Weatherford

COMPACT PHOTO DENSITY COMPENSATED NEUTRON MICRORESISTIVITY LOG

COMPANY	SHAKESPEARE OIL CO., INC.
WELL	ANDERSON #1-33
FIELD	WILDCAT
PROVINCE/COUNTY	DECATUR
COUNTRY/STATE	U.S.A. / KANSAS
LOCATION	1090' FSL & 1135' FWL

SEC	TWP	RGE	Other Services
33	4S	29W	MAI/MFE MSS

Latitude
Longitude
API Number 15-039-21233

Permanent Datum GL, Elevation 2776 feet
Log Measured From KB
Drilling Measured From KB @ 8 FEET

Elevations:	feet
KB	2784.00
DF	2782.00
GL	2776.00

Date	16-SEP-2016			
Run Number	ONE			
Service Order	4558-161170171			
Depth Driller	4500.00	feet		
Depth Logger	4504.00	feet		
First Reading	4472.00	feet		
Last Reading	3600.00	feet		
Casing Driller	264.00	feet		
Casing Logger	264.00	feet		
Bit Size	7.875	inches		
Hole Fluid Type	CHEMICAL			
Density / Viscosity	9.30	lb/USg	60.00 CP	
PH / Fluid Loss	10.00		6.80 ml/30Min	
Sample Source	FLOWLINE			
Rm @ Measured Temp	1.45 @ 75.0	ohm-m		
Rmf @ Measured Temp	1.16 @ 75.0	ohm-m		
Rmc @ Measured Temp	1.74 @ 75.0	ohm-m		
Source Rmf / Rmc	CALC		CALC	
Rm @ BHT	0.95 @115.0	ohm-m		
Time Since Circulation	5 HOURS			
Max Recorded Temp	115.00	deg F		
Equipment / Base	13096		OKC	
Recorded By	ADAM SILL			
Witnessed By	TIM PRIEST			

BOREHOLE RECORD

Last Edited: 16-SEP-2016 09:36

Bit Size inches	Depth From feet	Depth To feet
7.875	264.00	4500.00

CASING RECORD

Type	Size inches	Depth From feet	Shoe Depth feet	Weight pounds/ft
SURFACE	8.625	0.00	264.00	24.00

REMARKS

- SOFTWARE ISSUE: WLS 15.03.5939.

- RUN ONE: MCG, MML, MDN, MPD, MFE, MSS, MAI RUN IN COMBINATION.
  - HARDWARE: DUAL BOWSPRING USED ON MDN.
    0.5 INCH STANDOFF USED ON MFE.
    TWO 0.5 INCH STANDOFFS USED ON MSS.
    0.5 INCH STANDOFF USED ON MAI.

- 2.71 G/CC LIMESTONE DENSITY MATRIX USED TO CALCULATE POROSITY.

- BOREHOLE RUGOSITY, TIGHT PULLS, AND WASHOUTS WILL AFFECT DATA QUALITY.

- ALL INTERVALS LOGGED AND SCALED PER CUSTOMER'S REQUEST.

- TOTAL HOLE VOLUME FROM TD TO SURFACE CASING: 1672 CU.FT.

- ANNULAR HOLE VOLUME WITH 5.5 INCH PRODUCTION CASING FROM TD TO 3600 FEET: 168 CU.FT.

- RIG: DUKE #4.

- ENGINEER: A. SILL.

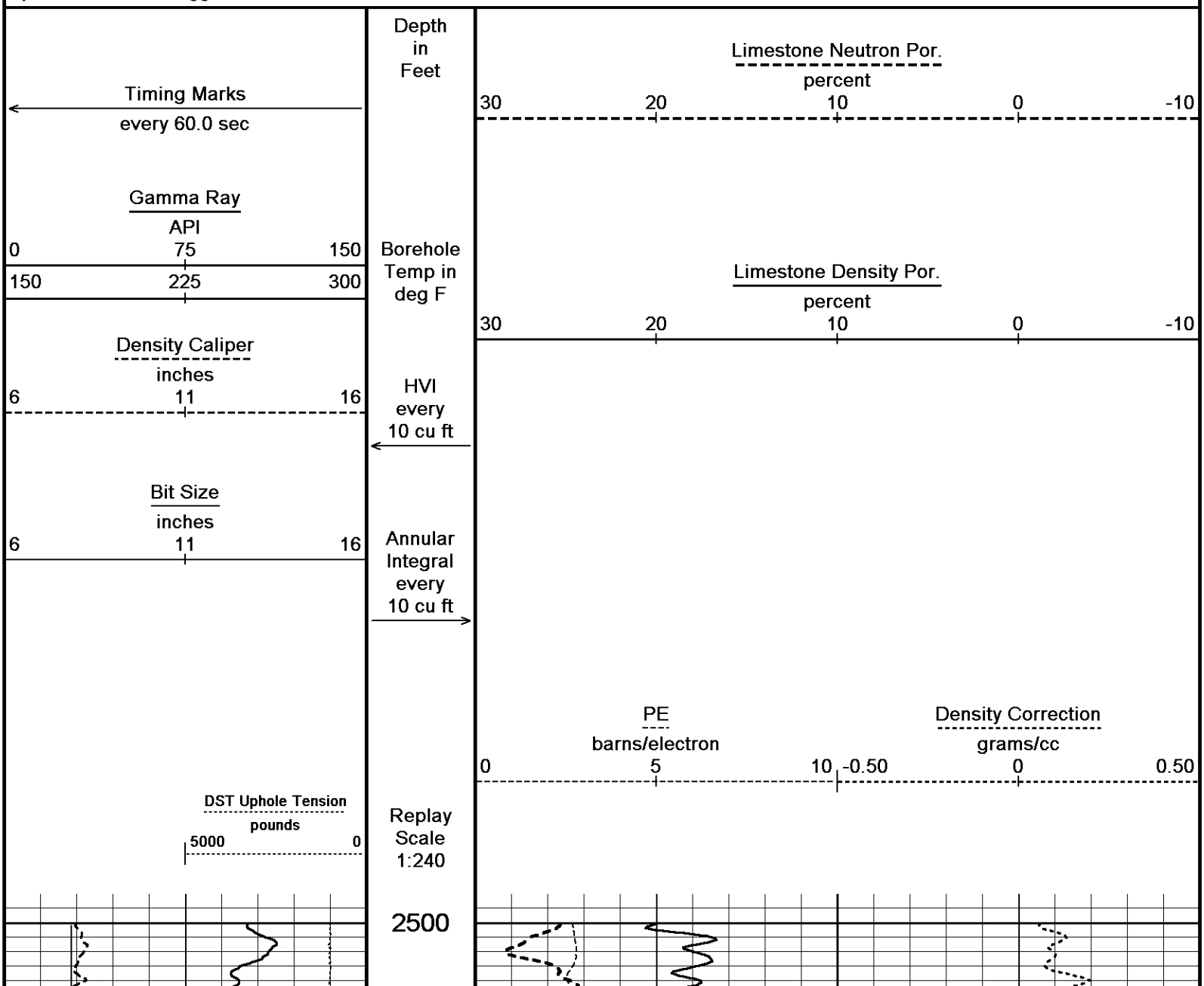
- OPERATOR: J. JONES.

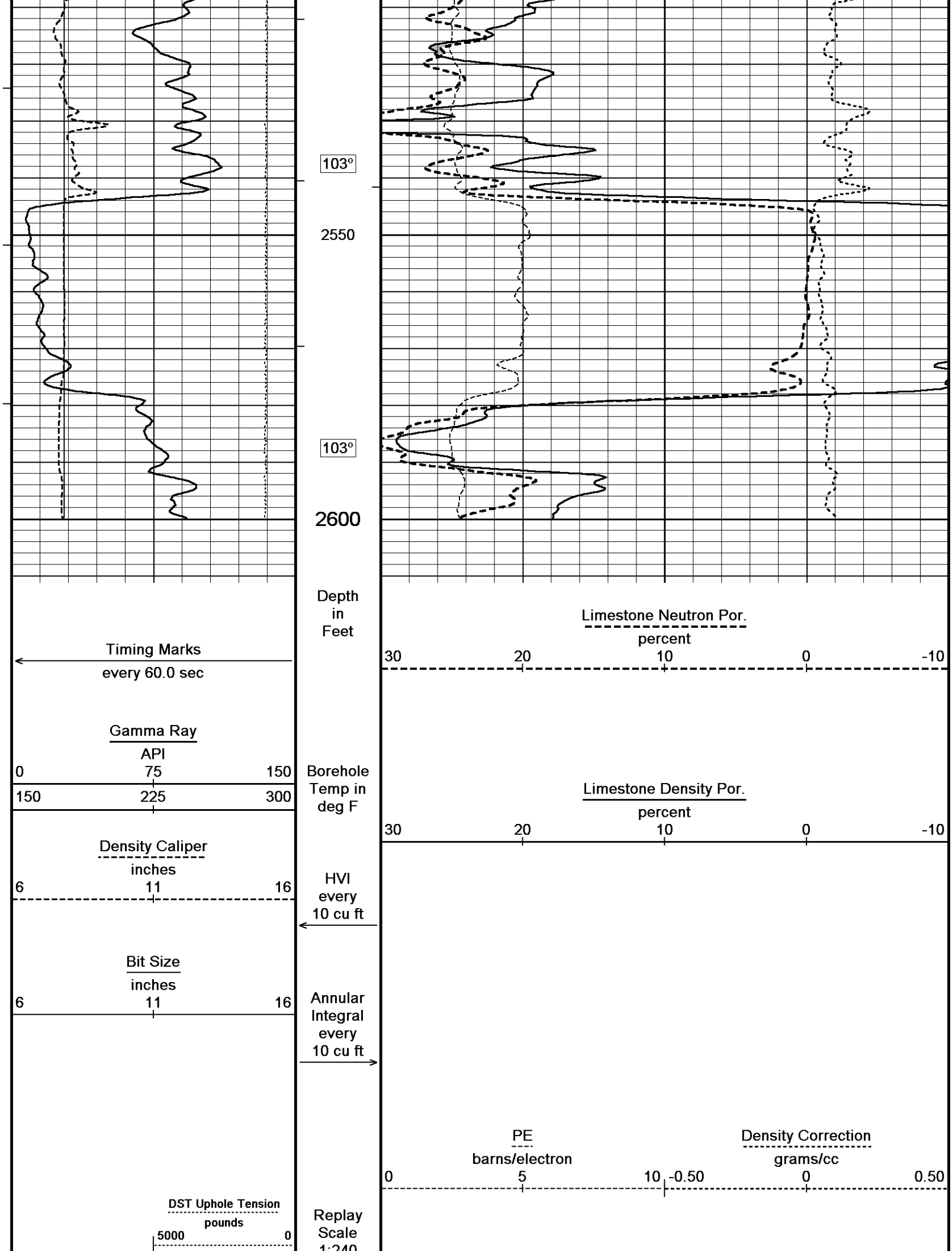
5 INCH LIMESTONE MAIN - ANHYDRITE

Depth Based Data - Maximum Sampling Increment 10.0cm — Plotted on 16-SEP-2016 14:38

Filename: C:\Minimus 15.03.5939\Logs\Shakespeare Anderso...\Shakespeare Anderson #1-33_002.dta — Recorded on 16-SEP-2016 11:59

System Versions: Logged with 15.03.5939 Plotted with 15.03.5939




103°
2550
103°
2600
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
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

Depth Based Data - Maximum Sampling Increment 10.0cm — Plotted on 16-SEP-2016 14:38
Filename: C:\Minimus 15.03.5939\Logs\Shakespeare Anderso...\Shakespeare Anderson #1-33_002.dta — Recorded on 16-SEP-2016 11:59
System Versions: Logged with 15.03.5939 Plotted with 15.03.5939

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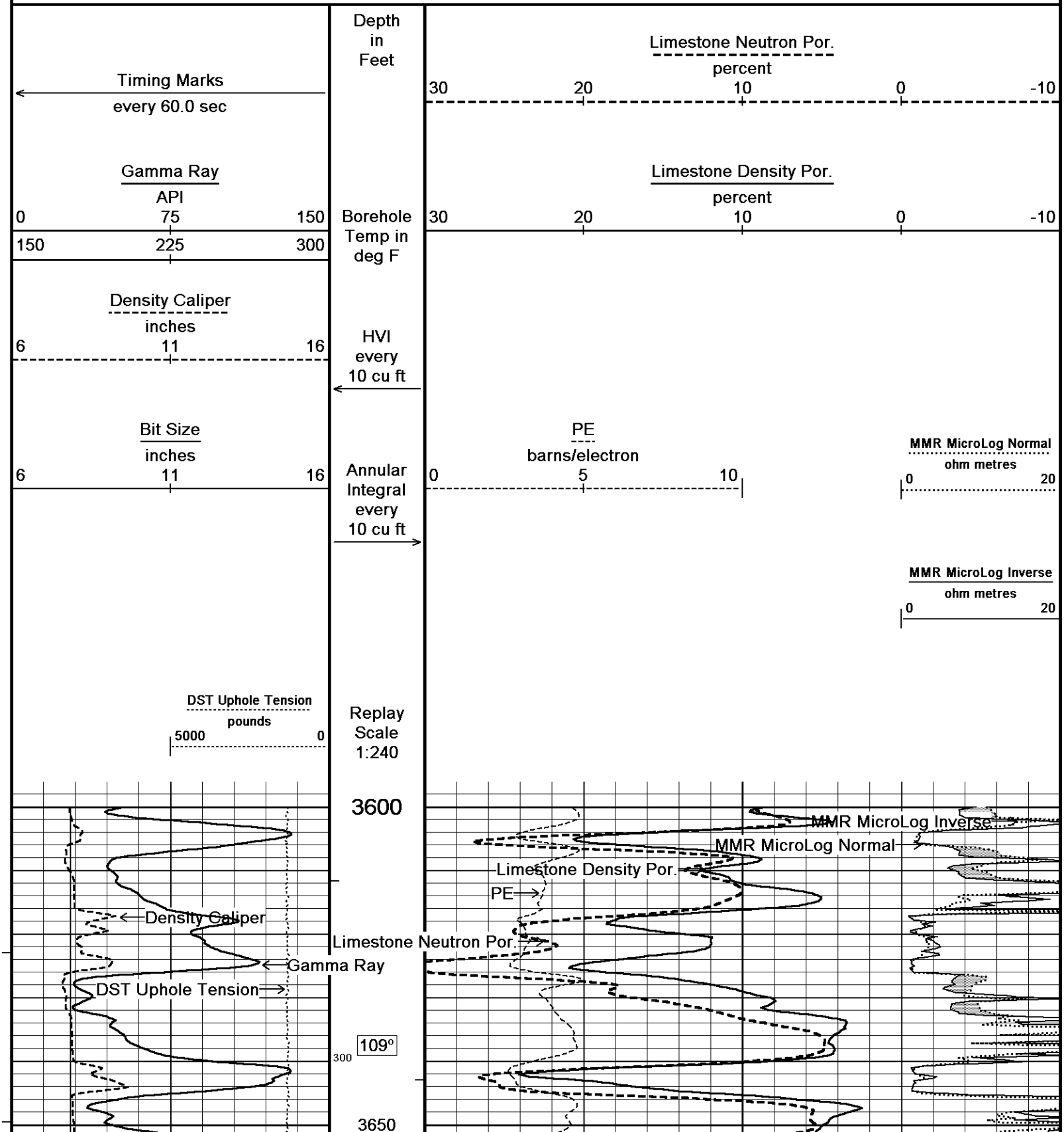
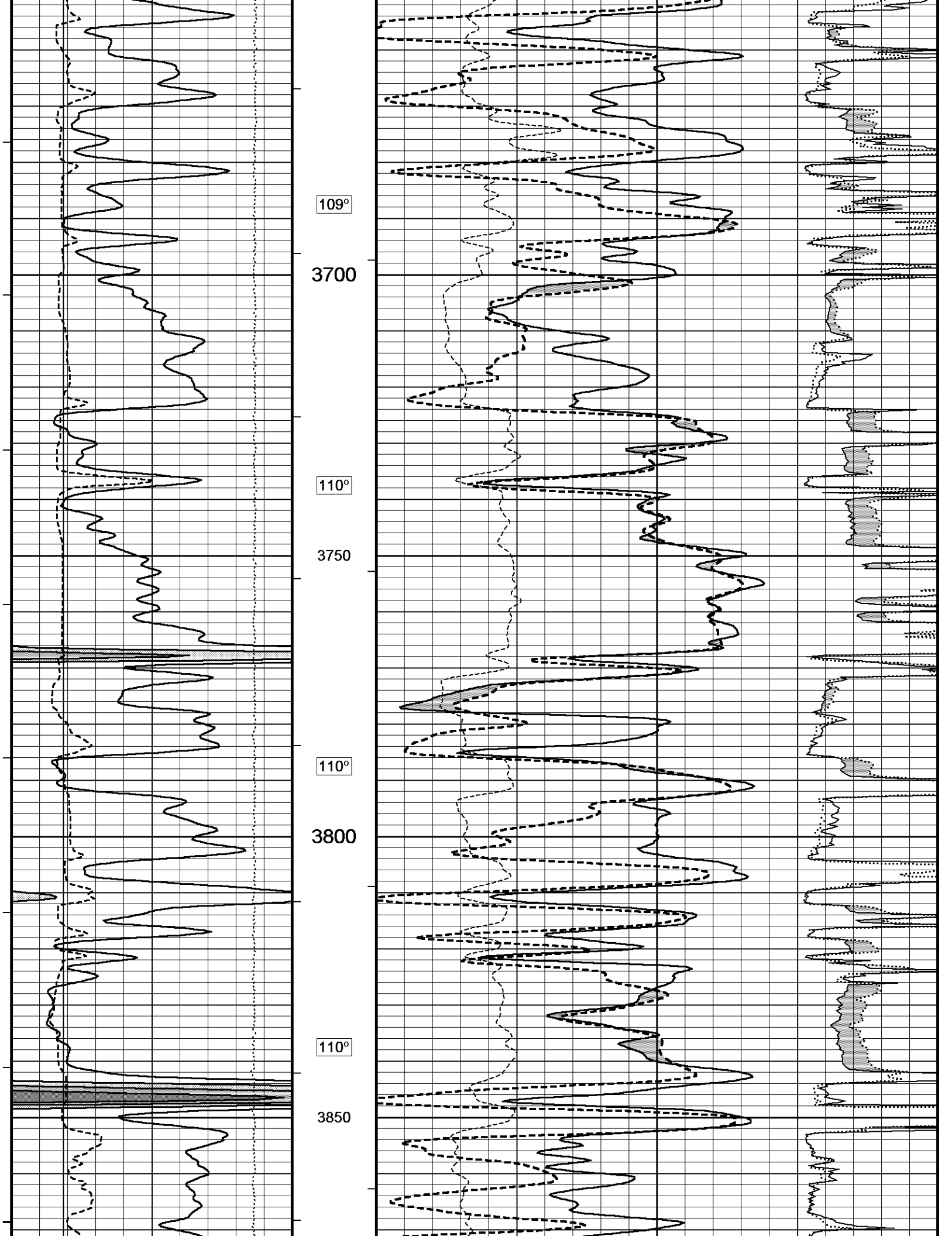
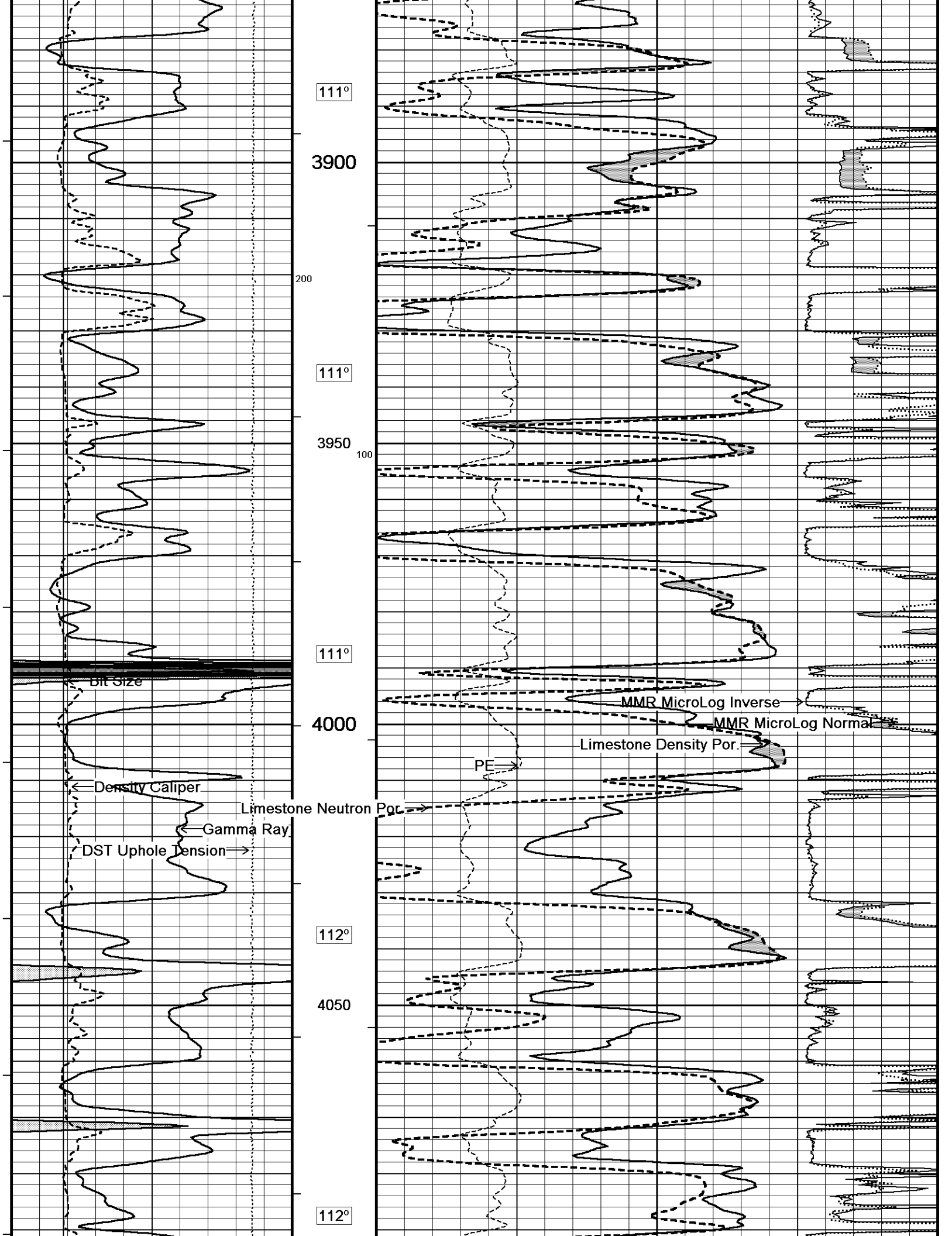
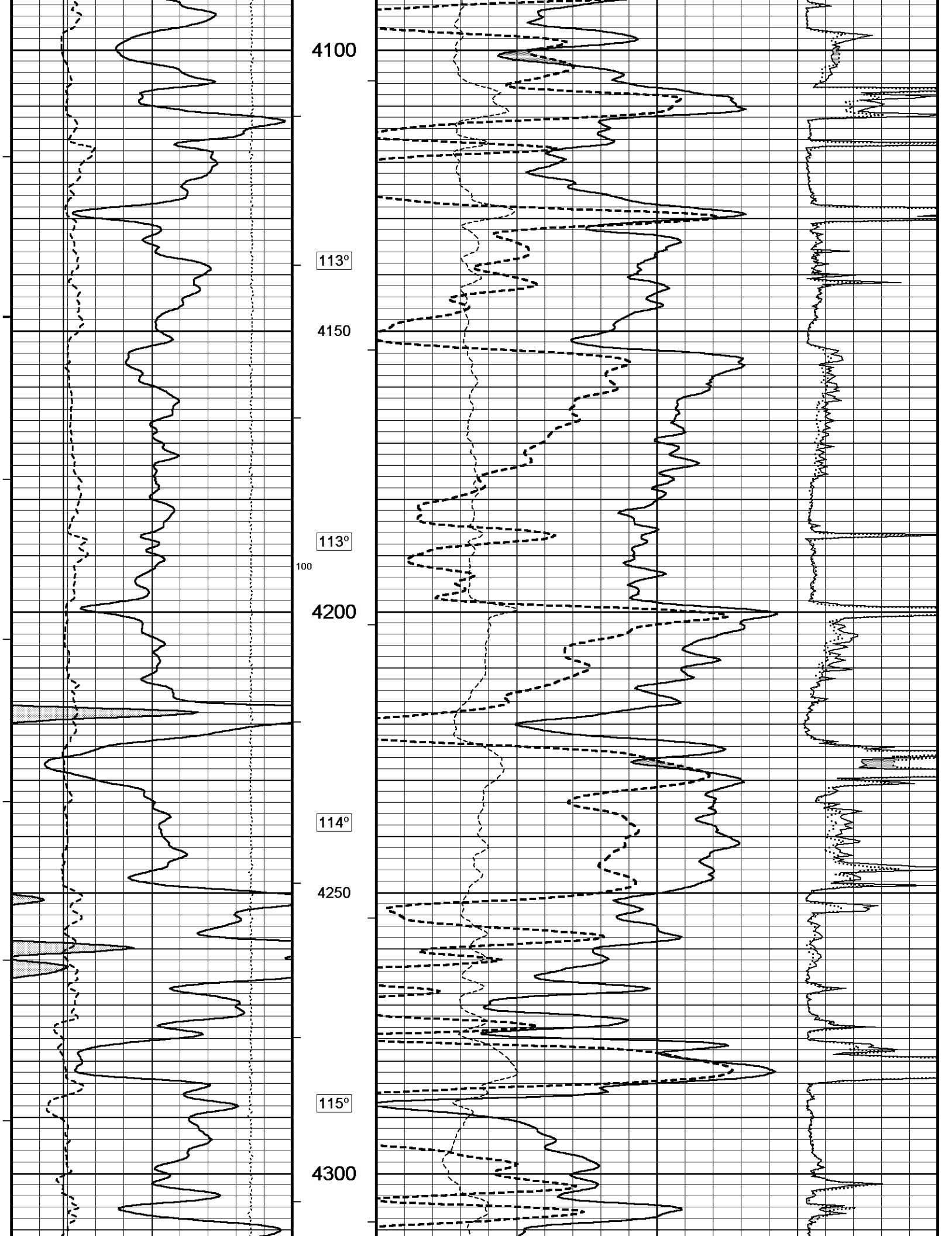
5 INCH LIMESTONE MAIN

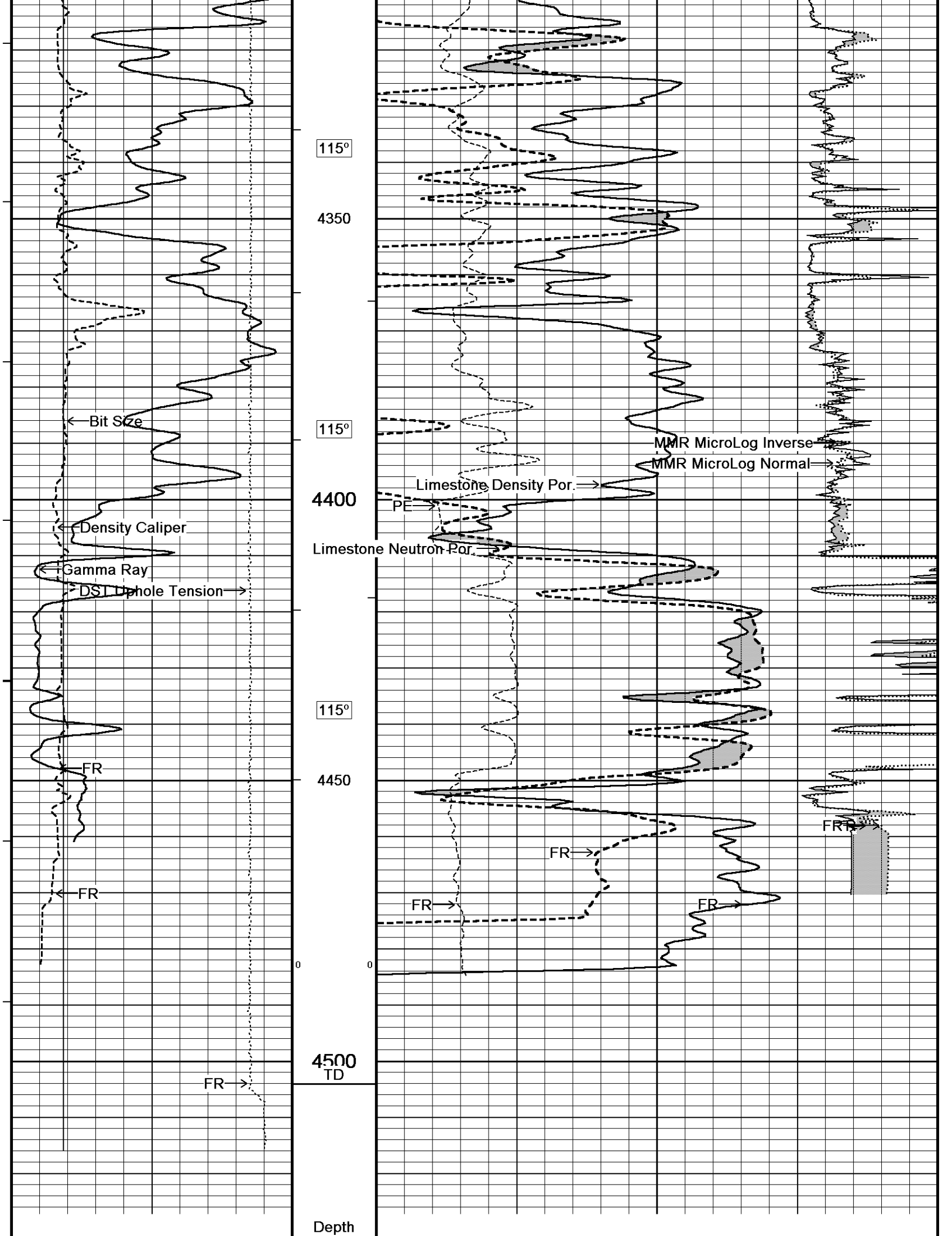
Depth Based Data - Maximum Sampling Increment 10.0cm — Plotted on 16-SEP-2016 14:38
Filename: C:\Minimus 15.03.5939\Logs\Shakespeare Anderso...\Shakespeare Anderson #1-33_002.dta — Recorded on 16-SEP-2016 11:59
System Versions: Logged with 15.03.5939 Plotted with 15.03.5939

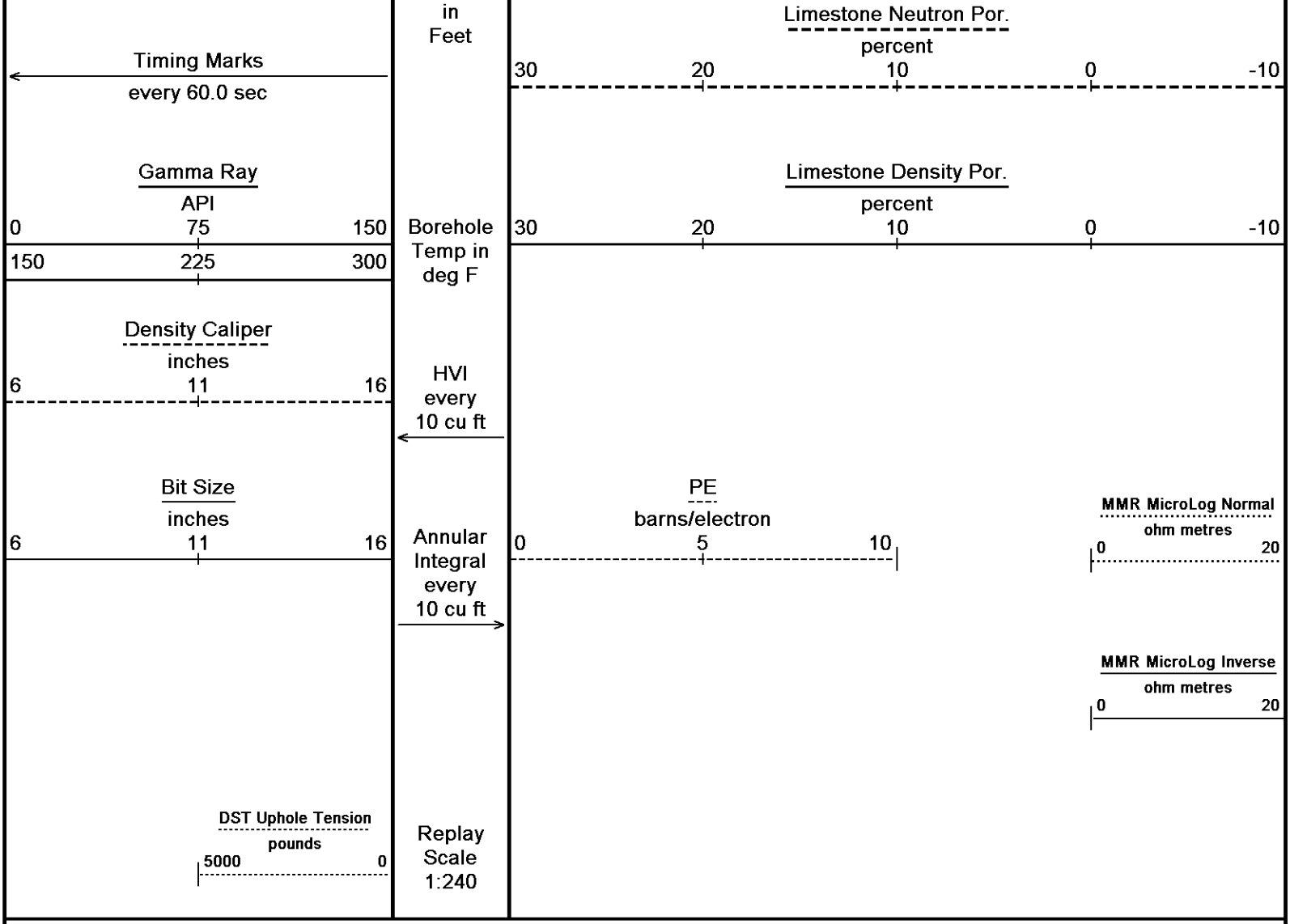



109°
3700
110°
3750
110°
3800
110°
3850


111°
3900
200
111°
3950
100
111°
Bit Size
4000
MMR MicroLog Inverse
MMR MicroLog Normal
Limestone Density Por.
PE
Density Caliper
Limestone Neutron Por.
Gamma Ray
DST Uphole Tension
112°
4050
112°


4100
113°
4150
113°
100
4200
114°
4250
115°
4300


115°
4350
115°
4400
115°
4450
0
0
4500
TD
Depth
Bit Size
Density Caliper
Gamma Ray
DSI Uphole Tension
FR
FR
FR
MMR MicroLog Inverse
MMR MicroLog Normal
Limestone Density Por.
PE
Limestone Neutron Por.
FR
FR
FR
FR



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5 INCH LIMESTONE MAIN

REPEAT SECTION

Depth Based Data - Maximum Sampling Increment 10.0cm — Plotted on 16-SEP-2016 14:38
Filename: C:\Minimus 15.03.5939\Logs\Shakespeare Anderso...\Shakespeare Anderson #1-33_001.dta — Recorded on 16-SEP-2016 11:32
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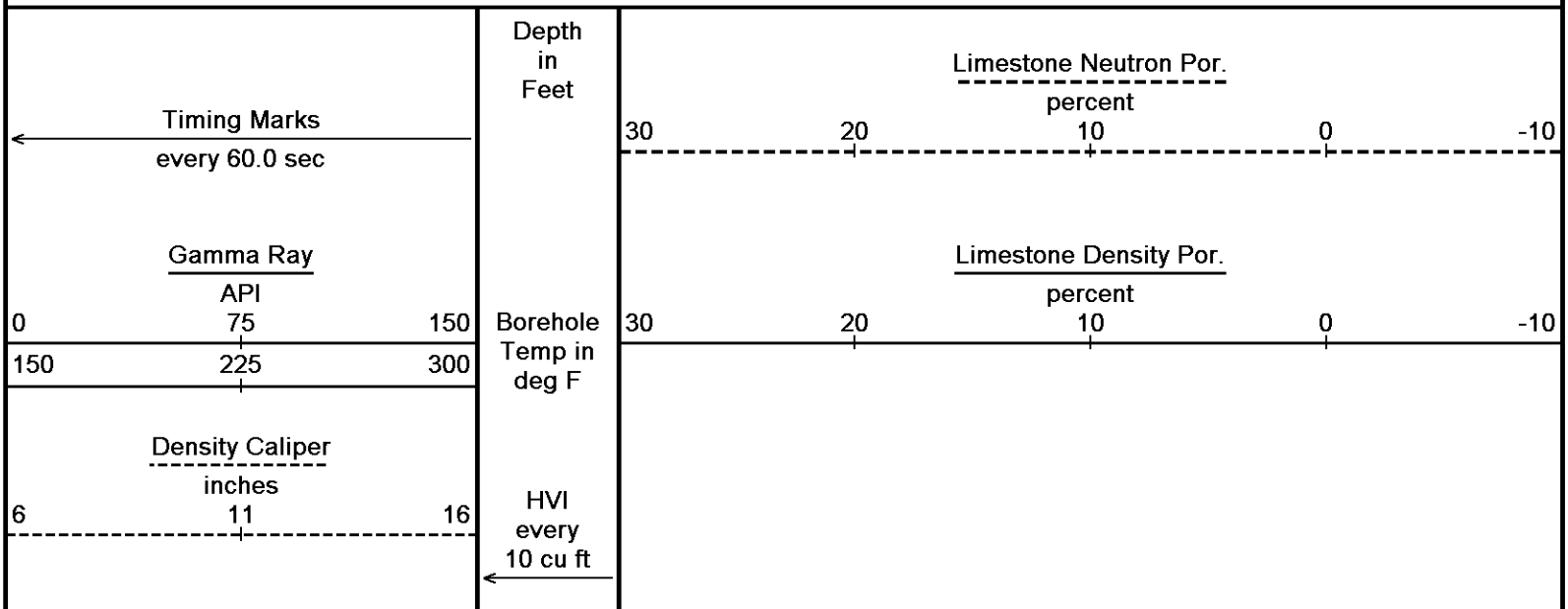
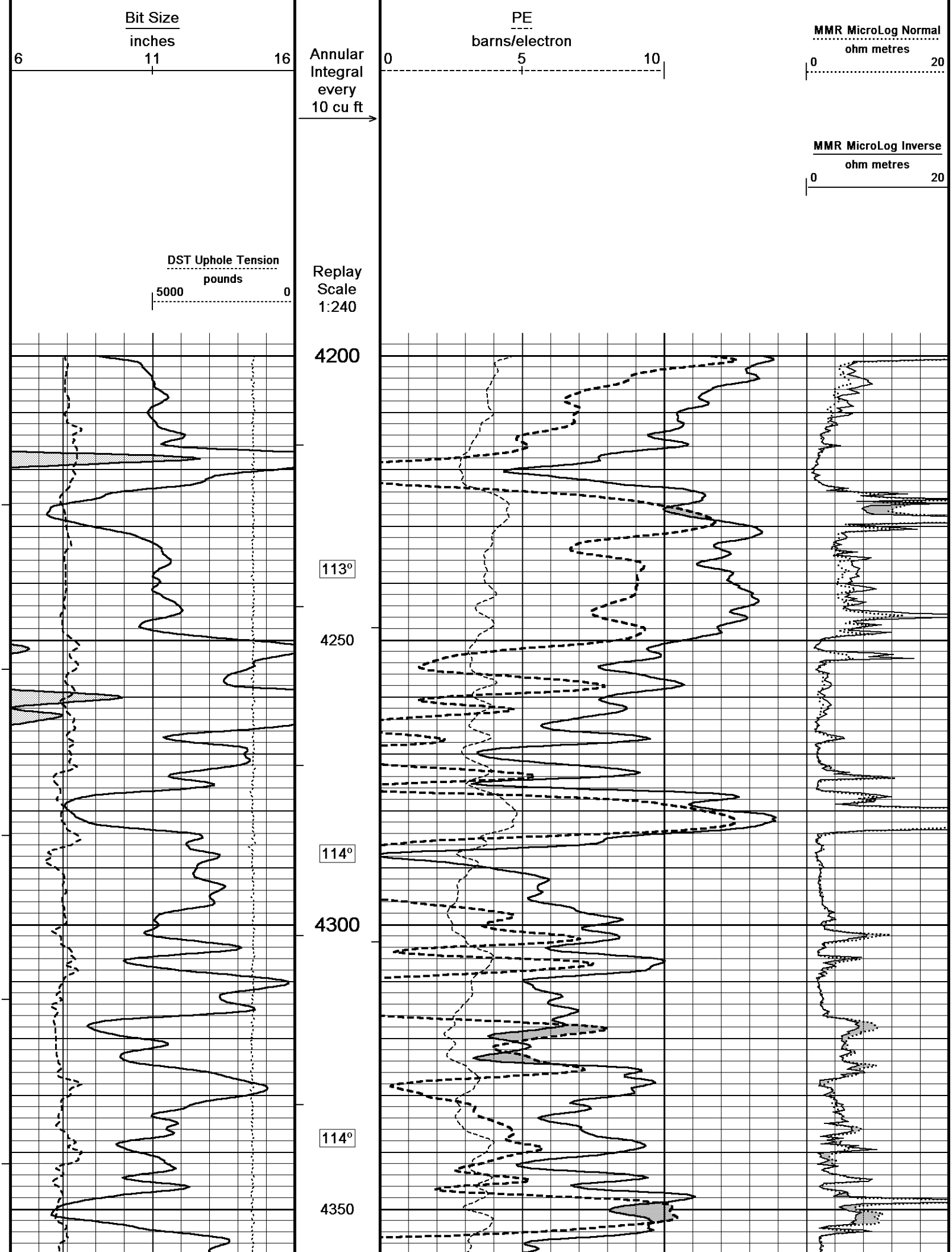
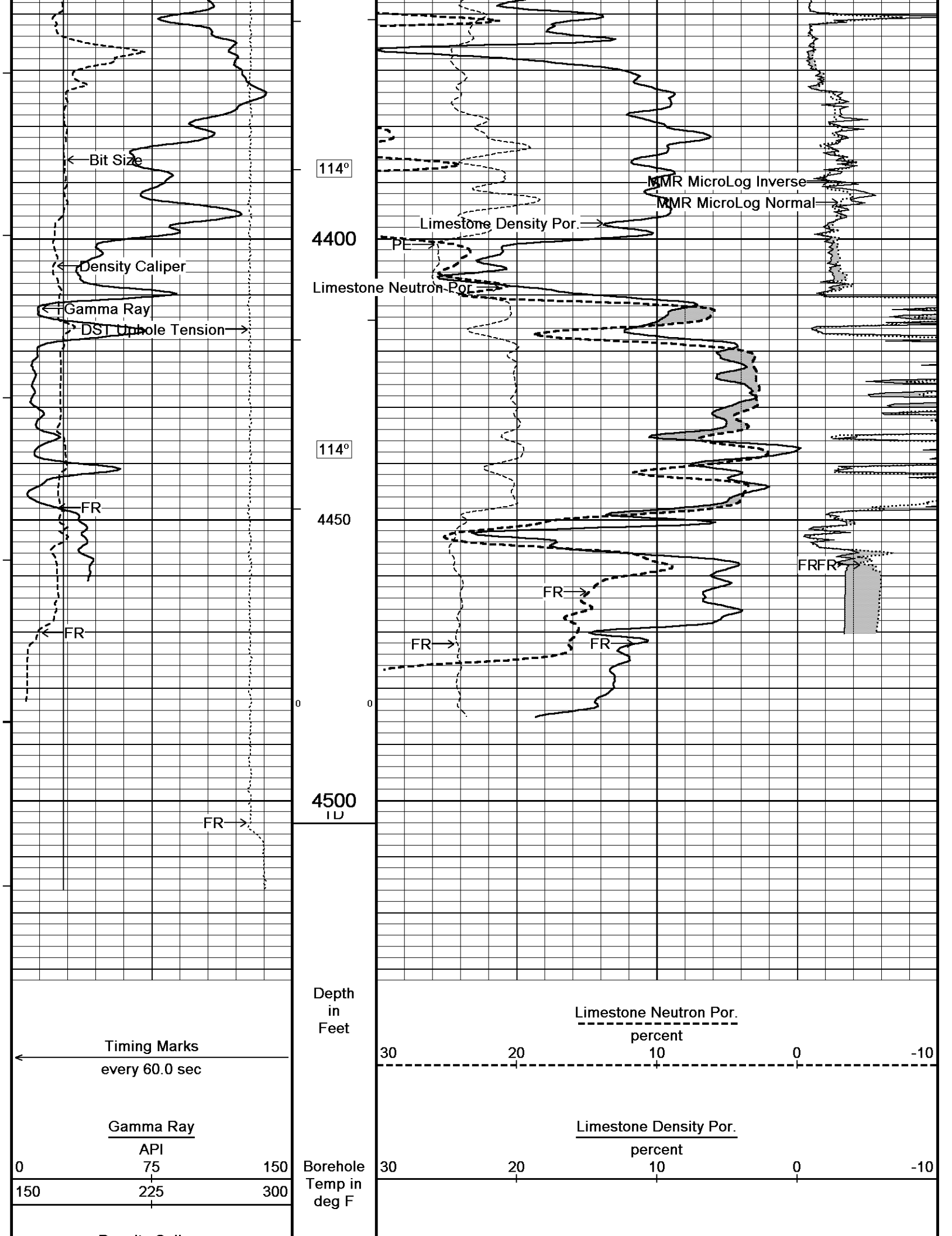
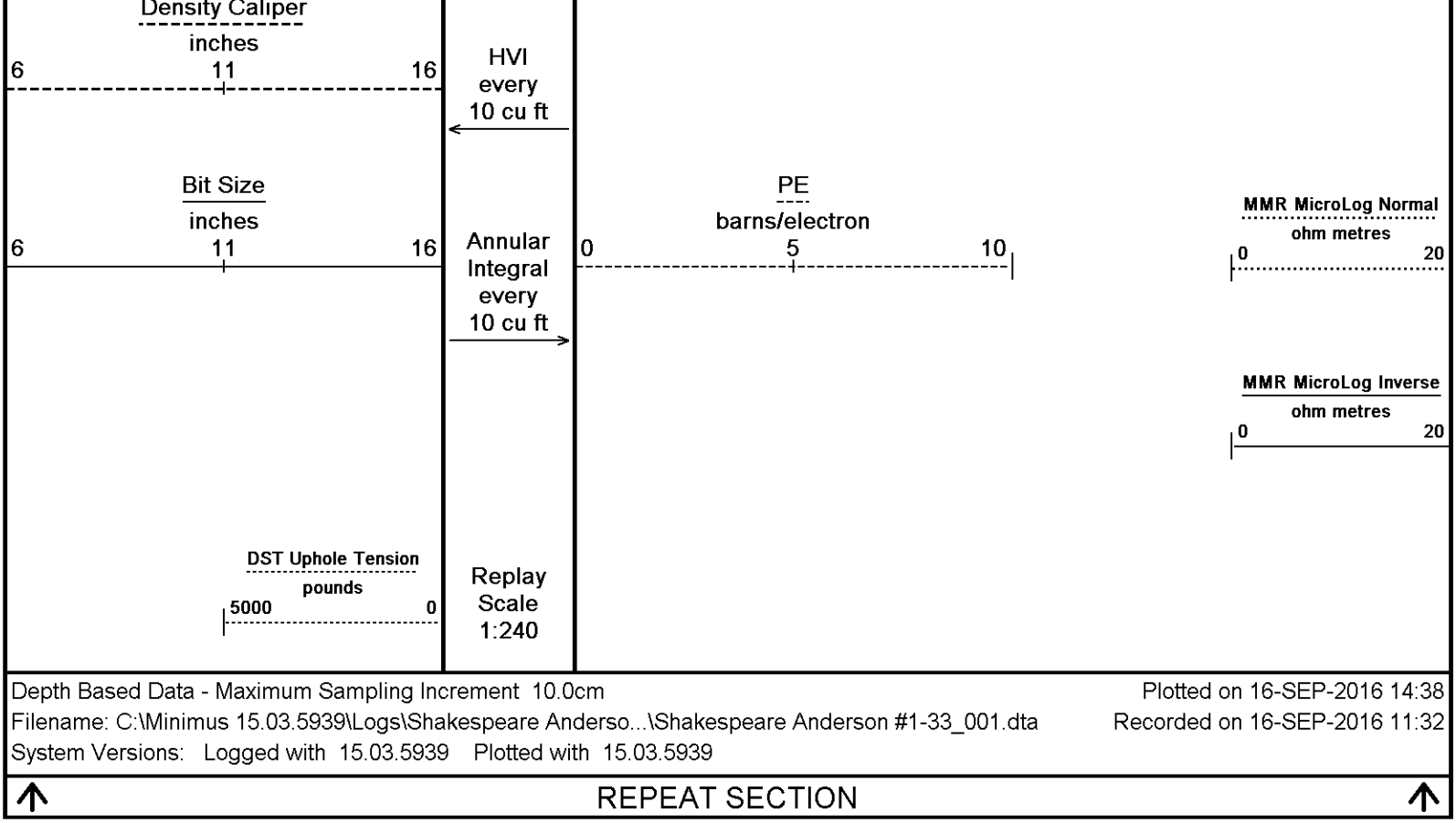



Bit Size
inches
6
11
16
Annular Integral every 10 cu ft
PE
barns/electron
0
5
10
MMR MicroLog Normal
ohm metres
0
20
MMR MicroLog Inverse
ohm metres
0
20
DST Uphole Tension
pounds
5000
0
Replay Scale 1:240
4200
113°
4250
114°
4300
114°
4350


Bit Size
Density Caliper
Gamma Ray
DST Uphole Tension
FR
FR
FR
114°
4400
Limestone Density Por.
PE
Limestone Neutron Por.
114°
4450
FR
FR
FR
FRFR
MMR MicroLog Inverse
MMR MicroLog Normal
0
0
4500
TD
Depth in Feet
Timing Marks
every 60.0 sec
Gamma Ray
API
0
75
150
150
225
300
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 16-SEP-2016 14:38
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REPEAT SECTION

5 INCH BULK DENSITY MAIN

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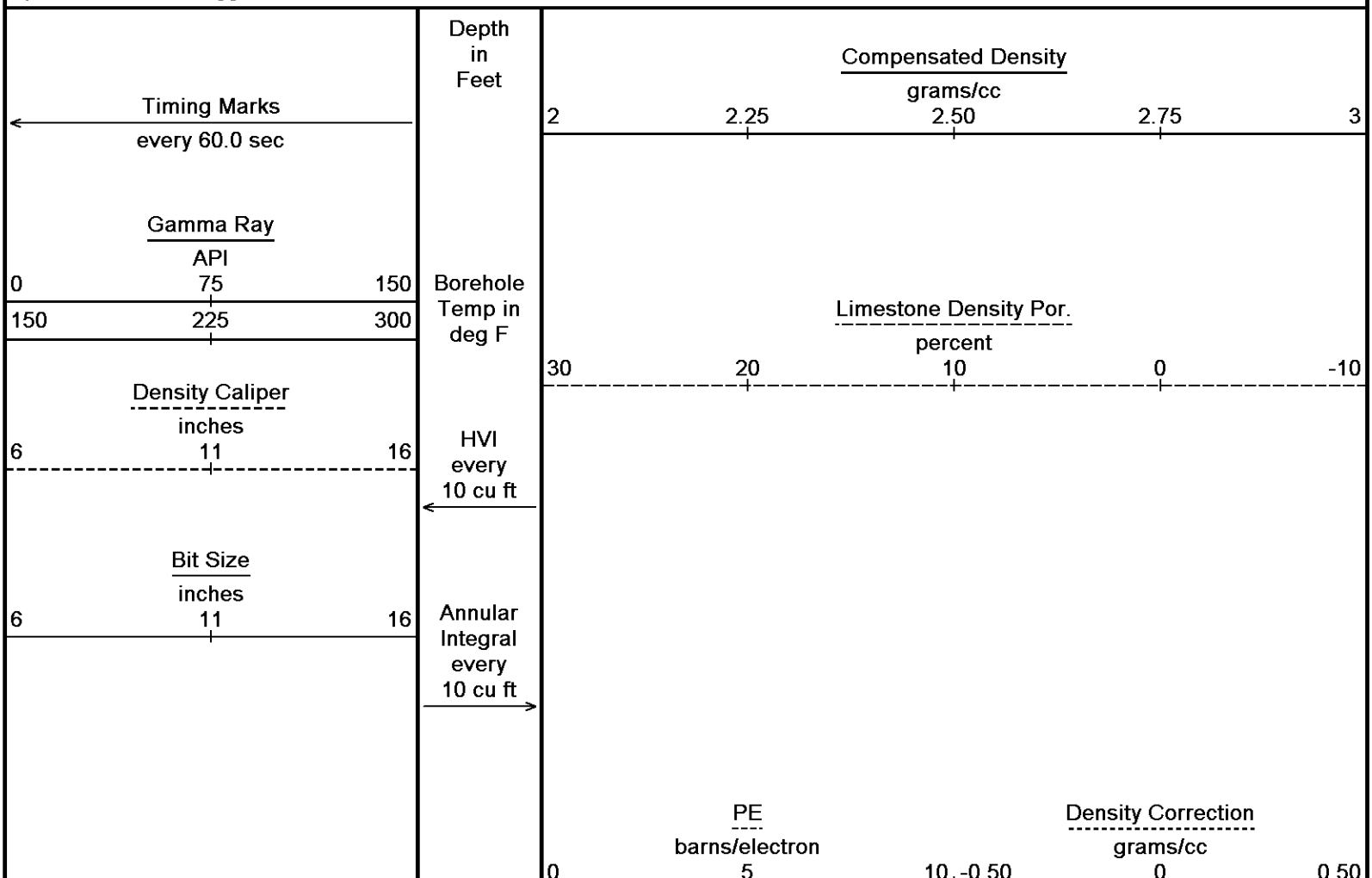
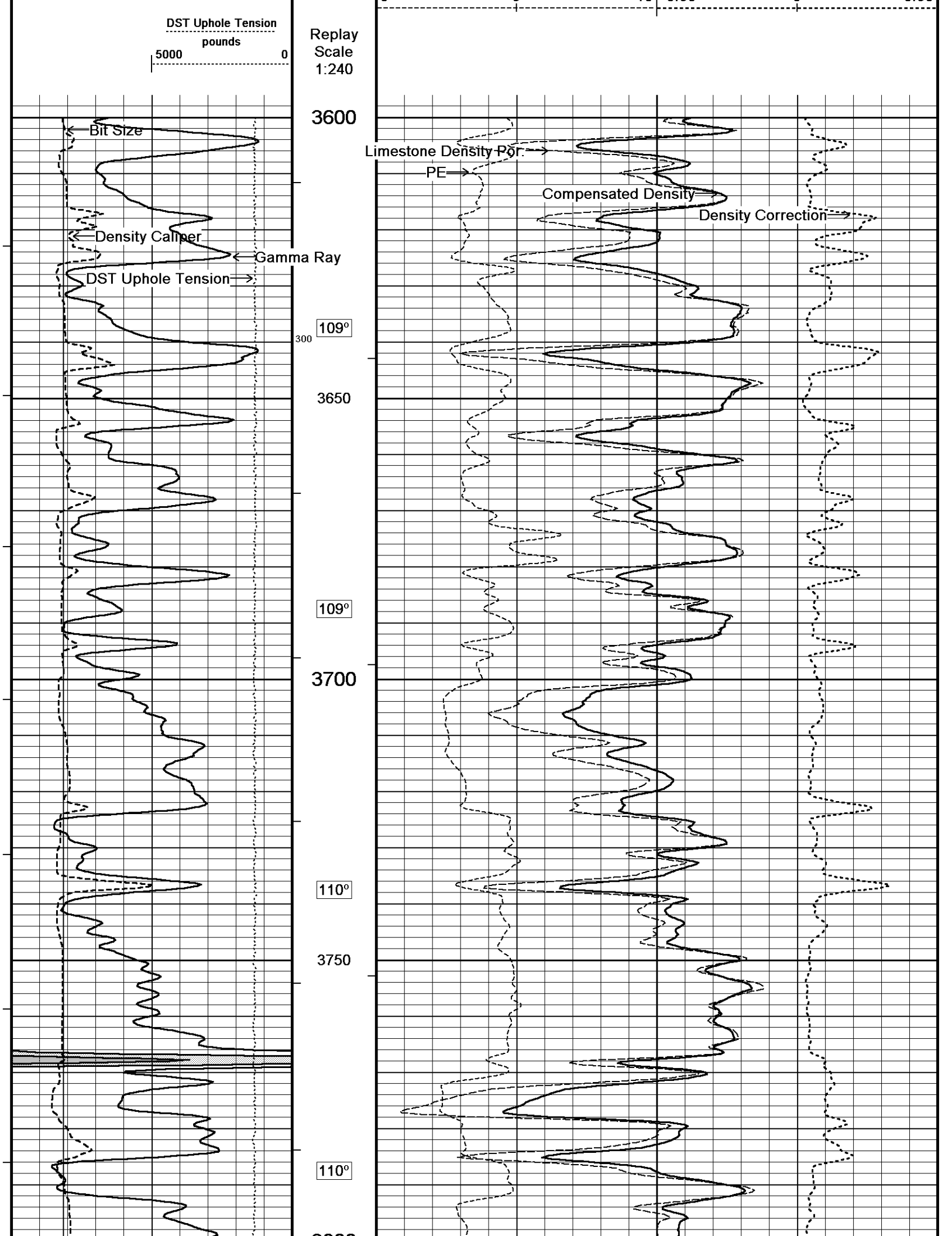
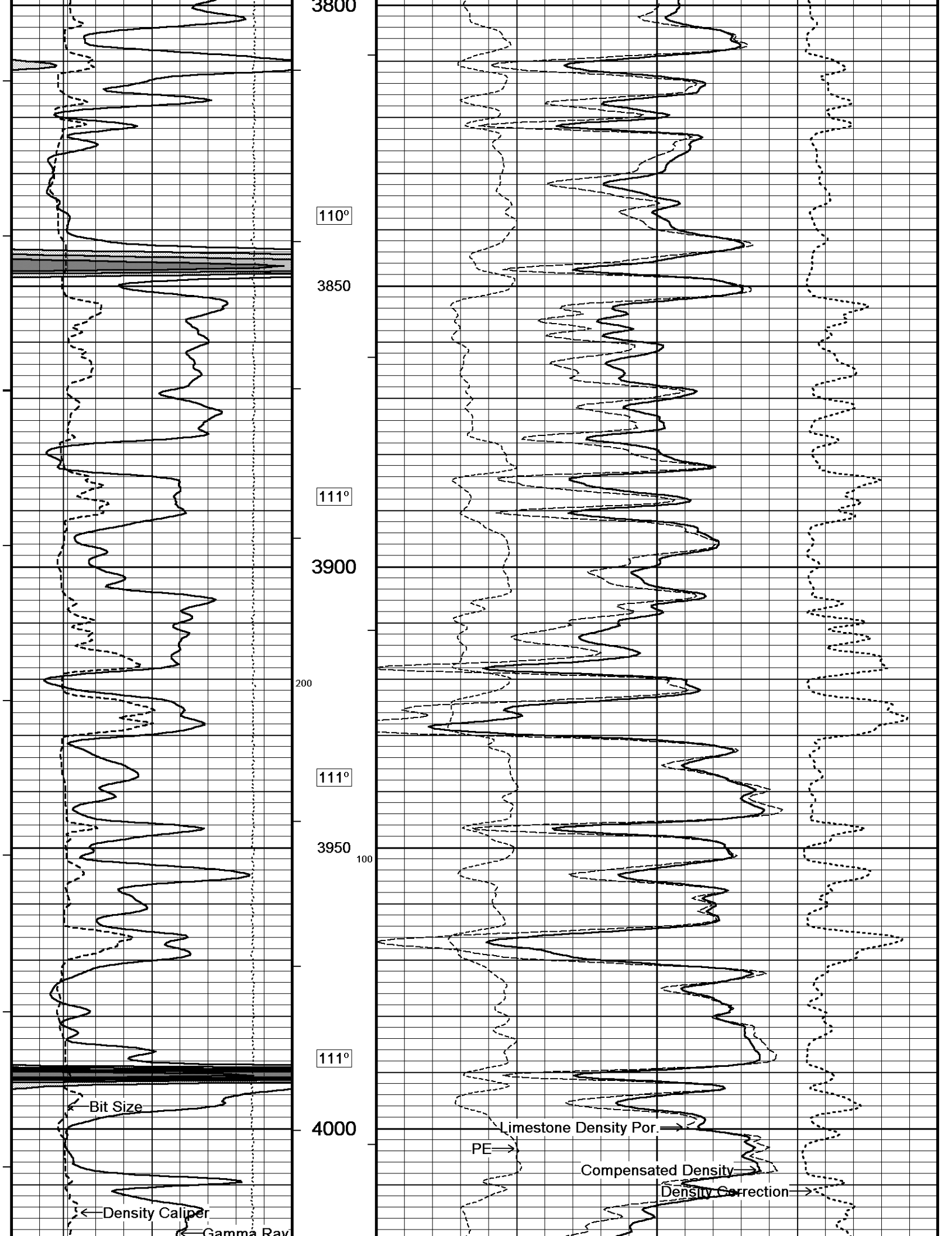
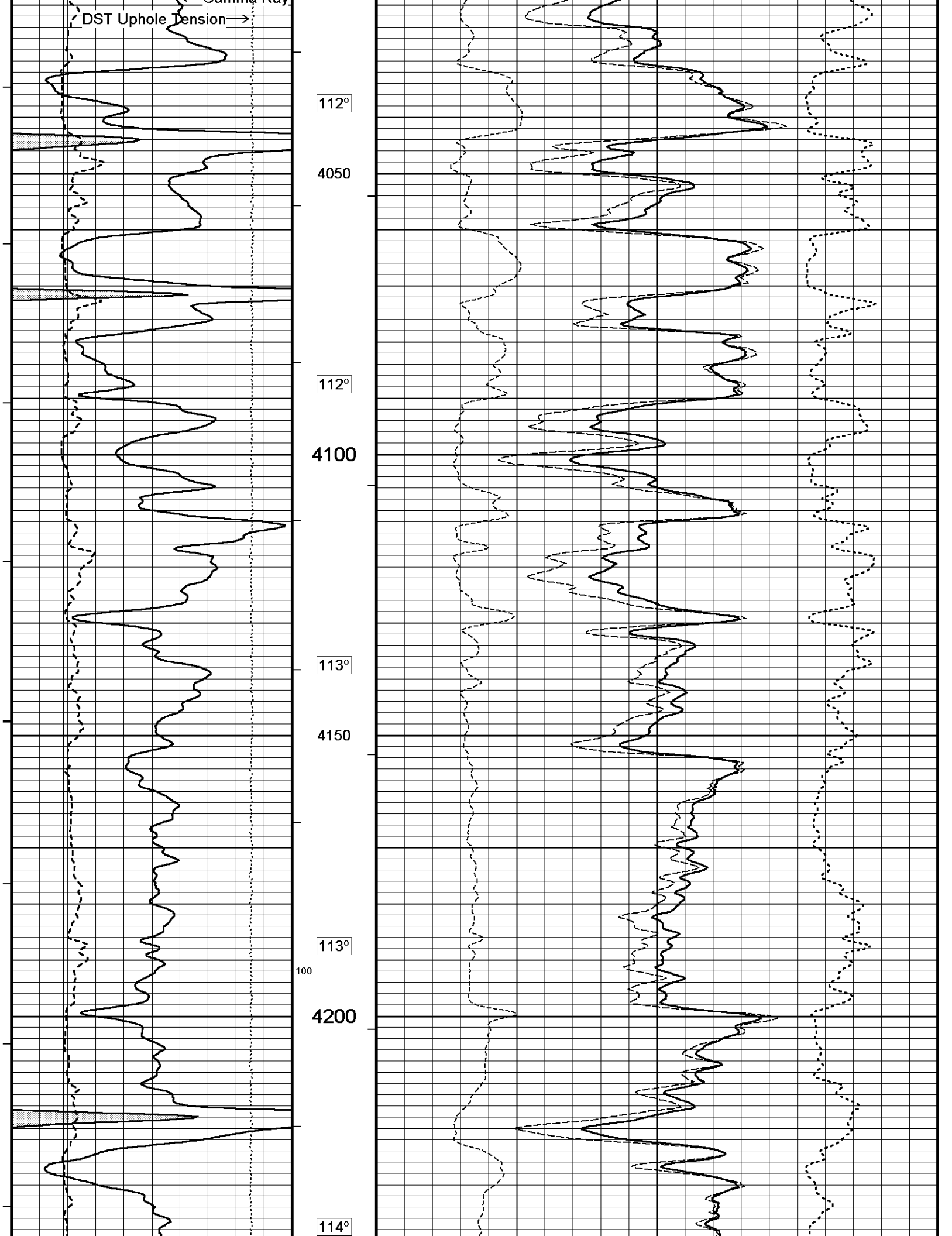
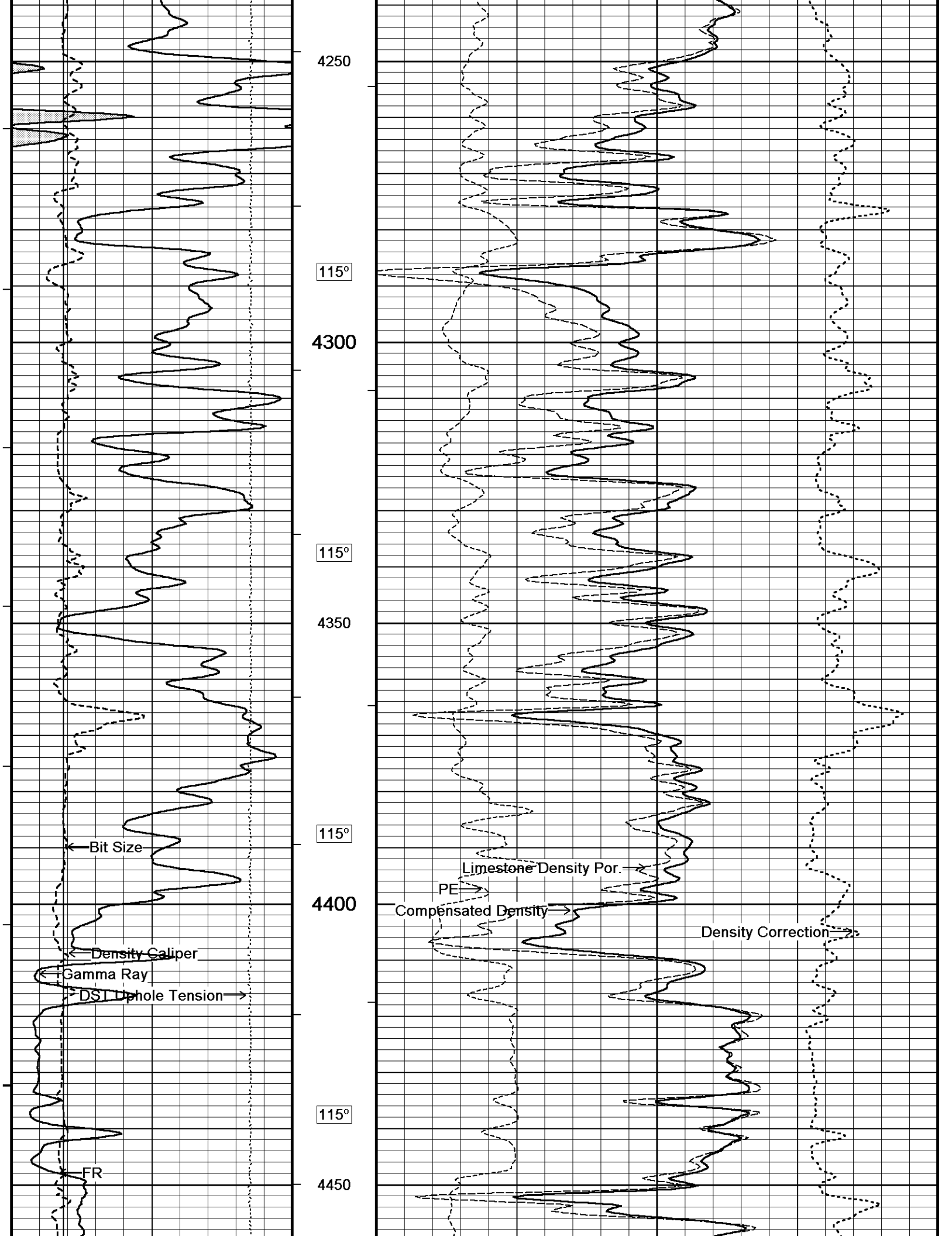
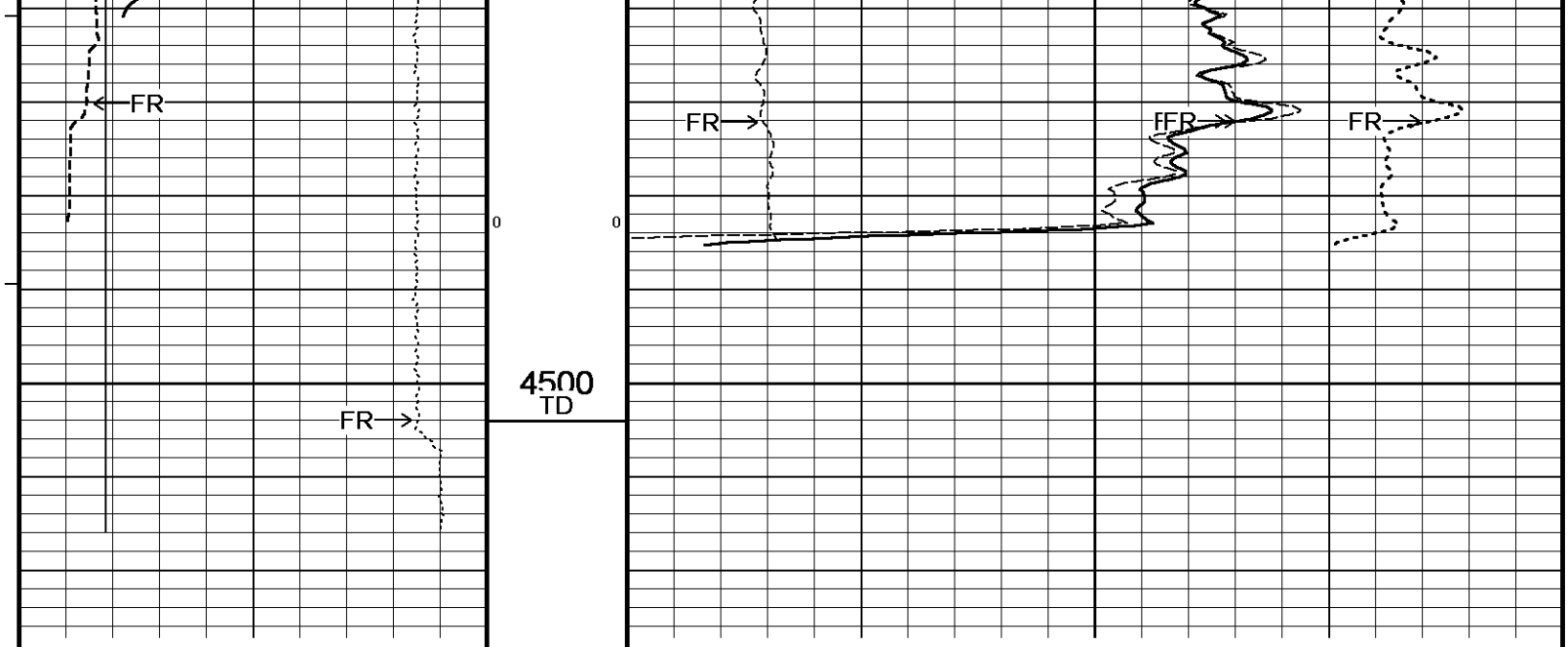



DST Uphole Tension
pounds
5000
0
Replay
Scale
1:240
3600
Bit Size
Density Caliper
Gamma Ray
DST Uphole Tension
Limestone Density Por.
PE
Compensated Density
Density Correction
109°
300
3650
109°
3700
110°
3750
110°


3800
110°
3850
111°
3900
200
111°
3950
100
111°
4000
Bit Size
Density Caliper
Gamma Ray
Limestone Density Por.
PE
Compensated Density
Density Correction


DST Uphole Tension
112°
4050
112°
4100
113°
4150
113°
100
4200
114°


4250
115°
4300
115°
4350
115°
4400
115°
4450
Bit Size
Density Caliper
Gamma Ray
DST Uphole Tension
FR
Limestone Density Por.
PE
Compensated Density
Density Correction



4500
TD

Depth
in
Feet

Timing Marks
every 60.0 sec

Gamma Ray
API
0 75 150
150 225 300

Density Caliper
inches
6 11 16

Bit Size
inches
6 11 16

DST Uphole Tension
pounds
5000 0

Borehole
Temp in
deg F

HVI
every
10 cu ft

Annular
Integral
every
10 cu ft

Replay
Scale
1:240

Compensated Density
grams/cc
2 2.25 2.50 2.75 3

Limestone Density Por.
percent
30 20 10 0 -10

PE
barns/electron
0 5 10

Density Correction
grams/cc
-0.50 0 0.50

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

REPEAT SECTION

Depth Based Data - Maximum Sampling Increment 10.0cm
Plotted on 16-SEP-2016 14:38

Filename: C:\Minimus 15.03.5939\Logs\Shakespeare Anderso...\Shakespeare Anderson #1-33_001.dta Recorded on 16-SEP-2016 11:32
System Versions: Logged with 15.03.5939 Plotted with 15.03.5939

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

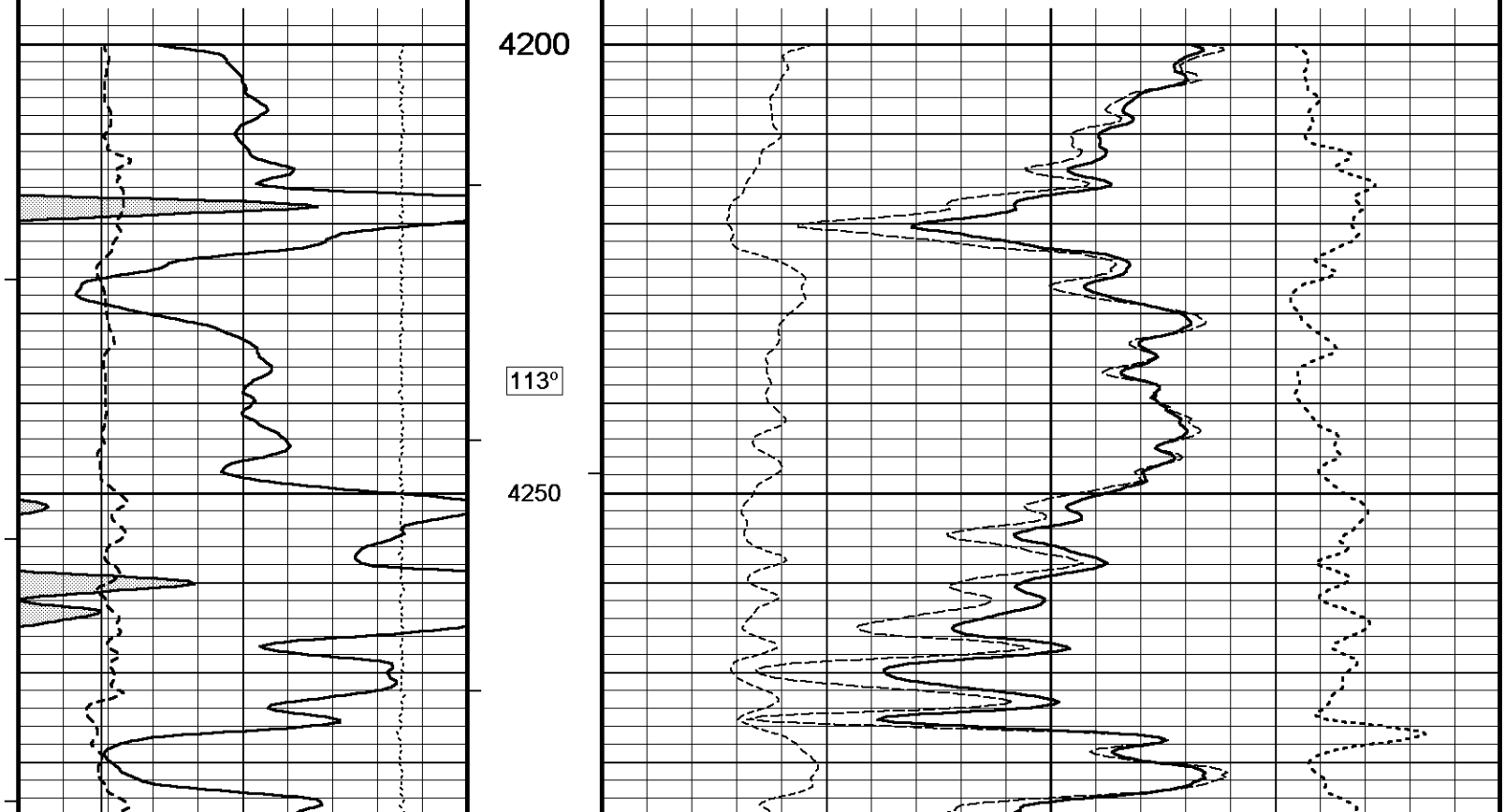
Replay Scale 1:240

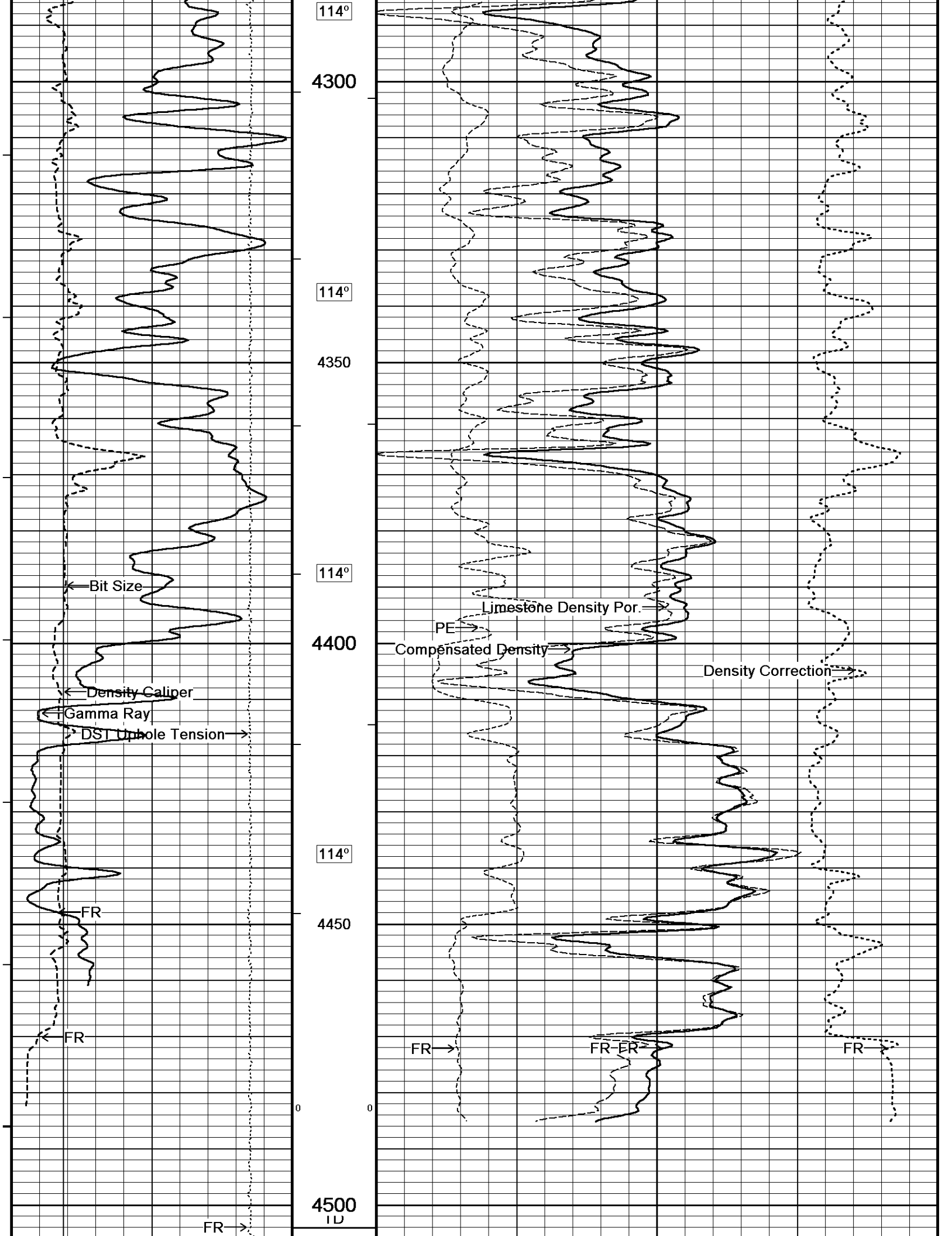
Compensated Density
grams/cc
2 2.25 2.50 2.75 3

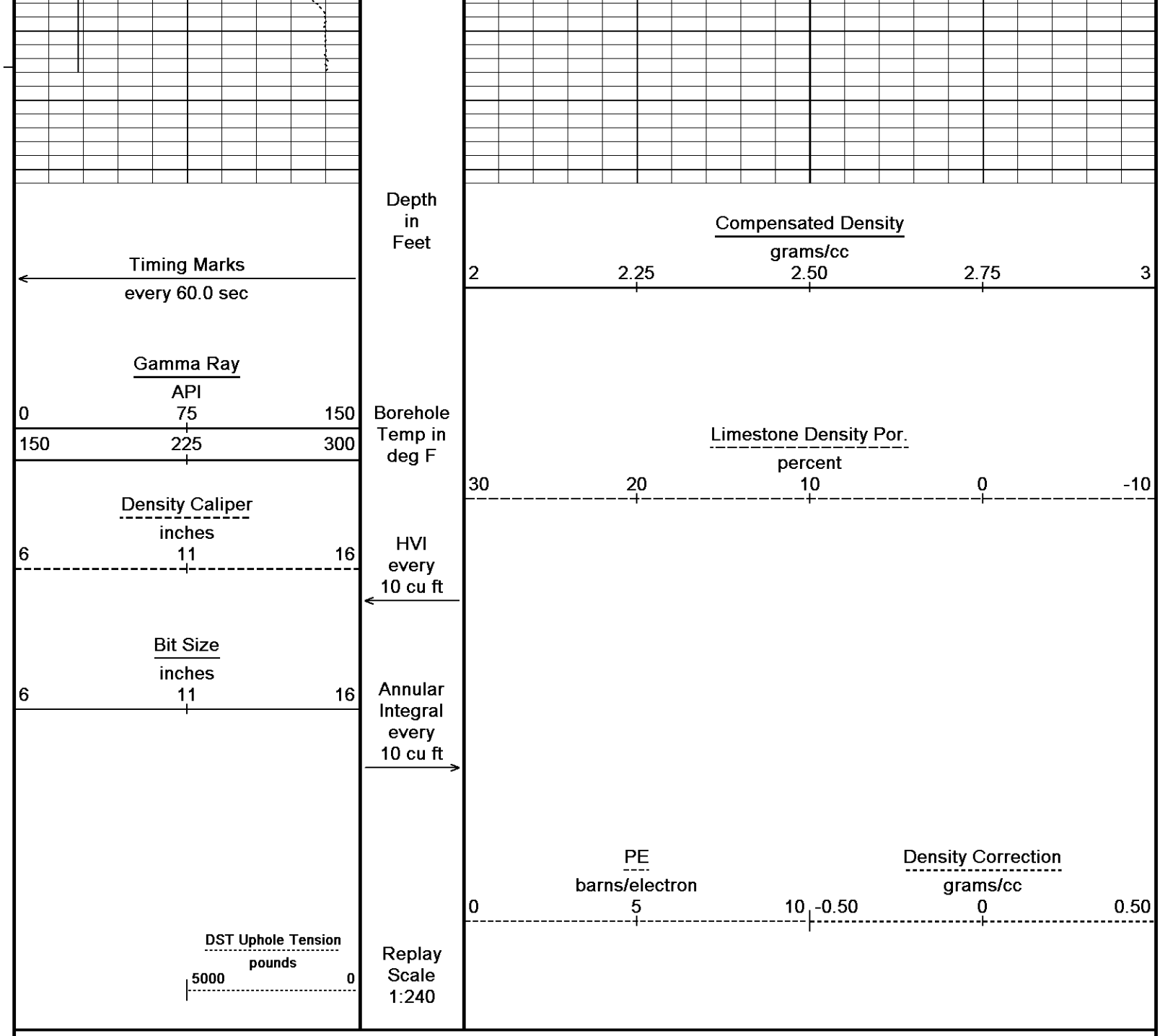
Limestone Density Por.
percent
30 20 10 0 -10

PE
barns/electron
0 5 10

Density Correction
grams/cc
-0.50 0 0.50




114°
4300
114°
4350
114°
Bit Size
4400
Density Caliper
Gamma Ray
DST Uphole Tension
114°
FR
4450
FR
0
0
4500
TD
FR
Limestone Density Por
PE
Compensated Density
Density Correction
FR
FR FR
FR



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REPEAT SECTION

BEFORE SURVEY CALIBRATION

C:\Minimus 15.03.5939\Logs\Shakespeare Anderson #1-33\Shakespeare Anderson #1-33_001.dta

General Constants All 000 — Last Edited on 16-SEP-2016,11:13

General Parameters		
Mud Resistivity	1.450	ohm-metres
Mud Resistivity Temperature	75.000	degrees F
Water Level	0.000	feet
Borehole Fluid Processing	Wet Hole	
Hole/Annular Volume and Differential Caliper Parameters		
HVOL Method	Single Caliper	
HVOL Caliper 1	Density Caliper	
HVOL Caliper 2	N/A	
Annular Volume Diameter	5.500	inches

Annular Volume Diameter	5.500	Inches
Caliper for Differential Caliper	None	

Rwa Parameters

Porosity used	Limestone Density Por.
Resistivity used	Array Ind. One Res Rt
RWA Constant A	0.610
RWA Constant M	2.150
SW/APOR Tool Source	0.000

Down-hole Tension Calibration SMS 0

Field Calibration on 24-JUL-2016 15:20

Reading No	Measured	Calibrated (lbs)
1	15235.81	0.00
2	16026.61	481.00

Gamma Calibration MCG-C 123

Field Calibration on 15-SEP-2016 17:04

	Measured	Calibrated (API)
Background	70	48
Calibrator (Gross)	734	504
Calibrator (Net)	664	456

Gamma Calibration Tolerances MCG-C 123

Ratio	1.457	1.40 1.475 1.55	Counts/API

Gamma Constants MCG-C 123

Last Edited on 16-SEP-2016,09:38

Gamma Calibrator Number	MCGGRCC141	
GRC-M Calibrator Jig in Use?	NO	
Inactive Background Jig in Use?	NO	
Mud Density	1.12	gm/cc
Caliper Source for Processing	Density Caliper	
Tool Position	Eccentred	
Potassium Equivalence	Chloride	
K Mud Concentration	0.00	%

High Resolution Temperature Calibration MCG-C 123

Field Calibration on 31-OCT-2015,17:05

	Measured	Calibrated(Deg F)
Lower	50.00	50.00
Upper	100.00	100.00

High Resolution Temperature Constants MCG-C 123

Last Edited on 22-SEP-2015,11:43

Pre-filter Length	11

SP Calibration MCG-C 123

Field Calibration on 14-JUL-2016 12:06

	Measured	Calibrated (mV)
Reference 1	101.2	100.6
Reference 2	-99.1	-99.9

Micro Normal and Micro Inverse Calibration MMR-C.A 247

Base Calibration on 28-AUG-2016 19:13
Field Check on 15-SEP-2016 16:48

Base Calibration

Channel	Measured Resistor 1	Measured Resistor 2	Calibrated (ohm-m) Resistor 1	Calibrated (ohm-m) Resistor 2
Micro Normal	10.2	49.9	5.1	25.6
Micro Inverse	10.0	49.5	3.4	16.9

Channel	Base Check (ohm-m)	Field Check (ohm-m)
Micro Normal	93.6	93.6
Micro Inverse	62.2	62.2

Micro Normal & Micro Inverse Calibration Tolerance MMR-C.A 247

Micro Normal Res. 1	10.2	-5% 10.0 +5%	ohm	Micro Normal Res. 2	49.9	-5% 50.0 +5% ohm
Micro Inverse Res. 1	10.0	-5% 10.0 +5%	ohm	Micro Inverse Res. 2	49.5	-5% 50.0 +5% ohm
Micro Normal Base Check	93.6	-2% 93.19 +2%	ohm-m			
		-2% 62.11 +2%				

Micro Inverse Base Check 62.2 ohm-m

Micro Normal Field Check 93.6 (-2% 93.6 +2%) ohm-m

Micro Inverse Field Check 62.2 (-2% 62.2 +2%) ohm-m

Micro Normal and Micro Inverse Constants MMR-C.A 247

Last Edited on 26-JUN-2016,15:44

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	0.0000	inches

Caliper Calibration MMR-C.A 247

Base Calibration on 28-AUG-2016 19:08
Field Calibration on 15-SEP-2016 16:45

Base Calibration

Reading No	Measured	Calibrator Size (in)
1	14869	5.98
2	18207	7.97
3	21411	9.86
4	25389	11.92
5	0	0.00
6	N/A	N/A

Field Calibration

Measured Caliper (in)	Actual Caliper (in)
7.95	7.97

Caliper Calibration Tolerances MMR-C.A 247

Short Arm Field Cal. 7.95 (7.77 7.97 8.17) in

Micro-Resistivity Caliper Constants MMR-C.A 247

Last Edited on

Sonde Configuration Resistivity Mode

Neutron Calibration MDN-A.B 66

Base Calibration on 22-MAY-2016,18:15
Field Check on 15-SEP-2016 17:26

Base Calibration

	Measured		Calibrated (cps)	
	Near	Far	Near	Far
	3116	97	3714	110
Ratio	32.277		33.764	

Field Calibrator at Base

	Calibrated (cps)	
	2061	3028
Ratio	0.681	

Field Check

	Calibrated (cps)	
	2173	3105
Ratio	0.700	

Neutron Calibration Tolerances MDN-A.B 66

Ratio 32.277 (-5% 33 +5%)

Base Check 0.681 (0.65 0.7 0.75)

Field Check 0.700 (0.661 0.681 0.701)

Neutron Constants MDN-A.B 66

Last Edited on 16-SEP-2016,09:38

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-B.J 352

Base Calibration on 28-AUG-2016 18:58
Field Check on 15-SEP-2016 16:35

Base Calibration

	Measured	Calibrated (ohm-m)
Reference 1	0.0	0.0
Reference 2	963.3	126.8
Base Check		281.3
Field Check		281.4

FE Calibration Tolerances MFE-B.J 352

Reference 2	963.3	-3% 980.0 +3%	ohm
Base Check	281.3	-2% 277.0 +2%	ohm-m
Field Check	281.4	-2% 281.3 +2%	ohm-m

FE Constants MFE-B.J 352

Last Edited on 16-SEP-2016,09:37

Running Mode	No Sleeve	
MFE K Factor	0.1268	
Borehole Correction Constants		
Sonde Position	0.5	inches
Hole Size Source	Density Caliper	
Hole Size Constant Value	N/A	inches
Rm Source	Global Value: Temperature Corrected	
Temp. for Rm Corr.	MCG External Temperature	

Sonic Constants MSS-A.A 55

Last Edited on 16-SEP-2016,09:37

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

Sonde Parameters

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

Peak Amplitude Source N/A

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

Processed Fixed Gate Parameters

Waveform Used For Processing N/A

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

Full Waveform Parameters

Use 3' Waveform to derive TR	N/A	
Use 4' Waveform to derive TR	N/A	
Use 5' Waveform to derive TR	N/A	
Use 6' Waveform to derive TR	N/A	
3' Waveform Discriminator Level	N/A	mV
4' Waveform Discriminator Level	N/A	mV
5' Waveform Discriminator Level	N/A	mV
6' Waveform Discriminator Level	N/A	mV
3' Waveform Filter	N/A	
4' Waveform Filter	N/A	
5' Waveform Filter	N/A	
6' Waveform Filter	N/A	
Semblance Level	N/A	
Semblance Window Width	N/A	micro-sec
Sonic 1 Despiker	N/A	N/A
Sonic 2 Despiker	N/A	N/A

Induction Calibration MAI-A.A 111

Base Calibration on 05-AUG-2014,09:34
Field Check on 15-SEP-2016 16:34

Base Calibration

Test Loop Calibration

Channel	Measured Low	Measured High	Calibrated (mmho/m) Low	Calibrated (mmho/m) High
1	17.6	473.6	9.3	966.2
2	6.4	385.9	7.6	821.4
3	3.2	264.0	5.2	566.0
4	2.1	135.5	2.6	279.2

Array Temperature 23.0 Deg F

Test Loop Calibration Verified 22-MAY-2016,17:59

Channel	Base Check (mmho/m) Low	Base Check (mmho/m) High	Field Check (mmho/m) Low	Field Check (mmho/m) High
1	12.1	3873.0	10.9	3868.8
2	29.8	3528.1	28.0	3523.2
3	29.1	3021.3	27.5	3016.8
4	19.1	2058.5	18.0	2055.1
Deep	17.7	1962.1	16.7	1958.8
Medium	43.1	3976.4	40.9	3970.7
Shallow	44.4	5232.7	41.8	5226.0
Array Temperature		65.8		82.2 Deg F

Induction Calibration Tolerances MAI-A.A 111

Low Conductivity 1	17.6	13.0 17.0 21.0	mmho/m	High Conductivity 1	473.6	430.0 475.0 520.0	mmho/m
Low Conductivity 2	6.4	4.5 6.0 7.5	mmho/m	High Conductivity 2	385.9	345.0 385.0 425.0	mmho/m
Low Conductivity 3	3.2	1.0 3.5 6.0	mmho/m	High Conductivity 3	264.0	240.0 260.0 280.0	mmho/m
Low Conductivity 4	2.1	0.0 2.0 4.0	mmho/m	High Conductivity 4	135.5	120.0 135.0 150.0	mmho/m
Background Vx 1	0.0	-110.0 -32.5 45.0	mmho/m	Phase Check Loop 1	0.0	-2.0 0.0 2.0	%
Background Vx 2	0.0	-35.0 20.0 75.0	mmho/m	Phase Check Loop 2	0.0	-2.0 0.0 2.0	%
Background Vx 3	0.0	-60.0 2.5 65.0	mmho/m	Phase Check Loop 3	0.0	-2.0 0.0 2.0	%
Background Vx 4	0.0	-50.0 -17.5 15.0	mmho/m	Phase Check Loop 4	0.0	-2.0 0.0 2.0	%

Induction Constants MAI-A.A 111

Last Edited on 16-SEP-2016,09:37

Induction Model	RtAP-WBM	
Borehole Correction Constants		
Tool Centred	No	
Hole Size Source	Density Caliper	
Hole Size Constant Value	N/A	inches
Stand-off Type	Fins	
Stand-off	0.50	inches
Number of Fins on Stand-off	8.0000	
Stand-off Fin Angle	45.00	degrees
Stand-off Fin Width	0.5000	inches
Rm Source	Global Value: Temperature Corrected	
Temp. for Rm Corr.	MCG External Temperature	
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	

High Resolution Temperature Calibration MAI-A.A 111

Field Calibration on 24-NOV-2014,10:23

	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

Photo Density Calibration MPD-B 104

Base Calibration on 28-AUG-2016 20:24
Field Check on 15-SEP-2016 16:42

Density Calibration

Base Calibration	Measured		Calibrated (sdu)	
	Near	Far	Near	Far
Background	1145	1339		
Reference 1	49665	24007	59556	30836
Reference 2	20032	2442	24941	2541
Field Check at Base	1144.9	1338.6		
Field Check	1140.3	1322.0		

PE Calibration

Base Calibration	WS	Measured WH	Ratio	Calibrated Ratio
Background	211	1021		
Reference 1	20773	49486	0.424	0.371
Reference 2	5807	19899	0.296	0.272

Field Check at Base		
	211.3	1021.2

Field Check		
	208.3	1017.9

Photo Density Calibration Tolerances MPD-B 104

		-5%		+5%
Near Density Ratio	2.57		2.52	
PE Calibration	0.119	0.089	0.110	0.131
Far Density Ratio	20.54		21.00	
Near Den. Field Check	1140.3	-3%	1144.9	+3%
PE WS Field Check	208.3	-6%	211.3	+6%
Far Den. Field Check	1322.0	-3%	1338.6	+3%
PE WH Field Check	1017.9	-6%	1021.2	+6%

Density Constants MPD-B 104

Last Edited on 16-SEP-2016,09:37

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	1.12	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 104

Base Calibration on 28-AUG-2016 19:51
Field Calibration on 15-SEP-2016 16:36

Base Calibration

Reading No	Measured	Calibrator Size (in)
1	13646	3.99
2	22688	5.98
3	31297	7.97
4	39521	9.86
5	48608	11.92
6	N/A	N/A

Field Calibration

Measured Caliper (in)	Actual Caliper (in)
7.90	7.97

Caliper Calibration Tolerances MPD-B 104

		7.77	7.97	8.17	
Short Arm Field Cal.	7.90				in

DOWNHOLE EQUIPMENT

Cablehead, 11 pin
CBH-CA 176 LG: 2.40 ft WT: 24.3 lb OD: 2.244 in

Compact Comms Gamma
MCG-C 123 LG: 8.70 ft WT: 63.9 lb OD: 2.244 in

Compact Micro-Resistivity
MMR-C.A 247 LG: 8.59 ft WT: 81.6 lb OD: 4.882 in

Compact Neutron
MDN-A.B 66 LG: 5.04 ft WT: 50.7 lb OD: 2.244 in

Compact Density/Caliper
MPD-B 104 LG: 9.59 ft WT: 90.4 lb OD: 2.449 in

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

Compact Sonic
MSS-A.A 55 LG: 12.52 ft WT: 72.8 lb OD: 2.244 in

Compact Induction
MAI-A.A 111 LG: 10.81 ft WT: 48.5 lb OD: 2.244 in

Total Length: 63.70 ft Weight: 480.6 lb

56.02 ft	GRGC - MCG Gamma Ray
53.11 ft	CGXT - MCG External Temperature
46.76 ft	MBTC - MMR Caliper
45.76 ft	MINV - MMR MicroLog Inverse
45.76 ft	MNRL - MMR MicroLog Normal
40.97 ft	NPRL - Limestone Neutron Por.
33.73 ft	AVOL - Annular Volume
33.73 ft	HVOL - Hole Volume
33.73 ft	CLDC - Density Caliper
31.80 ft	DPRL - Limestone Density Por.
31.80 ft	DEN - Compensated Density
31.80 ft	DCOR - Density Correction
31.74 ft	PDPE - PE
26.24 ft	FEFE - Shallow FE
16.96 ft	TR11 - 4' Transit Time
16.46 ft	TR21 - 3' Transit Time
15.95 ft	TR12 - 6' Transit Time
15.46 ft	TR22 - 5' Transit Time
12.96 ft	SPRL - Wyllie Lime. Sonic Por.
12.96 ft	DT35 - 3-5' Compensated Sonic
3.34 ft	R40O - Array Ind. One Res 40
3.34 ft	R60O - Array Ind. One Res 60
3.34 ft	CTAO - Array Ind. One Cond Ct
3.34 ft	RTAO - Array Ind. One Res Rt
0.23 ft	SPCG - Spontaneous Potential
Tool Zero	(0.13ft from bottom)
-0.13 ft	SMTU - DST Uphole Tension

All measurements relative to tool zero.

COMPANY	SHAKESPEARE OIL CO., INC.
WELL	ANDERSON #1-33
FIELD	WILDCAT
PROVINCE/COUNTY	DECATUR
COUNTRY/STATE	U.S.A. / KANSAS

Elevation Kelly Bushing	2784.00	feet	First Reading	4472.00	feet
Elevation Drill Floor	2782.00	feet	Depth Driller	4500.00	feet
Elevation Ground Level	2776.00	feet	Depth Logger	4504.00	feet

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