Weatherford®

CML MESSENGER SHUTTLE
ARRAY INDUCTION
ELECTRIC LOG

COMPANY	WHITING OIL AND GAS CORPORATION
WELL	RAZOR 21A-2814B
FIELD	WILDCAT
PROVINCE/COUNTY	WELD
COUNTRY/STATE	U.S.A. / COLORADO
LOCATION	SHL: 405' FNL & 661' FEL

SEC	TWP	RGE	Other Services
21	10N	58W	MDN\MPD CMI
API Number	05-123-37854		

Permanent Datum G.L., Elevation 4833 feet
Log Measured From KB
Drilling Measured From K.B. @ 17.3 FEET

Elevations:	feet
KB	4850.30
DF	4849.30
GL	4833.00

Date	19-SEP-2013			
Run Number	ONE			
Service Order	3535723			
Depth Driller	12721.00	feet		
Depth Logger	12721.00	feet		
First Reading	12692.00	feet		
Last Reading	6203.00	feet		
Casing Driller	6203.00	feet		
Casing Logger	6203.00	feet		
Bit Size	6.000	inches		
Hole Fluid Type	WBM			
Density / Viscosity	9.30 lb/USg		46.00 CP	
PH / Fluid Loss	8.00		4.80 ml/30Min	
Sample Source	FLOWLINE			
Rm @ Measured Temp	1.70 @ 70.0	ohm-m		
Rmf @ Measured Temp	1.28 @ 70.0	ohm-m		
Rmc @ Measured Temp	2.55 @ 70.0	ohm-m		
Source Rmf / Rmc	CALC		CALC	
Rm @ BHT	0.59 @207.0	ohm-m		
Time Since Circulation	1 HOUR			
Max Recorded Temp	207.00	deg F		
Equipment / Base	18088		OKC	
Recorded By	M. JOHNSON			
Witnessed By	P. BUCKNAM			

BOREHOLE RECORD

Last Edited: 19-SEP-2013 15:57

Bit Size inches	Depth From feet	Depth To feet
6.000	6203.00	12721.00

CASING RECORD

Type	Size inches	Depth From feet	Shoe Depth feet	Weight pounds/ft
INTERMED	7.000	0.00	6203.00	26.00

REMARKS

LOGGED WITH WLS 13.06.9804

LOGGED USING MESSAGER SHUTTLE METHOD OF DEPLOYMENT

TOOLS RAN: SRT-67, SKJ-589, MBS 1, MBS 2,200V MBS-134,MMSE174,MTI-55,MGS-170,MCL-064,SKJ-348,SHA-635,MIS-768, MDN-214, MPD-497,MIS-770, SHA-579, SKJ-657,MIS-023, MIM-263, MIE 263, MIS-276, SKJ-654, MAI-494 RAN IN COMBINATION

HARDWARE: MAI: MIS-B 0.5" STANDOFF USED ABOVE MAI, ISA STAND-OFF RAN BELOW MAI
MFE: MIS-B 0.5" STANDOFF USED ABOVE MFE
- MDN: MIS-A DOUBLE BOWSPRING USED ABOVE MDN.
- MPD: 4INCH PROFILE PLATE USED, MIS-A SINGLE BOWSPRING USED BELOW MP

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

LONGITUDE:-103.863442
LATITUDE: 40.830067

DRILL PIPE DEPTH DURING DEPLOYMENT: 12590
LOGGING TOOL DEPTH AFTER DEPLOYMENT: 12692

OPERATORS: W. WILLIAMS, T. WILLIAMS

RIG: CADE DRILLING 21

2 INCH MAIN LOG

Depth Based Data - Maximum Sampling Increment 10.0cm
Plotted on 22-SEP-2013 10:48
Filename: C:\Data\Whiting Oil and Gas Corp_Razor 21A-2814B\Razor 21A-2814B.dta
Recorded on 20-SEP-2013 23:31
System Versions: Processed with 13.06.9804 Plotted with 13.06.9804

Timing Marks
every 60.0 sec

Density Caliper
inches
4 9 14

MGS Gamma Ray
API
0 100 200
200 300 400

Bit Size
inches
4 9 14

Depth In Feet

Borehole Temp in deg F

Replay Scale 1:600

Array Ind. Six Cond Ct
mmhos
1000 750 500 250 0
2000 1750 1500 1250 1000

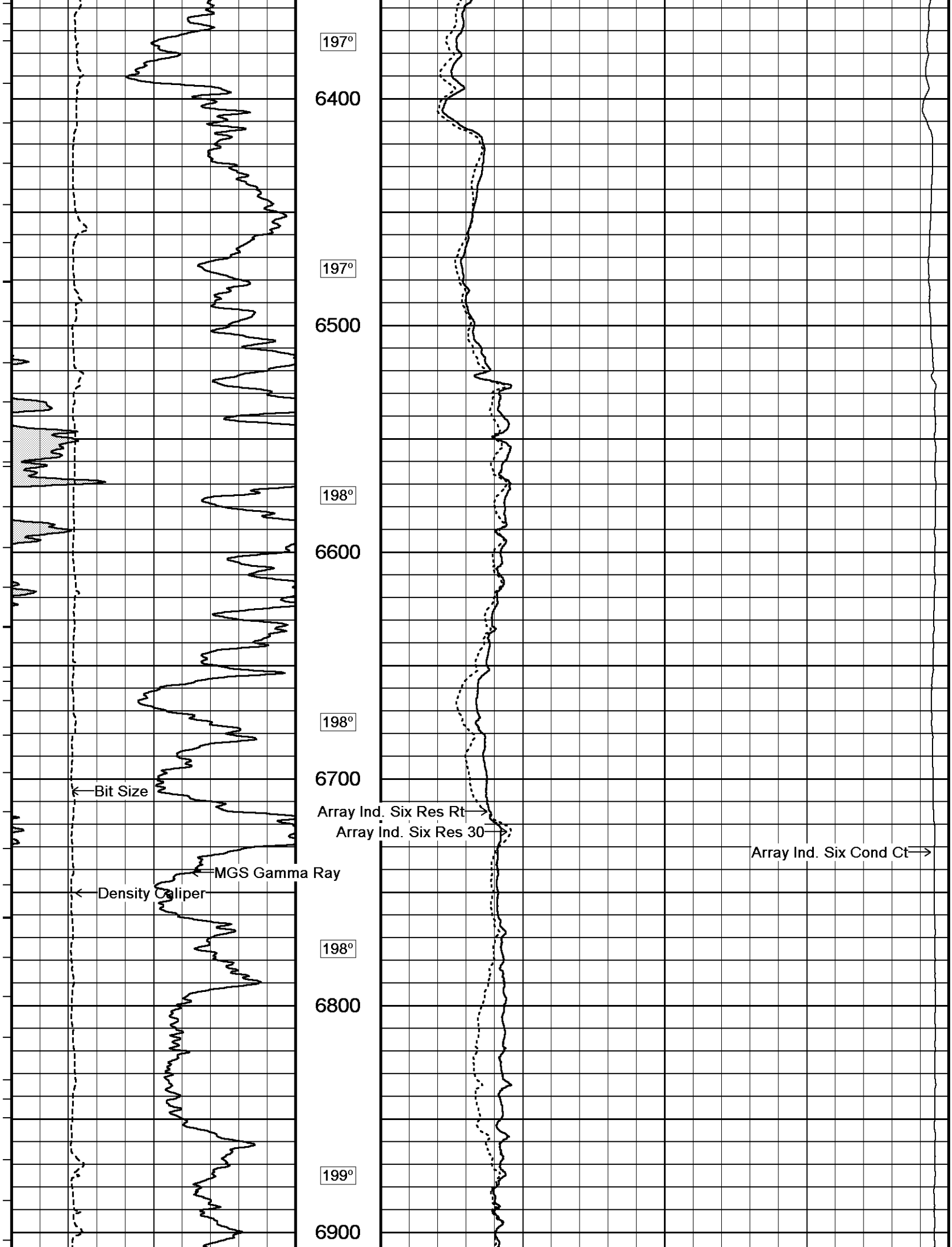
Array Ind. Six Res 30
ohm metres
0 50 100

Array Ind. Six Res Rt
ohm metres
0 50 100

Casing
6200

196°

6300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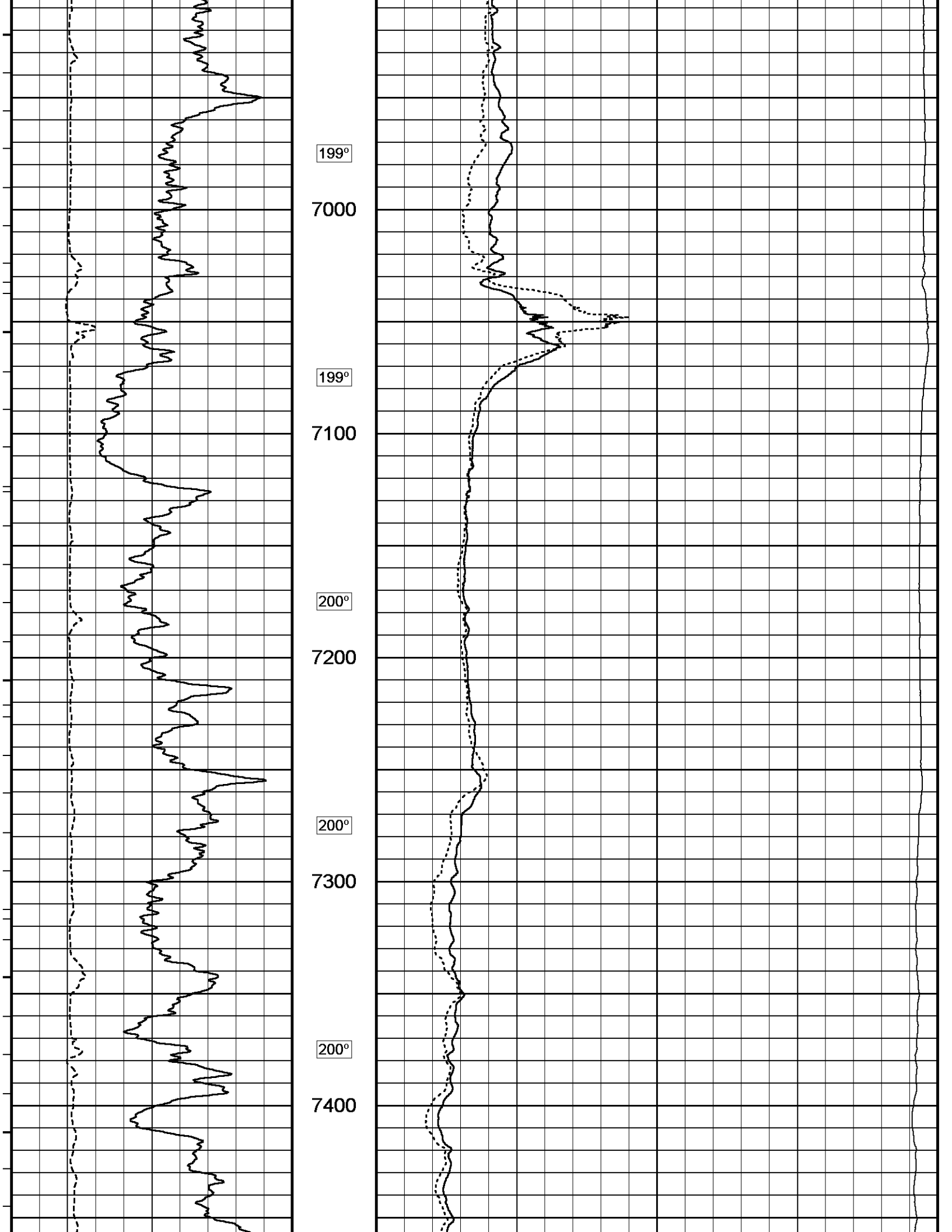
Array Ind. Six Res 30
Array Ind. Six Cond Ct
MGS Gamma Ray
Density Caliper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7200
200°
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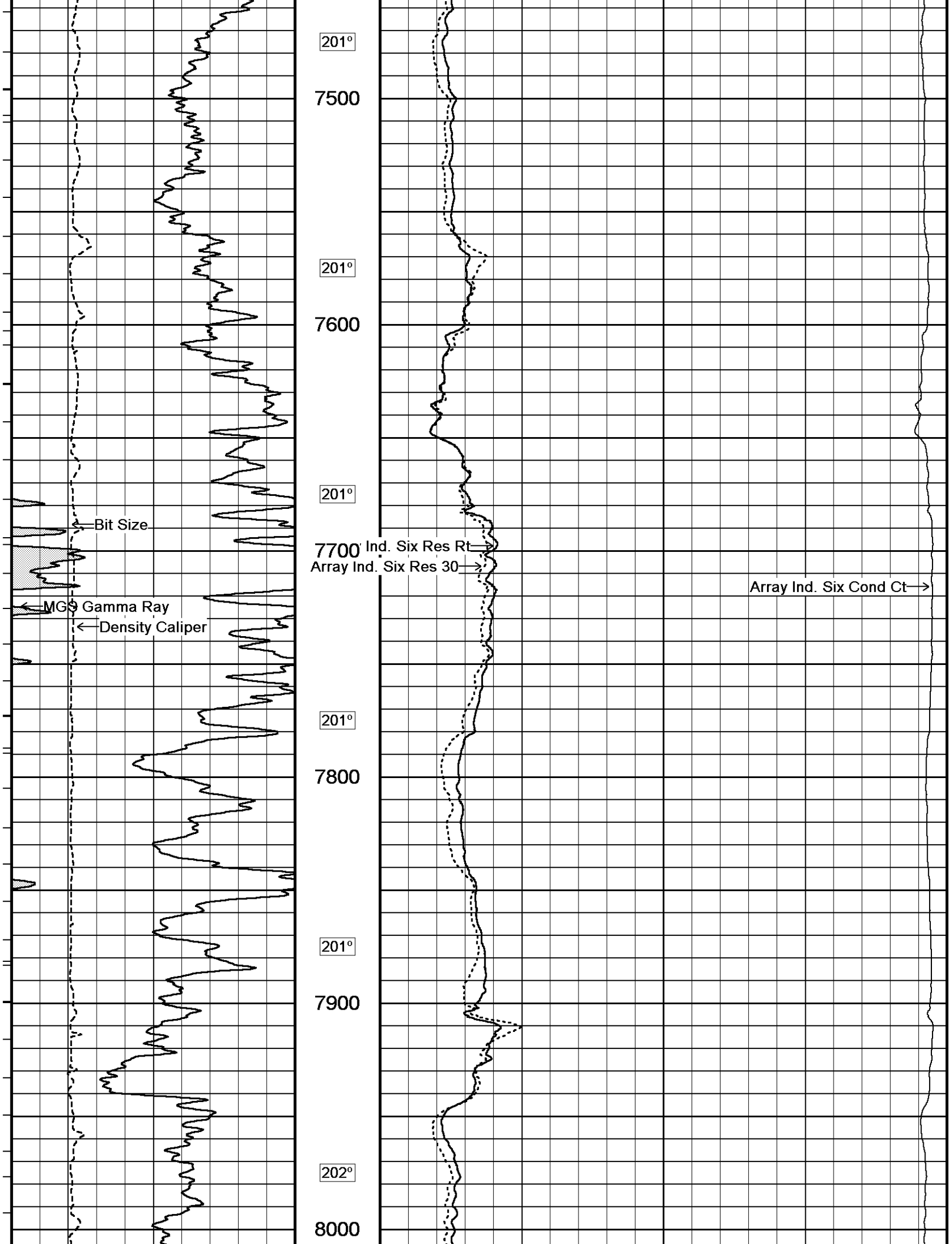
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202°
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Density Caliper
Ind. Six Res Rt
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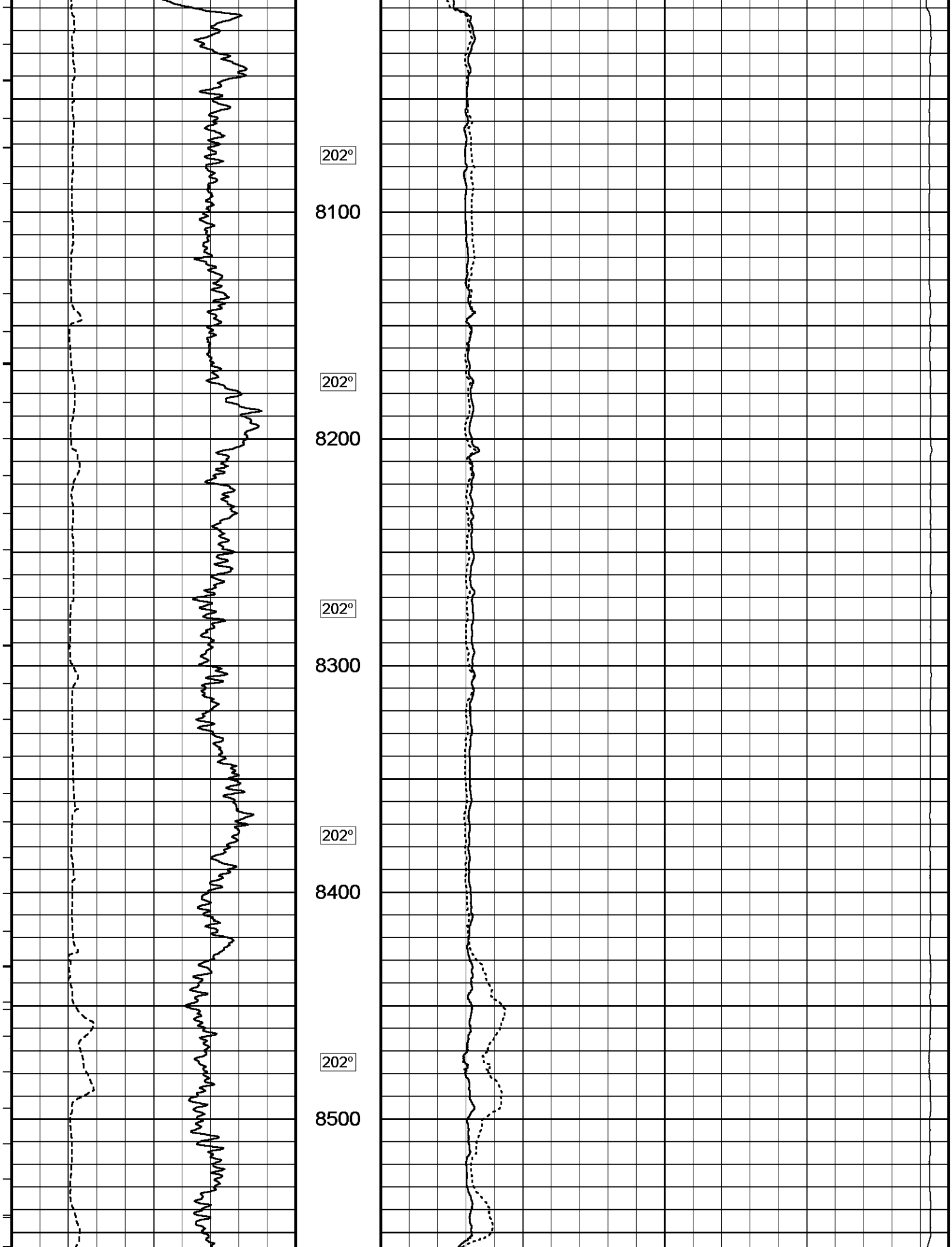
Array Ind. Six Cond Ct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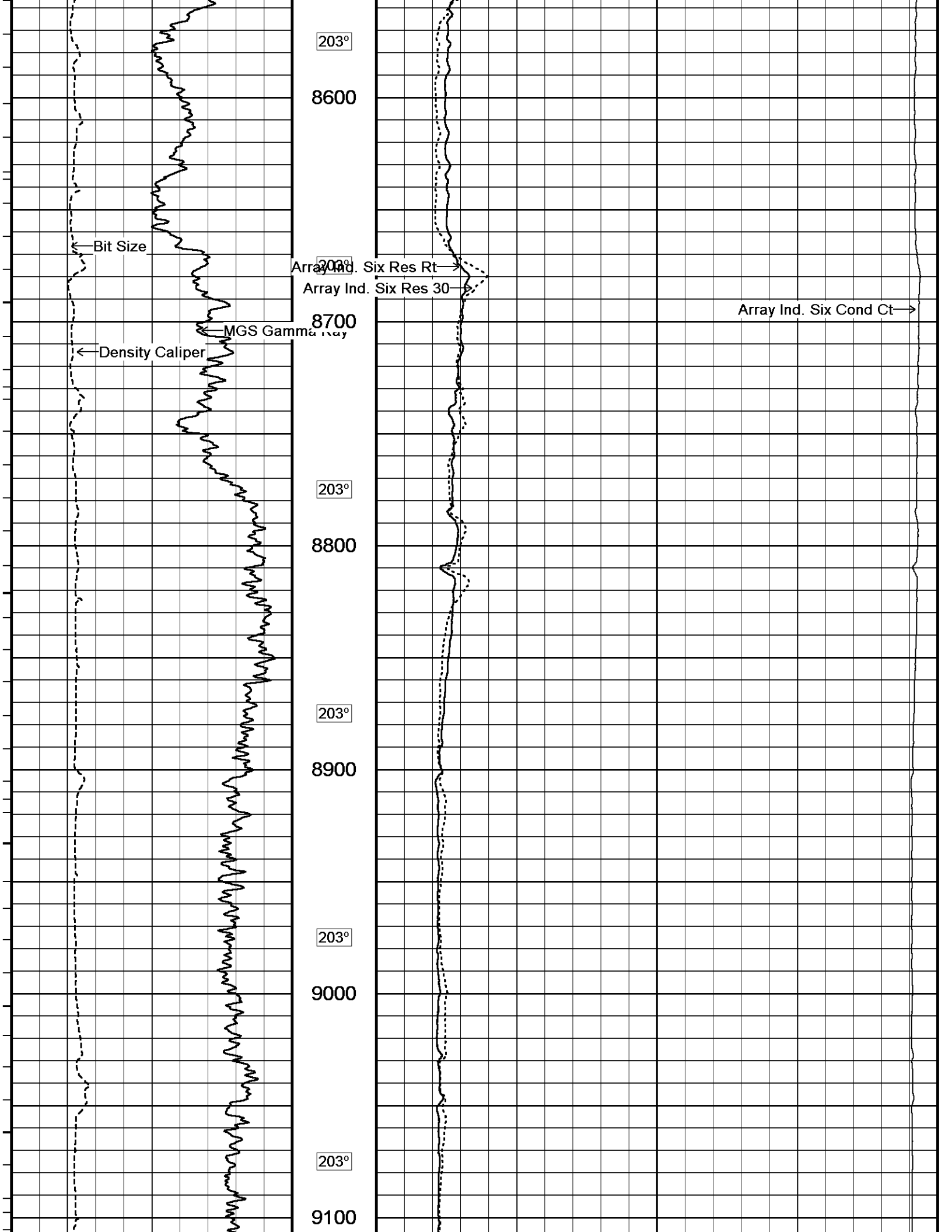
202°
8400
202°
8500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Bit Size
203°
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Array Ind. Six Res 30
Array Ind. Six Cond Ct
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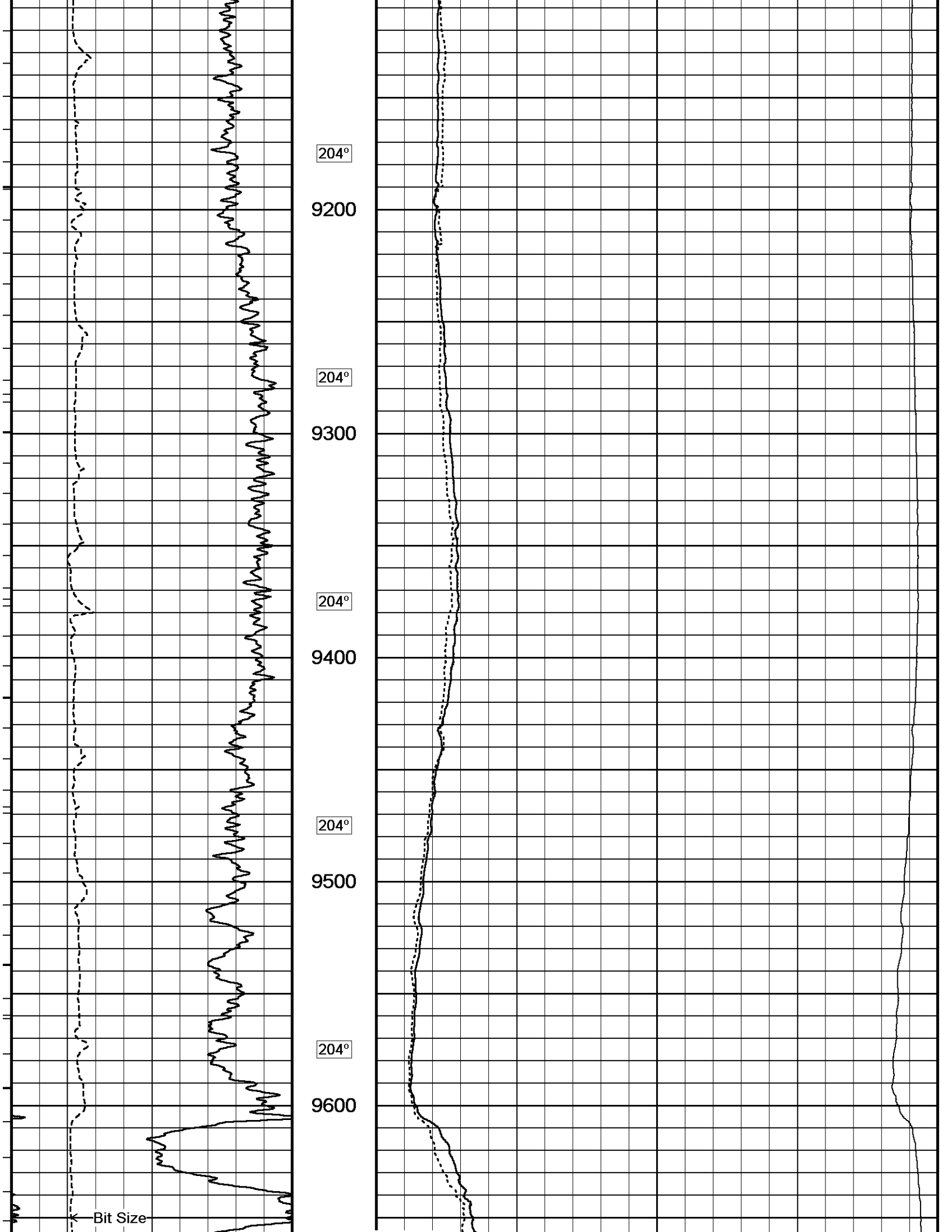
MGS Gamma Ray
Density Caliper
203°
8800
203°
8900
203°
9000
203°
9100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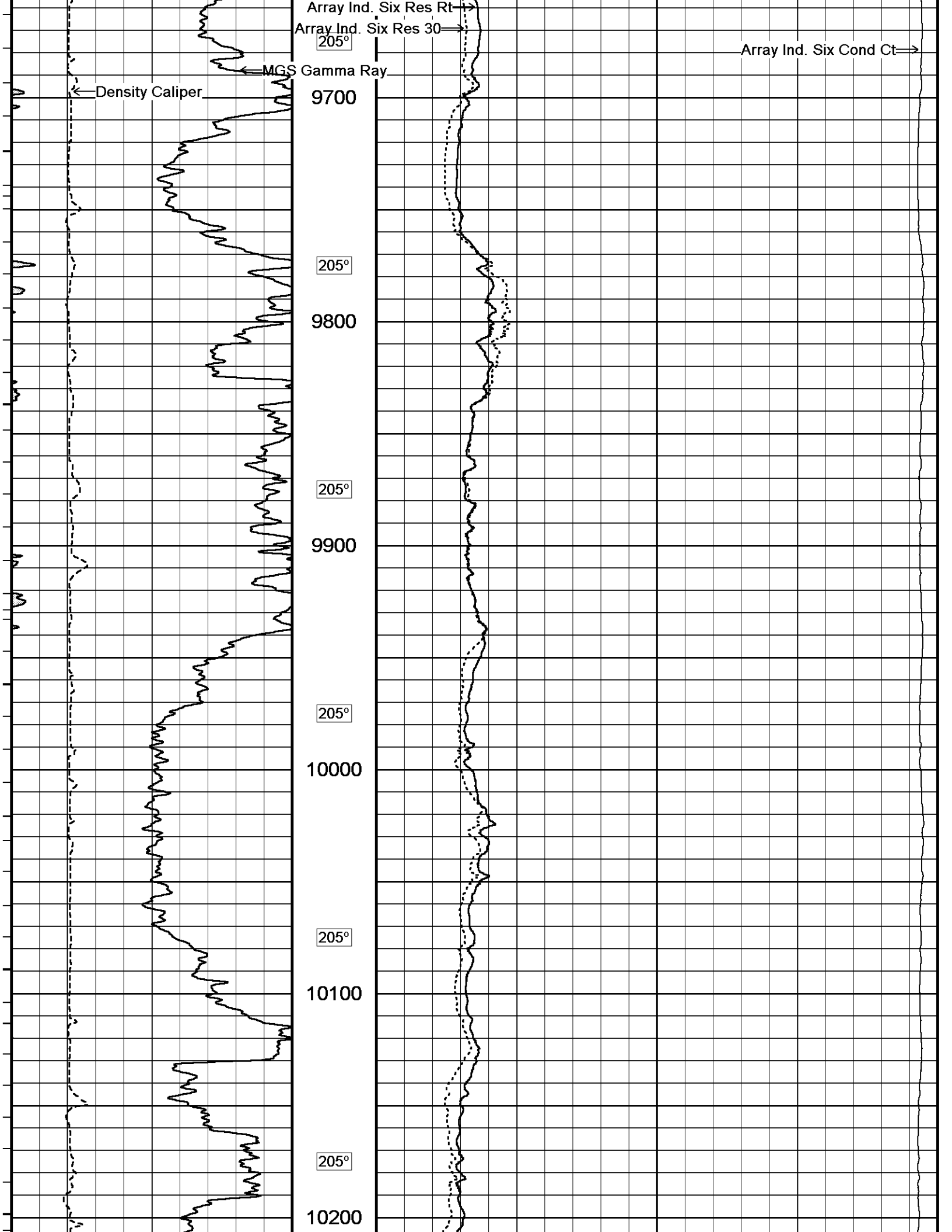
Bit Size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Array Ind. Six Res 30
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Array Ind. Six Cond Ct
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Density Caliper
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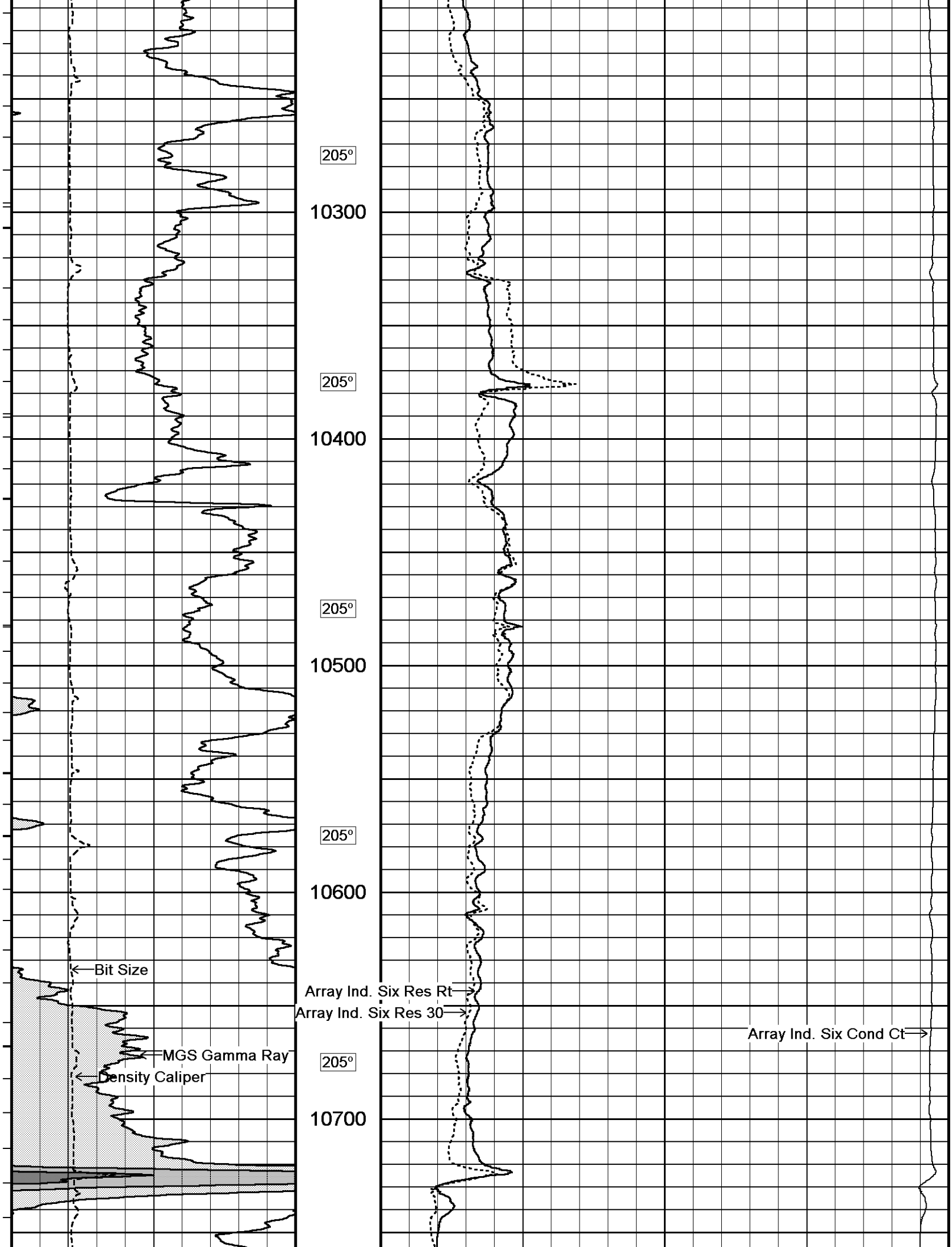
205°
9900
205°
10000
205°
10100
205°
10200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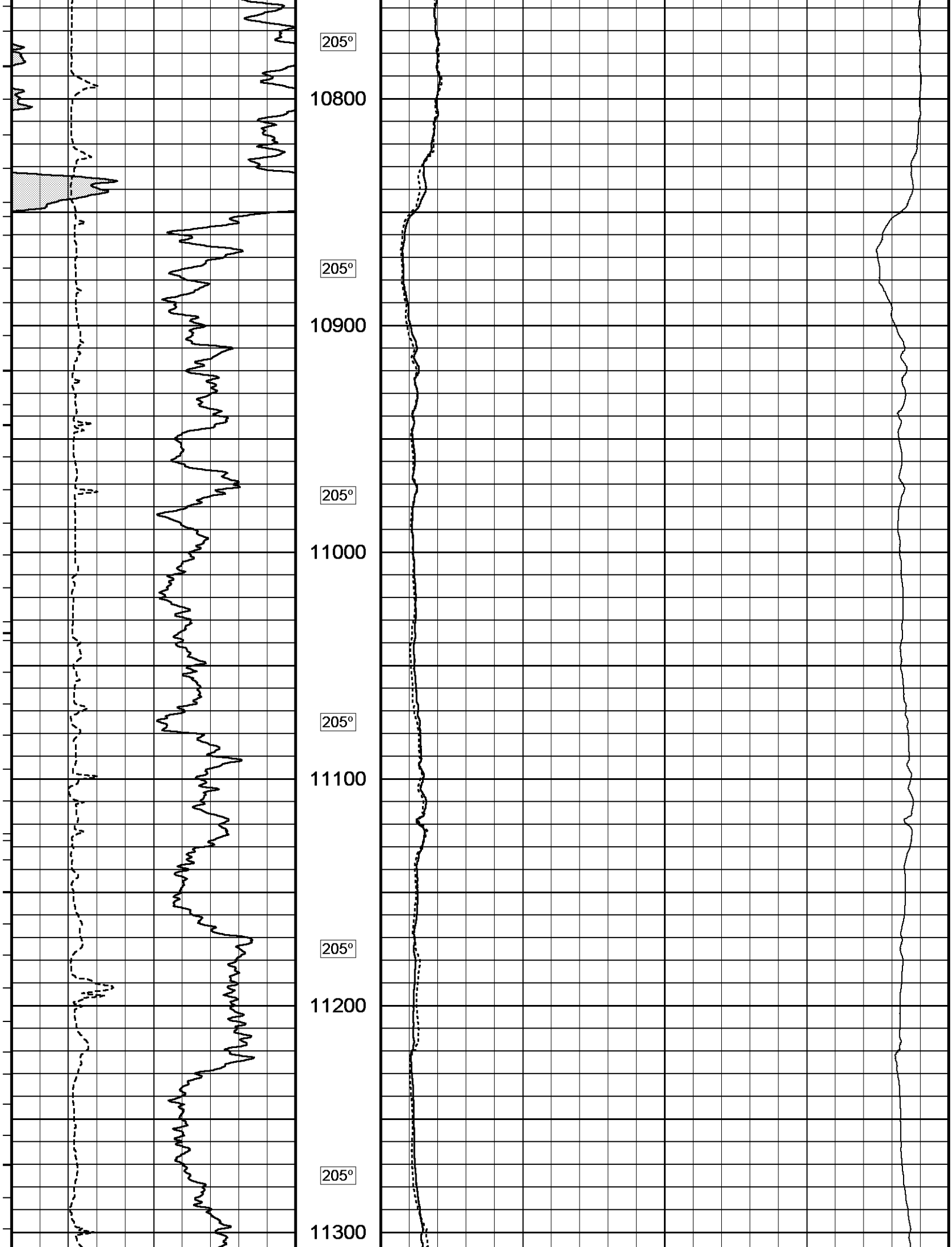
Array Ind. Six Cond Ct
MGS Gamma Ray
Density Caliper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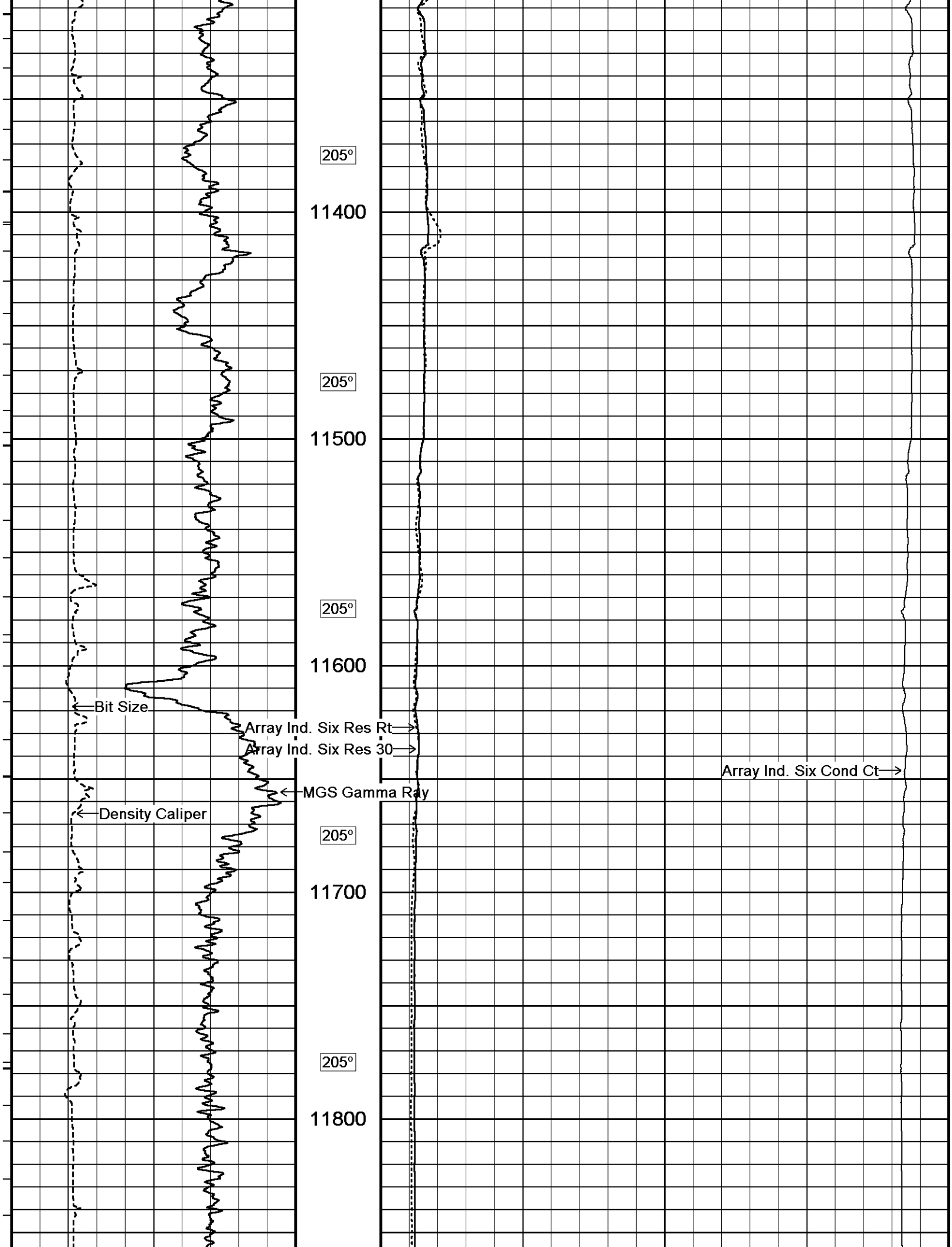
205°
11400
205°
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205°
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Bit Size
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Array Ind. Six Res 30
Array Ind. Six Cond Ct
MGS Gamma Ray
Density Caliper
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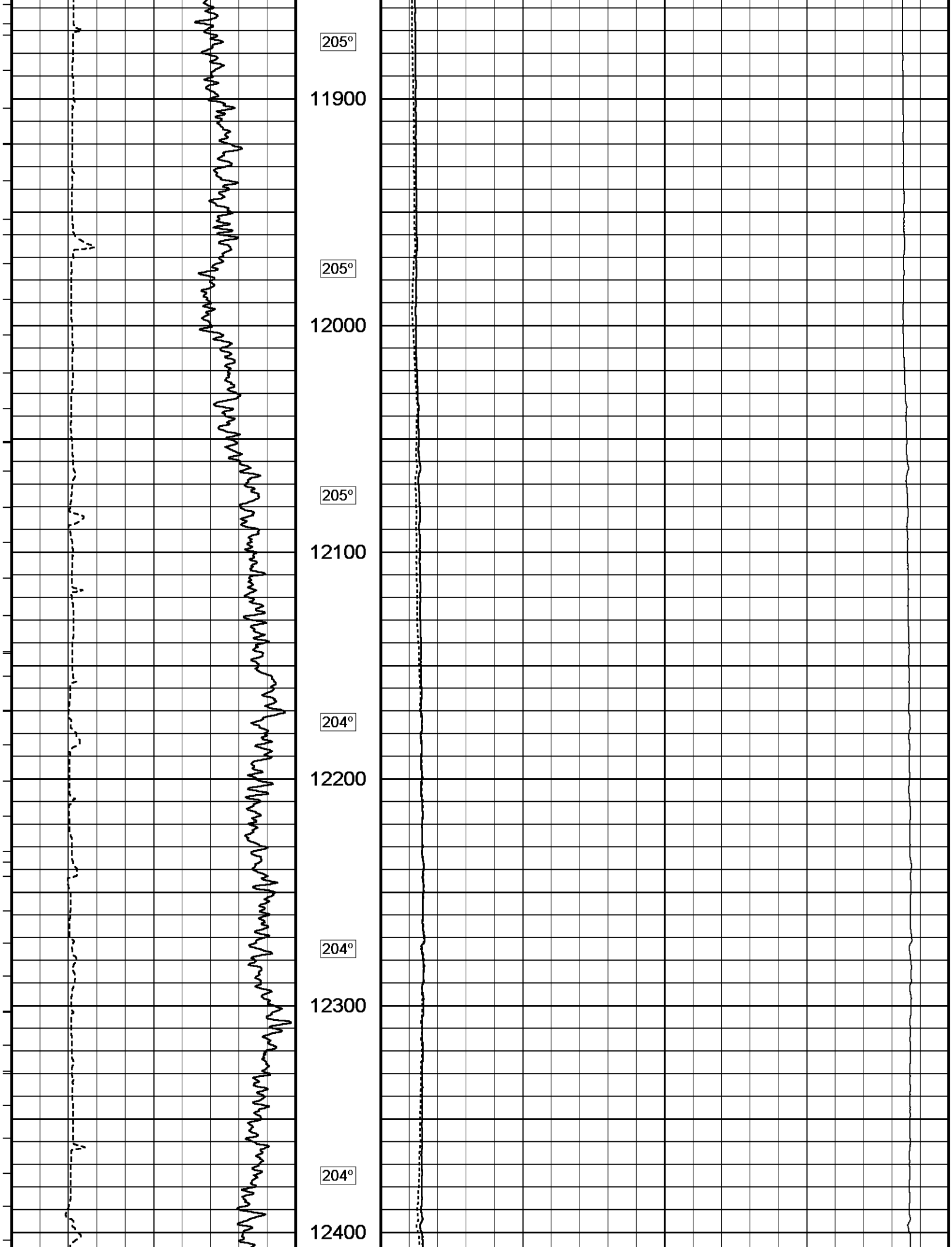
11700
205°
11800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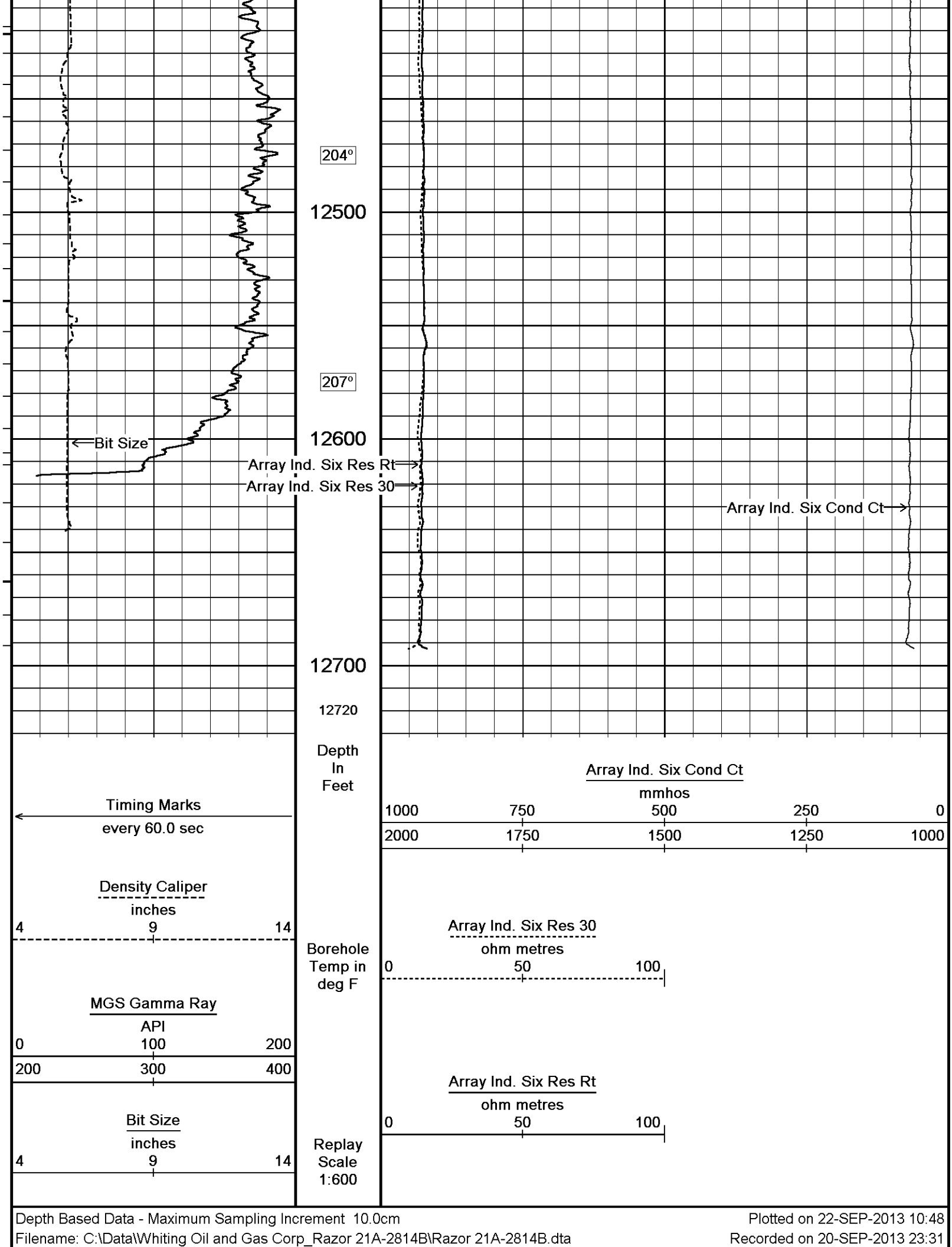


Depth Based Data - Maximum Sampling Increment 10.0cm

Plotted on 22-SEP-2013 10:48

Filename: C:\Data\Whiting Oil and Gas Corp_Razor 21A-2814B\Razor 21A-2814B.dta

Recorded on 20-SEP-2013 23:31

System Versions: Processed with 13.06.9804 Plotted with 13.06.9804

2 INCH MAIN LOG

5 INCH MAIN LOG

Depth Based Data - Maximum Sampling Increment 10.0cm
Plotted on 22-SEP-2013 10:48
Filename: C:\Data\Whiting Oil and Gas Corp_Razor 21A-2814B\Razor 21A-2814B.dta
Recorded on 20-SEP-2013 23:31
System Versions: Processed with 13.06.9804 Plotted with 13.06.9804

Timing Marks
every 60.0 sec

Density Caliper
inches
4 9 14

MGS Gamma Ray
API
0 100 200
200 300 400

Bit Size
inches
4 9 14

Depth In Feet

Borehole Temp in deg F

Replay Scale 1:240

6188

6200

196°

6250

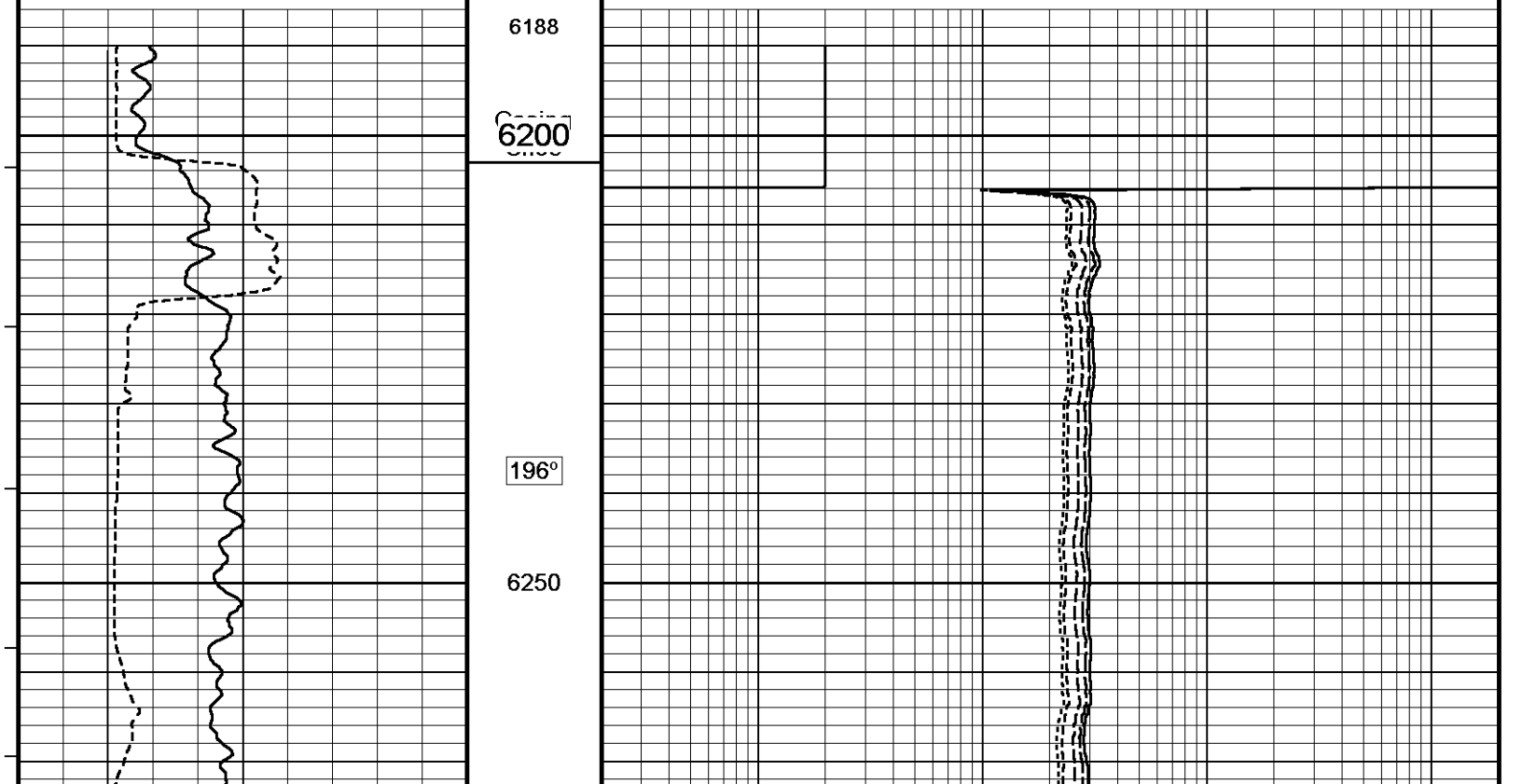
Array Ind. Six Res 30
ohm metres
0.20 2000
1 10 100 1000

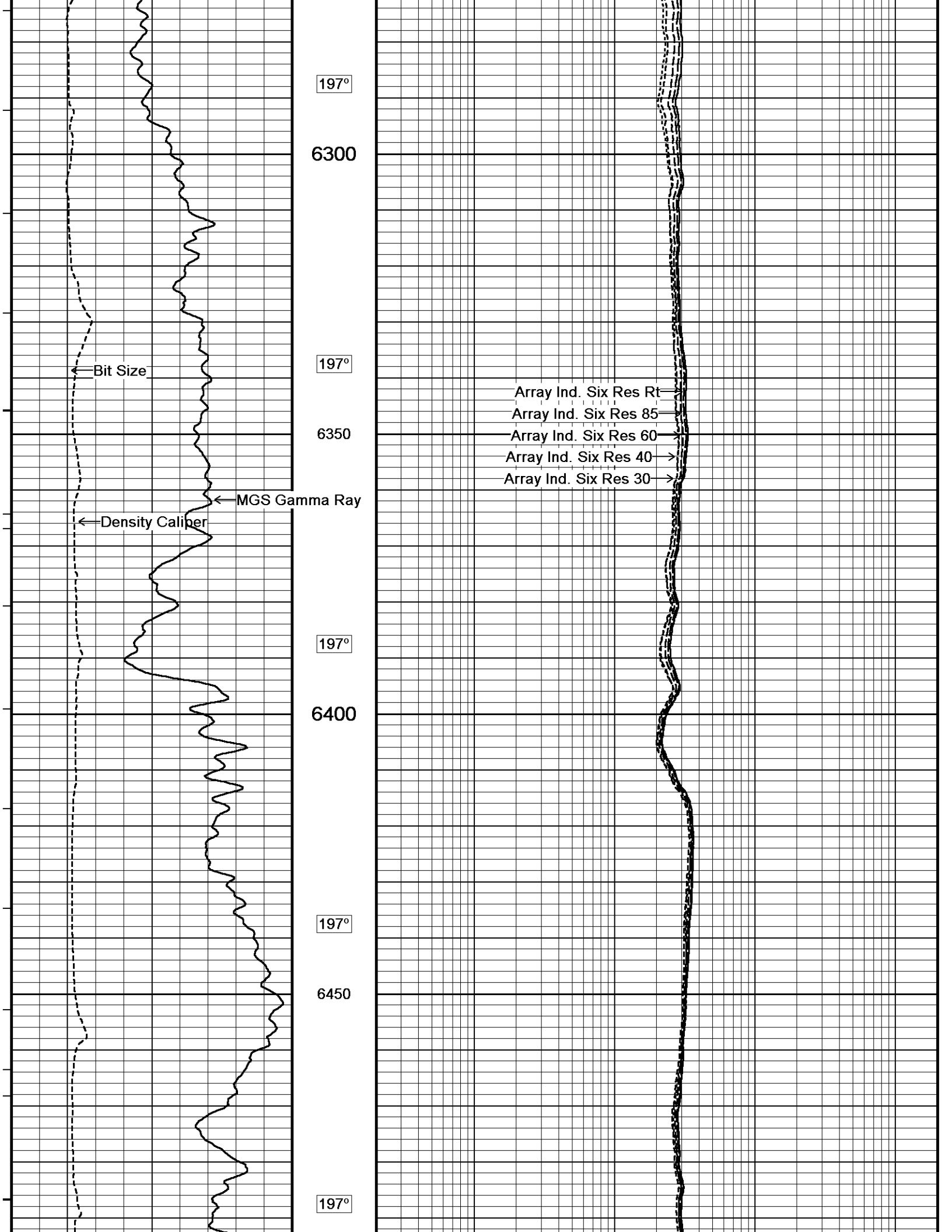
Array Ind. Six Res 40
ohm metres
0.20 2000
1 10 100 1000

Array Ind. Six Res 60
ohm metres
0.20 2000
1 10 100 1000

Array Ind. Six Res 85
ohm metres
0.20 2000
1 10 100 1000

Array Ind. Six Res Rt
ohm metres
0.20 2000
1 10 100 1000




197°
6300
197°
Bit Size
6350
MGS Gamma Ray
Density Caliper
197°
6400
197°
6450
197°
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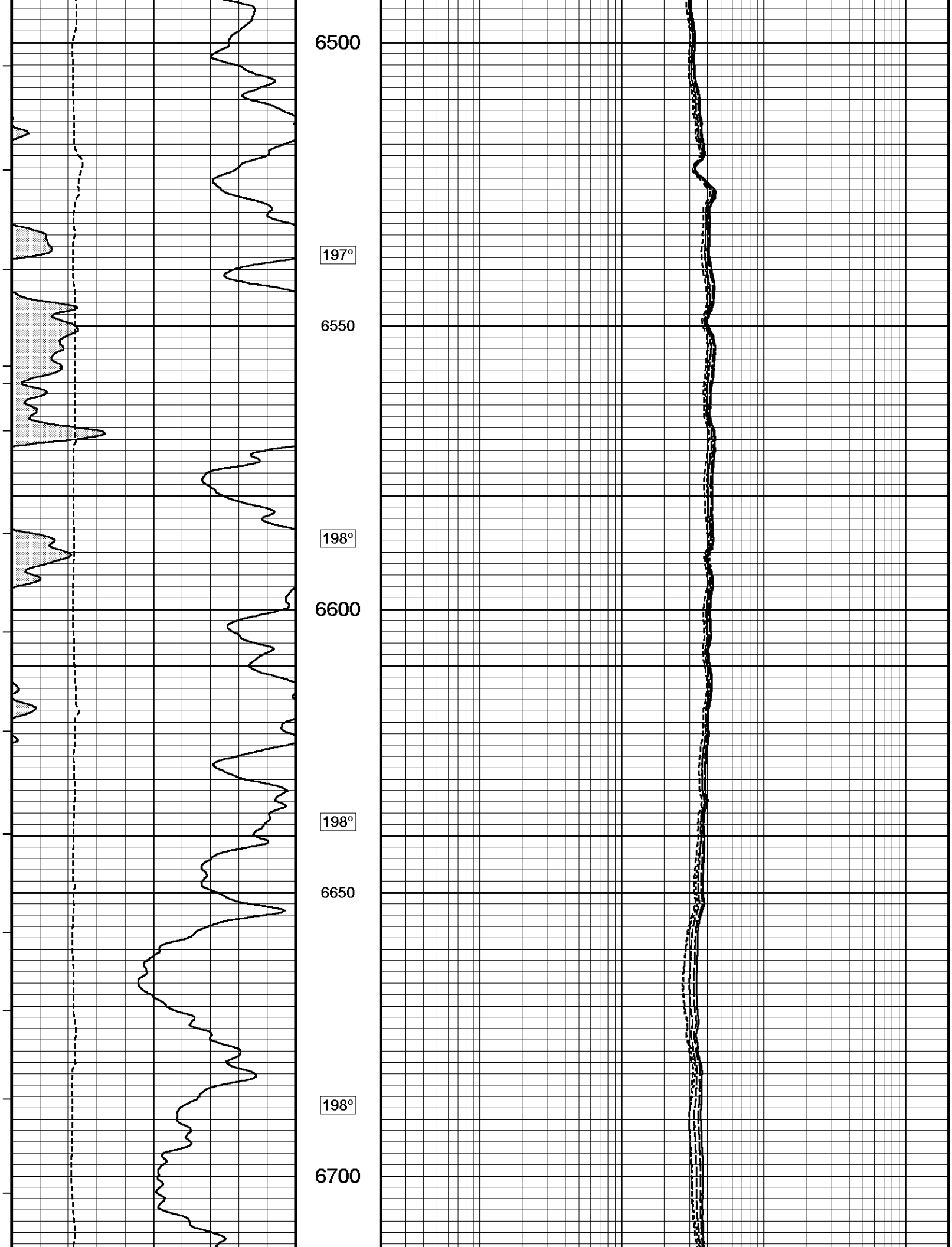
Array Ind. Six Res 85
Array Ind. Six Res 60
Array Ind. Six Res 40
Array Ind. Six Res 30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198°
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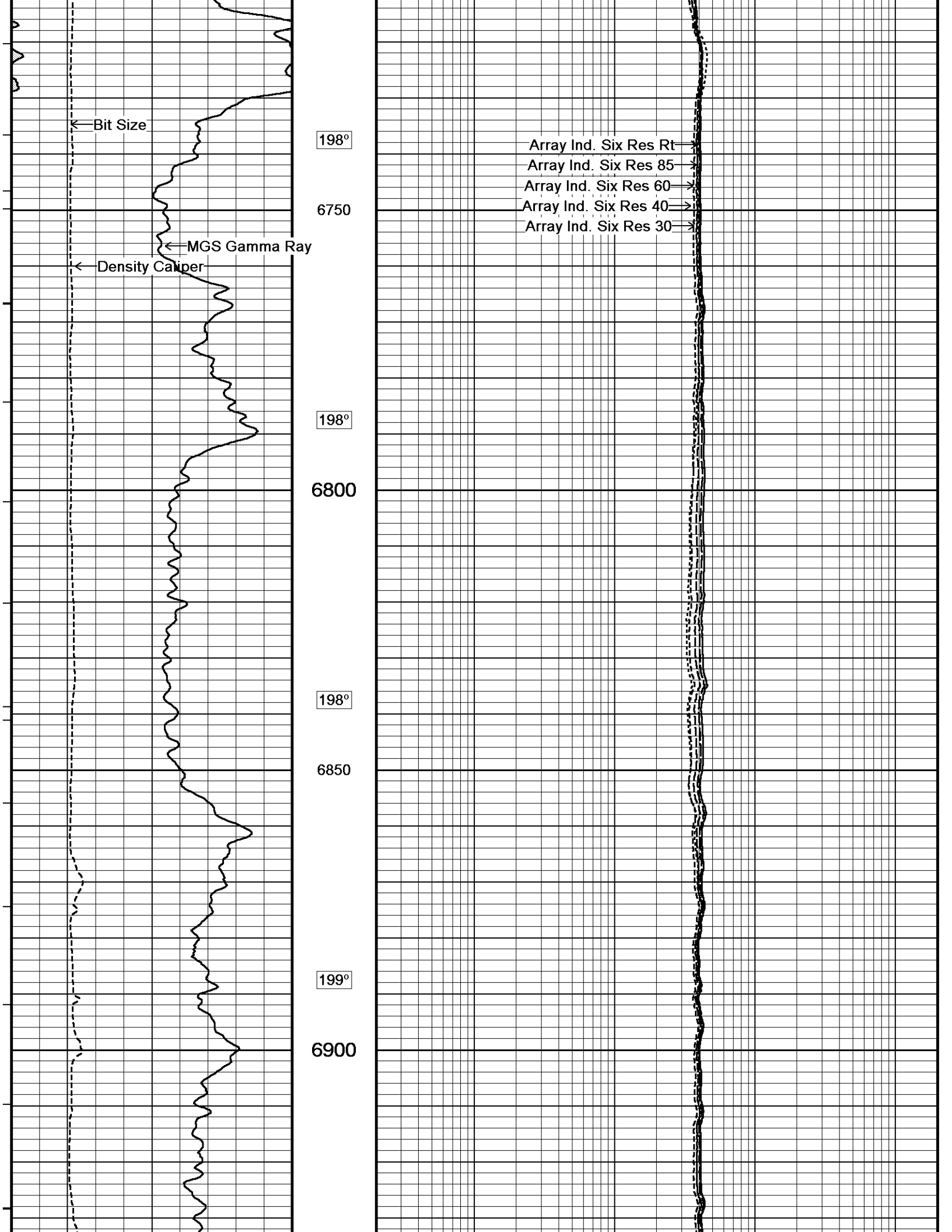
198°
6650
198°
6700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198°
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Array Ind. Six Res 85
Array Ind. Six Res 60
Array Ind. Six Res 40
Array Ind. Six Res 30
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MGS Gamma Ray
Density Caliper
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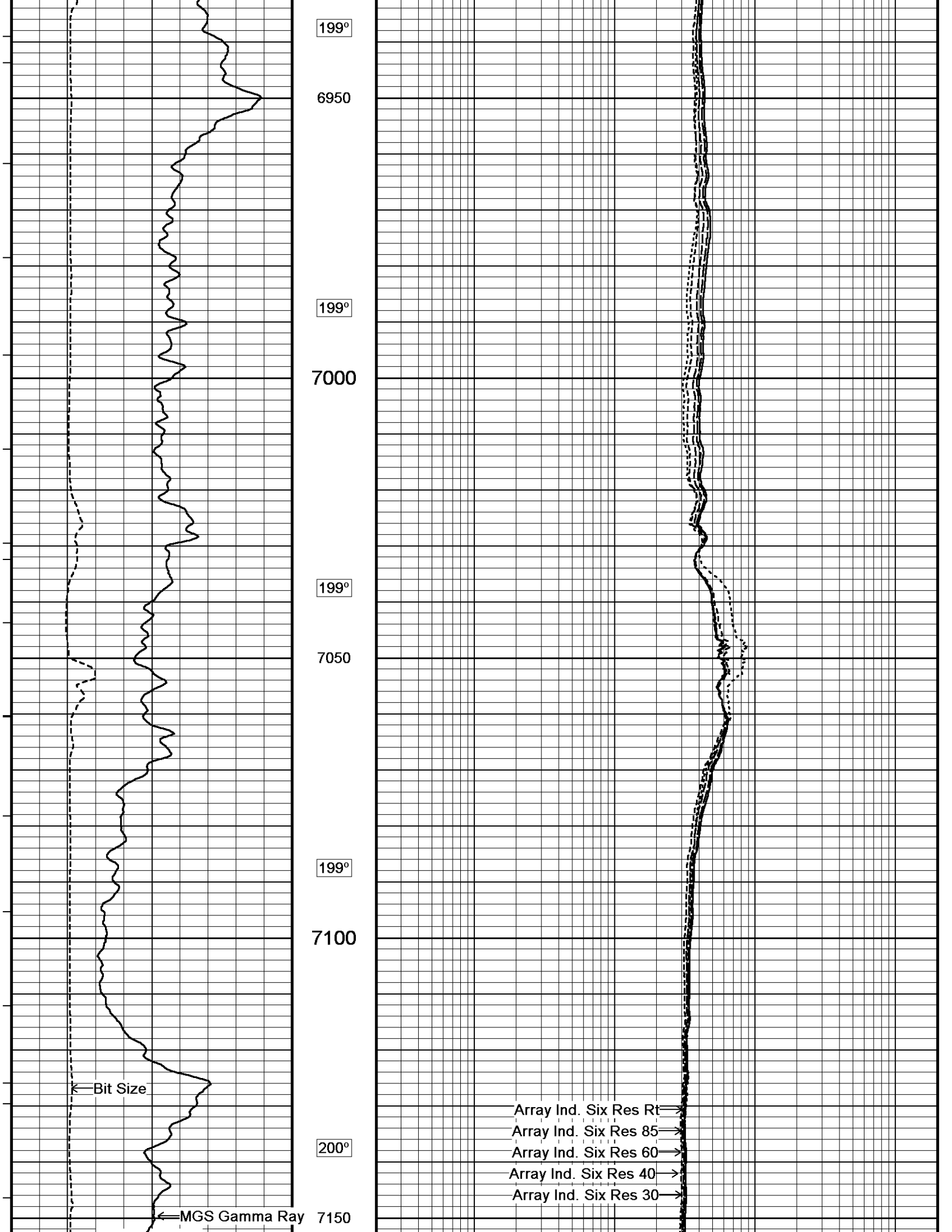
6800
198°
6850
199°
6900


199°
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199°
7000
199°
7050
199°
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200°
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Bit Size
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Array Ind. Six Res 60
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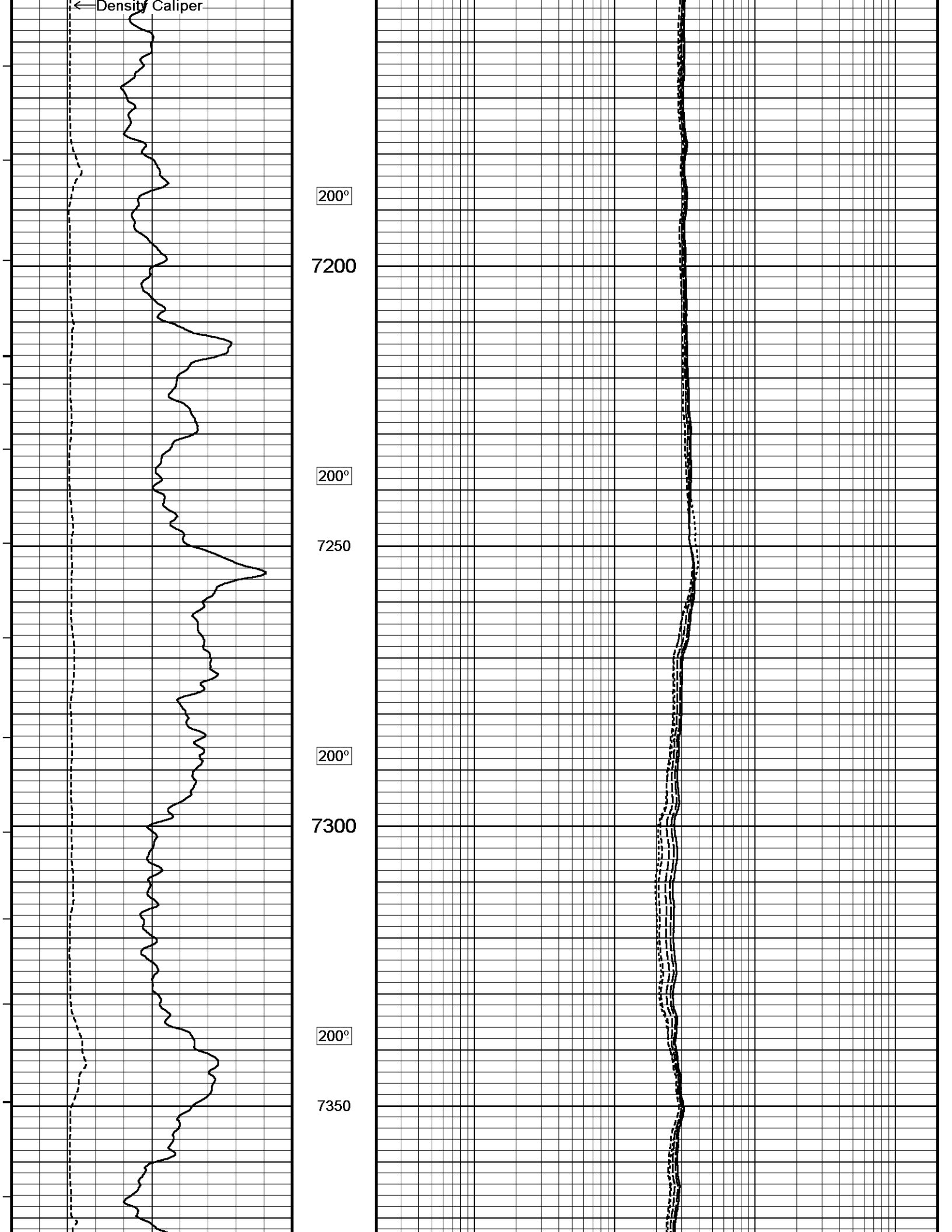
Array Ind. Six Res 30


←Density Caliper
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200°
7250
200°
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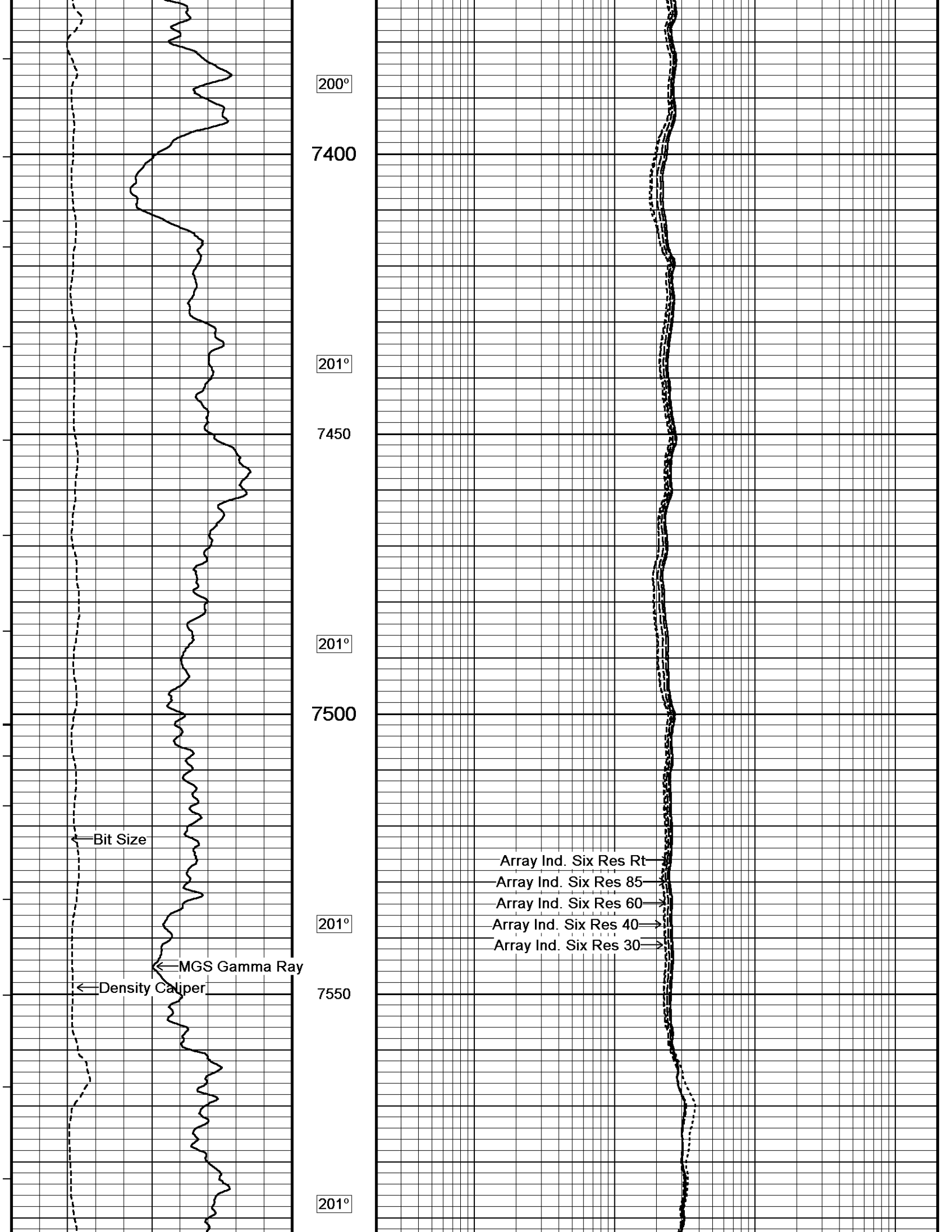
200°
7350


200°
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201°
7450
201°
7500
Bit Size
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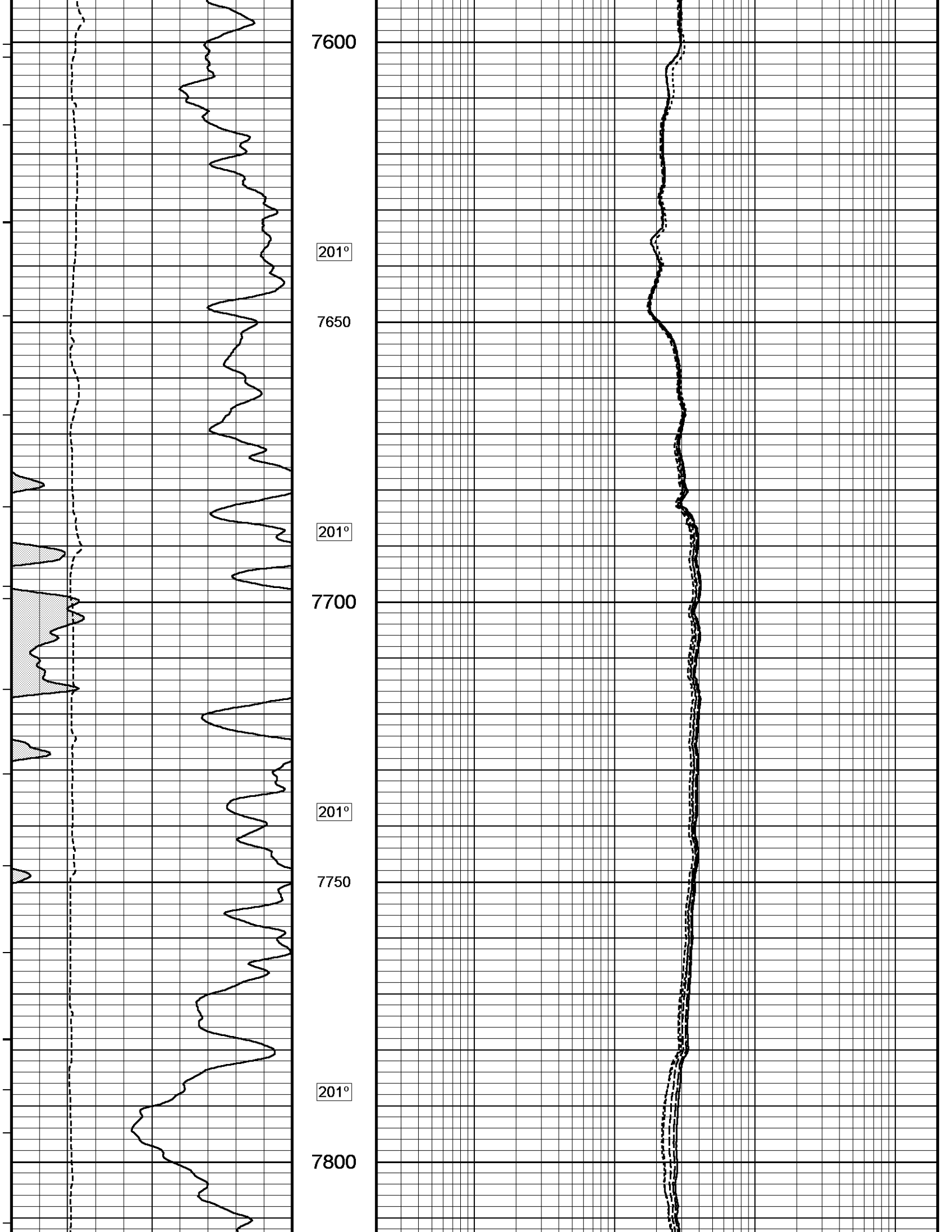
Array Ind. Six Res 60
Array Ind. Six Res 40
Array Ind. Six Res 30
201°
MGS Gamma Ray
Density Caliper
7550
201°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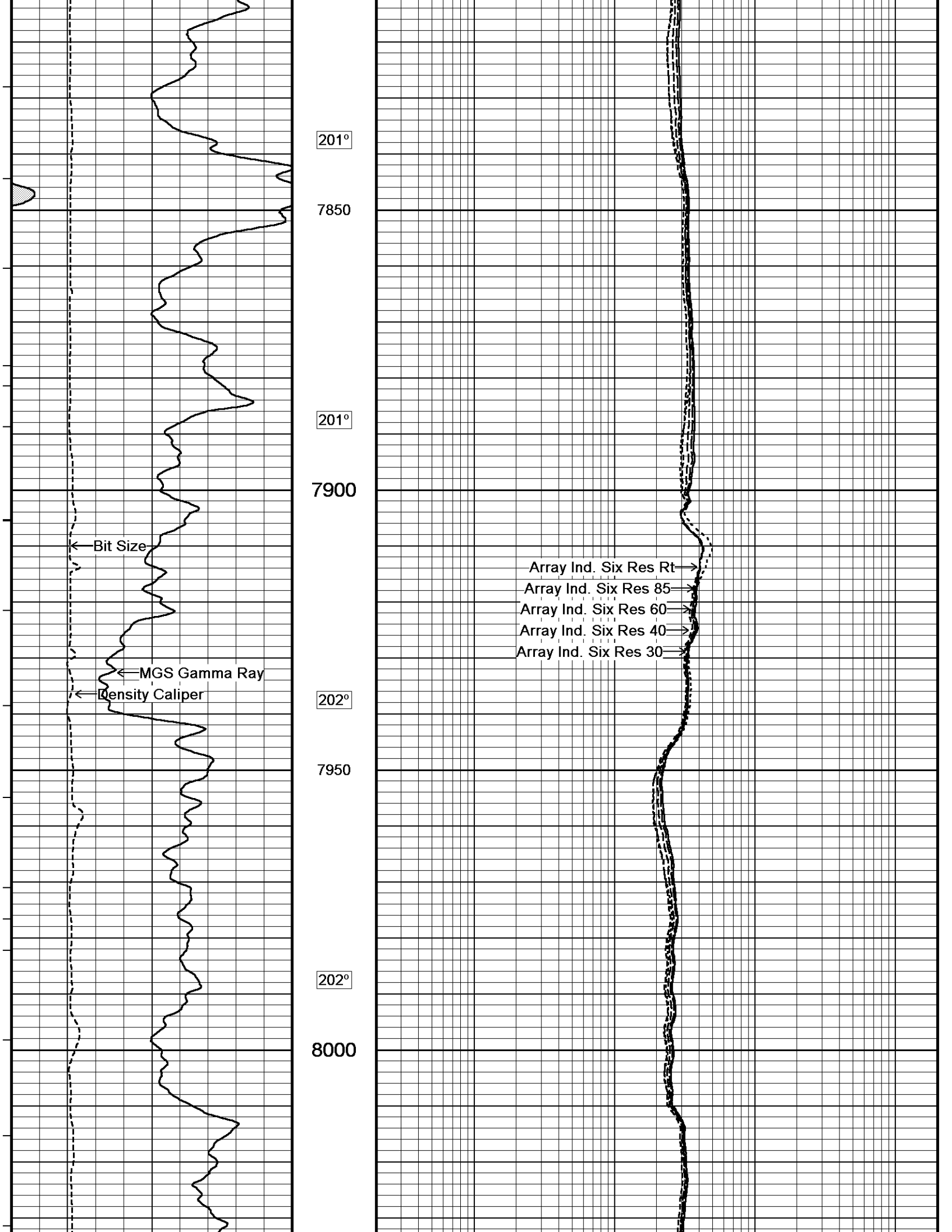
7750
201°
7800


201°
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201°
7900
Bit Size
MGS Gamma Ray
Density Caliper
202°
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202°
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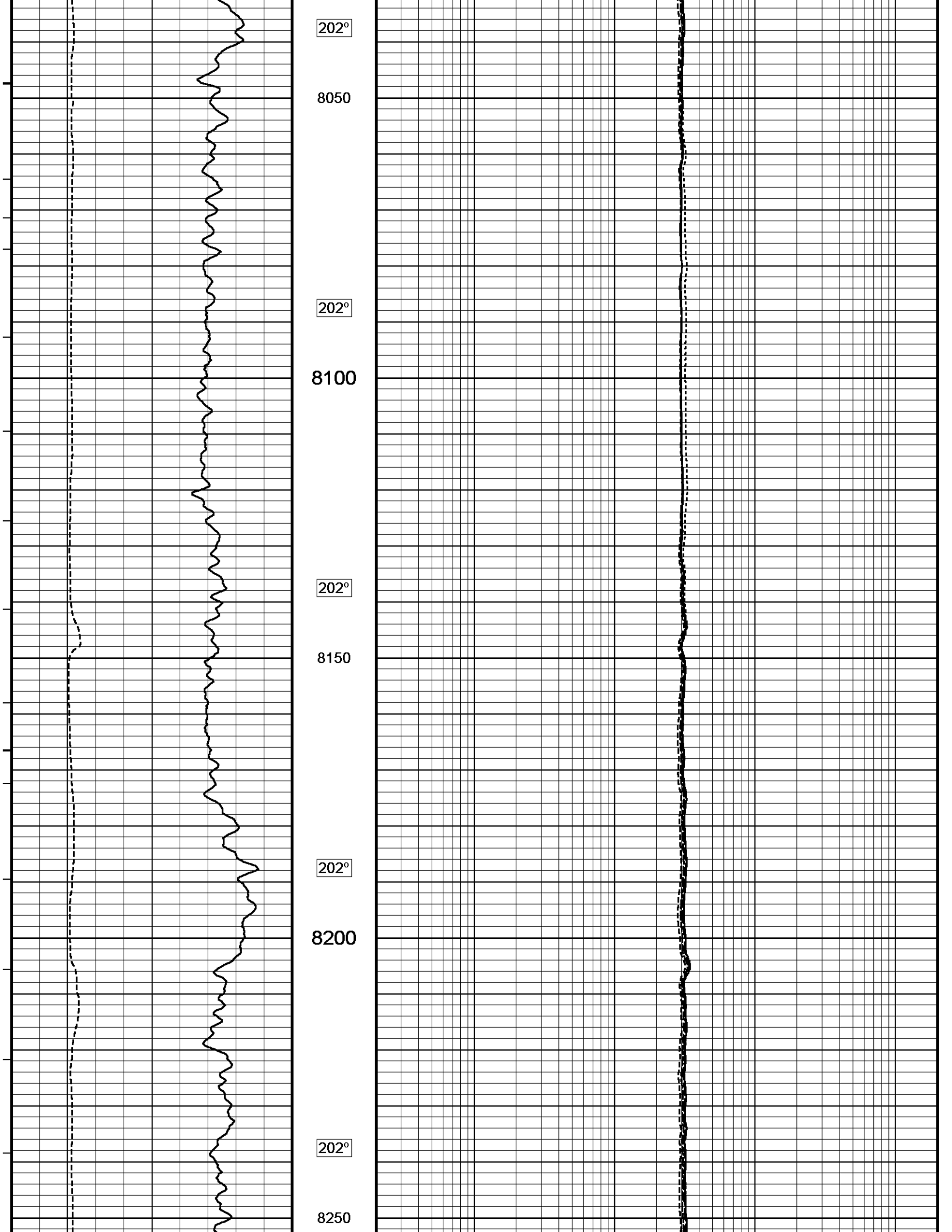
Array Ind. Six Res 30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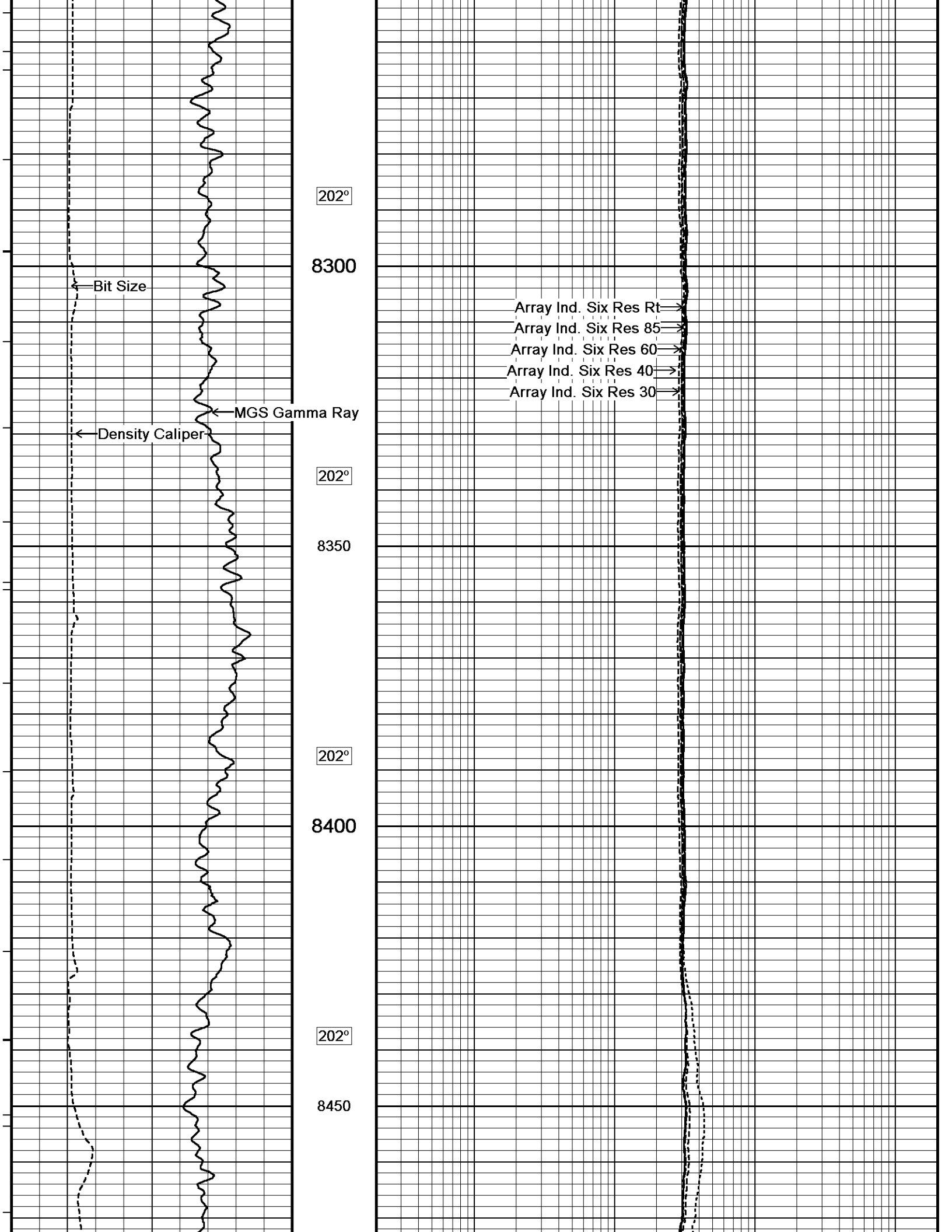
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Density Caliper
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202°
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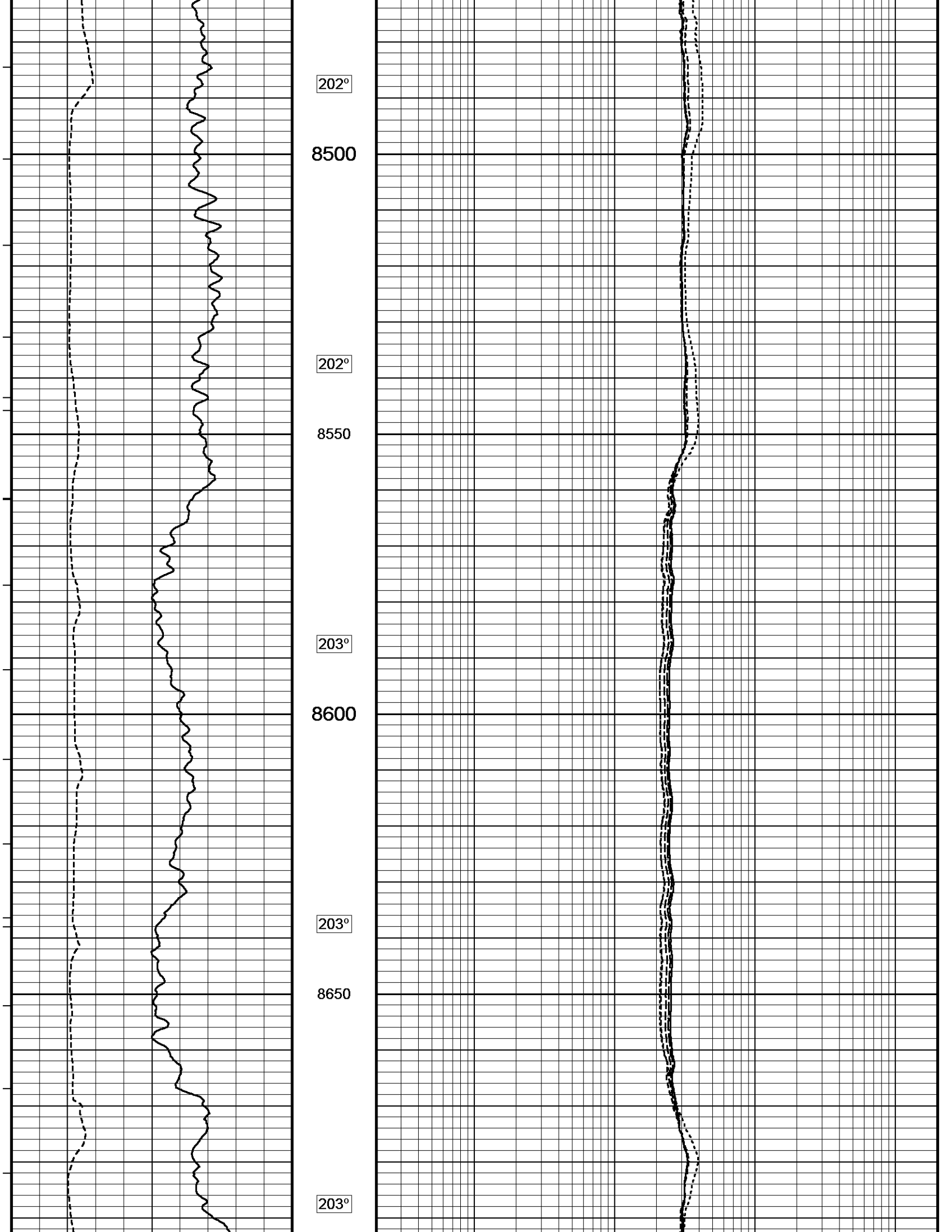
202°
8450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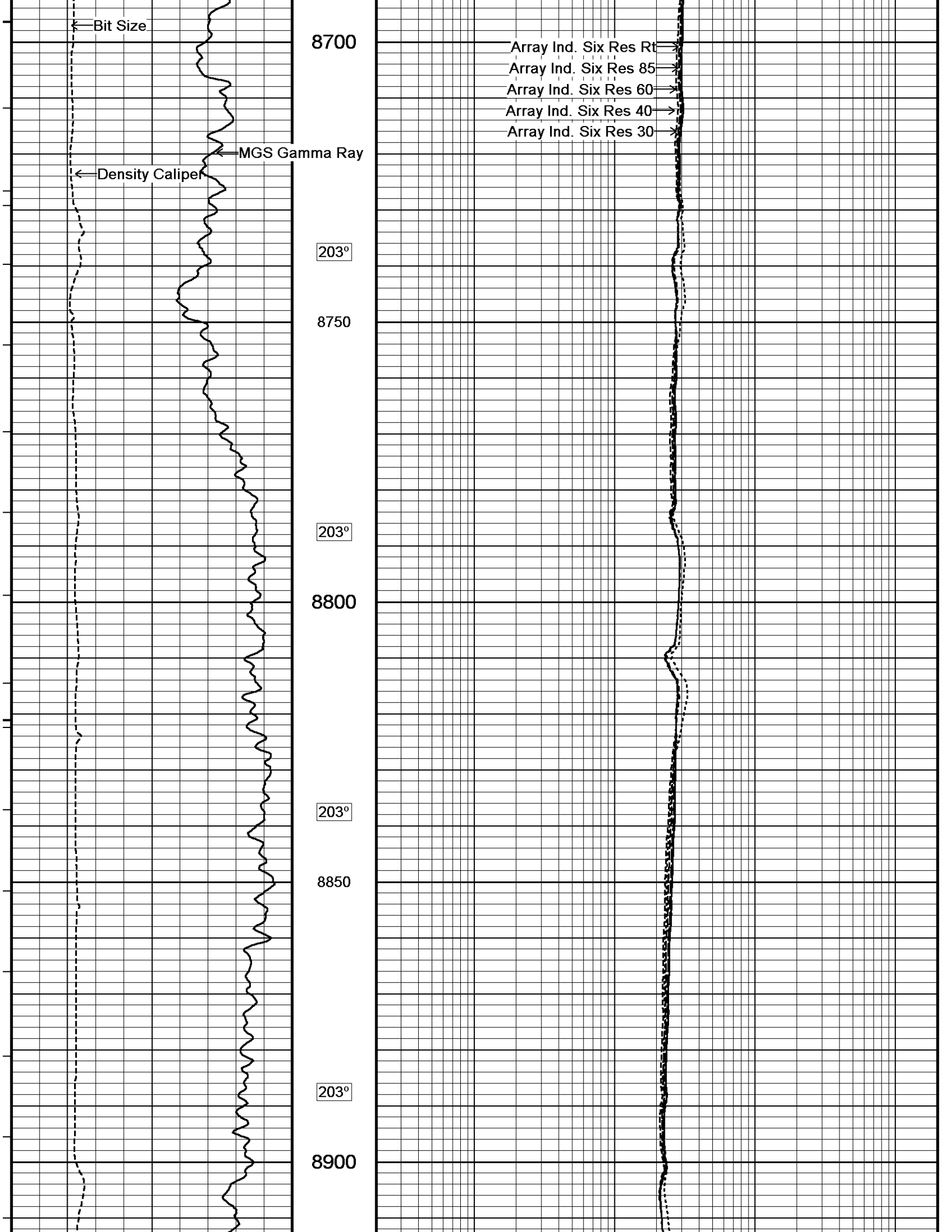
203°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Density Caliper
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203°
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203°
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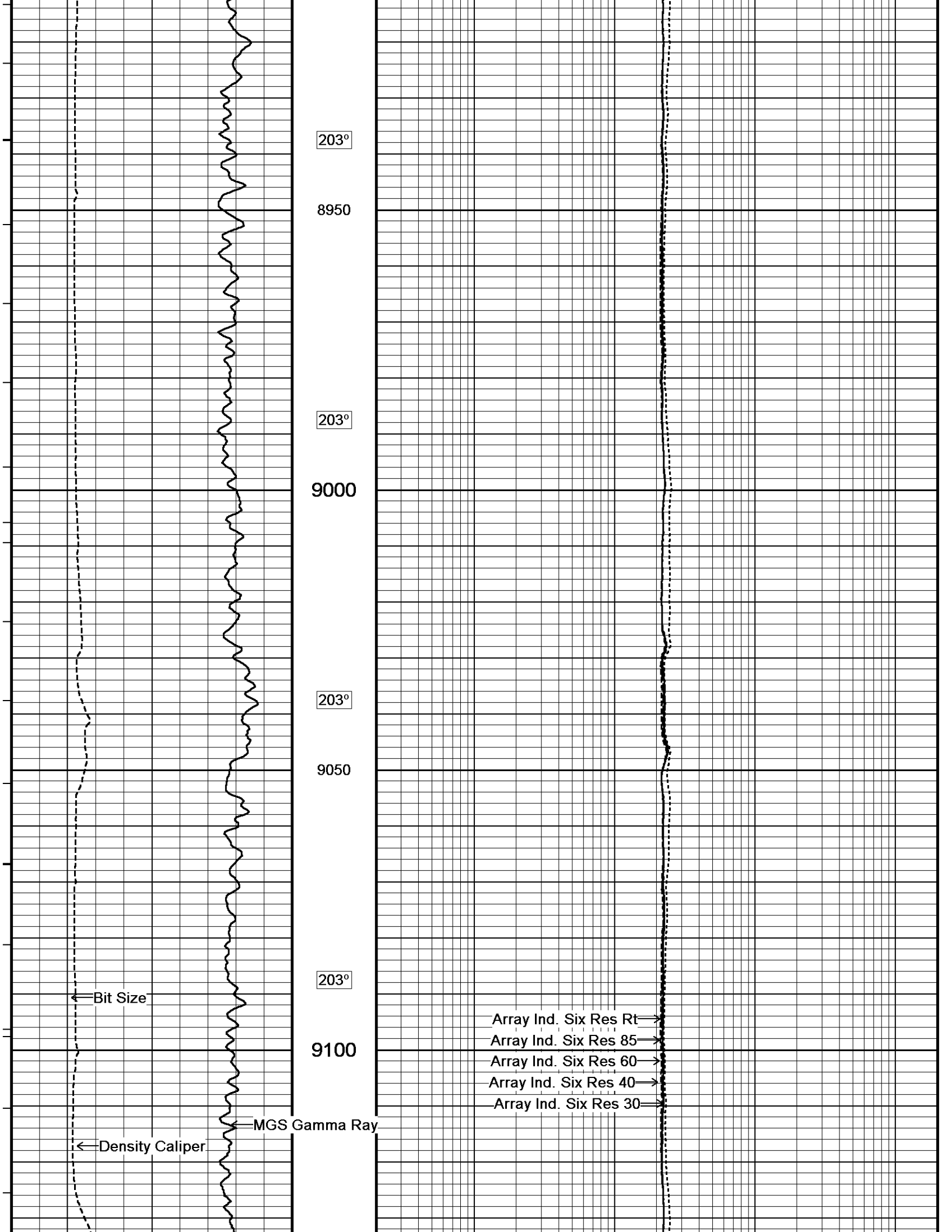
203°
8900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203°
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Density Caliper
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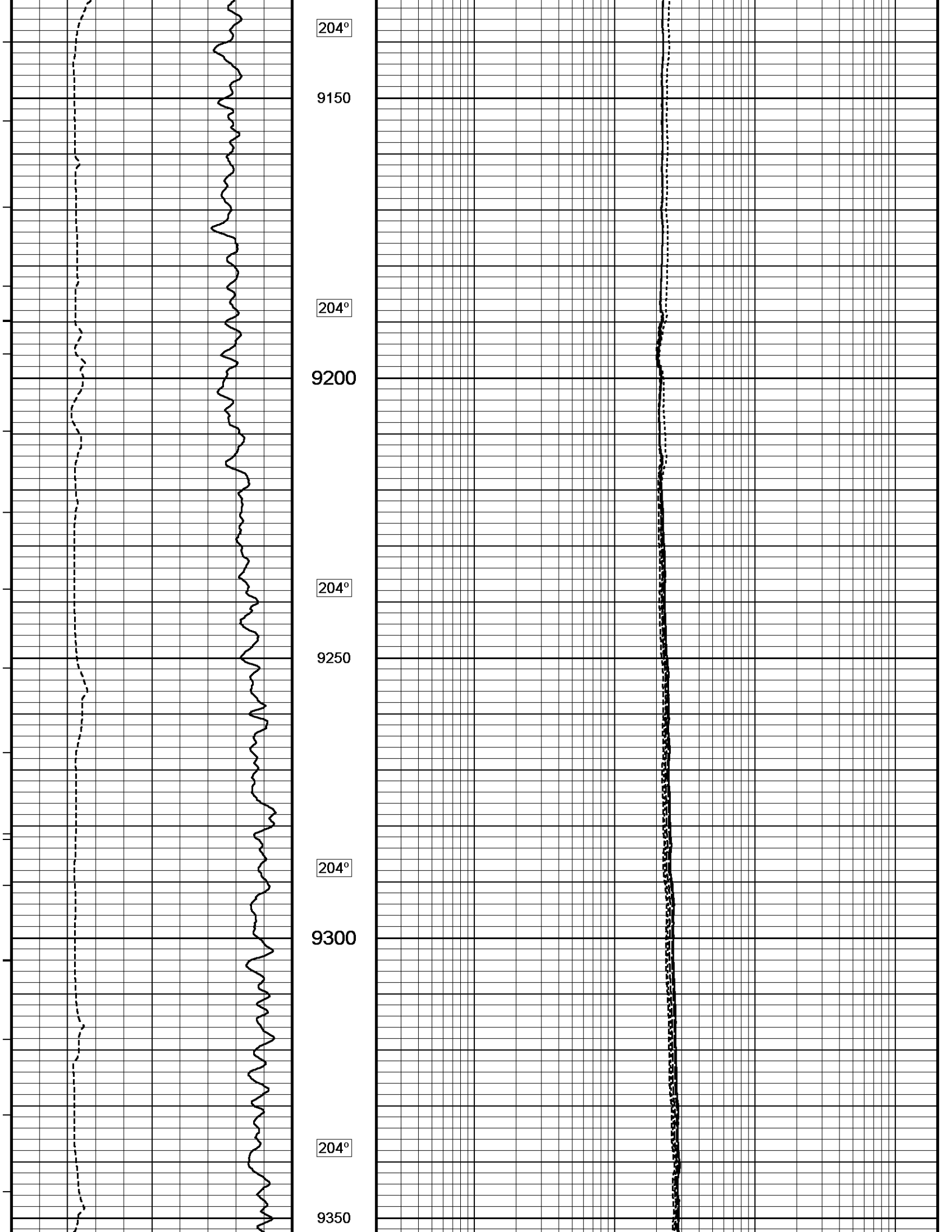
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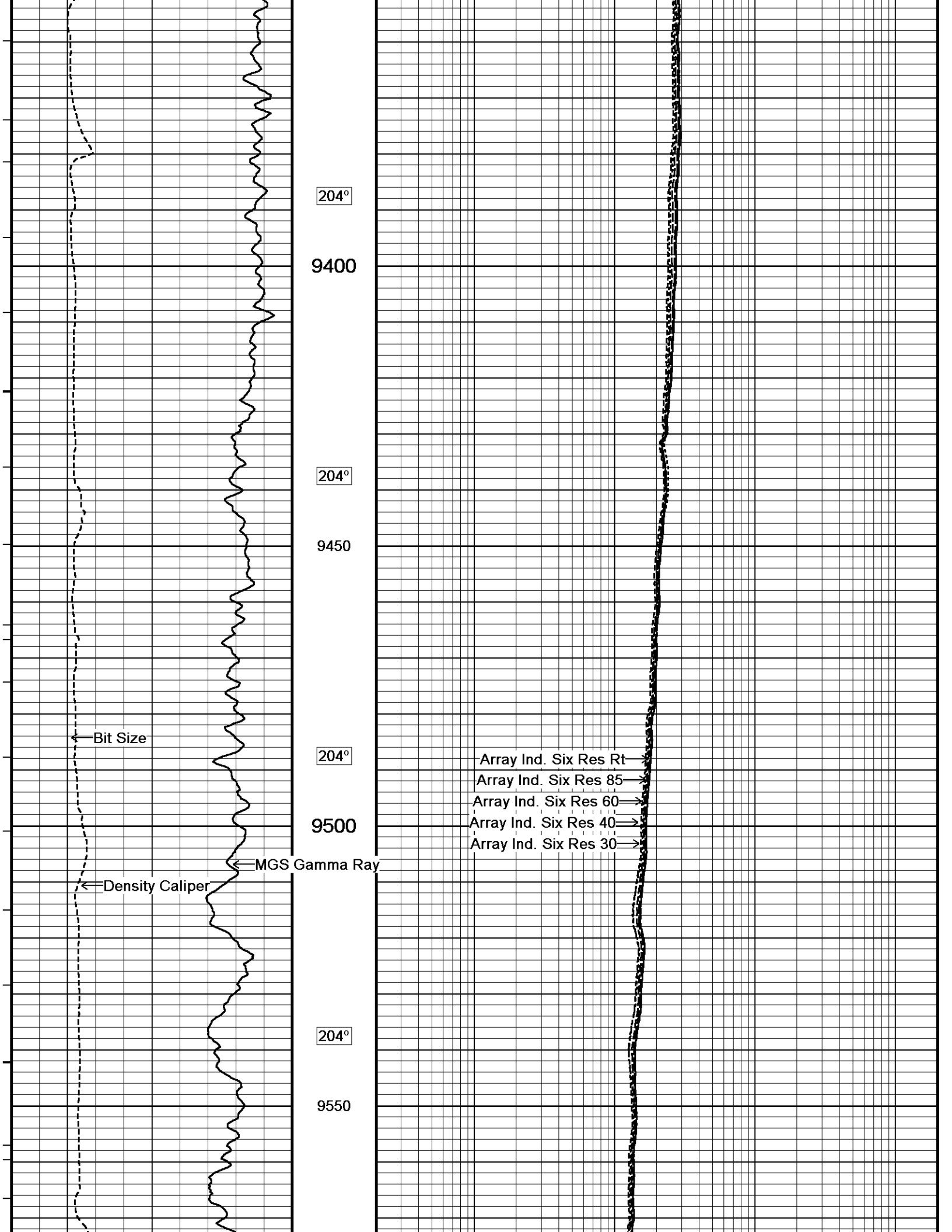
9350


204°
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Bit Size
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Array Ind. Six Res 60
Array Ind. Six Res 40
Array Ind. Six Res 30
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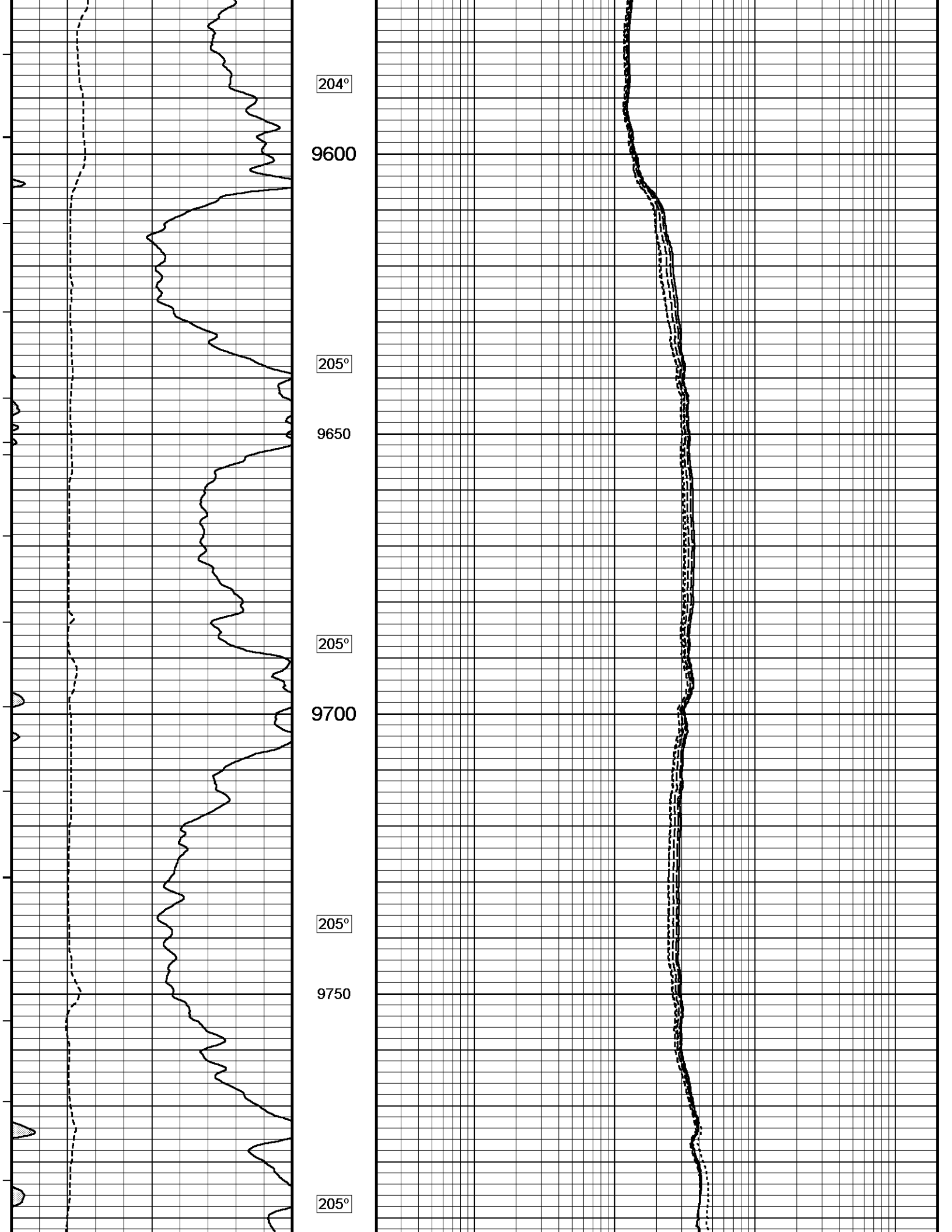
MGS Gamma Ray
Density Caliper
204°
9550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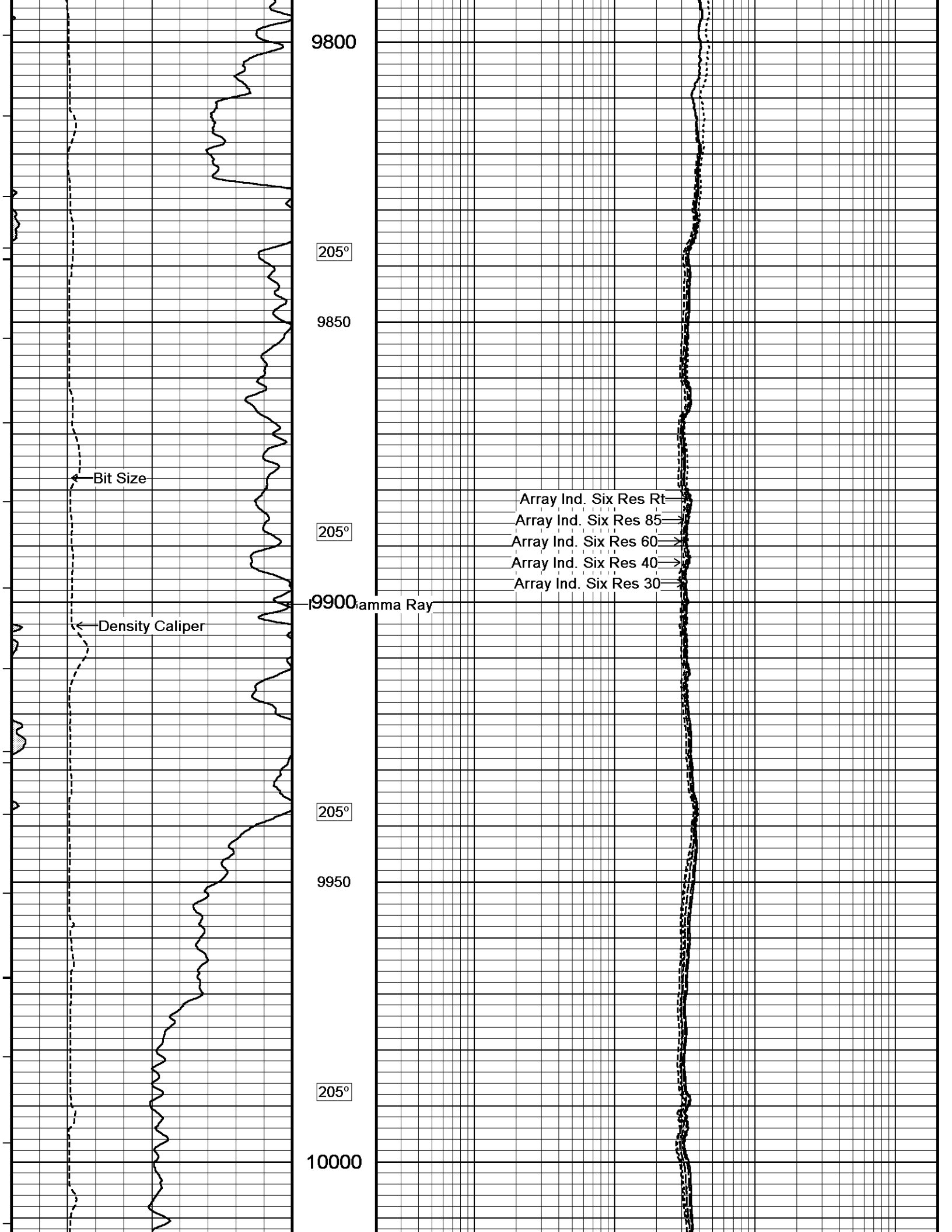
205°
9700
205°
9750
205°


9800
205°
9850
Bit Size
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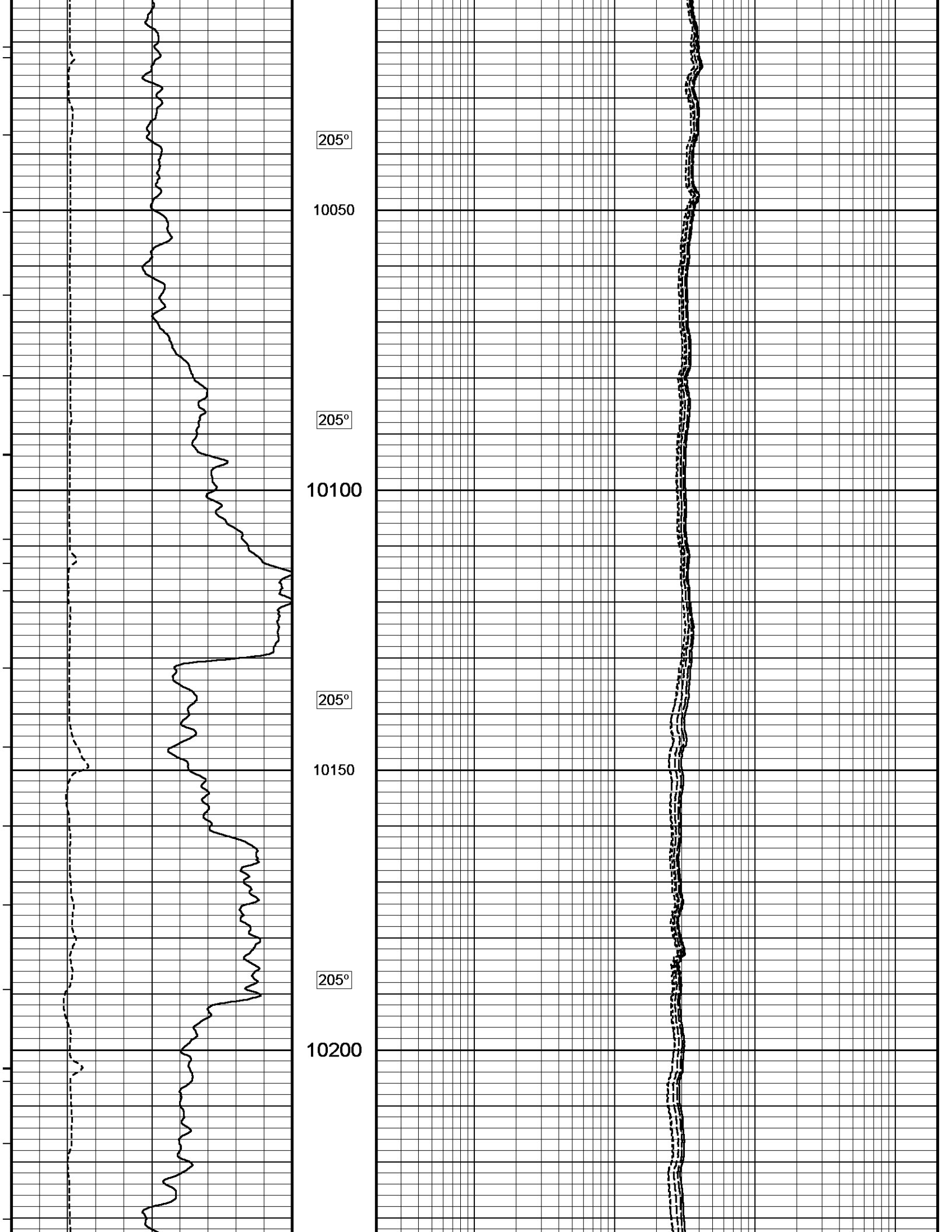
Array Ind. Six Res 85
Array Ind. Six Res 60
Array Ind. Six Res 40
Array Ind. Six Res 30
205°
9900
amma Ray
Density Caliper
205°
9950
205°
10000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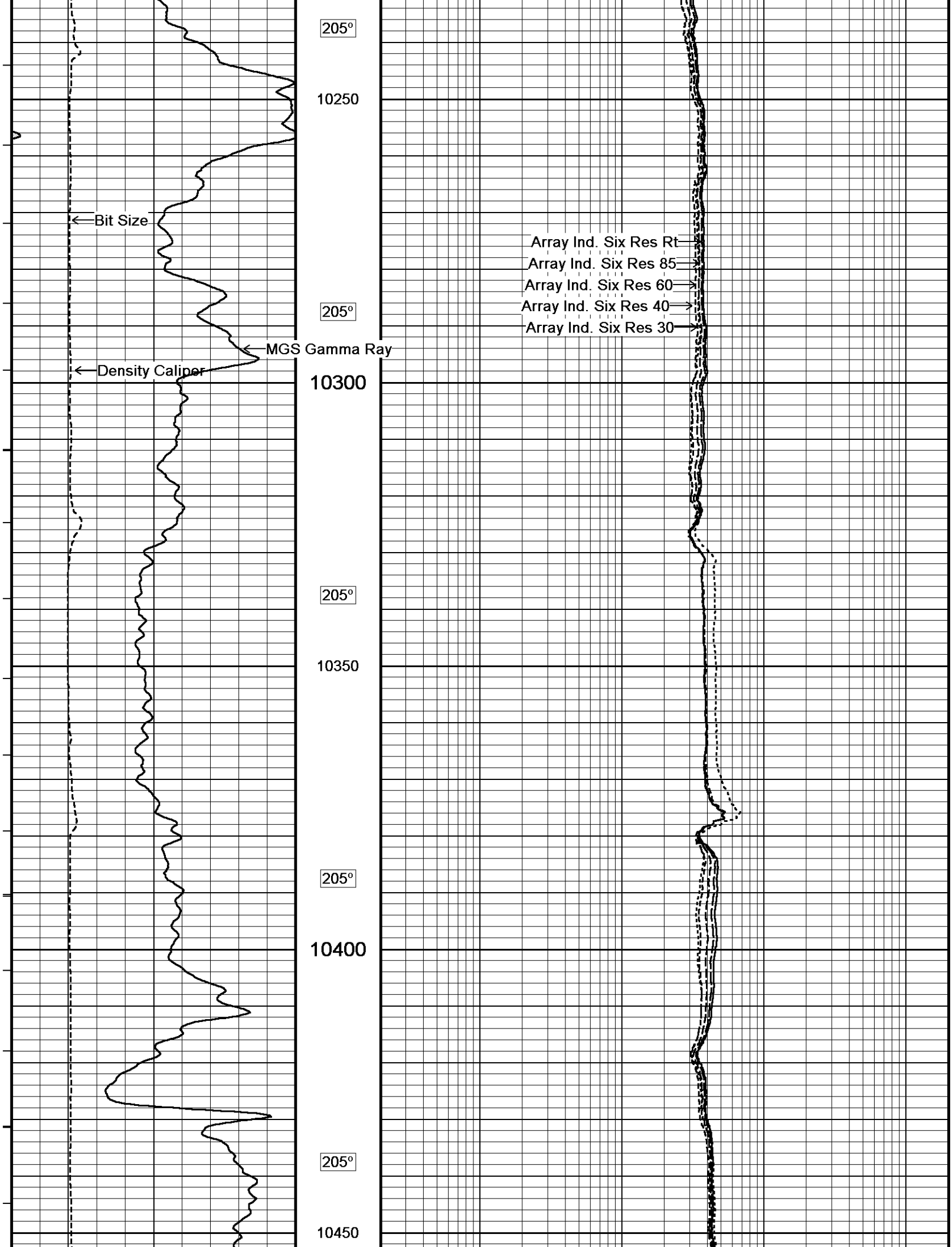
205°
10100
205°
10150
205°
10200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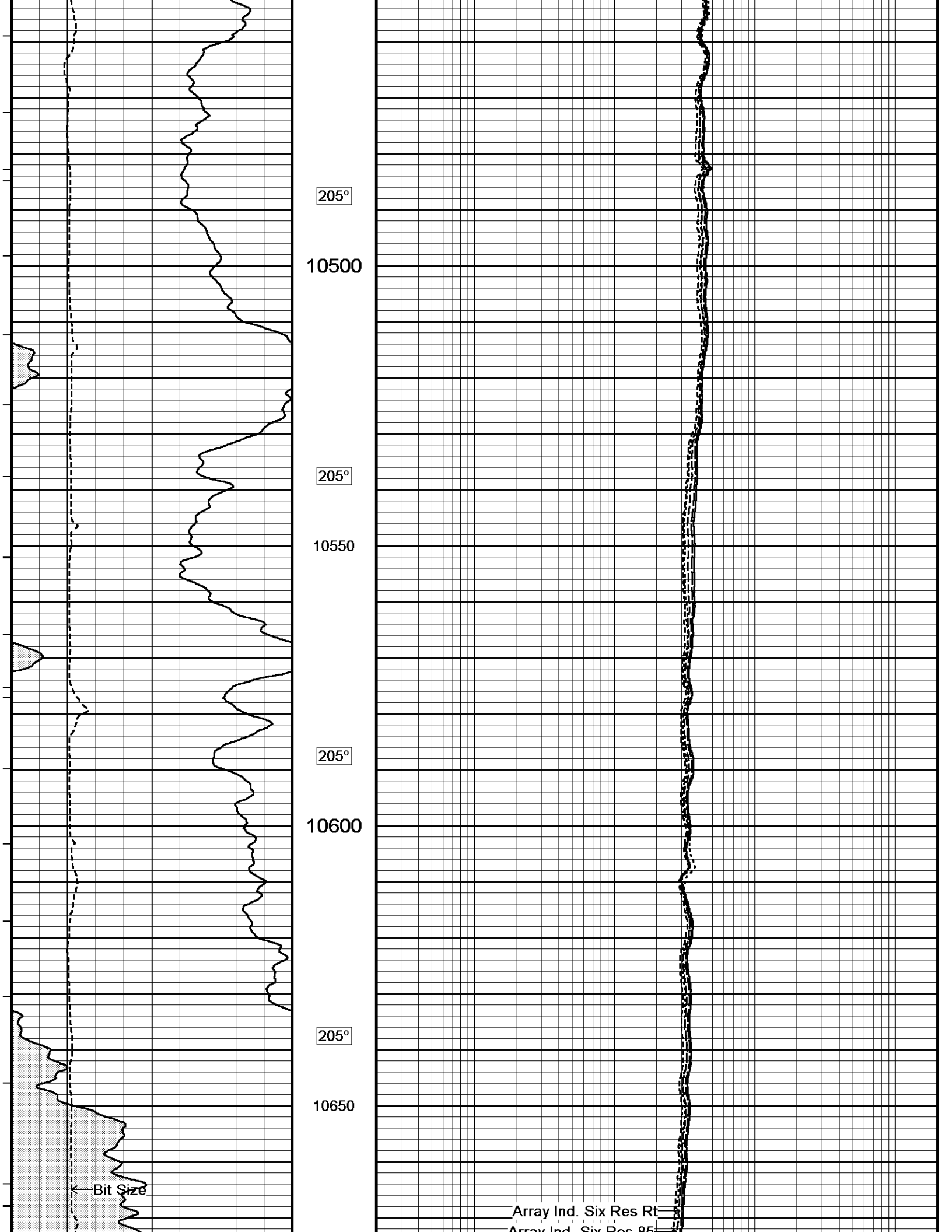
Array Ind. Six Res 60
Array Ind. Six Res 40
Array Ind. Six Res 30
205°
MGS Gamma Ray
Density Caliper
10300
205°
10350
205°
10400
205°
10450


205°
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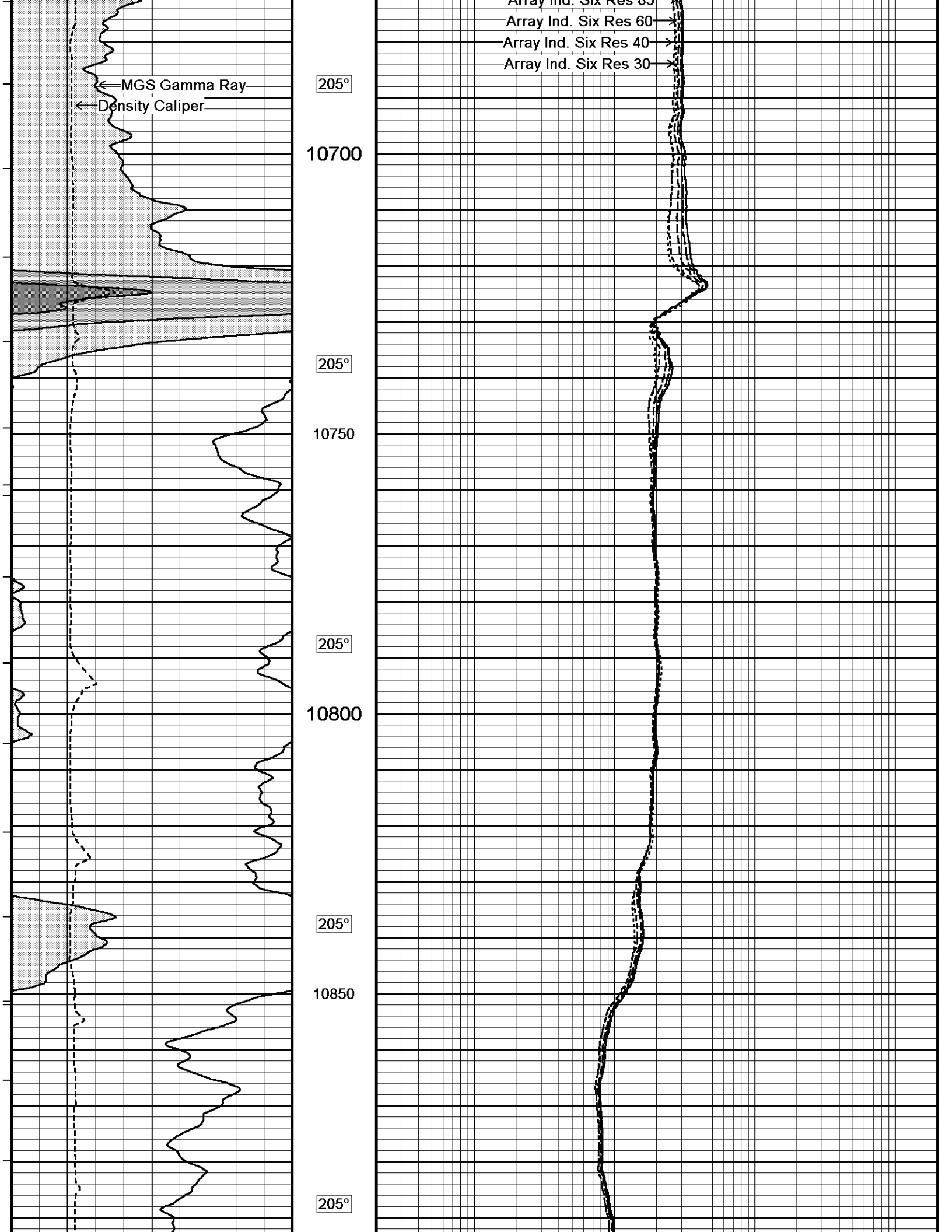
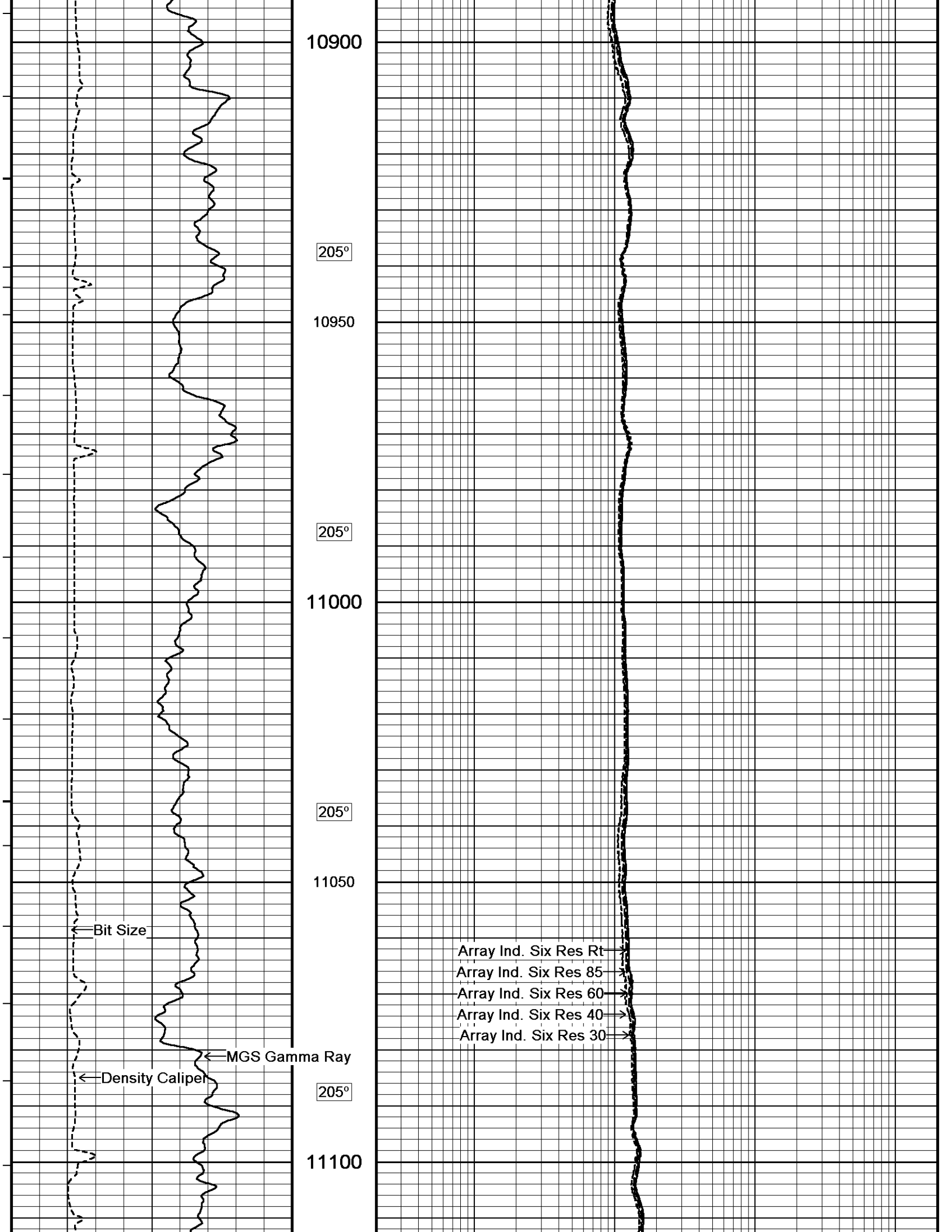
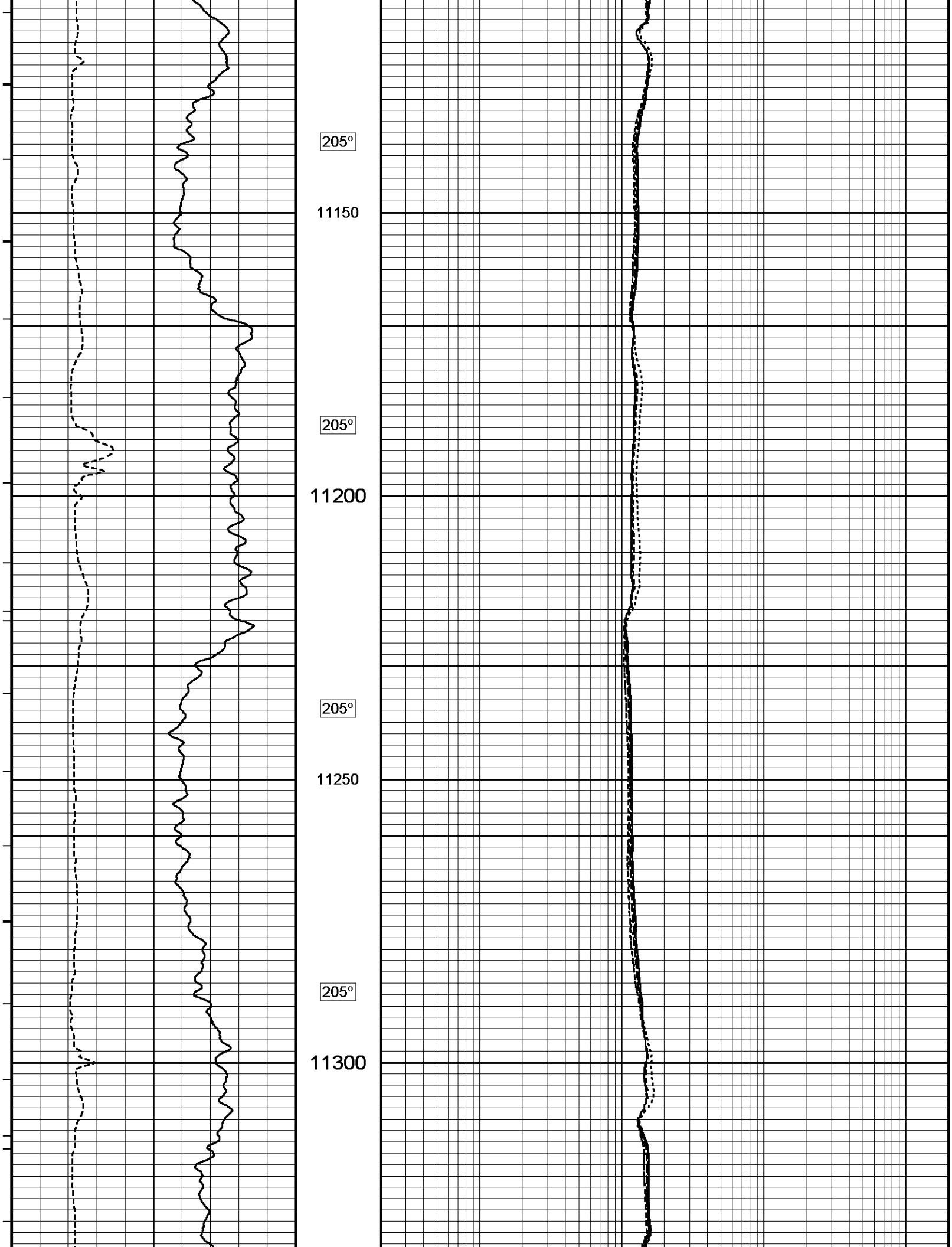
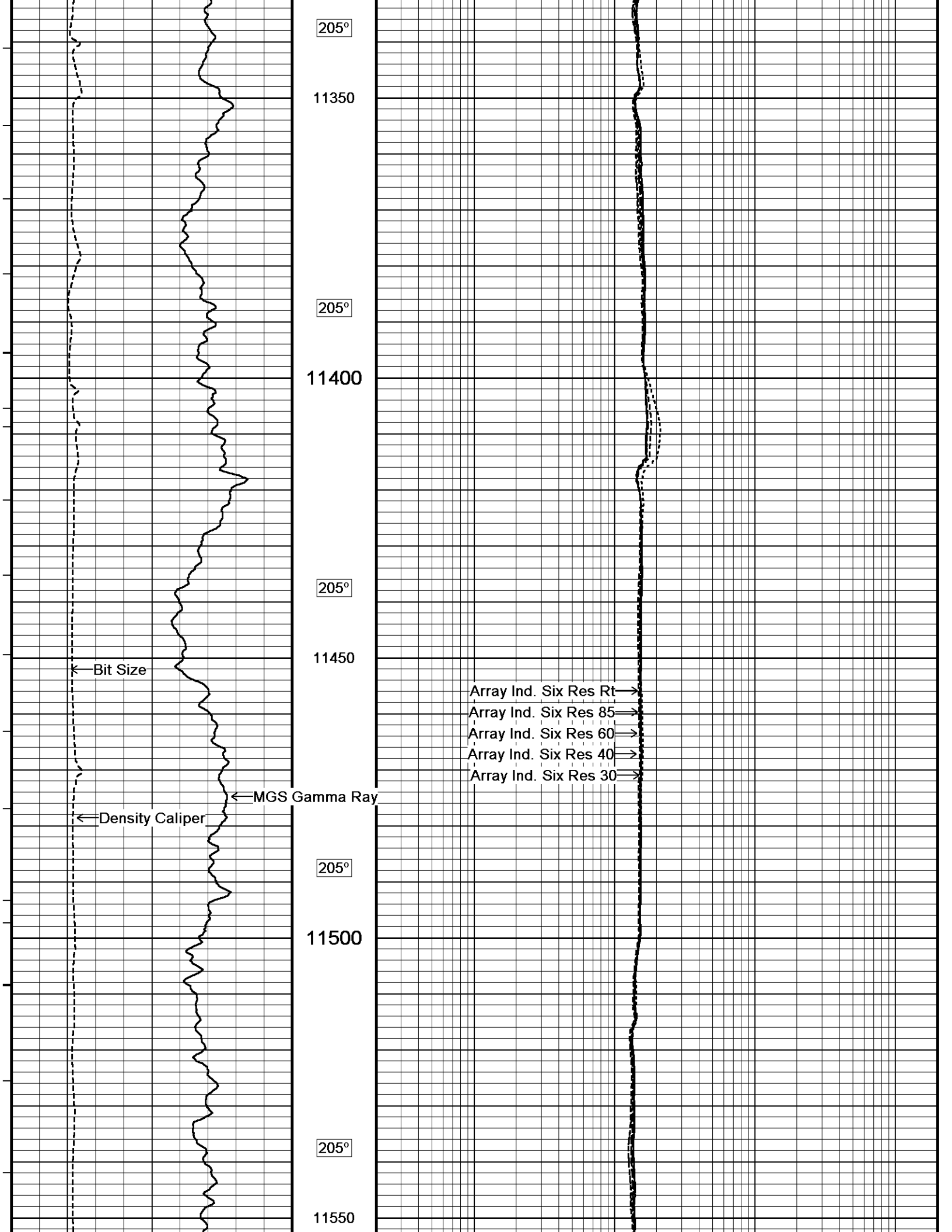
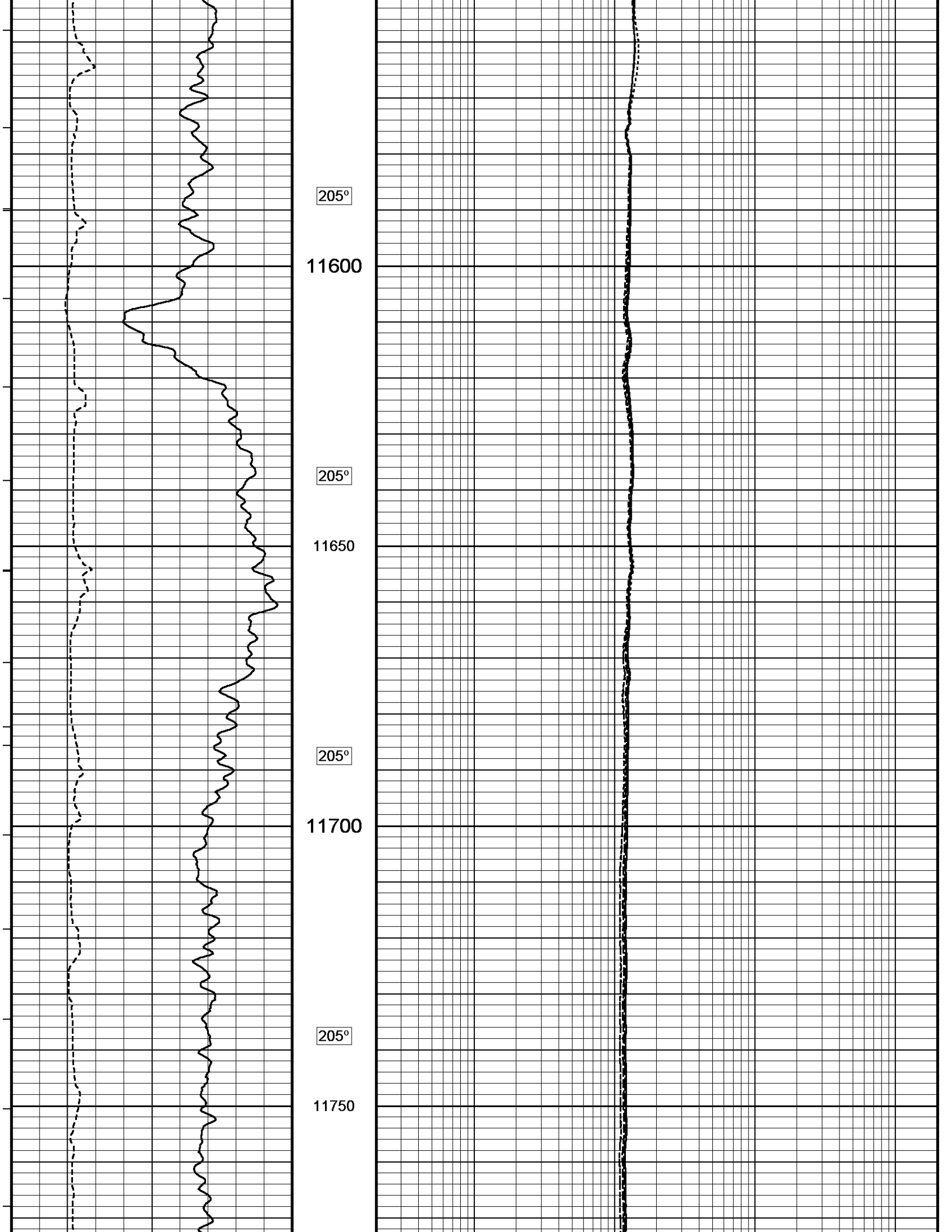
205°
10550
205°
10600
205°
10650
Bit Size
Array Ind. Six Res Rt

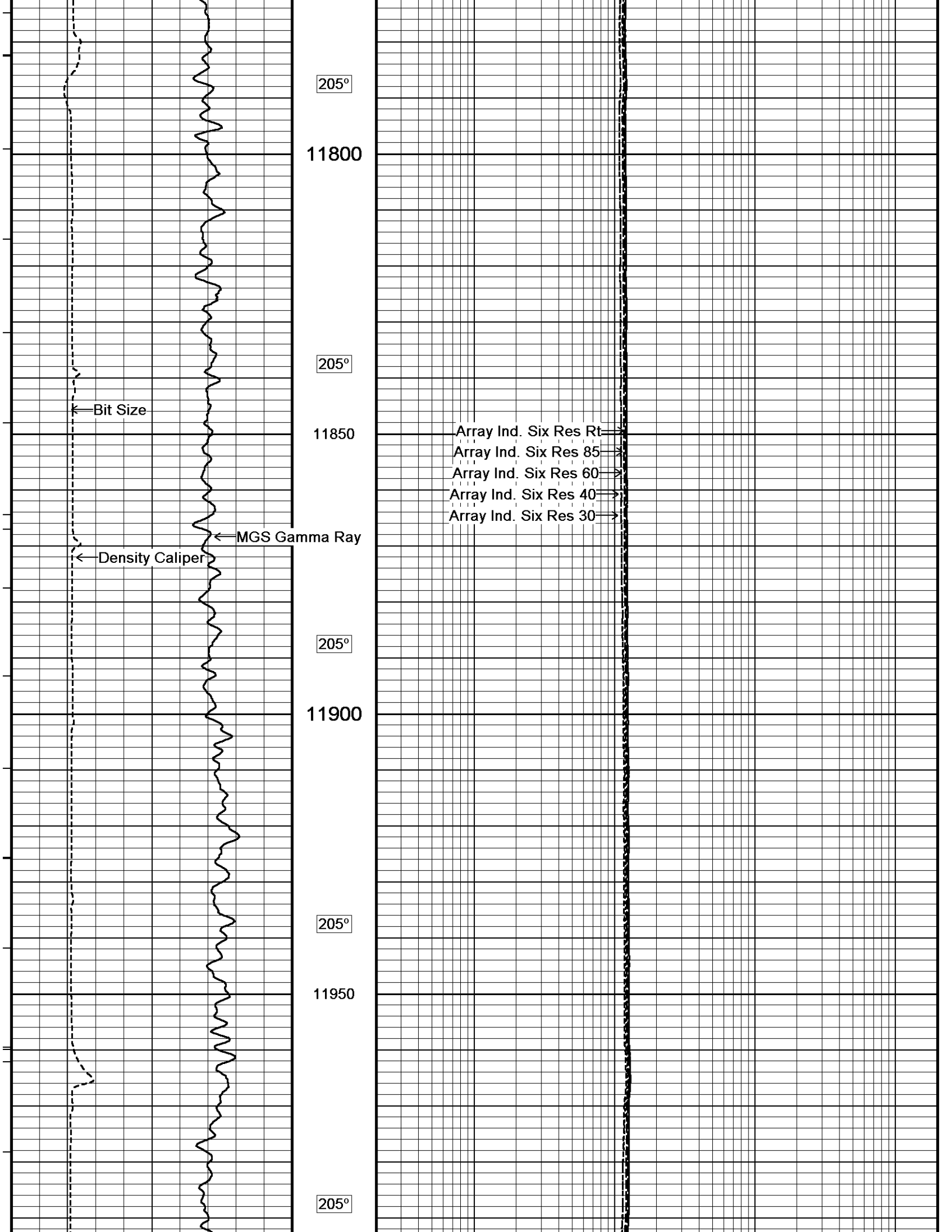

Array Ind. Six Res 85
Array Ind. Six Res 60
Array Ind. Six Res 40
Array Ind. Six Res 30
MGS Gamma Ray
Density Caliper
205°
10700
205°
10750
205°
10800
205°
10850
205°

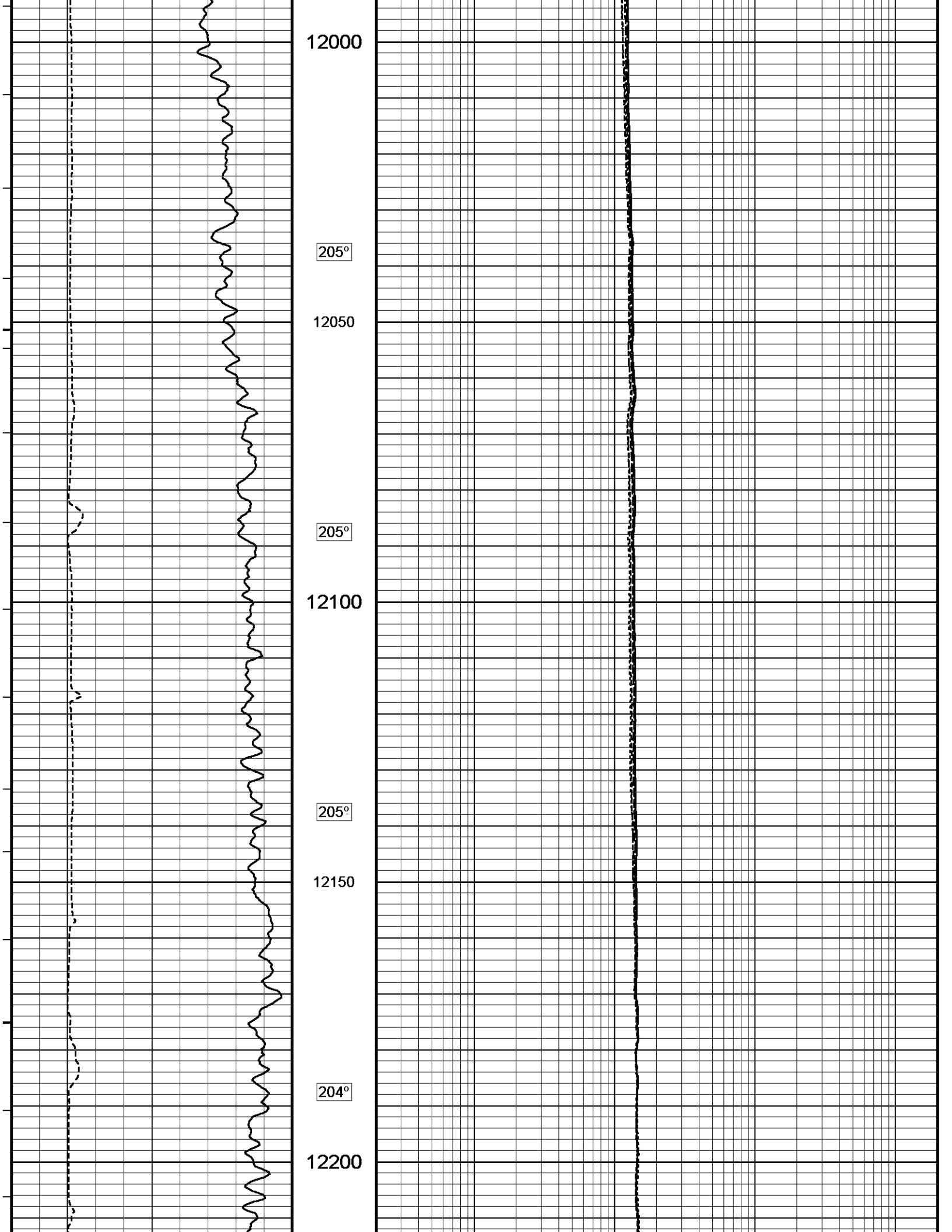

10900
205°
10950
205°
11000
205°
11050
Bit Size
Array Ind. Six Res Rt
Array Ind. Six Res 85
Array Ind. Six Res 60
Array Ind. Six Res 40
Array Ind. Six Res 30
MGS Gamma Ray
Density Caliper
205°
11100

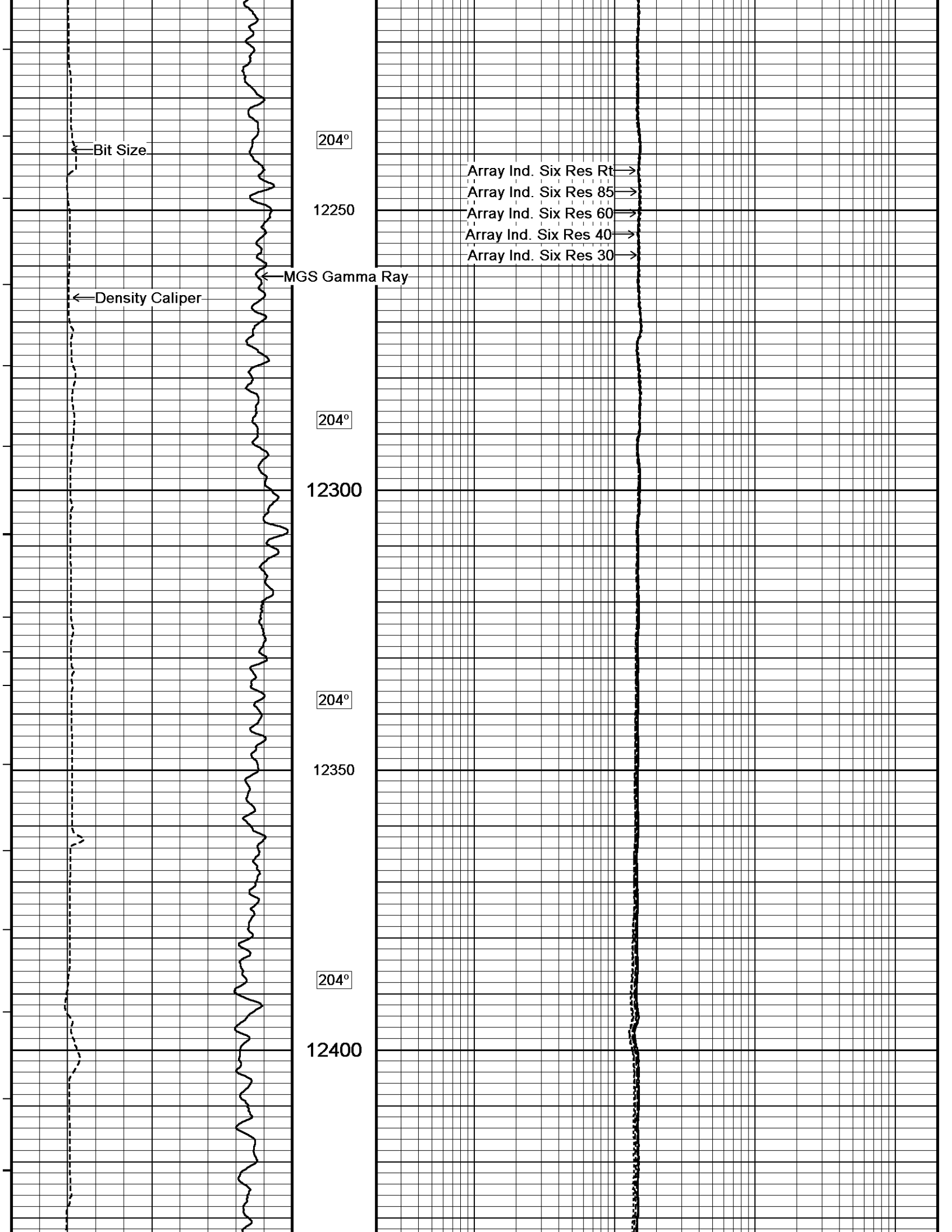

205°
11150
205°
11200
205°
11250
205°
11300

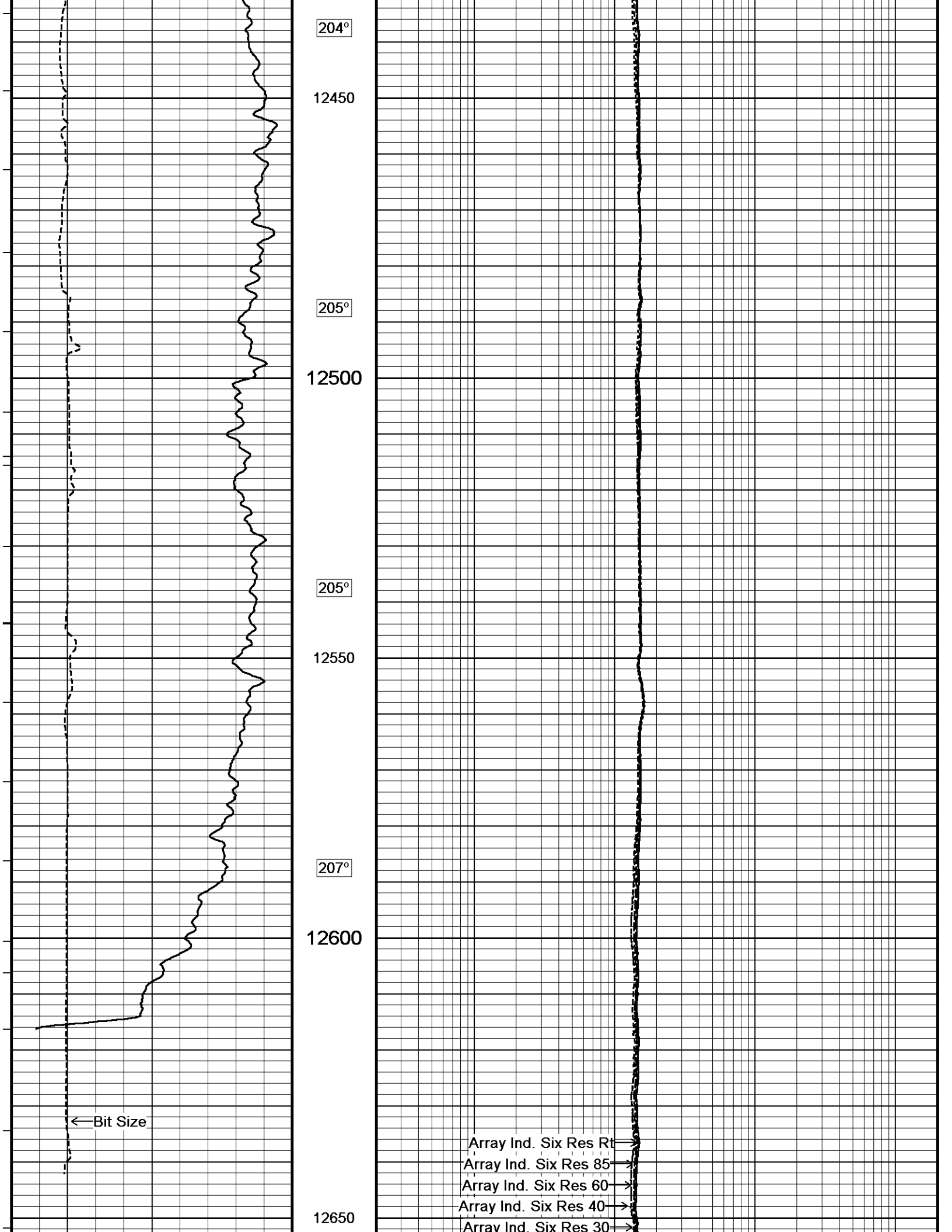

205°
11350
205°
11400
205°
11450
205°
11500
205°
11550
Bit Size
Density Caliper
MGS Gamma Ray
Array Ind. Six Res Rt
Array Ind. Six Res 85
Array Ind. Six Res 60
Array Ind. Six Res 40
Array Ind. Six Res 30

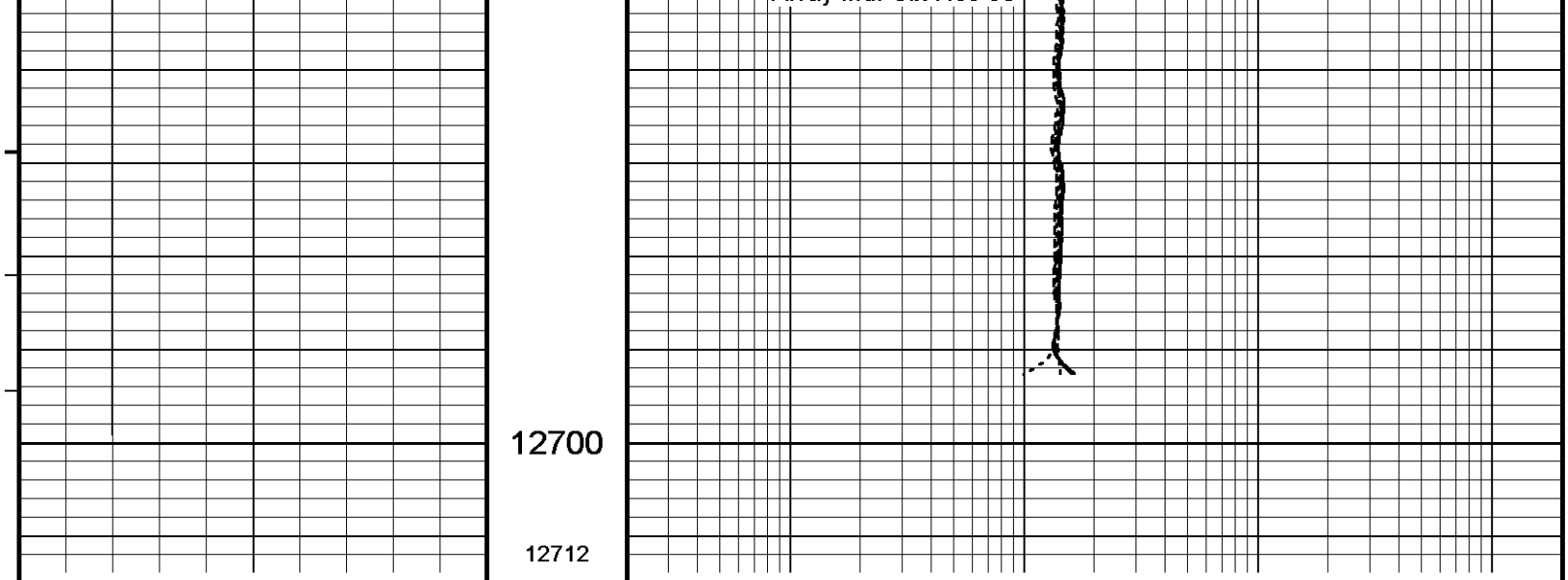

205°
11600
205°
11650
205°
11700
205°
11750


205°
11800
205°
Bit Size
11850
Array Ind. Six Res Rt
Array Ind. Six Res 85
Array Ind. Six Res 60
Array Ind. Six Res 40
Array Ind. Six Res 30
MGS Gamma Ray
Density Caliper
205°
11900
205°
11950
205°


12000
205°
12050
205°
12100
205°
12150
204°
12200


Bit Size
Density Caliper
MGS Gamma Ray
Array Ind. Six Res Rt
Array Ind. Six Res 85
Array Ind. Six Res 60
Array Ind. Six Res 40
Array Ind. Six Res 30
204°
12250
204°
12300
204°
12350
204°
12400


204°
12450
205°
12500
205°
12550
207°
12600
12650
←Bit Size
Array Ind. Six Res Rt
Array Ind. Six Res 85
Array Ind. Six Res 60
Array Ind. Six Res 40
Array Ind. Six Res 30



12700

12712

Depth In Feet

Timing Marks
every 60.0 sec

Density Caliper
inches
4 9 14

MGS Gamma Ray
API
0 100 200
200 300 400

Bit Size
inches
4 9 14

Borehole Temp in deg F

Replay Scale 1:240

Array Ind. Six Res 30
ohm metres
0.20 1 10 100 1000 2000

Array Ind. Six Res 40
ohm metres
0.20 1 10 100 1000 2000

Array Ind. Six Res 60
ohm metres
0.20 1 10 100 1000 2000

Array Ind. Six Res 85
ohm metres
0.20 1 10 100 1000 2000

Array Ind. Six Res Rt
ohm metres
0.20 1 10 100 1000 2000

Depth Based Data - Maximum Sampling Increment 10.0cm
Plotted on 22-SEP-2013 10:48
Filename: C:\Data\Whiting Oil and Gas Corp_Razor 21A-2814B\Razor 21A-2814B.dta
Recorded on 20-SEP-2013 23:31
System Versions: Processed with 13.06.9804 Plotted with 13.06.9804

5 INCH MAIN LOG

BEFORE SURVEY CALIBRATION

C:\Data\Whiting Oil and Gas Corp_Razor 21A-2814B\Razor 21A-2814B.dta

General Constants All 000

Last Edited on 20-SEP-2013,23:44

General Parameters

Mud Resistivity	1.700	ohm-metres
Mud Resistivity Temperature	70.000	degrees F
Water Level	0.000	feet
Borehole Fluid Processing	Wet Hole	

Hole/Annular Volume and Differential Caliper Parameters		
HVOL Method	Single Caliper	
HVOL Caliper 1	Density Caliper	
HVOL Caliper 2	N/A	
Annular Volume Diameter	4.500	inches
Caliper for Differential Caliper	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	
SW/APOR Tool Source	0.000	

Strain Gauge Constants MMS-E.B 174

Last Edited on 12-AUG-2013,15:53

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	

MMS Parameters MMS-E.B 174

Last Edited on 19-SEP-2013 19:05

Logging Parameters

Firmware Version	2v52	
Caliper Open On	MAI	
Caliper Open Delay		minutes
Caliper Closed On	Unknown	
Caliper Closed Delay	N/A	minutes
Sample Rate	1.00	seconds
Use Deep Sleep	No	
Delay Deep Sleep	N/A	
Deep Sleep Wake Time	N/A	minutes
Deep Sleep Wake on Temperature	N/A	
Deep Sleep Wake Temperature	N/A	degrees C
Deep Sleep Wake on Pressure	N/A	
Deep Sleep Wake Pressure	N/A	psi
MMI Pad Pressure	8.0	

Release Parameters

Pulse Duration Base Level	10.0	seconds
Pulse Duration Transition Time	25.0	seconds
Pulse Duration Status Pulse From	20.0	seconds
Pulse Duration Caliper Close From	75.0	seconds
Pulse Duration Caliper Open From	80.0	seconds
Pulse Duration Release Pulse From	120.0	seconds
Pulse Duration Release Pulse To	280.0	seconds
Pulse Release Duration	240.0	seconds
Pulse Discriminator Pressure Band	485.0	seconds
Pulse Pressure Discriminator	1106.0	seconds
Use Negative Pulsing	No	
Good Status Reply Open Hole	65535.0	seconds
Good Status Reply Cased Hole	20.0	seconds
Bad Status Reply	60.0	seconds
Status Pulse To	45.0	seconds
Caliper Close To		seconds
Caliper Open To	105.0	seconds

Configuration

MMS,MGS,MDN,MPD,MPD,MIM,MIE,MAI

Gamma Calibration MGS-C.J 170

Field Calibration on 19-SEP-2013,16:27

	Measured	Calibrated (API)
Background	103	68
Calibrator (Gross)	1336	885
Calibrator (Net)	1234	817

Gamma Constants MGS-C.J 170

Last Edited on 20-SEP-2013,23:45

Gamma Calibrator Number	GRC-070	
Mud Density	1.11	gm/cc
Caliper Source for Processing	Density Caliper	
Tool Position	Eccentred	
Concentration of KCl		kppm
K Mud Type	Chloride	
K Mud Concentration	0.00	%

SP Calibration MGS-C.J 170

Field Calibration on 13-SEP-2013,12:51

	Measured	Calibrated (mV)
Reference 1	-99.0	-100.1
Reference 2	101.0	99.9

High Resolution Temperature Calibration MGS-C.J 170

Field Calibration on 13-SEP-2013,12:51

	Measured	Calibrated(Deg F)
Lower	60.00	61.00
Upper	101.00	99.00

High Resolution Temperature Constants MGS-C.J 170

Last Edited on 13-SEP-2013,12:51

Pre-filter Length	11

Neutron Calibration MDN-B.A 214

Base Calibration on 13-SEP-2013 13:33
Field Check on 19-SEP-2013 16:23

Base Calibration

	Measured		Calibrated (cps)	
	Near	Far	Near	Far
	2997	91	3714	110
Ratio	32.756		33.764	

Field Calibrator at Base

	Calibrated (cps)	
	2128	3147
Ratio	0.676	

Field Check

	Calibrated (cps)	
	2135	3138
Ratio	0.680	

Neutron Constants MDN-B.A 214

Last Edited on 20-SEP-2013,23:47

Neutron Source Id	P31129B	
Neutron Jig Number	NJ5244	
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	7.00	cu
Dolomite Sigma	4.70	cu
Formation Pressure Source	None	
Formation Pressure	N/A	kpsi
Temperature Source	Constant Value	
Temperature	68.00	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	

Navigation Constants MIE-B.A 263

Last Edited on

Magnetic Declination	0.00	degrees	East

Accelerometer Parameters MIE-B.A 263

Date Of Last Accelerometer Calibration 17-SEP-2012,14:43

	X Accelerometer	Y Accelerometer	Z Accelerometer
Slope	-1.109010	-1.107099	-1.100526
Offset	0.007052	0.003811	0.001104

Accelerometer Constants MIE-B.A 263

Last Edited on 12-AUG-2013,21:33

Accelerometer Calibrator Number 000

Accelerometer Temperature Characterisation

X Accelerometer

Serial Number	1173			
Calibration Date	18-Jun-2012			
	B0	B1	B2	B3
Bias(g)	0.00000e+000	1.14172e-005	-2.31925e-008	2.14144e-010
	SF0	SF1	SF2	SF3
Scale Factor(mA/g)	3.00000e+000	2.73528e-004	2.42371e-007	1.16163e-009

Y Accelerometer

Serial Number	1182			
Calibration Date	16-Jun-2012			
	B0	B1	B2	B3
Bias(g)	0.00000e+000	2.81141e-005	2.27423e-008	-2.19073e-010
	SF0	SF1	SF2	SF3
Scale Factor(mA/g)	3.00000e+000	2.61892e-004	3.10100e-007	4.78517e-010

Z Accelerometer

Serial Number	1118			
Calibration Date	12-Jul-2011			
	B0	B1	B2	B3
Bias(g)	0.00000e+000	2.80348e-005	6.99344e-009	-8.31315e-011
	SF0	SF1	SF2	SF3
Scale Factor(mA/g)	3.00000e+000	2.95053e-004	3.90273e-007	3.96648e-010

Imager Pad Check MIE-B.A 263

Field Check on 12-AUG-2013 21:46

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 263

Last Edited on 12-AUG-2013,21:34

Sonde Configuration	Imager Mode	
Arm-Pad Kit	Normal Pads (12.25 in)	
Arm-Pad Kit Serial Number	N/A	
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	0.0500	mAmp
Image Processing	Enabled	

Caliper Calibration MIE-B.A 263

Base Calibration on 12-AUG-2013 22:19
Field Calibration on 12-AUG-2013 22:22

Base Calibration

Reading No	Pads 1-5 Meas.	Pads 3-7 Meas.	Calibrator Size (in)
1	26896	26795	5.96
2	37624	37221	7.98
3	47165	46851	9.86
4	59017	58438	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	24886	25132	24774	25107	5.96

2	33932	33696	33644	34118	7.98
3	42150	41949	42030	42331	9.86
4	51988	51934	51898	52510	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)
7.96	7.88	7.98

Measured Pad 2 Caliper(in)	Measured Pad 4 Caliper(in)	Measured Pad 6 Caliper(in)	Measured Pad 8 Caliper(in)	Actual Caliper(in)
4.02	4.04	3.95	3.95	7.98

Caliper Constants MIE-B.A 263

Last Edited on 06-JUN-2013,14:46

Caliper Difference for BRKT	0.120	inches

Magnetometer Parameters MIE-B.A 263

Date Of Last Magnetometer Calibration 3-OCT-2012,11:40

	X Magnetometer	Y Magnetometer	Z Magnetometer
Slope	-1.000000	-1.002053	-0.995229
Offset	-0.002504	-0.016318	-0.005385

Magnetometer Constants MIE-B.A 263

Last Edited on

Magnetometer Calibrator Number	000

Induction Calibration MAI-C.A 494

Base Calibration on 13-AUG-2013,14:10
Field Check on 19-SEP-2013 16:09

Base Calibration

Test Loop Calibration

Channel	Measured Low	Measured High	Calibrated (mmho/m) Low	Calibrated (mmho/m) High
1	16.0	455.1	9.3	966.2
2	6.0	369.3	7.6	821.4
3	3.0	251.1	5.2	566.0
4	0.1	128.5	2.6	279.2

Array Temperature 23.3 Deg F

Channel	Base Check (mmho/m) Low	Base Check (mmho/m) High	Field Check (mmho/m) Low	Field Check (mmho/m) High
1			-3.2	2124.9
2			14.1	1952.9
3			15.4	1684.5
4			13.8	1139.6
Deep			12.1	1094.2
Medium			21.0	2226.2
Shallow			17.2	2892.7

Array Temperature 69.5 Deg F

Induction Constants MAI-C.A 494

Last Edited on 20-SEP-2013,23:44

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-C.A 494

Field Calibration on 12-FEB-2013,17:19

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

High Resolution Temperature Constants MAI-C.A 494

Last Edited on 12-FEB-2013,17:18

Pre-filter Length	11

Photo Density Calibration MPD-D.A 497

Base Calibration on 21-SEP-2013 03:13
Field Check on 21-SEP-2013 03:26

Density Calibration

Base Calibration	Measured		Calibrated (sdu)	
	Near	Far	Near	Far
Reference 1	50399	24481	59814	31141
Reference 2	22249	2672	24943	2546

Field Check at Base

1314.9	1529.7

Field Check

1314.0	1525.7

PE Calibration

Base Calibration	Measured			Calibrated
	WS	WH	Ratio	Ratio
Background	248	1174		
Reference 1	21312	50195	0.430	0.368
Reference 2	6894	22098	0.318	0.272

Field Check at Base

248.4	1173.8

Field Check

246.9	1172.3

Density Constants MPD-D.A 497

Last Edited on 21-SEP-2013,03:31

Density Source Id	P20716B	
Nylon Calibrator Number	DNC-E-687	
Aluminium Calibrator Number	DACD696	
Density Shoe Profile	4 inch	
Caliper Source for Processing	Density Caliper	
PE Correction to Density	Not Applied	
Mud Density	1.00	gm/cc
Mud Density Z/A Multiplier	1.11	
Mud Filtrate Density	1.00	gm/cc
Dry Hole Mud Filtrate Density	1.00	gm/cc
DNCT	0.00	gm/cc
CRCT	0.00	gm/cc

Density Z/A Correction	Hybrid

Matrix density (gm/cc)	Depth (m)
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

Caliper Calibration MPD-D.A 497

Base Calibration on 21-SEP-2013 03:20
Field Calibration on 21-SEP-2013 03:21

Base Calibration

Reading No	Measured	Calibrator Size (in)
1	16970	3.99
2	26463	5.96
3	36587	7.98
4	46034	9.86
5	56910	11.92
6	N/A	N/A

Field Calibration

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

DOWNHOLE EQUIPMENT

C:\Data\Whiting Oil and Gas Corp_Razor 21A-2814B\Razor 21A-2814B.dta

Shuttle Running Tool 3.5"
SRT-A.A 67 LG: 6.62 ft WT: 37.5 lb OD: 2.52 in

SKJ-E.B Compact Knuckle Joint
SKJ-E.B 578 LG: 2.17 ft WT: 24.3 lb OD: 2.24 in

Empty 400v Battery
MLK-A 1 LG: 14.23 ft WT: 30.9 lb OD: 2.24 in

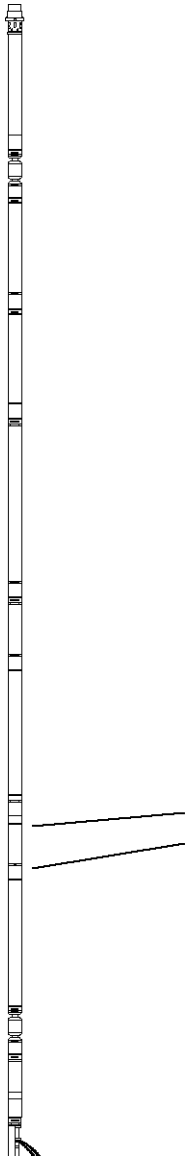
200v Standard Life Spacer
MLK-A 2 LG: 16.31 ft WT: 30.9 lb OD: 2.24 in

MBS-G.A 200v Compact Battery Sub
MBS-G.A 136 LG: 17.06 ft WT: 123.5 lb OD: 2.24 in

Compact Memory Sub E.B
MMS-E.B 174 LG: 5.20 ft WT: 37.5 lb OD: 2.24 in

Compact Tool Isolator sub.
MTI-B.A 55 LG: 1.54 ft WT: 13.2 lb OD: 2.24 in

Compact Short Gamma
MGS-C.J 170 LG: 3.41 ft WT: 24.3 lb OD: 2.24 in



83.74 ft GGME - Borehole Corr. MGS Gamma
81.75 ft GSXT - MGS External Temperature

Compact Collar Locator
MCL-B.J 64 LG: 3.17 ft WT: 26.5 lb OD: 2.24 in

SKJ-E.A Compact Knuckle Joint
SKJ-E.A 348 LG: 2.17 ft WT: 24.3 lb OD: 2.24 in

SHA-J.B Compact Swivel Head Adaptor
SHA-J.B 635 LG: 2.30 ft WT: 22.0 lb OD: 2.24 in

MIS-D.B Compact Inline Bowspring sub
MIS-D.B 768 LG: 5.70 ft WT: 33.1 lb OD: 2.24 in

Compact Neutron
MDN-B.A 214 LG: 5.04 ft WT: 50.7 lb OD: 2.24 in

Compact Density/Caliper
MPD-D.A 497 LG: 9.59 ft WT: 90.4 lb OD: 2.24 in

MIS-D.B Compact Inline Bowspring sub
MIS-D.B 770 LG: 5.70 ft WT: 33.1 lb OD: 2.24 in

SHA-J.B Compact Swivel Head Adaptor
SHA-J.B 579 LG: 2.30 ft WT: 22.0 lb OD: 2.24 in

SKJ-E.B Compact Knuckle Joint
SKJ-E.B 657 LG: 2.17 ft WT: 24.3 lb OD: 2.24 in

MIS-A.A Compact Inline Bowspring sub
MIS-A.A 23 LG: 5.70 ft WT: 33.1 lb OD: 2.24 in

Compact MMI Memory Section
MIM-B.A 263 LG: 4.65 ft WT: 26.5 lb OD: 2.24 in

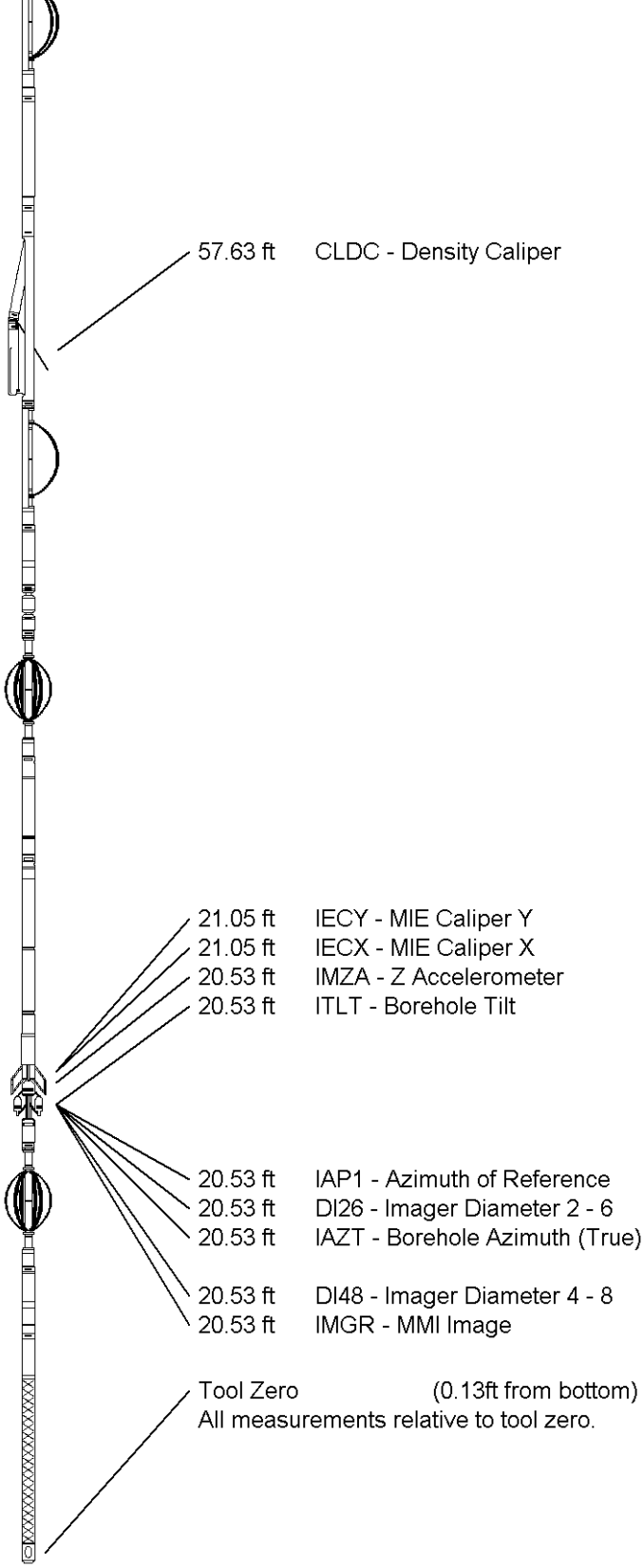
Compact MMI Electrode Section
MIE-B.A 263 LG: 13.96 ft WT: 99.2 lb OD: 4.09 in

MIS-A.A Compact Inline Bowspring sub
MIS-A.A 276 LG: 5.70 ft WT: 33.1 lb OD: 2.24 in

SHA-J.B Compact Swivel Head Adaptor
SHA-J.B 634 LG: 2.30 ft WT: 22.0 lb OD: 2.24 in

Compact Induction
MAI-C.A 494 LG: 10.81 ft WT: 48.5 lb OD: 2.24 in

Total Length: 147.78 ft Weight: 910.5 lb



COMPANY	WHITING OIL AND GAS CORPORATION
WELL	RAZOR 21A-2814B
FIELD	WILDCAT
PROVINCE/COUNTY	WELD
COUNTRY/STATE	U.S.A. / COLORADO

Elevation Kelly Bushing	4850.30	feet	First Reading	12692.00	feet
Elevation Drill Floor	4849.30	feet	Depth Driller	12721.00	feet
Elevation Ground Level	4833.00	feet	Depth Logger	12721.00	feet

Weatherford®

CML MESSENGER SHUTTLE

ARRAY INDUCTION

ELECTRIC LOG