



Weatherford
180

**COMPACT PHOTO DENSITY
COMPENSATED NEUTRON
MICRORESISTIVITY LOG**

COMPANY

SHAKESPEARE OIL COMPANY, INC.

WELL

ZANOBIA #1-22

FIELD

WILDCAT

PROVINCE/COUNTY

LOGAN

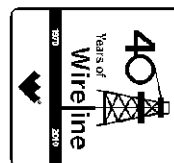
COUNTRY/STATE

U.S.A. / KANSAS

LOCATION

1090' FSL & 2305' FWL

SW/4



SEC

TWP

RGE

Other Services

MSS

22

15S

33W

MA/ME

Permit Number

15-109-21088

Permanent Datum G.L., Elevation 2802 feet

Log Measured From KB

Drilling Measured From K.B.

Elevations:

feet

KB

2812.00

DF

2811.00

Date

13-JUL-2012

GL

2802.00

Run Number

ONE

Depth Driller

4585.00

feet

Depth Logger

4585.00

feet

First Reading

4553.00

feet

Last Reading

3600.00

feet

Casing Driller

253.00

feet

Casing Logger

253.00

feet

Bit Size

7.875

inches

Hole Fluid Type

CHEMICAL

Density / Viscosity

8.70

lb/USg

54.00

CP

PH / Fluid Loss

10.00

10.40 ml/30Min

Sample Source

FLOWLINE

Rm @ Measured Temp

0.34 @ 87.0

ohm-m

Rmf @ Measured Temp

0.27 @ 87.0

ohm-m

Rmc @ Measured Temp

0.41 @ 87.0

ohm-m

Source Rmf / Rmc

CALC

CALC

Rm @ BHT

0.27 @109.0

ohm-m

Time Since Circulation

4 HOURS

Max Recorded Temp

109.00

deg F

Equipment Name

COMPACT

Equipment / Base

13057

LIB

BOREHOLE RECORD

Last Edited: 13-JUL-2012 12:39

Bit Size
inches

7.875

Depth From
feet

253.00

Depth To
feet

4585.00

CASING RECORD

Type

Size
inches

8.625

Depth From
feet

0.00

Shoe Depth
feet

253.00

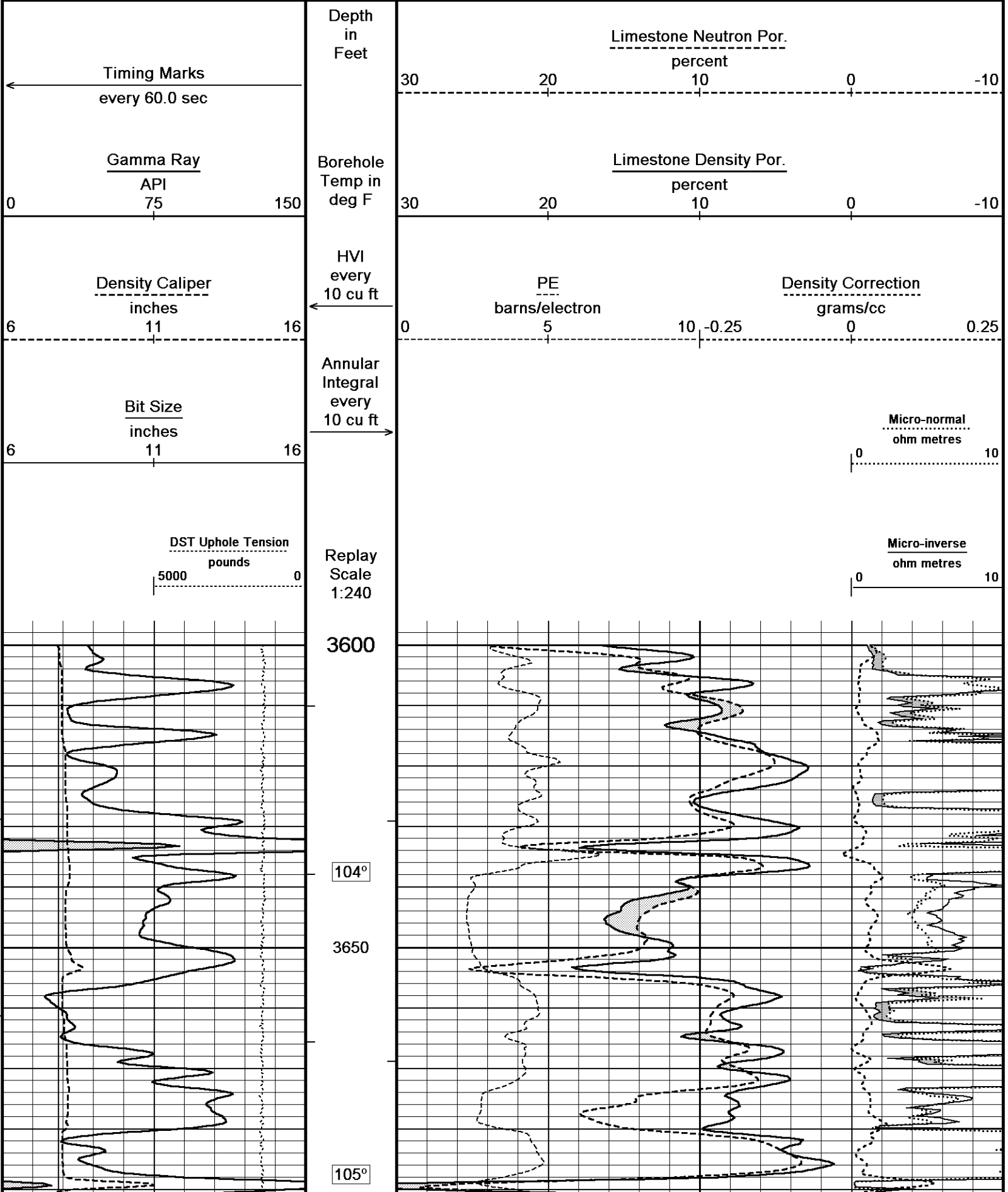
Weight
pounds/ft

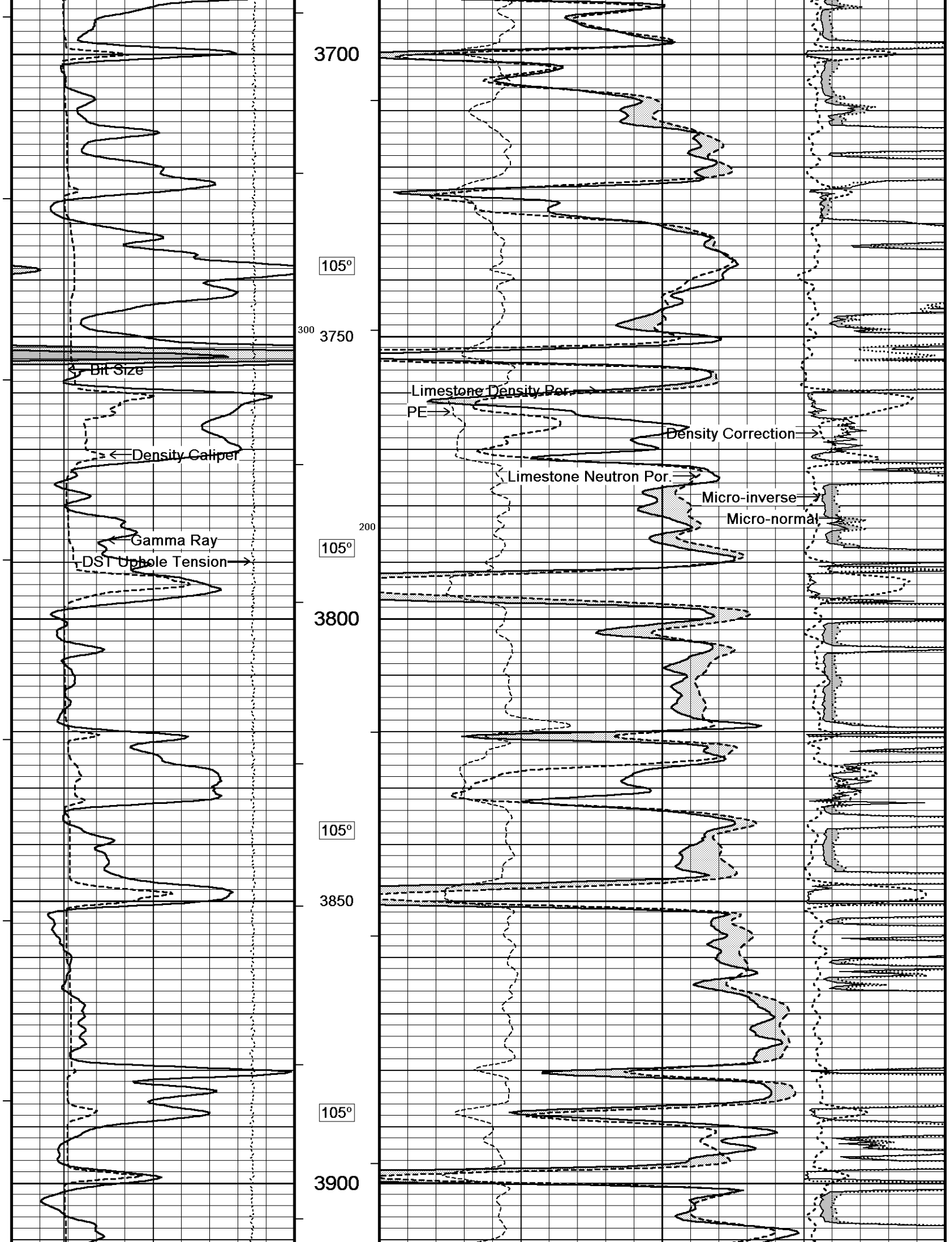
24.00

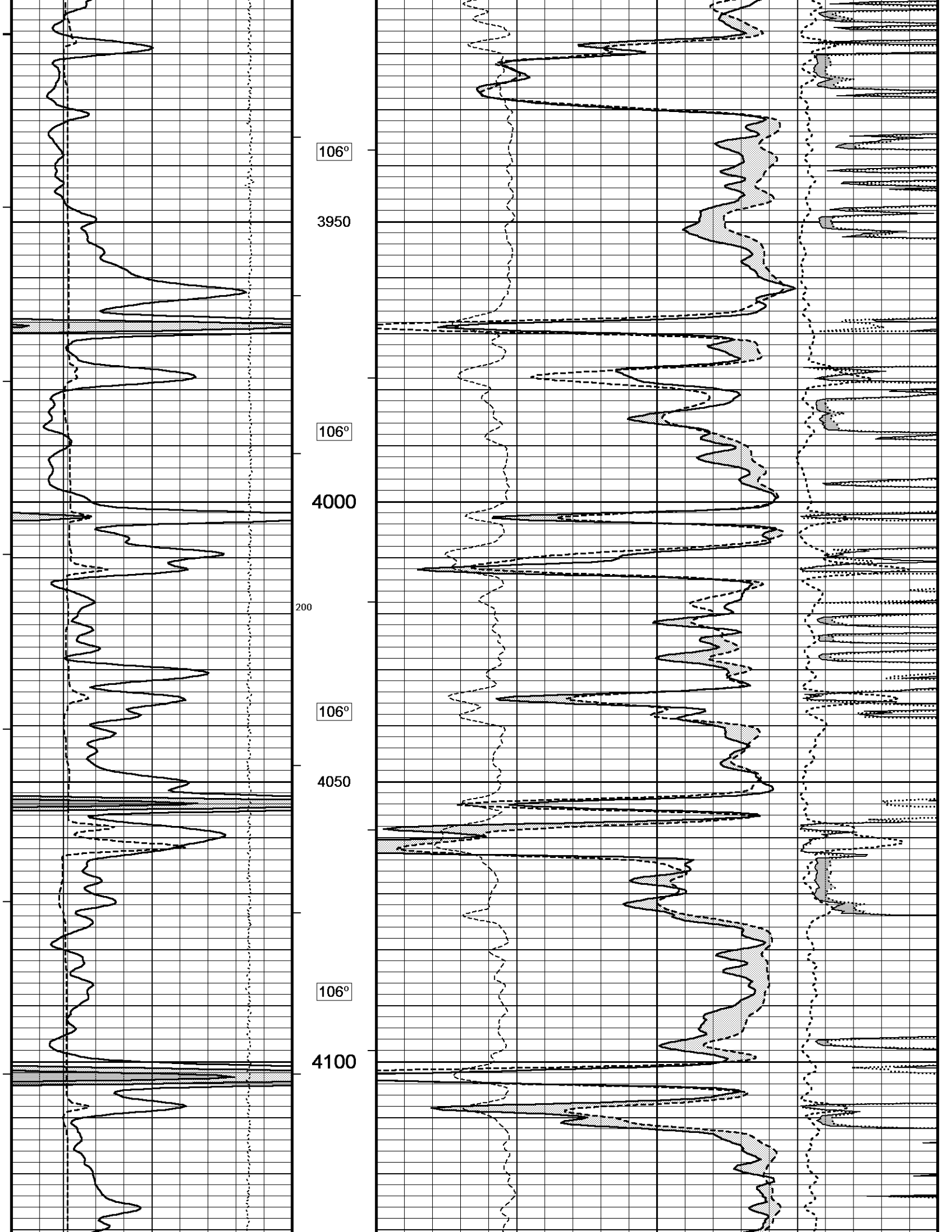
REMARKS

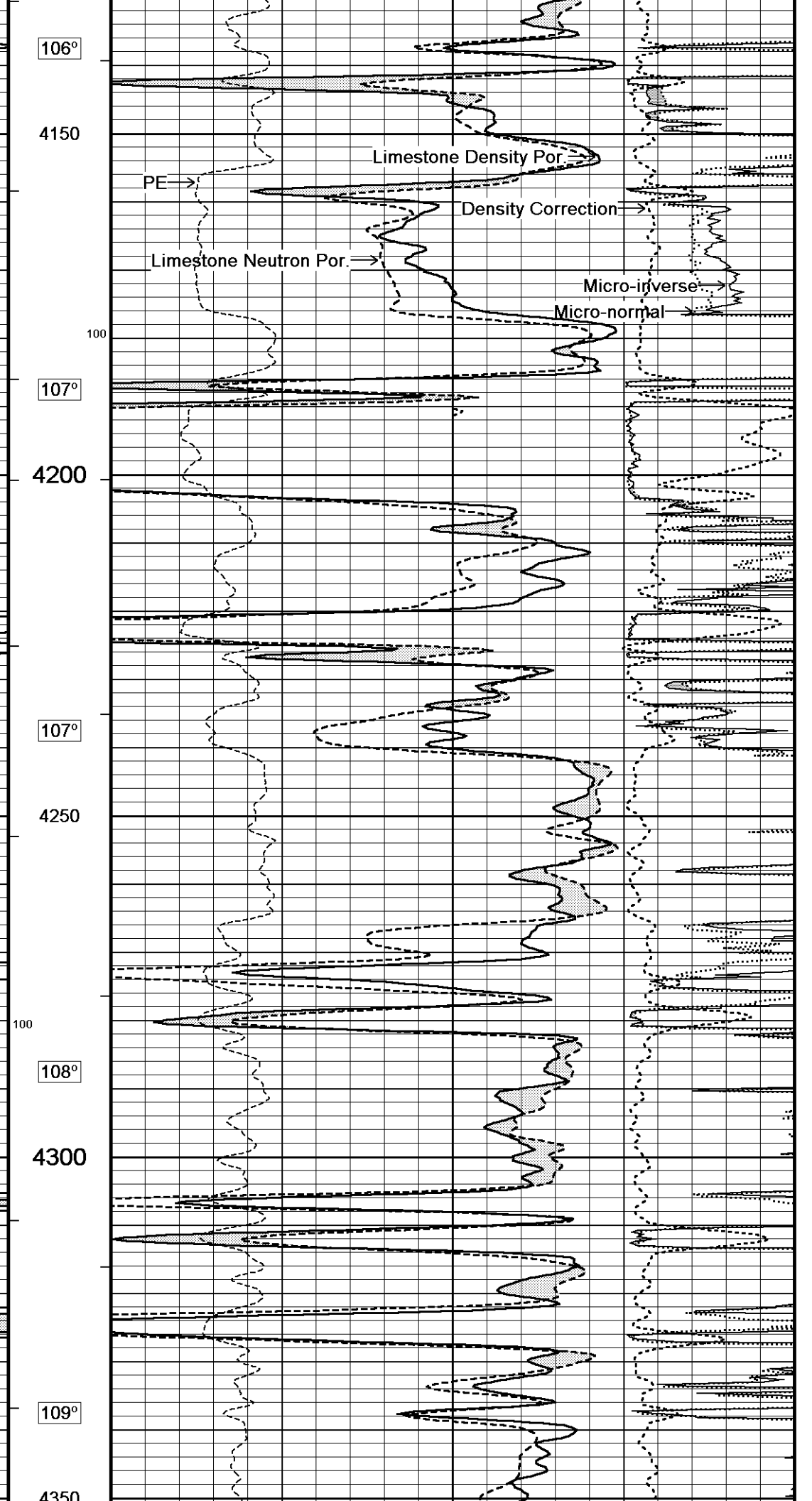
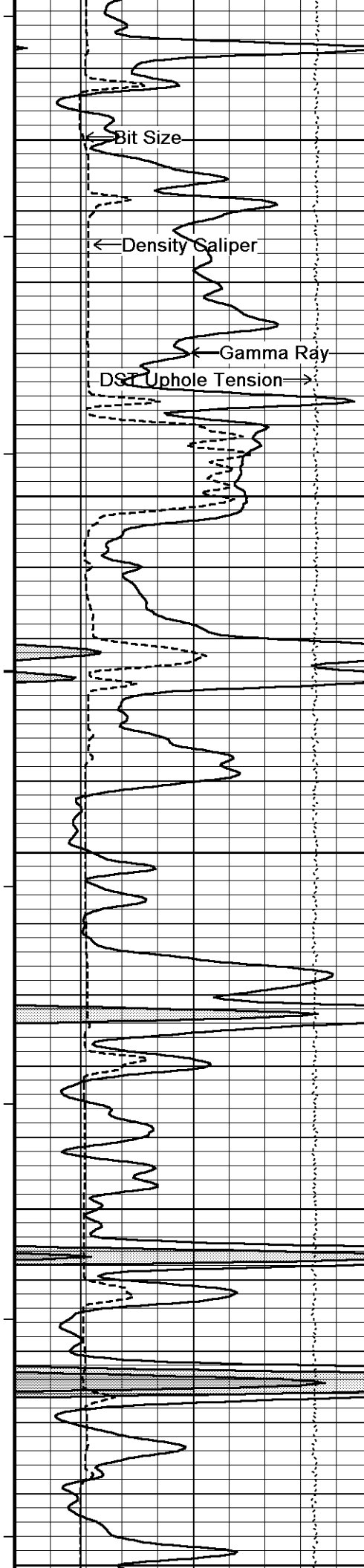
Tools Ran: MCG, MML, MDN, MPD, MFE, MSS, MAI.
Hardware Used: MDN Dual Eccentralizer used. MPD 8 inch profile plate used. MFE, MSS and MAI 0.5 inch standoffs used.
2.71 g/cc Limestone Density Matrix used to calculate porosity.
Sonic porosity calculated using a Limestone scale (47.5 usec/ft).
All intervals logged and scaled per customer's request.
Tight pulls, washouts and borehole rugosity will affect data quality.
Annular volume with 4.5 inch production casing= 247 cu. ft.
Total hole volume from TD to Surface casing= 2128 cu. ft.
Service order: #3534557
Rig: HD Drilling #2
Engineer: L. Scott
Operator(s): N. Adame

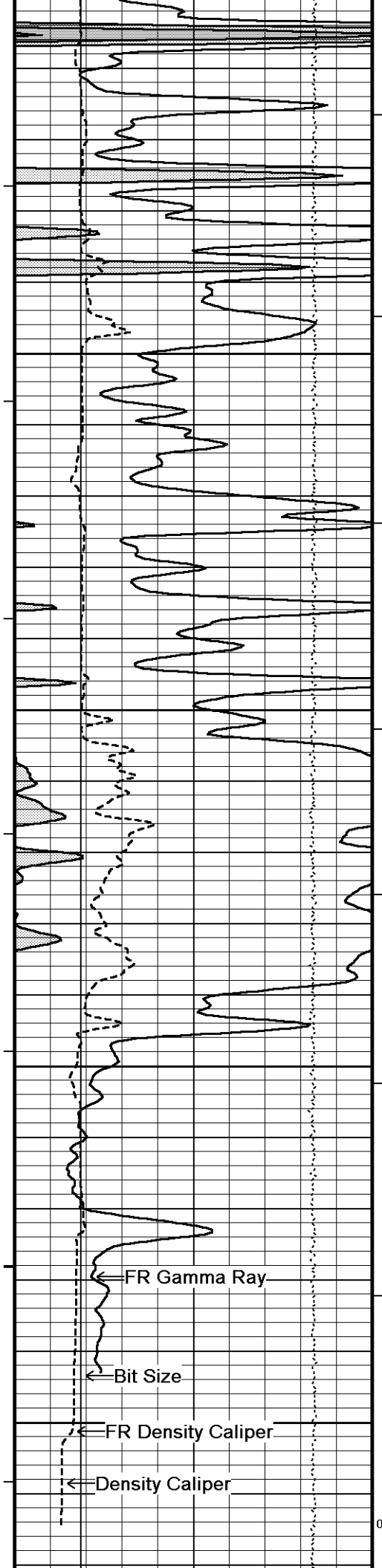
All interpretations are opinions based on inferences from electrical or other measurements and we cannot, and do not, guarantee the accuracy or correctness of any interpretations, and we shall not, except in the case of gross or wilful negligence on our part, be liable or responsible for any loss, costs, 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.



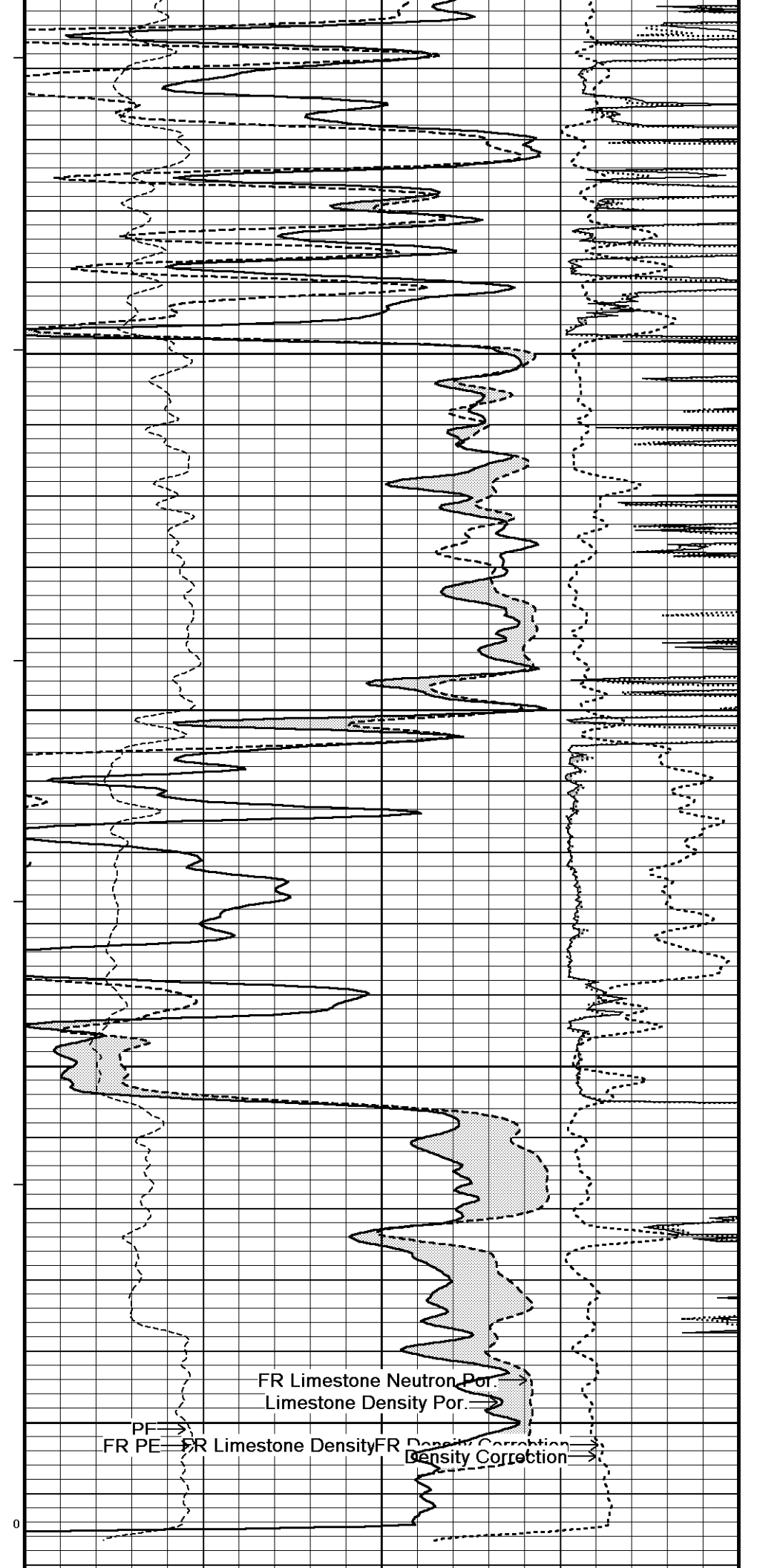




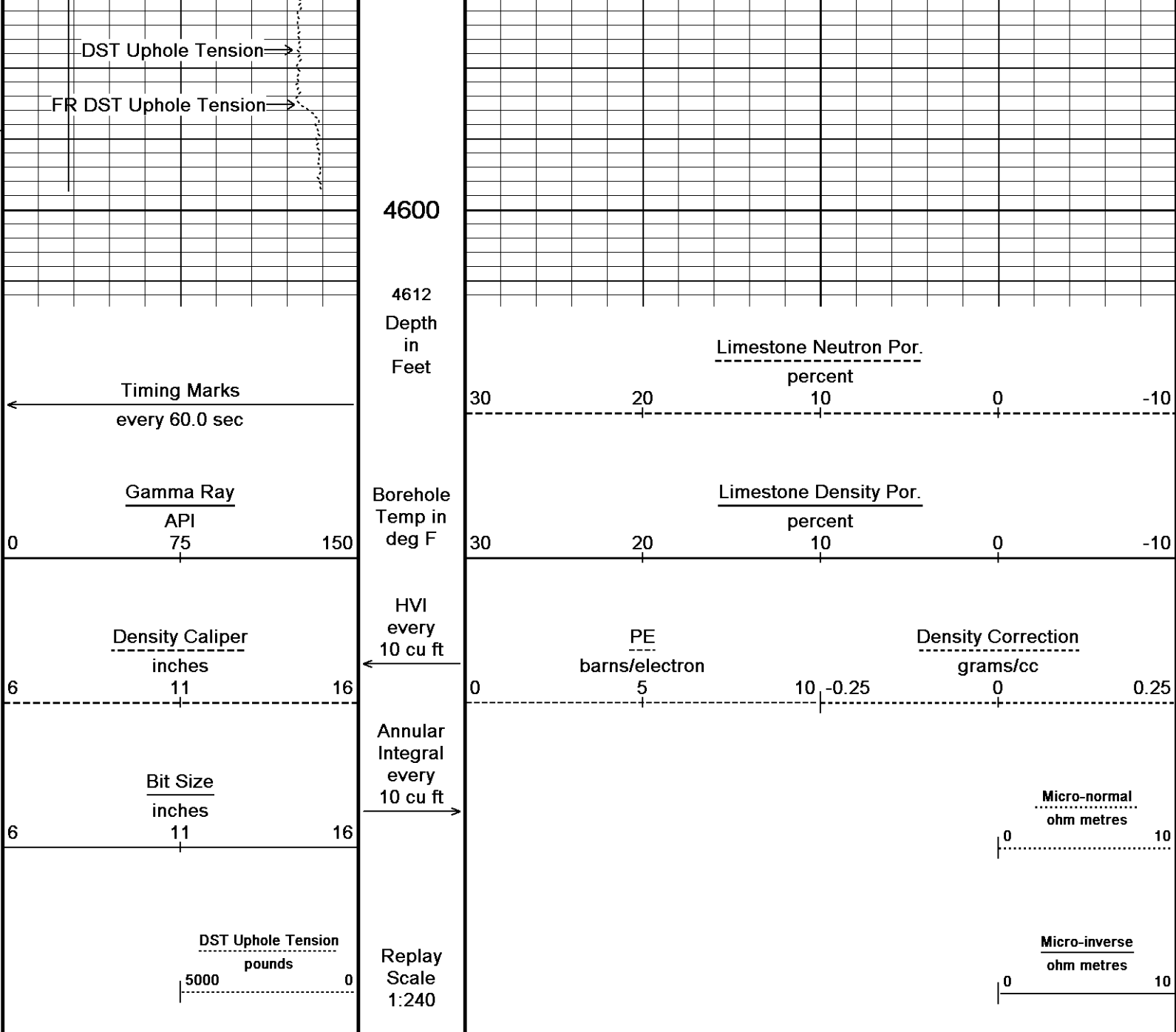




4550
109°
4400
109°
4450
110°
4500
109°
4550
0



PF
FR PE
FR Limestone Neutron Por.
Limestone Density Por.
FR Limestone Density
FR Density Correction
Density Correction



Depth Based Data - Maximum Sampling Increment 10.0cm

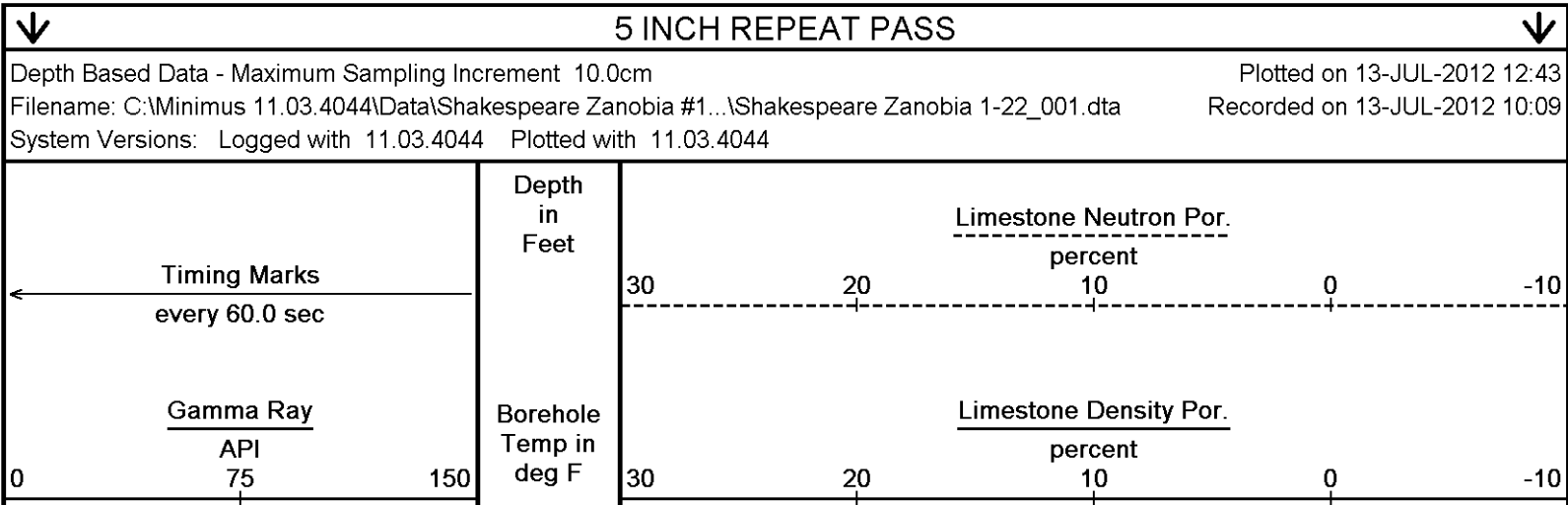
Plotted on 13-JUL-2012 12:43

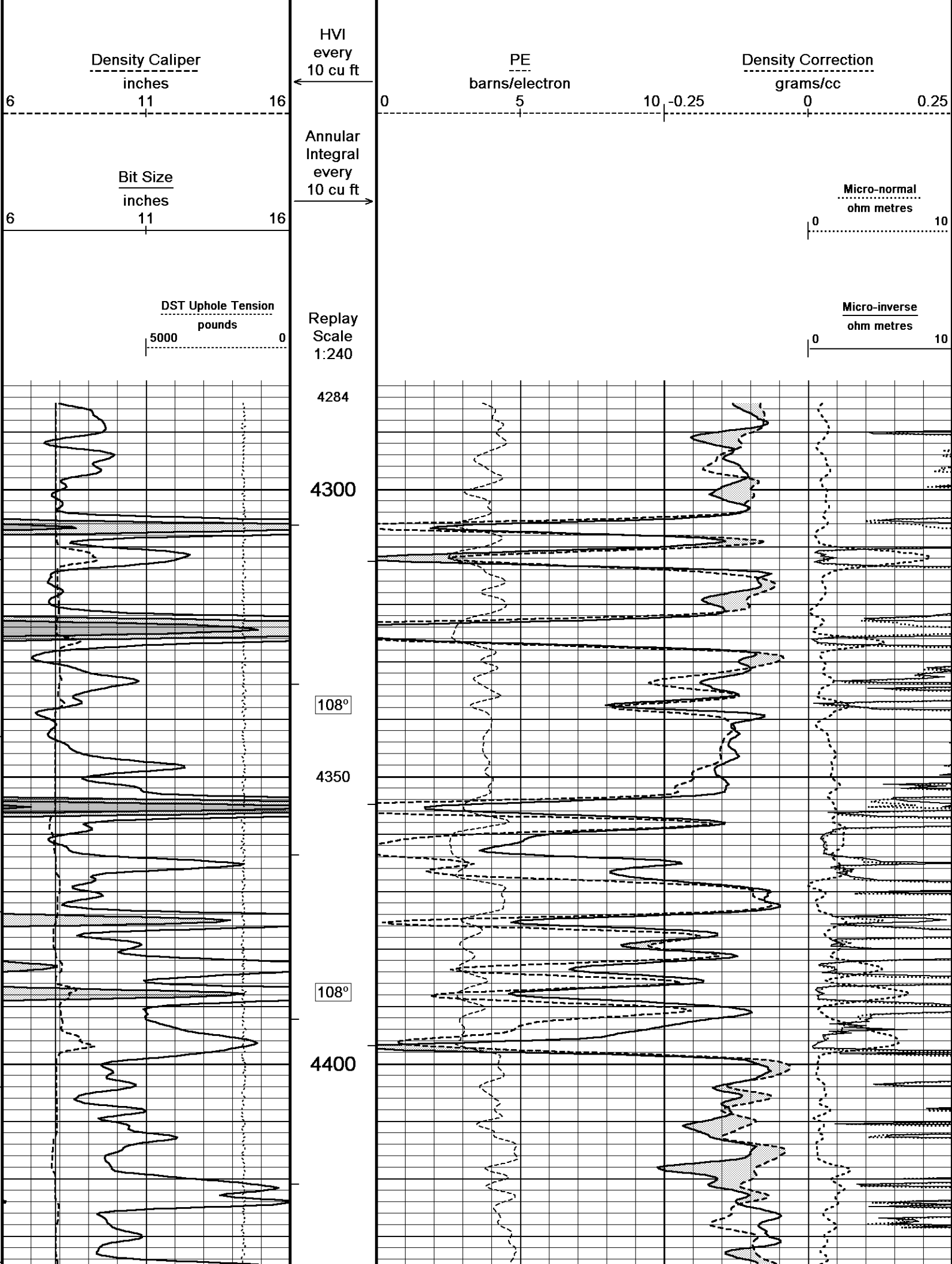
Filename: C:\Minimus 11.03.4044\Data\Shakespeare Zanobia #1...\Shakespeare Zanobia 1-22_002.dta

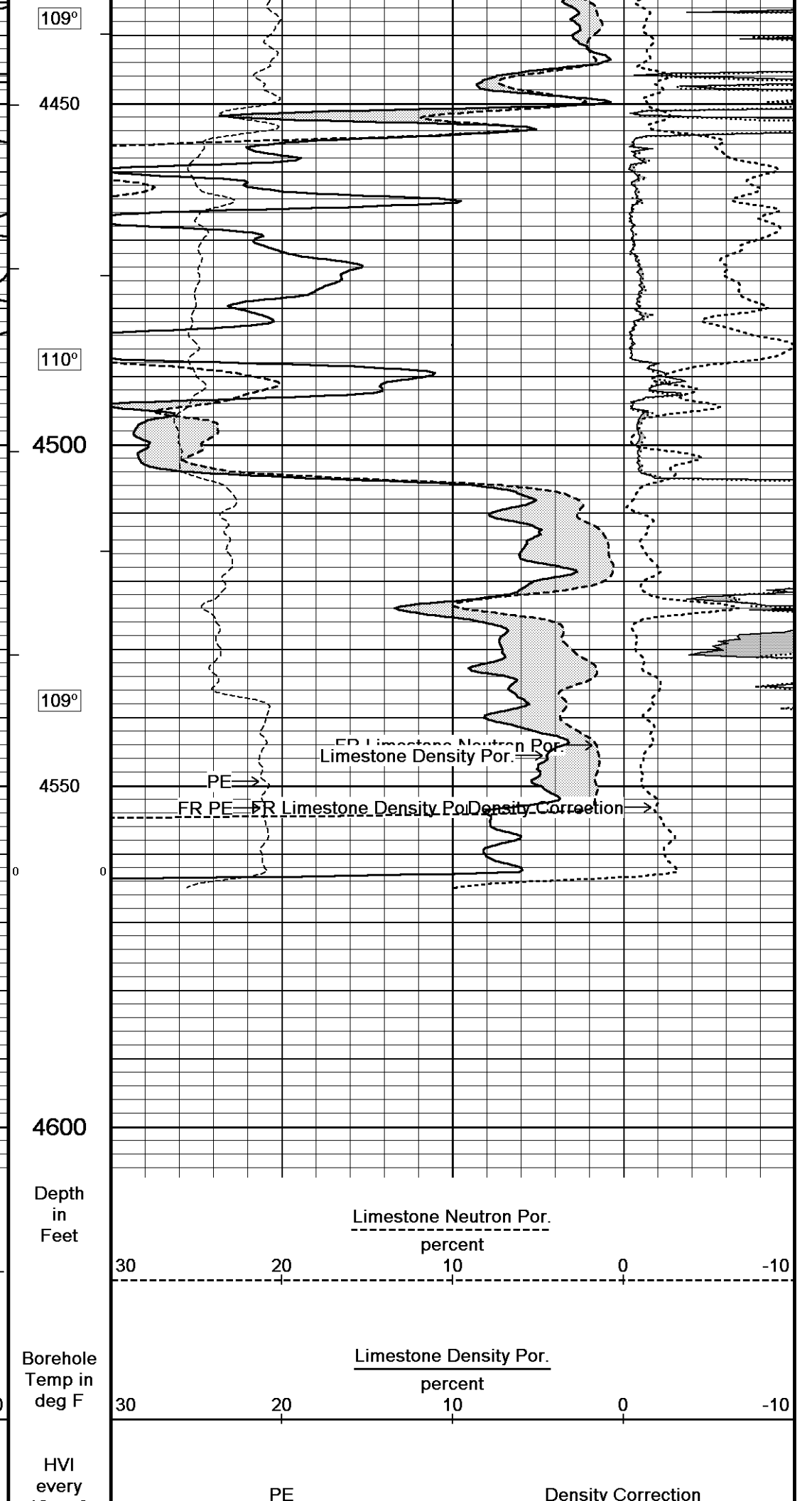
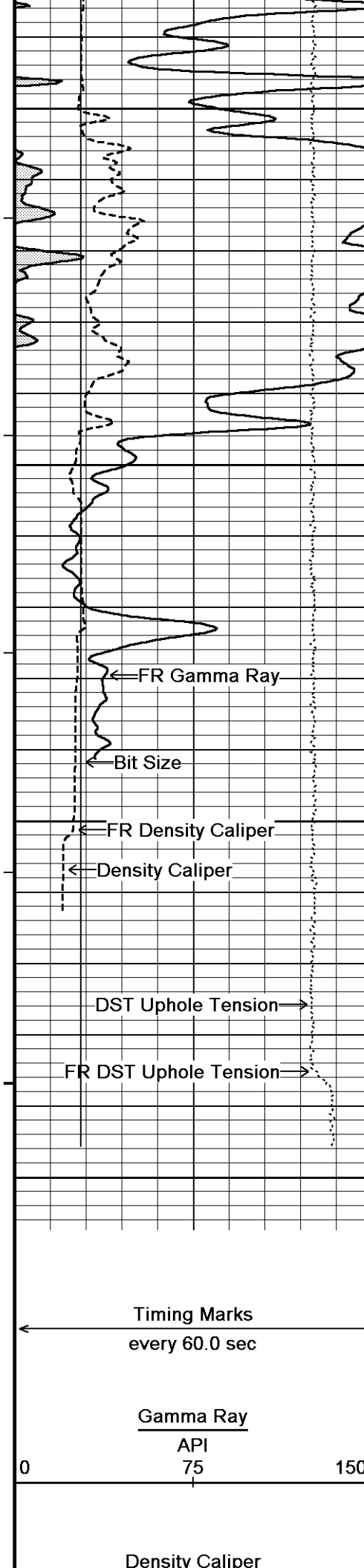
Recorded on 13-JUL-2012 10:29

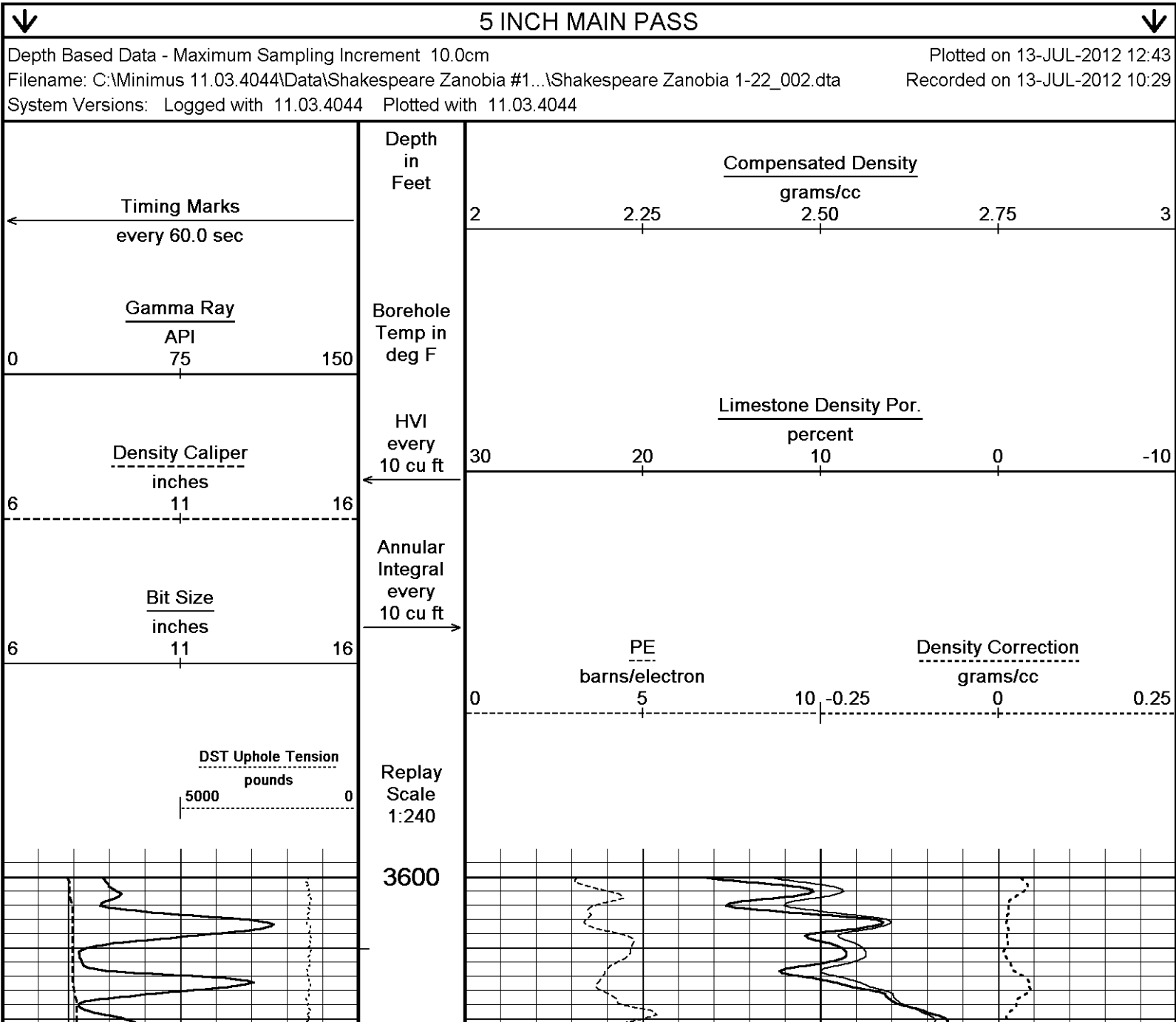
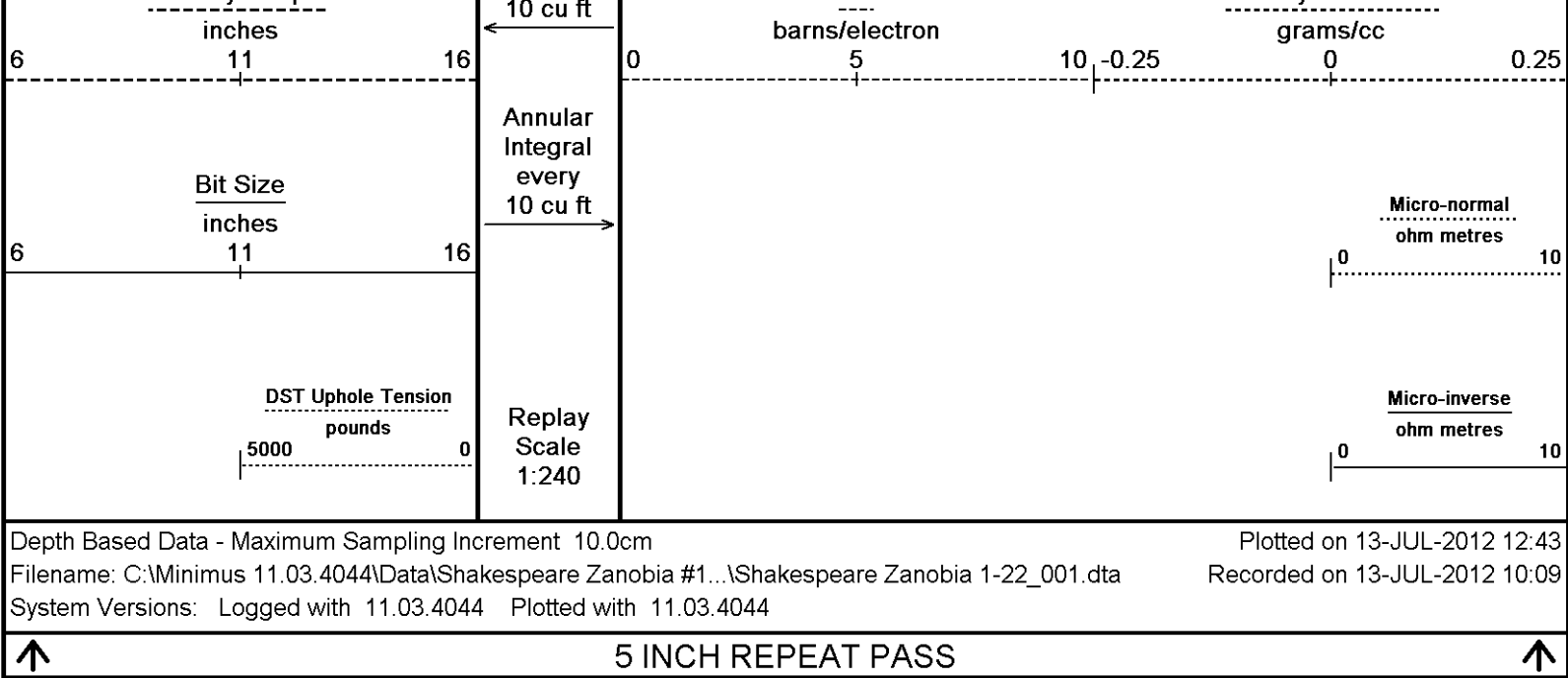
System Versions: Logged with 11.03.4044 Plotted with 11.03.4044

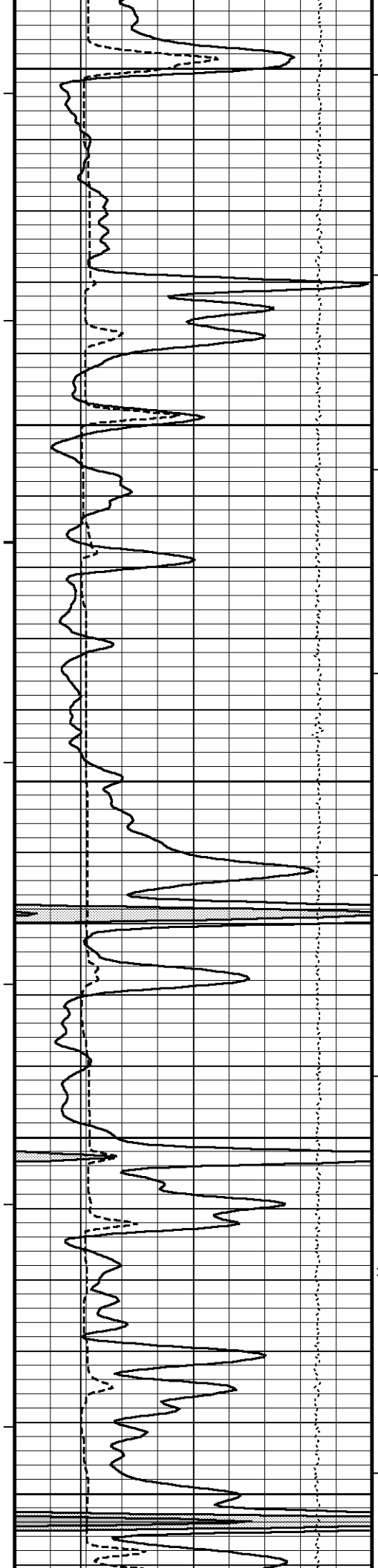
↑ 5 INCH MAIN PASS ↑



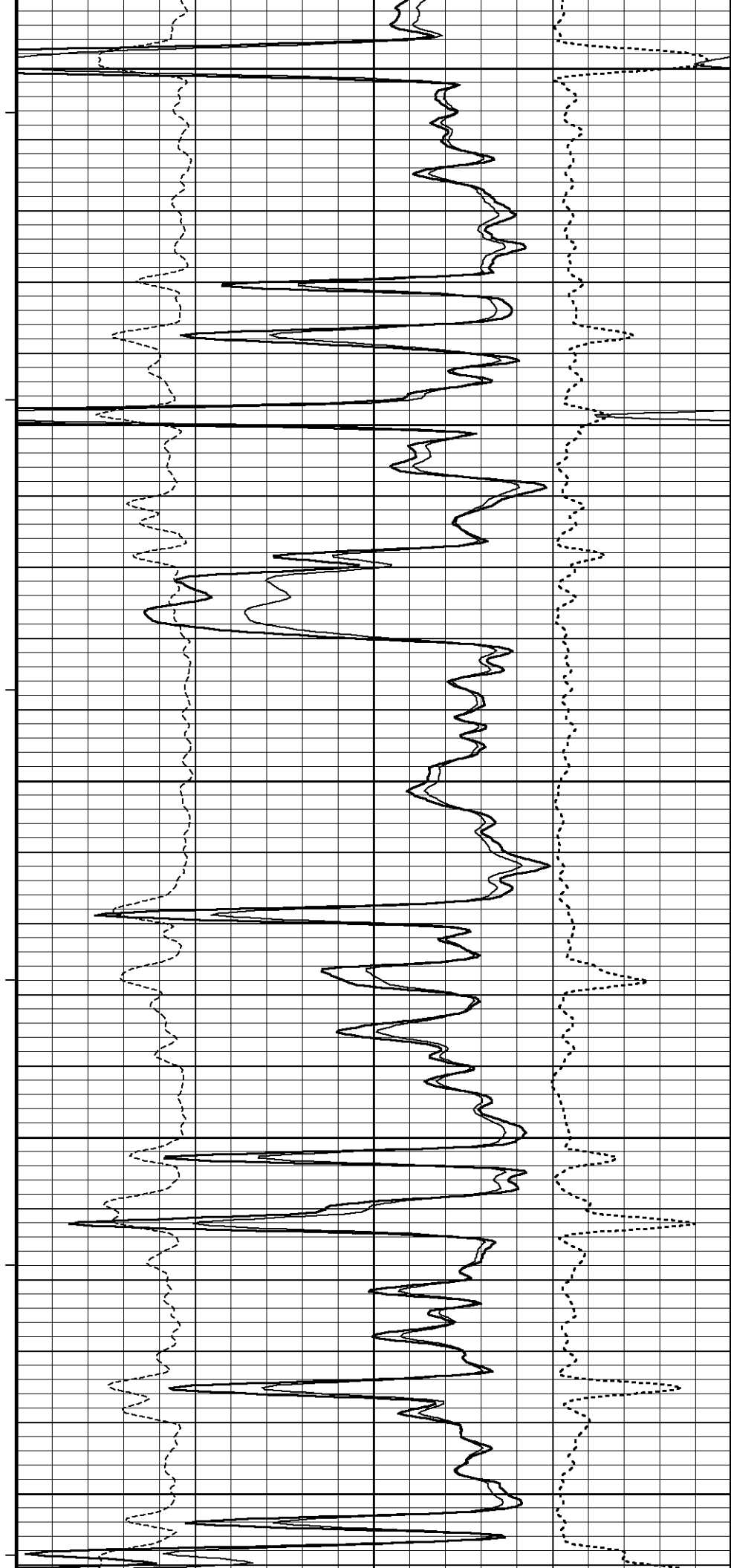


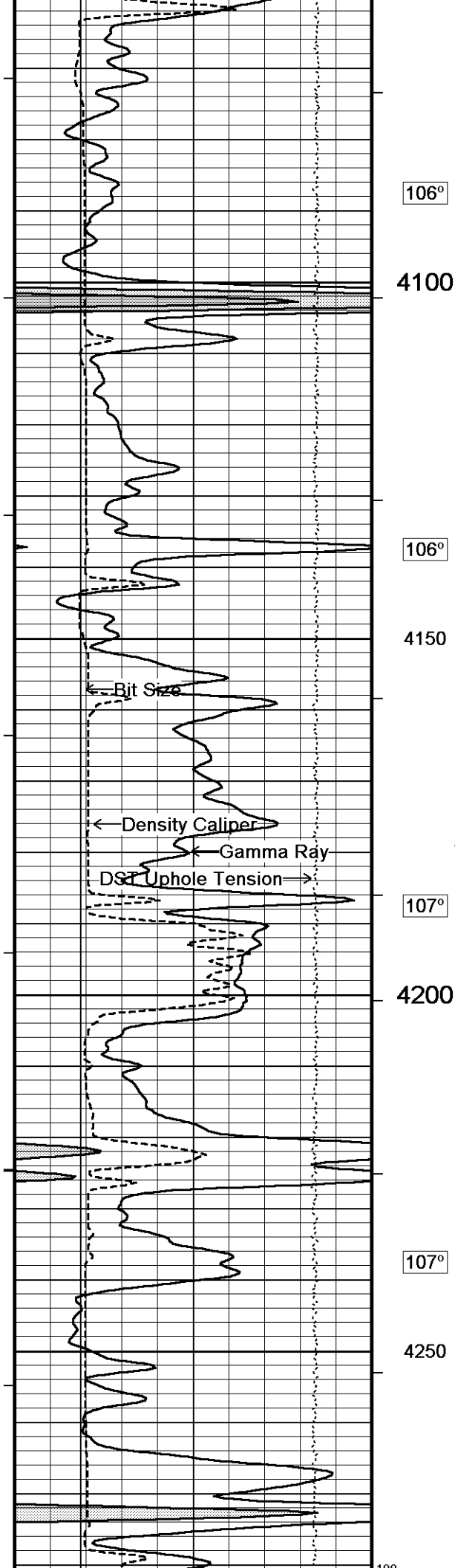






3850
105°
3900
106°
3950
106°
4000
200
4050





106°

4100

106°

4150

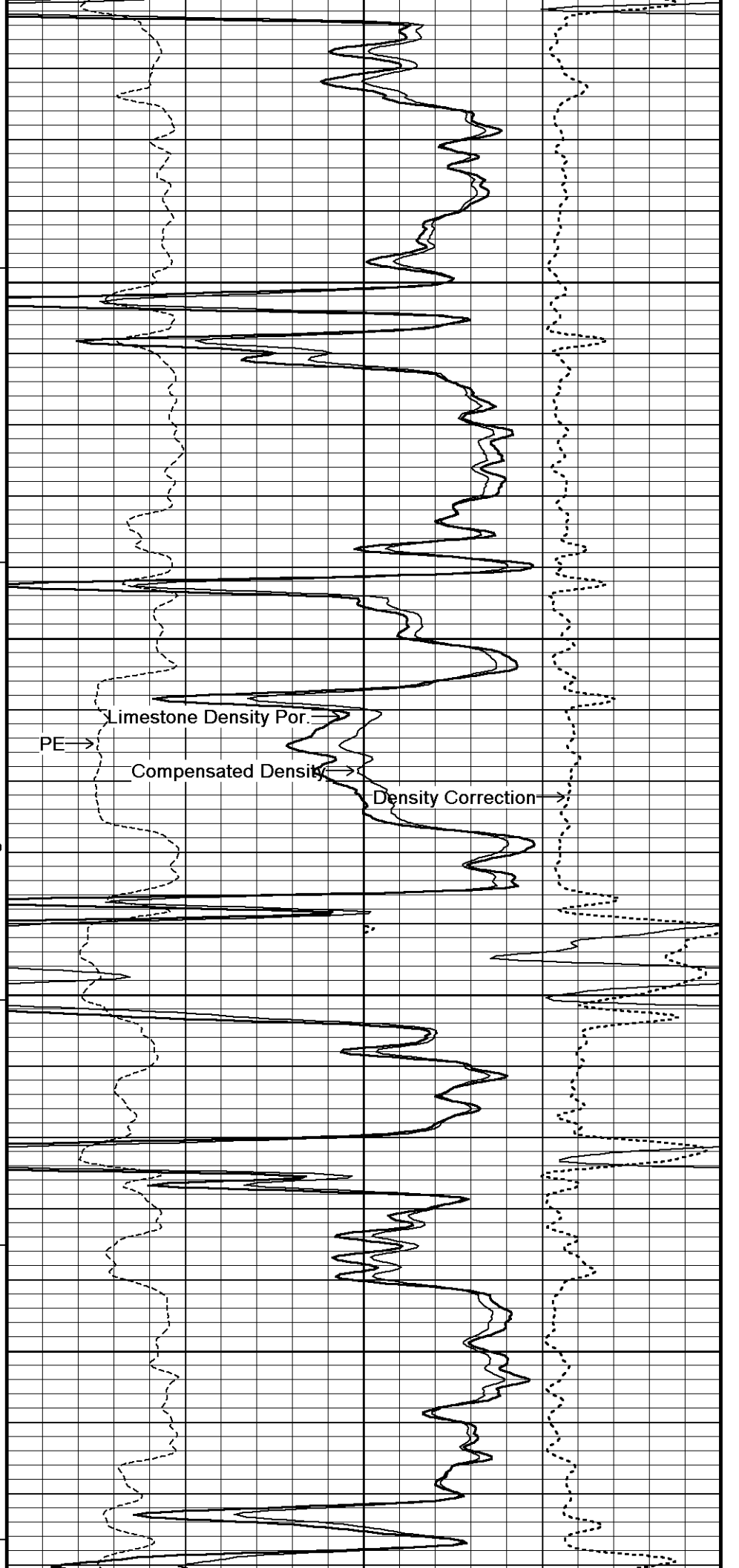
107°

4200

107°

4250

400



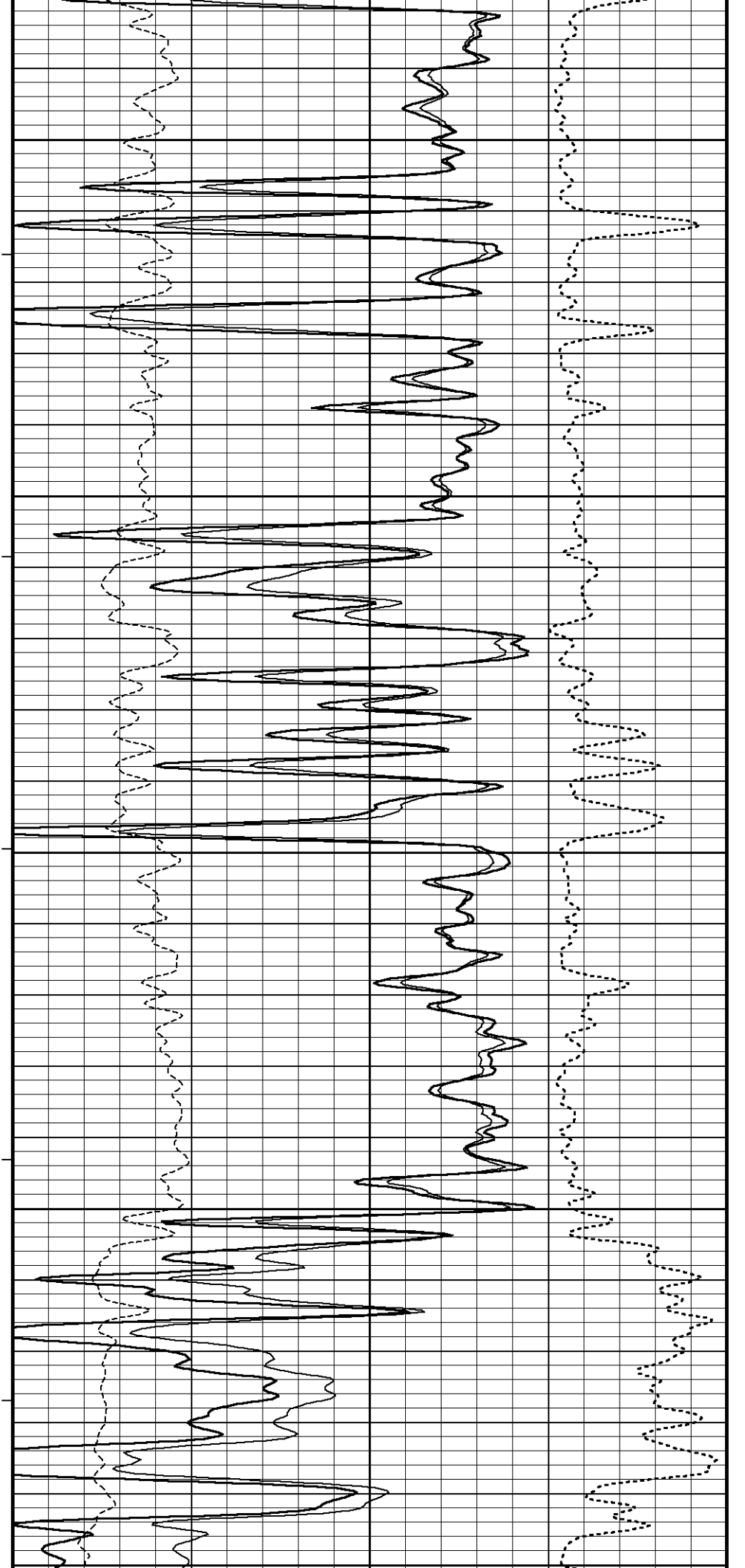
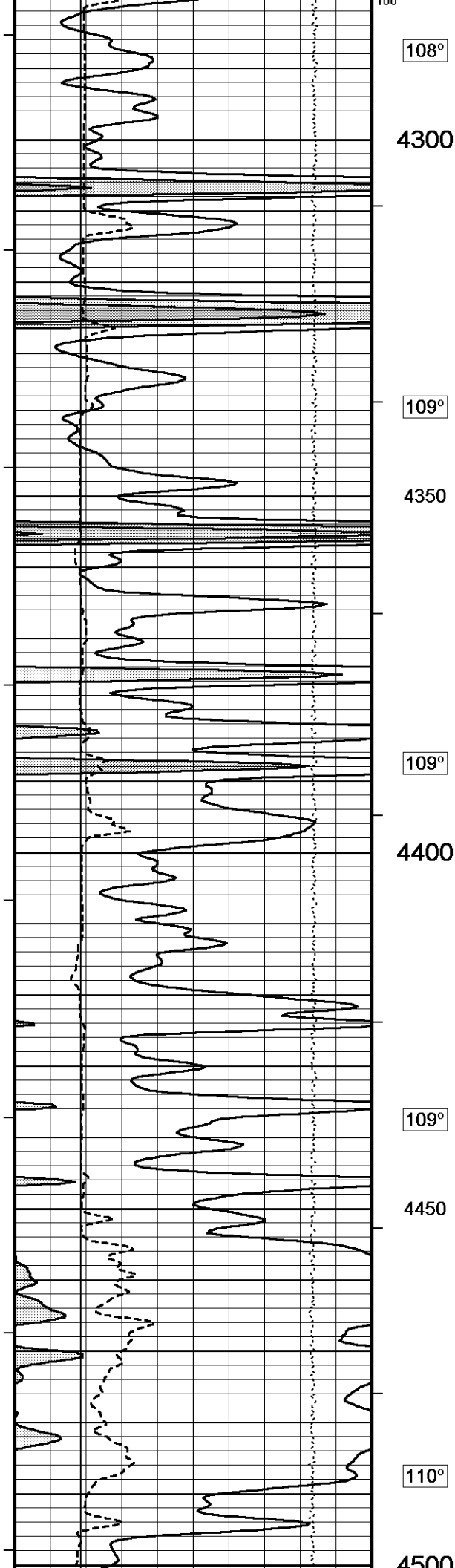
PE →

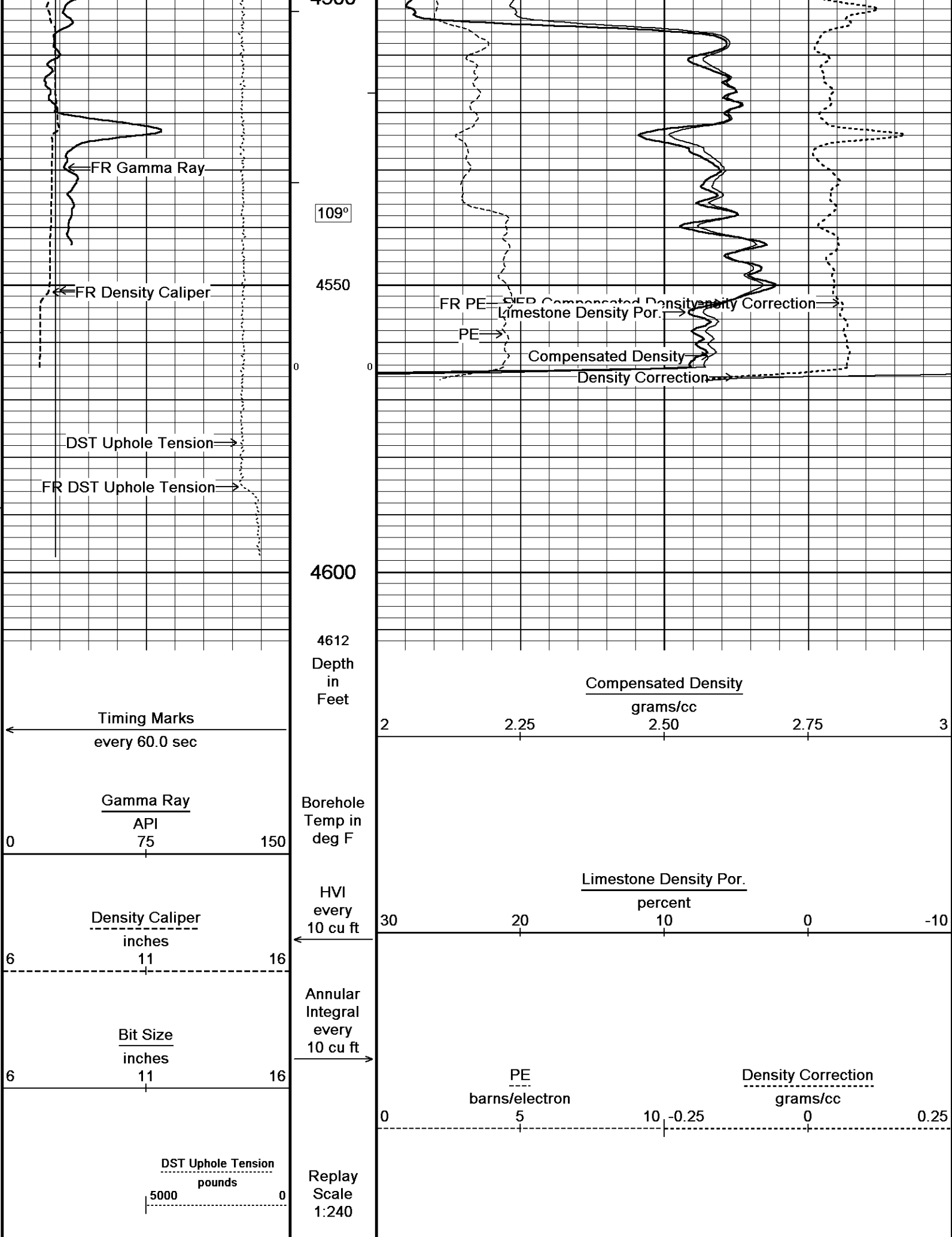
Limestone Density Por. →

Compensated Density →

Density Correction →

100

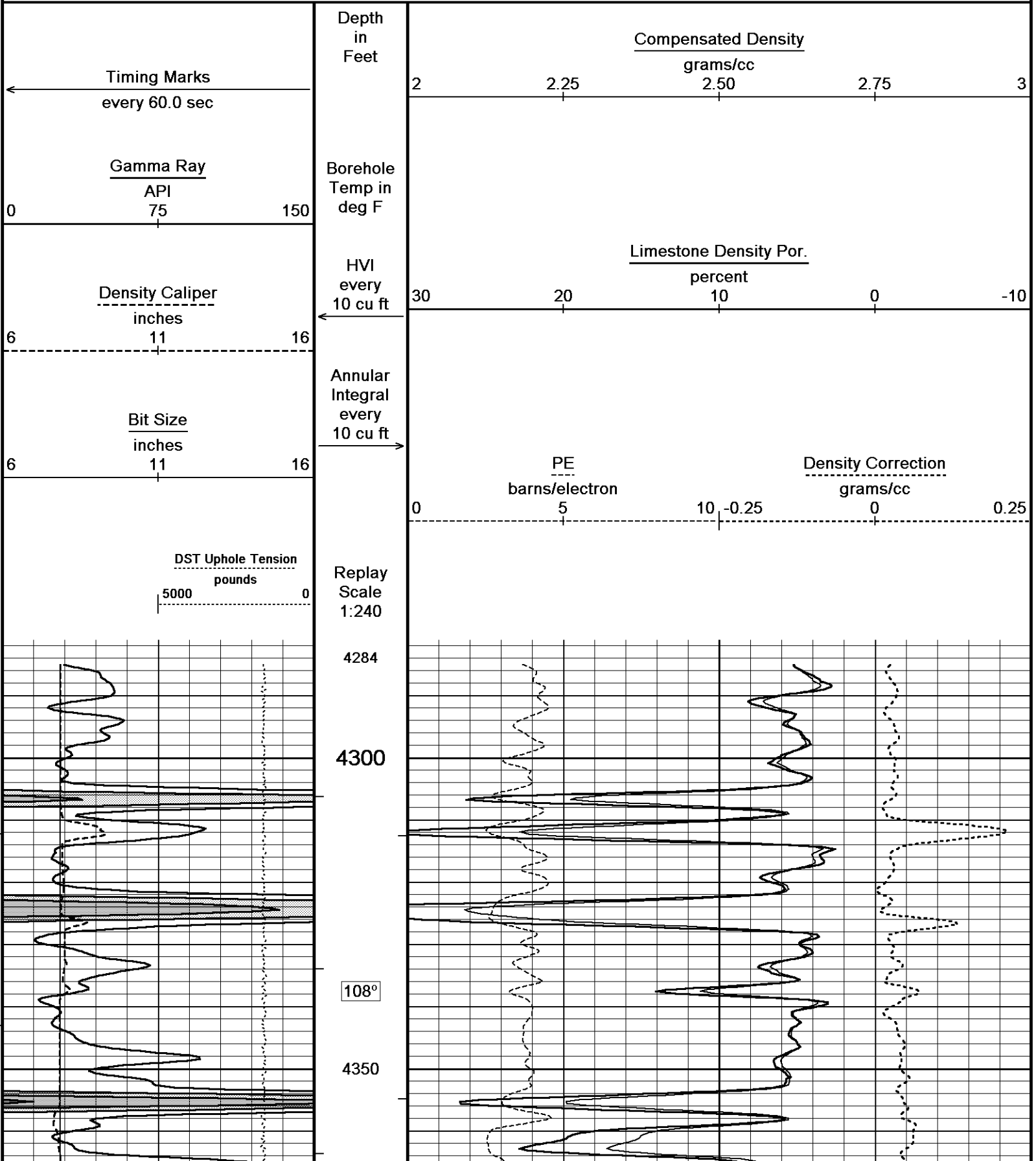


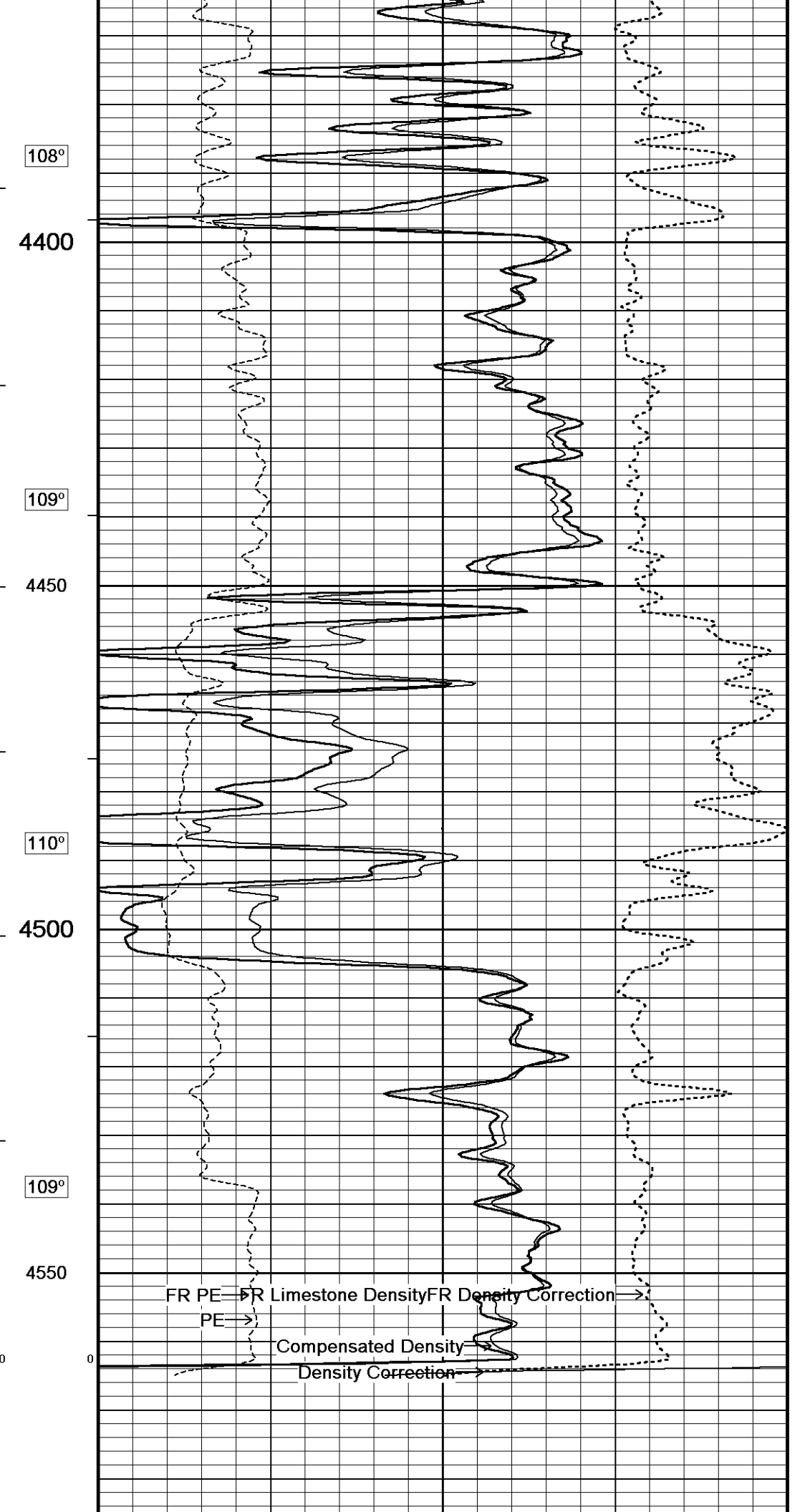
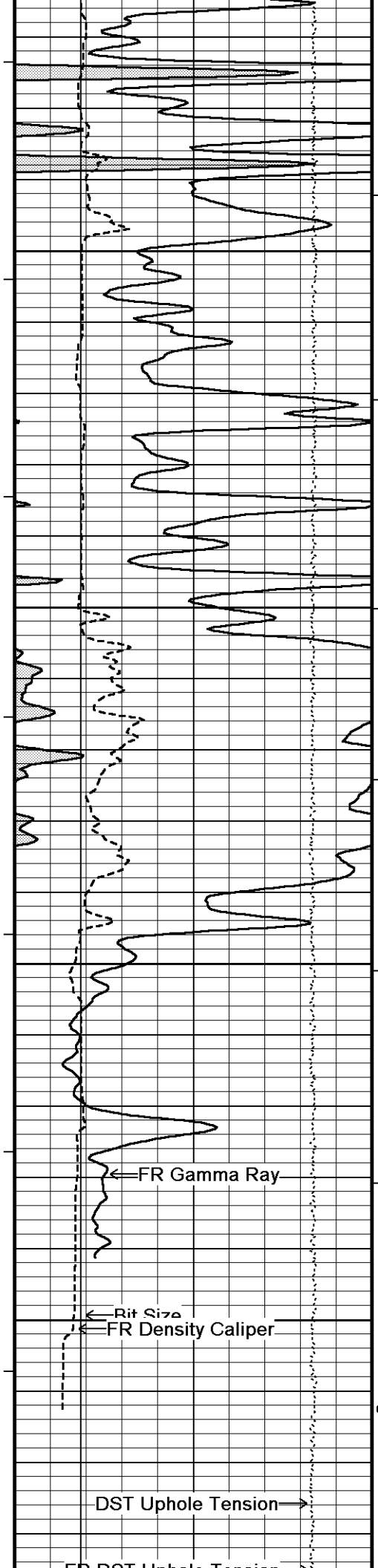


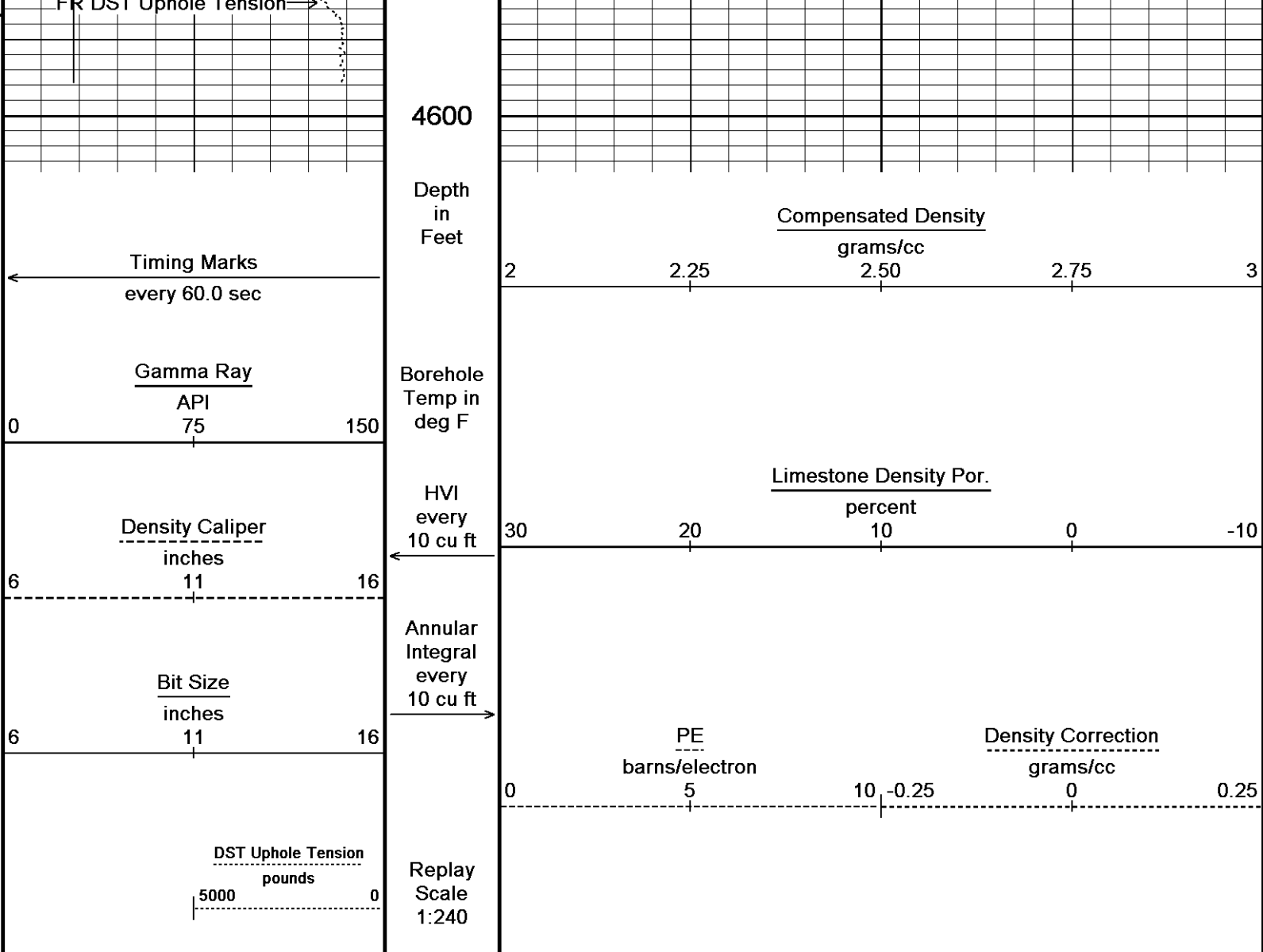
5 INCH MAIN PASS

5 INCH REPEAT PASS

Depth Based Data - Maximum Sampling Increment 10.0cm
Plotted on 13-JUL-2012 12:43
Filename: C:\Minimus 11.03.4044\Data\Shakespeare Zanobia #1...\Shakespeare Zanobia 1-22_001.dta
Recorded on 13-JUL-2012 10:09
System Versions: Logged with 11.03.4044 Plotted with 11.03.4044







Depth Based Data - Maximum Sampling Increment 10.0cm Plotted on 13-JUL-2012 12:43
Filename: C:\Minimus 11.03.4044\Data\Shakespeare Zanobia #1...\Shakespeare Zanobia 1-22_001.dta Recorded on 13-JUL-2012 10:09
System Versions: Logged with 11.03.4044 Plotted with 11.03.4044

↑ 5 INCH REPEAT PASS ↑

BEFORE SURVEY CALIBRATION		
C:\Minimus 11.03.4044\Data\Shakespeare Zanobia #1-22\Shakespeare Zanobia 1-22.dta		
General Constants All 000		Last Edited on 13-JUL-2012,09:08
General Parameters		
Mud Resistivity	0.340	ohm-metres
Mud Resistivity Temperature	87.000	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	

Down-hole Tension Calibration SMS 0			Field Calibration on 08-JUL-2012 04:57	
Reading No	Measured	Calibrated (lbs)		
1	13893.37	0.00		
2	13954.26	582.00		
Gamma Calibration MCG-C 84			Field Calibration on 12-JUL-2012 15:43	
	Measured	Calibrated (API)		
Background	72	49		
Calibrator (Gross)	1139	774		
Calibrator (Net)	1067	725		
Gamma Constants MCG-C 84			Last Edited on 13-JUL-2012,09:08	
Gamma Calibrator Number	GR38			
Mud Density	1.04	gm/cc		
Caliper Source for Processing	Density Caliper			
Tool Position	Eccentred			
Concentration of KCl	0.00	kppm		
SP Calibration MCG-C 84			Field Calibration on 06-JUL-2012 09:32	
	Measured	Calibrated (mV)		
Reference 1	105.6	101.0		
Reference 2	-96.1	-101.0		
High Resolution Temperature Calibration MCG-C 84			Field Calibration on 28-MAY-2012,07:32	
	Measured	Calibrated(Deg F)		
Lower	50.00	50.00		
Upper	75.00	75.00		
High Resolution Temperature Constants MCG-C 84			Last Edited on	
Pre-filter Length	11			
Micro Normal and Micro Inverse Calibration MML-A 4			Base Calibration on 28-JUN-2012 09:09 Field Check on 12-JUL-2012 15:34	
Base Calibration				
Channel	Resistor 1	Measured Resistor 2	Calibrated (ohm-m)	
			Resistor 1	Resistor 2
Micro Normal	12.2	60.3	5.0	25.0
Micro Inverse	15.7	78.4	5.0	25.0
Channel	Base Check (ohm-m)		Field Check (ohm-m)	
Micro Normal	62.9		62.9	
Micro Inverse	48.2		48.2	
Micro Normal and Micro Inverse Constants MML-A 4			Last Edited on 12-JUL-2012,15:32	
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			
Caliper Calibration MML-A 4			Base Calibration on 28-JUN-2012 09:05 Field Calibration on 12-JUL-2012 15:32	
Base Calibration				
Reading No	Measured	Calibrator Size (in)		
1	15261	5.98		
2	18643	7.97		
3	21962	9.86		
4	25966	11.92		
5	0	0.00		
6	N/A	N/A		
Field Calibration				
	Measured Caliper (in)	Actual Caliper (in)		
	6.09	5.98		
Neutron Calibration MDN-A.B 65			Base Calibration on 28-JUN-2012 11:51 Field Check on 12-JUL-2012 15:50	

Base Calibration		Measured		Calibrated (cps)	
	Near		Far	Near	Far
	3161		99	3714	110
Ratio		31.971			33.764
Field Calibrator at Base				Calibrated (cps)	
				1631	2328
Ratio					0.700
Field Check				Calibrated (cps)	
				1629	2346
Ratio					0.695

Neutron Constants MDN-A.B 65				Last Edited on 13-JUL-2012,09:09	
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	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 55			Base Calibration on 19-JUN-2012 09:07 Field Check on 12-JUL-2012 15:22		
Base Calibration		Measured	Calibrated (ohm-m)		
Reference 1		0.0		0.0	
Reference 2		952.0		126.8	
Base Check				281.3	
Field Check				281.3	

FE Constants MFE-A.A 55				Last Edited on 13-JUL-2012,09:09	
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		

Sonic Constants MSS-C.K 330				Last Edited on 13-JUL-2012,09:09	
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	

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 45

Base Calibration on 12-JAN-2012,13:34
Field Check on 12-JUL-2012 15:21

Base Calibration

Test Loop Calibration	Measured		Calibrated (mmho/m)	
Channel	Low	High	Low	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 79.4 Deg F

Channel	Base Check (mmho/m)		Field Check (mmho/m)	
	Low	High	Low	High
1	0.0	0.0	18.3	3851.8
2	0.0	0.0	31.6	3629.8
3	0.0	0.0	28.6	3049.8
4	0.0	0.0	18.3	2079.3
Deep	0.0	0.0	16.0	1911.3
Medium	0.0	0.0	42.5	4061.2
Shallow	0.0	0.0	49.5	5483.8

Array Temperature 0.0 88.5 Deg F

Induction Constants MAI-A.A 45

Last Edited on 13-JUL-2012,09:09

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	

High Resolution Temperature Calibration MAI-A.A 45

Field Calibration on 28-JUN-2012,09:51

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

High Resolution Temperature Constants MAI-A.A 45

Last Edited on 12-JAN-2012,11:13

Pre-filter Length	11
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Caliper Calibration MPD-B 31

Base Calibration on 17-JUN-2012 20:26

Field Calibration on 12-JUL-2012 15:23

Base Calibration

Reading No	Measured	Calibrator Size (in)
1	17360	3.99
2	25891	5.98
3	34800	7.97
4	43168	9.86
5	52528	11.92
6	N/A	N/A

Field Calibration

Measured Caliper (in)	Actual Caliper (in)
6.00	5.98

Photo Density Calibration MPD-B 31

Base Calibration on 17-JUN-2012 20:49

Field Check on 12-JUL-2012 15:29

Density Calibration

Base Calibration	Measured		Calibrated (sdu)	
	Near	Far	Near	Far
Reference 1	48464	24458	59556	30836
Reference 2	19785	1991	24941	2541

Field Check at Base

695.5	853.6
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Field Check

693.4	856.0
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PE Calibration

Base Calibration

	WS	Measured WH	Ratio	Calibrated Ratio
Background	128	610		
Reference 1	19401	48326	0.404	0.371
Reference 2	5740	19688	0.294	0.272

Field Check at Base

128.0 610.0

Field Check

127.7 608.0

Density Constants MPD-B 31

Last Edited on 13-JUL-2012,09:09

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	1.04 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 11.03.4044\Data\Shakespeare Zanobia #1-22\Shakespeare Zanobia 1-22.dta

Compact Comms Gamma
MCG-C 84 LG: 8.70 ft WT: 63.9 lb OD: 2.24 in

Compact Comms Gamma
MCG-C 84 LG: 8.70 ft WT: 63.9 lb OD: 2.24 in

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

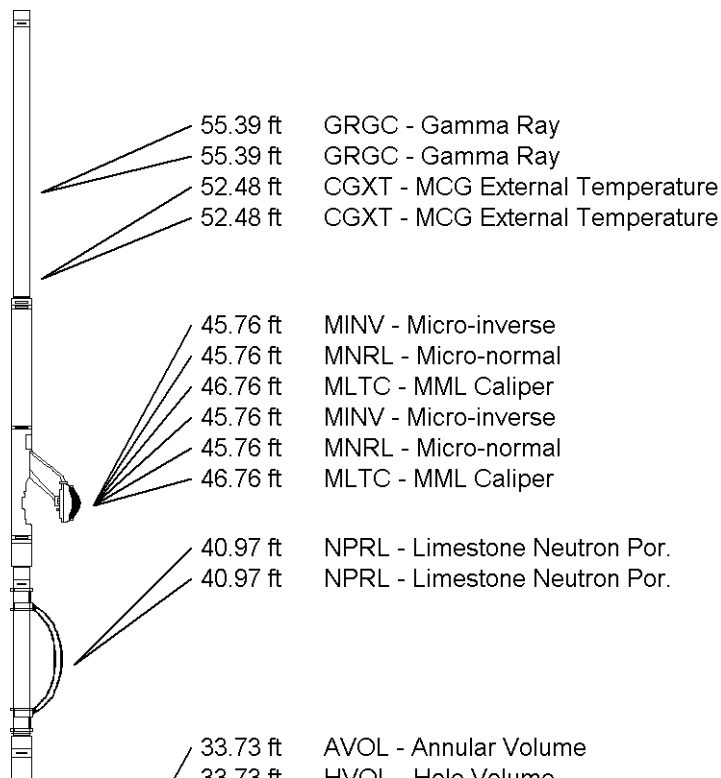
Compact Micro-log
MML-A 4 LG: 7.97 ft WT: 81.6 lb OD: 2.24 in

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

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



Compact Focussed Electric
MFE-A.A 55 LG: 6.05 ft WT: 48.5 lb OD: 2.24 in

Compact Focussed Electric
MFE-A.A 55 LG: 6.05 ft WT: 48.5 lb OD: 2.24 in

Compact Sonic
MSS-C.K 330 LG: 12.52 ft WT: 72.8 lb OD: 2.24 in

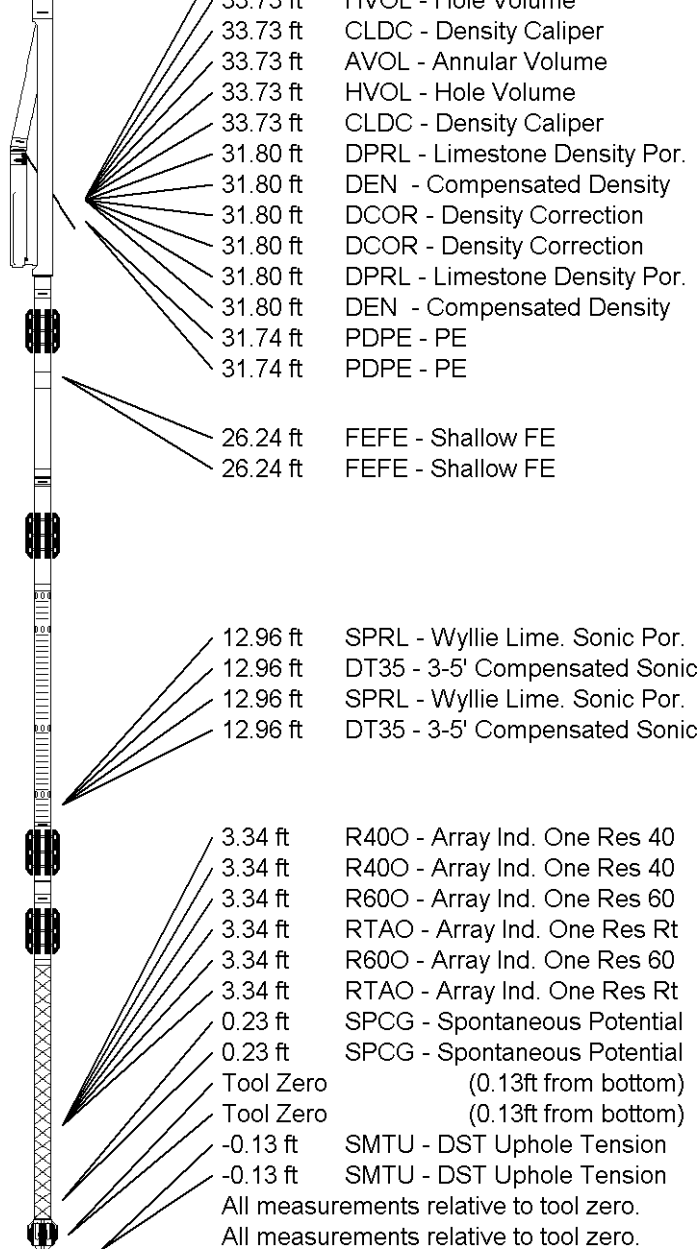
Compact Sonic
MSS-C.K 330 LG: 12.52 ft WT: 72.8 lb OD: 2.24 in

Compact Induction
MAI-A.A 45 LG: 10.81 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: 60.68 ft Weight: 456.4 lb

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COMPANY	SHAKESPEARE OIL COMPANY, INC.
WELL	ZANOBIA #1-22
FIELD	WILDCAT
PROVINCE/COUNTY	LOGAN
COUNTRY/STATE	U.S.A. / KANSAS

Elevation Kelly Bushing	2812.00	feet	First Reading	4553.00	feet
Elevation Drill Floor	2811.00	feet	Depth Driller	4585.00	feet
Elevation Ground Level	2802.00	feet	Depth Logger	4585.00	feet



Weatherford®

COMPACT PHOTO DENSITY
COMPENSATED NEUTRON
MICRORESISTIVITY LOG

