Weatherford®

COMPACT PHOTO DENSITY
COMPENSATED NEUTRON LOG

COMPANY	SANDRIDGE ENERGY
WELL	UNRUH 2629 2-17H
FIELD	MONGER
PROVINCE/COUNTY	GRAY
COUNTRY/STATE	U.S.A. / KANSAS
LOCATION	SHL: 275' FSL & 330' FEL
	BHL: 330' FNL & 330' FEL

SEC	TWP	RGE	Other Services
17	26S	29W	MAI

API Number 15-069-20413
Permit Number

Permanent Datum G.L., Elevation 2745 feet
Log Measured From KB
Drilling Measured From K.B. @ 20 feet

Elevations:	feet
KB	2765.00
DF	2765.00
GL	2745.00

Date	02-DEC-2012				
Run Number	ONE				
Depth Driller	9370.00	feet			
Depth Logger	9370.00	feet			
First Reading	9287.00	feet			
Last Reading	4000.00	feet			
Casing Driller	5425.00	feet			
Casing Logger	5427.00	feet			
Bit Size	6.125	inches			
Hole Fluid Type	WBM				
Density / Viscosity	9.00	lb/USg	9.00	CP	
PH / Fluid Loss	10.00		4.20	ml/30Min	
Sample Source	Flowline				
Rm @ Measured Temp	0.86 @ 68.0	ohm-m			
Rmf @ Measured Temp	0.69 @ 68.0	ohm-m			
Rmc @ Measured Temp	1.03 @ 68.0	ohm-m			
Source Rmf / Rmc	CALC		CALC		
Rm @ BHT	0.48 @125.0	ohm-m			
Time Since Circulation	1 HOUR				
Max Recorded Temp	125.00	deg F			
Equipment Name	Compact				
Equipment / Base	18086		GJ		
Recorded By	M. RICHINS				
Witnessed By	R. ROBLES				
S.O. # / AFE #	3529549		DC12567		

BOREHOLE RECORD

Last Edited: 03-DEC-2012 01:36

Bit Size inches	Depth From feet	Depth To feet
6.125	5425.00	9370.00

CASING RECORD

Type	Size inches	Depth From feet	Shoe Depth feet	Weight pounds/ft
INTERMED	7.000	0.00	5425.00	26.00

REMARKS

LOGGED WITH WLS VER 13.03.7779 SOFTWARE

200V MESSENGER SYSTEM USED.
DEPTH BASED ON RIG'S EDR SYSTEM / PIPE STRAP

HARDWARE: MPD: 4"PROFILE PLATE
MISD: ECCENTRALIZED

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

ANNULAR HOLE VOLUME FROM T.D. TO INTERMEDIATE CASING WITH 4.5 IN PRODUCTION CASING = 440 CU. FT.
TOTAL HOLE VOLUME FROM T.D. TO INTERMEDIATE CASING = 865 CU.FT.

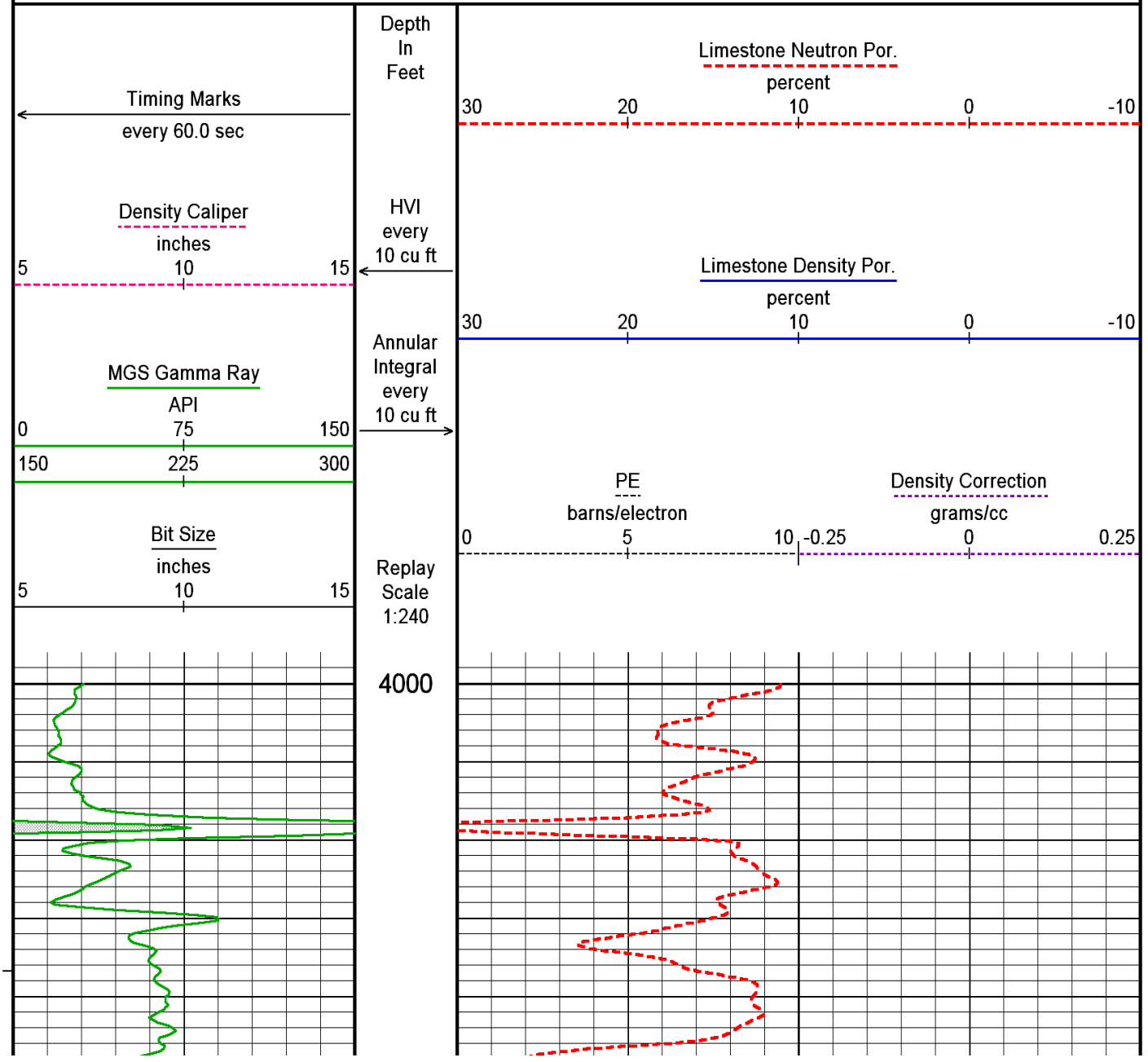
SERVICE ORDER # 3529549
RIG: LARIAT 20

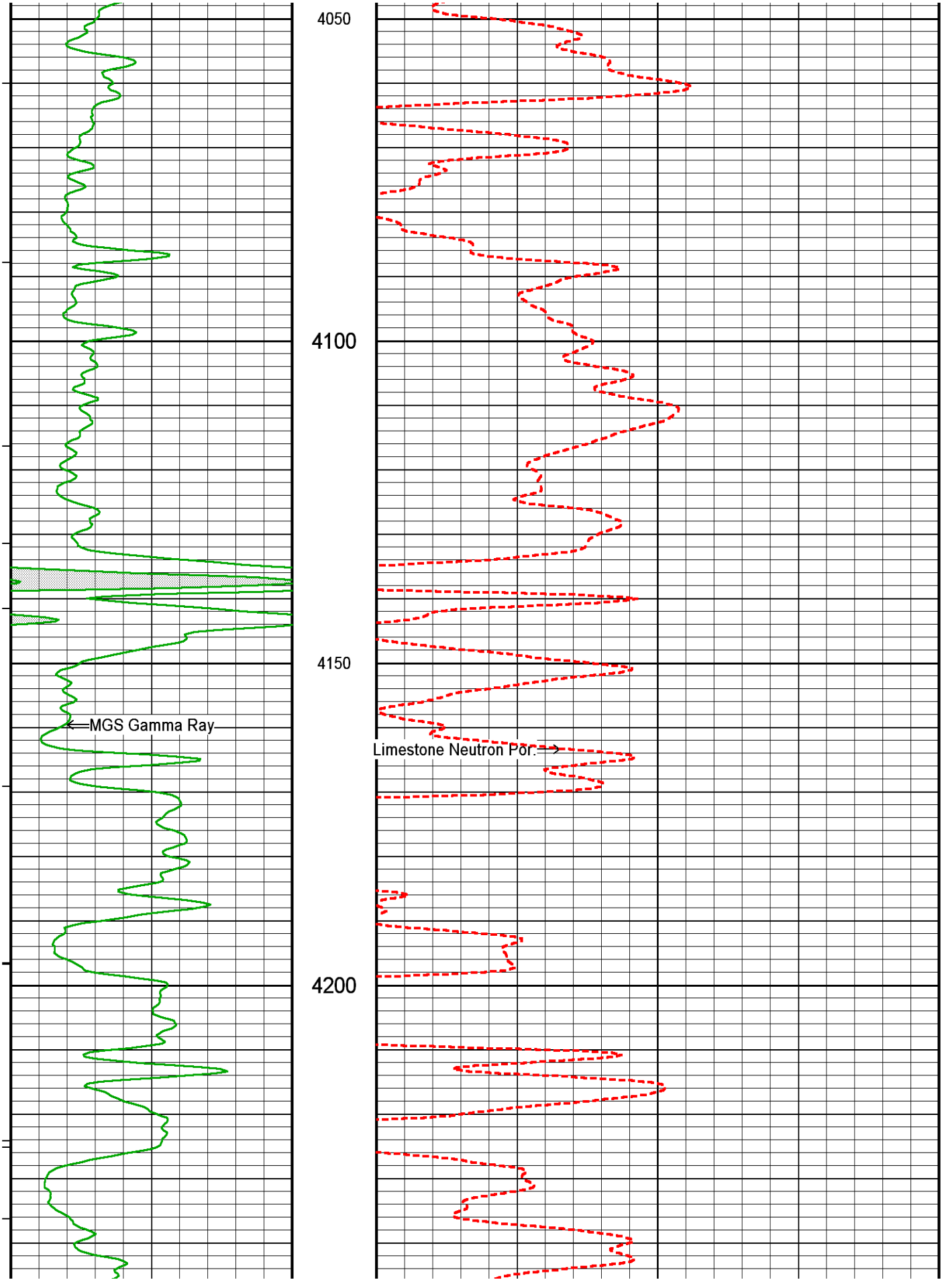
OPERATORS: A. ALLRED, C. STAAKE

5 INCH MAIN LOG DSC

Depth Based Data - Maximum Sampling Increment 10.0cm
Filename: C:\Logs\Sand Ridge\Unruh 2629 2-17H\Unruh 2629 2-17H MMS Depth2.dta
System Versions: Processed with 13.03.7779 Plotted with 13.03.7779

Plotted on 03-DEC-2012 01:56
Recorded on 03-DEC-2012 00:39

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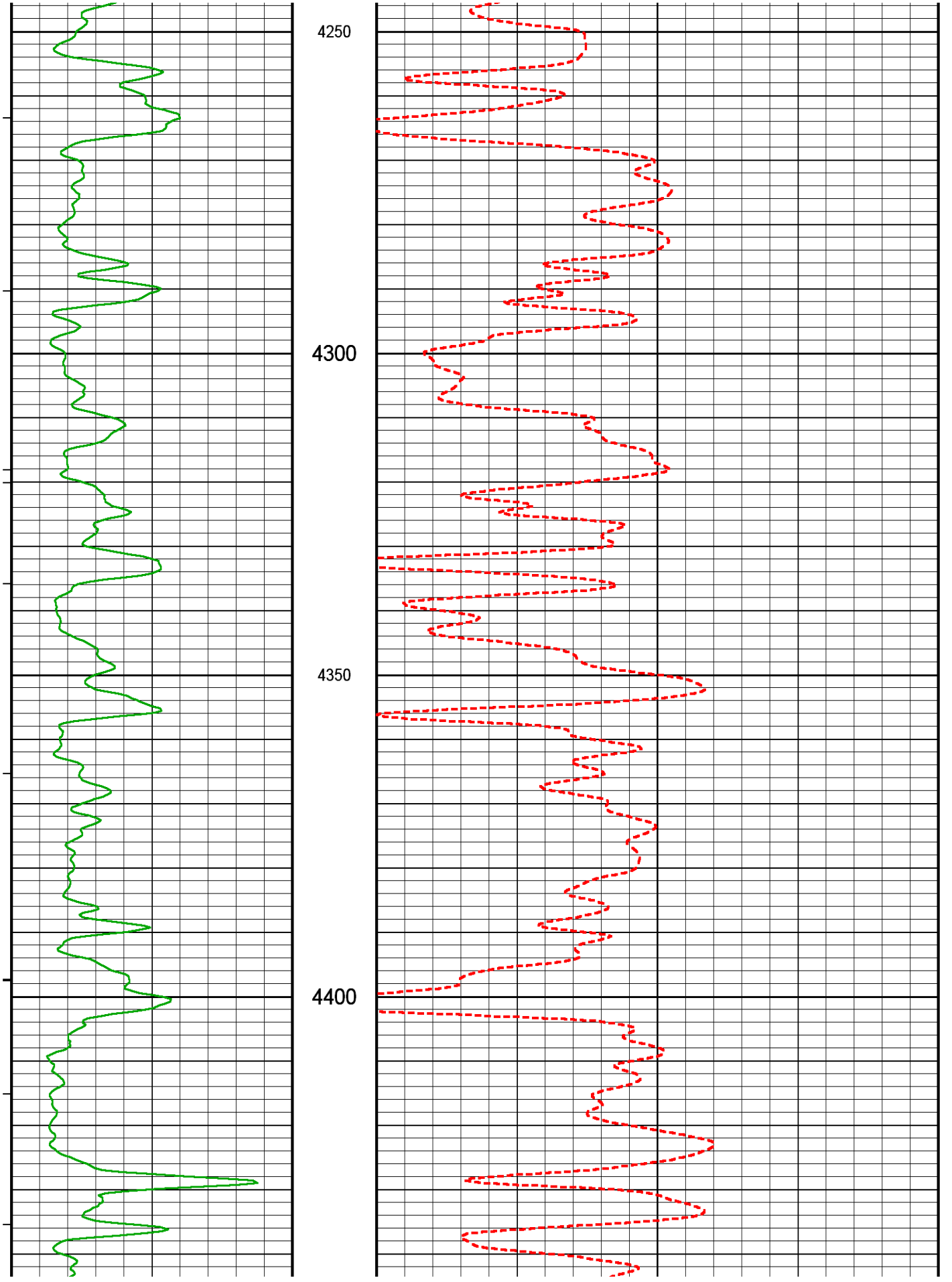
4150
4200
←MGS Gamma Ray
Limestone Neutron Por.→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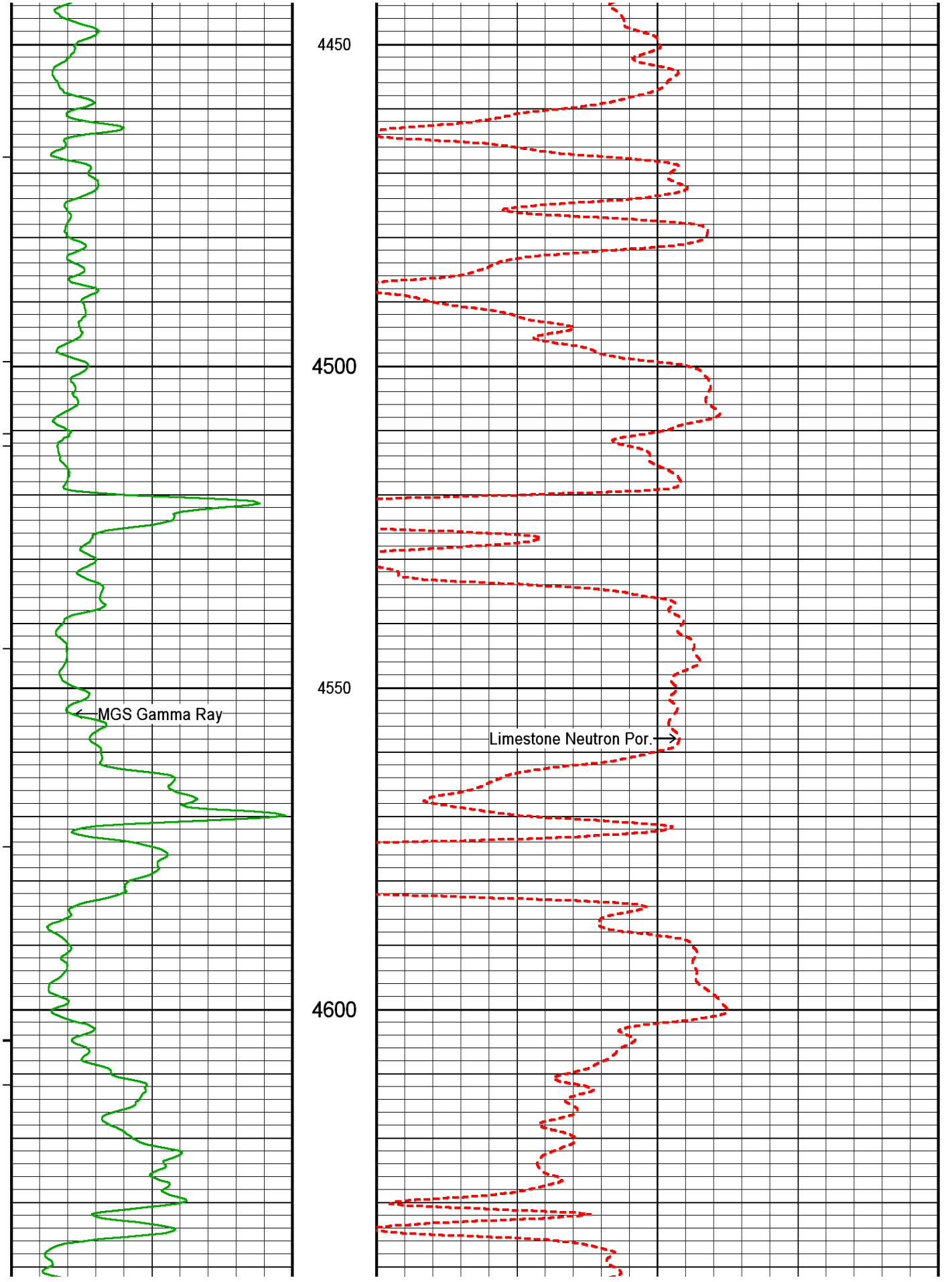
4300
4350
4400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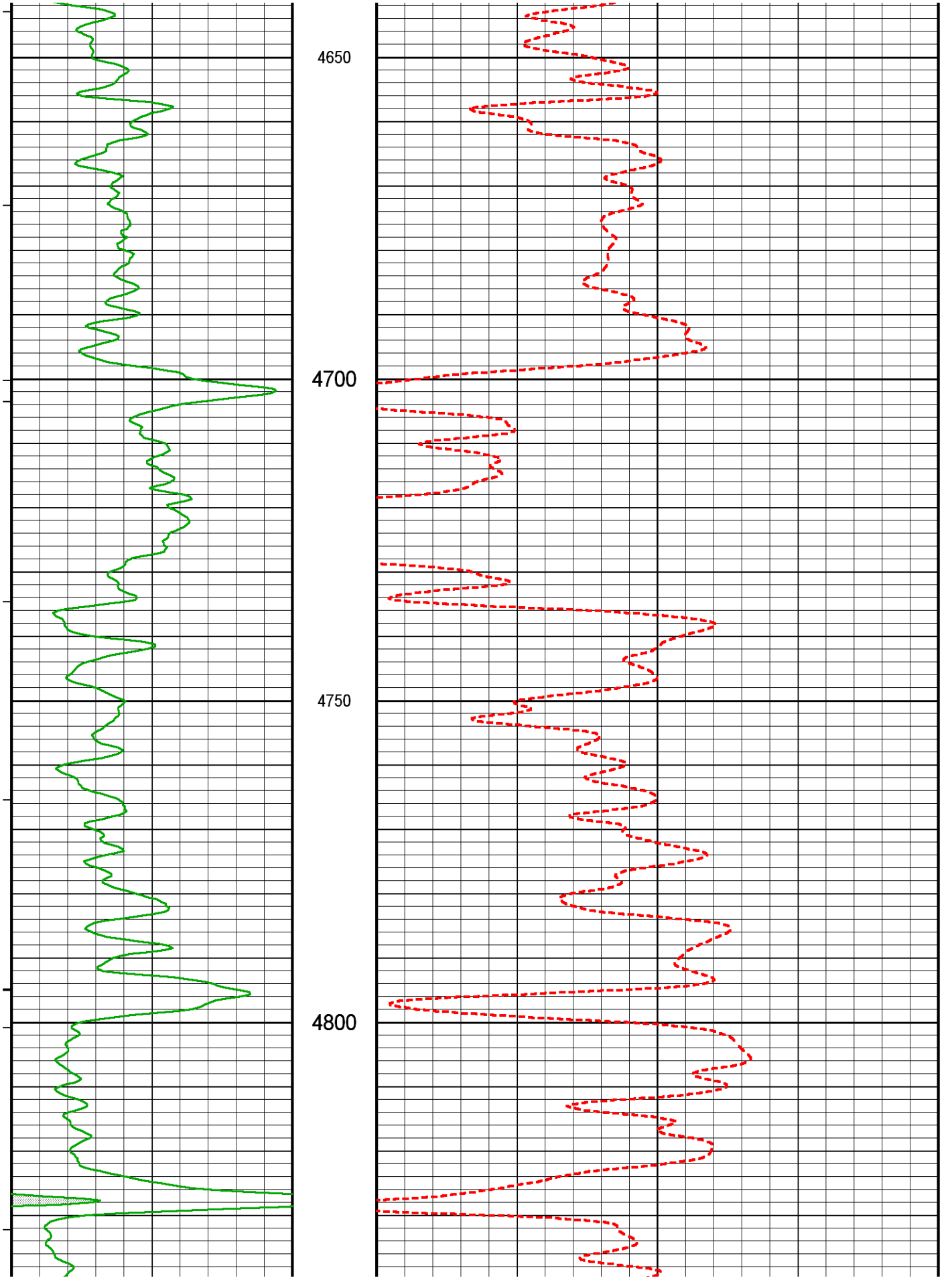
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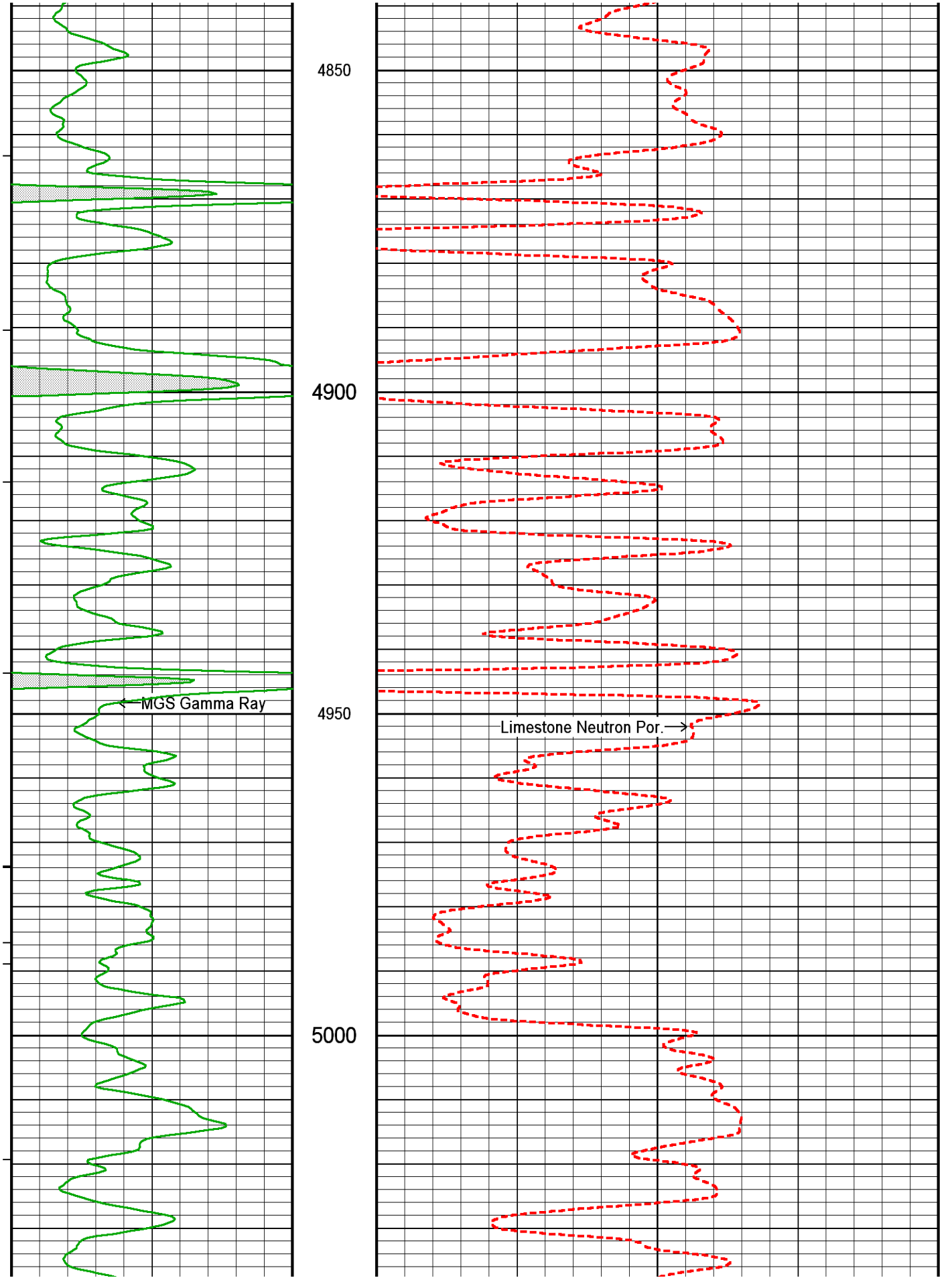
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4900
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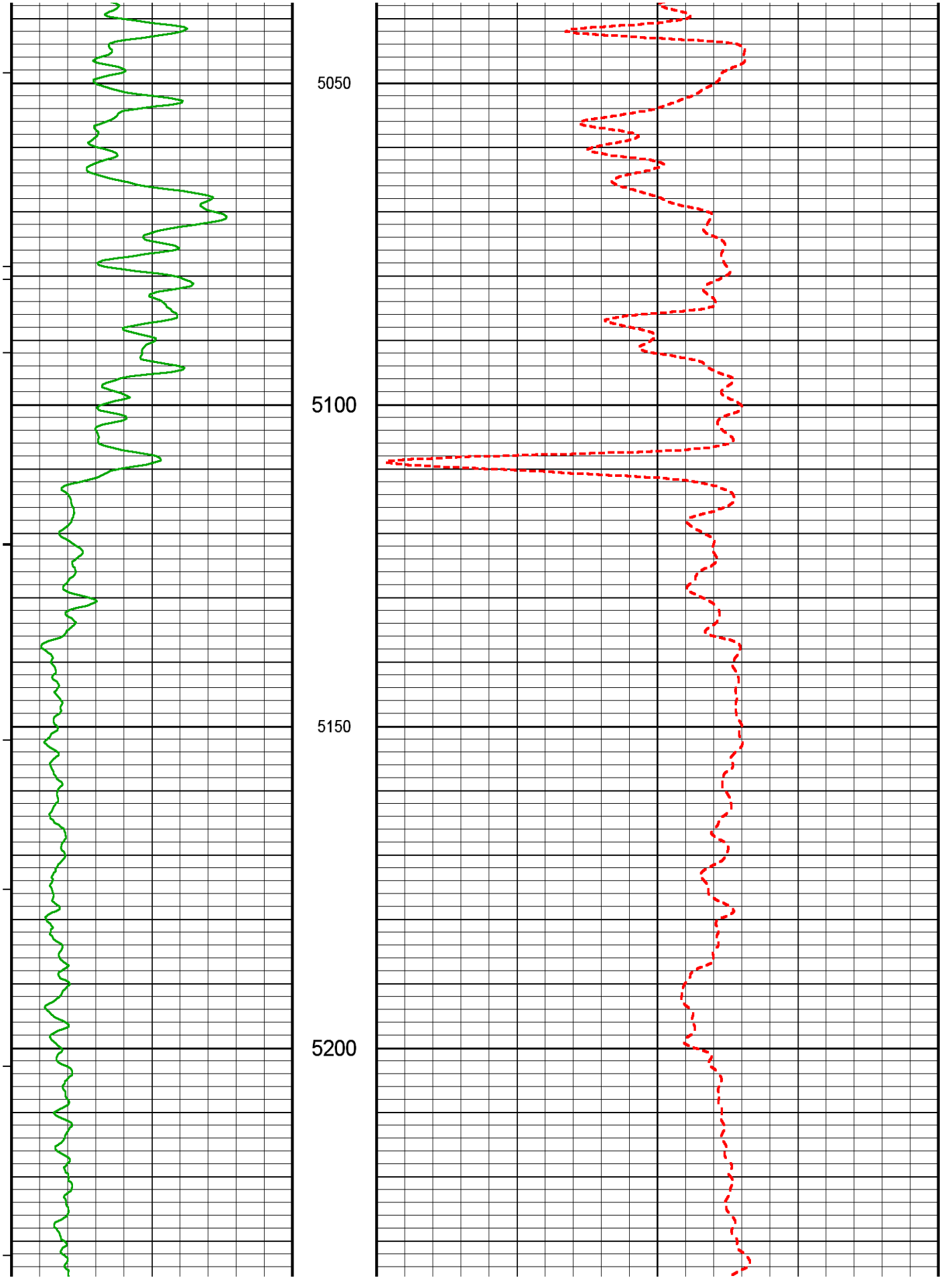
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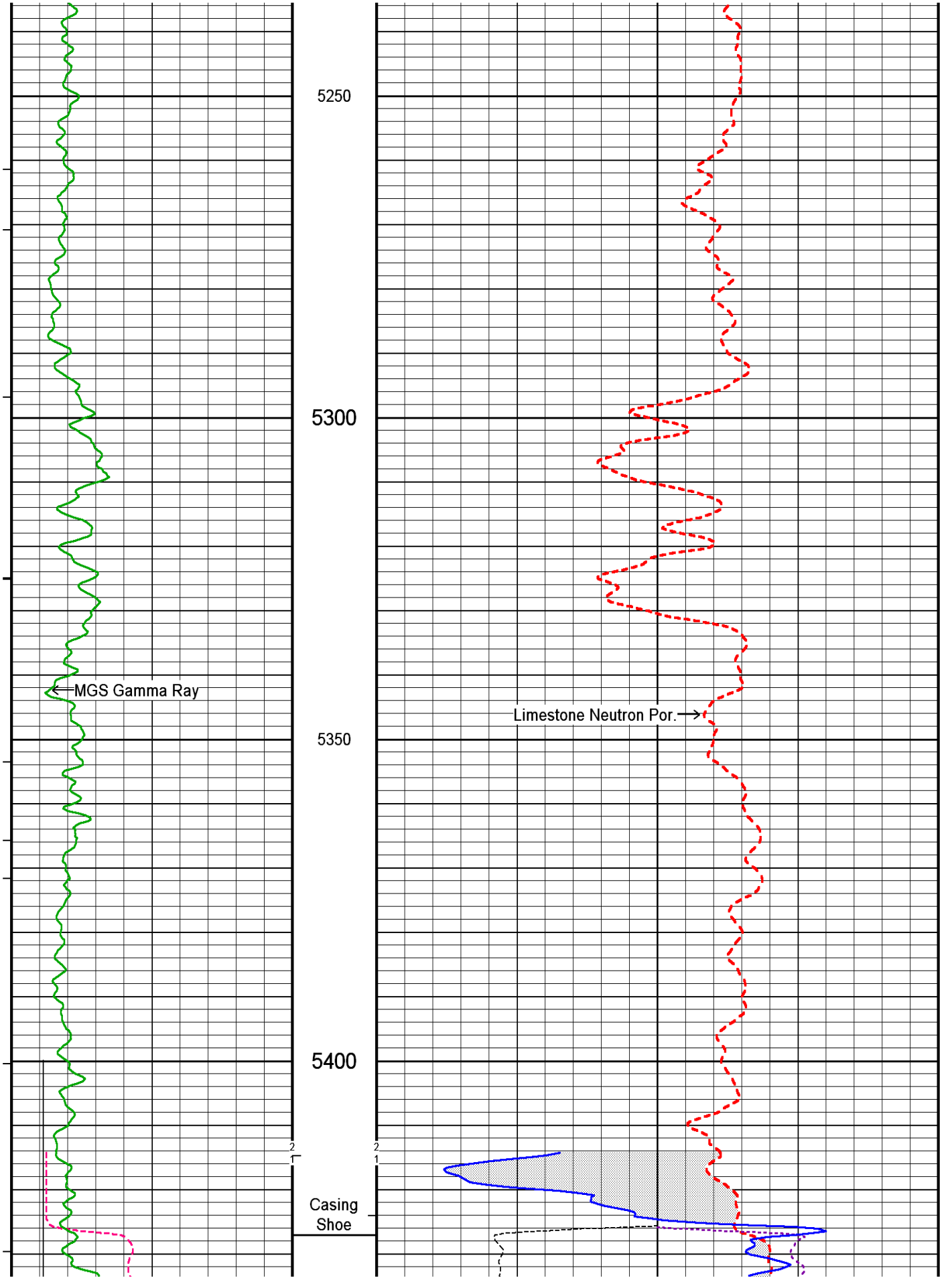
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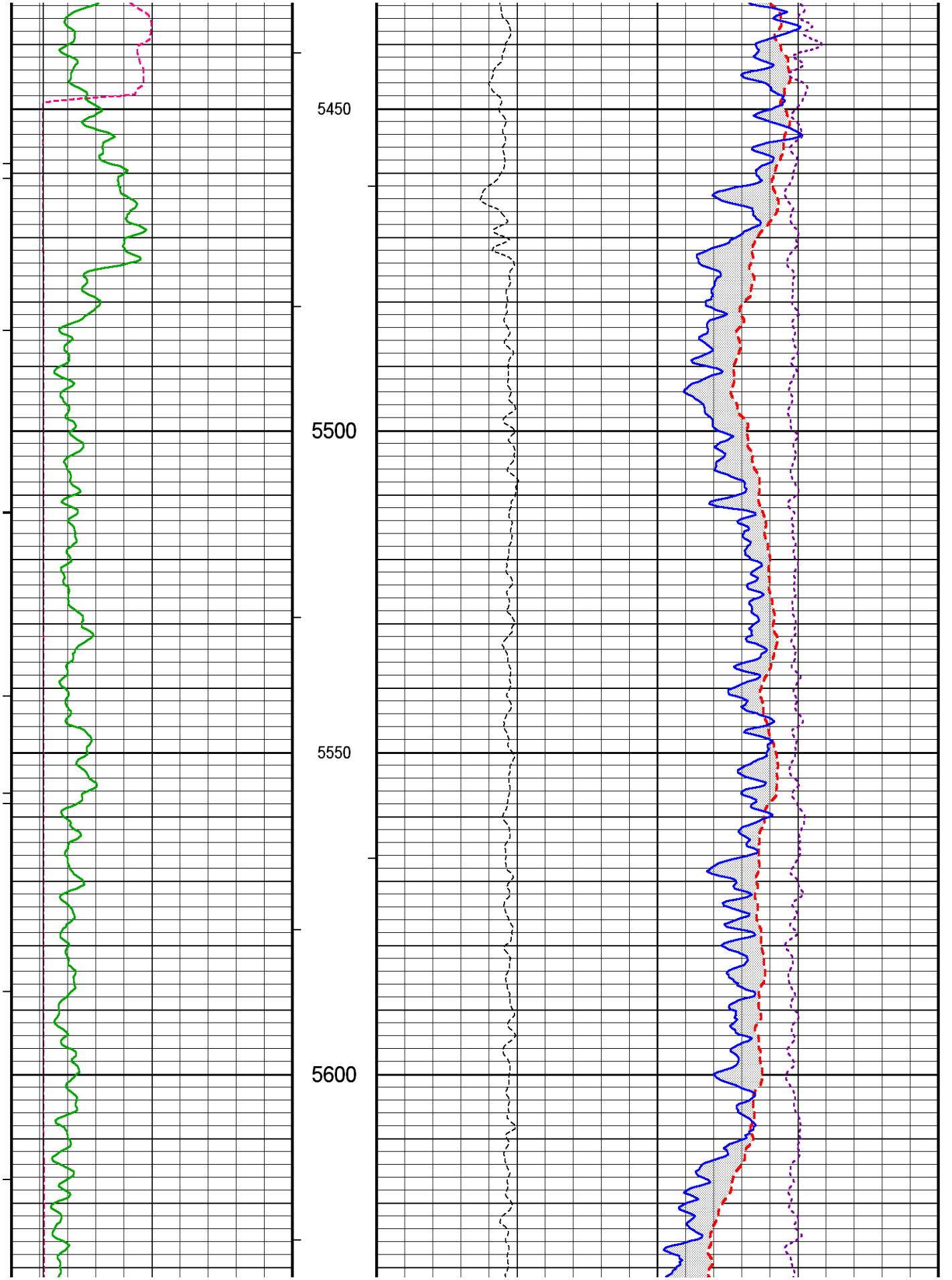
Limestone Neutron Por.
Casing Shoe
2
2
1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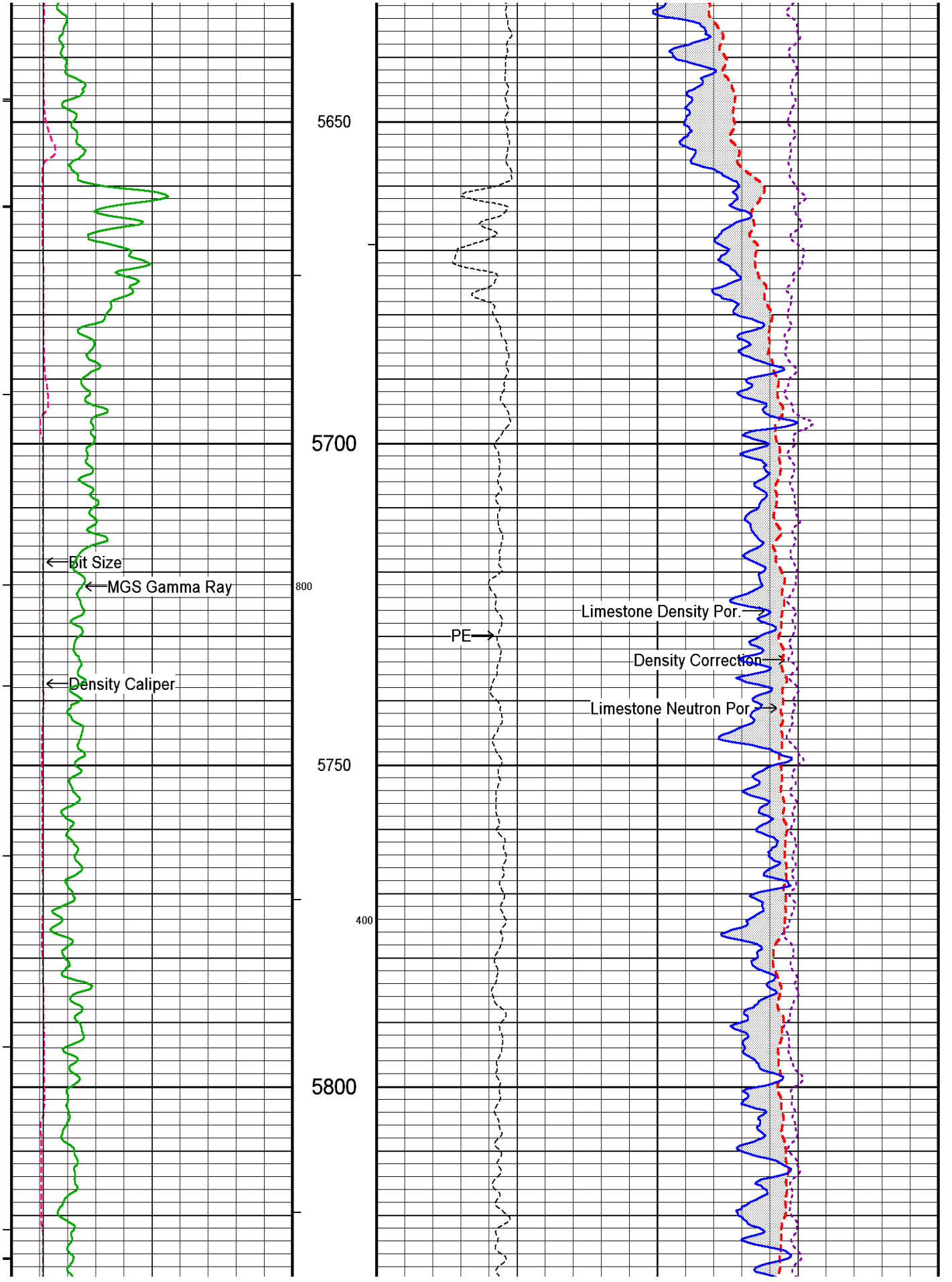
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800
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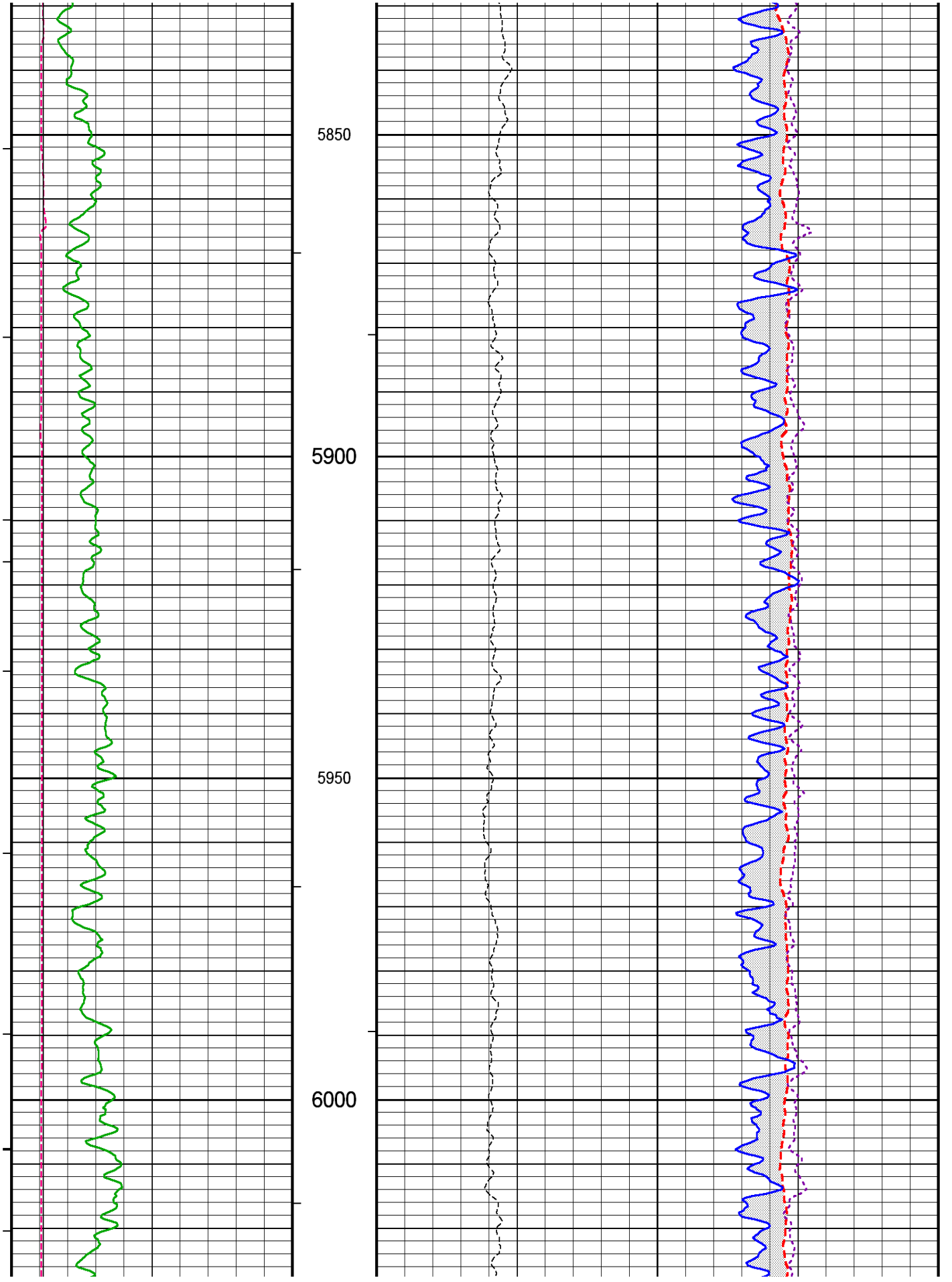
Density Caliper
PE
Limestone Density Por.
Density Correction
Limestone Neutron Por.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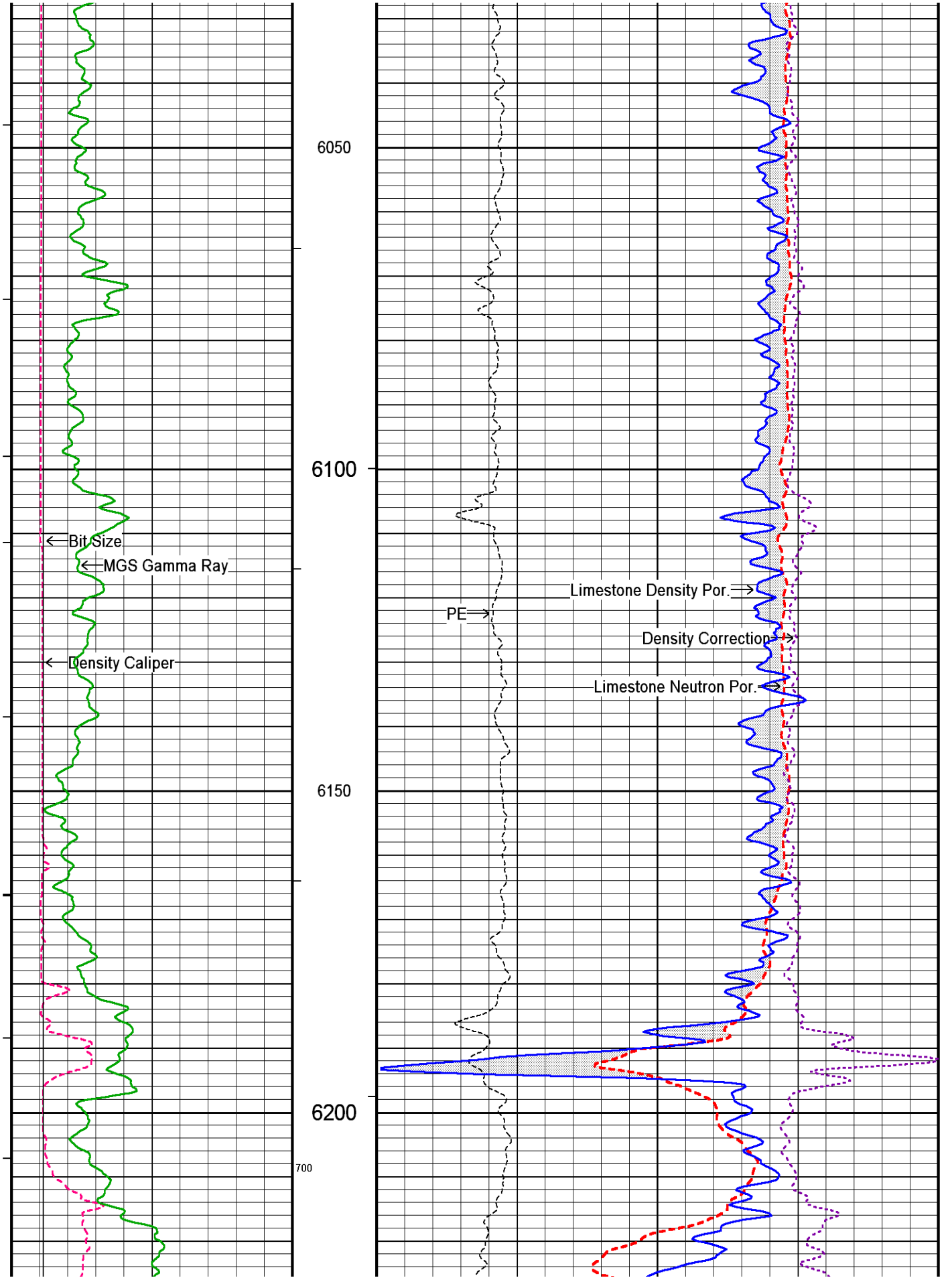
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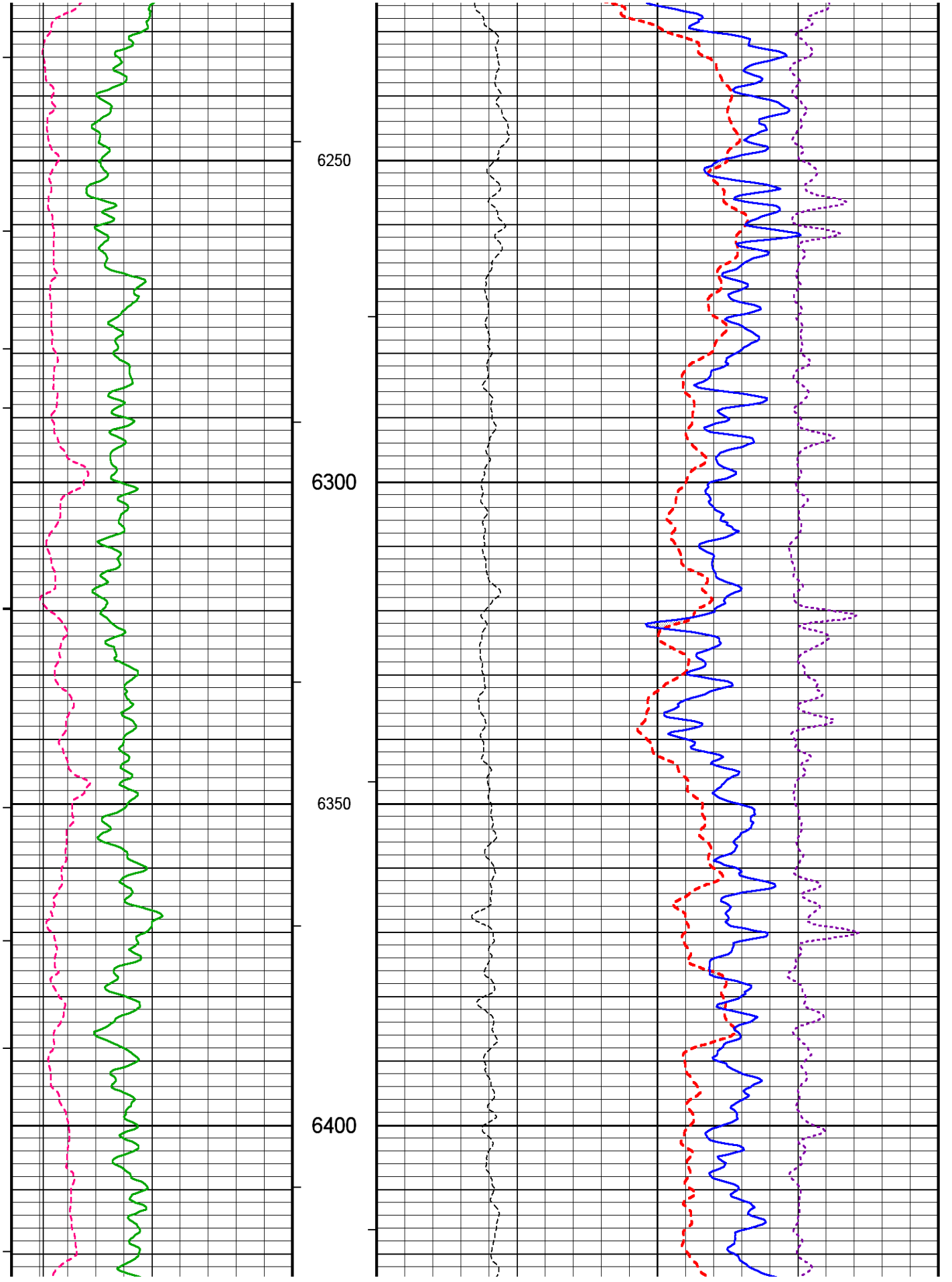
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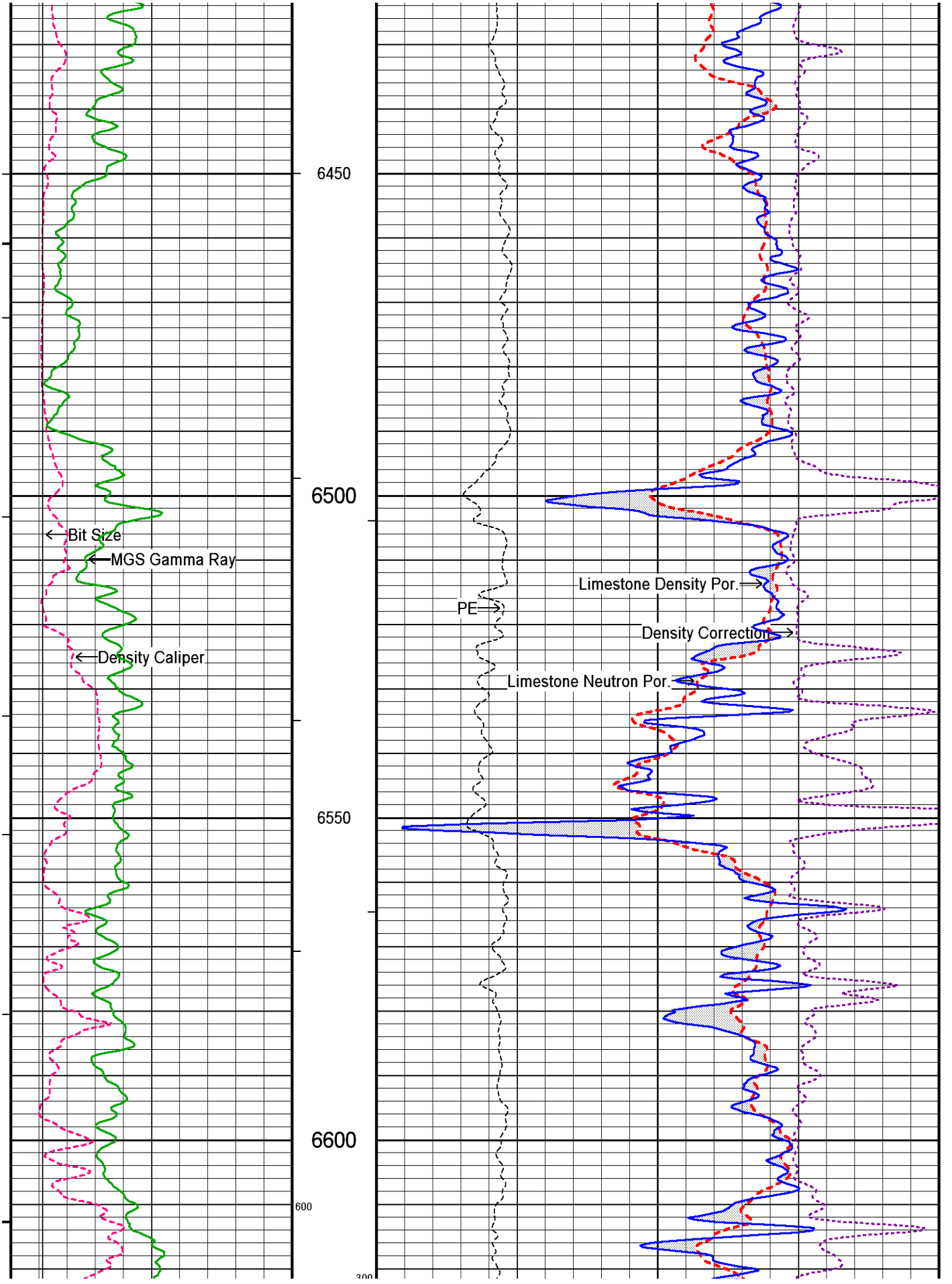
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Density Caliper
PE
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Density Correction
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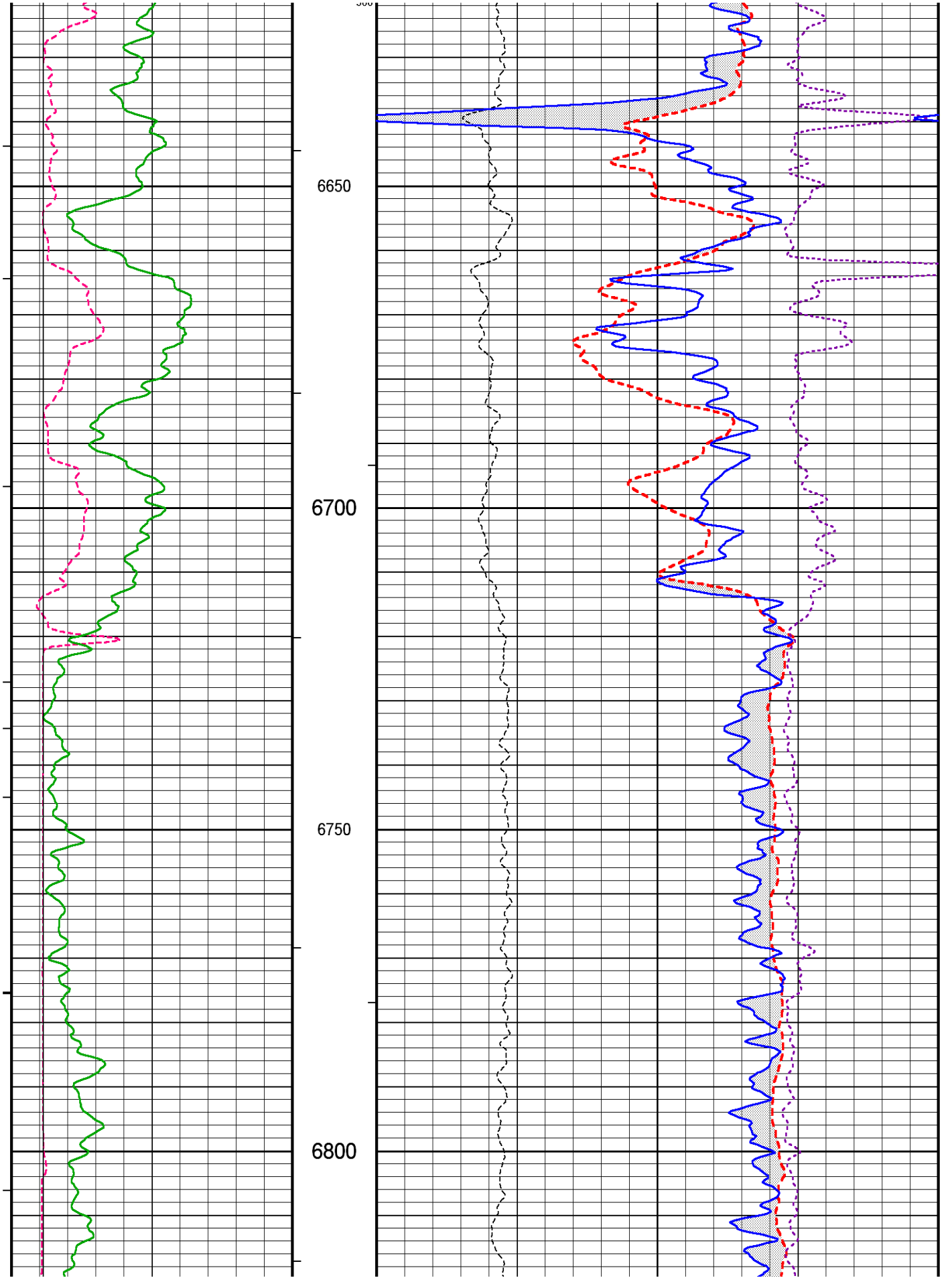
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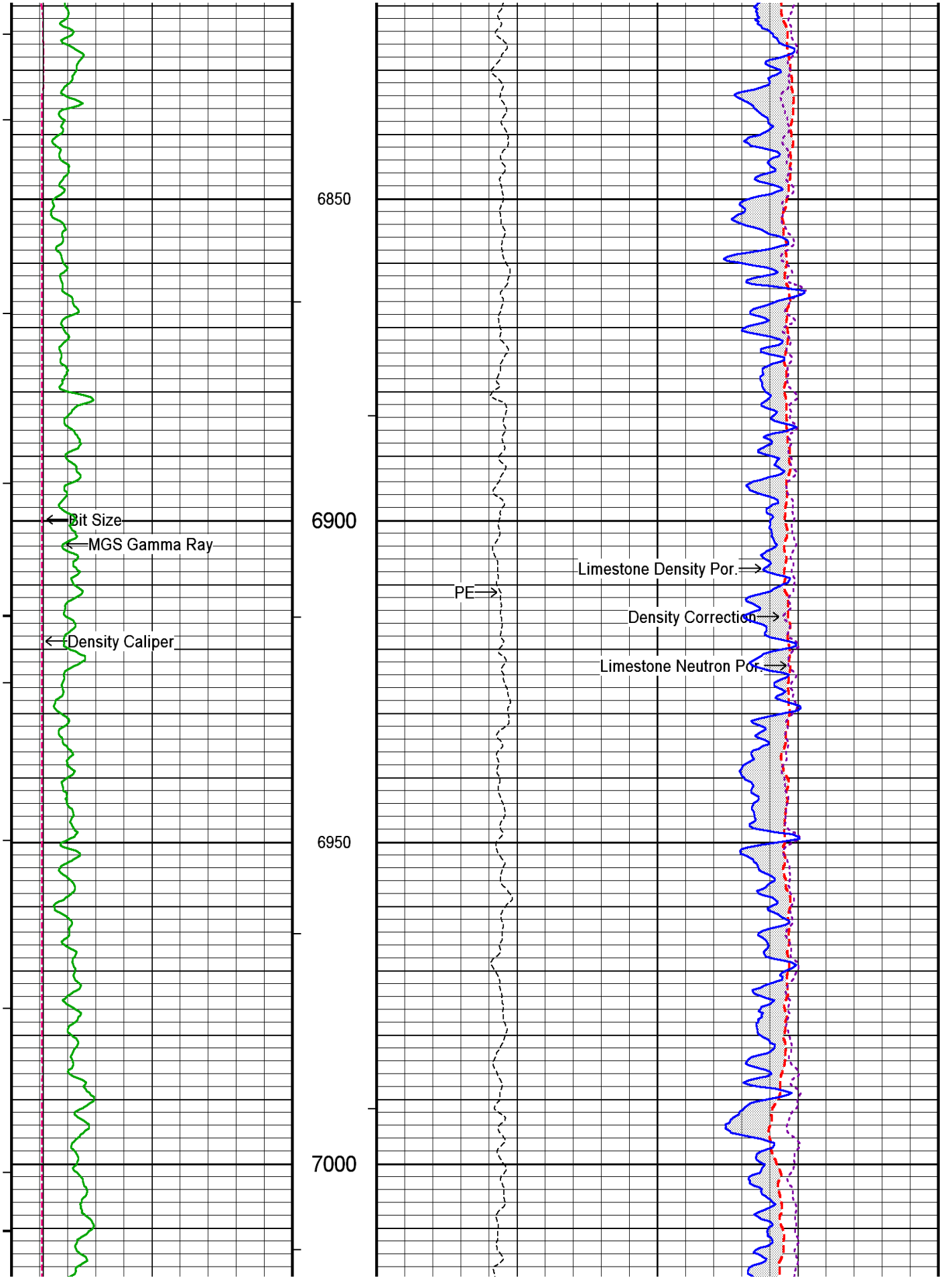
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Density Correction
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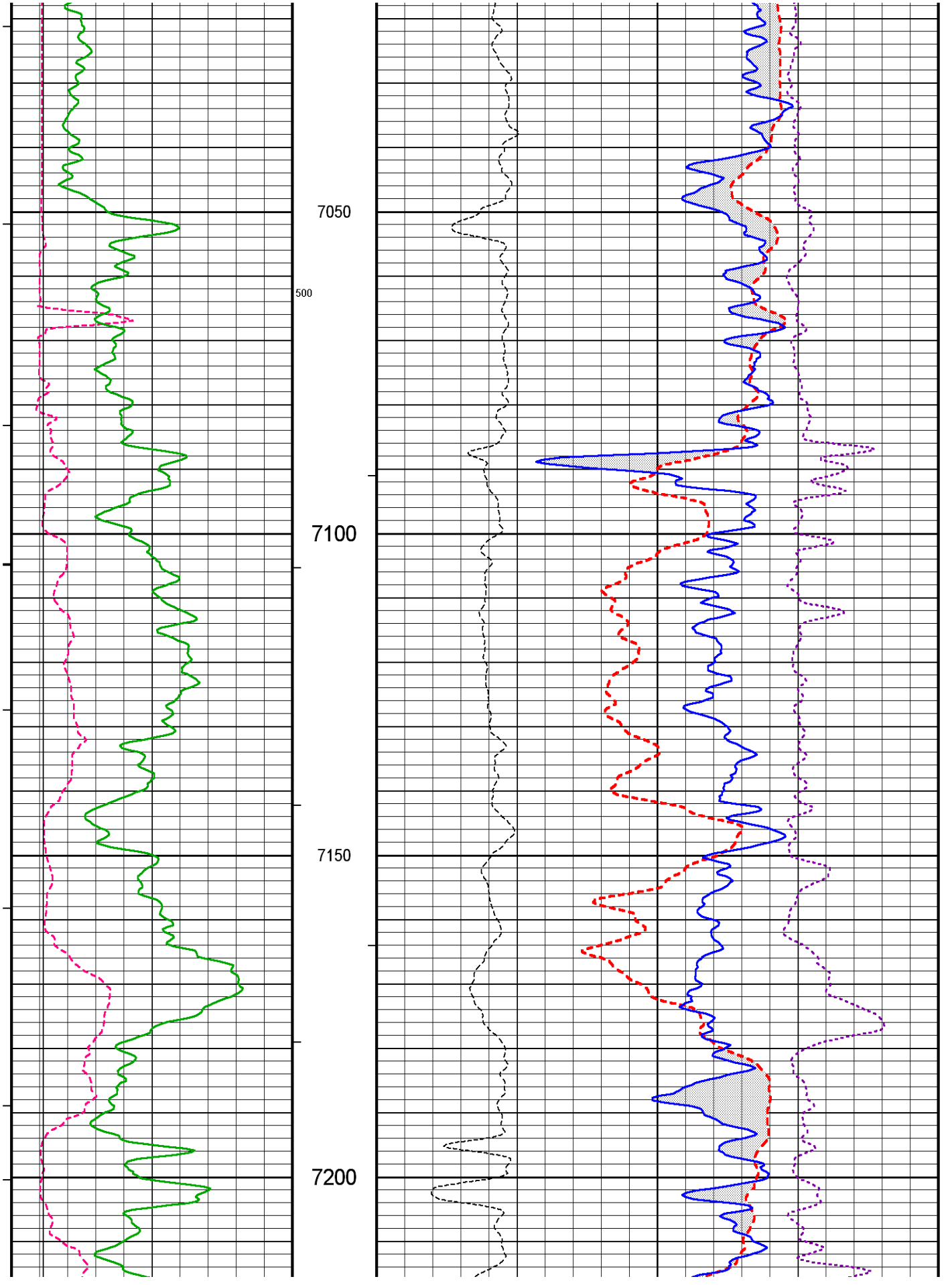
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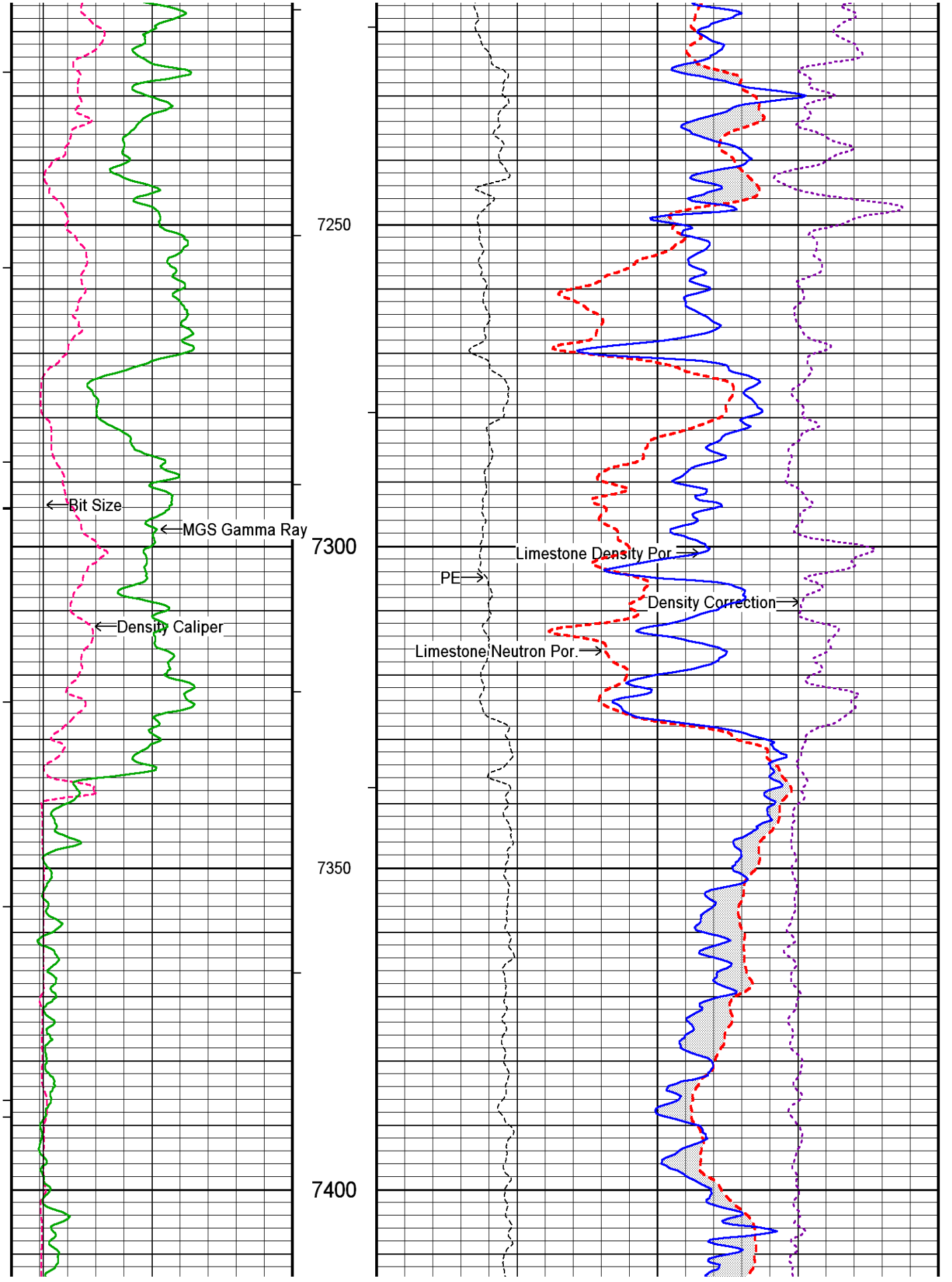
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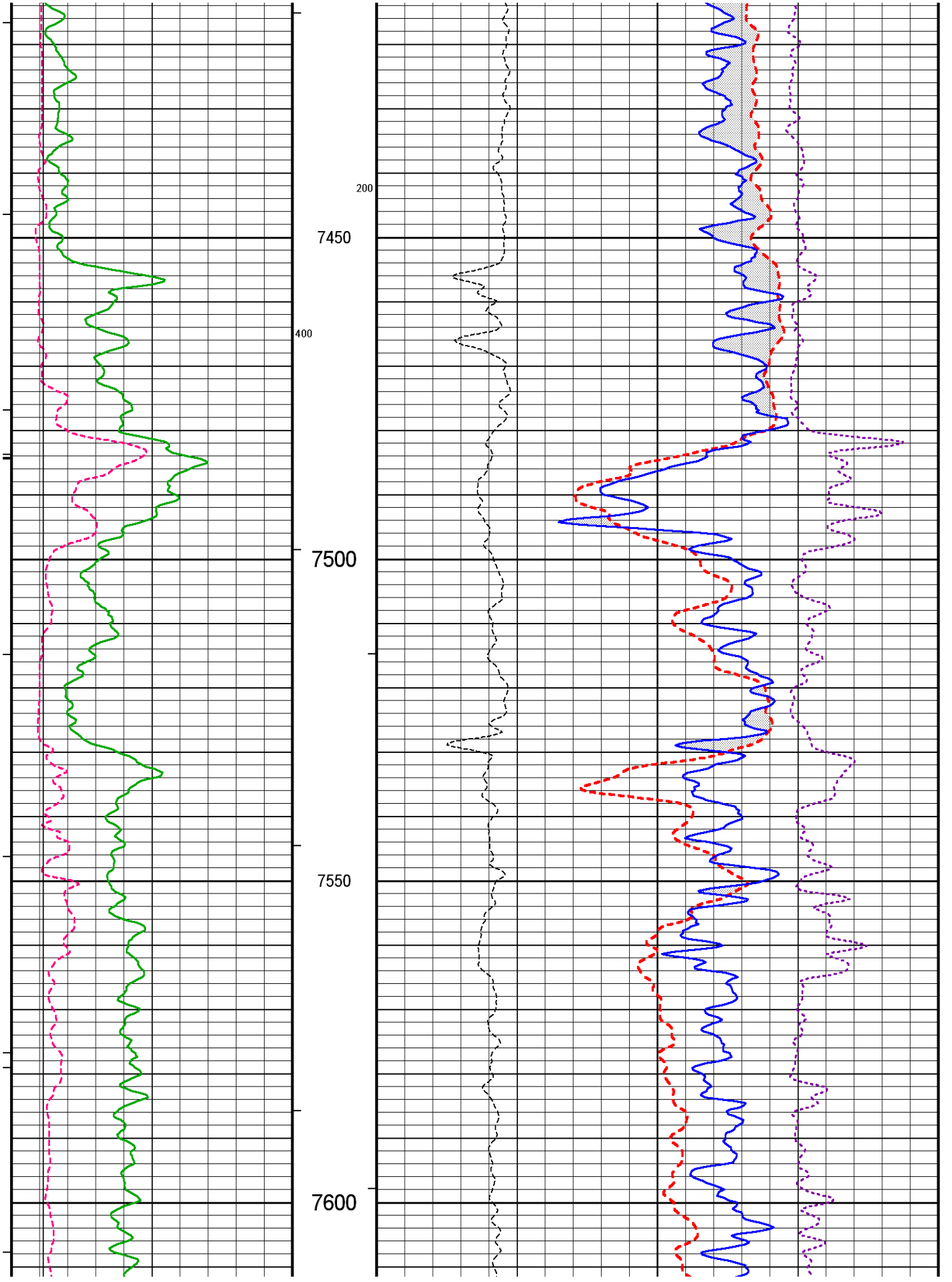
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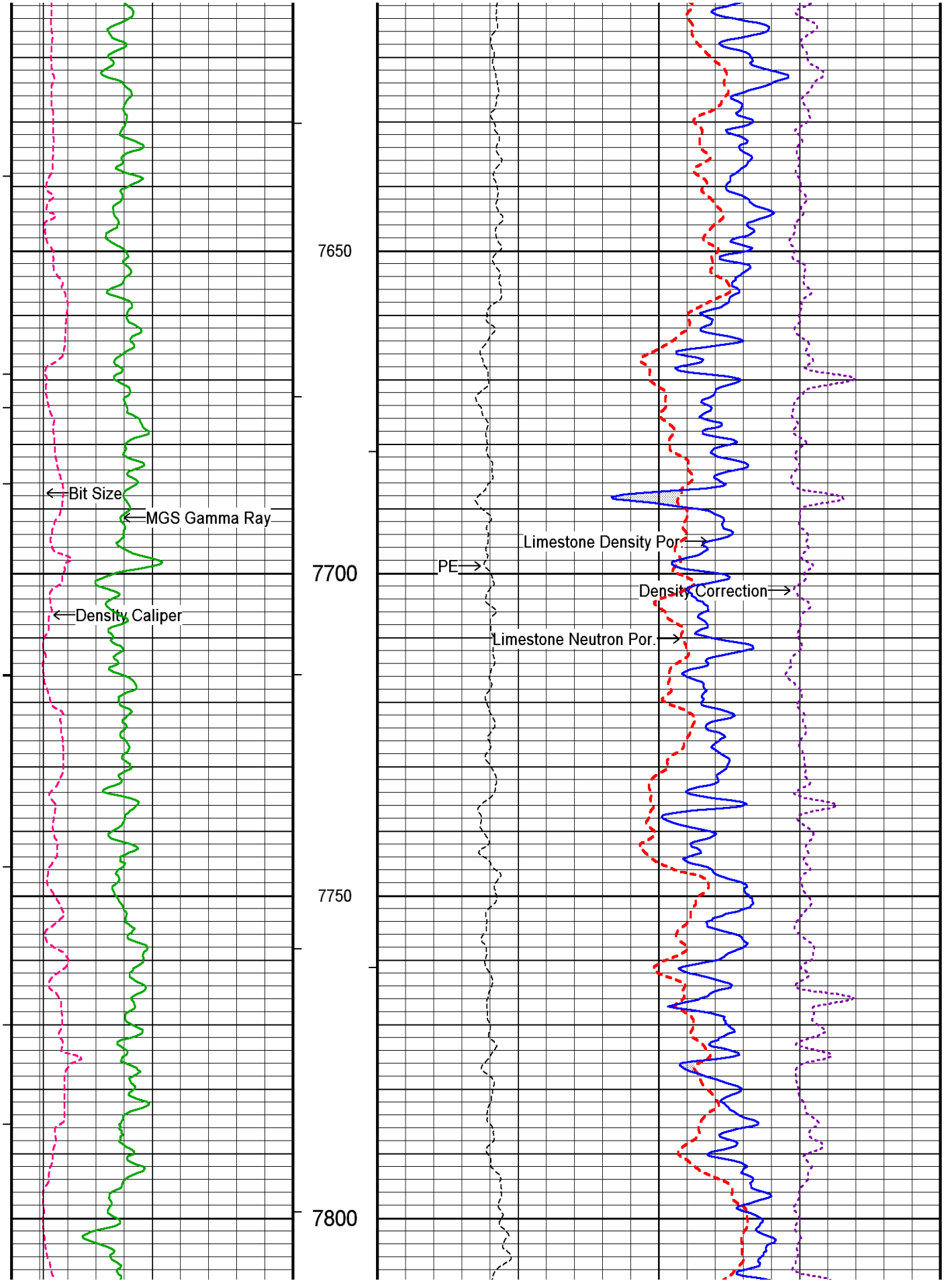
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Density Correction
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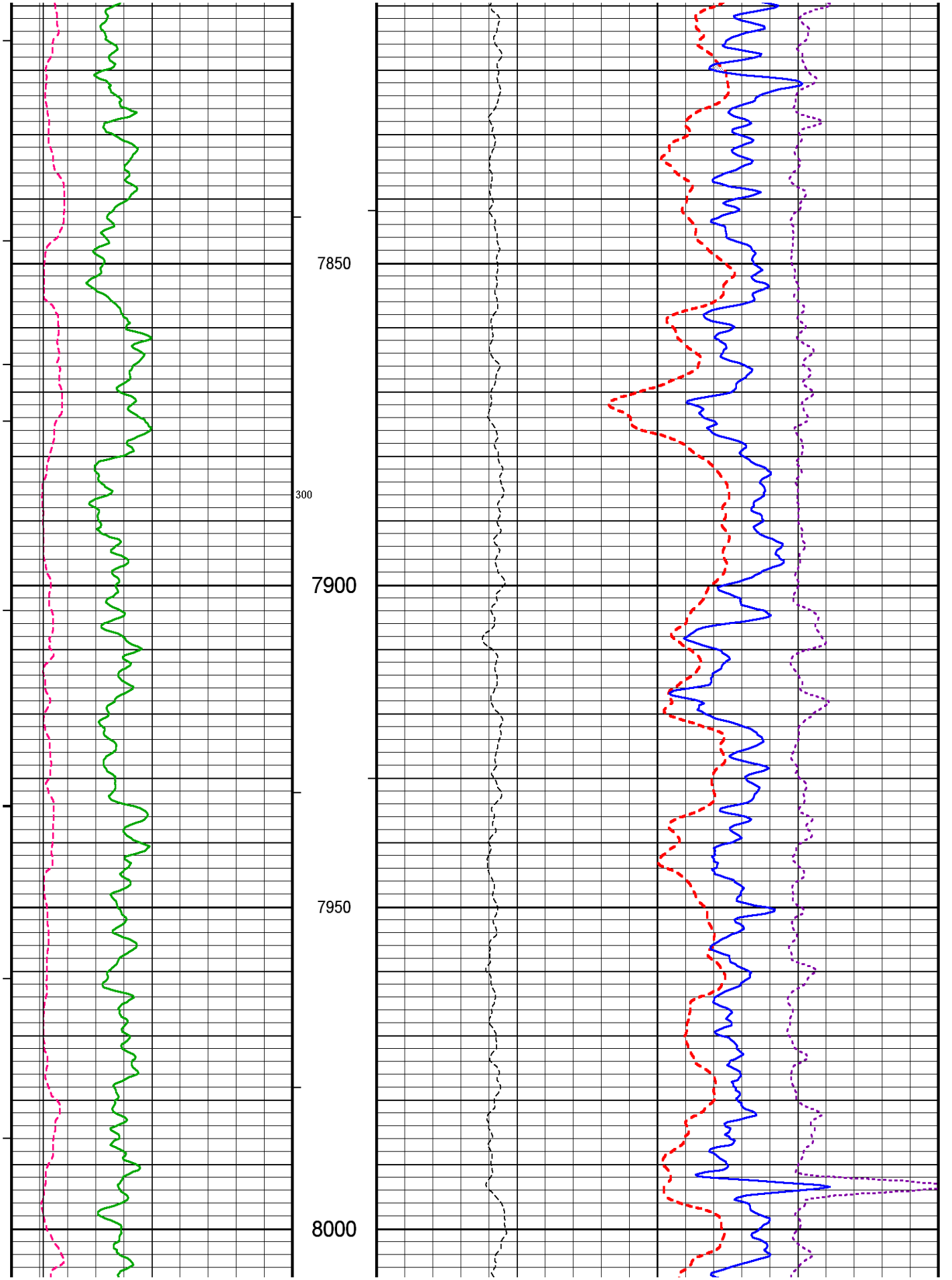
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7900
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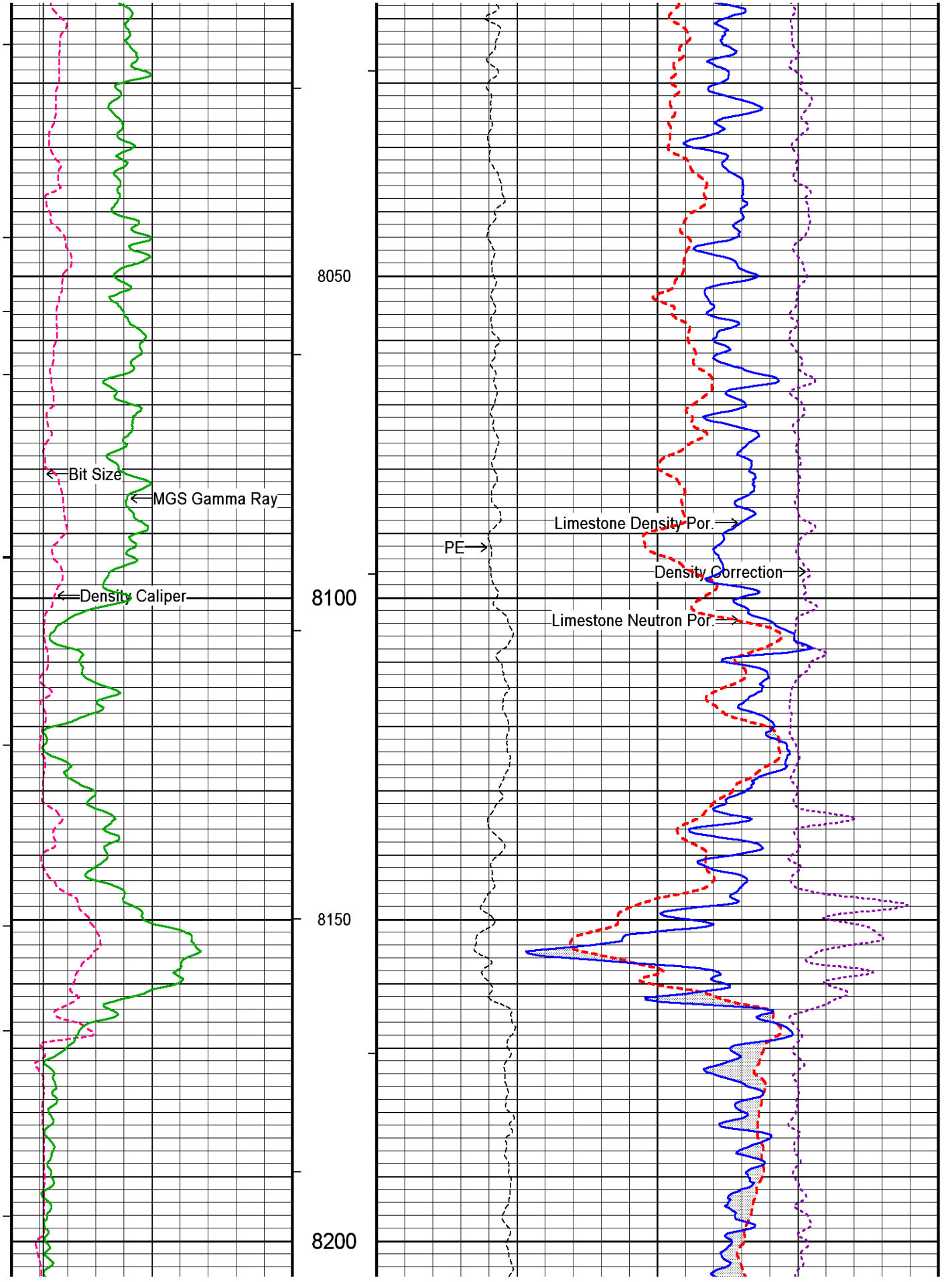
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Density Correction
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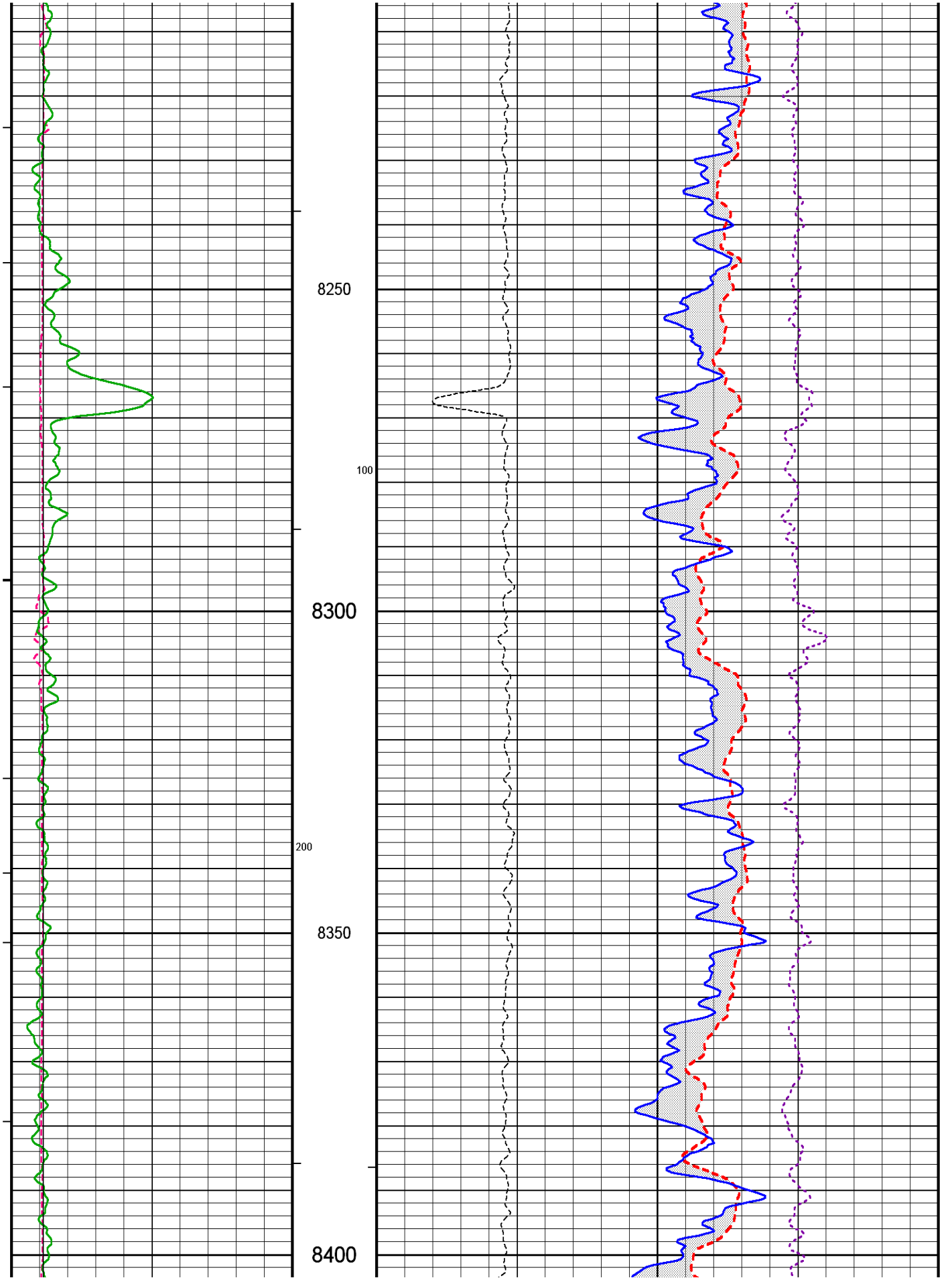
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100
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200
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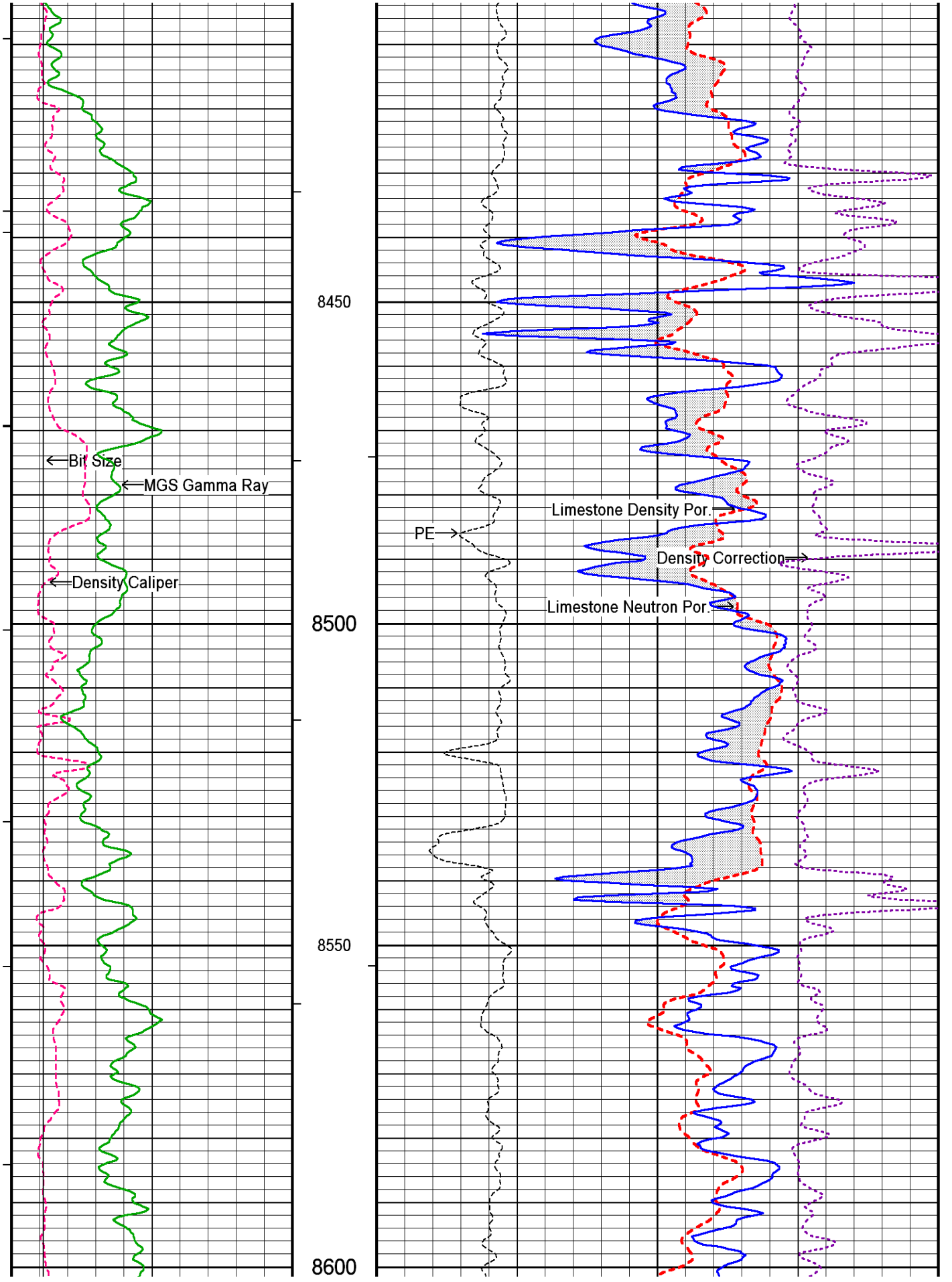
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Density Correction
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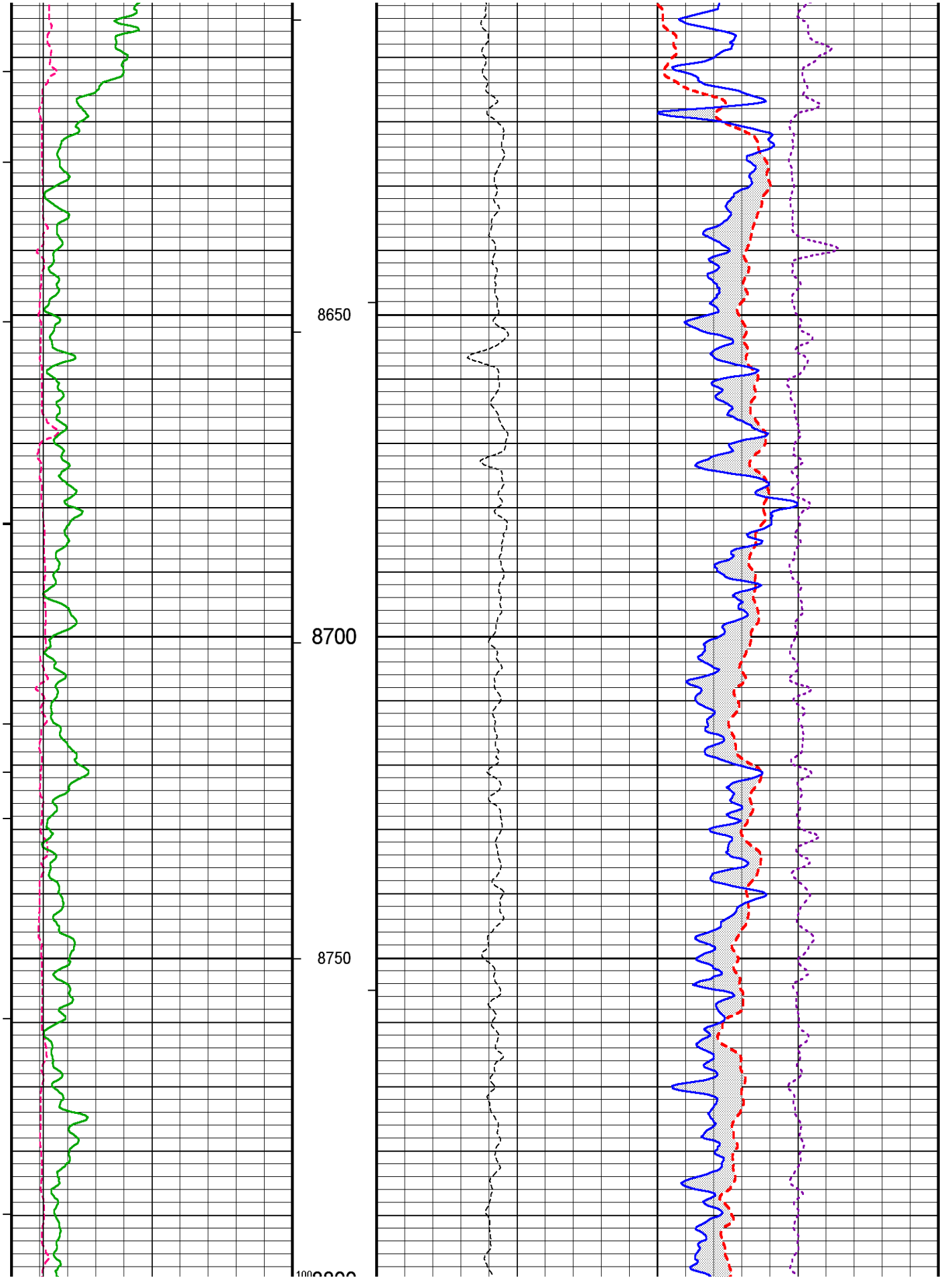
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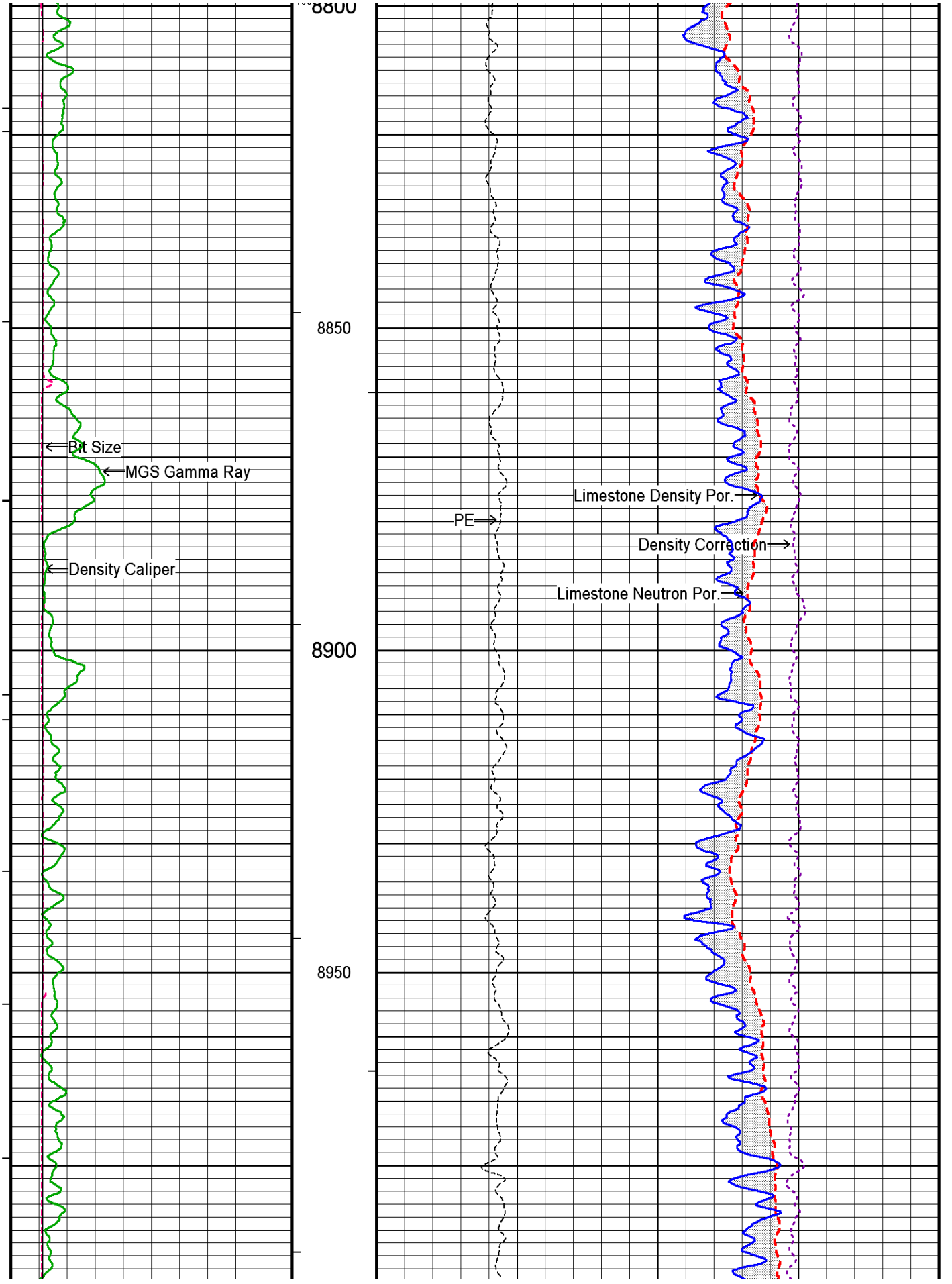
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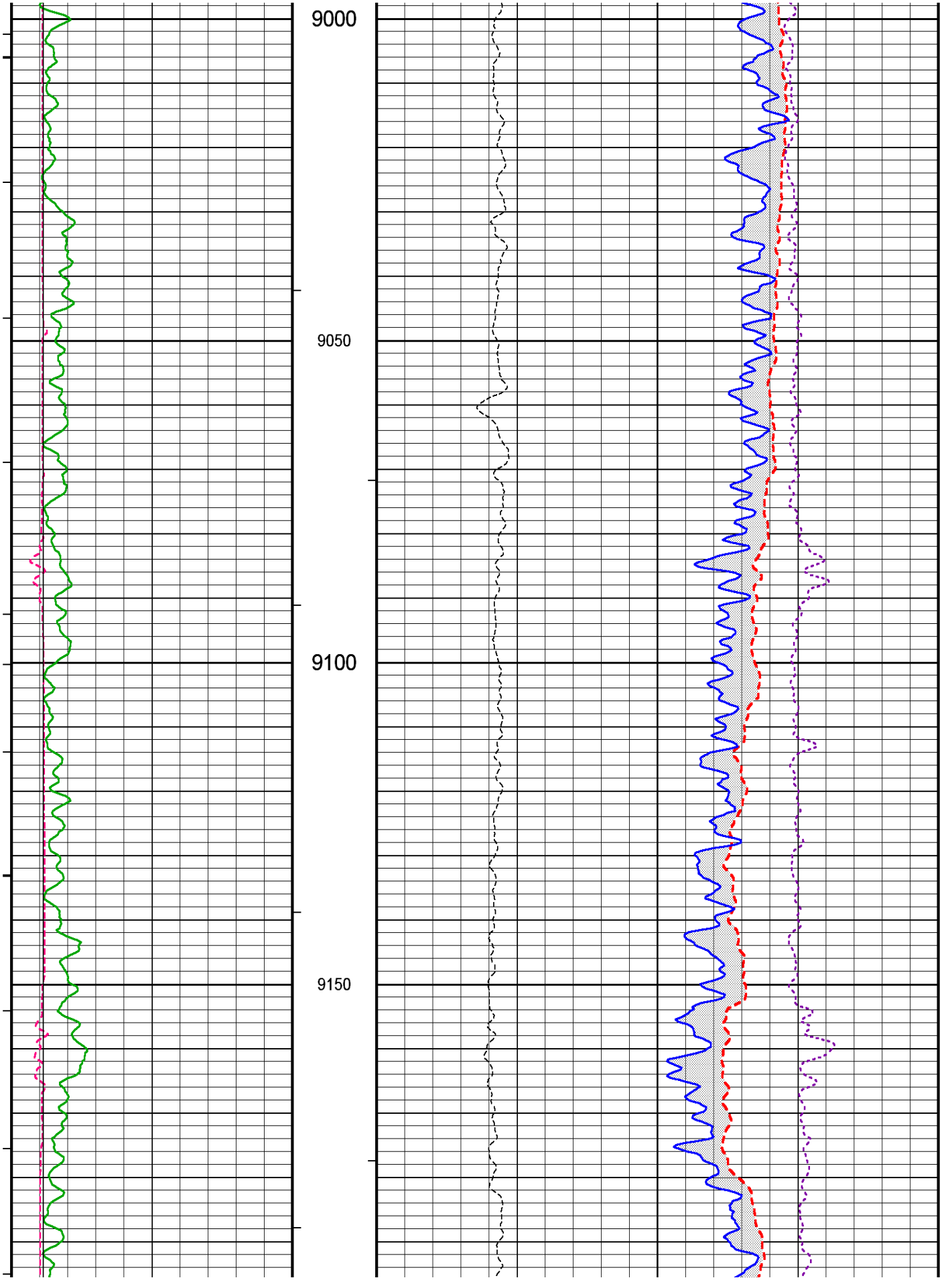
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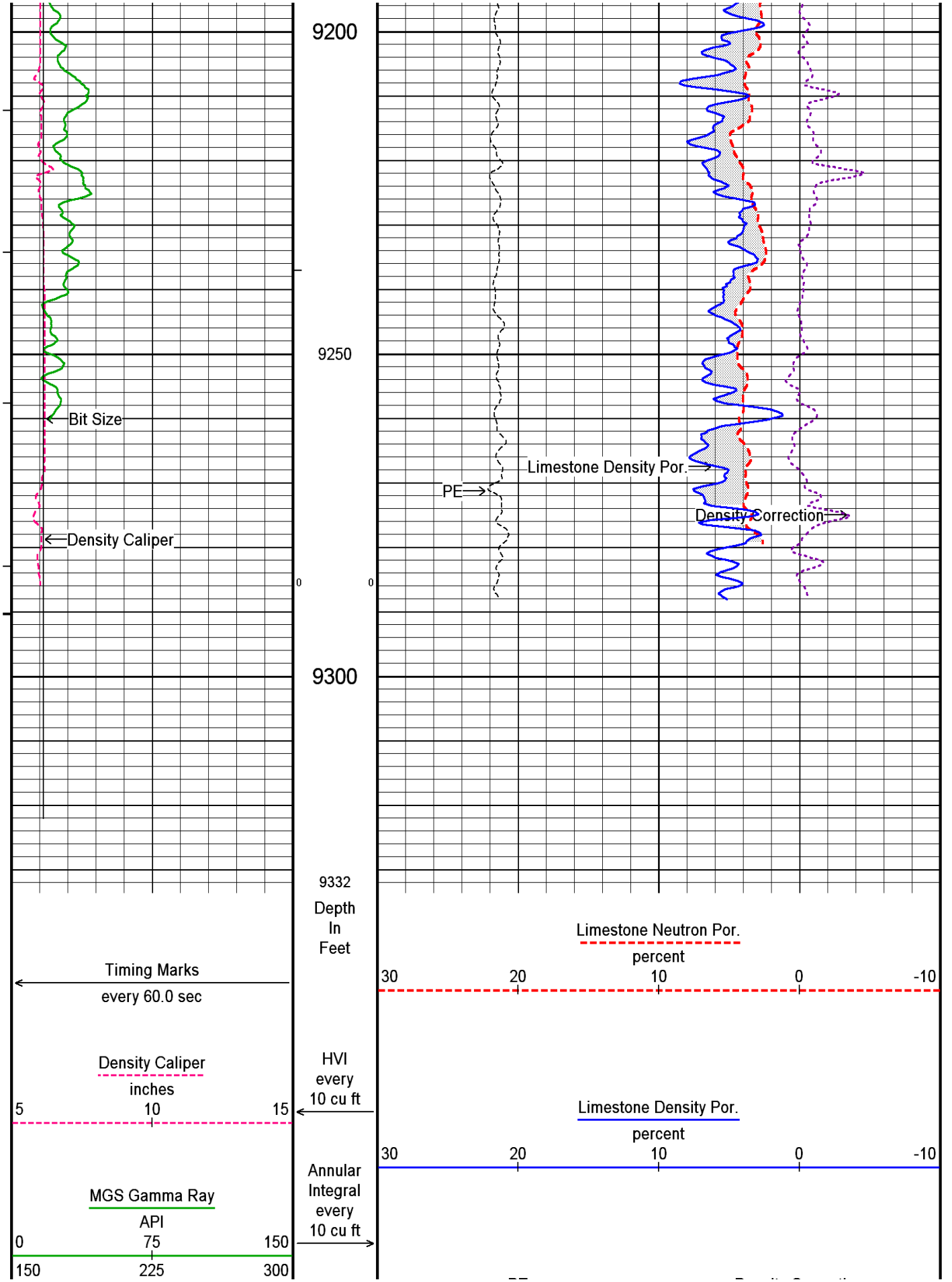
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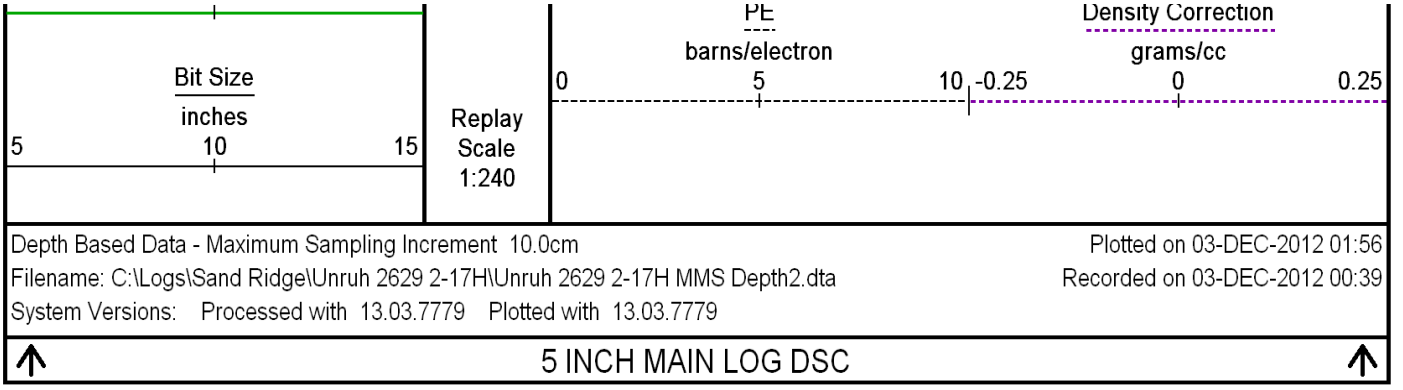
Bit Size
Density Caliper
PE
Limestone Density Por.
Density Correction
0
0
Depth
In
Feet
Timing Marks
every 60.0 sec
Density Caliper
inches
5
10
15
HVI
every
10 cu ft
MGS Gamma Ray
API
0
75
150
150
225
300
Annular
Integral
every
10 cu ft
Limestone Neutron Por.
percent
30
20
10
0
-10
Limestone Density Por.
percent
30
20
10
0
-10



Depth Based Data - Maximum Sampling Increment 10.0cm
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System Versions: Processed with 13.03.7779 Plotted with 13.03.7779

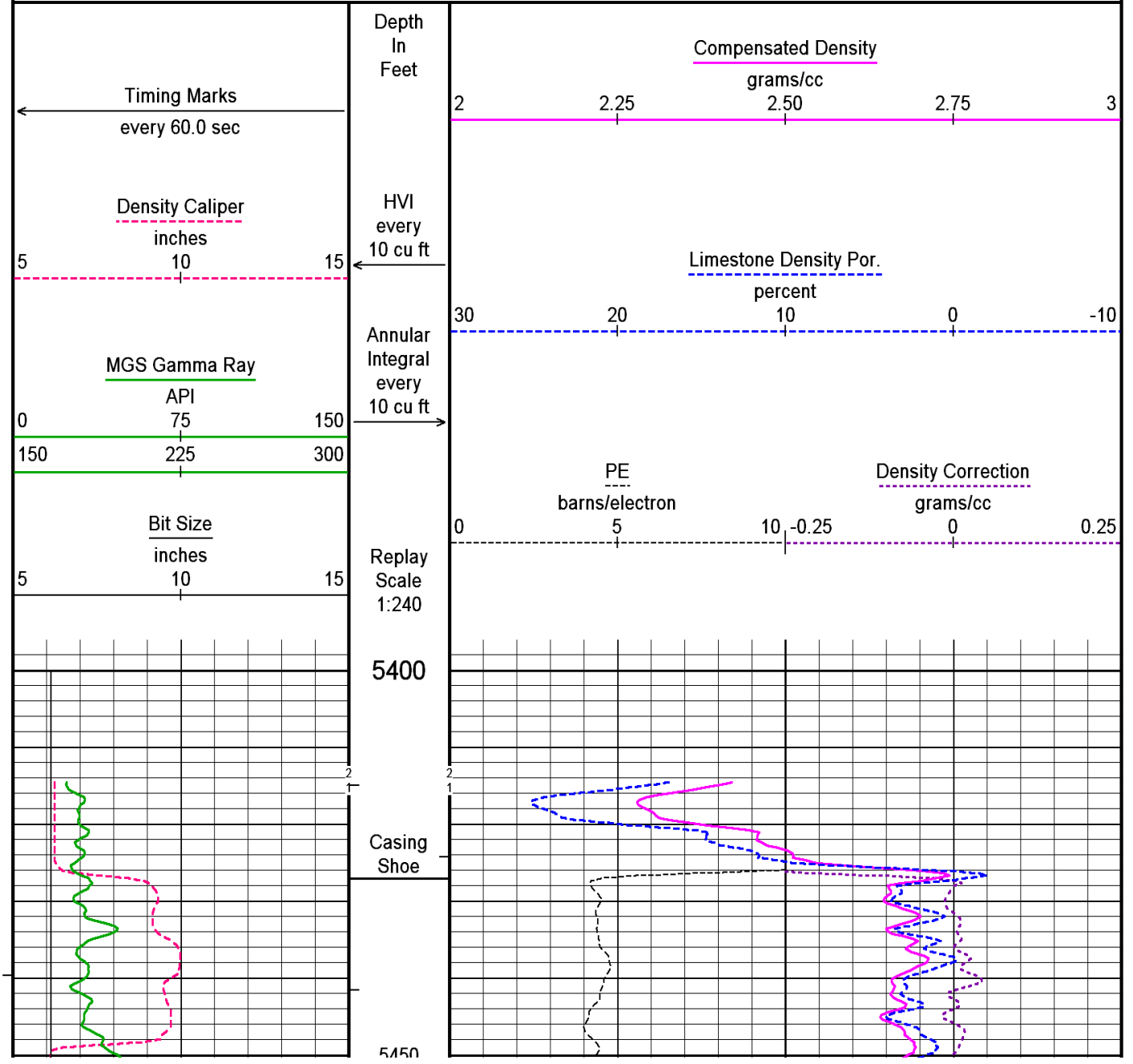
Plotted on 03-DEC-2012 01:56
Recorded on 03-DEC-2012 00:39

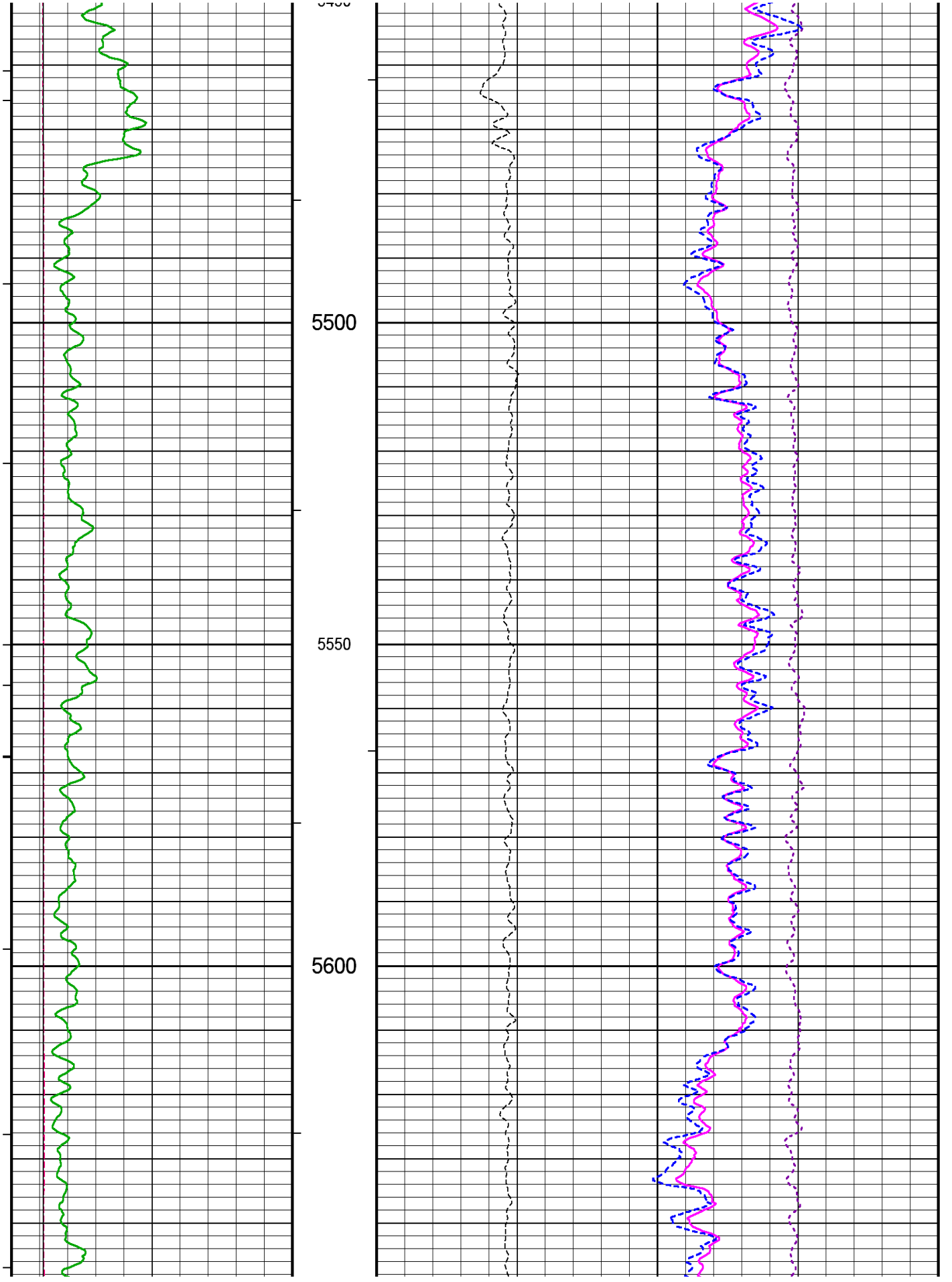
5 INCH MAIN LOG DSC

5 INCH BULK DENSITY LOG DSC

Depth Based Data - Maximum Sampling Increment 10.0cm
Filename: C:\Logs\Sand Ridge\Unruh 2629 2-17H\Unruh 2629 2-17H MMS Depth2.dta
System Versions: Processed with 13.03.7779 Plotted with 13.03.7779

Plotted on 03-DEC-2012 01:56
Recorded on 03-DEC-2012 00:39

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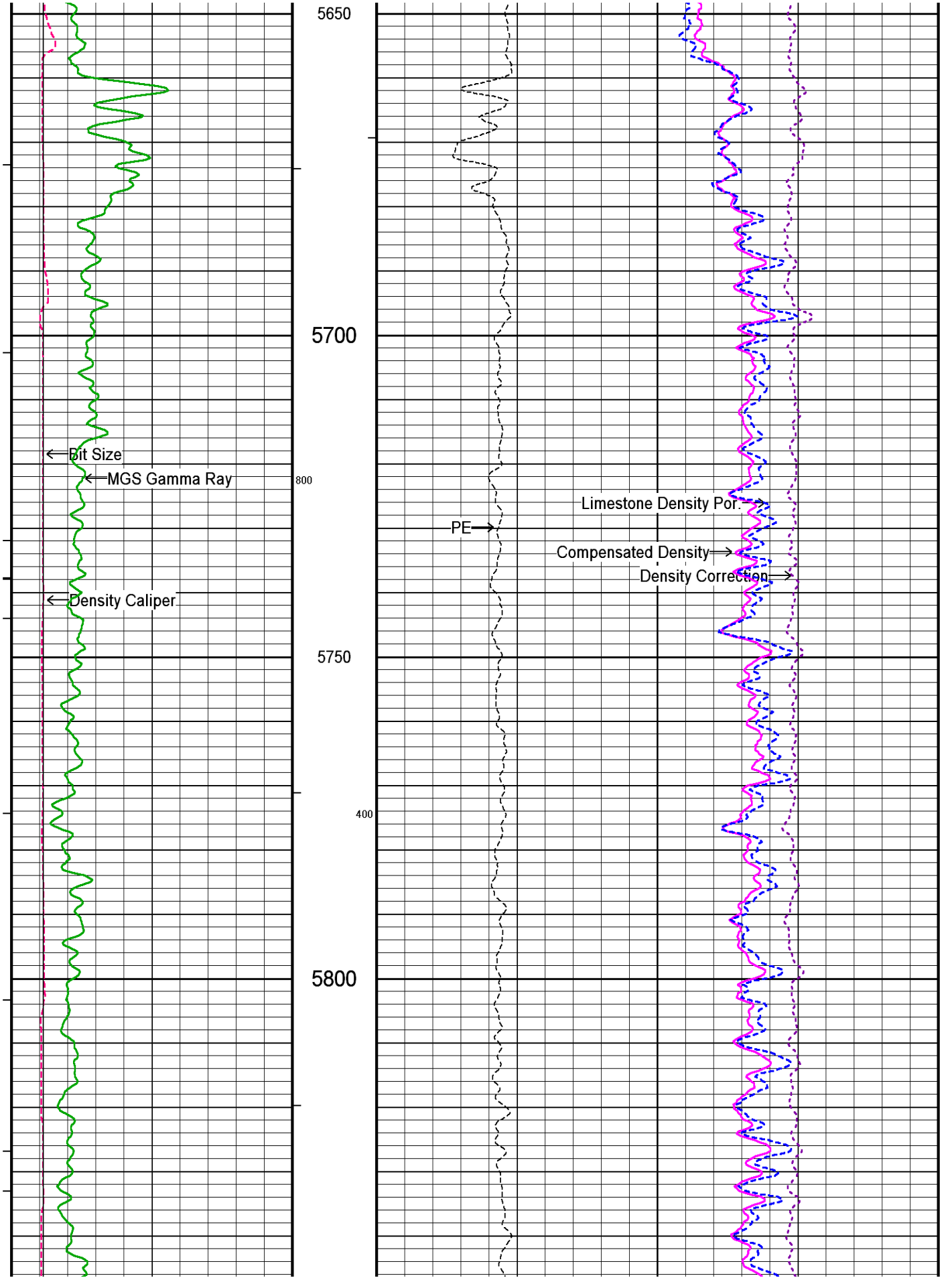
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5800
800
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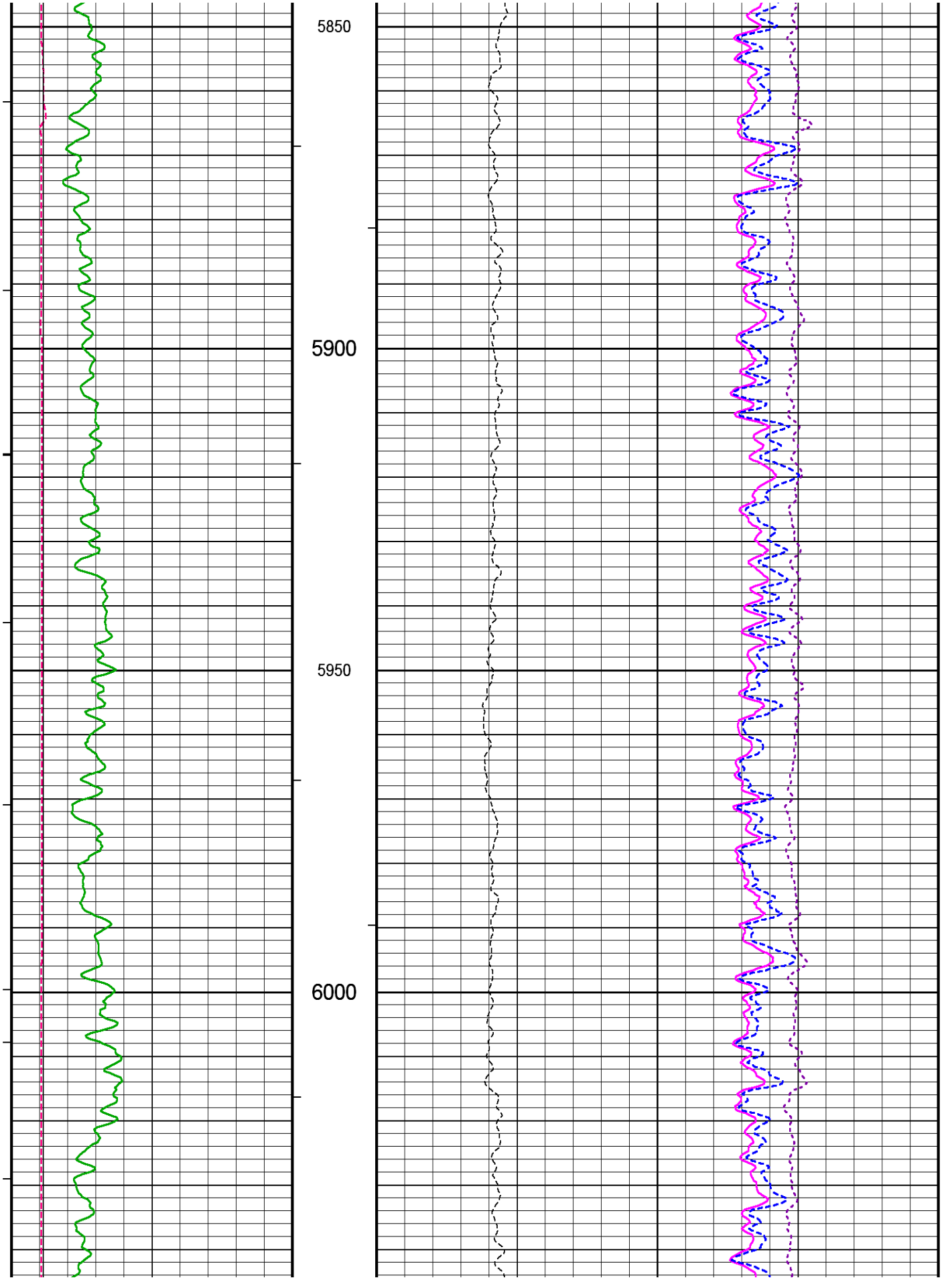
Bit Size
MGS Gamma Ray
Density Caliper
PE
Limestone Density Por.
Compensated Density
Density Correction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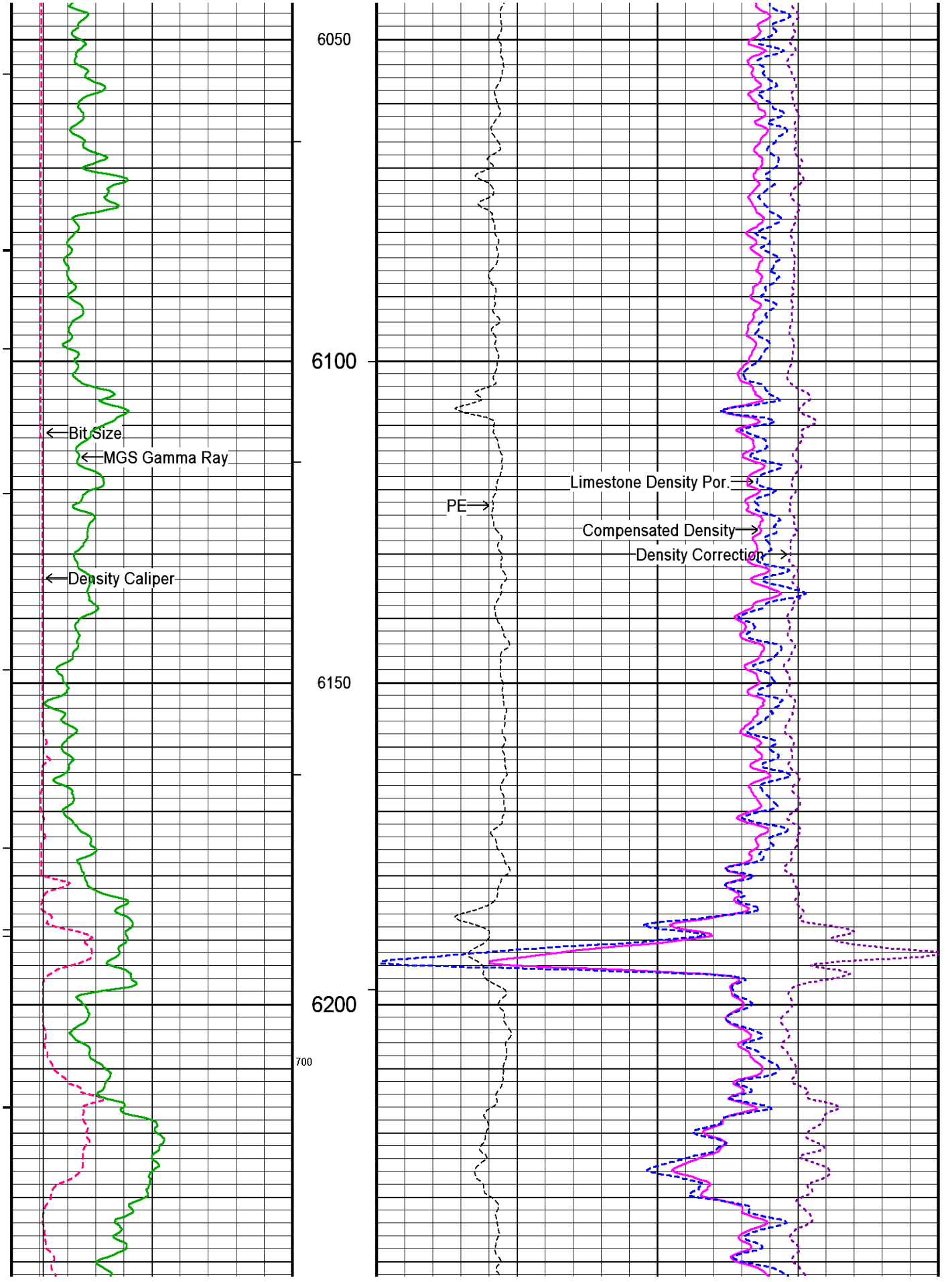
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6200
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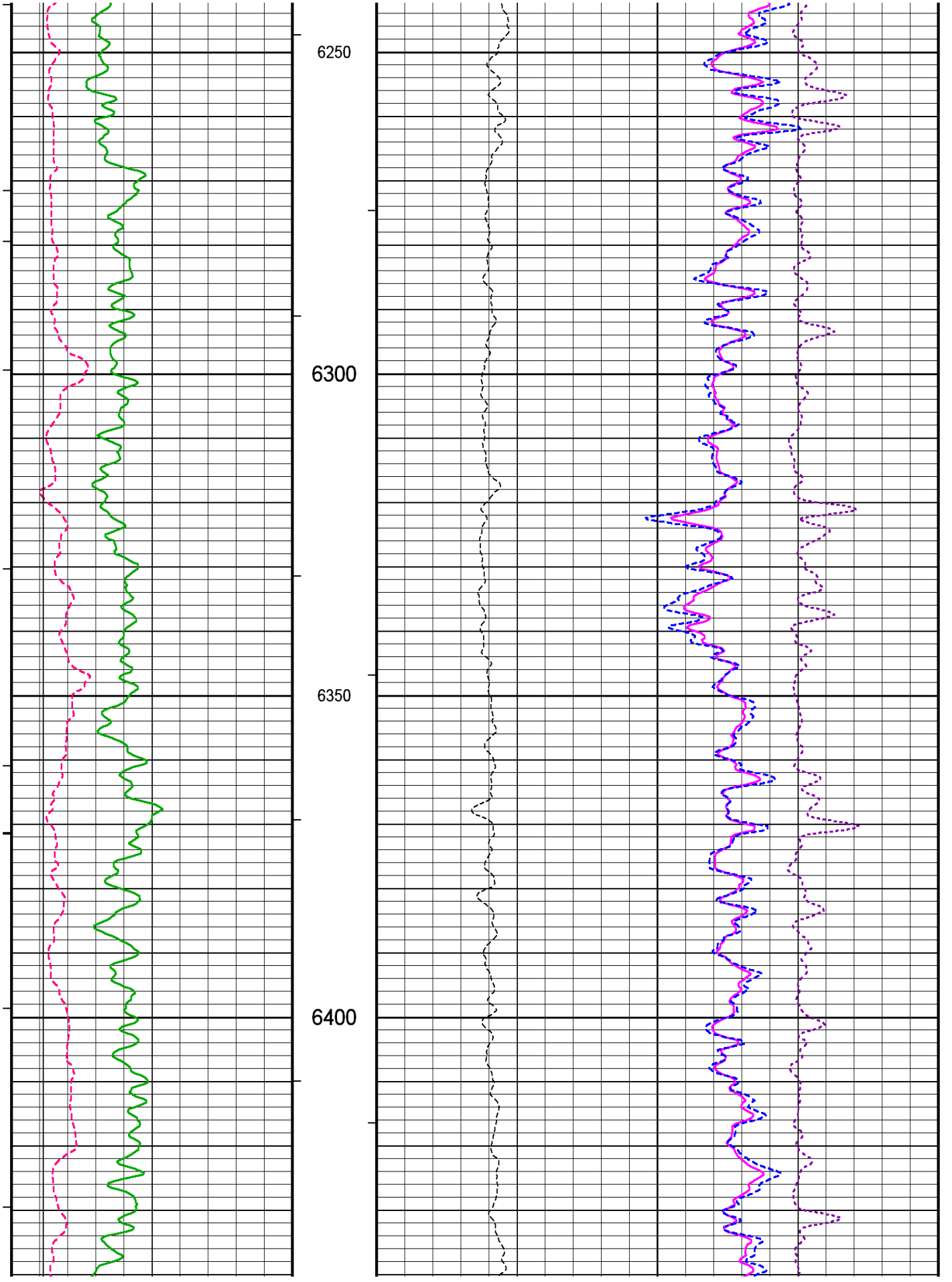
MGS Gamma Ray
Density Caliper
PE
Limestone Density Por.
Compensated Density
Density Correction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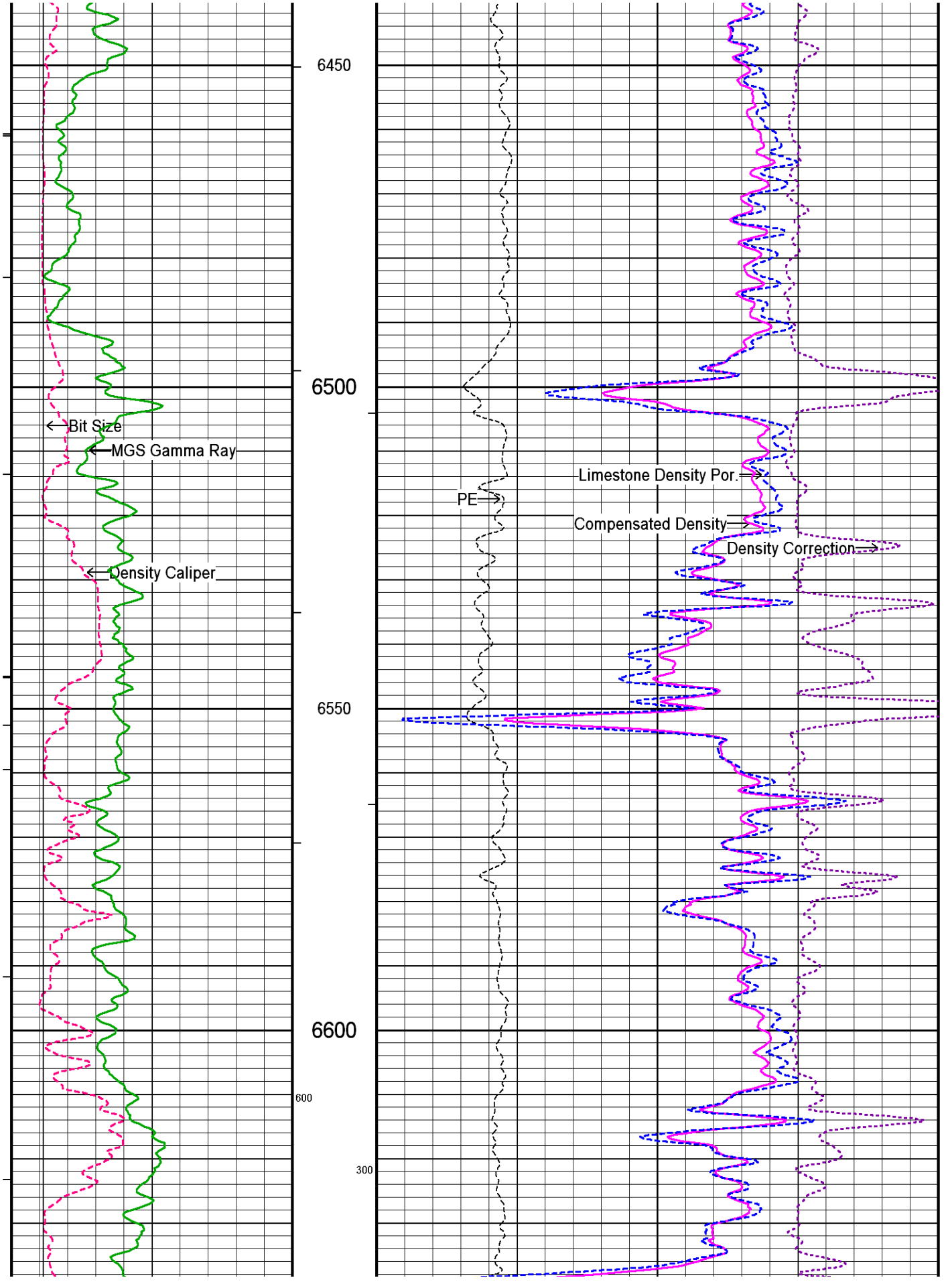
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Density Caliper
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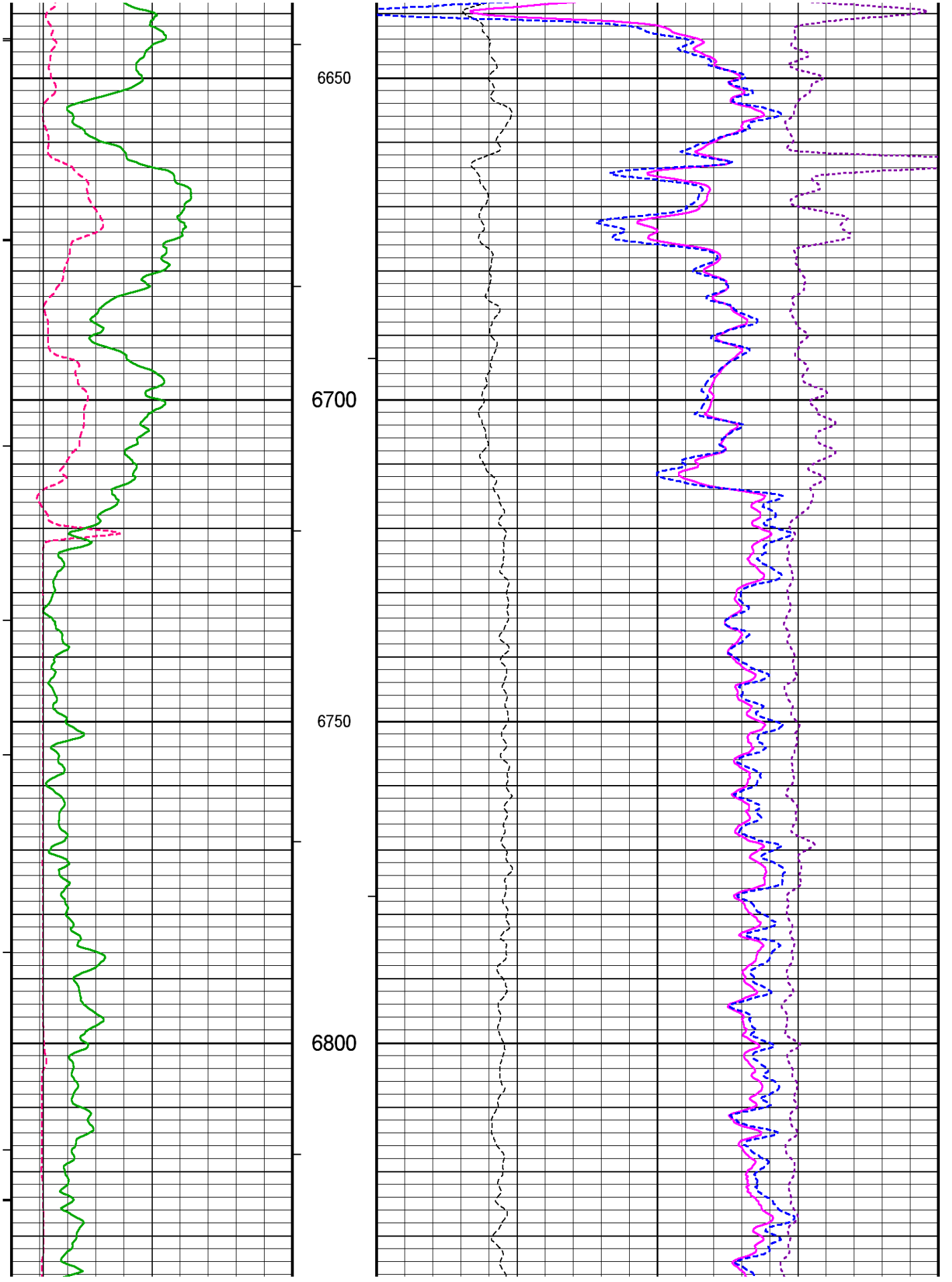
Compensated Density
Density Correction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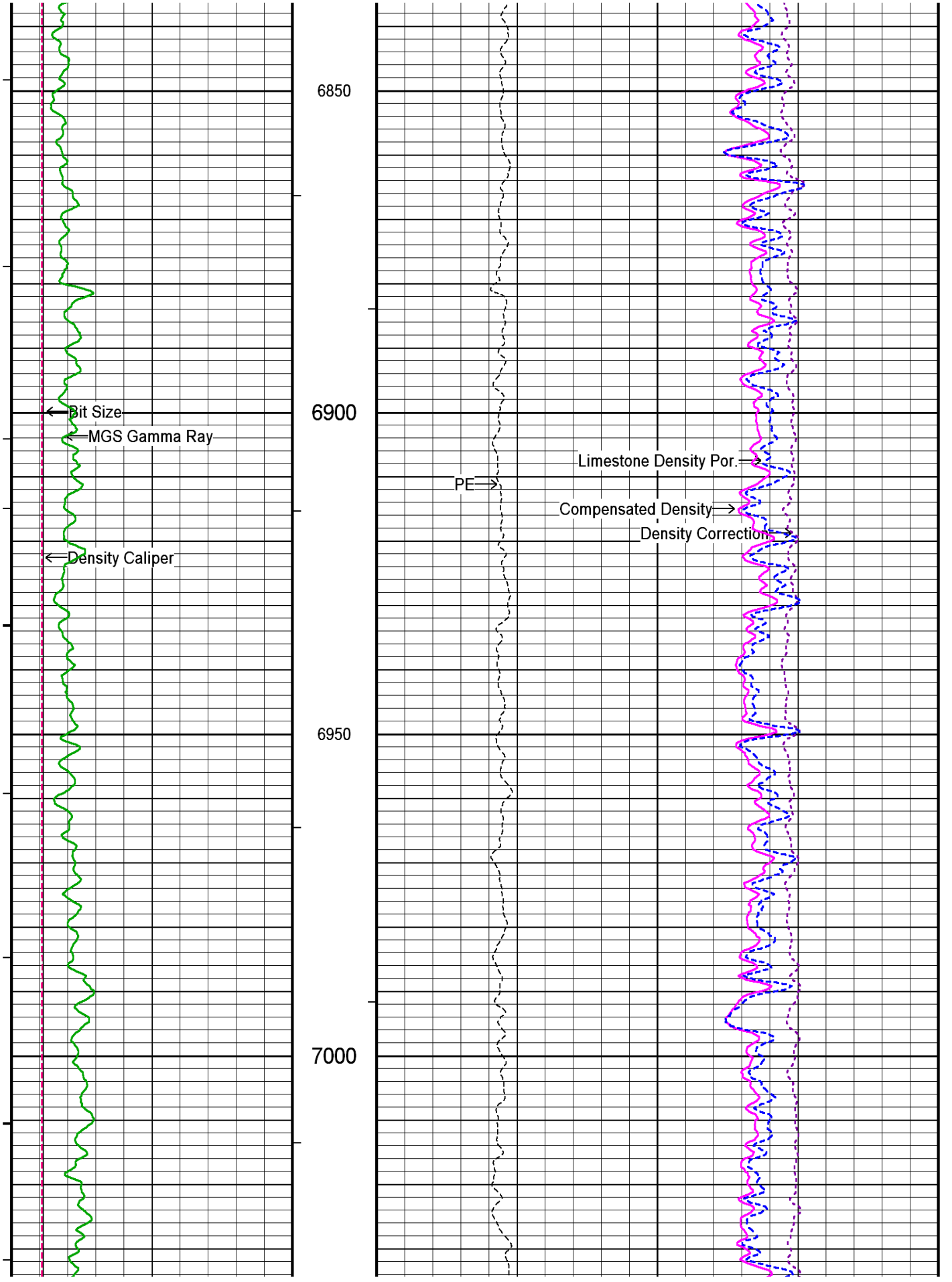
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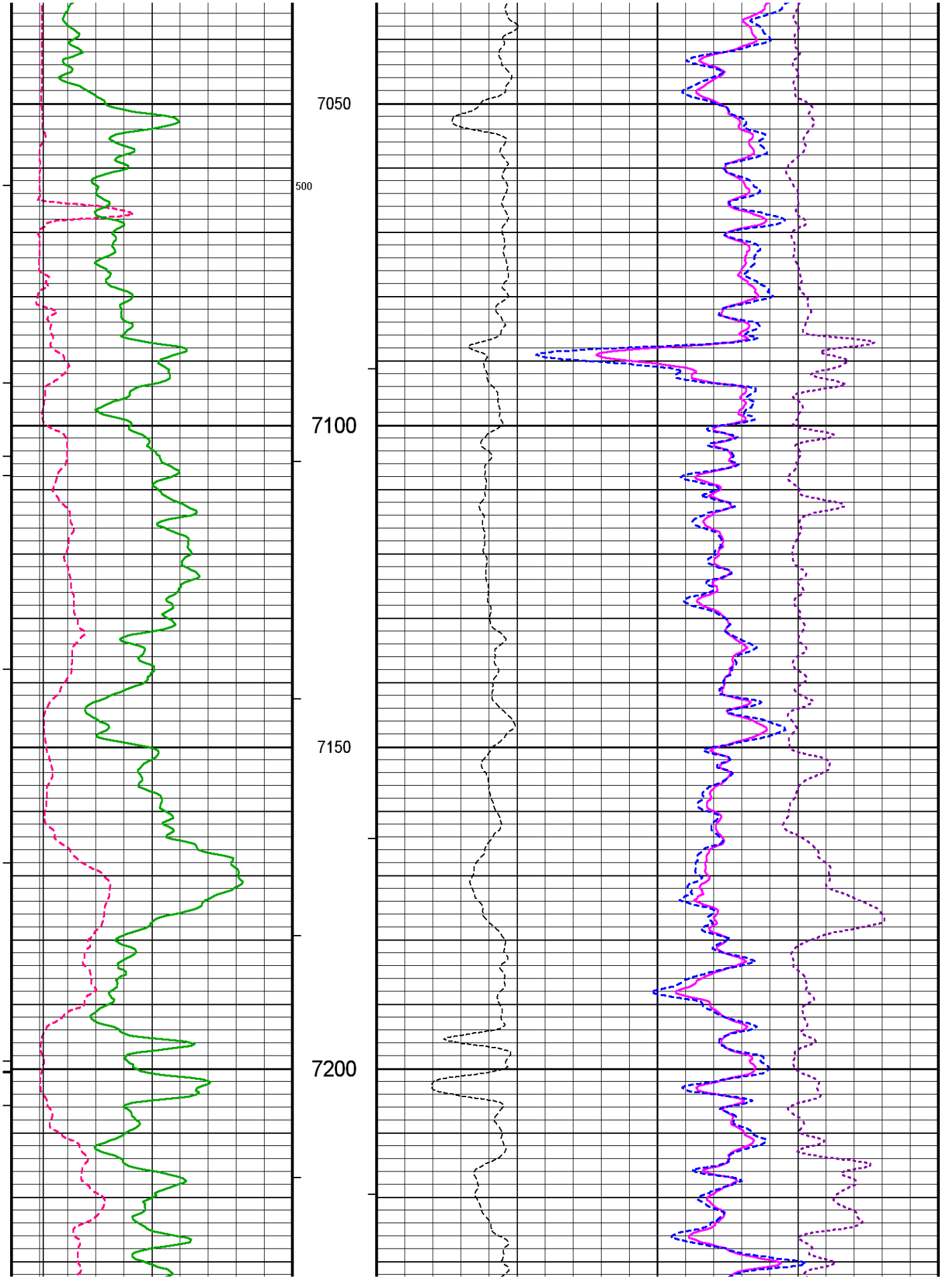
Compensated Density
Density Correction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7100
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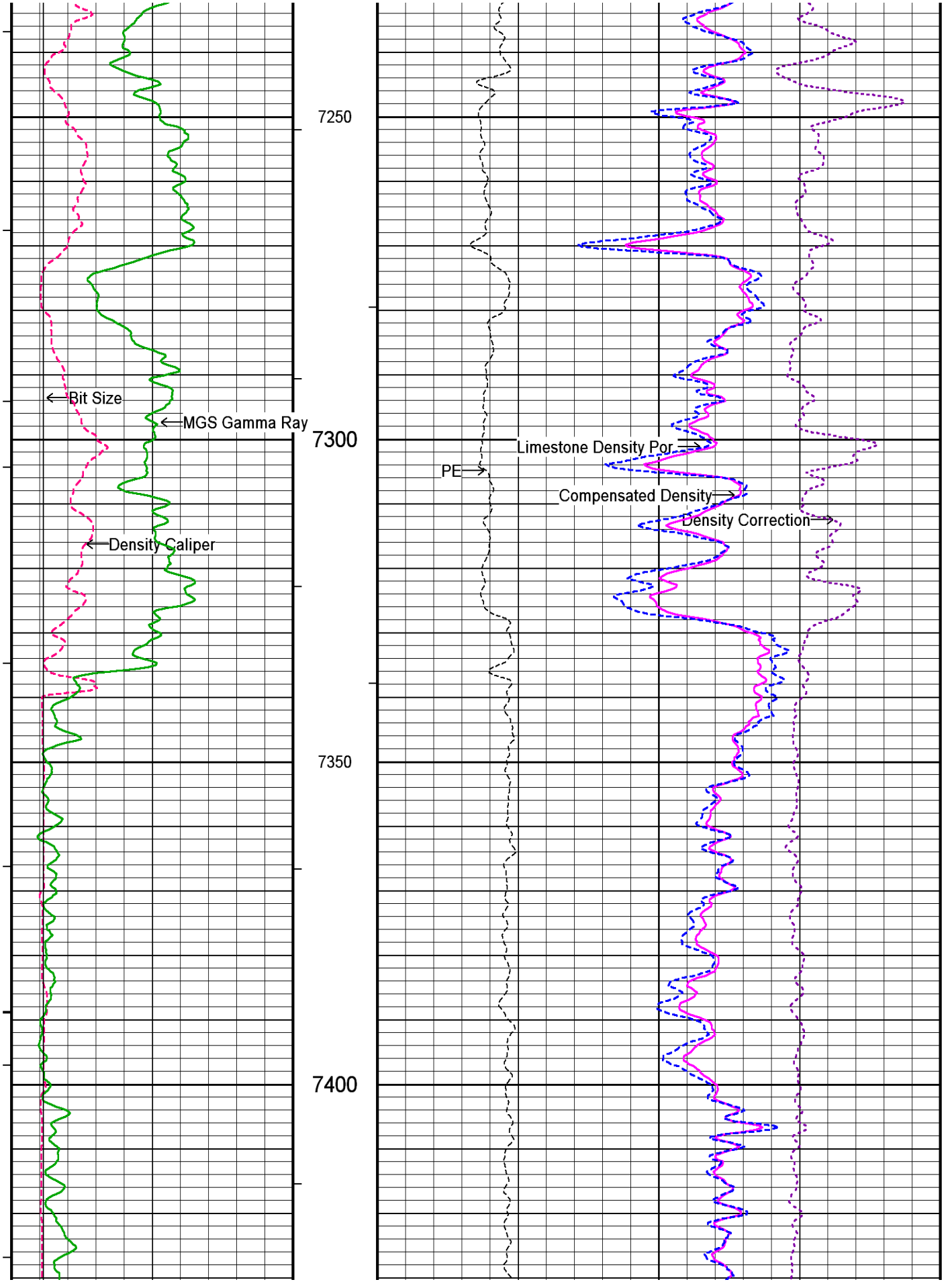
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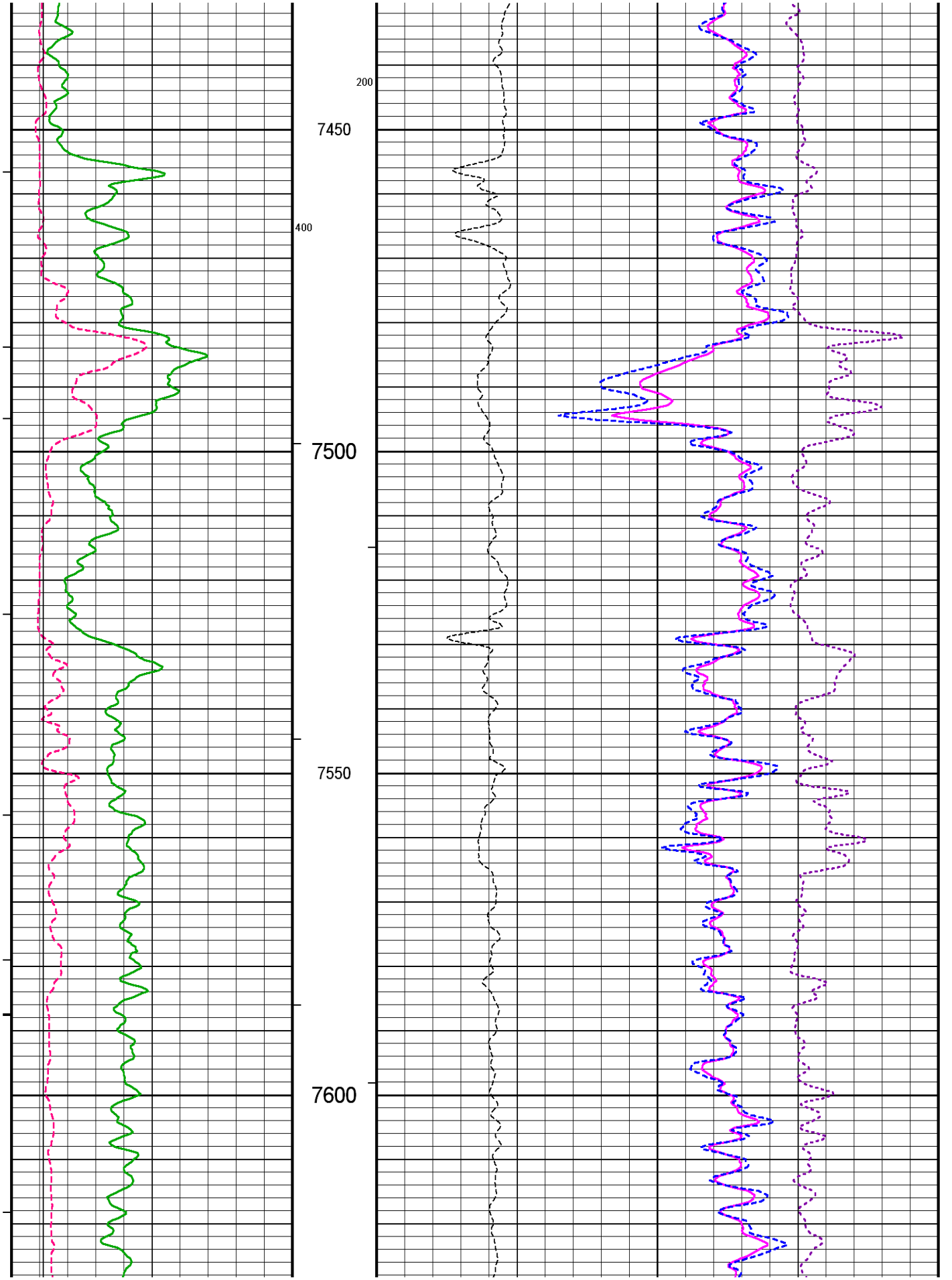
7300
7350
7400
Bit Size
MGS Gamma Ray
Density Caliper
Limestone Density Por
PE
Compensated Density
Density Correction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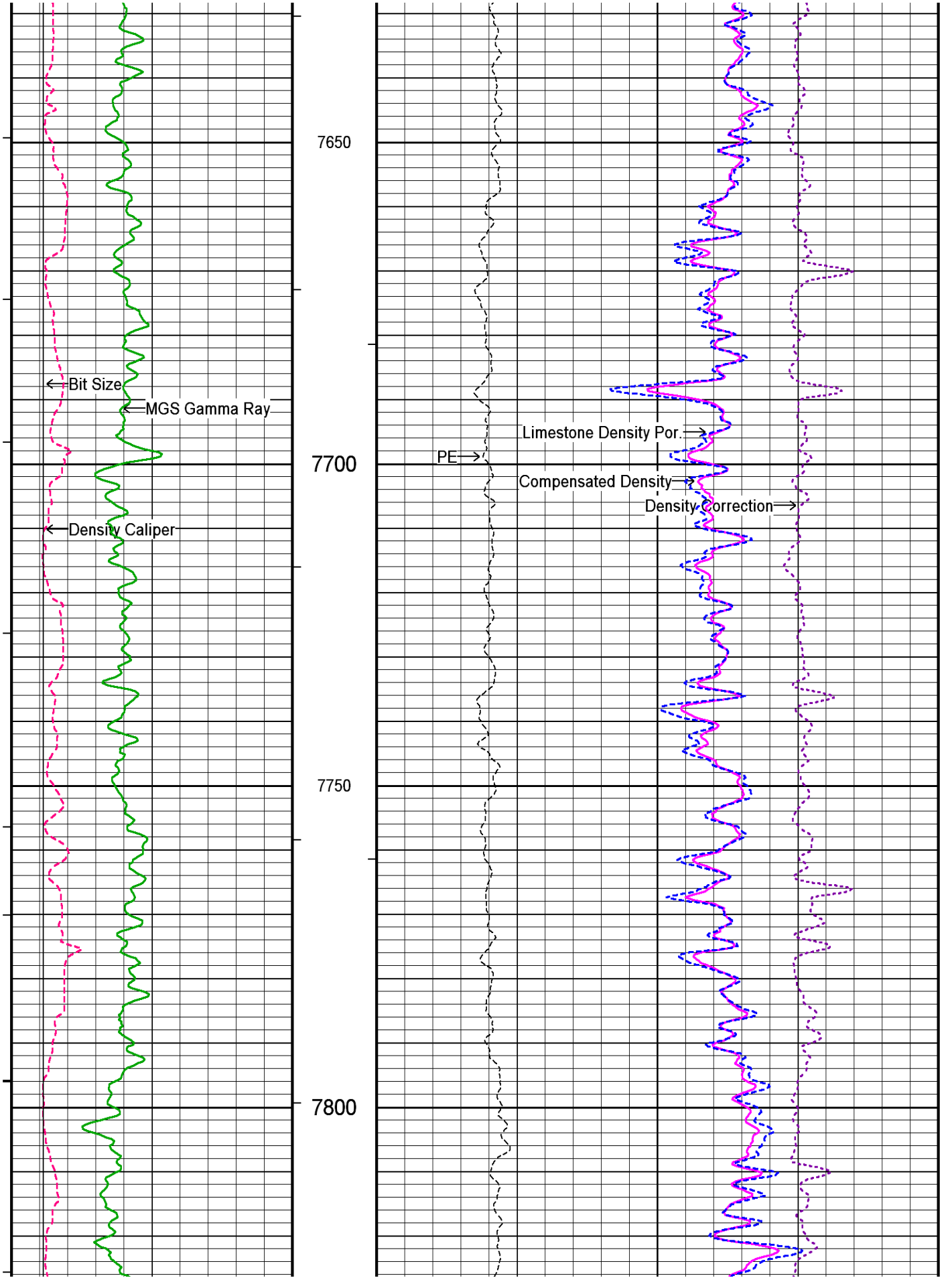
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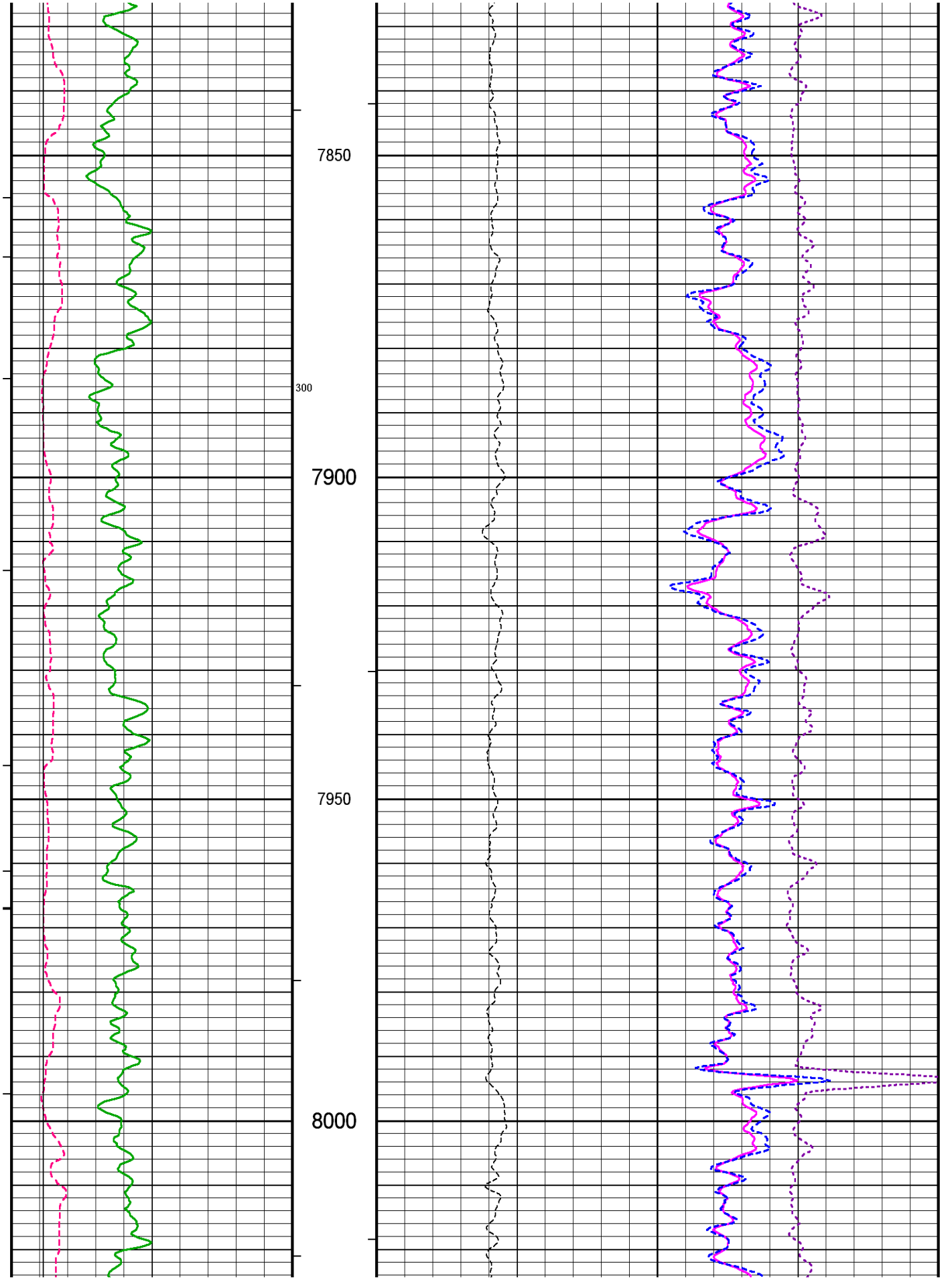
7750
7800
Bit Size
MGS Gamma Ray
Density Caliper
PE
Limestone Density Por.
Compensated Density
Density Correction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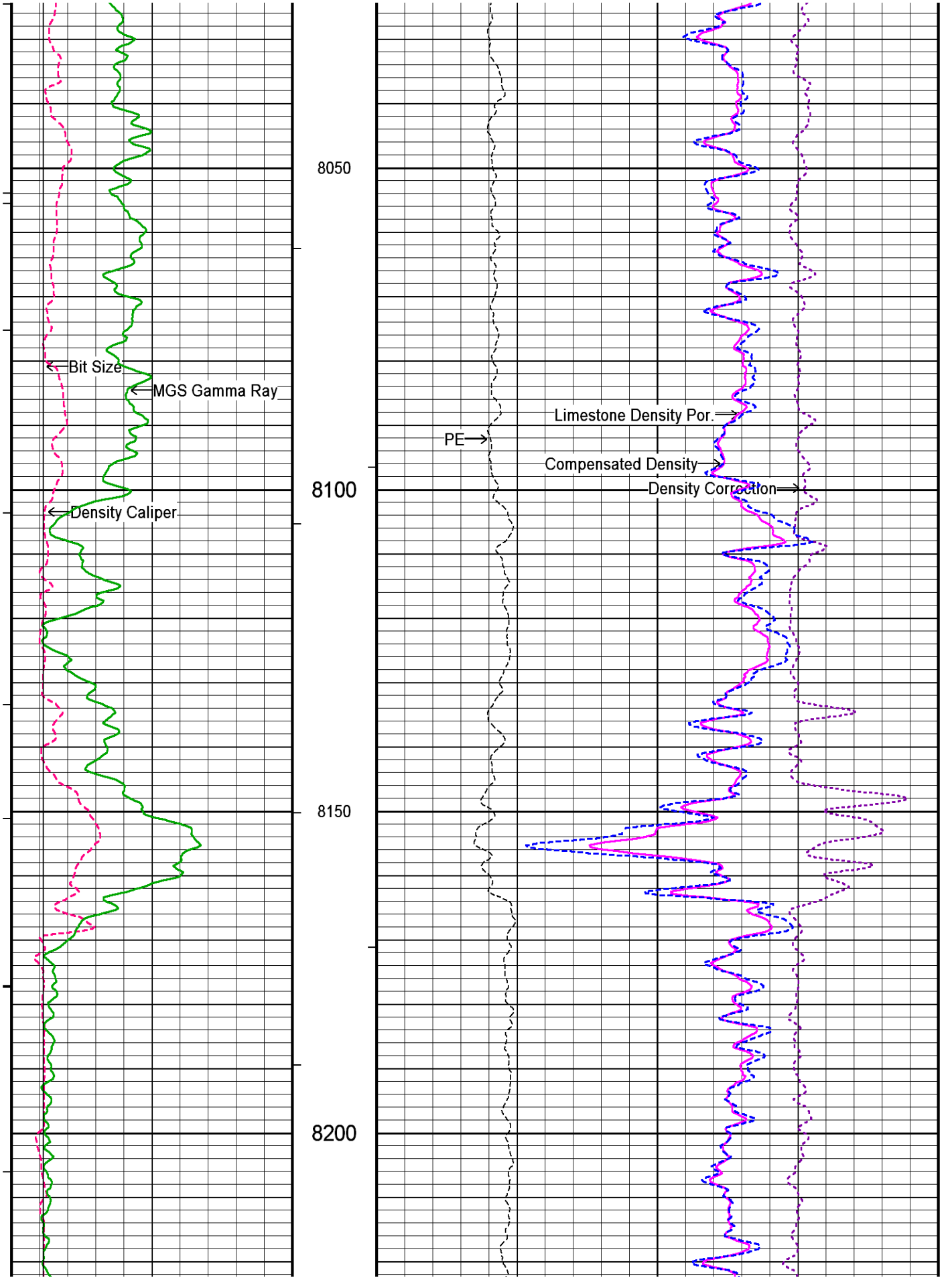
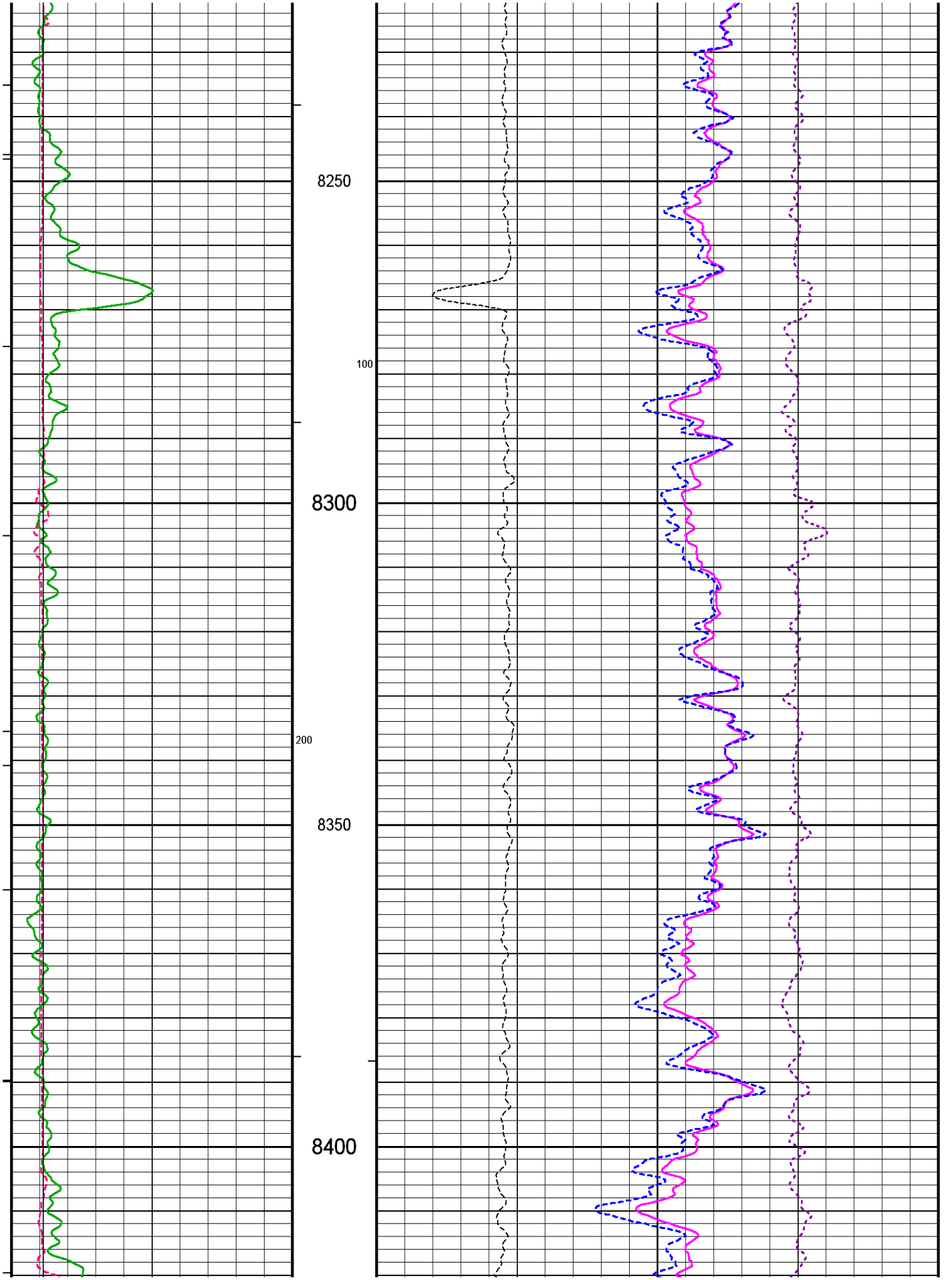
300
7900
7950
8000


8050
8100
8150
8200
Bit Size
MGS Gamma Ray
Density Caliper
PE
Limestone Density Por.
Compensated Density
Density Correction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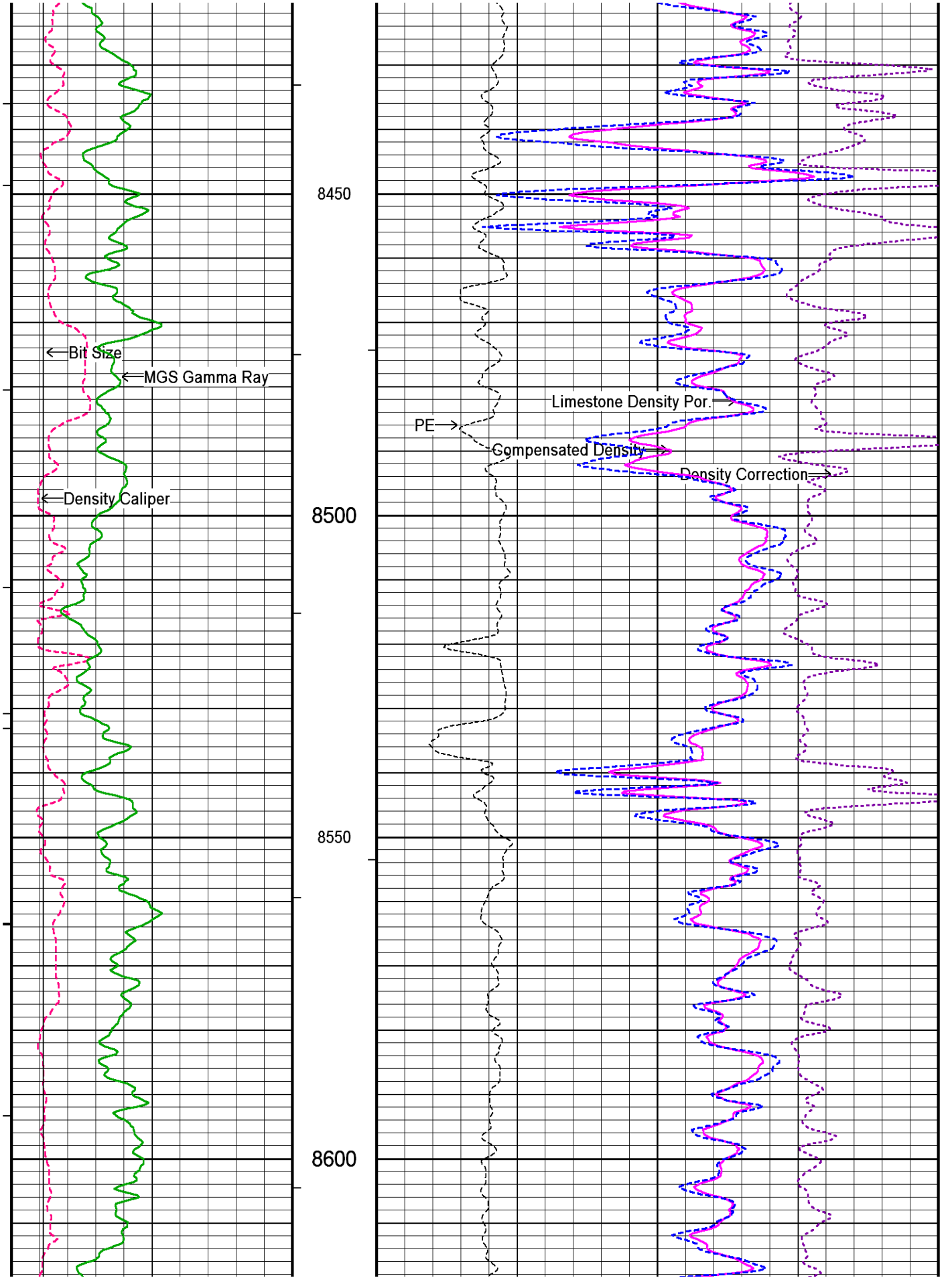
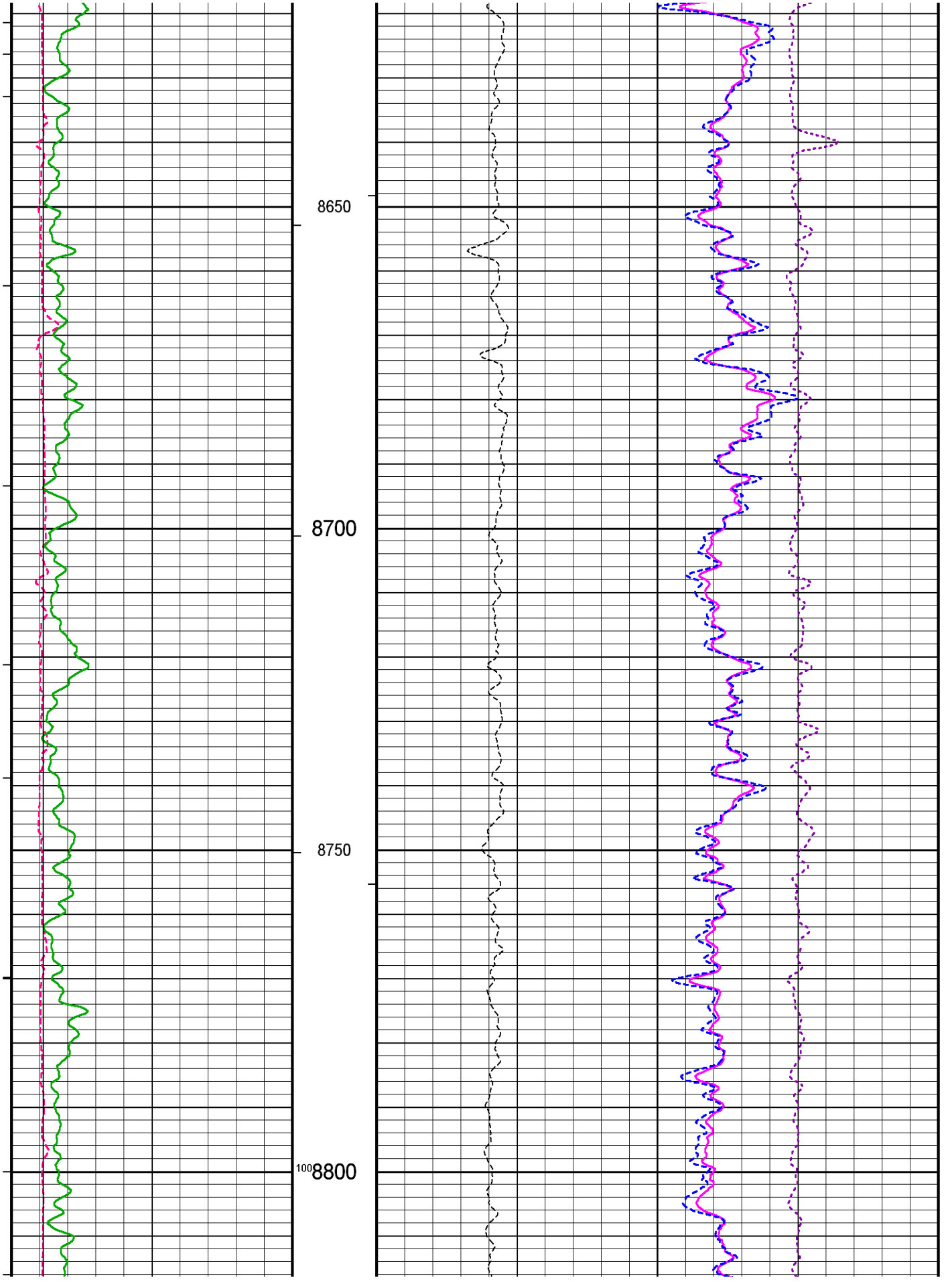
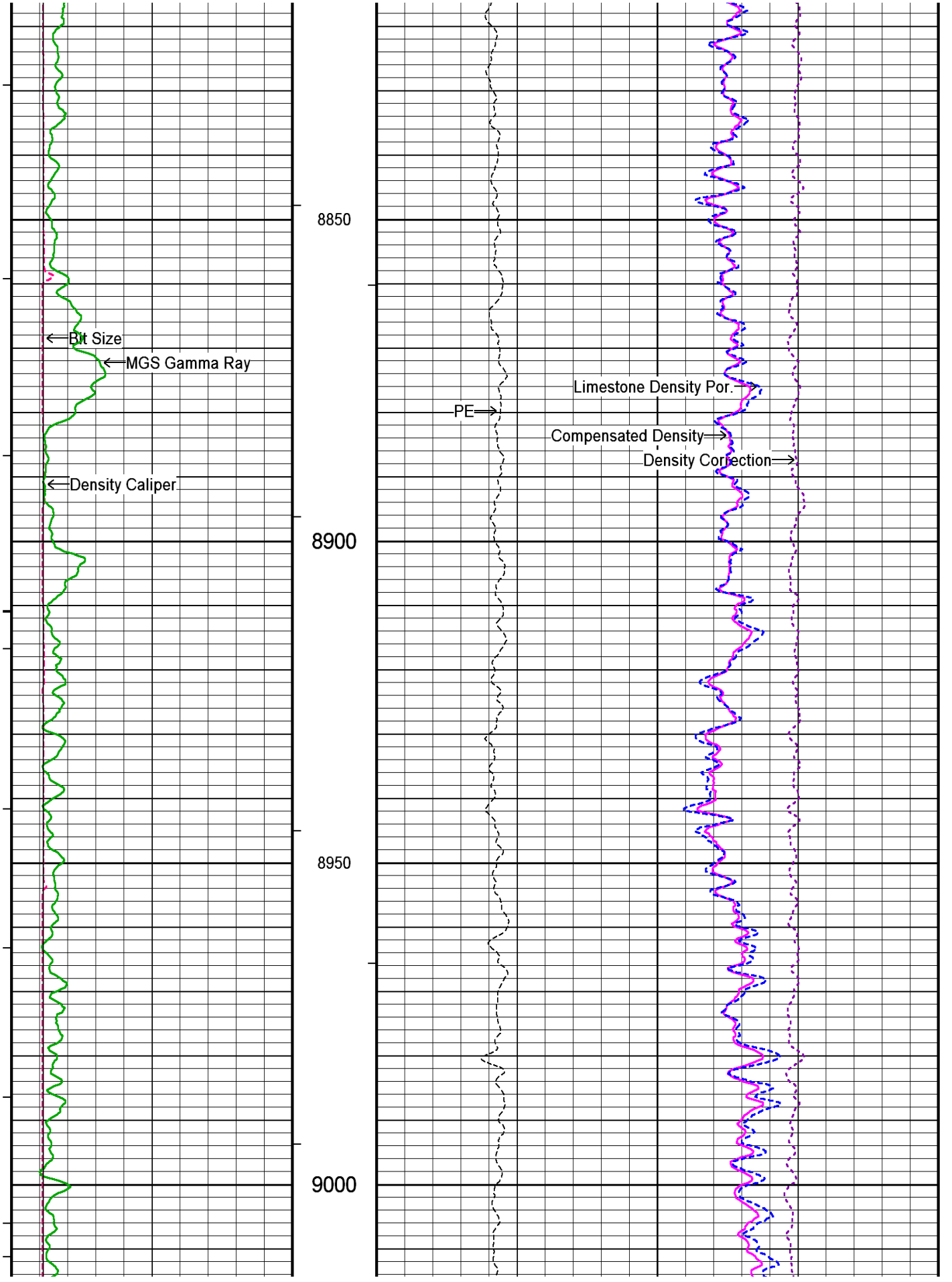
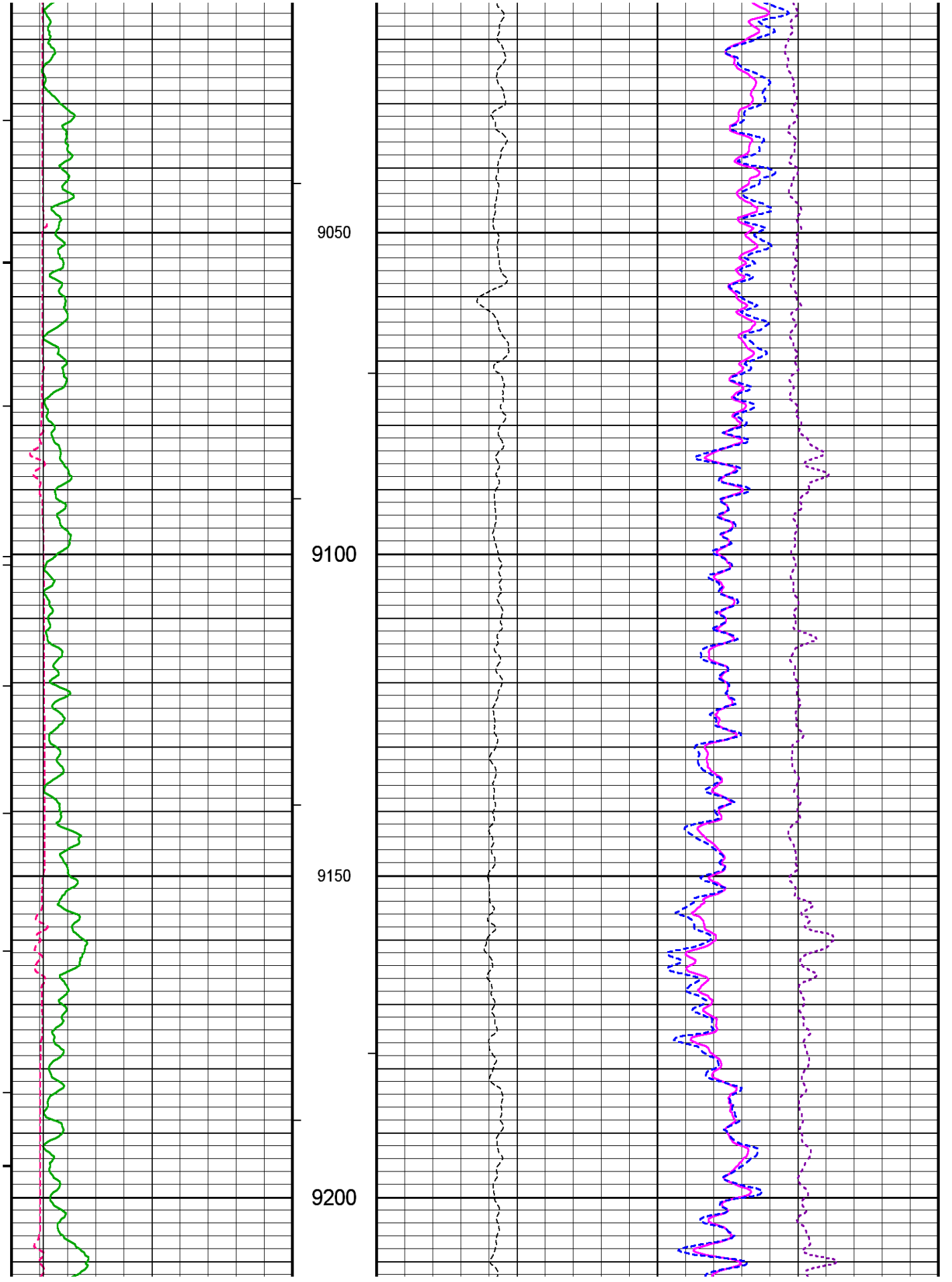
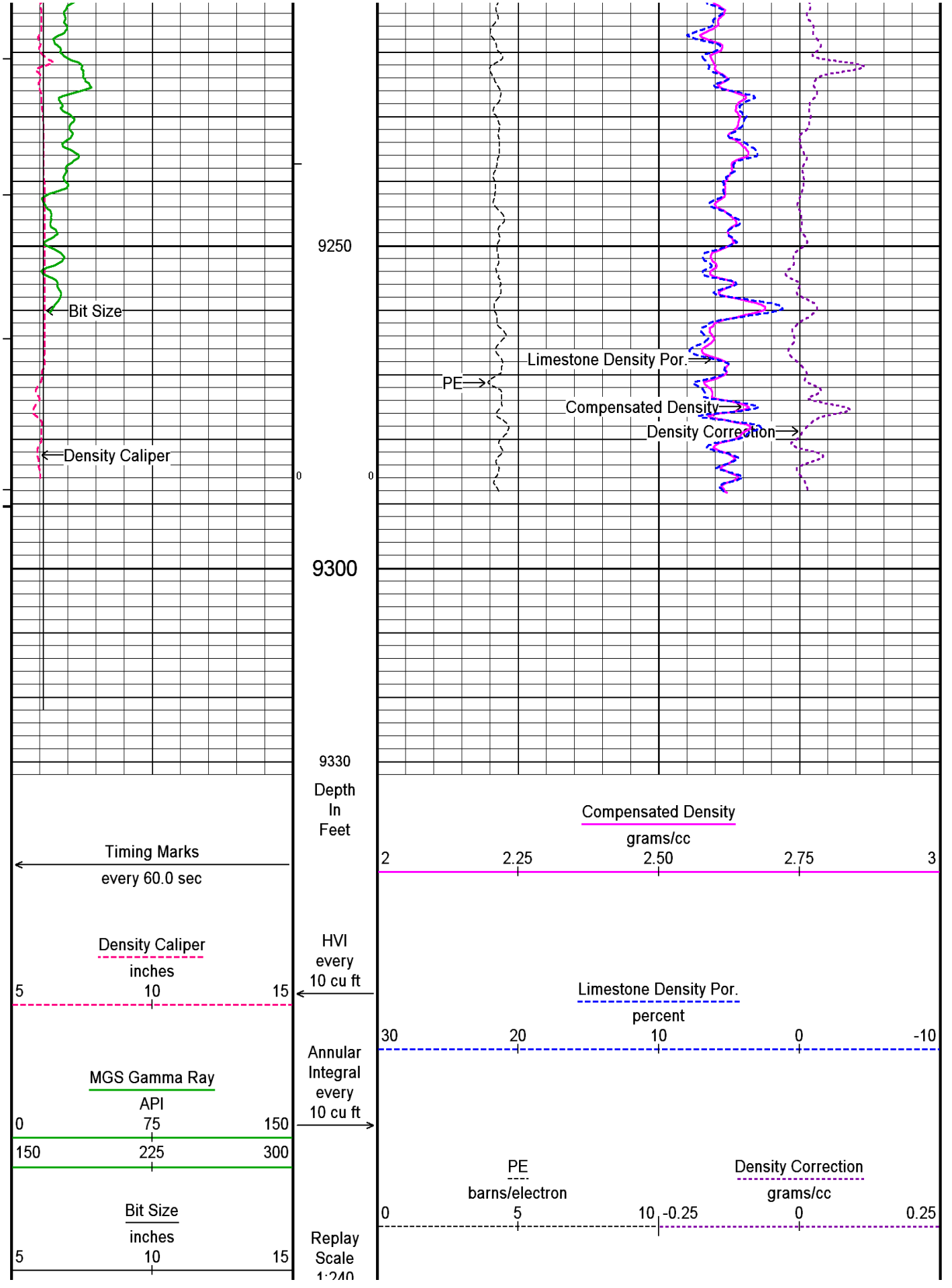
100
8300
200
8350
8400


8450
8500
8550
8600
Bit Size
MGS Gamma Ray
Density Caliper
PE
Limestone Density Por.
Compensated Density
Density Correction


8650
8700
8750
100
8800


8850
8900
8950
9000
Bit Size
MGS Gamma Ray
Density Caliper
PE
Limestone Density Por.
Compensated Density
Density Correction


9050
9100
9150
9200


Bit Size
Density Caliper
PE
Limestone Density Por.
Compensated Density
Density Correction
9250
9300
9330
0
0
Depth
In
Feet
Timing Marks
every 60.0 sec
Density Caliper
inches
5
10
15
HVI
every
10 cu ft
MGS Gamma Ray
API
0
75
150
150
225
300
Annular
Integral
every
10 cu ft
Bit Size
inches
5
10
15
Replay
Scale
1:240
Compensated Density
grams/cc
2
2.25
2.50
2.75
3
Limestone Density Por.
percent
30
20
10
0
-10
PE
barns/electron
0
5
10
Density Correction
grams/cc
-0.25
0
0.25

Depth Based Data - Maximum Sampling Increment 10.0cm — Plotted on 03-DEC-2012 01:56
Filename: C:\Logs\Sand Ridge\Unruh 2629 2-17H\Unruh 2629 2-17H MMS Depth2.dta — Recorded on 03-DEC-2012 00:39
System Versions: Processed with 13.03.7779 Plotted with 13.03.7779

5 INCH BULK DENSITY LOG DSC

BEFORE SURVEY CALIBRATION

C:\Logs\Sand Ridge\Unruh 2629 2-17H\Unruh 2629 2-17H MMS Depth2.dta

Down-hole Tension Calibration All 000

Field Calibration on 24-OCT-2010 03:34

Reading No	Measured	
1	15659.85	0.00
2	15734.68	370.00

General Constants All 000

Last Edited on 03-DEC-2012,01:42

General Parameters		
Mud Resistivity	0.860	ohm-metres
Mud Resistivity Temperature	68.000	degrees F
Water Level	0.000	feet
Density/Neutron Processing	Wet Hole	
Hole/Annular Volume and Differential Caliper Parameters		
HVOL Method	Single Caliper	
HVOL Caliper 1	Density Caliper	
HVOL Caliper 2	N/A	
Annular Volume Diameter	4.500	inches
Caliper for Differential Caliper	Density Caliper	
Rwa Parameters		
Porosity used	Base Density Porosity	
Resistivity used	Array Ind. One Res Rt	
RWA Constant A	0.610	
RWA Constant M	2.150	

Down-hole Tension Calibration SMS 0

Field Calibration on 17-JUL-2012 16:31

Reading No	Measured	
1	15685.37	20.00
2	16738.51	350.00

Strain Gauge Constants MMS-E.A 123

Last Edited on

Atmospheric Pressure	14.70	psi
Serial Number	0	
Calibration Date	000000000000	
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	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2000.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
4000.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
6000.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
8000.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
10000.0	0.000		0.000		0.000		0.000	

High Resolution Temperature Calibration MGS-C.J 119

Field Calibration on 15-NOV-2012,16:28

Measured Calibrated(Deg F)

	Measured	Calibrated(Deg F)
Lower	20.00	20.00
Upper	200.00	200.00

High Resolution Temperature Constants MGS-C.J 119

Last Edited on 15-NOV-2012,16:28

Pre-filter Length	11

SP Calibration MGS-C.J 119

Field Calibration on 23-JUL-2012 04:11

	Measured	Calibrated (mV)
Reference 1	100.0	100.0
Reference 2	-100.0	-100.0

Gamma Calibration MGS-C.J 119

Field Calibration on 01-DEC-2012 23:22

	Measured	Calibrated (API)
Background	206	177
Calibrator (Gross)	1016	873
Calibrator (Net)	810	696

Gamma Constants MGS-C.J 119

Last Edited on 03-DEC-2012,01:42

Gamma Calibrator Number	GRC 210	
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 427

Base Calibration on 20-NOV-2012 10:29
Field Check on 01-DEC-2012 23:15

Base Calibration

	Measured		Calibrated (cps)	
	Near	Far	Near	Far
	2983	91	3714	110
Ratio	32.853		33.764	

Field Calibrator at Base

	Calibrated (cps)	
	2253	3303
Ratio	0.682	

Field Check

	Calibrated (cps)	
	2229	3293
Ratio	0.677	

Neutron Constants MDN-B.J 427

Last Edited on 03-DEC-2012,01:42

Neutron Source Id	P62413B	
Neutron Jig Number	NJ6643	
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	

EE Calibration MEE-C.A 381

Base Calibration on 04-OCT-2012 19:22

FE Calibration MFE-C.A 381 — Base Calibration on 01-DEC-2012,15:22
Field Check on 01-DEC-2012 23:04

Base Calibration

	Measured	Calibrated (ohm-m)
Reference 1	9.7	1.3
Reference 2	961.8	126.8
Base Check		281.8
Field Check		281.8

FE Constants MFE-C.A 381

Last Edited on 03-DEC-2012,01:42

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.	MGS External Temperature	
Stand-off	0.5	inches

High Resolution Temperature Calibration MAI-B.J 434

Field Calibration on 22-NOV-2012,11:59

	Measured	Calibrated(Deg F)
Lower	10.00	10.00
Upper	100.00	100.00

High Resolution Temperature Constants MAI-B.J 434

Last Edited on 22-NOV-2012,11:59

Pre-filter Length	11

Induction Calibration MAI-B.J 434

Base Calibration on 15-NOV-2012,15:39
Field Check on 01-DEC-2012 22:58

Base Calibration

Test Loop Calibration	Measured		Calibrated (mmho/m)	
Channel	Low	High	Low	High
1	14.7	442.4	9.3	966.2
2	5.0	355.7	7.6	821.4
3	3.2	250.0	5.2	566.0
4	1.6	129.2	2.6	279.2
Array Temperature		74.5	Deg F	

Channel	Base Check (mmho/m)		Field Check (mmho/m)	
	Low	High	Low	High
1			16.8	4104.0
2			34.0	3793.0
3			29.8	3171.8
4			20.7	2140.7
Deep			16.6	1971.6
Medium			43.8	4229.0
Shallow			53.2	5755.8
Array Temperature				41.9 Deg F

Induction Constants MAI-B.J 434

Last Edited on 03-DEC-2012,01:42

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	6.0000	
Stand-off Fin Angle	60.00	degrees
Stand-off Fin Width	1.0000	inches
Borehole Corr. Rm Source	Temperature Corr	

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	

Photo Density Calibration MPD-D.A 460

Base Calibration on 20-NOV-2012 13:48
Field Check on 01-DEC-2012 23:09

Density Calibration

Base Calibration	Measured Near	Measured Far	Calibrated (sdu) Near	Calibrated (sdu) Far
Reference 1	63316	30564	59720	30898
Reference 2	25941	2914	24621	2513

Field Check at Base

	1324.7	1574.1

Field Check

	1327.0	1570.3

PE Calibration

Base Calibration	WS	Measured WH	Measured Ratio	Calibrated Ratio
Background	255	1183		
Reference 1	28728	63081	0.460	0.370
Reference 2	8313	25780	0.328	0.271

Field Check at Base

255.3	1183.4	

Field Check

254.2	1184.3	

Density Constants MPD-D.A 460

Last Edited on 02-DEC-2012,00:36

Density Source Id	P74832B	
Nylon Calibrator Number	628	
Aluminium Calibrator Number	628	
Density Shoe Profile	4 inch	
Caliper Source for Processing	Density Caliper	
PE Correction to Density	Not Applied	
Mud Density	1.08	gm/cc

Mud Density	1.08	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	

Caliper Calibration MPD-D.A 460

Base Calibration on 20-NOV-2012 14:17
Field Calibration on 01-DEC-2012 23:11

Base Calibration

Reading No	Measured	Calibrator Size (in)
1	19280	4.00
2	27805	5.96
3	35744	7.98
4	43979	9.86
5	53110	11.88
6	N/A	N/A

Field Calibration

Measured Caliper (in)	Actual Caliper (in)
5.82	5.96

DOWNHOLE EQUIPMENT

C:\Logs\Sand Ridge\Unruh 2629 2-17H\Unruh 2629 2-17H MMS Depth2.dta

Shuttle Running Tool 3.5" (SRT A)
SRT-A 8 LG: 5.90 ft WT: 37.5 lb OD: 2.52 in

MBS-F.A 200v Compact Battery Sub
MBS-F.A 121 LG: 10.61 ft WT: 70.5 lb OD: 2.24 in

Compact Memory Sub E.A
MMS-E.A 123 LG: 5.20 ft WT: 37.5 lb OD: 2.24 in

Compact Tool Isolator sub.
MTI-B.A 65 LG: 1.54 ft WT: 13.2 lb OD: 2.24 in

Compact Short Gamma
MGS-C.J 119 LG: 3.41 ft WT: 24.3 lb OD: 2.24 in

Compact Collar Locator
MCL-B.J 51 LG: 3.17 ft WT: 26.5 lb OD: 2.24 in

SKJ-D.A Compact Knuckle Joint
SKJ-D.A 203 LG: 2.17 ft WT: 24.3 lb OD: 2.24 in

SHA-J.A Compact Swivel Head Adaptor
SHA-J.A 314 LG: 2.30 ft WT: 22.0 lb OD: 2.24 in

MIS-D.A Compact Inline Bowspring sub
MIS-D.A 439 LG: 5.70 ft WT: 33.1 lb OD: 2.24 in

Compact Neutron
MDN-B.J 427 LG: 5.04 ft WT: 50.7 lb OD: 2.24 in

Compact Density/Caliper
MPD-D.A 460 LG: 9.59 ft WT: 90.4 lb OD: 2.24 in

MIS-D.B Compact Inline Bowspring sub
MIS-D.B 723 LG: 5.70 ft WT: 33.1 lb OD: 2.24 in

SHA-J.B Compact Swivel Head Adaptor
SHA-J.B 572 LG: 2.30 ft WT: 22.0 lb OD: 2.24 in

SKJ-E.B Compact Knuckle Joint
SKJ-E.B 533 LG: 2.17 ft WT: 24.3 lb OD: 2.24 in

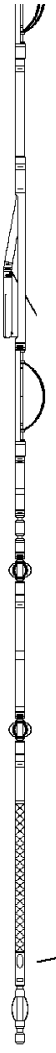
MIS-E.B Compact Inline Standoff sub
MIS-E.B 695 LG: 2.14 ft WT: 15.4 lb OD: 2.24 in

Compact Focussed Electric
MFE-C.A 381 LG: 6.05 ft WT: 48.5 lb OD: 2.24 in

MIS-E.B Compact Inline Standoff sub
MIS-E.B 696 LG: 2.14 ft WT: 15.4 lb OD: 2.24 in

Compact Induction
MAI-B.J 434 LG: 12.52 ft WT: 48.5 lb OD: 2.24 in

Total Length: 87.64 ft Weight: 637.1 lb



Tool Zero (1.84ft from bottom)
All measurements relative to tool zero.

COMPANY	SANDRIDGE ENERGY
WELL	UNRUH 2629 2-17H
FIELD	MONGER
PROVINCE/COUNTY	GRAY
COUNTRY/STATE	U.S.A. / KANSAS

Elevation Kelly Bushing	2765.00	feet	First Reading	9287.00	feet
Elevation Drill Floor	2765.00	feet	Depth Driller	9370.00	feet
Elevation Ground Level	2745.00	feet	Depth Logger	9370.00	feet

Weatherford®

COMPACT PHOTO DENSITY COMPENSATED NEUTRON LOG