



Weatherford

ARRAY INDUCTION LOG

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

SEC 17 TWP 26S RGE 29W Other Services MDN / MPD
 API Number 15-069-20413
 Permit Number

Permanent Datum G.L., Elevation 2745 feet
 Log Measured From KB Elevations: KB 2765.00
 Drilling Measured From K.B. @ 20 feet DF 2765.00
 GL 2745.00

Date	02-DEC-2012
Run Number	ONE
Depth Driller	9370.00 feet
Depth Logger	9370.00 feet
First Reading	9313.00 feet
Last Reading	4000.00 feet
Casing Driller	5425.00 feet
Casing Logger	5427.00 feet
Bit Size	6.125 inches
Hole Fluid Type	WBM
Density / Viscosity	9.00 lb/USg 9.00 CP
PH / Fluid Loss	10.00 4.20 ml/30Min
Sample Source	Flowline
Rm @ Measured Temp	0.86 @ 68.0 ohm-m
Rmf @ Measured Temp	0.69 @ 68.0 ohm-m
Rmc @ Measured Temp	1.03 @ 68.0 ohm-m
Source Rmf / Rmc	CALC CALC
Rm @ BHT	0.48 @125.0 ohm-m
Time Since Circulation	1 HOUR
Max Recorded Temp	125.00 deg F
Equipment Name	Compact
Equipment / Base	18086 GU
Recorded By	M. RICHINS
Witnessed By	R. ROBLES
S.O. # / AFE #	3529549

BOREHOLE RECORD Last Edited: 03-DEC-2012 01:36

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

CASING RECORD

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

REMARKS

LOGGED WITH WLS VER 13.03.7779 SOFTWARE

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

HARDWARE: MPD: 4"PROFILE PLATE
 MISD: ECCENTRALIZED

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

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

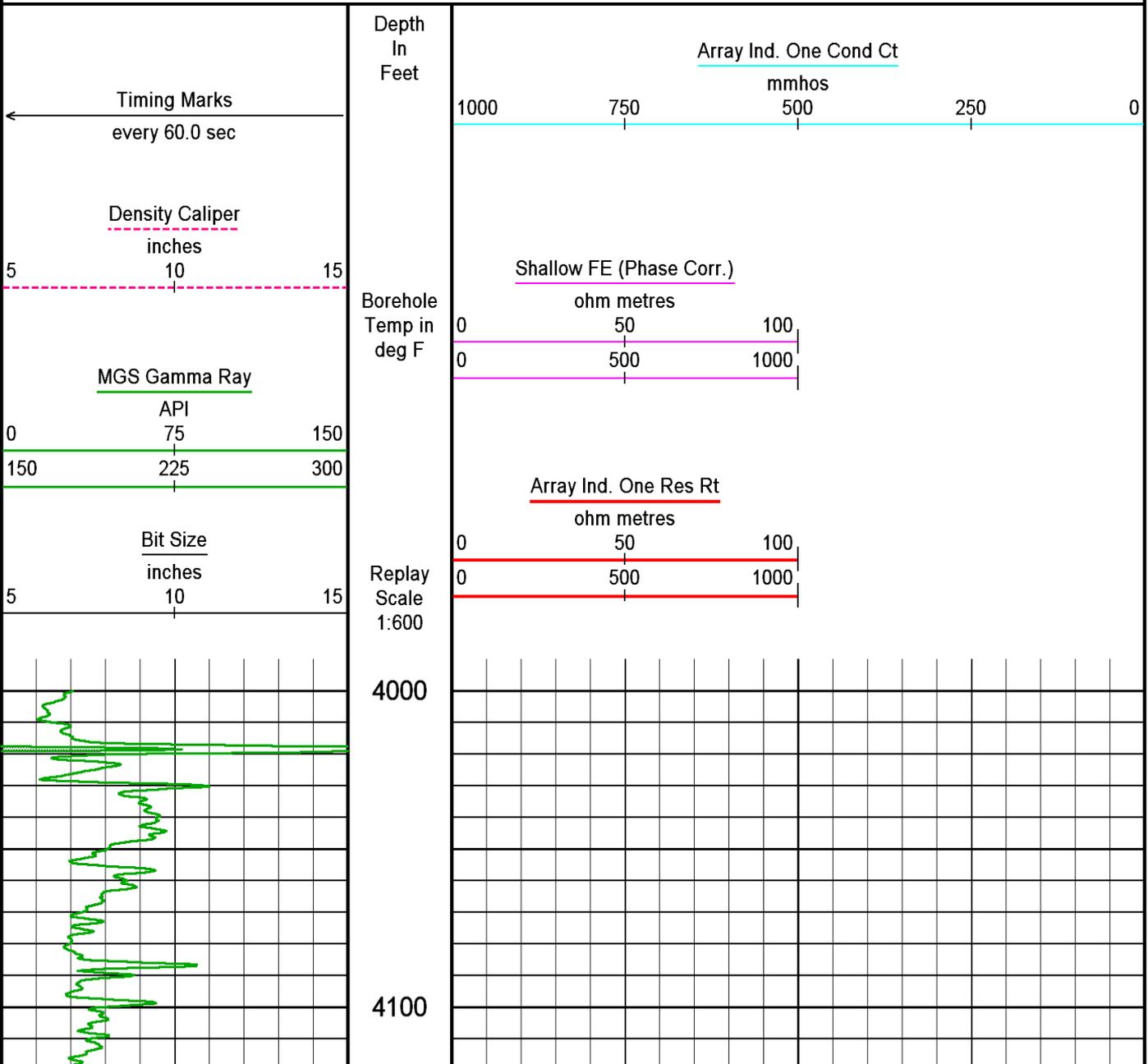
SERVICE ORDER # 3529549
 RIG: LARIAT 20

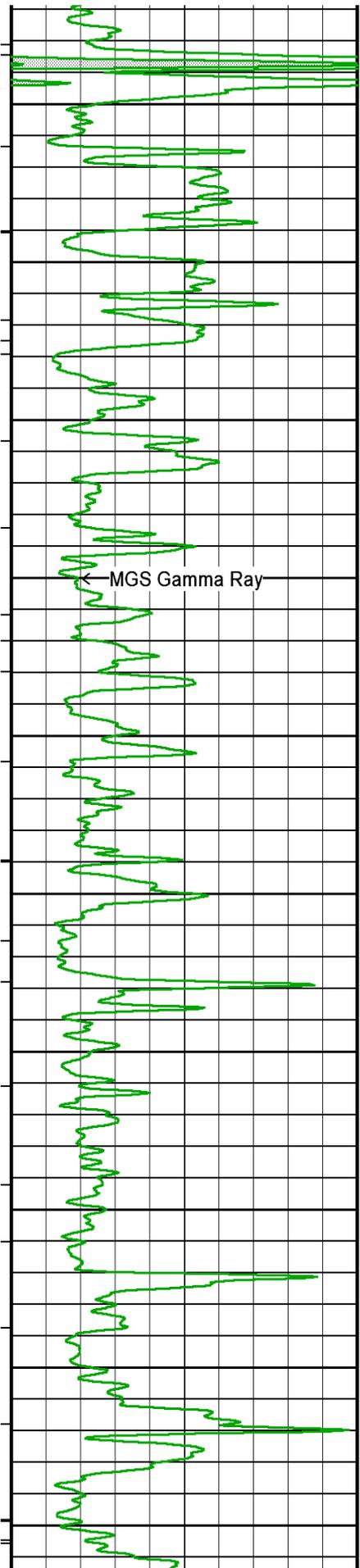
OPERATORS: A. ALLRED, C. STAAKE

All interpretations are opinions based on inferences from electrical or other measurements and we cannot, and do not, guarantee the accuracy or correctness of any interpretations, and we shall not, except in the case of gross or wilful negligence on our part, be liable or responsible for any loss, costs, damages or expenses incurred or sustained by anyone resulting from any interpretation made by any of our officers, agents or employees. These interpretations are also subject to our general terms and conditions in our price schedule.

2 INCH MAIN LOG DSC

Depth Based Data - Maximum Sampling Increment 10.0cm Plotted on 03-DEC-2012 01:58
 Filename: C:\Logs\Sand Ridge\Unruh 2629 2-17H\Unruh 2629 2-17H MMS Depth2.dta Recorded on 03-DEC-2012 00:39
 System Versions: Processed with 13.03.7779 Plotted with 13.03.7779





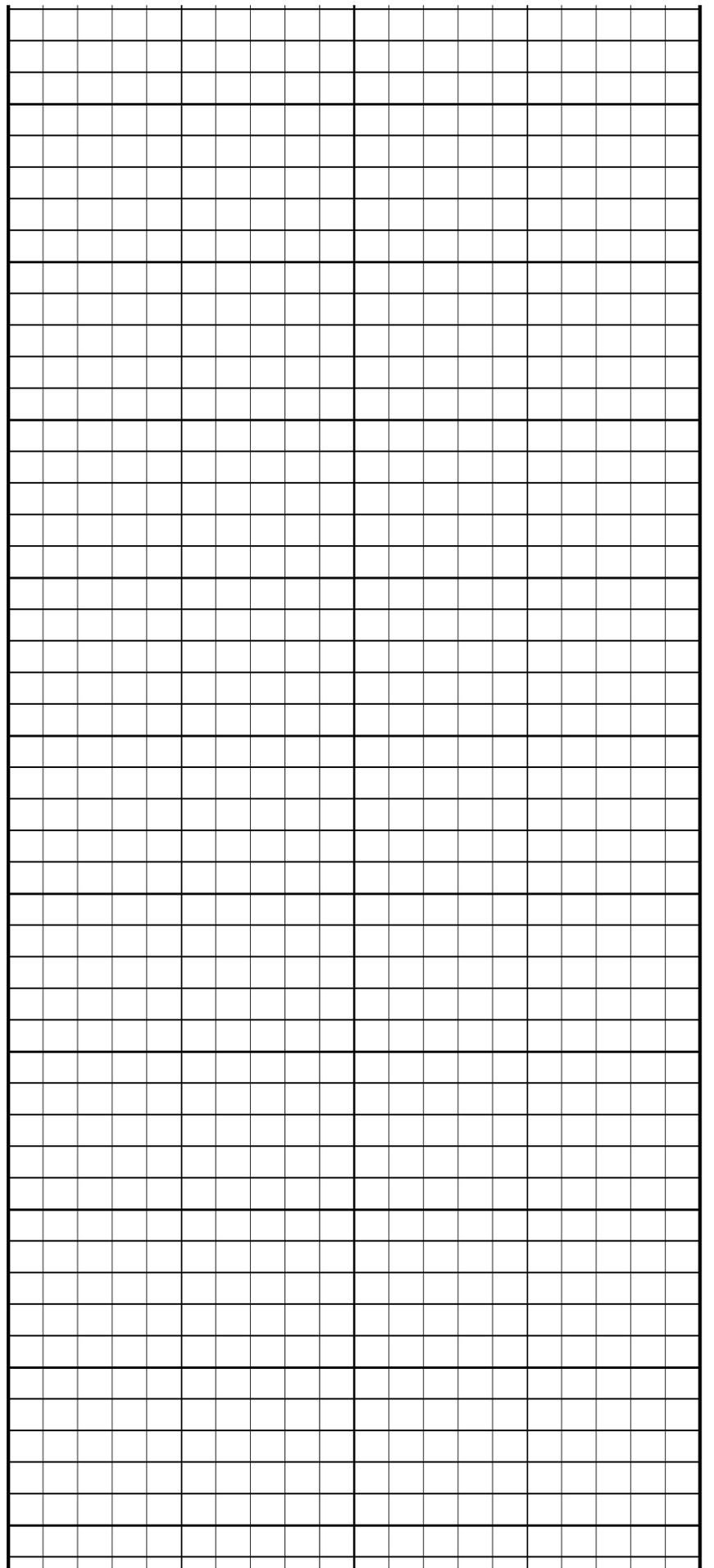
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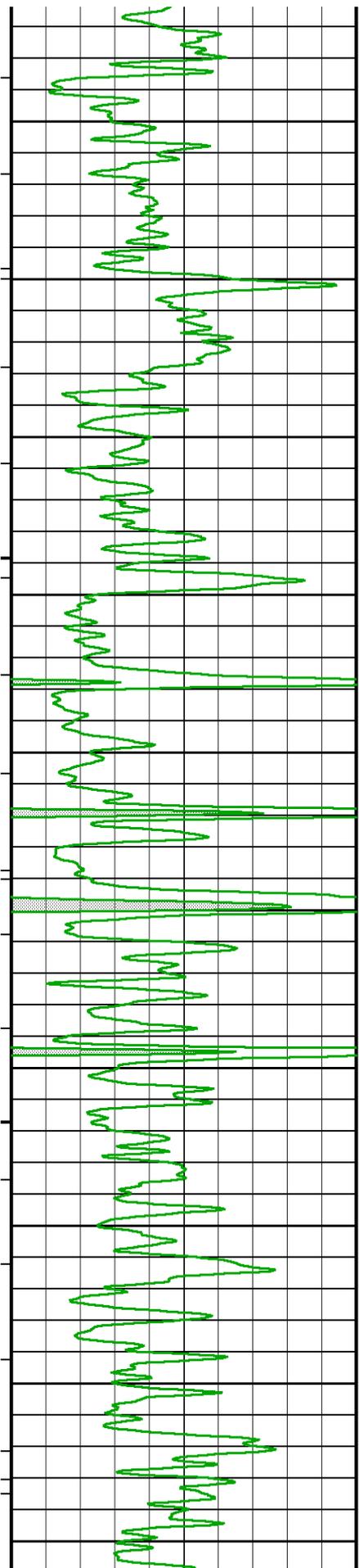
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4400

4500

4600





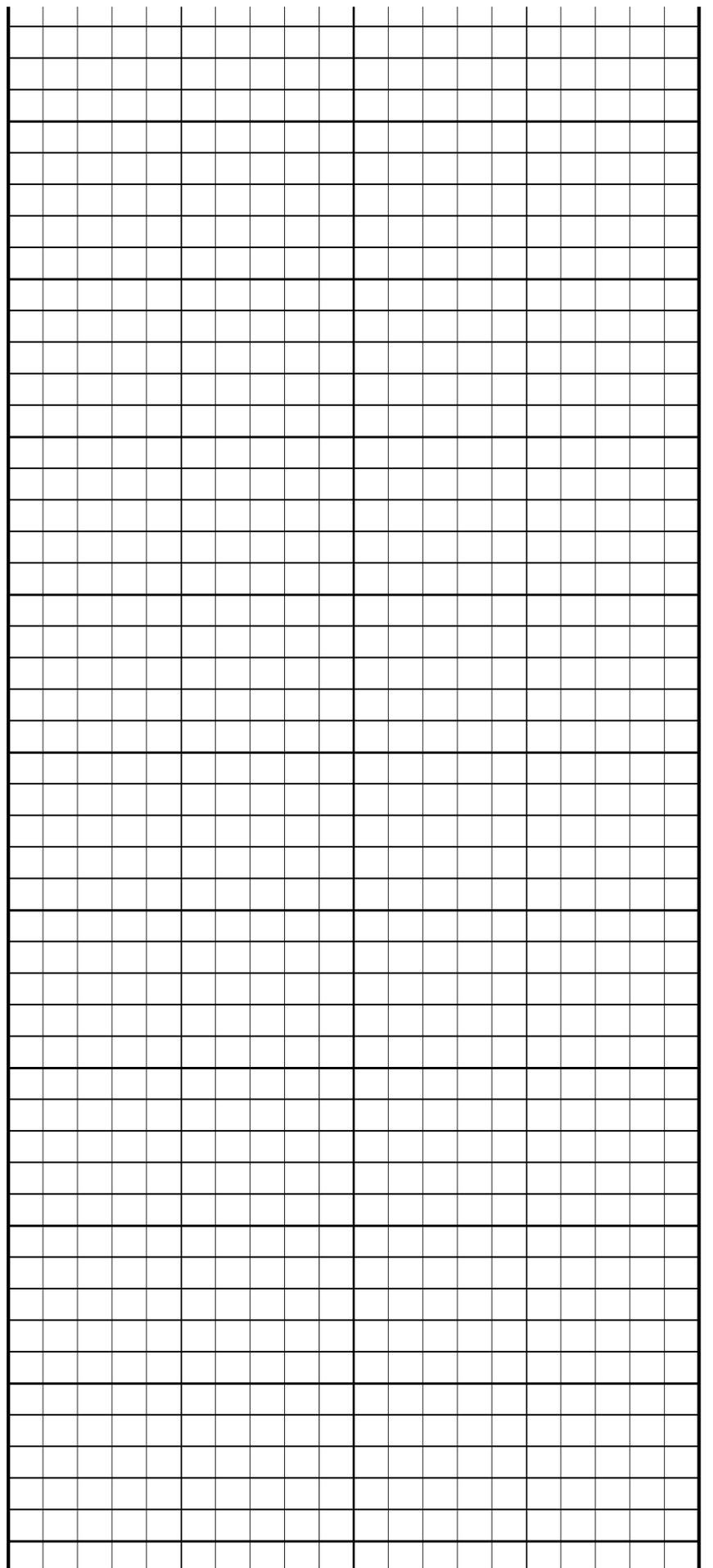
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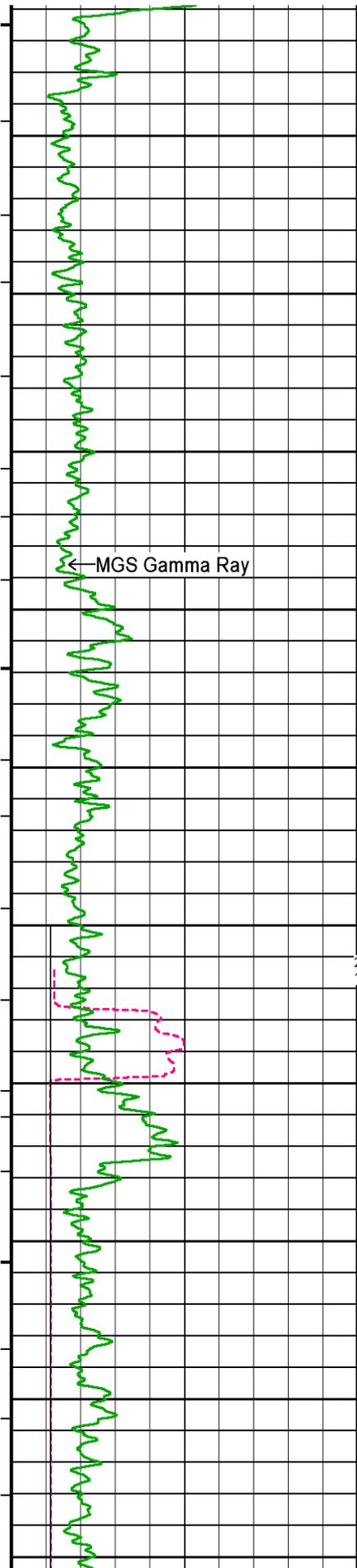
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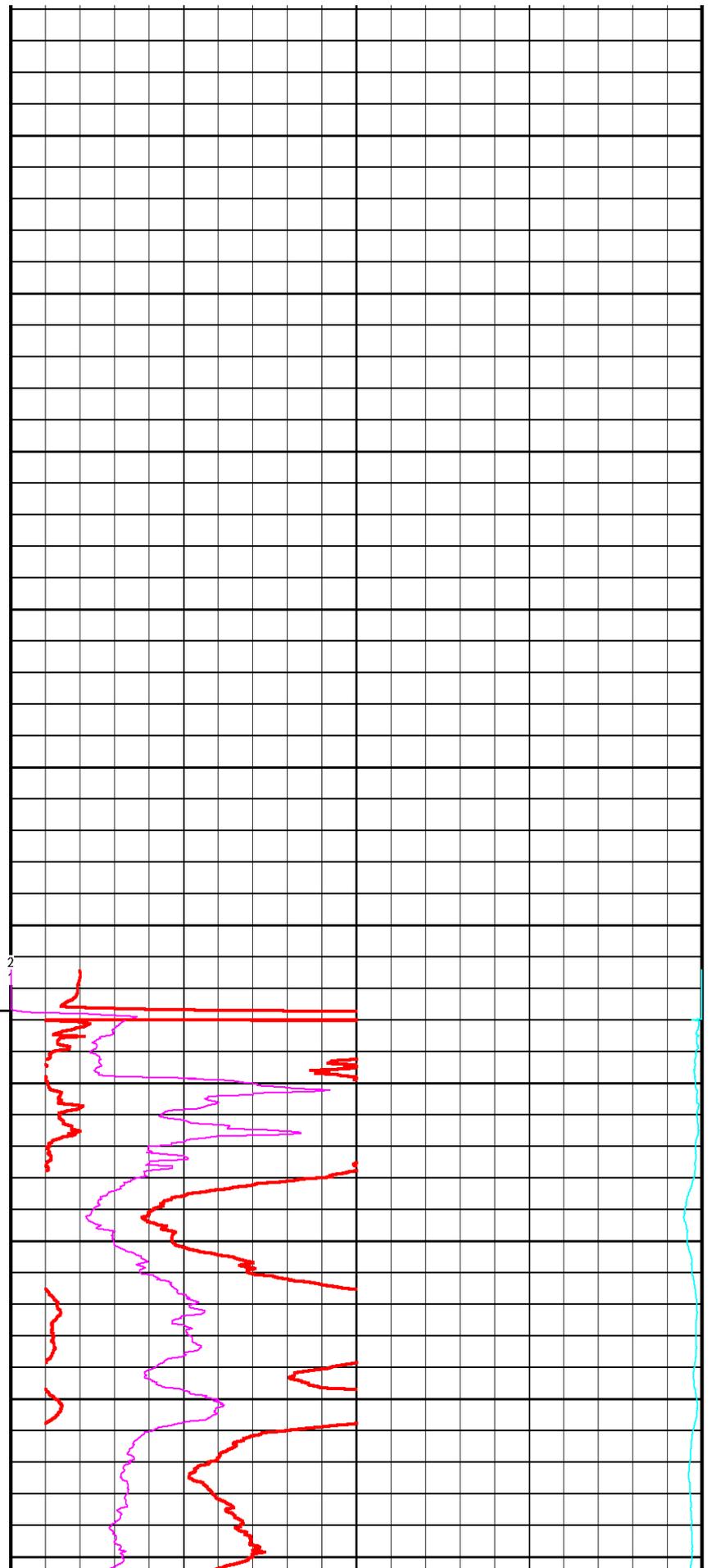
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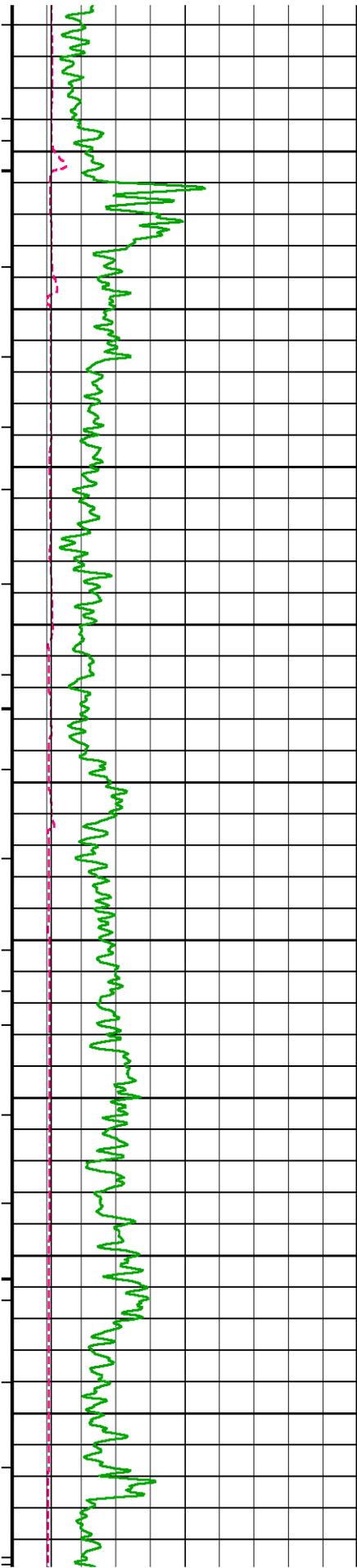
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5600





122°

5700

122°

5800

123°

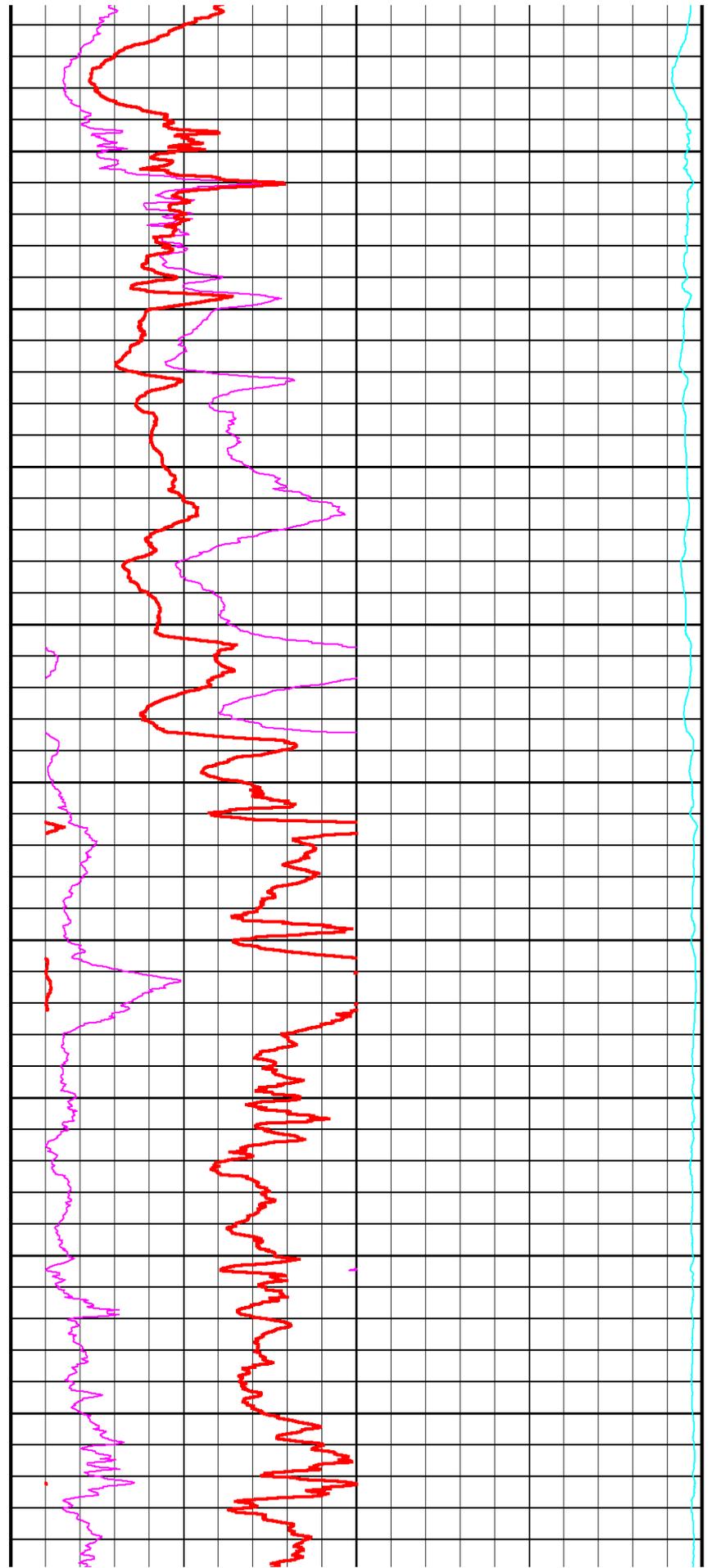
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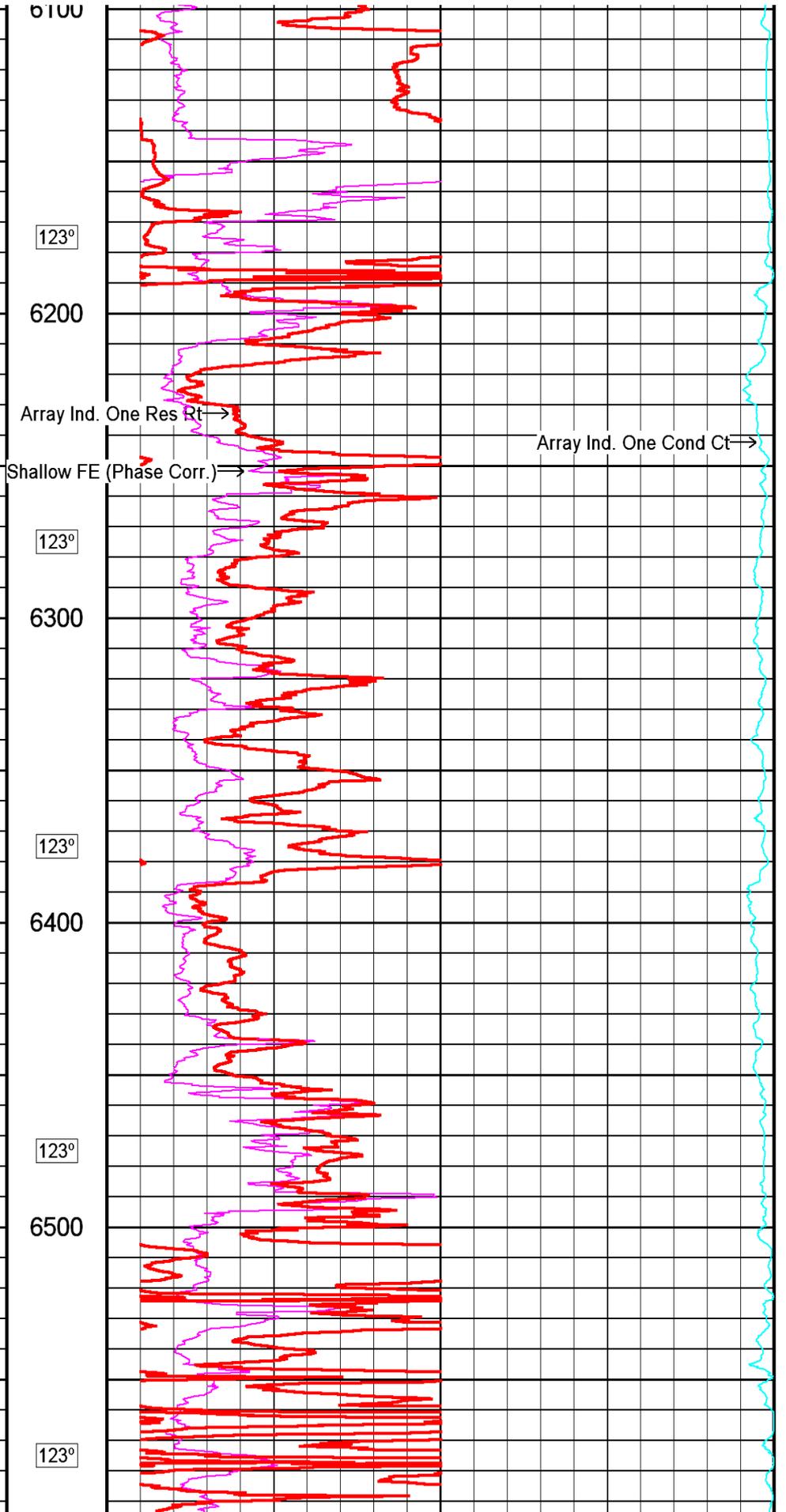
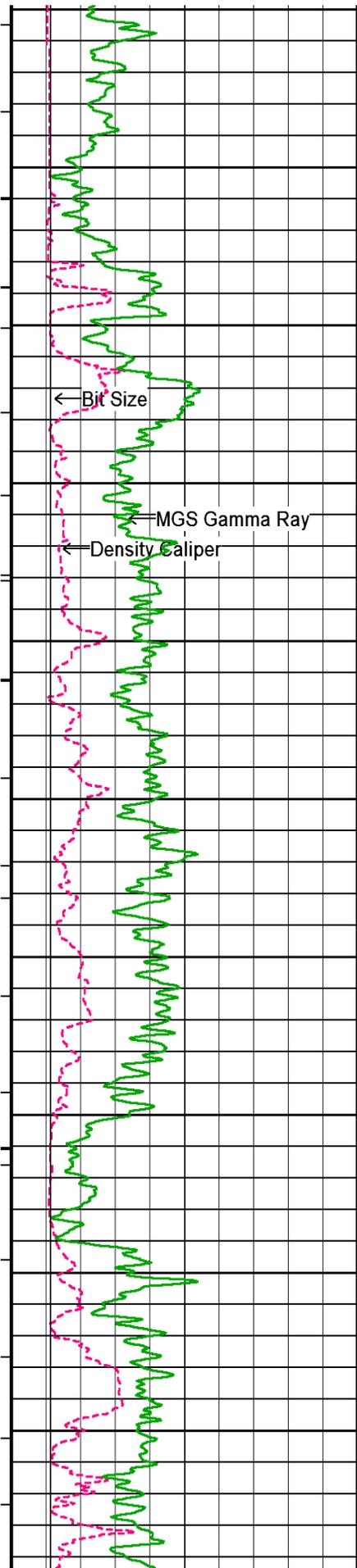
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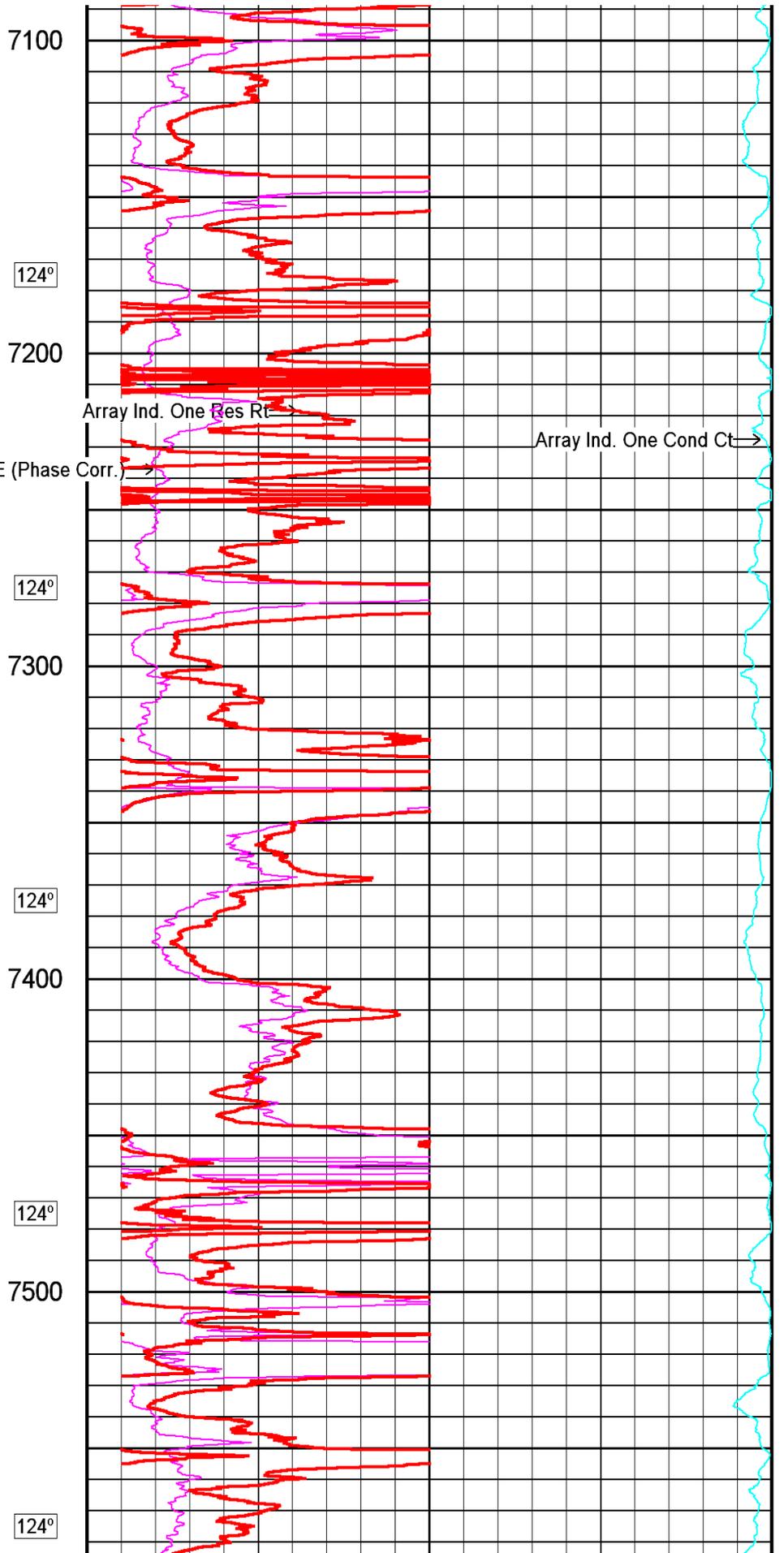
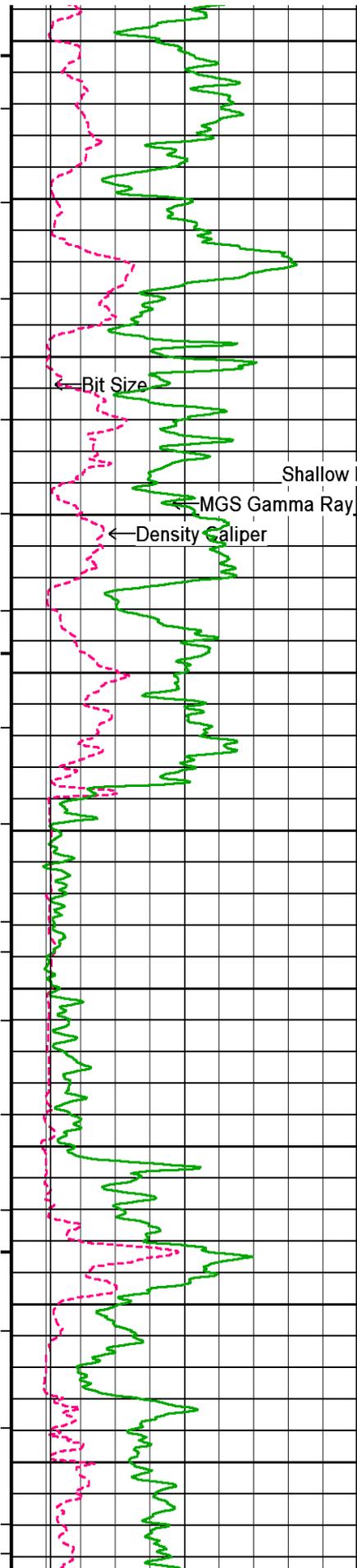
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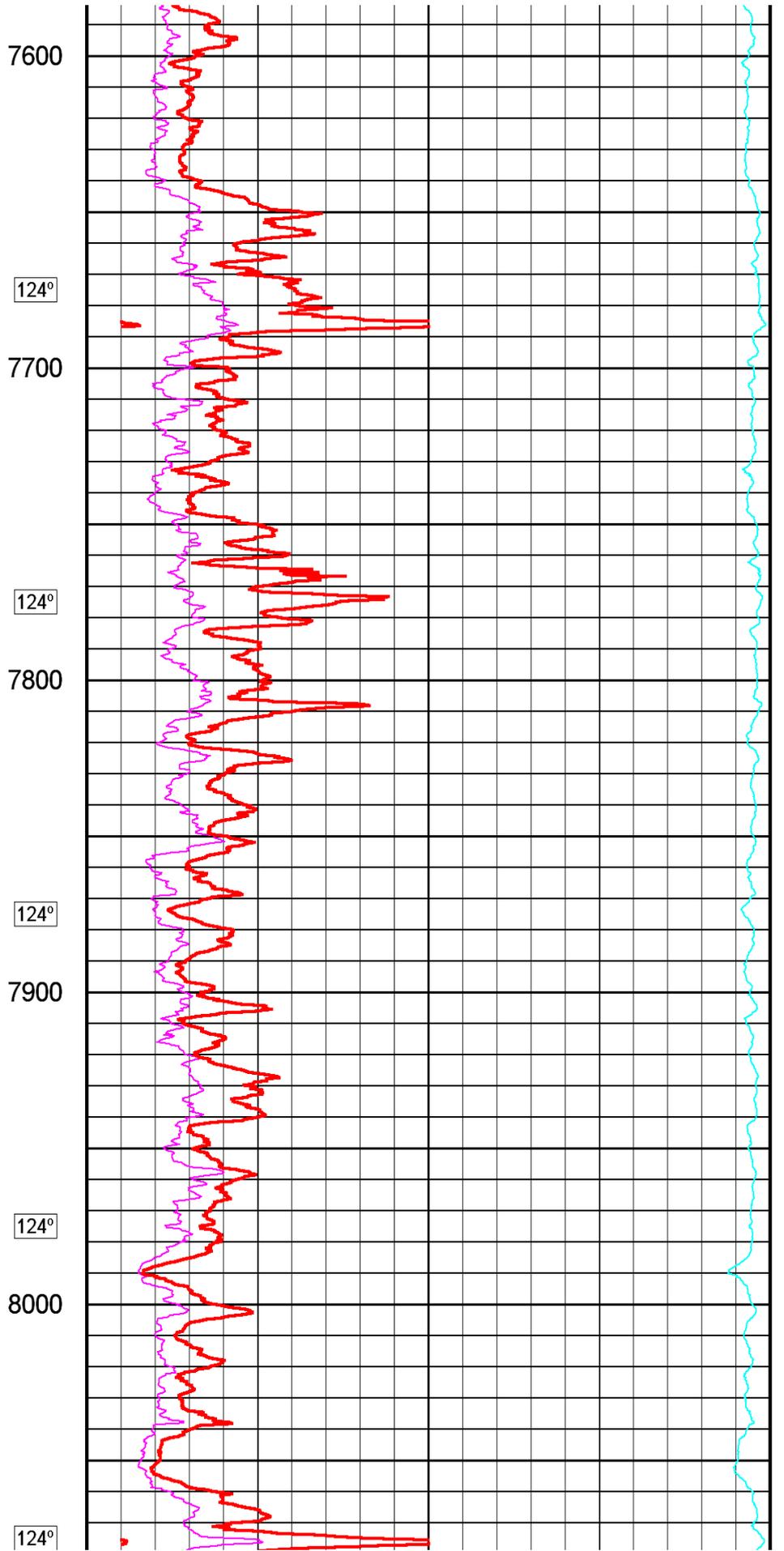
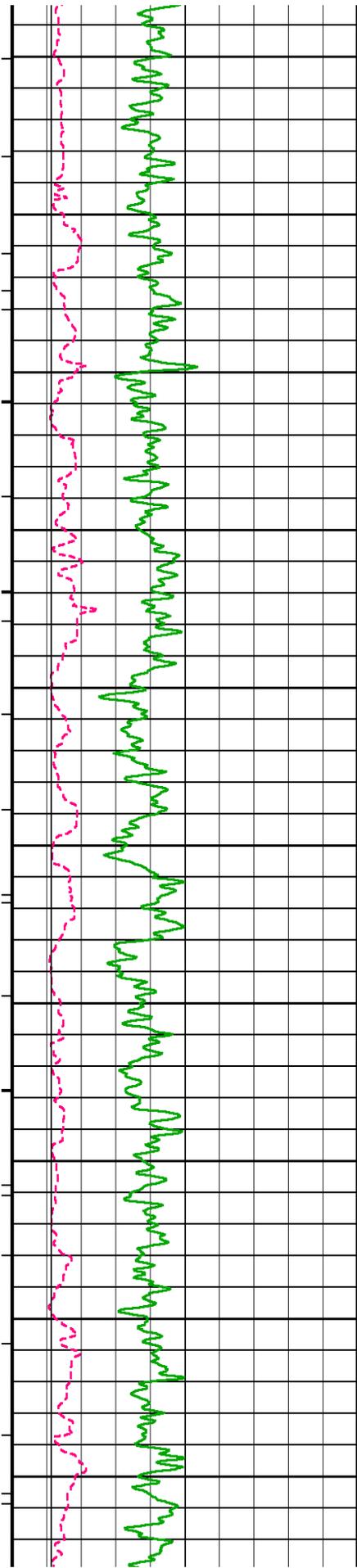
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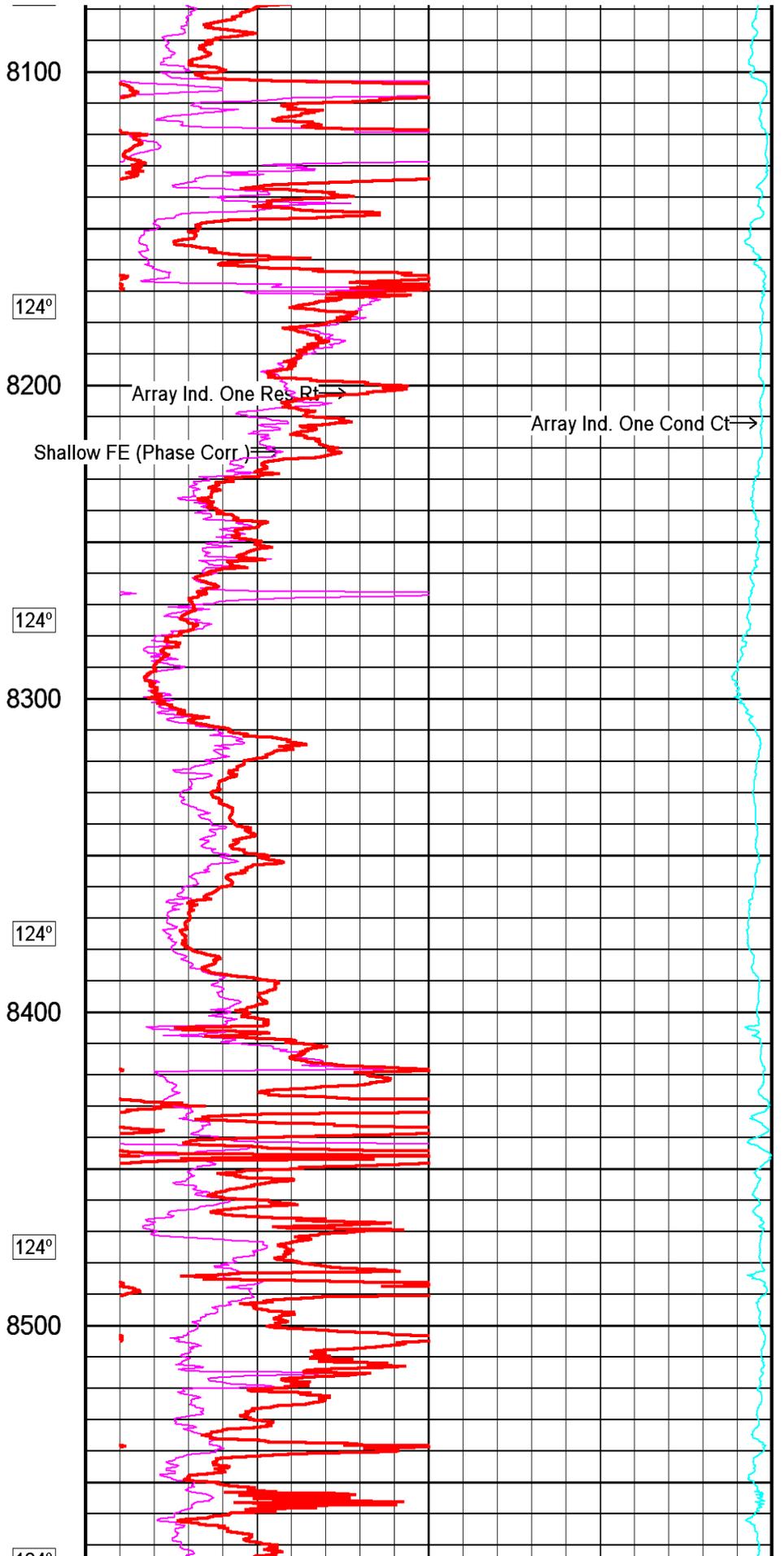
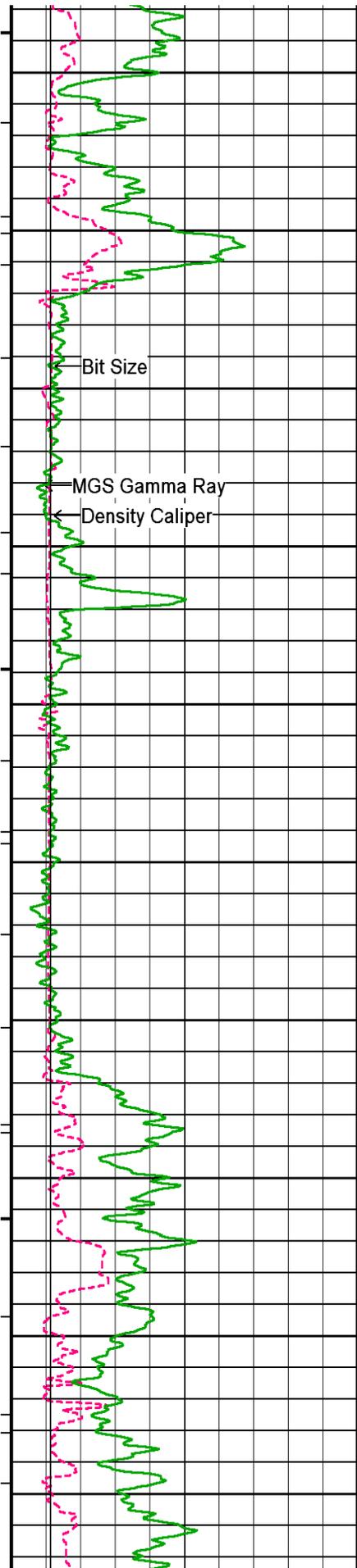
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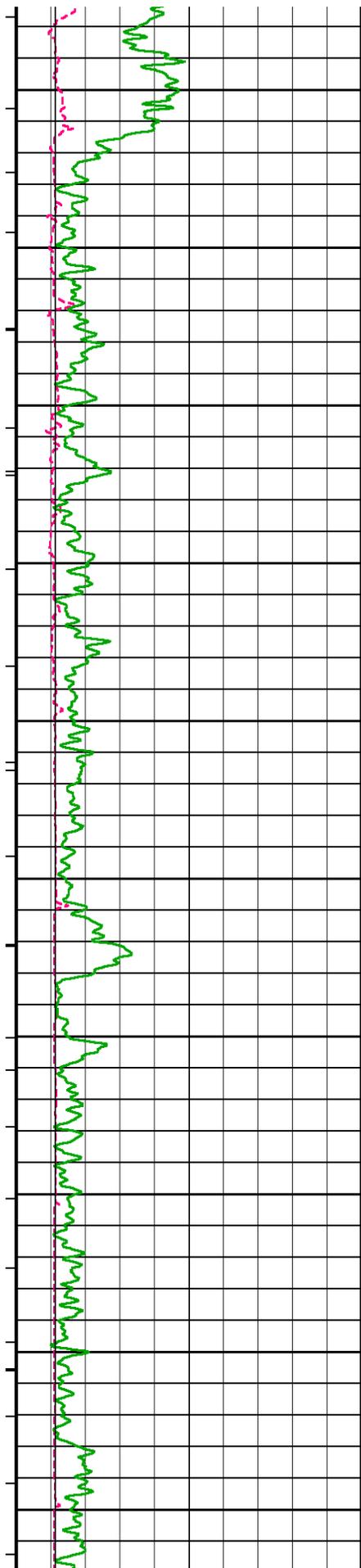












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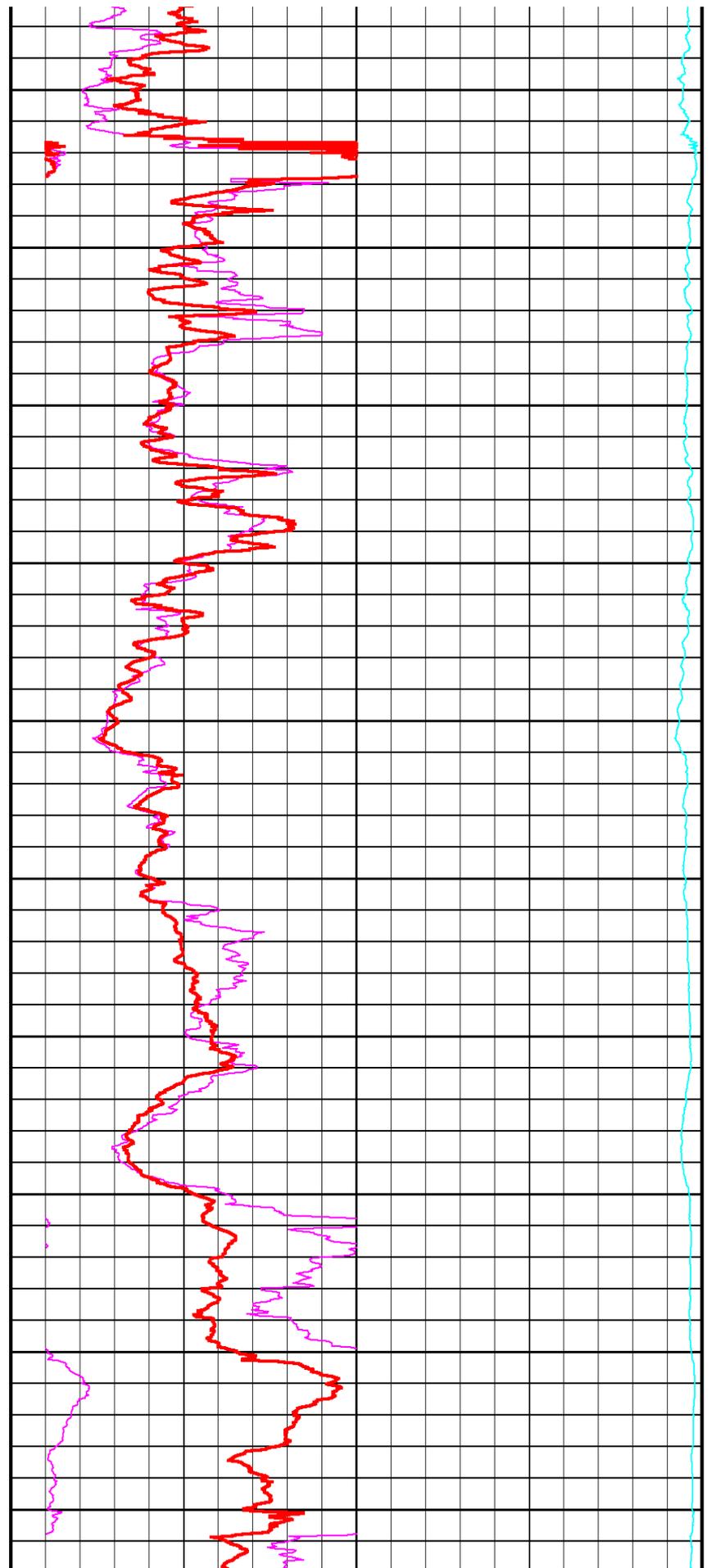
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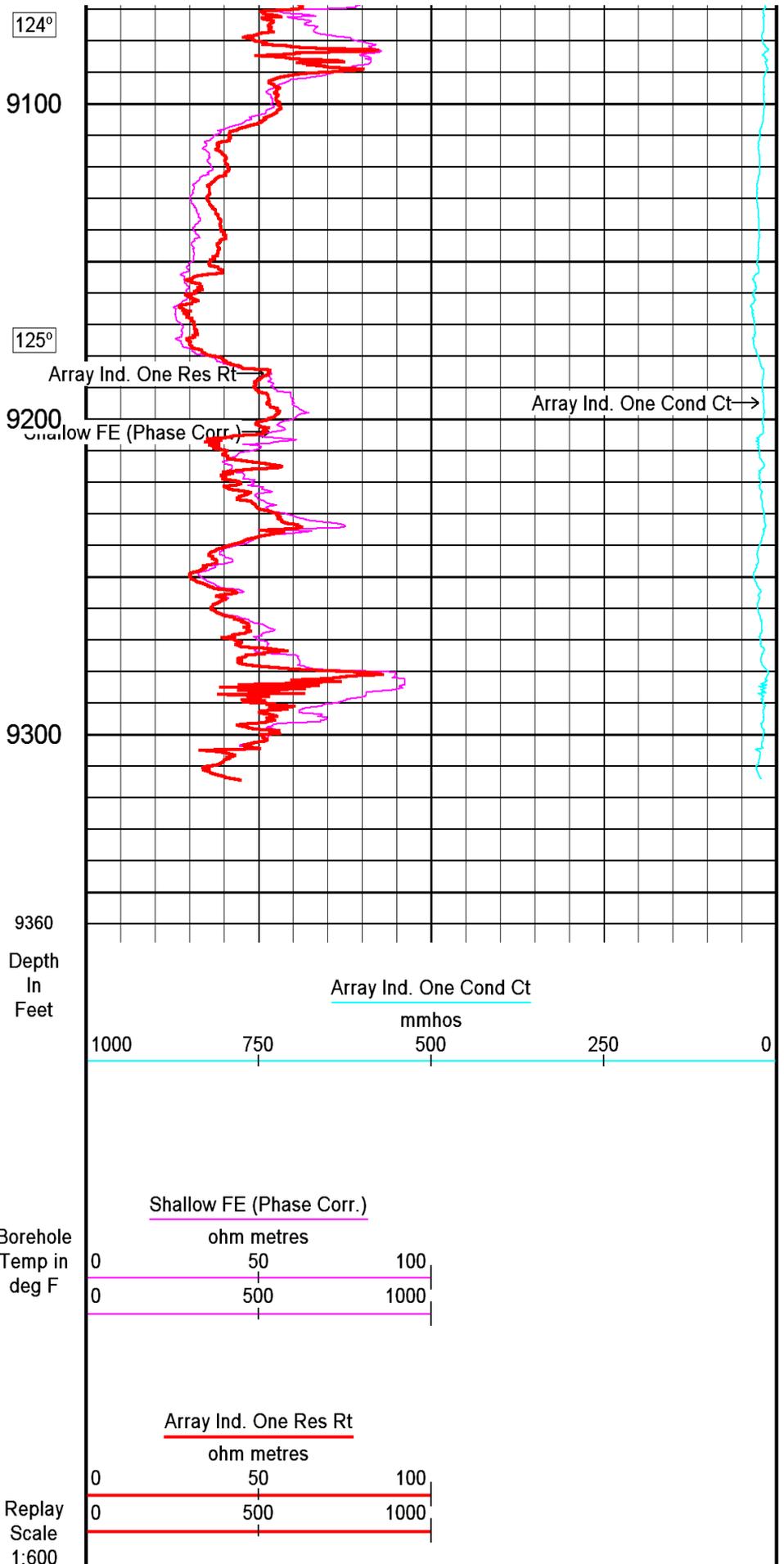
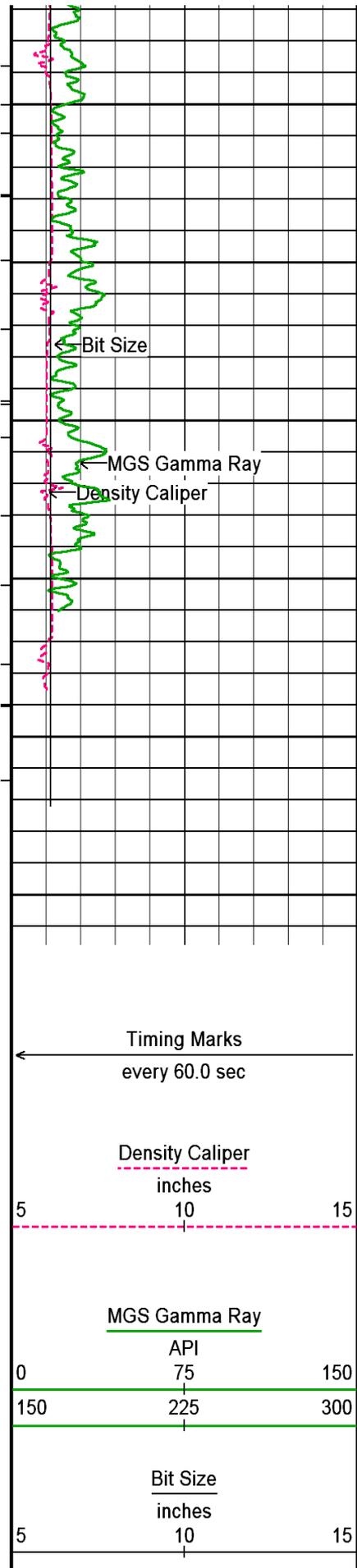
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9000





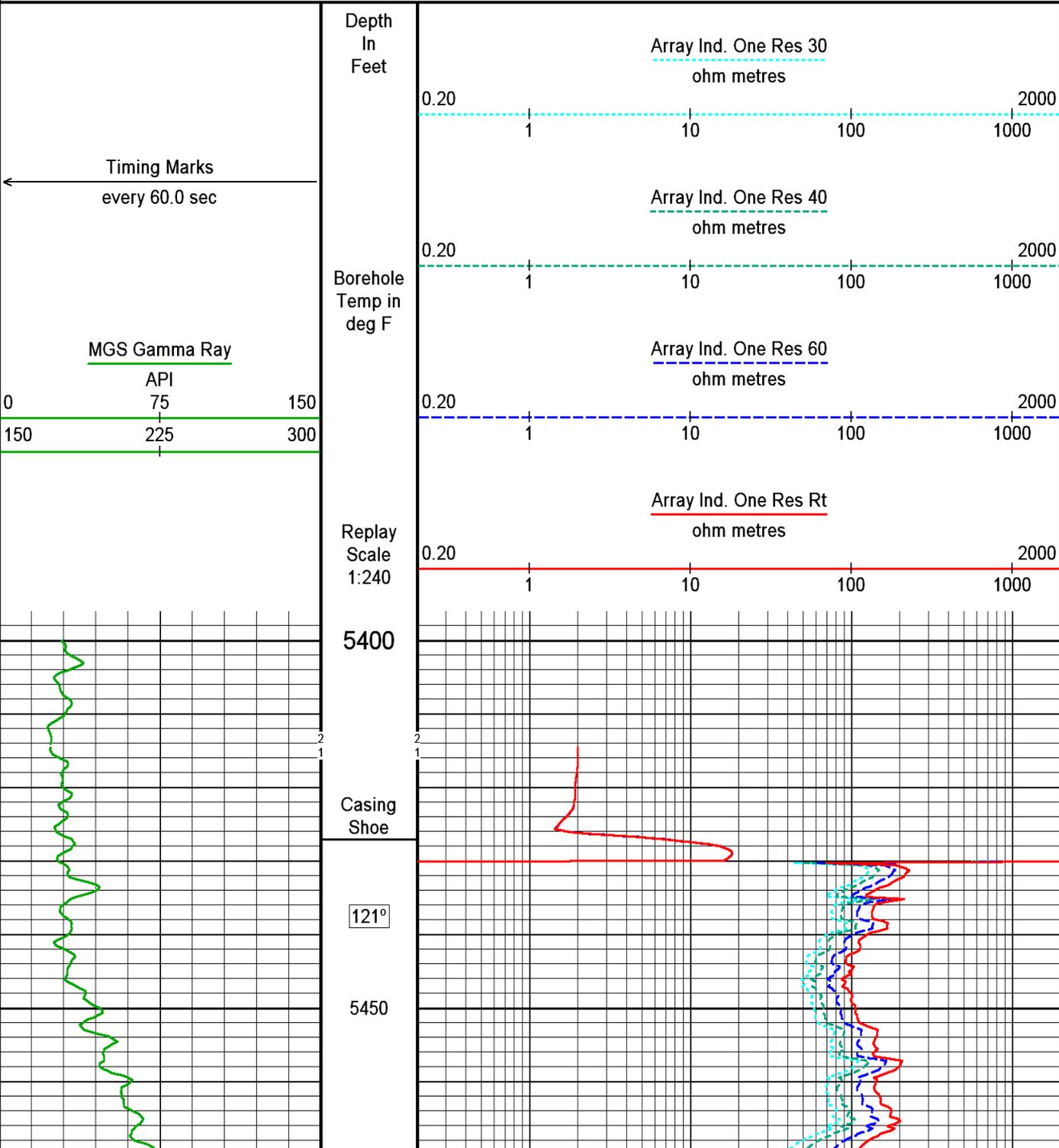
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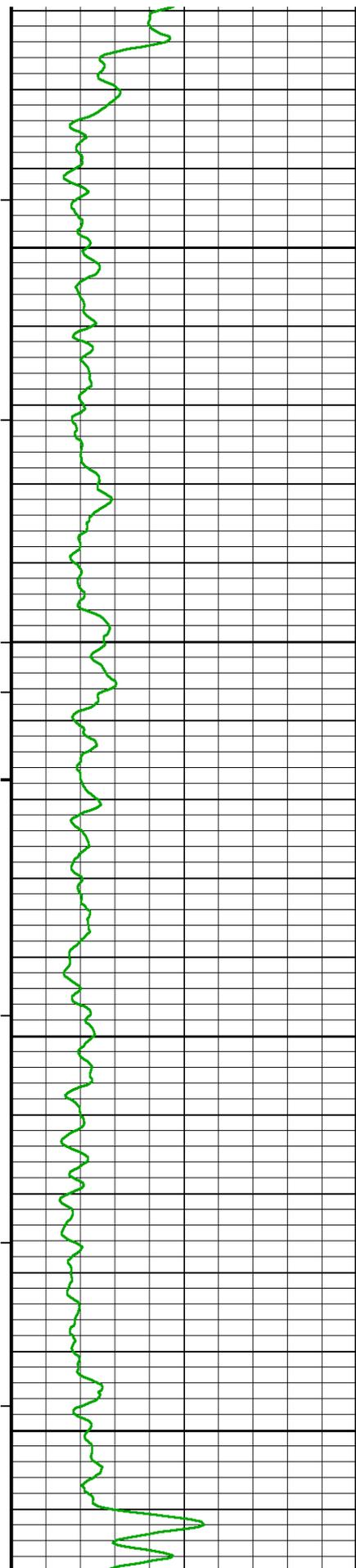
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5500

122°

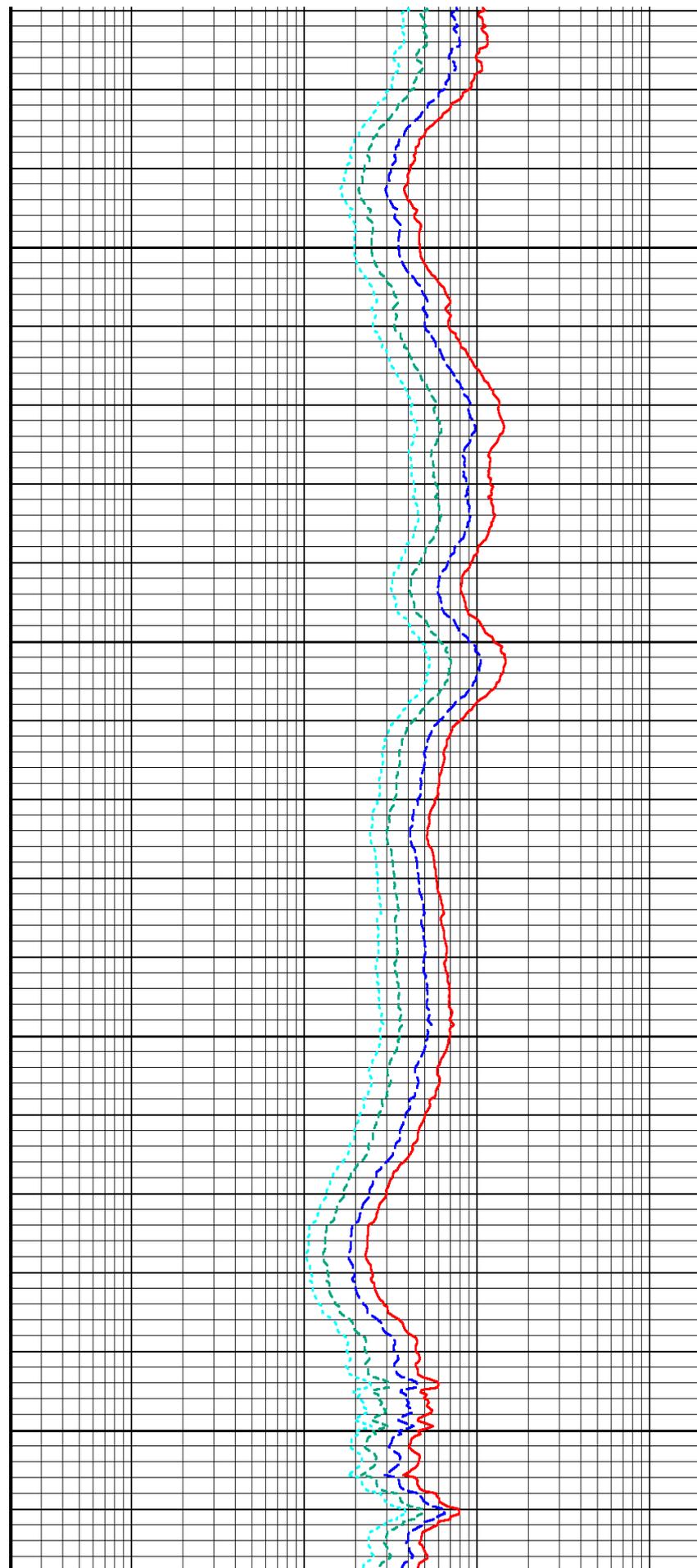
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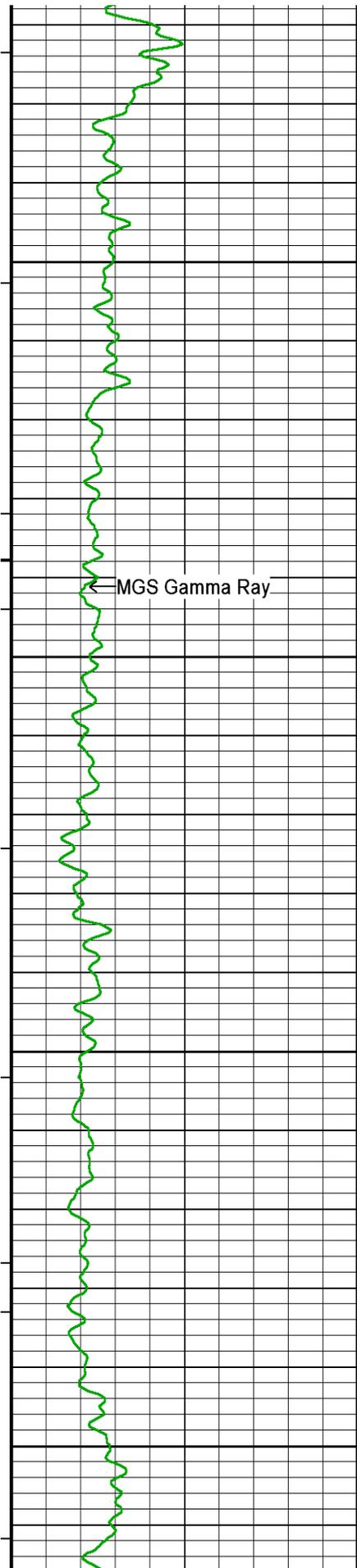
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122°

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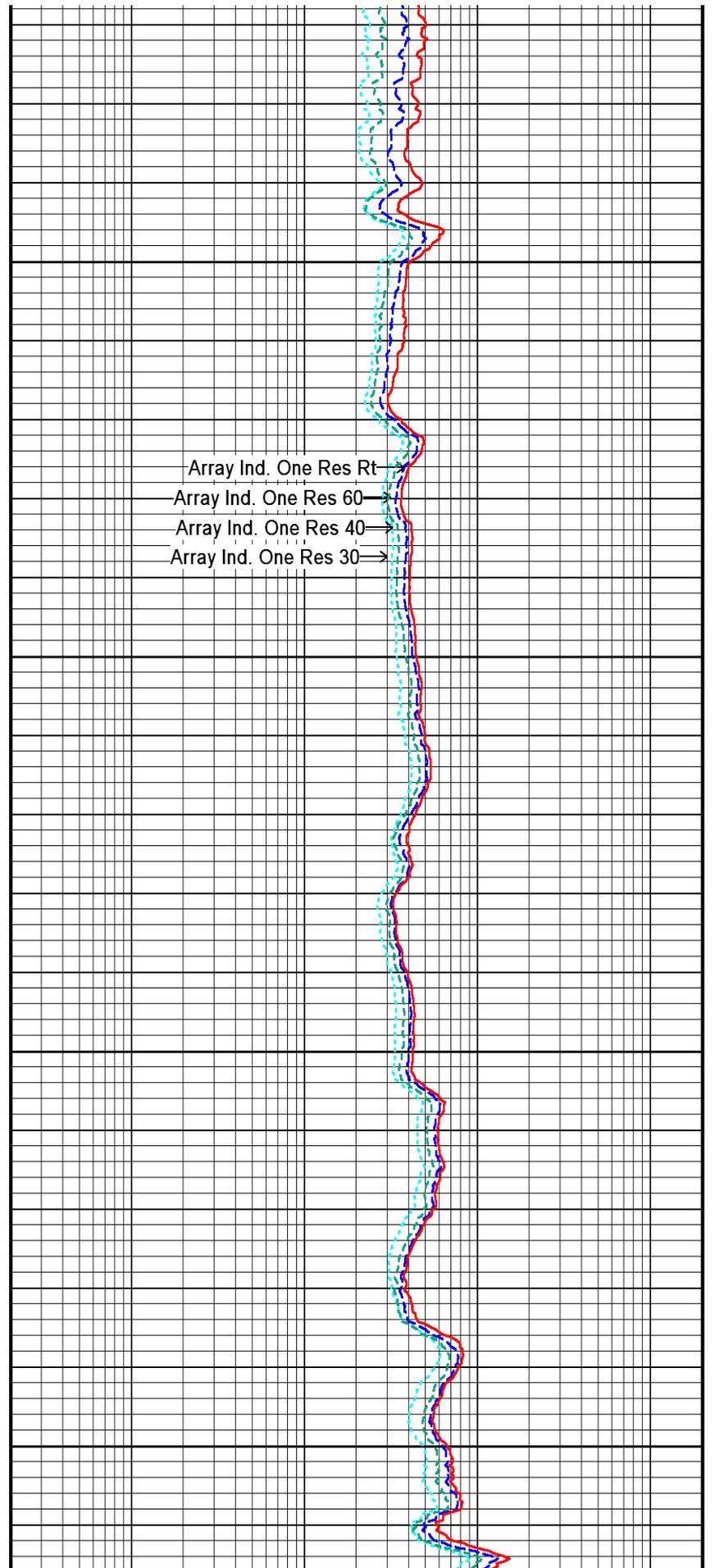
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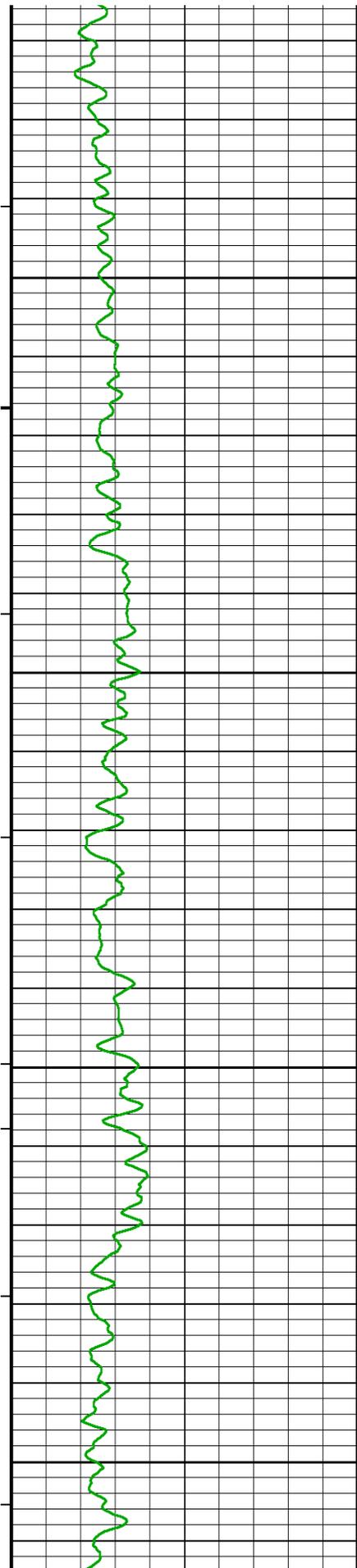
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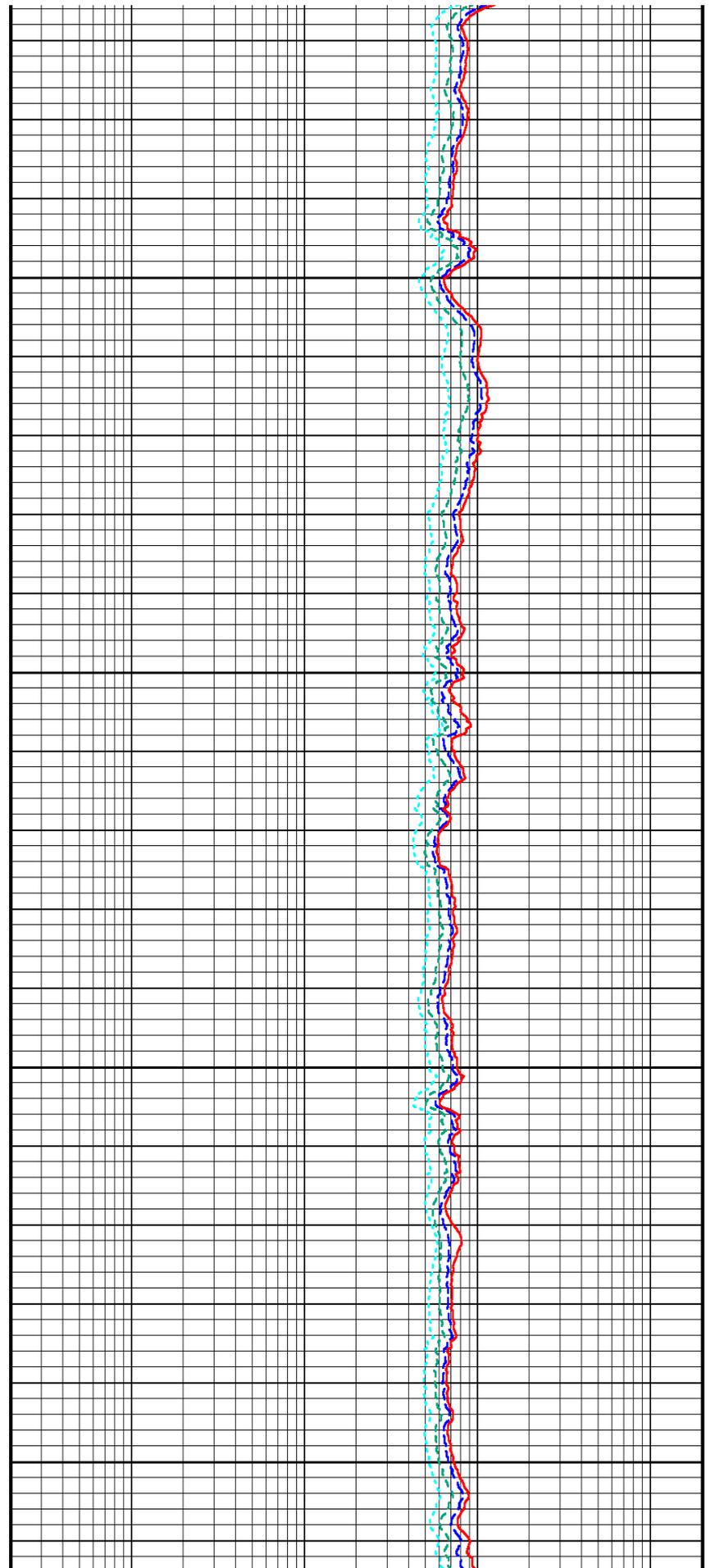
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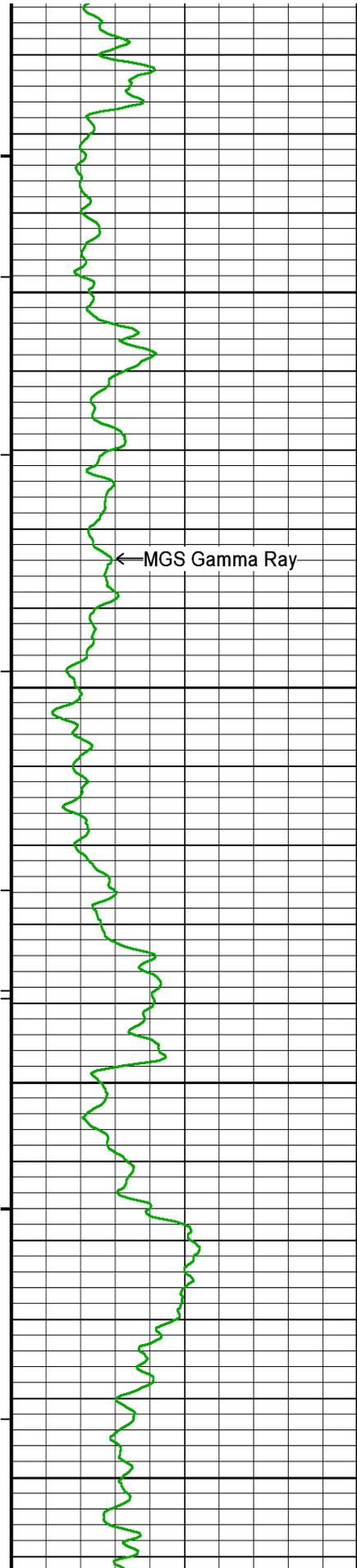
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6050





123°

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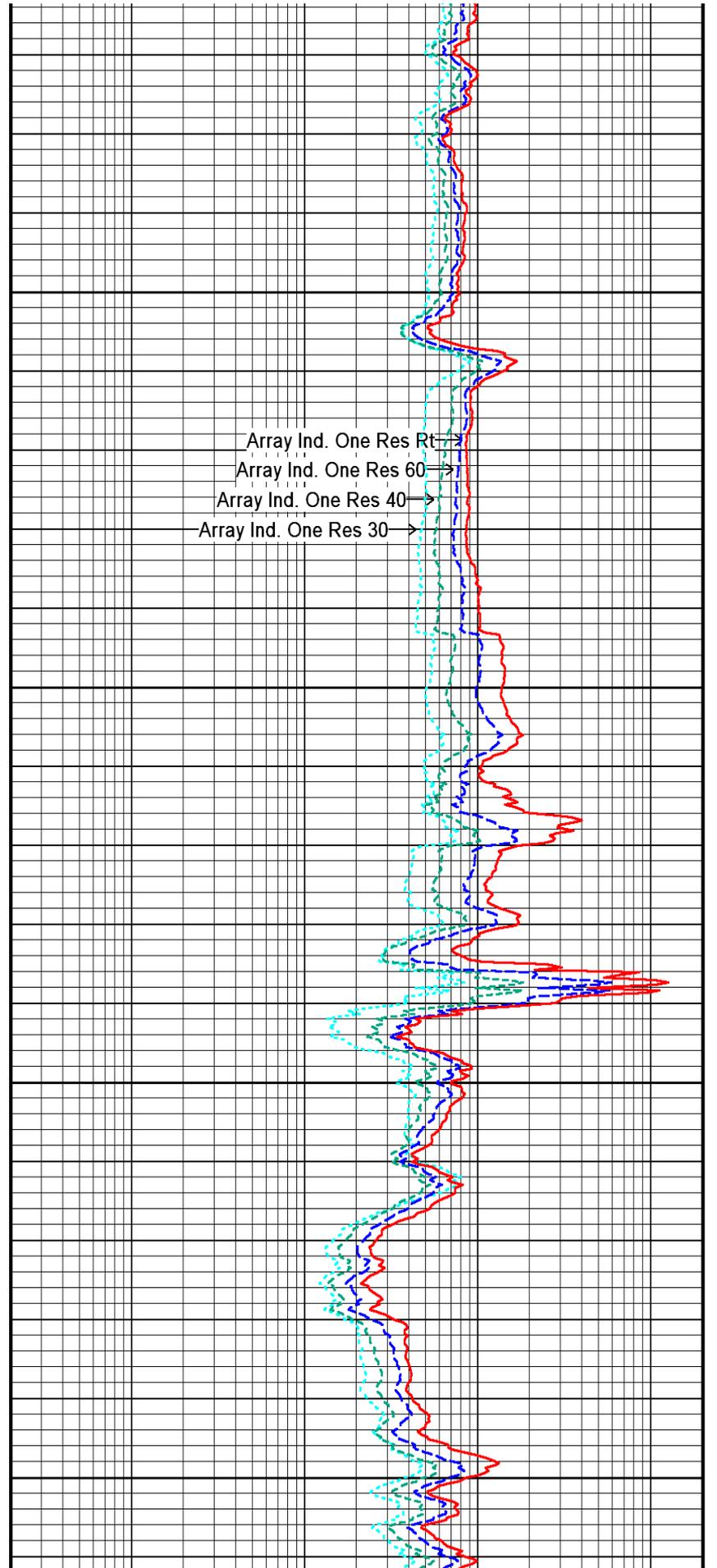
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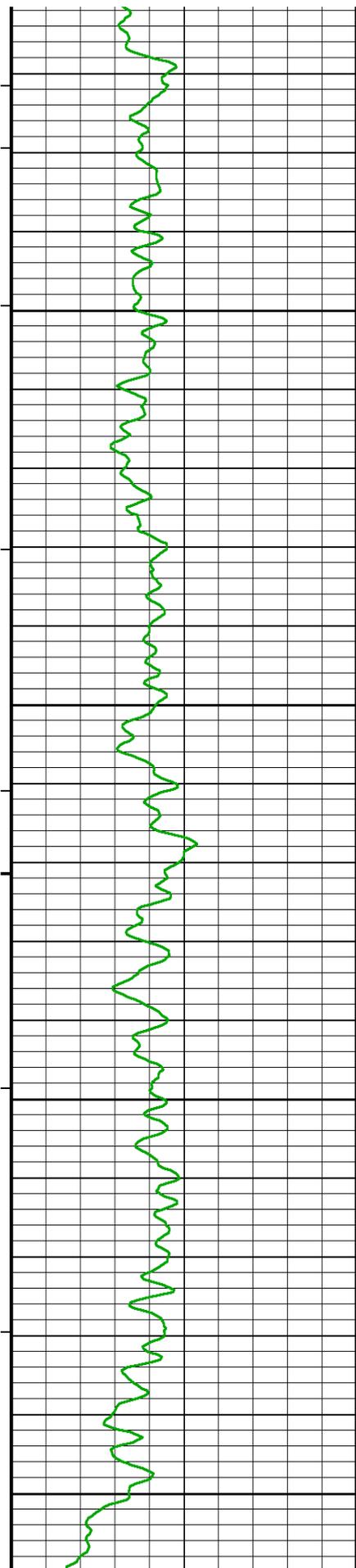
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123°

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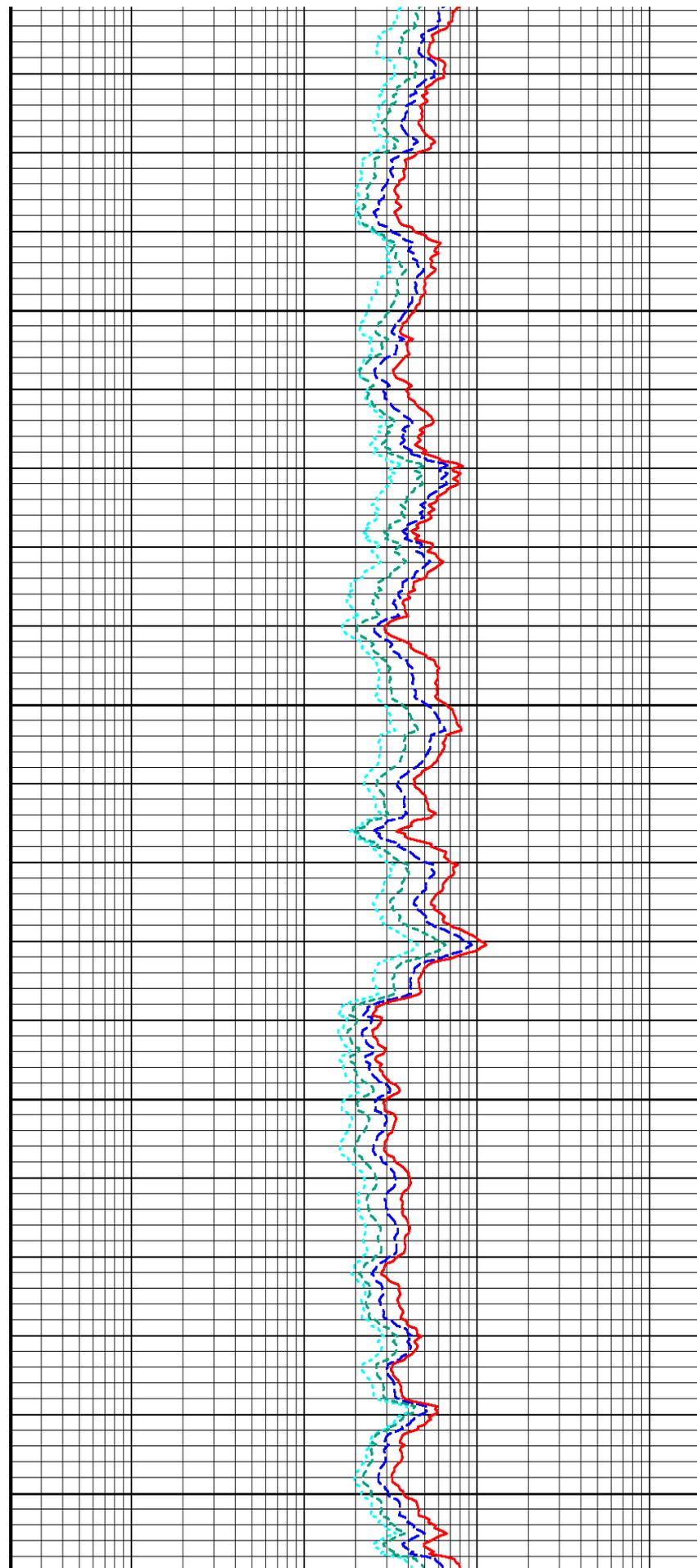
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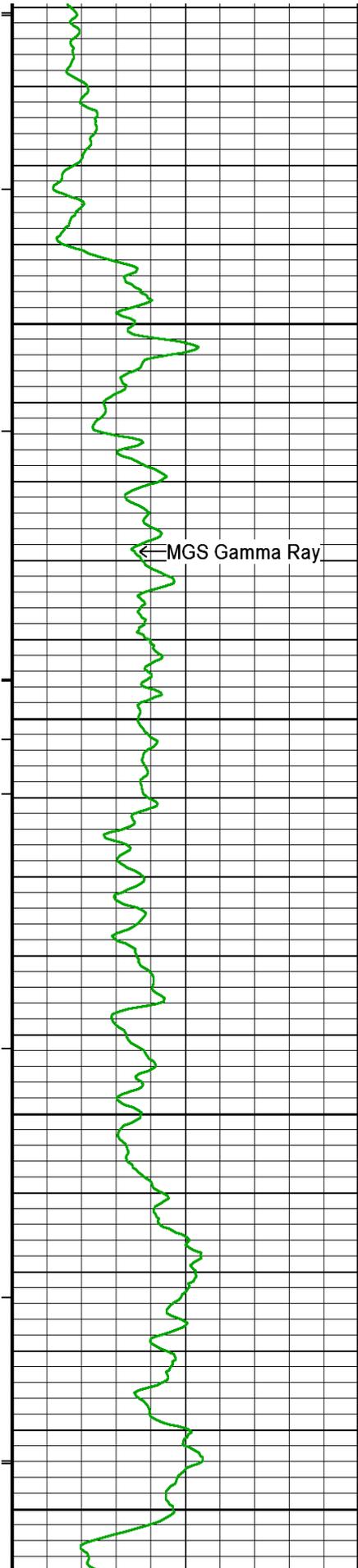
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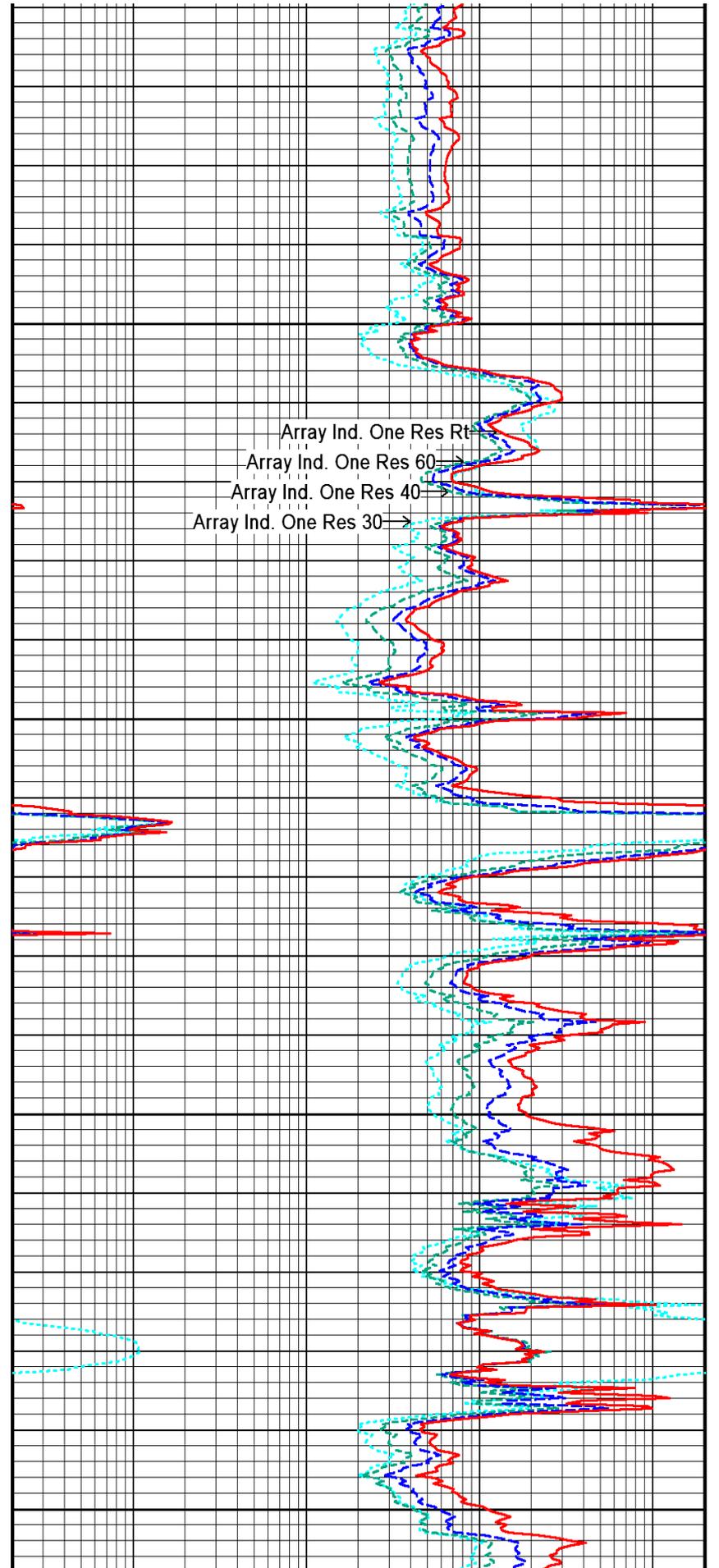
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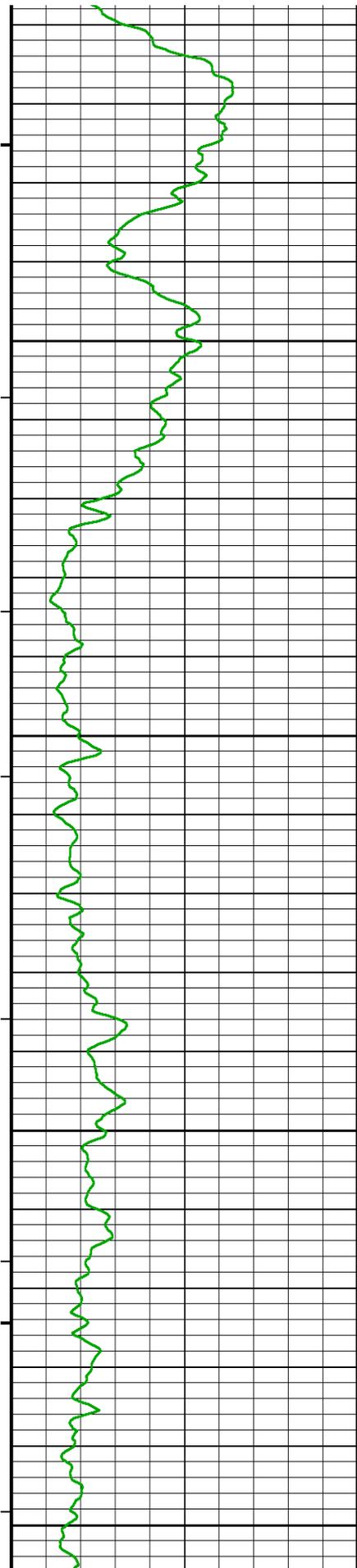


Array Ind. One Res Rt

Array Ind. One Res 60

Array Ind. One Res 40

Array Ind. One Res 30



123°

6700

123°

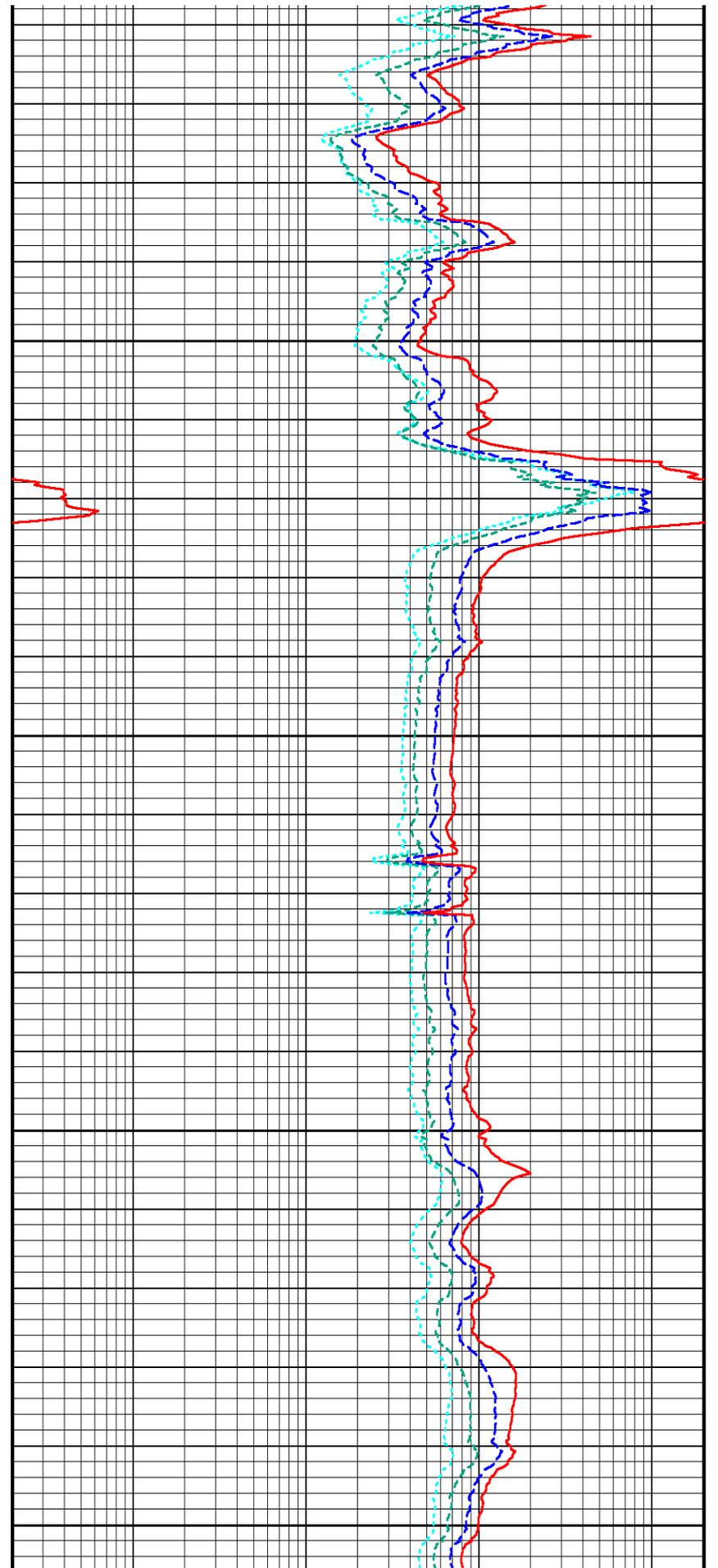
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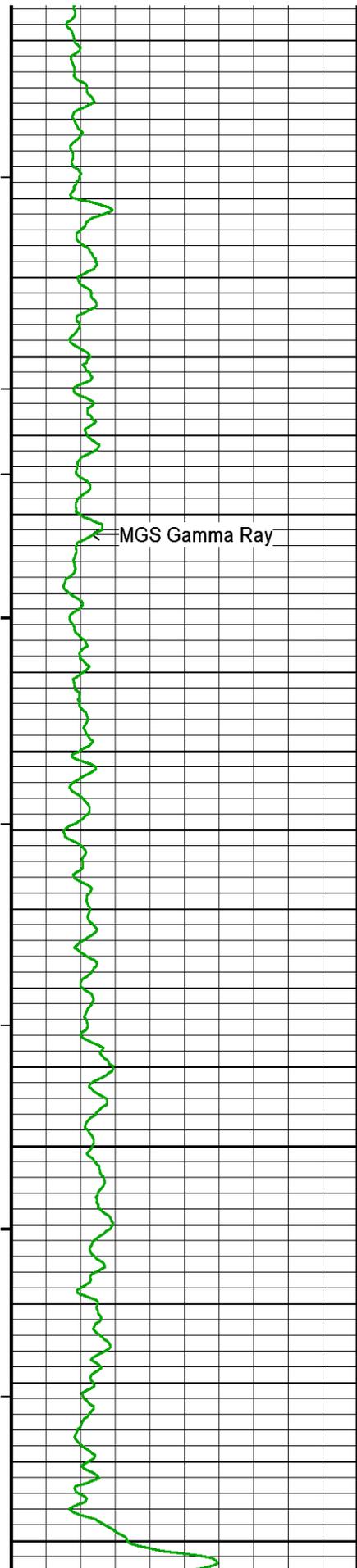
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6800

124°

6850





124°

6900

124°

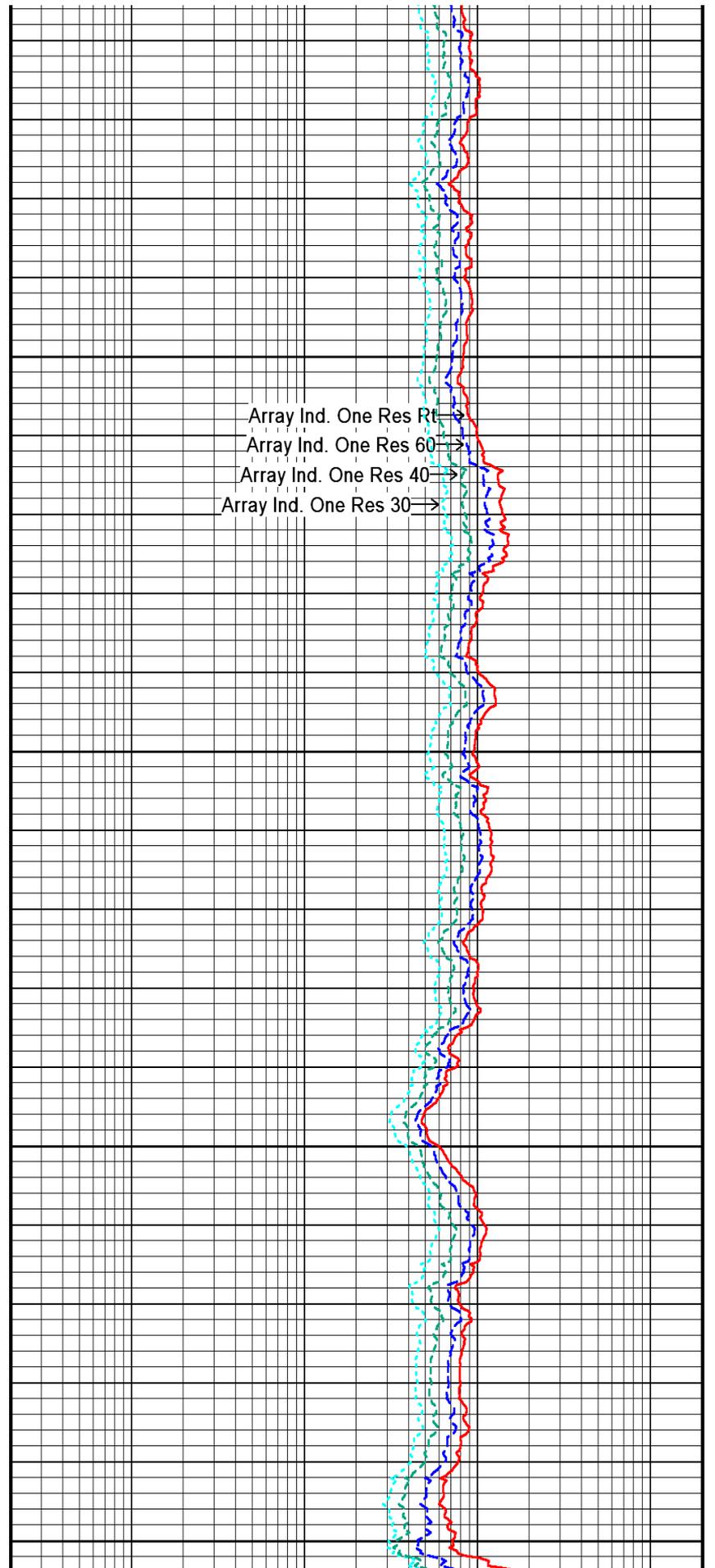
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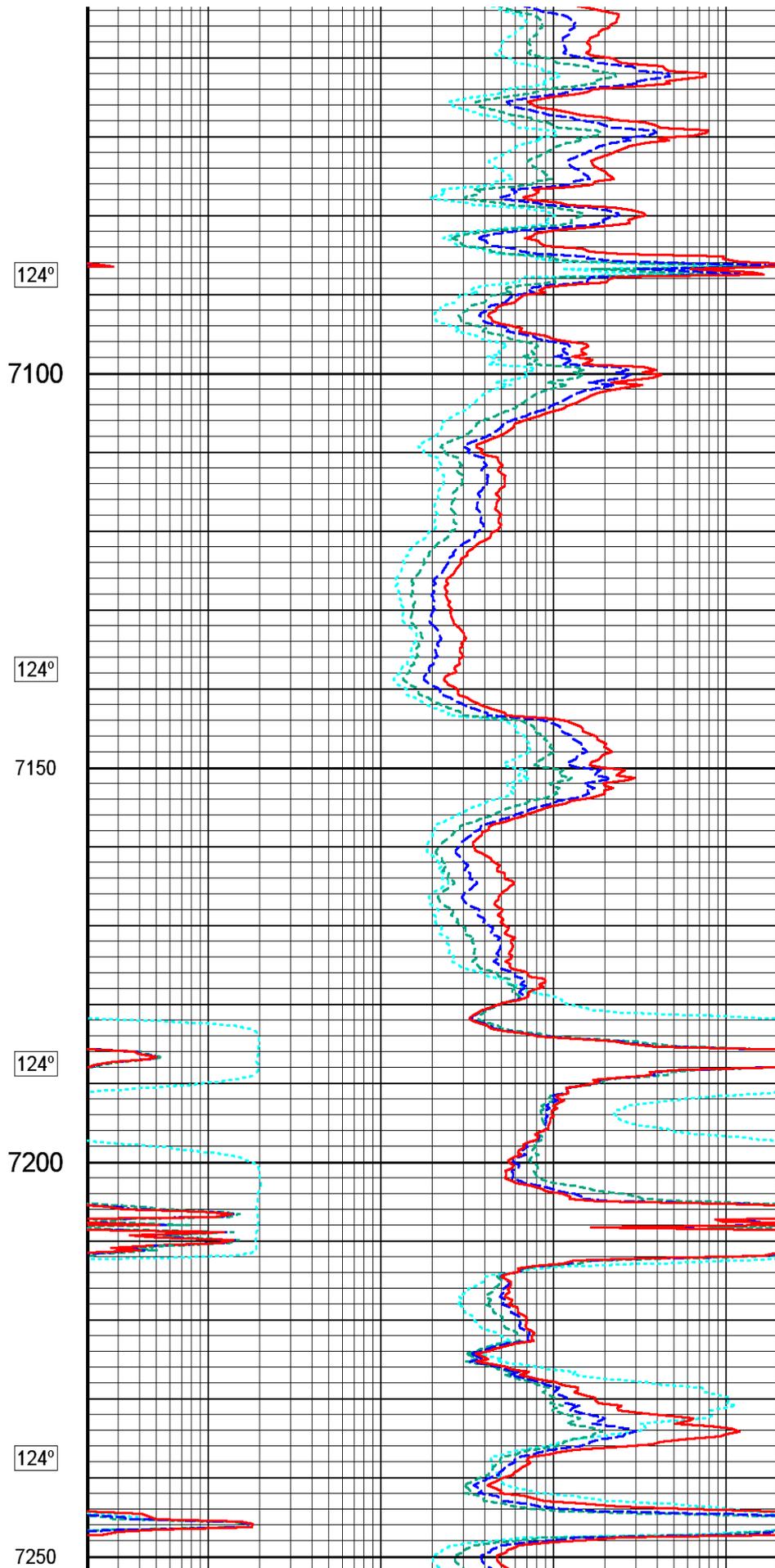
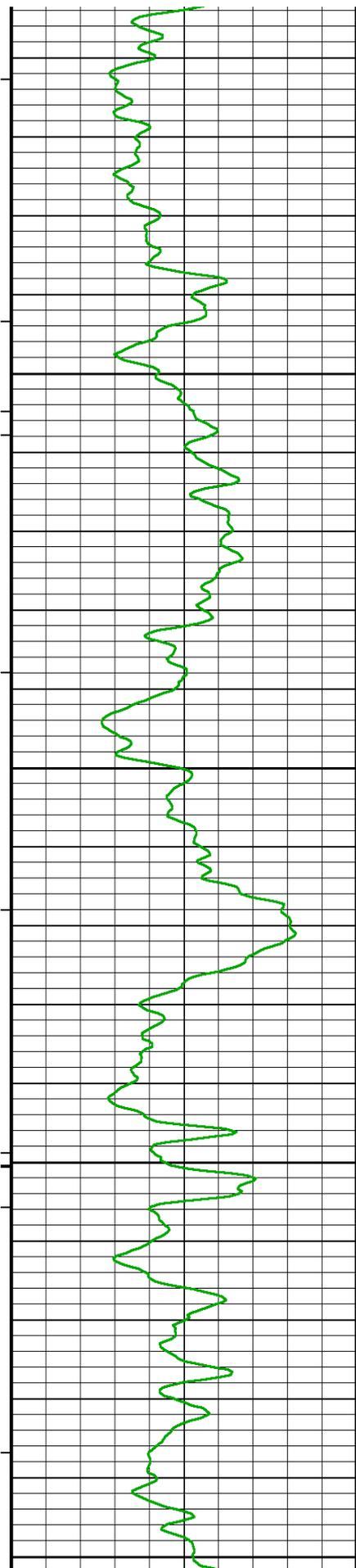
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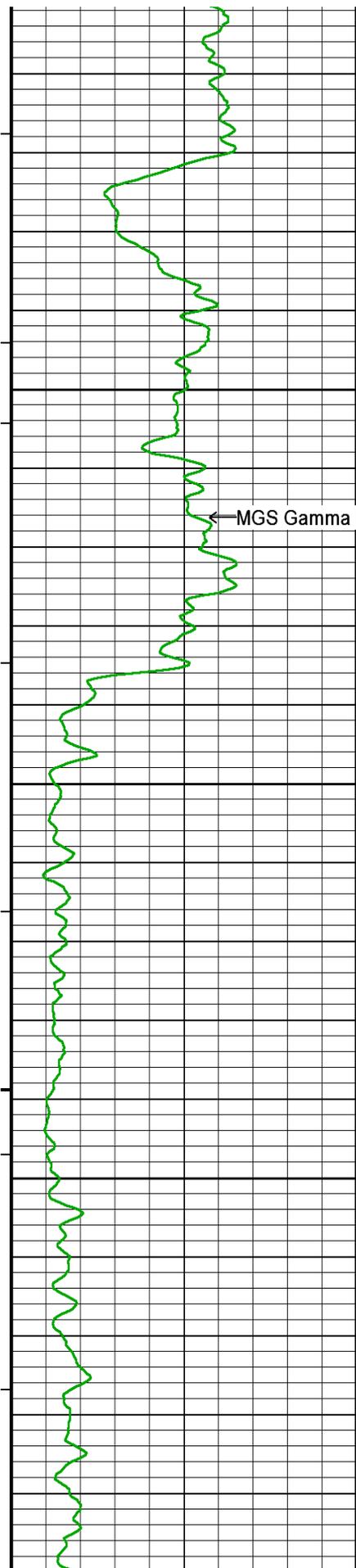
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124°

7050







← MGS Gamma Ray

124°

7300

124°

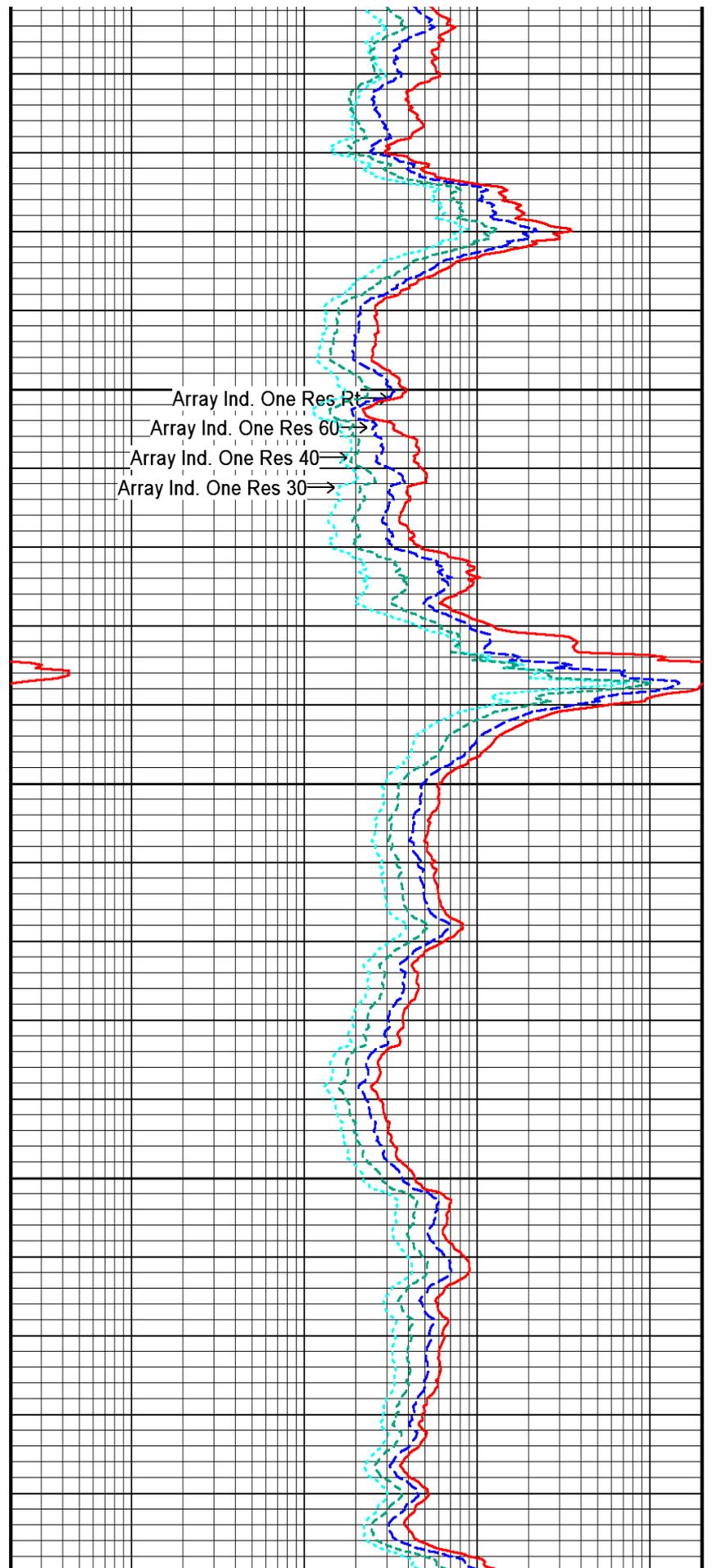
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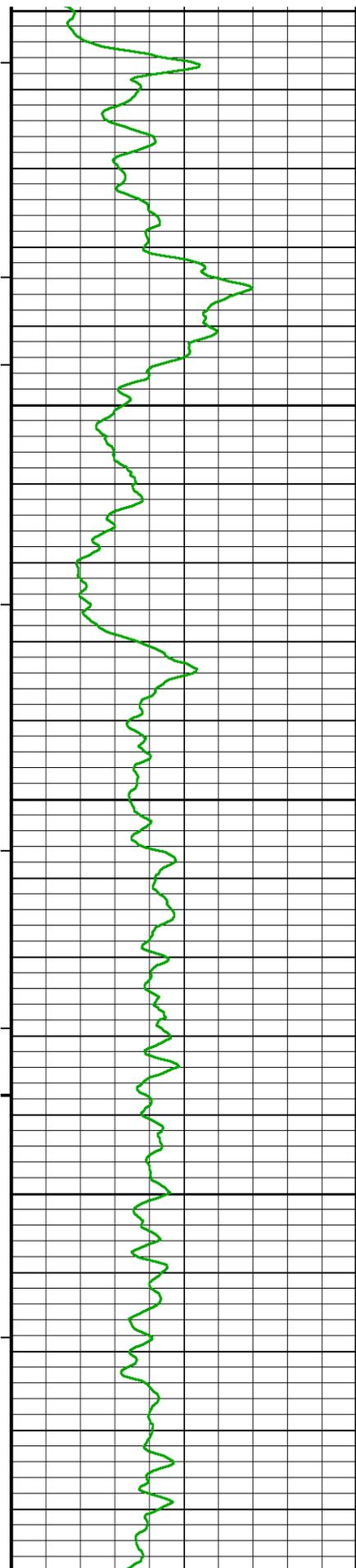
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124°

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Array Ind. One Res RT
Array Ind. One Res 60
Array Ind. One Res 40
Array Ind. One Res 30



7450

124°

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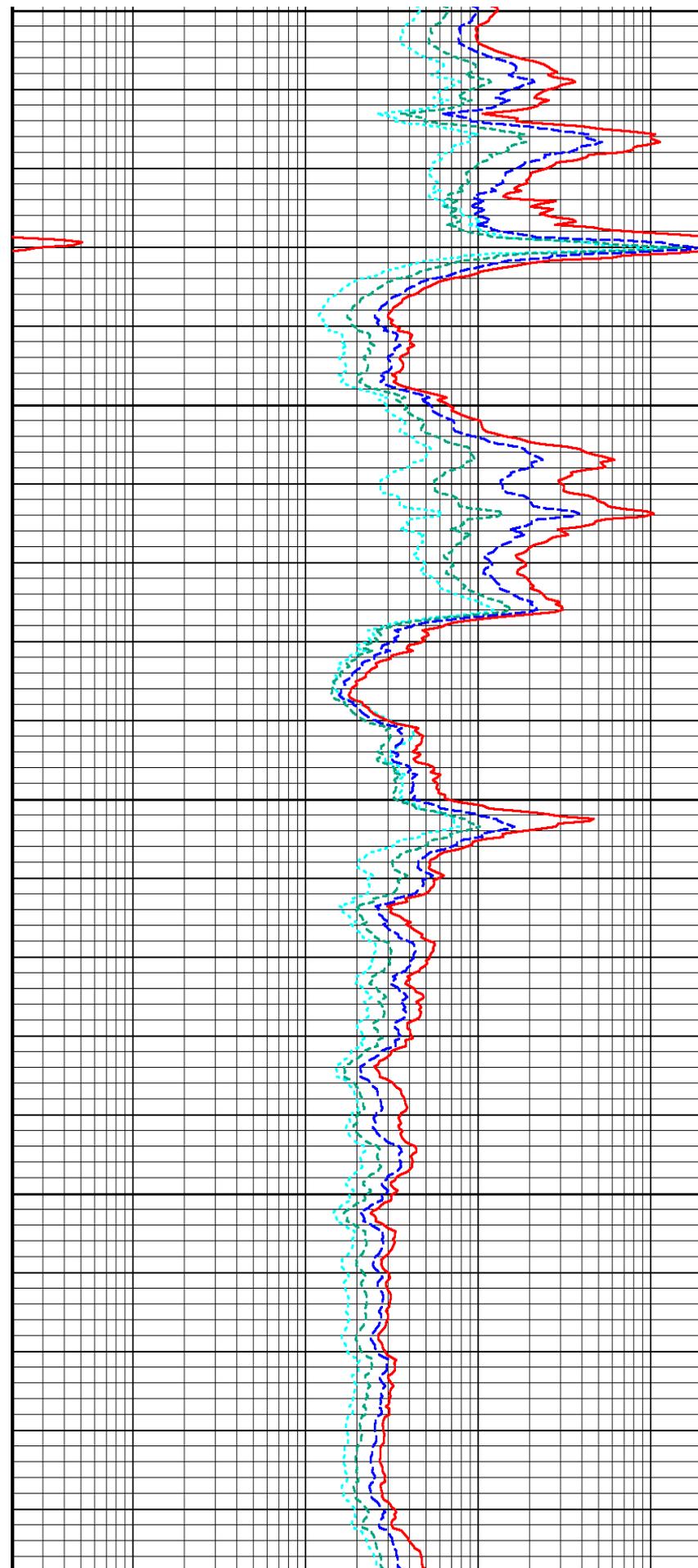
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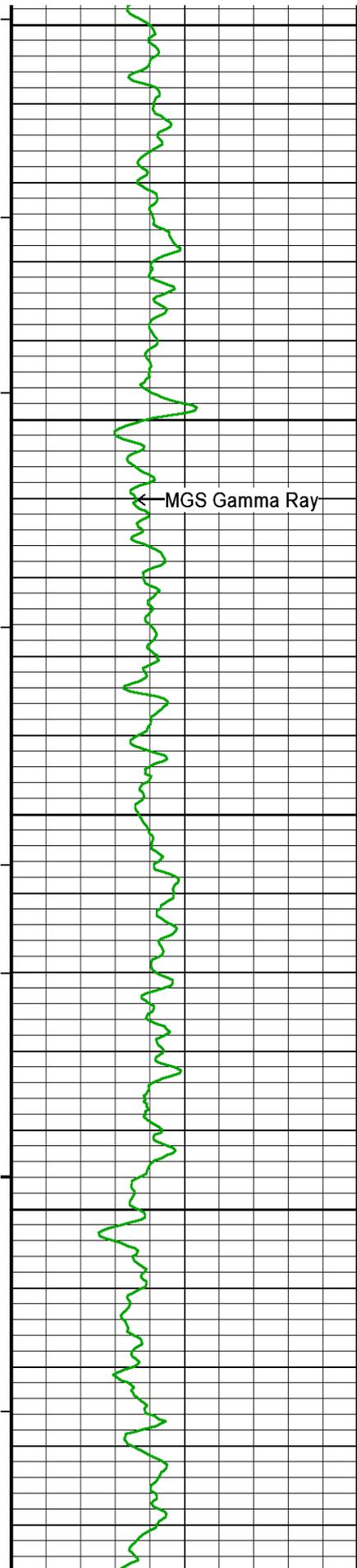
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124°





← MGS Gamma Ray

7650

124°

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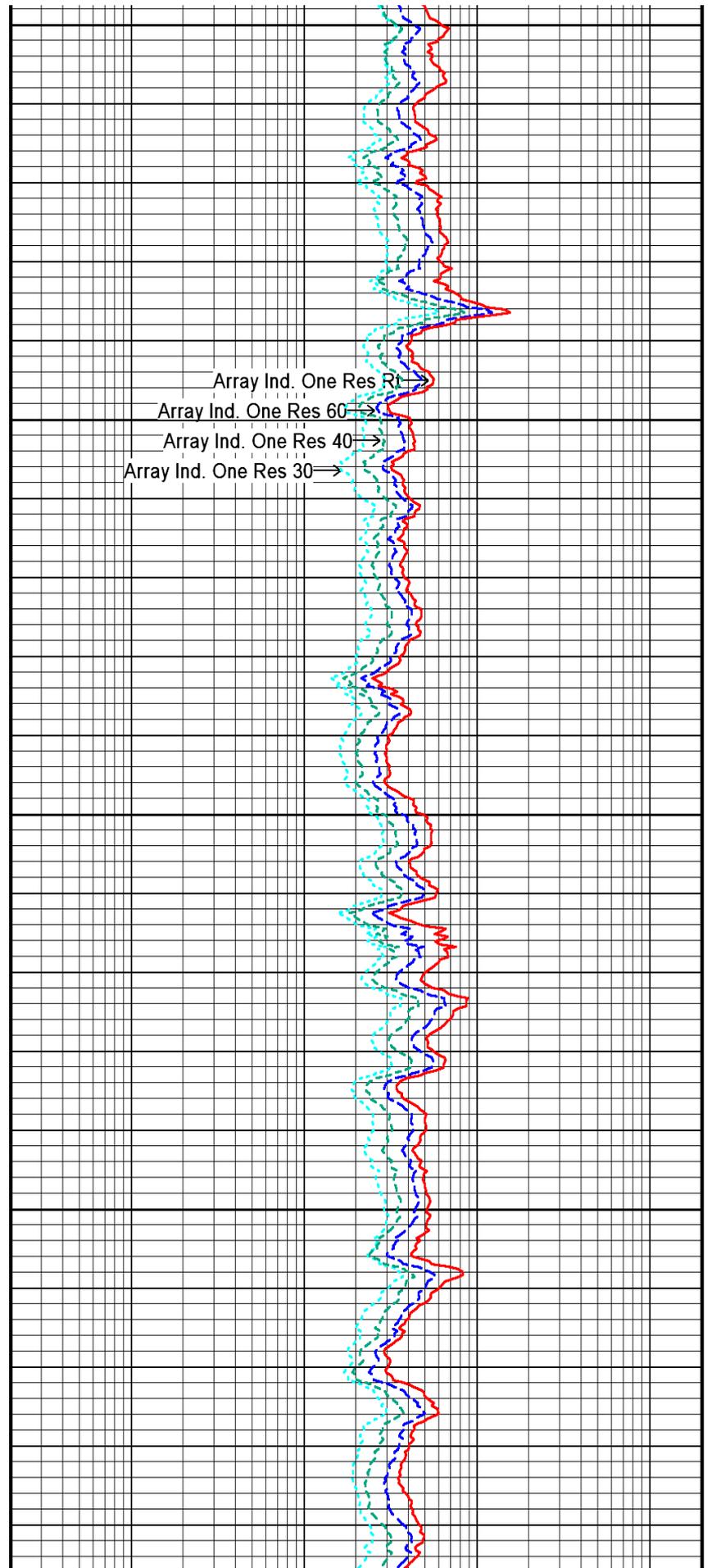
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7750

124°

7800

124°



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

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124°

7700

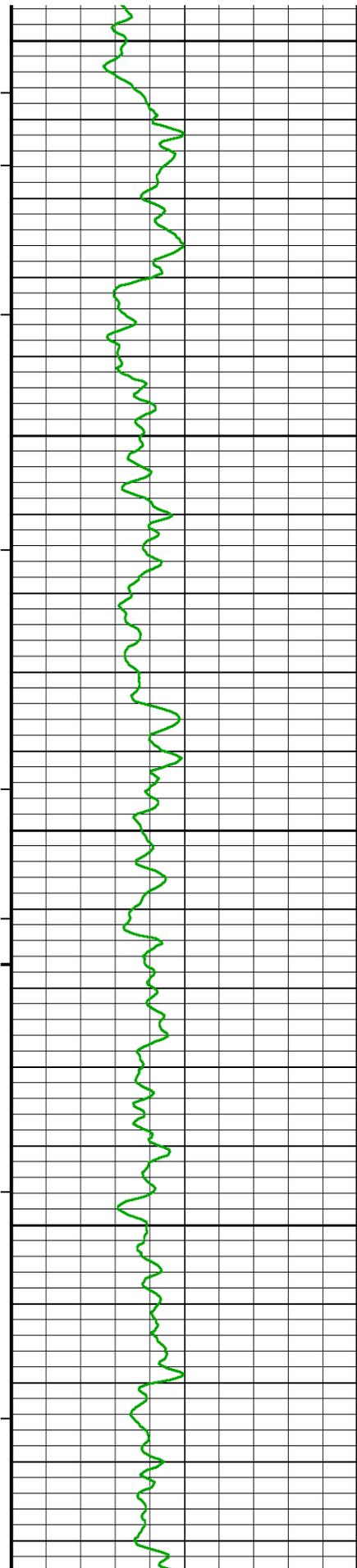
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124°

7800

124°



7850

124°

7900

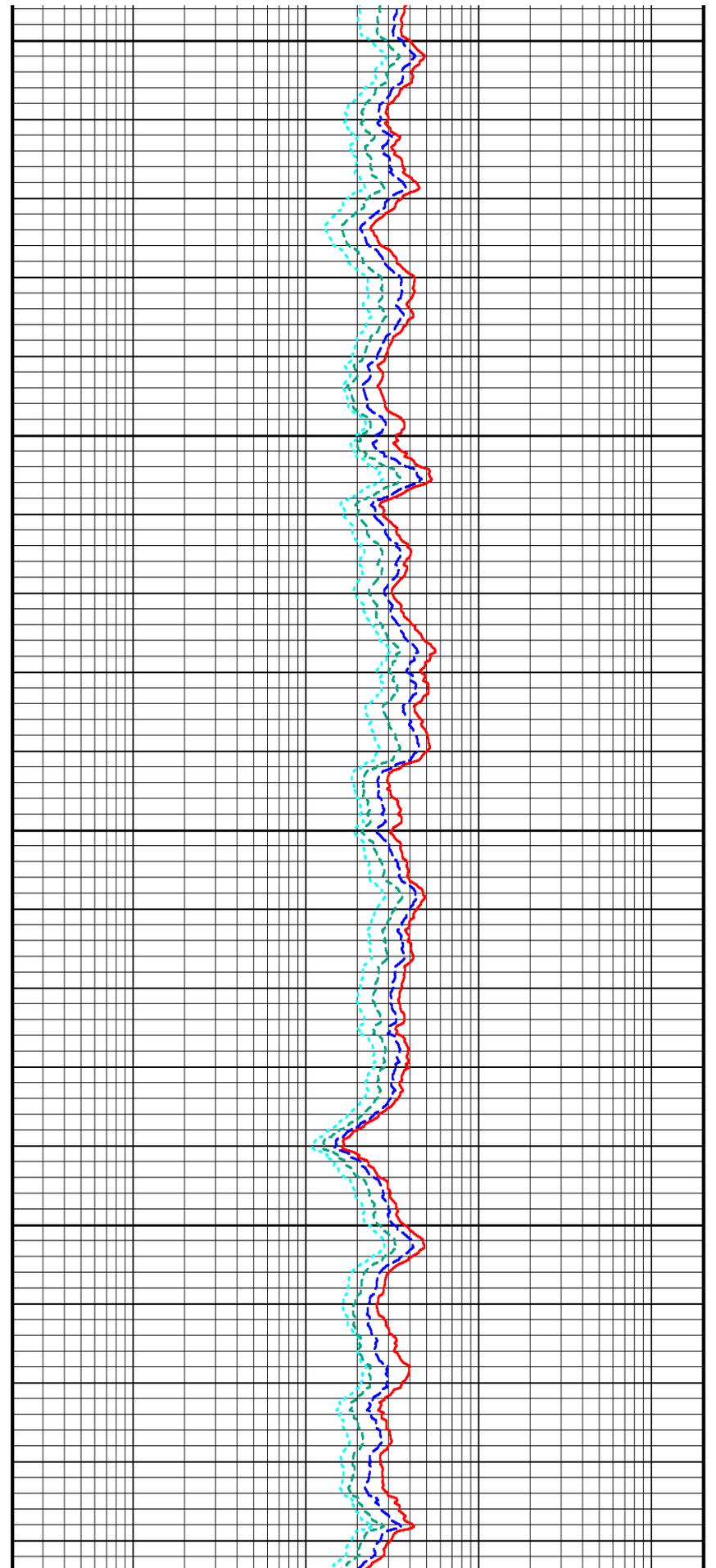
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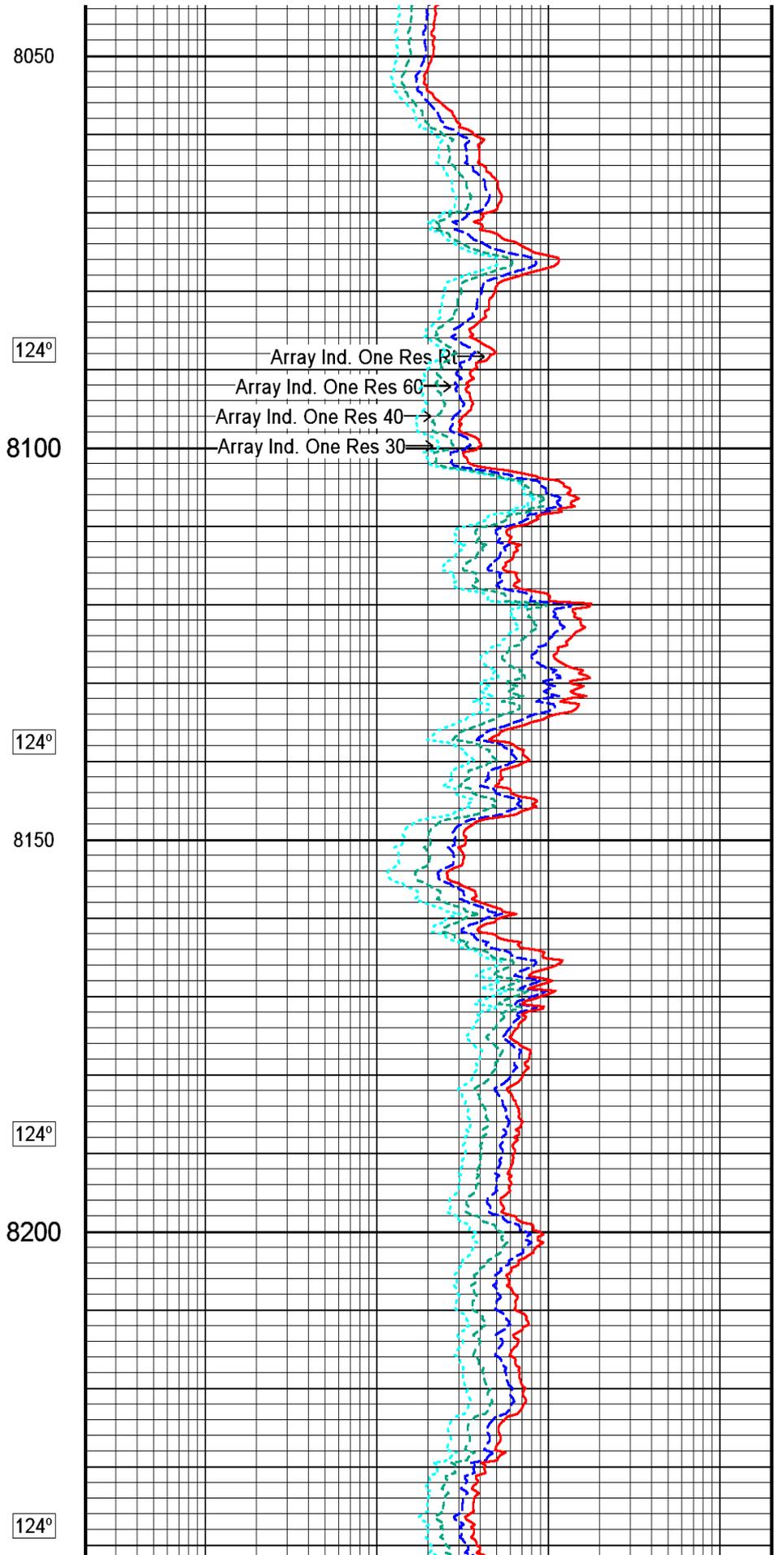
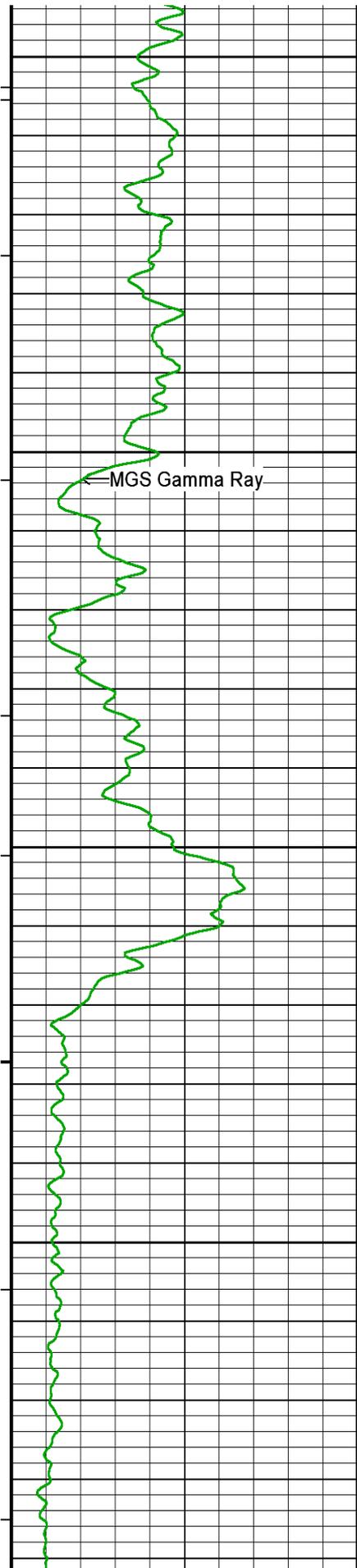
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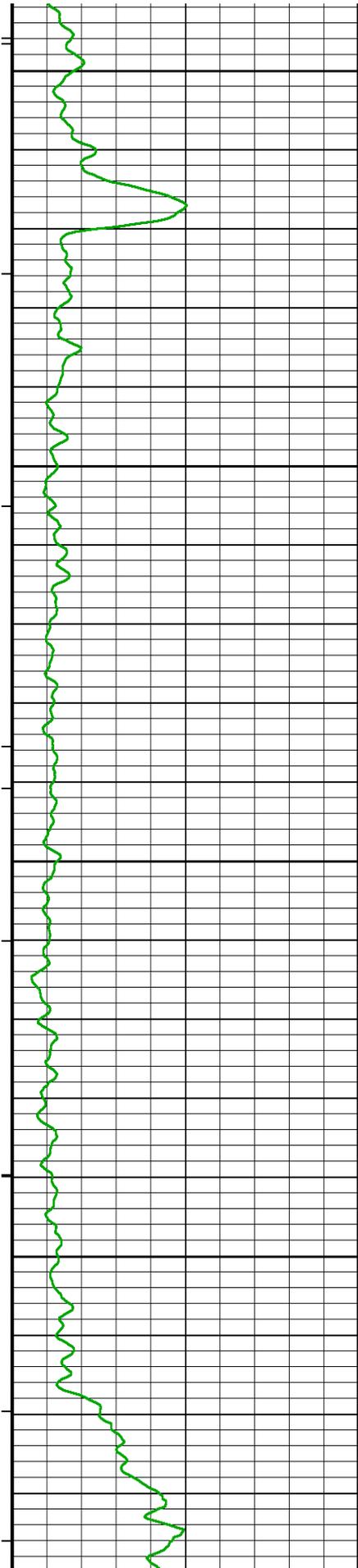
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124°







8250

124°

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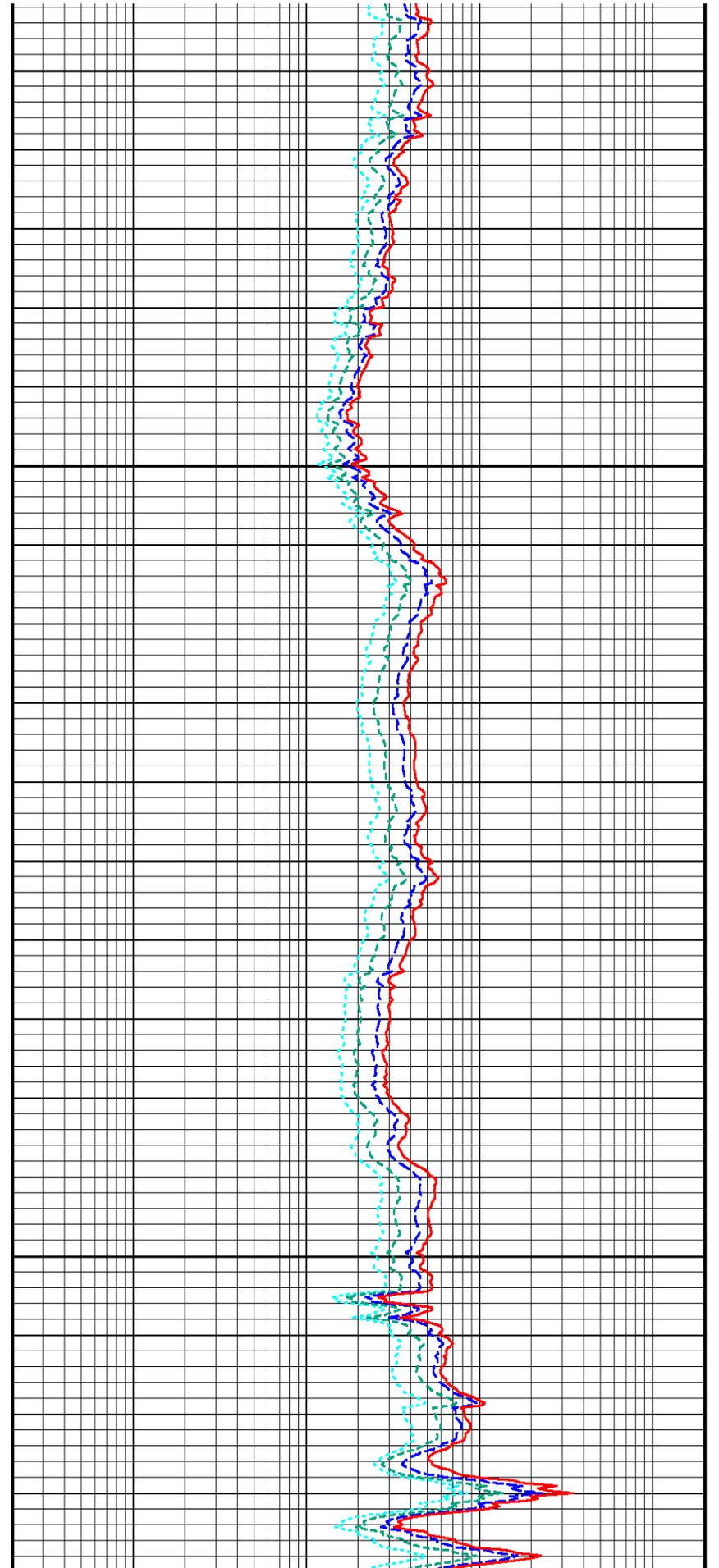
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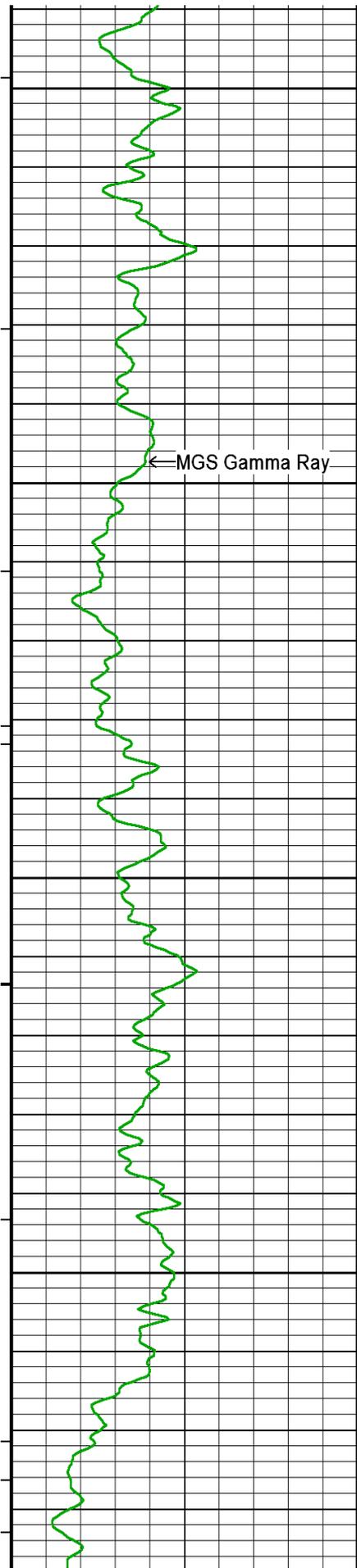
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124°

8400

124°





8450

124°

8500

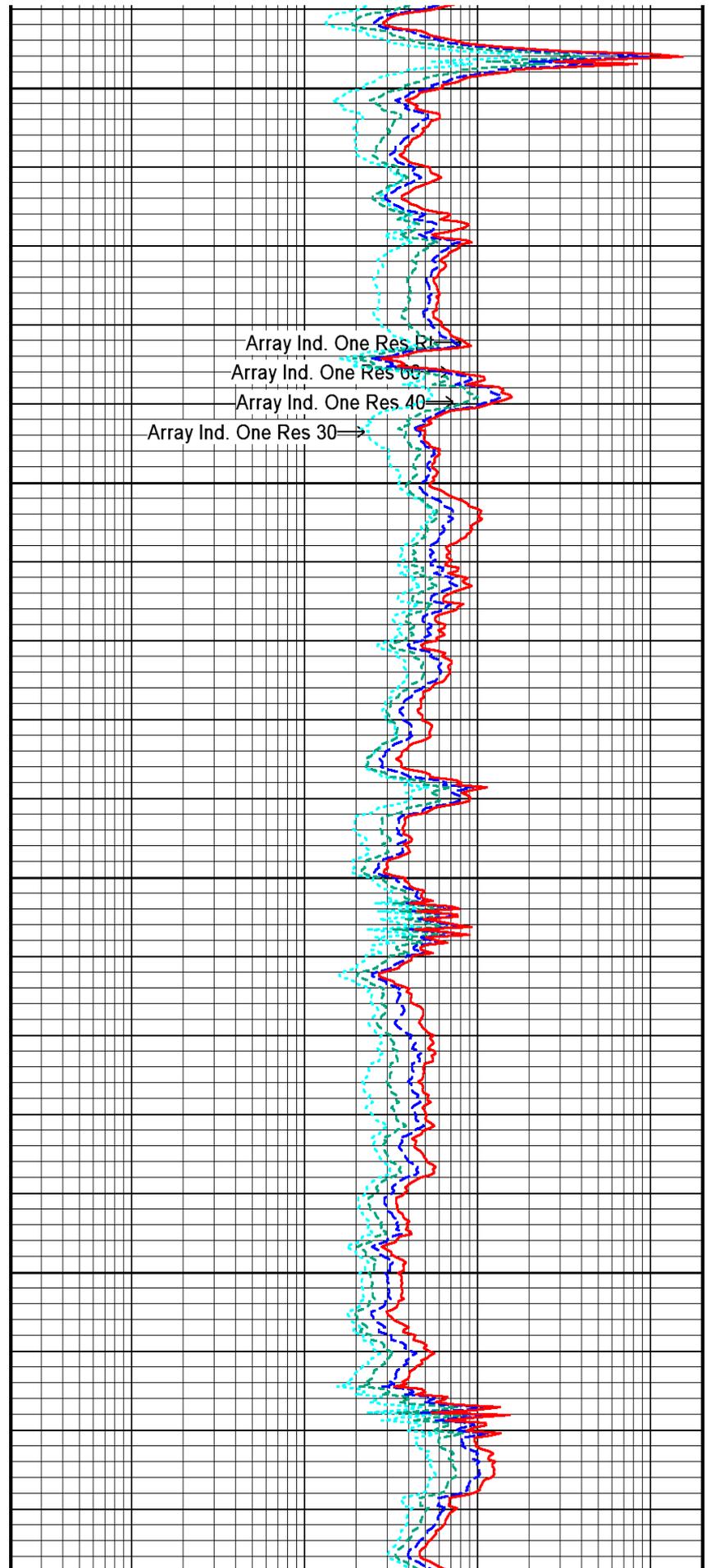
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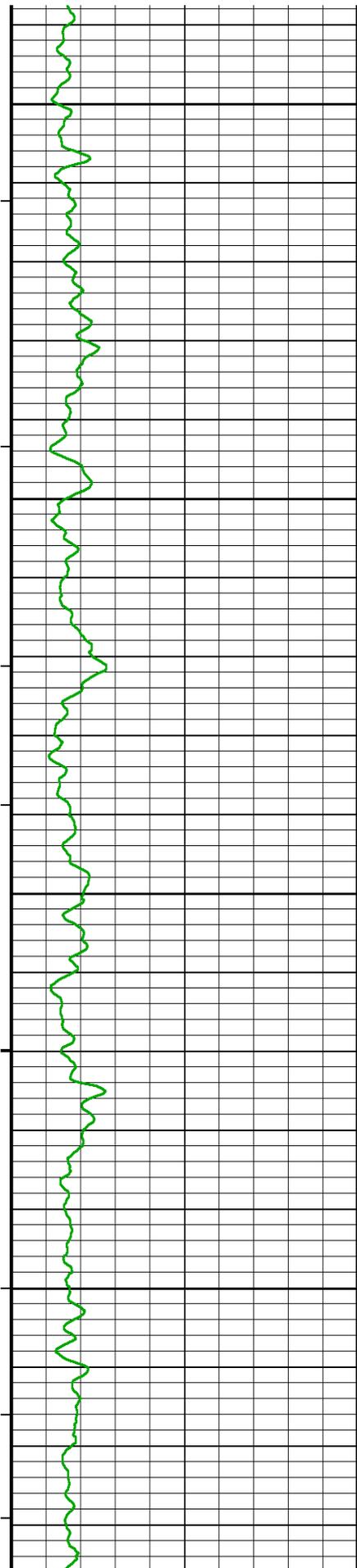
124°

8600

124°



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



124

8650

124°

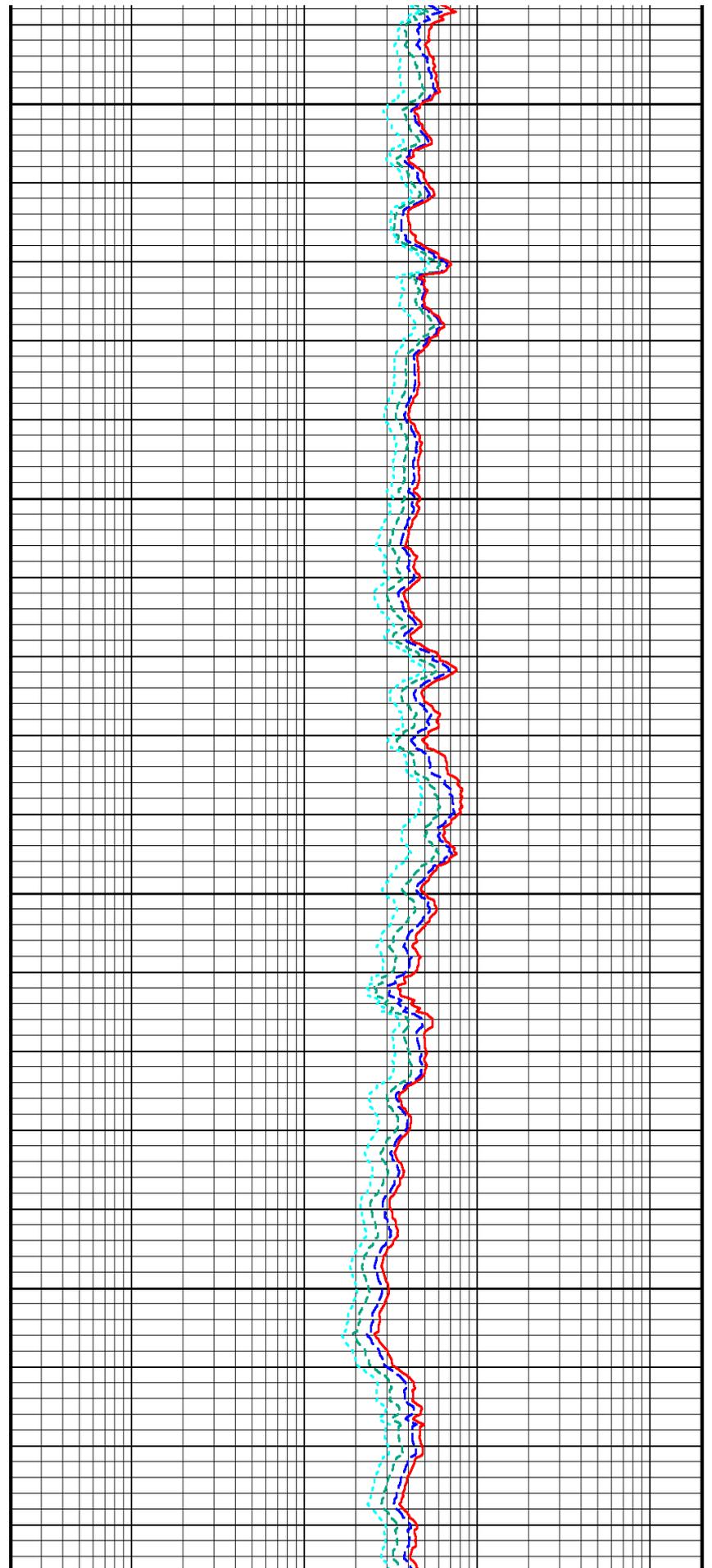
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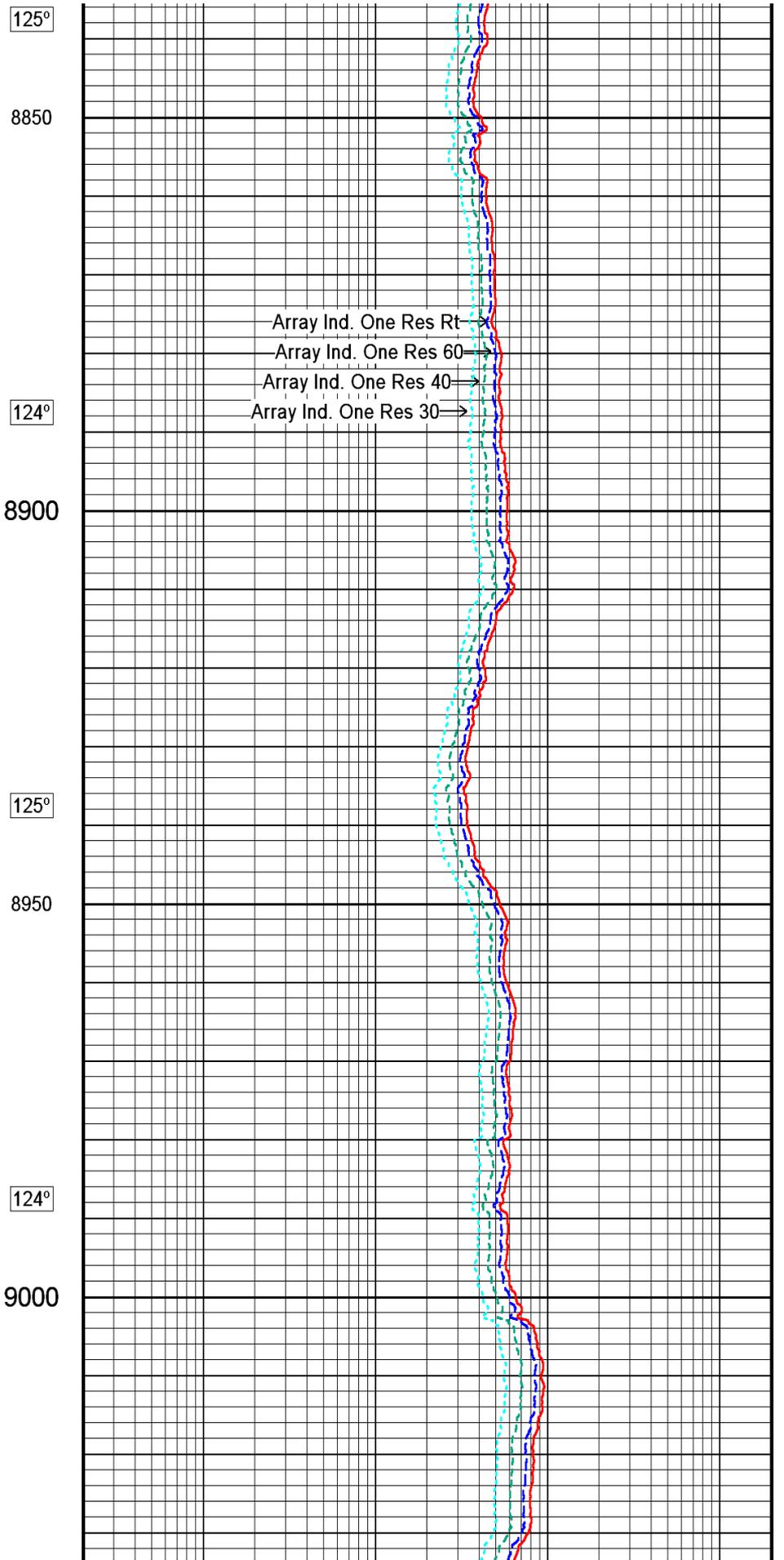
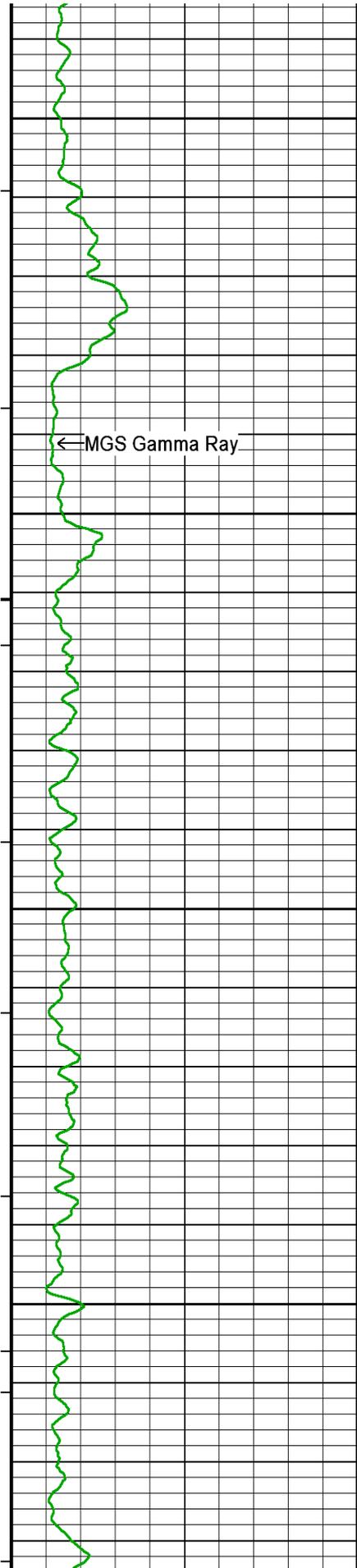
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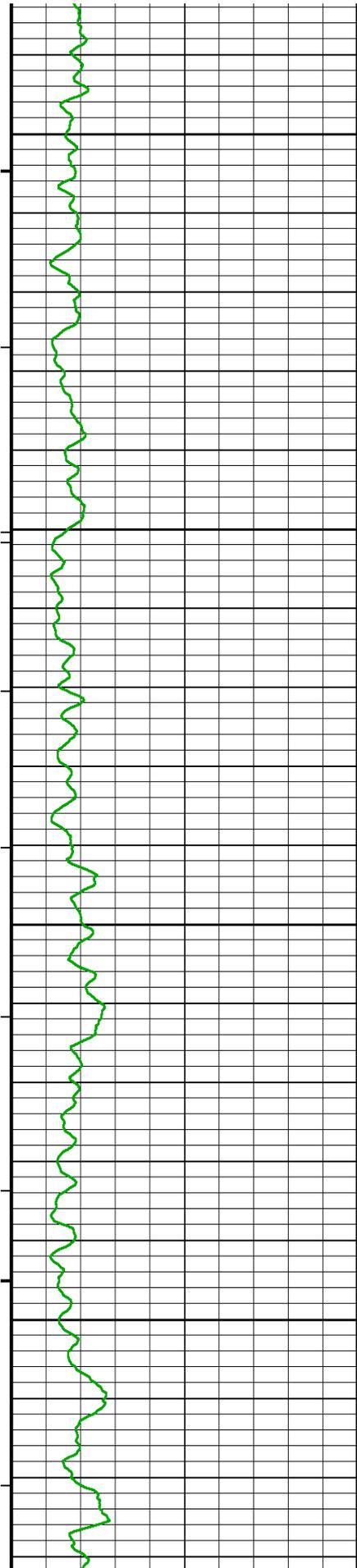
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124°

8800







124°

9050

124°

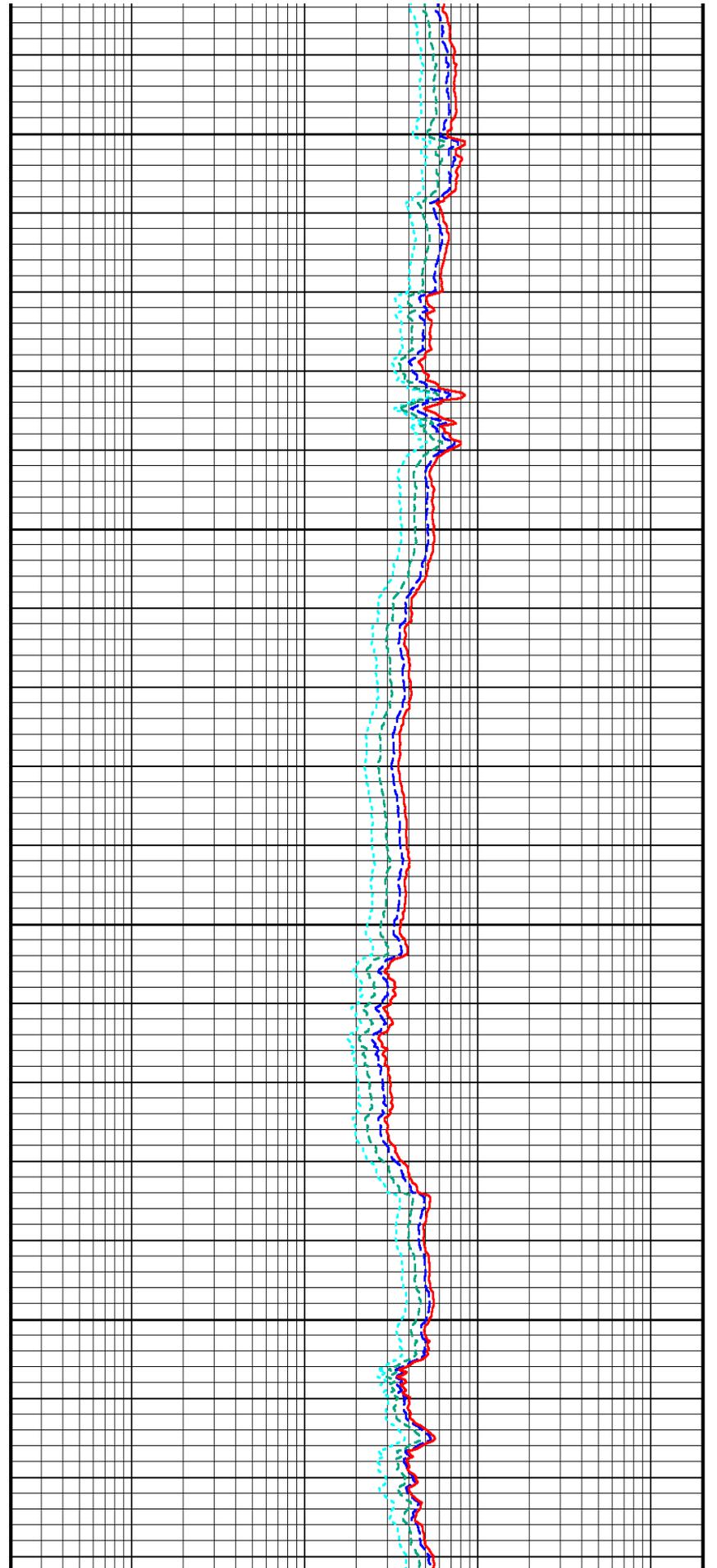
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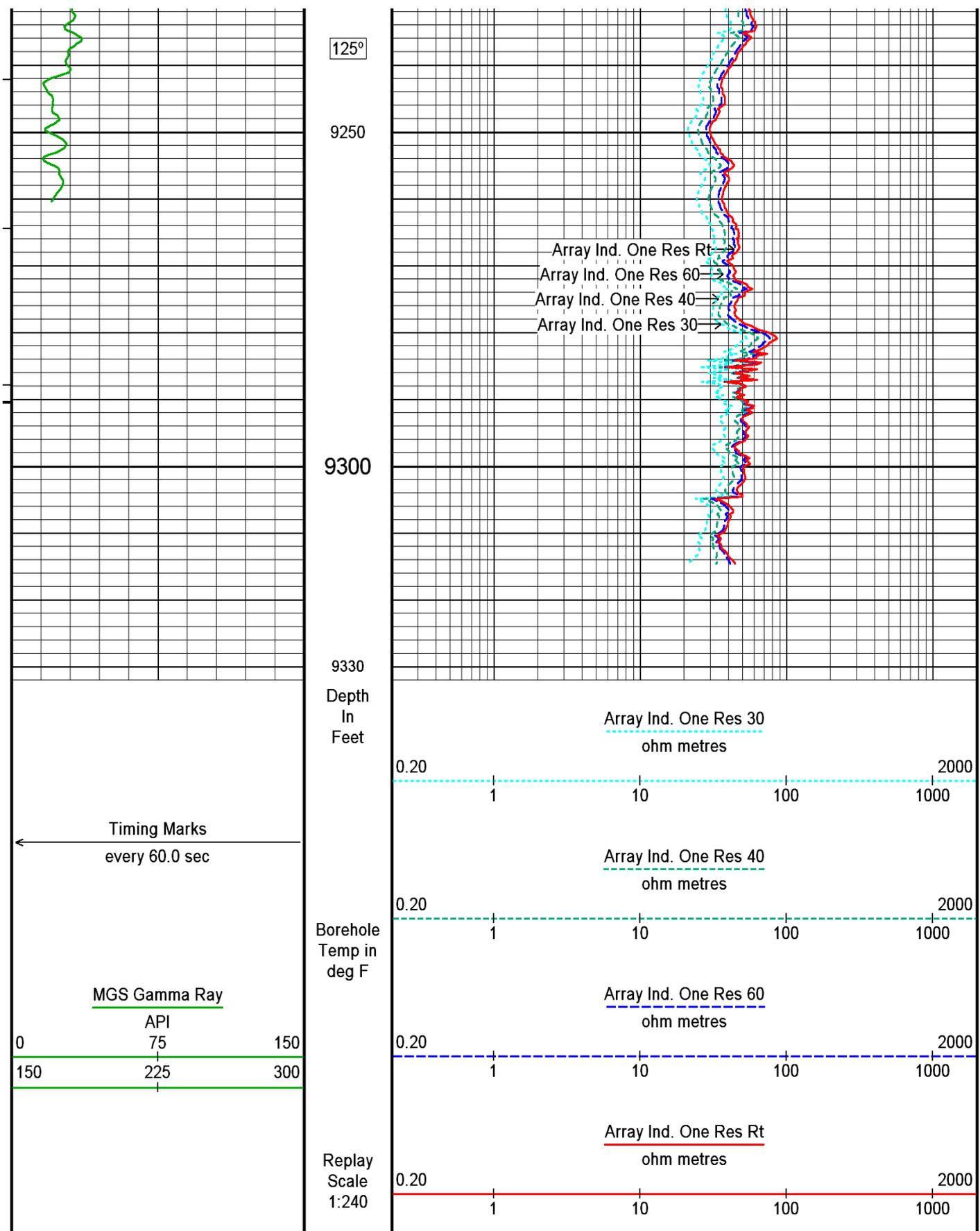
125°

9150

125°

9200





Depth Based Data - Maximum Sampling Increment 10.0cm

Plotted on 03-DEC-2012 01:58

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

Recorded on 03-DEC-2012 00:39

System Versions: Processed with 13.03.7779 Plotted with 13.03.7779



BEFORE SURVEY CALIBRATION

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

Down-hole Tension Calibration All 000

Field Calibration on 24-OCT-2010 03:34

Reading No	Measured	
1	15659.85	0.00
2	15734.68	370.00

General Constants All 000

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

General Parameters

Mud Resistivity	0.860	ohm-metres
Mud Resistivity Temperature	68.000	degrees F
Water Level	0.000	feet
Density/Neutron Processing	Wet Hole	

Hole/Annular Volume and Differential Caliper Parameters

HVOL Method	Single Caliper	
HVOL Caliper 1	Density Caliper	
HVOL Caliper 2	N/A	
Annular Volume Diameter	4.500	inches
Caliper for Differential Caliper	Density Caliper	

Rwa Parameters

Porosity used	Base Density Porosity
Resistivity used	Array Ind. One Res Rt
RWA Constant A	0.610
RWA Constant M	2.150

Down-hole Tension Calibration SMS 0

Field Calibration on 17-JUL-2012 16:31

Reading No	Measured	
1	15685.37	20.00
2	16738.51	350.00

Strain Gauge Constants MMS-E.A 123

Last Edited on

Atmospheric Pressure	14.70	psi						
Serial Number	0							
Calibration Date	000000000000							
Base Check Date								
Dead Weight Serial Number	0							
Dead Weight Gravitational Correction	1.0							
Temperature	75.0	150.0	250.0	350.0	degrees F			
Pressure psia	Inc.	Dec.	Inc.	Dec.	Inc.	Dec.	Inc.	Dec.
0.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2000.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
4000.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
6000.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
8000.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
10000.0	0.000		0.000		0.000		0.000	

High Resolution Temperature Calibration MGS-C.J 119

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

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

High Resolution Temperature Constants MGS-C.J 119

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

Pre-filter Length	11
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SP Calibration MGS-C.J 119			Field Calibration on 23-JUL-2012 04:11	
	Measured		Calibrated (mV)	
Reference 1	100.0		100.0	
Reference 2	-100.0		-100.0	
Gamma Calibration MGS-C.J 119			Field Calibration on 01-DEC-2012 23:22	
	Measured		Calibrated (API)	
Background	206		177	
Calibrator (Gross)	1016		873	
Calibrator (Net)	810		696	
Gamma Constants MGS-C.J 119			Last Edited on 03-DEC-2012,01:42	
Gamma Calibrator Number	GRC 210			
Mud Density	1.00		gm/cc	
Caliper Source for Processing	Density Caliper			
Tool Position	Eccentred			
Concentration of KCl	0.00		kppm	
Neutron Calibration MDN-B.J 427			Base Calibration on 20-NOV-2012 10:29 Field Check on 01-DEC-2012 23:15	
Base Calibration				
	Measured		Calibrated (cps)	
	Near	Far	Near	Far
	2983	91	3714	110
Ratio	32.853		33.764	
Field Calibrator at Base				
			Calibrated (cps)	
			2253	3303
Ratio			0.682	
Field Check				
			Calibrated (cps)	
			2229	3293
Ratio			0.677	
Neutron Constants MDN-B.J 427			Last Edited on 03-DEC-2012,01:42	
Neutron Source Id	P62413B			
Neutron Jig Number	NJ6643			
Epithermal Neutron	No			
Caliper Source for Processing	Density Caliper			
Stand-off	0.00		inches	
Mud Density	1.00		gm/cc	
Limestone Sigma	7.10		cu	
Sandstone Sigma	4.26		cu	
Dolomite Sigma	4.70		cu	
Formation Pressure Source	None			
Formation Pressure	N/A		kpsi	
Temperature Source	None			
Temperature	N/A		degrees F	
Mud Salinity	0.00		kppm	
Salinity Correction	Not Applied			
Formation Fluid Salinity Source	None			
Formation Fluid Salinity	N/A		kppm	
Barite Mud Correction	Not Applied			
FE Calibration MFE-C.A 381			Base Calibration on 04-OCT-2012,19:22 Field Check on 01-DEC-2012 23:04	
Base Calibration				
	Measured		Calibrated (ohm-m)	
Reference 1	9.7		1.3	
Reference 2	961.8		126.8	

Base Check	281.8
Field Check	281.8

FE Constants MFE-C.A 381		Last Edited on 03-DEC-2012,01:42	
Running Mode	No Sleeve		
MFE K Factor	0.1268		
Caliper Source for FE correction	Density Caliper		
Caliper Value for FE correction	N/A	inches	
Rm Source for FE correction	Temperature Corr		
Temp. for Rm Corr.	MGS External Temperature		
Stand-off	0.5	inches	

High Resolution Temperature Calibration MAI-B.J 434		Field Calibration on 22-NOV-2012,11:59	
	Measured	Calibrated(Deg F)	
Lower	10.00	10.00	
Upper	100.00	100.00	

High Resolution Temperature Constants MAI-B.J 434		Last Edited on 22-NOV-2012,11:59	
Pre-filter Length	11		

Induction Calibration MAI-B.J 434		Base Calibration on 15-NOV-2012,15:39	
		Field Check on 01-DEC-2012 22:58	
Base Calibration			
Test Loop Calibration		Measured	
Channel	Low	High	Calibrated (mmho/m)
			Low High
1	14.7	442.4	9.3 966.2
2	5.0	355.7	7.6 821.4
3	3.2	250.0	5.2 566.0
4	1.6	129.2	2.6 279.2
Array Temperature	74.5		Deg F
Channel		Base Check (mmho/m)	
	Low	High	Field Check (mmho/m)
			Low High
1			16.8 4104.0
2			34.0 3793.0
3			29.8 3171.8
4			20.7 2140.7
Deep			16.6 1971.6
Medium			43.8 4229.0
Shallow			53.2 5755.8
Array Temperature			41.9 Deg F

Induction Constants MAI-B.J 434		Last Edited on 03-DEC-2012,01:42	
Induction Model	RtAP-WBM		
Caliper for Borehole Corr.	Density Caliper		
Hole Size for Borehole Correction	N/A	inches	
Tool Centred	No		
Stand-off Type	Fins		
Stand-off	0.50	inches	
Number of Fins on Stand-off	6.0000		
Stand-off Fin Angle	60.00	degrees	
Stand-off Fin Width	1.0000	inches	
Borehole Corr. Rm Source	Temperature Corr		
Temp. for Rm Corr.	MGS External Temperature		
Squasher Start	0.0020	mhos/metre	
Squasher Offset	N/A	mhos/metre	
Borehole Normalisation			
DRM1	0.0000	DRC1	0.0000

DRM2	0.0000	DRC2	0.0000
MRM1	0.0000	MRC1	0.0000
MRM2	0.0000	MRC2	0.0000
SRM1	0.0000	SRC1	0.0000
SRM2	0.0000	SRC2	0.0000

Calibration Site Corrections

Channel 1	0.00	mmhos/metre
Channel 2	0.00	mmhos/metre
Channel 3	0.00	mmhos/metre
Channel 4	0.00	mmhos/metre

Apparent Porosity and Water Saturation Constants

Archie Constant (A)	1.00	
Cementation Exponent (M)	2.00	
Saturation Exponent (N)	2.00	
Saturation of Water for Apor	100.00	percent
Resistivity of Water for Apor and Sw	0.05	ohm-m
Resistivity of Mud Filtrate for Sw	0.00	ohm-m
Source for Rt	0.00	
Source for Rxo	0.00	

Photo Density Calibration MPD-D.A 460

Base Calibration on 20-NOV-2012 13:48

Field Check on 01-DEC-2012 23:09

Density Calibration

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

Field Check at Base

1324.7 1574.1

Field Check

1327.0 1570.3

PE Calibration

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

Field Check at Base

255.3 1183.4

Field Check

254.2 1184.3

Density Constants MPD-D.A 460

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

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

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	0.00

Caliper Calibration MPD-D.A 460

Base Calibration on 20-NOV-2012 14:17

Field Calibration on 01-DEC-2012 23:11

Base Calibration

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

Field Calibration

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

DOWNHOLE EQUIPMENT

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

Shuttle Running Tool 3.5" (SRT A)

SRT-A 8 LG: 5.90 ft WT: 37.5 lb OD: 2.52 in

MBS-F.A 200v Compact Battery Sub

MBS-F.A 121 LG: 10.61 ft WT: 70.5 lb OD: 2.24 in

Compact Memory Sub E.A

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

Compact Tool Isolator sub.

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

Compact Short Gamma

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

Compact Collar Locator

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

SKJ-D.A Compact Knuckle Joint

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

SHA-J.A Compact Swivel Head Adaptor

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

MIS-D.A Compact Inline Bowspring sub

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

Compact Neutron

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



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

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

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

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

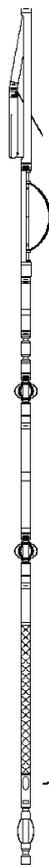
MIS-E.B Compact Inline Standoff sub
MIS-E.B 695 LG: 2.14 ft WT: 15.4 lb OD: 2.24 in

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

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

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

Total Length: 87.64 ft Weight: 637.1 lb



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

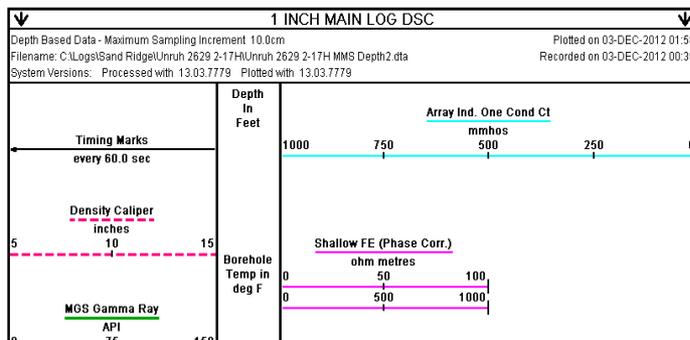
COMPANY SANDRIDGE ENERGY
WELL UNRUH 2629 2-17H
FIELD MONGER
PROVINCE/COUNTY GRAY
COUNTRY/STATE U.S.A. / KANSAS

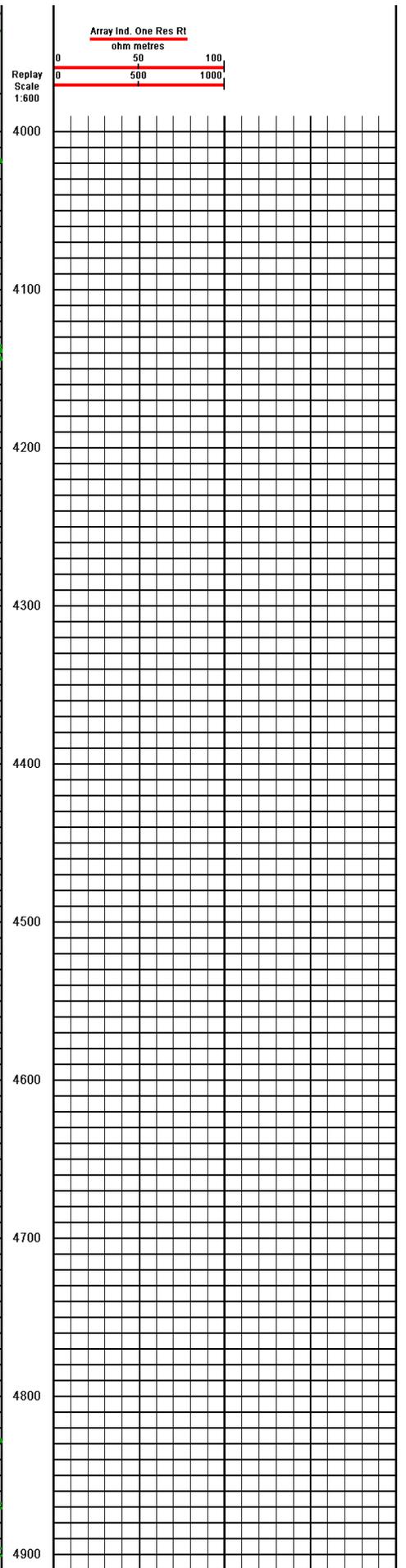
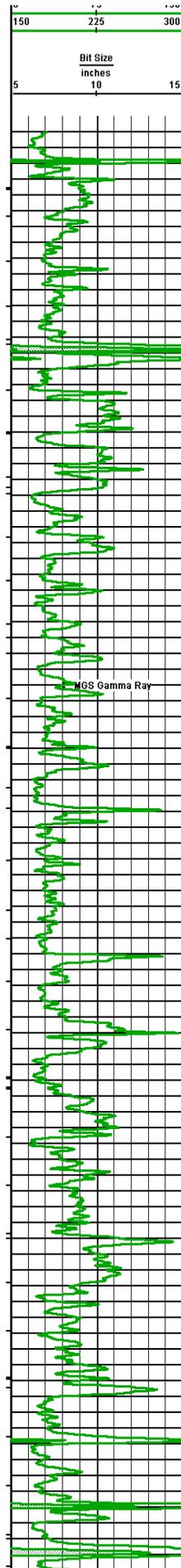
Elevation Kelly Bushing	2765.00	feet	First Reading	9313.00	feet
Elevation Drill Floor	2765.00	feet	Depth Driller	9370.00	feet
Elevation Ground Level	2745.00	feet	Depth Logger	9370.00	feet

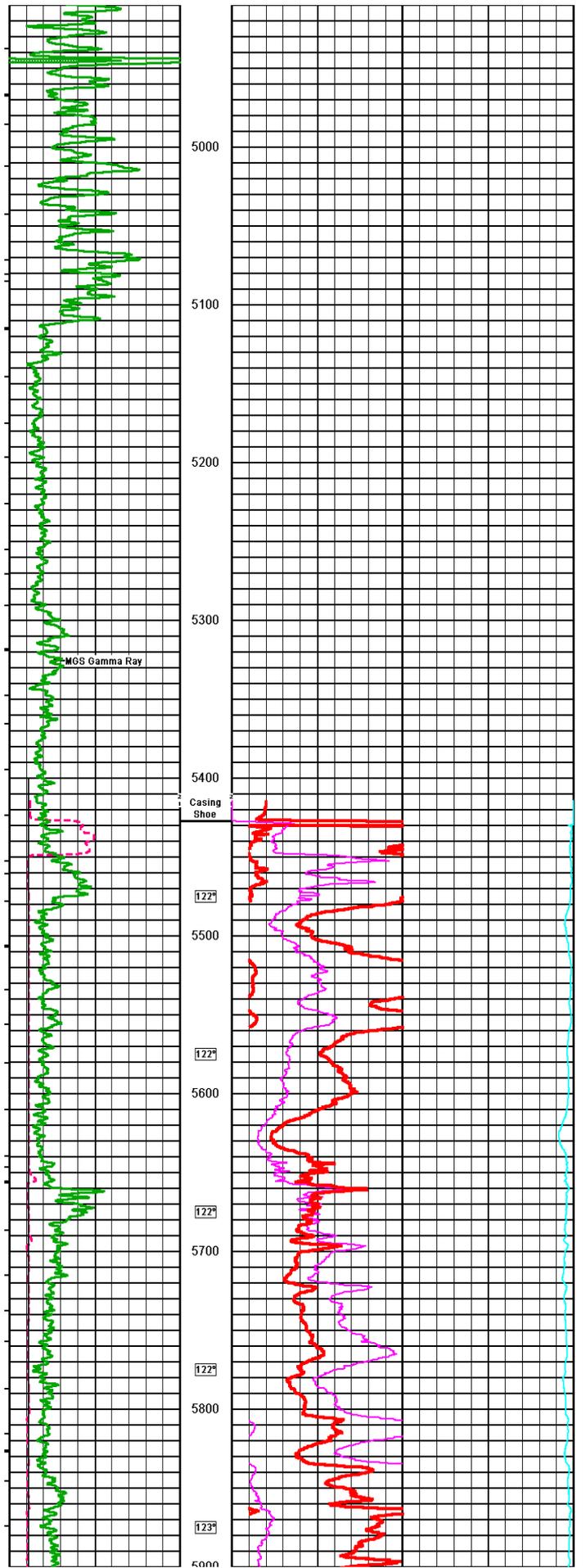


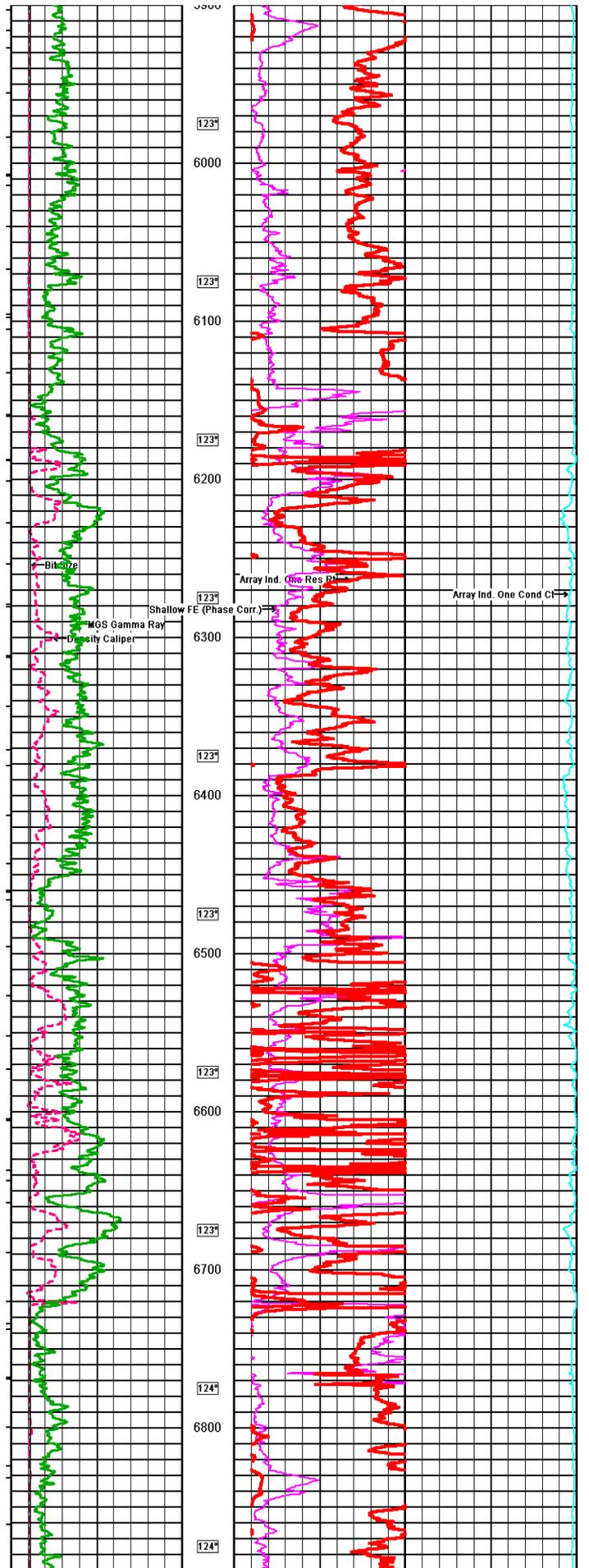
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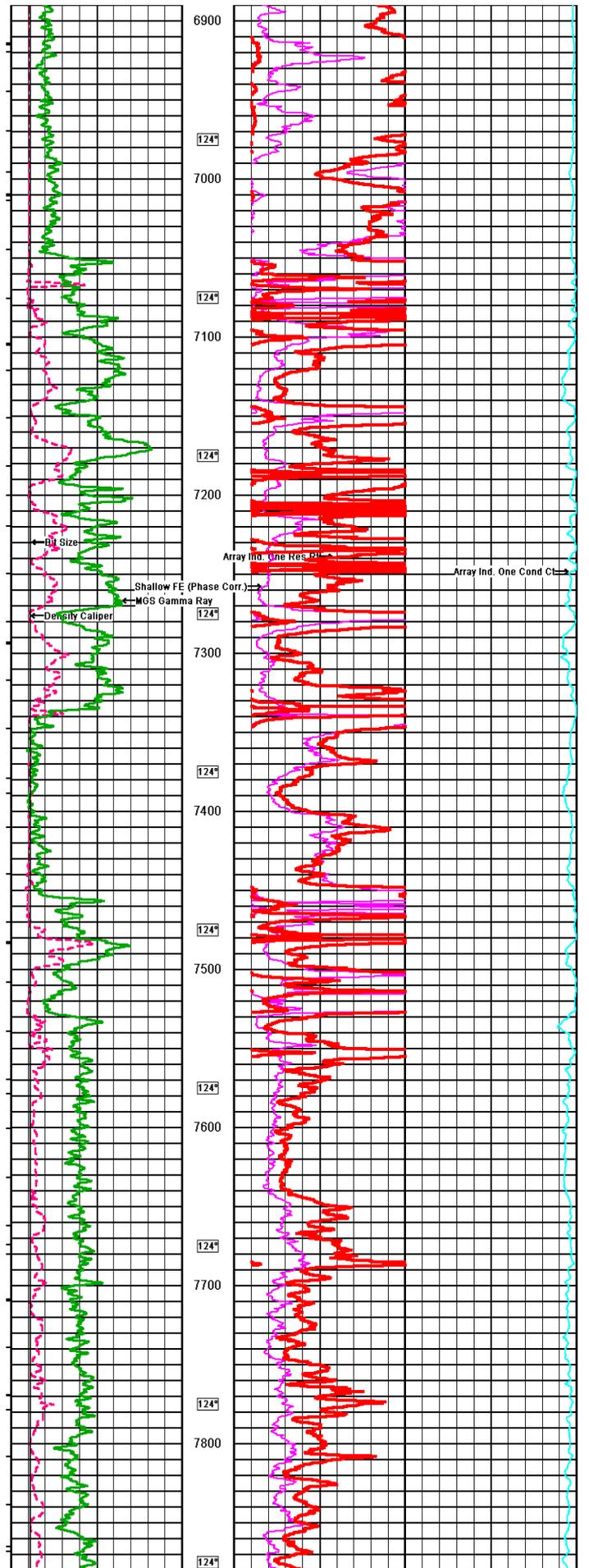
ARRAY INDUCTION LOG

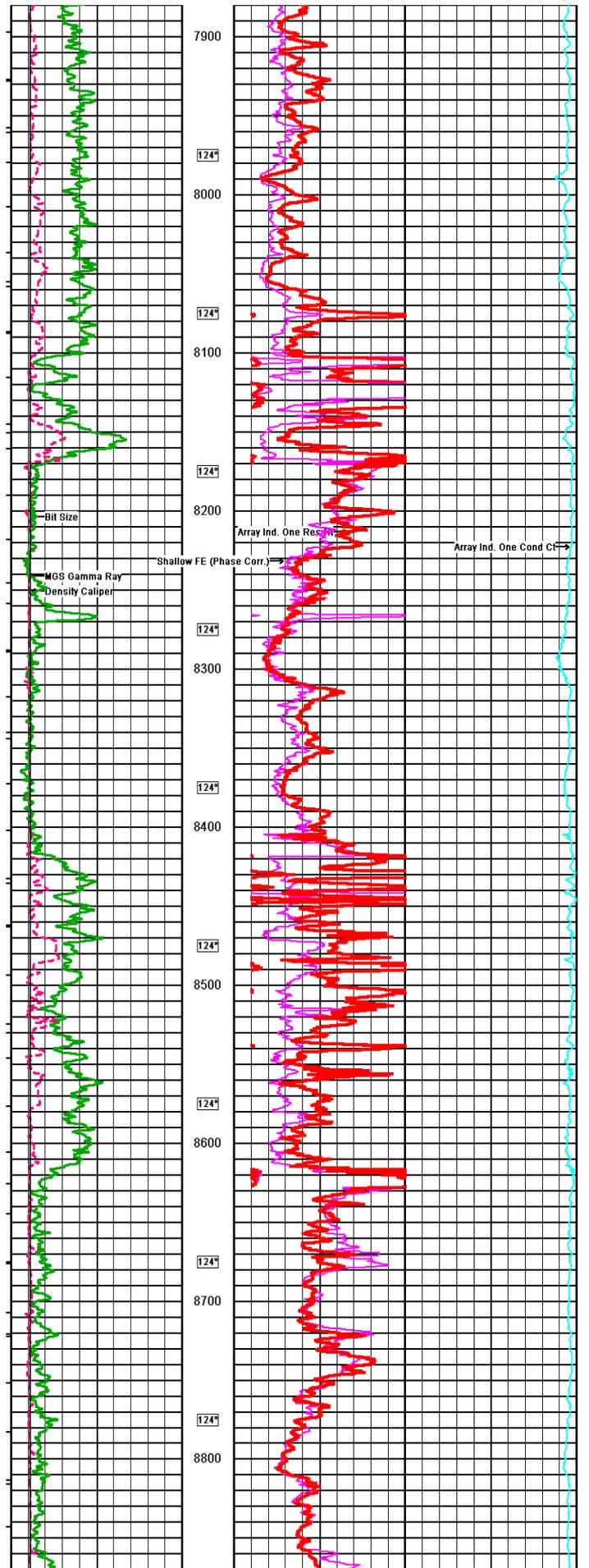


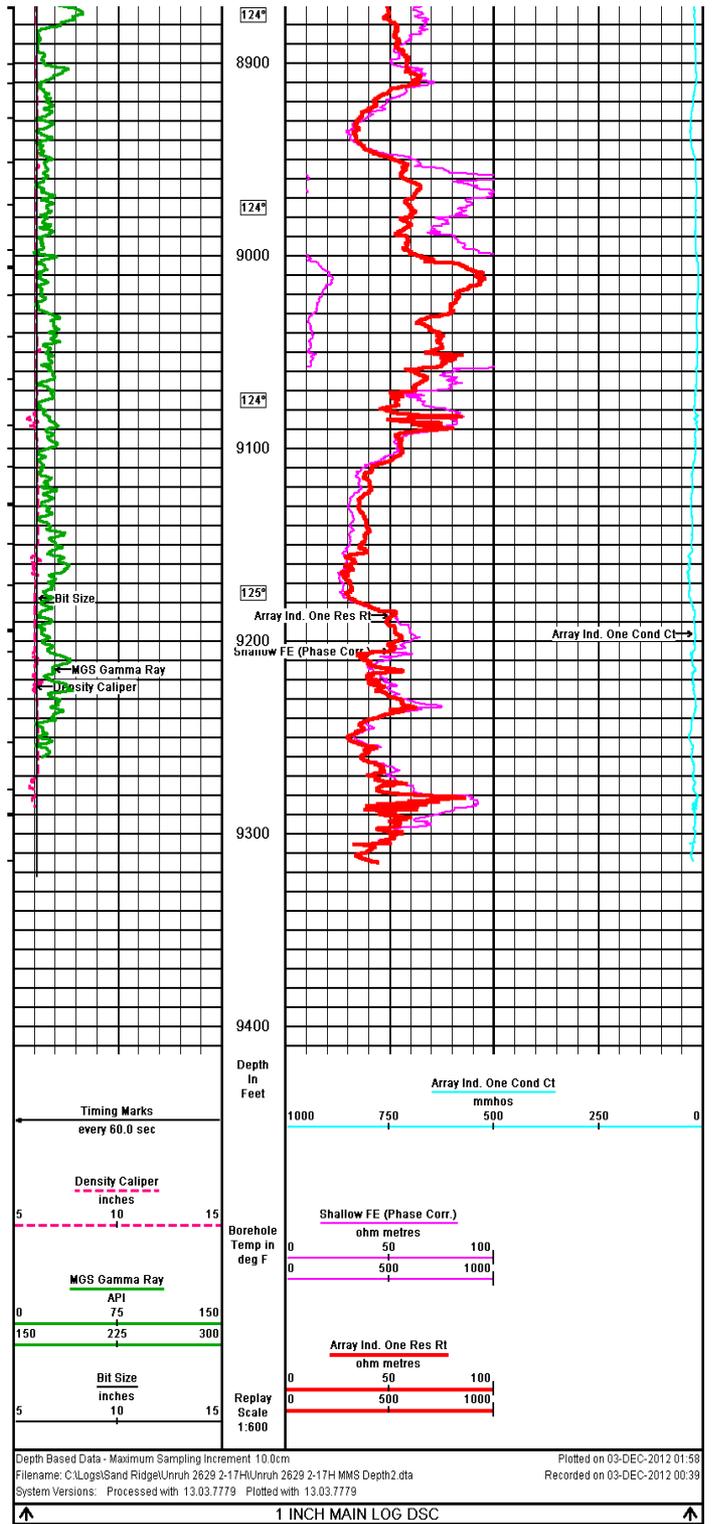












COMPANY	SANDRIDGE ENERGY		
WELL	UNRUH 2629 2-17H		
FIELD	MONGER		
PROVINCE/COUNTY	GRAY		
COUNTRY/STATE	U.S.A. / KANSAS		
Elevation Kelly Bushing	2765.00 feet	First Reading	feet
Elevation Drill Floor	2765.00 feet	Depth Driller	9370.00 feet
Elevation Ground Level	2745.00 feet	Depth Logger	9370.00 feet

