

BAKER HUGHES				LWD MEMORY LOG			
Gamma Ray							
Scale:		Company: Noble Energy					
1:240 MD		Well: Wells Ranch AF07-645					
Depth Reference:		Field: Weld County(Noble NAD 83 Grid)					
Driller's Depth		County: Weld		State: Colorado			
Status:		Surface Location:		Other Services:			
Final Print		Latitude: 040° 24' 53.856" N		Directional			
API No: 05-123-44250-00		Longitude: 104° 20' 18.096" W					
Job ID: 8645411		UTM: N/A		N/A			
		SEC: 8		TWN: 5N RGE: 62W			
Permanent Datum (P.D.): Ground Level		Elevation: 4704.00 ft		KB: N/A			
Log Measured From: Rig Floor		Above P.D. 30.00 ft		DF: 4734.00 ft			
				GL: 4704.00 ft			
Dates				Interval Logged			
Date From: 2017-07-07		Top: (ft) 1952.00		Azi Reference North: Grid		Dip Angle: (deg) 67.14	
Date To: 2017-07-10		Bottom: (ft) 16015.00		Total Magnetic Field Strength: (nT)		52291	
Spud Date: 2017-07-06				Mag to Reference North Correction: (deg)		7.13 E	
Borehole Record				Casing Record			
Hole Size (in)		From (ft)		To (ft)		Size (in)	
13.500		30.00		1952.00		9.625	
8.500		1952.00		16015.00			
Mud Record				Deviation Record			
Type		From (ft)		To (ft)		Hole Size (in)	
Oil Based Mud		1952.00		16015.00		8.500	
						14063.00	
						0.53 283.48	
						90.52 271.75	

Mud Properties Record											
Date / Time	Run No.	Measured Depth (ft)	Mud Type	Density (ppg)	Viscosity (cP)	pH	Fluid Loss (cm3)	Oil / Water	Source	Total Chlorides (ppm)	K+ (%)
2017-07-08 04:00	1	2133.00	Oil Based Mud	9.2	11	N/A	435.6	82/18	Active Pit	19500	0.00
2017-07-08 15:00	1	5510.00	Oil Based Mud	9.1	9	N/A	120.7	84/16	Active Pit	20500	0.00
2017-07-09 04:00	1	8563.00	Oil Based Mud	9.1	11	N/A	68.1	83/17	Active Pit	21000	0.00
2017-07-09 15:00	1	11111.00	Oil Based Mud	9.1	11	N/A	54.1	83/17	Active Pit	21000	0.00
2017-07-10 04:00	1	13779.00	Oil Based Mud	9.4	15	N/A	167.7	84/16	Active Pit	20500	0.00
2017-07-10 15:00	1	16015.00	Oil Based Mud	9.5	16	N/A	149.5	84/16	Active Pit	19500	0.00

Equipment and Service Data

Run No.	Tool	Serial Number	Measurement	Sensor Offset (ft)	Bit Offset (ft)	Max O.D. (in)	Min I.D. (in)
1	ATC_SU	12536524	Near Bit VSS	5.93	6.73	7.000	4.330
1	ATC_SU	12536524	Near Bit Inclination	5.93	6.73	7.000	4.330
1	ATC_MWD	13067101	Gamma (single)	2.75	12.90	7.000	3.250
1	ATC_MWD	13067101	Directional (mag)	12.27	22.42	7.000	3.250

Service and Tool Mnemonics

Mnemonic	Name	Description
ATC_SU	ATC_SU	Auto Trak Curve Steering Unit
ATC_MWD	ATC_MWD	Auto Trak Curve MWD
ATC_LCPM	ATC_LCPM	Auto Trak Curve LCPM

Comments


1	Depth measurements were obtained from a depth control system not supplied or operated by Baker Hughes. Due to the lack of control by Baker Hughes, depth calibrations and measurements could not be independently verified.
2	Baker Hughes LWD run 1 utilized a 6.75 inch NaviGamma services (Gamma Ray and Directional) services behind a 8.5 inch bit and rotary steerable assembly from 1952 to 16015 feet MD (1952 to 6537 feet TVD).

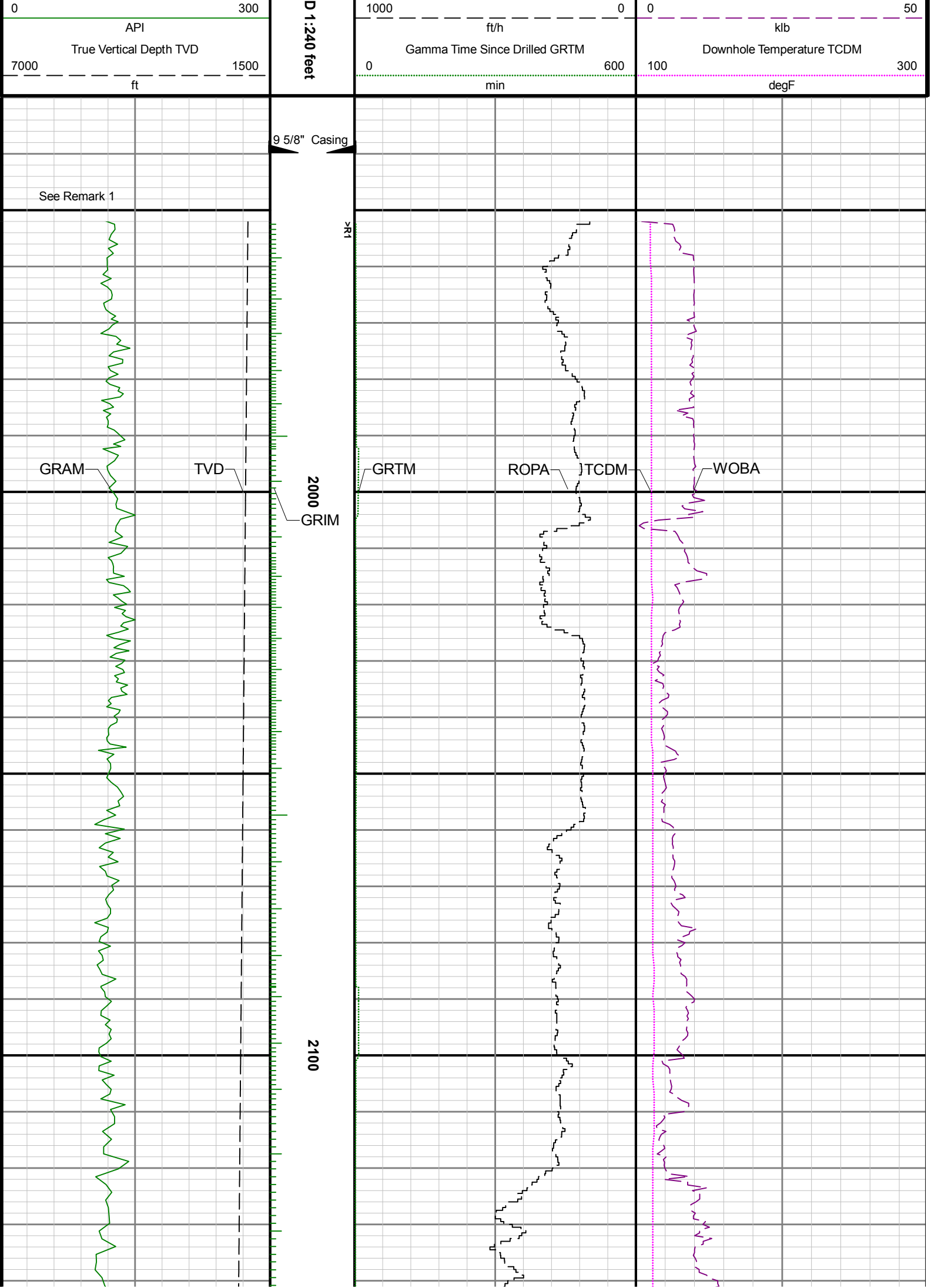
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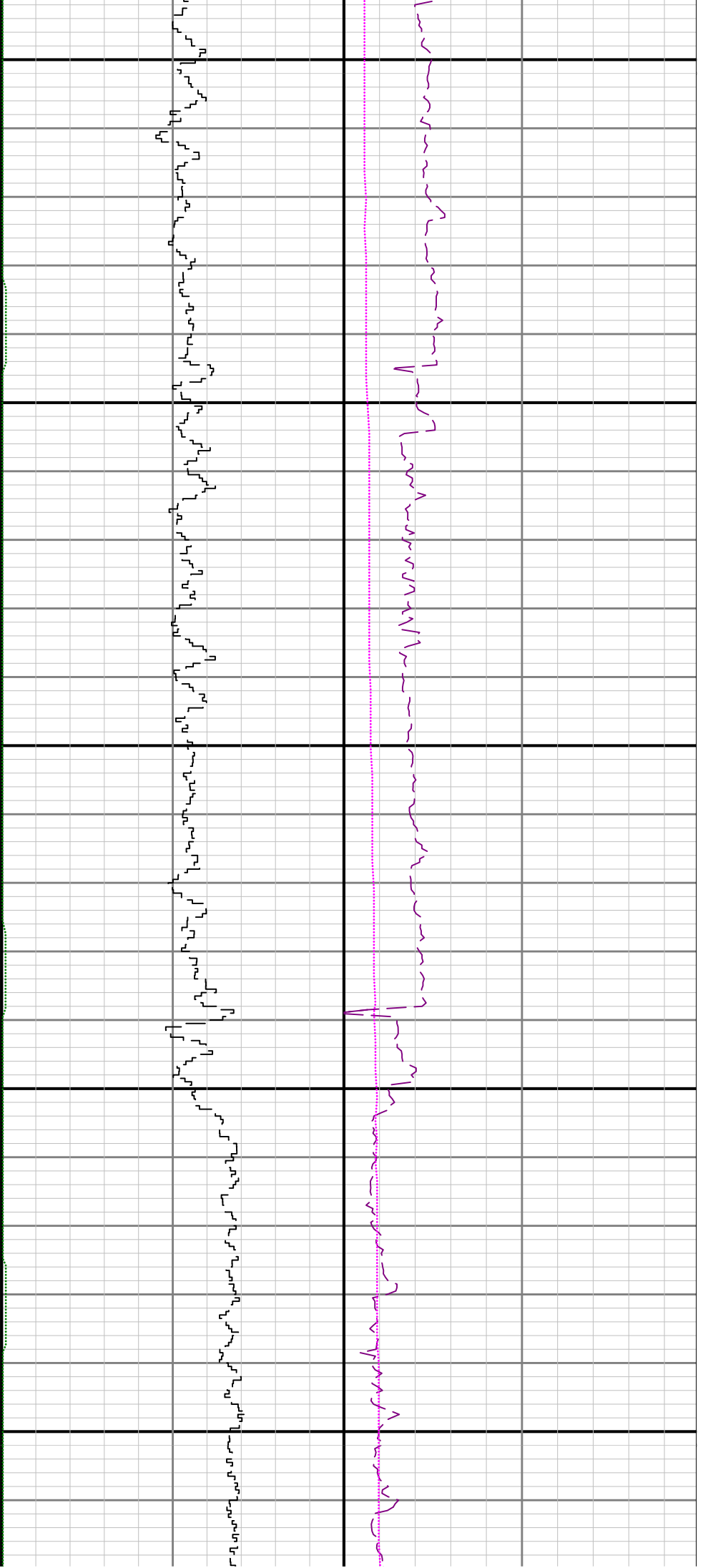
Number	Measured Depth (ft)	Hole Section (in)	Run No.	Remark
1	1952.00	8.500	1	Gamma Ray logging operations began at 1952 feet MD (1952 feet TVD) per customer request.
2	16002.00	8.500	1	The interval from 16002 to 16015 feet MD (6537 feet TVD) was not logged after being drilled due to sensor to bit offset at well TD.

Curve Mnemonics

Presented Curves	Description	Units
ROPA	Depth Averaged ROP 3 ft Average	ft/h
TVD	True Vertical Depth	ft
WOBA	Weight On Bit, Average 1 ft Average	klb
GRAM	OnTrak - Gamma Ray - Apparent - Memory 0.5 ft Average	API
GRIM	OnTrak - Gamma Ray - Data Point Indicator - Memory	unitless
GRTM	OnTrak - Gamma Ray - Time Since Drilled - Memory	min
TCDM	Downhole Temperature	degF

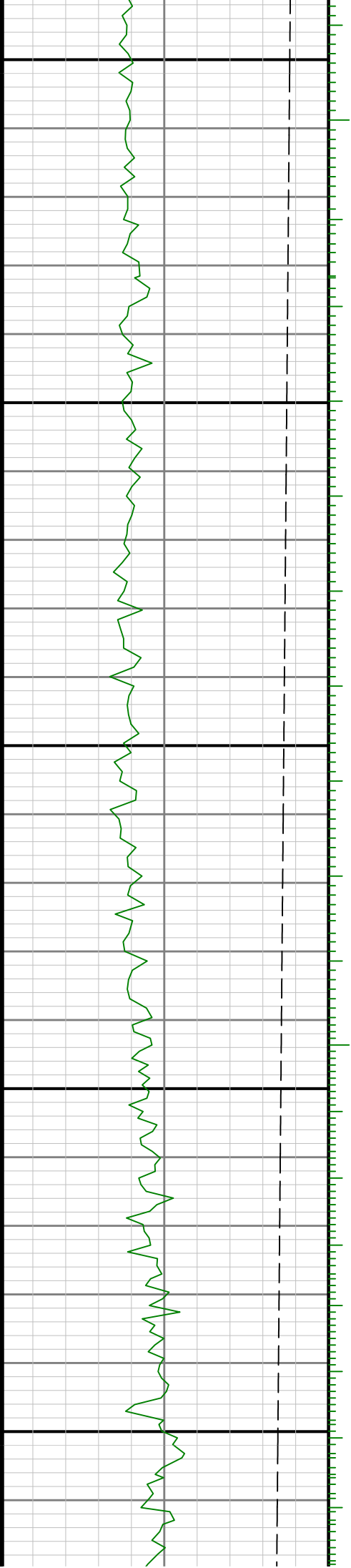
	Company	Noble Energy	
	Well	Wells Ranch AF07-645	
	Interval	Date From: 2017-07-07 20:58:49	Top: 1952.00
	Created	Date To: 2017-07-10 05:53:27	Bottom: 16015.00
Gamma Ray - Apparent 0.5 ft Average GRAM		≡	Depth Averaged ROP 3 ft Average ROPA
			Weight On Bit, Average 1 ft Average WOBA

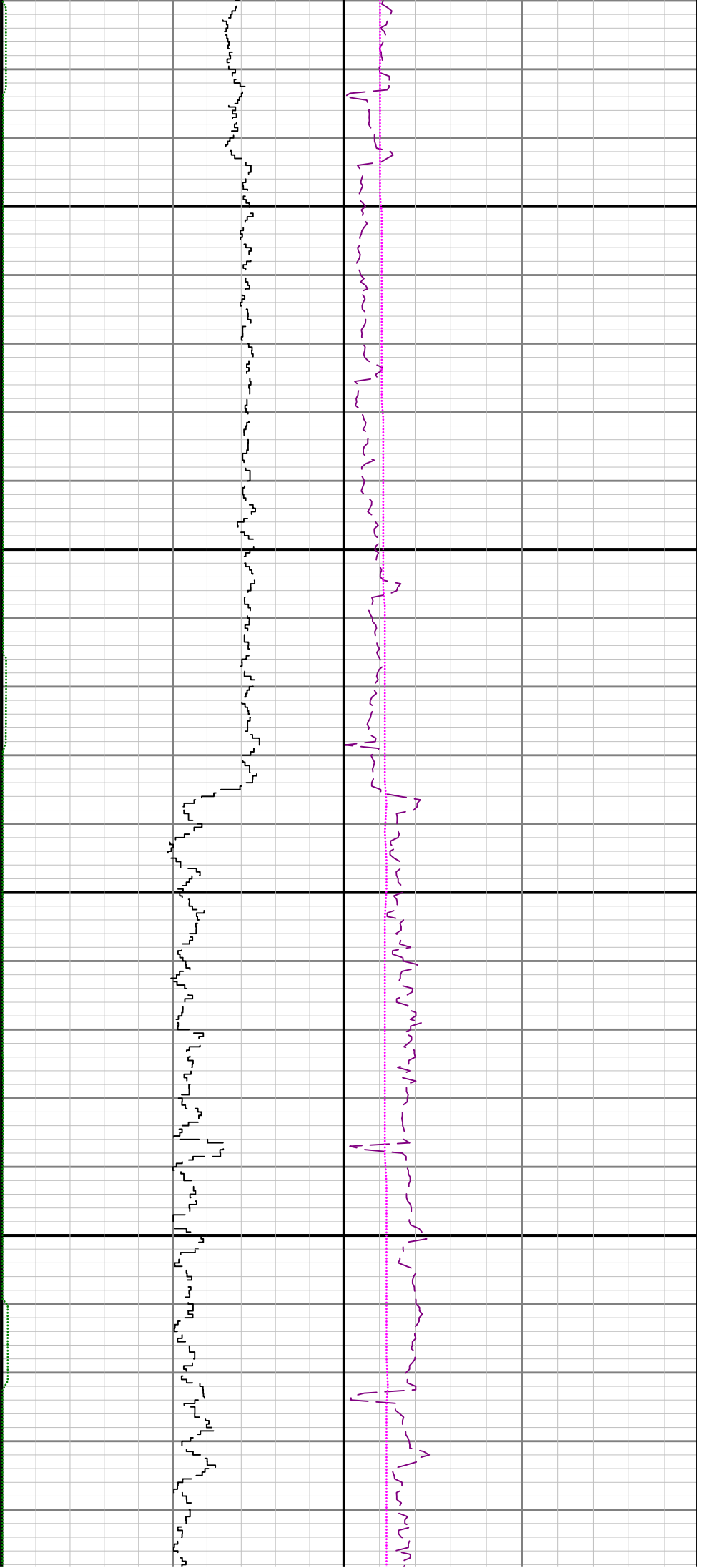




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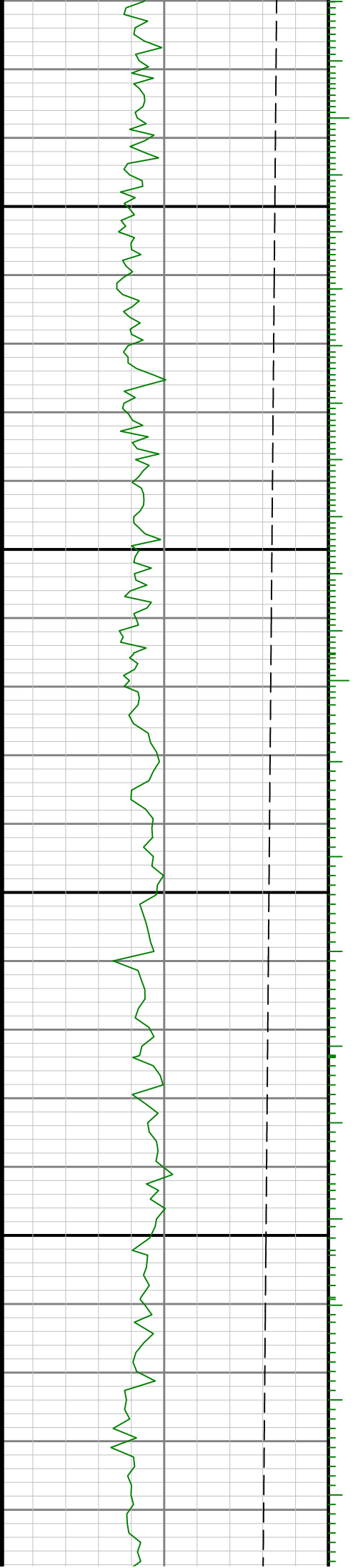


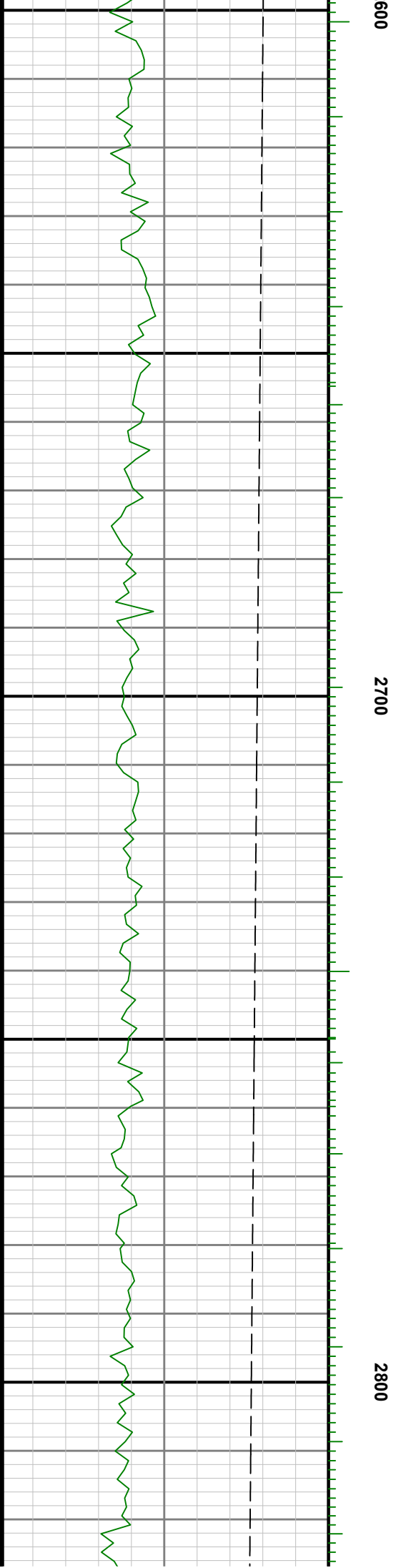
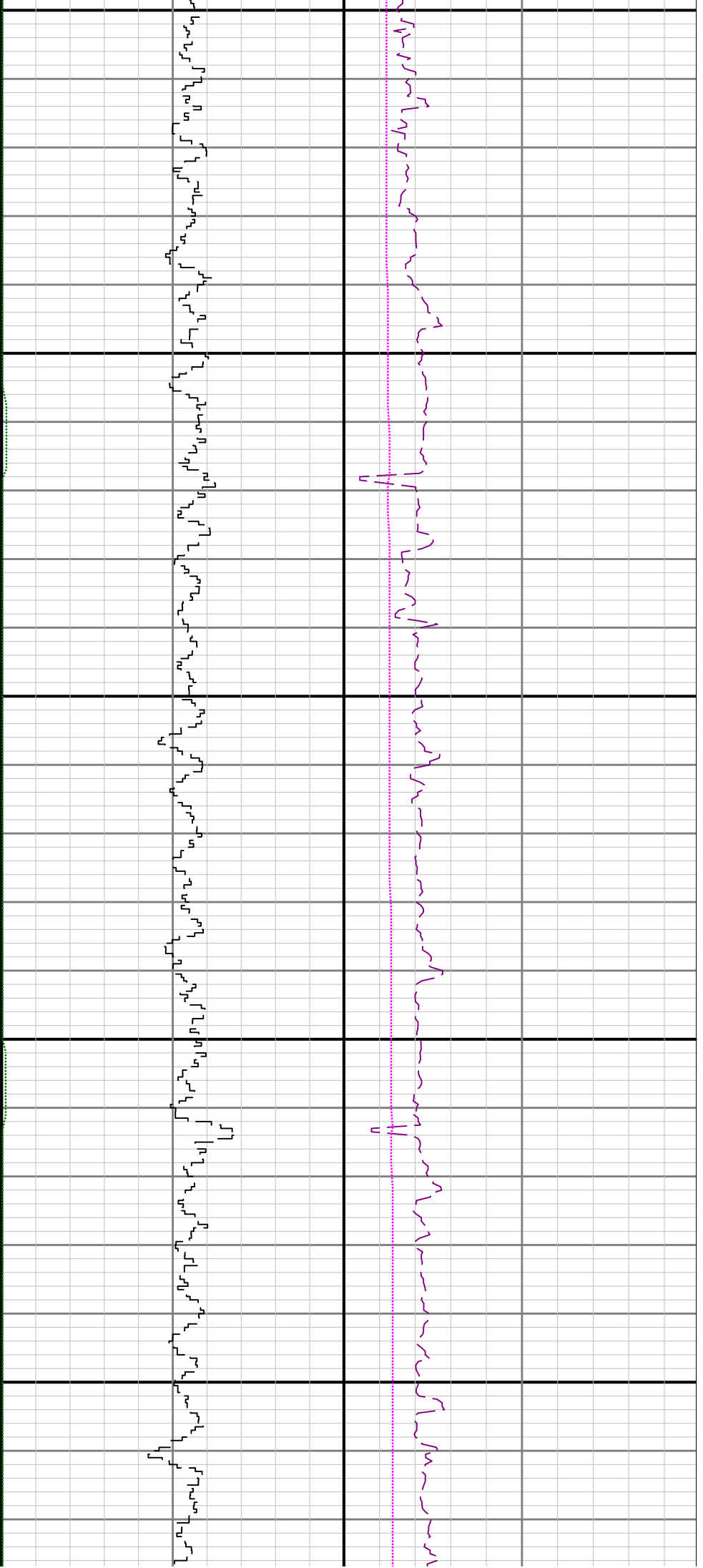


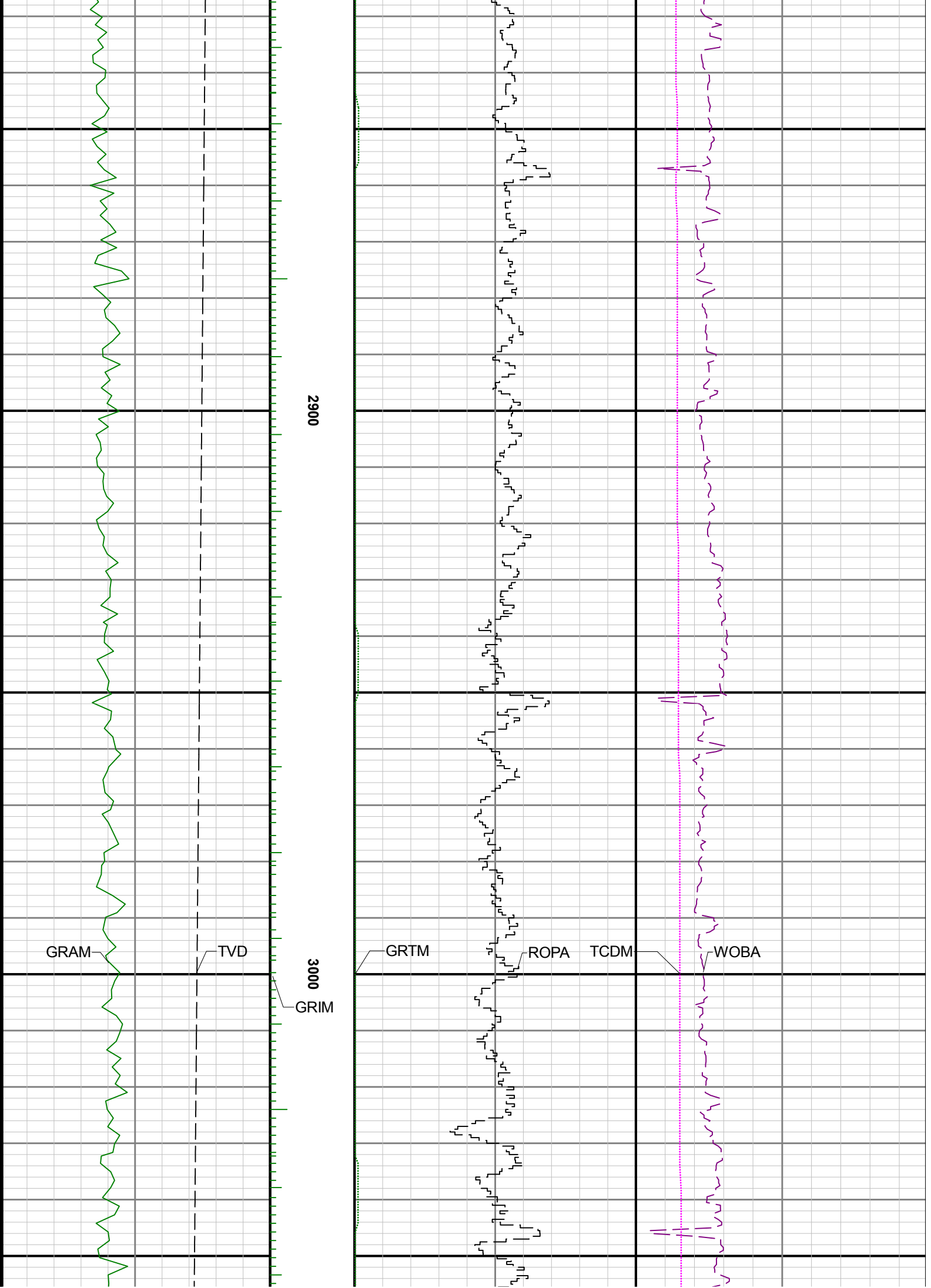
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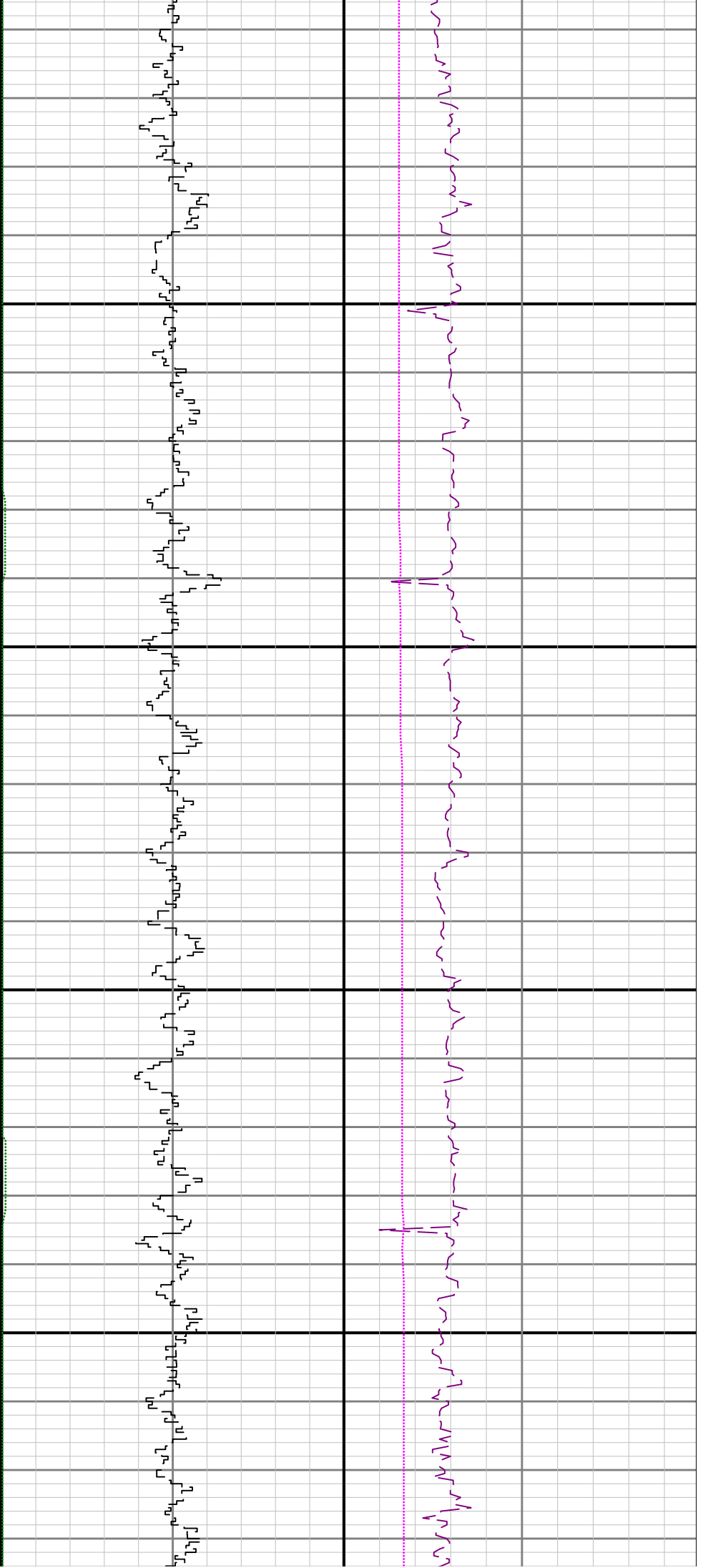
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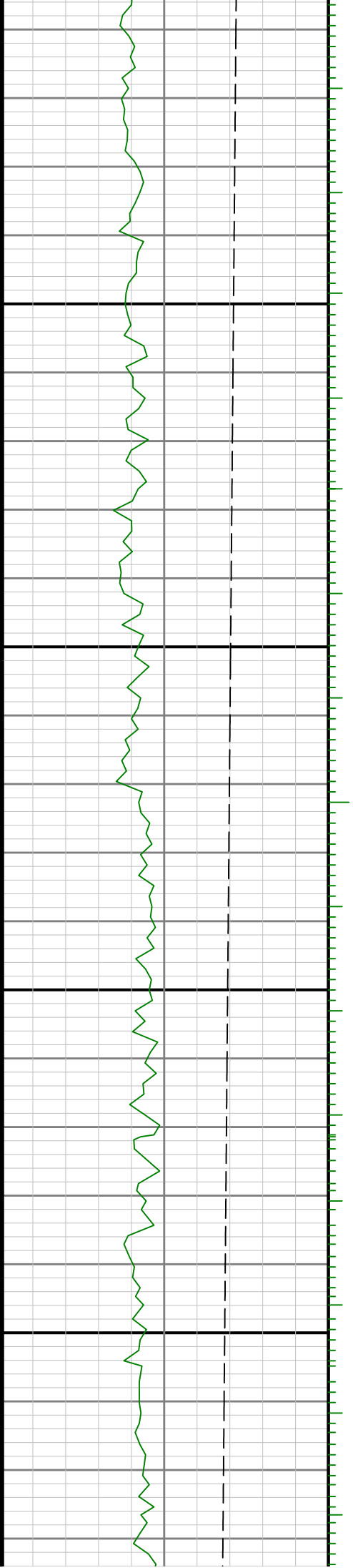


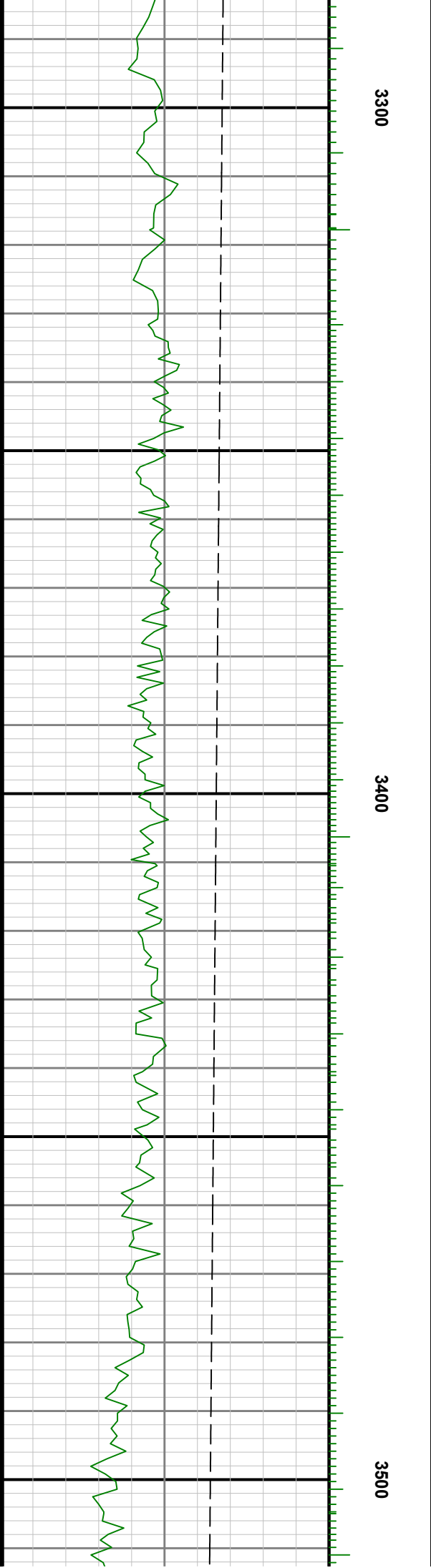
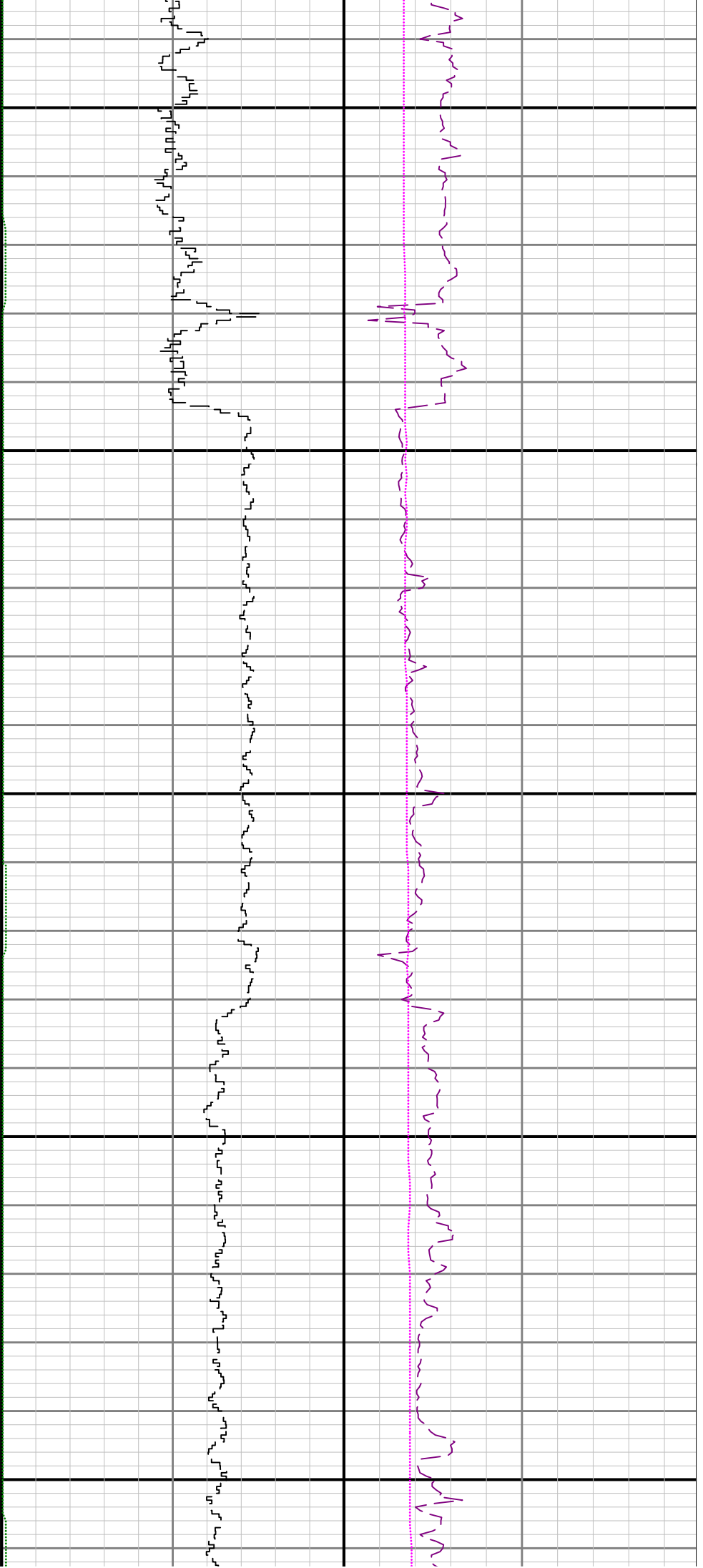


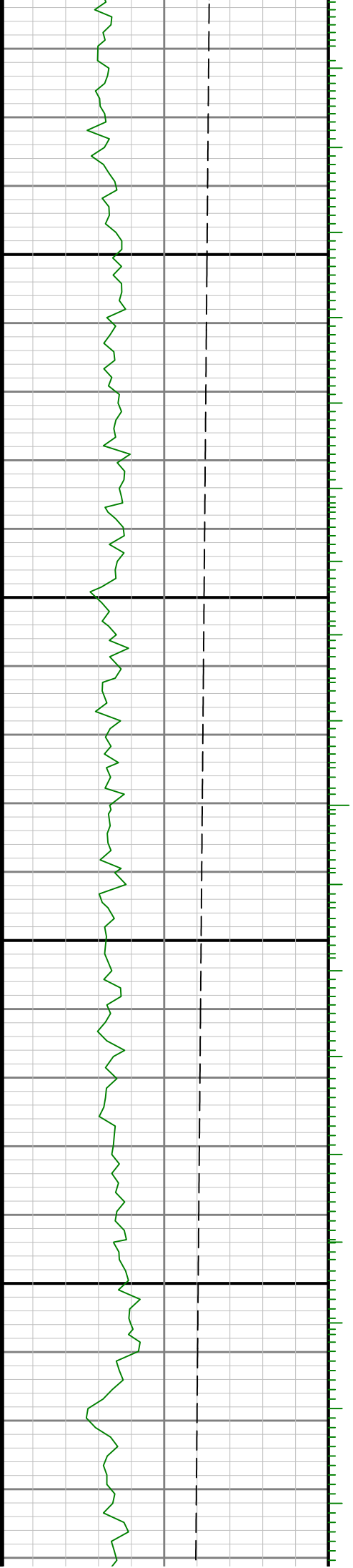
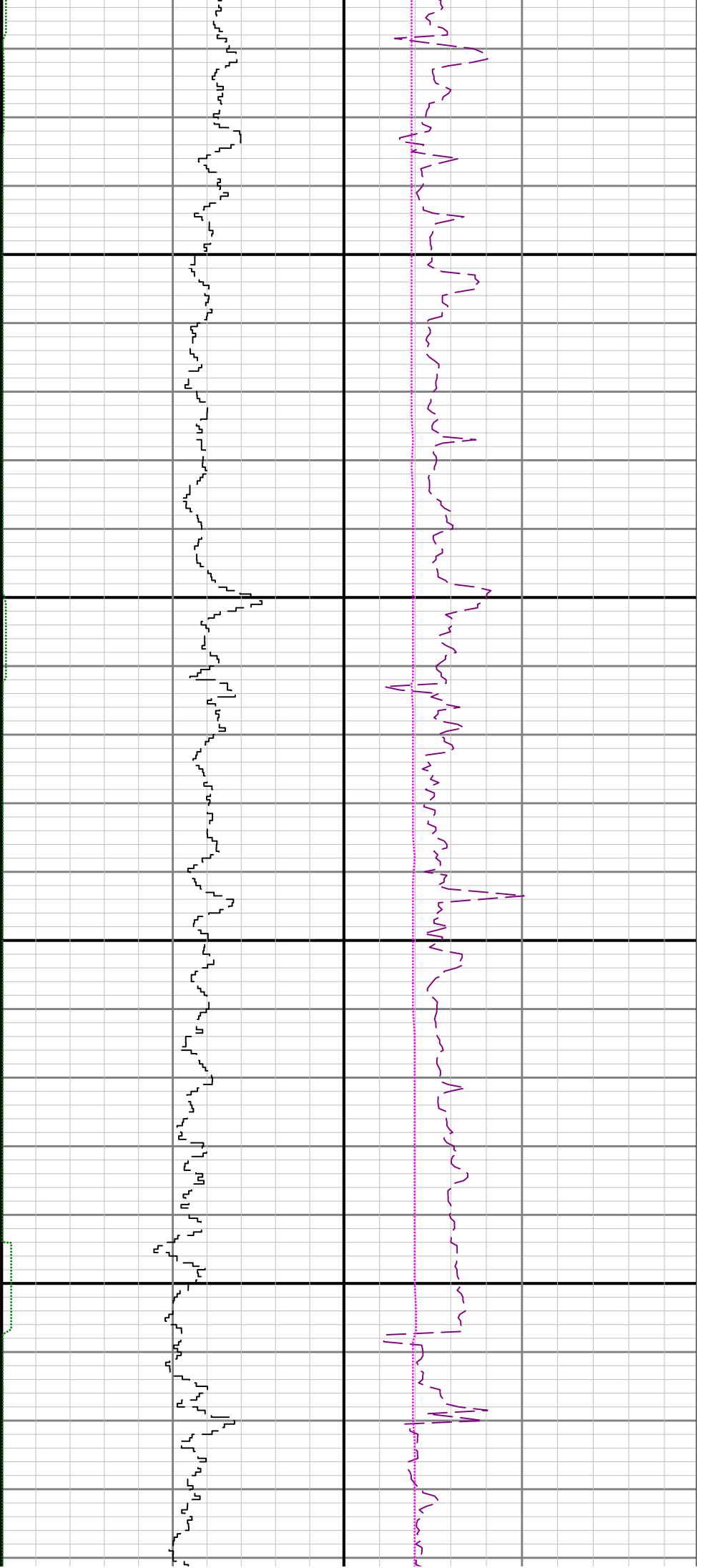


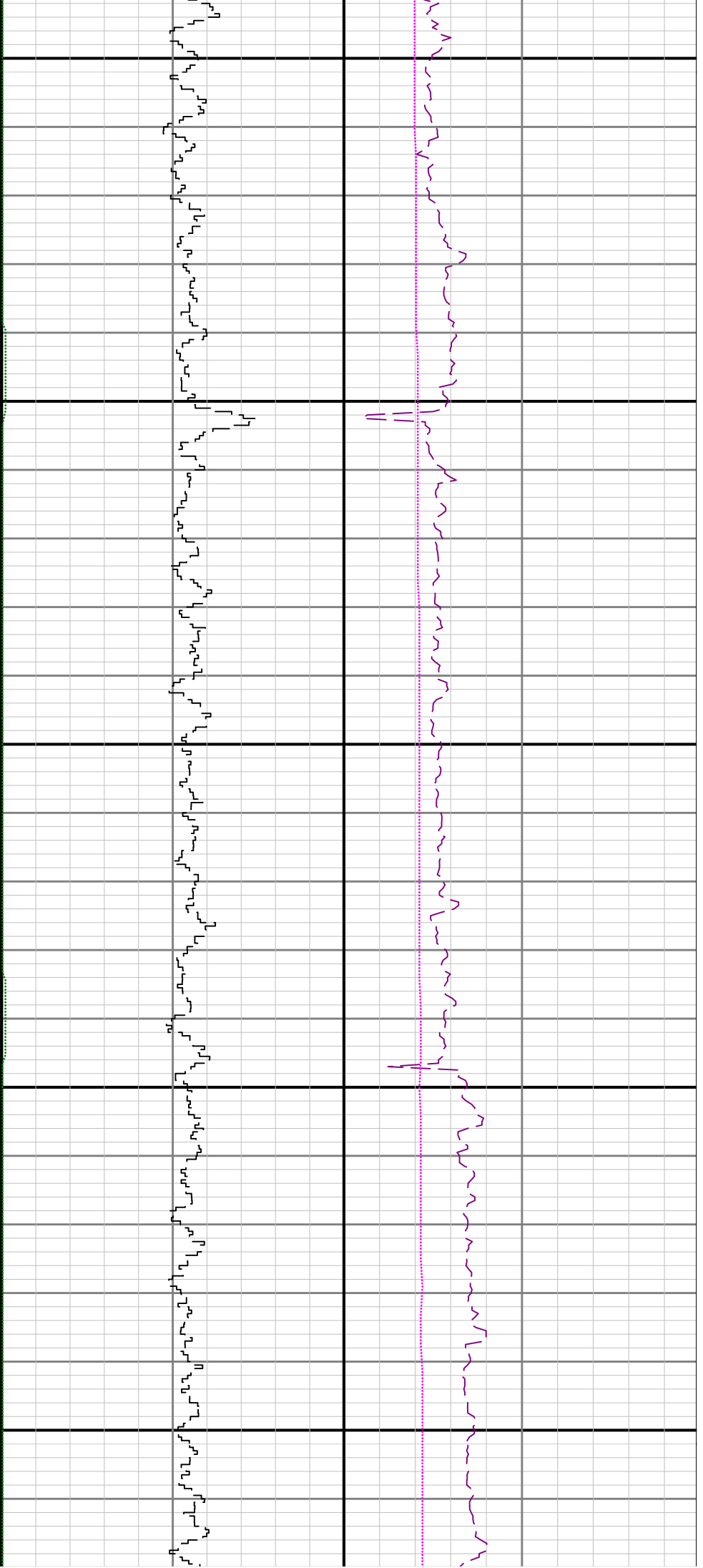
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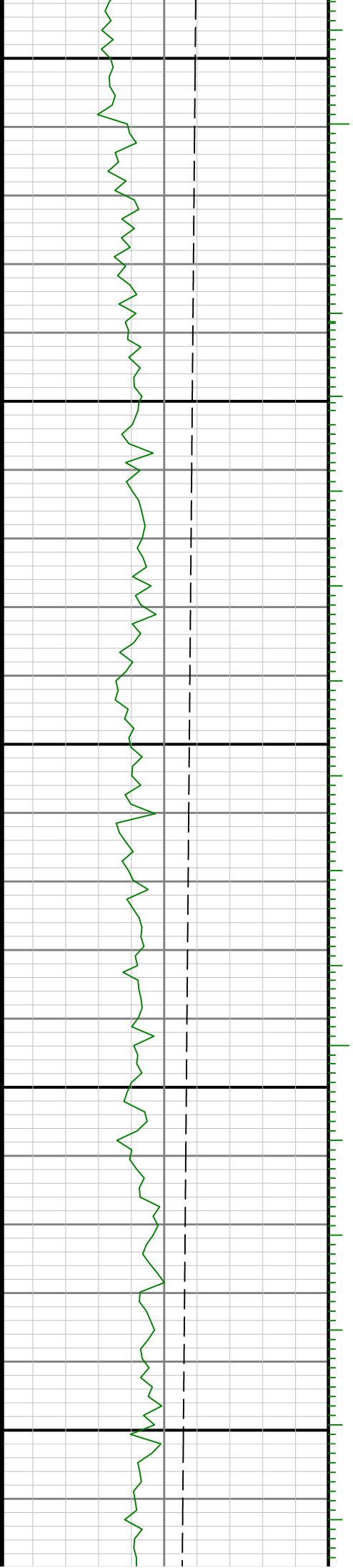


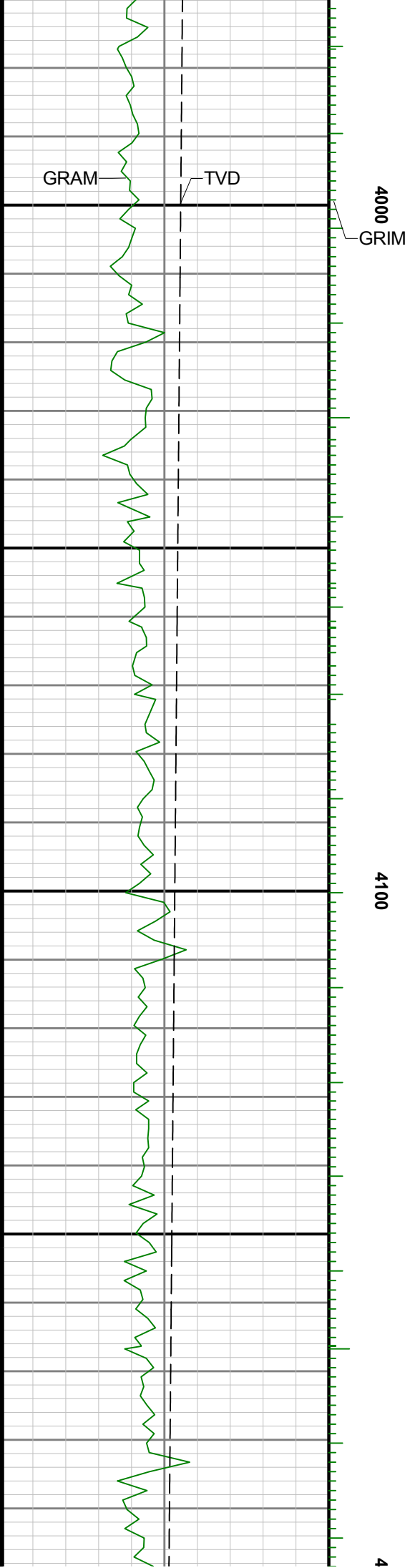
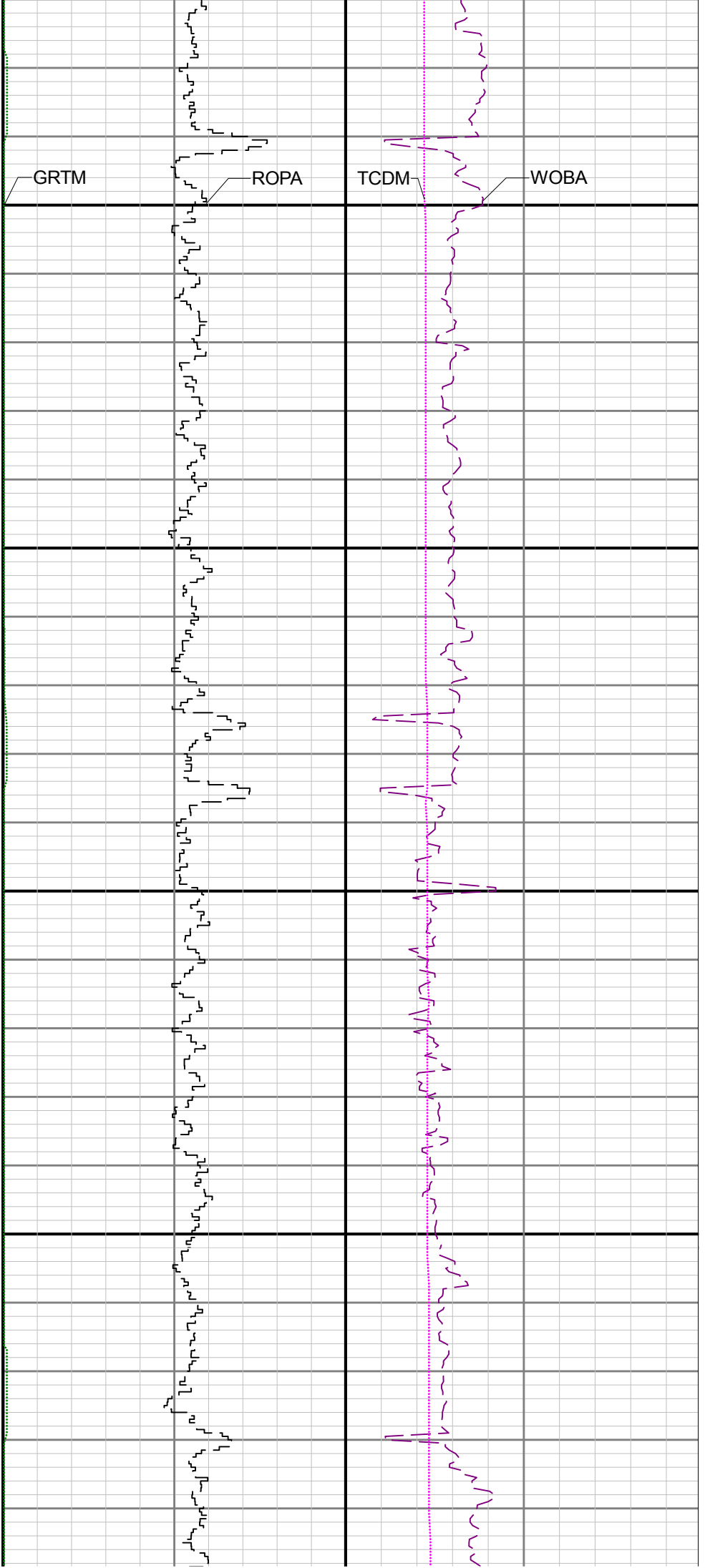


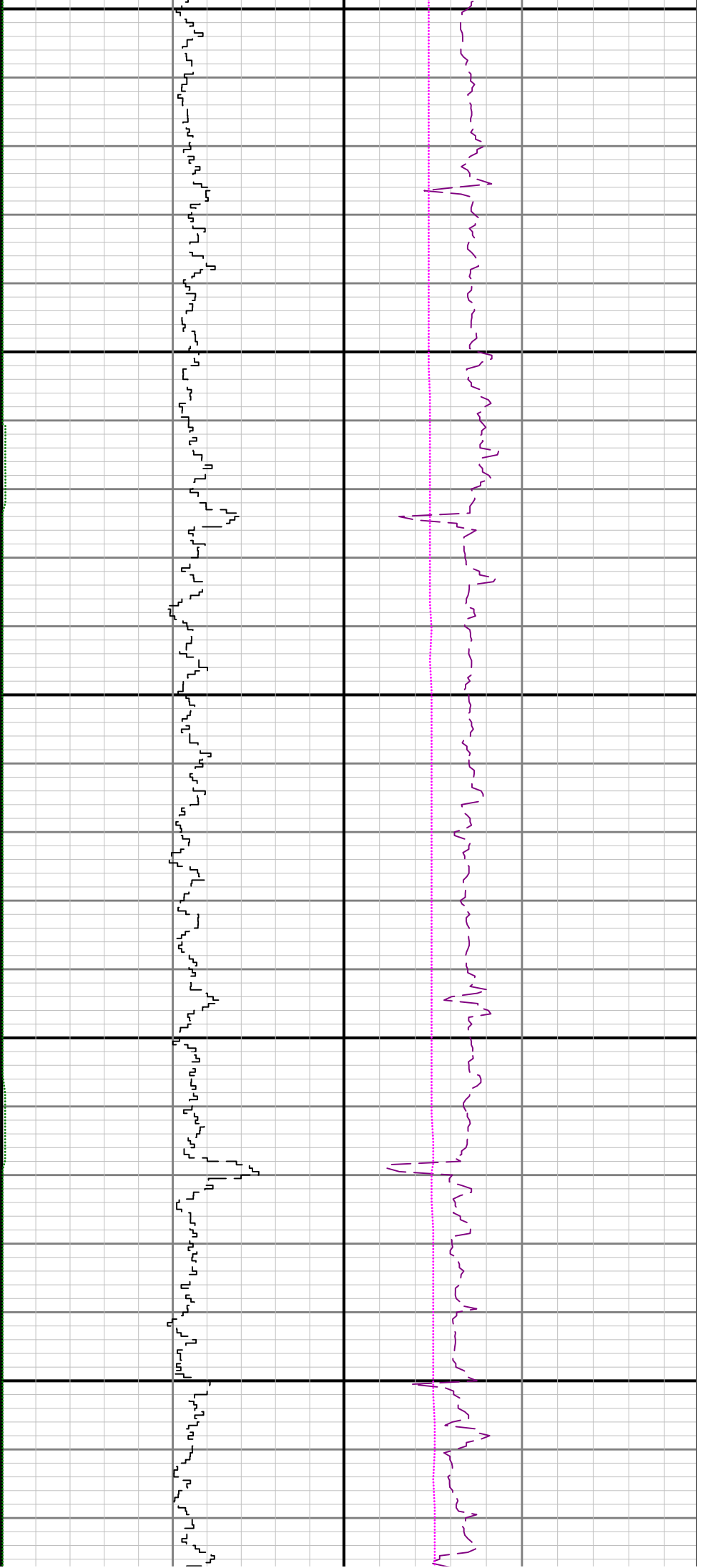


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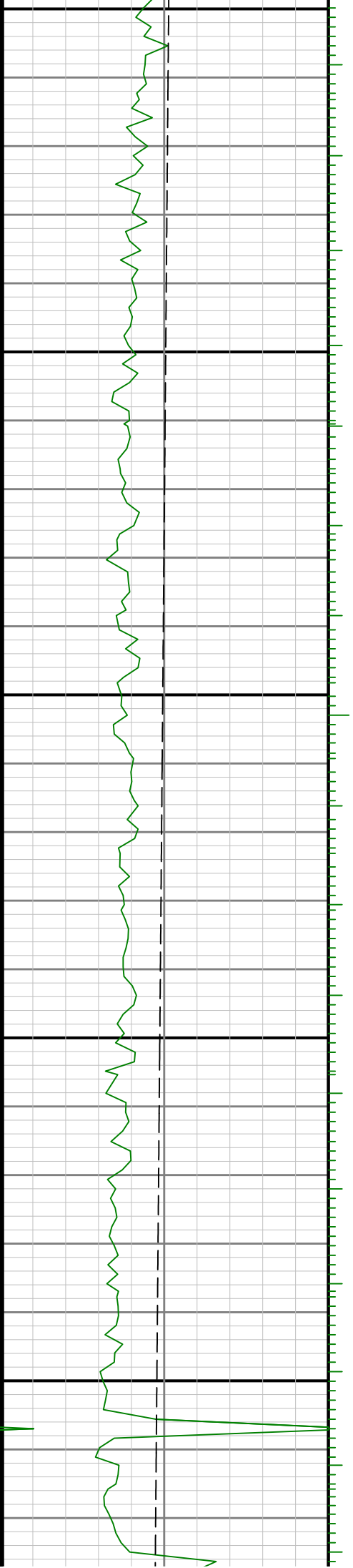


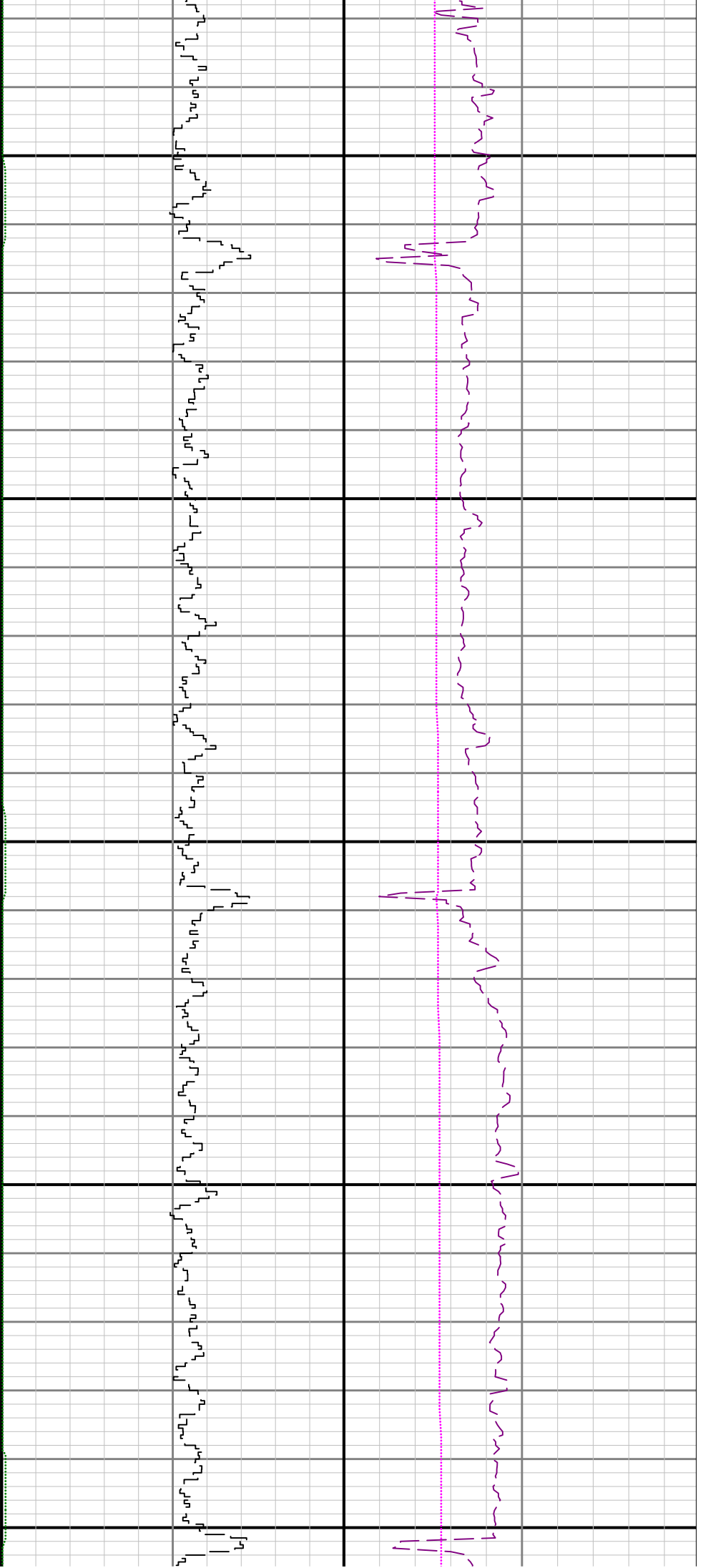


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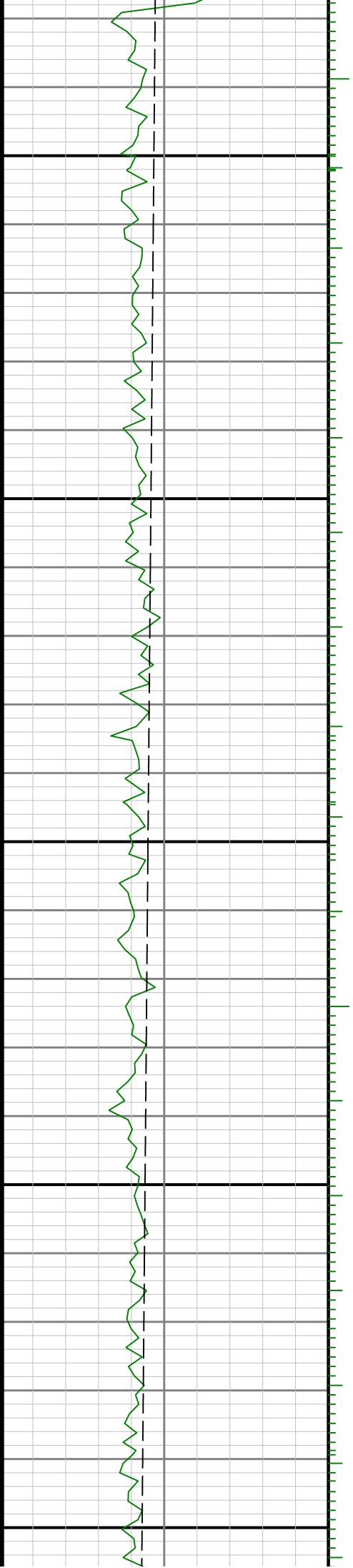
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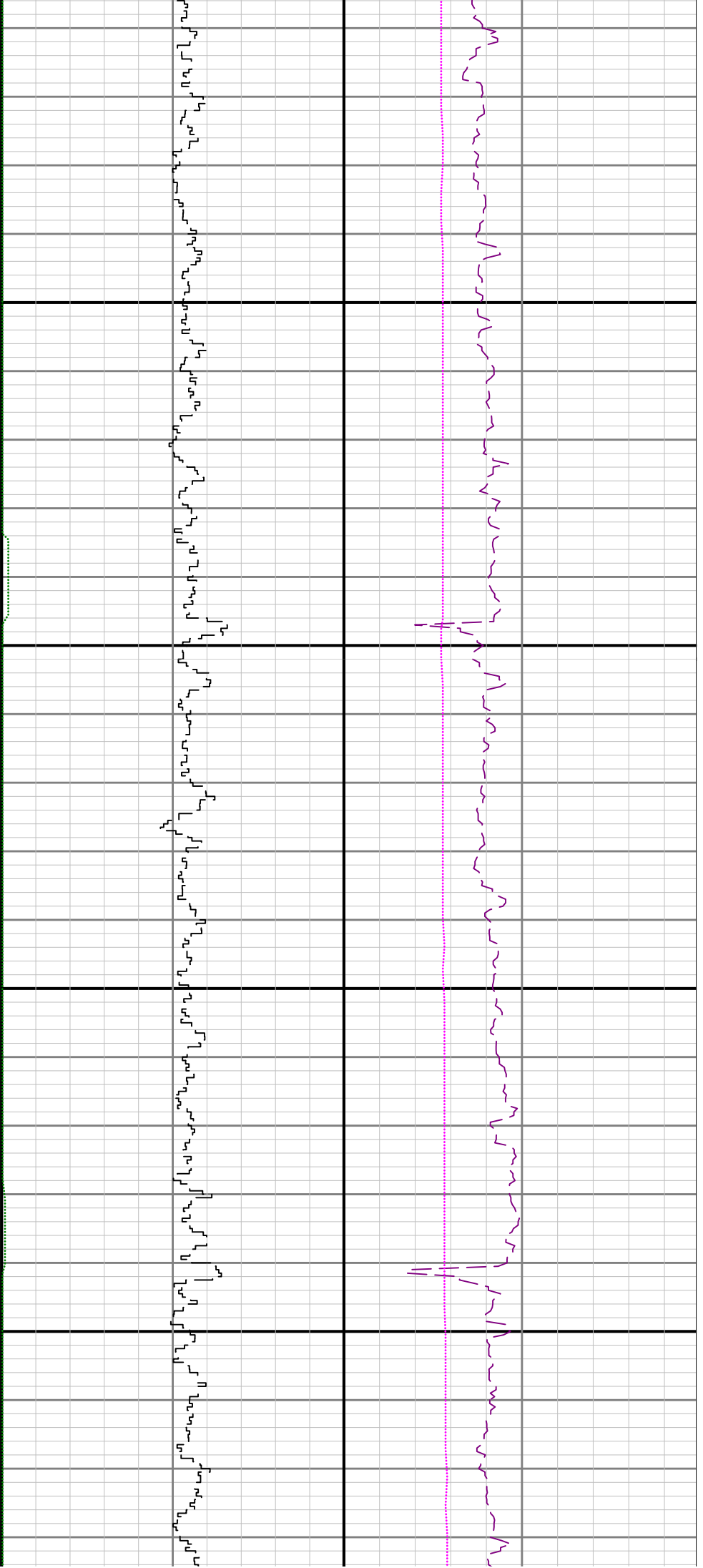




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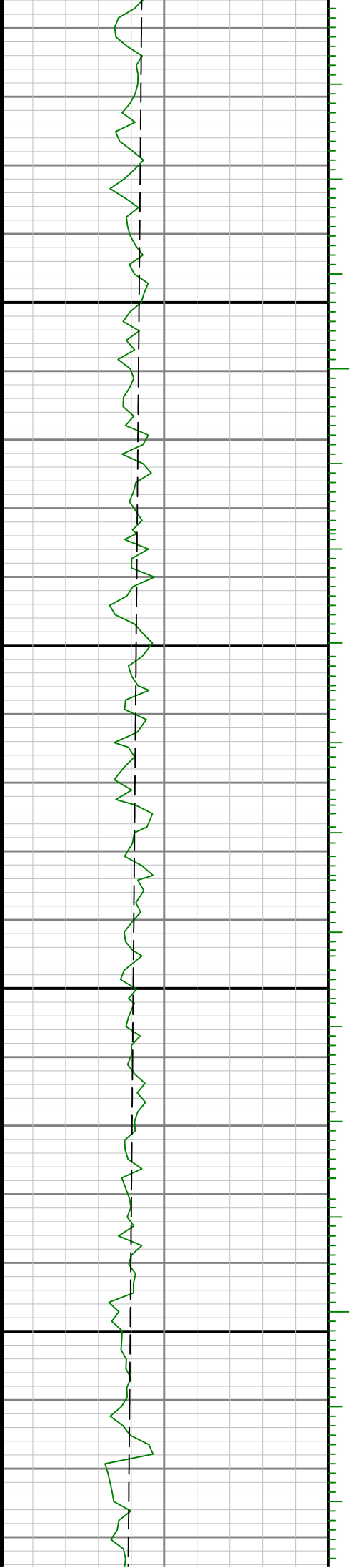
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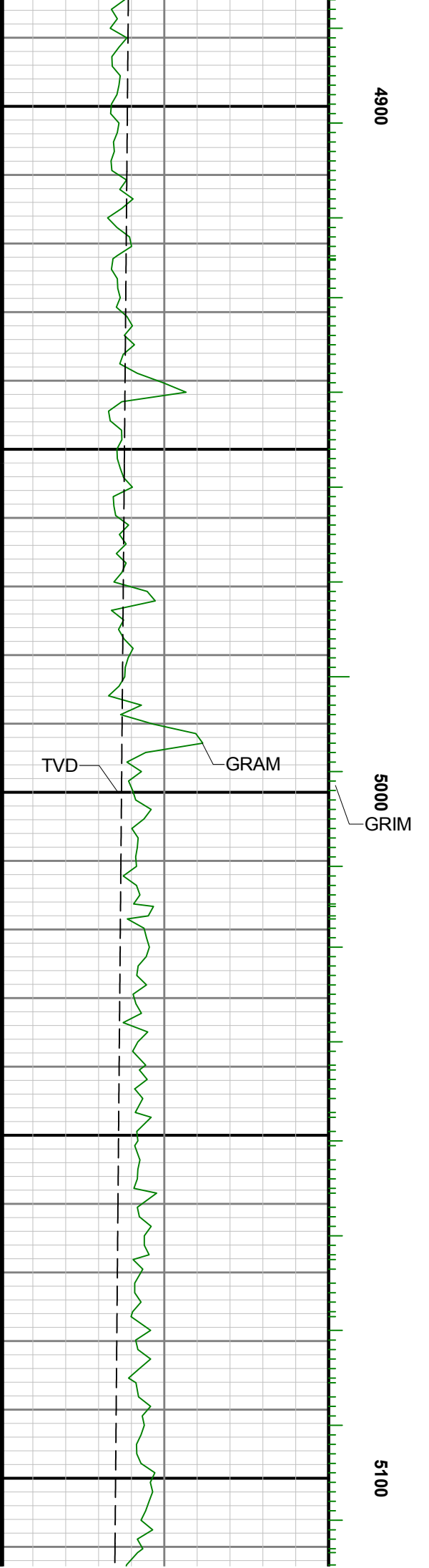
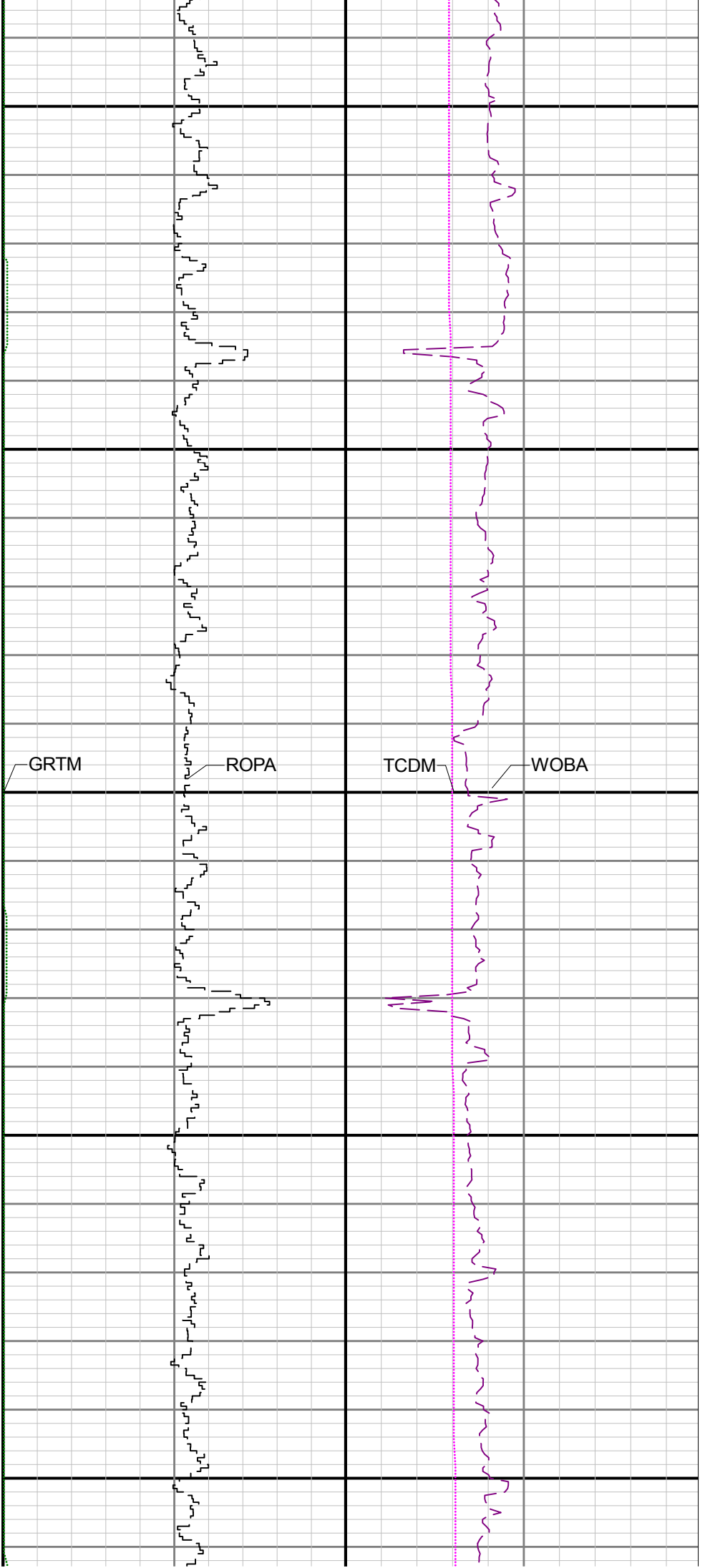


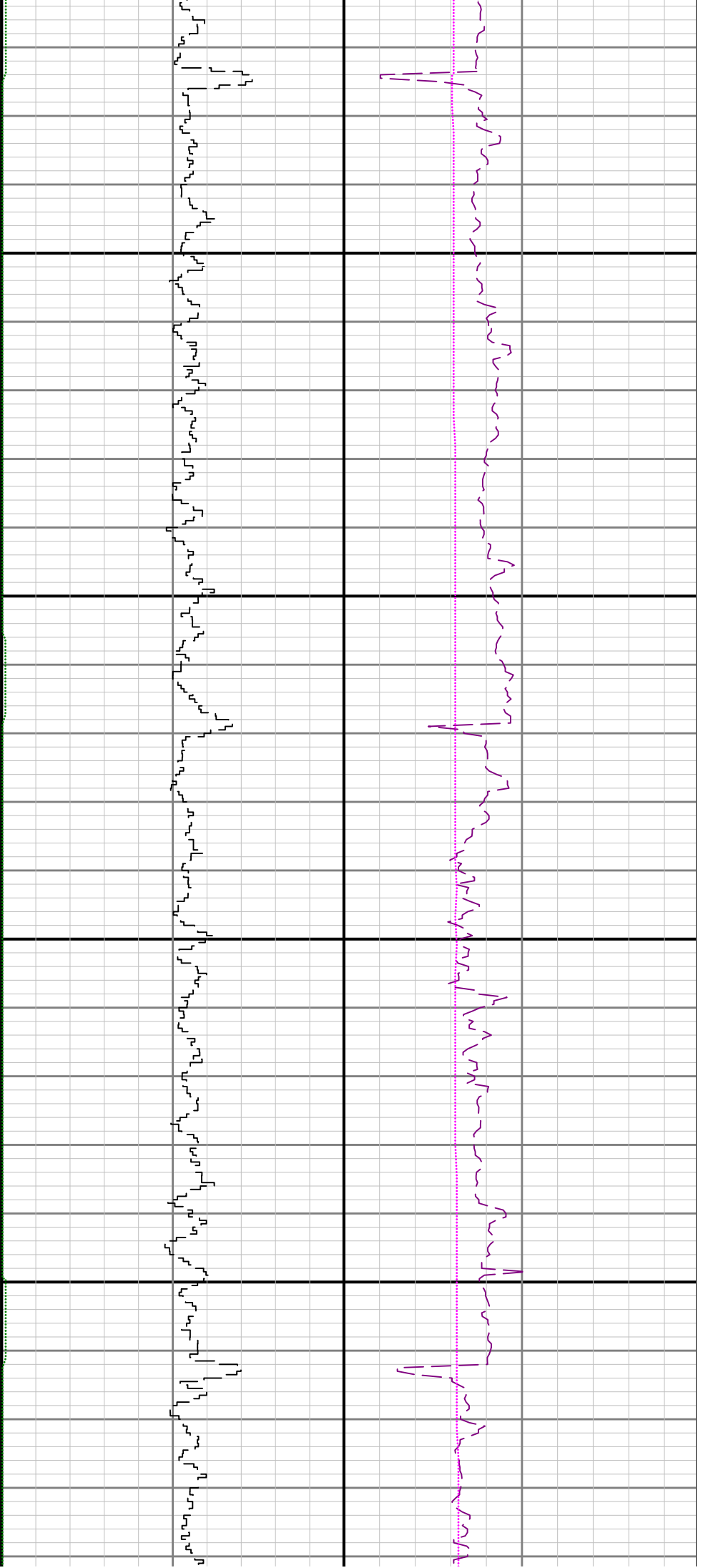


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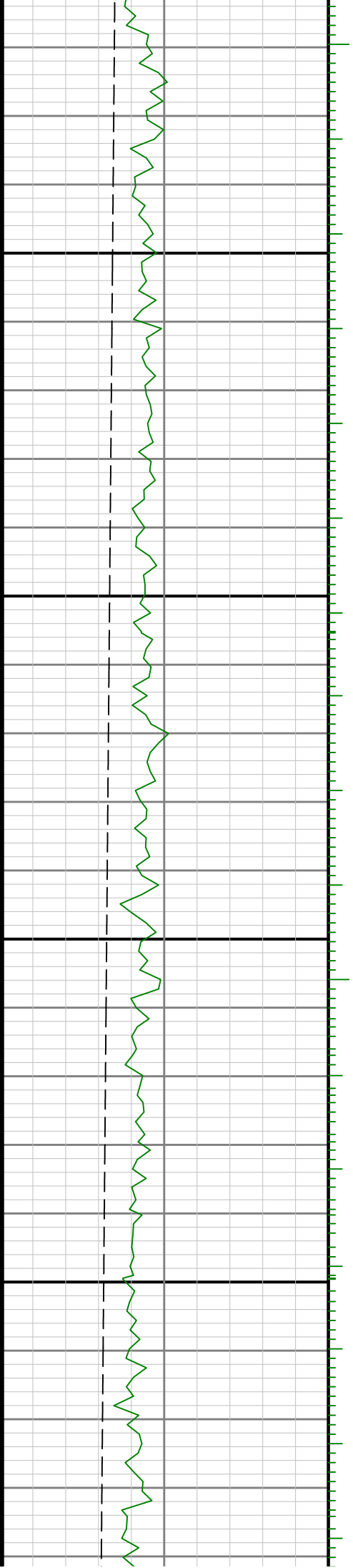


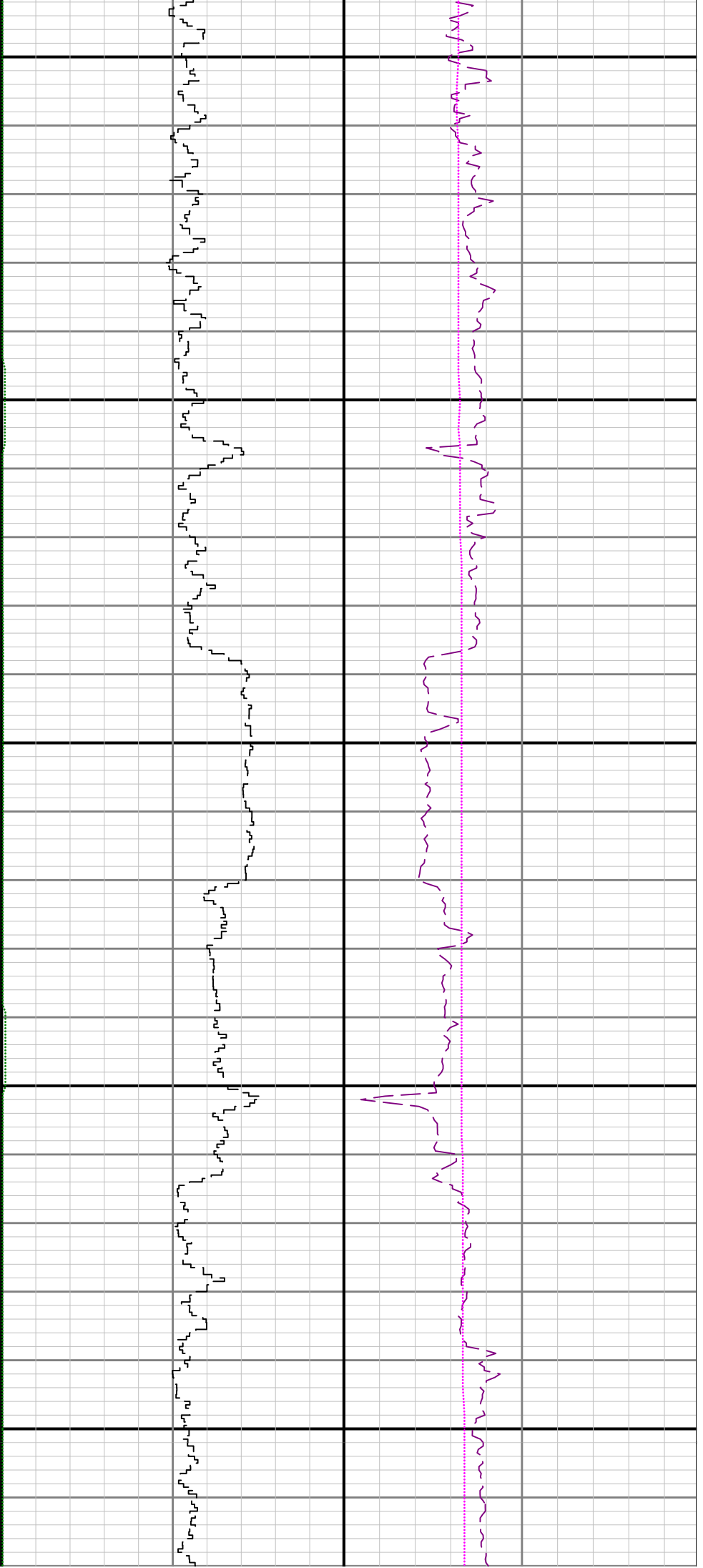




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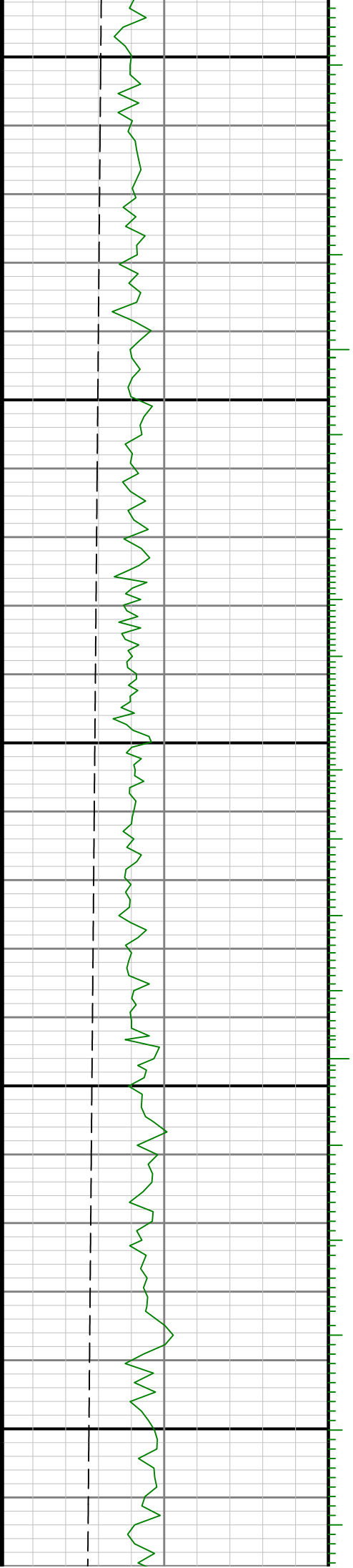
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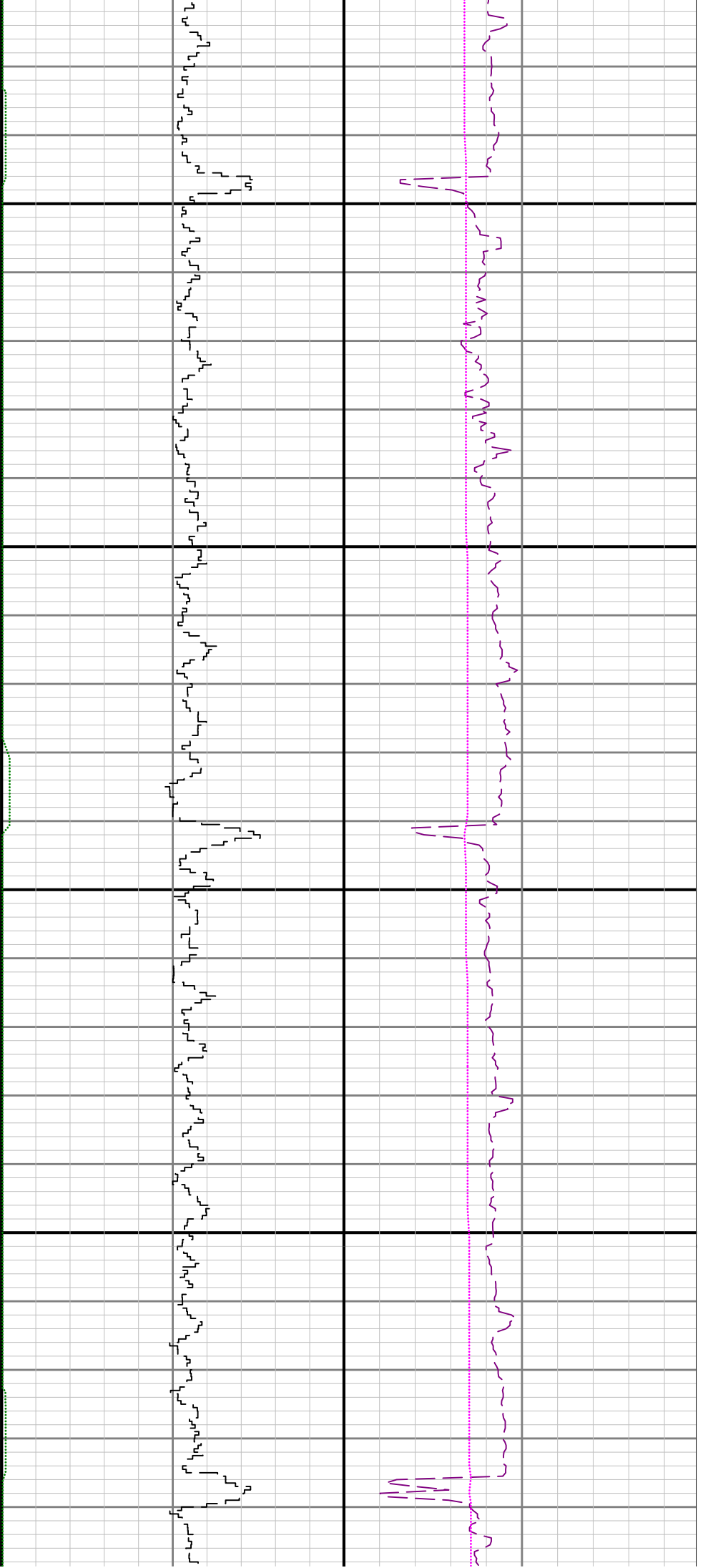




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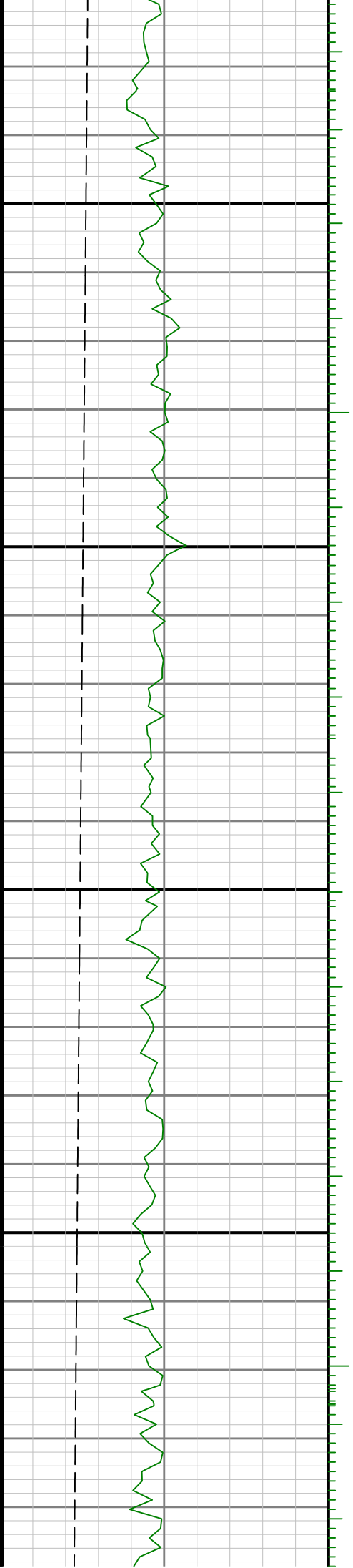


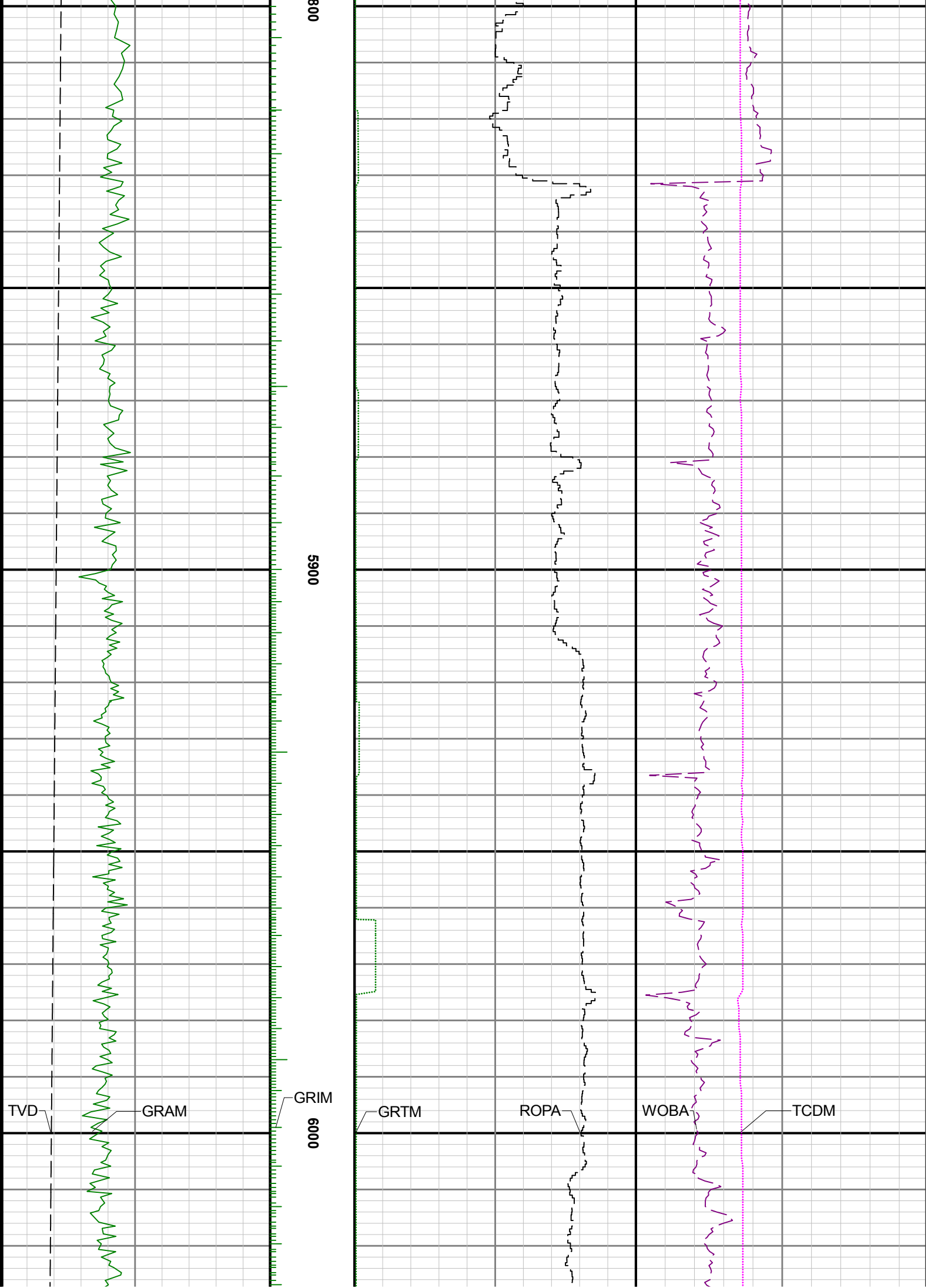


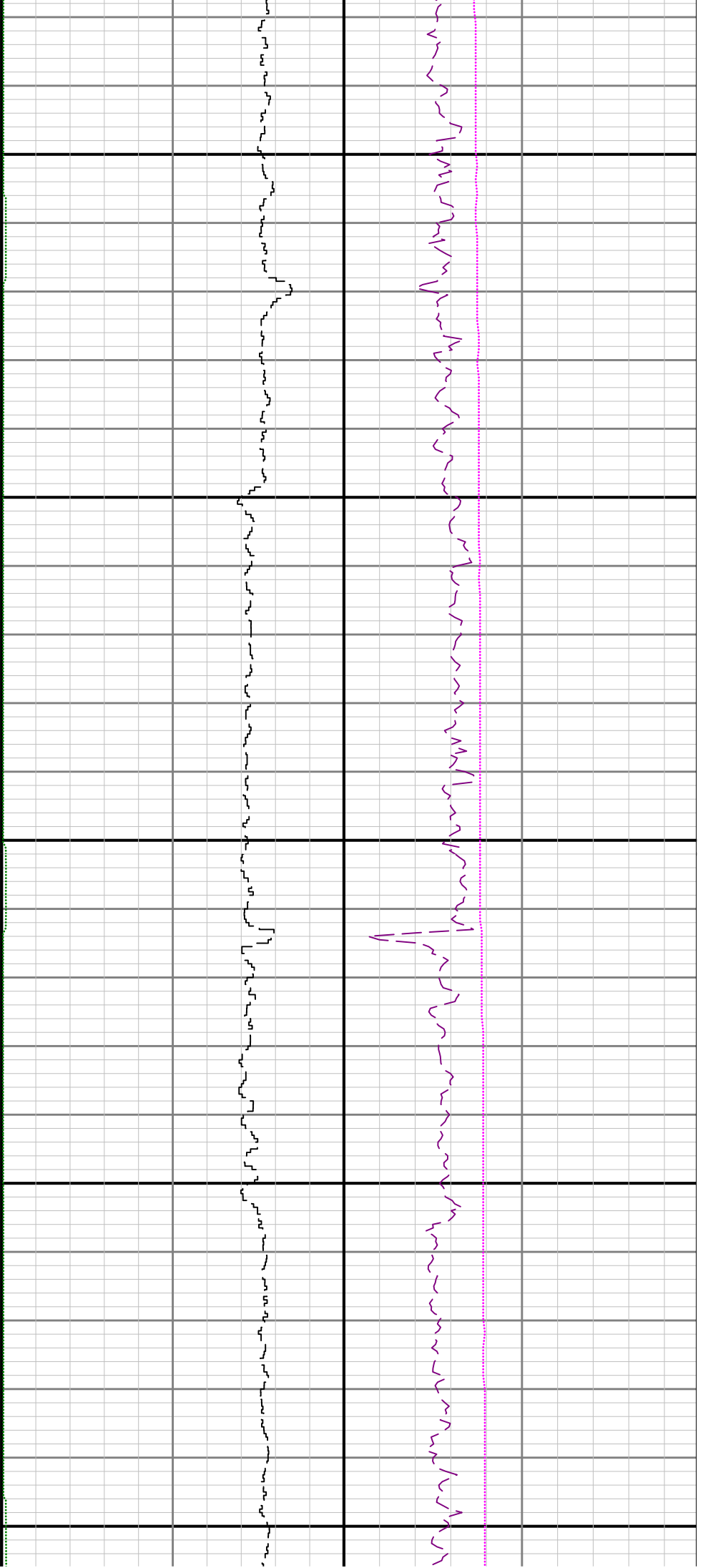
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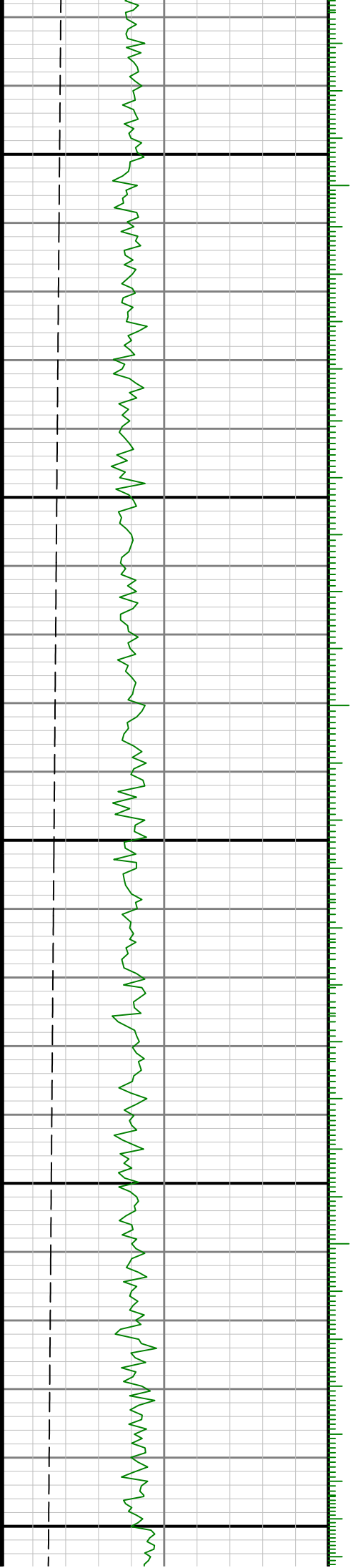


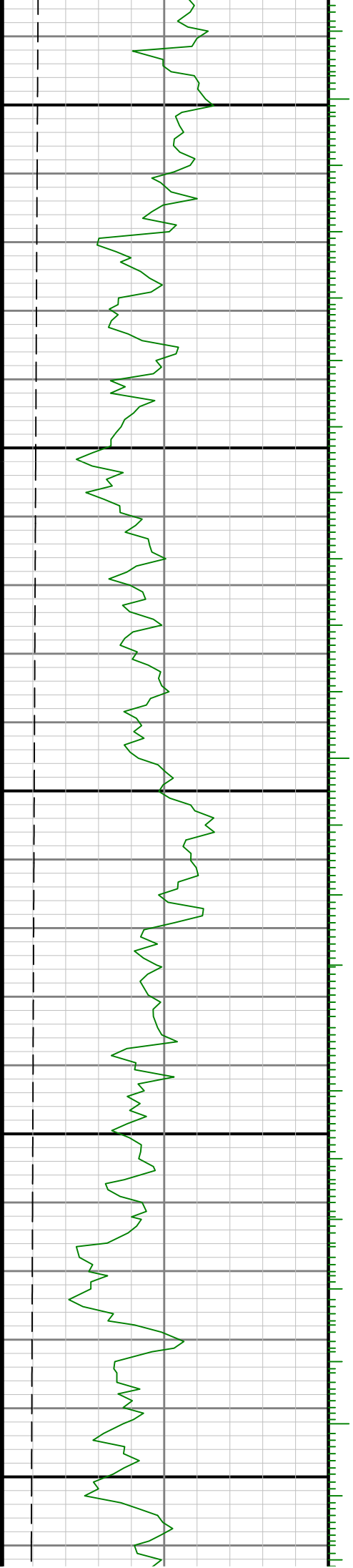




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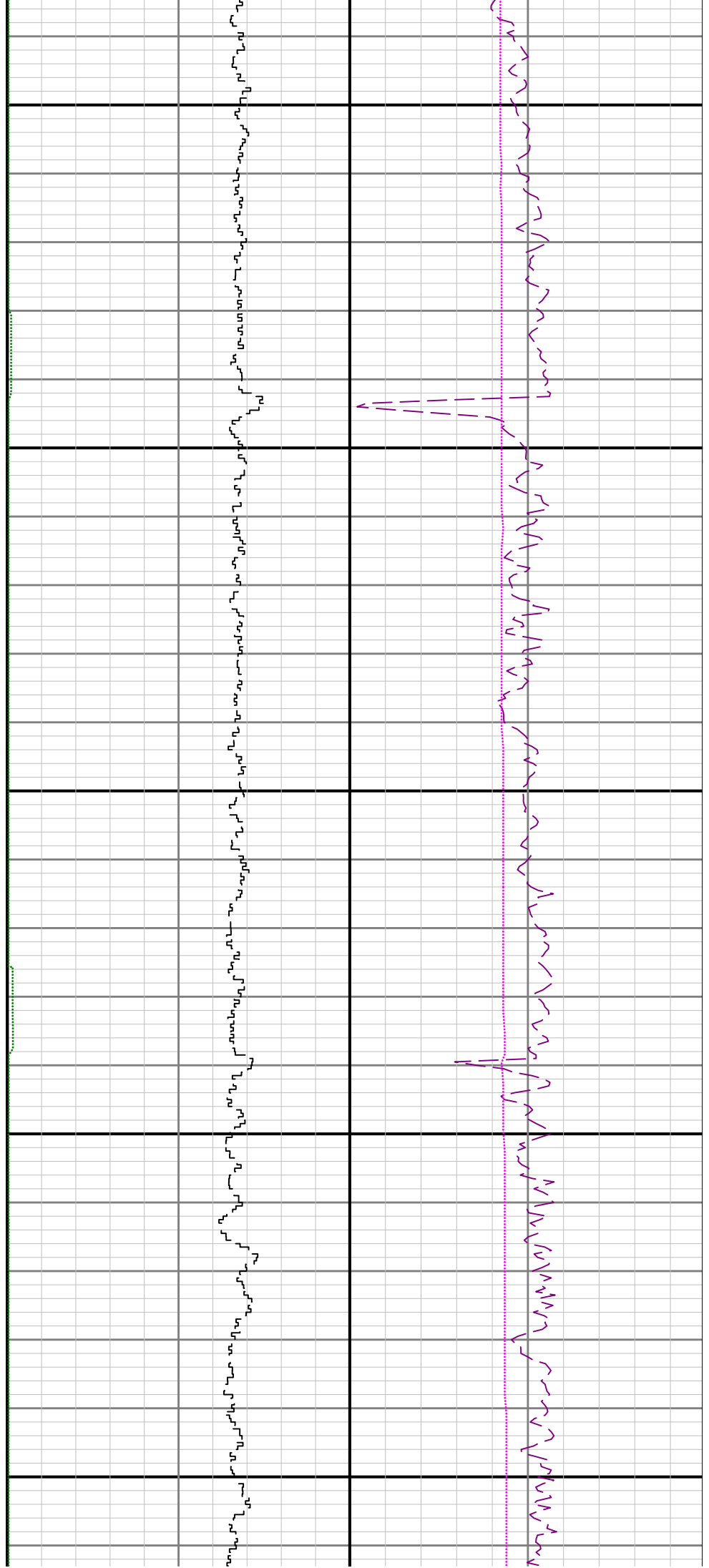


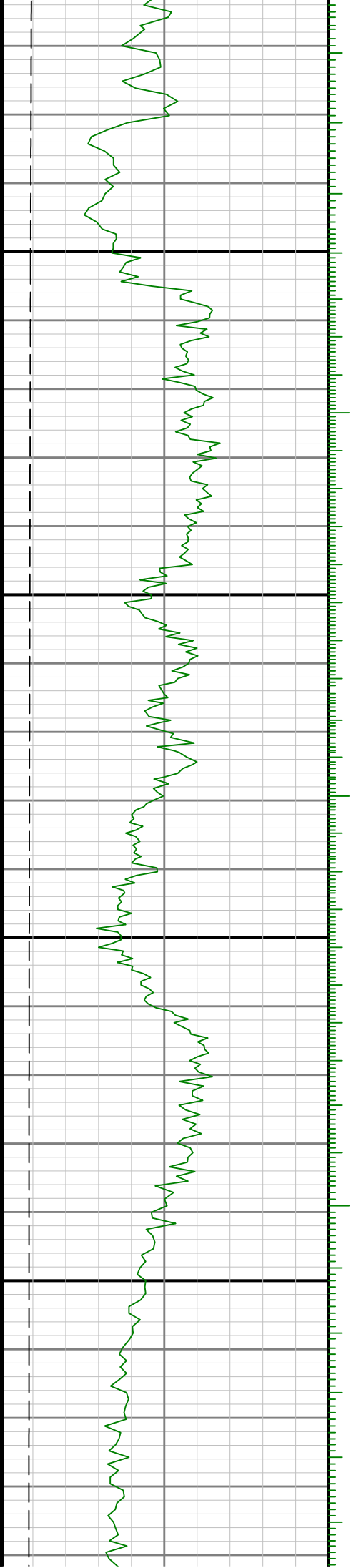


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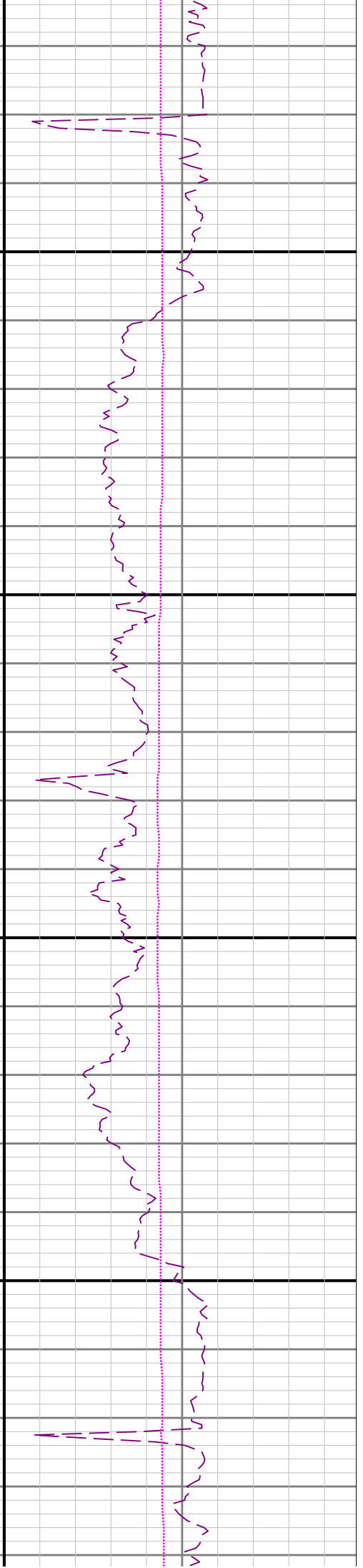
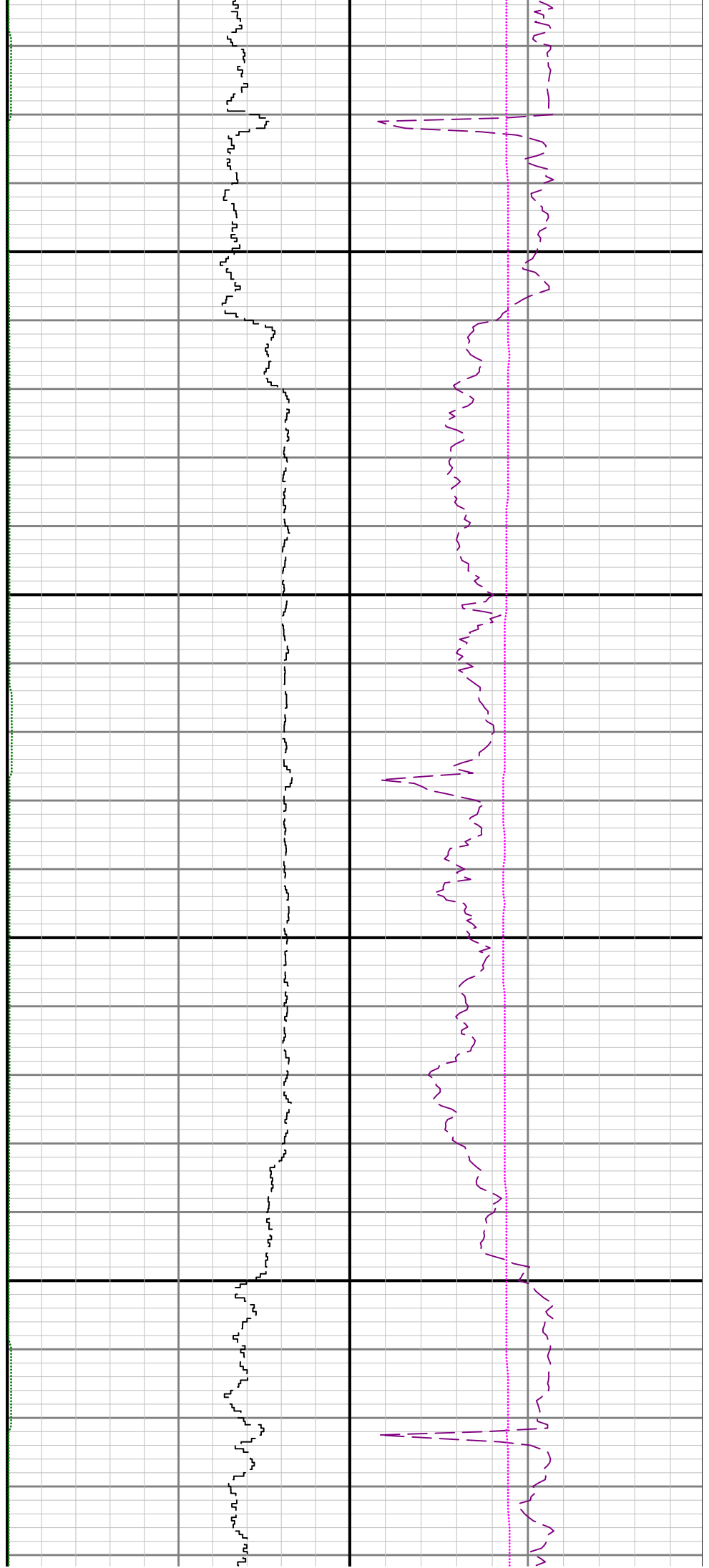
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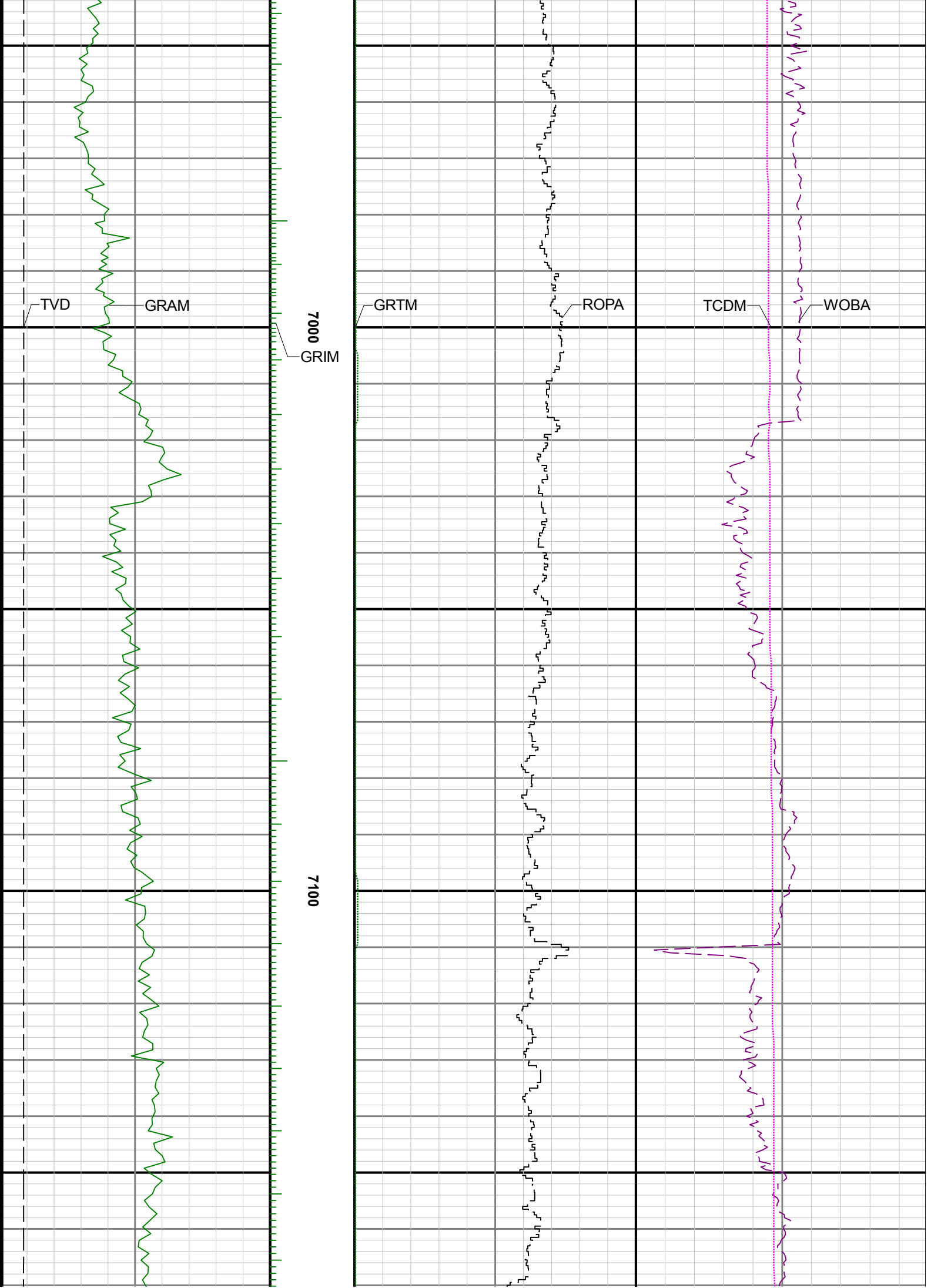




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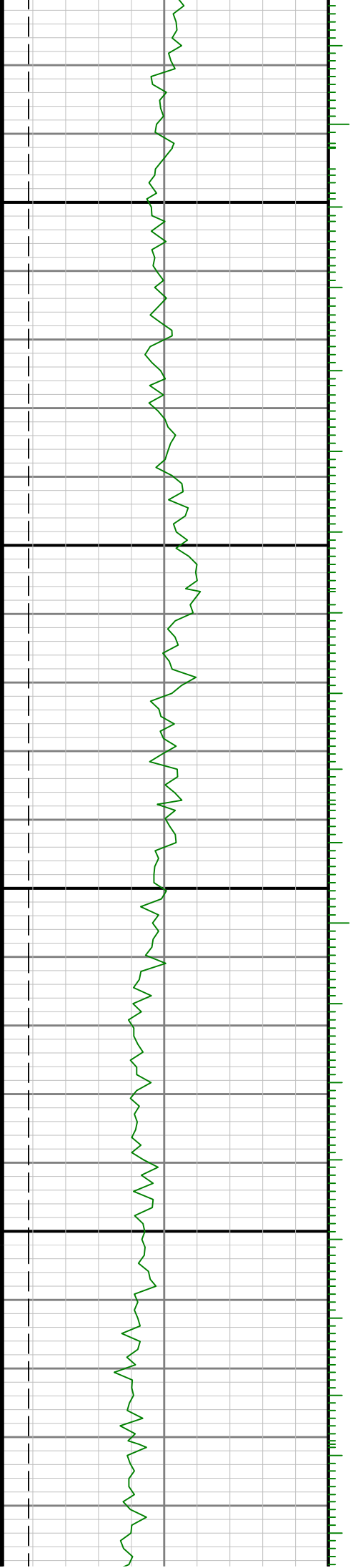


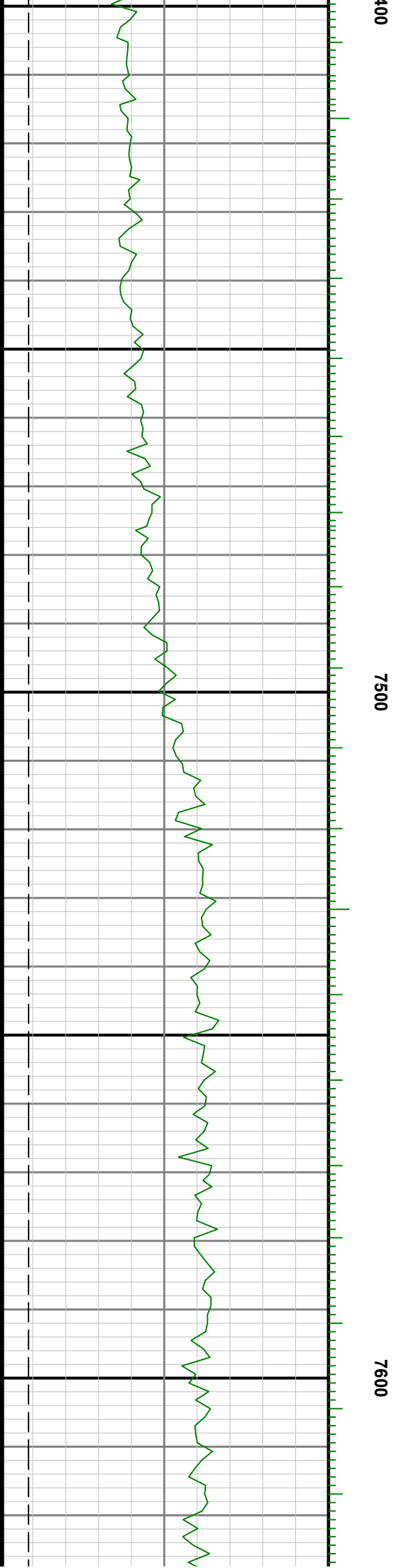


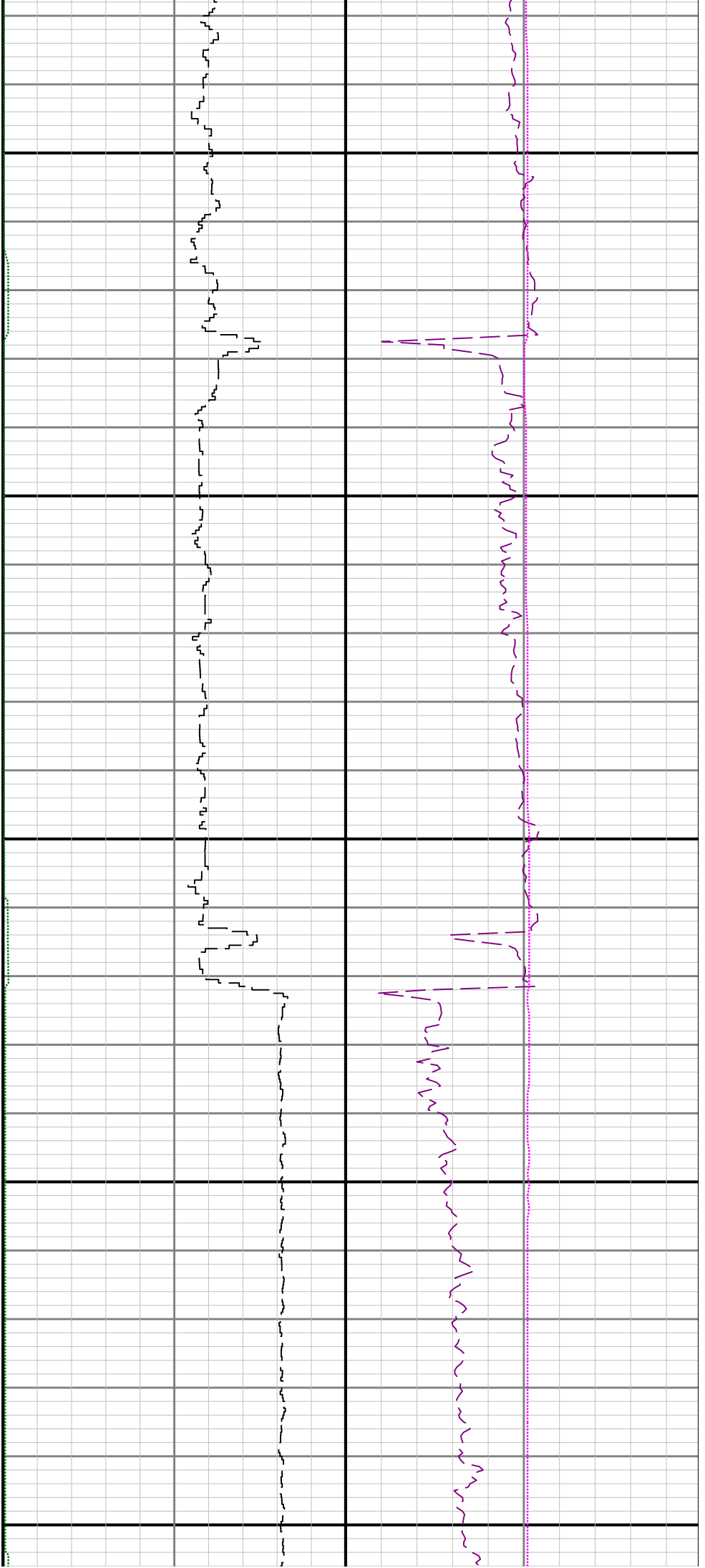
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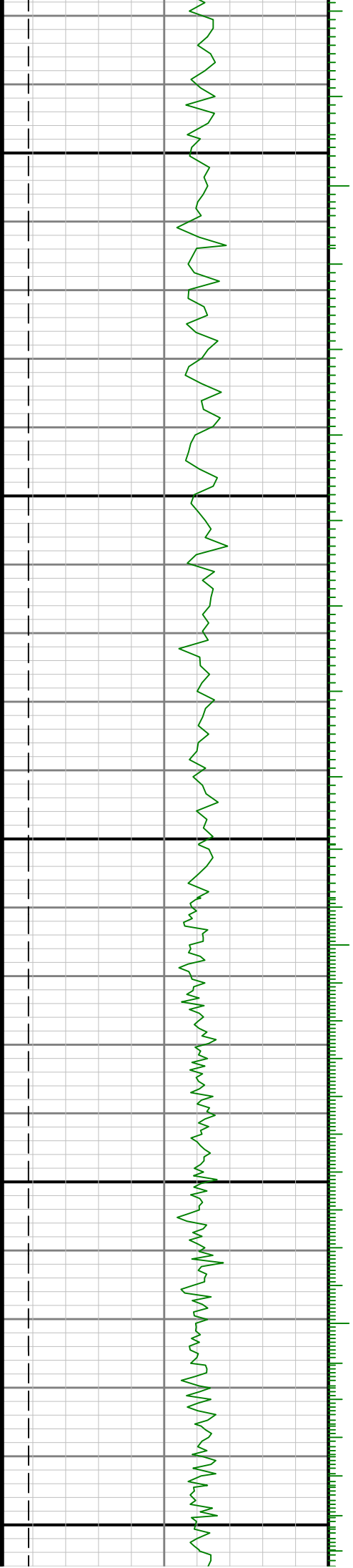


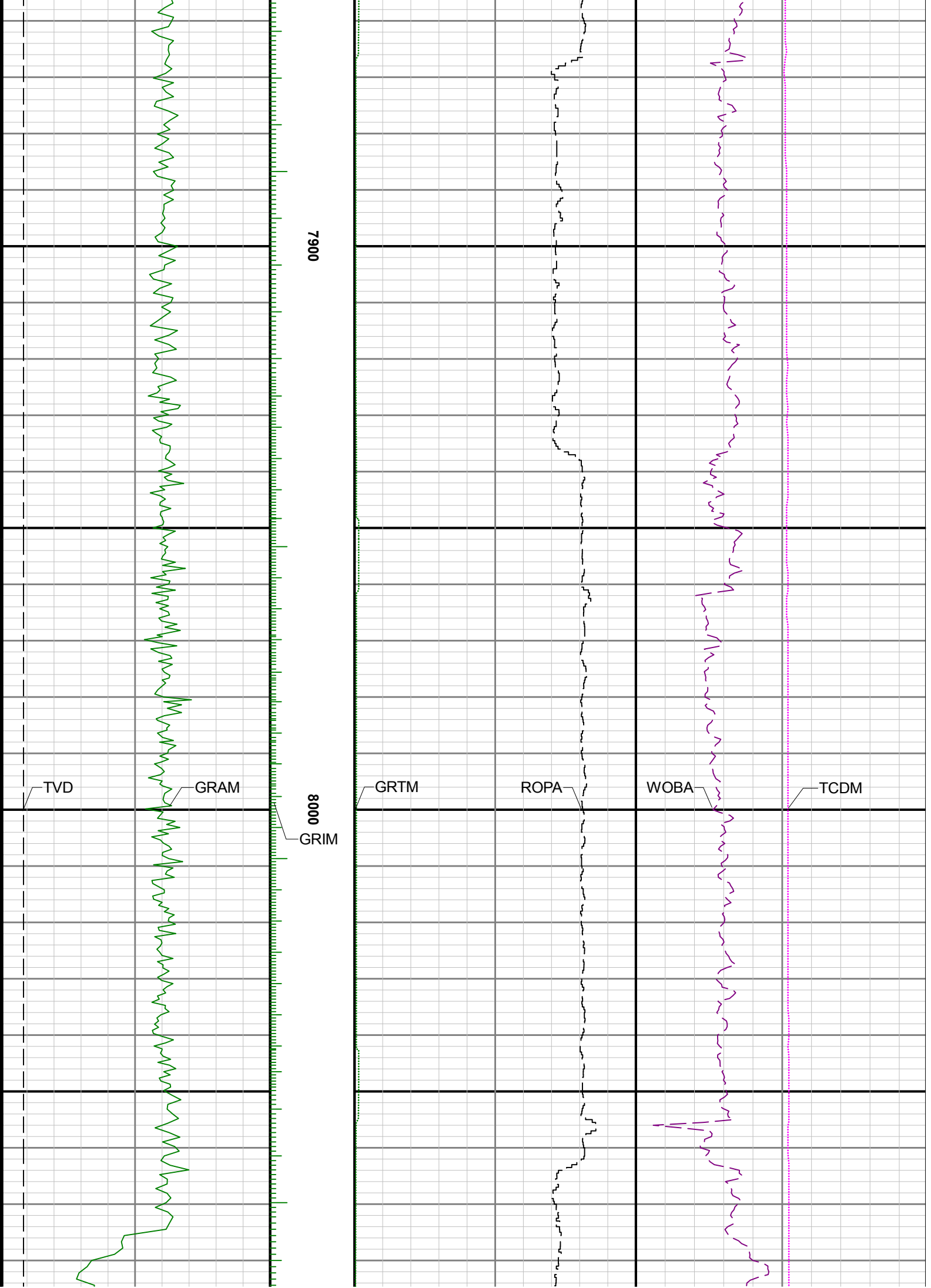


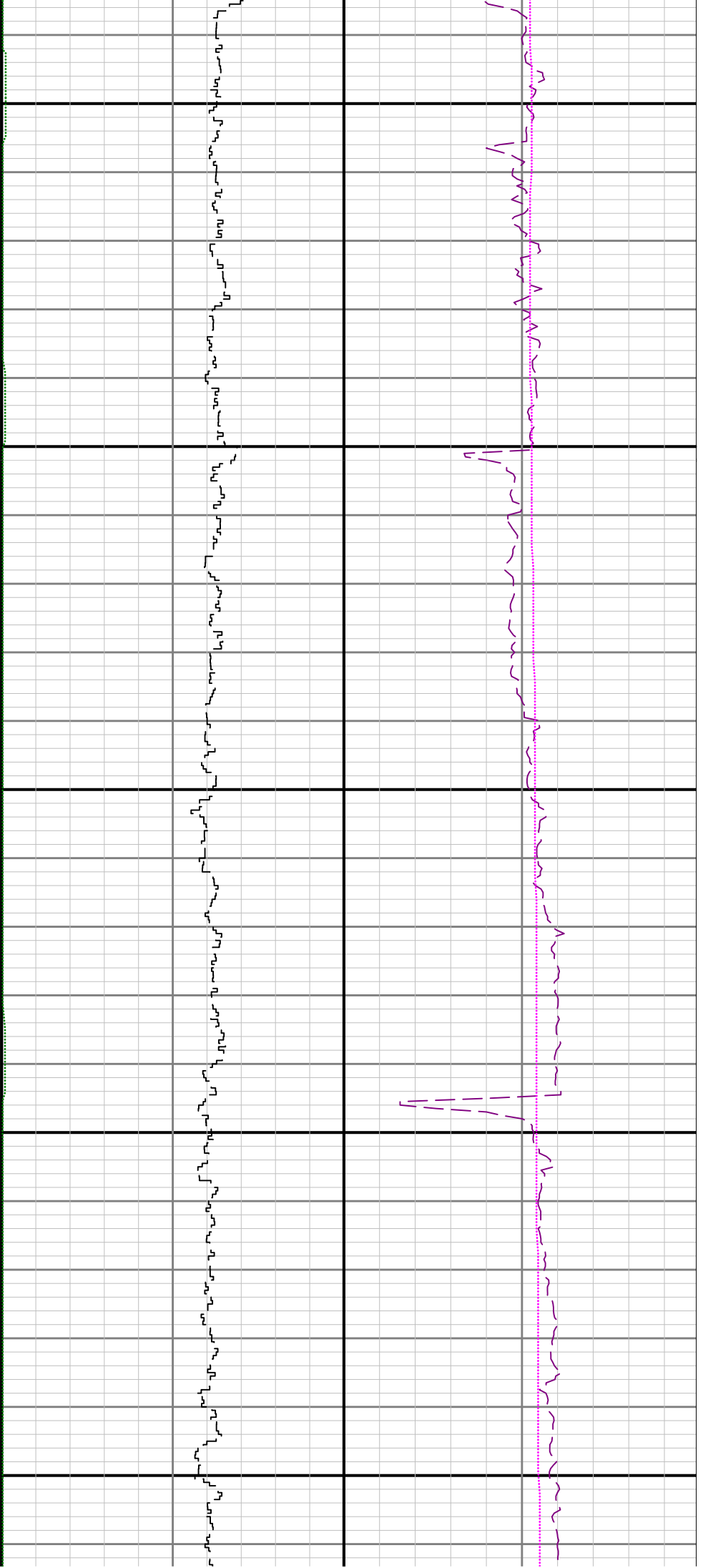


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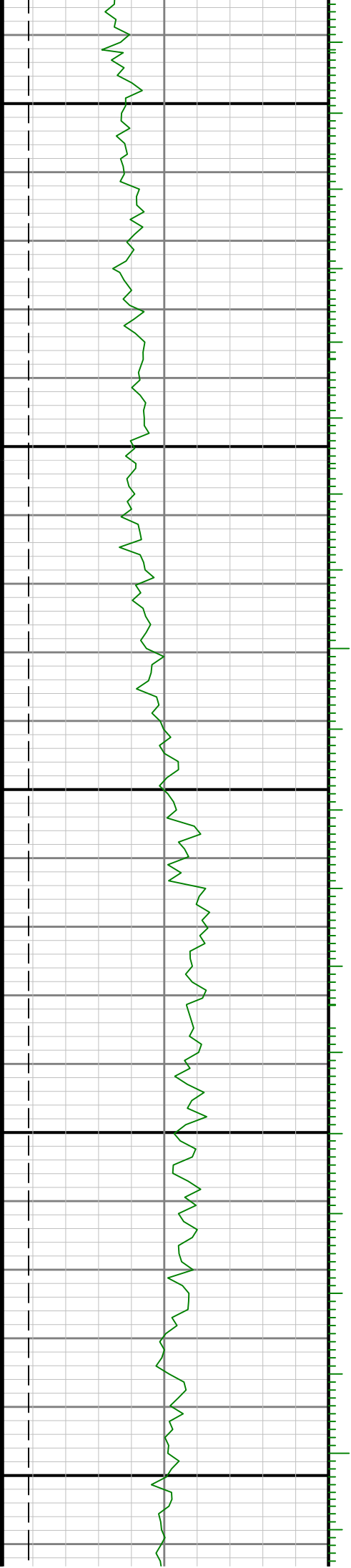


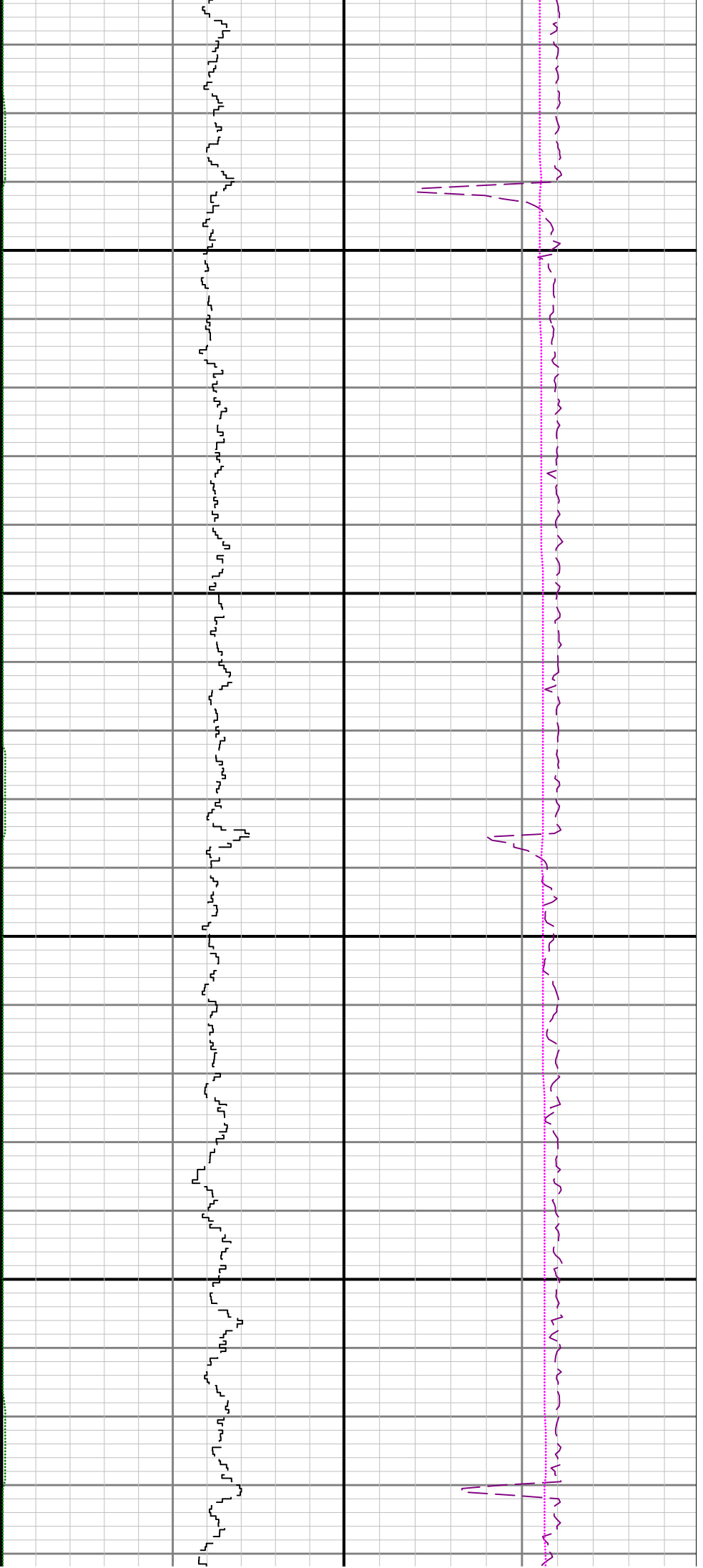


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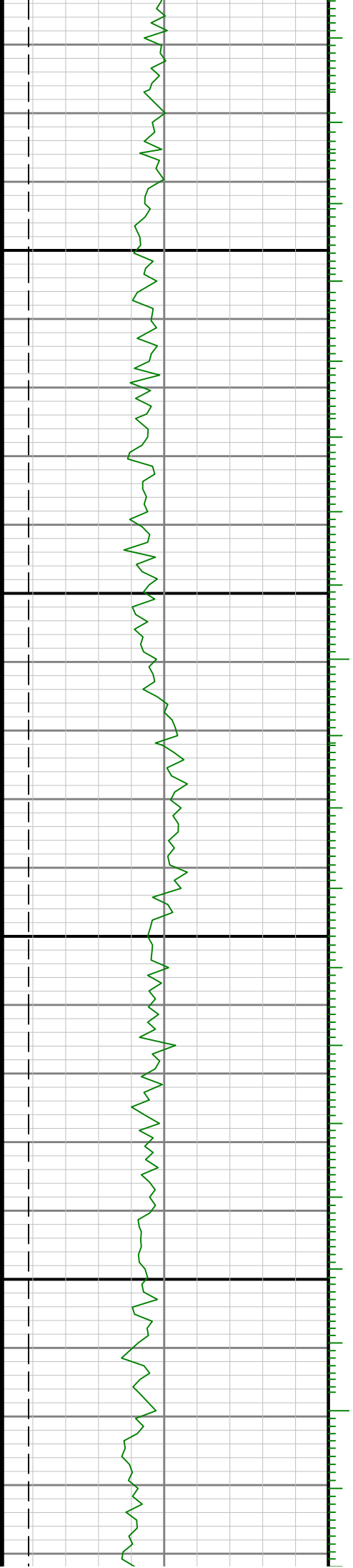
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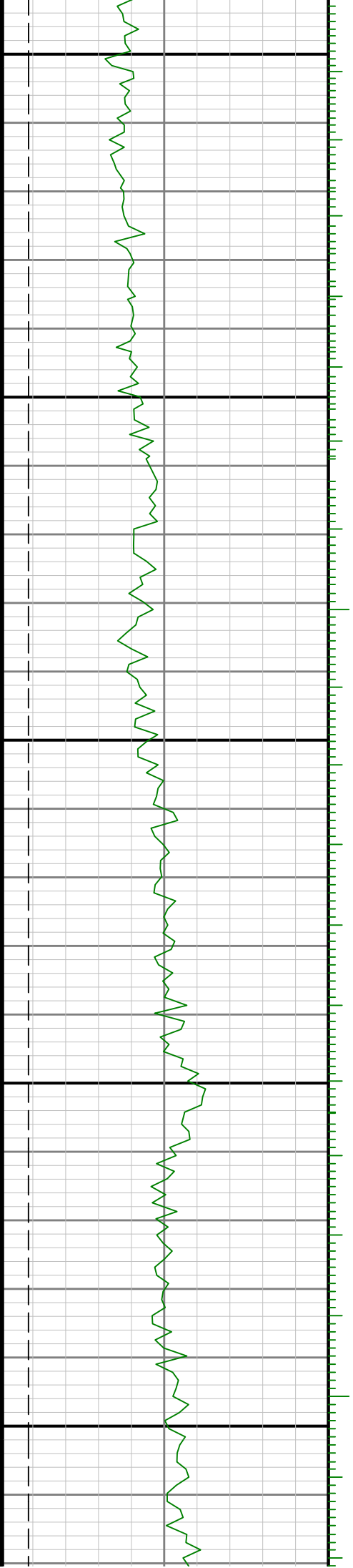




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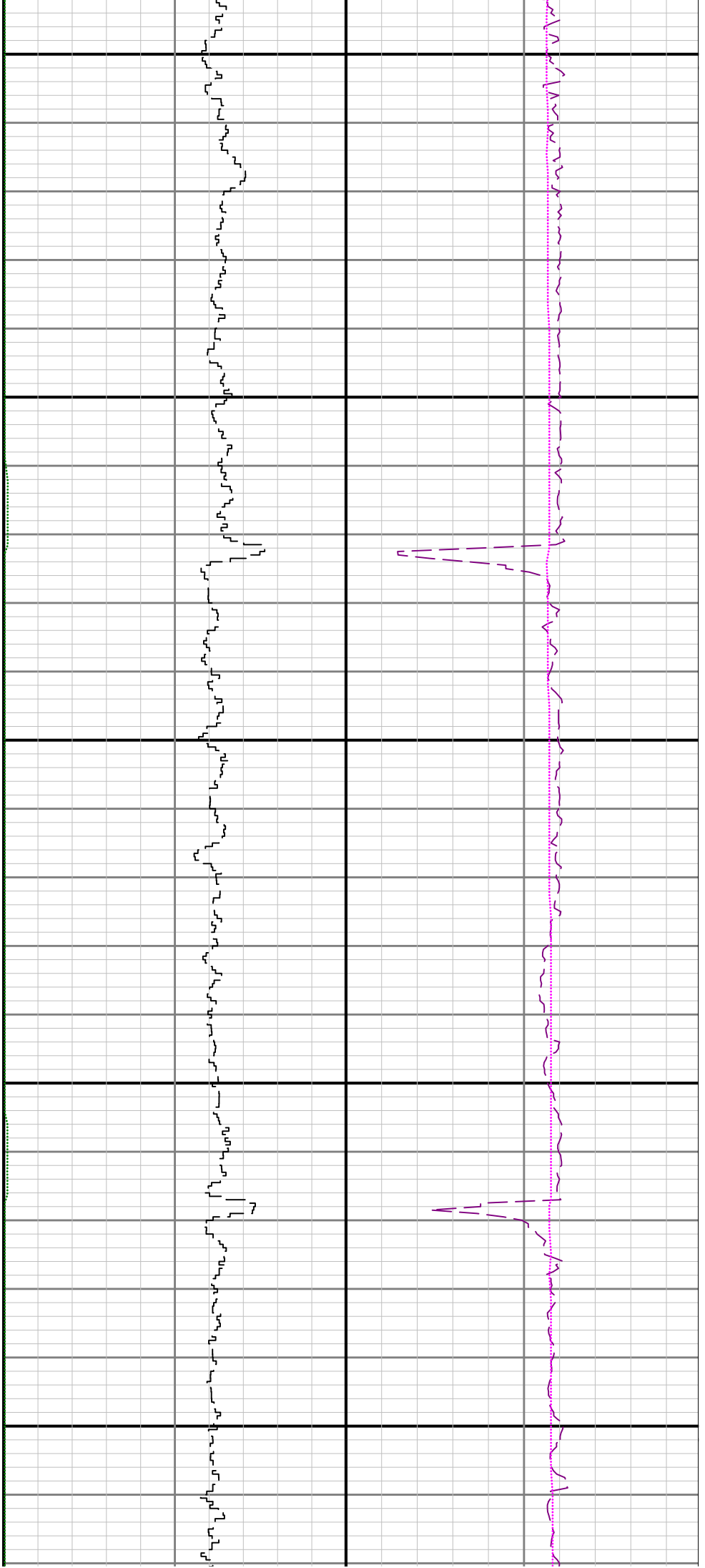
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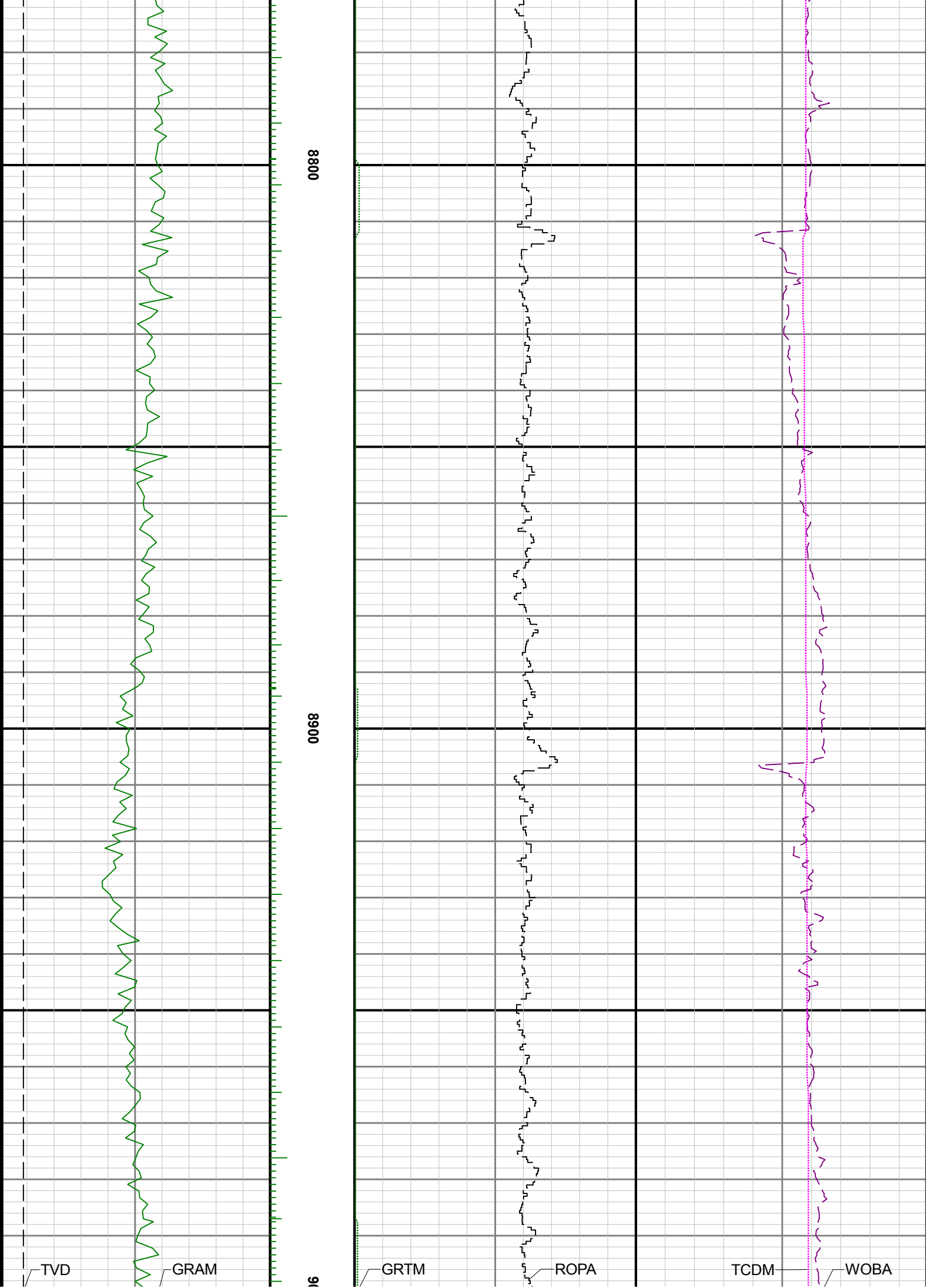


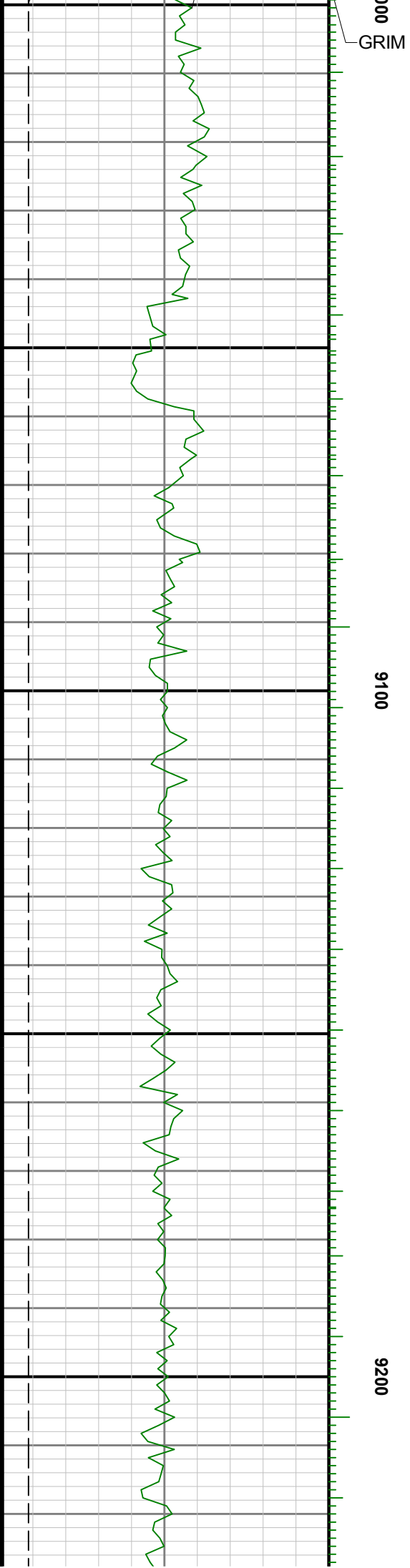
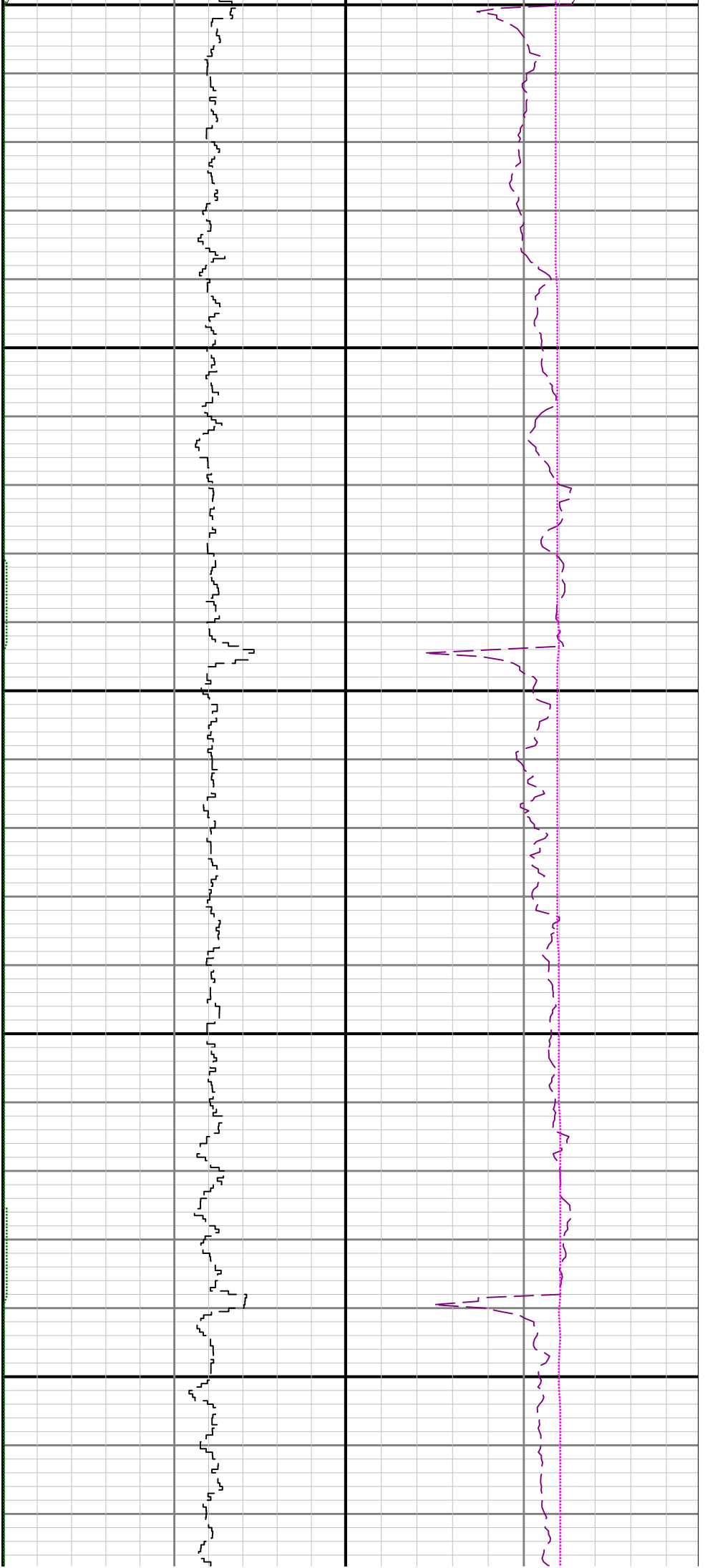


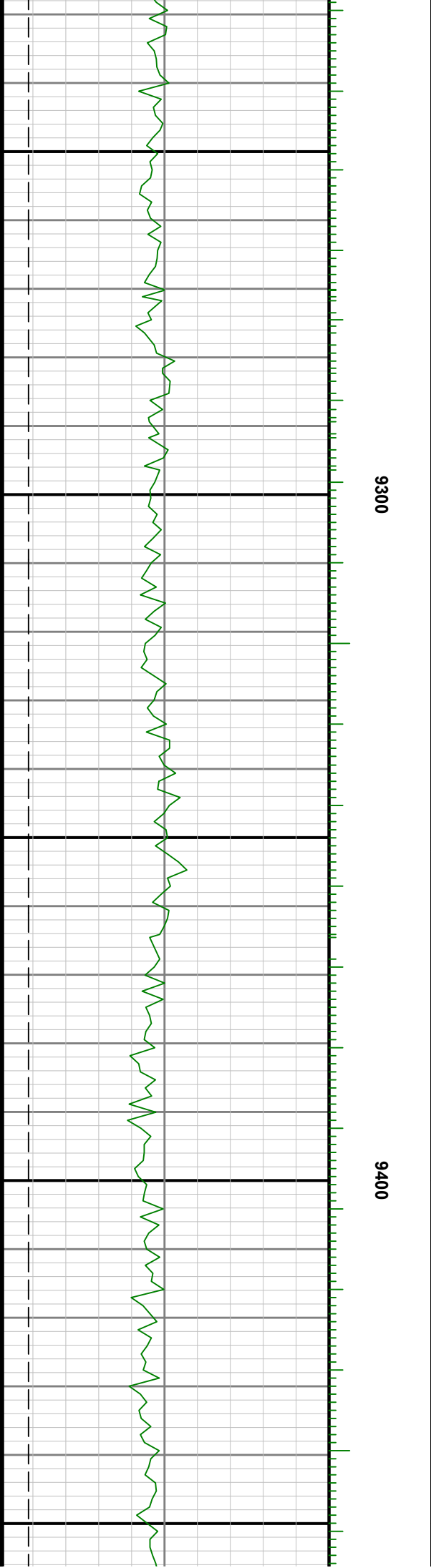
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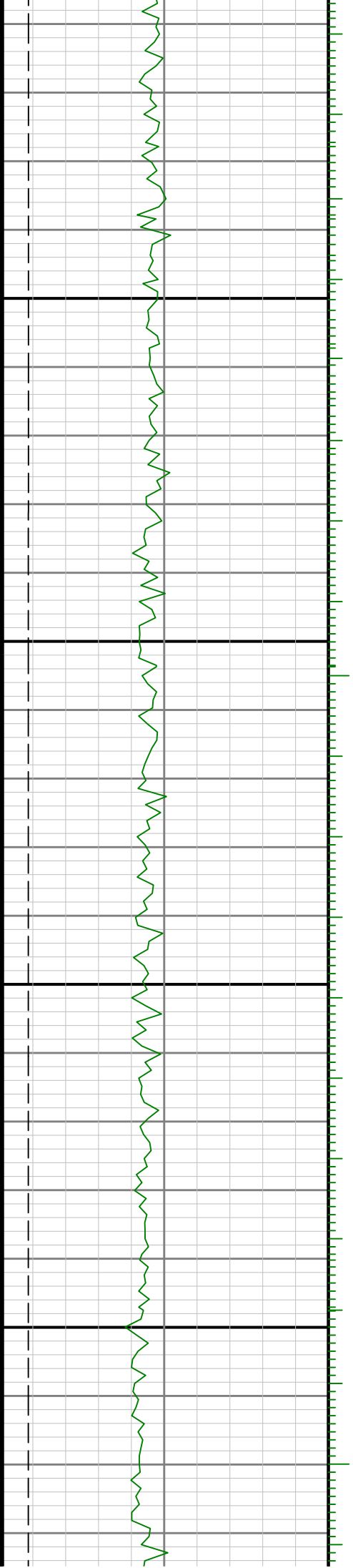
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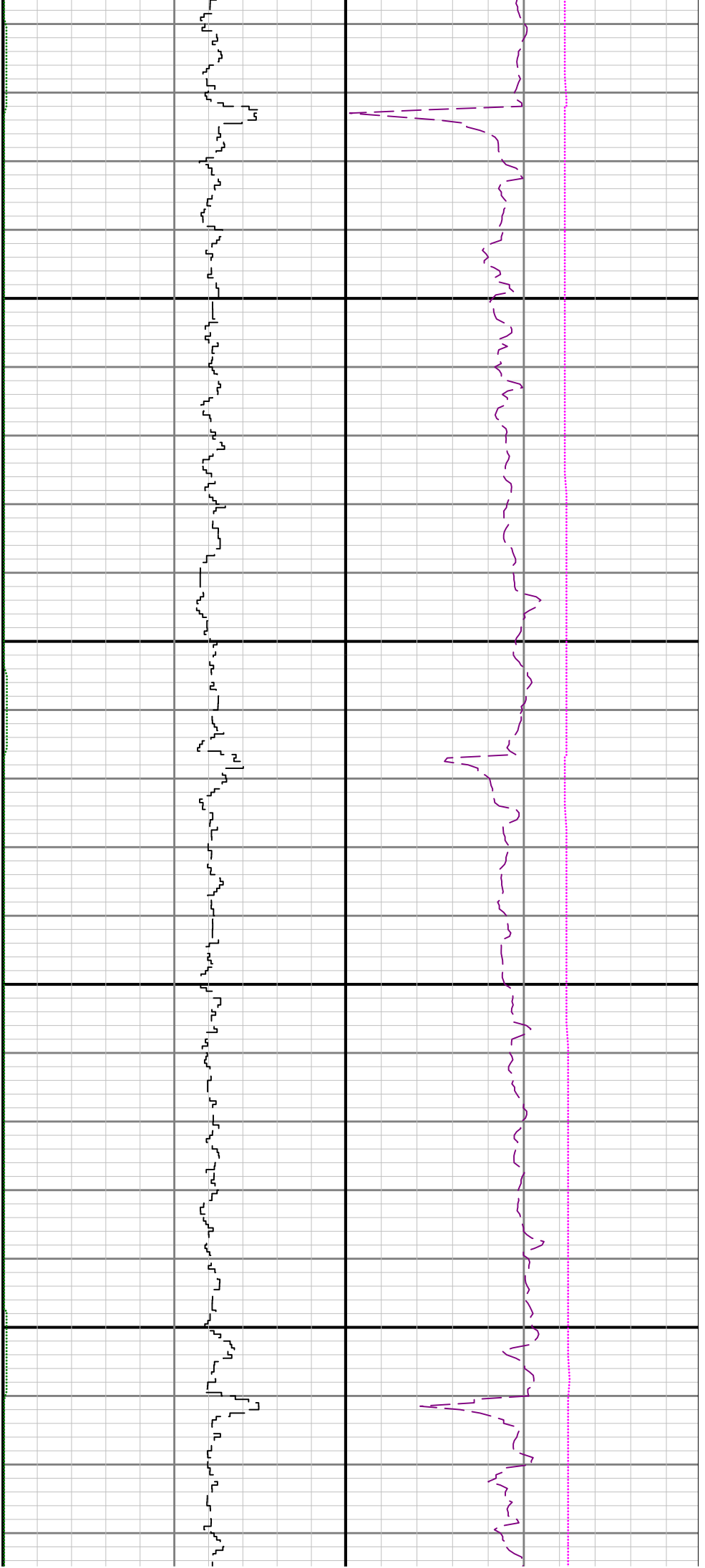


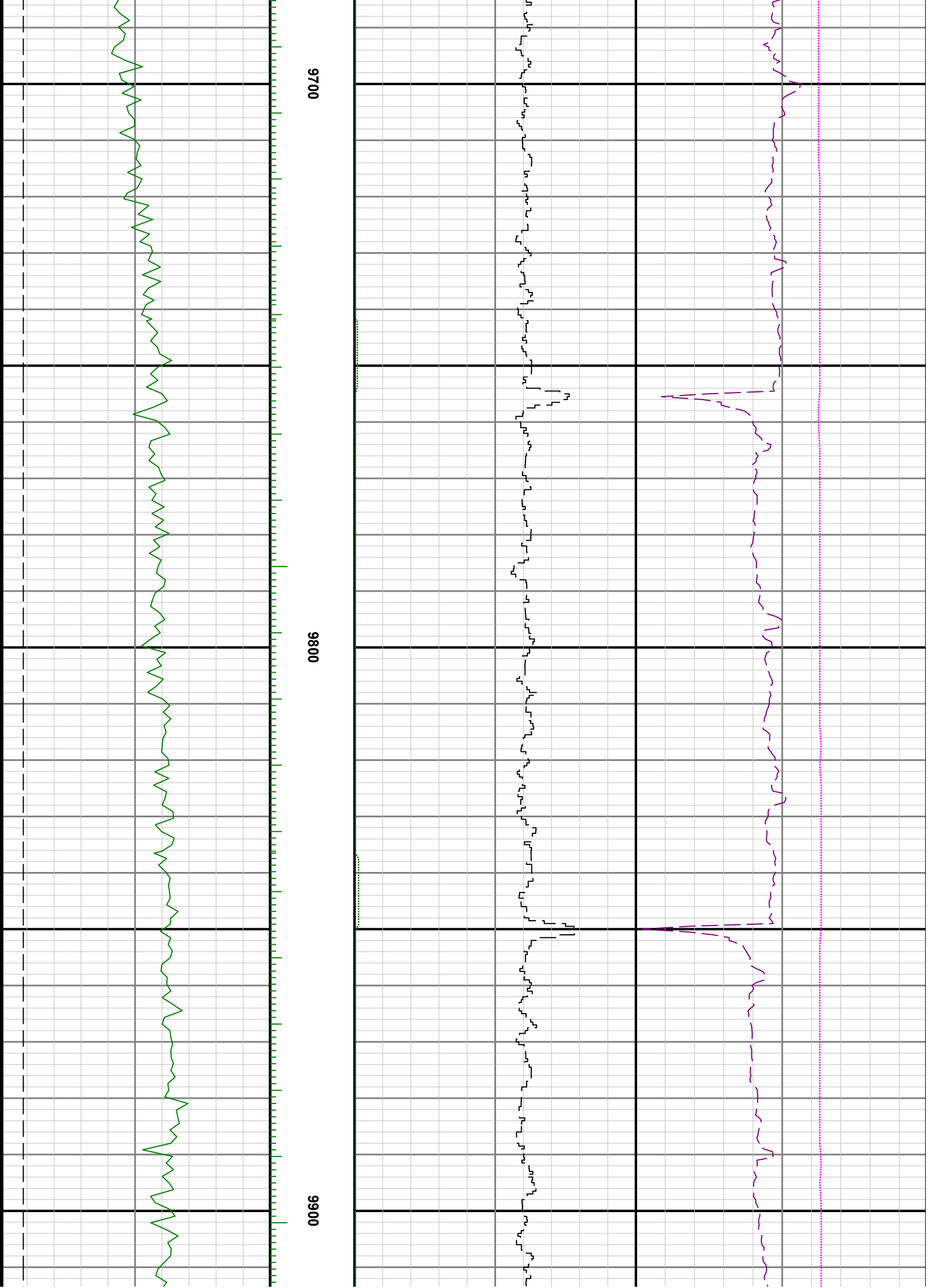


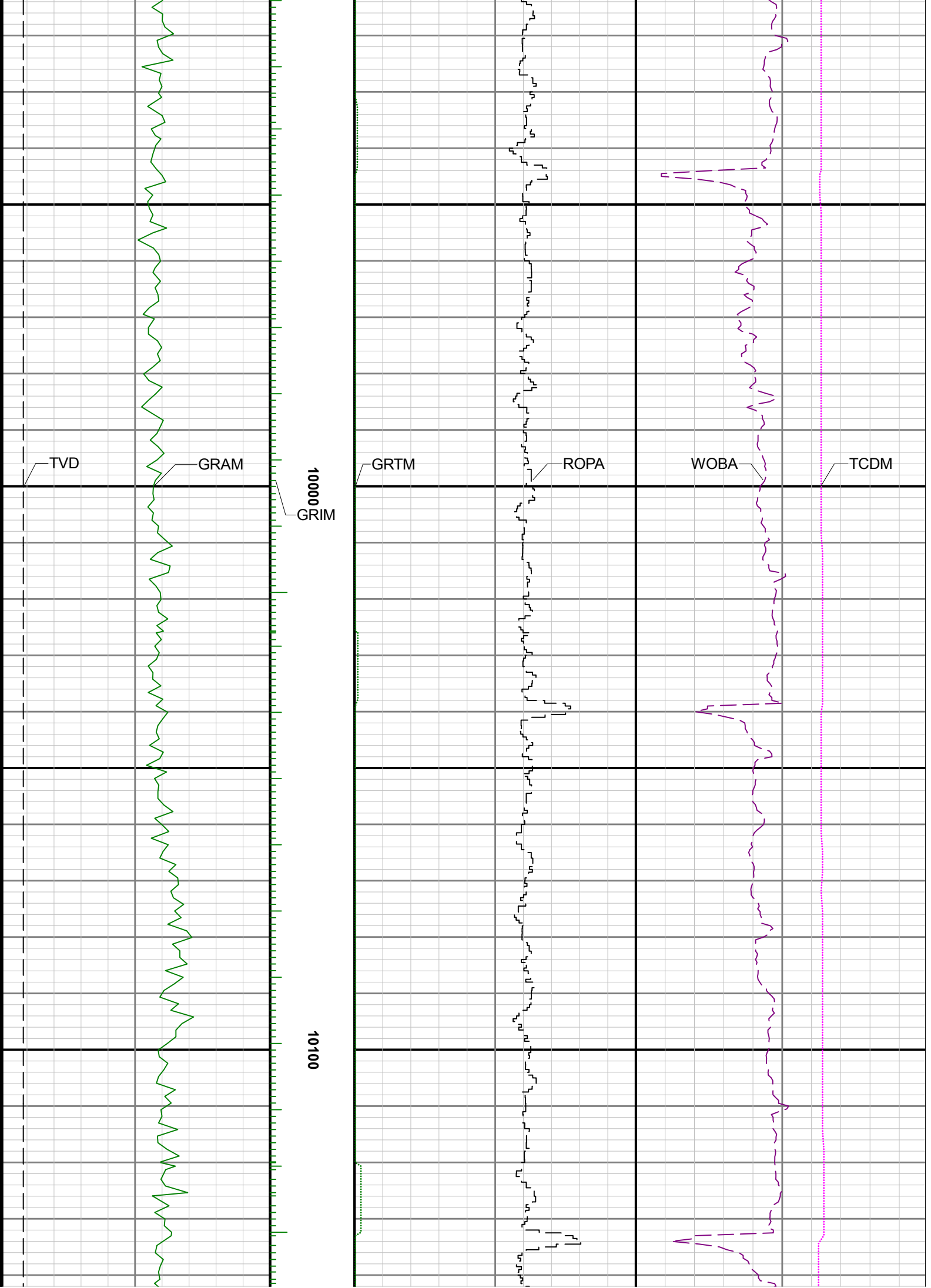


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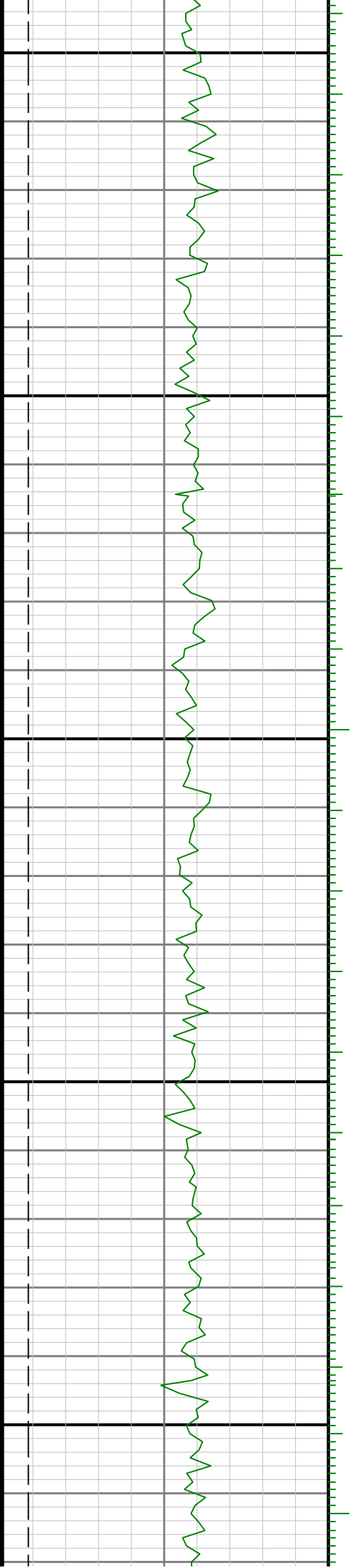


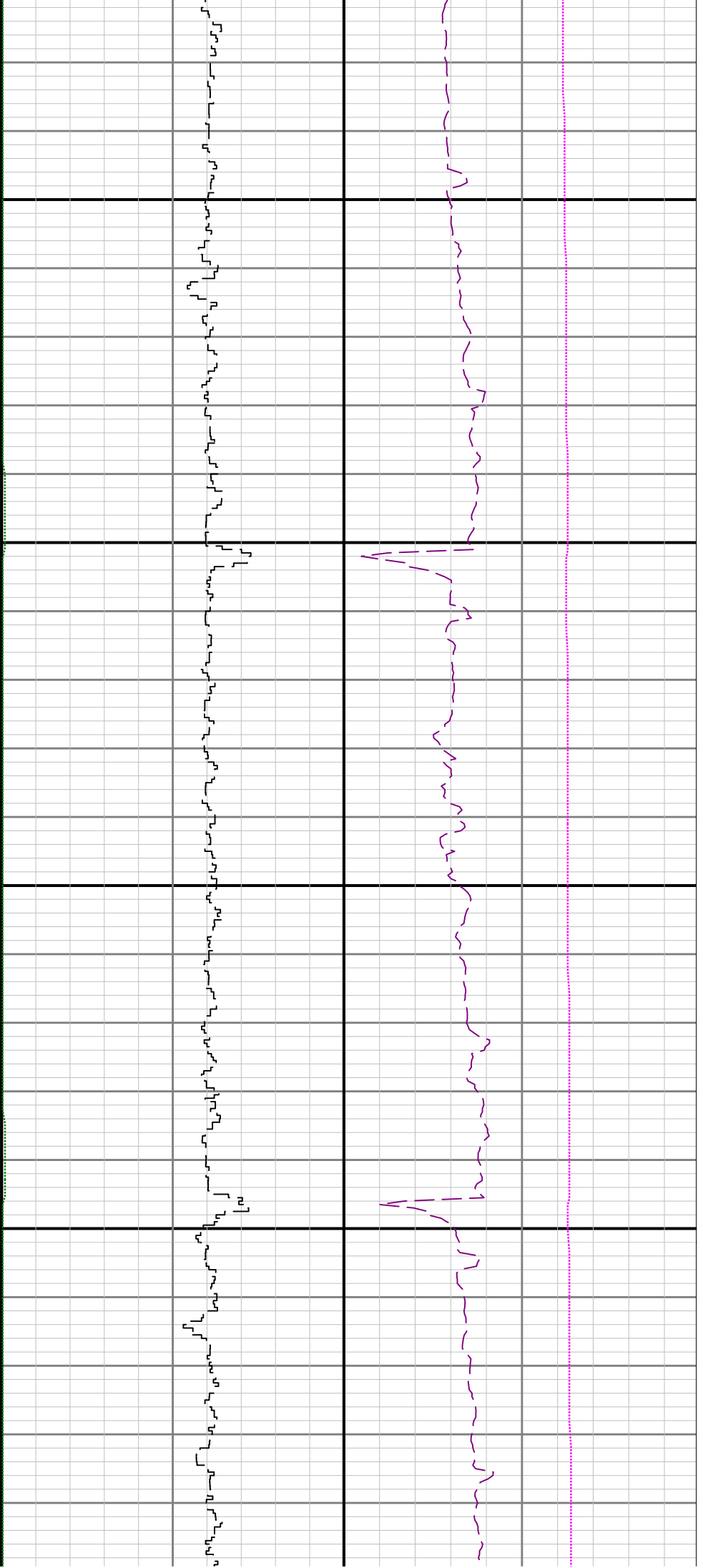




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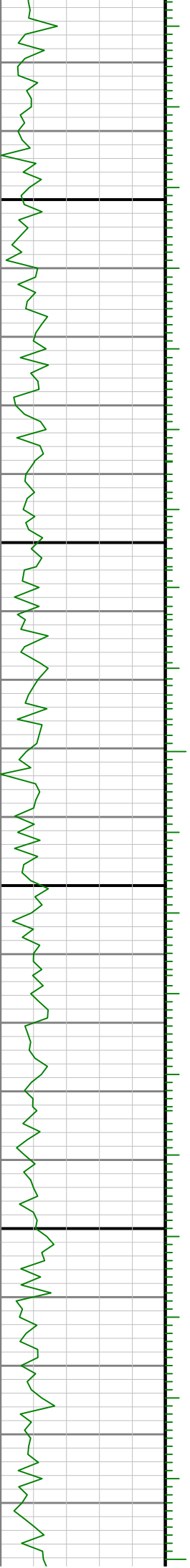


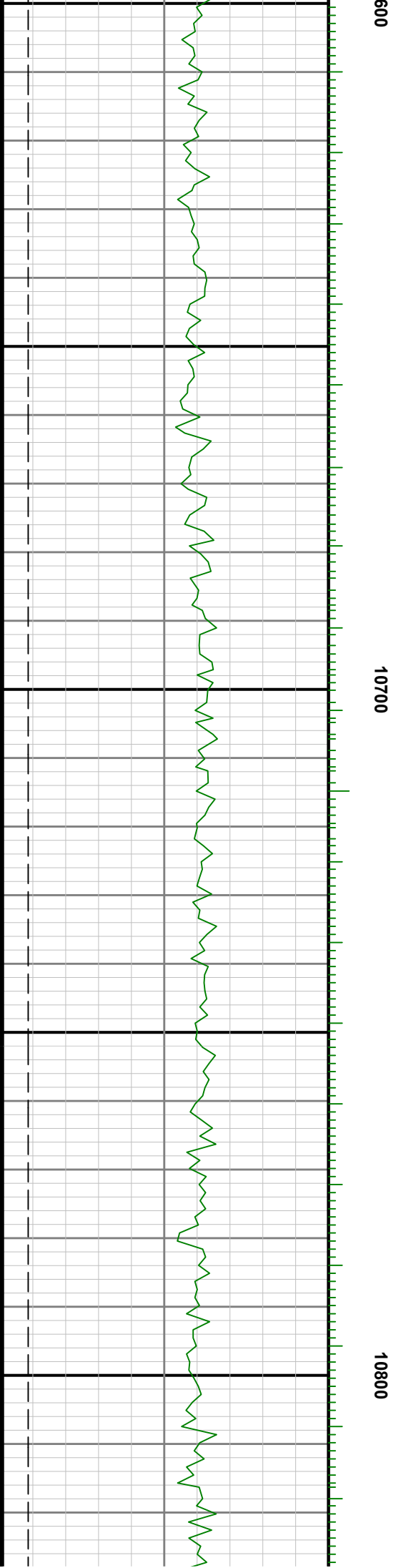


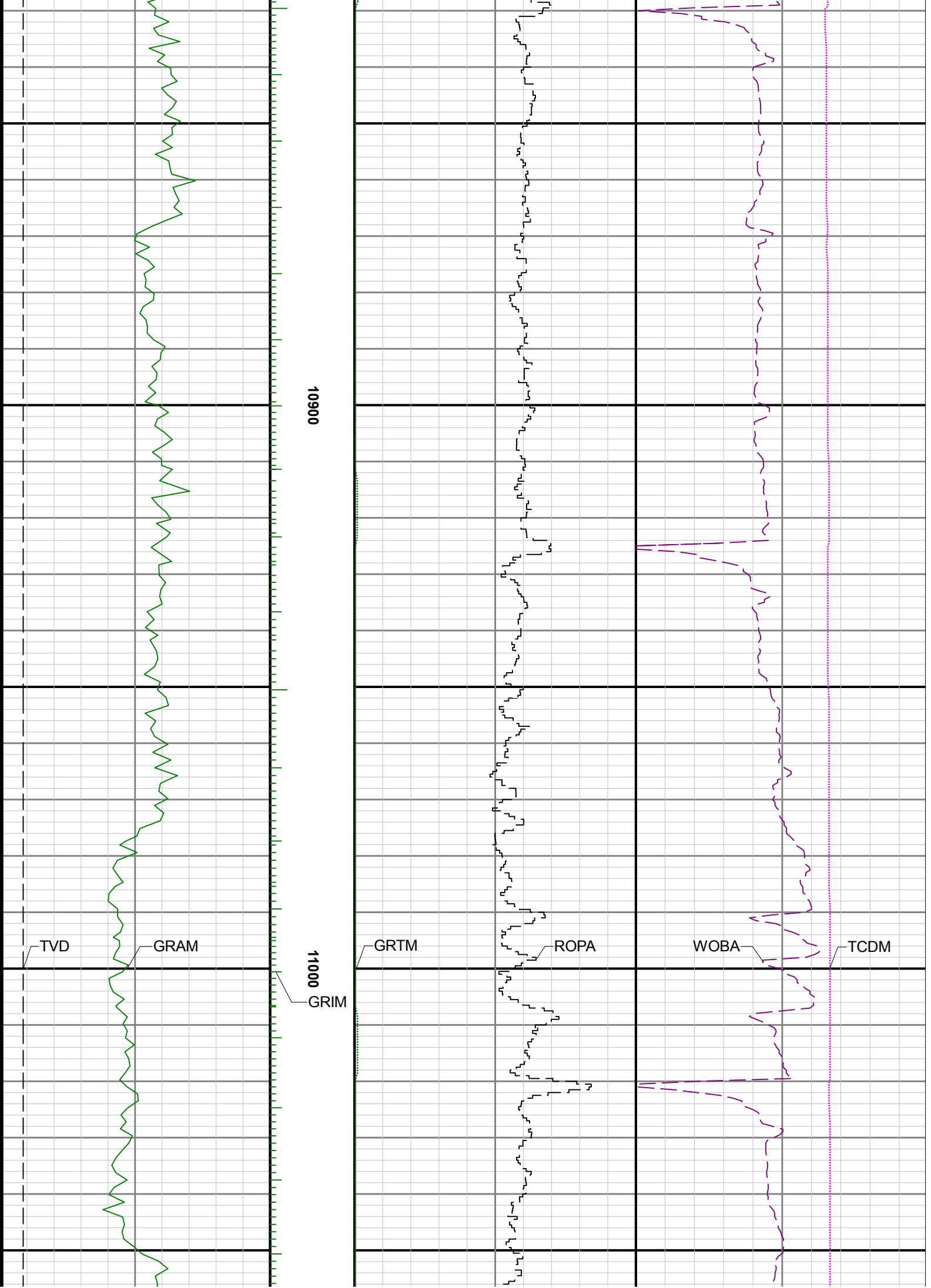
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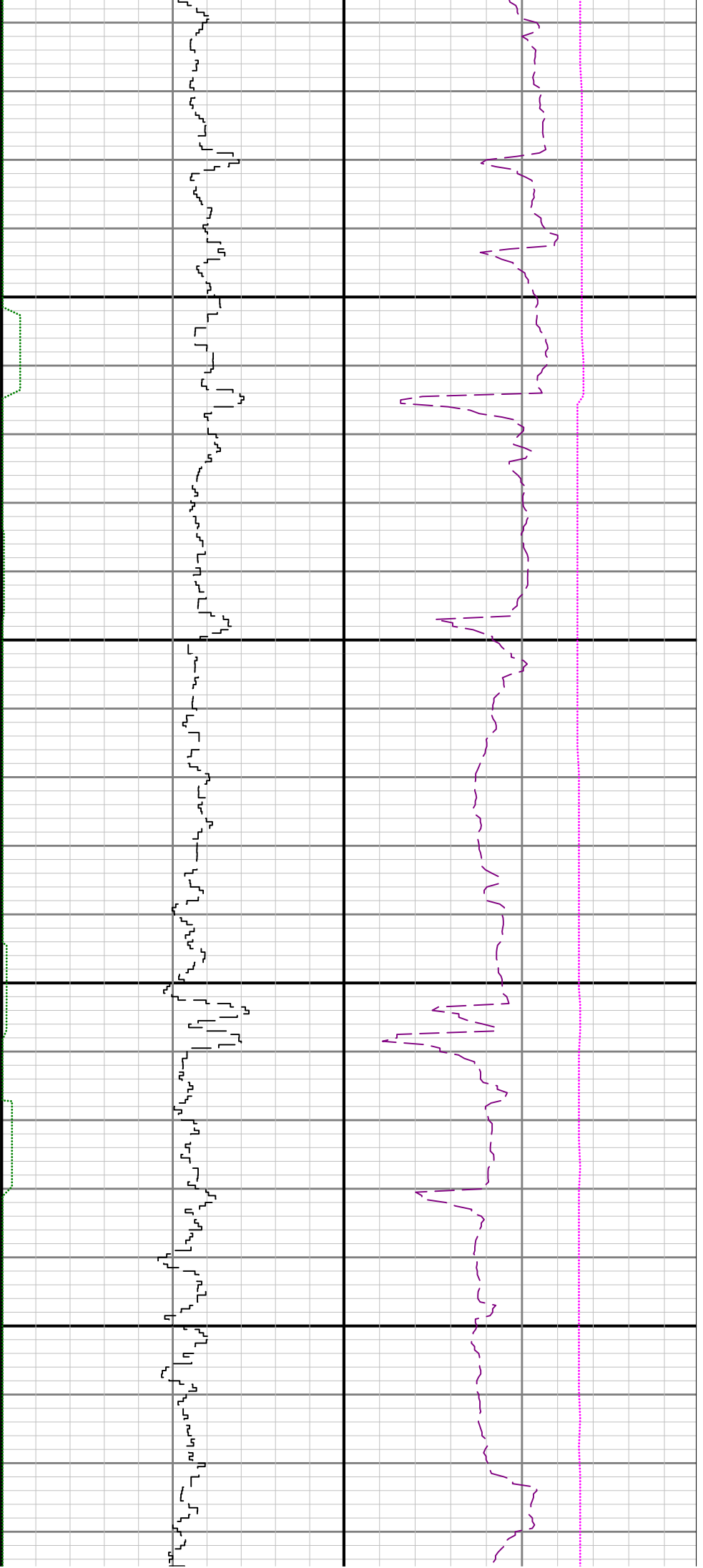
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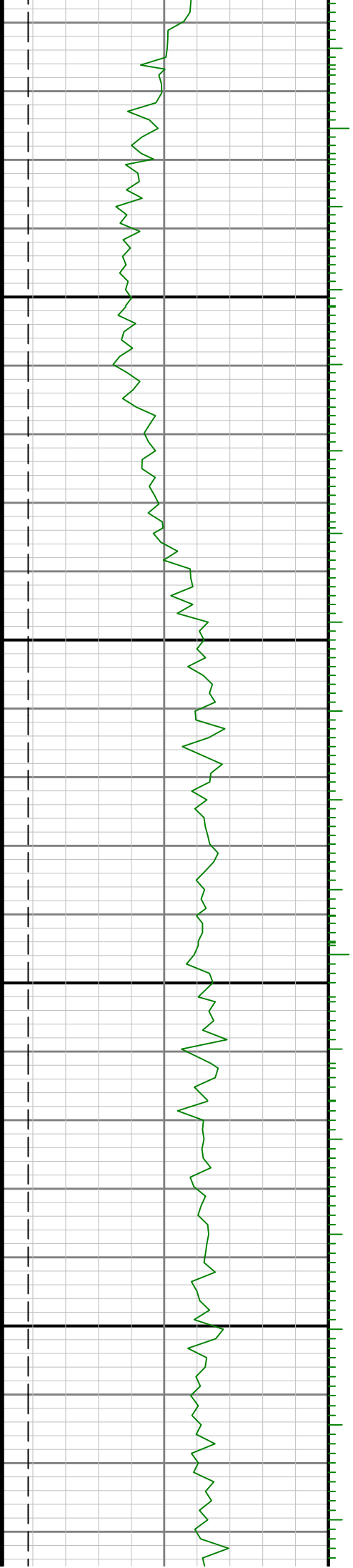


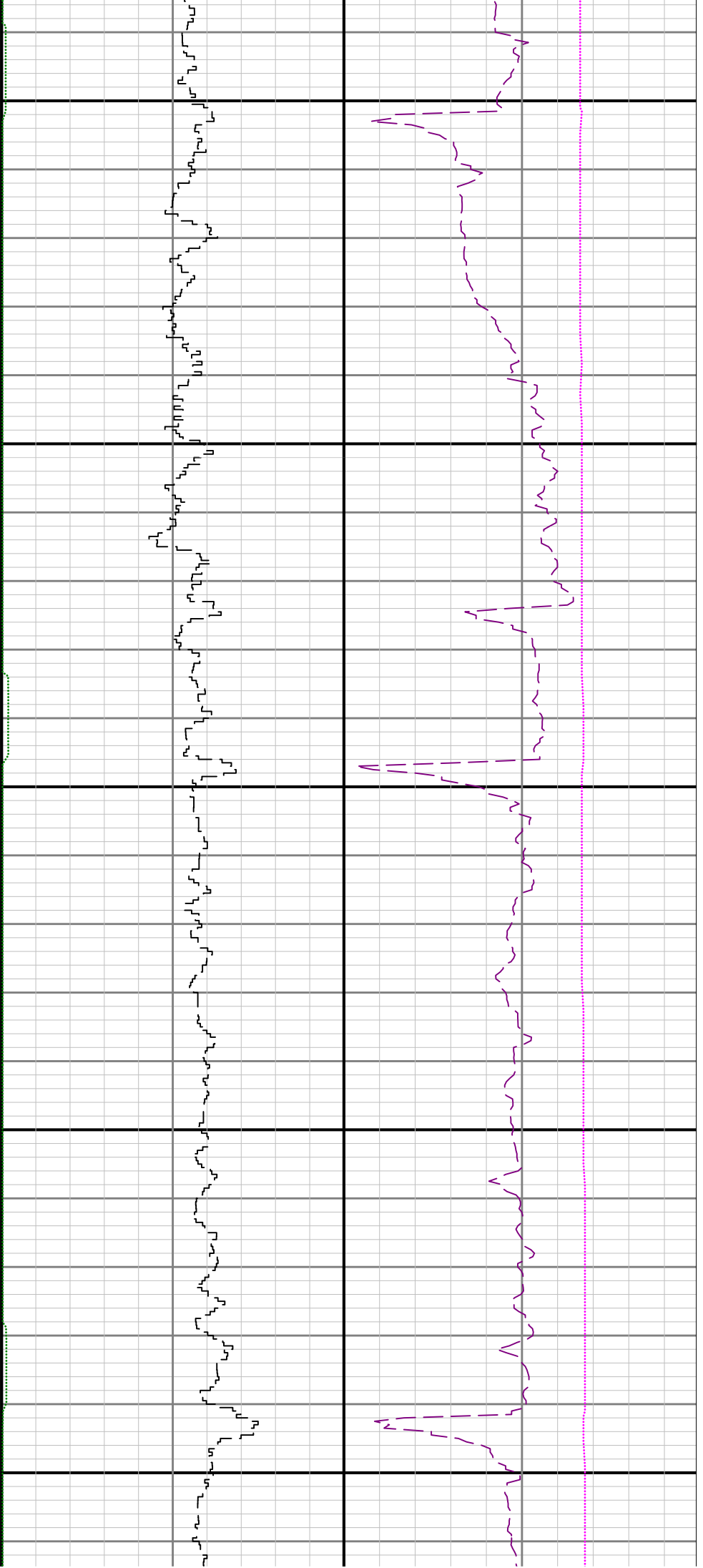




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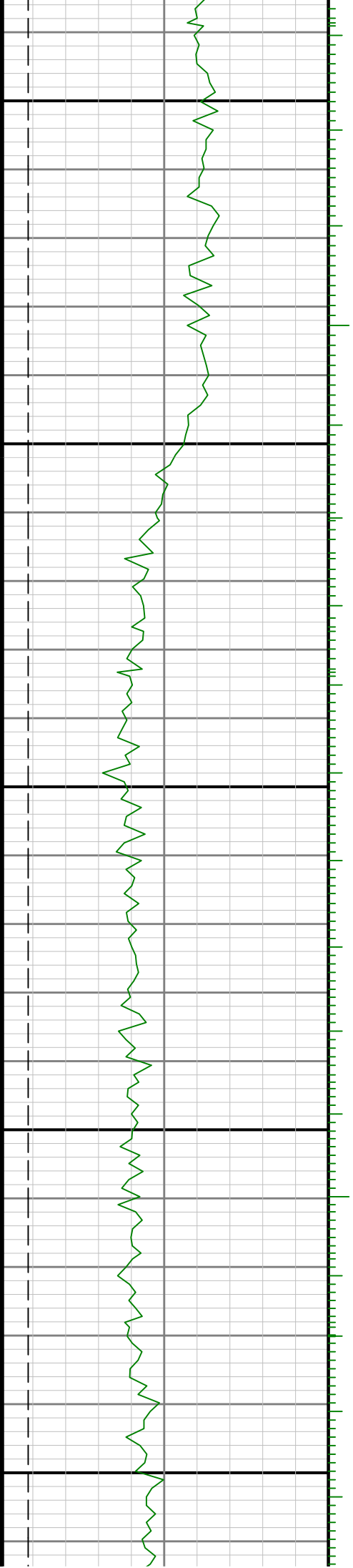


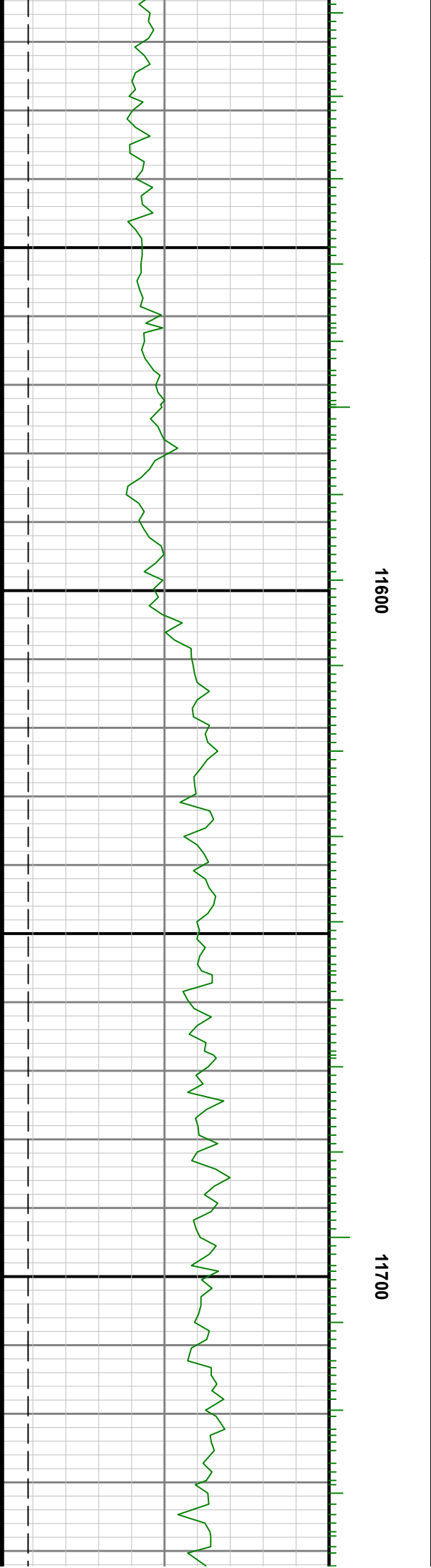
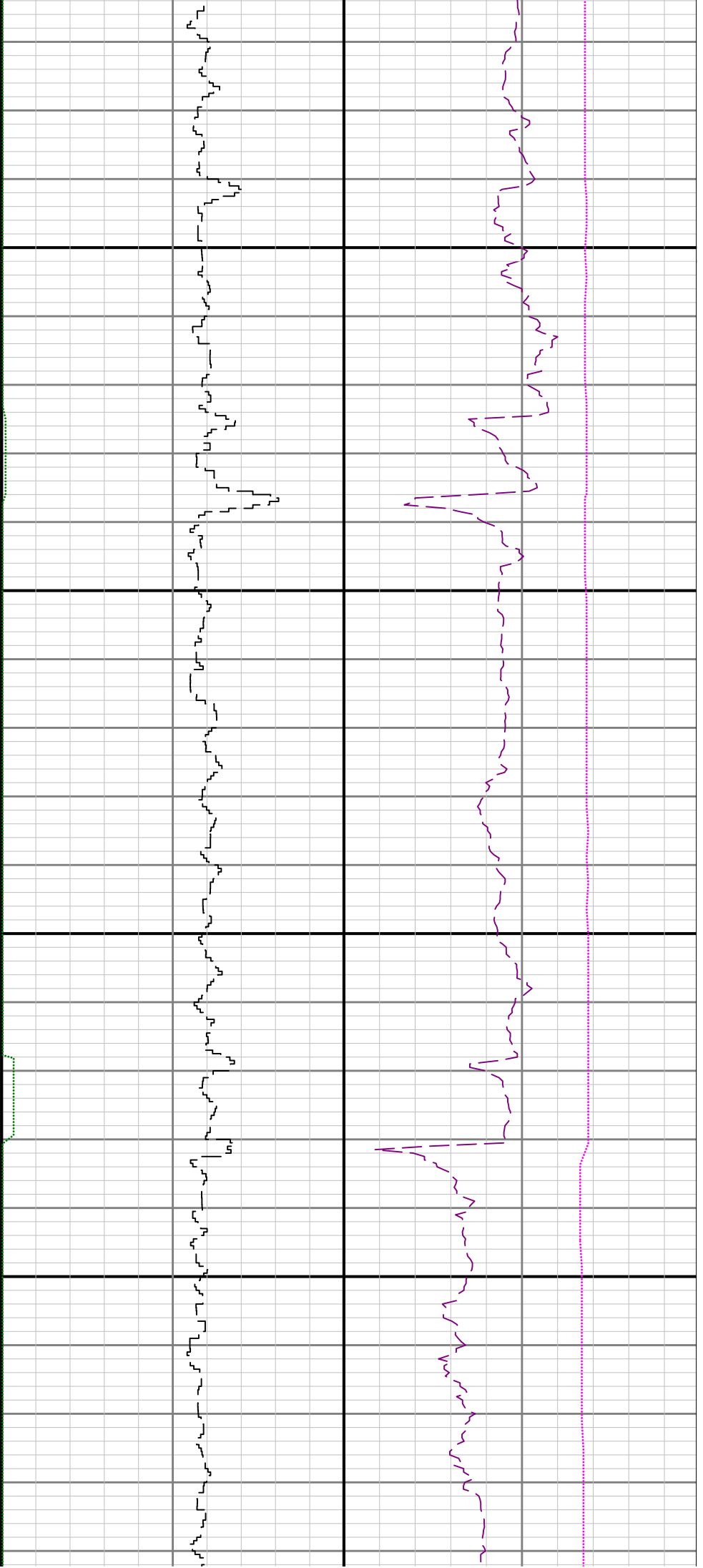


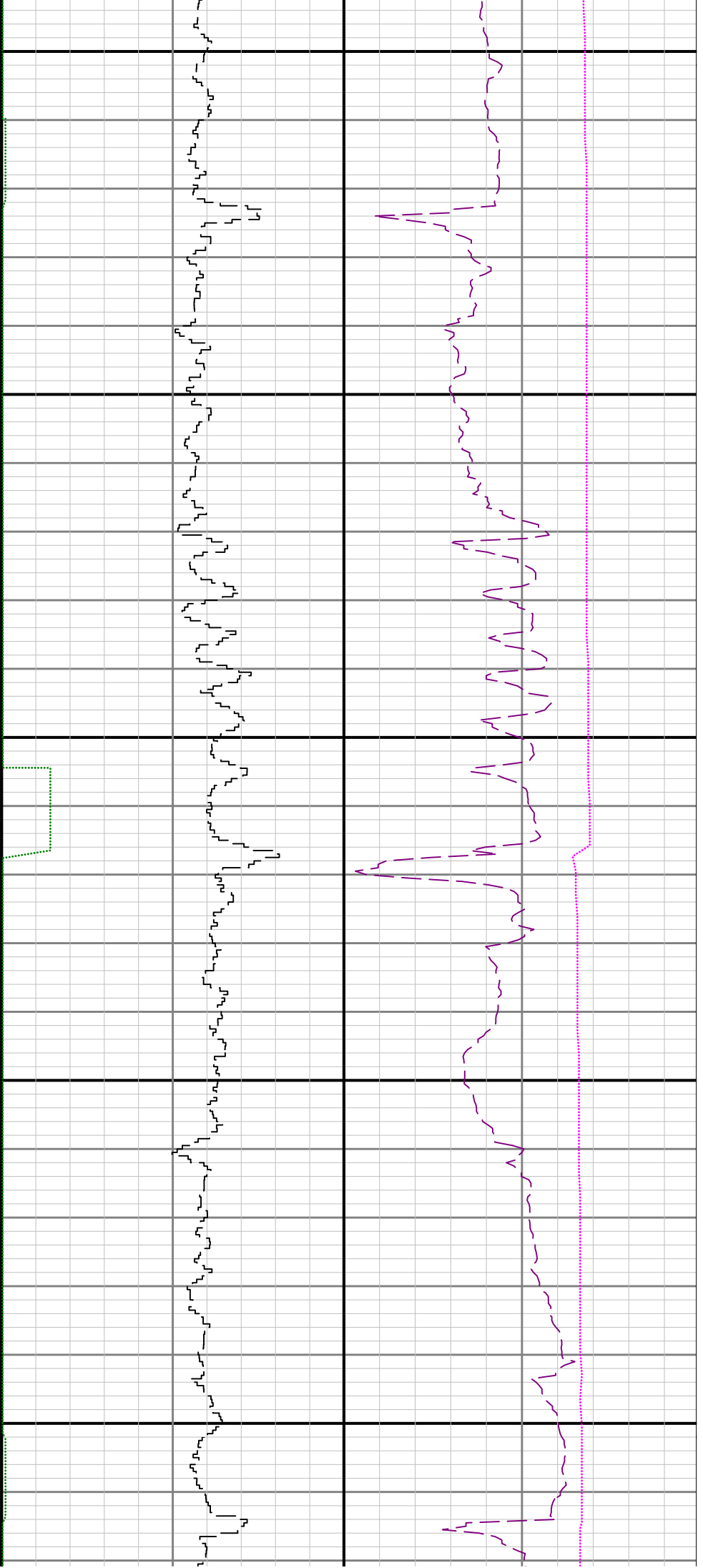
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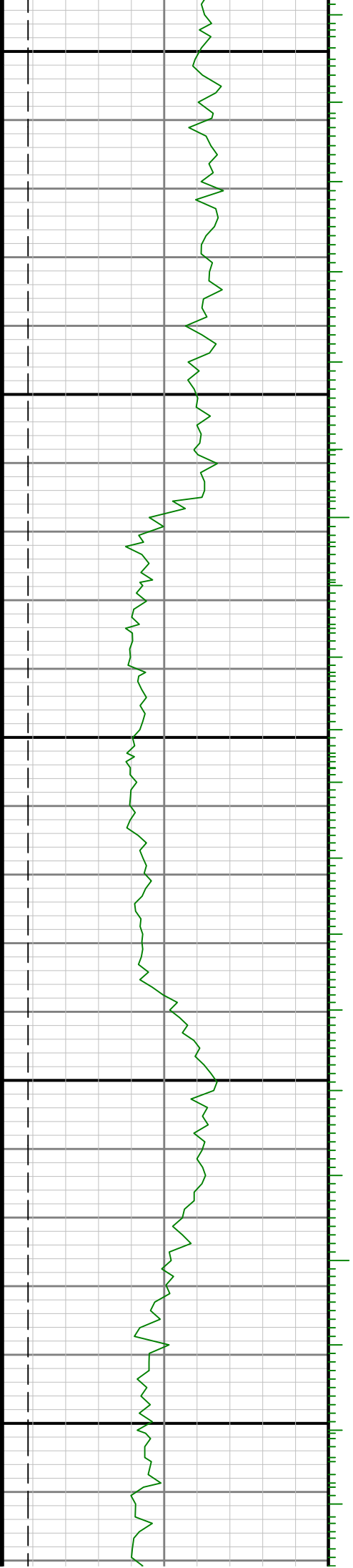




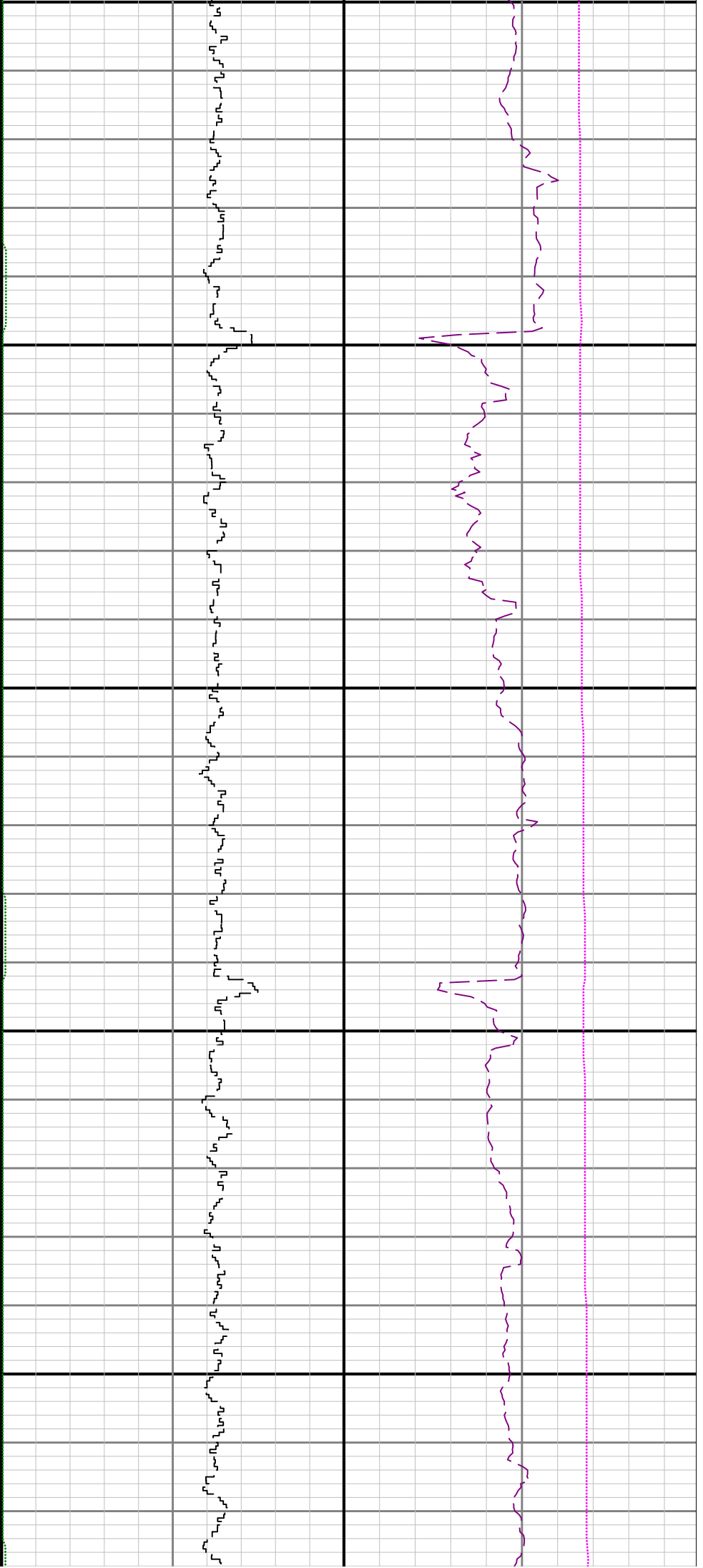


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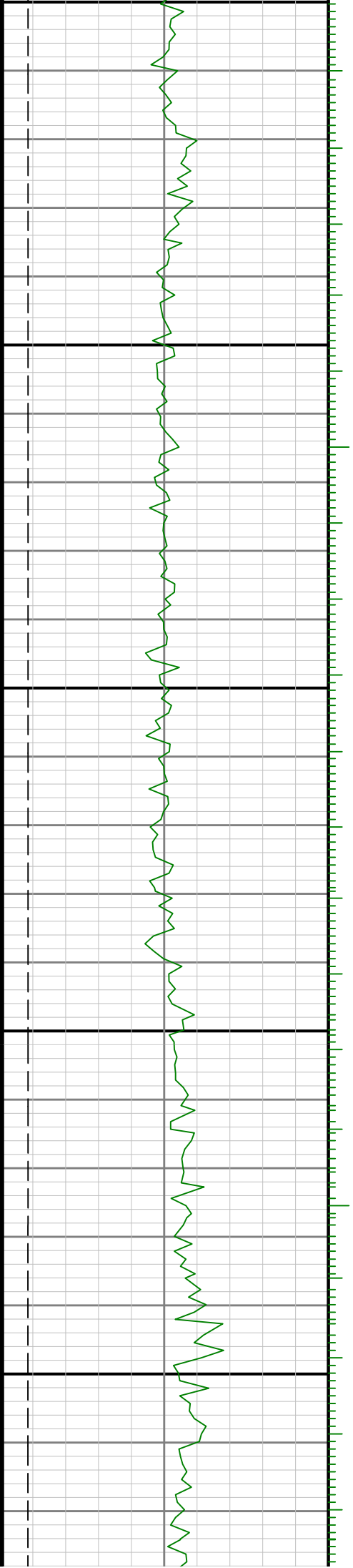


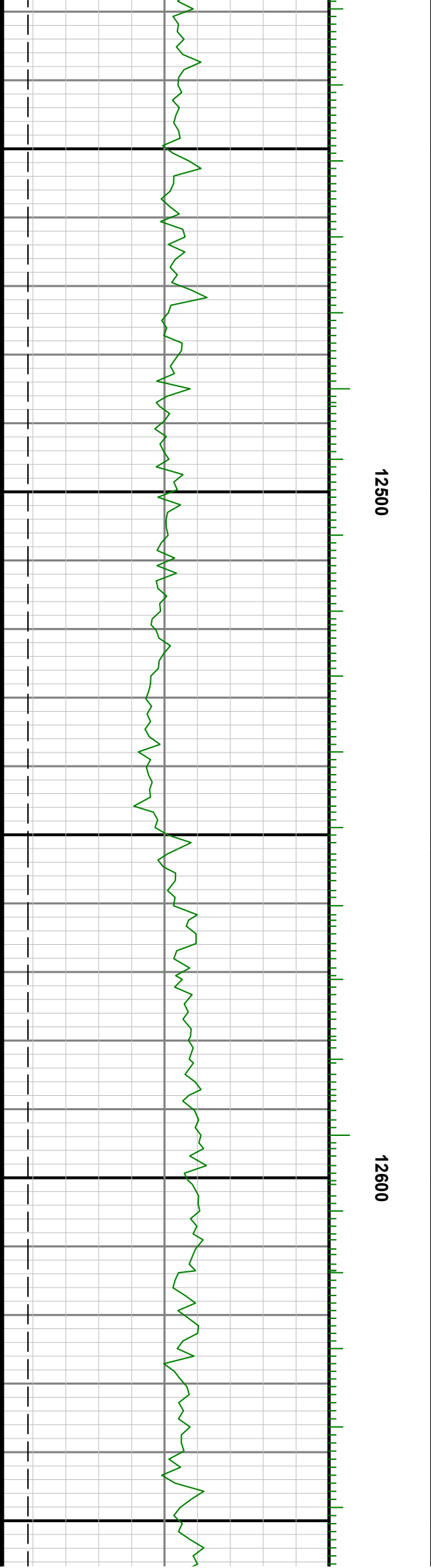
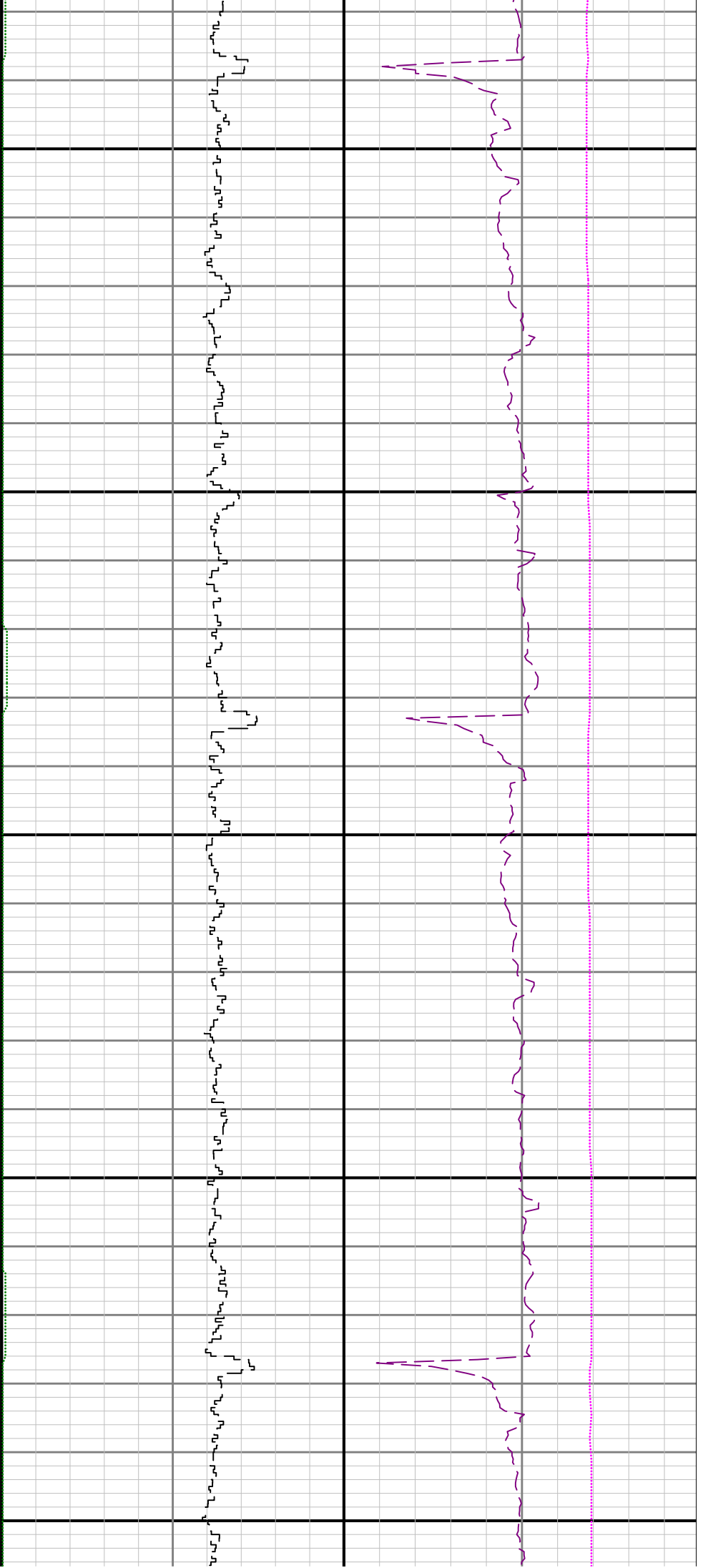


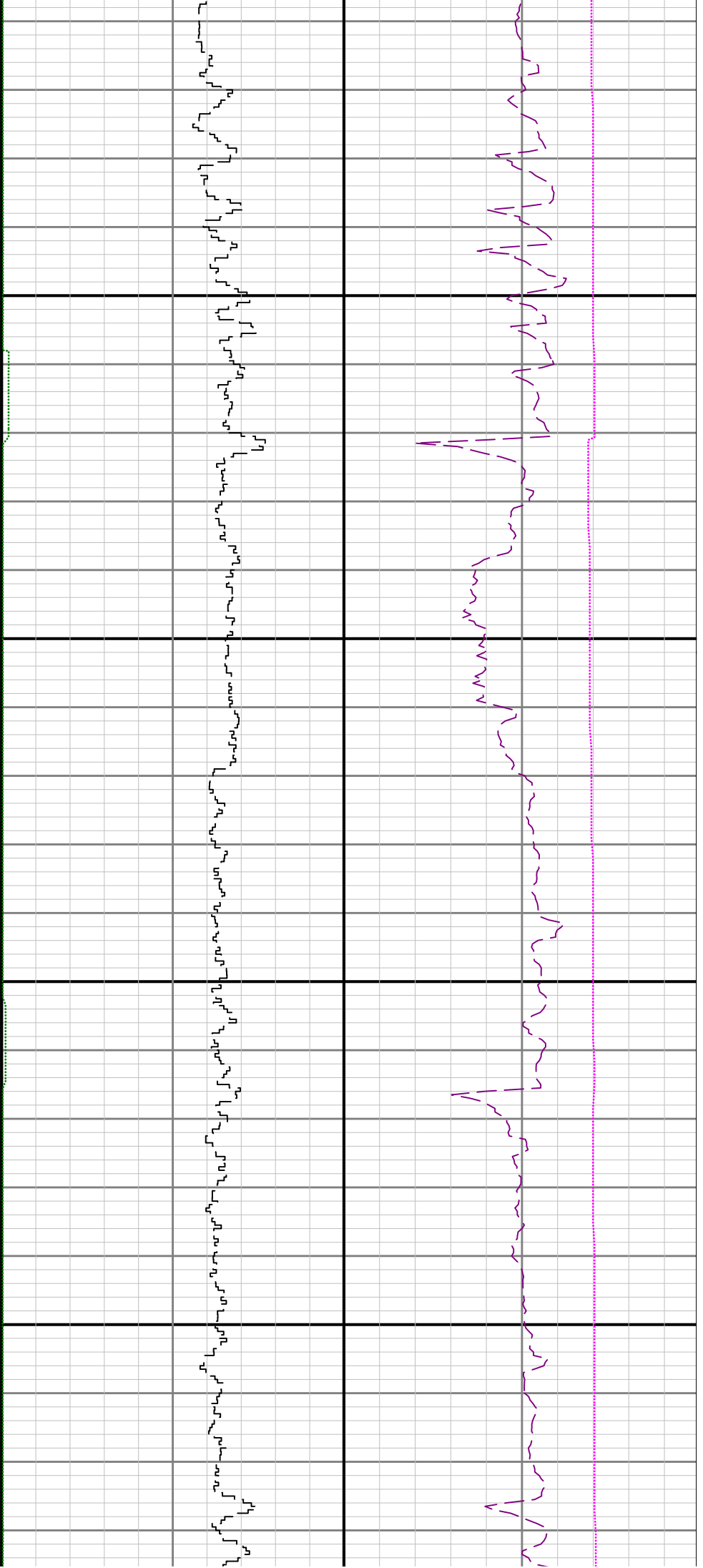
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12300

12400

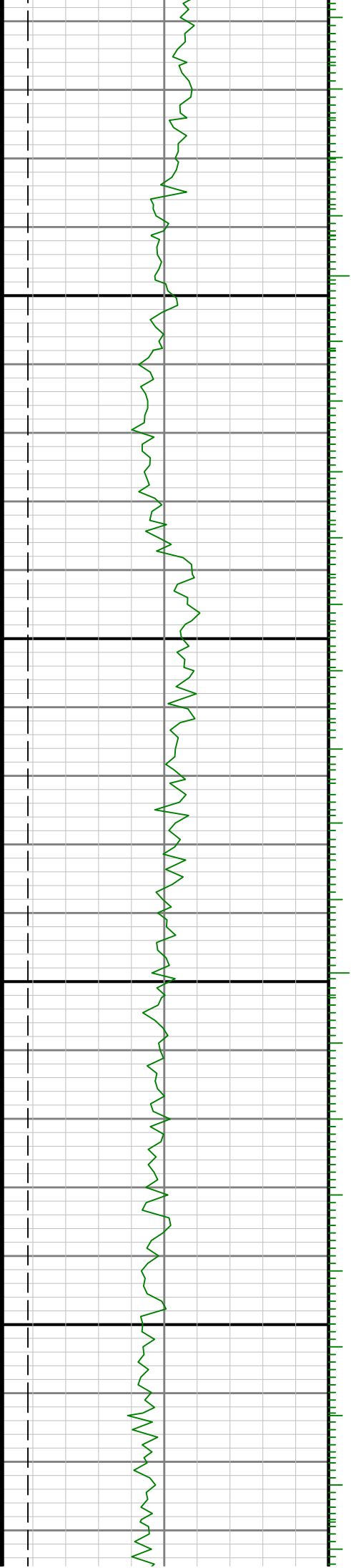


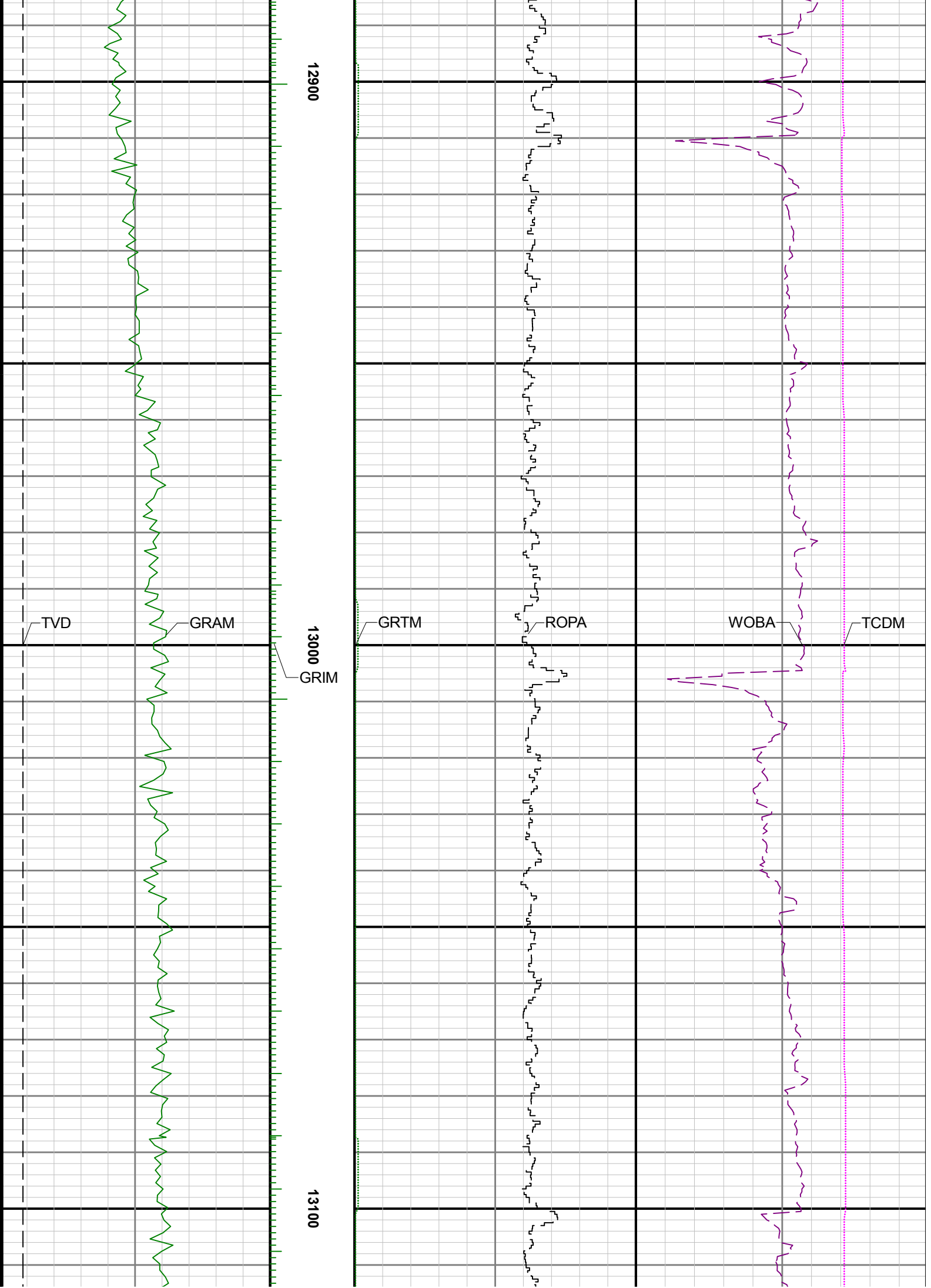


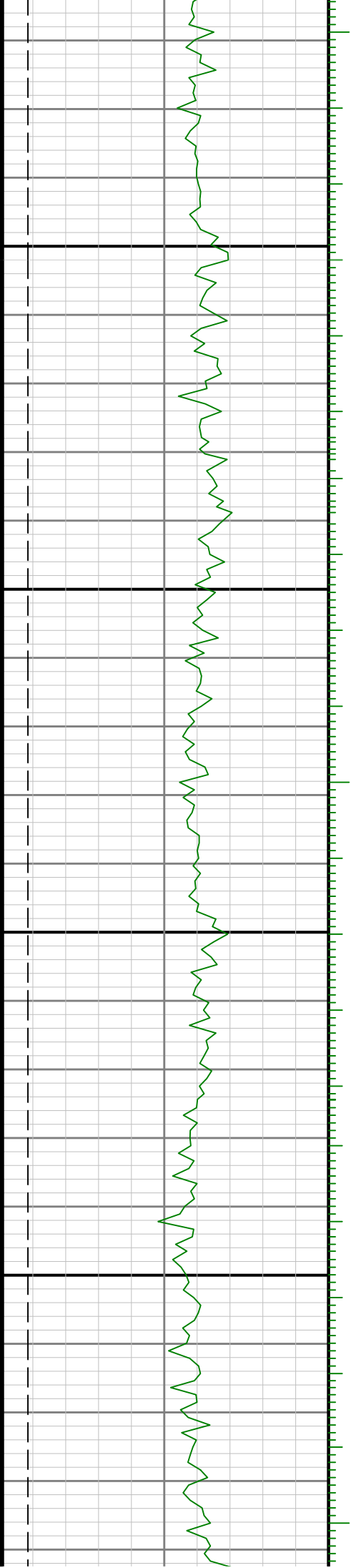
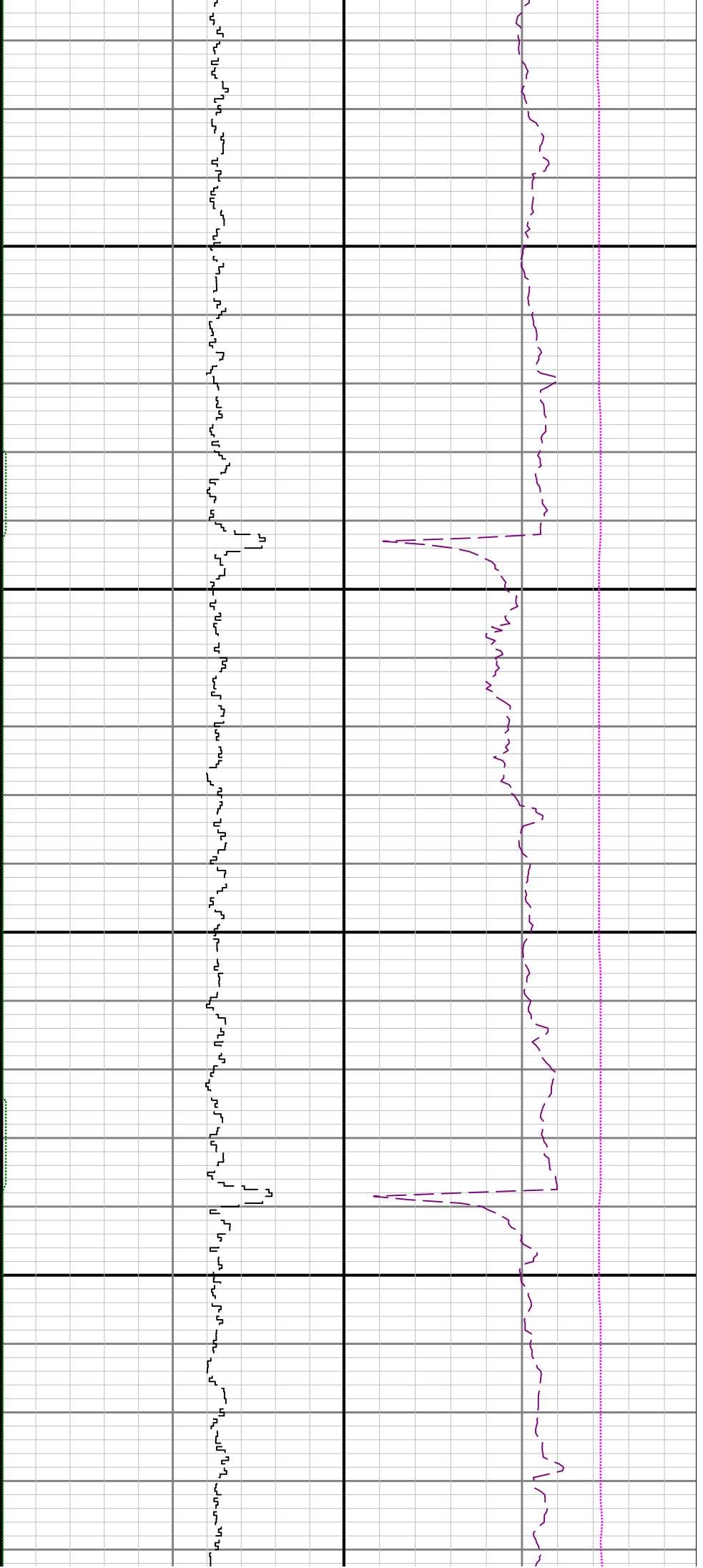


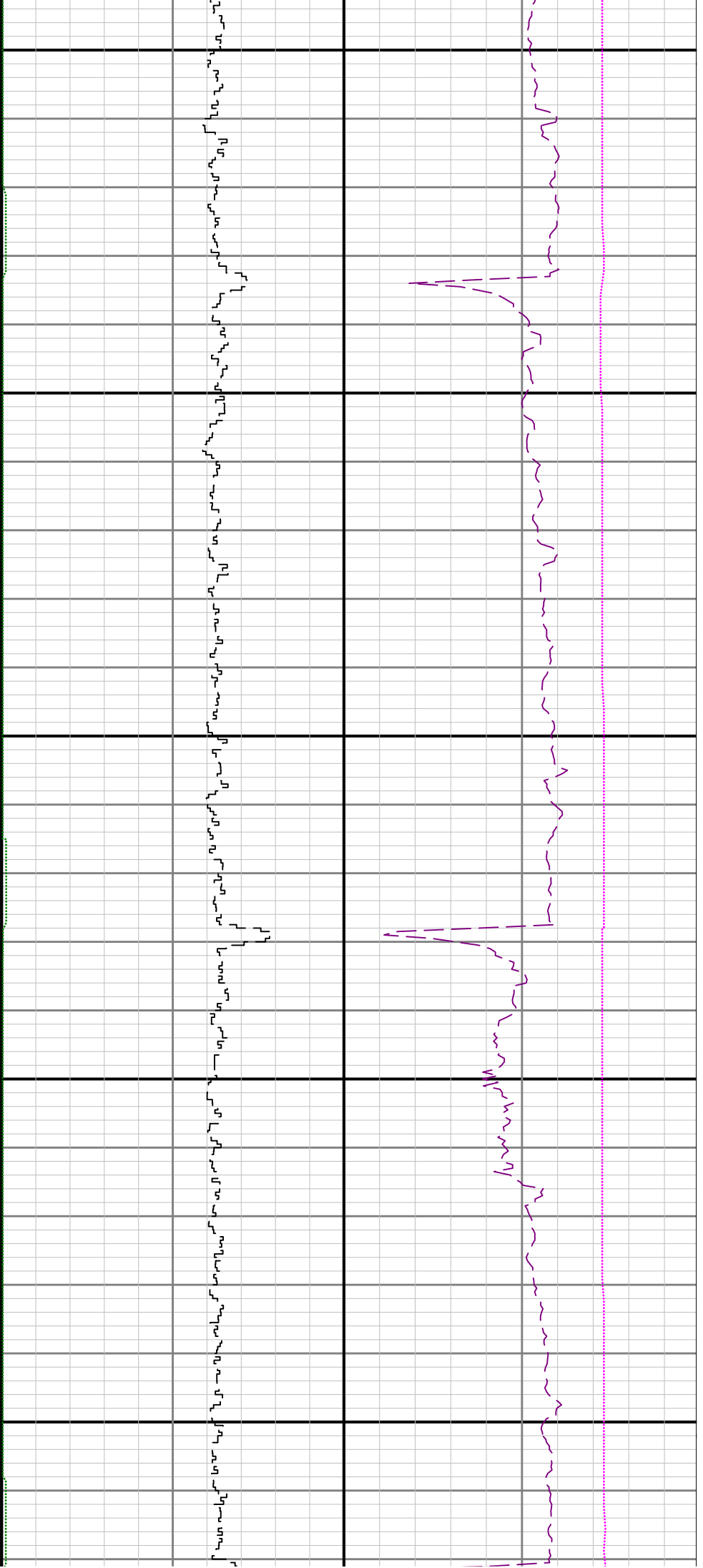
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12800



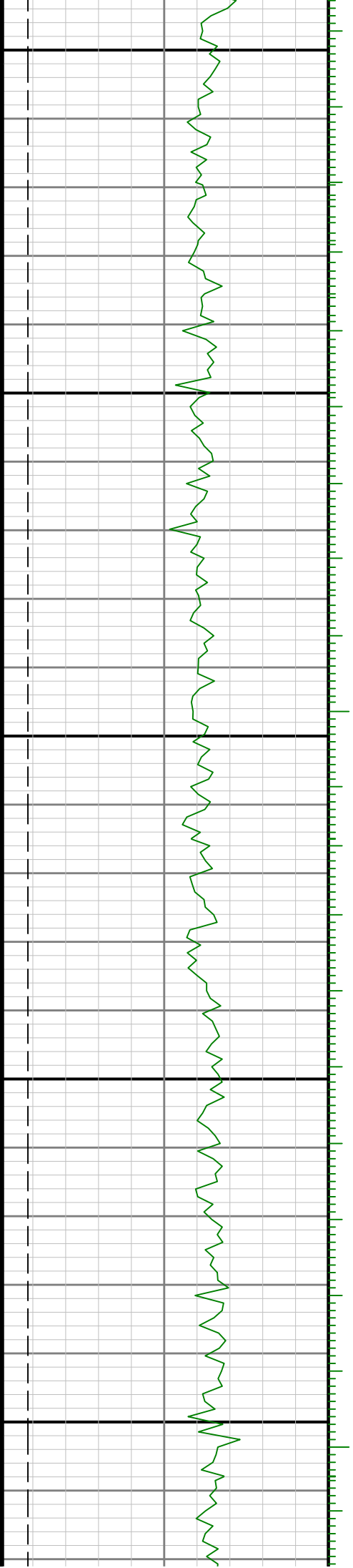


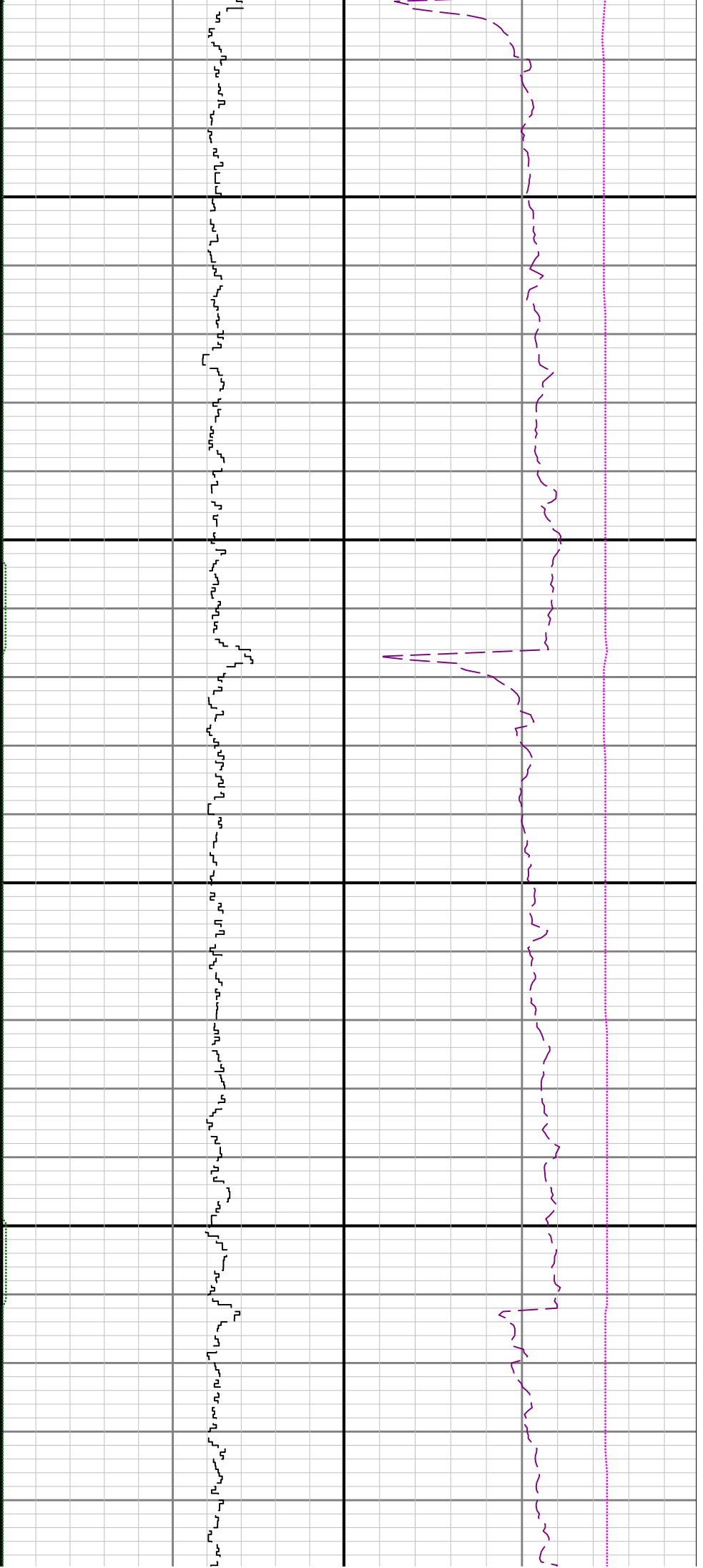




13400

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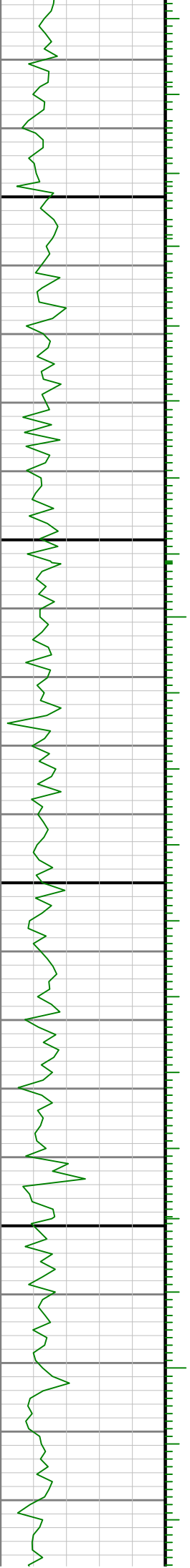


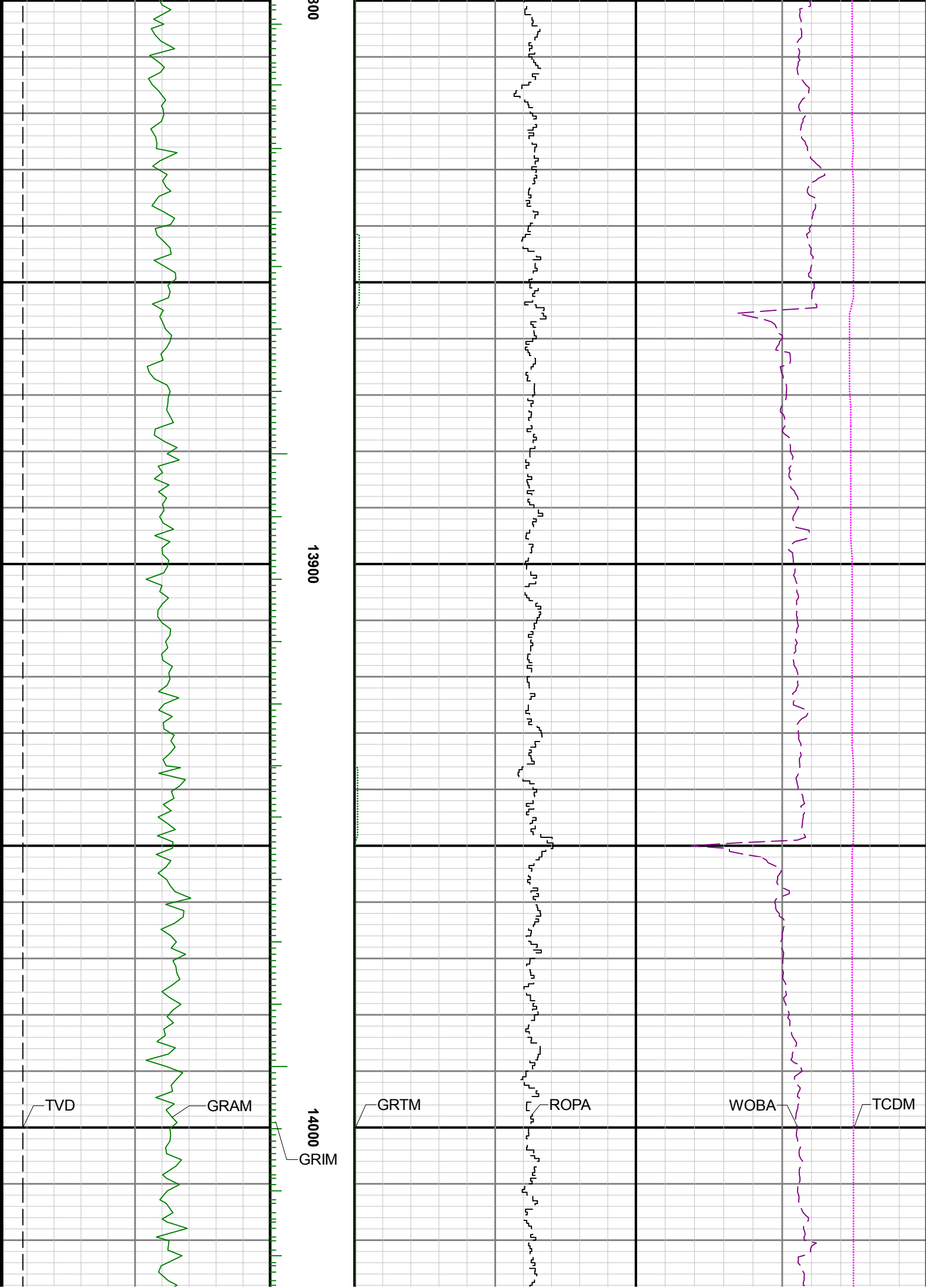


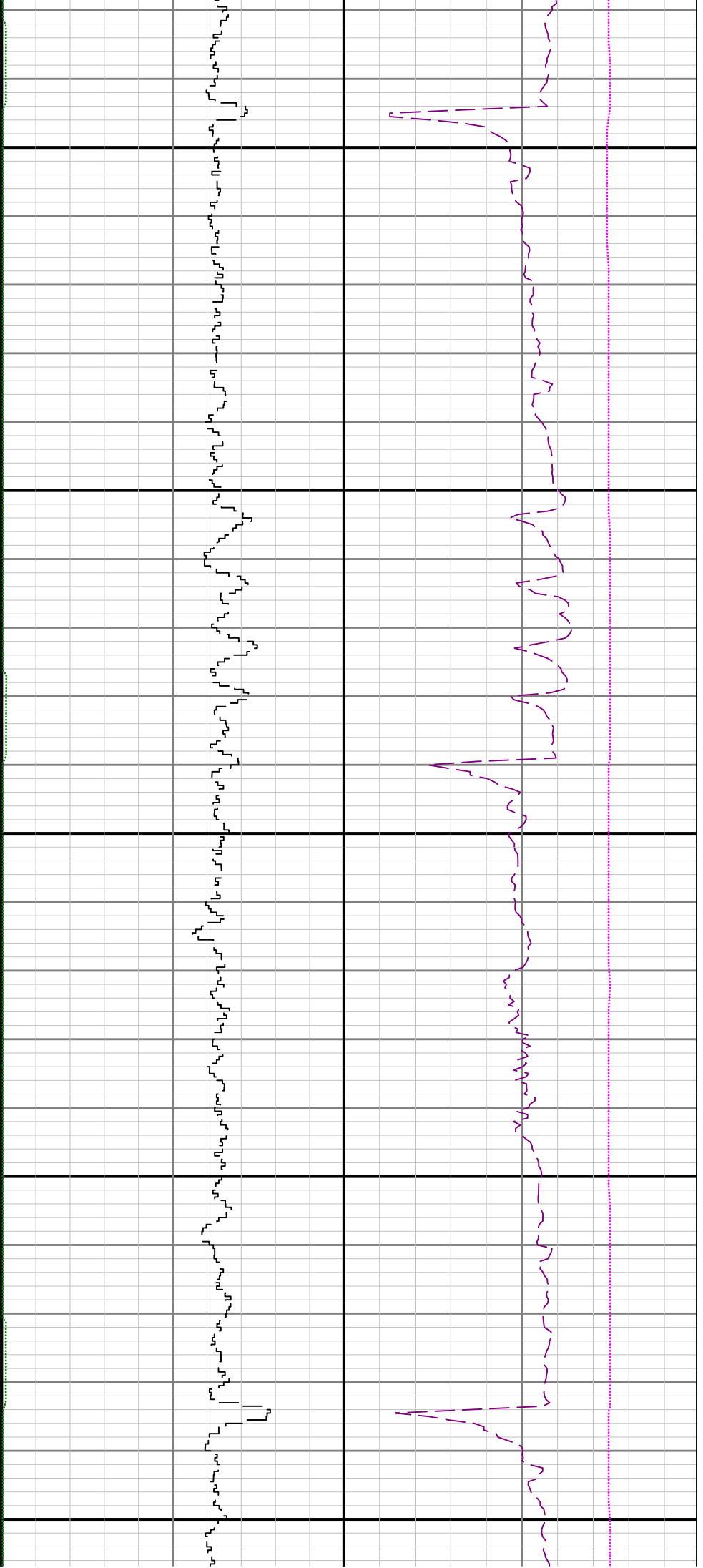
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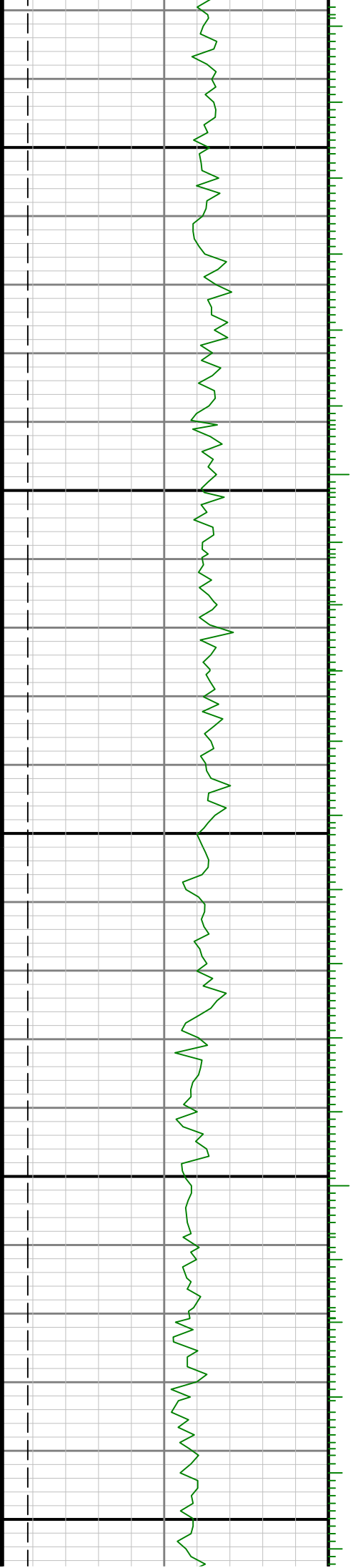


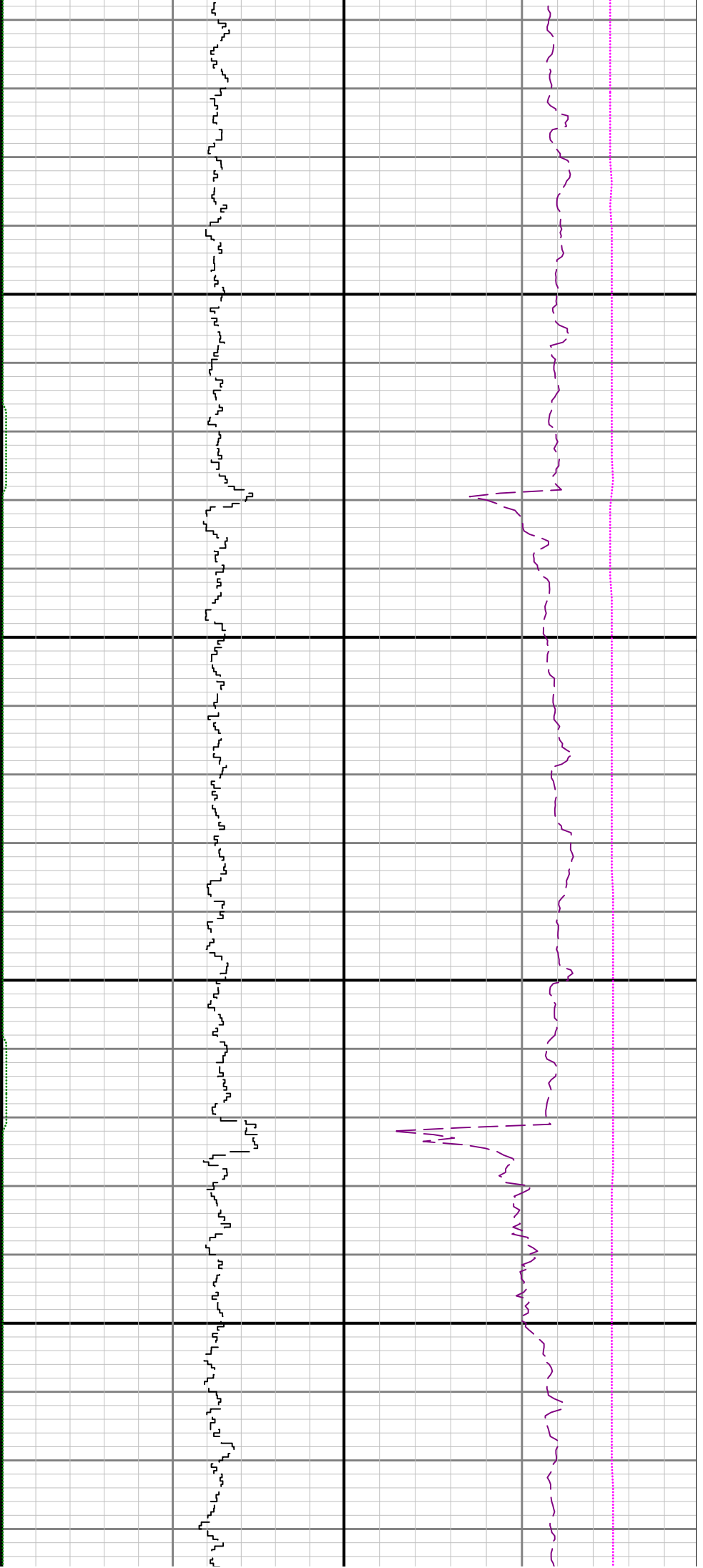




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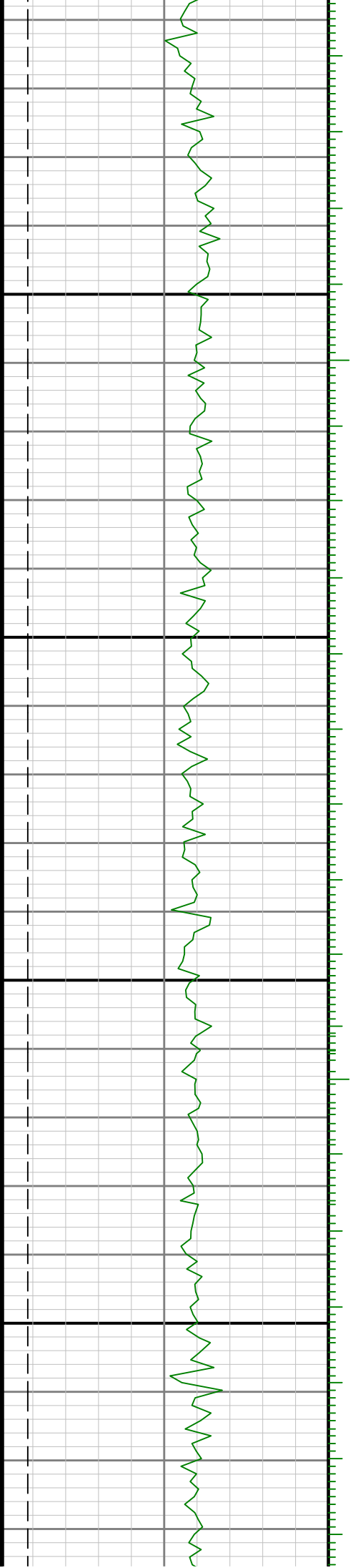
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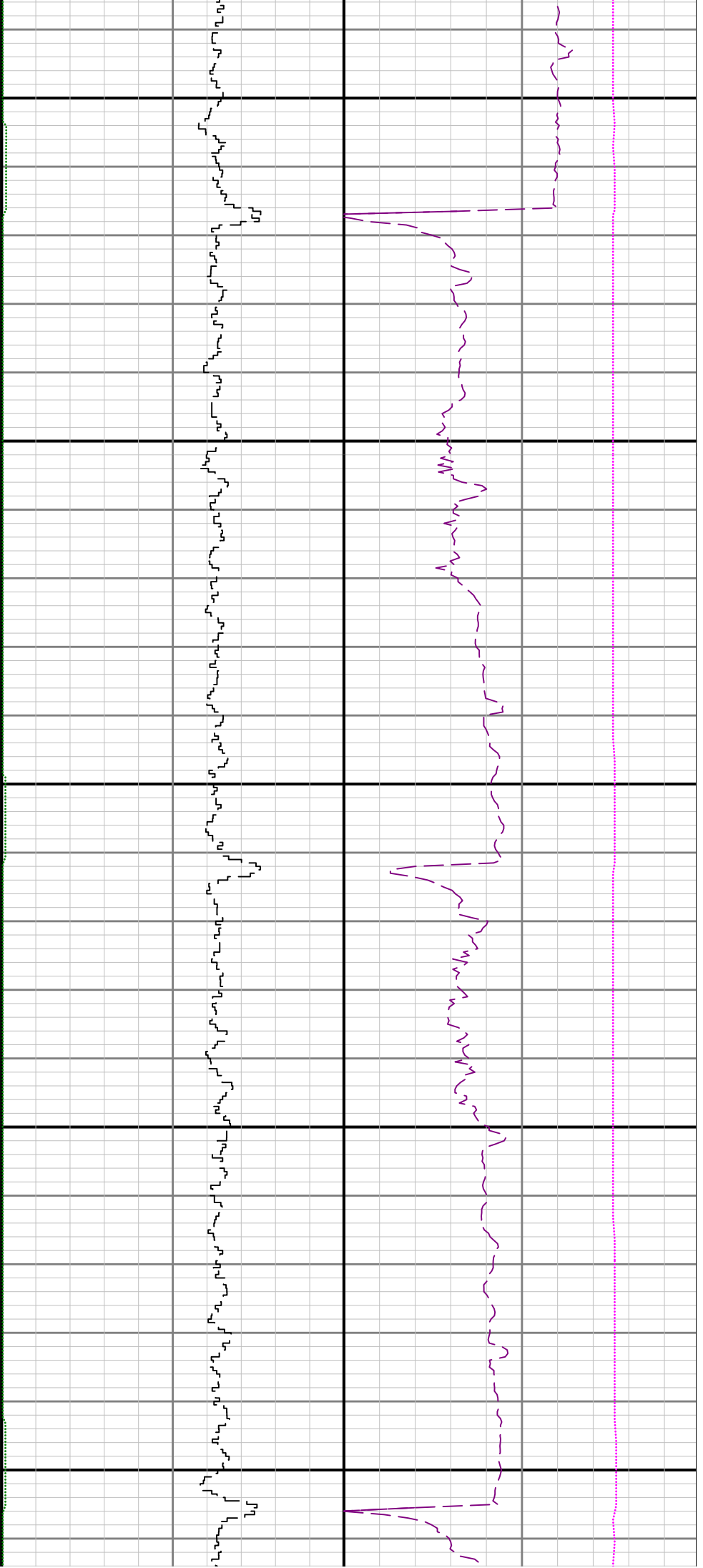




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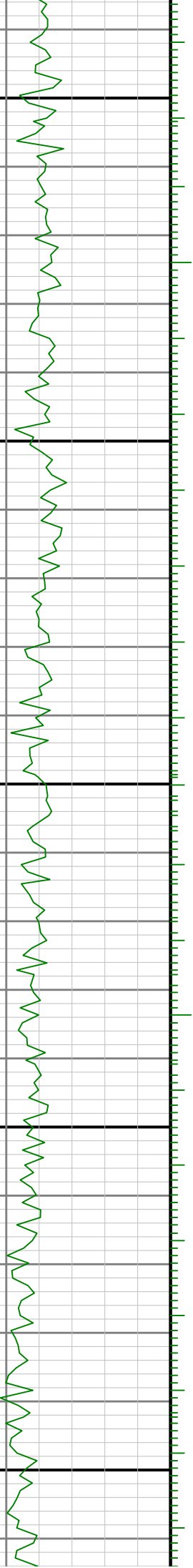


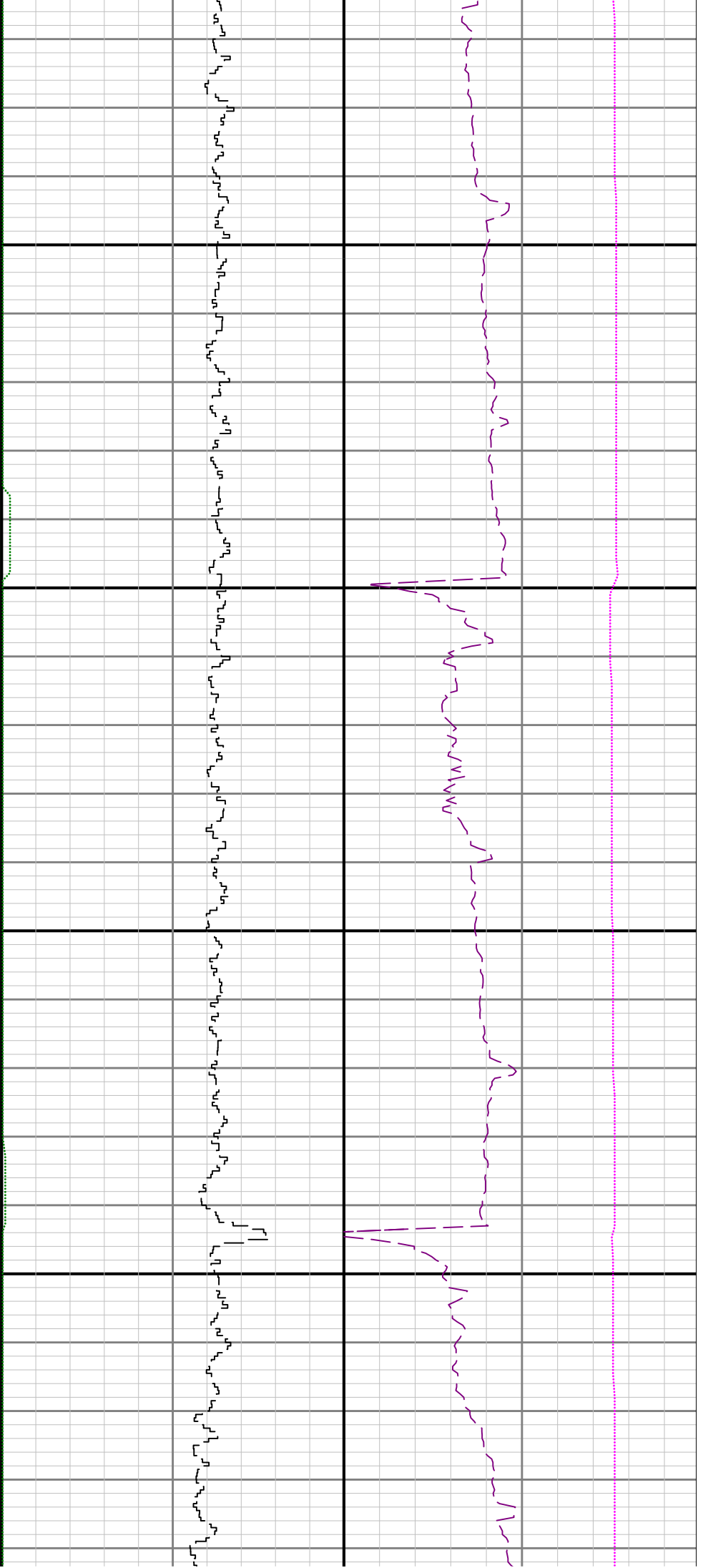


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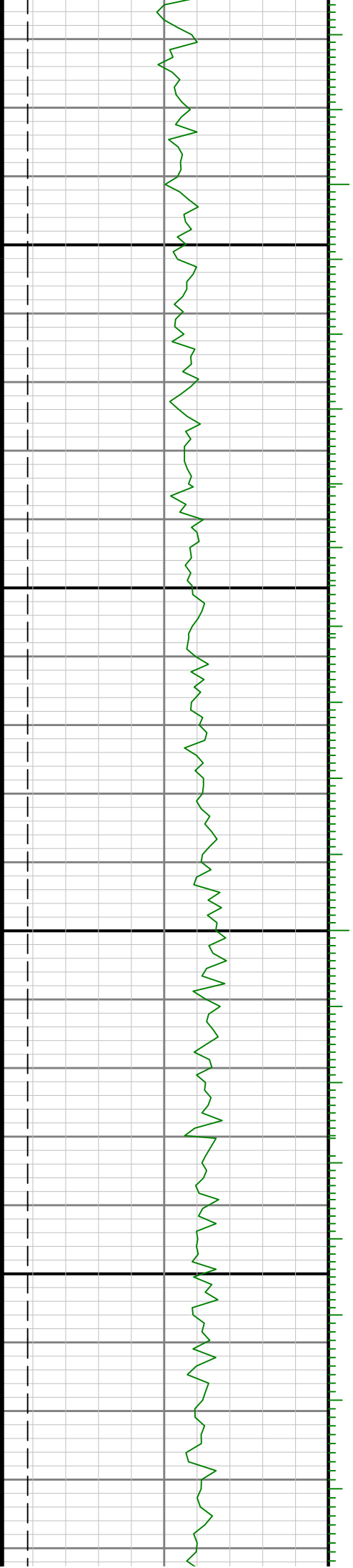
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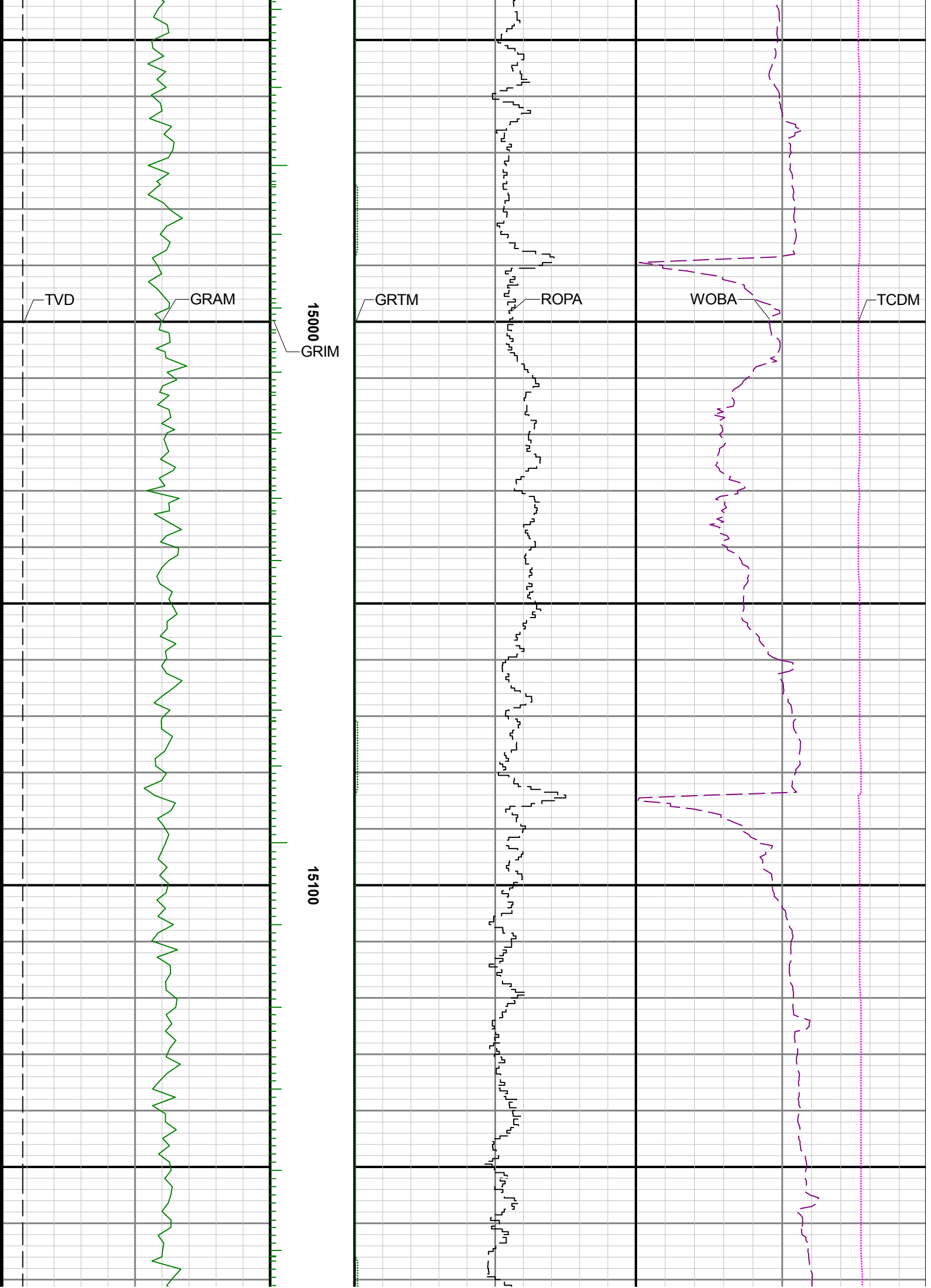


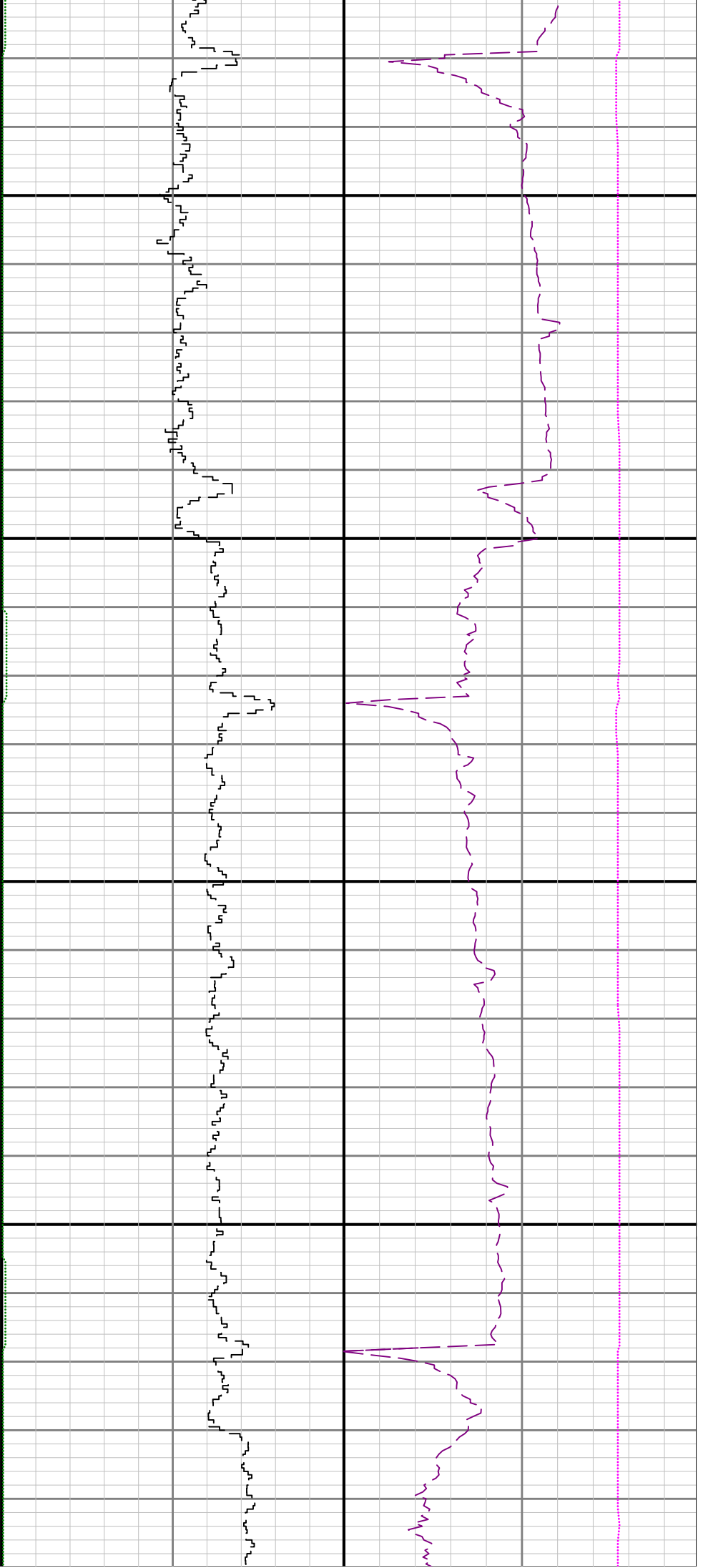


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14900



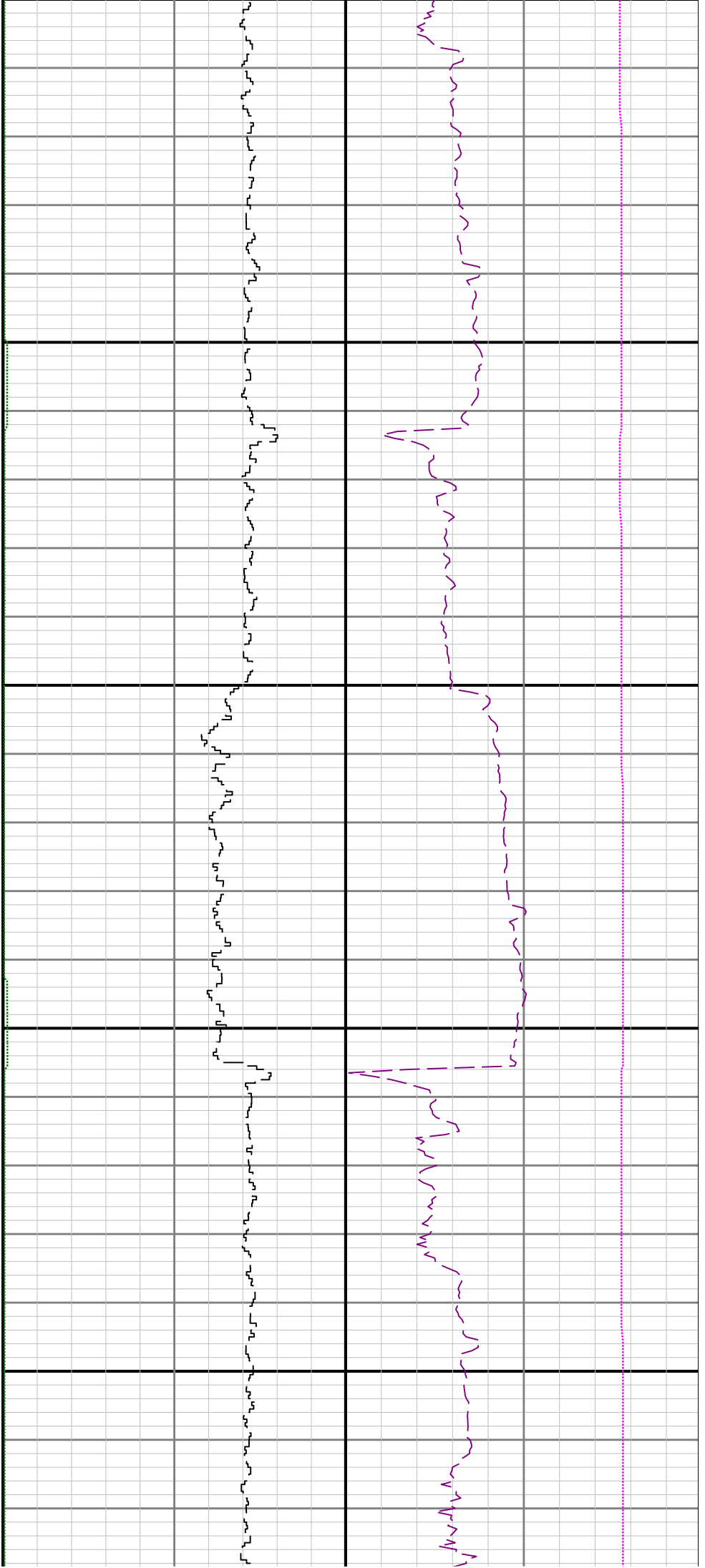




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15300

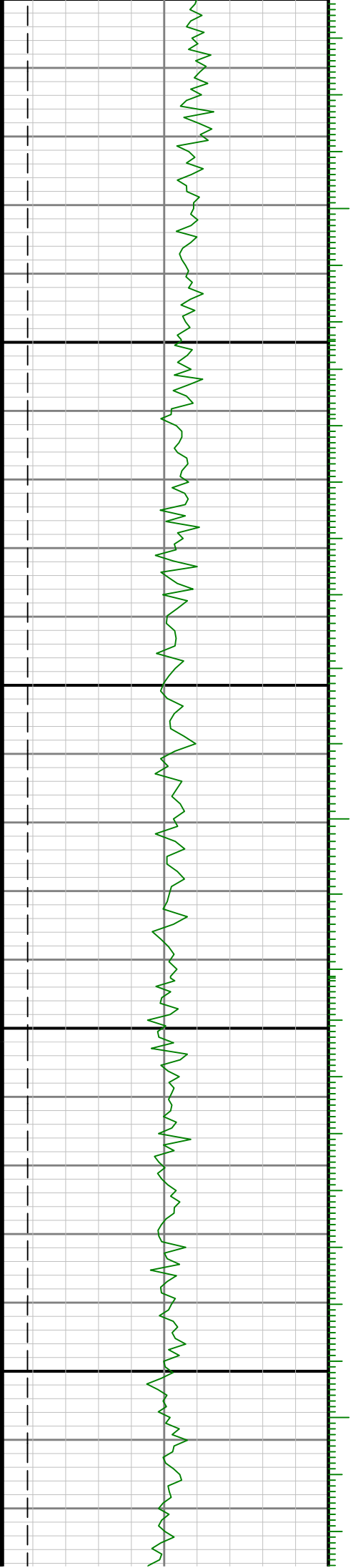
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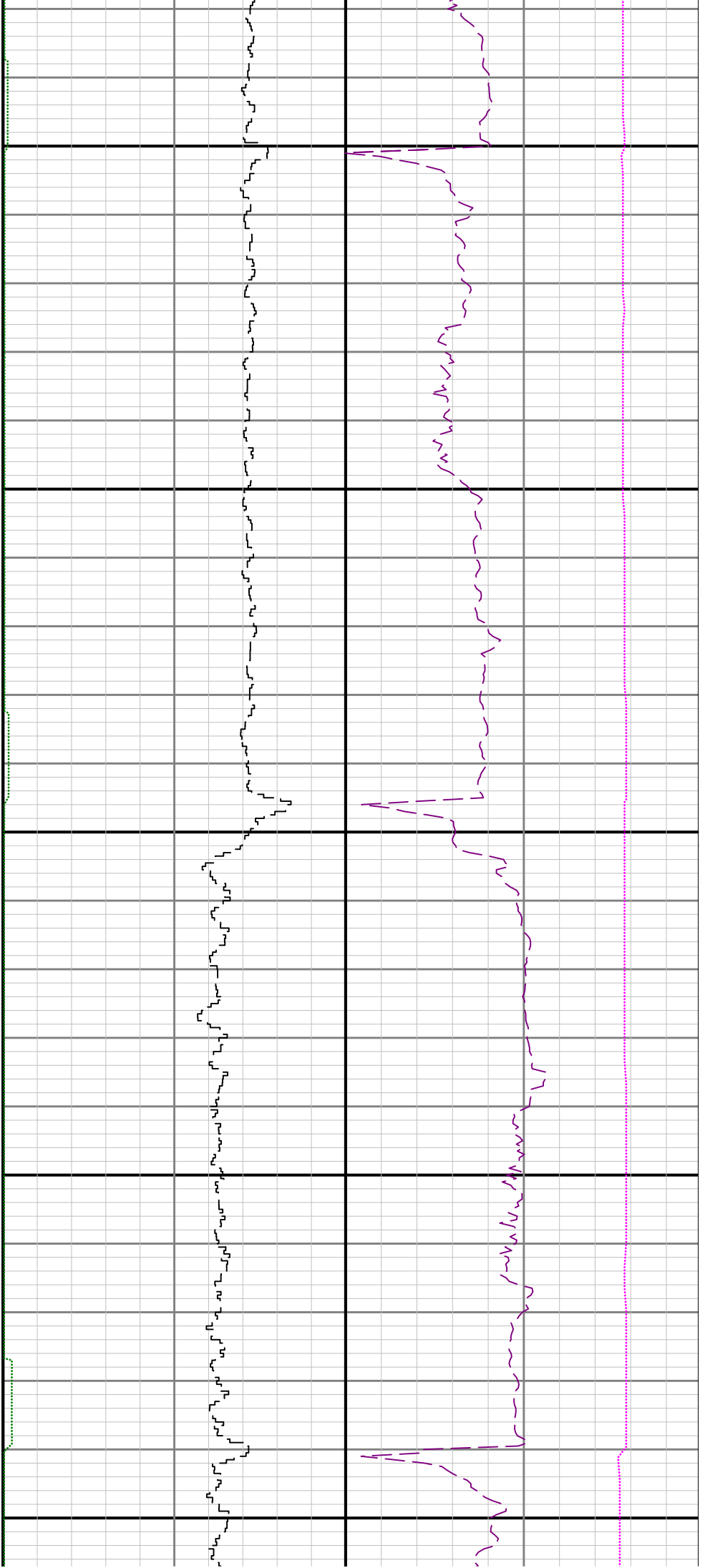


100

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