Weatherford®

MEASURED DEPTH
PHOTO DENSITY
DUAL SPACED NEUTRON

COMPANY	WHITING OIL AND GAS CORPORATION
WELL	HORSETAIL 29G-2012B
FIELD	REDTAIL
PROVINCE/COUNTY	WELD
COUNTRY/STATE	U.S.A. / COLORADO
LOCATION	SHL: 2328 FNL & 1888 FWL
PERMIT NUMBER	BHL: 100 FNL & 1485 FWL

SEC	TWP	RGE
29	10N	57W

Other Services
MICRO IMAGER — ARRAY INDUCTION
SPECTRAL GAMMA

API Number 05-123-38804

Permanent Datum G.L., Elevation 4694 feet
Log Measured From KB
Drilling Measured From K.B. @ 18 FEET

Elevations:	feet
KB	4712.00
DF	4712.00
GL	4694.00

Date	26-OCT-2014				
Run Number	ONE				
Service Order	6551-101540329				
Depth Driller	13700.00	feet			
Depth Logger	13700.00	feet			
First Reading	13610.00	feet			
Last Reading	5962.00	feet			
Casing Driller	5981.00	feet			
Casing Logger	5982.00	feet			
Bit Size	6.000	inches			
Hole Fluid Type	WBM				
Density / Viscosity	10.60 lb/USg		44.00 type in		
PH / Fluid Loss	8.40		5.60 ml/30Min		
Sample Source	FLOWLINE				
Rm @ Measured Temp	1.88 @ 86.6	ohm-m			
Rmf @ Measured Temp	1.50 @ 86.6	ohm-m			
Rmc @ Measured Temp	2.26 @ 86.6	ohm-m			
Source Rmf / Rmc	CALC		CALC		
Rm @ BHT	0.79 @210.0	ohm-m			
Time Since Circulation	1 HOUR				
Max Recorded Temp	216.00	deg F			
Equipment / Base	18086		Casper		
Recorded By	C CULLEN				
Witnessed By	M ODEBERG			GEOLOGIST	
WSL				WSL	

BOREHOLE RECORD

Last Edited: 26-OCT-2014 09:16

Bit Size (inches)	Depth From (feet)	Depth To (feet)
6.000	5981.00	13700.00

CASING RECORD

Type	Size (inches)	Depth From (feet)	Shoe Depth (feet)	Weight (pounds/ft)
SURFACE	7.000	0.00	5981.00	29.00

REMARKS

LOGGED WITH WLS 14.01.3220

LOGGED USING MESSAGER SHUTTLE METHOD OF DEPLOYMENT

HARDWARE:
MDN: MIS-A SINGLE BOWSPRING USED ABOVE MDN
MPD: 4INCH PROFILE PLATE USED, MIS-A SINGLE BOWSPRING USED BELOW MPD
CMI: OVER BODY BASKET AND MIS-D BASKETS PLACED ABOVE AND BELOW FOR CENTRALIZATION
SGS: RAN BELOW CMI. ECCENTRALIZED WITH SKJ.

2.71 G/CC DENSITY MATRIX USED TO CALCULATE POROSITY

ALL INTERVALS LOGGED AND SCALED PER CUSTOMER'S REQUEST

ANNULAR HOLE VOLUME FROM TD TO 7"-29# CASING AT 5982 FEET = 660 CUBIC FEET.
TOTAL HOLE VOLUME FROM TD TO 7"-29# CASING AT 5982 FEET = 1510 CUBIC FEET.

OPERATORS: S LANDON, J GERDES

OPERATORS: S.LANDON, J. CERDES

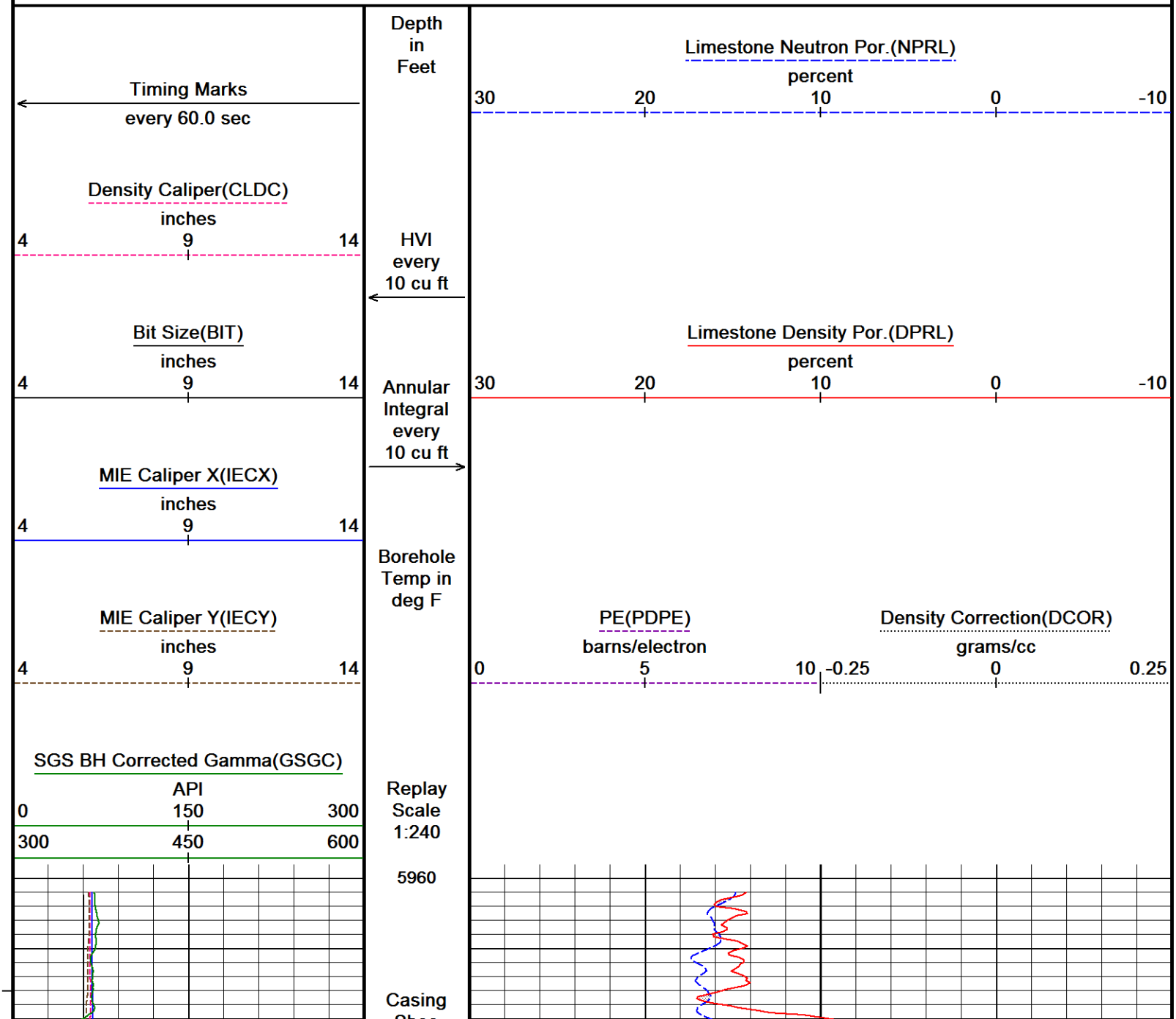
RIG: PIONEER 54

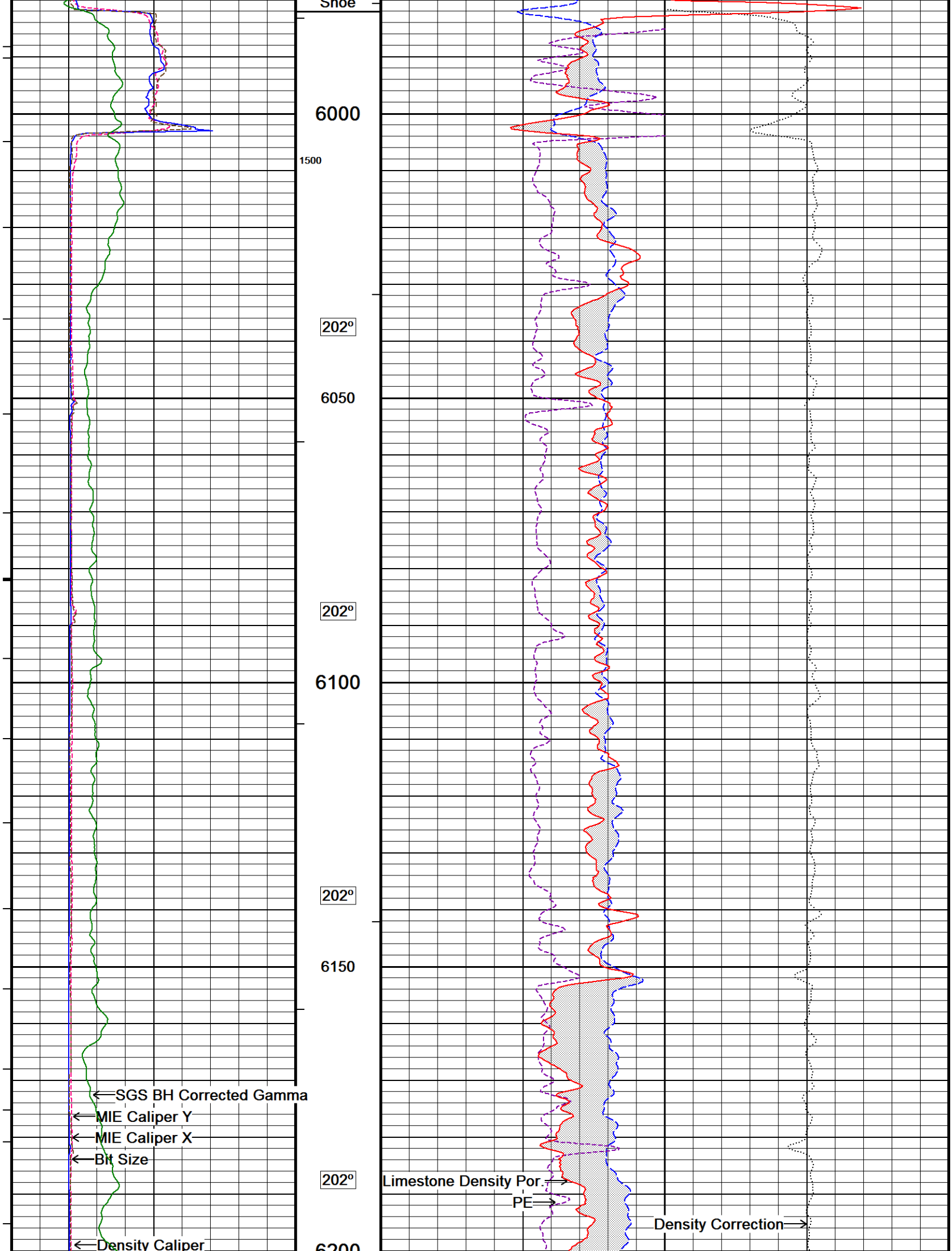
5 INCH MAIN LOG

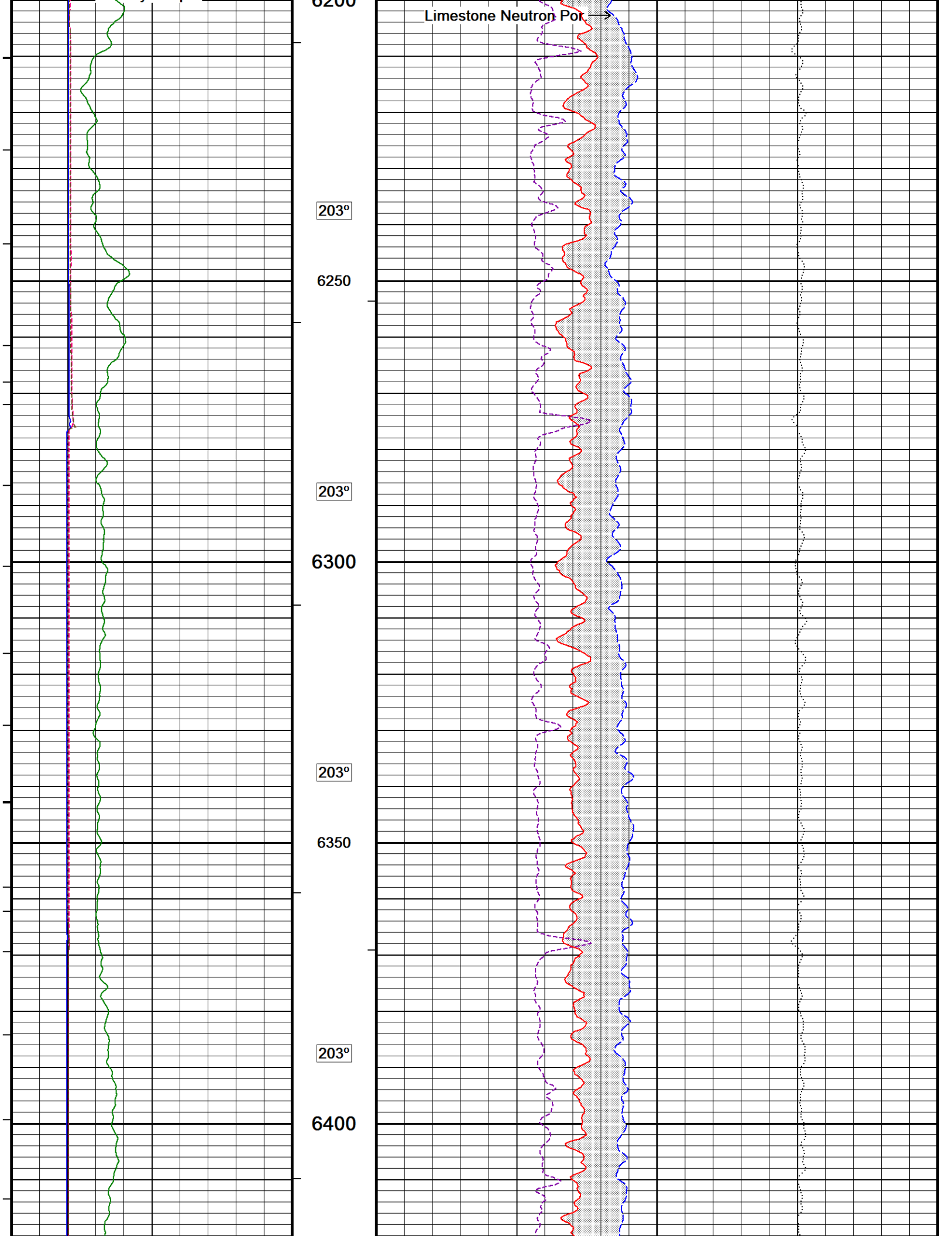
Depth Based Data - Maximum Sampling Increment 10.0cm — Plotted on 27-OCT-2014 19:12

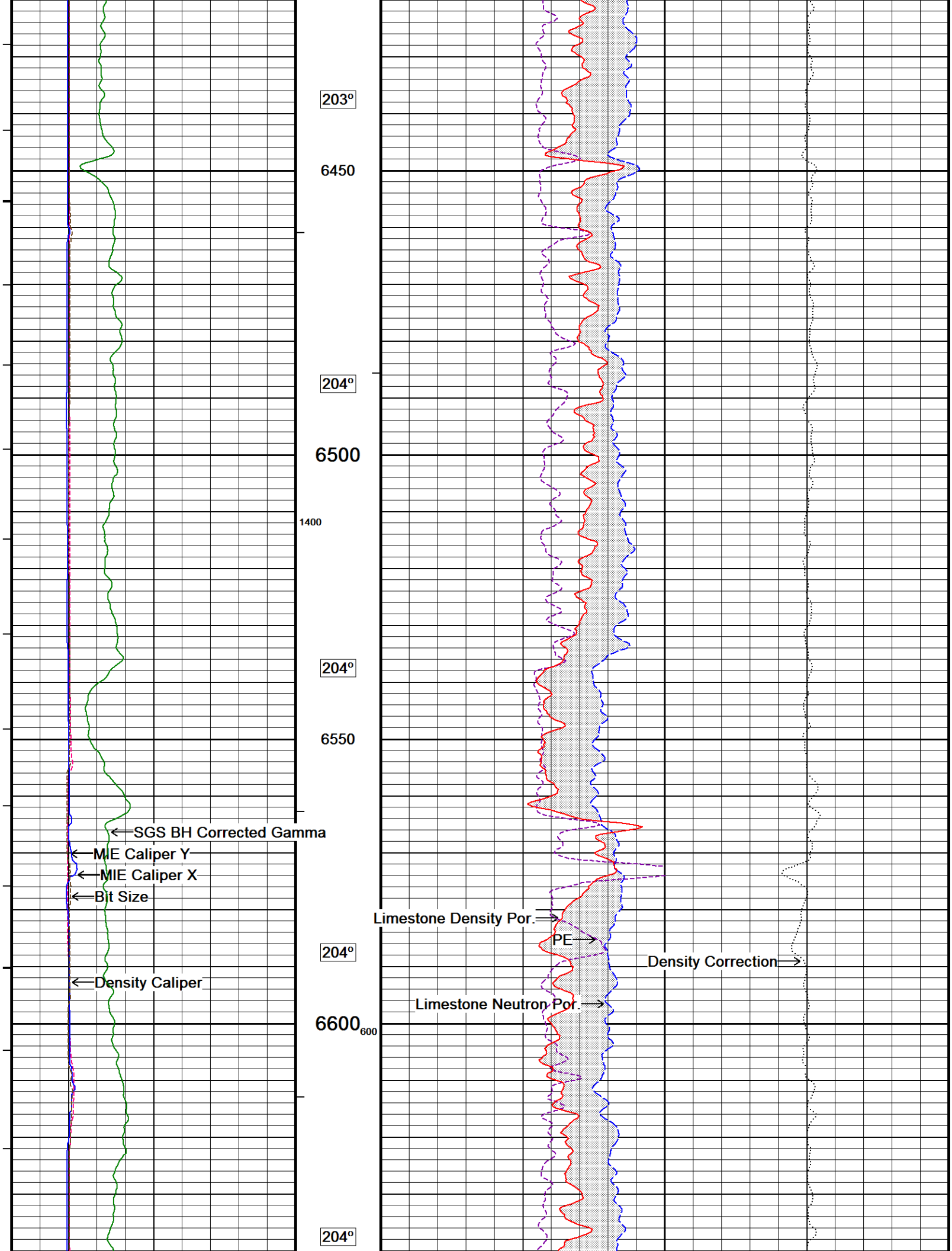
Filename: D:\Logs\Whiting\HORSETAIL 29G-2012B\MMS DEPTH.dta — Recorded on 27-OCT-2014 17:11

System Versions: Logged with 14.01.3220 Processed with 14.01.3220 Plotted with 14.01.3220




Shoe
6000
1500
202°
6050
202°
6100
202°
6150
202°
6200
SGS BH Corrected Gamma
MIE Caliper Y
MIE Caliper X
Bit Size
Density Caliper
Limestone Density Por.
PE
Density Correction


Limestone Neutron Por
6200
203°
6250
203°
6300
203°
6350
203°
6400


203°
6450
204°
6500
1400
204°
6550
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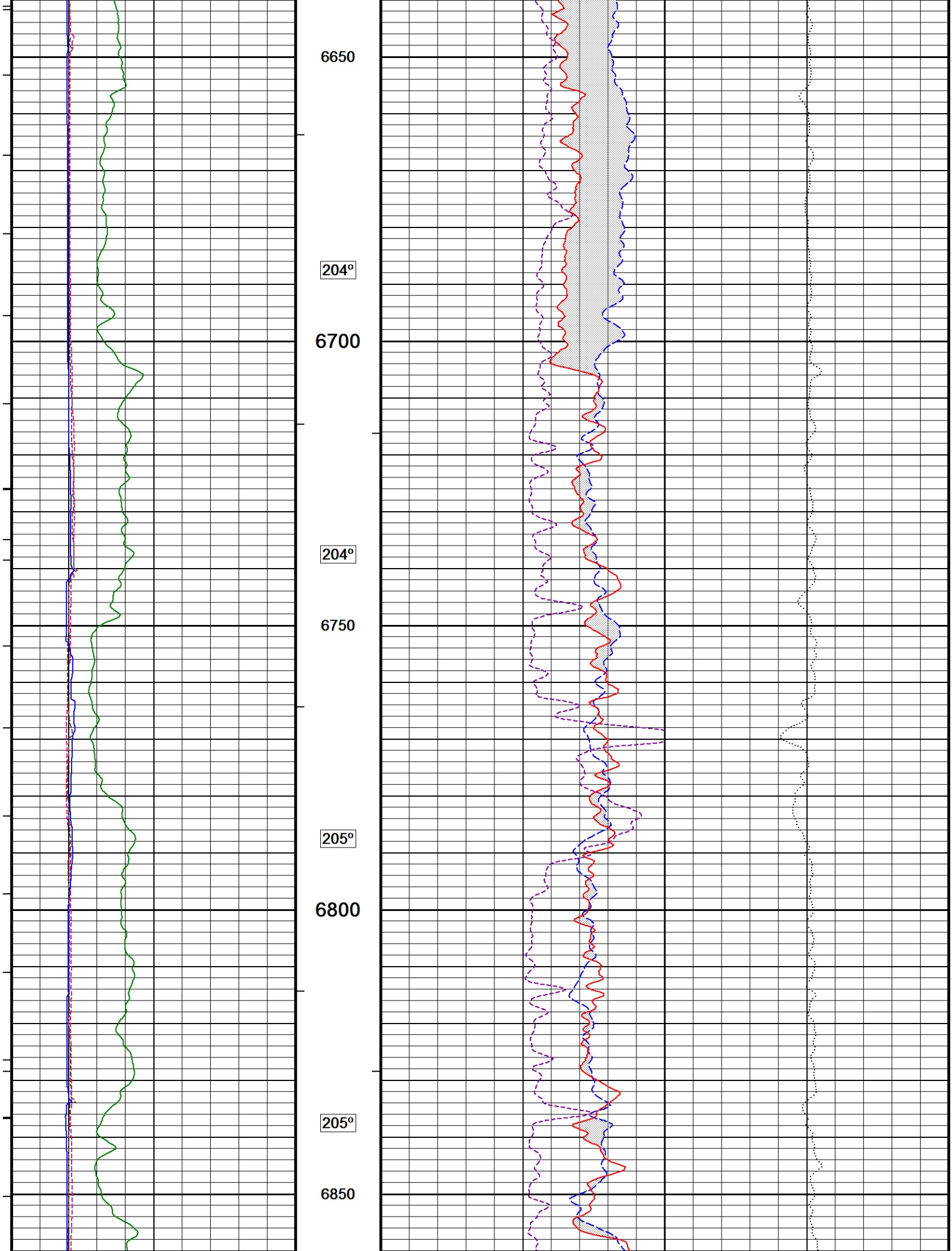
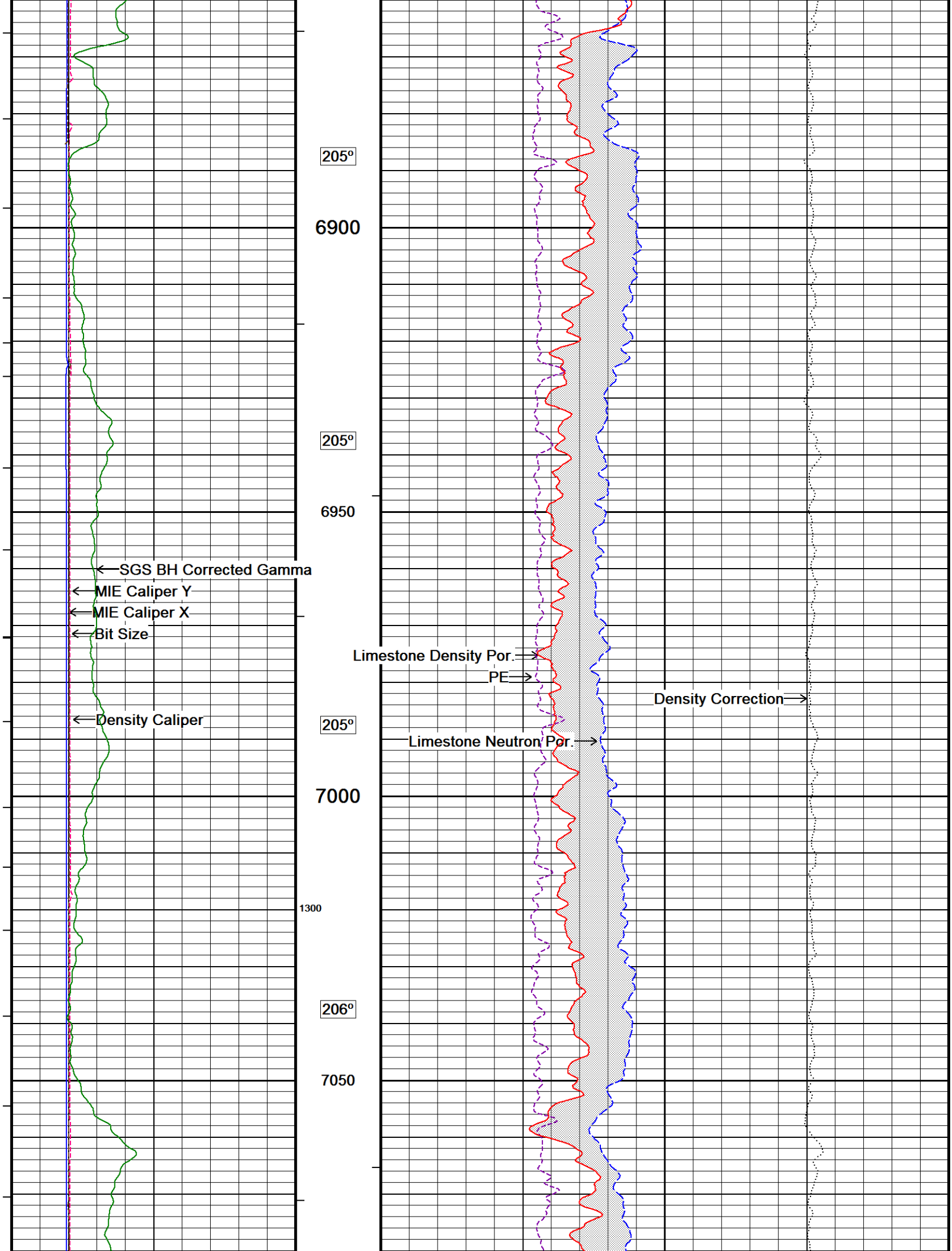
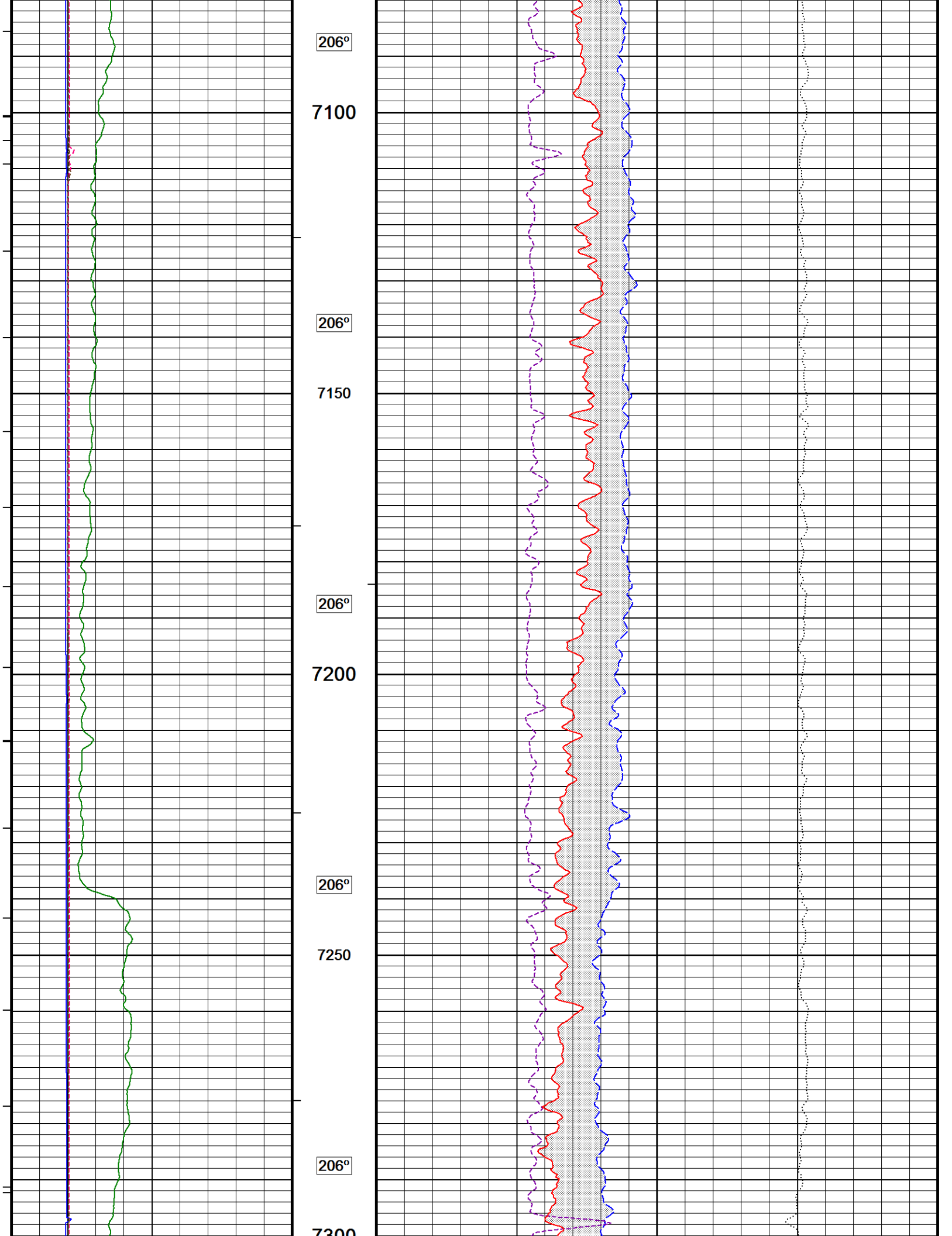
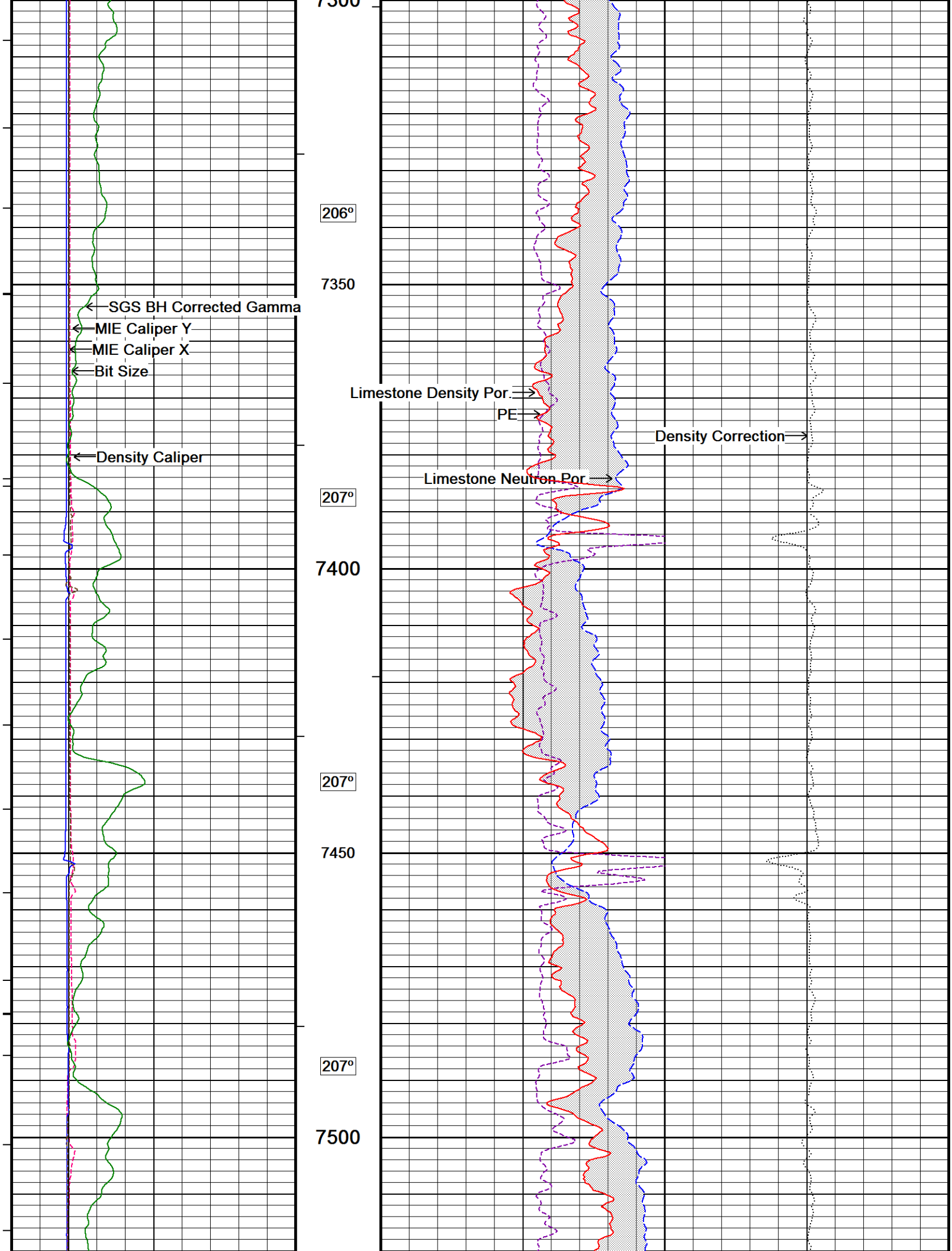
MIE Caliper Y
MIE Caliper X
Bit Size
Density Caliper
Limestone Density Por.
PE
Density Correction
204°
Limestone Neutron Por.
6600
600
204°


6650
204°
6700
204°
6750
205°
6800
205°
6850


205°
6900
205°
6950
SGS BH Corrected Gamma
MIE Caliper Y
MIE Caliper X
Bit Size
Density Caliper
Limestone Density Por.
PE
Density Correction
205°
Limestone Neutron Por.
7000
1300
206°
7050


206°
7100
206°
7150
206°
7200
206°
7250
206°
7300


7300
206°
7350
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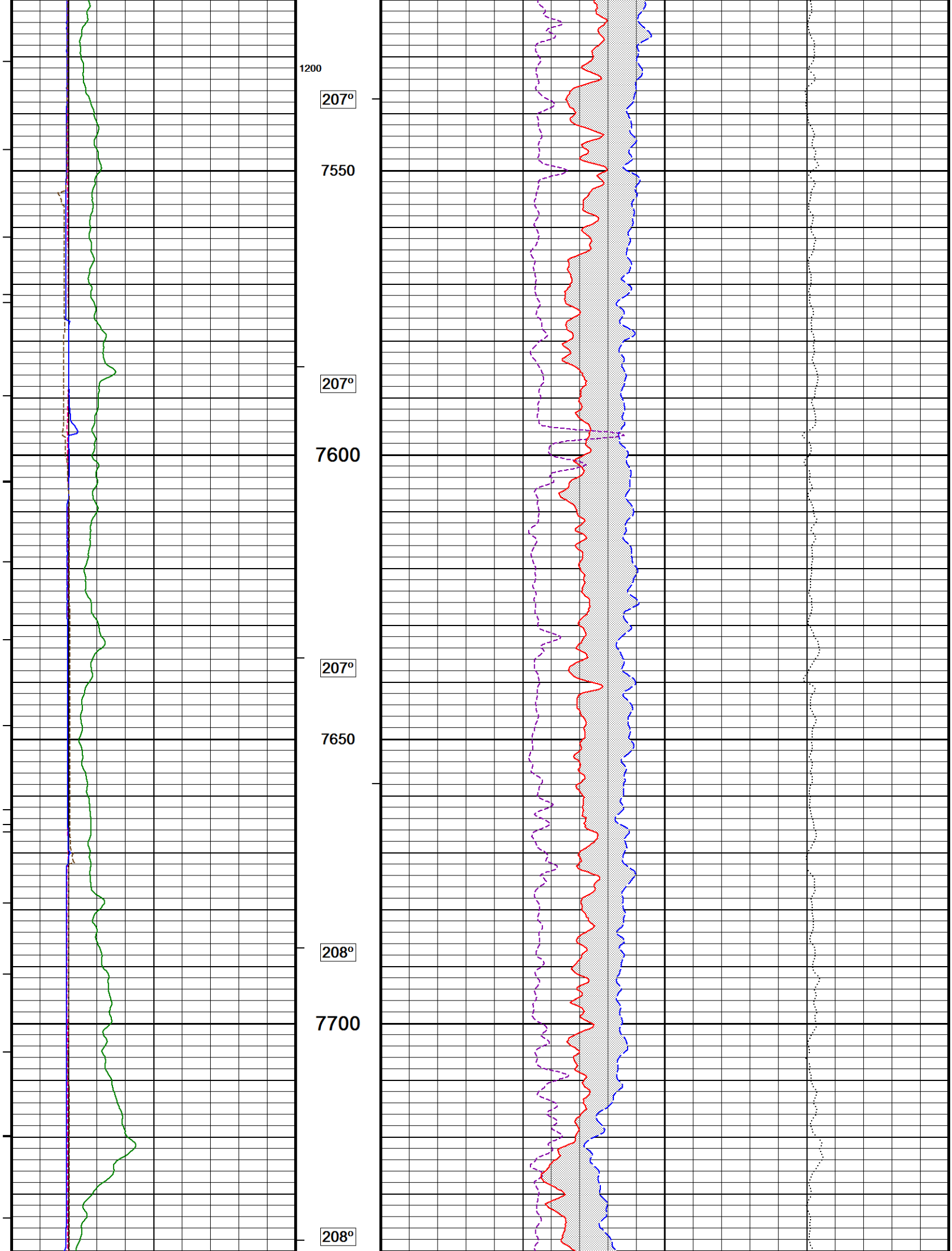
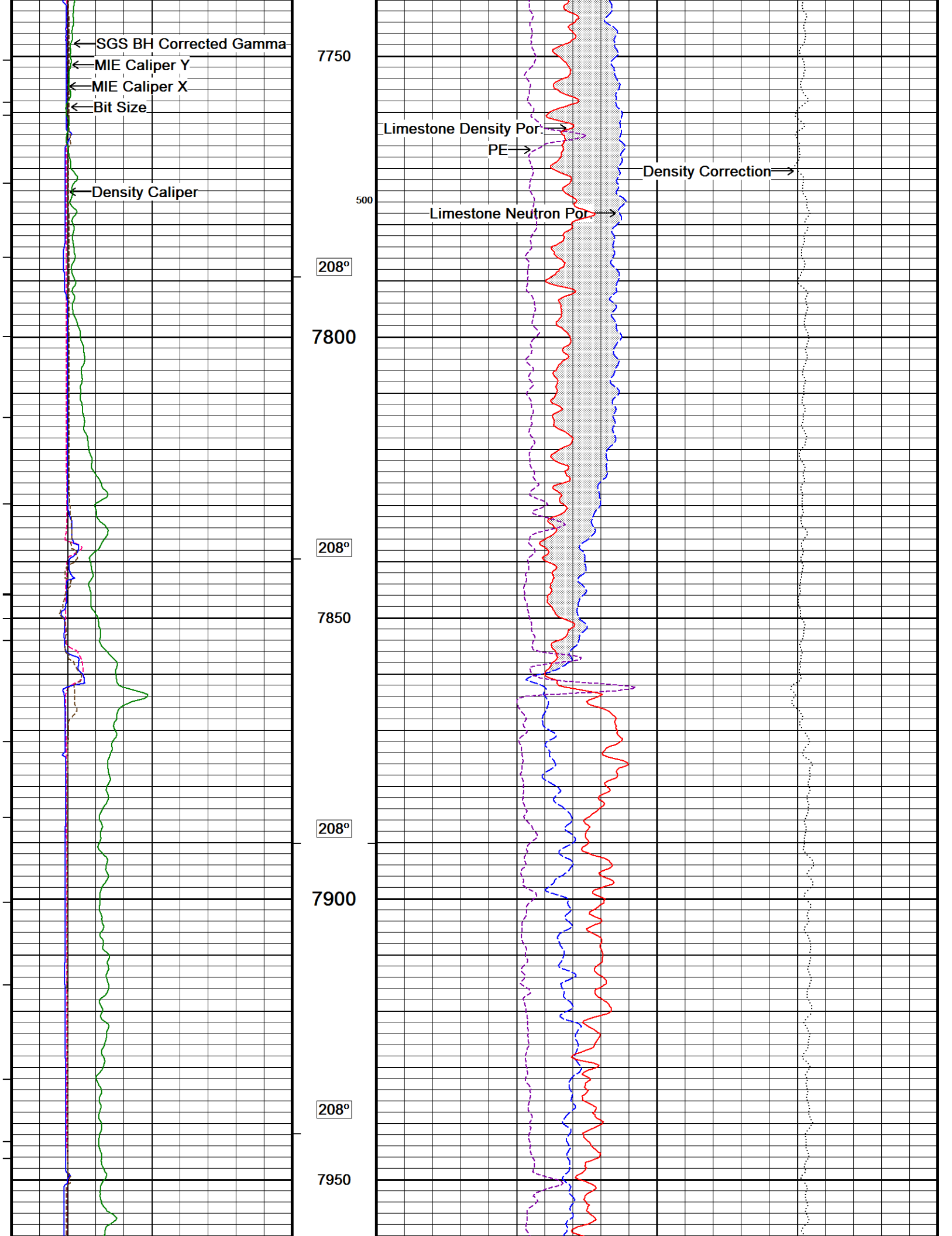
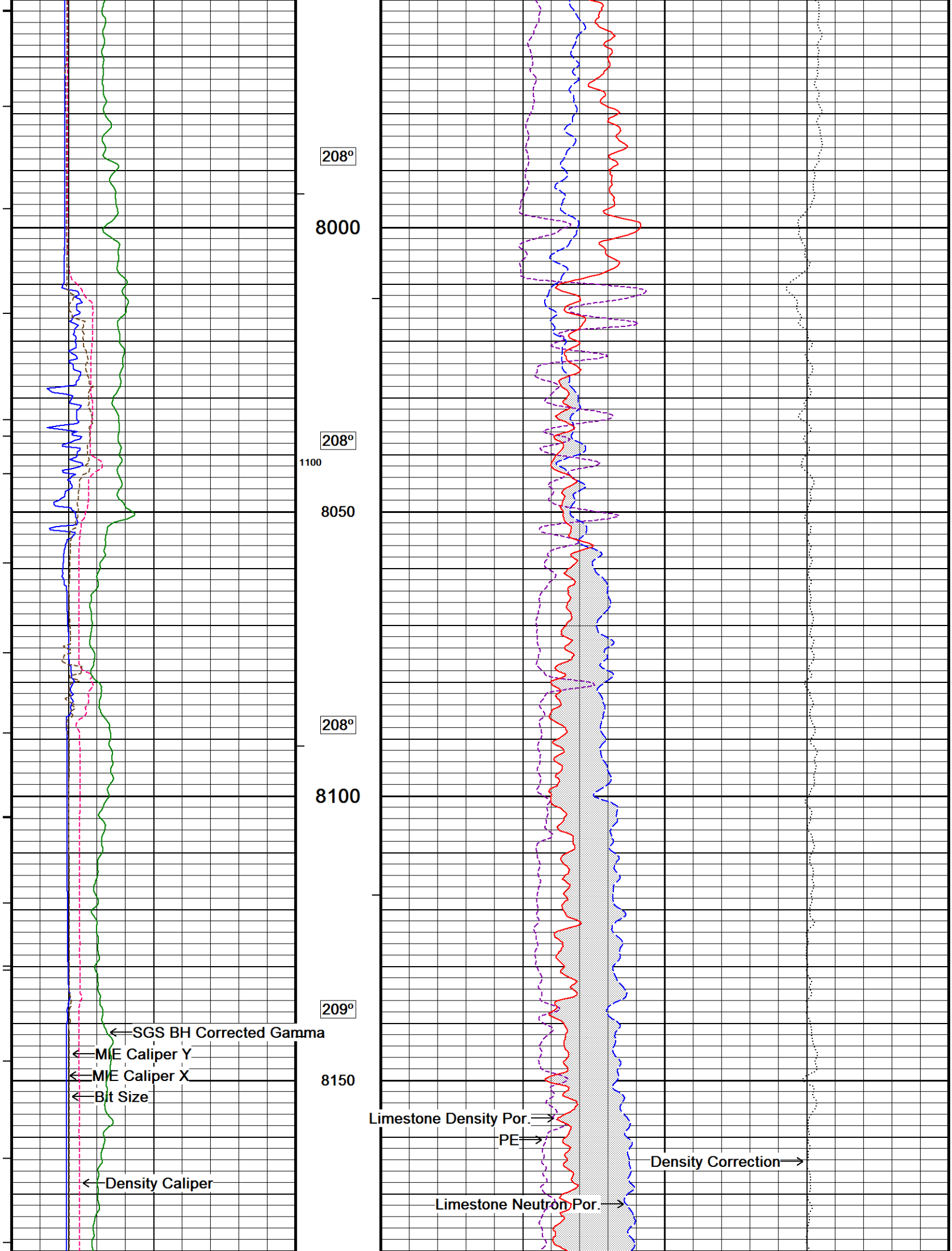
MIE Caliper Y
MIE Caliper X
Bit Size
Density Caliper
Limestone Density Por
PE
Density Correction
Limestone Neutron Por
207°
7400
207°
7450
207°
7500


1200
207°
7550
207°
7600
207°
7650
208°
7700
208°


SGS BH Corrected Gamma
MIE Caliper Y
MIE Caliper X
Bit Size
Density Caliper
7750
Limestone Density Por.
PE
Density Correction
500
Limestone Neutron Por.
208°
7800
208°
7850
208°
7900
208°
7950


208°
8000
208°
1100
8050
208°
8100
209°
8150
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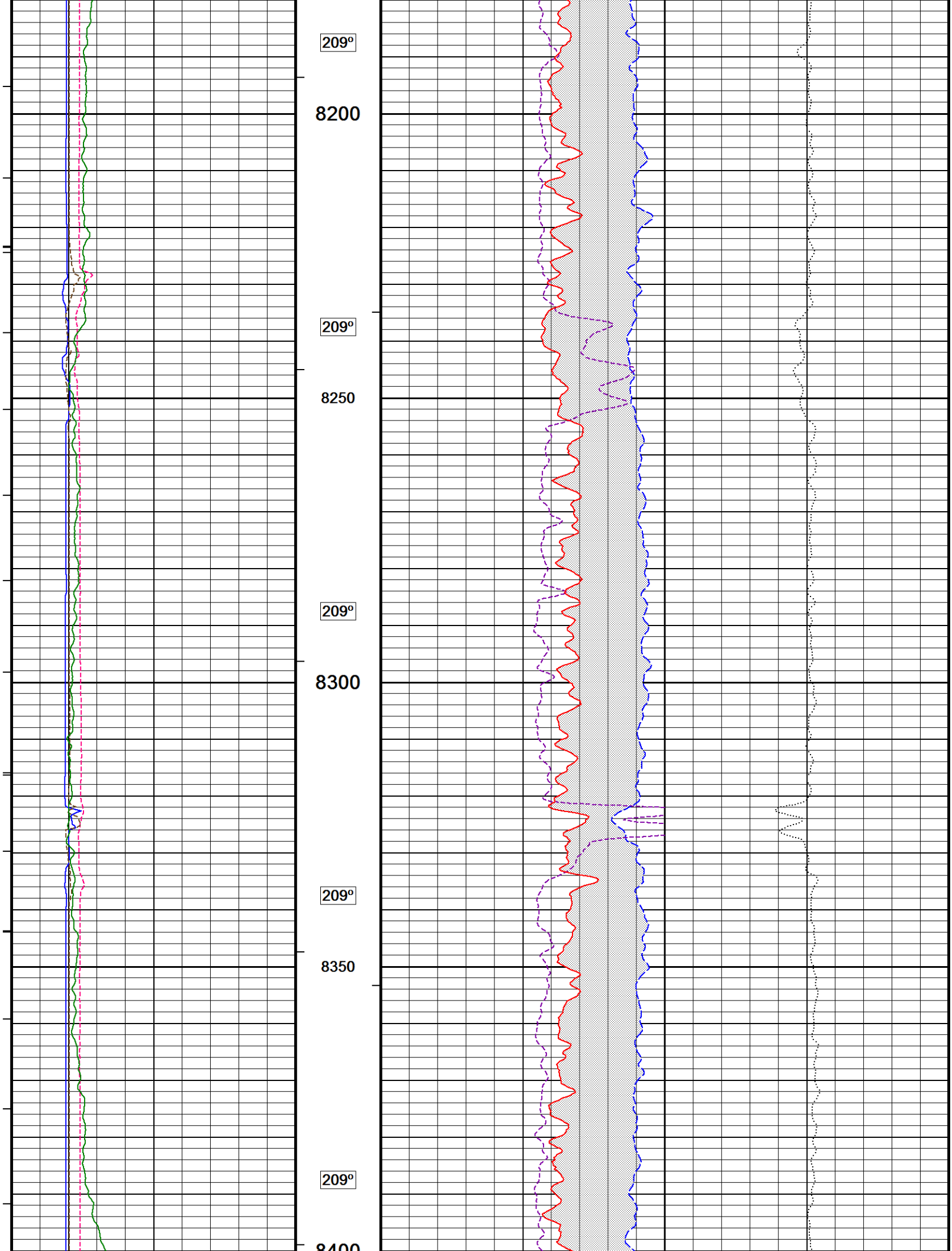
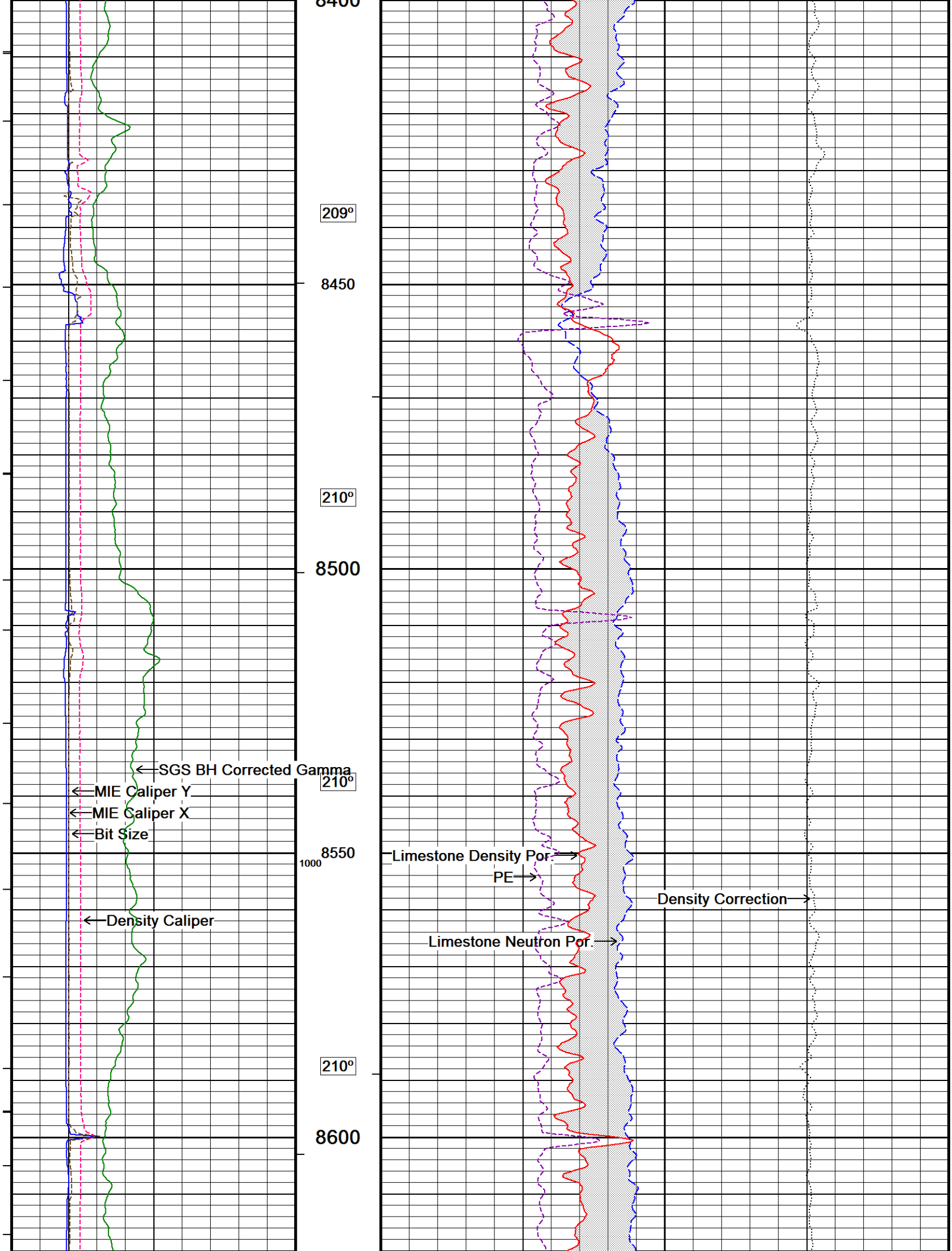
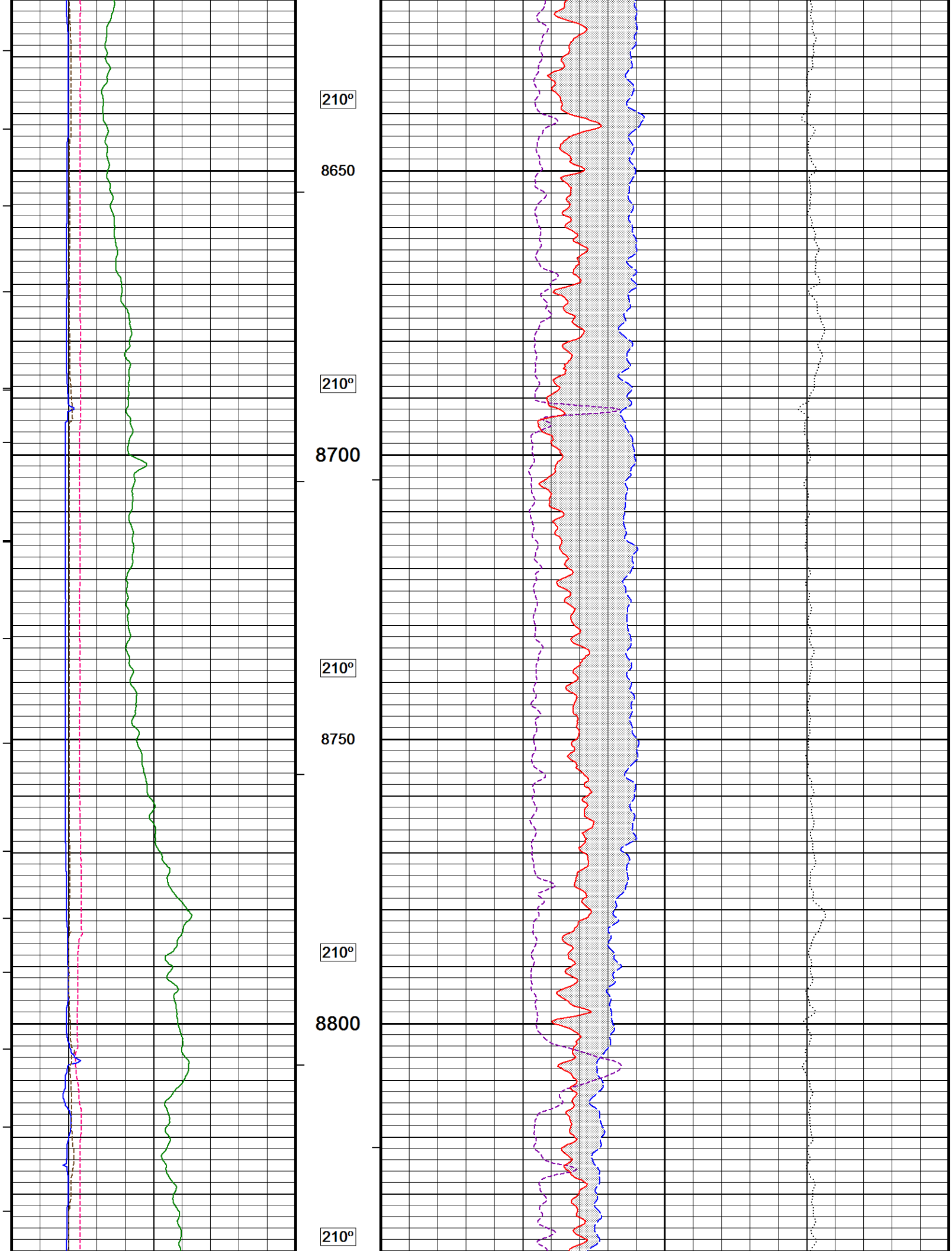
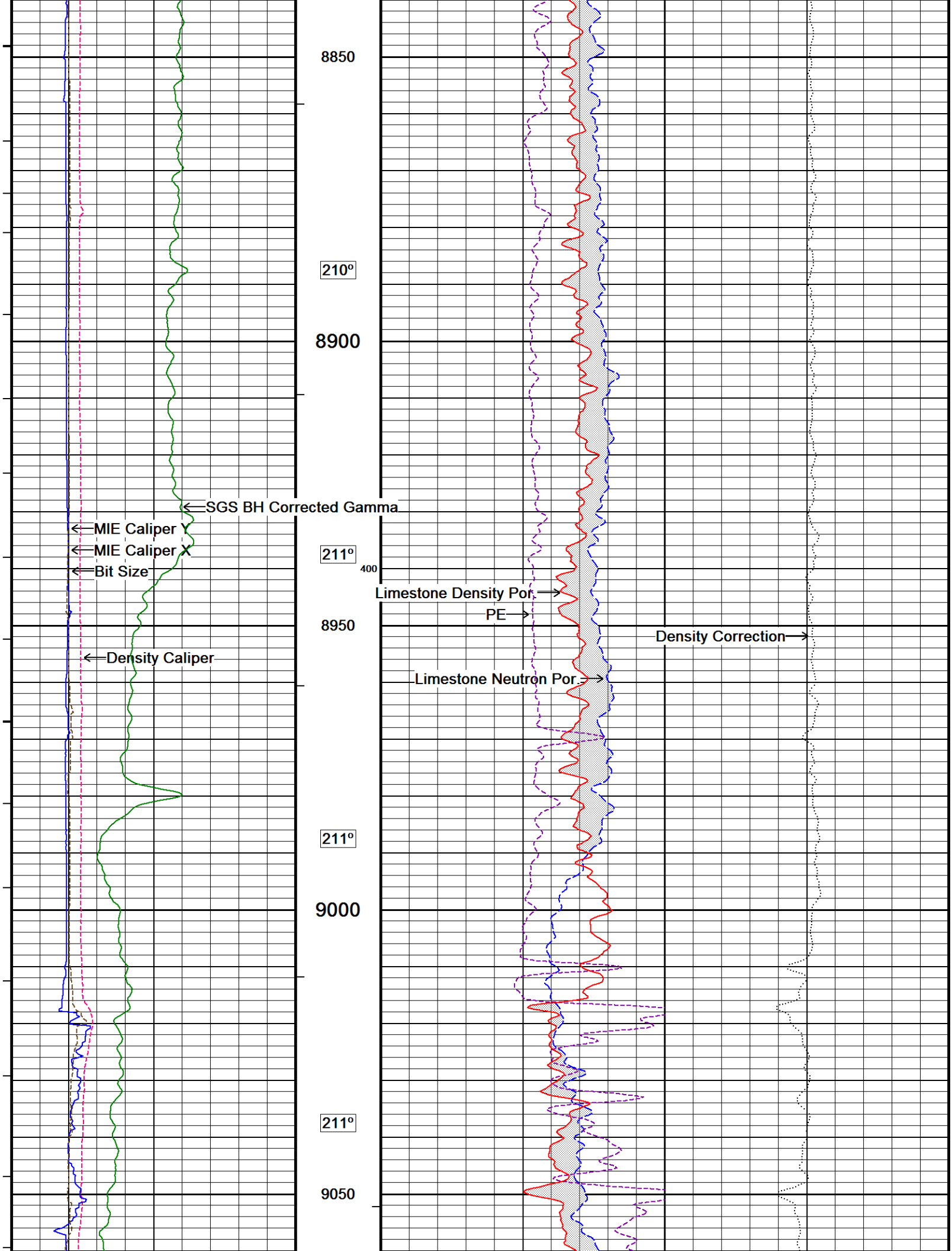
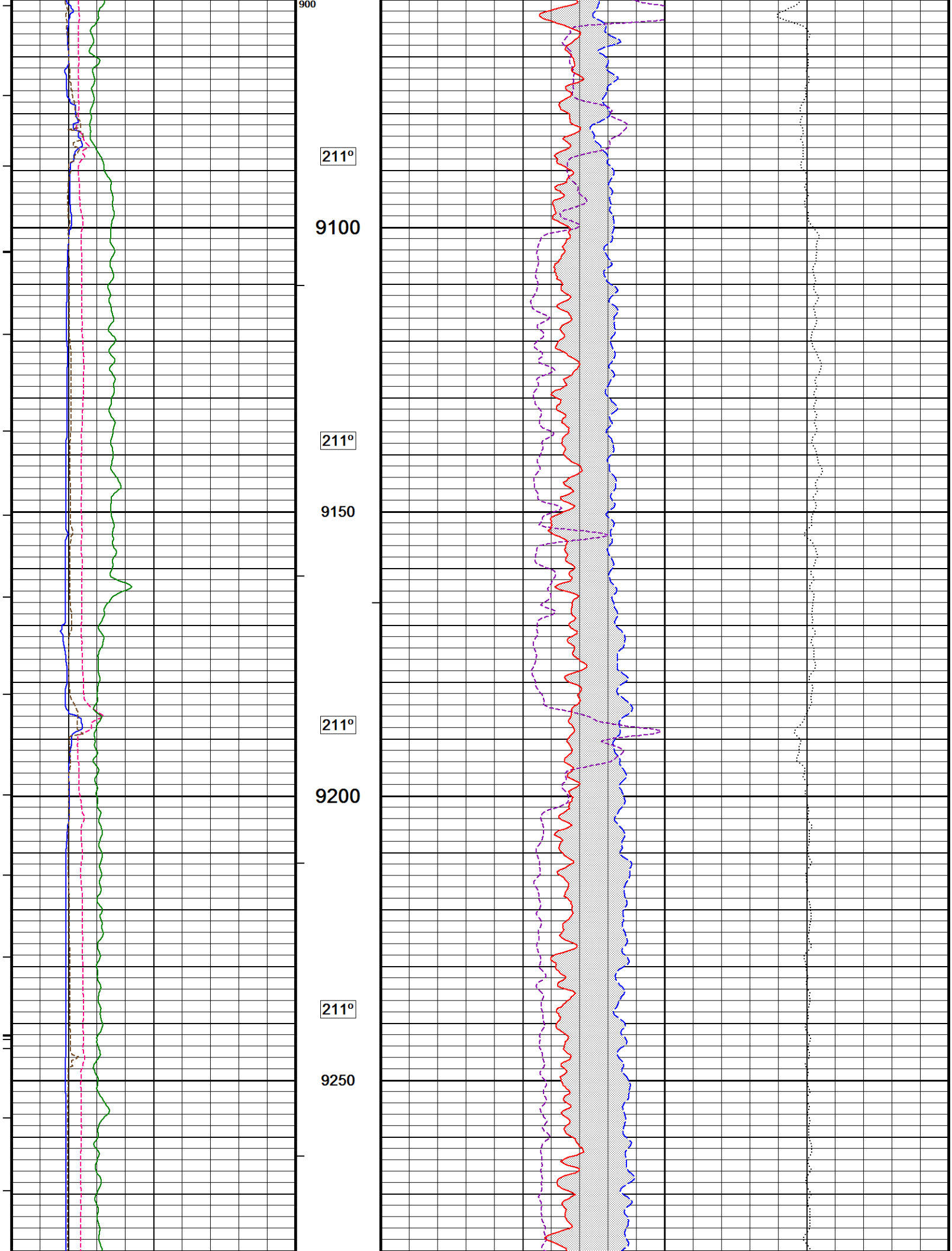
MIE Caliper Y
MIE Caliper X
Bit Size
Density Caliper
Limestone Density Por
PE
Density Correction
Limestone Neutron Por

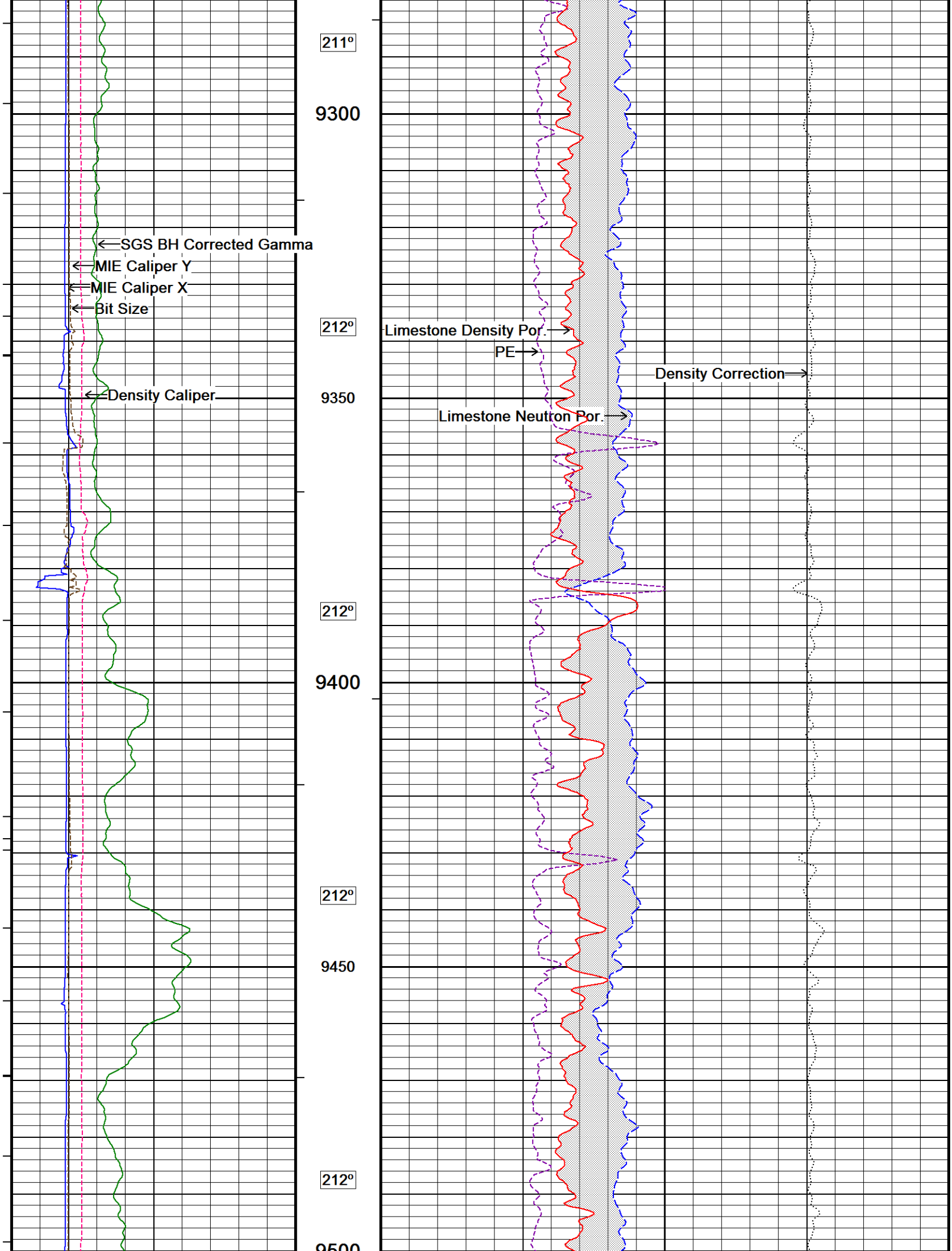

209°
8200
209°
8250
209°
8300
209°
8350
209°
8400

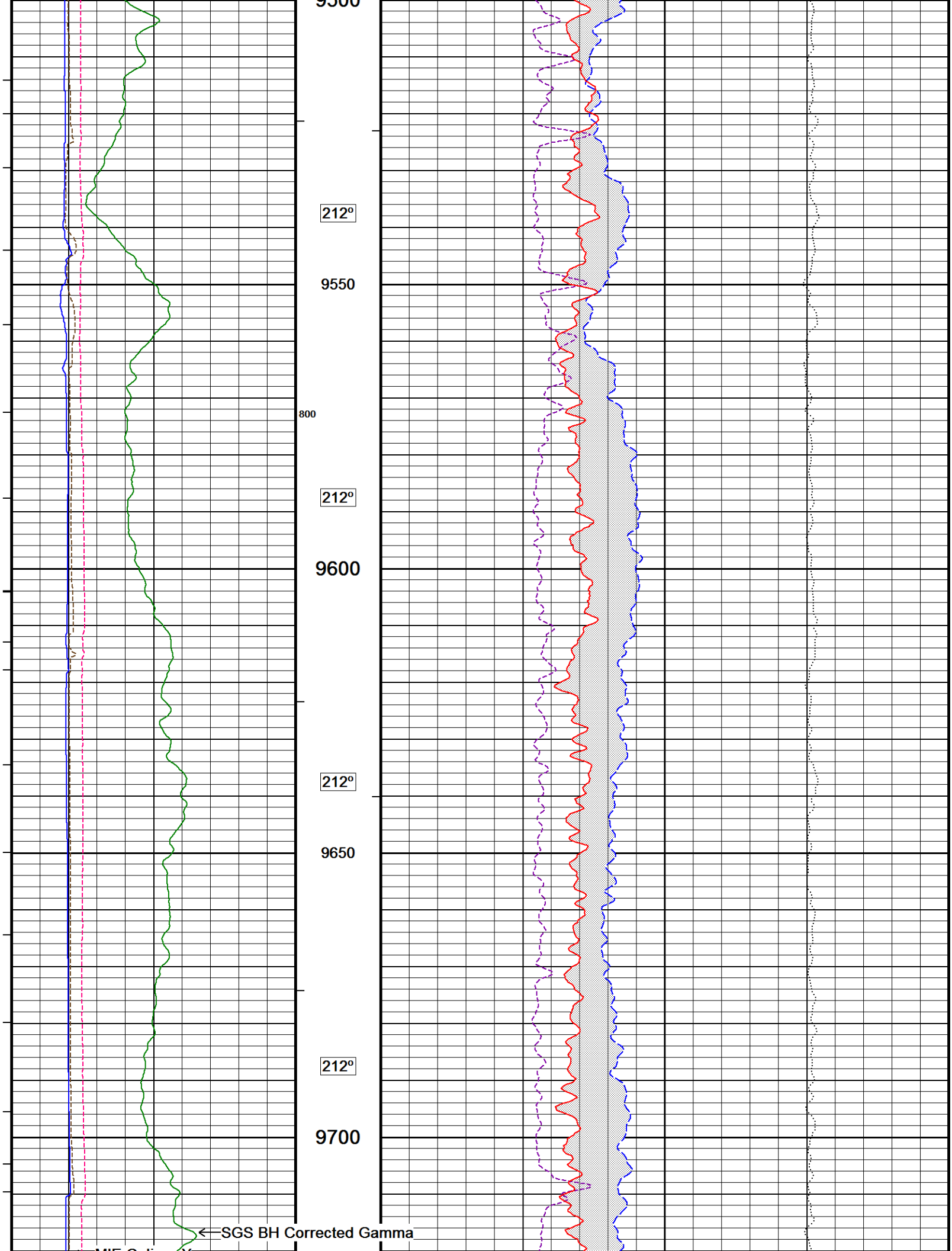

8400
209°
8450
210°
8500
210°
8550
1000
210°
8600
SGS BH Corrected Gamma
MIE Caliper Y
MIE Caliper X
Bit Size
Density Caliper
Limestone Density Por
PE
Density Correction
Limestone Neutron Por

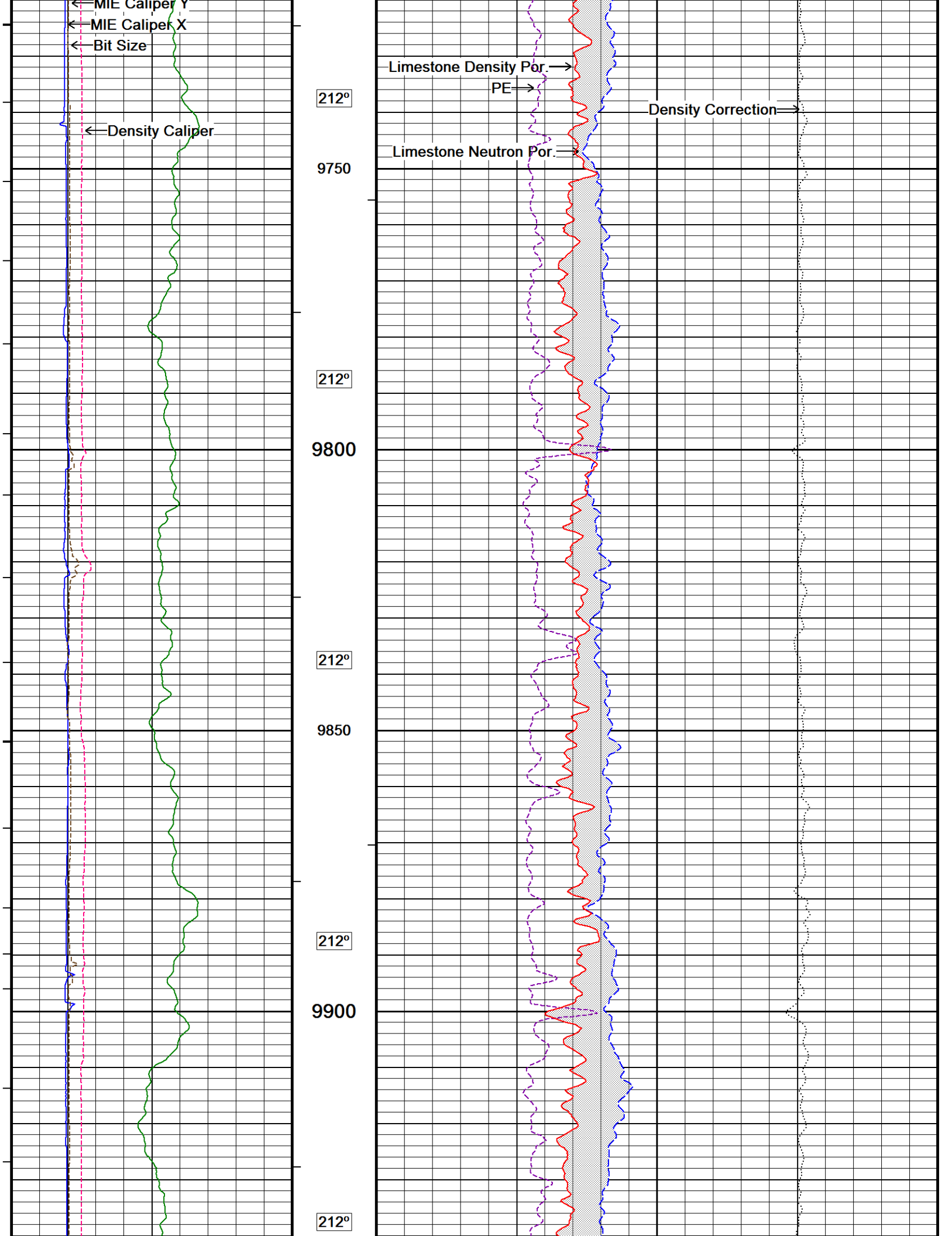

210°
8650
210°
8700
210°
8750
210°
8800
210°

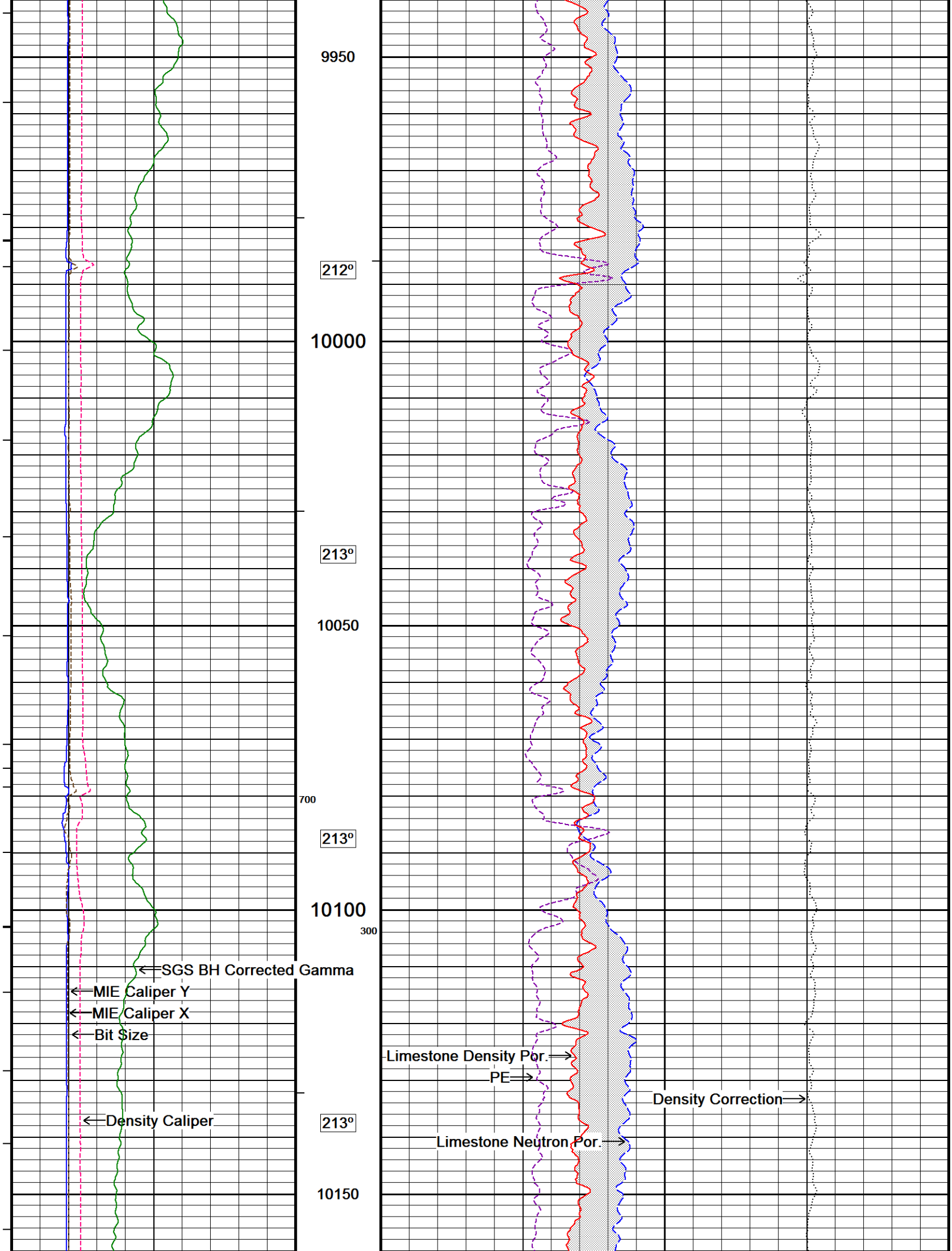

8850
210°
8900
SGS BH Corrected Gamma
MIE Caliper Y
MIE Caliper X
Bit Size
211°
400
Limestone Density Por
PE
8950
Density Correction
Density Caliper
Limestone Neutron Por
211°
9000
211°
9050

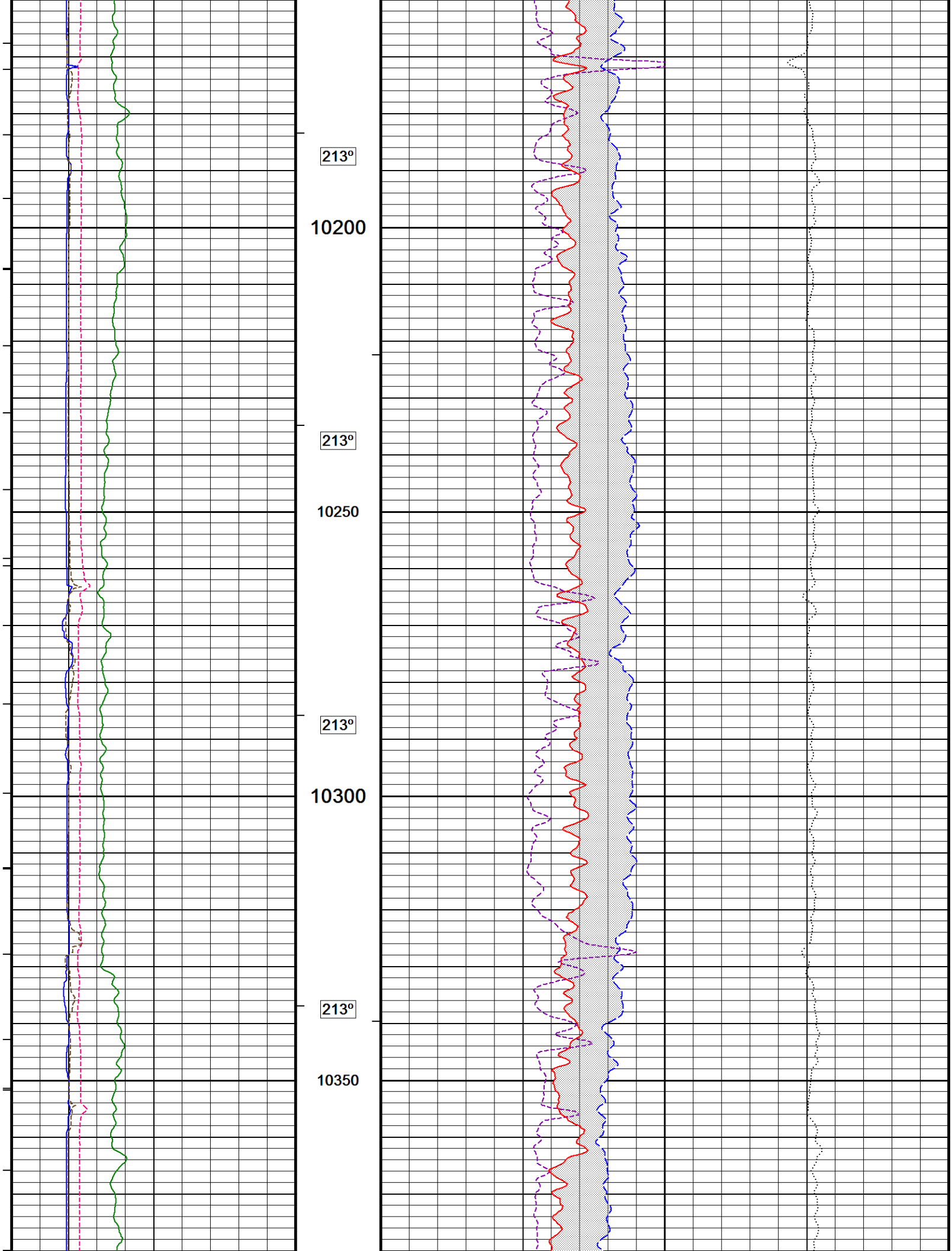

900
211°
9100
211°
9150
211°
9200
211°
9250

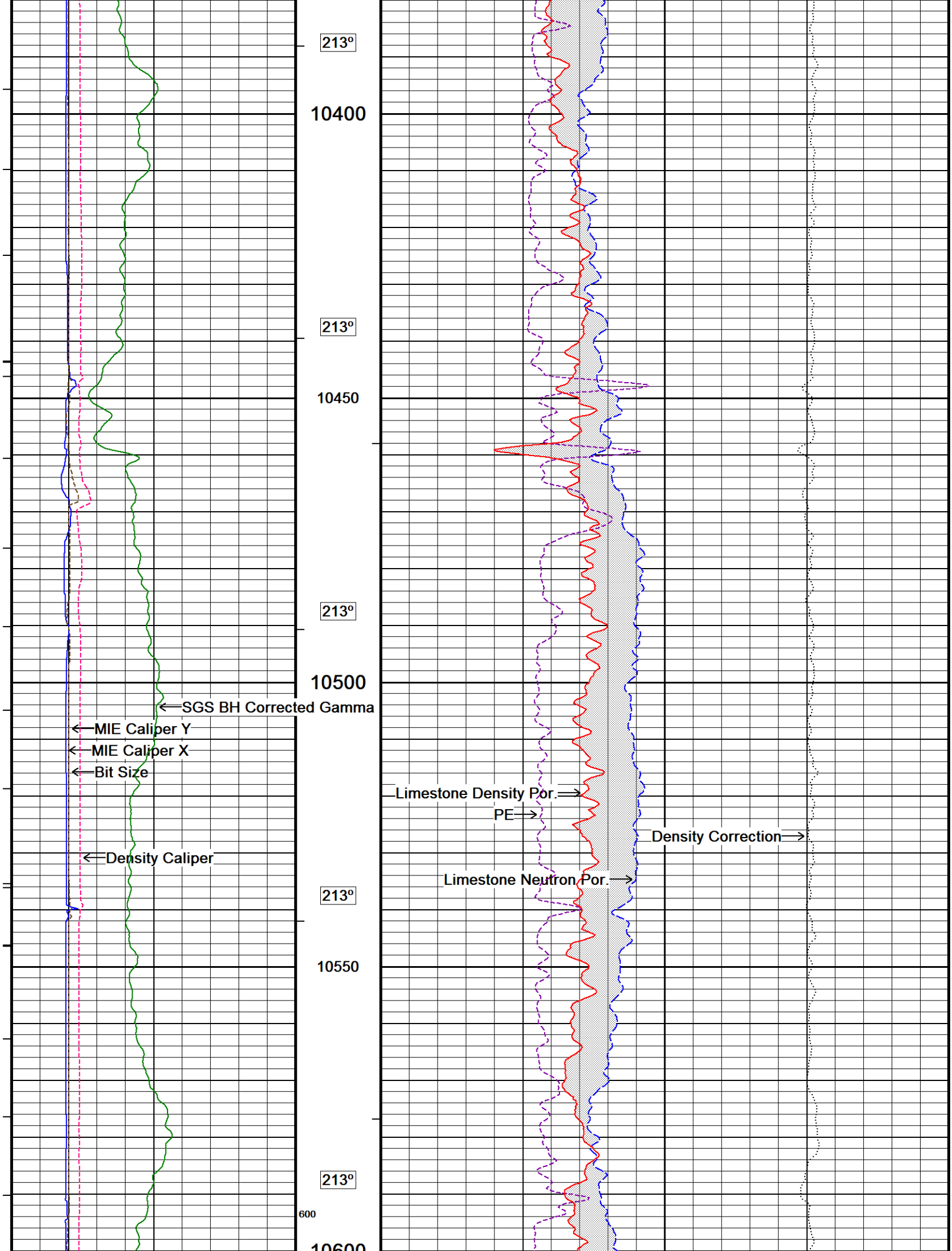

211°
9300
212°
9350
212°
9400
212°
9450
212°
9500
SGS BH Corrected Gamma
MIE Caliper Y
MIE Caliper X
Bit Size
Density Caliper
Limestone Density Por.
PE
Density Correction
Limestone Neutron Por.

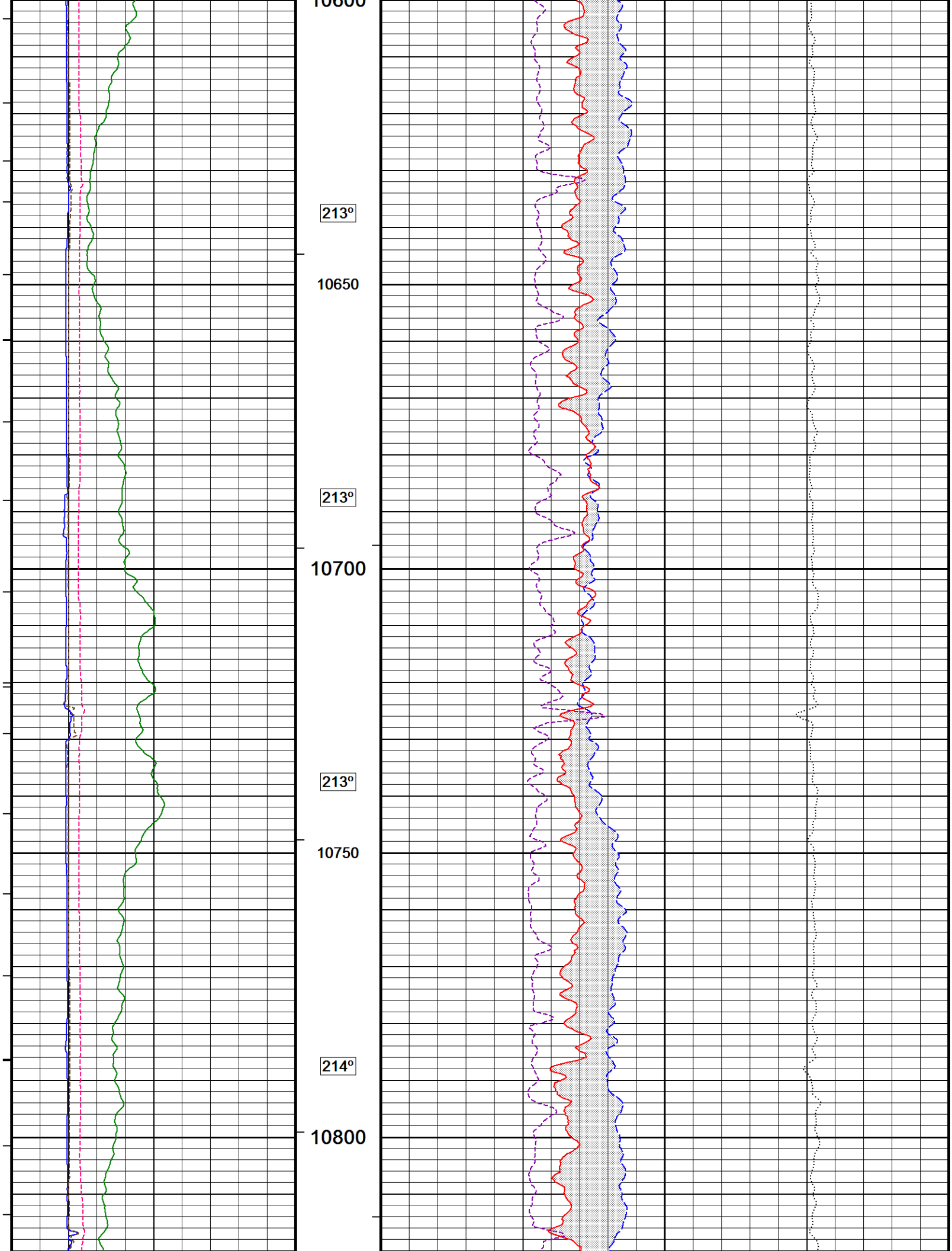

9500
212°
9550
800
212°
9600
212°
9650
212°
9700
⟸SGS BH Corrected Gamma

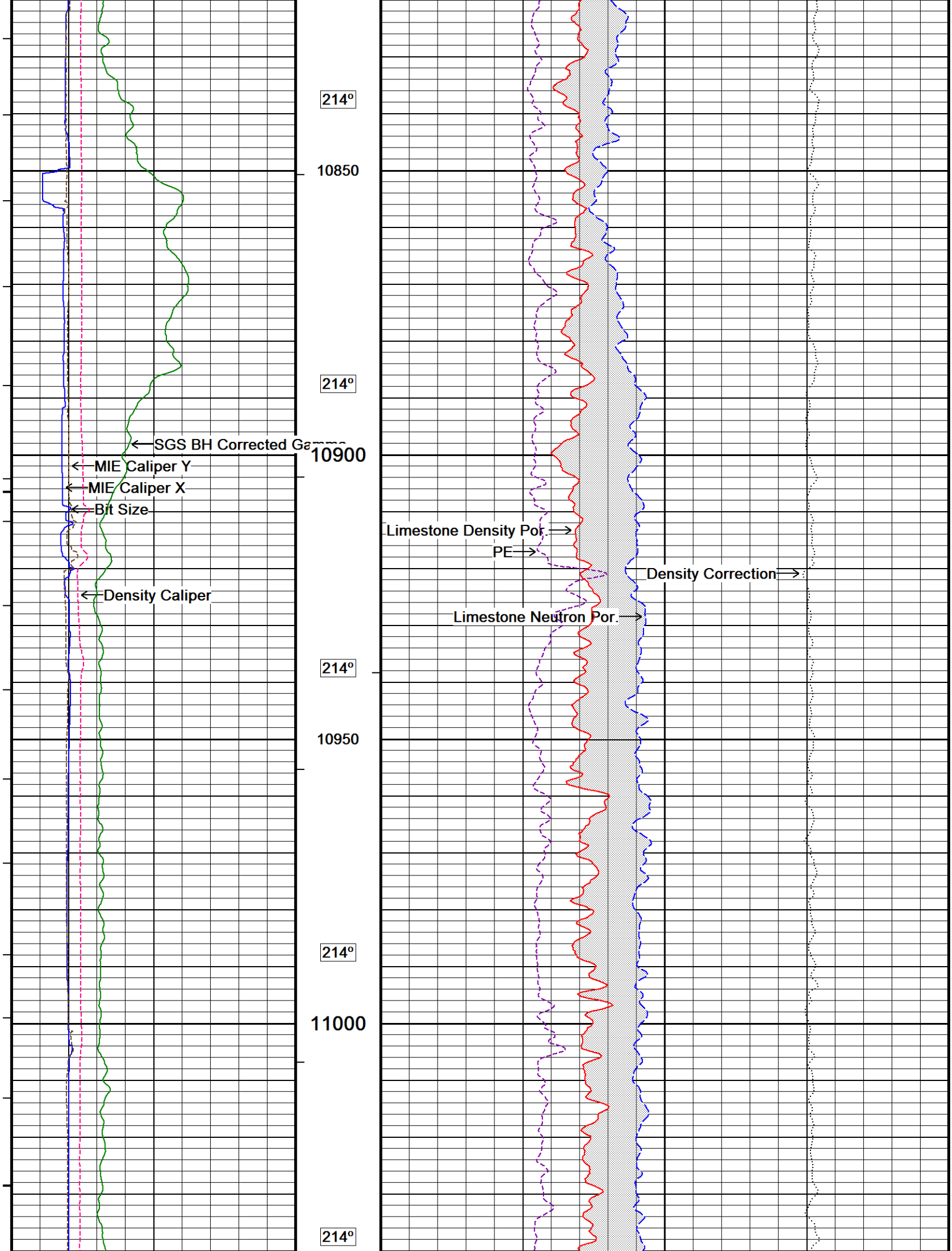

MIE Caliper Y
MIE Caliper X
Bit Size
Density Caliper
Limestone Density Por.
PE
Density Correction
Limestone Neutron Por.
212°
9750
212°
9800
212°
9850
212°
9900
212°

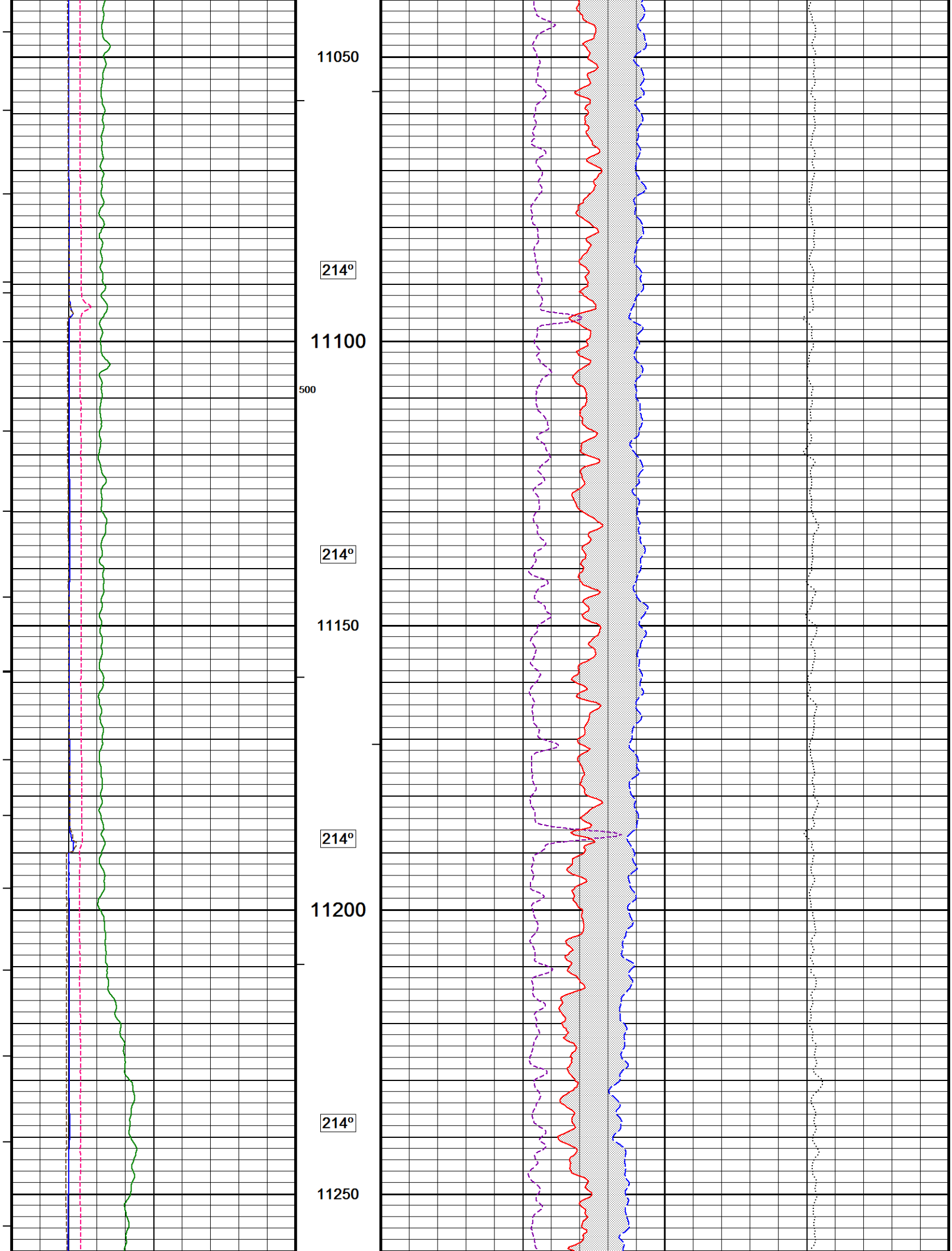

9950
212°
10000
213°
10050
700
213°
10100
300
213°
10150
SGS BH Corrected Gamma
MIE Caliper Y
MIE Caliper X
Bit Size
Density Caliper
Limestone Density Por.
PE
Density Correction
Limestone Neutron Por.

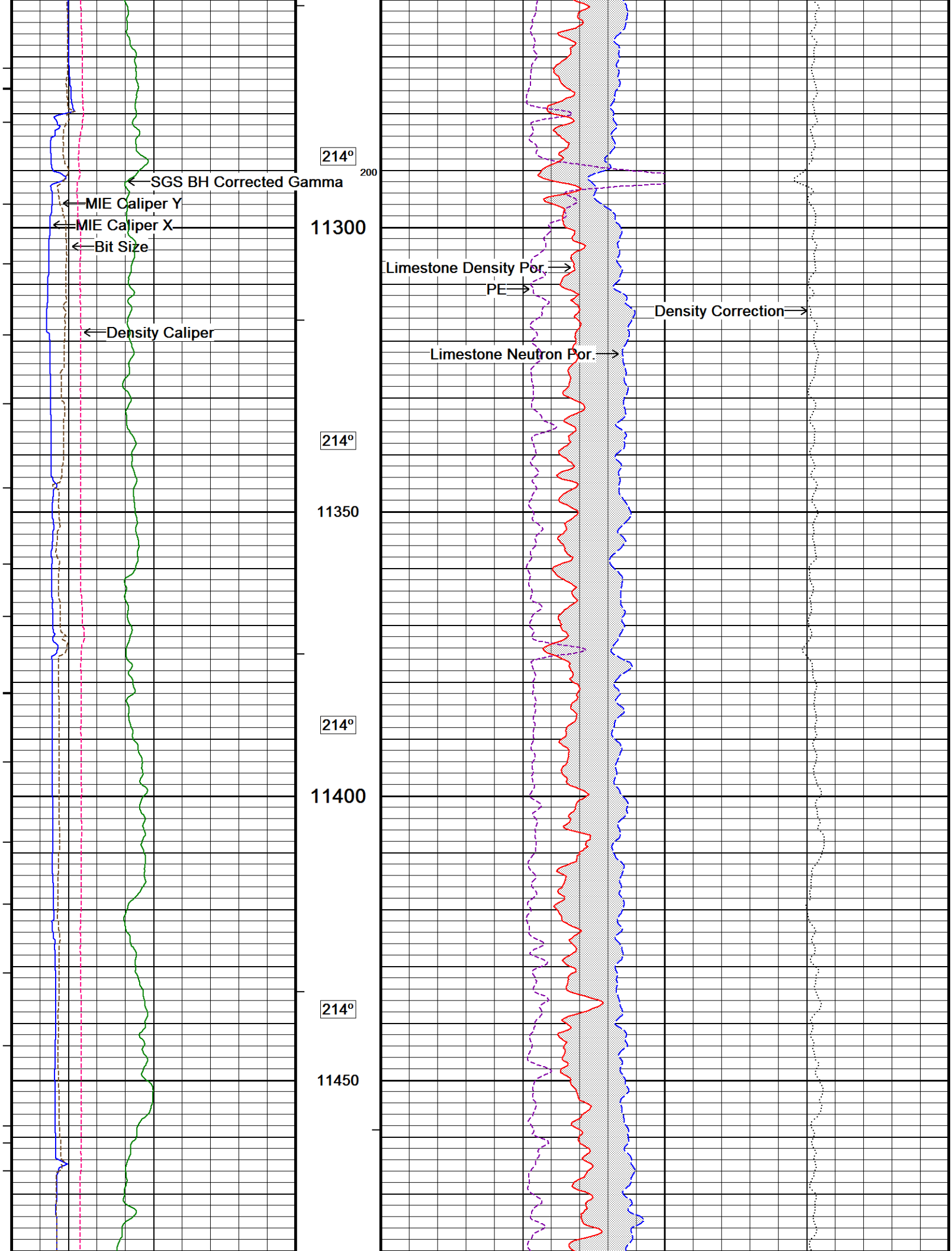

213°
10200
213°
10250
213°
10300
213°
10350


213°
10400
213°
10450
213°
10500
213°
10550
213°
600
10600
SGS BH Corrected Gamma
MIE Caliper Y
MIE Caliper X
Bit Size
Density Caliper
Limestone Density Por.
PE
Density Correction
Limestone Neutron Por.


10600
213°
10650
213°
10700
213°
10750
214°
10800


214°
10850
214°
SGS BH Corrected Gamma
10900
MIE Caliper Y
MIE Caliper X
Bit Size
Density Caliper
Limestone Density Por.
PE
Density Correction
Limestone Neutron Por.
214°
10950
214°
11000
214°


11050
214°
11100
500
214°
11150
214°
11200
214°
11250


214°
200
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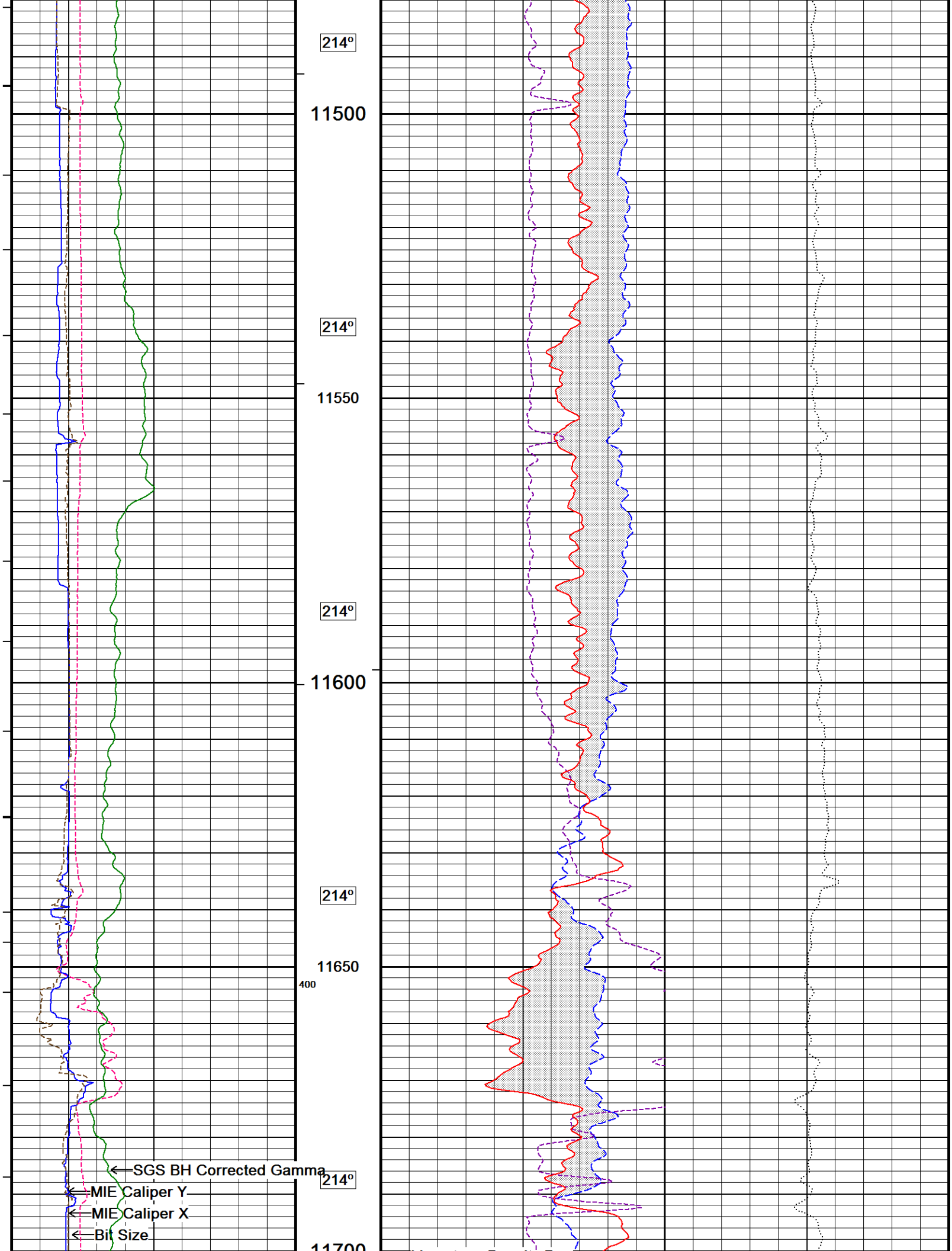
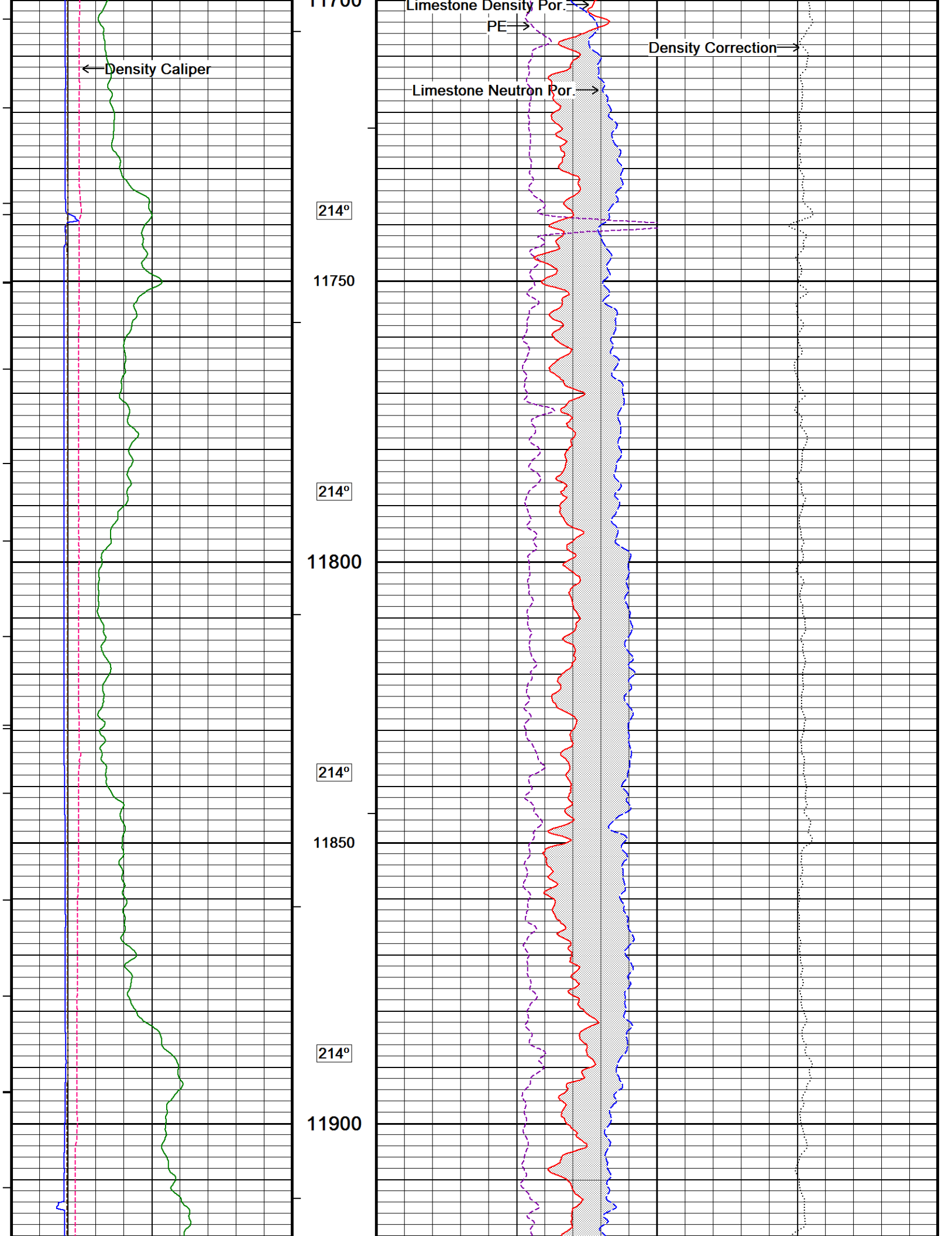
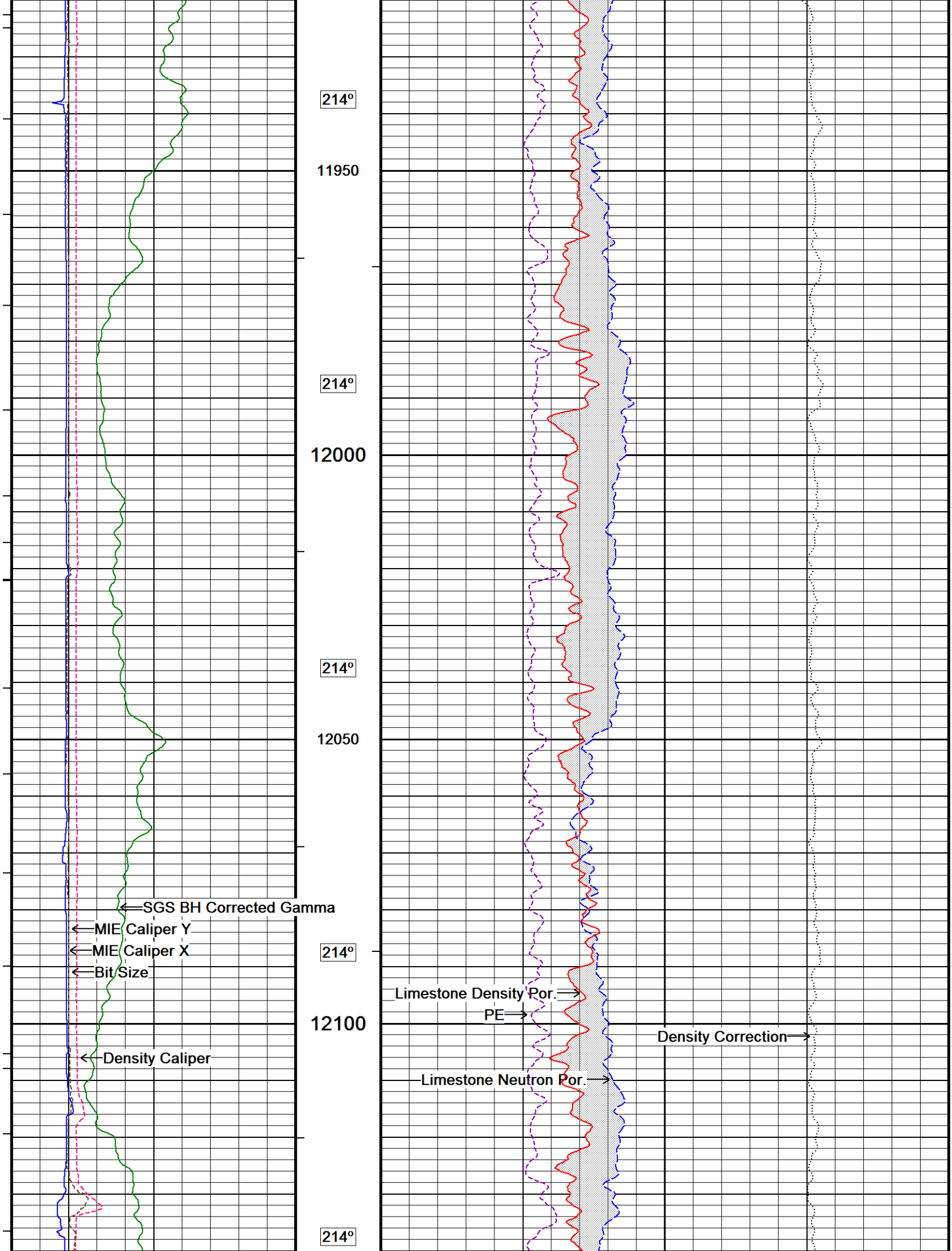
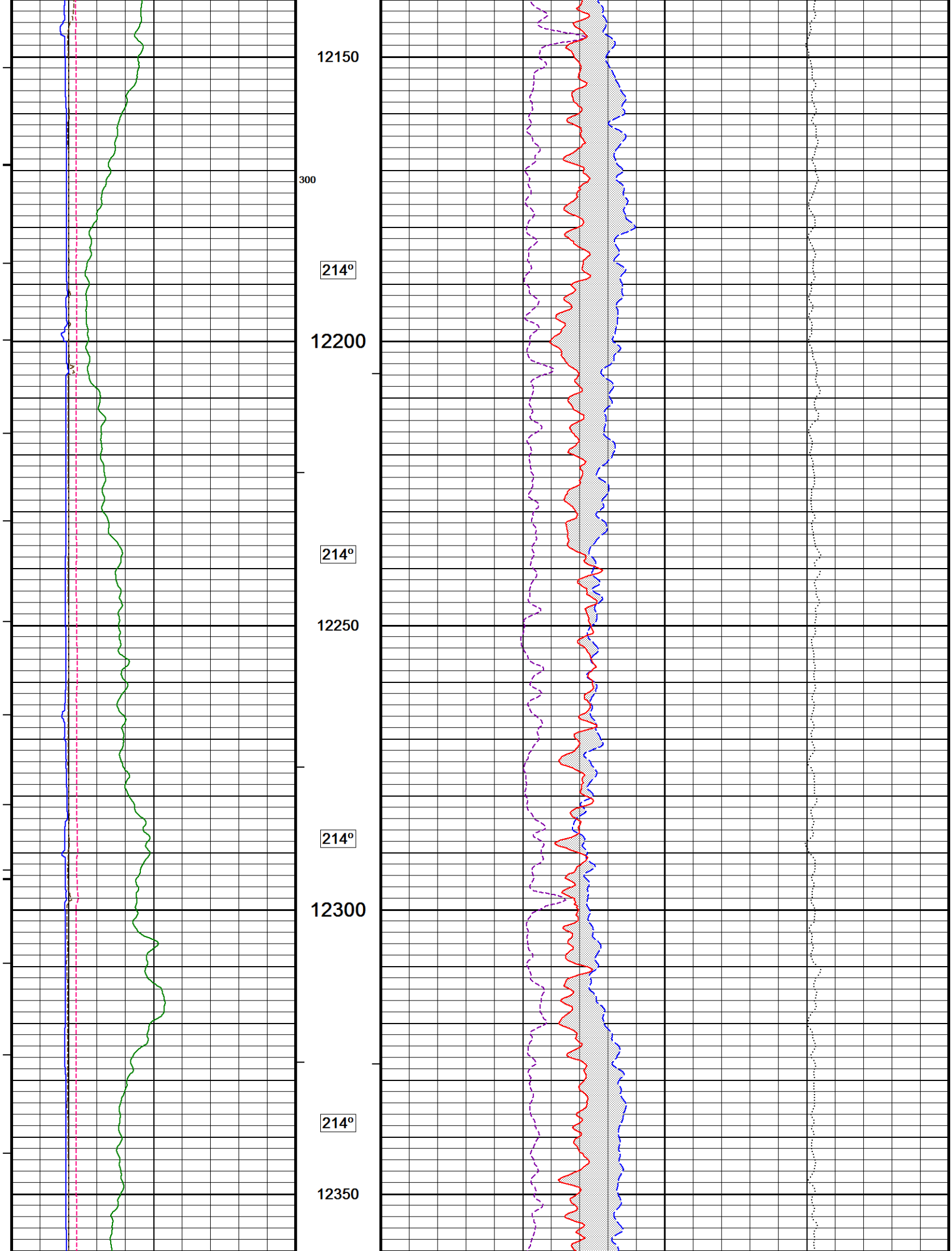
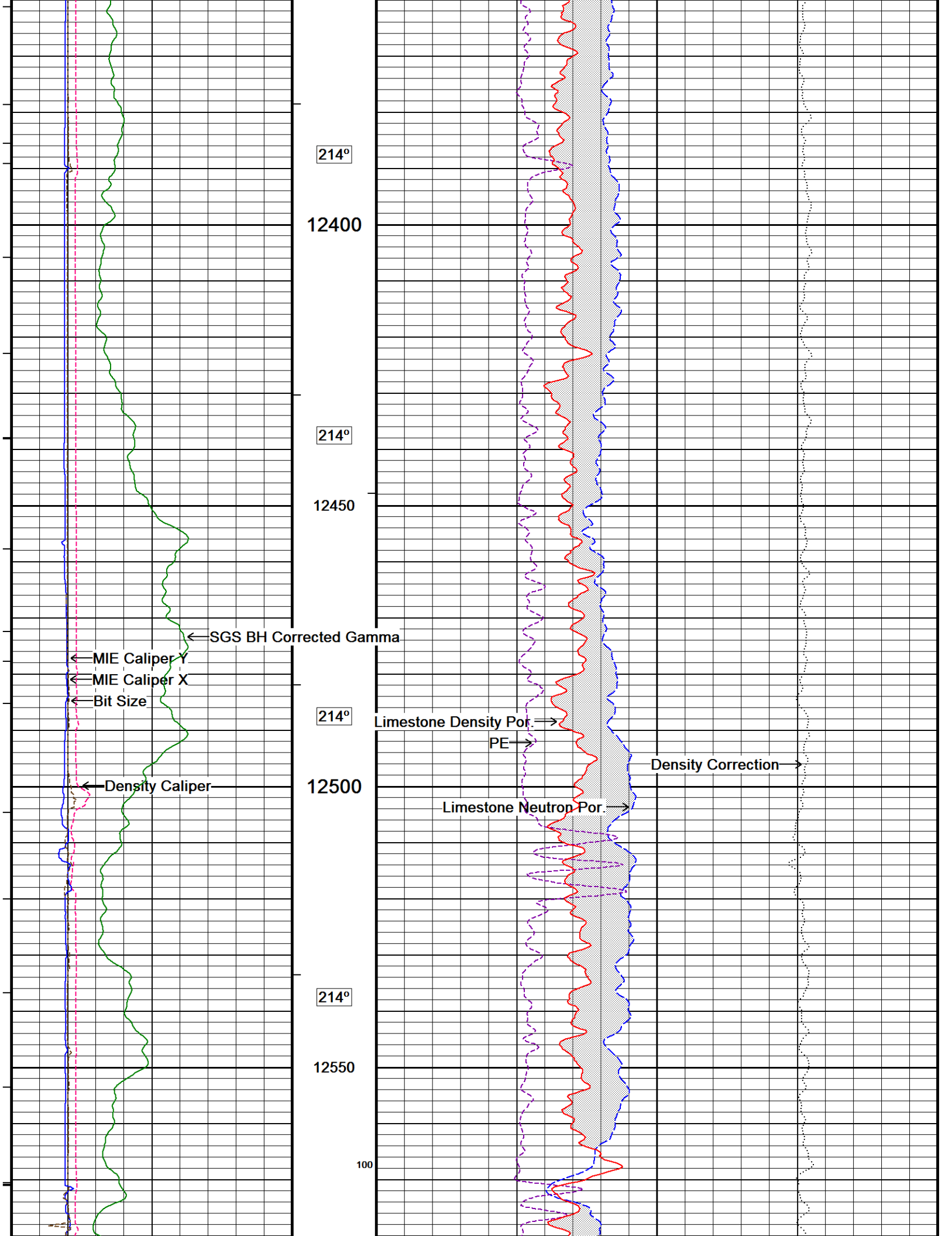
MIE Caliper Y
MIE Caliper X
Bit Size
11300
Limestone Density Por.
PE
Density Correction
Density Caliper
Limestone Neutron Por.
214°
11350
214°
11400
214°
11450

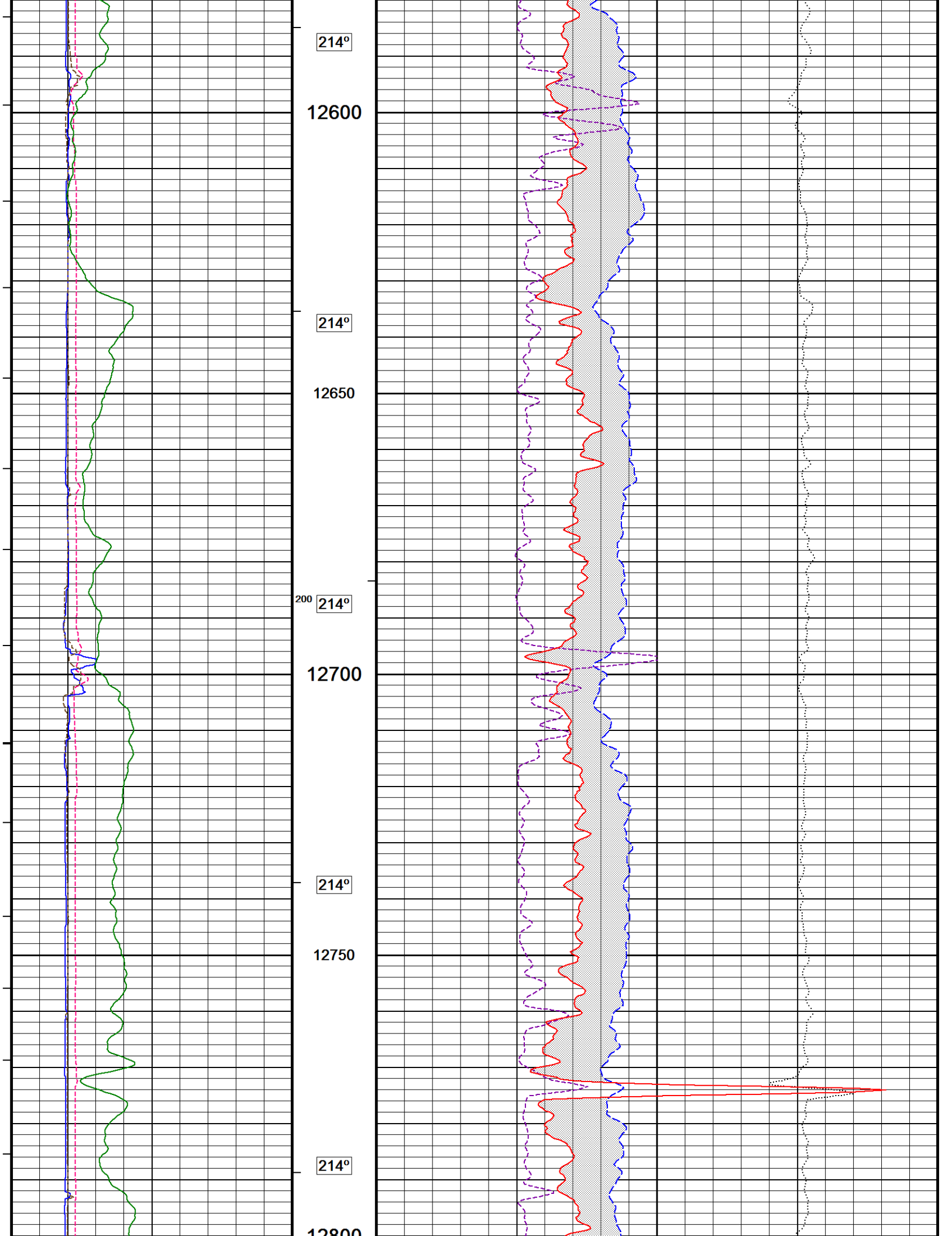

214°
11500
214°
11550
214°
11600
214°
11650
400
214°
11700
SGS BH Corrected Gamma
MIE Caliper Y
MIE Caliper X
Bit Size

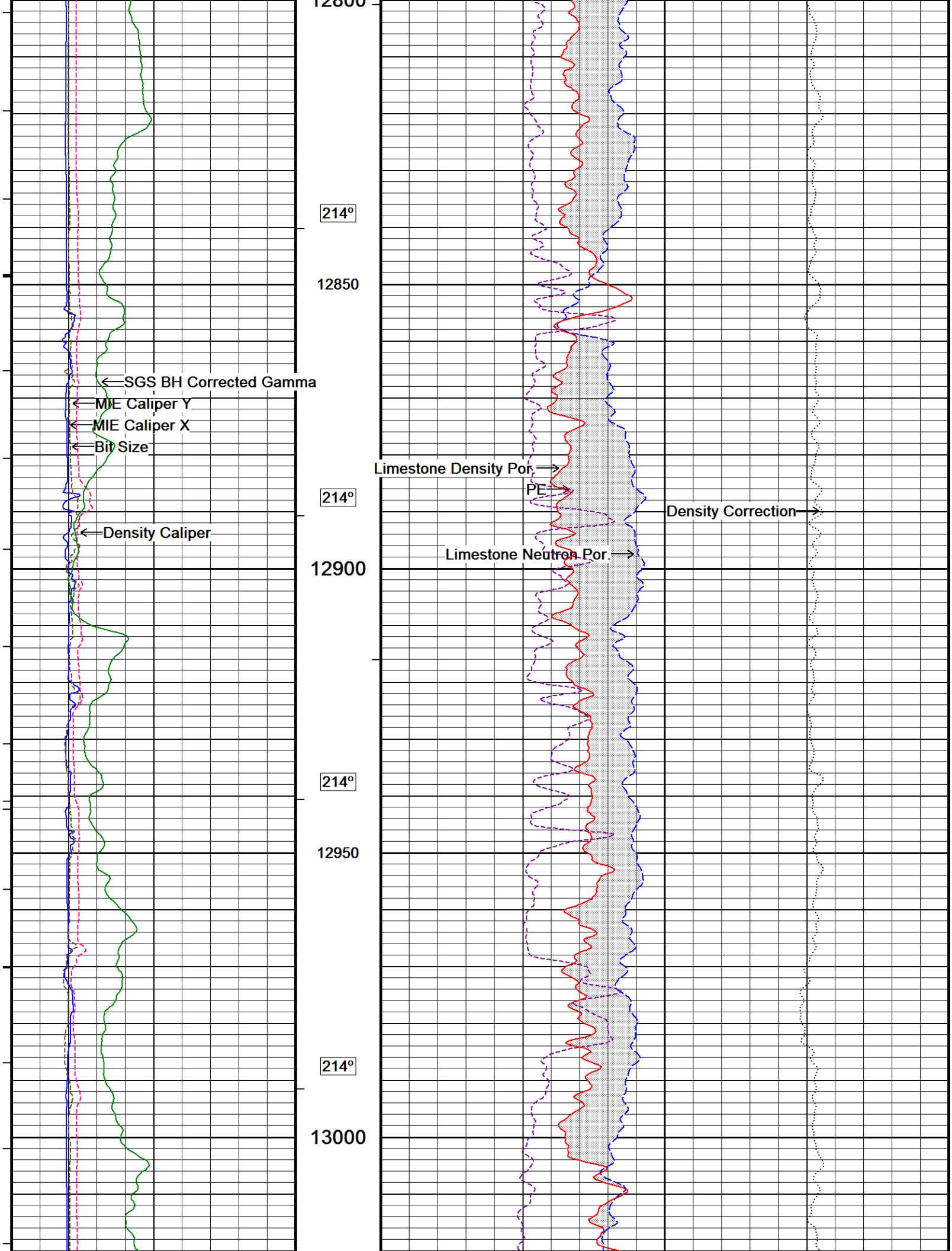

Limestone Density Por.
PE
Density Correction
Limestone Neutron Por.
Density Caliper
214°
11750
214°
11800
214°
11850
214°
11900

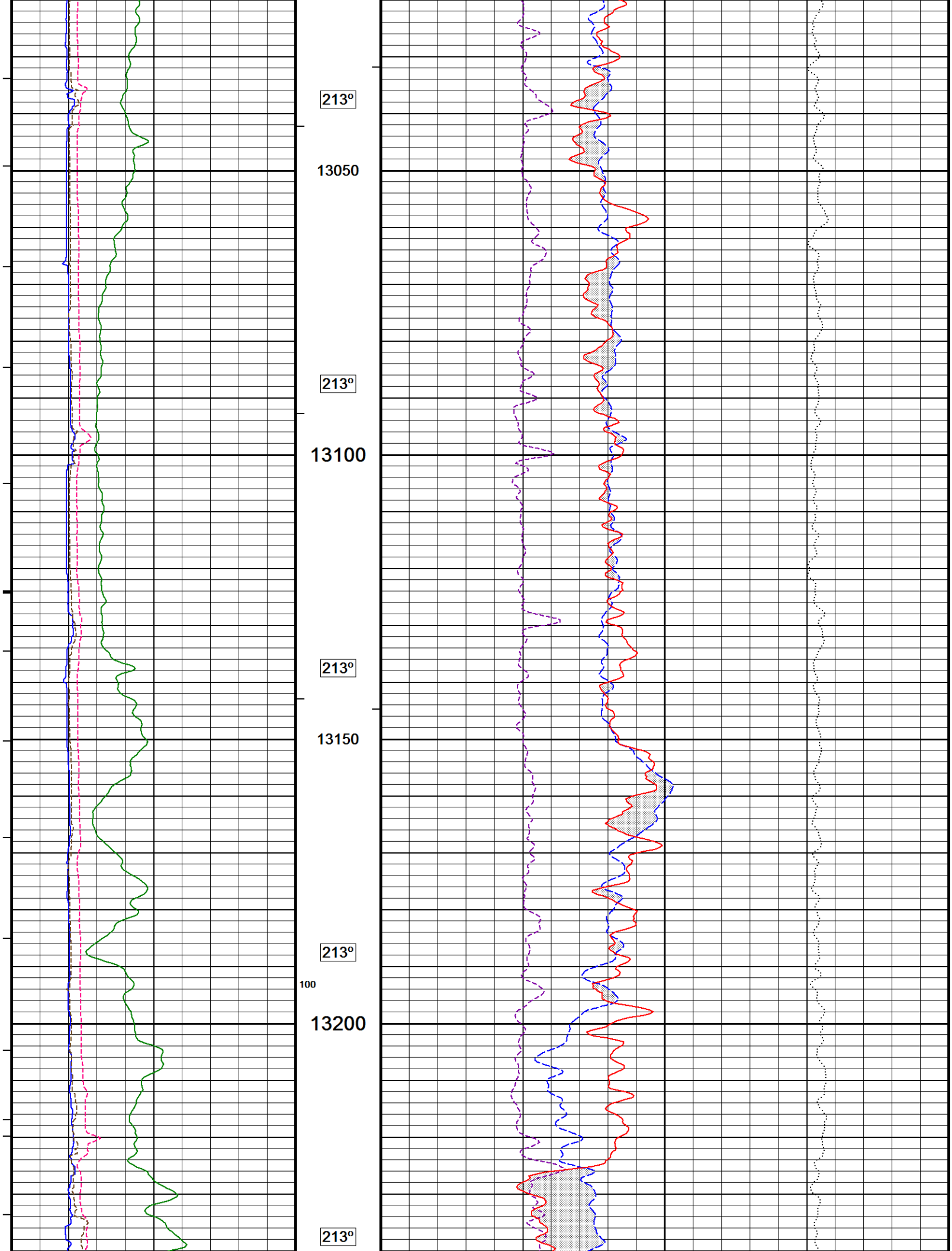

214°
11950
214°
12000
214°
12050
214°
12100
214°
SGS BH Corrected Gamma
MIE Caliper Y
MIE Caliper X
Bit Size
Density Caliper
Limestone Density Por.
PE
Density Correction
Limestone Neutron Por.

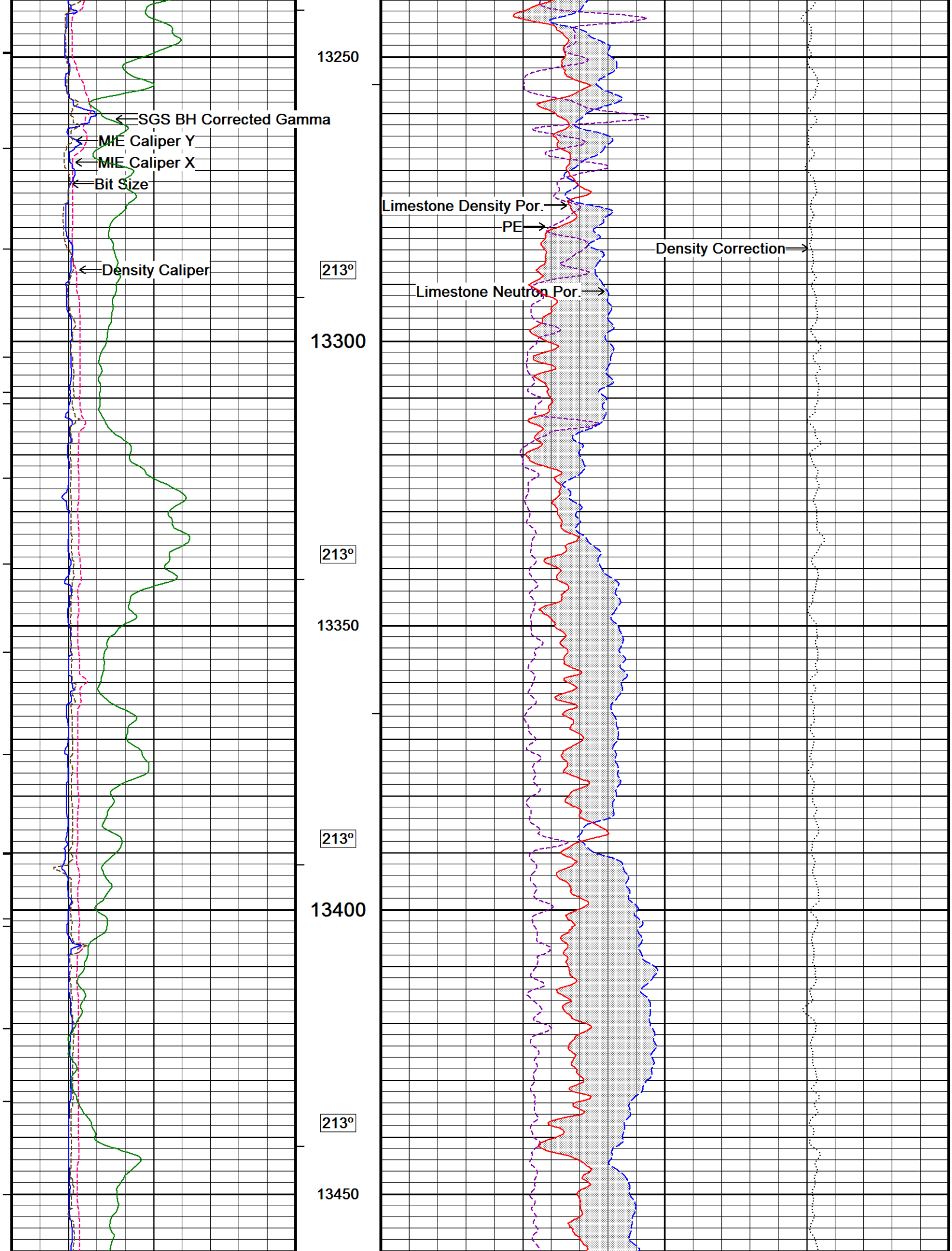

12150
300
214°
12200
214°
12250
214°
12300
214°
12350

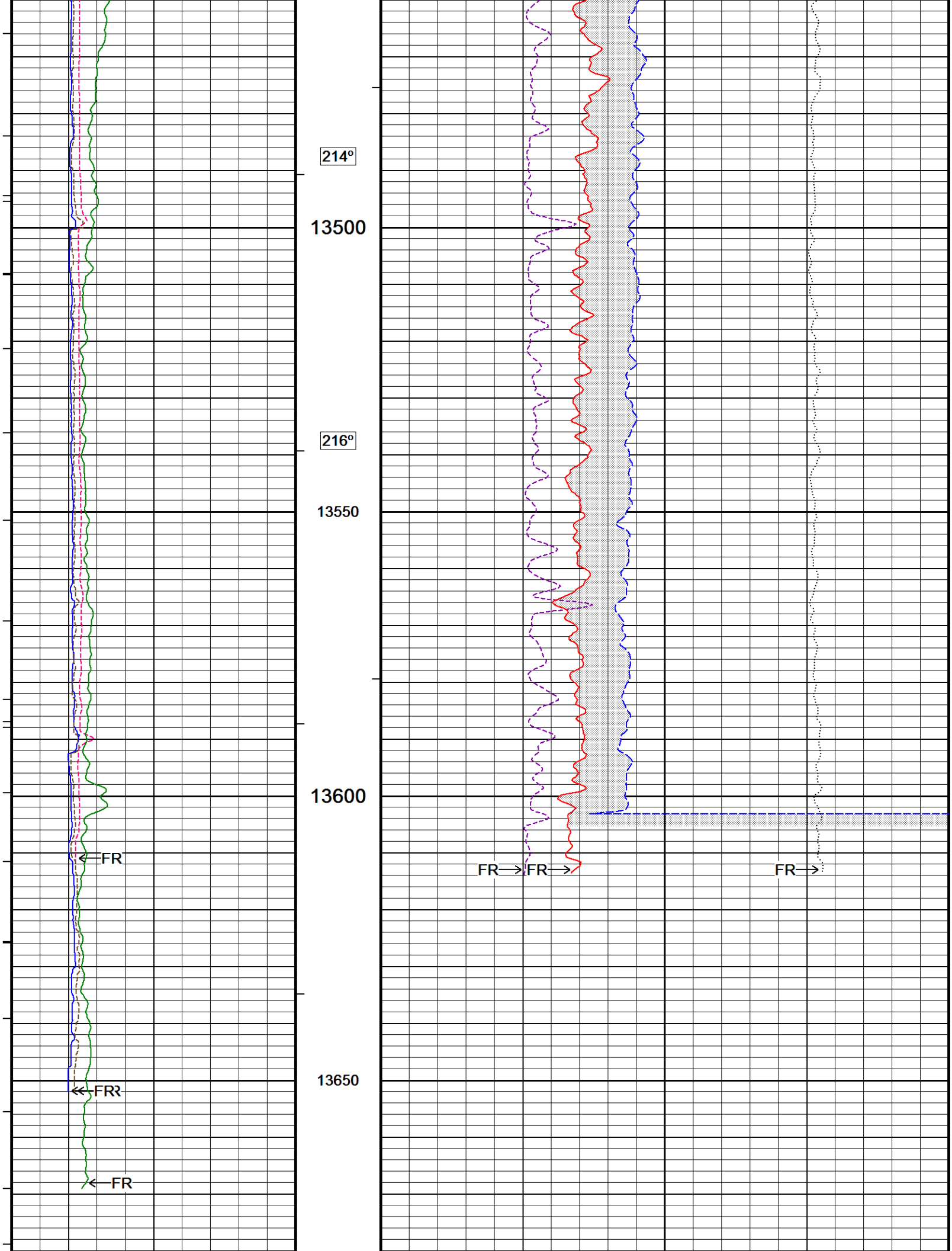

214°
12400
214°
12450
SGS BH Corrected Gamma
MIE Caliper Y
MIE Caliper X
Bit Size
214°
Limestone Density Por.
PE
Density Correction
Density Caliper
12500
Limestone Neutron Por.
214°
12550
100

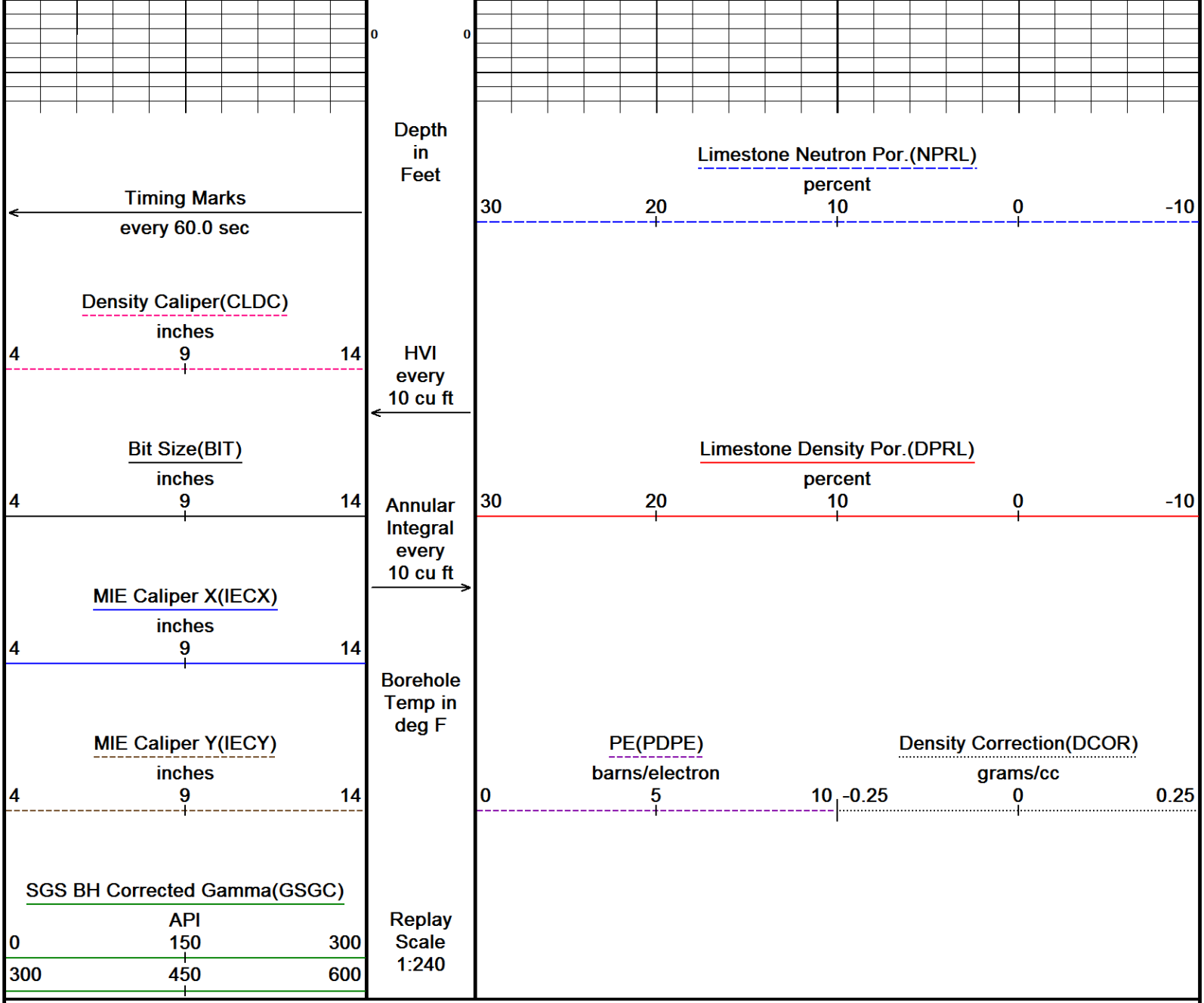

214°
12600
214°
12650
200
214°
12700
214°
12750
214°
12800


12800
214°
12850
SGS BH Corrected Gamma
MIE Caliper Y
MIE Caliper X
Bit Size
Density Caliper
Limestone Density Por
PE
214°
Density Correction
Limestone Neutron Por
12900
214°
12950
214°
13000


213º
13050
213º
13100
213º
13150
213º
100
13200
213º


13250
SGS BH Corrected Gamma
MIE Caliper Y
MIE Caliper X
Bit Size
Density Caliper
213°
13300
213°
13350
213°
13400
213°
13450
Limestone Density Por.
PE
Density Correction
Limestone Neutron Por.


214°
13500
216°
13550
13600
13650
FR
FR
FR
FR
FR

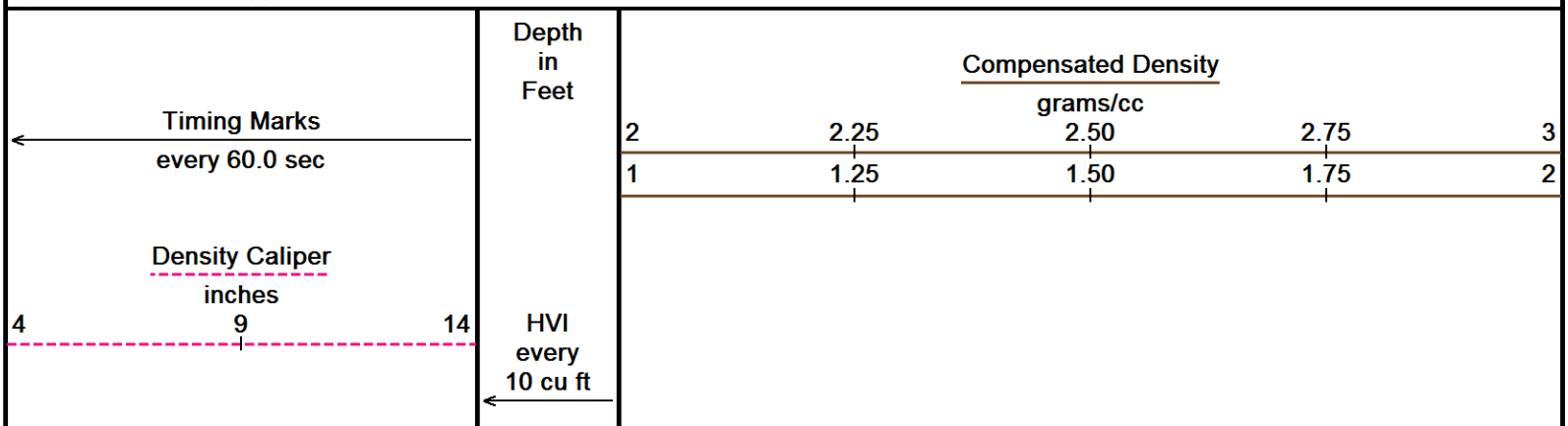


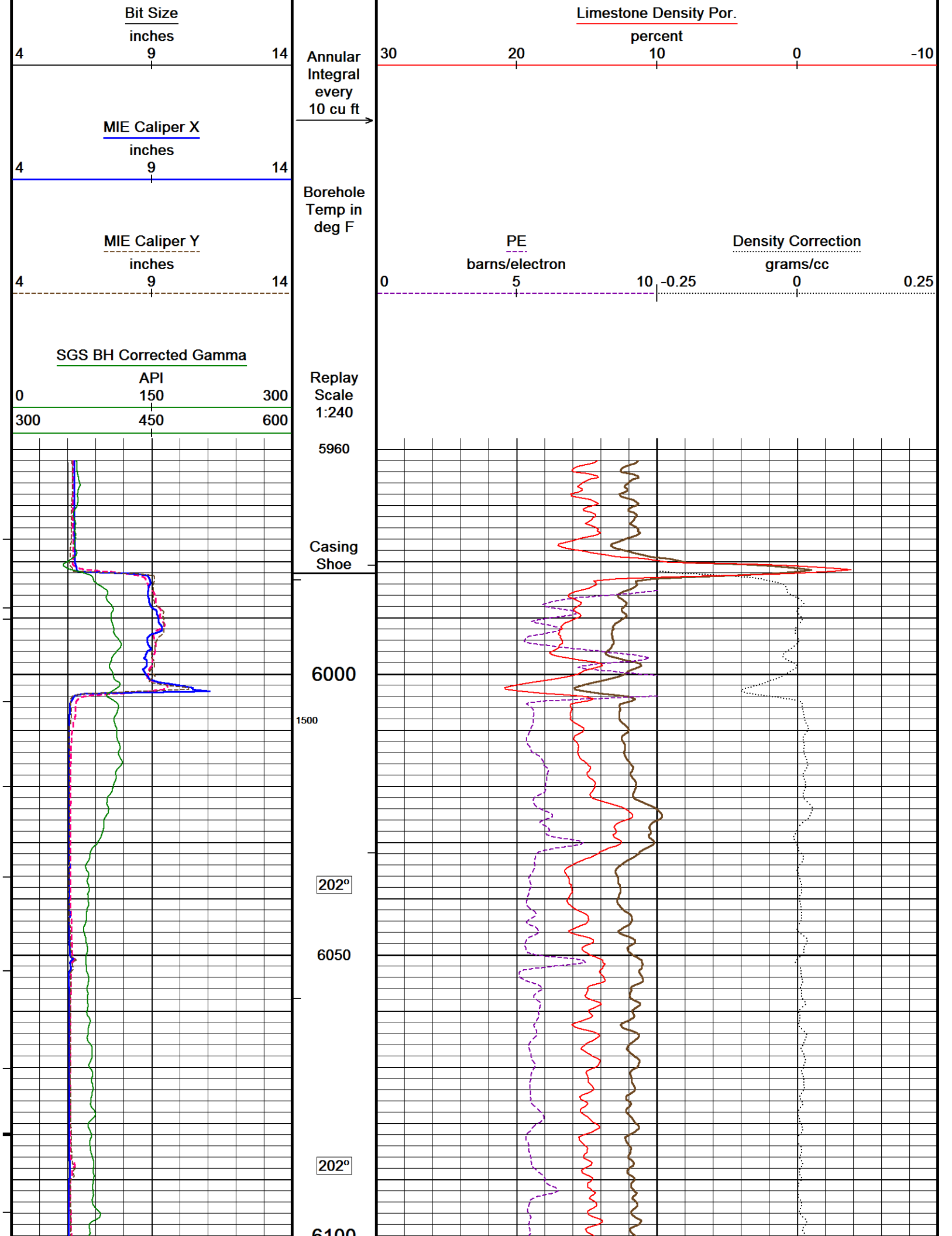
Depth Based Data - Maximum Sampling Increment 10.0cm
Plotted on 27-OCT-2014 19:12
Filename: D:\Logs\Whiting\HORSETAIL 29G-2012B\MMS DEPTH.dta
Recorded on 27-OCT-2014 17:11
System Versions: Logged with 14.01.3220 Processed with 14.01.3220 Plotted with 14.01.3220

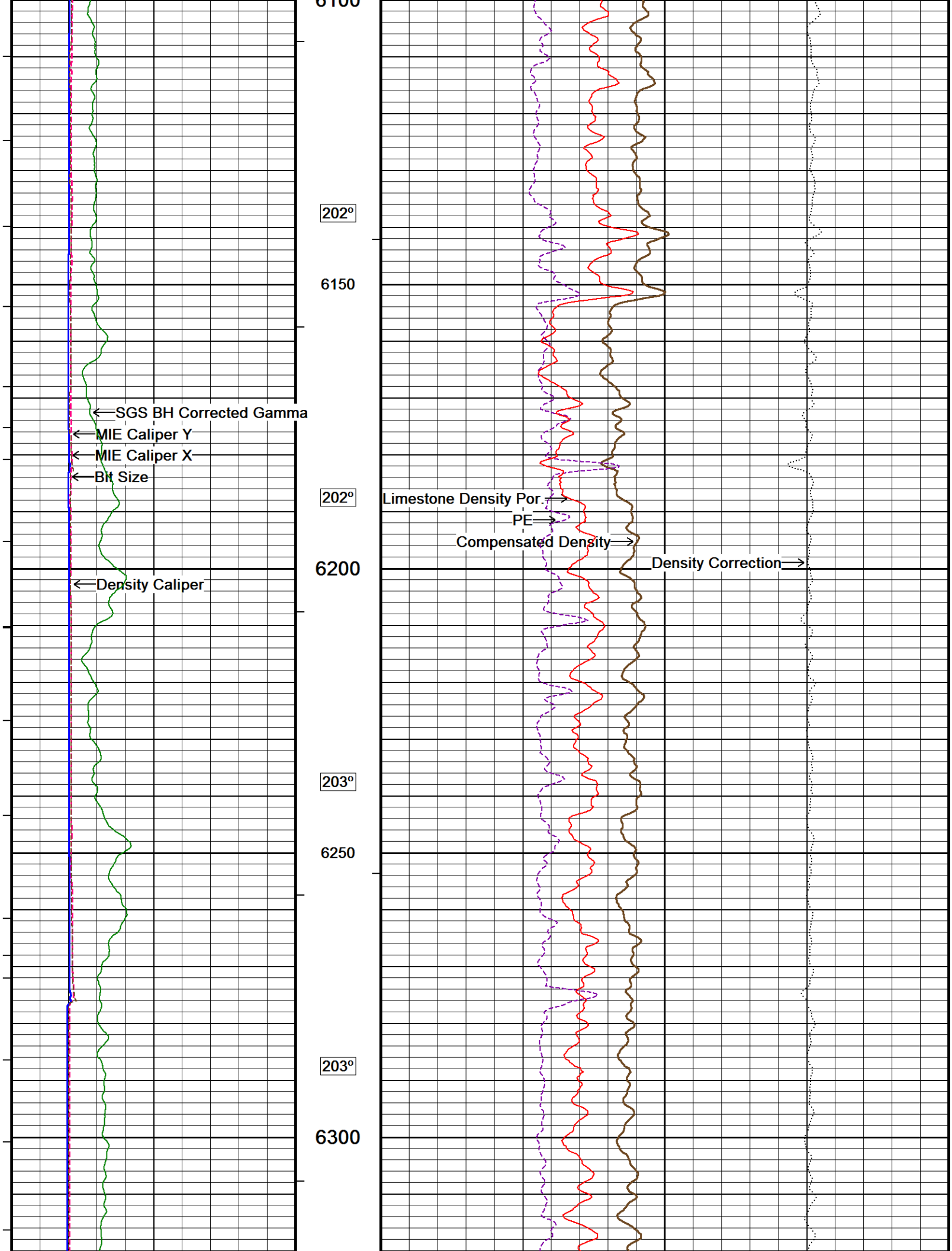
5 INCH MAIN LOG

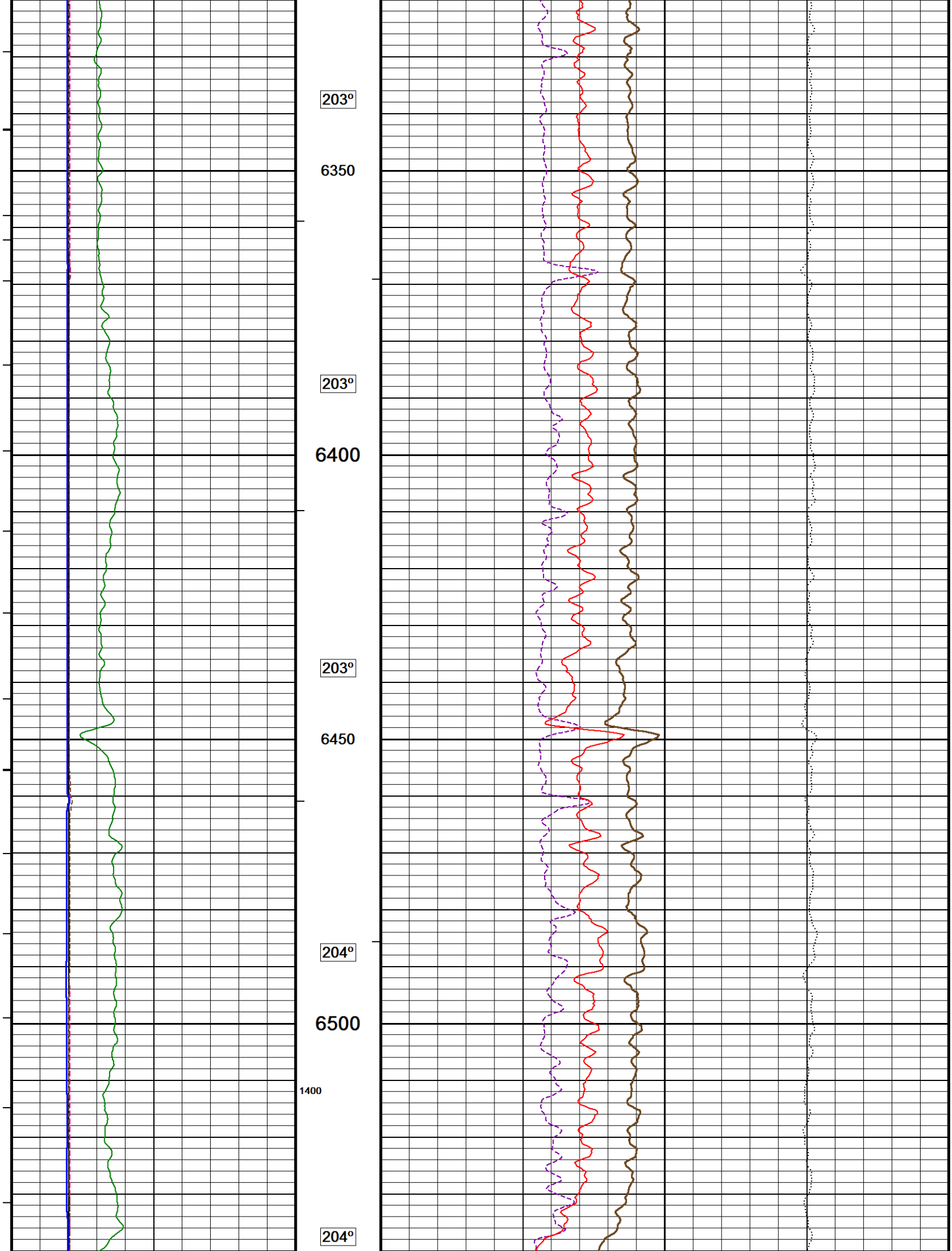
5 INCH MAIN LOG

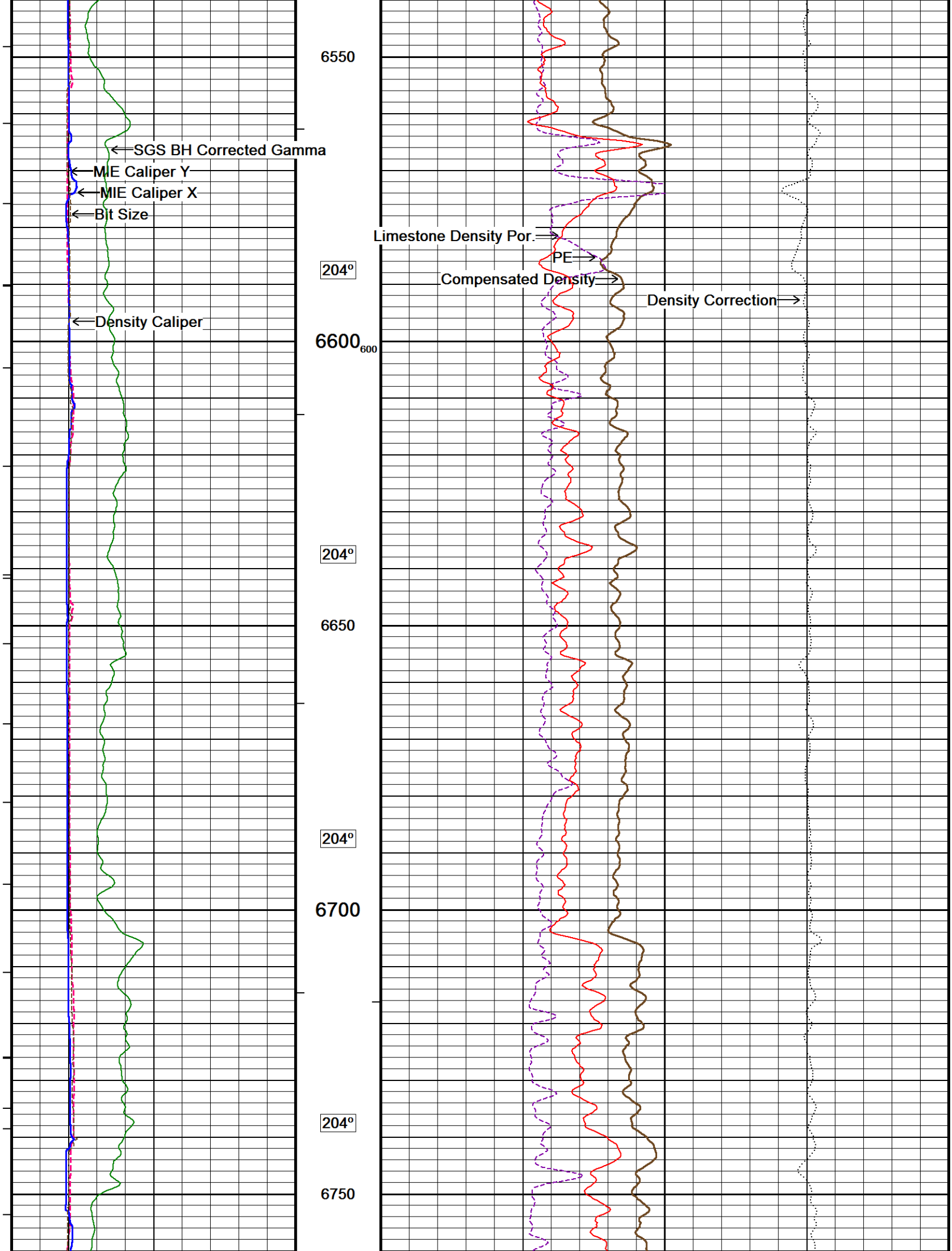
Depth Based Data - Maximum Sampling Increment 10.0cm
Plotted on 27-OCT-2014 19:12
Filename: D:\Logs\Whiting\HORSETAIL 29G-2012B\MMS DEPTH.dta
Recorded on 27-OCT-2014 17:11
System Versions: Logged with 14.01.3220 Processed with 14.01.3220 Plotted with 14.01.3220

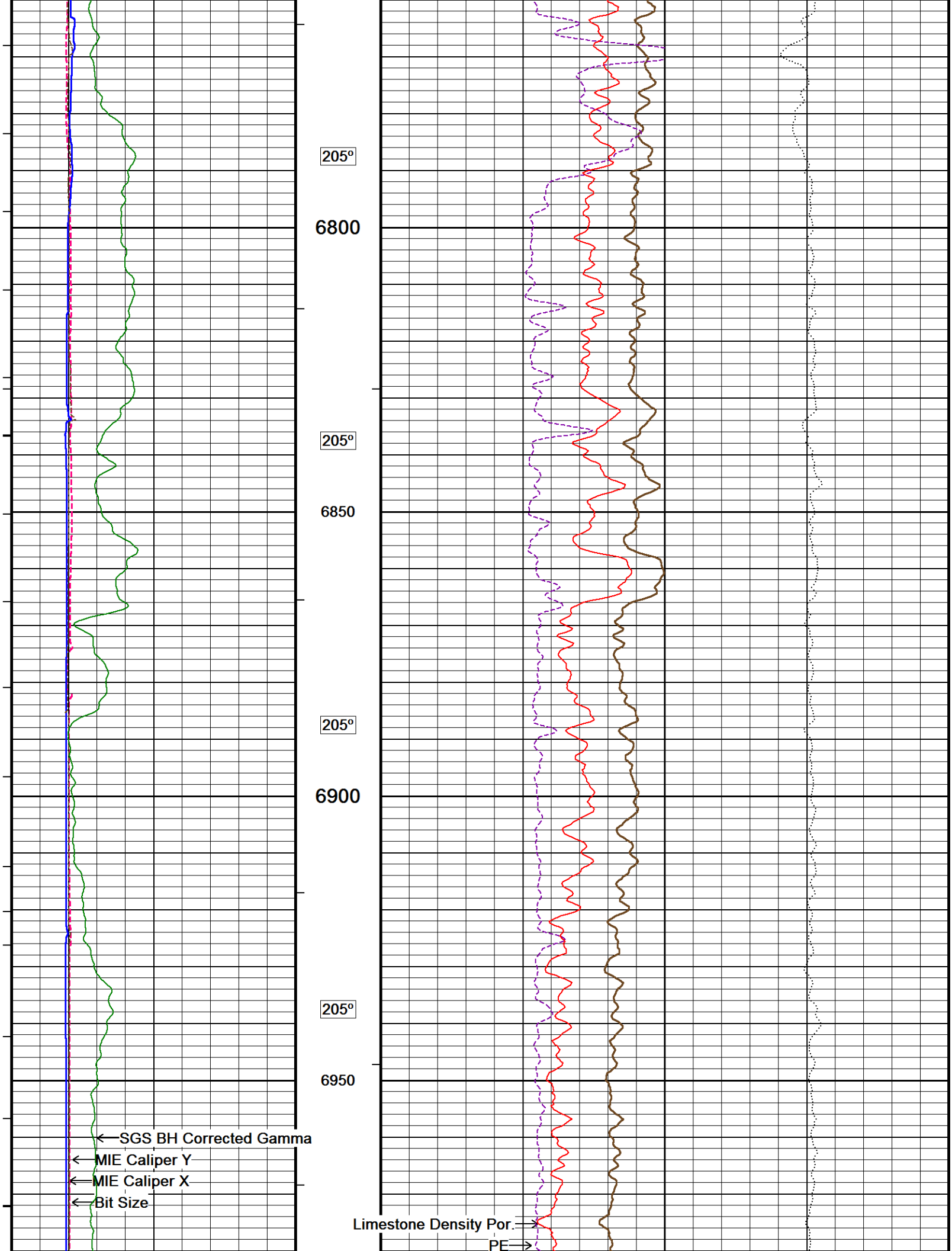


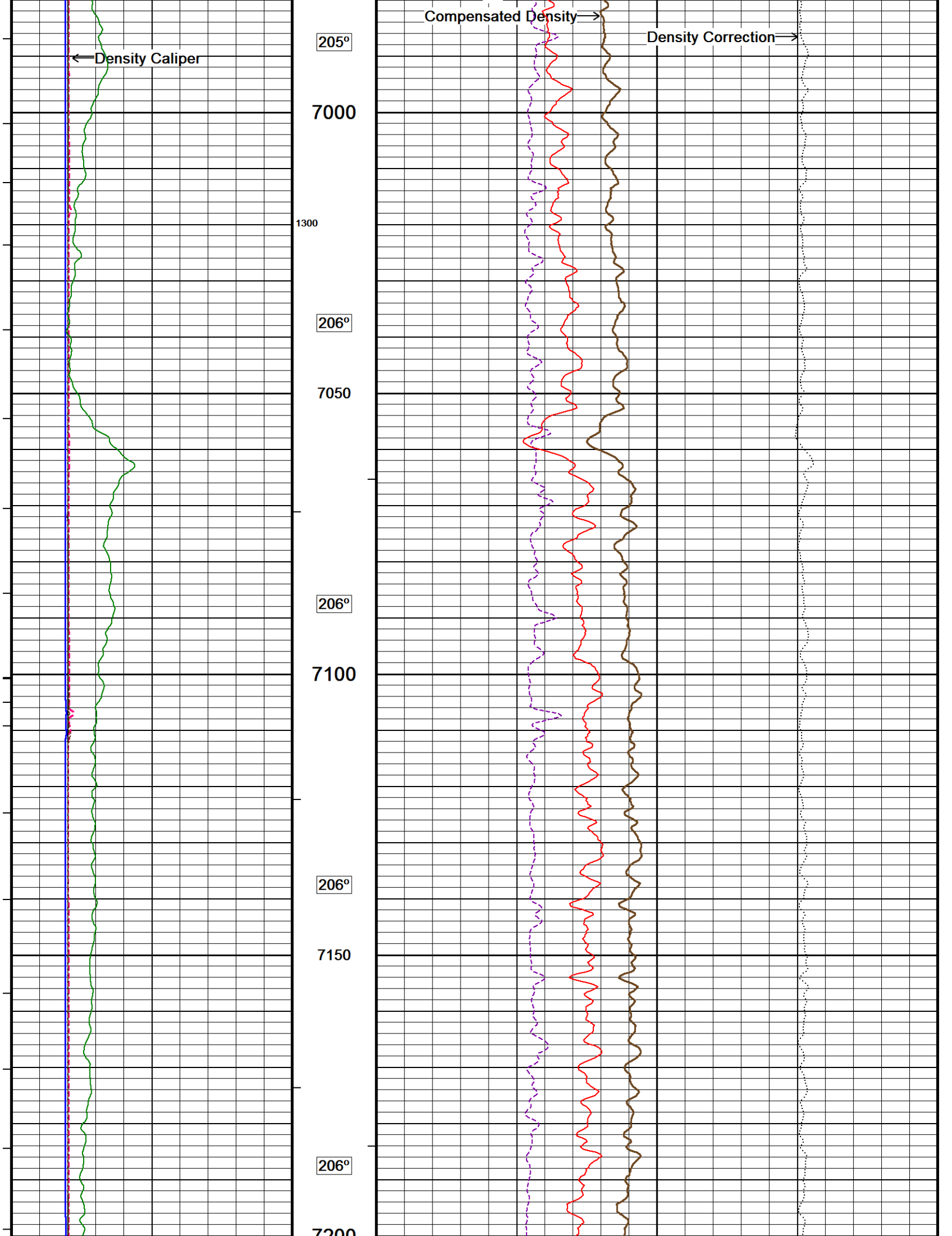

Bit Size
inches
4
9
14
MIE Caliper X
inches
4
9
14
MIE Caliper Y
inches
4
9
14
SGS BH Corrected Gamma
API
0
150
300
300
450
600
Annular Integral every 10 cu ft
Borehole Temp in deg F
Replay Scale 1:240
5960
Casing Shoe
6000
1500
202°
6050
202°
6100
Limestone Density Por.
percent
30
20
10
0
-10
PE
barns/electron
0
5
10
Density Correction
grams/cc
-0.25
0
0.25

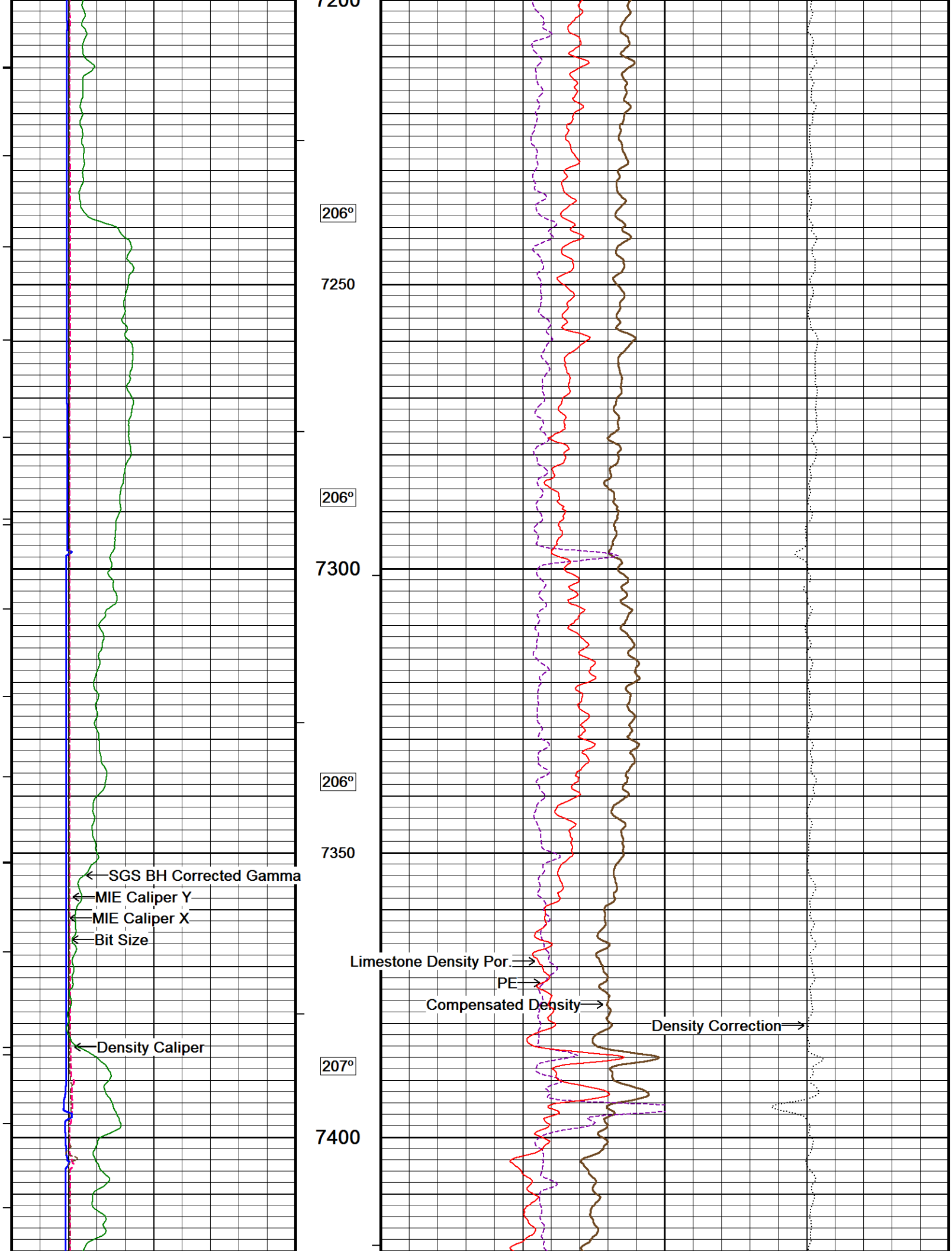

6100
202°
6150
SGS BH Corrected Gamma
MIE Caliper Y
MIE Caliper X
Bit Size
202°
Limestone Density Por
PE
Compensated Density
Density Correction
6200
Density Caliper
203°
6250
203°
6300

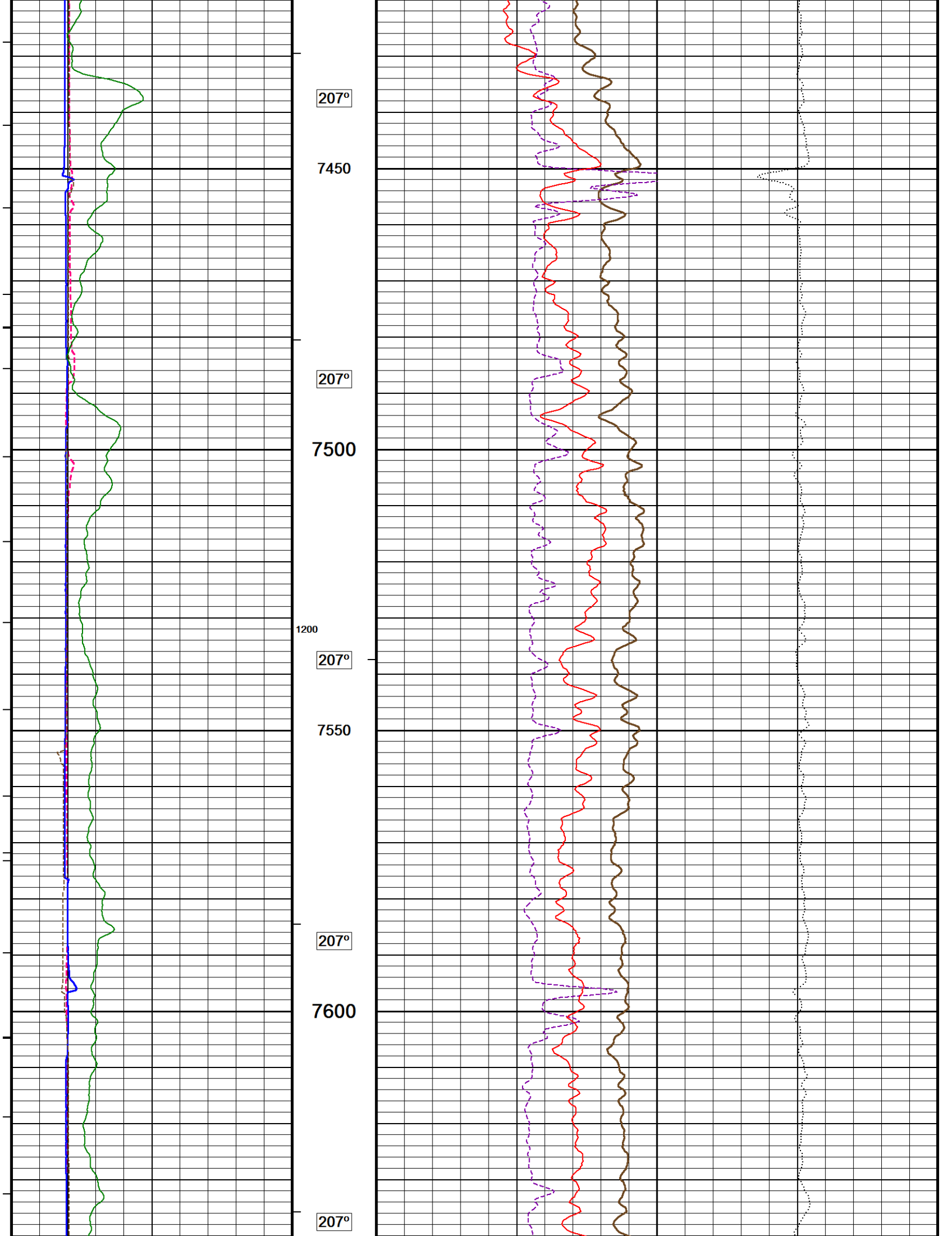

203°
6350
203°
6400
203°
6450
204°
6500
1400
204°

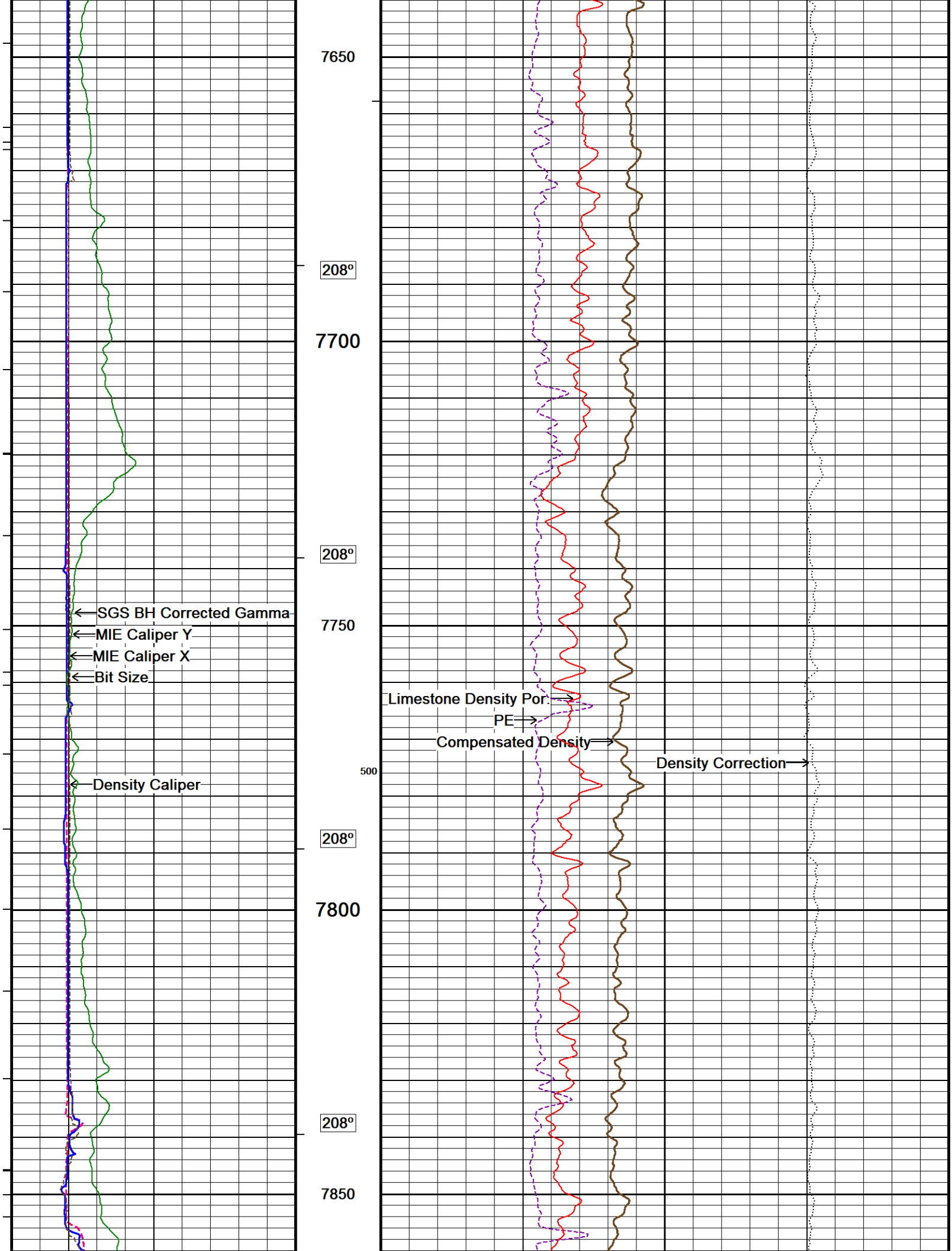

6550
SGS BH Corrected Gamma
MIE Caliper Y
MIE Caliper X
Bit Size
Limestone Density Por
PE
204°
Compensated Density
Density Correction
Density Caliper
6600
600
204°
6650
204°
6700
204°
6750

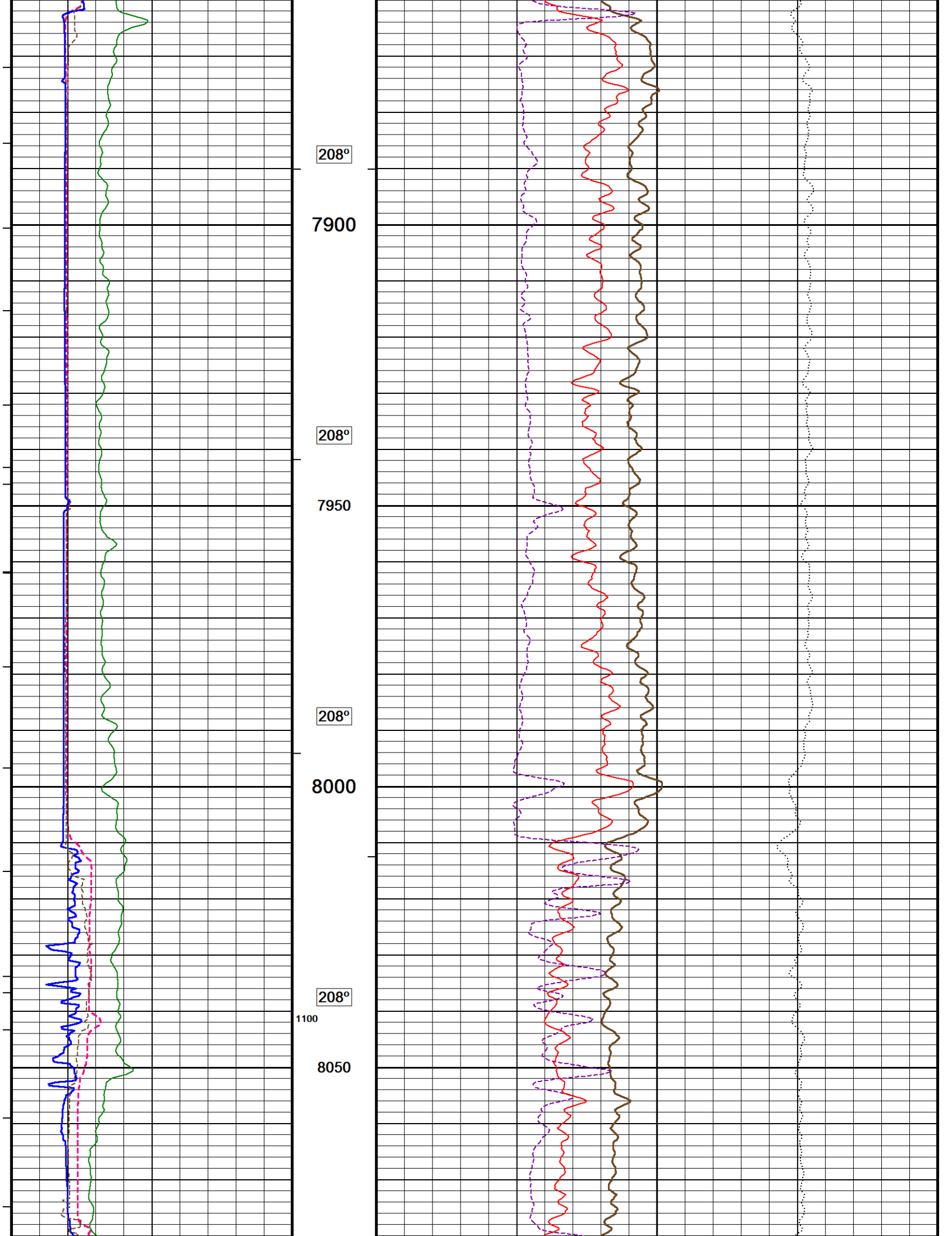

205°
6800
205°
6850
205°
6900
205°
6950
SGS BH Corrected Gamma
MIE Caliper Y
MIE Caliper X
Bit Size
Limestone Density Por.
PE

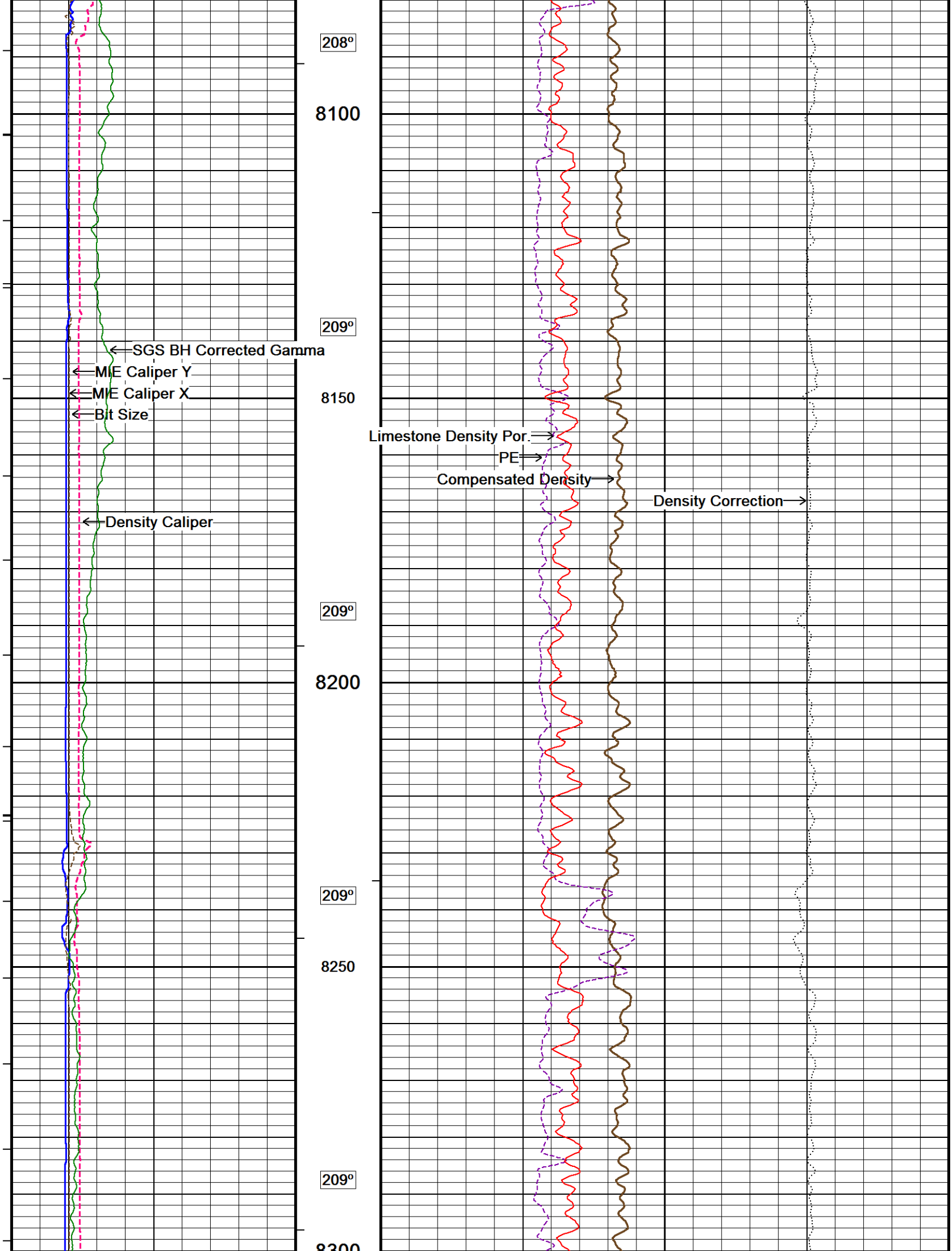

Density Caliper
205°
7000
1300
206°
7050
206°
7100
206°
7150
206°
7200
Compensated Density
Density Correction

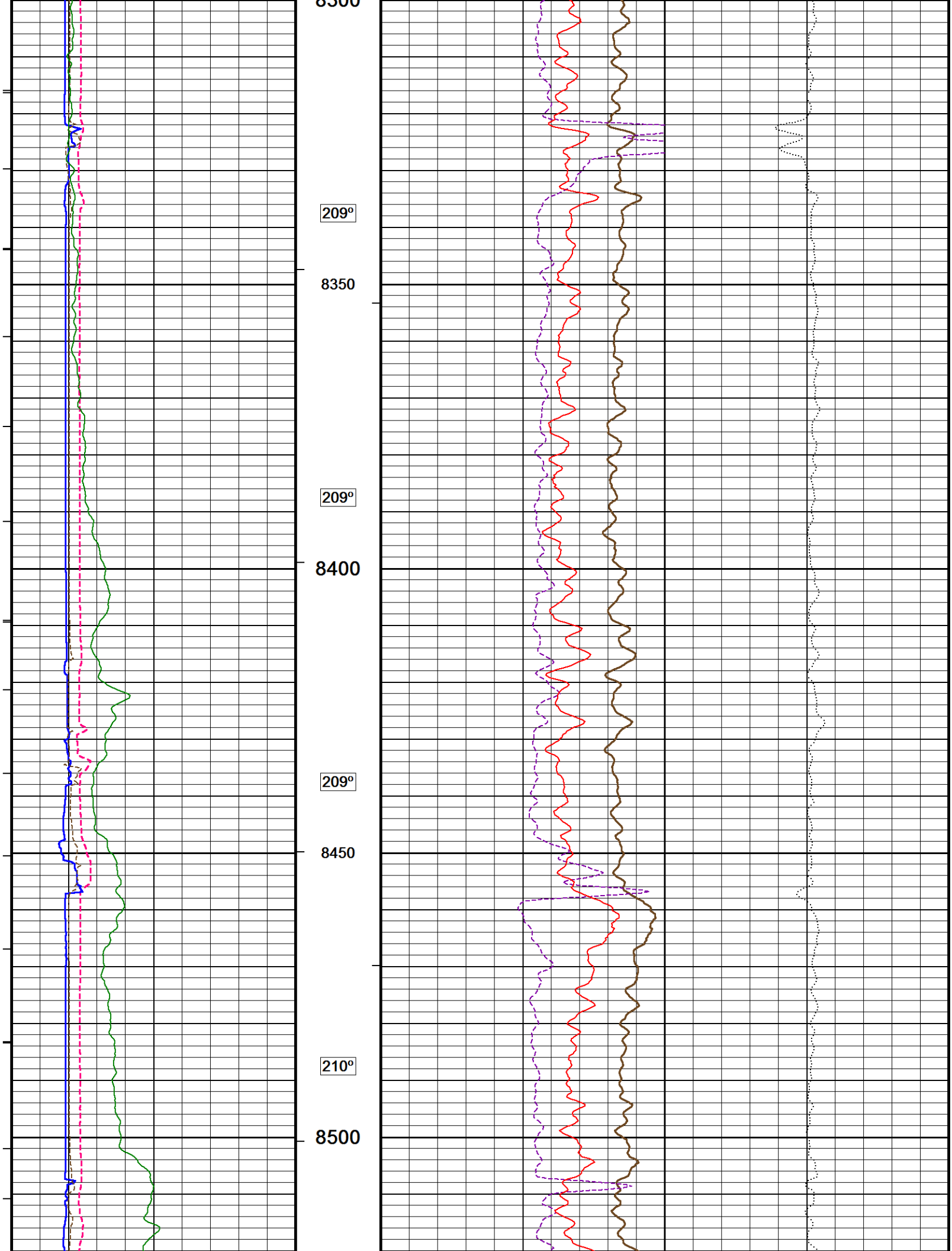

7200
206°
7250
206°
7300
206°
7350
207°
7400
SGS BH Corrected Gamma
MIE Caliper Y
MIE Caliper X
Bit Size
Density Caliper
Limestone Density Por.
PE
Compensated Density
Density Correction

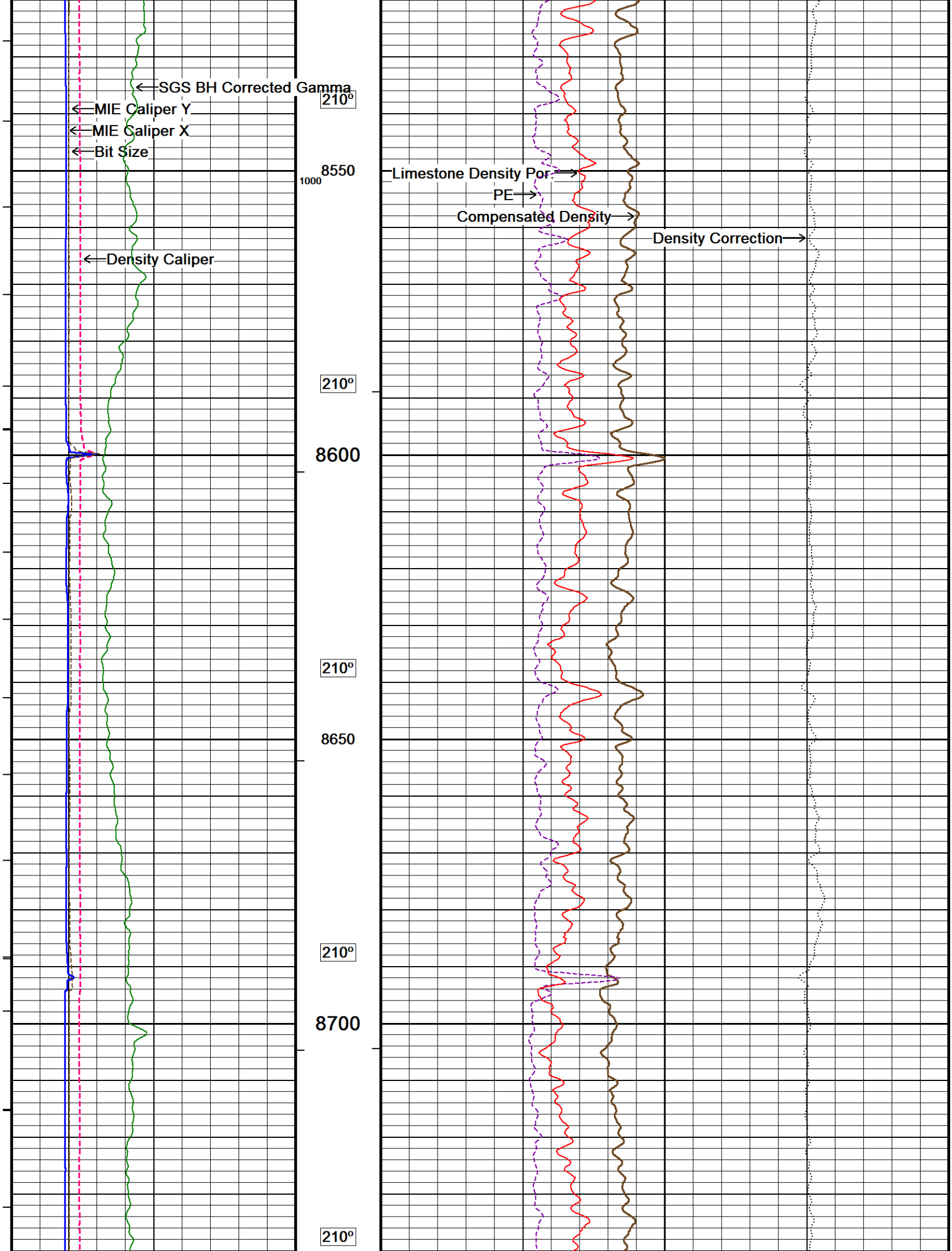

207°
7450
207°
7500
1200
207°
7550
207°
7600
207°

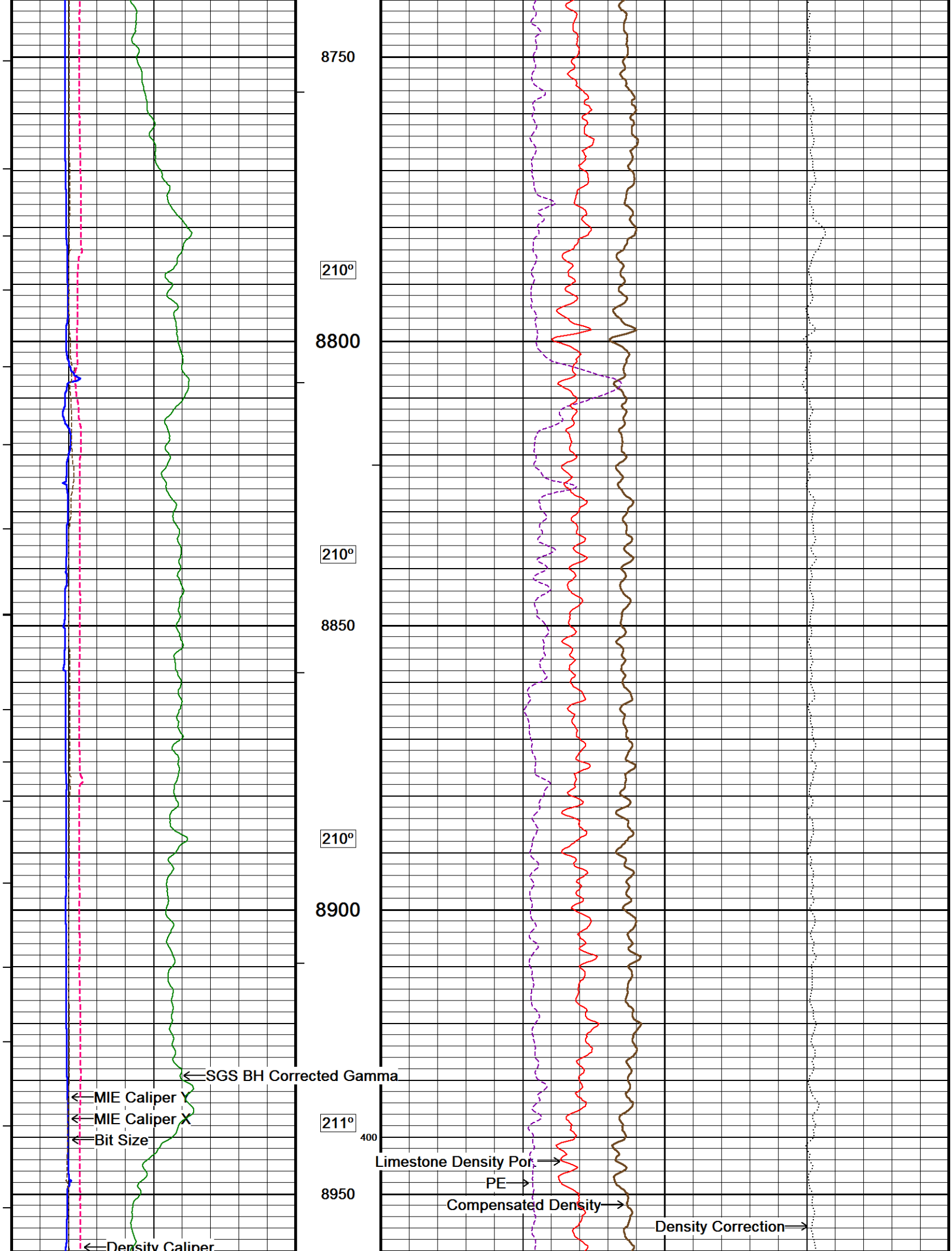

7650
208°
7700
208°
7750
500
208°
7800
208°
7850
SGS BH Corrected Gamma
MIE Caliper Y
MIE Caliper X
Bit Size
Density Caliper
Limestone Density Por
PE
Compensated Density
Density Correction

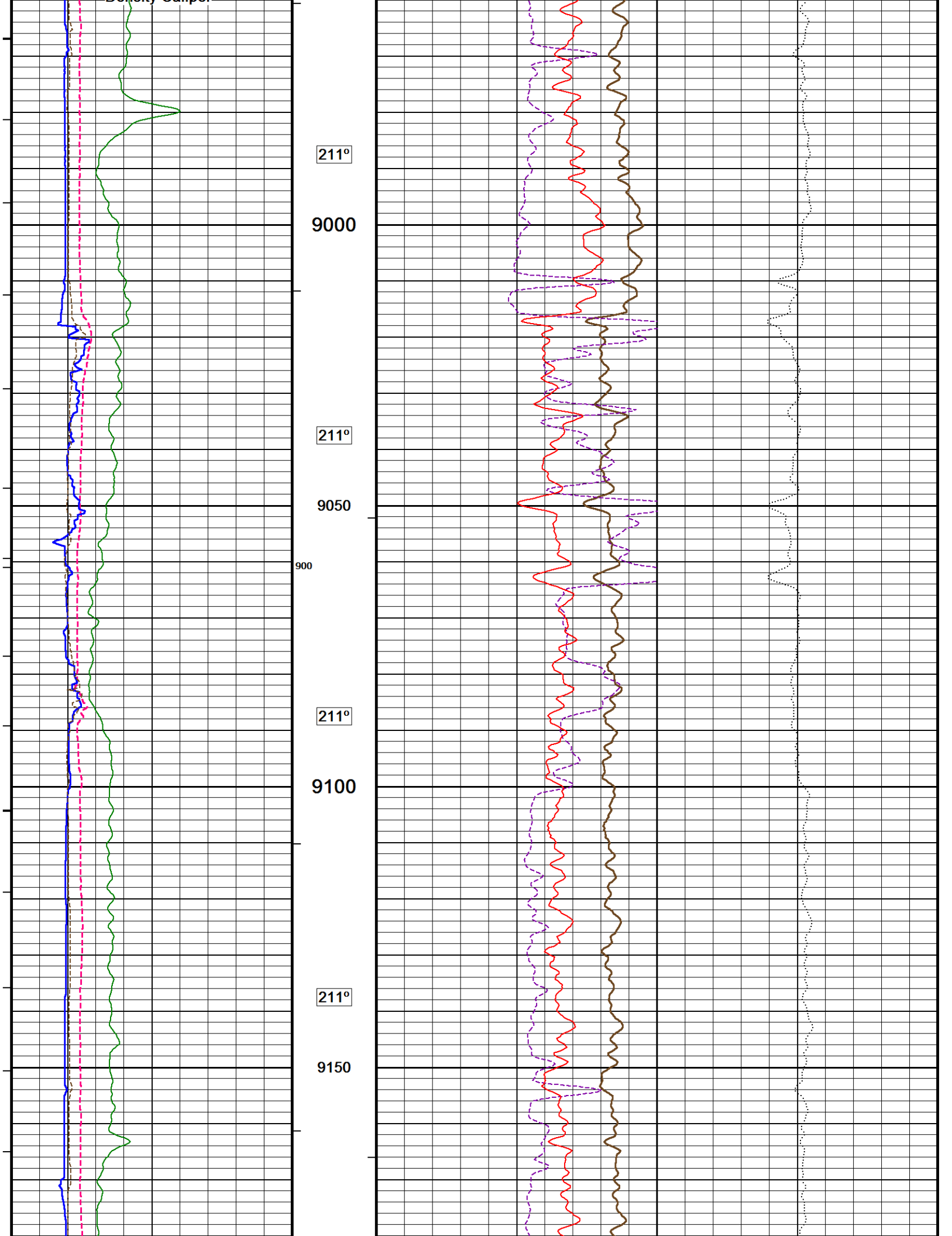

208°
7900
208°
7950
208°
8000
208°
1100
8050

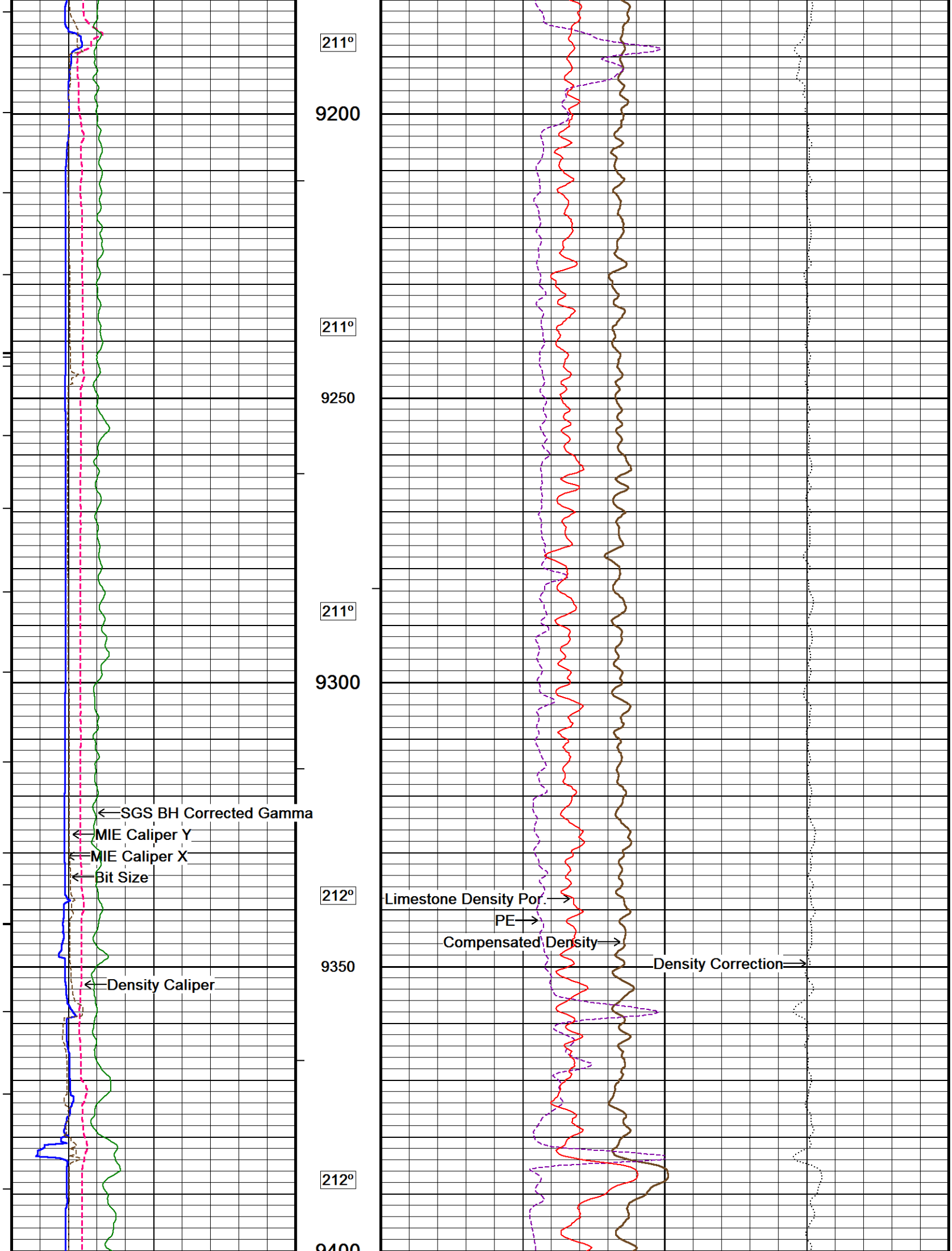

208°
8100
209°
SGS BH Corrected Gamma
MIE Caliper Y
MIE Caliper X
Bit Size
8150
Limestone Density Por.
PE
Compensated Density
Density Correction
Density Caliper
209°
8200
209°
8250
209°

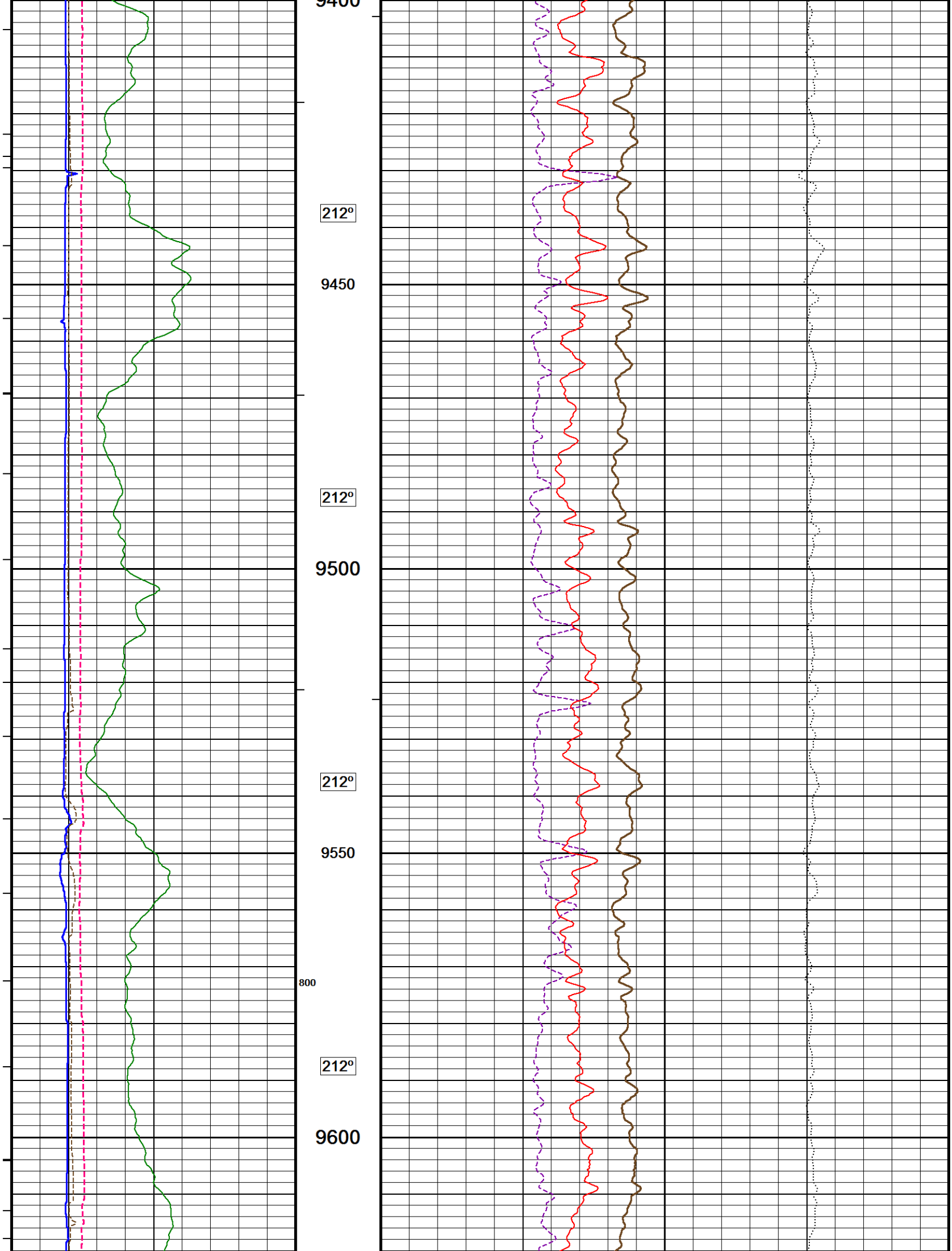

8300
209°
8350
209°
8400
209°
8450
210°
8500

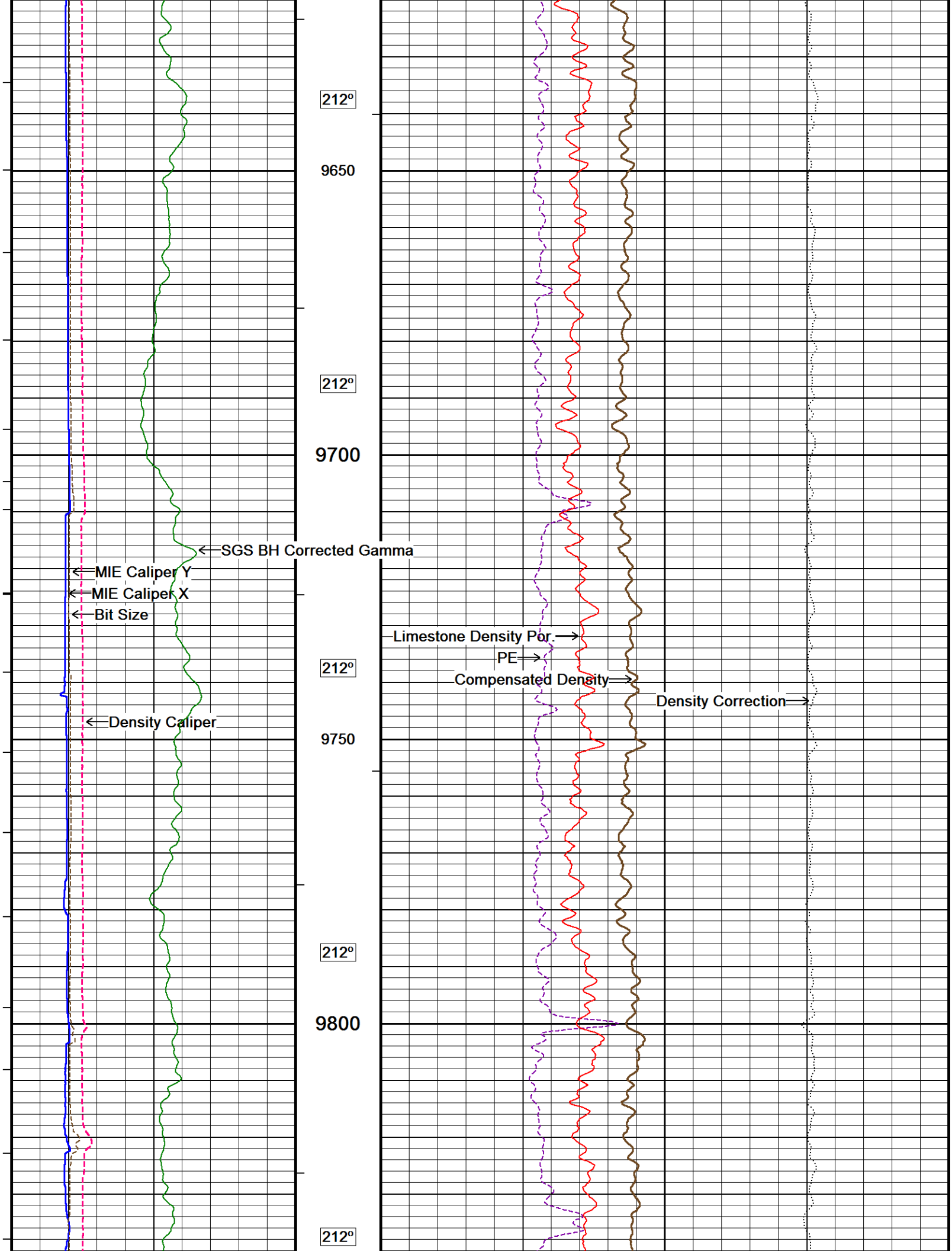

SGS BH Corrected Gamma
MIE Caliper Y
MIE Caliper X
Bit Size
Density Caliper
210°
1000
8550
210°
8600
210°
8650
210°
8700
210°
Limestone Density Por.
PE
Compensated Density
Density Correction

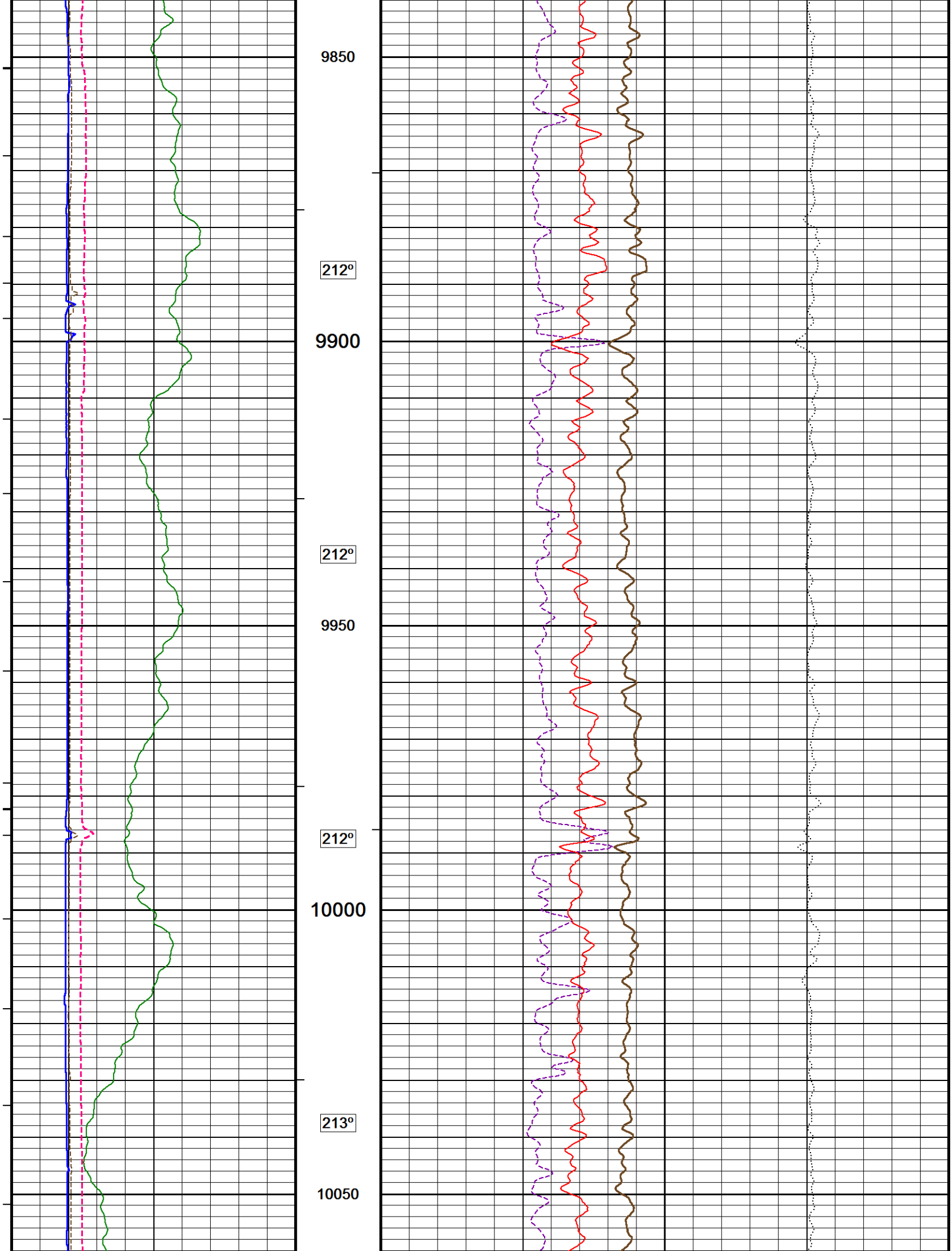

8750
210°
8800
210°
8850
210°
8900
211°
8950
SGS BH Corrected Gamma
MIE Caliper Y
MIE Caliper X
Bit Size
Density Caliper
400
Limestone Density Por
PE
Compensated Density
Density Correction

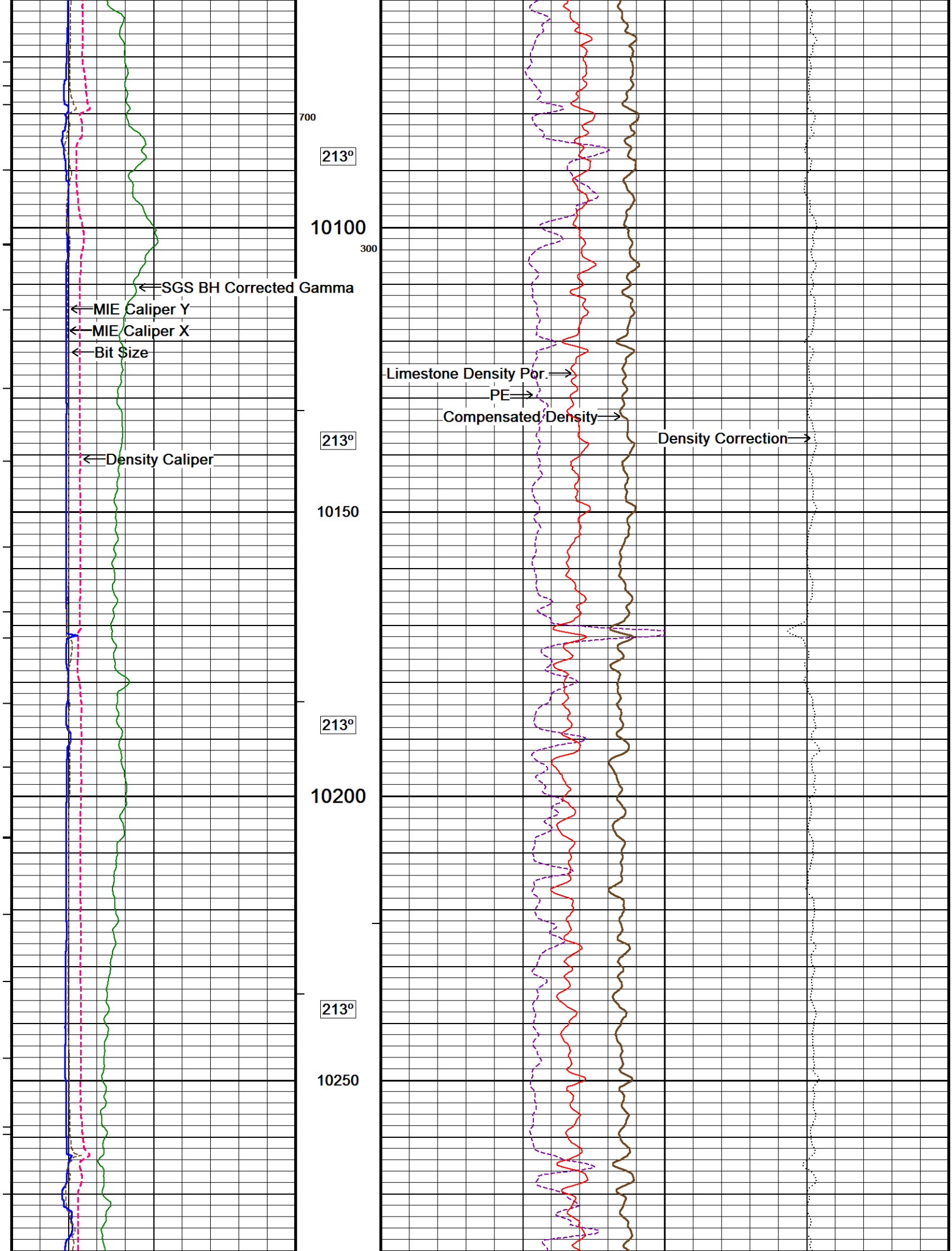

Density Caliper
211°
9000
211°
9050
900
211°
9100
211°
9150

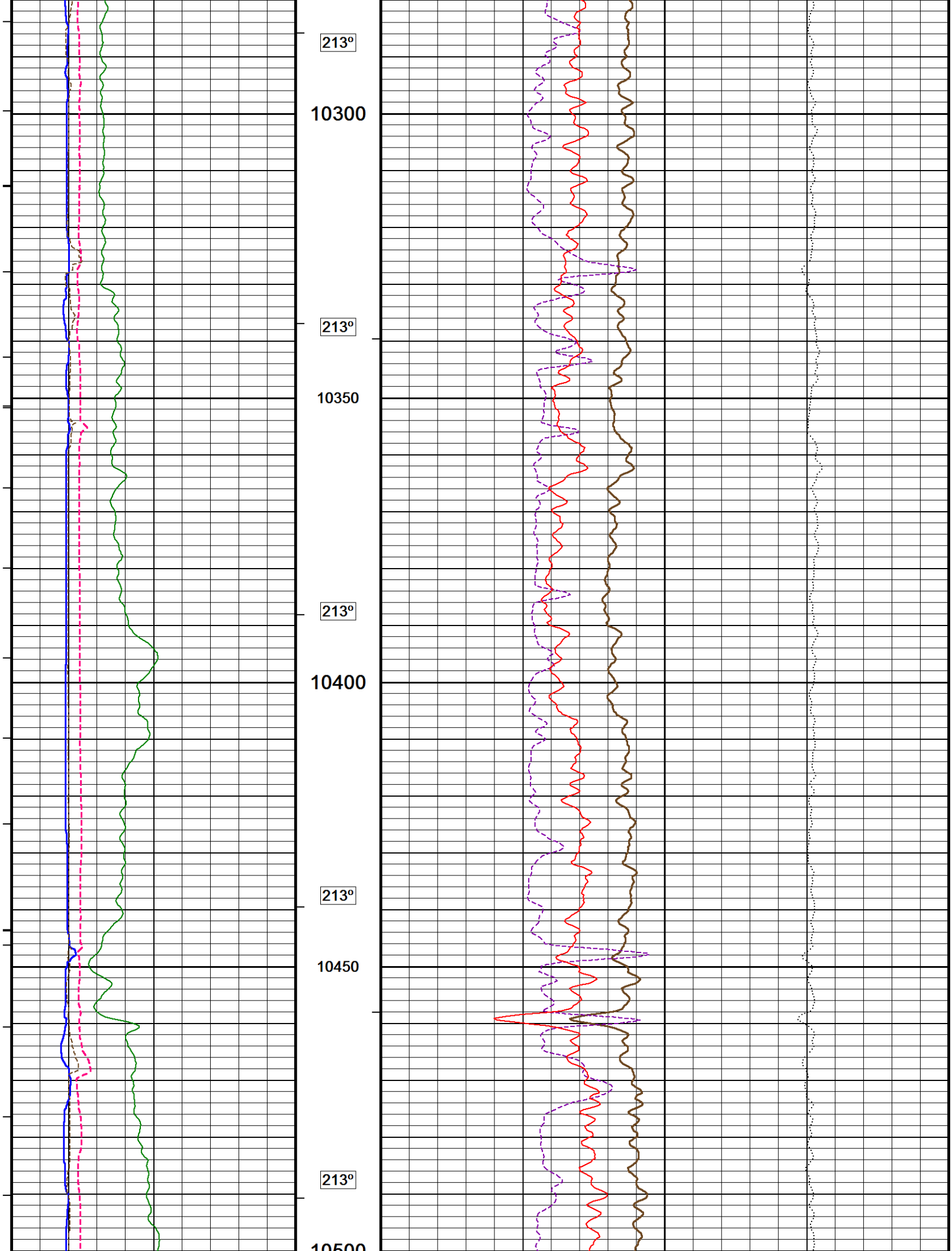

211°
9200
211°
9250
211°
9300
212°
9350
212°
9400
SGS BH Corrected Gamma
MIE Caliper Y
MIE Caliper X
Bit Size
Density Caliper
Limestone Density Por.
PE
Compensated Density
Density Correction

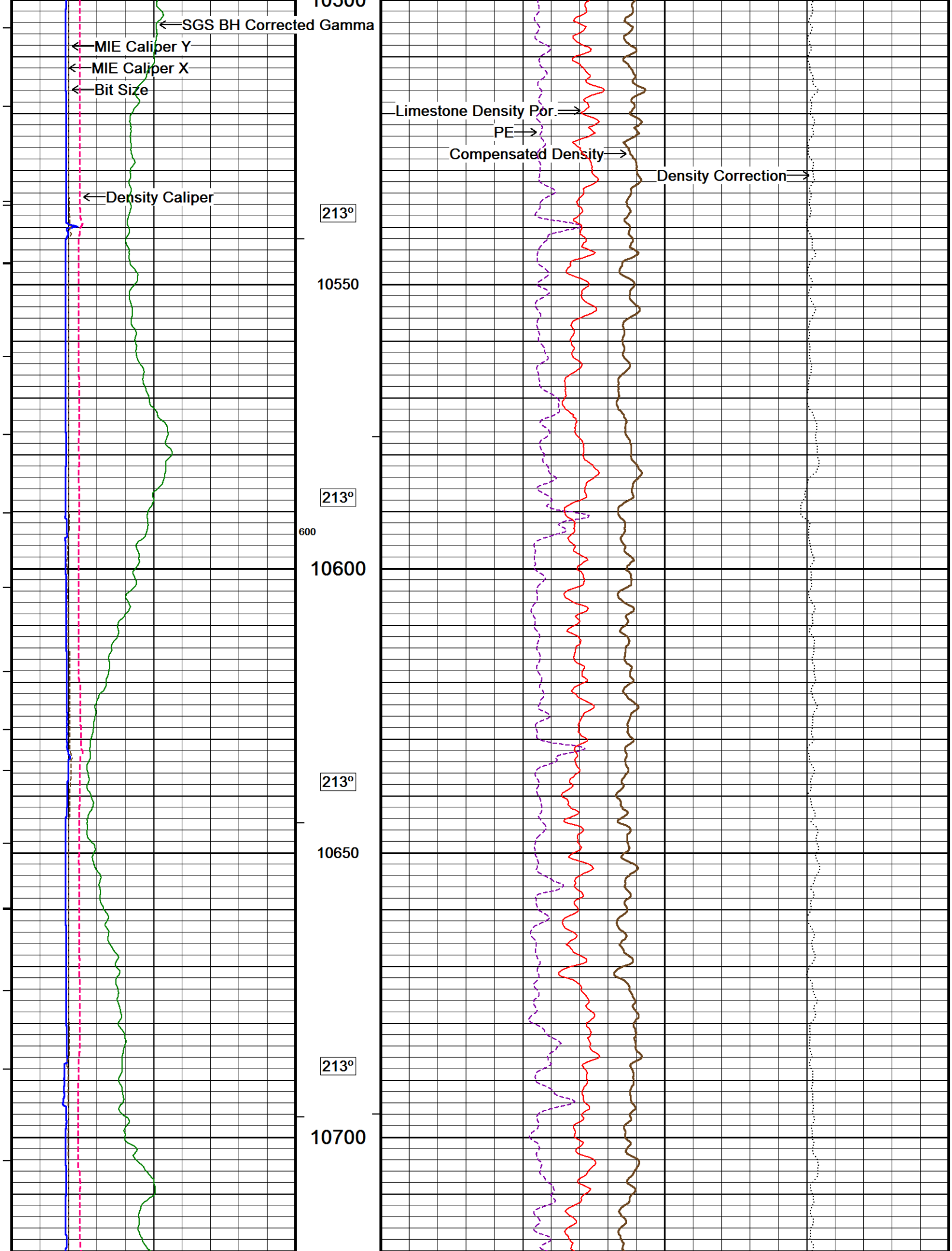

9400
212°
9450
212°
9500
212°
9550
800
212°
9600

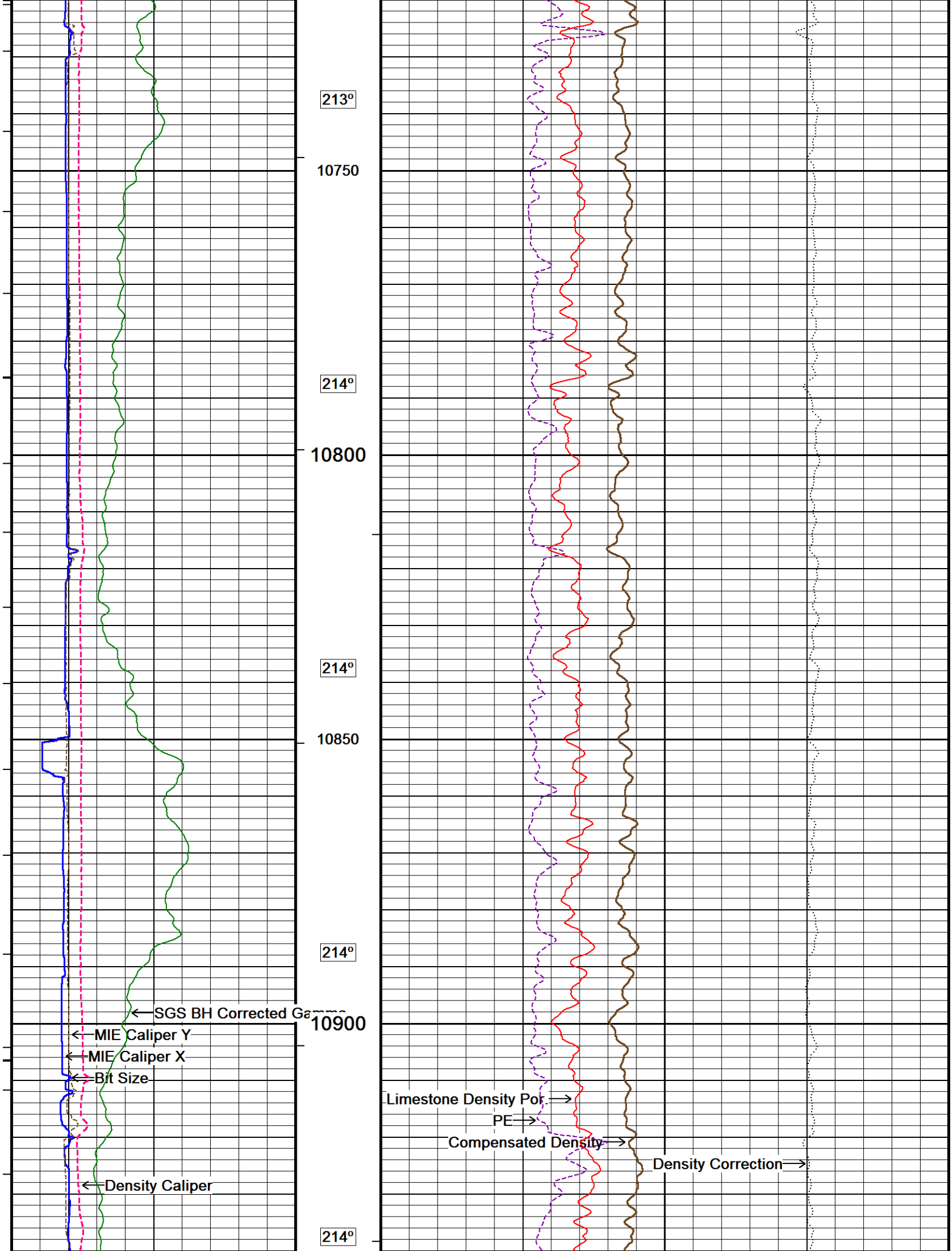

212°
9650
212°
9700
SGS BH Corrected Gamma
MIE Caliper Y
MIE Caliper X
Bit Size
Density Caliper
Limestone Density Por
PE
Compensated Density
Density Correction
212°
9750
212°
9800
212°

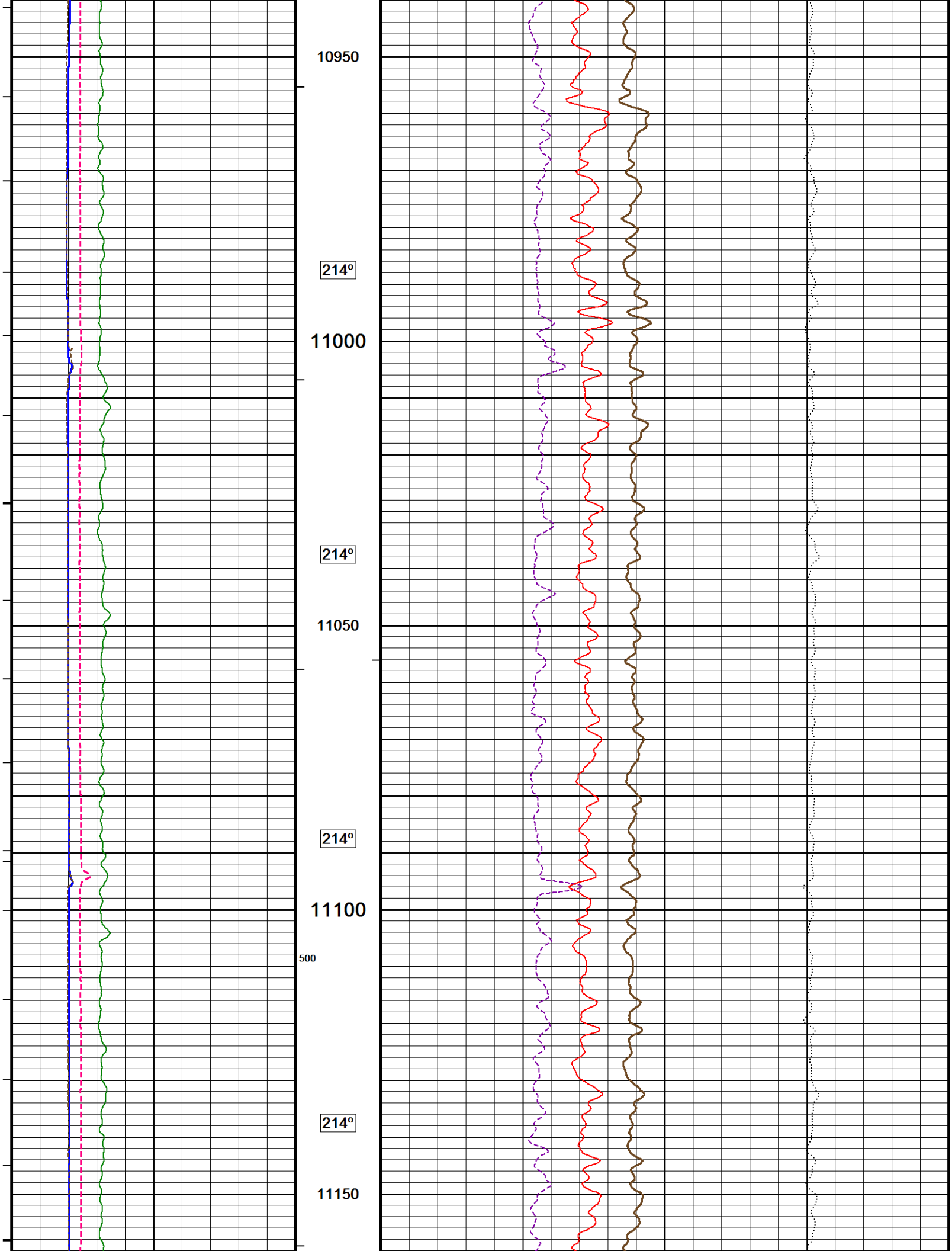

9850
212°
9900
212°
9950
212°
10000
213°
10050

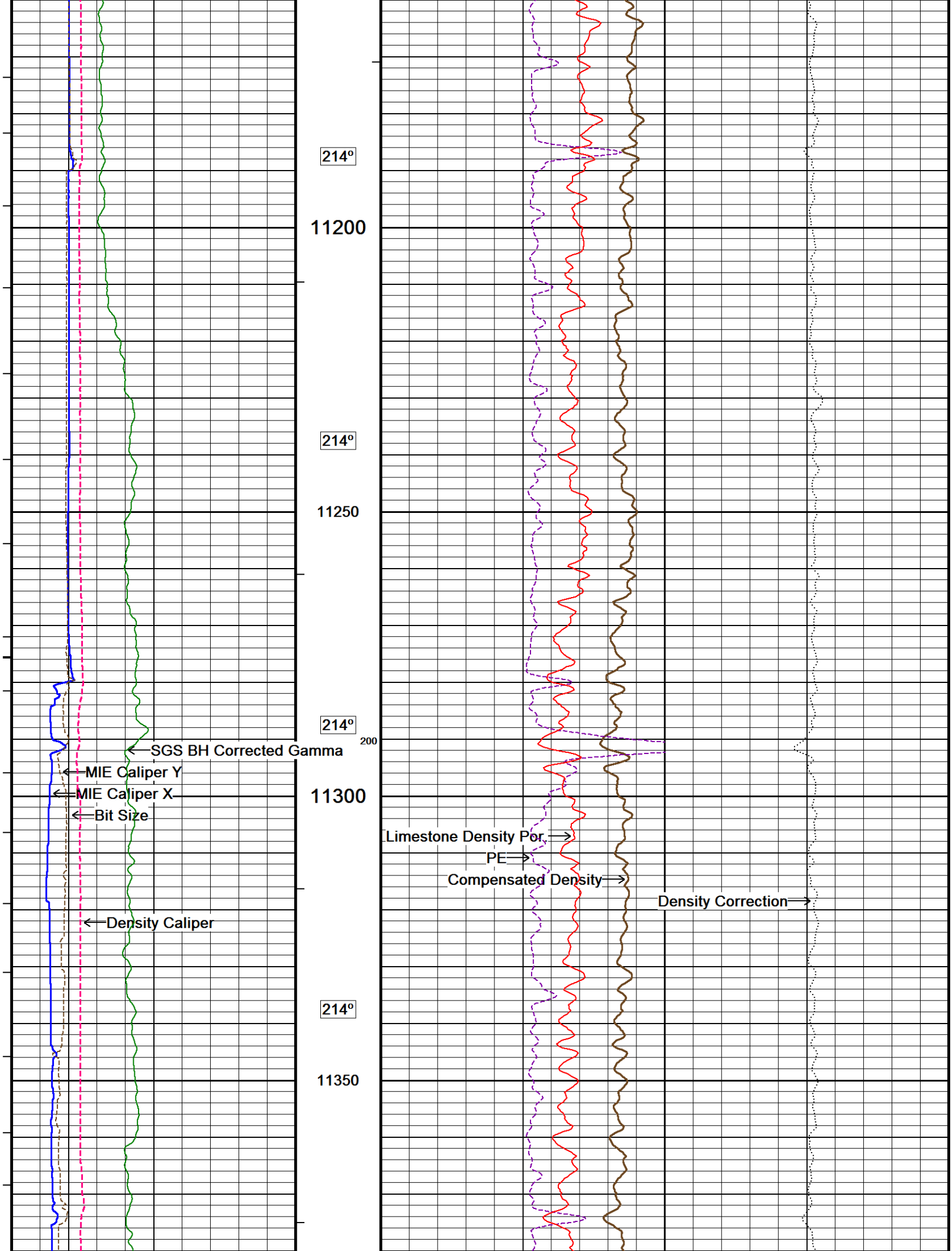

700
213°
10100
300
SGS BH Corrected Gamma
MIE Caliper Y
MIE Caliper X
Bit Size
Density Caliper
213°
10150
213°
10200
213°
10250
Limestone Density Por.
PE
Compensated Density
Density Correction

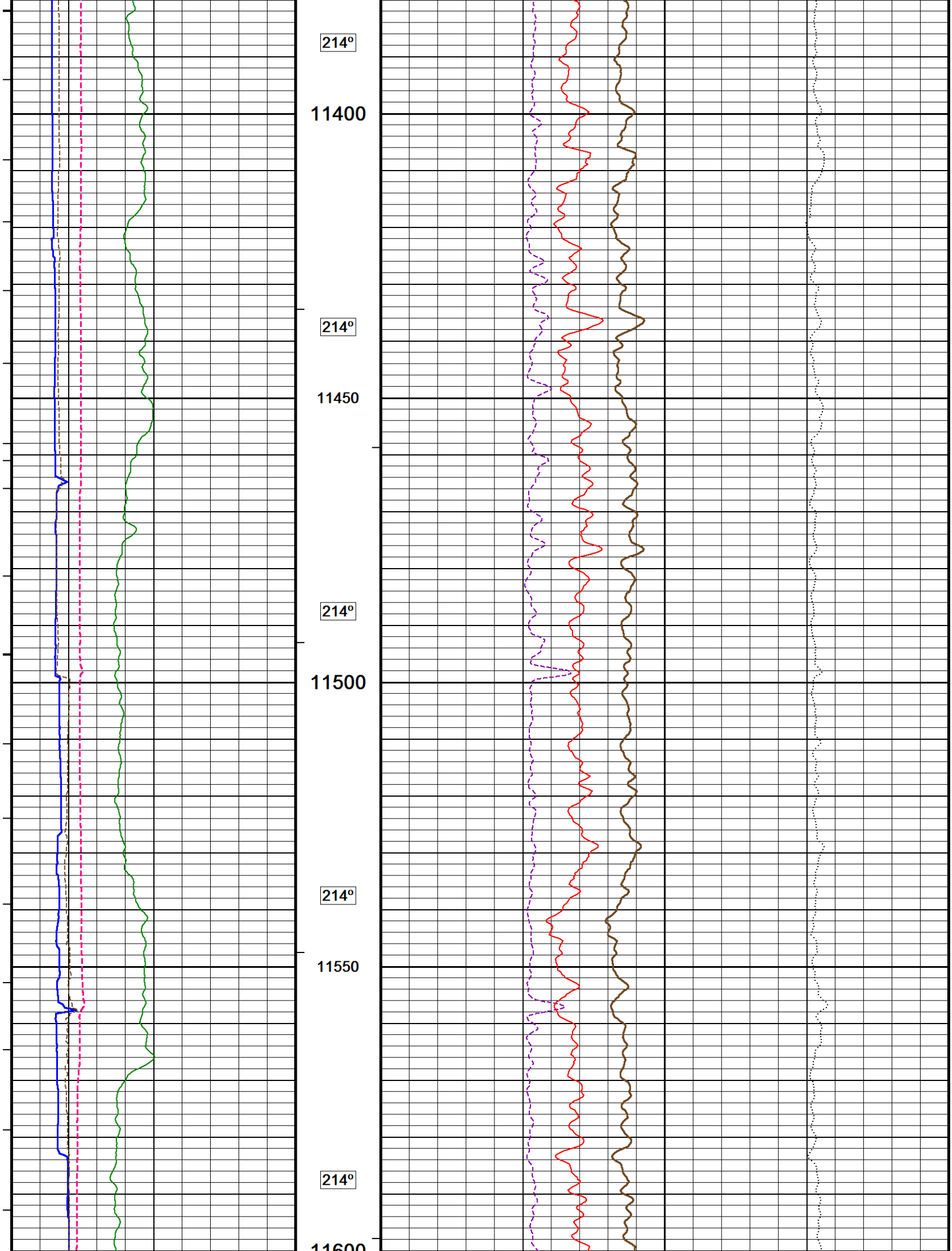

213°
10300
213°
10350
213°
10400
213°
10450
213°
10500

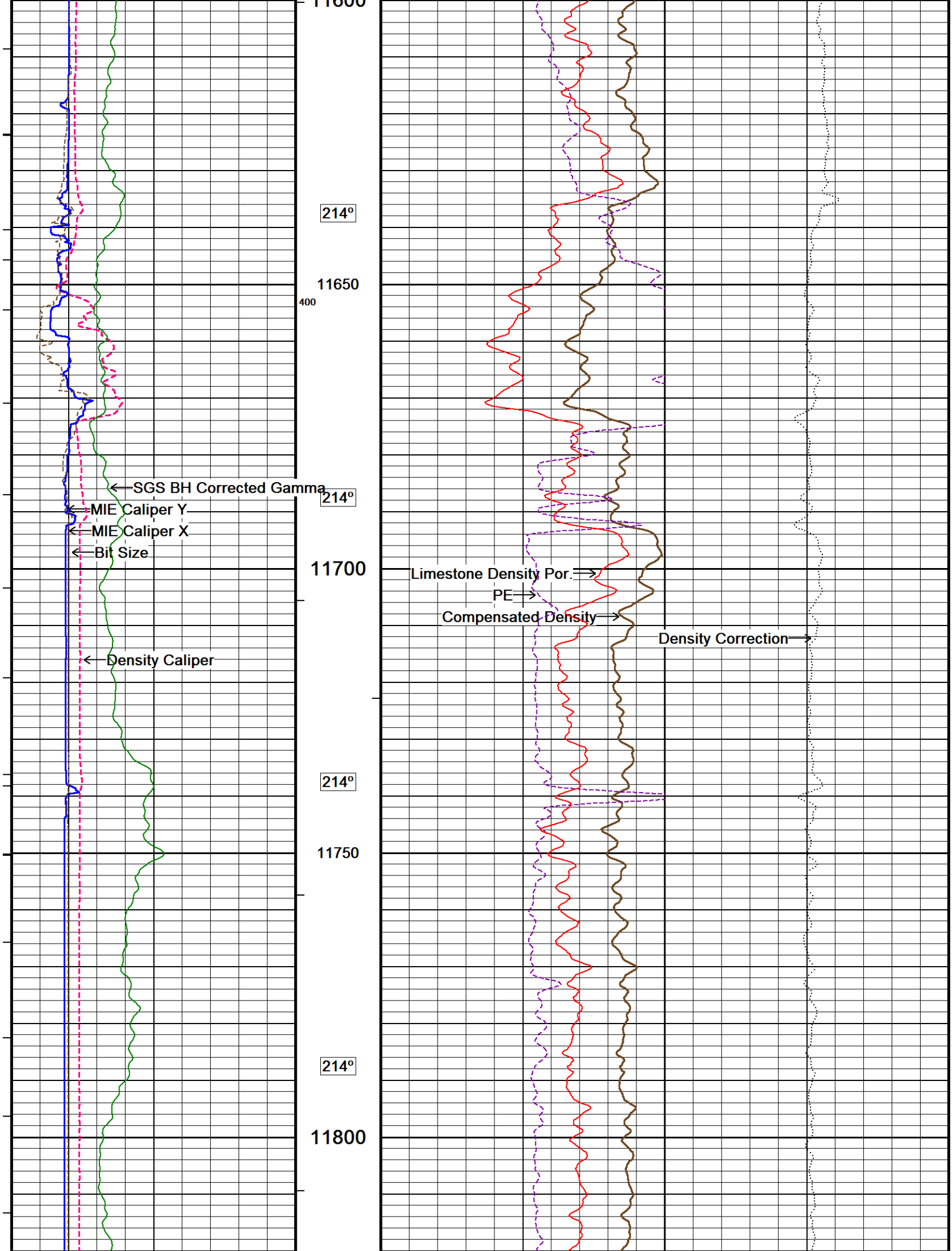

SGS BH Corrected Gamma
MIE Caliper Y
MIE Caliper X
Bit Size
Density Caliper
Limestone Density Por
PE
Compensated Density
Density Correction
213°
213°
213°
213°
10550
600
10600
10650
10700

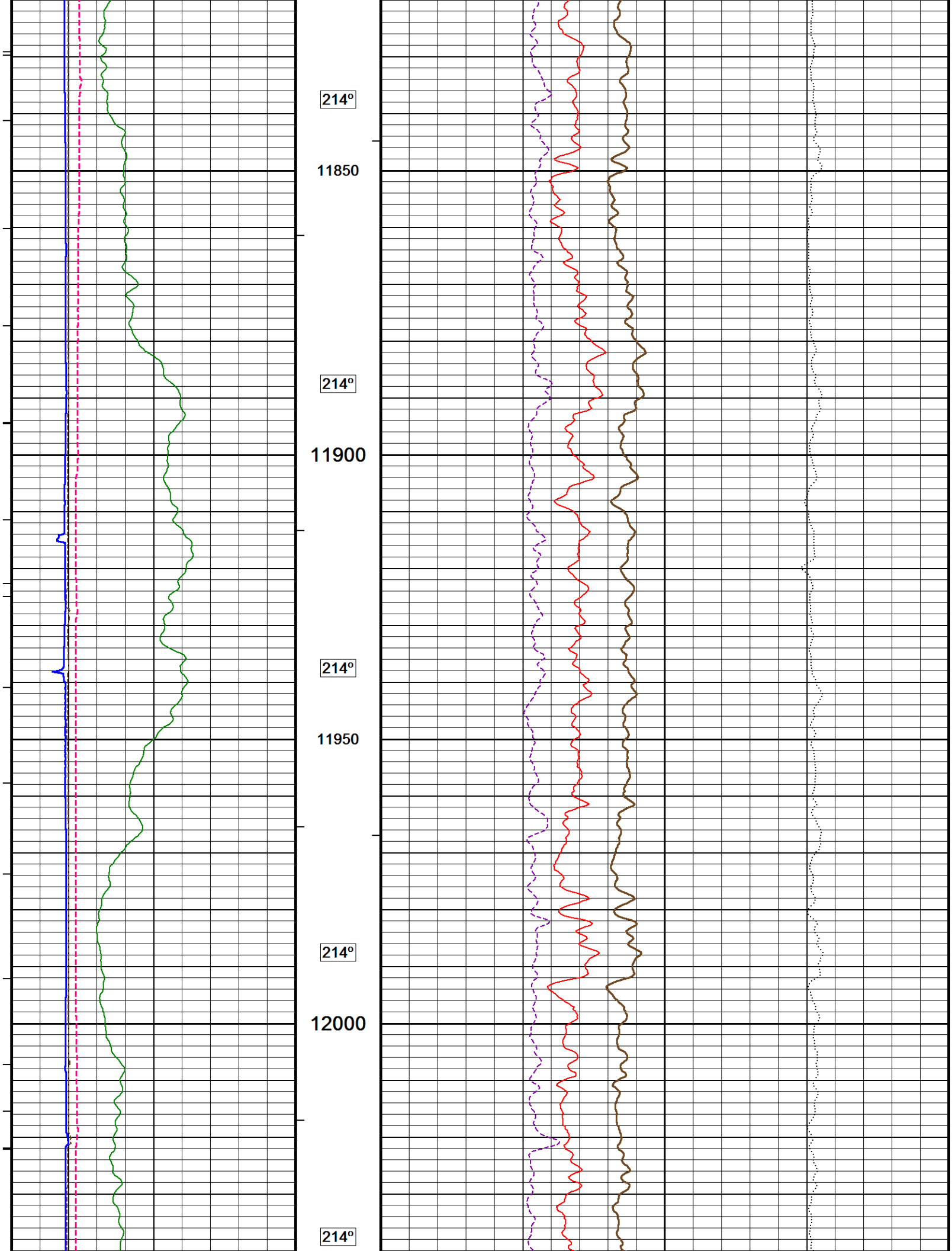

213º
10750
214º
10800
214º
10850
214º
10900
214º
SGS BH Corrected Gamma
MIE Caliper Y
MIE Caliper X
Bit Size
Density Caliper
Limestone Density Por
PE
Compensated Density
Density Correction

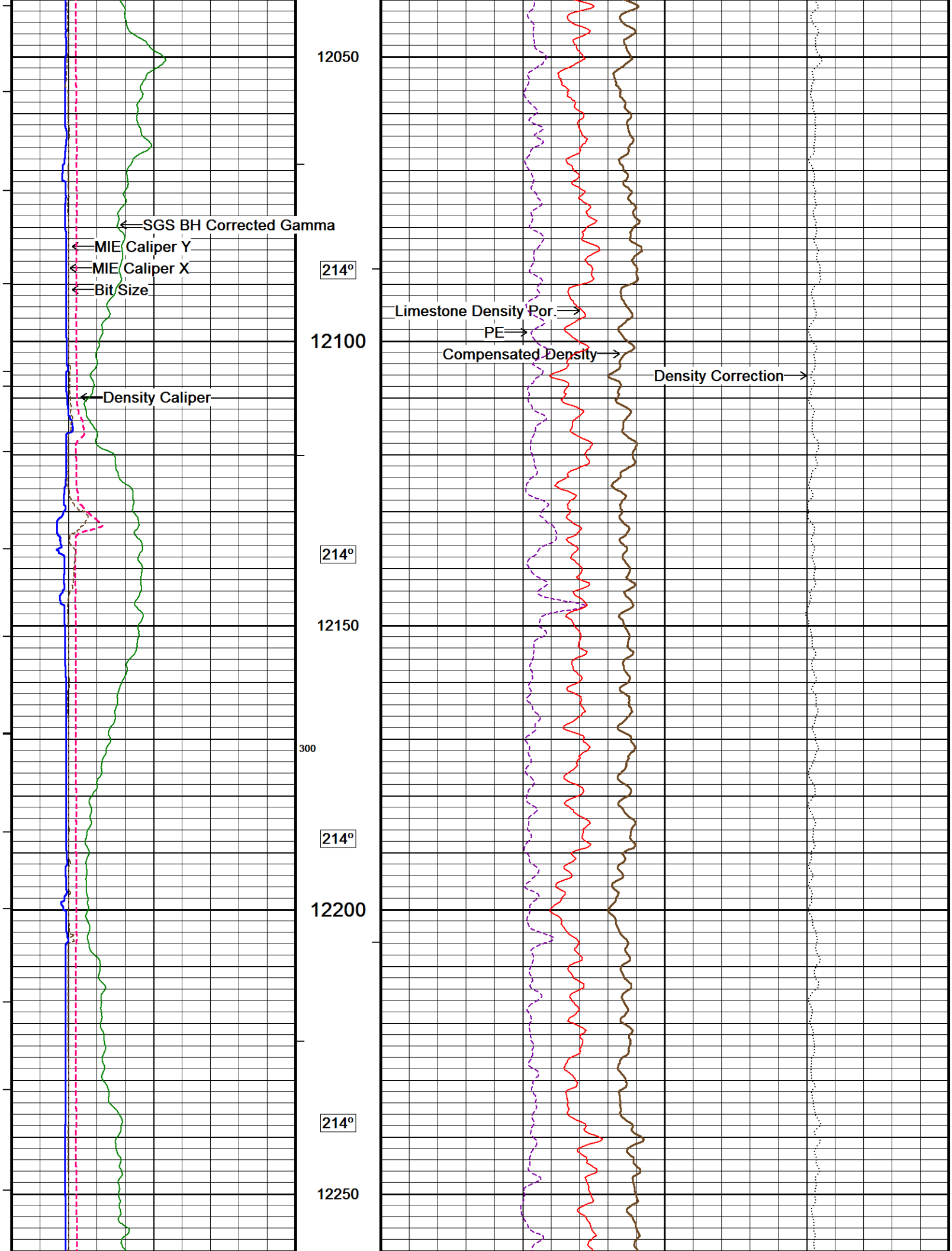

10950
214°
11000
214°
11050
214°
11100
500
214°
11150

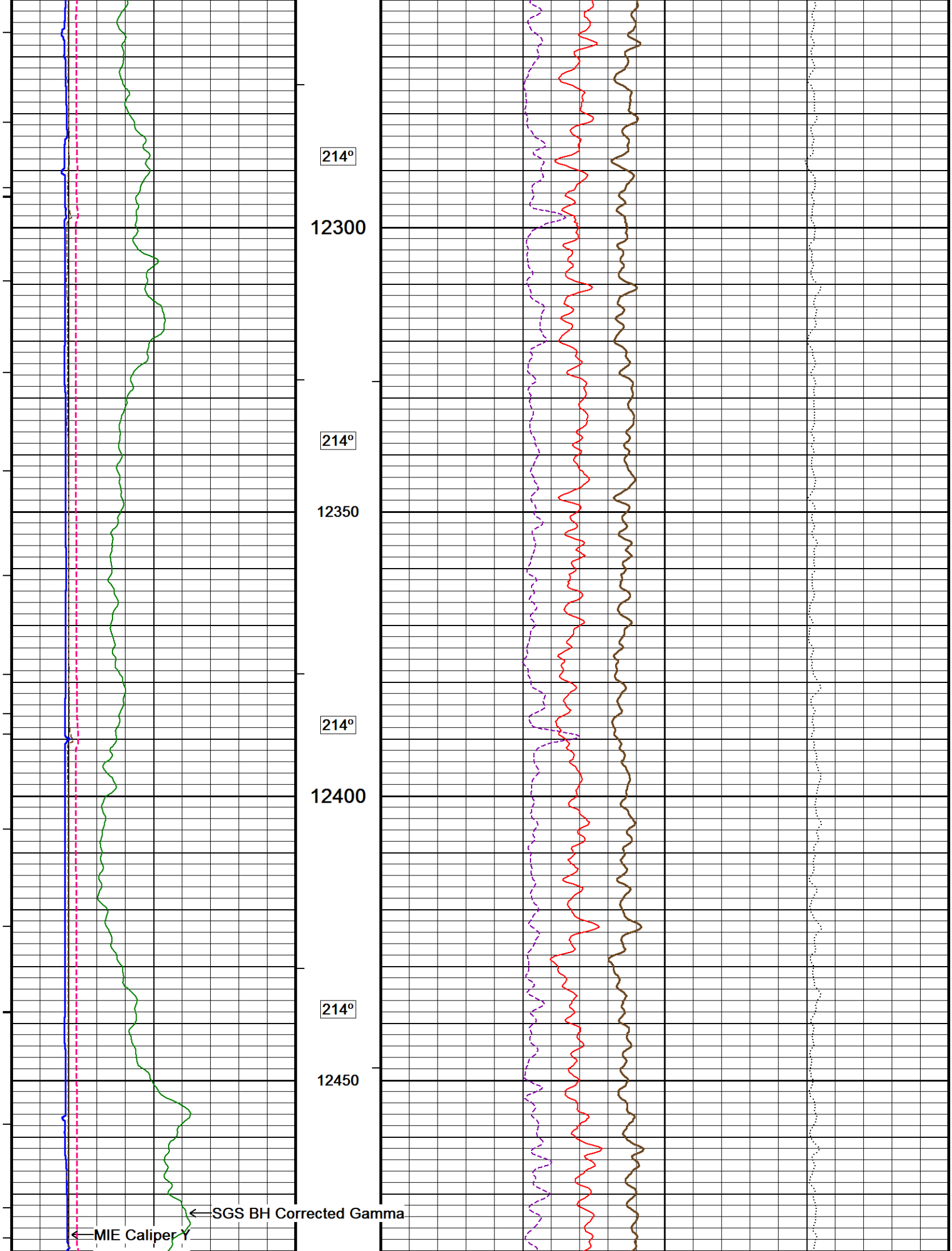

214°
11200
214°
11250
214°
200
SGS BH Corrected Gamma
MIE Caliper Y
MIE Caliper X
Bit Size
11300
Limestone Density Por
PE
Compensated Density
Density Correction
Density Caliper
214°
11350

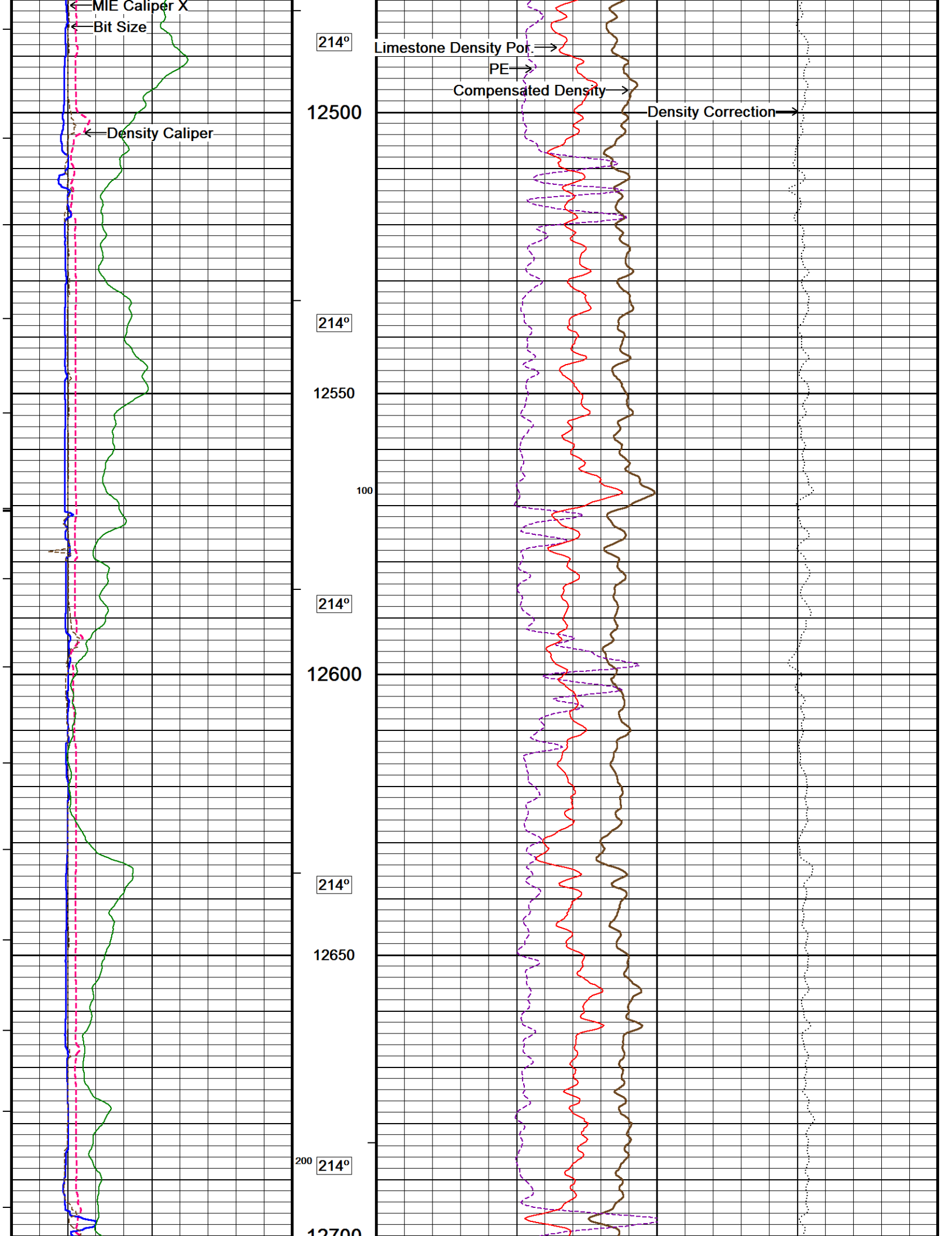

214°
11400
214°
11450
214°
11500
214°
11550
214°
11600

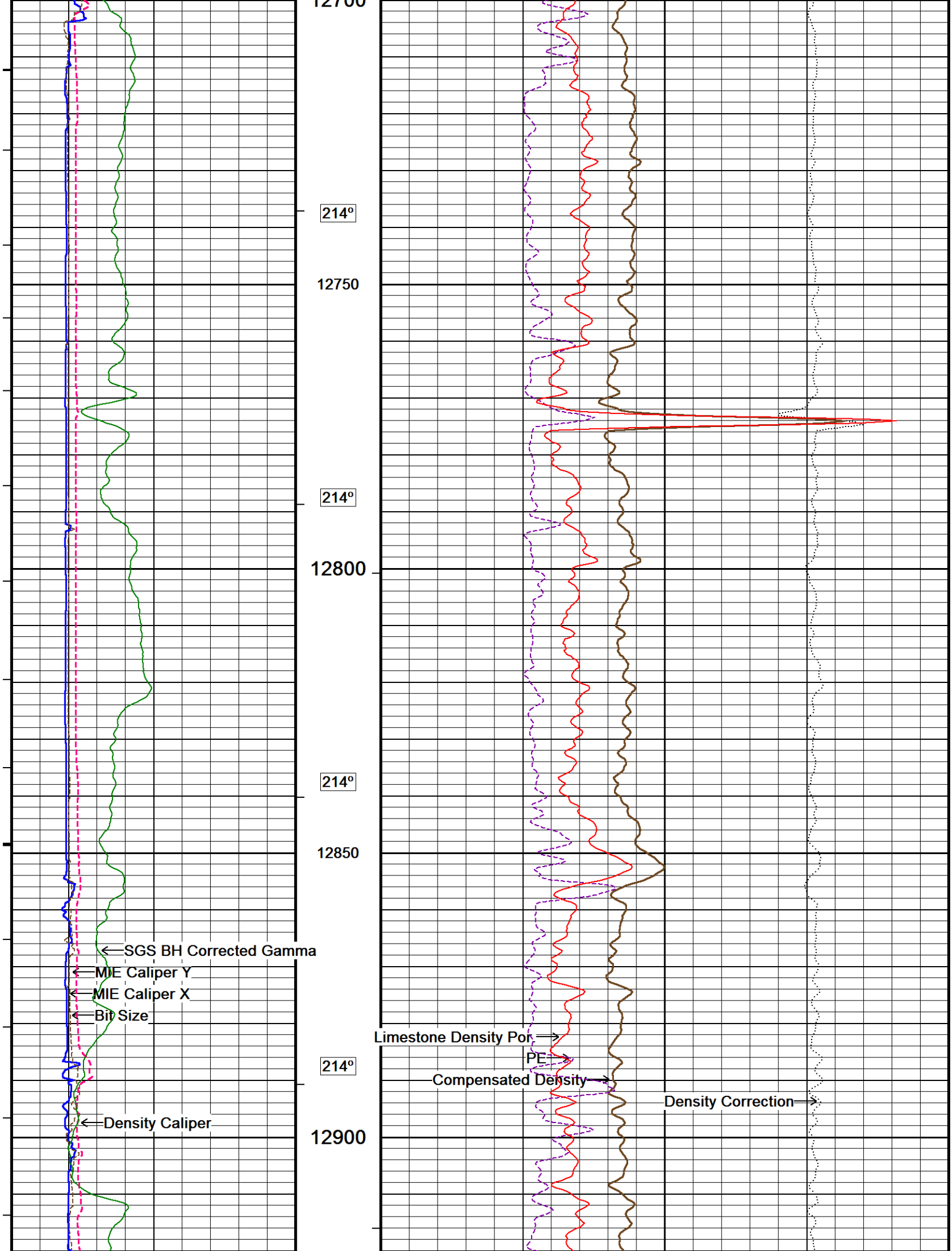

11600
214°
11650
400
214°
SGS BH Corrected Gamma
MIE Caliper Y
MIE Caliper X
Bit Size
11700
Limestone Density Por.
PE
Compensated Density
Density Correction
Density Caliper
214°
11750
214°
11800

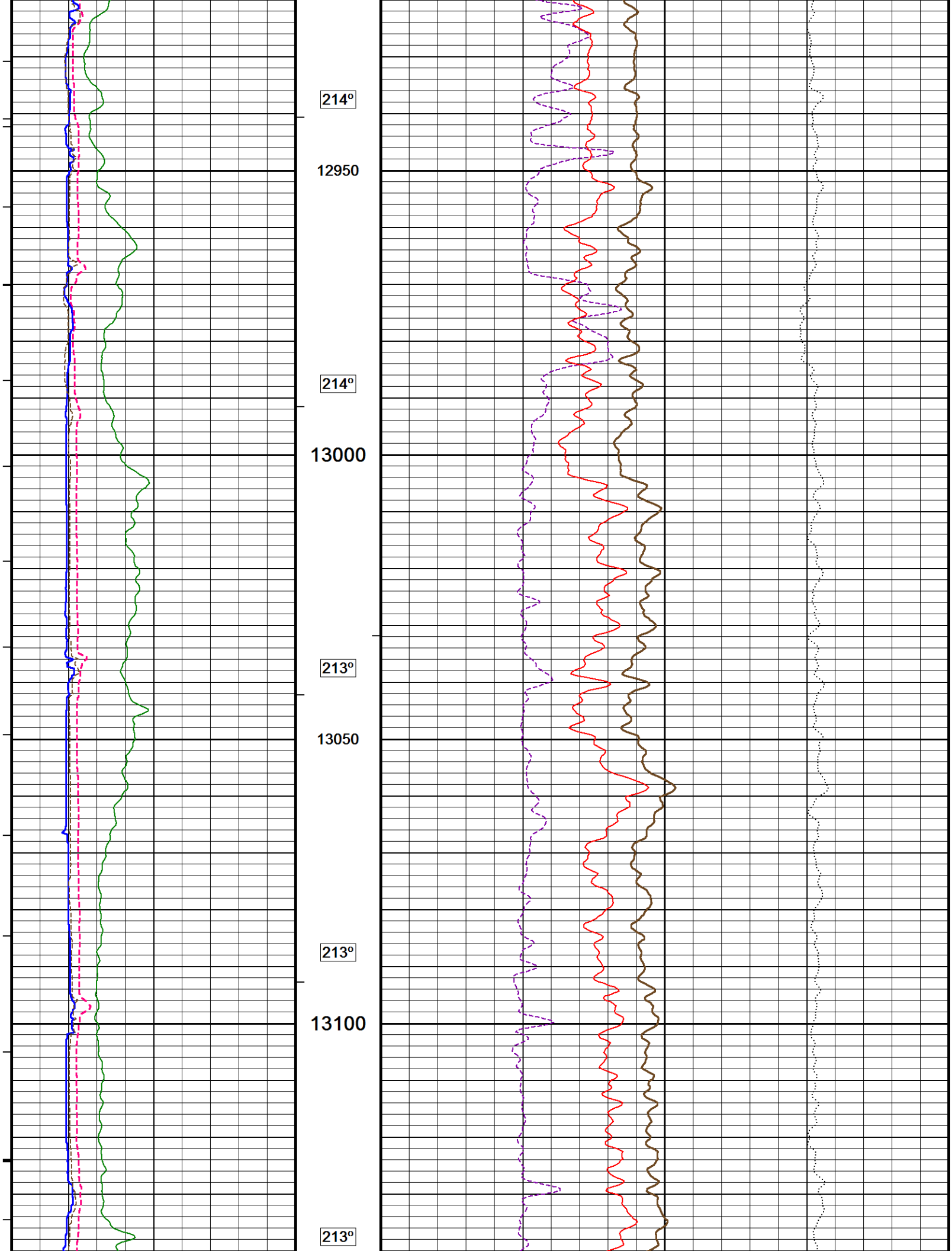

214°
11850
214°
11900
214°
11950
214°
12000
214°

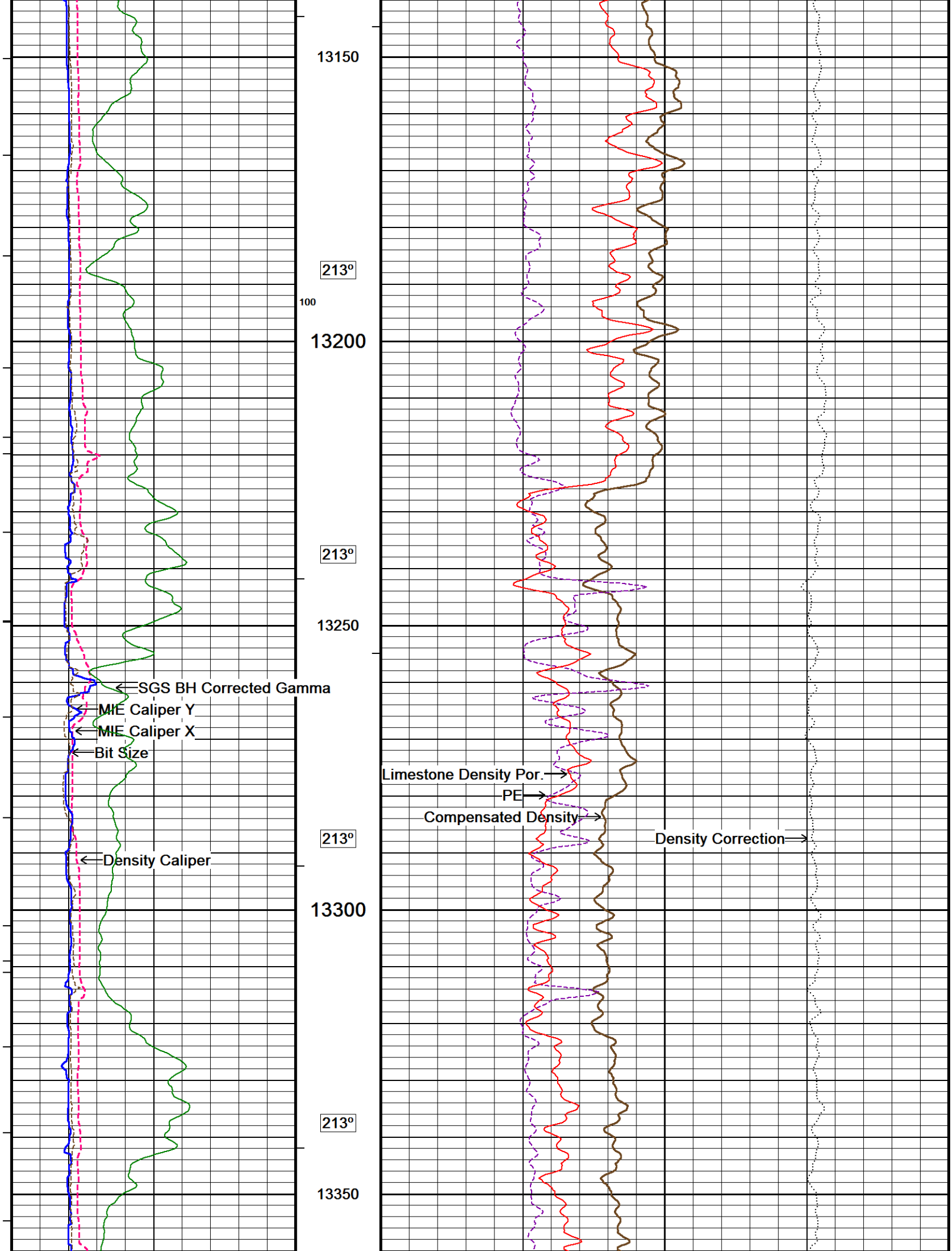

12050
214°
12100
214°
12150
300
214°
12200
214°
12250
SGS BH Corrected Gamma
MIE Caliper Y
MIE Caliper X
Bit Size
Density Caliper
Limestone Density Por
PE
Compensated Density
Density Correction

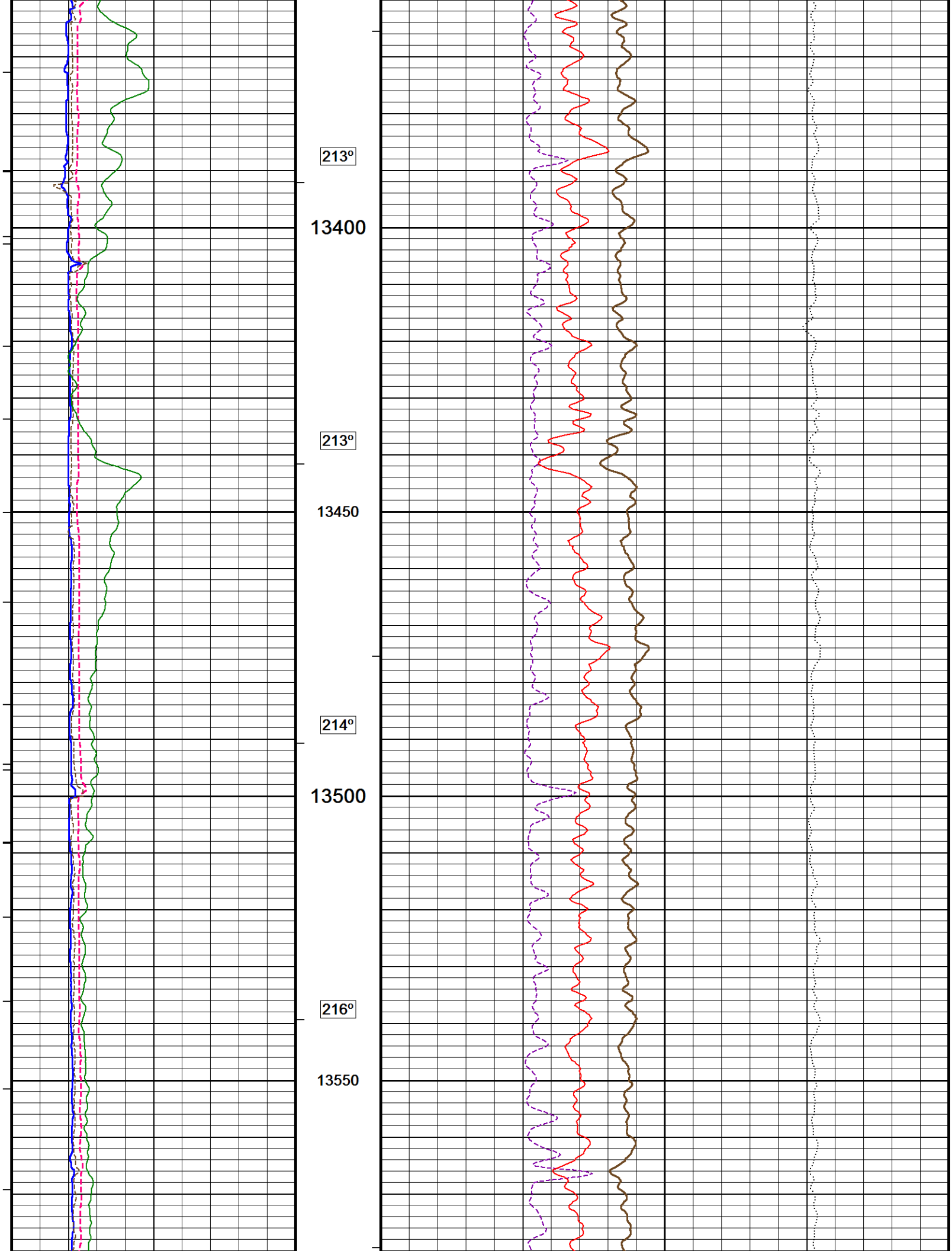

214°
12300
214°
12350
214°
12400
214°
12450
SGS BH Corrected Gamma
MIE Caliper Y

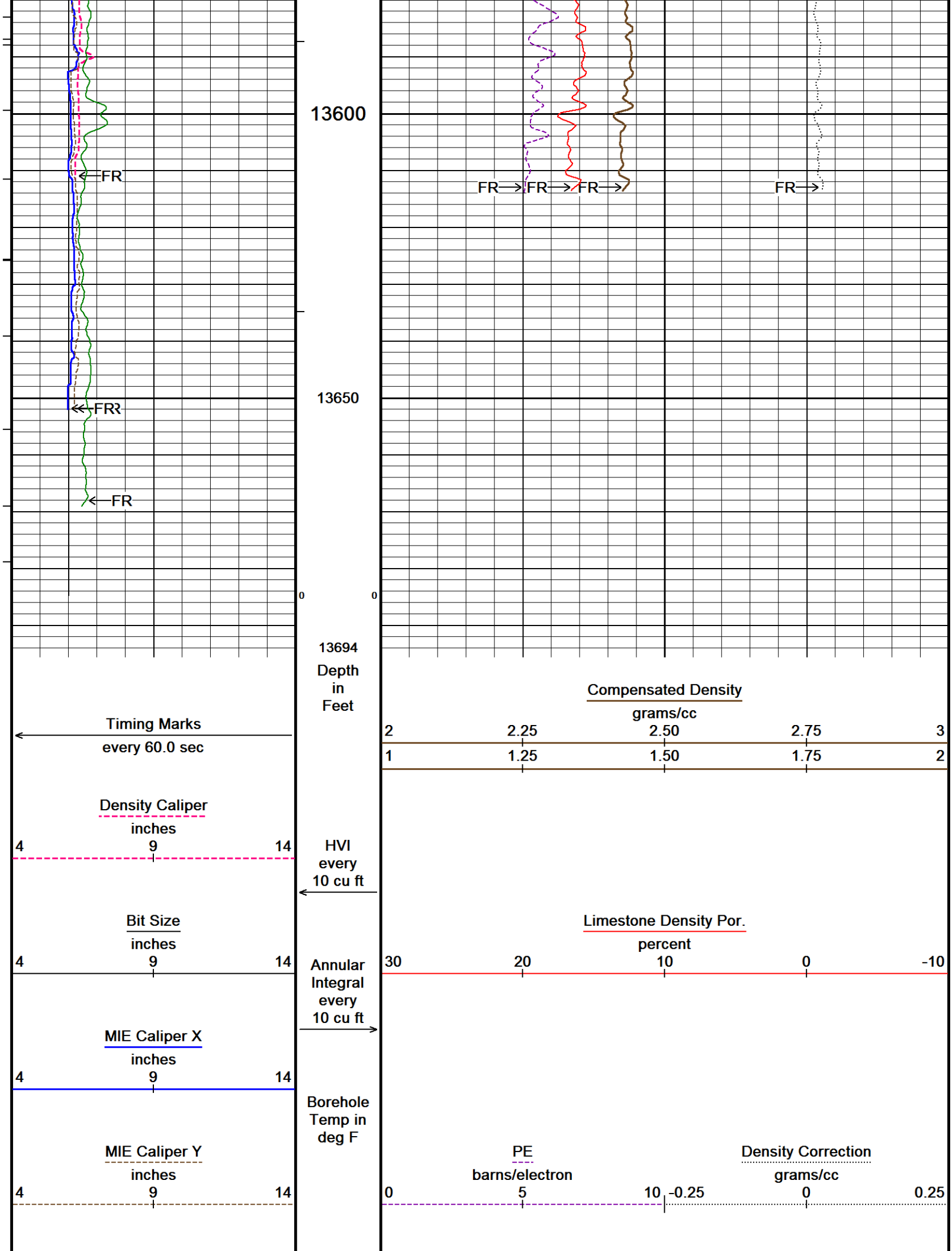

MIE Caliper X
Bit Size
Density Caliper
214°
12500
214°
12550
100
214°
12600
214°
12650
200
214°
12700
Limestone Density Por
PE
Compensated Density
Density Correction


12700
214°
12750
214°
12800
214°
12850
214°
12900
SGS BH Corrected Gamma
MIE Caliper Y
MIE Caliper X
Bit Size
Density Caliper
Limestone Density Por
PE
Compensated Density
Density Correction


214°
12950
214°
13000
213°
13050
213°
13100
213°


13150
213°
100
13200
213°
13250
SGS BH Corrected Gamma
MIE Caliper Y
MIE Caliper X
Bit Size
Limestone Density Por.
PE
Compensated Density
Density Correction
213°
Density Caliper
13300
213°
13350


213°
13400
213°
13450
214°
13500
216°
13550


13600
13650
13694
FR
FR
FR
FR
FR
FR
FR
0
0
Depth
in
Feet
Timing Marks
every 60.0 sec
Compensated Density
grams/cc
2
2.25
2.50
2.75
3
1
1.25
1.50
1.75
2
Density Caliper
inches
4
9
14
HVI
every
10 cu ft
Bit Size
inches
4
9
14
Limestone Density Por.
percent
30
20
10
0
-10
Annular
Integral
every
10 cu ft
MIE Caliper X
inches
4
9
14
Borehole
Temp in
deg F
MIE Caliper Y
inches
4
9
14
PE
barns/electron
0
5
10
Density Correction
grams/cc
-0.25
0
0.25

SGS BH Corrected Gamma			Replay Scale 1:240
	API		
0	150	300	
300	450	600	

Depth Based Data - Maximum Sampling Increment 10.0cm — Plotted on 27-OCT-2014 19:13
Filename: D:\Logs\Whiting\HORSETAIL 29G-2012B\MMS DEPTH.dta — Recorded on 27-OCT-2014 17:11
System Versions: Logged with 14.01.3220 Processed with 14.01.3220 Plotted with 14.01.3220

5 INCH MAIN LOG

BEFORE SURVEY CALIBRATION

D:\Logs\Whiting\HORSETAIL 29G-2012B\MMS DEPTH.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 27-OCT-2014,16:20

General Parameters		
Mud Resistivity	1.880	ohm-metres
Mud Resistivity Temperature	86.600	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 Diam. X Armswing	
HVOL Caliper 2	MIE Diam. Y Armswing	
Annular Volume Diameter	4.500	inches
Caliper for Differential Caliper	MIE Diam. X Armswing	
Rwa Parameters		
Porosity used	Base Density Porosity	
Resistivity used	Array Ind. Four Res Rt	
RWA Constant A	0.610	
RWA Constant M	2.150	
SW/APOR Tool Source	0.000	

Down-hole Tension Calibration SMS 0

Field Calibration on 03-MAR-2014 17:38

Reading No	Measured	Calibrated (lbs)
1	15344.12	0.00
2	16163.79	590.00

Strain Gauge Constants MMS-F.A 189

Last Edited on 18-SEP-2012,14:07

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-D.A 185

Field Calibration on 28-FEB-2014,12:06

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

Upper	200.00	200.00

High Resolution Temperature Constants MGS-D.A 185

Last Edited on 10-APR-2014,11:59

Pre-filter Length	11

SP Calibration MGS-D.A 185

Field Calibration on 28-FEB-2014,12:05

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

Gamma Calibration MGS-D.A 185

Field Calibration on 26-OCT-2014 09:34

	Measured	Calibrated (API)
Background	165	116
Calibrator (Gross)	1022	718
Calibrator (Net)	857	602

Gamma Constants MGS-D.A 185

Last Edited on 26-OCT-2014,13:00

Gamma Calibrator Number	GRCC224	
Mud Density	1.27	gm/cc
Caliper Source for Processing	Density Caliper	
Tool Position	Eccentred	
Concentration of KCl		kppm
K Mud Type	Chloride	
K Mud Concentration	0.00	%

Neutron Calibration MDN-B.J 372

Base Calibration on 01-OCT-2014 13:06
Field Check on 26-OCT-2014 09:44

Base Calibration

	Measured		Calibrated (cps)	
	Near	Far	Near	Far
	2881	87	3714	110
Ratio	33.018		33.764	

Field Calibrator at Base

	Calibrated (cps)	
	2377	3500
Ratio	0.679	

Field Check

	Calibrated (cps)	
	2405	3548
Ratio	0.678	

Neutron Constants MDN-B.J 372

Last Edited on 27-OCT-2014,16:21

Neutron Source Id	P44385B	
Neutron Jig Number	NJ5236	
Air Hole Processing	Modified Ratio	
Caliper Source for Processing	Density Caliper	
Stand-off	0.00	inches
Mud Density	1.00	gm/cc
Limestone Sigma	7.10	cu
Sandstone Sigma	7.00	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	

Imager Pad Check MIE-A.A 173

Field Check on 09-OCT-2014 14:29

Pad 1	20/20 Buttons Verified	Pad 5	20/20 Buttons Verified
Pad 2	24/24 Buttons Verified	Pad 6	24/24 Buttons Verified
Pad 3	20/20 Buttons Verified	Pad 7	20/20 Buttons Verified
Pad 4	24/24 Buttons Verified	Pad 8	24/24 Buttons Verified

Compact Micro Imager Constants MIE-A.A 173

Last Edited on 24-AUG-2014,16:32

Compact Micro Imager Constants MIE-A.A 173

Last Edited on 24-AUG-2014,16:32

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	11111111.0000	mAmp
Image Processing	11111111	

Navigation Constants MIE-A.A 173

Last Edited on 10-SEP-2014,09:35

Magnetic Declination	0.00	degrees	East

Magnetometer Parameters MIE-A.A 173

Date Of Last Magnetometer Calibration 17-JUL-2014,16:28

	X Magnetometer	Y Magnetometer	Z Magnetometer
Slope	-1.000000	-1.011067	-0.996373
Offset	0.009674	-0.014518	0.002543

Magnetometer Constants MIE-A.A 173

Last Edited on

Magnetometer Calibrator Number 000

Accelerometer Parameters MIE-A.A 173

Date Of Last Accelerometer Calibration 15-JUL-2014,13:24

	X Accelerometer	Y Accelerometer	Z Accelerometer
Slope	-1.113967	-1.108777	-1.100961
Offset	0.007433	0.003599	0.006425

Accelerometer Constants MIE-A.A 173

Last Edited on 26-OCT-2014,10:01

Accelerometer Calibrator Number 000

Accelerometer Temperature Characterisation

X Accelerometer

Serial Number	648			
Calibration Date	19-Aug-2008			
	B0	B1	B2	B3
Bias(g)	0.00000e+000	-9.57706e-006	9.83611e-009	1.13245e-011
	SF0	SF1	SF2	SF3
Scale Factor(mA/g)	3.00000e+000	2.83616e-004	1.98700e-007	1.44742e-009

Y Accelerometer

Serial Number	652			
Calibration Date	19-Aug-2008			
	B0	B1	B2	B3
Bias(g)	0.00000e+000	3.42793e-006	-1.11656e-008	-4.36730e-011
	SF0	SF1	SF2	SF3
Scale Factor(mA/g)	3.00000e+000	2.75161e-004	2.12516e-007	8.53262e-010

Z Accelerometer

Serial Number	588			
Calibration Date	06-May-2008			
	B0	B1	B2	B3
Bias(g)	0.00000e+000	2.55228e-005	-4.28668e-009	8.28710e-011
	SF0	SF1	SF2	SF3
Scale Factor(mA/g)	3.00000e+000	2.82774e-004	2.50728e-007	1.25354e-009

Caliper Calibration MIE-A.A 173

Base Calibration on 26-OCT-2014 10:05
Field Calibration on 26-OCT-2014 10:07

Base Calibration

Reading No	Pads 1-5 Meas.	Pads 3-7 Meas.	Calibrator Size (in)
1	26645	27489	5.96
2	36054	37578	7.98
3	45717	47596	9.86

4	56451	58410	11.88	
5	0	0	0.00	

Reading No	Pad 2 Meas.	Pad 4 Meas.	Pad 6 Meas.	Pad 8 Meas.	Calibrator Size (in)
1	25036	26114	25590	25375	5.96
2	33290	34908	34476	33887	7.98
3	41361	43260	42764	42134	9.86
4	50340	52903	53157	51547	11.88
5	0	0	0	0	0.00

Field Calibration

Measured Pads 1-5 Caliper(in)	Measured Pads 3-7 Caliper(in)	Actual Caliper(in)
5.89	5.97	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)
3.01	2.99	2.98	2.98	5.96

Caliper Constants MIE-A.A 173

Last Edited on

Caliper Difference for BRKT	0.120	inches

High Resolution Temperature Calibration MAI-B.J 375

Field Calibration on 24-SEP-2014,03:39

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

High Resolution Temperature Constants MAI-B.J 375

Last Edited on 24-SEP-2014,03:39

Pre-filter Length	11

Induction Calibration MAI-B.J 375

Base Calibration on 06-MAR-2014,09:29
Field Check on 26-OCT-2014 09:40

Base Calibration

Test Loop Calibration

Channel	Measured Low	Measured High	Calibrated (mmho/m) Low	Calibrated (mmho/m) High
1	17.2	476.3	9.3	966.2
2	6.0	379.5	7.6	821.4
3	3.1	258.6	5.2	566.0
4	1.5	131.2	2.6	279.2

Array Temperature	74.3	Deg F

Channel	Base Check (mmho/m) Low	Base Check (mmho/m) High	Field Check (mmho/m) Low	Field Check (mmho/m) High
1			12.8	3802.1
2			30.5	3542.4
3			29.3	3049.5
4			20.5	2097.0
Deep			18.5	1993.6
Medium			42.4	4012.6
Shallow			44.7	5231.5

Array Temperature	69.5	Deg F

Induction Constants MAI-B.J 375

Last Edited on 27-OCT-2014,16:22

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	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	

Caliper Calibration MPD-C.J 378

Base Calibration on 26-OCT-2014 09:57
Field Calibration on 26-OCT-2014 09:58

Base Calibration

Reading No	Measured	Calibrator Size (in)
1	13871	4.00
2	21735	5.96
3	30021	7.98
4	37927	9.86
5	46879	11.88
6	N/A	N/A

Field Calibration

Measured Caliper (in)	Actual Caliper (in)
5.97	5.96

Photo Density Calibration MPD-C.J 378

Base Calibration on 01-OCT-2014 11:53
Field Check on 26-OCT-2014 09:50

Density Calibration

Base Calibration	Measured		Calibrated (sdu)	
	Near	Far	Near	Far
Background	1145	1223		
Reference 1	56123	24901	59443	30683
Reference 2	22147	2322	25113	2508

Field Check at Base

1145.2	1222.9

Field Check

1146.1	1229.7

PE Calibration

Base Calibration	Measured			Calibrated
	WS	WH	Ratio	Ratio
Background	209	1030		
Reference 1	24056	55936	0.434	0.372
Reference 2	6396	22017	0.295	0.268

Field Check at Base

209.3	1029.7

Field Check

209.5	1029.6

Density Constants MPD-C.J 378

Last Edited on 26-OCT-2014,13:00

Density Source Id	P44264B
Nylon Calibrator Number	652
Aluminium Calibrator Number	659

Density Shoe Profile	4 inch	
Caliper Source for Processing	Density Caliper	
PE Correction to Density	Not Applied	
Mud Density	1.27	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

Spectral Gamma Calibration SGS-E.J 128

Base Calibration on 25-SEP-2014 17:21
Field Calibration on 13-OCT-2014,17:33

Base Calibration

Potassium Calibrator

	Gate 1	Gate 2	Gate 3	Gate 4	Gate 5
Background	106.5	36.9	3.8	1.4	2.3
Calibrator (Gross)	234.7	121.4	29.0	1.5	2.4
Calibrator (Net)	128.2	84.5	25.2	0.1	0.1

	K %	U ppm	Th ppm
Concentrations	5.9	0.0	0.0

Uranium Calibrator

	Gate 1	Gate 2	Gate 3	Gate 4	Gate 5
Background	106.5	36.9	3.8	1.4	2.3
Calibrator (Gross)	561.8	196.8	17.3	11.1	5.9
Calibrator (Net)	455.4	159.9	13.5	9.7	3.6

	K %	U ppm	Th ppm
Concentrations	0.0	16.6	0.0

Thorium Calibrator

	Gate 1	Gate 2	Gate 3	Gate 4	Gate 5
Background	106.5	36.9	3.8	1.4	2.3
Calibrator (Gross)	424.1	156.4	12.6	6.6	17.3
Calibrator (Net)	317.6	119.5	8.8	5.2	14.9

	K %	U ppm	Th ppm
Concentrations	0.0	0.0	44.7

Mixture Calibrator

	Gate 1	Gate 2	Gate 3	Gate 4	Gate 5
Background	106.5	36.9	3.8	1.4	2.3
Calibrator (Gross)	906.0	369.5	48.4	14.6	19.8
Calibrator (Net)	799.6	332.5	44.6	13.2	17.5

Field Calibration

Gamma Ray

	Measured	Calibrated (API)
Background	157	31
Calibrator (Gross)	1356	271
Calibrator (Net)	1199	240

Mixture Calibrator

	Gate 1	Gate 2	Gate 3	Gate 4	Gate 5
Background	105.4	35.9	3.8	1.4	2.2
Calibrator (Gross)	900.9	365.2	48.3	14.3	19.5
Calibrator (Net)	795.4	329.3	44.5	12.9	17.3

Spectral Gamma Constants SGS-E.J 128

Last Edited on 26-OCT-2014,13:00

Background Calibrator Number	**440**	
Mixture Calibrator Number	**450**	
Potassium Calibrator Number	**500**	
Uranium Calibrator Number	**506**	
Thorium Calibrator Number	**503**	
Mud Density	**1.27**	**gm/cc**
Caliper Source for Processing	**Density Caliper**	
Tool Position	**Eccentred**	
Concentration of KCl		**kppm**
K Mud Type	**Chloride**	
K Mud Concentration	**0.00**	**%**

DOWNHOLE EQUIPMENT

D:\Logs\Whiting\HORSETAIL 29G-2012B\MMS DEPTH.dta

Shuttle Running Tool 3.5" (SRT A)
SRT-A 6 LG: 6.47 ft WT: 37.5 lb OD: 2.520 in

400V EXT
MLK-A 1 LG: 14.23 ft WT: 30.9 lb OD: 2.240 in

200V ST
MLK-A 2 LG: 8.52 ft WT: 30.9 lb OD: 2.240 in

MMR LINKER
MLK-A 3 LG: 4.48 ft WT: 30.9 lb OD: 2.240 in

SKJ-E.B Compact Knuckle Joint
SKJ-E.B 614 LG: 2.17 ft WT: 24.3 lb OD: 2.244 in

MBS-G.A 200v Compact Battery Sub
MBS-G.A 126 LG: 17.06 ft WT: 123.5 lb OD: 2.240 in

Compact Memory Sub F.A
MMS-F.A 189 LG: 5.20 ft WT: 37.5 lb OD: 2.244 in

Compact Tool Isolator sub.
MTI-C.A 136 LG: 1.54 ft WT: 13.2 lb OD: 2.244 in

Compact Short Gamma
MGS-D.A 185 LG: 3.41 ft WT: 24.3 lb OD: 2.244 in

Compact Collar Locator
MCL-C.A 96 LG: 3.17 ft WT: 26.5 lb OD: 2.244 in

SKJ-E.A Compact Knuckle Joint
SKJ-E.A 244 LG: 2.17 ft WT: 24.3 lb OD: 2.244 in

SHA-H Compact Swivel Head Adaptor
SHA-H 142 LG: 2.30 ft WT: 22.0 lb OD: 2.244 in

MIS-D.B Compact Inline Bowspring sub
MIS-D.B 723 LG: 5.70 ft WT: 33.1 lb OD: 2.240 in

Compact Neutron
MDN-B.J 372 LG: 5.04 ft WT: 50.7 lb OD: 2.244 in

Compact Density/Caliper
MPD-C.J 378 LG: 9.59 ft WT: 90.4 lb OD: 2.244 in

MIS-D.B Compact Inline Bowspring sub
MIS-D.B 731 LG: 5.70 ft WT: 33.1 lb OD: 2.240 in

SHA-J.B Compact Swivel Head Adaptor
SHA-J.B 512 LG: 2.30 ft WT: 22.0 lb OD: 2.244 in

SKJ-E.A Compact Knuckle Joint
SKJ-E.A 245 LG: 2.17 ft WT: 24.3 lb OD: 2.244 in

MIS-E.B Compact Inline Standoff sub
MIS-E.B 695 LG: 2.14 ft WT: 15.4 lb OD: 2.244 in

SKJ-E.B Compact Knuckle Joint
SKJ-E.B 603 LG: 2.17 ft WT: 24.3 lb OD: 2.244 in

MIS-D.A Compact Inline Bowspring sub
MIS-D.A 437 LG: 5.70 ft WT: 33.1 lb OD: 2.240 in

Compact MMI Memory Section
MIM-A.A 173 LG: 4.65 ft WT: 26.5 lb OD: 2.240 in

Compact MMI Electrode Section
MIE-A.A 173 LG: 13.96 ft WT: 99.2 lb OD: 4.094 in

MIS-D.A Compact Inline Bowspring sub
MIS-D.A 293 LG: 5.70 ft WT: 33.1 lb OD: 2.240 in

SKJ-E.B Compact Knuckle Joint
SKJ-E.B 612 LG: 2.17 ft WT: 24.3 lb OD: 2.244 in

Spectral Gamma Ray Sub
SGS-E.J 128 LG: 7.78 ft WT: 105.8 lb OD: 3.543 in

SKJ-E.A Compact Knuckle Joint
SKJ-E.A 246 LG: 2.17 ft WT: 24.3 lb OD: 2.244 in

MIS-E.B Compact Inline Standoff sub
MIS-E.B 694 LG: 2.14 ft WT: 15.4 lb OD: 2.244 in

Compact Induction
MAI-B.J 375 LG: 10.81 ft WT: 48.5 lb OD: 2.240 in

Total Length: 160.56 ft Weight: 1128.8 lb

Tool Zero (0.13ft from bottom)

COMPANY	WHITING OIL AND GAS CORPORATION
WELL	HORSETAIL 29G-2012B
FIELD	REDTAIL
PROVINCE/COUNTY	WELD
COUNTRY/STATE	U.S.A. / COLORADO

Elevation Kelly Bushing	4712.00	feet	First Reading	13610.00	feet
Elevation Drill Floor	4712.00	feet	Depth Driller	13700.00	feet
Elevation Ground Level	4694.00	feet	Depth Logger	13700.00	feet

Weatherford®

MEASURED DEPTH
PHOTO DENSITY
DUAL SPACED NEUTRON