



**Weatherford®**

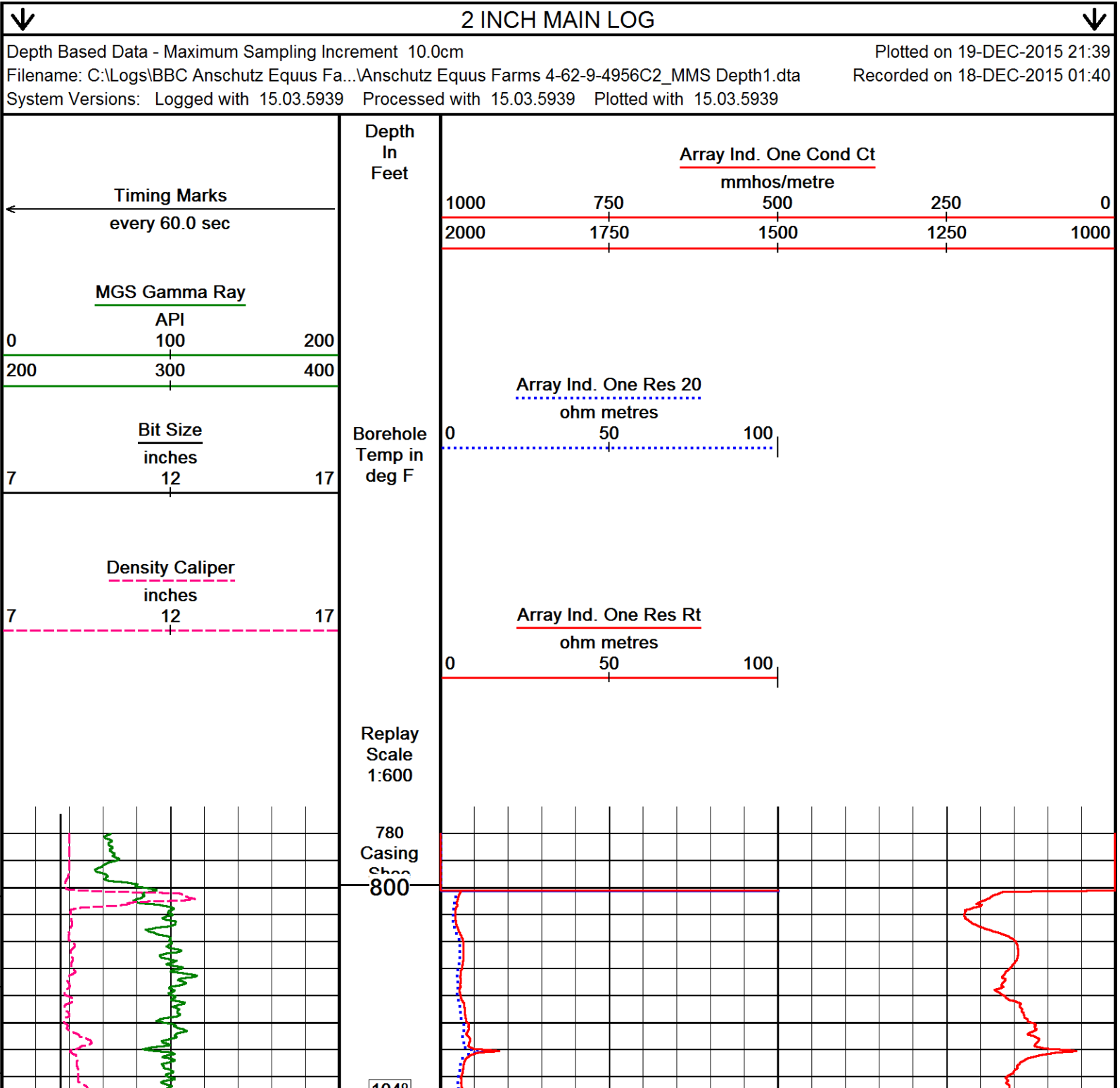
**ARRAY INDUCTION  
LOG**

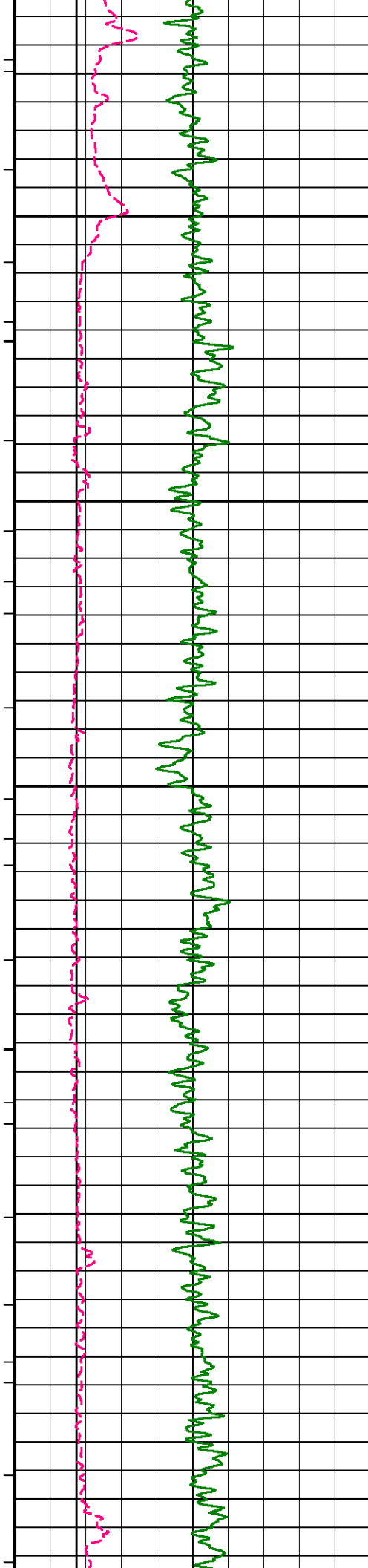
COMPANY	BILL BARRETT CORP			
WELL	ANSCHUTZ EQUUS FARMS 4-62-9-4956C2			
FIELD	WATTENBERG			
PROVINCE/COUNTY WELD				
COUNTRY/STATE	U.S.A. / COLORADO			
LOCATION	1090' FSL & 250' FWL			
SEC 9	TWP 4N	RGE 62W	Other Services SPECTRAL GAMMA RAY DUAL SPACED NEUTRON	
API Number	05-123-42156		PHOTO DENSITY	
Permanent Datum G.L., Elevation 4750 feet				
Log Measured From KB			Elevations: KB 4542.00 DF 4542.00 GL 4526.00	
Drilling Measured From K.B. @ 16 FEET				
Date	17-DEC-2015			
Run Number	ONE			
Service Order	2653-137484158			
Depth Driller	6629.00		feet	
Depth Logger	6629.00		feet	
First Reading	6610.00		feet	
Last Reading	799.00		feet	
Casing Driller	806.00		feet	
Casing Logger	799.00		feet	
Bit Size	8.750		inches	
Hole Fluid Type	WBM			
Density / Viscosity	10.10 lb/USg		35.00 Sec/Ct	
PH / Fluid Loss	8.40		5.00 ml/30Min	
Sample Source	FLOWLINE			
Rm @ Measured Temp	2.68 @ 70.0		ohm-m	
Rmf @ Measured Temp	2.14 @ 70.0		ohm-m	
Rmc @ Measured Temp	3.22 @ 70.0		ohm-m	
Source Rmf / Rmc	CALC		CALC	
Rm @ BHT	1.02 @189.0		ohm-m	
Time Since Circulation	0 HOURS			
Max Recorded Temp	189.00		deg F	
Equipment / Base	13045		Casper	
Recorded By	W HANKS			
Witnessed By	R SCHULTZ			

BOREHOLE RECORD					Last Edited: 17-DEC-2015 22:05
Bit Size inches		Depth From feet		Depth To feet	
8.750		806.00		6629.00	
CASING RECORD					
Type	Size inches	Depth From feet	Shoe Depth feet	Weight pounds/ft	
SURFACE	9.625	0.00	806.00	36.00	

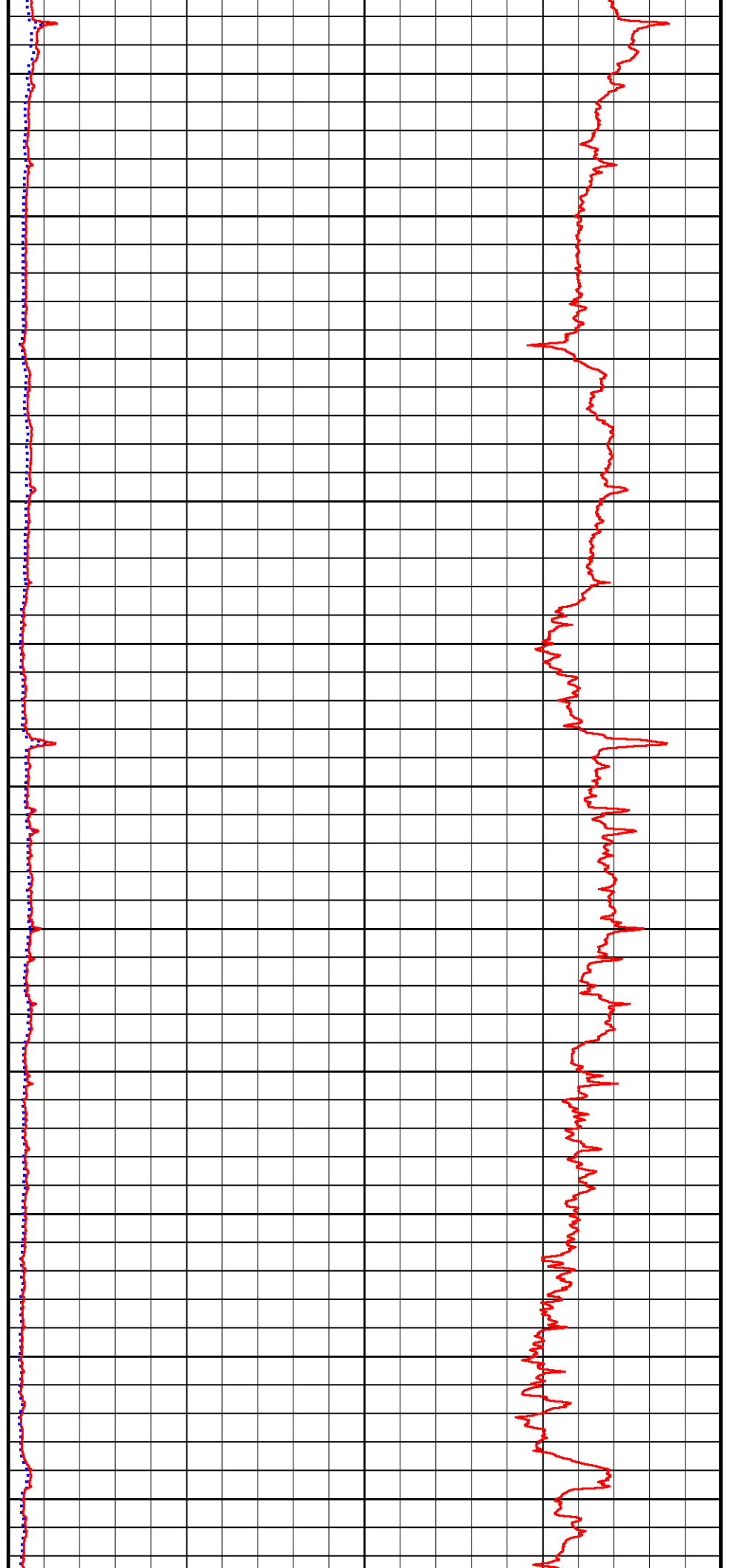
REMARKS
SOFTWARE VERSION USED: 15.03.5939 TOOLS CONVEYED VIA DRILL PIPE/COMPACT WELL SHUTTLE
LOGS RECORDED USING A 200V MEMORY LOGGING SYSTEM 200V EXTENDED BATTERIES USED TO POWER TOOLSTRING
ALL DEPTHS RECORDED WITH WEATHERFORD ADVANTAGE DEPTH SYSTEM IN CONJUNCTION WITH RIG PASON EDR SYSTEM ALL DEPTHS CORRECTED TO DRILLER'S STRAP DEPTH
TIGHT PULLS, BOREHOLE SIZE, AND RUGOSITY MAY AFFECT DATA QUALITY
HARDWARE USED: MPD - 4 INCH PROFILE PLATE MAI - INDUCTION STANDOFF ASSEMBLY MFE AND MAI STOOD OFF 0.5 INCHES USING ISA AND MISE ANCILLARIES
7 INCH PRODUCTION CASING SIZE USED TO CALCULATE ANNULAR HOLE VOLUME ANNULAR HOLE VOLUME FROM T.D. TO SURFACE CASING : 958 CUBIC FEET HOLE VOLUME FROM T.D. TO SURFACE CASING: 2503 CUBIC FEET

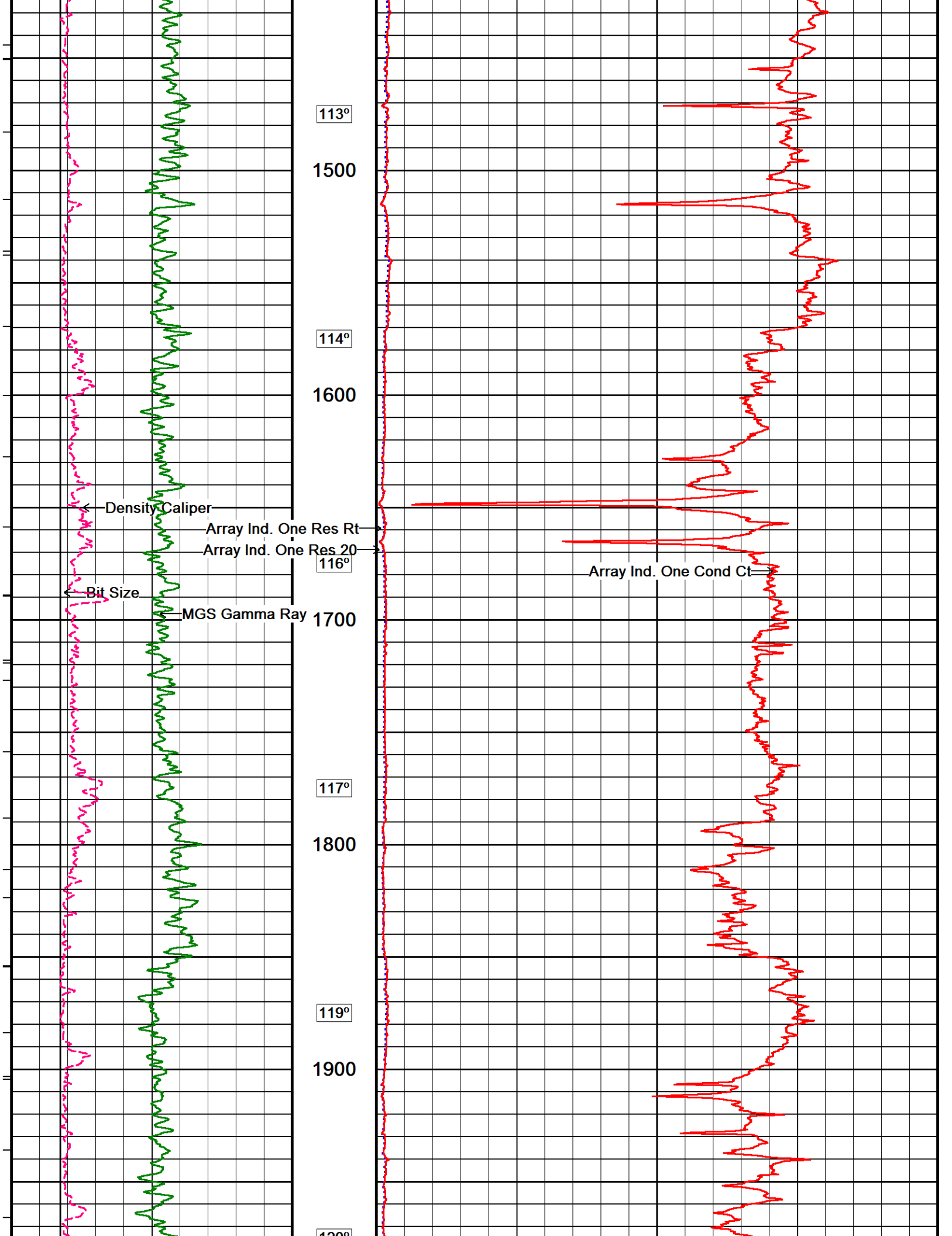
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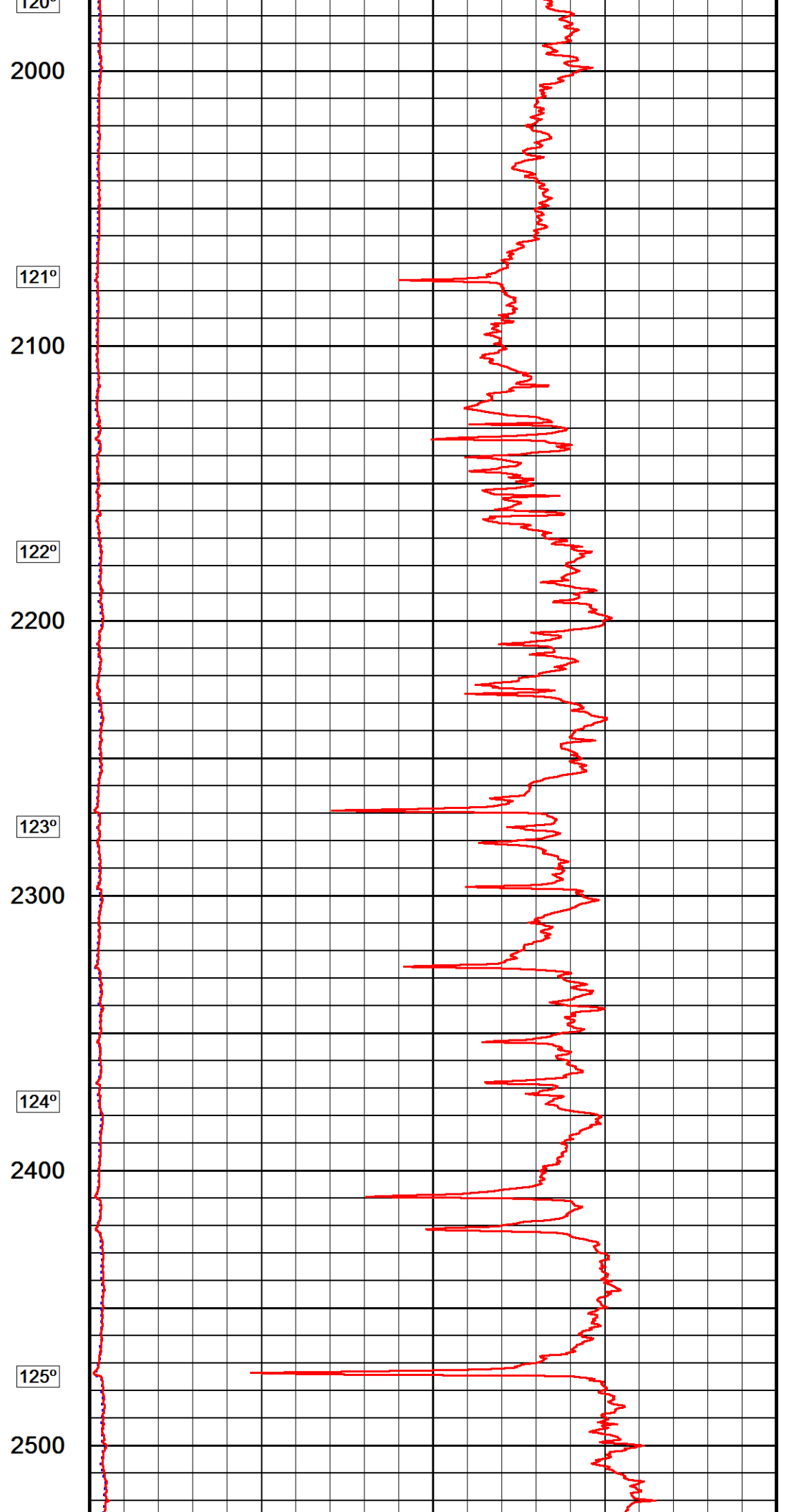
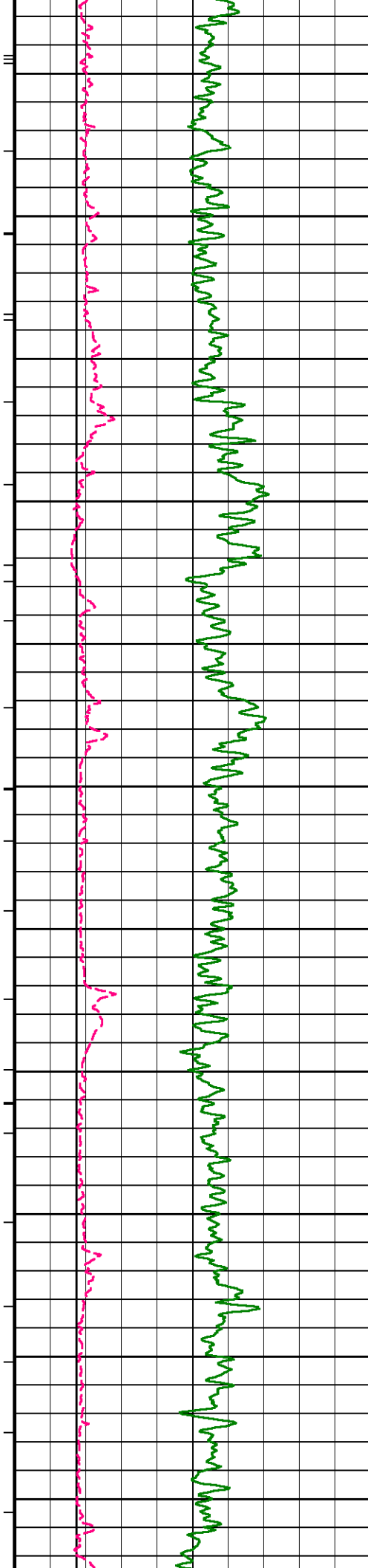


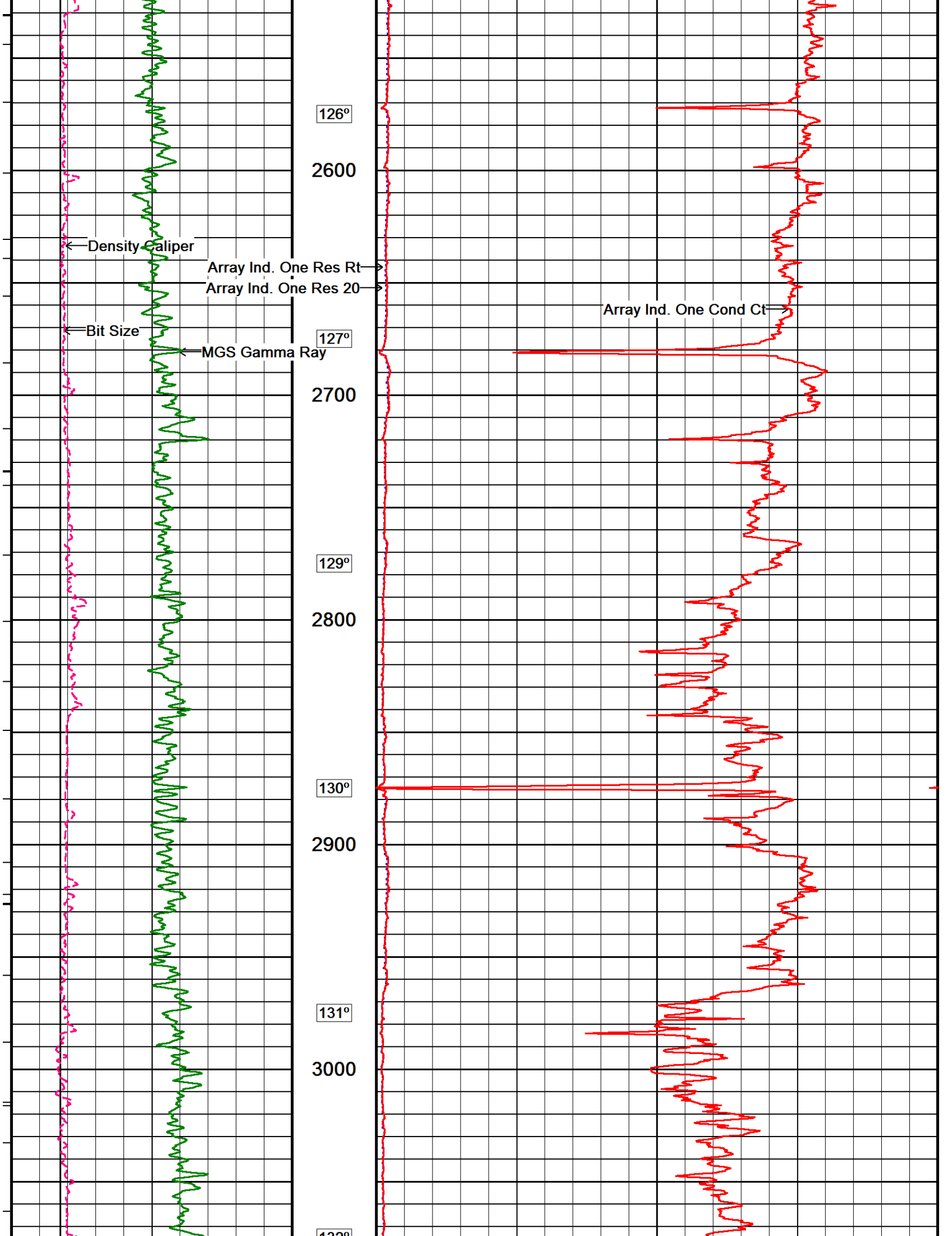


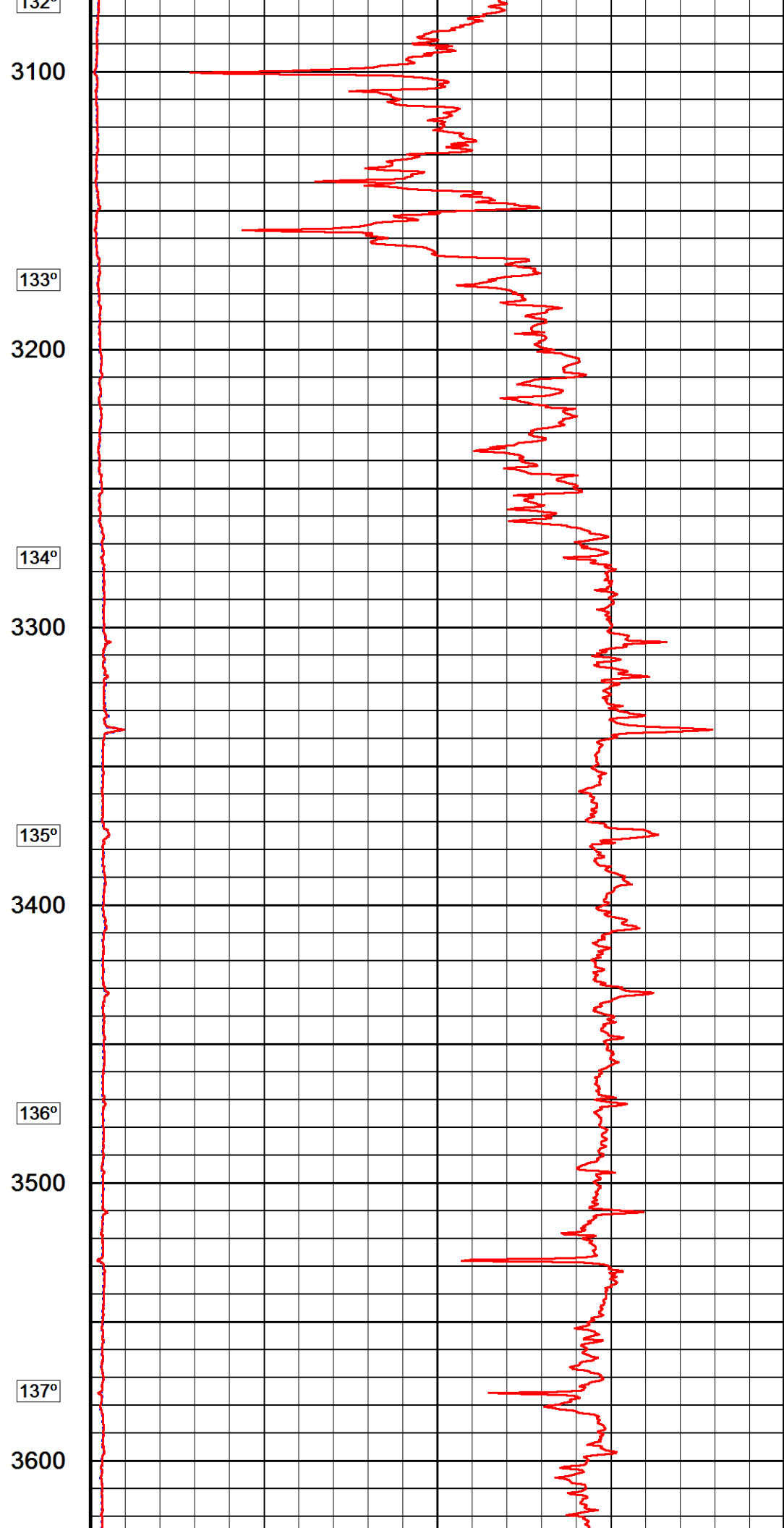
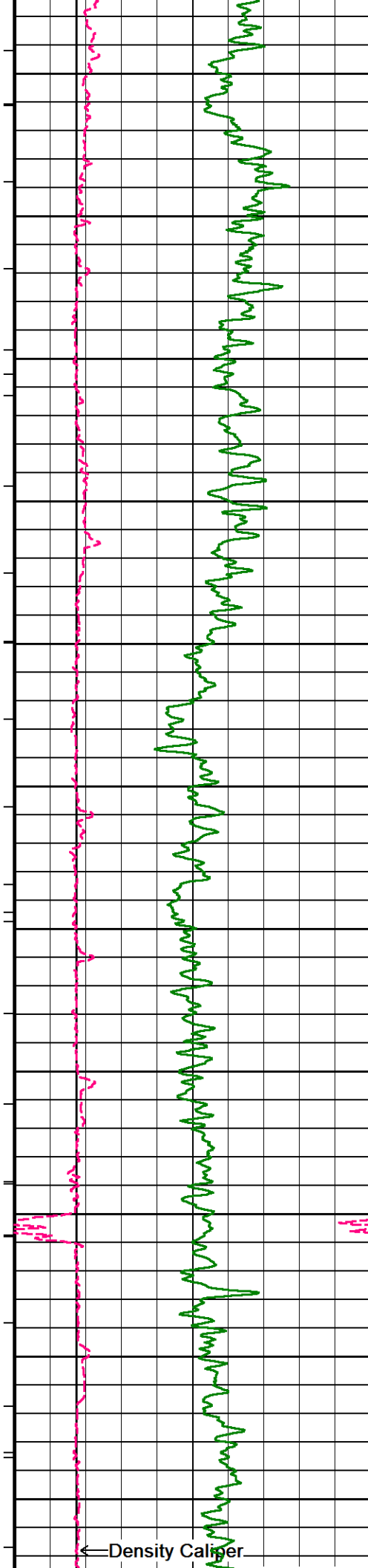
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900  
106°  
1000  
107°  
1100  
109°  
1200  
110°  
1300  
111°  
1400

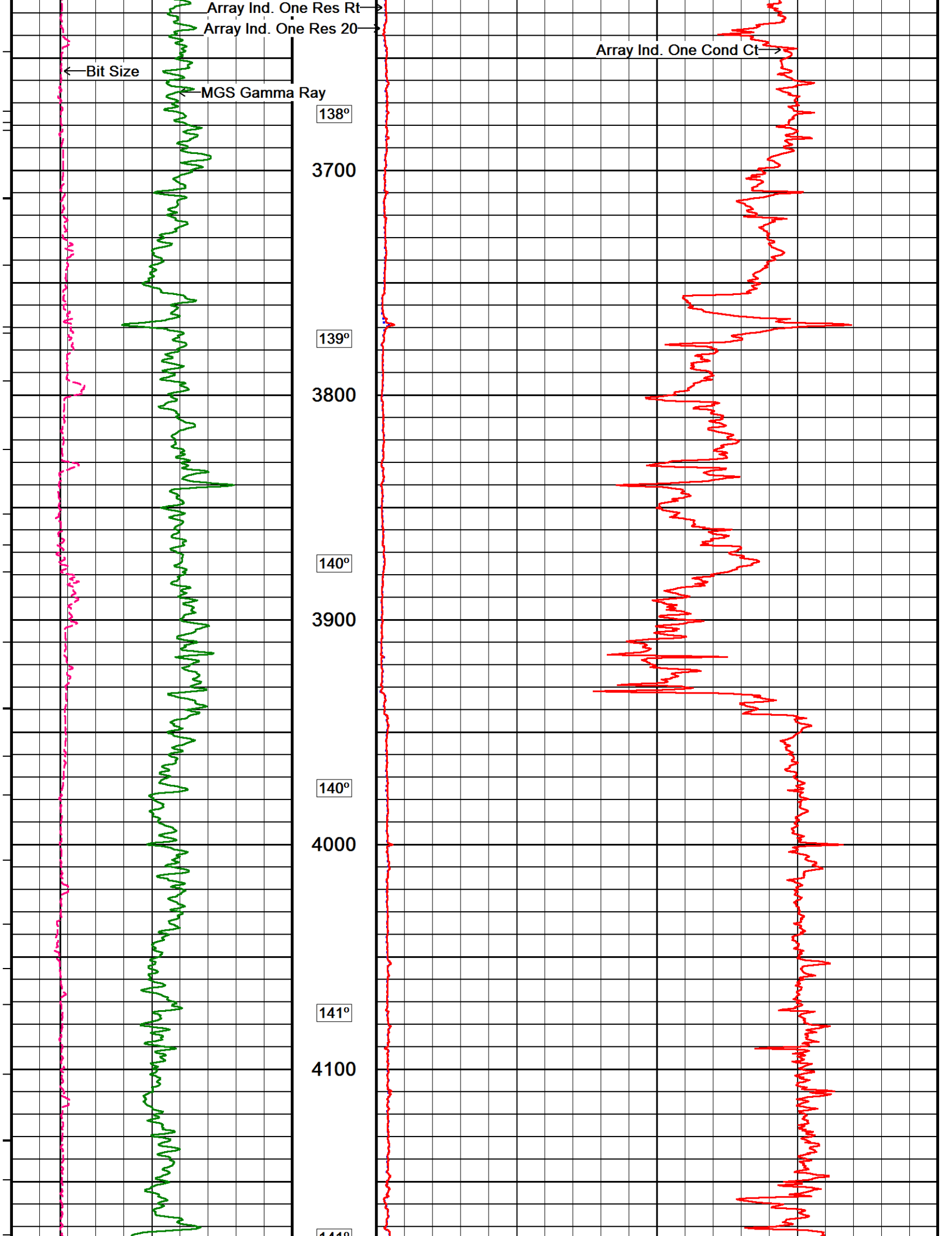




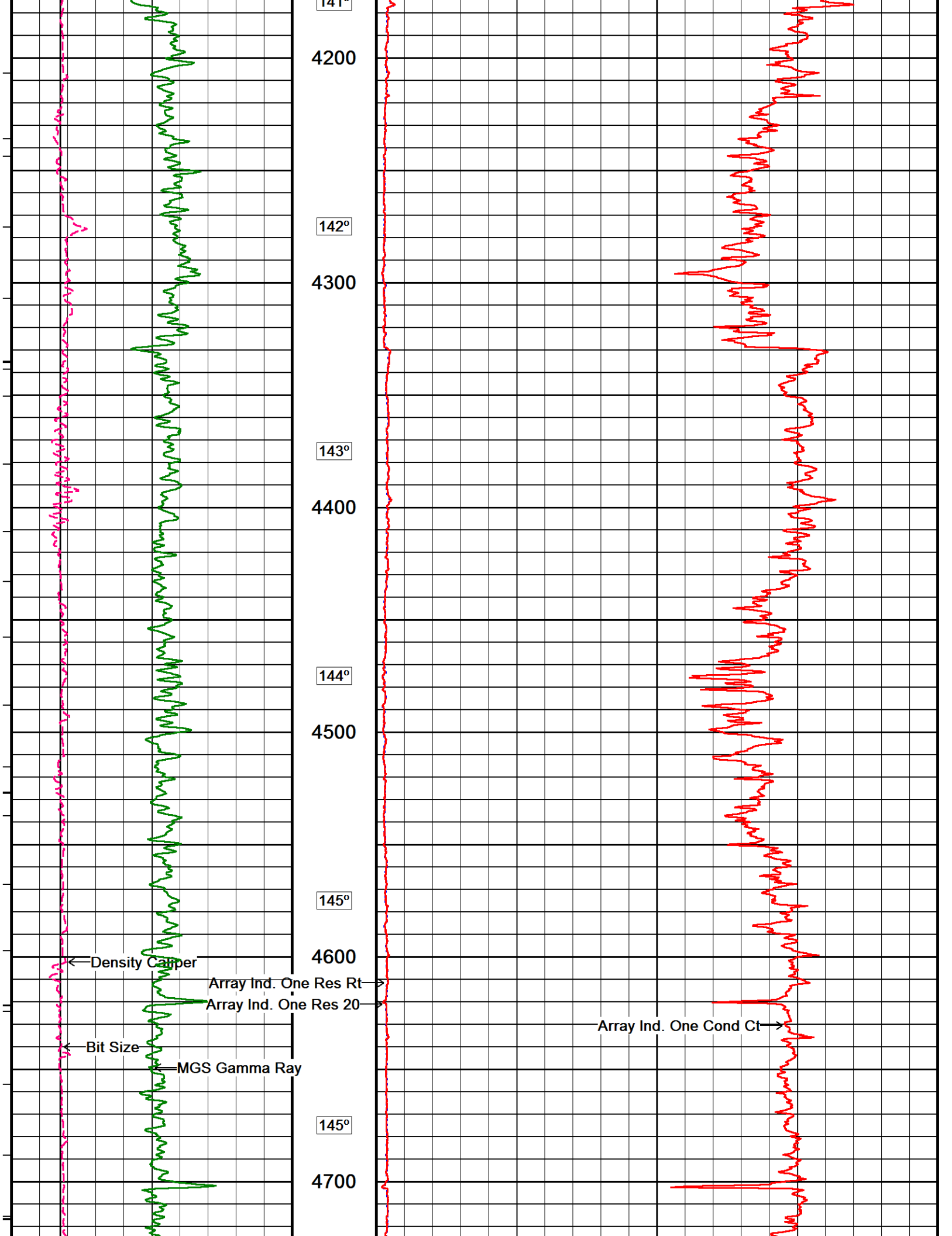


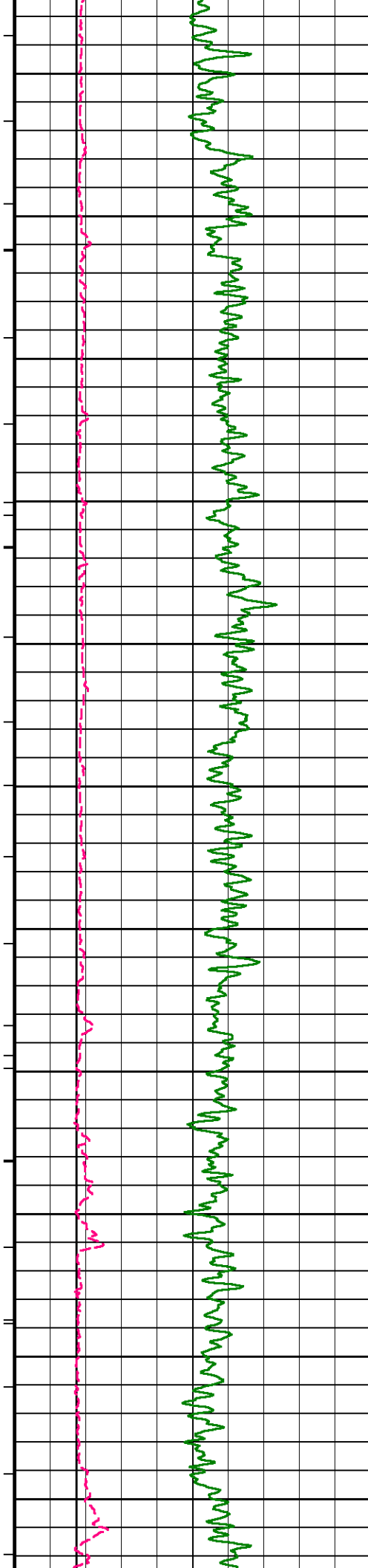












145°

4800

146°

4900

146°

5000

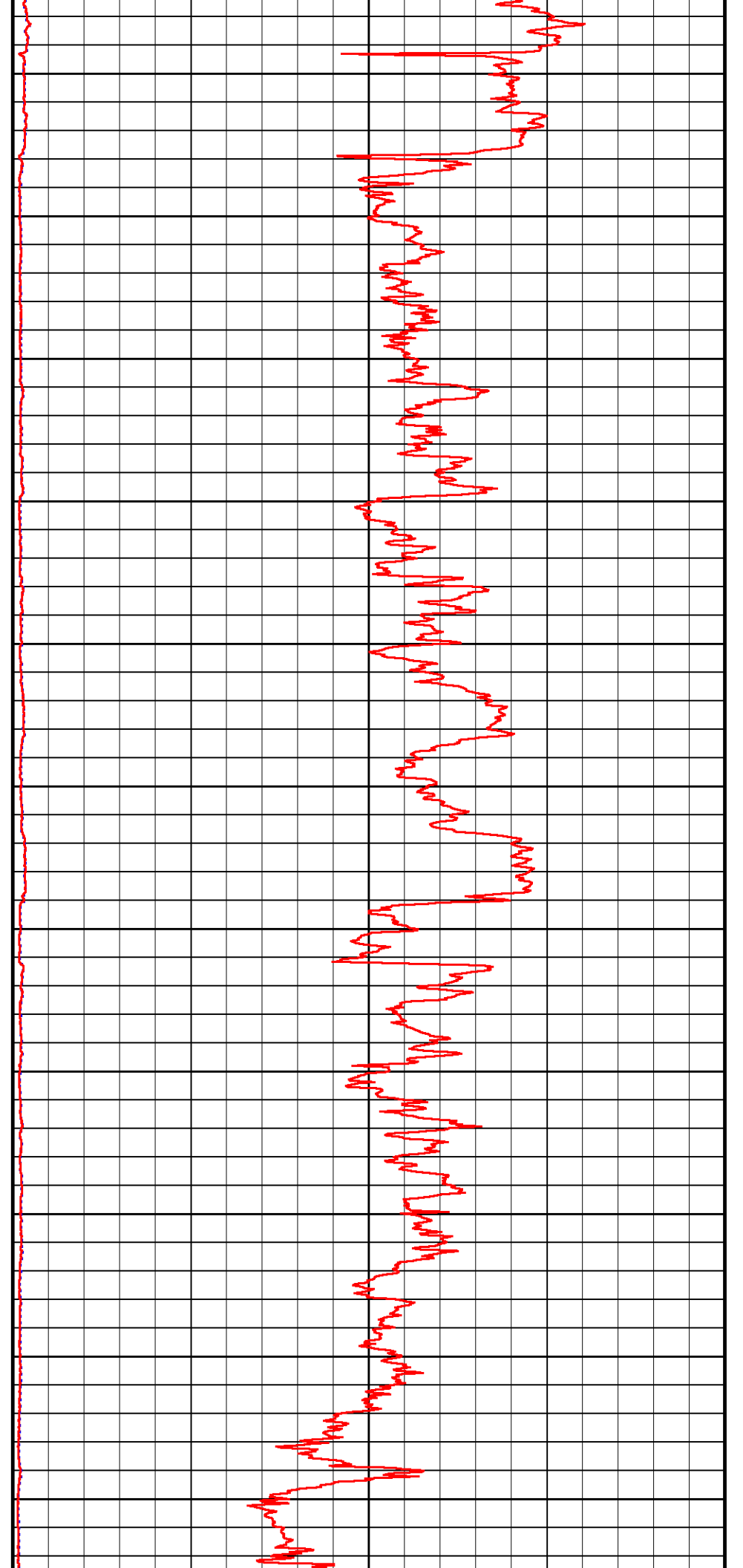
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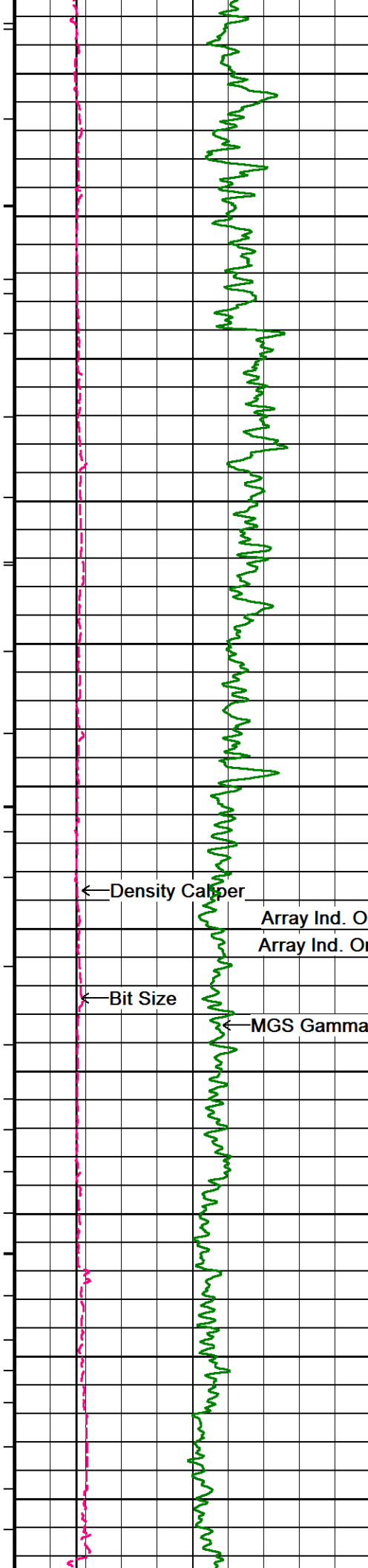
5100

146°

5200

145°





145°  
5300

145°  
5400

145°  
5500

145°  
5600

145°  
5700

145°  
5800

146°  
5900

← Density Caliper

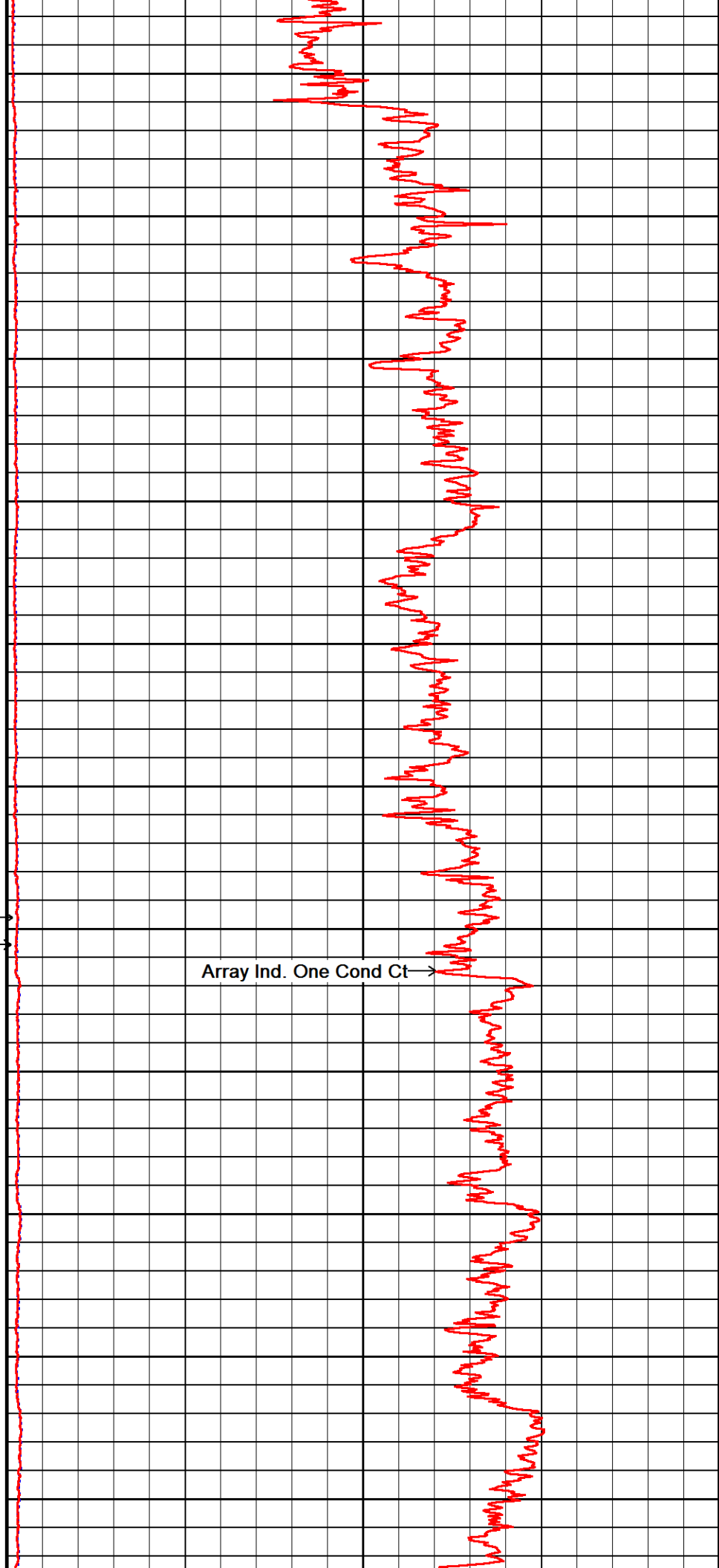
Array Ind. One

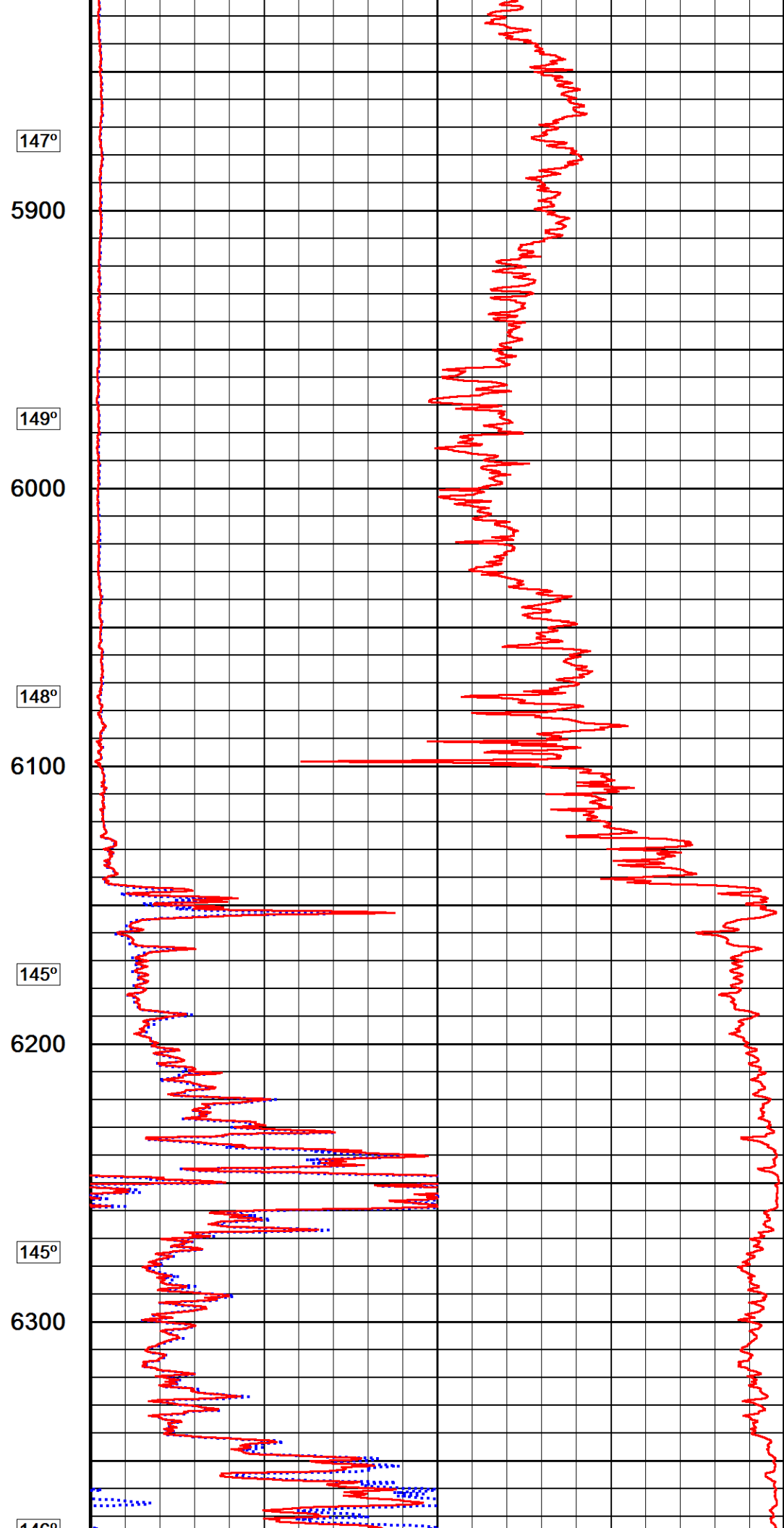
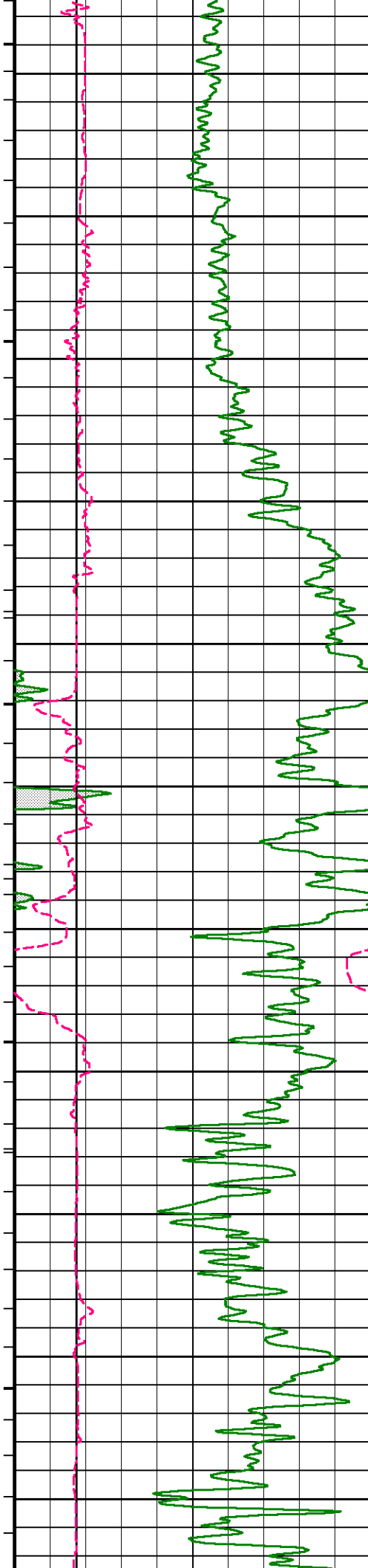
Array Ind. One

← Bit Size

← MGS Gamma Ray

Array Ind. One Cond Ct →







146°

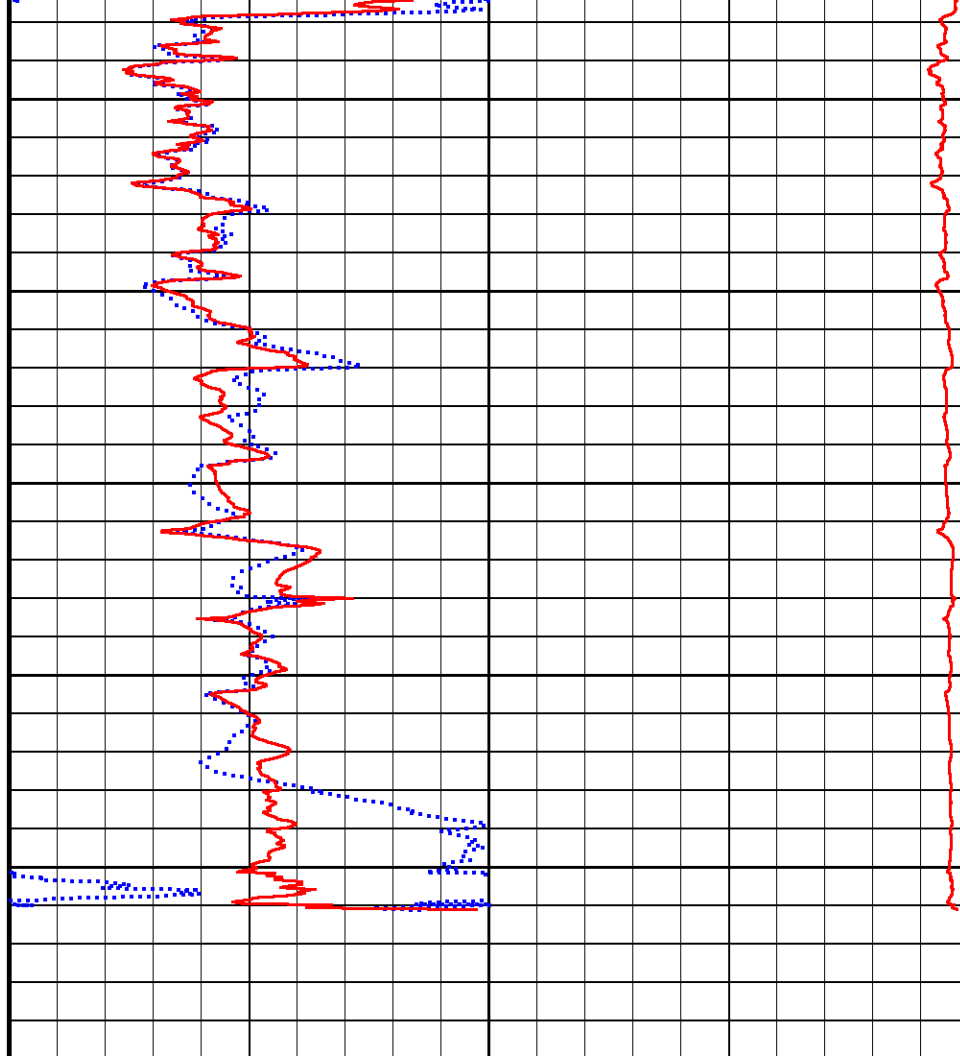
6400

165°

6500

FR

6600



Depth  
In  
Feet

← Timing Marks  
every 60.0 sec

MGs Gamma Ray

API

0 100 200

200 300 400

Bit Size

inches

7 12 17

Density Caliper

inches

7 12 17

Borehole  
Temp in  
deg F

Array Ind. One Cond Ct

mmhos/metre

1000 750 500 250 0

2000 1750 1500 1250 1000

Array Ind. One Res 20

ohm metres

0 50 100

Array Ind. One Res Rt

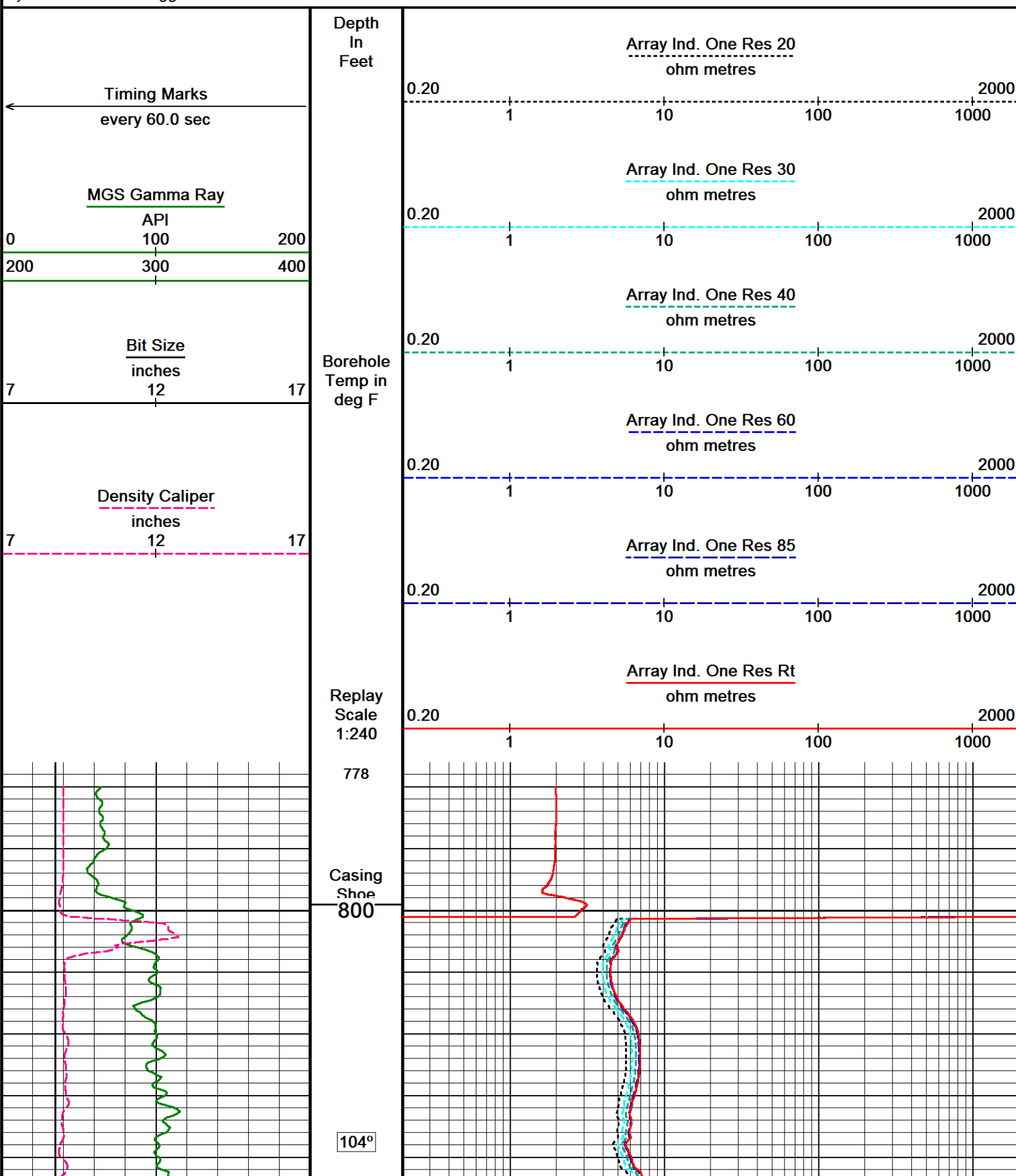
ohm metres

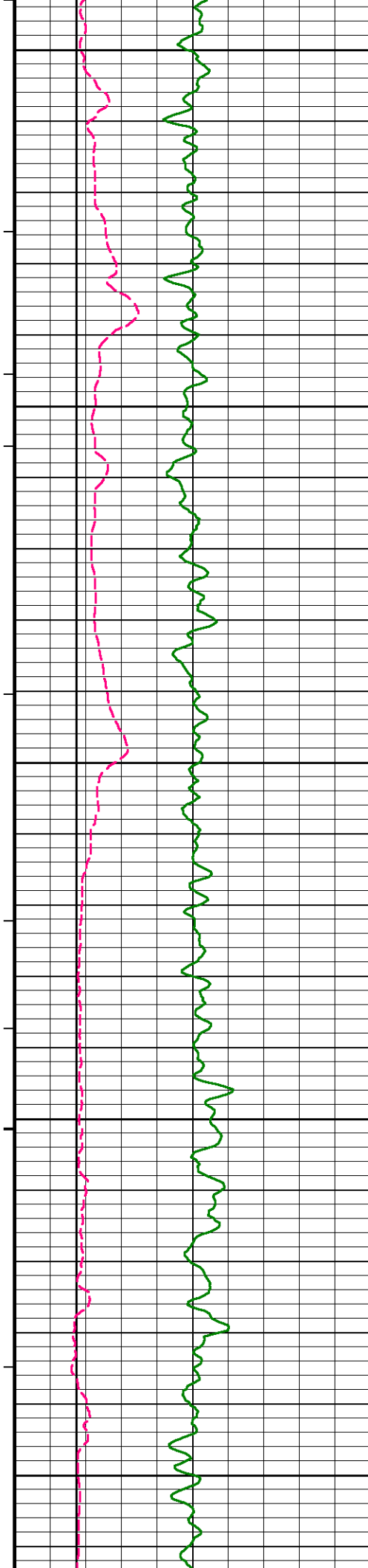
0 50 100

Replay  
Scale  
1:600



System Versions: Logged with 15.03.5939 Processed with 15.03.5939 Plotted with 15.03.5939





850

104°

900

105°

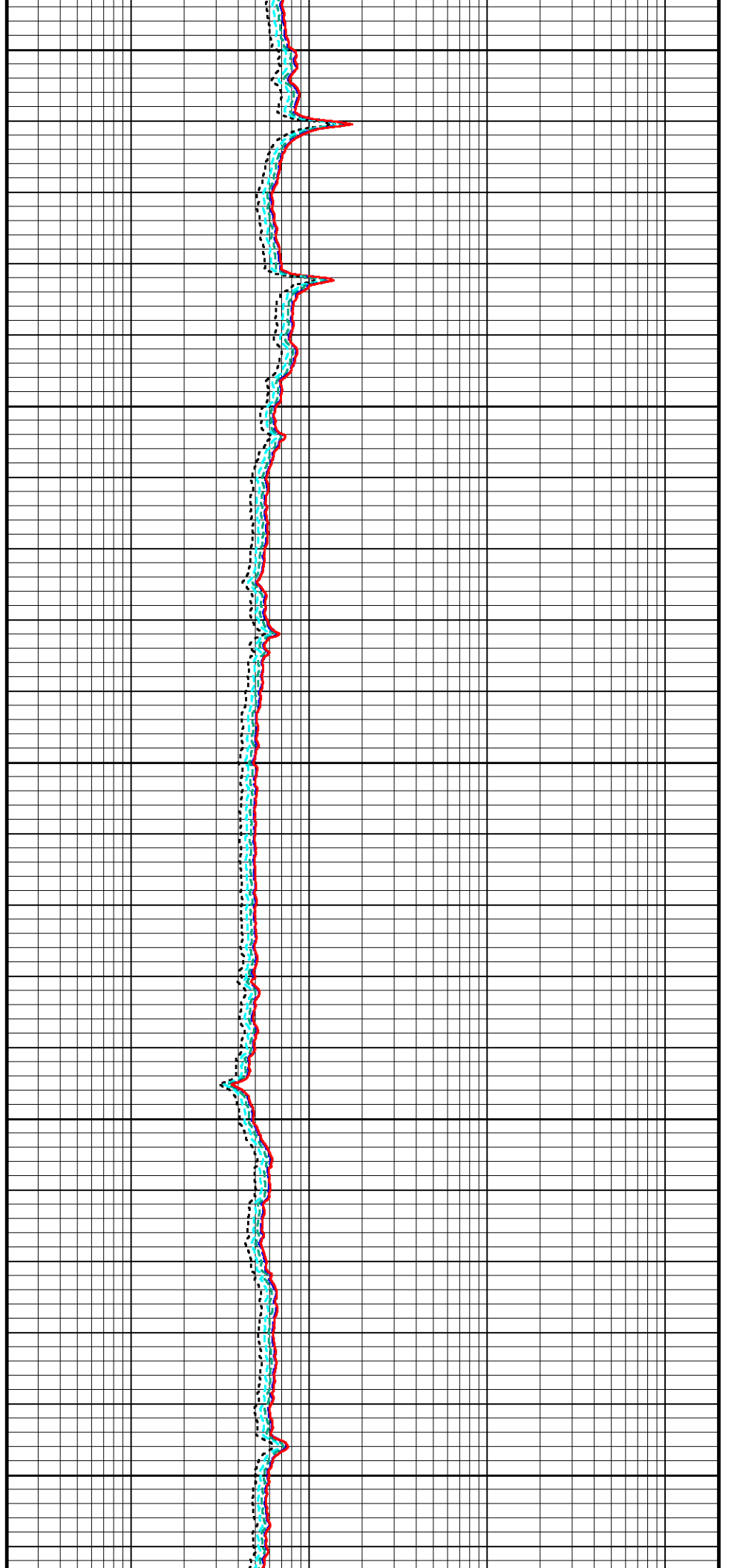
950

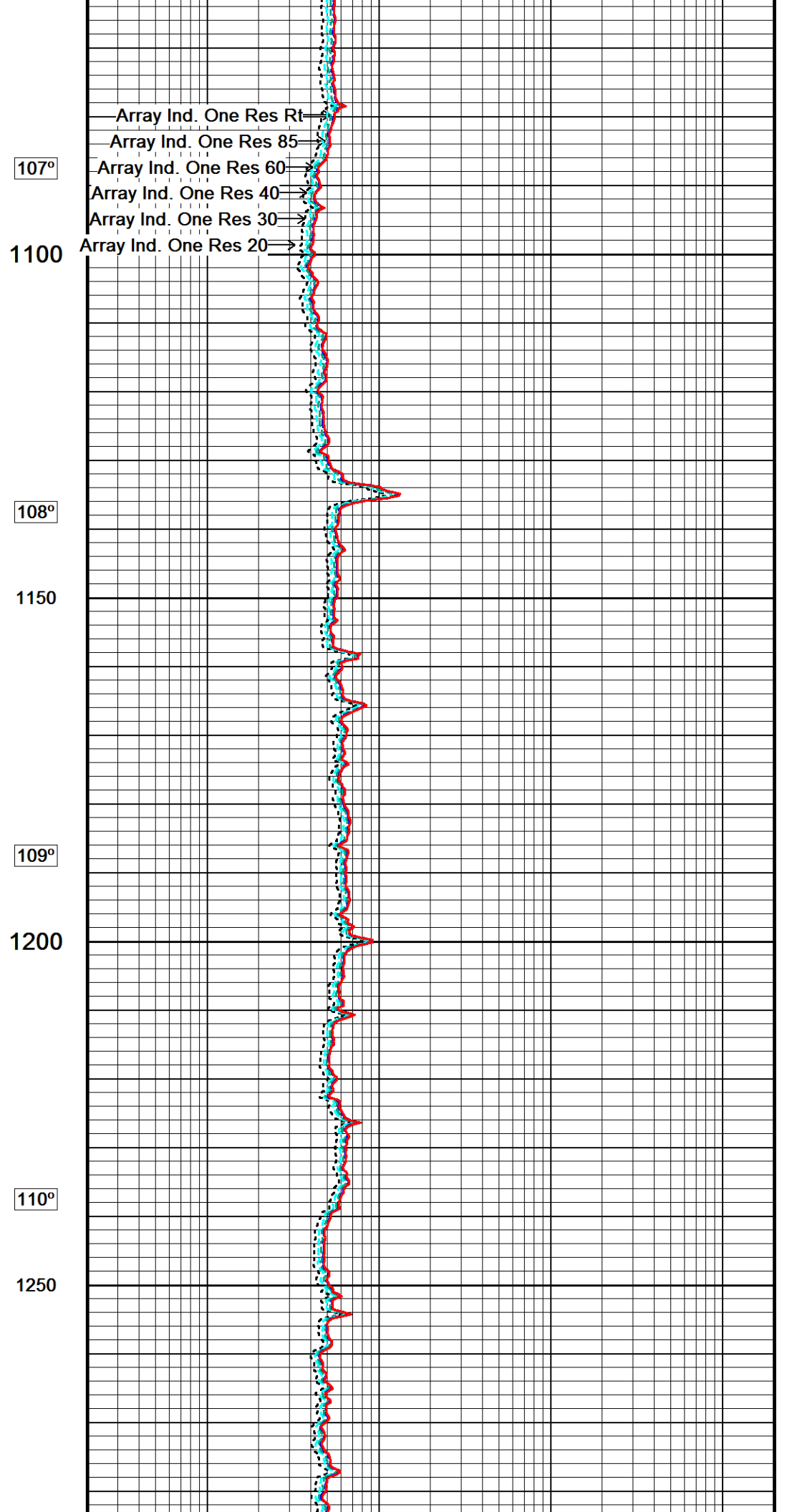
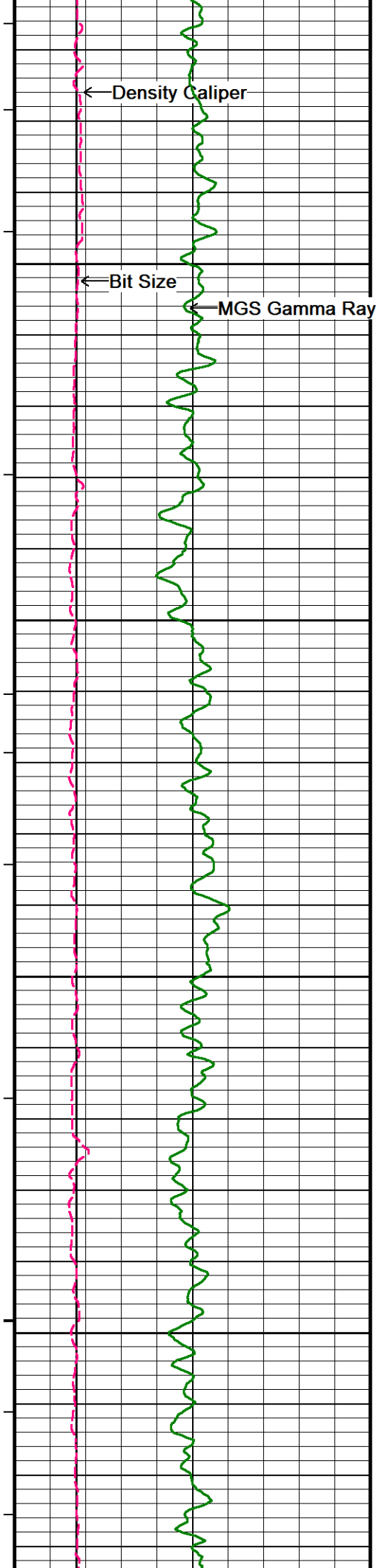
106°

1000

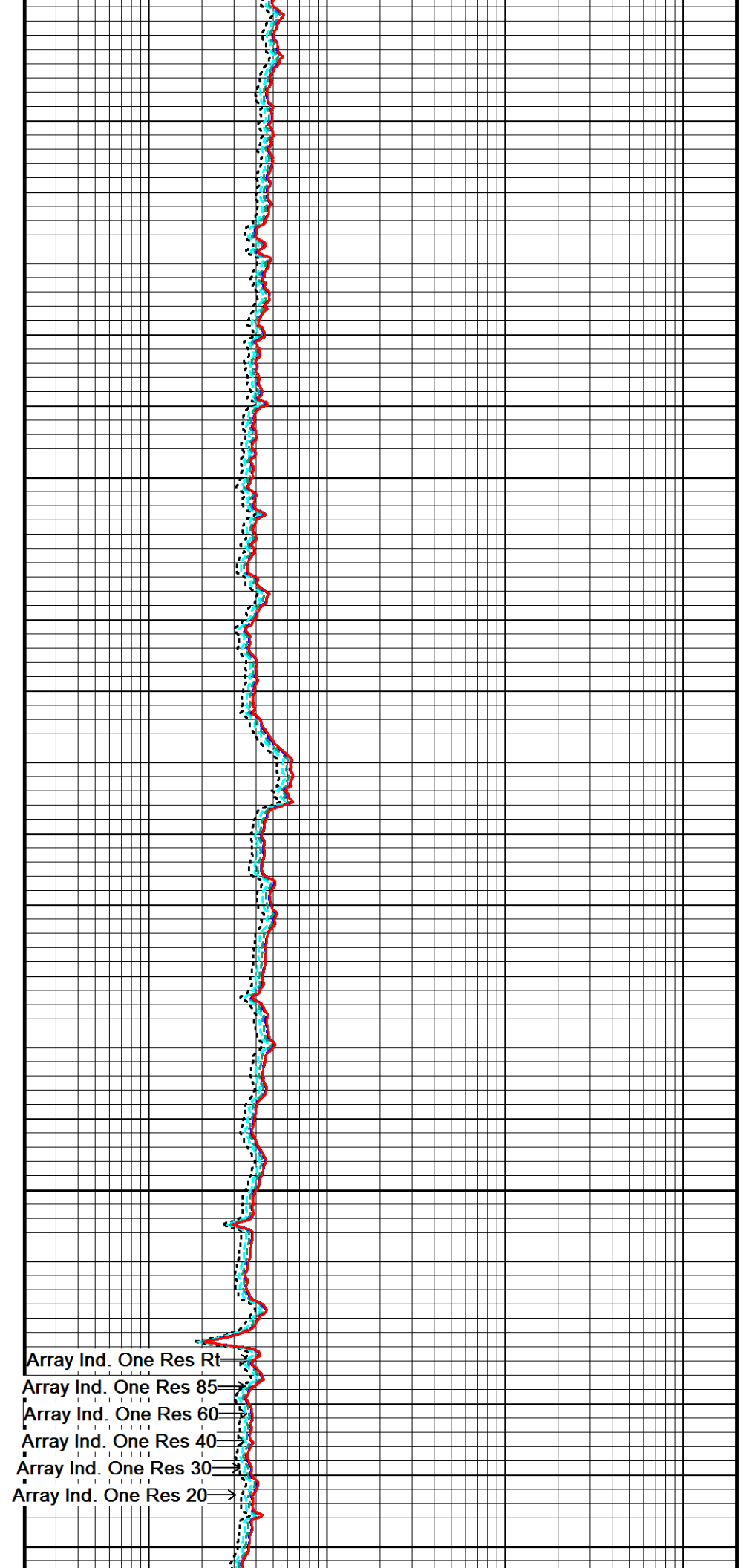
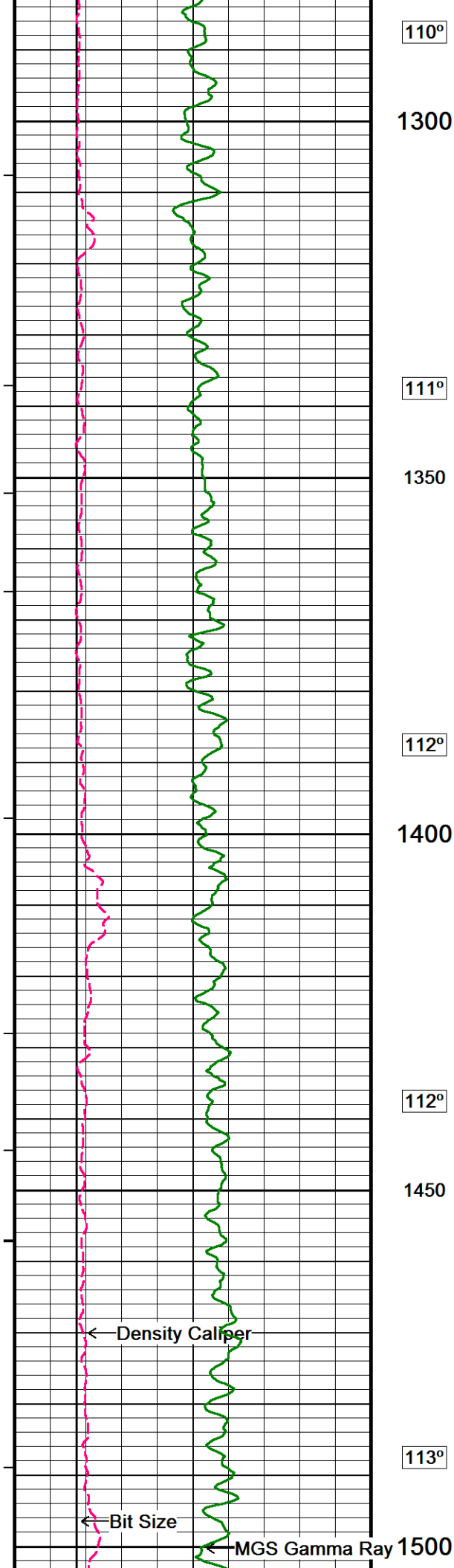
107°

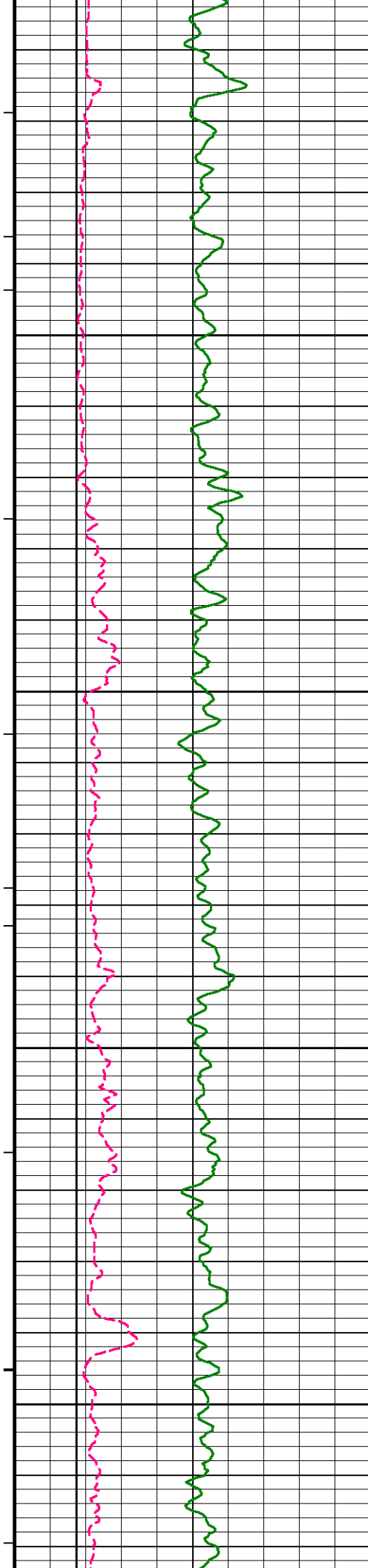
1050











114°

1550

115°

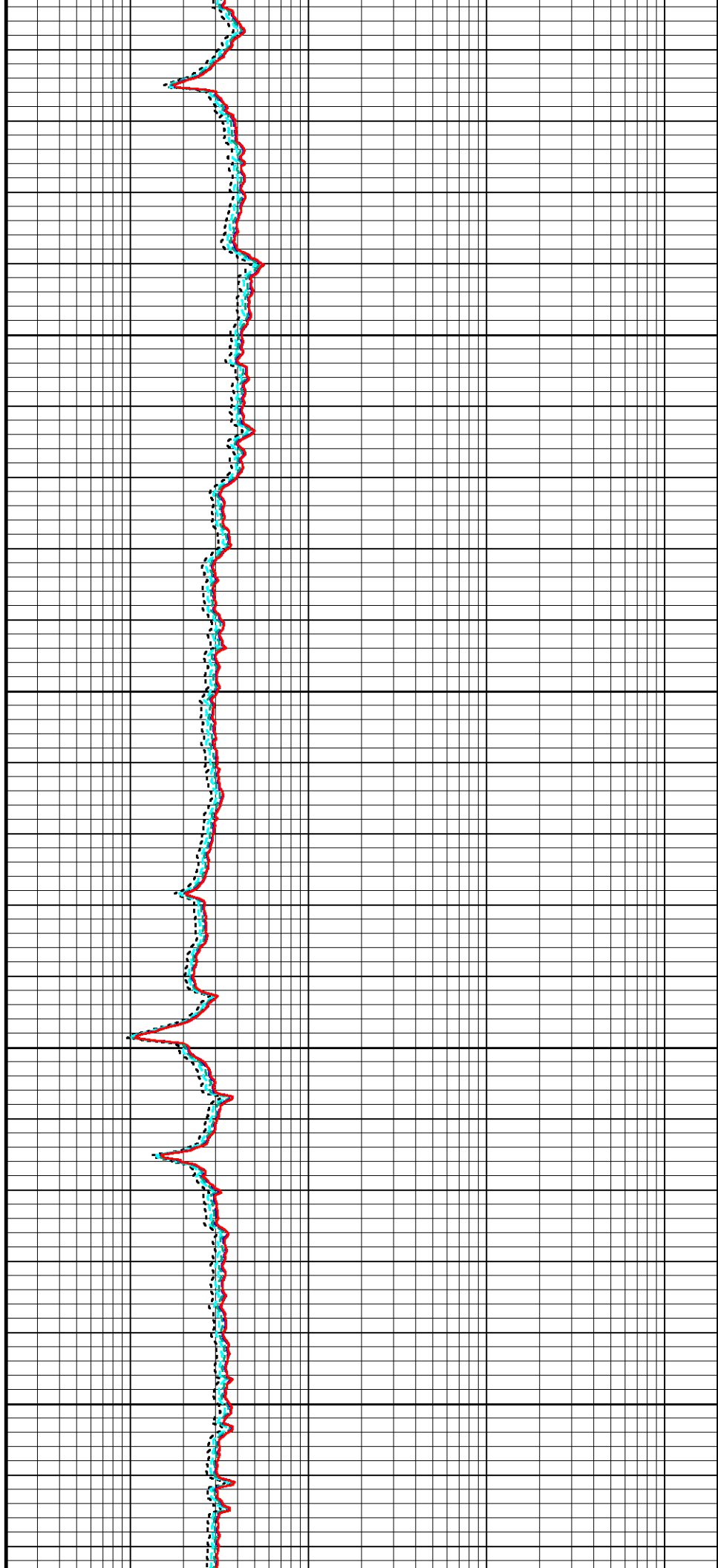
1600

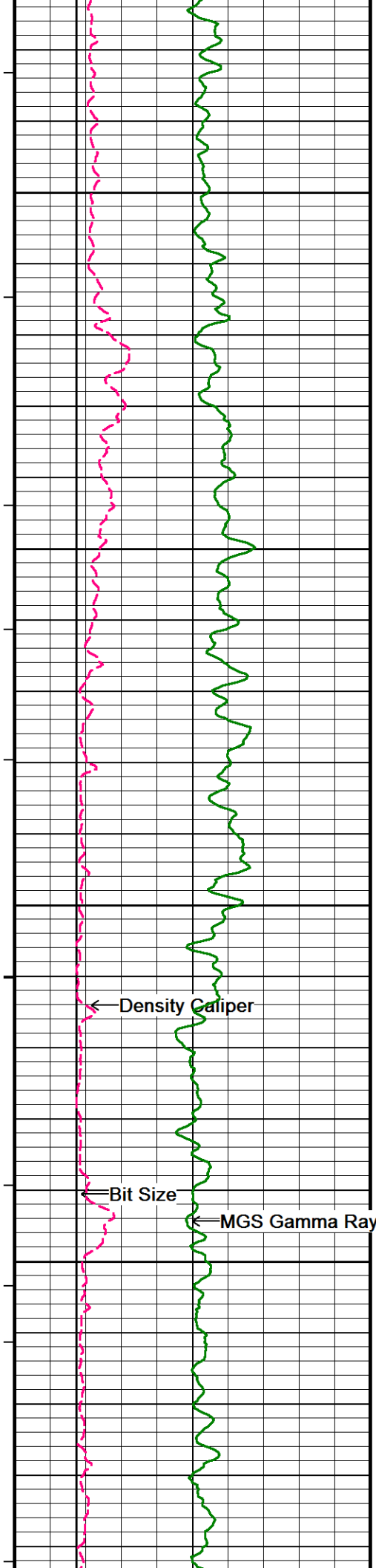
115°

1650

116°

1700





117°

1750

117°

1800

118°

1850

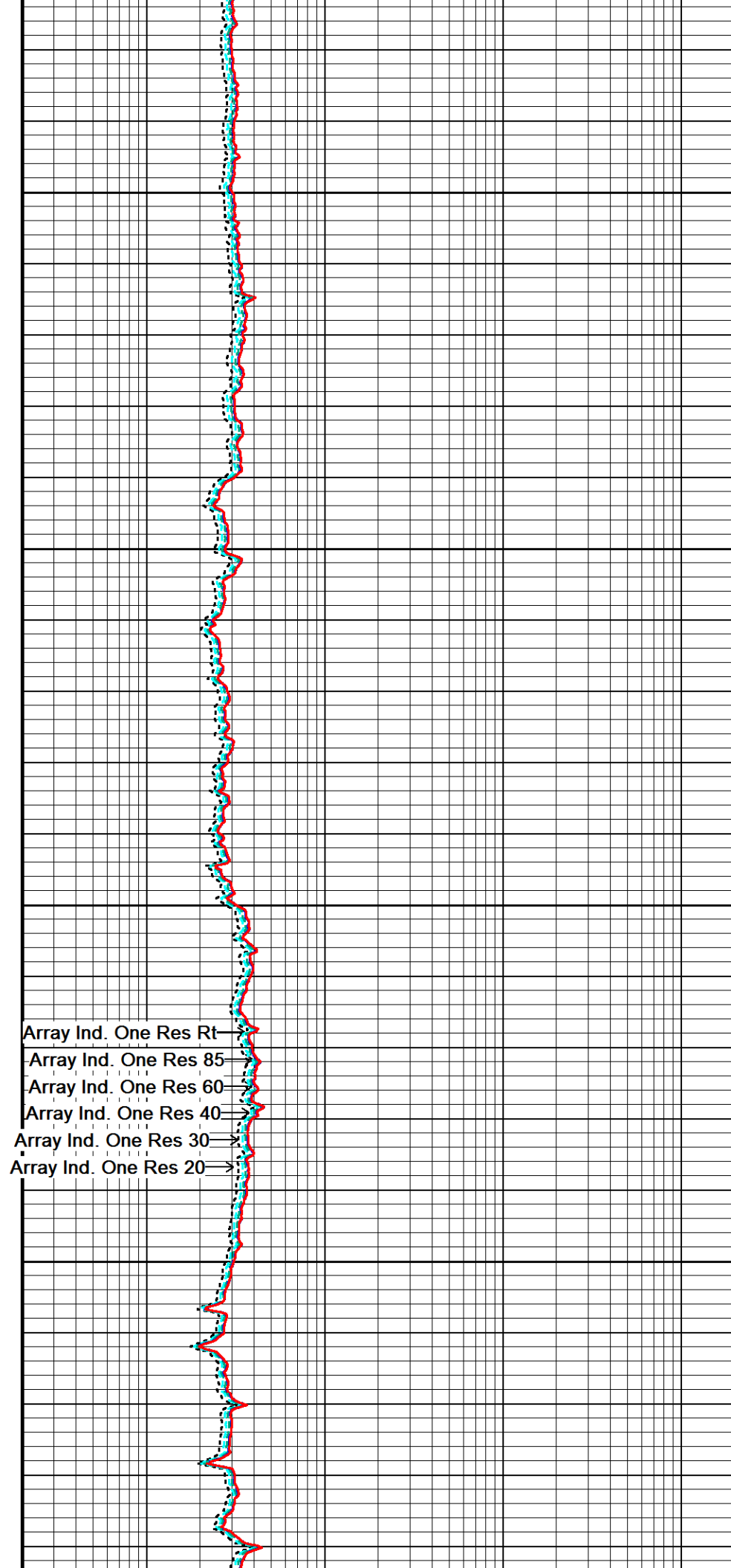
← Density Caliper

← Bit Size

← MGS Gamma Ray

1900

120°



Array Ind. One Res Rt

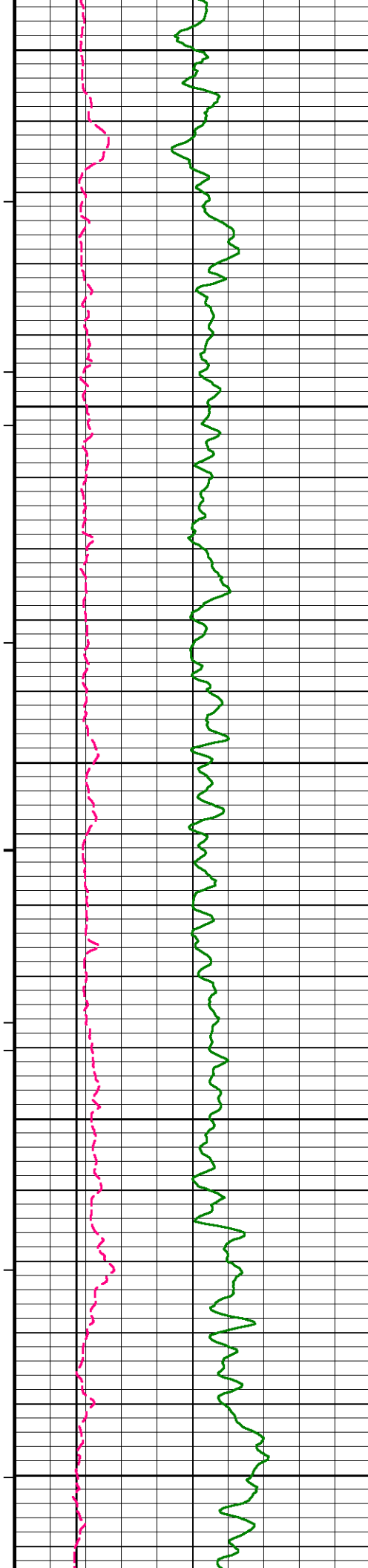
Array Ind. One Res 85

Array Ind. One Res 60

Array Ind. One Res 40

Array Ind. One Res 30

Array Ind. One Res 20



1950

120°

2000

121°

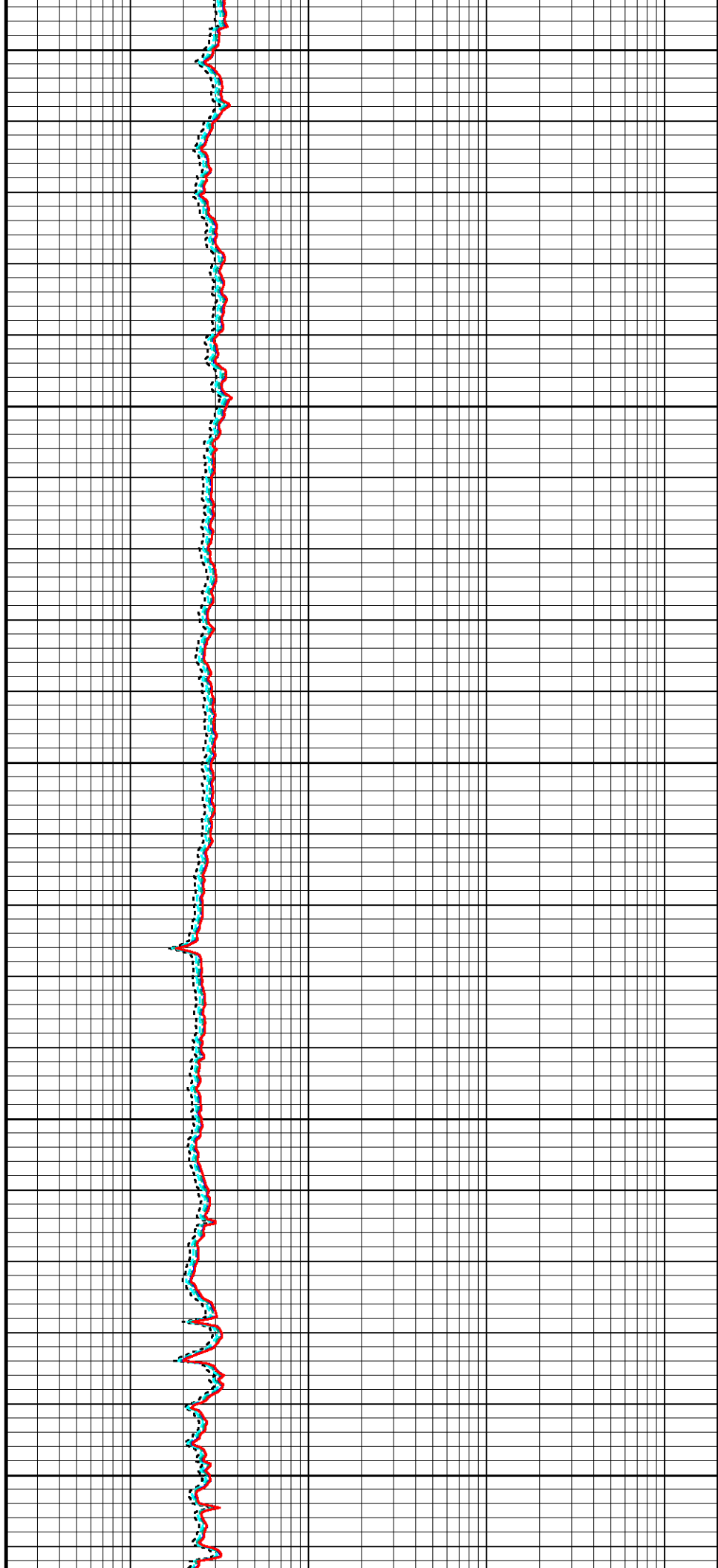
2050

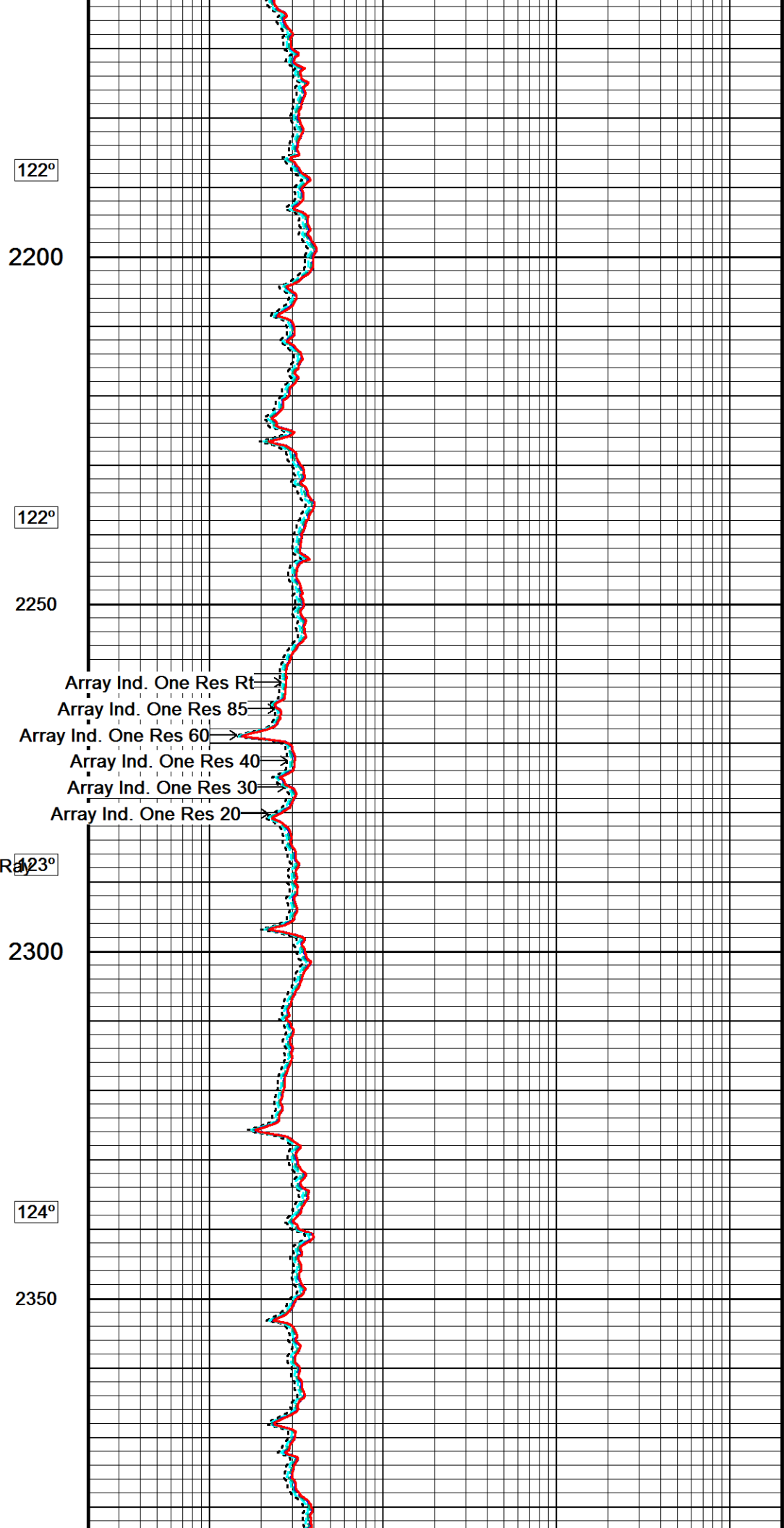
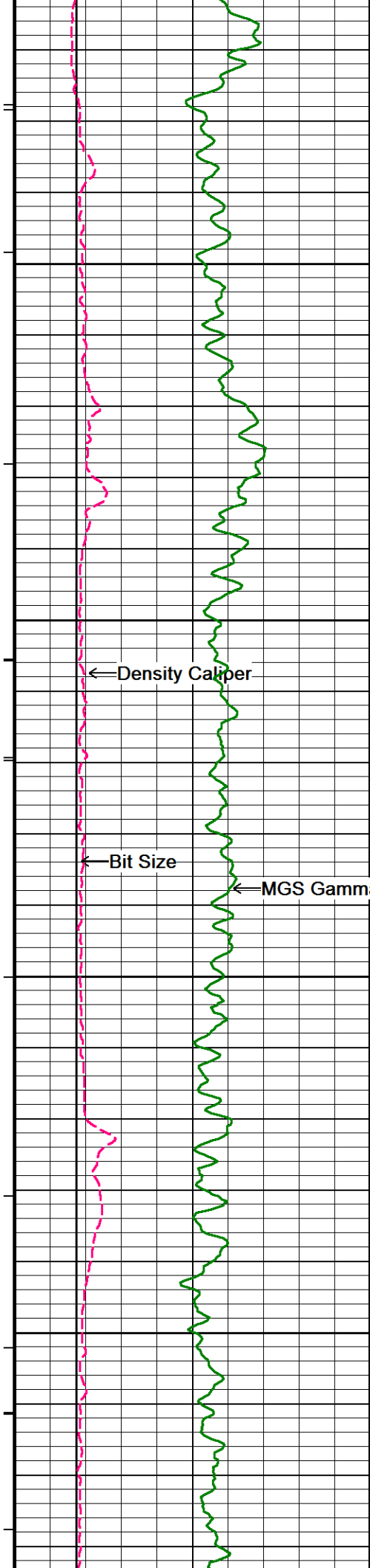
121°

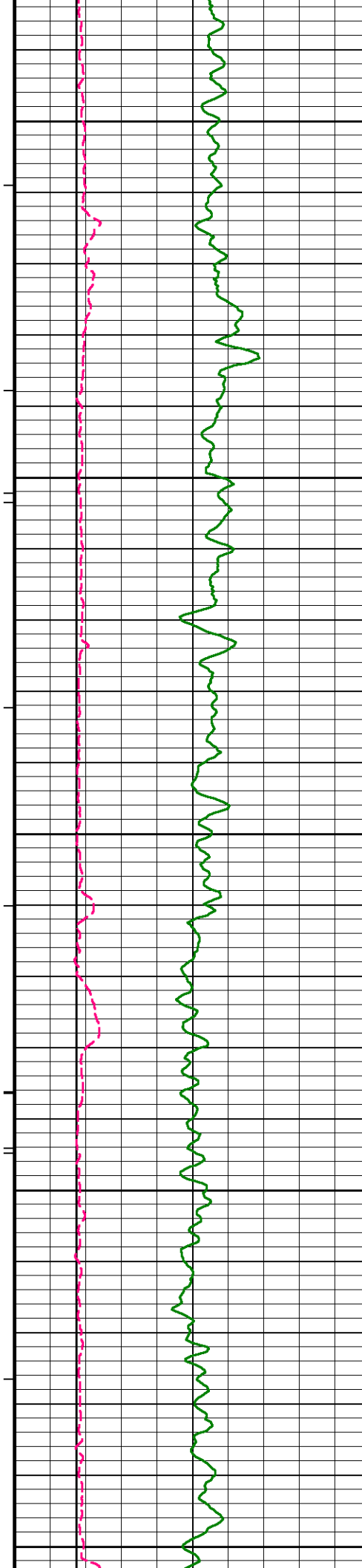
2100

122°

2150







124°

2400

125°

2450

125°

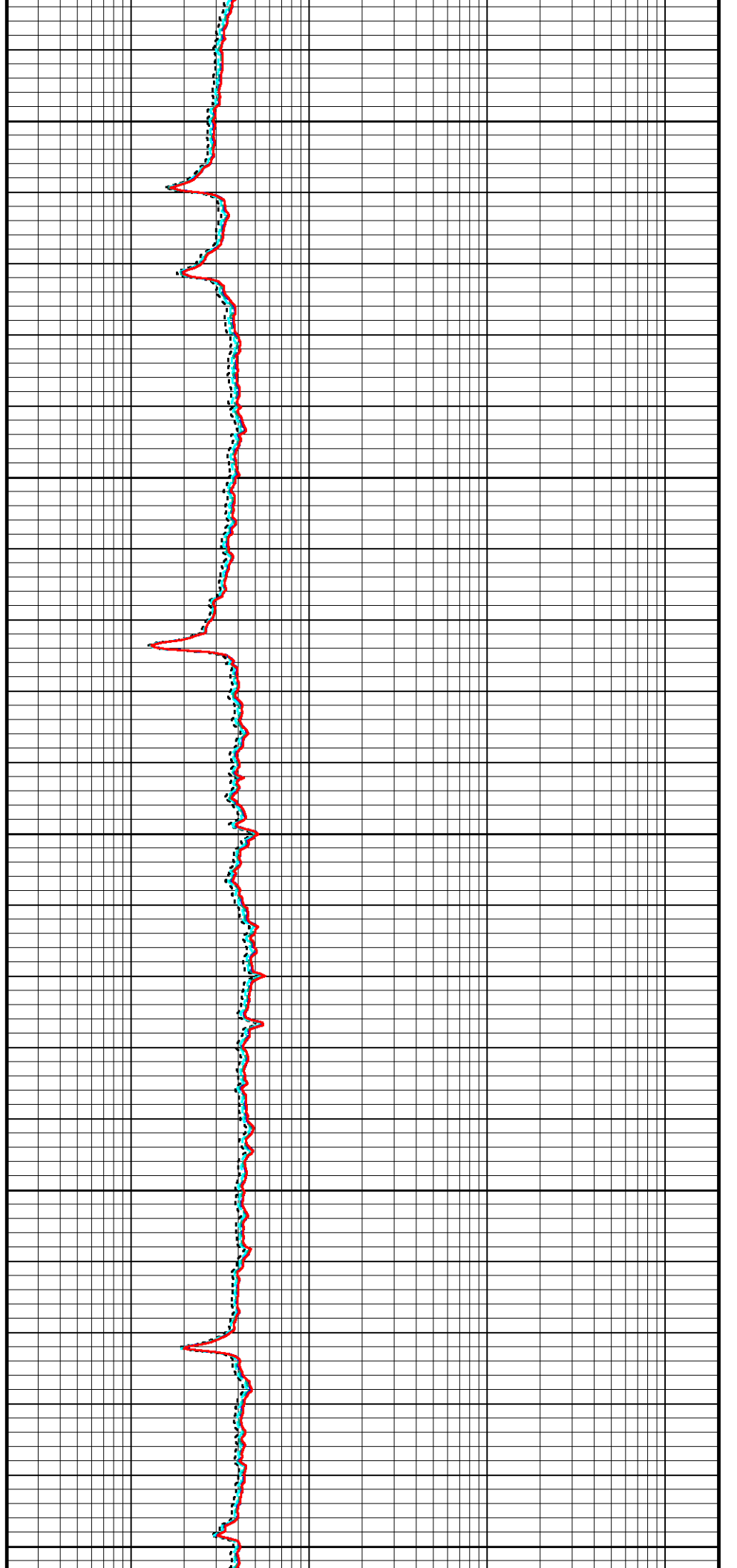
2500

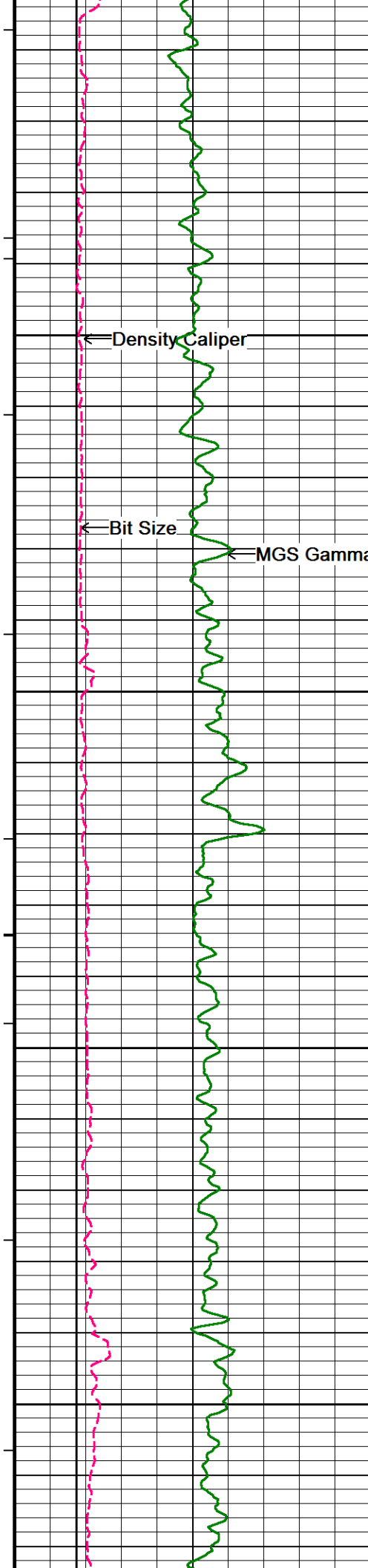
126°

2550

126°

2600





127°

2650

127°

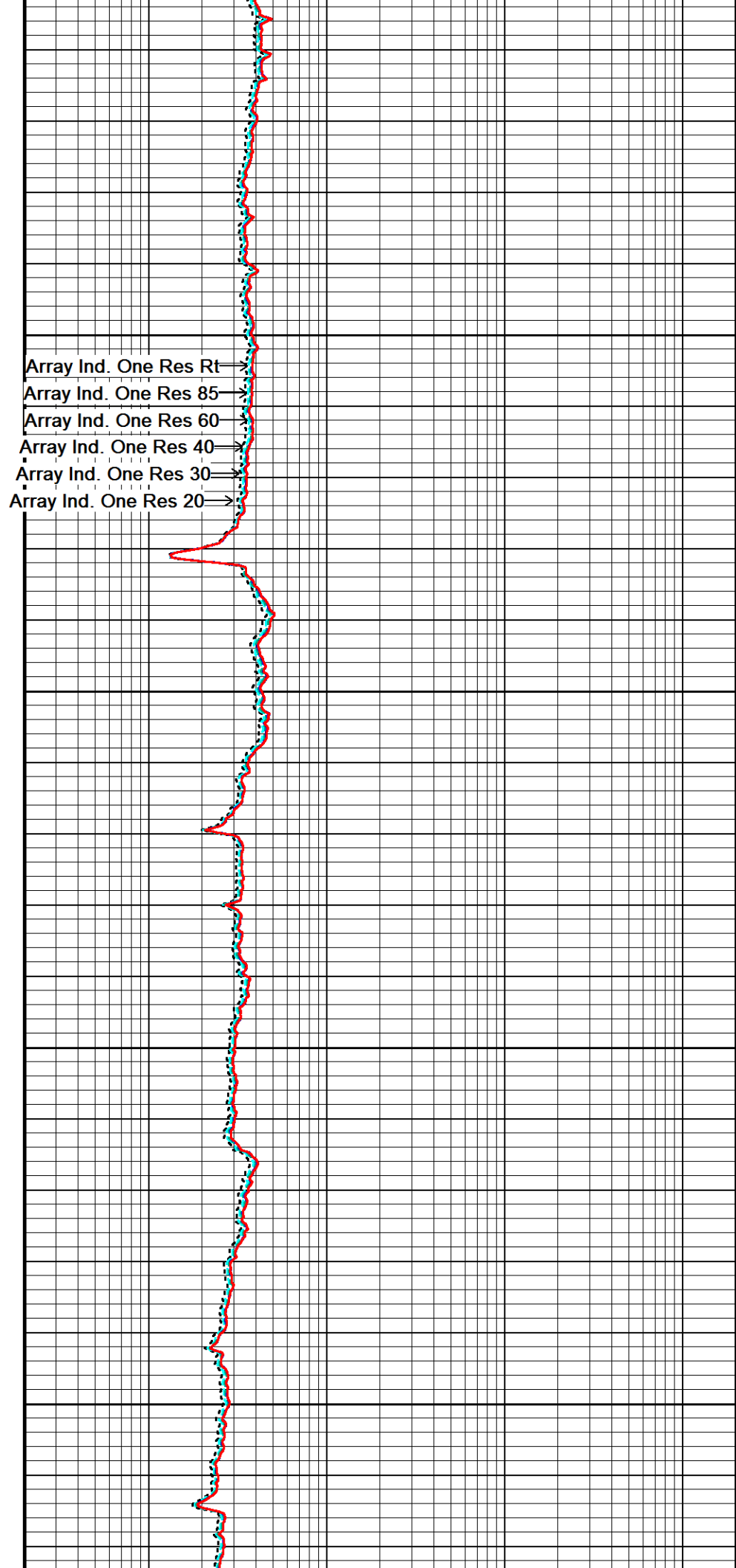
2700

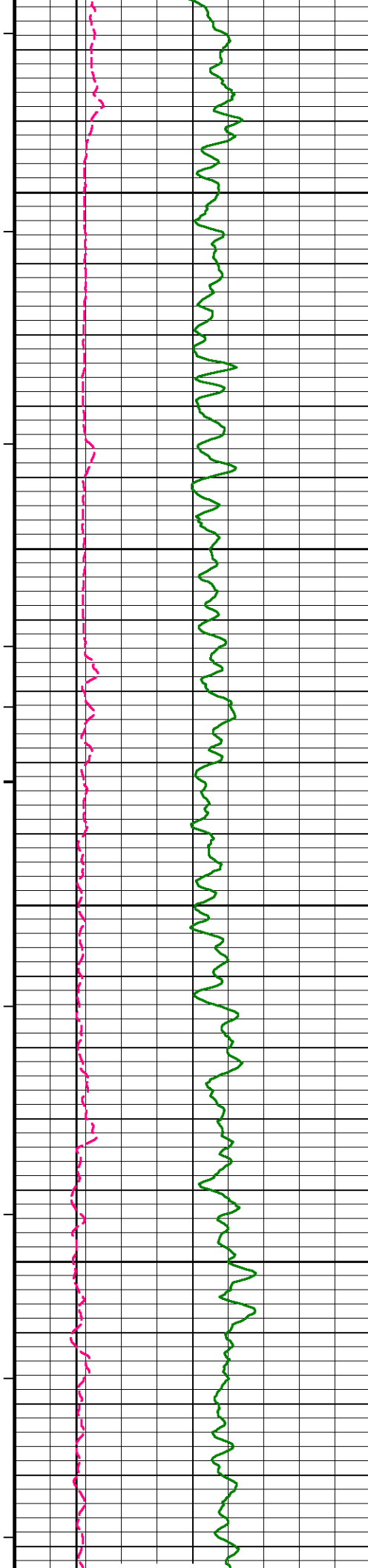
128°

2750

129°

2800





129°

2850

130°

2900

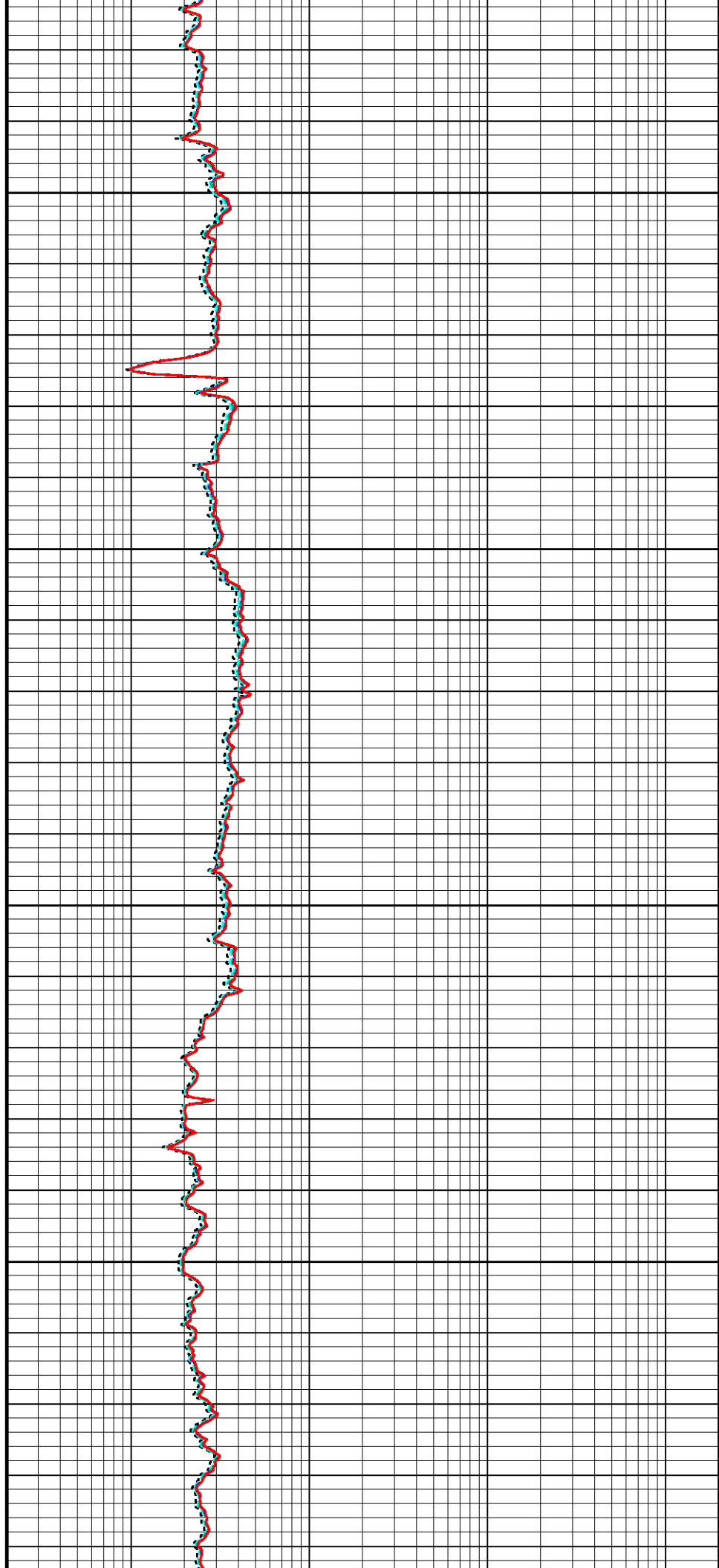
131°

2950

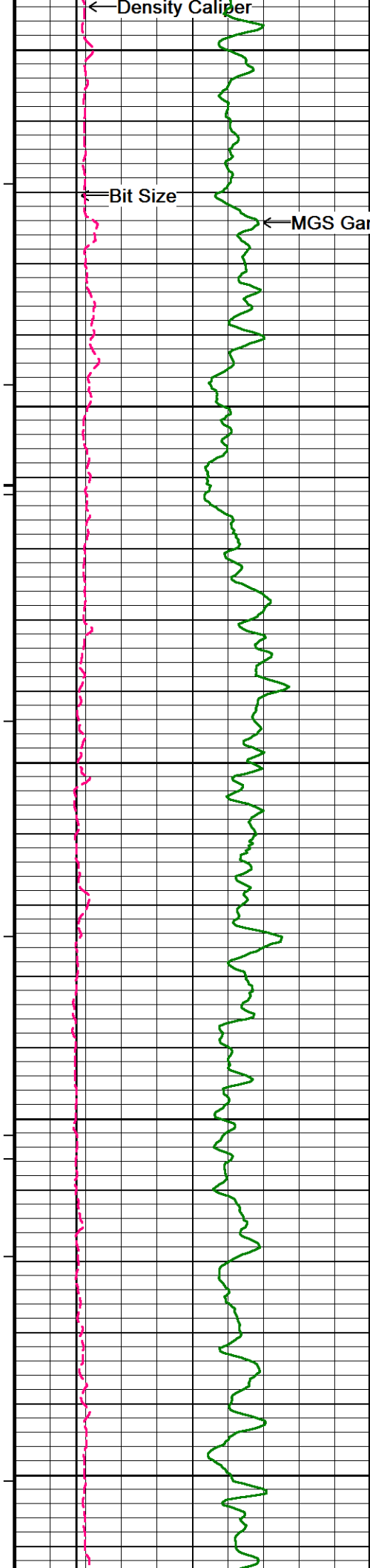
131°

3000

132°







Array Ind. One Res Rt  
3050  
Array Ind. One Res 85  
Array Ind. One Res 60  
Array Ind. One Res 40  
Array Ind. One Res 30  
Array Ind. One Res 20

132°

3100

133°

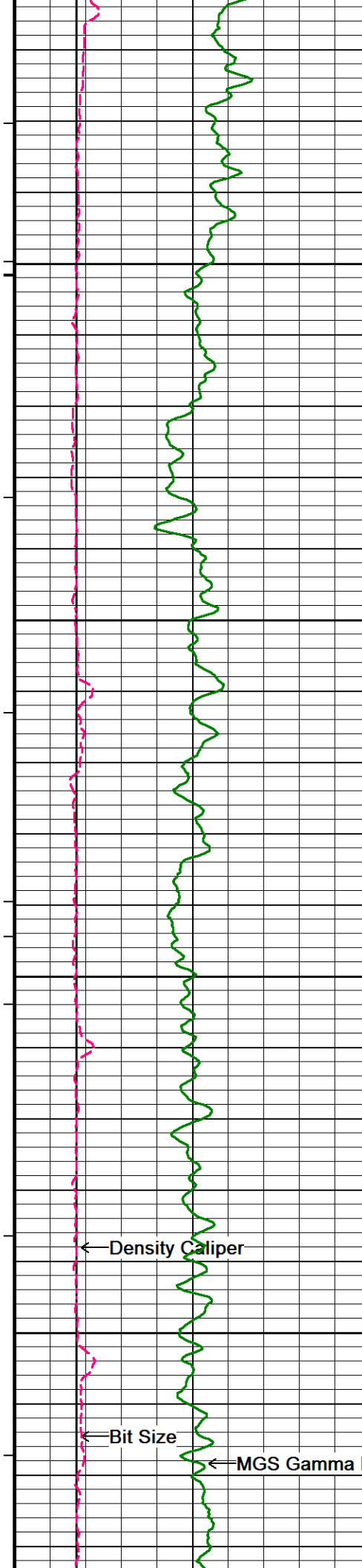
3150

133°

3200

134°

3250



134°

3300

135°

3350

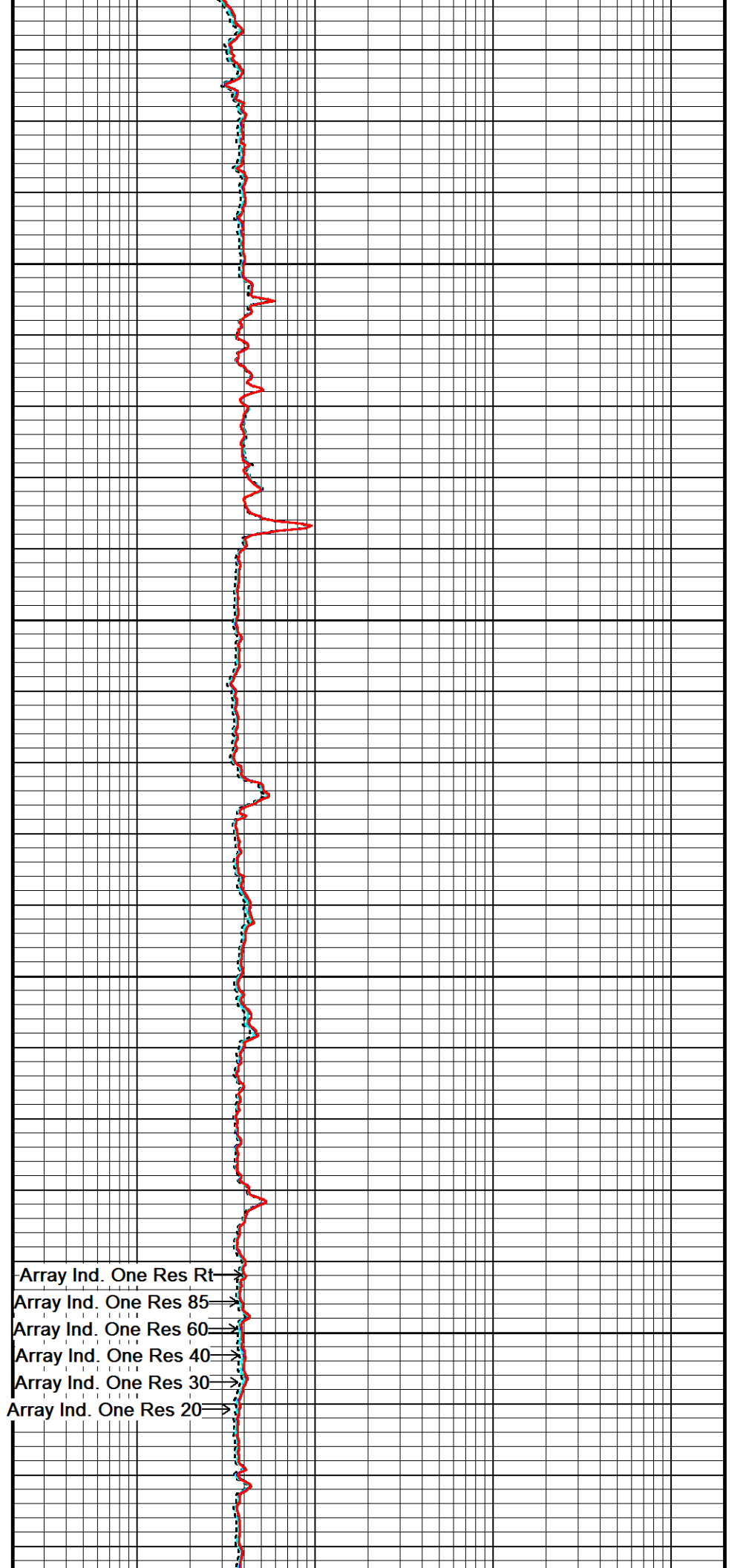
135°

3400

← Density Caliper

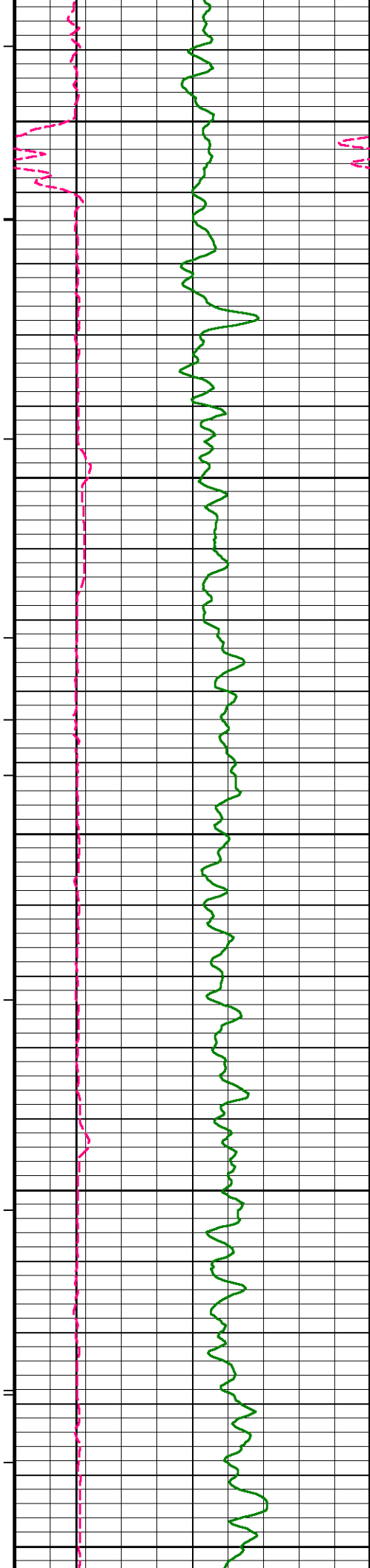
← Bit Size

← MGS Gamma Ray



Array Ind. One Res Rt  
Array Ind. One Res 85  
Array Ind. One Res 60  
Array Ind. One Res 40  
Array Ind. One Res 30  
Array Ind. One Res 20

3450



136°

3500

136°

3550

137°

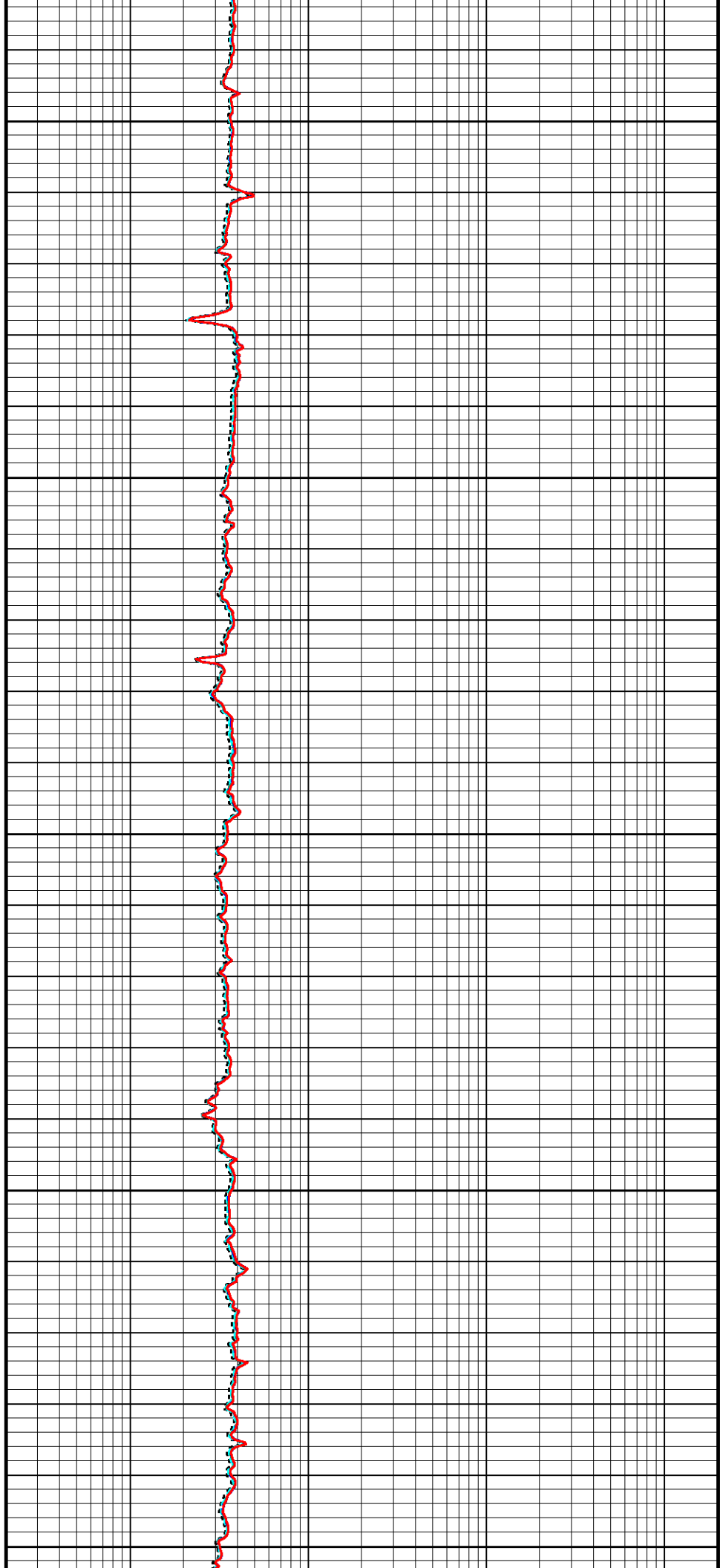
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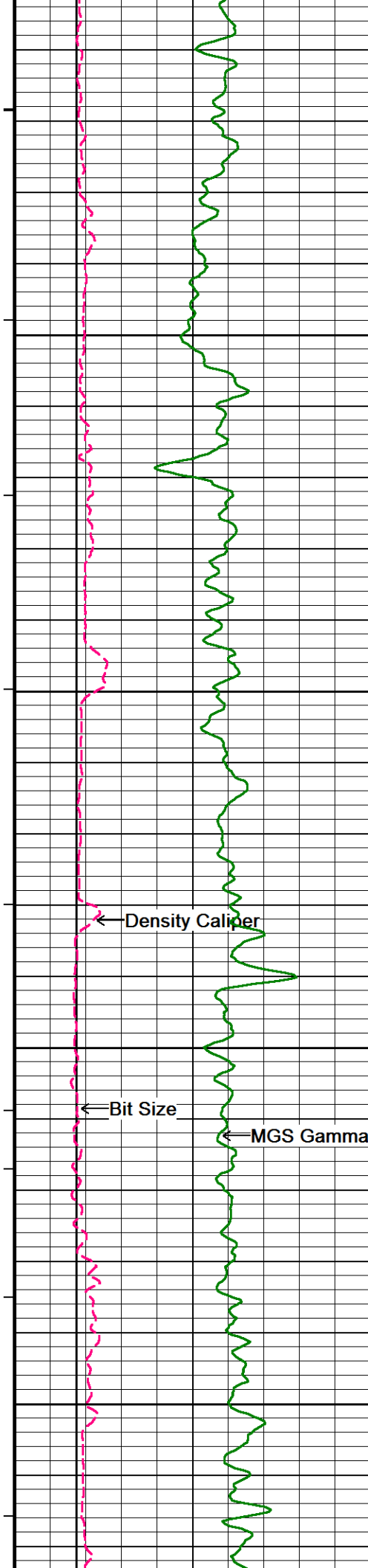
138°

3650

138°

3700





139°

3750

139°

3800

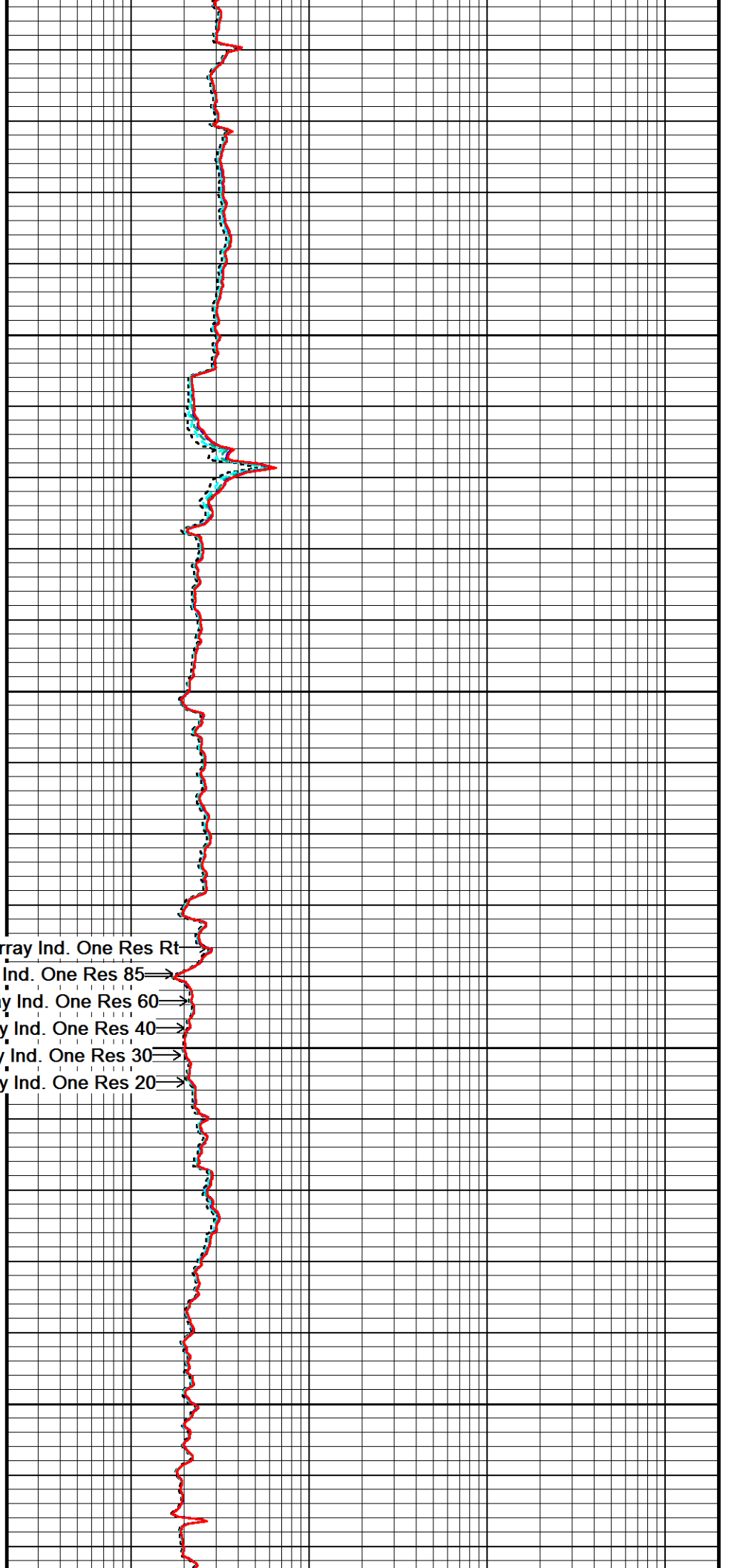
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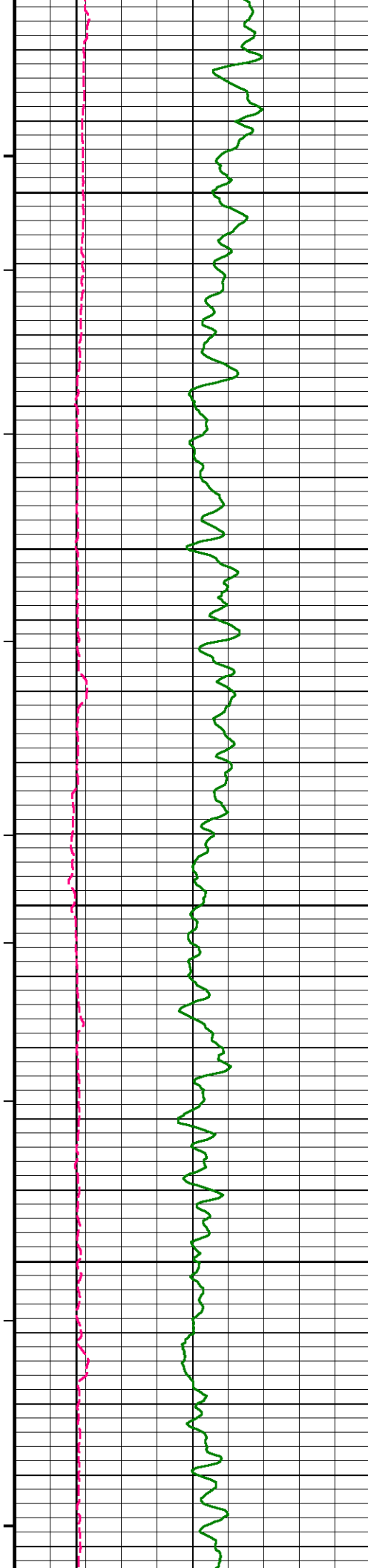
3850

140°

3900

- Array Ind. One Res Rt
- Array Ind. One Res 85
- Array Ind. One Res 60
- Array Ind. One Res 40
- Array Ind. One Res 30
- Array Ind. One Res 20





140°

3950

140°

4000

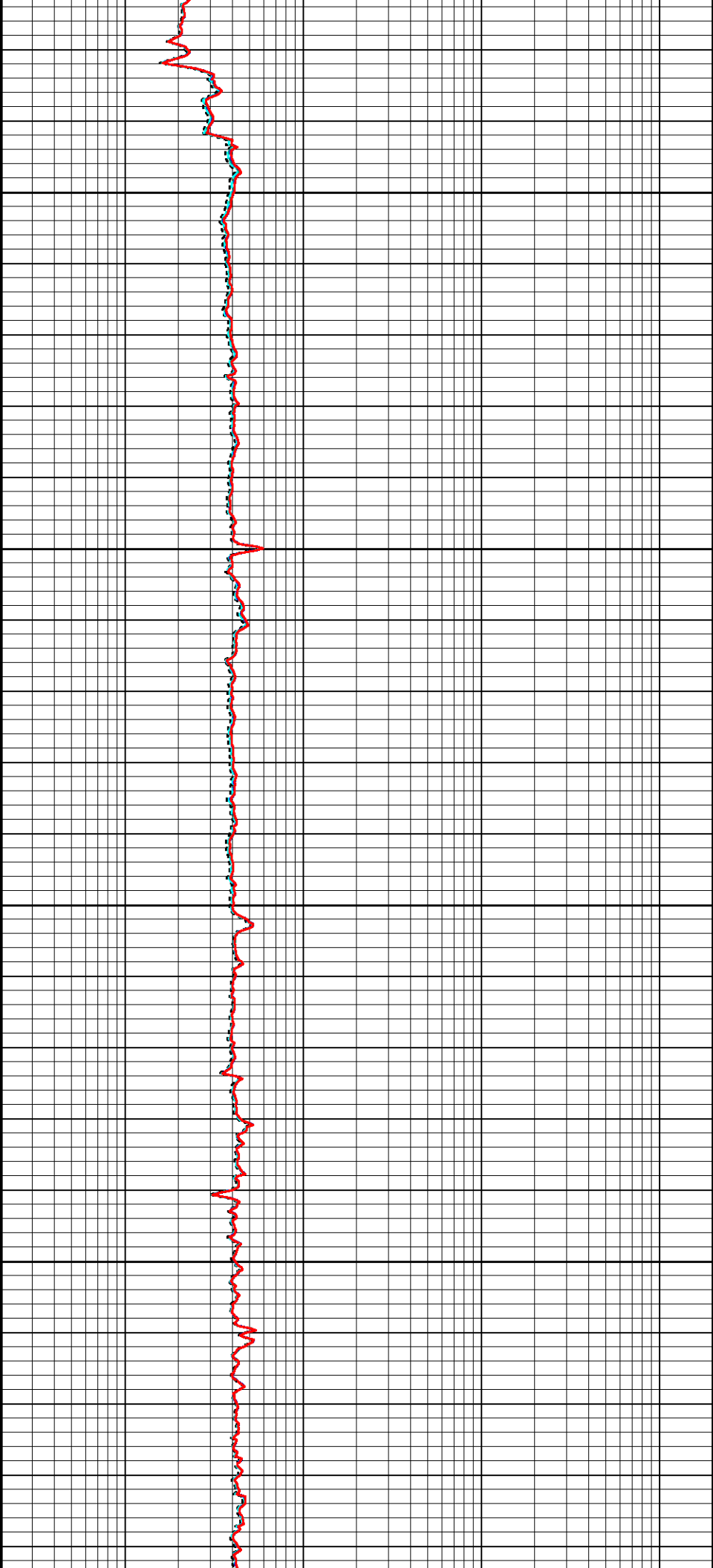
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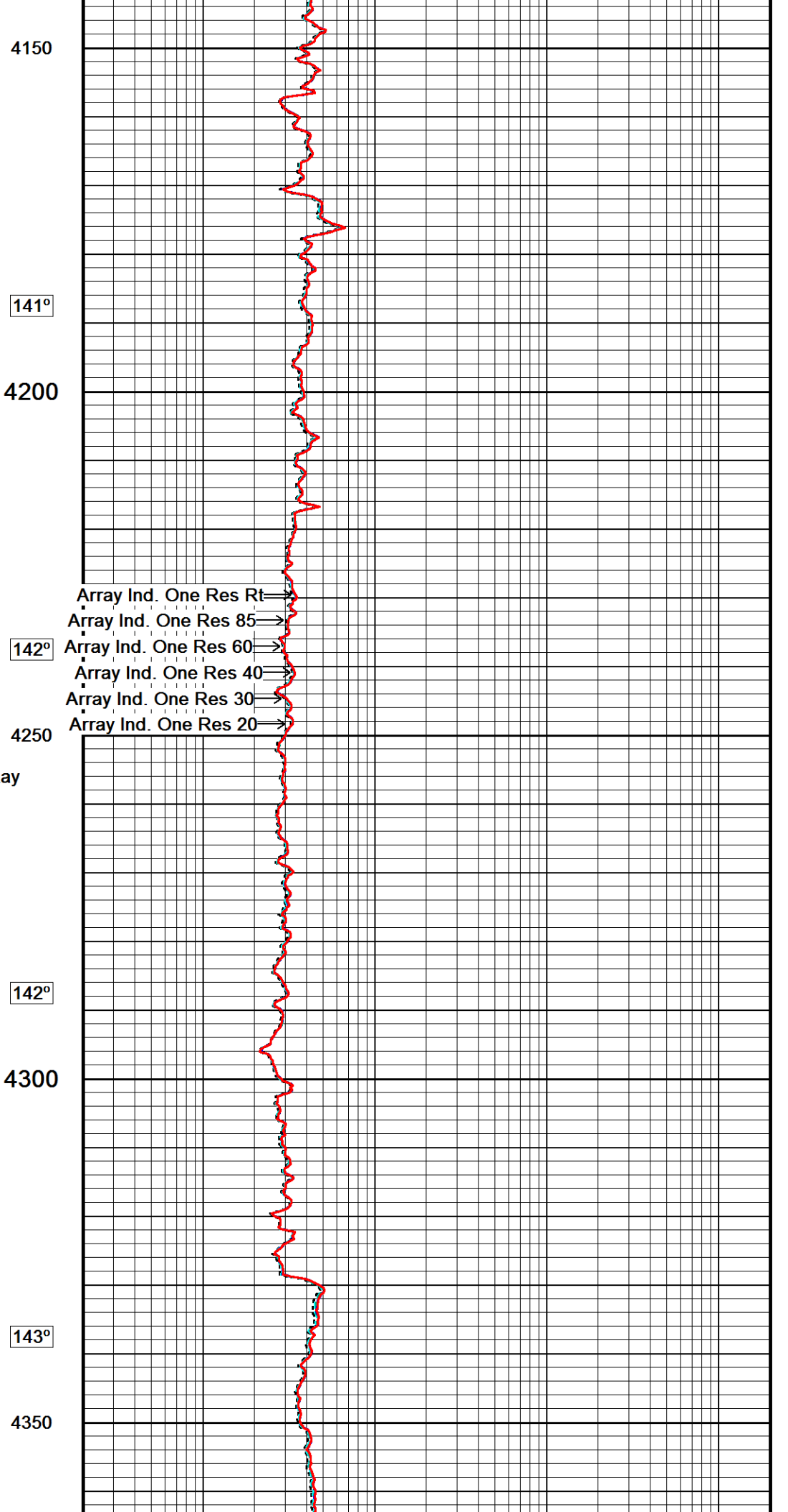
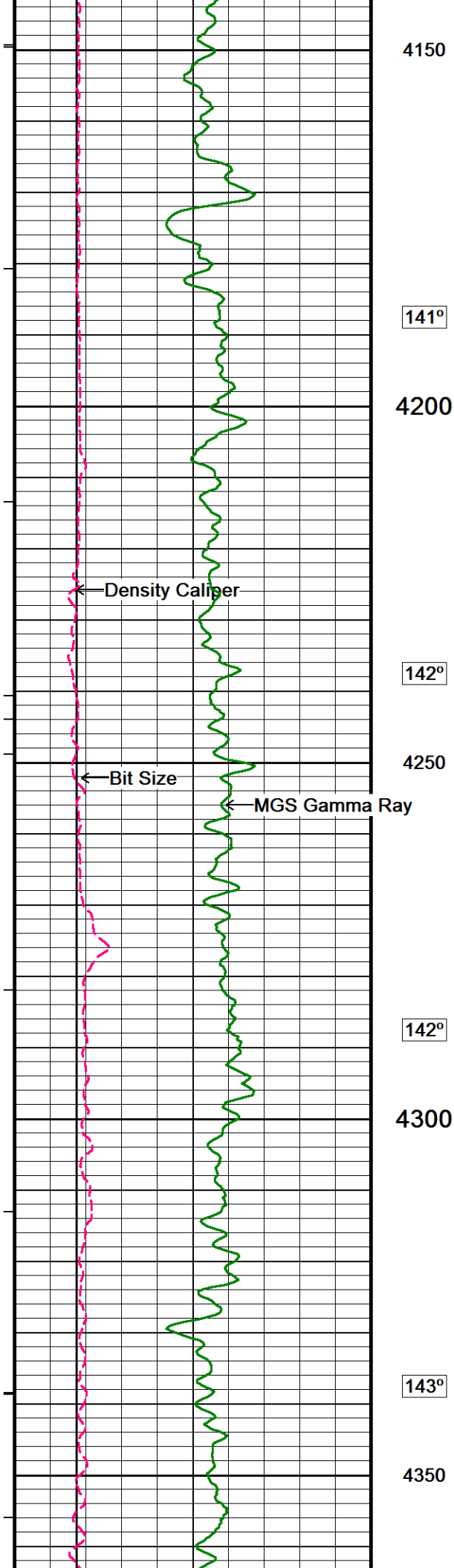
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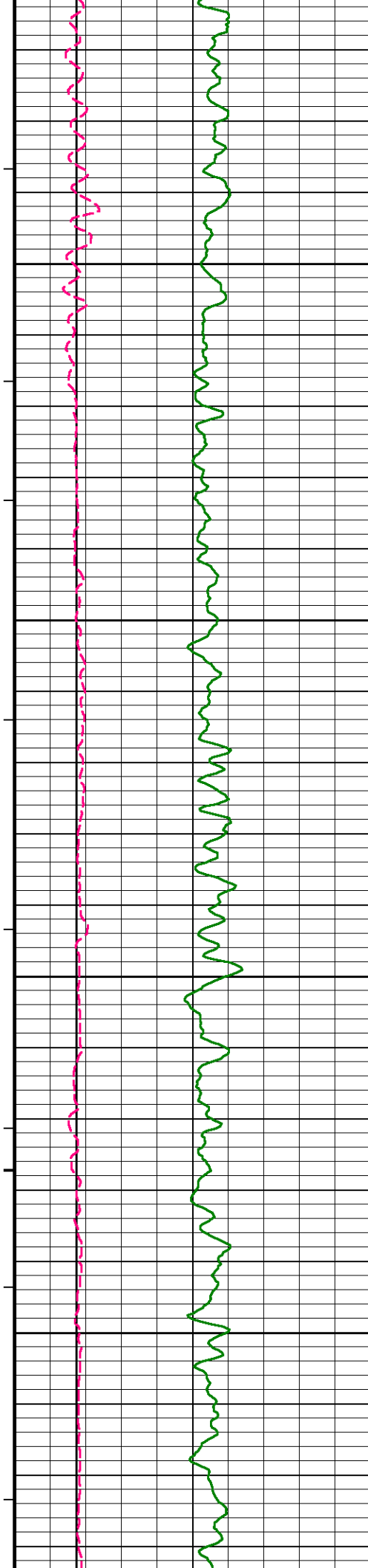
141°

4100

141°







143°

4400

143°

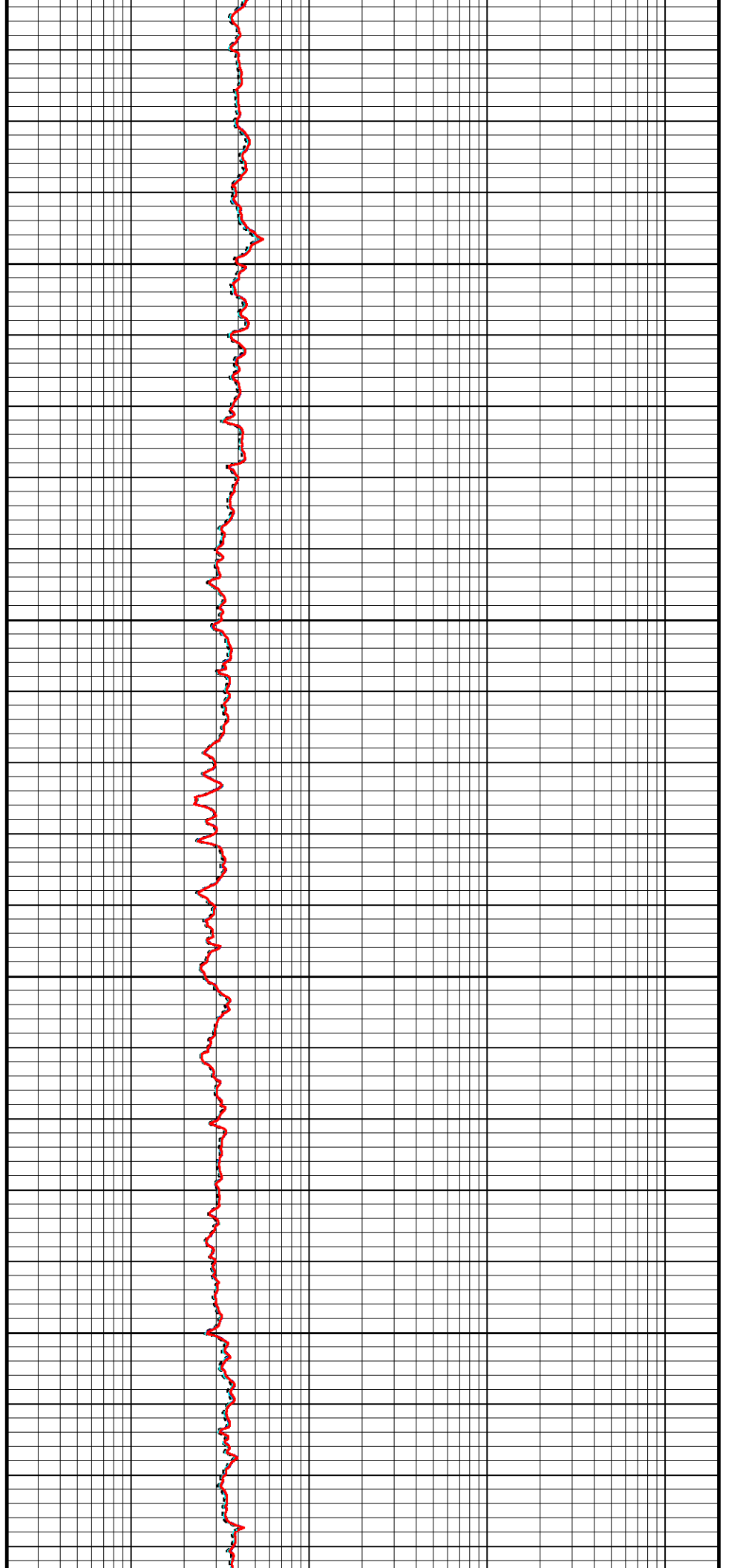
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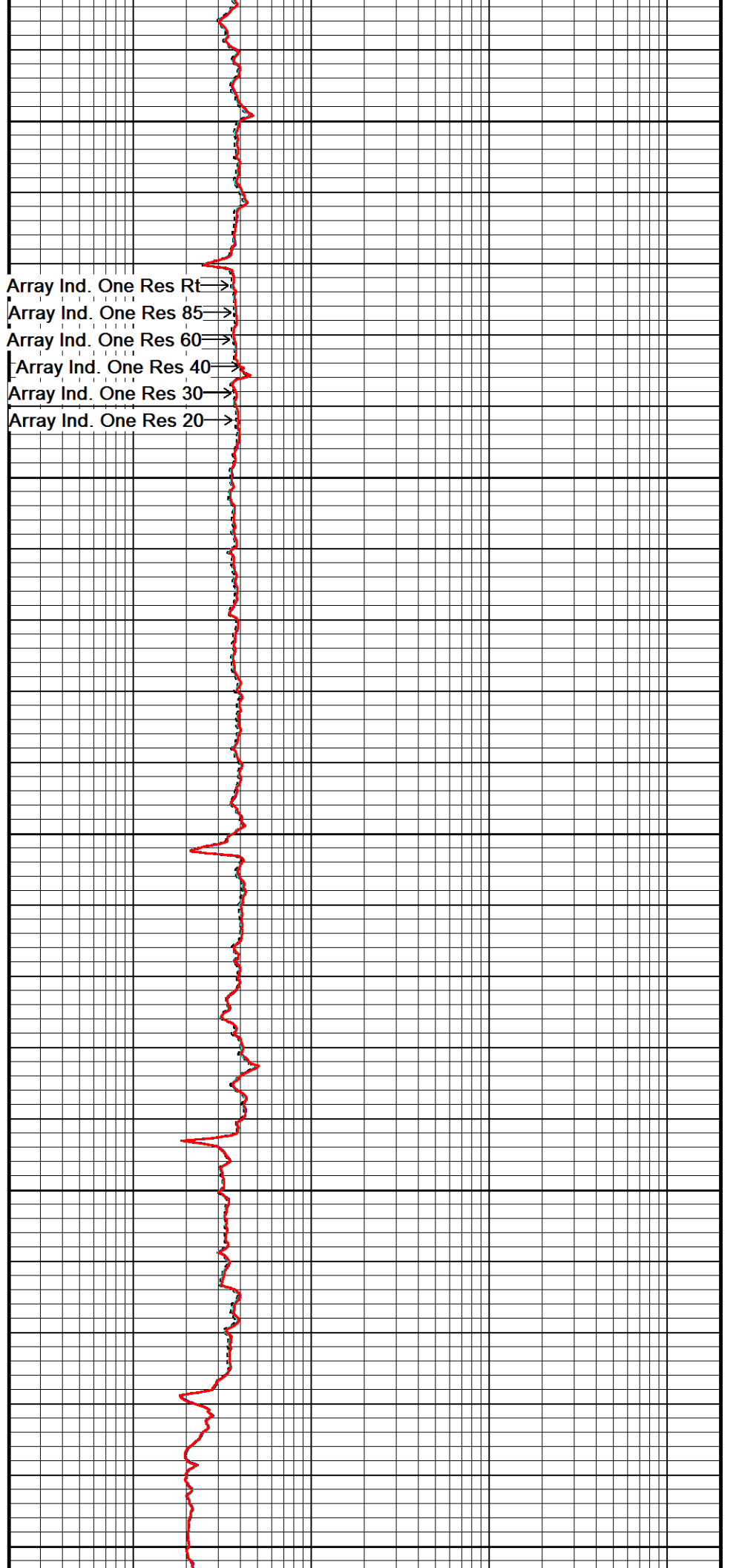
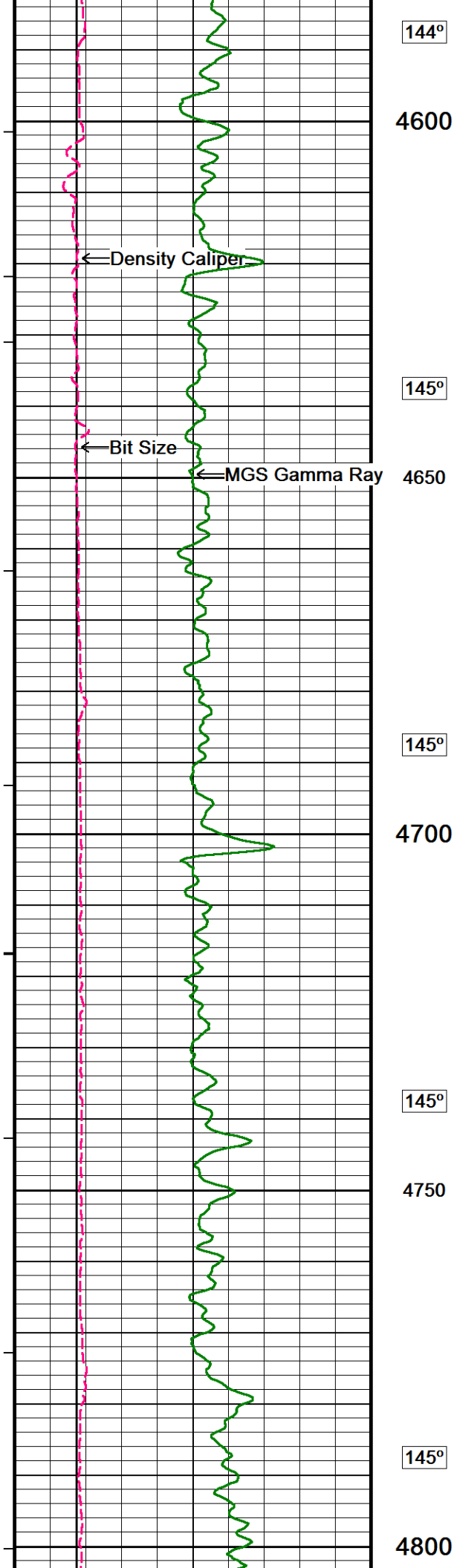
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4500

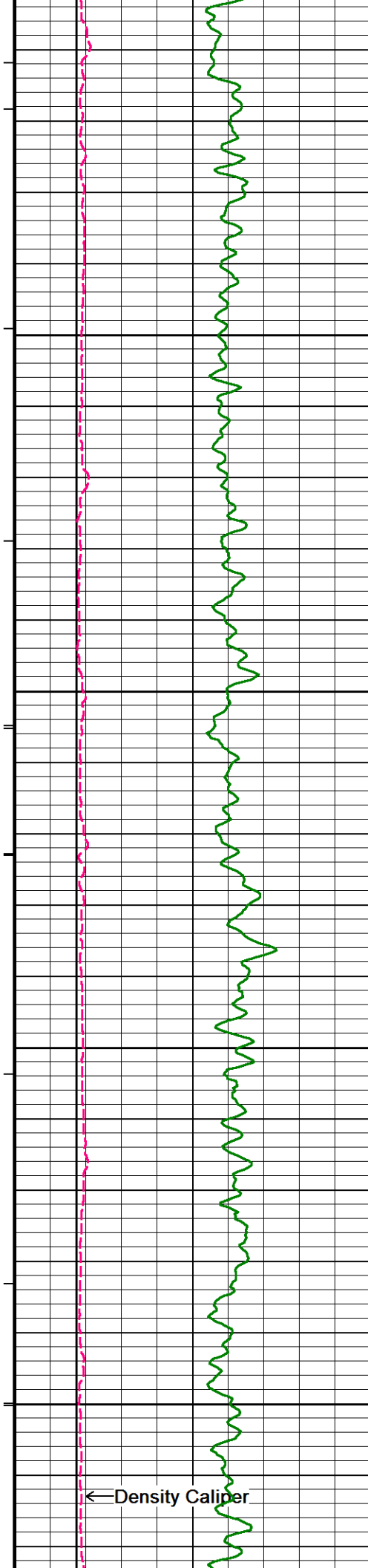
144°

4550









145°

4850

146°

4900

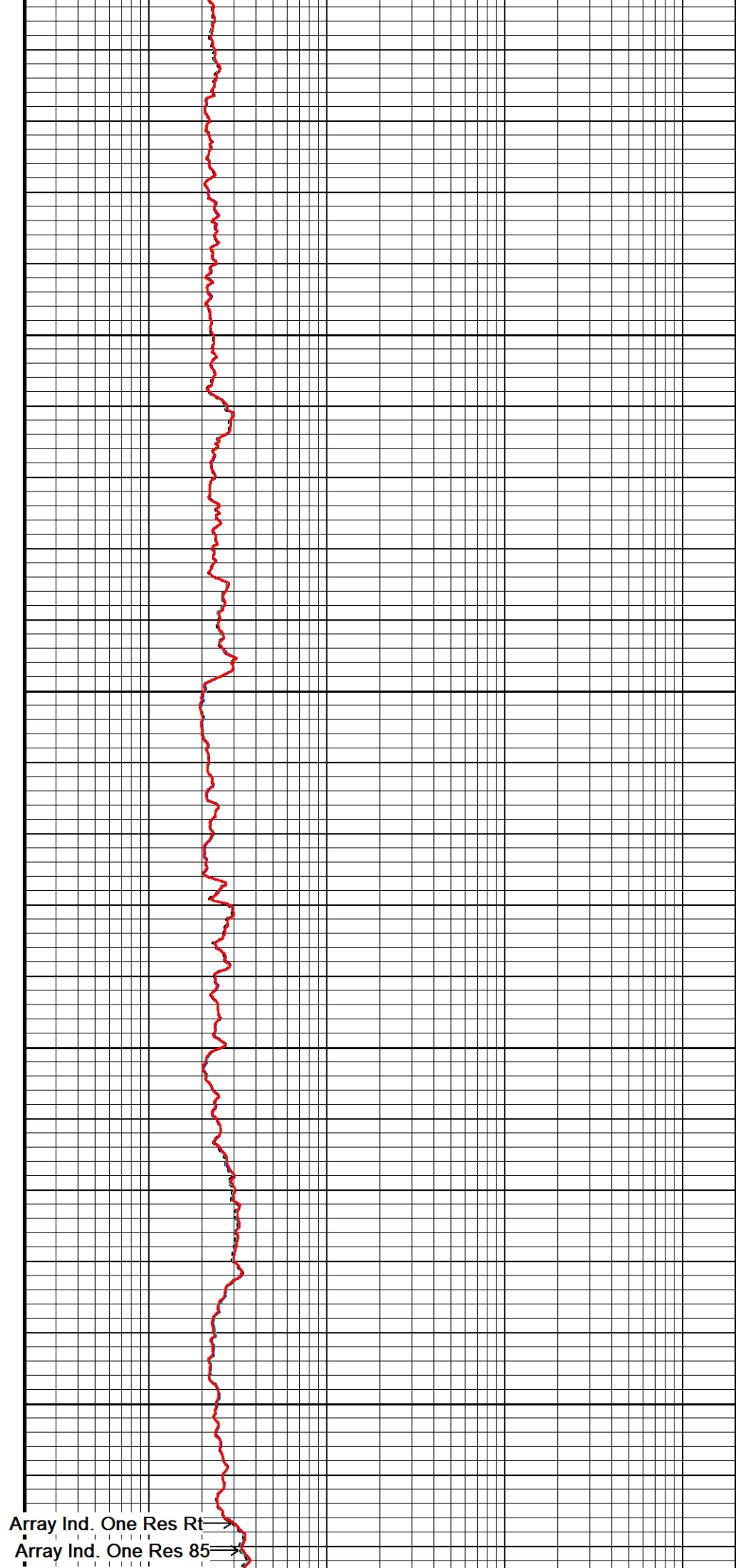
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4950

146°

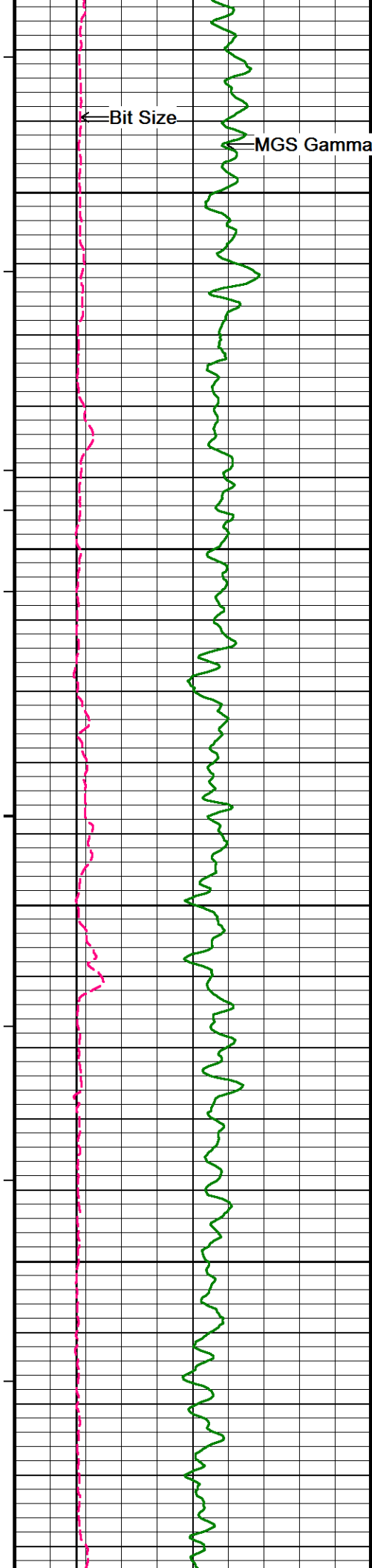
5000

← Density Caliper



Array Ind. One Res Rt →

Array Ind. One Res 85 →



146°

5050

146°

5100

146°

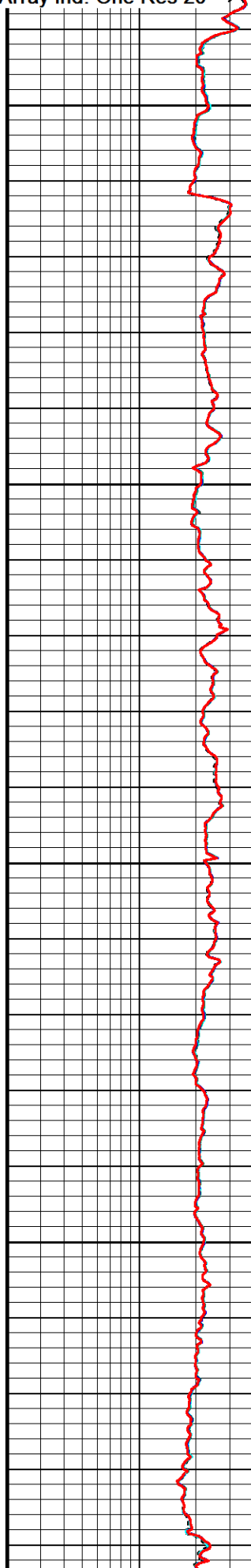
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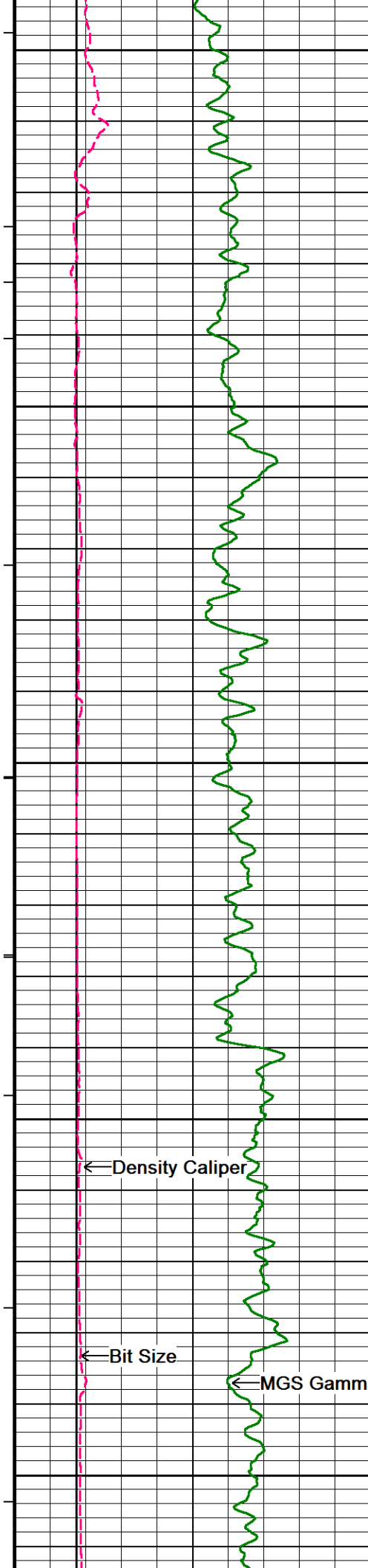
146°

5200

145°

Array Ind. One Res 60 →  
Array Ind. One Res 40 →  
Array Ind. One Res 30 →  
Array Ind. One Res 20 →





5250

145°

5300

145°

5350

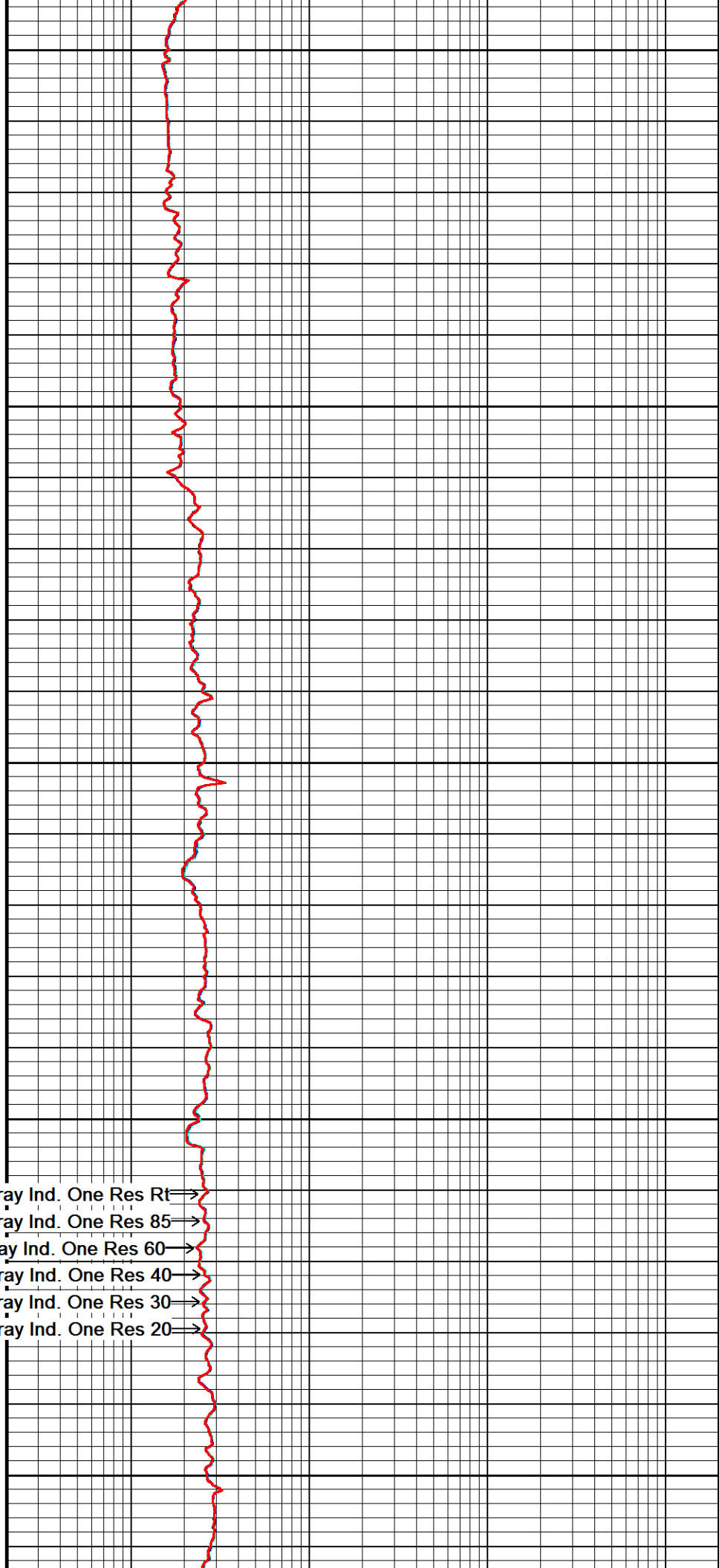
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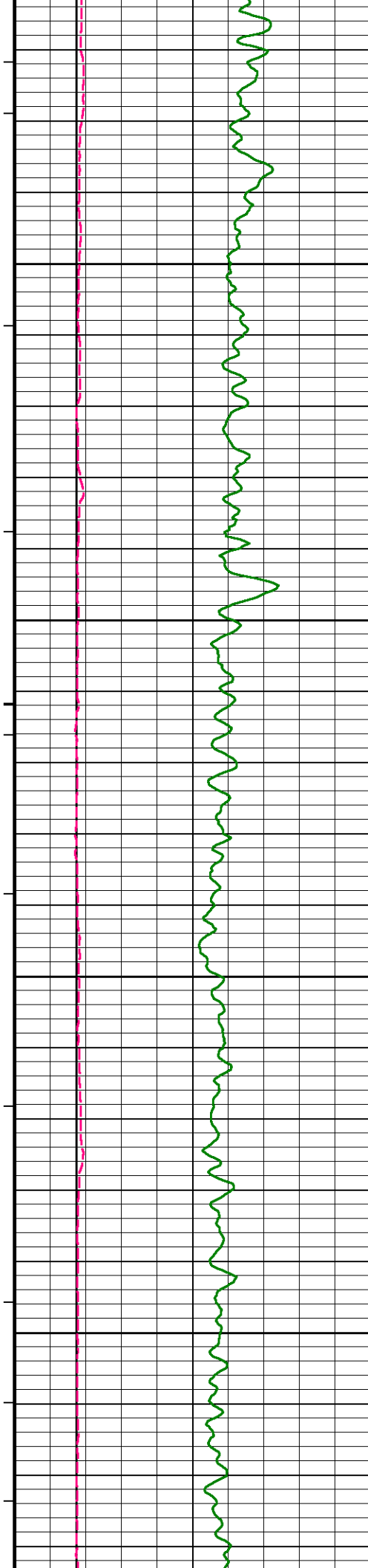
5400

145°

5450

Array Ind. One Res Rt  
Array Ind. One Res 85  
Array Ind. One Res 60  
Array Ind. One Res 40  
Array Ind. One Res 30  
Array Ind. One Res 20





145°

5500

145°

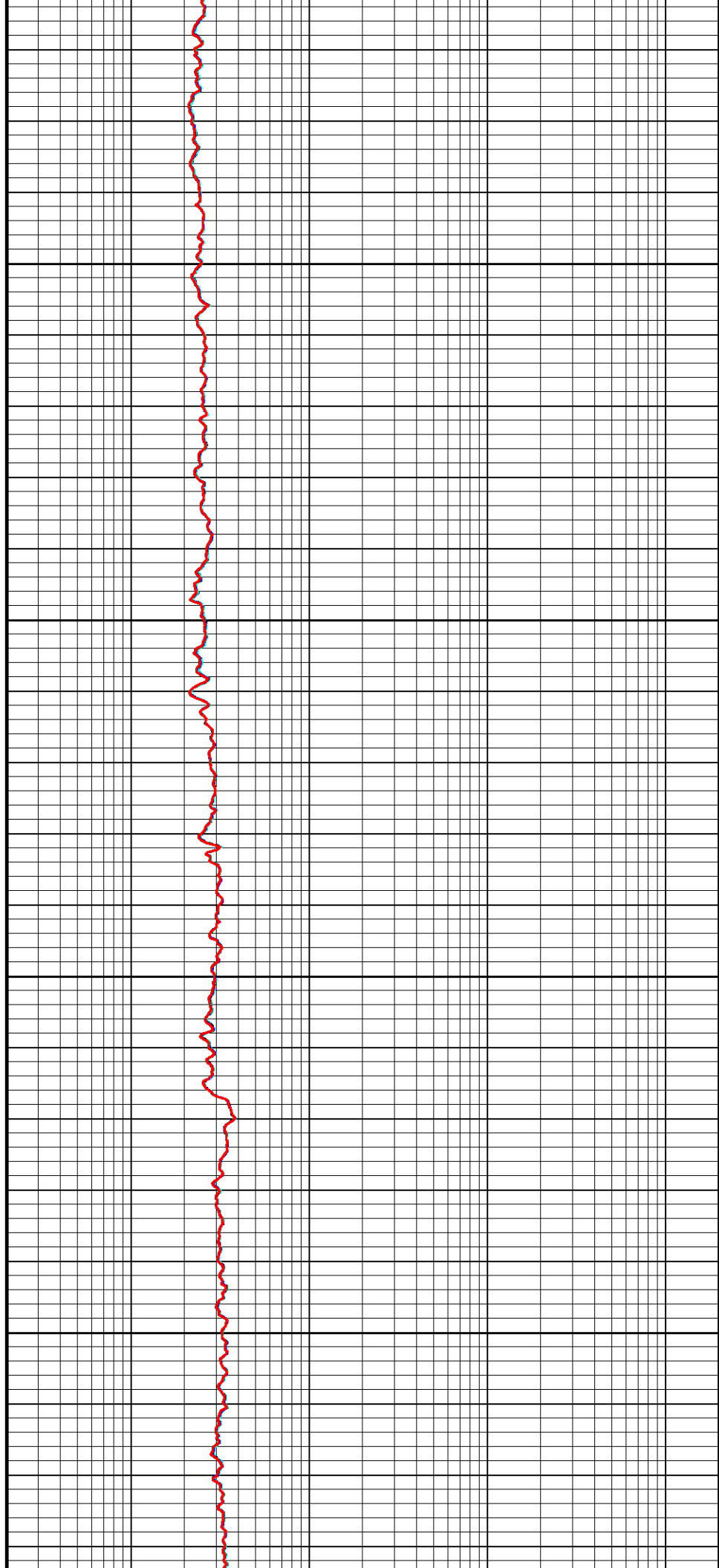
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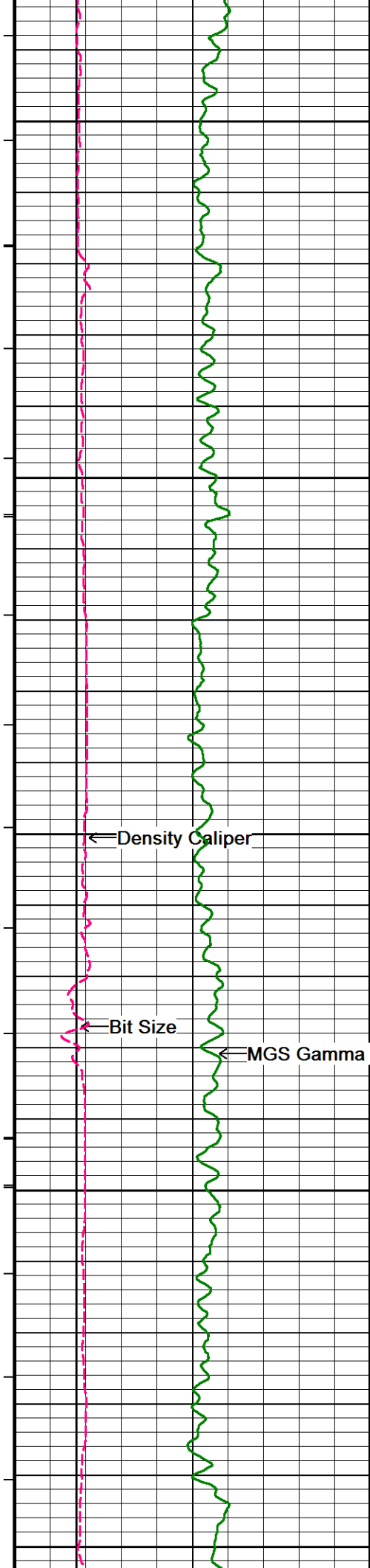
145°

5600

145°

5650





145°

5700

146°

5750

146°

5800

Array Ind. One Res Rt→

Array Ind. One Res 85→

Array Ind. One Res 60→

Array Ind. One Res 40→

Array Ind. One Res 30→

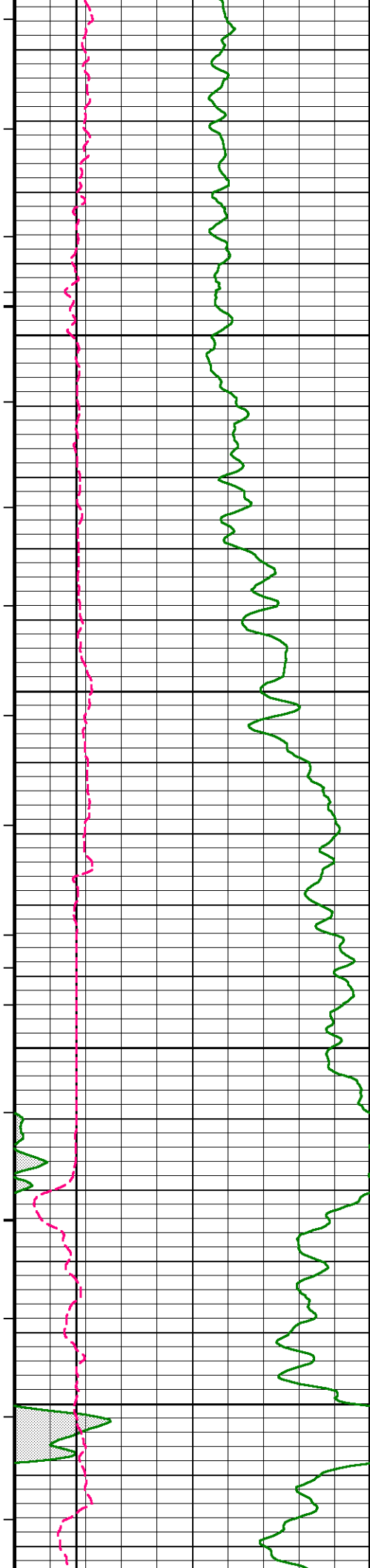
Array Ind. One Res 20→

147°

5850

147°

5900



148°

5950

148°

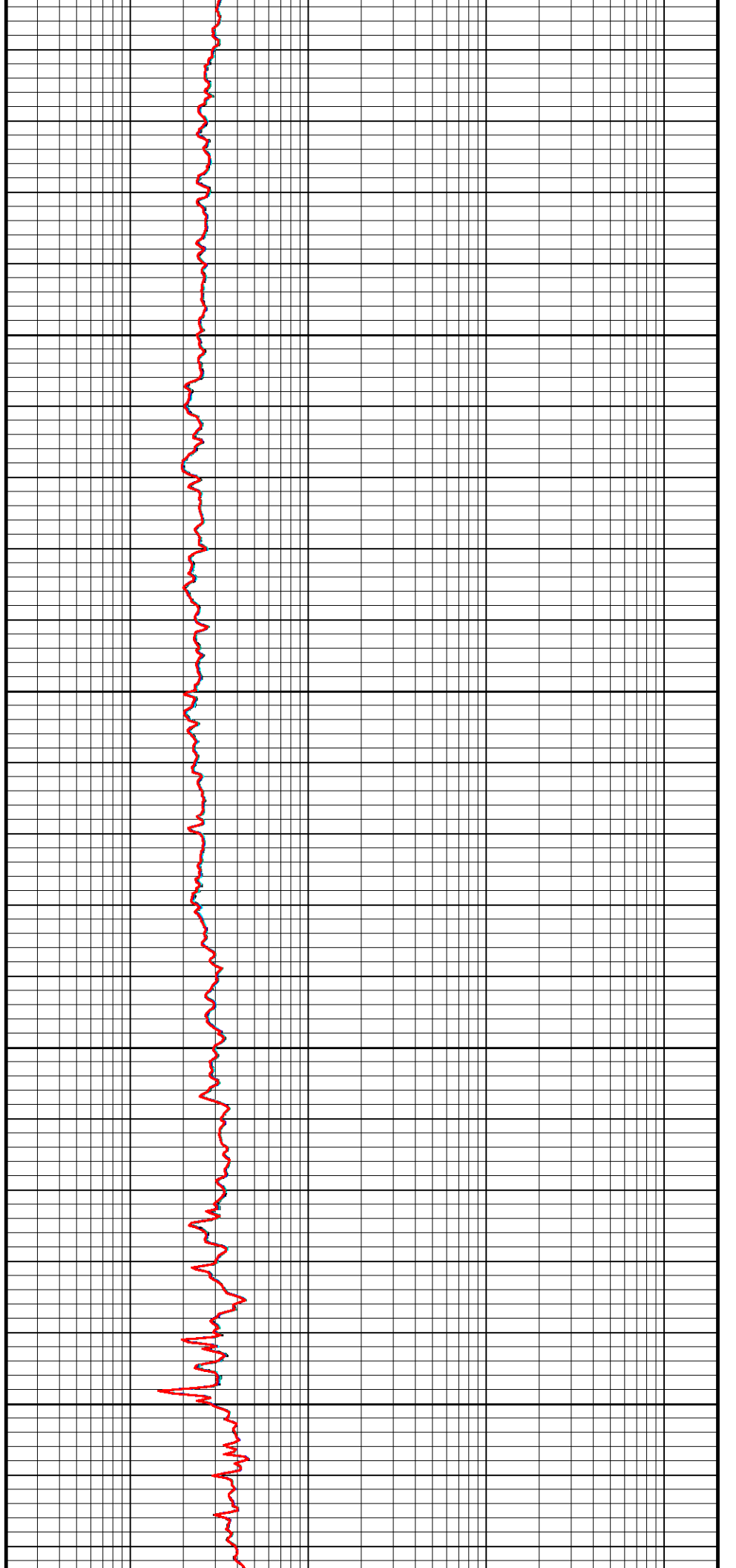
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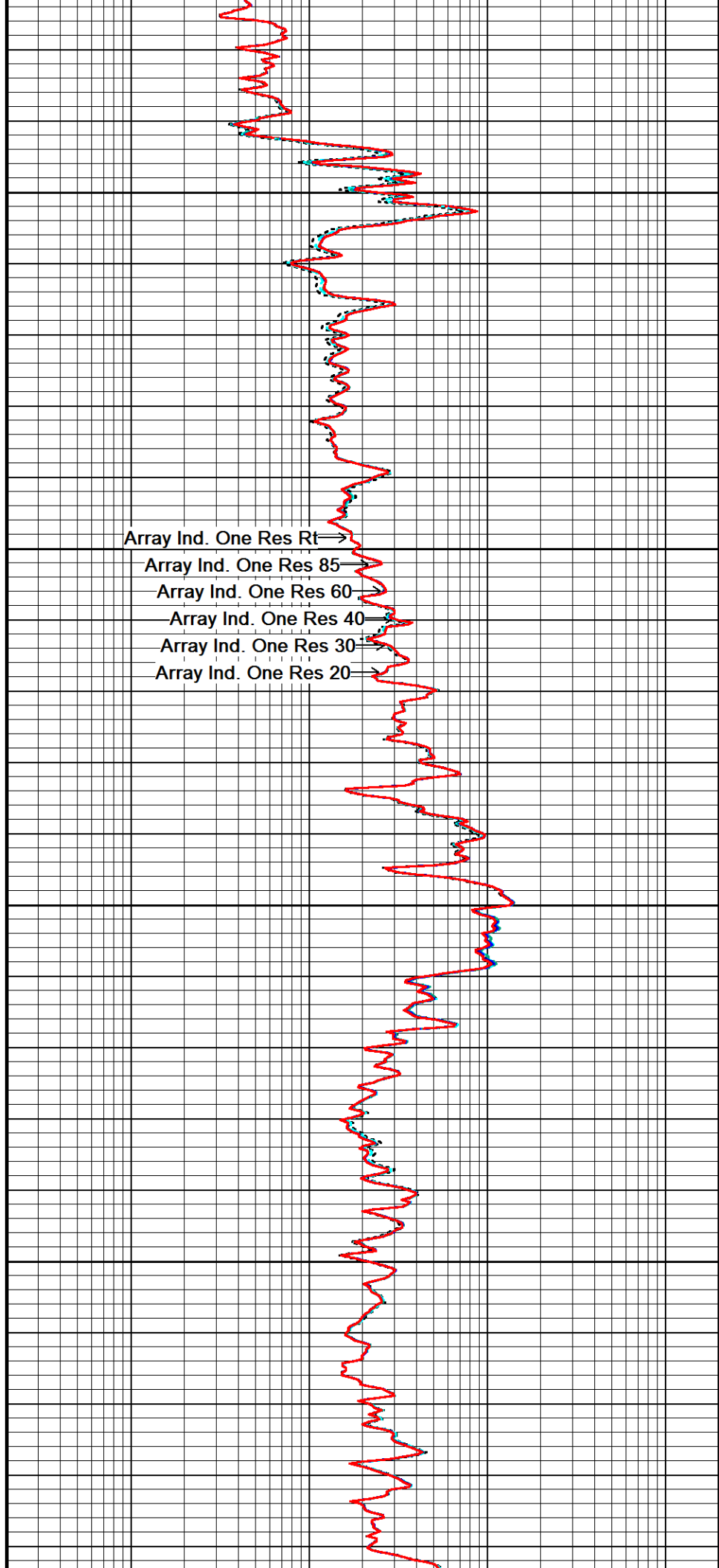
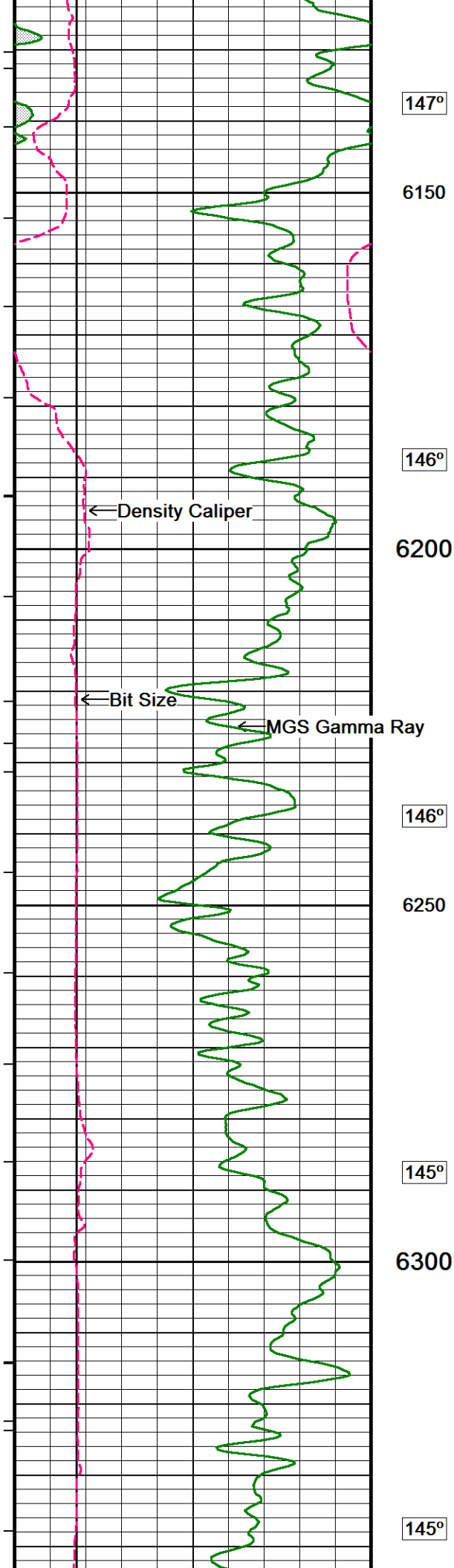
149°

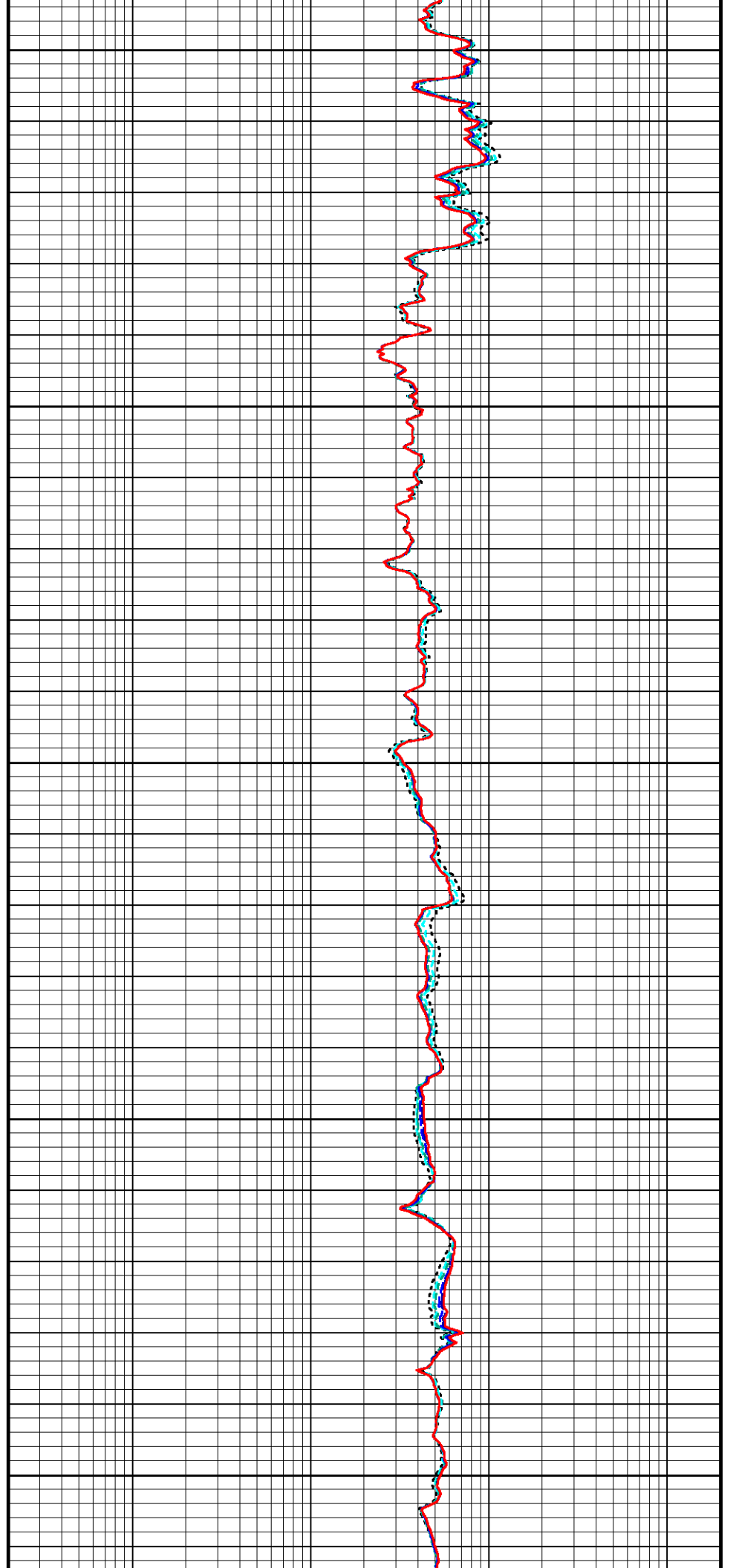
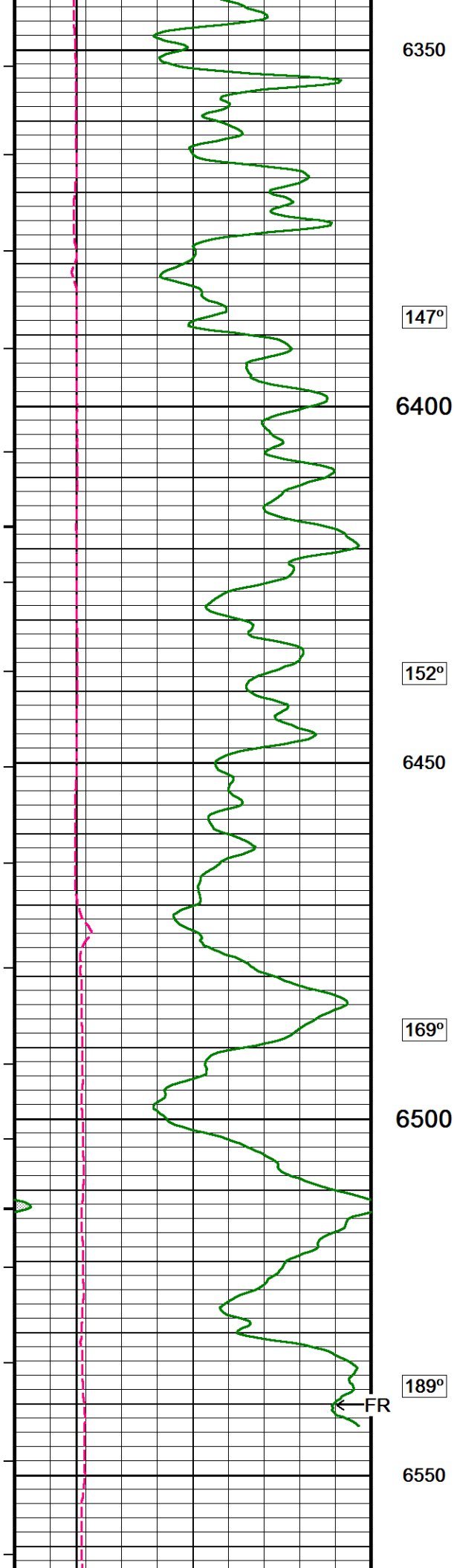
6050

146°

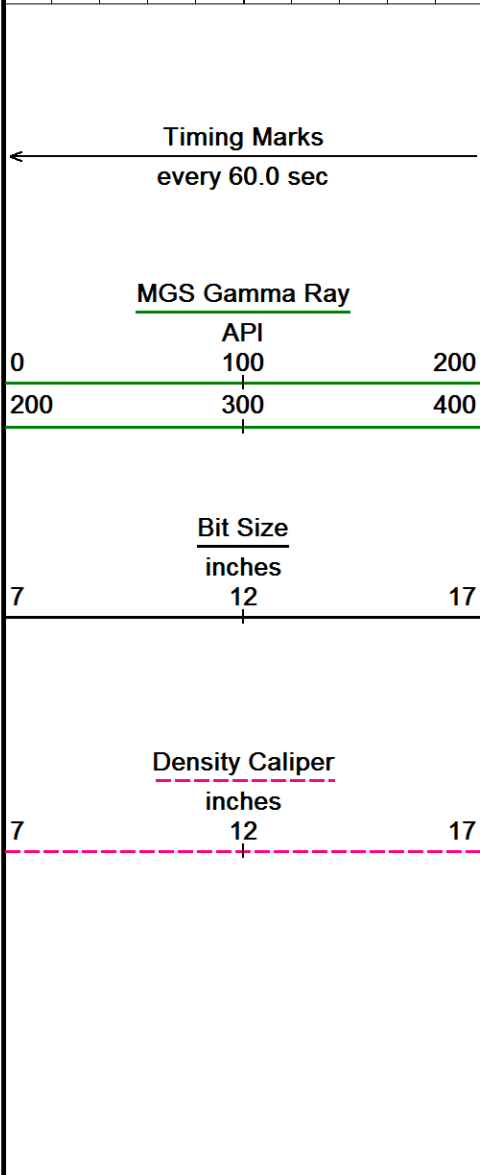
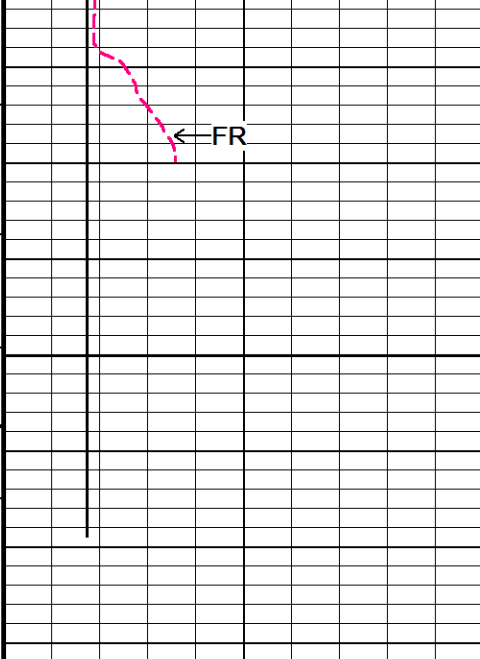
6100









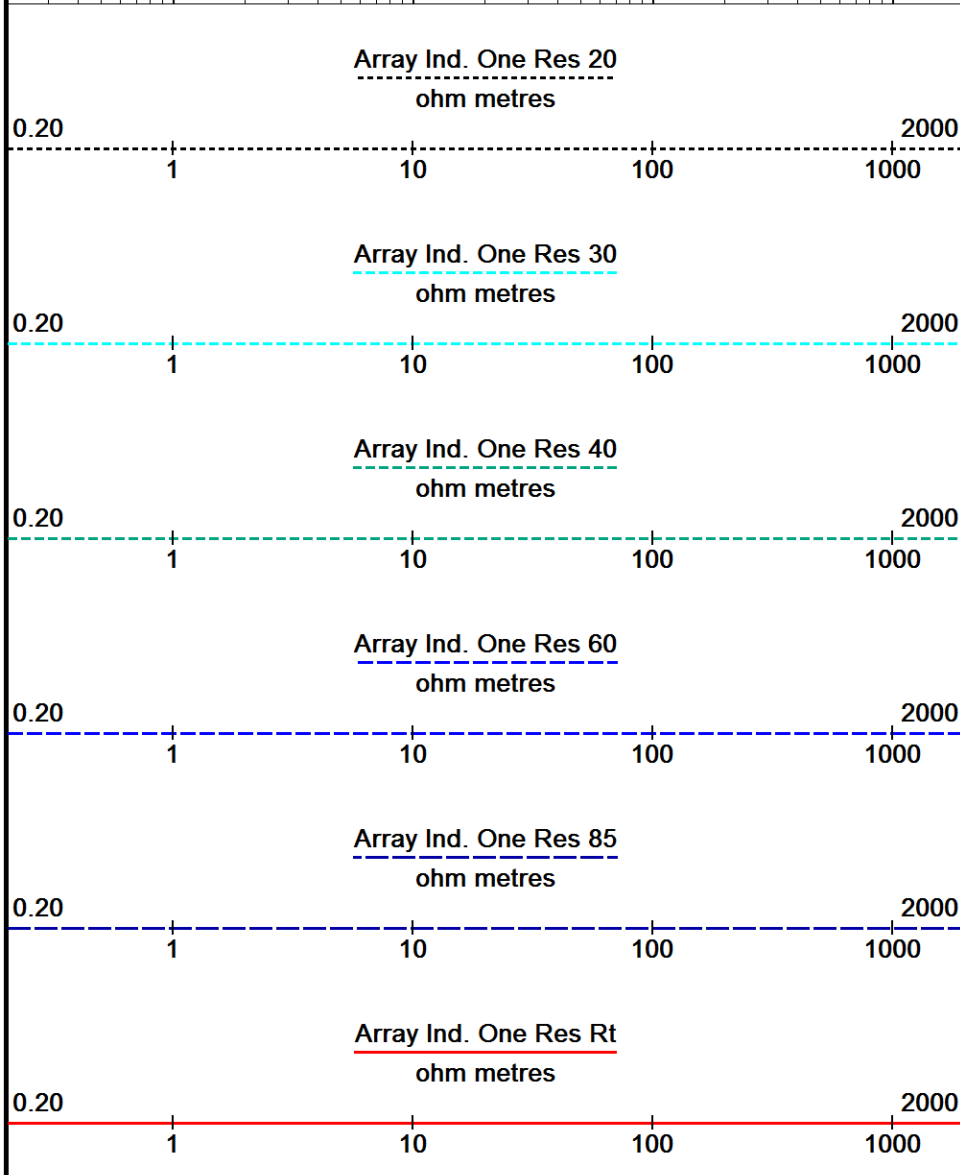
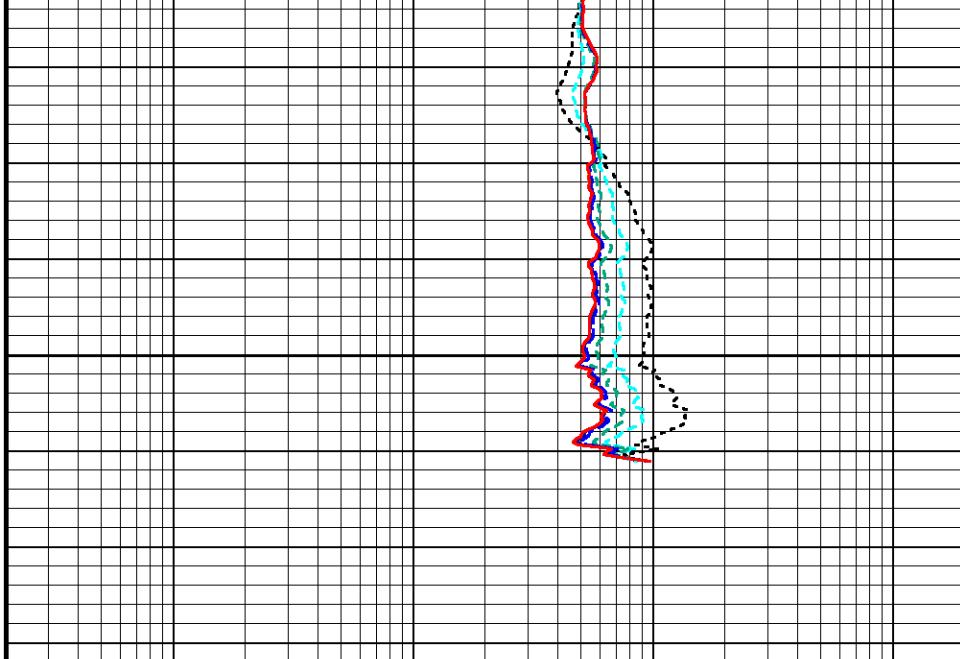


6600

Depth  
In  
Feet

Borehole  
Temp in  
deg F

Replay  
Scale  
1:240



Depth Based Data - Maximum Sampling Increment 10.0cm  
Filename: C:\Logs\BBC Anschutz Equus Fa...Anschutz Equus Farms 4-62-9-4956C2\_MMS Depth1.dta  
System Versions: Logged with 15.03.5939 Processed with 15.03.5939 Plotted with 15.03.5939  
Plotted on 19-DEC-2015 21:40  
Recorded on 18-DEC-2015 01:40

↑ 5 INCH MAIN LOG ↑

BEFORE SURVEY CALIBRATION

C:\Logs\BBC Anschutz Equus Farms 4-62-9-4956C2\New Folder\Anschutz Equus Farms 4-62-9-4956C2\_MMS Depth1.dta

## General Constants All 000

Last Edited on 18-DEC-2015,01:38

## General Parameters

Mud Resistivity	2.680	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	7.000	inches
Caliper for Differential Caliper	Density Caliper	

## Rwa Parameters

Porosity used	Base Density Porosity	
Resistivity used	Array Ind. Two Res Rt	
RWA Constant A	0.610	
RWA Constant M	2.150	
SW/APOR Tool Source	0.000	

## MMS Parameters MMS-F.A 249

Last Edited on 17-DEC-2015 05:09

## Logging Parameters

Firmware Version	2v59	
Caliper Open On	MAI	
Caliper Open Delay		minutes
Caliper Closed On	Unknown	
Caliper Closed Delay	N/A	minutes
Sample Rate	0.50	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	0.0	

## Release Parameters

Pulse Duration Base Level	10.0	seconds
Pulse Duration Transition Time	60.0	seconds
Pulse Duration Status Pulse From	20.0	seconds
Pulse Duration Caliper Close From	145.0	seconds
Pulse Duration Caliper Open From	150.0	seconds
Pulse Duration Release Pulse From	215.0	seconds
Pulse Duration Release Pulse To	280.0	seconds
Pulse Release Duration	240.0	seconds
Pulse Discriminator Pressure Band	96.0	seconds
Pulse Pressure Discriminator	213.0	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	80.0	seconds
Caliper Close To		seconds
Caliper Open To	210.0	seconds

## Configuration

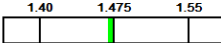
MMS,MGS,MSG,MSG,MSG,MDN,MPD,MPD,MVC,MFE,MAI

## Gamma Calibration MGS-D.A 218

Field Calibration on 17-DEC-2015 01:15

	Measured	Calibrated (API)
Background	192	131
Calibrator (Gross)	1112	757
Calibrator (Net)	920	626

## Gamma Calibration Tolerances MGS-D.A 218

Ratio 1.469  Counts/API

## Gamma Constants MGS-D.A 218

Last Edited on 12-DEC-2015,20:55

Gamma Calibrator Number 51  
 GRC-M Calibrator Jig in Use? NO  
 Inactive Background Jig in Use? NO  
 Mud Density 1.00 gm/cc  
 Caliper Source for Processing Density Caliper  
 Tool Position Eccentred  
 Potassium Equivalence Chloride  
 K Mud Concentration 0.00 %

## High Resolution Temperature Calibration MGS-D.A 218

Field Calibration on 12-DEC-2015,20:56

	Measured	Calibrated(Deg F)
Lower	50.00	50.00
Upper	100.00	100.00

## High Resolution Temperature Constants MGS-D.A 218

Last Edited on 12-DEC-2015,20:55

Pre-filter Length 11

## Induction Calibration MAI-B.J 363

Base Calibration on 17-SEP-2015,09:22

Field Check on 17-DEC-2015 00:30

## Base Calibration

## Test Loop Calibration

## Measured

## Calibrated (mmho/m)

Channel	Low	High	Low	High
1	17.8	467.2	9.3	966.2
2	6.3	374.8	7.6	821.4
3	3.8	260.7	5.2	566.0
4	2.0	132.4	2.6	279.2

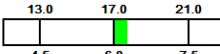
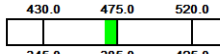
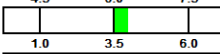
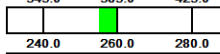
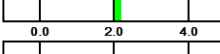
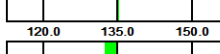
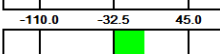
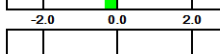
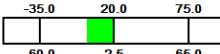
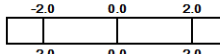
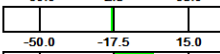
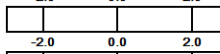

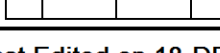

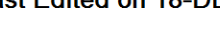
Array Temperature 69.4 Deg F

Test Loop Calibration Verified 29-NOV-2015 08:30

Channel	Base Check (mmho/m)		Field Check (mmho/m)	
	Low	High	Low	High
1	10.0	3901.4	8.2	3904.0
2	30.1	3612.4	29.7	3614.3
3	27.8	3051.3	27.6	3051.7
4	19.5	2099.4	19.5	2099.7
Deep	16.2	1952.4	16.1	1951.9
Medium	41.3	4023.6	41.3	4024.4
Shallow	46.0	5404.2	45.4	5408.4

Array Temperature 40.5 15.9 Deg F

## Induction Calibration Tolerances MAI-B.J 363

Low Conductivity 1	17.8		mmho/m High Conductivity 1	467.2		mmho/m
Low Conductivity 2	6.3		mmho/m High Conductivity 2	374.8		mmho/m
Low Conductivity 3	3.8		mmho/m High Conductivity 3	260.7		mmho/m
Low Conductivity 4	2.0		mmho/m High Conductivity 4	132.4		mmho/m
Background Vx 1	0.0		mmho/m Phase Check Loop 1	0.0		%
Background Vx 2	0.0		mmho/m Phase Check Loop 2	0.0		%
Background Vx 3	0.0		mmho/m Phase Check Loop 3	0.0		%
Background Vx 4	0.0		mmho/m Phase Check Loop 4	0.0		%

## Induction Constants MAI-B.J 363

Last Edited on 18-DEC-2015,01:33

Induction Model RtAP-WBM

## Borehole Correction Constants

Tool Centred No

Hole Size Source Density Caliper

Hole Size Source	Density Caliper		
Hole Size Constant Value	N/A	inches	
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	
Rm Source	Global Value: Constant Temperature		
Temp. for Rm Corr.	N/A		
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	
Symmetrised Receiver Gains			
Receiver 1	1.00		
Receiver 2	1.00		
Receiver 3	1.00		
Receiver 4	1.00		
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 15-DEC-2015 10:49

Field Calibration on 17-DEC-2015 00:53

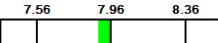
##### Base Calibration

Reading No	Measured	Calibrator Size (in)
1	14560	3.99
2	22800	5.96
3	31156	7.96
4	39296	9.85
5	48435	11.88
6	N/A	N/A

##### Field Calibration

Measured Caliper (in)	Actual Caliper (in)
7.89	7.96

#### Caliper Calibration Tolerances MPD-C.J 378

Long Arm Field Cal. 7.89  in

### DOWNHOLE EQUIPMENT

C:\Logs\BBC Anschutz Equus Farms 4-62-9-4956C2\New Folder\Anschutz Equus Farms 4-62-9-4956C2\_MMS Depth1.dta

Shuttle Running Tool 3.5"  
SRT-A.A 35 LG: 6.62 ft WT: 37.5 lb OD: 2.520 in



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: 2.240 in

Compact Tool Isolator sub.  
MTI-C.A 99 LG: 1.54 ft WT: 13.2 lb OD: 2.240 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

Compact Spectral Gamma  
MSG-A.A 111 LG: 10.94 ft WT: 90.4 lb OD: 2.240 in

Compact Knuckle Joint  
SKJ-E.B 537 LG: 2.17 ft WT: 24.3 lb OD: 2.240 in

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

Compact Inline Bowspring sub  
MIS-D.B 730 LG: 5.70 ft WT: 33.1 lb OD: 2.240 in

Compact Neutron  
MDN-C.A 462 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

Compact Vee Arm Caliper  
MVC-A.A 138 LG: 8.06 ft WT: 61.7 lb OD: 2.244 in

Compact Swivel Head Adaptor  
SHA-J.B 573 LG: 2.30 ft WT: 22.0 lb OD: 2.244 in

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

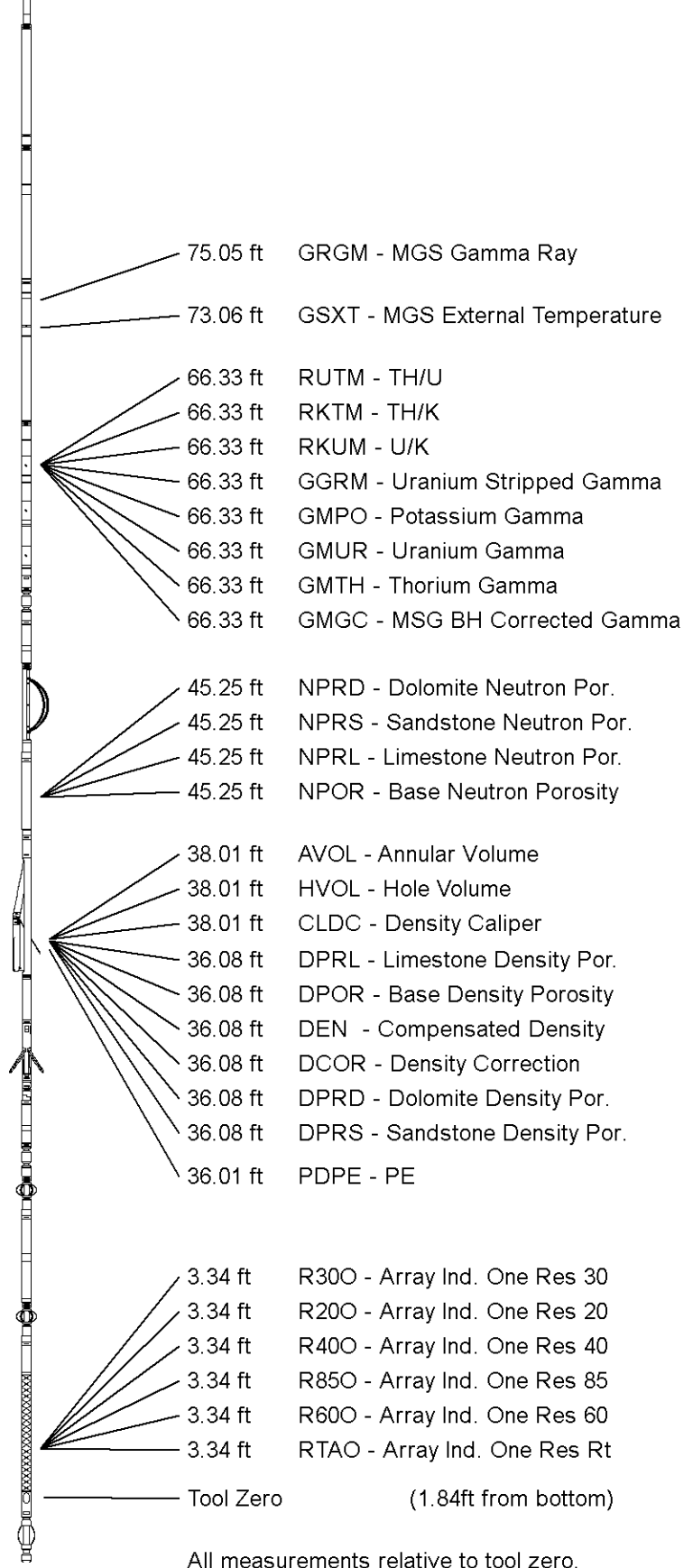
Compact Inline Standoff sub  
MIS-E.A 277 LG: 2.14 ft WT: 15.4 lb OD: 2.240 in

Compact Focussed Electric  
MFE-C.A 404 LG: 6.05 ft WT: 48.5 lb OD: 2.244 in

Compact Inline Standoff sub  
MIS-E.B 662 LG: 2.14 ft WT: 15.4 lb OD: 2.240 in

Compact Induction  
MAI-B.J 363 LG: 12.52 ft WT: 48.5 lb OD: 2.240 in

Total Length: 108.10 ft Weight: 809.1 lb



COMPANY	BILL BARRETT CORP
WELL	ANSCHUTZ EQUUS FARMS 4-62-9-4956C2
FIELD	WATTENBERG
PROVINCE/COUNTY	WELD
COUNTRY/STATE	U.S.A. / COLORADO

Elevation Kelly Bushing	4542.00	feet	First Reading	6610.00	feet
Elevation Drill Floor	4542.00	feet	Depth Driller	6629.00	feet
Elevation Ground Level	4526.00	feet	Depth Logger	6629.00	feet



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