

**Weatherford****COMPACT PHOTO DENSITY
COMPENSATED NEUTRON**

COMPANY

O'BRIEN ENERGY RESOURCES CORP.

WELL

VAIL #5-31

FIELD

NOVINGER EAST

PROVINCE/COUNTY

MEADE

COUNTRY/STATE

U.S.A. / KANSAS

LOCATION

1320' FNL & 1320' FWL
NW/4

SEC

TWP

RGE

Other Services

MML

31

33S

29W

MAI/MFE

Permit Number

15-119-21333

Permanent Datum G.L., Elevation 2671 feet

Log Measured From KB

Drilling Measured From K.B.

Date

29-JAN-2013

Run Number

ONE

Service Order

3537854

Depth Driller

6400.00 feet

Depth Logger

6408.00 feet

First Reading

6389.00 feet

Last Reading

4000.00 feet

Casing Driller

1490.00 feet

Casing Logger

1490.00 inches

Bit Size

7.875

Hole Fluid Type

CHEMICAL

Density / Viscosity

9.35 lb/USg 52.00 type in

PH / Fluid Loss

9.00

Sample Source

FLOWLINE

Rm @ Measured Temp

1.05 @ 84.0 ohm-m

Rmf @ Measured Temp

0.84 @ 84.0 ohm-m

Rmc @ Measured Temp

1.26 @ 84.0 ohm-m

Source Rmf / Rmc

CALC

Rm @ BHT

0.69 @126.0 ohm-m

Time Since Circulation

5 HOURS

Max Recorded Temp

126.00 deg F

Equipment / Base

13057 LIB

Recorded By

LYNN SCOTT

Witnessed By

PETER DEBENHAM

ERIK PETERSEN

ROGER PEARSON

IOB#

LB13-027

BOREHOLE RECORD

Last Edited: 29-JAN-2013 12:18

Bit Size
inches

7.875

Depth From
feet

1490.00

Depth To
feet

6400.00

CASING RECORD

Type

Size
inches

8.625

Depth From
feet

0.00

Shoe Depth
feet

1490.00

Weight
pounds/ft

24.00

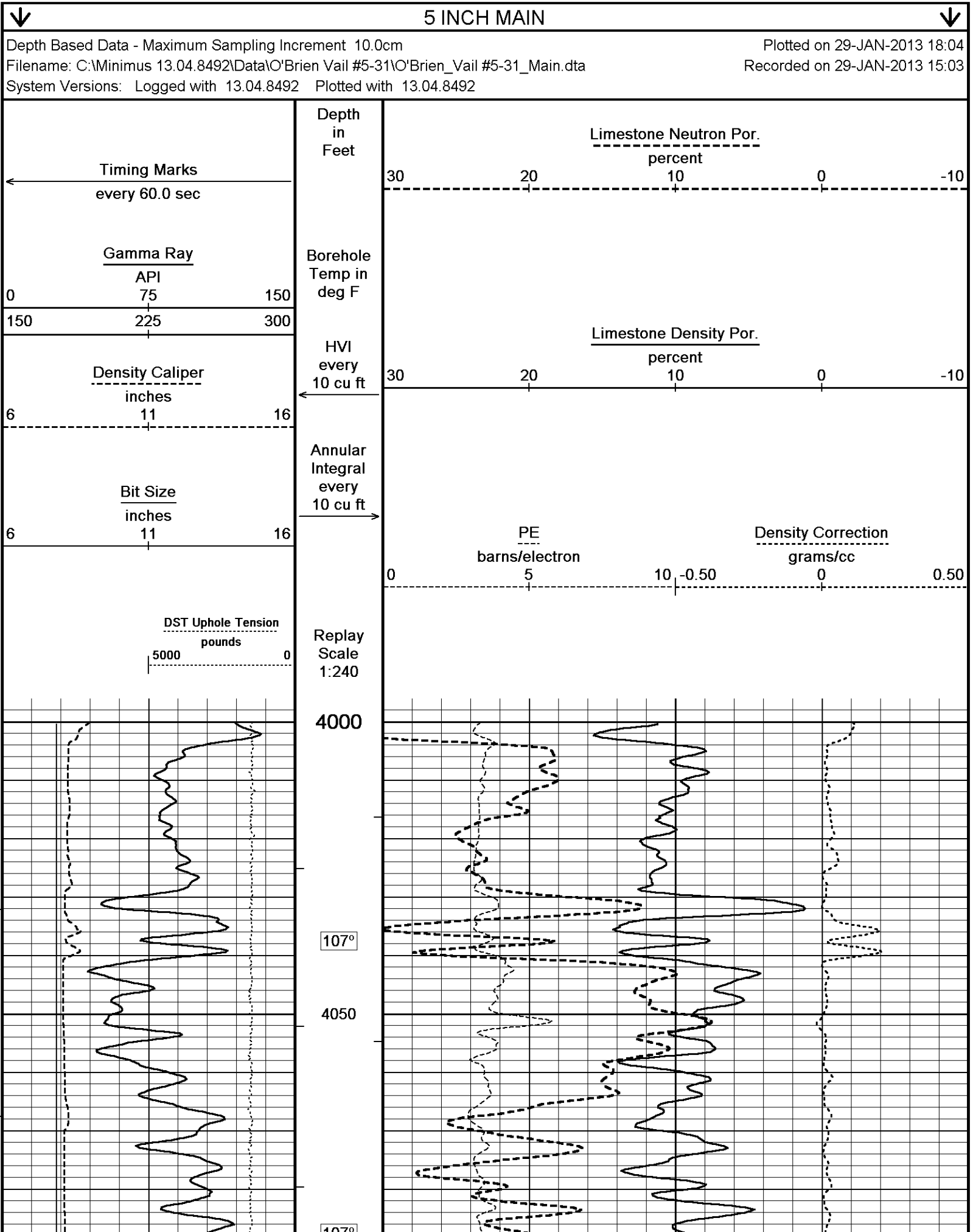
REMARKS

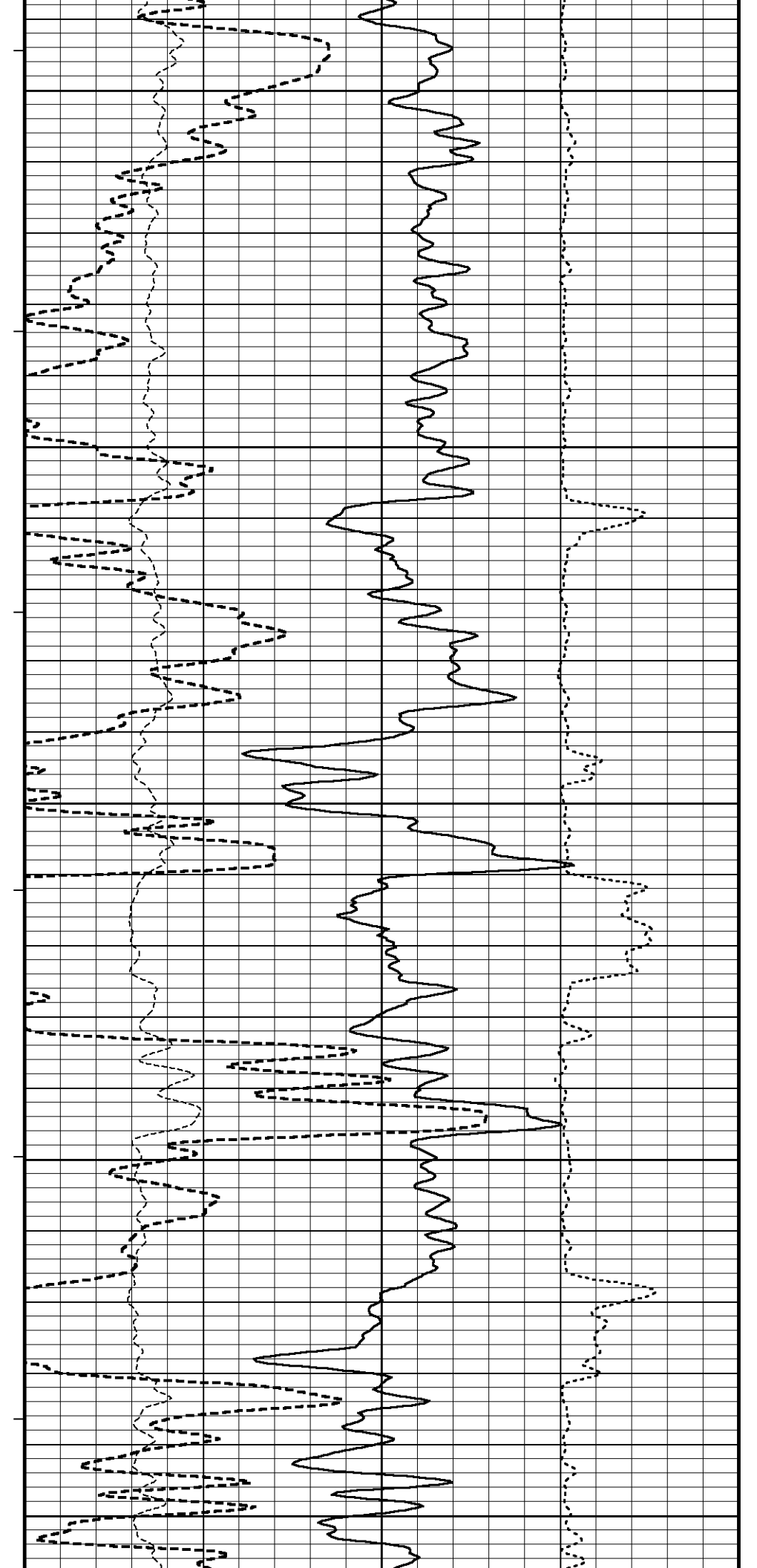
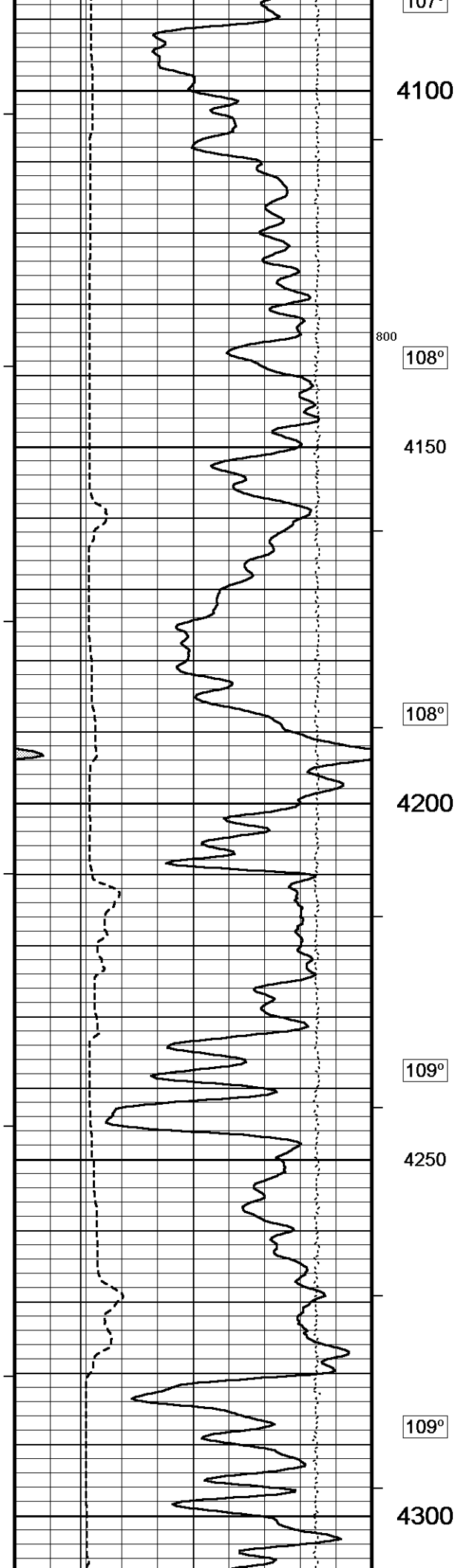
Tools Ran: MCG, MML, MDN, MPD, MFE, MAI ran in combination.
Hardware Used: MDN Dual bowspring used. MPD 8 inch profile plate used. MAI and MFE 0.5 Inch standoffs used.
2.71 g/cc Limestone Density Matrix used to calculate porosity.
All intervals logged and scaled per customer's request.
Tight pulls, washouts and borehole rugosity will affect data quality.
Total hole volume from TD to Surface Casing= 1960 cu. ft.
Annular volume with 4.5 inch production casing from TD to 4000 = 580 cu. ft.
Service order: #3537854
Rig: Duke #6
Engineer: L. Scott, E. Petersen
Operator(s): M. Stegman

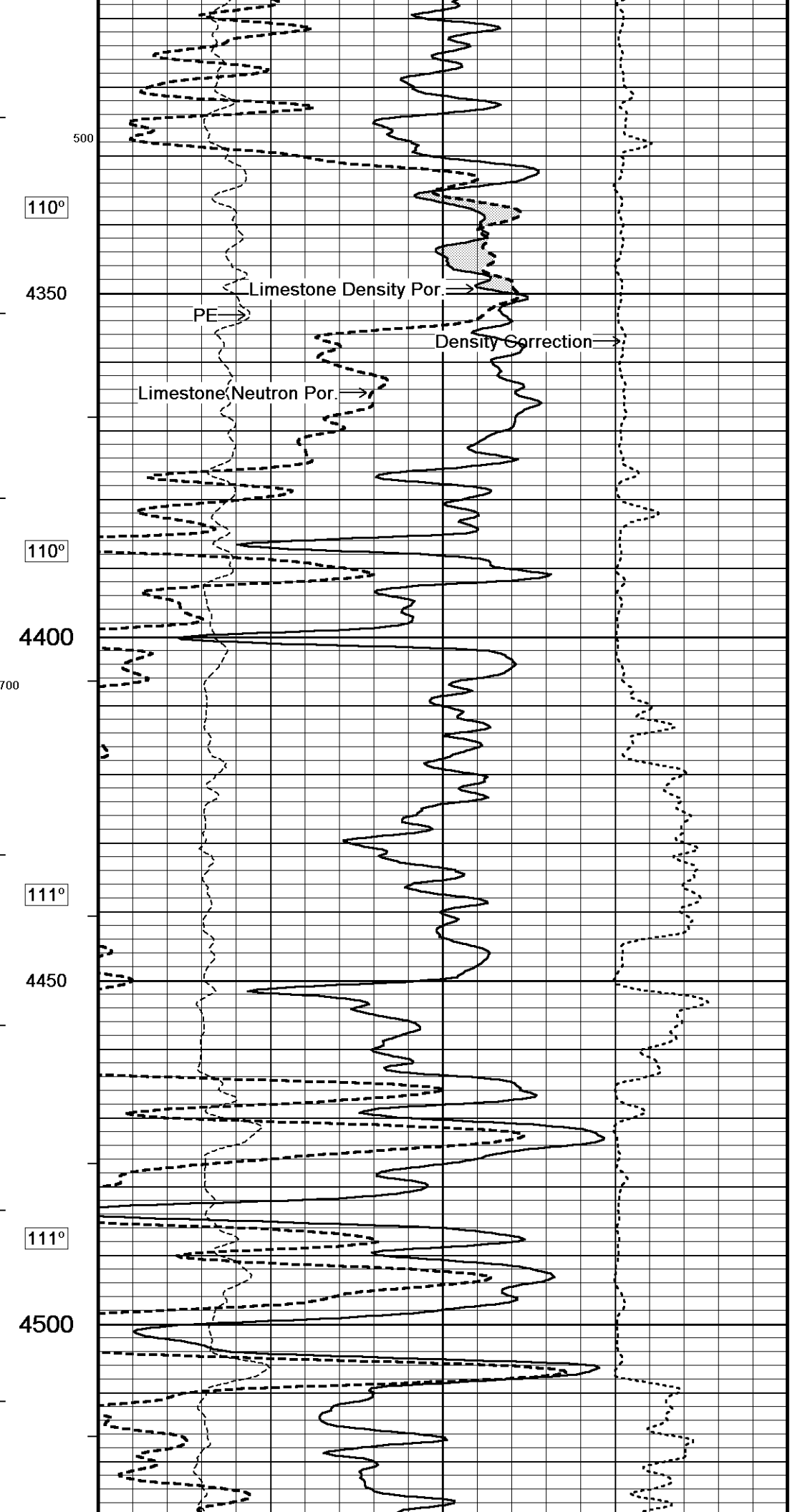
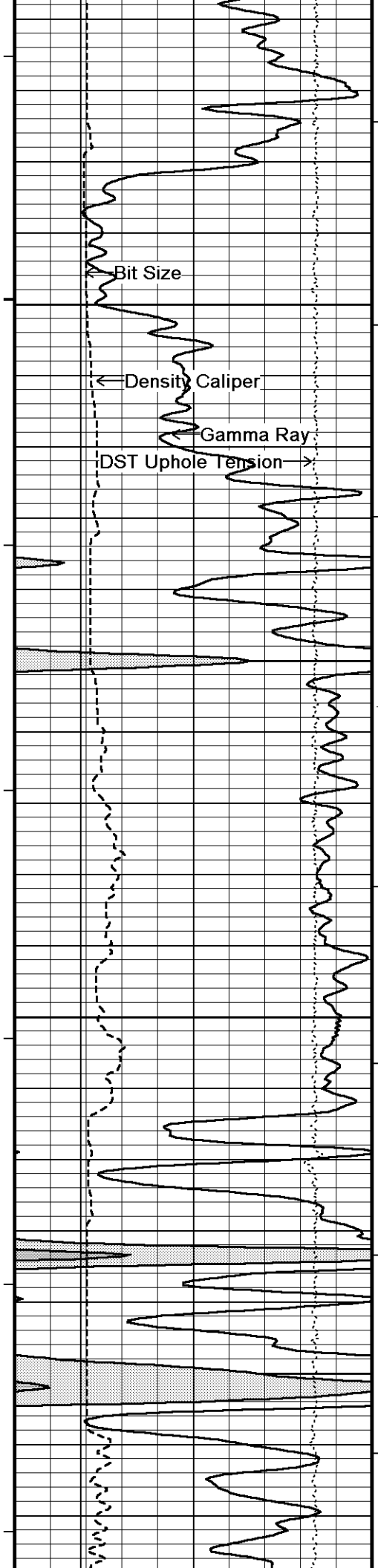
Software duplicates the pH onto the fluid loss. The fluid loss is 8.0 ml/30min.

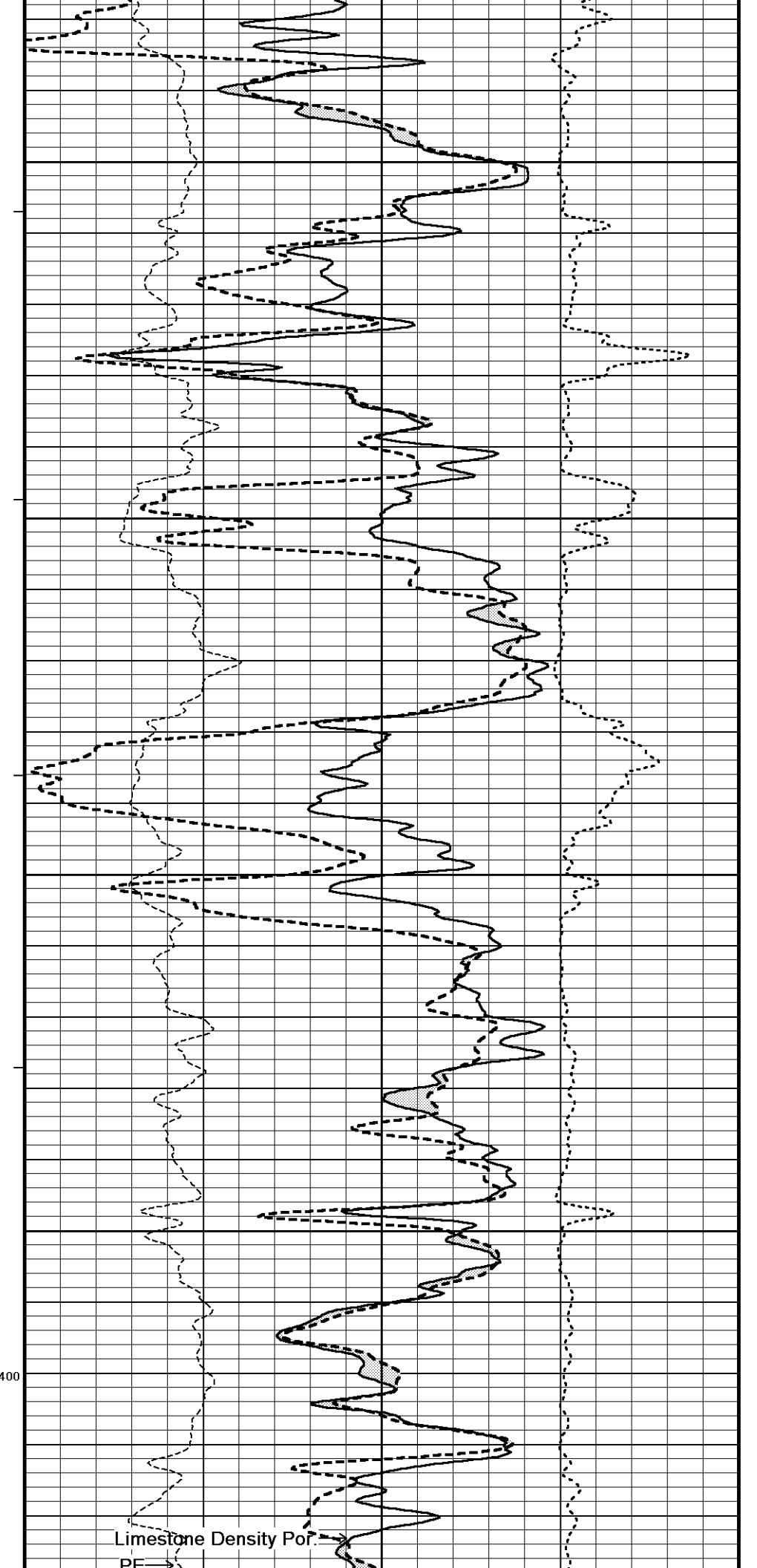
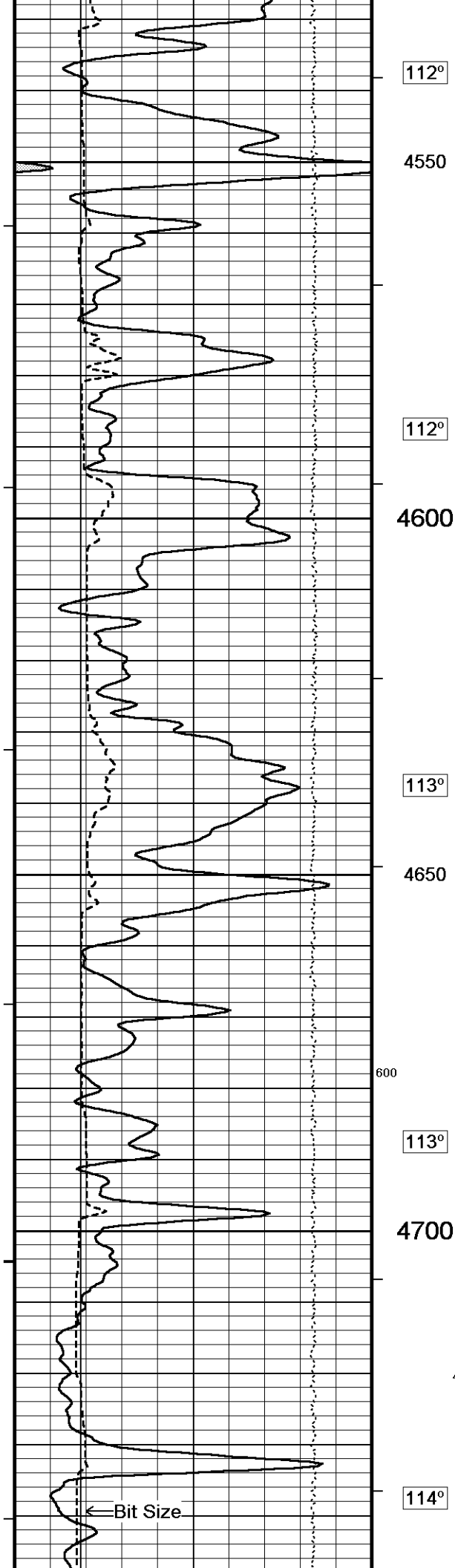
All interpretations are opinions based on inferences from electrical or other measurements and we cannot, and do not, guarantee the accuracy or correctness of any interpretations, and we shall not, except in the case of gross or wilful negligence on our part, be liable or responsible for any loss, costs, damages or expenses incurred or sustained by anyone resulting from any interpretation made by any of our officers, agents or

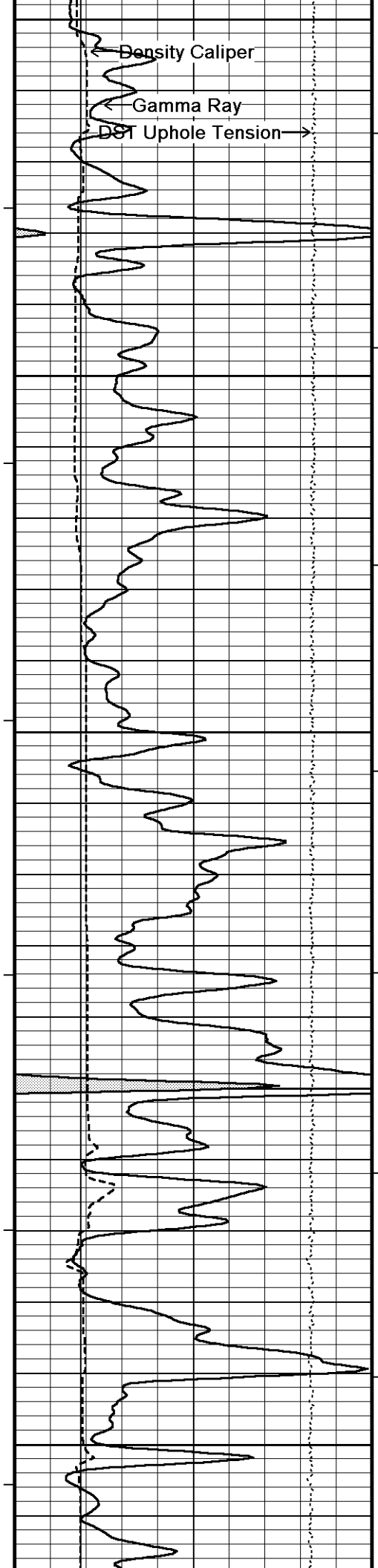
employees. These interpretations are also subject to our general terms and conditions in our price schedule.











4750

114°

4800

114°

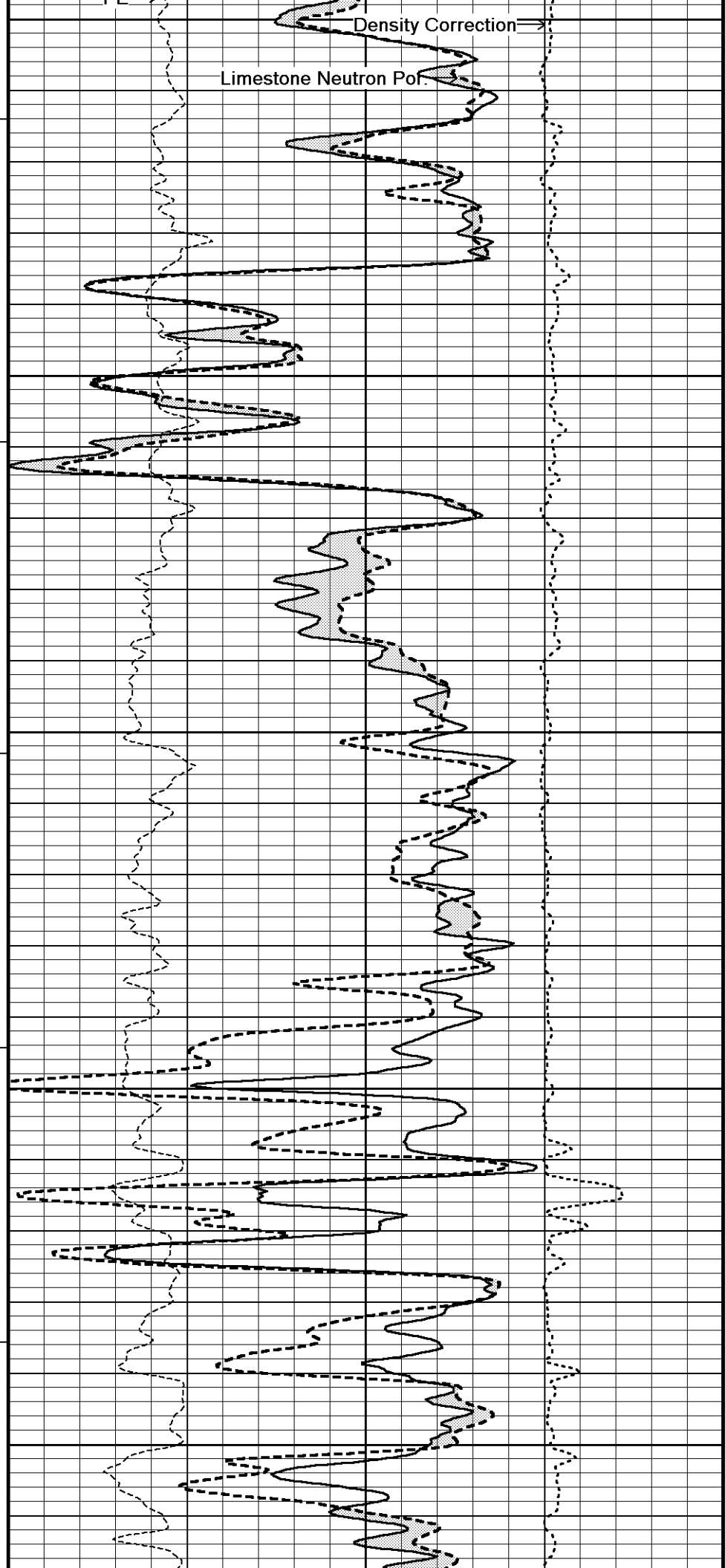
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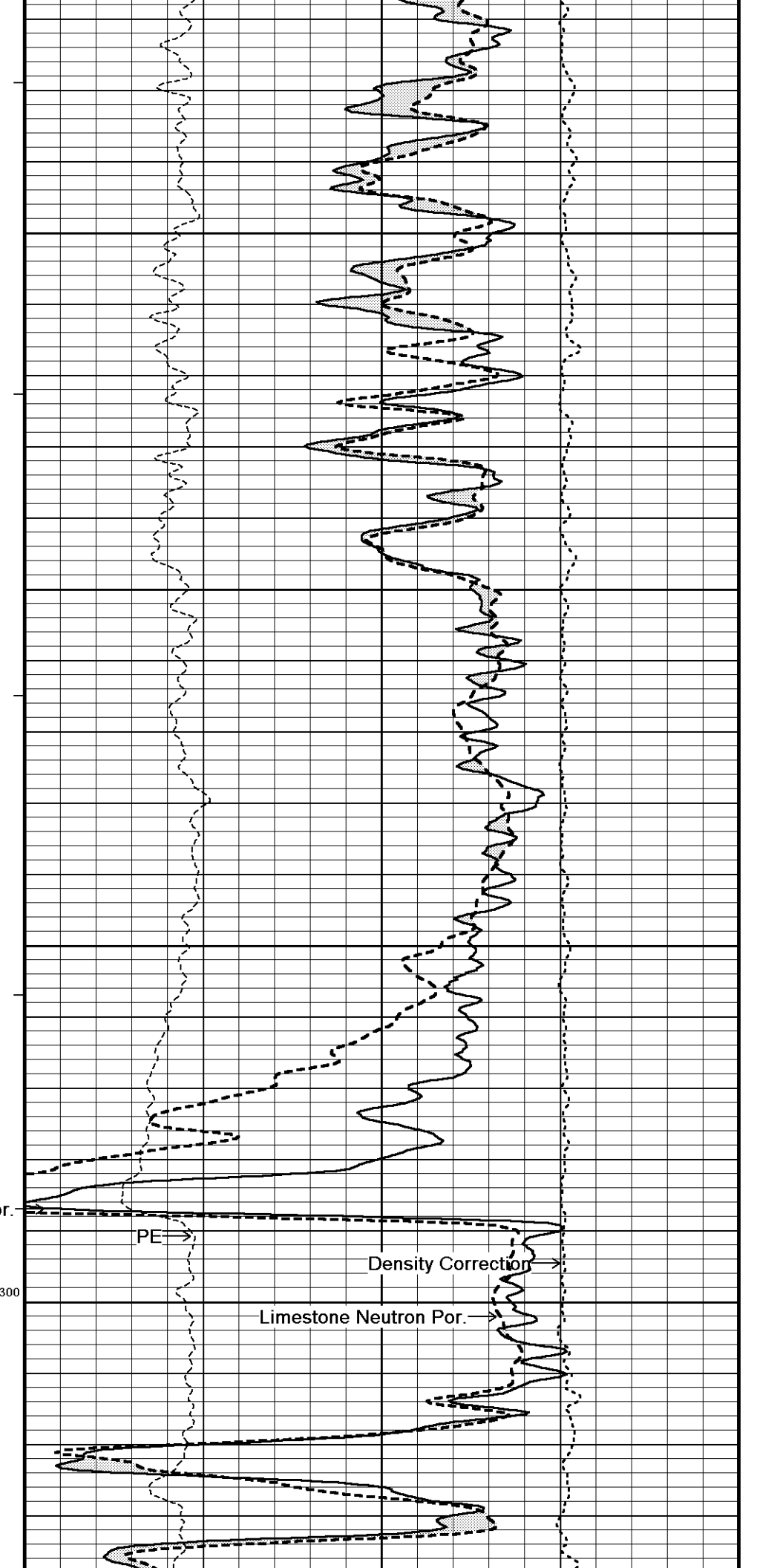
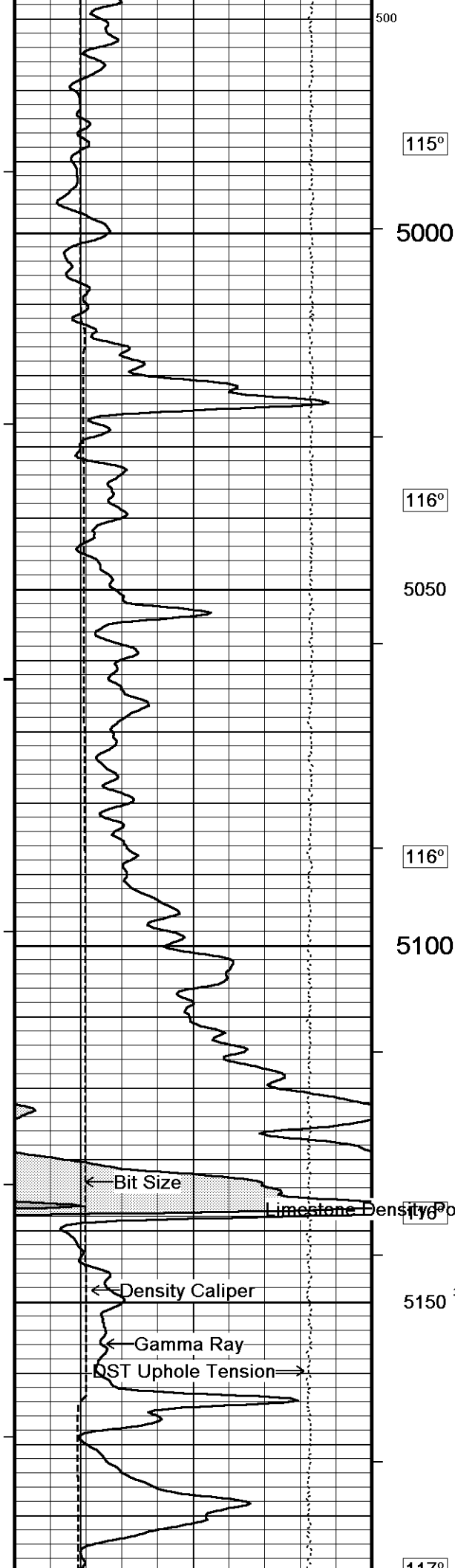
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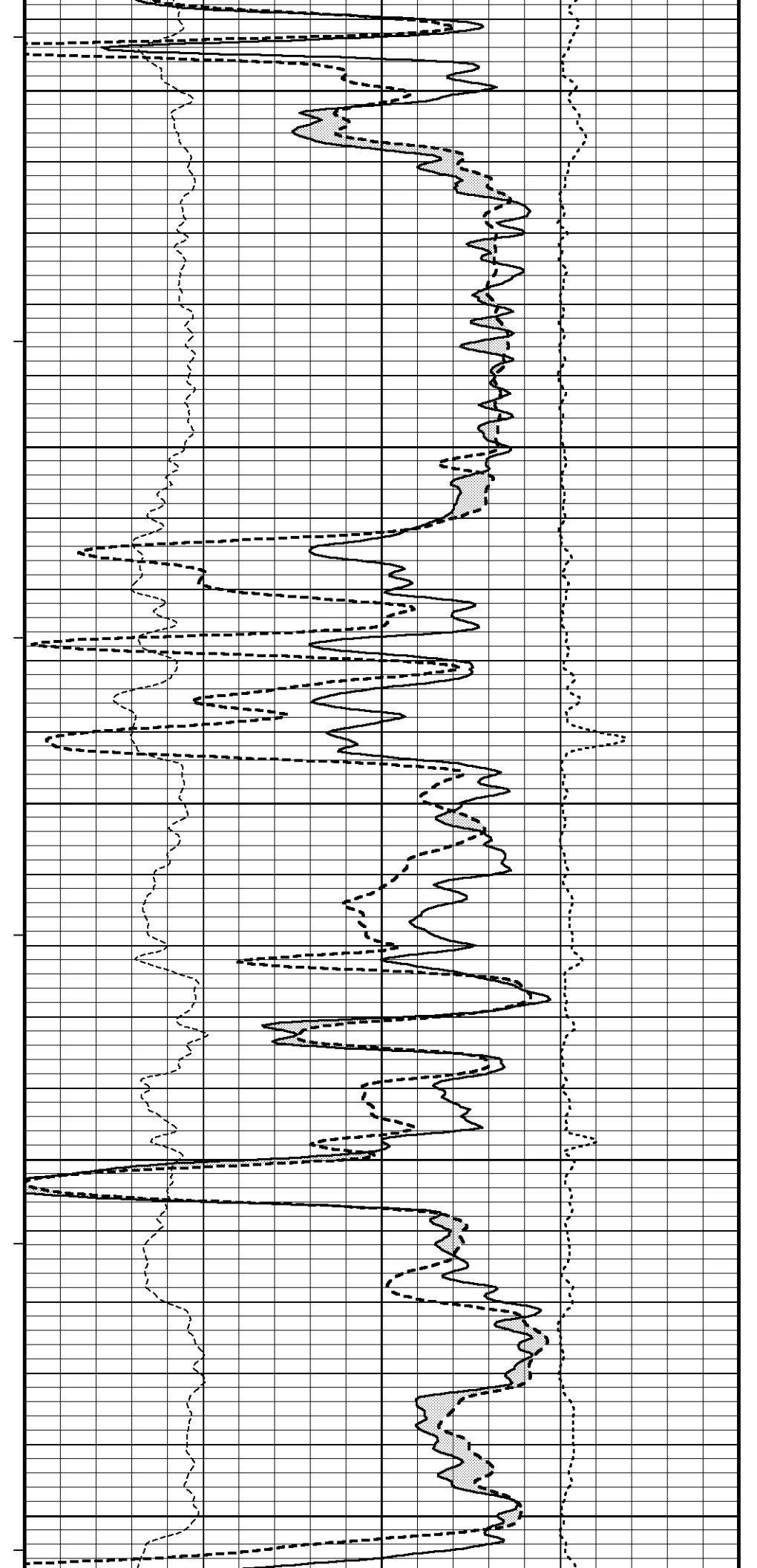
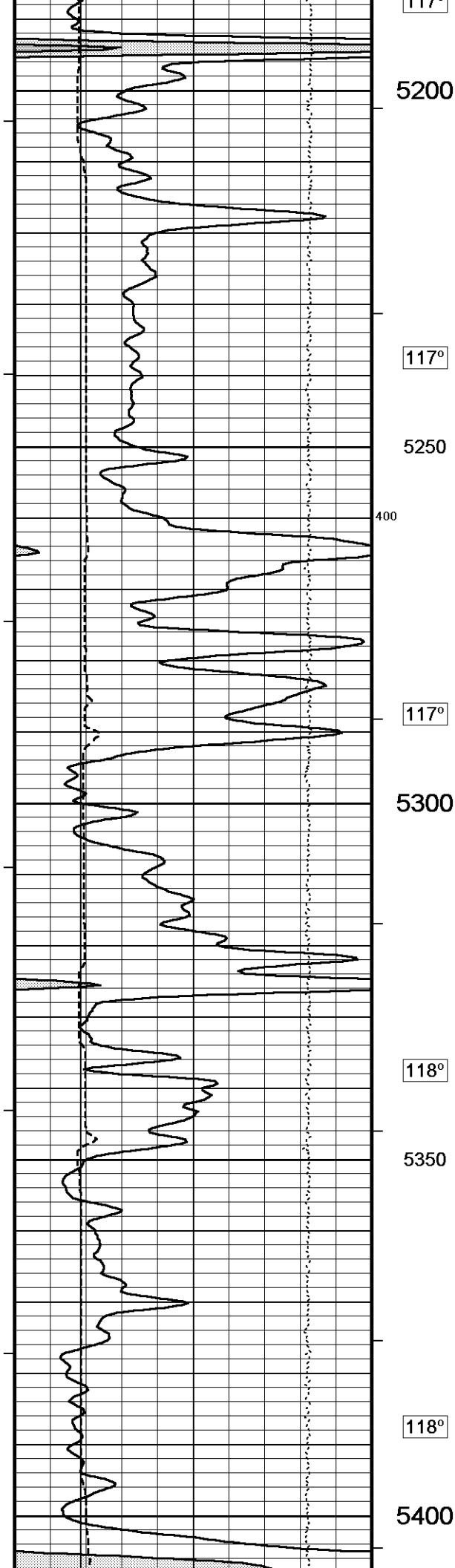
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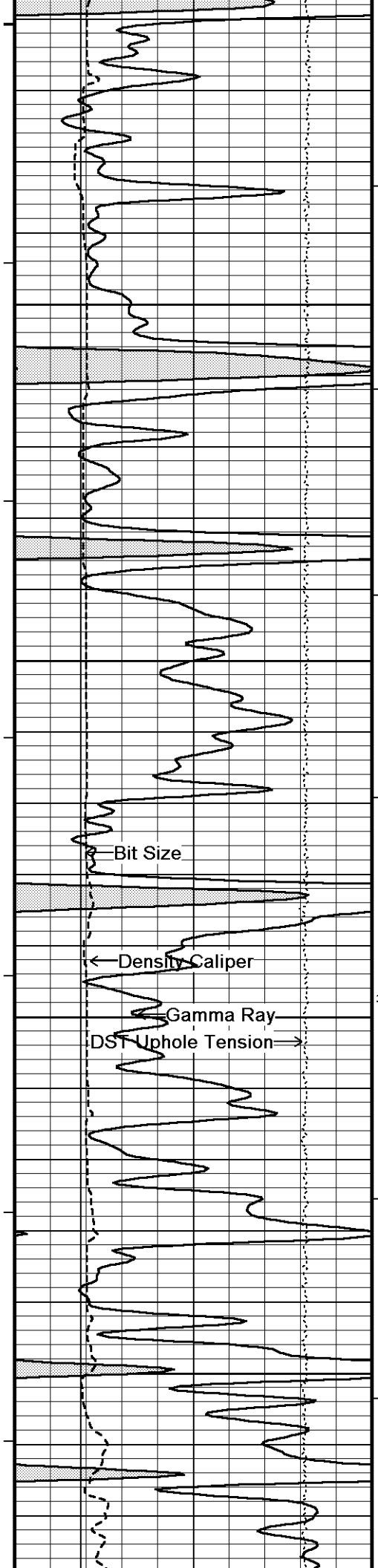
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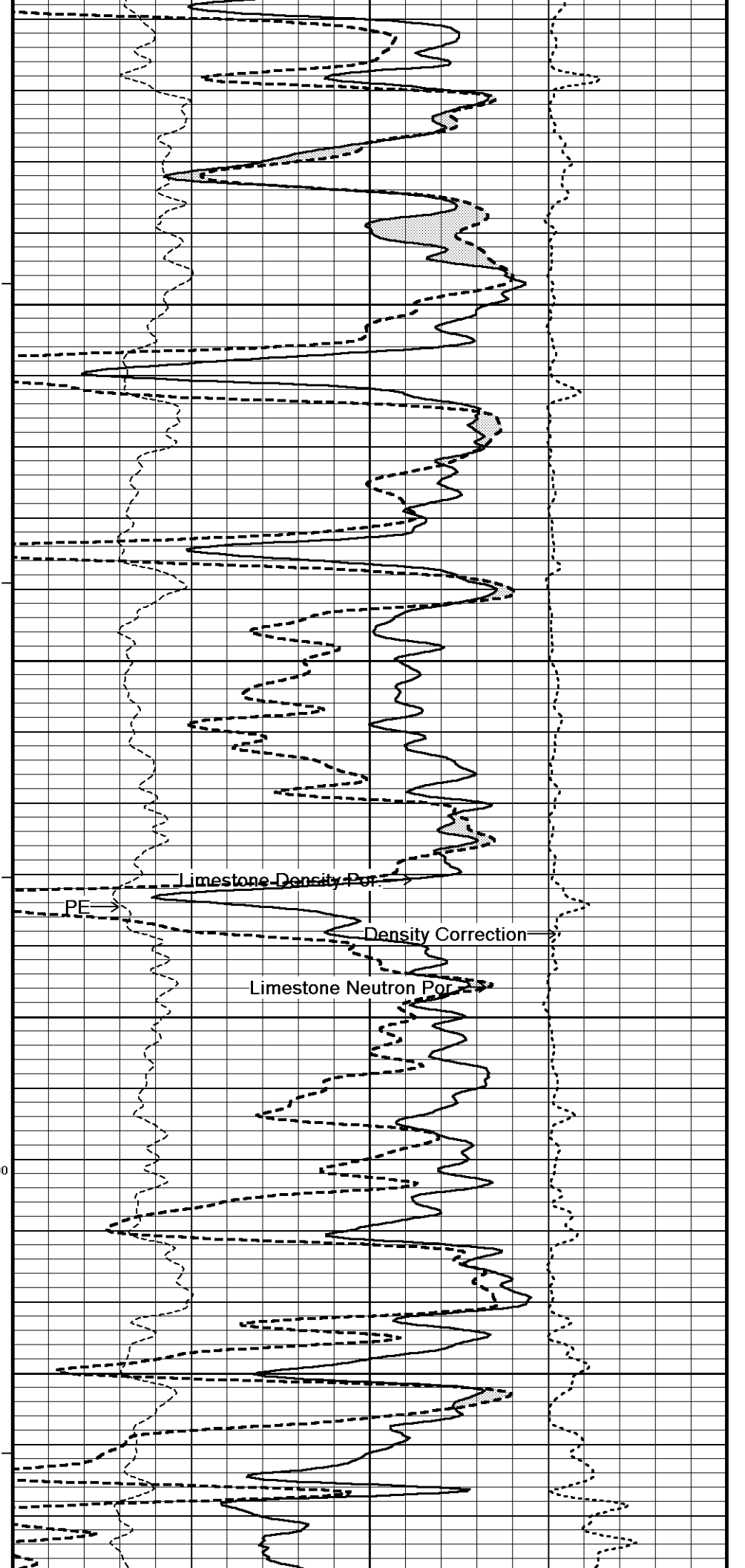








119°
5450
119°
5500
119°
5550
300
200
120°
5600



Bit Size

Density Caliper

Gamma Ray

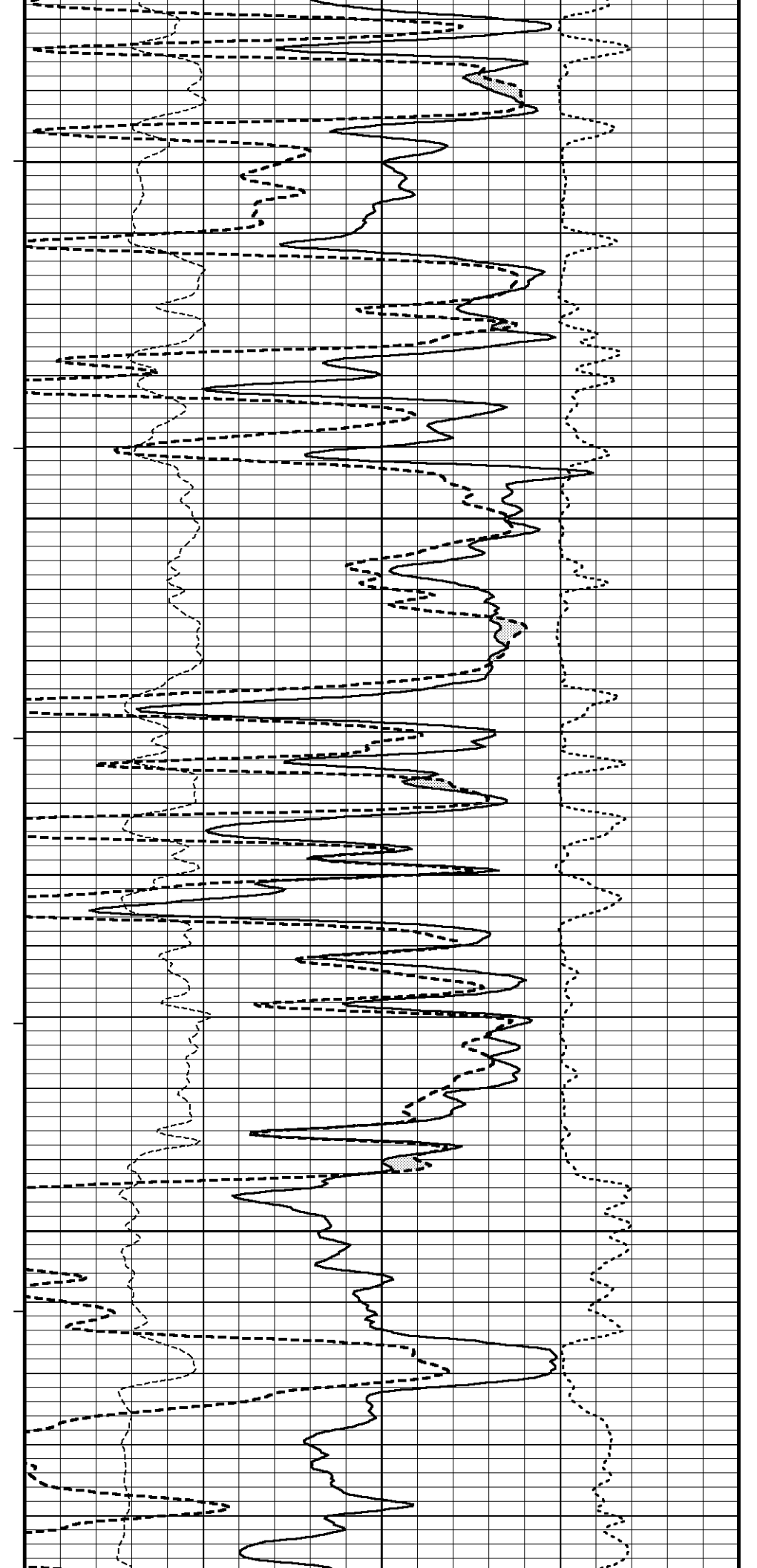
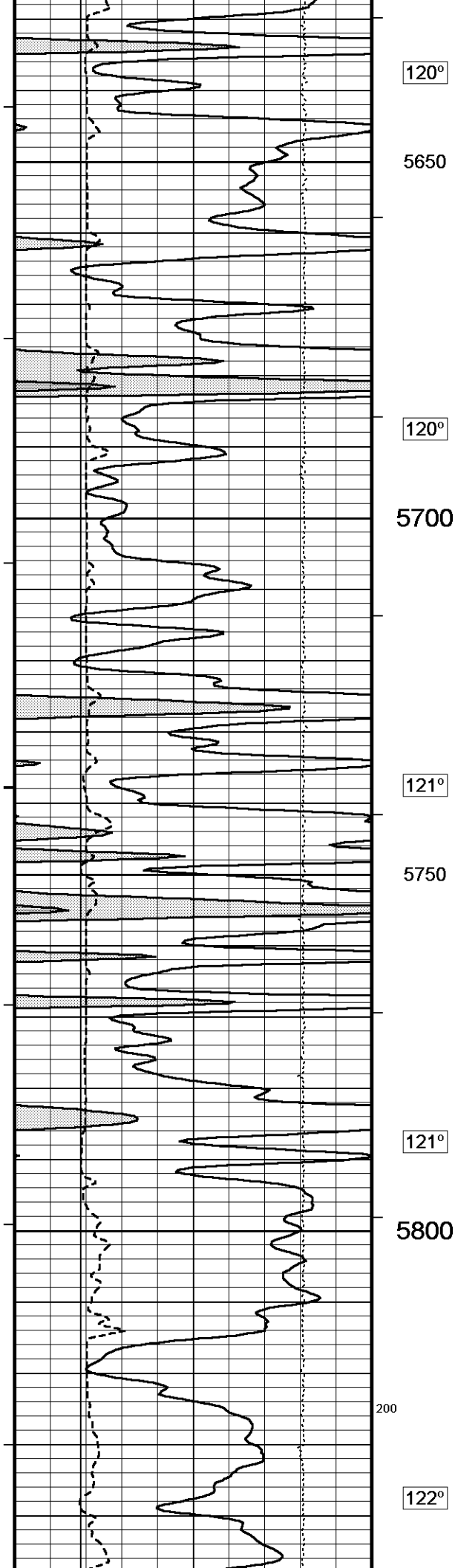
DST Uphole Tension

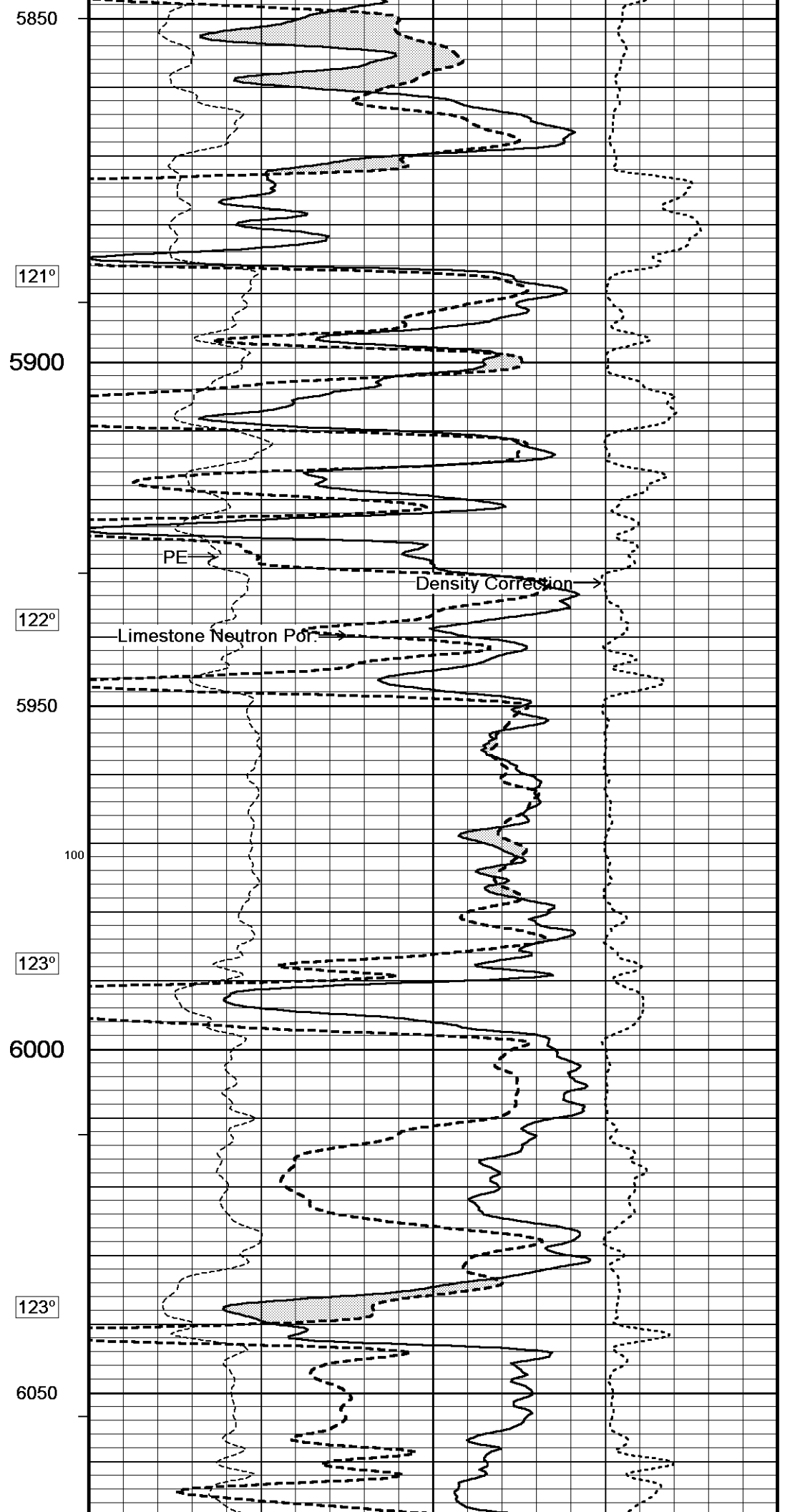
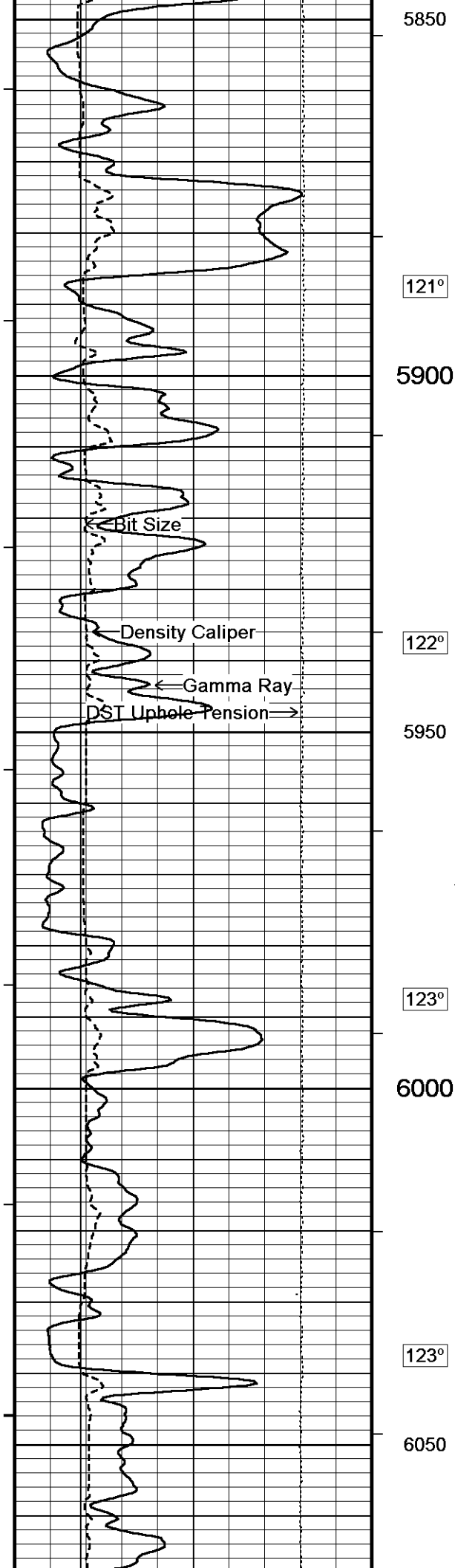
PE

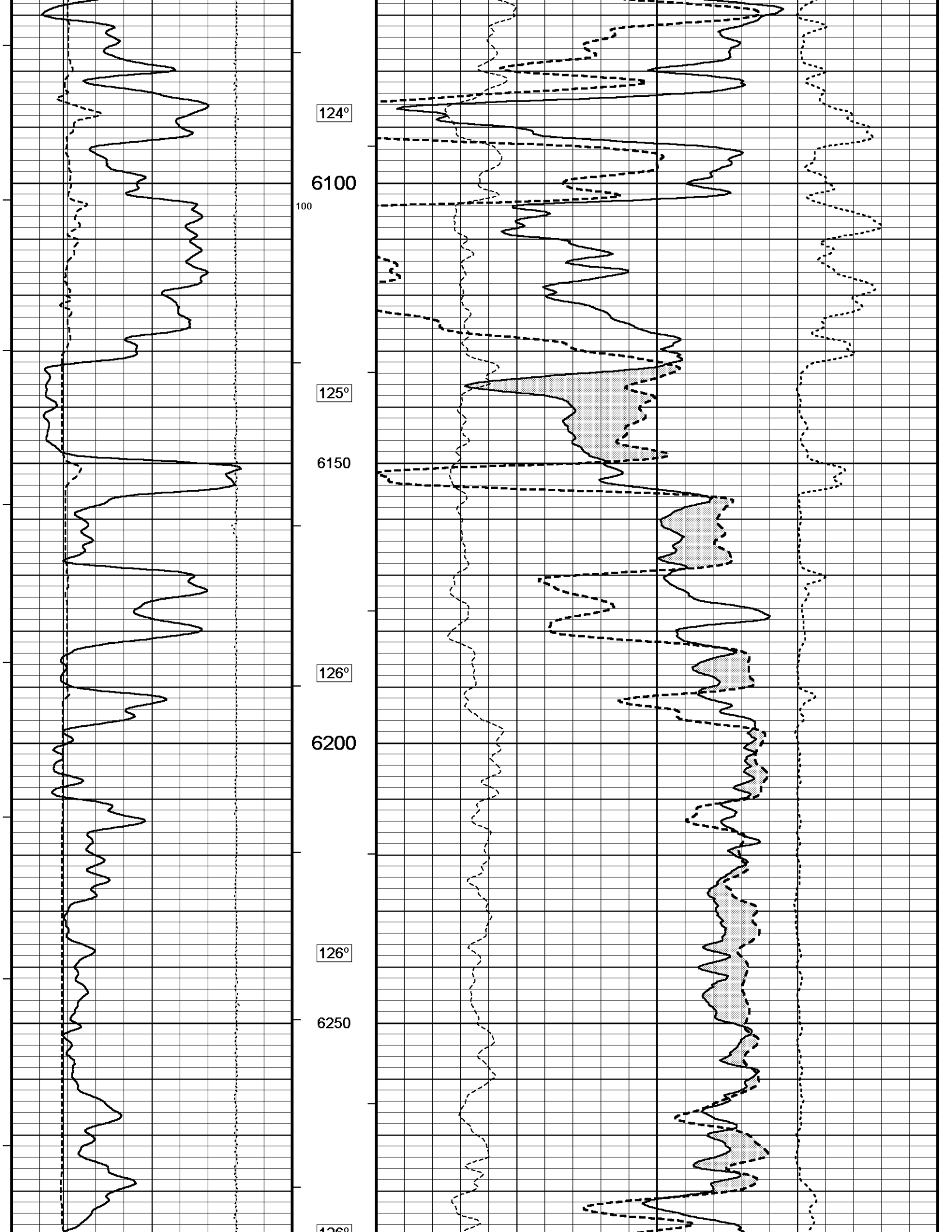
Limestone Density Por

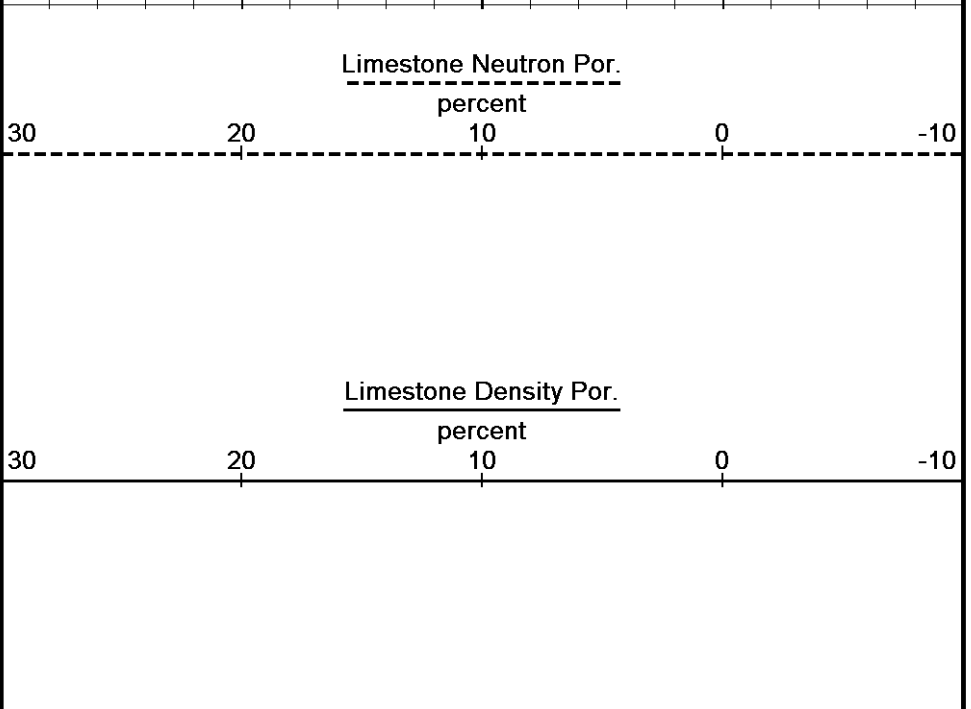
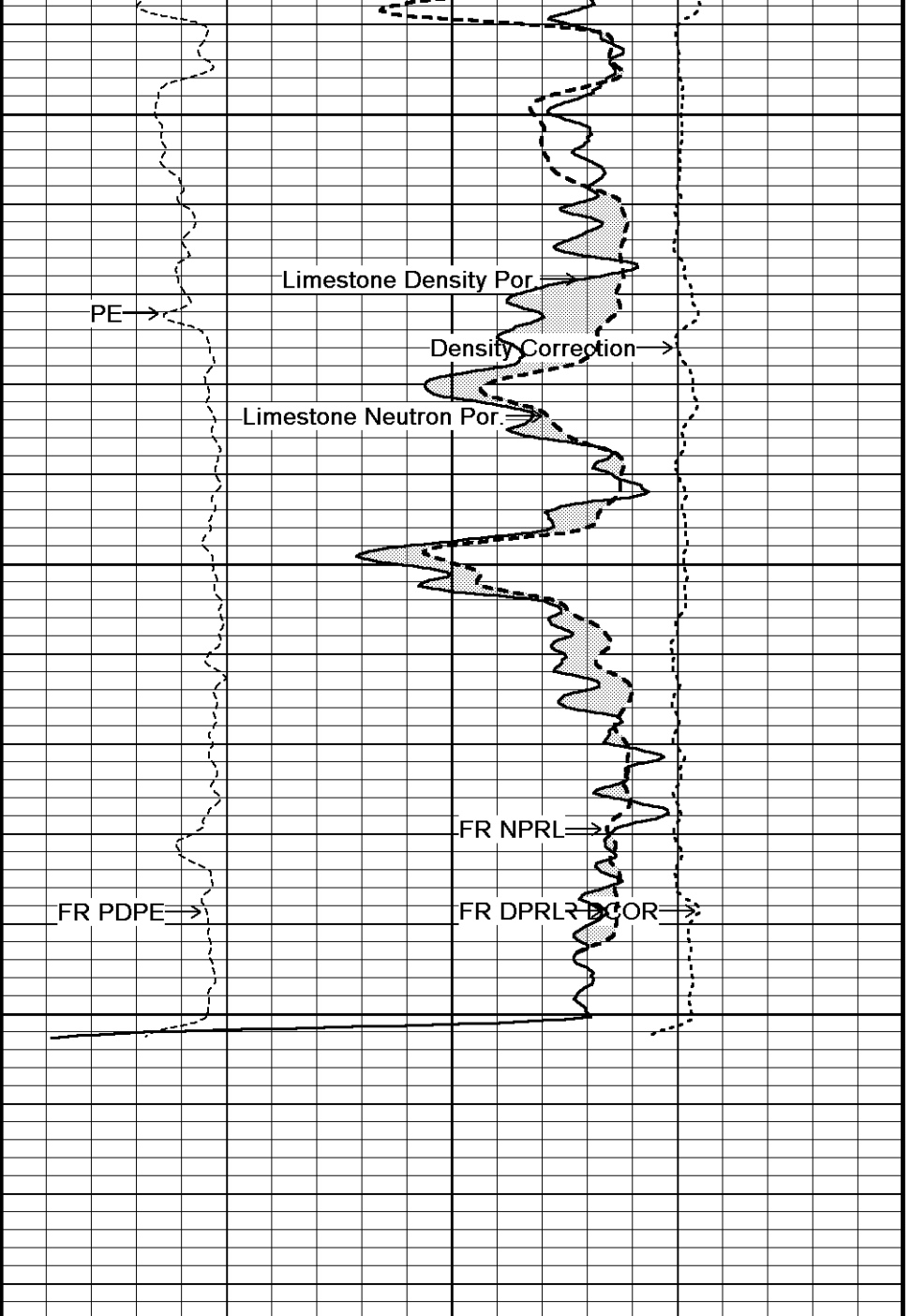
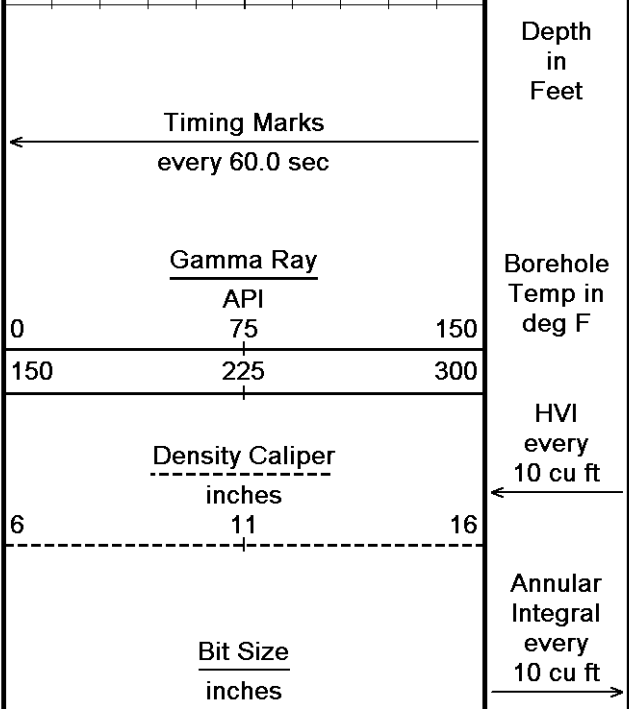
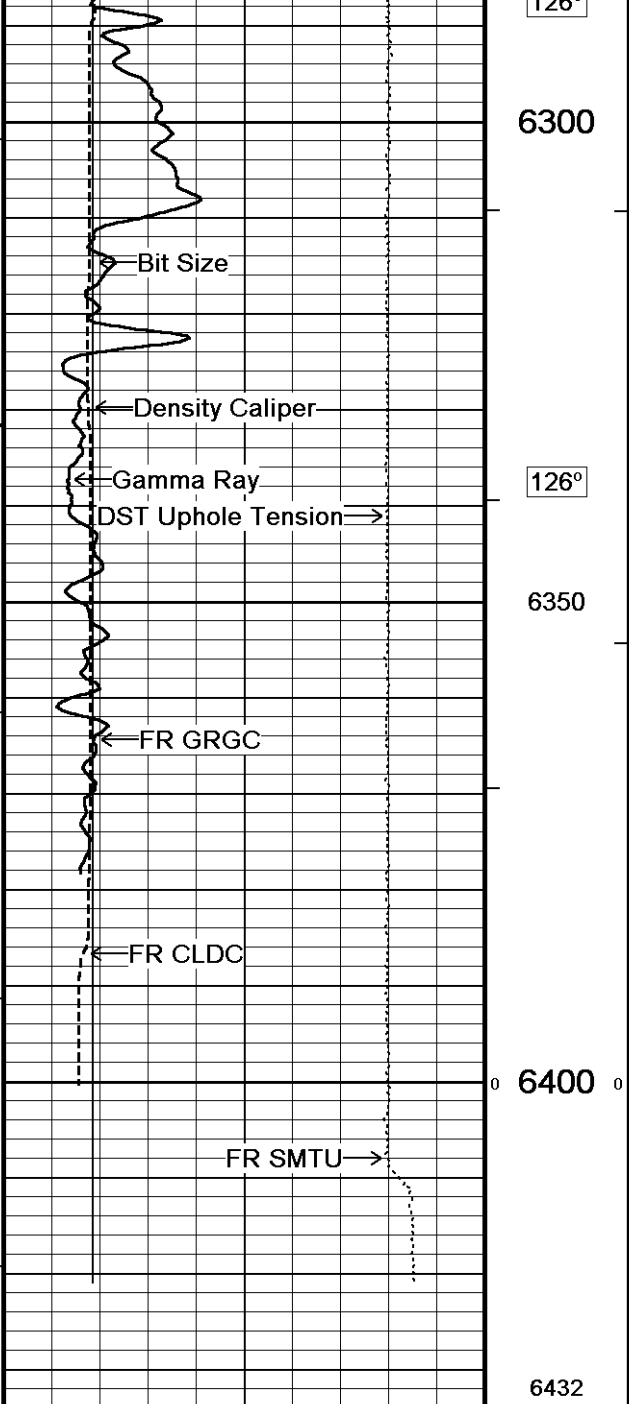
Density Correction

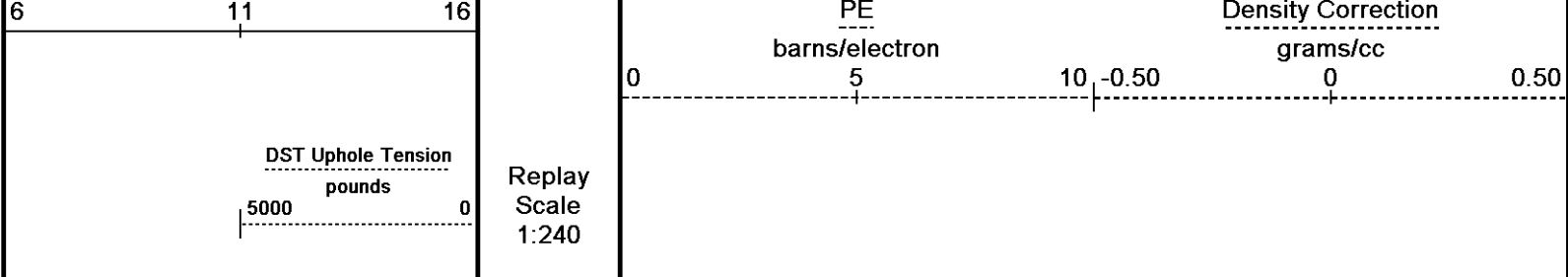
Limestone Neutron Por











Depth Based Data - Maximum Sampling Increment 10.0cm	Plotted on 29-JAN-2013 18:04
Filename: C:\Minimus 13.04.8492\Data\O'Brien Vail #5-31\O'Brien_Vail #5-31_Main.dta	Recorded on 29-JAN-2013 15:03
System Versions: Logged with 13.04.8492 Plotted with 13.04.8492	

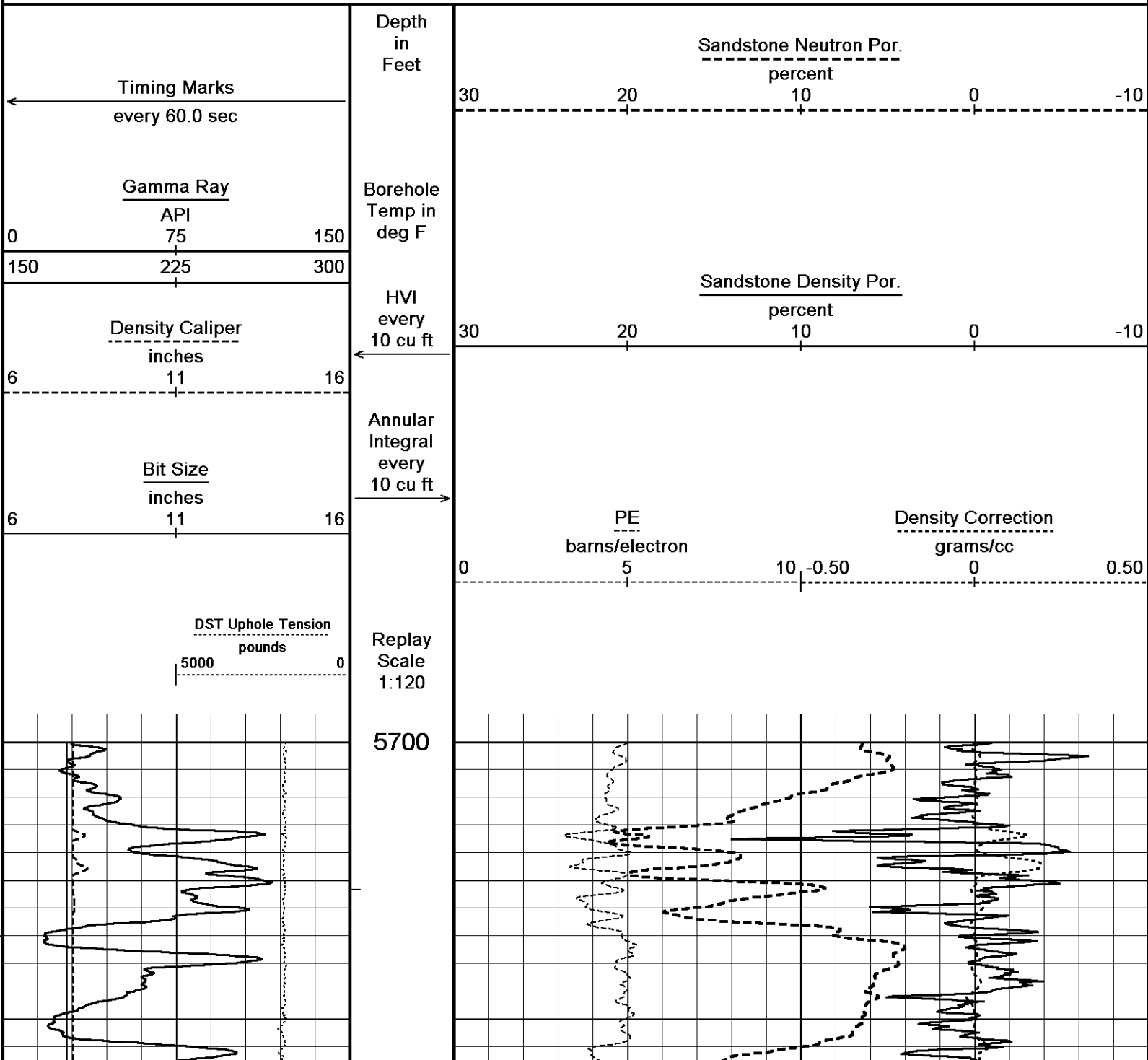
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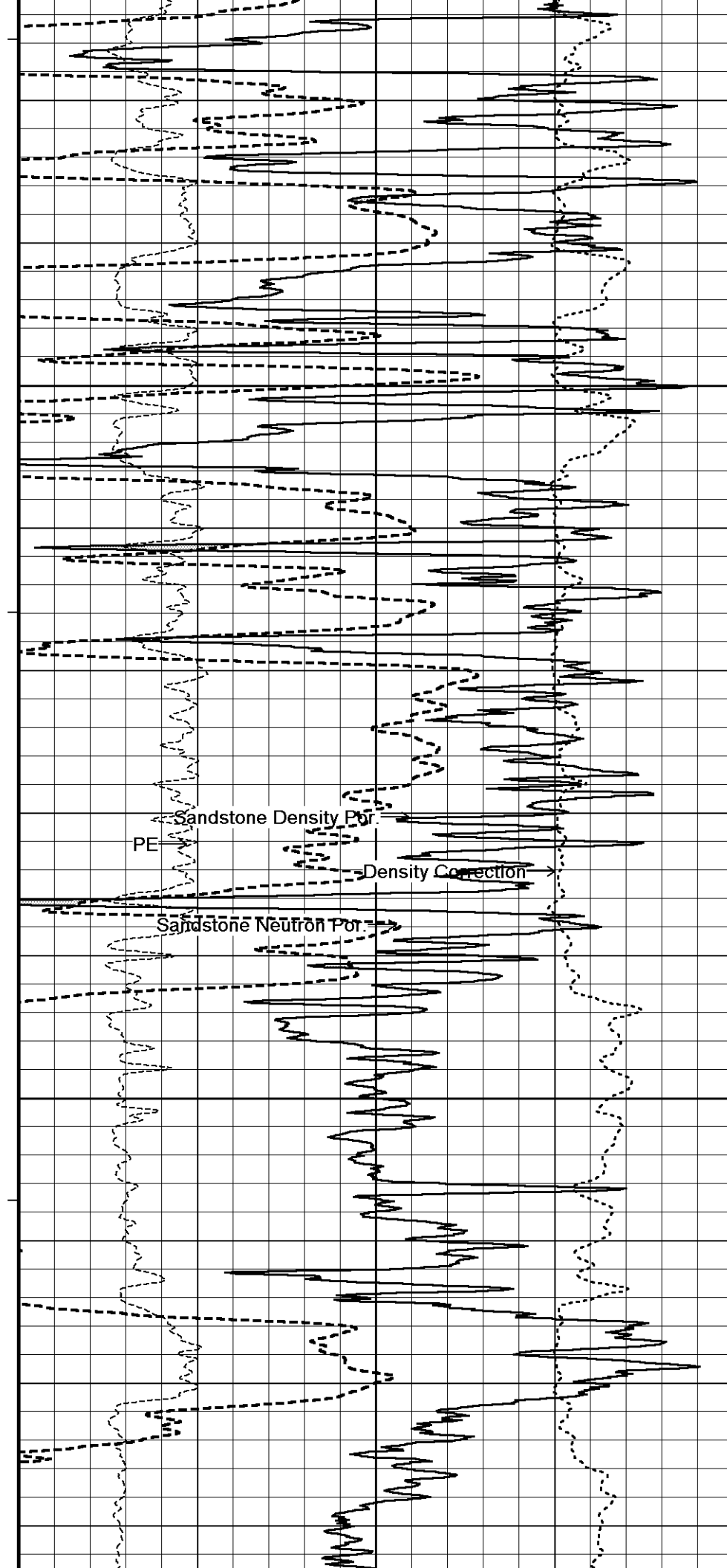
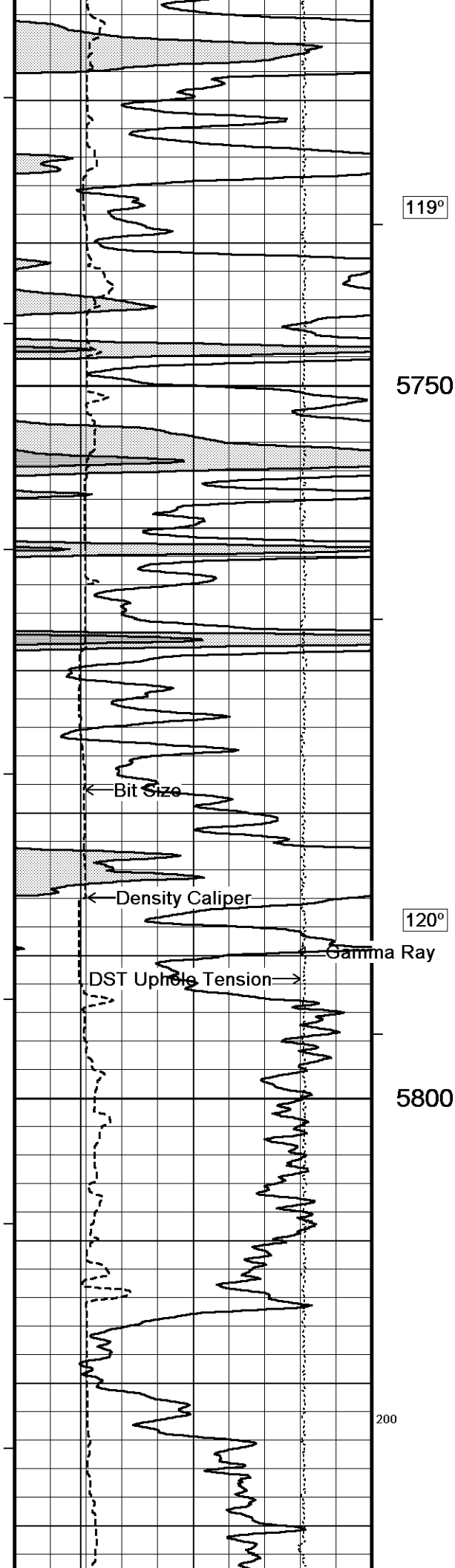
5 INCH MAIN

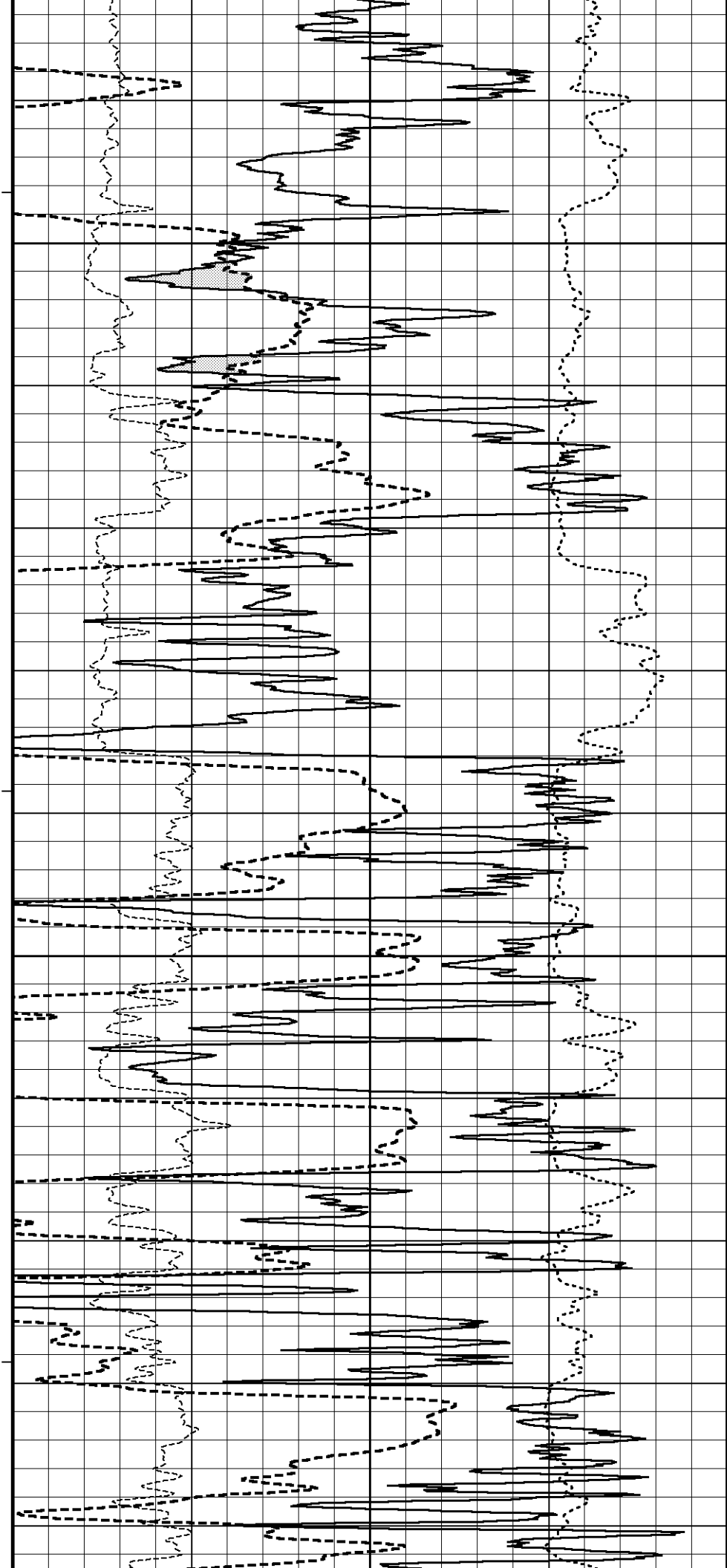
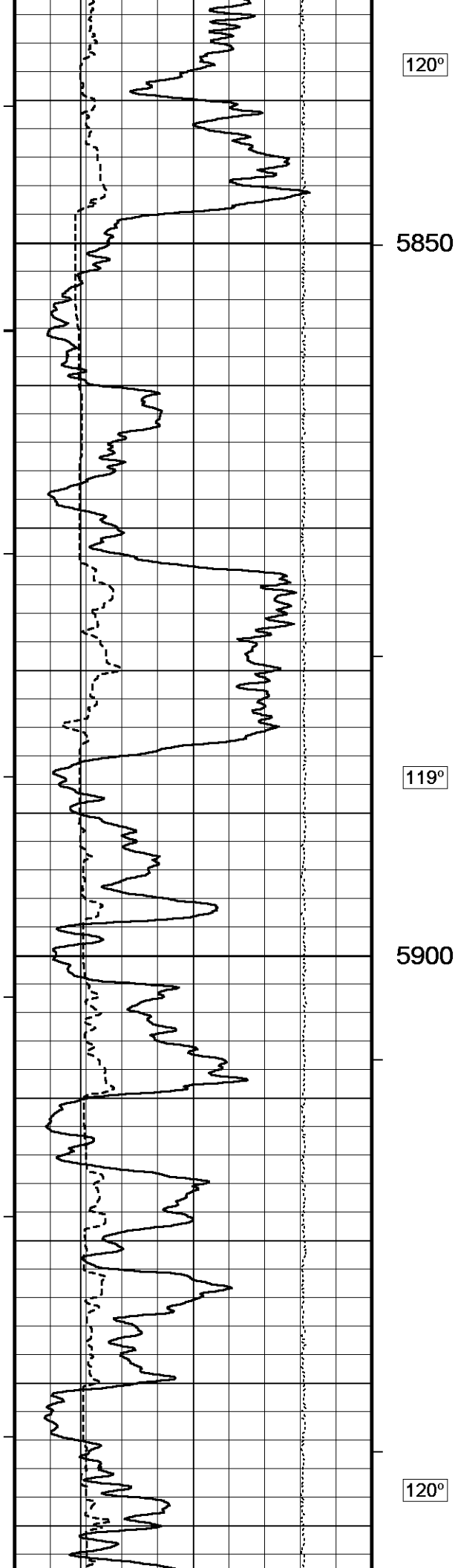
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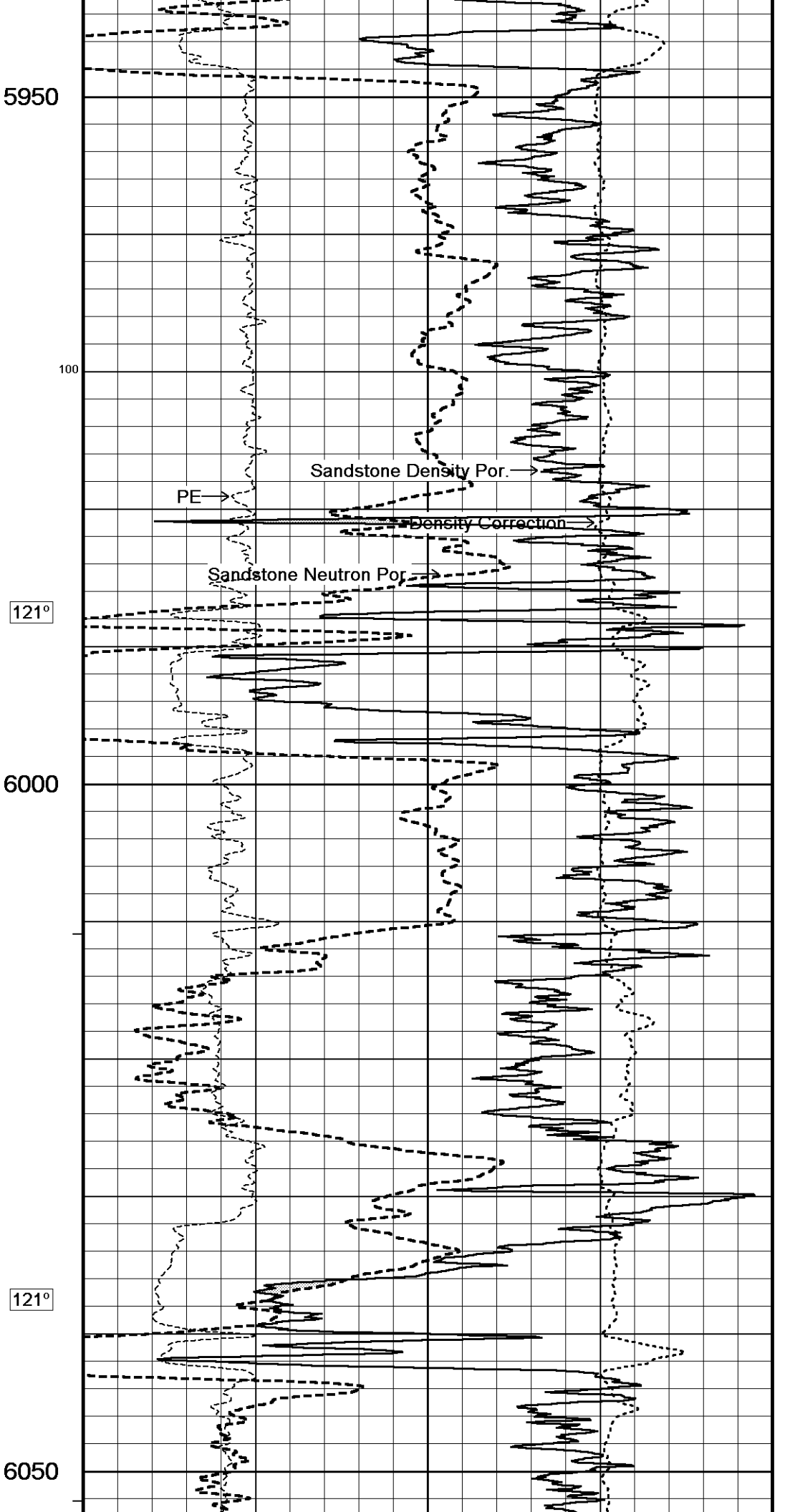
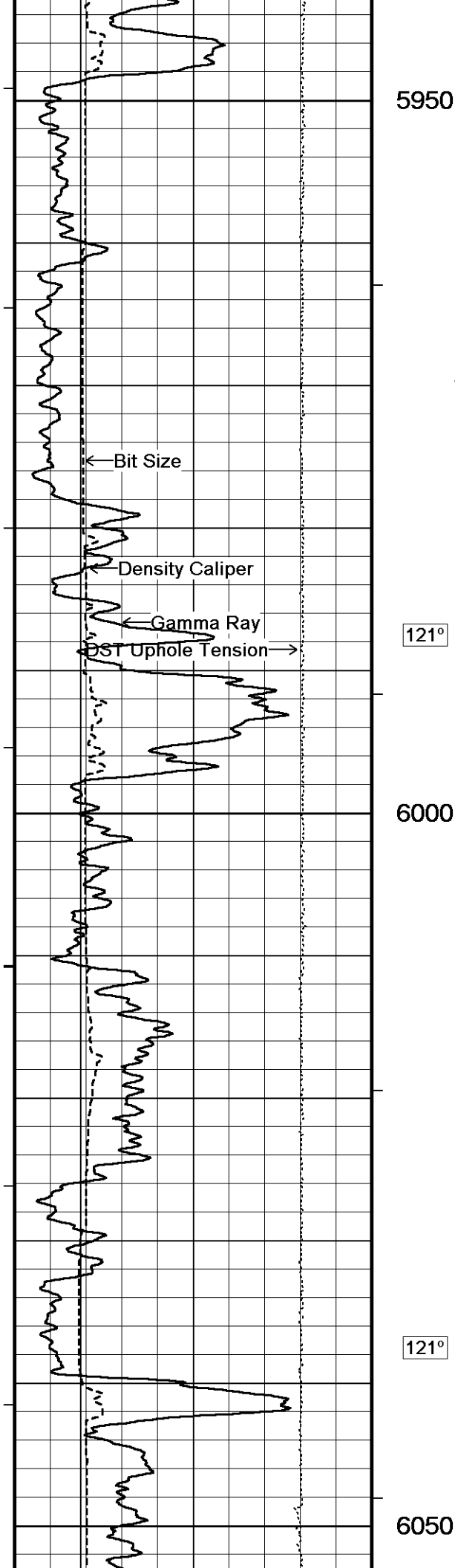


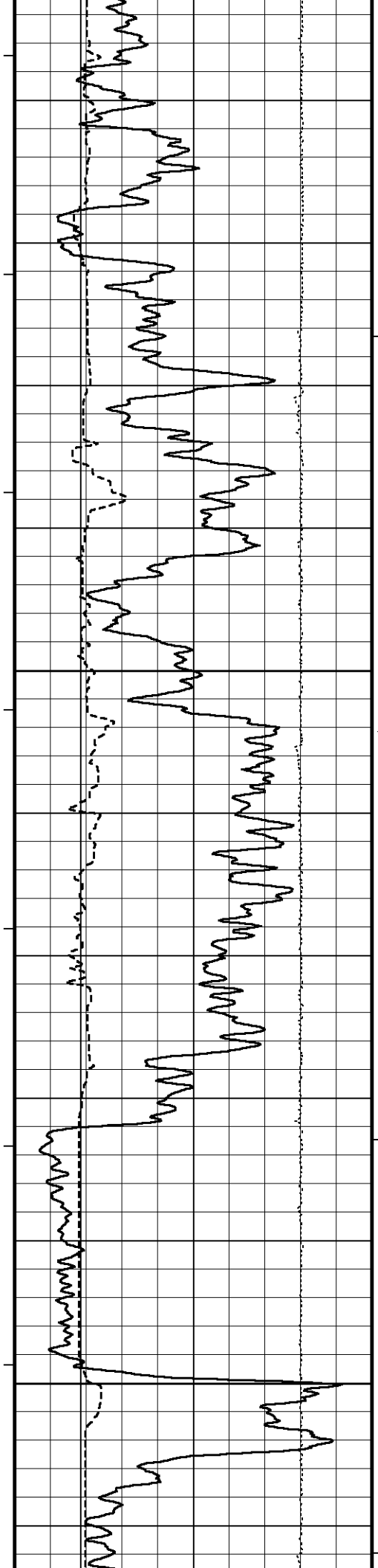
Depth Based Data - Maximum Sampling Increment 2.5cm	Plotted on 29-JAN-2013 18:04
Filename: C:\Minimus 13.04.8492\Data\O'Brien Vail #5-31\O'Brien_Vail #5-31_HIGHRES.dta	Recorded on 29-JAN-2013 13:58
System Versions: Logged with 13.04.8492 Plotted with 13.04.8492	











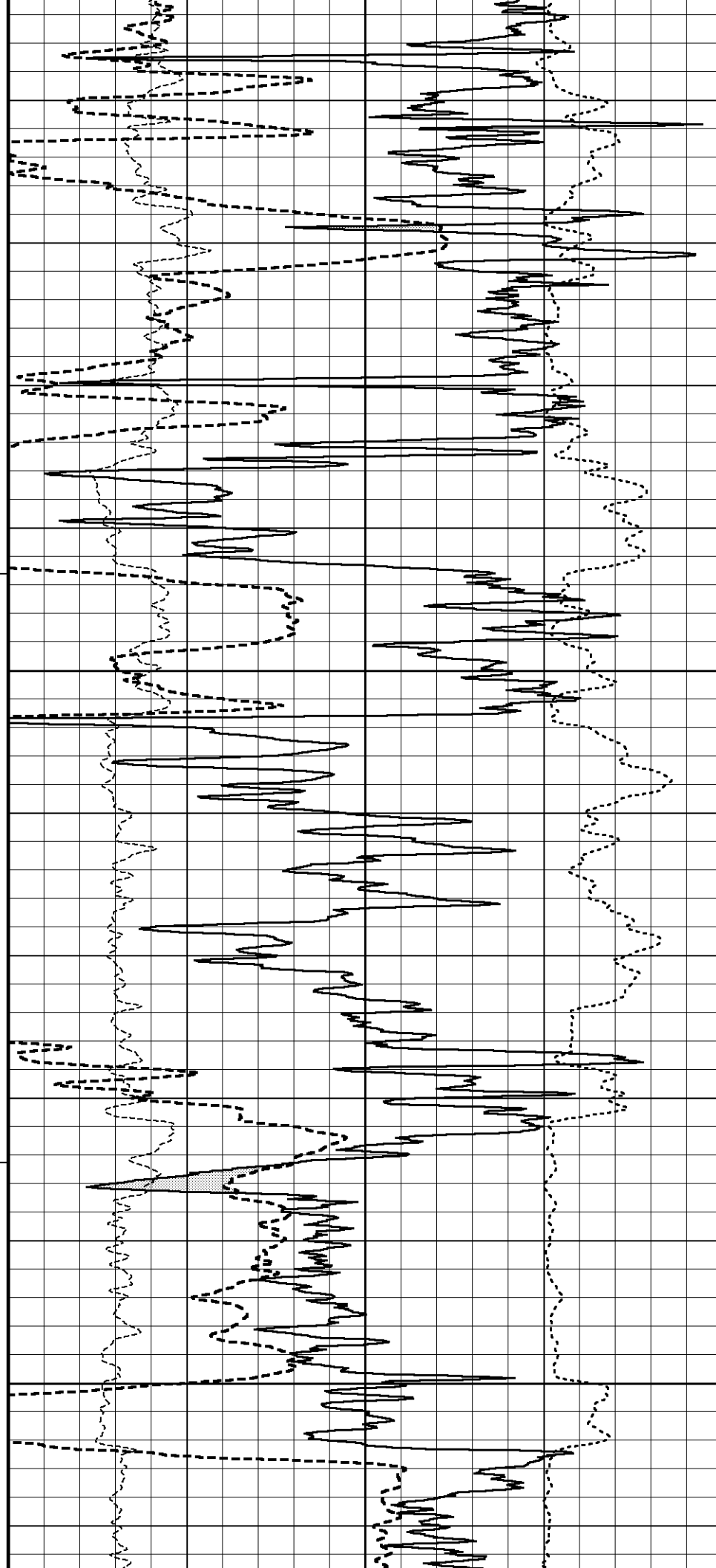
121°

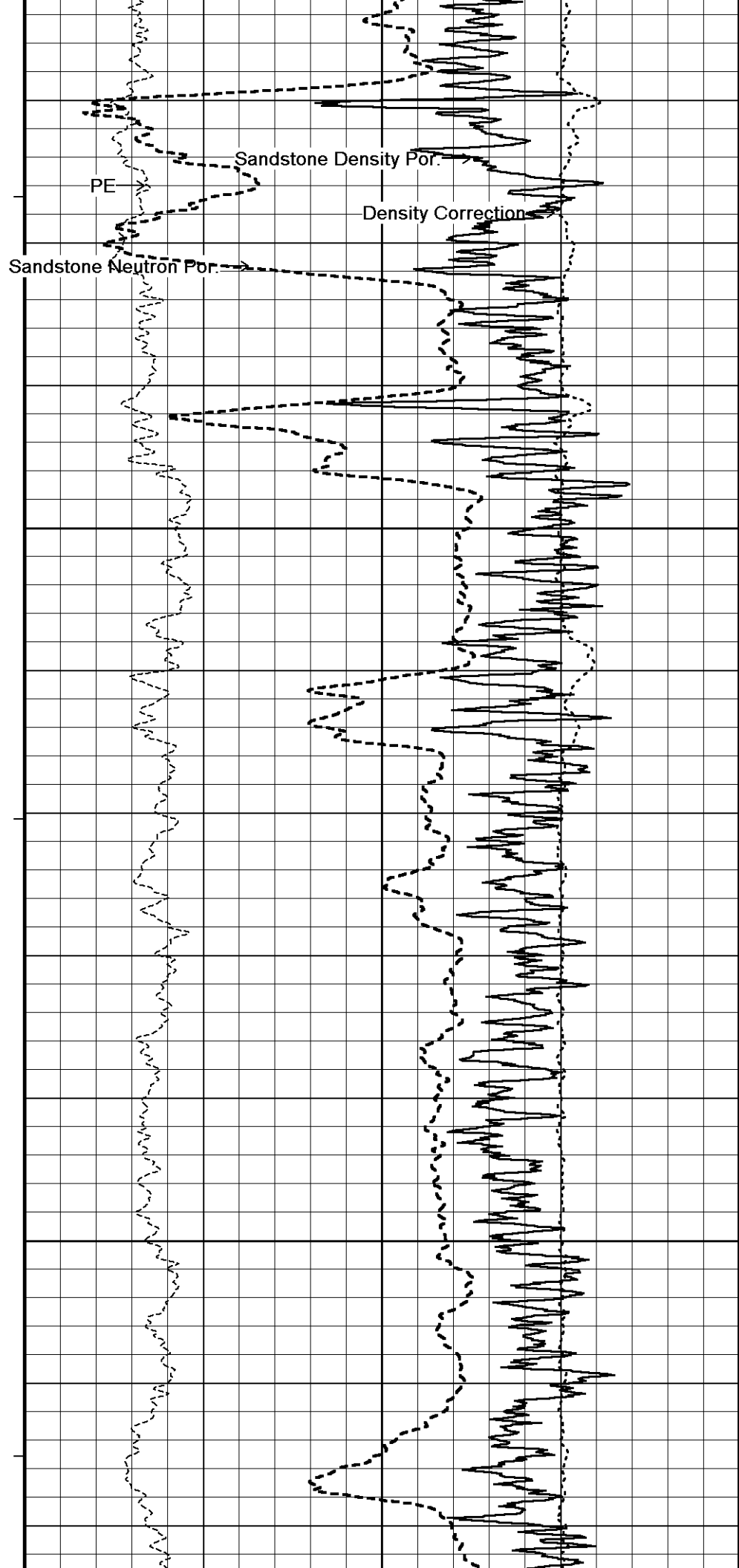
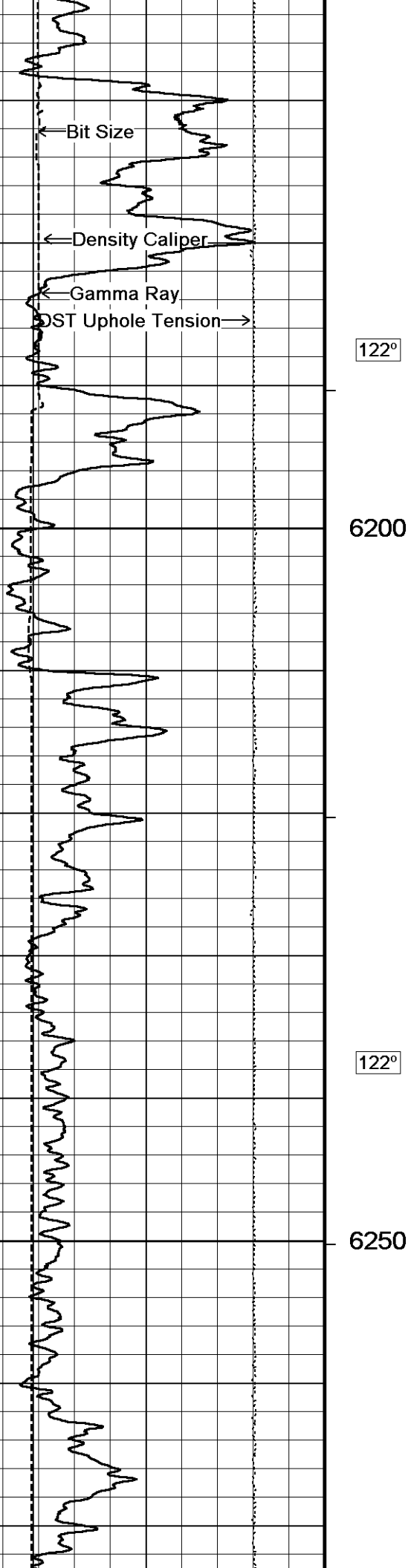
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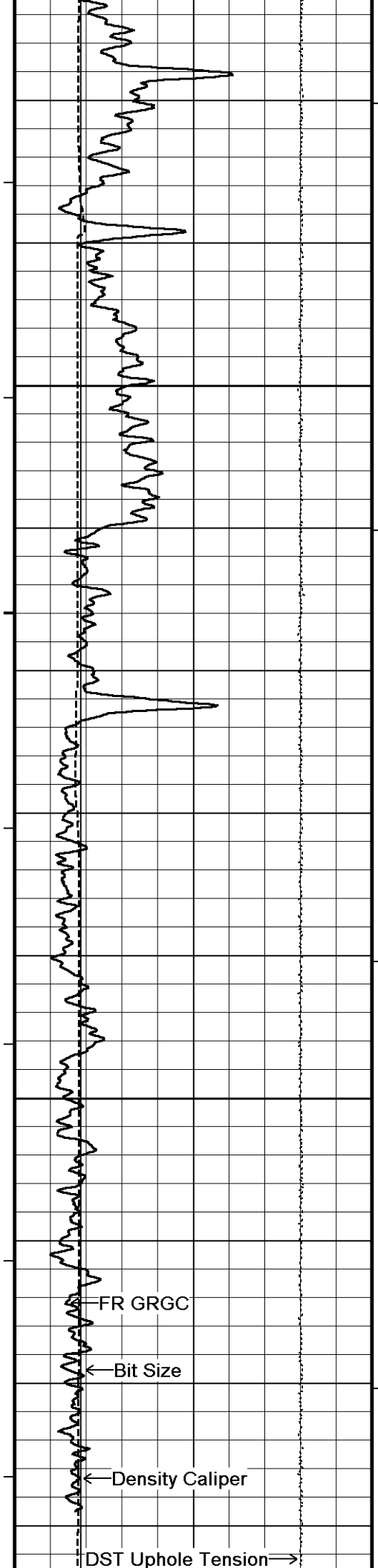
100

122°

6150





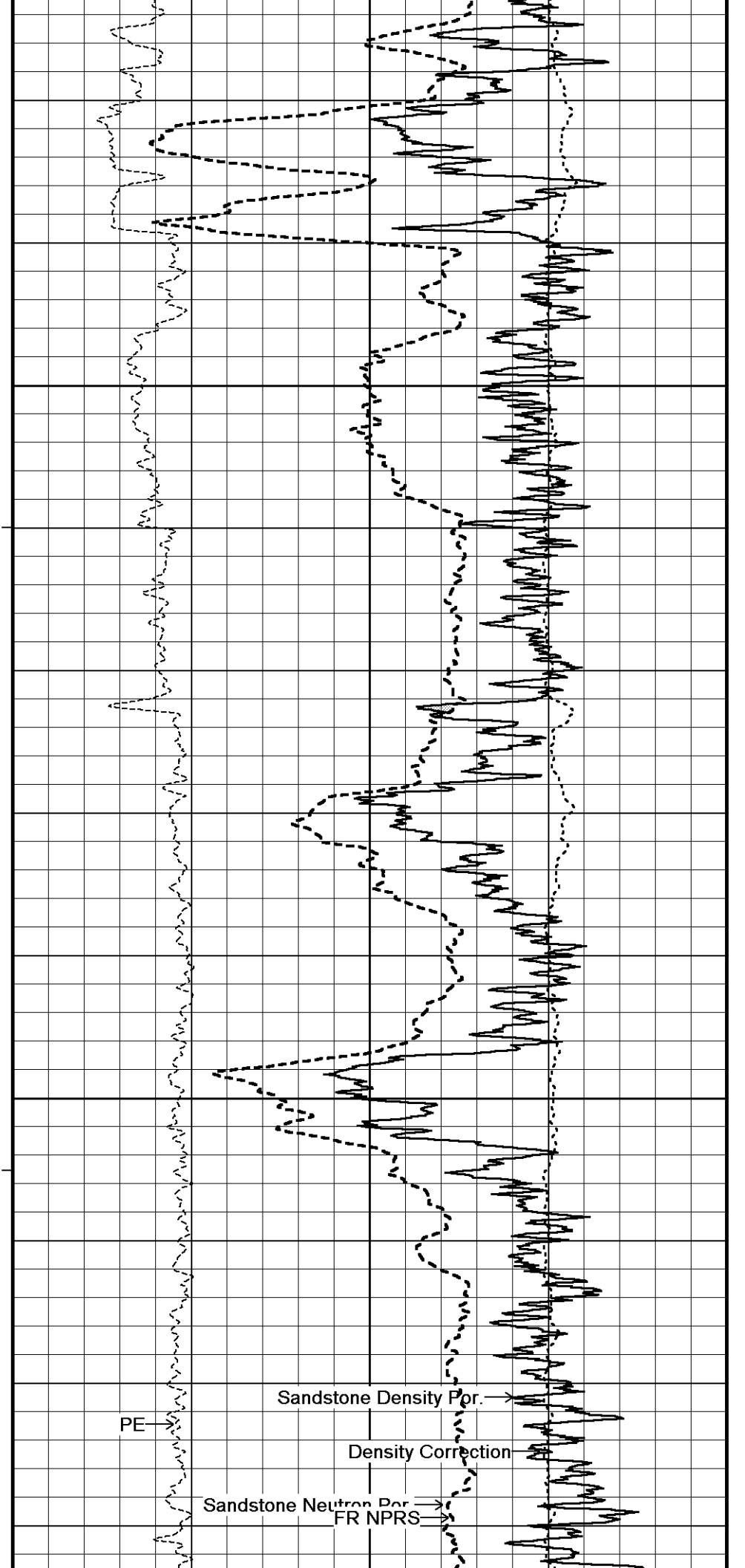


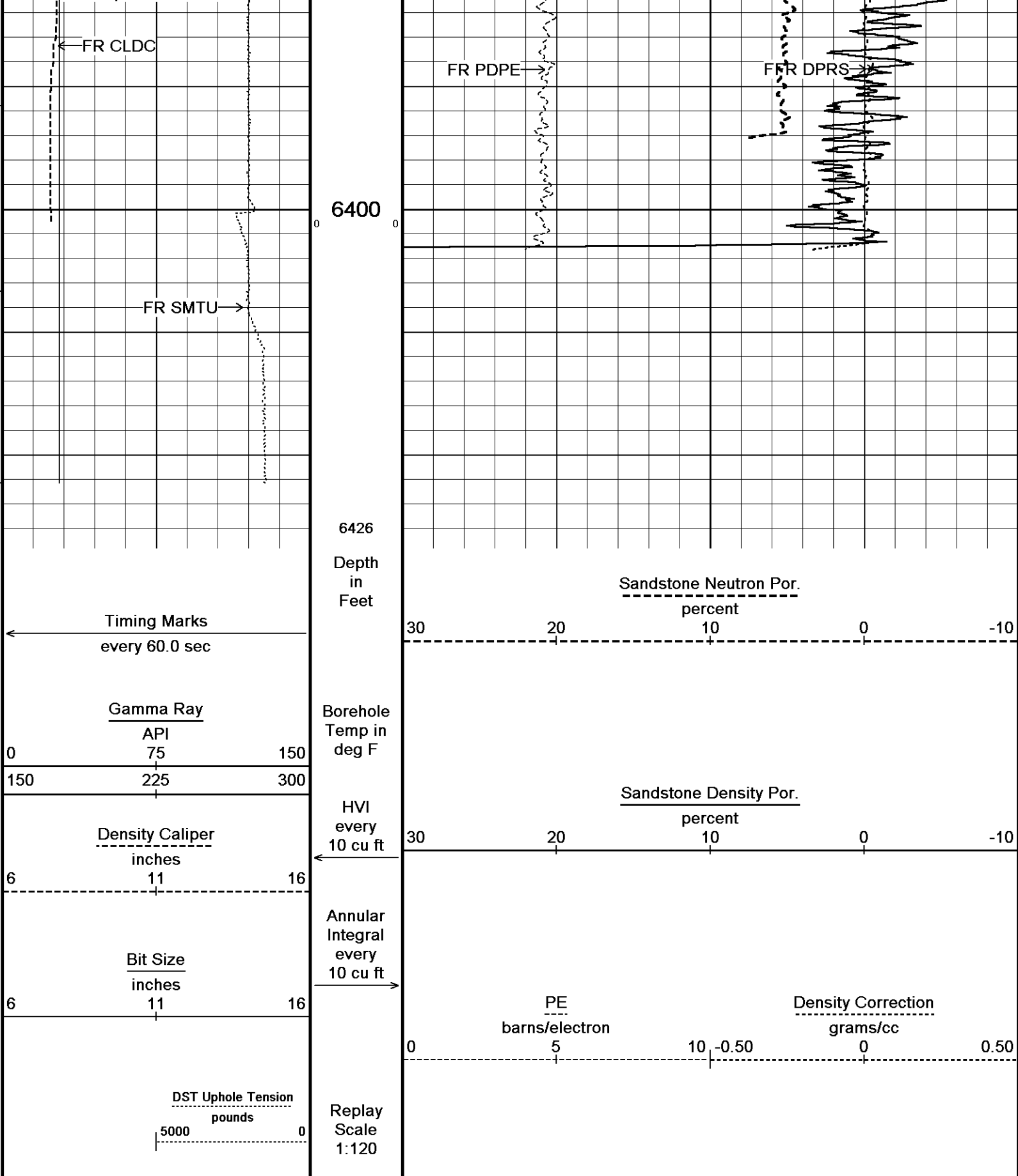
123°

6300

123°

6350

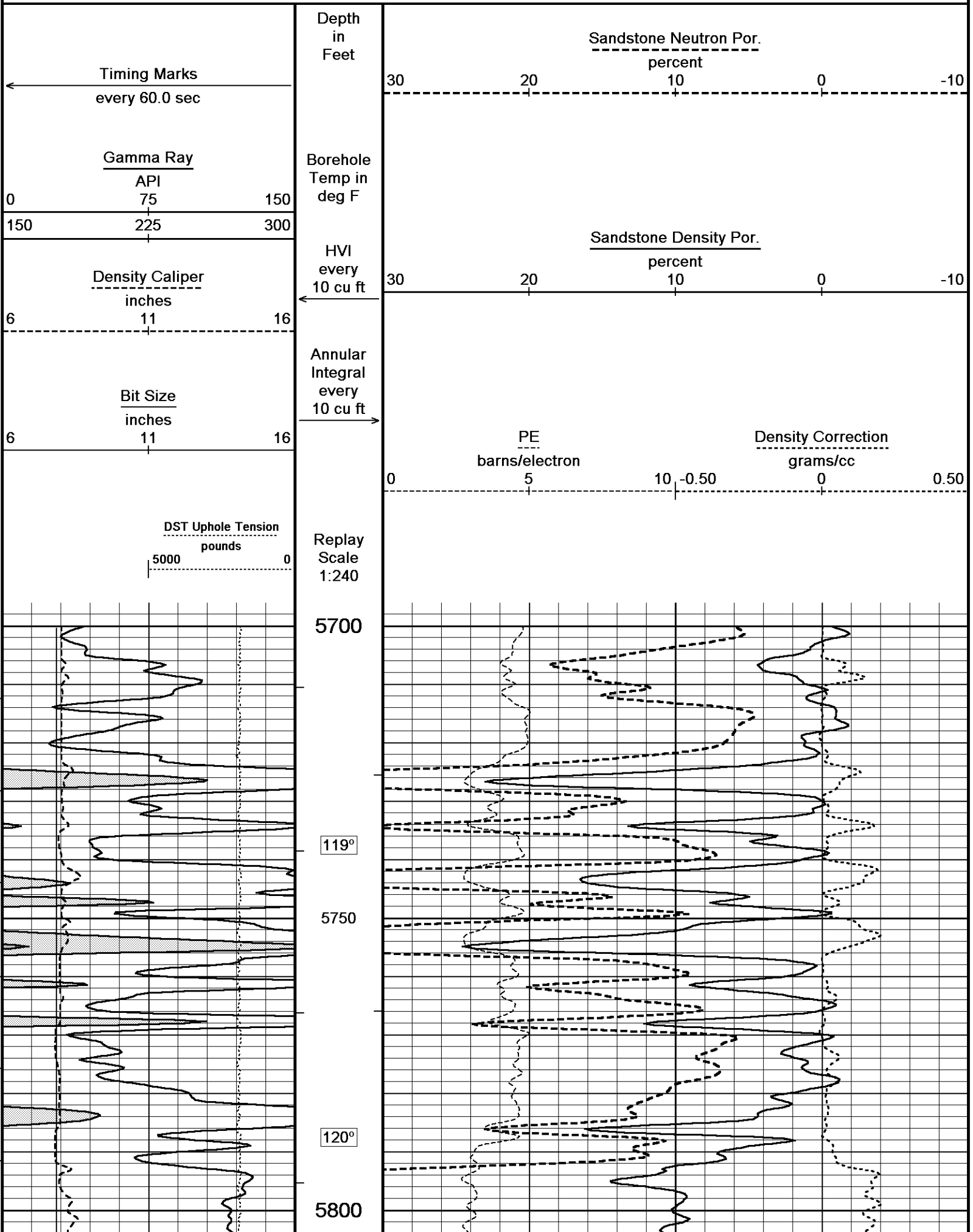


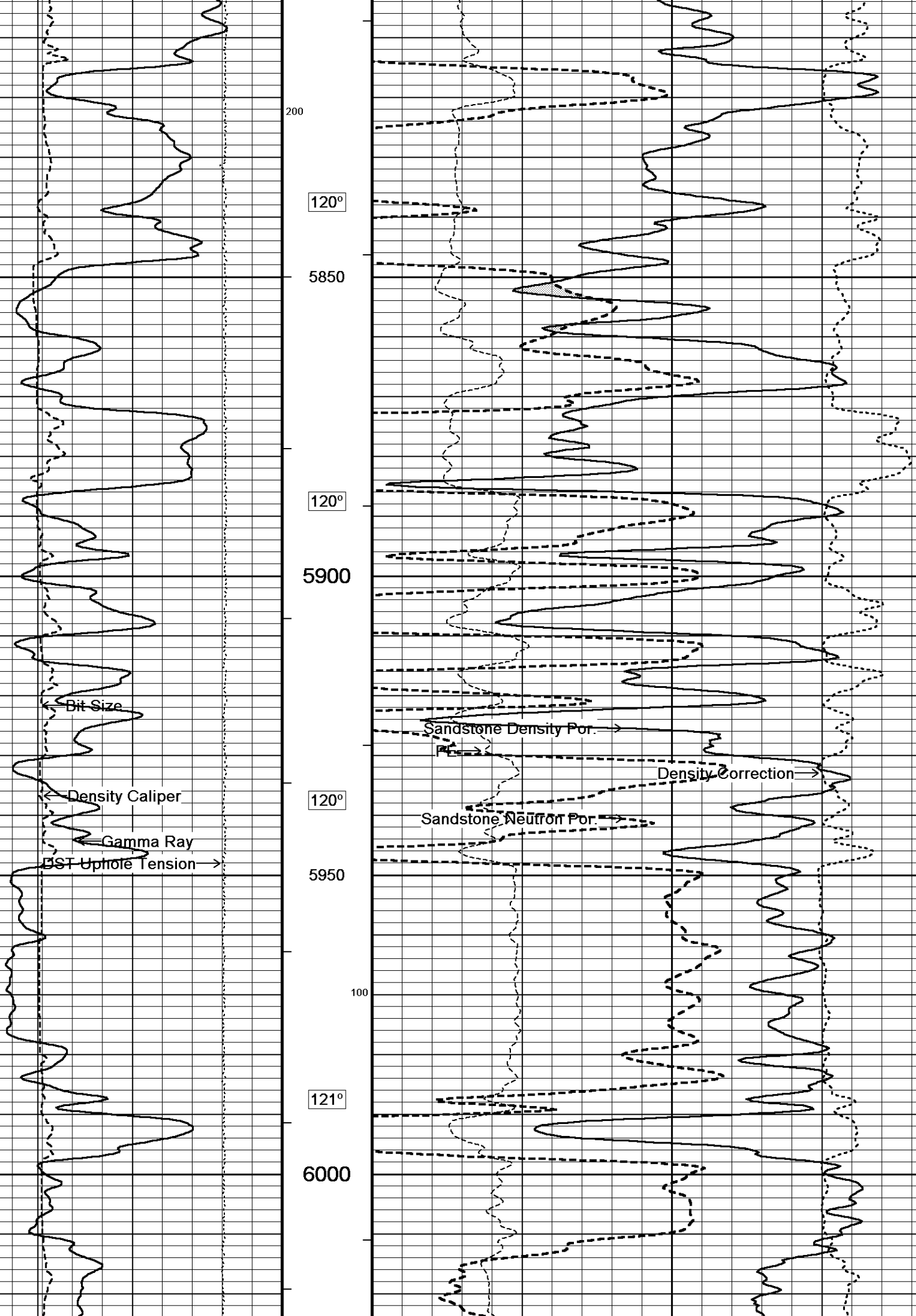


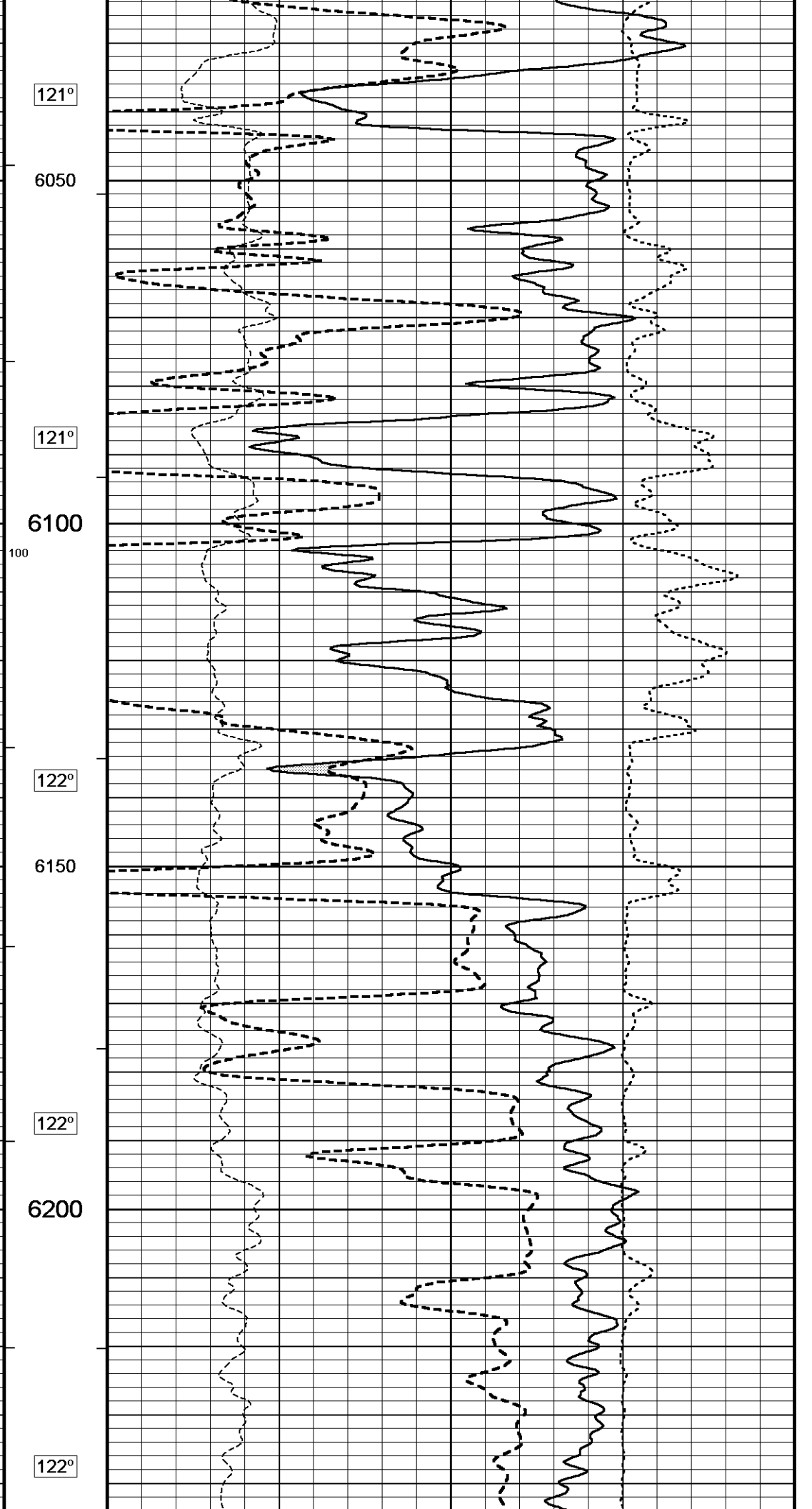
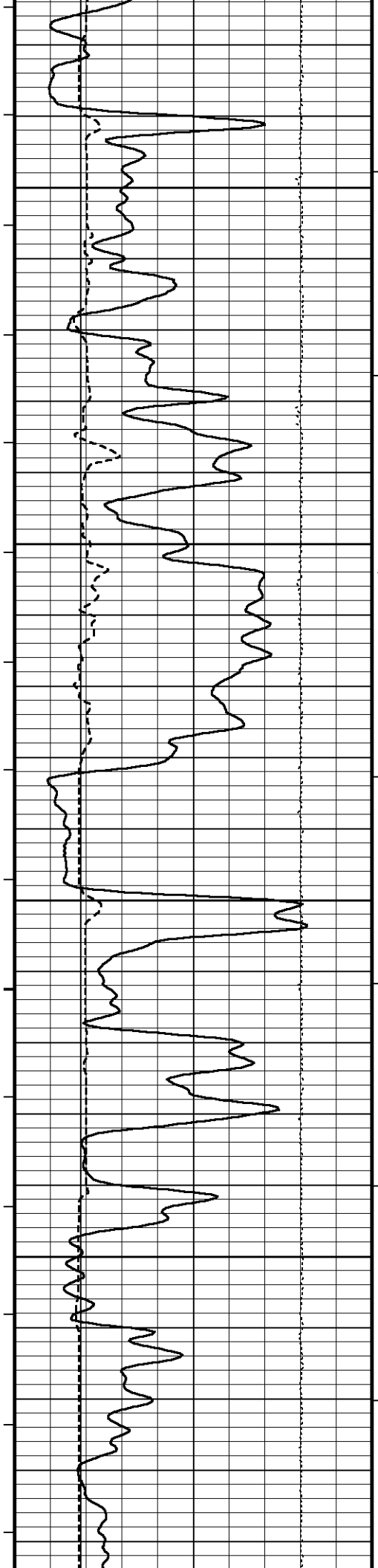
Depth Based Data - Maximum Sampling Increment 2.5cm
Filename: C:\Minimus 13.04.8492\Data\O'Brien Vail #5-31\O'Brien_Vail #5-31_HIGHRES.dta
System Versions: Logged with 13.04.8492 Plotted with 13.04.8492

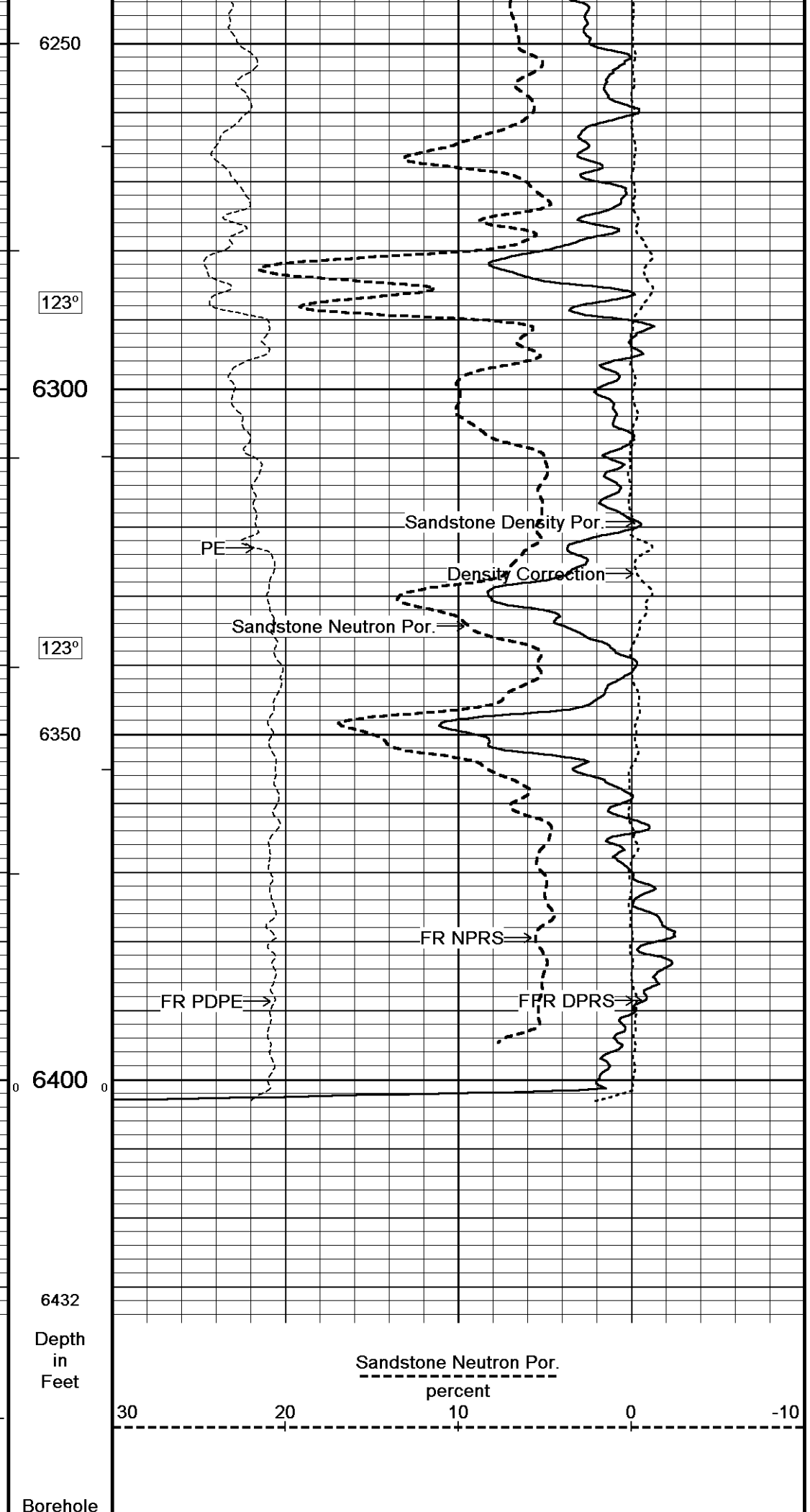
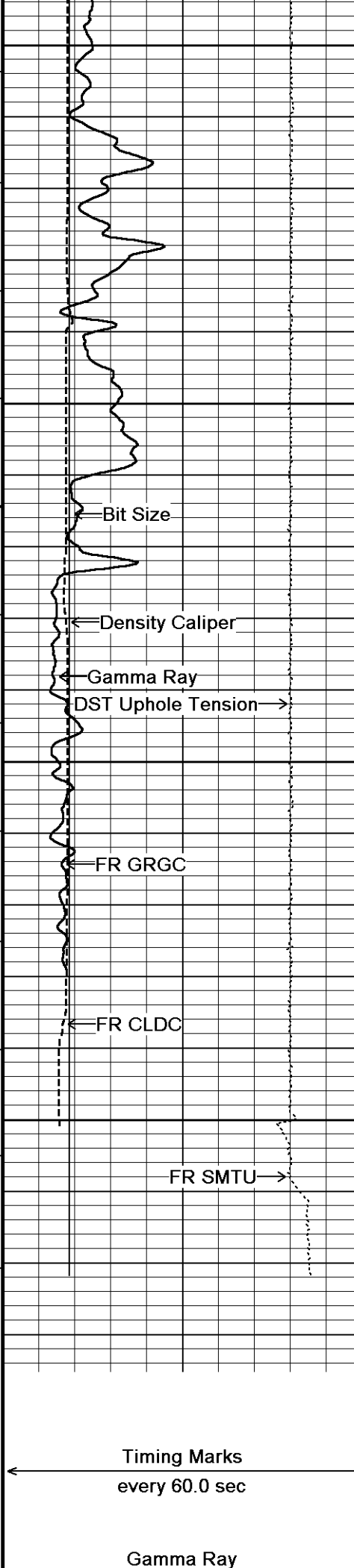
10 INCH HI-RES

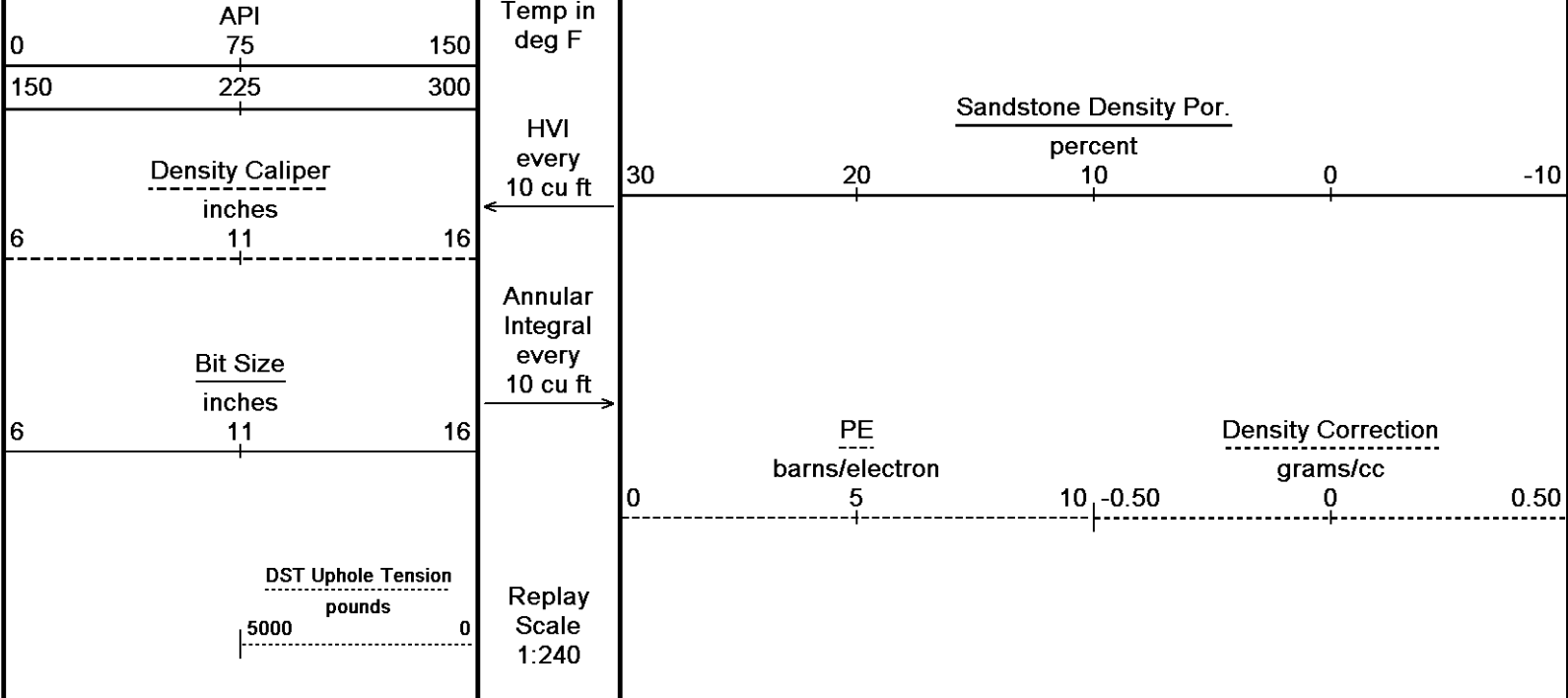
REPEAT SECTION











Depth Based Data - Maximum Sampling Increment 10.0cm

Plotted on 29-JAN-2013 18:04

Filename: C:\Minimus 13.04.8492\Data\O'Brien Vail #5-31\O'Brien_Vail #5-31_Repeat.dta

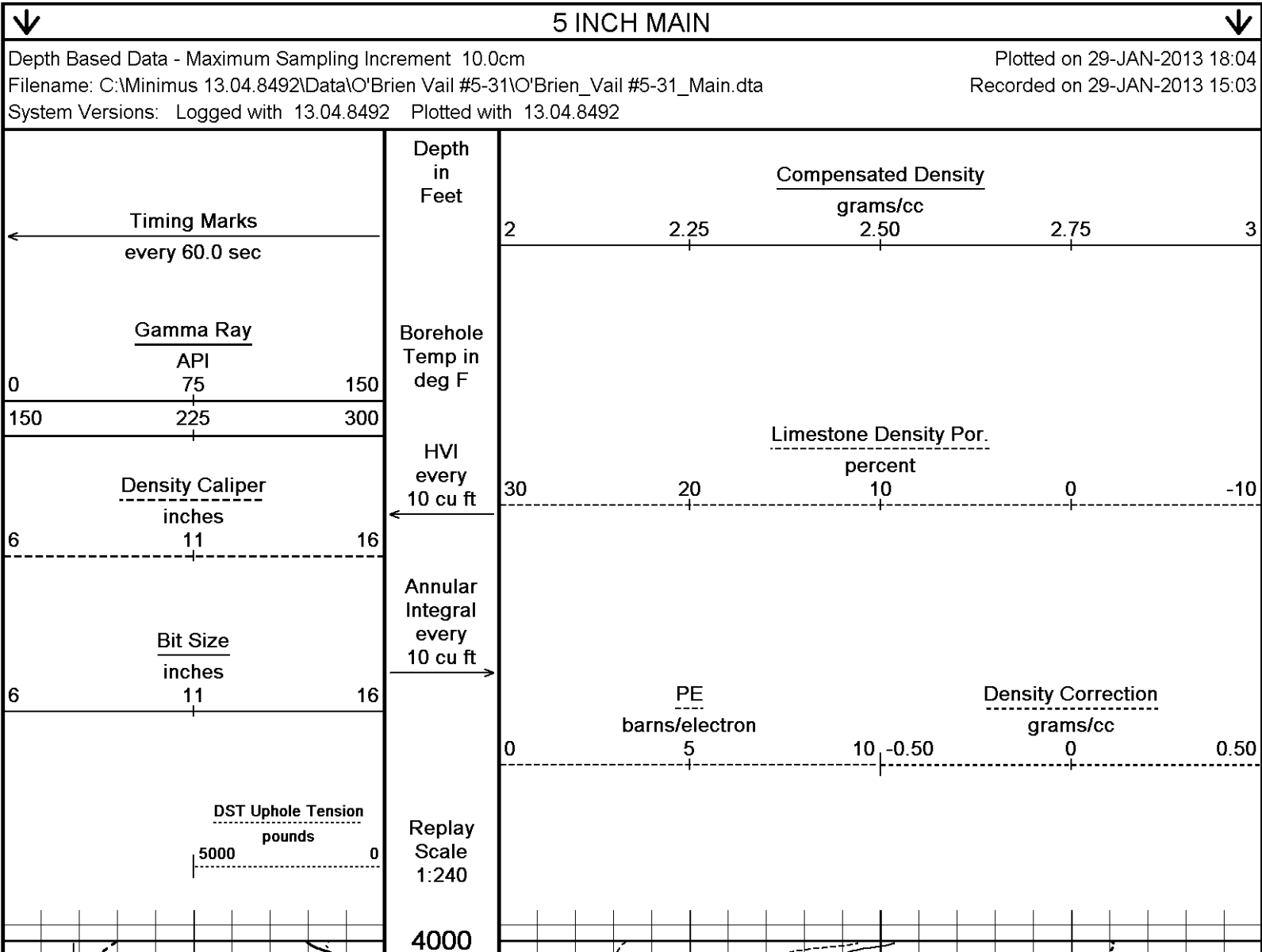
Recorded on 29-JAN-2013 13:58

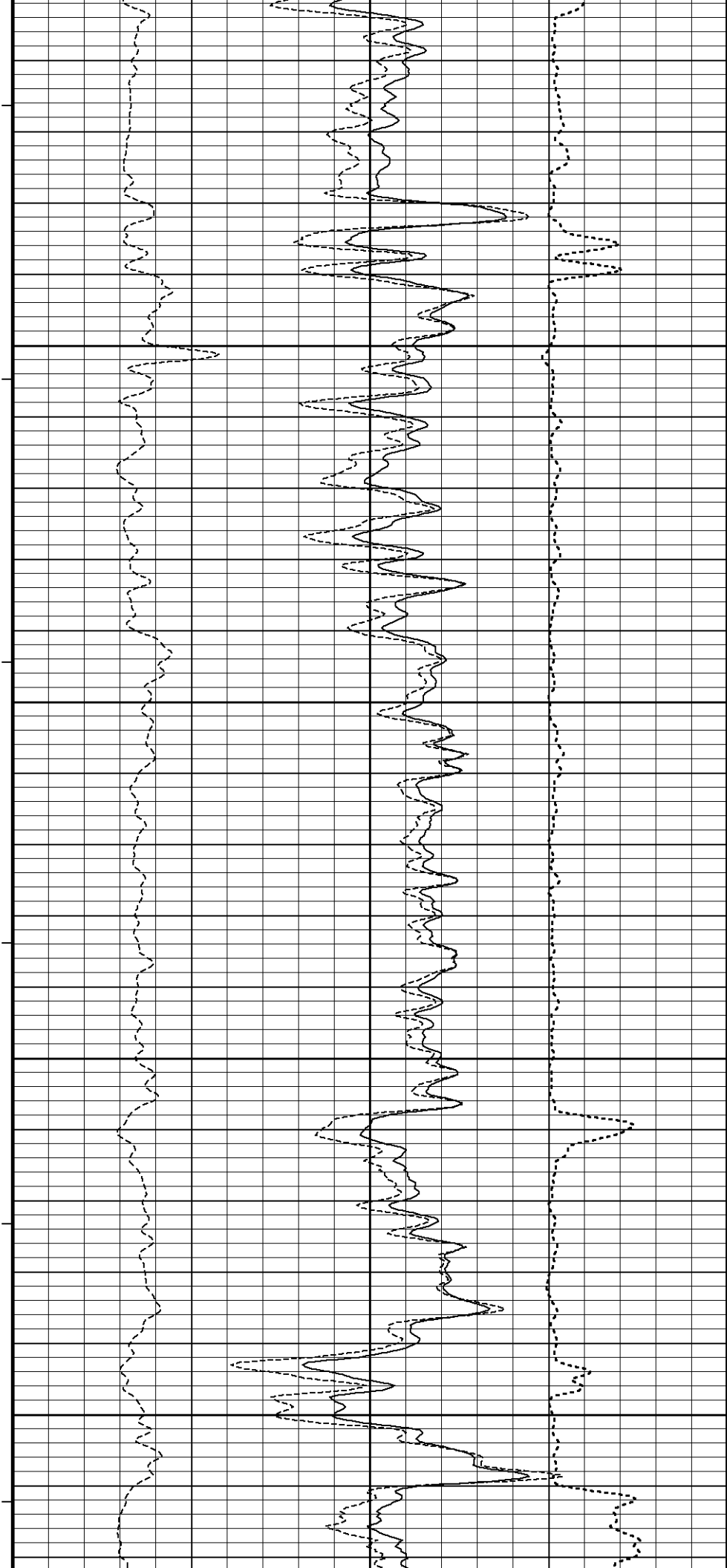
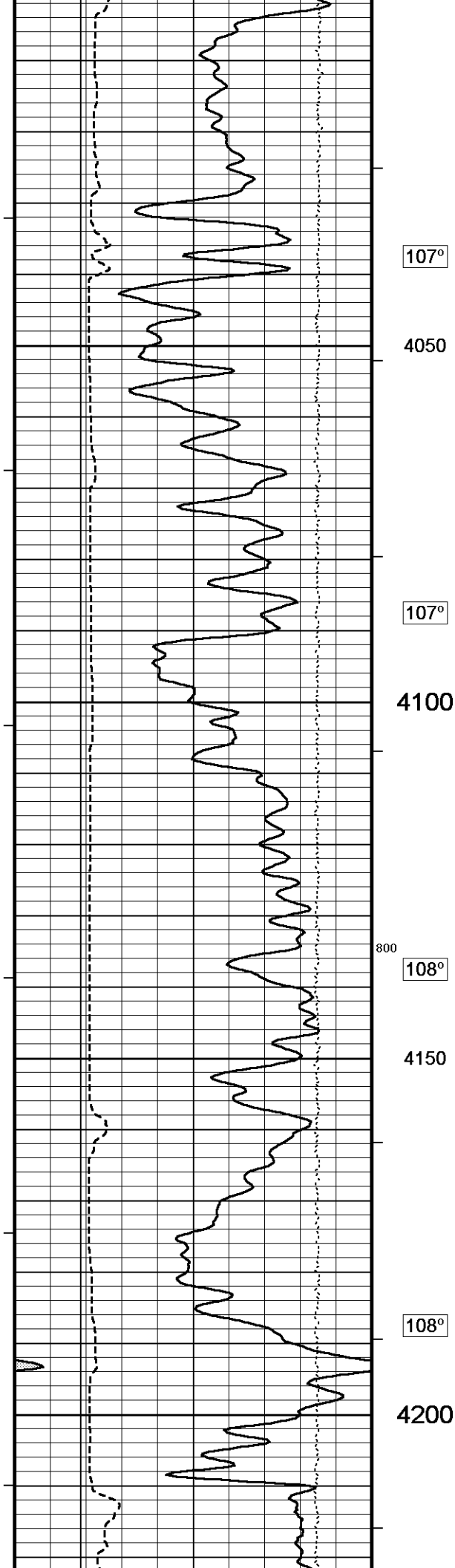
System Versions: Processed with 13.04.8492 Plotted with 13.04.8492

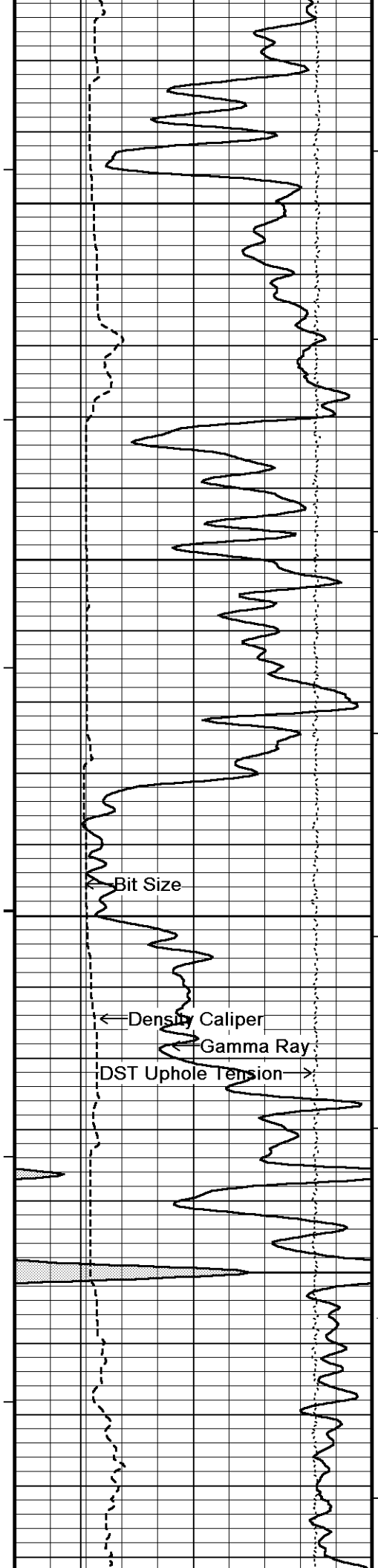
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REPEAT SECTION

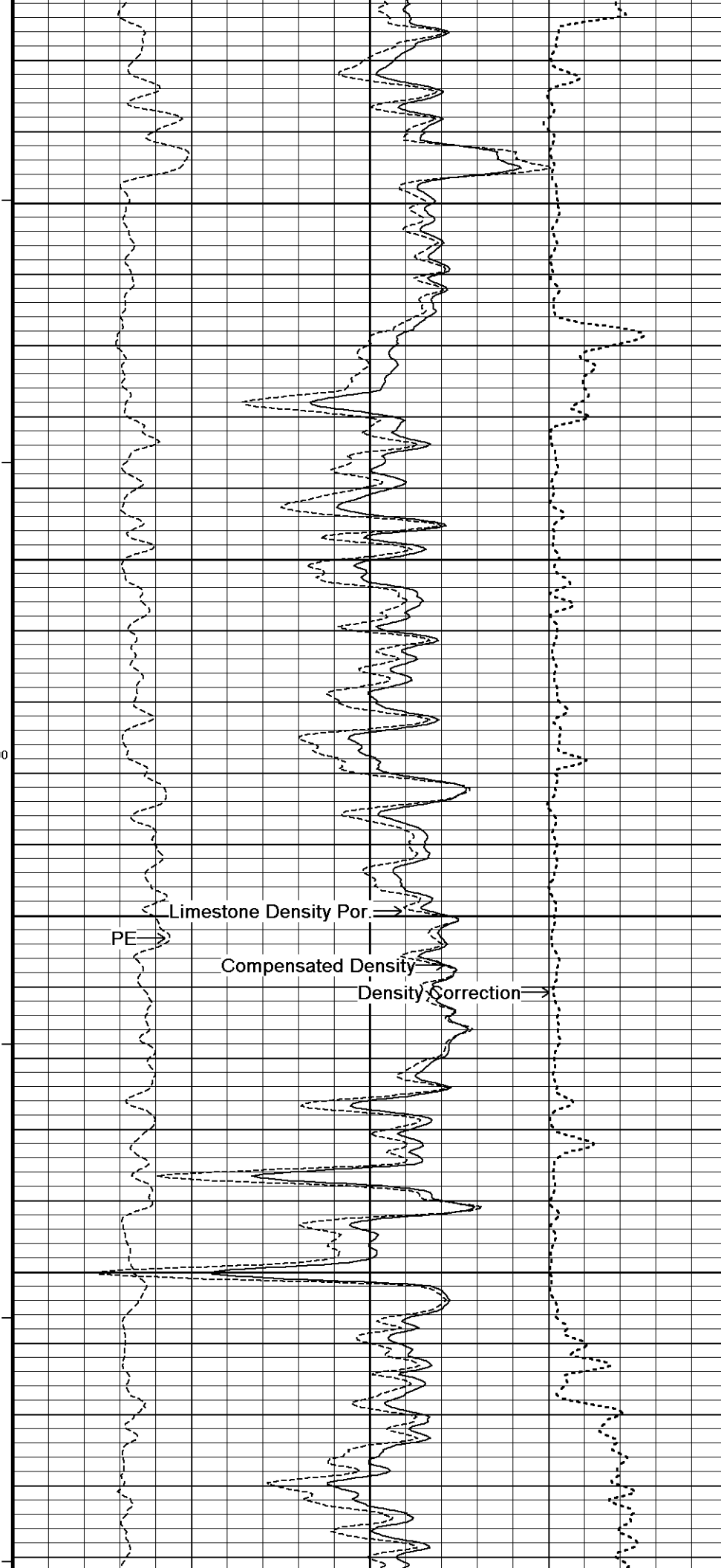
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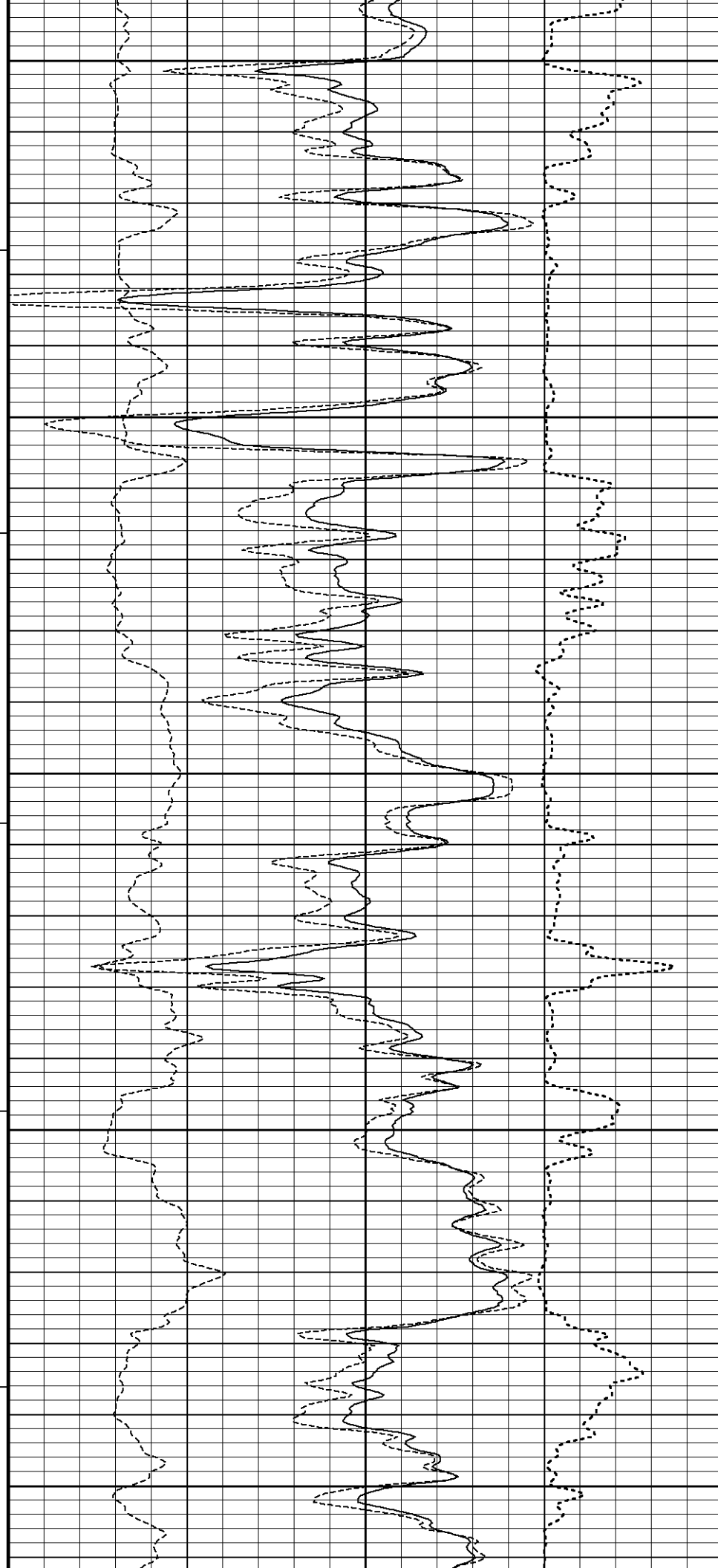
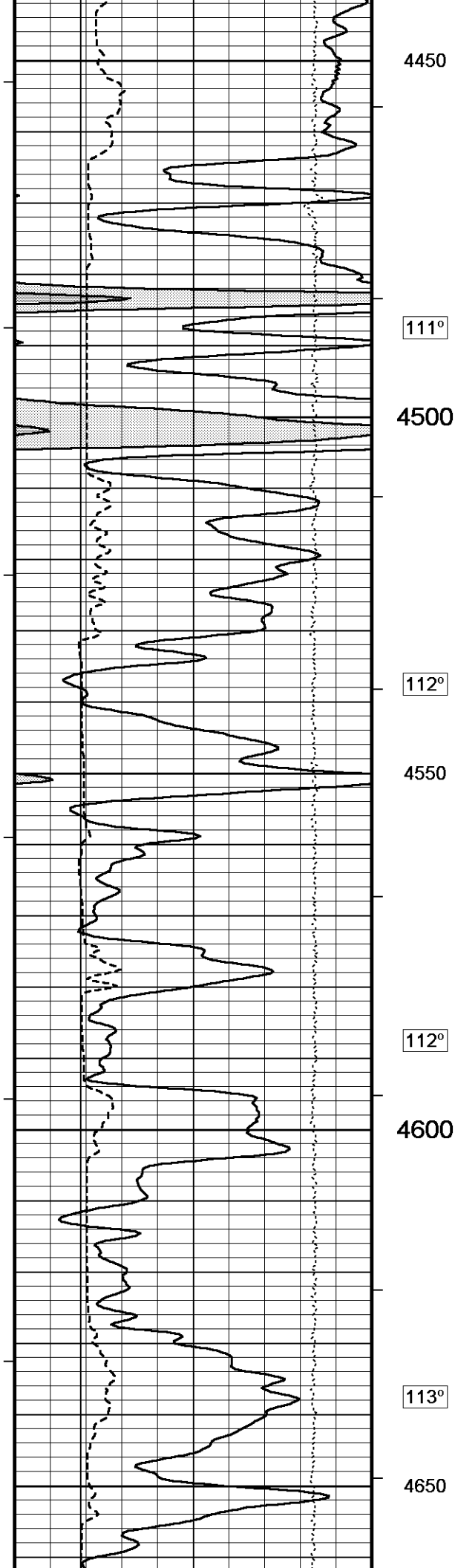


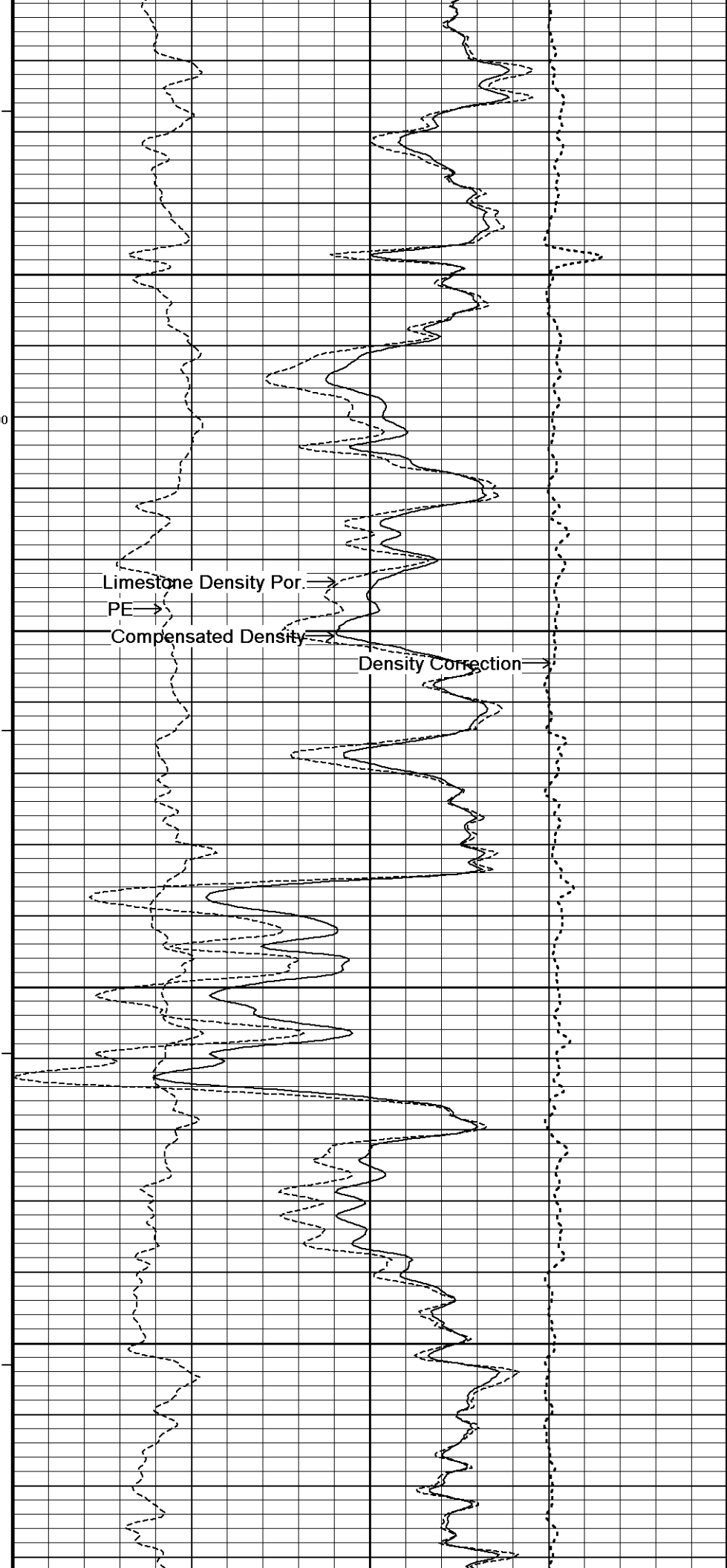
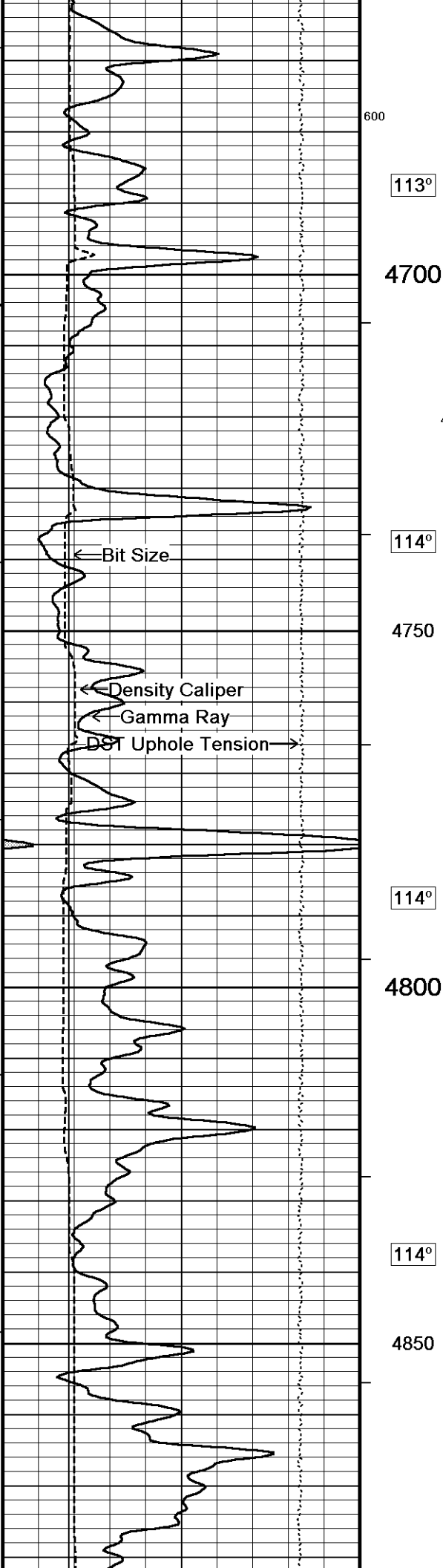


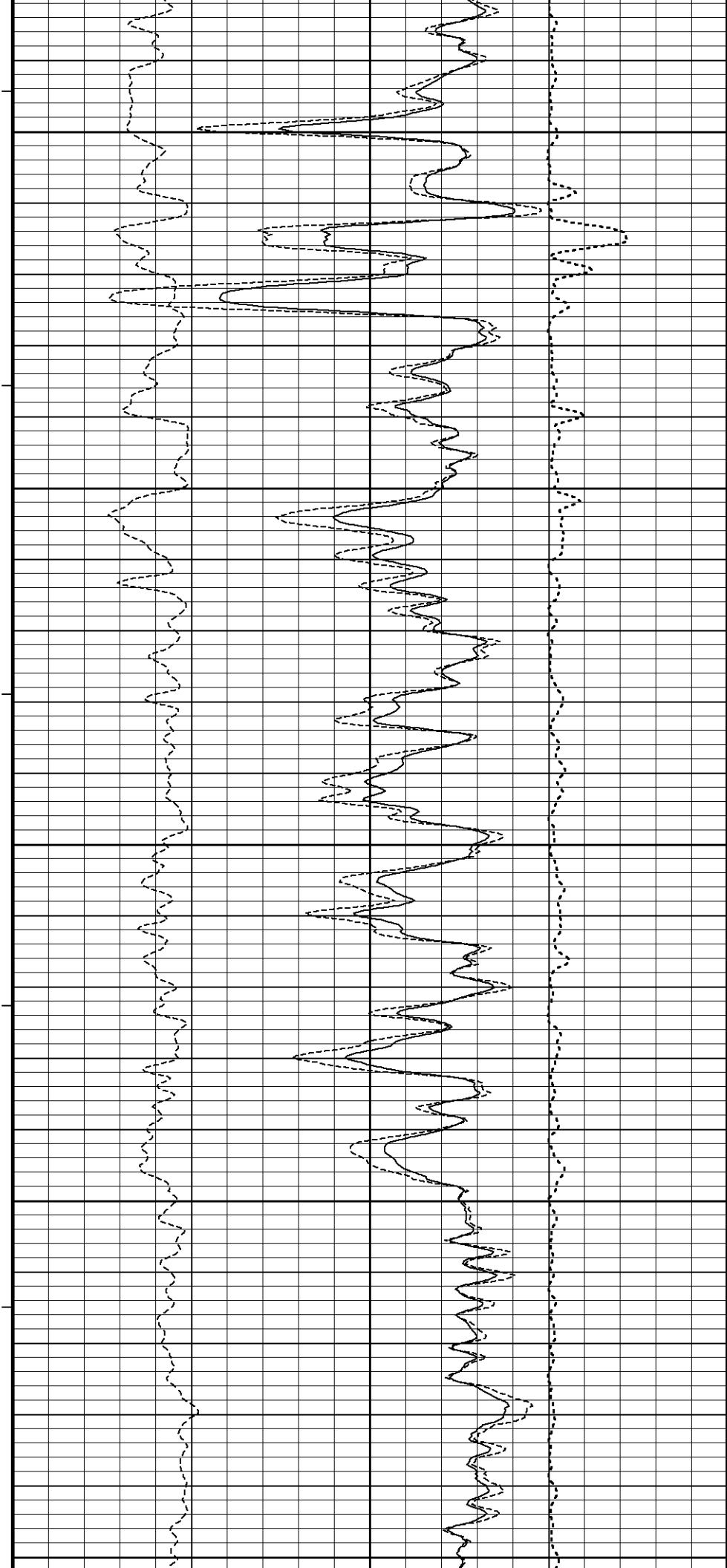
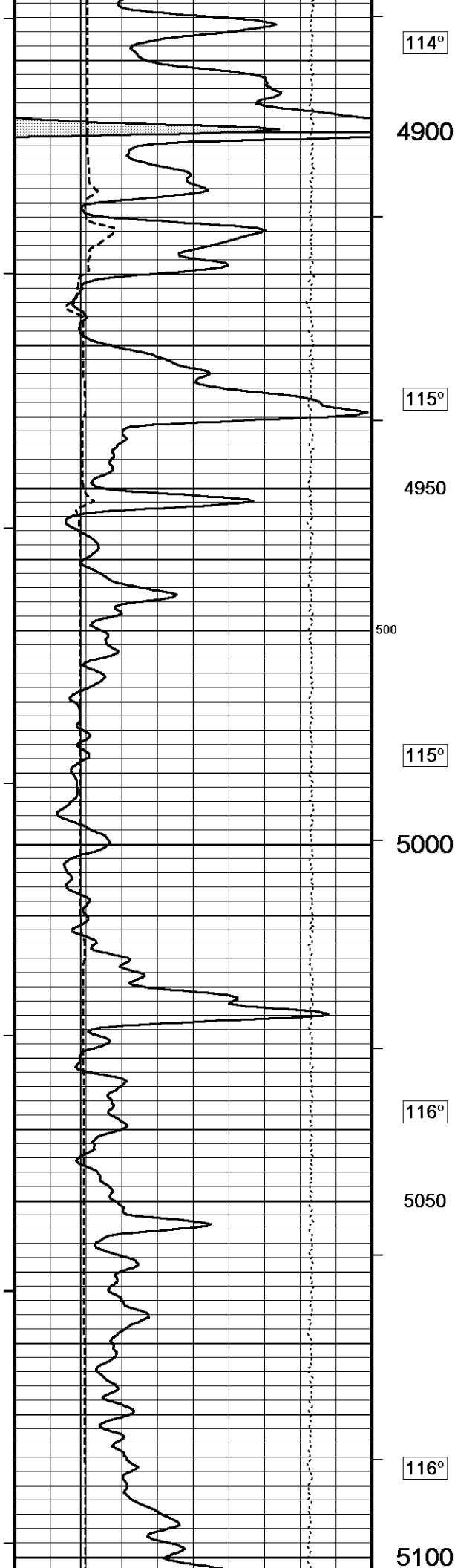


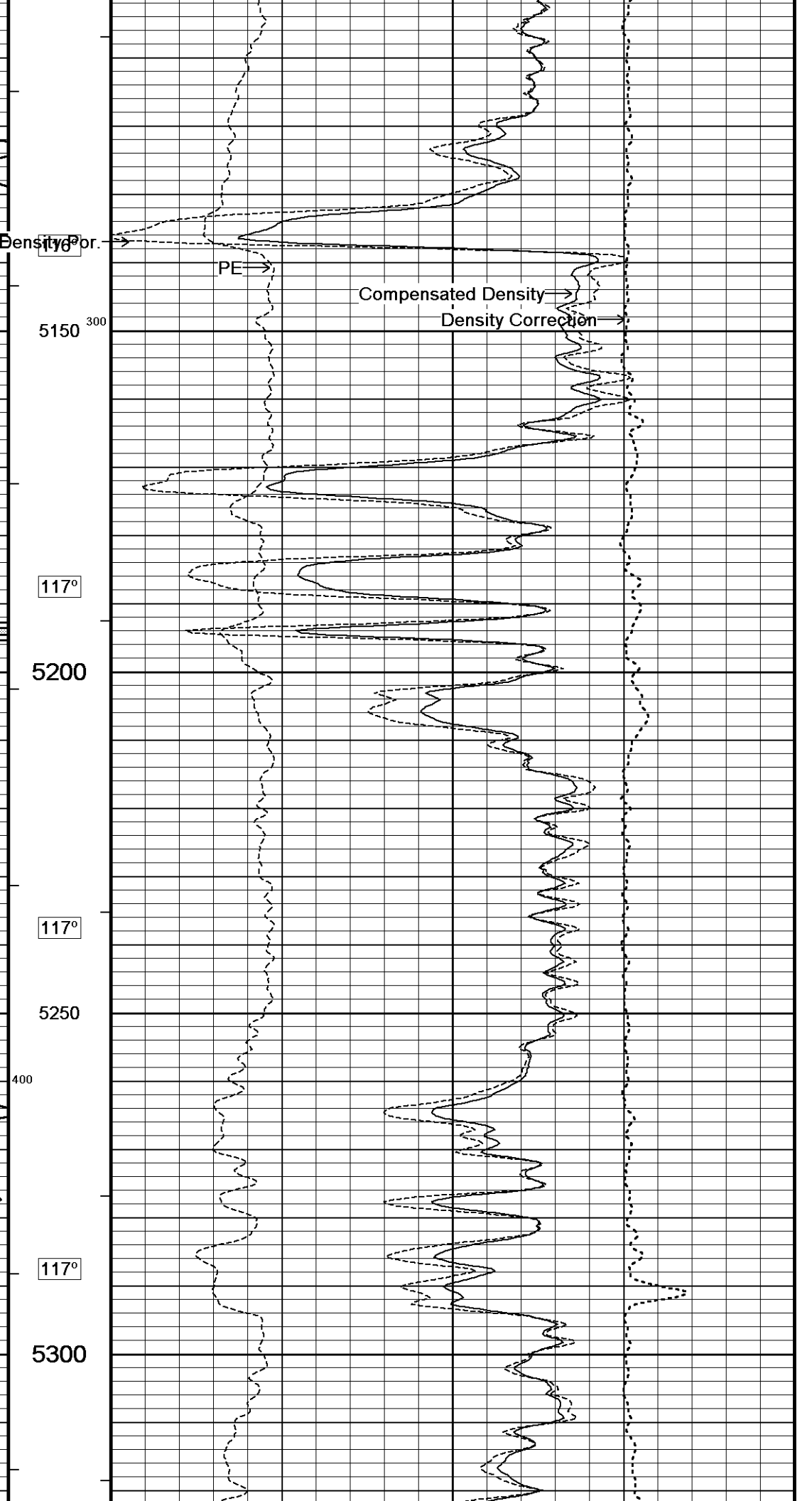
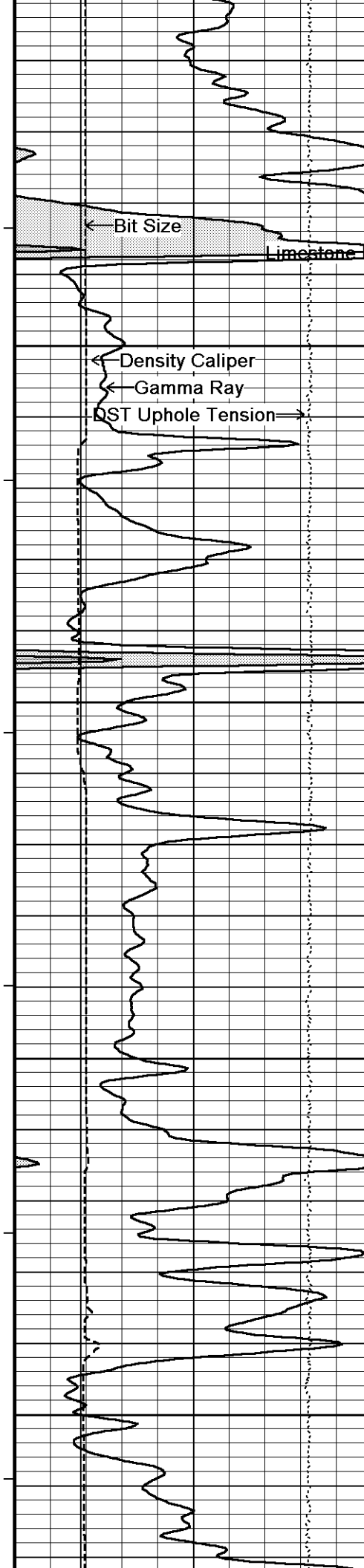
109°
4250
109°
4300
500
110°
4350
110°
4400
700
111°

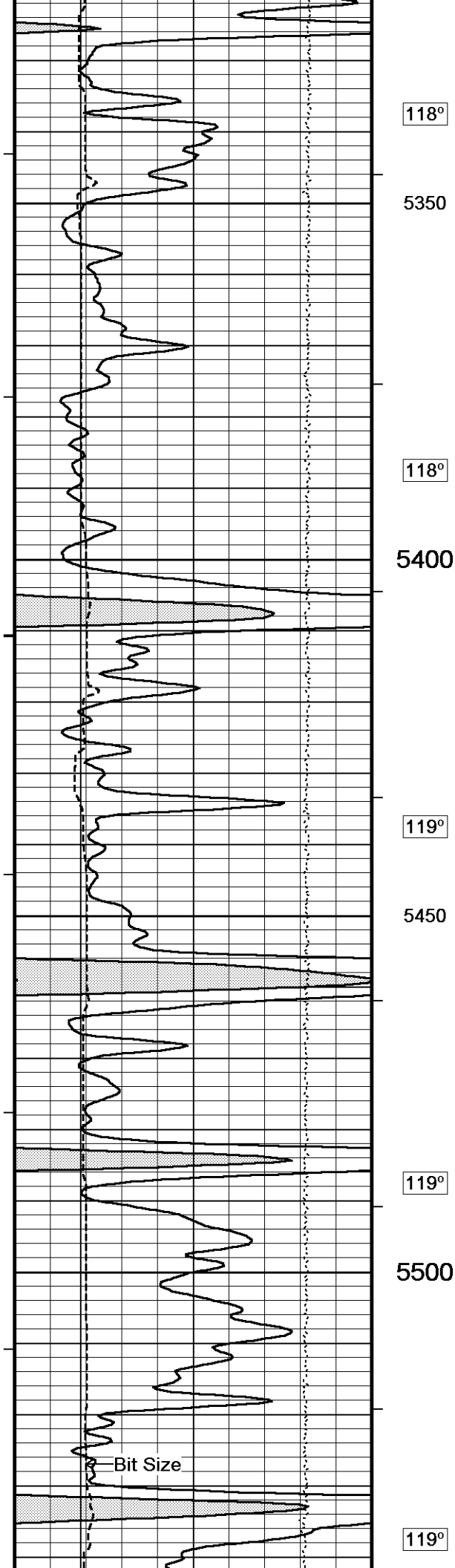












118°

5350

118°

5400

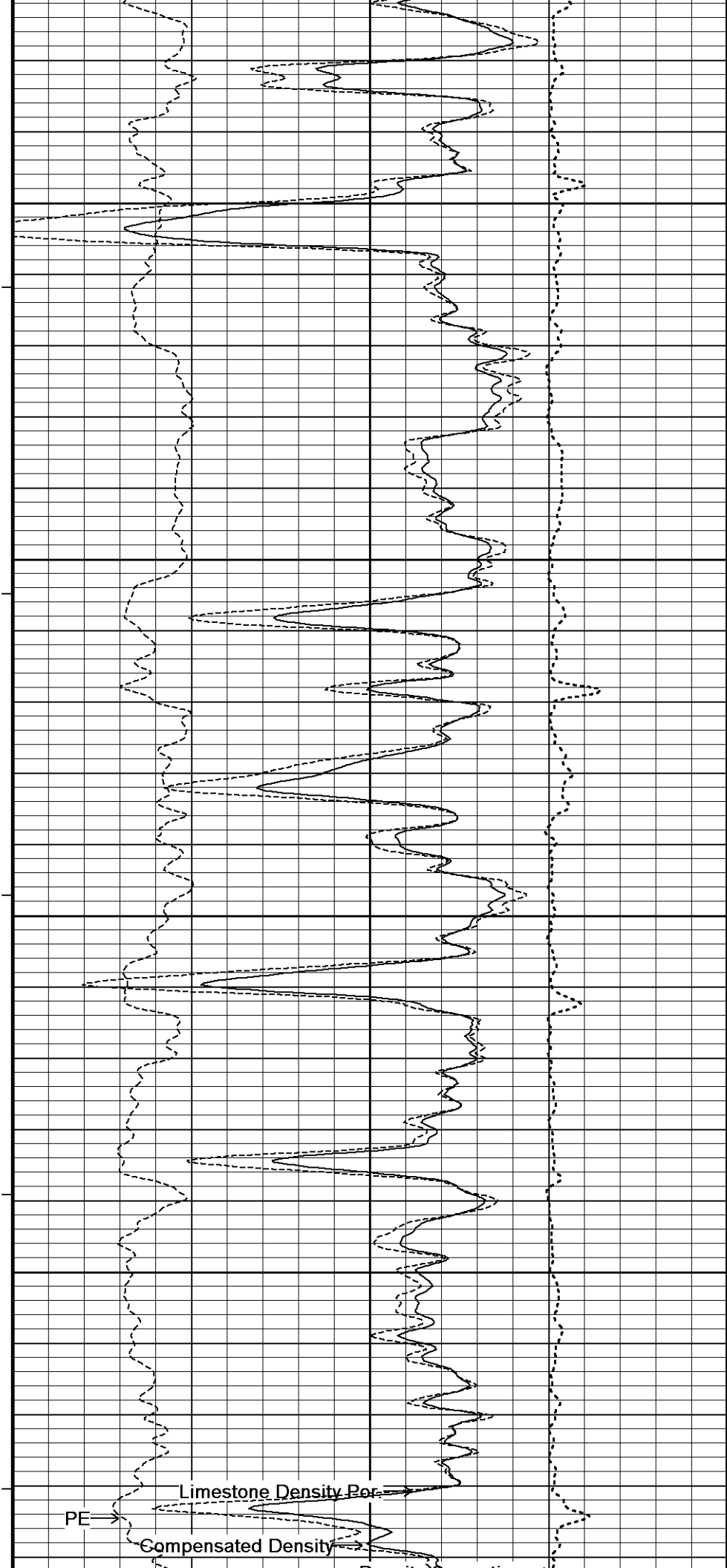
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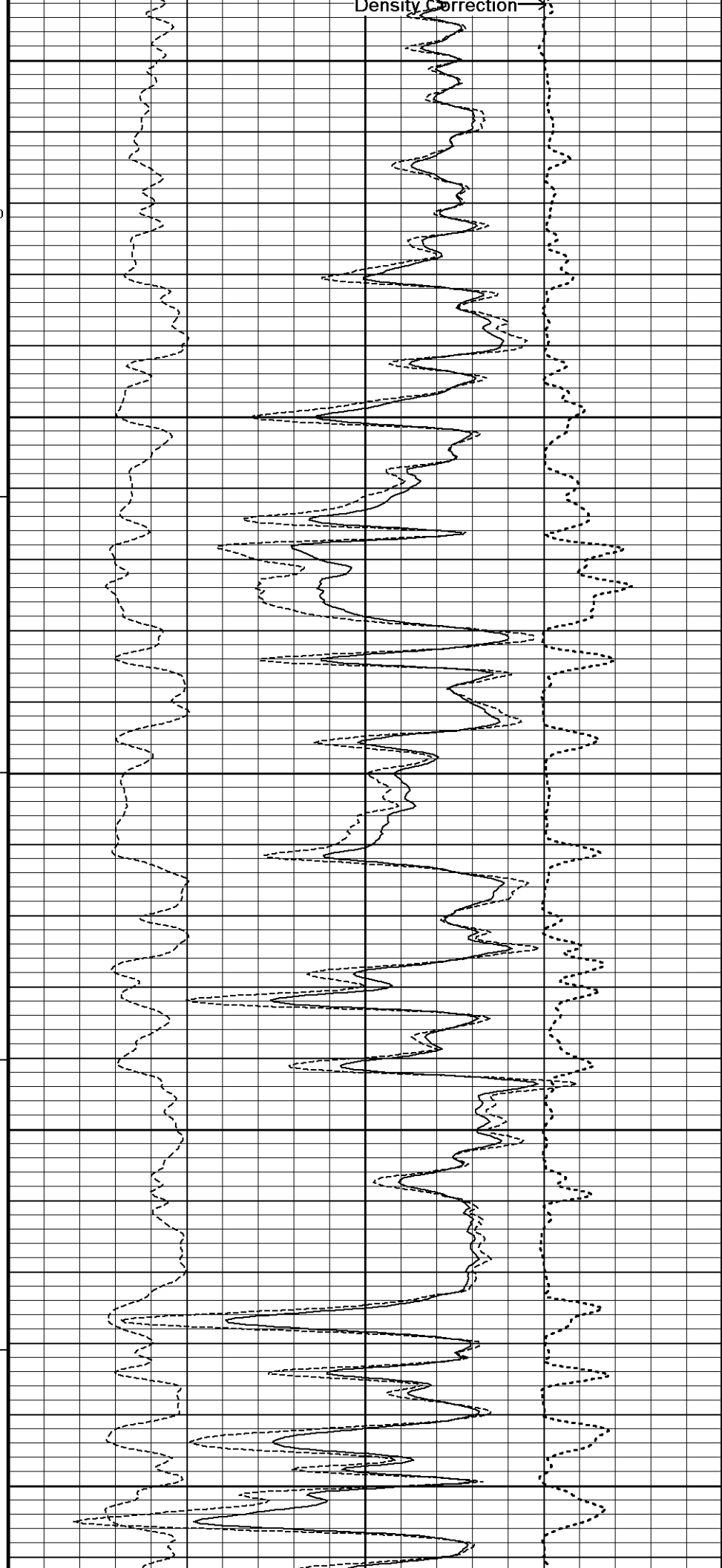
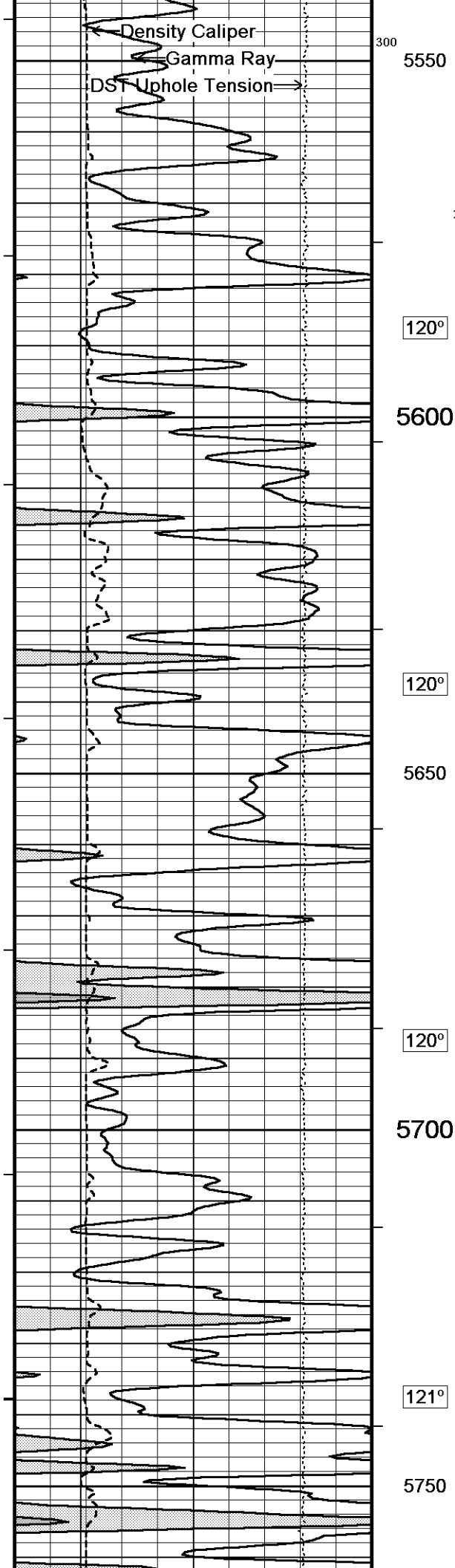
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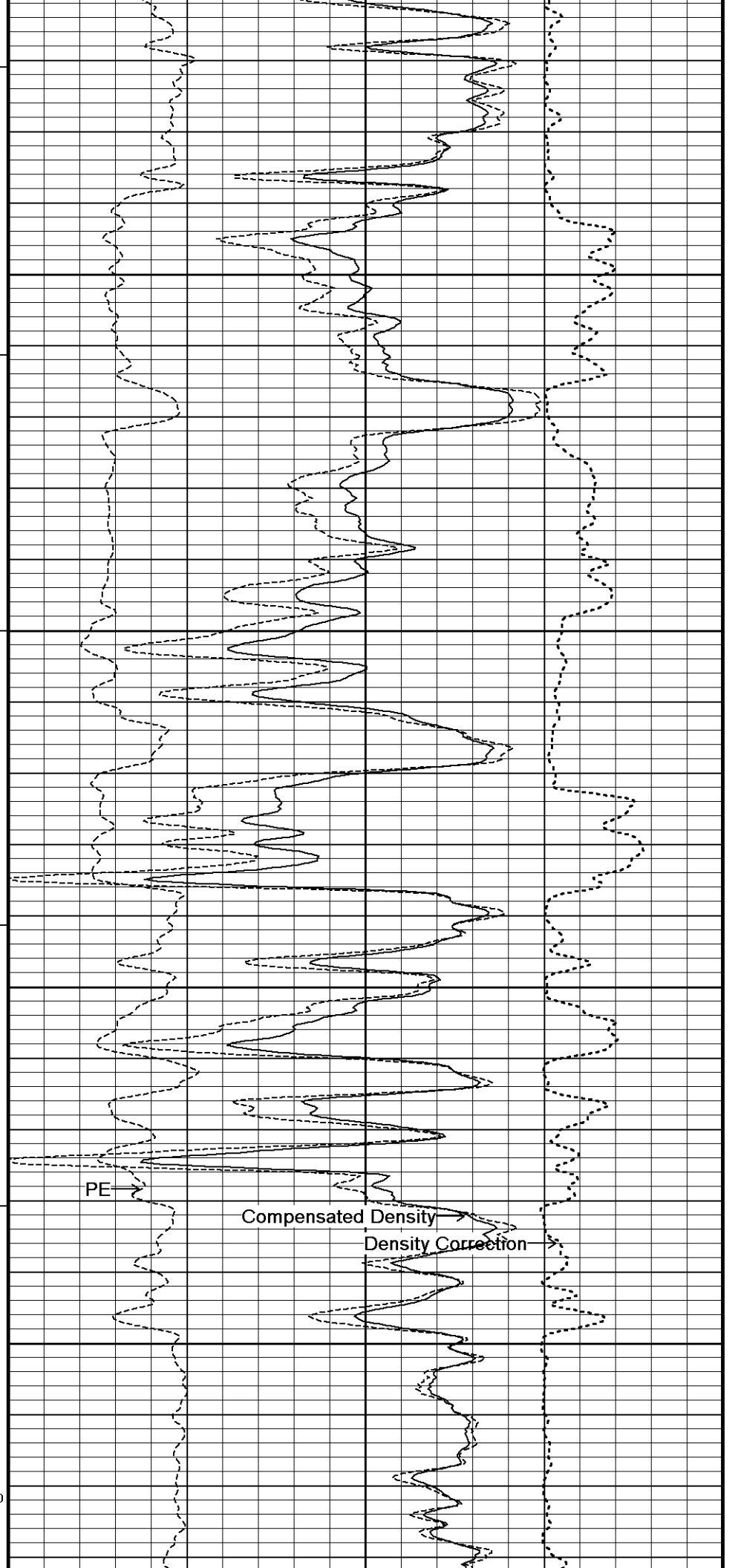
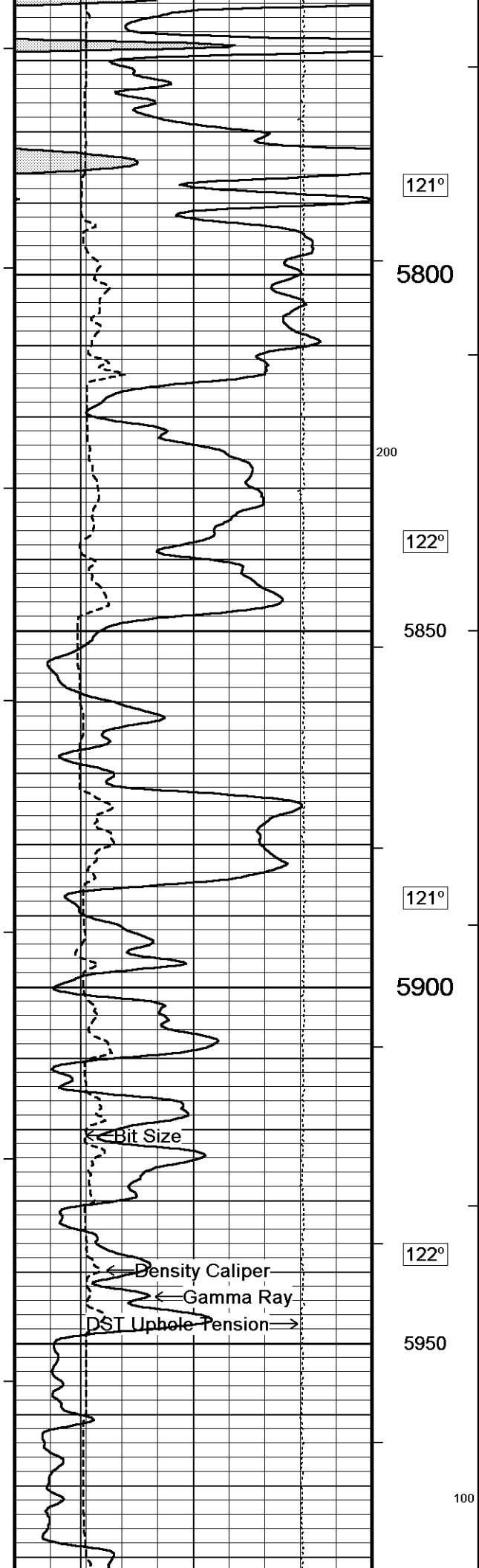
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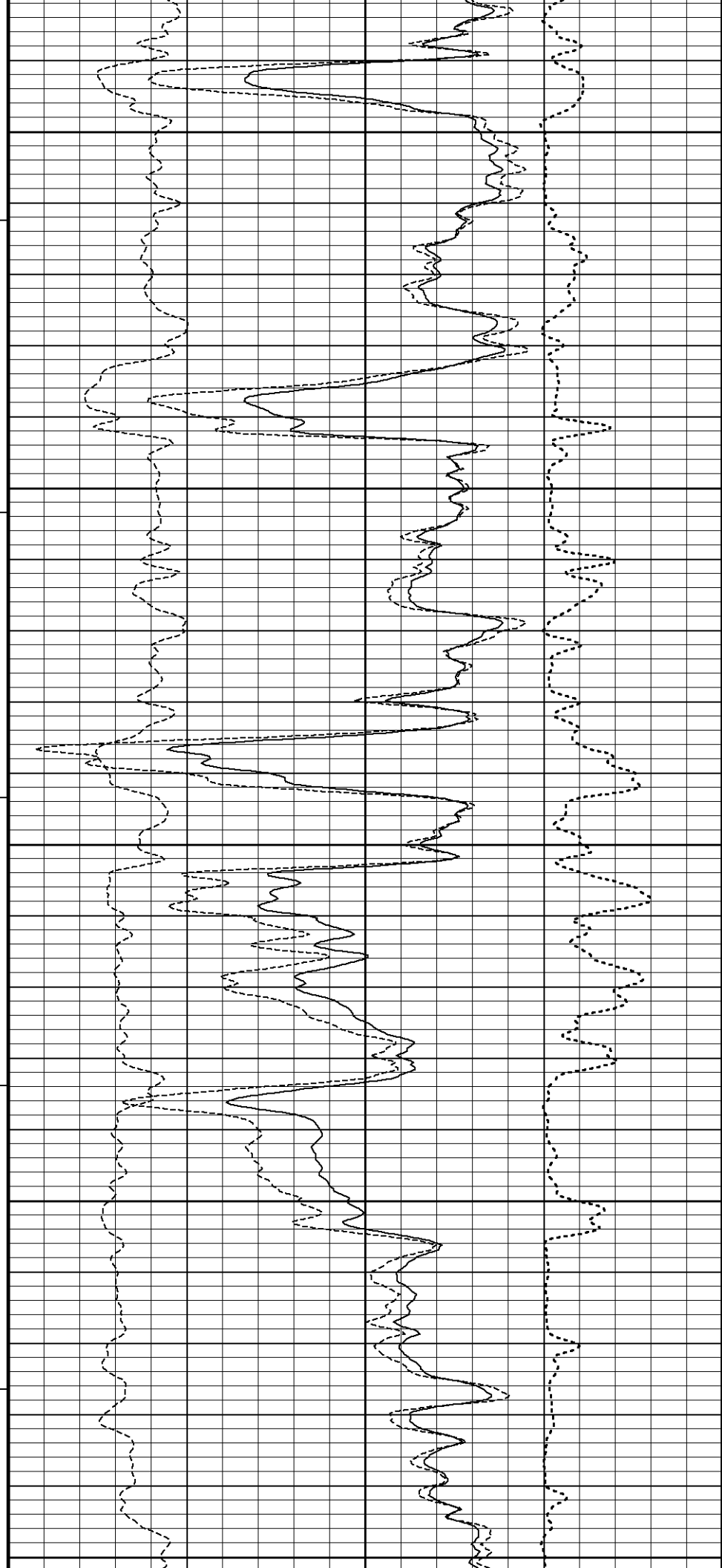
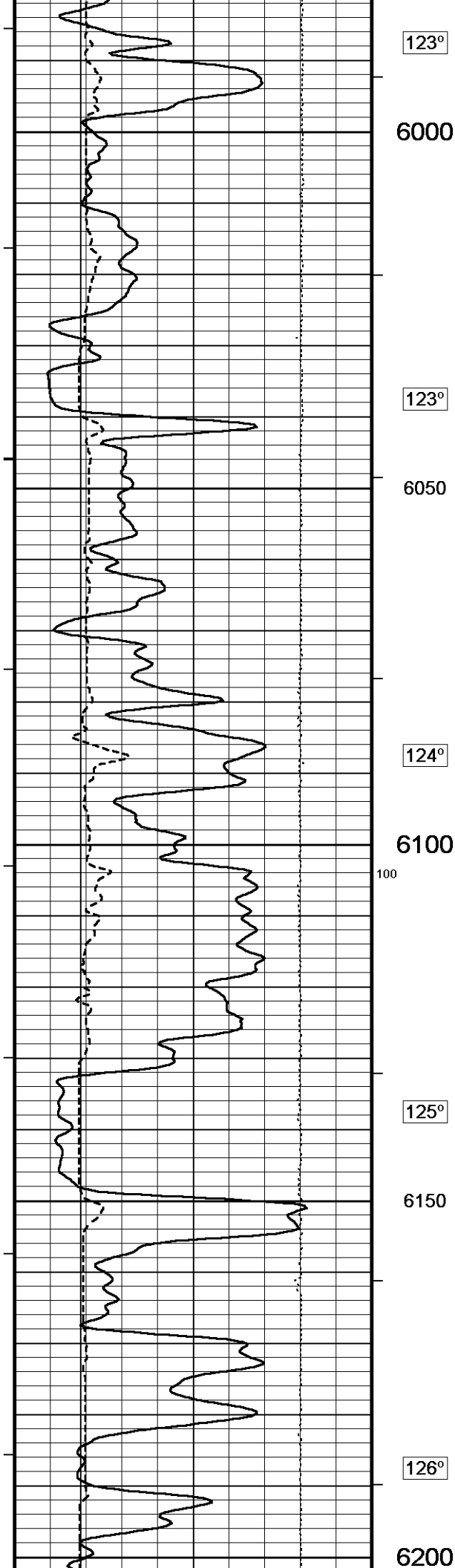
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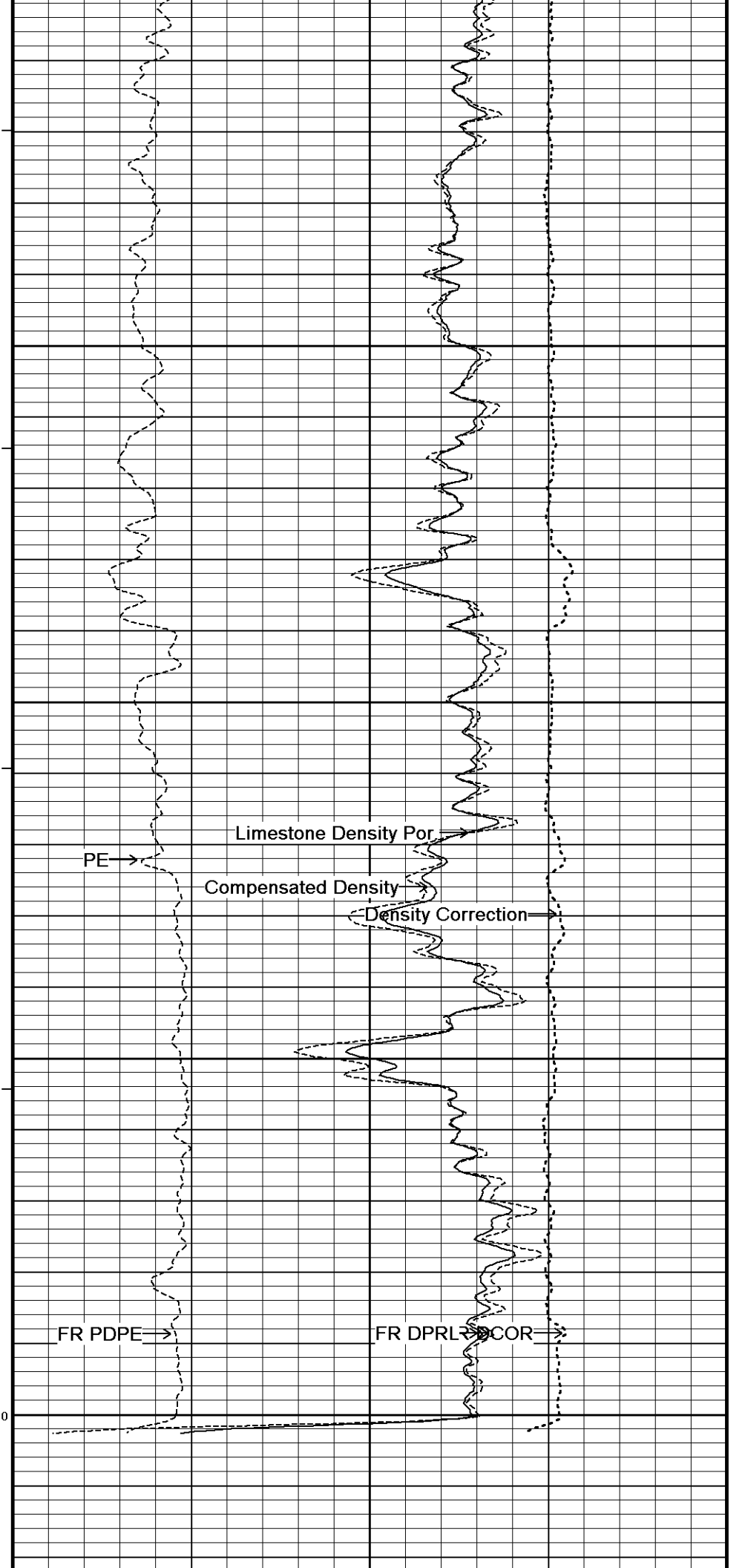
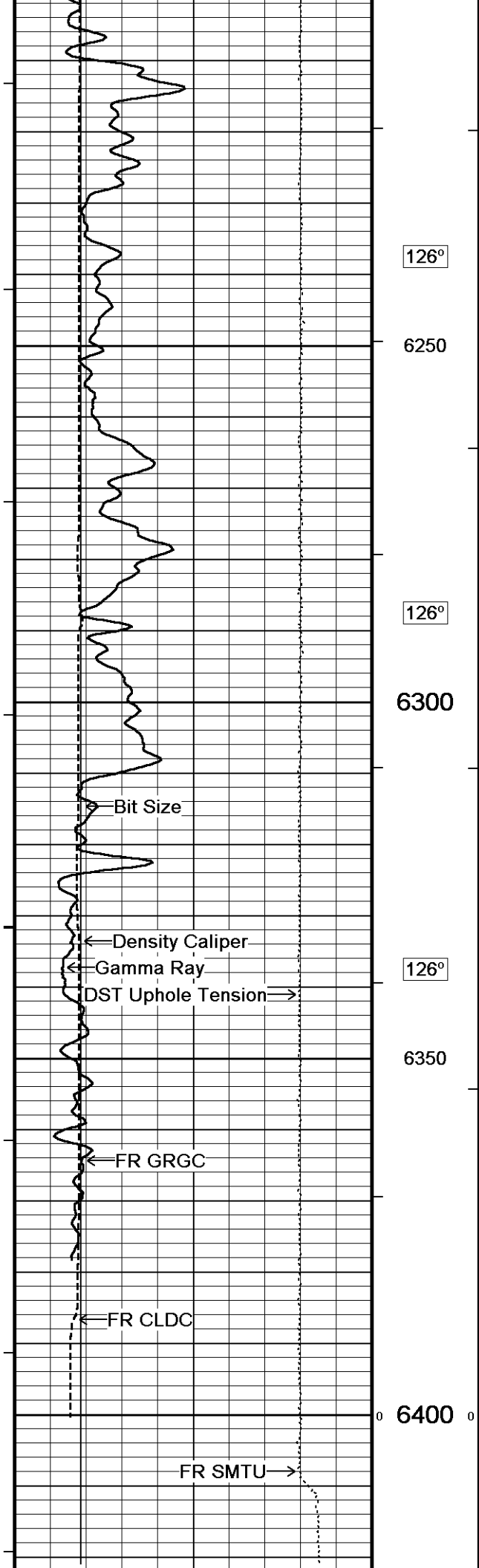
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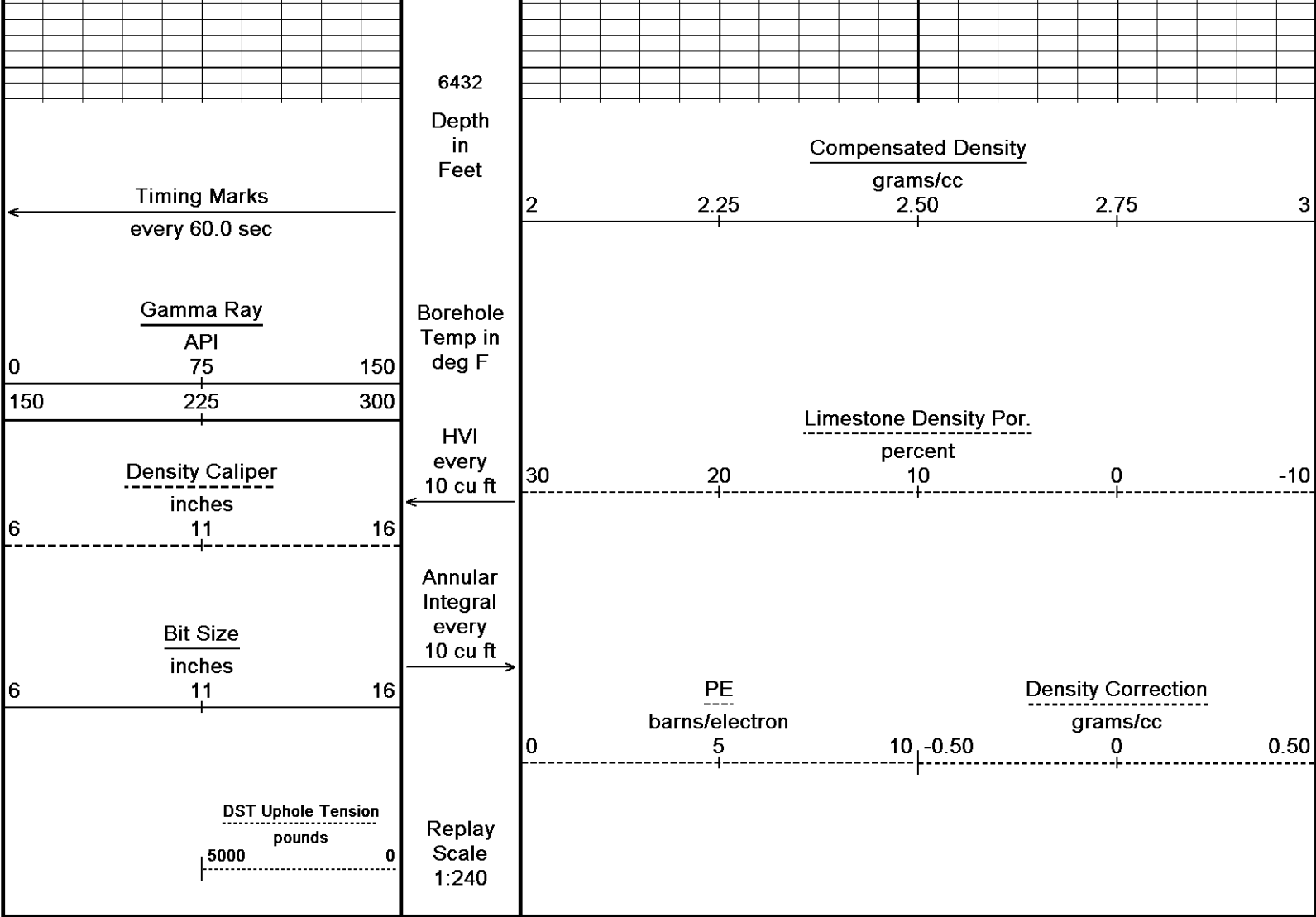












Depth Based Data - Maximum Sampling Increment 10.0cm

Plotted on 29-JAN-2013 18:04

Filename: C:\Minimus 13.04.8492\Data\O'Brien Vail #5-31\O'Brien_Vail #5-31_Main.dta

Recorded on 29-JAN-2013 15:03

System Versions: Logged with 13.04.8492 Plotted with 13.04.8492

5 INCH MAIN

10 INCH HI-RES

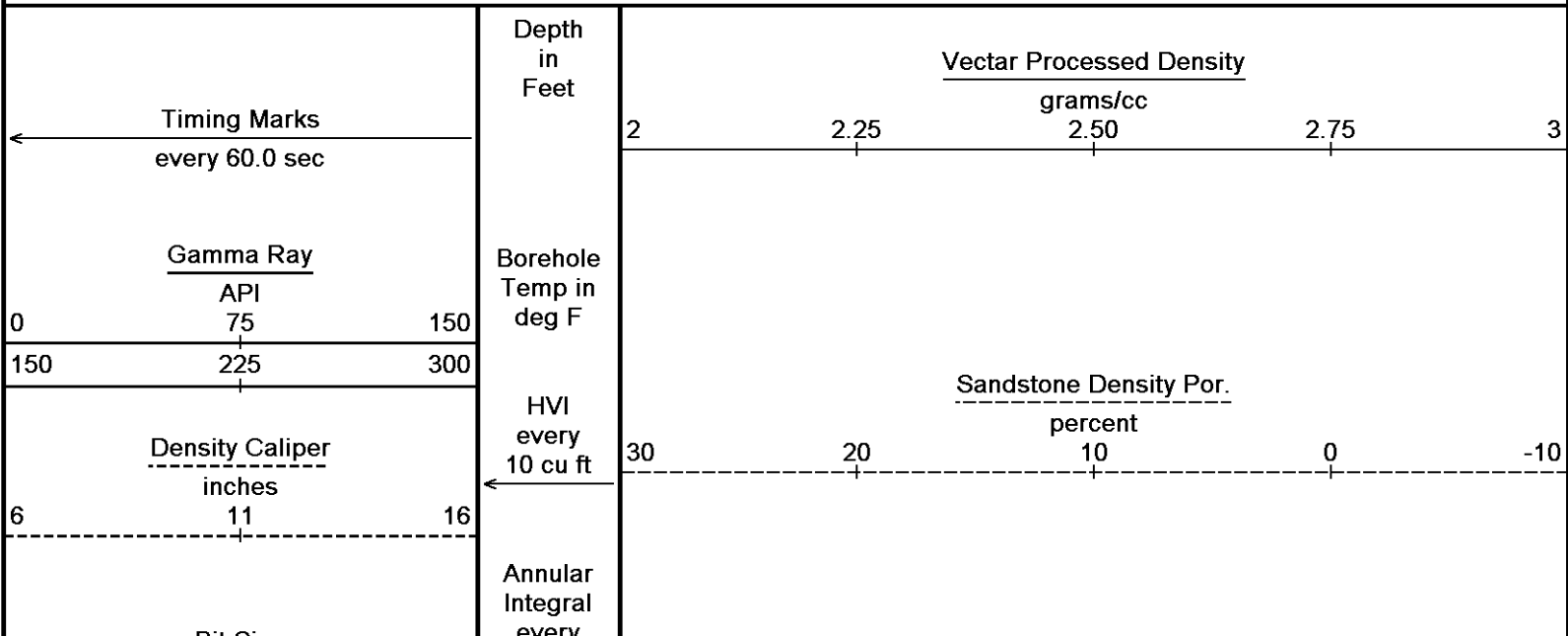
Depth Based Data - Maximum Sampling Increment 2.5cm

Plotted on 29-JAN-2013 18:04

Filename: C:\Minimus 13.04.8492\Data\O'Brien Vail #5-31\O'Brien_Vail #5-31_HIGHRES.dta

Recorded on 29-JAN-2013 13:58

System Versions: Logged with 13.04.8492 Plotted with 13.04.8492



Bit Size

inches

6 11 16

DST Uphole Tension

pounds

5000 0

every 10 cu ft

Replay
Scale
1:120

5700

119°

5750

Bit Size

Density Caliper

120°

Gamma Ray

PE

barns/electron

Density Correction

grams/cc

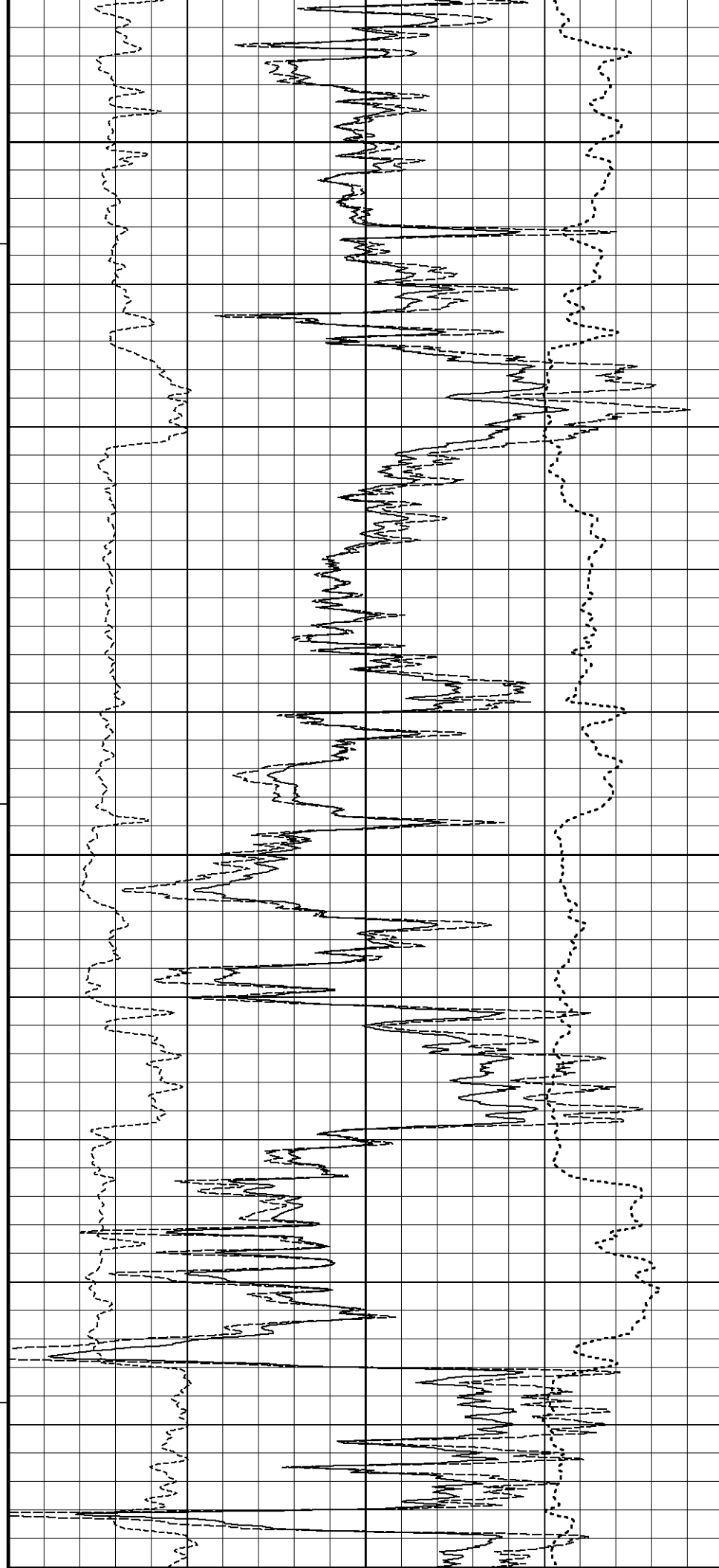
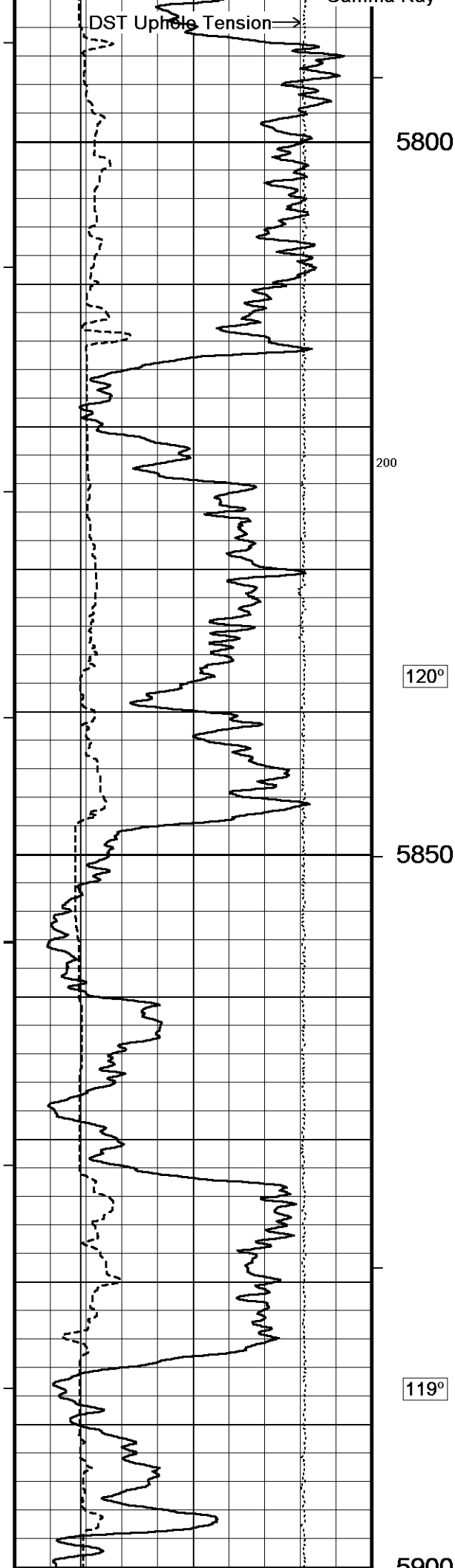
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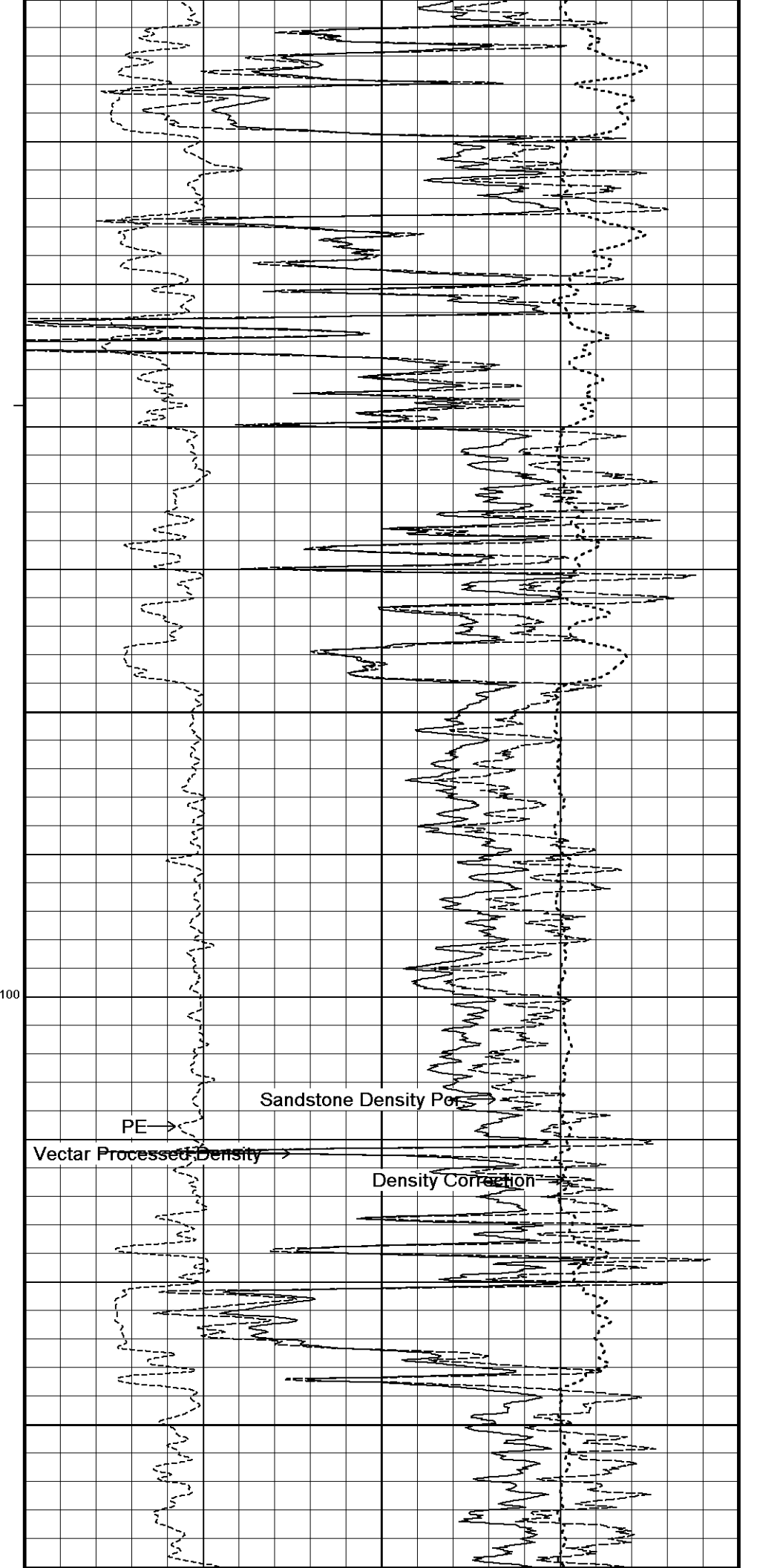
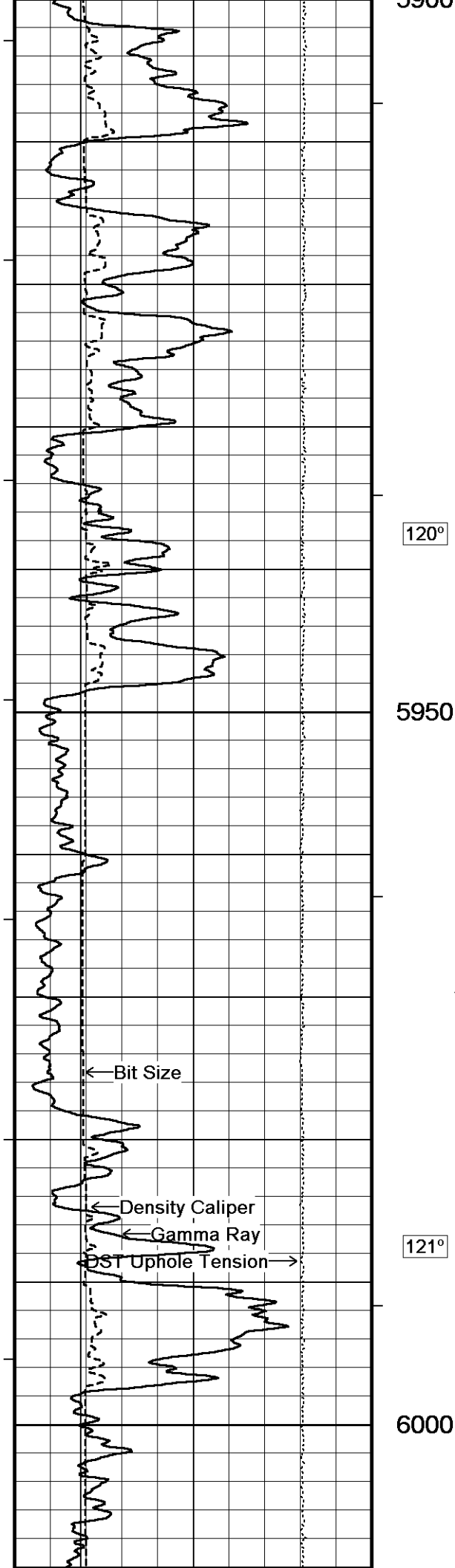
Sandstone Density Por

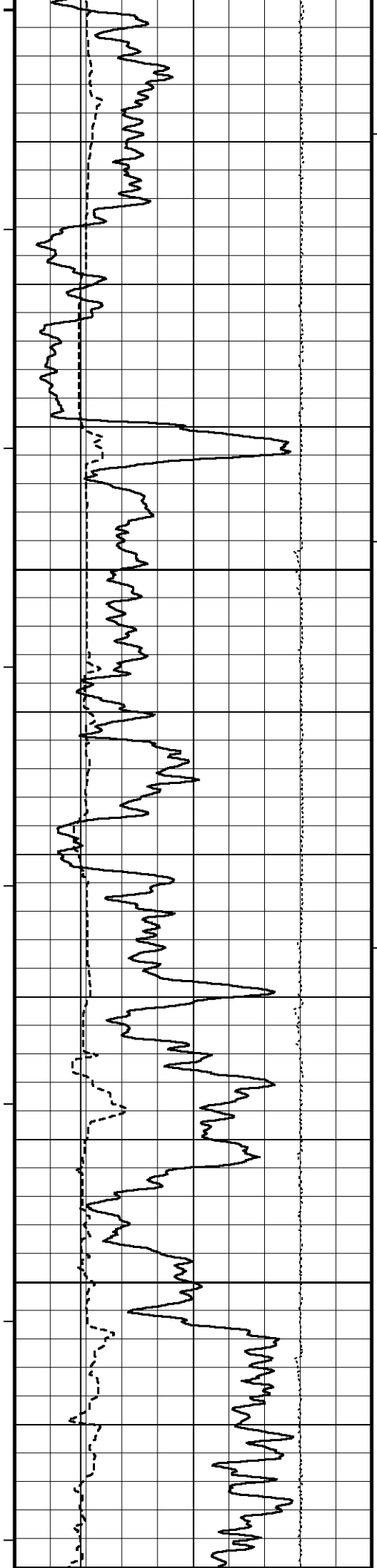
PE

Vector Processed Density

Density Correction







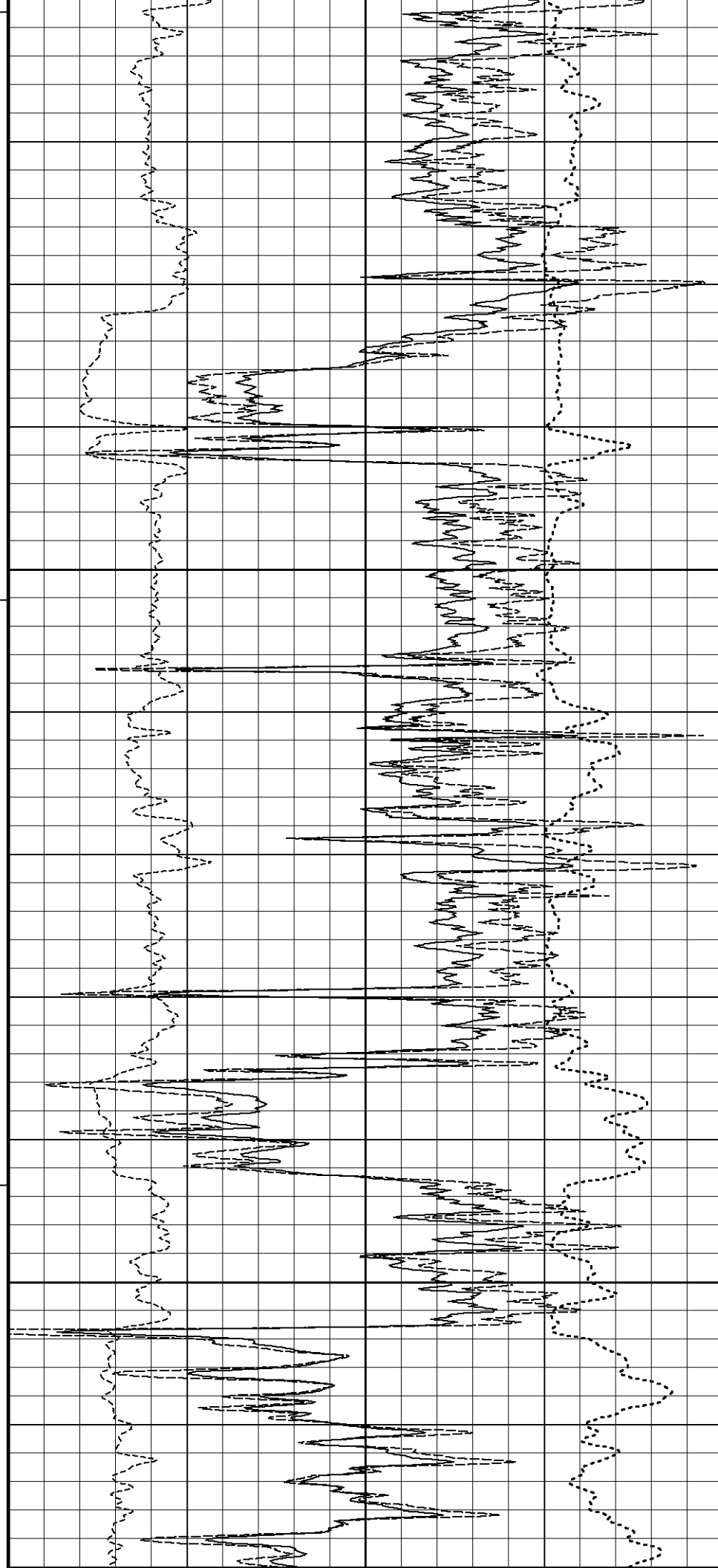
121°

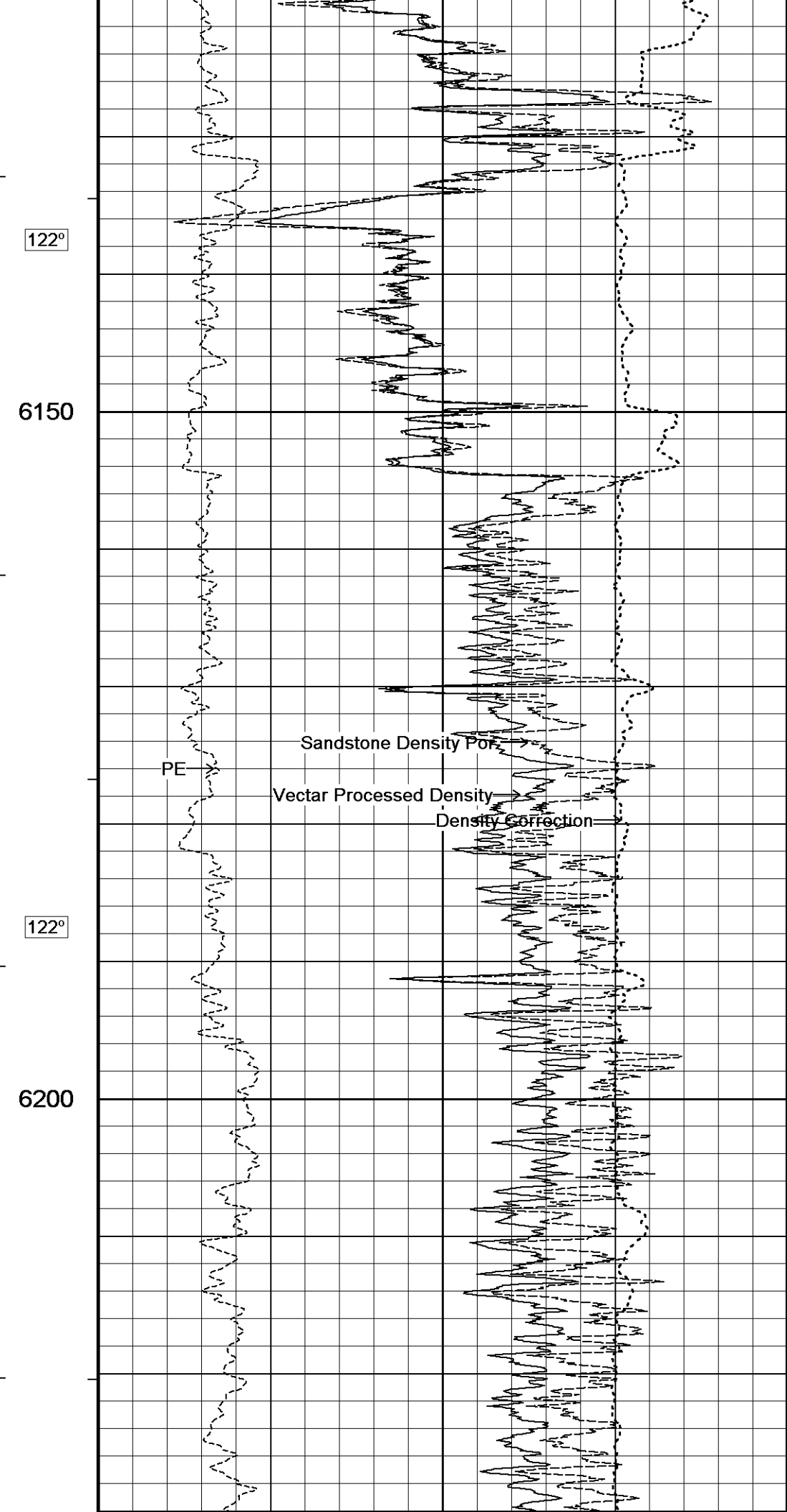
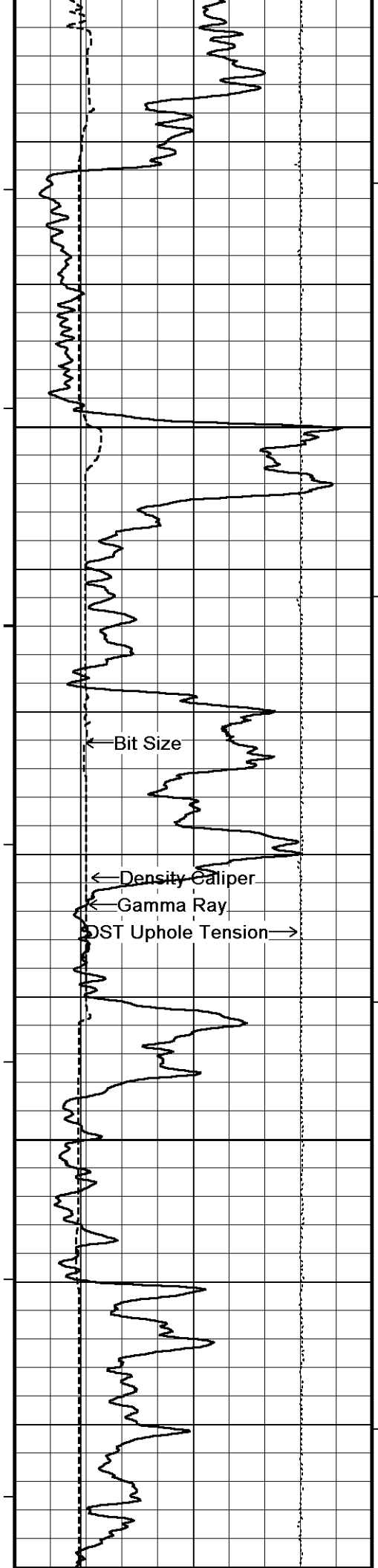
6050

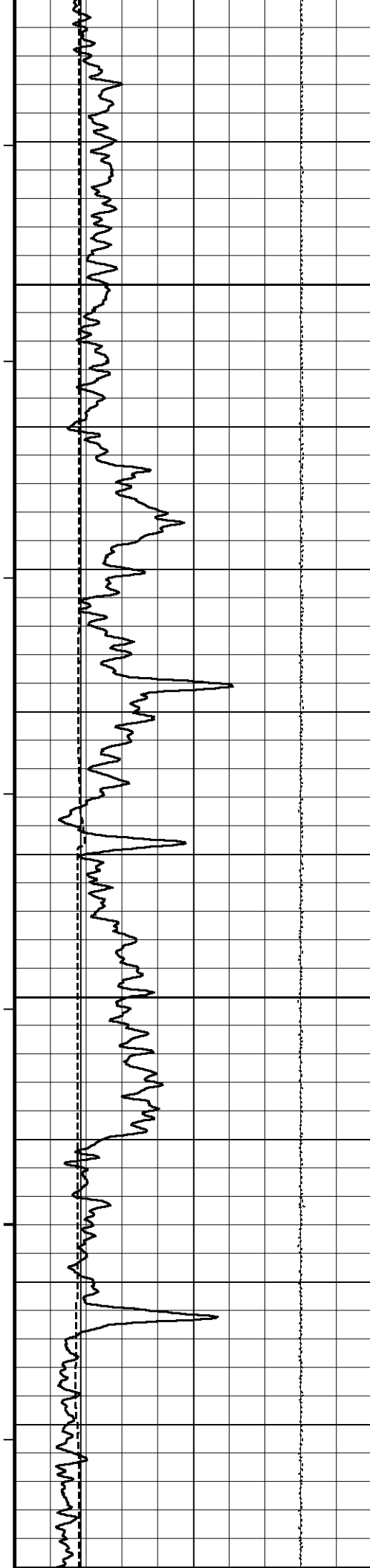
121°

6100

100







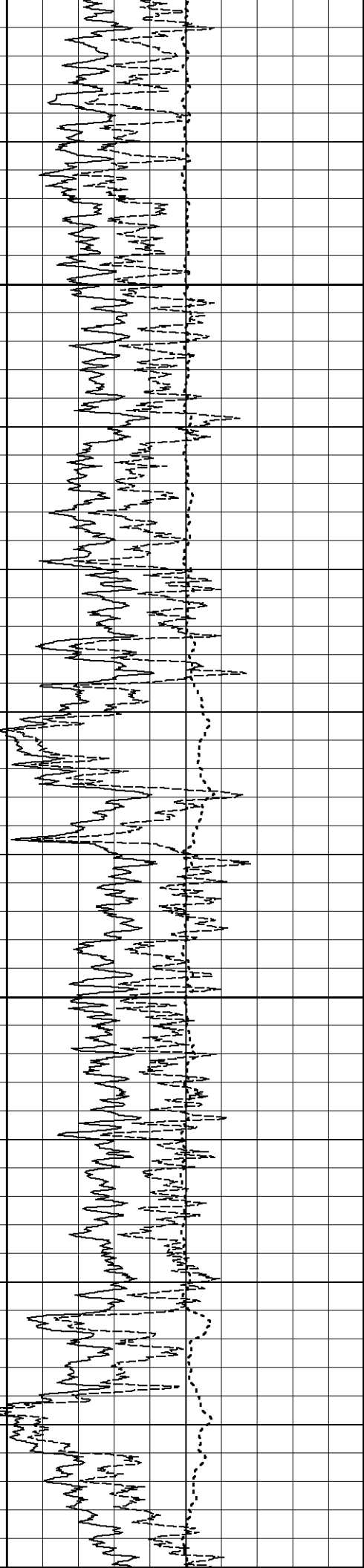
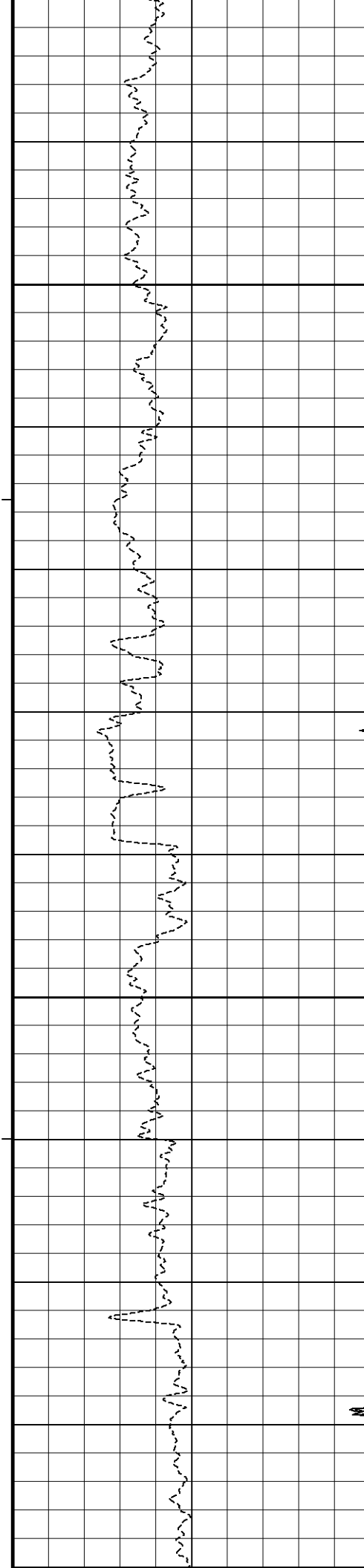
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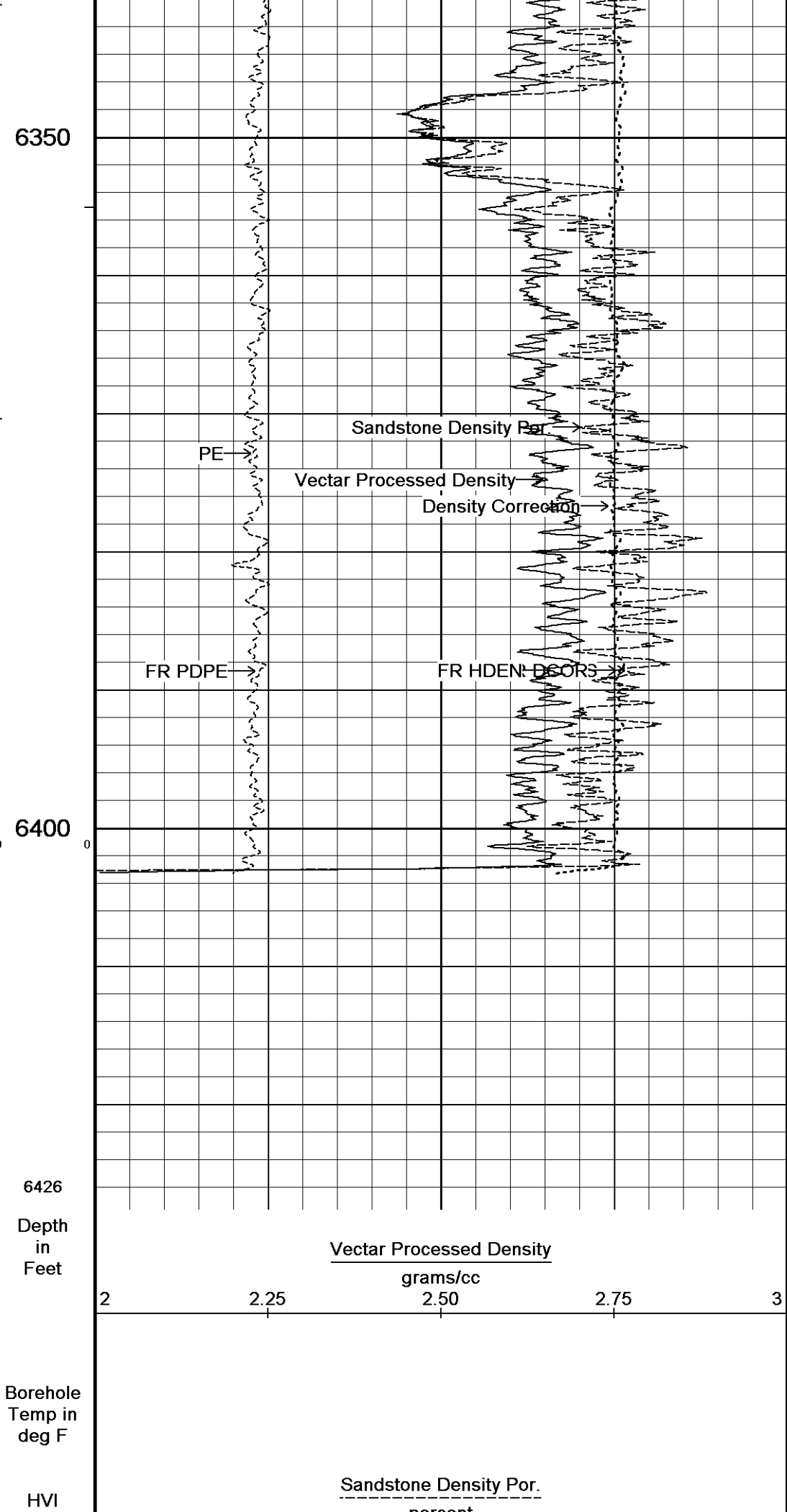
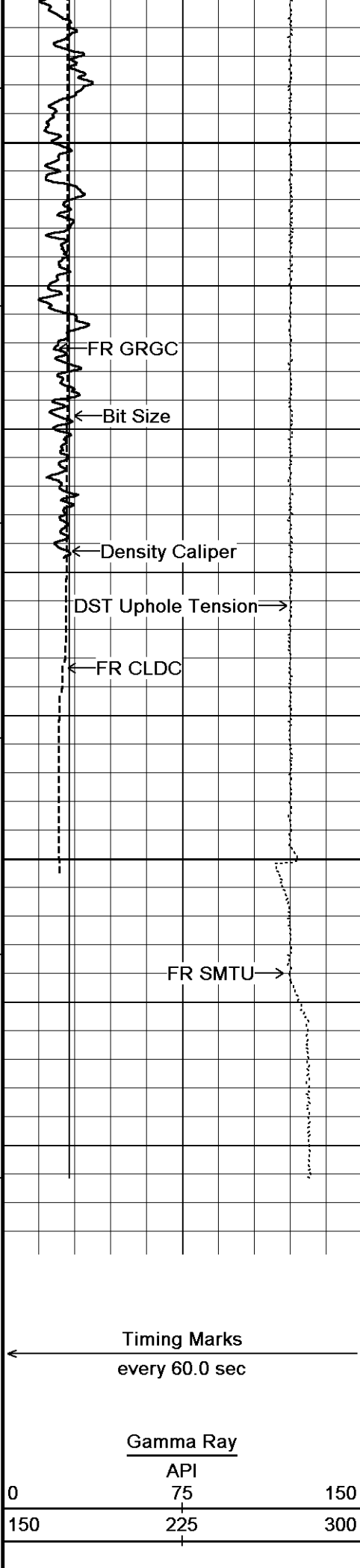
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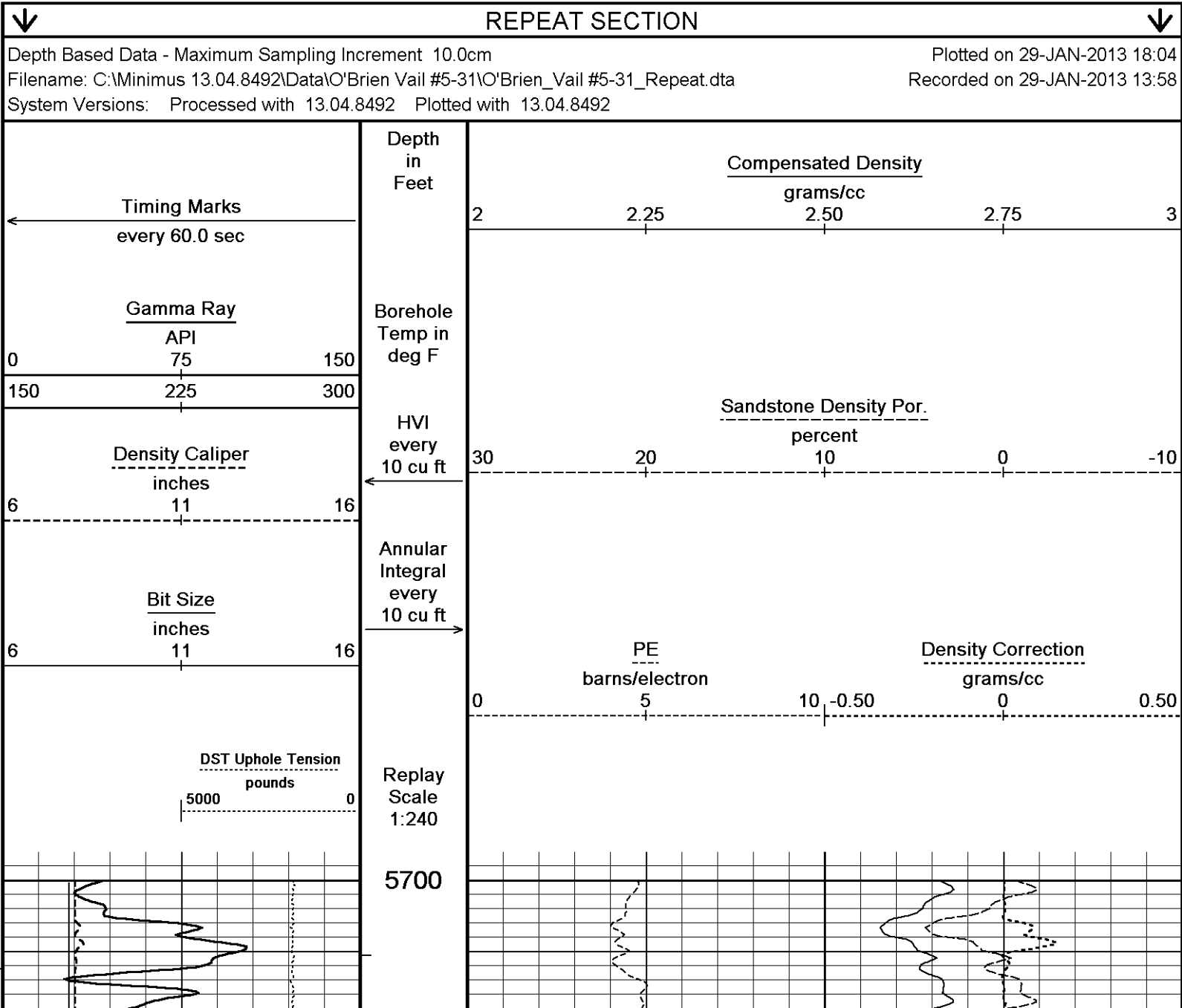
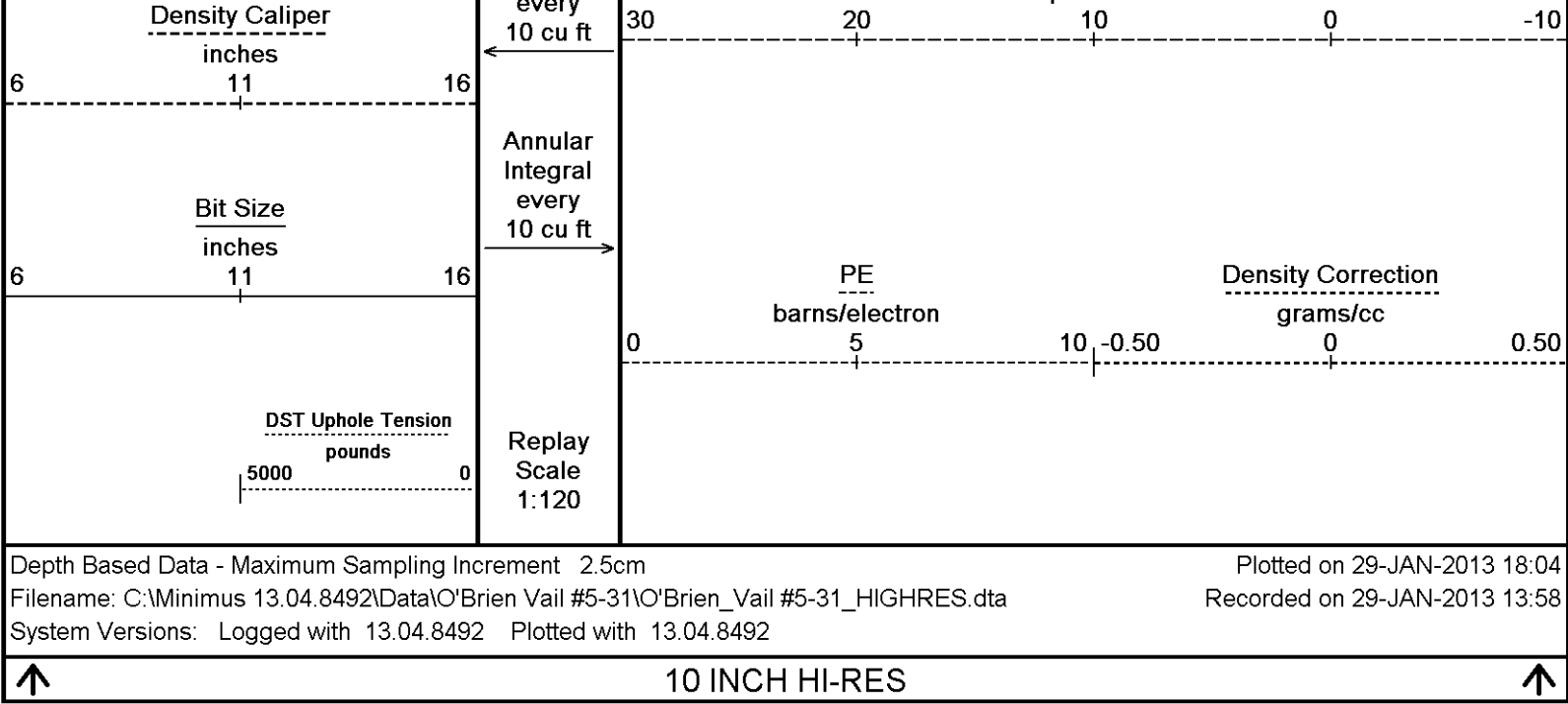
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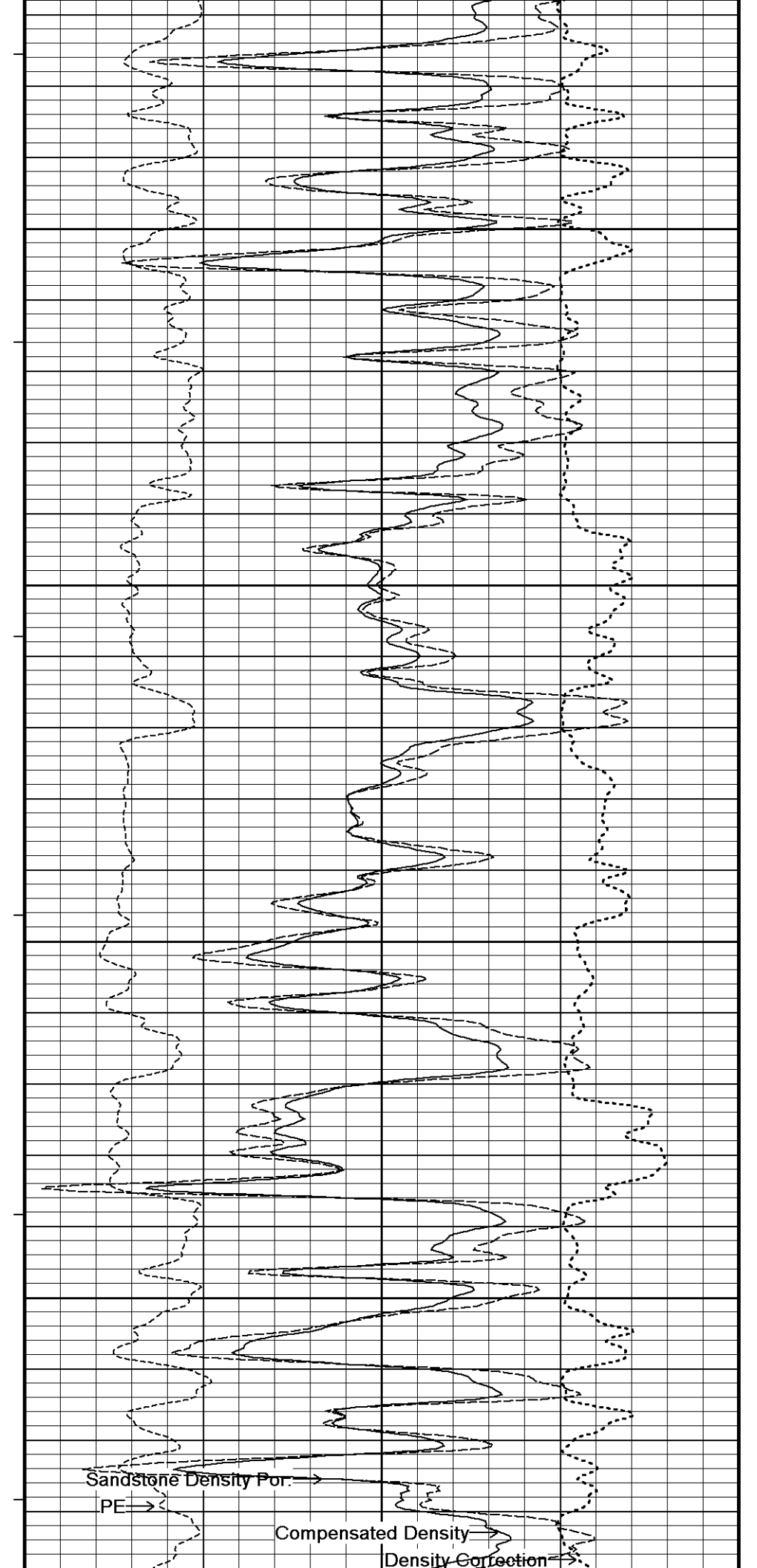
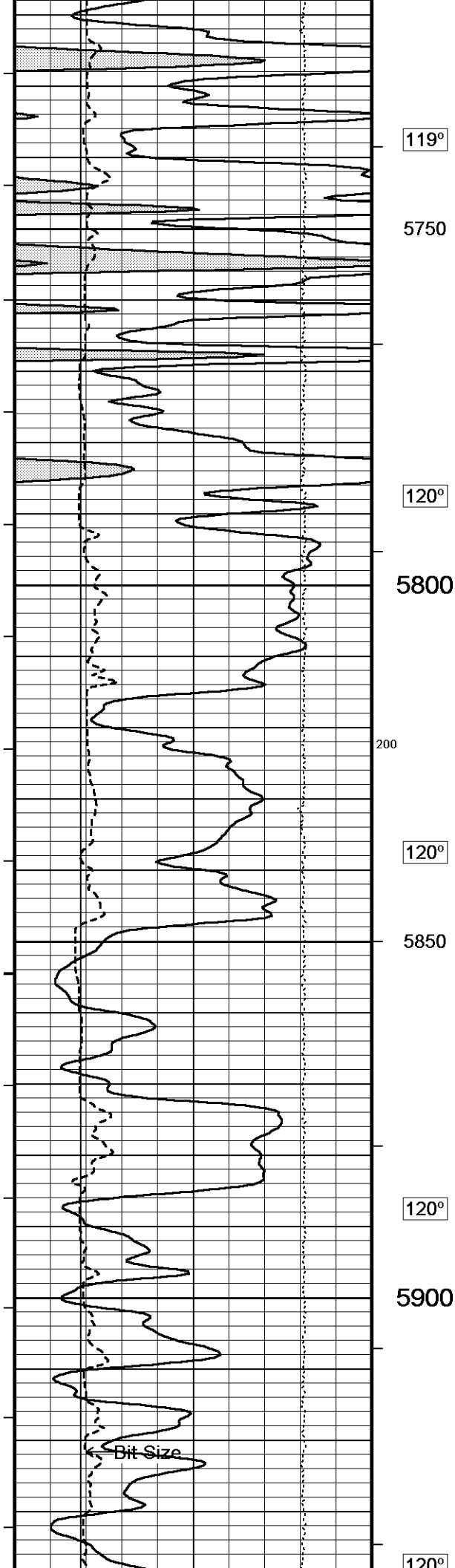
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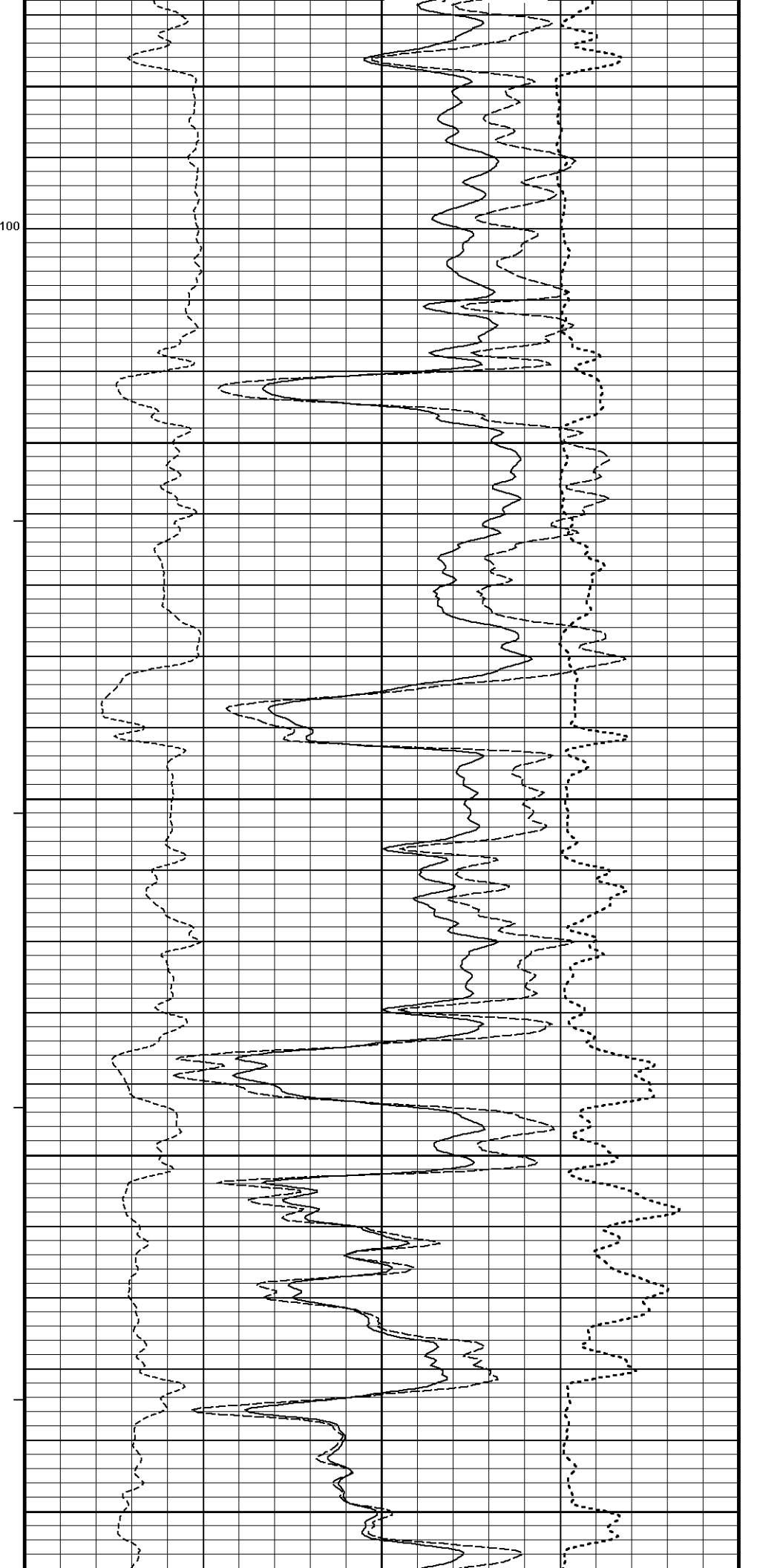
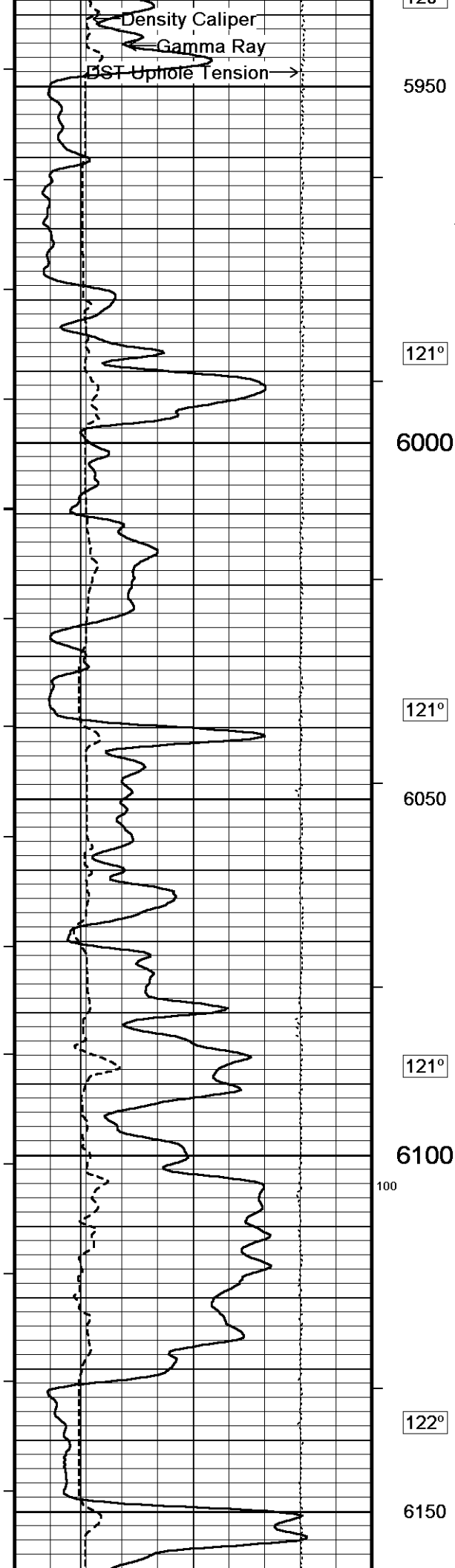
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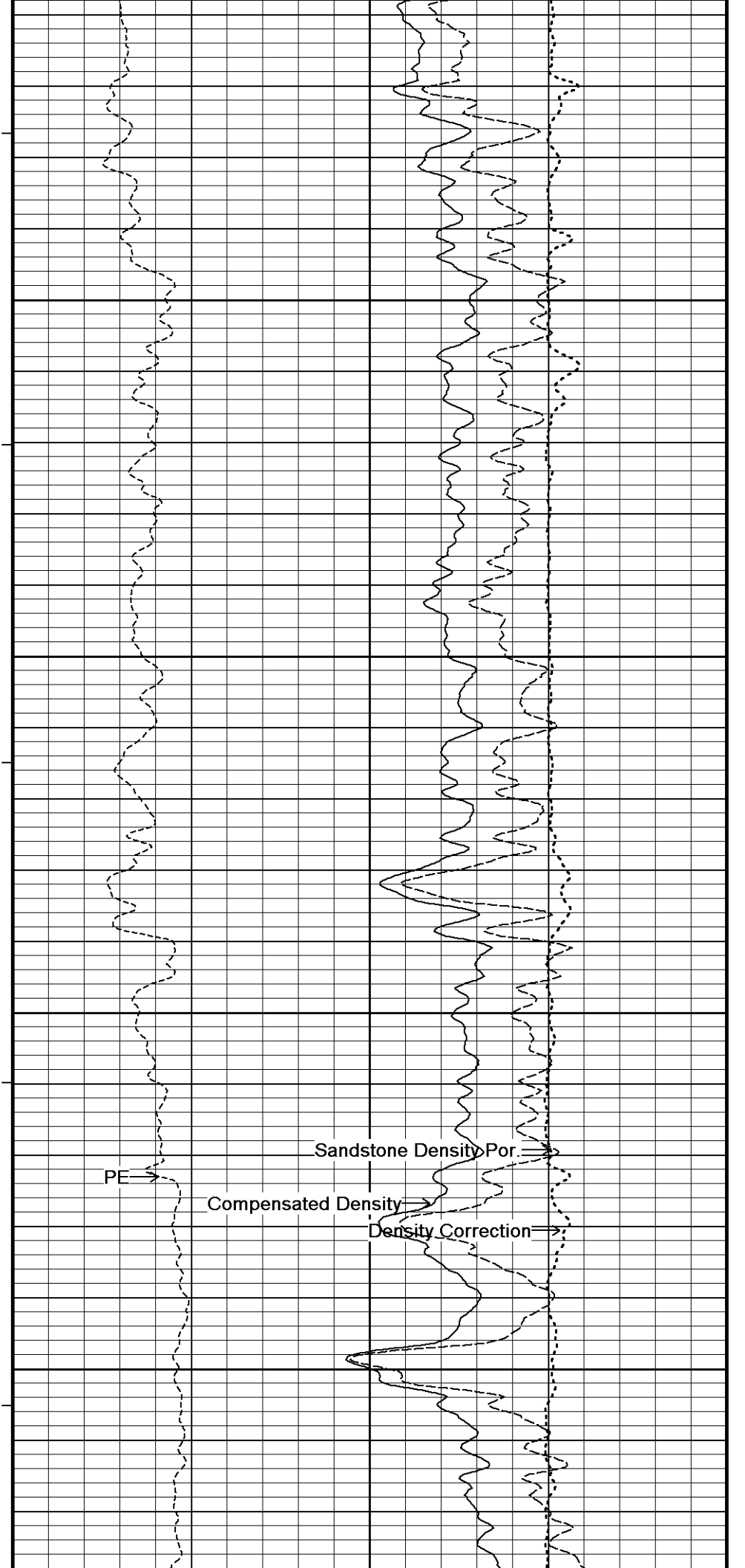
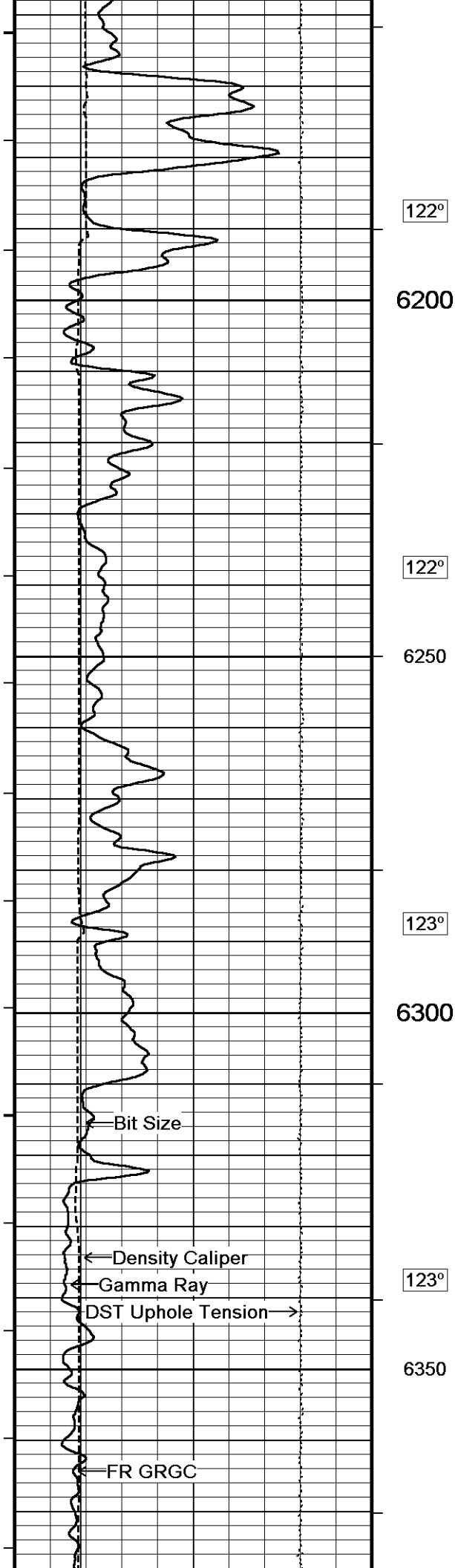


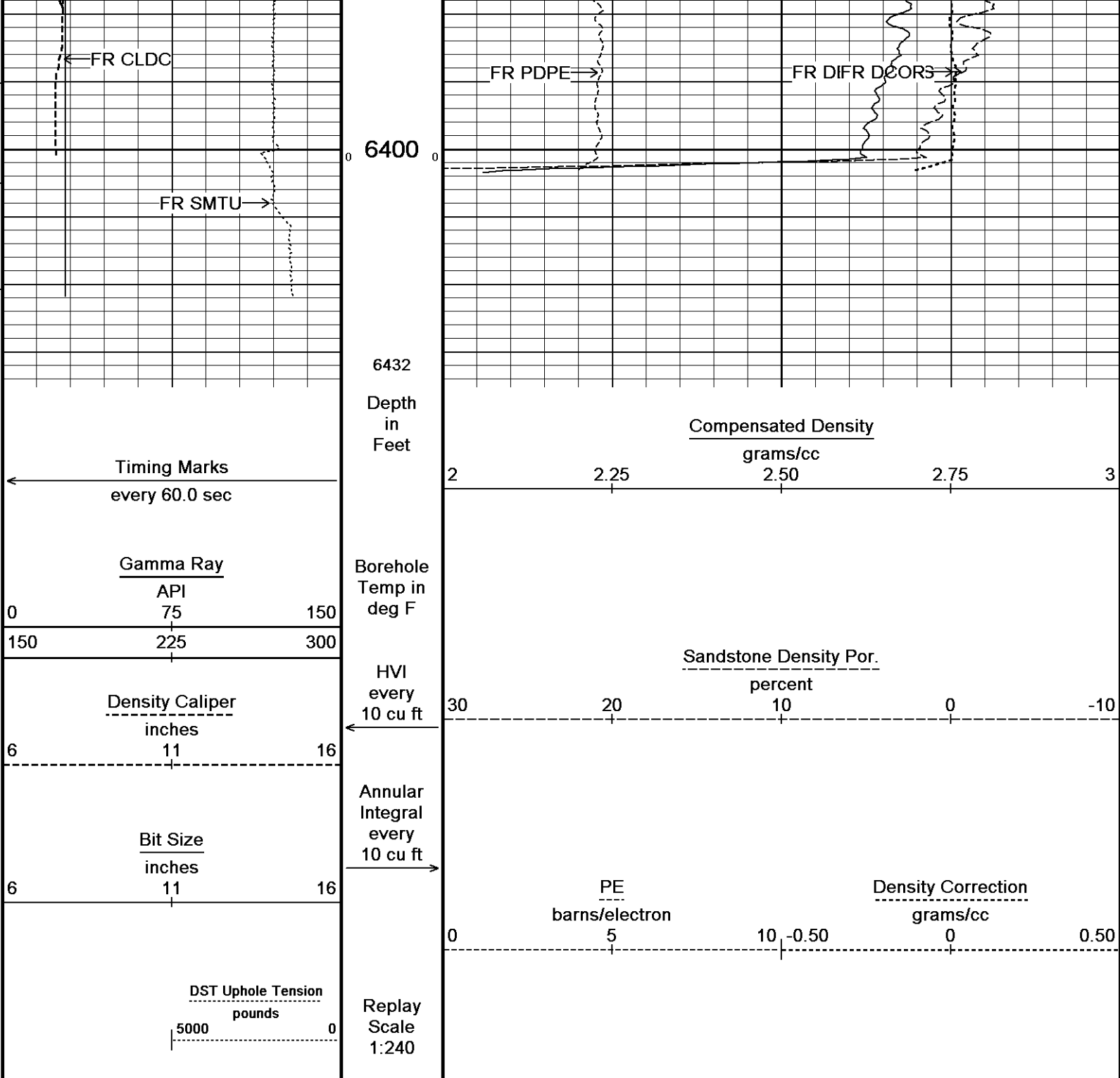












Depth Based Data - Maximum Sampling Increment 10.0cm
Filename: C:\Minimus 13.04.8492\Data\O'Brien Vail #5-31\O'Brien_Vail #5-31_Repeat.dta
System Versions: Processed with 13.04.8492 Plotted with 13.04.8492
Plotted on 29-JAN-2013 18:04
Recorded on 29-JAN-2013 13:58

↑ REPEAT SECTION ↑

BEFORE SURVEY CALIBRATION		
C:\Minimus 13.04.8492\Data\O'Brien Vail #5-31\O'Brien_Vail #5-31_Main.dta		
General Constants All 000		Last Edited on 29-JAN-2013,12:10
General Parameters		
Mud Resistivity	1.050	ohm-metres
Mud Resistivity Temperature	81.000	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	Density Caliper		
Rwa Parameters			
Porosity used	Base Density Porosity		
Resistivity used	Array Ind. Four Res Rt		
RWA Constant A	1.000		
RWA Constant M	2.000		

Down-hole Tension Calibration SMS 0			Field Calibration on 25-JAN-2013 17:27
Reading No	Measured	Calibrated (lbs)	
1	15306.37	0.00	
2	15980.37	415.00	

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 29-JAN-2013 09:50
	Measured	Calibrated (API)	
Background	74	51	
Calibrator (Gross)	1129	776	
Calibrator (Net)	1055	725	

Gamma Constants MCG-C 208			Last Edited on 29-JAN-2013,09:44
Gamma Calibrator Number	GR38		
Mud Density	1.00	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		

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)
6.04	5.98

Micro Normal and Micro Inverse Calibration MMR-A 11

Base Calibration on 16-JAN-2013 10:36
Field Check on 29-JAN-2013 09:42

Base Calibration

Channel	Resistor 1	Measured		Calibrated (ohm-m)	
		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 29-JAN-2013 09:54

Base Calibration

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

Field Calibrator at Base

	Calibrated (cps)
	1720 2499
Ratio	0.688

Field Check

	Calibrated (cps)
	1721 2500
Ratio	0.696

Neutron Constants MDN-A.B 65

Last Edited on 29-JAN-2013,12:10

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	

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 29-JAN-2013,12:12

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
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Induction Calibration MAI-A.A 45

Base Calibration on 26-JUL-2012,09:22

Field Check on 29-JAN-2013 09:34

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	78.4	Deg F
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Channel	Base Check (mmho/m)		Field Check (mmho/m)	
	Low	High	Low	High
1			18.6	3851.8
2			31.7	3629.2
3			28.6	3049.2
4			18.3	2079.1
Deep			16.1	1911.1
Medium			42.5	4060.2
Shallow			49.6	5482.8

Array Temperature	62.9	Deg F
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Induction Constants MAI-A.A 45

Last Edited on 29-JAN-2013,12:12

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

[illegible]

0.00
0.00

0.00

Caliper Calibration MPD-B 31

Base Calibration on 28-JAN-2013 08:35

Field Calibration on 29-JAN-2013 09:41

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)
5.94	5.98

DOWNHOLE EQUIPMENT

C:\Minimus 13.04.8492\Data\O'Brien Vail #5-31\O'Brien_Vail #5-31_Main.dta

SHA-F Compact Swivel Head Adaptor

SHA-F 59 LG: 2.74 ft WT: 26.5 lb OD: 2.24 in

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

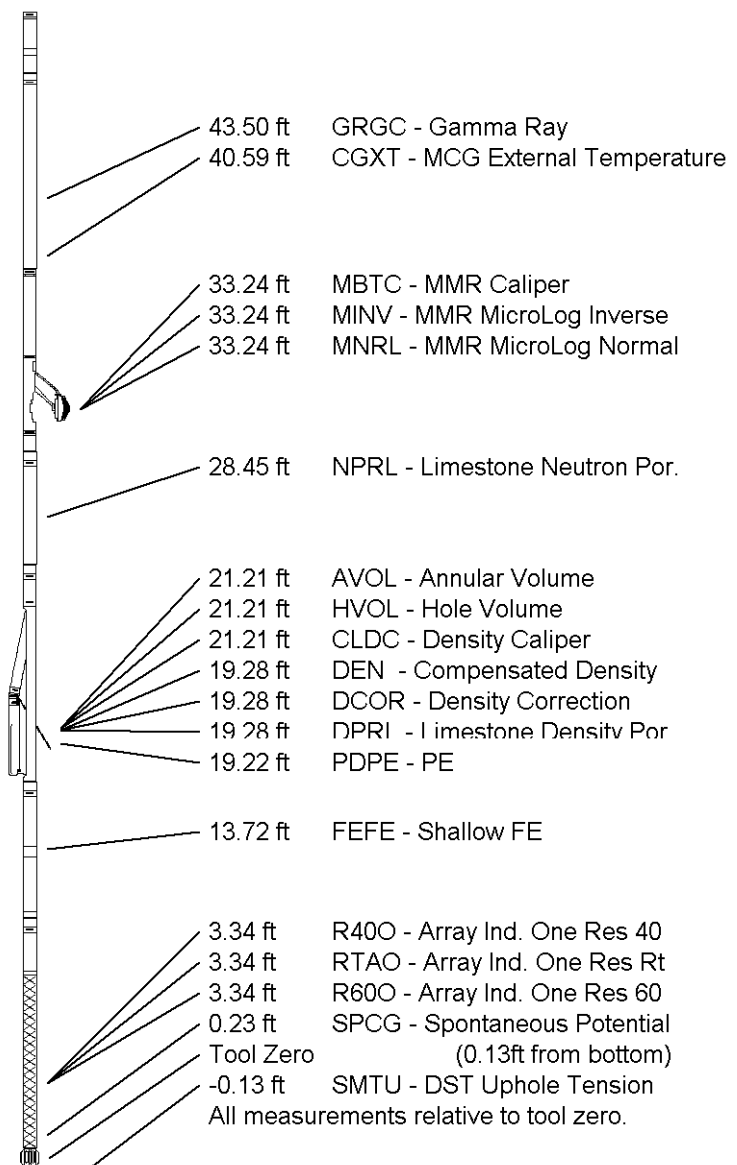
Compact Focussed Electric

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: 51.52 ft Weight: 410.1 lb



COMPANY

O'BRIEN ENERGY RESOURCES CORP.

WELL

VAIL #5-31

FIELD

NOVINGER EAST

PROVINCE/COUNTY

MEADE

PROVINCE/COUNTY MEADE
COUNTRY/STATE U.S.A. / KANSAS

Elevation Kelly Bushing	2683.00	feet	First Reading	6389.00	feet
Elevation Drill Floor	2682.00	feet	Depth Driller	6400.00	feet
Elevation Ground Level	2671.00	feet	Depth Logger	6408.00	feet



Weatherford®

COMPACT PHOTO DENSITY
COMPENSATED NEUTRON