



**Weatherford**<sup>®</sup>

**CML MESSENGER SHUTTLE**

**ARRAY INDUCTION**

**LOG**

COMPANY **SANDRIDGE ENERGY**  
 WELL **TURNER 3406 3-7H**  
 FIELD **EASTHAM**  
 PROVINCE/COUNTY **HARPER**  
 COUNTRY/STATE **USA / KANSAS**  
 LOCATION **250' FSL & 880' FWL**  
**SW SE SW SW**

SEC **7** TWP **34S** RGE **6W** Other Services  
 MDN/MPD  
 API Number **15-077-21896**  
 Permit Number  
 Permanent Datum G.L., Elevation 1301 feet  
 Log Measured From DF  
 Drilling Measured From DF @ 18FEET

Elevations:  
 KB 1319.00 feet  
 DF 1319.00  
 GL 1301.00

Date	11-JAN-2013	
Run Number	ONE	
Depth Driller	11690.00	feet
Depth Logger	11690.00	feet
First Reading	11588.00	feet
Last Reading	5360.00	feet
Casing Driller	5360.00	feet
Casing Logger	5360.00	feet
Bit Size	6.125	inches
Hole Fluid Type	WATER	
Density / Viscosity	8.35 lb/USg	27.00 CP
PH / Fluid Loss	8.00	60.00 ml/30Min
Sample Source	FLOWLINE	
Rm @ Measured Temp	2.20 @ 60.0	ohm-m
Rmf @ Measured Temp	1.76 @ 60.0	ohm-m
Rmc @ Measured Temp	2.64 @ 60.0	ohm-m
Source Rmf / Rmc	CALC	CALC
Rm @ BHT	0.90 @146.0	ohm-m
Time Since Circulation	1 HOUR	
Max Recorded Temp	146.00	deg F
Equipment Name	COMPACT	
Equipment / Base	18064	OKC
Recorded By	B.ALLEN	
Witnessed By	T. ALCORN	
AFE# / S.O.	DC12568	3539577

**BOREHOLE RECORD**

Last Edited: 12-JAN-2013 18:22

Bit Size inches	Depth From feet	Depth To feet
12.250	0.00	800.00
8.750	800.00	5360.00
6.125	5360.00	11690.00

**REMARKS**

LOGGED WITH WLS VER 13.03.7779 SOFTWARE

WELL LOGGED USING MESSENGER METHOD OF DEPLOYMENT, AND MEMORY LOGGING SYSTEM

HARDWARE: MAI: ISA STANDOFF BELOW

MPD: 4"PROFILE PLATE, MIS-A SINGLE SPRING DECENTRALIZER BELOW

MDN: MISD DOUBLE SPRING DECENTRALIZER RAN ABOVE

2.71 G/CC DENSITY MATRIX USED TOCALCULATE POROSITY

ALL INTERVALS LOGGED AND SCALED PER CUSTOMER REQUEST

DRILL PIPE DEPTH DURING DEPLOYMENT - 11511.47

LOGGING TOOL DEPTH AFTER DEPLOYMENT: 11594.47

4.5" CASING USED TO CALCULATE AHV

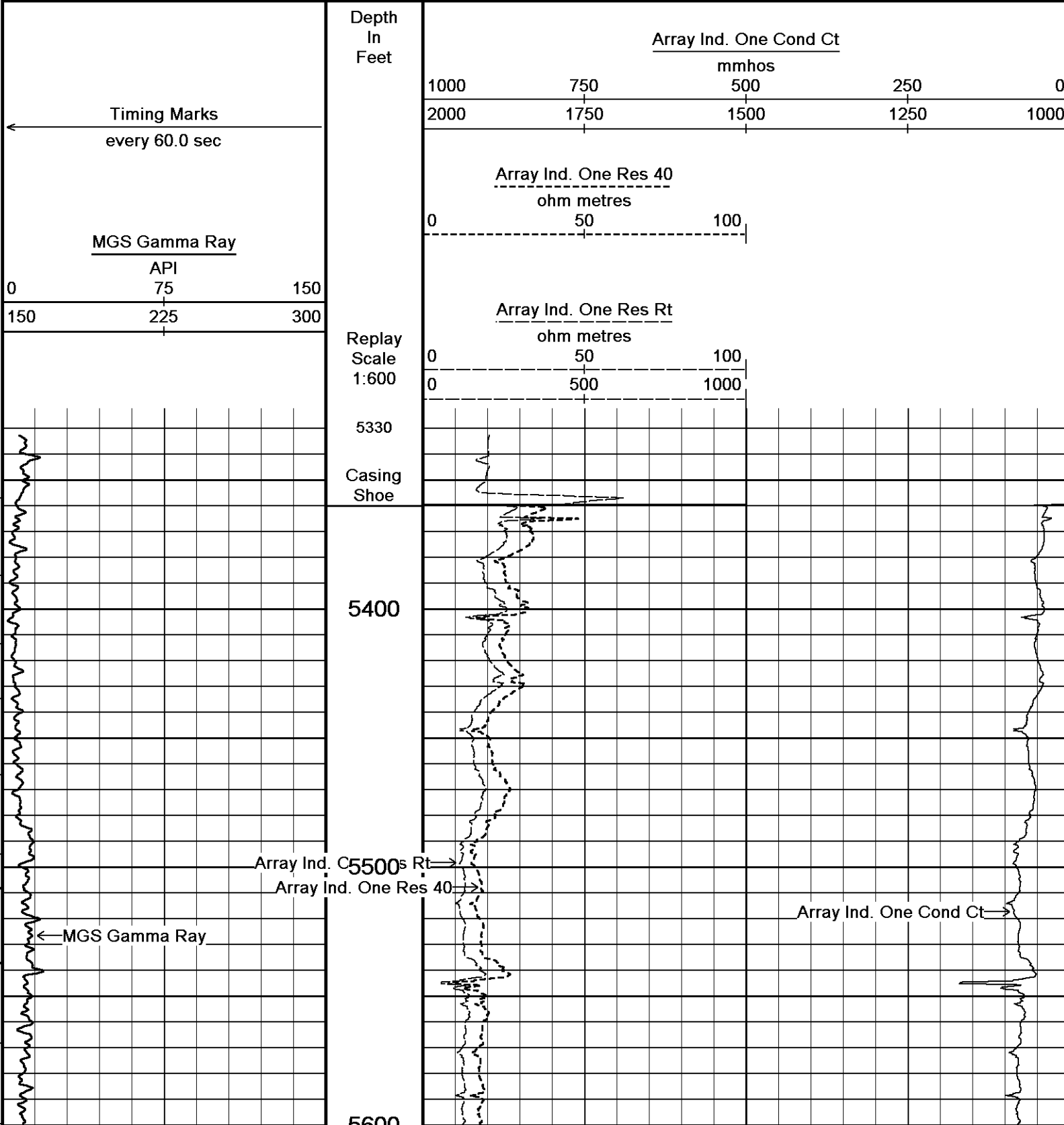
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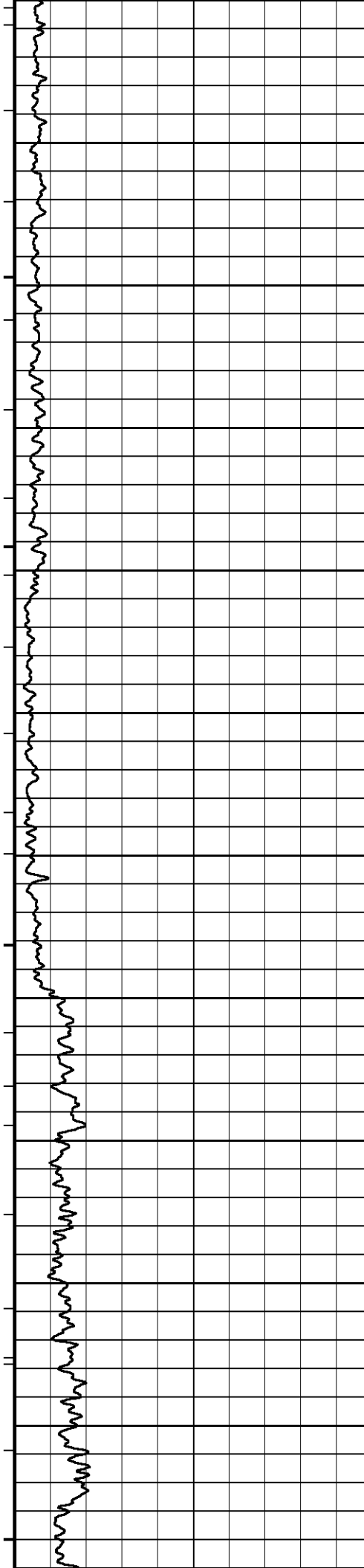
RIG: LARIAT 39

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.

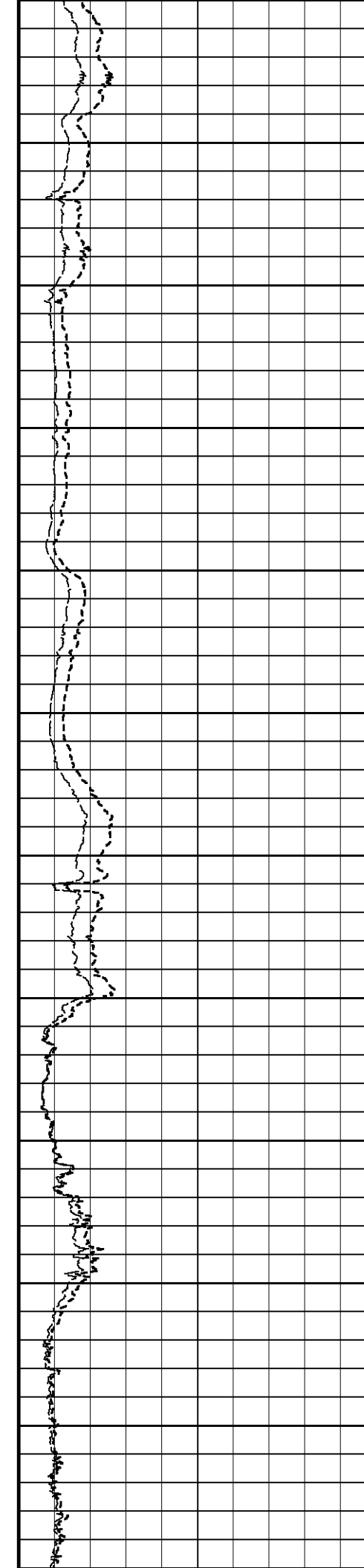
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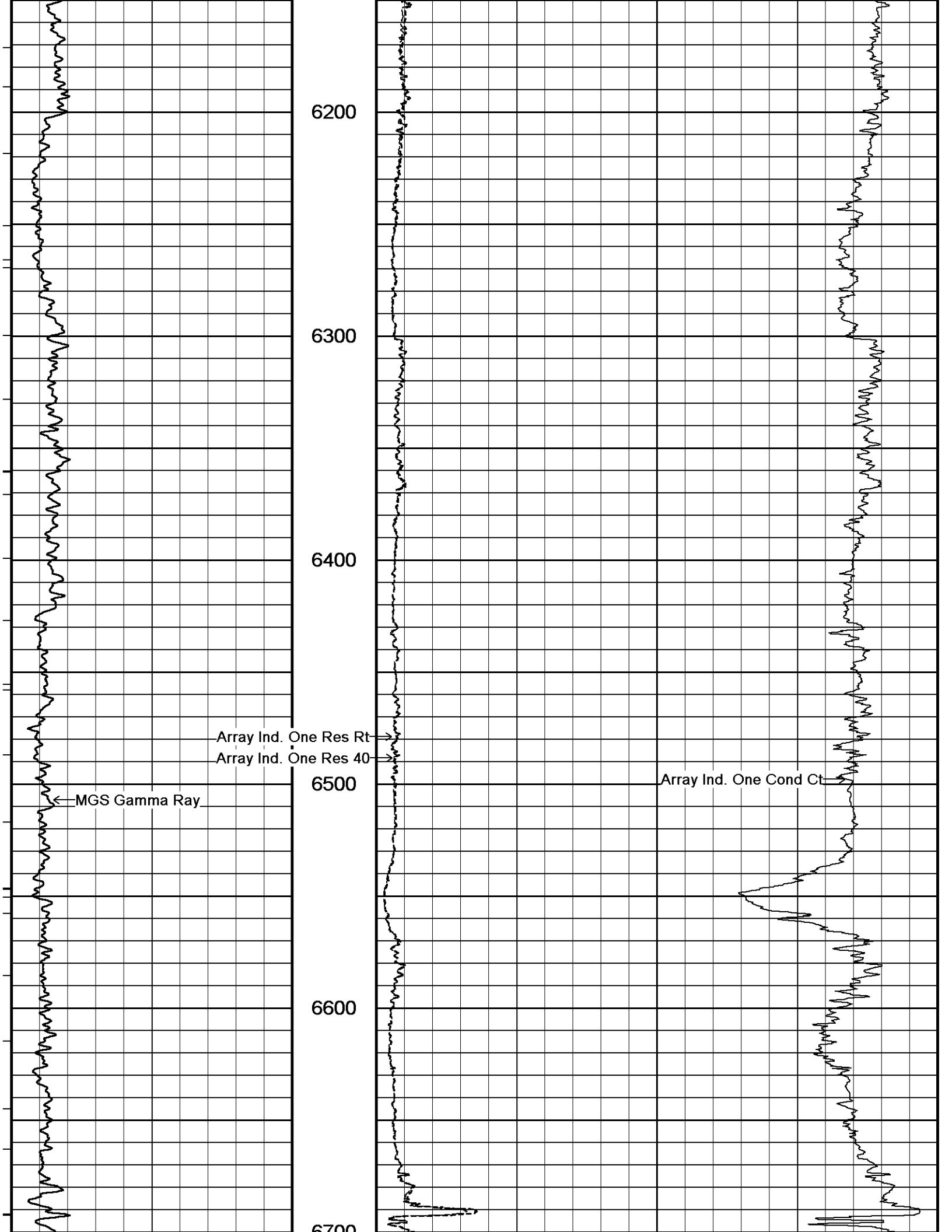
Depth Based Data - Maximum Sampling Increment 10.0cm Plotted on 12-JAN-2013 18:33  
 Filename: C:\Data\SANDRIDGE (TURNER 3406 3-7H)\41985 RTAP Depth.dta Recorded on 12-JAN-2013 17:02  
 System Versions: Processed with 13.03.7779 Plotted with 13.03.7779

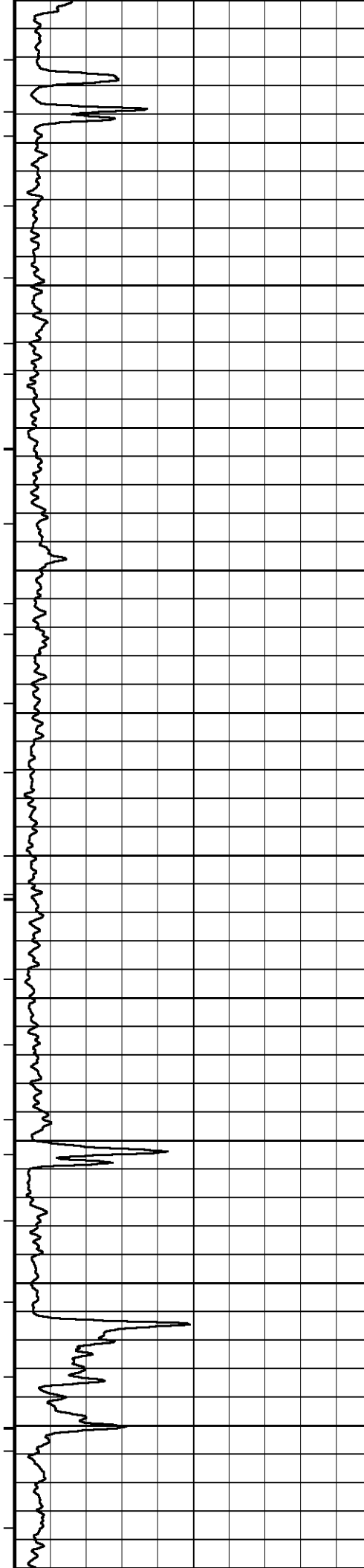




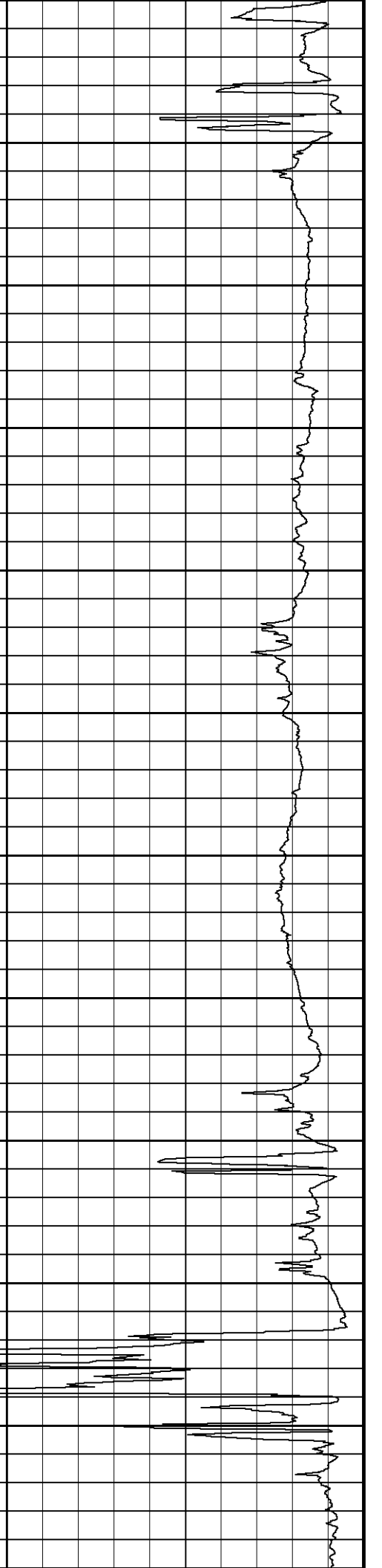
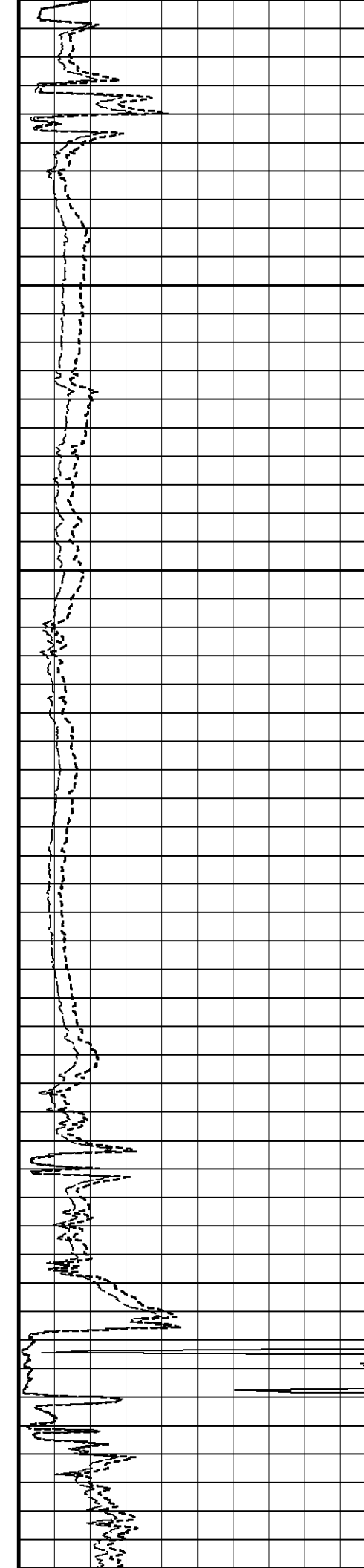
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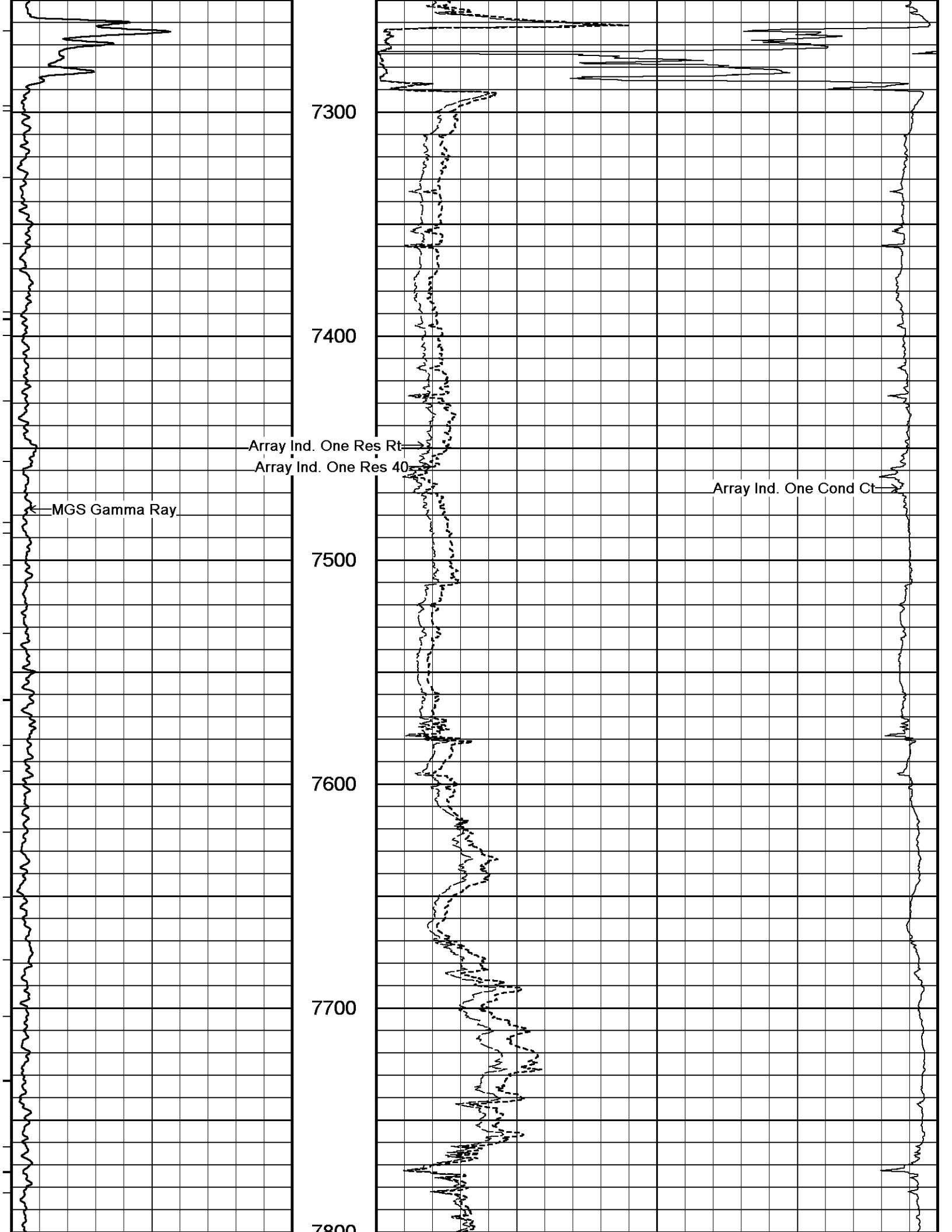


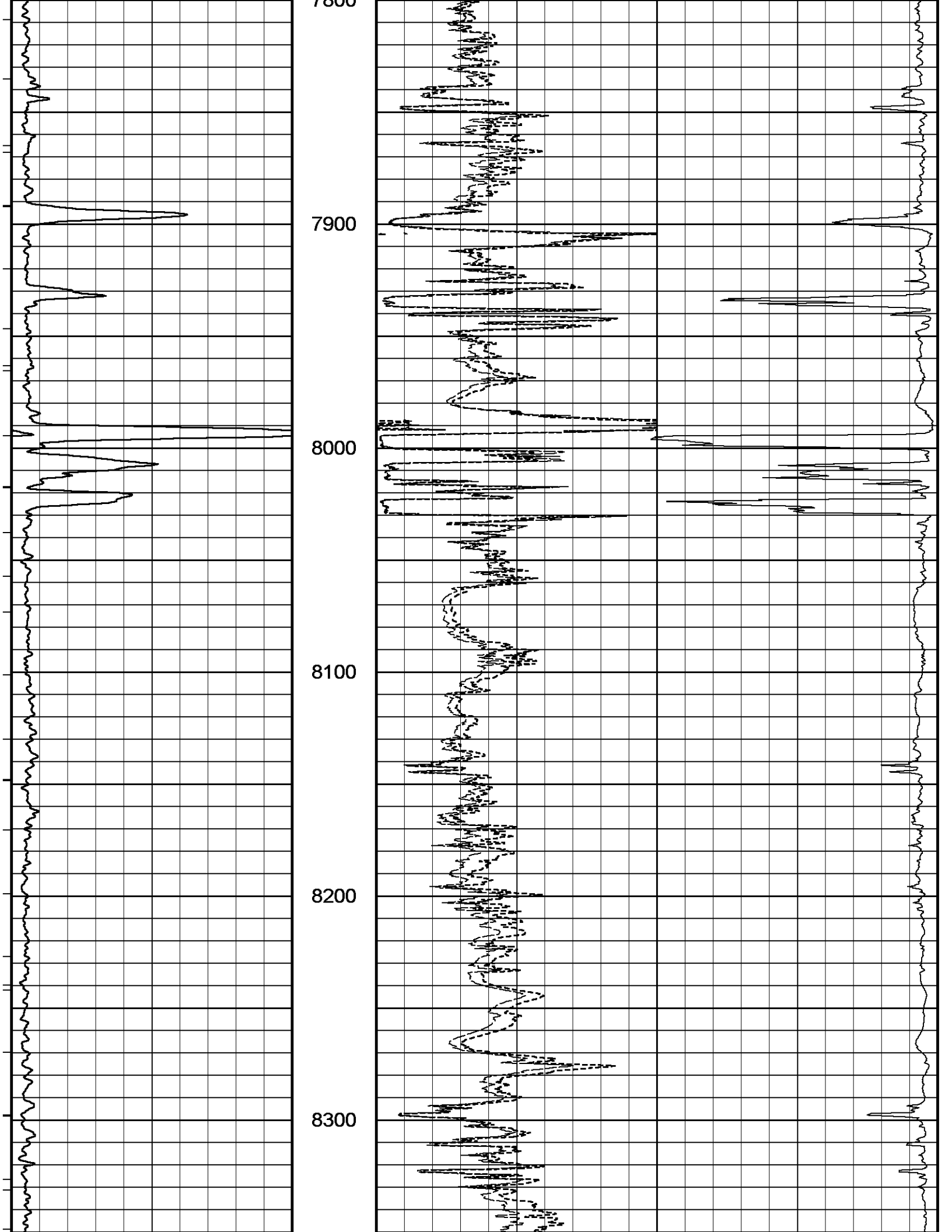


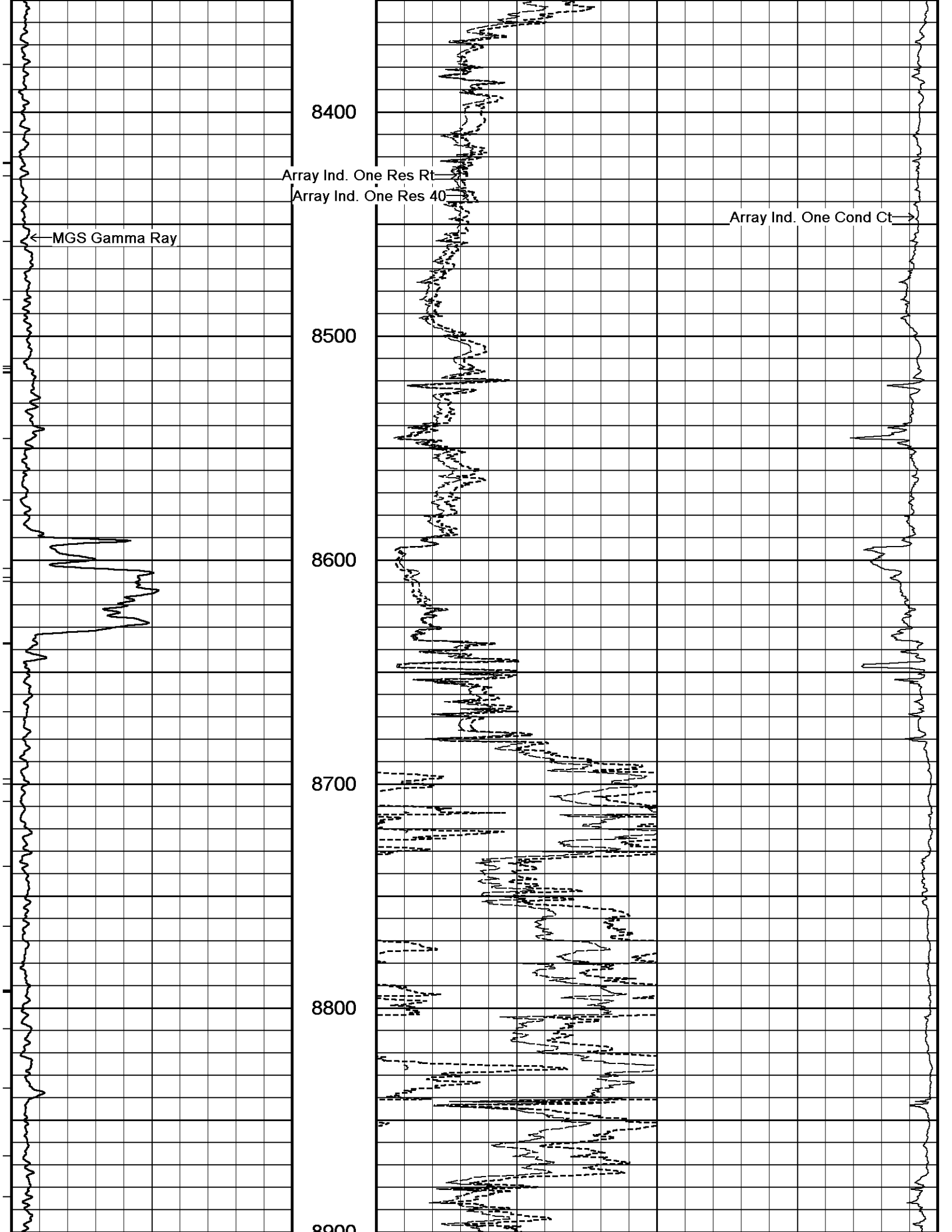


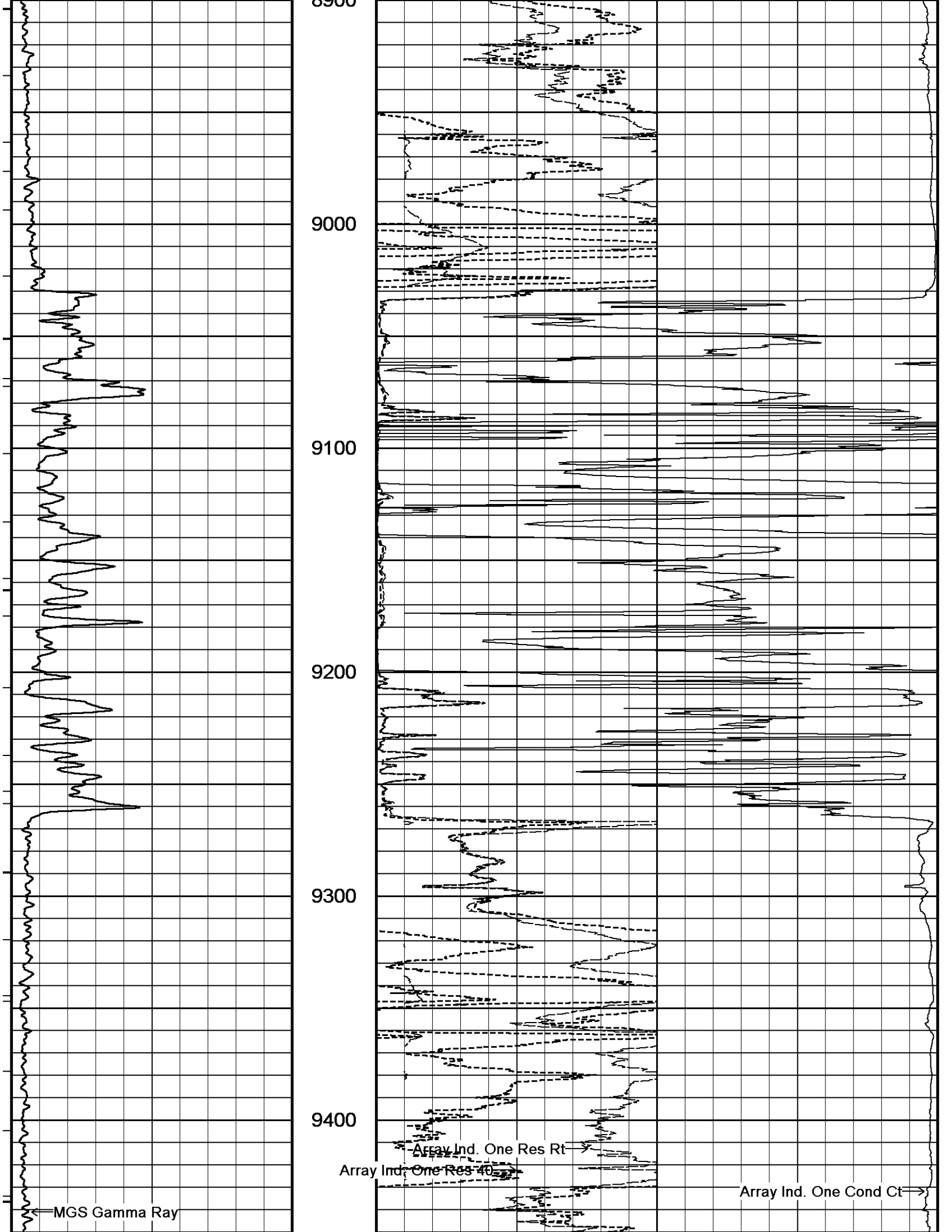
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6900  
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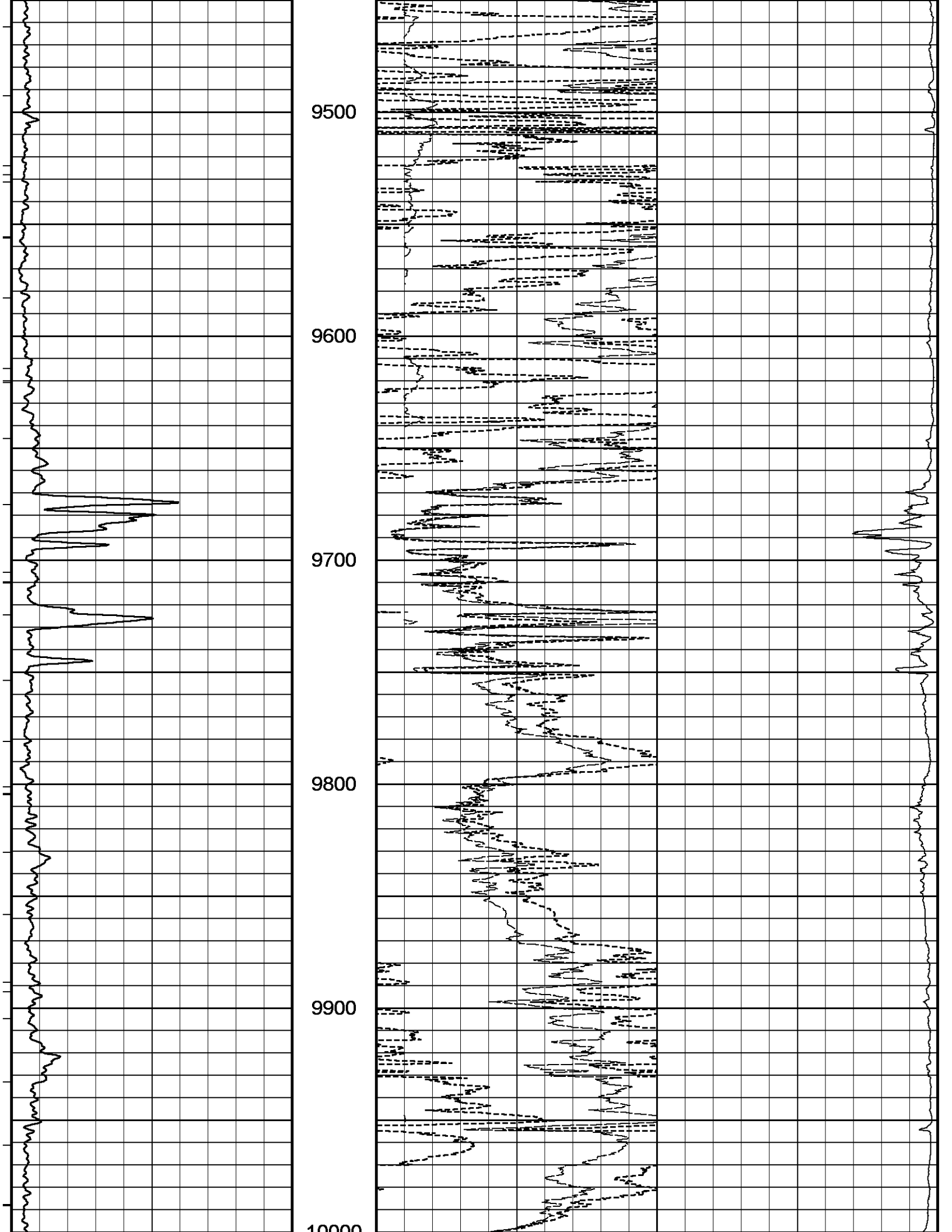


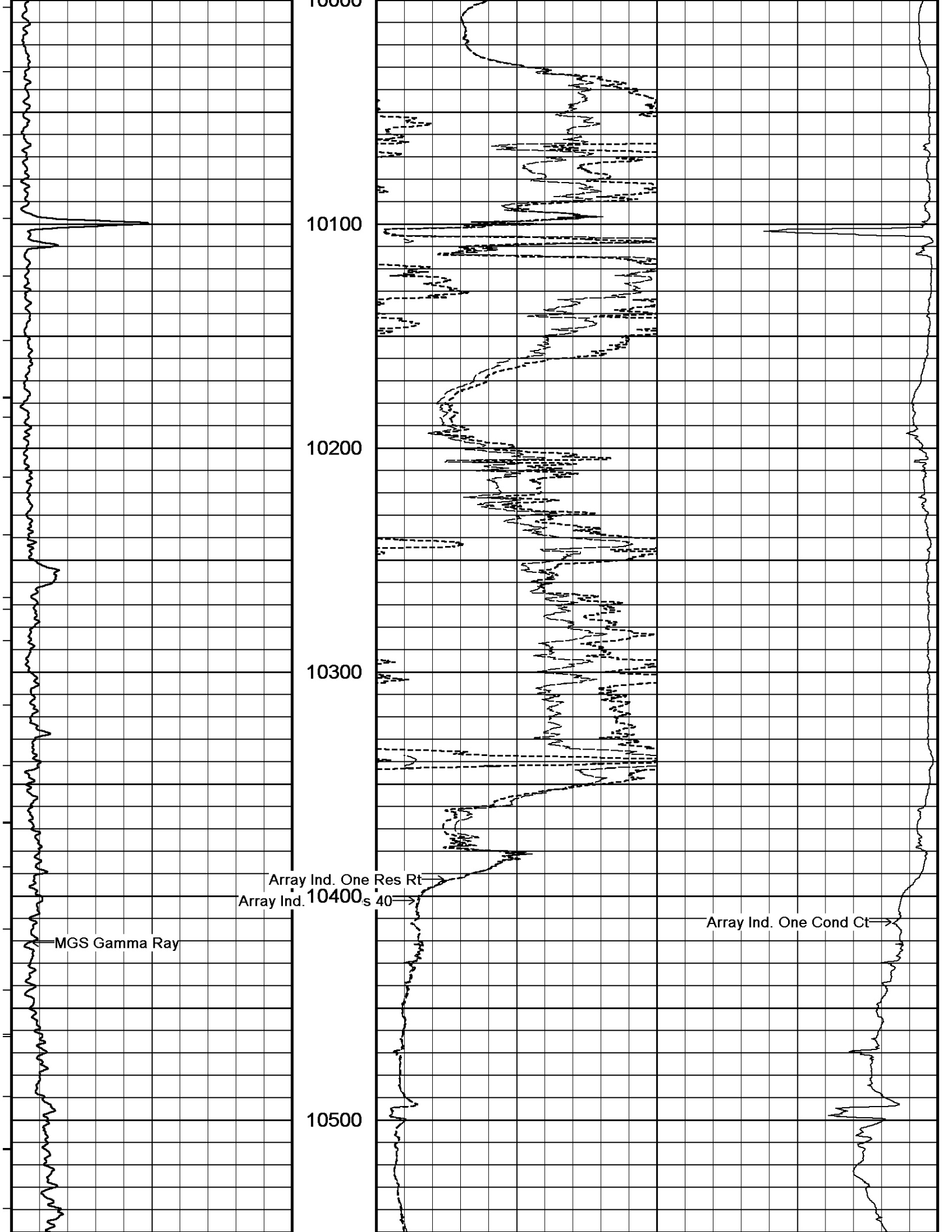


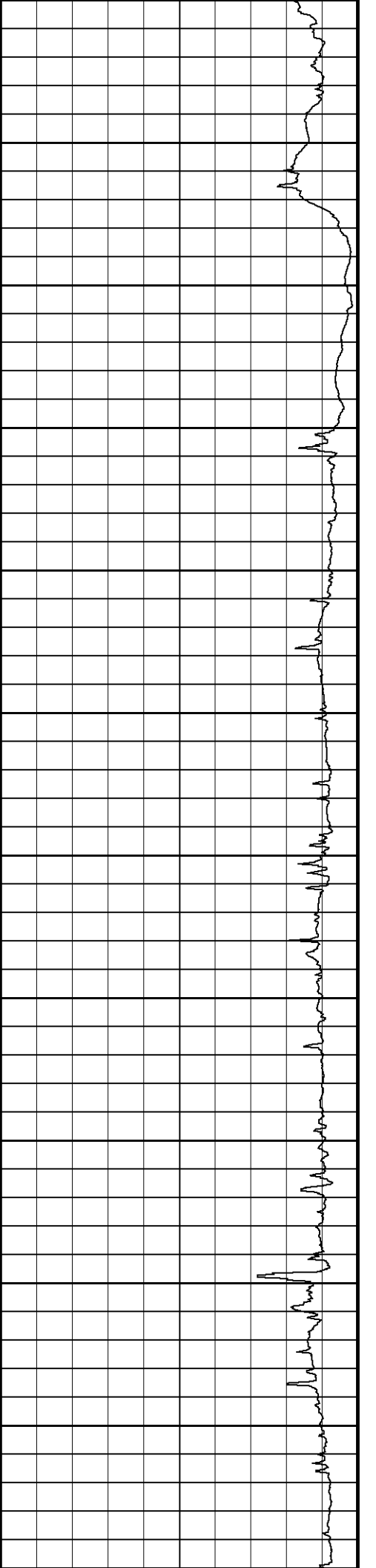
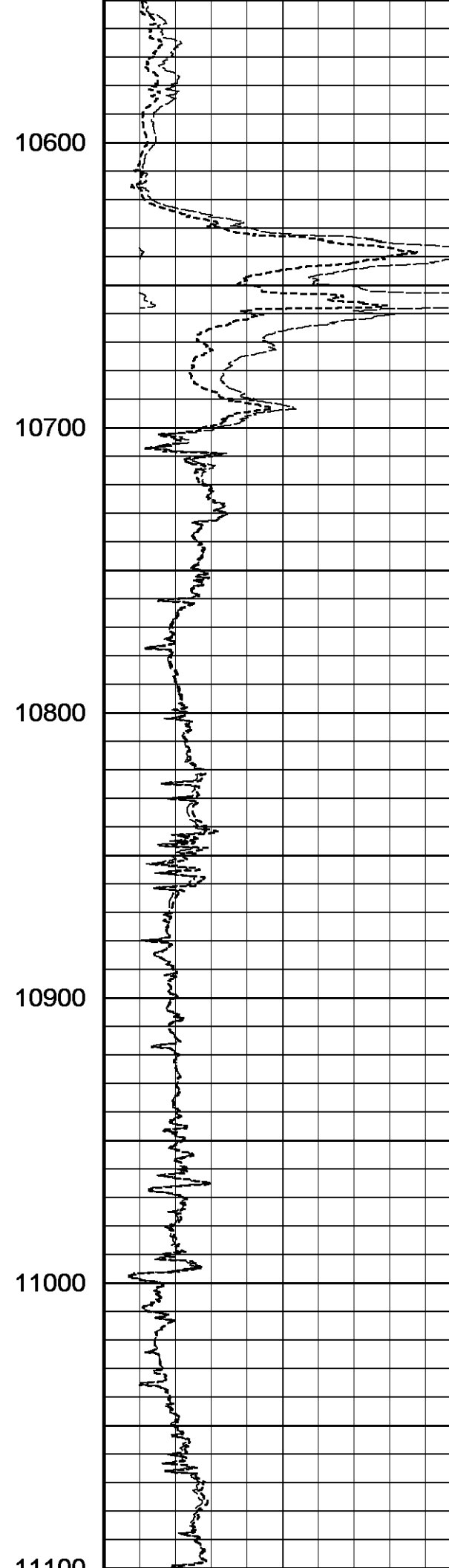
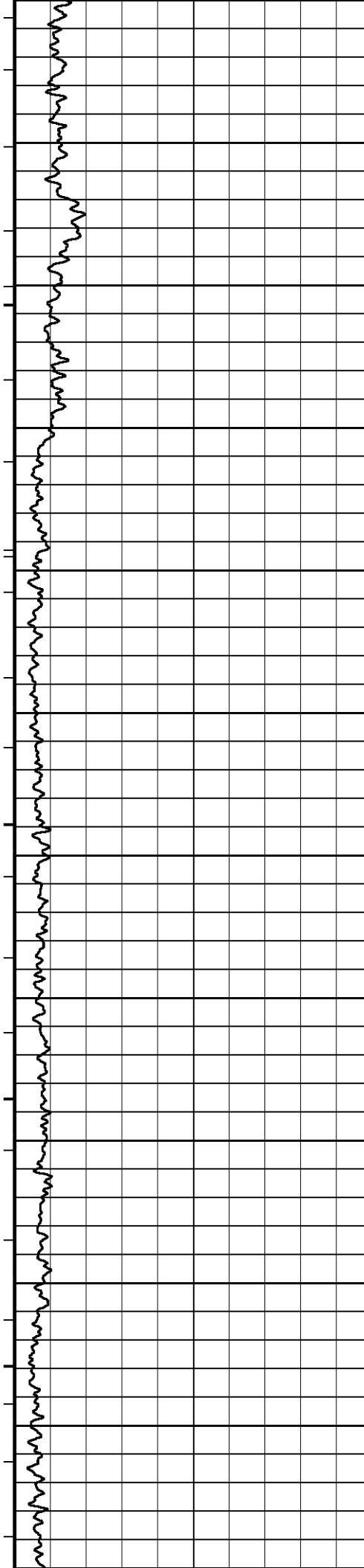


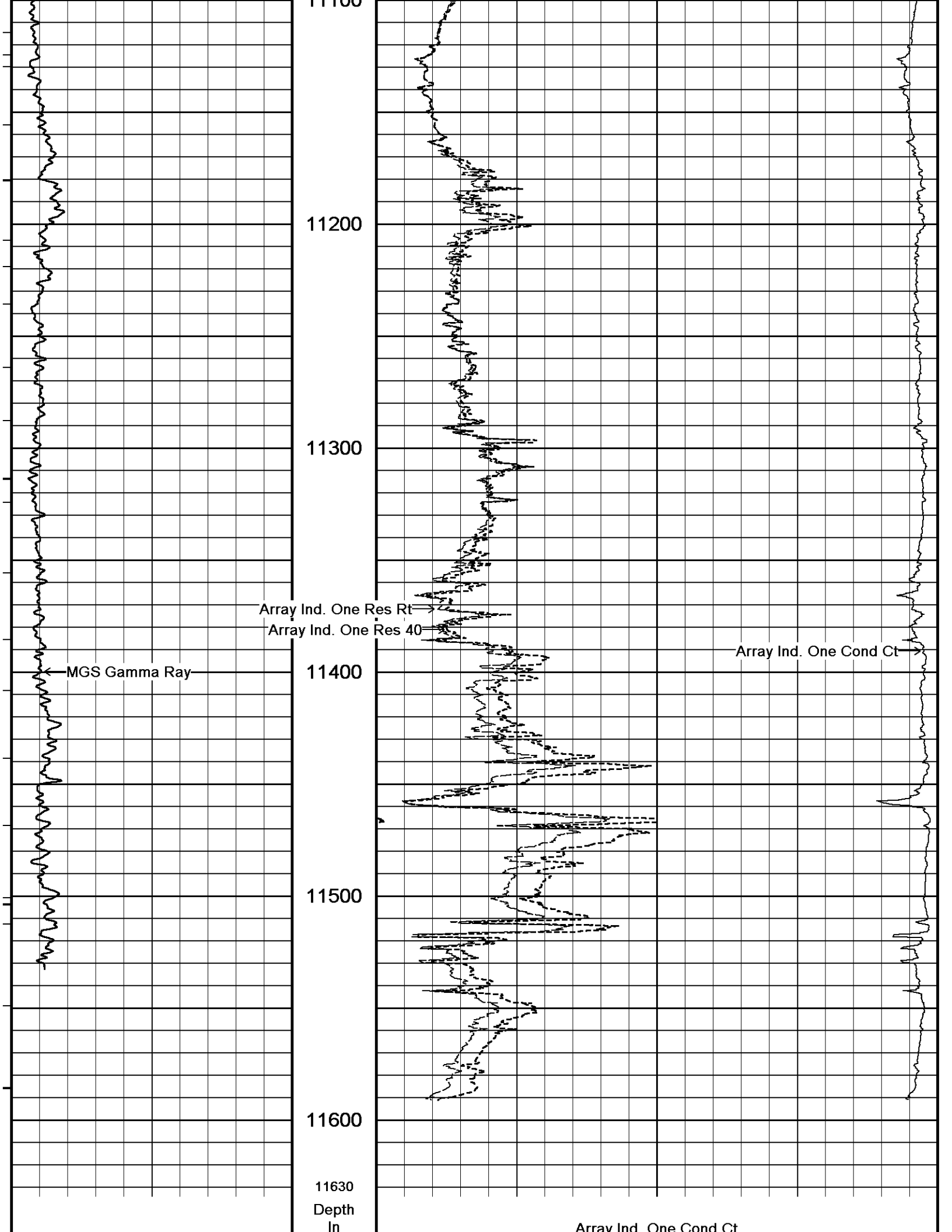


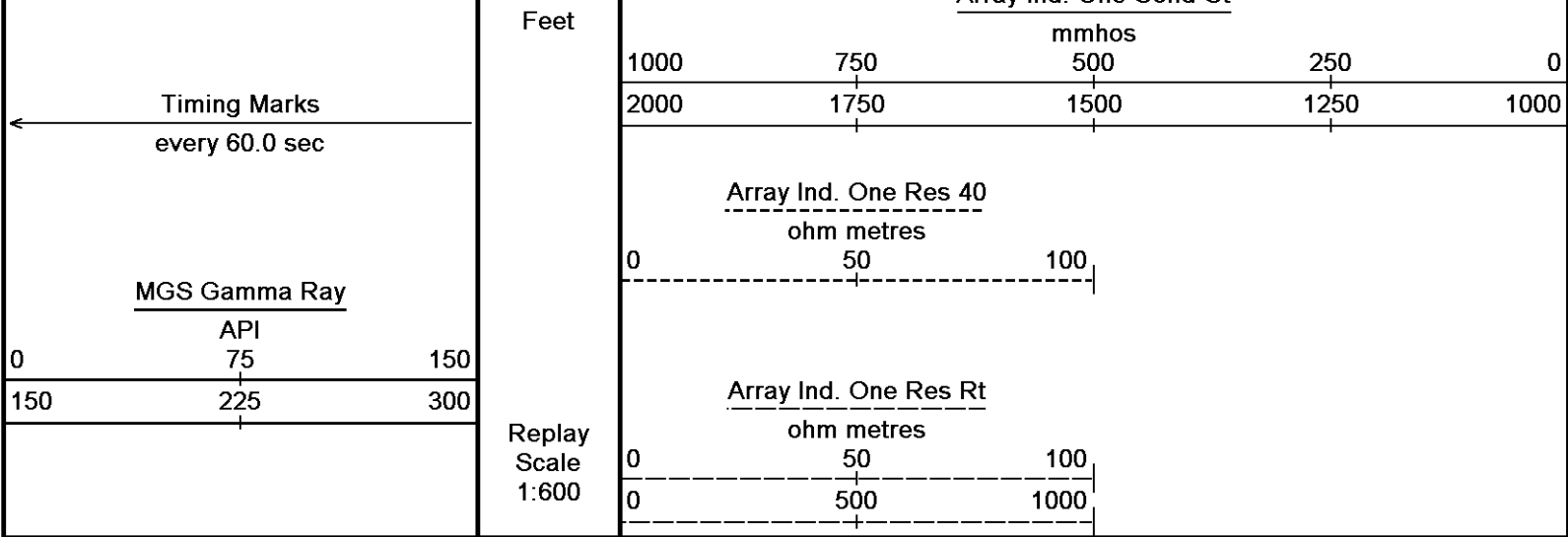








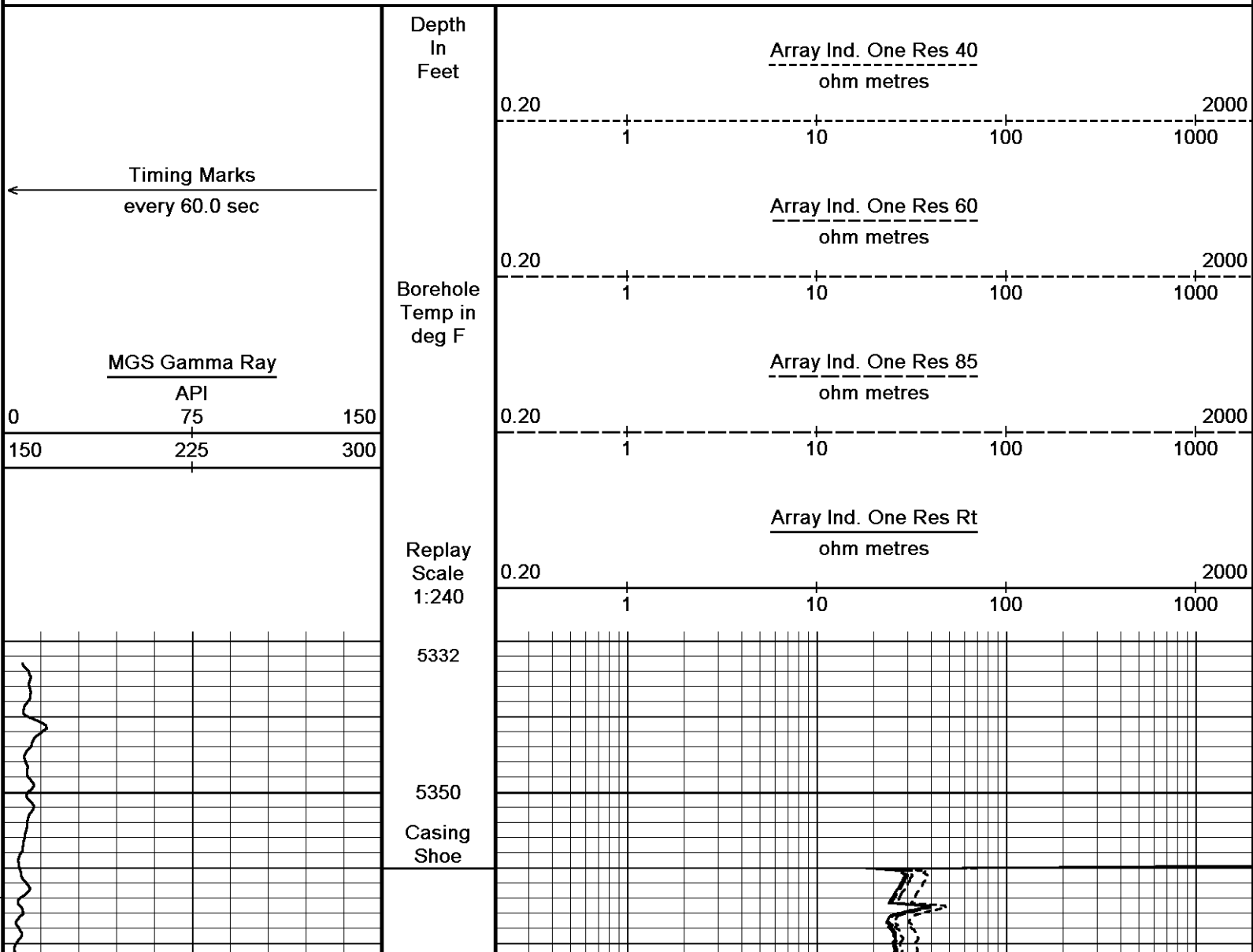


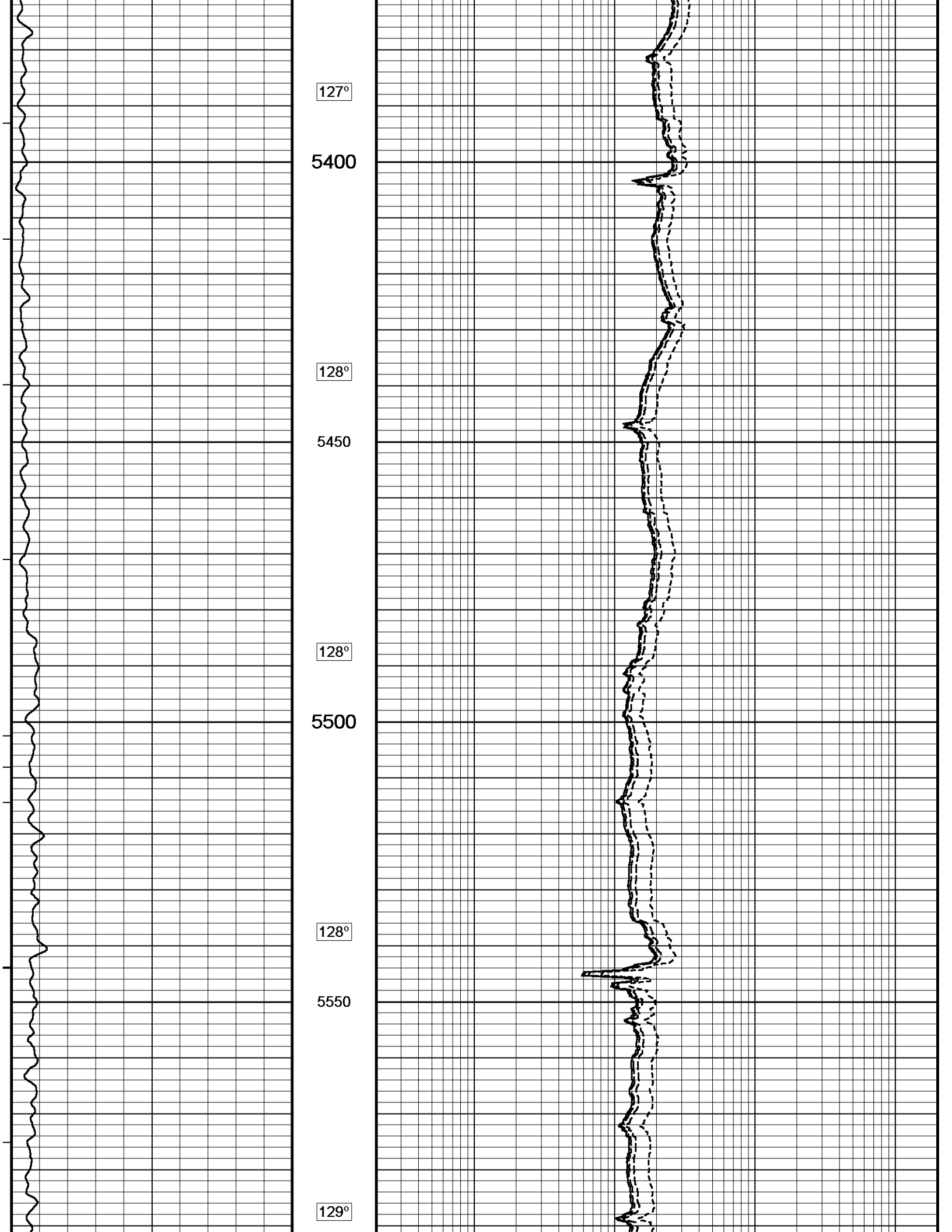


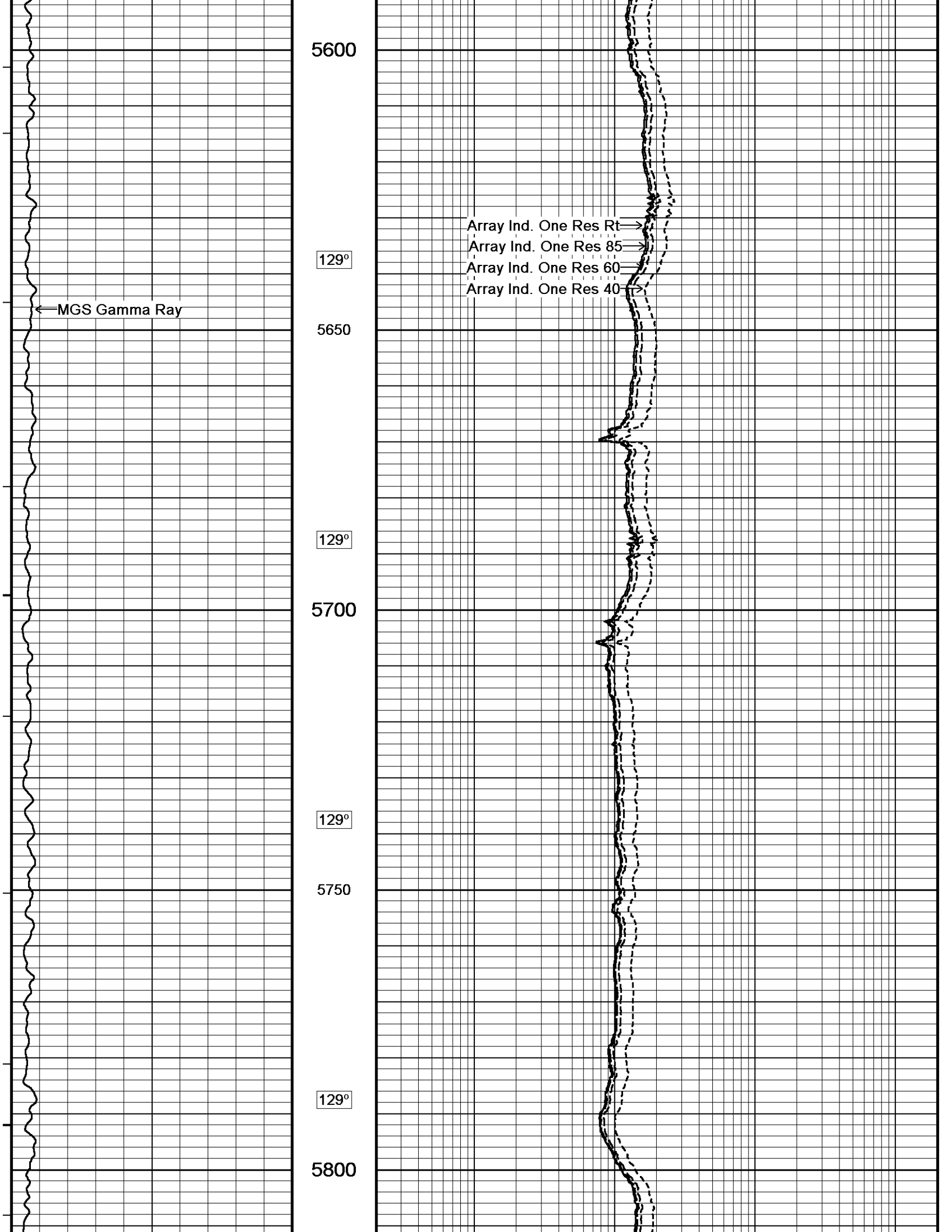
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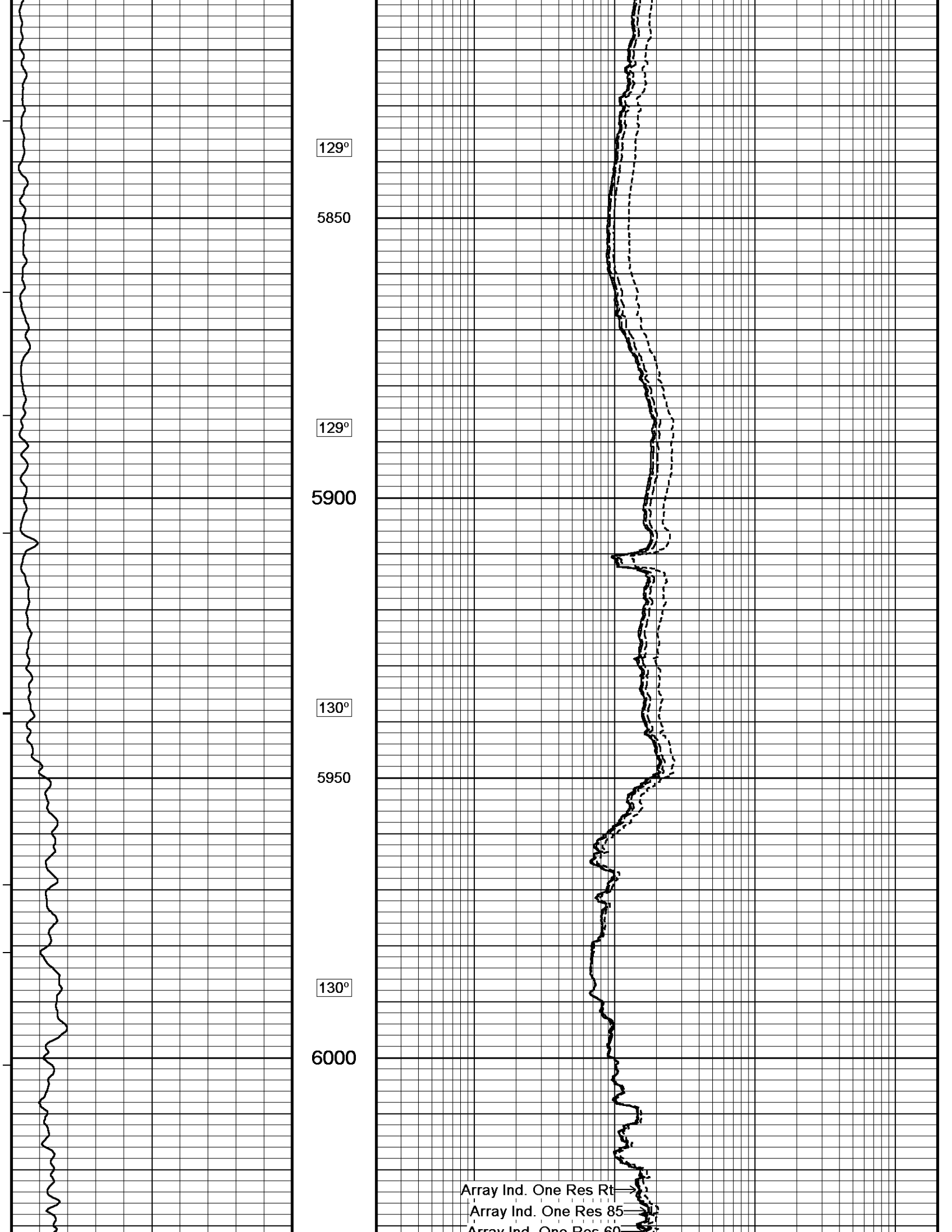
MAIN PASS

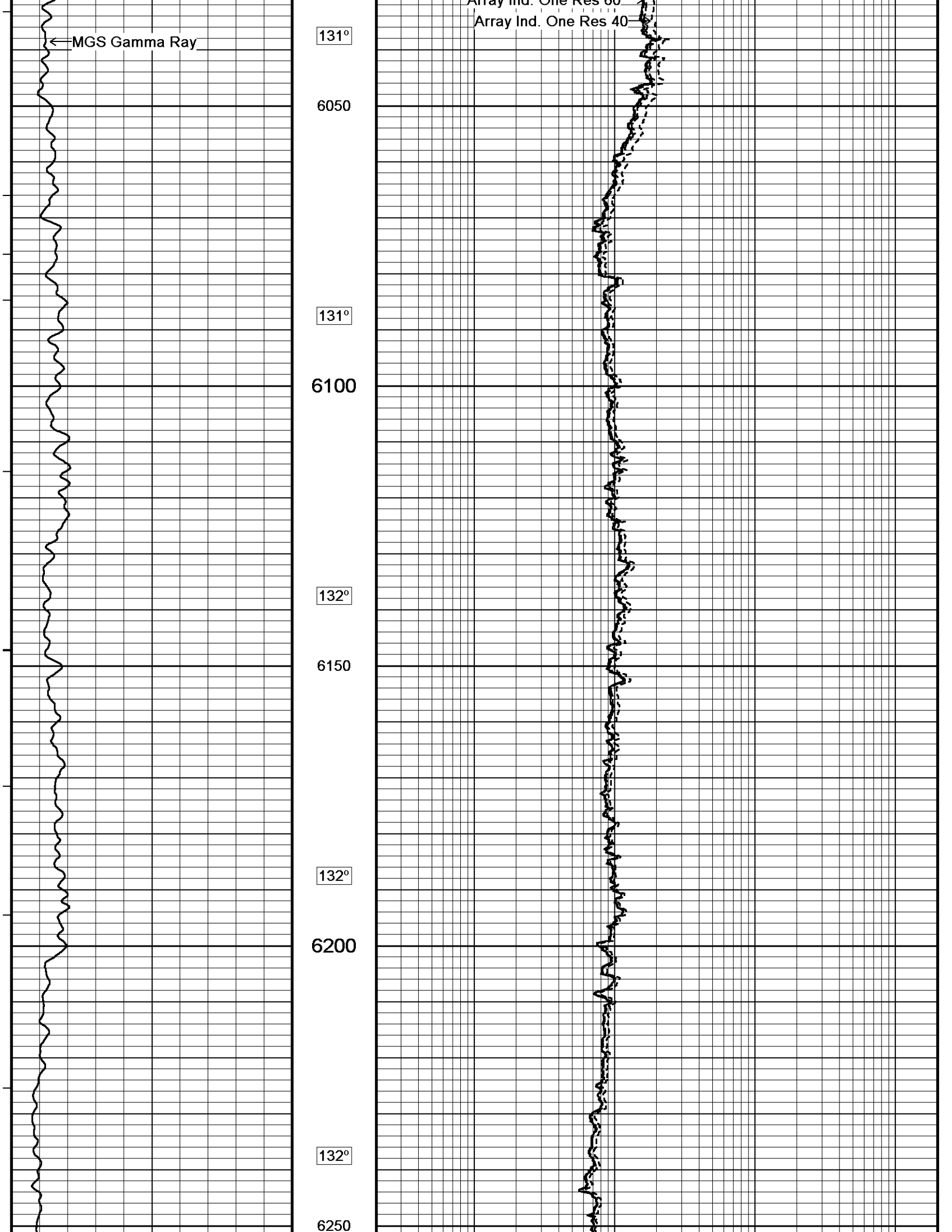
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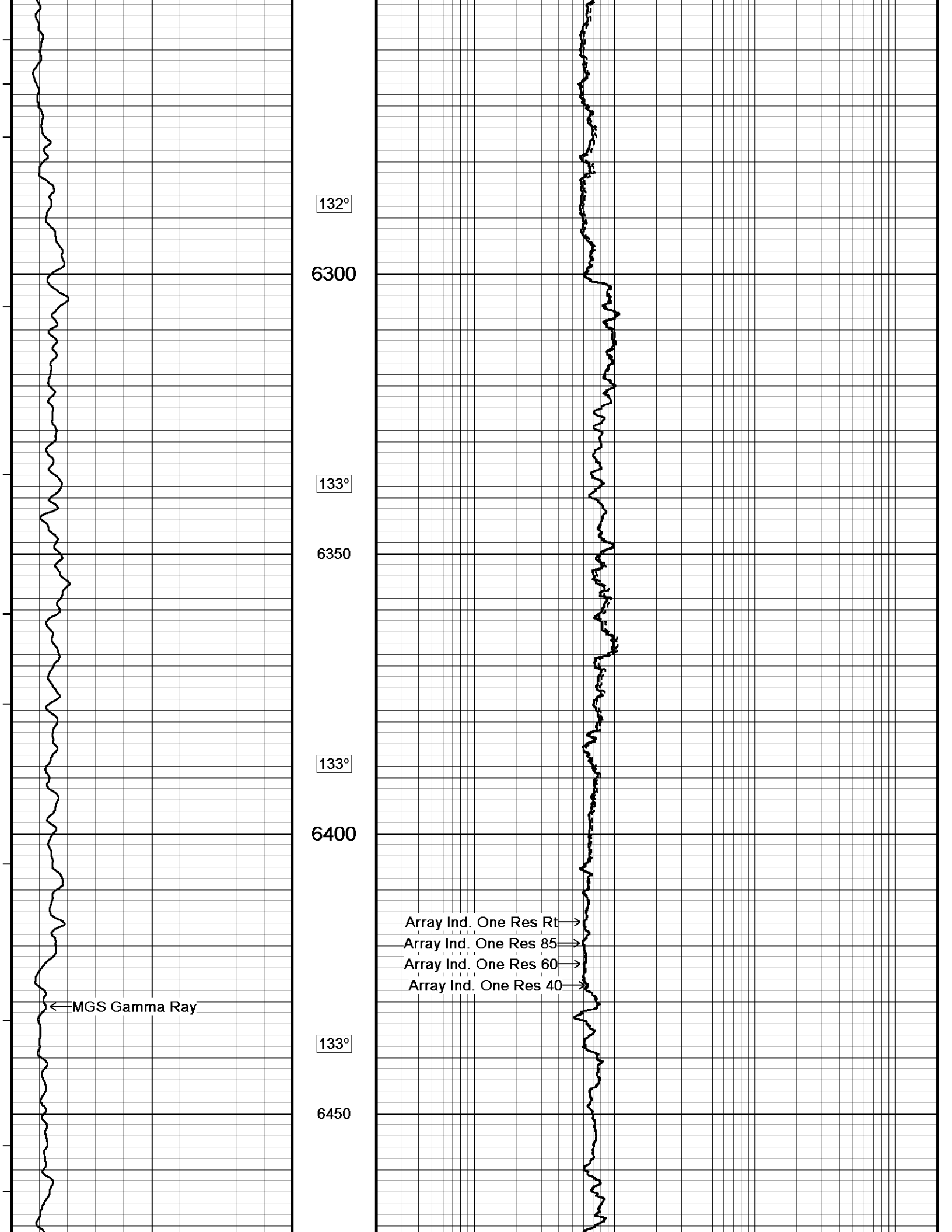


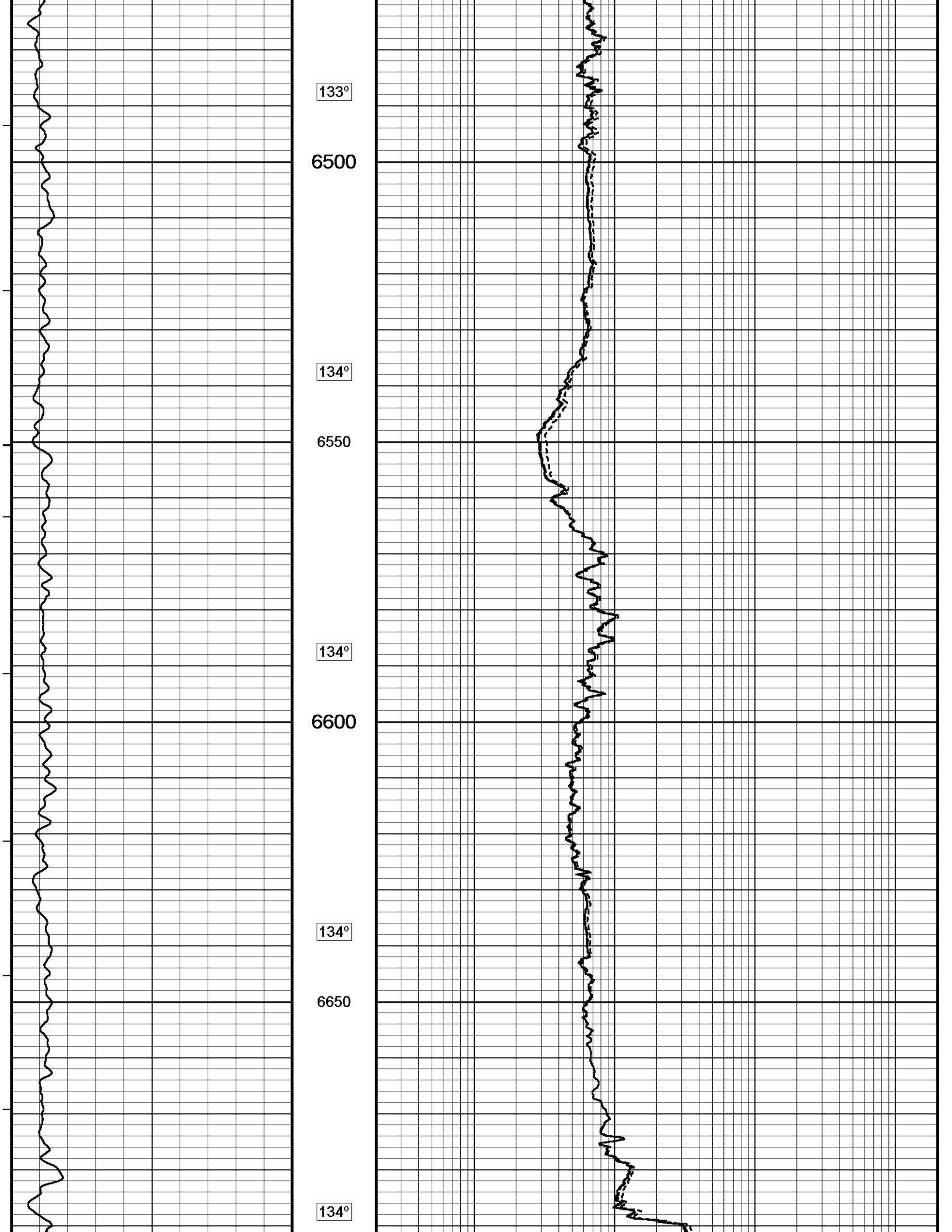


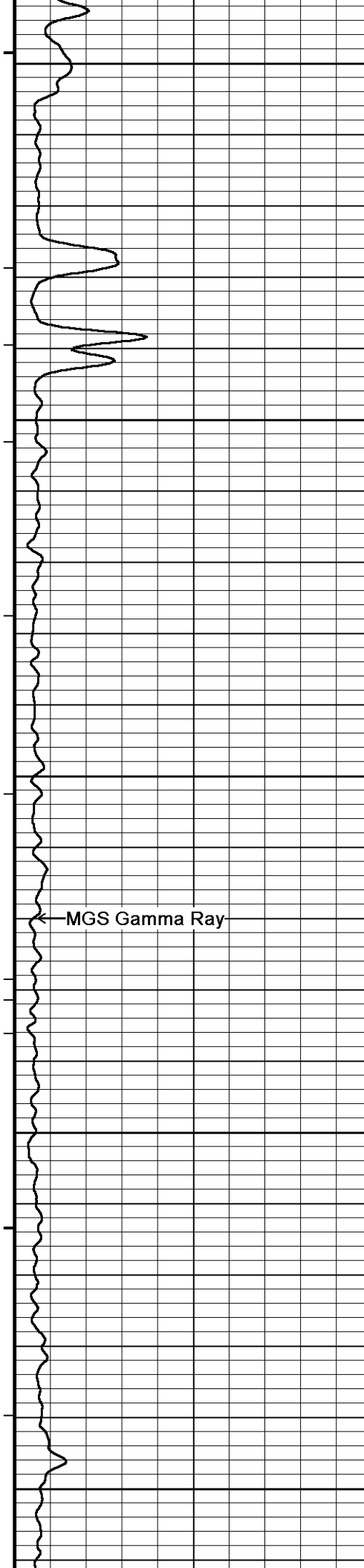












6700

134°

6750

134°

6800

134°

6850

134°

6900

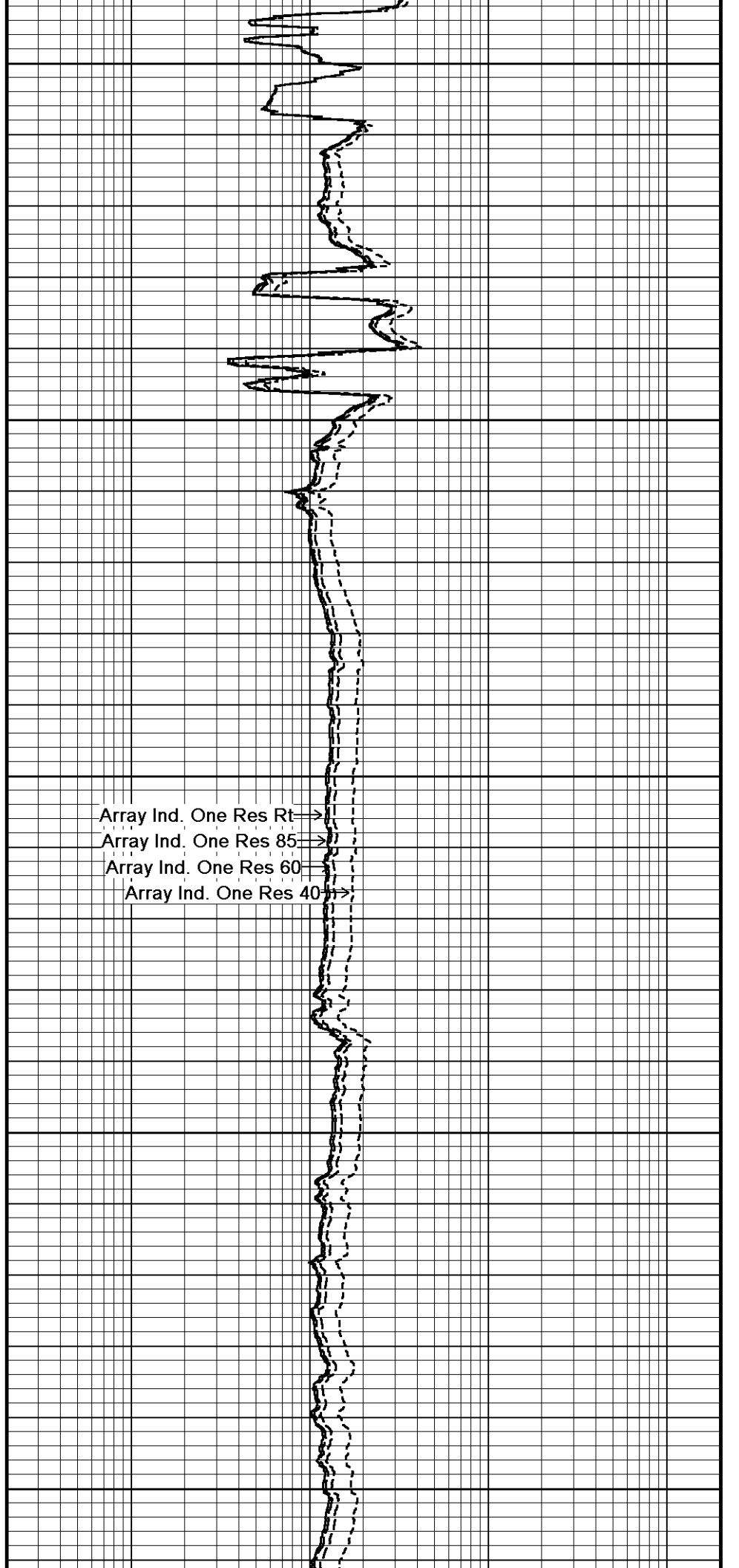
MGS Gamma Ray

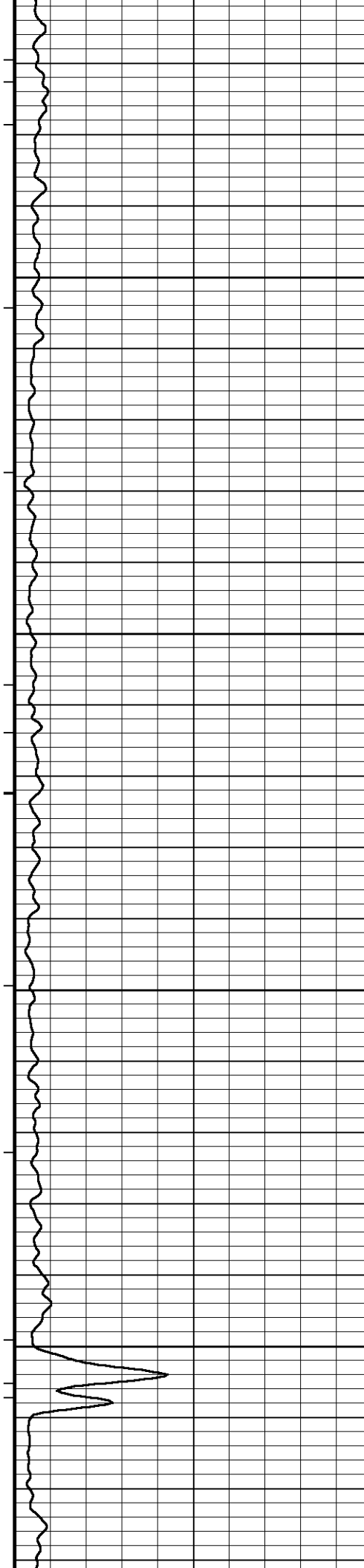
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Array Ind. One Res 85 →

Array Ind. One Res 60 →

Array Ind. One Res 40 →





134°

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135°

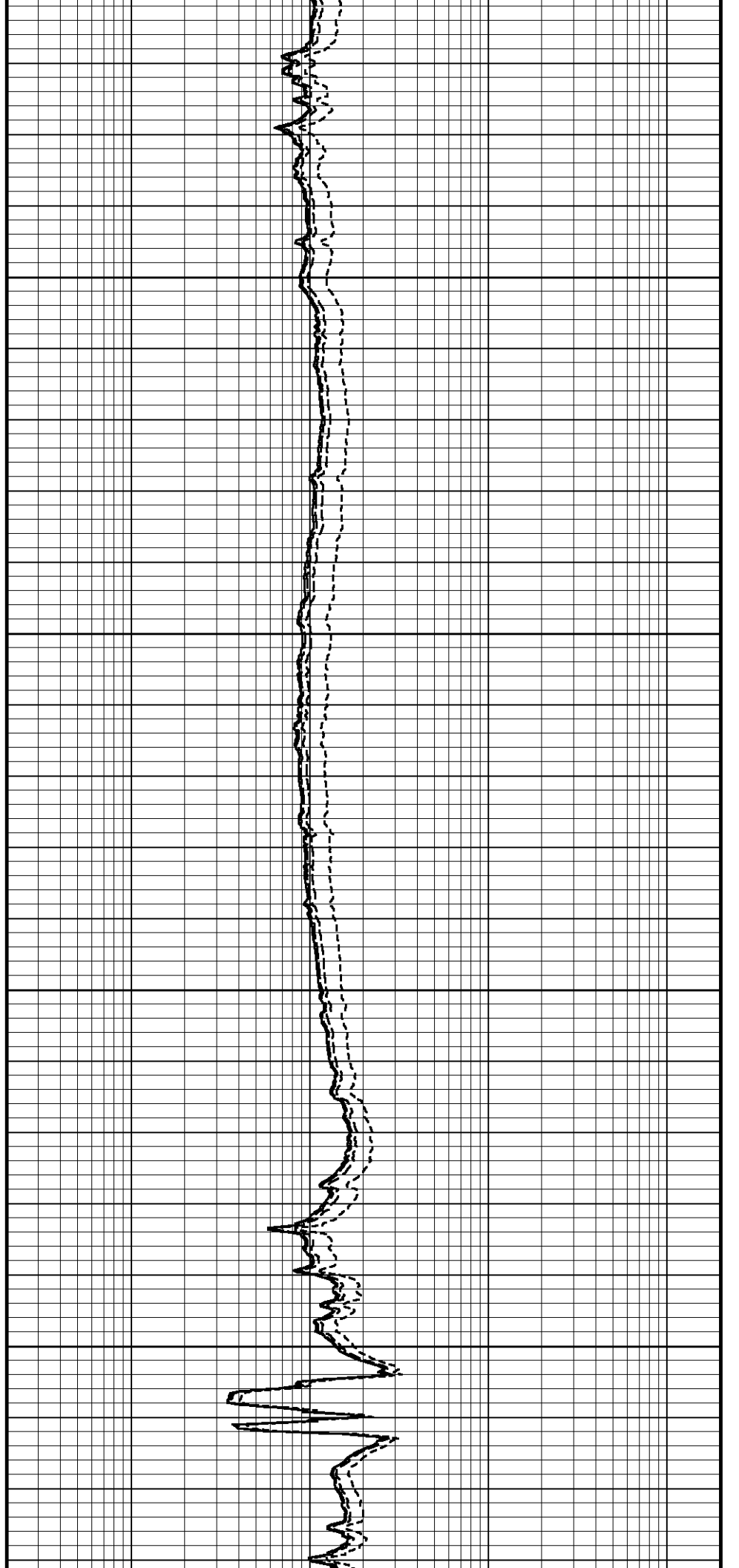
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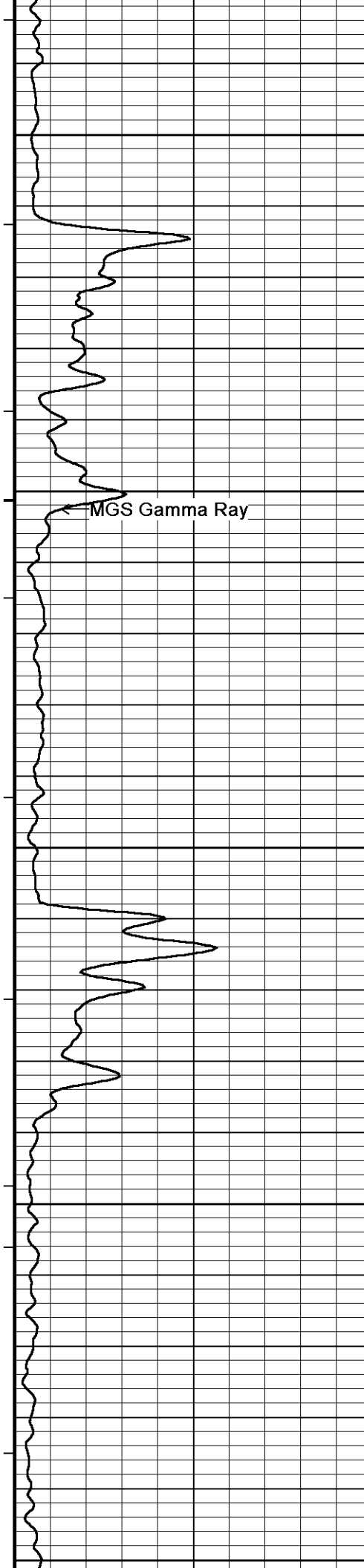
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135°

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135°

7150

Array Ind. One Res Rt

Array Ind. One Res 85

Array Ind. One Res 60

Array Ind. One Res 40

7200

135°

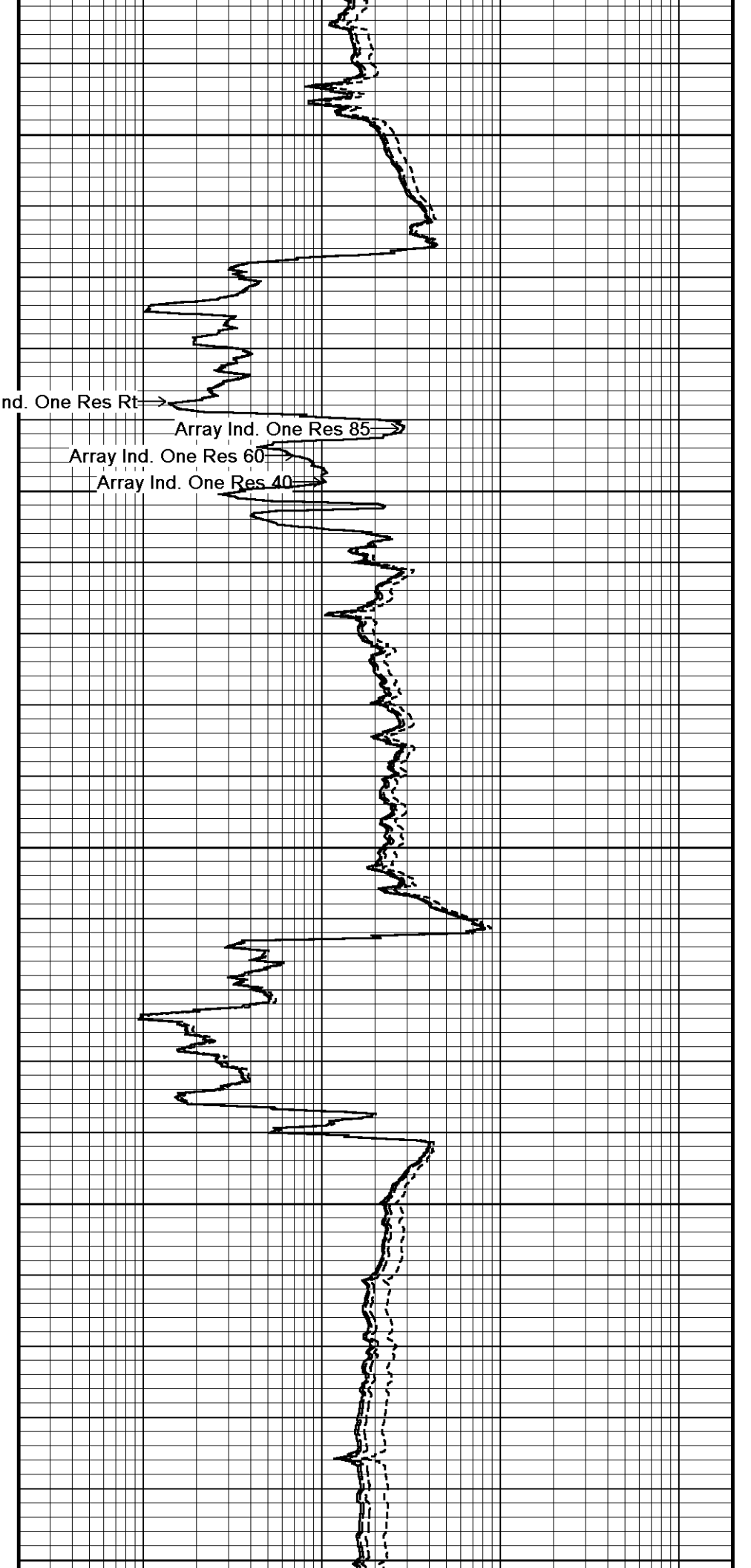
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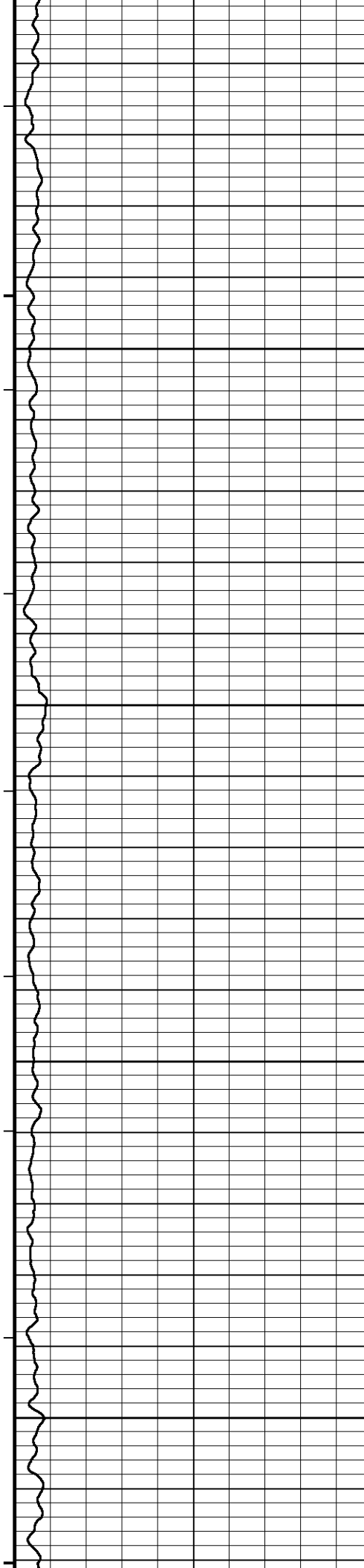
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7300

136°

7350





136°

7400

136°

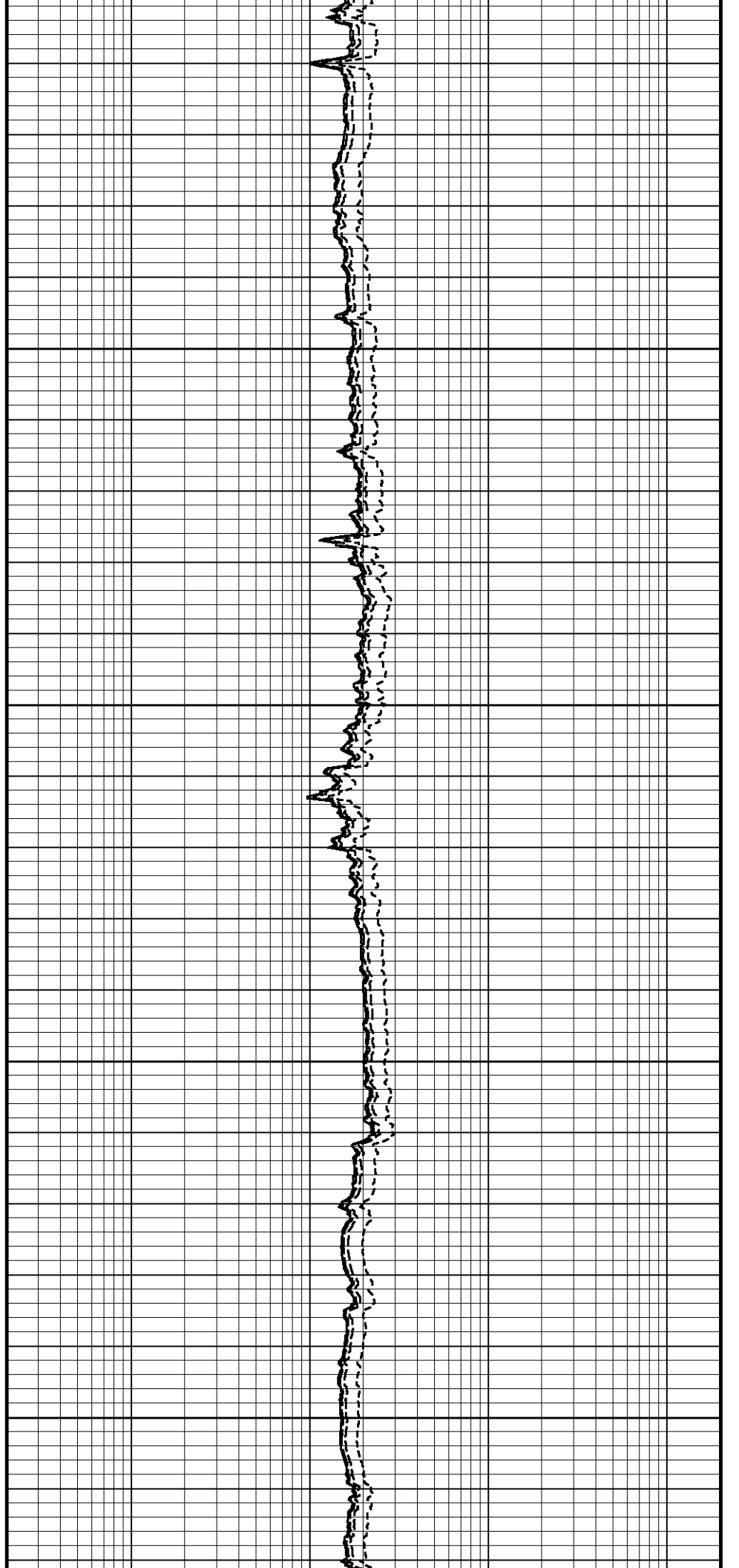
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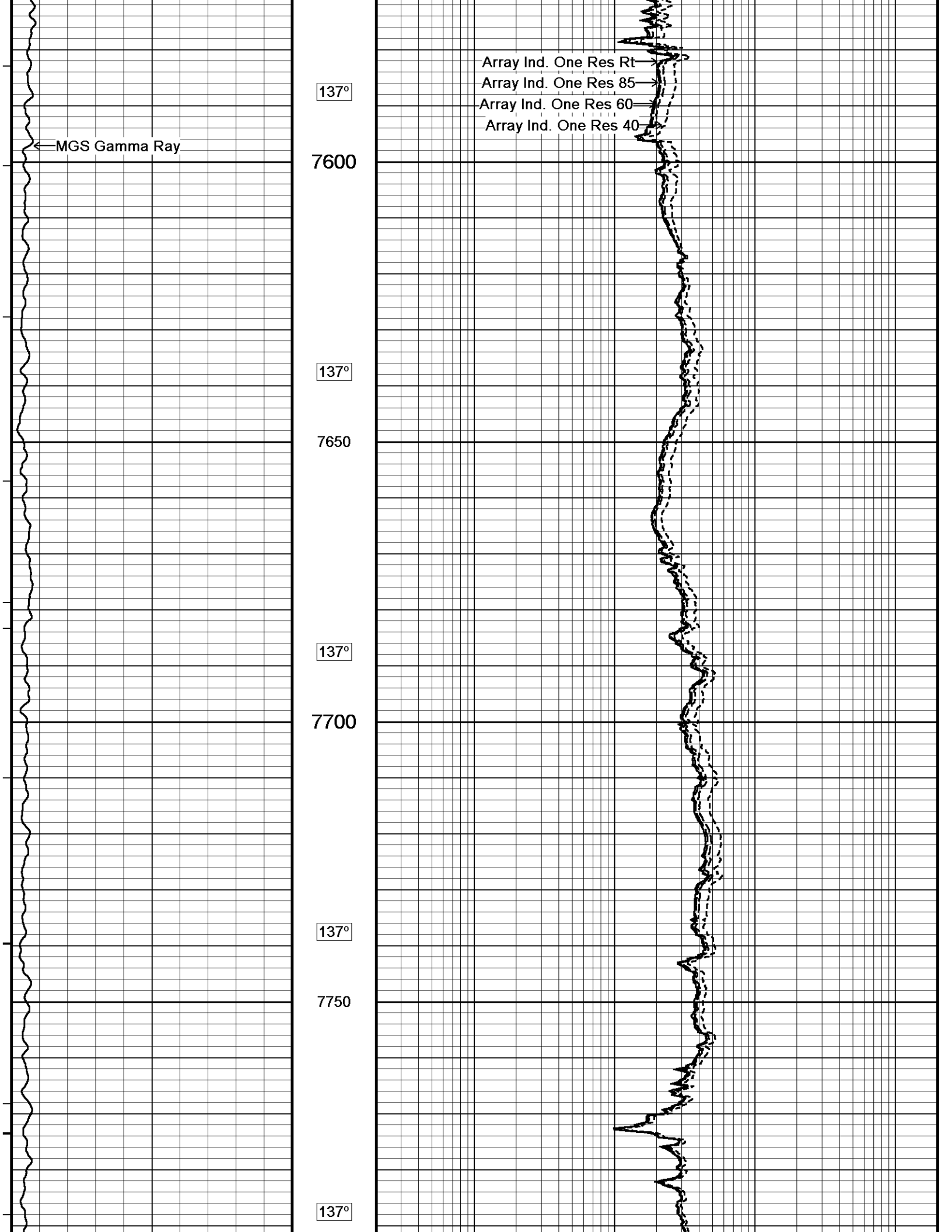
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136°

7550





137°

7600

137°

7650

137°

7700

137°

7750

137°

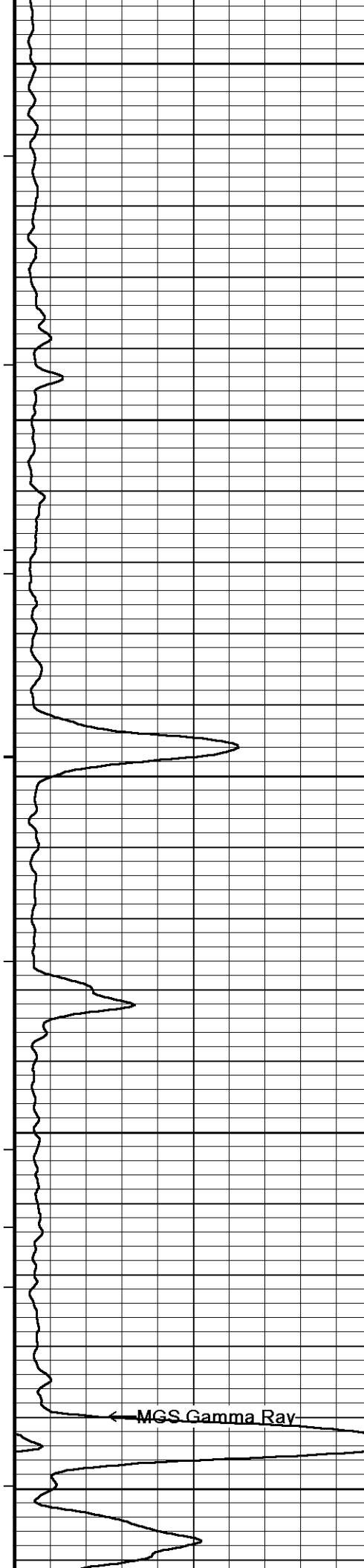
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Array Ind. One Res 85

Array Ind. One Res 60

Array Ind. One Res 40

MGS Gamma Ray



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137°

7850

137°

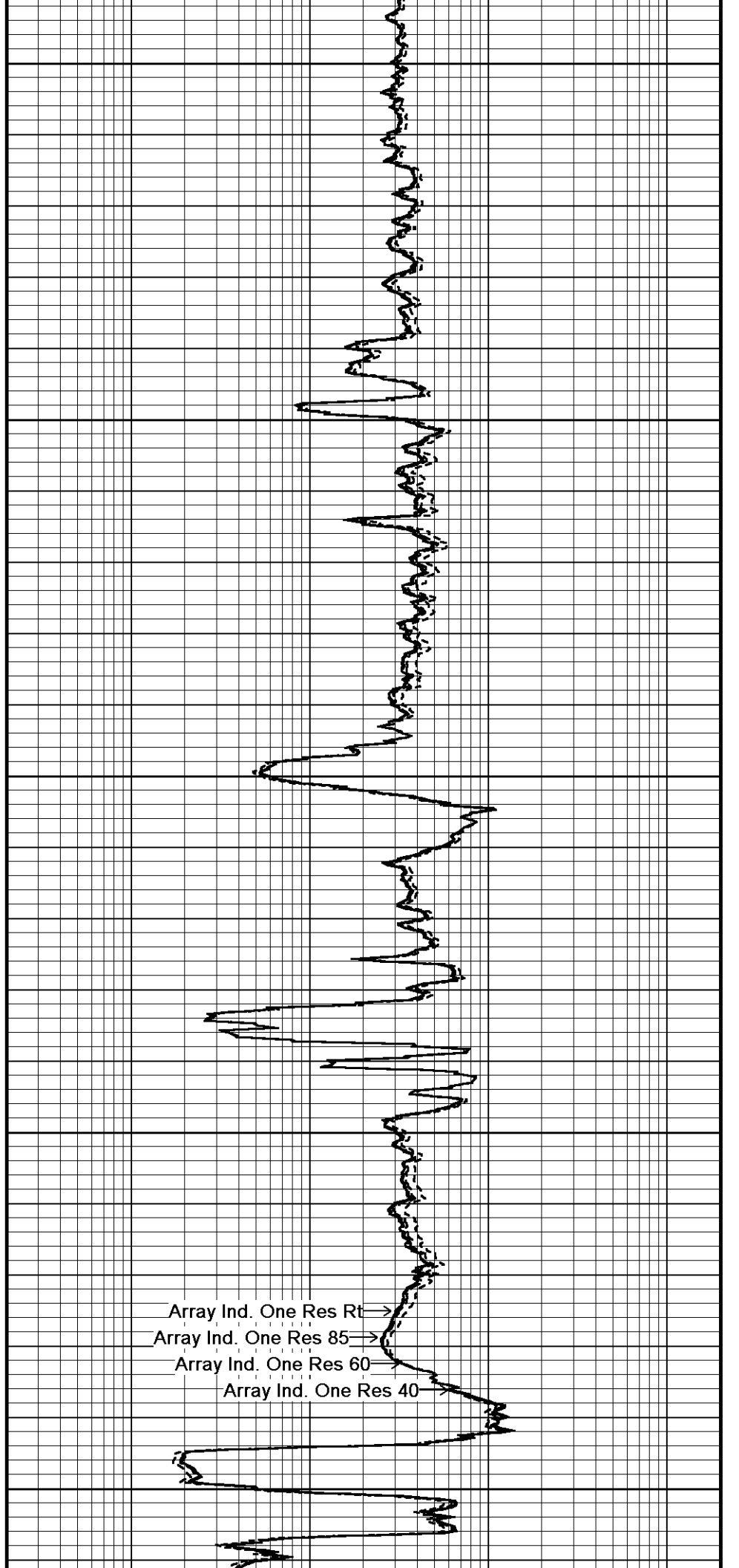
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137°

7950

137°

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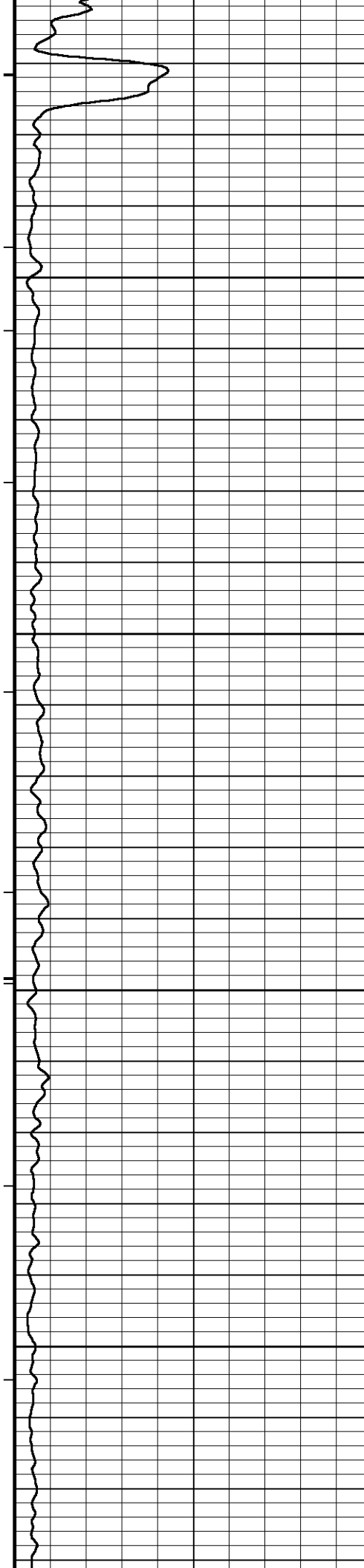


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Array Ind. One Res 85 →

Array Ind. One Res 60 →

Array Ind. One Res 40 →



138°

8050

138°

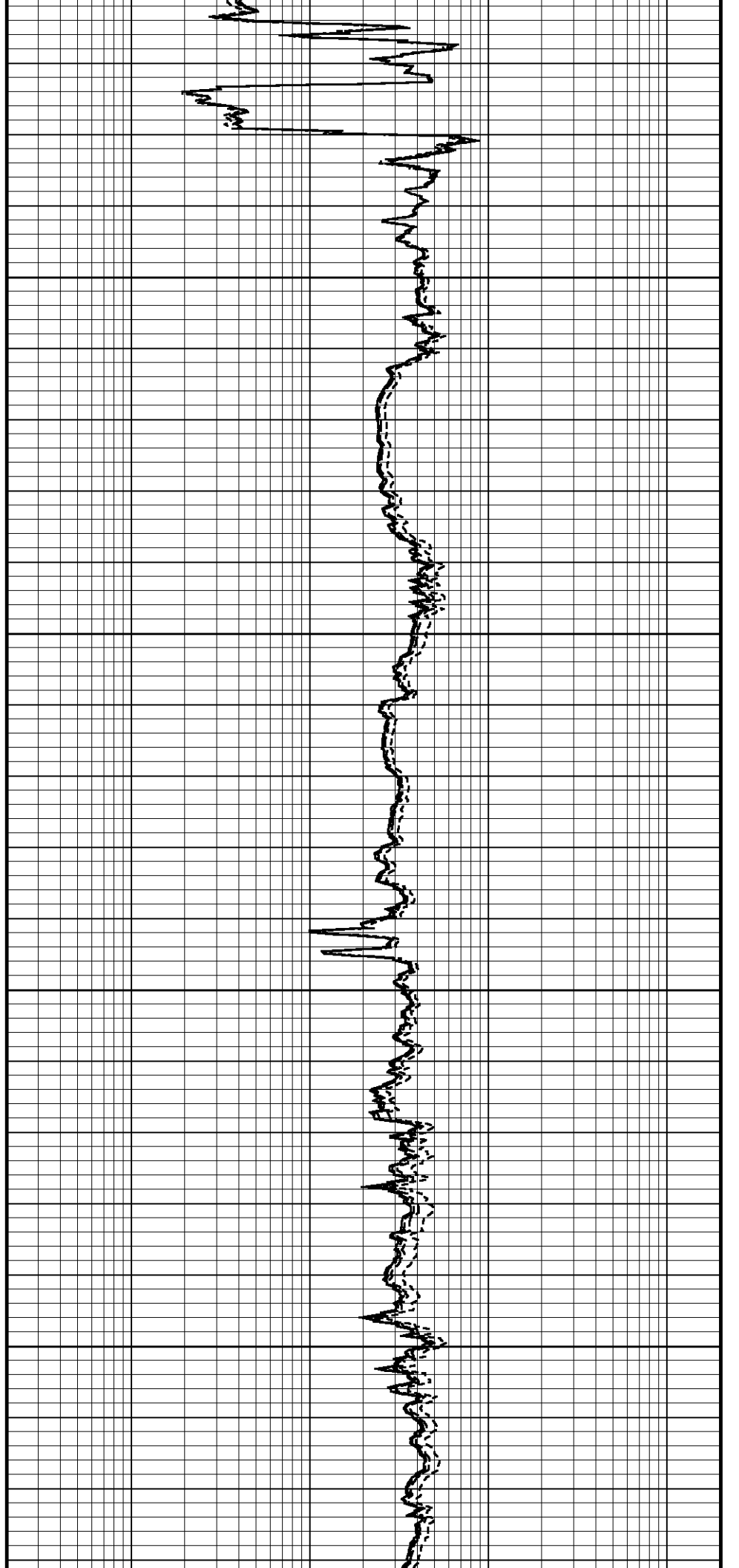
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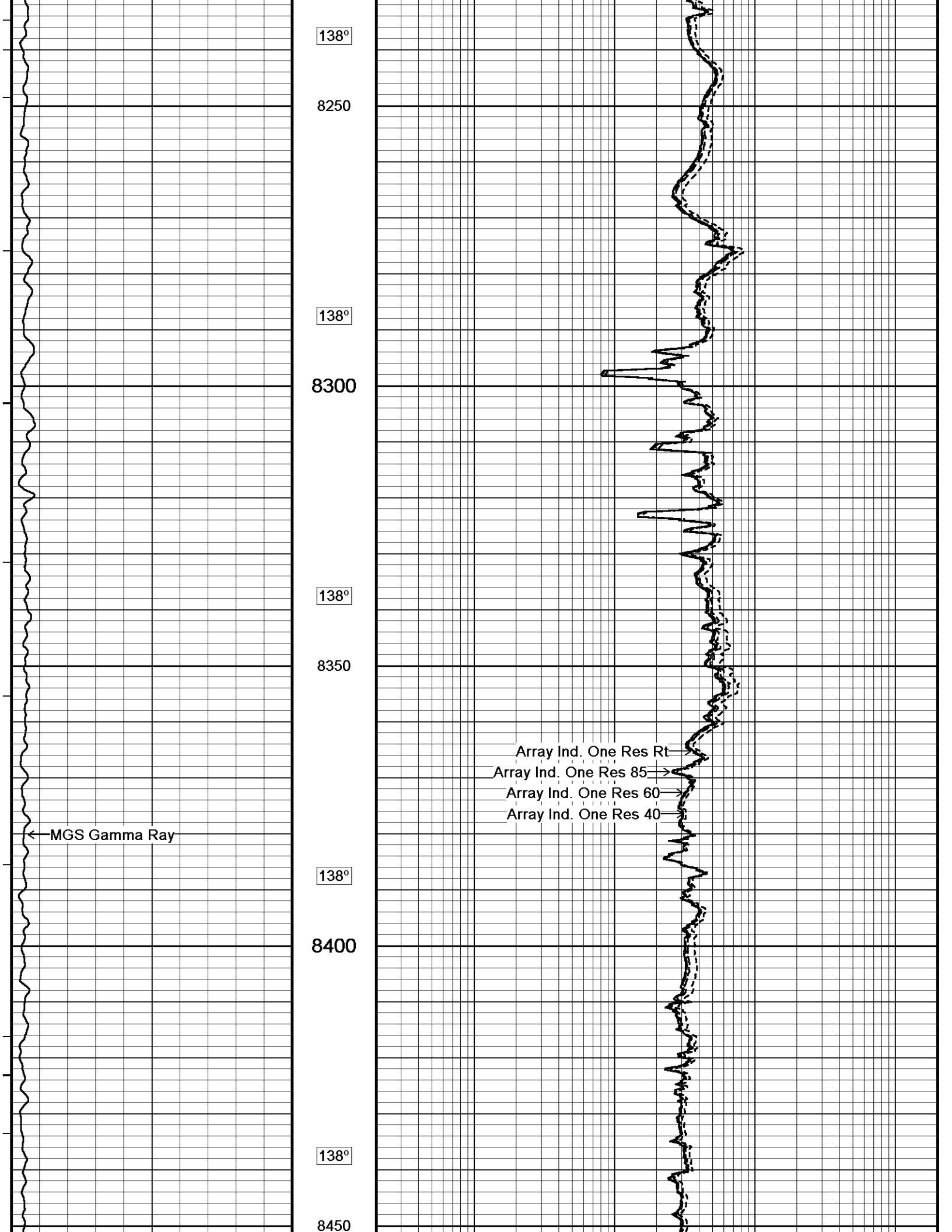
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8150

138°

8200





138°

8250

138°

8300

138°

8350

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

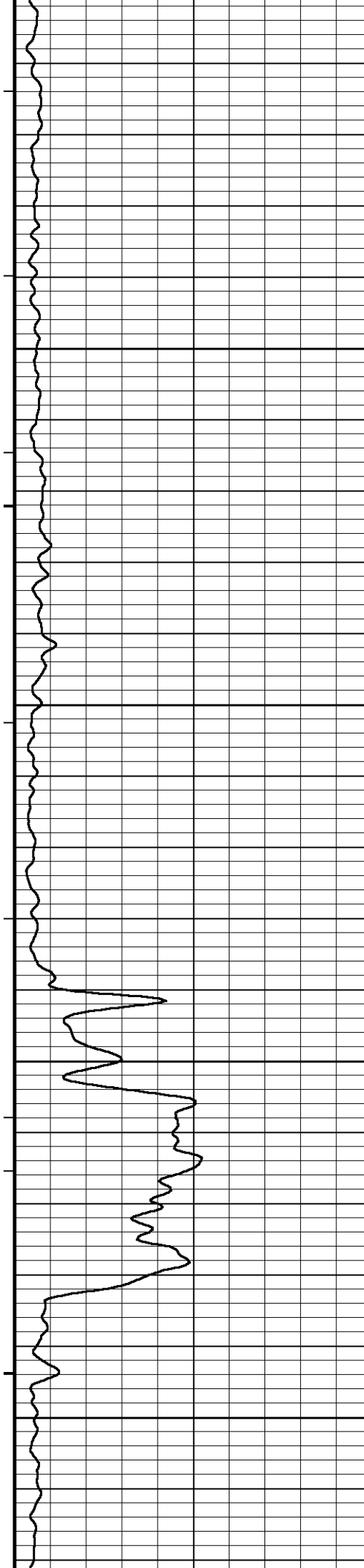
MGS Gamma Ray

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8400

138°

8450



138°

8500

139°

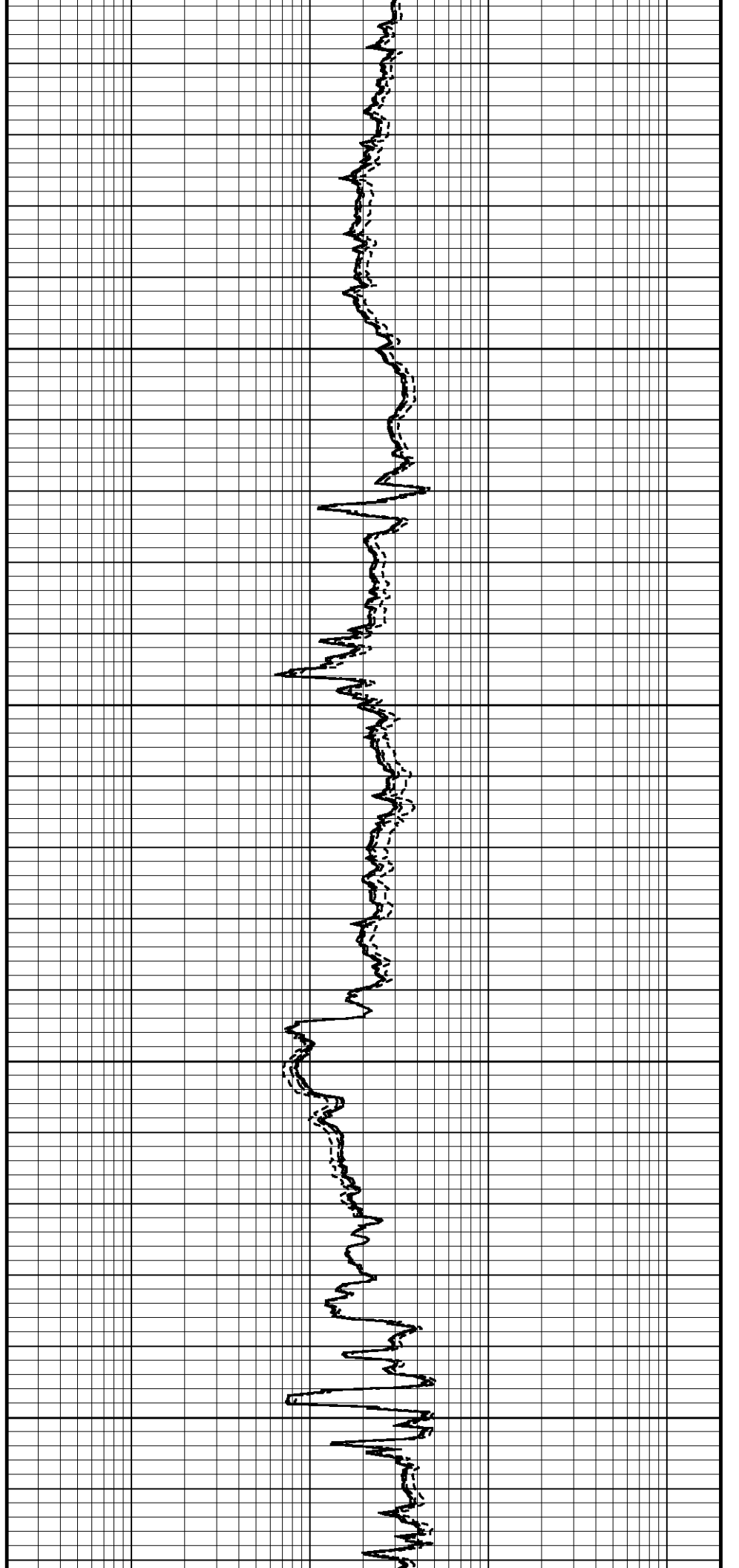
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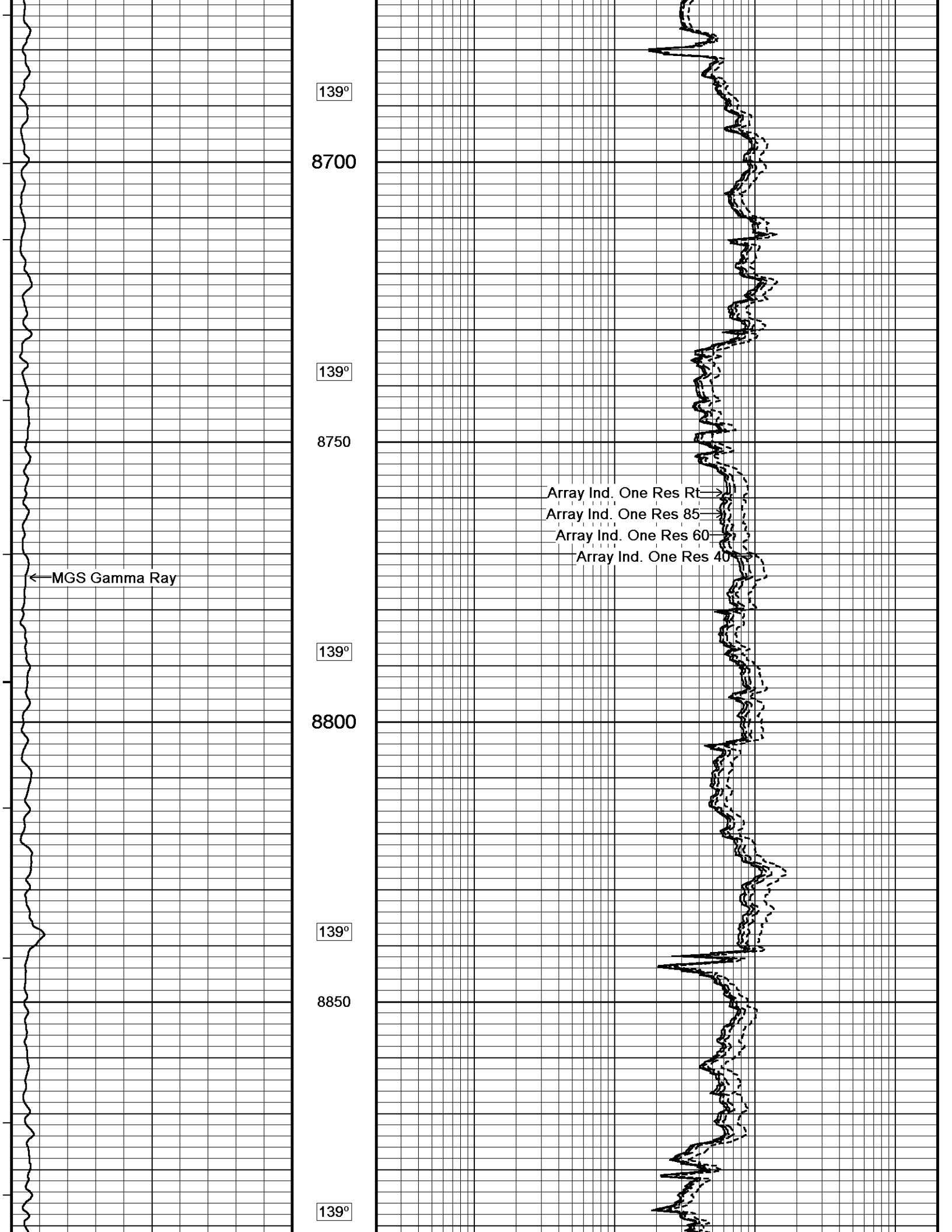
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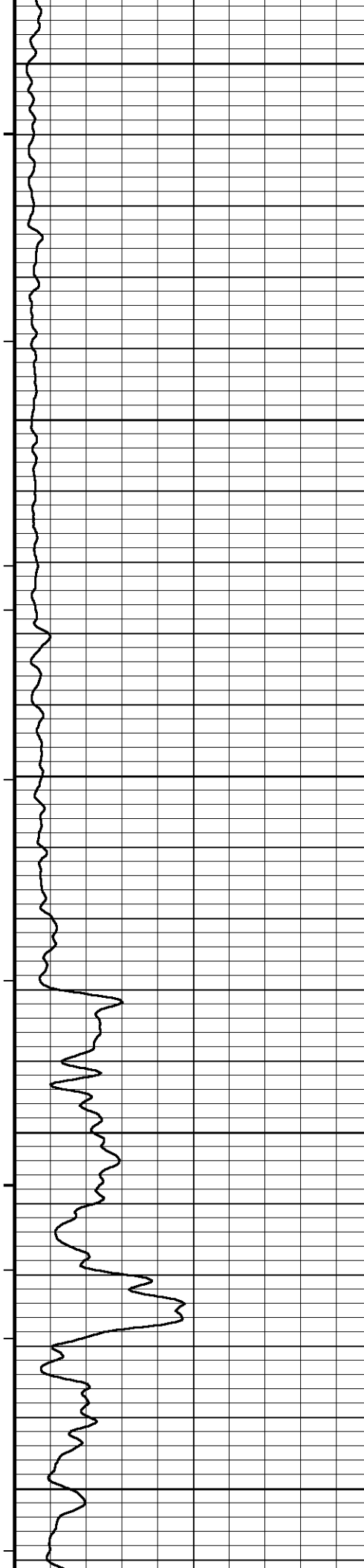
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139°

8650







8900

139°

8950

139°

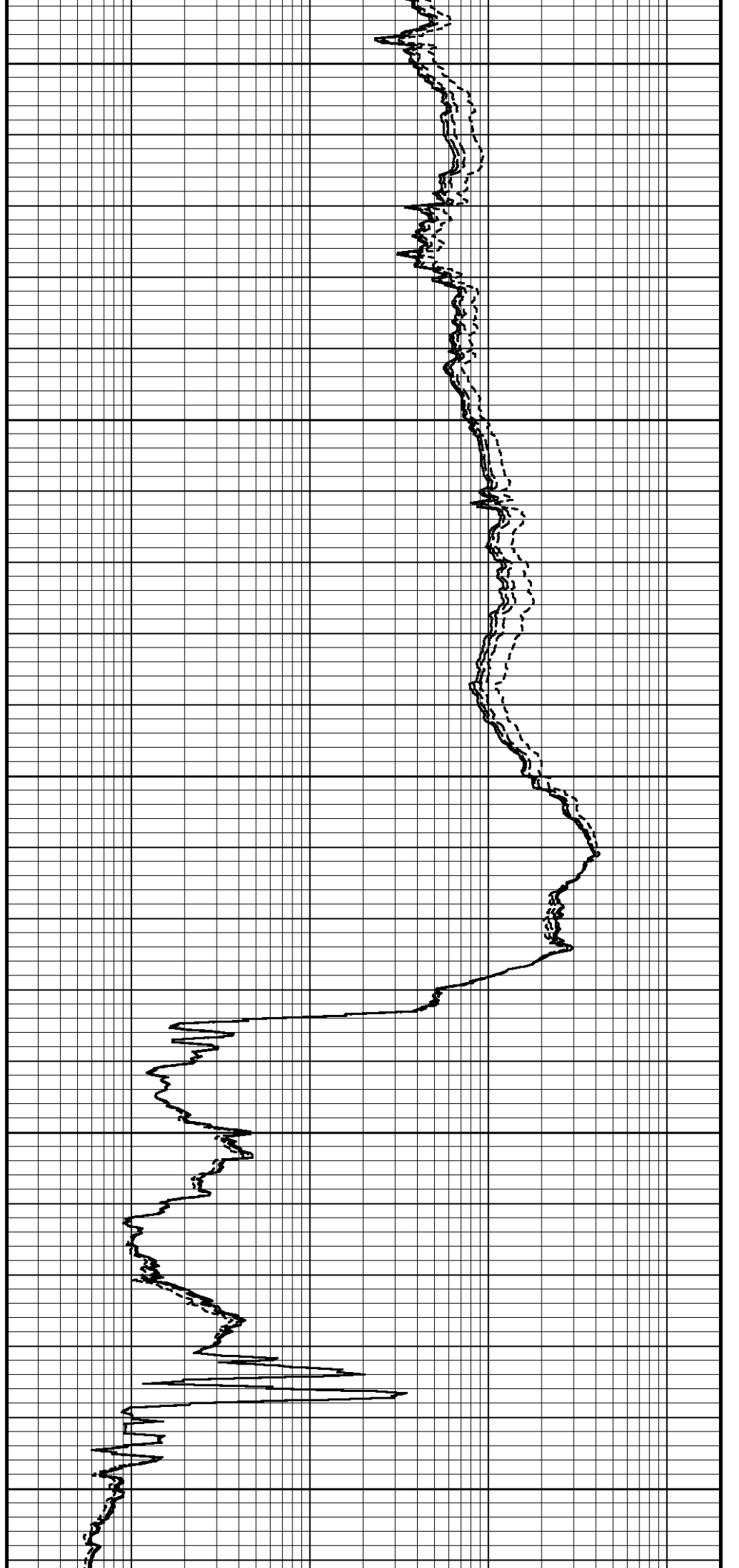
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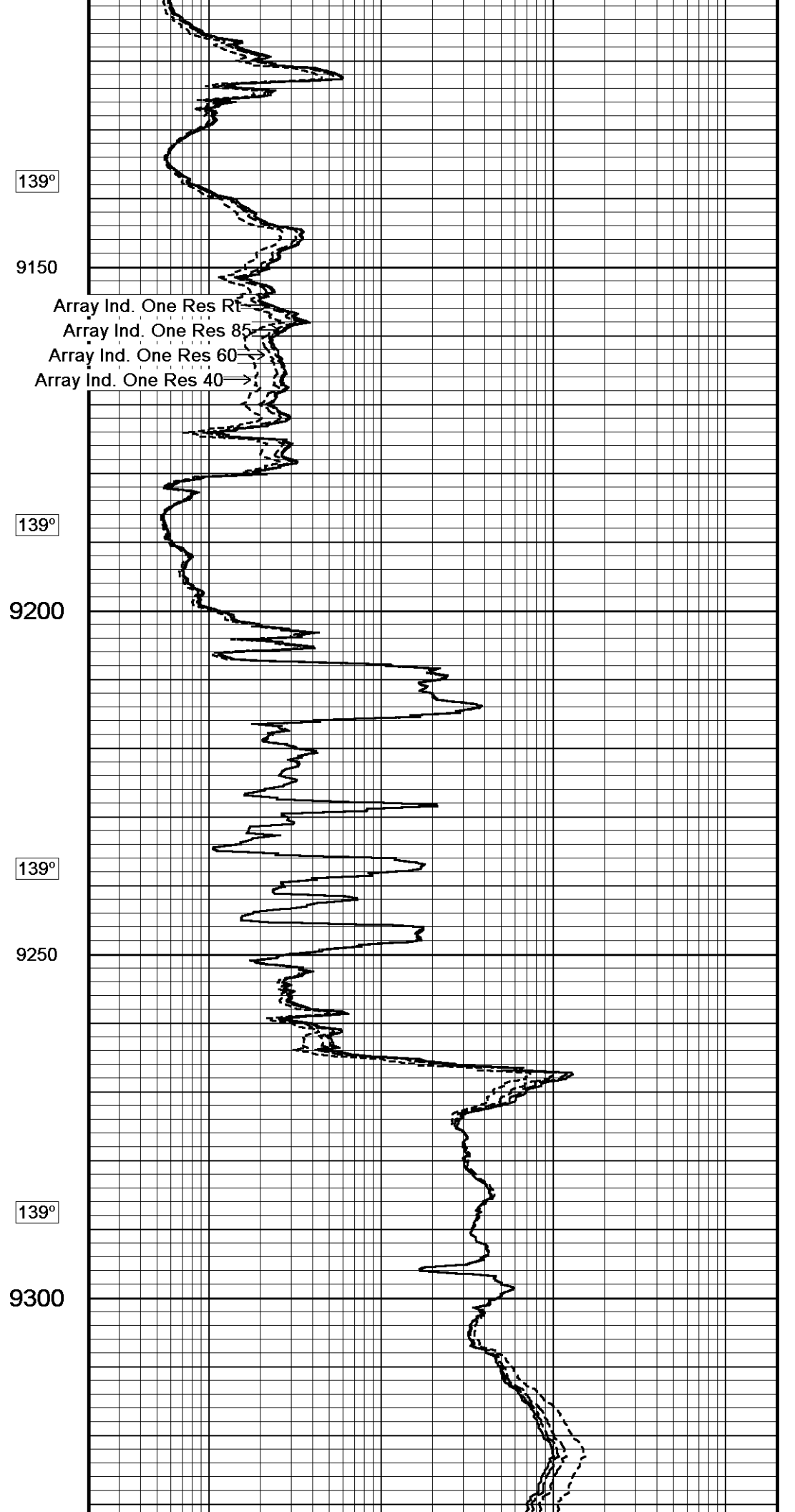
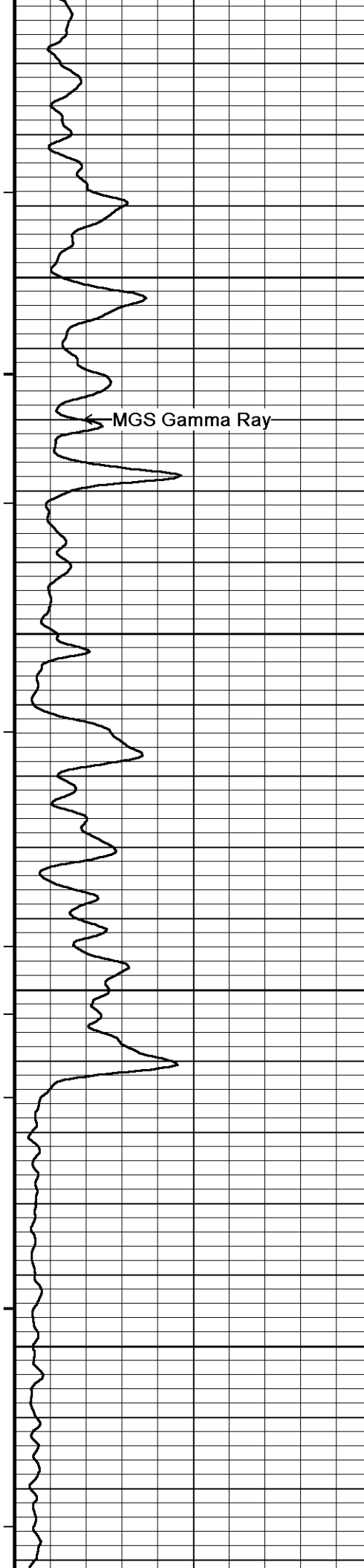
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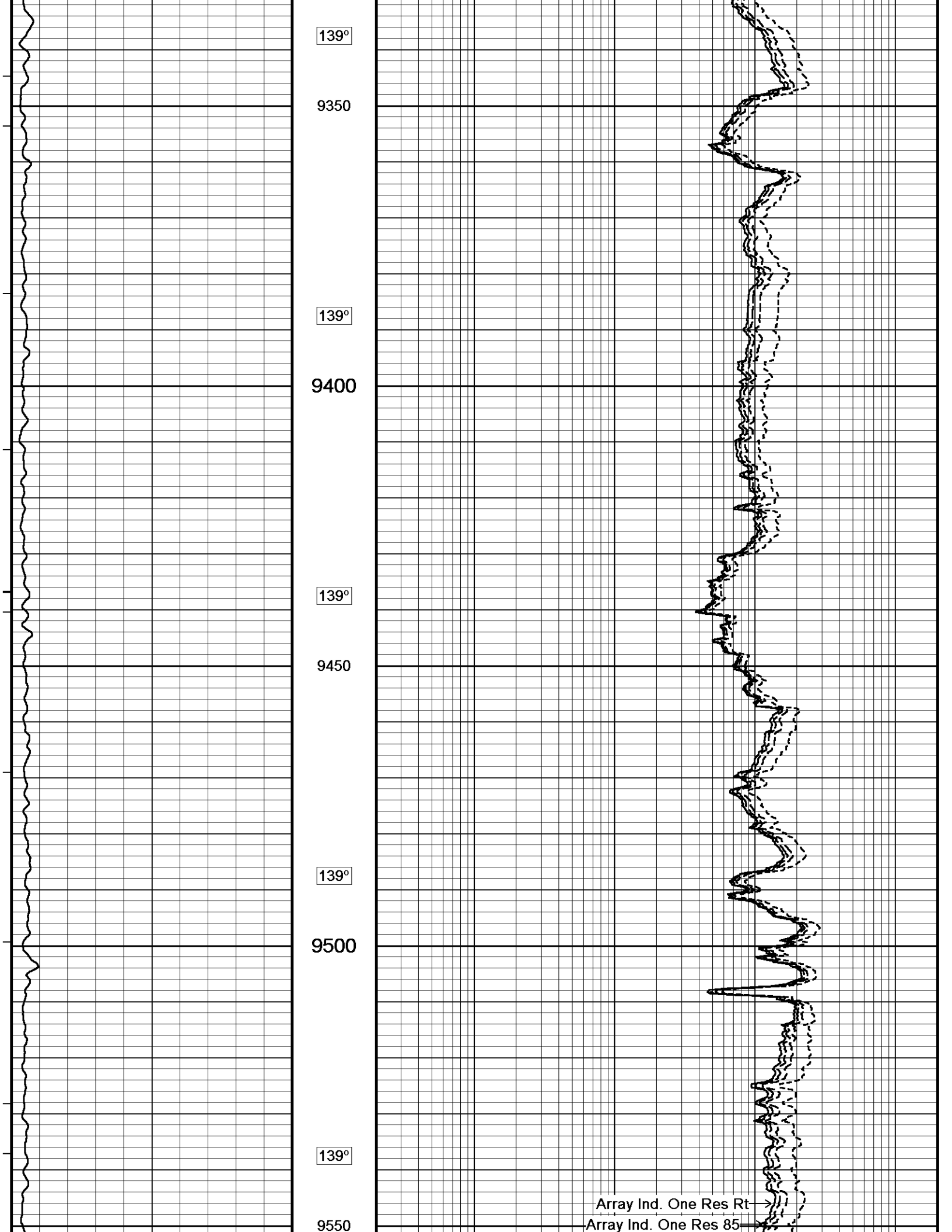
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9450

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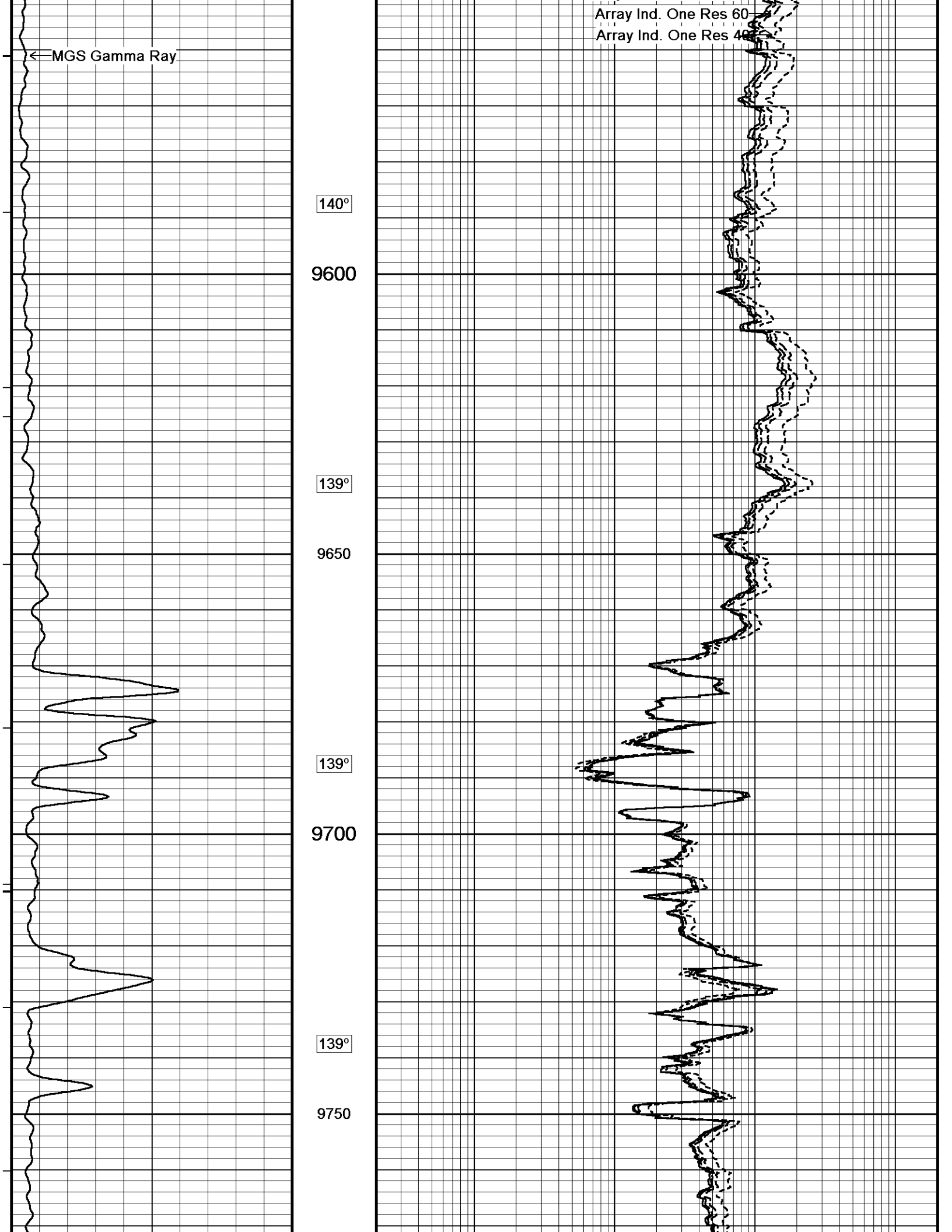
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Array Ind. One Res Rt

Array Ind. One Res 85



← MGS Gamma Ray

Array Ind. One Res 60  
Array Ind. One Res 40

140°

9600

139°

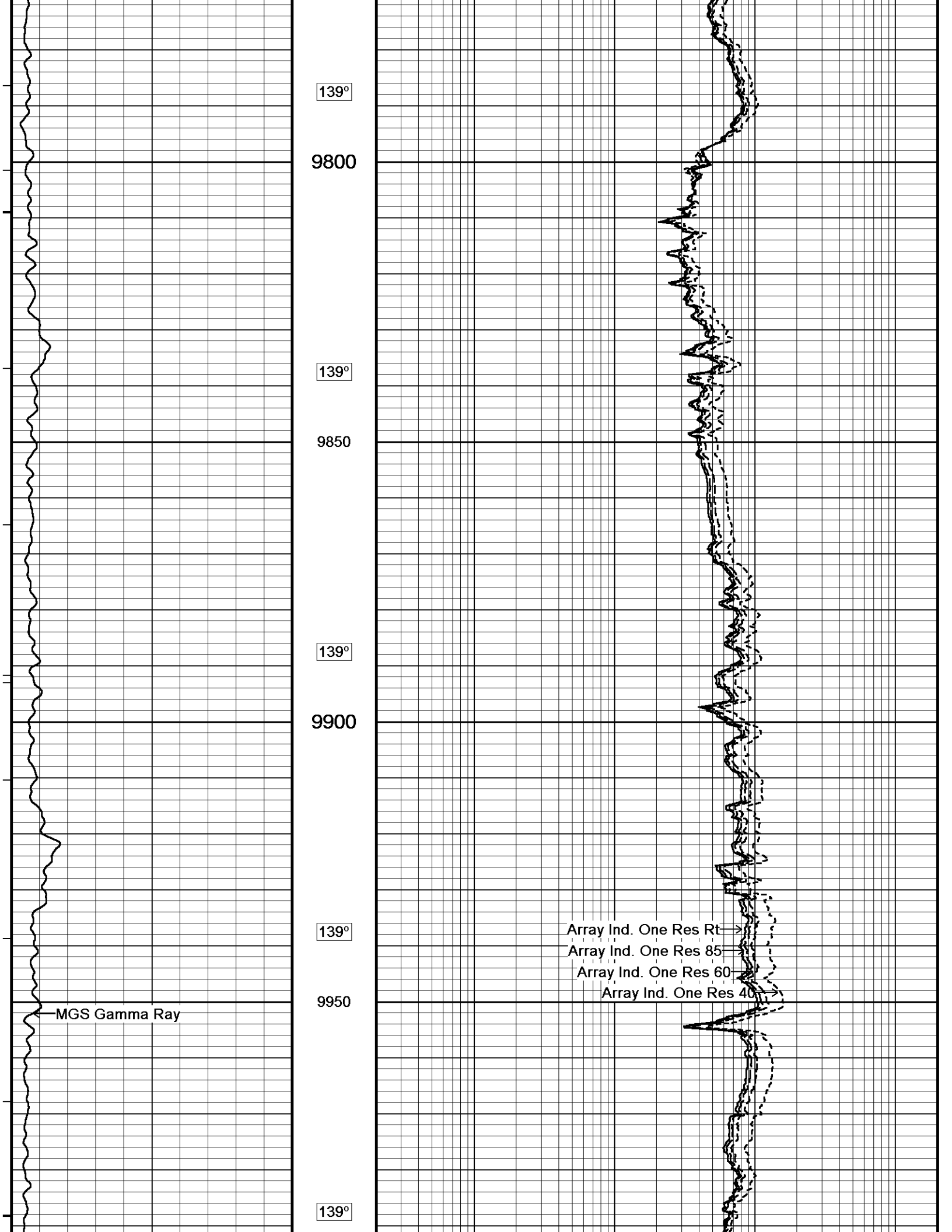
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139°

9750



139°

9800

139°

9850

139°

9900

139°

9950

139°

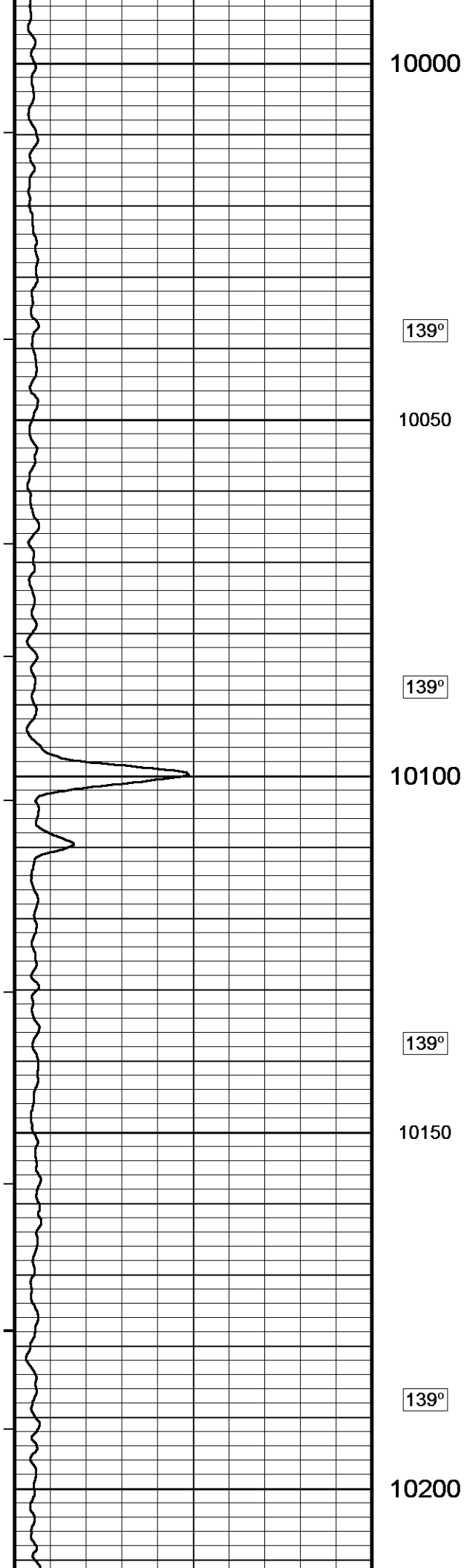
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MGS Gamma Ray

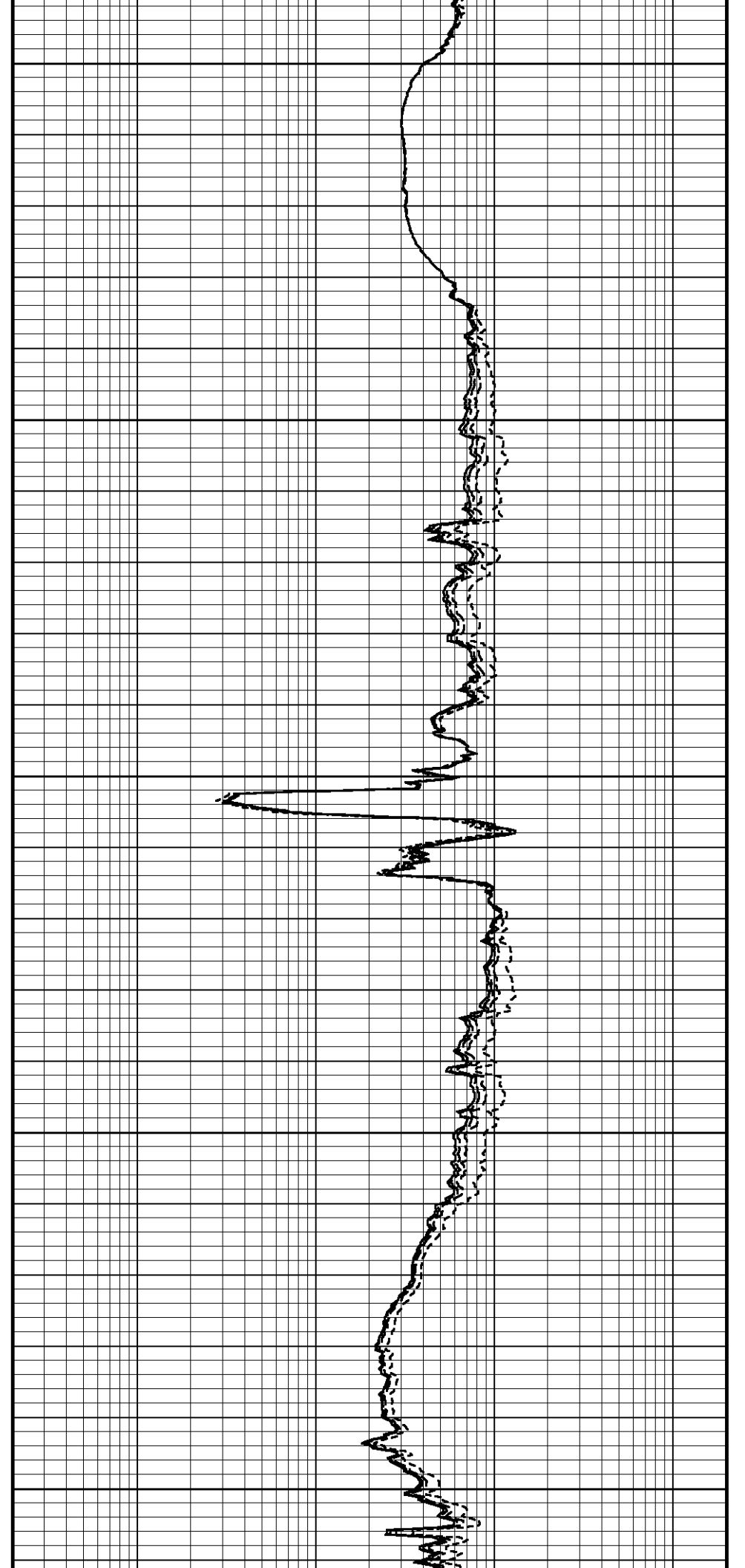


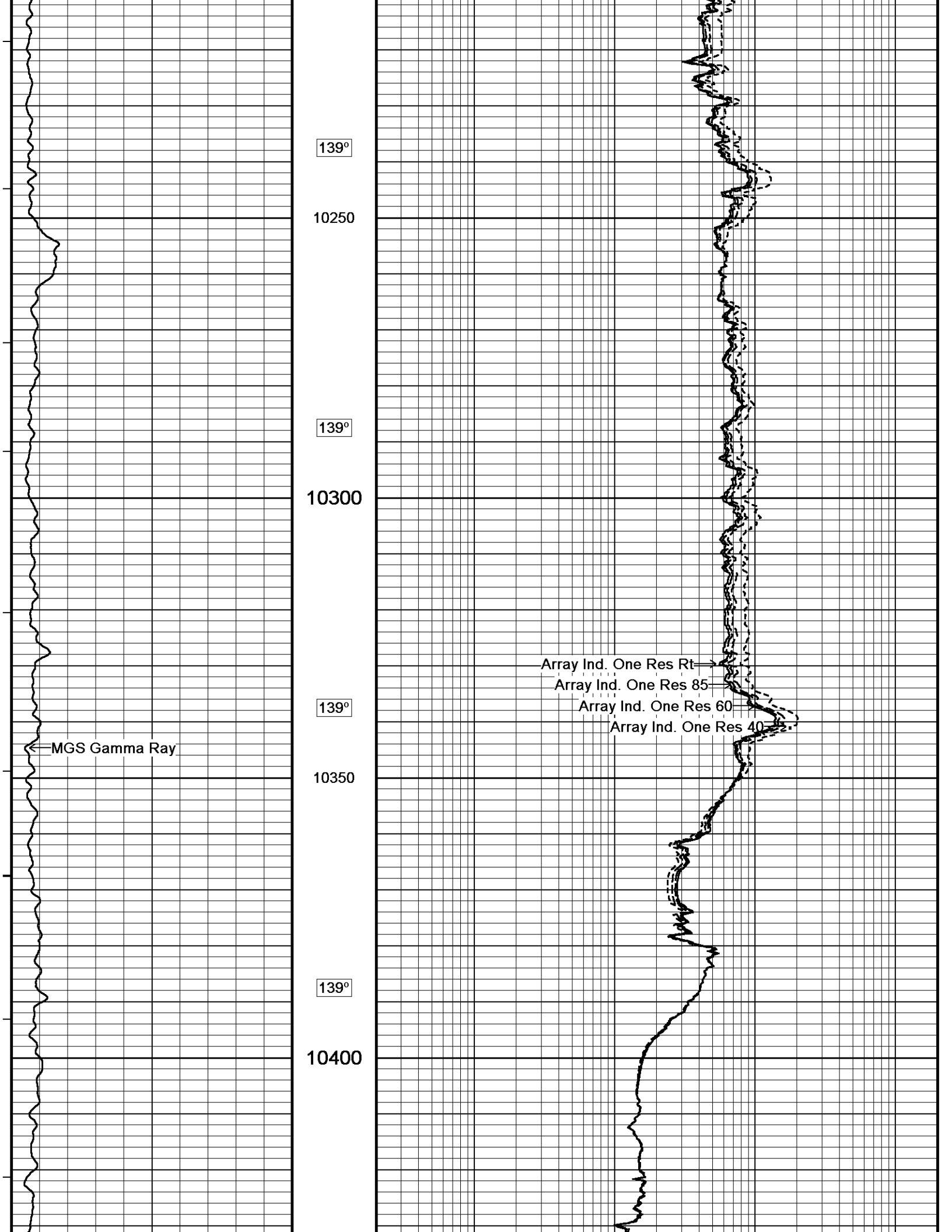
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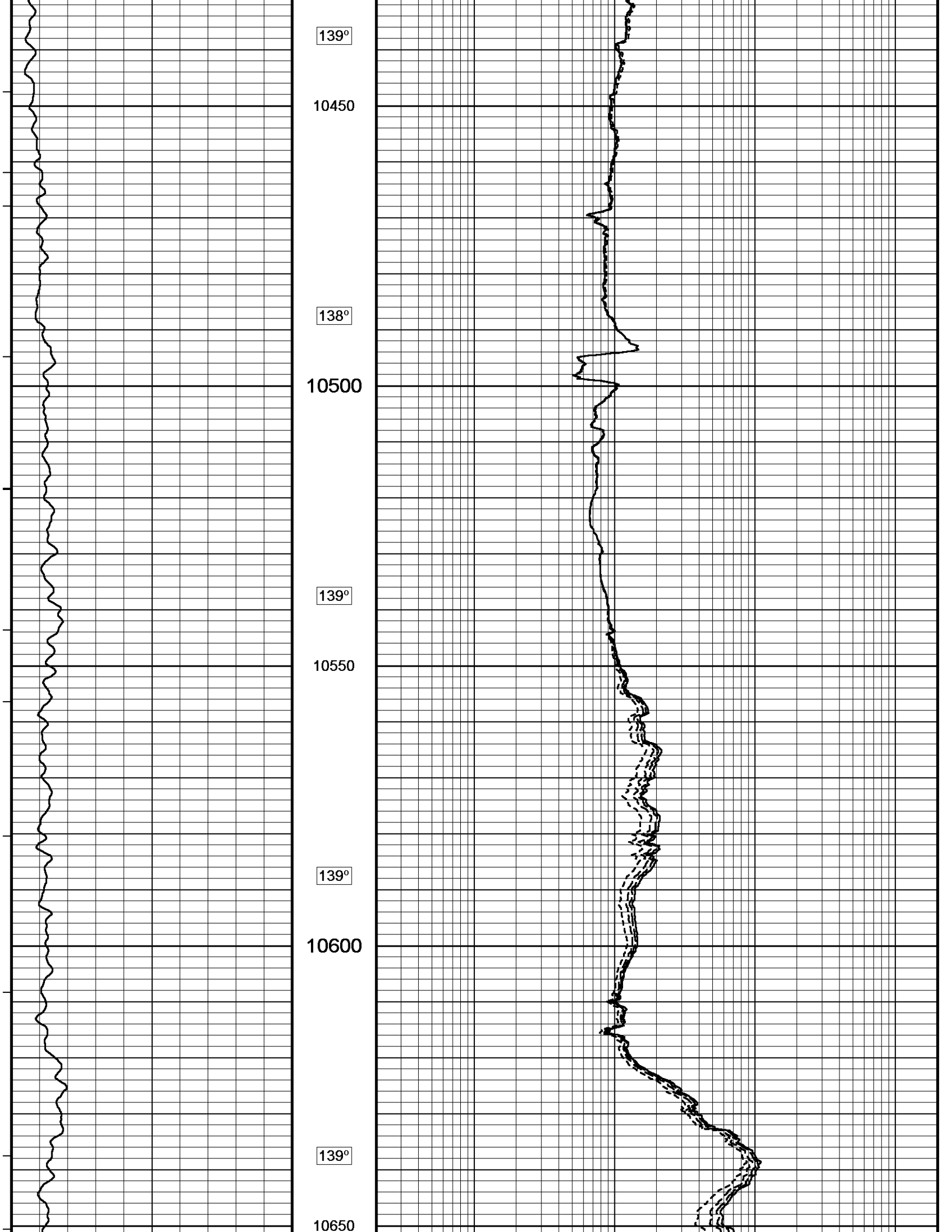
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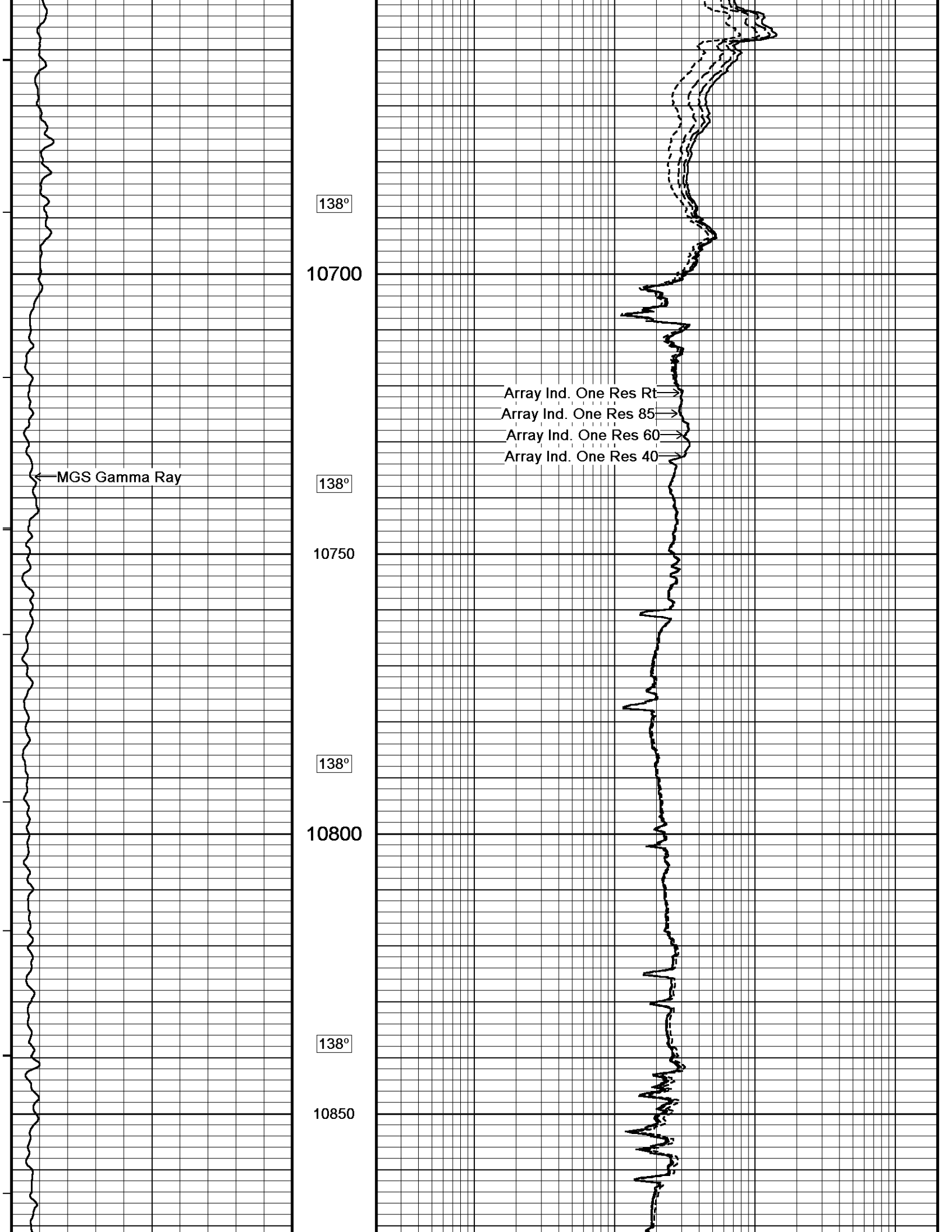
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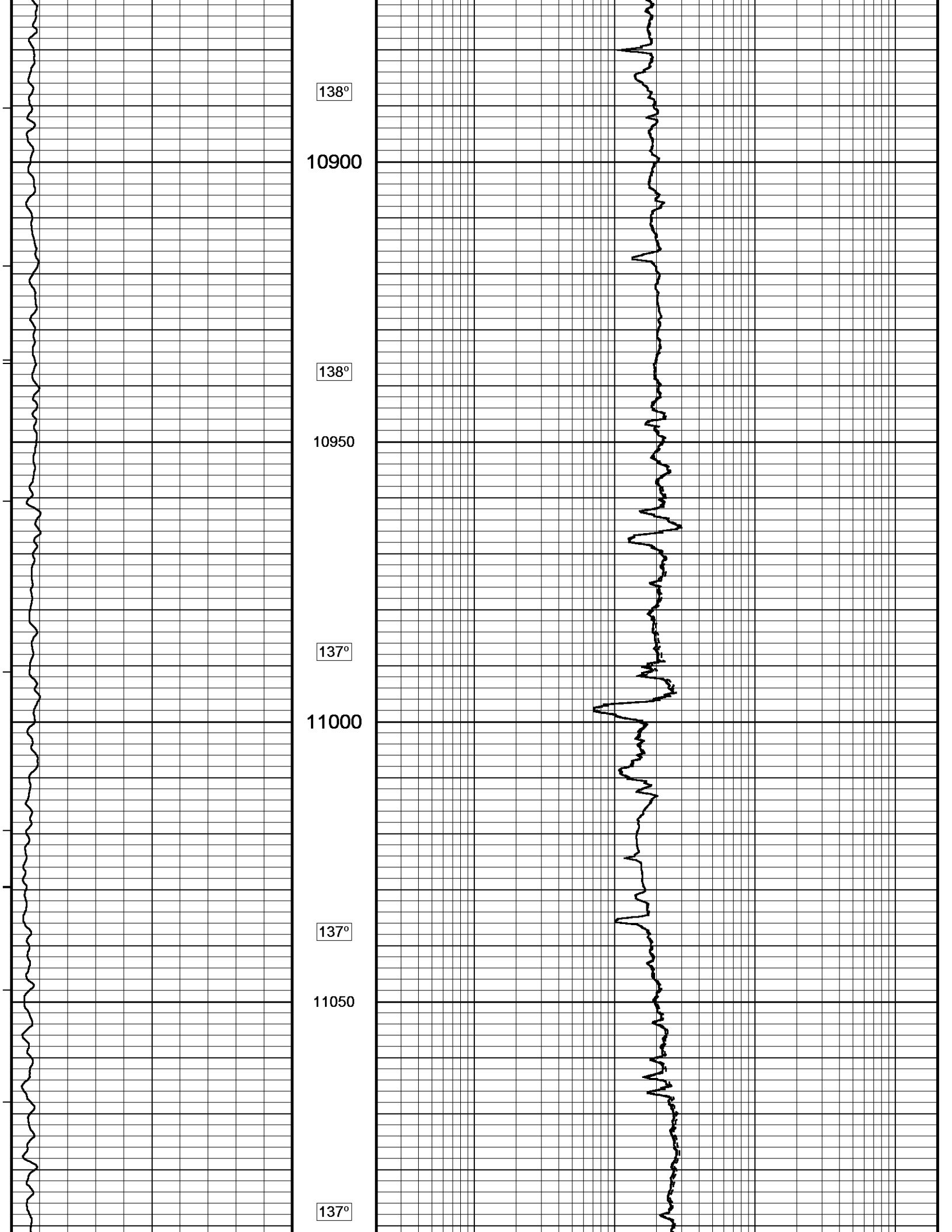
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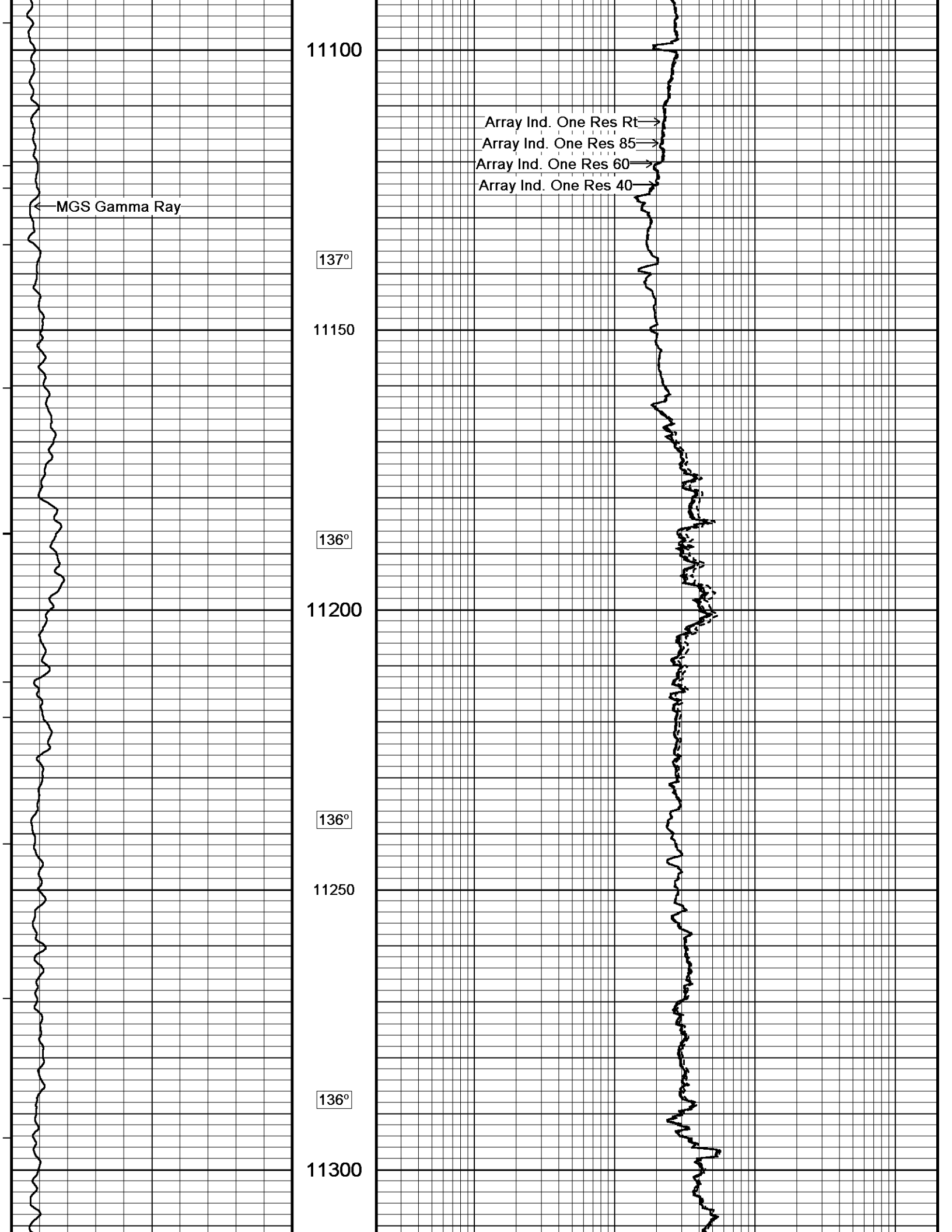












11100

137°

11150

136°

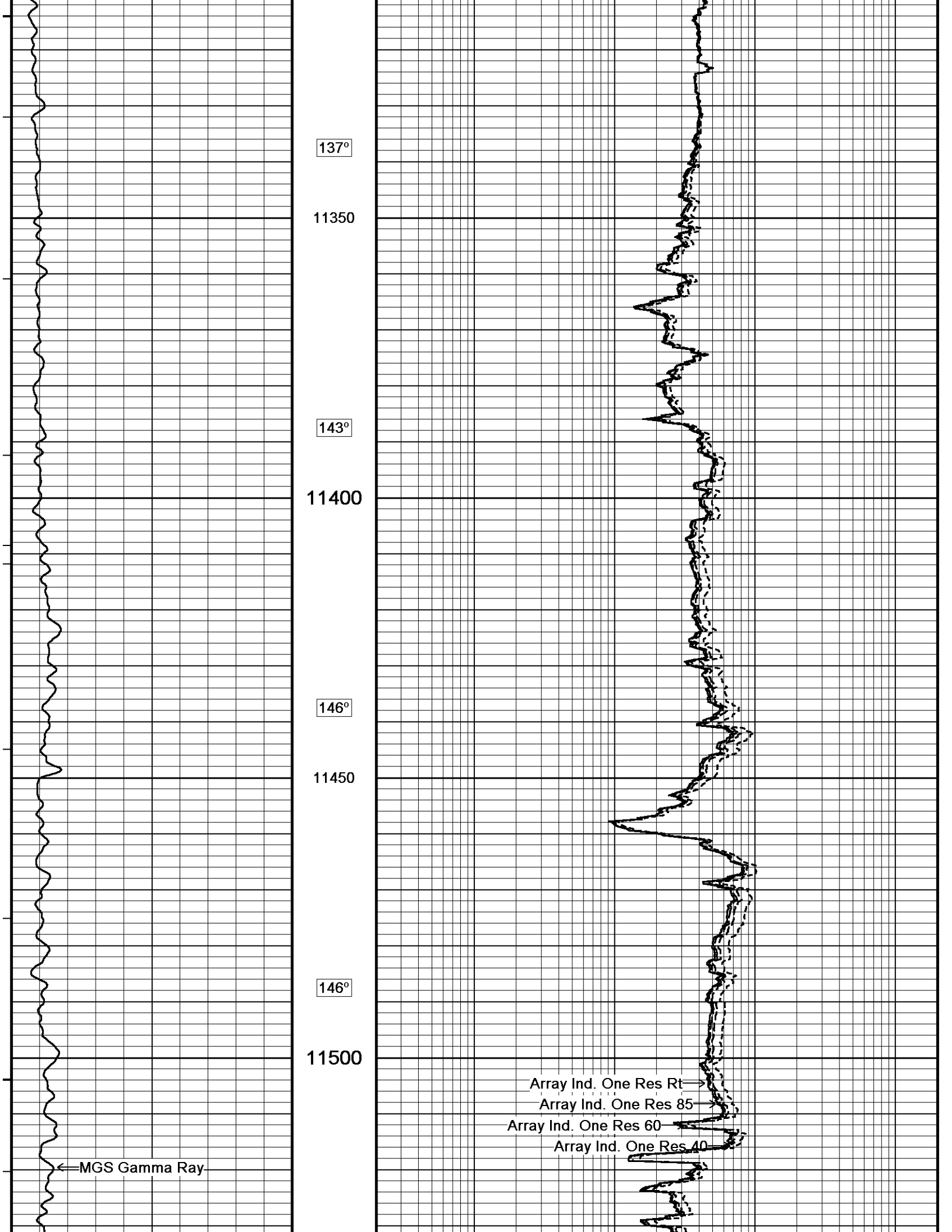
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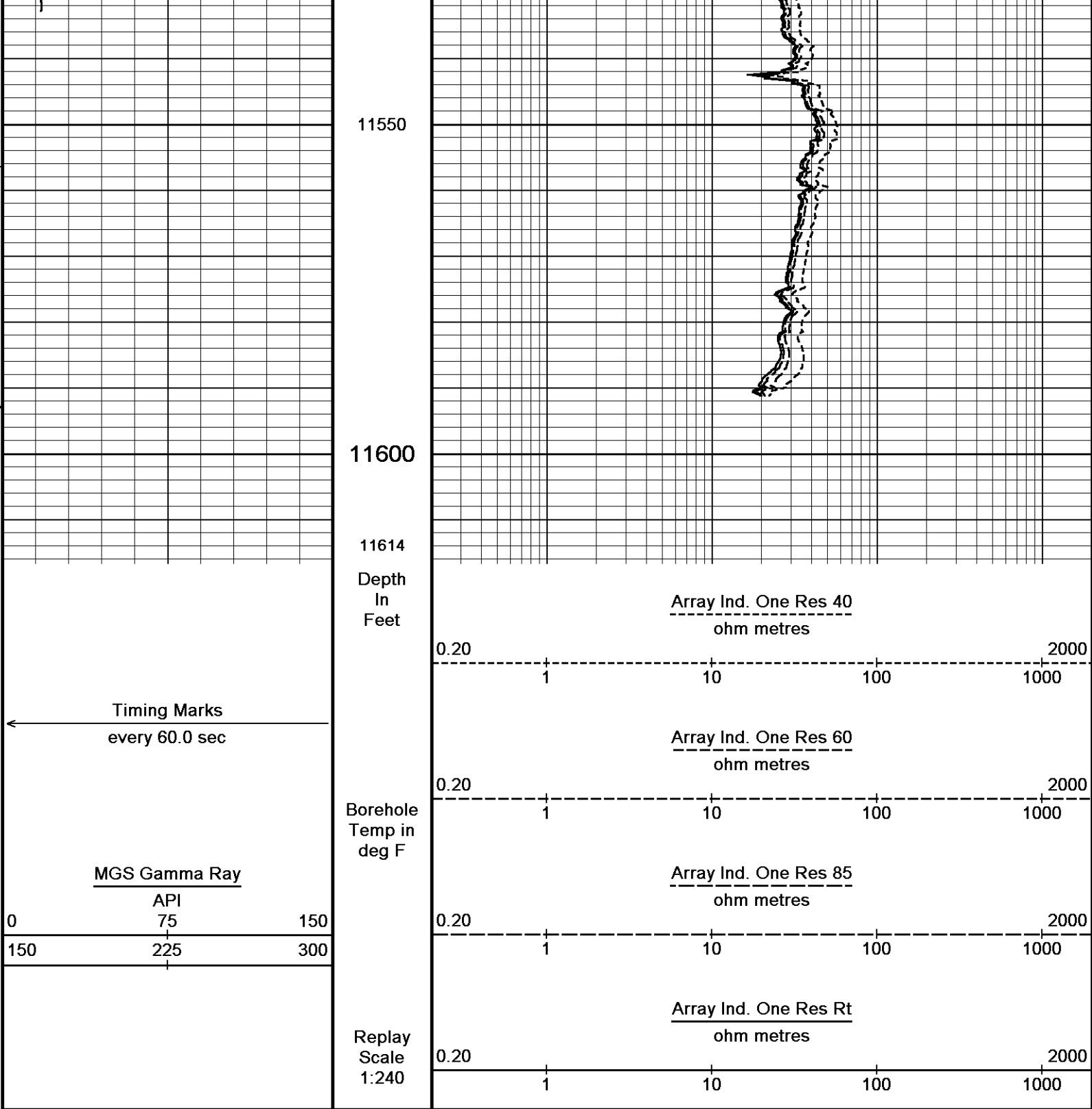
136°

11250

136°

11300





Depth Based Data - Maximum Sampling Increment 10.0cm  
 Plotted on 12-JAN-2013 18:33  
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↑ MAIN PASS ↑

BEFORE SURVEY CALIBRATION  
 C:\Data\SANDRIDGE (TURNER 3406 3-7H)\41985 RTAP Depth.dta

General Constants All 000  
 Last Edited on 12-JAN-2013,17:16

General Parameters		
Mud Resistivity	2.200	ohm-metres
Mud Resistivity Temperature	60.000	degrees F
Water Level	0.000	feet

## Hole/Annular Volume and Differential Caliper Parameters

HVOL Method	Single Caliper	
HVOL Caliper 1	None	
HVOL Caliper 2	N/A	
Annular Volume Diameter	4.500	inches
Caliper for Differential Caliper	None	

## 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 05-SEP-2012,13:01

Reading No	Measured	Calibrated (lbs)
1	15152.07	0.00
2	18386.74	2000.00

## Strain Gauge Constants MMS-E.B 166

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	0.000	0.000	0.000	0.000

## MMS Parameters MMS-E.B 166

Last Edited on 11-JAN-2013 09:54

## Logging Parameters

Firmware Version	2v40	
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	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,MDN,MPD,MPD,MFE,MAI

Gamma Calibration MGS-C.J 133

Field Calibration on 11-JAN-2013 09:43

	Measured	Calibrated (API)
Background	49	34
Calibrator (Gross)	1052	730
Calibrator (Net)	1003	696

Gamma Constants MGS-C.J 133

Last Edited on 12-JAN-2013,05:49

Gamma Calibrator Number	036	
Mud Density	1.00	gm/cc
Caliper Source for Processing	Density Caliper	
Tool Position	Eccentred	
Concentration of KCl	0.00	kppm

High Resolution Temperature Calibration MGS-C.J 133

Field Calibration on 11-JAN-2013,09:39

	Measured	Calibrated(Deg F)
Lower	0.00	0.00
Upper	0.00	0.00

High Resolution Temperature Constants MGS-C.J 133

Last Edited on 11-JAN-2013,09:39

Pre-filter Length	11
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Neutron Calibration MDN-B.J 423

Base Calibration on 07-DEC-2012 10:11  
Field Check on 11-JAN-2013 09:39

Base Calibration					
	Measured		Calibrated (cps)		
	Near	Far	Near	Far	
Ratio	2834	86	3714	110	
	32.927		33.764		
Field Calibrator at Base					
			Calibrated (cps)		
Ratio			2559	3758	
			0.681		
Field Check					
			Calibrated (cps)		
Ratio			1361	2006	

Neutron Constants MDN-B.J 423

Last Edited on 11-JAN-2013,09:32

Neutron Source Id	000	
Neutron Jig Number	000	
Epithermal Neutron	No	
Caliper Source for Processing	Density Caliper	
Stand-off	0.00	inches
Mud Density	1.04	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	MGS External Temperature	
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-B.J 328

Base Calibration on 07-DEC-2012 09:27  
Field Check on 11-JAN-2013 09:27

Base Calibration

Reference 1	Measured	0.0	Calibrated (ohm-m)	0.0
Reference 2		981.4		126.8
Base Check				274.7
Field Check				274.8

FE Constants MFE-B.J 328			Last Edited on 11-JAN-2013,09:26	
Running Mode	No Sleeve			
MFE K Factor	0.1268			
Caliper Source for FE correction	Bit Size			
Caliper Value for FE correction	N/A		inches	
Rm Source for FE correction	Constant Value			
Temp. for Rm Corr.	N/A			
Stand-off	Centred		inches	

High Resolution Temperature Calibration MAI-C.A 427			Field Calibration on 11-JAN-2013,09:21	
	Measured		Calibrated(Deg F)	
Lower	10.00		10.00	
Upper	100.00		100.00	

High Resolution Temperature Constants MAI-C.A 427			Last Edited on 11-JAN-2013,09:21	
Pre-filter Length	11			

Induction Calibration MAI-C.A 427			Base Calibration on 08-DEC-2012,09:11		Field Check on 11-JAN-2013 09:26	
Base Calibration						
Test Loop Calibration		Measured		Calibrated (mmho/m)		
Channel	Low	High	Low	High		
1	14.4	434.9	9.3	966.2		
2	5.8	355.4	7.6	821.4		
3	2.7	244.4	5.2	566.0		
4	1.8	129.3	2.6	279.2		
Array Temperature		22.9		Deg F		
Channel	Base Check (mmho/m)		Field Check (mmho/m)			
	Low	High	Low	High		
1			17.8	4140.3		
2			32.1	3770.4		
3			31.4	3209.8		
4			20.1	2124.3		
Deep			19.5	2020.0		
Medium			45.9	4288.6		
Shallow			47.4	5678.9		
Array Temperature				47.1 Deg F		

Induction Constants MAI-C.A 427			Last Edited on 12-JAN-2013,17:16			
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			



Base Calibration

Reading No	Measured	Calibrator Size (in)
1	19410	3.99
2	29147	5.97
3	38815	7.99
4	48375	9.86
5	59610	11.93
6	N/A	N/A

Field Calibration

Measured Caliper (in)	Actual Caliper (in)
5.87	5.97

DOWNHOLE EQUIPMENT

C:\Data\SANDRIDGE (TURNER 3406 3-7H)\41985 RTAP Depth.dta

Shuttle Running Tool 3.5" )  
SRT-A.A 40 LG: 6.62 ft WT: 37.5 lb OD: 2.52 in

MBS-F.A 200v Compact Battery Sub  
MBS-F.A 131 LG: 10.61 ft WT: 70.5 lb OD: 2.24 in

Compact Memory Sub E.B  
MMS-E.B 166 LG: 5.20 ft WT: 37.5 lb OD: 2.24 in

Compact Tool Isolator sub.  
MTI-B.A 63 LG: 1.54 ft WT: 13.2 lb OD: 2.24 in

Compact Short Gamma  
MGS-C.J 133 LG: 3.41 ft WT: 24.3 lb OD: 2.24 in

Compact Collar Locator  
MCL-B.J 72 LG: 3.17 ft WT: 26.5 lb OD: 2.24 in

SKJ-E.B Compact Knuckle Joint  
SKJ-E.B 458 LG: 2.17 ft WT: 24.3 lb OD: 2.24 in

SHA-J.A Compact Swivel Head Adaptor  
SHA-J.A 432 LG: 2.30 ft WT: 22.0 lb OD: 2.24 in

MIS-A.A Compact Inline Bowspring sub  
MIS-A.A 247 LG: 5.70 ft WT: 33.1 lb OD: 2.24 in

Compact Neutron  
MDN-B.J 423 LG: 5.04 ft WT: 50.7 lb OD: 2.24 in

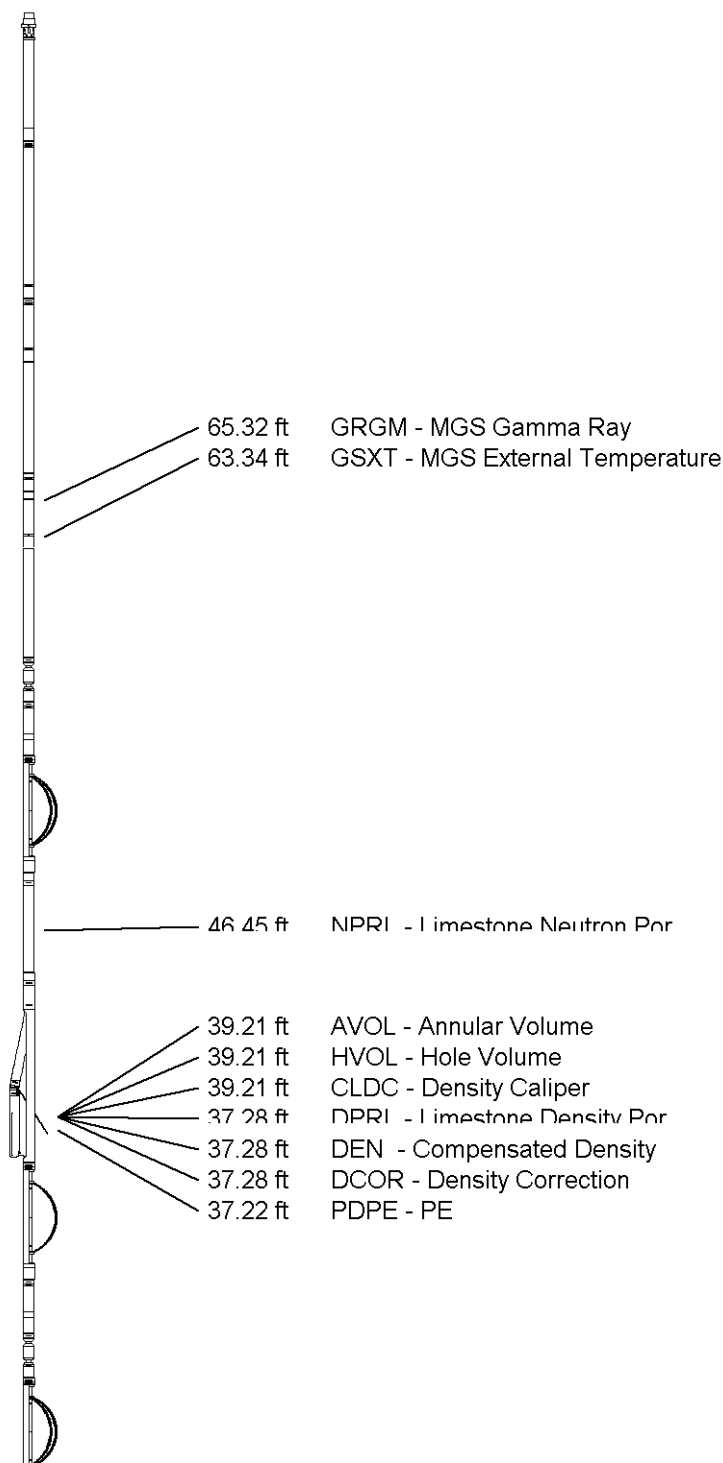
Compact Density/Caliper  
MPD-D.A 471 LG: 9.59 ft WT: 90.4 lb OD: 2.24 in

MIS-D.B Compact Inline Bowspring sub  
MIS-D.B 591 LG: 5.70 ft WT: 33.1 lb OD: 2.24 in

SHA-J.A Compact Swivel Head Adaptor  
SHA-J.A 205 LG: 2.30 ft WT: 22.0 lb OD: 2.24 in

SKJ-E.B Compact Knuckle Joint  
SKJ-E.B 477 LG: 2.17 ft WT: 24.3 lb OD: 2.24 in

MIS-D.B Compact Inline Bowspring sub  
MIS-D.B 565 LG: 5.70 ft WT: 33.1 lb OD: 2.24 in

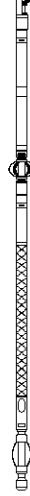


Compact Focussed Electric  
 MFE-B.J 328 LG: 6.05 ft WT: 48.5 lb OD: 2.24 in

MIS-E.A Compact Inline Standoff sub  
 MIS-E.A 336 LG: 2.14 ft WT: 15.4 lb OD: 2.24 in

Compact Induction  
 MAI-C.A 427 LG: 12.52 ft WT: 48.5 lb OD: 2.24 in

Total Length: 91.93 ft Weight: 654.8 lb



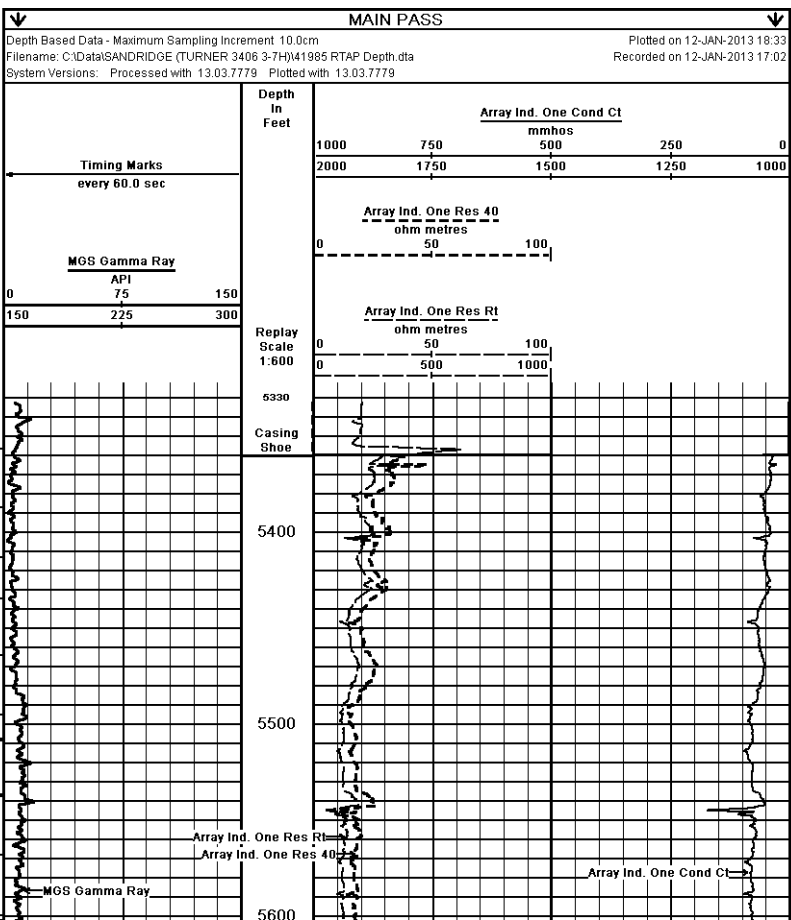
- 3.34 ft CTAO - Array Ind. One Cond Ct
  - 3.34 ft R600 - Array Ind. One Res 60
  - 3.34 ft R400 - Array Ind. One Res 40
  - 3.34 ft R300 - Array Ind. One Res 30
  - 3.34 ft R850 - Array Ind. One Res 85
  - 3.34 ft RTAO - Array Ind. One Res Rt
  - Tool Zero (1.84ft from bottom)
- All measurements relative to tool zero.

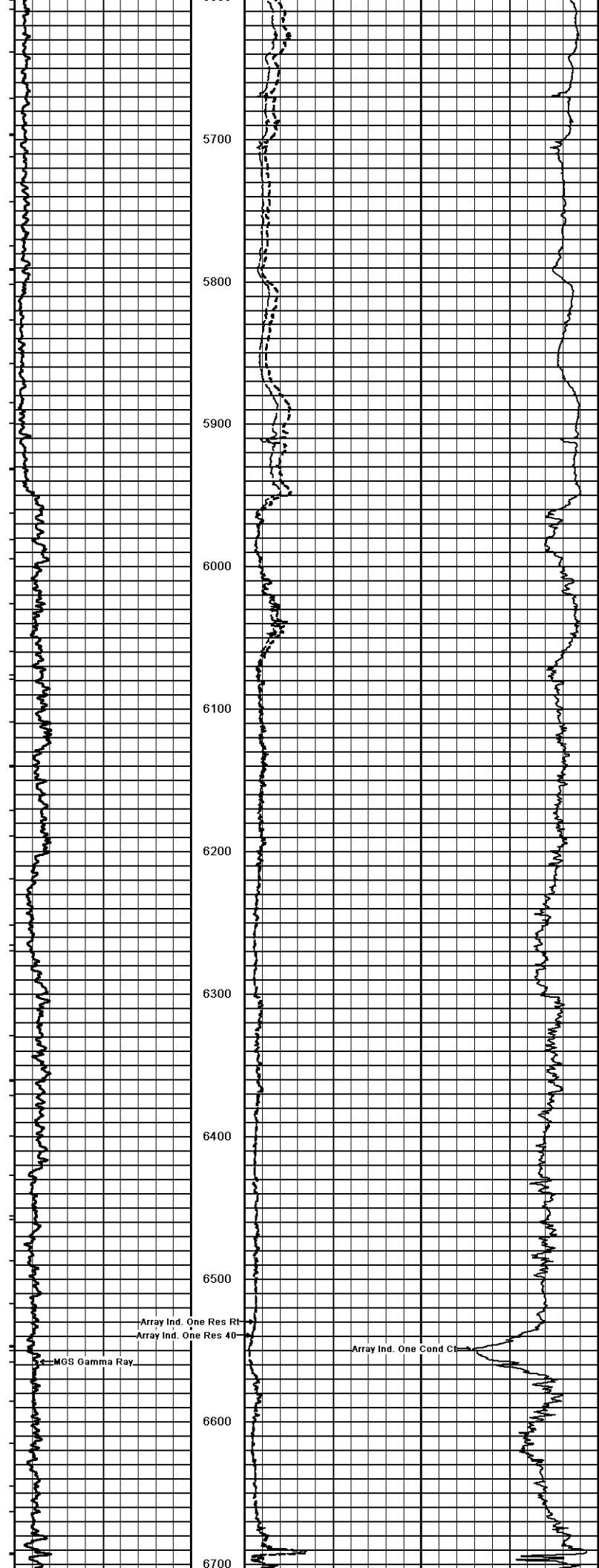
COMPANY	SANDRIDGE ENERGY				
WELL	TURNER 3406 3-7H				
FIELD	EASTHAM				
PROVINCE/COUNTY	HARPER				
COUNTRY/STATE	USA / KANSAS				
Elevation Kelly Bushing	1319.00	feet	First Reading	11588.00	feet
Elevation Drill Floor	1319.00	feet	Depth Driller	11690.00	feet
Elevation Ground Level	1301.00	feet	Depth Logger	11690.00	feet

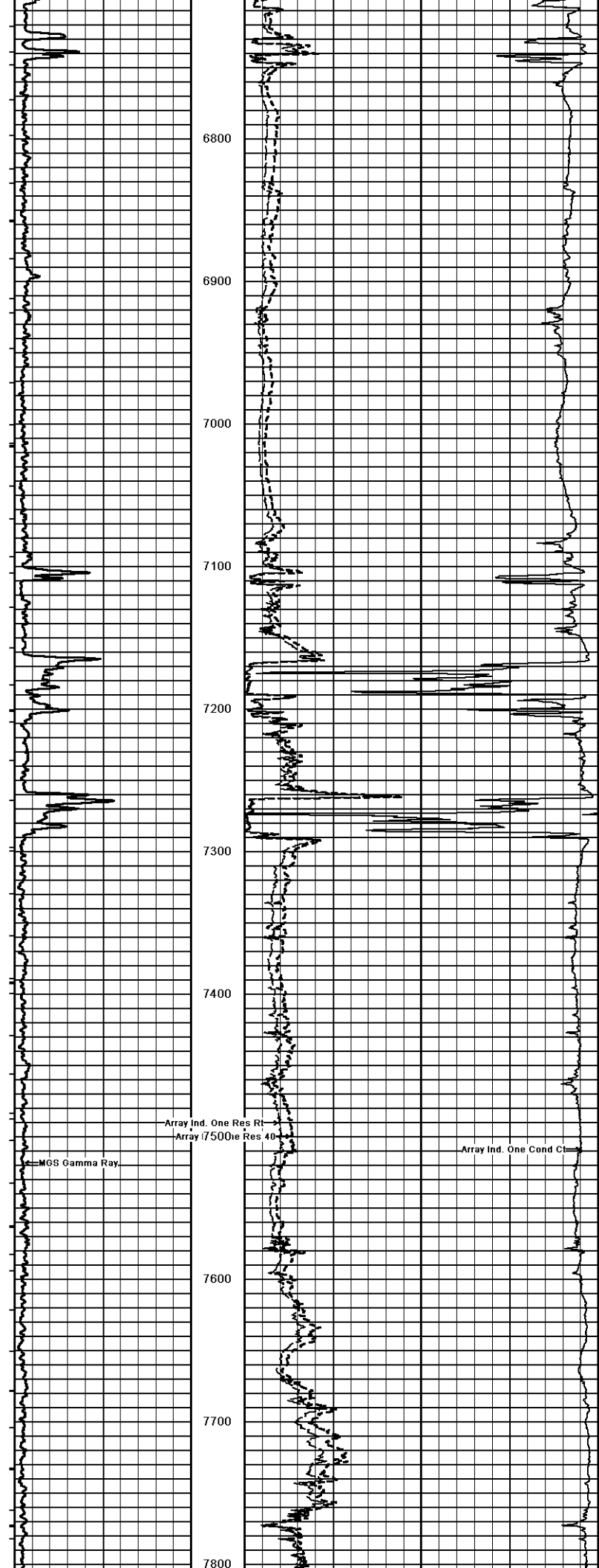
CML MESSENGER SHUTTLE

ARRAY INDUCTION

LOG



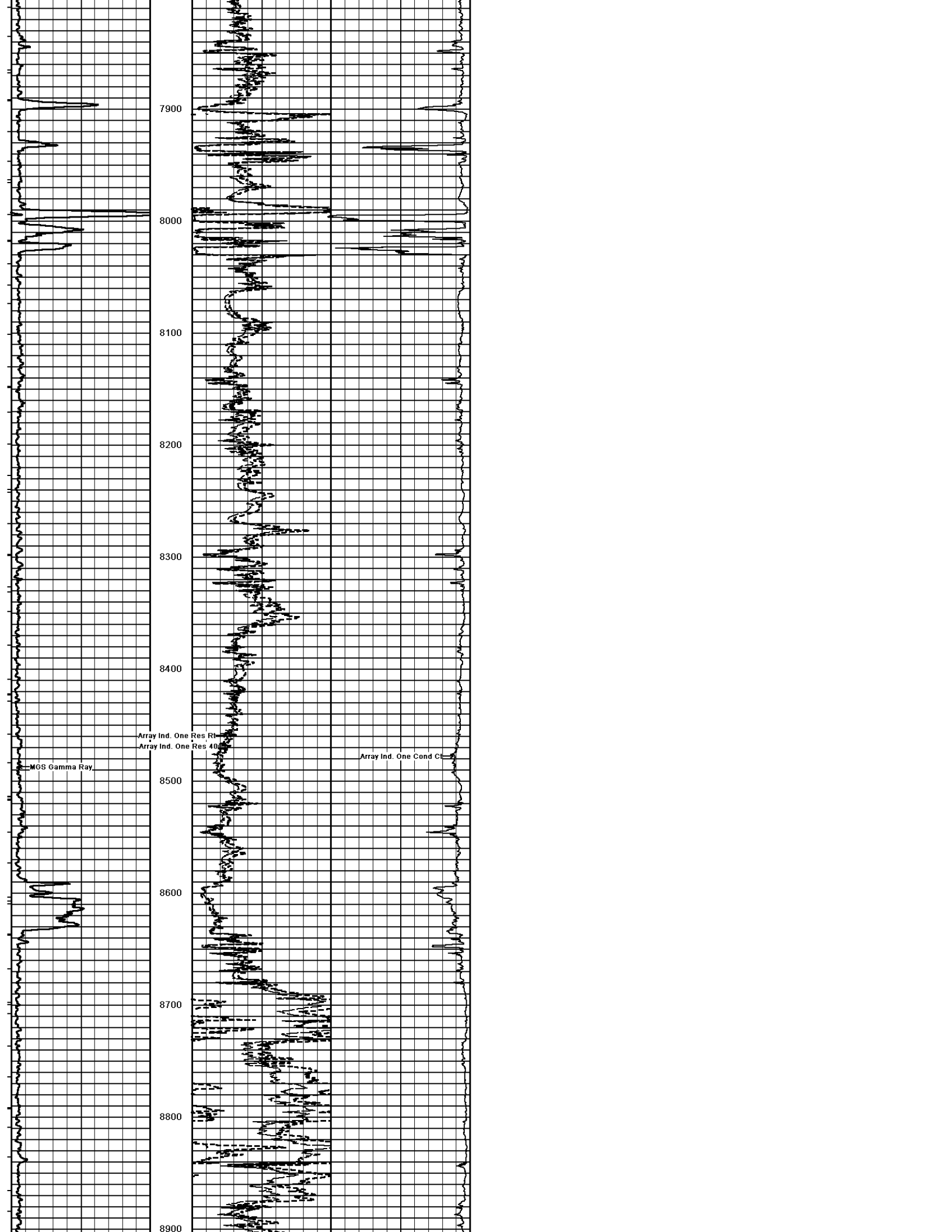


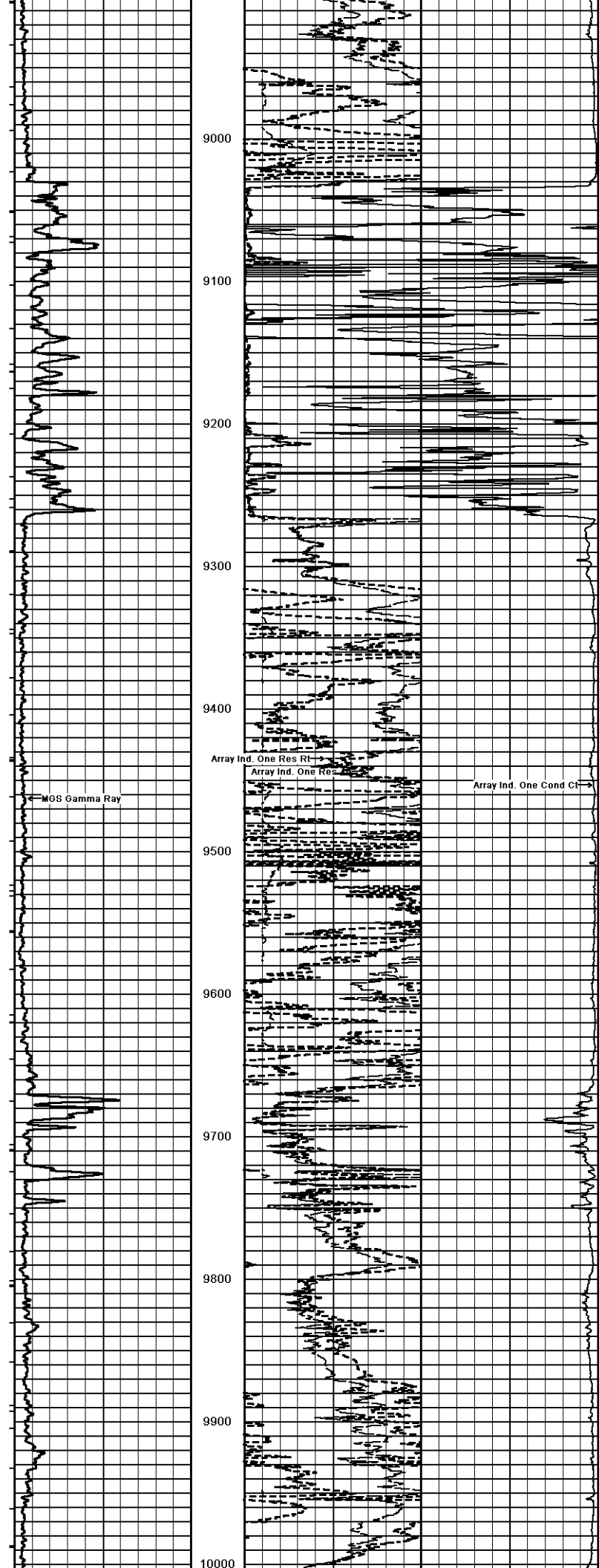


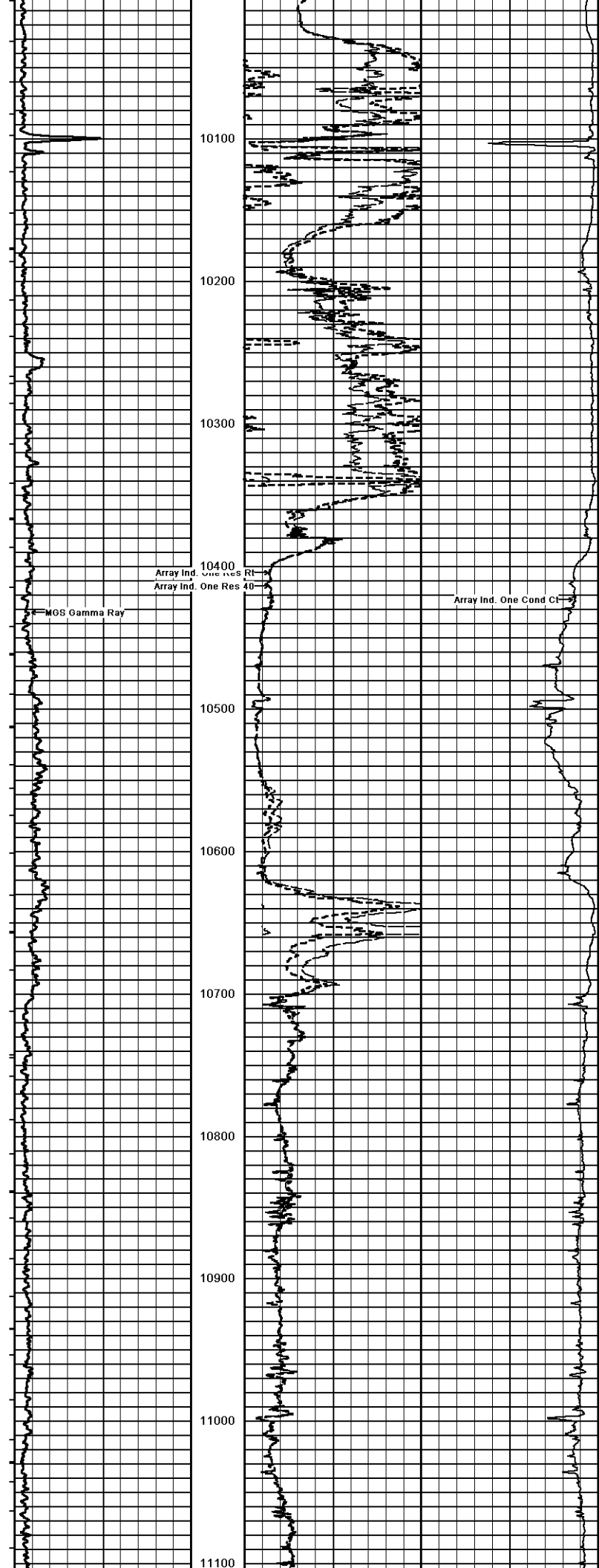
Array Ind. One Res Rt

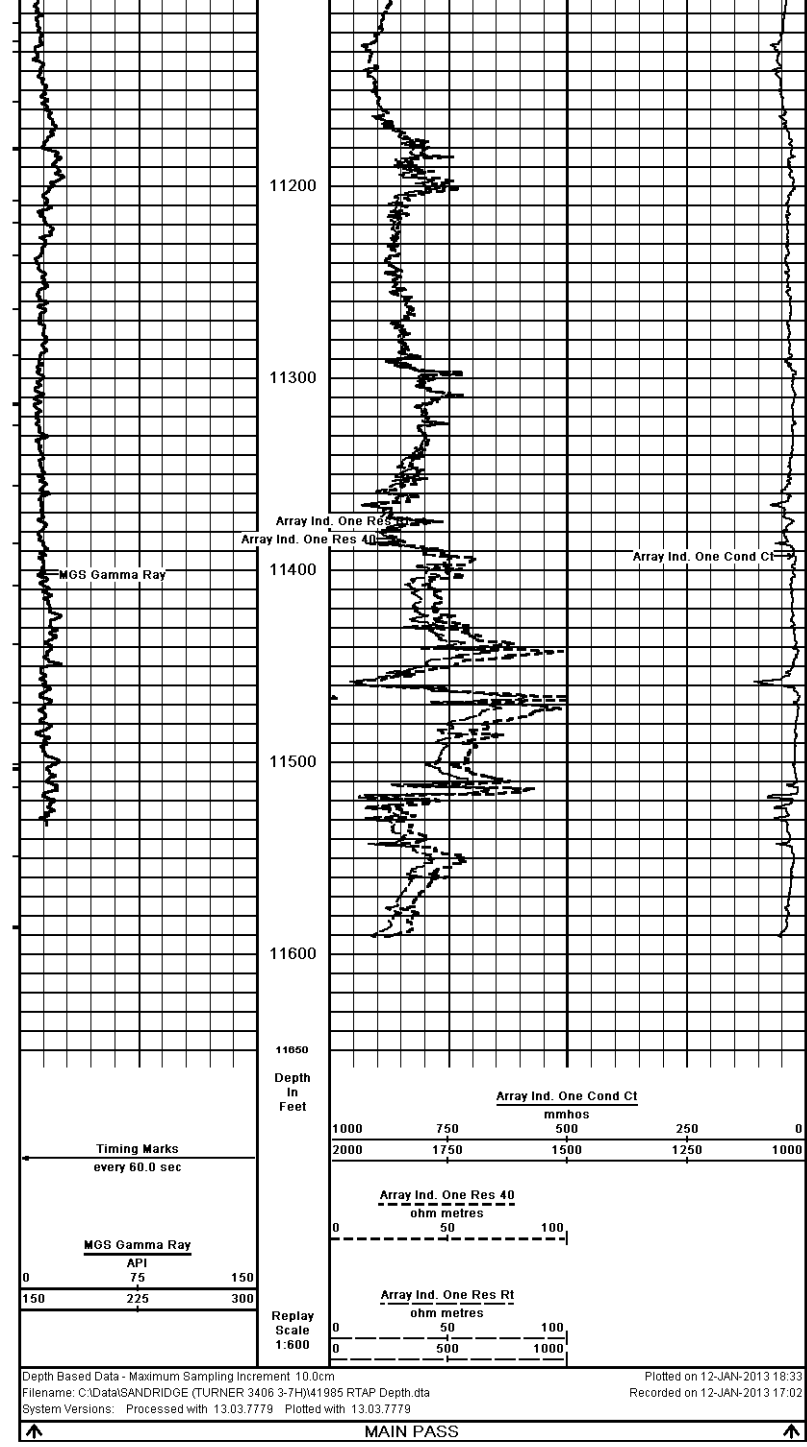
Array Ind. One Cond Ct

MGS Gamma Ray










COMPANY	SANDRIDGE ENERGY			
WELL	TURNER 3406 3-7H			
FIELD	EASTHAM			
PROVINCE/COUNTY	HARPER			
COUNTRY/STATE	USA / KANSAS			
Elevation Kelly Bushing	1319.00	feet	First Reading	11598.00 feet
Elevation Drill Floor	1319.00	feet	Depth Driller	11690.00 feet
Elevation Ground Level	1301.00	feet	Depth Logger	11690.00 feet

 CML MESSENGER SHUTTLE  
ARRAY INDUCTION  
LOG