



Weatherford

**COMPACT PHOTO DENSITY
COMPENSATED NEUTRON
MICRORESISTIVITY LOG**

COMPANY					SHAKESPEARE OIL CO., INC.				
WELL					CARSON 3-25				
FIELD					PENCE EAST				
PROVINCE/COUNTY					SCOTT				
COUNTRY/STATE					U.S.A. / KANSAS				
LOCATION					1000' FSL & 1600' FWL				
SEC 25	TWP 16S	RGE 34W	Other Services		MSS				
Latitude		MAI							
Longitude									
API Number		15-171-21064							
Permanent Datum GL, Elevation 3102 feet									
Log Measured From KB									
Drilling Measured From KB									
Date					08-JUN-2014				
Run Number					ONE				
Service Order					4558-89434029				
Depth Driller					4870.00		feet		
Depth Logger					4869.00		feet		
First Reading					4843.00		feet		
Last Reading					3750.00		feet		
Casing Driller					266.00		feet		
Casing Logger					267.00		feet		
Bit Size					7.875		inches		
Hole Fluid Type					CHEMICAL				
Density / Viscosity					9.30 lb/USg		50.00 CP		
PH / Fluid Loss					10.50		9.60 ml/30Min		
Sample Source					MUDPIT				
Rm @ Measured Temp					0.57 @ 70.0		ohm-m		
Rmf @ Measured Temp					0.46 @ 70.0		ohm-m		
Rmc @ Measured Temp					0.68 @ 70.0		ohm-m		
Source Rmf / Rmc					CALC		CALC		
Rm @ BHT					0.35 @115.0		ohm-m		
Time Since Circulation					4 HOURS				
Max Recorded Temp					115.00		deg F		
Equipment / Base					13244		LIB		
Recorded By					ADAM SILL				
Witnessed By					WES HANSON				
JOB #					LB14-174				

BOREHOLE RECORD					Last Edited: 08-JUN-2014 15:40
Bit Size inches		Depth From feet		Depth To feet	
7.875		265.00		4870.00	
CASING RECORD					
Type	Size inches	Depth From feet	Shoe Depth feet	Weight pounds/ft	
SURFACE	8.625	0.00	265.00	24.00	

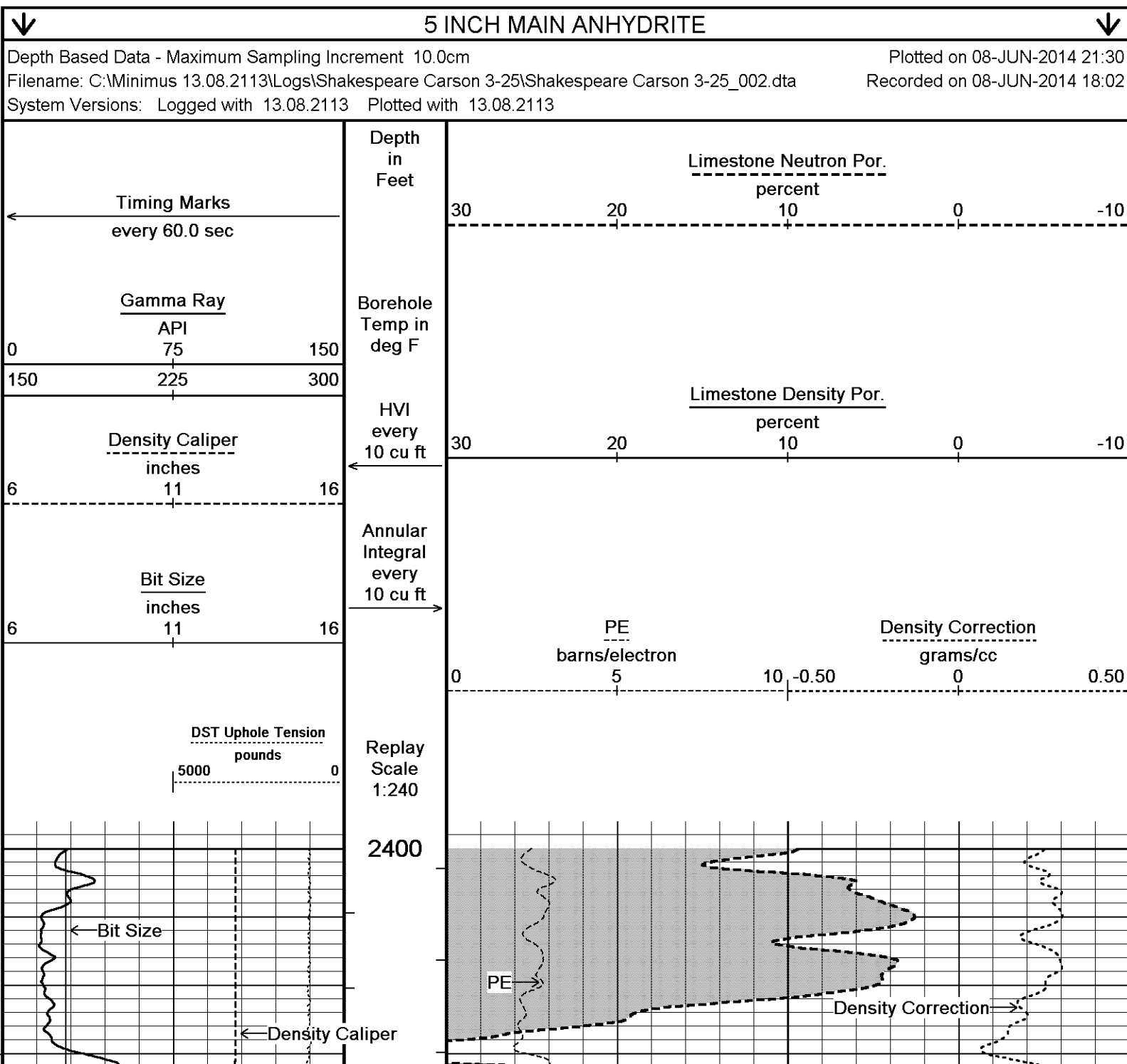
REMARKS
- SOFTWARE ISSUE: WLS 13.08.2113.
- RUN ONE: MCG, MML, MDN, MPD, MSS, MAI RUN IN COMBINATION. - HARDWARE: DUAL BOWSPRING USED ON MDN. TWO 0.5 INCH STANDOFFS USED ON MSS. 0.5 INCH STANDOFF USED ON MAI.
- 2.71 G/CC LIMESTONE DENSITY MATRIX USED TO CALCULATE POROSITY.
- BOREHOLE RUGOSITY, TIGHT PULLS, AND WASHOUTS WILL AFFECT DATA QUALITY.
- ALL INTERVALS LOGGED AND SCALED PER CUSTOMER'S REQUEST.
- TOTAL HOLE VOLUME FROM TD TO SURFACE CASING: 2141 CU.FT.
- ANNULAR HOLE VOLUME WITH 5.5 INCH PRODUCTION CASING FROM TD TO 3750 FEET: 198 CU.FT.
- RIG: SOUTHWIND #70

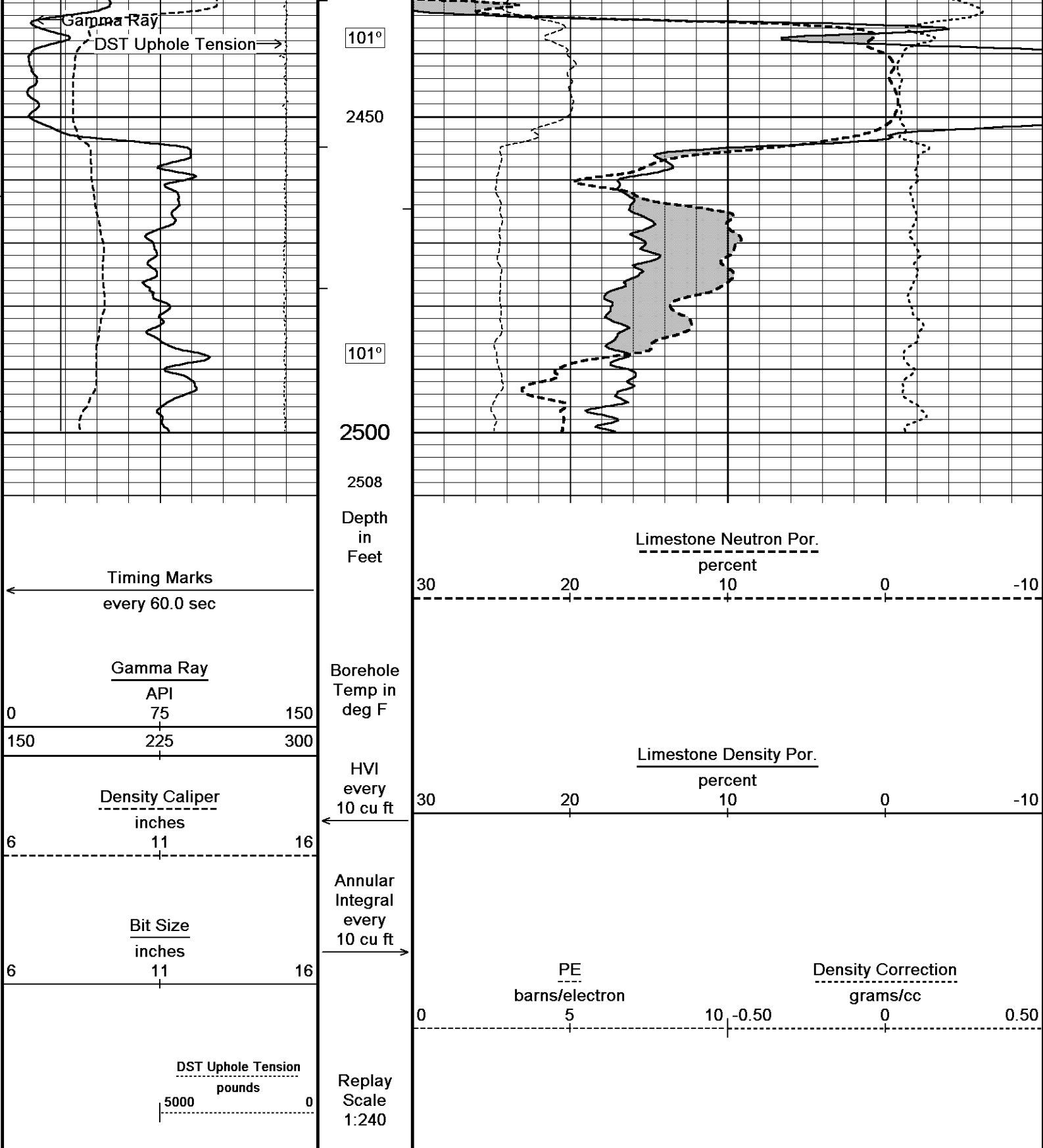
RIS: 00311 WIND #70.

- ENGINEER: A. SILL.

- OPERATOR: K. RINEHART.

In interpreting, communicating or providing information and/or making recommendations, either written or oral, as to logs or test or other data, type or amount of material, or Work or other service to be furnished, or manner of performance, or in predicting results to be obtained, the Contractor will give the Company the benefit of the Contractor's best judgment based on its experience and will perform all such Work in a good and workmanlike manner. Any interpretation of test or other data, and any recommendation or reservoir description based upon such interpretations, are opinions based upon inferences from measurements and empirical relationships and assumptions, which inferences and assumptions are not infallible, and with respect to which professional engineers and analysts may differ. ACCORDINGLY ANY INTERPRETATION OR RECOMMENDATION RESULTING FROM THE SERVICES WILL BE AT THE SOLE RISK OF THE COMPANY, AND THE CONTRACTOR CANNOT AND DOES NOT WARRANT THE ACCURACY, CORRECTNESS OR COMPLETENESS OF ANY SUCH INTERPRETATION OR RECOMMENDATION, WHICH INTERPRETATIONS AND RECOMMENDATIONS SHOULD NOT, THEREFORE, UNDER ANY CIRCUMSTANCES BE RELIED UPON AS THE SOLE OR MAIN BASIS FOR ANY DRILLING, COMPLETION, WELL TREATMENT, PRODUCTION OR FINANCIAL DECISION, OR ANY PROCEDURE INVOLVING ANY RISK TO THE SAFETY OF ANY DRILLING ACTIVITY, DRILLING RIG OR ITS CREW OR ANY OTHER INDIVIDUAL. THE COMPANY HAS FULL RESPONSIBILITY FOR ALL DECISIONS CONCERNING THE SERVICES.



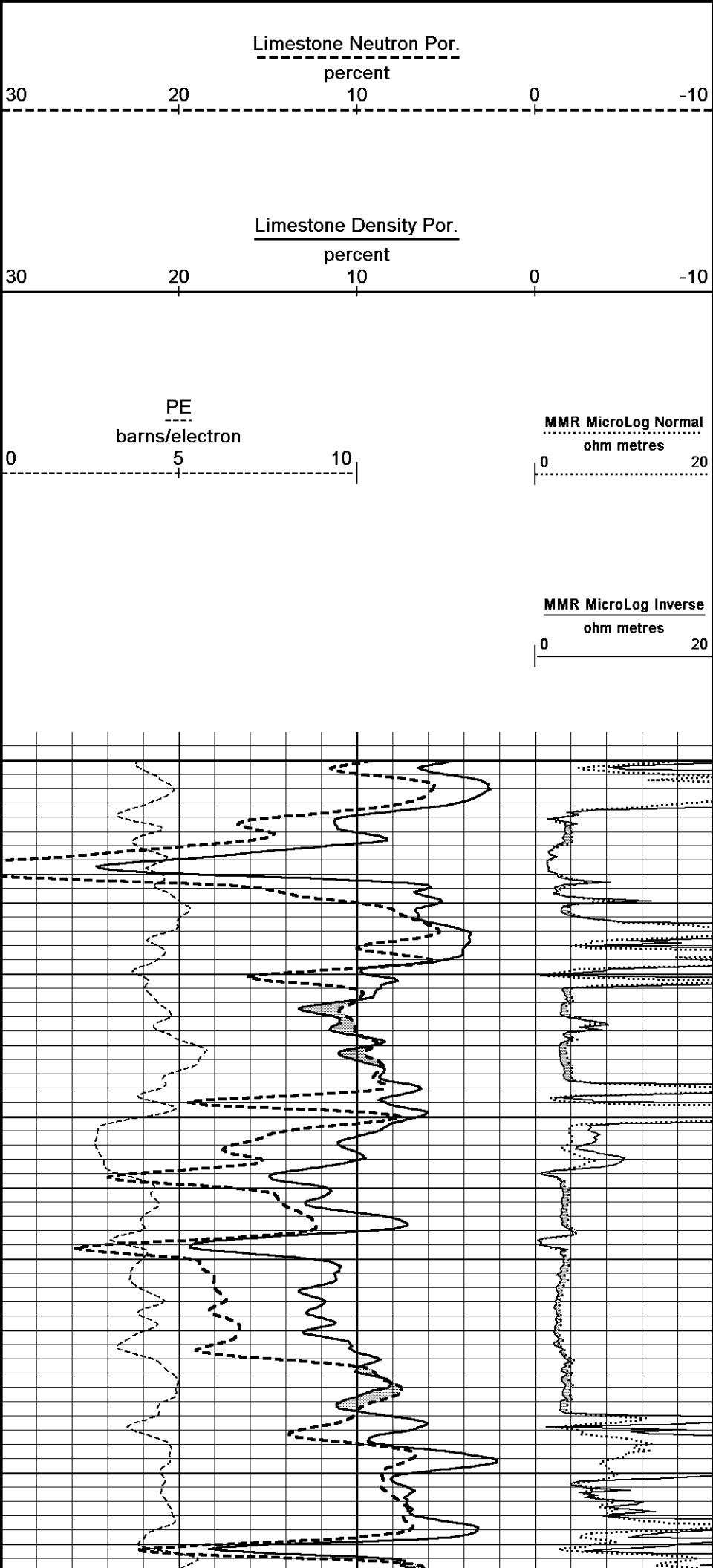
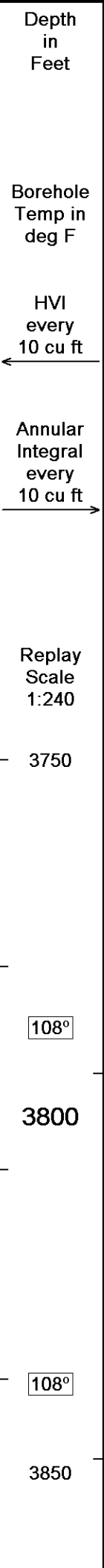
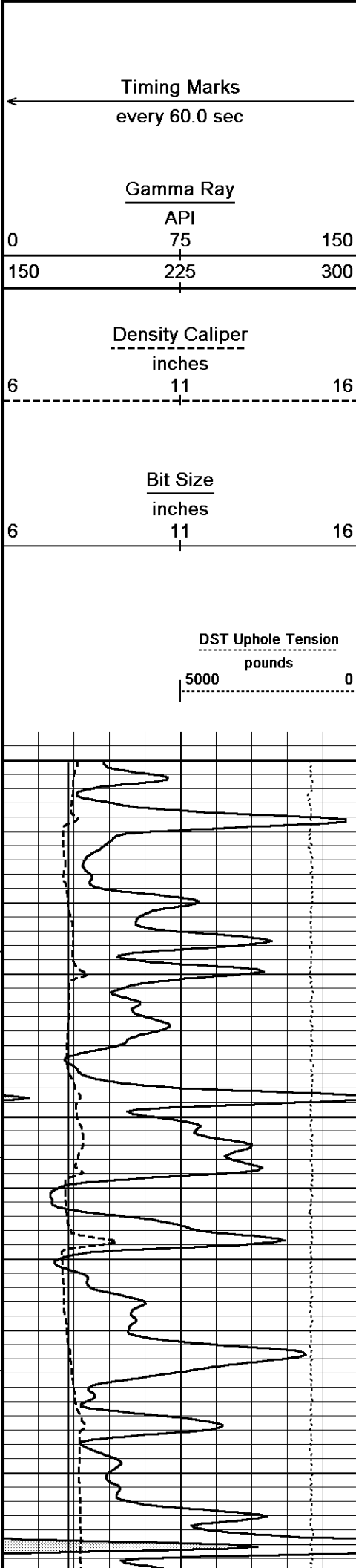


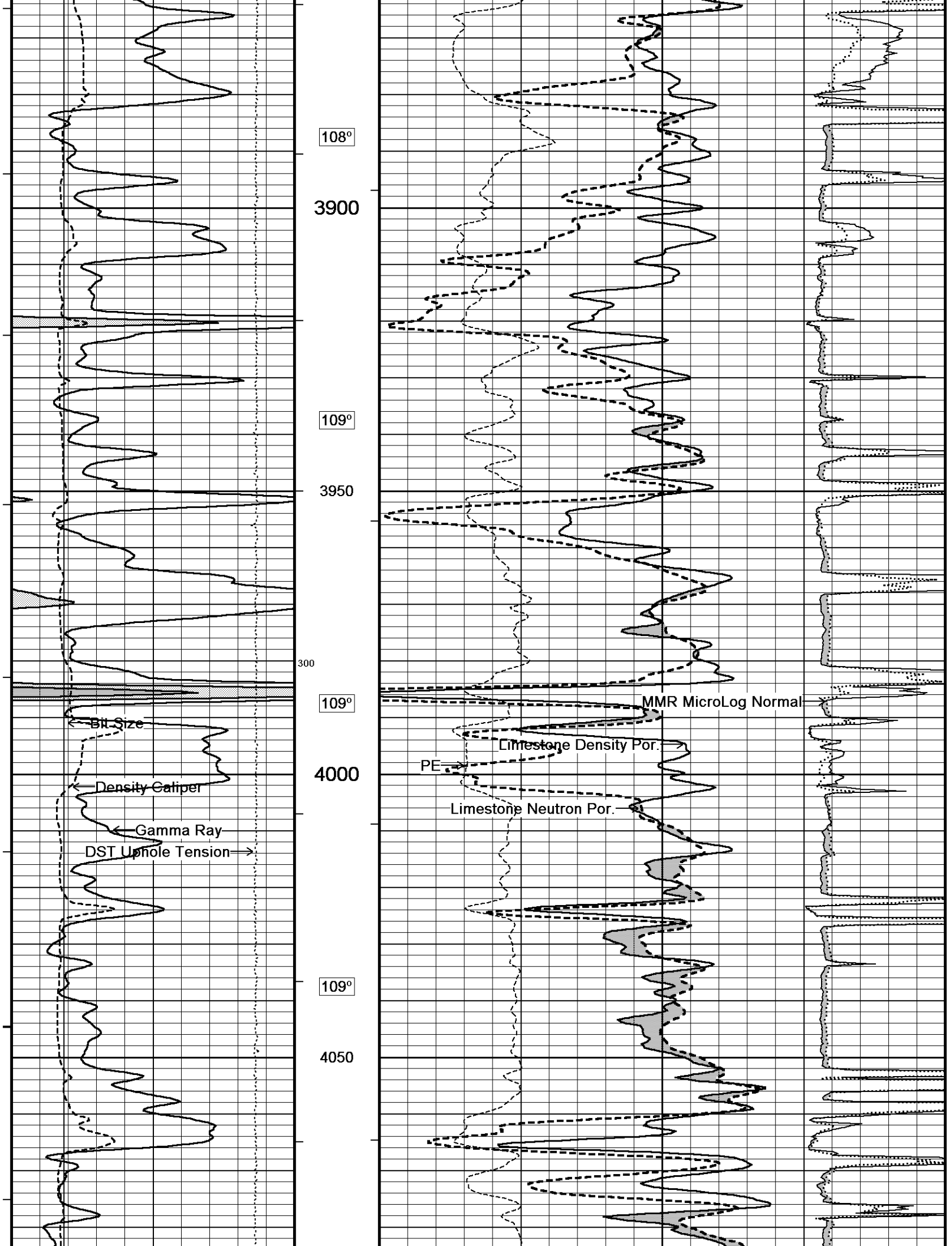
Depth Based Data - Maximum Sampling Increment 10.0cm Plotted on 08-JUN-2014 21:30
Filename: C:\Minimus 13.08.2113\Logs\Shakespeare Carson 3-25\Shakespeare Carson 3-25_002.dta Recorded on 08-JUN-2014 18:02
System Versions: Logged with 13.08.2113 Plotted with 13.08.2113

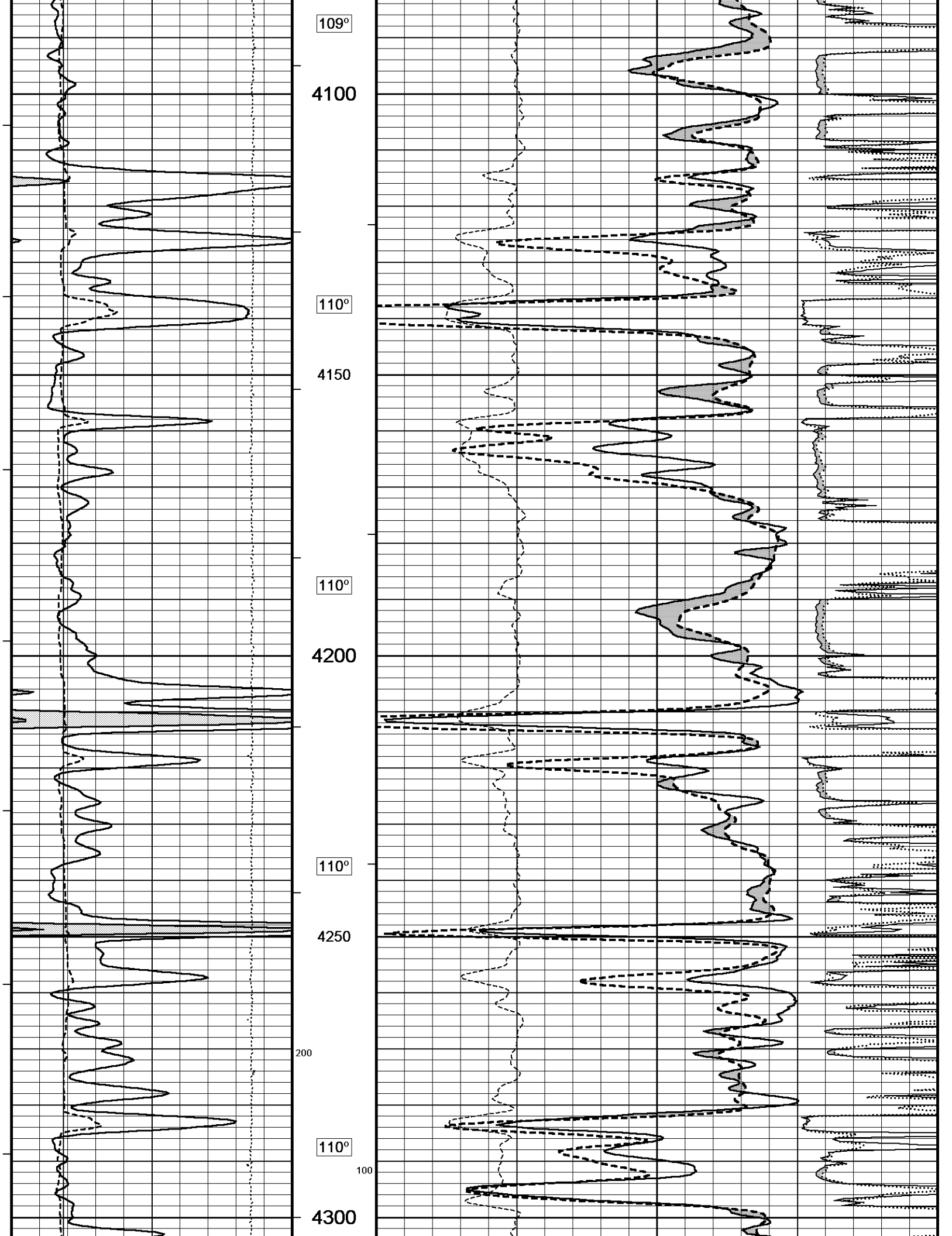
↑ 5 INCH MAIN ANHYDRITE ↑

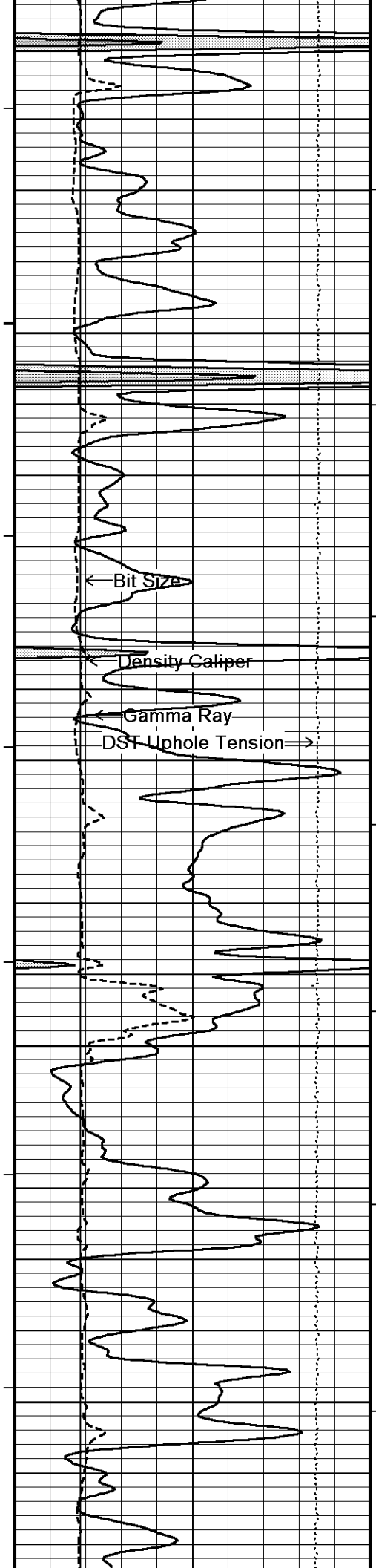
↓ 5 INCH MAIN ↓

Depth Based Data - Maximum Sampling Increment 10.0cm Plotted on 08-JUN-2014 21:30
Filename: C:\Minimus 13.08.2113\Logs\Shakespeare Carson 3-25\Shakespeare Carson 3-25_002.dta Recorded on 08-JUN-2014 18:02
System Versions: Logged with 13.08.2113 Plotted with 13.08.2113









111°

4350

111°

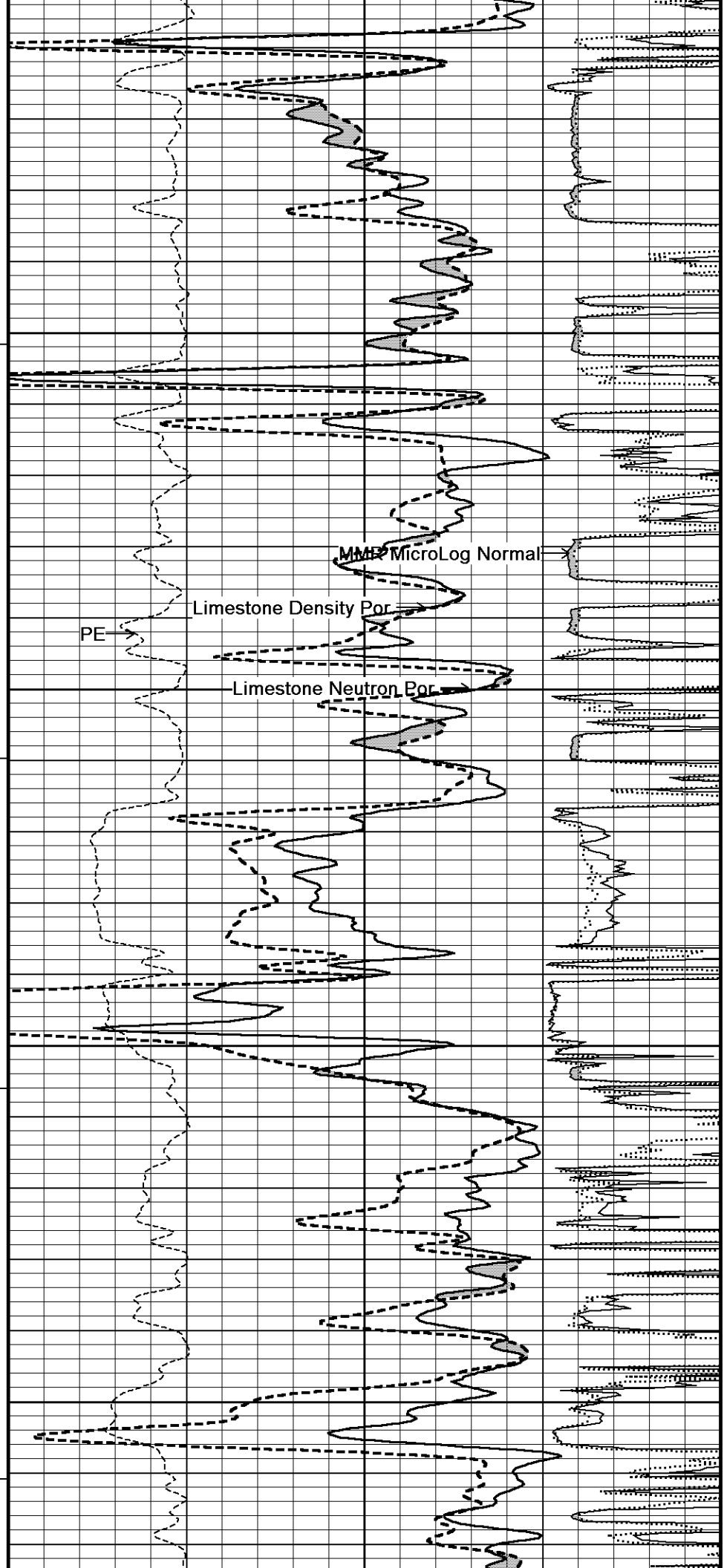
4400

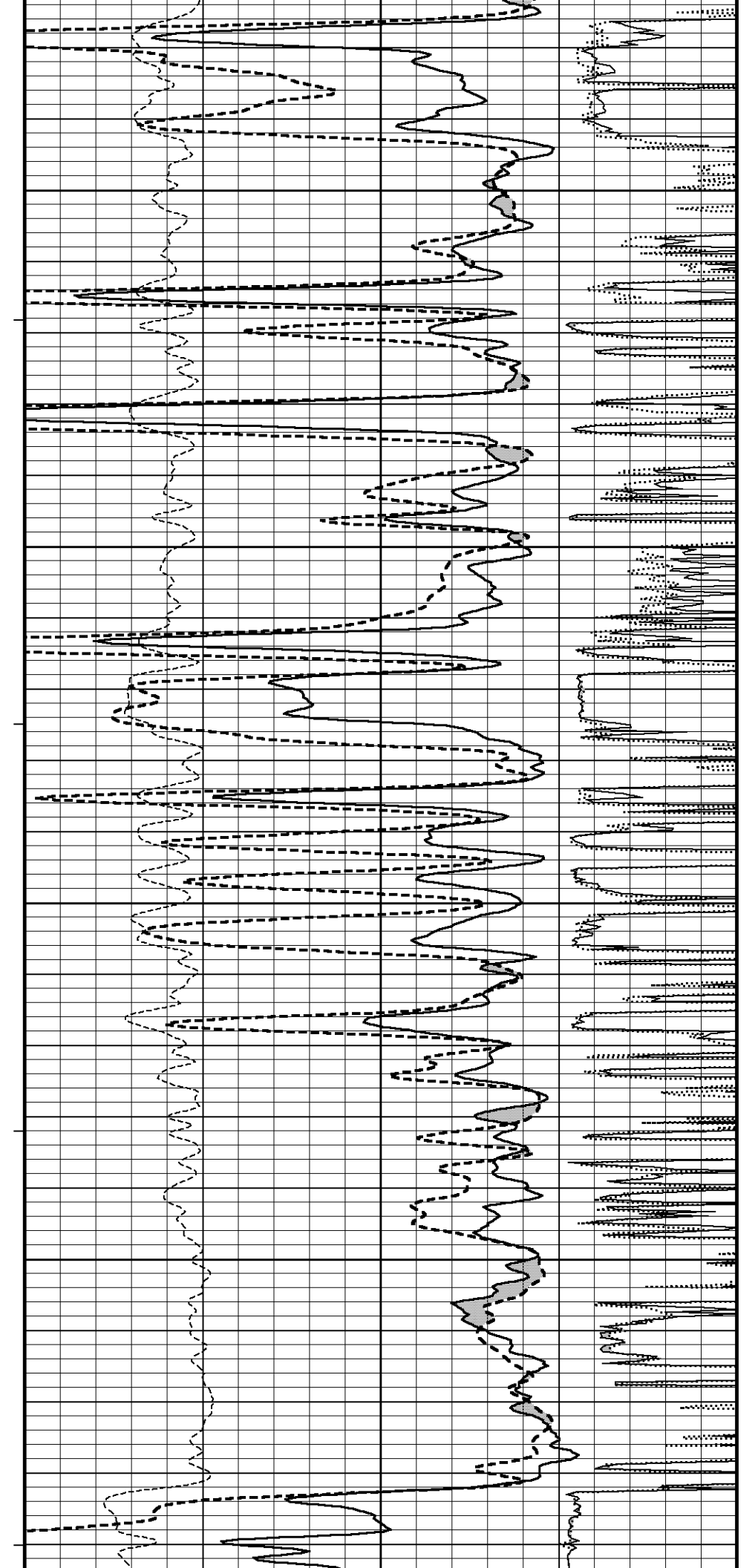
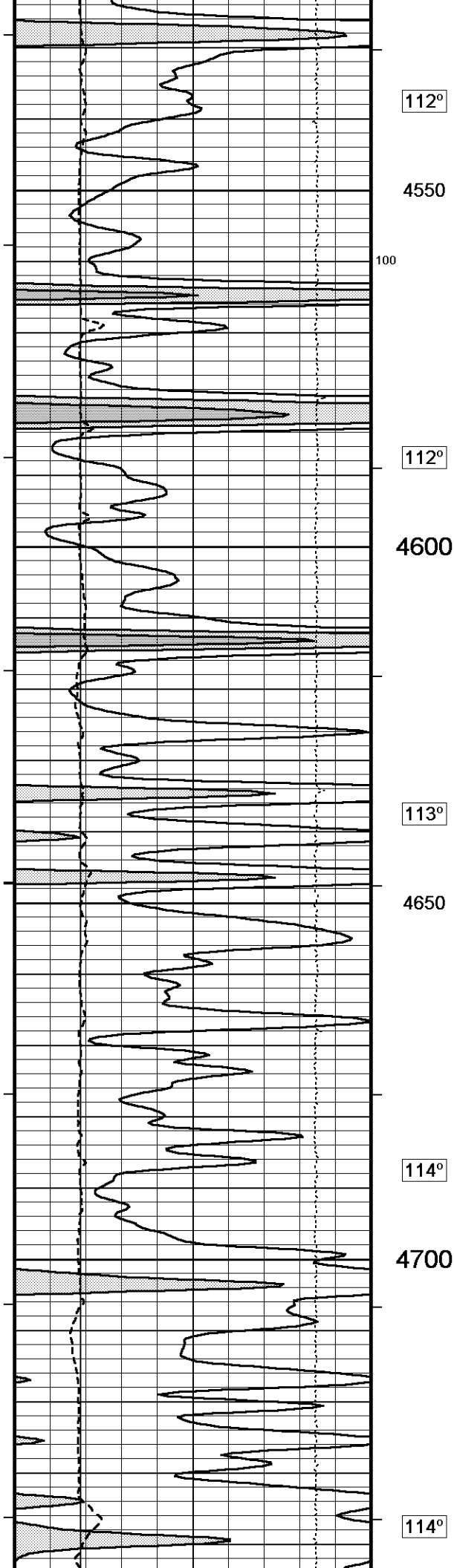
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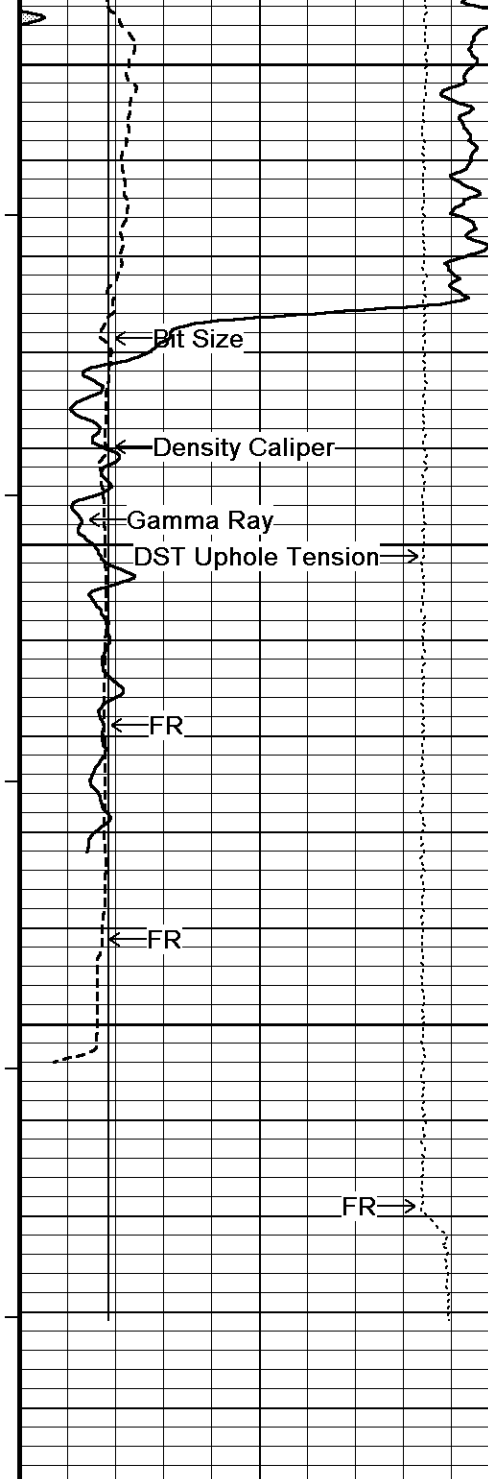
4450

111°

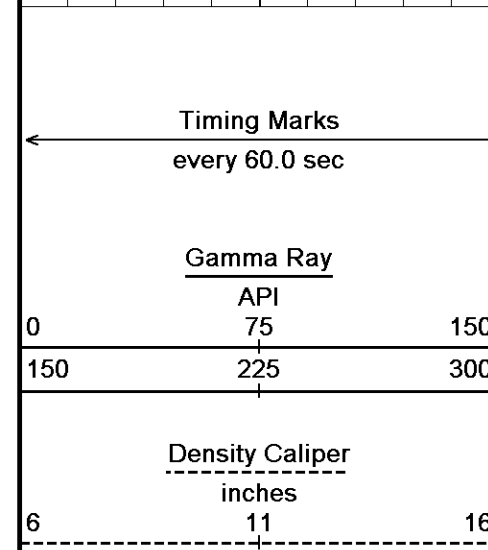
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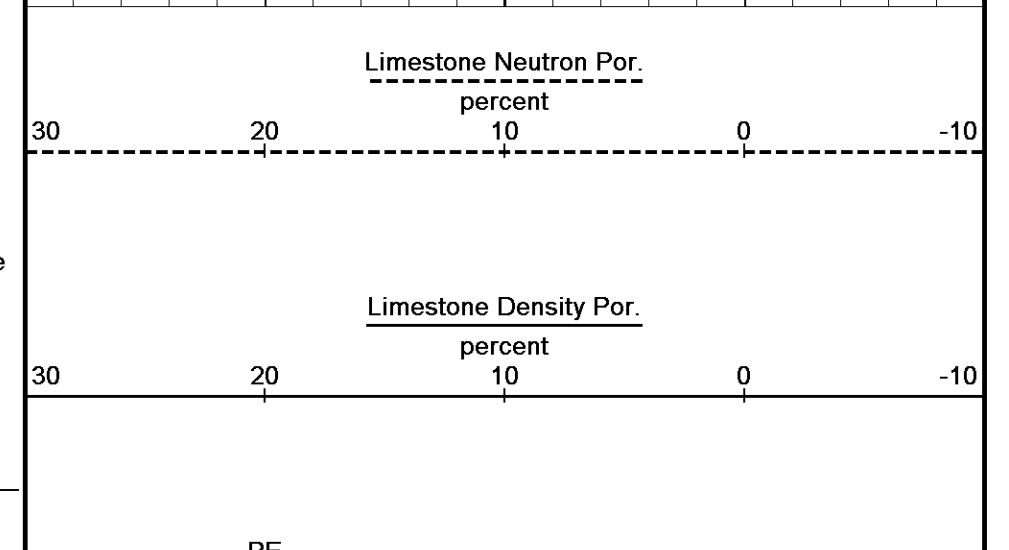
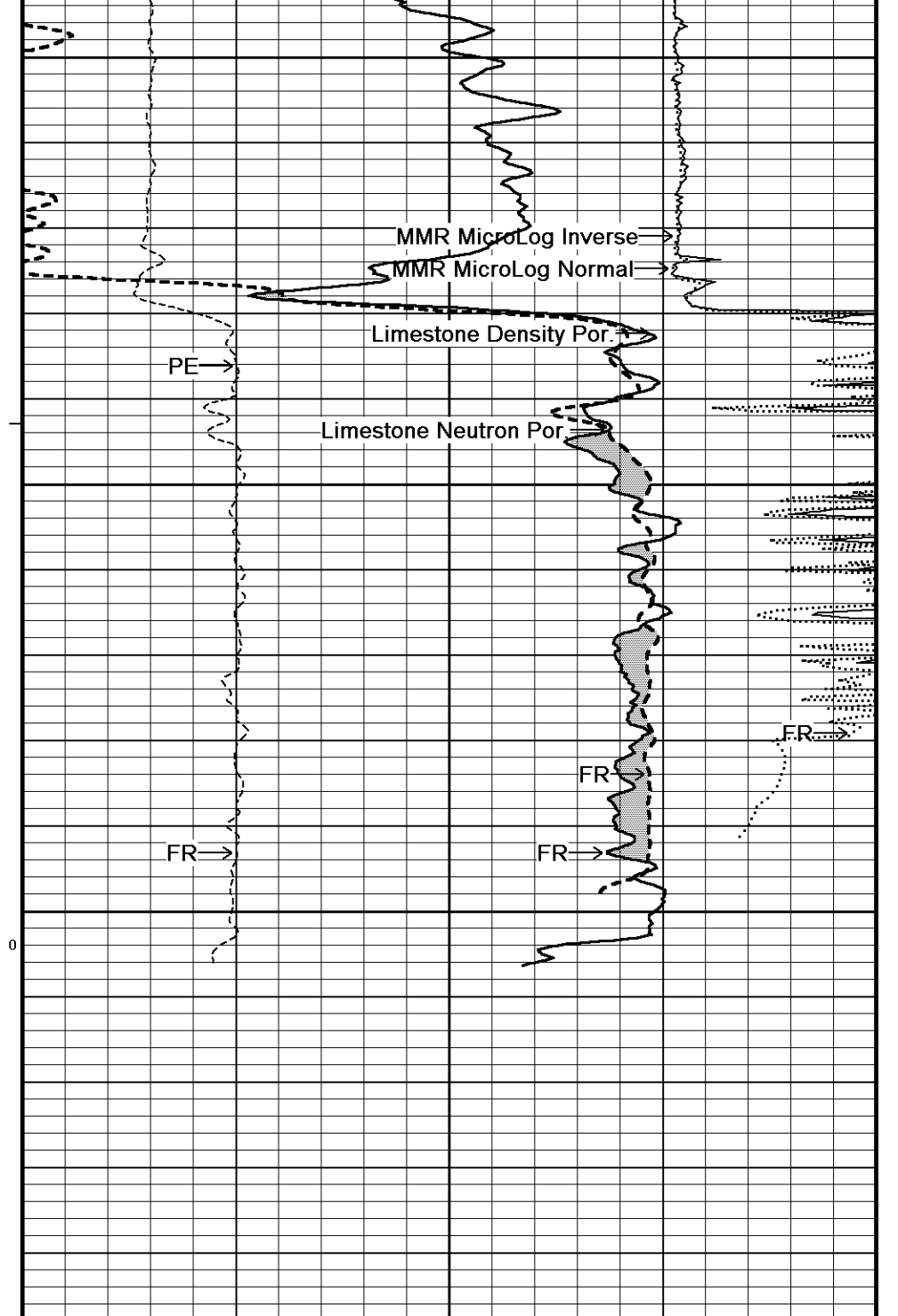




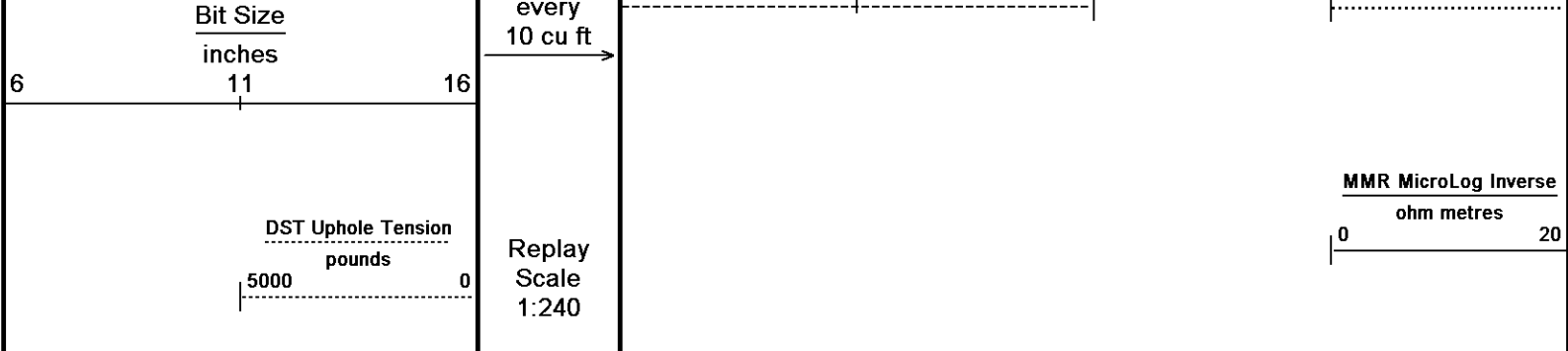
4750
115°
4800
4850
4896
Depth in Feet



Timing Marks
every 60.0 sec
Borehole
Temp in
deg F
HVI
every
10 cu ft



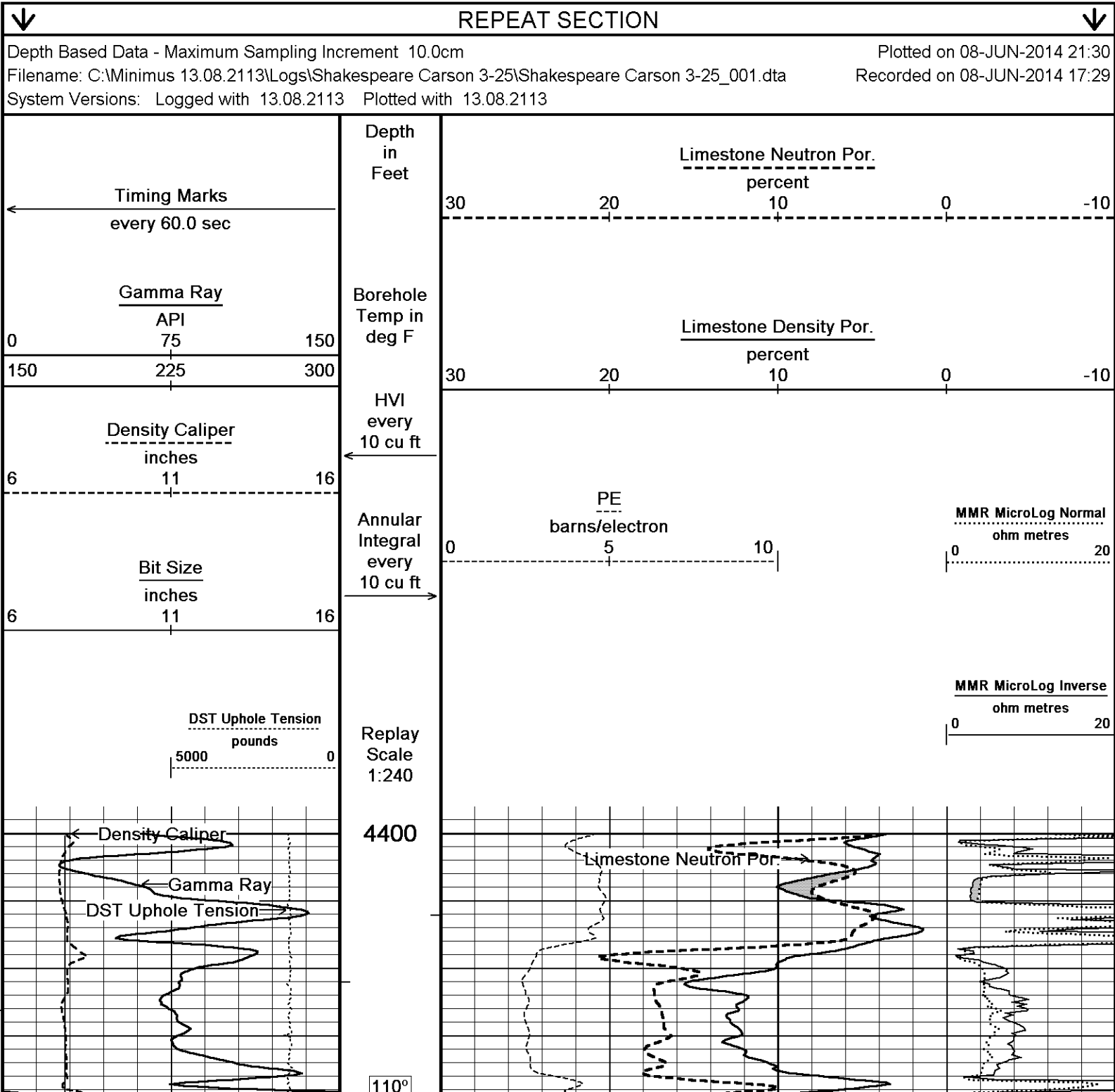
Annular
Integral
PE
barns/electron
MMR MicroLog Normal
ohm metres

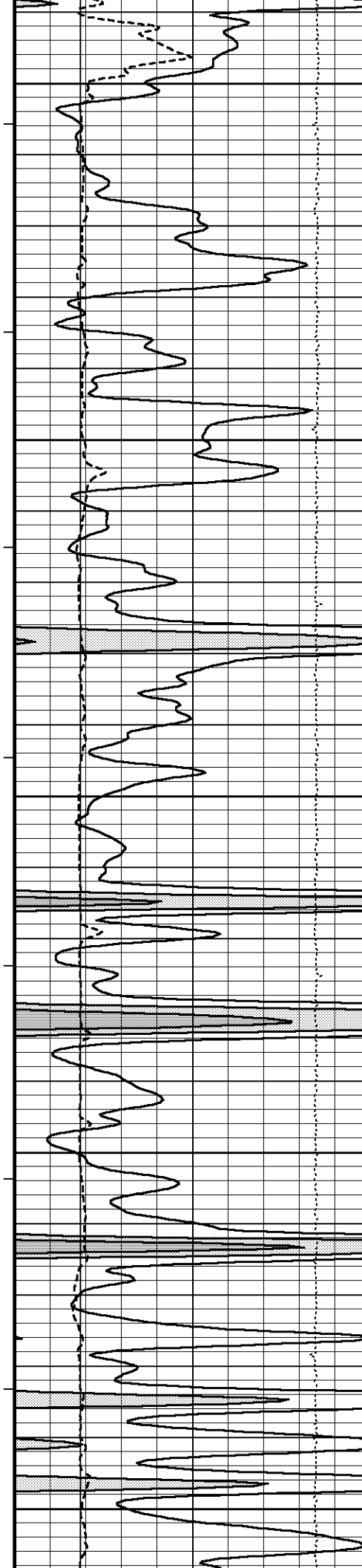


Depth Based Data - Maximum Sampling Increment 10.0cm
Filename: C:\Minimus 13.08.2113\Logs\Shakespeare Carson 3-25\Shakespeare Carson 3-25_002.dta
System Versions: Logged with 13.08.2113 Plotted with 13.08.2113

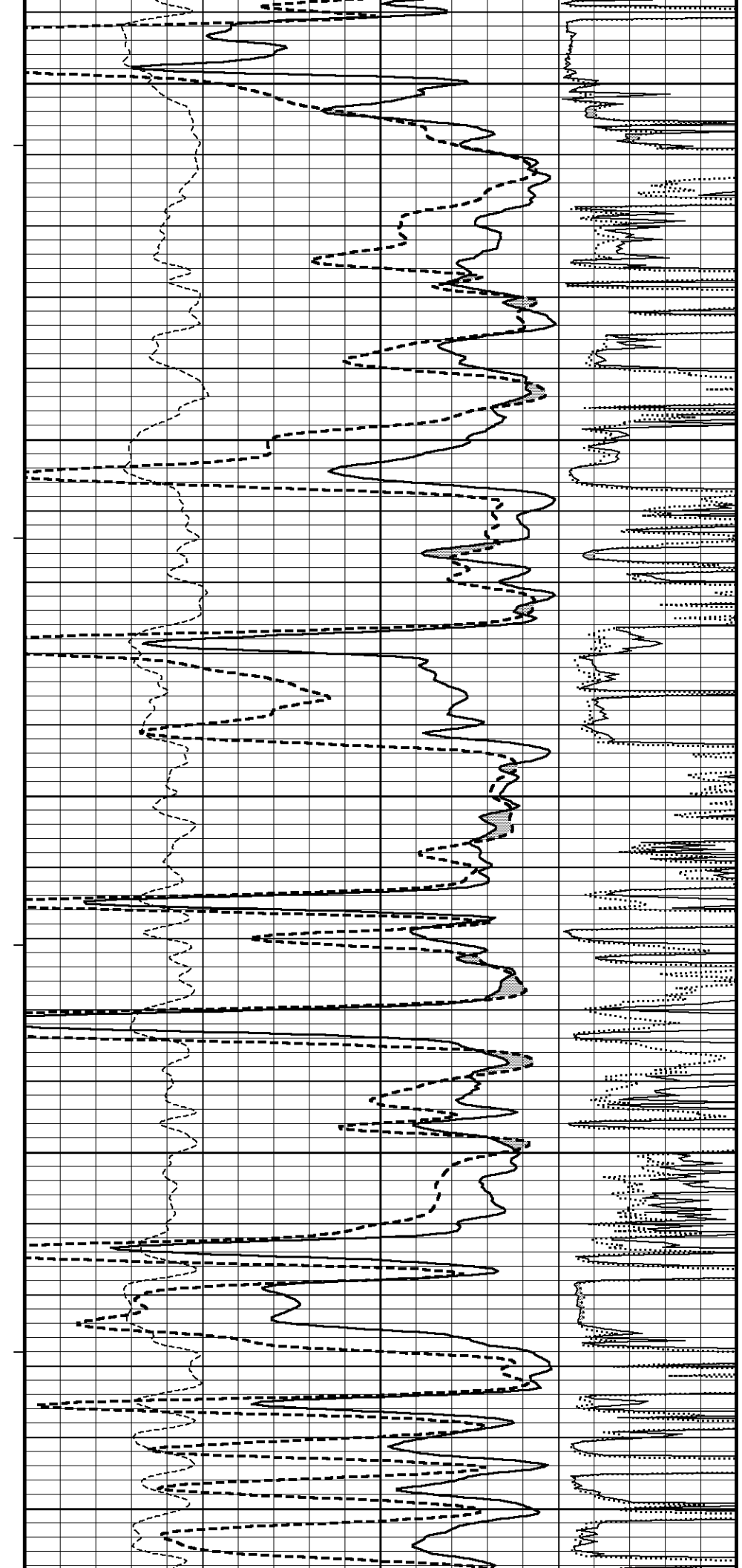
Plotted on 08-JUN-2014 21:30
Recorded on 08-JUN-2014 18:02

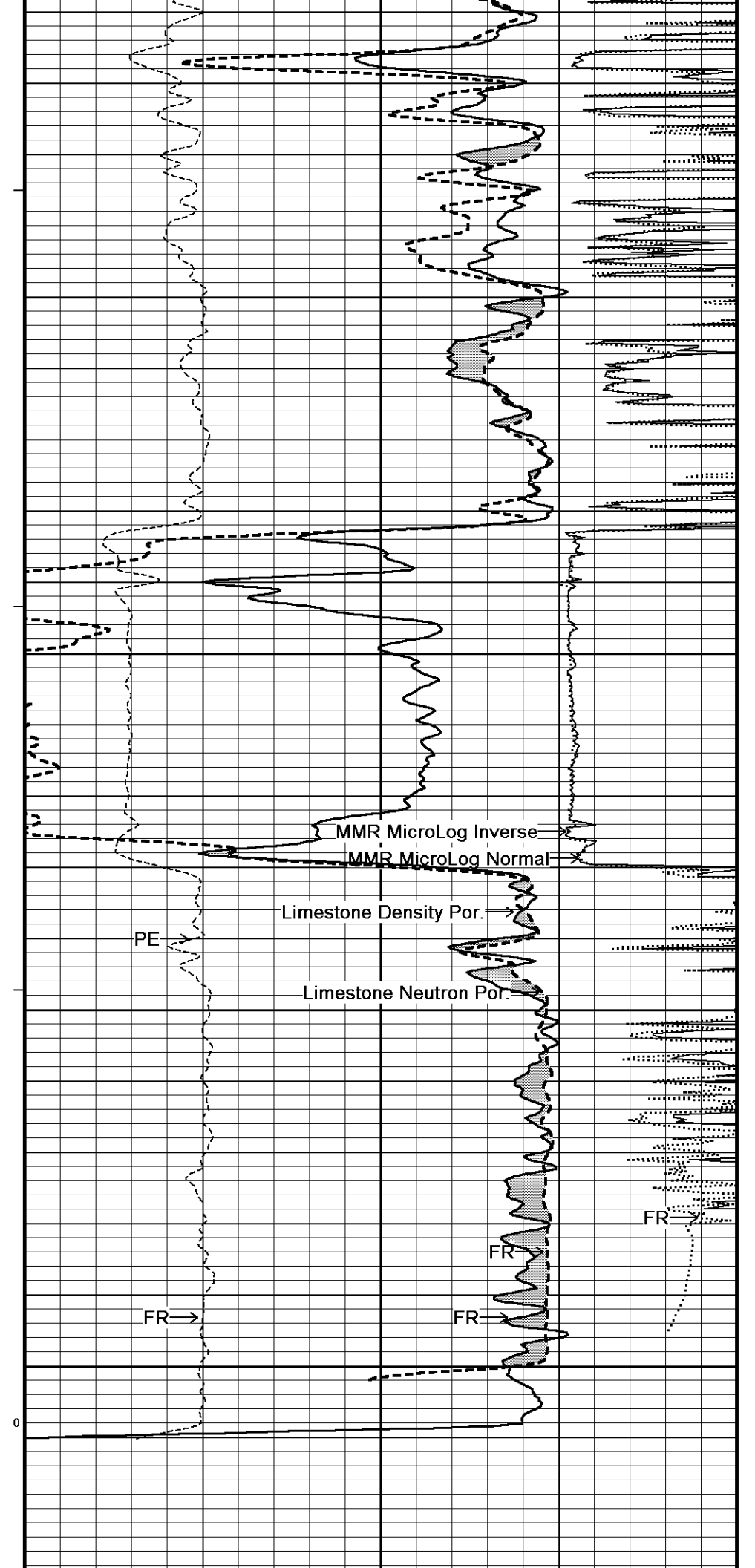
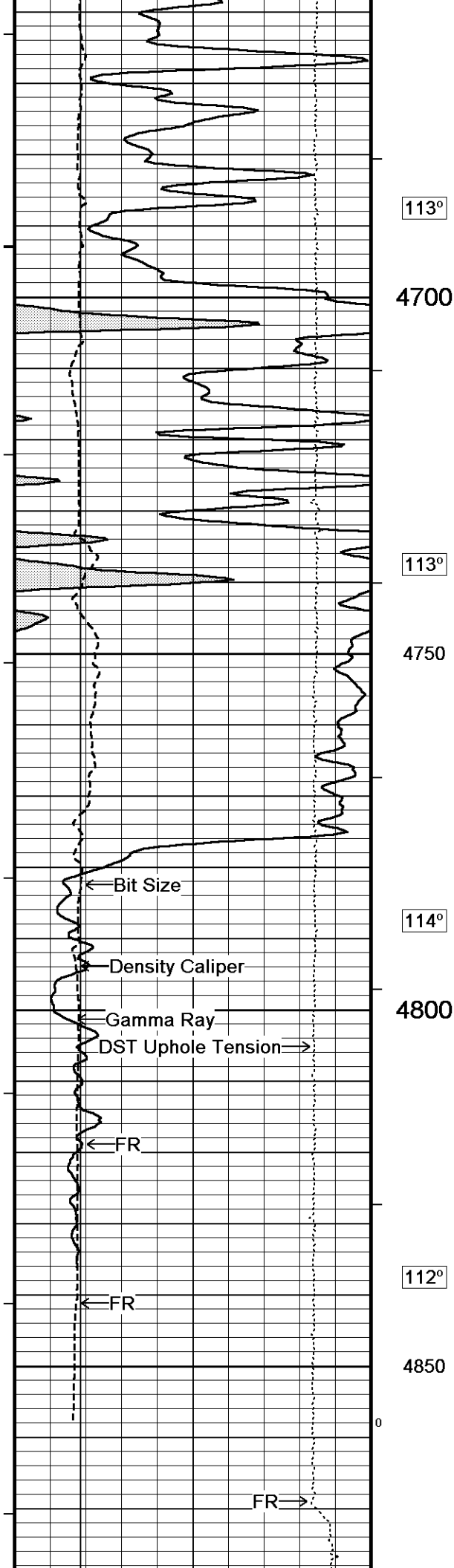
↑ 5 INCH MAIN ↑

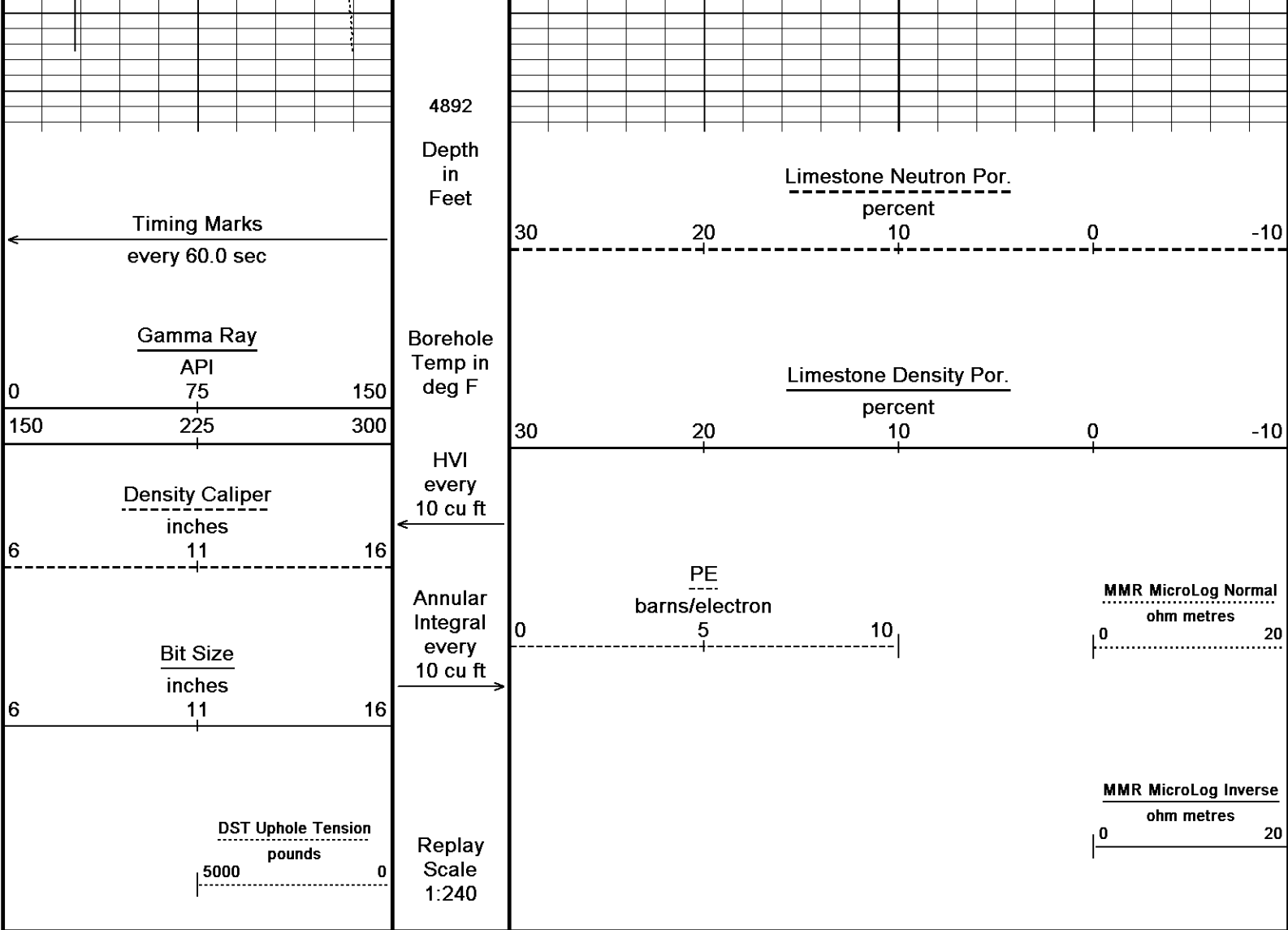




4450
 111°
4500
 111°
4550
100
4600
 112°
4650







Depth Based Data - Maximum Sampling Increment 10.0cmPlotted on 08-JUN-2014 21:30

Filename: C:\Minimus 13.08.2113\Logs\Shakespeare Carson 3-25\Shakespeare Carson 3-25_001.dtaRecorded on 08-JUN-2014 17:29

System Versions: Logged with 13.08.2113Plotted with 13.08.2113

↑

REPEAT SECTION

↑

↓

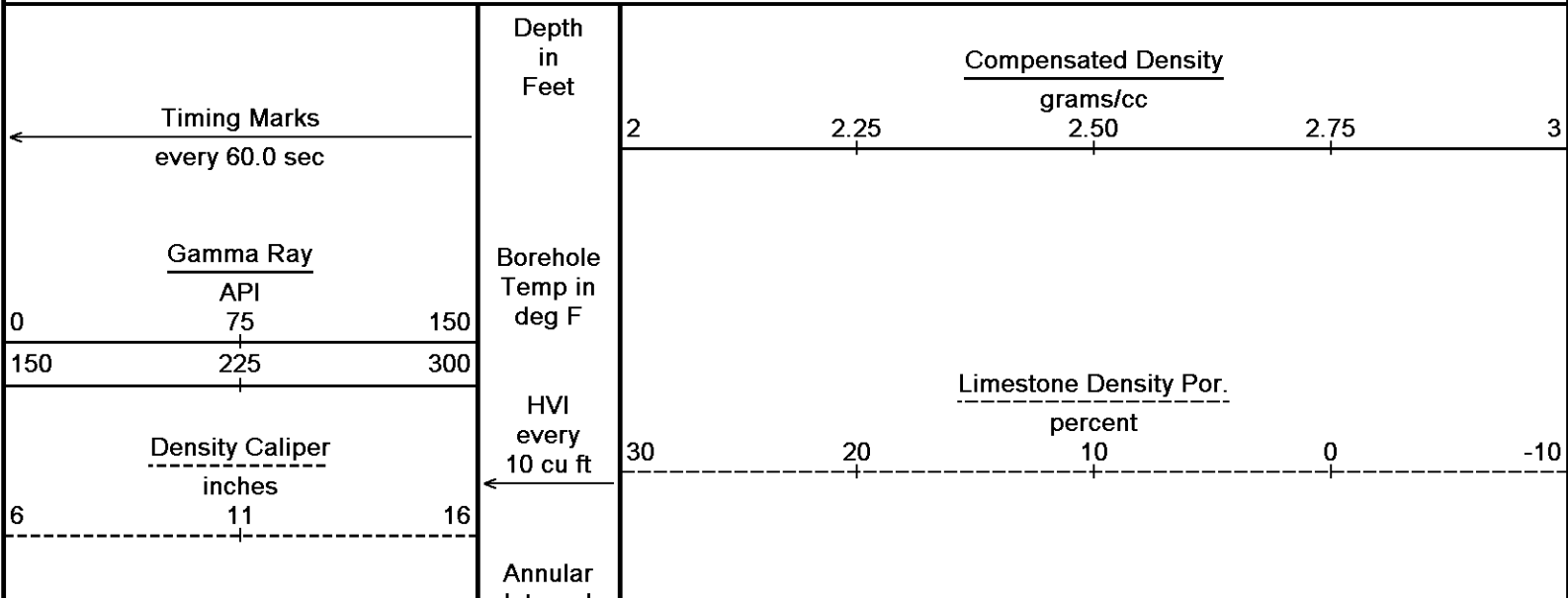
5 INCH MAIN

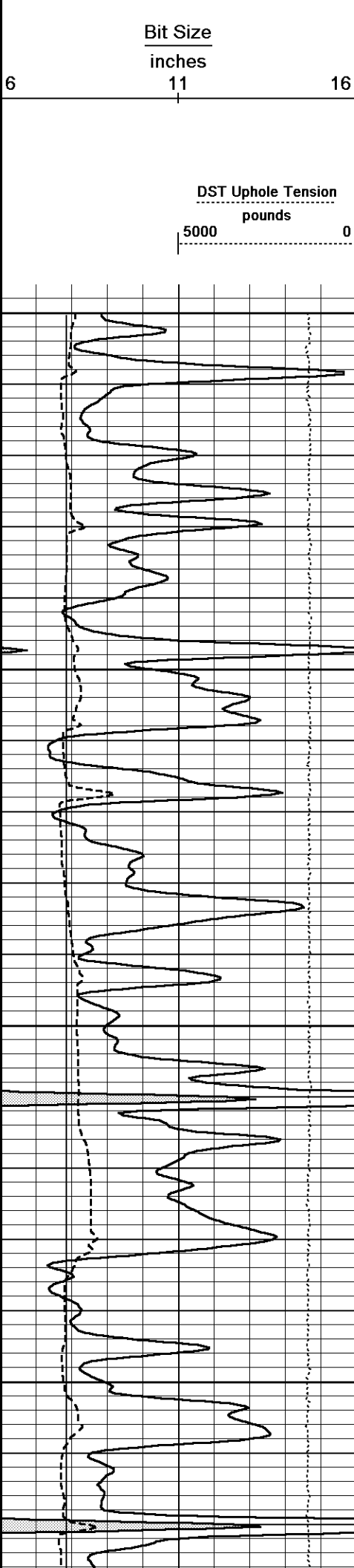
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Depth Based Data - Maximum Sampling Increment 10.0cmPlotted on 08-JUN-2014 21:30

Filename: C:\Minimus 13.08.2113\Logs\Shakespeare Carson 3-25\Shakespeare Carson 3-25_002.dtaRecorded on 08-JUN-2014 18:02

System Versions: Logged with 13.08.2113Plotted with 13.08.2113





Integral
every
10 cu ft

Replay
Scale
1:240

3750

108°

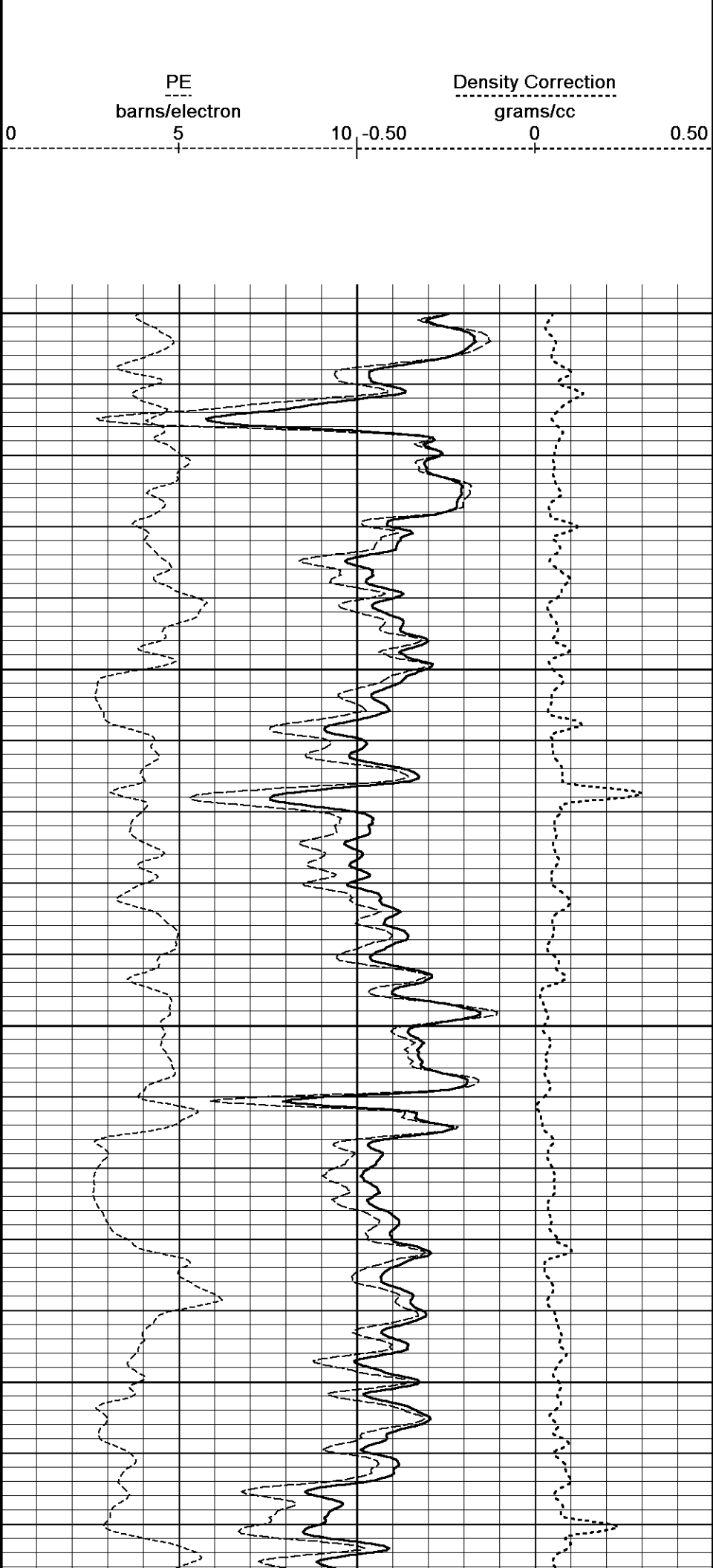
3800

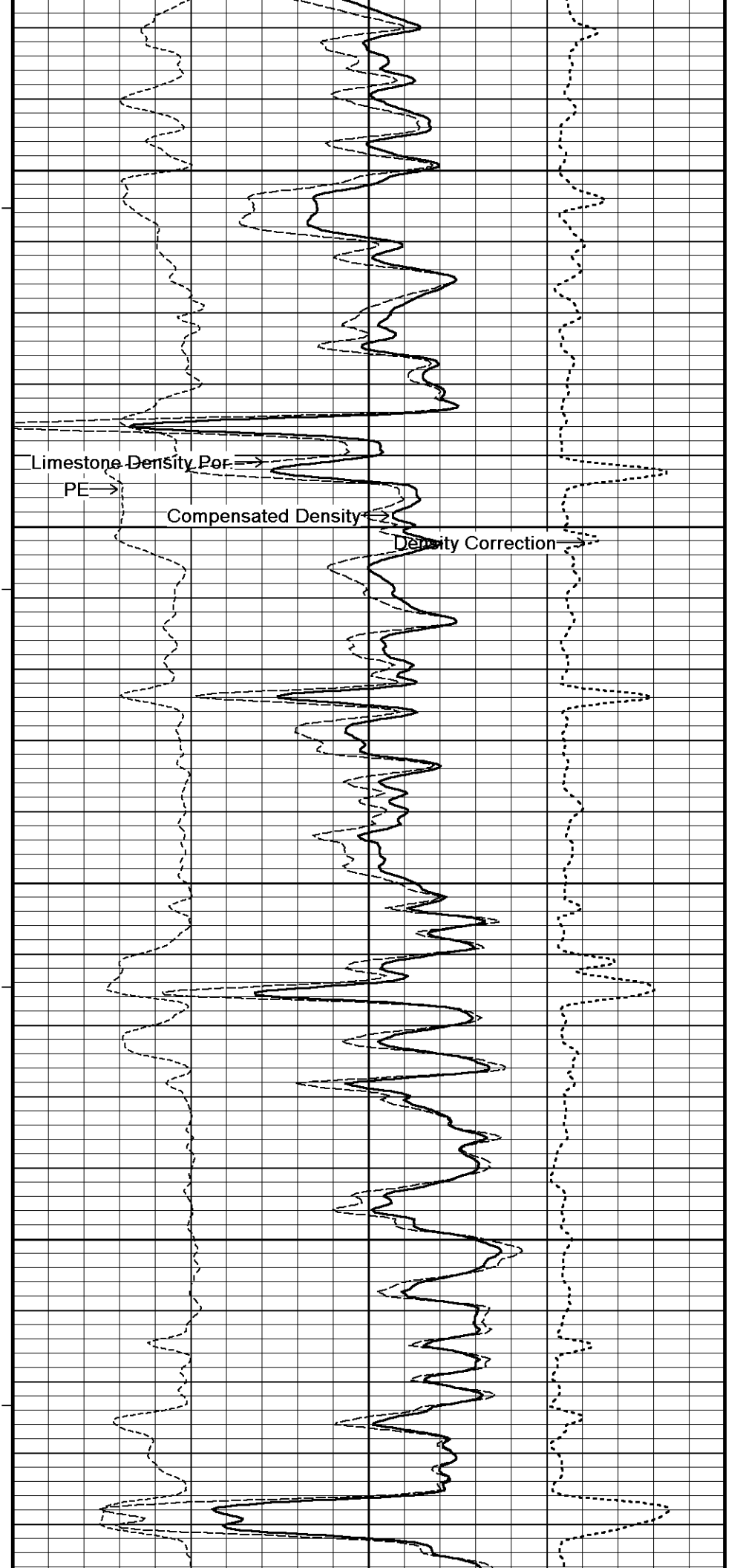
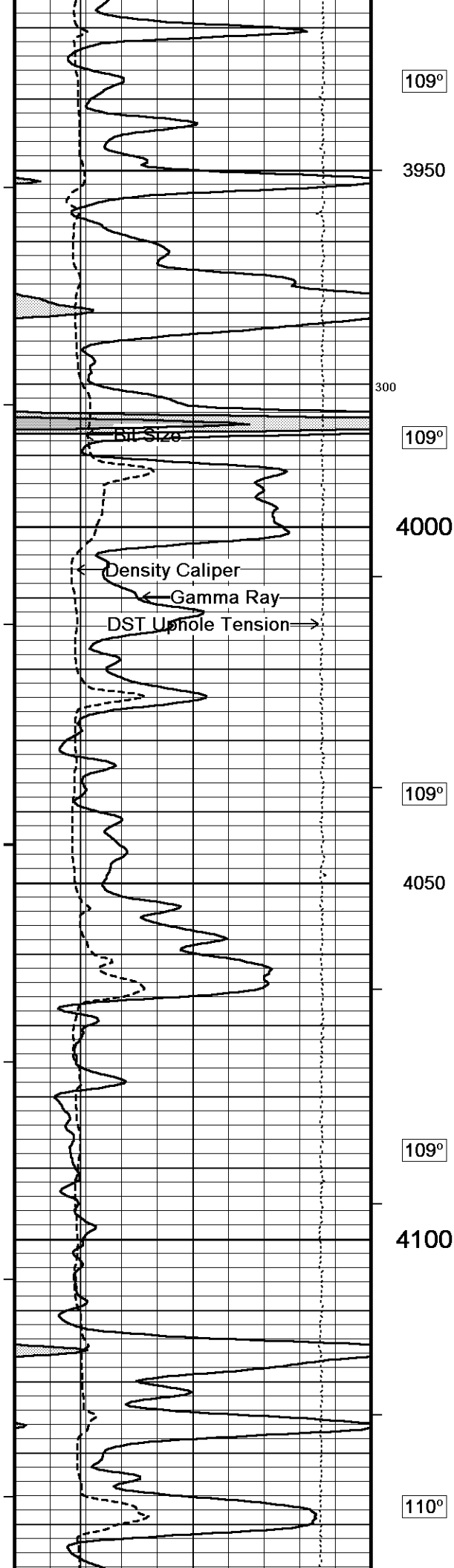
108°

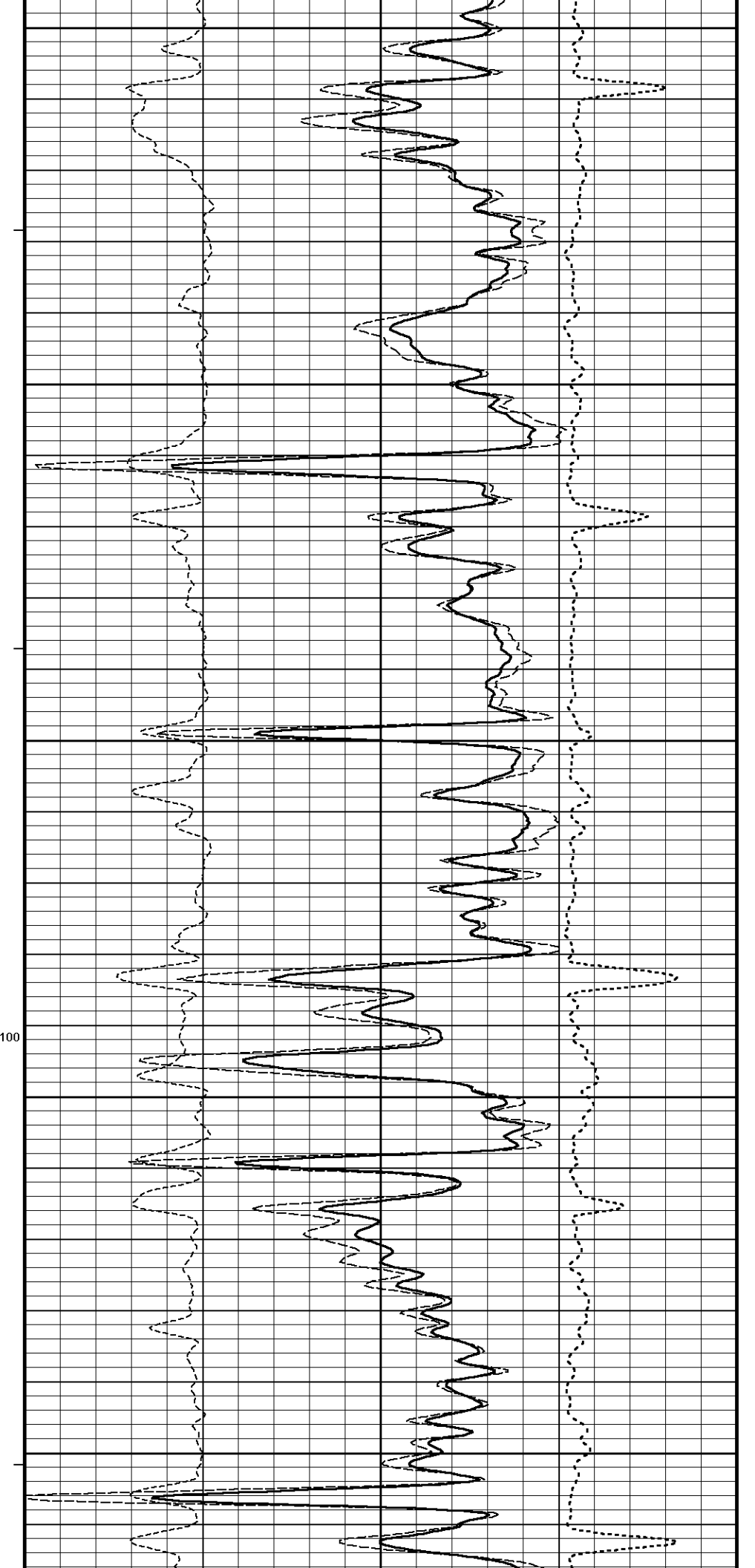
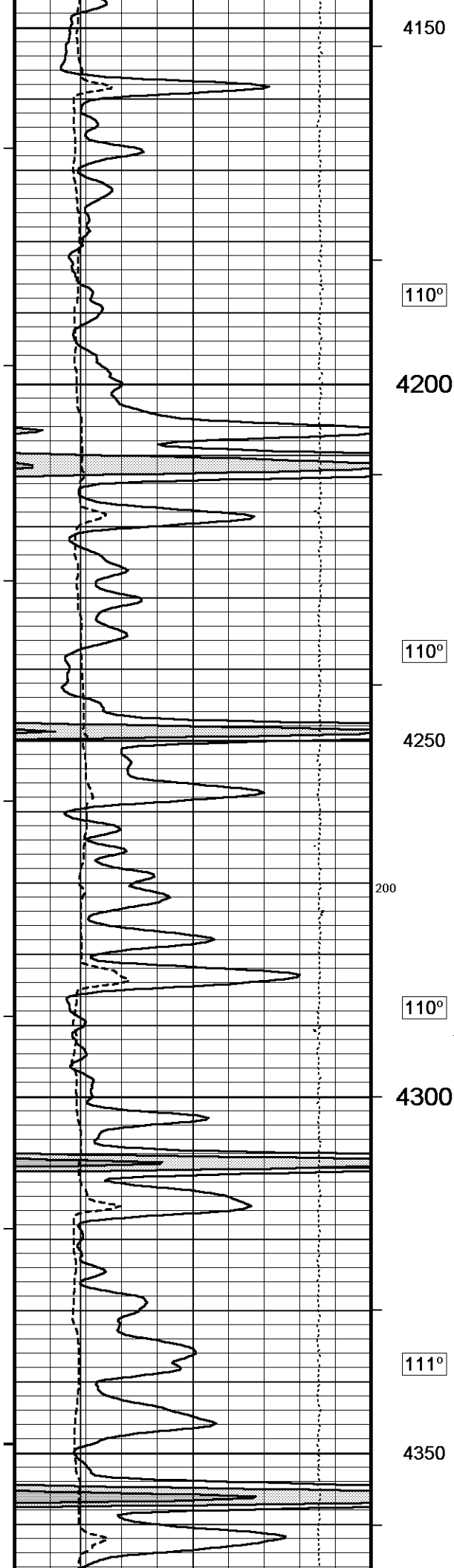
3850

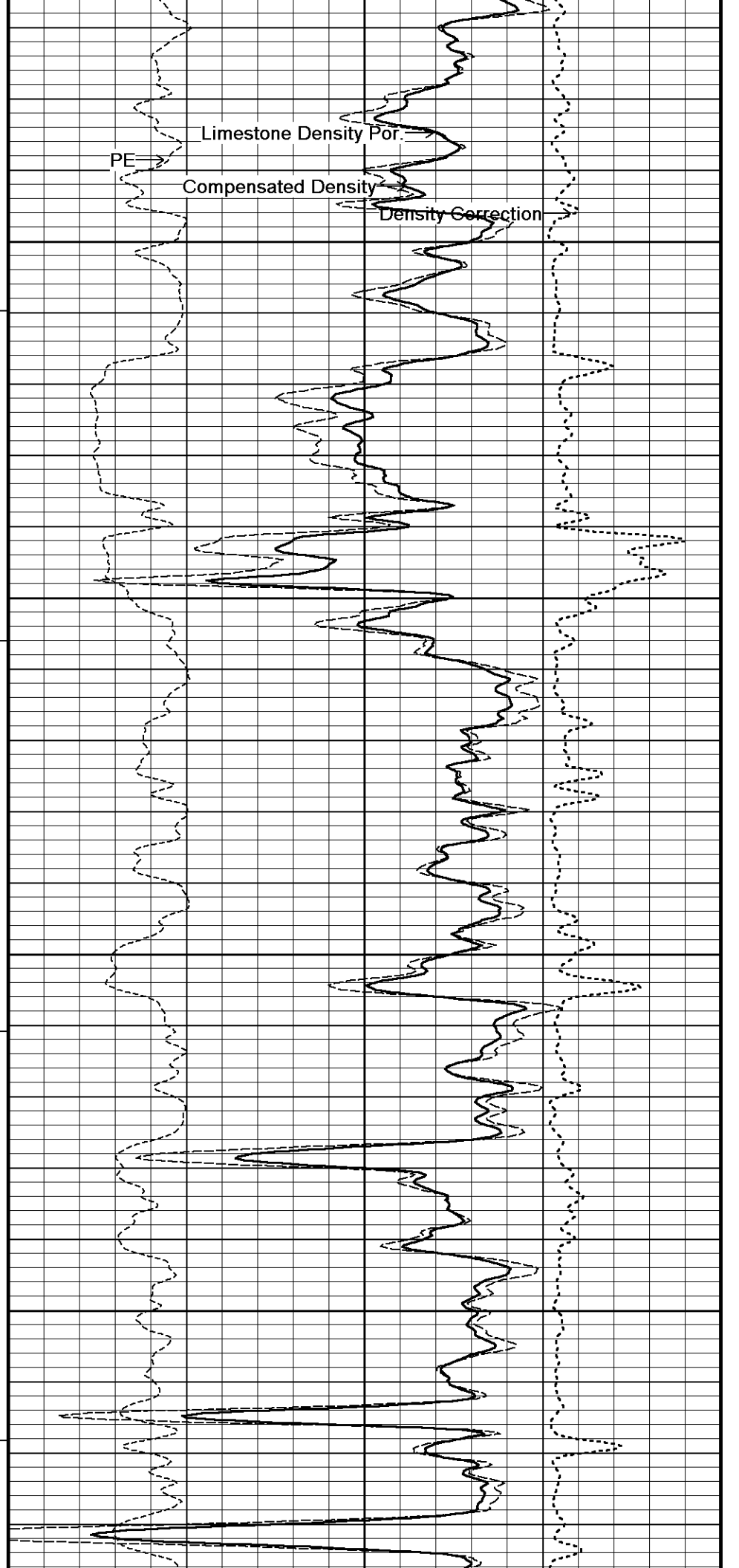
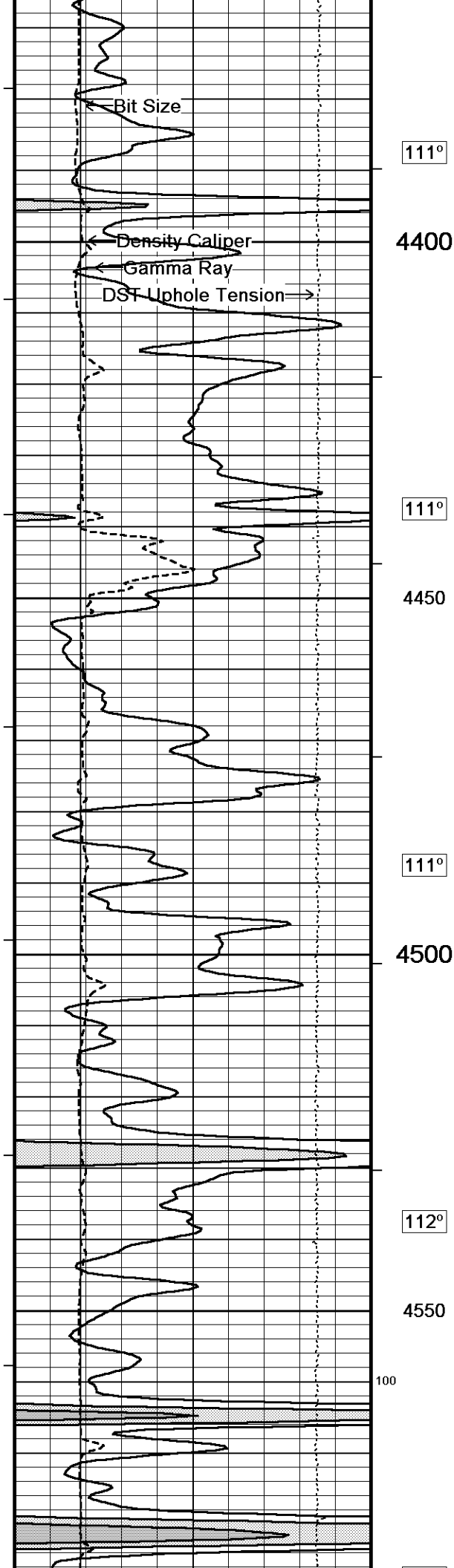
108°

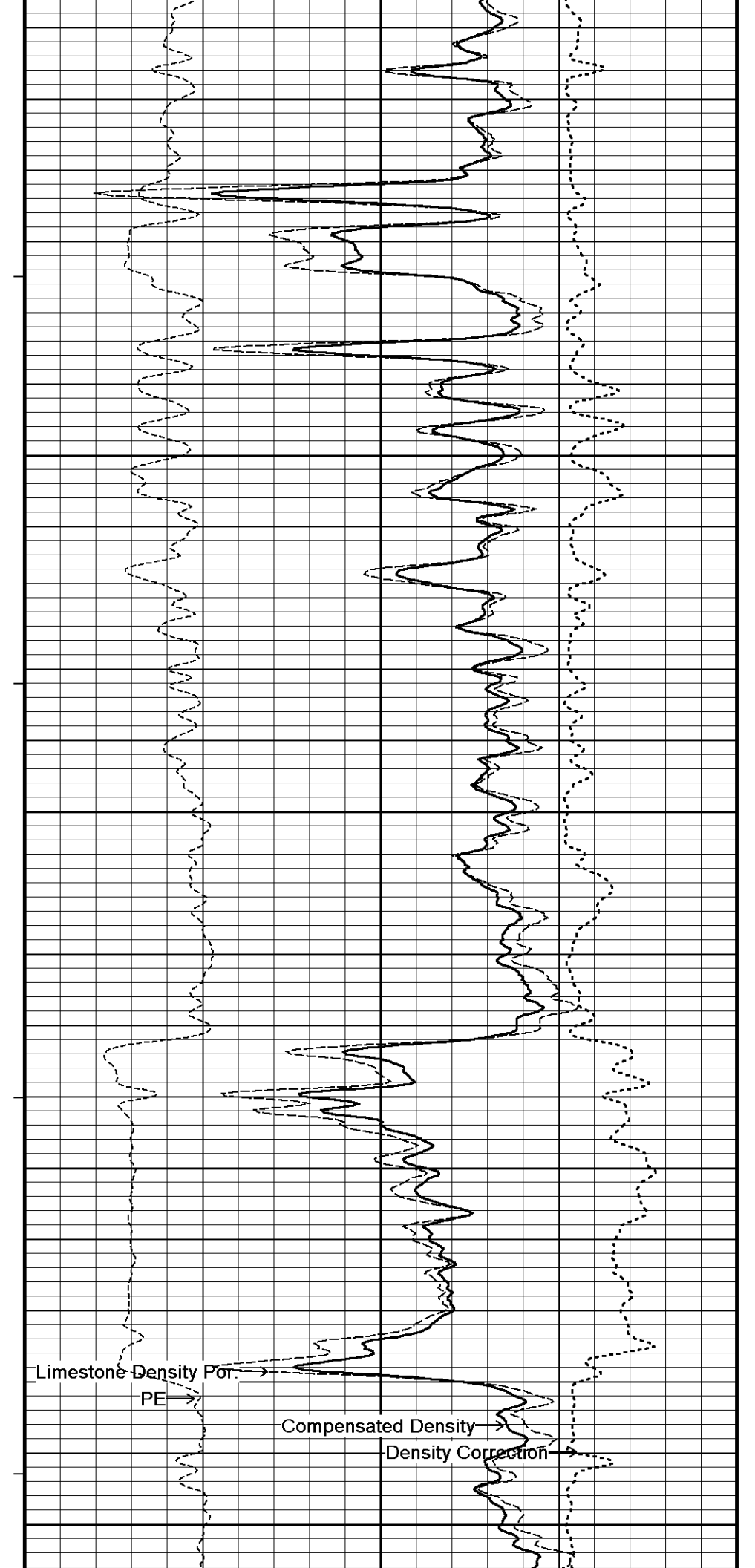
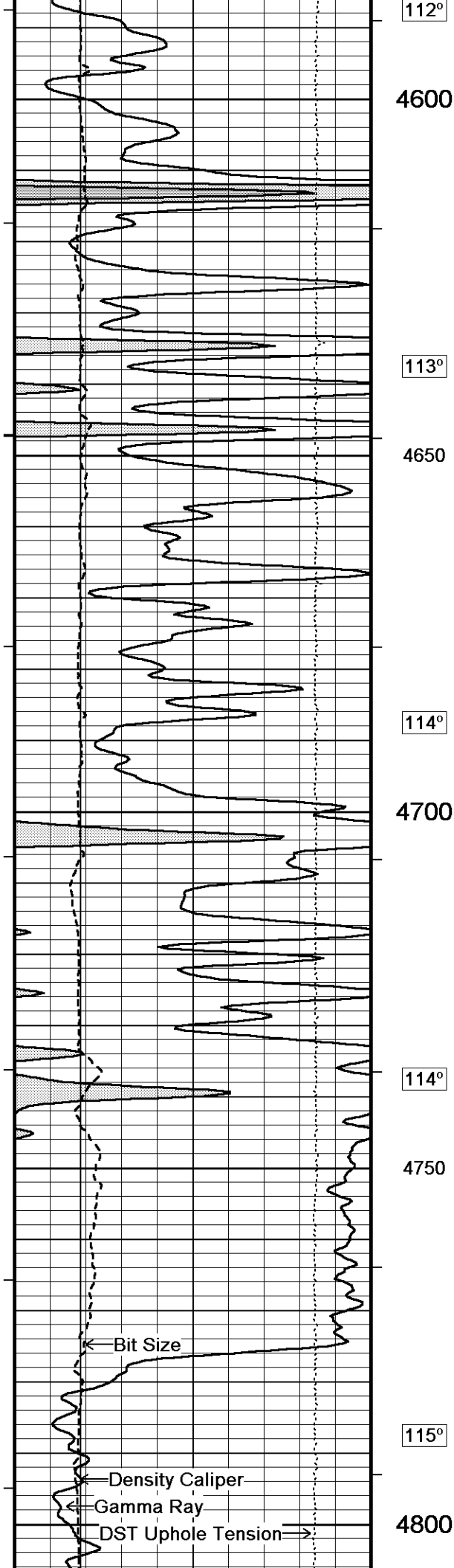
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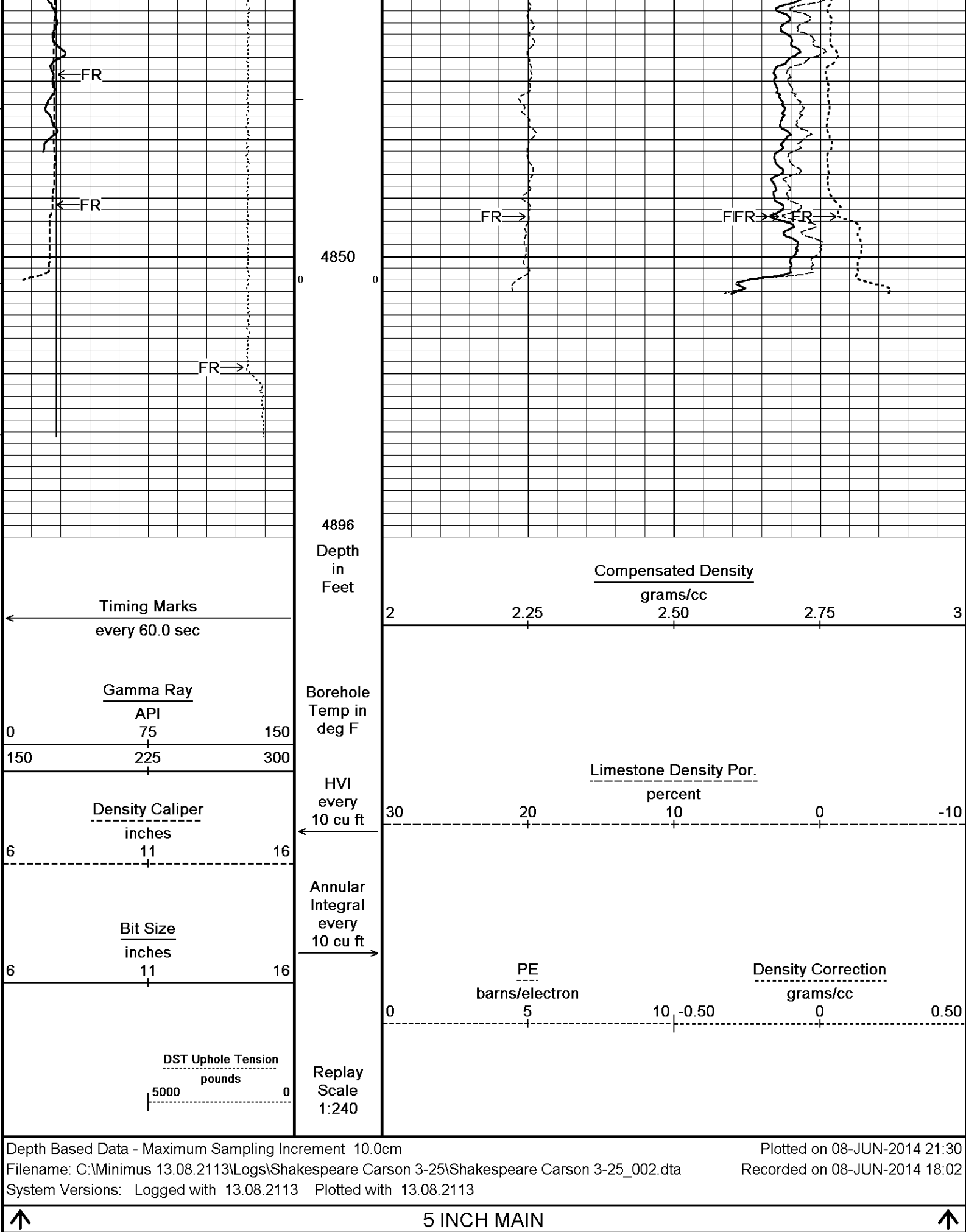


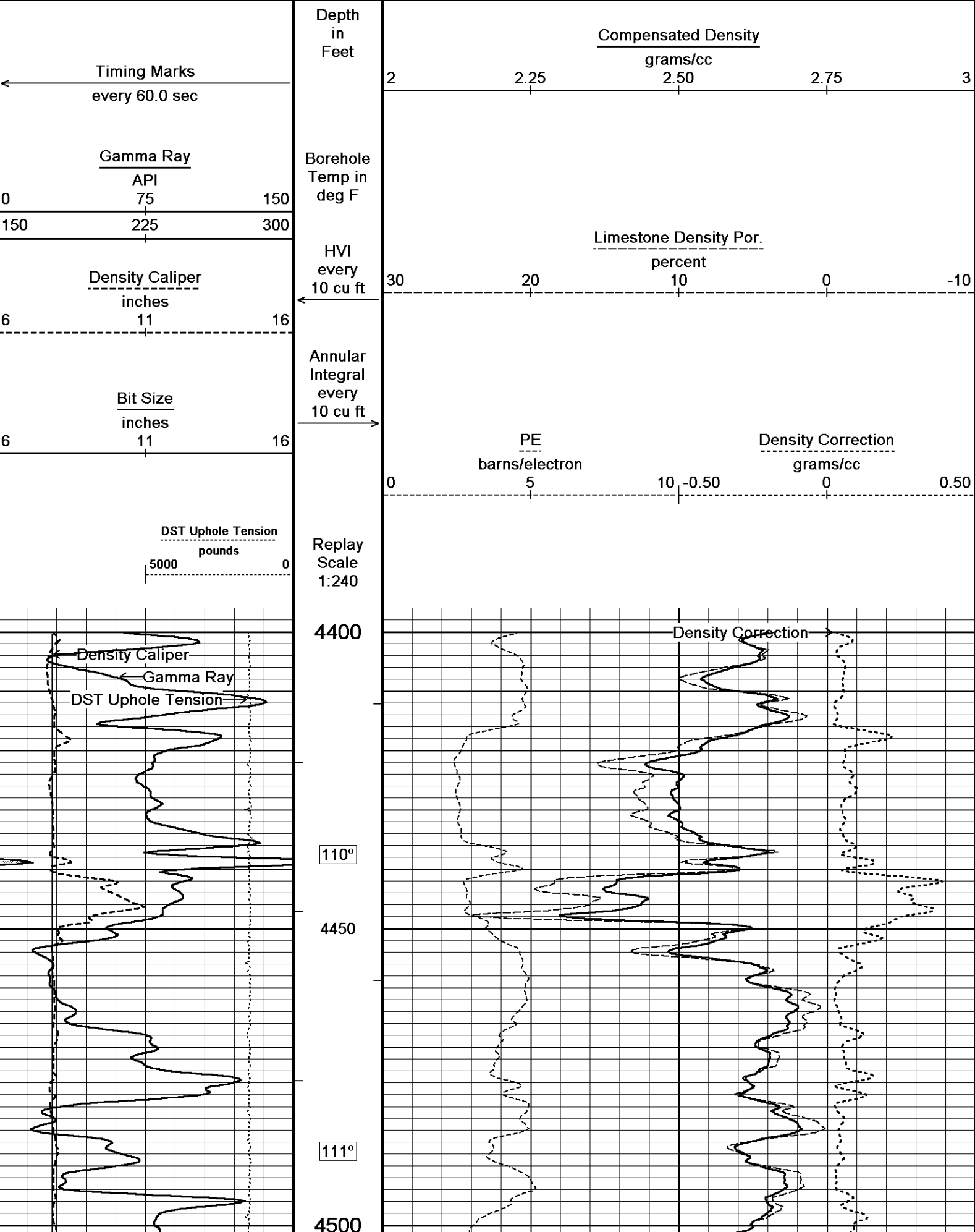


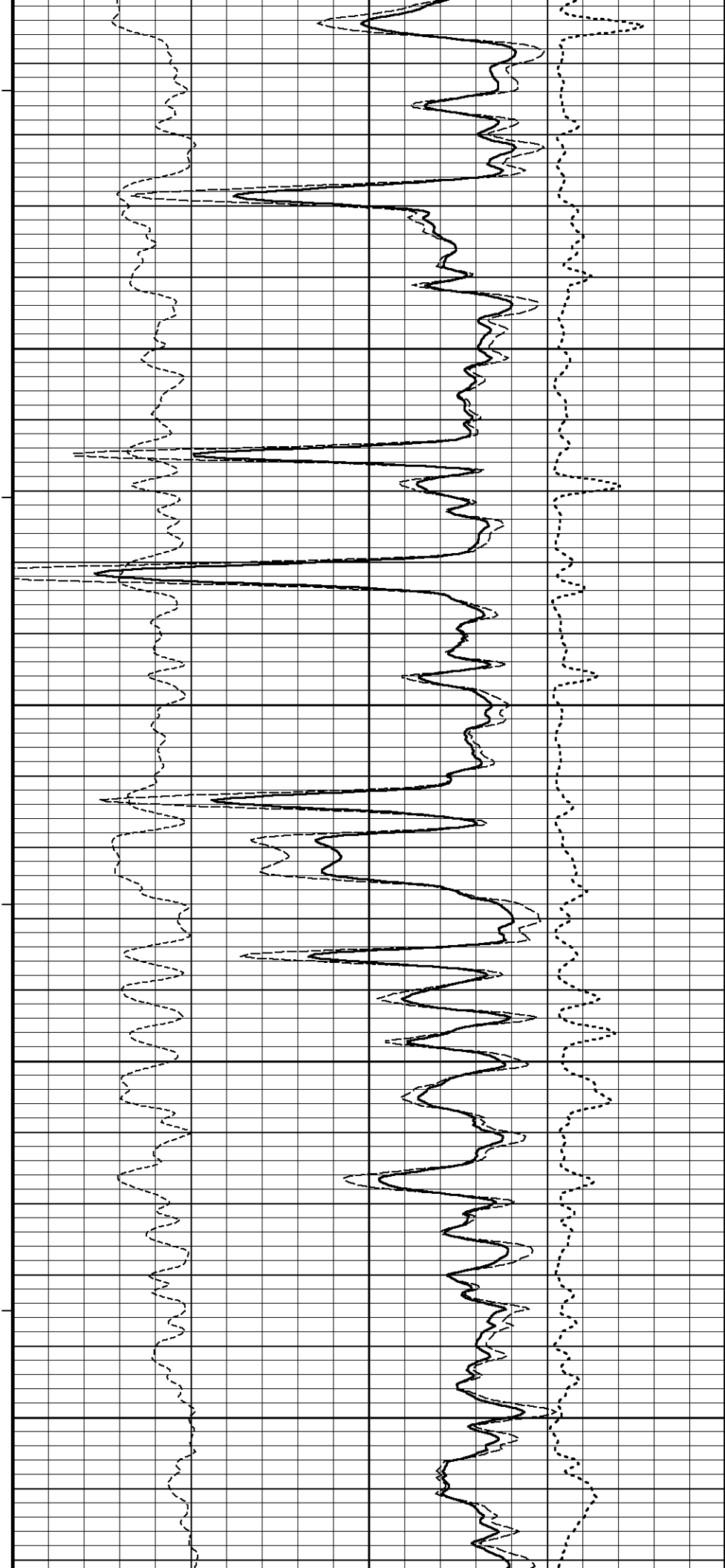
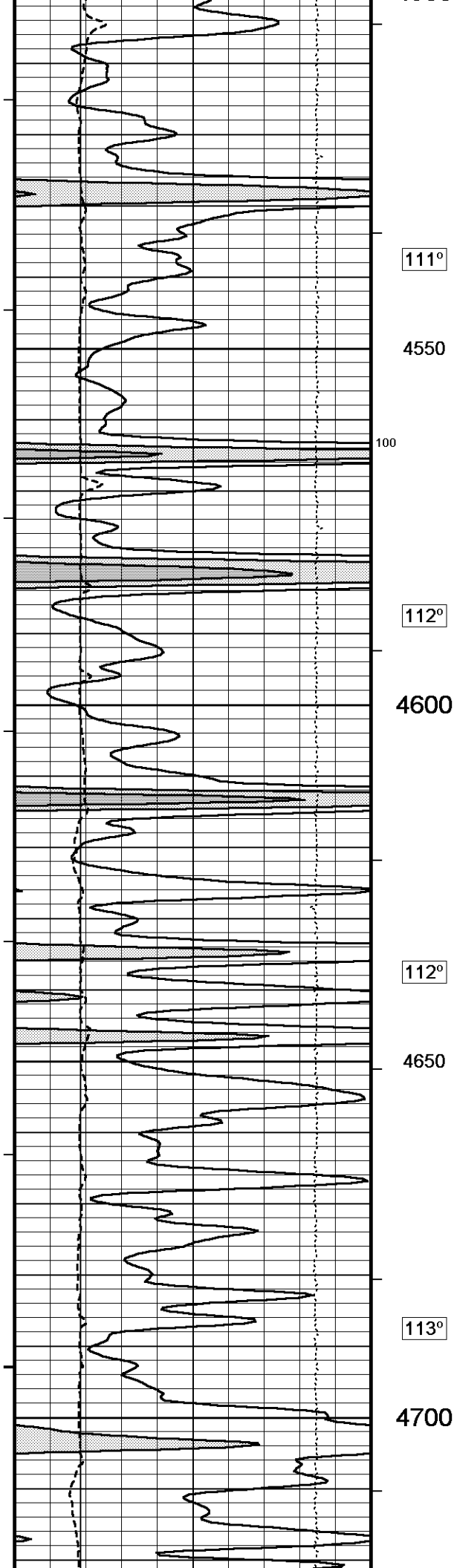


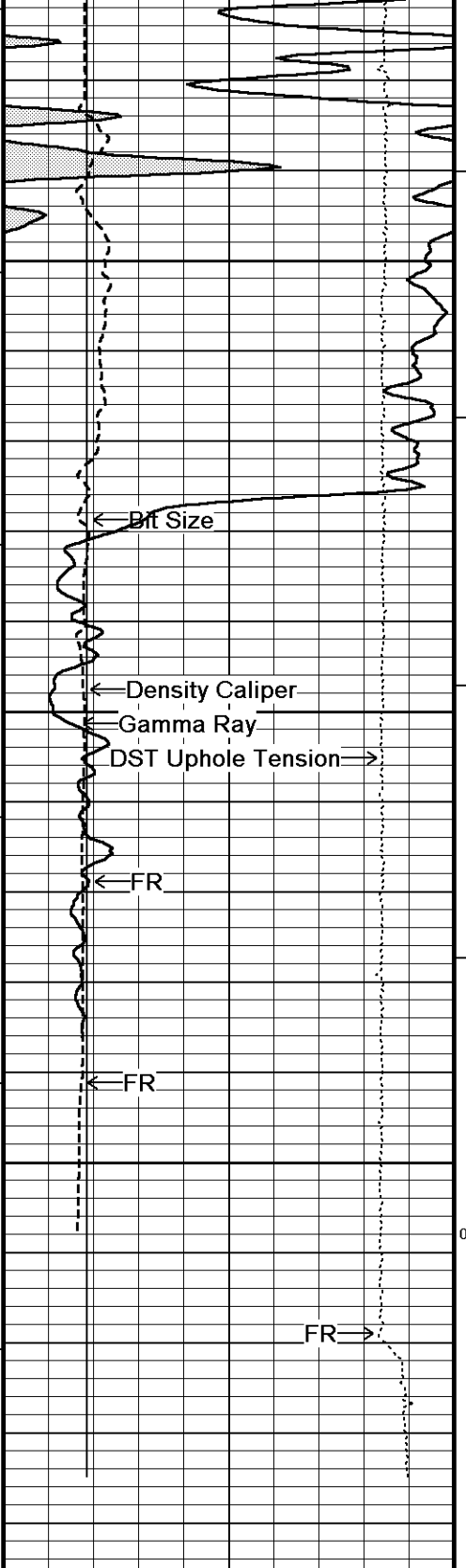












113°

4750

114°

4800

112°

4850

4892

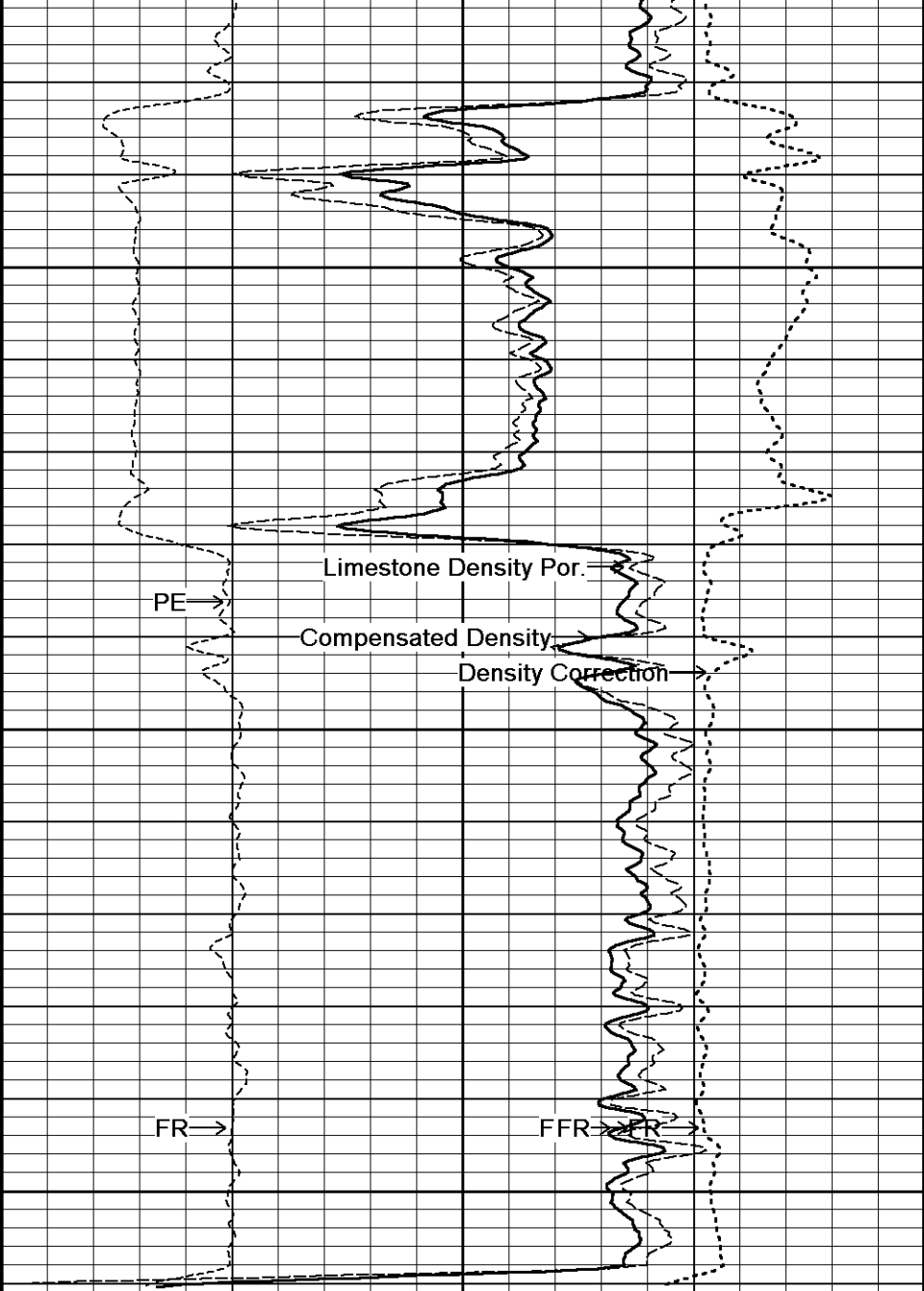
Depth
in
Feet

← Timing Marks
every 60.0 sec

Gamma Ray			
API			
0	75	150	
150	225	300	

Borehole
Temp in
deg F

HVI
every



PE →

Limestone Density Por. →

Compensated Density →

Density Correction →

FR →

FFR →

Compensated Density

grams/cc

2

2.25

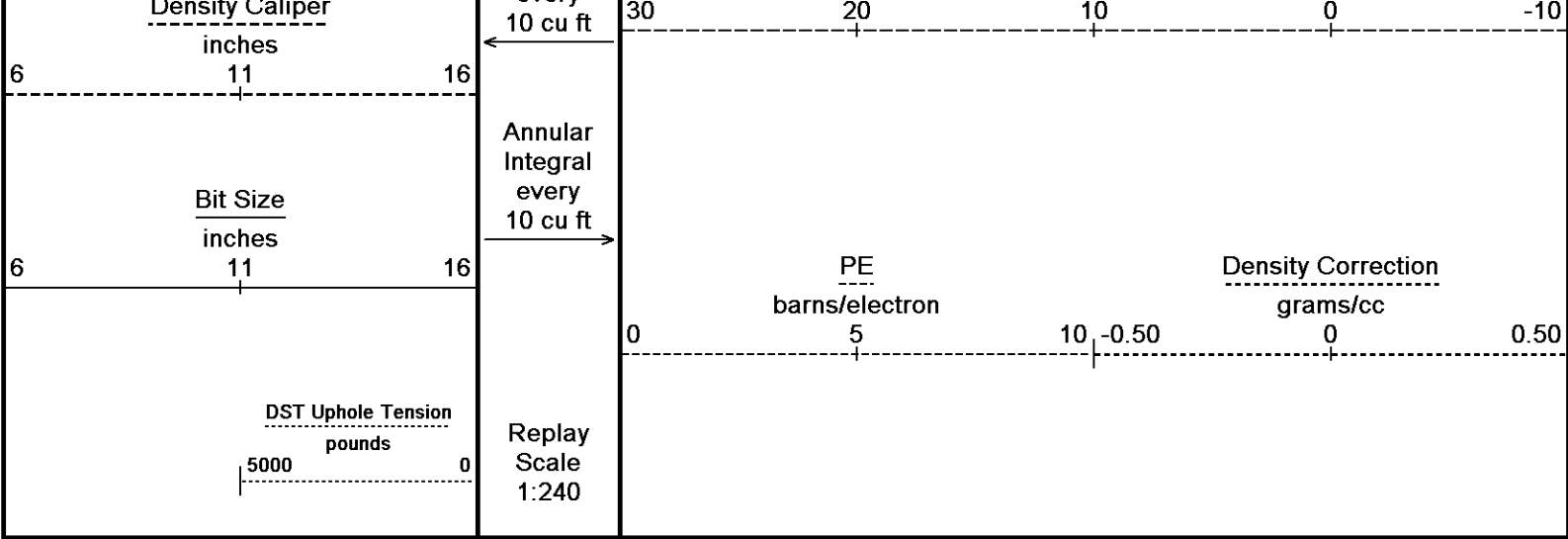
2.50

2.75

3

Limestone Density Por.

percent



Depth Based Data - Maximum Sampling Increment 10.0cm
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 Filename: C:\Minimus 13.08.2113\Logs\Shakespeare Carson 3-25\Shakespeare Carson 3-25_001.dta
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↑ REPEAT SECTION ↑

BEFORE SURVEY CALIBRATION			
C:\Minimus 13.08.2113\Logs\Shakespeare Carson 3-25\Shakespeare Carson 3-25_001.dta			
General Constants All 000		Last Edited on 08-JUN-2014,16:12	
General Parameters			
Mud Resistivity	0.570	ohm-metres	
Mud Resistivity Temperature	70.000	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	MMR Caliper		
Rwa Parameters			
Porosity used	Crossplot Porosity		
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 06-JUN-2014 13:04	
Reading No	Measured	Calibrated (lbs)	
1	15091.74	0.00	
2	15786.19	408.00	
SP Calibration MCG-C 208		Field Calibration on 04-JUN-2014 10:39	
	Measured	Calibrated (mV)	
Reference 1	99.6	99.0	
Reference 2	-98.1	-98.8	
High Resolution Temperature Calibration MCG-C 208		Field Calibration on 23-JAN-2014,17:11	
	Measured	Calibrated(Deg F)	
Lower	50.00	50.00	
Upper	75.00	75.00	
High Resolution Temperature Constants MCG-C 208		Last Edited on 23-JAN-2014,17:11	
Pre-filter Length	11		

Gamma Calibration MCG-C 208

Field Calibration on 04-JUN-2014 10:53

	Measured	Calibrated (API)
Background	68	46
Calibrator (Gross)	1134	771
Calibrator (Net)	1067	725

Gamma Constants MCG-C 208

Last Edited on 08-JUN-2014,15:53

Gamma Calibrator Number	GRC038	
Mud Density	1.12	gm/cc
Caliper Source for Processing	Density Caliper	
Tool Position	Eccentred	
Concentration of KCl		kppm
K Mud Type	Chloride	
K Mud Concentration	0.00	%

Caliper Calibration MMR-C.A 248

Base Calibration on 10-MAY-2014 09:28

Field Calibration on 04-JUN-2014 10:29

Base Calibration		
Reading No	Measured	Calibrator Size (in)
1	13446	5.98
2	16585	7.97
3	19782	9.86
4	23693	11.92
5	0	0.00
6	N/A	N/A
Field Calibration		
	Measured Caliper (in)	Actual Caliper (in)
	8.02	7.97

Micro Normal and Micro Inverse Calibration MMR-C.A 248

Base Calibration on 10-MAY-2014 09:40

Field Check on 04-JUN-2014 10:27

Base Calibration				
		Measured		Calibrated (ohm-m)
Channel	Resistor 1	Resistor 2	Resistor 1	Resistor 2
Micro Normal	10.1	49.8	5.1	25.6
Micro Inverse	9.9	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 and Micro Inverse Constants MMR-C.A 248

Last Edited on 23-JAN-2014,17:04

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

Neutron Calibration MDN-B.J 387

Base Calibration on 08-MAY-2014 14:03

Field Check on 04-JUN-2014 10:59

Base Calibration				
		Measured		Calibrated (cps)
	Near	Far	Near	Far
	2970	91	3714	110
Ratio		32.668		33.764
Field Calibrator at Base				Calibrated (cps)
			1688	2486
Ratio				0.679
Field Check				Calibrated (cps)
			1689	2475
Ratio				0.683

Neutron Constants MDN-B.J 387

Last Edited on 08-JUN-2014,15:53

Neutron Source Id	P58125B
Neutron Jig Number	5824NE
Epithermal Neutron	
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	

Sonic Constants MSS-A.A 73

Last Edited on 08-JUN-2014,15:53

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

Compliance 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 5

Base Calibration on 21-JAN-2014,09:50
Field Check on 04-JUN-2014 10:24

Base Calibration

Test Loop Calibration

Channel	Measured		Calibrated (mmho/m)	
	Low	High	Low	High
1	16.3	470.8	9.3	966.2
2	5.6	376.1	7.6	821.4
3	2.6	266.1	5.2	566.0
4	1.6	130.0	2.6	279.2

Array Temperature 71.1 Deg F

Channel	Base Check (mmho/m)		Field Check (mmho/m)	
	Low	High	Low	High
1			15.3	3863.0
2			31.7	3590.9
3			29.7	2971.5
4			20.7	2126.3
Deep			18.4	1912.3
Medium			42.9	3861.3
Shallow			47.2	5372.6

Array Temperature 79.2 Deg F

Induction Constants MAI-A.A 5

Last Edited on 08-JUN-2014,16:02

Induction Model

RtAP-NC

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 5

Field Calibration on 21-JAN-2014,15:43

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

DOWNHOLE EQUIPMENT

C:\Minimus 13.08.2113\Logs\Shakespeare Carson 3-25\Shakespeare Carson 3-25_001.dta

CBH-C, Cablehead, 11 pin

CBH-C 0 LG: 2.40 ft WT: 24.3 lb OD: 2.244 in

Compact Comms Gamma

MCG-C 208 LG: 8.70 ft WT: 63.9 lb OD: 2.244 in

Compact Micro-Resistivity

MMR-C.A 248 LG: 8.59 ft WT: 81.6 lb OD: 4.882 in

Compact Neutron

MDN-B.J 387 LG: 5.04 ft WT: 50.7 lb OD: 2.244 in

Compact Density/Caliper

MPD-D.A 480 LG: 9.59 ft WT: 90.4 lb OD: 2.449 in

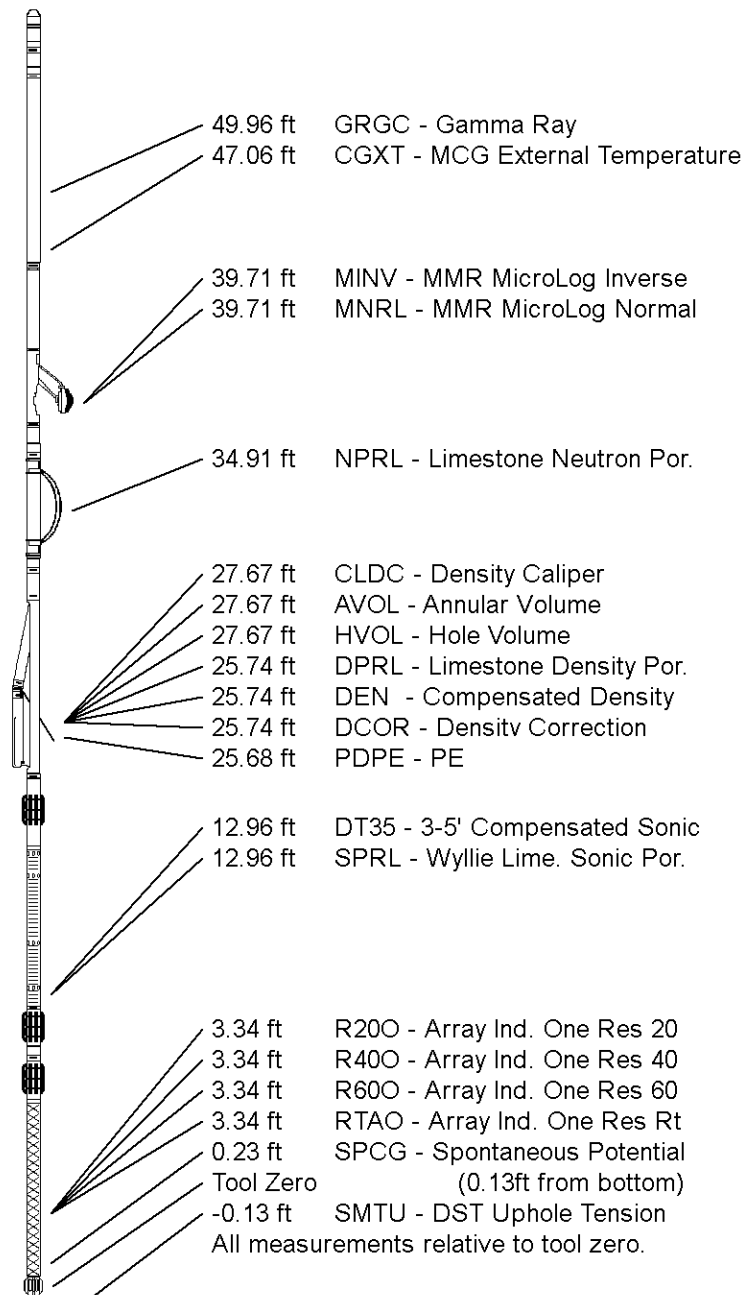
Compact Sonic

MSS-A.A 73 LG: 12.52 ft WT: 72.8 lb OD: 2.244 in

Compact Induction

MAI-A.A 5 LG: 10.81 ft WT: 48.5 lb OD: 2.244 in

Total Length: 57.64 ft Weight: 432.1 lb



COMPANY

SHAKESPEARE OIL CO., INC.

WELL

CARSON 3-25

FIELD

PENCE EAST

PROVINCE/COUNTY

SCOTT

COUNTRY/STATE

U.S.A. / KANSAS

Elevation Kelly Bushing 3114.00 feet

Elevation Drill Floor 3112.00 feet

Elevation Ground Level 3102.00 feet

First Reading 4843.00 feet

Depth Driller 4870.00 feet

Depth Logger 4869.00 feet

COMPACT PHOTO DENSITY
COMPENSATED NEUTRON

