



Weatherford[®]

**COMPACT PHOTO DENSITY
COMPENSATED NEUTRON
MICRORESISTIVITY LOG**

COMPANY	SHAKESPEARE OIL CO.		
WELL	CAMPBELL #3-17		
FIELD	WILDCAT		
PROVINCE/COUNTY LOGAN	U.S.A. / KANSAS		
COUNTRY/STATE	1855' FSL & 1726' FEL		
LOCATION	1855' FSL & 1726' FEL		
SEC	TWP	RGE	Other Services
17	13S	32W	MAI/MFE
API Number	15-109-21218		
Permit Number			
Permanent Datum G.L., Elevation 3029 feet			
Log Measured From KB			
Drilling Measured From K.B. @ 10 FEET			
Date	25-NOV-2013		
Run Number	ONE		
Service Order	3547649		
Depth Driller	4715.00 feet		
Depth Logger	4710.00 feet		
First Reading	4691.00 feet		
Last Reading	3715.00 feet		
Casing Driller	227.00 feet		
Casing Logger	222.00 feet		
Bit Size	7.875 inches		
Hole Fluid Type	CHEMICAL		
Density / Viscosity	9.10 lb/USg	44.00 CP	
PH / Fluid Loss	10.00	8.00 ml/30Min	
Sample Source	FLOWLINE		
Rm @ Measured Temp	0.97 @ 81.0	ohm-m	
Rmf @ Measured Temp	0.77 @ 81.0	ohm-m	
Rmc @ Measured Temp	1.16 @ 81.0	ohm-m	
Source Rmf / Rmc	CALC	CALC	
Rm @ BHT	0.77 @ 109.0	ohm-m	
Time Since Circulation	4 HOURS		
Max Recorded Temp	109.00	deg F	
Equipment / Base	13096	LIB	
Recorded By	R.HOFFMAN		
Witnessed By	TIM PRIEST		
JOB #	LB13-335		

Elevations:	feet
KB	3039.00
DF	3037.00
GL	3029.00

BOREHOLE RECORD Last Edited: 25-NOV-2013 04:00

Bit Size inches	Depth From feet	Depth To feet
7.875	227.00	4715.00

CASING RECORD

Type	Size inches	Depth From feet	Shoe Depth feet	Weight pounds/ft
SURFACE	8.625	0.00	227.00	24.00

REMARKS

- SOFTWARE ISSUE: WLS 13.05.9583.
- 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.
- 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: 1871 CU. FT.
- ANNULAR HOLE VOLUME WITH 5.5 INCH CASING FROM TD TO SURFACE CASING: 248 CU. FT.
- SERVICE ORDER # 3547649

- RIG: HD DRILLING #2.

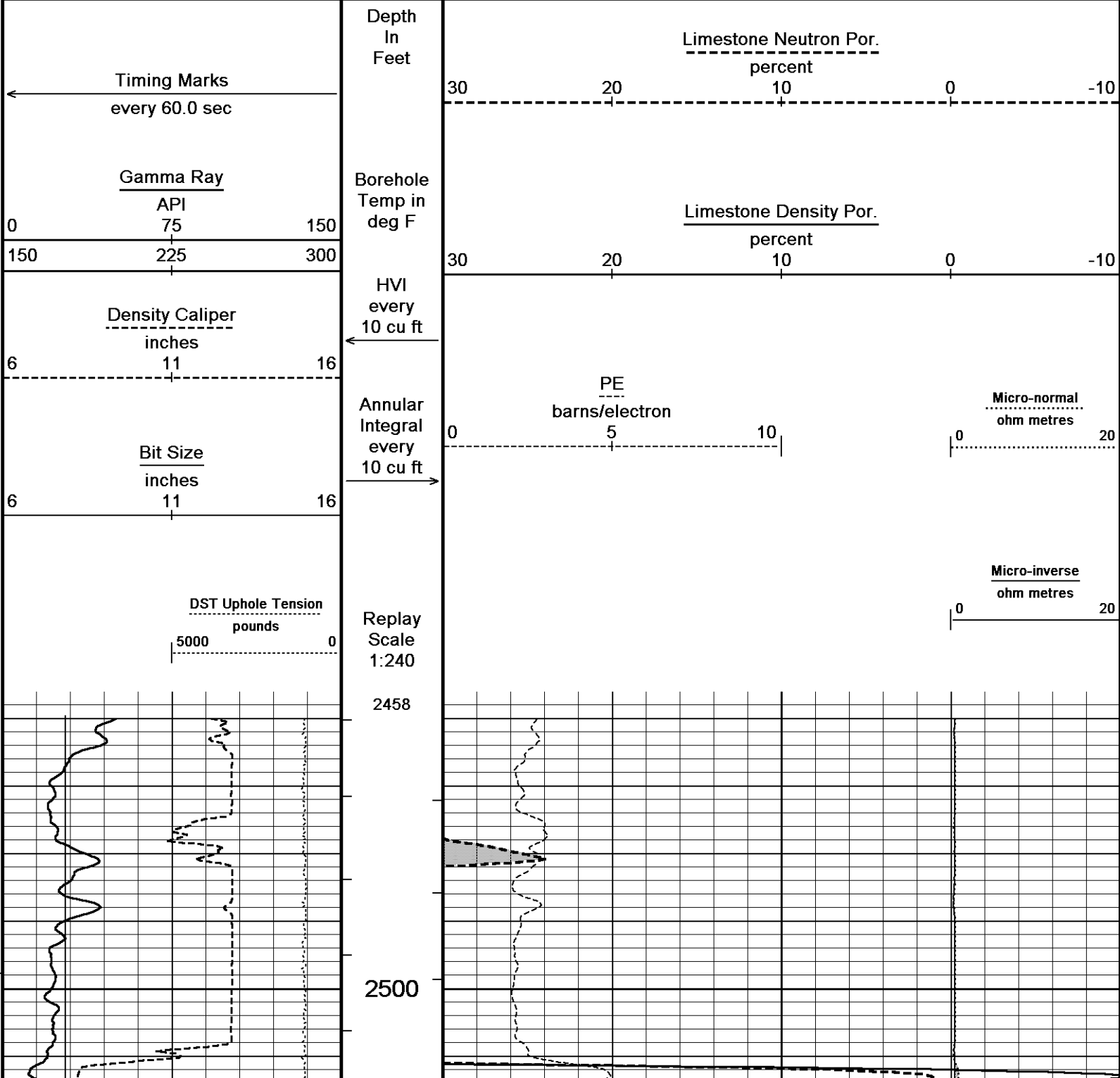
- ENGINEER: ROB HOFFMAN

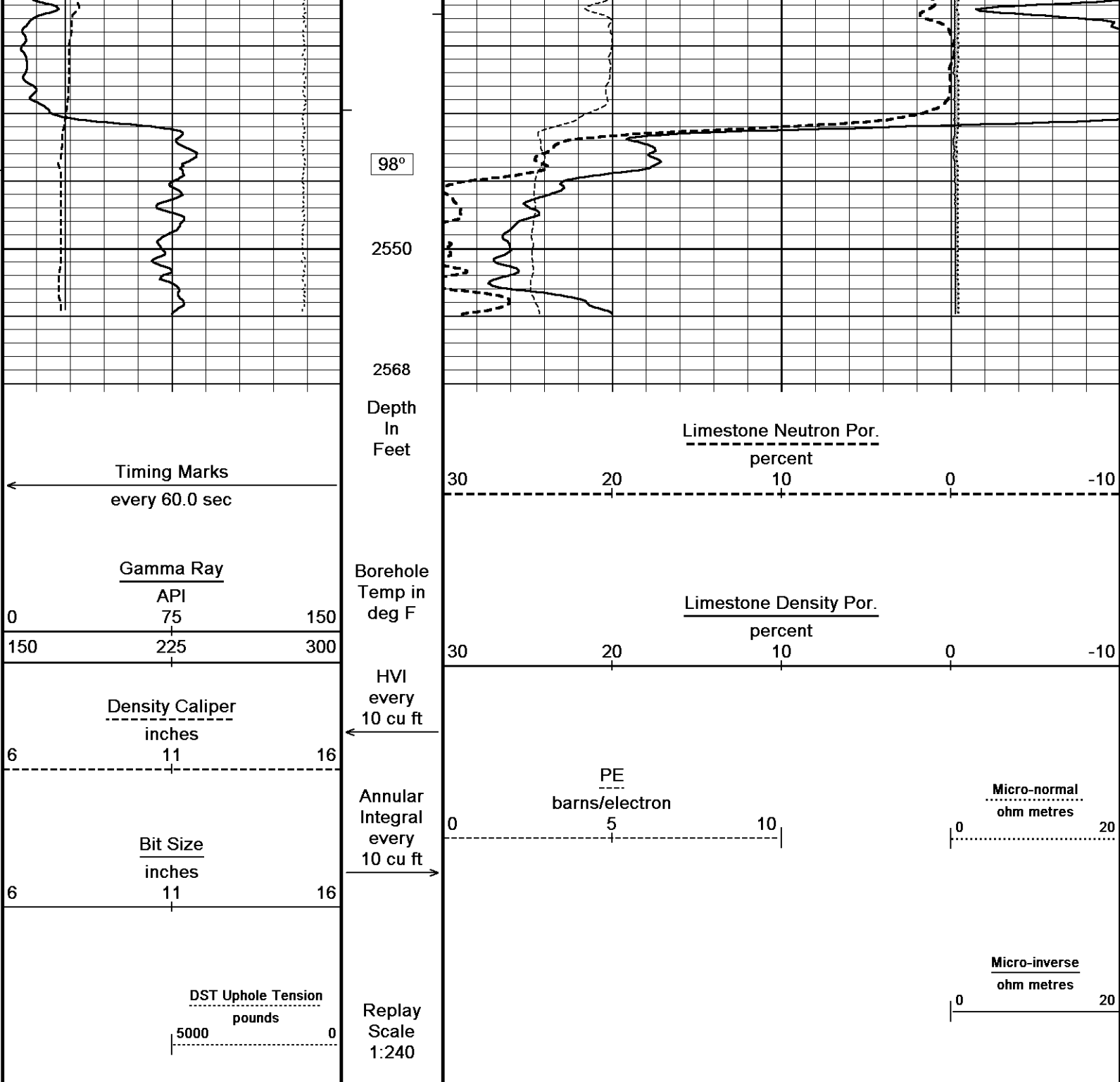
- OPERATOR(S): J. DUNLAP, S. MENDEZ

All interpretations are opinions based on inferences from electrical or other measurements and we cannot, and do not, guarantee the accuracy or correctness of any interpretations, and we shall not, except in the case of gross or wilful negligence on our part, be liable or responsible for any loss, costs, damages or expenses incurred or sustained by anyone resulting from any interpretation made by any of our officers, agents or 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 25-NOV-2013 09:21
 Filename: C:\Minimus 13.05.9583\Log\Shakespeare Campbell...\Shakespeare Campbell #3-17 Main.dta Recorded on 25-NOV-2013 06:37
 System Versions: Logged with 13.05.9583 Plotted with 13.05.9583



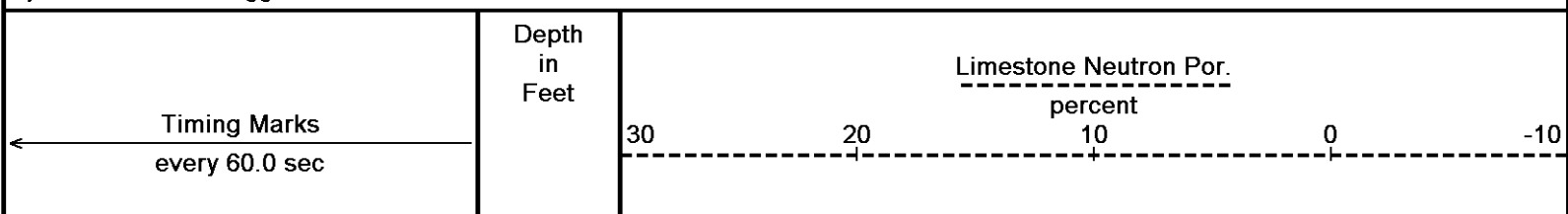


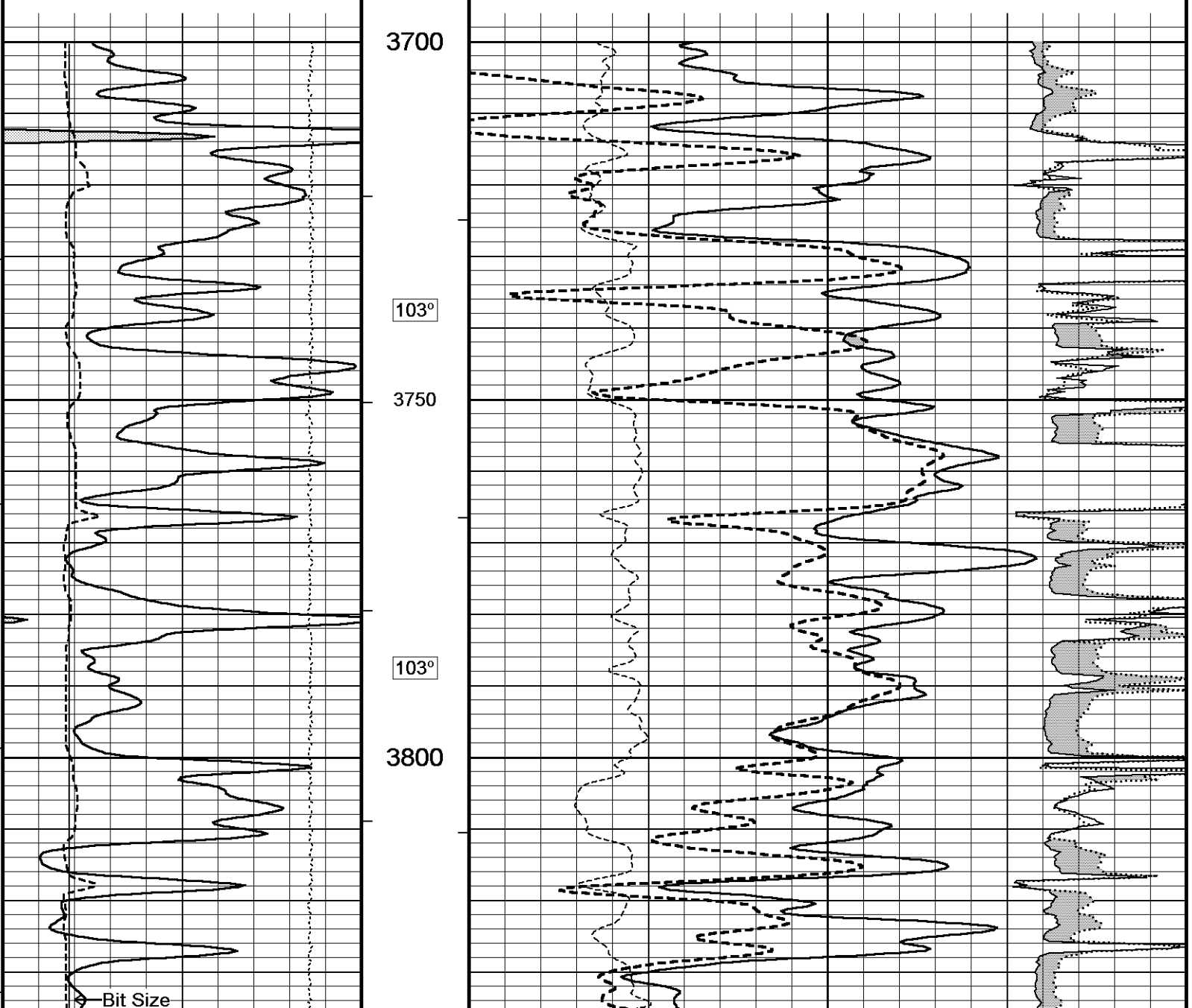
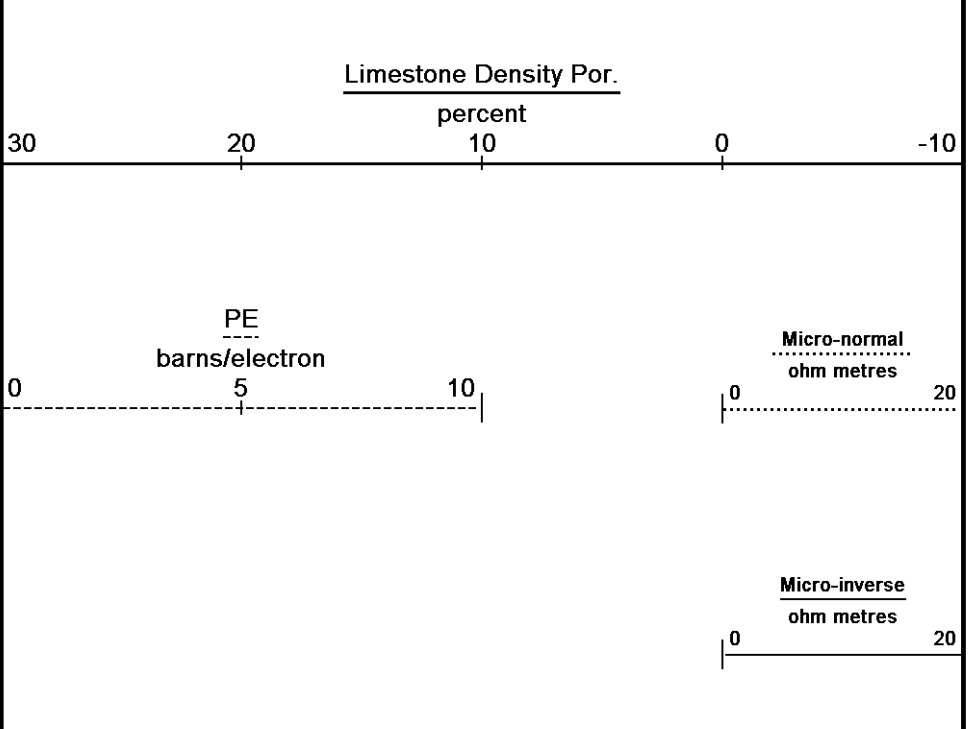
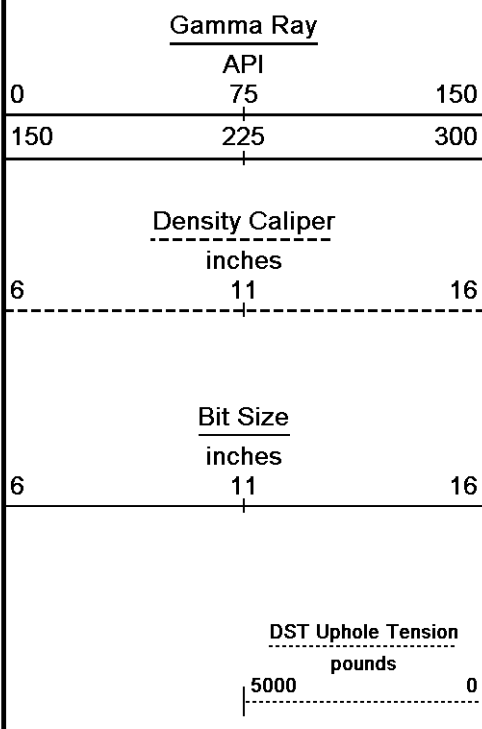
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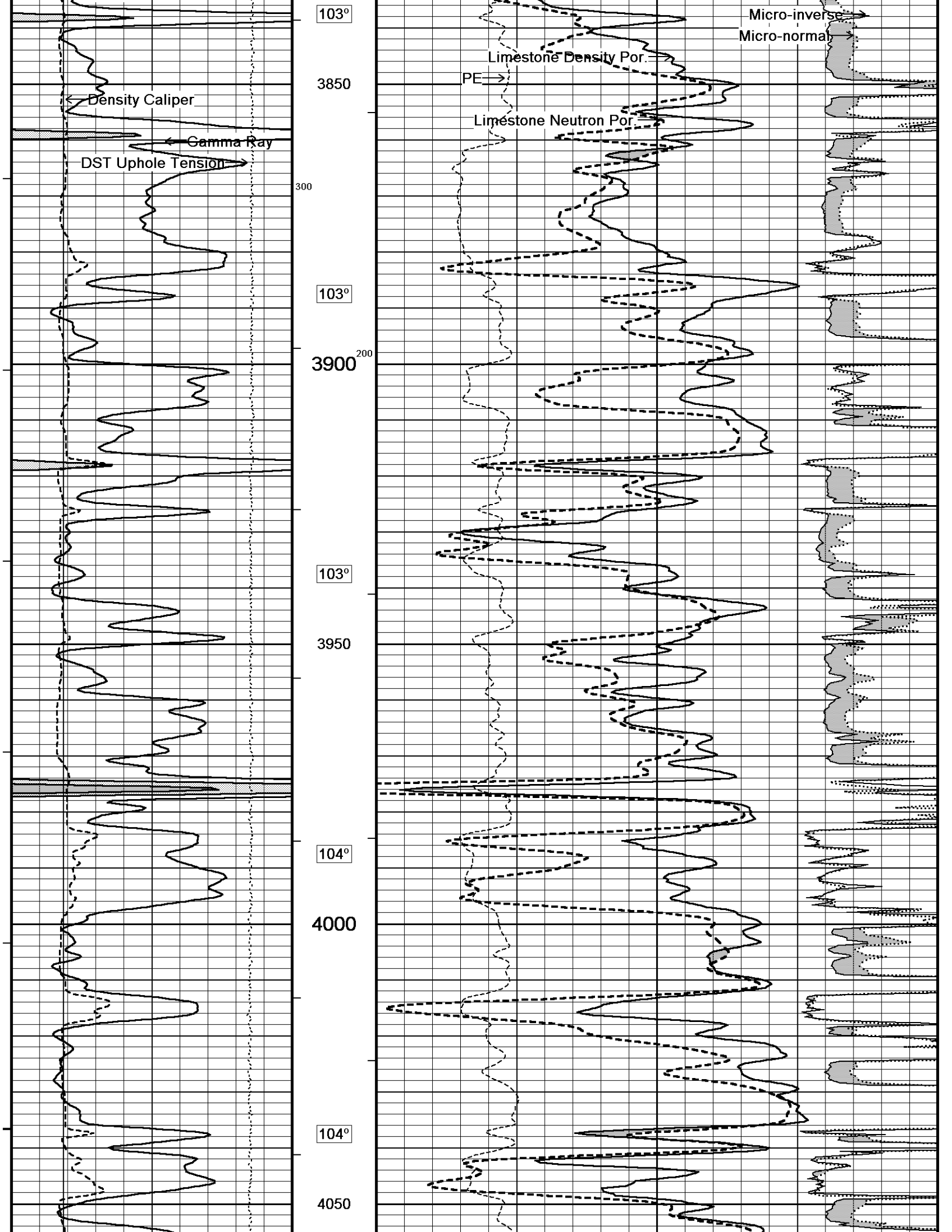
↑ 5 INCH MAIN ↑

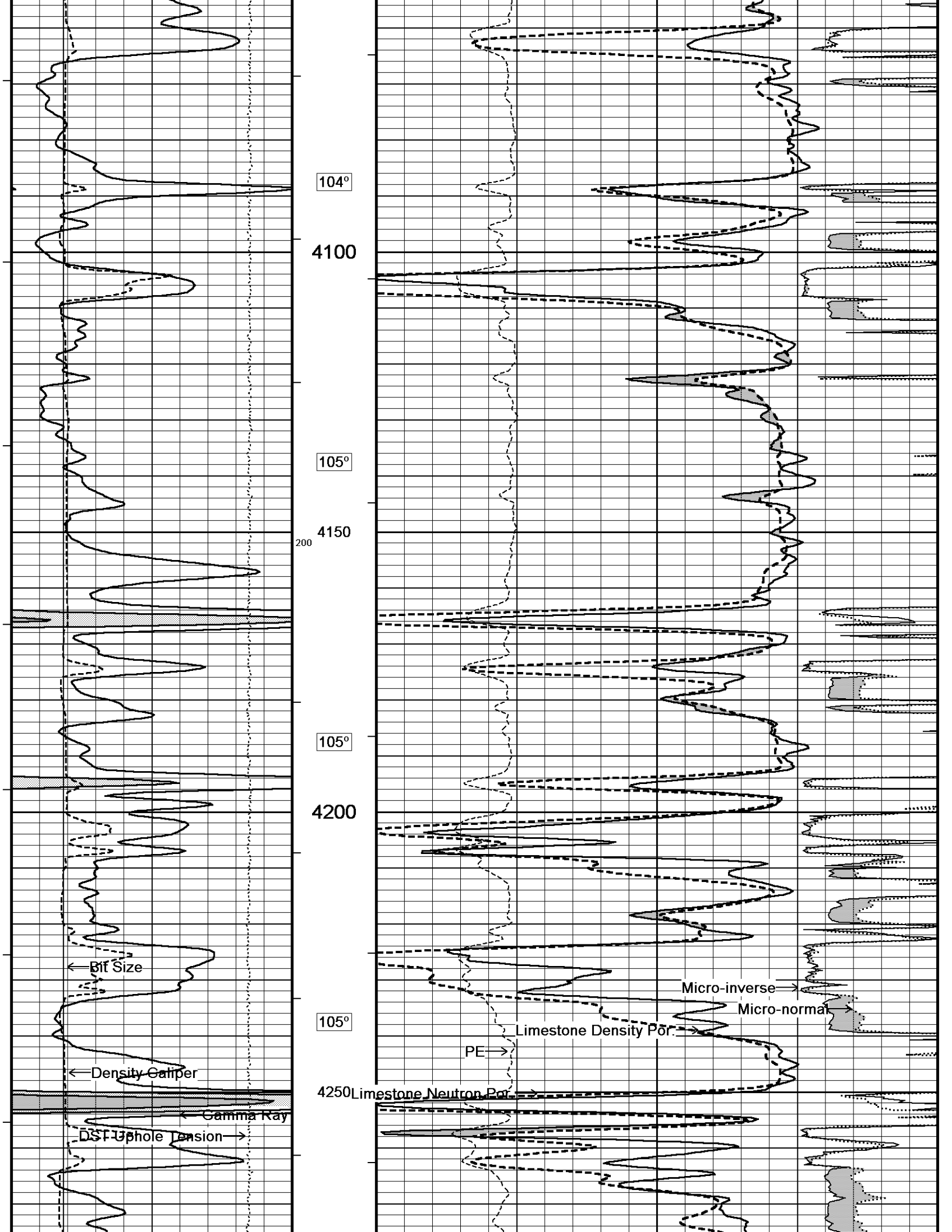
↓ 5 INCH MAIN ↓

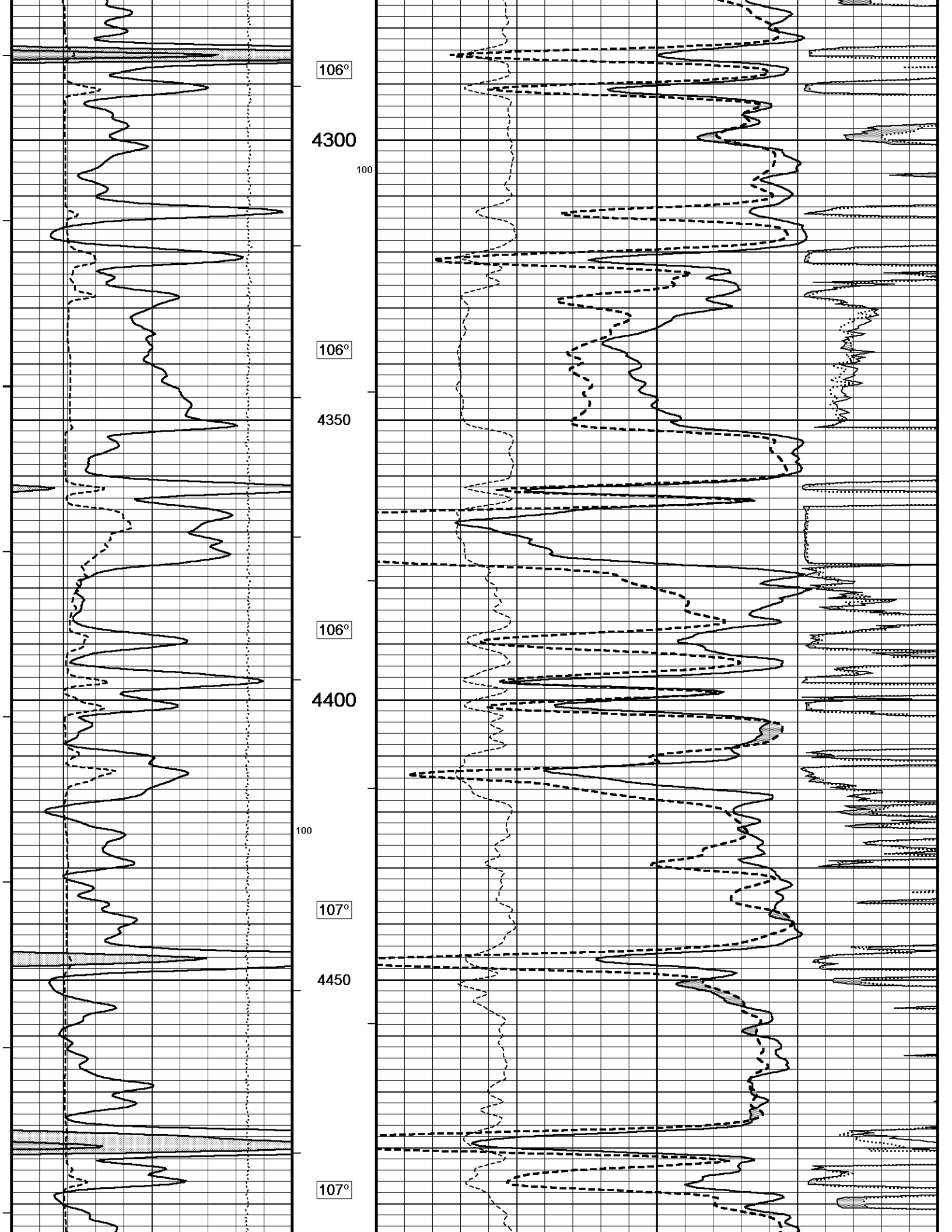
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 Filename: C:\Minimus 13.05.9583\Log\Shake...\Shakespeare Campbell #3-17 Main spooled section.dta Recorded on 25-NOV-2013 07:17
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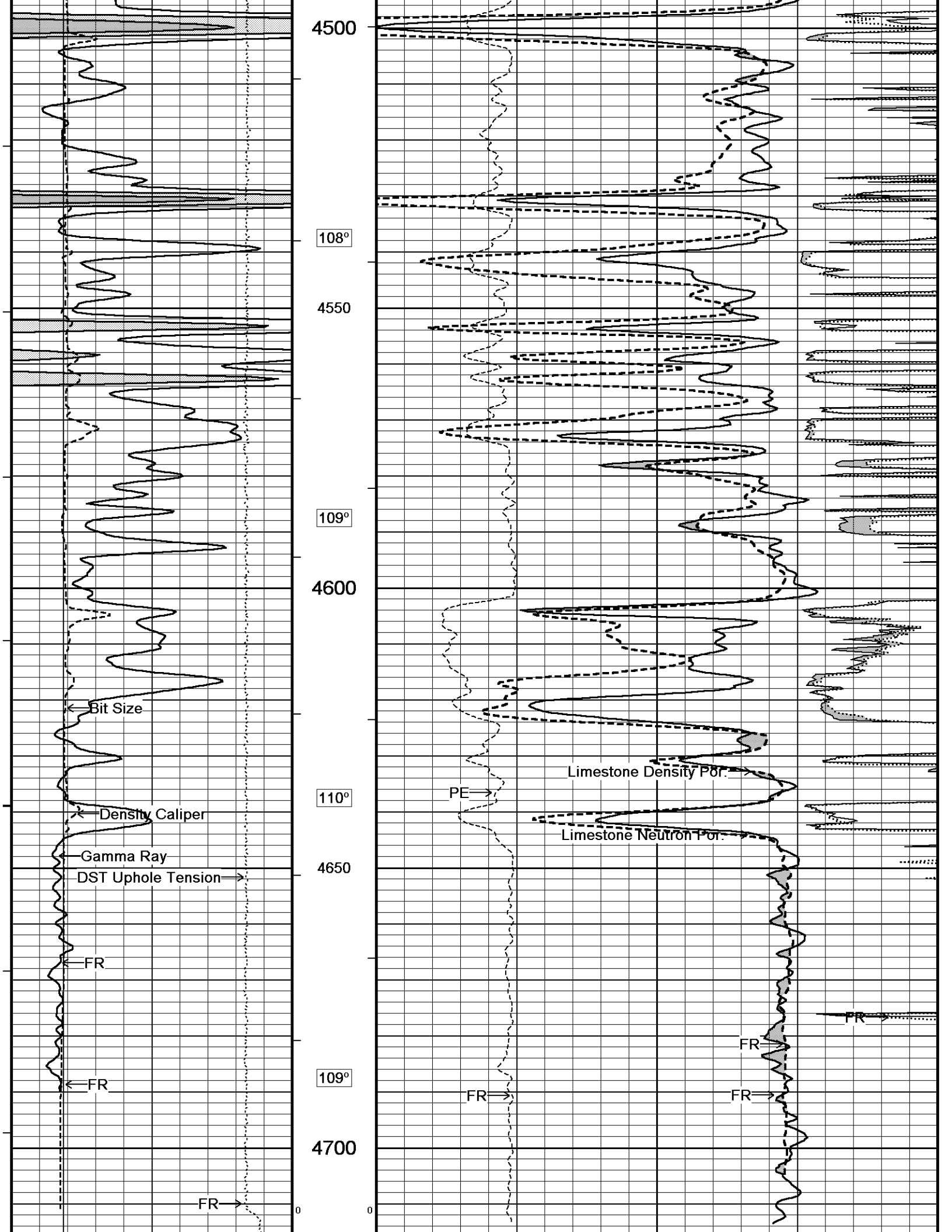


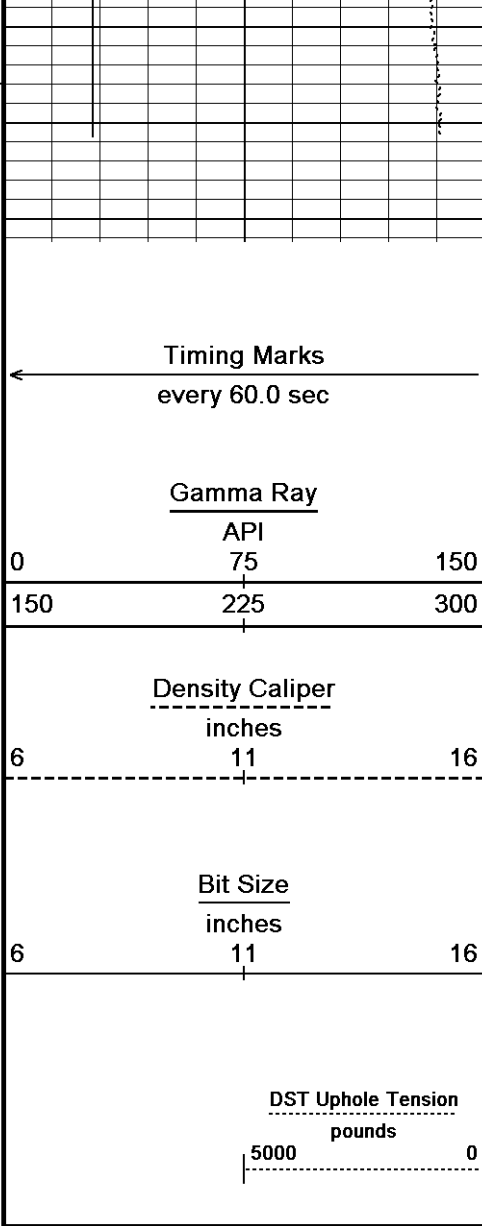












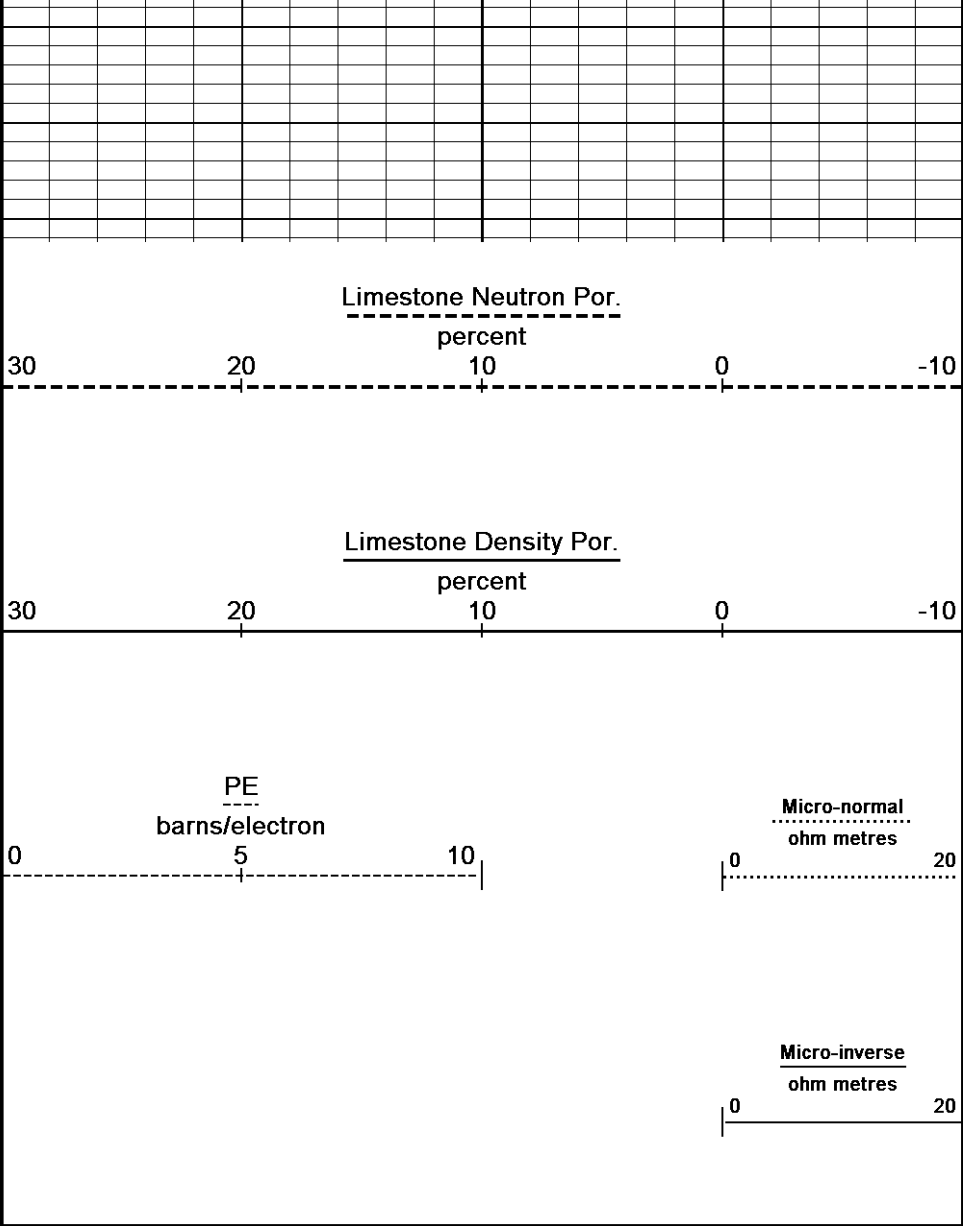
4740
Depth in Feet

Borehole Temp in deg F

HVI every 10 cu ft

Annular Integral every 10 cu ft

Replay Scale 1:240

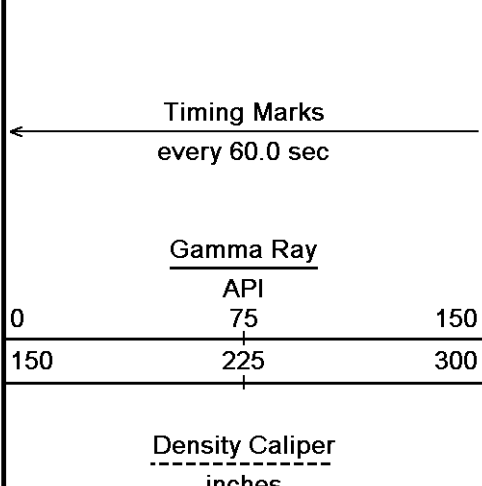


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↑ 5 INCH MAIN ↑

↓ REPEAT SECTION ↓

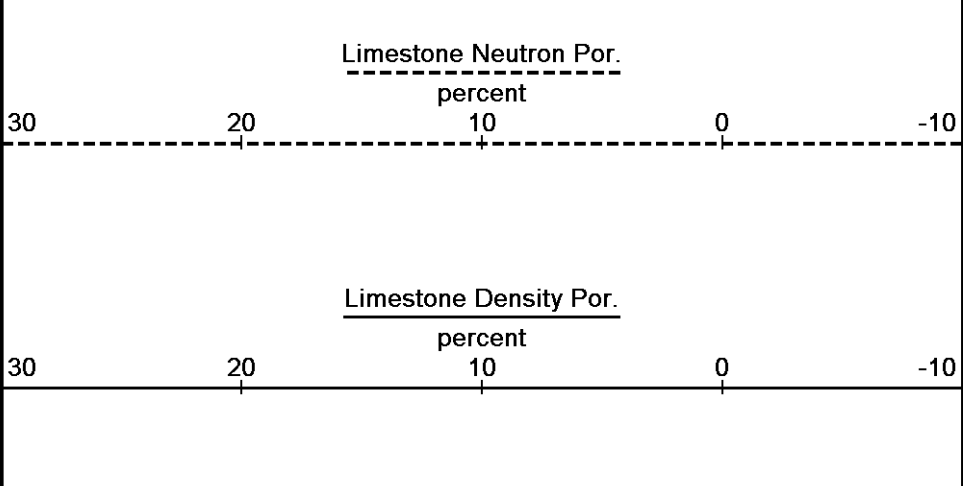
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Depth in Feet

Borehole Temp in deg F

HVI every 10 cu ft



6 11 16
Bit Size
inches

DST Uphole Tension
pounds
5000 0

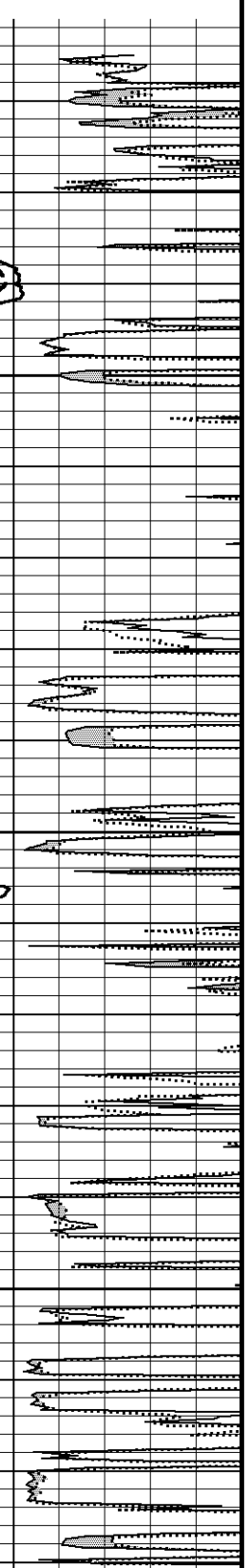
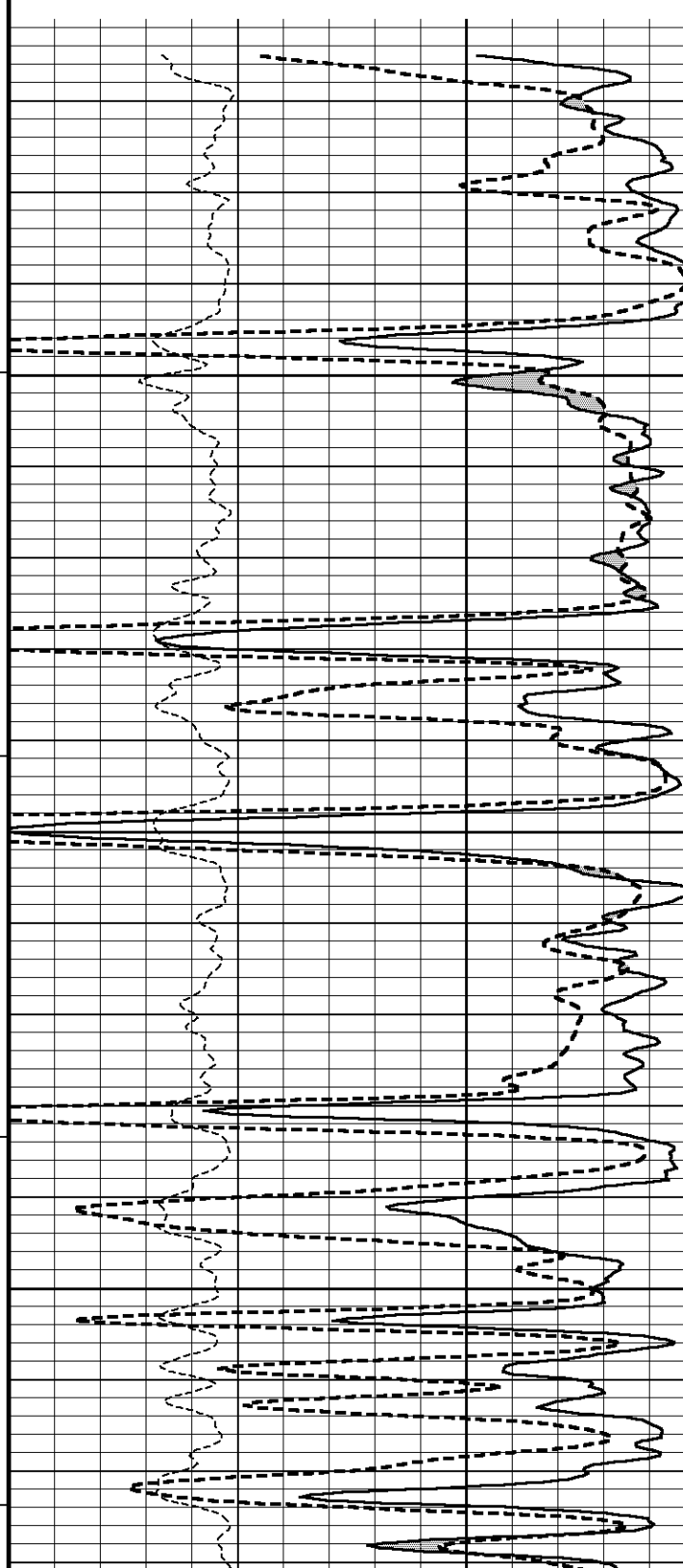
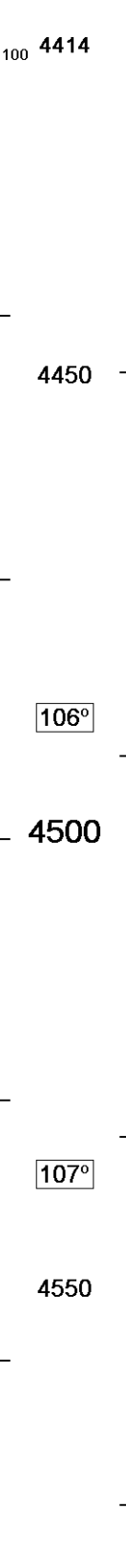
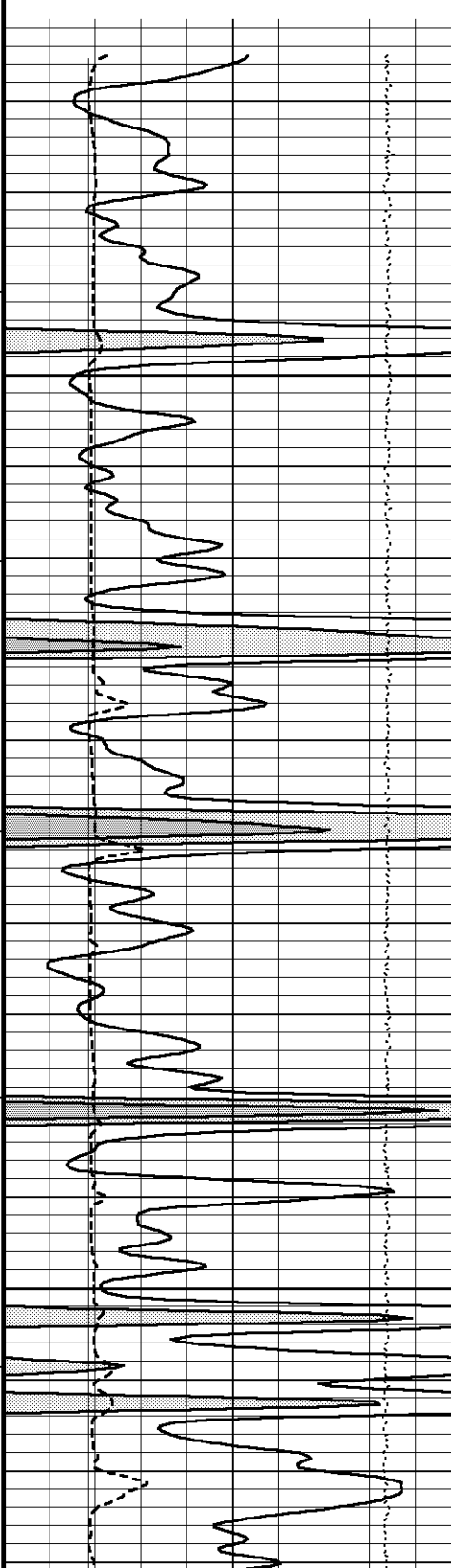
Annular
Integral
every
10 cu ft

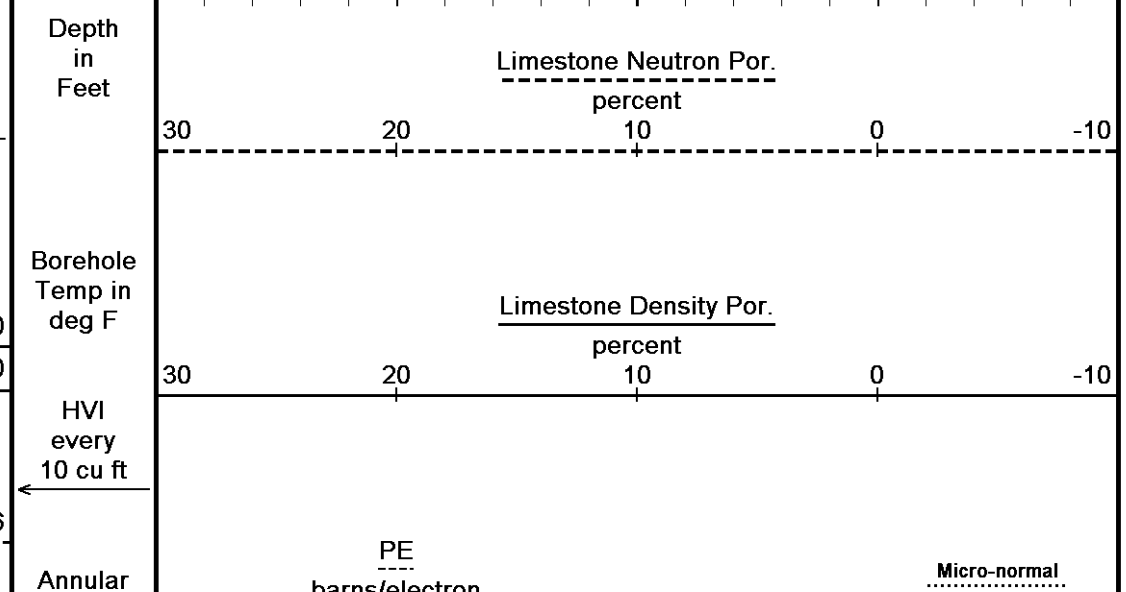
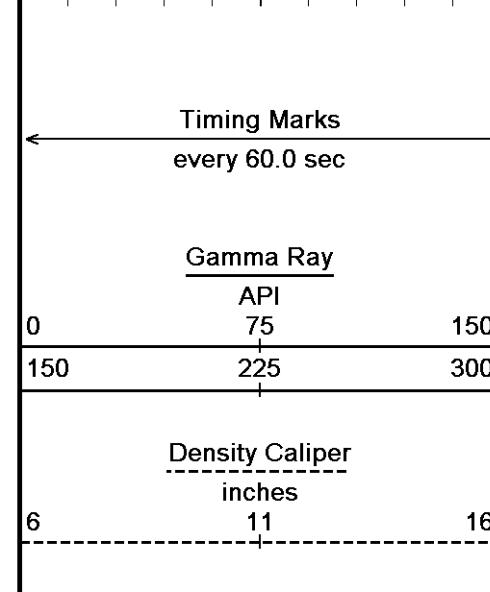
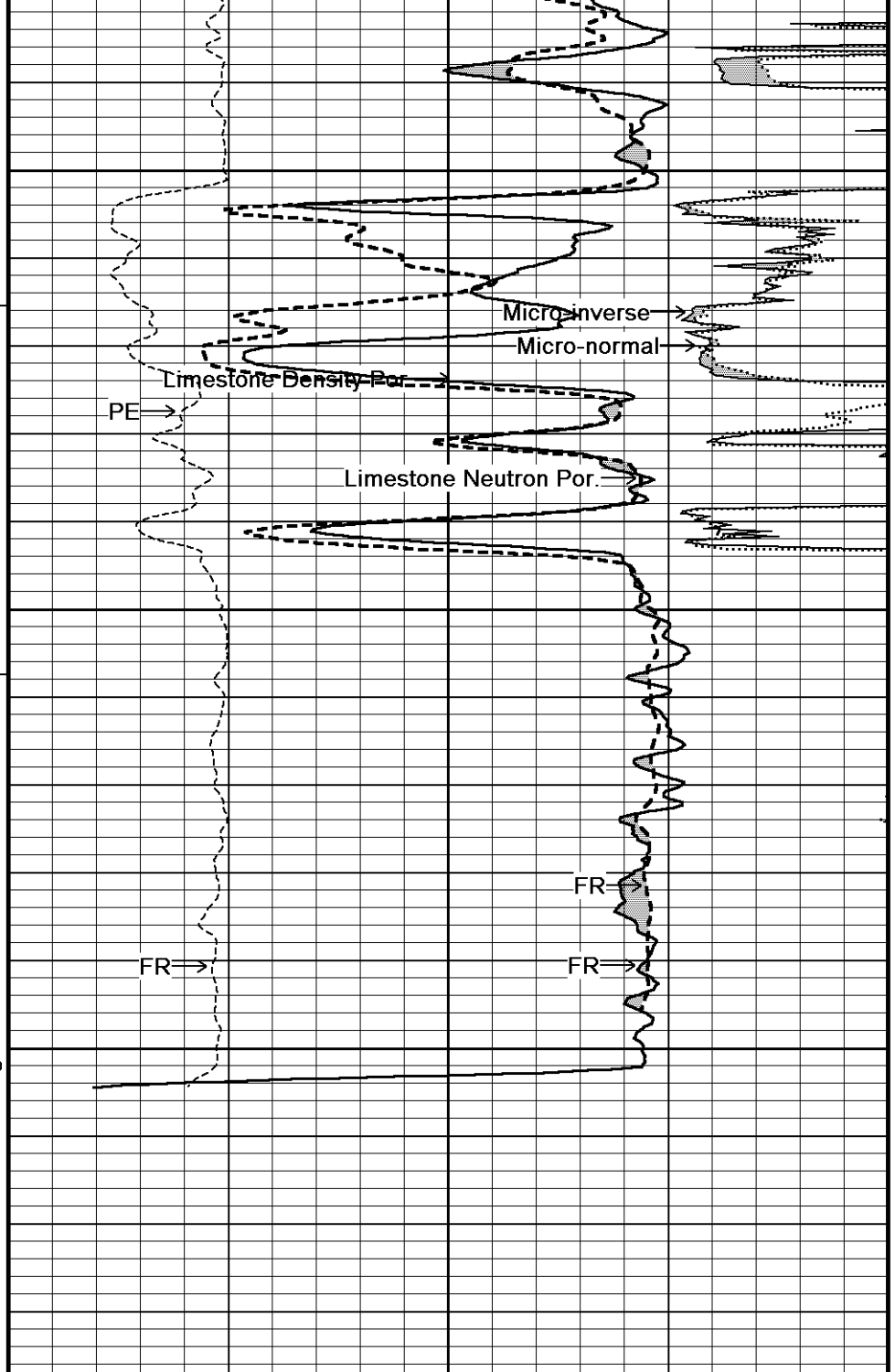
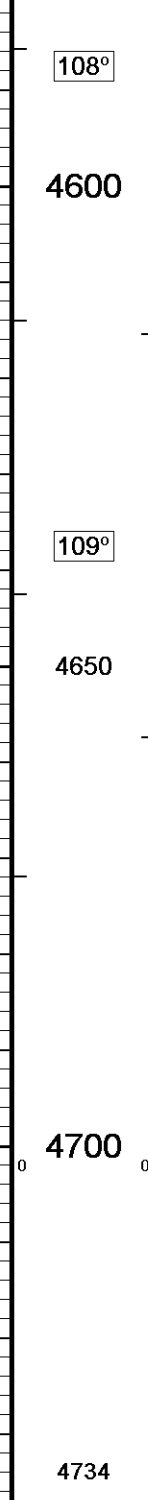
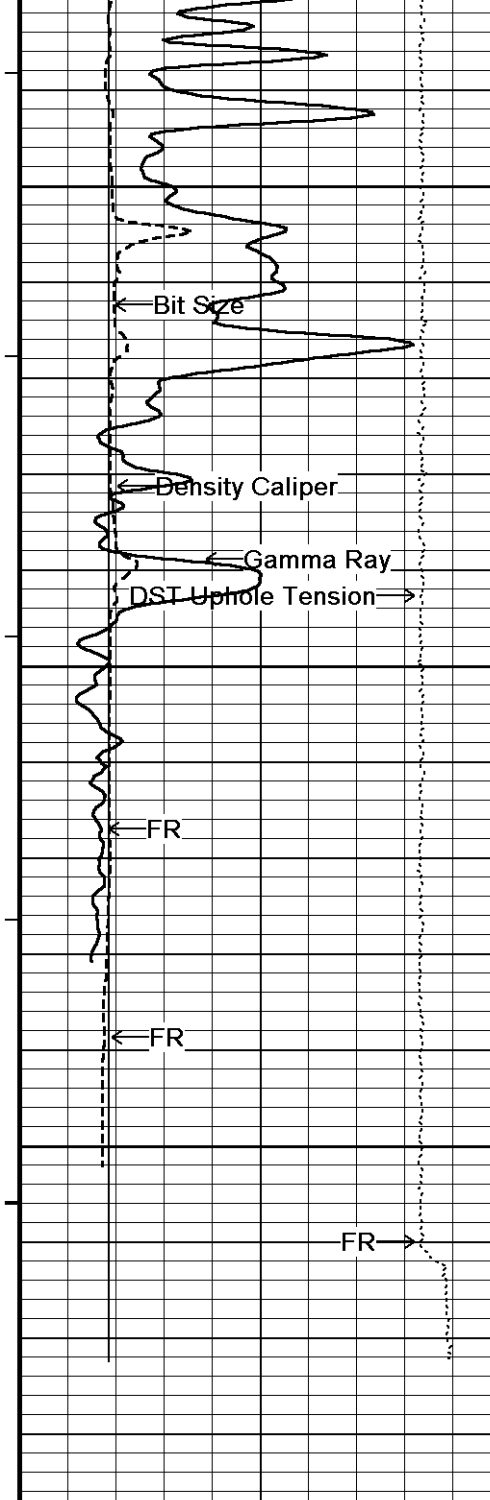
Replay
Scale
1:240

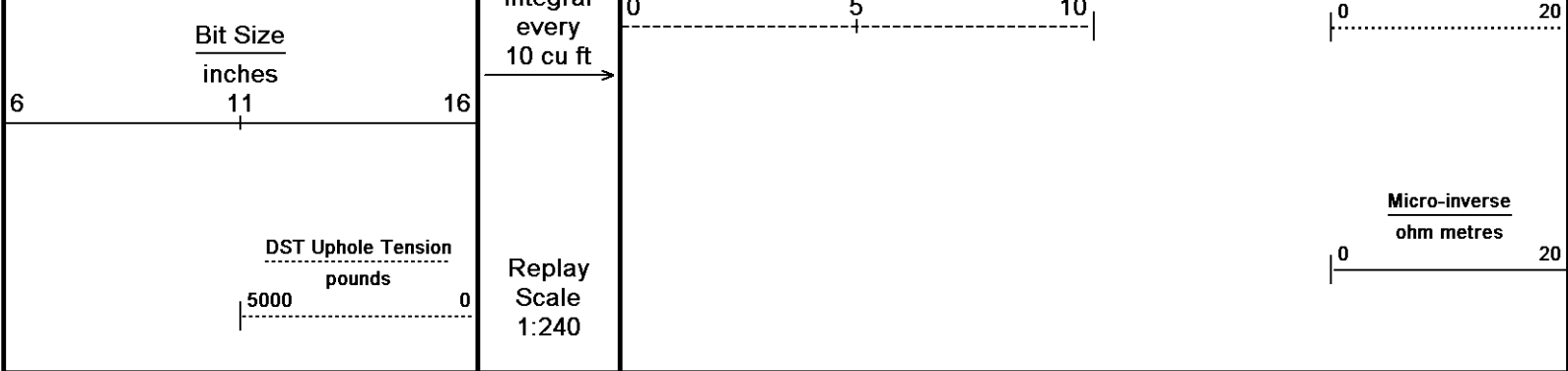
PE
barns/electron
0 5 10

Micro-normal
ohm metres
0 20

Micro-inverse
ohm metres
0 20





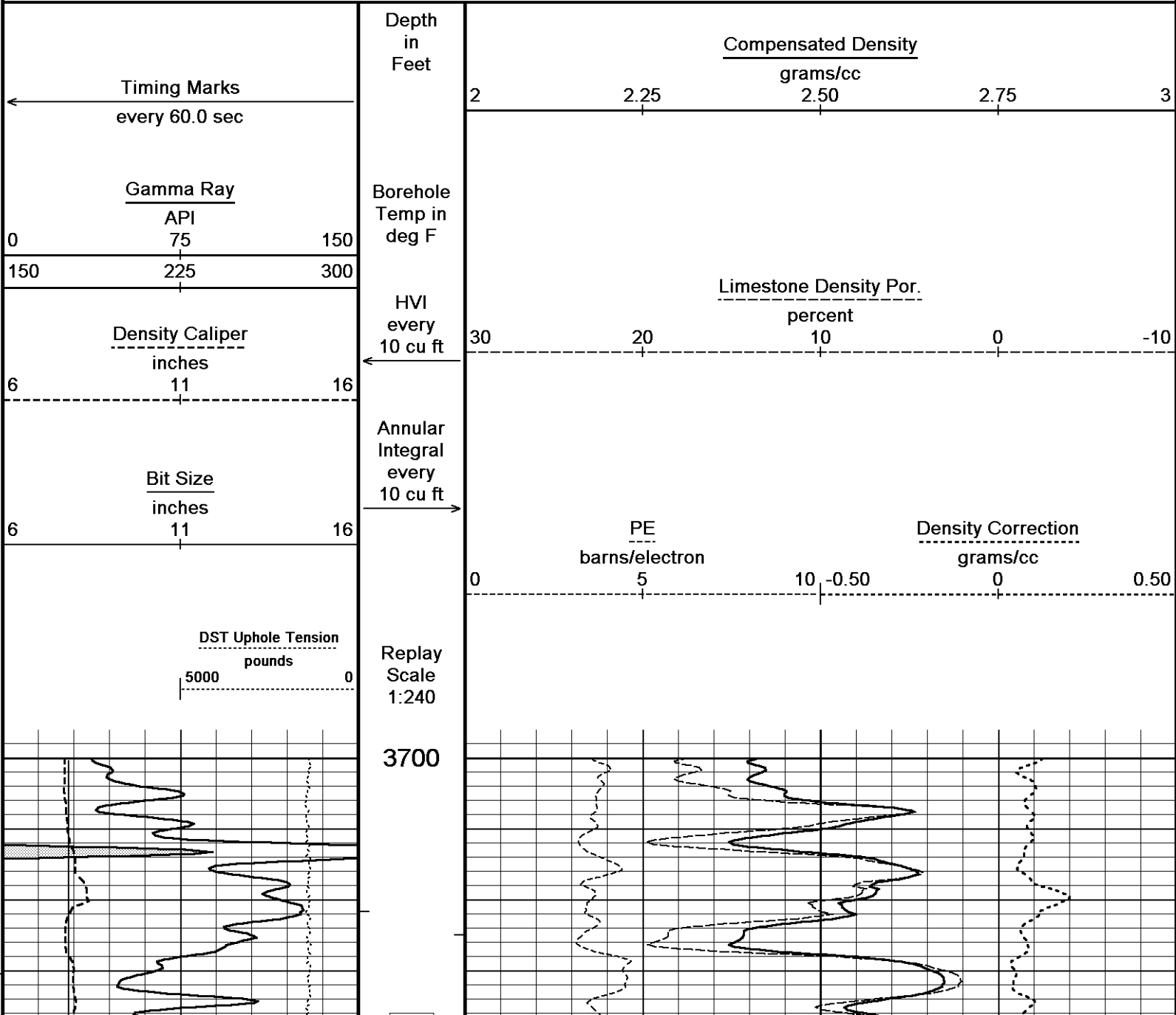


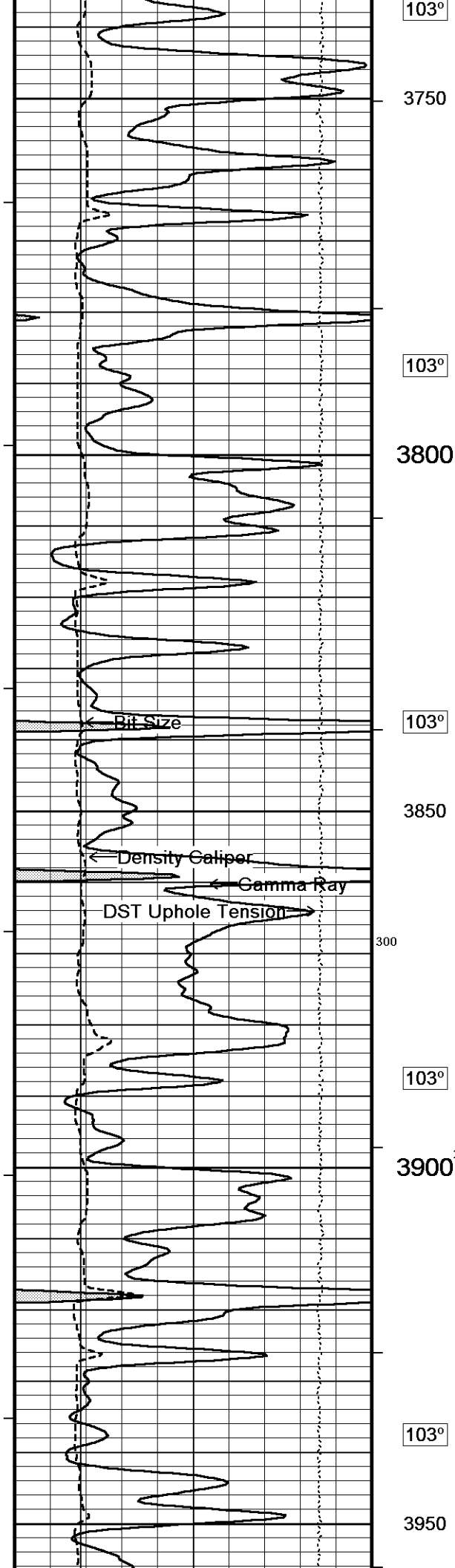
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↑ REPEAT SECTION ↑

↓ 5 INCH MAIN ↓

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 Plotted on 25-NOV-2013 09:21
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103°

3750

103°

3800

103°

3850

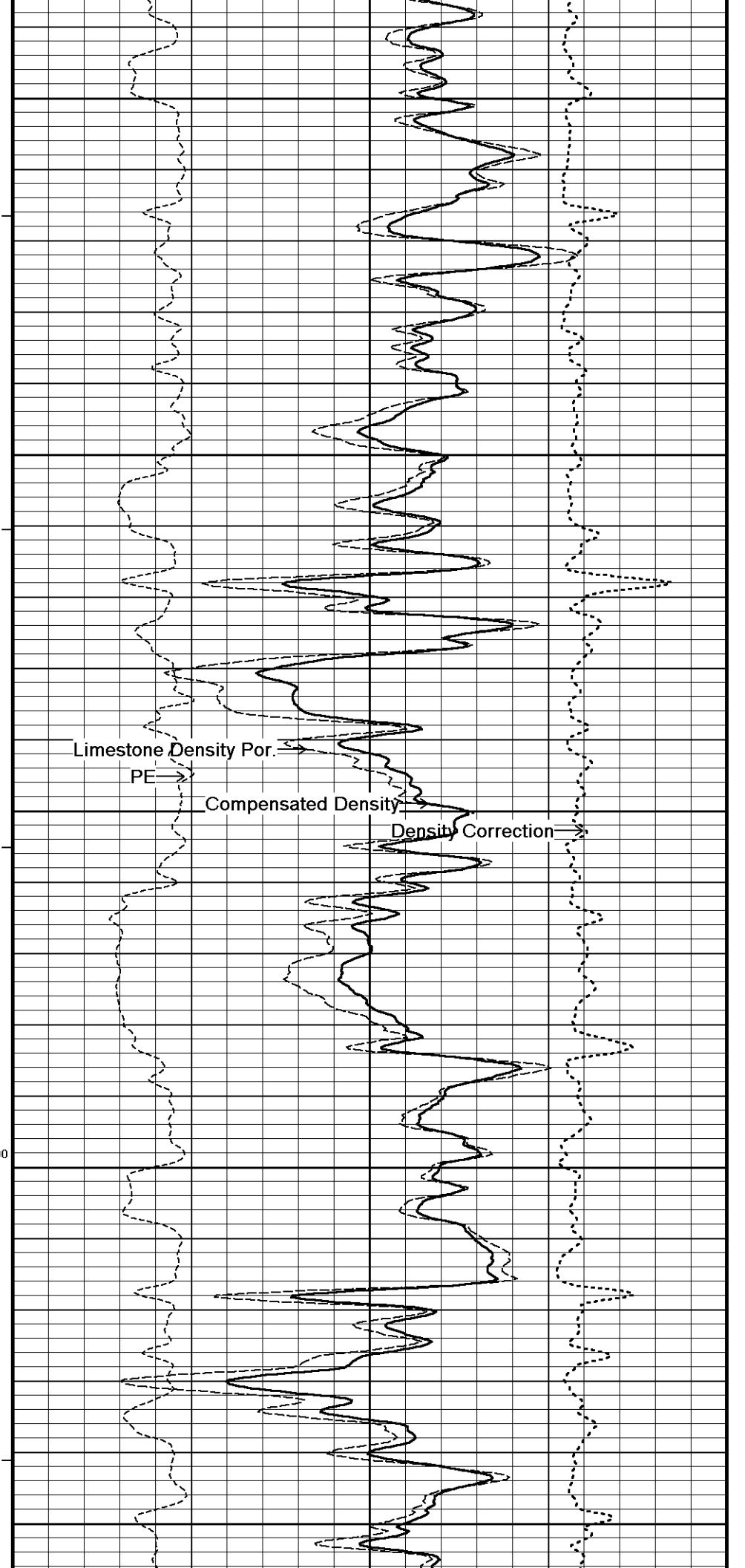
300

103°

3900²⁰⁰

103°

3950

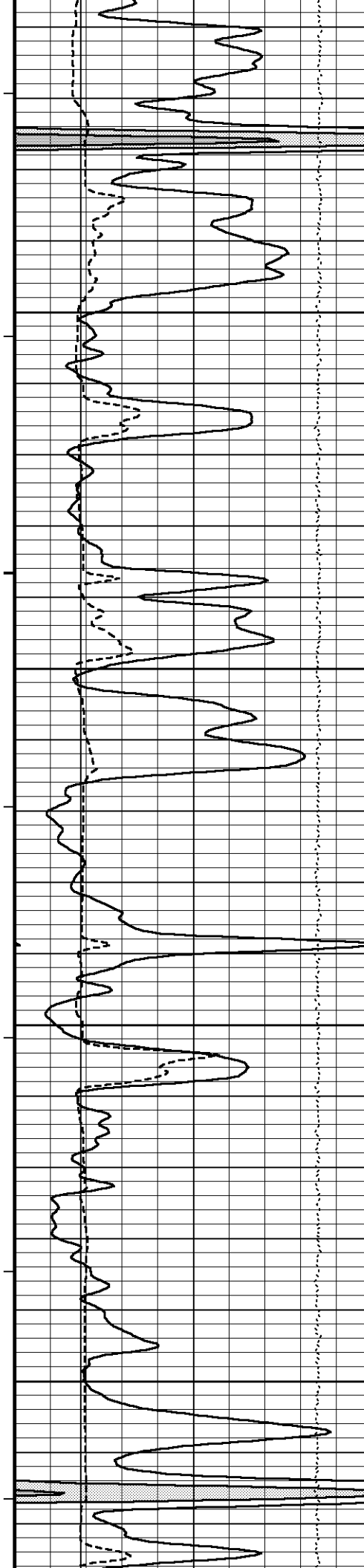


Limestone Density Por.

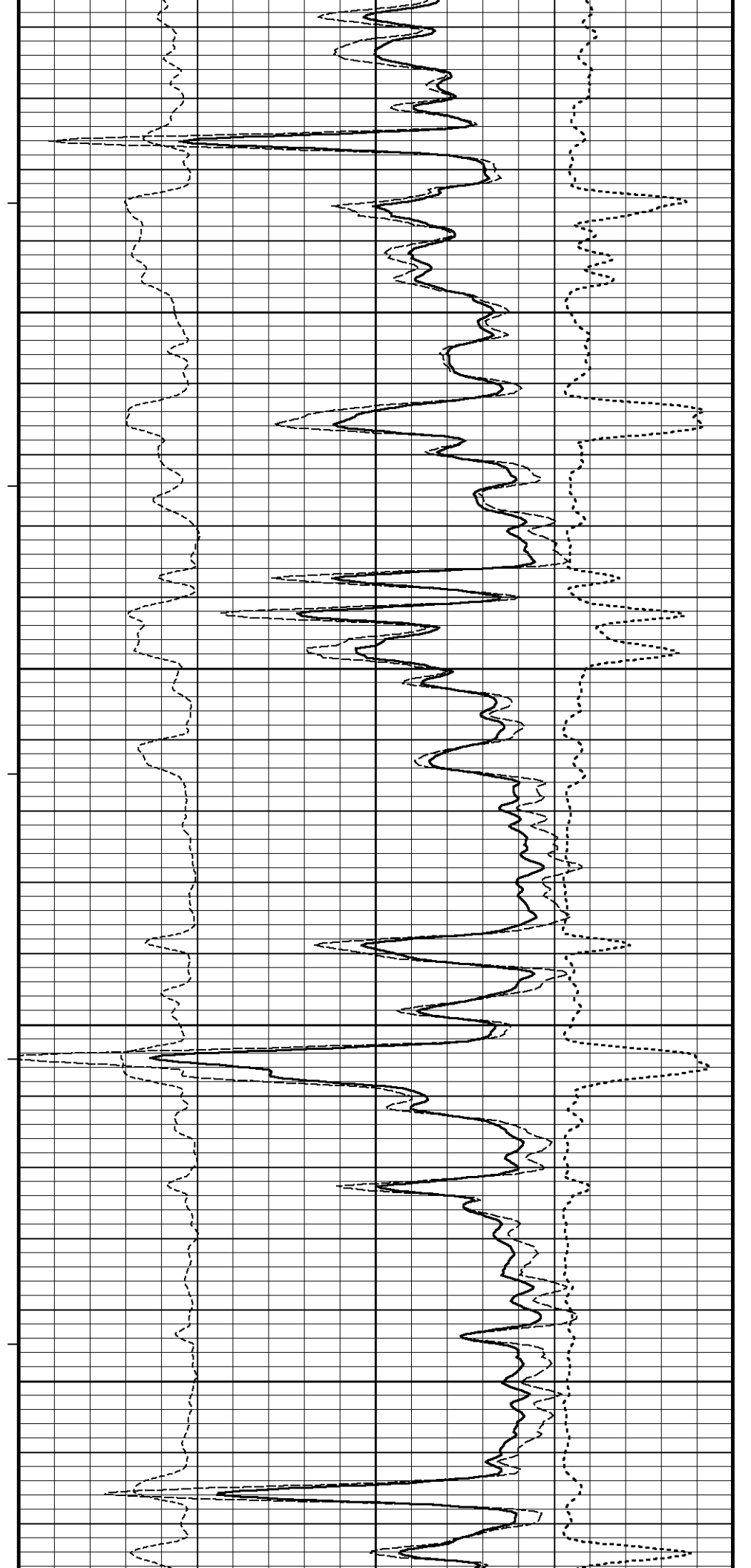
PE

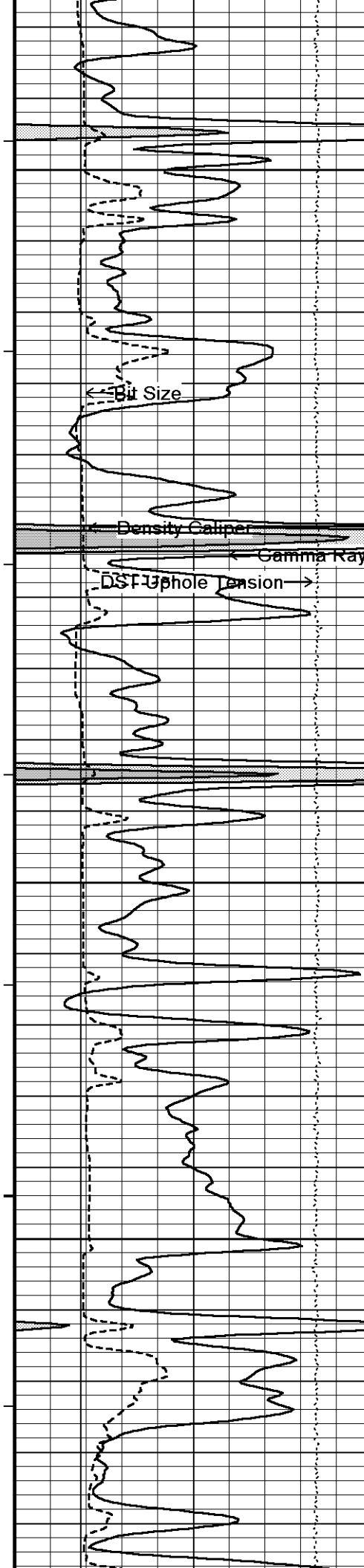
Compensated Density

Density Correction

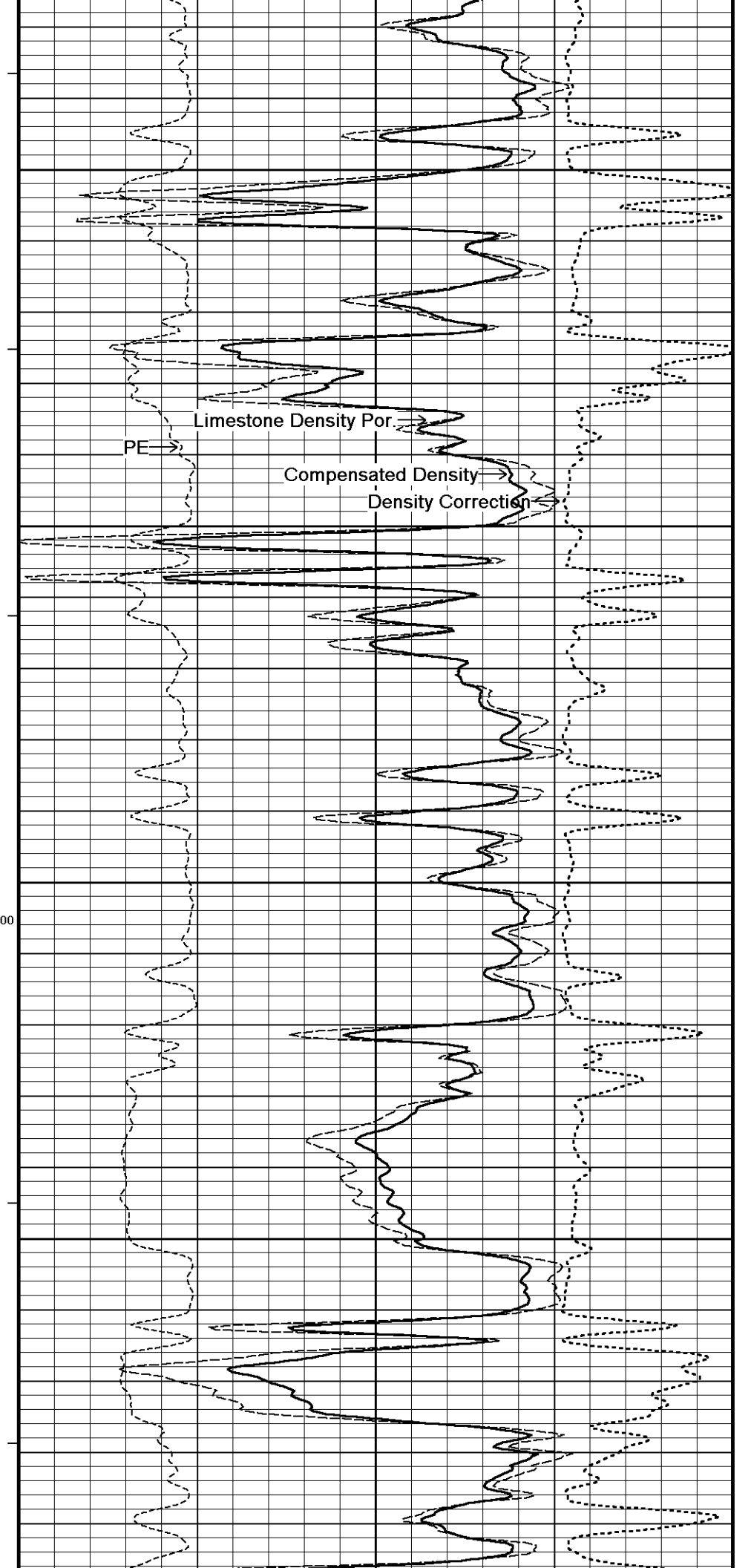


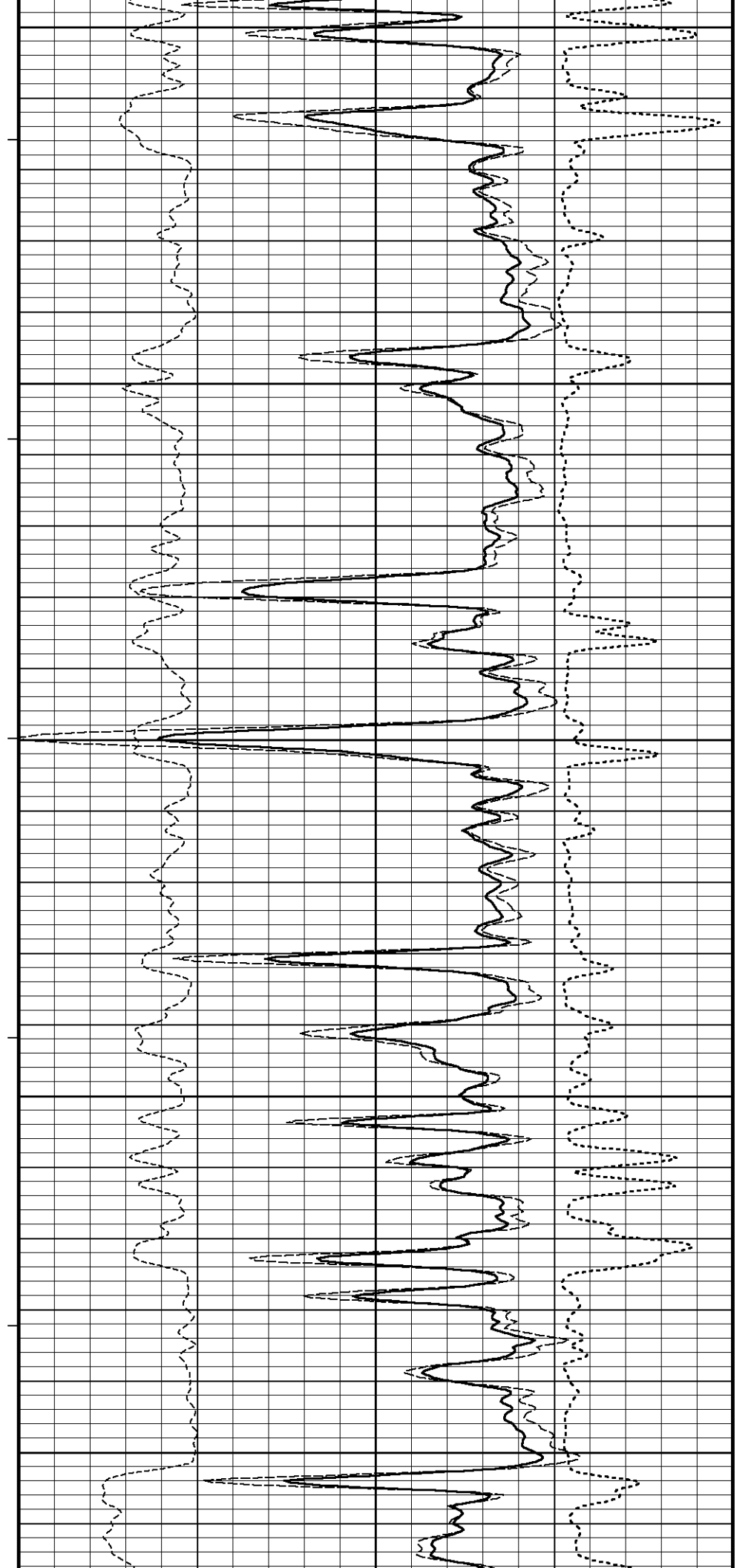
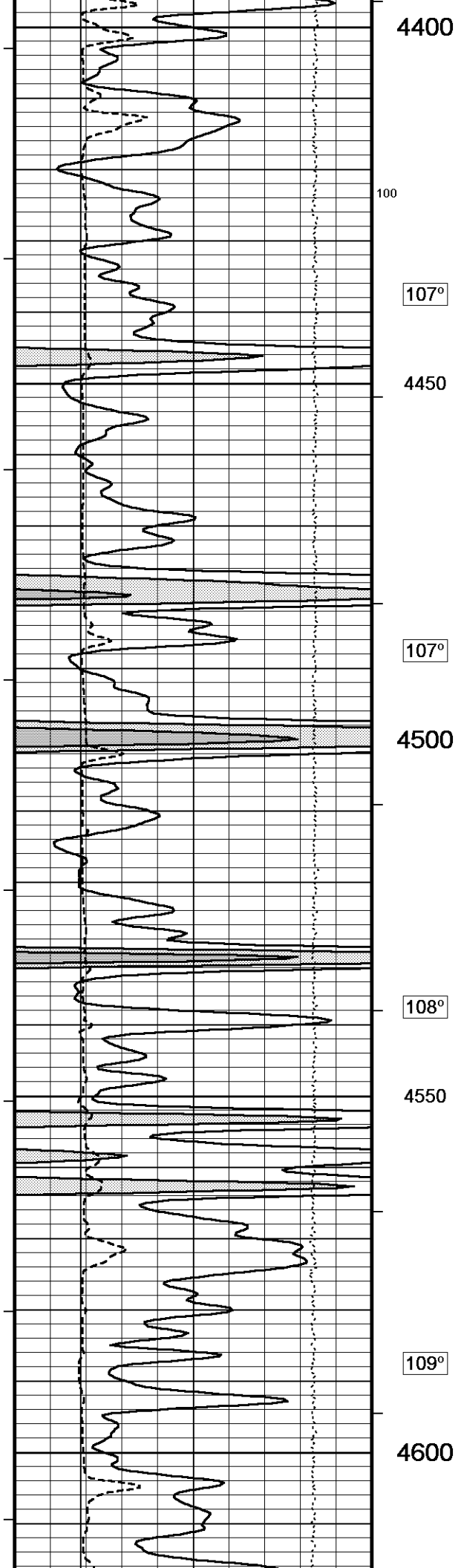
104°
4000
104°
4050
104°
4100
105°
4150
200

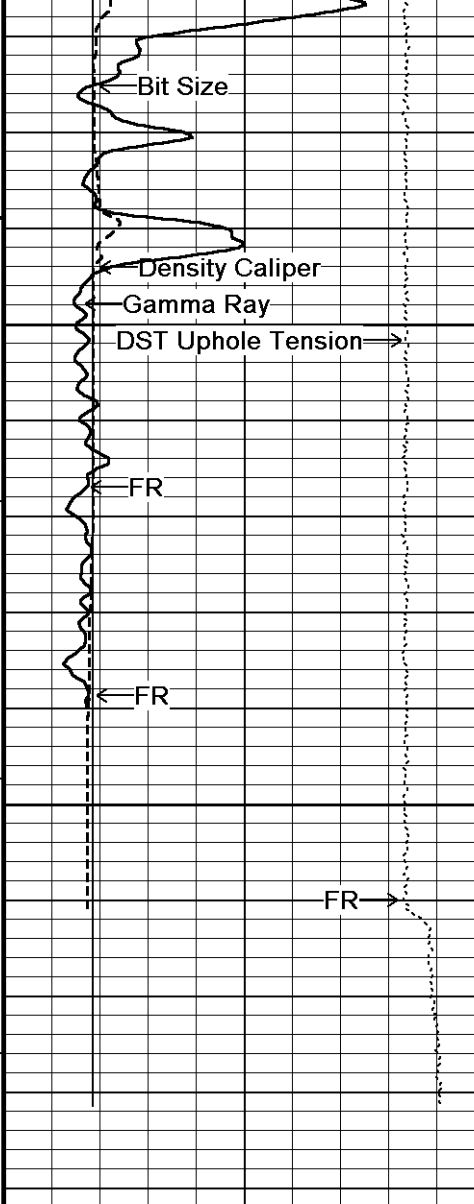




105°
4200
105°
4250
106°
4300
100
106°
4350
106°







110°

4650

109°

4700

0

4740
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

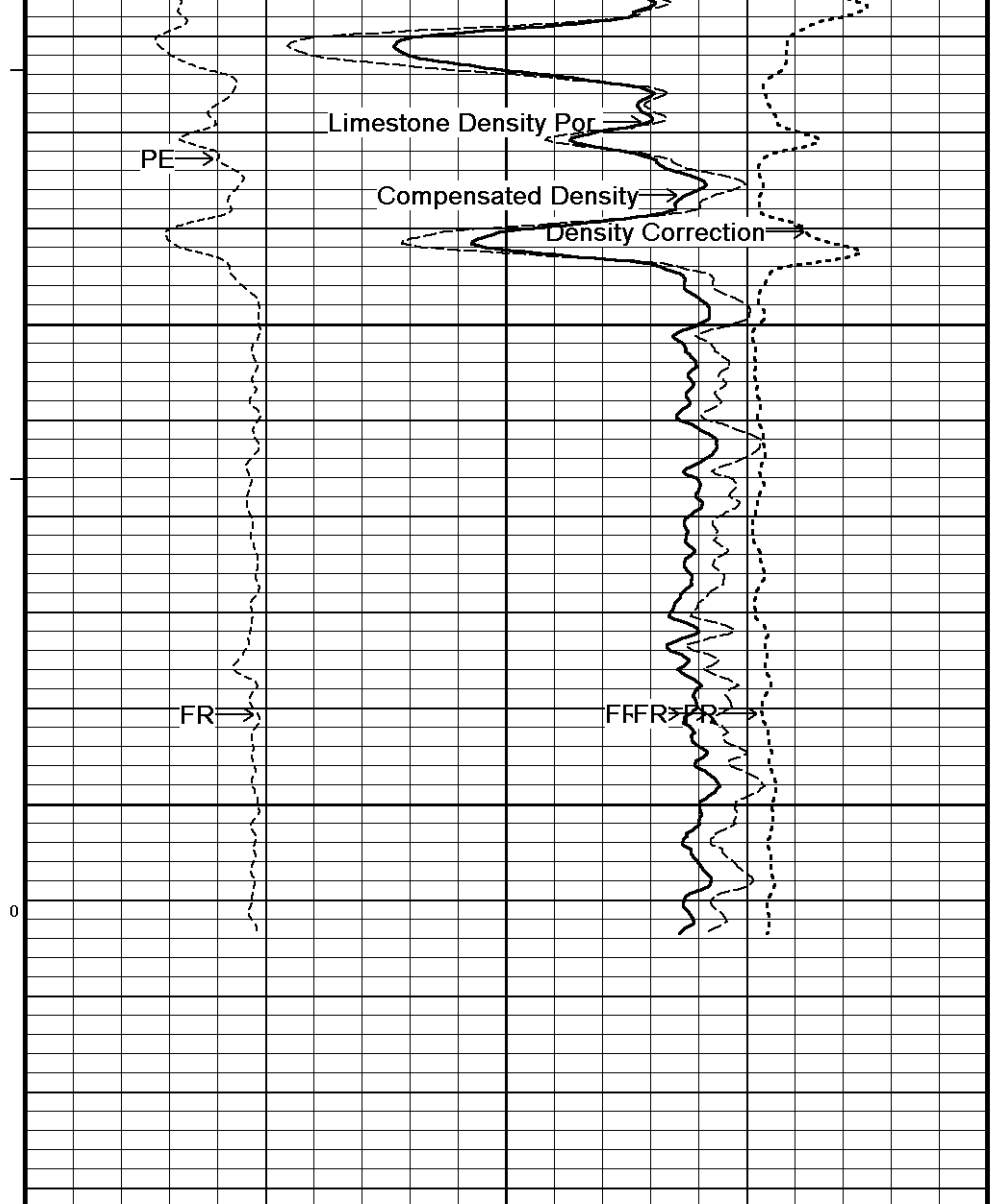
DST Uphole Tension
pounds

Borehole
Temp in
deg F

HVI
every
10 cu ft

Annular
Integral
every
10 cu ft

Replay



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

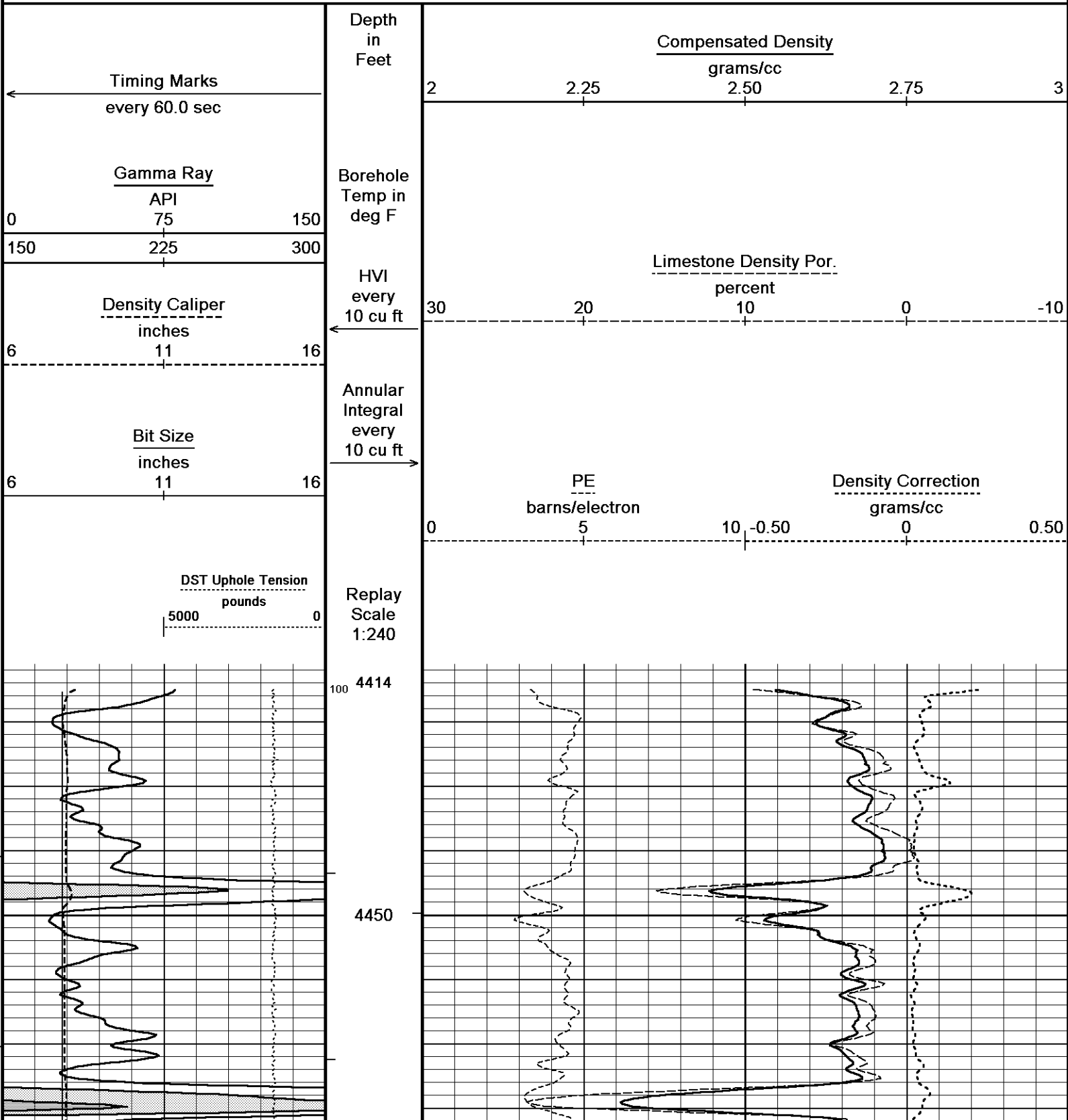
5000 0
Scale
1:240

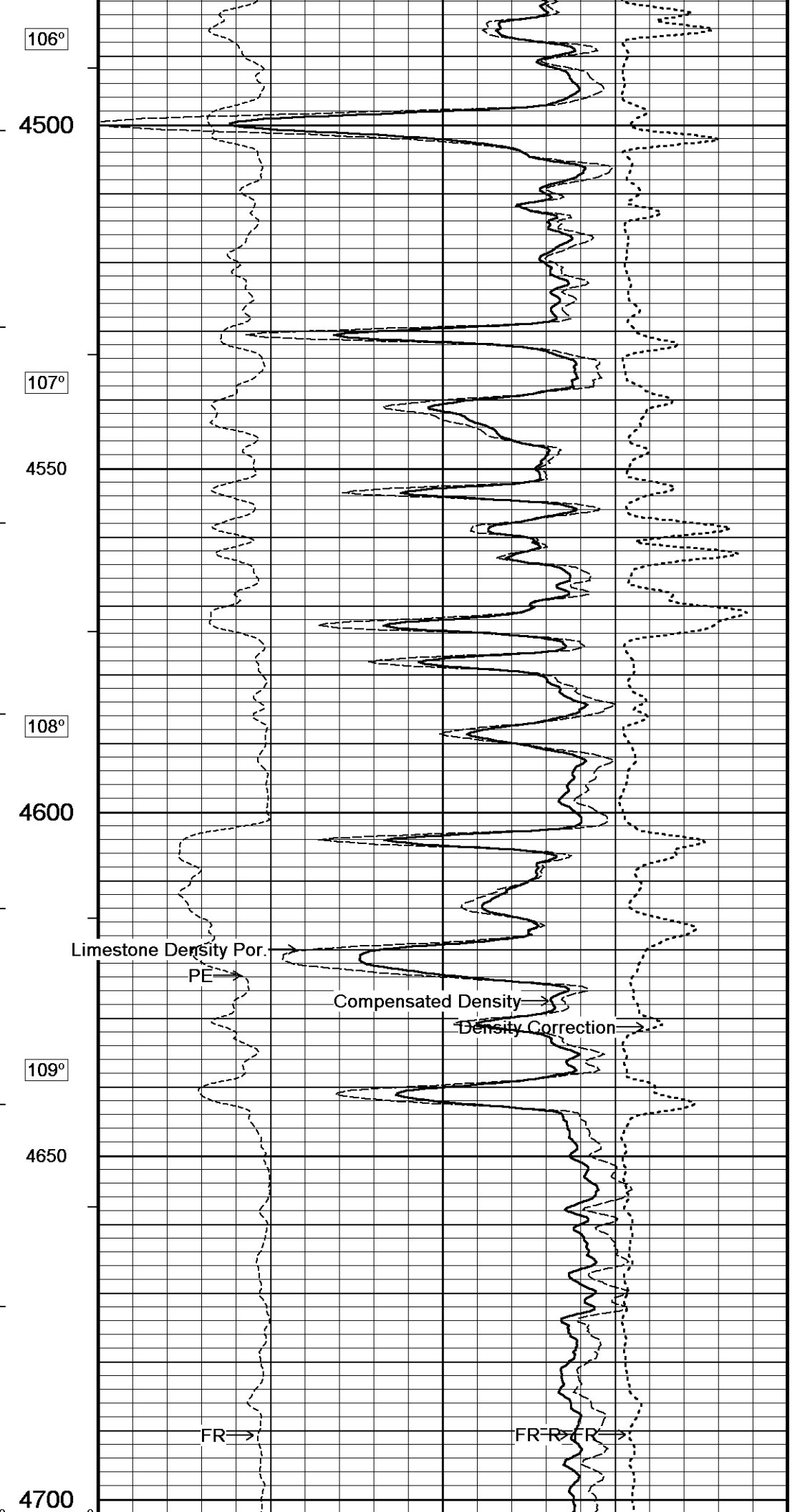
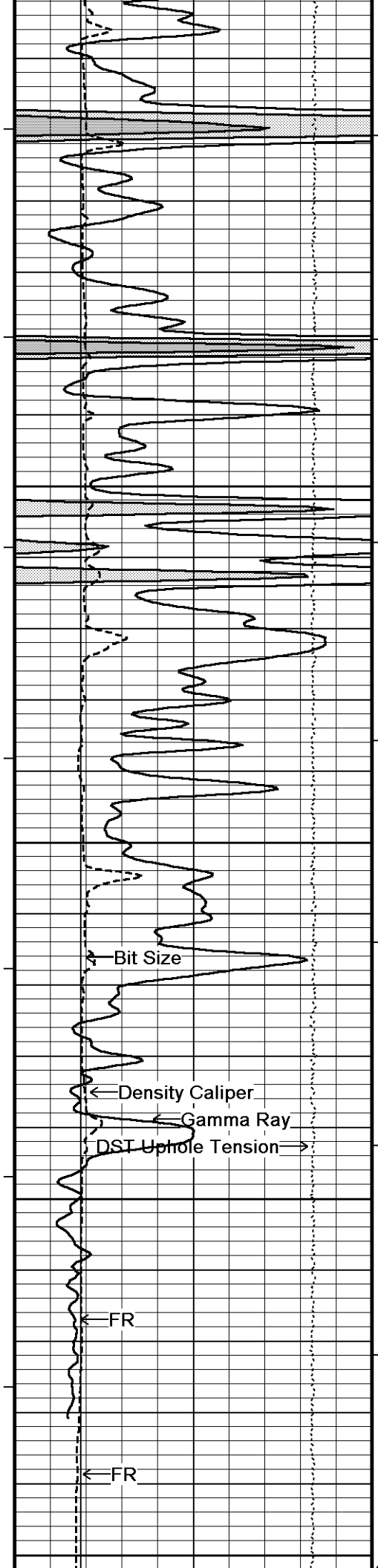
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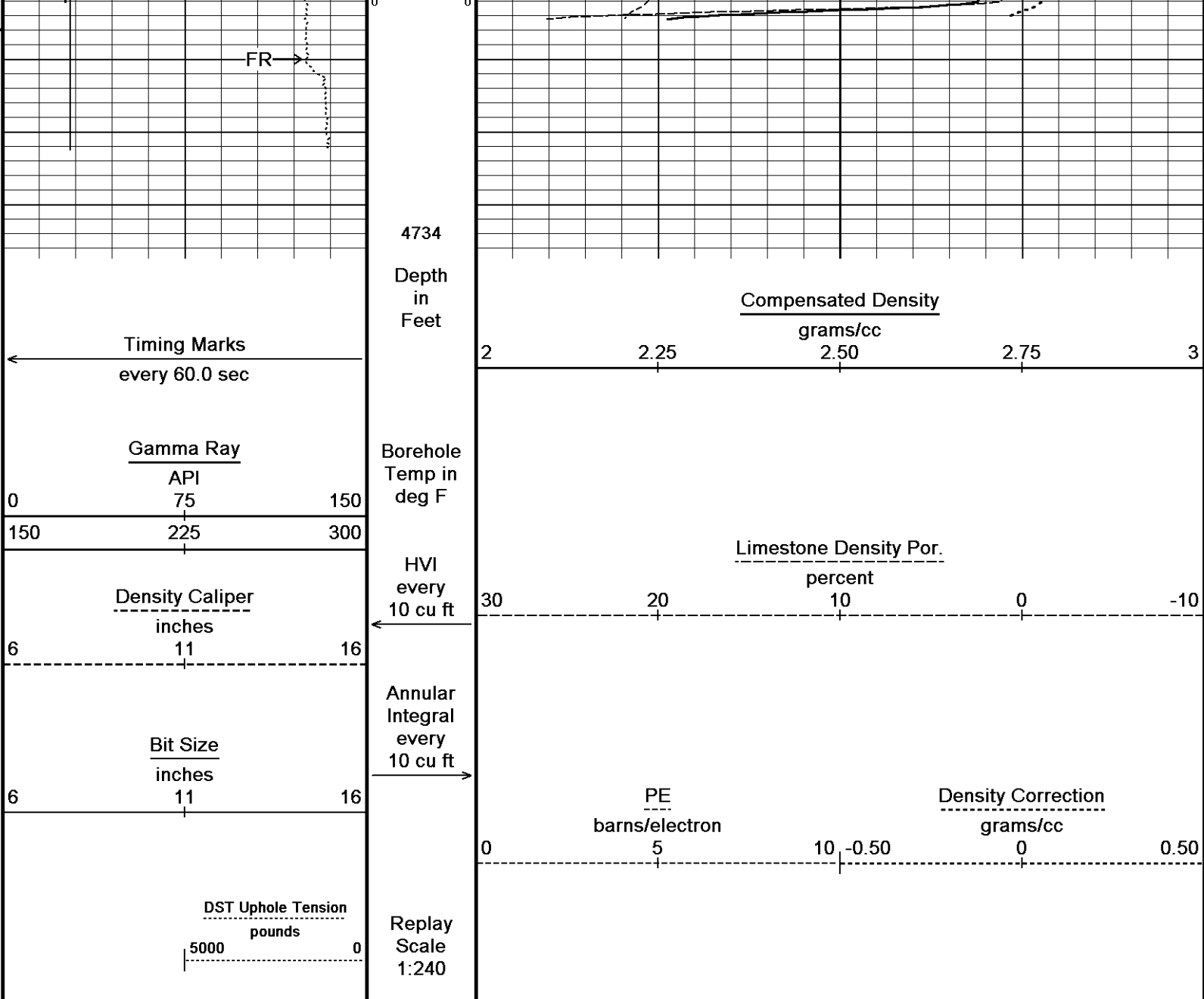
↑ 5 INCH MAIN ↑

↓ REPEAT SECTION ↓

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↑ REPEAT SECTION ↑

BEFORE SURVEY CALIBRATION
 C:\Minimus 13.05.9583\Log\Shakespeare Campbell 3-17\Shakespeare Campbell #3-17 Main spooled section.dta

General Constants All 000		Last Edited on 24-NOV-2013,16:40
General Parameters		
Mud Resistivity	1.280	ohm-metres
Mud Resistivity Temperature	94.000	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	MML Caliper	
Rwa Parameters		

Porosity used	Crossplot Porosity	
Resistivity used	Array Ind. One Res Rt	
RWA Constant A		1.000
RWA Constant M		2.000
SW/APOR Tool Source		0.000

Down-hole Tension Calibration SMS 0			Field Calibration on 25-NOV-2013 05:39
Reading No	Measured	Calibrated (lbs)	
1	15665.91	0.00	
2	16246.60	399.00	

Gamma Calibration MCG-B 39			Field Calibration on 24-NOV-2013 13:13
	Measured	Calibrated (API)	
Background	69	47	
Calibrator (Gross)	1146	772	
Calibrator (Net)	1077	725	

Gamma Constants MCG-B 39			Last Edited on 25-NOV-2013,04:05
Gamma Calibrator Number	GRC38		
Mud Density	1.09	gm/cc	
Caliper Source for Processing	Density Caliper		
Tool Position	Eccentred		
Concentration of KCl		kppm	
K Mud Type	Chloride		
K Mud Concentration	0.00	%	

SP Calibration MCG-B 39			Field Calibration on 30-JUL-2013,09:41
	Measured	Calibrated (mV)	
Reference 1	105.8	100.0	
Reference 2	-94.3	-100.0	

High Resolution Temperature Calibration MCG-B 39			Field Calibration on 30-JUL-2013,09:41
	Measured	Calibrated(Deg F)	
Lower	50.00	50.00	
Upper	75.00	75.00	

High Resolution Temperature Constants MCG-B 39			Last Edited on 30-JUL-2013,09:41
Pre-filter Length	11		

Caliper Calibration MML-A 3			Base Calibration on 23-NOV-2013 19:41	Field Calibration on 24-NOV-2013 13:02
Base Calibration				
Reading No	Measured	Calibrator Size (in)		
1	15082	5.98		
2	18325	7.97		
3	21622	9.86		
4	25597	11.92		
5	0	0.00		
6	N/A	N/A		
Field Calibration	Measured Caliper (in)	Actual Caliper (in)		
	5.98	5.98		

Micro Normal and Micro Inverse Calibration MML-A 3					Base Calibration on 23-NOV-2013 17:02	Field Check on 24-NOV-2013 13:00
Base Calibration						
Channel	Resistor 1	Measured Resistor 2	Calibrated (ohm-m) Resistor 1	Resistor 2		
Micro Normal	12.2	60.2	5.0	25.0		
Micro Inverse	15.7	78.3	5.0	25.0		
Channel	Base Check (ohm-m)	Field Check (ohm-m)				
Micro Normal	63.0	63.0				
Micro Inverse	48.3	48.3				

Micro Normal and Micro Inverse Constants MML-A 3			Last Edited on 24-NOV-2013,16:39
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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		N/A	inches

Neutron Calibration MDN-A.B 66

Base Calibration on 19-NOV-2013 15:33
Field Check on 24-NOV-2013 13:17

Base Calibration					
		Measured		Calibrated (cps)	
	Near	Far	Near	Far	
	3066	94	3714	110	
Ratio	32.484		33.764		
Field Calibrator at Base					
			Calibrated (cps)		
			1680	2433	
Ratio			0.691		
Field Check					
			Calibrated (cps)		
			1679	2427	
Ratio			0.677		

Neutron Constants MDN-A.B 66

Last Edited on 24-NOV-2013,16:39

Neutron Source Id	P0204NN	
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	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 353

Base Calibration on 07-OCT-2013 09:02
Field Check on 24-NOV-2013 12:53

Base Calibration			
		Measured	Calibrated (ohm-m)
Reference 1		0.0	0.0
Reference 2		964.2	126.8
Base Check			281.0
Field Check			281.2

FE Constants MFE-B.J 353

Last Edited on 24-NOV-2013,16:39

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

Induction Calibration MAI-A.A 167

Base Calibration on 02-OCT-2013,14:21
Field Check on 24-NOV-2013 12:52

Base Calibration					
Test Loop Calibration					
		Measured		Calibrated (mmho/m)	
Channel	Low	High	Low	High	
1	17.3	474.2	9.3	966.2	
2	6.3	388.4	7.6	821.4	
3	3.3	259.4	5.2	566.0	
4	1.9	133.0	2.6	279.2	

Array Temperature 76.8 Deg F

Channel	Base Check (mmho/m)		Field Check (mmho/m)	
	Low	High	Low	High
1			11.6	3841.5
2			29.3	3479.9
3			29.0	3055.8
4			19.8	2083.4
Deep			18.5	2050.6
Medium			42.2	3995.2
Shallow			42.5	5058.6

Array Temperature 50.4 Deg F

Induction Constants MAI-A.A 167

Last Edited on 24-NOV-2013,16:39

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	60.00		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	

High Resolution Temperature Calibration MAI-A.A 167

Field Calibration on 18-AUG-2013,02:21

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

High Resolution Temperature Constants MAI-A.A 167

Last Edited on 15-SEP-2013,16:14

Pre-filter Length 11

Photo Density Calibration MPD-C.A 216

Base Calibration on 04-NOV-2013,14:26

Field Check on 24-NOV-2013 12:59

Density Calibration	Measured		Calibrated (sdu)	
	Near	Far	Near	Far
Base Calibration				
Reference 1	53102	19935	52888	19096
Reference 2	25779	2814	25270	2567

Field Check at Base
1121.7 1316.5

Field Check
1122.3 1321.1

PE Calibration

Base Calibration	WS	Measured WH	Ratio	Calibrated Ratio
Background	205	1001		
Reference 1	18282	52929	0.348	0.309
Reference 2	7413	25647	0.292	0.273

Field Check at Base
204.5 1000.7

Field Check
202.5 1002.2

Density Constants MPD-C.A 216

Last Edited on 25-NOV-2013,04:04

Density Source Id	18235B	
Nylon Calibrator Number	DNCE528	
Aluminium Calibrator Number	DACD528	
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 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	0.00	

Caliper Calibration MPD-C.A 216

Base Calibration on 03-NOV-2013 23:03
Field Calibration on 24-NOV-2013 12:54

Base Calibration Reading No	Measured	Calibrator Size (in)
1	16494	4.01
2	26560	5.96
3	36690	7.98
4	46752	9.95
5	57360	11.91
6	N/A	N/A

Field Calibration	Measured Caliper (in)	Actual Caliper (in)
	5.96	5.98

DOWNHOLE EQUIPMENT

C:\Minimus 13.05.9583\Log\Shakespeare Campbell 3-17\Shakespeare Campbell #3-17 Main spooled section.dta

3/8" Triple Cone Cable Head (MCB C A)
MCB-C.A 5 LG: 1.58 ft WT: 15.4 lb OD: 2.24 in

Compact Comms Gamma
MCG-B 39 LG: 8.70 ft WT: 63.9 lb OD: 2.24 in



42.87 ft GRGC - Gamma Ray
39.96 ft CGXT - MCG External Temperature

Compact Micro-log
MML-A.3 LG: 7.97 ft WT: 81.6 lb OD: 2.24 in

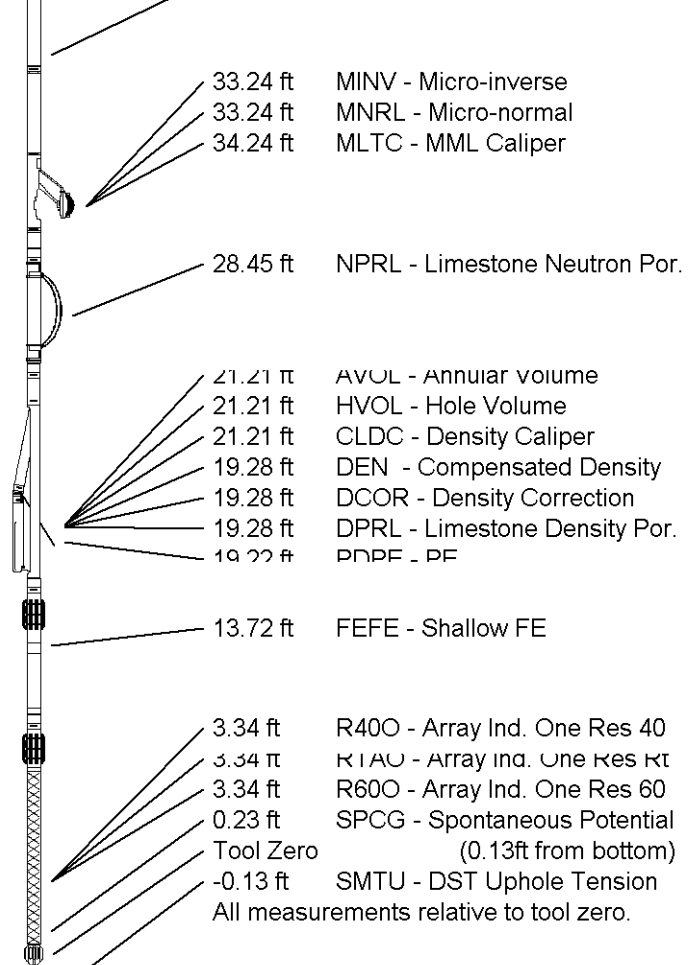
Compact Neutron
MDN-A.B 66 LG: 5.04 ft WT: 50.7 lb OD: 2.24 in

Compact Density/Caliper
MPD-C.A 216 LG: 9.59 ft WT: 90.4 lb OD: 2.45 in

Compact Focused Electric
MFE-B.J 353 LG: 6.05 ft WT: 48.5 lb OD: 2.24 in

Compact Induction
MAI-A.A 167 LG: 10.81 ft WT: 48.5 lb OD: 2.24 in

Total Length: 49.73 ft Weight: 399.0 lb



COMPANY SHAKESPEARE OIL CO.
WELL CAMPBELL #3-17
FIELD WILDCAT
PROVINCE/COUNTY LOGAN
COUNTRY/STATE U.S.A. / KANSAS

Elevation Kelly Bushing	3039.00	feet	First Reading	4691.00	feet
Elevation Drill Floor	3037.00	feet	Depth Driller	4715.00	feet
Elevation Ground Level	3029.00	feet	Depth Logger	4710.00	feet



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COMPACT PHOTO DENSITY
COMPENSATED NEUTRON
MICRORESISTIVITY LOG