

BAKER HUGHES				LWD MEMORY LOG			
				Gamma Ray			
Scale:		Company: Noble Energy					
1:240 MD		Well: Wells Ranch AF07-659					
Depth Reference:		Field: Weld County(Noble NAD 83 GRID)					
Driller's Depth		County: Weld County		State: Colorado			
Status:		Surface Location:		Other Services:			
Final Print		Latitude:		040° 24' 54.612" N			
API No: 05-123-44246-00		Longitude:		104° 20' 18.096" W			
Job ID: 8645461		UTM:		N/A			
		SEC: 8		TWN: 5N		RGE: 62W	
Permanent Datum (P.D.):		Ground Level		Elevation:		4705.00 ft	
Log Measured From:		Rig Floor		Above P.D.		30.00 ft	
						KB: N/A	
						DF: 4735.00 ft	
						GL: 4705.00 ft	
Dates				Interval Logged			
Date From: 2017-07-17		Top: (ft) 1940.00		Azi Reference North: Grid			
Date To: 2017-07-19		Bottom: (ft) 16445.00		Total Magnetic Field Strength: (nT) 52286			
Spud Date: 2017-07-16				Mag to Reference North Correction: (deg) 7.13 E			
Borehole Record				Casing Record			
Hole Size (in)		From (ft)		To (ft)		Size (in)	
13.500		0.00		1940.00		9.625	
8.500		1940.00		16445.00			
		</					

Date/Time	Run No.	Measured Depth (ft)	Mud Type	Density (ppg)	Viscosity (cP)	pH	Fluid Loss (cm3)	Shale Water	Sealant	Total Solids (ppm)	Chlorides (%)
2017-07-17 15:00	1	3328.00	Oil Based Mud	9.1	12	N/A	244.4	74/26	Active Pit	19000	0.00
2017-07-18 04:00	1	6522.00	Oil Based Mud	9.0	12	N/A	25.6	72.5/27.5	Active Pit	20000	0.00
2017-07-18 15:00	1	9651.00	Oil Based Mud	9.2	12	N/A	227.7	74/26	Active Pit	23000	0.00
2017-07-19 04:00	1	12734.00	Oil Based Mud	9.4	11	N/A	165.6	74.5/25.5	Active Pit	23000	0.00
2017-07-19 15:00	1	15210.00	Oil Based Mud	9.4	12	N/A	242.8	85/15	Active Pit	22500	0.00
2017-07-20 04:00	1	16445.00	Oil Based Mud	9.3	12	N/A	123.7	87/13	Active Pit	20000	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	2.250
1	ATC_SU	12536524	Near Bit Inclination	5.93	6.73	7.000	2.250
1	ATC_MWD	13067101	Gamma (single)	2.75	12.90	7.000	2.250
1	ATC_MWD	13067101	Directional (mag)	12.27	22.42	7.000	2.250

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 (Directional and Gamma Ray) services behind a 8.5 inch bit and rotary steerable assembly from 1940 to 16445 feet MD (1940 to 6495 feet TVD).

Remarks

Number	Measured Depth (ft)	Hole Section (in)	Run No.	Remark
1	1940.00	8.500	1	Gamma Ray logging operations began at 1940 feet MD (1940 feet TVD) per customer request.
2	16432.00	8.500	1	The interval from 16432 to 16445 feet MD (6495 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 AF07-659	
	Interval	Date From: 2017-07-17 11:02:58	Top: 1940.00
	Created	Date To: 2017-07-19 19:47:21	Bottom: 16445.00
		2017-07-20 07:19:21	

Gamma Ray - Apparent 0.5 ft Average GRAM	MD 1:240 feet	Depth Averaged ROP 3 ft Average ROPA	Weight On Bit, Average 1 ft Average WOBA
0 300		1000 0	0 50
API		ft/h	klb
True Vertical Depth TVD		Gamma Time Since Drilled GRTM	Downhole Temperature TCDM
7000 1500		0 600	100 300
ft		min	degF

9 5/8" Casing

See Remark 1

GRAM

TVD

2000

GRIM

>R1

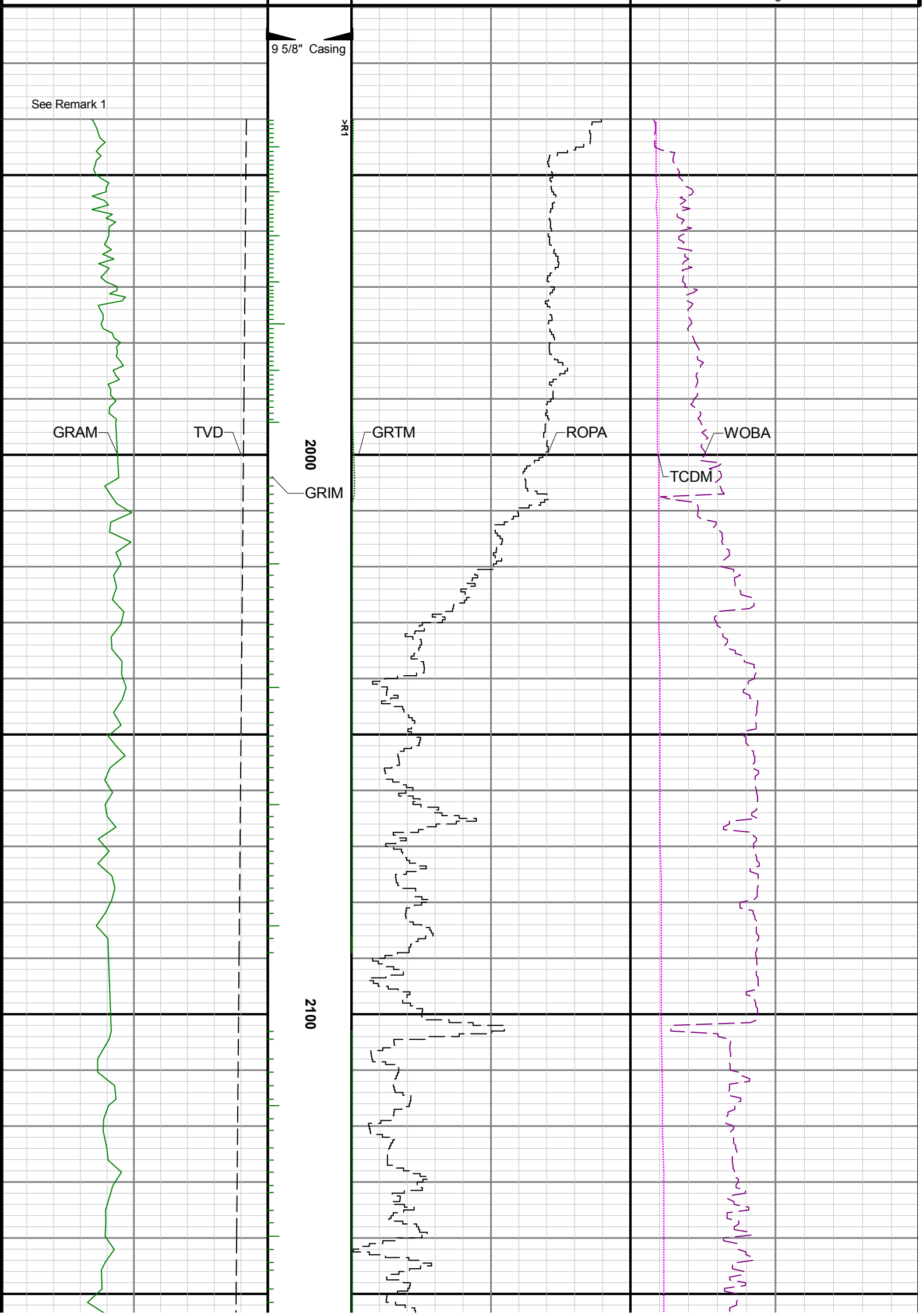
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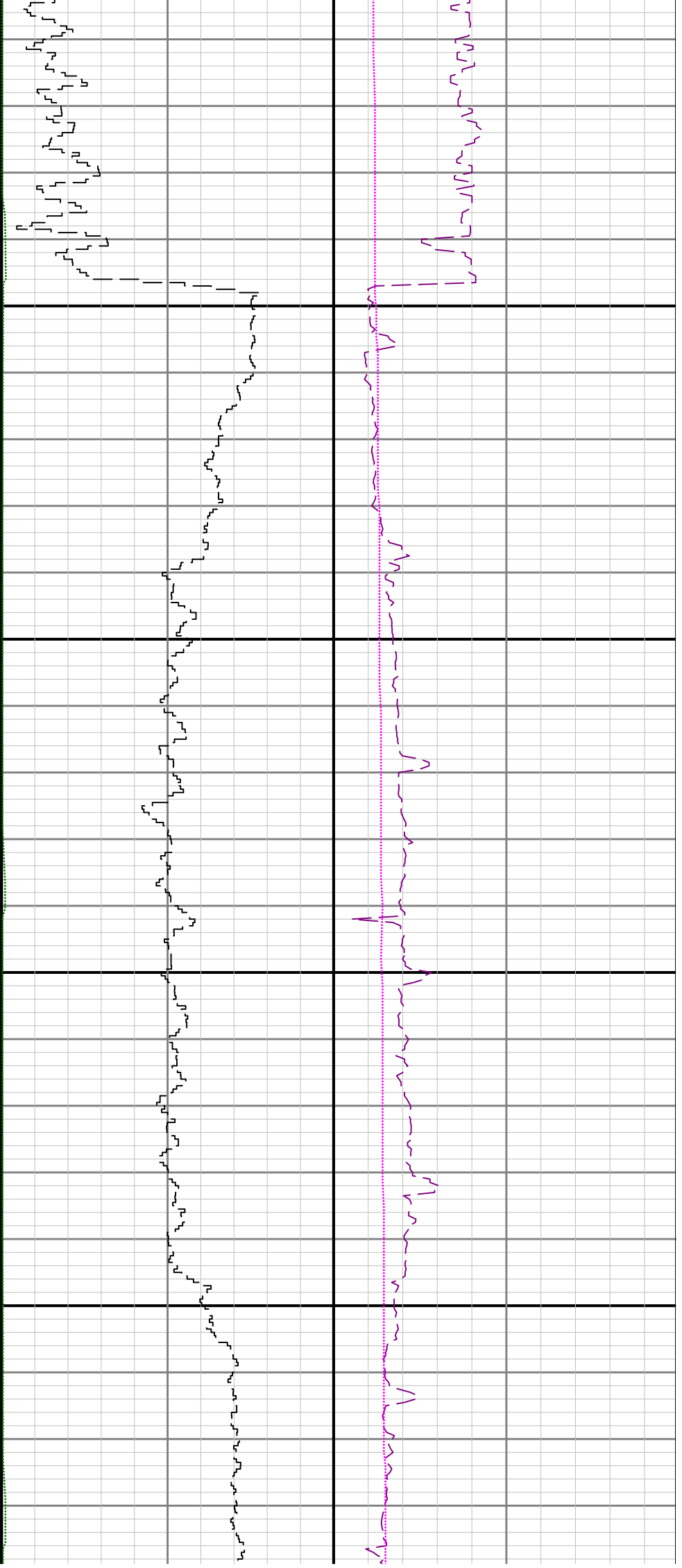
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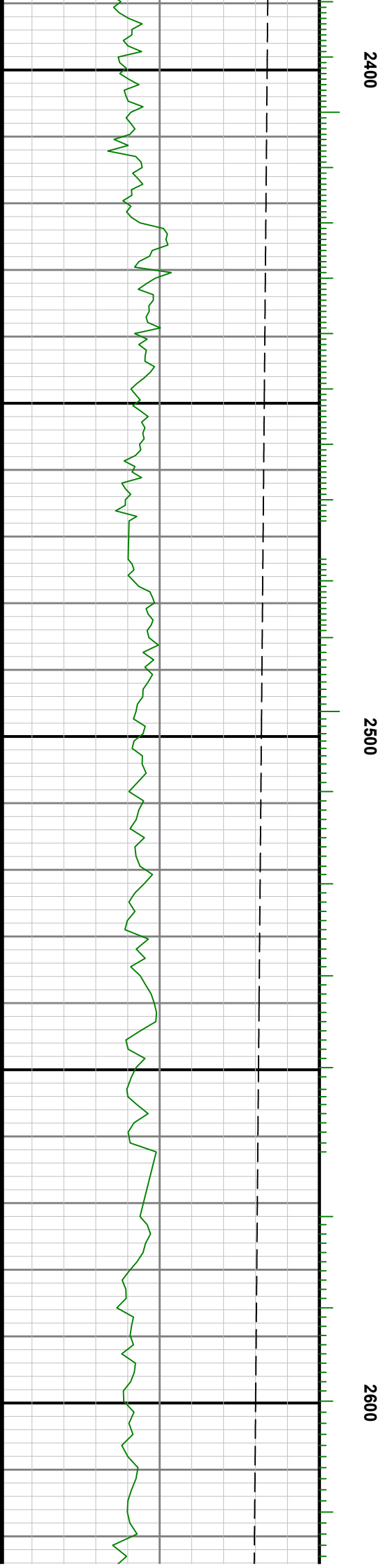
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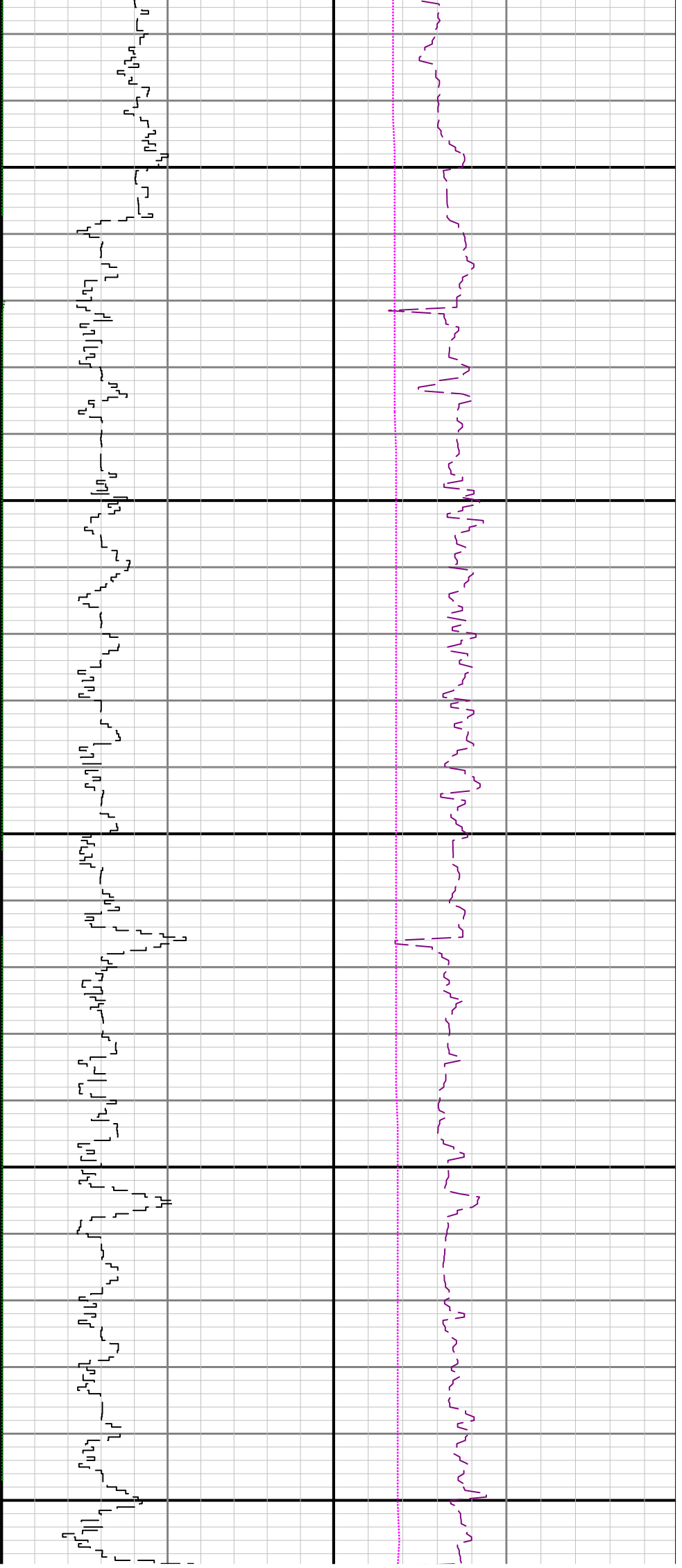




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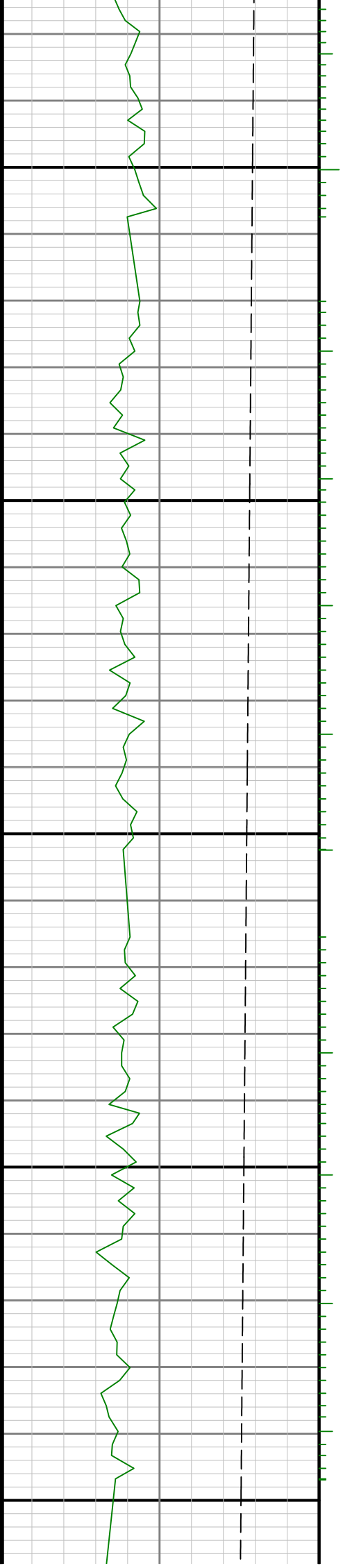
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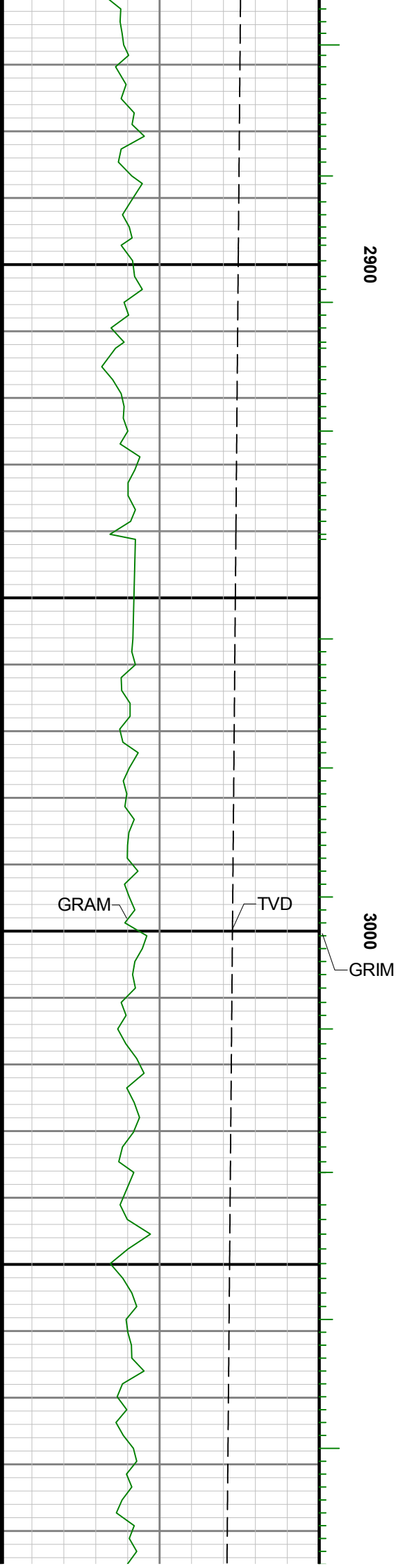
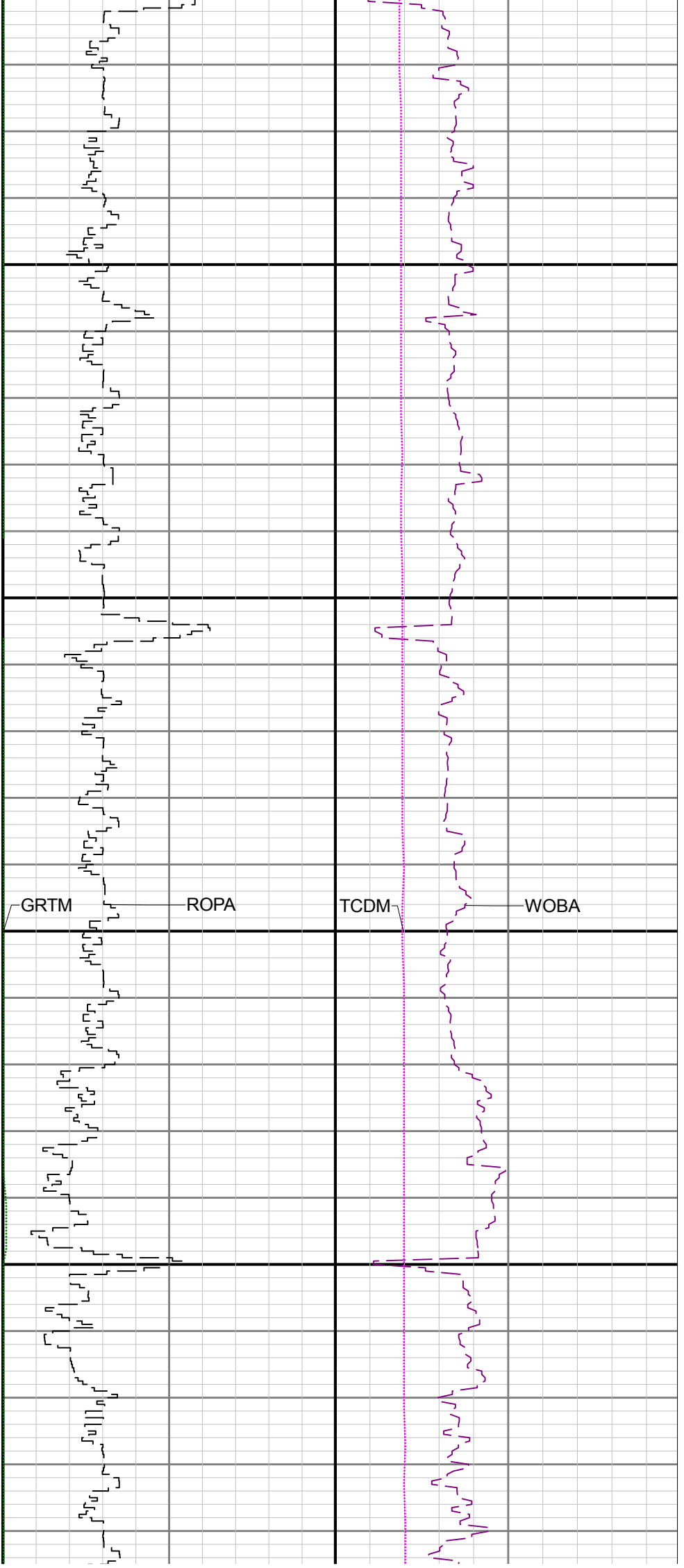


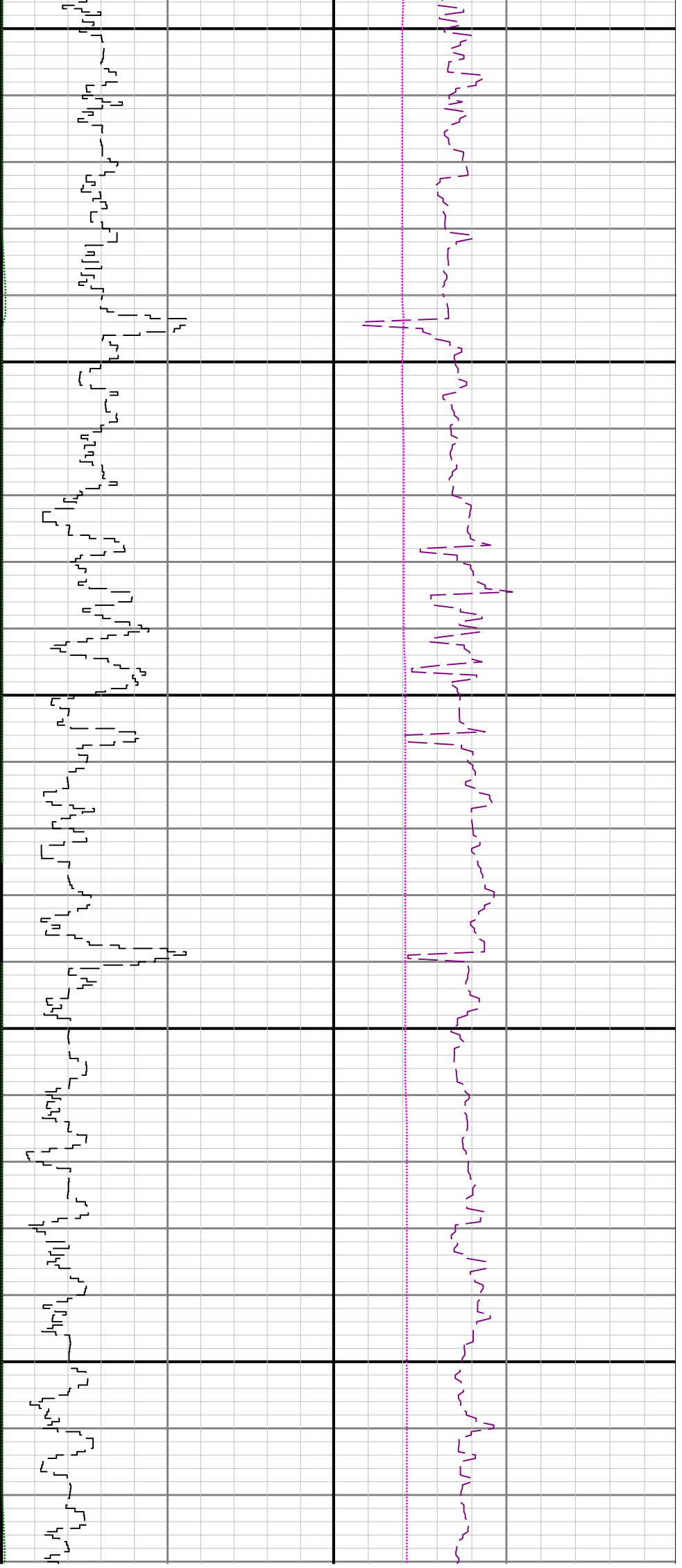


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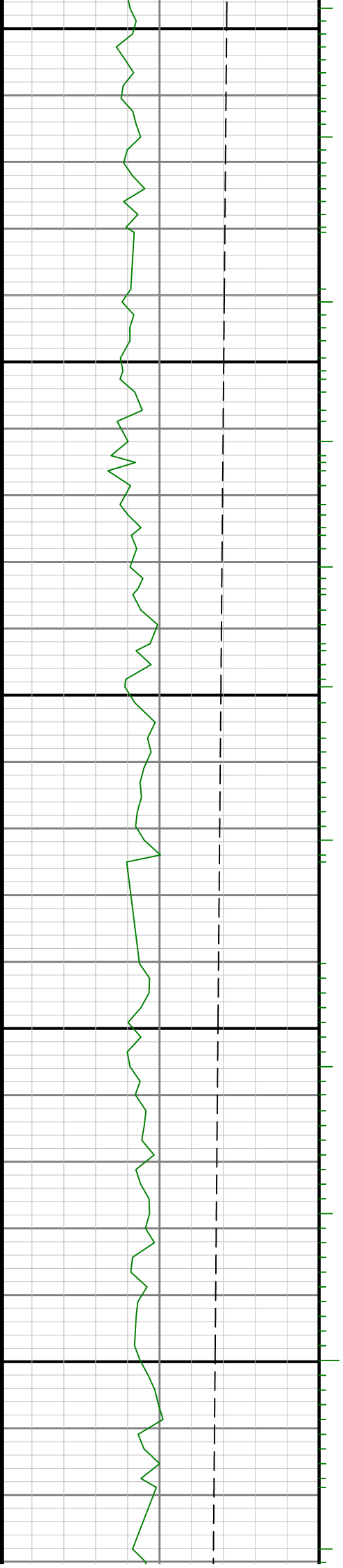


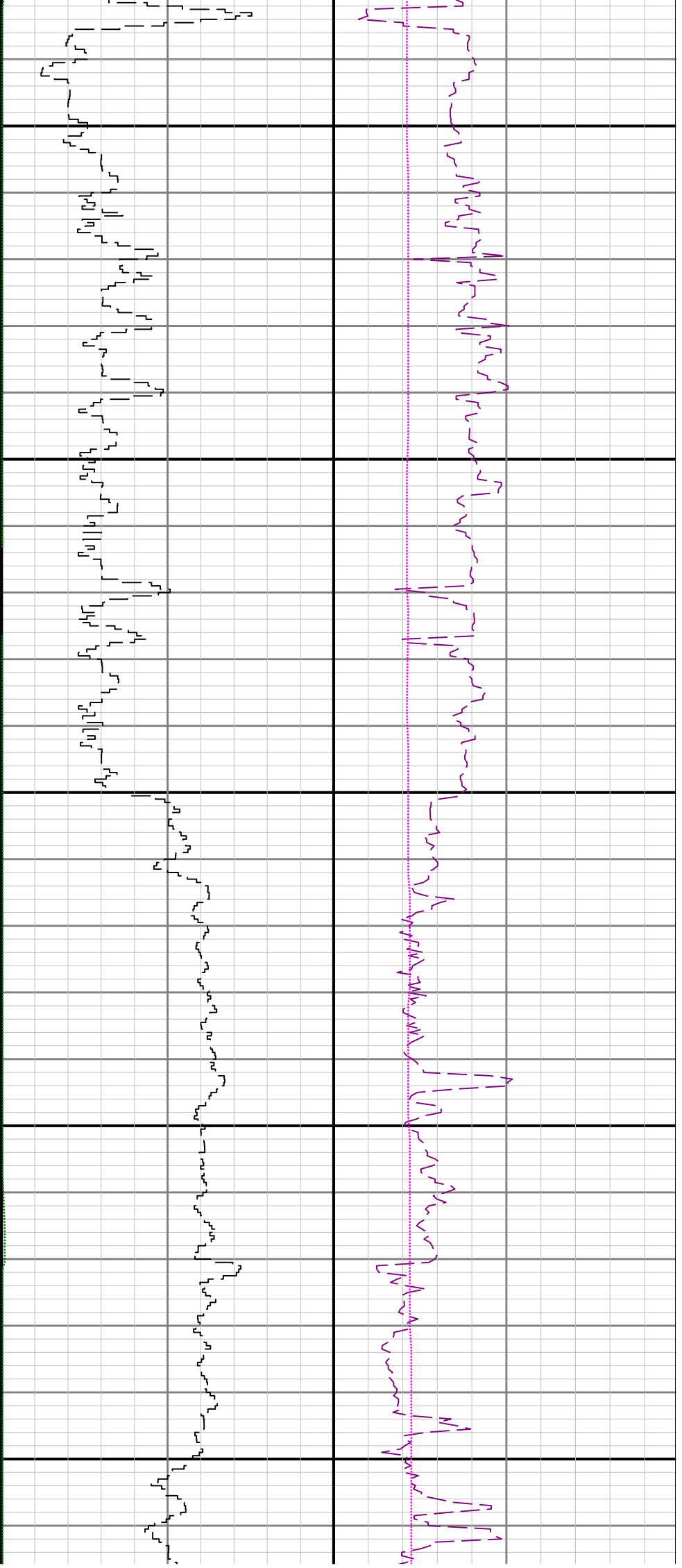


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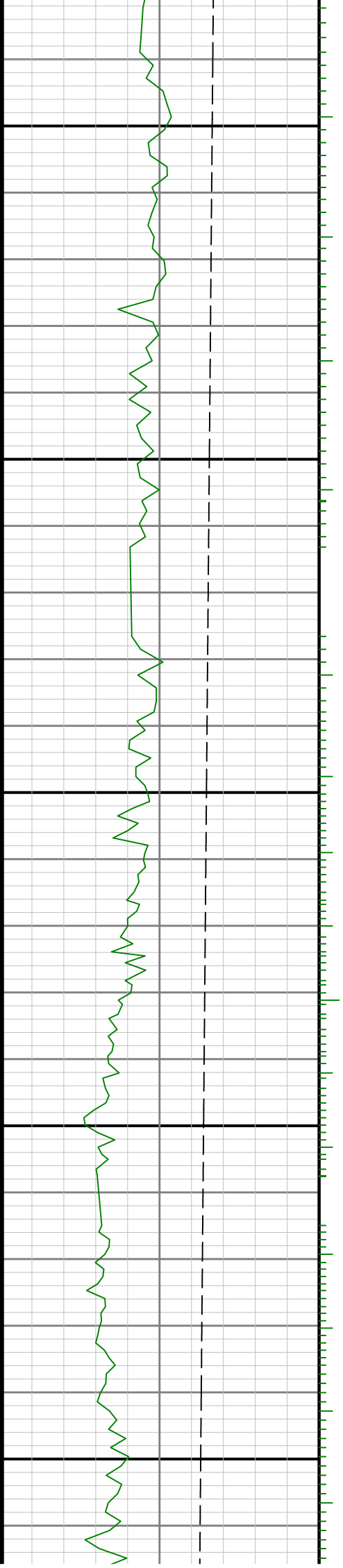
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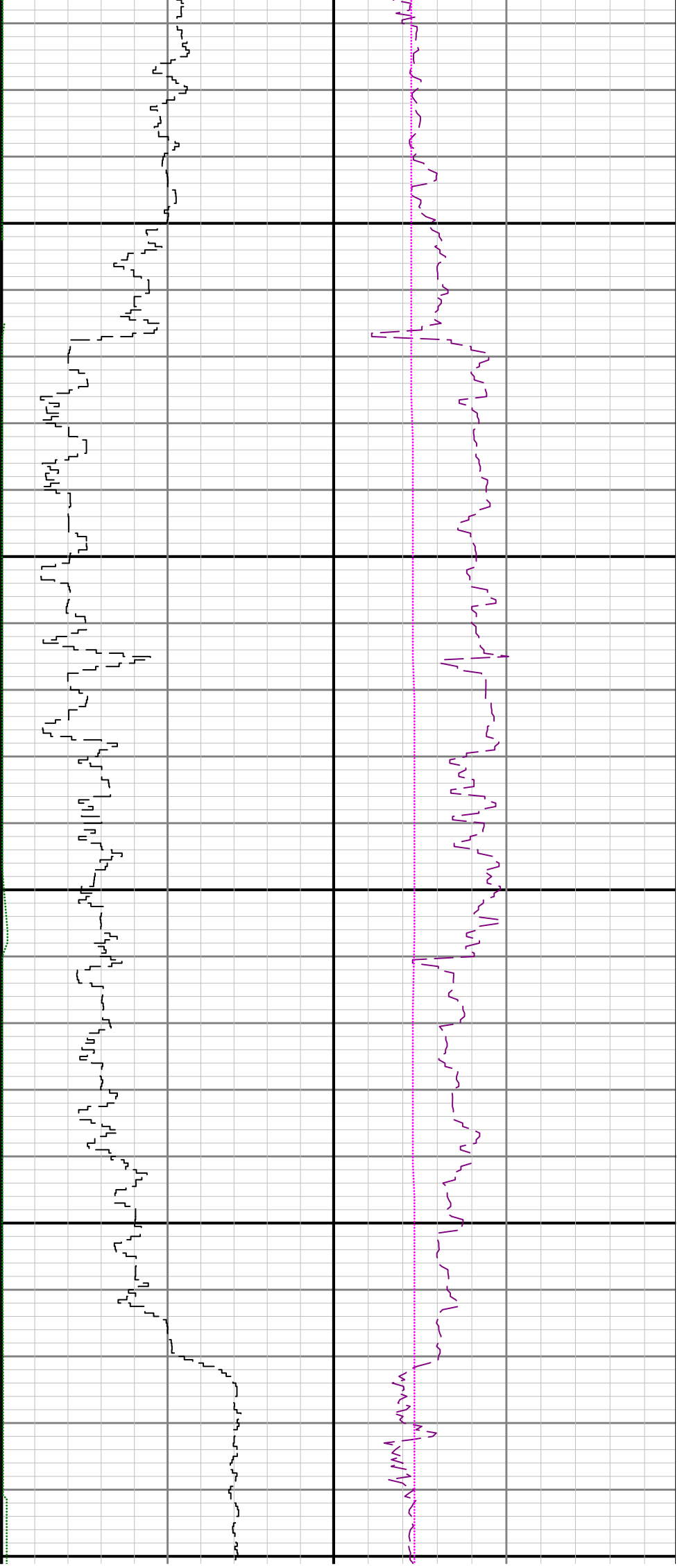




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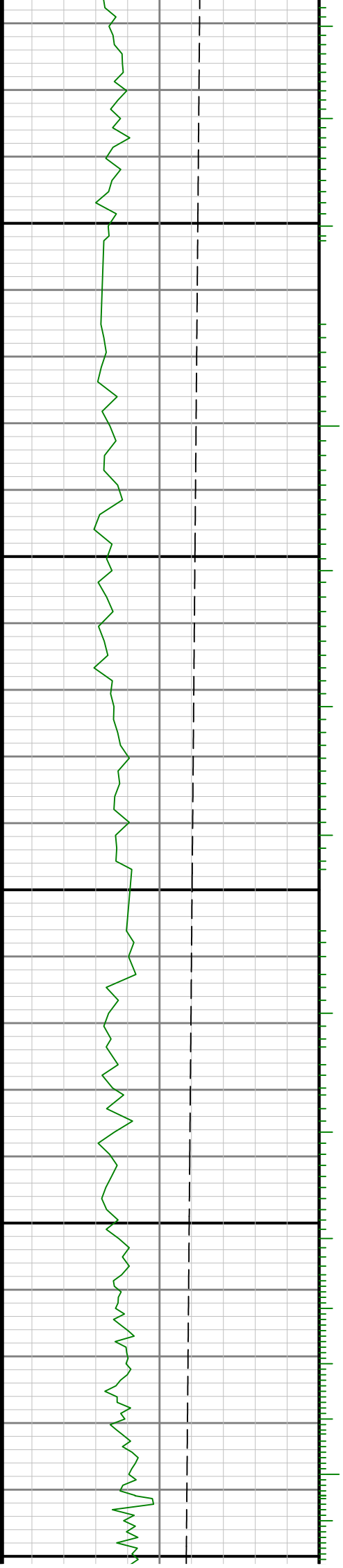


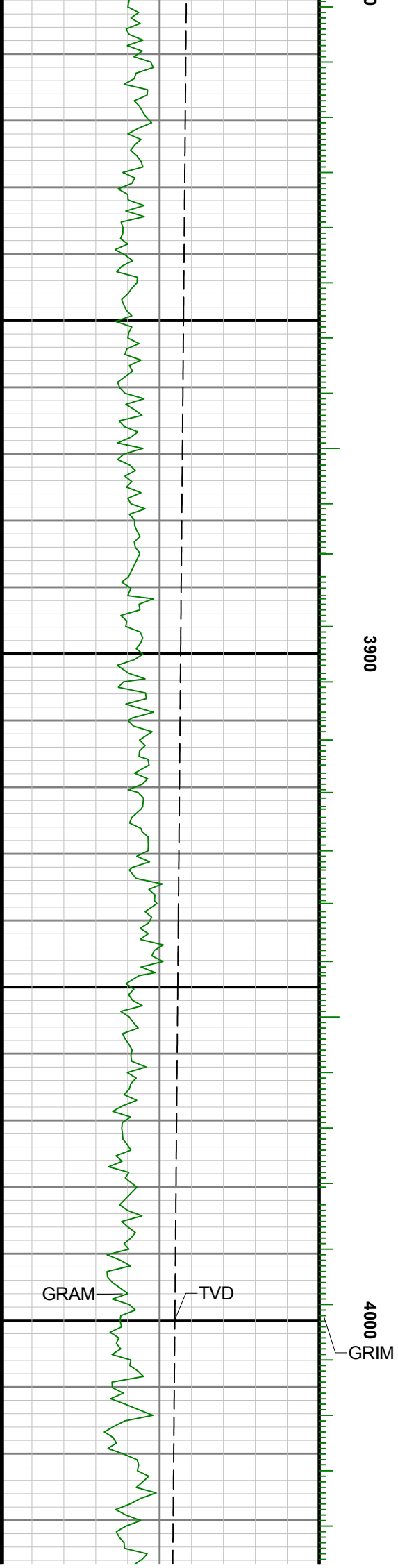
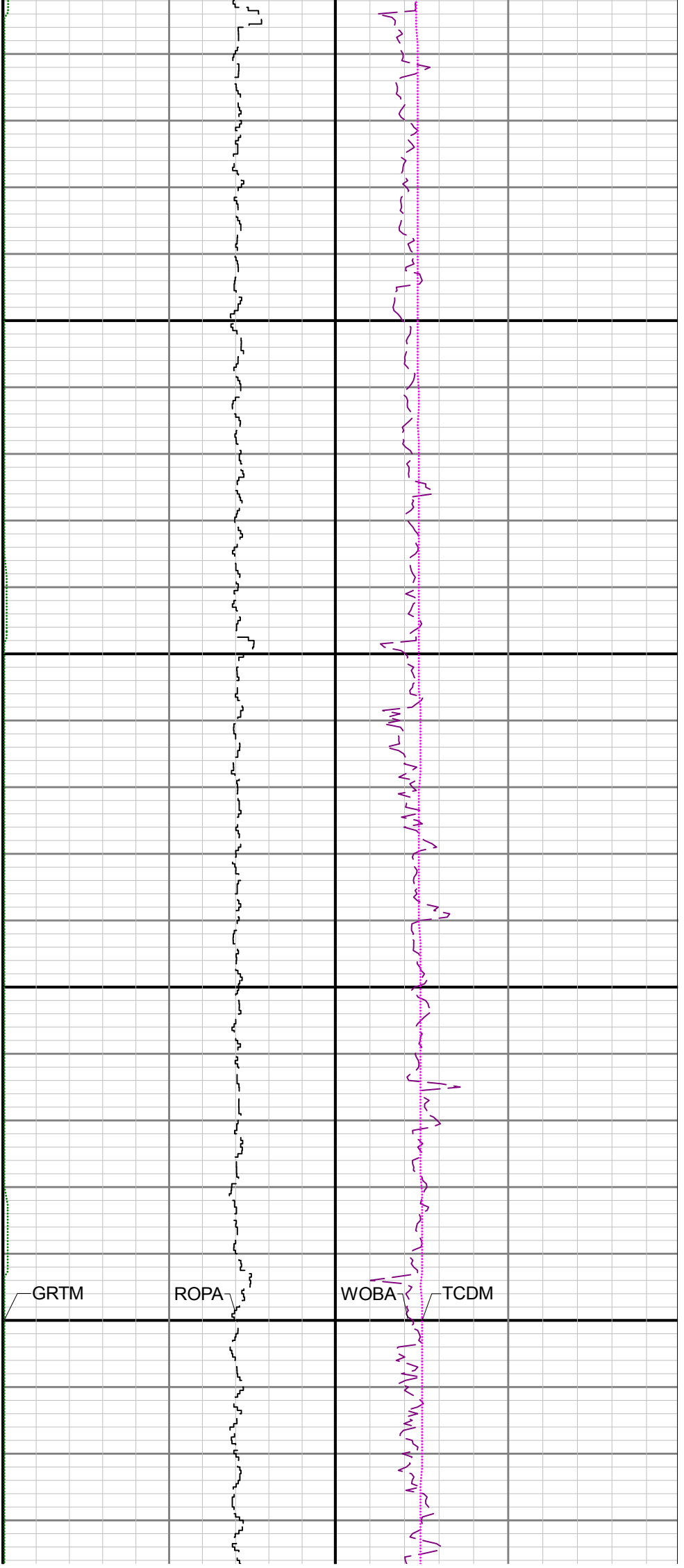


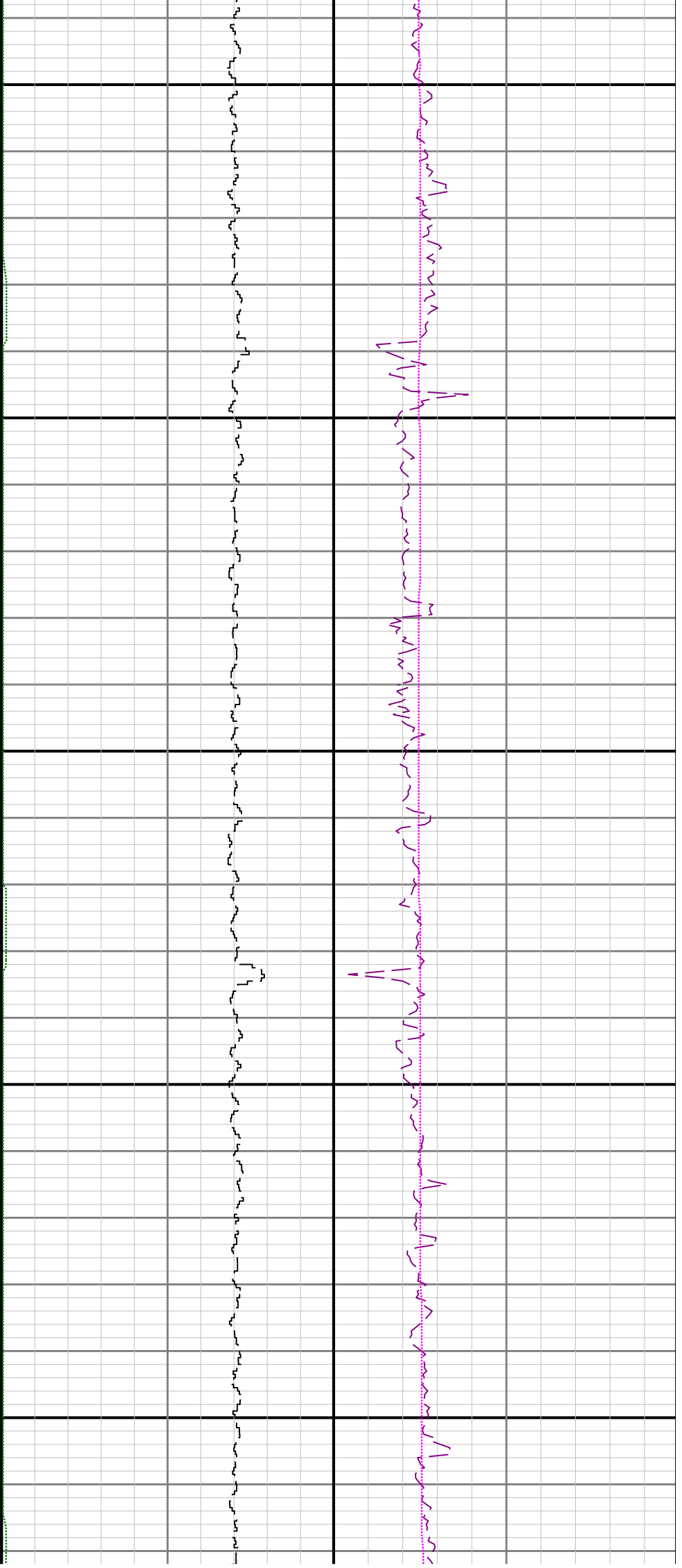
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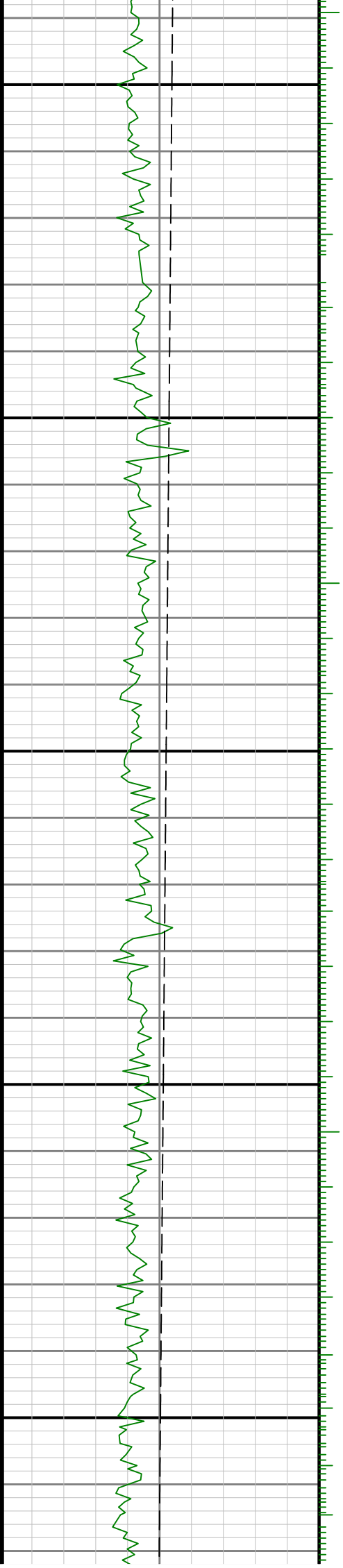


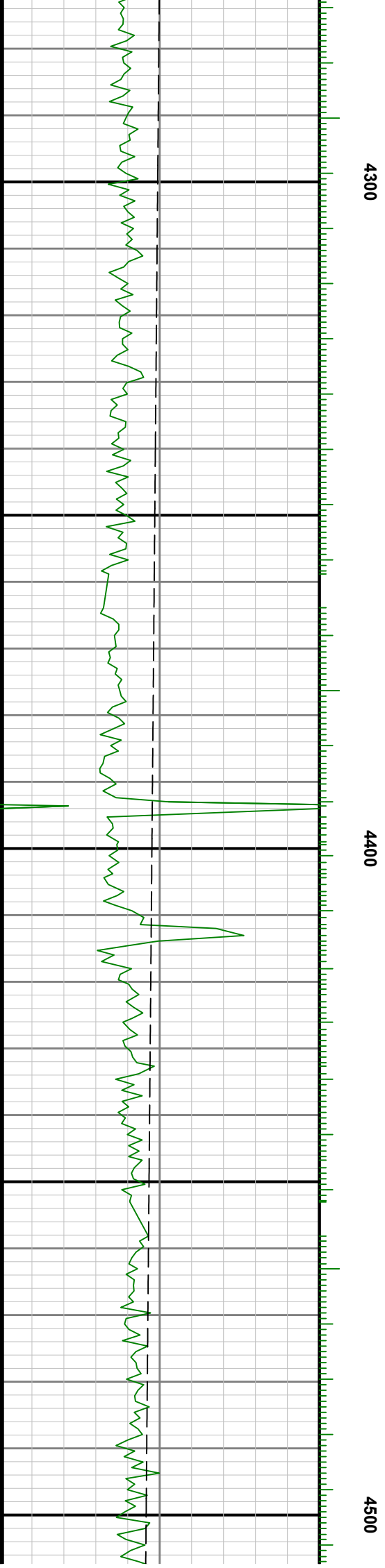
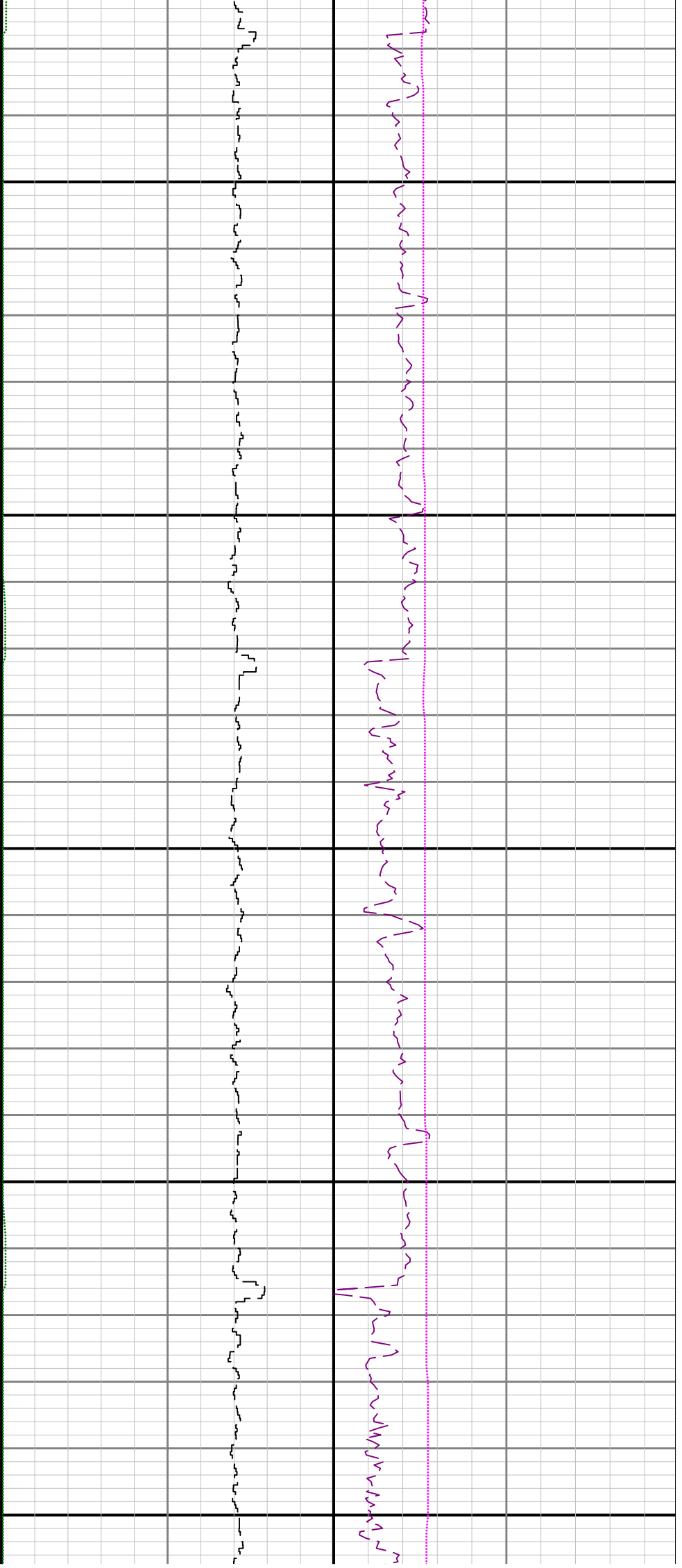


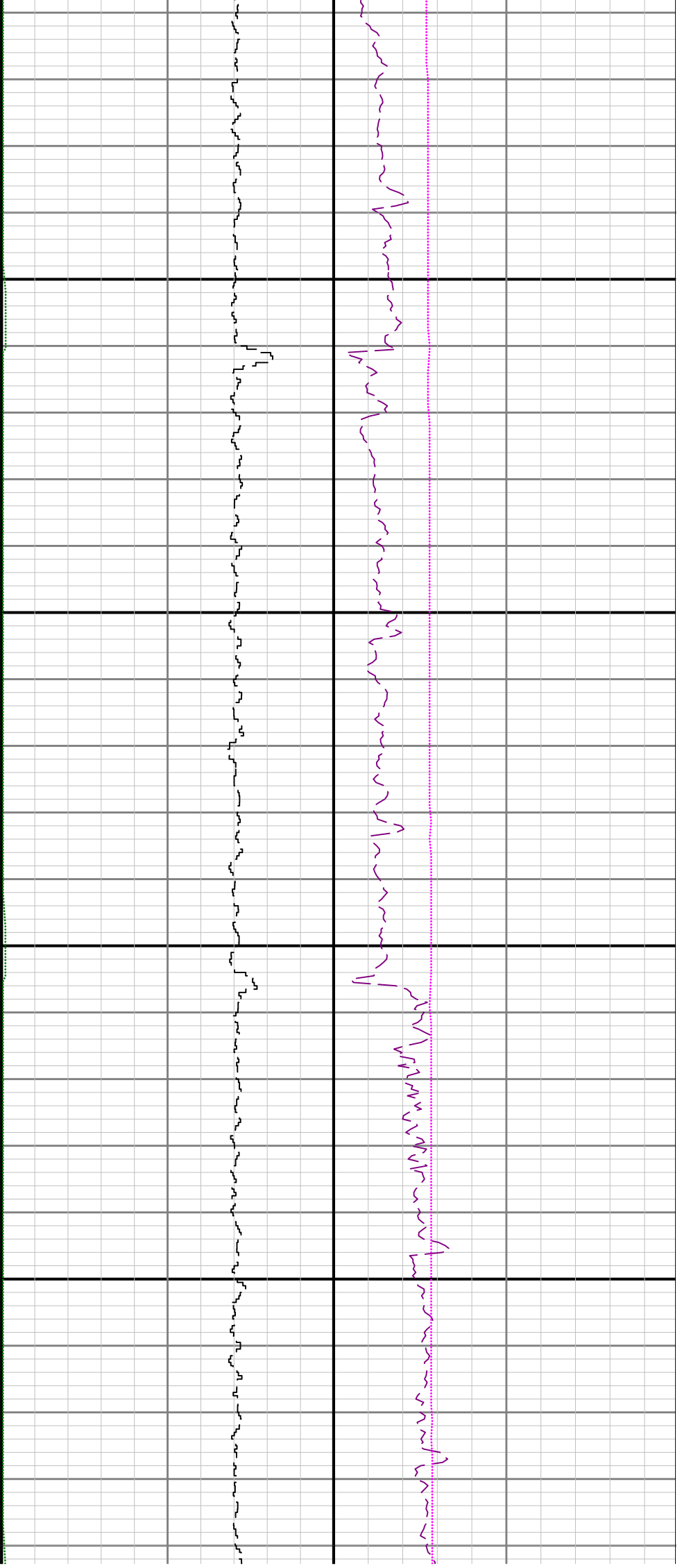


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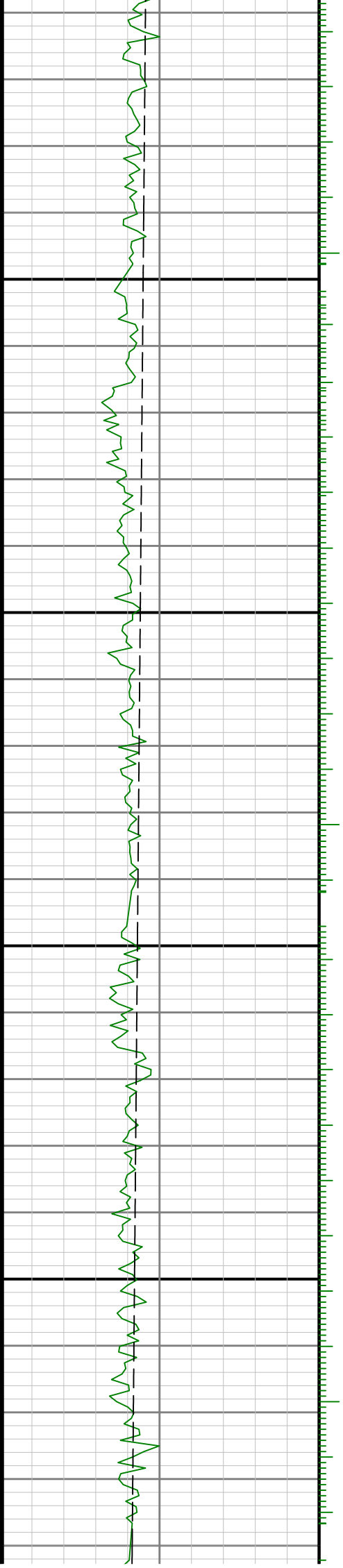


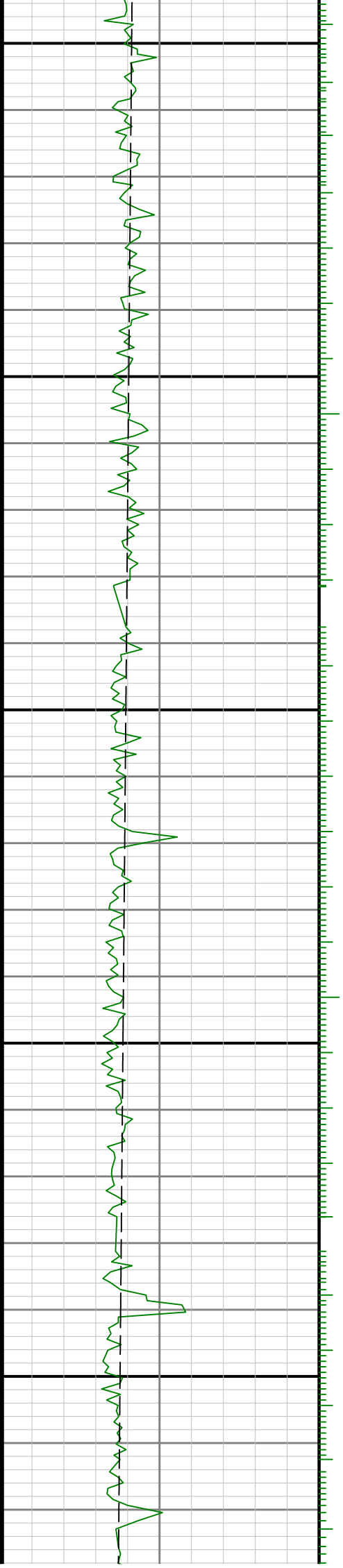
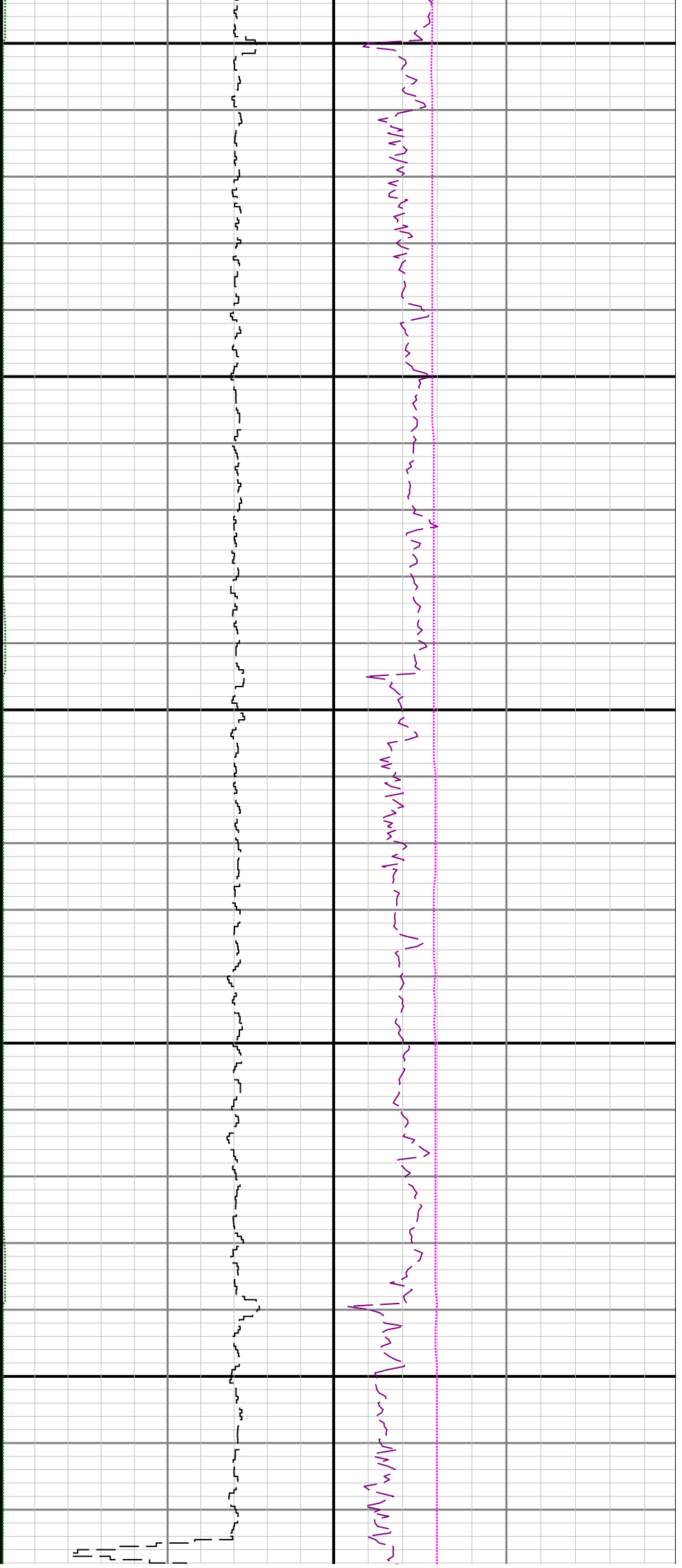


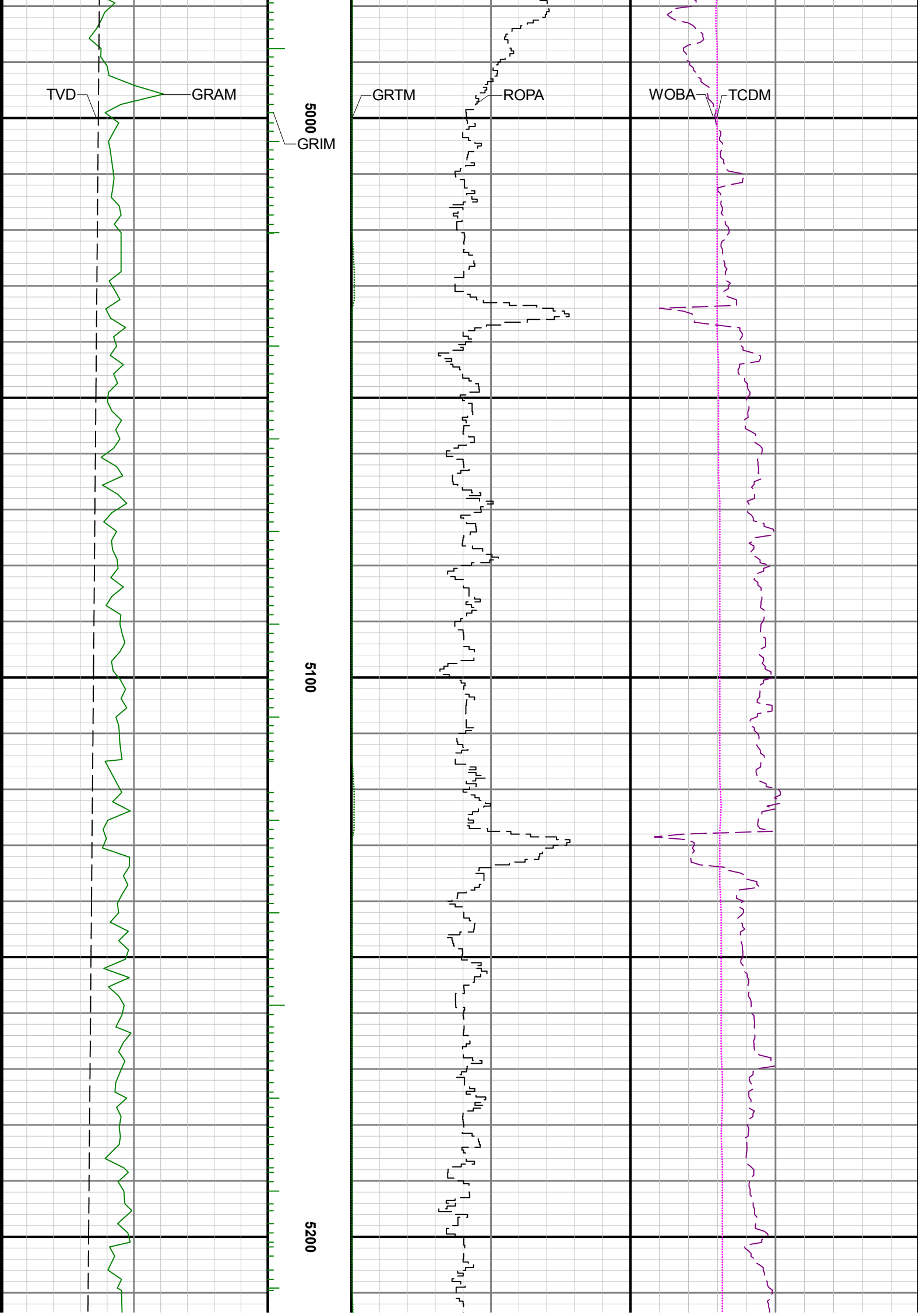


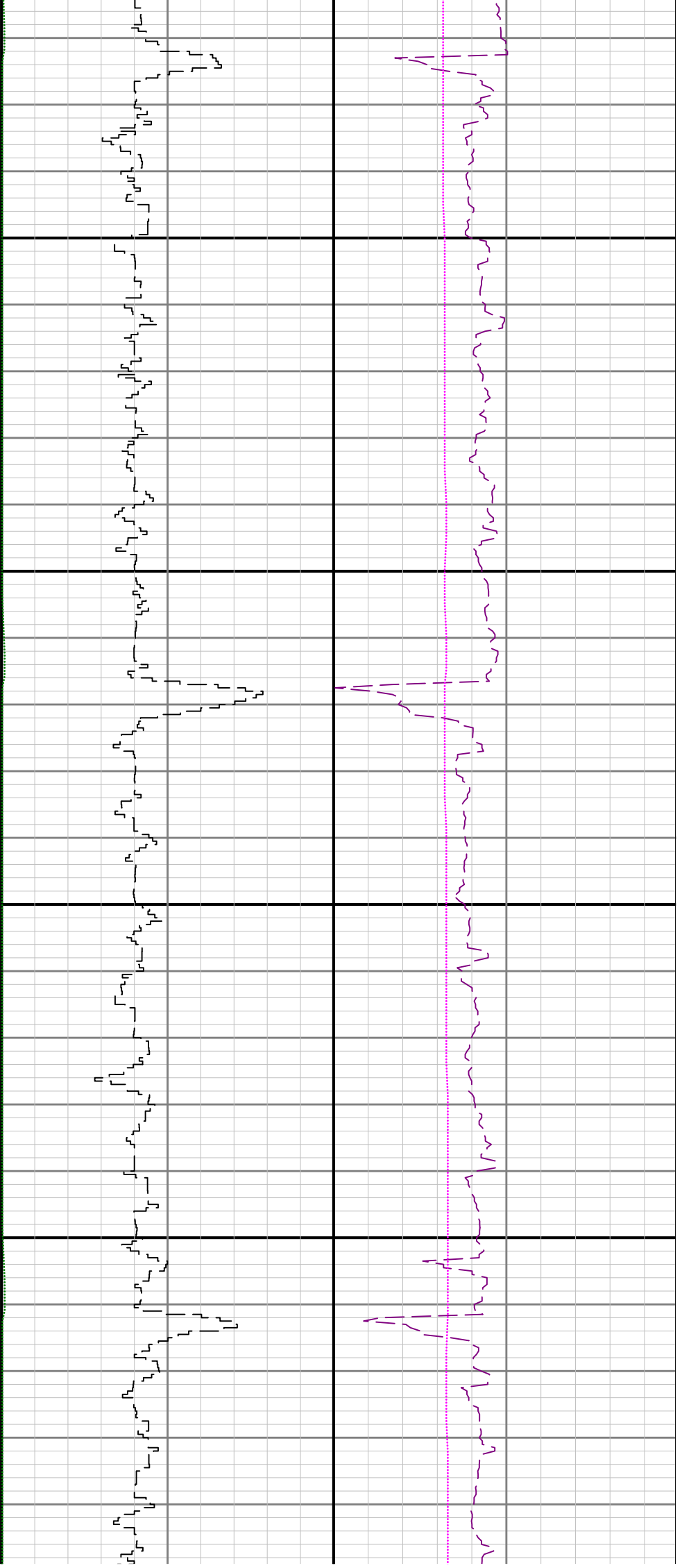
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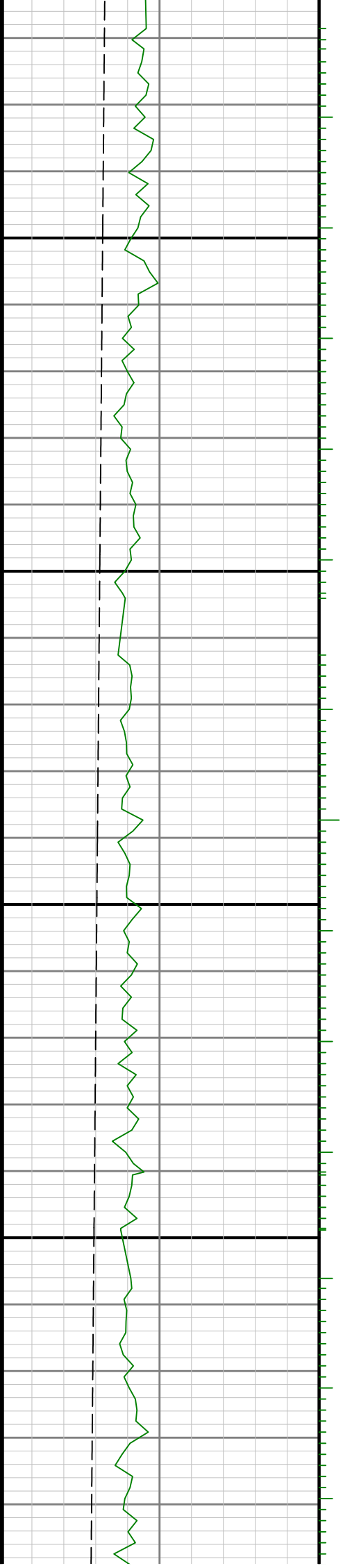


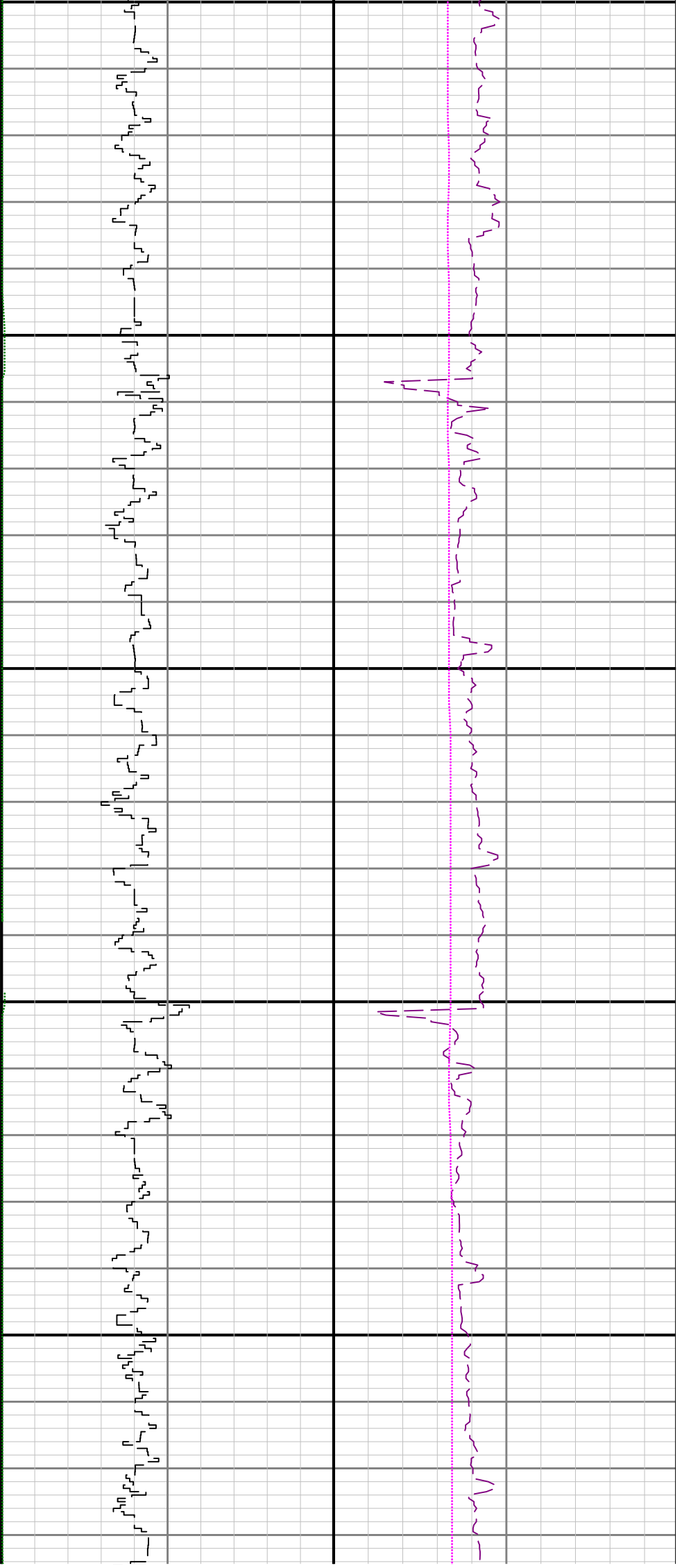




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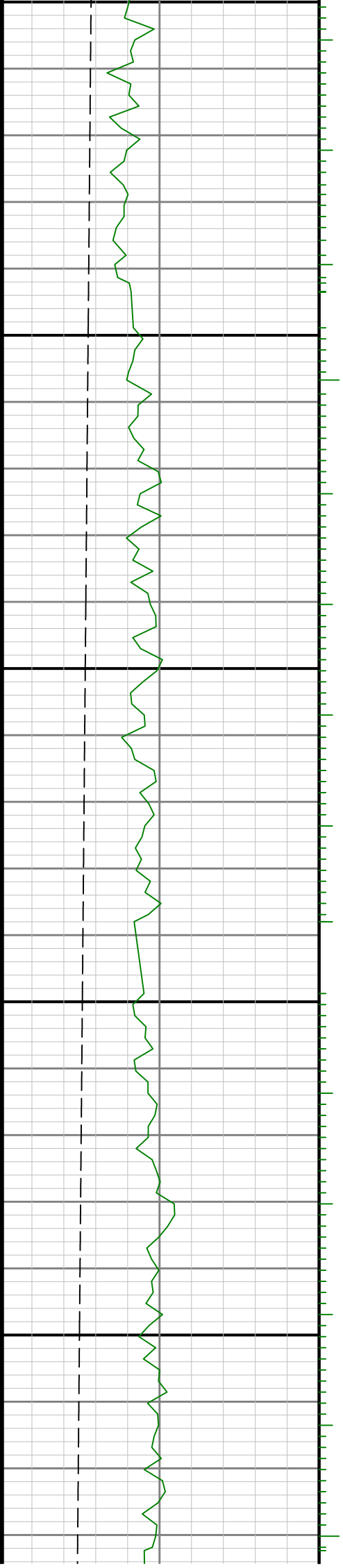
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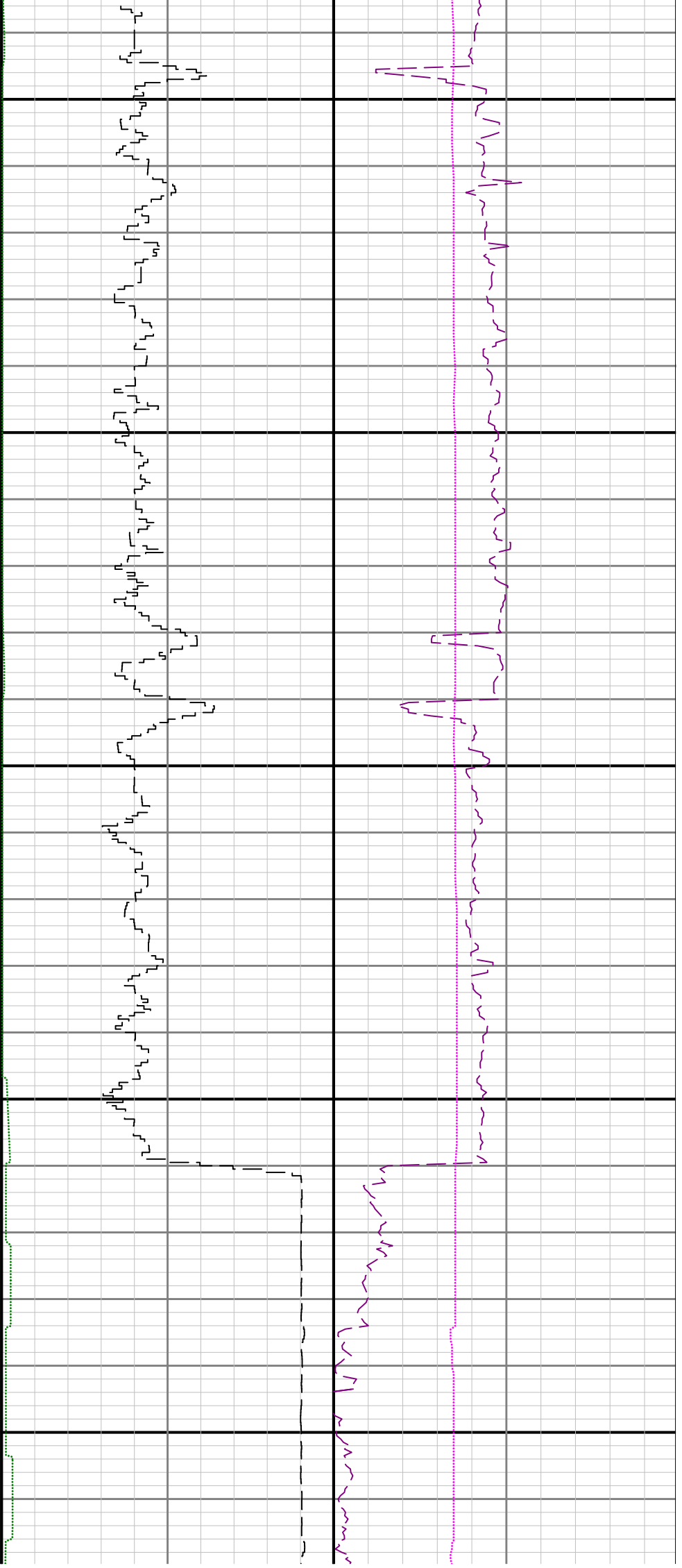




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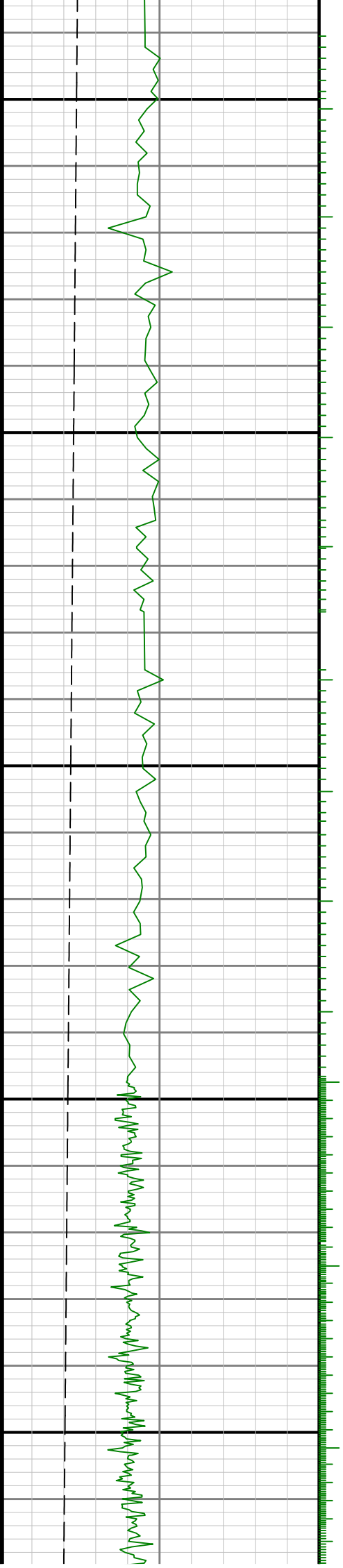


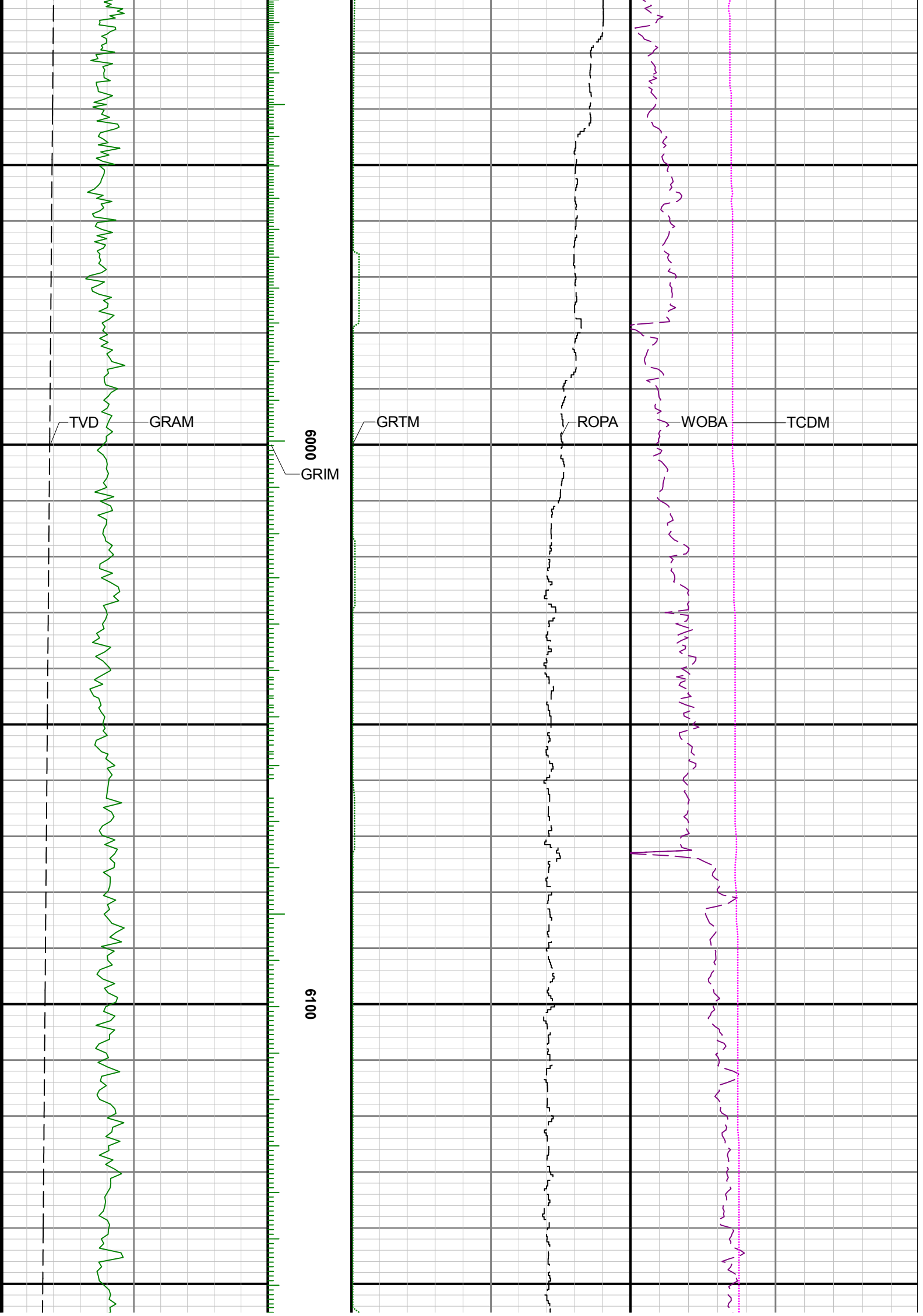


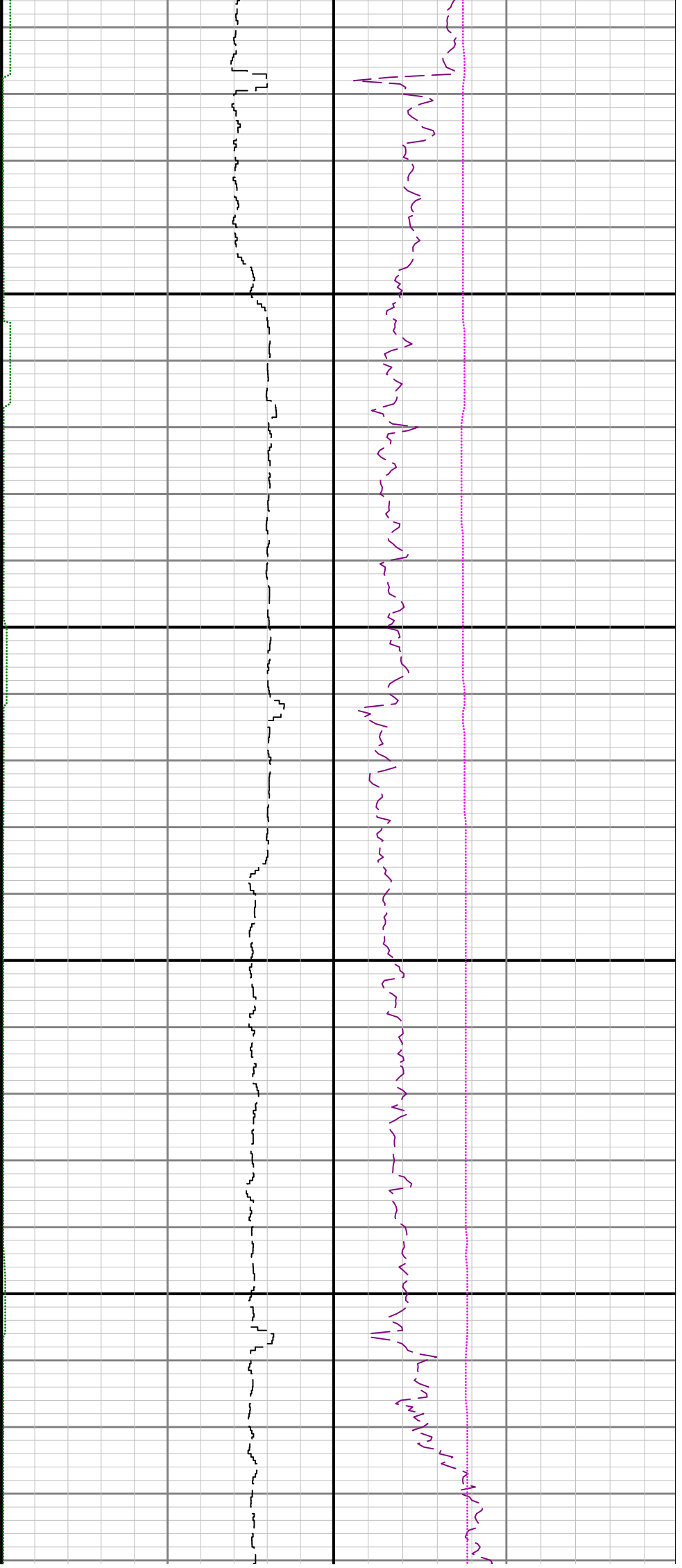
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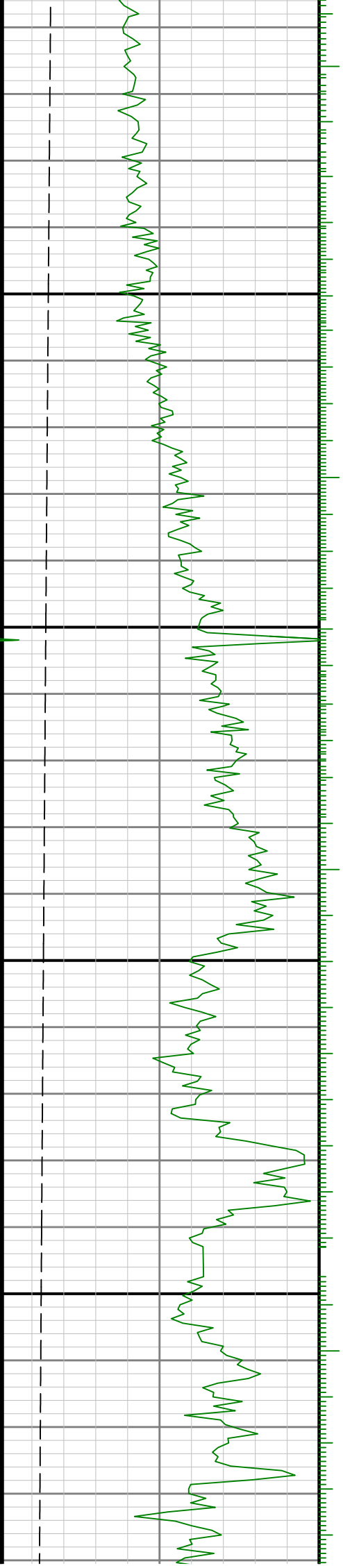


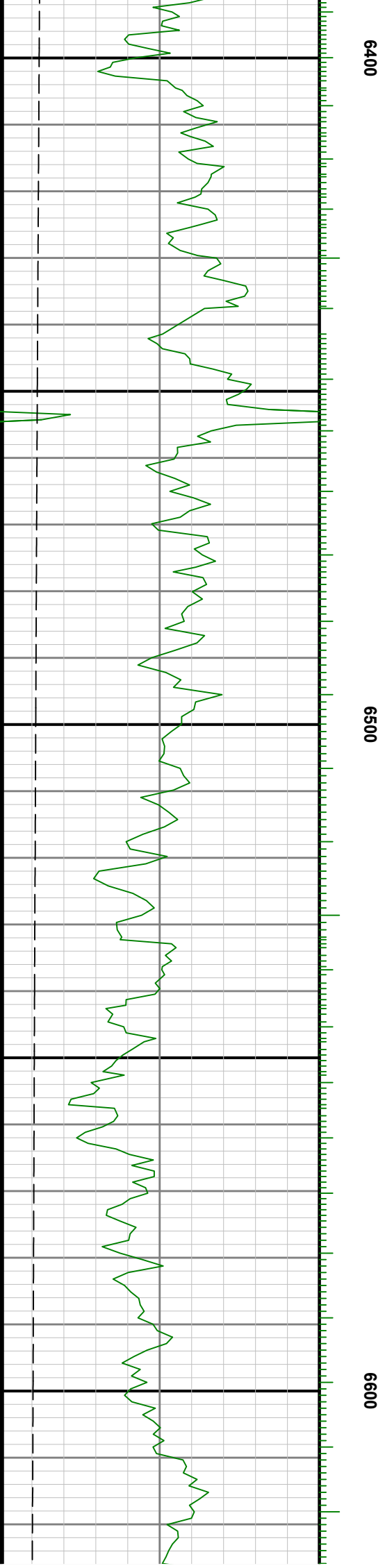
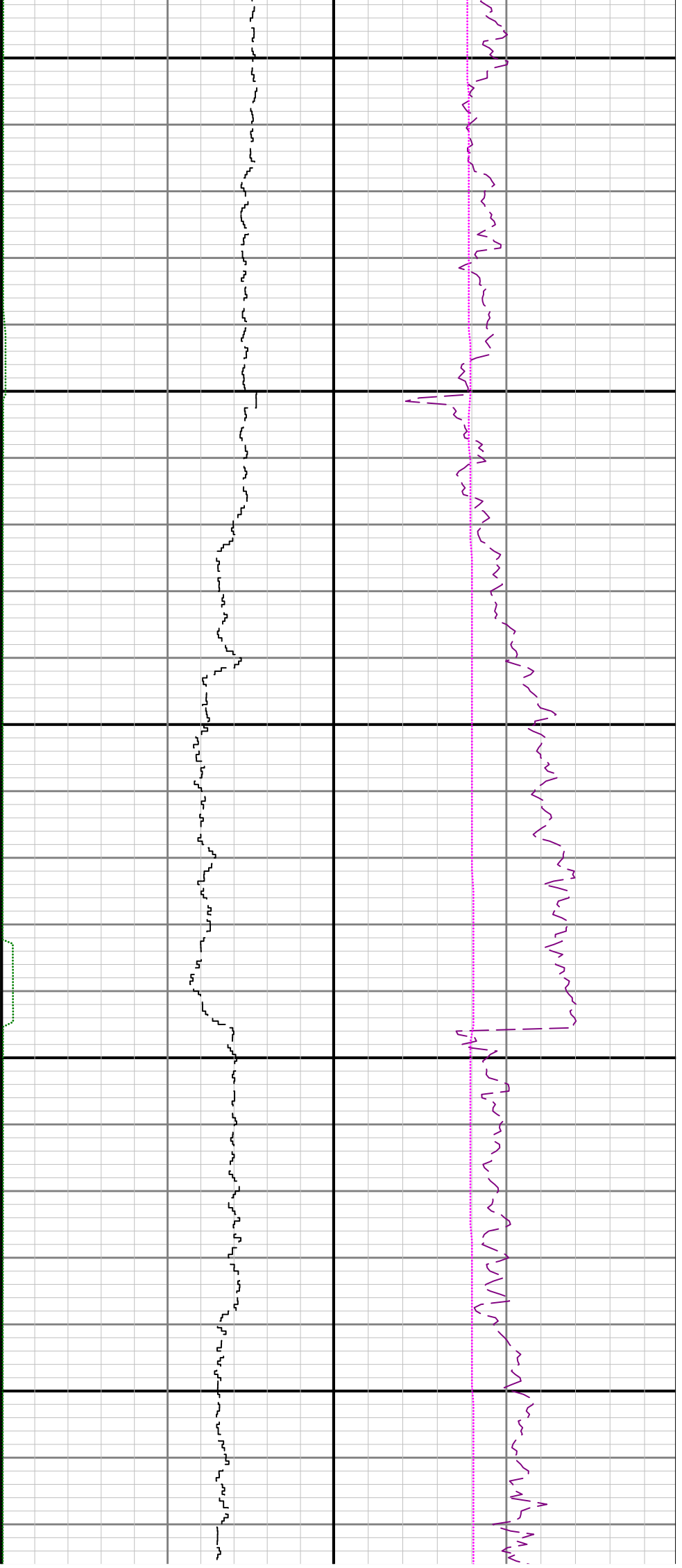


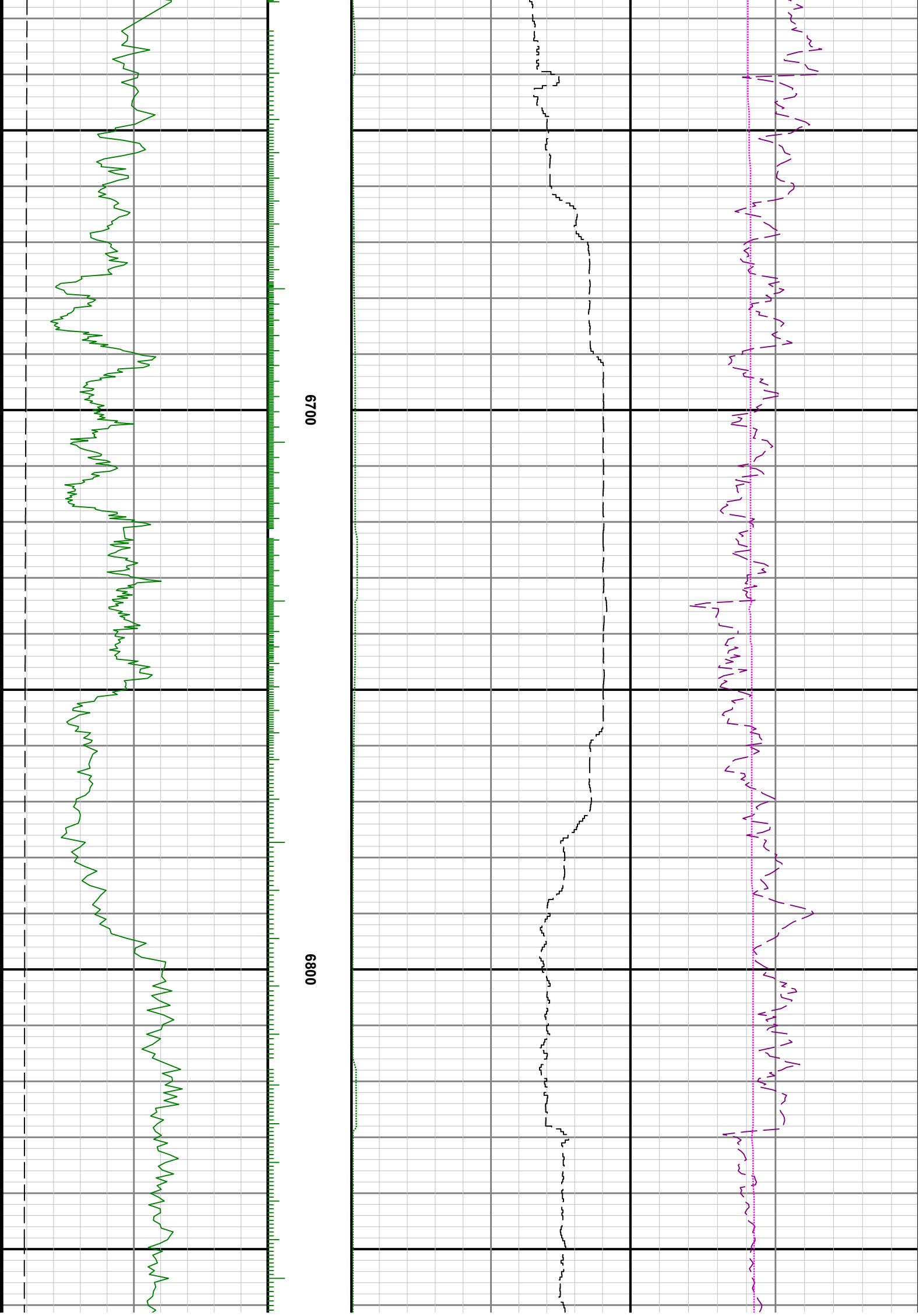


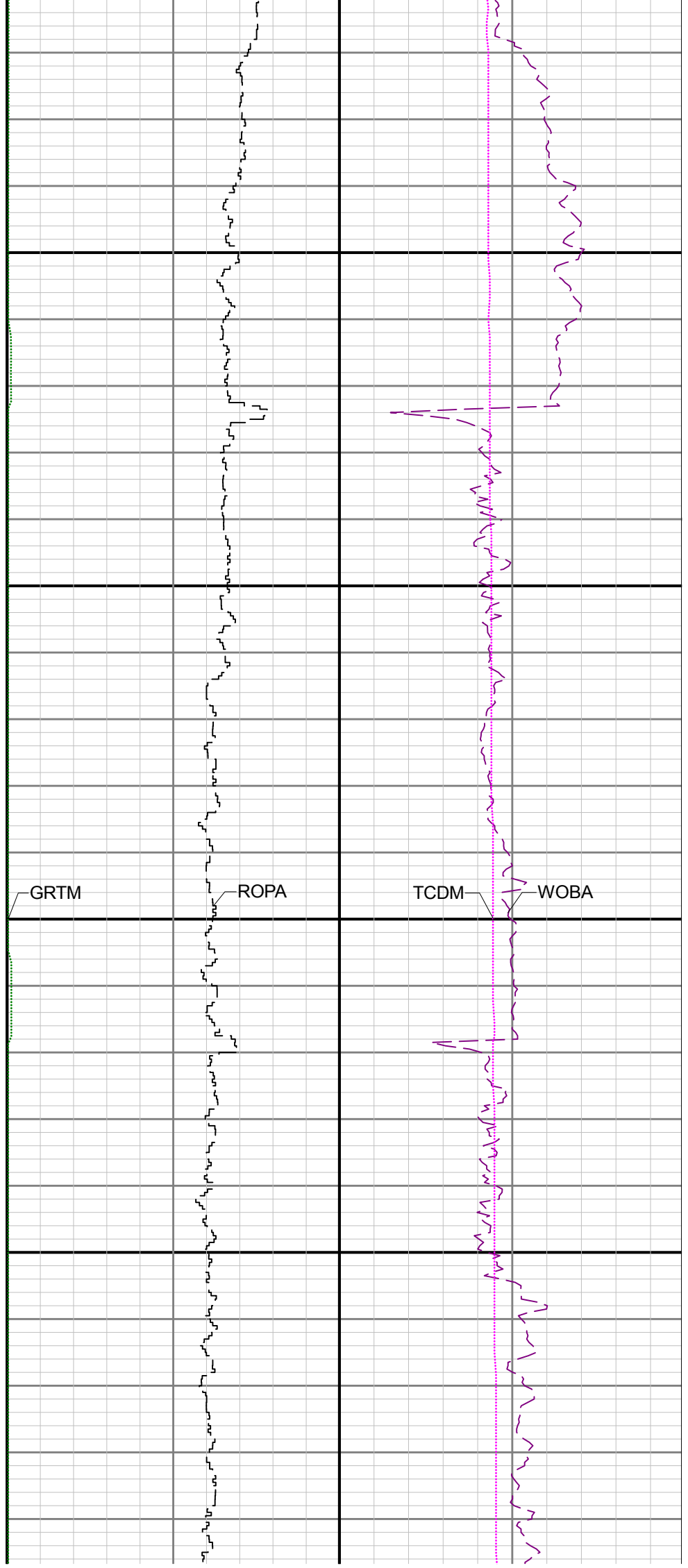
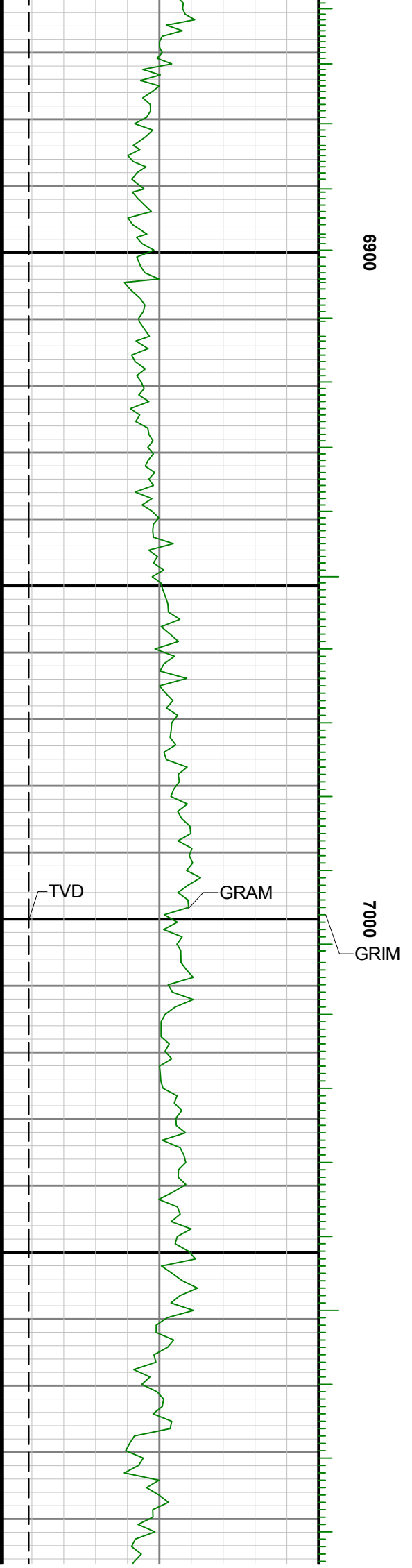
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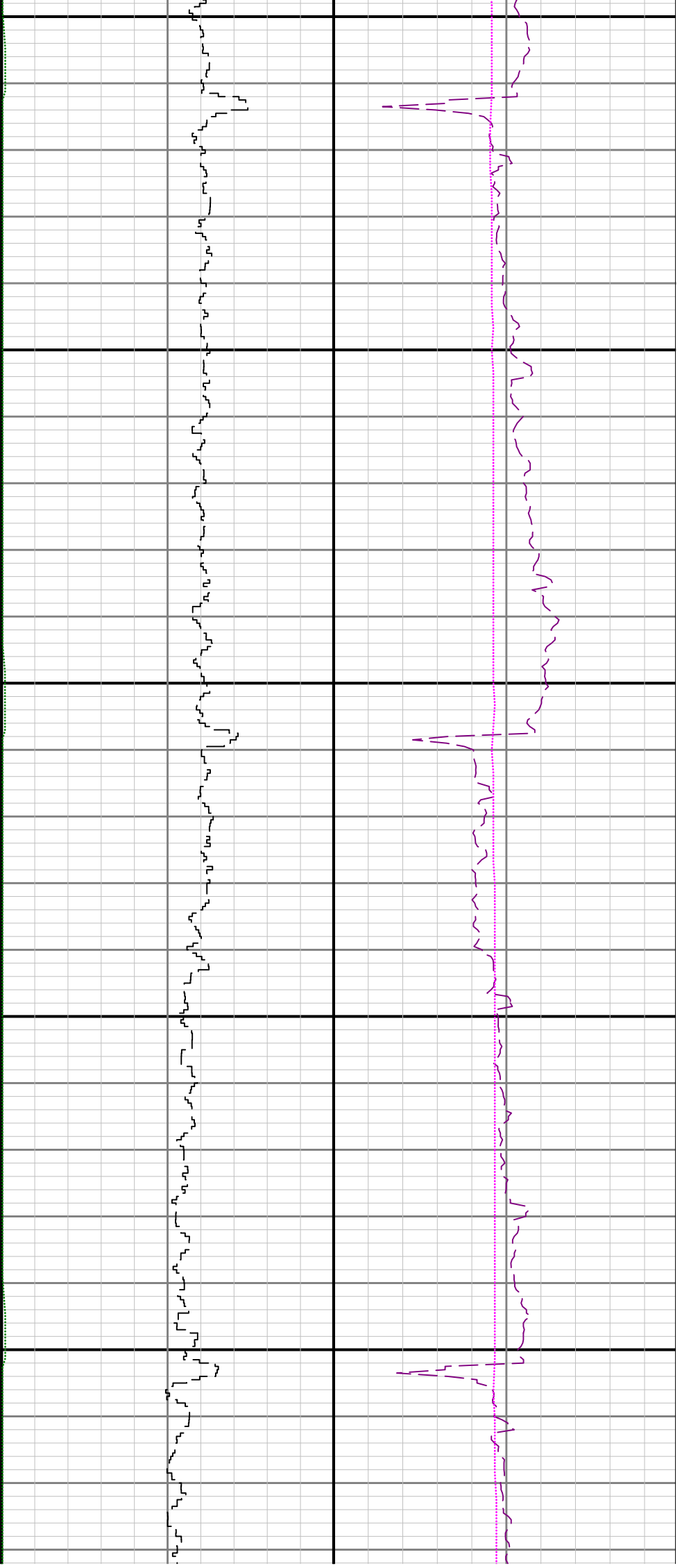
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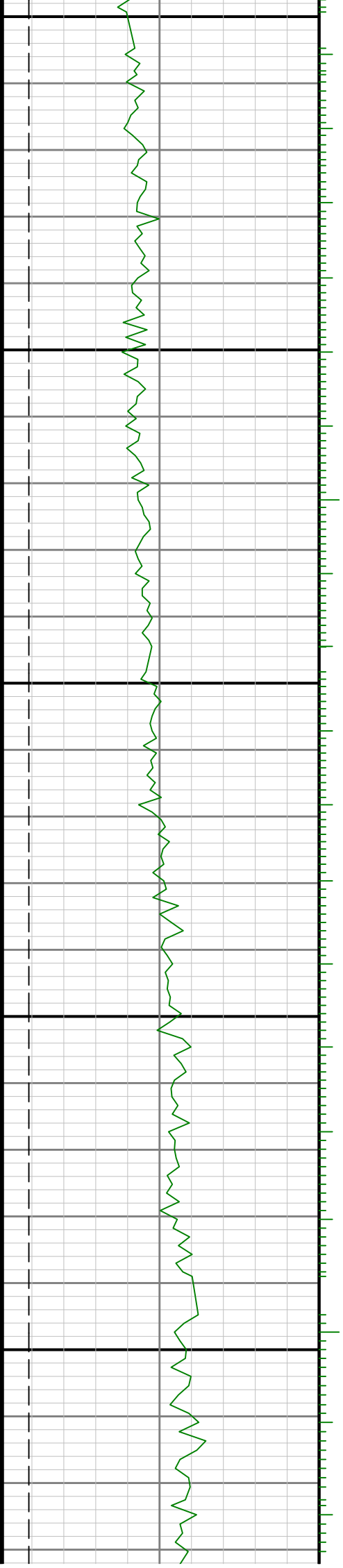


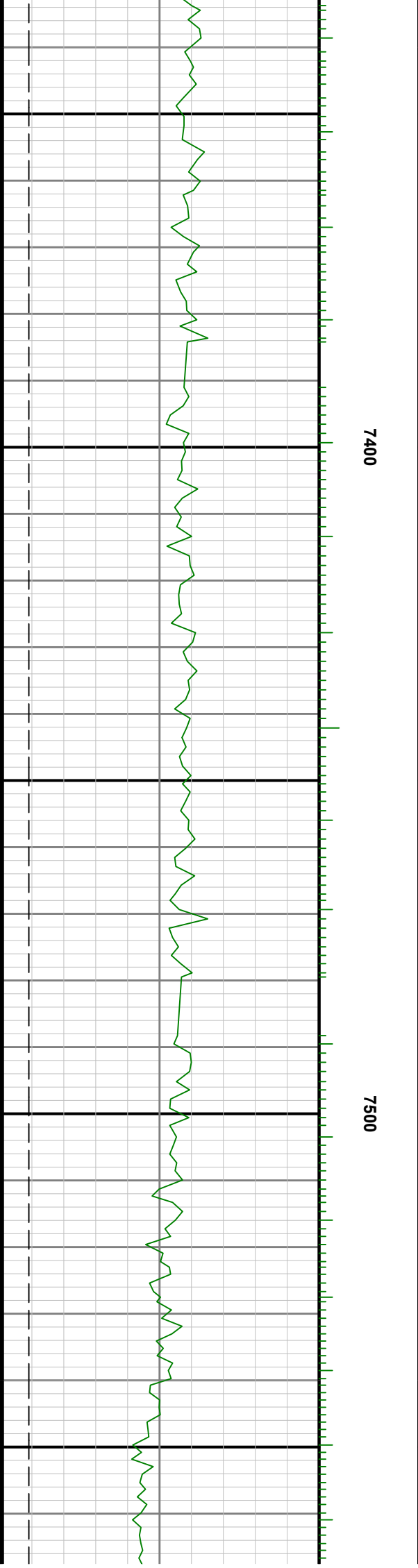
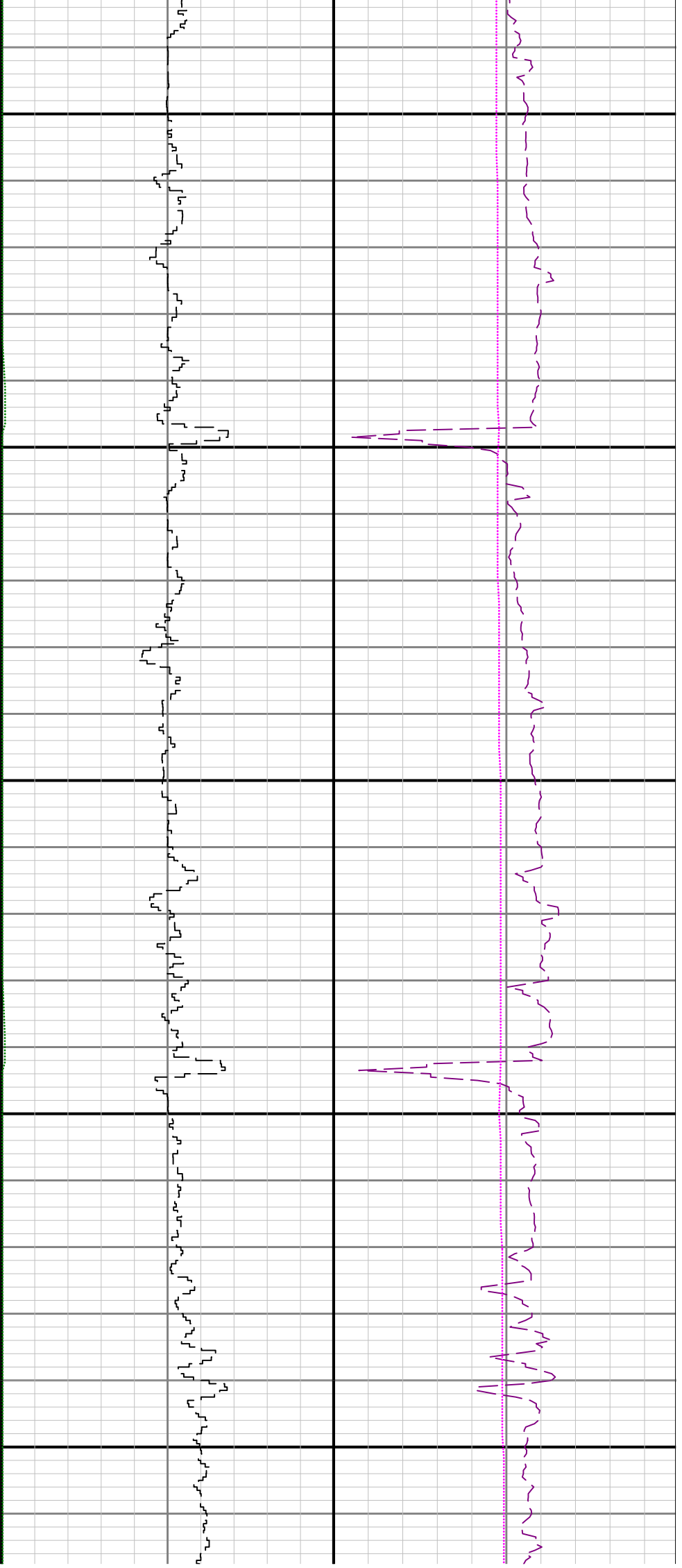


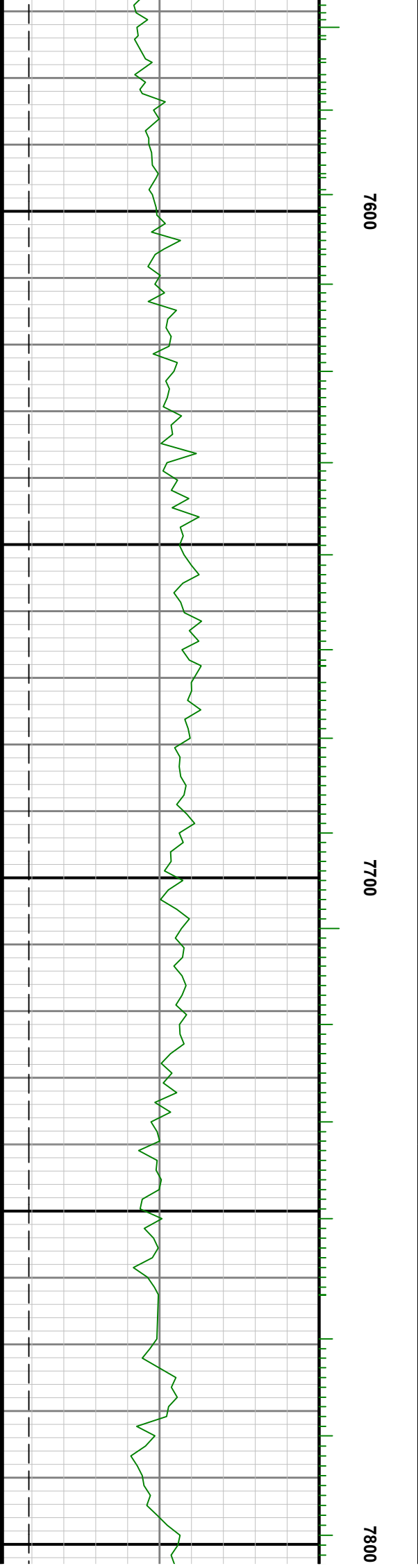
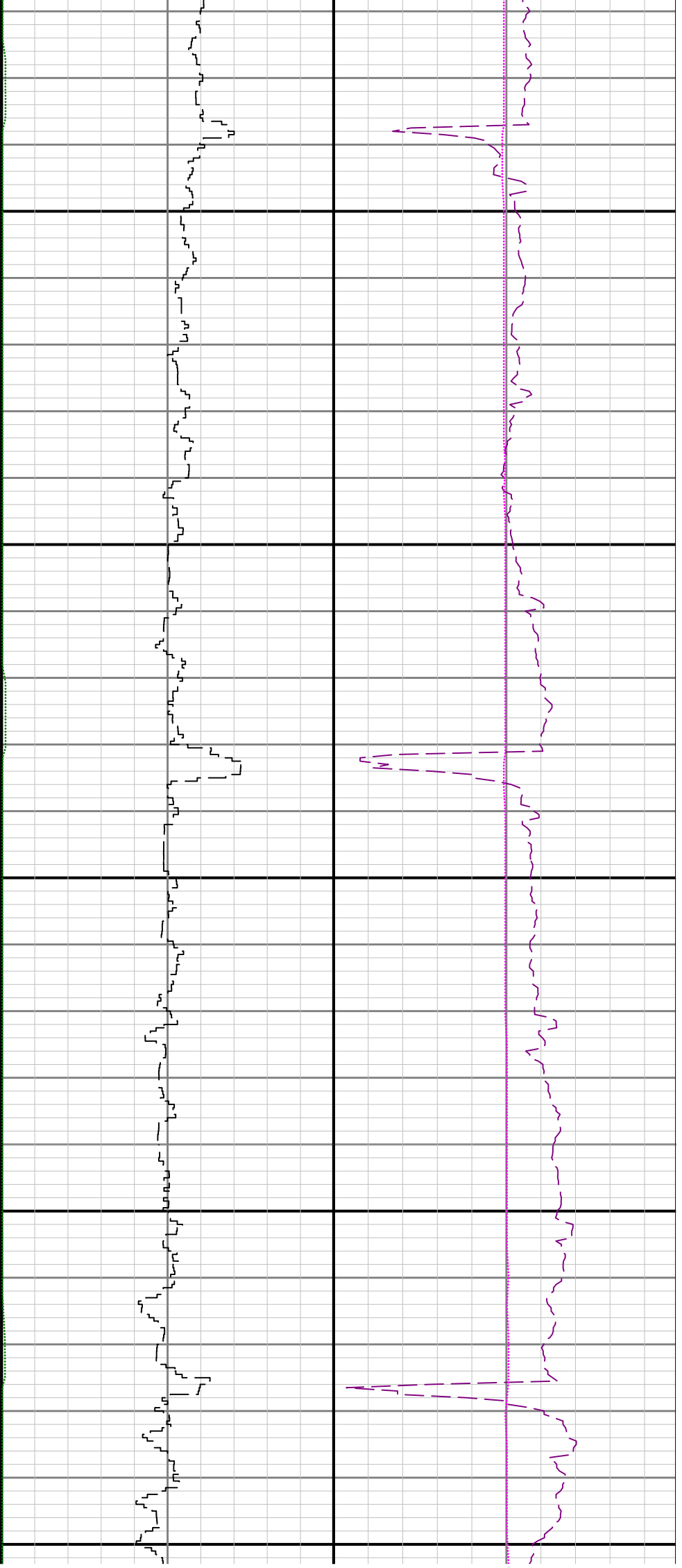
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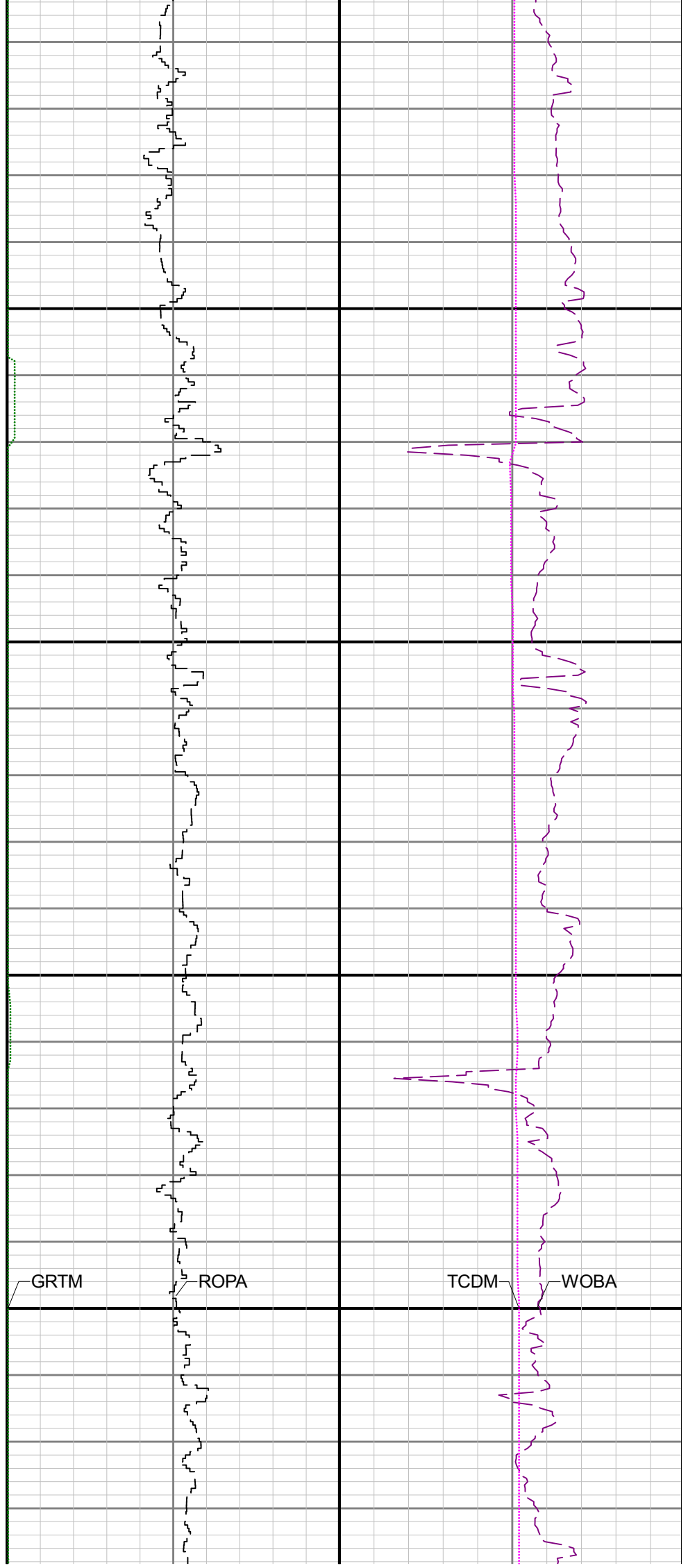
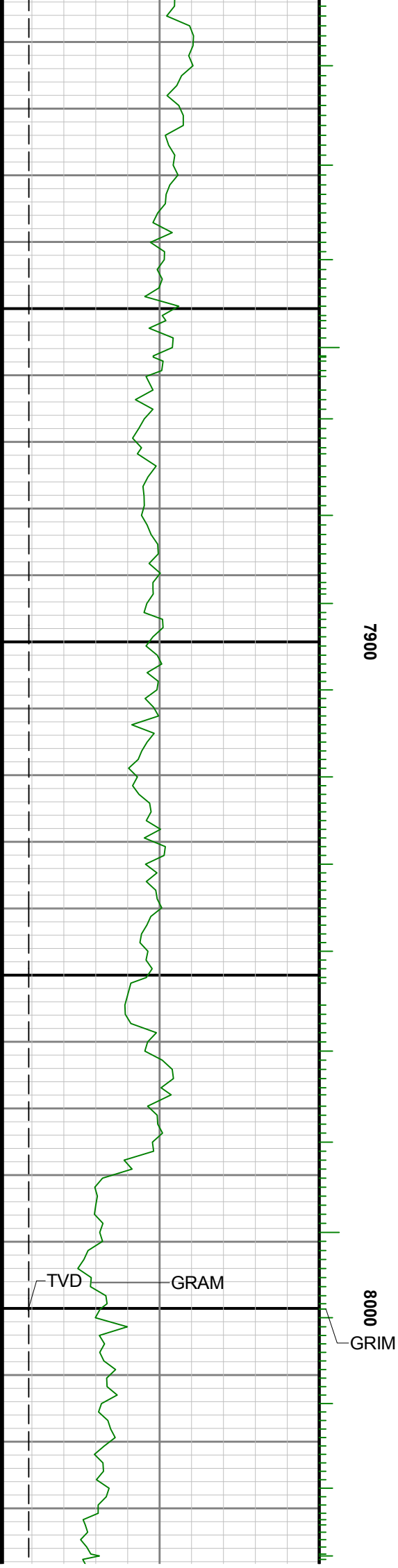
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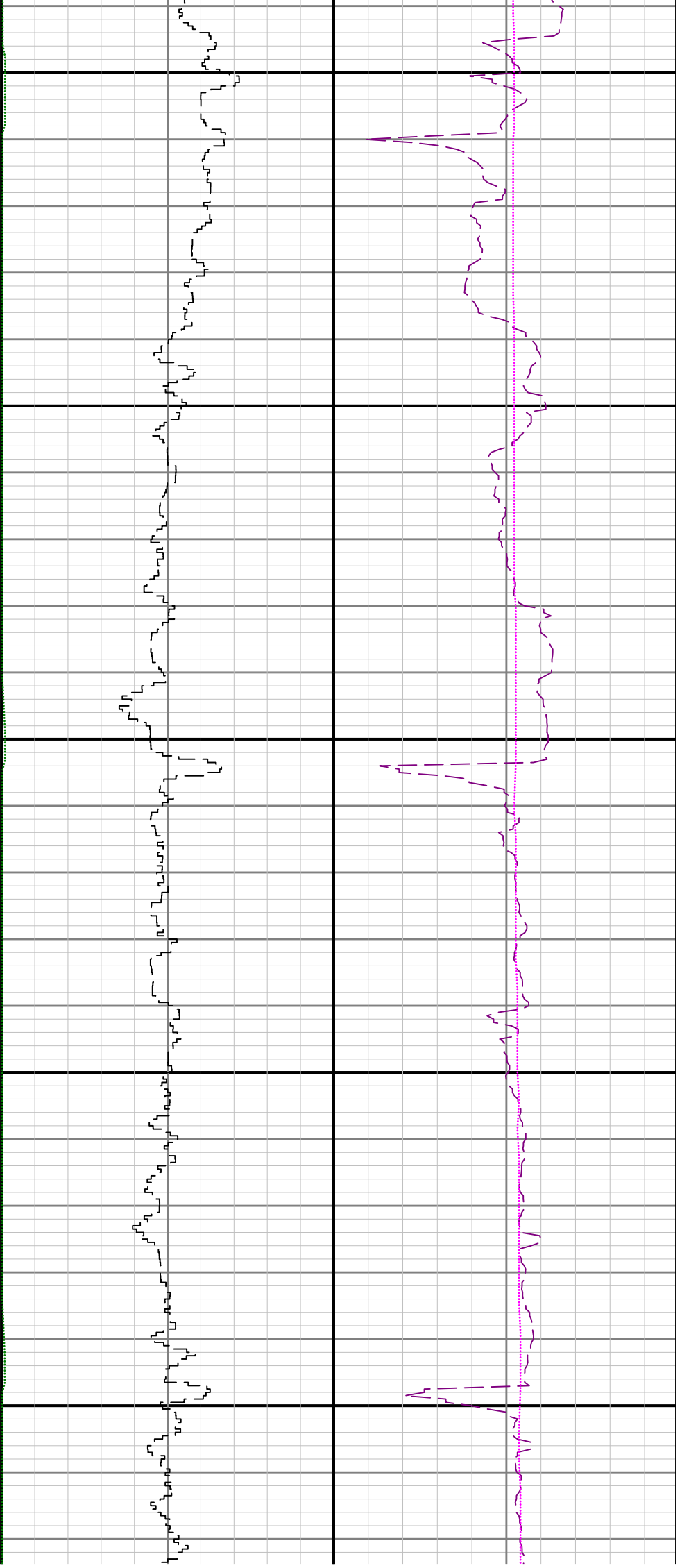
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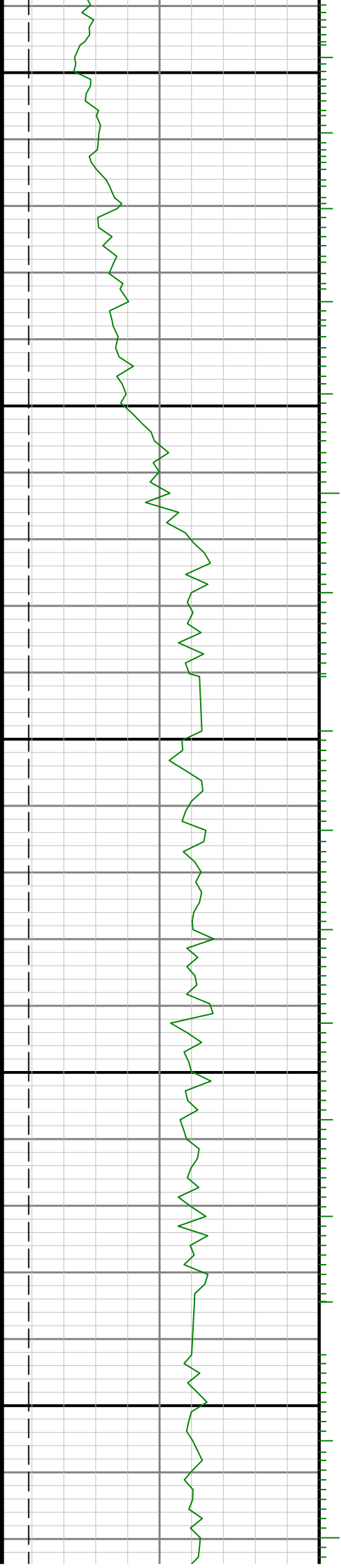


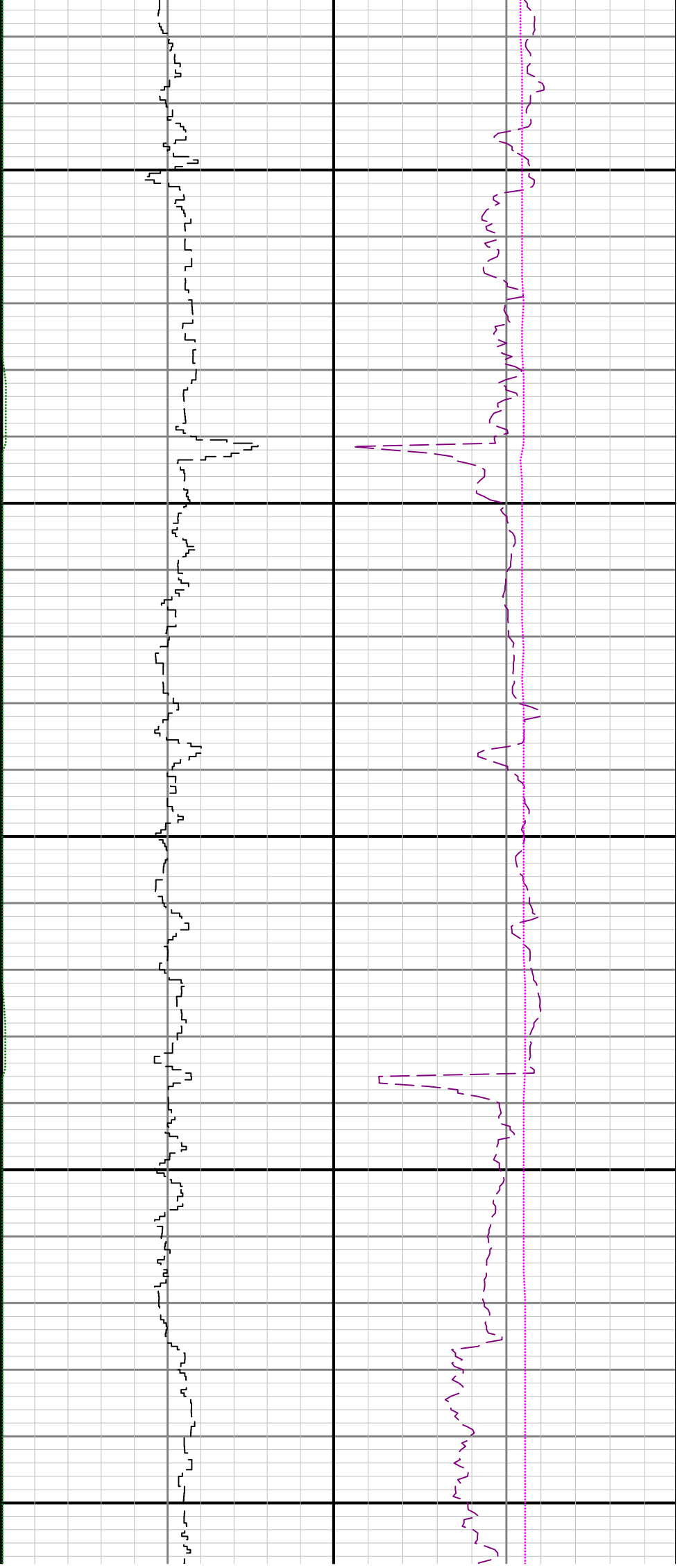




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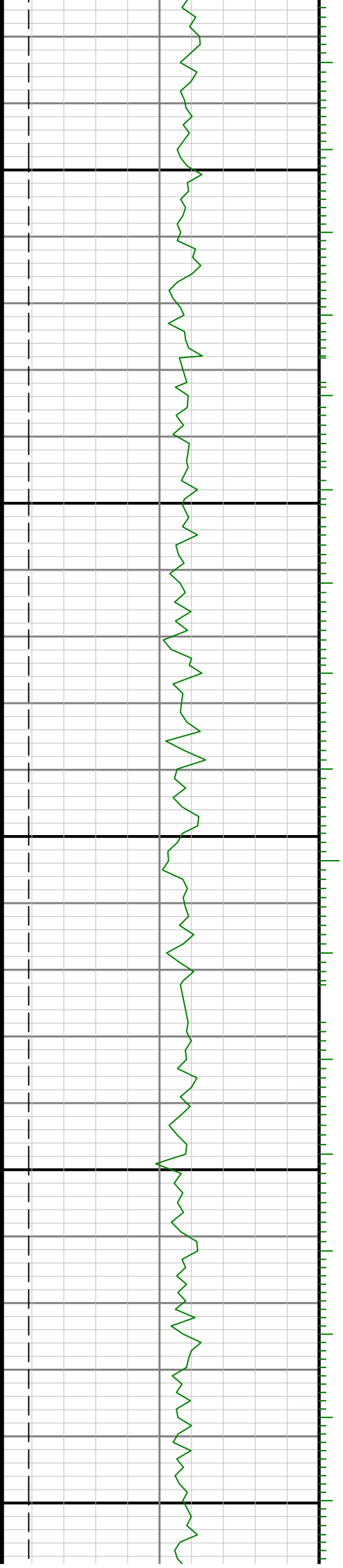


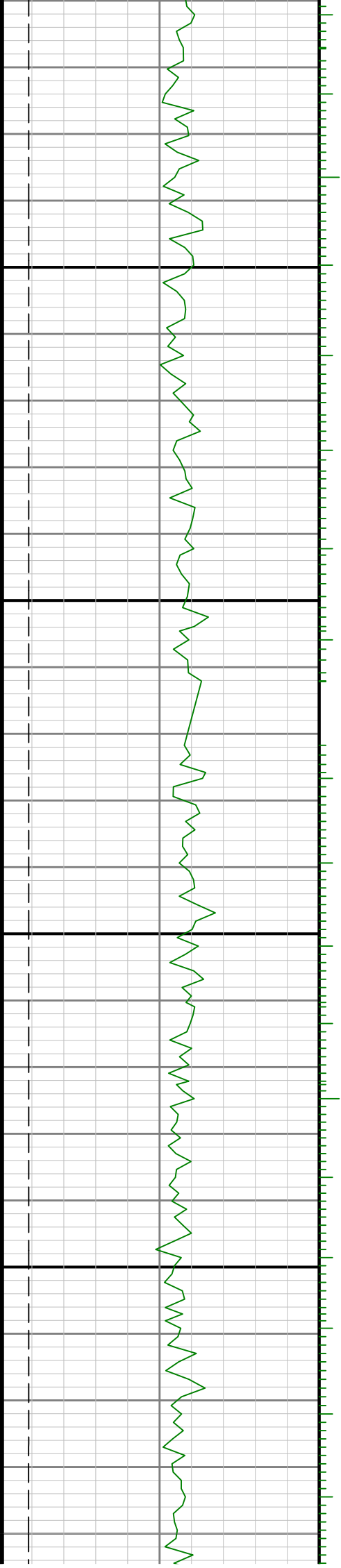


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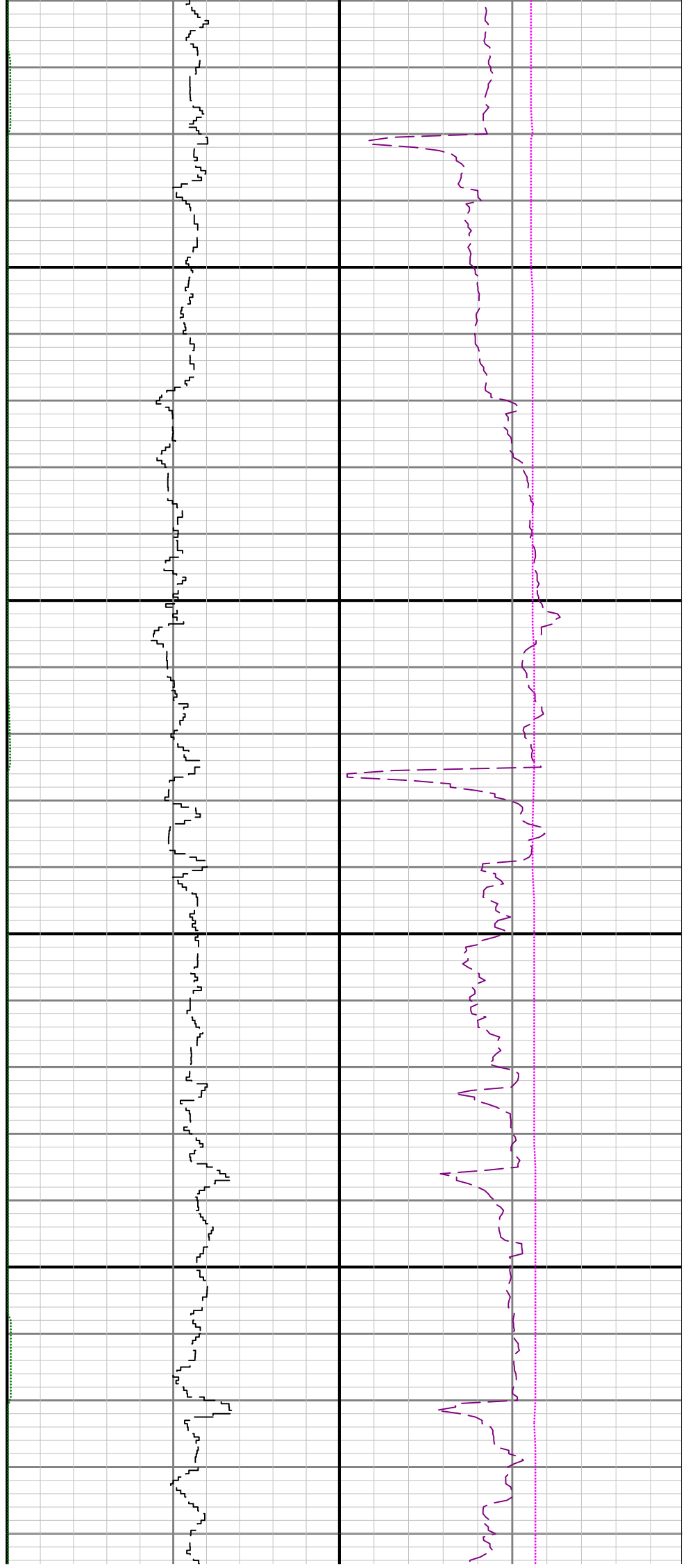
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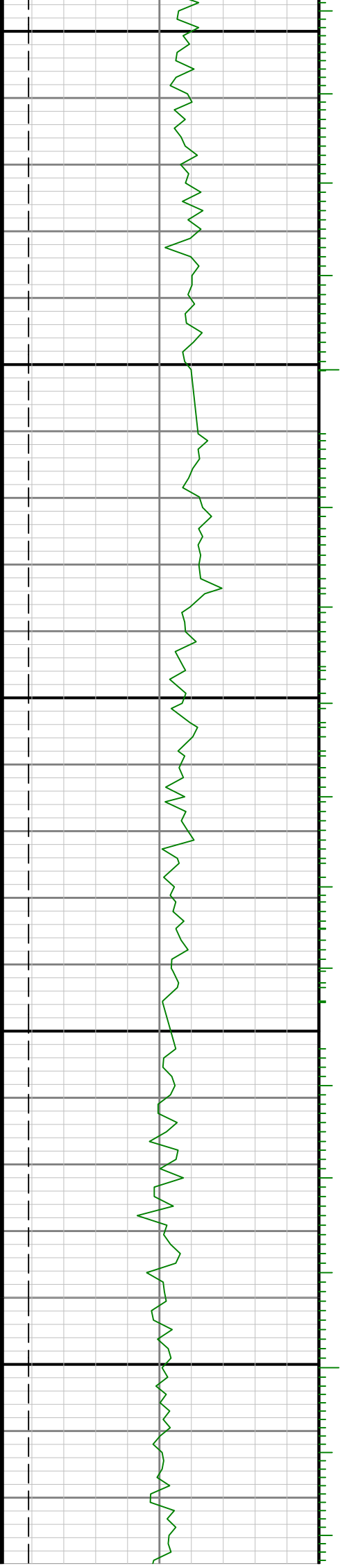




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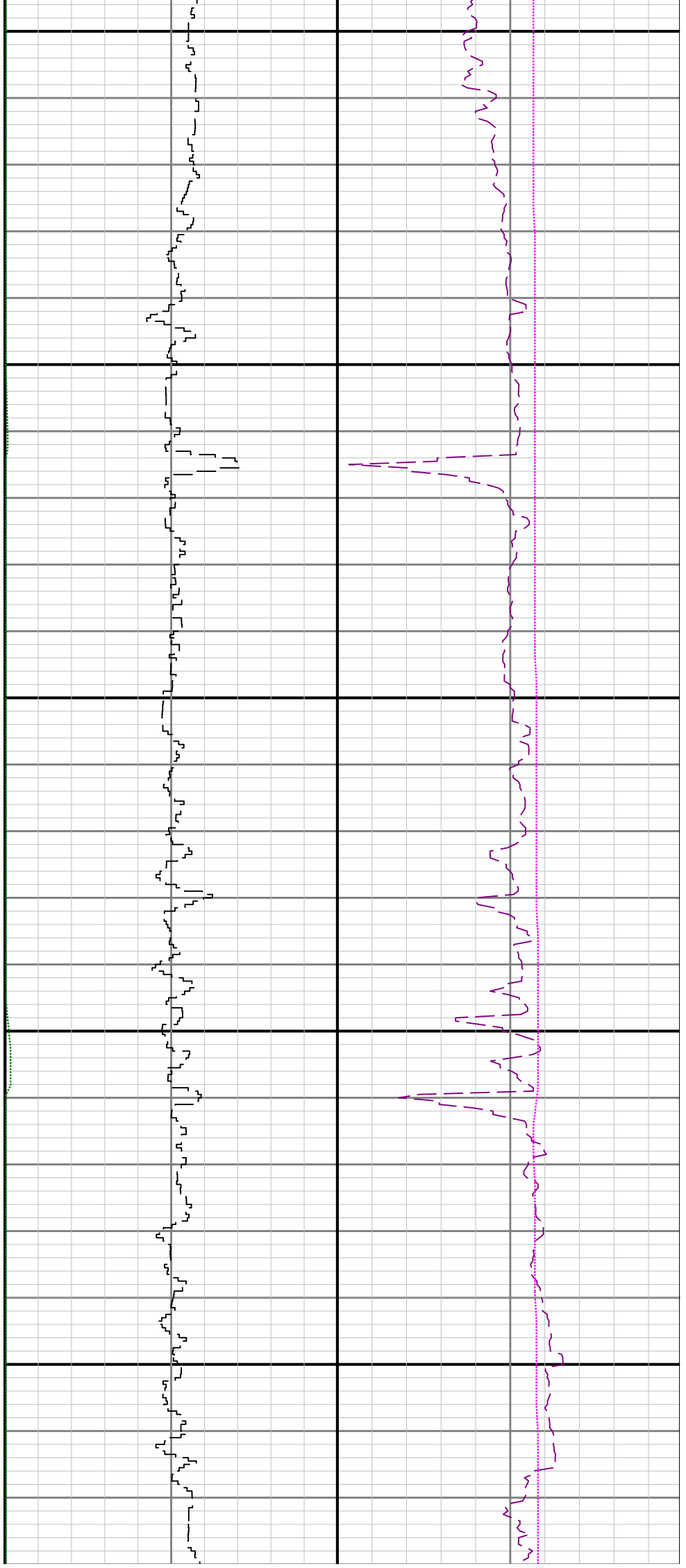
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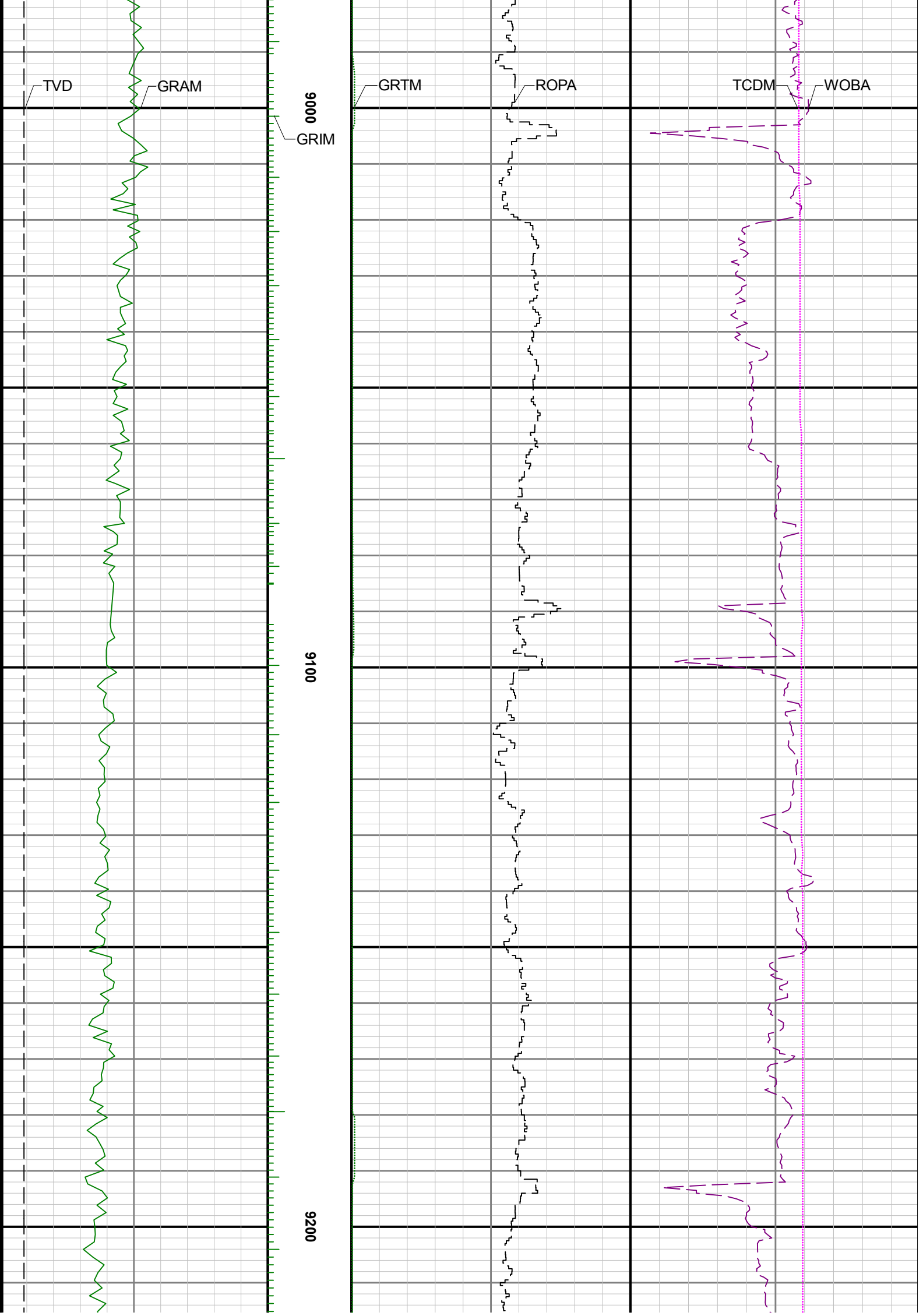


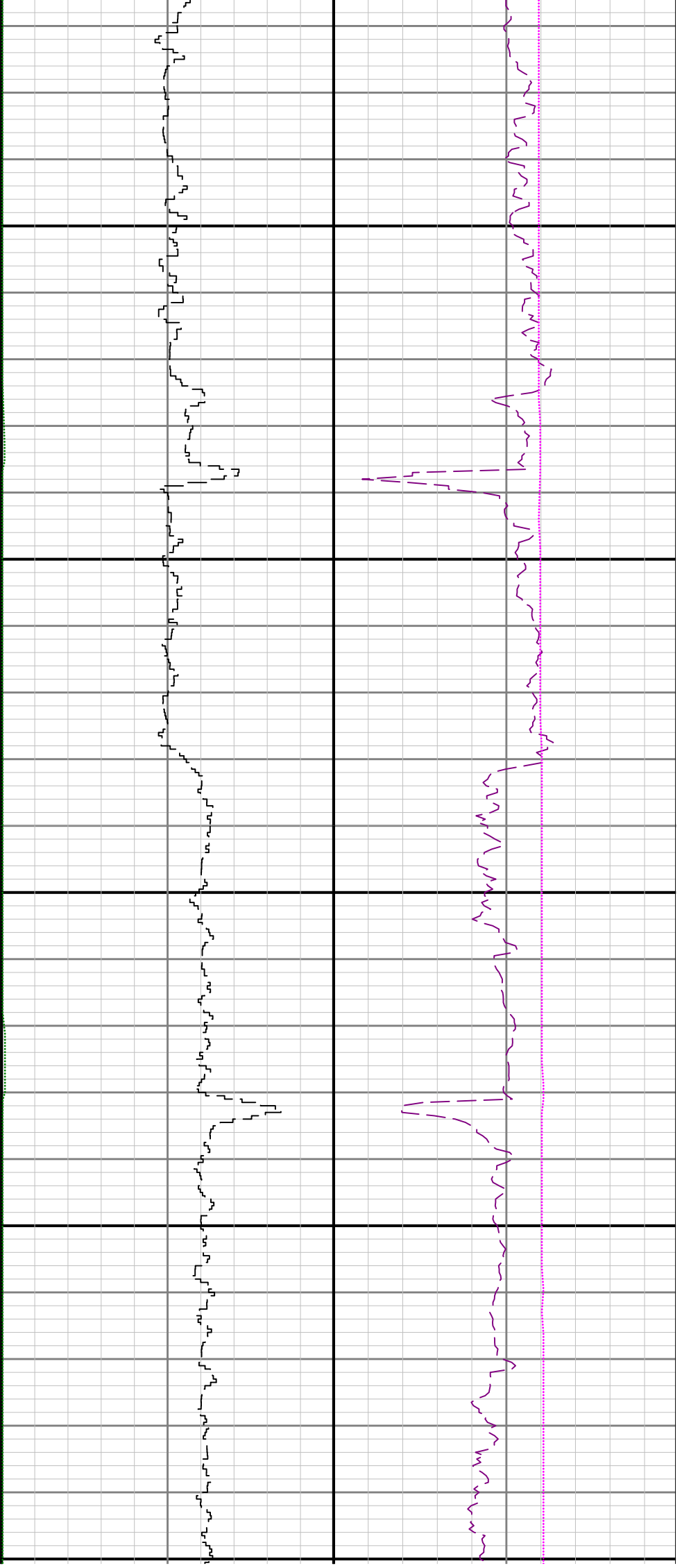


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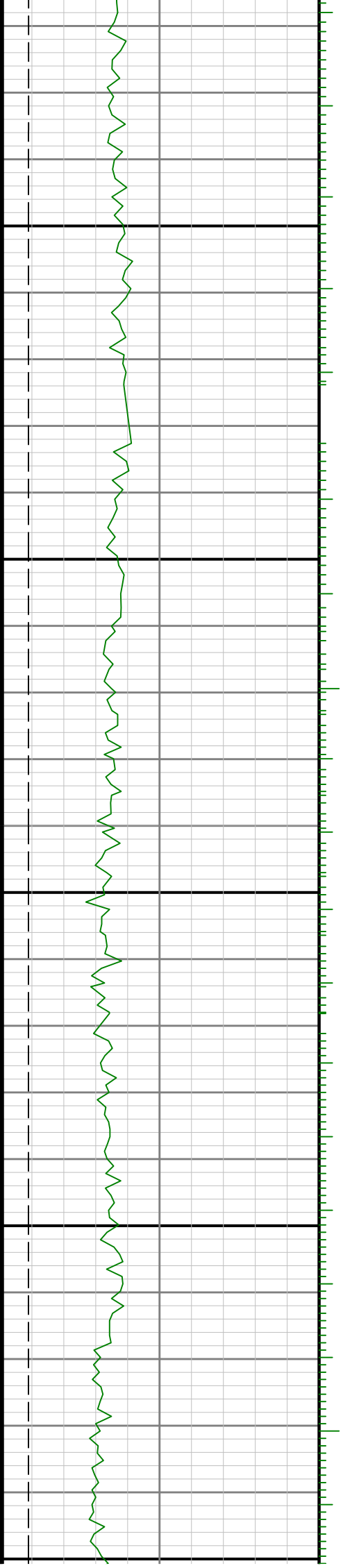


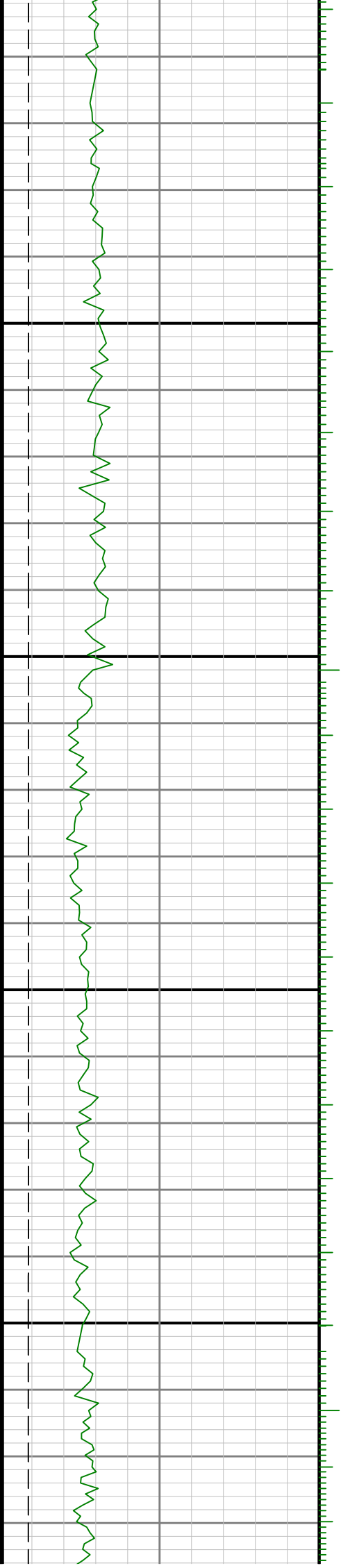




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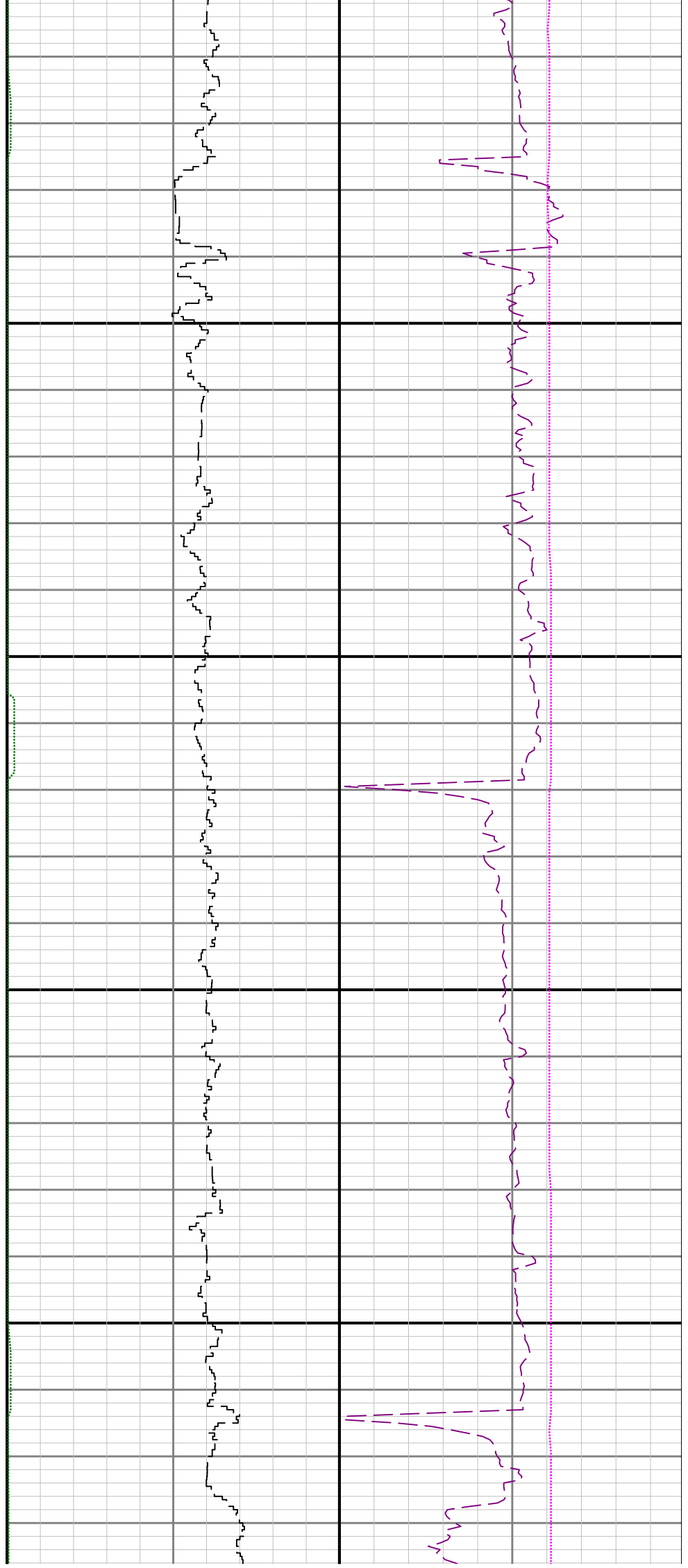
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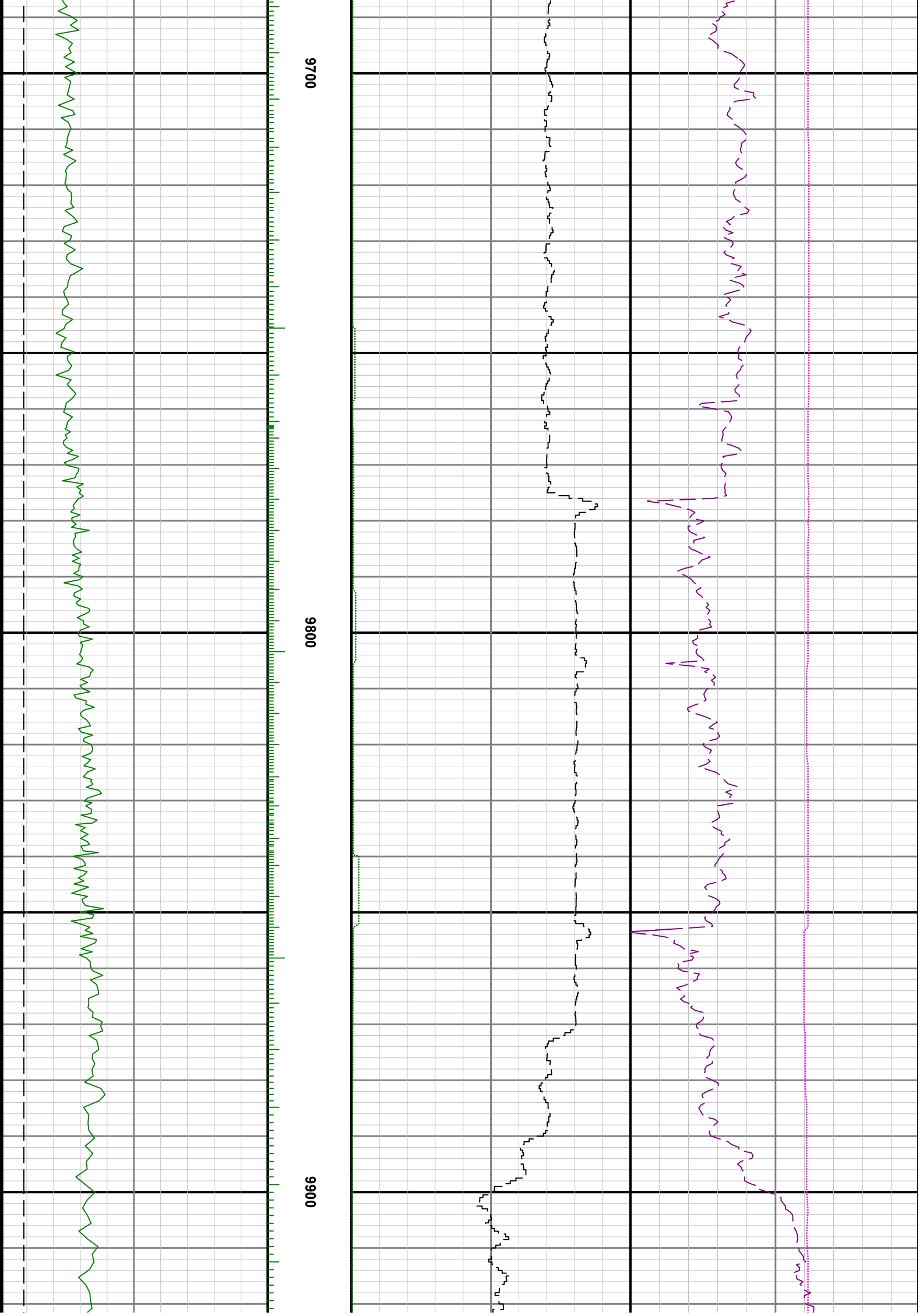


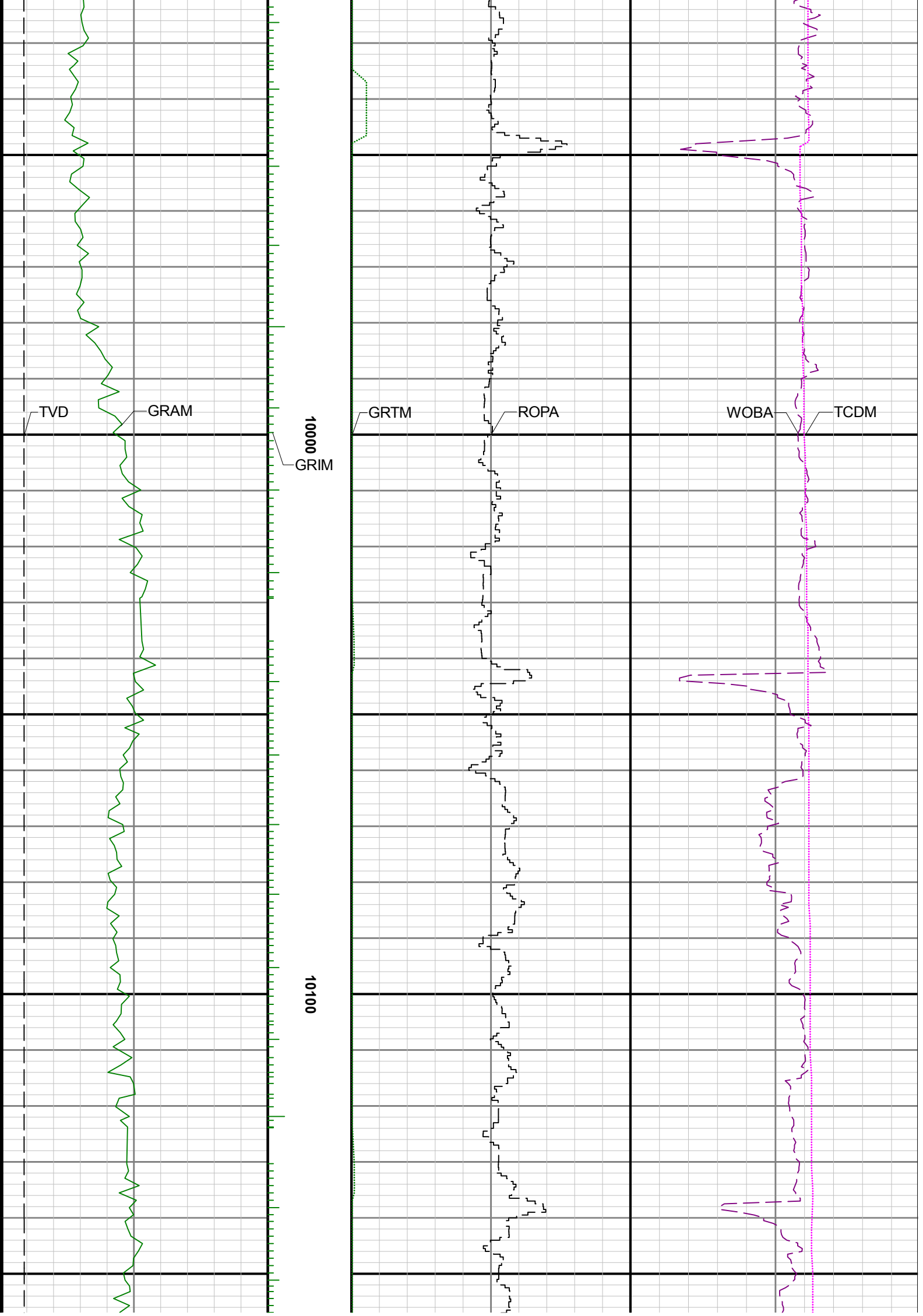


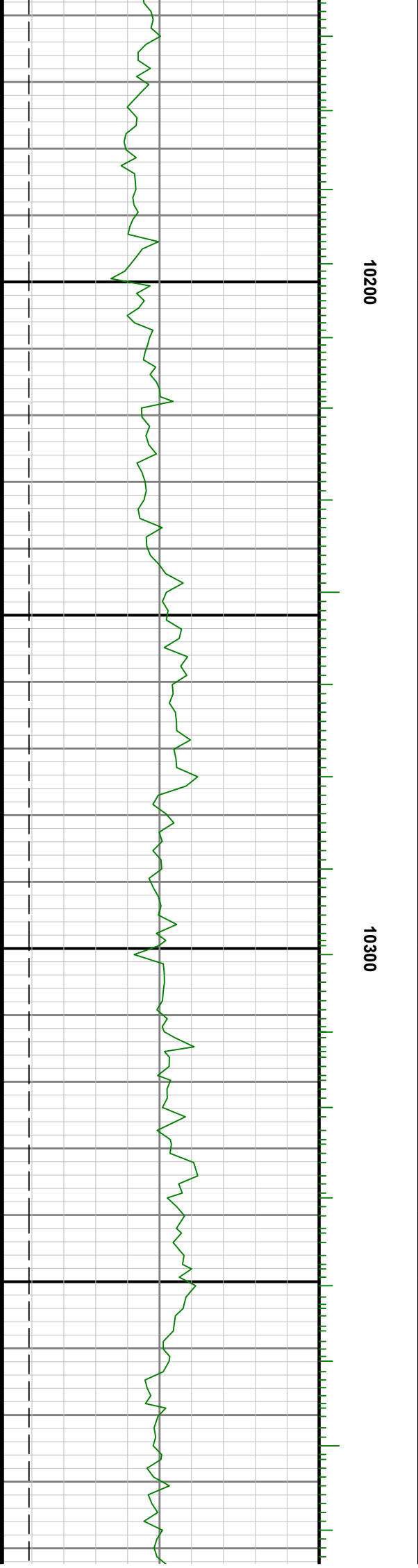
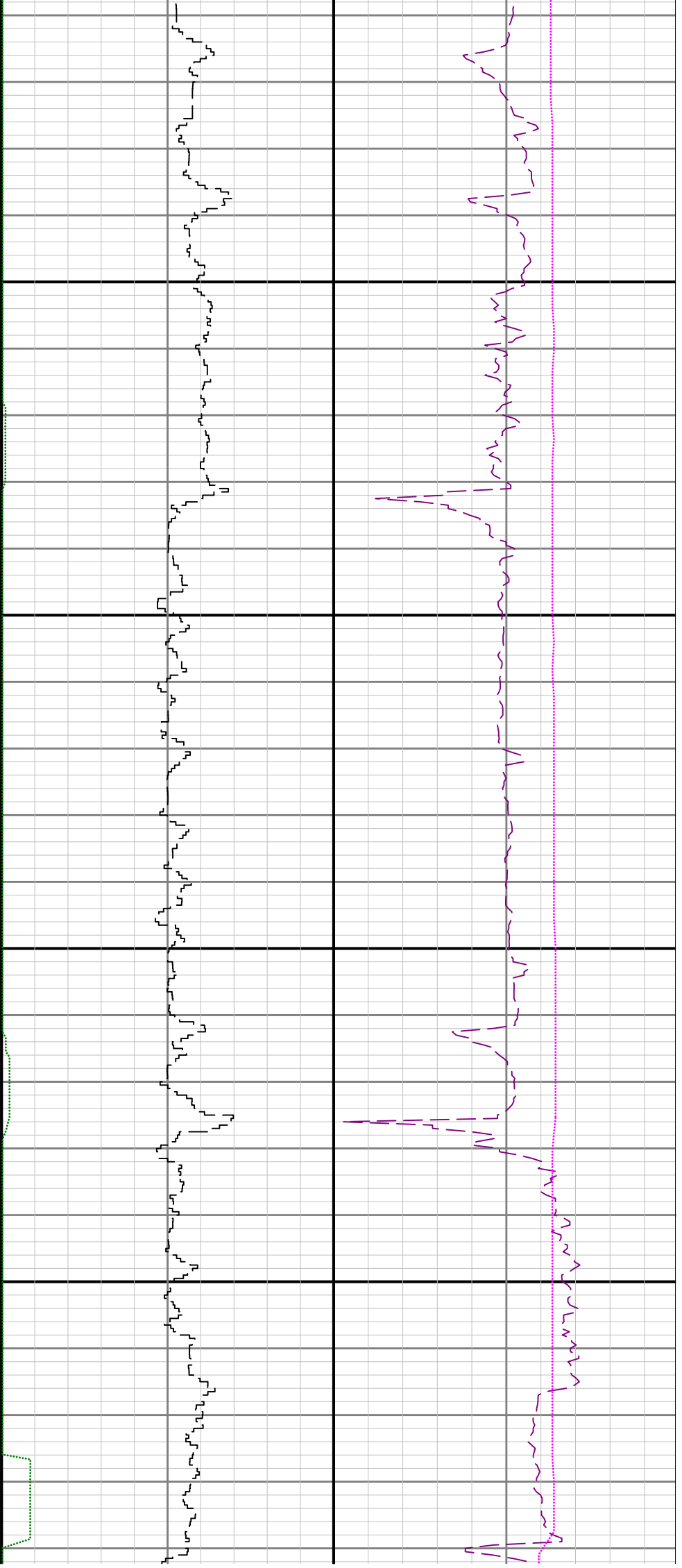
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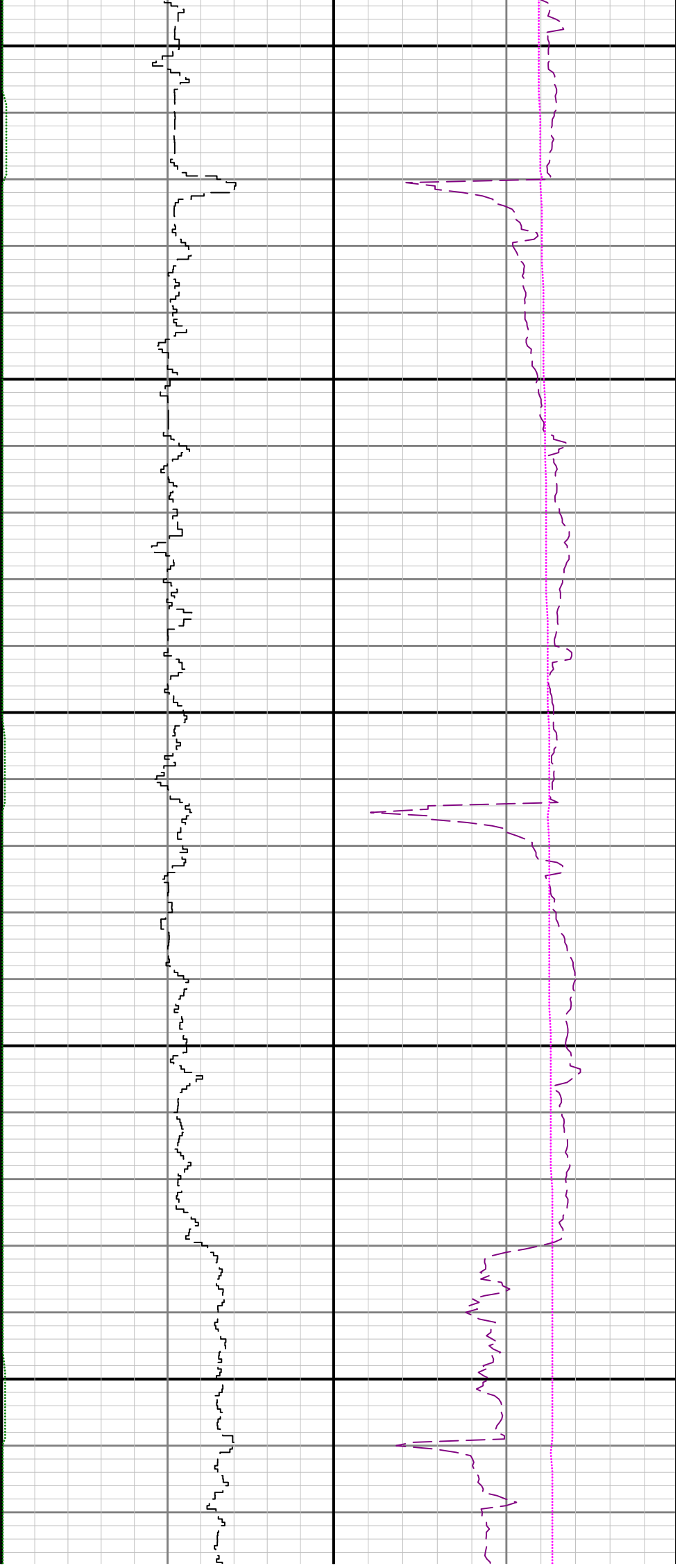
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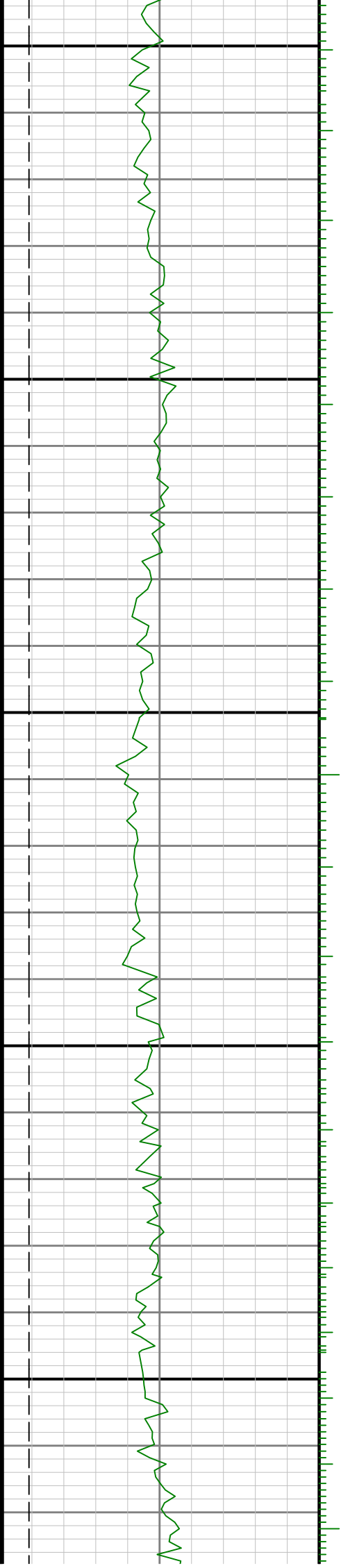




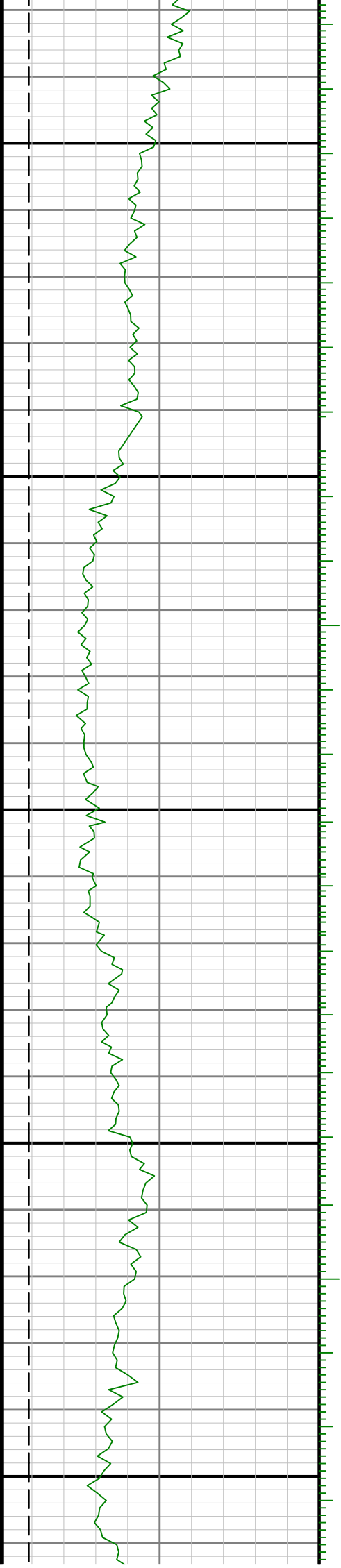
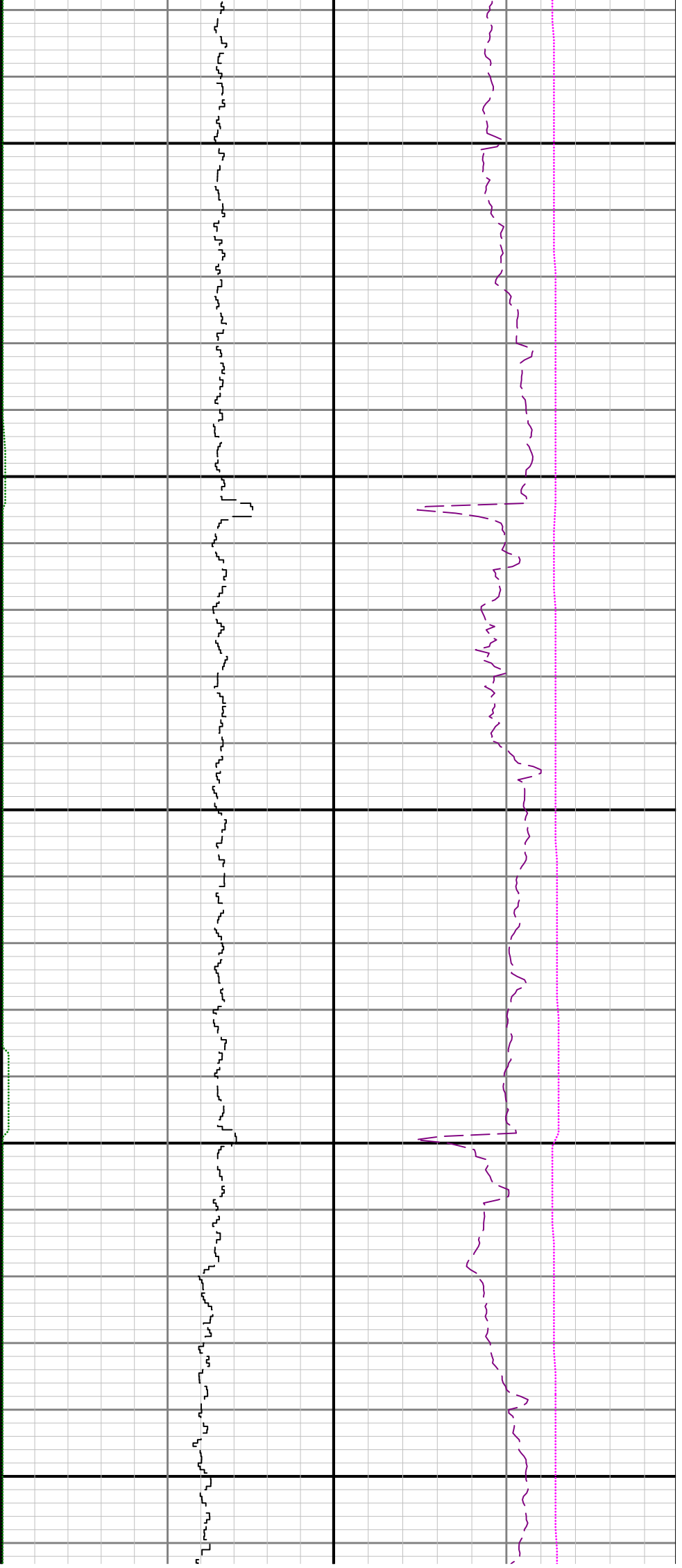


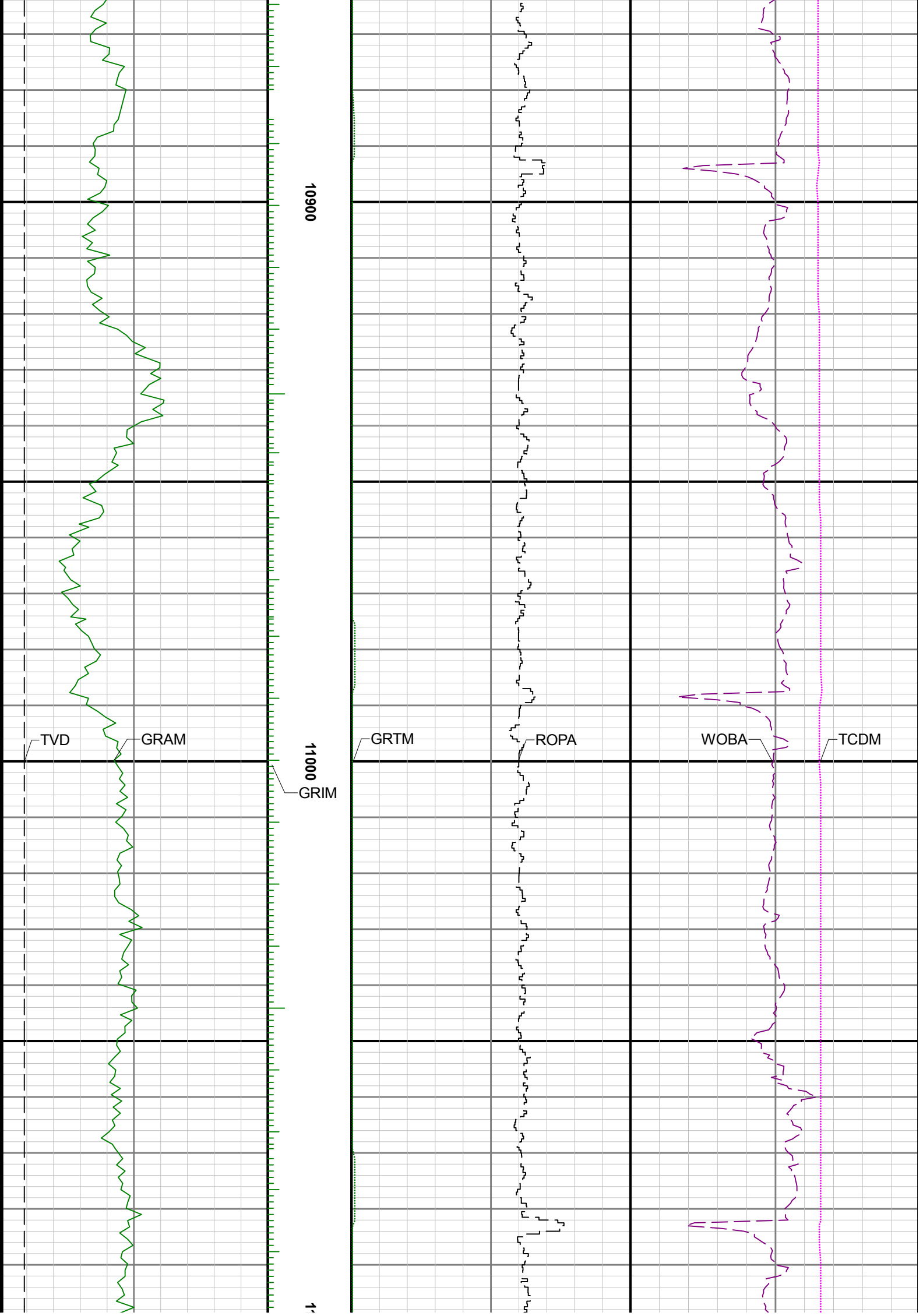
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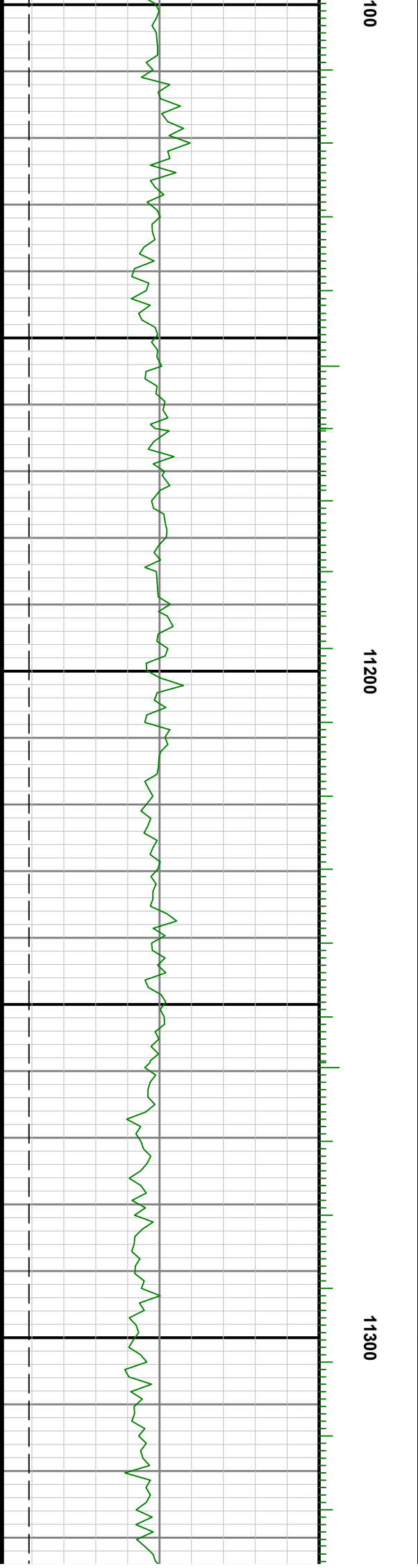
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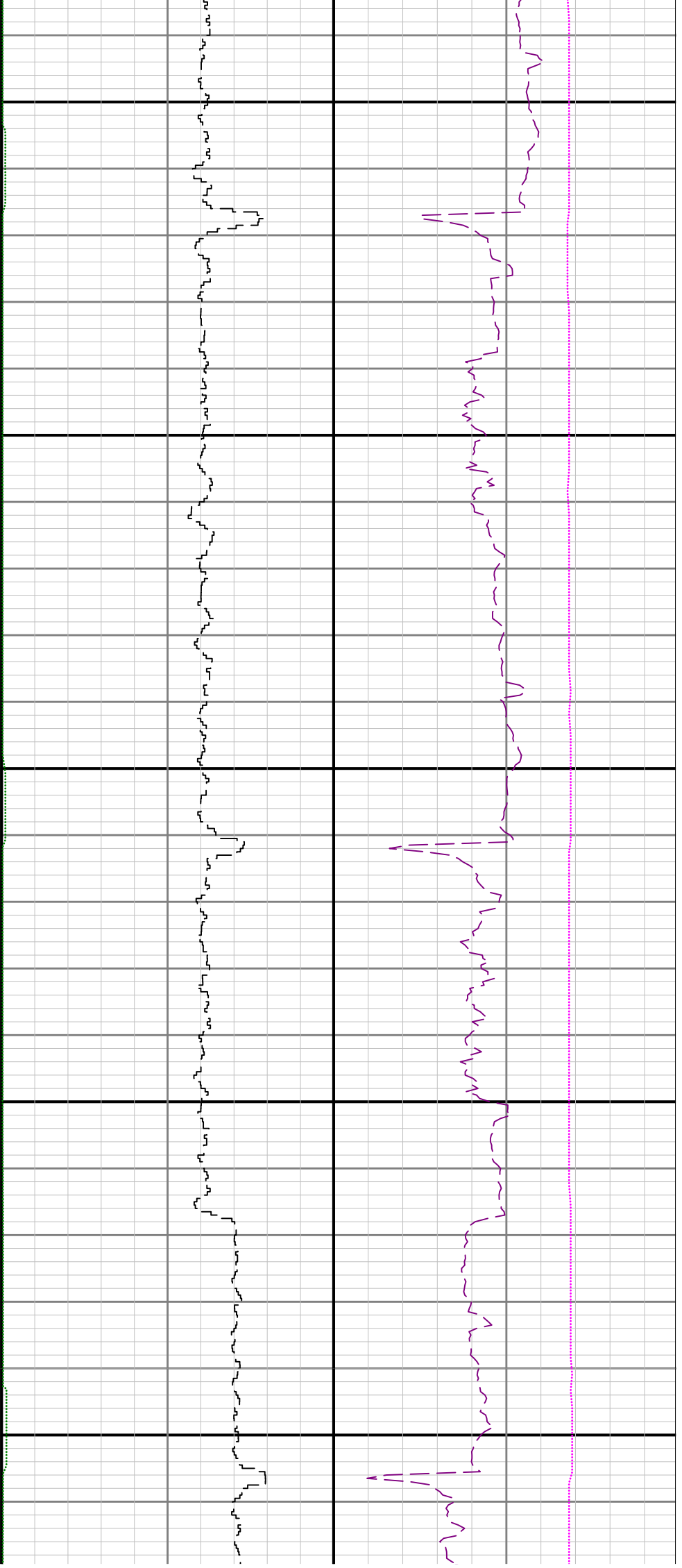


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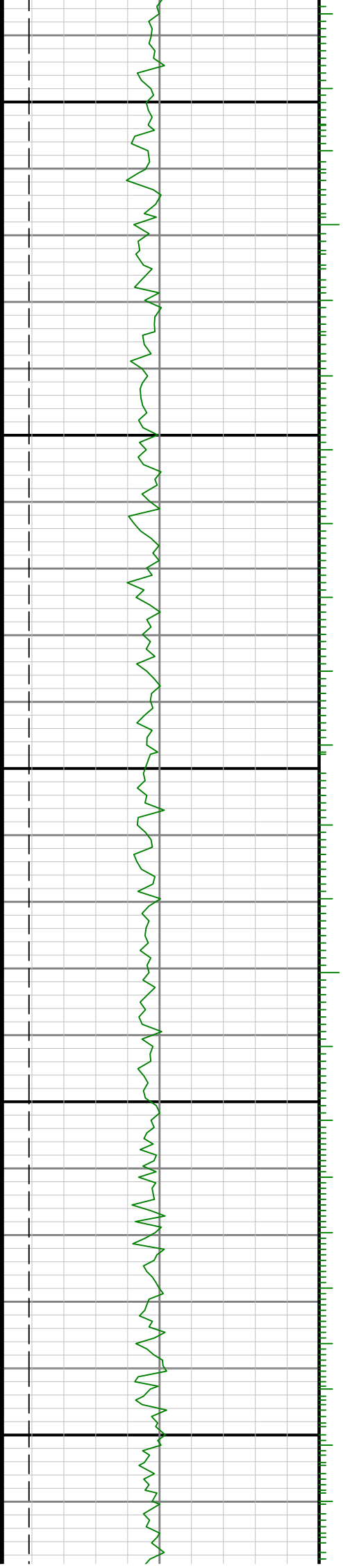


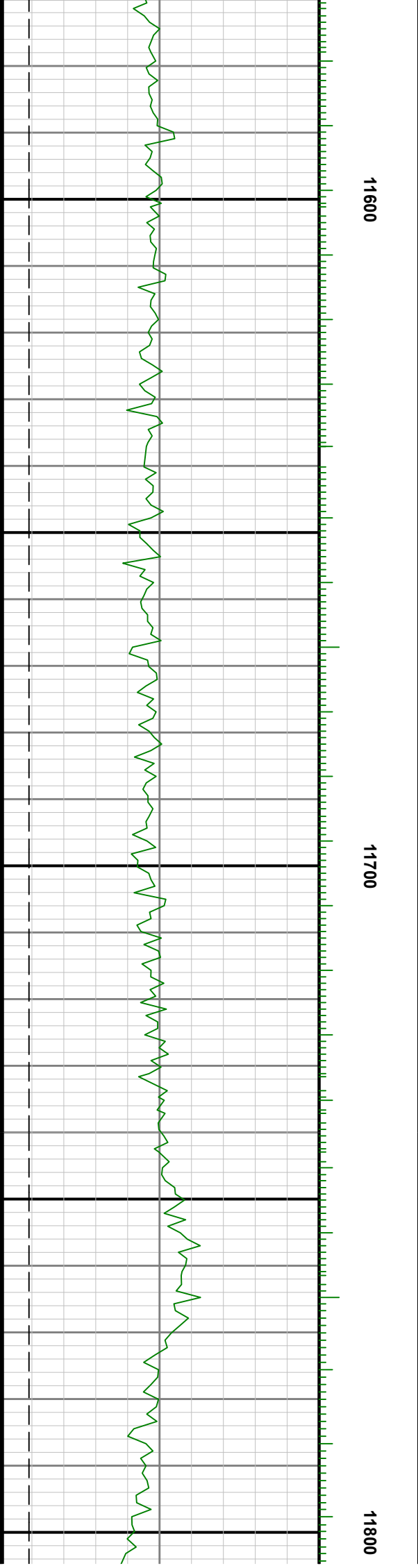
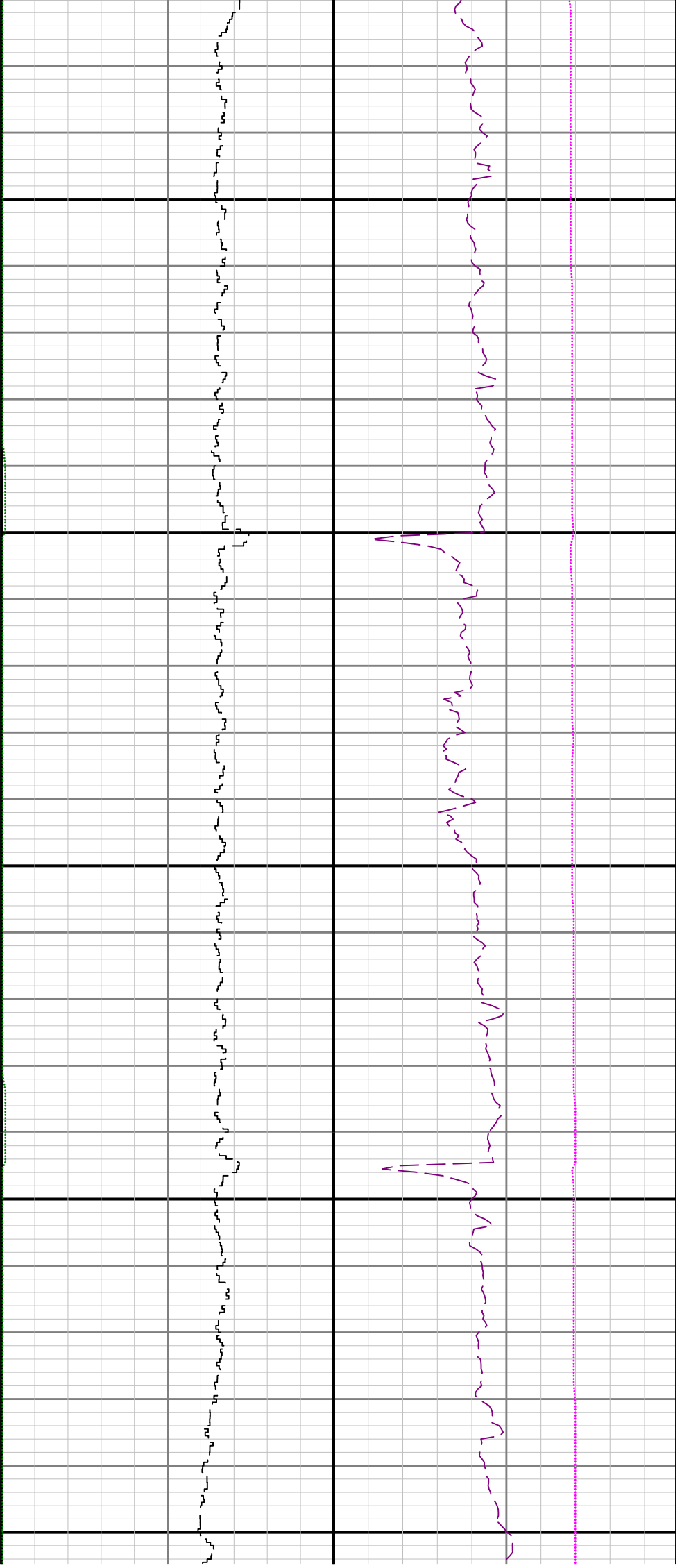


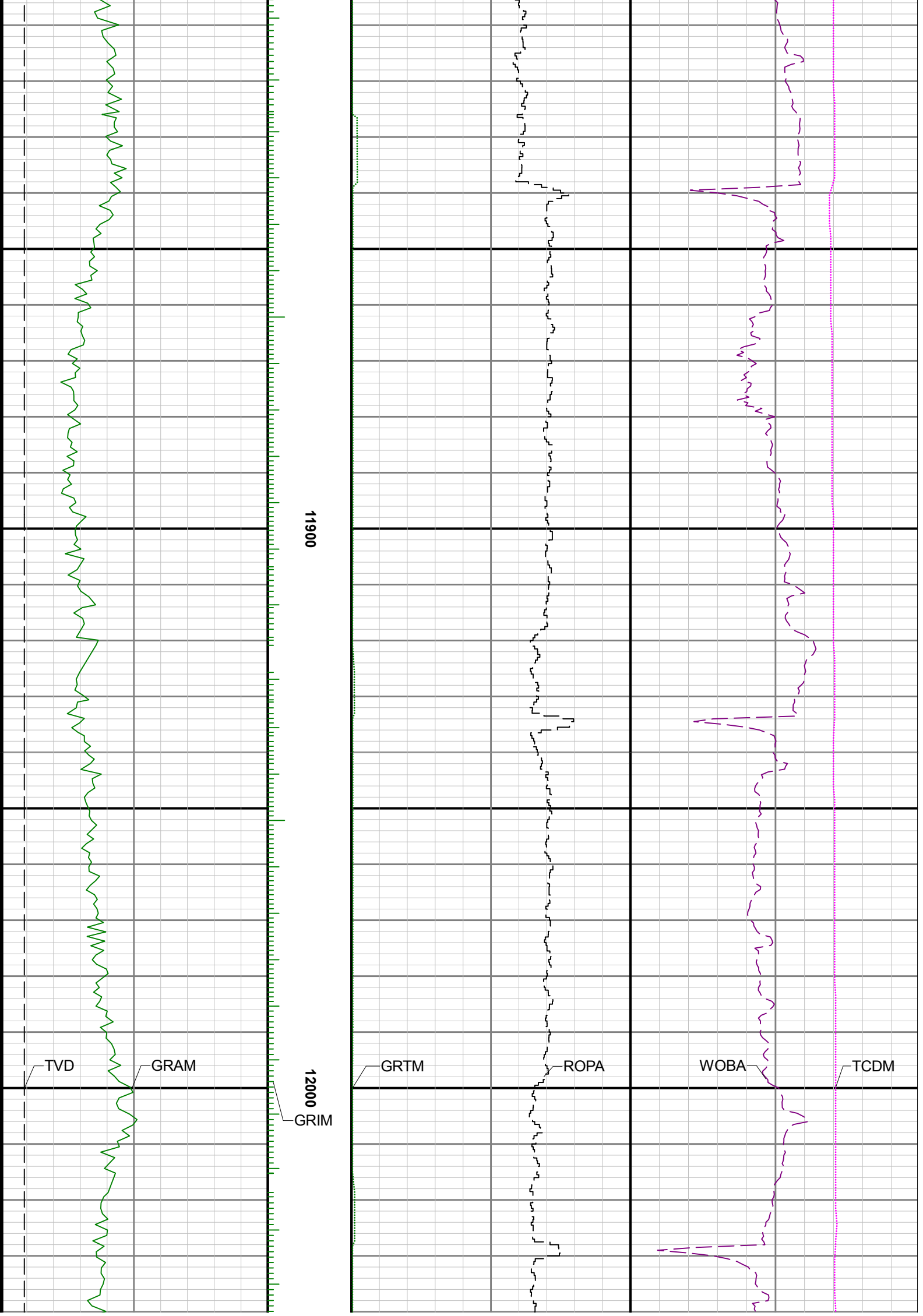


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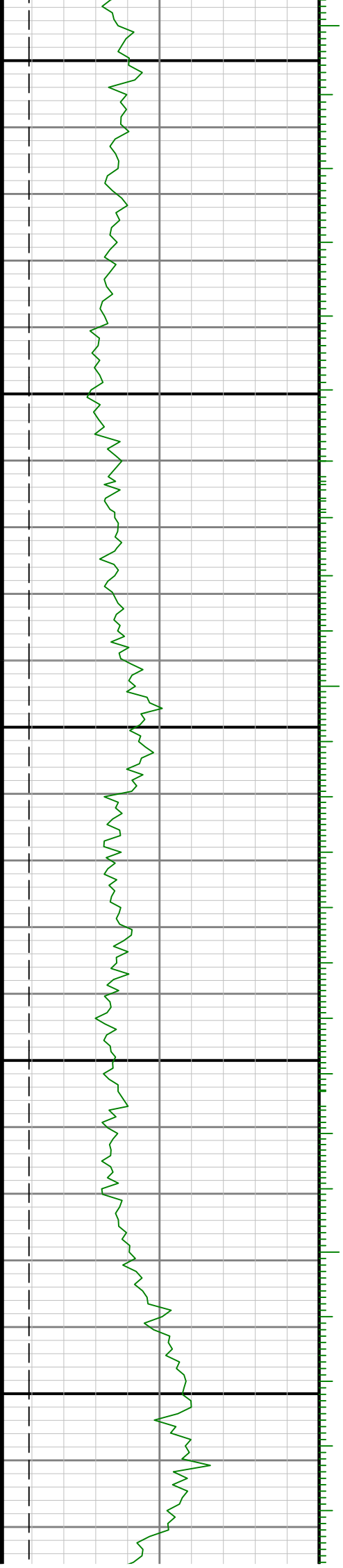


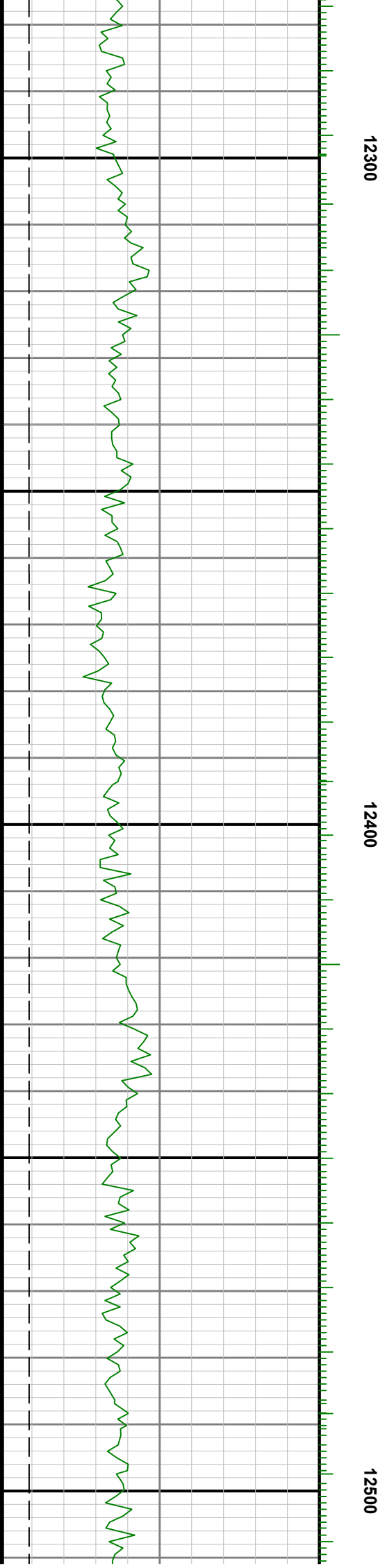
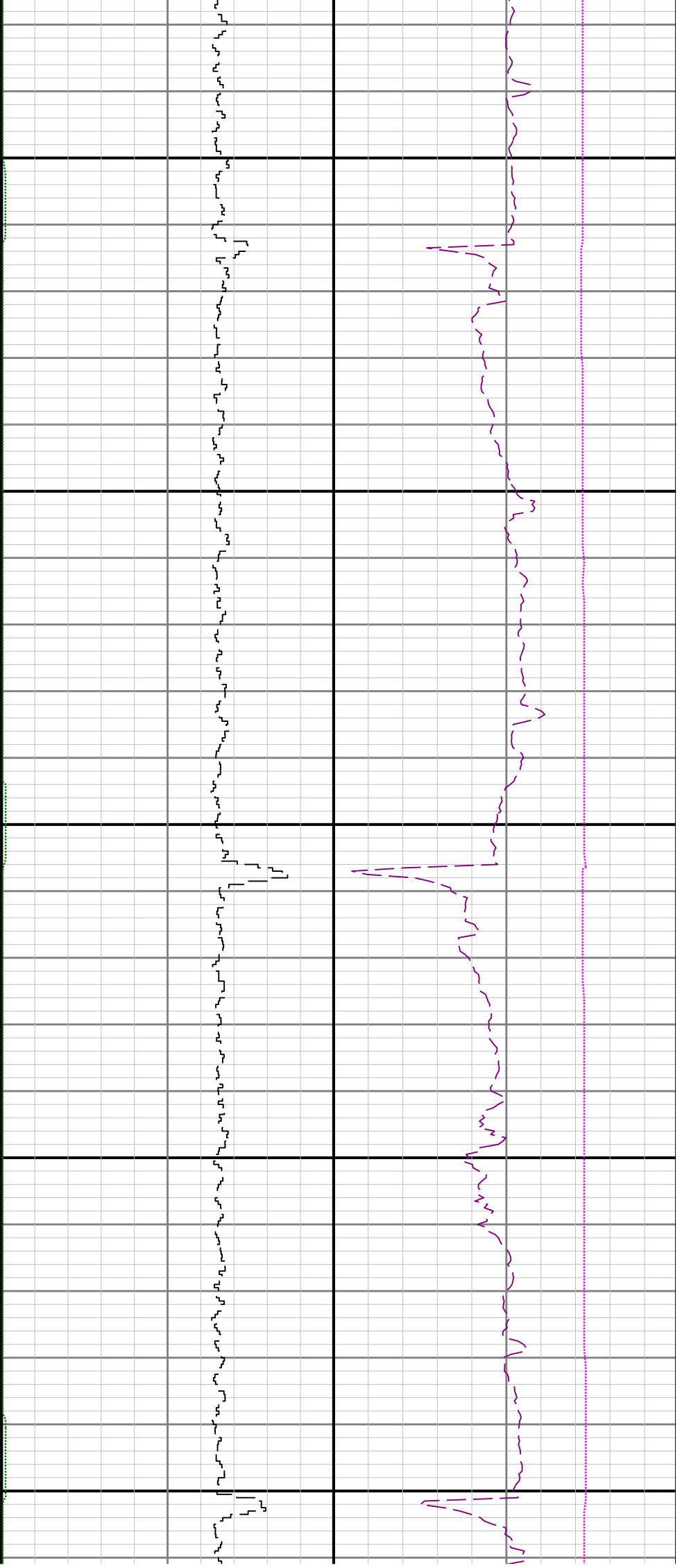


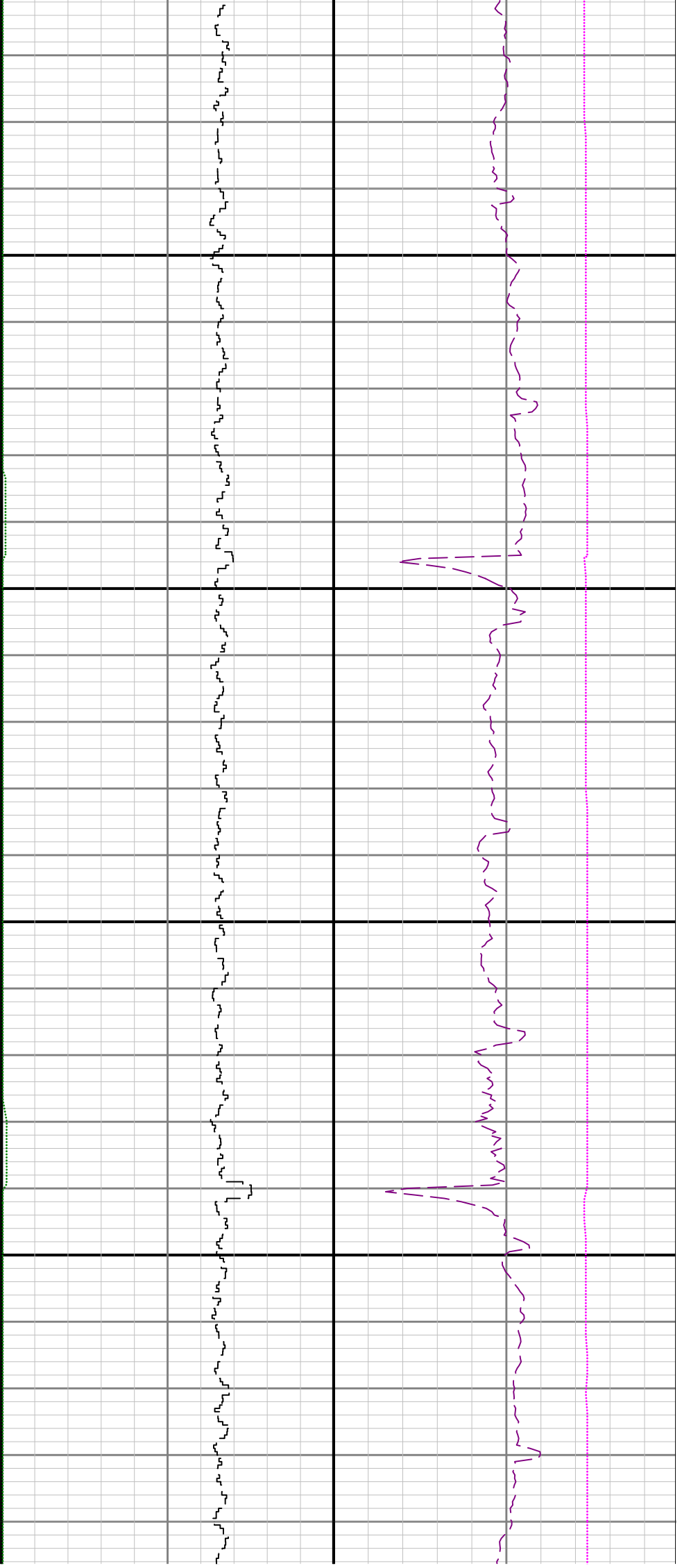


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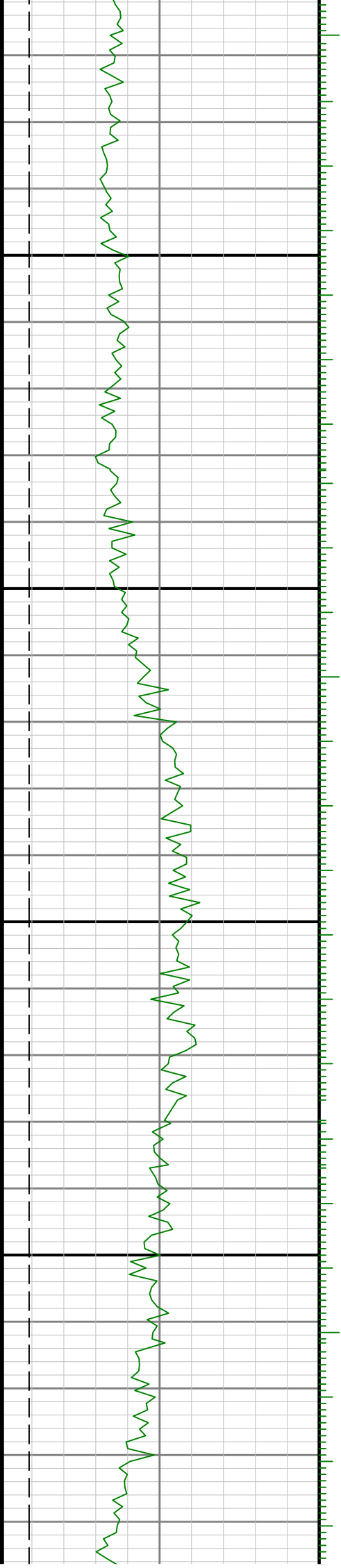






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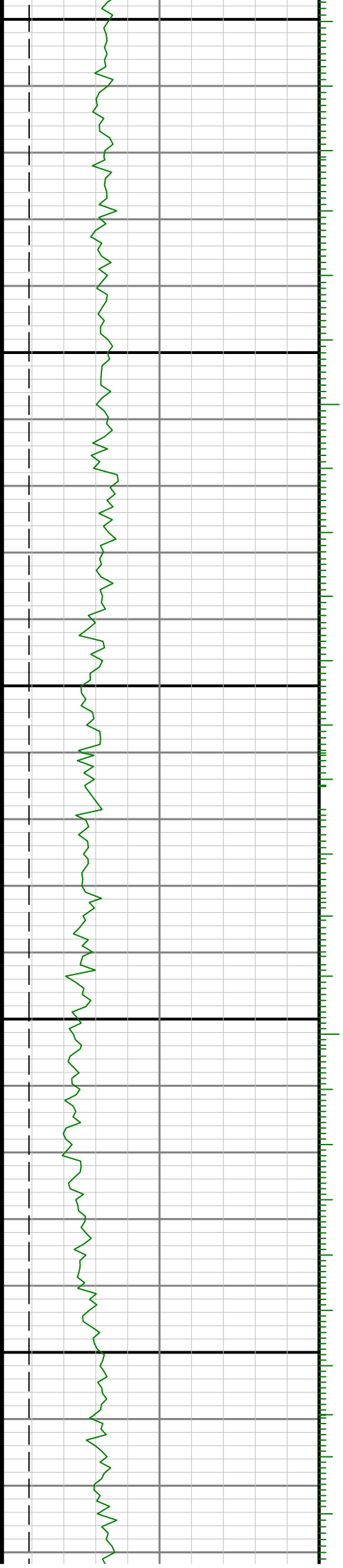
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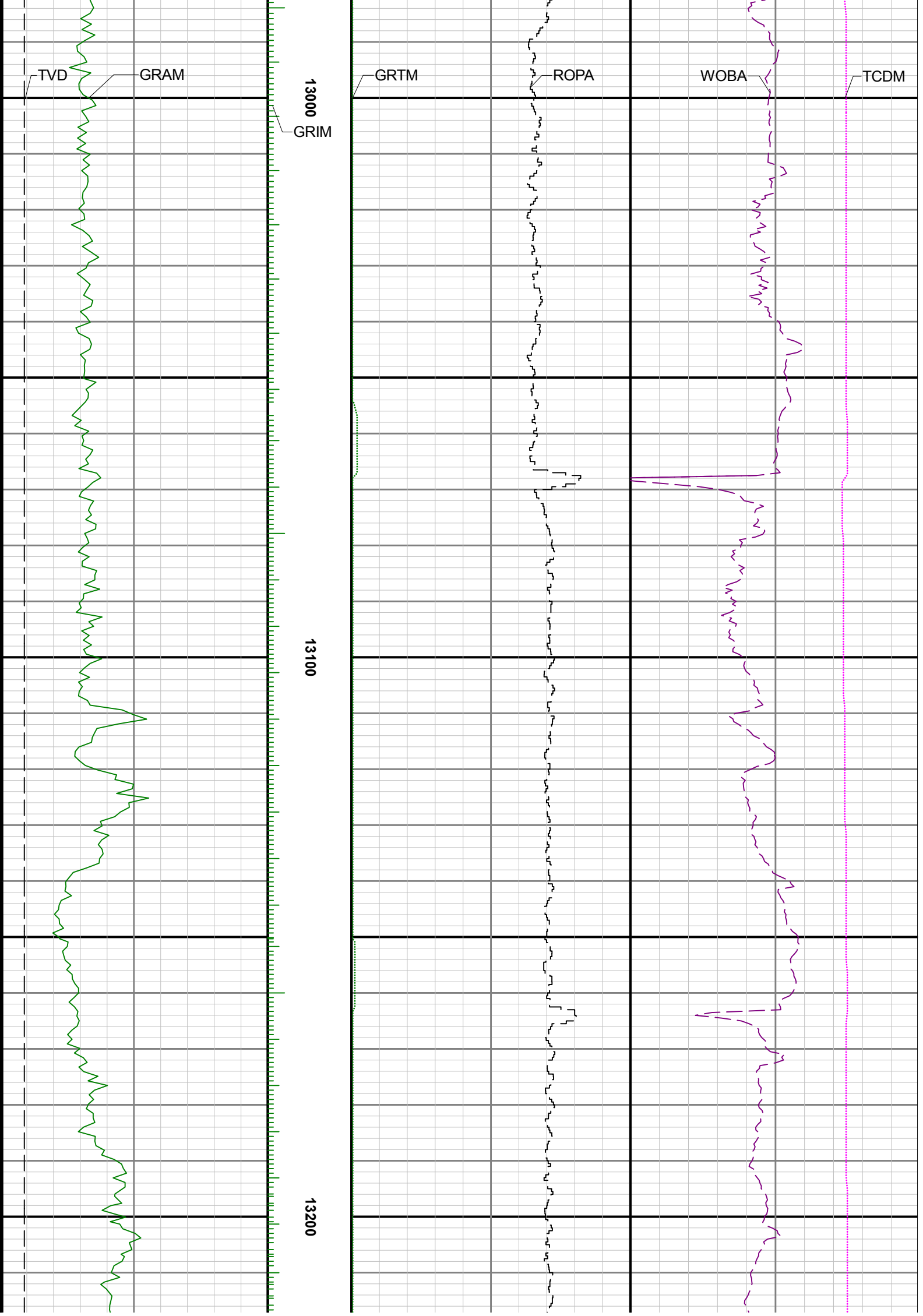




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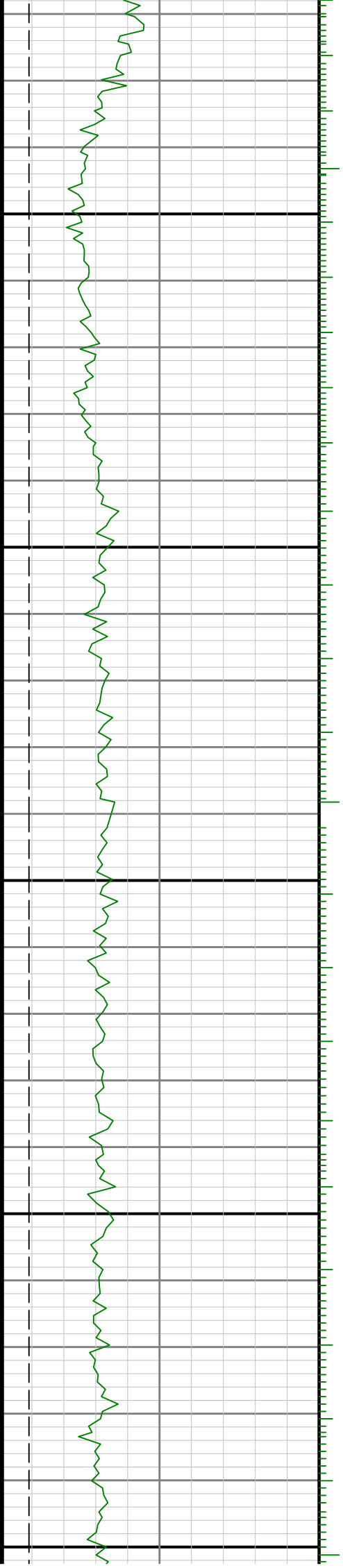






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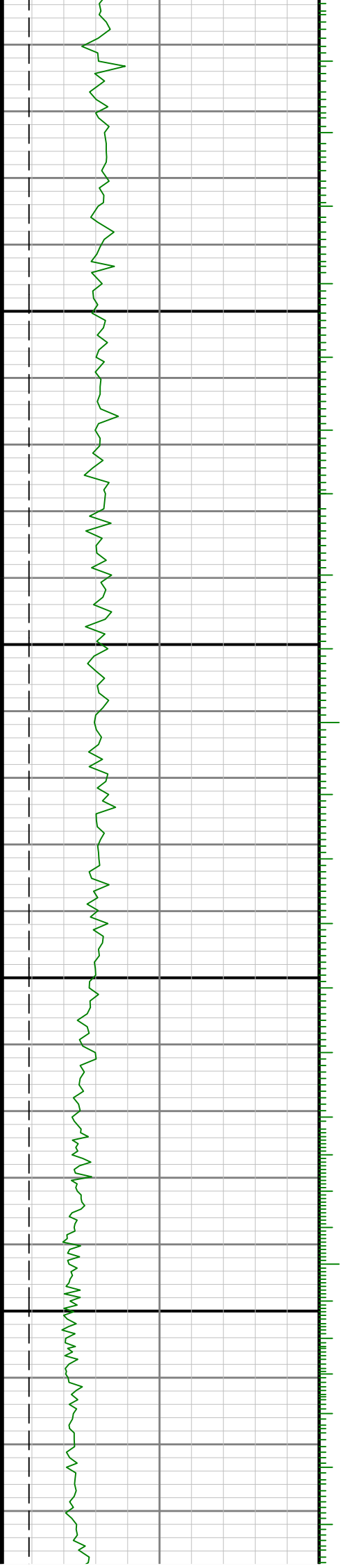
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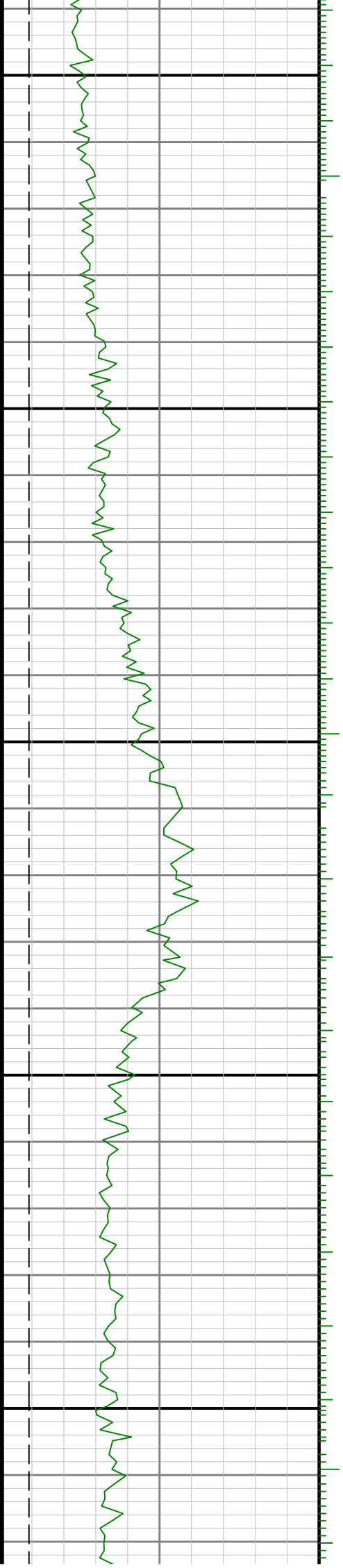


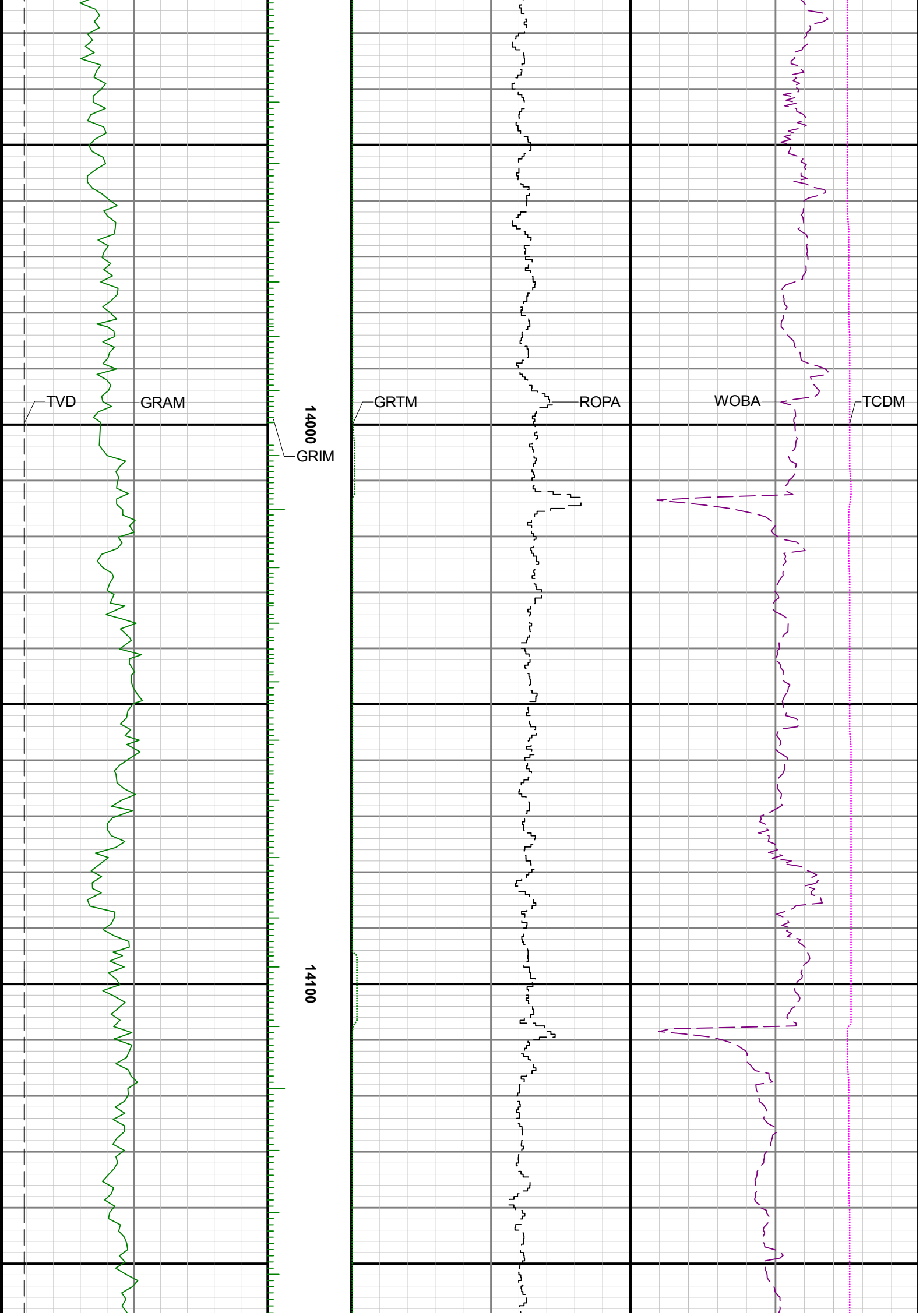


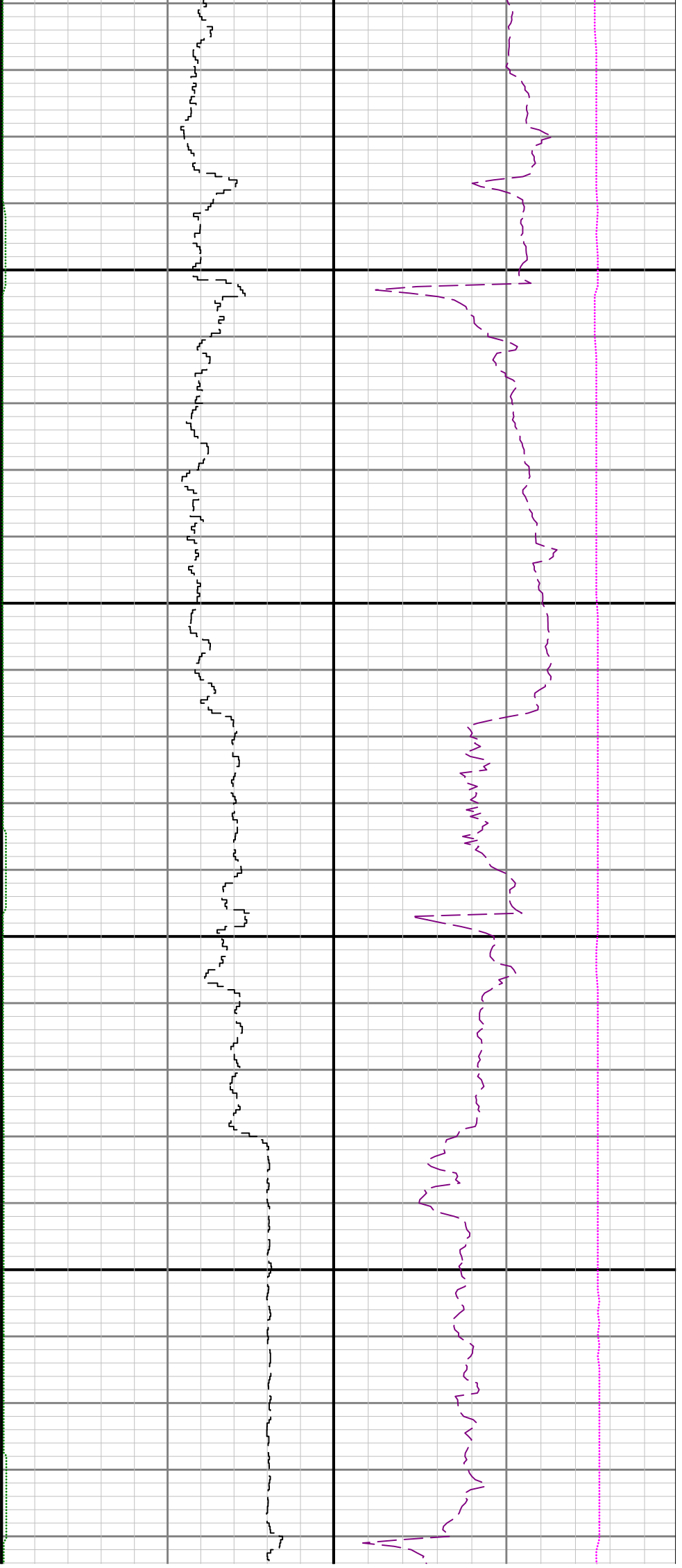
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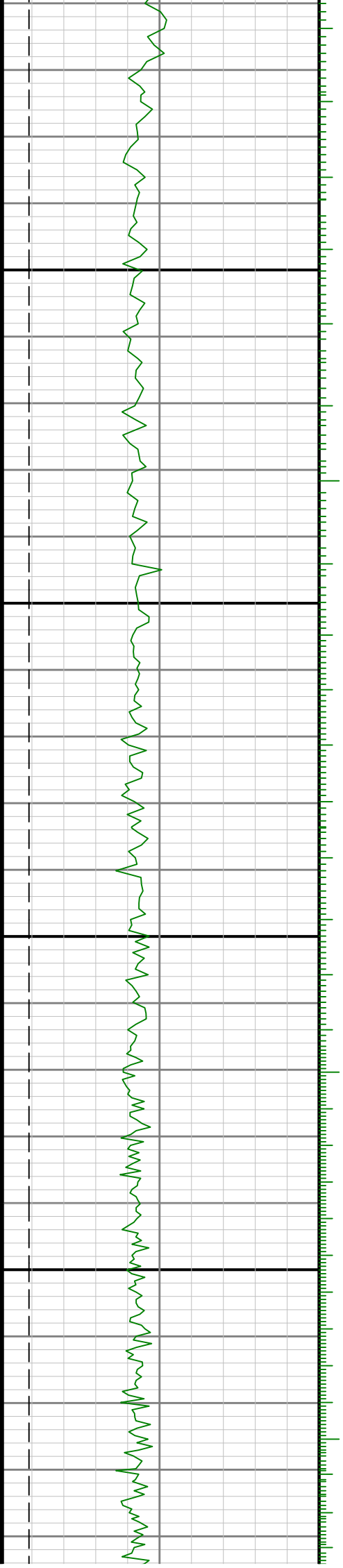


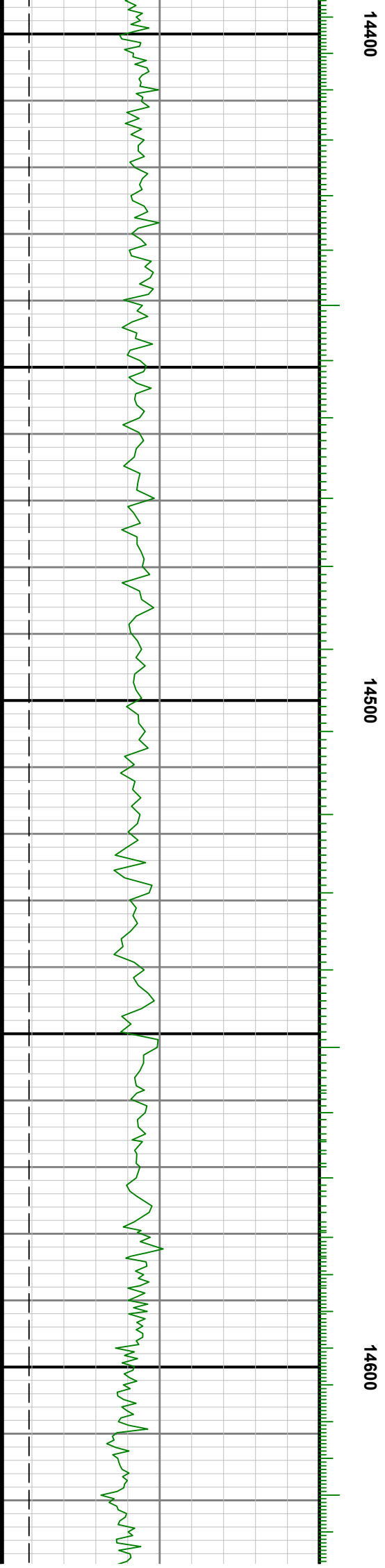
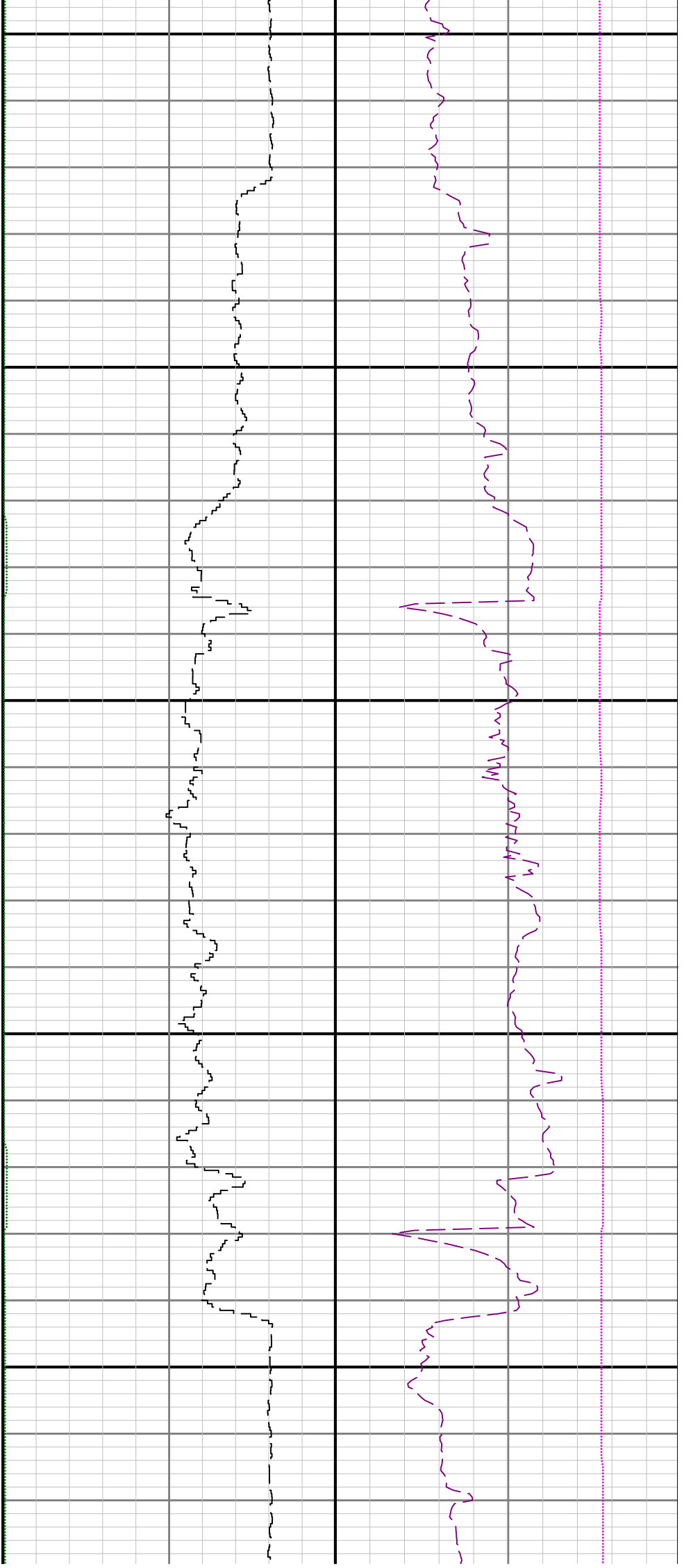


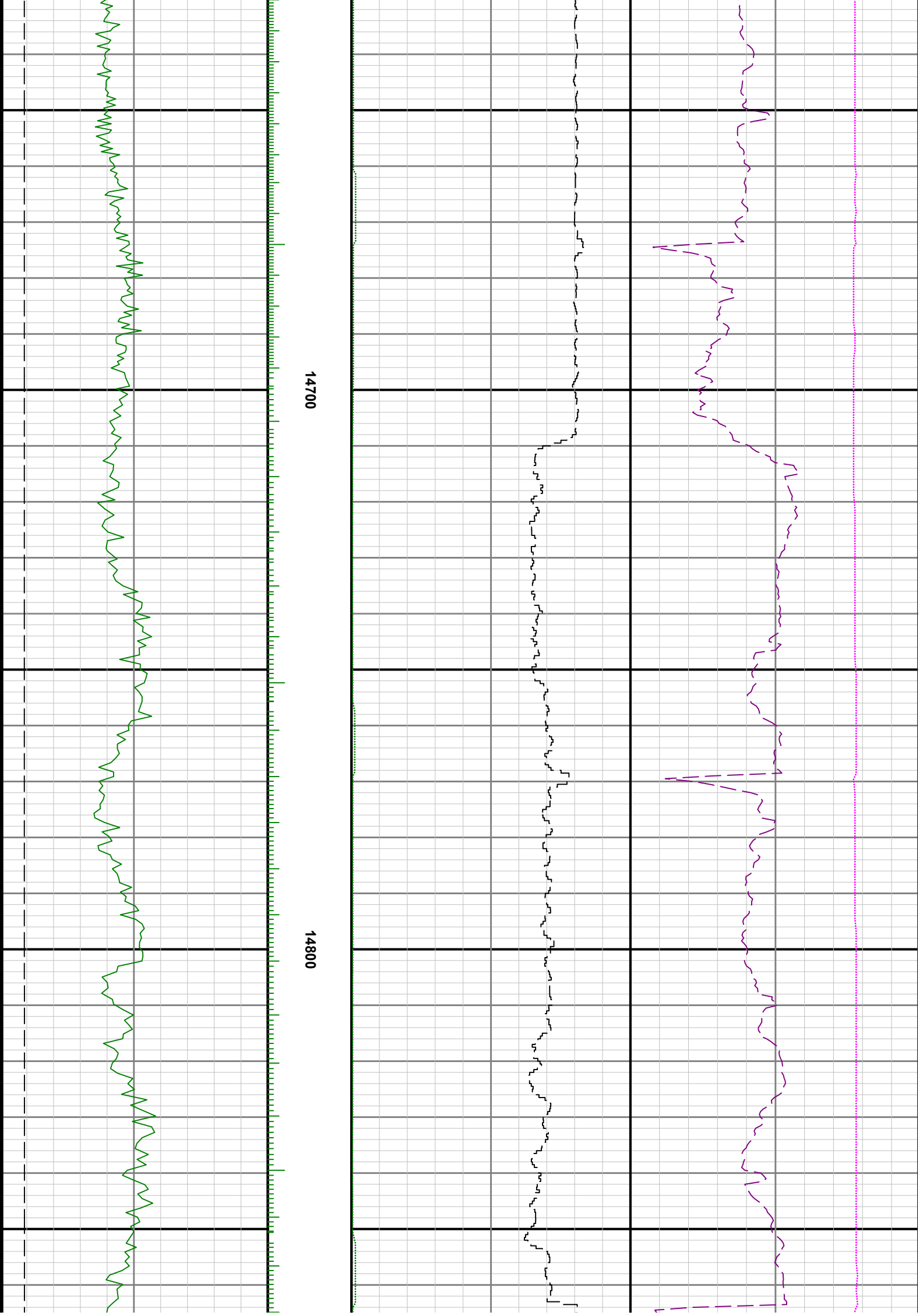


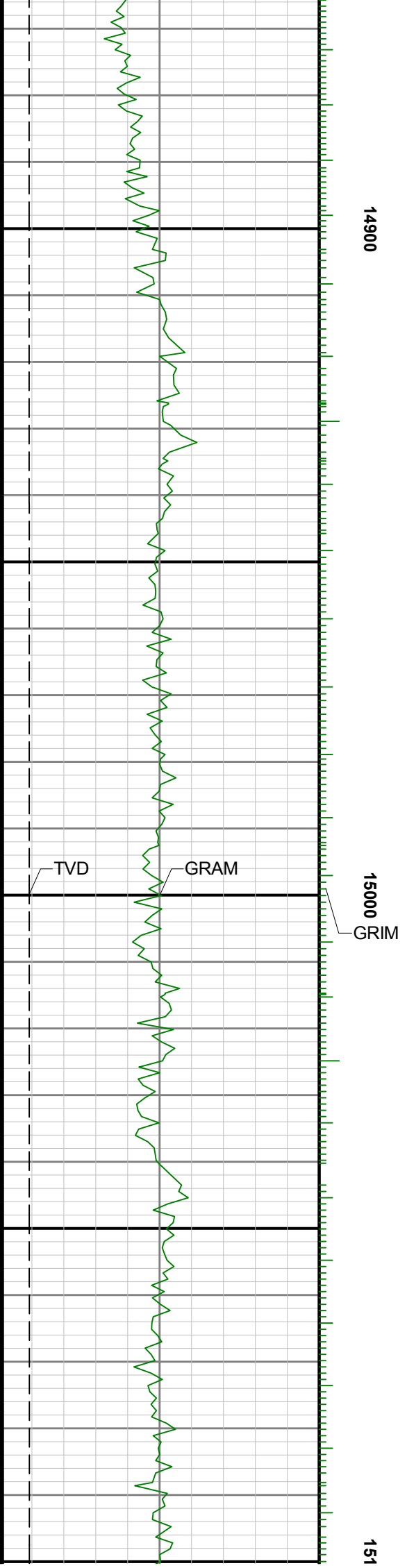
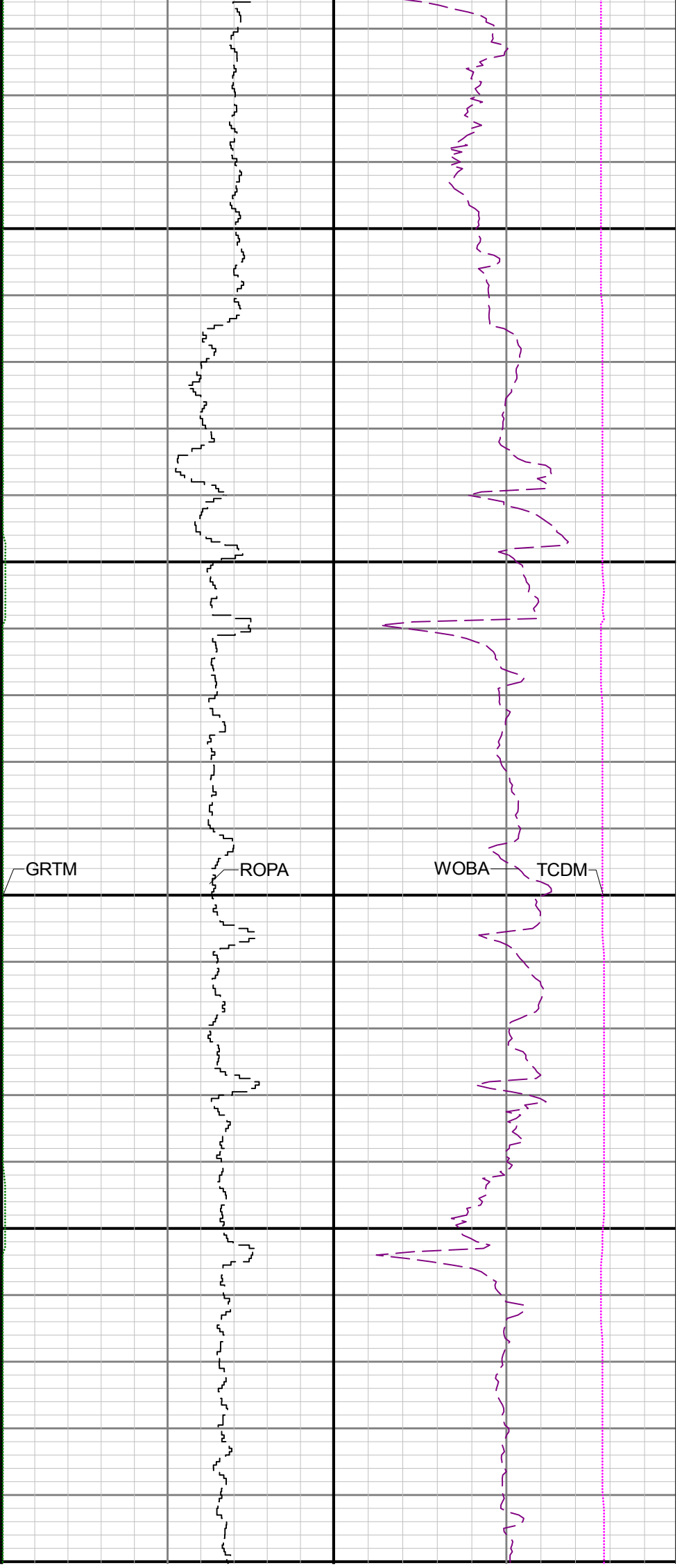
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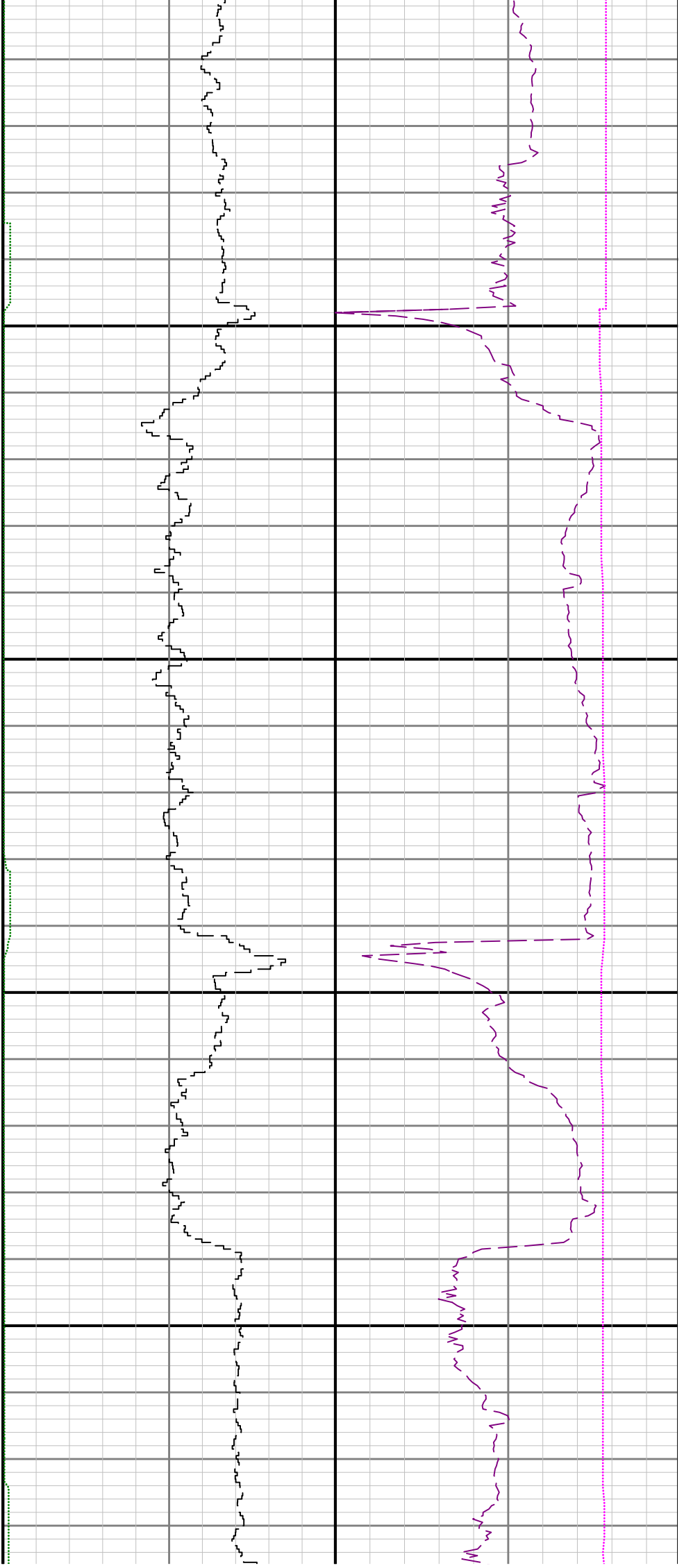
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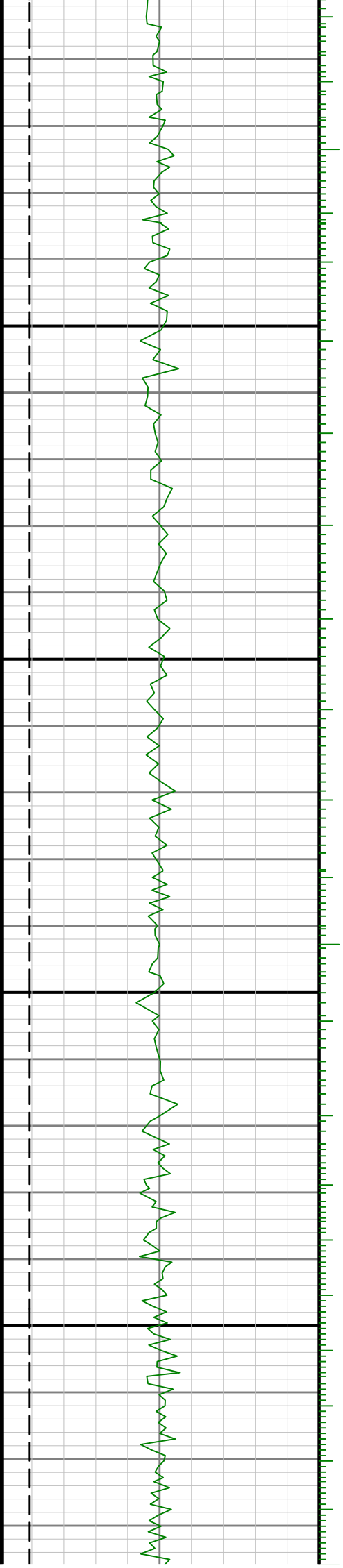


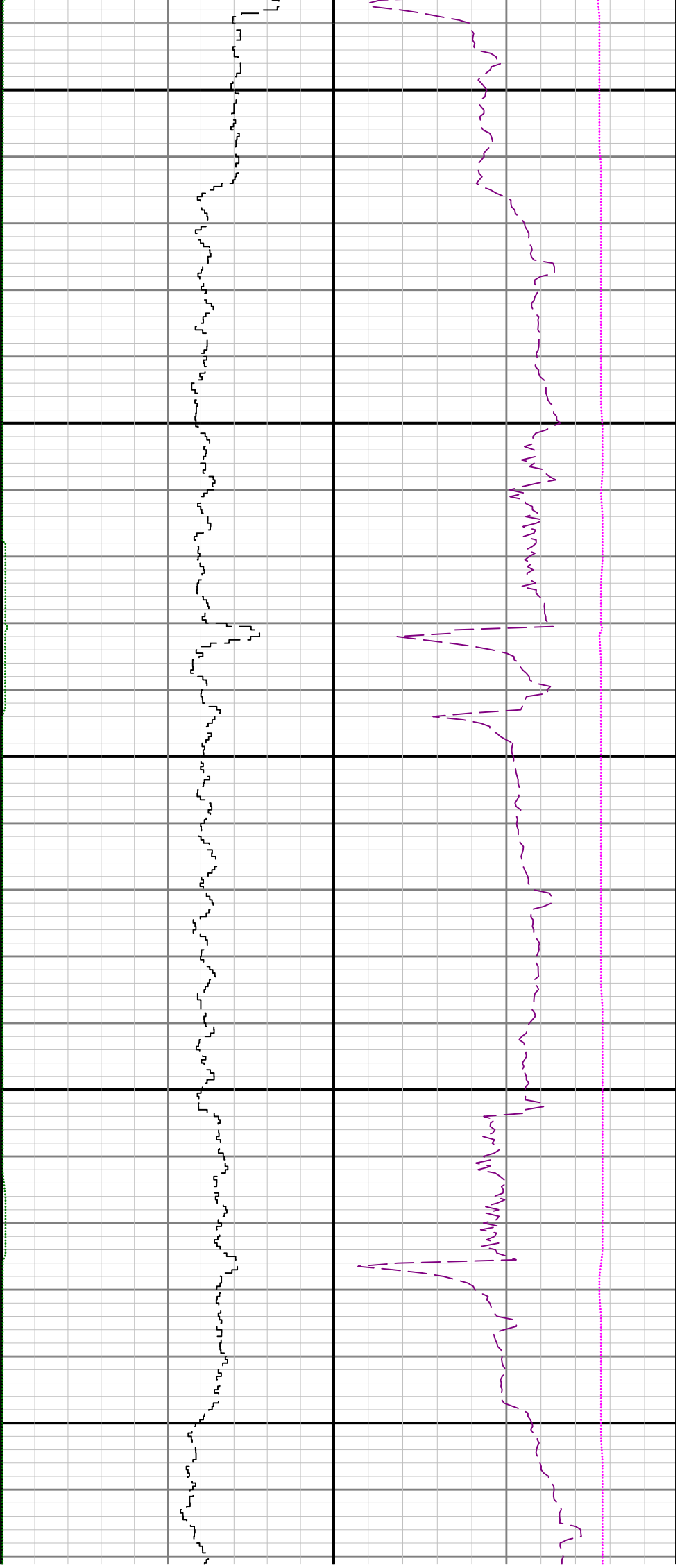






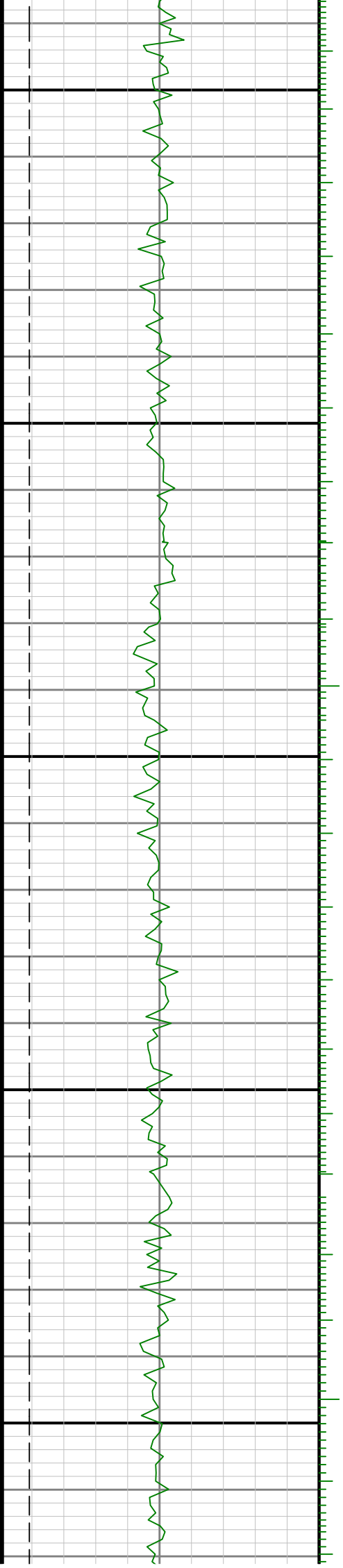
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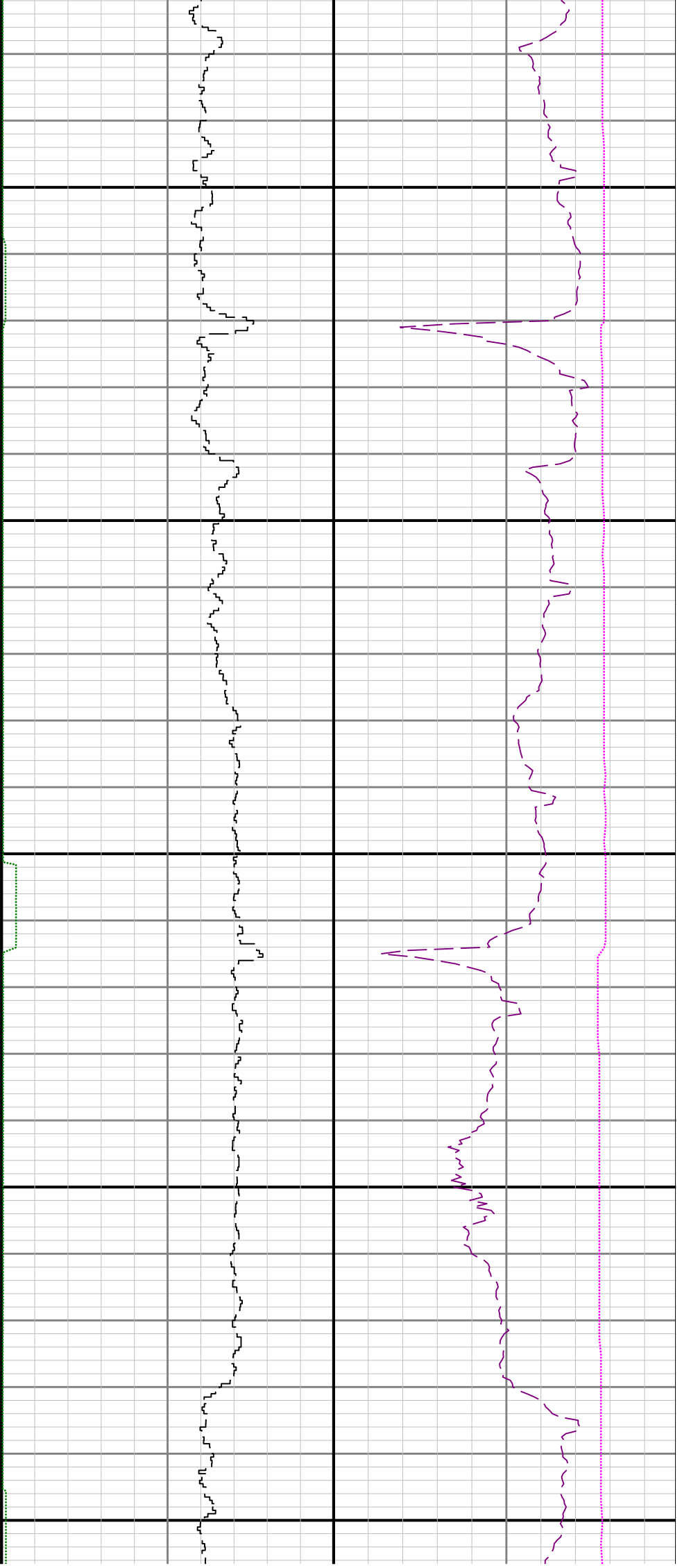




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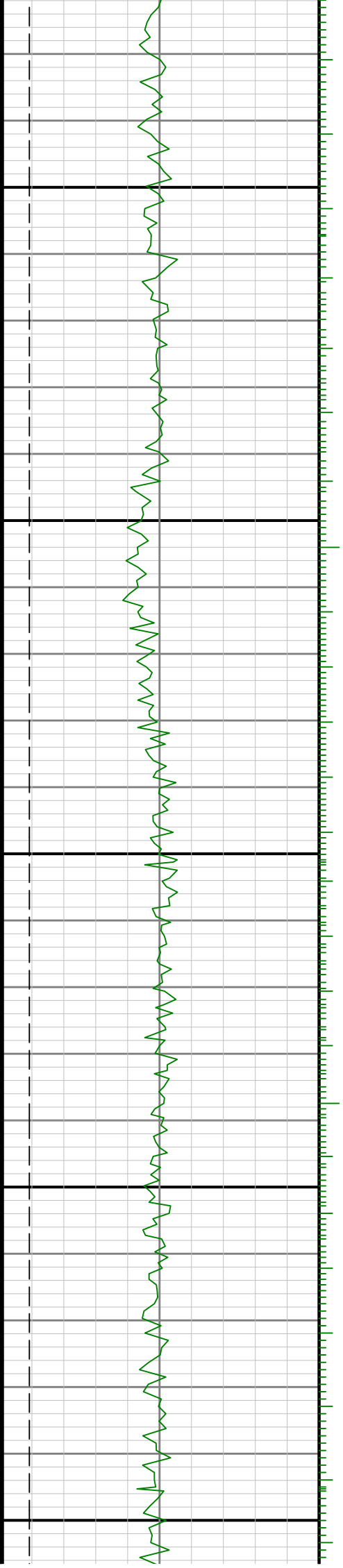


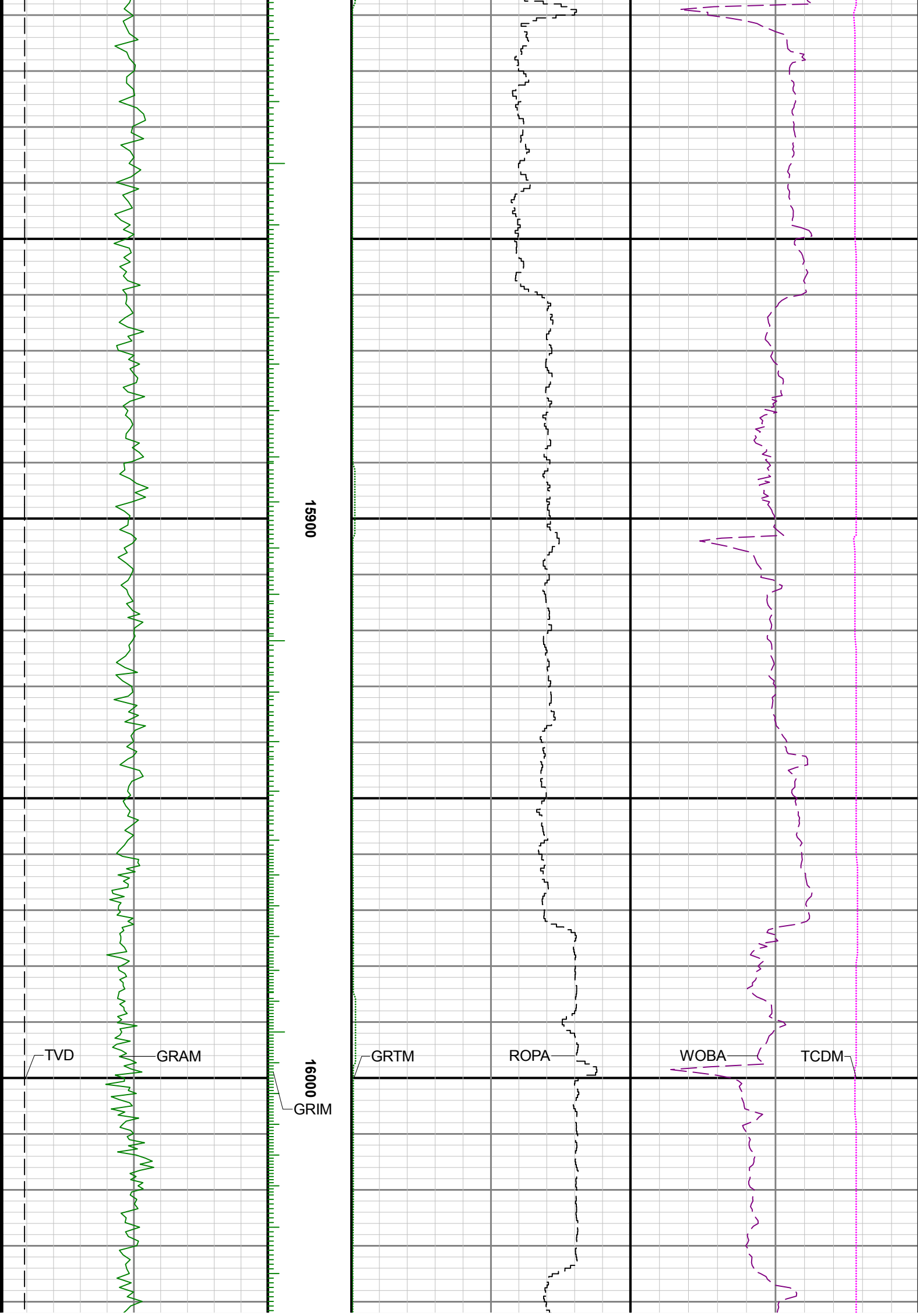


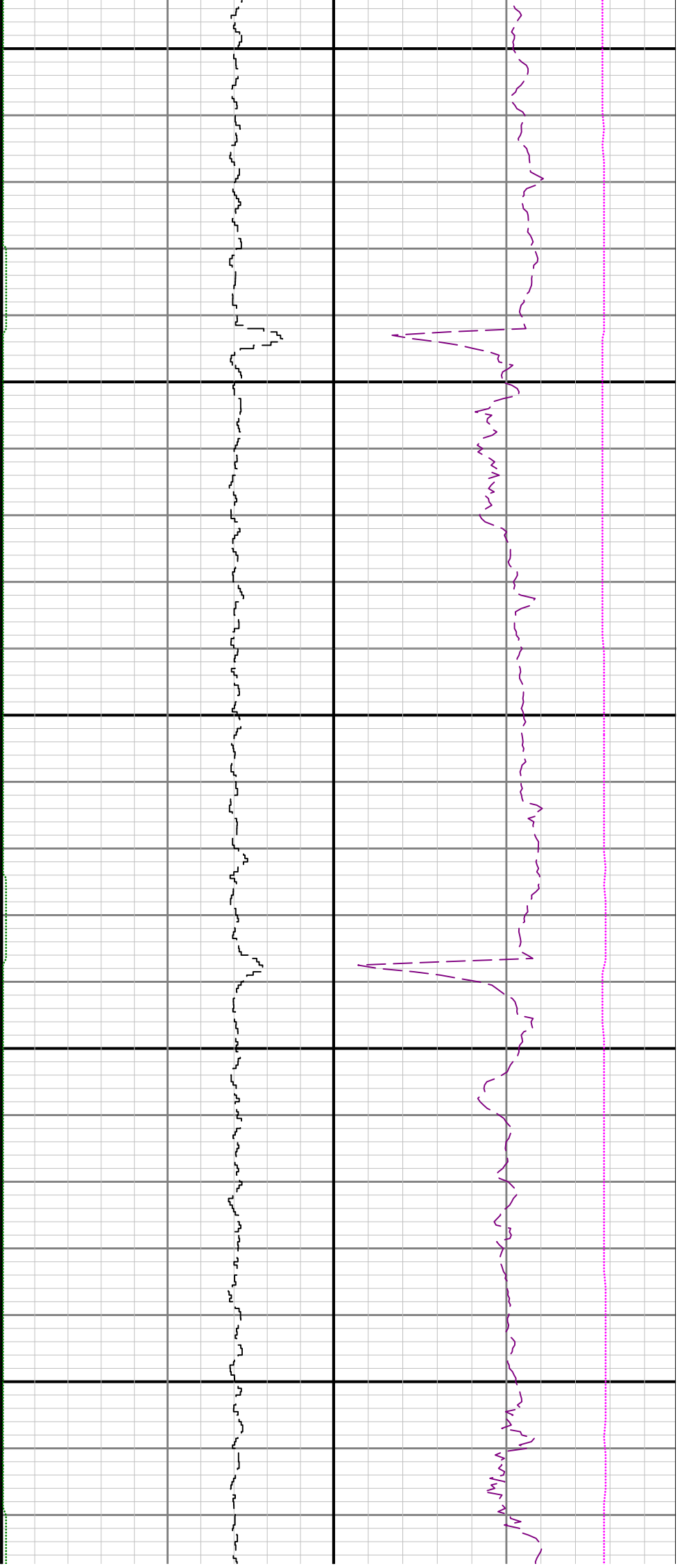
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