



Weatherford[®]

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

COMPANY **SOURCE ENERGY**
 WELL **CONDIFF 8-22-5-23H**
 FIELD **SAUZEK**
 PROVINCE/COUNTY **SUMNER**
 COUNTRY/STATE **USA / KANSAS**
 LOCATION **SHL: 2246' FNL & 1477' FWL
BHL: 2022' FSL & 1554' FWL**

SEC	TWP	RGE	Other Services
8	33S	1E	MAI CMI
API Number	15-191-22669-01		
Permit Number			
Permanent Datum G.L., Elevation 1262 feet			
Log Measured From KB			
Drilling Measured From K.B. @ 17 FEET			
Date	23-FEB-2013		
Run Number	ONE		
Service Order	3539399		
Depth Driller	8011.00	feet	
Depth Logger	7975.00	feet	
First Reading	7915.00	feet	
Last Reading	4154.00	feet	
Casing Driller	4154.00	feet	
Casing Logger	4154.00	inches	
Bit Size	6.125		
Hole Fluid Type	WATER		
Density / Viscosity	8.40 lb/USg	27.00 CP	
PH / Fluid Loss	9.30	9.30	
Sample Source	FLOWLINE		
Rm @ Measured Temp	5.10 @ 41.0	ohm-m	
Rmf @ Measured Temp	4.308 @ 41.0	ohm-m	
Rmc @ Measured Temp	6.12 @ 41.0	ohm-m	
Source Rmf / Rmc	CALC	CALC	
Rm @ BHT	1.72 @ 121.0	ohm-m	
Time Since Circulation	0 HOURS		
Max Recorded Temp	121.00	deg F	
Equipment / Base	18006	OKC	
Recorded By	D. ROWELL		
Witnessed By	J. CALDARO-BAIRD		

Elevations:	feet
KB	1264.00
DF	1262.00
GL	1247.00

BOREHOLE RECORD

Last Edited: 24-FEB-2013 01:37

Bit Size inches	Depth From feet	Depth To feet
8.750	0.00	4197.00
6.125	4154.00	8011.00

CASING RECORD

Type	Size inches	Depth From feet	Shoe Depth feet	Weight pounds/ft
INTERMED	7.000	0.00	4145.00	26.00

REMARKS

LOGGED WITH WLS VER 13.04.8492 SOFTWARE

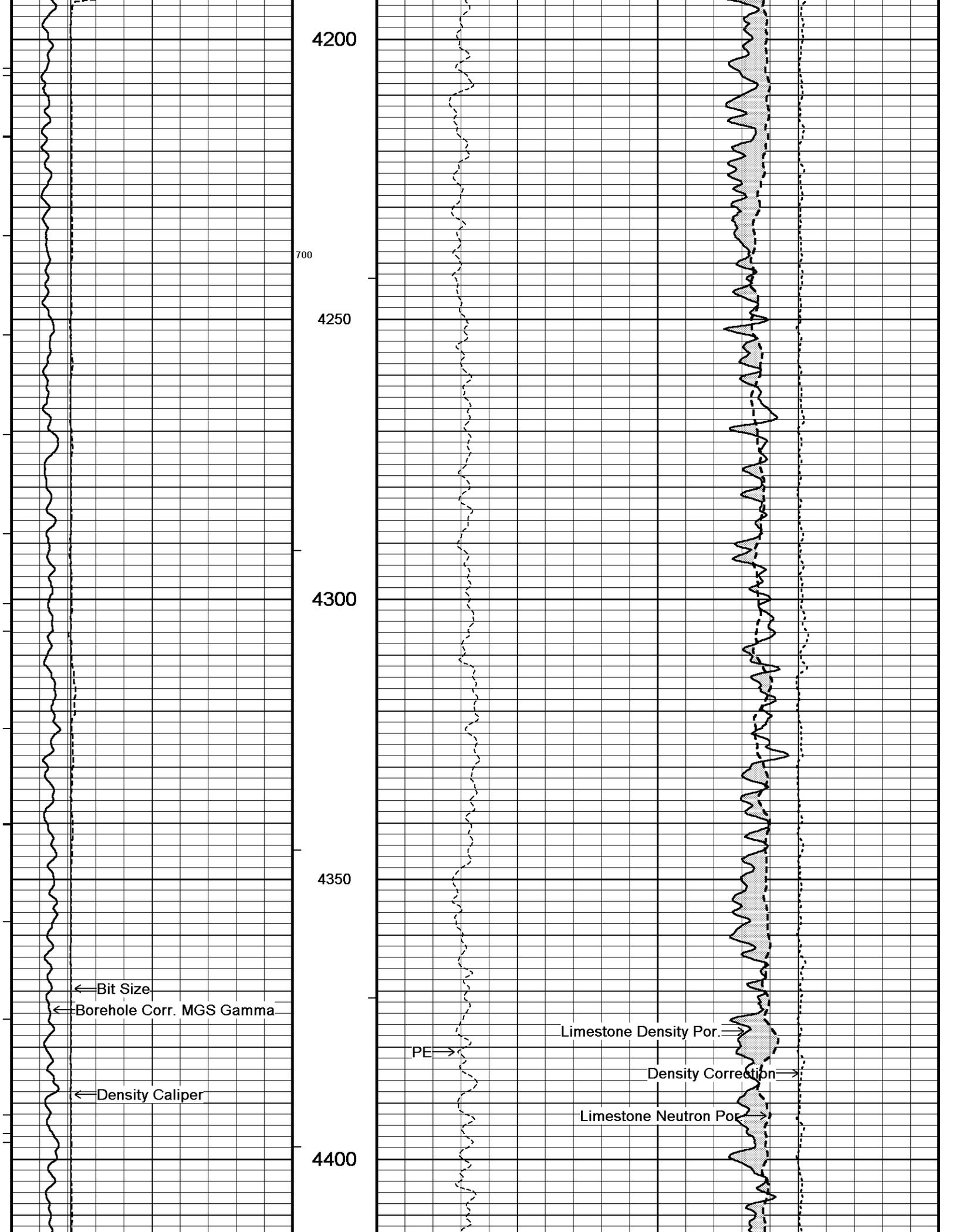
WELL LOGGED USING MESSENGER METHOD OF DEPLOYMENT, AND MEMORY LOGGING SYSTEM

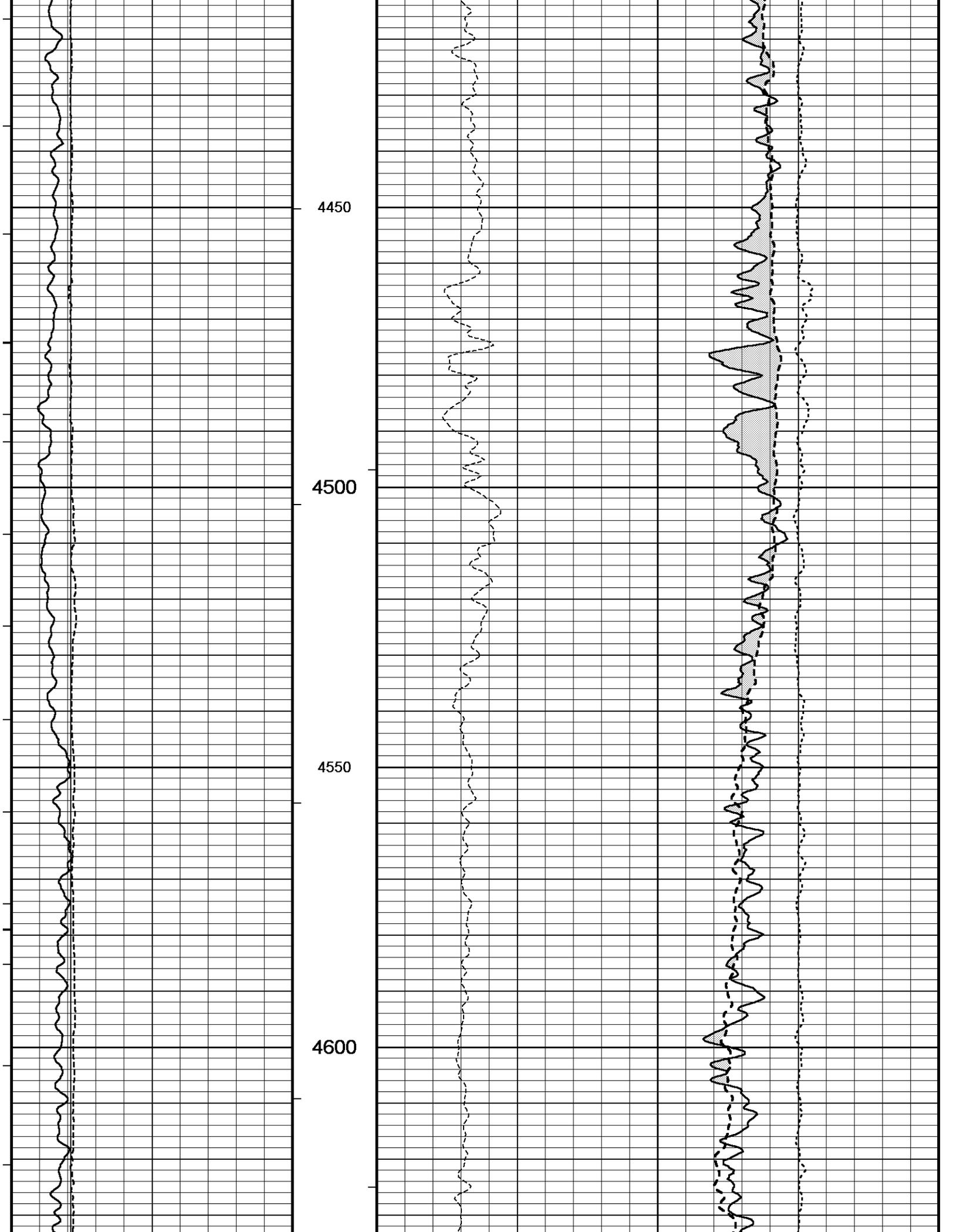
HARDWARE: MAI: ISA STANDOFF BELOW
 MPD: 4"PROFILE PLATE, MIS-A SINGLE SPRING DECENTRALIZER BELOW
 MDN: MISD DOUBLE SPRING DECENTRALIZER RAN ABOVE

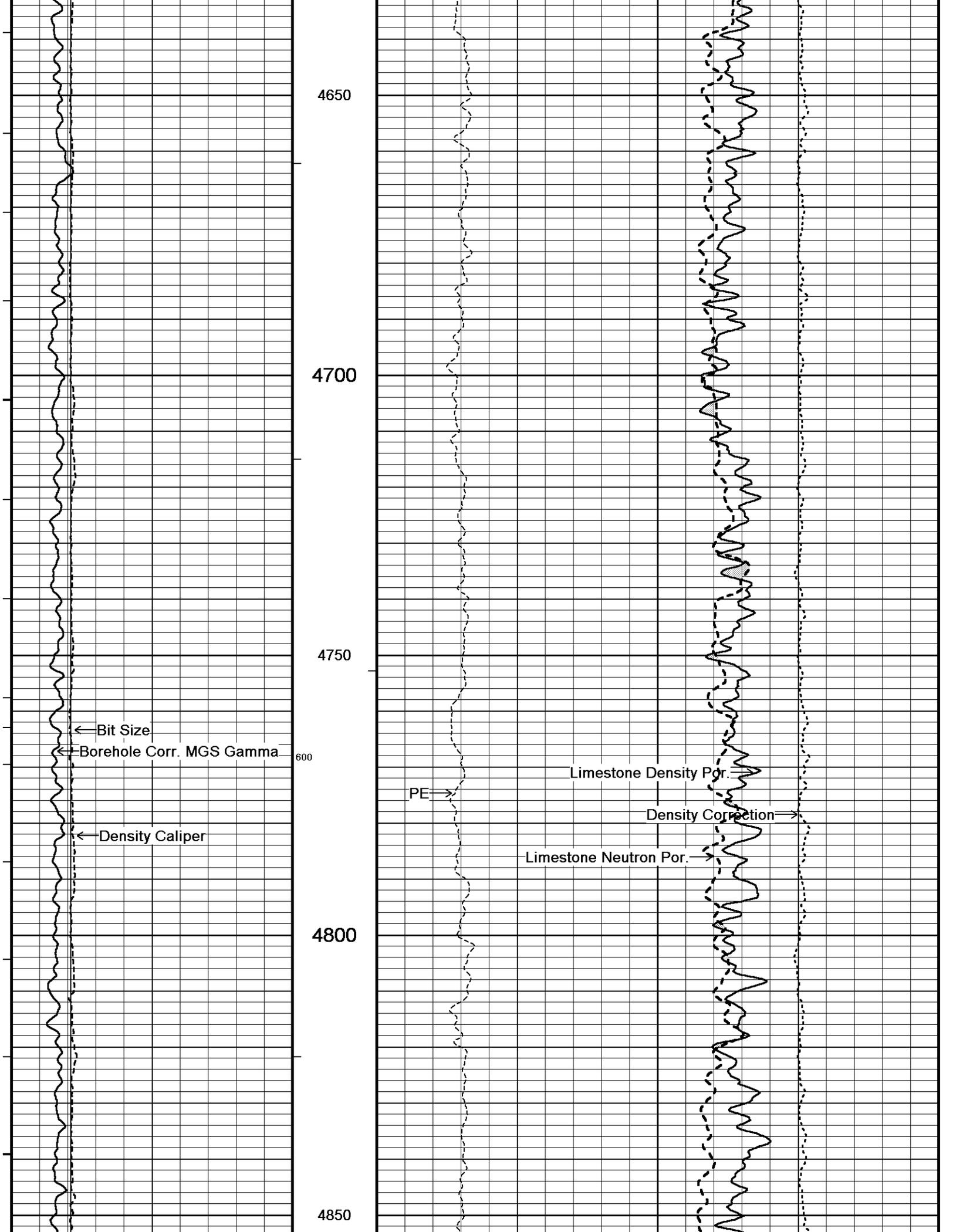
2.71 G/CC DENSITY MATRIX USED TO CALCULATE POROSITY
 ALL INTERVALS LOGGED AND SCALED PER CUSTOMER REQUEST

DRILL PIPE DEPTH DURING DEPLOYMENT: 7871
 LOGGING TOOL DEPTH AFTER DEPLOYMENT: 7975

4.5" CASING USED TO CALCULATE AHV







4650

4700

4750

4800

4850

← Bit Size

← Borehole Corr. MGS Gamma

← Density Caliper

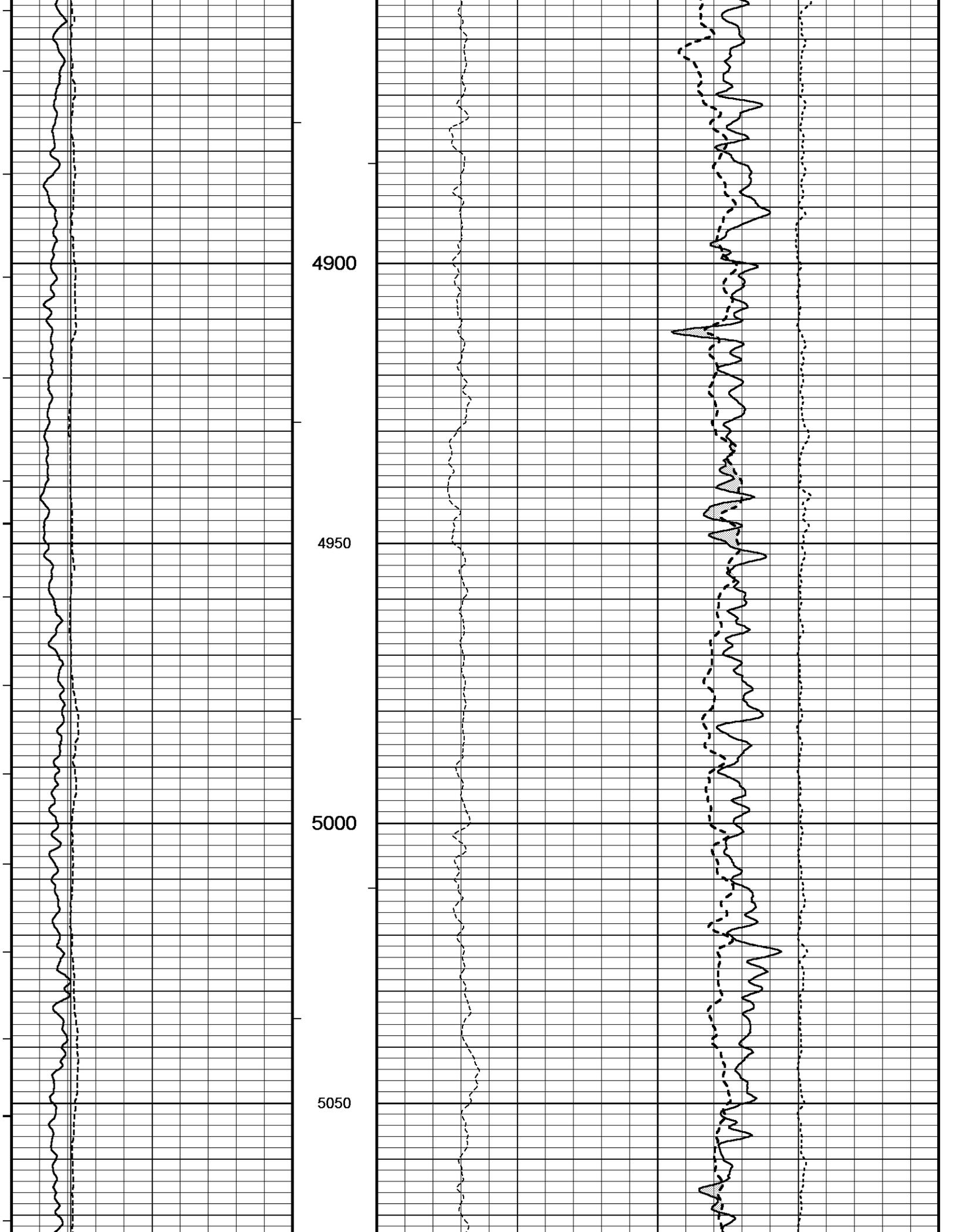
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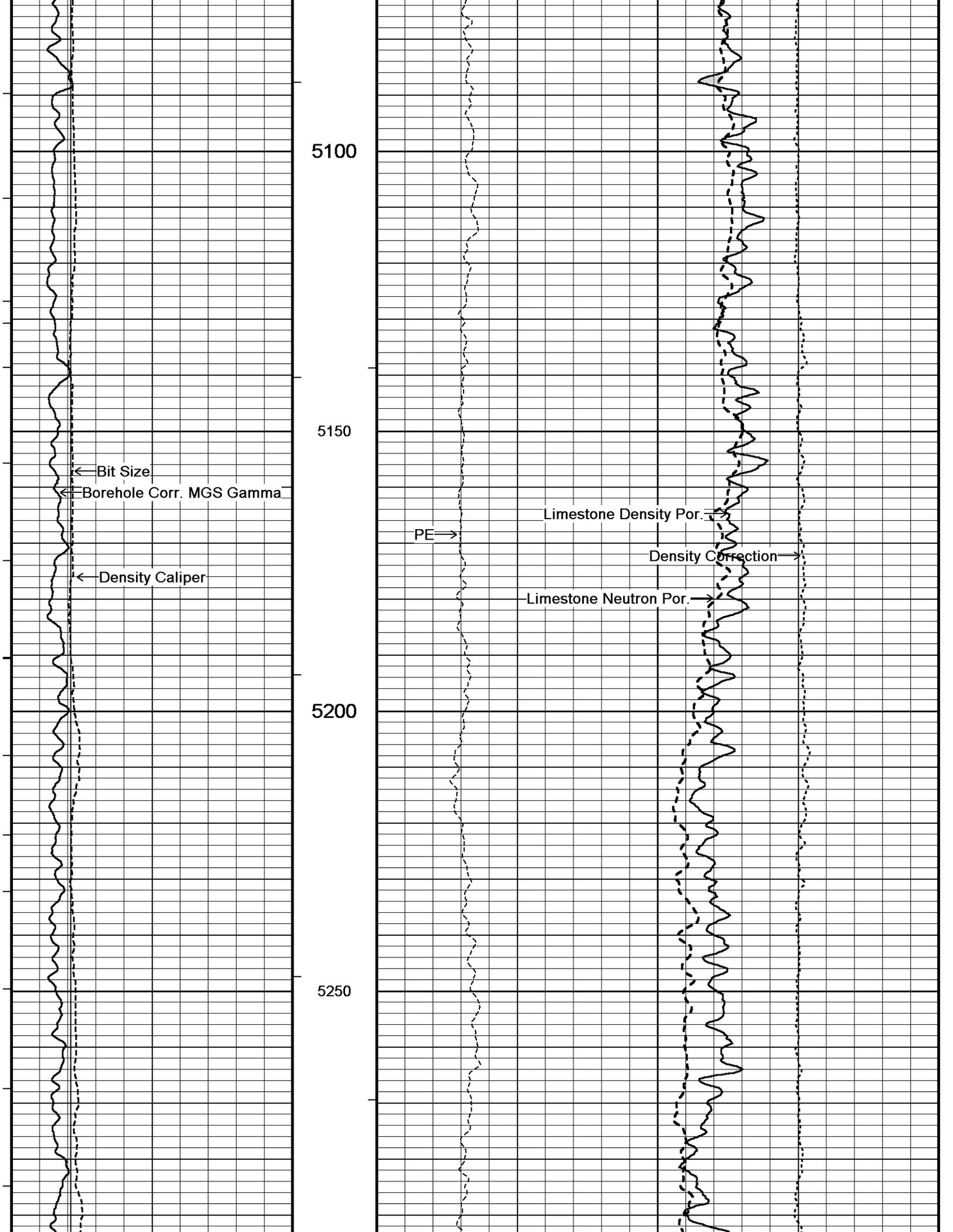
PE →

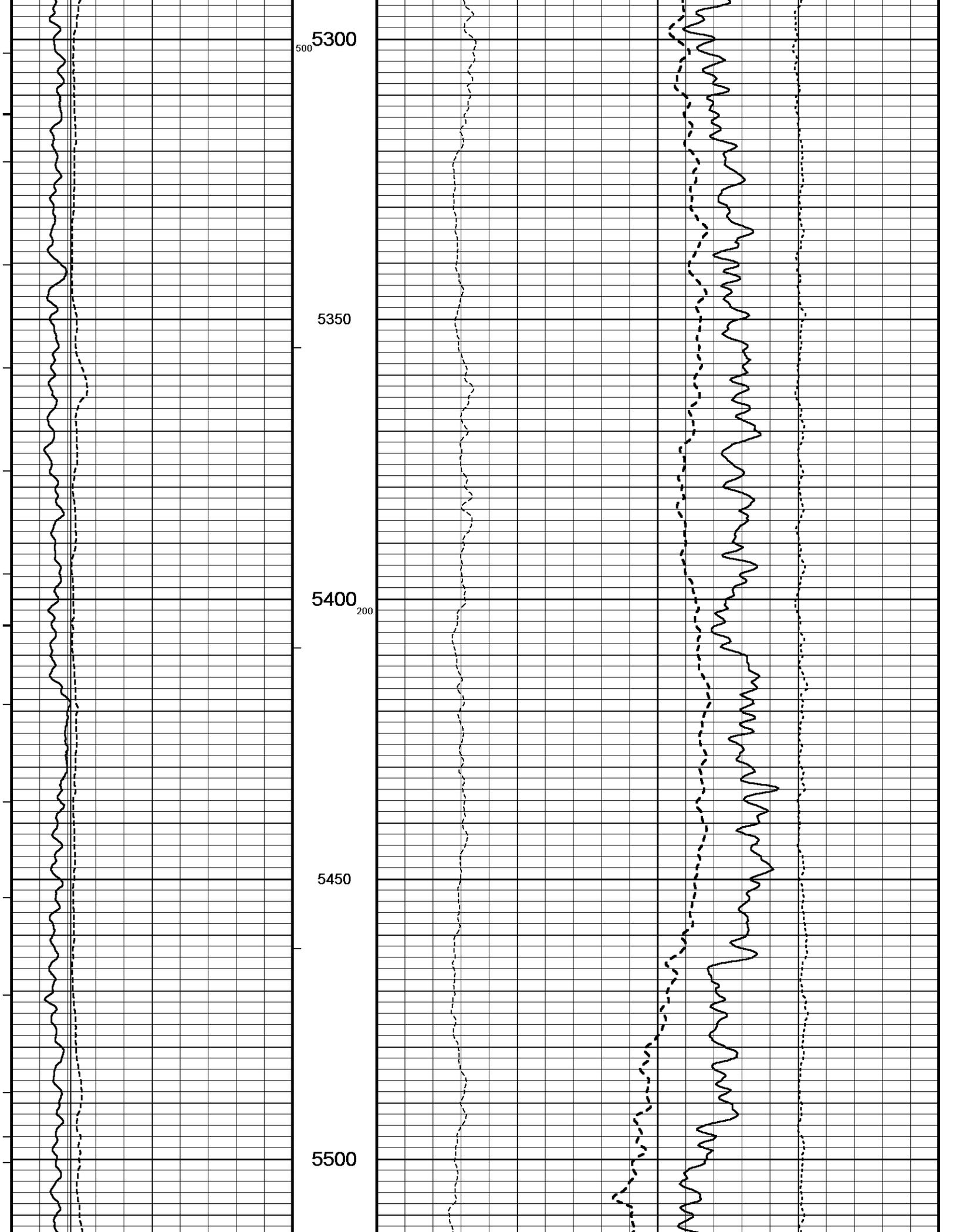
Limestone Density Por.

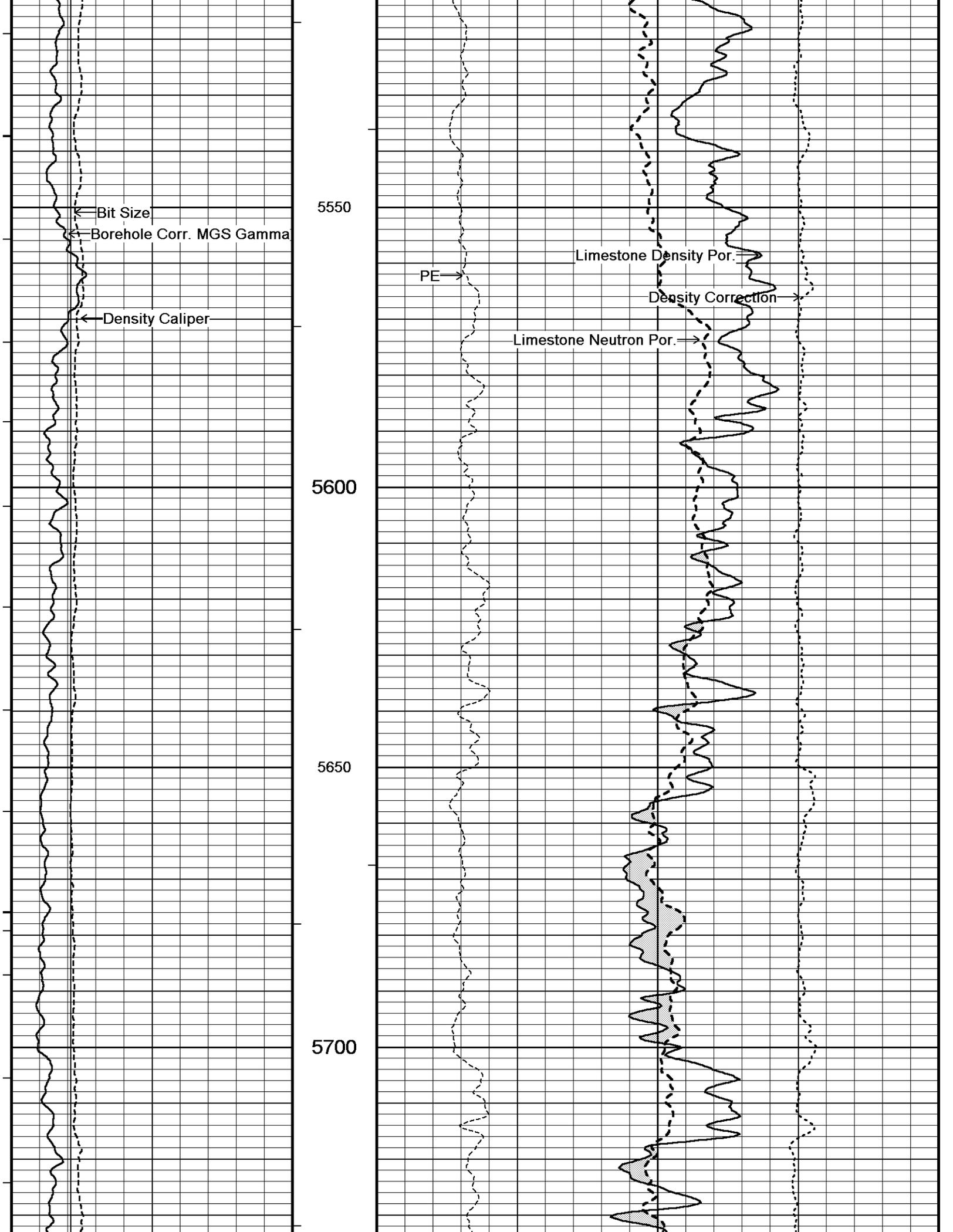
Density Correction →

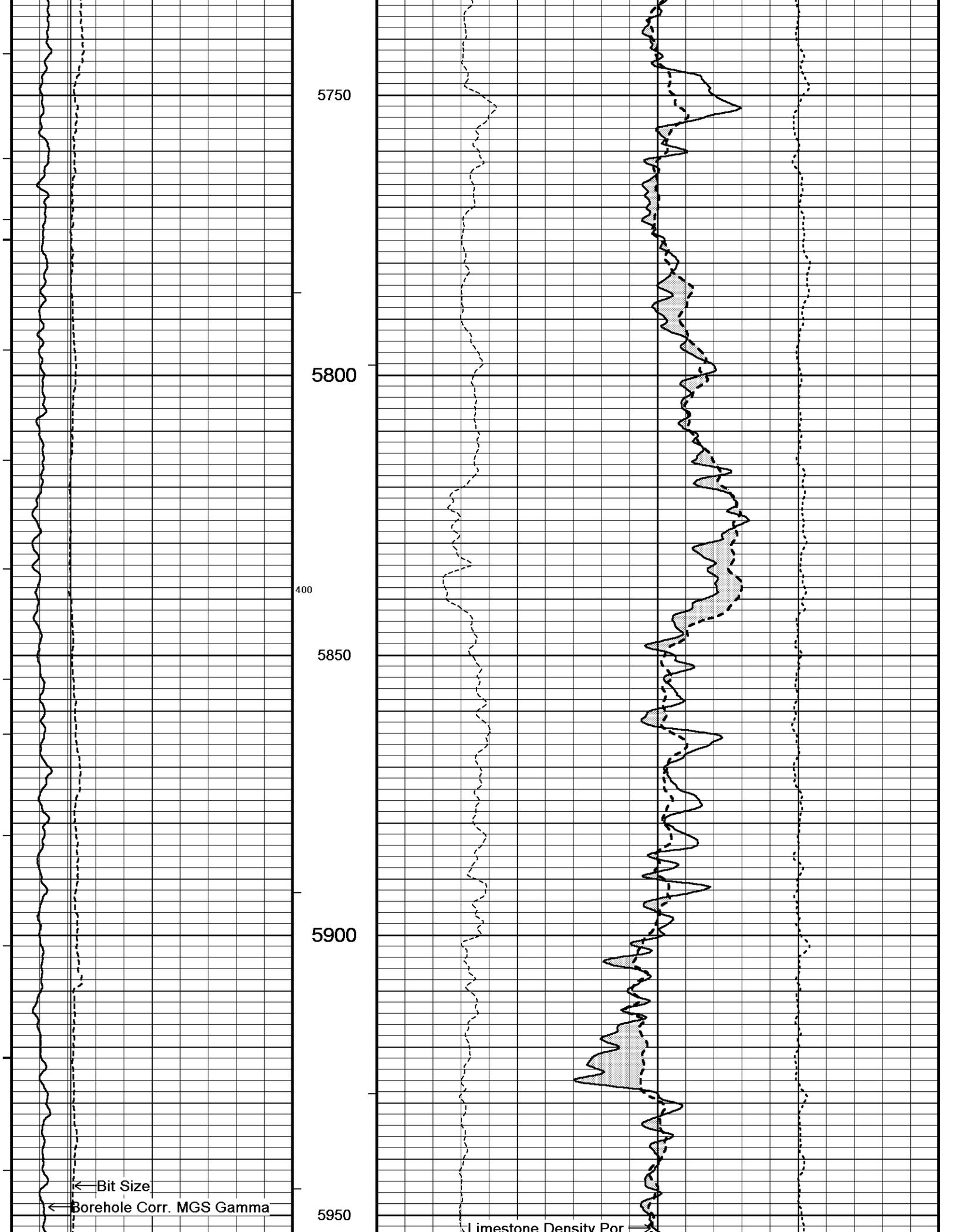
Limestone Neutron Por.

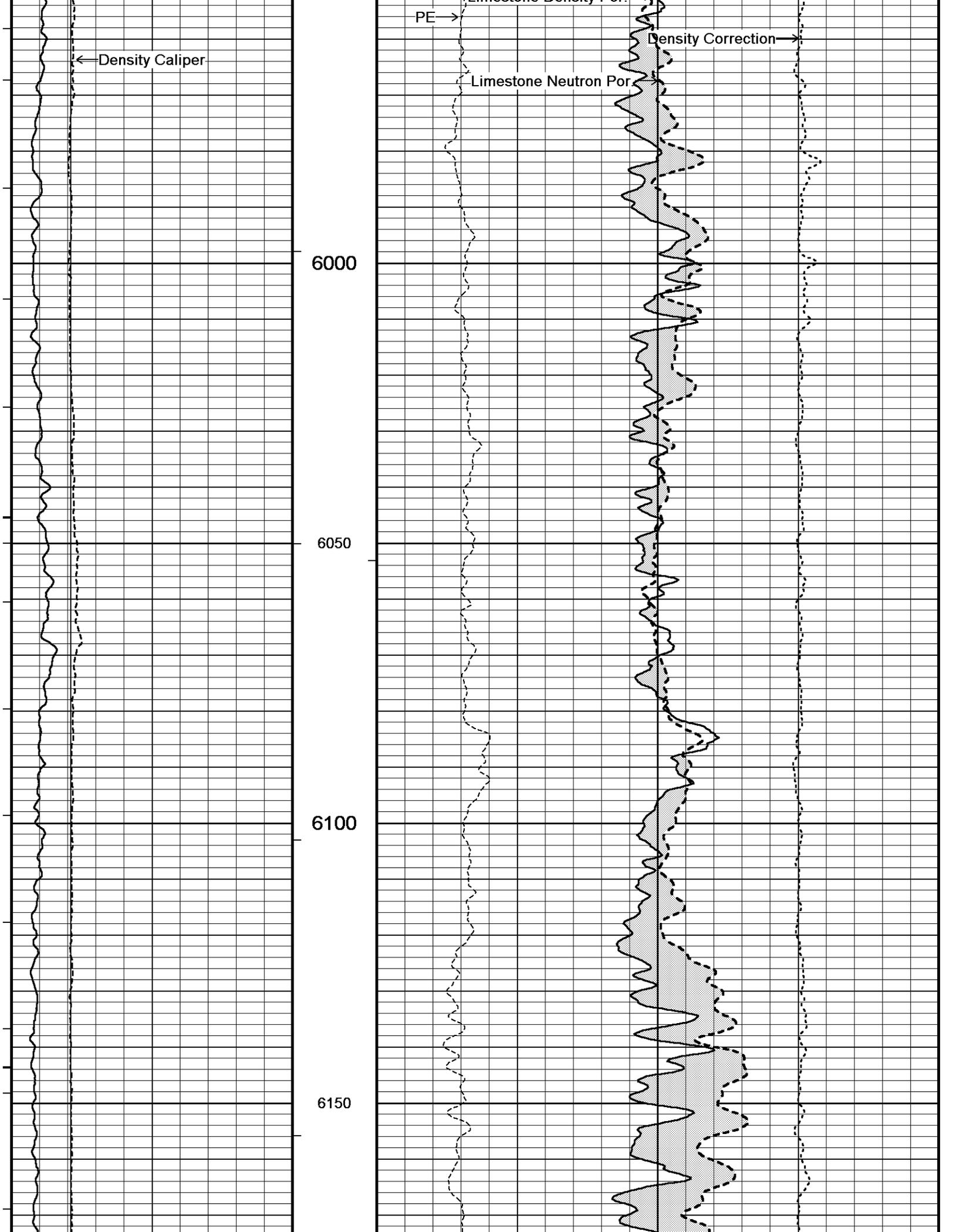


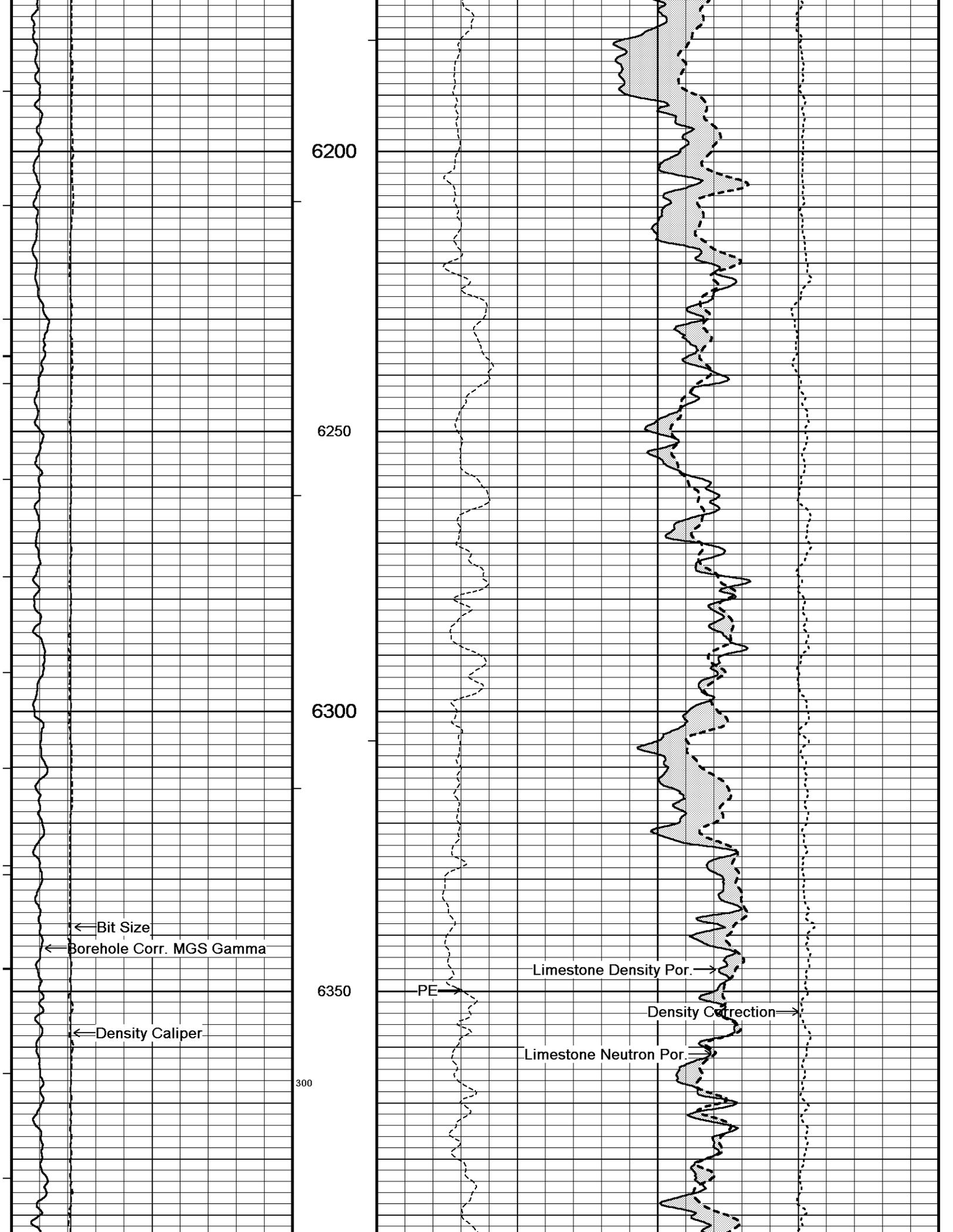


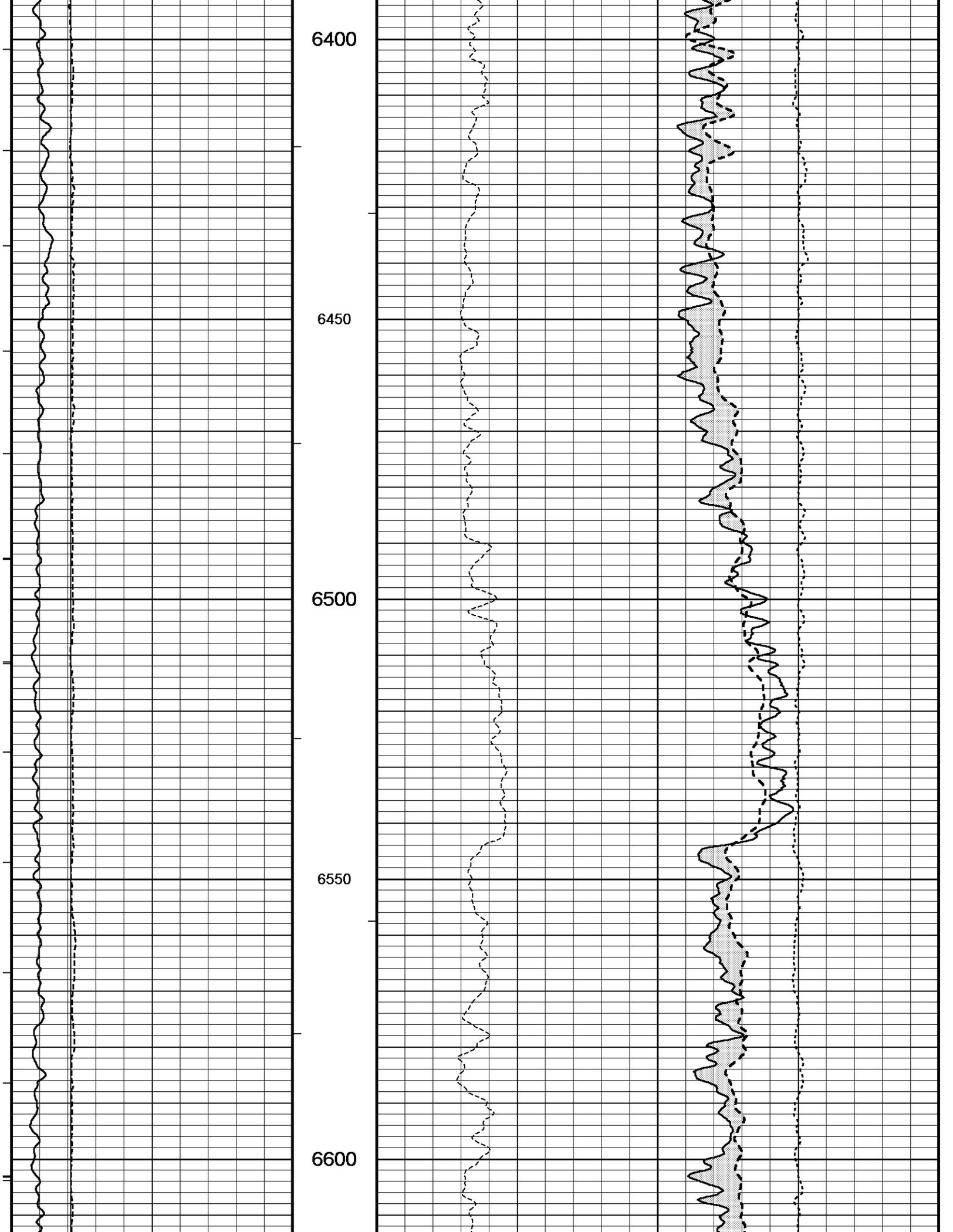


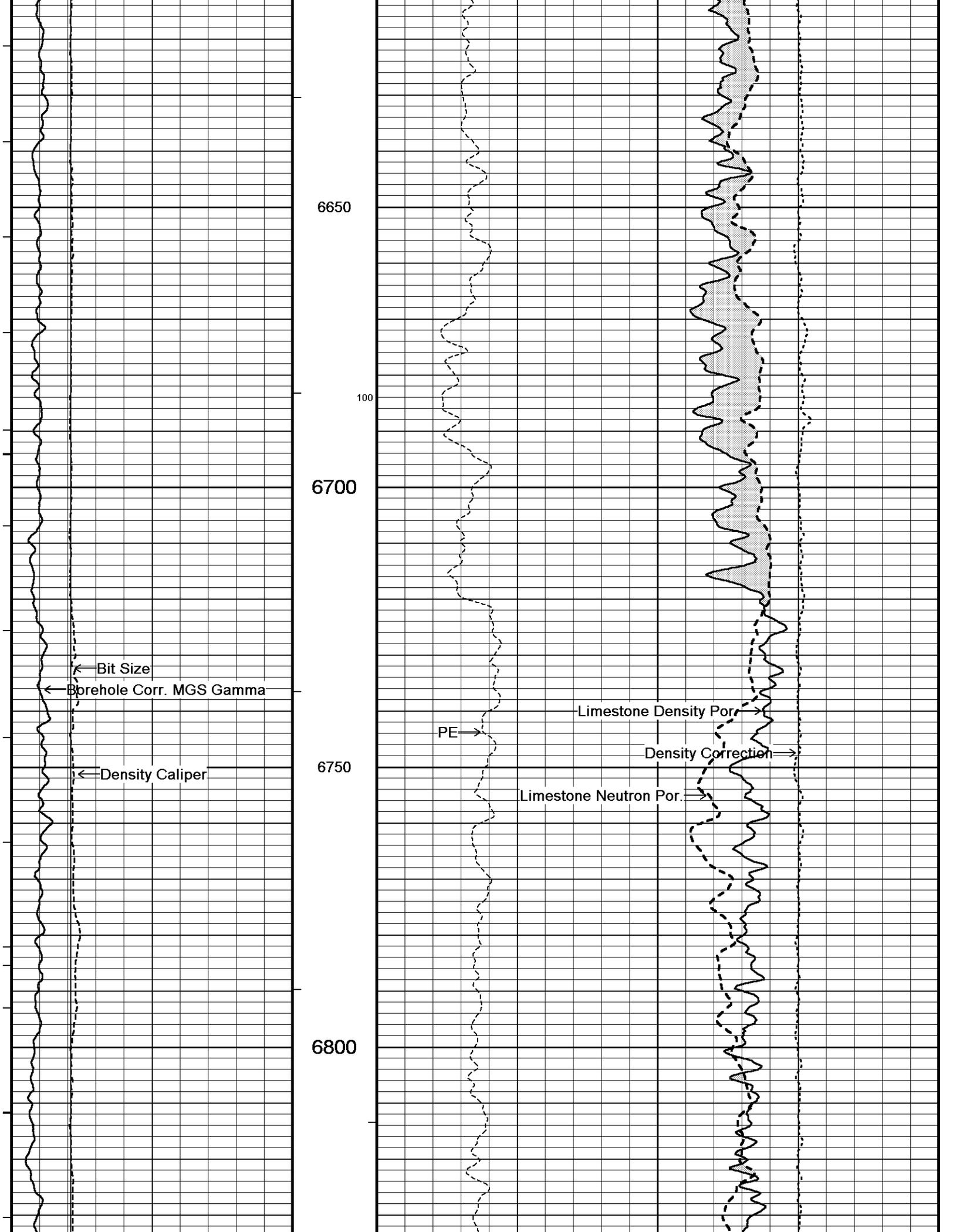












6650

100

6700

← Bit Size
← Borehole Corr. MGS Gamma

Limestone Density Por. →

PE →

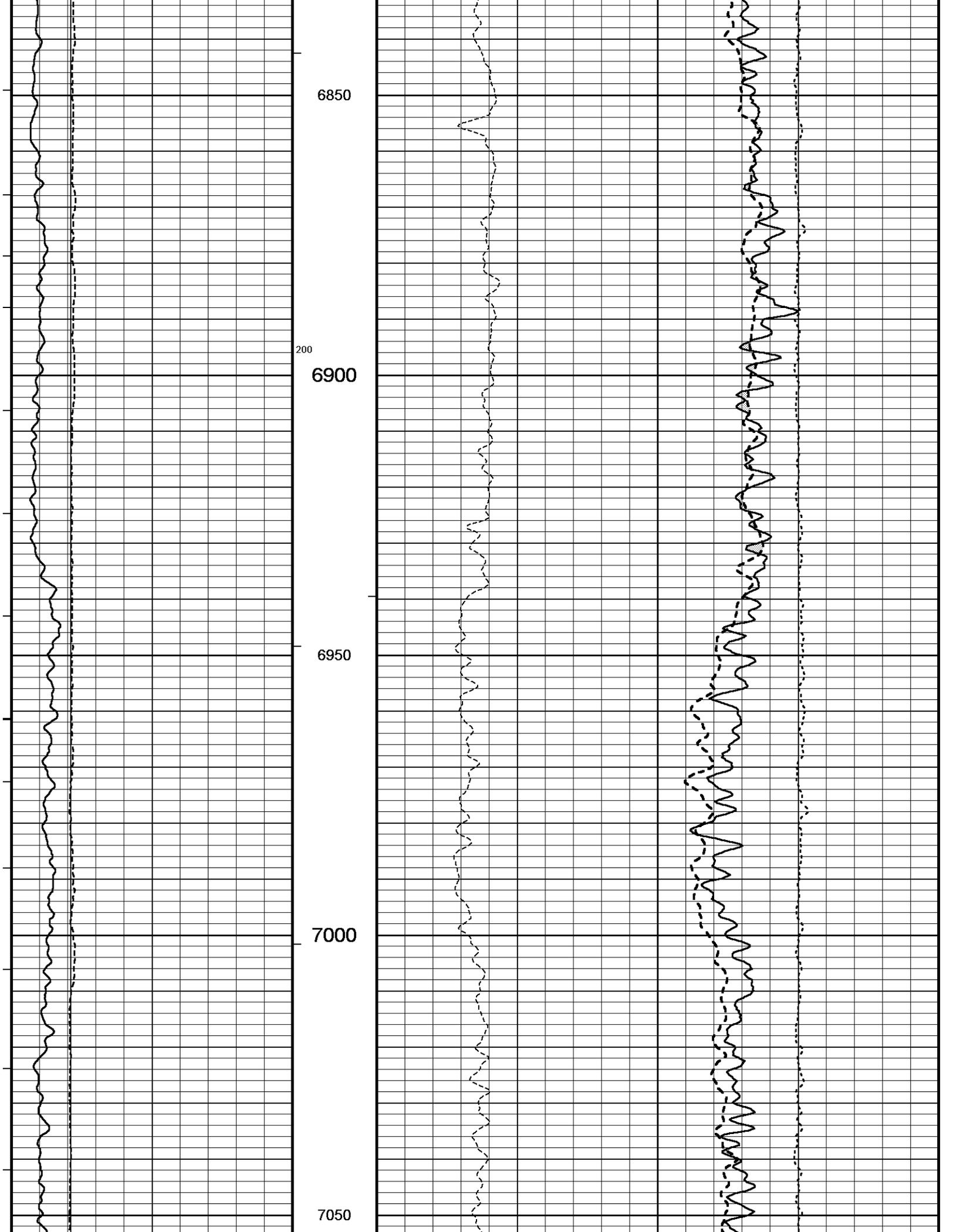
Density Correction →

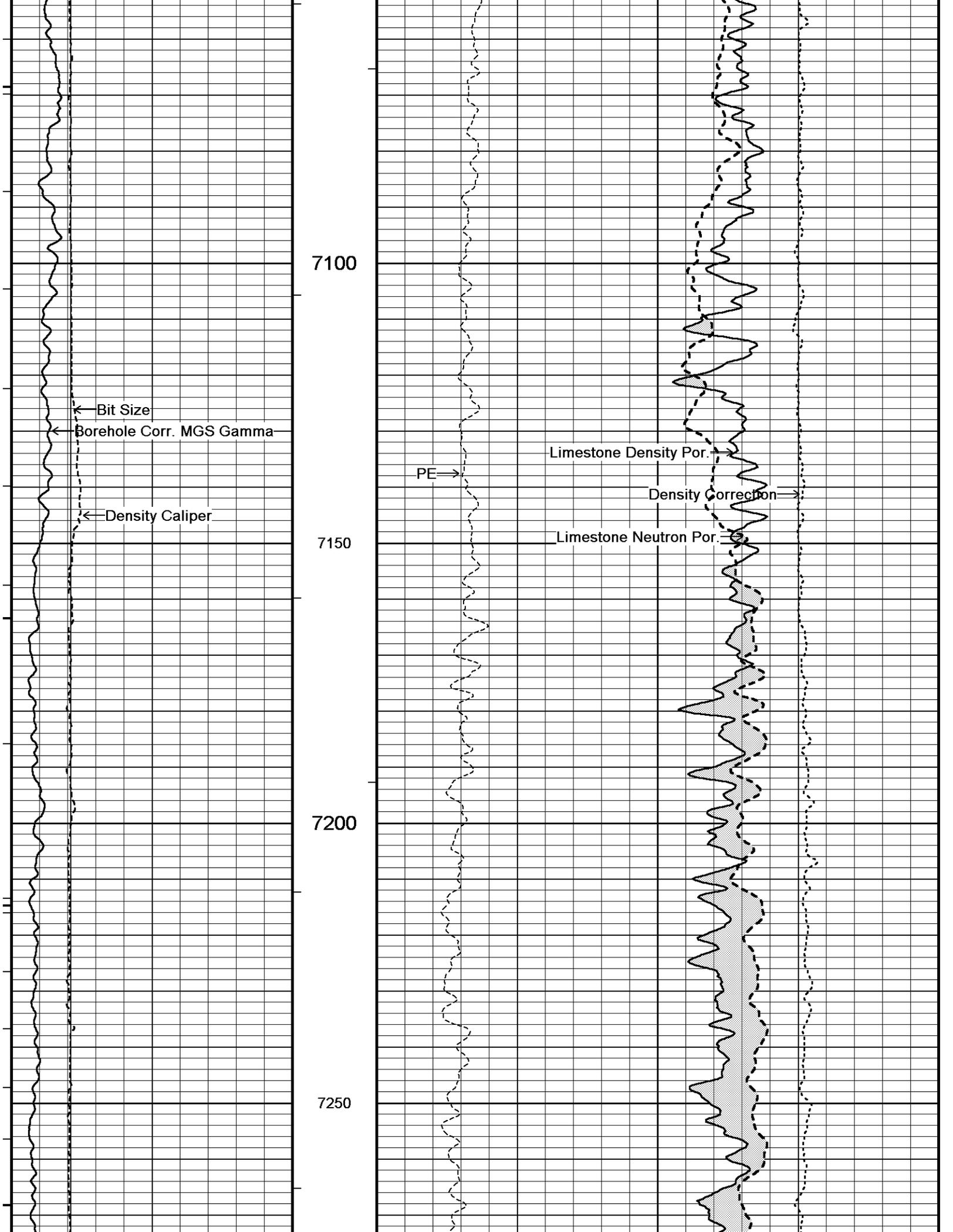
← Density Caliper

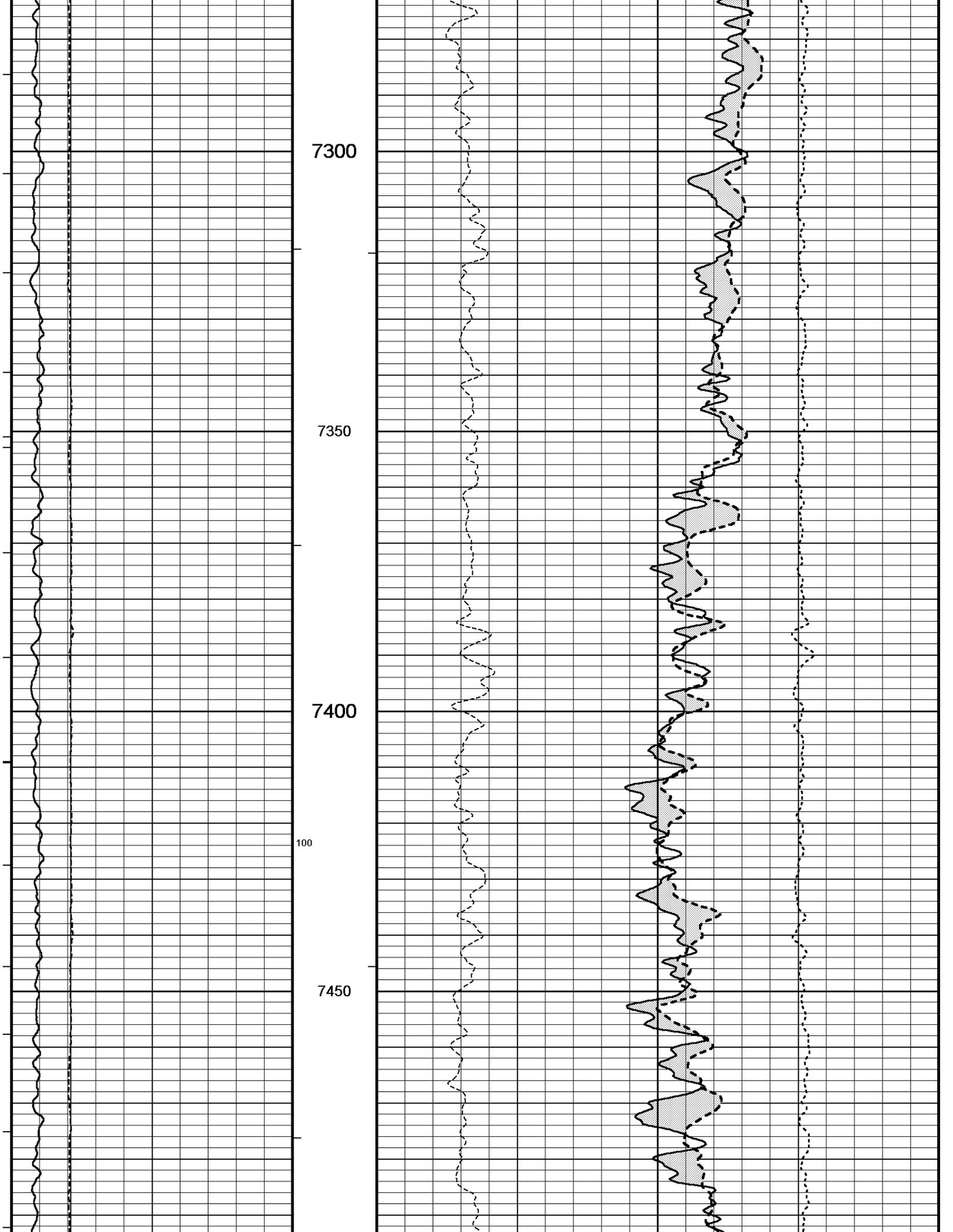
6750

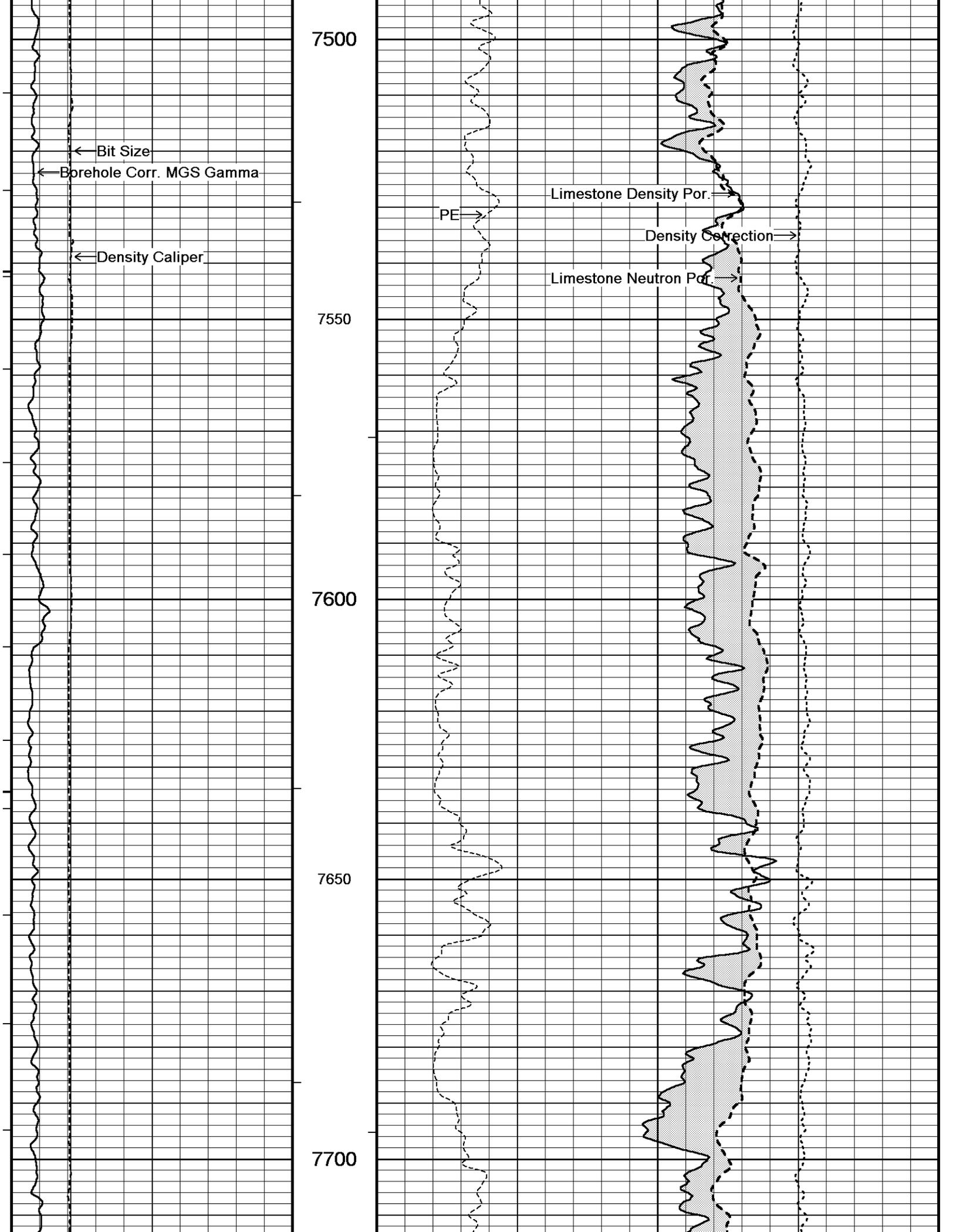
Limestone Neutron Por. →

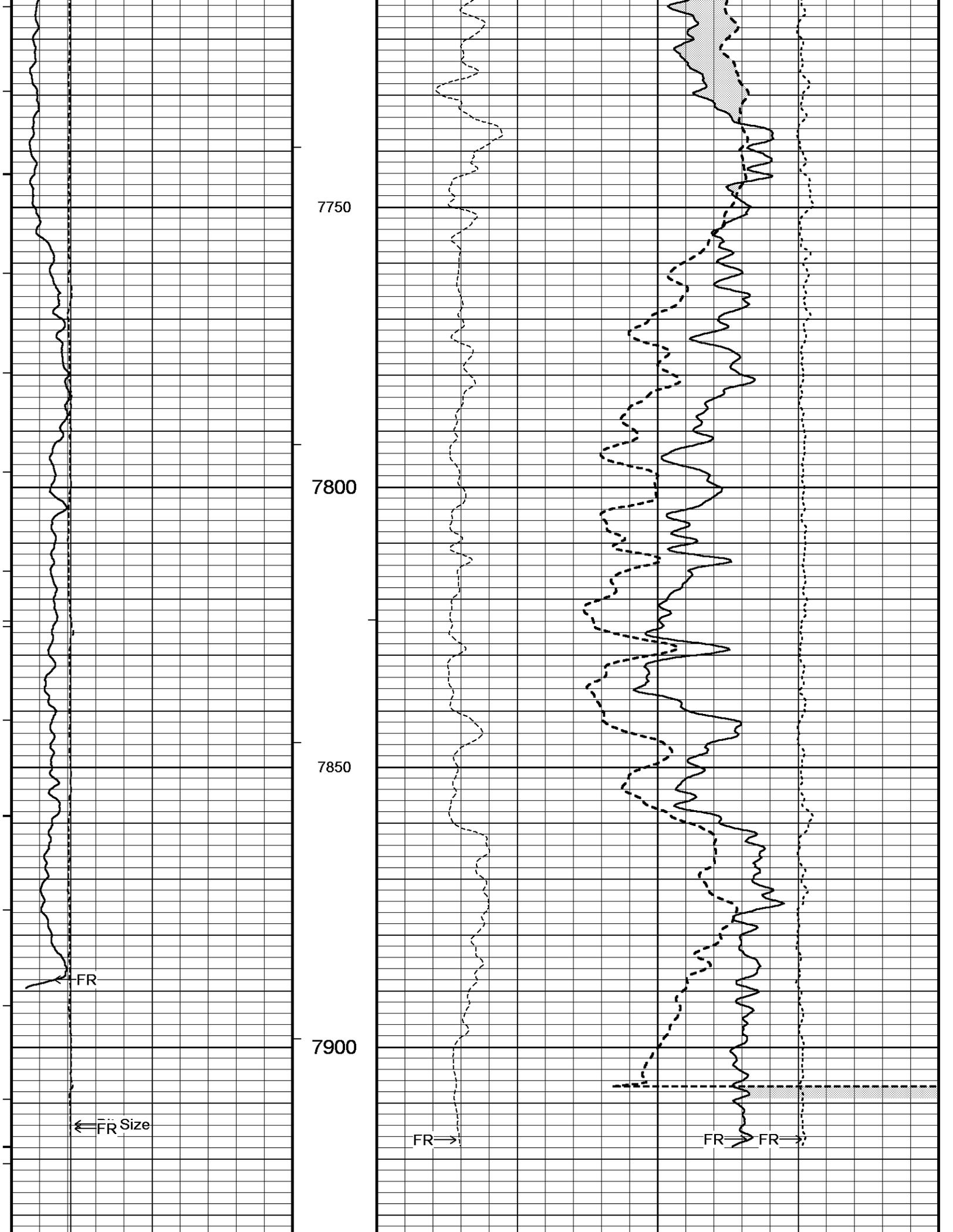
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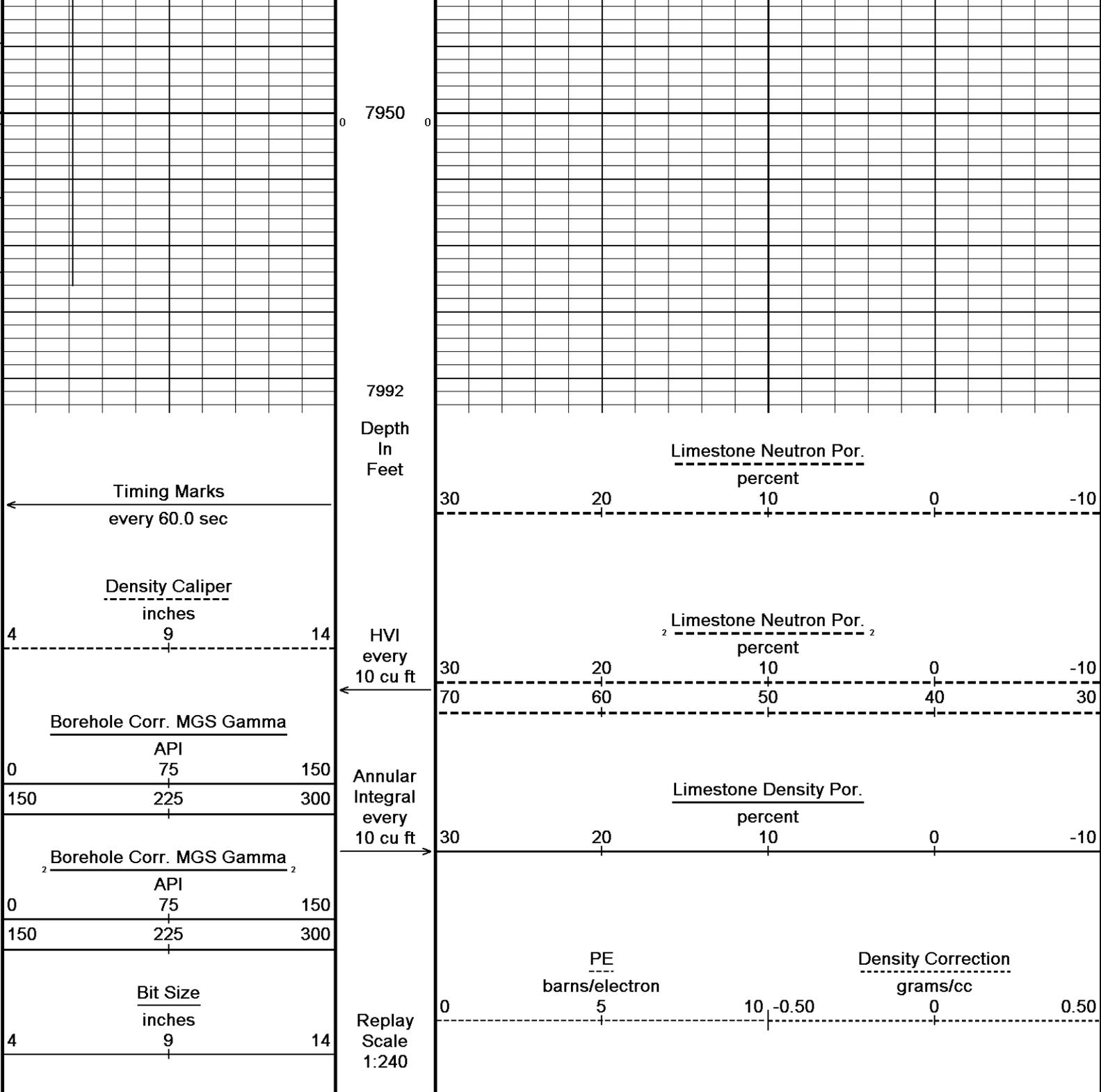












5 INCH MAIN LOG

5 INCH BULK DENSITY LOG

Depth Based Data - Maximum Sampling Increment 10.0cm
 Plotted on 24-FEB-2013 01:37
 Filename: C:\Minimus 13.04.8492\Data\00 Source (CONDIFF 8-22-5-23H)\172000 RTAP.dta
 Recorded on 23-FEB-2013 21:45
 System Versions: Processed with 13.04.8492 Plotted with 13.04.8492

Depth In Feet	Compensated Density grams/cc
2	2.25
	2.50
	2.75
3	

Density Caliper
inches
4 9 14

Borehole Corr. MGS Gamma
API
0 75 150
150 225 300

Bit Size
inches
4 9 14

HVI
every
10 cu ft

Annular
Integral
every
10 cu ft

Limestone Density Por.
percent
30 20 10 0 -10

PE
barns/electron
0 5 10

Density Correction
grams/cc
-0.50 0 0.50

Replay
Scale
1:240

4138

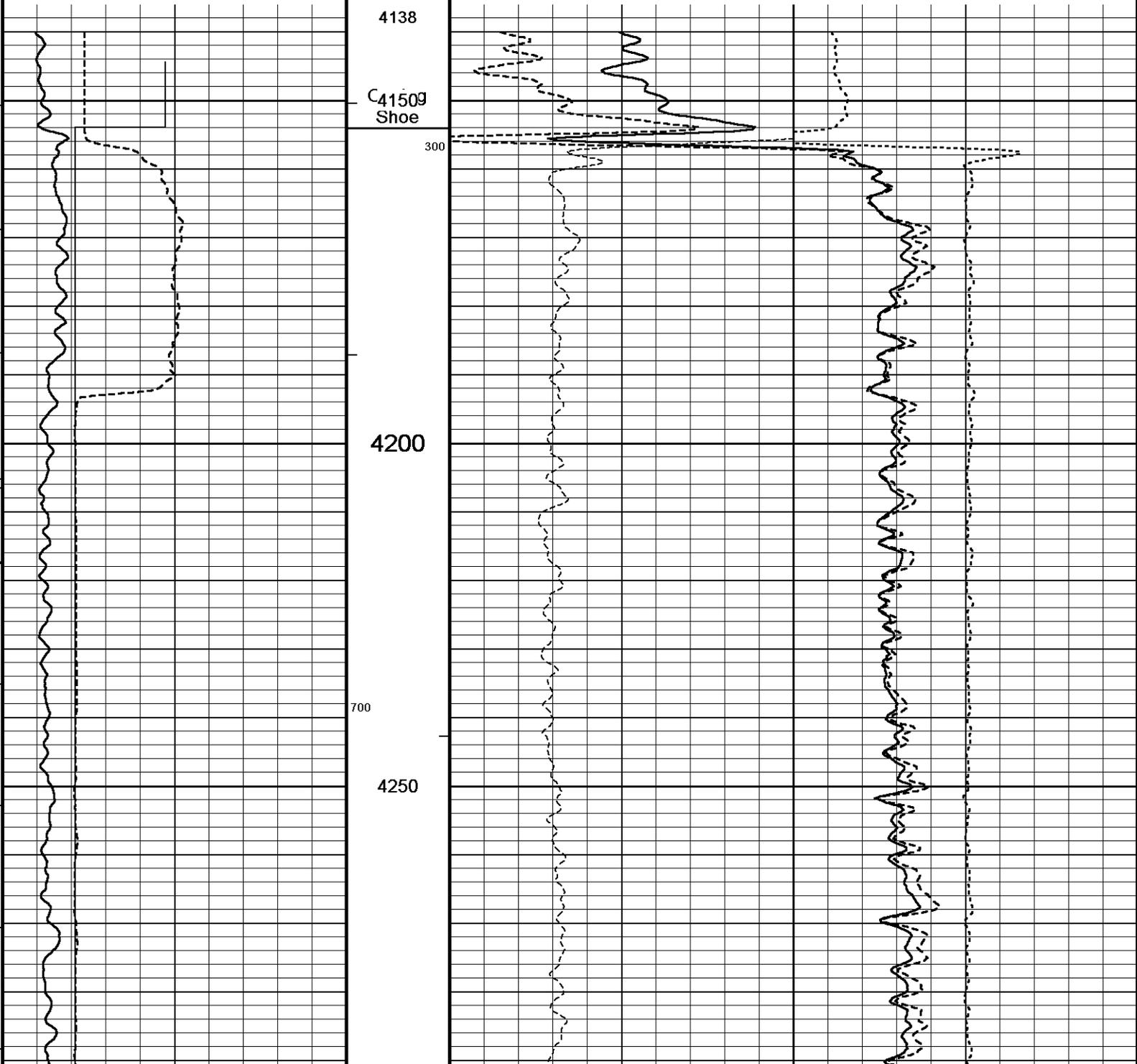
C41509
Shoe

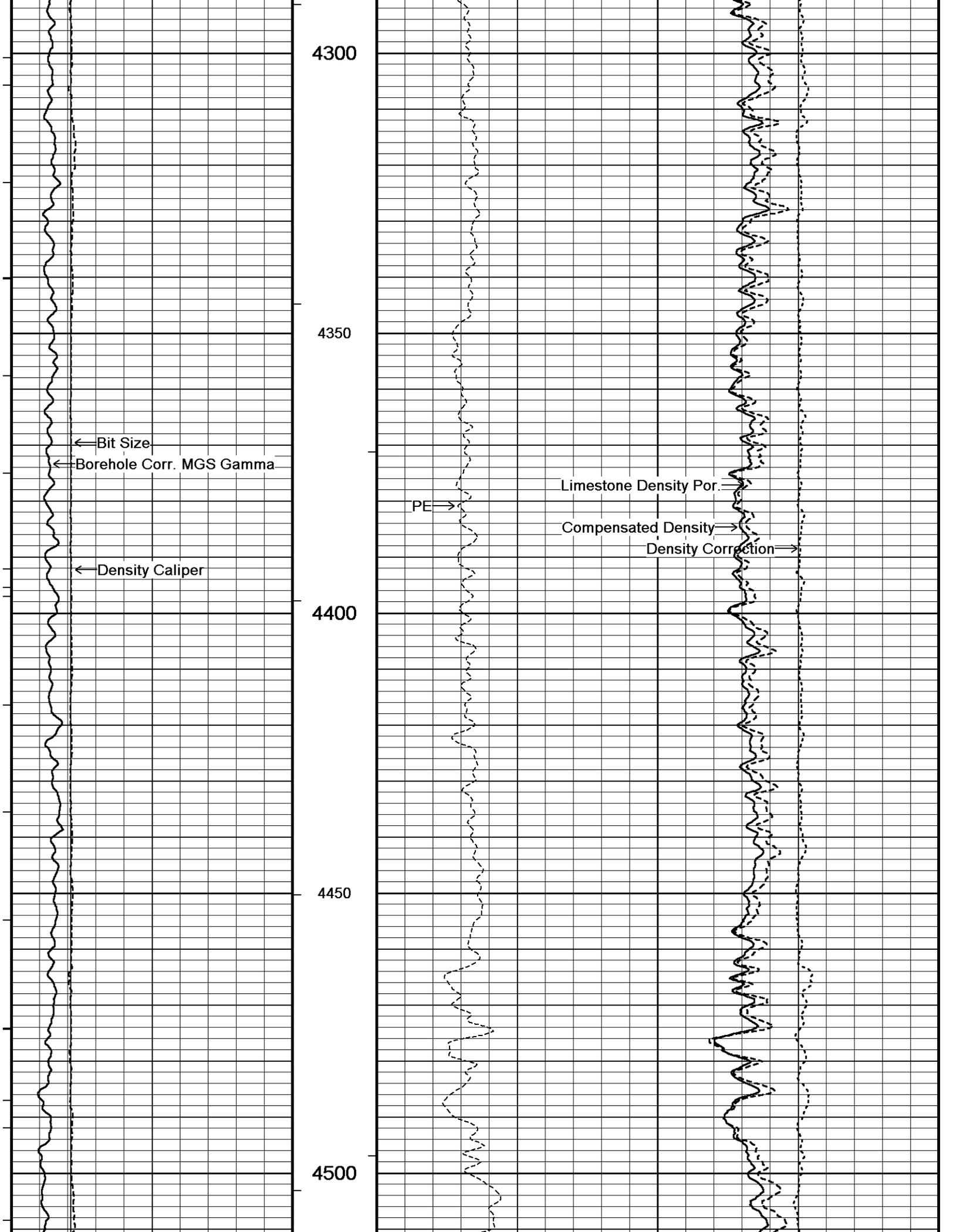
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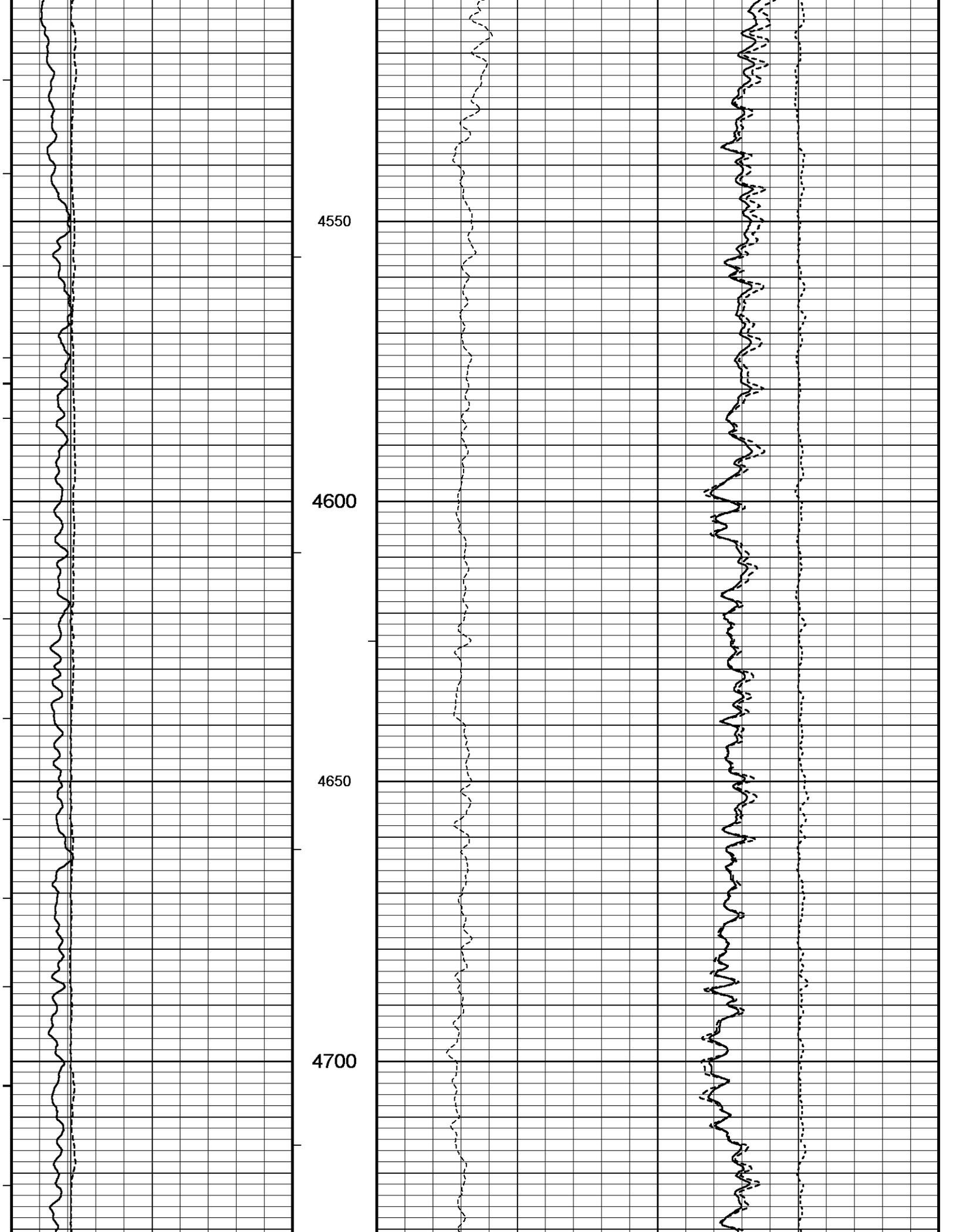
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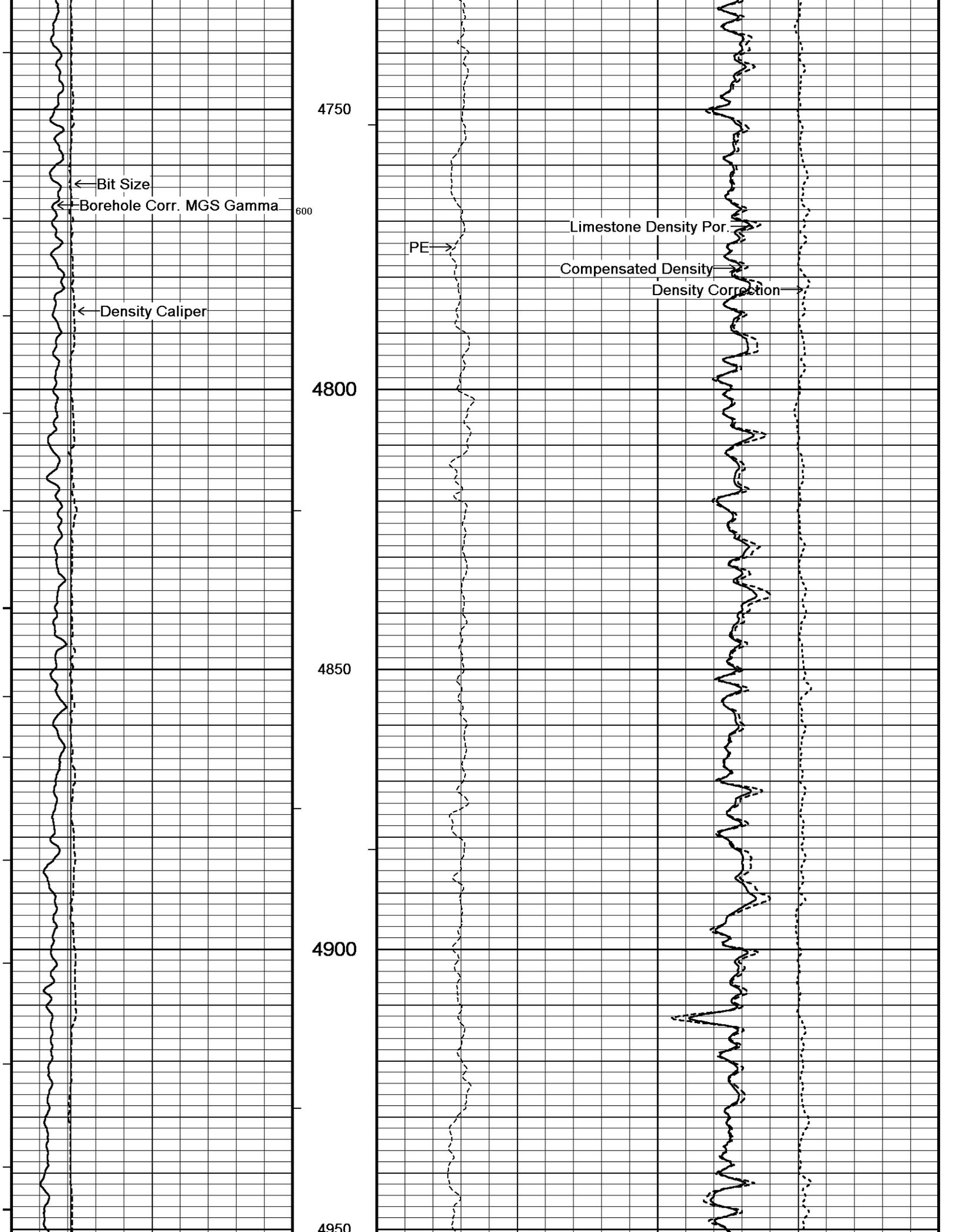
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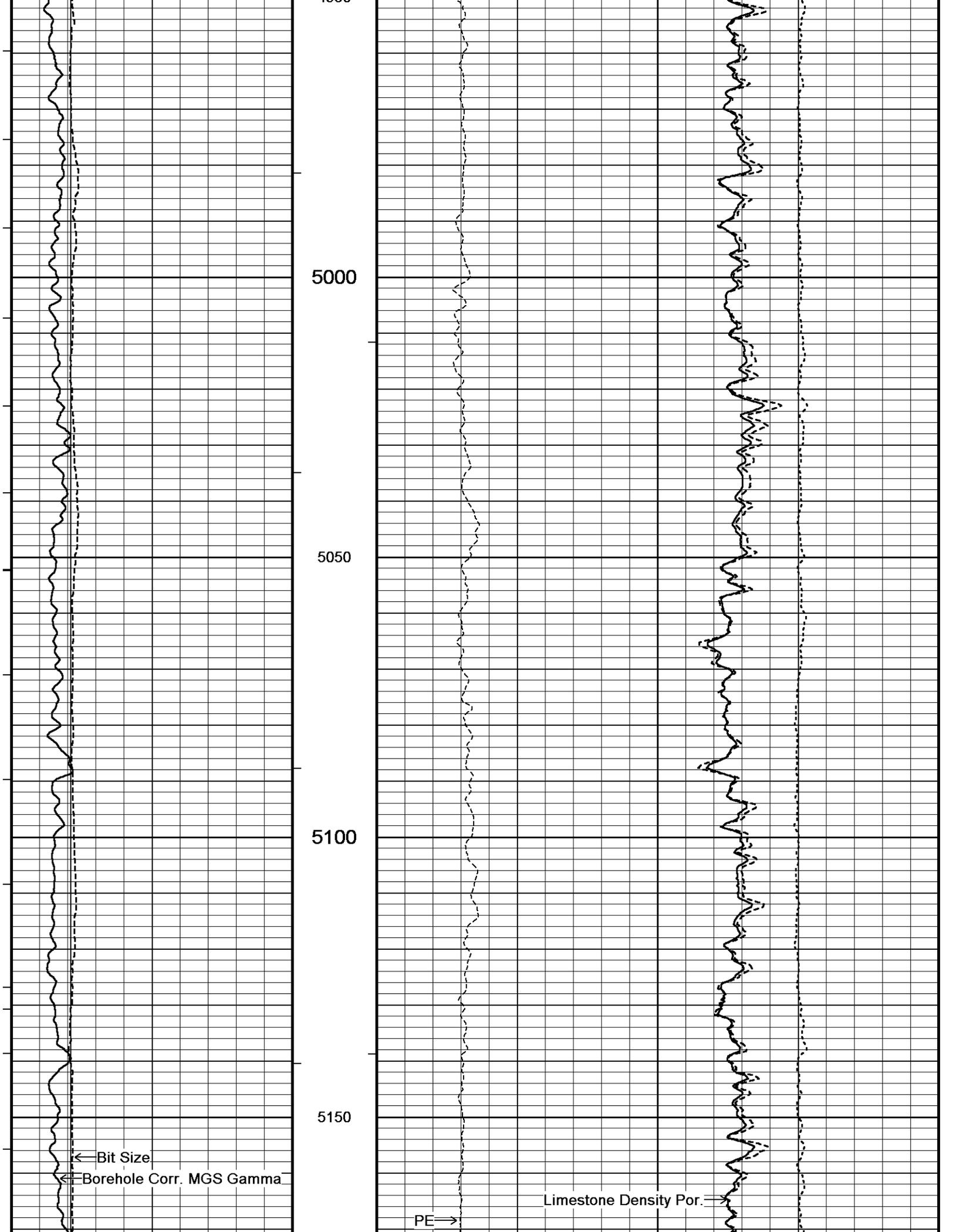
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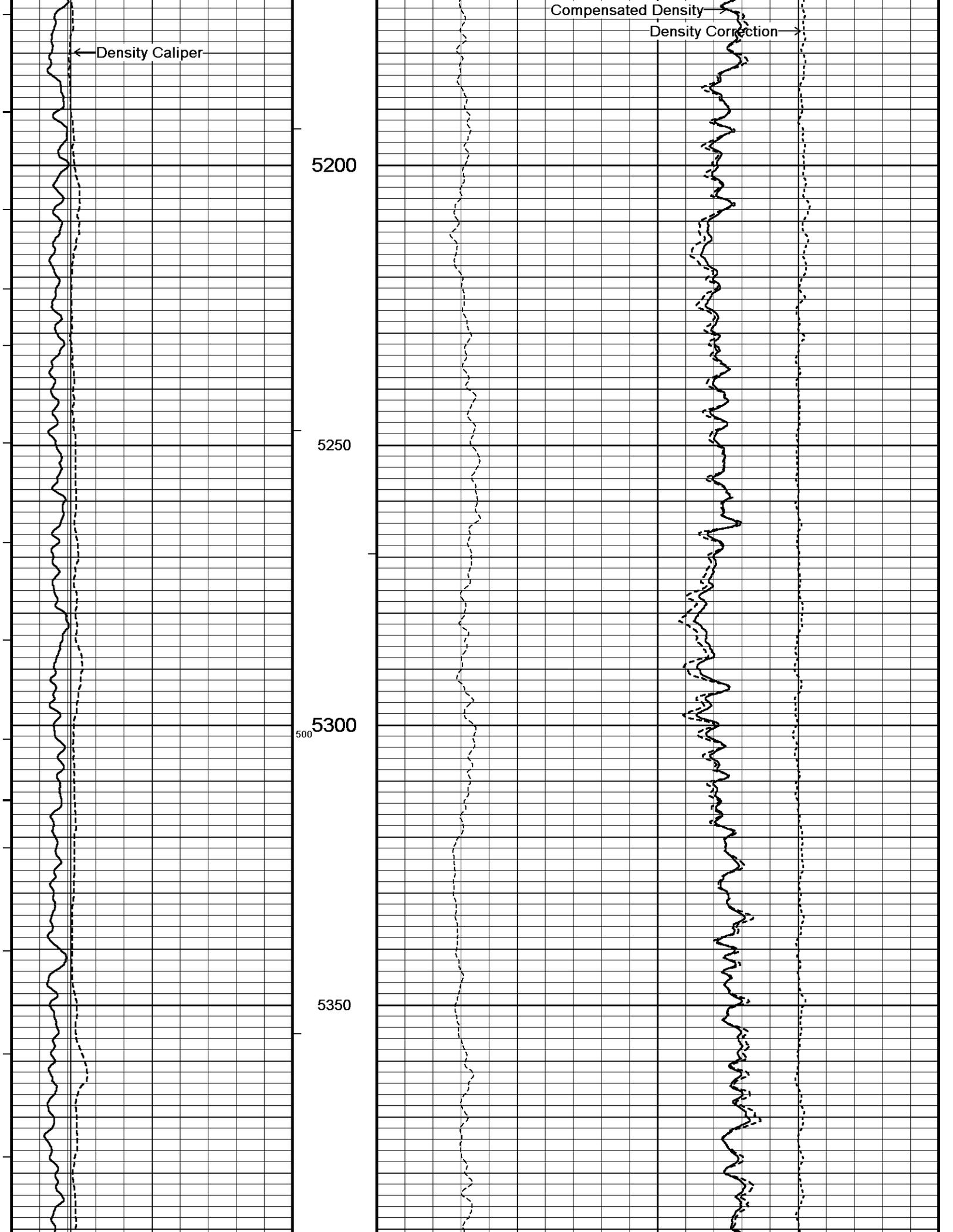


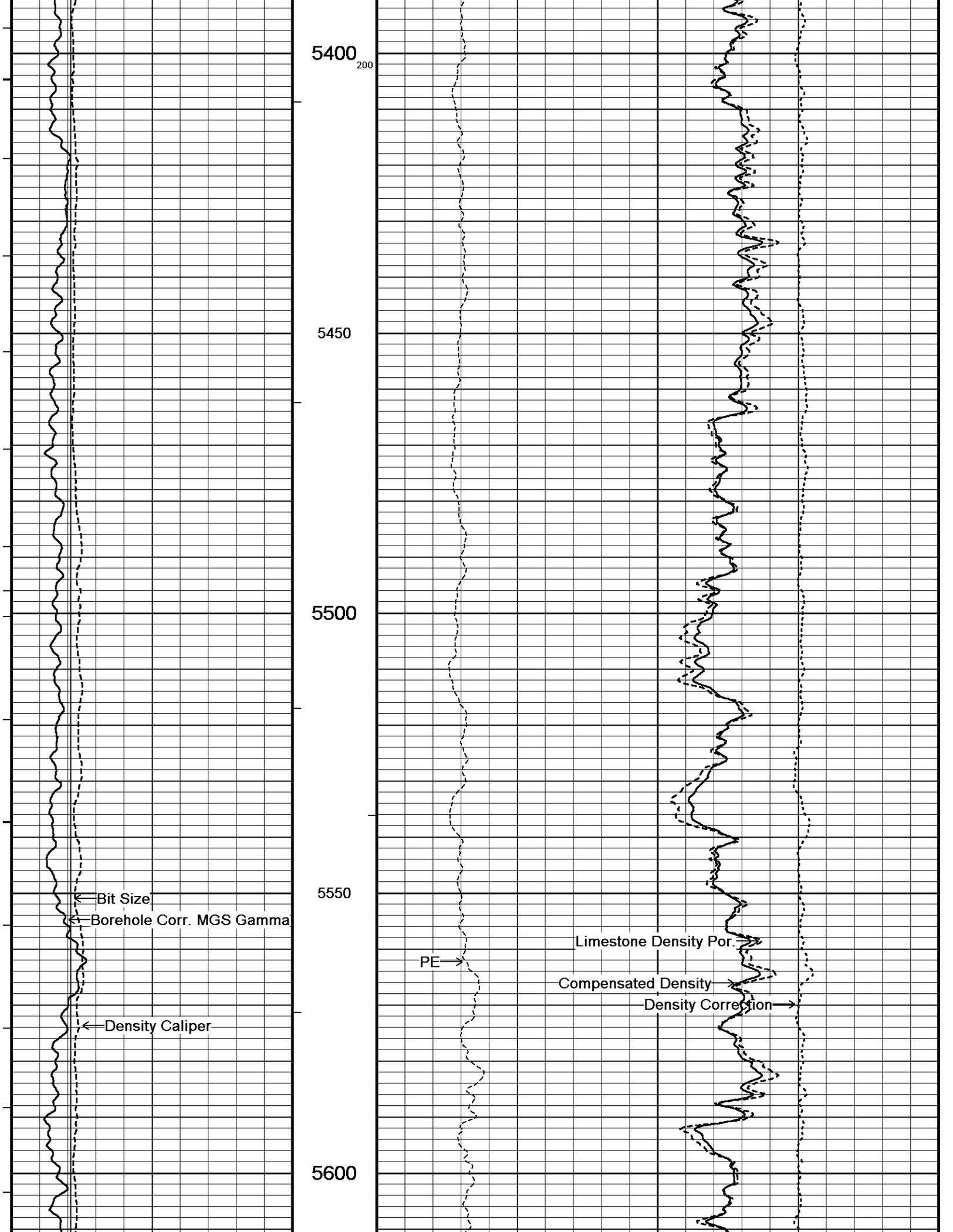


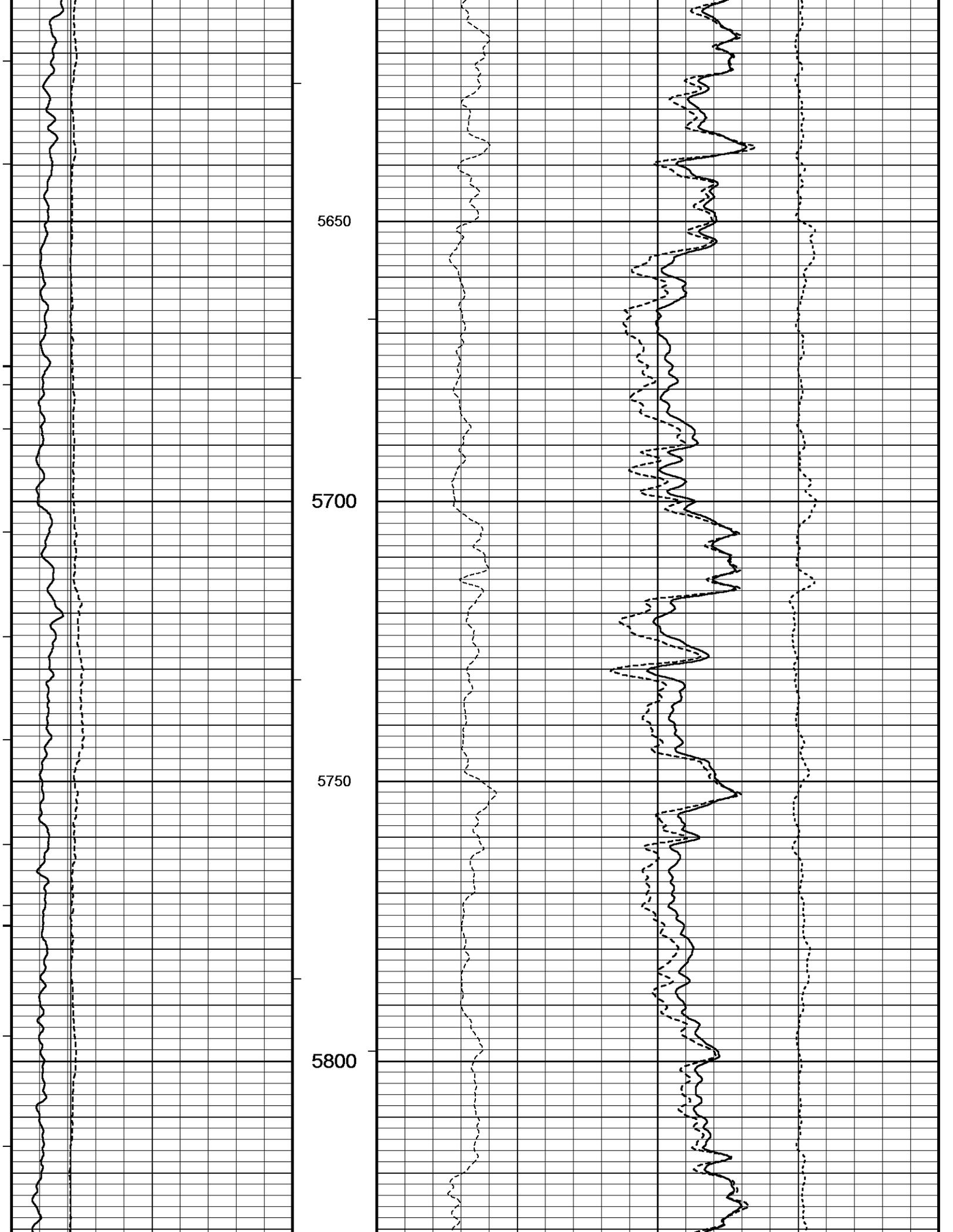


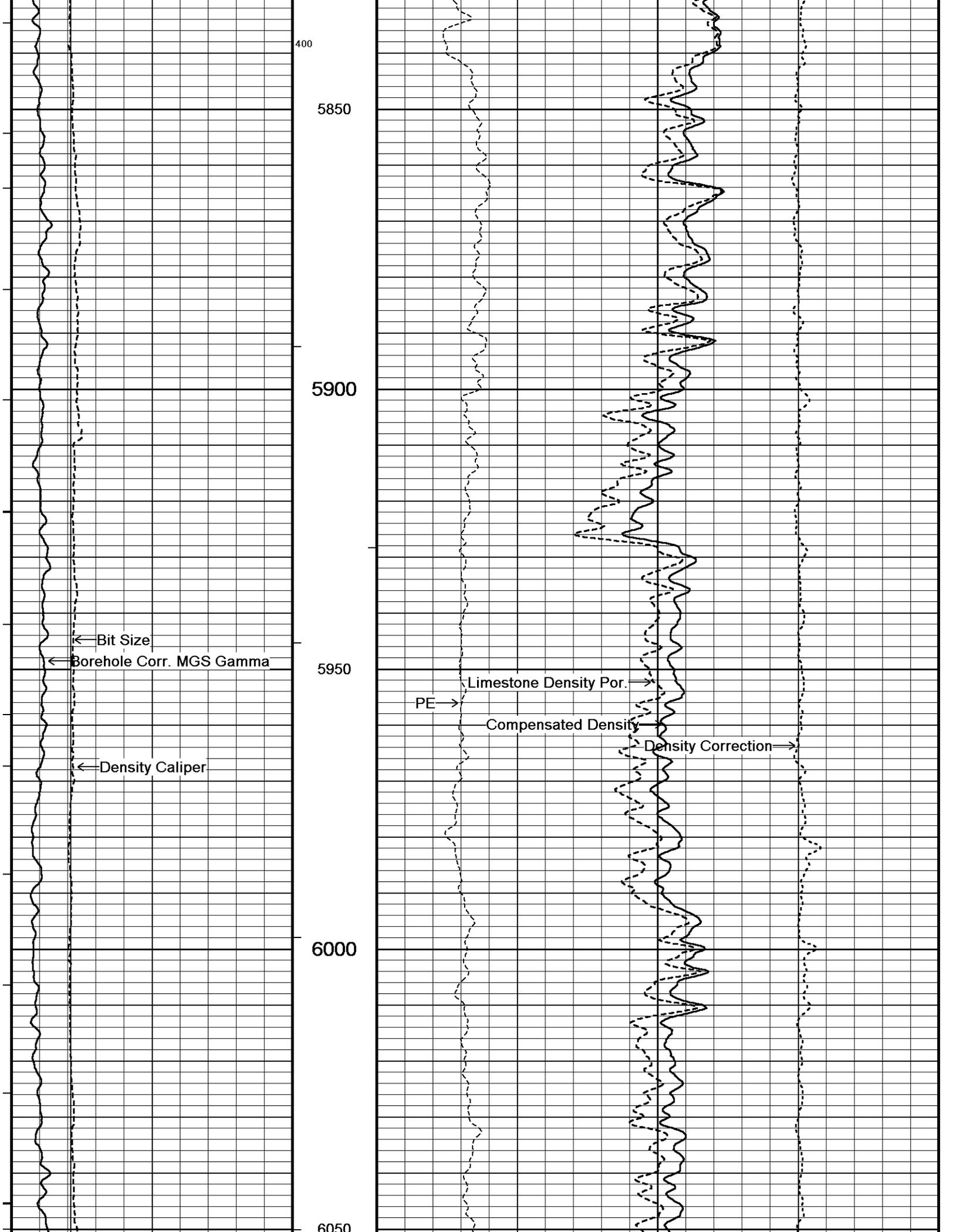


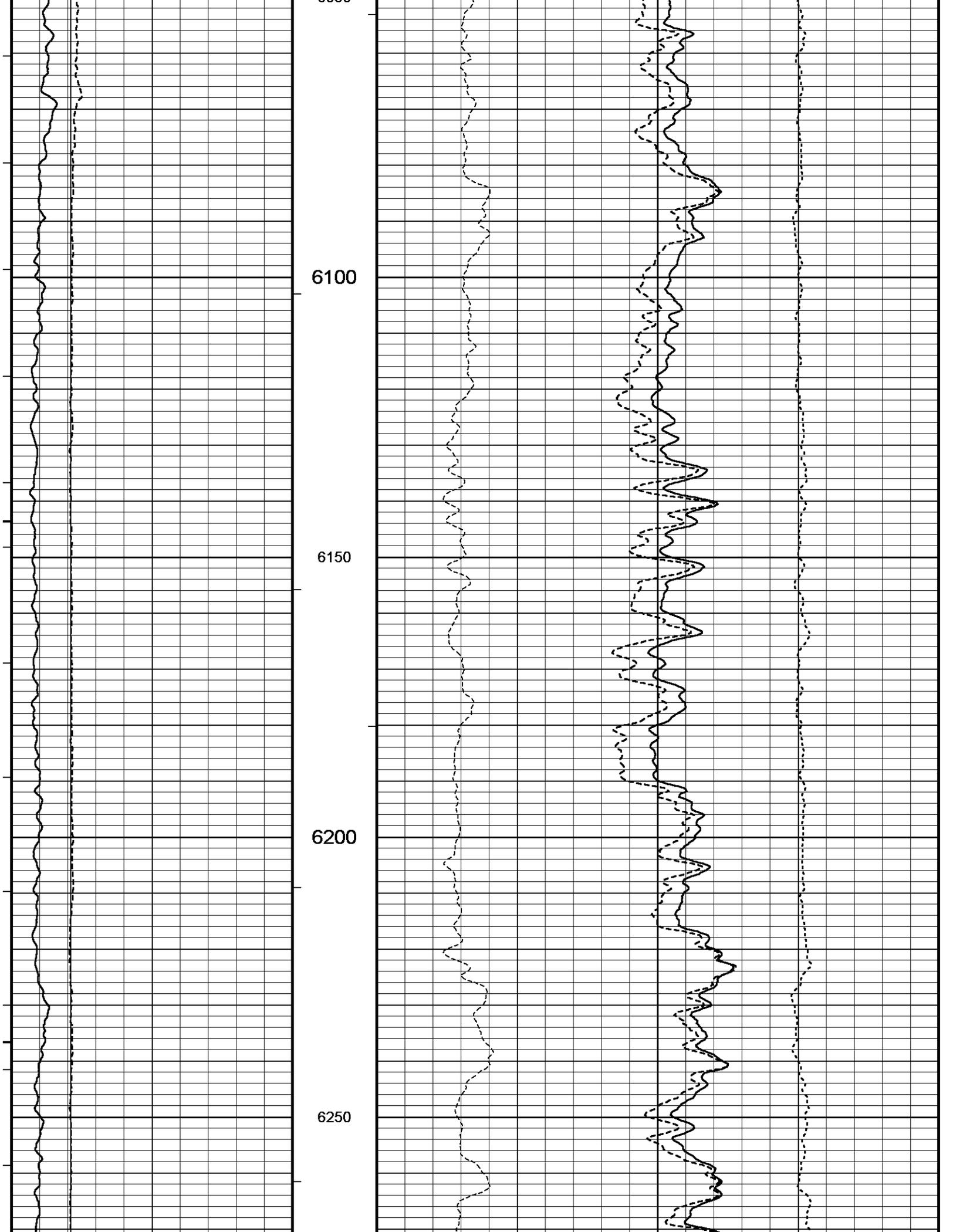


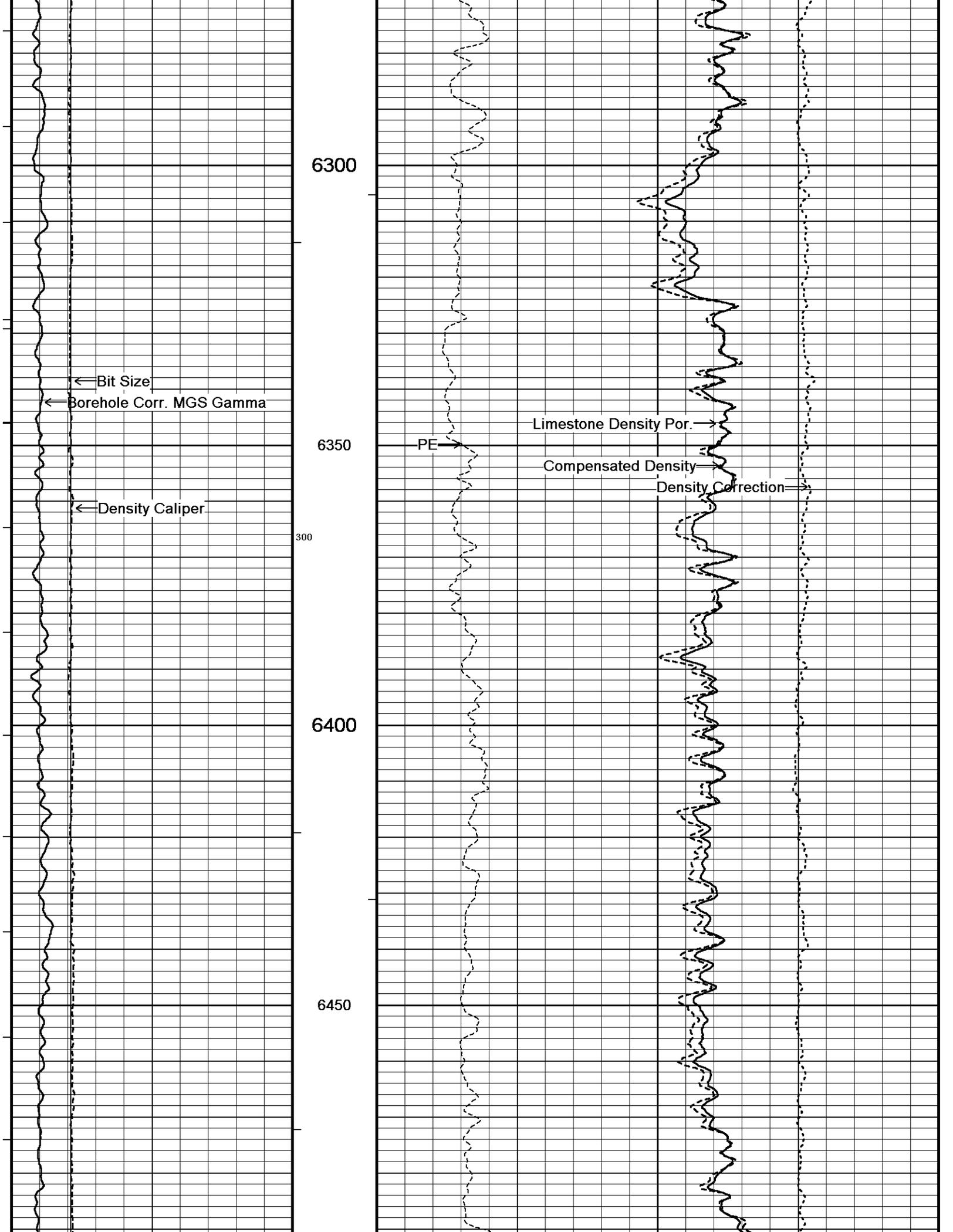












6300

6350

6400

6450

300

← Bit Size
← Borehole Corr. MGS Gamma

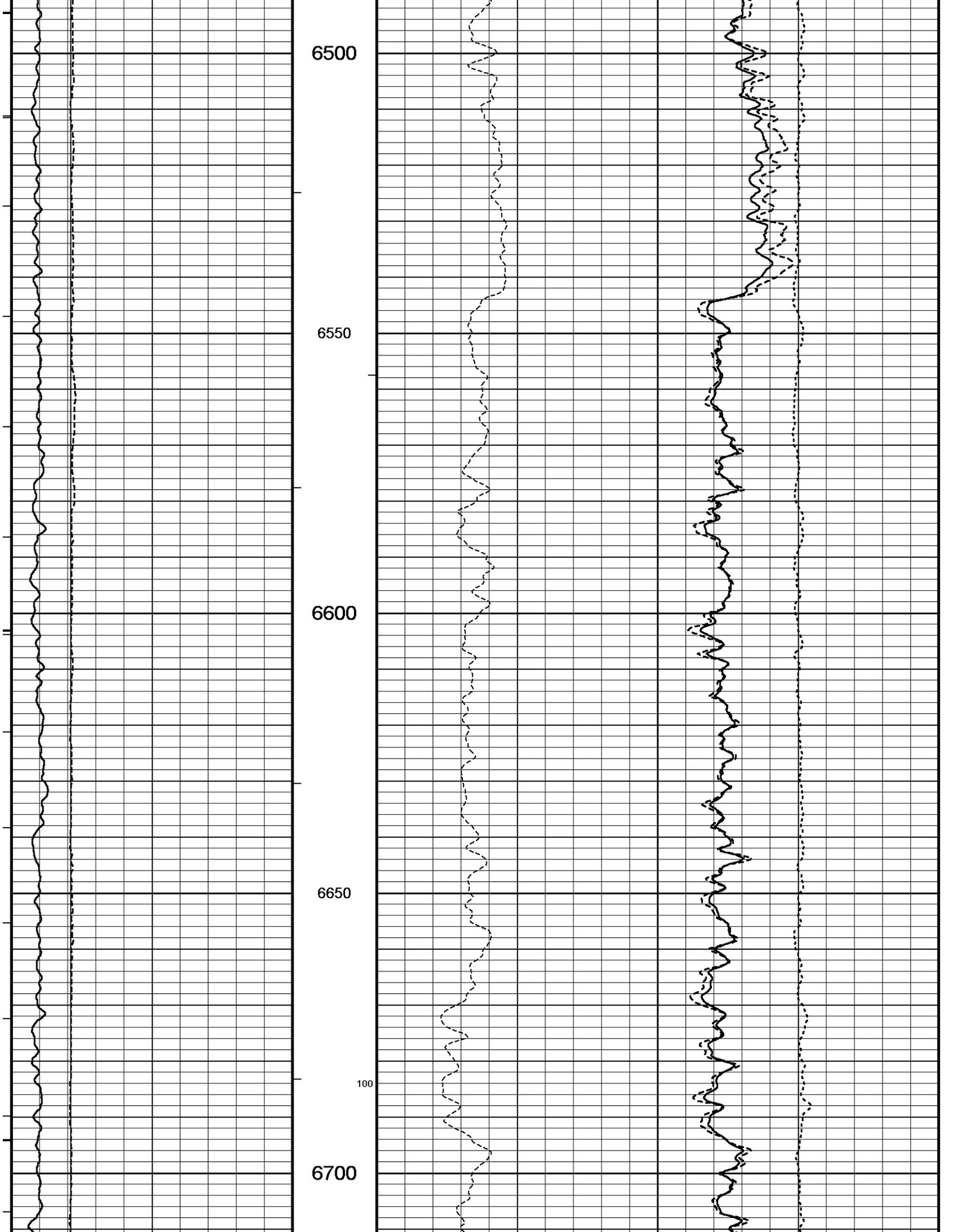
← Density Caliper

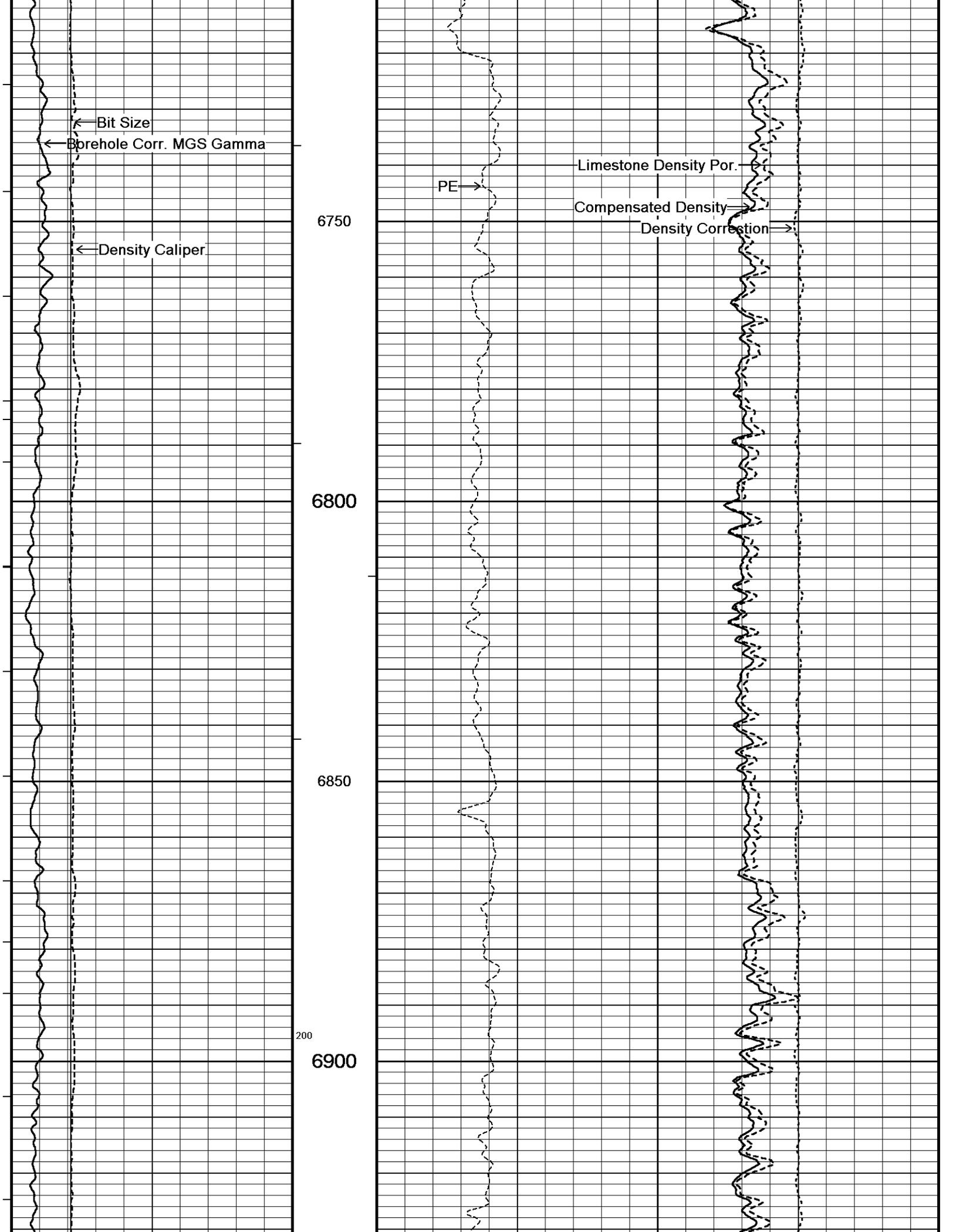
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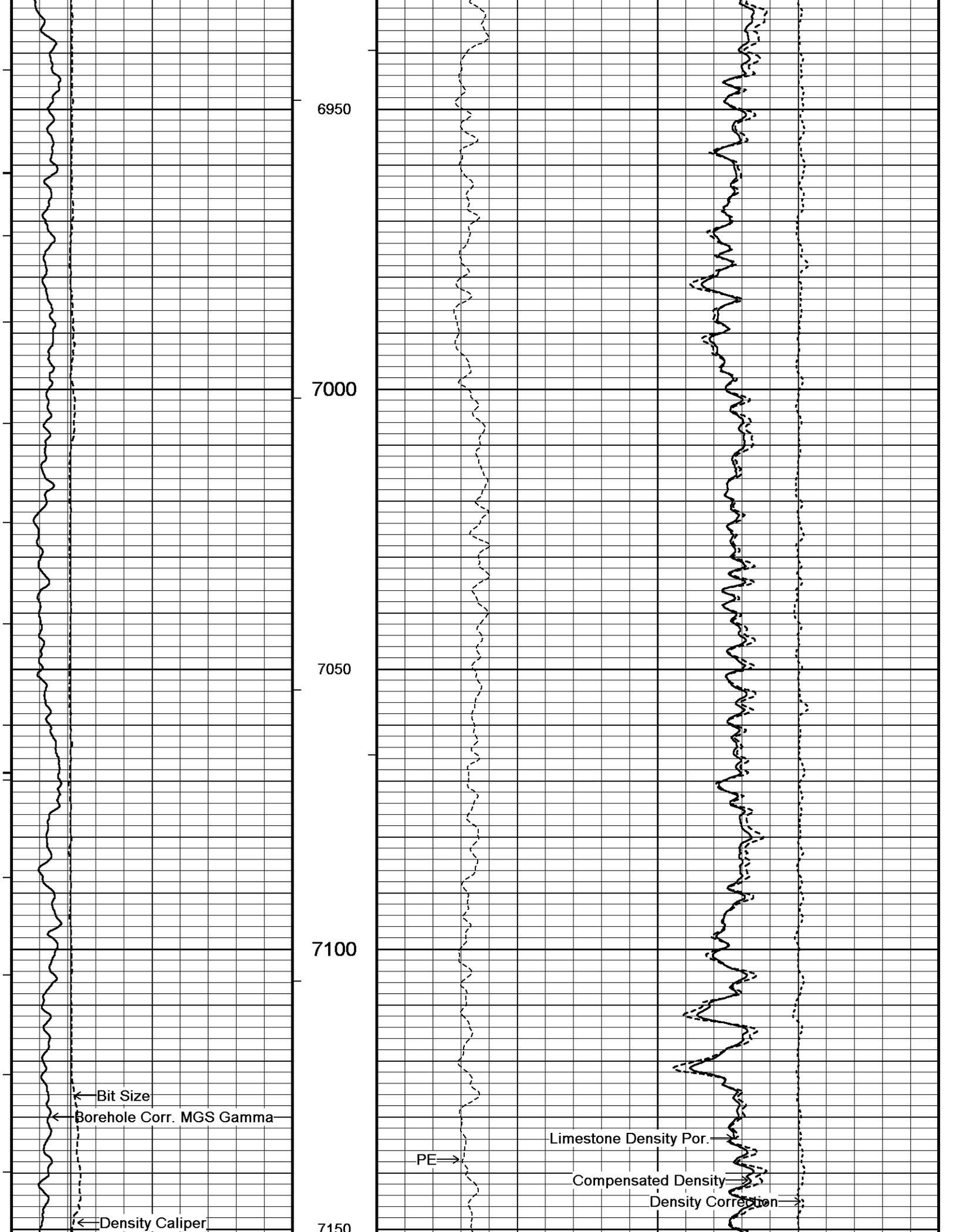
Limestone Density Por.

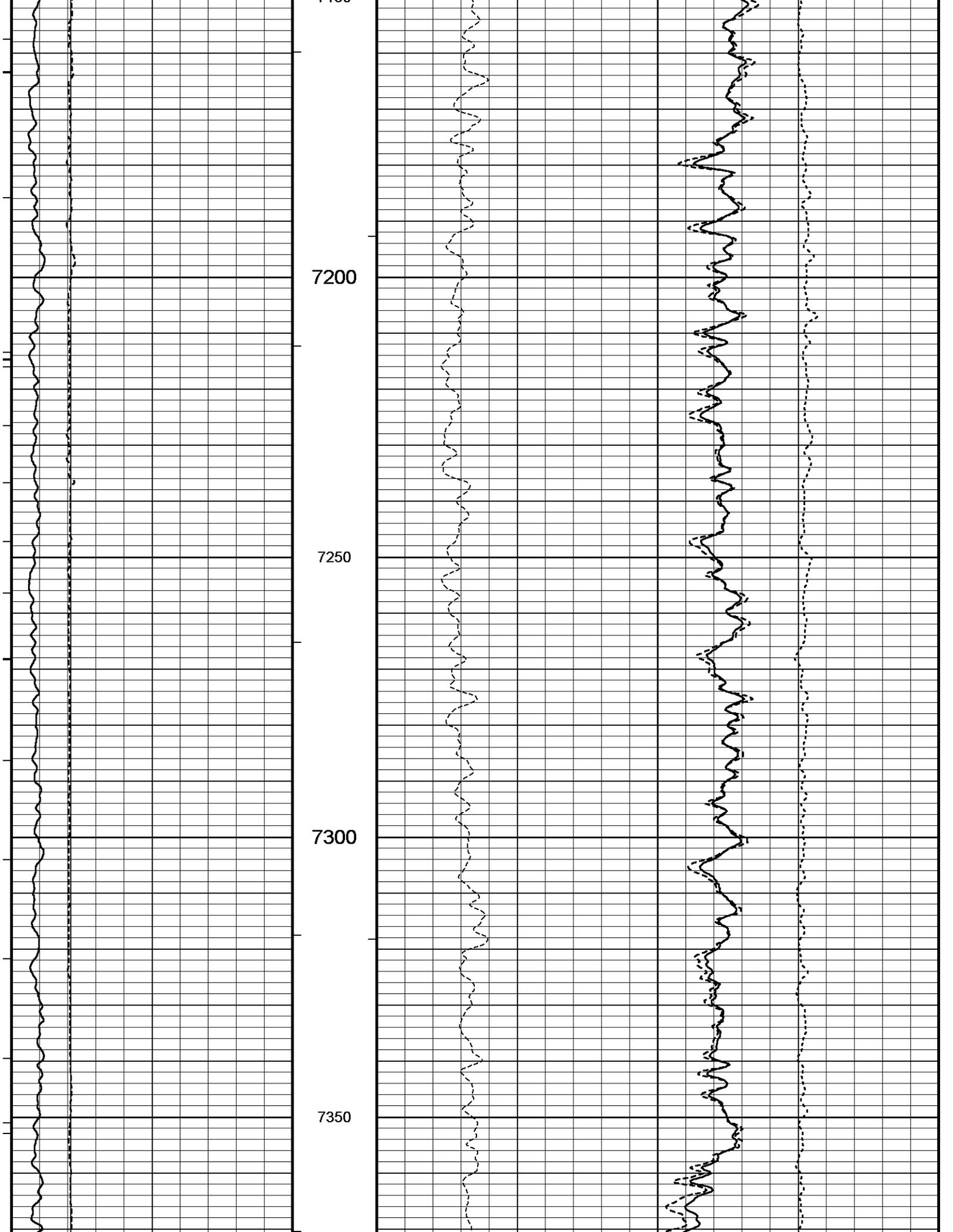
Compensated Density

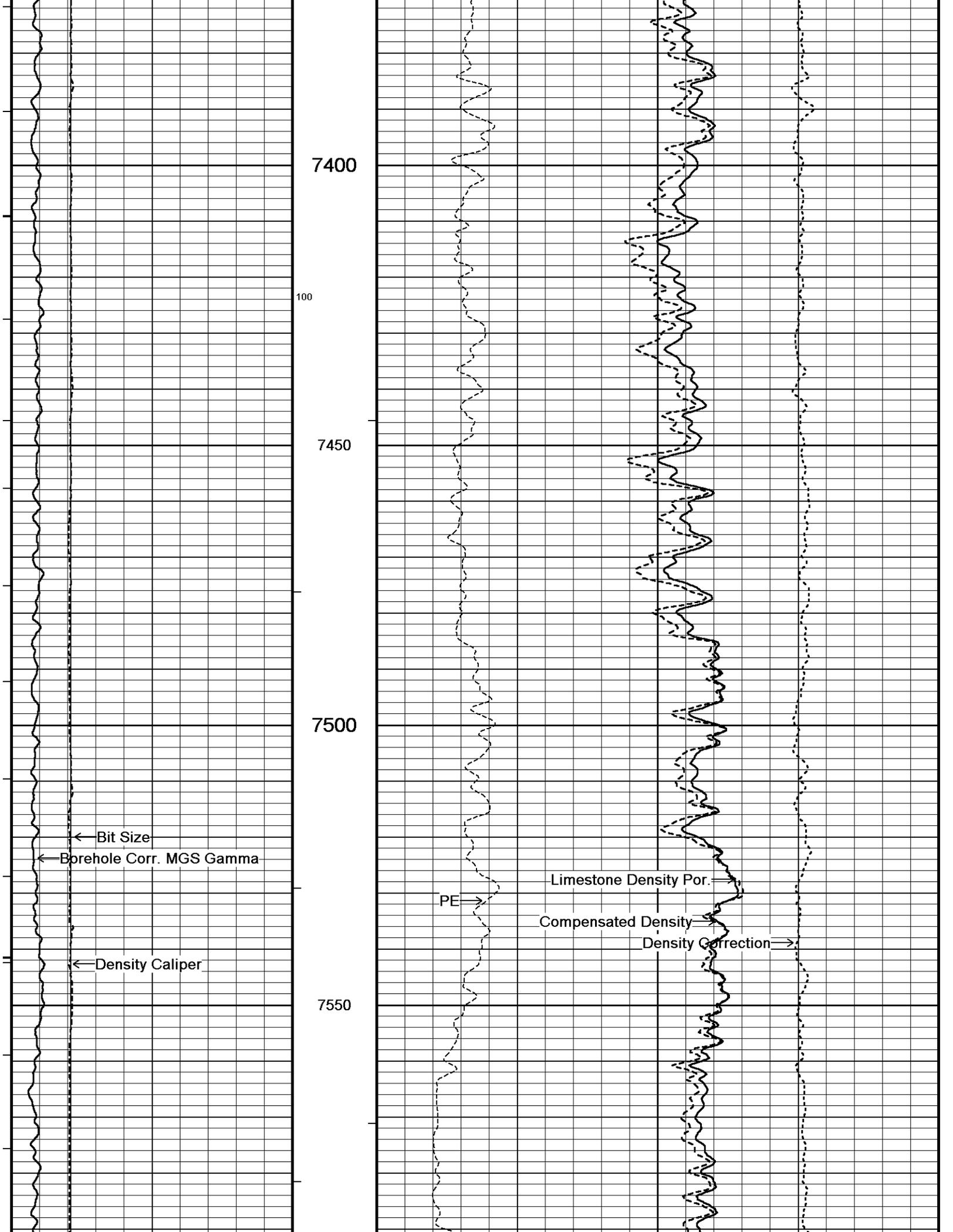
Density Correction

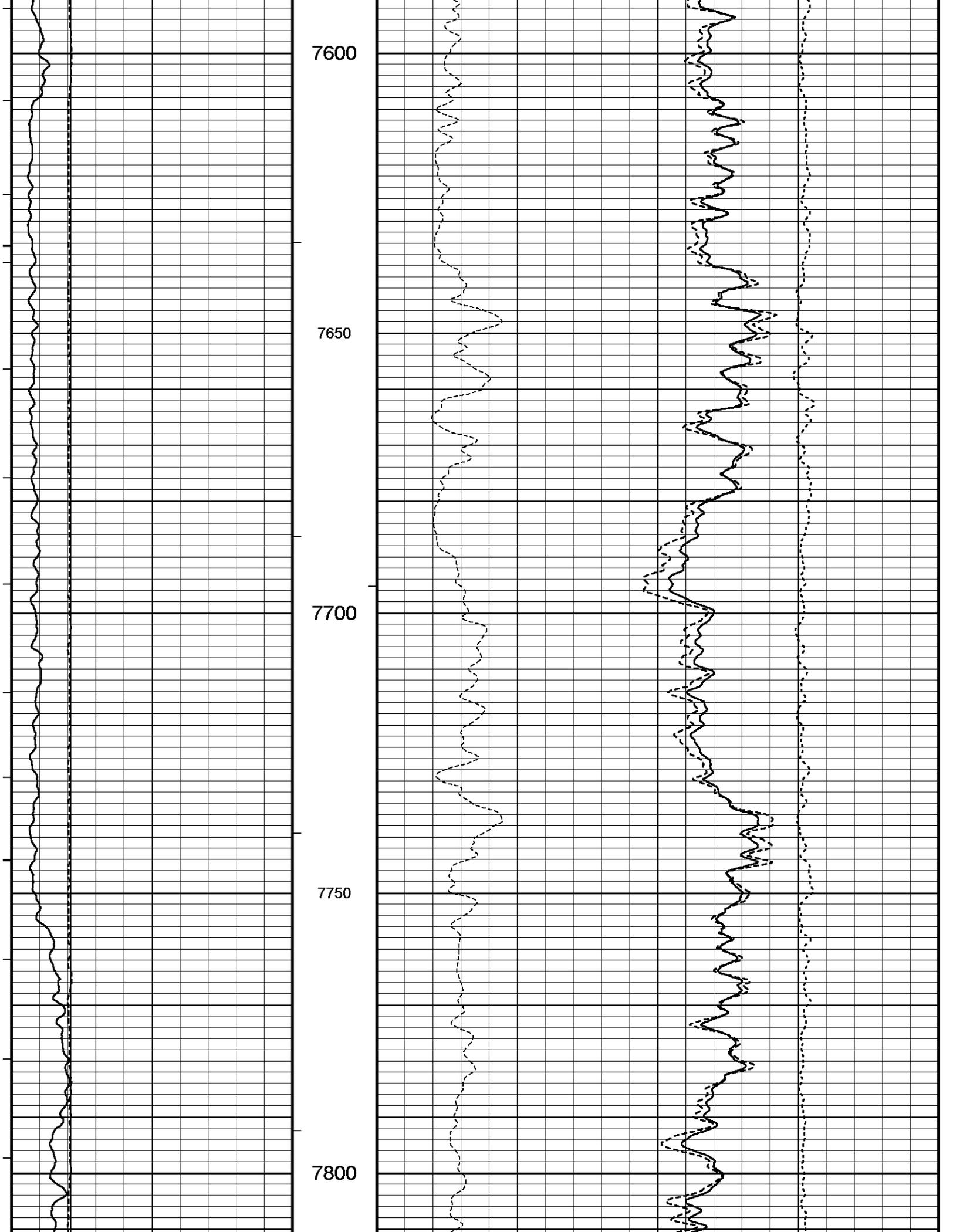


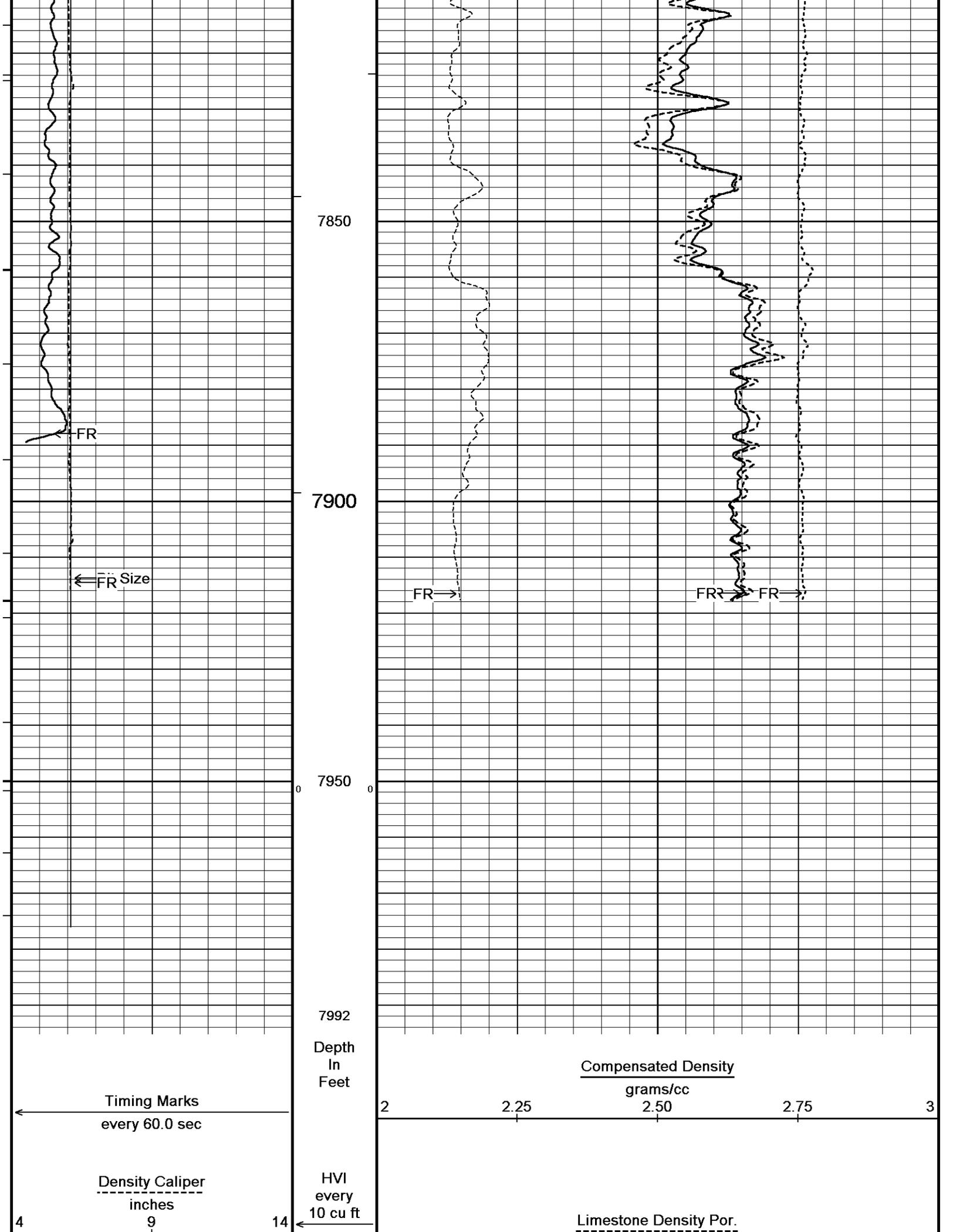


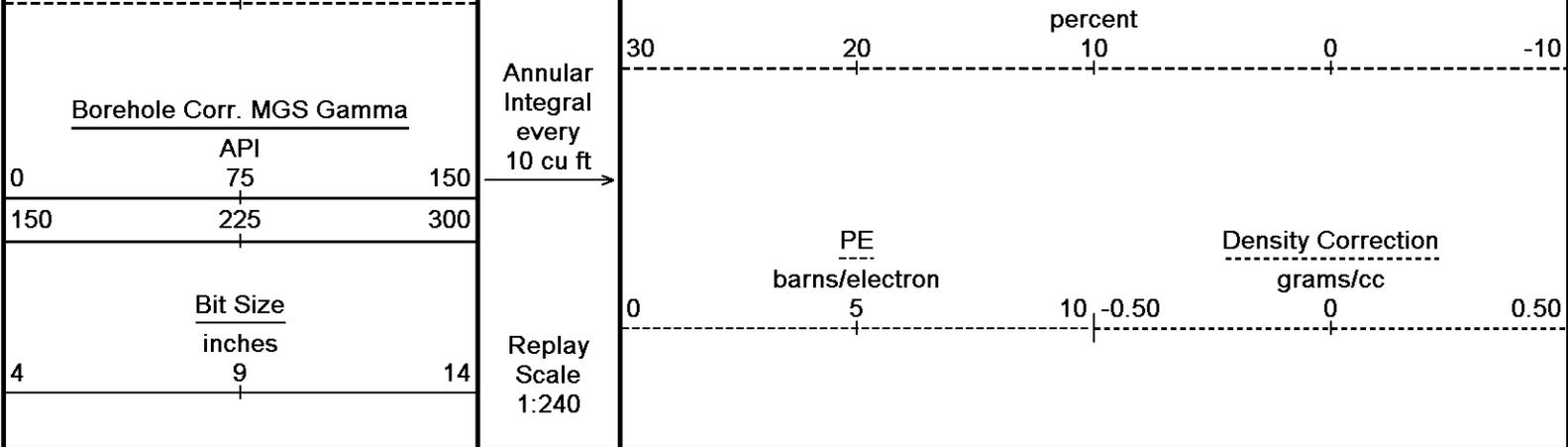












Depth Based Data - Maximum Sampling Increment 10.0cm
 Plotted on 24-FEB-2013 01:37
 Filename: C:\Minimus 13.04.8492\Data\00 Source (CONDIFF 8-22-5-23H)\172000 RTAP.dta
 Recorded on 23-FEB-2013 21:45
 System Versions: Processed with 13.04.8492 Plotted with 13.04.8492

5 INCH BULK DENSITY LOG

BEFORE SURVEY CALIBRATION
 C:\Minimus 13.04.8492\Data\00 Source (CONDIFF 8-22-5-23H)\172000 RTAP.dta

Down-hole Tension Calibration All 000 Field Calibration on 24-FEB-2009 00:00

Reading No	Measured	
1	14953.75	0.00
2	17846.38	1500.00

General Constants All 000 Last Edited on 23-FEB-2013,18:21

General Parameters

Mud Resistivity	5.100	ohm-metres
Mud Resistivity Temperature	41.000	degrees F
Water Level	0.000	feet
Borehole Fluid Processing	Wet Hole	

Hole/Annular Volume and Differential Caliper Parameters

HVOL Method	XY Caliper	
HVOL Caliper 1	MIE Caliper X	
HVOL Caliper 2	MIE Caliper Y	
Annular Volume Diameter	4.500	inches
Caliper for Differential Caliper	Density Caliper	

Rwa Parameters

Porosity used	Limestone Density Por.	
Resistivity used	Array Ind. Six Res Rt	
RWA Constant A	0.610	
RWA Constant M	2.150	

Down-hole Tension Calibration SMS 0 Field Calibration on 05-SEP-2012,13:01

Reading No	Measured	Calibrated (lbs)
1	15152.07	0.00
2	18386.74	2000.00

Strain Gauge Constants MMS-E.B 167 Last Edited on 02-FEB-2013,08:19

Atmospheric Pressure	14.70		psi
Serial Number	262784		
Calibration Date	21-Jan-2011		
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	0.038 0.038	0.049 0.049	0.063 0.063 0.077 0.078
3000.0	5.218 5.220	5.230 5.232	5.244 5.246 5.257 5.259
6000.0	10.409 10.412	10.422 10.425	10.436 10.440 10.447 10.452

8000.0	10.409	10.412	10.422	10.425	10.438	10.440	10.447	10.452
9000.0	15.610	15.615	15.623	15.628	15.638	15.643	15.650	15.656
12000.0	20.823	20.826	20.837	20.841	20.853	20.857	20.866	20.869
15000.0	26.048		26.064		26.081		26.093	

High Resolution Temperature Calibration MGS-C.J 136				Field Calibration on 22-FEB-2013,05:09			
		Measured		Calibrated(Deg F)			
Lower		0.00		0.00			
Upper		0.00		0.00			

High Resolution Temperature Constants MGS-C.J 136				Last Edited on 22-FEB-2013,05:09			
Pre-filter Length			11				

SP Calibration MGS-C.J 136				Field Calibration on 22-FEB-2013,05:09			
		Measured		Calibrated (mV)			
Reference 1		102.2		98.7			
Reference 2		-94.7		-98.3			

Gamma Calibration MGS-C.J 136				Field Calibration on 22-FEB-2013 05:09			
		Measured		Calibrated (API)			
Background		44		31			
Calibrator (Gross)		1848		1292			
Calibrator (Net)		1804		1261			

Gamma Constants MGS-C.J 136				Last Edited on 23-FEB-2013,18:20			
Gamma Calibrator Number		BLUE					
Mud Density		1.01		gm/cc			
Caliper Source for Processing		Density Caliper					
Tool Position		Eccentred					
Concentration of KCl		0.00		kppm			

Neutron Calibration MDN-B.J 388				Base Calibration on 20-FEB-2013 01:10 Field Check on 22-FEB-2013 05:13			
Base Calibration							
		Measured		Calibrated (cps)			
		Near	Far	Near	Far		
Ratio		2965	87	3714	110		
		34.094		33.764			
Field Calibrator at Base				Calibrated (cps)			
				1263	1931		
Ratio				0.654			
Field Check				Calibrated (cps)			
				1264	1921		
Ratio				0.647			

Neutron Constants MDN-B.J 388				Last Edited on 23-FEB-2013,18:20			
Neutron Source Id		p31112b					
Neutron Jig Number		blue					
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					

Caliper Calibration MIE-A.J 233				Base Calibration on 22-FEB-2013 05:18			
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Base Calibration

Reading No	Pads 1-5 Meas.	Pads 3-7 Meas.	Calibrator Size (in)
1	27635	26985	5.96
2	38181	37797	8.01
3	48664	47686	10.01
4	60719	59475	12.13
5	0	0	0.00

Reading No	Pad 2 Meas.	Pad 4 Meas.	Pad 6 Meas.	Pad 8 Meas.	Calibrator Size (in)
1	27327	23627	24282	26939	5.96
2	36604	32485	33227	35920	8.01
3	45176	40909	42459	45233	10.01
4	55357	51259	52967	55460	12.13
5	0	0	0	0	0.00

Field Calibration

	Measured Pads 1-5 Caliper(in)	Measured Pads 3-7 Caliper(in)	Actual Caliper(in)		
	6.02	6.02	5.96		
	Measured Pad 2 Caliper(in)	Measured Pad 4 Caliper(in)	Measured Pad 6 Caliper(in)	Measured Pad 8 Caliper(in)	Actual Caliper(in)
	3.00	3.07	3.07	2.93	5.96

Caliper Constants MIE-A.J 233

Last Edited on 10-NOV-2012 06:39

Caliper Difference for BRKT 0.120 inches

Accelerometer Parameters MIE-A.J 233

Date Of Last Accelerometer Calibration 11-JUL-2012,16:04

	X Accelerometer	Y Accelerometer	Z Accelerometer
Slope	-1.103264	-1.116469	-1.106207
Offset	0.010635	0.006475	0.004891

Accelerometer Constants MIE-A.J 233

Last Edited on 14-JAN-2013,13:07

Accelerometer Calibrator Number 000

Accelerometer Temperature Characterisation

X Accelerometer

Serial Number	468			
Calibration Date	17-Dec-2007			
	B0	B1	B2	B3
Bias(g)	0.00000e+000	-6.34516e-006	-5.01333e-009	5.89860e-011
	SF0	SF1	SF2	SF3
Scale Factor(mA/g)	3.00000e+000	2.86986e-004	5.01603e-007	3.36551e-011

Y Accelerometer

Serial Number	1073			
Calibration Date	02-May-2011			
	B0	B1	B2	B3
Bias(g)	0.00000e+000	-1.04005e-005	2.19294e-008	-1.31489e-010
	SF0	SF1	SF2	SF3
Scale Factor(mA/g)	3.00000e+000	2.69223e-004	2.39527e-007	9.12553e-010

Z Accelerometer

Serial Number	977			
Calibration Date	20-Jan-2011			
	B0	B1	B2	B3
Bias(g)	0.00000e+000	1.86594e-005	1.00709e-008	3.83419e-011
	SF0	SF1	SF2	SF3
Scale Factor(mA/g)	3.00000e+000	2.74913e-004	2.75506e-007	1.29284e-009

Magnetometer Parameters MIE-A.J 233

Date Of Last Magnetometer Calibration 28-NOV-2012,18:05

	X Magnetometer	Y Magnetometer	Z Magnetometer
Slope	-1.000000	-1.001739	-0.998267
Offset	-0.005746	-0.010400	0.000941

Magnetometer Constants MIE-A.J 233

Last Edited on

Magnetometer Calibrator Number 000

Navigation Constants MIE-A.J 233 Last Edited on 30-DEC-2012,14:46

Magnetic Declination 4.75 degrees East

Imager Pad Check MIE-A.J 233 Field Check on

Pad 1	Pad Not Tested	Pad 5	Pad Not Tested
Pad 2	Pad Not Tested	Pad 6	Pad Not Tested
Pad 3	Pad Not Tested	Pad 7	Pad Not Tested
Pad 4	Pad Not Tested	Pad 8	Pad Not Tested

Compact Micro Imager Constants MIE-A.J 233 Last Edited on 12-FEB-2013,10:37

Sonde Configuration	Imager Mode
Arm-Pad Kit	Normal Pads (12.25 in)
Arm-Pad Kit Serial Number	
Centre Pad 1 Rotational Offset	0.00 degrees
Image/Borehole Ovality Reference	Azimuth of Pad 1
Non Active Buttons	Omit
Search Angle	0.00 degrees
Correlation Interval	3.28 feet
Correlation Step	1.64 feet
Current Offset	0.0000 mAmp
Squasher Start	N/A mAmp
Image Processing	Enabled

Induction Calibration MAI-A.A 158 Base Calibration on 19-FEB-2013,09:58

Field Check on 22-FEB-2013 05:03

Base Calibration					
Test Loop Calibration		Measured		Calibrated (mmho/m)	
Channel	Low	High	Low	High	
1	17.2	475.3	9.3	966.2	
2	6.1	381.2	7.6	821.4	
3	3.8	265.2	5.2	566.0	
4	2.7	132.2	2.6	279.2	
Array Temperature	22.3		Deg F		
Channel		Base Check (mmho/m)		Field Check (mmho/m)	
	Low	High	Low	High	
1			10.9	3815.1	
2			29.4	3532.0	
3			26.9	2983.0	
4			17.8	2098.7	
Deep			14.7	1944.9	
Medium			40.8	3889.5	
Shallow			46.3	5238.0	
Array Temperature			48.2	Deg F	

Induction Constants MAI-A.A 158 Last Edited on 23-FEB-2013,18:21

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	0.0000
Stand-off Fin Angle	60.00 degrees
Stand-off Fin Width	0.0000 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

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 158

Field Calibration on 22-FEB-2013,05:03

	Measured	Calibrated(Deg F)
Lower	0.00	0.00
Upper	0.00	0.00

High Resolution Temperature Constants MAI-A.A 158

Last Edited on 22-FEB-2013,05:03

Pre-filter Length	11
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Caliper Calibration MPD-C.J 435

Base Calibration on 19-FEB-2013 09:01
Field Calibration on 22-FEB-2013 05:27

Base Calibration

Reading No	Measured	Calibrator Size (in)
1	16700	4.01
2	26272	5.96
3	36352	7.98
4	46064	9.86
5	56816	11.88
6	N/A	N/A

Field Calibration

Measured Caliper (in)	Actual Caliper (in)
5.94	5.96

Photo Density Calibration MPD-C.J 435

Base Calibration on 19-FEB-2013 09:19
Field Check on 22-FEB-2013 05:25

Density Calibration

Base Calibration	Measured		Calibrated (sdu)	
	Near	Far	Near	Far
Reference 1	57217	27705	59869	31110
Reference 2	23705	2661	24557	2522

Field Check at Base

1288.7	1335.4
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Field Check

1291.8	1331.5
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PE Calibration

Base Calibration	WS	Measured		Calibrated Ratio
		WH	Ratio	
Background	232	1152		
Reference 1	23225	57010	0.412	0.369
Reference 2	6484	23557	0.279	0.271

Field Check at Base

231.7	1151.9
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Field Check

235.0	1154.0
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Density Source Id	p21137b	
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	1.01	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	0.00	

DOWNHOLE EQUIPMENT

C:\Minimus 13.04.8492\Data\00 Source (CONDIFF 8-22-5-23H)\LEGACY TOOLSTRING.dta

RUNNING TOOL
MLK-A 1 LG: 4.87 ft WT: 30.9 lb OD: 2.24 in

SKJ-E.B Compact Knuckle Joint
SKJ-E.B 469 LG: 2.17 ft WT: 24.3 lb OD: 2.24 in

Spacer-Empty Battery
MLK-A 2 LG: 14.23 ft WT: 30.9 lb OD: 2.24 in

Spacer-Empty Battery
MLK-A 3 LG: 14.23 ft WT: 30.9 lb OD: 2.24 in

MBS-G.A 200v Compact Battery Sub
MBS-G.A 119 LG: 17.06 ft WT: 123.5 lb OD: 2.24 in

Compact Memory Sub E.B
MMS-E.B 167 LG: 5.20 ft WT: 37.5 lb OD: 2.24 in

Compact Tool Isolator sub.
MTI-B.A 67 LG: 1.54 ft WT: 13.2 lb OD: 2.24 in

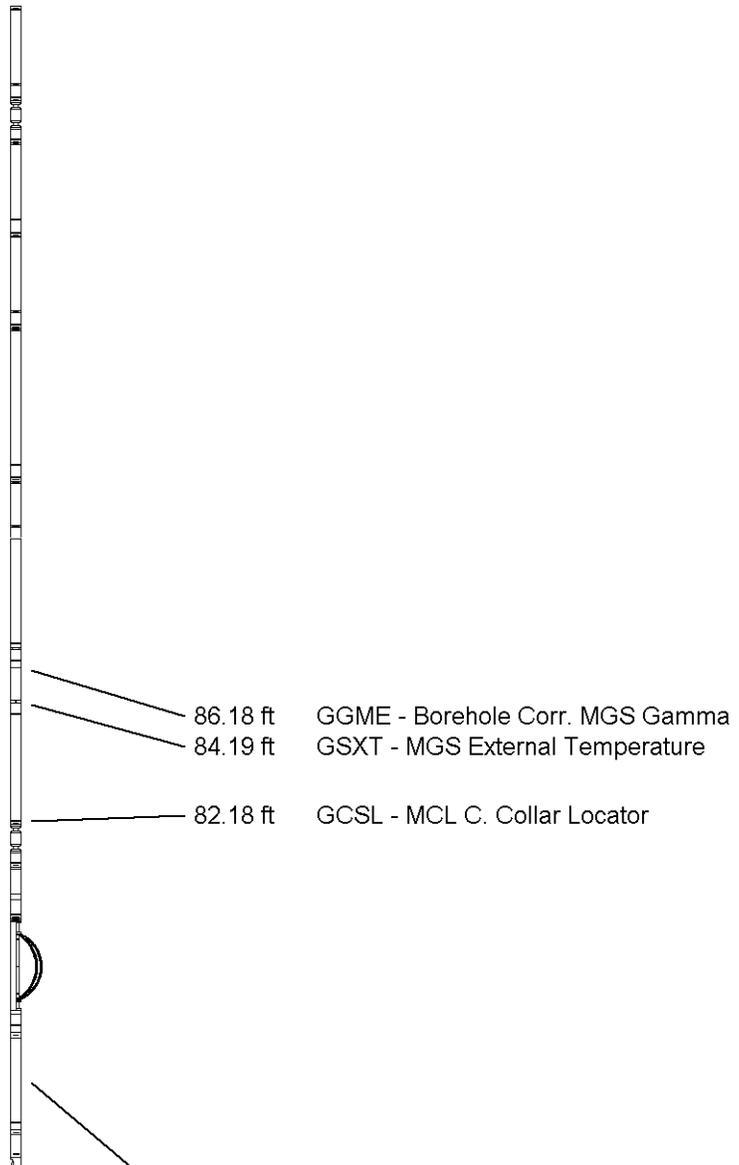
Compact Short Gamma
MGS-C.J 136 LG: 3.41 ft WT: 24.3 lb OD: 2.24 in

Compact Collar Locator
MCL-B.J 60 LG: 3.17 ft WT: 26.5 lb OD: 2.24 in

SKJ-D.A Compact Knuckle Joint
SKJ-D.A 41 LG: 2.17 ft WT: 24.3 lb OD: 2.24 in

SHA-F Compact Swivel Head Adaptor
SHA-F 33 LG: 2.74 ft WT: 26.5 lb OD: 2.24 in

MIS-A.A Compact Inline Bowspring sub
MIS-A.A 260 LG: 5.70 ft WT: 33.1 lb OD: 2.24 in



Compact Neutron
MDN-B.J 388 LG: 5.04 ft WT: 50.7 lb OD: 2.24 in

Compact Density/Caliper
MPD-C.J 435 LG: 9.59 ft WT: 90.4 lb OD: 2.24 in

MIS-A.A Compact Inline Bowspring sub
MIS-A.A 15 LG: 5.70 ft WT: 33.1 lb OD: 2.24 in

SHA-J.A Compact Swivel Head Adaptor
SHA-J.A 454 LG: 2.30 ft WT: 22.0 lb OD: 2.24 in

SKJ-D.A Compact Knuckle Joint
SKJ-D.A 42 LG: 2.17 ft WT: 24.3 lb OD: 2.24 in

MIS-D.A Compact Inline Bowspring sub
MIS-D.A 333 LG: 5.70 ft WT: 33.1 lb OD: 2.24 in

Compact MMI Memory Section
MIM-B.A 254 LG: 4.65 ft WT: 26.5 lb OD: 2.24 in

Compact MMI Electrode Section
MIE-A.J 233 LG: 13.96 ft WT: 99.2 lb OD: 4.09 in

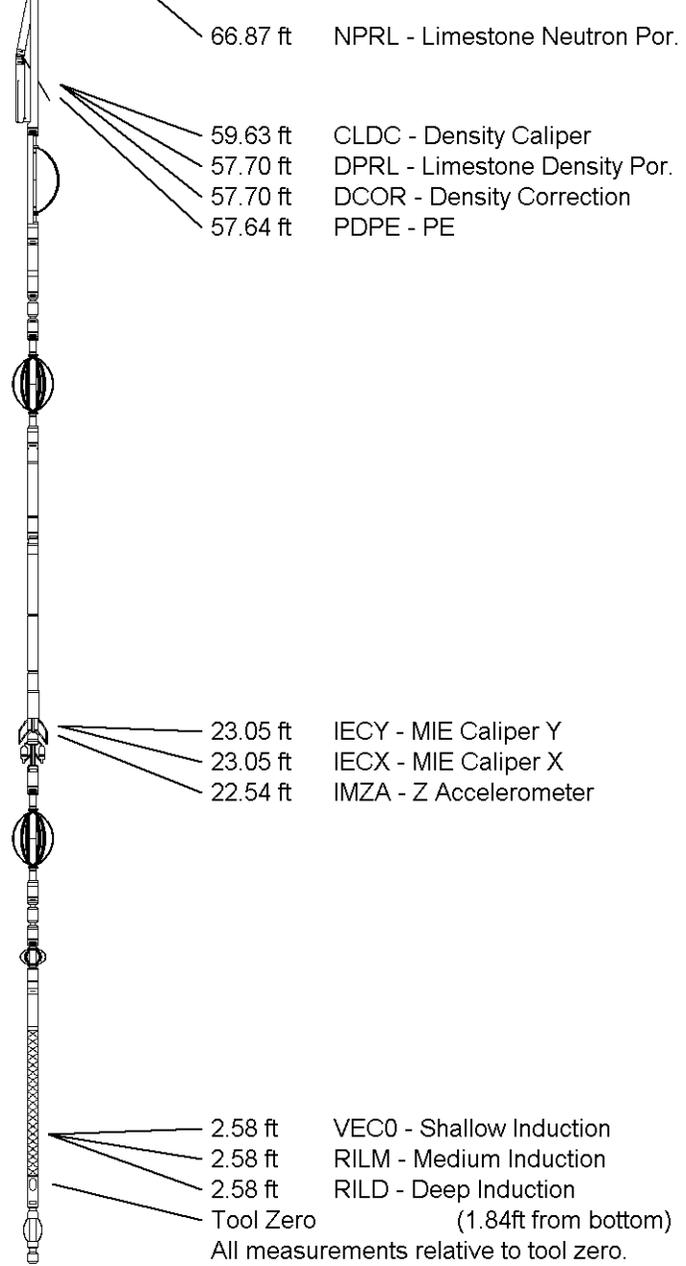
MIS-D.B Compact Inline Bowspring sub
MIS-D.B 606 LG: 5.70 ft WT: 33.1 lb OD: 2.24 in

SKJ-E.B Compact Knuckle Joint
SKJ-E.B 584 LG: 2.17 ft WT: 24.3 lb OD: 2.24 in

MIS-B Compact Inline Standoff sub
MIS-B 27 LG: 2.14 ft WT: 15.4 lb OD: 2.24 in

Compact Induction
MAI-A.A 158 LG: 12.52 ft WT: 48.5 lb OD: 2.24 in

Total Length: 148.10 ft Weight: 925.9 lb



COMPANY	SOURCE ENERGY
WELL	CONDIFF 8-22-5-23H
FIELD	SAUZEK
PROVINCE/COUNTY	SUMNER
COUNTRY/STATE	USA / KANSAS

Elevation Kelly Bushing	1264.00	feet	First Reading	7915.00	feet
Elevation Drill Floor	1262.00	feet	Depth Driller	8011.00	feet
Elevation Ground Level	1247.00	feet	Depth Logger	7975.00	feet



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

