

**Weatherford****CML MESSENGER SHUTTLE
COMPACT PHOTO DENSITY
COMPENSATED NEUTRON LOG**

COMPANY

WELL

FIELD

PROVINCE/COUNTY

COUNTRY/STATE

LOCATION

Sandridge Energy**Brothers 3119 1-6H****Six Moons****Comanche****U.S.A./Kansas****375' FNL & 1080' FWL**

SEC

7

TWP
31SRGE
19WOther Services
MAI

API Number

15-033-21690

Permit Number

Permanent Datum G.L., Elevation 2169 feet

Log Measured From KB

Drilling Measured From K.B. @ 19 feet

Date

10-MAR-2013

Run Number

one

Service Order

3540321

Depth Driller

10070.00

Depth Logger

10070.00

First Reading

10016.00

Last Reading

3500.00

Casing Driller

5572.00

Casing Logger

5572.00

Bit Size

6.125

Hole Fluid Type

WBM

Density / Viscosity

9.05 lb/USg

PH / Fluid Loss

9.50

Sample Source

flowline

Rm @ Measured Temp

0.94 @ 68.0

Rmf @ Measured Temp

0.75 @ 68.0

Rmc @ Measured Temp

1.13 @ 68.0

Source Rmf / Rmc

Calc

Rm @ BHT

0.50 @ 128.0

Time Since Circulation

1 hour

Max Recorded Temp

128.00

Equipment / Base

18077

Recorded By

Steven Tolley

Witnessed By

Maggie Roden

Elevations:
KB 2188.00
DF 2188.00
GL 2169.00**BOREHOLE RECORD**

Last Edited: 10-MAR-2013 11:16

Bit Size
inchesDepth From
feetDepth To
feet

8.750

0.00

5572.00

6.125

5572.00

10070.00

CASING RECORD

Type

Size
inchesDepth From
feetShoe Depth
feetWeight
pounds/ft

inter

7.000

0.00

5572.00

23.00

REMARKS

LOGGED WITH WLS 13.04.8492

LOGGED USING MESSENGER SHUTTLE METHOD OF DEPLOYMENT

TOOLS RAN: SRT-69,,200V MBS-114,MMSE133,MTI-076, MGS-142,MCL-063,SKJ-472,SHA-438,MIS-608, MDN-391, MPD-394,MIS-607, SHA-167, SKJ-479,, MAI-170 RAN IN COMBINATION

HARDWARE: MAI: MIS-B 0.5" STANDOFF USED ABOVE MAI, ISA STAND-OFF RAN BELOW MAI

MFE: MIS-B 0.5" STANDOFF USED ABOVE MFE

MDN: MIS-A DOUBLE BOWSPRING USED ABOVE MDN.

MPD: 4INCH PROFILE PLATE USED, MIS-A SINGLE BOWSPRING USED BELOW MPD

2.71 G/CC DENSITY MATRIX USED TO CALCULATE POROSITY

ALL INTERVALS LOGGED AND SCALED PER CUSTOMER'S REQUEST

DRILL PIPE DEPTH DURING DEPLOYMENT: 9970

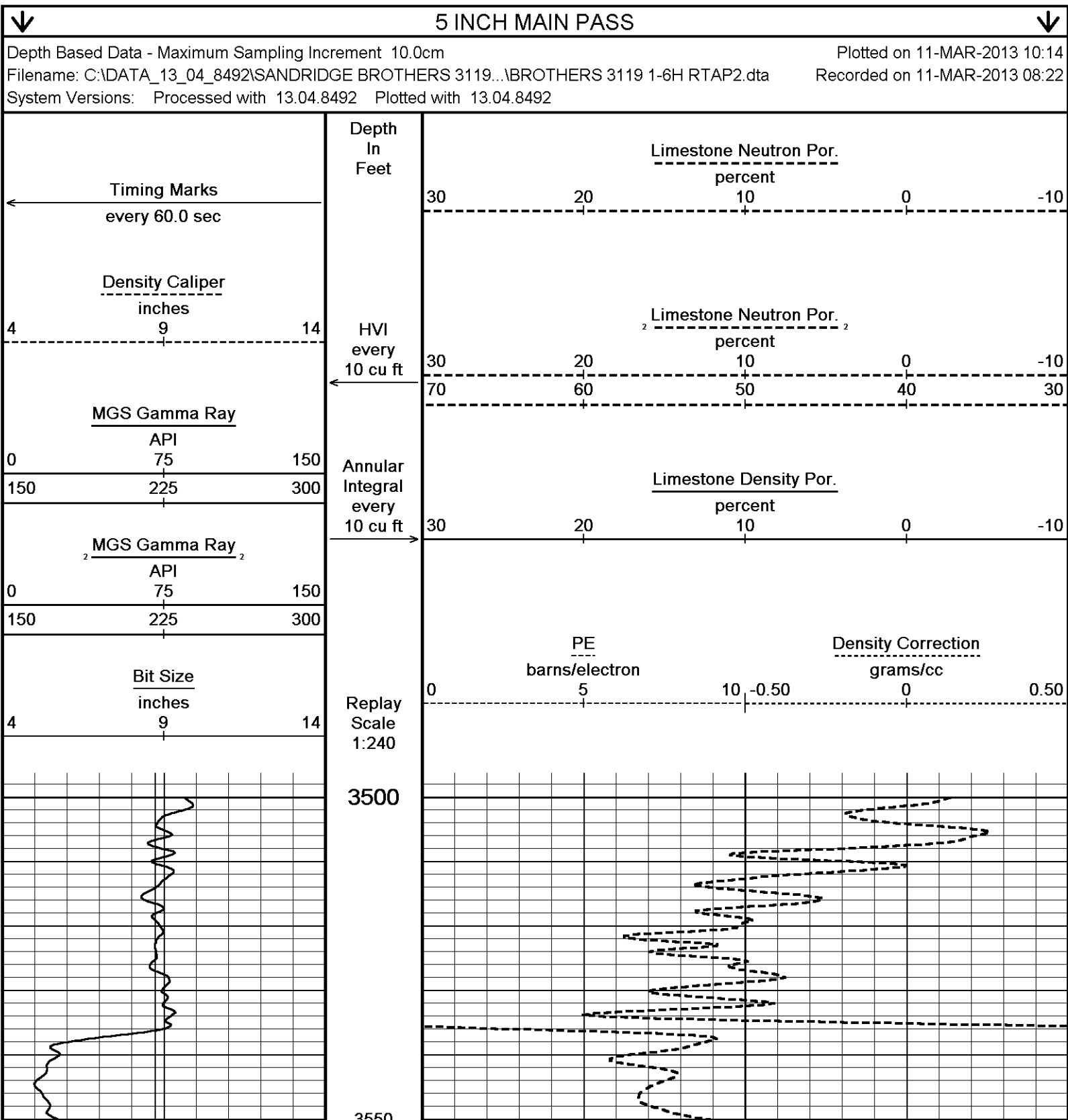
DRILL PIPE DEPTH AFTER DEPLOYMENT: 5570
LOGGING TOOL DEPTH AFTER DEPLOYMENT: 10050

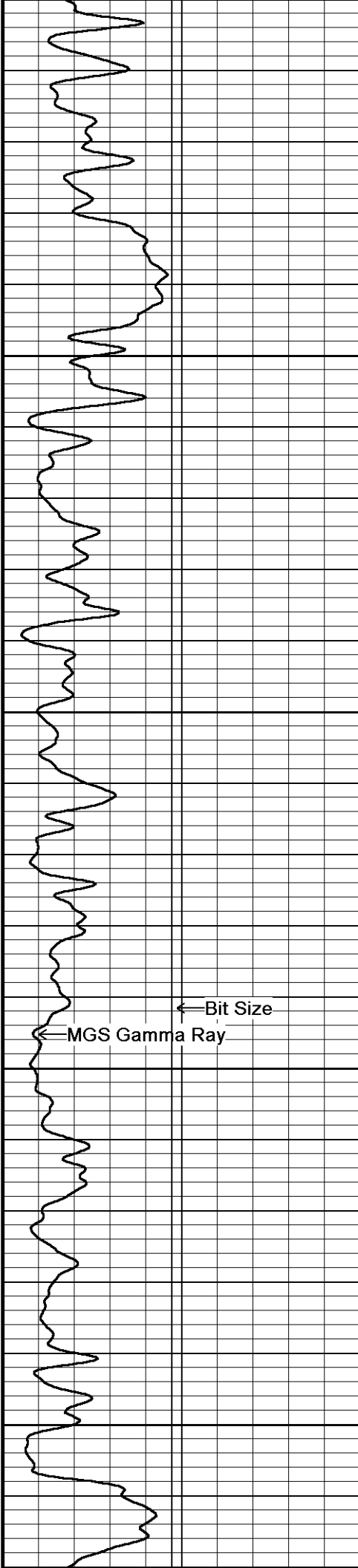
OPERATORS: CRAIG ALEXANDER AND BRIAN BALINAGER

RIG: LARIAT #41

LOG RESPONSES EFFECTED BY HOLE RUGOSITY

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.





3550

3600

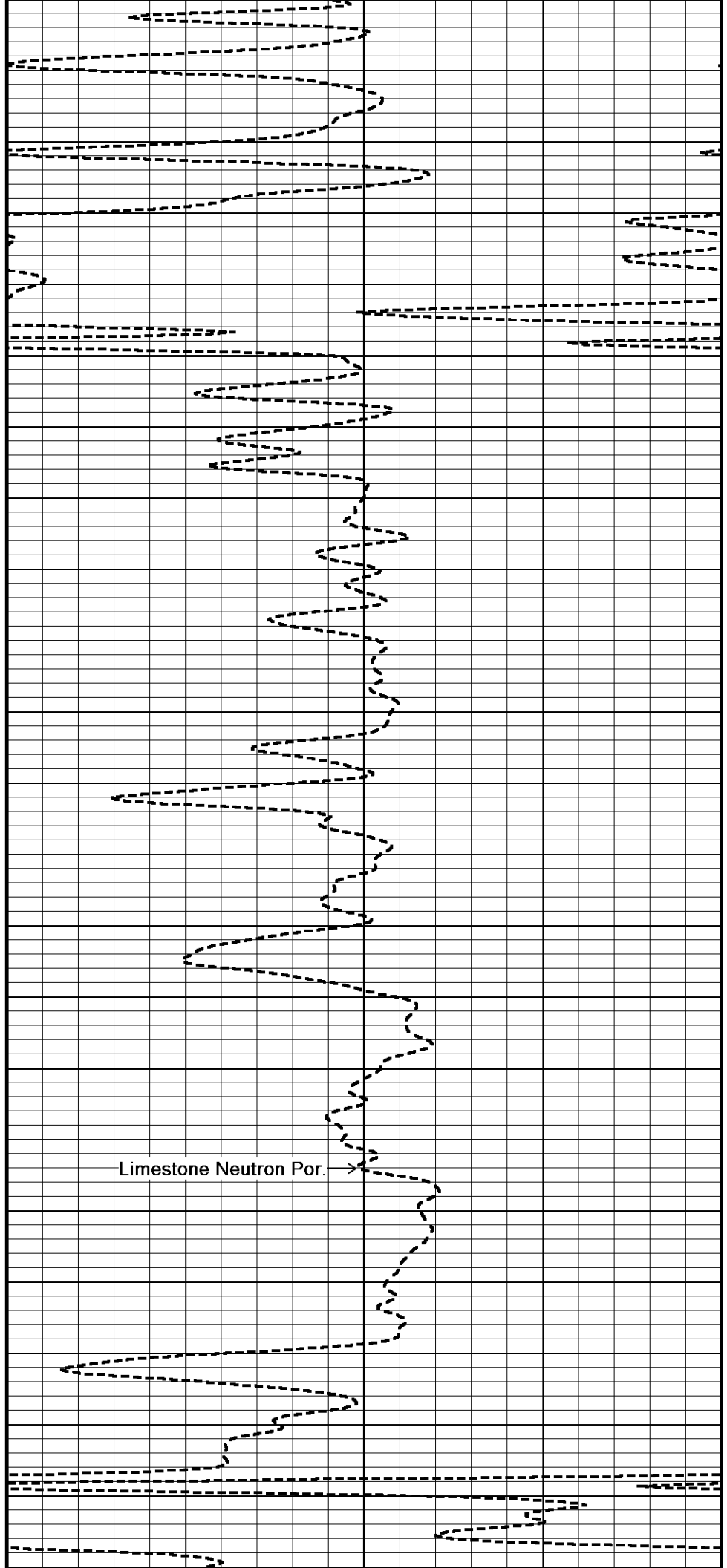
3650

3700

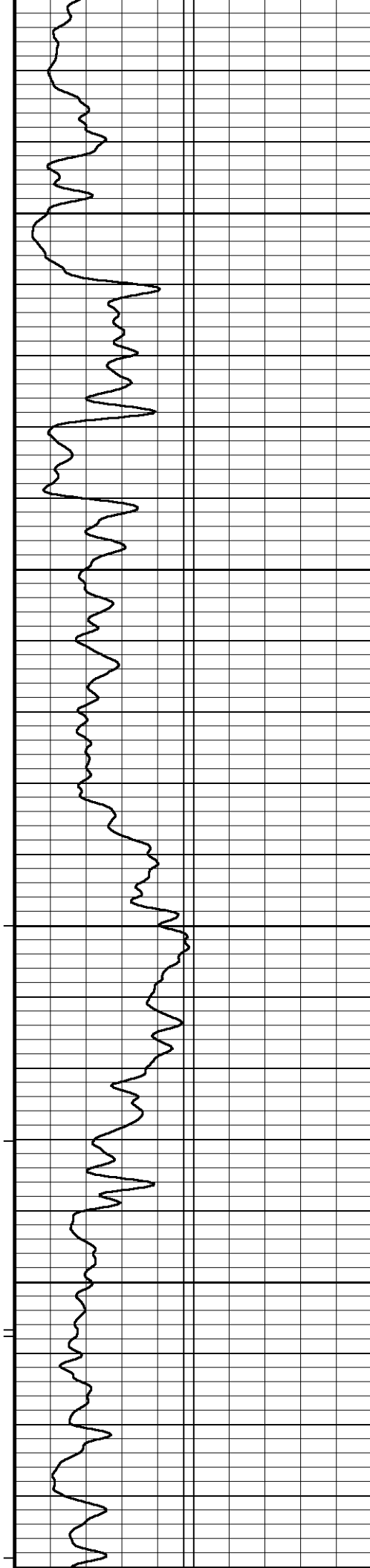
3750

← Bit Size

← MGS Gamma Ray



Limestone Neutron Por.

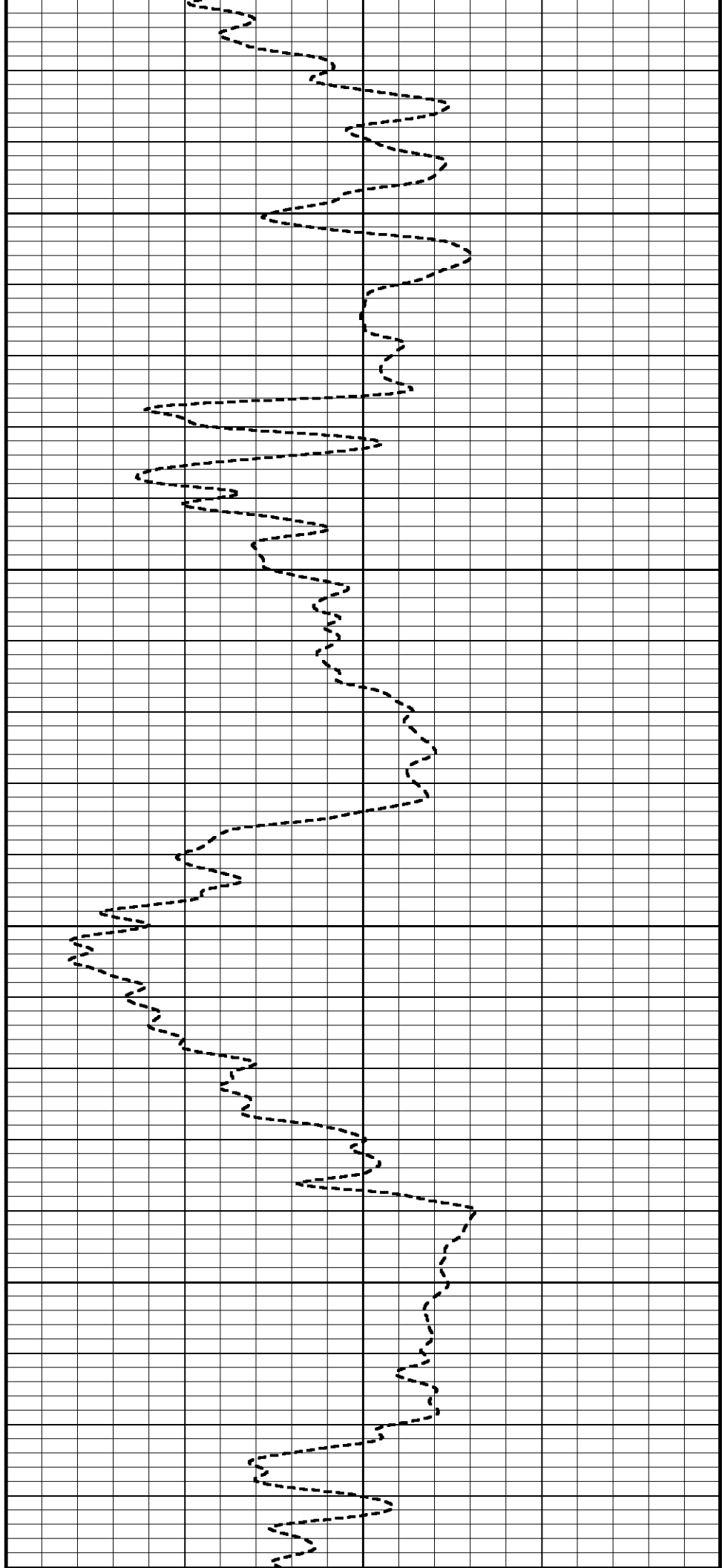


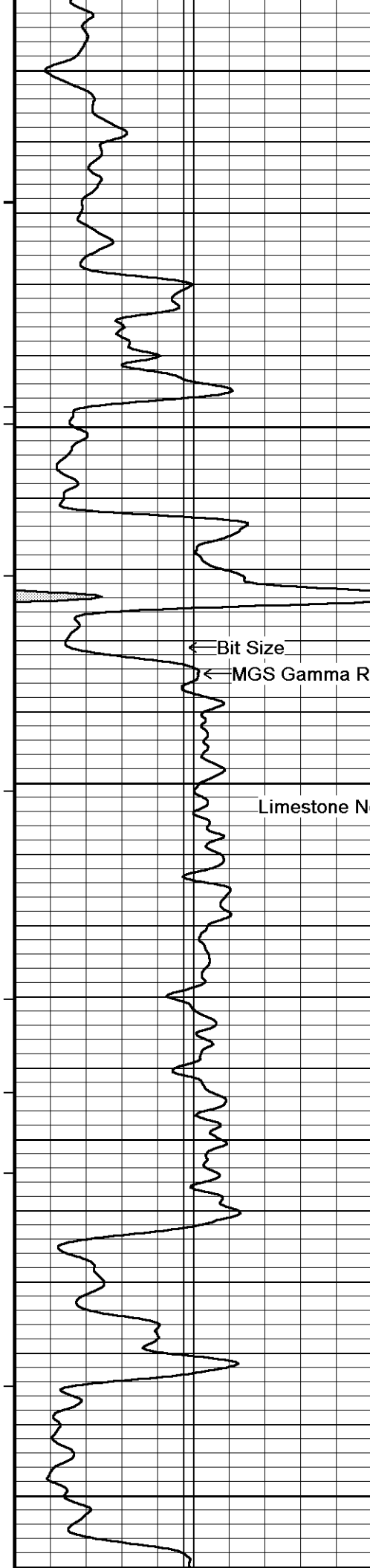
3800

3850

3900

3950





4000

4050

4100

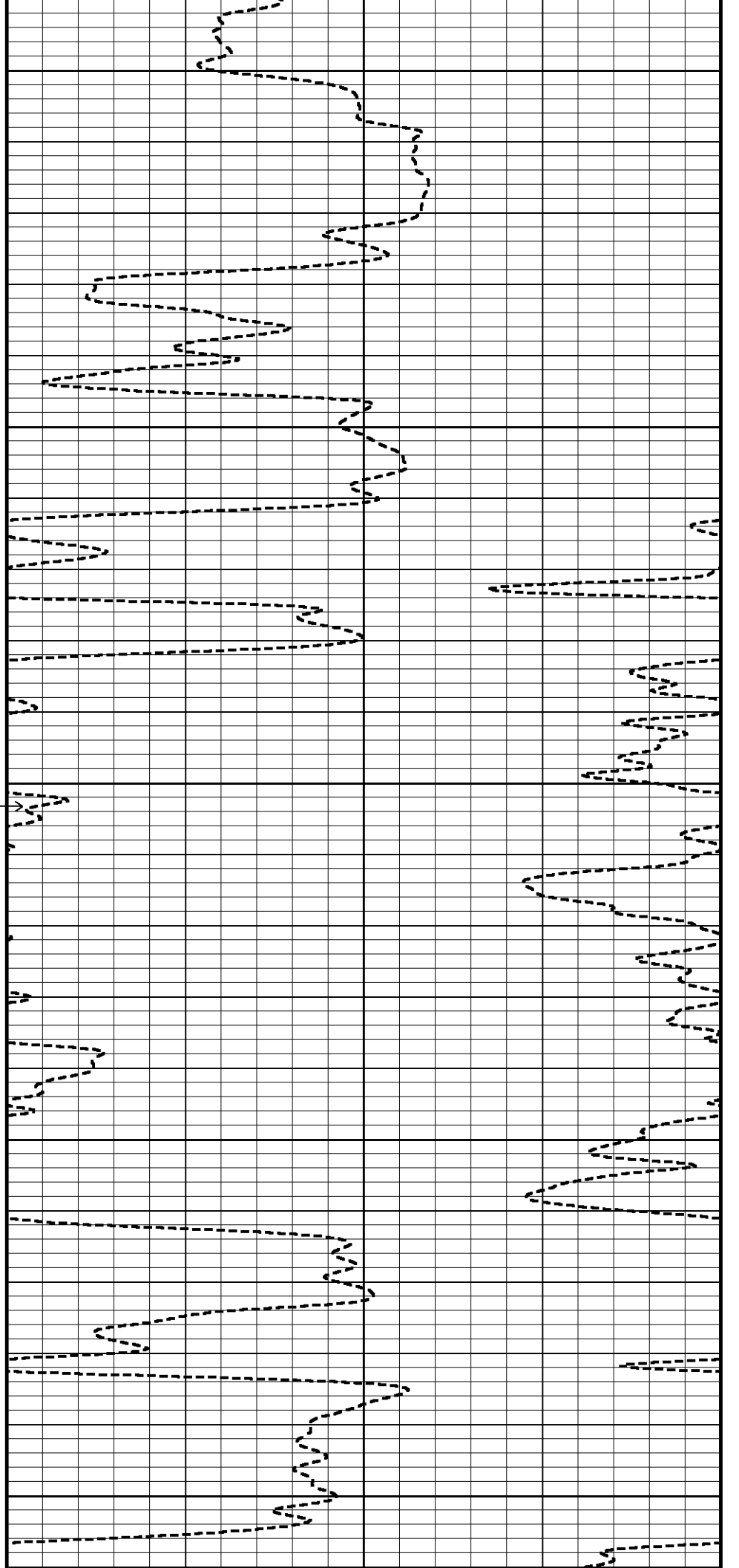
4150

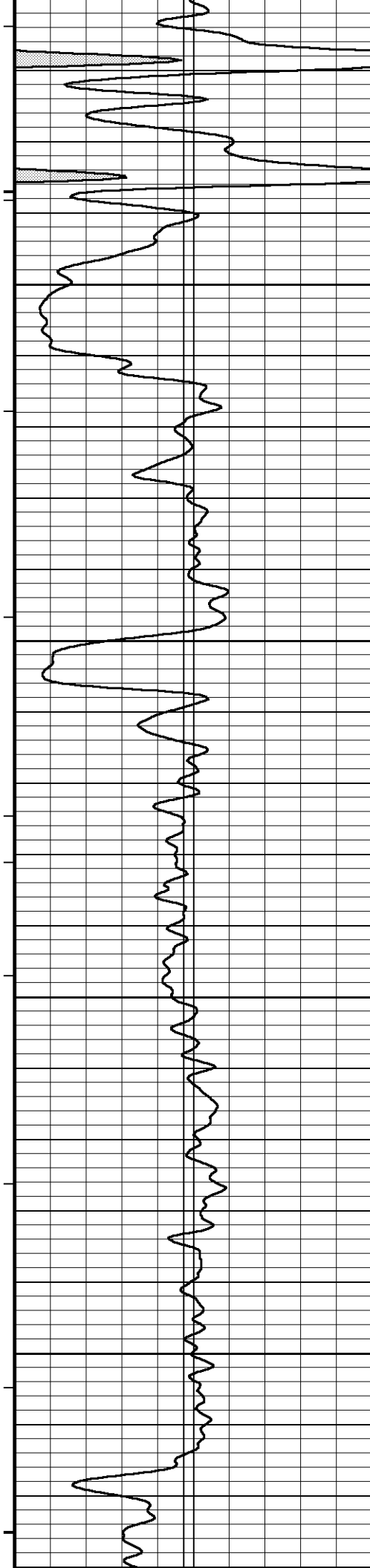
4200

← Bit Size

← MGS Gamma Ray

Limestone Neutron Por.



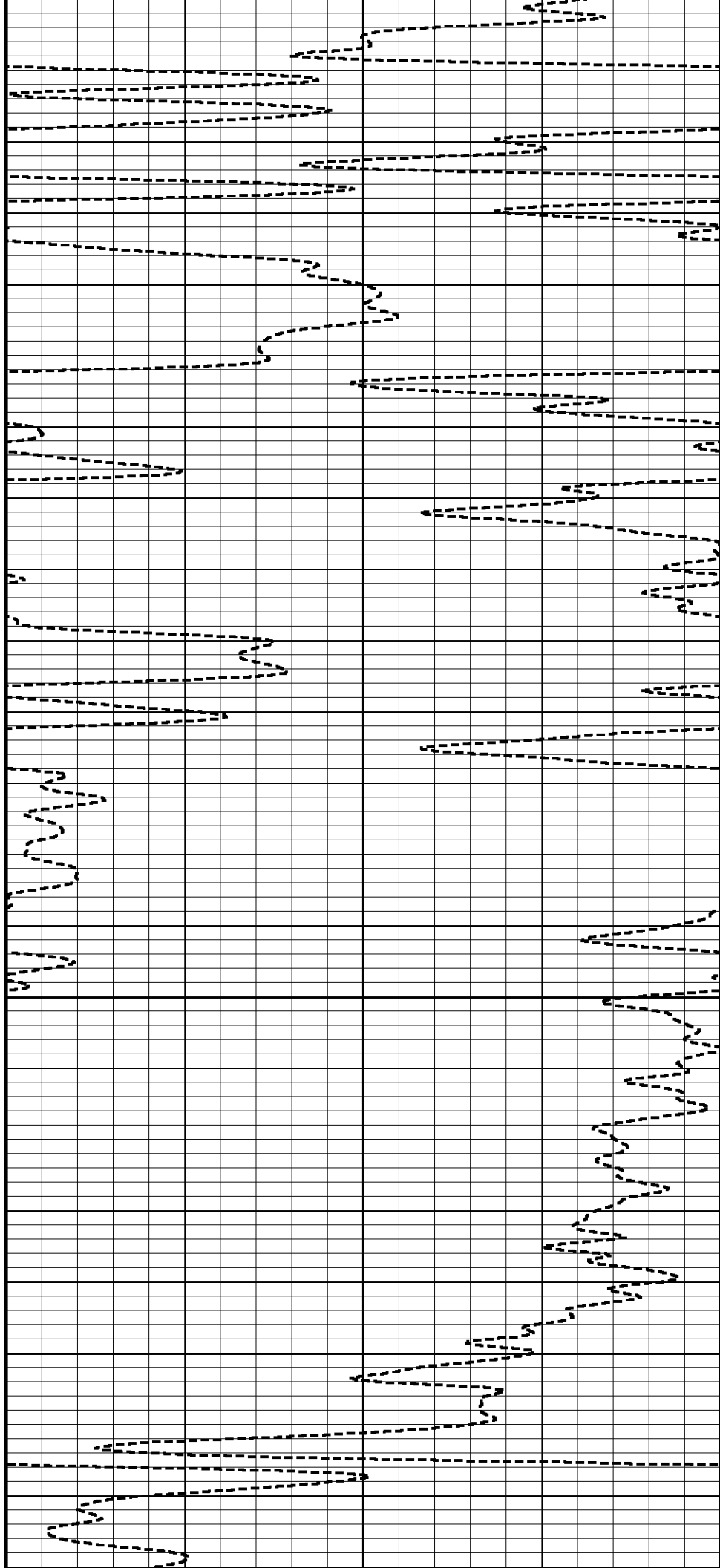


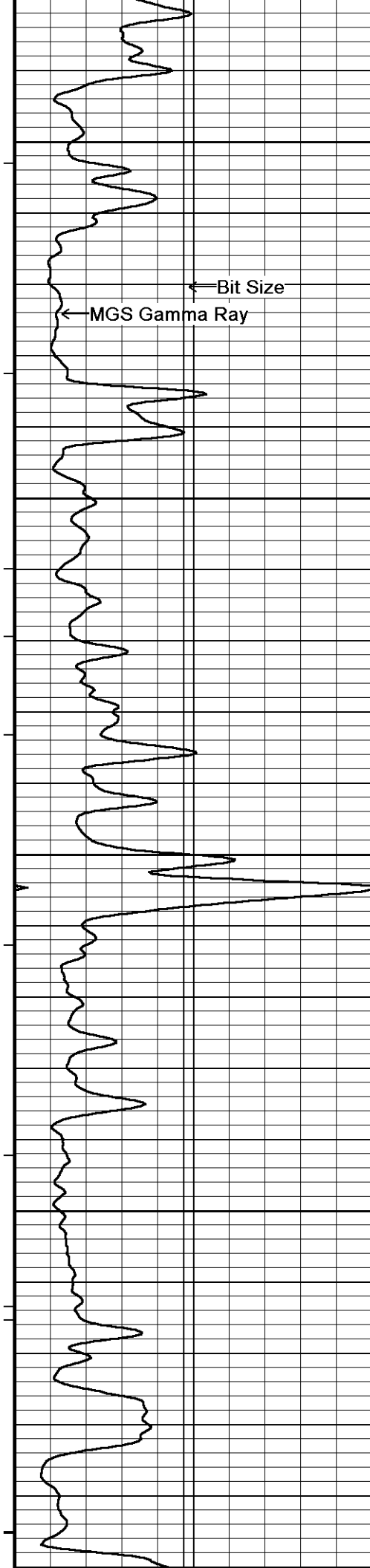
4250

4300

4350

4400





4450

4500

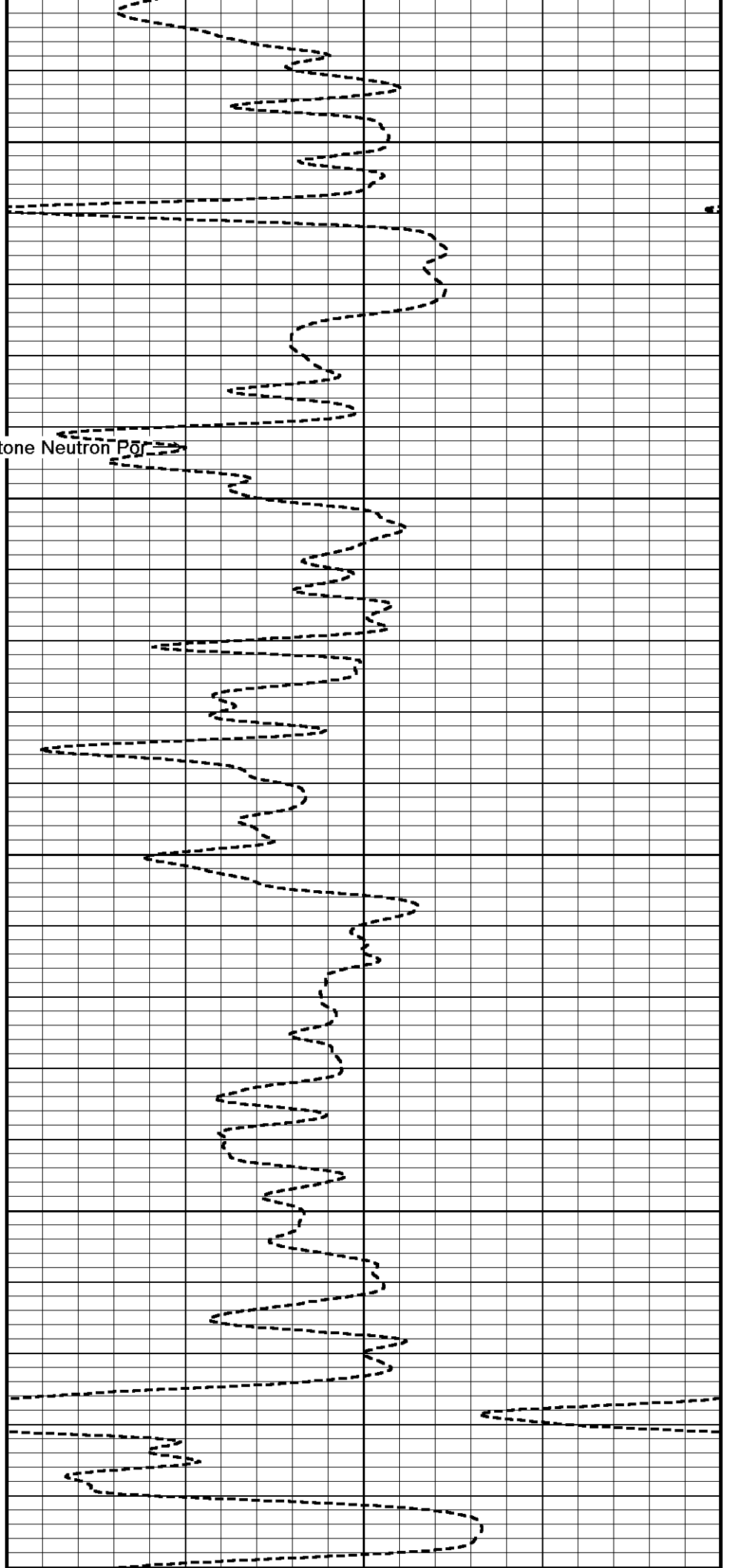
4550

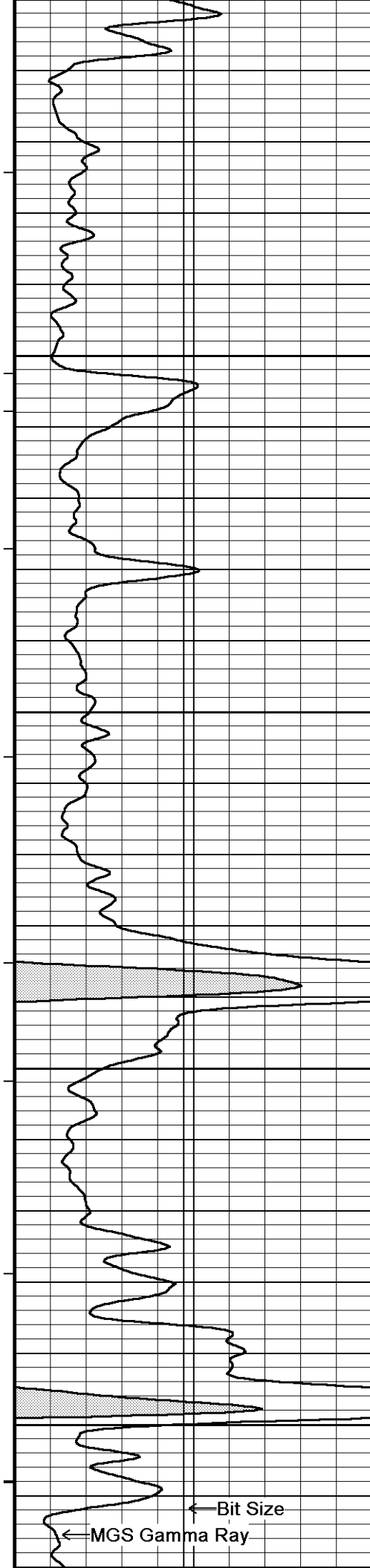
4600

4650

← Bit Size
← MGS Gamma Ray

Limestone Neutron Porosity





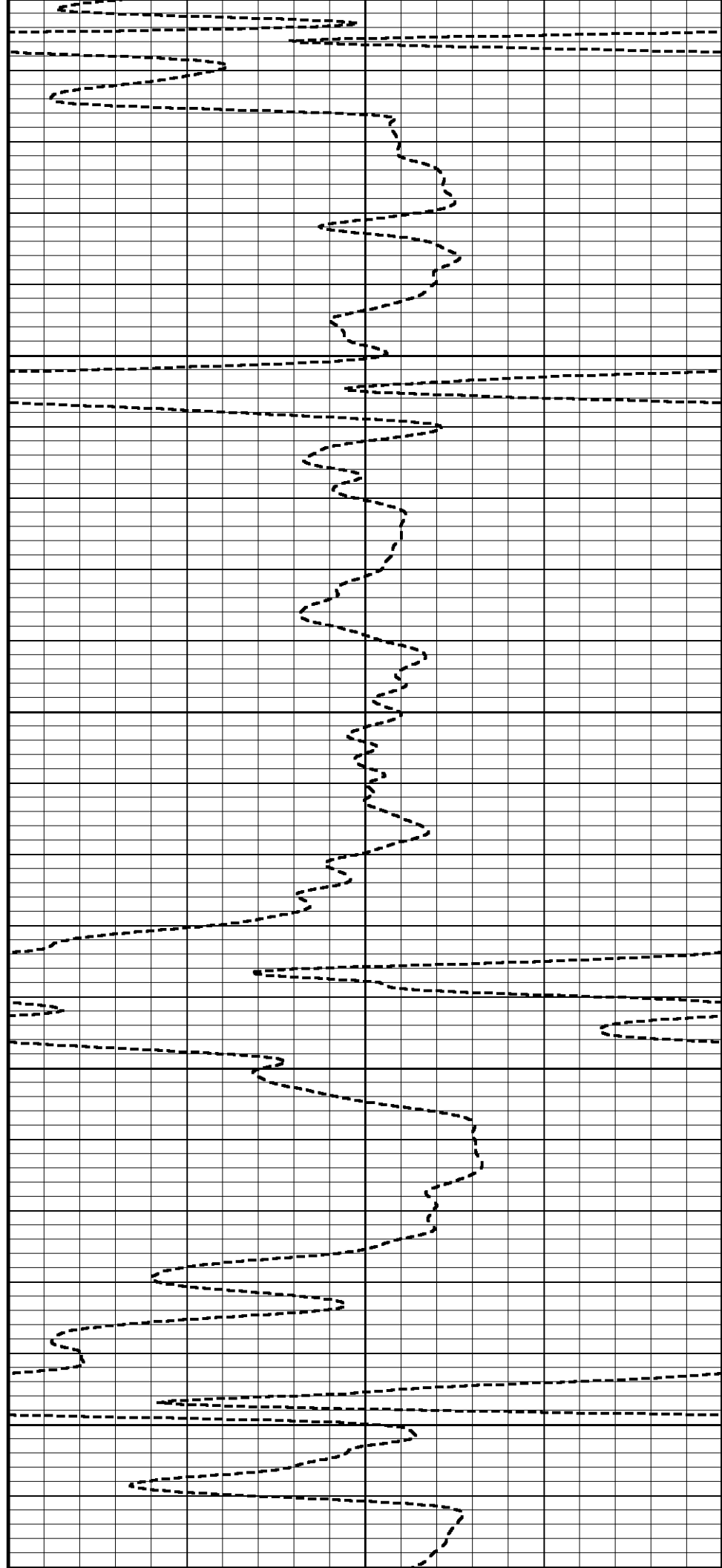
4650

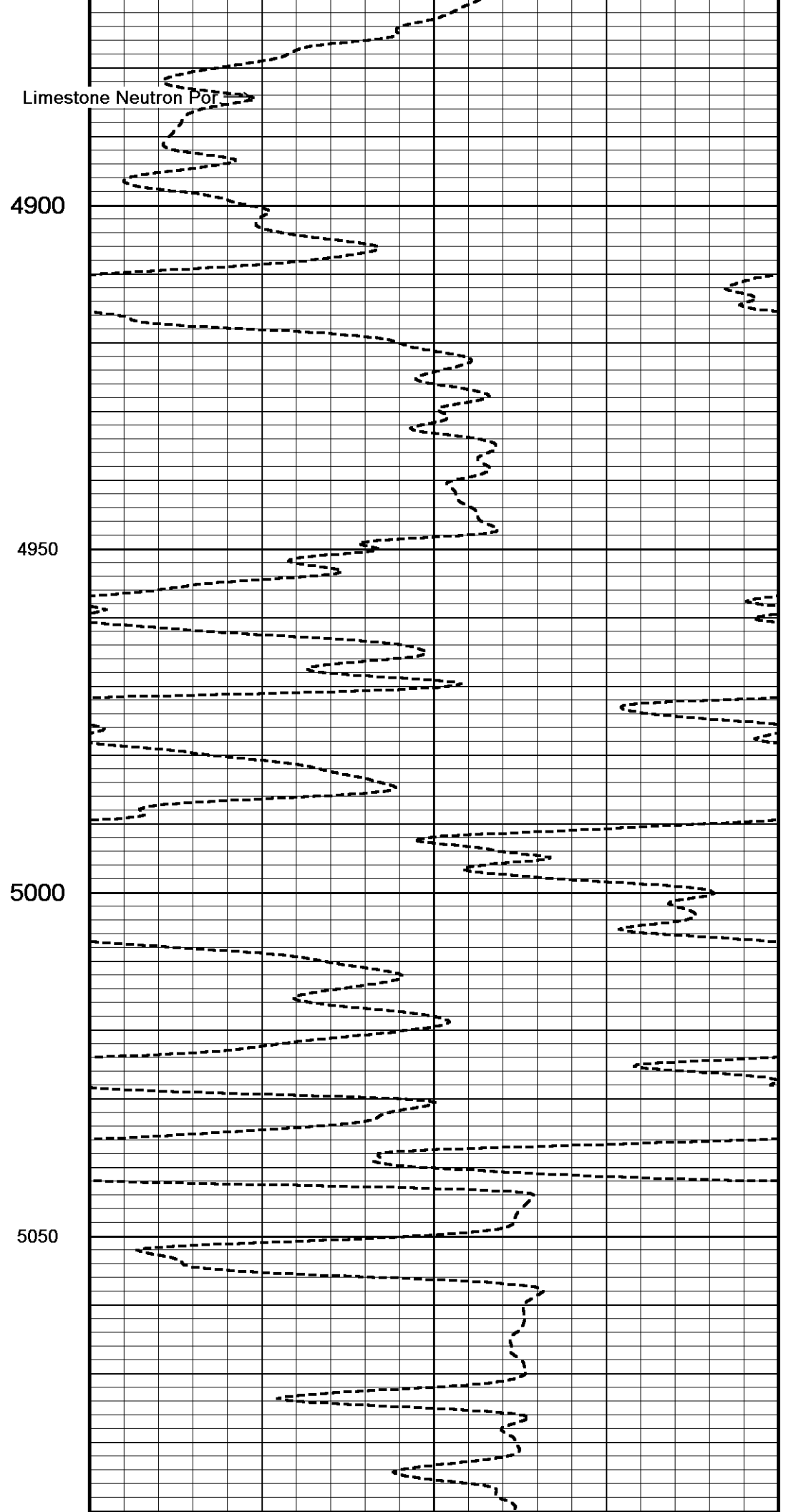
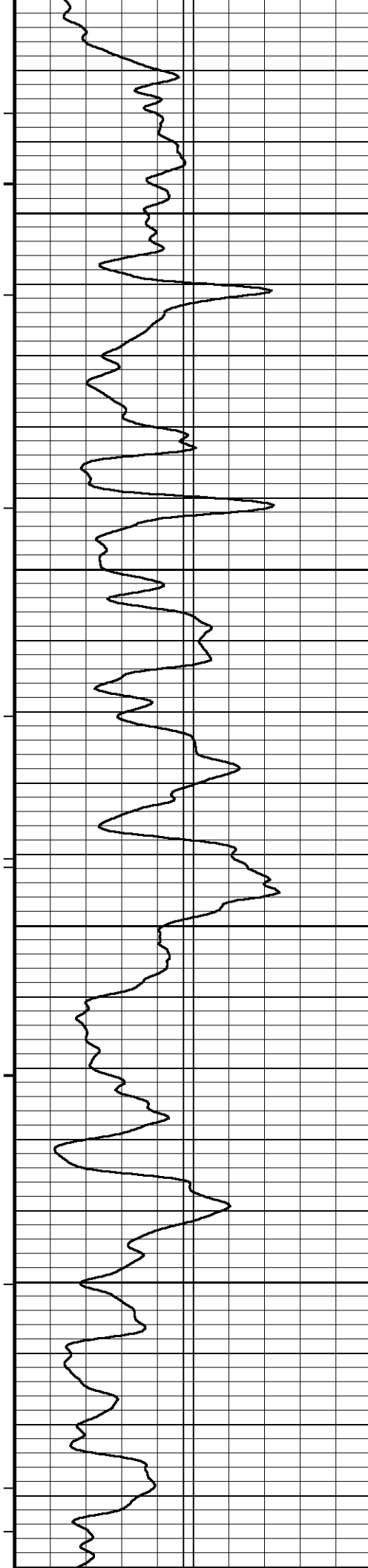
4700

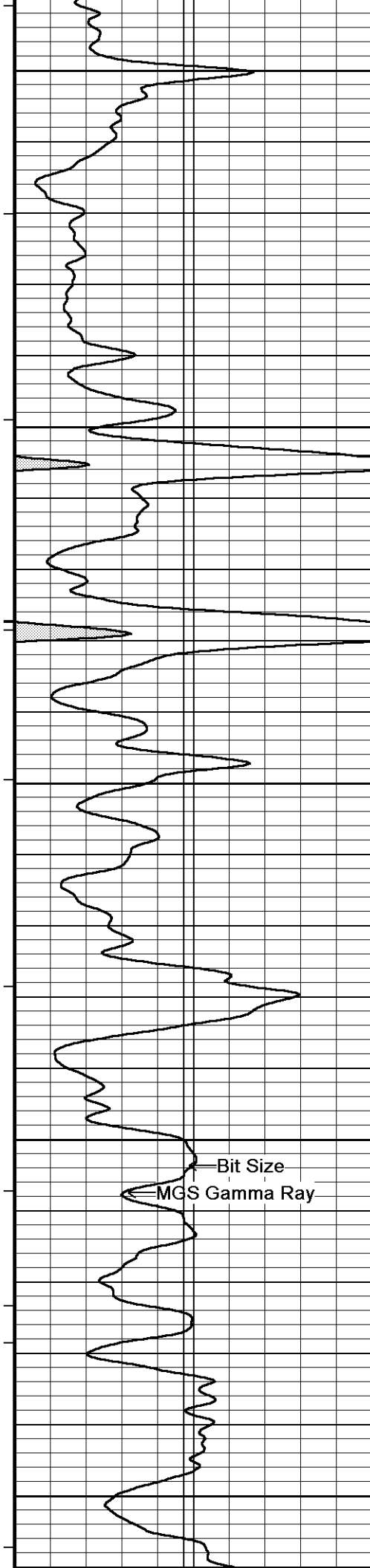
4750

4800

4850







5100

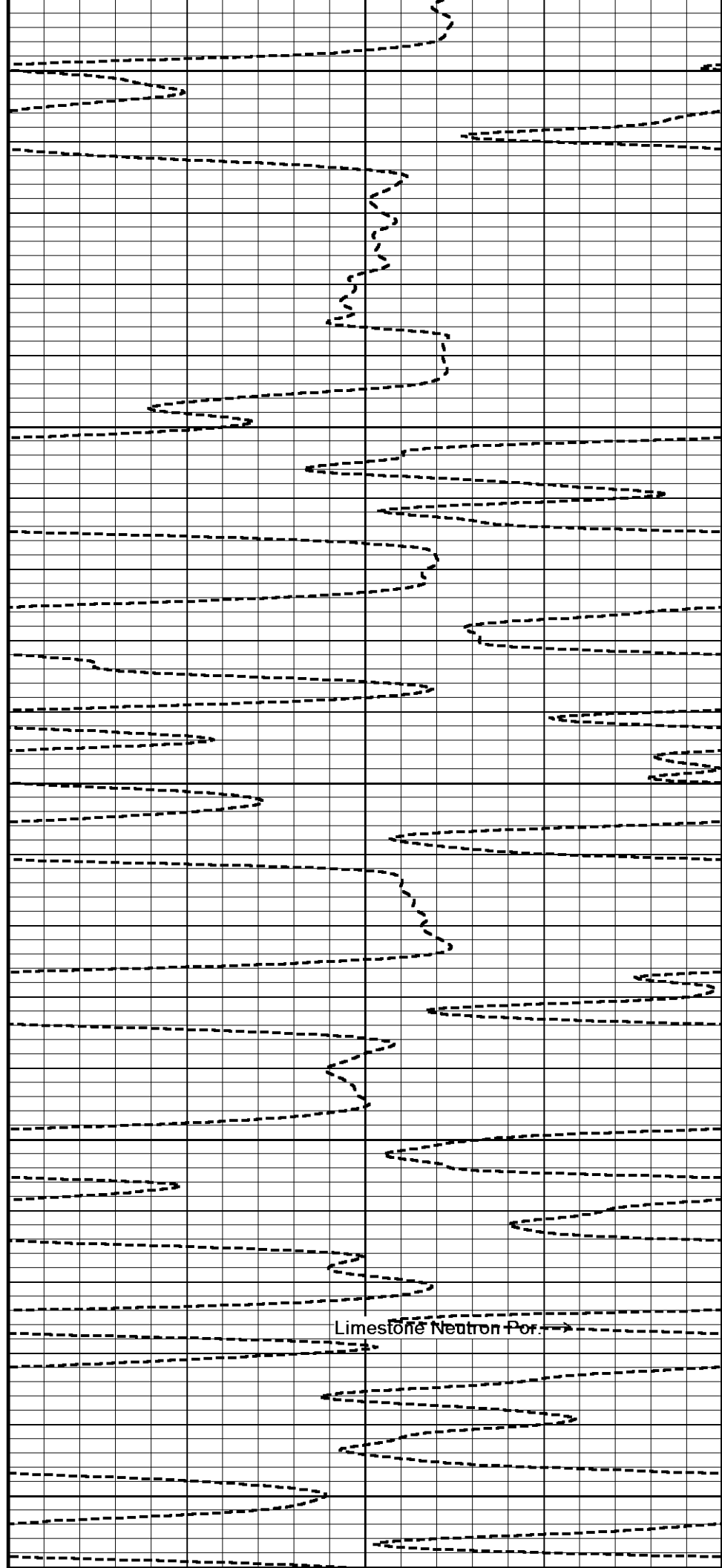
5150

5200

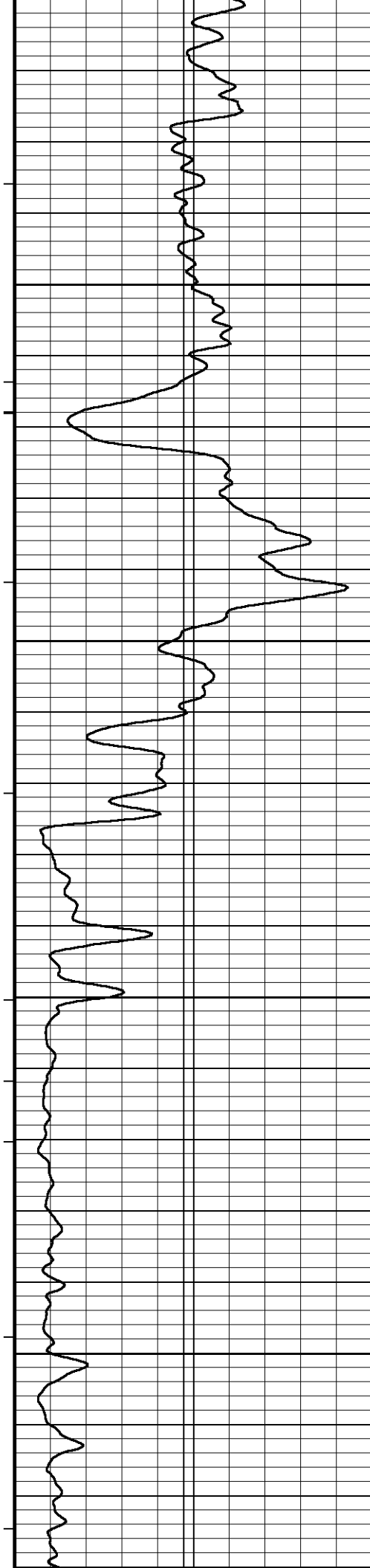
5250

5300

Bit Size
MGS Gamma Ray



Limestone Neutron Por.

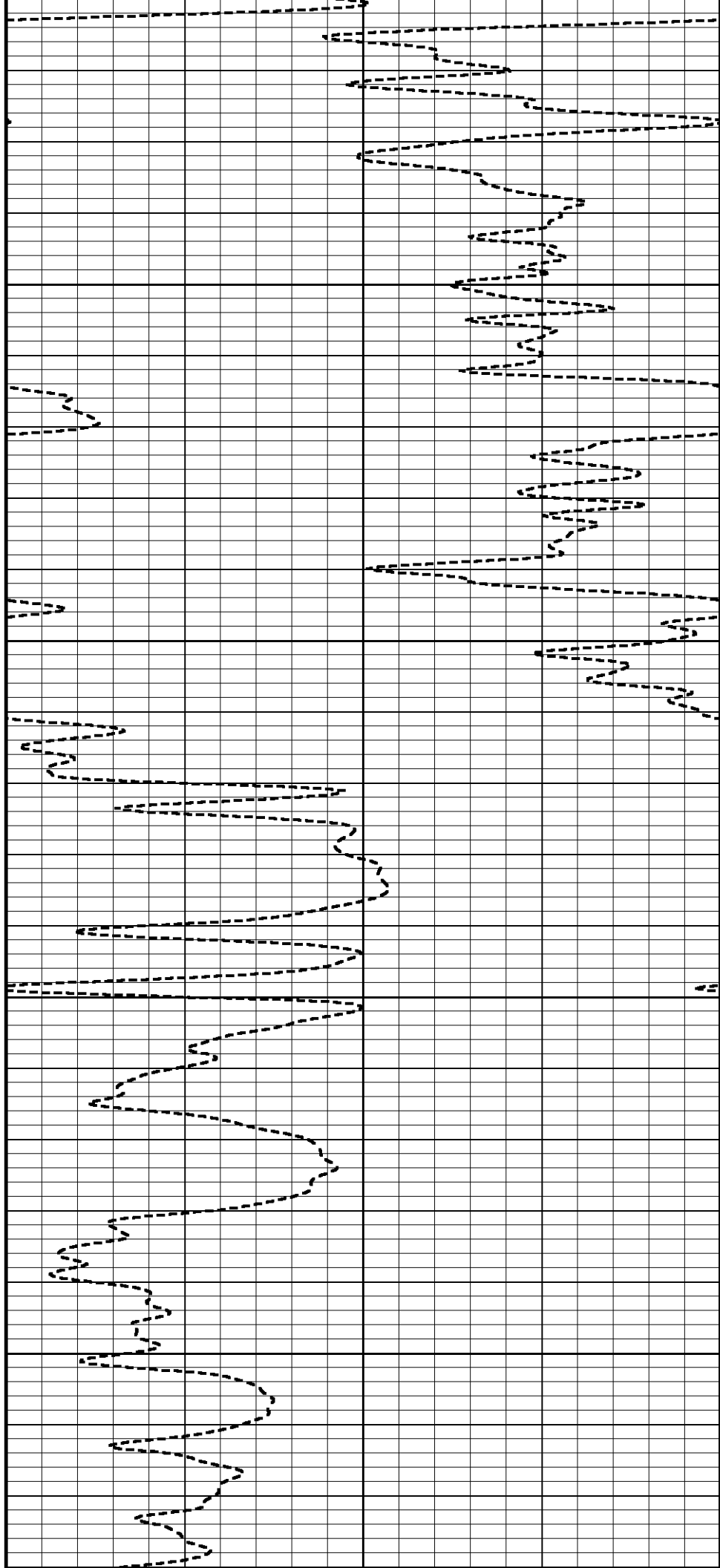


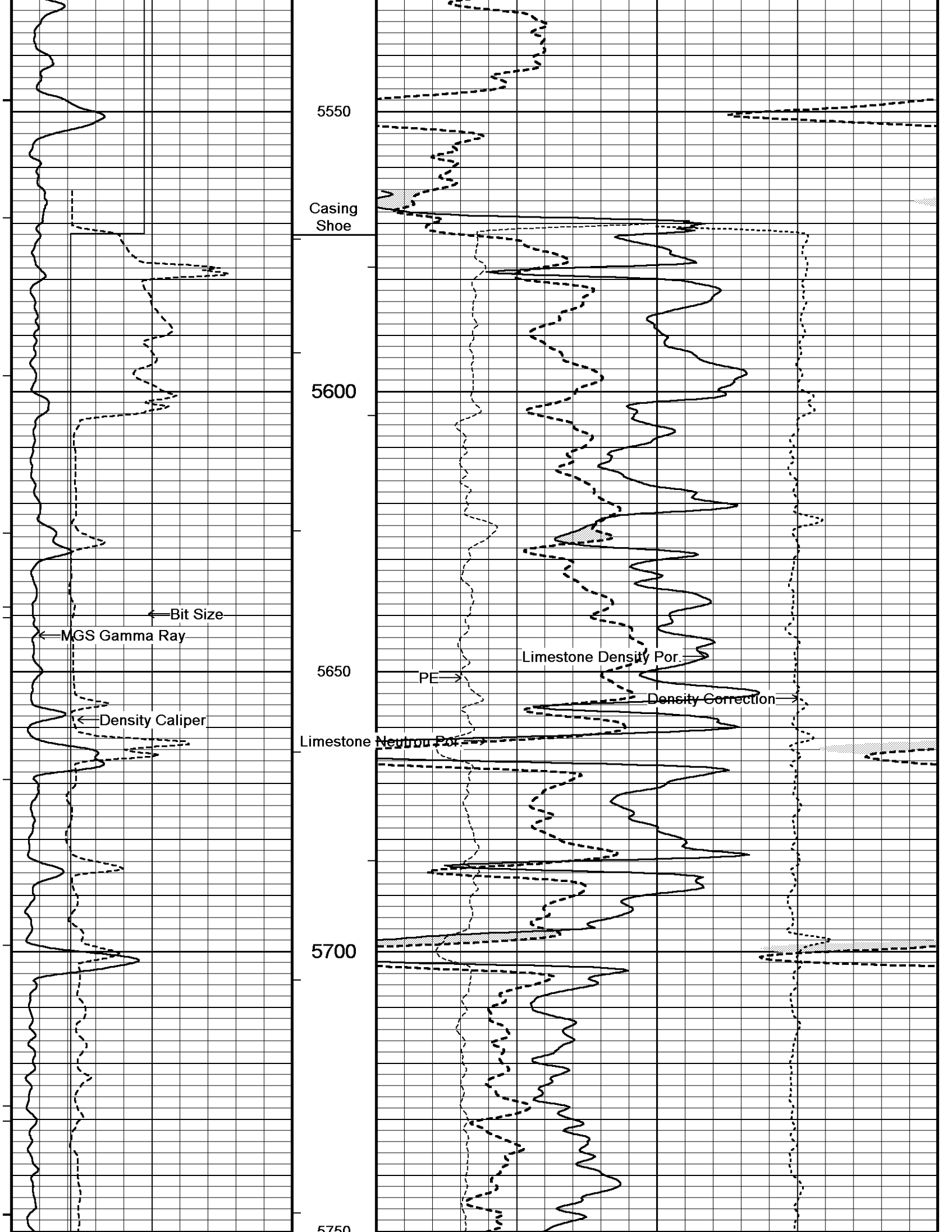
5350

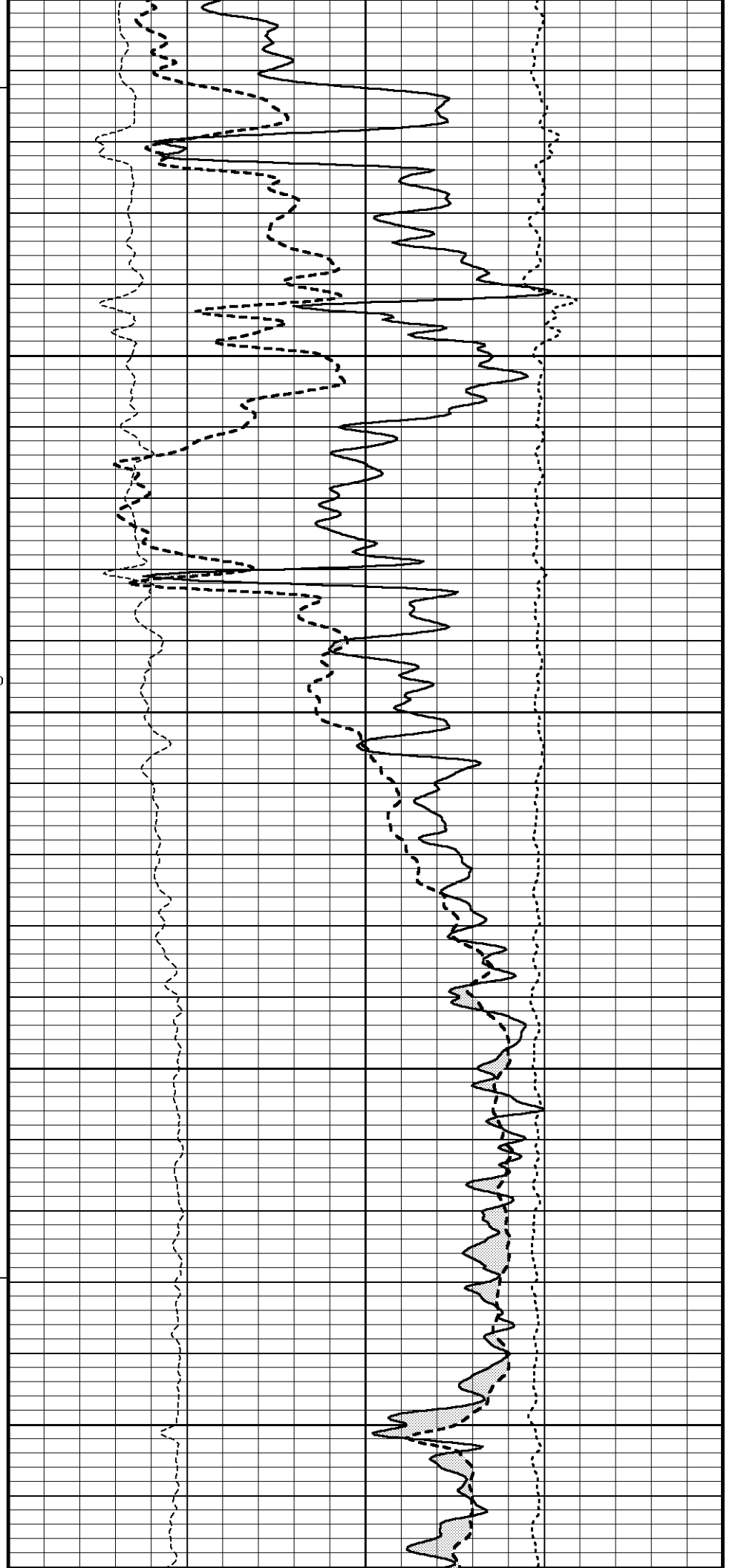
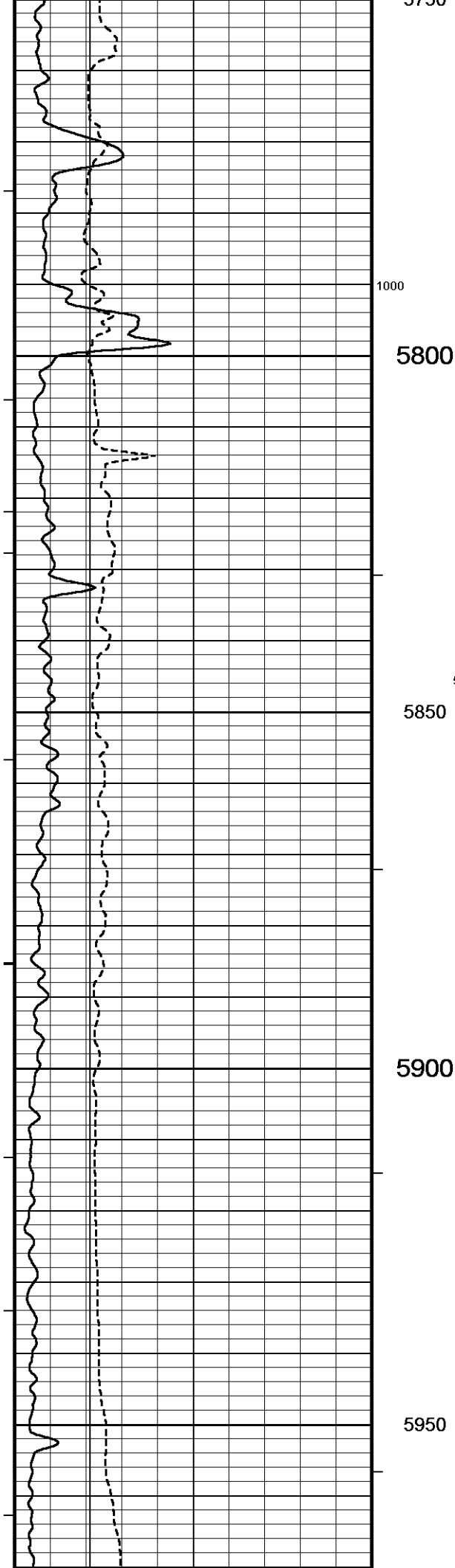
5400

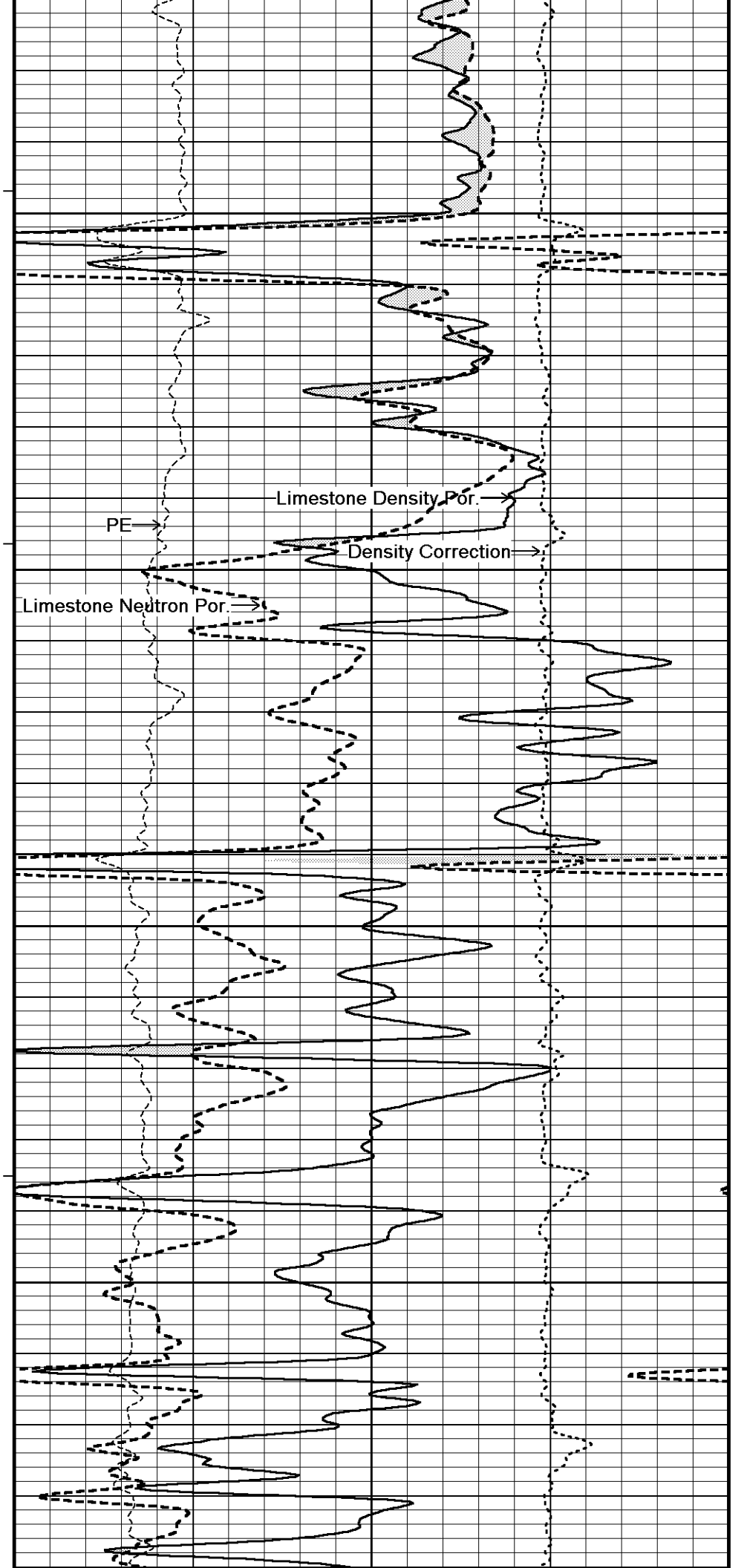
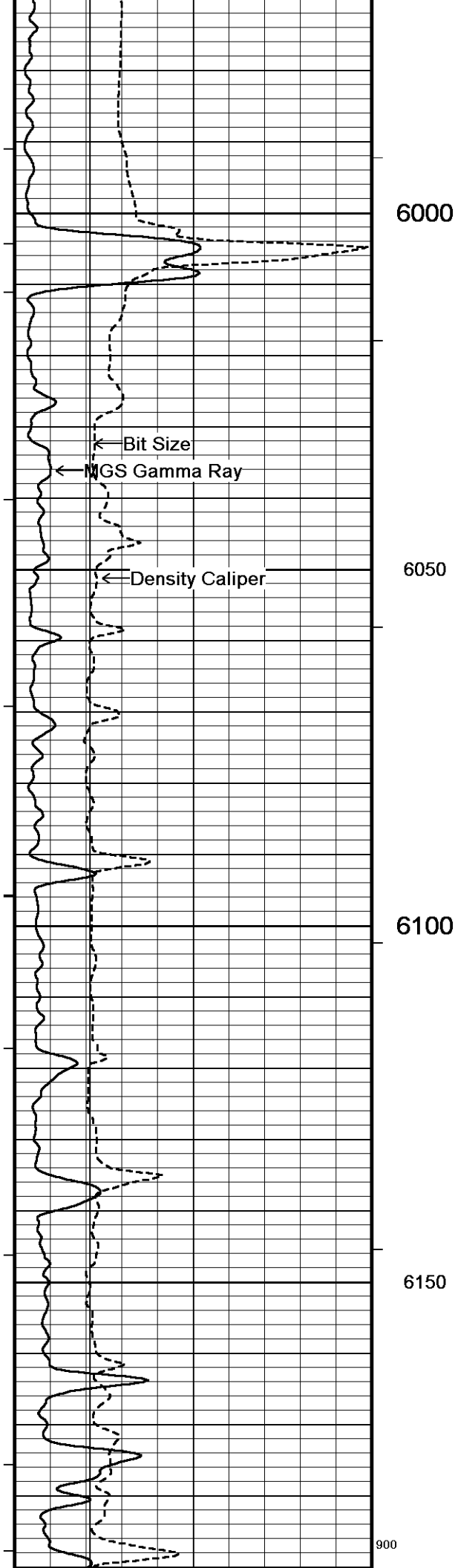
5450

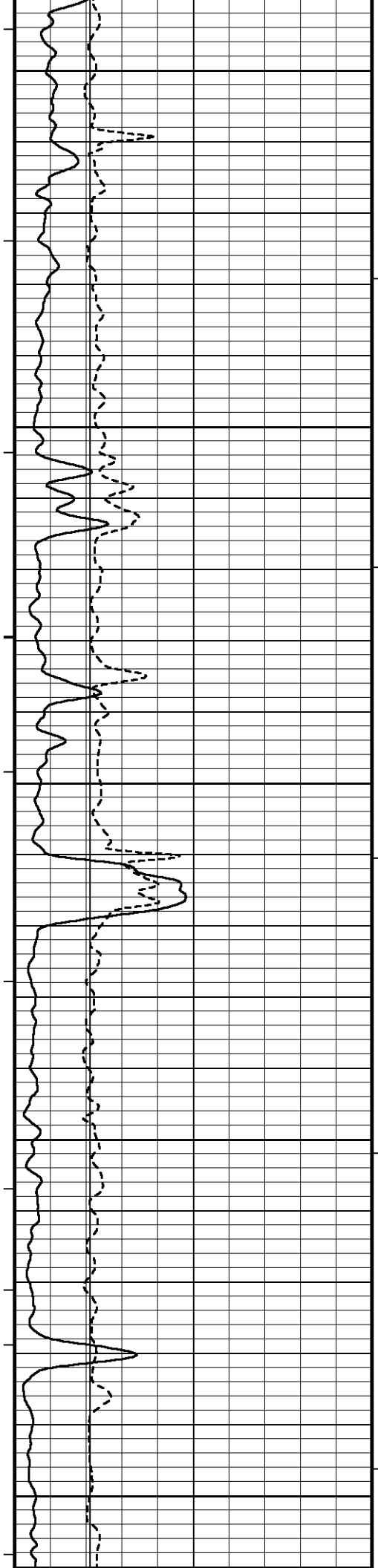
5500











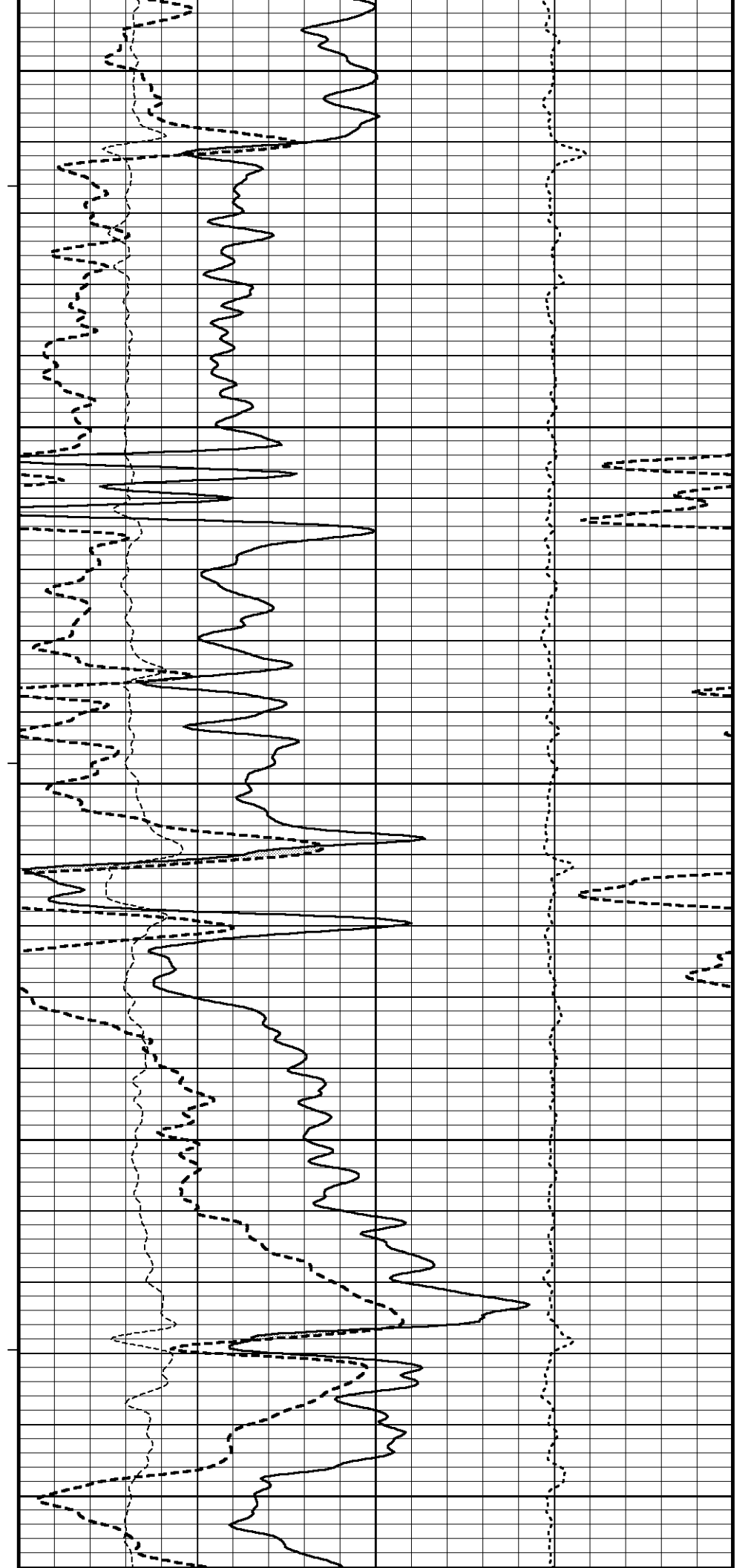
6200

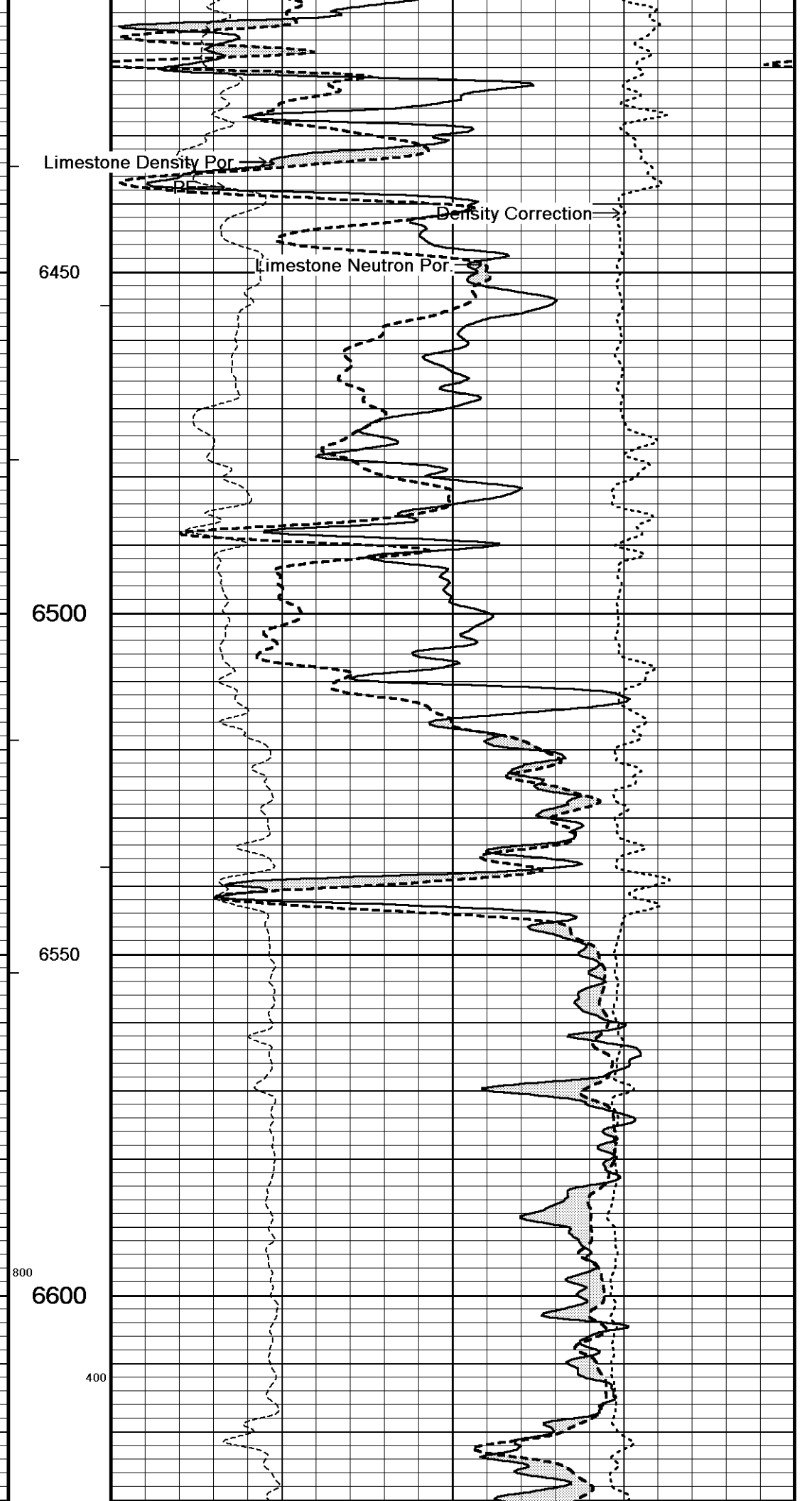
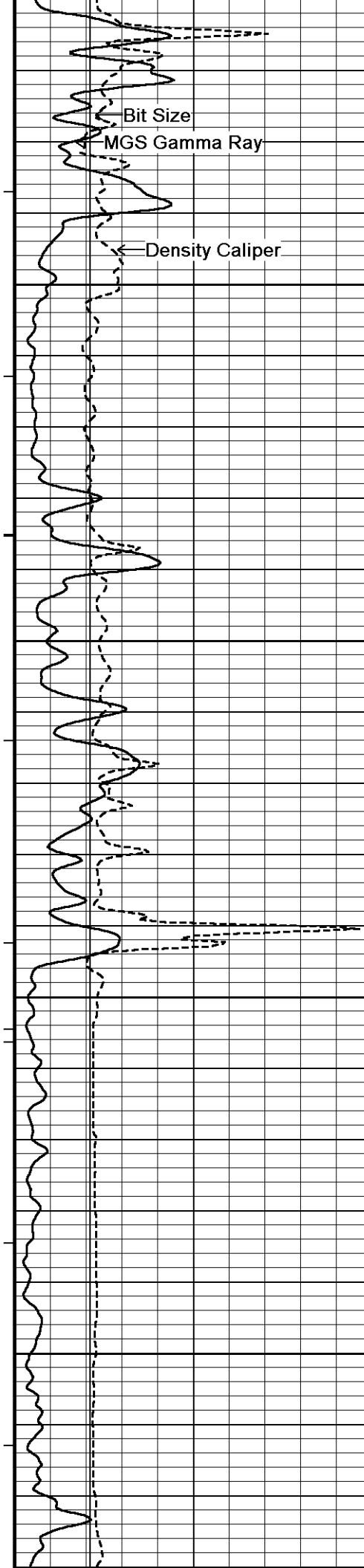
6250

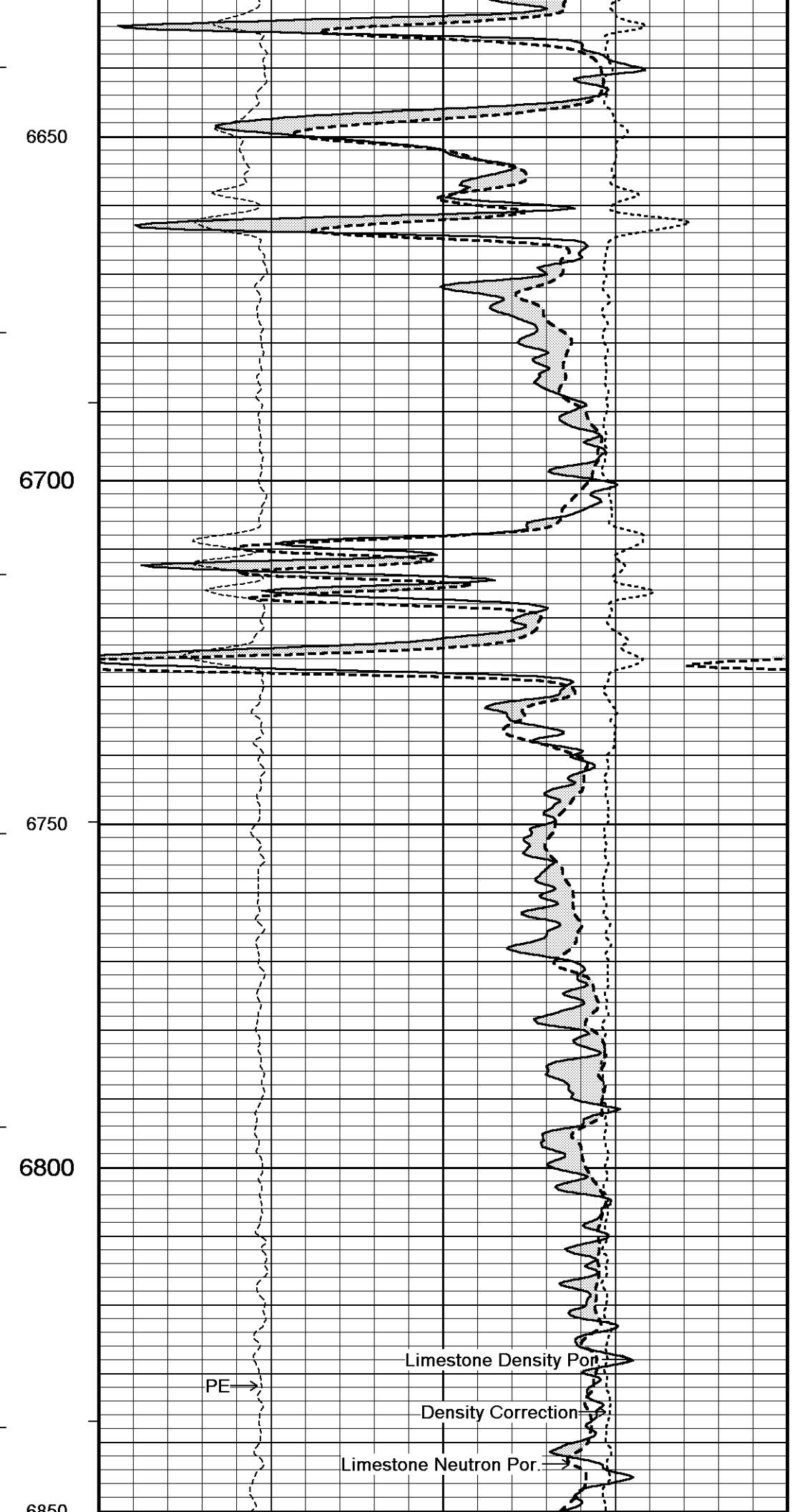
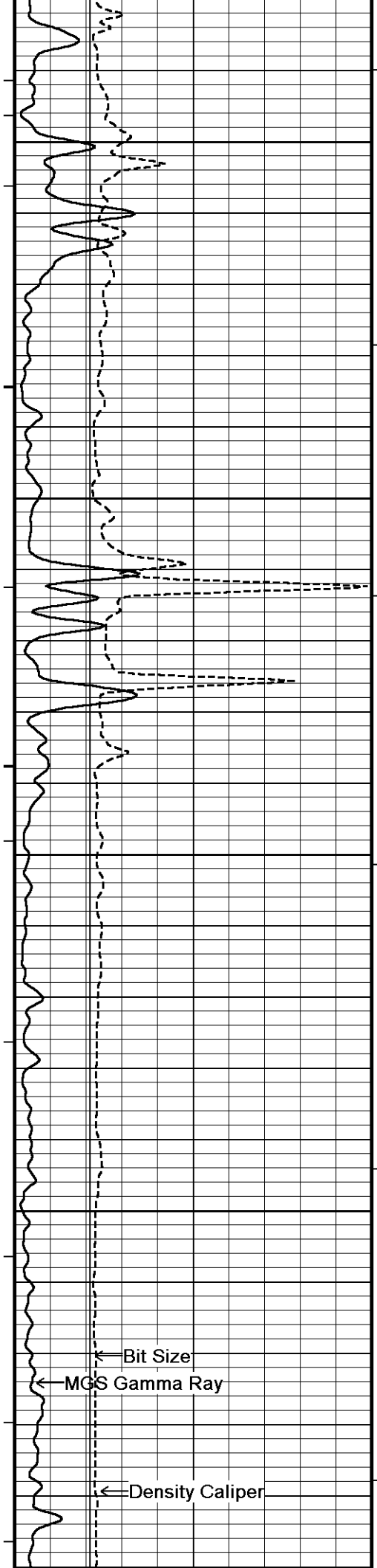
6300

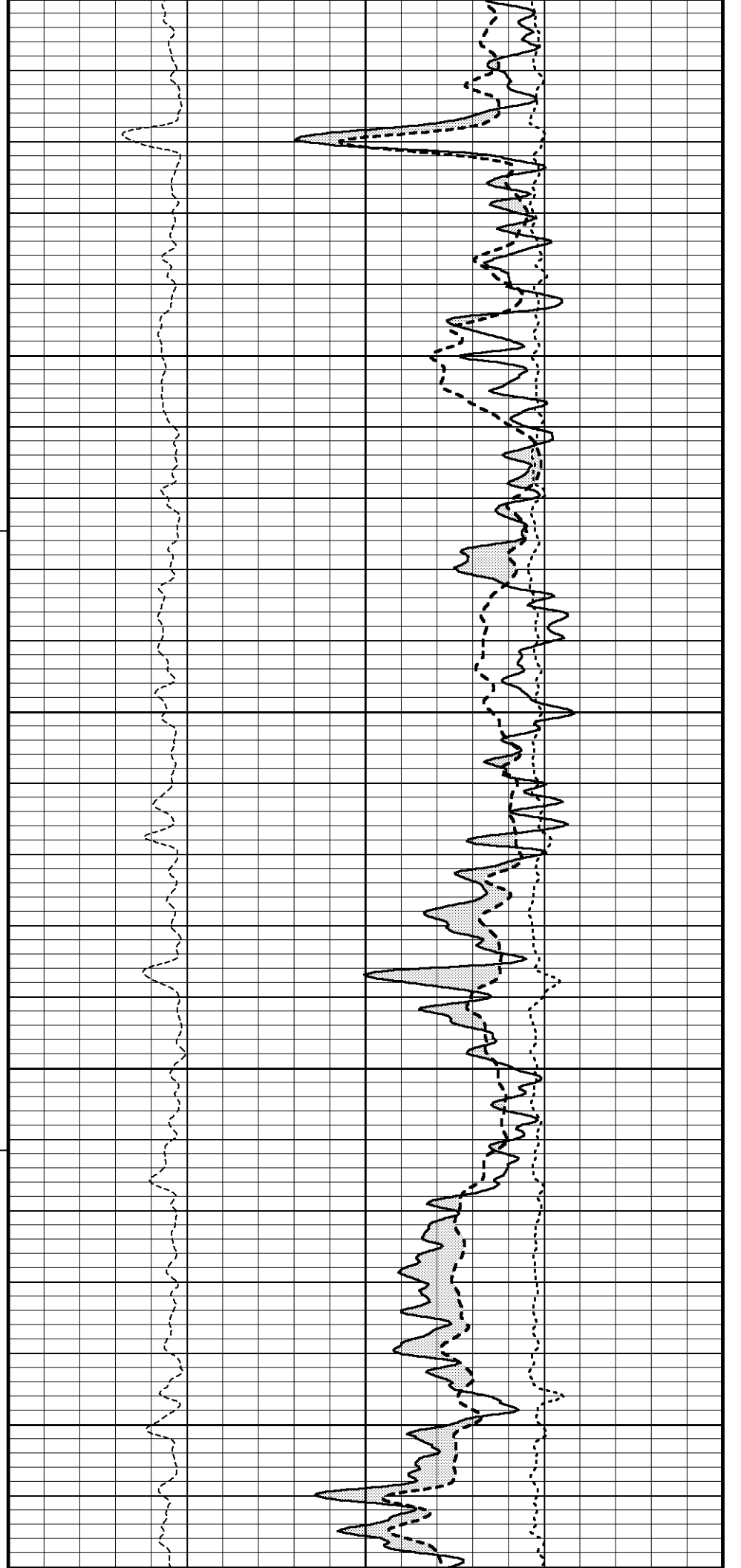
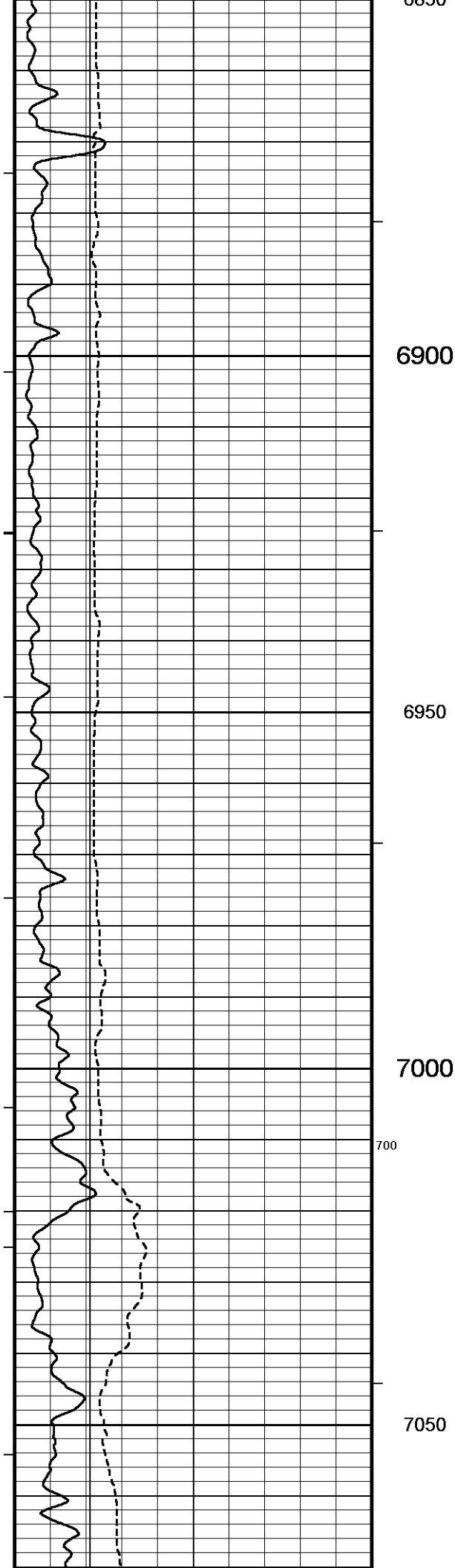
6350

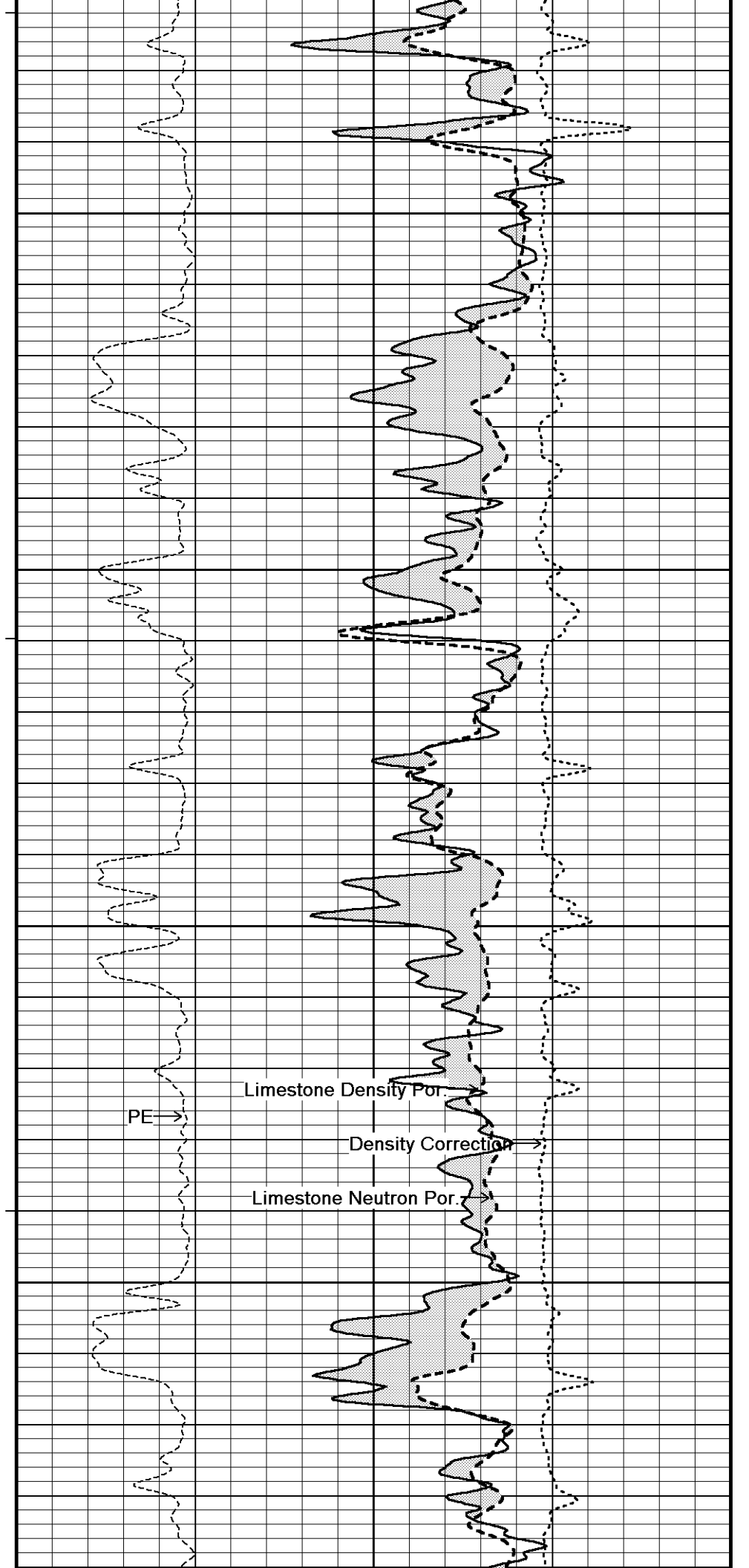
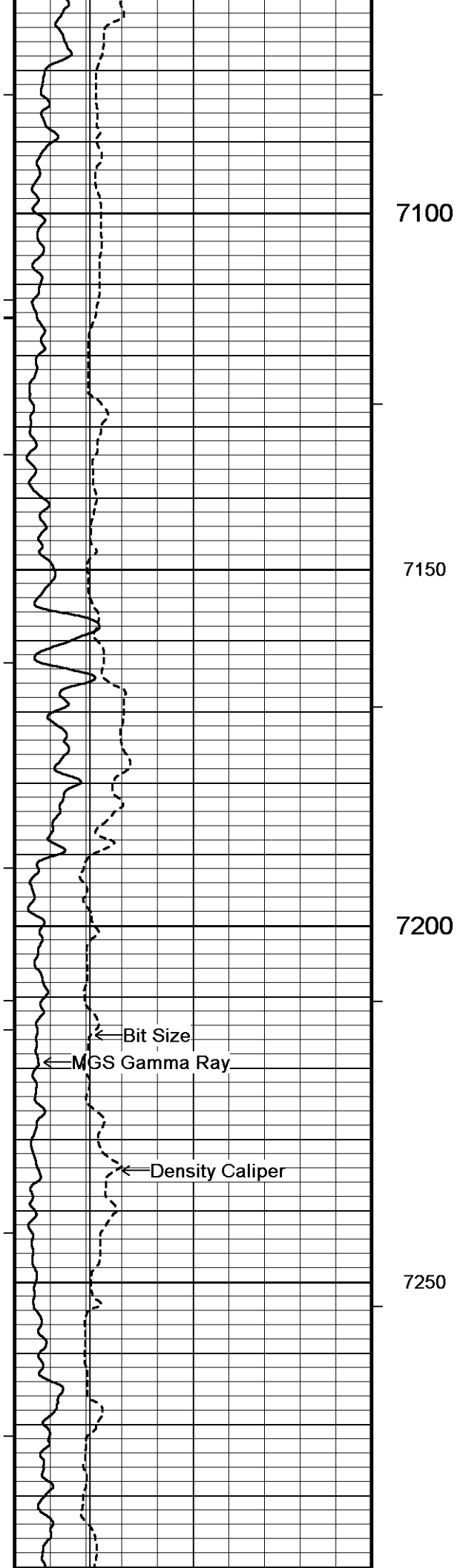
6400

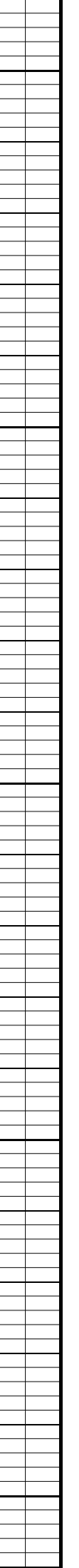
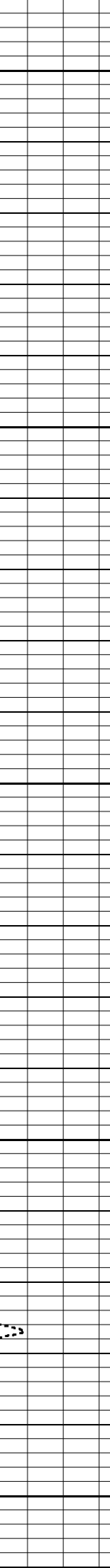
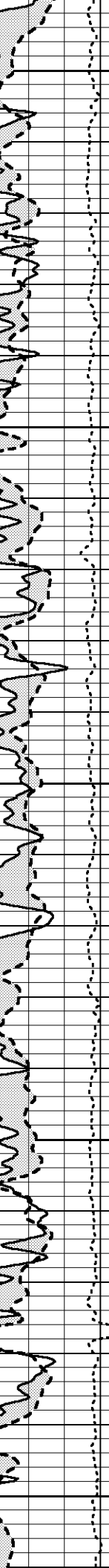
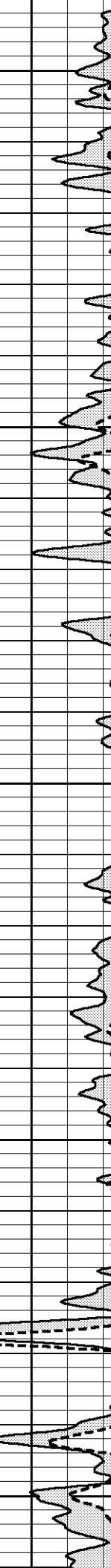
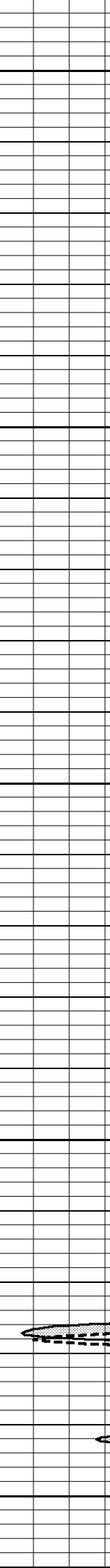
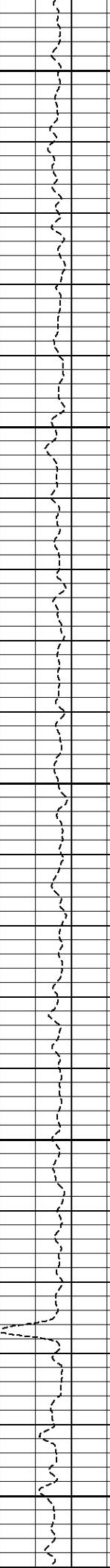
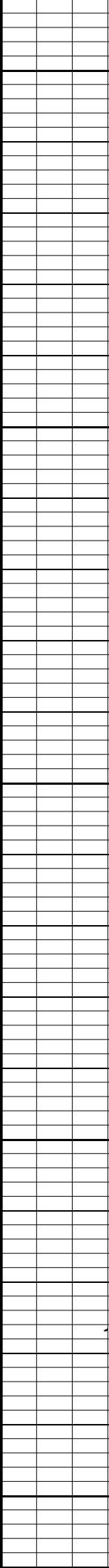
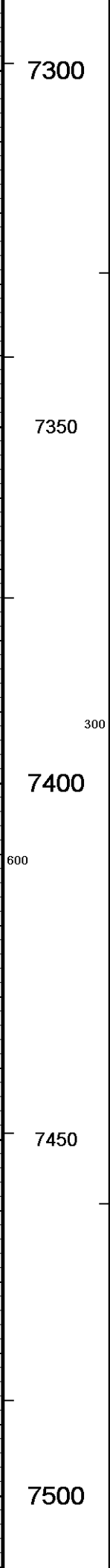
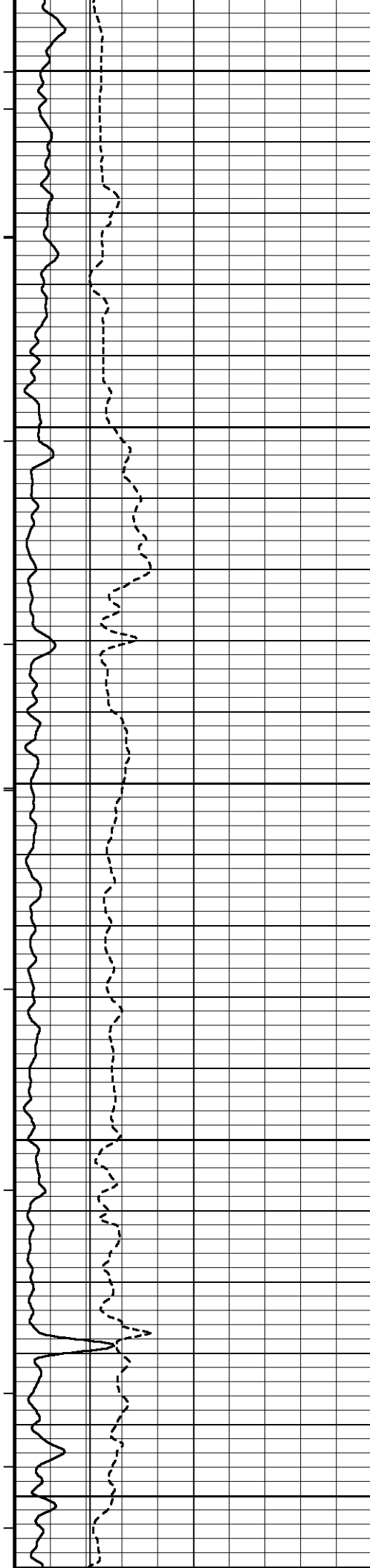


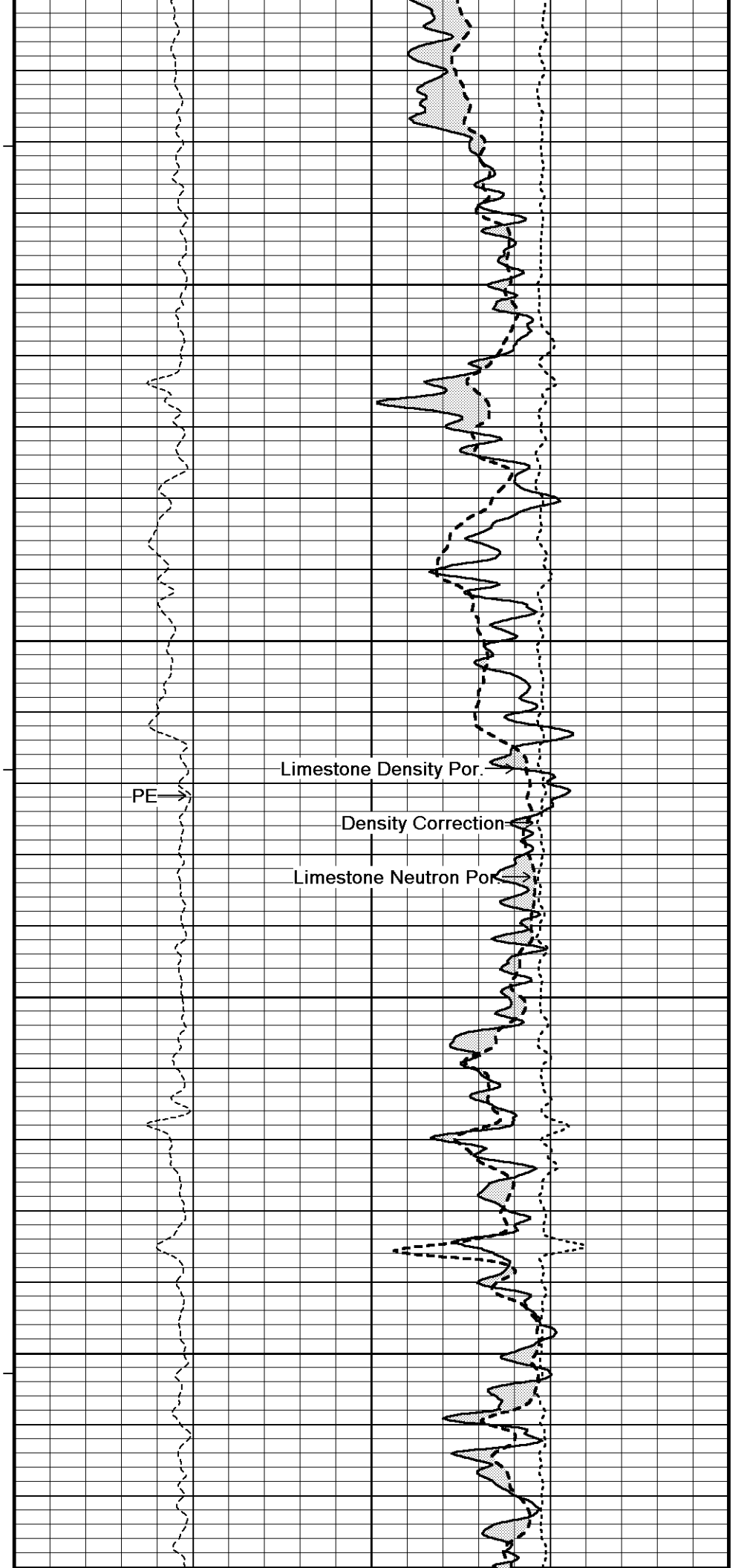
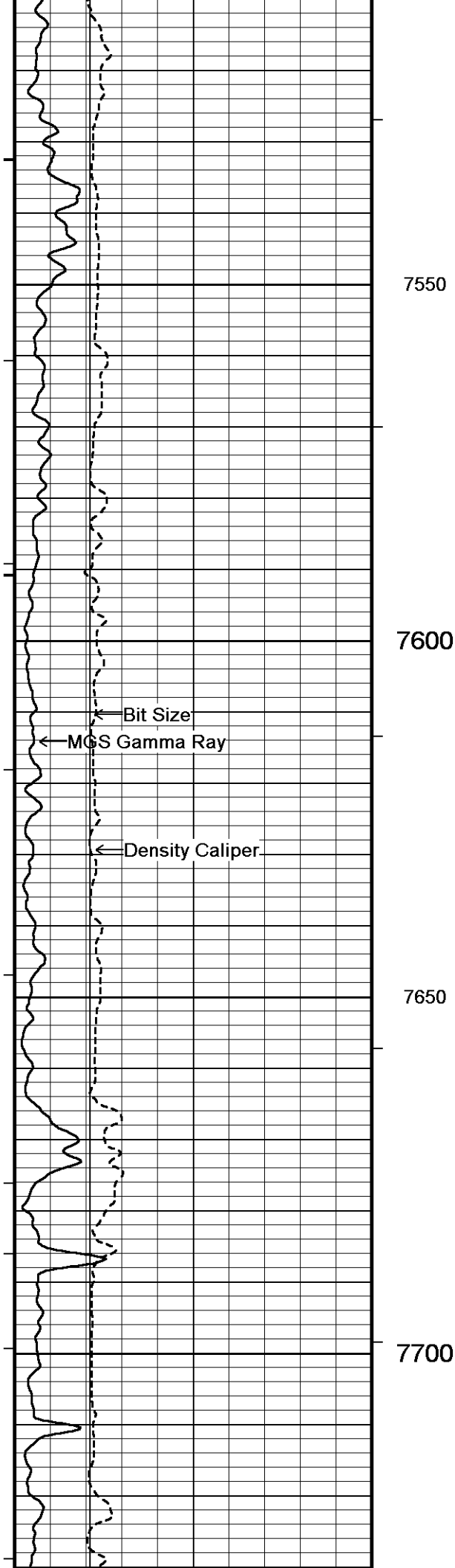


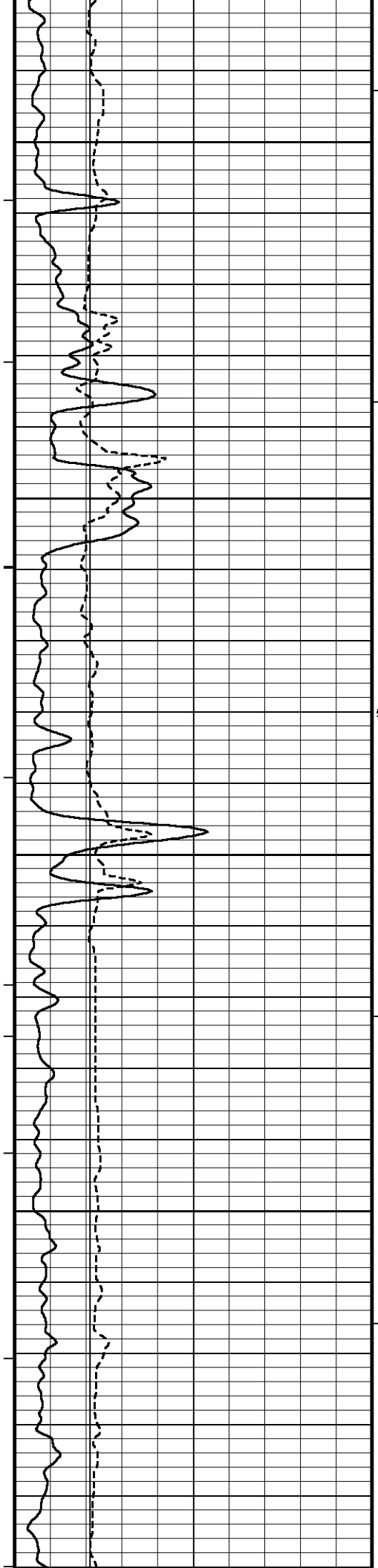




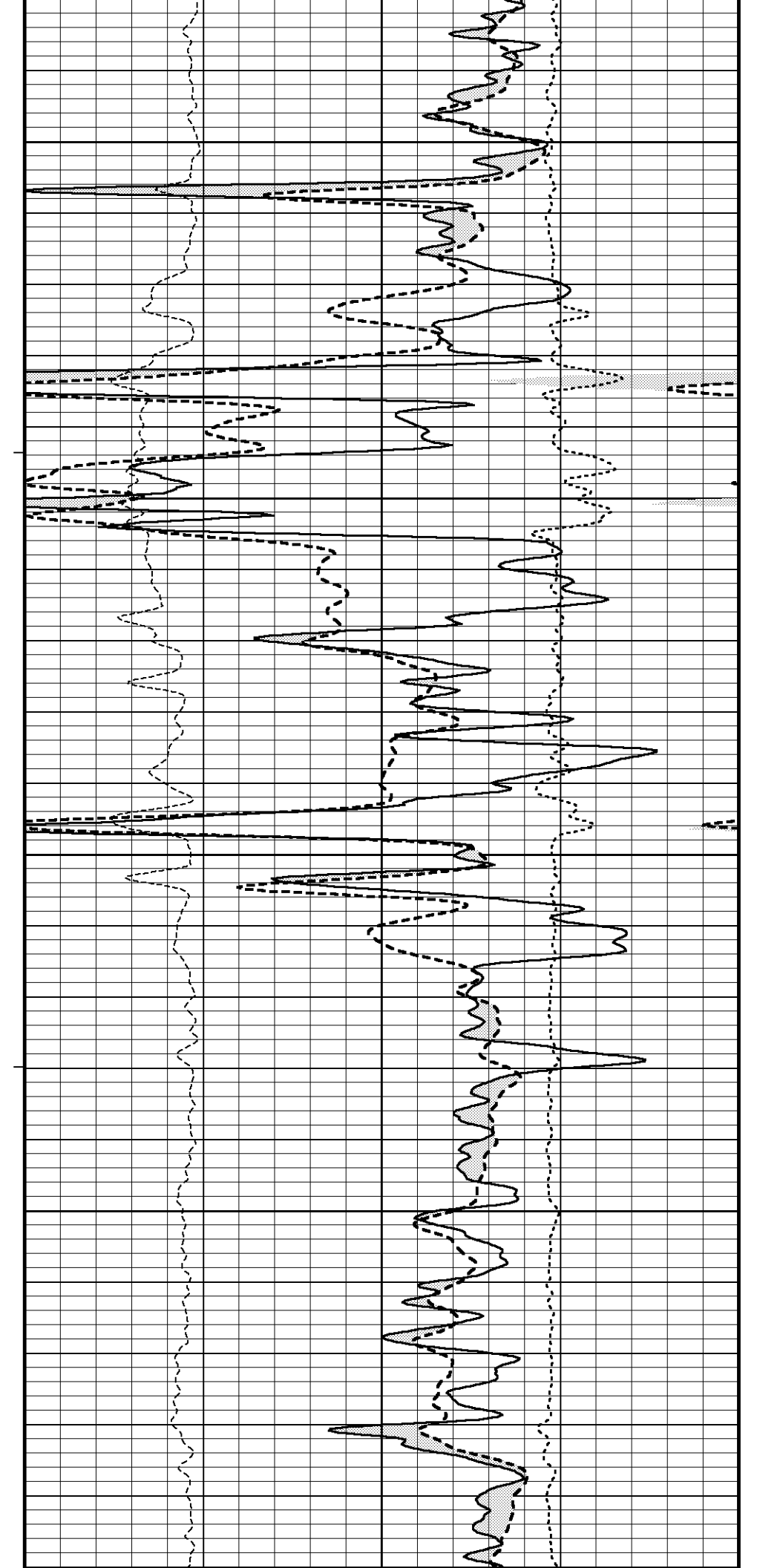


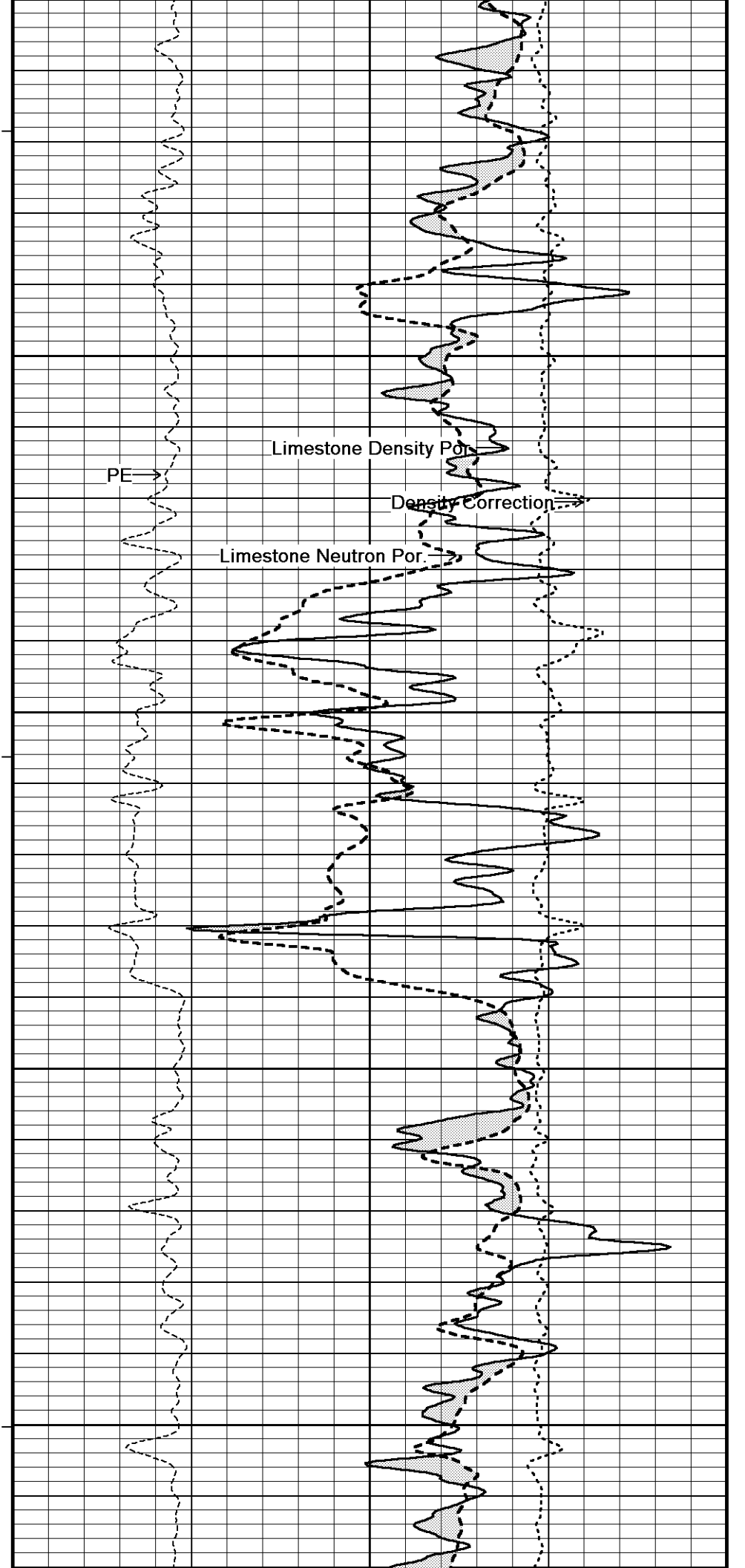
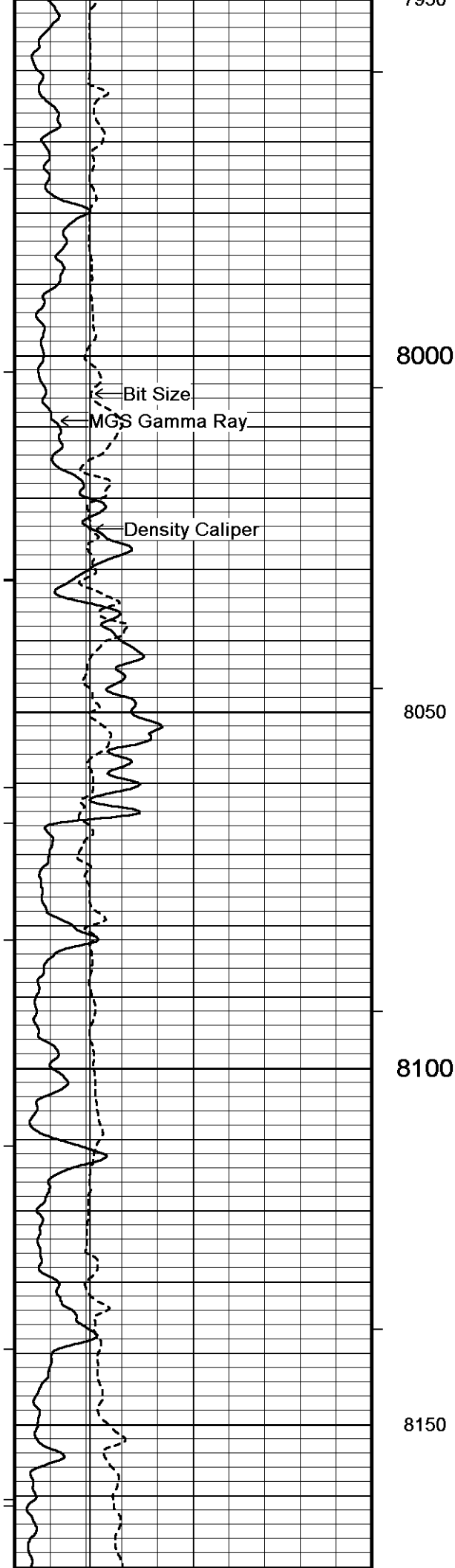


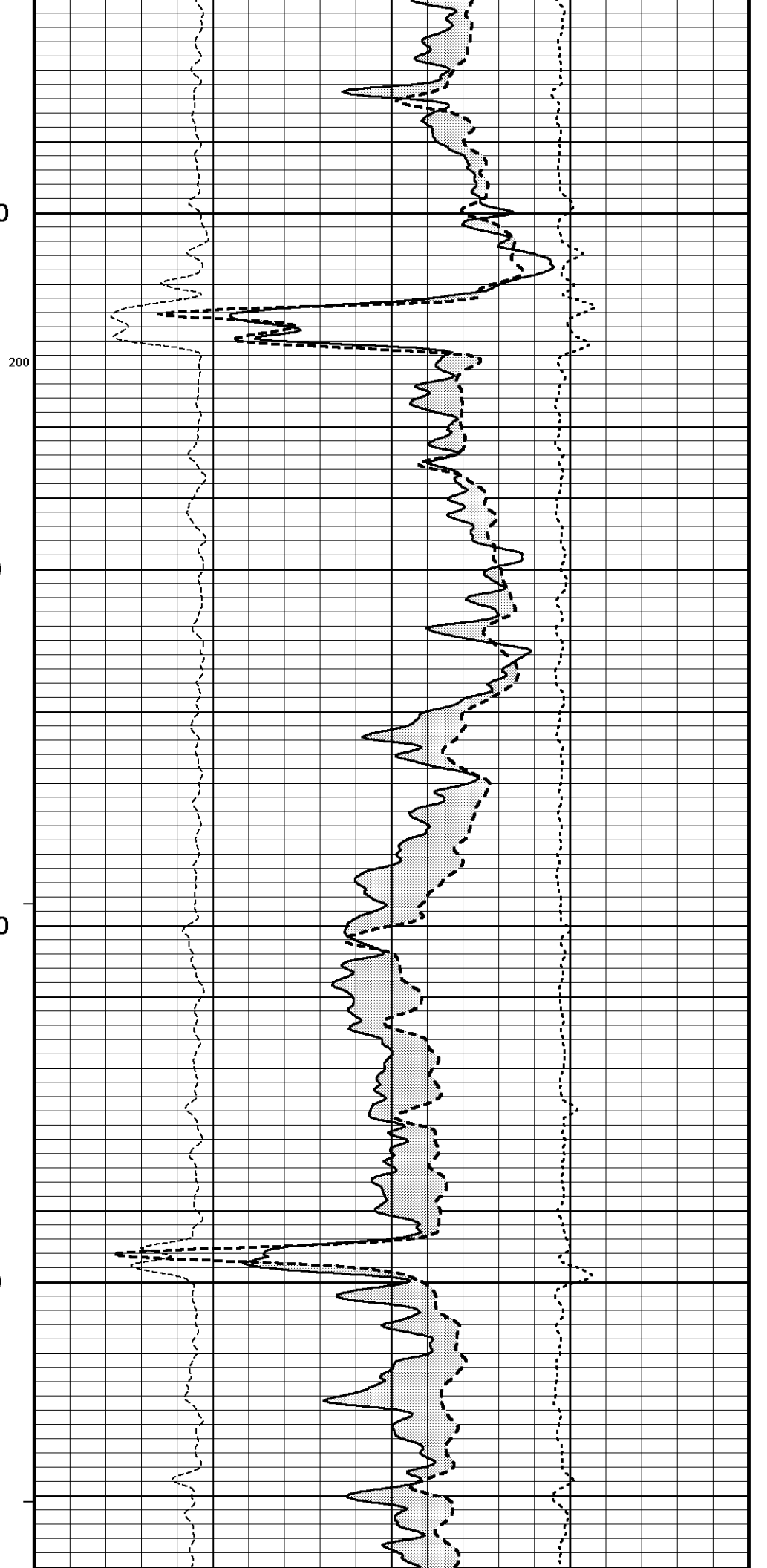
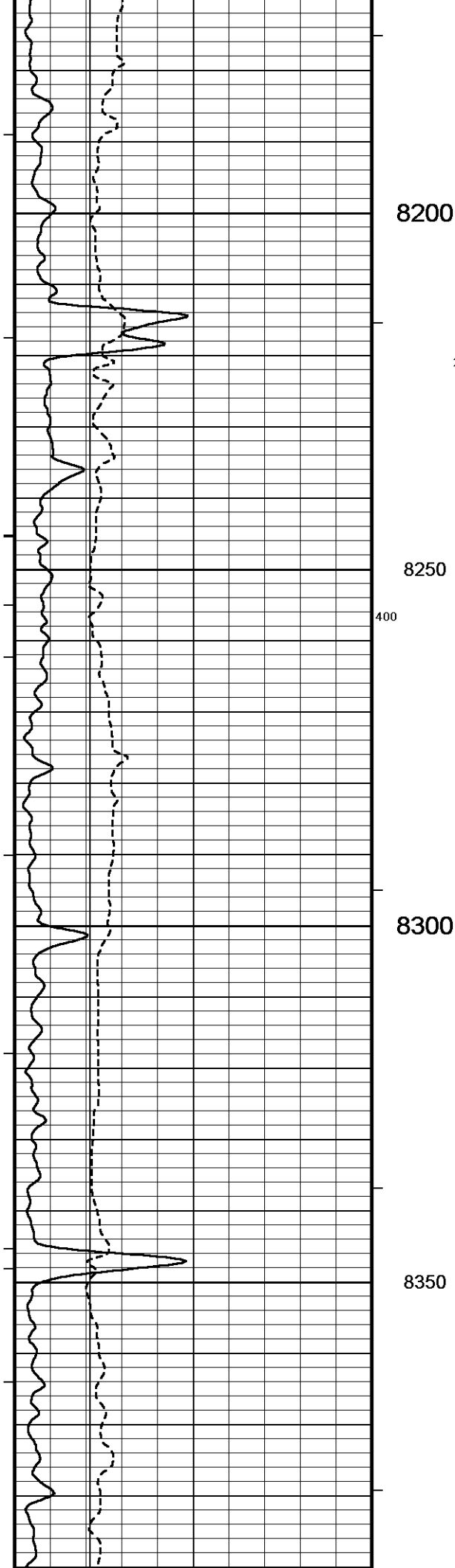


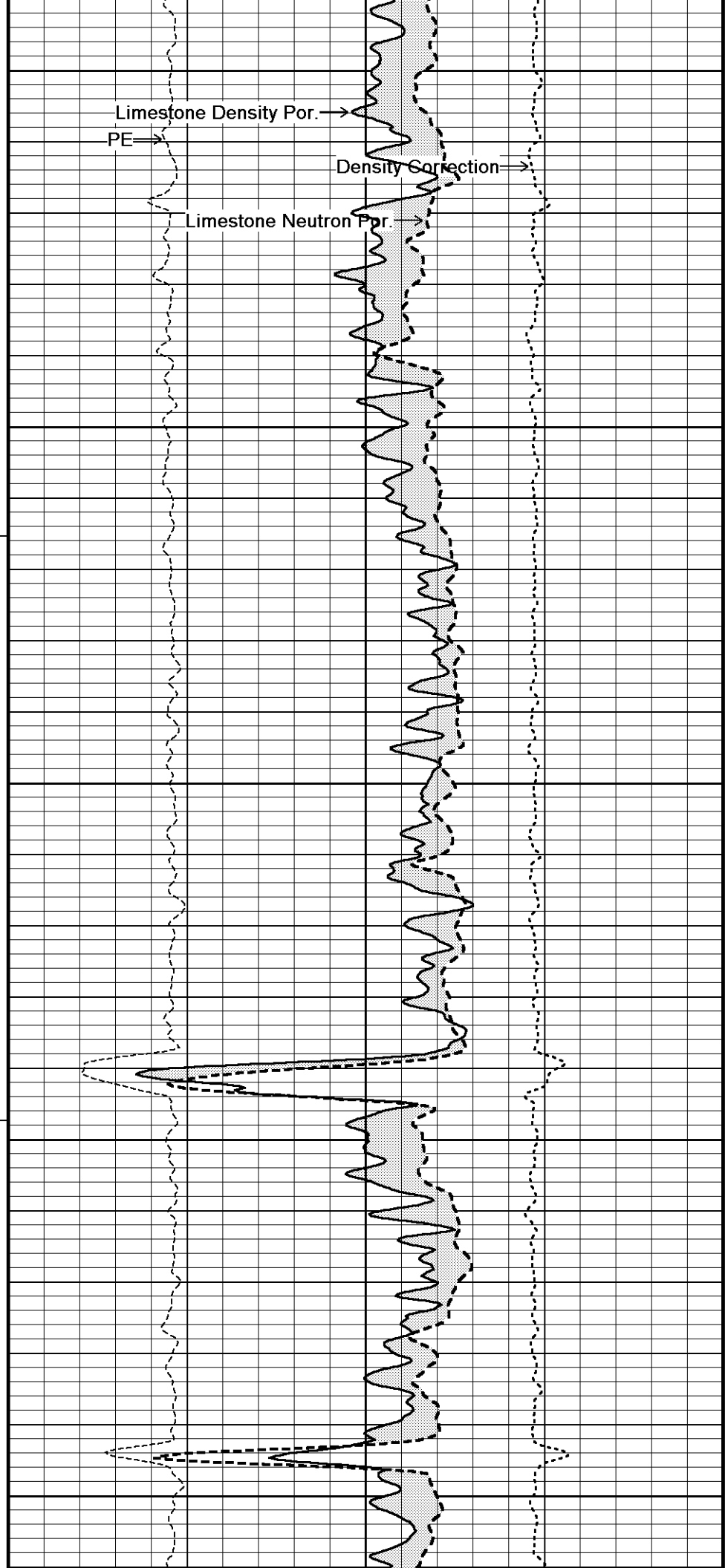
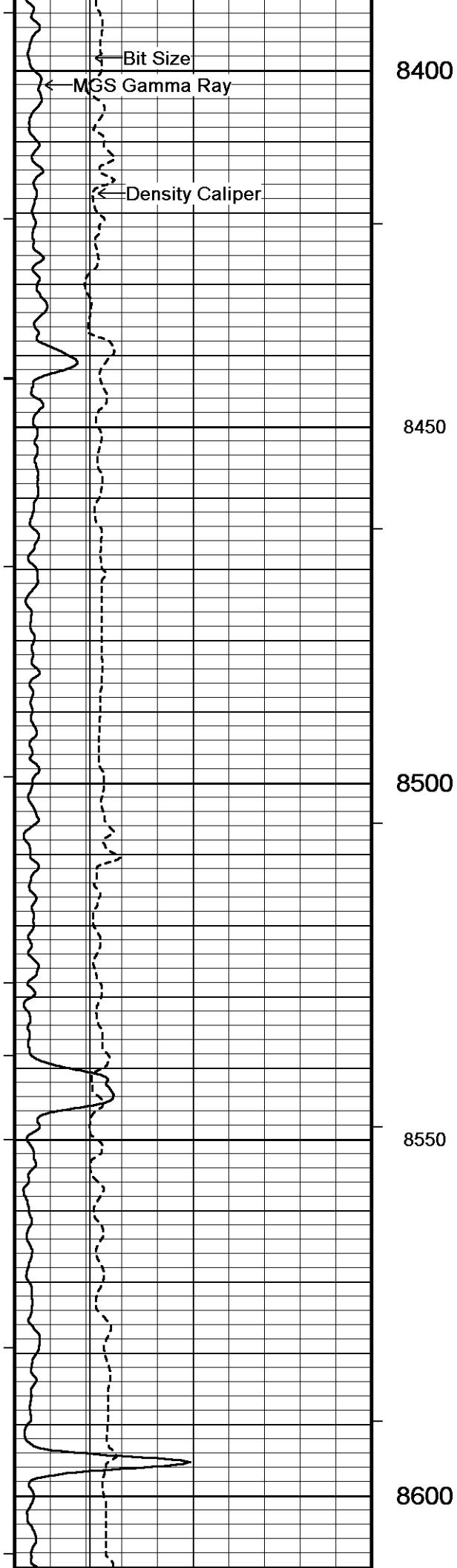


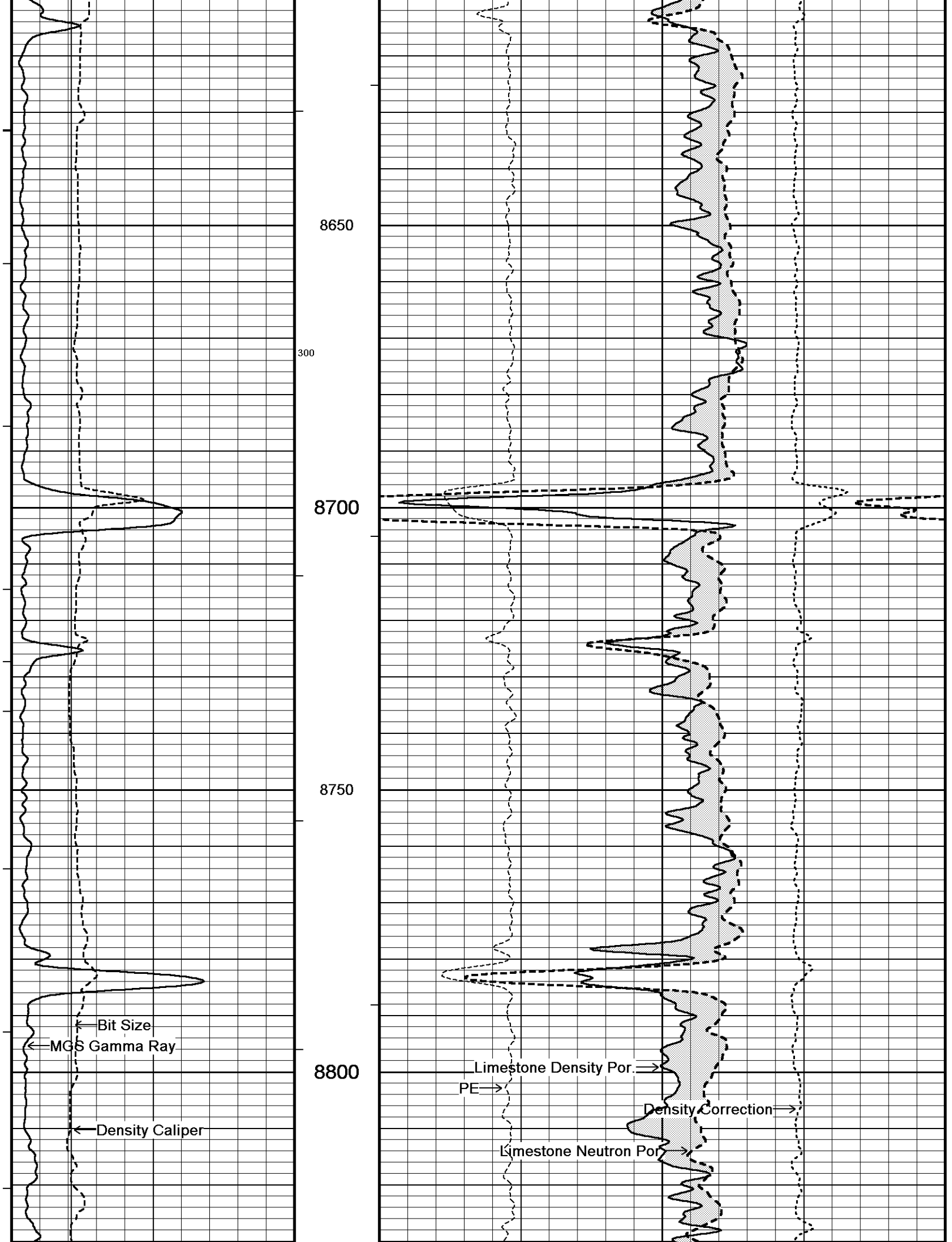
7750
7800
500
7850
7900
7950

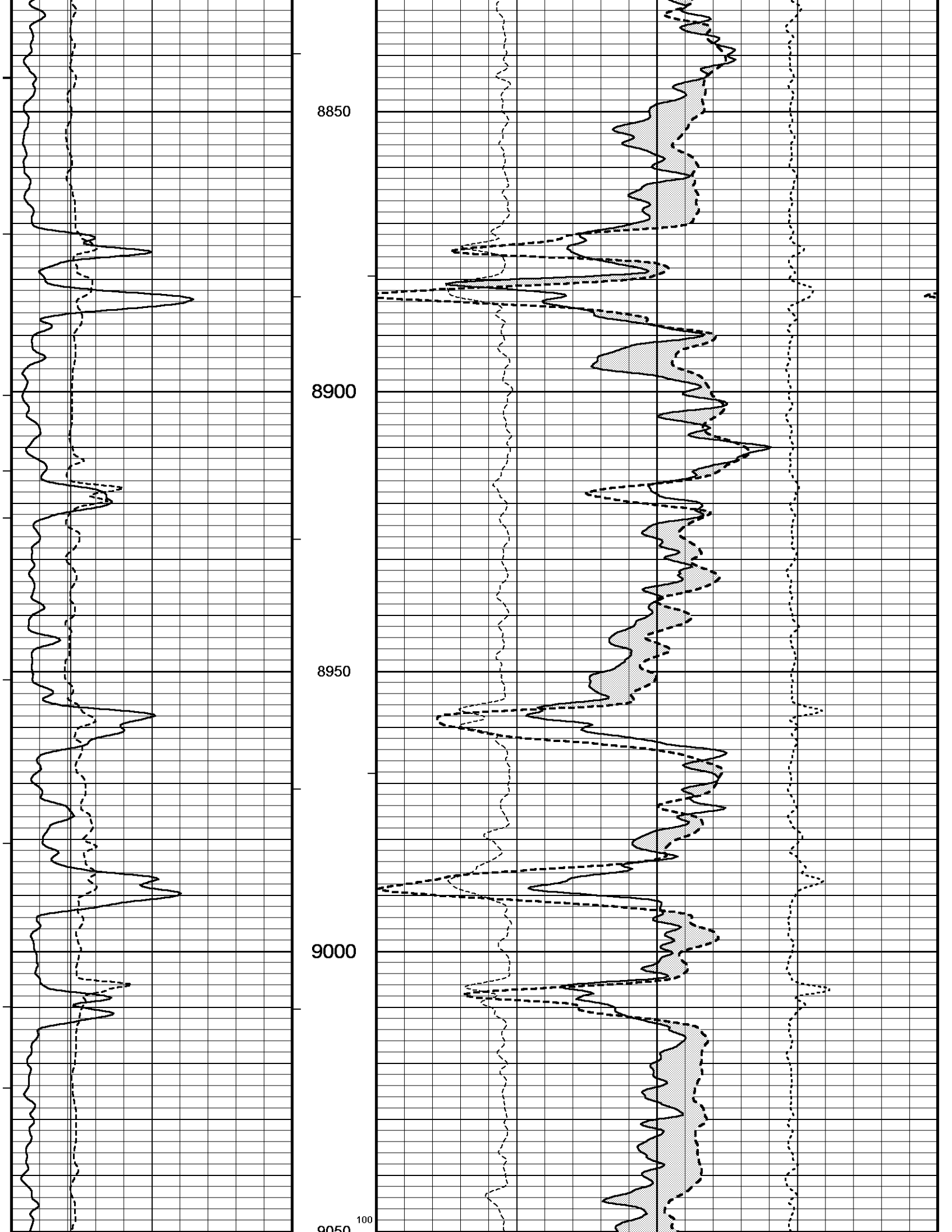


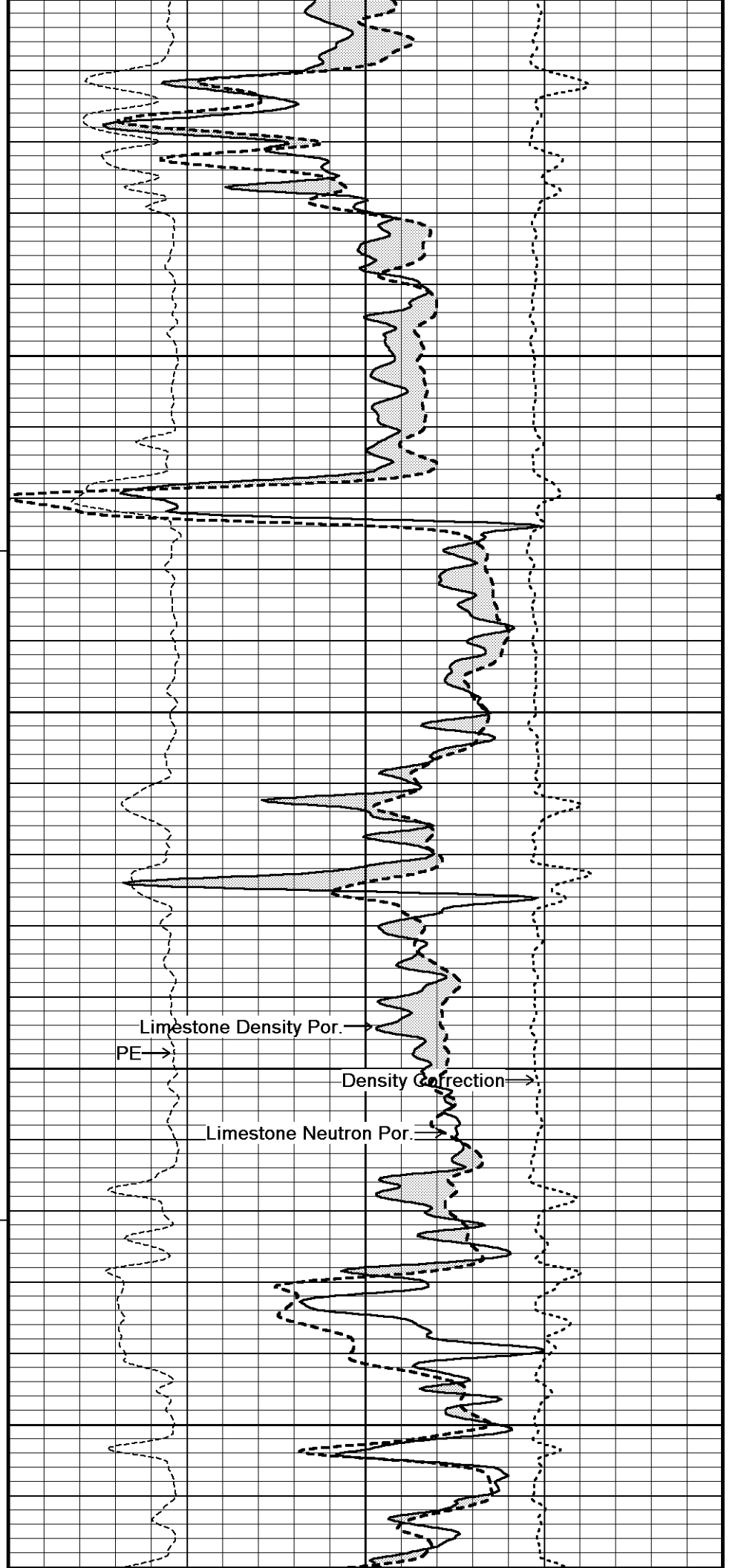
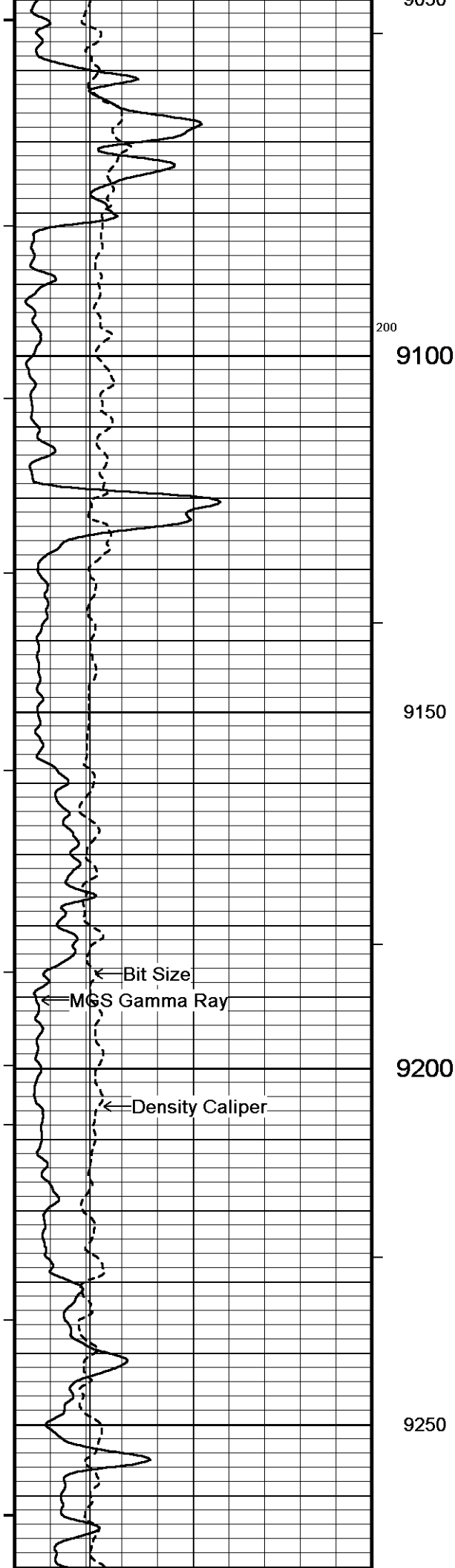


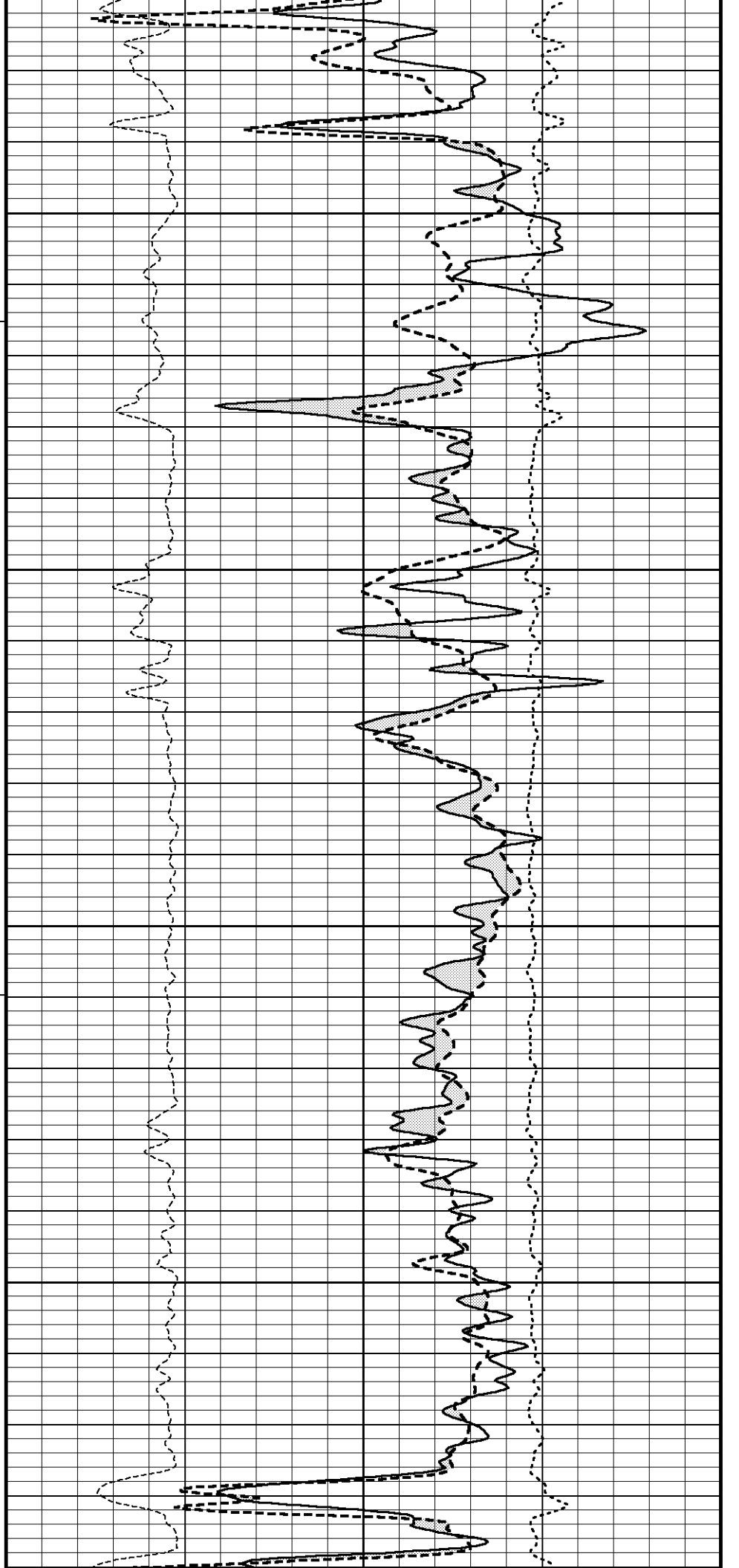
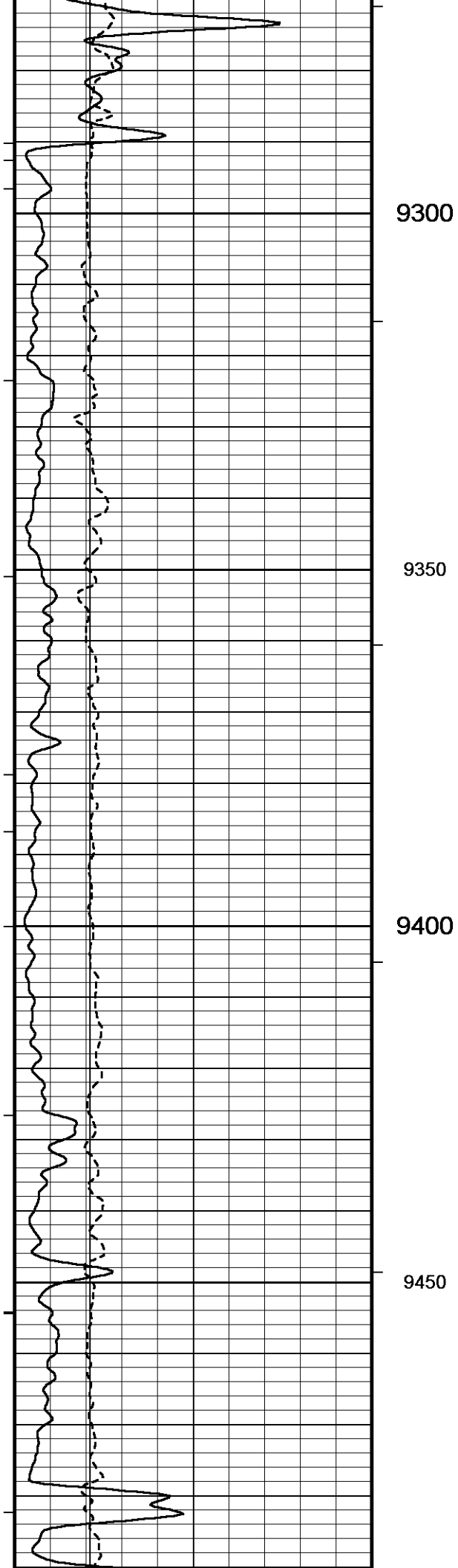


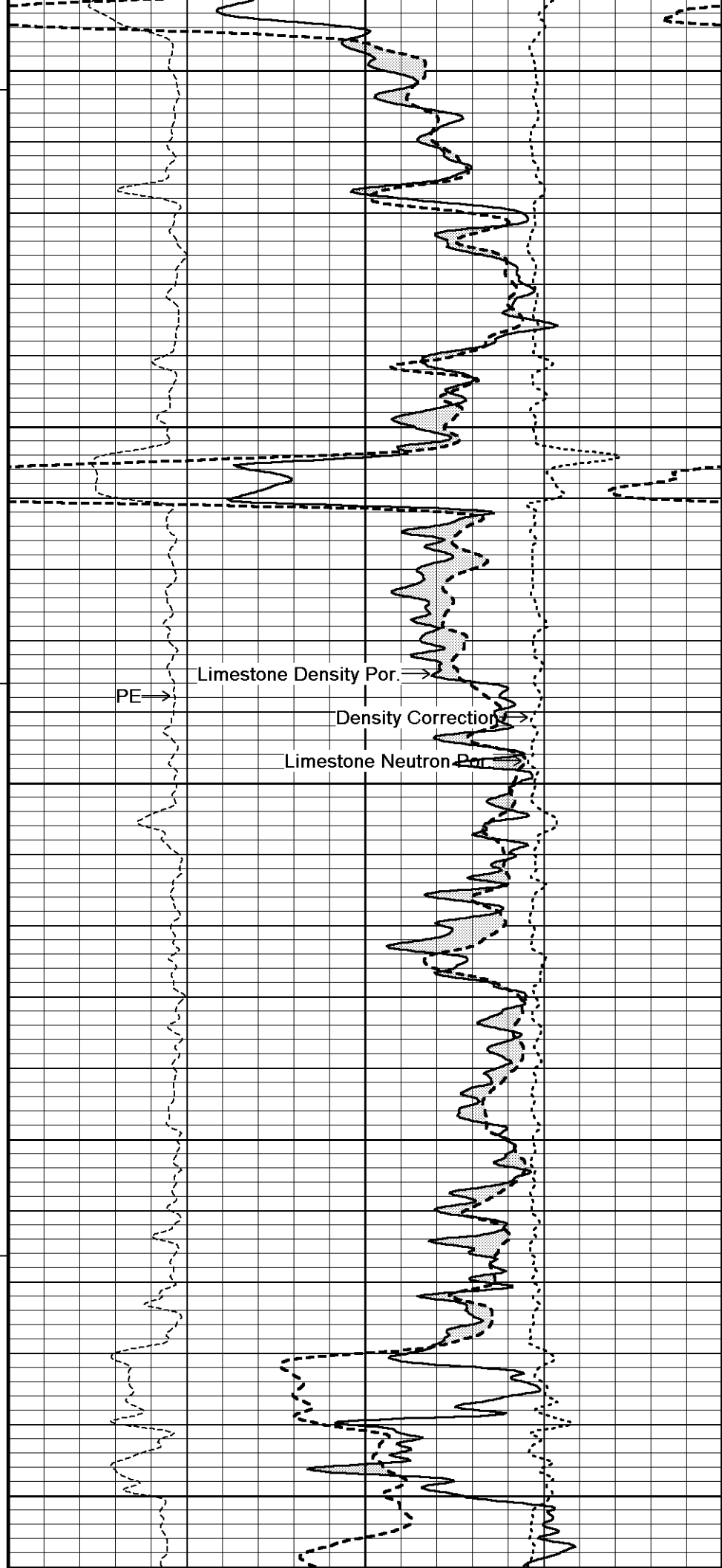
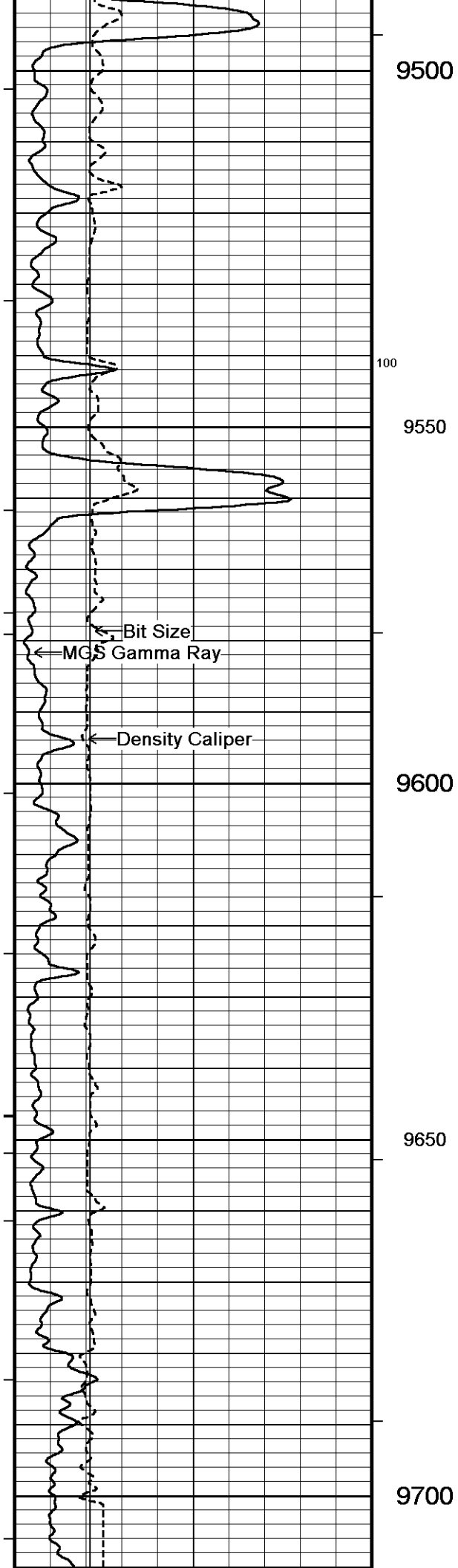


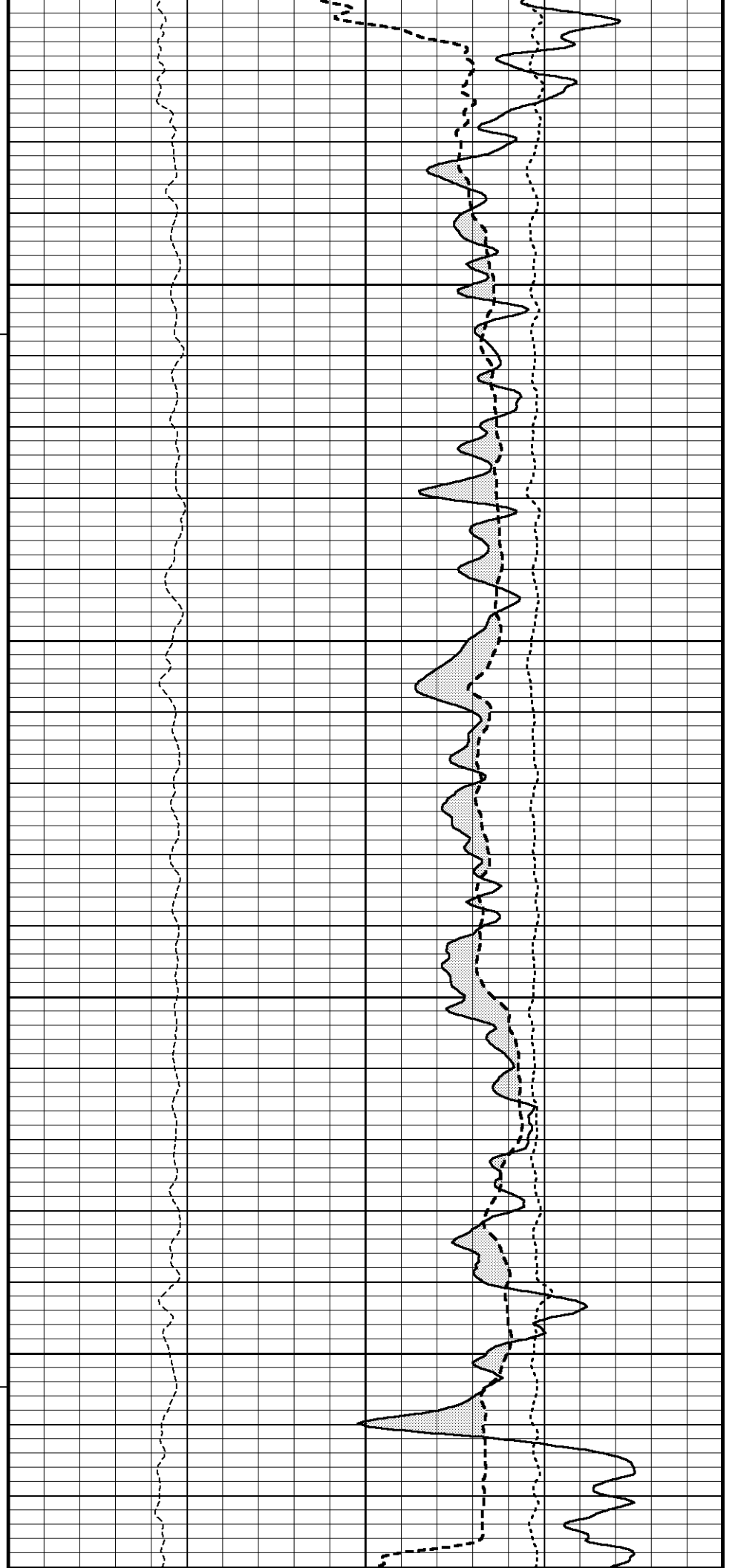
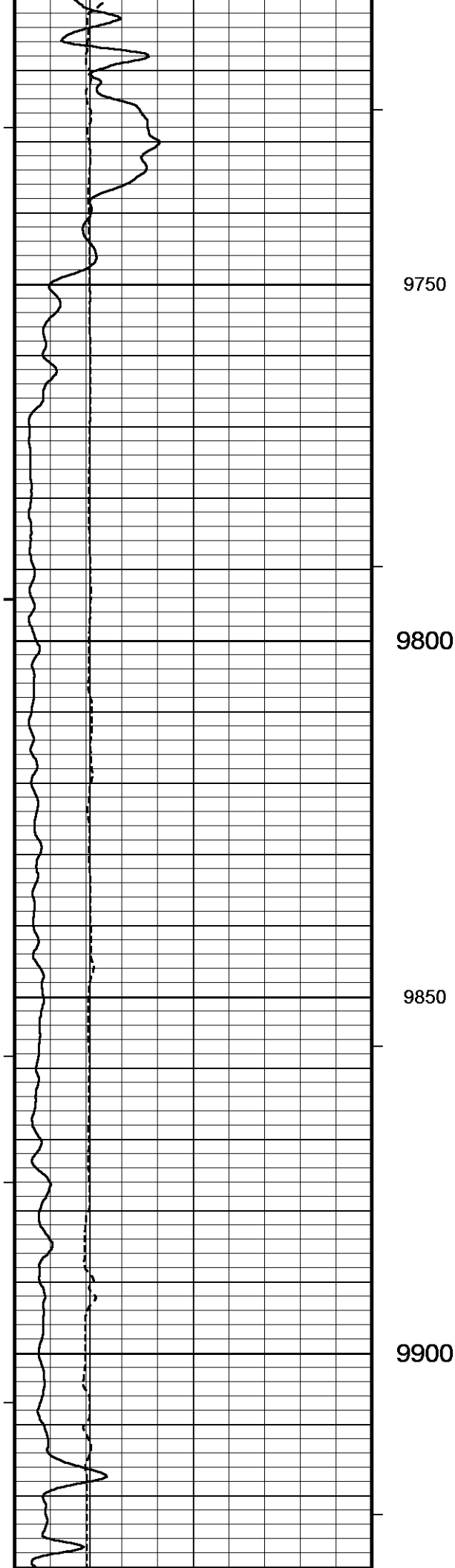


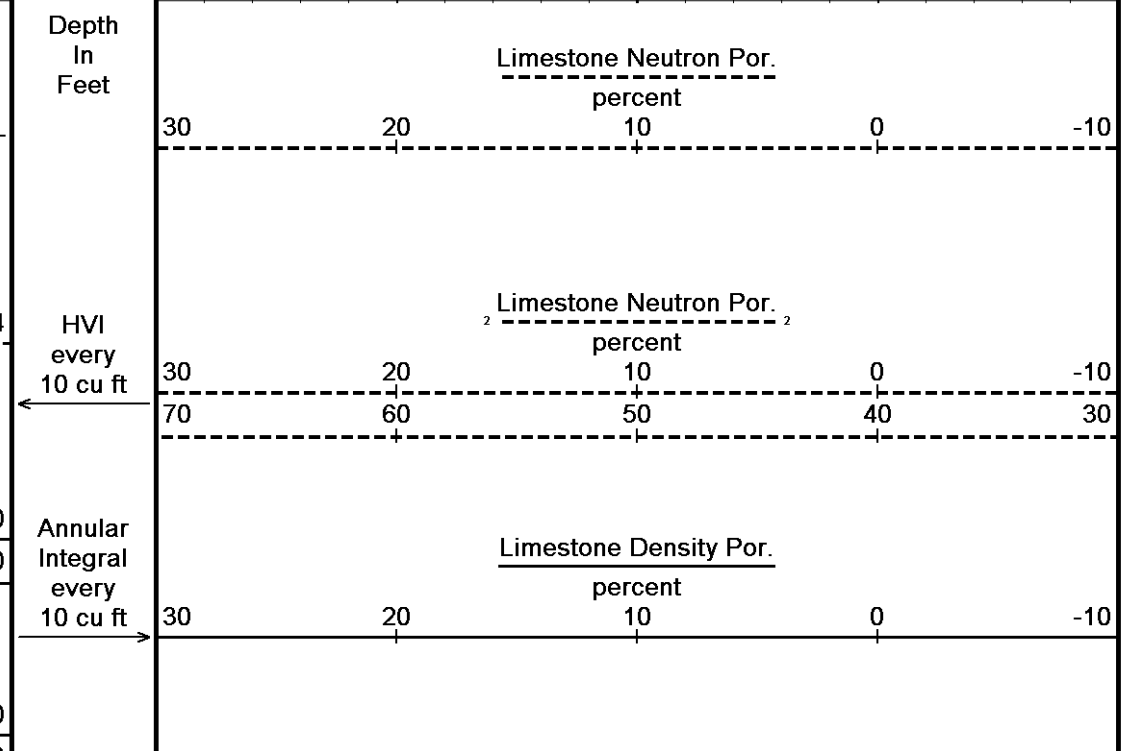
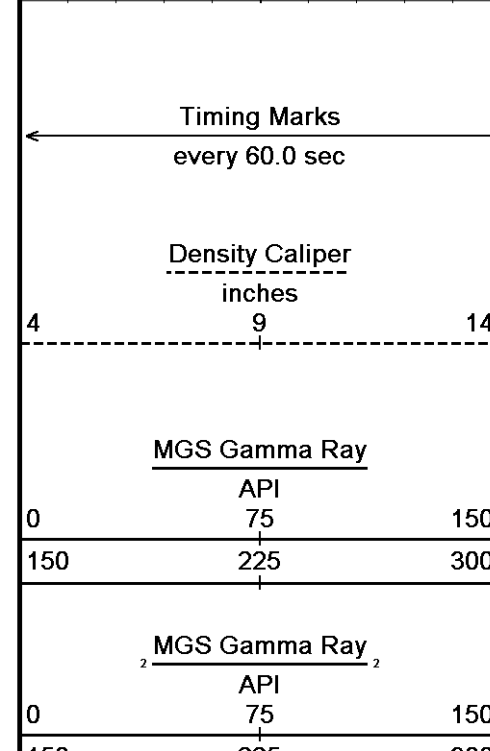
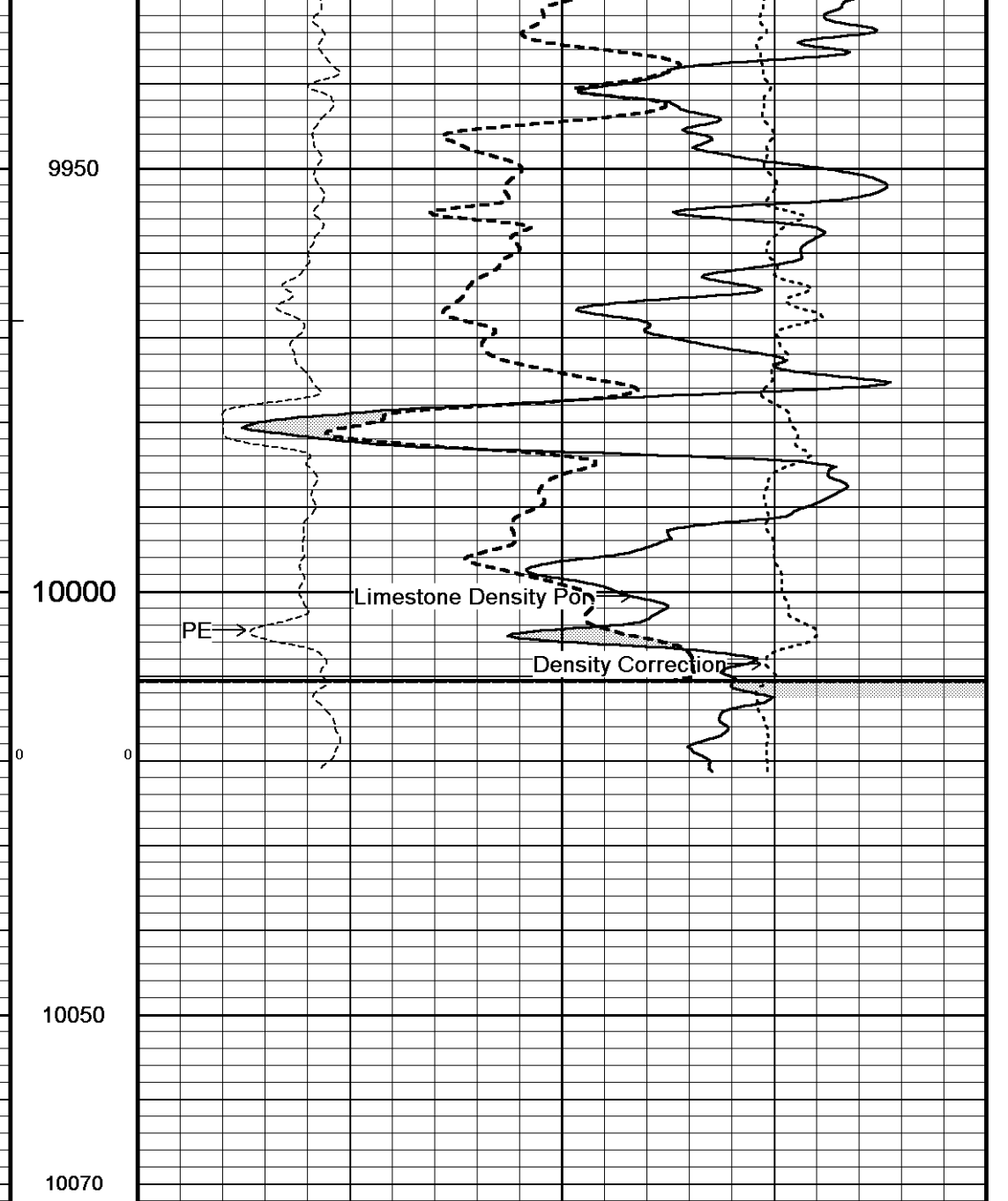
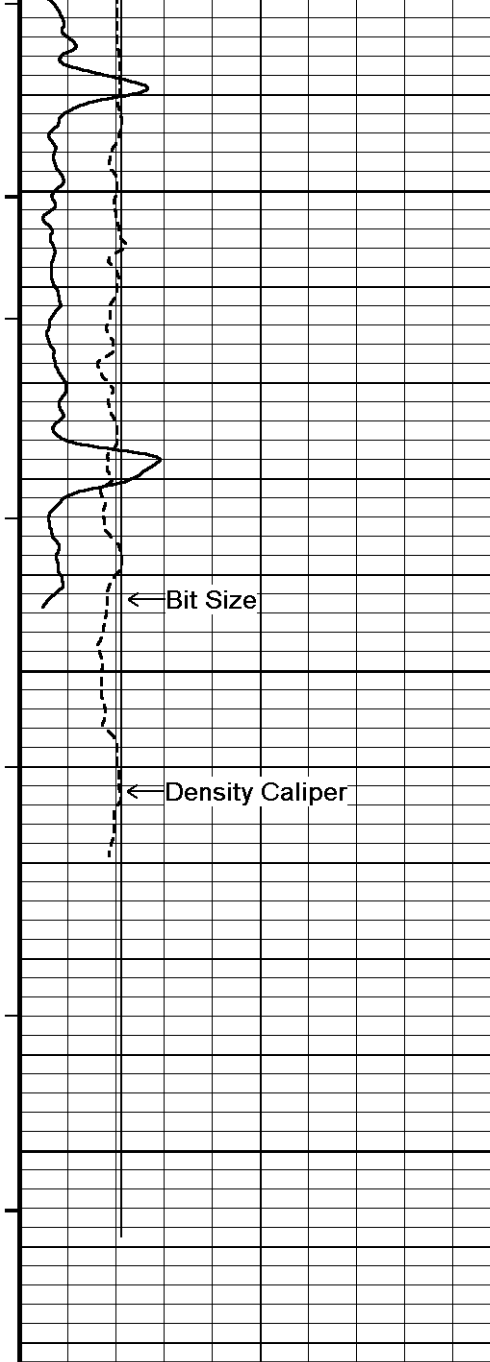


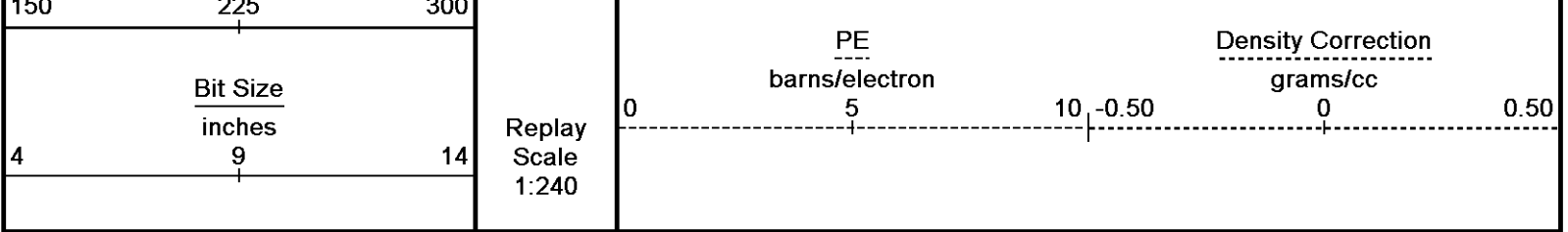








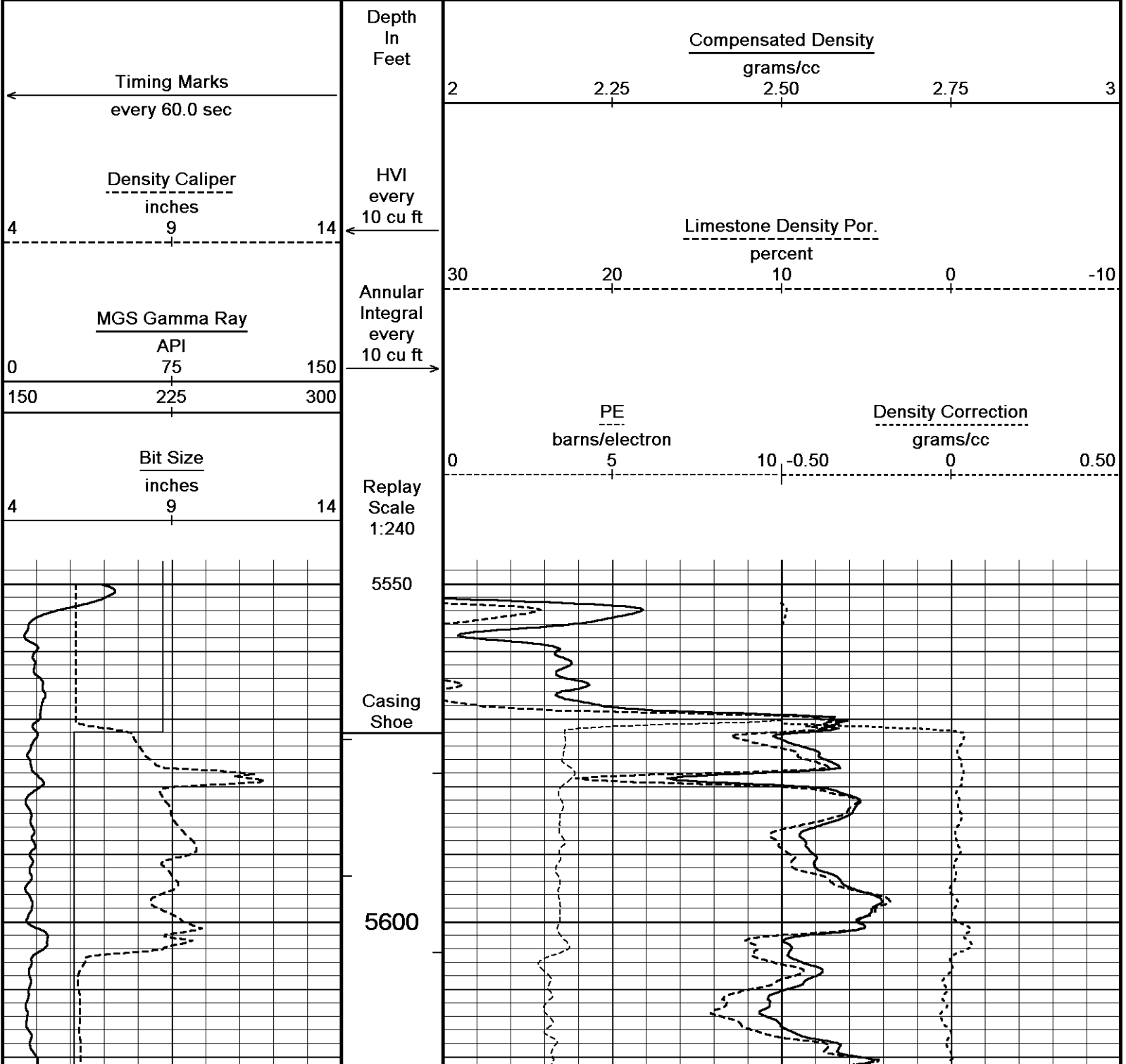


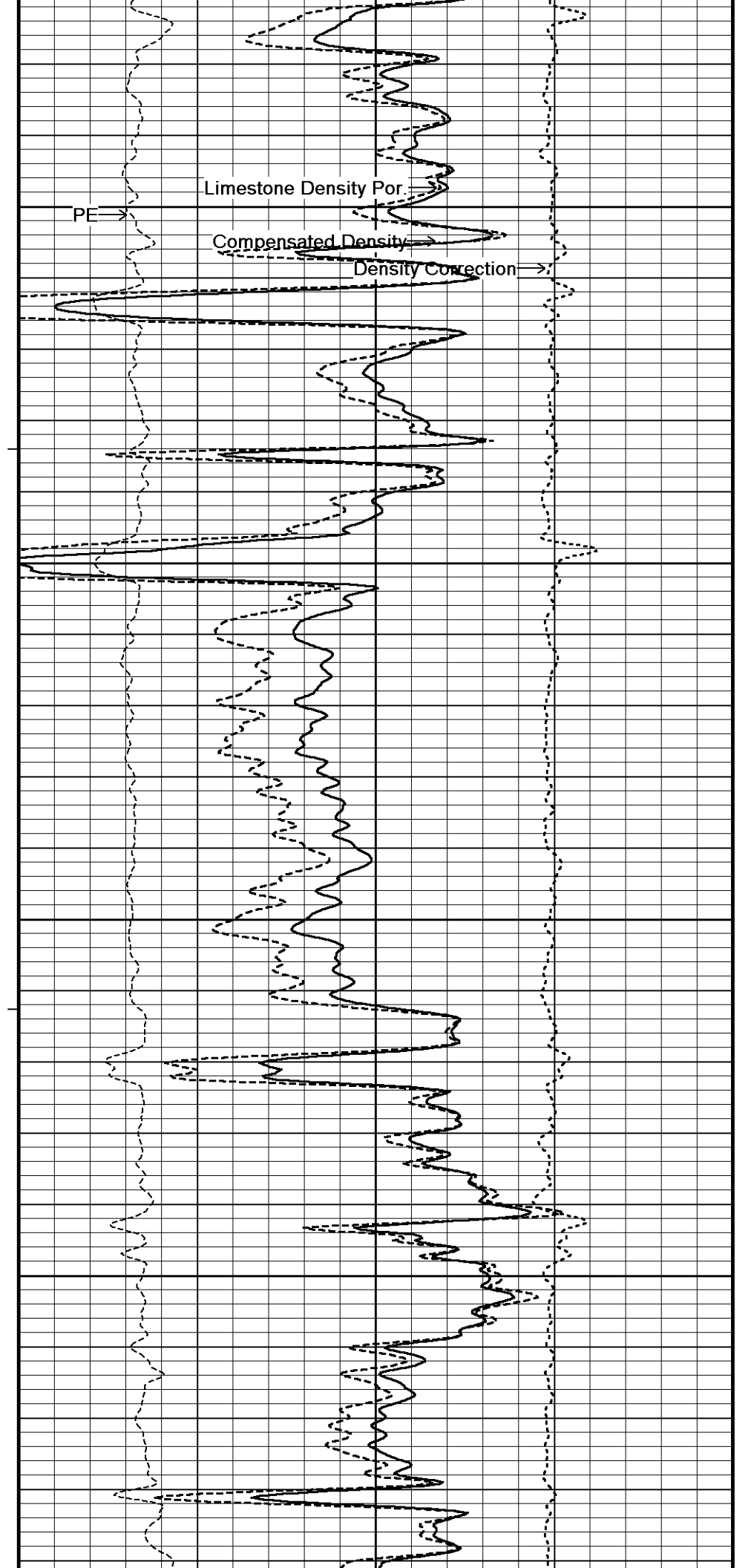
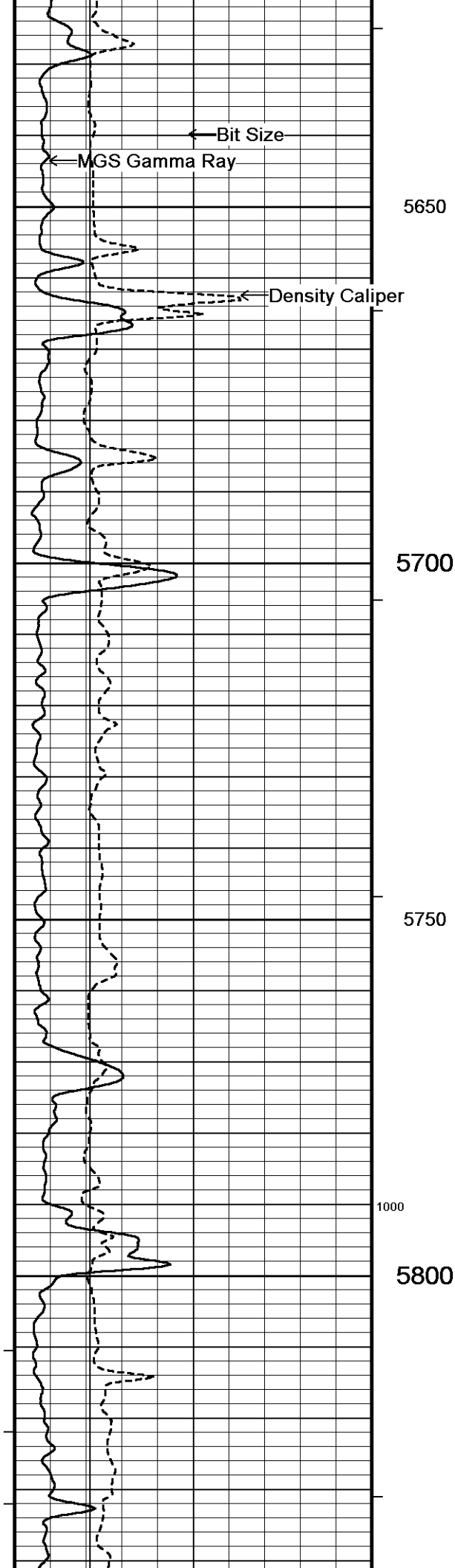


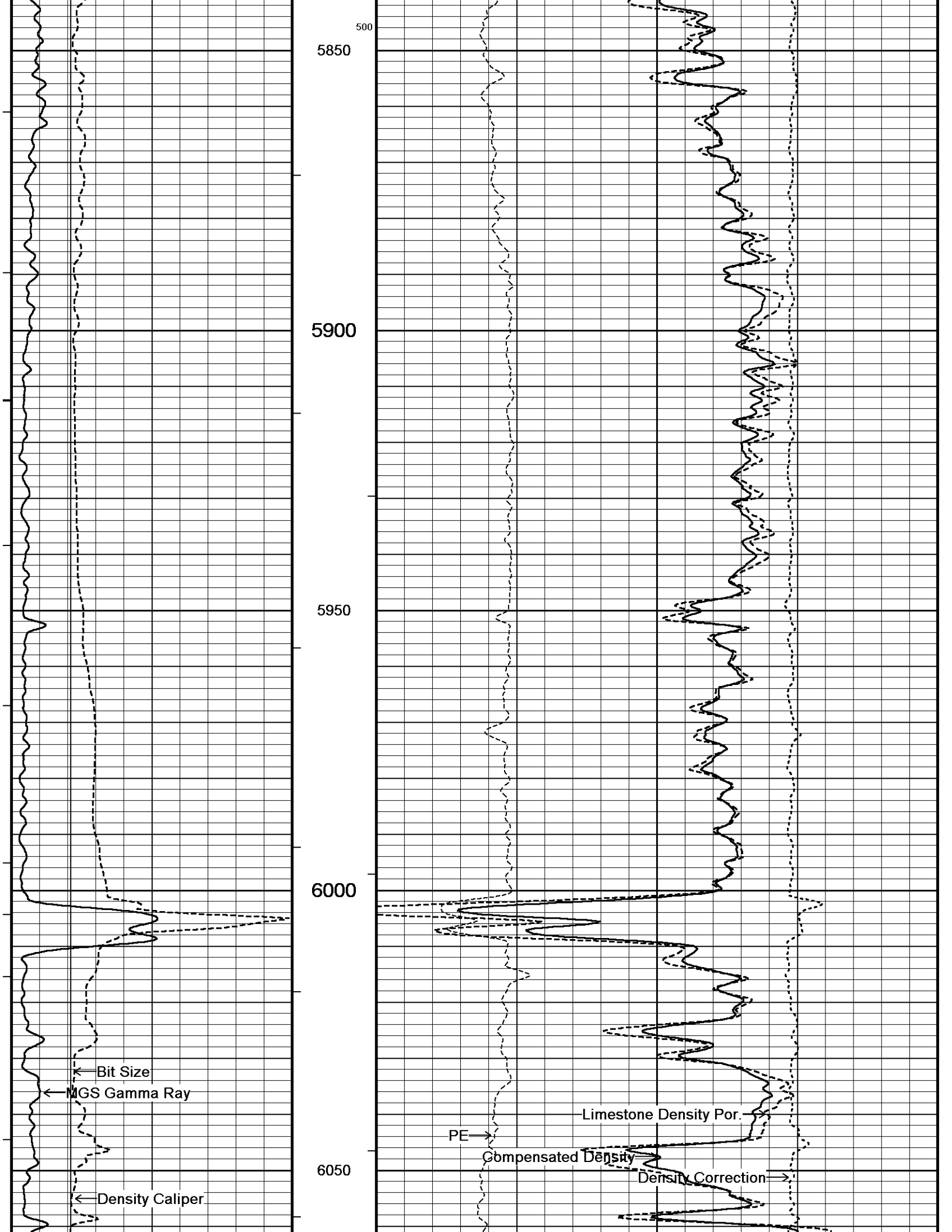
Depth Based Data - Maximum Sampling Increment 10.0cm
Filename: C:\DATA_13_04_8492\SANDRIDGE BROTHERS 3119...\BROTHERS 3119 1-6H RTAP2.dta
System Versions: Processed with 13.04.8492 Plotted with 13.04.8492

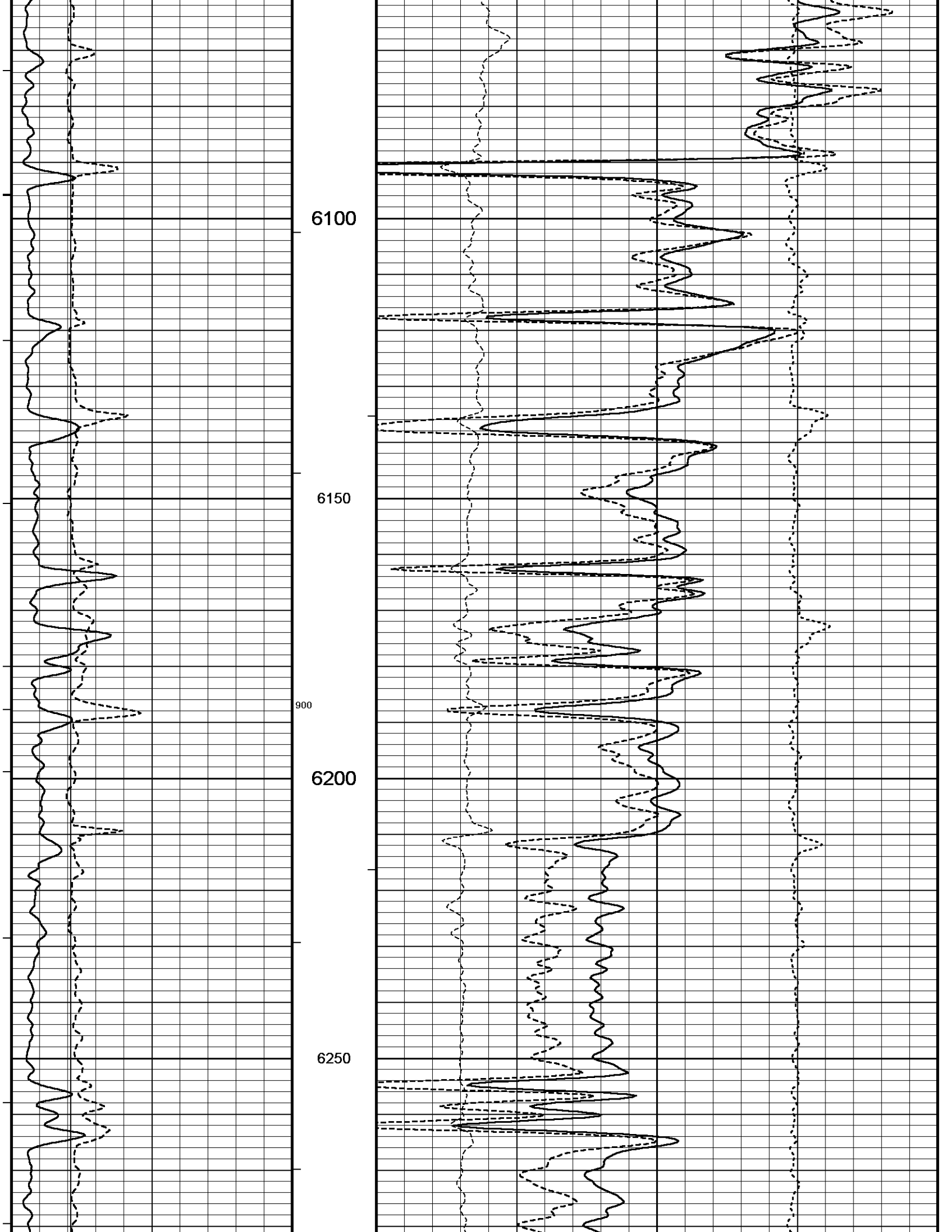
Plotted on 11-MAR-2013 10:14
Recorded on 11-MAR-2013 08:22

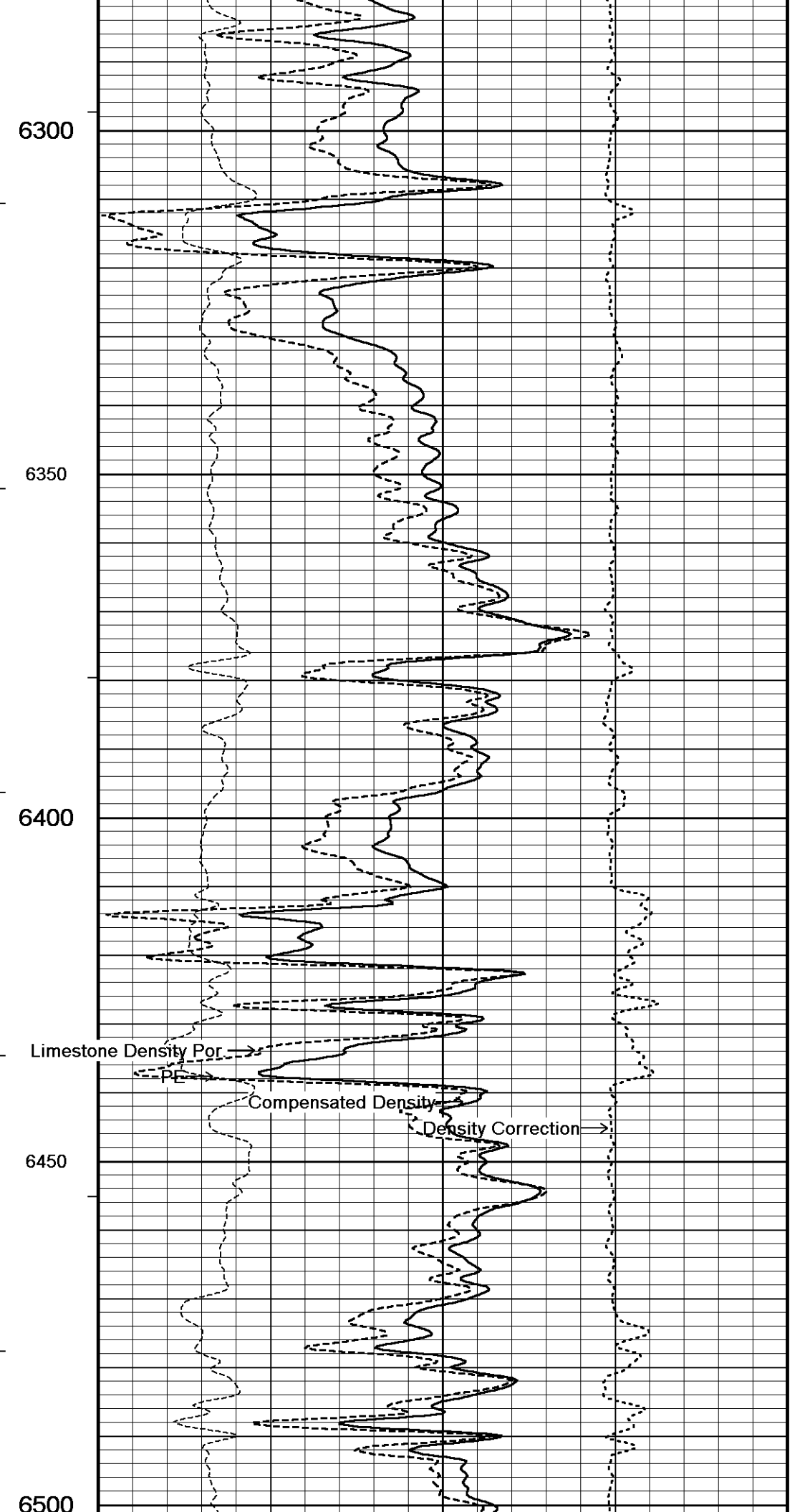
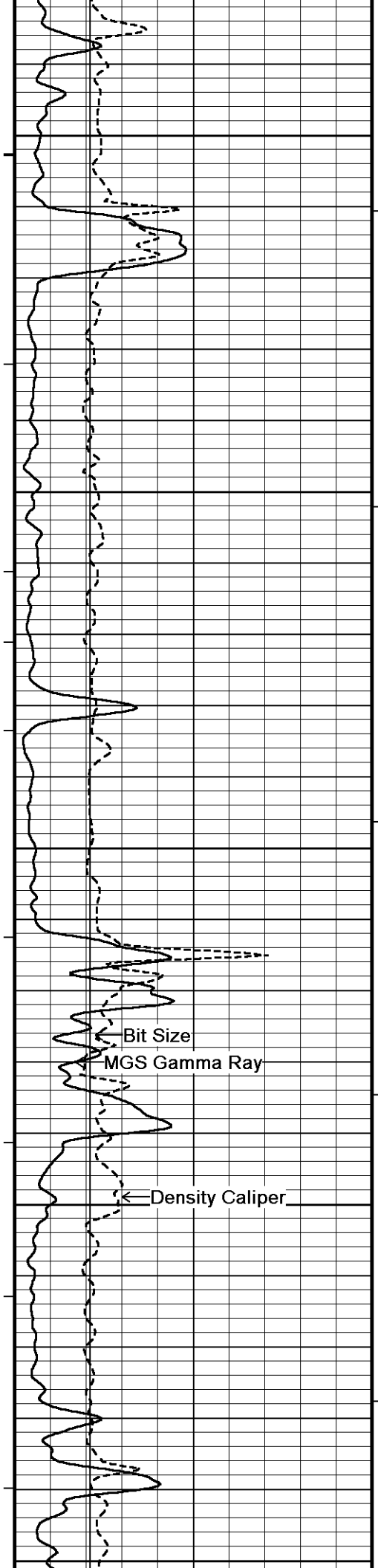
5 INCH MAIN PASS

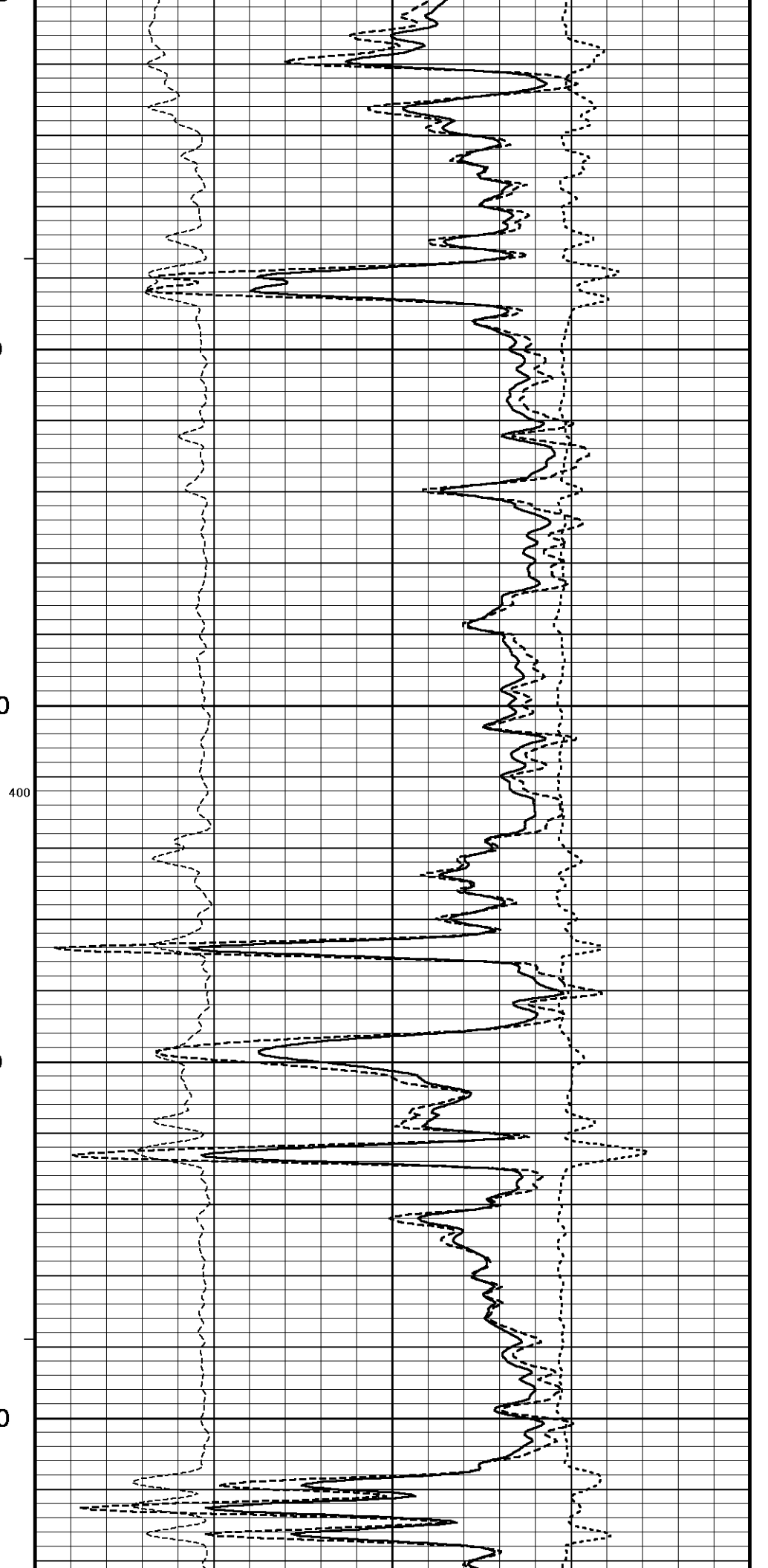
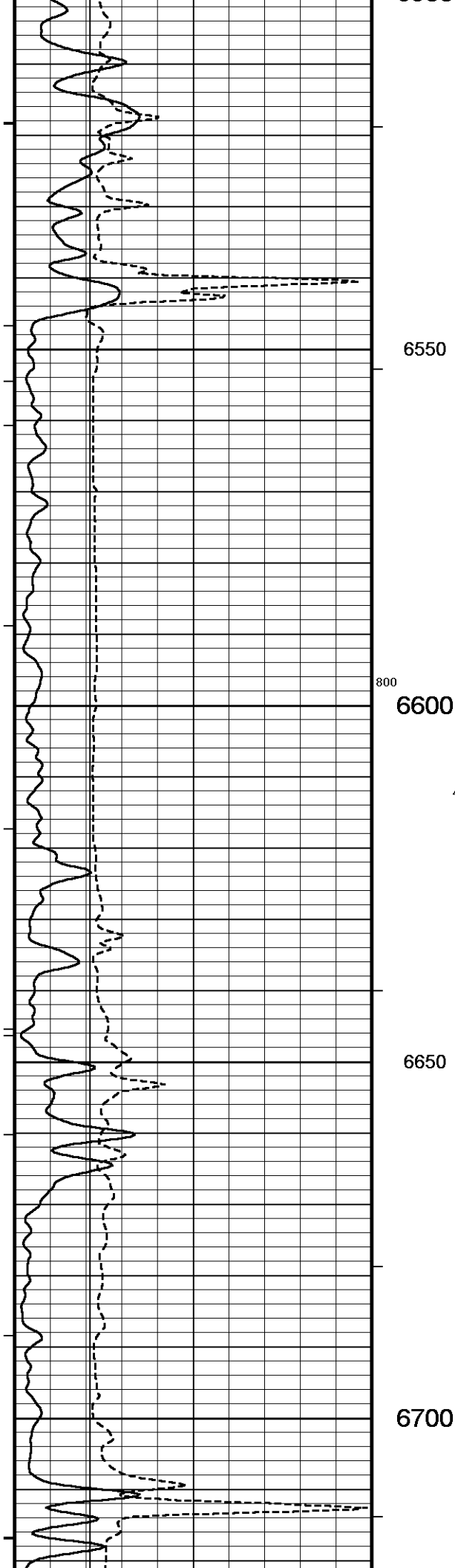


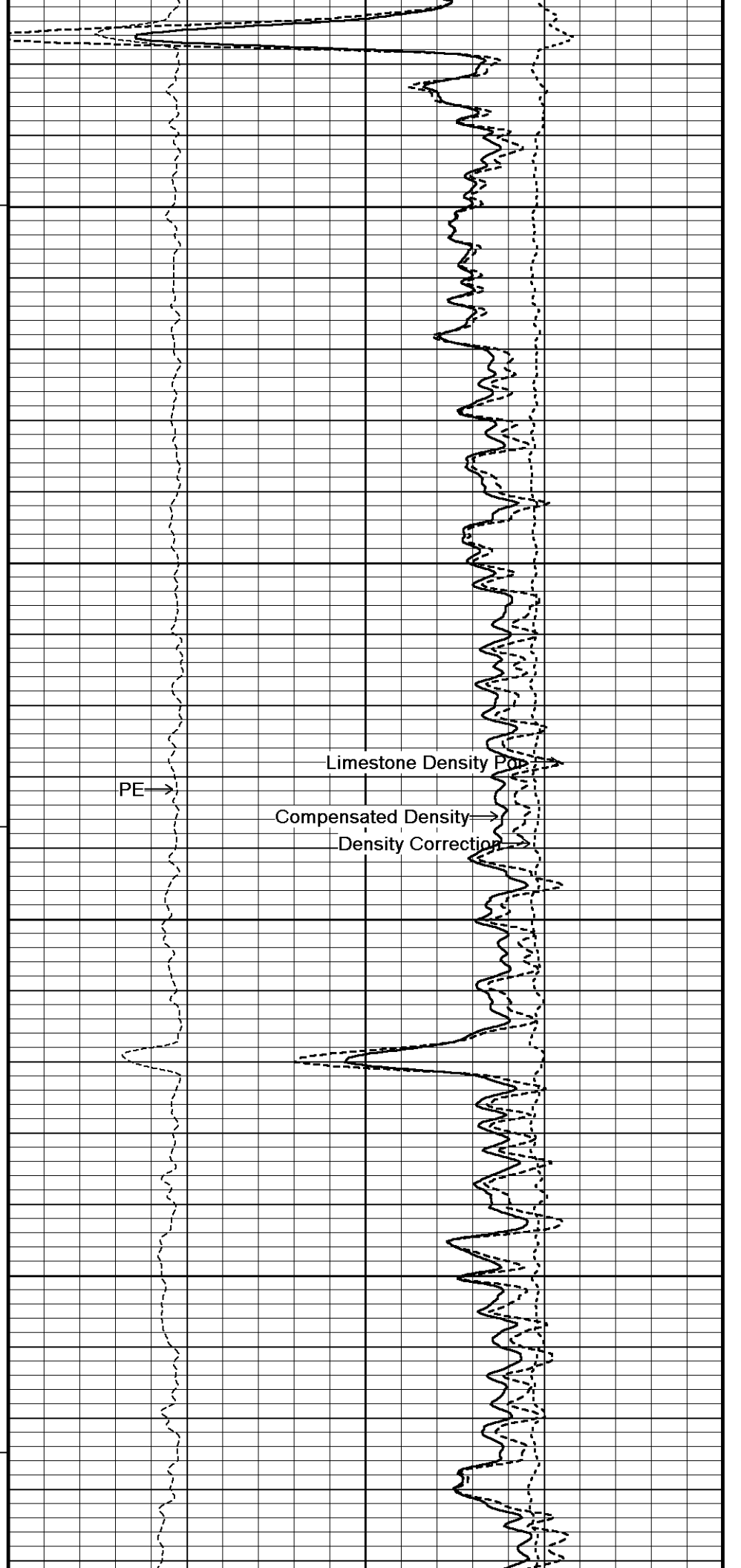
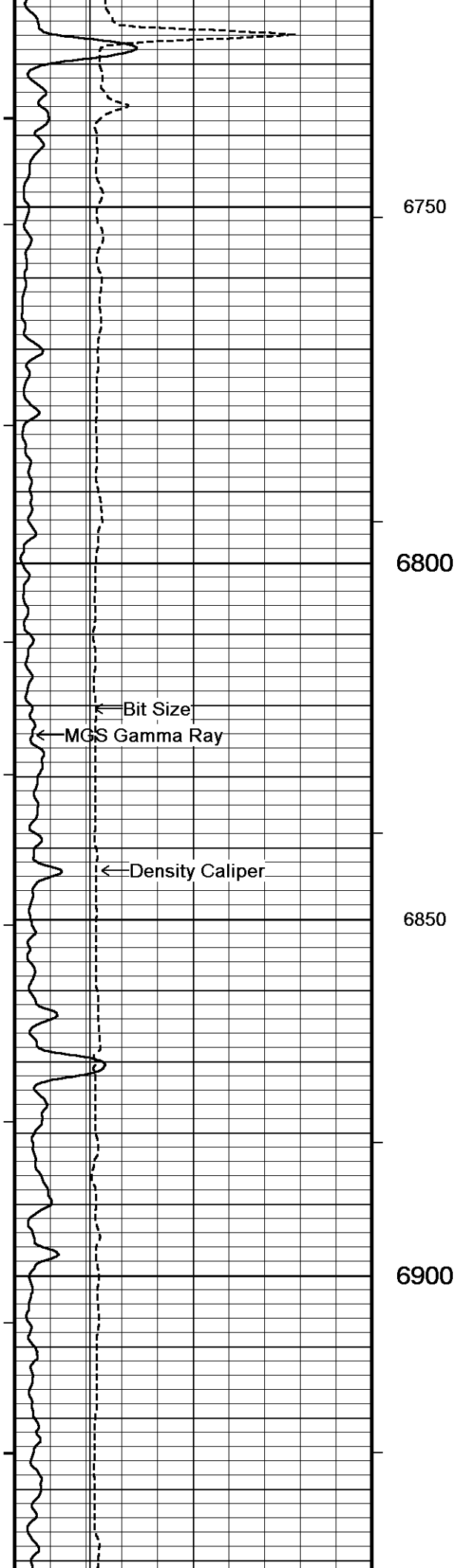


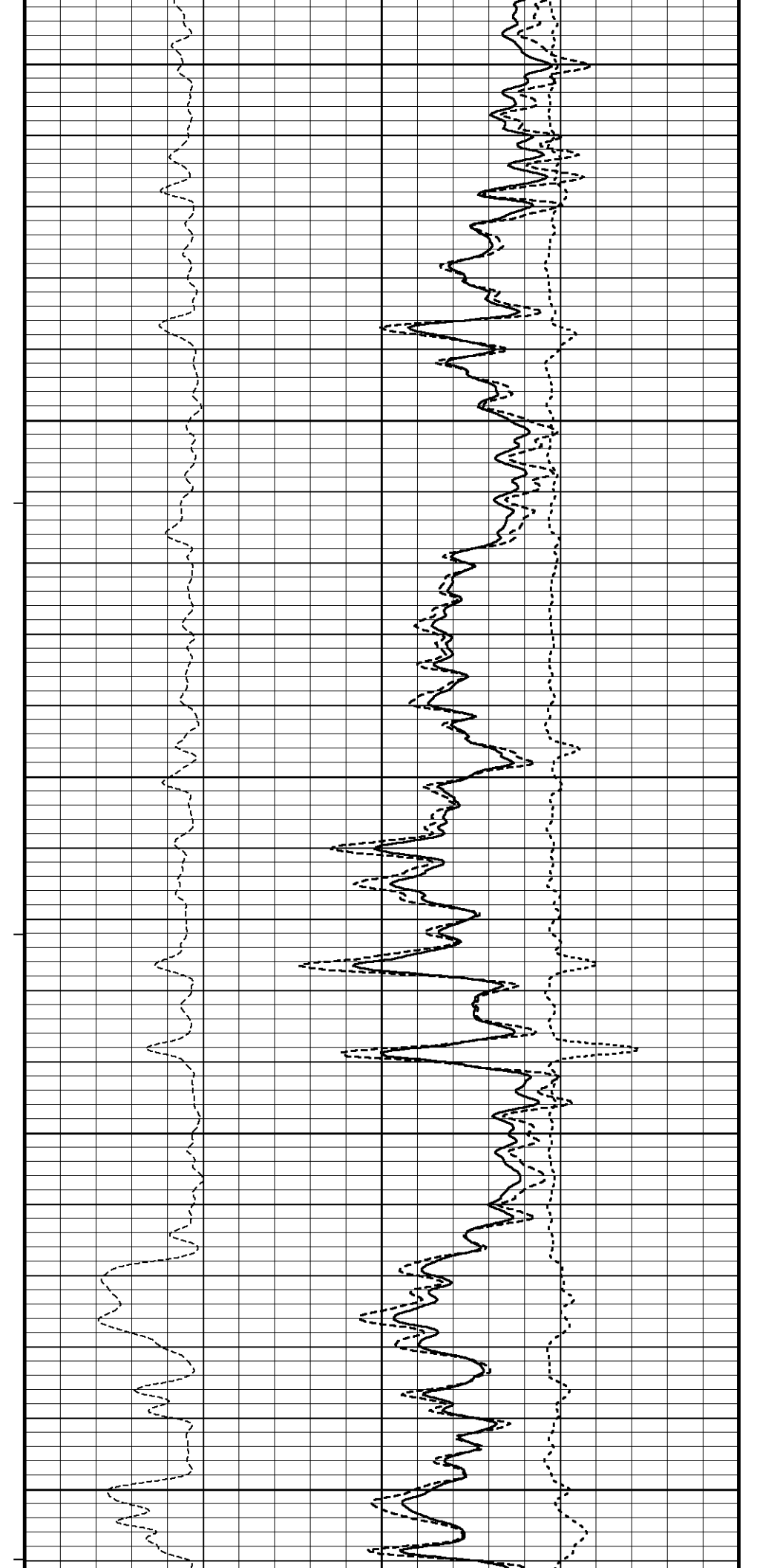
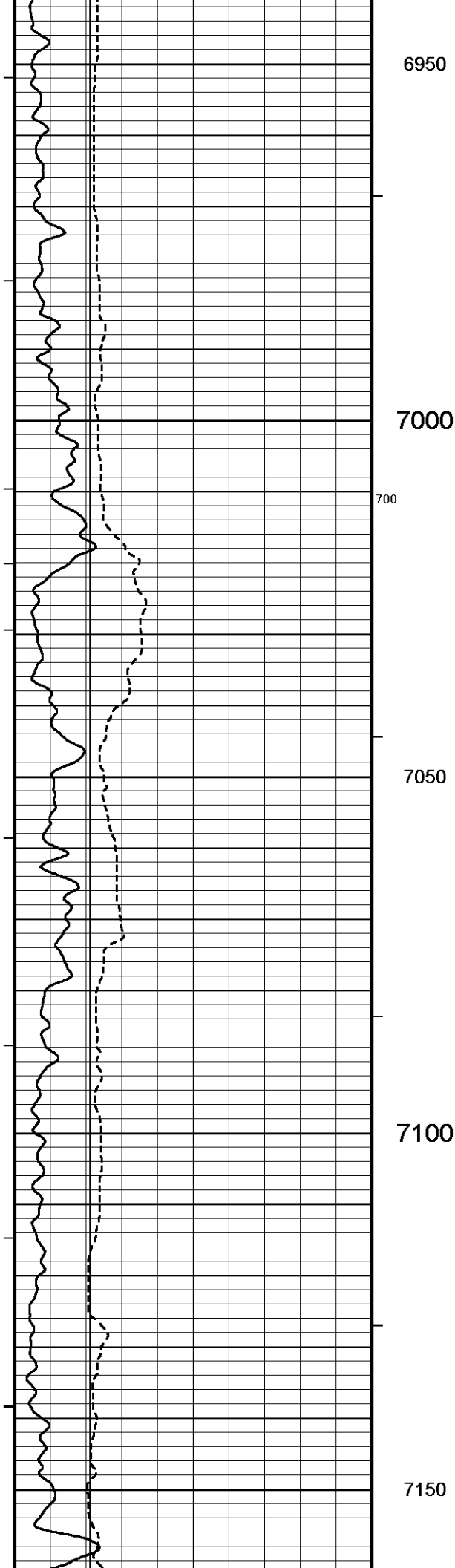


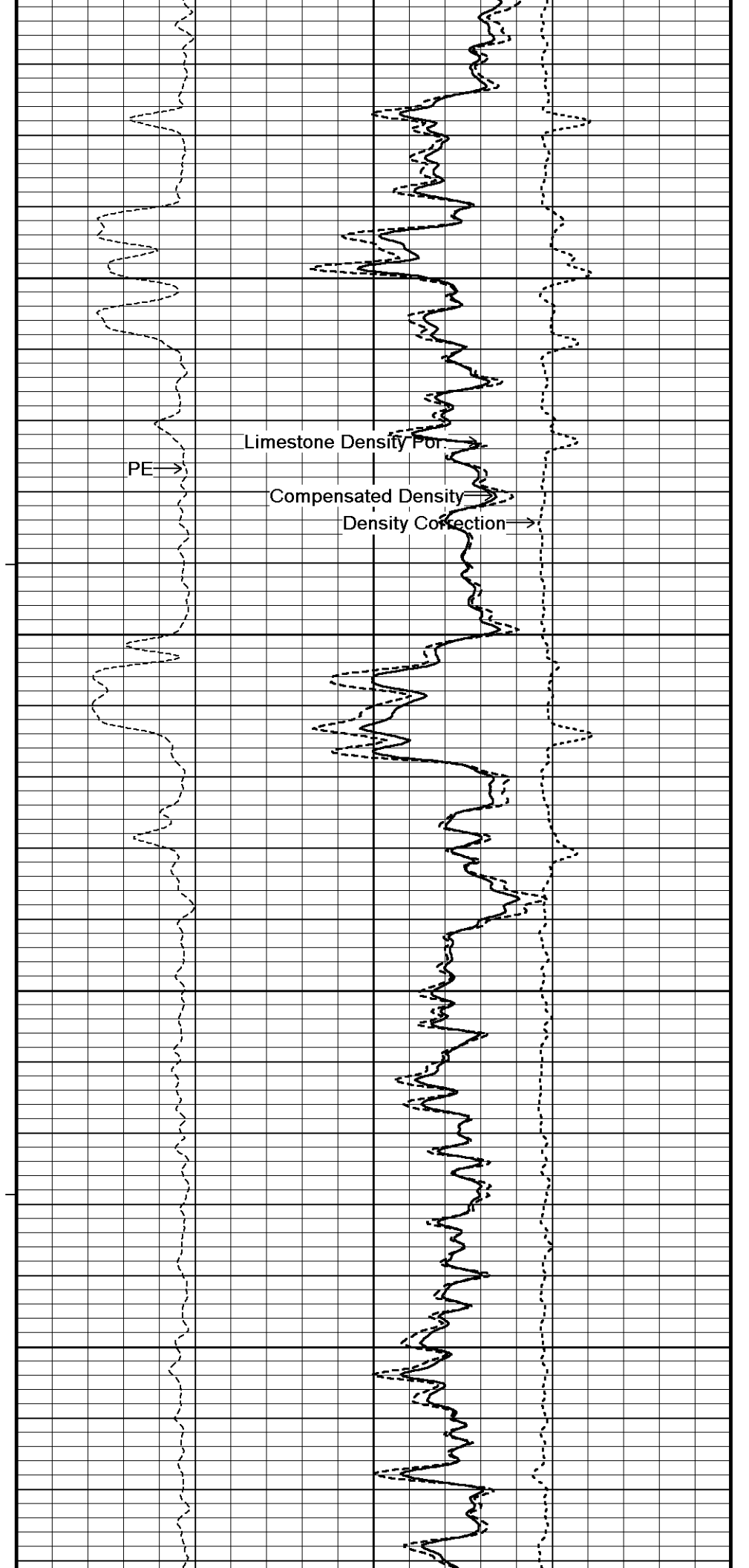
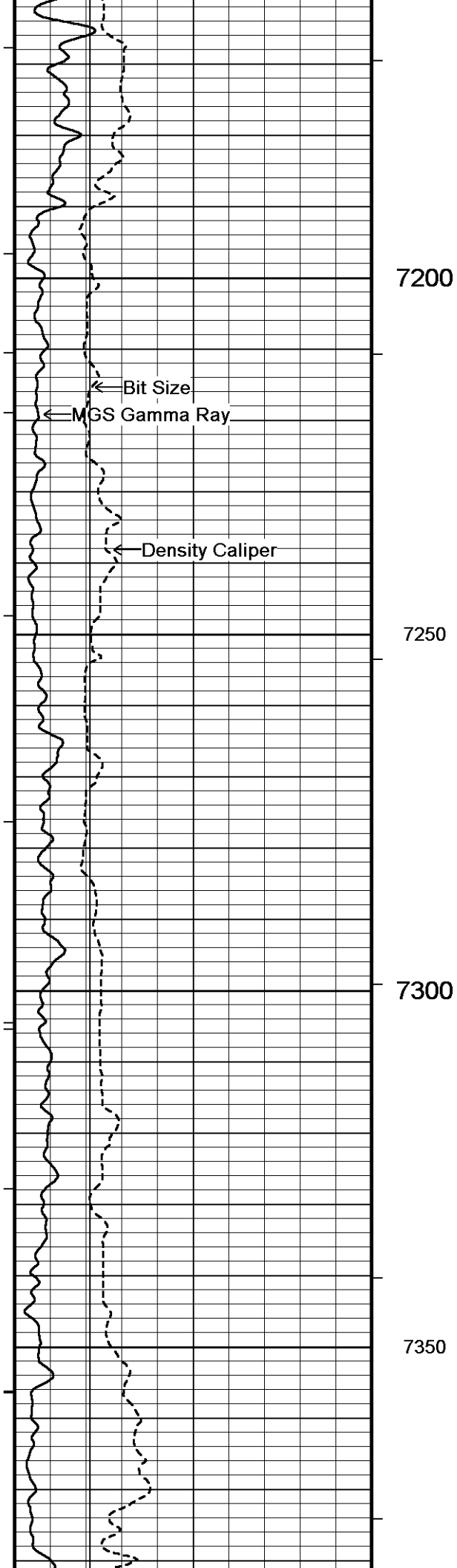


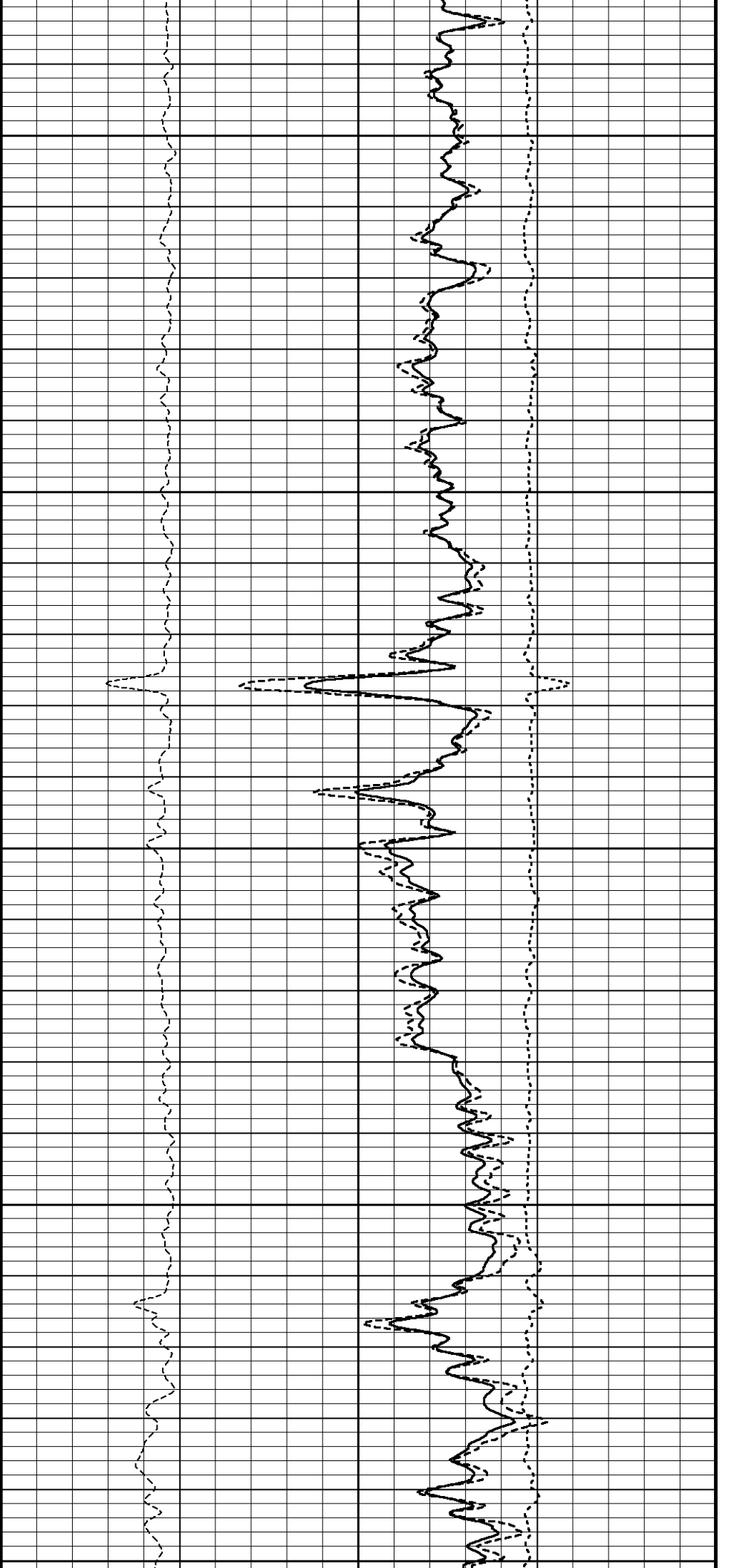
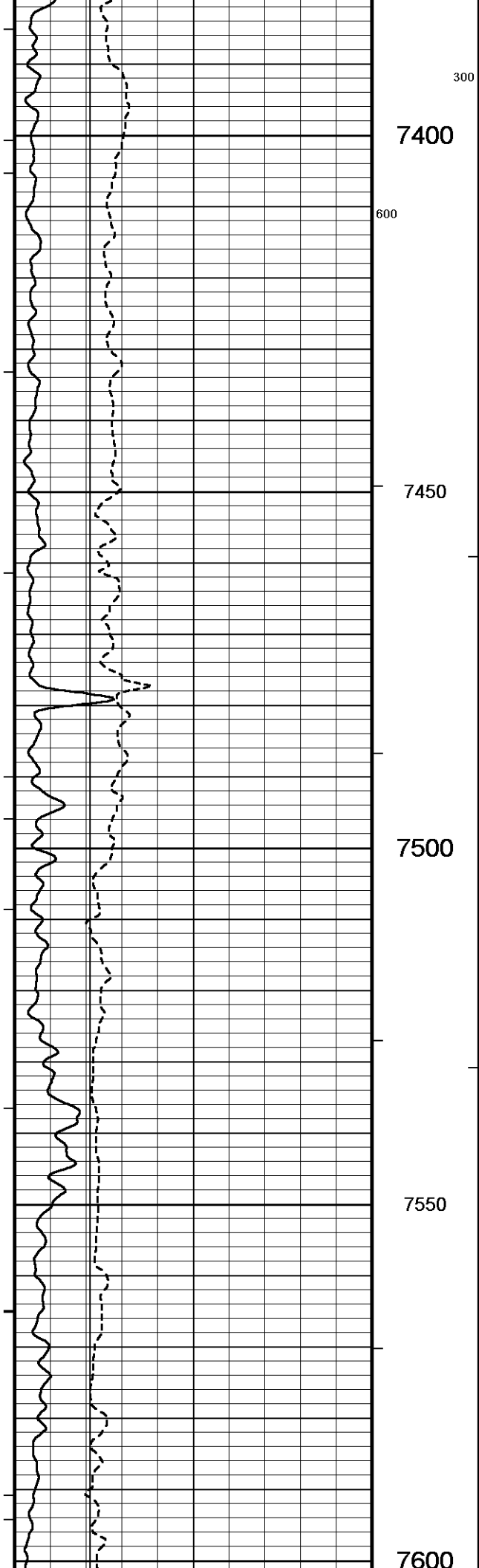


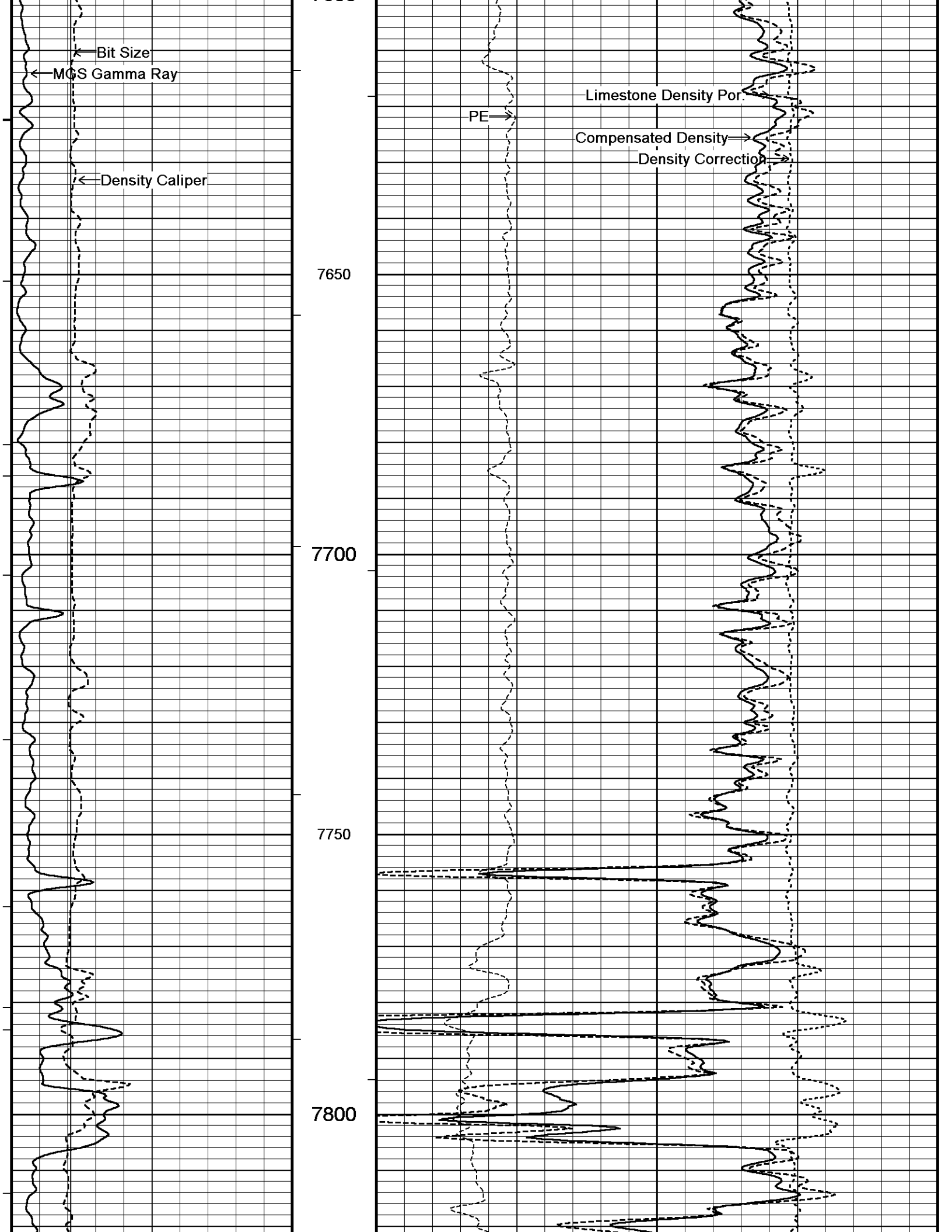


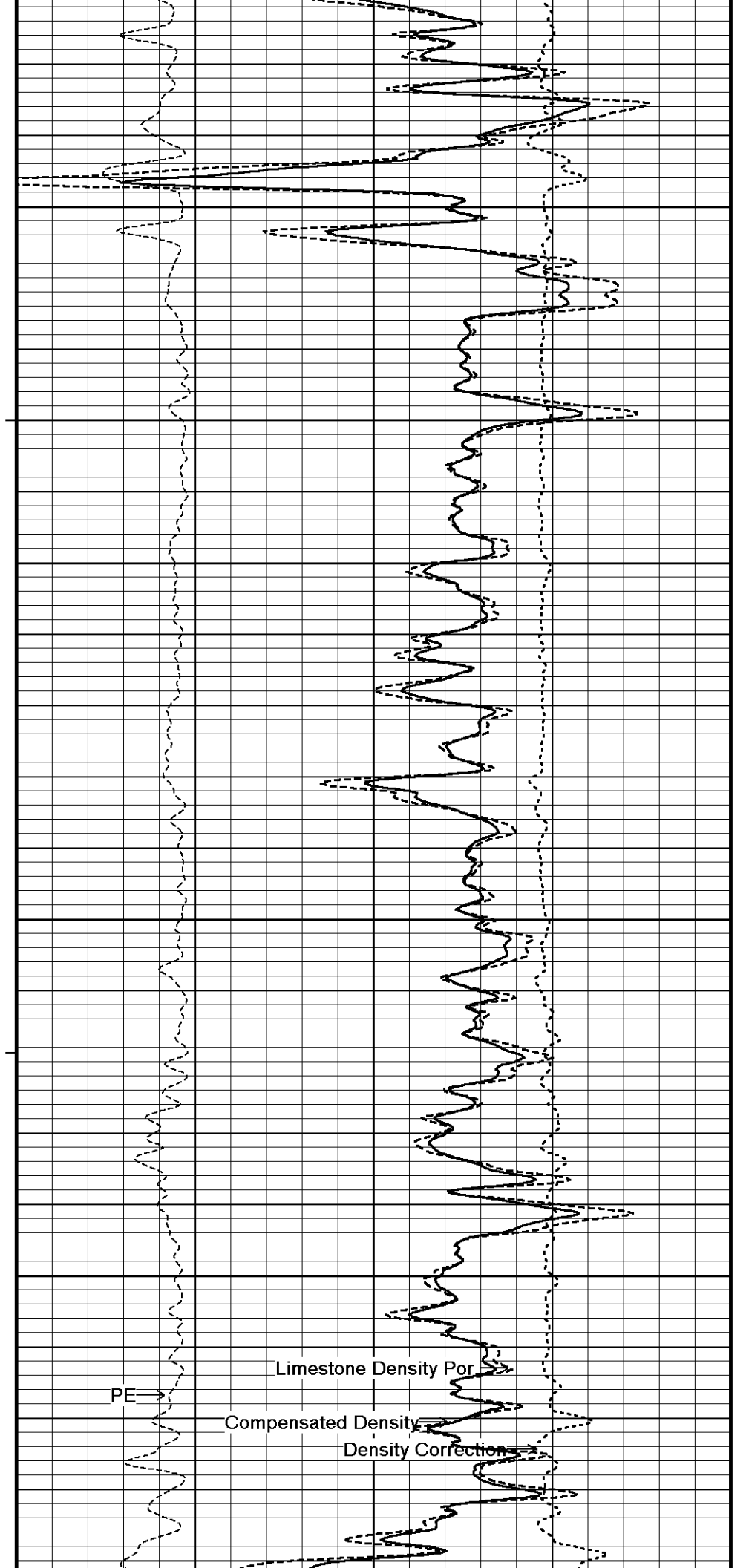
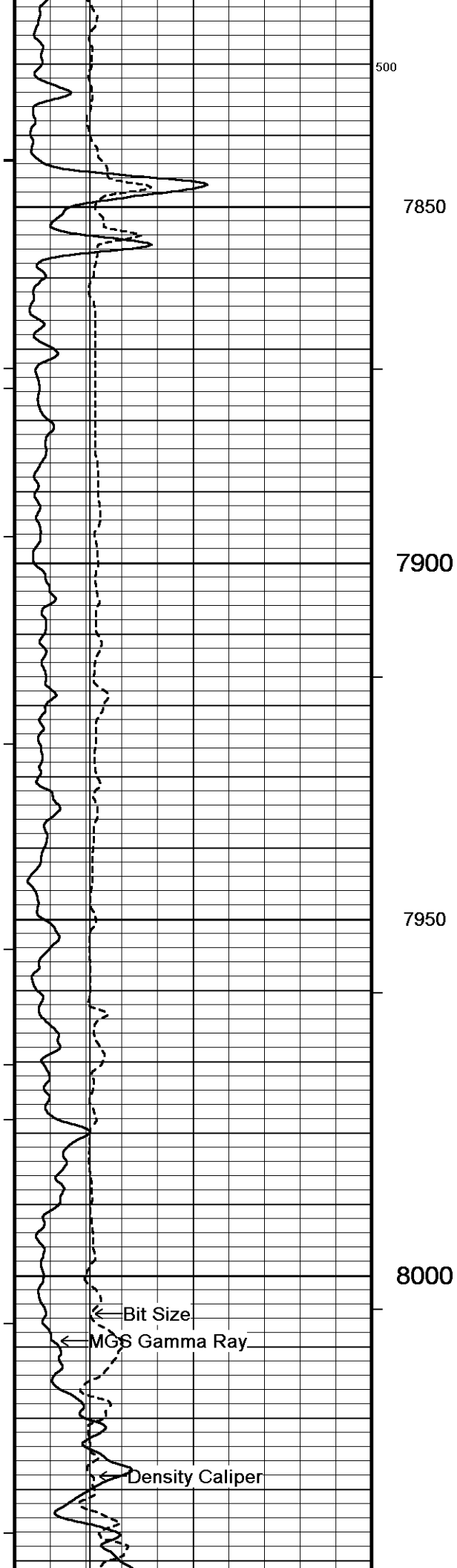


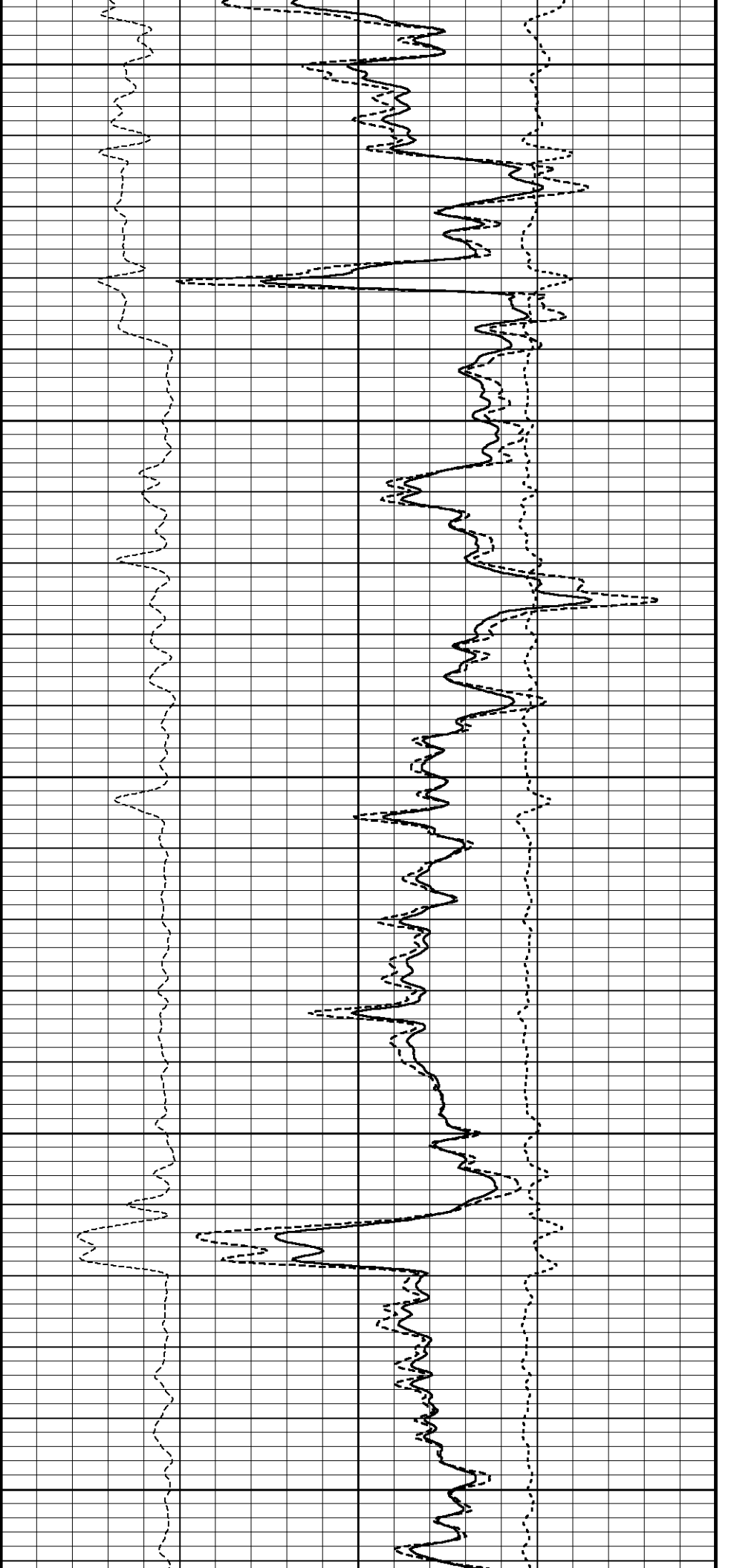
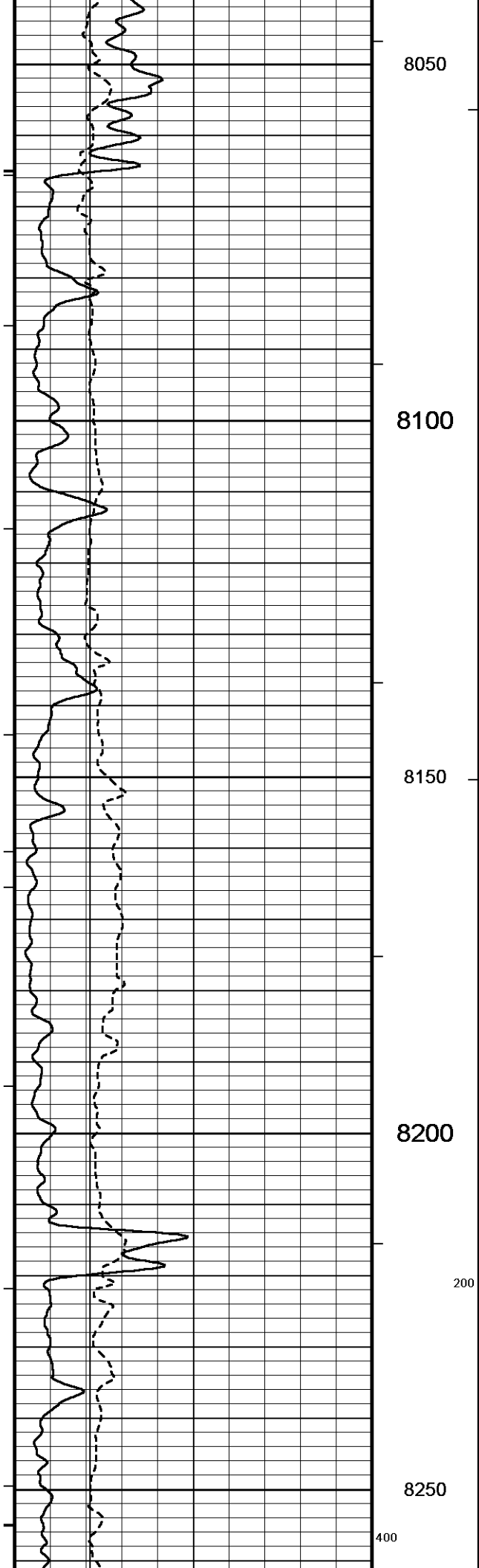


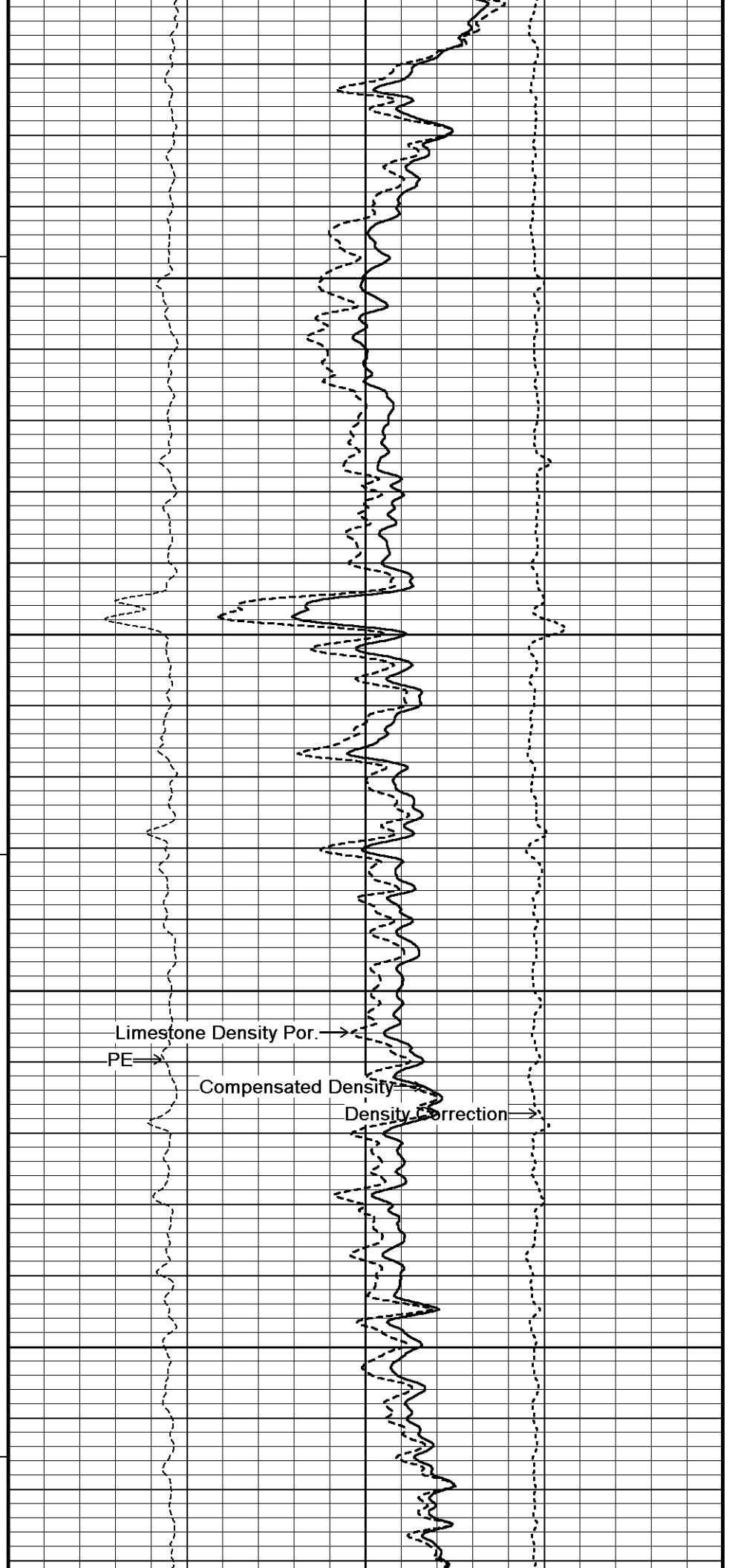
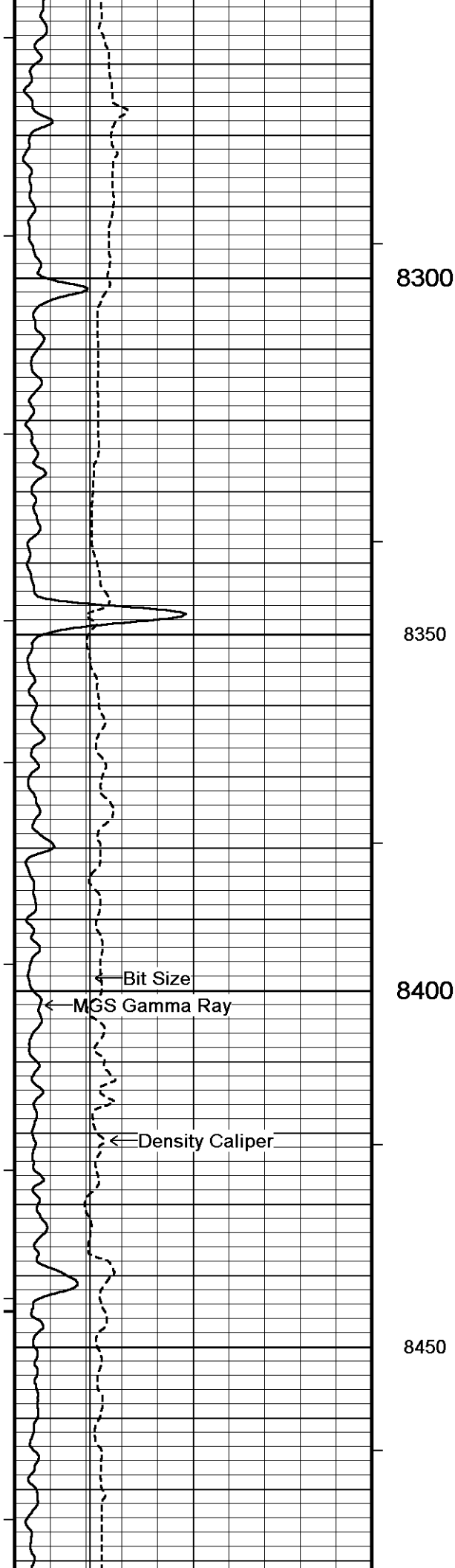


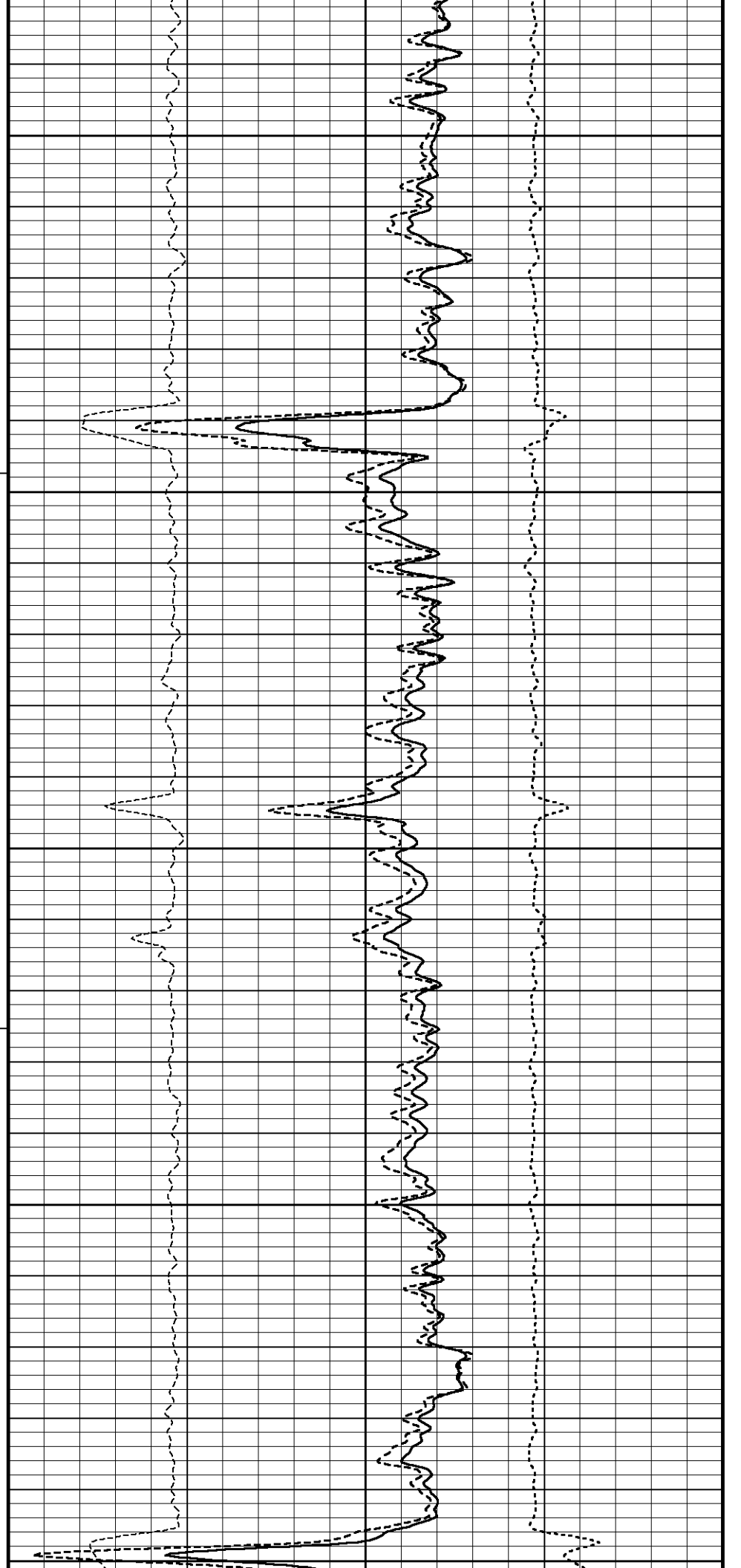
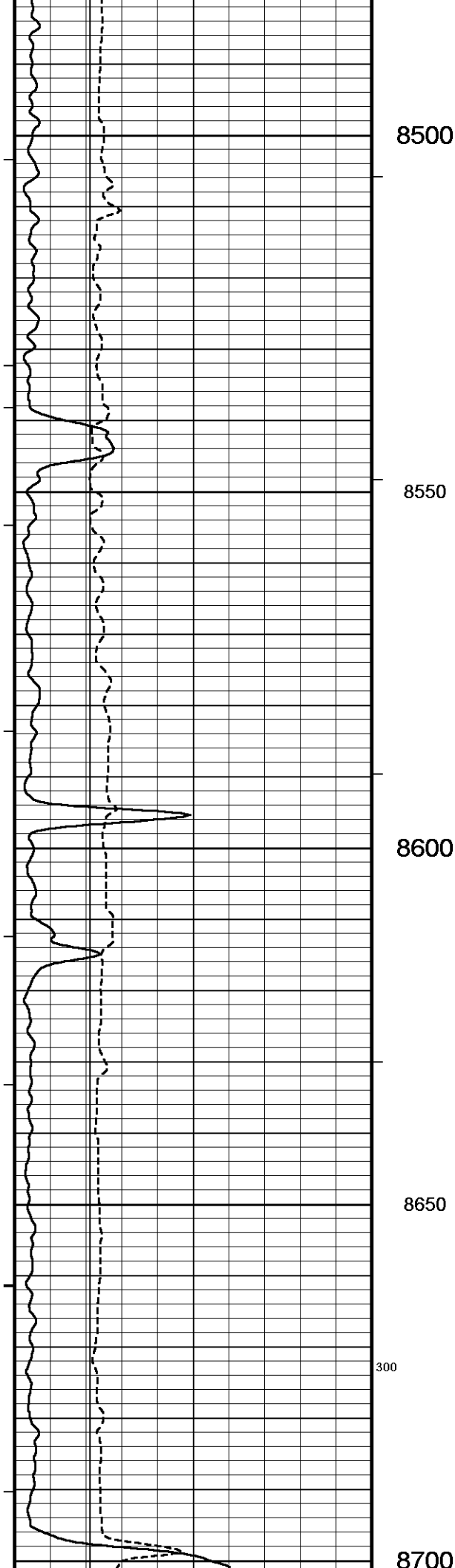


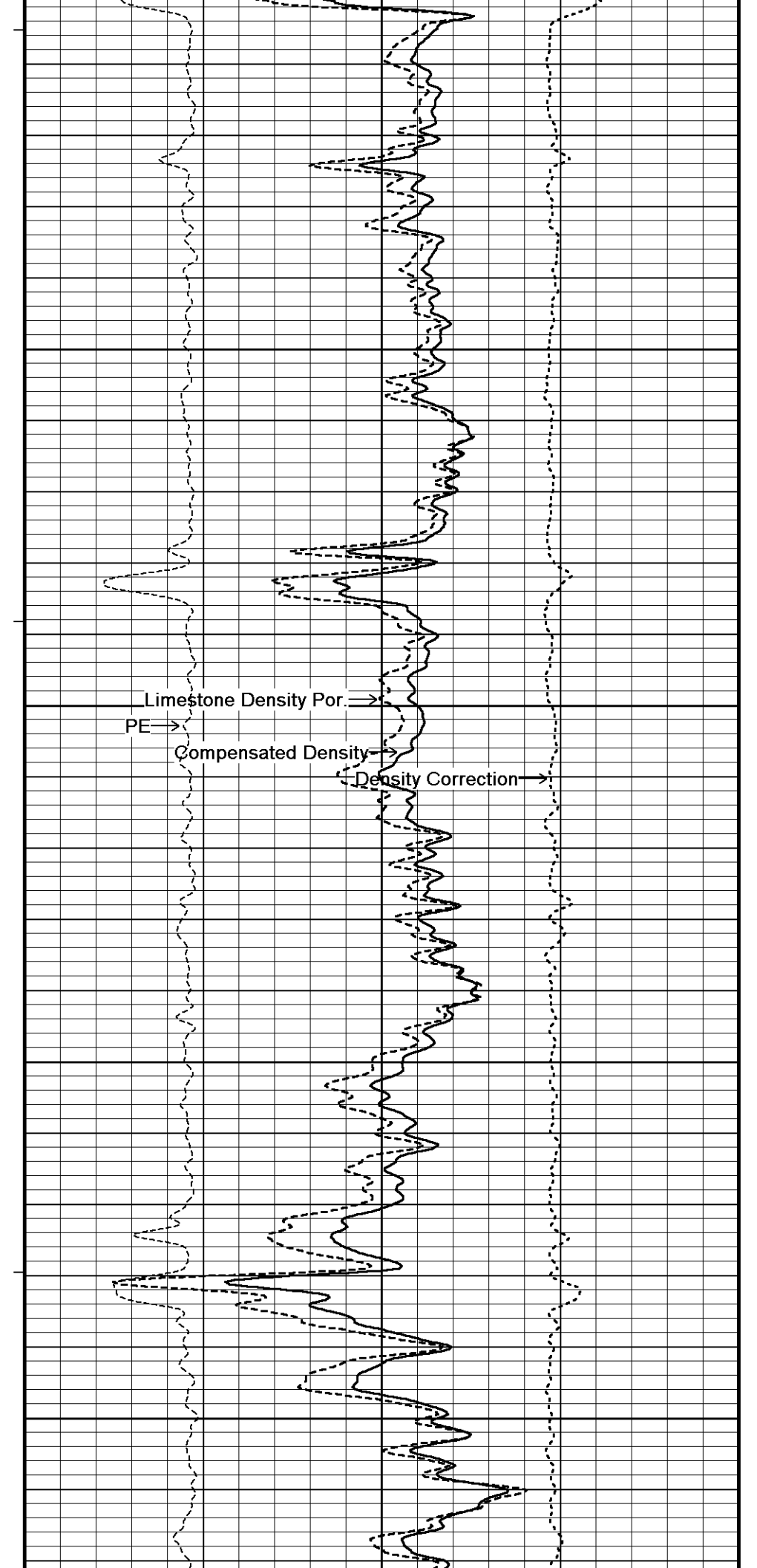
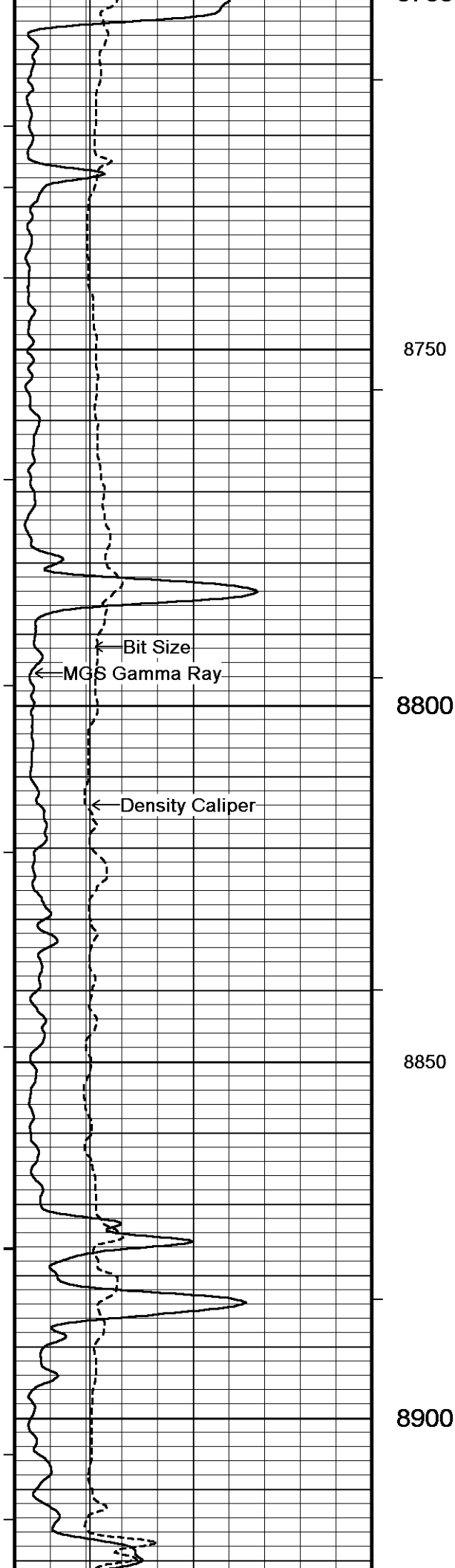


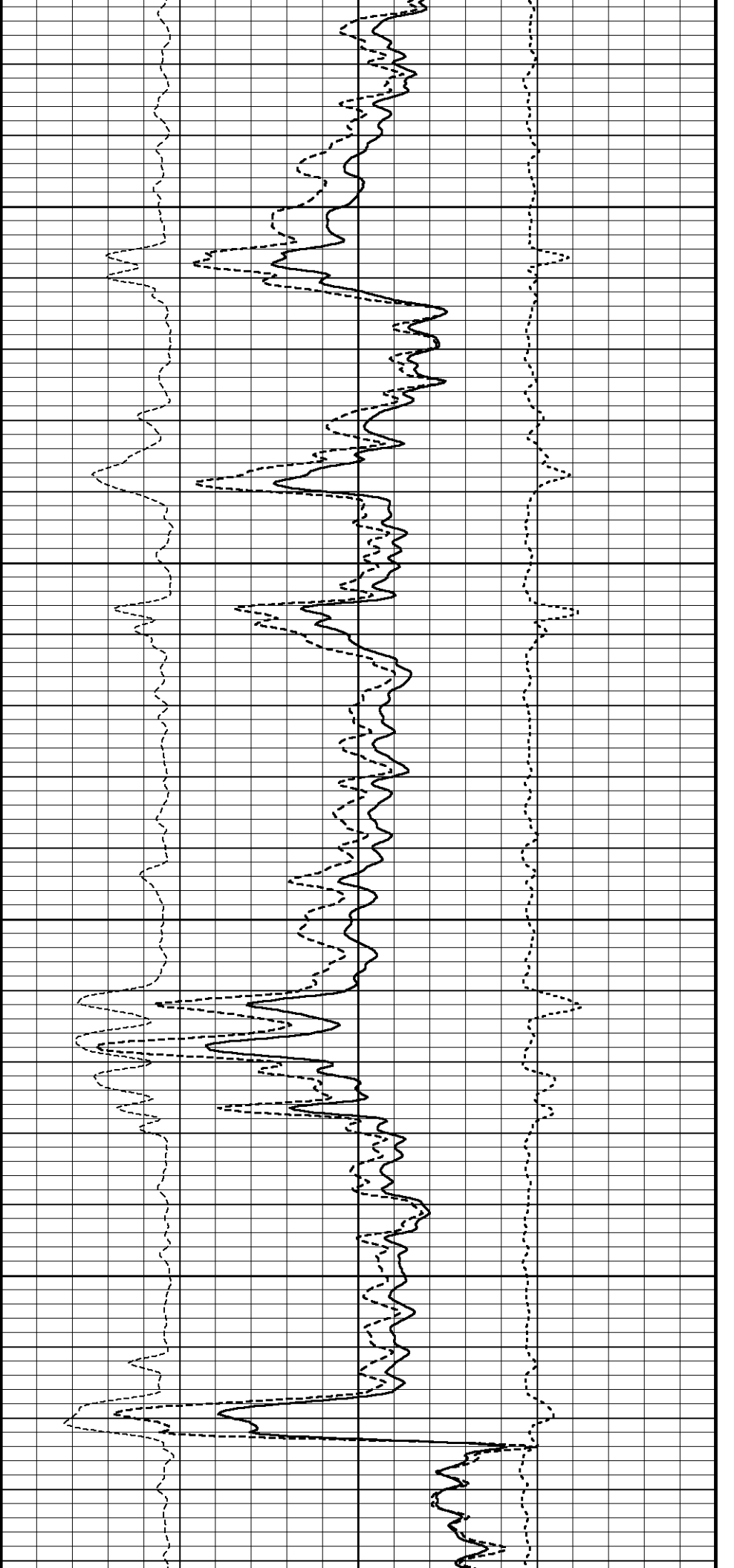
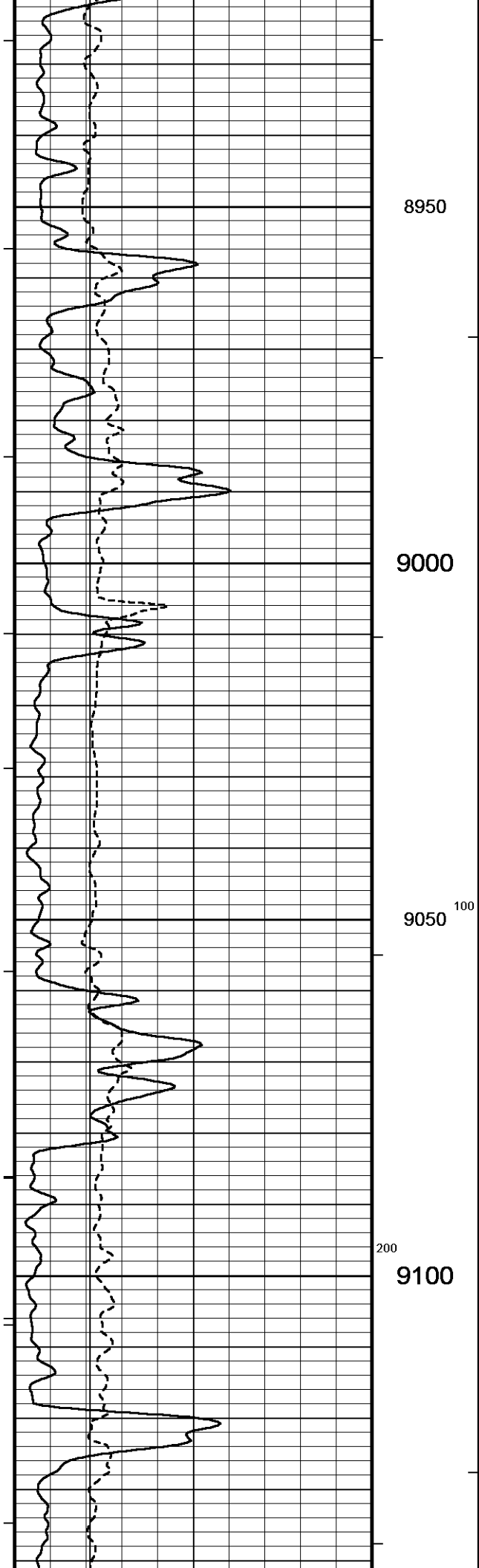


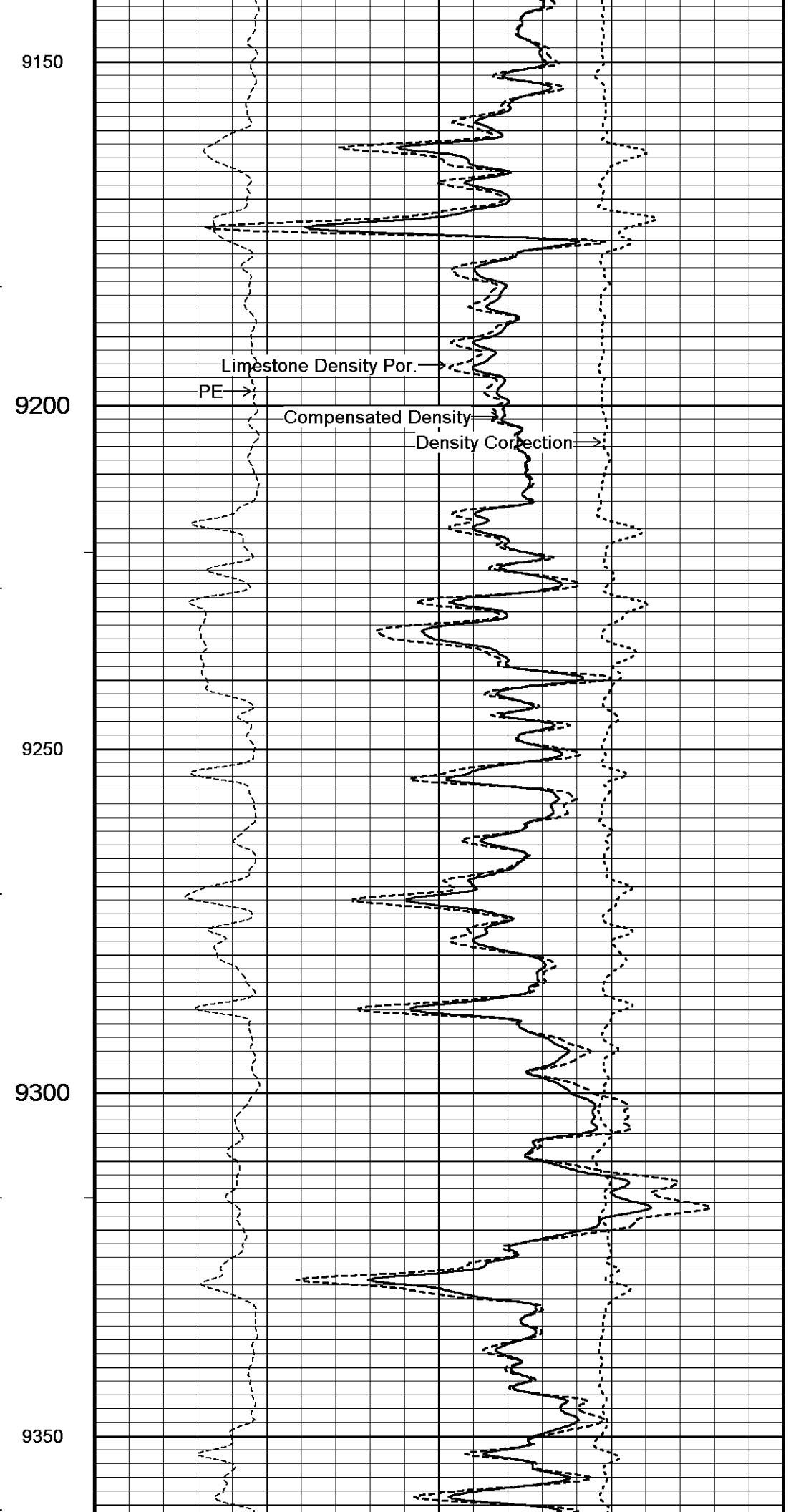
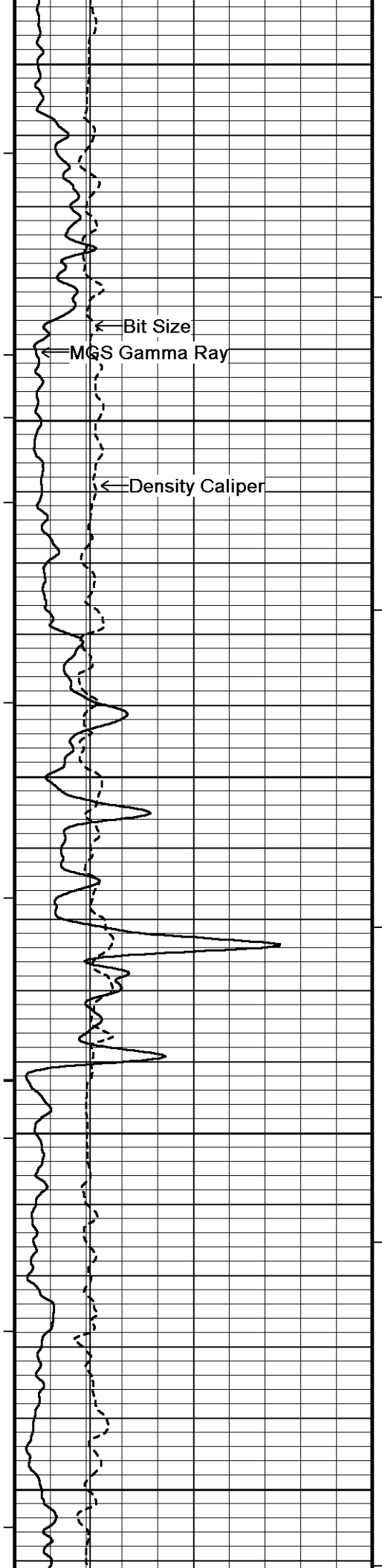


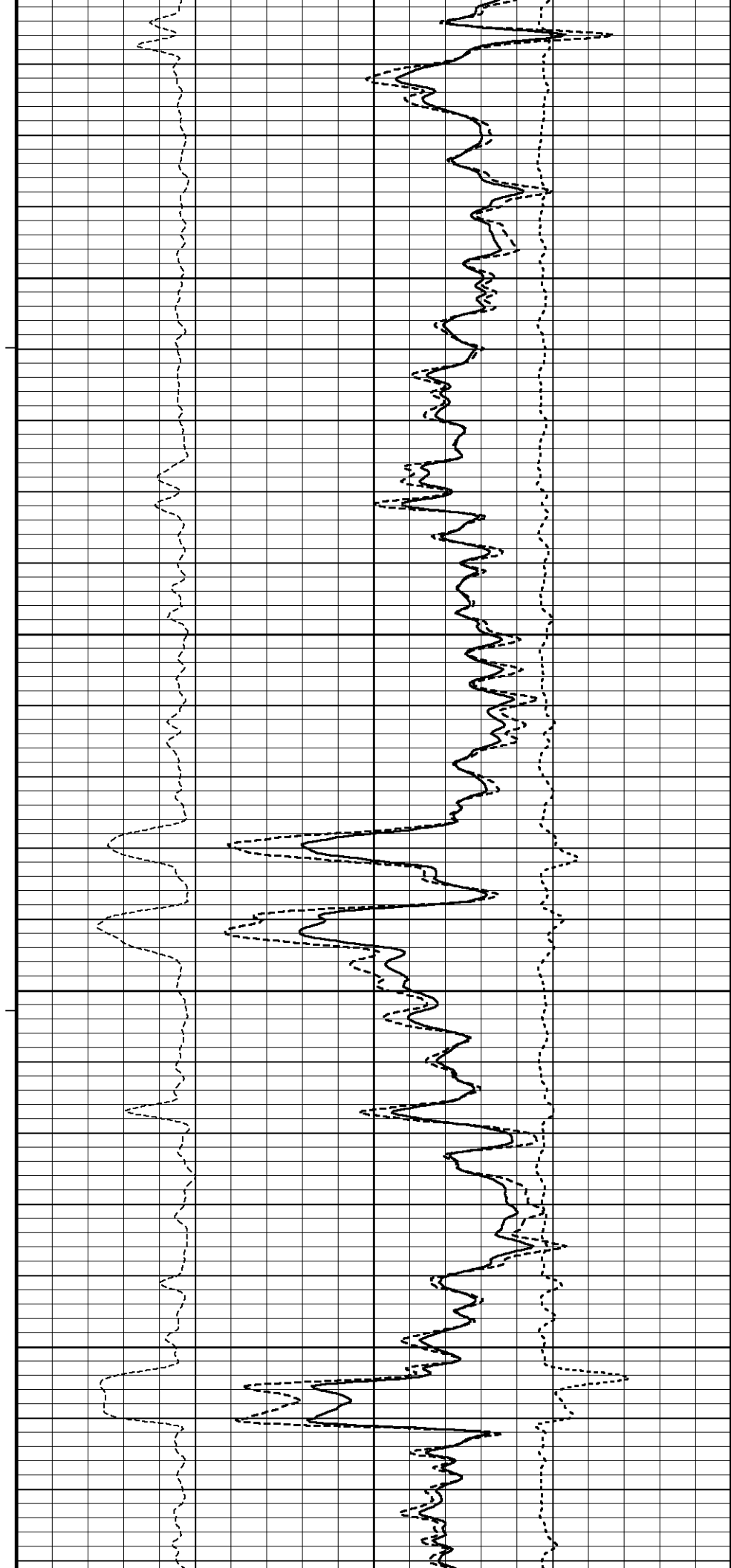
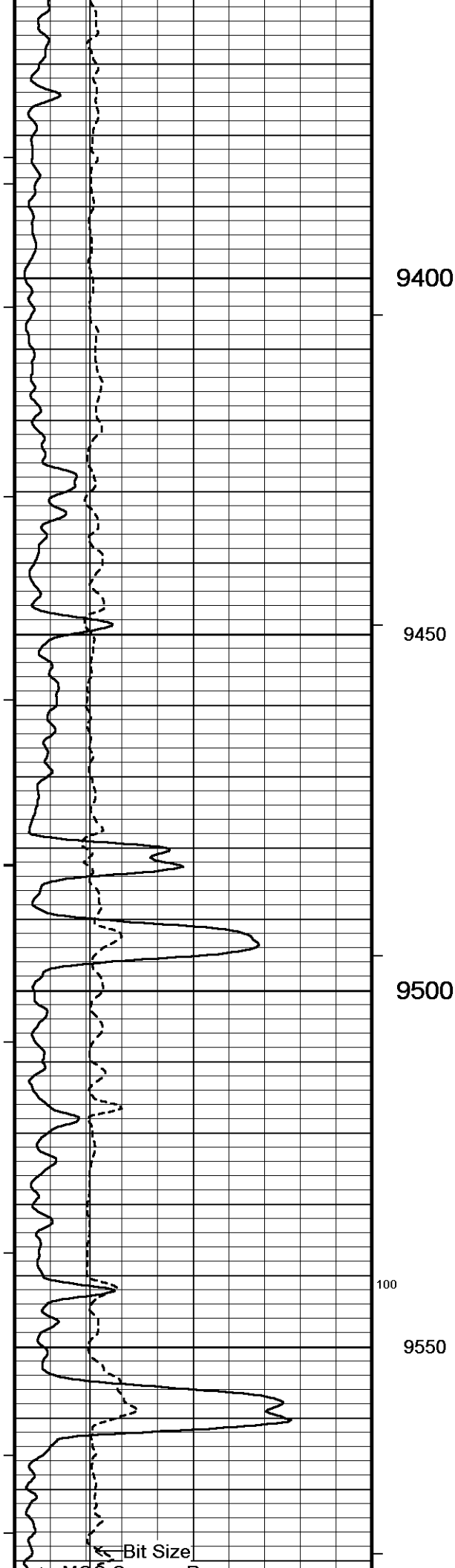


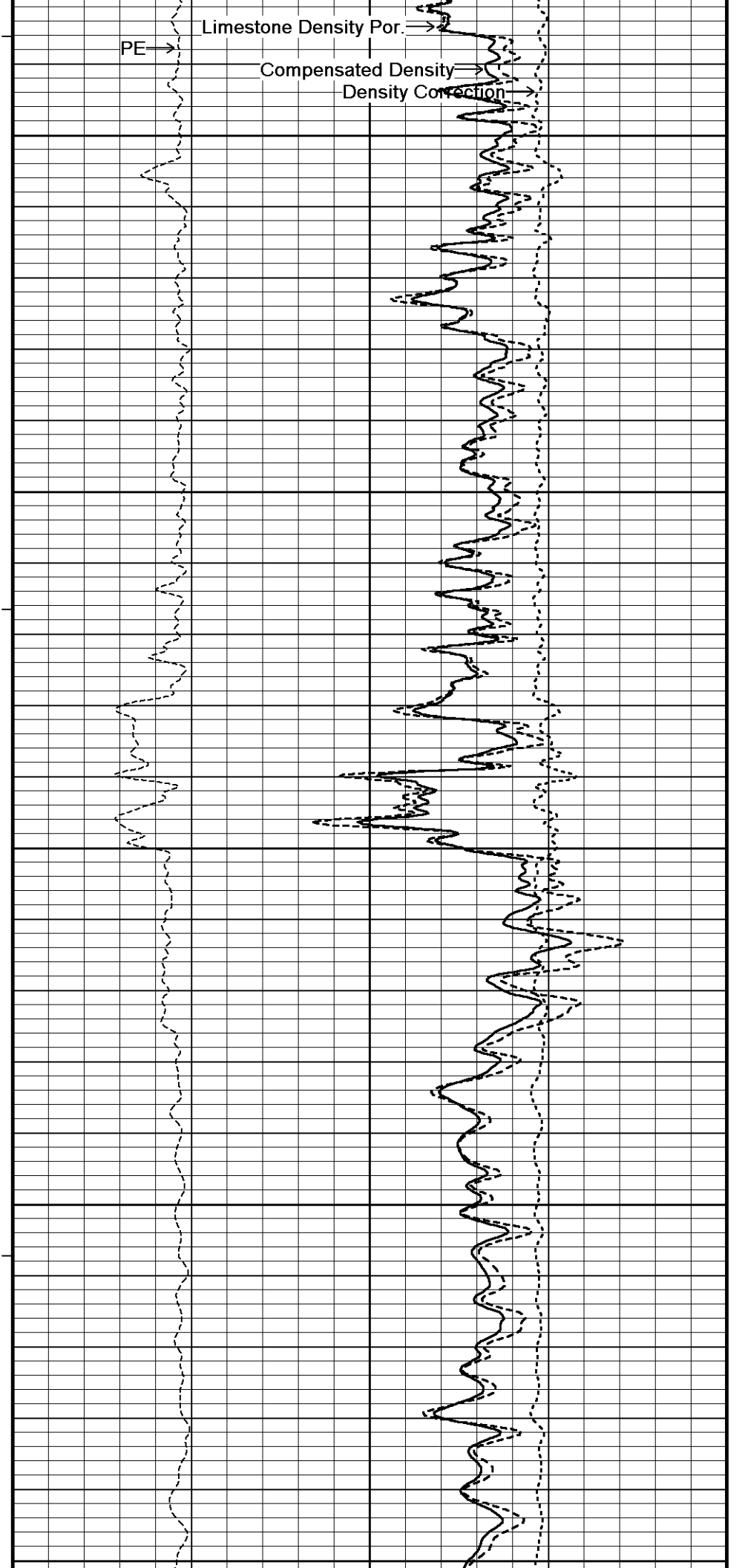
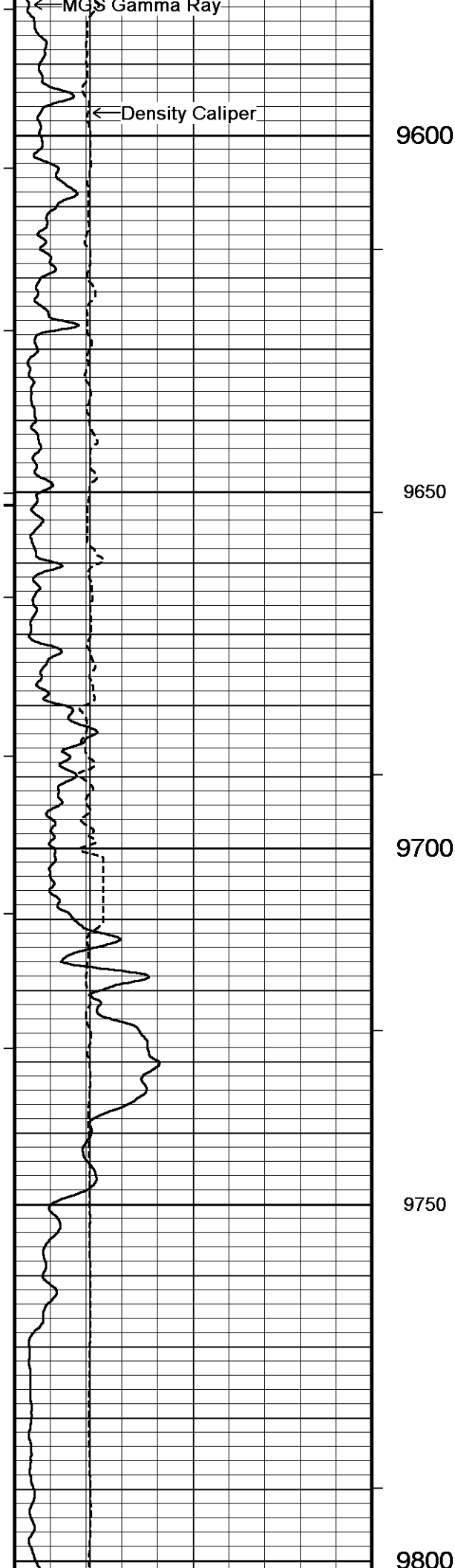


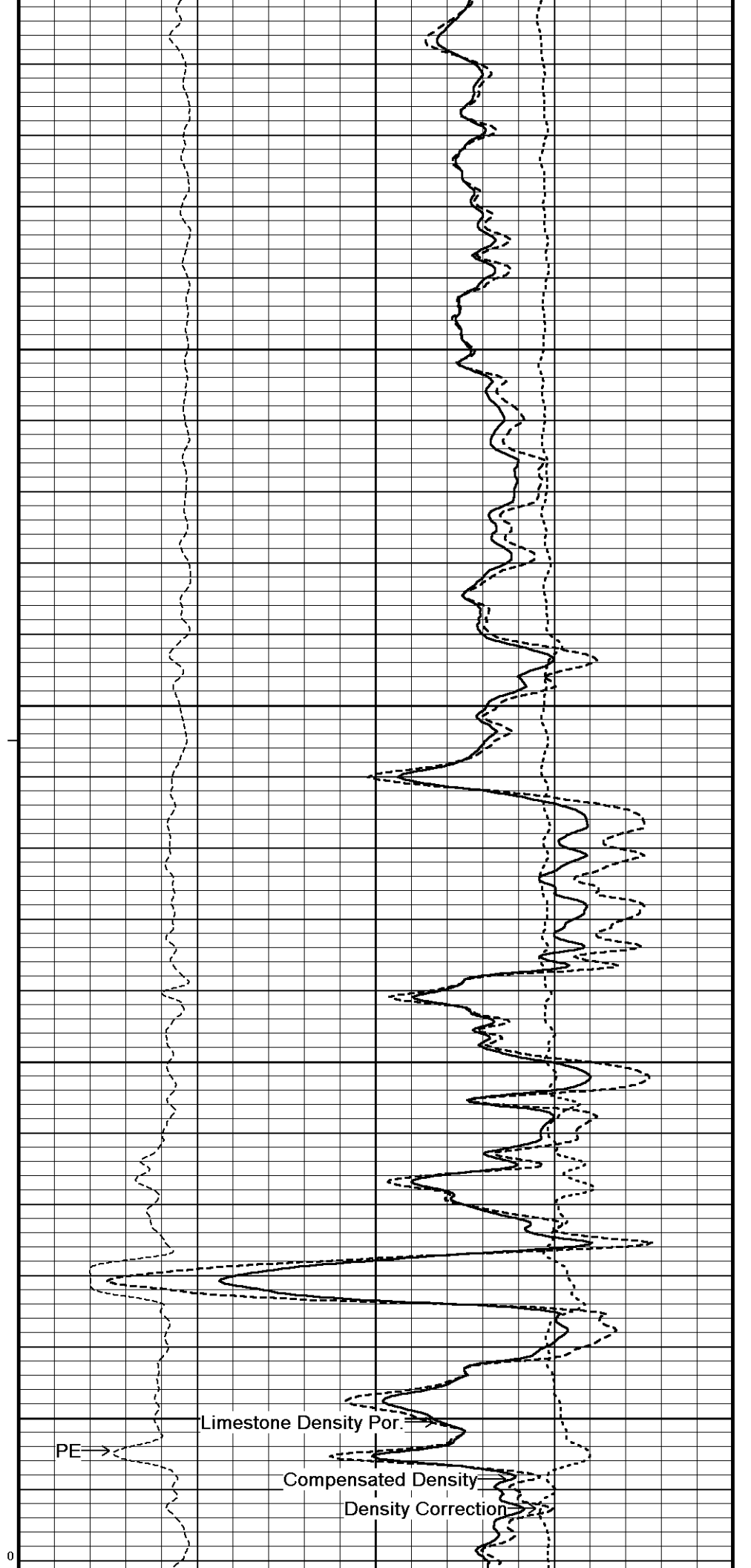
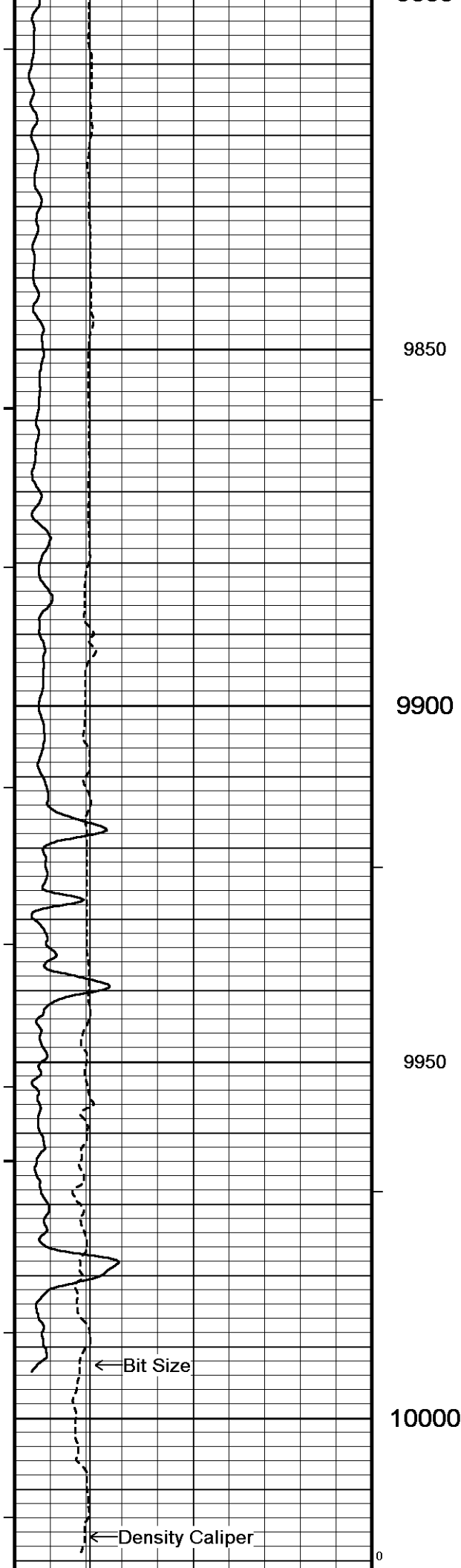


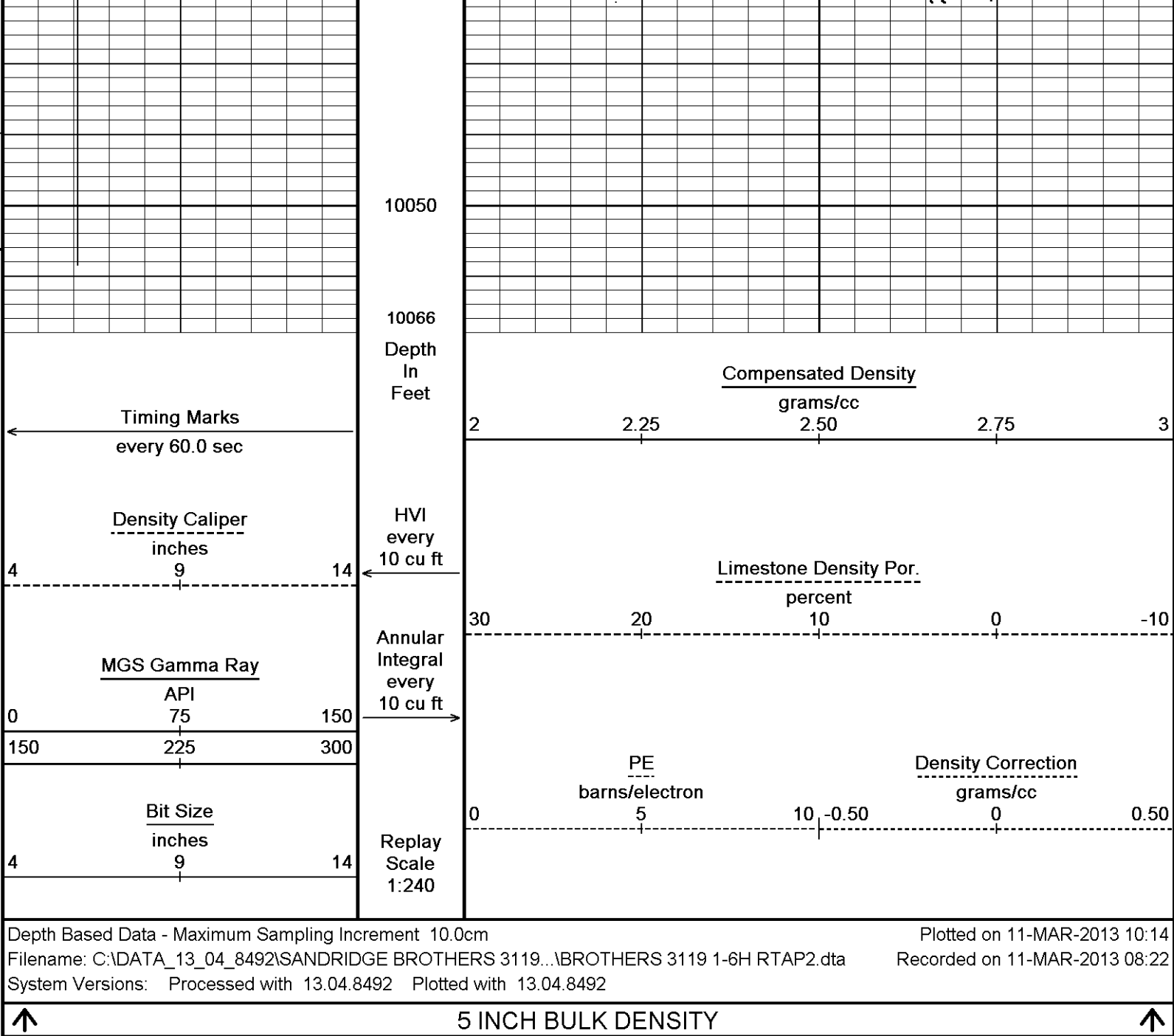












BEFORE SURVEY CALIBRATION		
C:\DATA_13_04_8492\SANDRIDGE BROTHERS 3119 1-6HIBROTHERS 3119 1-6H RTAP2.dta		
General Constants All 000		Last Edited on 06-MAR-2013,20:09
General Parameters		
Mud Resistivity	2.400	ohm-metres
Mud Resistivity Temperature	50.000	degrees F
Water Level	0.000	feet
Borehole Fluid 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	None	
Rwa Parameters		
Porosity used	Base Density Porosity	
Resistivity used	Array Ind. Six Res Rt	
RWA Constant A	0.610	

RWA Constant A	0.810								
RWA Constant M	2.150								
Strain Gauge Constants MMS-E.B 158					Last Edited on 02-MAR-2013,15:44				
Atmospheric Pressure	14.70				psi				
Serial Number	261995								
Calibration Date	13-Nov-2010								
Base Check Date									
Dead Weight Serial Number	0								
Dead Weight Gravitational Correction	1.0								
Temperature	75.0		150.0		250.0		350.0		degrees F
Pressure psia	Inc.	Dec.	Inc.	Dec.	Inc.	Dec.	Inc.	Dec.	
0.0	-0.116	-0.116	-0.105	-0.106	-0.097	-0.097	-0.095	-0.095	
3000.0	5.065	5.068	5.080	5.083	5.094	5.097	5.101	5.103	
6000.0	10.257	10.263	10.277	10.282	10.296	10.301	10.307	10.313	
9000.0	15.460	15.466	15.484	15.490	15.509	15.515	15.526	15.533	
12000.0	20.673	20.678	20.703	20.707	20.734	20.739	20.757	20.762	
15000.0	25.900		25.935		25.973		26.002		

SP Calibration MGS-C.J 142					Field Calibration on 02-MAR-2013,15:32				
		Measured		Calibrated (mV)					
Reference 1		100.0		100.0					
Reference 2		-100.0		-100.0					

High Resolution Temperature Calibration MGS-C.J 142					Field Calibration on 02-MAR-2013,15:32				
		Measured		Calibrated(Deg F)					
Lower		0.00		0.00					
Upper		0.00		0.00					

High Resolution Temperature Constants MGS-C.J 142					Last Edited on 02-MAR-2013,15:32				
Pre-filter Length		11							

Gamma Calibration MGS-C.J 142					Field Calibration on 04-MAR-2013 14:33				
		Measured		Calibrated (API)					
Background		44		29					
Calibrator (Gross)		1099		725					
Calibrator (Net)		1055		696					

Gamma Constants MGS-C.J 142					Last Edited on 06-MAR-2013,19:41				
Gamma Calibrator Number		036							
Mud Density		1.00		gm/cc					
Caliper Source for Processing		Density Caliper							
Tool Position		Eccentred							
Concentration of KCl		0.00		kppm					

Neutron Calibration MDN-B.J 391					Base Calibration on 04-FEB-2013 09:37 Field Check on 09-MAR-2013 22:39				
Base Calibration									
		Measured		Calibrated (cps)					
	Near	Far		Near	Far				
	3127	94		3714	110				
Ratio		33.324		33.764					
Field Calibrator at Base									
				Calibrated (cps)					
				2292	3445				
Ratio				0.665					
Field Check									
				Calibrated (cps)					
				2101	3158				
Ratio				0.668					

Neutron Constants MDN-B.J 391					Last Edited on 09-MAR-2013,22:36				
Neutron Source Id		N1055							
Neutron Jig Number		N639							
Epithermal Neutron		No							
Caliper Source for Processing		Density Caliper							
Stand-off		0.00		inches					

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	MGS External Temperature	
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	

FE Calibration MFE-C.A 395

Base Calibration on 09-MAR-2013,23:07

Field Check on 09-MAR-2013,23:07

Base Calibration

	Measured	Calibrated (ohm-m)
Reference 1	0.0	0.0
Reference 2	972.5	126.8
Base Check		279.1
Field Check		279.1

FE Constants MFE-C.A 395

Last Edited on

Running Mode	No Sleeve	
MFE K Factor	0.1268	
Caliper Source for FE correction	Bit Size	
Caliper Value for FE correction	2.25	inches
Rm Source for FE correction	Constant Value	
Temp. for Rm Corr.	MCG External Temperature	
Stand-off	Centred	inches

Induction Calibration MAI-A.A 166

Base Calibration on 01-MAR-2013,14:03

Field Check on 09-MAR-2013 22:28

Base Calibration

Test Loop Calibration	Measured		Calibrated (mmho/m)	
Channel	Low	High	Low	High
1	17.4	475.9	9.3	966.2
2	6.7	390.1	7.6	821.4
3	3.6	261.4	5.2	566.0
4	2.0	135.3	2.6	279.2

Array Temperature 0.0 Deg F

Channel	Base Check (mmho/m)		Field Check (mmho/m)	
	Low	High	Low	High
1			11.1	3816.4
2			27.9	3457.6
3			27.7	3027.5
4			18.9	2043.7
Deep			17.7	2008.7
Medium			40.3	3979.9
Shallow			40.5	5057.7

Array Temperature 54.2 Deg F

Induction Constants MAI-A.A 166

Last Edited on 11-MAR-2013,08:29

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	0.00	inches
Number of Fins on Stand-off	6.0000	
Stand-off Fin Angle	60.00	degrees
Stand-off Fin Width	0.5000	inches
Borehole Corr. Rm Source	Temperature Corr	
Temp. for Rm Corr.	MGS 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 166			
			Field Calibration on 01-MAR-2013,06:39
	Measured	Calibrated(Deg F)	
Lower	0.00	10.00	
Upper	100.00	100.00	
High Resolution Temperature Constants MAI-A.A 166			
			Last Edited on 02-MAR-2013,15:30
Pre-filter Length	11		
Caliper Calibration MPD-B 166			
			Base Calibration on 02-JAN-2013 13:59
			Field Calibration on 04-MAR-2013 14:44
Base Calibration			
Reading No	Measured	Calibrator Size (in)	
1	13888	4.02	
2	22271	6.00	
3	30944	8.03	
4	38940	10.02	
5	48352	12.01	
6	N/A	N/A	
Field Calibration			
	Measured Caliper (in)	Actual Caliper (in)	
	6.10	6.00	
Photo Density Calibration MPD-B 166			
			Base Calibration on 27-FEB-2013,20:31
			Field Check on 09-MAR-2013 22:35
Density Calibration			
Base Calibration			
	Measured	Calibrated (sdu)	
	Near	Far	Near Far
Reference 1	49795	21888	59869 31110
Reference 2	20626	2381	24557 2522
Field Check at Base			
	1172.4	1342.2	
Field Check			
	1166.7	1334.2	
PE Calibration			
Base Calibration			
	Measured	Calibrated	
	WS	WH	Ratio
Background	212	1049	
Reference 1	20253	49611	0.413
Reference 2	5714	20492	0.283
			0.271

Field Check at Base
211.9 1049.4

Field Check
212.8 1042.6

Density Constants MPD-B 166

Last Edited on 06-MAR-2013,19:42

Density Source Id	236	
Nylon Calibrator Number	633	
Aluminium Calibrator Number	633	
Density Shoe Profile	4 inch	
Caliper Source for Processing	Density Caliper	
PE Correction to Density	Not Applied	
Mud Density	1.00	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	0.00

DOWNHOLE EQUIPMENT

C:\DATA_13_04_8492\SANDRIDGE BROTHERS 3119 1-6H\BROTHERS 3119 1-6H RTAP2.dta

Shuttle Running Tool 3.5")
SRT-A.A 69 LG: 6.62 ft WT: 37.5 lb OD: 2.52 in

MBS-G.A 200v Compact Battery Sub
MBS-G.A 115 LG: 10.61 ft WT: 70.5 lb OD: 2.24 in

Compact Memory Sub E.B
MMS-E.B 158 LG: 5.20 ft WT: 37.5 lb OD: 2.24 in

Compact Tool Isolator sub.
MTI-B.A 76 LG: 1.54 ft WT: 13.2 lb OD: 2.24 in

Compact Short Gamma
MGS-C.J 142 LG: 3.41 ft WT: 24.3 lb OD: 2.24 in

Compact Collar Locator
MCL-B.J 63 LG: 3.17 ft WT: 26.5 lb OD: 2.24 in

SKJ-E.B Compact Knuckle Joint
SKJ-E.B 479 LG: 2.17 ft WT: 24.3 lb OD: 2.24 in

SHA-J.A Compact Swivel Head Adaptor
SHA-J.A 451 LG: 2.30 ft WT: 22.0 lb OD: 2.24 in

MIS-D.B Compact Inline Bowspring sub
MIS-D.B 608 LG: 5.70 ft WT: 33.1 lb OD: 2.24 in



61.76 ft GRGM - MGS Gamma Ray
59.77 ft GSXT - MGS External Temperature

42.89 ft NPRL - Limestone Neutron Por.

Compact Density/Caliper
MPD-B 166 LG: 9.59 ft WT: 90.4 lb OD: 2.24 in

MIS-D.B Compact Inline Bowspring sub
MIS-D.B 607 LG: 5.70 ft WT: 33.1 lb OD: 2.24 in

SHA-J.A Compact Swivel Head Adaptor
SHA-J.A 438 LG: 2.30 ft WT: 22.0 lb OD: 2.24 in

SKJ-E.B Compact Knuckle Joint
SKJ-E.B 478 LG: 2.17 ft WT: 24.3 lb OD: 2.24 in

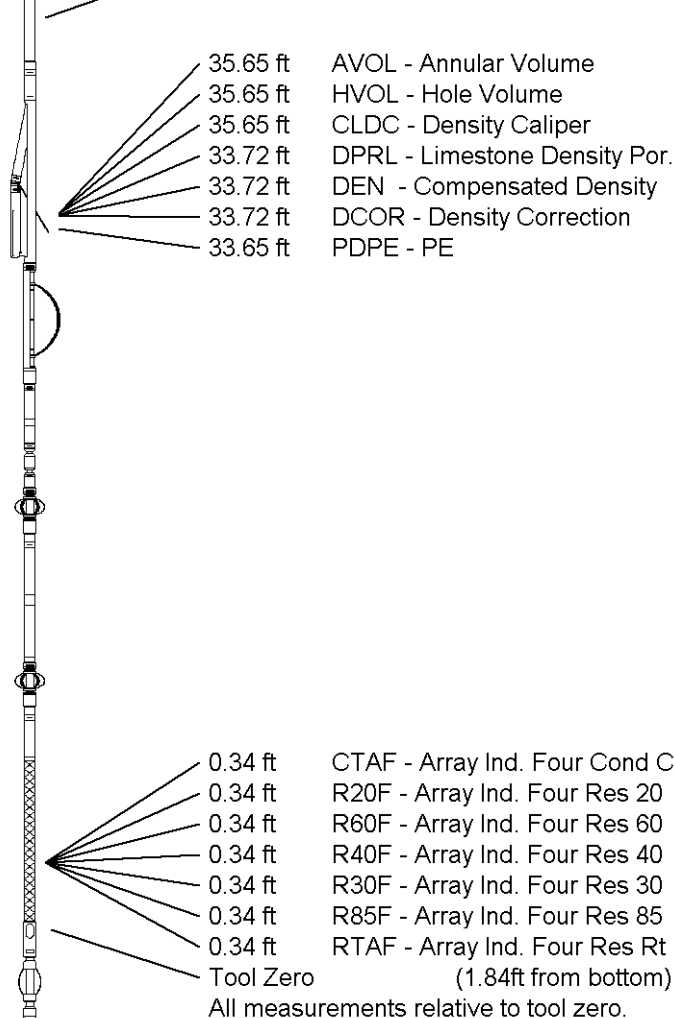
MIS-E.B Compact Inline Standoff sub
MIS-E.B 597 LG: 2.14 ft WT: 15.4 lb OD: 2.24 in

Compact Focussed Electric
MFE-C.A 395 LG: 6.05 ft WT: 48.5 lb OD: 2.24 in

MIS-E.B Compact Inline Standoff sub
MIS-E.B 575 LG: 2.14 ft WT: 15.4 lb OD: 2.24 in

Compact Induction
MAI-A.A 166 LG: 12.52 ft WT: 48.5 lb OD: 2.24 in

Total Length: 88.36 ft Weight: 637.1 lb



COMPANY Sandridge Energy
WELL Brothers 3119 1-6H
FIELD Six Moons
PROVINCE/COUNTY Comanche
COUNTRY/STATE U.S.A./ Kansas

Elevation Kelly Bushing	2188.00	feet	First Reading	10016.00	feet
Elevation Drill Floor	2188.00	feet	Depth Driller	10070.00	feet
Elevation Ground Level	2169.00	feet	Depth Logger	10070.00	feet



Weatherford®

CML MESSENGER SHUTTLE
COMPACT PHOTO DENSITY
COMPENSATED NEUTRON LOG