cc
-0.25 0 0.25

Micro-normal
ohm metres
0 10

Micro-inverse
ohm metres
0 10


106°
4500
106°
4550
107°
4600
108°
4650
Bit Size
FR Gamma Ray
FR MML Caliper
Density Caliper
PE
Limestone Neutron Por.
Limestone Density Por
Density Correction
FR Limestone Neutron Por.



Depth Based Data - Maximum Sampling Increment 10.0cm
Plotted on 28-NOV-2010 14:18
Filename: C:\Minimus 11_01\Data\Grand Mesa Greg 1-26\GRAND MESA GREG 1-26_001.dta
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Repeat Section

5 Inch Main

Depth Based Data - Maximum Sampling Increment 10.0cm
Plotted on 28-NOV-2010 14:18
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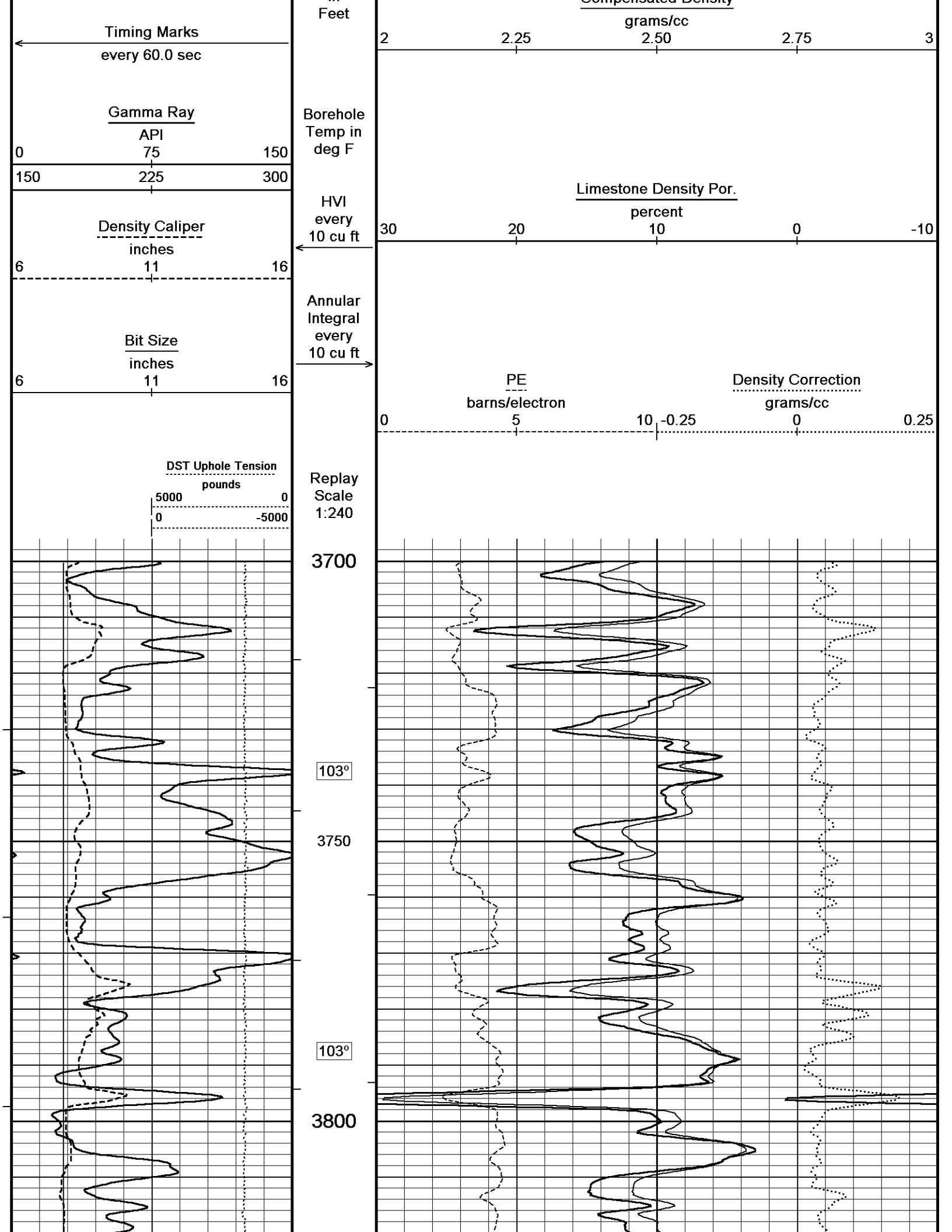
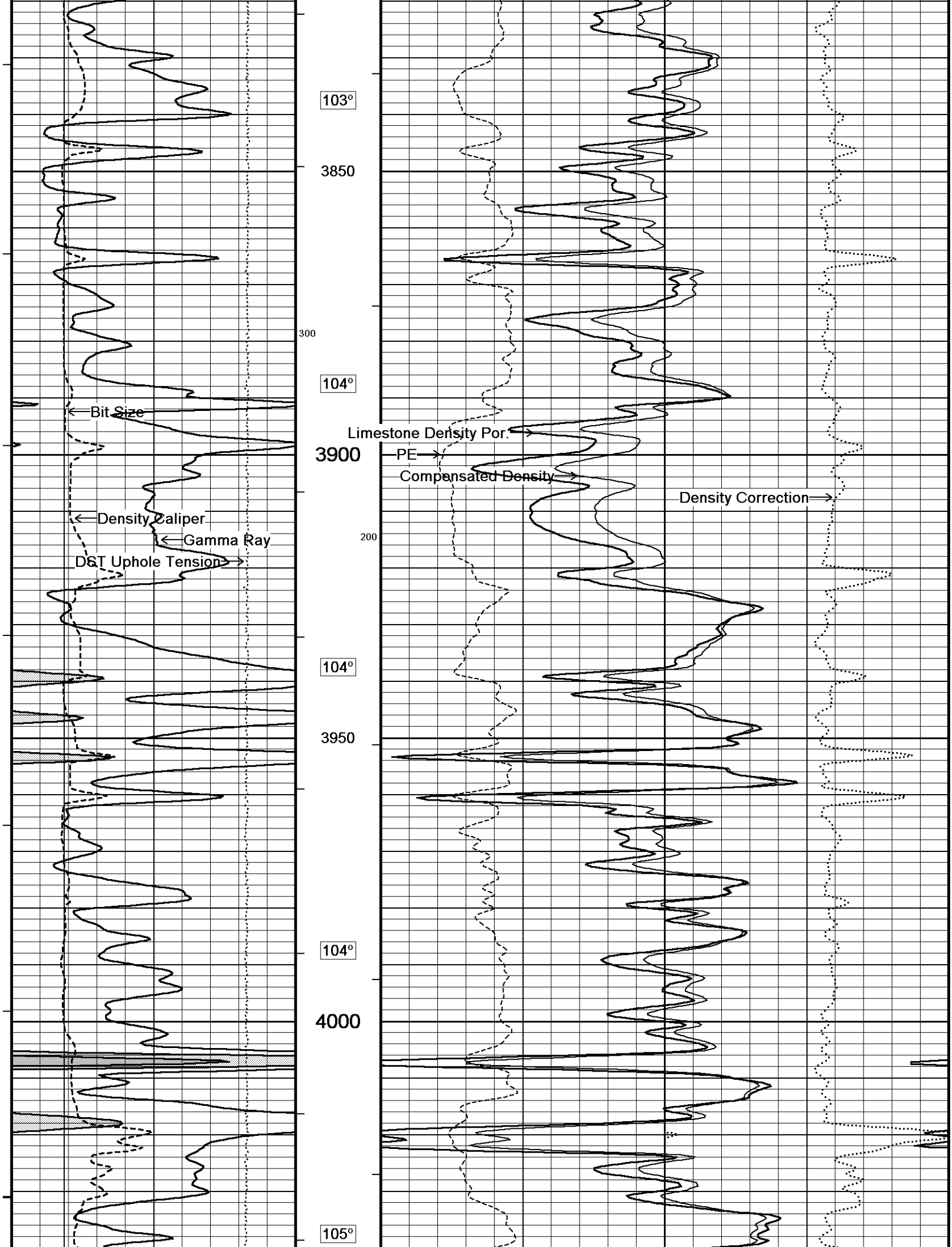
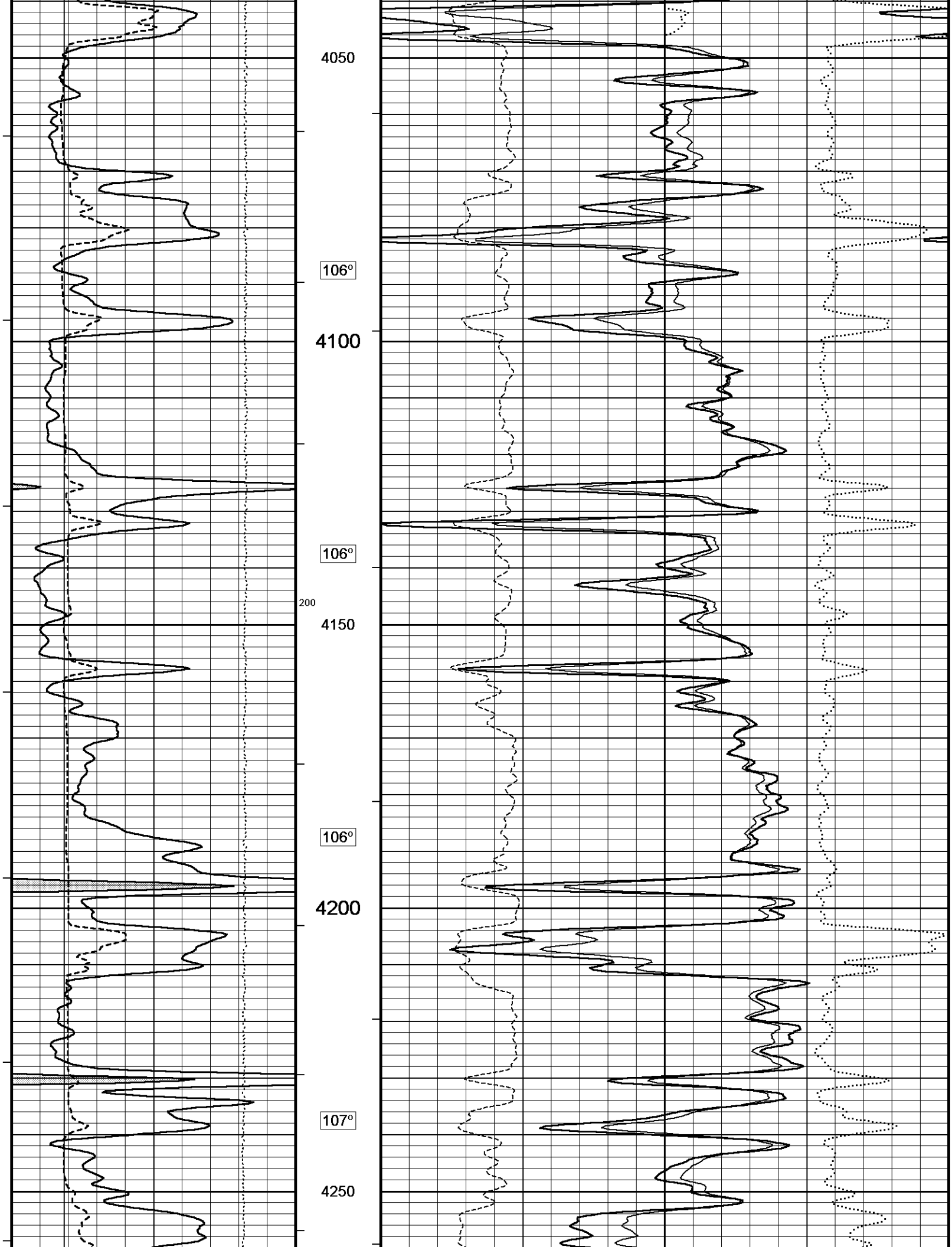
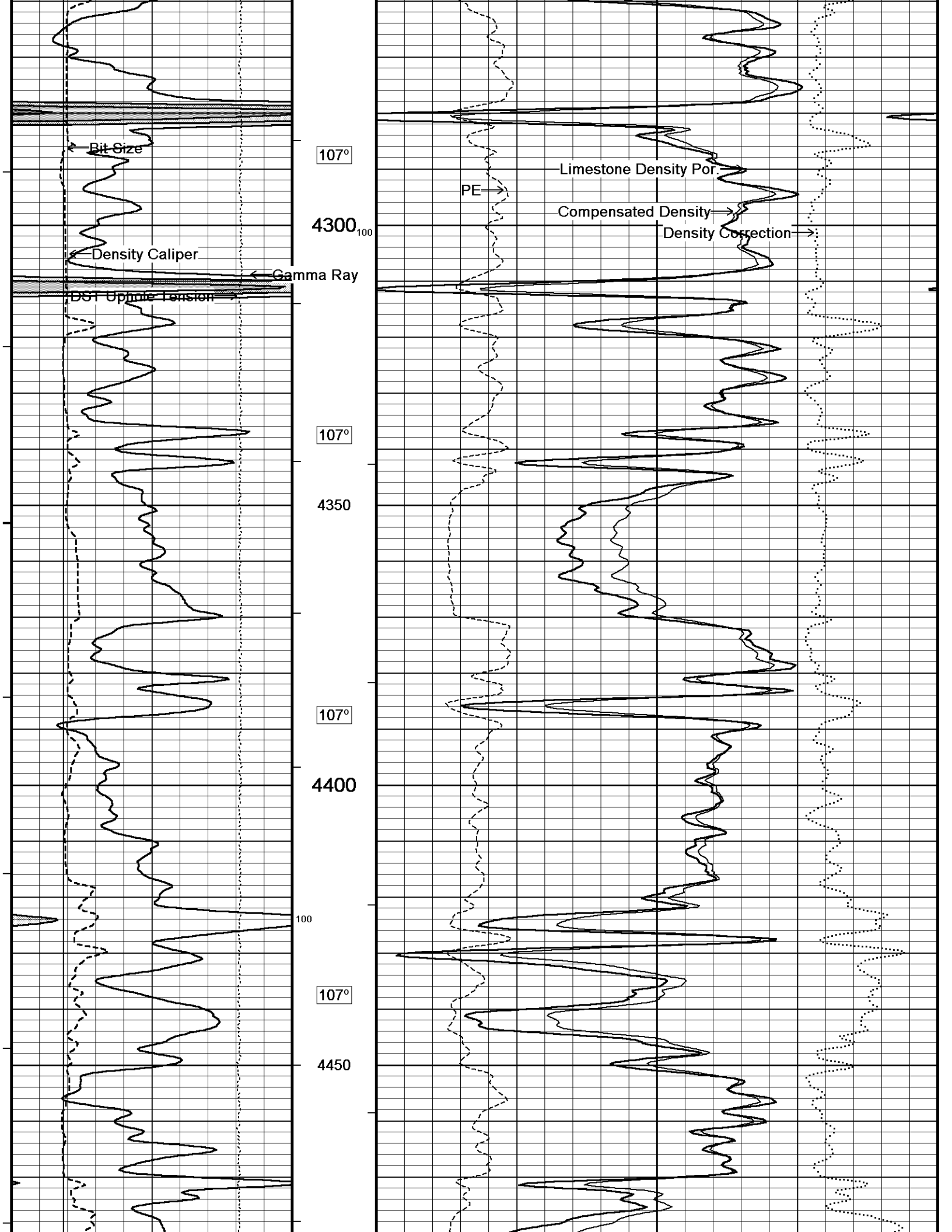
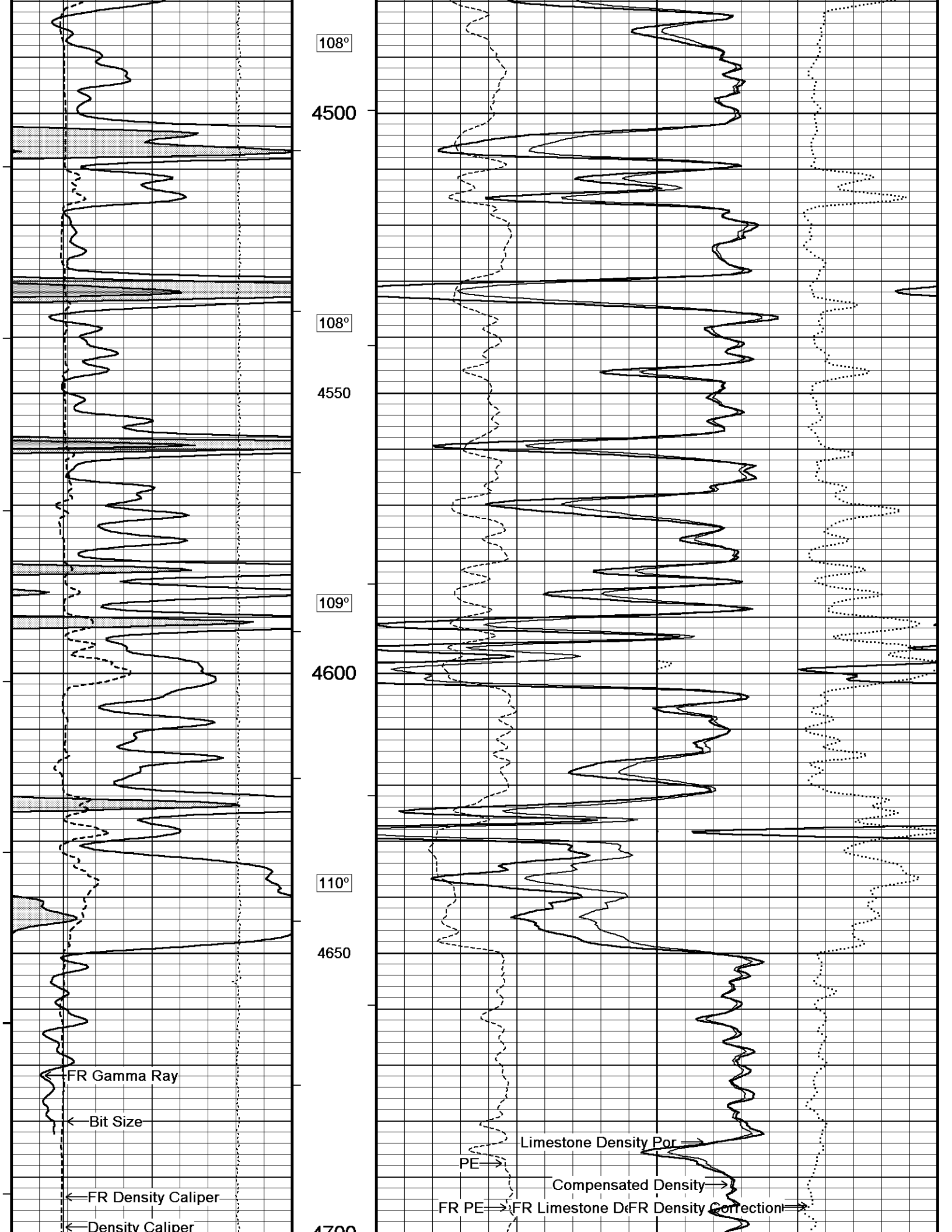
Depth
in
Compensated Density


Timing Marks
every 60.0 sec
Feet
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
-0.25
0
0.25
DST Uphole Tension
pounds
5000
0
0
-5000
Replay Scale 1:240
3700
103°
3750
103°
3800


103°
3850
300
104°
Bit Size
Limestone Density Por.
3900
PE
Compensated Density
Density Correction
Density Caliper
200
Gamma Ray
DST Uphole Tension
104°
3950
104°
4000
105°


4050
106°
4100
106°
200
4150
106°
4200
107°
4250


Bit Size
Density Caliper
Gamma Ray
DST Uphole Tension
107°
4300
100
107°
4350
107°
4400
100
107°
4450
PE
Limestone Density Por
Compensated Density
Density Correction


108°
4500
108°
4550
109°
4600
110°
4650
4700
FR Gamma Ray
Bit Size
FR Density Caliper
Density Caliper
Limestone Density Por
PE
Compensated Density
FR PE
FR Limestone De
FR Density Correction

Depth Based Data - Maximum Sampling Increment 10.0cm
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5 Inch Main

Repeat Section

Depth Based Data - Maximum Sampling Increment 10.0cm
Plotted on 28-NOV-2010 14:18
Filename: C:\Minimus 11_01\Data\Grand Mesa Greg 1-26\GRAND MESA GREG 1-26_001.dta
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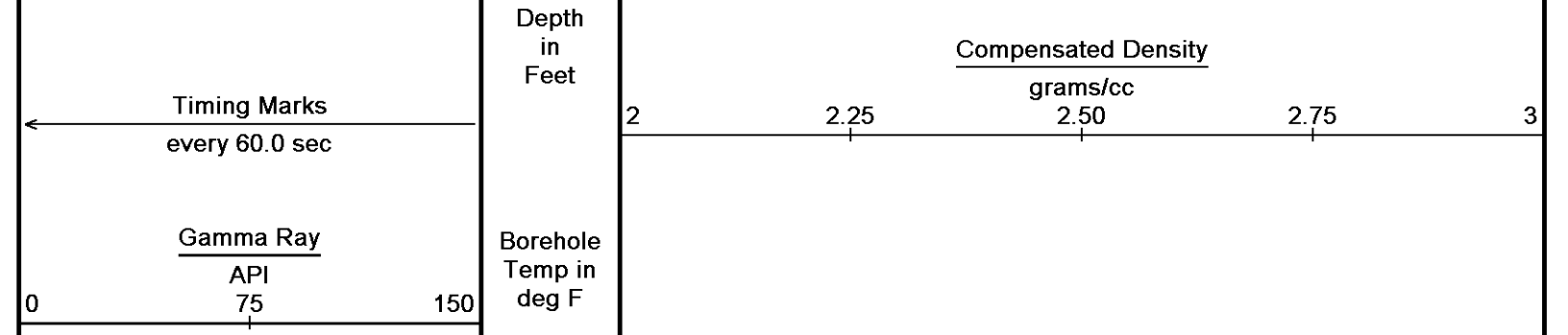
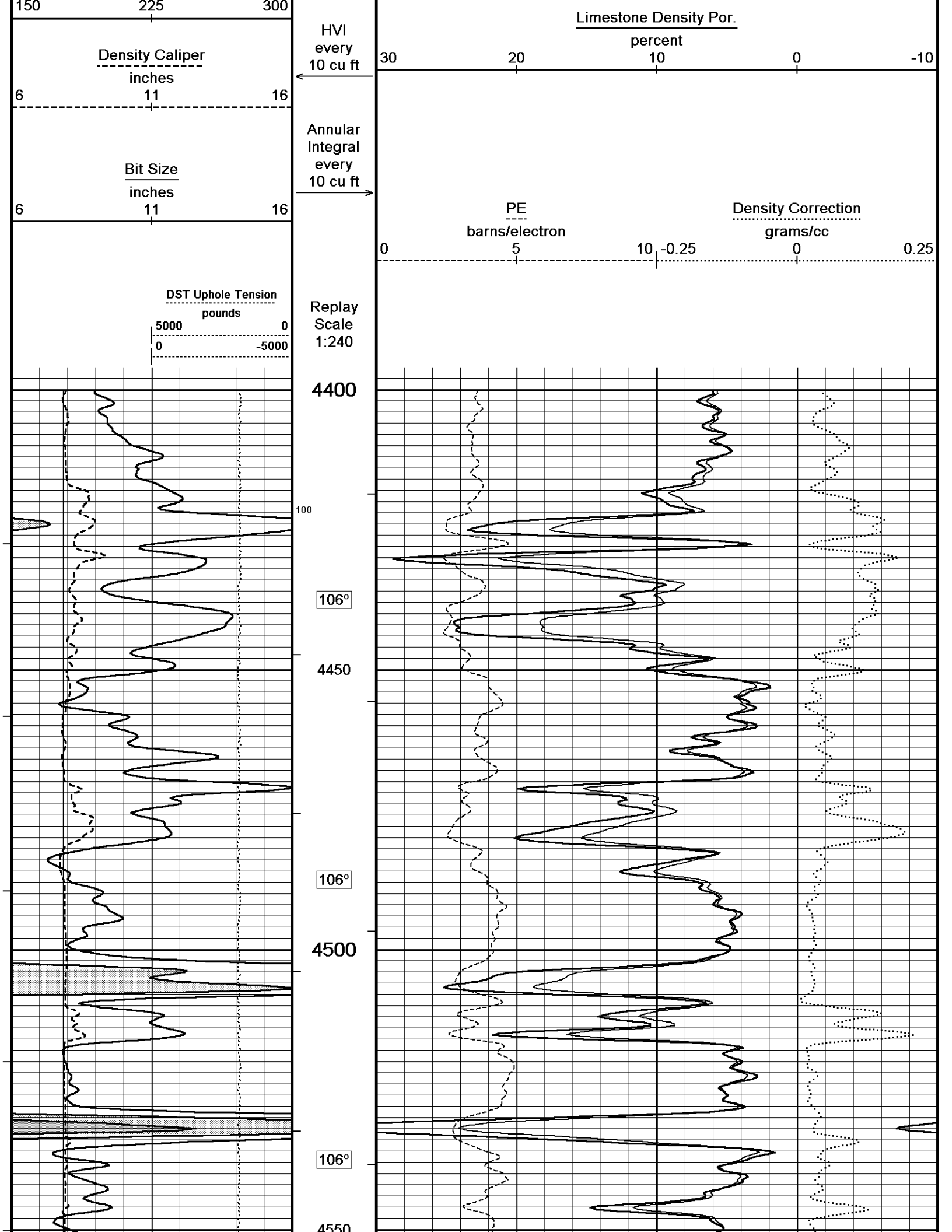
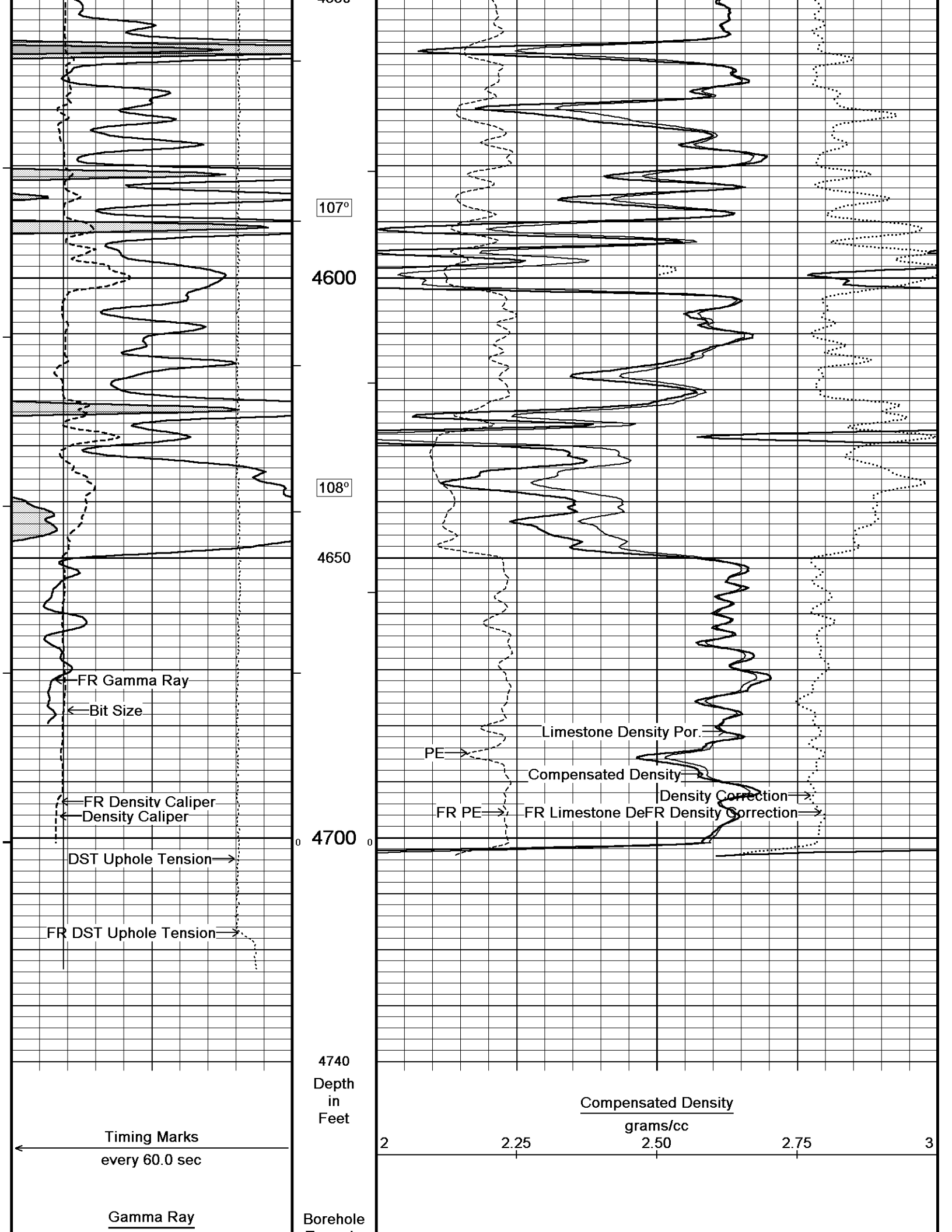
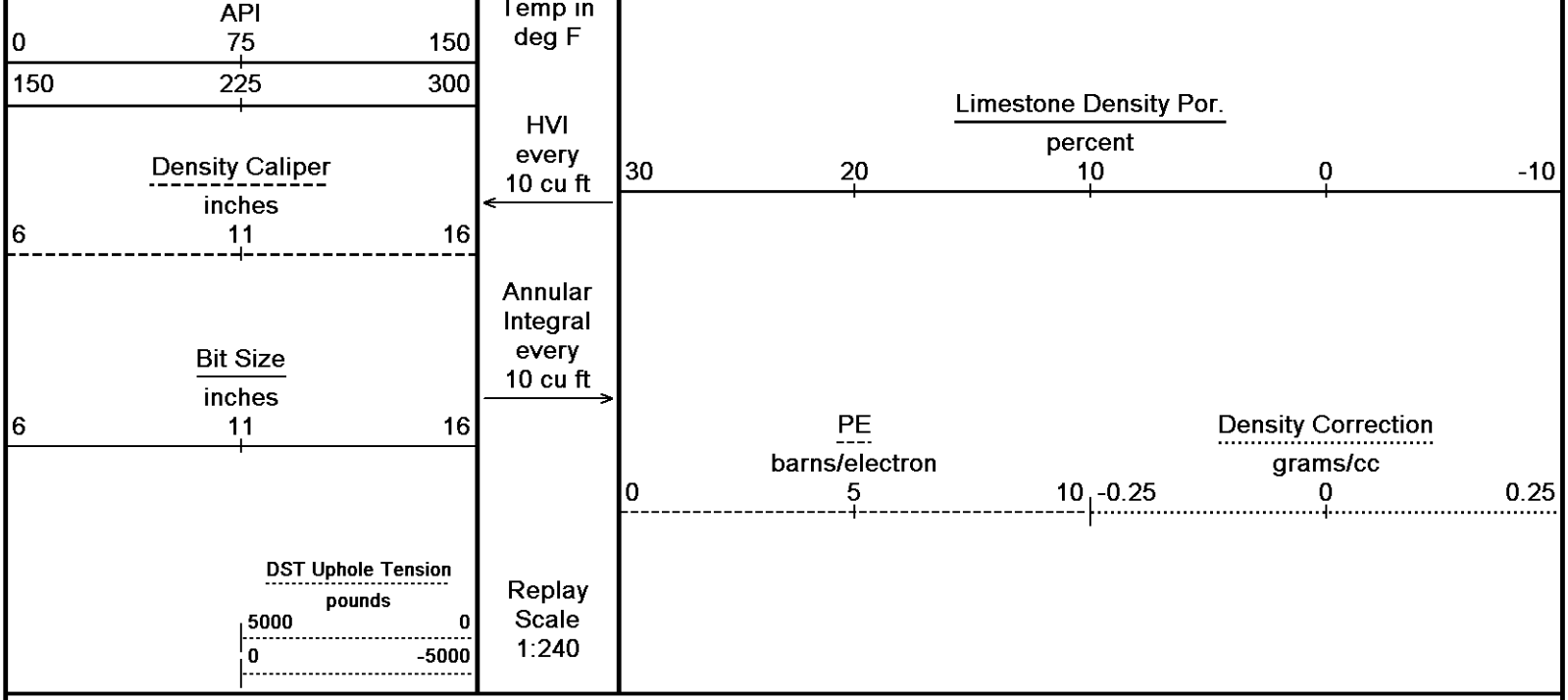
System Versions: Logged with 11.01.2198 Plotted with 11.01.2198




150
225
300
Density Caliper
inches
6
11
16
Bit Size
inches
6
11
16
HVI
every
10 cu ft
Annular
Integral
every
10 cu ft
Limestone Density Por.
percent
30
20
10
0
-10
PE
barns/electron
0
5
10
Density Correction
grams/cc
-0.25
0
0.25
DST Uphole Tension
pounds
5000
0
0
-5000
Replay
Scale
1:240
4400
100
106°
4450
106°
4500
106°
4550


107°
4600
108°
4650
FR Gamma Ray
Bit Size
FR Density Caliper
Density Caliper
0
4700
0
DST Uphole Tension
FR DST Uphole Tension
Limestone Density Por.
PE
Compensated Density
Density Correction
FR PE
FR Limestone DeFR Density Correction
4740
Depth
in
Feet
Timing Marks
every 60.0 sec
Gamma Ray
Compensated Density
grams/cc
2
2.25
2.50
2.75
3



Depth Based Data - Maximum Sampling Increment 10.0cm — Plotted on 28-NOV-2010 14:18
Filename: C:\Minimus 11_01\Data\Grand Mesa Greg 1-26\GRAND MESA GREG 1-26_001.dta — Recorded on 28-NOV-2010 11:52
System Versions: Logged with 11.01.2198 Plotted with 11.01.2198

Repeat Section

BEFORE SURVEY CALIBRATION

C:\Minimus 11_01\Data\Grand Mesa Greg 1-26\GRAND MESA GREG 1-26.dta

General Constants All 000

Last Edited on 28-NOV-2010,10:50

General Parameters		
Mud Resistivity	1.410	ohm-metres
Mud Resistivity Temperature	79.000	degrees F
Water Level	0.000	feet
Density/Neutron 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	Limestone Density Por.	
Resistivity used	Array Ind. One Res Rt	
RWA Constant A	0.610	
RWA Constant M	2.150	

High Resolution Temperature Calibration MCG-B 67

Field Calibration on 06-AUG-2010,10:40

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

High Resolution Temperature Constants MCG-B 67

Last Edited on 06-AUG-2010,10:39

Pre-filter Length	11

SP Calibration MCG-B 67

Field Calibration on 09-SEP-2010 13:54

	Measured	Calibrated (mV)
Reference 1	104.1	100.0
Reference 2	-95.6	-100.0

Gamma Calibration MCG-B 67

Field Calibration on 22-NOV-2010 15:24

	Measured	Calibrated (API)
Background	65	45
Calibrator (Gross)	732	501
Calibrator (Net)	667	456

Gamma Constants MCG-B 67

Last Edited on 28-NOV-2010,10:51

Gamma Calibrator Number	grcc141	
Mud Density	1.13	gm/cc
Caliper Source for Processing	Density Caliper	
Tool Position	Eccentred	
Concentration of KCl	0.00	kppm

Micro Normal and Micro Inverse Calibration MML-A 4

Base Calibration on 12-NOV-2010 14:02
Field Check on 22-NOV-2010 15:13

Base Calibration

	Measured		Calibrated (ohm-m)	
Channel	Resistor 1	Resistor 2	Resistor 1	Resistor 2
Micro Normal	12.1	60.1	2.6	12.8
Micro Inverse	15.6	78.3	1.7	8.4

Channel	Base Check (ohm-m)	Field Check (ohm-m)
Micro Normal	32.2	32.2
Micro Inverse	16.3	16.3

Micro Normal and Micro Inverse Constants MML-A 4

Last Edited on 22-NOV-2010,15:12

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

Caliper Calibration MML-A 4

Base Calibration on 12-NOV-2010 13:52
Field Calibration on 22-NOV-2010 15:15

Base Calibration

Reading No	Measured	Calibrator Size (in)
1	14910	5.96
2	18255	7.98
3	21651	9.95
4	25473	11.91
5	0	0.00
6	N/A	N/A

Field Calibration

Measured Caliper (in)	Actual Caliper (in)
5.99	5.96

Neutron Calibration MDN-A.B 41

Base Calibration on 22-NOV-2010 11:30
Field Check on 22-NOV-2010 11:47

Base Calibration

	Measured		Calibrated (cps)	
	Near	Far	Near	Far
	3119	96	3714	110
Ratio	32.359		33.764	

Field Calibrator at Base

	Calibrated (cps)	
	2108	3061
Ratio	0.689	

Field Check

	Calibrated (cps)	
	2112	3071
Ratio	0.688	

Neutron Constants MDN-A.B 41

Last Edited on 28-NOV-2010,10:51

Neutron Source Id	p31124b	
Neutron Jig Number	nj5736	
Epithermal Neutron	No	
Caliper Source for Processing	Bit Size	
Stand-off	0.00	inches
Mud Density	1.13	gm/cc
Limestone Sigma	7.10	cu

Sandstone Sigma	4.26	cu
Dolomite Sigma	4.70	cu
Formation Pressure Source	Constant Value	
Formation Pressure	0.00	kpsi
Temperature Source	Constant Value	
Temperature	68.00	degrees F
Mud Salinity	0.00	kppm
Formation Fluid Salinity Source	Constant Value	
Formation Fluid Salinity	0.00	kppm
Barite Mud Correction	Not Applied	

FE Calibration MFE-A.A 67

Base Calibration on 12-NOV-2010 13:38
Field Check on 22-NOV-2010 15:12

Base Calibration

	Measured	Calibrated (ohm-m)
Reference 1	0.0	0.0
Reference 2	961.4	126.8
Base Check		280.8
Field Check		280.8

FE Constants MFE-A.A 67

Last Edited on 28-NOV-2010,10:52

Running Mode	No Sleeve	
MFE K Factor	0.1268	
Caliper Source for FE correction	Density Caliper	
Caliper Value for FE correction	N/A	inches
Rm Source for FE correction	Temperature Corr	
Temp. for Rm Corr.	MCG External Temperature	
Stand-off	0.5	inches

High Resolution Temperature Calibration MAI-A.A 188

Field Calibration on 02-AUG-2010,11:00

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

High Resolution Temperature Constants MAI-A.A 188

Last Edited on

Pre-filter Length	11

Induction Calibration MAI-A.A 188

Base Calibration on 09-SEP-2010,10:03
Field Check on 22-NOV-2010 15:11

Base Calibration

Test Loop Calibration

Channel	Measured Low	Measured High	Calibrated (mmho/m) Low	Calibrated (mmho/m) High
1	16.5	472.3	9.3	966.2
2	6.0	378.3	7.6	821.4
3	3.5	260.7	5.2	566.0
4	1.1	135.1	2.6	279.2
Array Temperature		82.2	Deg F	

Channel	Base Check (mmho/m) Low	Base Check (mmho/m) High	Field Check (mmho/m) Low	Field Check (mmho/m) High	
1	0.0	0.0	13.7	3849.6	
2	0.0	0.0	30.7	3571.2	
3	0.0	0.0	28.5	3042.2	
4	0.0	0.0	21.1	2039.8	
Deep	0.0	0.0	18.1	1924.5	
Medium	0.0	0.0	40.4	4057.1	
Shallow	0.0	0.0	45.2	5364.4	
Array Temperature		0.0		56.3	Deg F

Induction Constants MAI-A.A 188

Last Edited on 28-NOV-2010,10:52

Induction Model	RtAP-WBM	
Caliper for Borehole Corr.	Density Caliper	
Hole Size for Borehole Correction	N/A	inches
Tool Centred	No	
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
Borehole Corr. Rm Source	Temperature Corr	
Temp. for Rm Corr.	MCG External Temperature	
Squasher Start	0.0020	mhos/metre
Squasher Offset	N/A	mhos/metre

Borehole Normalisation

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

Calibration Site Corrections

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

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-B 61

Base Calibration on 22-NOV-2010 11:55
Field Calibration on 22-NOV-2010 11:56

Base Calibration

Reading No	Measured	Calibrator Size (in)
1	19857	4.01
2	29308	5.96
3	39543	7.98
4	49616	9.95
5	59808	11.91
6	N/A	N/A

Field Calibration

Measured Caliper (in)	Actual Caliper (in)
5.94	5.96

Photo Density Calibration MPD-B 61

Base Calibration on 22-NOV-2010 12:12
Field Check on 22-NOV-2010 12:18

Density Calibration

Base Calibration	Measured		Calibrated (sdu)	
	Near	Far	Near	Far
Reference 1	42985	18873	59556	30836
Reference 2	16752	1673	24941	2541

Field Check at Base

680.6	839.8

Field Check

686.0	838.7

PE Calibration

Base Calibration	Measured			Calibrated
	WS	WH	Ratio	Ratio
Background	123	609		
Reference 1	17134	42878	0.402	0.371
Reference 2	4610	16672	0.279	0.272

Field Check at Base

123.4	608.5

Field Check

124.2 610.3

Density Constants MPD-B 61

Last Edited on 28-NOV-2010,10:51

Density Source Id	20718b	
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 Z/A Multiplier	1.11	
Mud Filtrate Density	1.00	gm/cc
Dry Hole Mud Filtrate Density	1.00	gm/cc
DNCT	0.00	gm/cc
CRCT	0.00	gm/cc
Density Z/A Correction	Hybrid	

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

DOWNHOLE EQUIPMENT

C:\Minimus 11_01\Data\Grand Mesa Greg 1-26\GRAND MESA GREG 1-26.dta

Compact Comms Gamma
MCG-B 67 LG: 8.70 ft WT: 63.9 lb OD: 2.24 in

45.02 ft GRGC - Gamma Ray
42.11 ft CGXT - MCG External Temperature

Compact Micro-log
MML-A 4 LG: 7.97 ft WT: 81.6 lb OD: 2.24 in

35.39 ft MINV - Micro-inverse
35.39 ft MNRL - Micro-normal
36.38 ft MLTC - MML Caliper

Compact Neutron
MDN-A.B 41 LG: 5.04 ft WT: 50.7 lb OD: 2.24 in

30.59 ft NPRL - Limestone Neutron Por.

Compact Density/Caliper
MPD-B 61 LG: 9.59 ft WT: 90.4 lb OD: 2.45 in

23.35 ft CLDC - Density Caliper
23.35 ft AVOL - Annular Volume
23.35 ft HVOL - Hole Volume
21.42 ft DEN - Compensated Density

SKJ-D.A Compact Knuckle Joint
SKJ-D.A 91 LG: 2.17 ft WT: 24.3 lb OD: 2.24 in

21.42 ft DCOR - Density Correction
21.42 ft DPRL - Limestone Density Por.
21.36 ft PDPE - PE

Compact Focussed Electric
MFE-A.A 67 LG: 6.03 ft WT: 48.5 lb OD: 2.24 in

13.70 ft FEFE - Shallow FE

Compact Induction
MAI-A.A 188 LG: 10.81 ft WT: 48.5 lb OD: 2.24 in

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)

Total Length: 50.30 ft Weight: 407.9 lb

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

COMPANY	GRAND MESA OPERATING COMPANY, INC.
WELL	GREG #1-26
FIELD	WILDCAT
PROVINCE/COUNTY	LOGAN
COUNTRY/STATE	U.S.A. / KANSAS

Elevation Kelly Bushing	3023.00	feet	First Reading	4695.00	feet
Elevation Drill Floor	3022.00	feet	Depth Driller	4720.00	feet
Elevation Ground Level	3018.00	feet	Depth Logger	4717.00	feet

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COMPACT PHOTO DENSITY
COMPENSATED NEUTRON
MICRO RESISITIVITY LOG

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