Weatherford®

MEASURED DEPTH
X-Y CALIPER
HOLE VOLUME LOG

COMPANY	WHITING OIL AND GAS CORPORATION
WELL	HORSETAIL 30F-1941
FIELD	REDTAIL
PROVINCE/COUNTY	WELD
COUNTRY/STATE	U.S.A. / COLORADO
LOCATION	SHL: 2324 FNL & 1860 FWL **SENW S. 30 10N 57W**
PERMIT NUMBER	BHL: 100 FNL & 1320 FWL

SEC 30	TWP 10N	RGE 57W	Other Services
			ARRAY INDUCTION — SPECTRAL GAMMA
			MICRO IMAGER
API Number	05-123-38742		NEUTRON/DENSITY

Permanent Datum G.L., Elevation 4780 feet
Log Measured From KB
Drilling Measured From K.B. @ 17 FEET

Elevations:	feet
KB	4797.00
DF	4797.00
GL	4780.00

Date	7-NOV-2014					
Run Number	ONE					
Service Order	6551-102498133					
Depth Driller	13938.00	feet				
Depth Logger	13938.00	feet				
First Reading	13890.00	feet				
Last Reading	6196.00	feet				
Casing Driller	6202.00	feet				
Casing Logger	6206.00	feet				
Bit Size	6.000	inches				
Hole Fluid Type	WBM					
Density / Viscosity	9.40	lb/USg	35.00	type in		
PH / Fluid Loss	8.20		6.00	ml/30Min		
Sample Source	FLOWLINE					
Rm @ Measured Temp	1.18 @ 69.7	ohm-m				
Rmf @ Measured Temp	0.94 @ 69.7	ohm-m				
Rmc @ Measured Temp	1.42 @ 69.7	ohm-m				
Source Rmf / Rmc	CALC	CALC				
Rm @ BHT	0.073 @115.0	ohm-m				
Time Since Circulation	1 HOUR					
Max Recorded Temp	221.00	deg F				
Equipment / Base	18087	Casper				
Recorded By	C CULLEN					
Witnessed By	M ODEBERG		GEOLOGIST			
WSL			WSL			

BOREHOLE RECORD

Last Edited: 07-NOV-2014 11:37

Bit Size inches	Depth From feet	Depth To feet
6.000	6202.00	13938.00

CASING RECORD

Type	Size inches	Depth From feet	Shoe Depth feet	Weight pounds/ft
SURFACE	7.000	0.00	6202.00	29.00

REMARKS

LOGGED WITH WLS 14.03.5114

LOGGED USING MESSAGER SHUTTLE METHOD OF DEPLOYMENT

HARDWARE:
MDN: MIS-D 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

THE LAST 8 STANDS RUNNING IN WERE WASHED DOWN AT 4BBLS/MIN AND 25RPM

ANNULAR HOLE VOLUME FROM TD TO 7"-29# CASING AT 6206 FEET = 705 CUBIC FEET.
TOTAL HOLE VOLUME FROM TD TO 7"-29# CASING AT 6206 FEET = 1560 CUBIC FEET

OPERATORS: SMITH, GERDES

RIG: XTREME 18

In interpreting, communicating or providing information and/or making recommendations, either written or oral, as to logs or test or other data, type or amount of material, or Work or other service to be furnished, or manner of performance, or in predicting results to be obtained, the Contractor will give the Company the benefit of the Contractor's best judgment based on its experience and will perform all such Work in a good and workmanlike manner. Any interpretation of test or other data, and any recommendation or reservoir description based upon such interpretations, are opinions based upon inferences from measurements and empirical relationships and assumptions, which inferences and assumptions are not infallible, and with respect to which professional engineers and analysts may differ. ACCORDINGLY ANY INTERPRETATION OR RECOMMENDATION RESULTING FROM THE SERVICES WILL BE AT THE SOLE RISK OF THE COMPANY, AND THE CONTRACTOR CANNOT AND DOES NOT WARRANT THE ACCURACY, CORRECTNESS OR COMPLETENESS OF ANY SUCH INTERPRETATION OR RECOMMENDATION, WHICH INTERPRETATIONS AND RECOMMENDATIONS SHOULD NOT, THEREFORE, UNDER ANY CIRCUMSTANCES BE RELIED UPON AS THE SOLE OR MAIN BASIS FOR ANY DRILLING, COMPLETION, WELL TREATMENT, PRODUCTION OR FINANCIAL DECISION, OR ANY PROCEDURE INVOLVING ANY RISK TO THE SAFETY OF ANY DRILLING ACTIVITY, DRILLING RIG OR ITS CREW OR ANY OTHER INDIVIDUAL. THE COMPANY HAS FULL RESPONSIBILITY FOR ALL DECISIONS CONCERNING THE SERVICES.

5 INCH MAIN LOG

Depth Based Data - Maximum Sampling Increment 10.0cm — Plotted on 08-NOV-2014 18:27

Filename: C:\LOGS\WHITING\HORSETAIL 30F-1941\MMS DEPTH.dta — Recorded on 08-NOV-2014 16:45

System Versions: Logged with 14.03.5114 Processed with 14.03.5114 Plotted with 14.03.5114

Timing Marks every 60.0 sec

Density Caliper(CLDC) inches 4 9 14

Bit Size(BIT) inches 4 9 14

SGS BH Corrected Gamma(GSGC) API 0 150 300 / 300 450 600

Depth in Feet

HVI every 10 cu ft

Annular Integral every 10 cu ft

Borehole Temp in deg F

Replay Scale 1:240

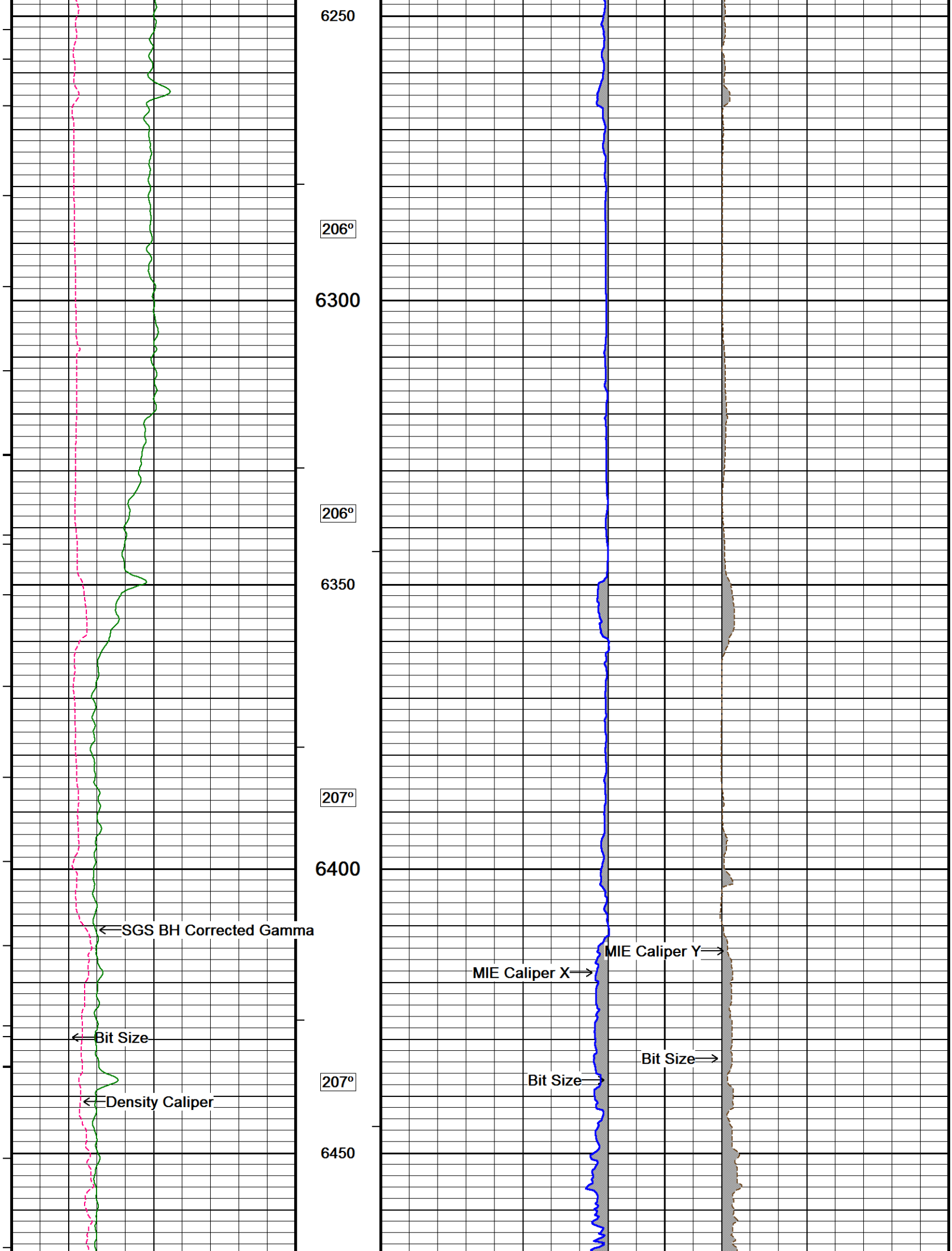
Bit Size(BIT) inches 14 9 4 — Bit Size(BIT) inches 4 9 14

Casing Size(CASE) inches 14 9 4 — Casing Size(CASE) inches 4 9 14

MIE Caliper X(IECX) inches 14 9 4 — MIE Caliper Y(IECY) inches 4 9 14

6200 Casing Shoe

206° 700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6300
206°
6350
207°
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207°
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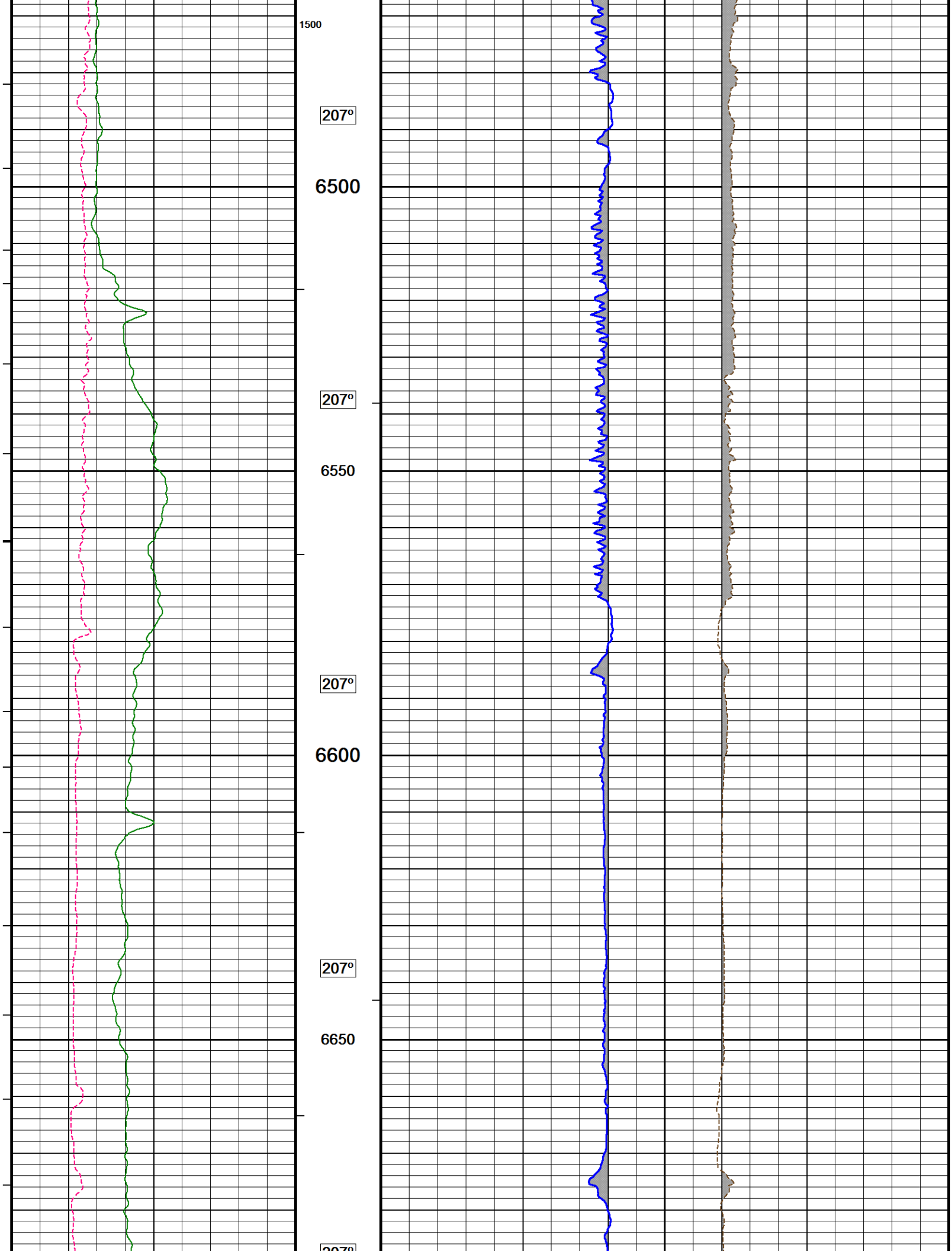
Bit Size
Density Caliper
MIE Caliper Y
MIE Caliper X
Bit Size
Bit Size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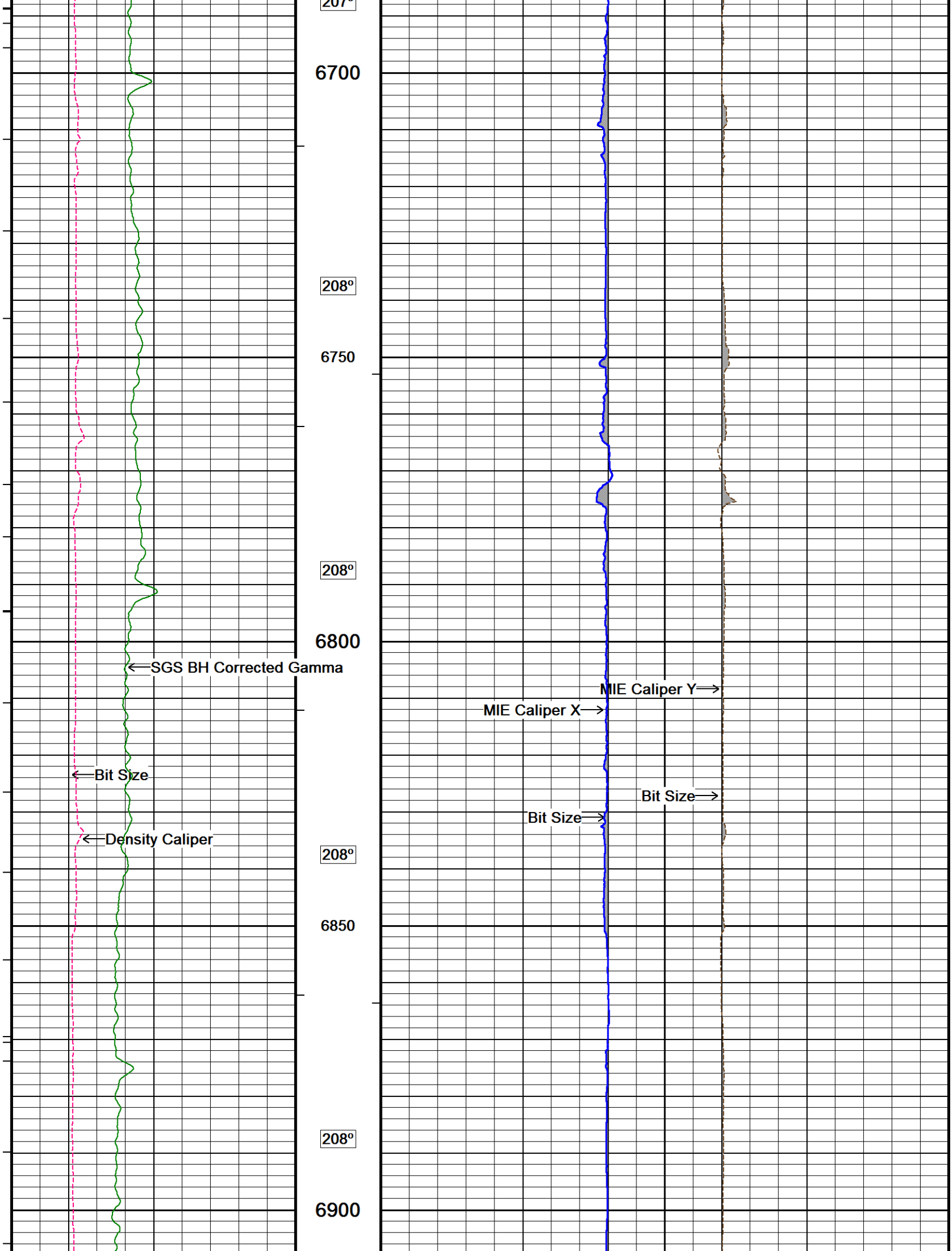
6500
207°
6550
207°
6600
207°
6650
207°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208°
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208°
6800
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Bit Size
Density Caliper
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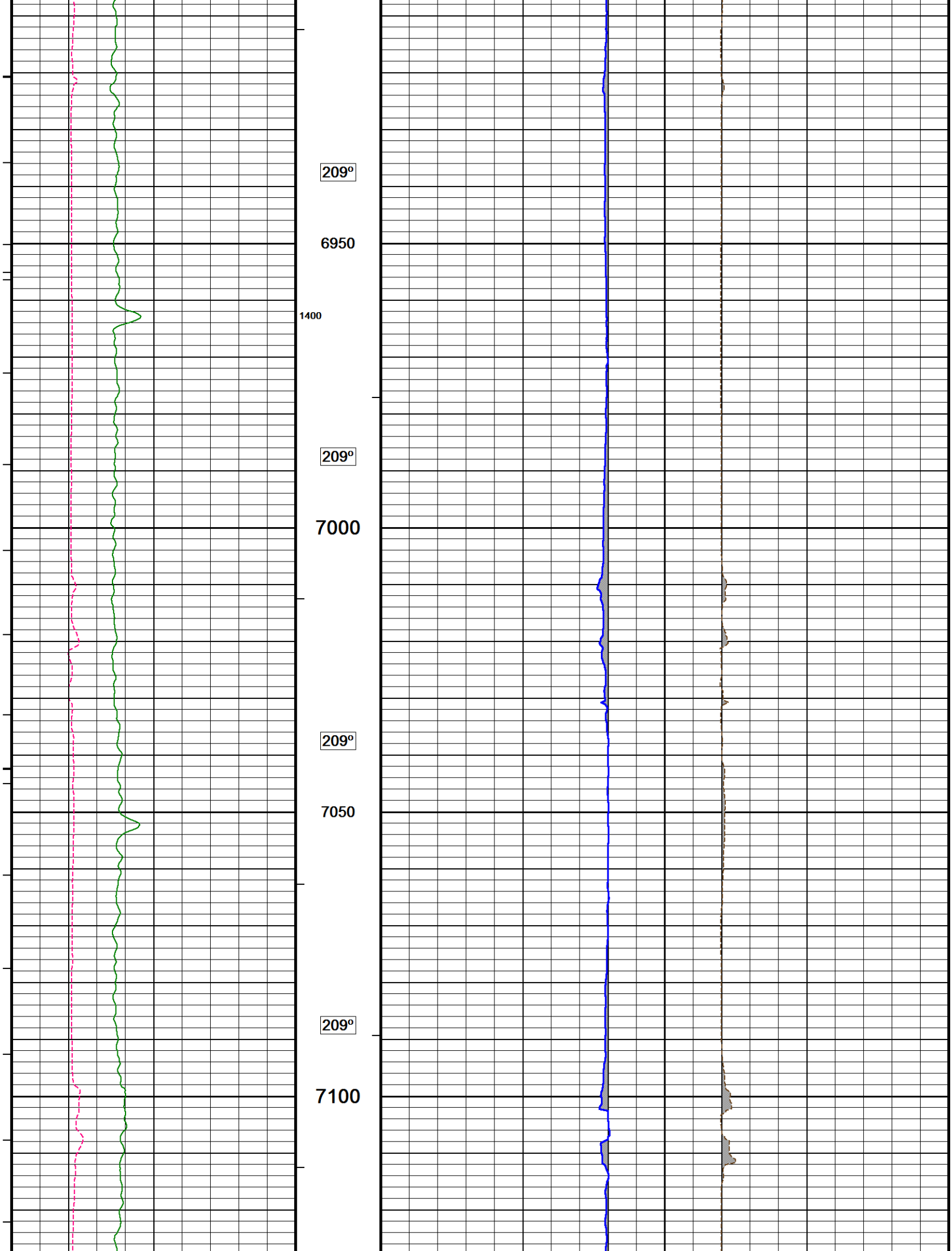
MIE Caliper Y
MIE Caliper X
Bit Size
Bit Size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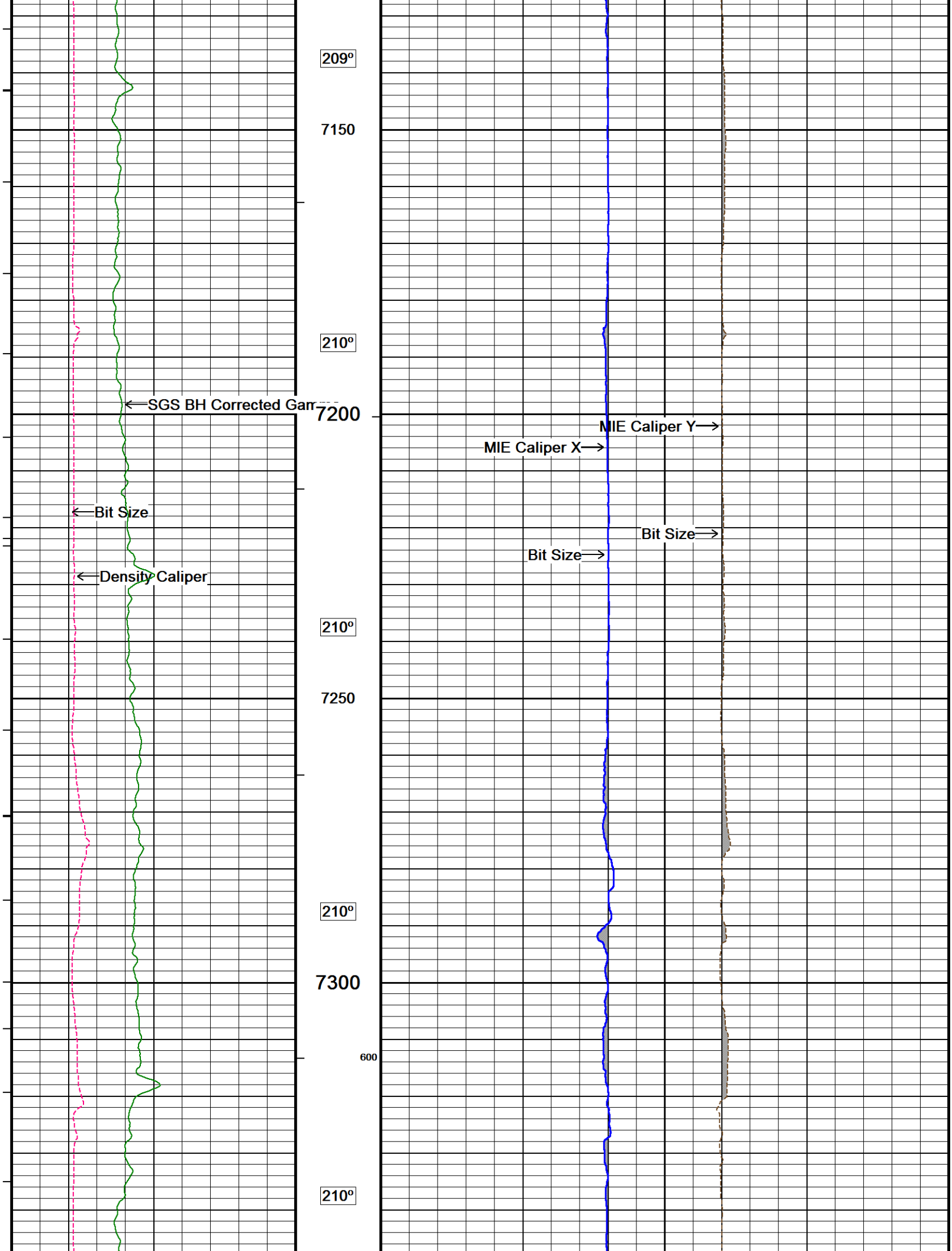
7000
209°
7050
209°
7100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7150
210°
SGS BH Corrected Gam
7200
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MIE Caliper X
Bit Size
Bit Size
Bit Size
Density Caliper
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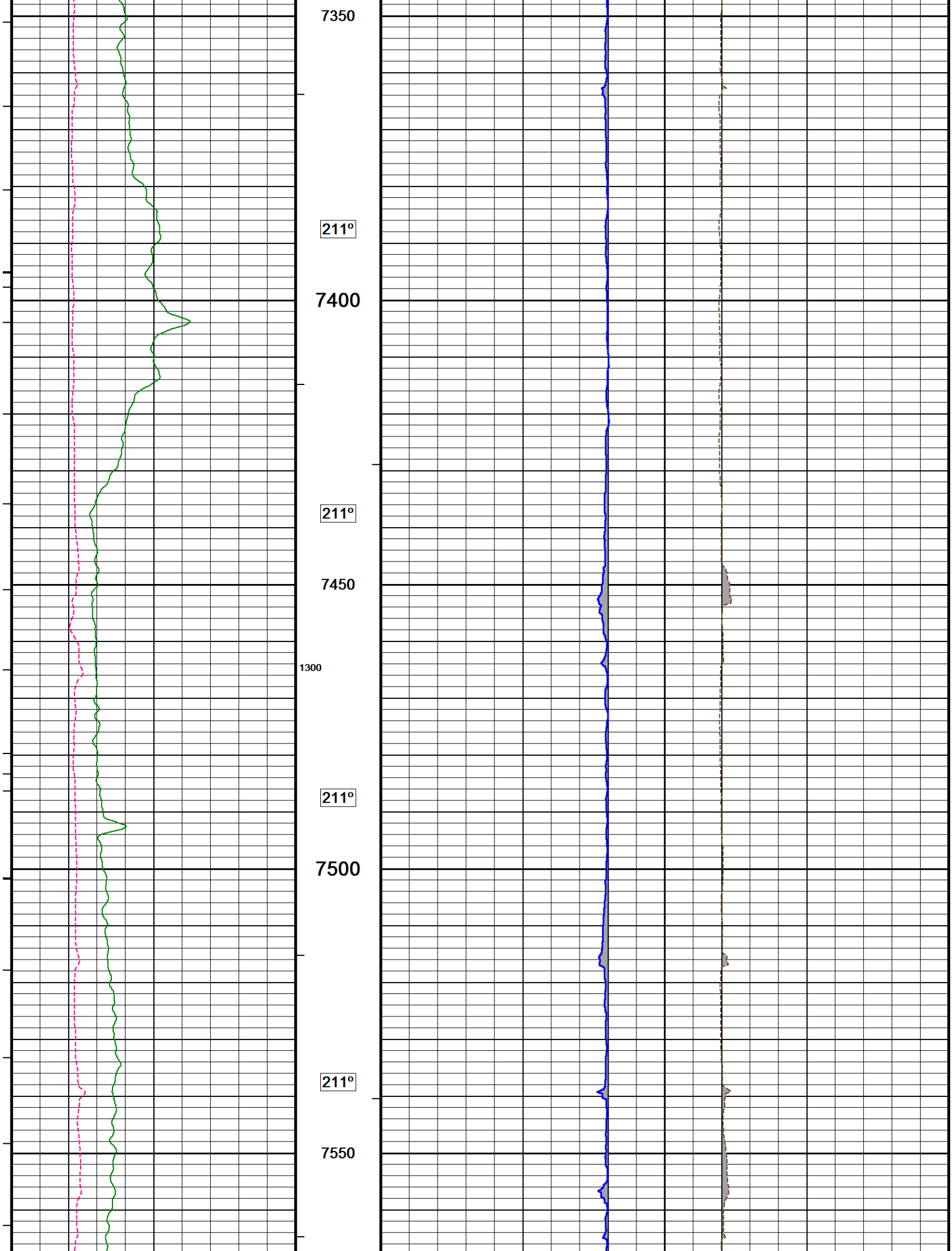
7250
210°
7300
600
210°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1300
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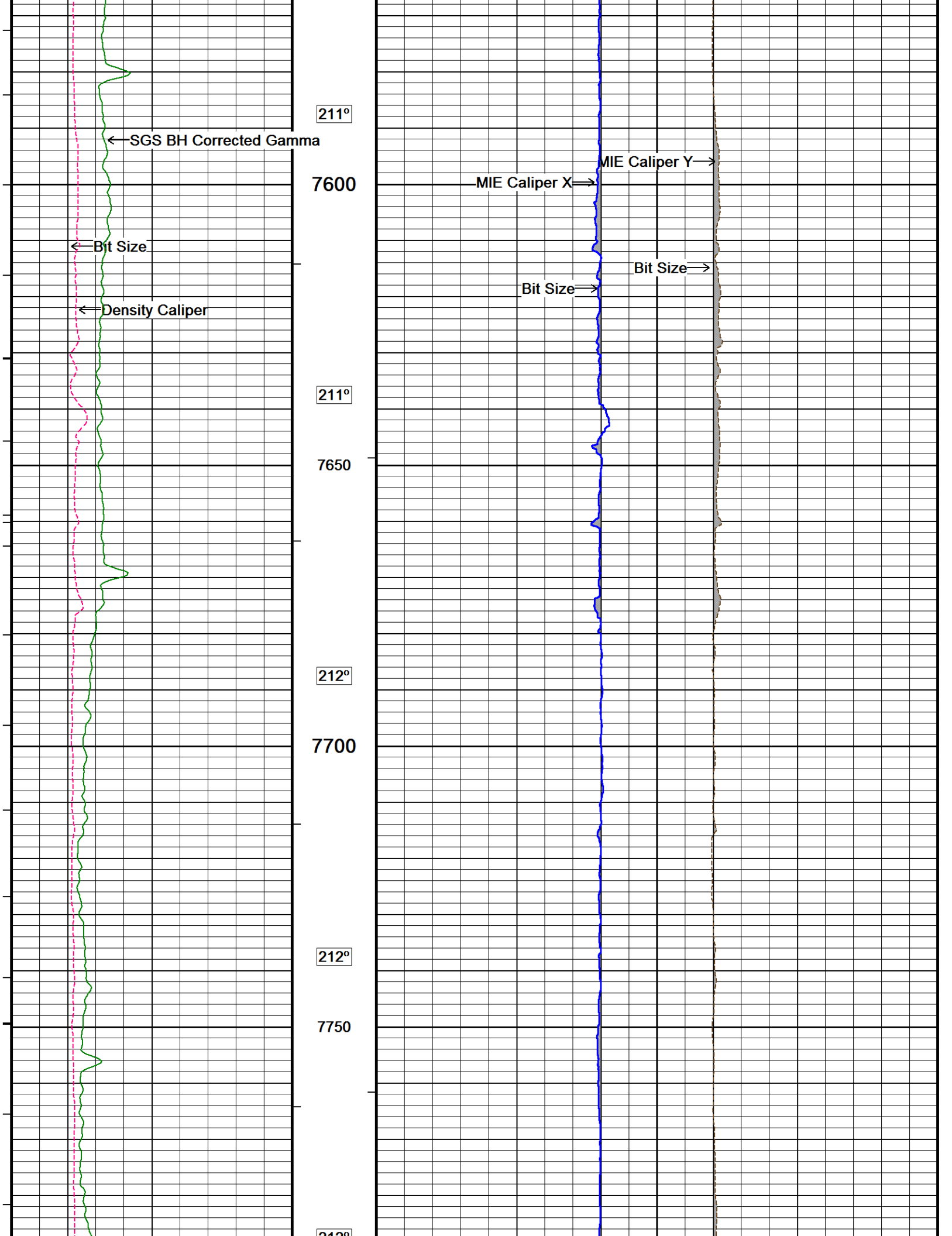
211°
7550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Bit Size
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212°
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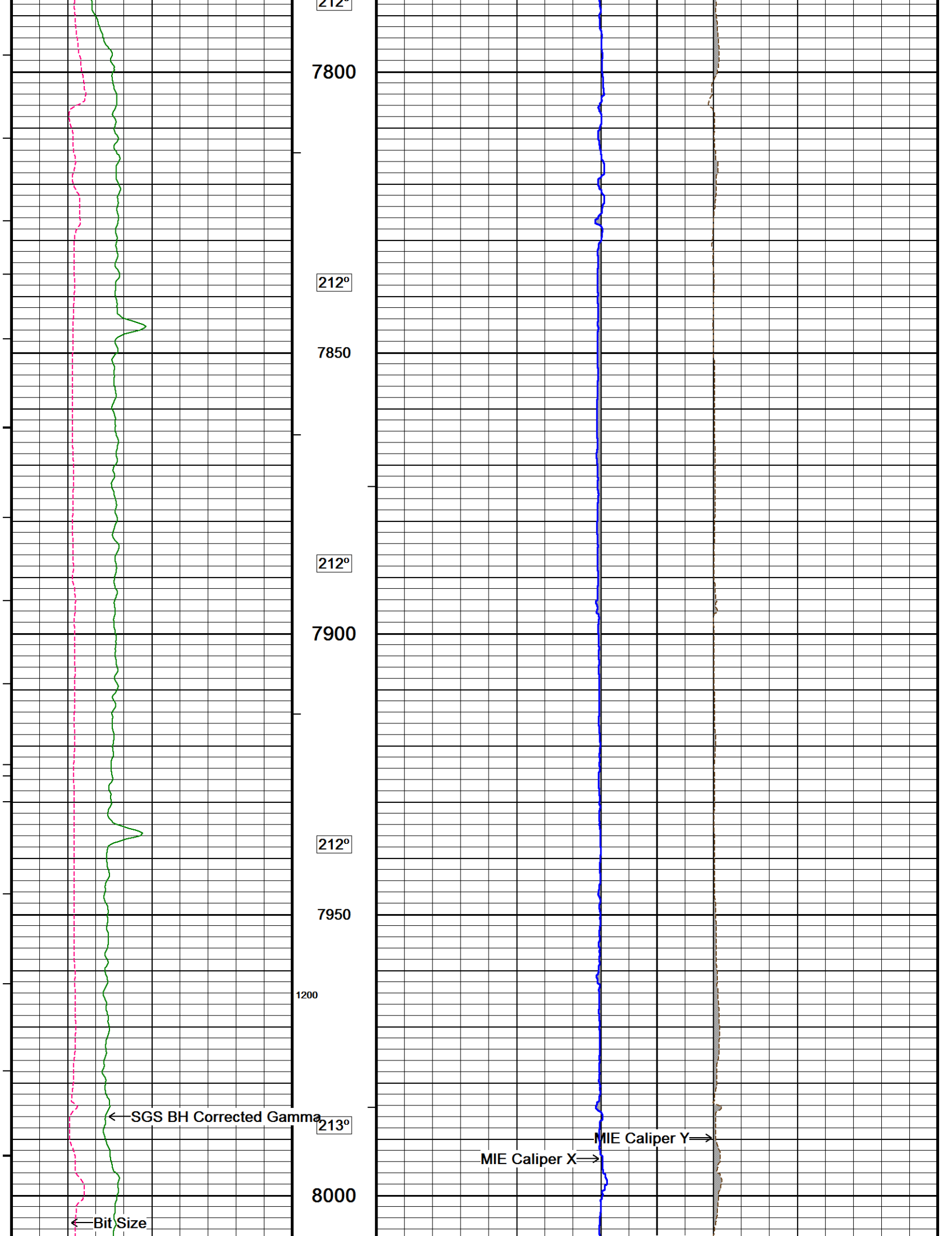
MIE Caliper X
Bit Size
Bit Size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212°
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1200
213°
8000
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Bit Size
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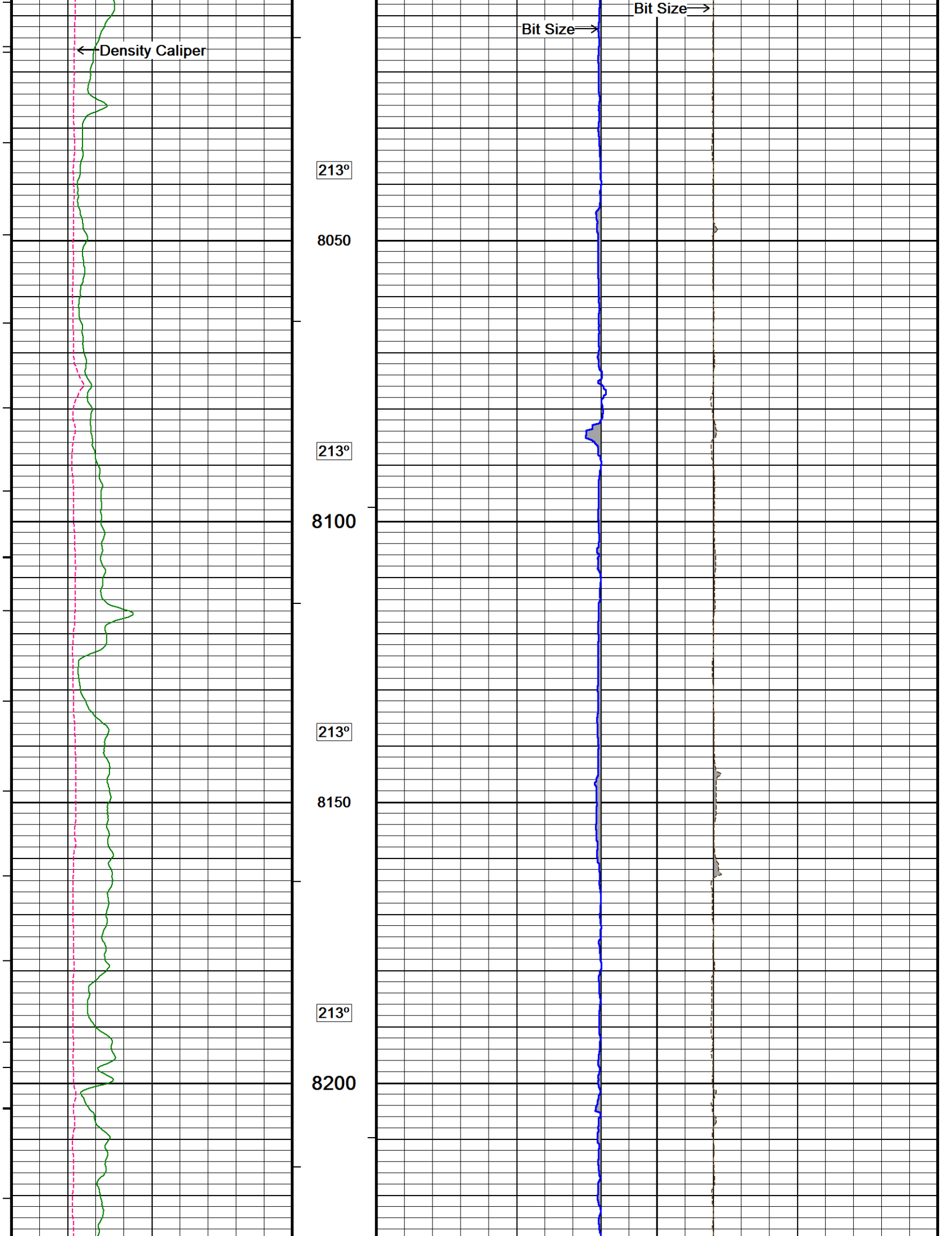
MIE Caliper X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Bit Size
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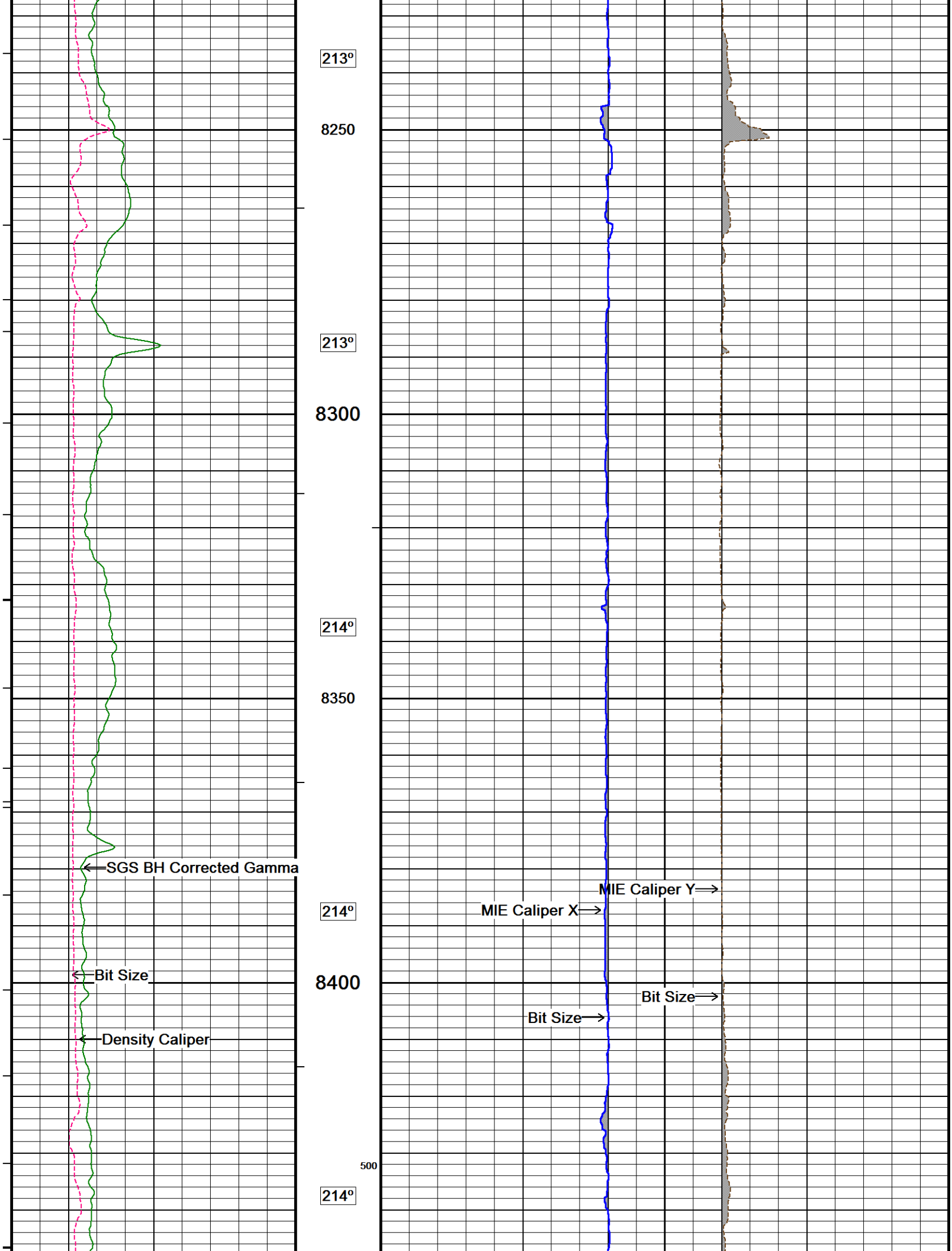
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8250
213°
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MIE Caliper Y
MIE Caliper X
Bit Size
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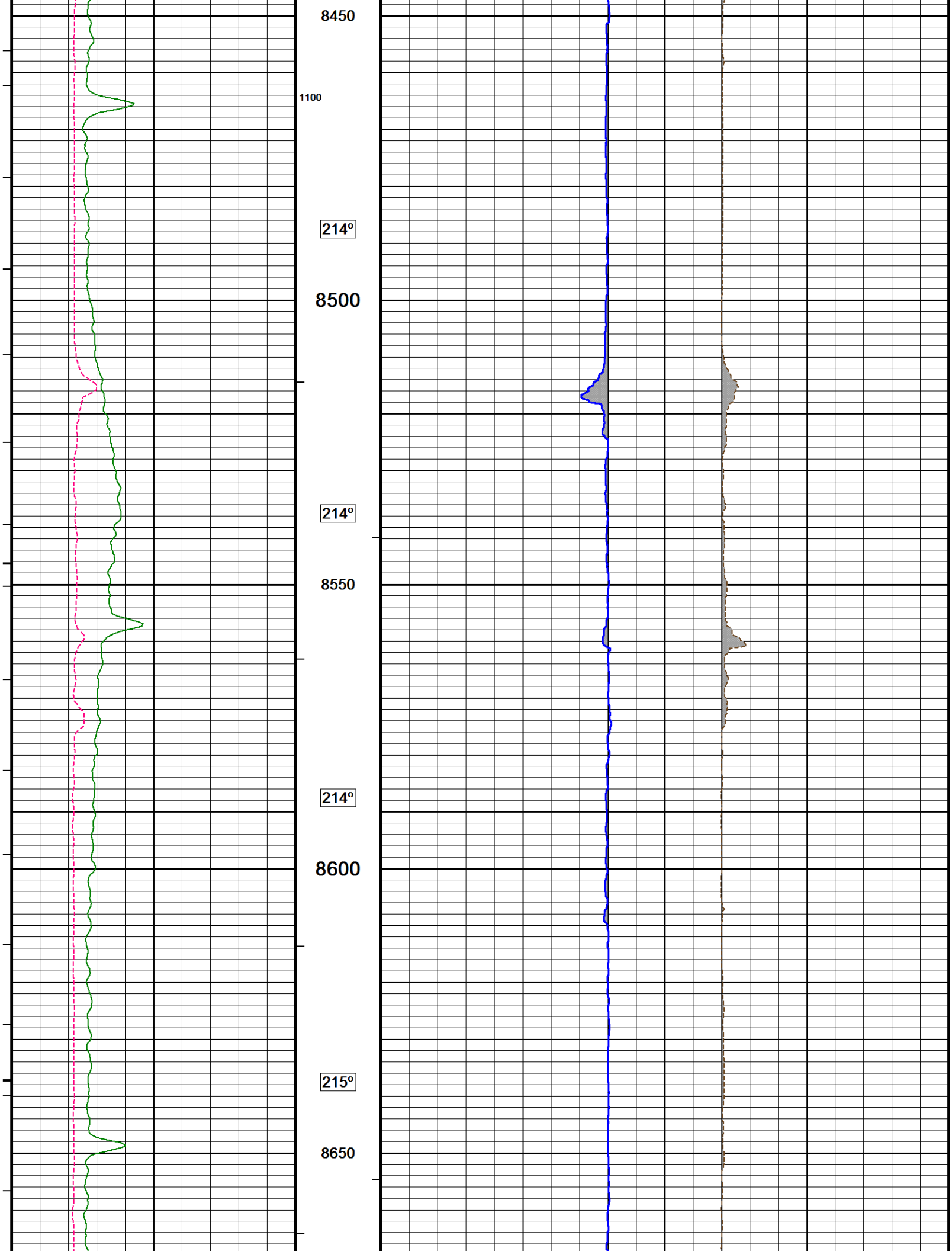
Bit Size
Bit Size
Density Caliper
500
214°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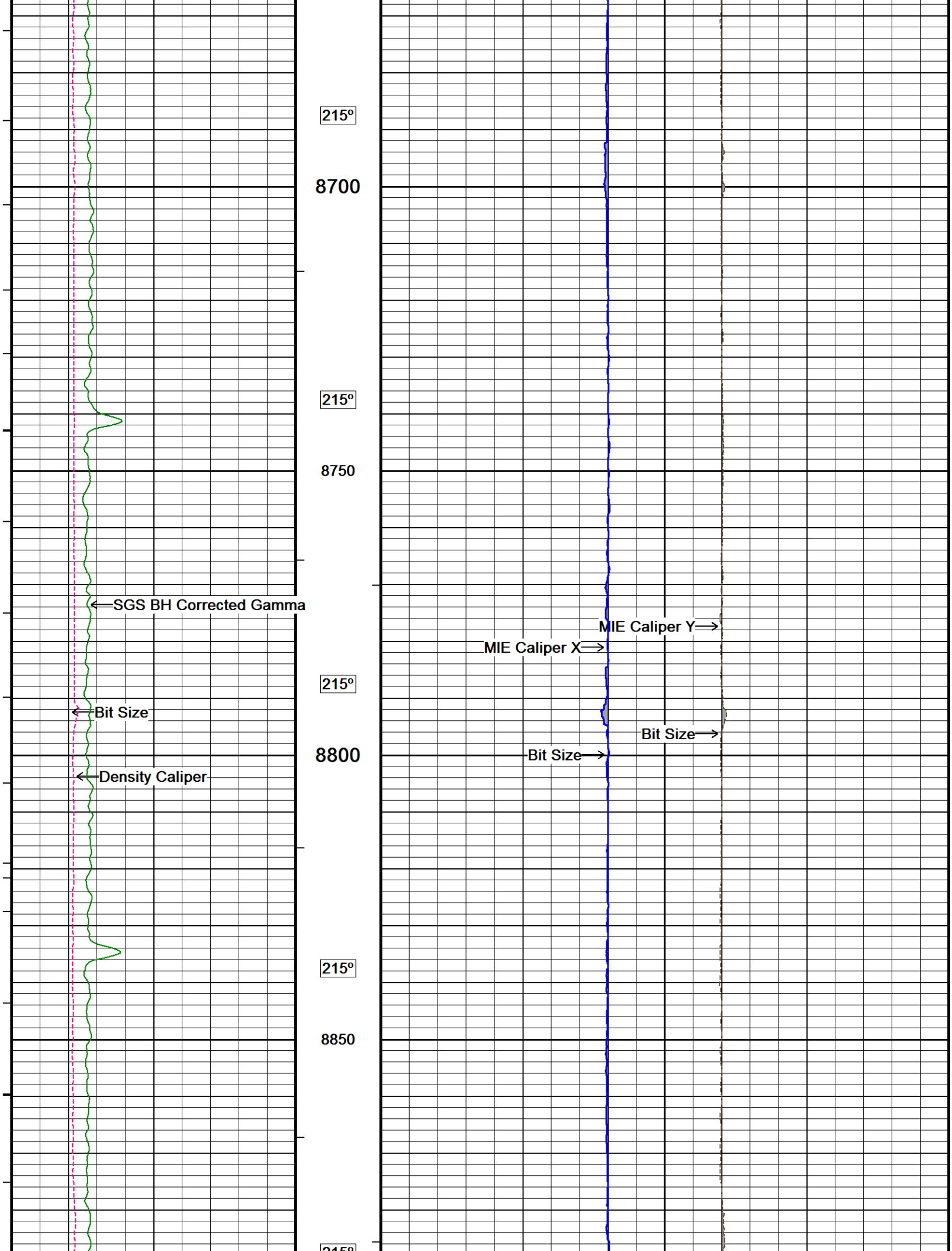
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MIE Caliper Y
MIE Caliper X
215°
Bit Size
Bit Size
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Bit Size
Density Caliper
215°
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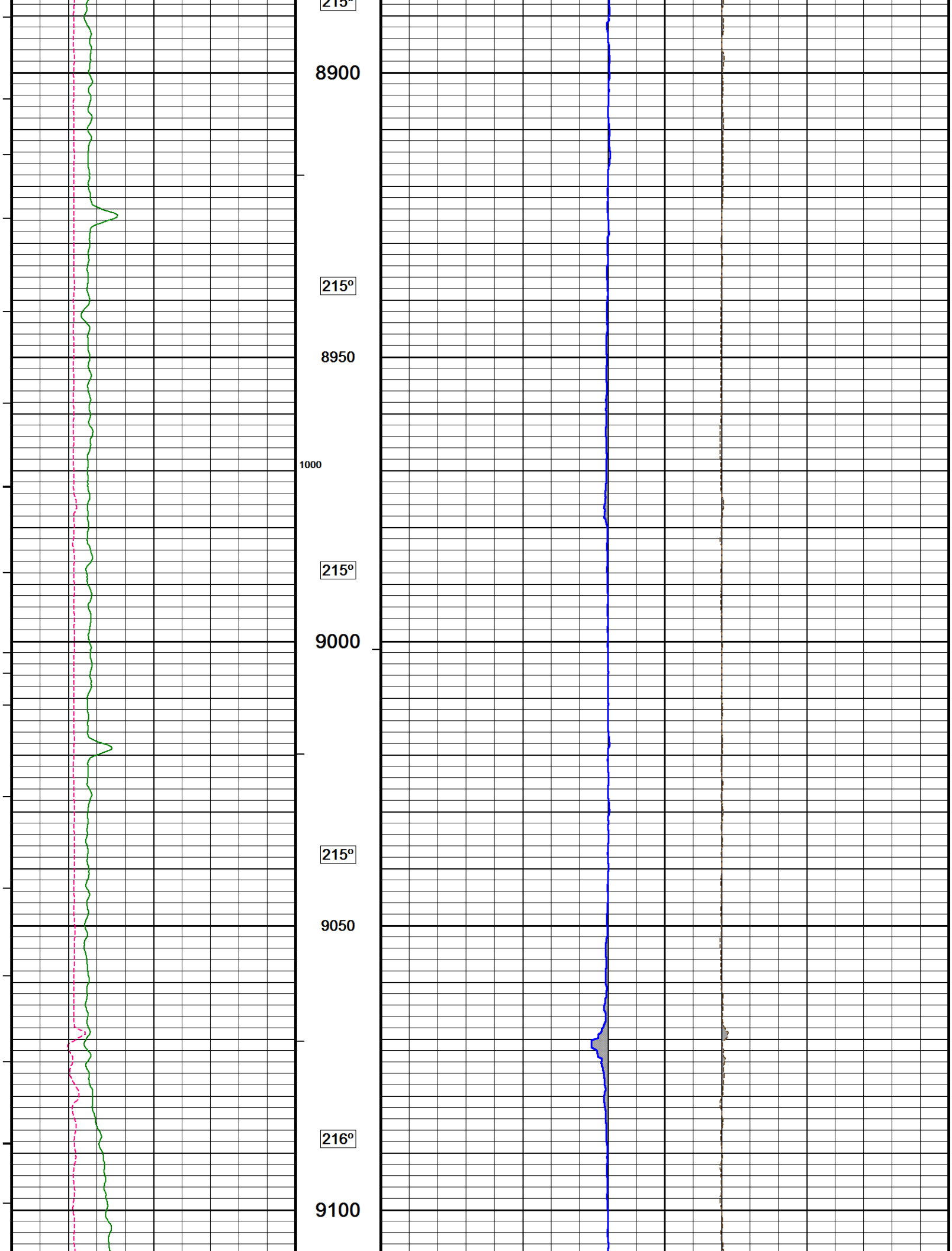
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216°
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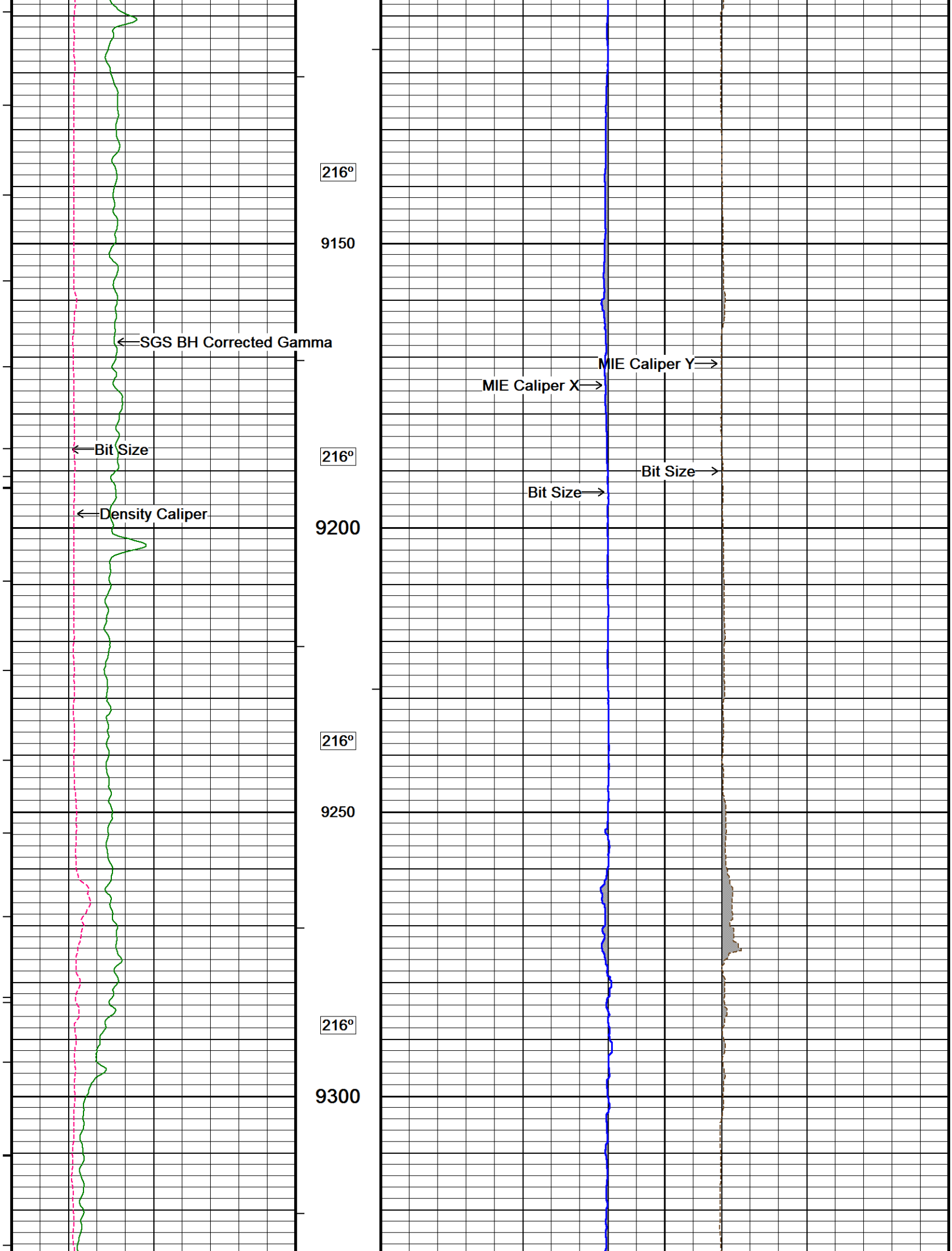
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MIE Caliper X
Bit Size
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Bit Size
Bit Size
Density Caliper
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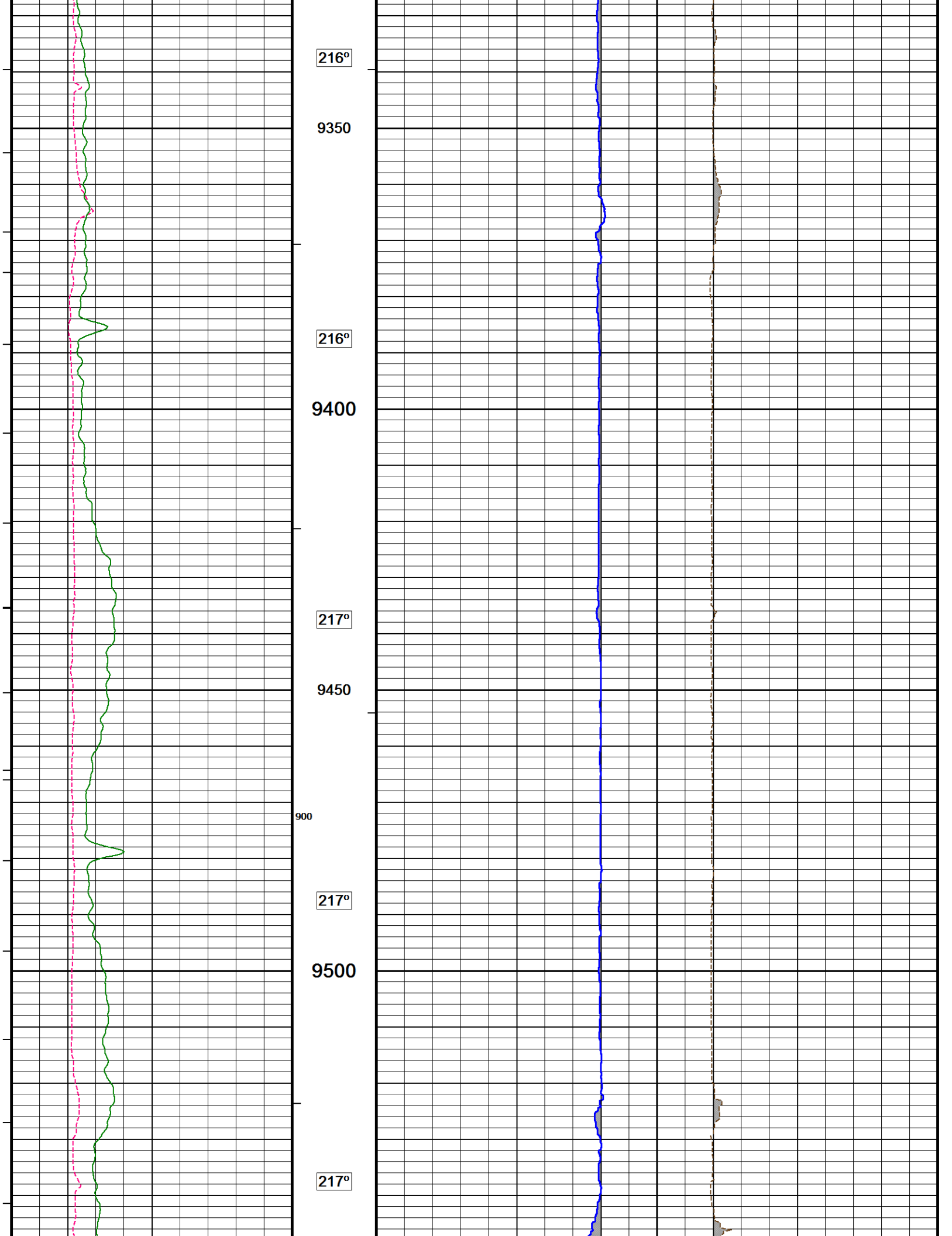
216°
9300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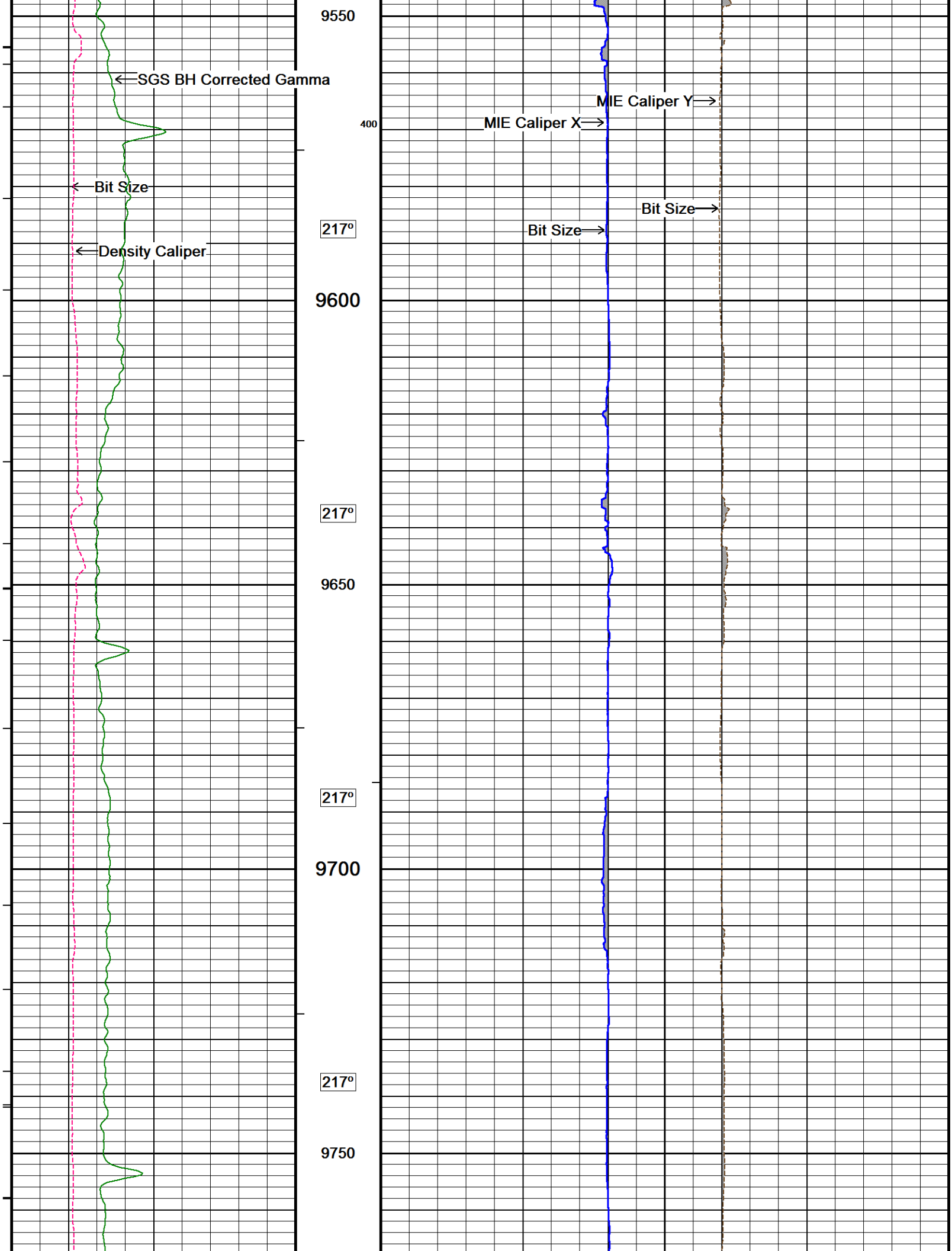
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Bit Size
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217°
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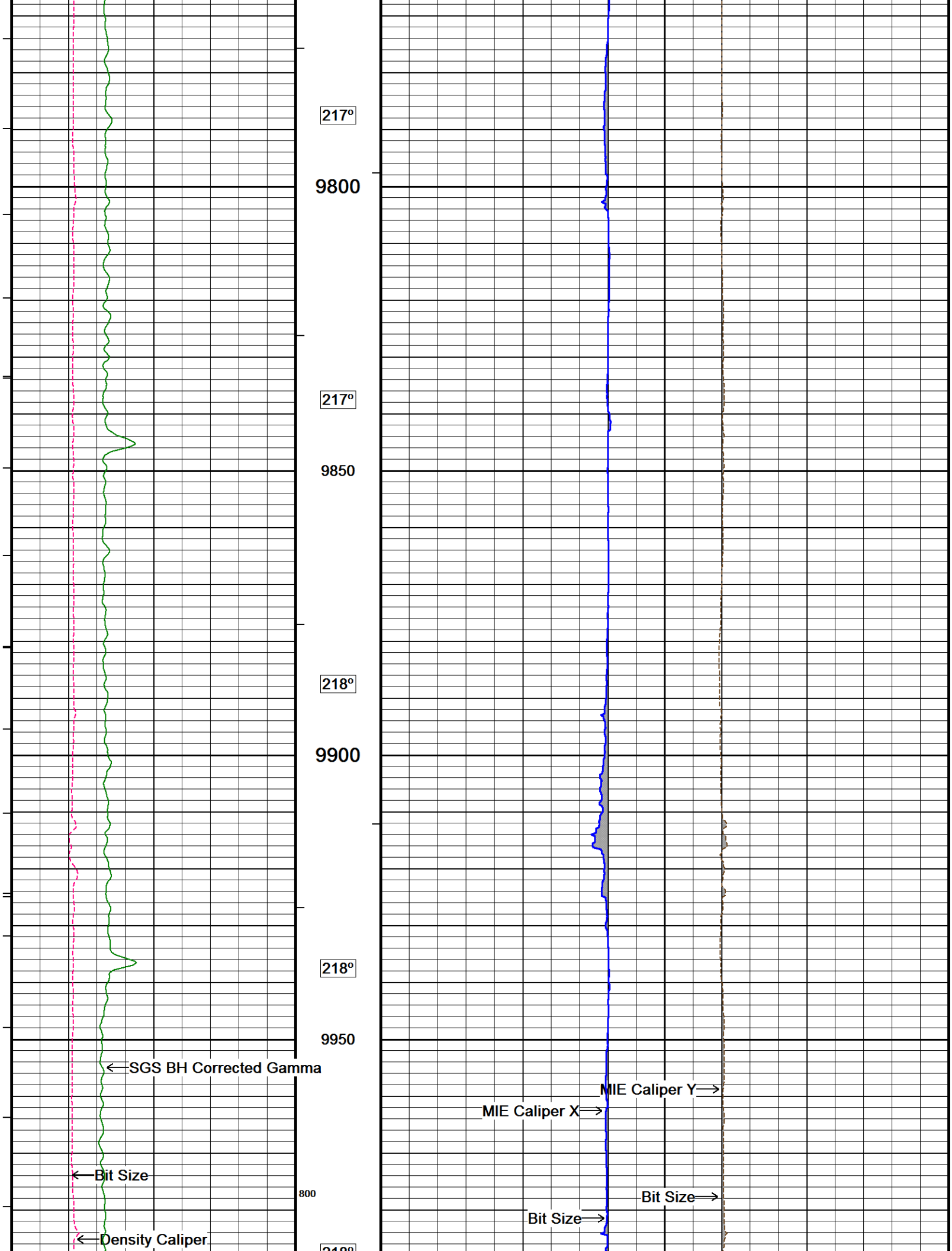
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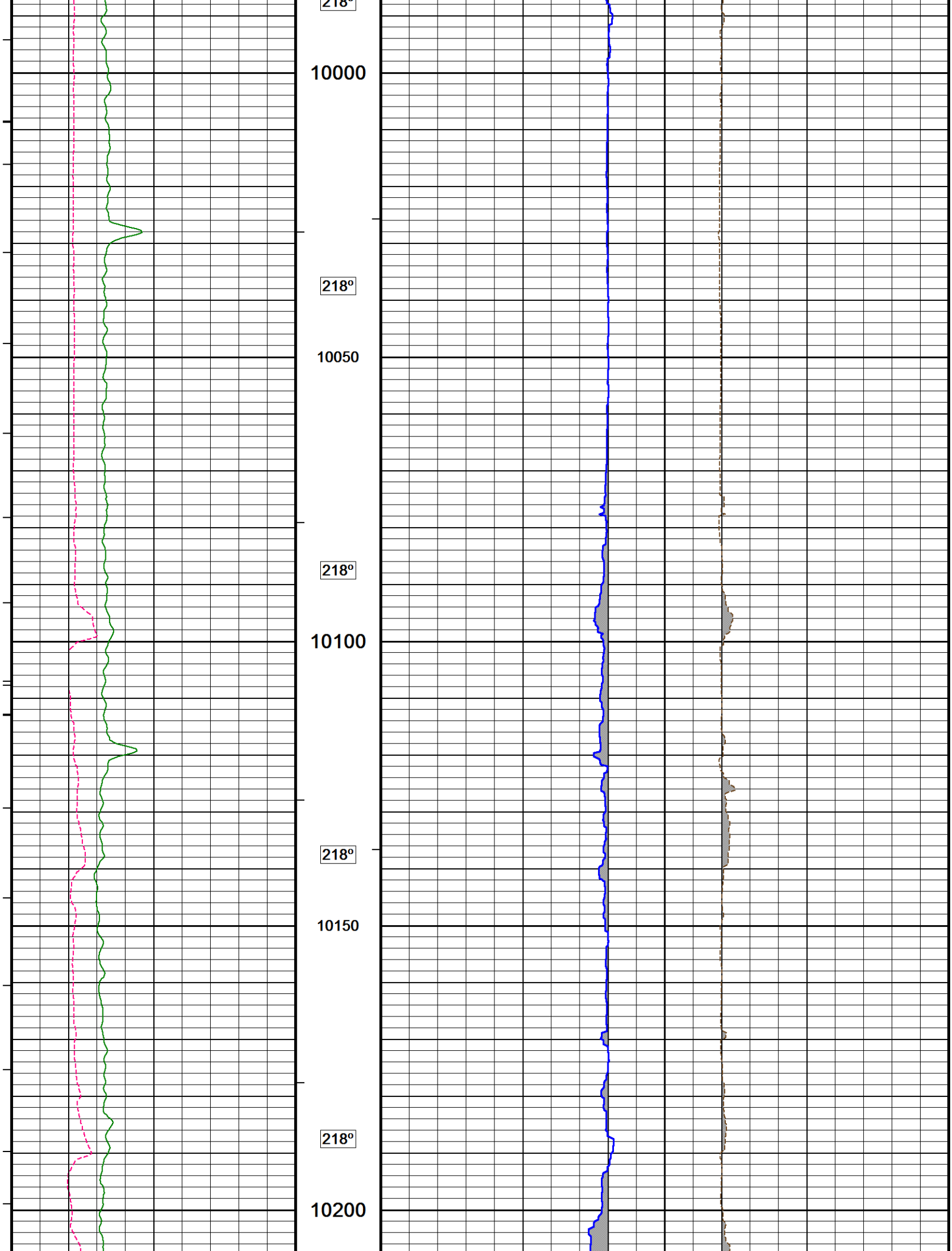
Bit Size→
Bit Size→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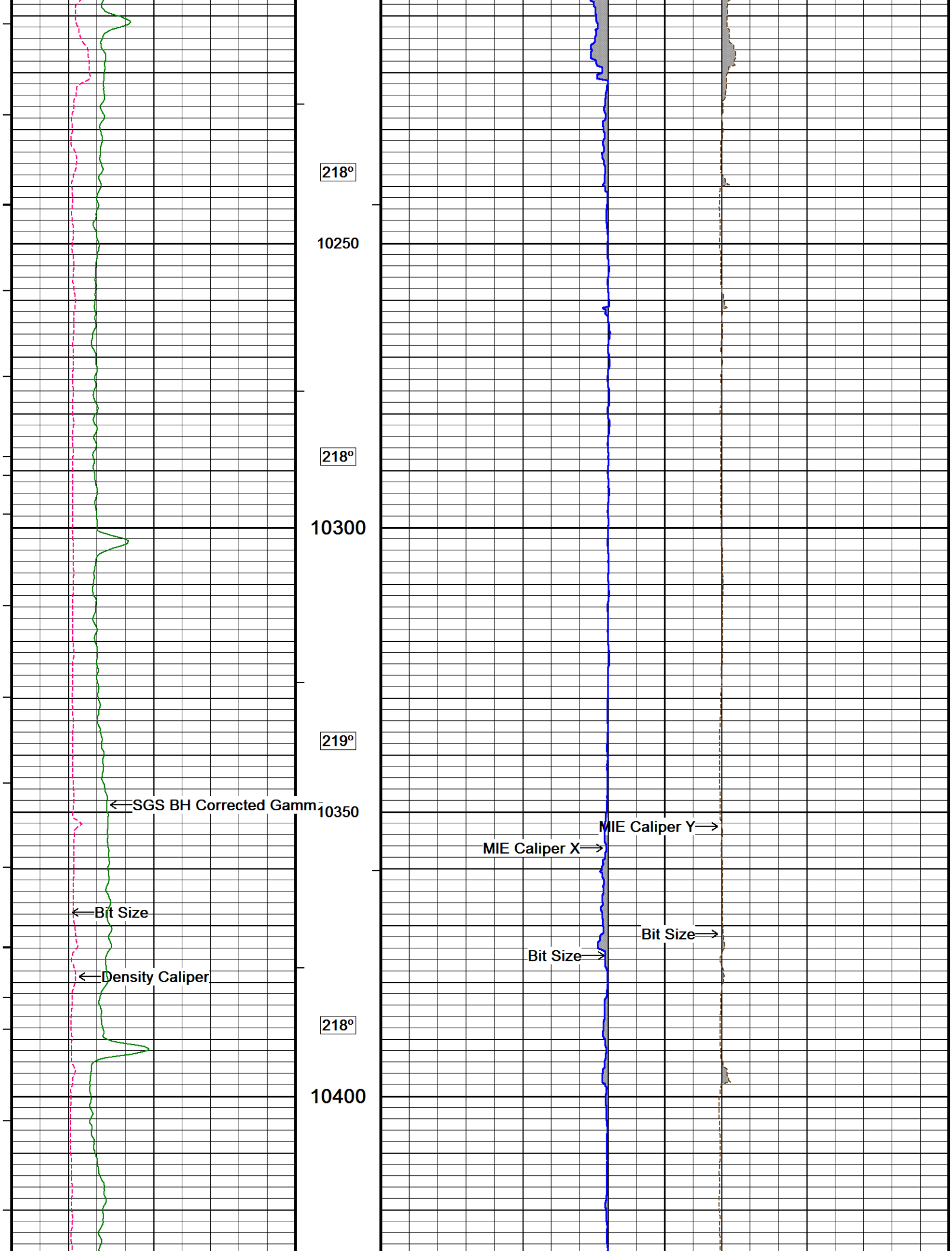
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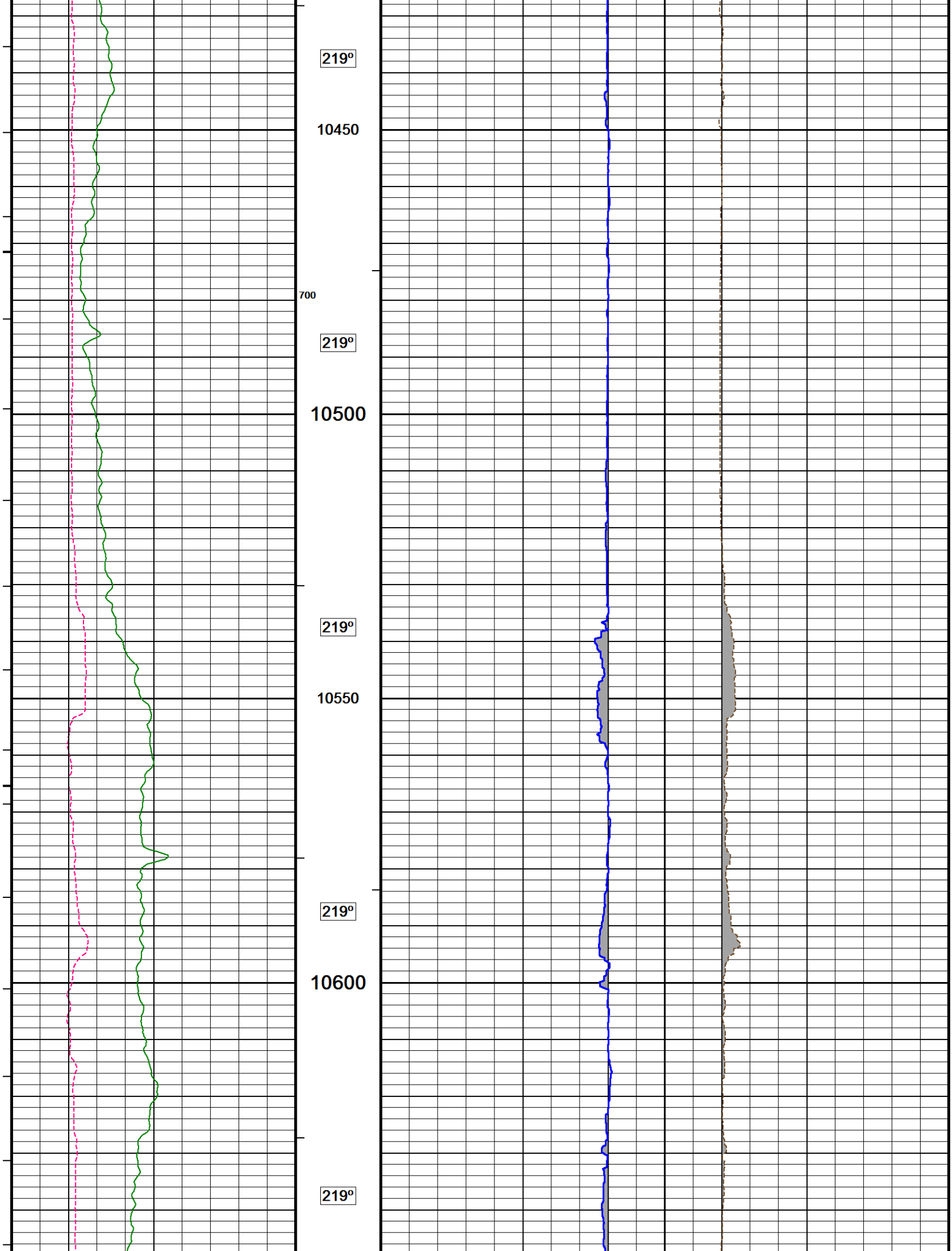
Bit Size→
Bit Size→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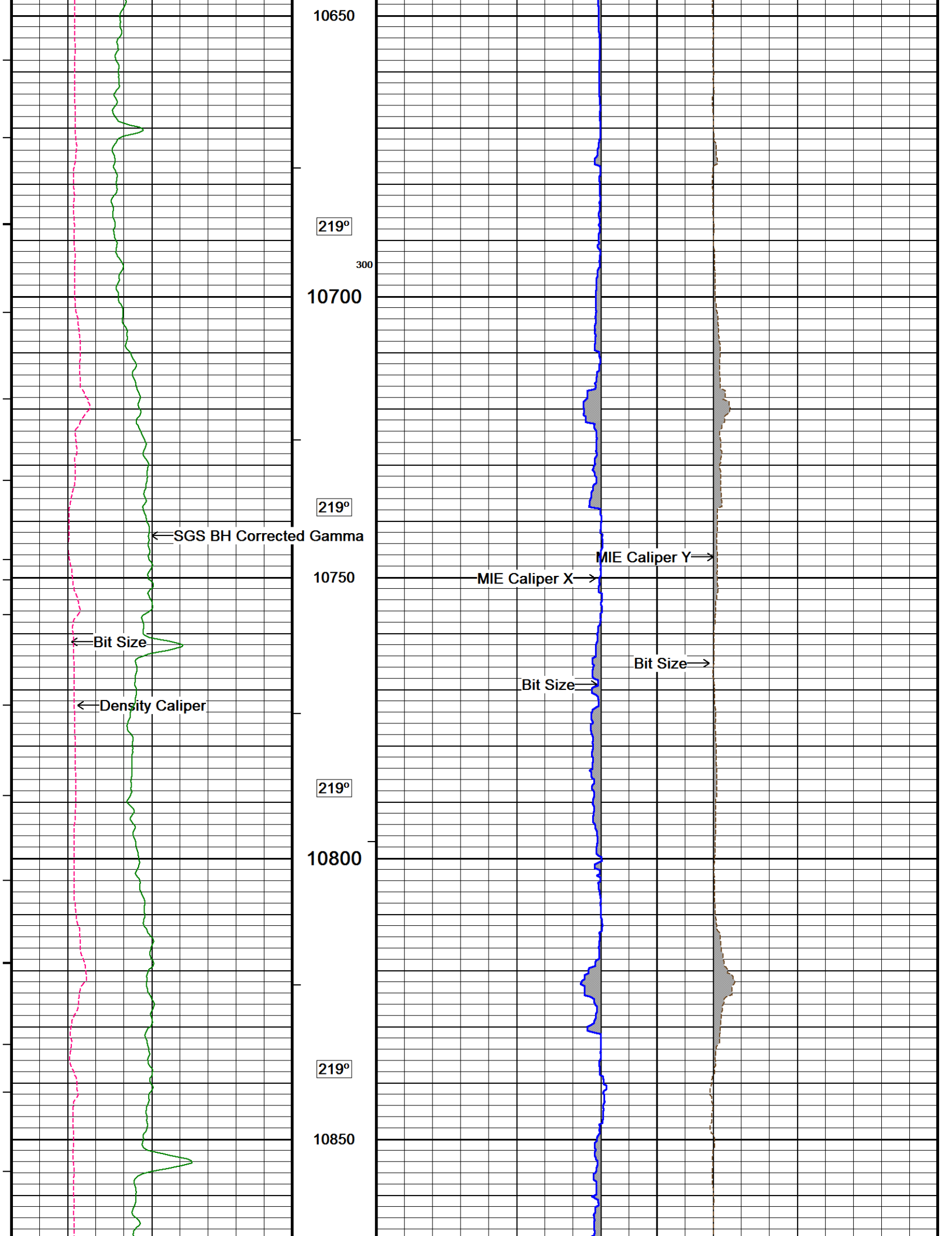
219°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Bit Size
Density Caliper
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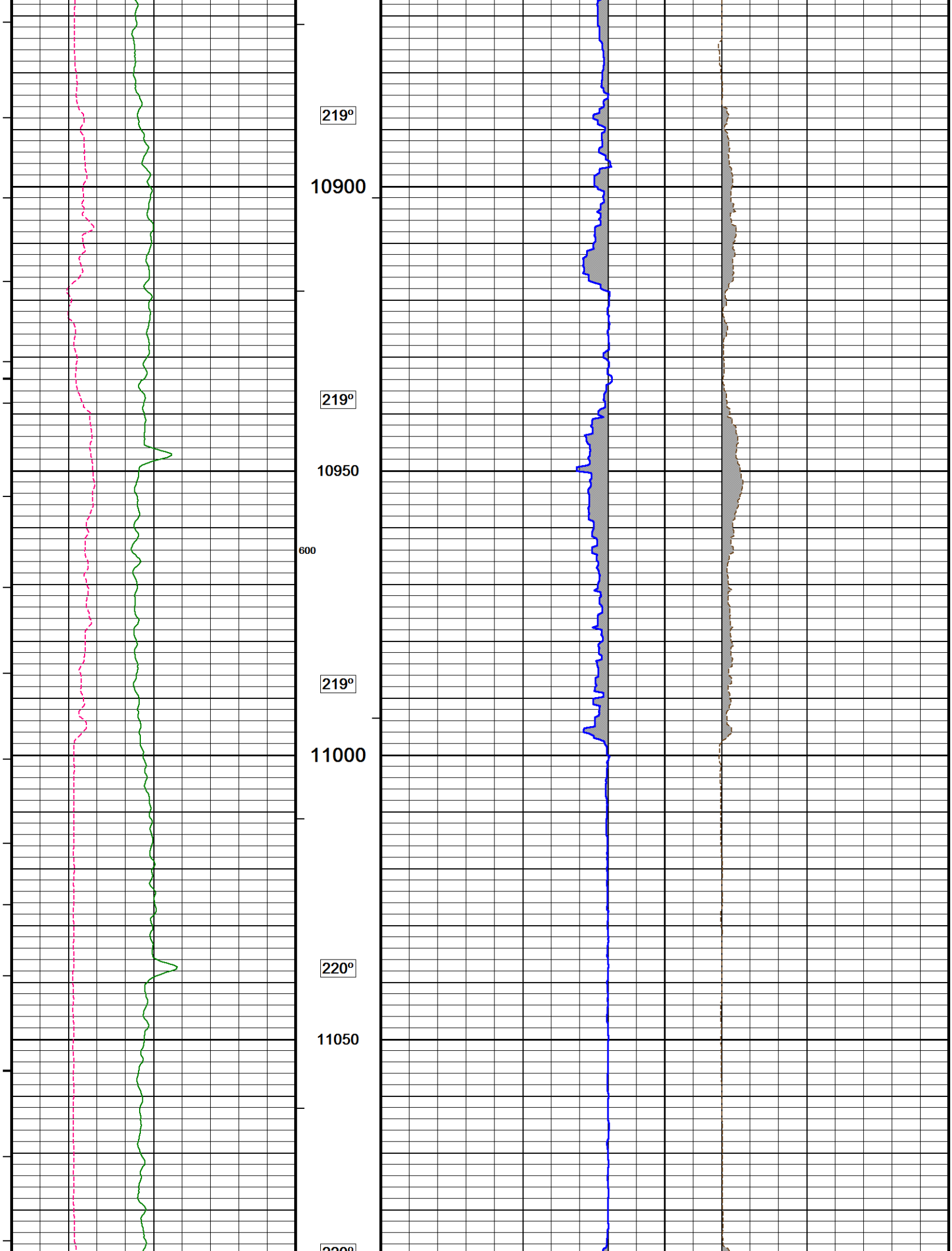
MIE Caliper Y
MIE Caliper X
Bit Size
Bit Size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11000
220°
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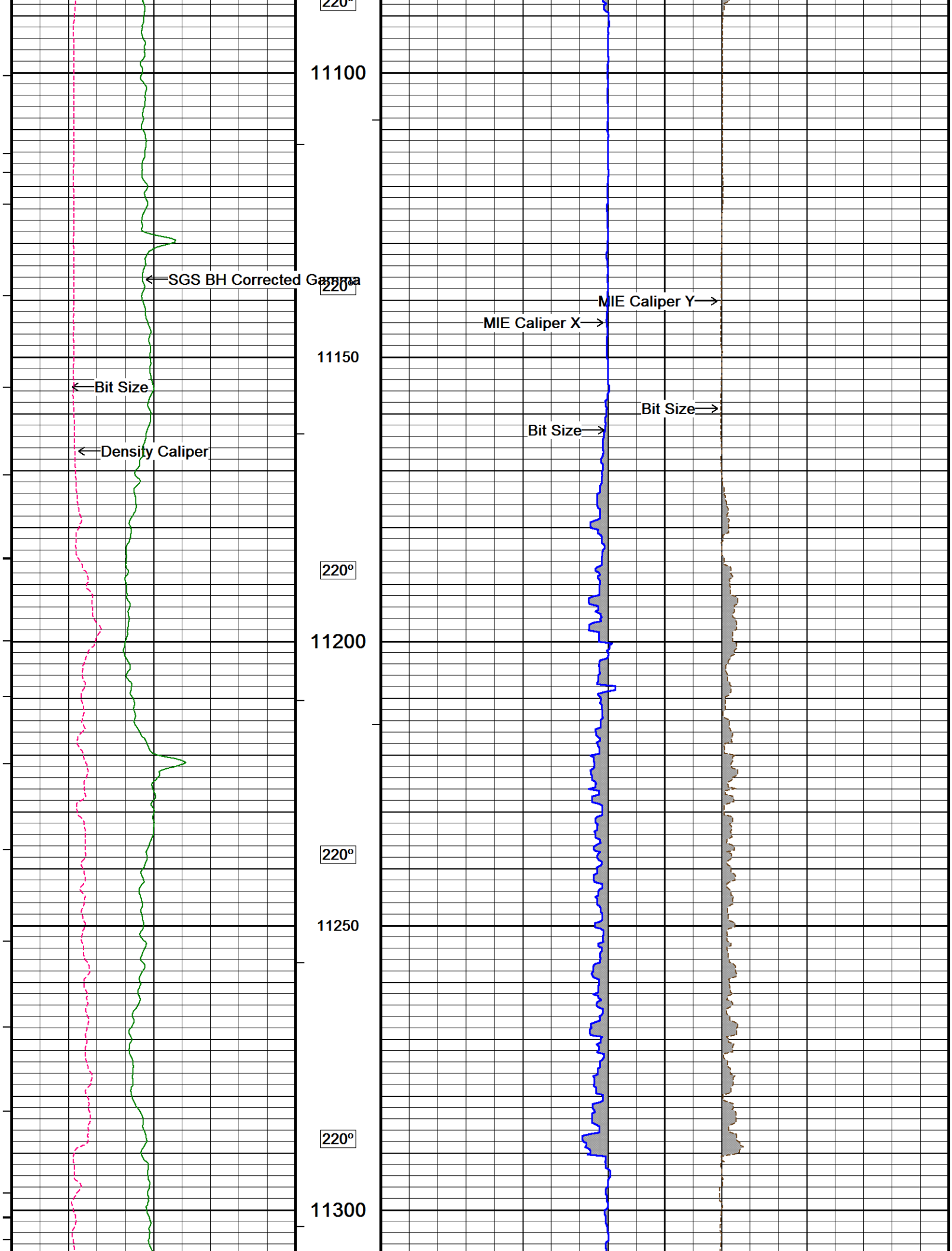
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220°
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Bit Size
Bit Size
Bit Size
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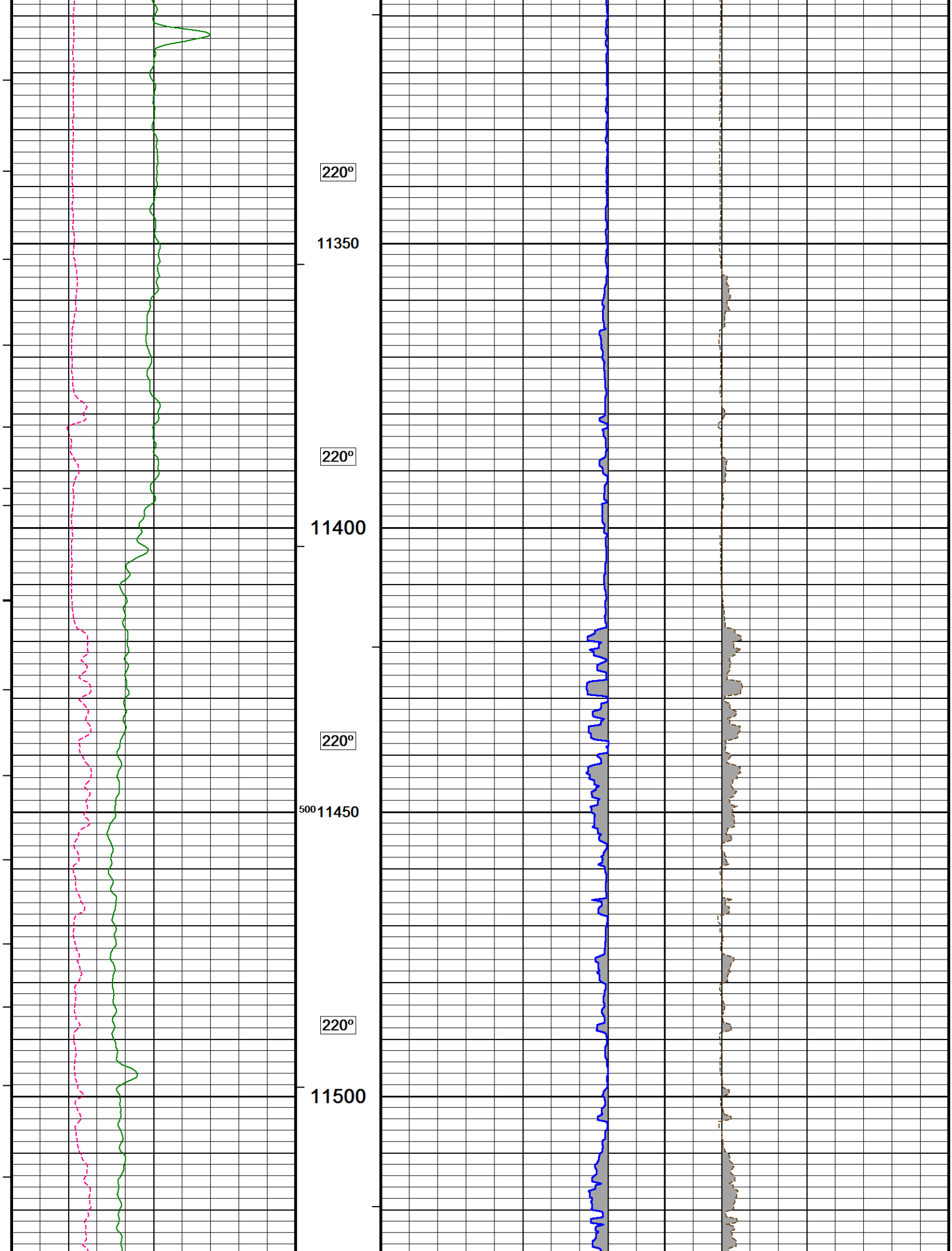
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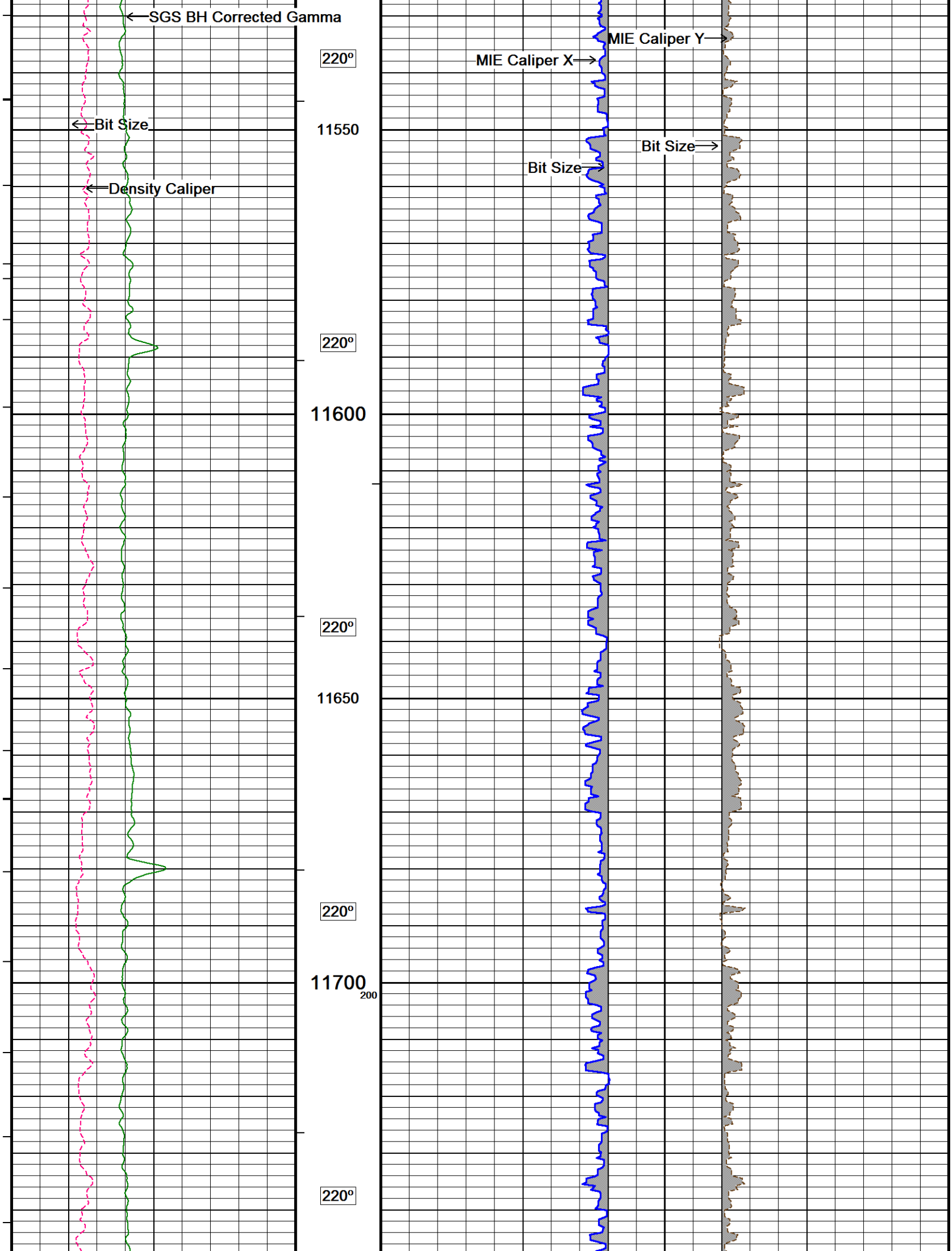
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Bit Size
Density Caliper
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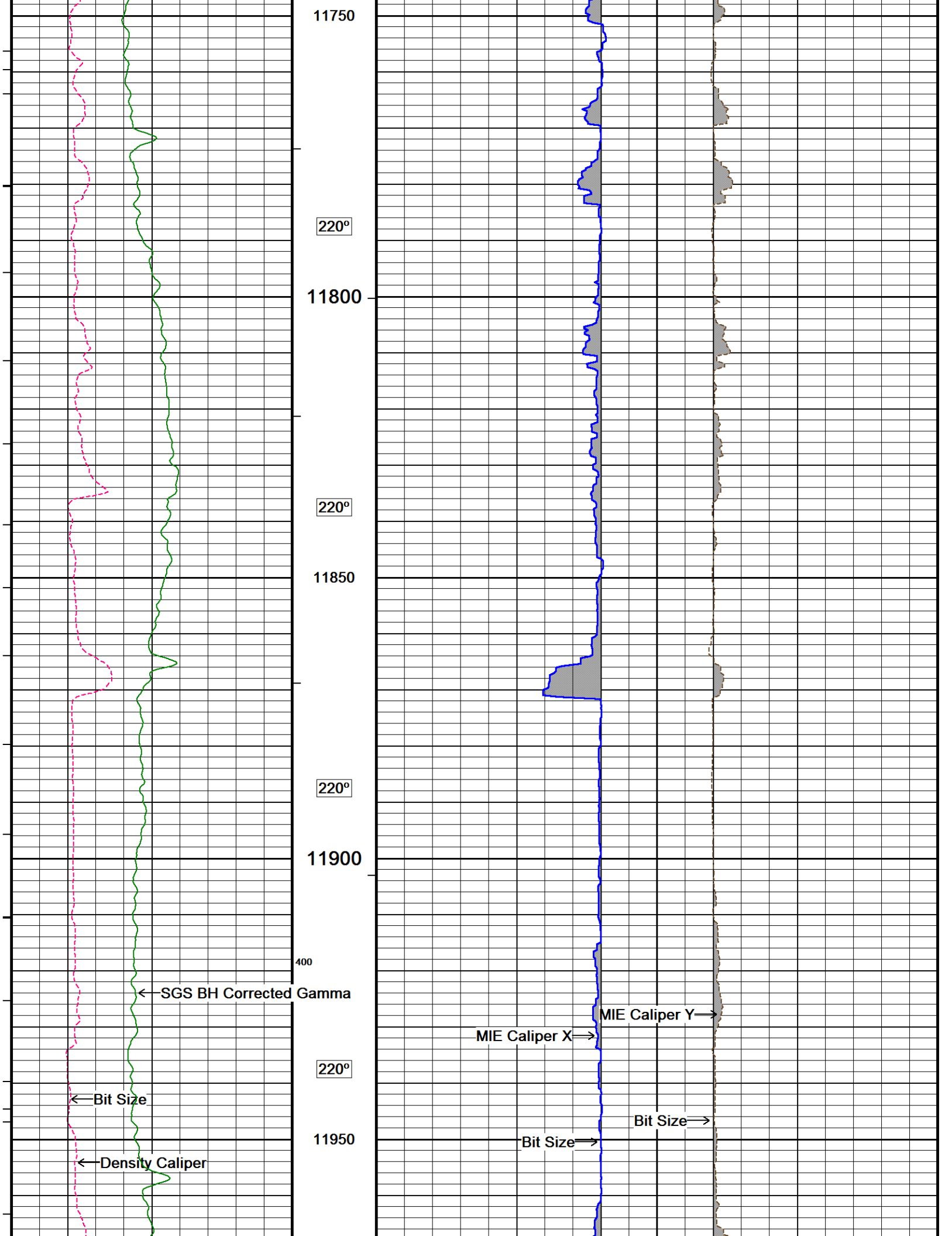
Bit Size
Bit Size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Bit Size
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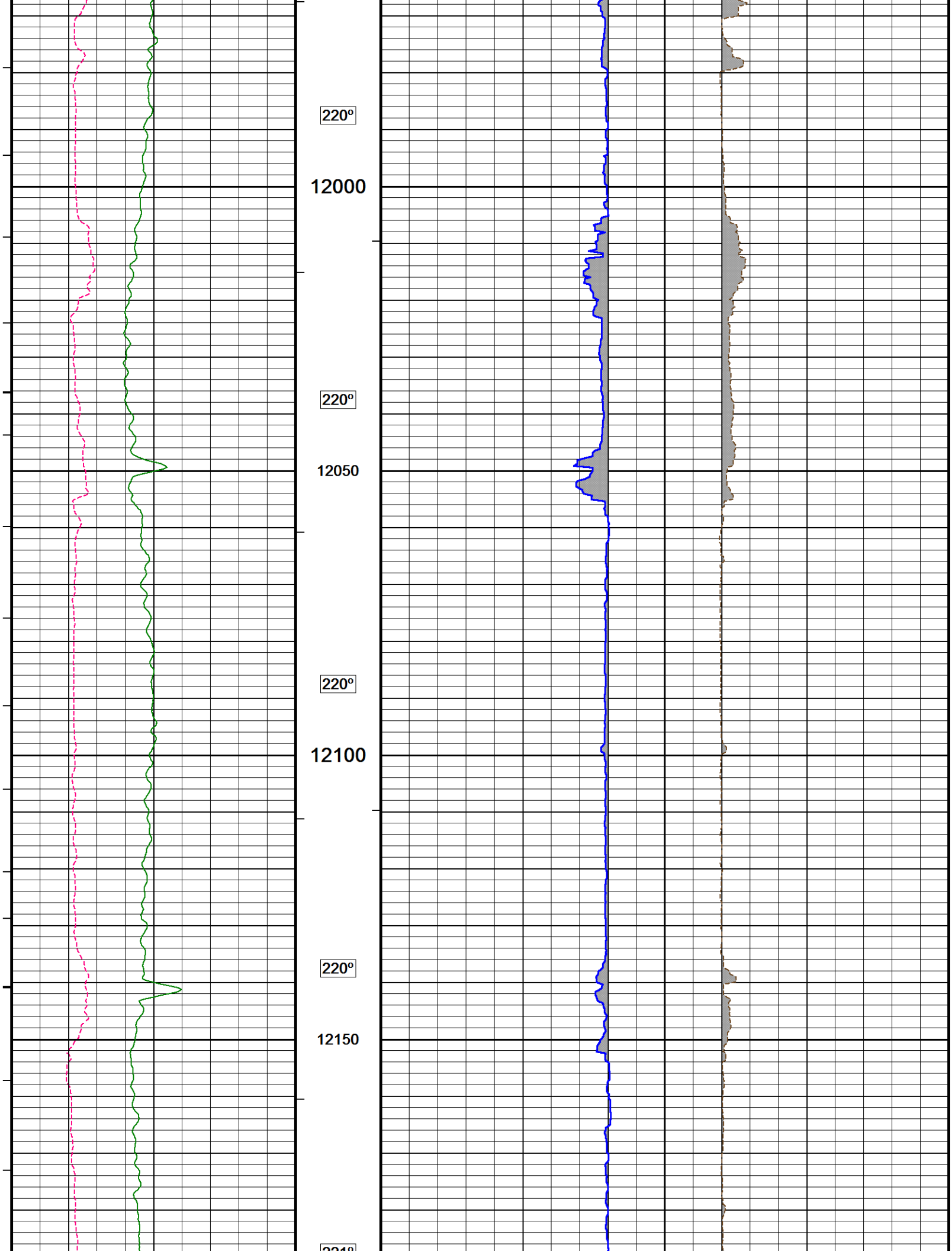
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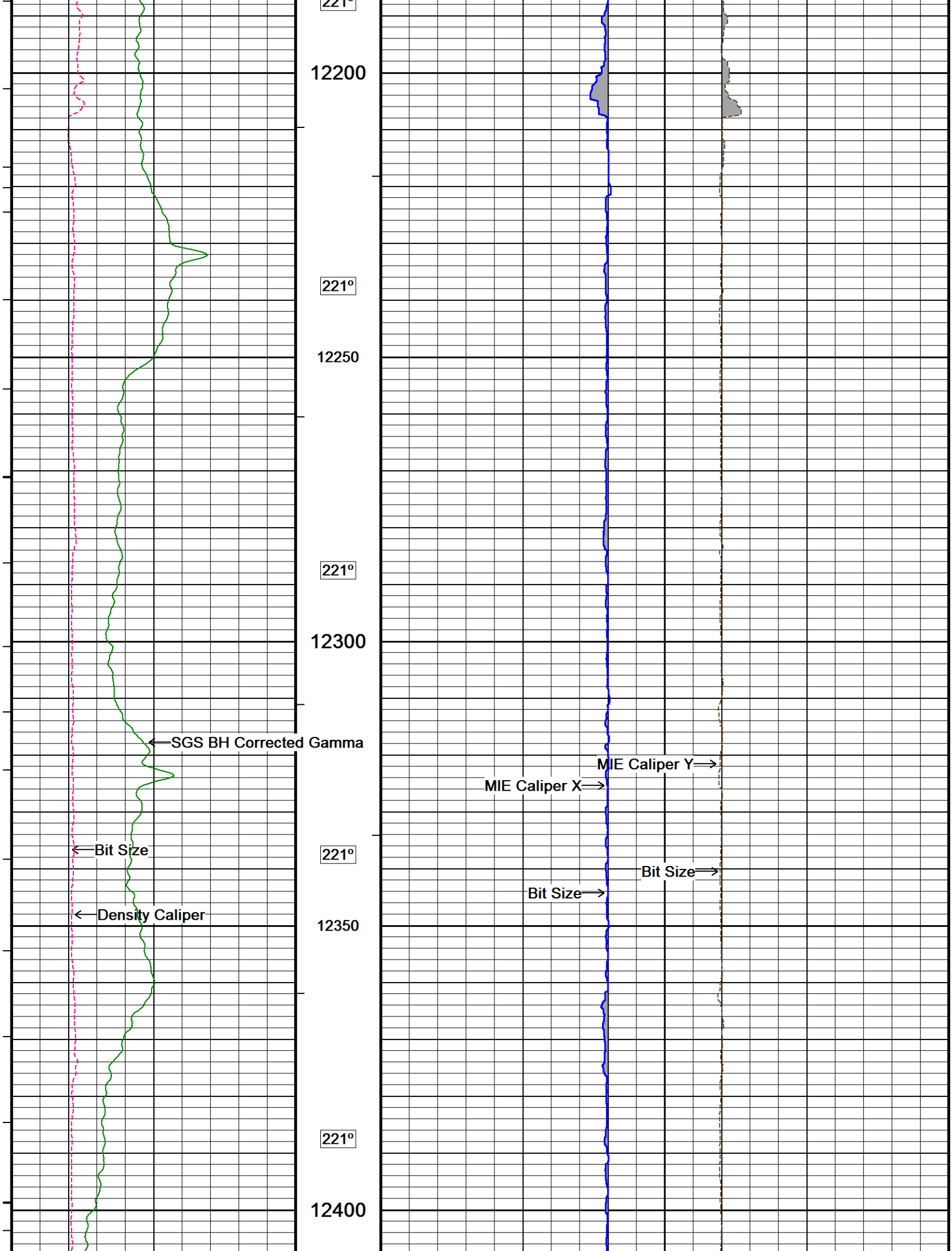
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Bit Size
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MIE Caliper Y
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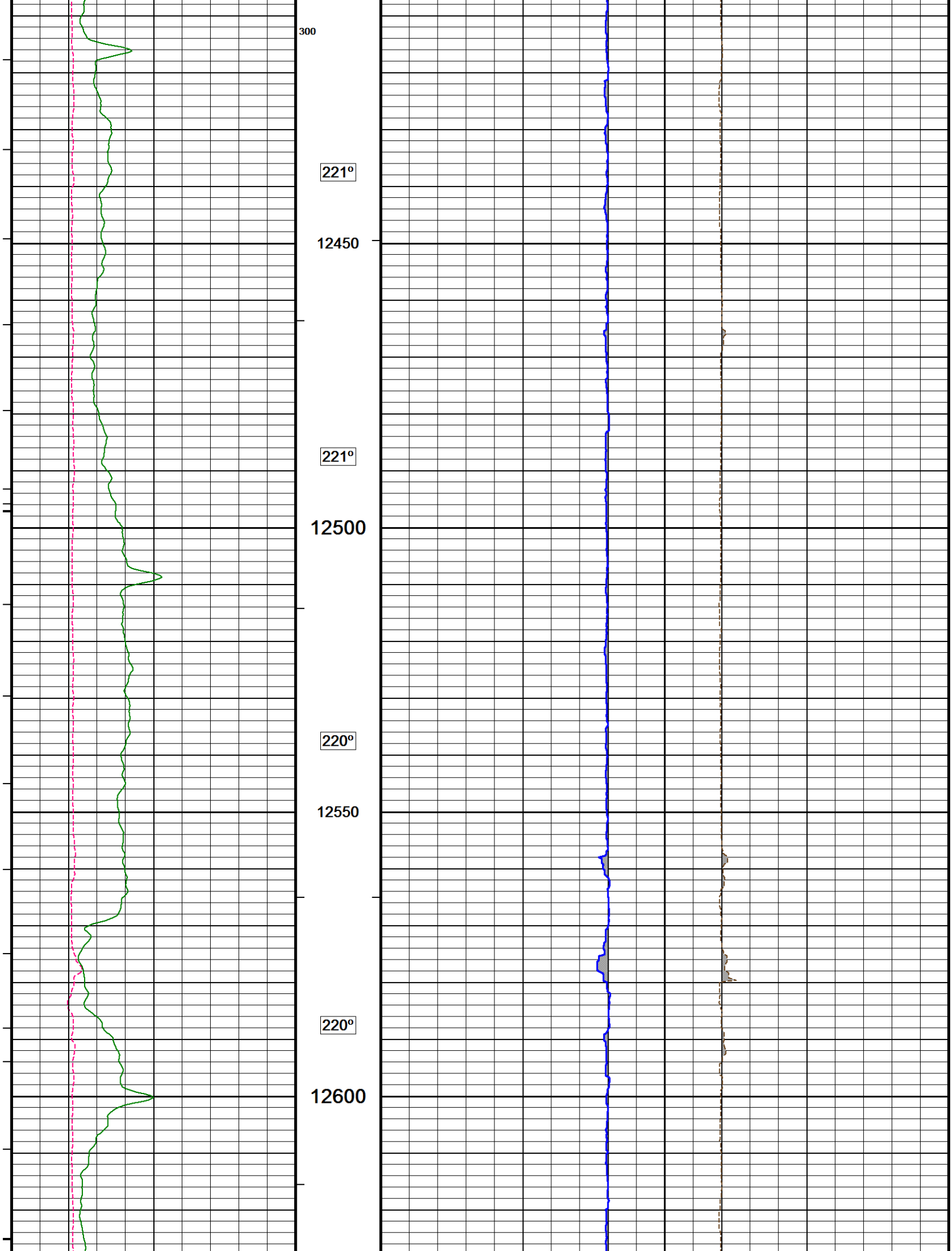
Bit Size
Bit Size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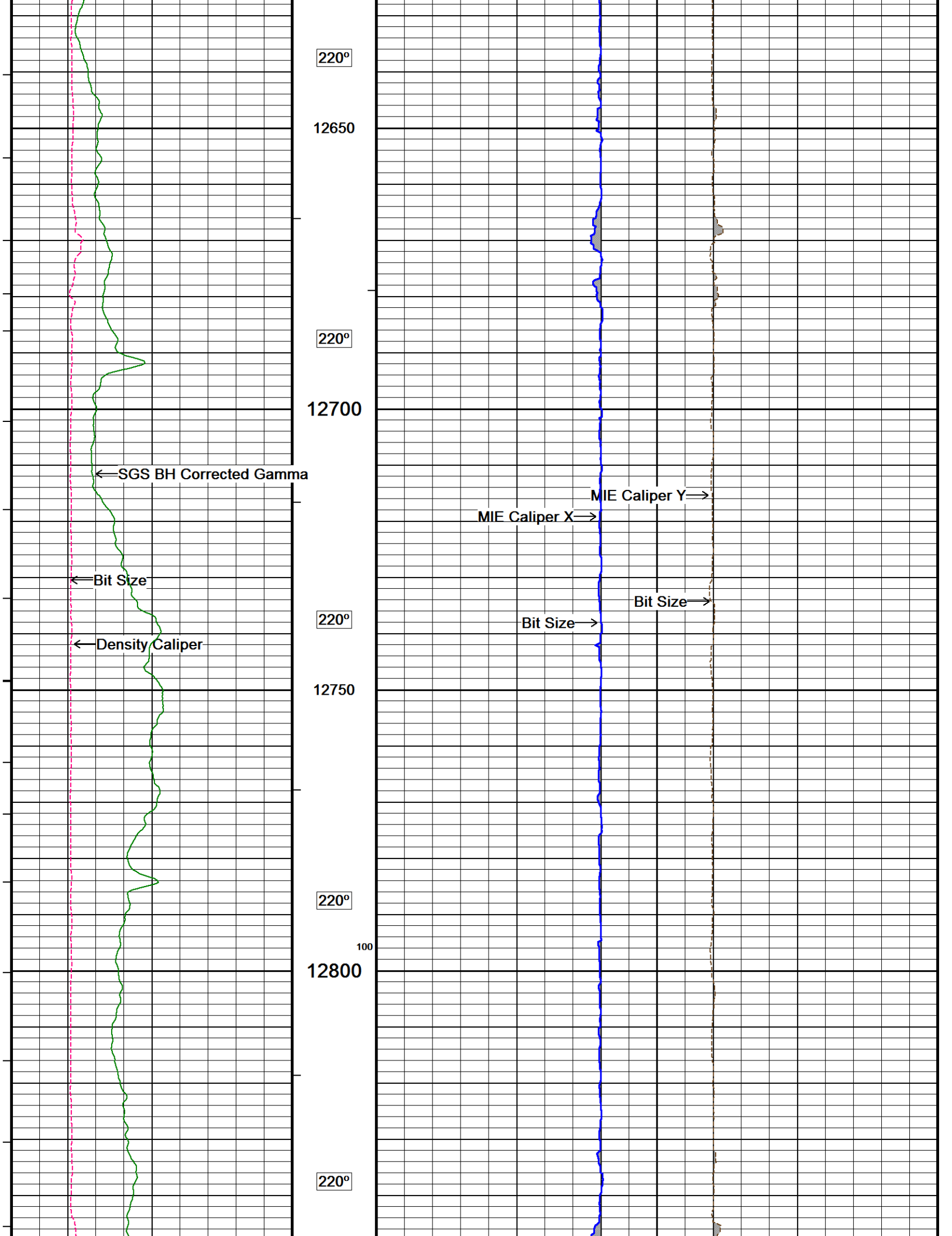
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Bit Size
Bit Size
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Density Caliper
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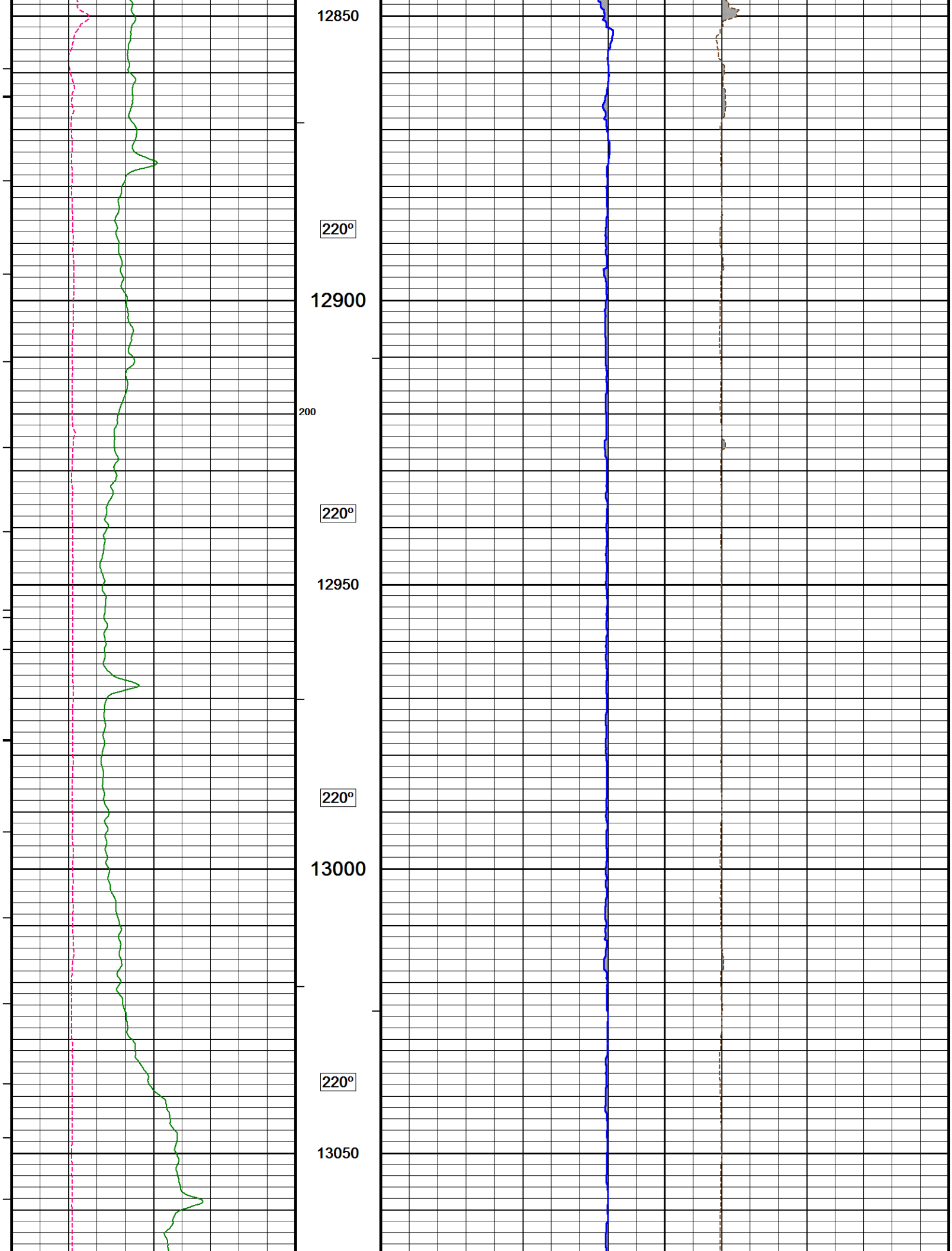
12800
220°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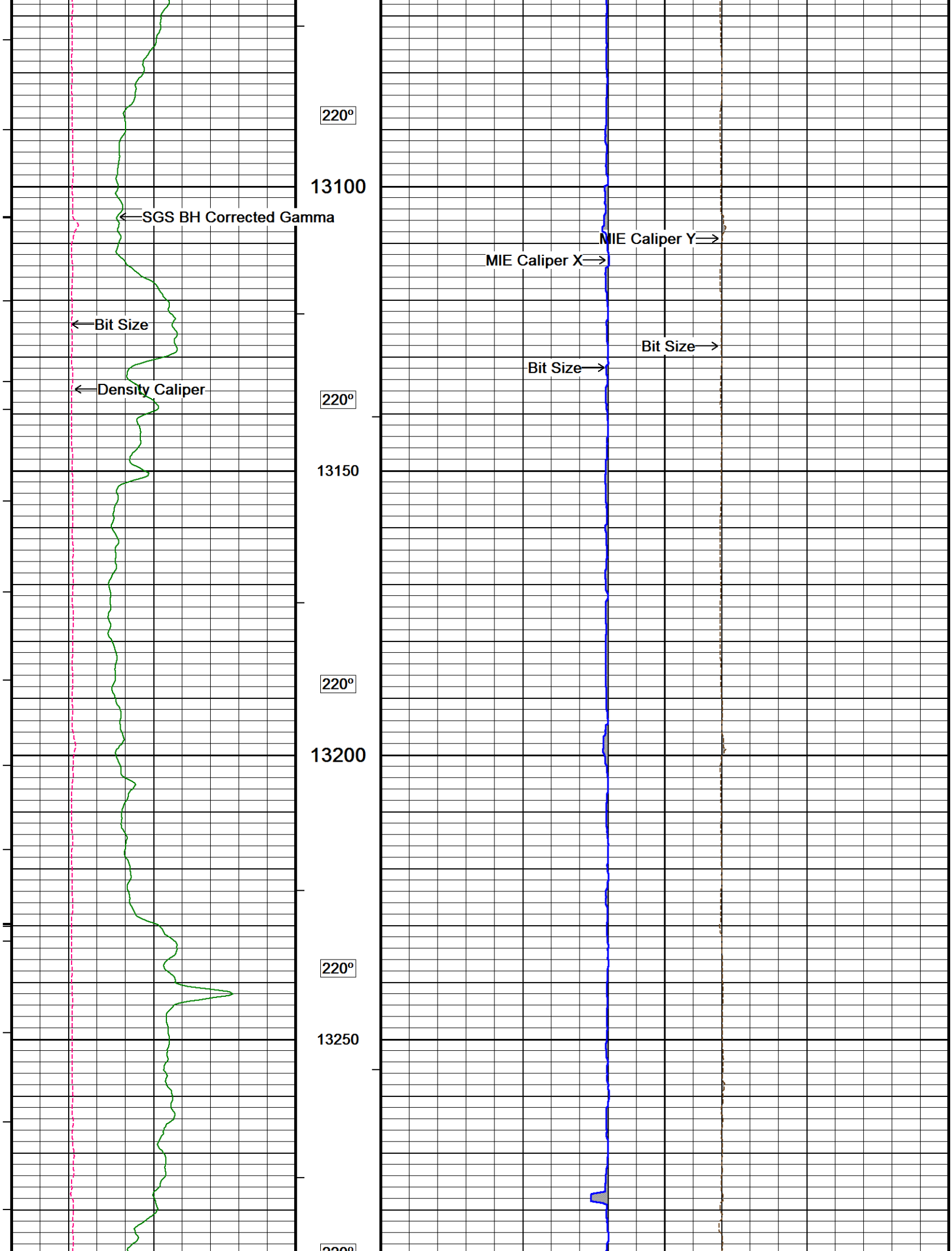
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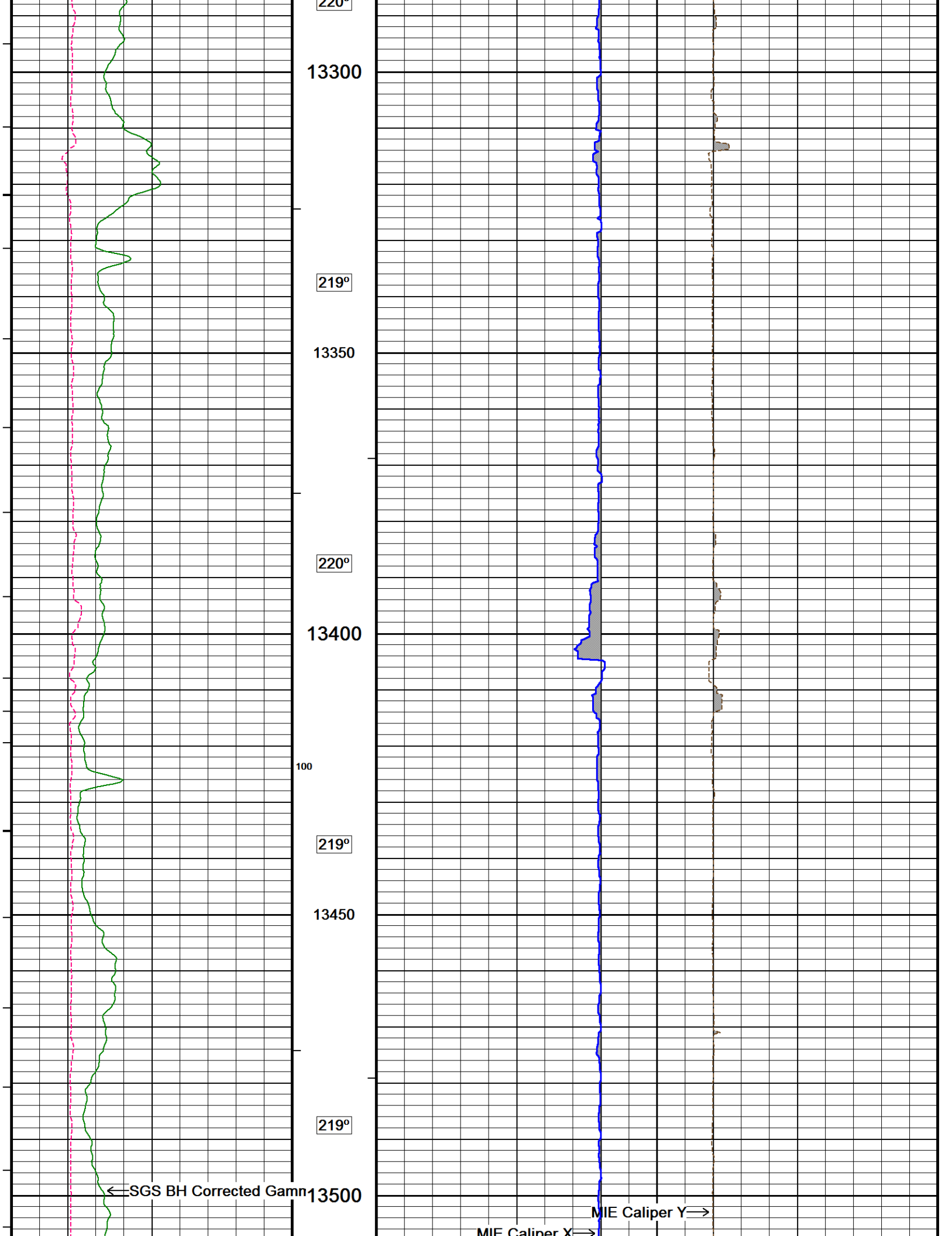
MIE Caliper Y
MIE Caliper X
Bit Size
Bit Size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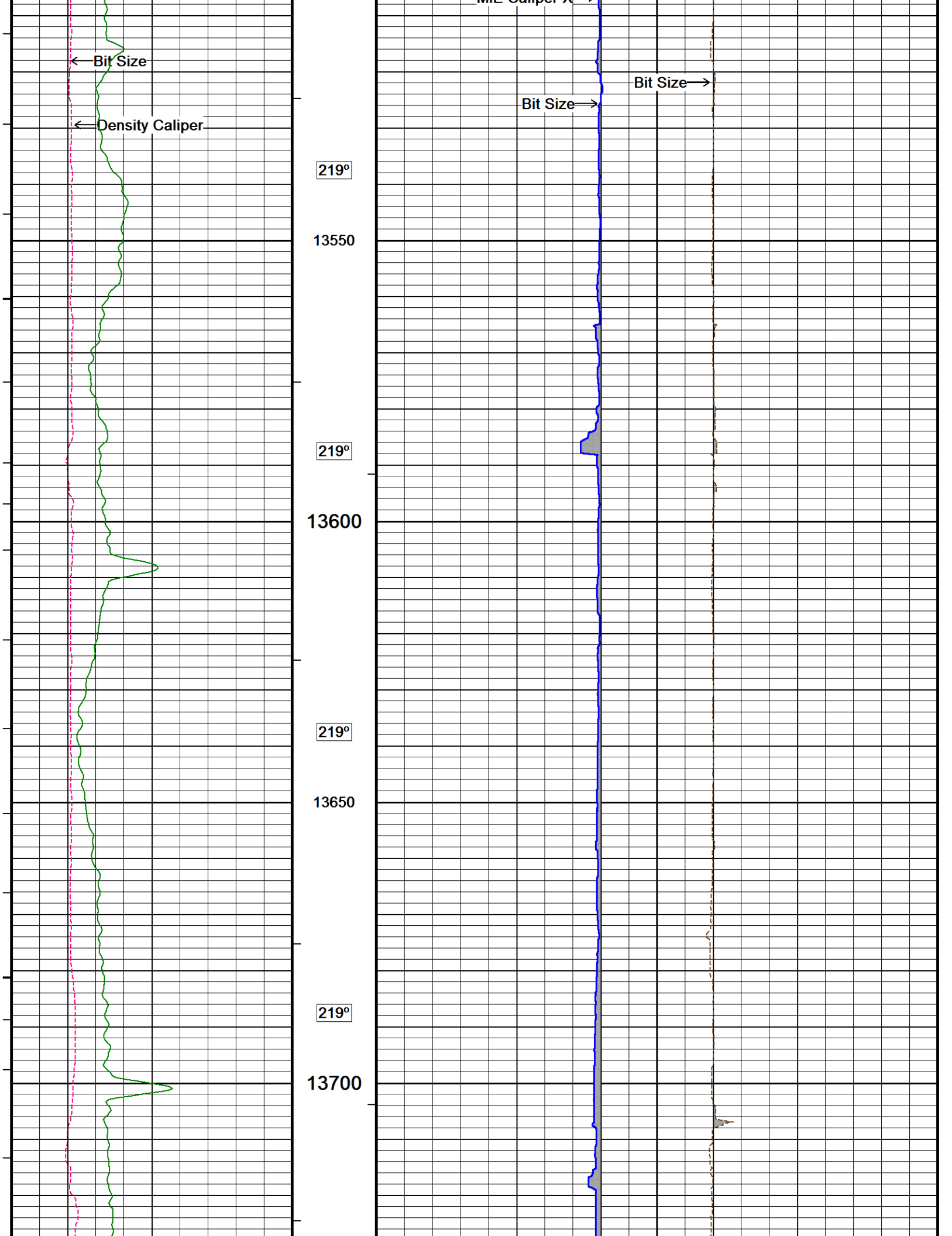
MIE Caliper Y→
MIE Caliper X→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←Density Caliper
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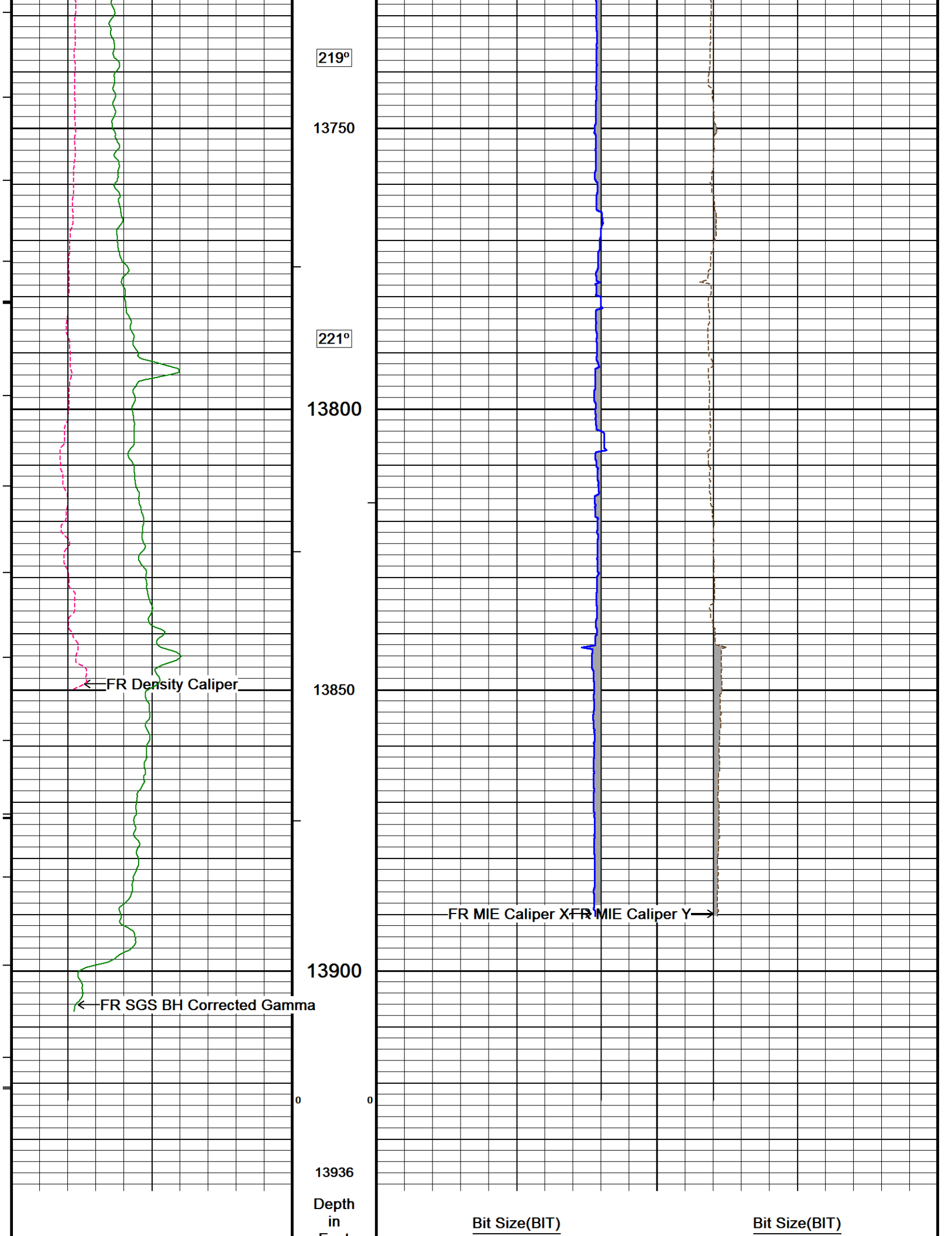
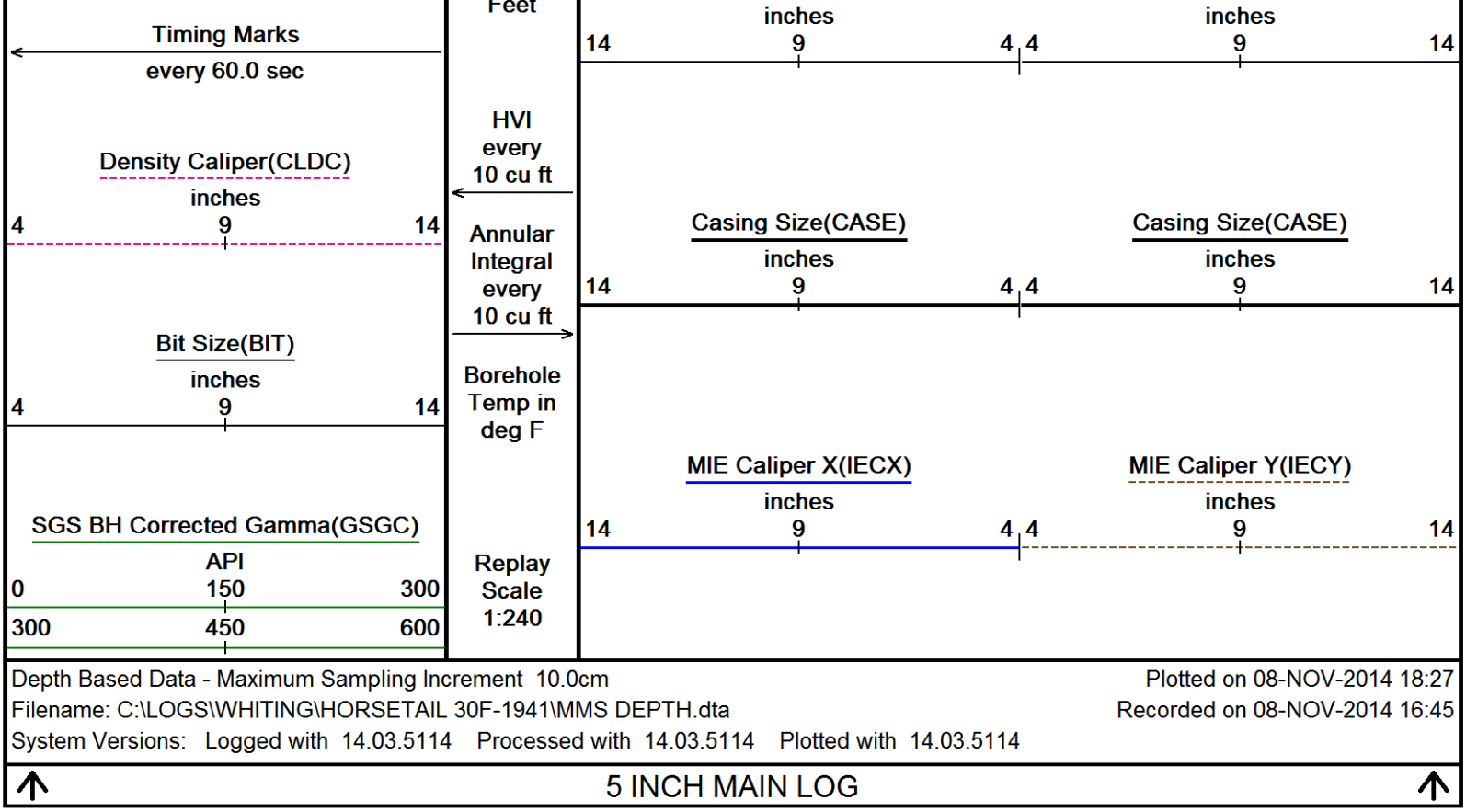
219°
13700
Bit Size→
Bit Size→


219°
13750
221°
13800
13850
13900
13936
Depth
in
FR Density Caliper
FR SGS BH Corrected Gamma
FR MIE Caliper X
FR MIE Caliper Y
0
0
Bit Size(BIT)
Bit Size(BIT)



Depth Based Data - Maximum Sampling Increment 10.0cm — Plotted on 08-NOV-2014 18:27

Filename: C:\LOGS\WHITING\HORSETAIL 30F-1941\MMS DEPTH.dta — Recorded on 08-NOV-2014 16:45

System Versions: Logged with 14.03.5114 Processed with 14.03.5114 Plotted with 14.03.5114

5 INCH MAIN LOG

BEFORE SURVEY CALIBRATION

C:\LOGS\WHITING\HORSETAIL 30F-1941\MMS DEPTH.dta

General Constants All 000

Last Edited on 08-NOV-2014,15:56

General Parameters		
Mud Resistivity	1.180	ohm-metres
Mud Resistivity Temperature	69.700	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	

Strain Gauge Constants MMS-F.A 249

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	

Gamma Calibration MGS-D.A 218

Field Calibration on 07-NOV-2014 09:56

	Measured	Calibrated (API)
Background	141	98
Calibrator (Gross)	913	632
Calibrator (Net)	772	534

Gamma Calibration Tolerances MGS-D.A 218

Ratio	1.446	1.40 / 1.475 / 1.55	Counts/API

Gamma Constants MGS-D.A 218

Last Edited on 07-NOV-2014,10:50

Gamma Calibrator Number	225	
GRC-M Calibrator Jig in Use?	NO	
Inactive Background Jig in Use?	NO	
Mud Density	1.13	gm/cc
Caliper Source for Processing	Density Caliper	
Tool Position	Centred	
Concentration of KCl		kppm
K Mud Type	Chloride	
K Mud Concentration	0.00	%

High Resolution Temperature Constants MGS-D.A 218

Last Edited on

Pre-filter Length	11

Neutron Calibration MDN-B.J 427

Base Calibration on 17-OCT-2014 11:47
Field Check on 07-NOV-2014 09:31

Base Calibration

	Measured		Calibrated (cps)	
	Near	Far	Near	Far
	2939	89	3714	110
Ratio	33.075		33.764	

Field Calibrator at Base

	Calibrated (cps)	
	2220	3322
Ratio	0.668	

Field Check

	Calibrated (cps)	
	2328	3470
Ratio	0.671	

Neutron Calibration Tolerances MDN-B.J 427

Near Reading	2939	-25% / 3500 / +25%	cps	Far Reading	89	-50% / 106 / +50% cps
Ratio	33.075	-5% / 33 / +5%				
Base Check	0.668	0.65 / 0.7 / 0.75				
Field Check	0.671	0.648 / 0.668 / 0.688				

Neutron Constants MDN-B.J 427

Last Edited on 07-NOV-2014,15:40

Neutron Source Id	P31131B	
Neutron Jig Number	NJ6630	
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

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	

Accelerometer Parameters MIE-B.A 260

Date Of Last Accelerometer Calibration 25-JUL-2014,14:06

	X Accelerometer	Y Accelerometer	Z Accelerometer
Slope	-1.090422	-1.101609	-1.113494
Offset	0.004661	0.006827	0.002640

Accelerometer Constants MIE-B.A 260

Last Edited on 03-NOV-2014,13:40

Accelerometer Calibrator Number 000

Accelerometer Temperature Characterisation

X Accelerometer

Serial Number	1139			
Calibration Date	10-May-2012			
	B0	B1	B2	B3
Bias(g)	0.00000e+000	4.88769e-005	1.88044e-008	-1.75722e-010
	SF0	SF1	SF2	SF3
Scale Factor(mA/g)	3.00000e+000	2.67684e-004	4.13884e-007	4.73822e-010

Y Accelerometer

Serial Number	1151			
Calibration Date	17-Jun-2012			
	B0	B1	B2	B3
Bias(g)	0.00000e+000	2.48608e-005	-4.00930e-009	1.04174e-010
	SF0	SF1	SF2	SF3
Scale Factor(mA/g)	3.00000e+000	2.71876e-004	2.98288e-007	7.92974e-010

Z Accelerometer

Serial Number	1152			
Calibration Date	18-Jun-2012			
	B0	B1	B2	B3
Bias(g)	0.00000e+000	3.03881e-005	1.67785e-008	-7.65678e-012
	SF0	SF1	SF2	SF3
Scale Factor(mA/g)	3.00000e+000	2.76121e-004	2.76484e-007	1.03336e-009

Magnetometer Parameters MIE-B.A 260

Date Of Last Magnetometer Calibration 26-JUL-2014,09:15

	X Magnetometer	Y Magnetometer	Z Magnetometer
Slope	-1.000000	-1.008692	-0.999396
Offset	0.001969	-0.024696	-0.003933

Magnetometer Constants MIE-B.A 260

Last Edited on

Magnetometer Calibrator Number 000

Imager Pad Check MIE-B.A 260

Field Check on 03-NOV-2014 14:00

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-B.A 260

Last Edited on 03-NOV-2014,13:41

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

Caliper Calibration MIE-B.A 260

Base Calibration on 07-NOV-2014 10:03
Field Calibration on 07-NOV-2014 10:04

Base Calibration

Reading No	Pads 1-5 Meas.	Pads 3-7 Meas.	Calibrator Size (in)
1	25052	24332	5.97
2	35168	34598	7.96
3	44597	44467	9.86
4	55884	56087	11.92
5	0	0	0.00

Reading No	Pad 2 Meas.	Pad 4 Meas.	Pad 6 Meas.	Pad 8 Meas.	Calibrator Size (in)
1	23834	24604	26111	25587	5.97
2	32467	33155	34545	34208	7.96
3	40525	41775	43457	42266	9.86
4	50109	52133	53480	51974	11.92
5	0	0	0	0	0.00

Field Calibration

Measured Pads 1-5 Caliper(in)	Measured Pads 3-7 Caliper(in)	Actual Caliper(in)
5.97	5.98	5.97

Measured Pad 2 Caliper(in)	Measured Pad 4 Caliper(in)	Measured Pad 6 Caliper(in)	Measured Pad 8 Caliper(in)	Actual Caliper(in)
3.02	2.98	2.98	3.01	5.97

Caliper Calibration Tolerances MIE-B.A 260

Upper

Short Arm X Field Cal. 5.97 in (5.77 – 5.97 – 6.17)

Short Arm Y Field Cal. 5.98 in (5.77 – 5.97 – 6.17)

Lower

Short Arm X Field Cal. 6.00 in (5.77 – 5.97 – 6.17)

Short Arm Y Field Cal. 6.00 in (5.77 – 5.97 – 6.17)

Caliper Constants MIE-B.A 260

Last Edited on 07-NOV-2014,09:58

Caliper Difference for BRKT	0.120	inches

Navigation Constants MIE-B.A 260

Last Edited on

Magnetic Declination	0.00	degrees	East

Induction Calibration MAI-B.A 289

Base Calibration on 09-OCT-2014,22:26
Field Check on 07-NOV-2014 09:09

Base Calibration

Test Loop Calibration Channel	Measured Low	Measured High	Calibrated (mmho/m) Low	Calibrated (mmho/m) High
1	16.7	472.3	9.3	966.2
2	5.8	381.9	7.6	821.4
3	3.2	261.2	5.2	566.0
4	1.9	138.0	2.6	279.2

Array Temperature	76.1	Deg F

Test Loop Calibration Verified

Channel	Base Check (mmho/m) Low	Base Check (mmho/m) High	Field Check (mmho/m) Low	Field Check (mmho/m) High
1			13.1	3833.6
2			30.7	3519.2
3			28.8	3019.5
4			18.9	1996.5
Deep			16.6	1912.6
Medium			43.0	4037.6
Shallow			47.1	5278.9

Array Temperature	56.2	Deg F

Induction Calibration Tolerances MAI-B.A 289

Low Conductivity 1 16.7 mmho/m (13.0 – 17.0 – 21.0)

High Conductivity 1 472.3 mmho/m (430.0 – 475.0 – 520.0)

Low Conductivity 1	16.7	4.5 6.0 7.5	mmho/m	High Conductivity 1	472.3	345.0 385.0 425.0	mmho/m
Low Conductivity 2	5.8	1.0 3.5 6.0	mmho/m	High Conductivity 2	381.9	240.0 260.0 280.0	mmho/m
Low Conductivity 3	3.2	0.0 2.0 4.0	mmho/m	High Conductivity 3	261.2	120.0 135.0 150.0	mmho/m
Low Conductivity 4	1.9	-110.0 -32.5 45.0	mmho/m	High Conductivity 4	138.0	-2.0 0.0 2.0	mmho/m
Background Vx 1	0.0	-35.0 20.0 75.0	mmho/m	Phase Check Loop 1	0.0	-2.0 0.0 2.0	%
Background Vx 2	0.0	-60.0 2.5 65.0	mmho/m	Phase Check Loop 2	0.0	-2.0 0.0 2.0	%
Background Vx 3	0.0	-50.0 -17.5 15.0	mmho/m	Phase Check Loop 3	0.0	-2.0 0.0 2.0	%
Background Vx 4	0.0		mmho/m	Phase Check Loop 4	0.0		%

Induction Constants MAI-B.A 289

Last Edited on 07-NOV-2014,15:41

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	

High Resolution Temperature Calibration MAI-B.A 289

Field Calibration on 13-OCT-2014,17:32

	Measured	Calibrated(Deg F)
Lower	10.00	10.00
Upper	100.00	101.00

High Resolution Temperature Constants MAI-B.A 289

Last Edited on 27-OCT-2014,21:34

Pre-filter Length	11

Caliper Calibration MPD-C.J 376

Base Calibration on 07-NOV-2014 09:19
Field Calibration on 07-NOV-2014 09:20

Base Calibration

Reading No	Measured	Calibrator Size (in)
1	12928	4.01
2	20944	5.97
3	29408	7.96
4	37648	9.86
5	47001	11.92
6	N/A	N/A

Field Calibration

Measured Caliper (in)	Actual Caliper (in)
6.00	5.97

Caliper Calibration Tolerances MPD-C.J 376

Long Arm Field Cal.	6.00	5.57 / 5.97 / 6.37	in

Photo Density Calibration MPD-C.J 376

Base Calibration on 18-OCT-2014 09:38
Field Check on 07-NOV-2014 09:25

Density Calibration

Base Calibration	Measured Near	Measured Far	Calibrated (sdu) Near	Calibrated (sdu) Far
Background	1153	1297		
Reference 1	55982	25827	59443	30683
Reference 2	22636	2466	25113	2508
Field Check at Base	1152.7	1296.7		
Field Check	1151.5	1304.2		

PE Calibration

Base Calibration	WS	WH	Ratio	Calibrated Ratio
Background	208	1031		
Reference 1	23060	55789	0.417	0.372
Reference 2	6283	22501	0.283	0.268
Field Check at Base	208.1	1031.0		
Field Check	207.2	1028.3		

Photo Density Calibration Tolerances MPD-C.J 376

Near Density Ratio	2.55	-5% / 2.52 / +5%	Far Density Ratio	20.98	-5% / 21.00 / +5%
PE Calibration	0.121	0.089 / 0.110 / 0.131			
Near Den. Field Check	1151.5	-3% / 1152.7 / +3%	Far Den. Field Check	1304.2	-3% / 1296.7 / +3%
PE WS Field Check	207.2	-6% / 208.1 / +6%	PE WH Field Check	1028.3	-6% / 1031.0 / +6%

Density Constants MPD-C.J 376

Last Edited on 07-NOV-2014,10:50

Density Source Id	P21136B	
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	1.13	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

Spectral Gamma Calibration SGS-E.J 128

Base Calibration on 25-SEP-2014 17:21
Field Calibration on 04-NOV-2014 08:43

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	164	33
Calibrator (Gross)	1360	273
Calibrator (Net)	1197	240

Mixture Calibrator

	Gate 1	Gate 2	Gate 3	Gate 4	Gate 5
Background	111.4	37.7	3.9	1.3	2.2
Calibrator (Gross)	908.3	363.2	47.5	14.7	19.3
Calibrator (Net)	796.9	325.6	43.5	13.4	17.2

Spectral Gamma Check Tolerances SGS-E.J 128

Base Check K	6.1	5.46 / 5.90 / 6.34	%
Base Check U	13.1	12.50 / 13.60 / 14.70	ppm
Base Check T	43.6	39.30 / 43.70 / 48.10	ppm
Field Check K	5.6	5.46 / 5.90 / 6.34	%
Field Check U	13.8	12.50 / 13.60 / 14.70	ppm
Field Check T	42.0	39.30 / 43.70 / 48.10	ppm

Spectral Gamma Constants SGS-E.J 128

Last Edited on 07-NOV-2014,10:51

Background Calibrator Number	440	
Mixture Calibrator Number	450	
Potassium Calibrator Number	500	
Uranium Calibrator Number	506	
Thorium Calibrator Number	503	
Mud Density	1.13	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

C:\LOGS\WHITING\HORSETAIL 30F-1941\MMS DEPTH.dta

Shuttle Running Tool 3.5" (SRT A)
SRT-A 15 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
MLK-A 3 LG: 4.48 ft WT: 30.9 lb OD: 2.240 in

SKJ-E.A Compact Knuckle Joint
SKJ-E.A 203 LG: 2.17 ft WT: 24.3 lb OD: 2.244 in

MBS-F.A 200v Compact Battery Sub
MBS-F.A 145 LG: 17.06 ft WT: 123.5 lb OD: 2.240 in

Compact Memory Sub F.A
MMS-F.A 249 LG: 5.20 ft WT: 37.5 lb OD: 2.244 in

Compact Tool Isolator sub.
MTI-C.A 145 LG: 1.54 ft WT: 13.2 lb OD: 2.244 in

Compact Short Gamma
MGS-D.A 218 LG: 3.41 ft WT: 24.3 lb OD: 2.244 in

Compact Collar Locator
MCL-C.A 128 LG: 3.17 ft WT: 26.5 lb OD: 2.244 in

SKJ-E.A Compact Knuckle Joint
SKJ-E.A 410 LG: 2.17 ft WT: 24.3 lb OD: 2.244 in

SHA-J.A Compact Swivel Head Adaptor
SHA-J.A 313 LG: 2.30 ft WT: 22.0 lb OD: 2.244 in

MIS-D.A Compact Inline Bowspring sub
MIS-D.A 296 LG: 5.70 ft WT: 33.1 lb OD: 2.240 in

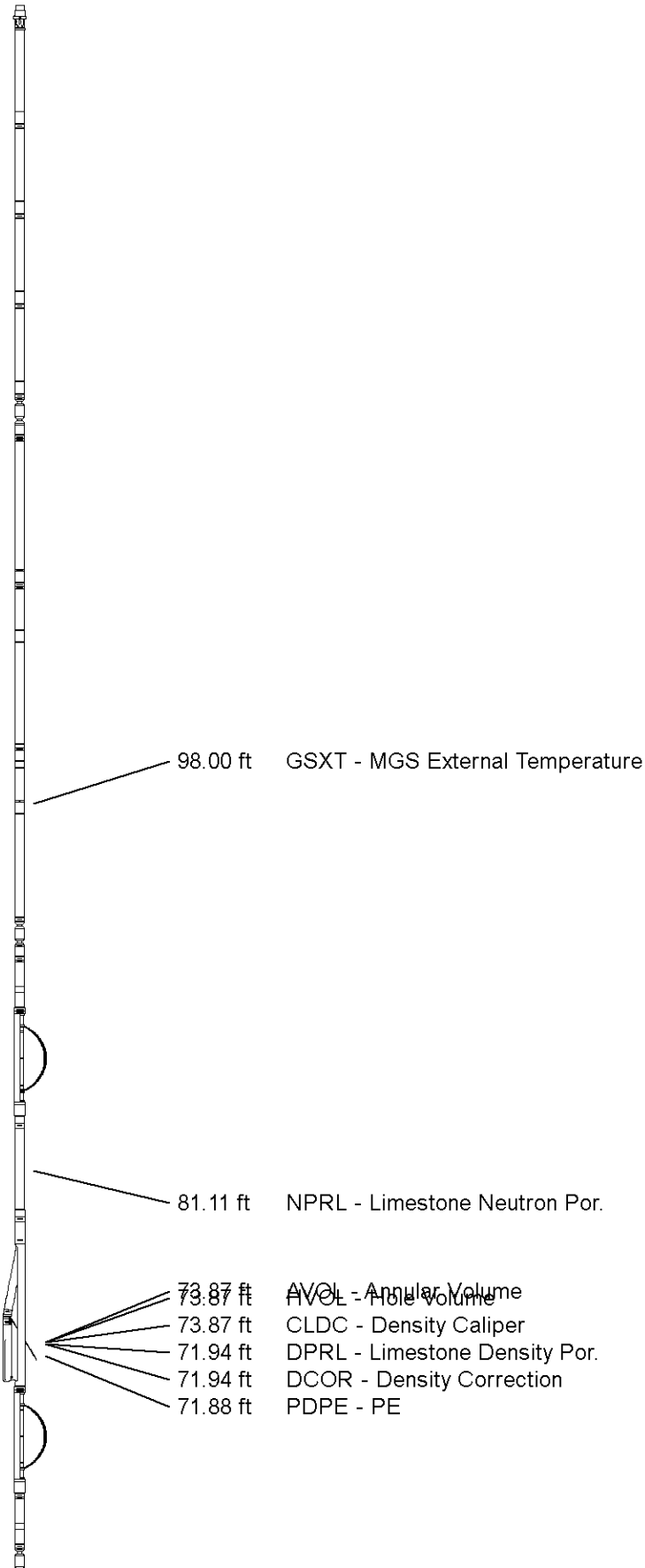
Compact Neutron
MDN-B.J 427 LG: 5.04 ft WT: 50.7 lb OD: 2.244 in

Compact Density/Caliper
MPD-C.J 376 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.A Compact Swivel Head Adaptor
SHA-J.A 314 LG: 2.30 ft WT: 22.0 lb OD: 2.244 in

SKJ-E.B Compact Knuckle Joint
SKJ-E.B 610 LG: 2.17 ft WT: 24.3 lb OD: 2.244 in



MIS-E.A Compact Inline Standoff sub
MIS-E.A 355 LG: 2.14 ft WT: 15.4 lb OD: 2.244 in

SKJ-E.B Compact Knuckle Joint
SKJ-E.B 537 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-B.A 260 LG: 4.65 ft WT: 26.5 lb OD: 2.244 in

Compact MMI Electrode Section
MIE-B.A 260 LG: 13.96 ft WT: 99.2 lb OD: 4.094 in

MIS-D.A Compact Inline Bowspring sub
MIS-D.A 439 LG: 5.70 ft WT: 33.1 lb OD: 2.240 in

SKJ-E.B Compact Knuckle Joint
SKJ-E.B 694 LG: 2.17 ft WT: 24.3 lb OD: 2.244 in

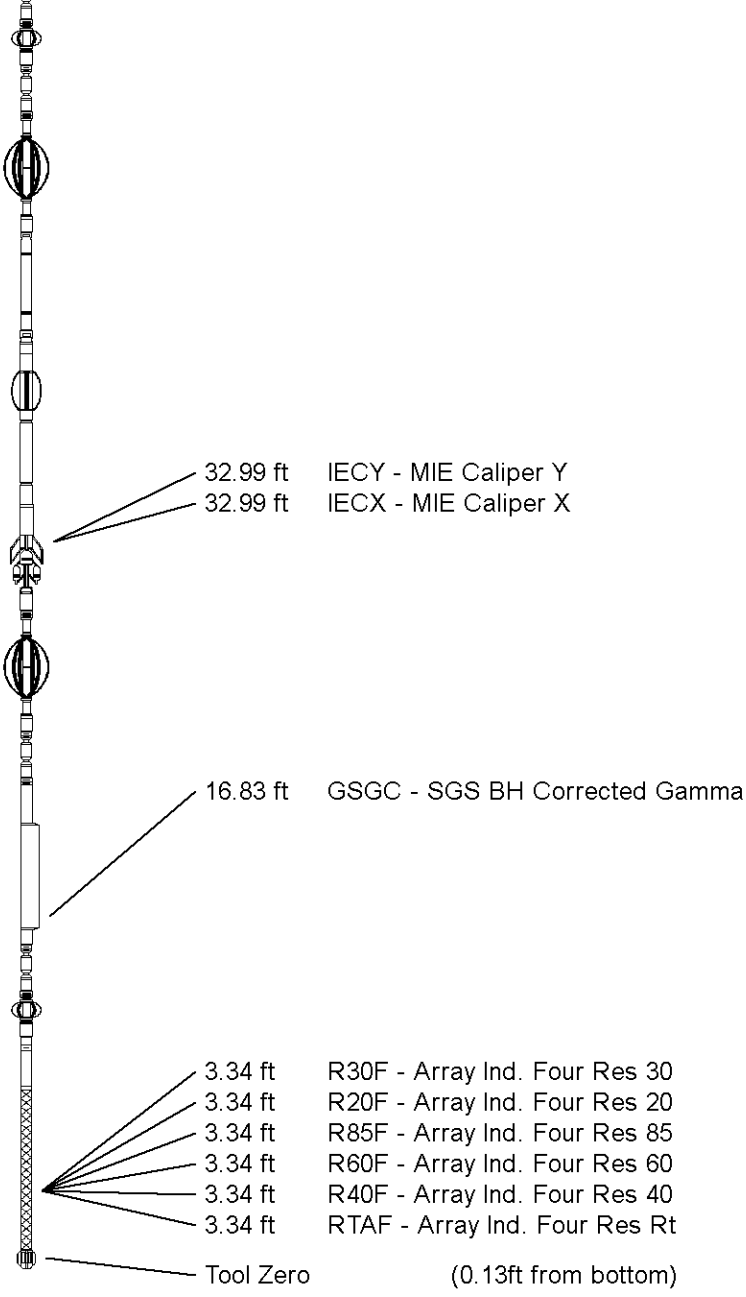
Spectral Gamma Ray Sub
SGS-E.J 128 LG: 7.78 ft WT: 105.8 lb OD: 3.543 in

SKJ-E.B Compact Knuckle Joint
SKJ-E.B 611 LG: 2.17 ft WT: 24.3 lb OD: 2.244 in

MIS-E.A Compact Inline Standoff sub
MIS-E.A 364 LG: 2.14 ft WT: 15.4 lb OD: 2.244 in

Compact Induction
MAI-B.A 289 LG: 10.81 ft WT: 48.5 lb OD: 2.240 in

Total Length: 160.56 ft Weight: 1128.8 lb



COMPANY	WHITING OIL AND GAS CORPORATION
WELL	HORSETAIL 30F-1941
FIELD	REDTAIL
PROVINCE/COUNTY	WELD
COUNTRY/STATE	U.S.A. / COLORADO

Elevation Kelly Bushing	4797.00	feet	First Reading	13890.00	feet
Elevation Drill Floor	4797.00	feet	Depth Driller	13938.00	feet
Elevation Ground Level	4780.00	feet	Depth Logger	13938.00	feet

Weatherford®

MEASURED DEPTH
X-Y CALIPER
HOLE VOLUME LOG