Weatherford®

COMPACT PHOTO DENSITY COMPENSATED NEUTRON MICRORESISTIVITY LOG

COMPANY	SHAKESPEARE OIL COMPANY, INC.
WELL	HOLADAY #1-19
FIELD	WILDCAT
PROVINCE/COUNTY	GOVE
COUNTRY/STATE	U.S.A. / KANSAS
LOCATION	335' FSL & 947' FWL NW SE SW SW

SEC	TWP	RGE	Other Services
19	13S	30W	MAI/MFE

API Number 15-063-21989
Permit Number

Permanent Datum G.L., Elevation 2828 feet
Log Measured From KB
Drilling Measured From K.B.

Elevations:	feet
KB	2838.00
DF	2837.00
GL	2828.00

Date	08-FEB-2013	
Run Number	ONE	
Service Order	3537859	
Depth Driller	4620.00 feet	
Depth Logger	4619.00 feet	
First Reading	4599.00 feet	
Last Reading	3600.00 feet	
Casing Driller	225.00 feet	
Casing Logger	221.00 inches	
Bit Size	7.875	
Hole Fluid Type	CHEMICAL lb/USg	
Density / Viscosity	9.20 lb/USg	53.00
PH / Fluid Loss	9.50	9.50
Sample Source	FLOWLINE	
Rm @ Measured Temp	1.15 @ 82.0 ohm-m	
Rmf @ Measured Temp	0.92 @ 82.0 ohm-m	
Rmc @ Measured Temp	1.38 @ 82.0 ohm-m	
Source Rmf / Rmc	CALC	CALC
Rm @ BHT	0.82 @116.0 ohm-m	
Time Since Circulation	5 HOURS	
Max Recorded Temp	116.00 deg F	
Equipment / Base	13057	LIB
Recorded By	LYNN SCOTT	
Witnessed By	TIM PRIEST	
JOB#	LB13-037	

BOREHOLE RECORD

Last Edited: 08-FEB-2013 15:08

Bit Size inches	Depth From feet	Depth To feet
7.875	225.00	4620.00

CASING RECORD

Type	Size inches	Depth From feet	Shoe Depth feet	Weight pounds/ft
SURFACE	8.625	0.00	225.00	24.00

REMARKS

Tools Ran: MCG, MML, MDN, MPD, MFE, MAI ran in combination.
Hardware Used: MDN Dual bowspring used. MPD 8 inch profile plate used. MAI and MFE 0.5 Inch standoffs used.
2.71 g/cc Limestone Density Matrix used to calculate porosity.
All intervals logged and scaled per customer's request.
Tight pulls, washouts and borehole rugosity will affect data quality.
Total hole volume from TD to Surface Casing= 1880 cu. ft.
Annular volume with 5.5 inch production casing from TD to 3600 ft.= 210 cu. ft.
Service order: #3537859
Rig: HD #2
Engineer: L. Scott
Operator(s): K. Rinehart

Software duplicates the pH value onto the fluid loss. The fluid loss is 7.2

employees. These interpretations are also subject to our general terms and conditions in our price schedule.

5 INCH MAIN

Depth Based Data - Maximum Sampling Increment 10.0cm
Plotted on 08-FEB-2013 20:18
Filename: C:\Minimus 13.04.8492\Data\Shakespeare Holaday #...\Shakespeare Holaday #1-19_002.dta
Recorded on 08-FEB-2013 18:05
System Versions: Logged with 13.04.8492 Plotted with 13.04.8492

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

Limestone Neutron Por.
percent
30 20 10 0 -10

Limestone Density Por.
percent
30 20 10 0 -10

PE
barns/electron
0 5 10

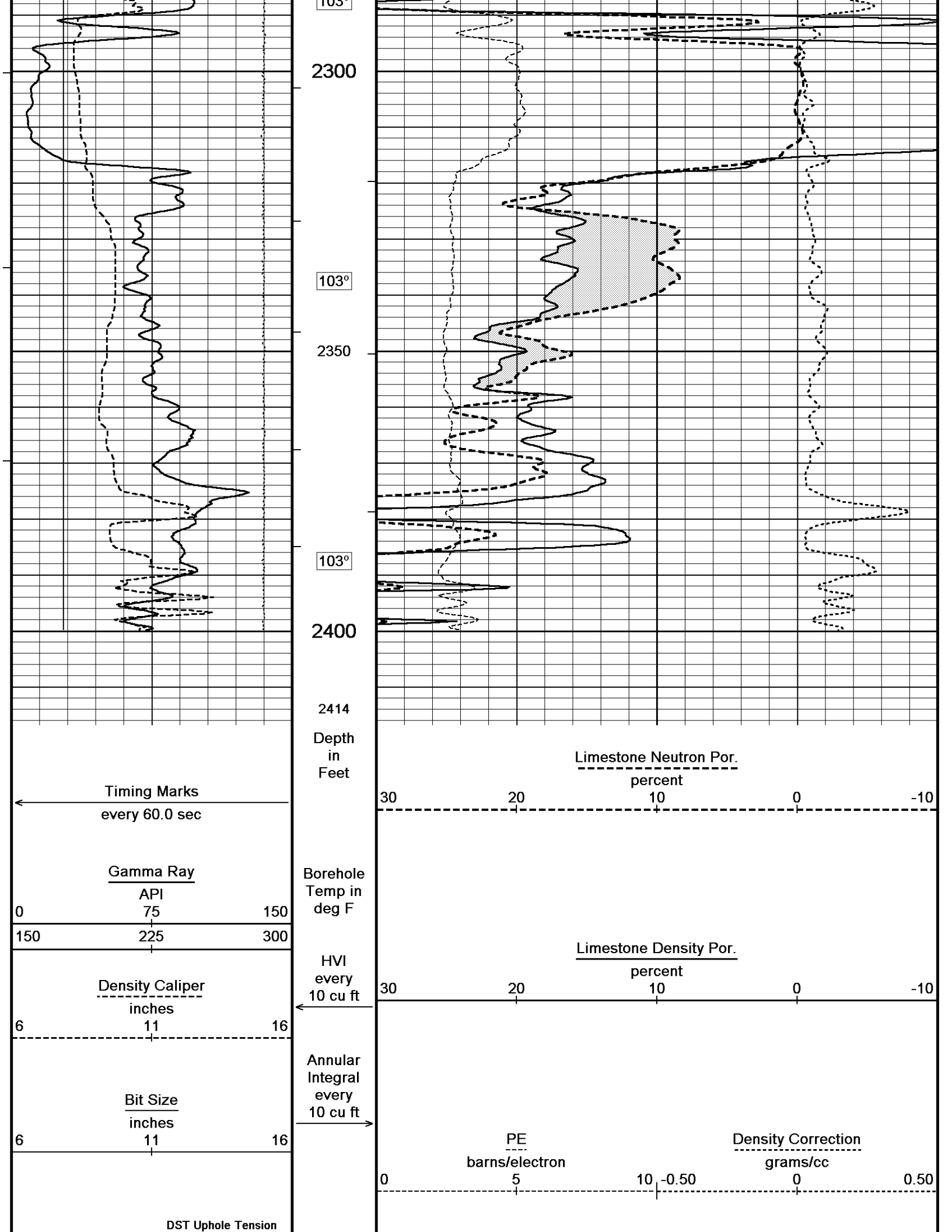
Density Correction
grams/cc
-0.50 0 0.50

2200

102°

2250

102°


103°
2300
103°
2350
103°
2400
2414
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
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
Density Correction
grams/cc
-0.50
0
0.50

pounds
5000 0

Replay Scale 1:240

Depth Based Data - Maximum Sampling Increment 10.0cm — Plotted on 08-FEB-2013 20:18
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5 INCH MAIN

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Depth Based Data - Maximum Sampling Increment 10.0cm — Plotted on 08-FEB-2013 20:18
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System Versions: Logged with 13.04.8492 Plotted with 13.04.8492

Timing Marks
every 60.0 sec

Depth in Feet

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 40

Bit Size
inches
6 11 16

MMR MicroLog Inverse
ohm metres
0 40

DST Uphole Tension
pounds
5000 0

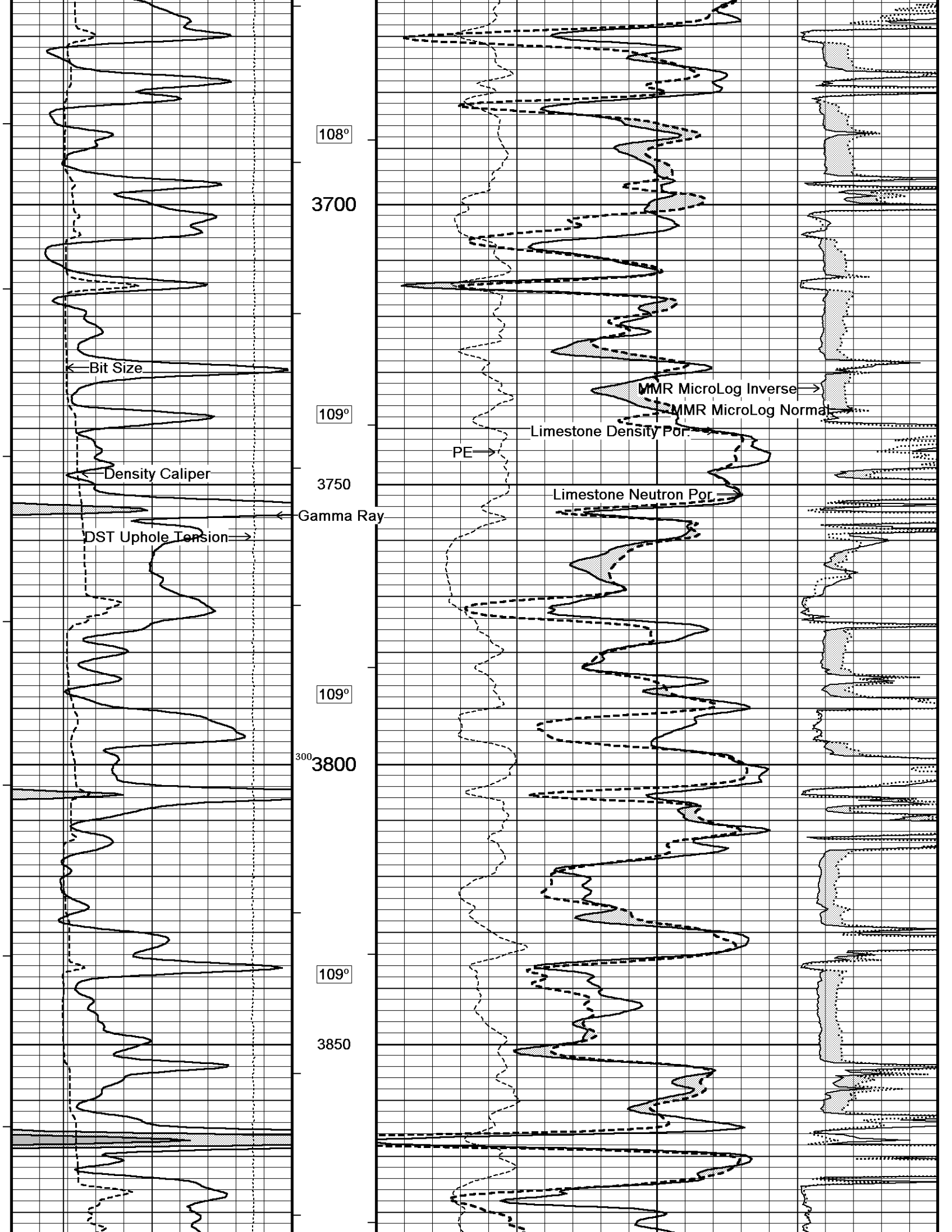
Replay Scale 1:240

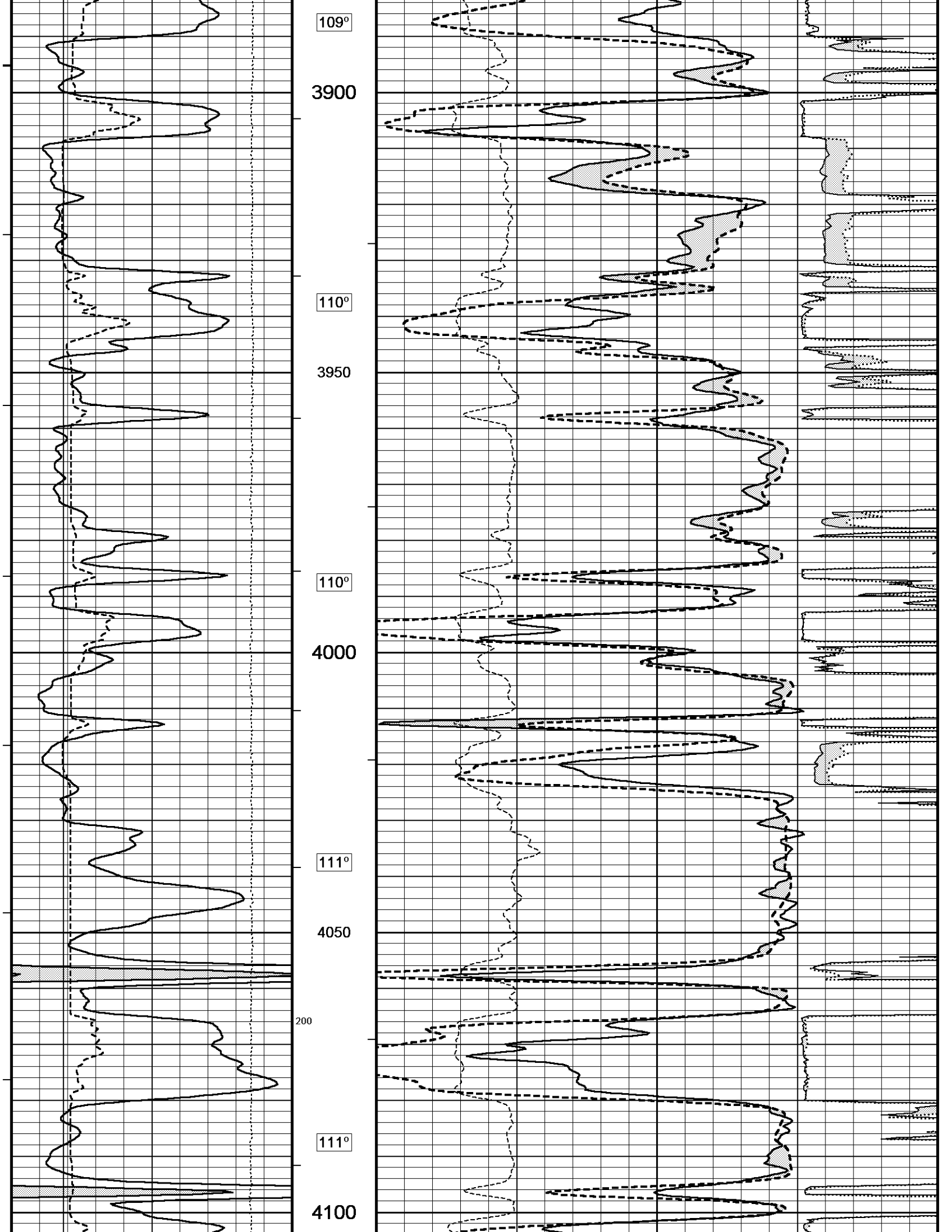
3600

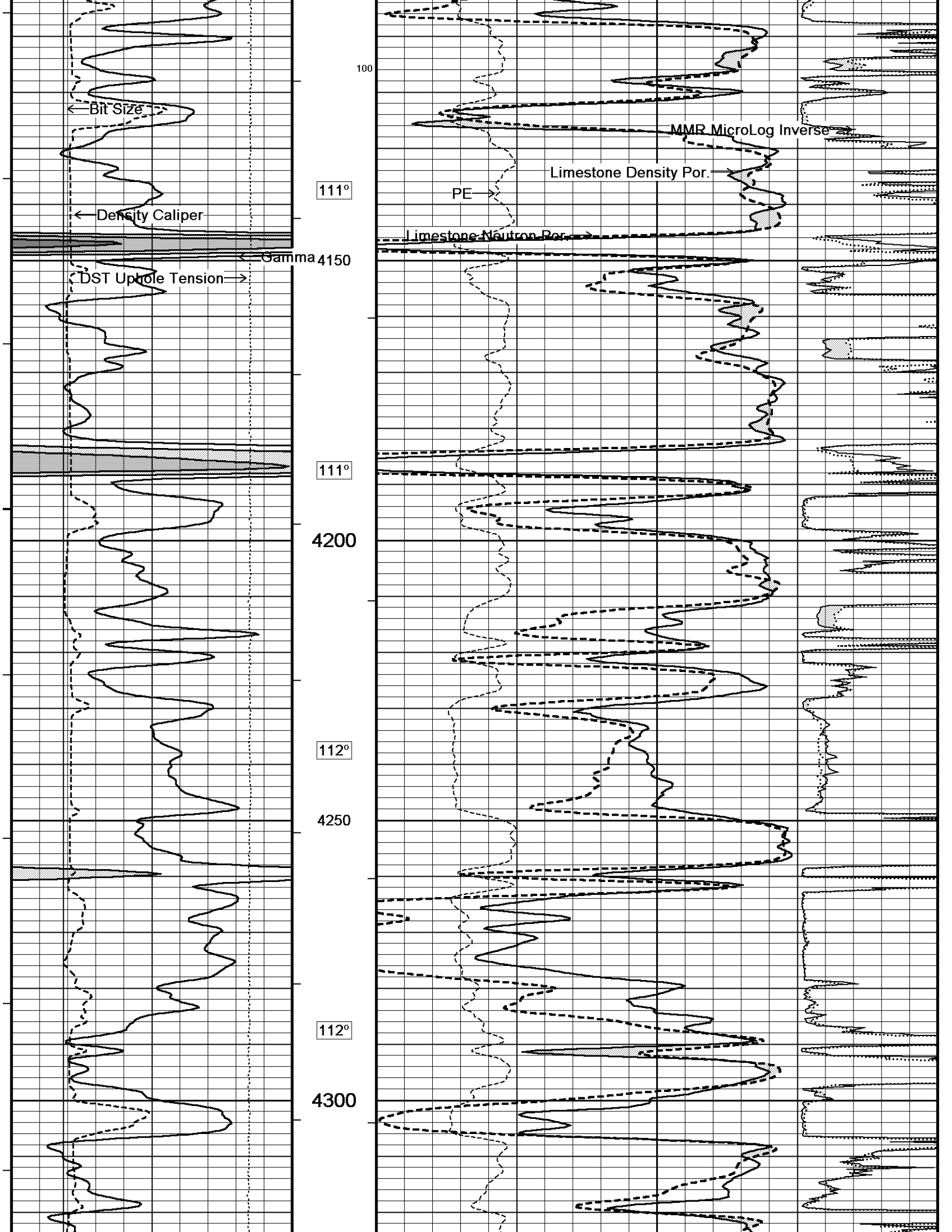
107°

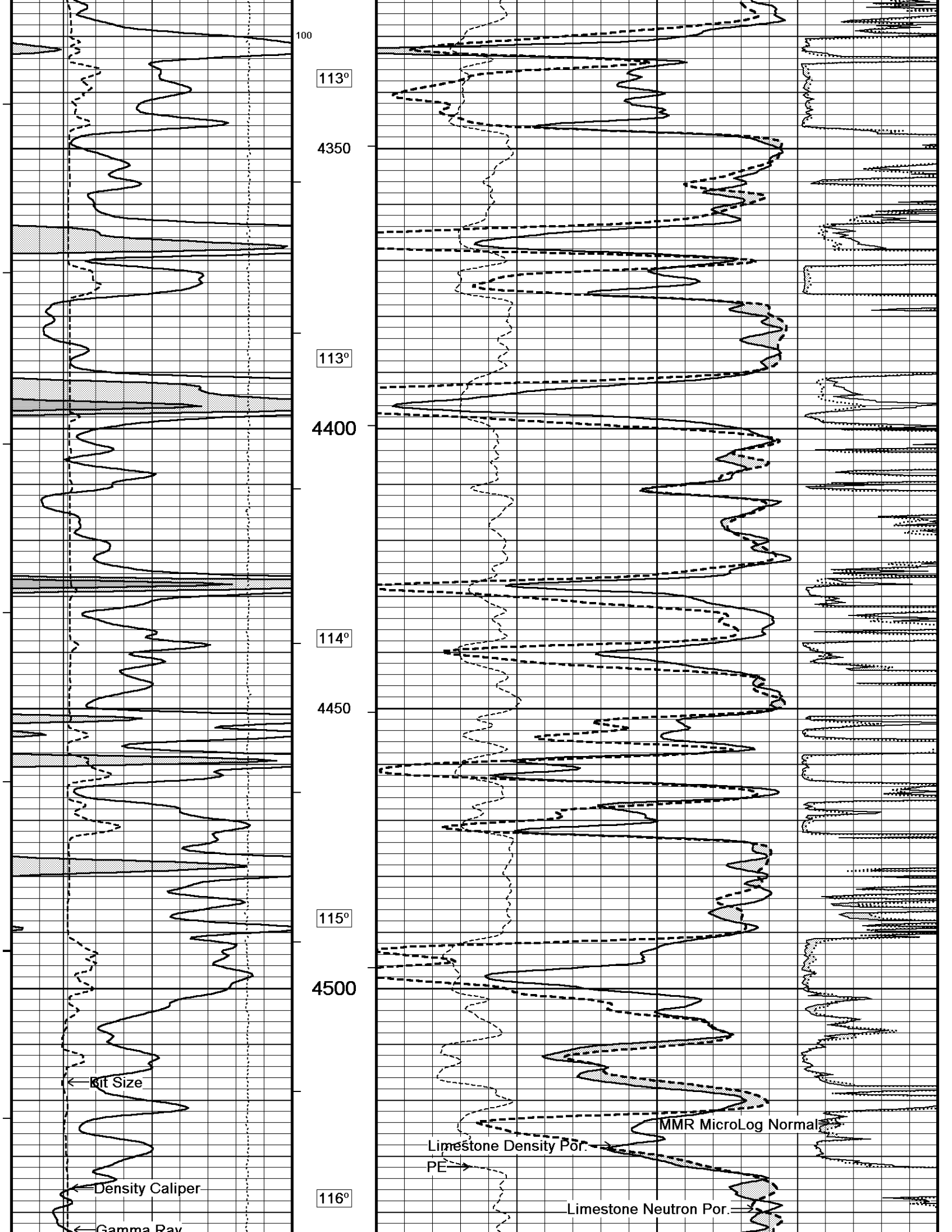
200

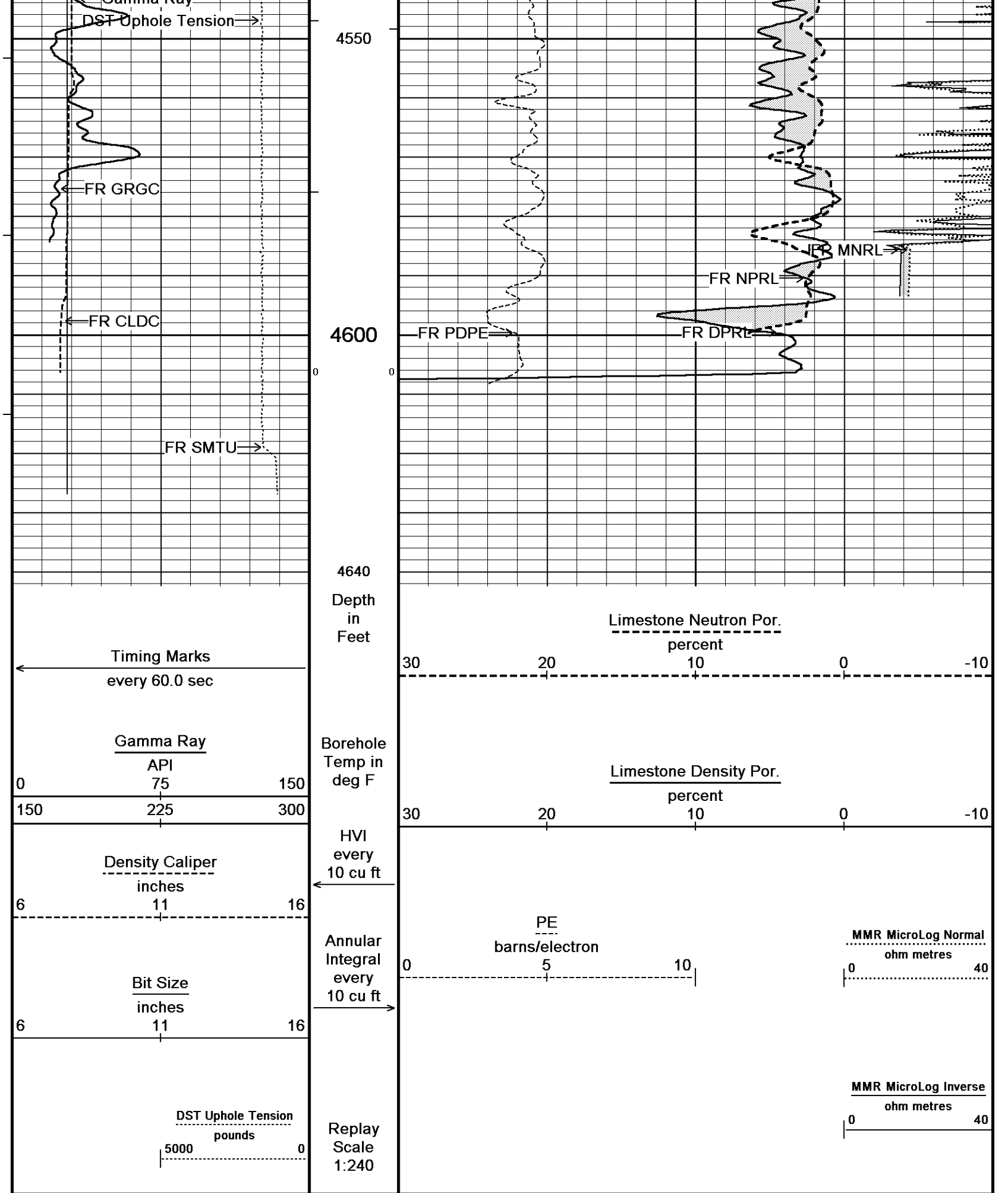
3650


108°
3700
Bit Size
MMR MicroLog Inverse
MMR MicroLog Normal
109°
Limestone Density Por
PE
Density Caliper
3750
Limestone Neutron Por
Gamma Ray
DST Uphole Tension
109°
300
3800
109°
3850


109°
3900
110°
3950
110°
4000
111°
4050
200
111°
4100


Bit Size
Density Caliper
Gamma
DST Uphole Tension
100
111°
4150
111°
4200
112°
4250
112°
4300
MMR MicroLog Inverse
Limestone Density Por.
PE
Limestone Neutron Por.


100
113°
4350
113°
4400
114°
4450
115°
4500
116°
Bit Size
Density Caliper
Gamma Ray
MMR MicroLog Normal
Limestone Density Por.
PE
Limestone Neutron Por.



Depth Based Data - Maximum Sampling Increment 10.0cm
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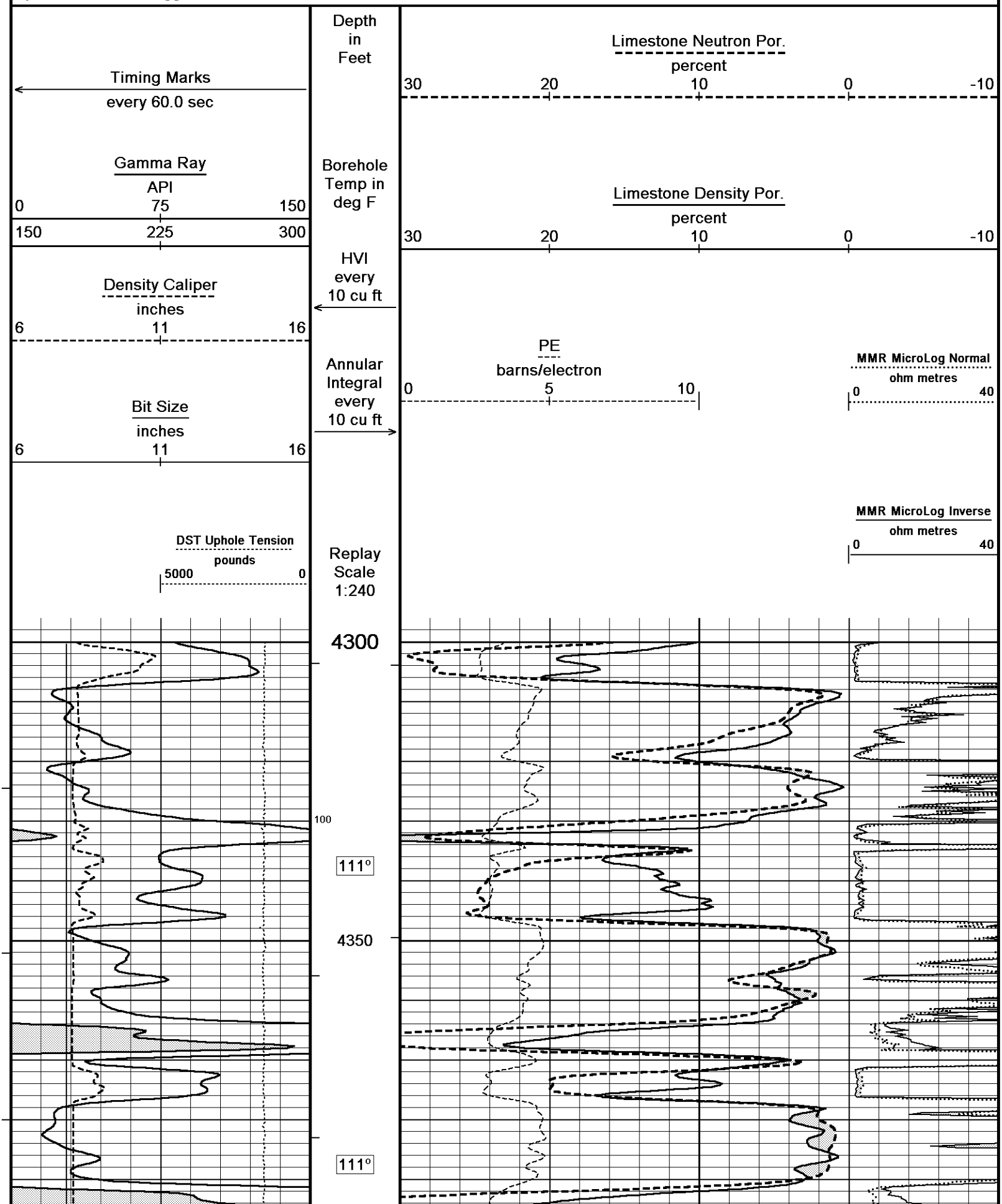
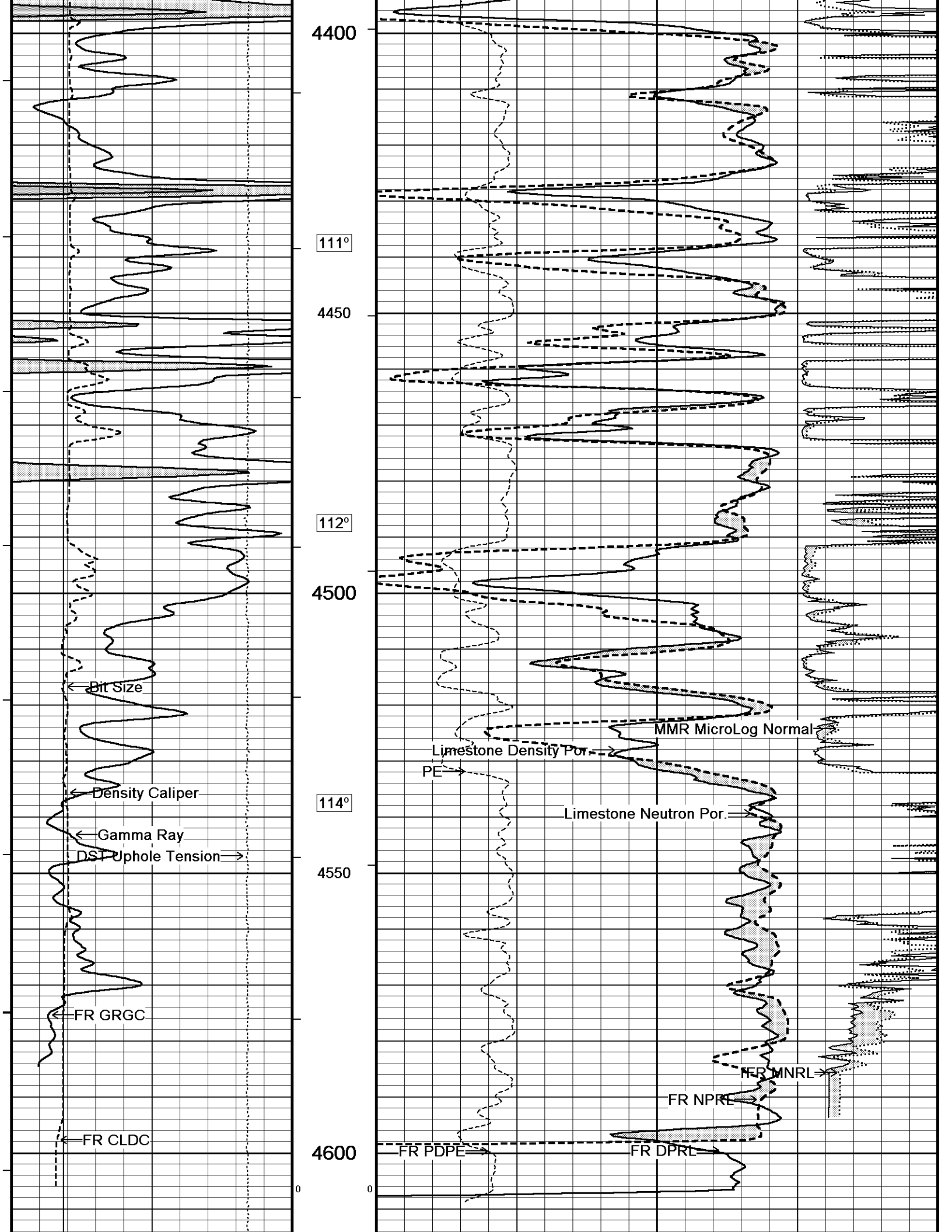
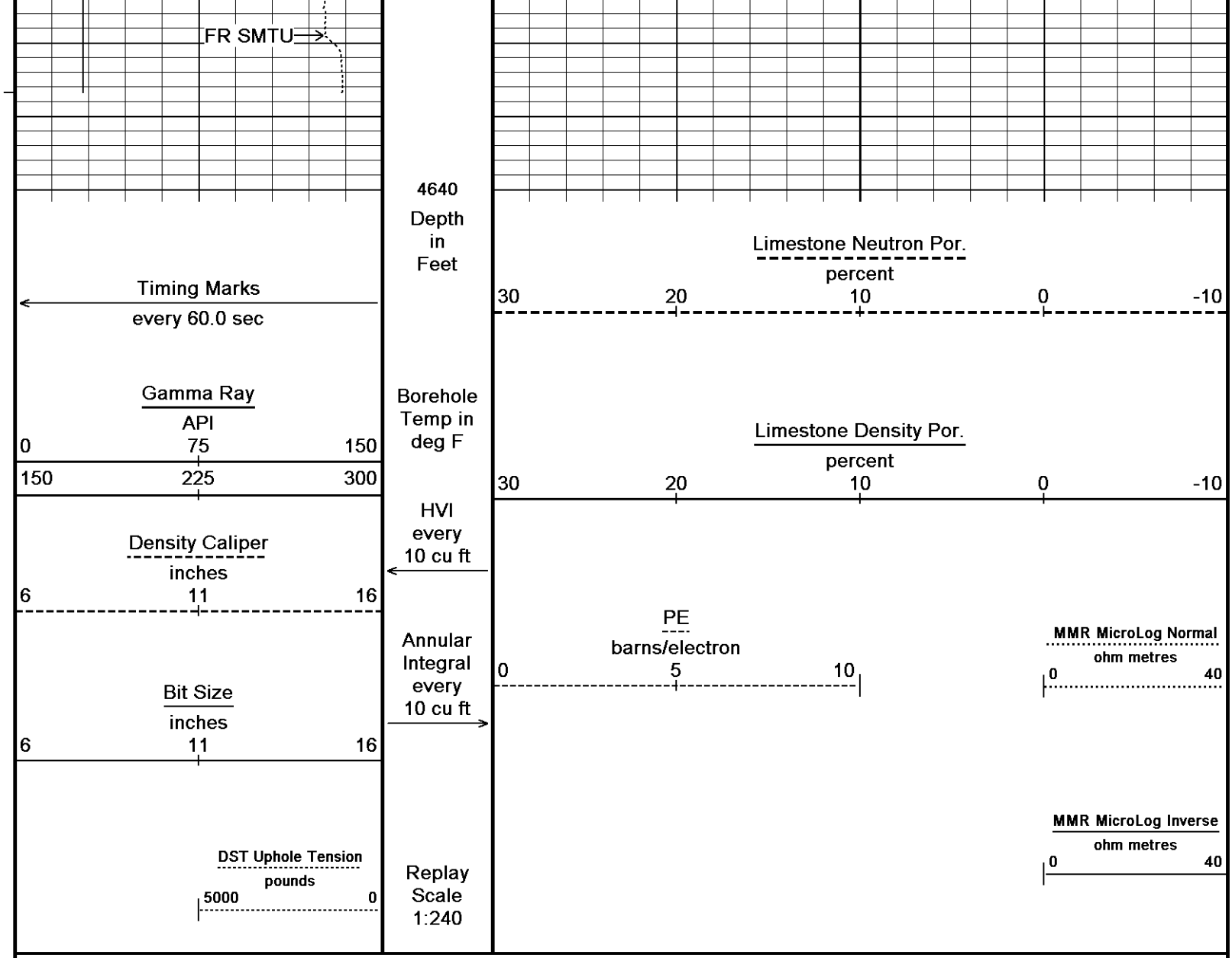
5 INCH MAIN

REPEAT SECTION

Depth Based Data - Maximum Sampling Increment 10.0cm
Plotted on 08-FEB-2013 20:18
Filename: C:\Minimus 13.04.8492\Data\Shakespeare Holaday #...\Shakespeare Holaday #1-19_001.dta
Recorded on 08-FEB-2013 17:47
System Versions: Logged with 13.04.8492 Plotted with 13.04.8492




4400
111°
4450
112°
4500
114°
4550
4600
Bit Size
Density Caliper
Gamma Ray
DST Uphole Tension
FR GRGC
FR CLDC
0
0
MMR MicroLog Normal
Limestone Density Por.
PE
Limestone Neutron Por.
FR MNRL
FR NPRL
FR PDPE
FR DPRL



Depth Based Data - Maximum Sampling Increment 10.0cm — Plotted on 08-FEB-2013 20:18
Filename: C:\Minimus 13.04.8492\Data\Shakespeare Holaday #...\Shakespeare Holaday #1-19_001.dta — Recorded on 08-FEB-2013 17:47
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REPEAT SECTION

5 INCH BULK DENSITY

Depth Based Data - Maximum Sampling Increment 10.0cm — Plotted on 08-FEB-2013 20:18
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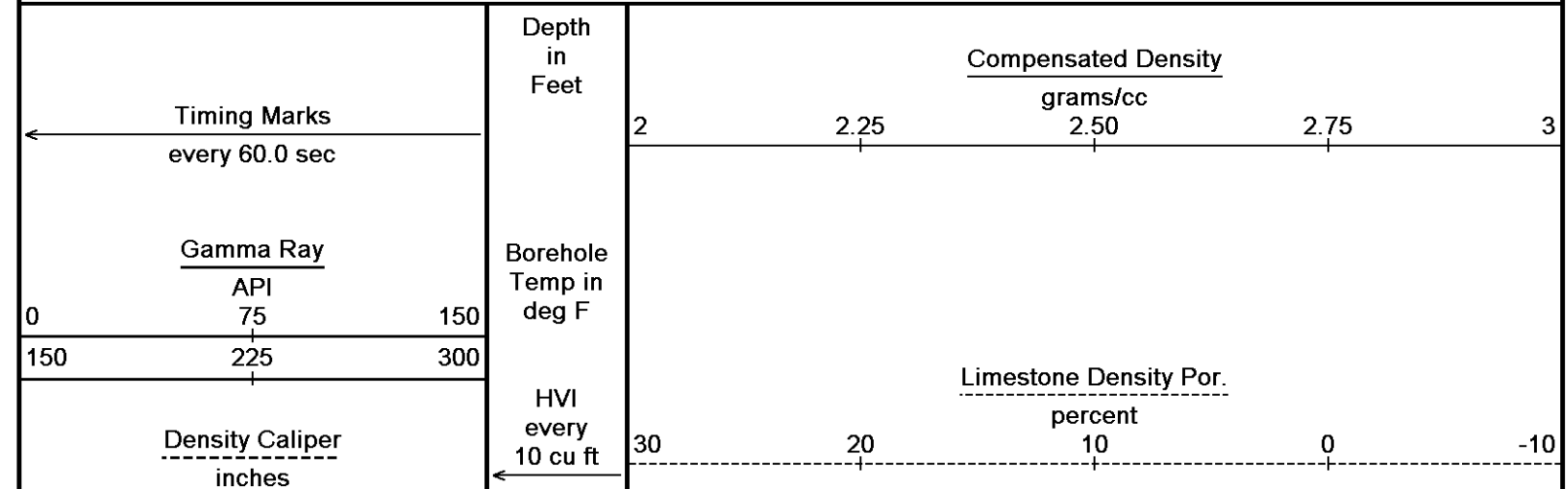
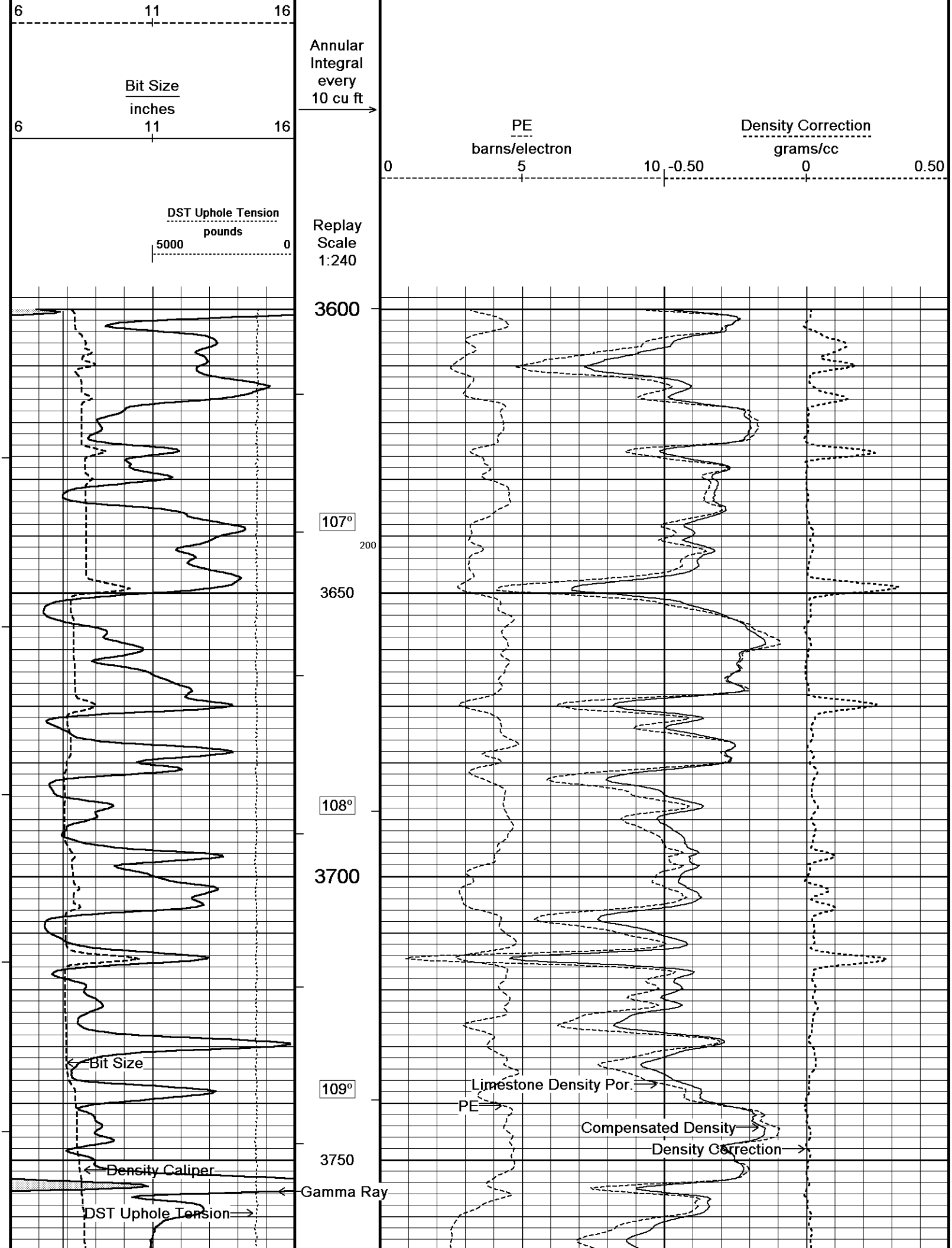
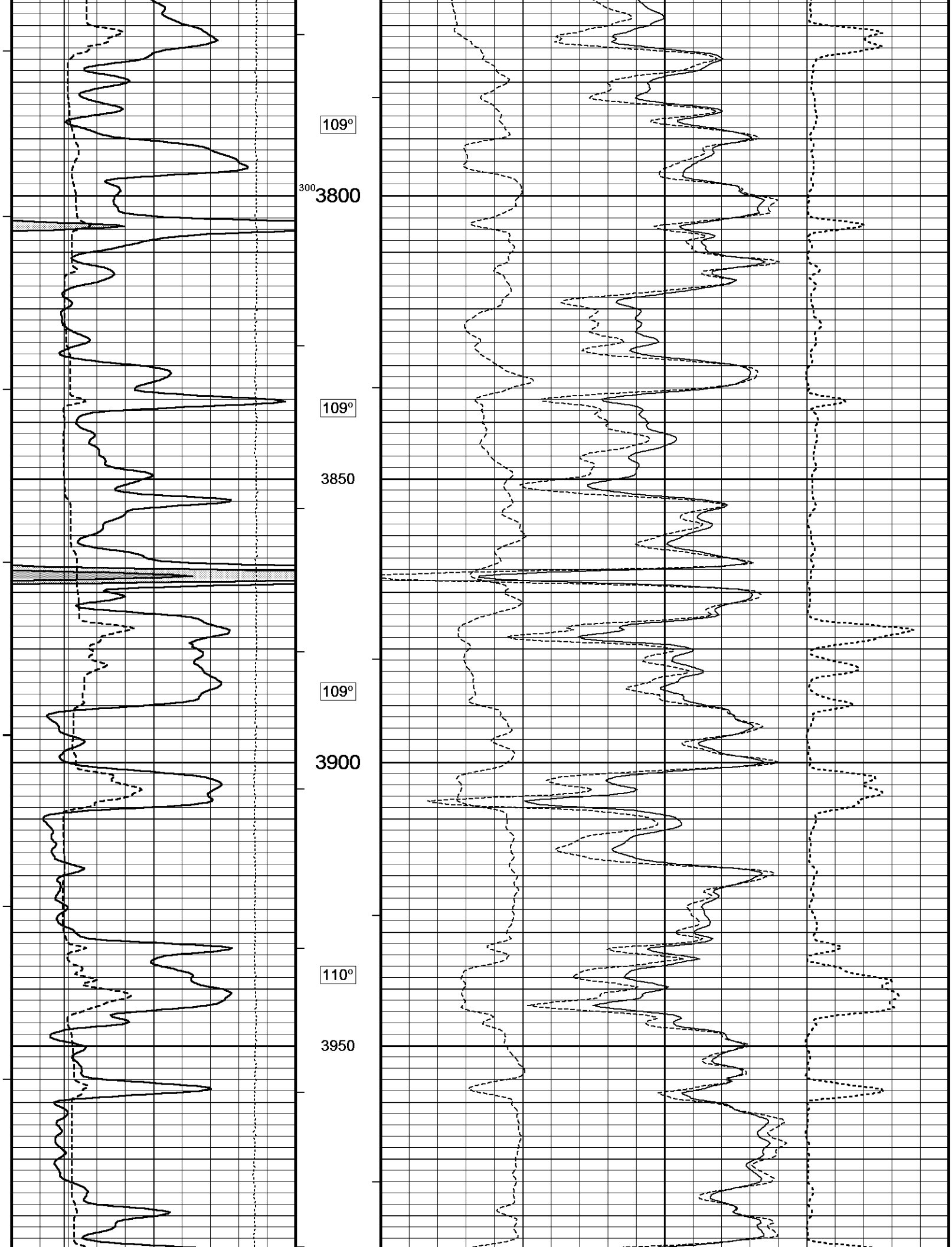
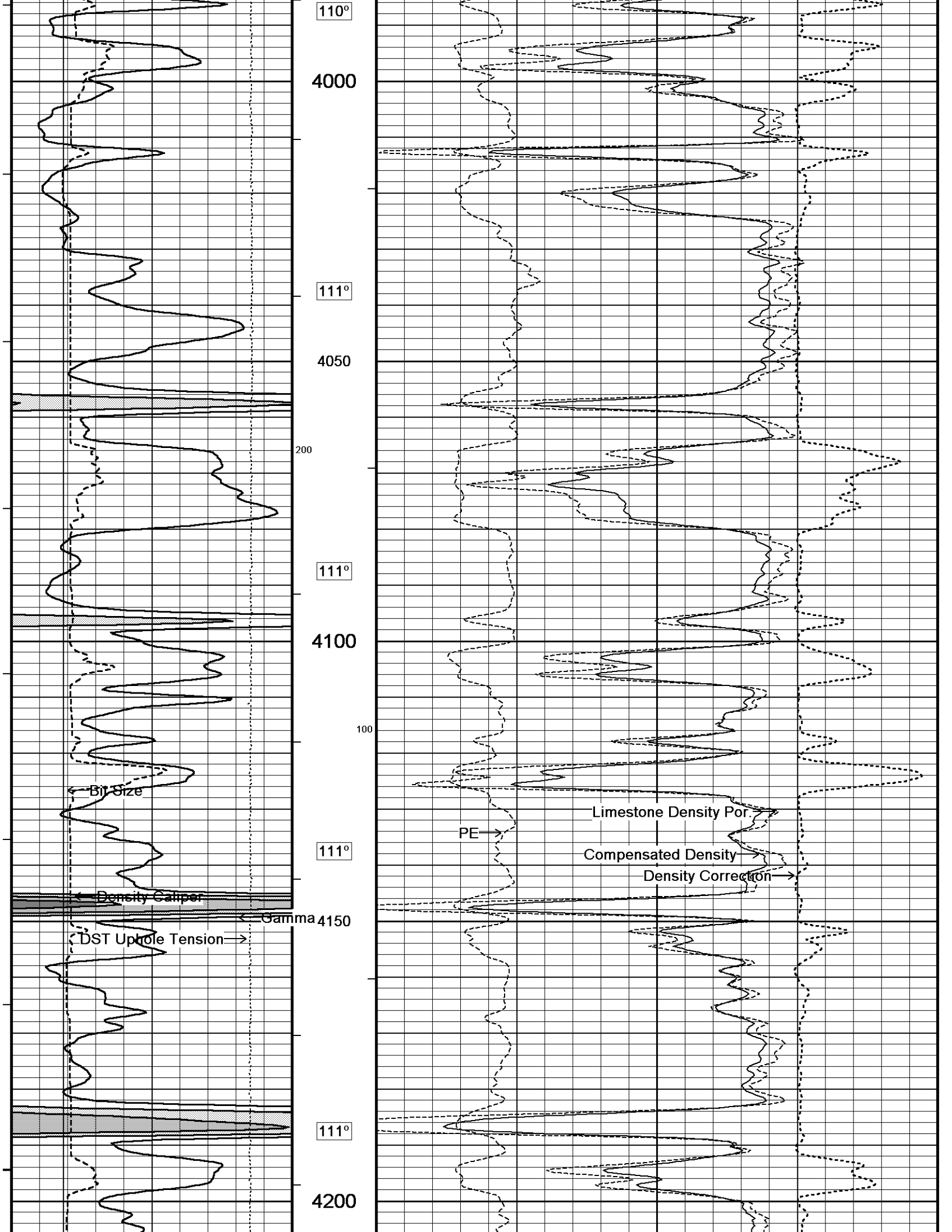
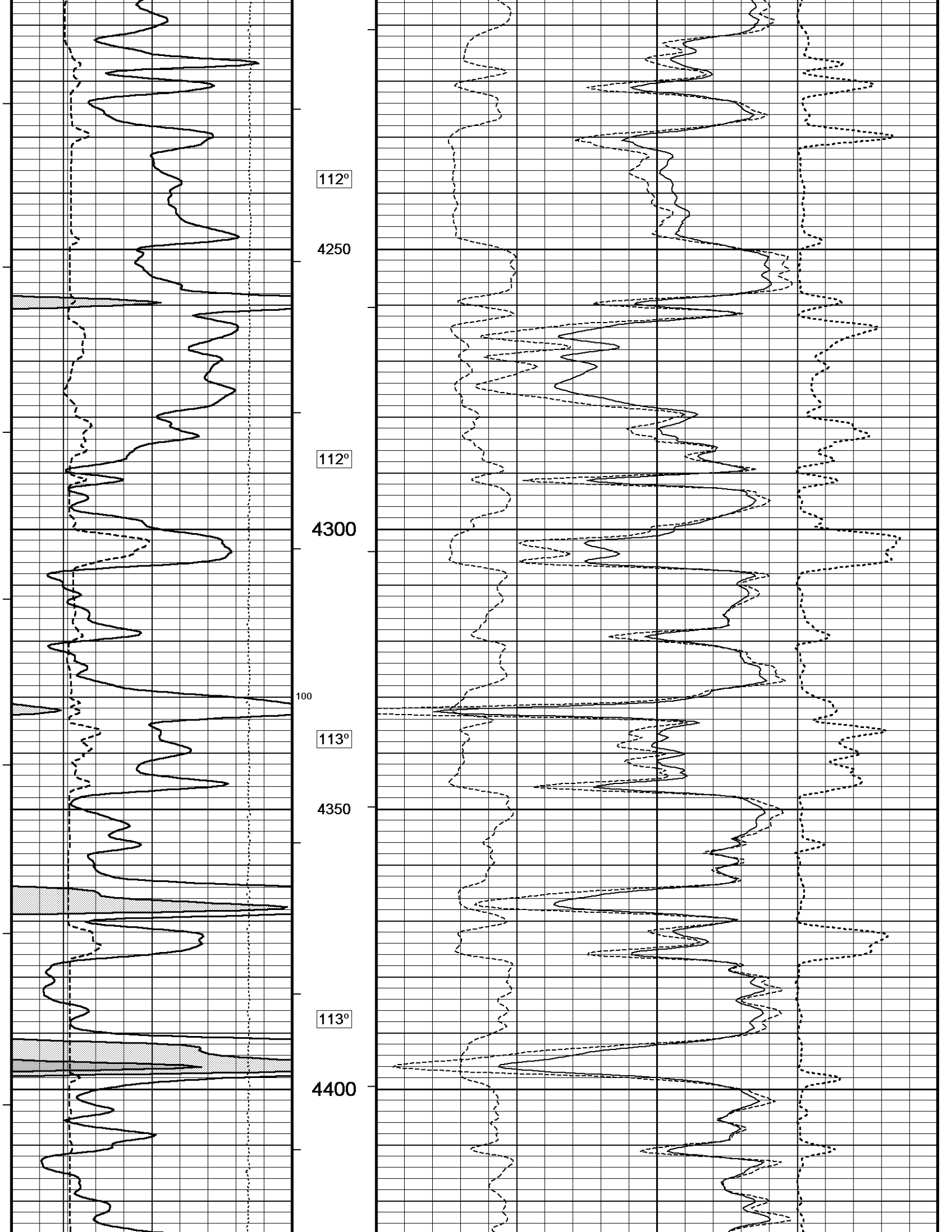
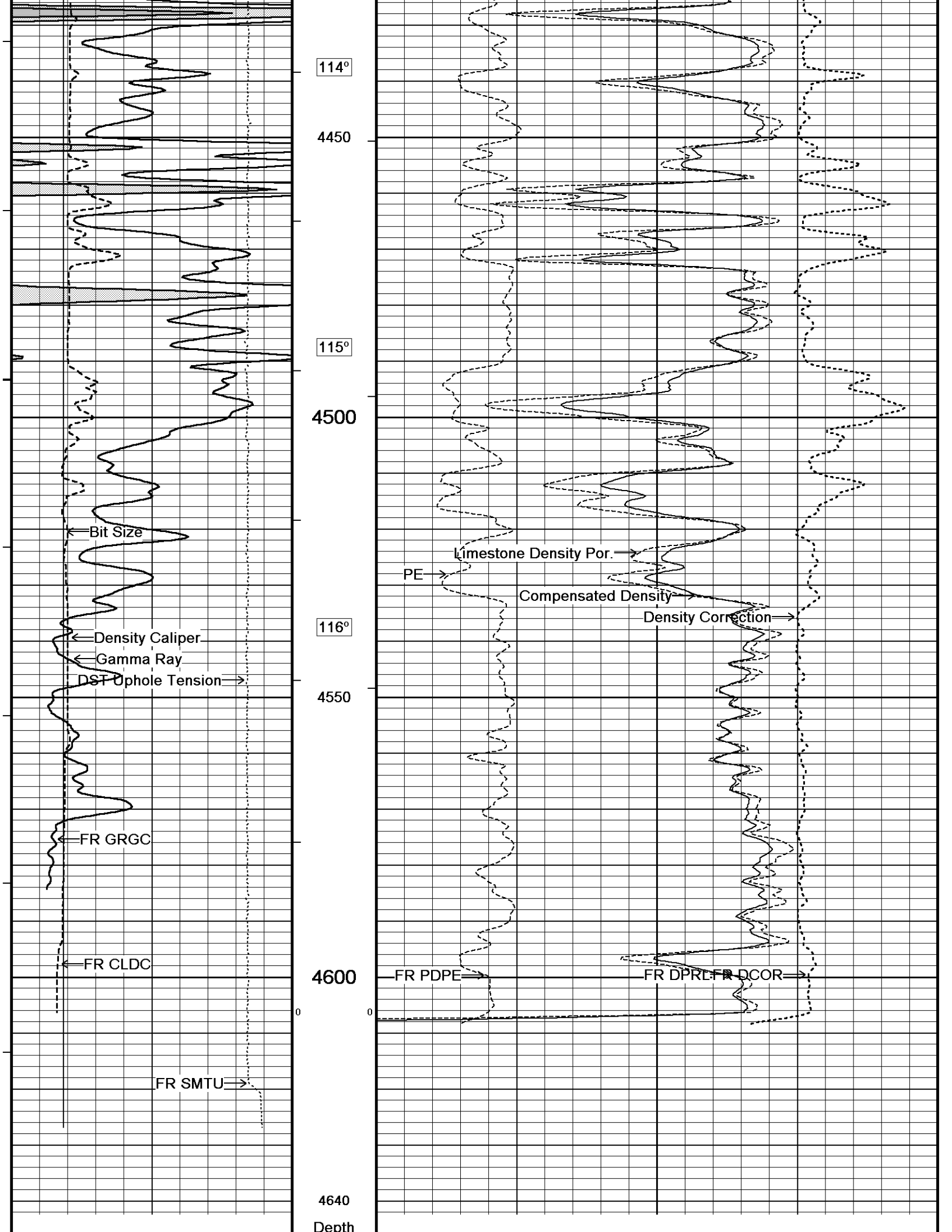


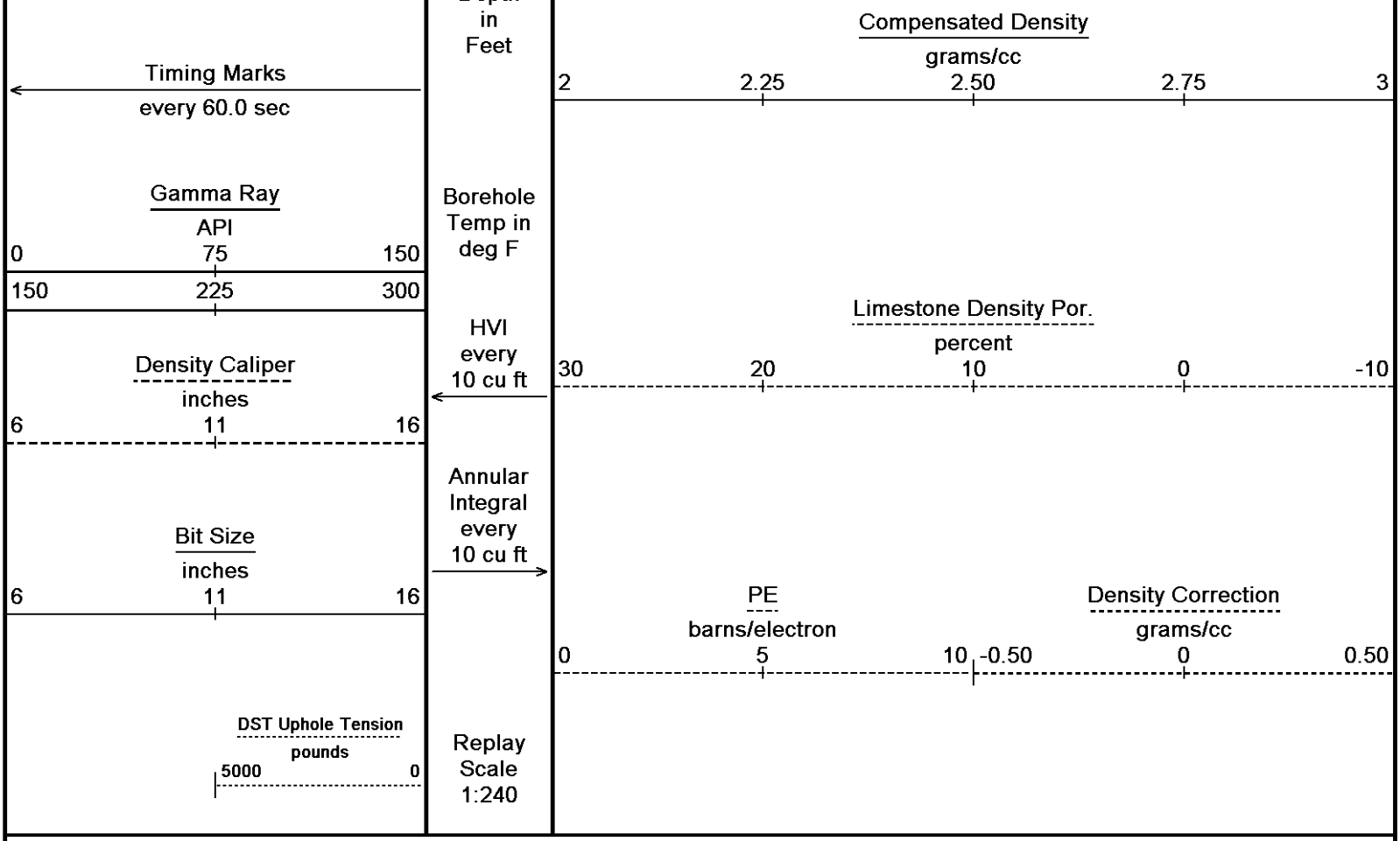

6
11
16
Bit Size
inches
6
11
16
DST Uphole Tension
pounds
5000
0
Annular Integral every 10 cu ft
Replay Scale 1:240
PE
barns/electron
0
5
10
Density Correction
grams/cc
-0.50
0
0.50
3600
107°
200
3650
108°
3700
109°
3750
Bit Size
Density Caliper
Gamma Ray
DST Uphole Tension
Limestone Density Por.
PE
Compensated Density
Density Correction


109°
300
3800
109°
3850
109°
3900
110°
3950


110°
4000
111°
4050
200
111°
4100
100
Bit Size
PE
Limestone Density Por.
111°
Compensated Density
Density Correction
Density Caliper
Gamma
4150
DST Uphole Tension
111°
4200


112°
4250
112°
4300
100
113°
4350
113°
4400


114°
4450
115°
4500
116°
4550
4600
4640
Depth
Bit Size
Density Caliper
Gamma Ray
DST Uphole Tension
FR GRGC
FR CLDC
FR SMTU
Limestone Density Por.
PE
Compensated Density
Density Correction
FR PDPE
FR DPRL
FR DCOR
0
0



Depth Based Data - Maximum Sampling Increment 10.0cm — Plotted on 08-FEB-2013 20:18
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5 INCH BULK DENSITY

REPEAT SECTION

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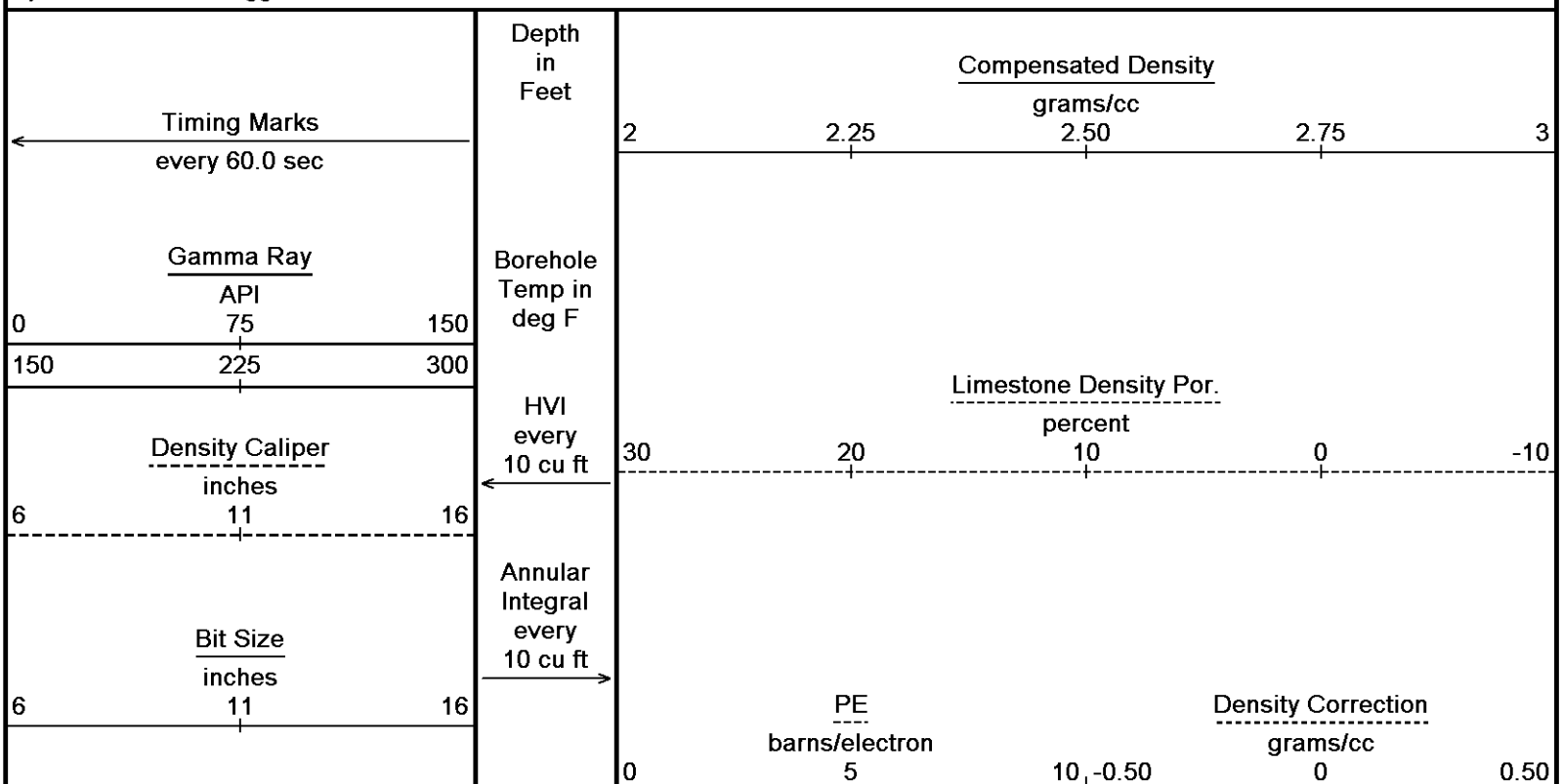
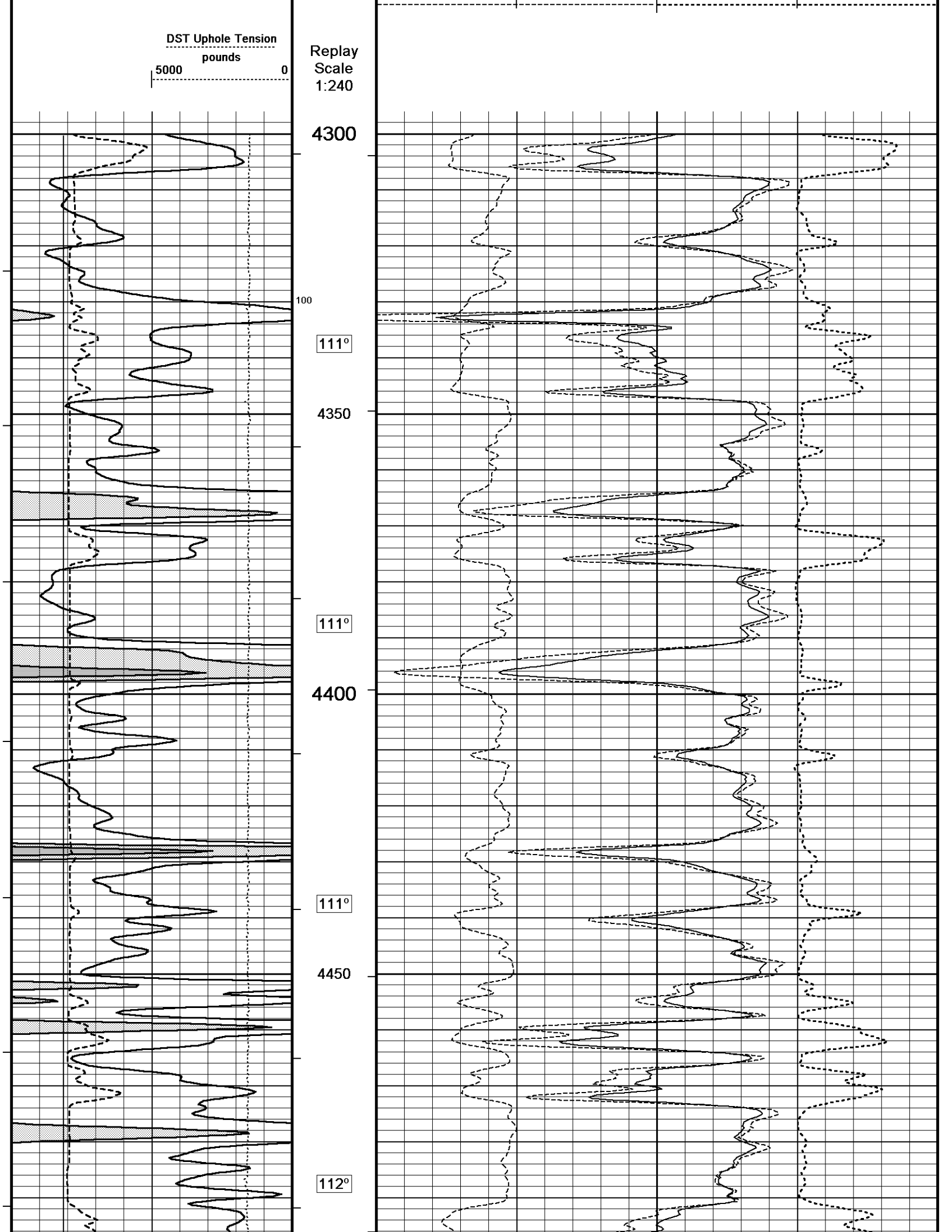
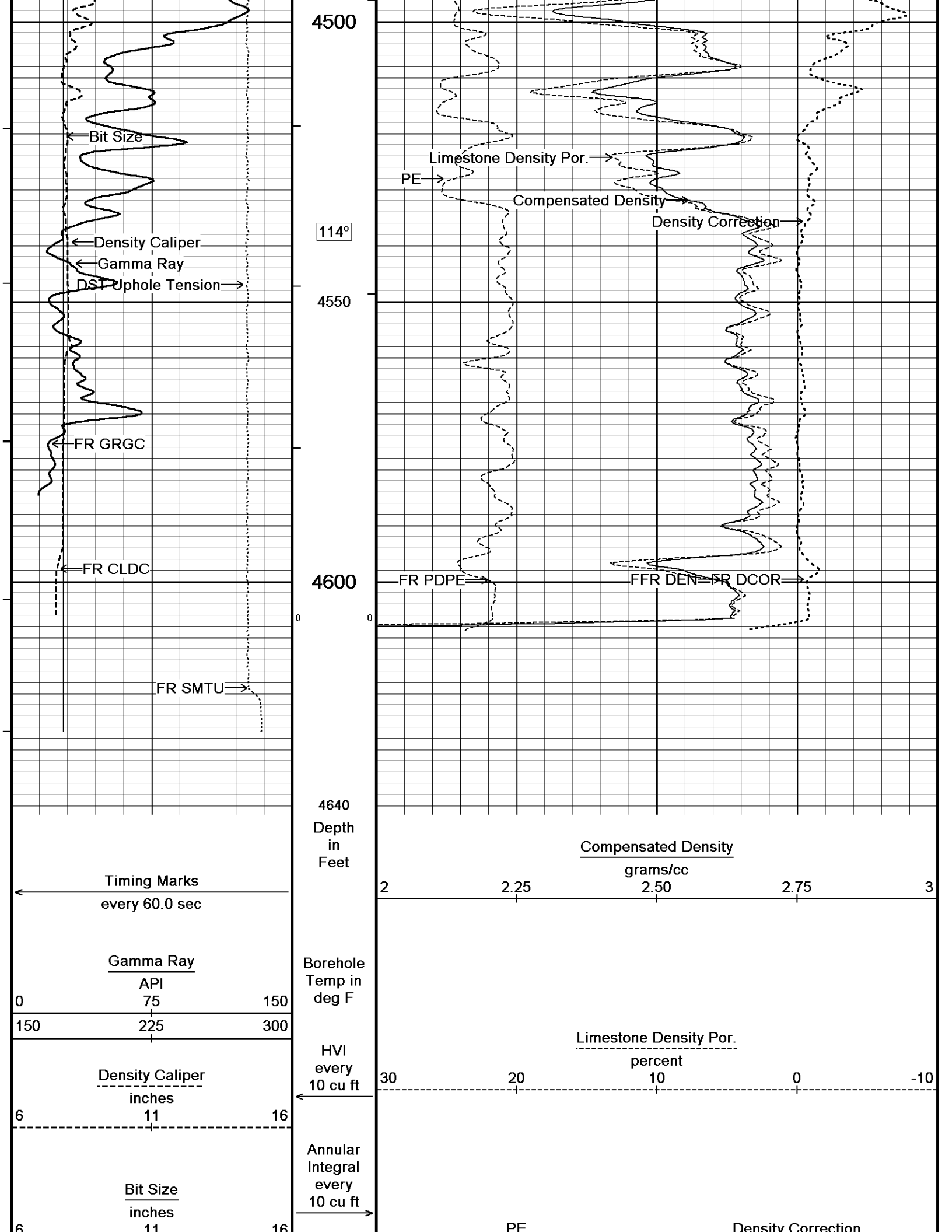
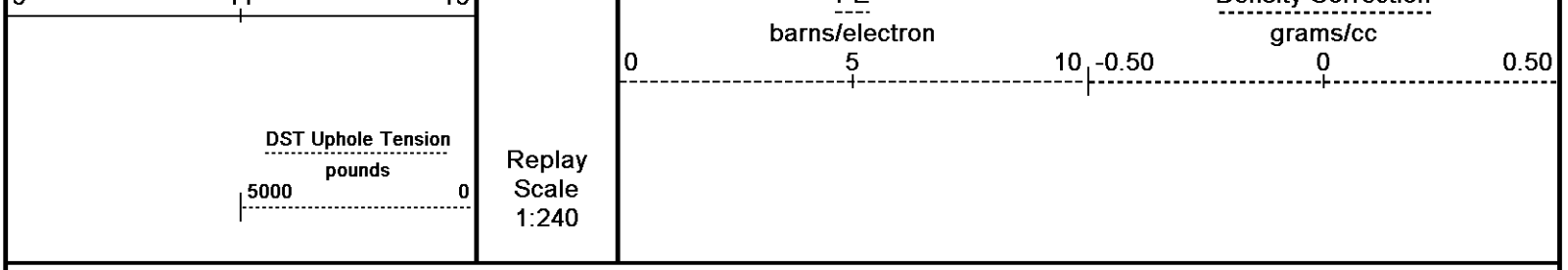



DST Uphole Tension
pounds
5000
0
Replay
Scale
1:240
4300
100
111°
4350
111°
4400
111°
4450
112°


4500
Bit Size
Limestone Density Por.
PE
Compensated Density
Density Correction
114°
Density Caliper
Gamma Ray
DST Uphole Tension
4550
FR GRGC
FR CLDC
4600
FR PDPE
FFR DEN
FR DCOR
0
0
FR SMTU
4640
Depth
in
Feet
Compensated Density
grams/cc
2
2.25
2.50
2.75
3
Timing Marks
every 60.0 sec
Gamma Ray
API
0
75
150
Borehole
Temp in
deg F
150
225
300
Limestone Density Por.
percent
HVI
every
10 cu ft
30
20
10
0
-10
Density Caliper
inches
6
11
16
Annular
Integral
every
10 cu ft
Bit Size
inches
6
11
16
PE
Density Correction



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REPEAT SECTION

BEFORE SURVEY CALIBRATION

C:\Minimus 13.04.8492\Data\Shakespeare Holaday #1-19\Shakespeare Holaday #1-19_001.dta

General Constants All 000

Last Edited on 08-FEB-2013,15:45

General Parameters		
Mud Resistivity	1.150	ohm-metres
Mud Resistivity Temperature	82.000	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	Density Caliper	
Rwa Parameters		
Porosity used	Base Density Porosity	
Resistivity used	Array Ind. Six Res Rt	
RWA Constant A	1.000	
RWA Constant M	2.000	

Down-hole Tension Calibration SMS 0

Field Calibration on 02-FEB-2013 03:49

Reading No	Measured	Calibrated (lbs)
1	13535.91	0.00
2	14074.23	471.00

SP Calibration MCG-C 208

Field Calibration on 27-DEC-2012 10:06

	Measured	Calibrated (mV)
Reference 1	100.9	100.0
Reference 2	-100.6	-100.0

High Resolution Temperature Calibration MCG-C 208

Field Calibration on 05-NOV-2012,14:26

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

High Resolution Temperature Constants MCG-C 208

Last Edited on 05-NOV-2012,14:25

Pre-filter Length	11

Gamma Calibration MCG-C 208

Field Calibration on 05-FEB-2013 10:10

	Measured	Calibrated (API)
Background	69	48
Calibrator (Gross)	1110	773
Calibrator (Net)	1041	725

Gamma Constants MCG-C 208

Last Edited on 08-FEB-2013,15:45

Gamma Calibrator Number	GR38	
Mud Density	1.10	gm/cc

Mud Density	1.10	gm/cc
Caliper Source for Processing	Density Caliper	
Tool Position	Eccentred	
Concentration of KCl	0.00	kppm

Micro Laterolog Calibration MMR-A 11

Base Calibration on 31-DEC-1999 00:00
Field Check on 31-DEC-1999 00:00

Base Calibration

	Measured		Calibrated (ohm-m)	
	Ref 1	Ref 2	Ref 1	Ref 2
	0.0	0.0	0.0	0.0

Base Check (ohm-m)	Field Check (ohm-m)
0.0	0.0

Micro Laterolog Constants MMR-A 11

Last Edited on 12-NOV-2012,01:59

Pad Type	6 in Solid Nylon B23059	
Micro Laterolog K Factor	0.0128	
Standoff Offset	0.0000	inches

Mudcake Thickness Correction Constants

Mud Cake Source	Constant Value	
Mud Cake Thickness	0.4000	inches
Mud Cake Thickness Caliper	N/A	
Mud Cake Resistivity	0.1500	ohm-m
Mud Cake Resistivity Temp.	68.00	Deg F
Mud Cake Resistivity Source	Constant Value	
Temp. Source Rmc Correc.	N/A	

Caliper Calibration MMR-A 11

Base Calibration on 16-JAN-2013 10:32
Field Calibration on 05-FEB-2013 09:58

Base Calibration

Reading No	Measured	Calibrator Size (in)
1	13881	5.98
2	17138	7.97
3	20398	9.86
4	24351	11.92
5	0	0.00
6	N/A	N/A

Field Calibration

Measured Caliper (in)	Actual Caliper (in)
6.09	5.98

Micro Normal and Micro Inverse Calibration MMR-A 11

Base Calibration on 16-JAN-2013 10:36
Field Check on 05-FEB-2013 09:54

Base Calibration

	Measured		Calibrated (ohm-m)	
Channel	Resistor 1	Resistor 2	Resistor 1	Resistor 2
Micro Normal	12.3	59.9	5.0	25.0
Micro Inverse	15.5	77.5	5.0	25.0

Channel	Base Check (ohm-m)	Field Check (ohm-m)
Micro Normal	76.3	76.3
Micro Inverse	58.7	58.7

Micro Normal and Micro Inverse Constants MMR-A 11

Last Edited on 05-NOV-2012,13:54

Pad Type	8-12 in Soft Rubber Inflatable 006-9011-159	
Micro Normal K Factor	1.0000	
Micro Inverse K Factor	1.0000	
Standoff Offset	0.0000	inches

Neutron Calibration MDN-A.B 65

Base Calibration on 24-JAN-2013 15:09
Field Check on 05-FEB-2013 10:14

Base Calibration

	Measured		Calibrated (cps)	
	Near	Far	Near	Far
	2952	92	3714	110
Ratio	32.138		33.764	

Field Calibrator at Base

Calibrated (cps)	
1708	2488

	1720	2499
Ratio	0.688	

Field Check	Calibrated (cps)	
	1721	2500
Ratio	0.696	

Neutron Constants MDN-A.B 65

Last Edited on 08-FEB-2013,15:46

Neutron Source Id	PN-521	
Neutron Jig Number	5824NE	
Epithermal Neutron	No	
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	None	
Temperature	N/A	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 16-JAN-2013 10:20
Field Check on 05-FEB-2013 09:44

Base Calibration

	Measured	Calibrated (ohm-m)
Reference 1	0.0	0.0
Reference 2	964.3	126.8
Base Check		281.2
Field Check		281.4

FE Constants MFE-B.J 352

Last Edited on 08-FEB-2013,15:46

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 45

Field Calibration on 13-DEC-2012,10:54

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

High Resolution Temperature Constants MAI-A.A 45

Last Edited on 13-DEC-2012,10:53

Pre-filter Length	11

Induction Calibration MAI-A.A 45

Base Calibration on 26-JUL-2012,09:22
Field Check on 05-FEB-2013 09:43

Base Calibration

Test Loop Calibration

Channel	Measured Low	Measured High	Calibrated (mmho/m) Low	Calibrated (mmho/m) High
1	14.4	472.6	9.3	966.2
2	5.7	374.0	7.6	821.4
3	3.4	261.2	5.2	566.0
4	2.5	133.9	2.6	279.2

Array Temperature 78.4 Deg F

Channel	Base Check (mmho/m) Low	Base Check (mmho/m) High	Field Check (mmho/m) Low	Field Check (mmho/m) High
1			18.6	3851.7

2	31.8	3629.3
3	28.7	3049.2
4	18.4	2079.1
Deep	16.1	1911.0
Medium	42.6	4060.2
Shallow	49.7	5483.2
Array Temperature	60.2	Deg F

Induction Constants MAI-A.A 45

Last Edited on 08-FEB-2013,15:46

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	

Photo Density Calibration MPD-B 31

Base Calibration on 24-JAN-2013 09:49
Field Check on 05-FEB-2013 09:50

Density Calibration

Base Calibration	Measured Near	Measured Far	Calibrated (sdu) Near	Calibrated (sdu) Far
Reference 1	45759	23102	59556	30836
Reference 2	18982	1934	24941	2541

Field Check at Base

	680.7	842.1

Field Check

	682.0	839.6

PE Calibration

Base Calibration	WS	Measured WH	Ratio	Calibrated Ratio
Background	127	606		
Reference 1	19469	45650	0.429	0.371
Reference 2	5712	18903	0.305	0.272

Field Check at Base		
	126.6	606.1
Field Check		
	124.3	605.7

Density Constants MPD-B 31

Last Edited on 08-FEB-2013,15:46

Density Source Id	254	
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	1.10	gm/cc
Mud Density Z/A Multiplier	1.11	
Mud Filtrate Density	1.00	gm/cc
Dry Hole Mud Filtrate Density	1.00	gm/cc
DNCT	0.00	gm/cc
CRCT	0.00	gm/cc
Density Z/A Correction	Hybrid	

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

Caliper Calibration MPD-B 31

Base Calibration on 28-JAN-2013 08:35
Field Calibration on 05-FEB-2013 09:46

Base Calibration

Reading No	Measured	Calibrator Size (in)
1	15824	3.99
2	24384	5.98
3	33040	7.97
4	41376	9.86
5	50943	11.92
6	N/A	N/A

Field Calibration

Measured Caliper (in)	Actual Caliper (in)
5.99	5.98

DOWNHOLE EQUIPMENT

C:\Minimus 13.04.8492\Data\Shakespeare Holaday #1-19\Shakespeare Holaday #1-19_001.dta

Compact Comms Gamma
MCG-C 208 LG: 8.70 ft WT: 63.9 lb OD: 2.24 in

Compact Micro-Resistivity
MMR-A 11 LG: 8.59 ft WT: 81.6 lb OD: 4.88 in

Compact Neutron
MDN-A.B 65 LG: 5.04 ft WT: 50.7 lb OD: 2.24 in

Compact Density/Caliper
MPD-B 31 LG: 9.59 ft WT: 90.4 lb OD: 2.45 in

43.50 ft GRGC - Gamma Ray
40.59 ft CGXT - MCG External Temperature

33.24 ft MBTC - MMR Caliper
33.24 ft MINV - MMR MicroLog Inverse
33.24 ft MNRL - MMR MicroLog Normal

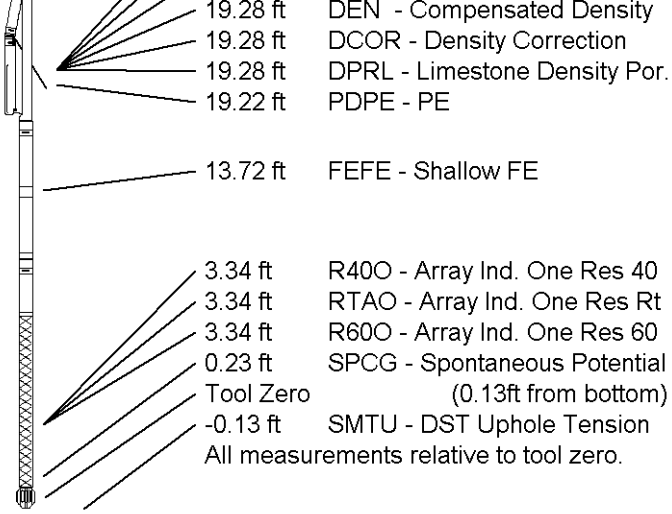
28.45 ft NPRL - Limestone Neutron Por.

21.21 ft AVOL - Annular Volume
21.21 ft HVOL - Hole Volume
21.21 ft CLDC - Density Caliper

Compact Focussed Electric
MFE-B.J 352 LG: 6.05 ft WT: 48.5 lb OD: 2.24 in

Compact Induction
MAI-A.A 45 LG: 10.81 ft WT: 48.5 lb OD: 2.24 in

Total Length: 48.78 ft Weight: 383.6 lb



19.28 ft	DEN - Compensated Density
19.28 ft	DCOR - Density Correction
19.28 ft	DPRL - Limestone Density Por.
19.22 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	SHAKESPEARE OIL COMPANY, INC.
WELL	HOLADAY #1-19
FIELD	WILDCAT
PROVINCE/COUNTY	GOVE
COUNTRY/STATE	U.S.A. / KANSAS

Elevation Kelly Bushing	2838.00	feet	First Reading	4599.00	feet
Elevation Drill Floor	2837.00	feet	Depth Driller	4620.00	feet
Elevation Ground Level	2828.00	feet	Depth Logger	4619.00	feet

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COMPACT PHOTO DENSITY
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