



LWD MEMORY LOG

Gamma Ray

Scale: **1:240 MD**

Company: **Noble Energy**

Well: **Dorothy State LG16-757**

Field: **Weld County**

County: **Weld** Country: **United States**

Driller's Depth **State: Colorado**

Status: **Final Print**

API No: **05-123-47612**

Job ID: **109454523**

Permanent Datum (P.D.): **Ground Level**

Log Measured From: **Rig Floor**

Elevation: **4855.00 ft**

Elev. KB: **4885.00 ft**

Elev. DF: **4855.00 ft**

Elev. GL: **4855.00 ft**

Interval Drilled

Date From: **2018-11-16** Top: (ft) **1944.00**

Date To: **2018-11-19** Bottom: (ft) **16692.00**

Spud Date: **2018-11-14**

Magnetic Field Reference

Azi Reference North: **Grid** Dip Angle: (deg) **66.98**

Total Magnetic Field Strength: (nT) **52343**

Mag to Reference North Correction: (deg) **6.93**

Borehole Record

Casing Record

Hole Size (in) From (ft) To (ft) Size (in) Weight (lb/ft) From (ft) To (ft)

13.500 30.00 1944.00 9.625 36.00 30.00 1934.00

8.500 1944.00 16692.00 30.00 1934.00

Mud Record

Deviation Record

Type From (ft) To (ft) Hole Size (in) Interval (ft) Inc | Az (Start) Inc | Az (End)

Oil Based Mud 1944.00 16692.00 8.500 14748.00 0.35 | 299.23 90.52 | 177.53

Acquisition System

Software Version

Other

Baker Hughes Cadence RT 4.2

DeliverableGen 1.0.8107.2

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Log Run Summary

Run No	Bit Run No.	Bit Size (in)	Bit Type	Bit Gauge Length (in)	Assembly Type	Logged Interval		Bit Depth Interval		Date / Time		Circ. Hours (h)
						Top (ft)	Bottom (ft)	From (ft)	To (ft)	Start Logging	End Logging	
1	1	8.500	PDC	2.00	AutoTrak Curve	1944.00	16678.00	1944.00	16692.00	2018-11-16 06:14	2018-11-18 23:22	57.46

Crew

Name	Arrive Wellsite	Depart Wellsite	Name	Arrive Wellsite	Depart Wellsite	Name	Arrive Wellsite	Depart Wellsite
Tien Bui	2018-11-14	2018-11-20						

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+ (%)
2018-11-15 10:22	1	1944.00	Oil Based Mud	9.2	12	N/A	24.8	81.1/18.9	Active Pit	24000	0.00
2018-11-17 09:39	1	8873.00	Oil Based Mud	9.3	11	N/A	17.6	83.3/16.7	Active Pit	25000	0.00
2018-11-18 05:32	1	12760.00	Oil Based Mud	9.4	12	N/A	18.0	83.6/16.4	Active Pit	22500	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	14547138	Near Bit VSS	5.93	6.74	7.000	4.330
1	ATC_SU	14547138	Near Bit Inclination	5.93	6.74	7.000	4.330
1	ATC_MWD	14307439	Gamma (single)	2.77	12.91	7.000	3.250

1	ATC_MWD	14307439	Directional (mag)	12.27	22.41	7.000	3.250
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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


- Depth measurements were obtained from a depth control system not supplied or operated by Baker Hughes. Due to lack of control by Baker Hughes logging engineers, depth calibrations and measurements could not be independently verified.
- Baker Hughes LWD Run 1 utilized 6 ¾ inch NaviGamma service (Gamma Ray and Directional) behind an 8 1/2 inch bit and rotary steerable assembly from 1944 to 16692 feet MD (1944 to 6074 feet TVD).
- The Gamma Ray Apparent (GRAM) data is presented 0 to 300 API, per the customer's request.

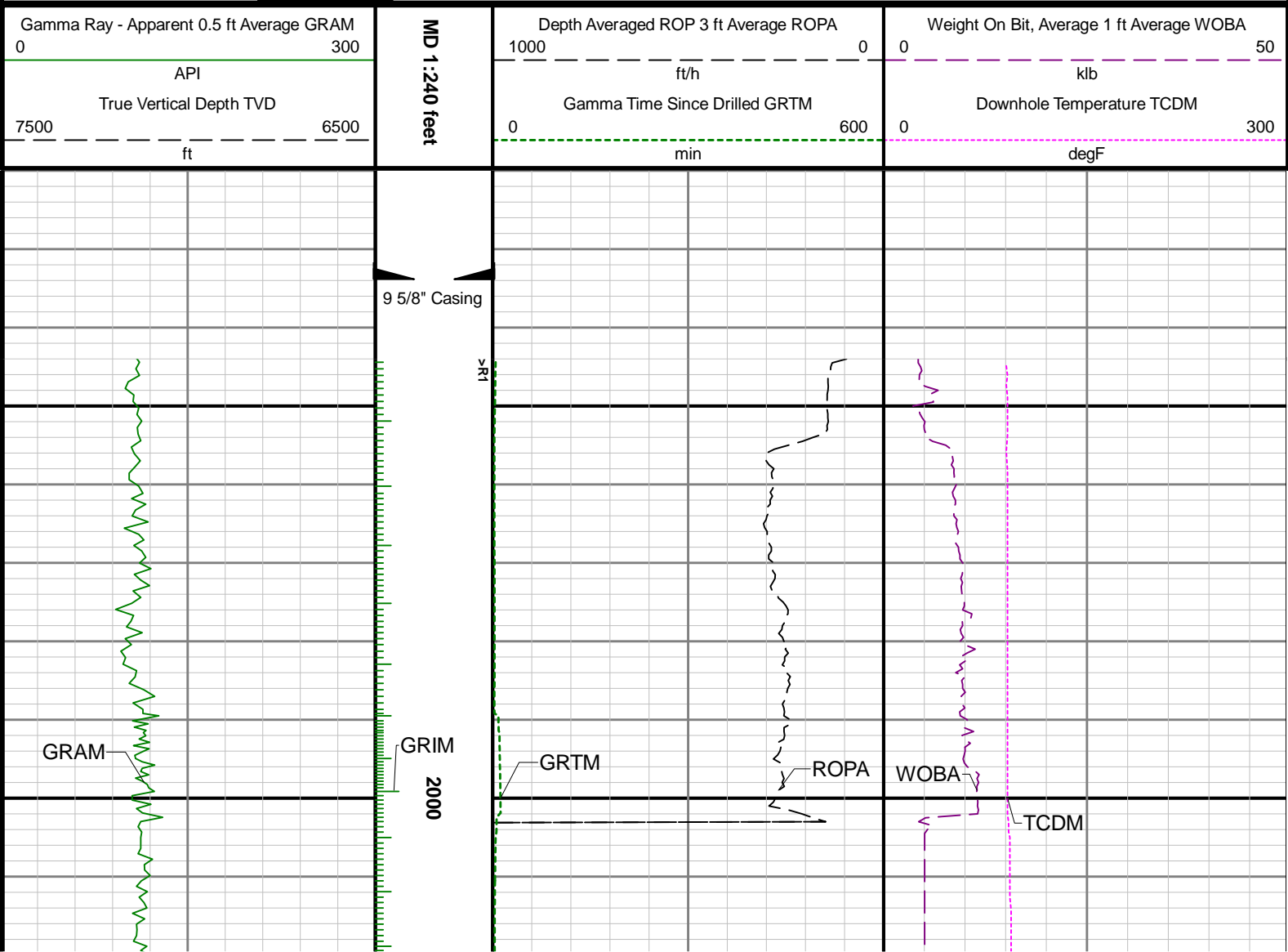
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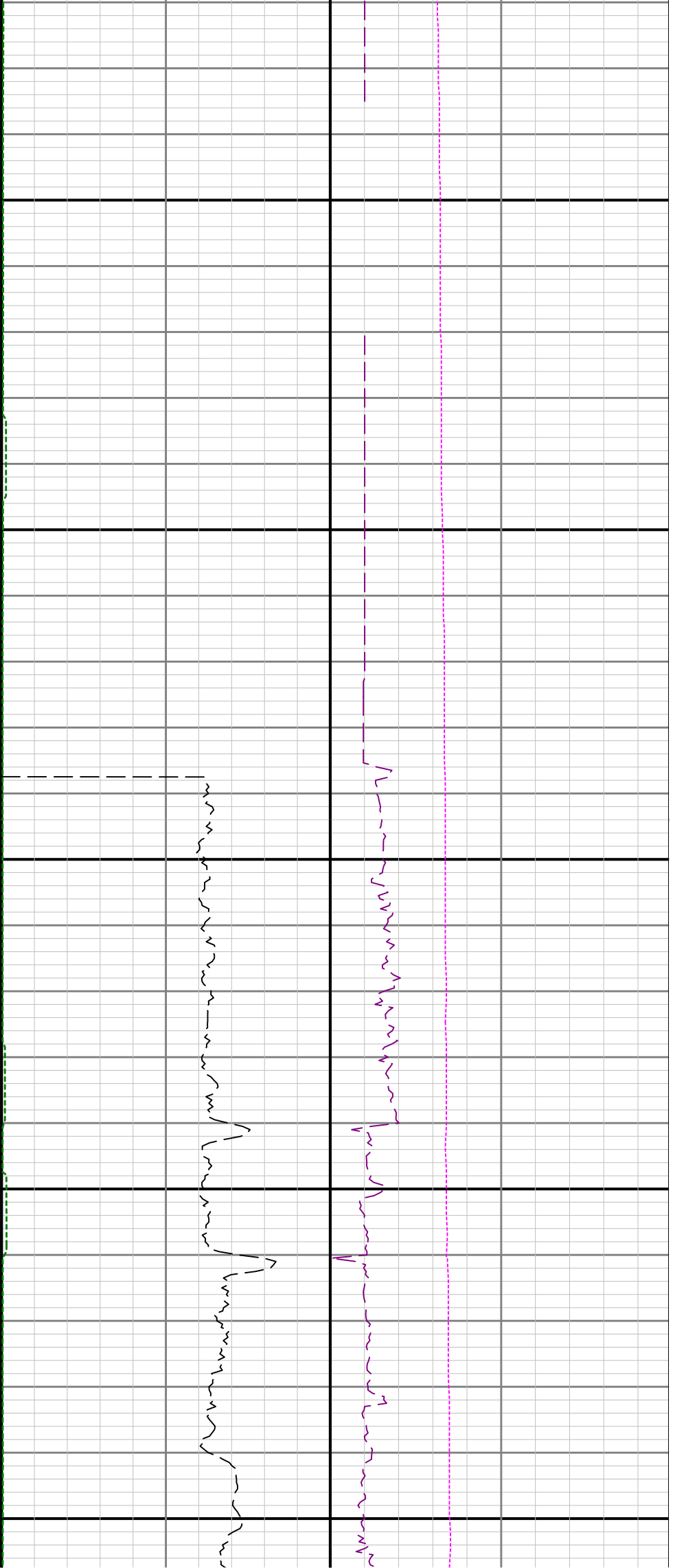
Number	Measured Depth (ft)	Hole Section (in)	Run No.	Remark
1	16678.00	8.500	1	The interval from 16678 to 16692 feet MD (6074 feet TVD) was not logged due to sensor to bit offset at well TD.

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	Gamma Ray - Apparent - Memory 0.5 ft Average	API
GRIM	Gamma Ray - Data Point Indicator - Memory	unitless
GRTM	Gamma Ray - Time Since Drilled - Memory	min
TCDM	Directional Real-Time Survey Temperature	degF

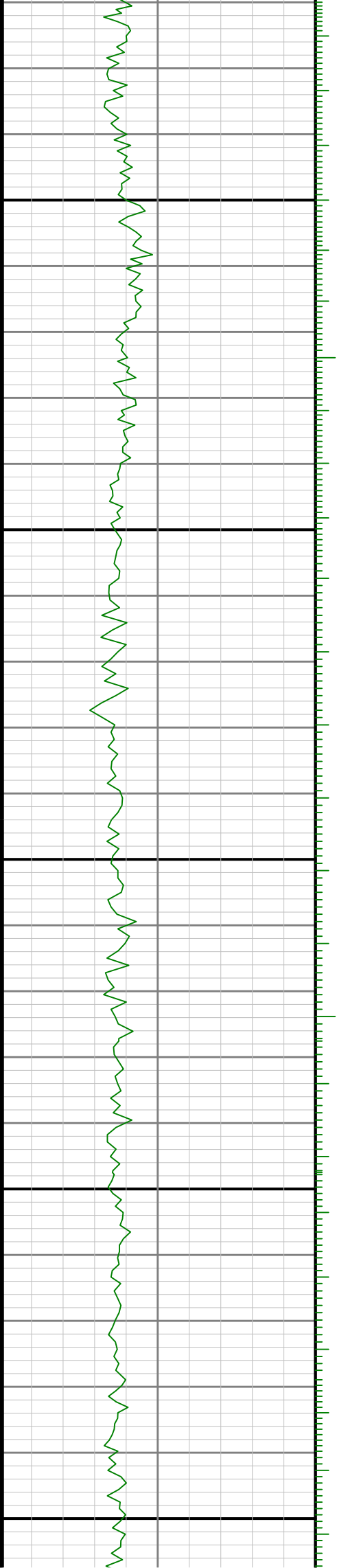
<div> <div>BAKER HUGHES</div> <div>a GE company</div> </div> <div>  </div>	Company	Noble Energy			
	Well	Dorothy State LG16-757			
	Interval	Date From:	2018-11-16 04:13	Top:	1944.00 ft
		Date To:	2018-11-19 15:16	Bottom:	16692.00 ft
	Created	2018-11-19 15:28:31			

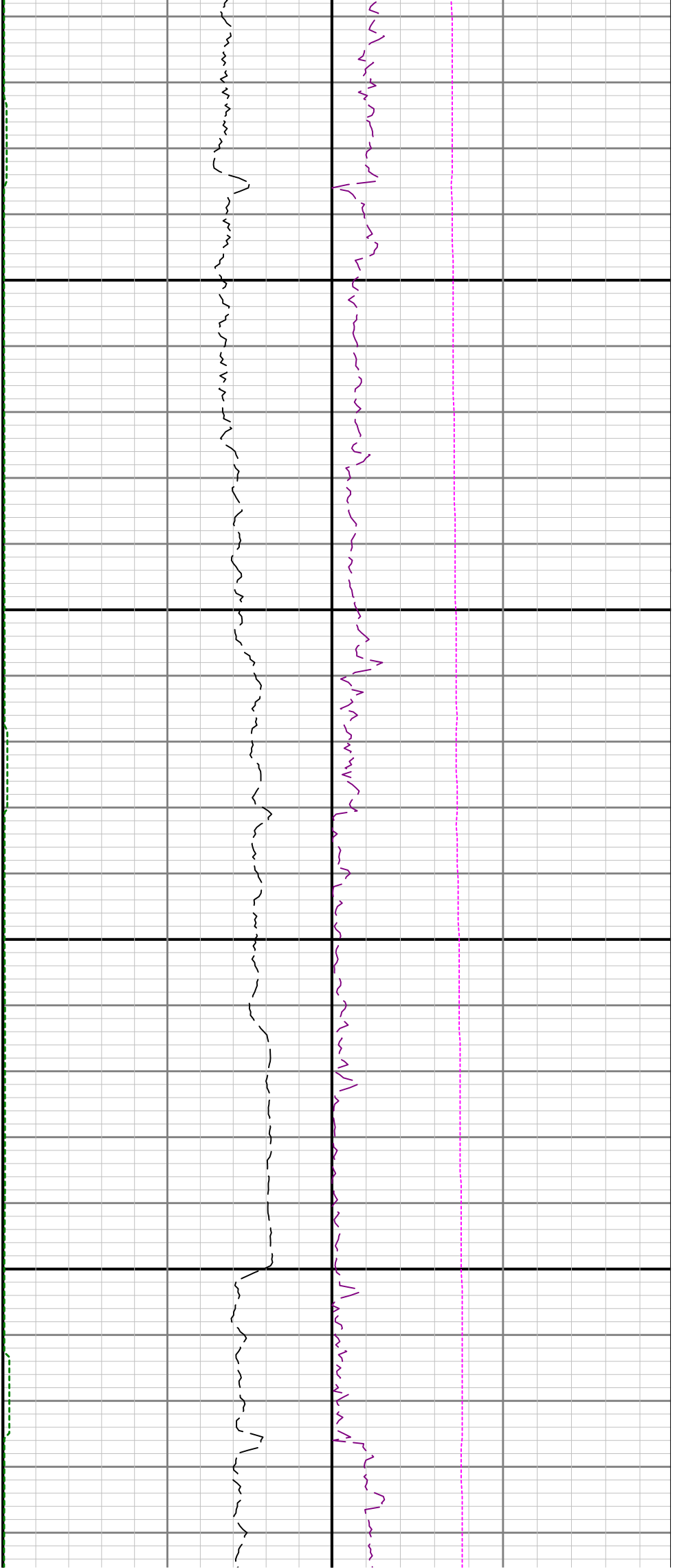




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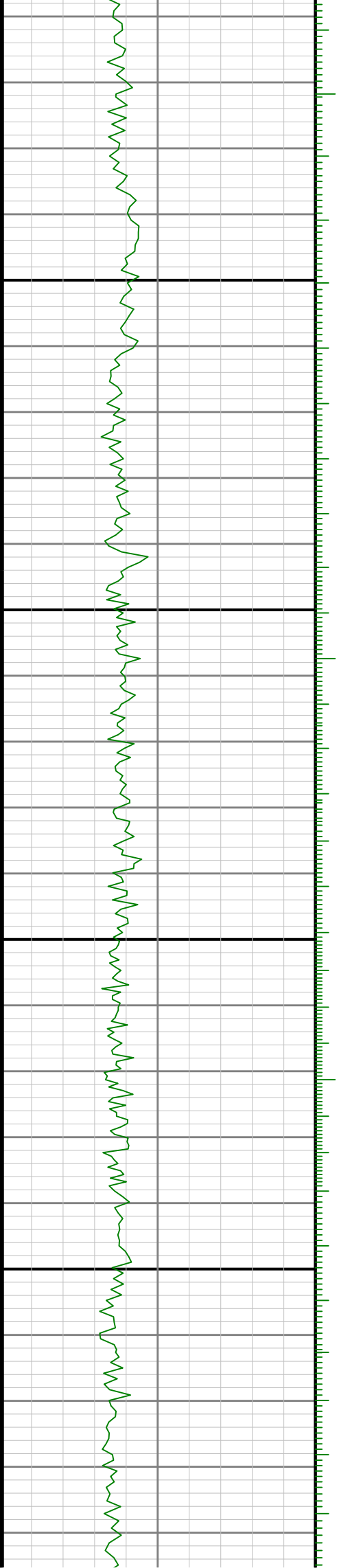
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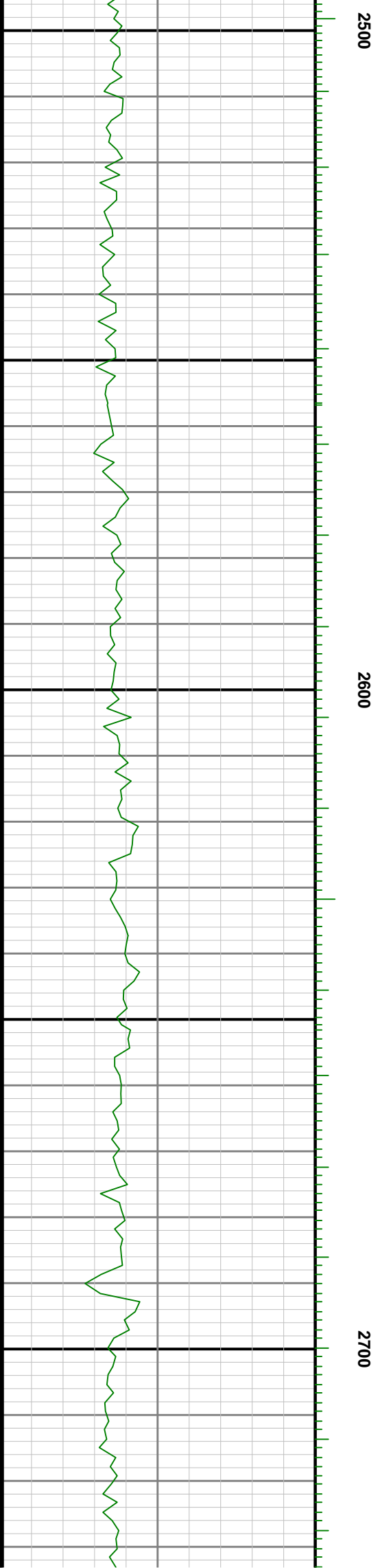
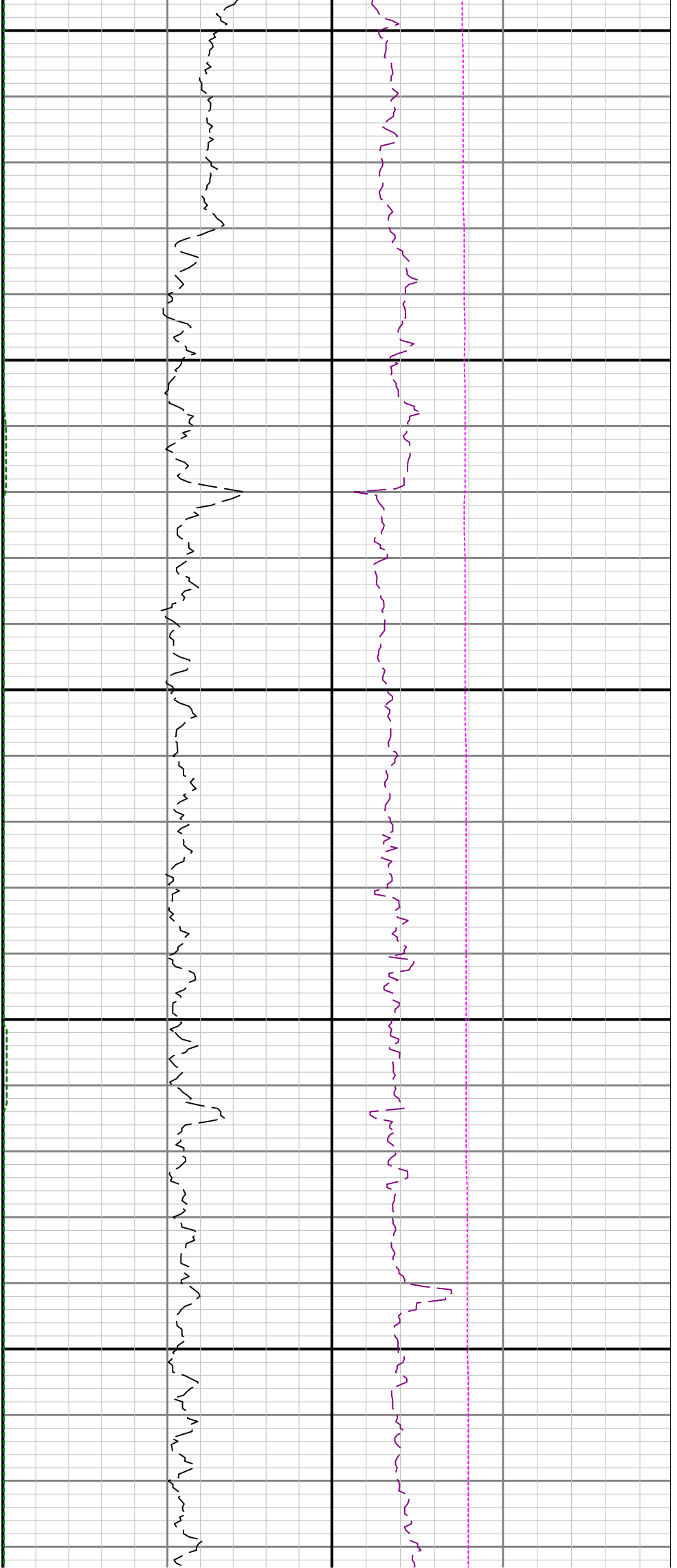


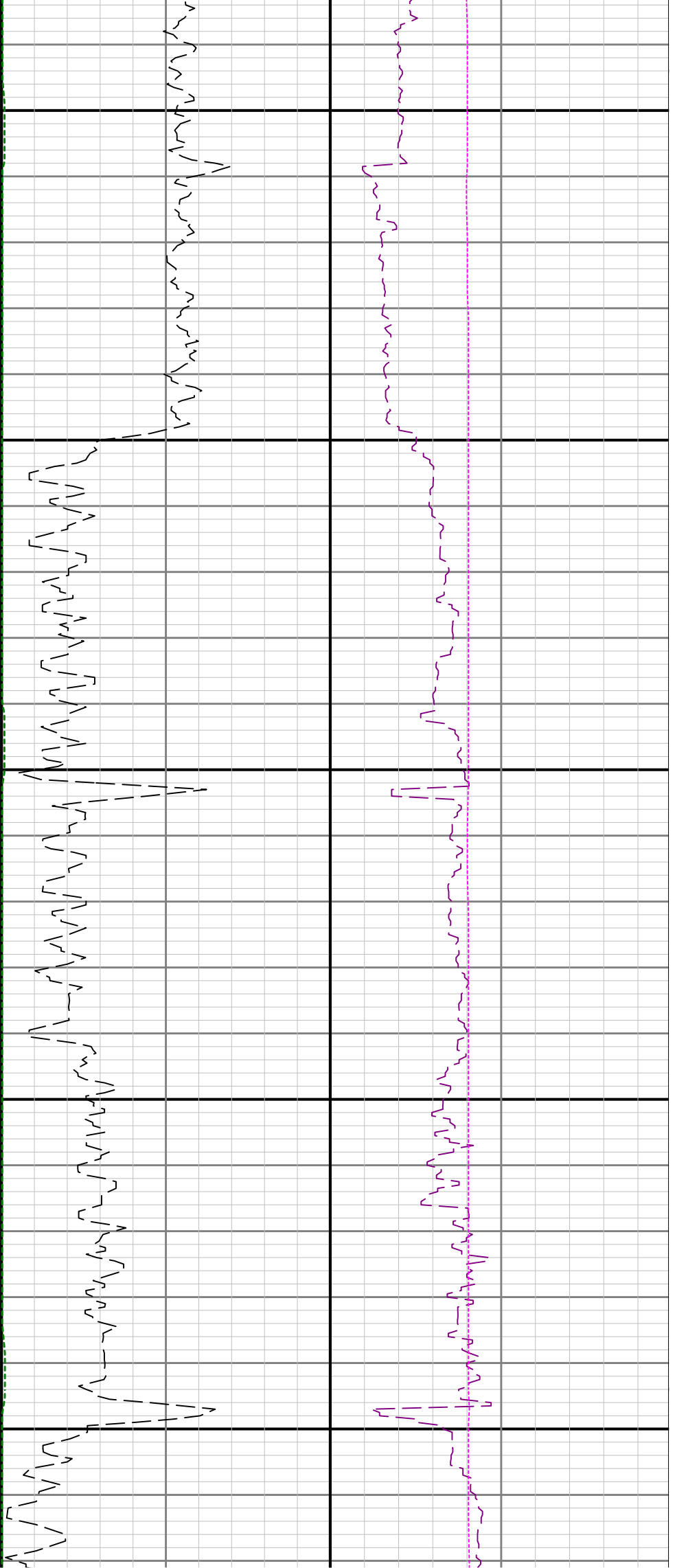


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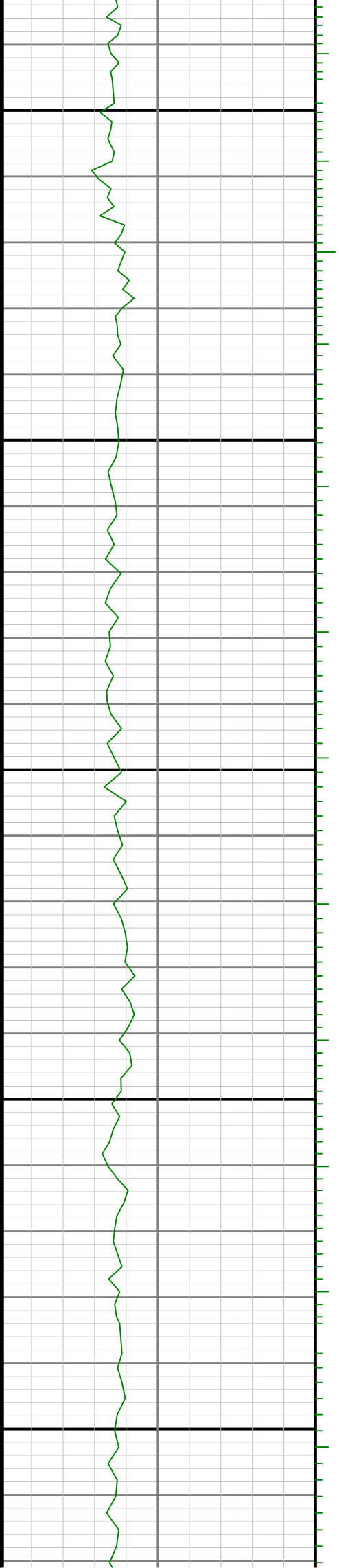


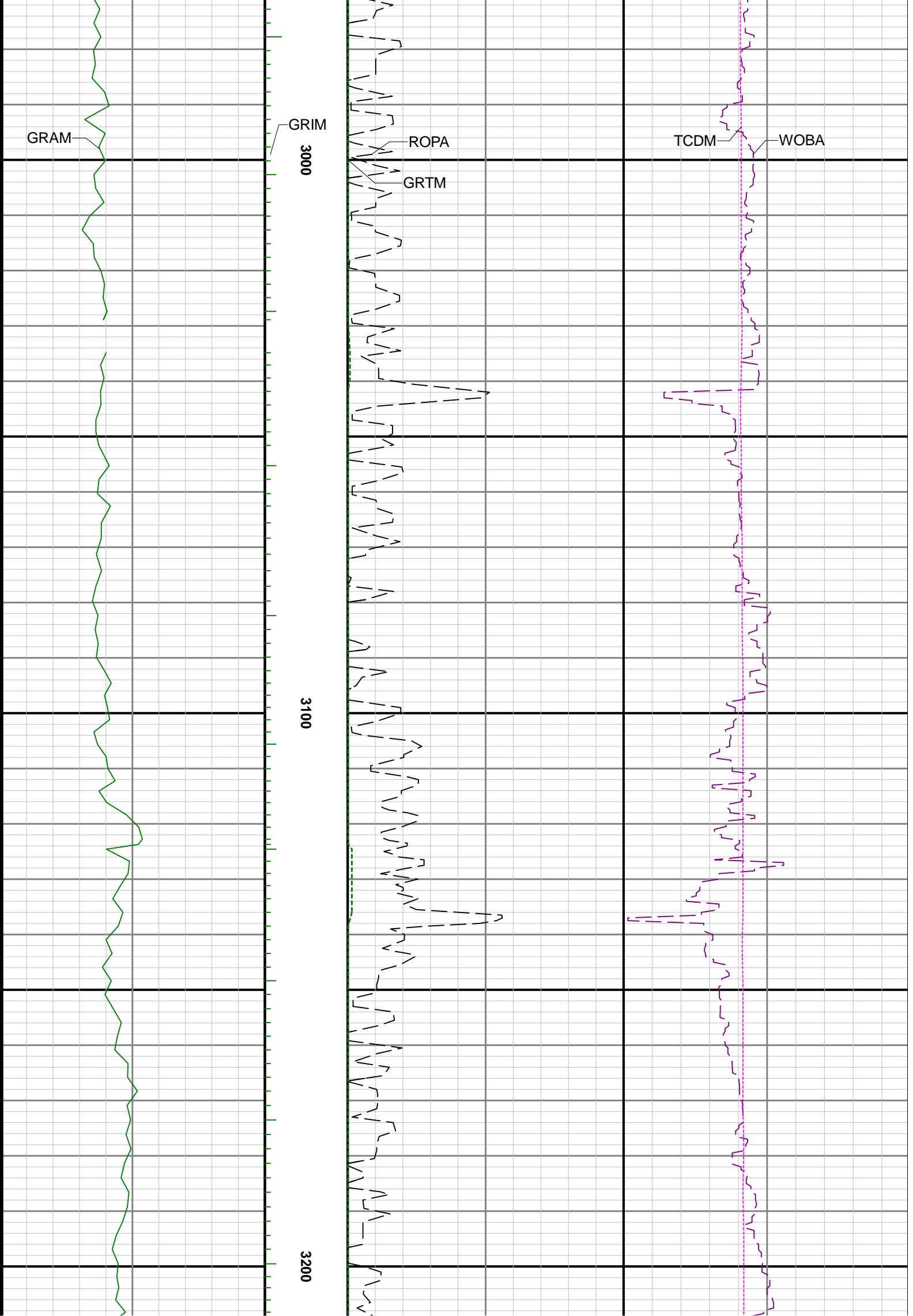


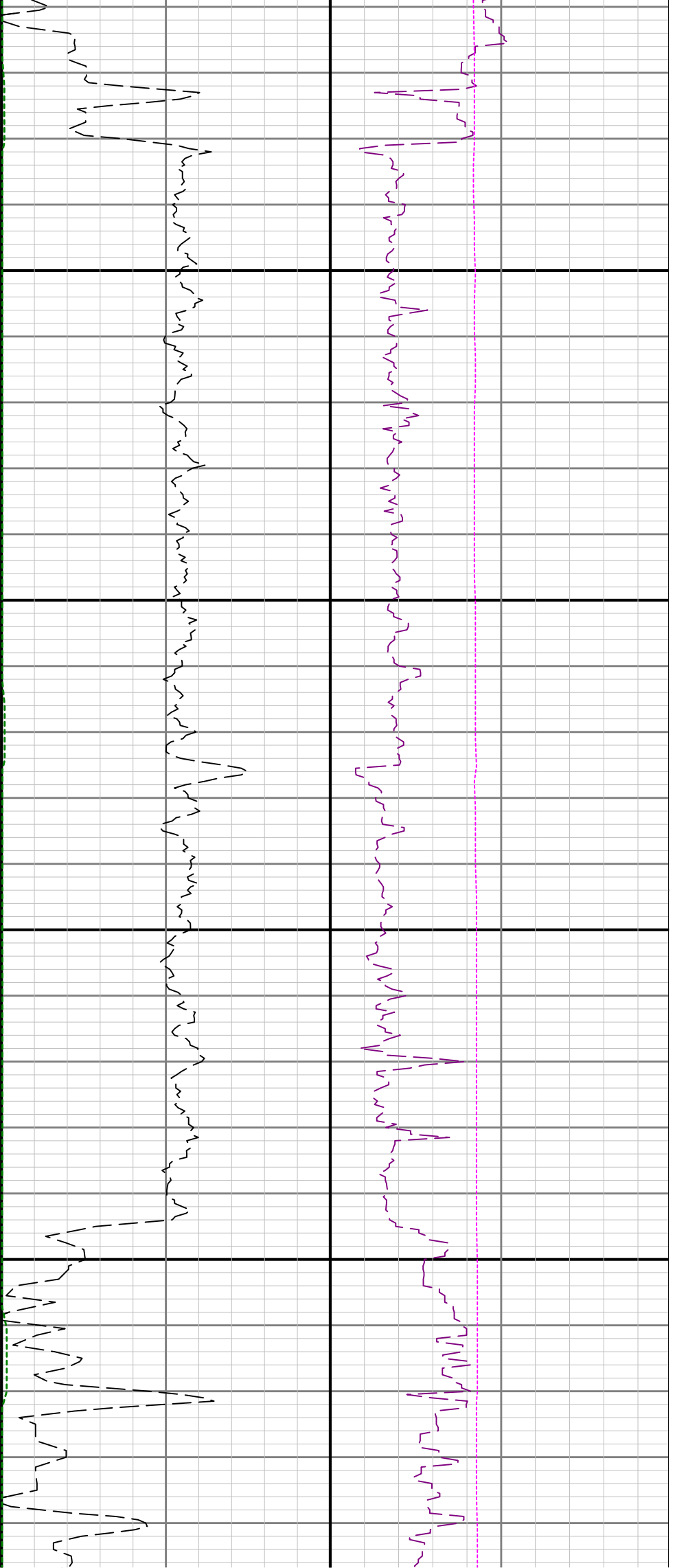


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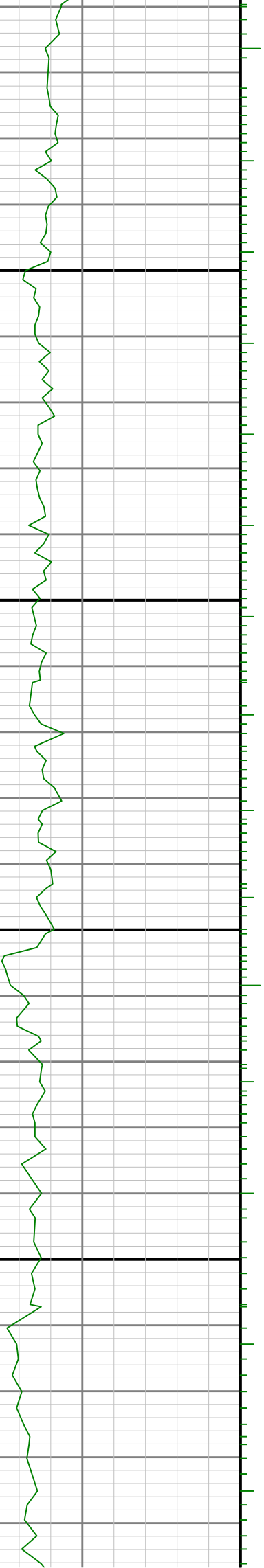


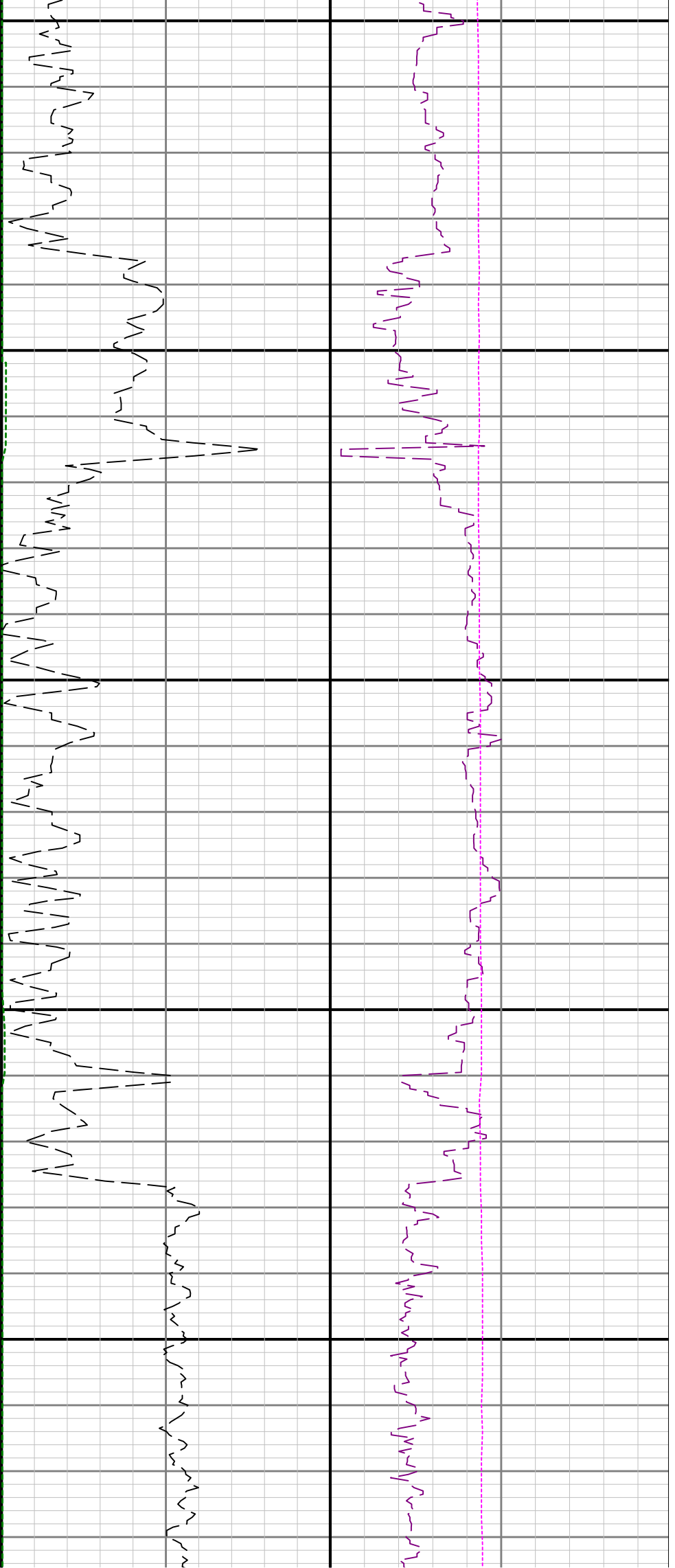




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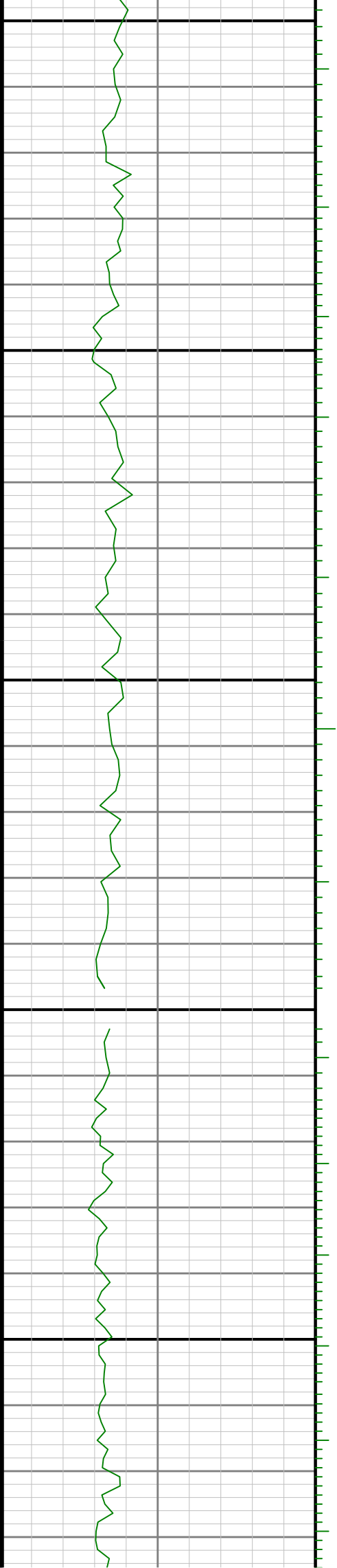
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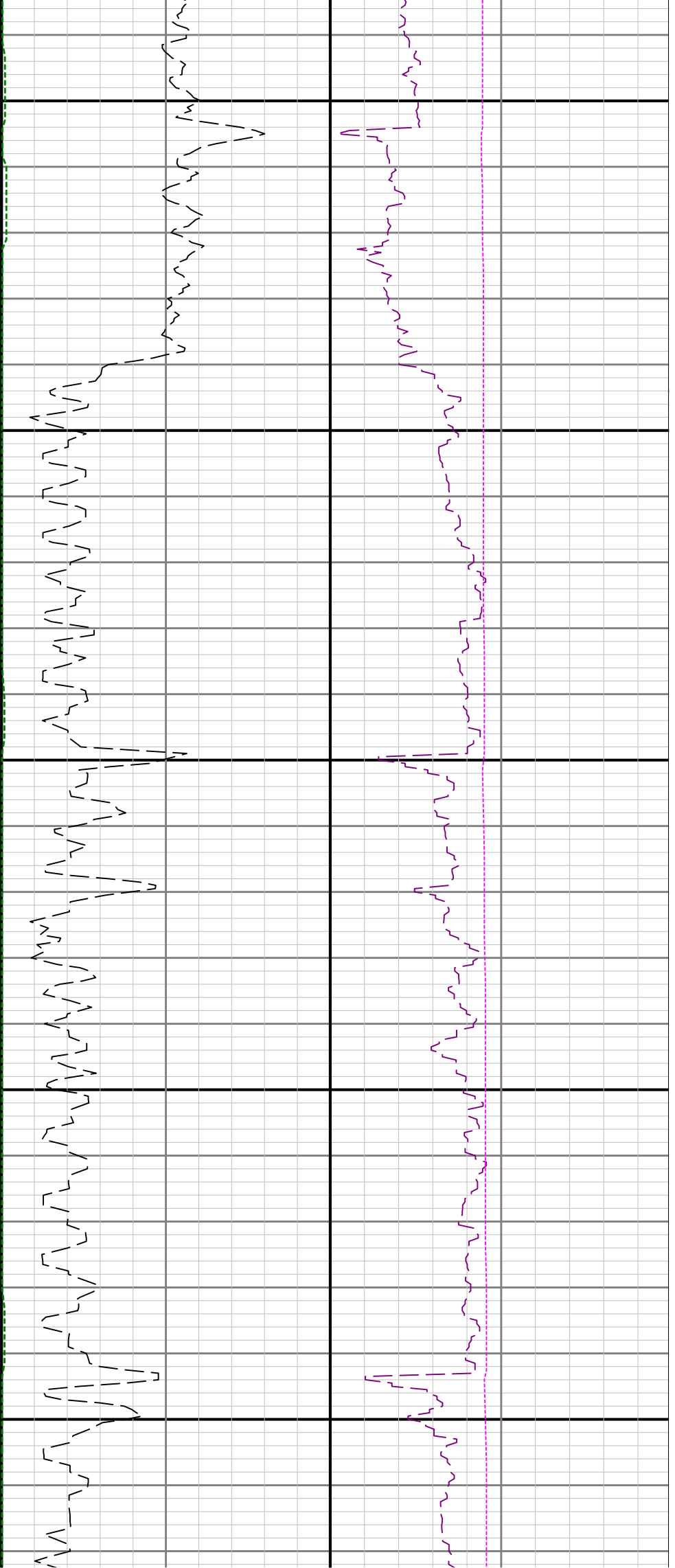




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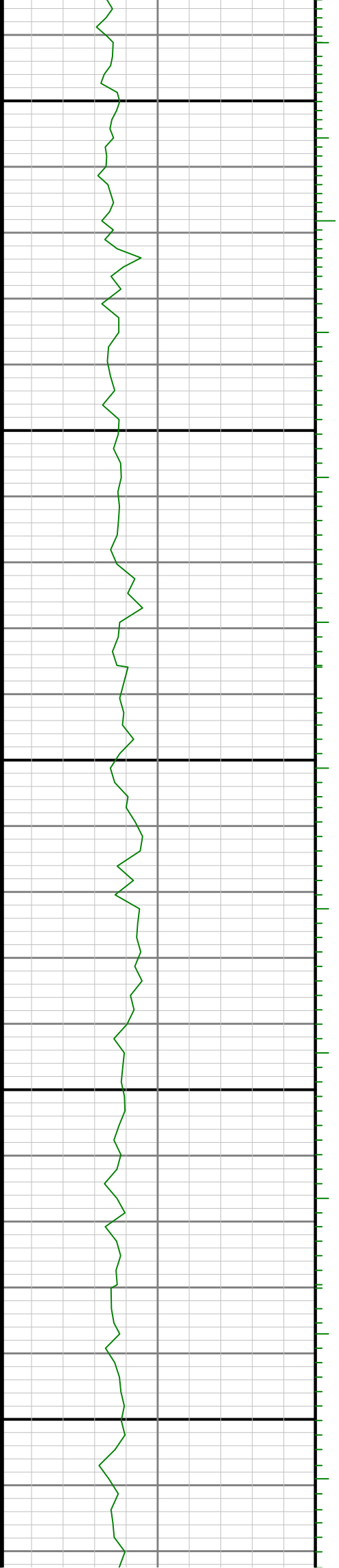


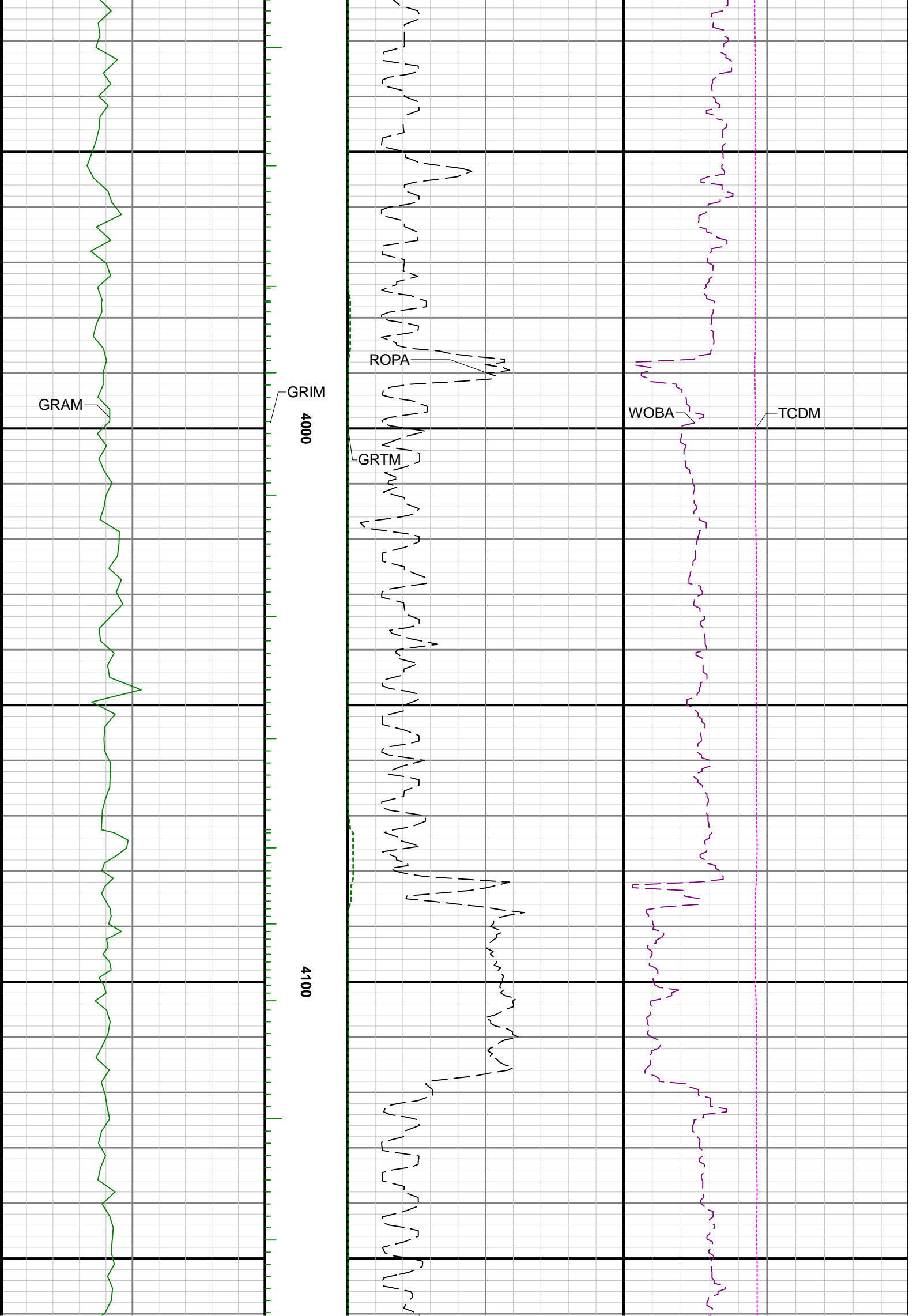


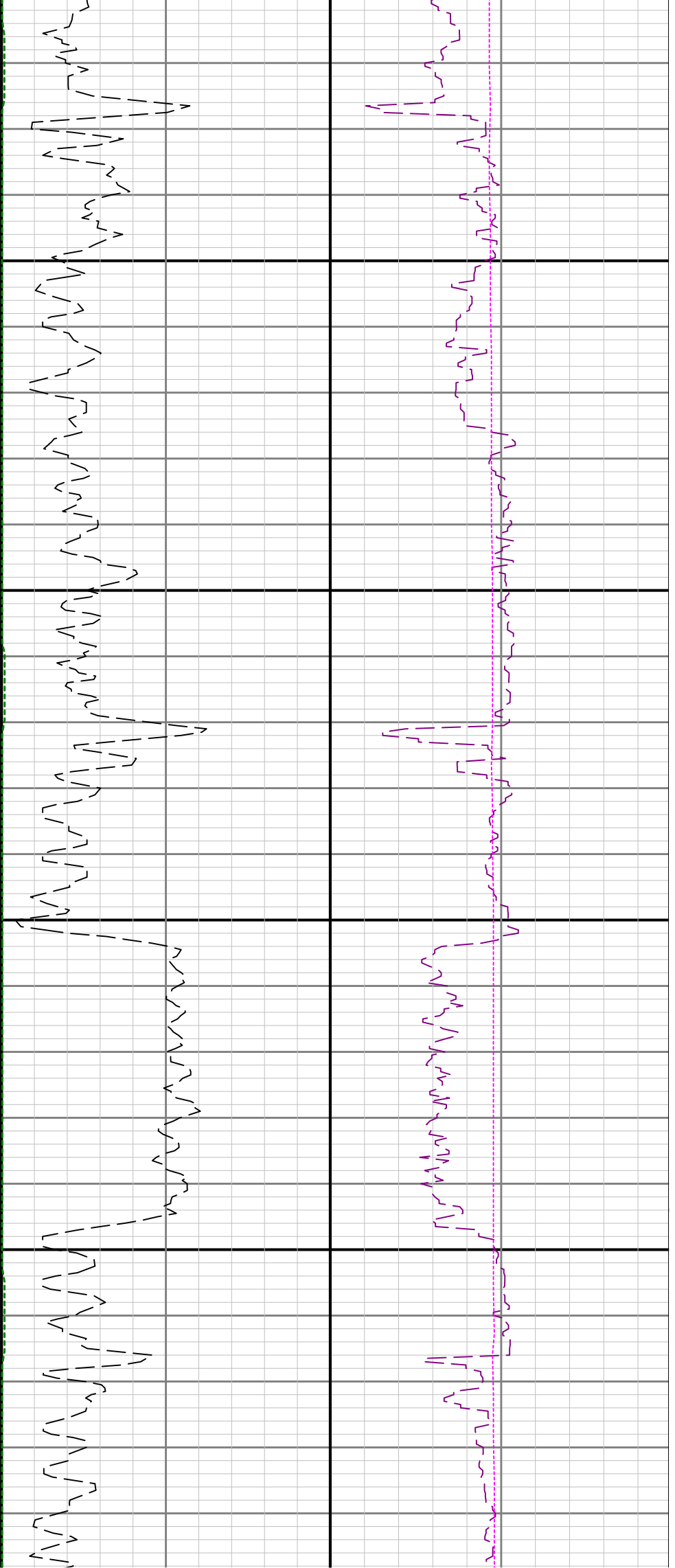
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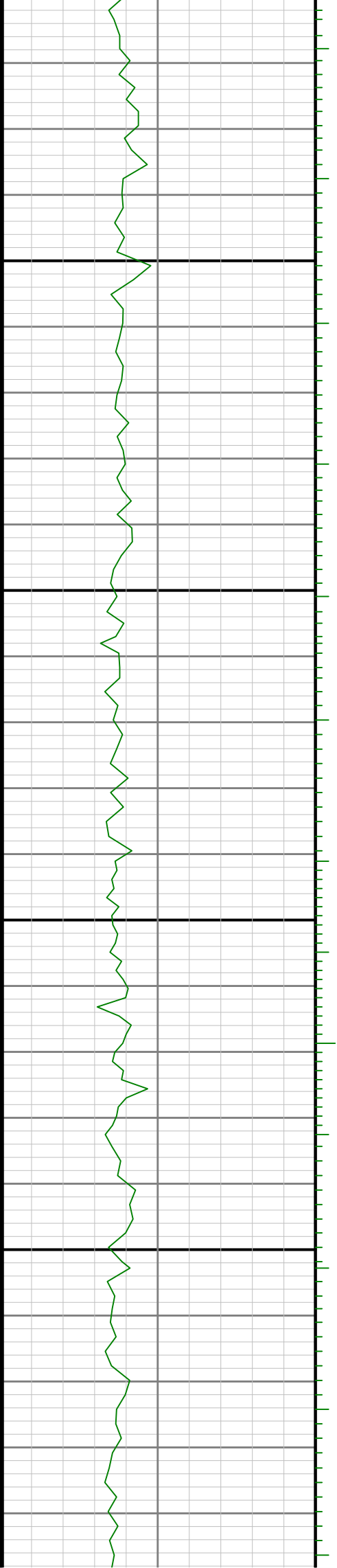


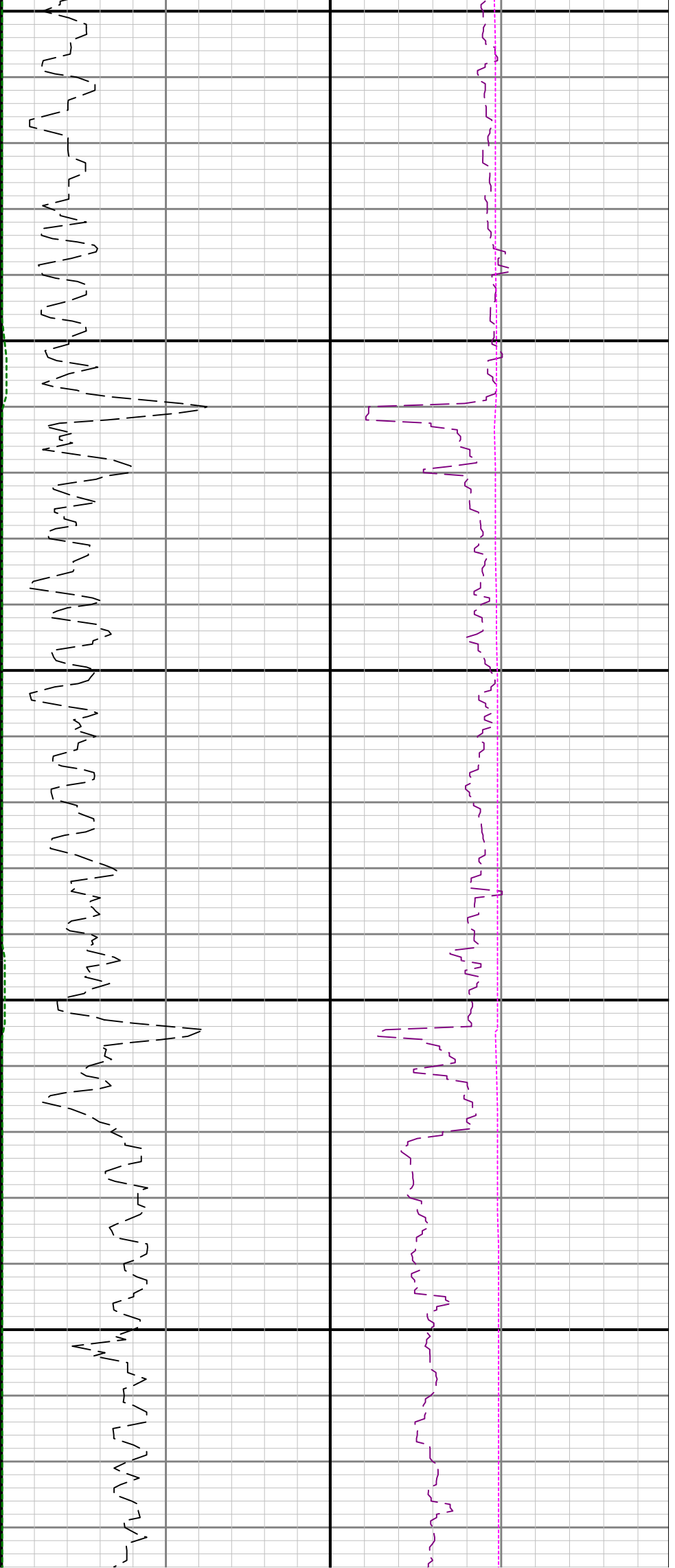


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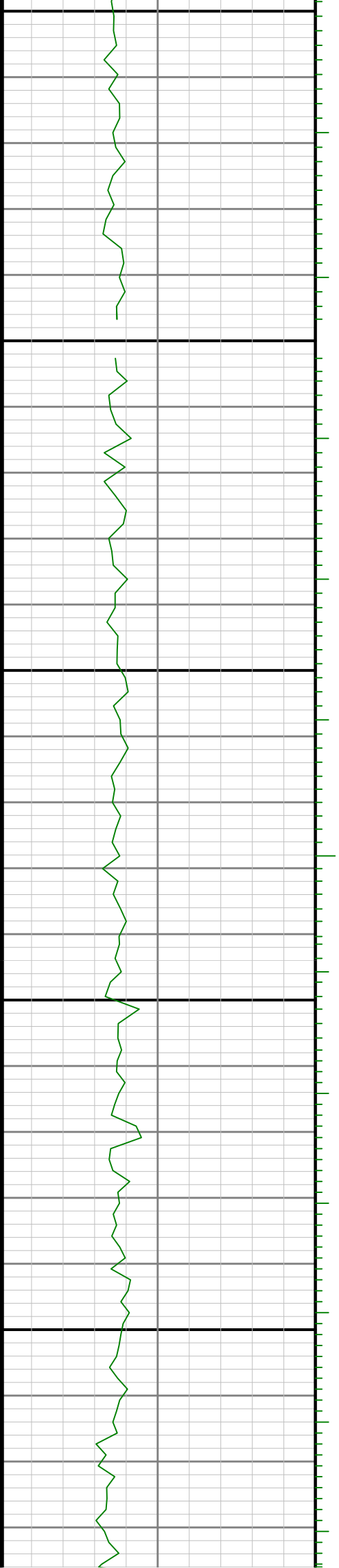


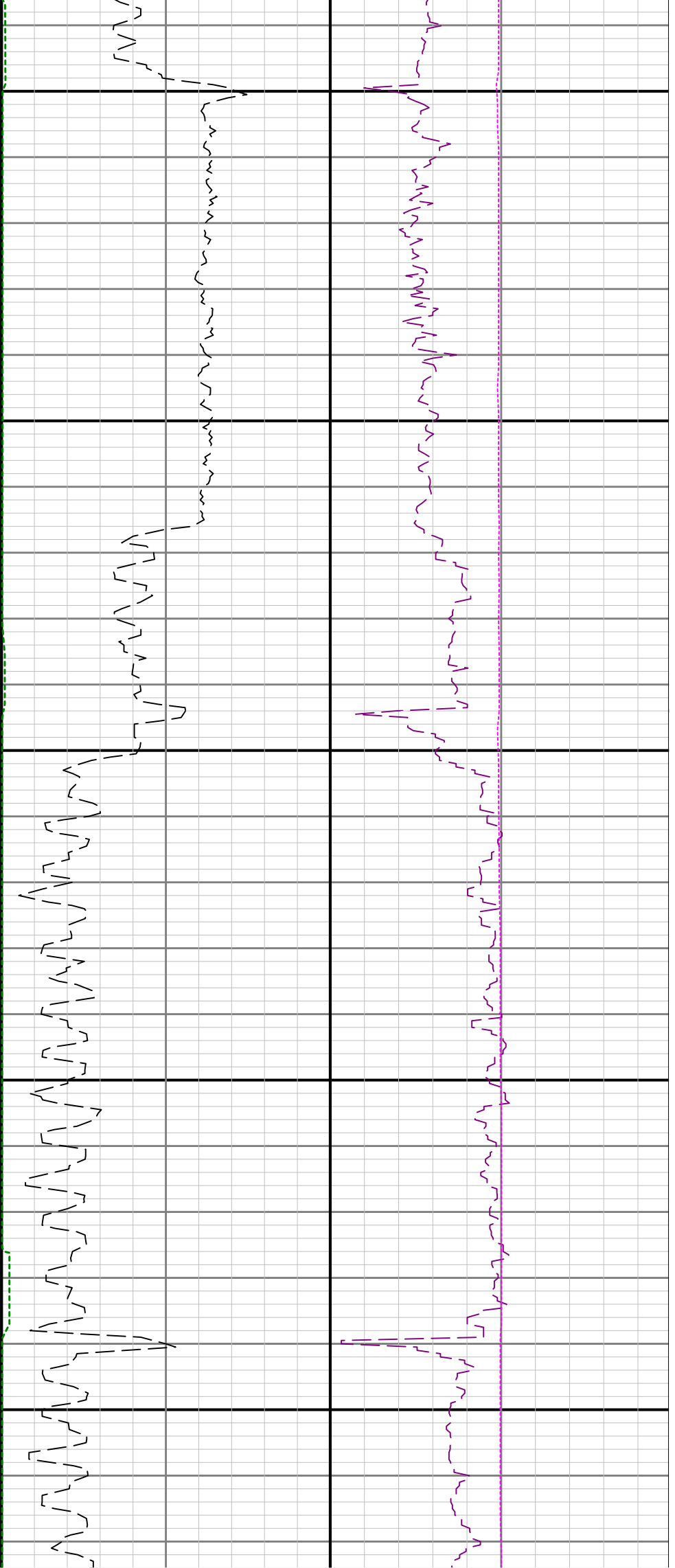


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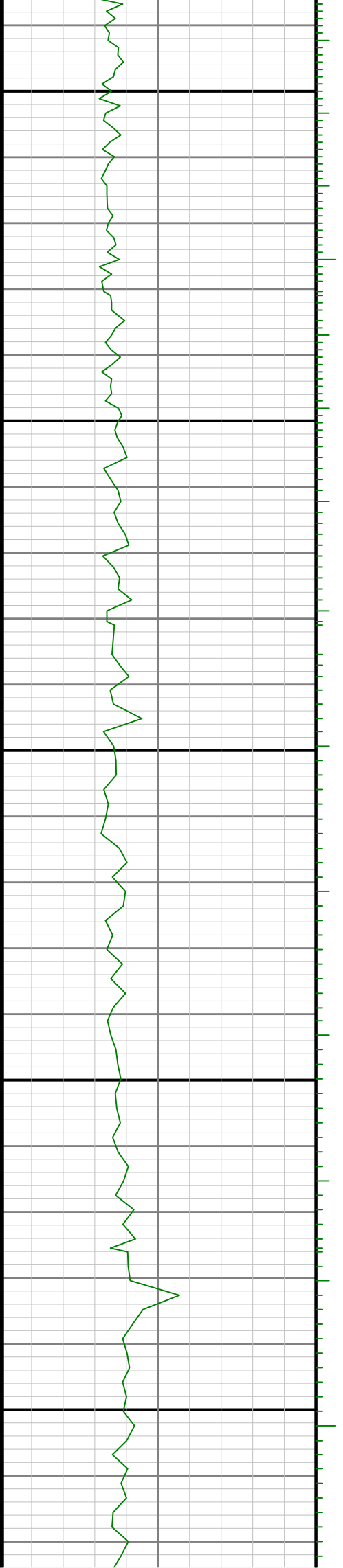
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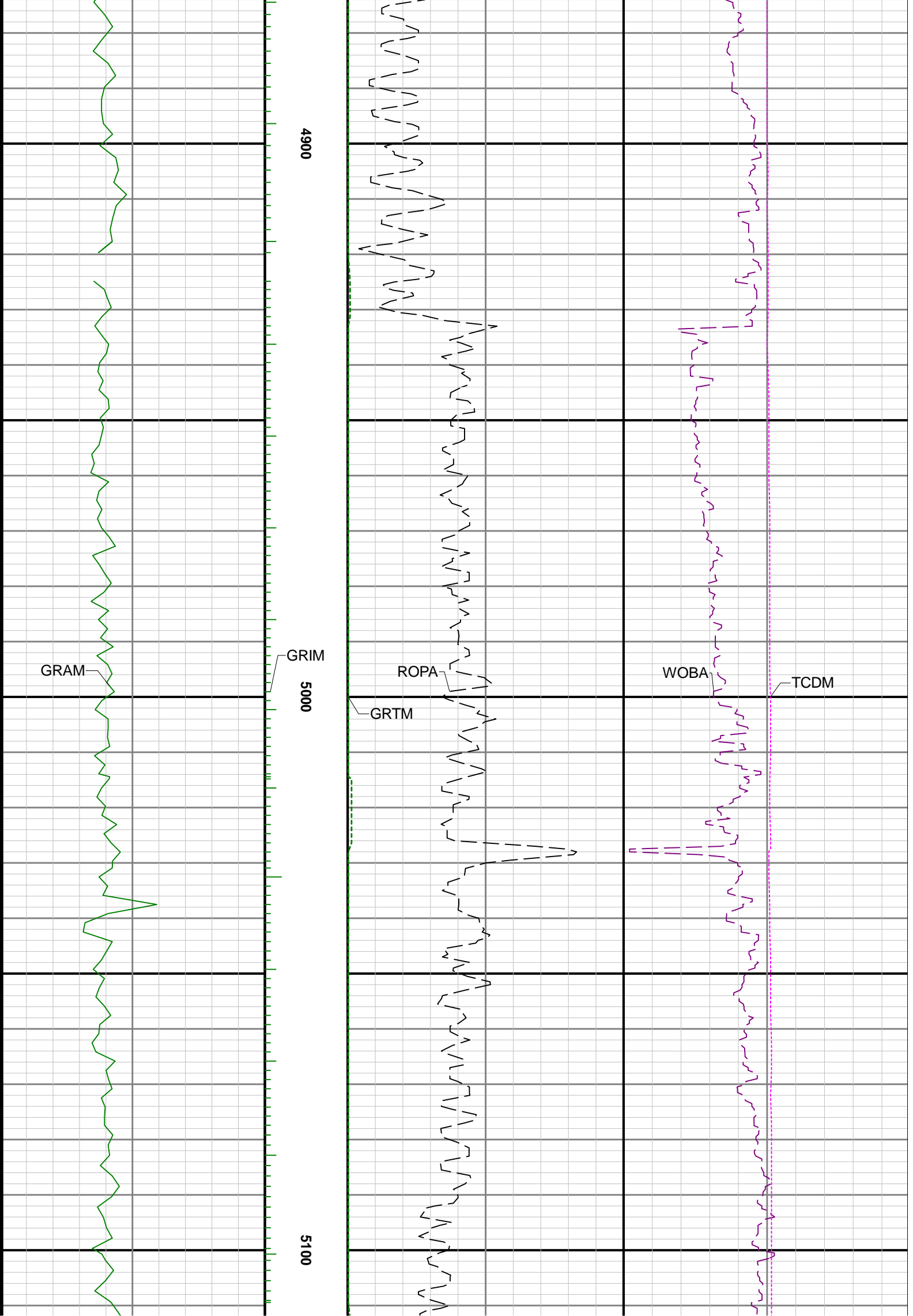


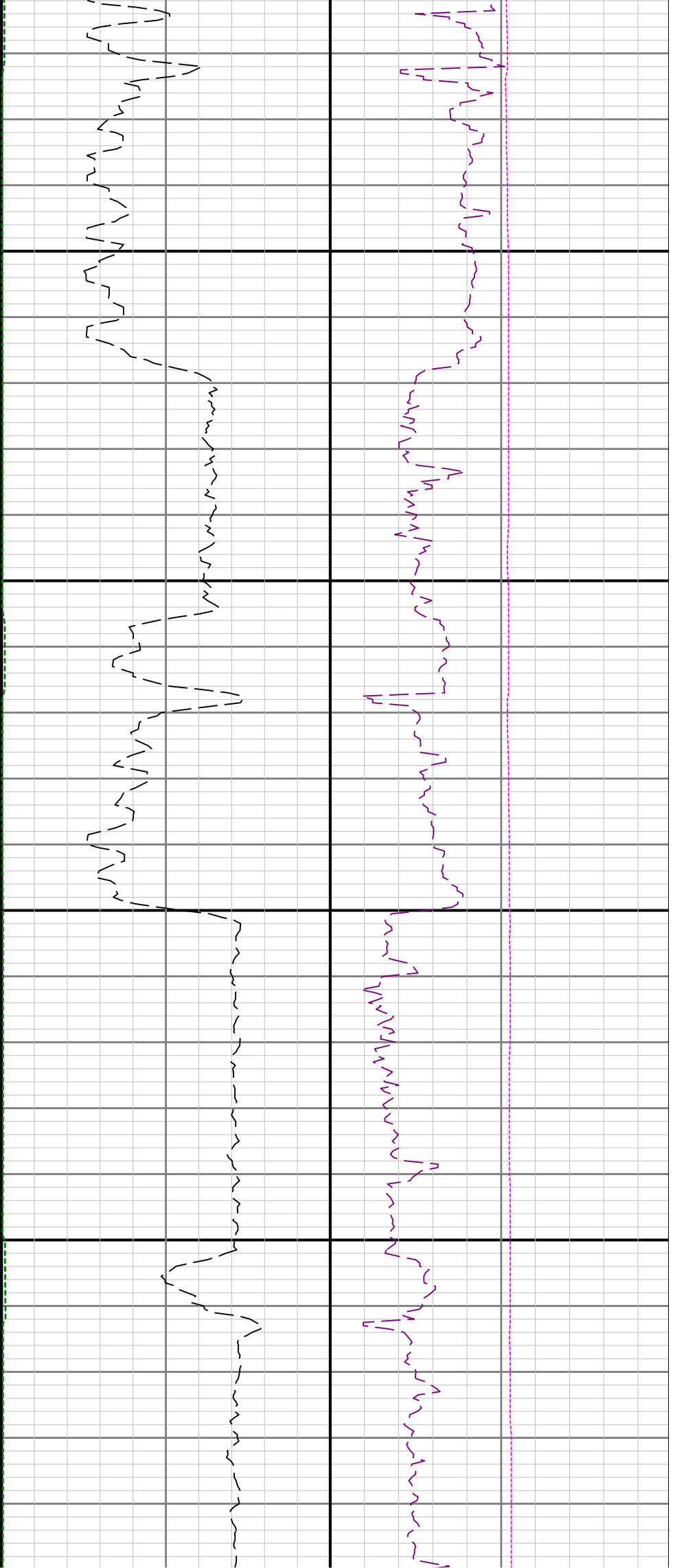


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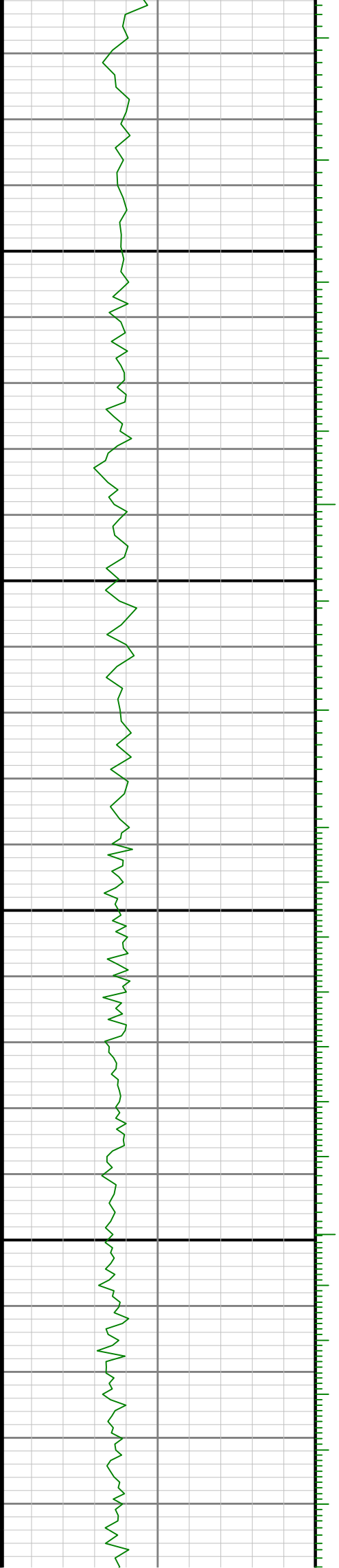


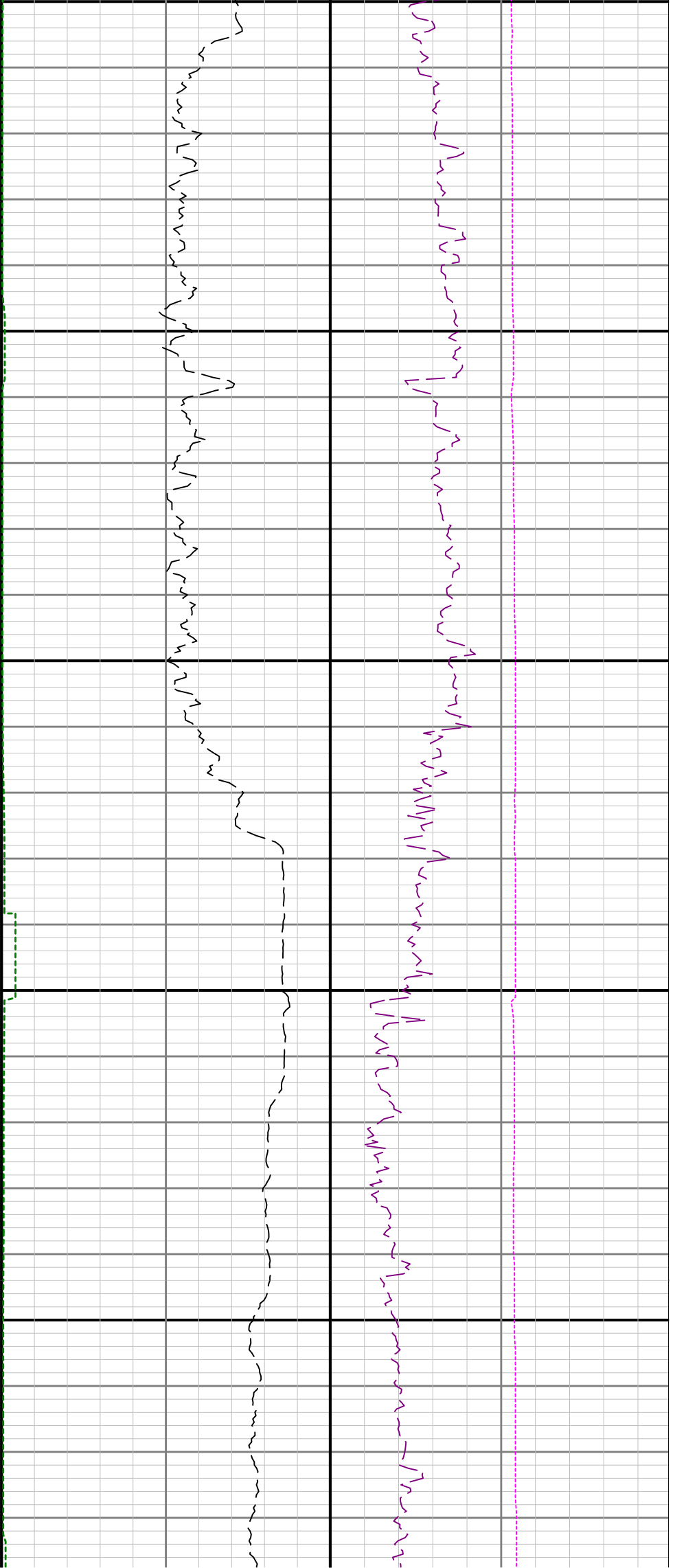




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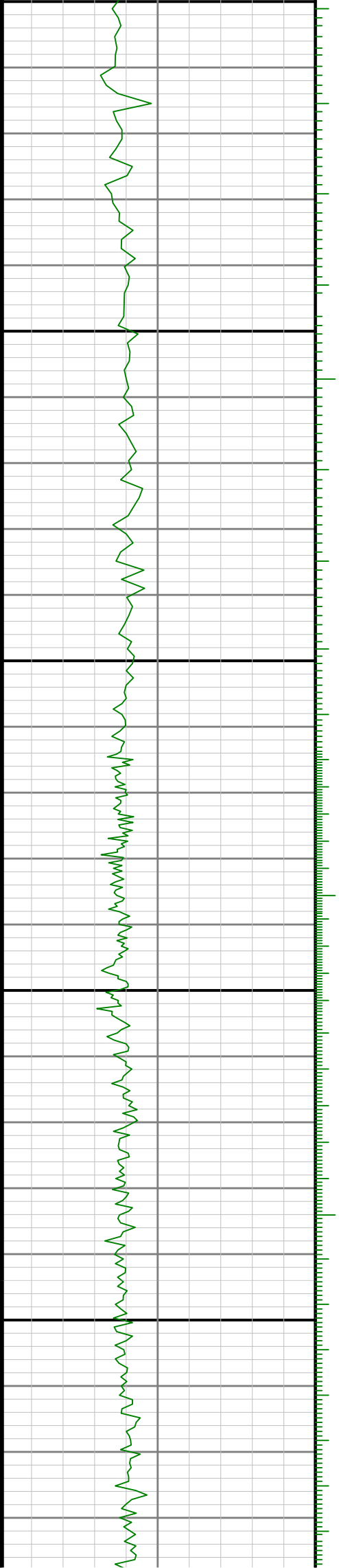
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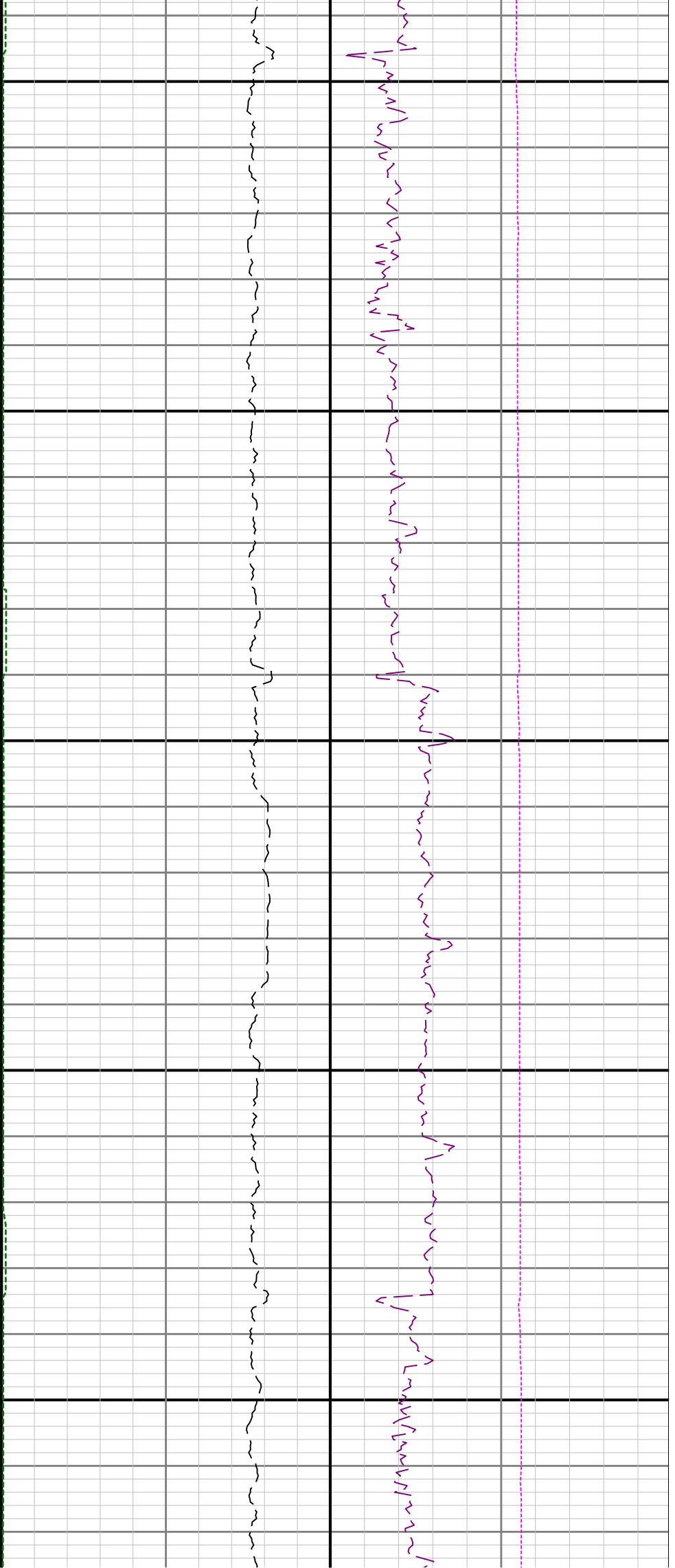




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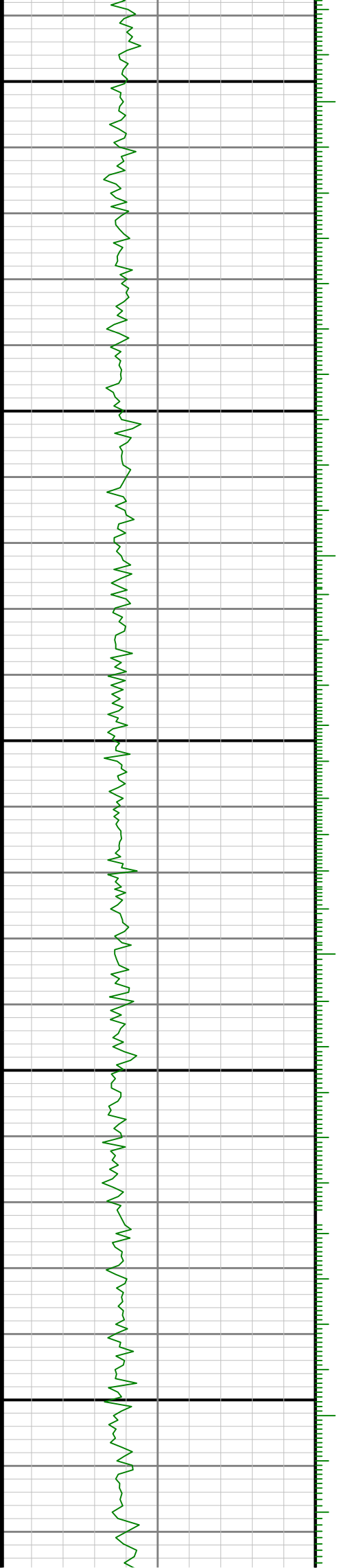


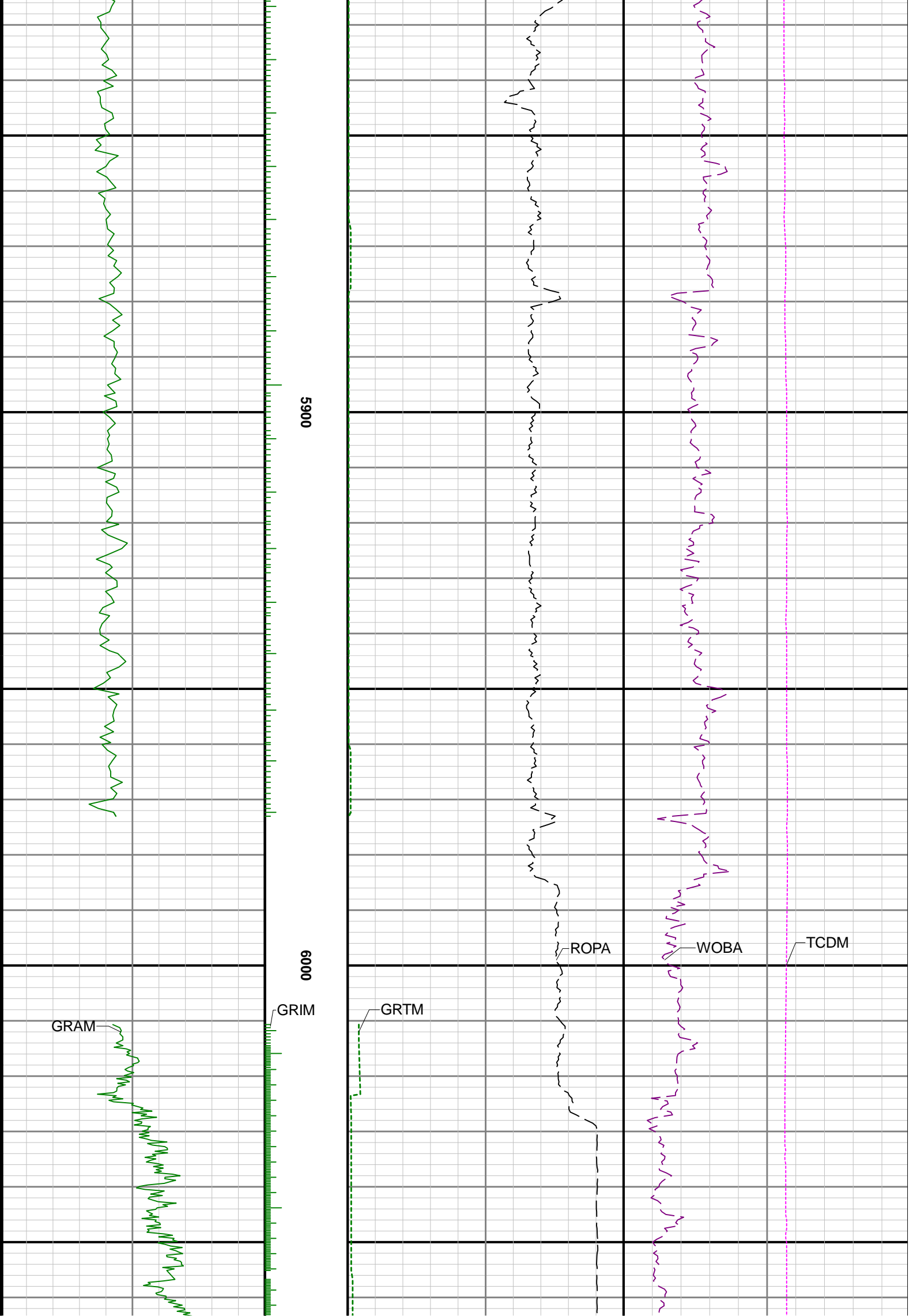


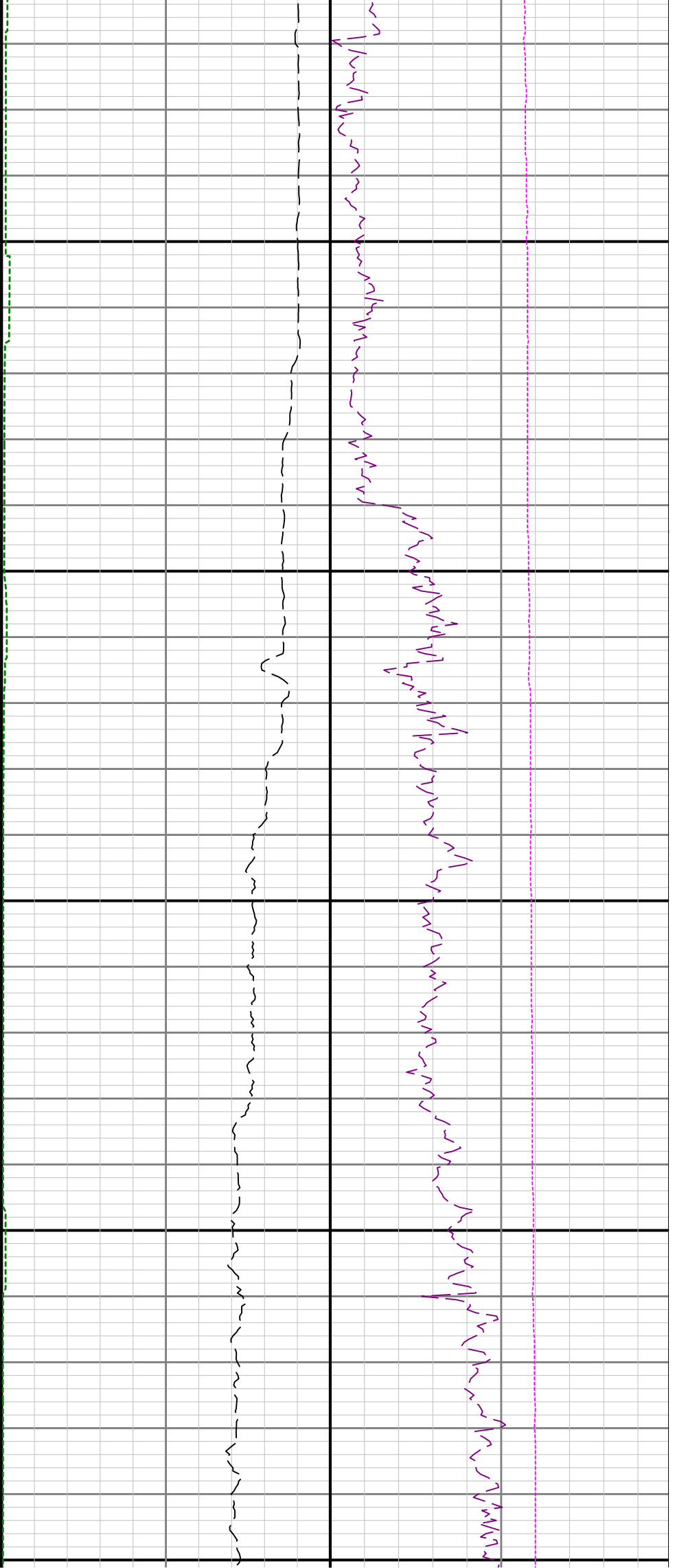
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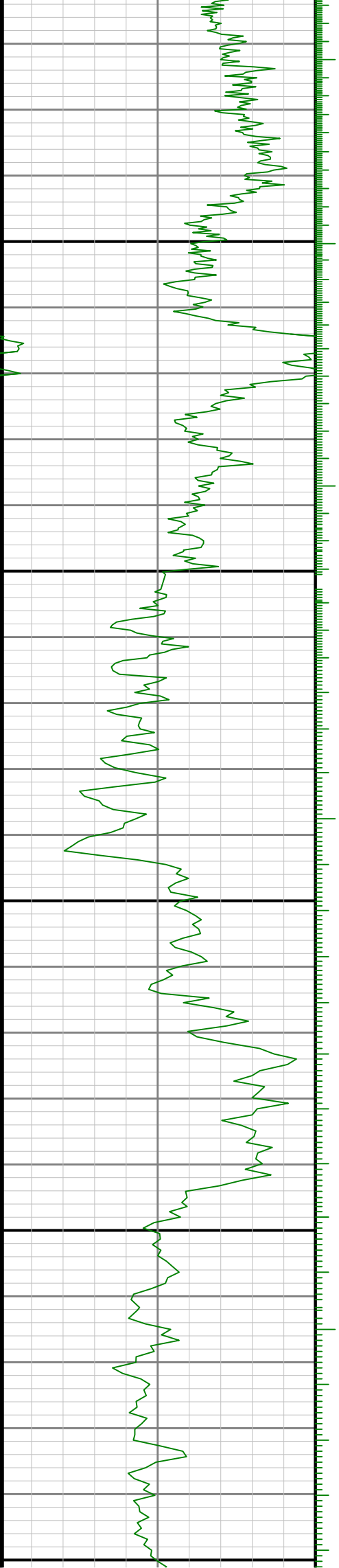


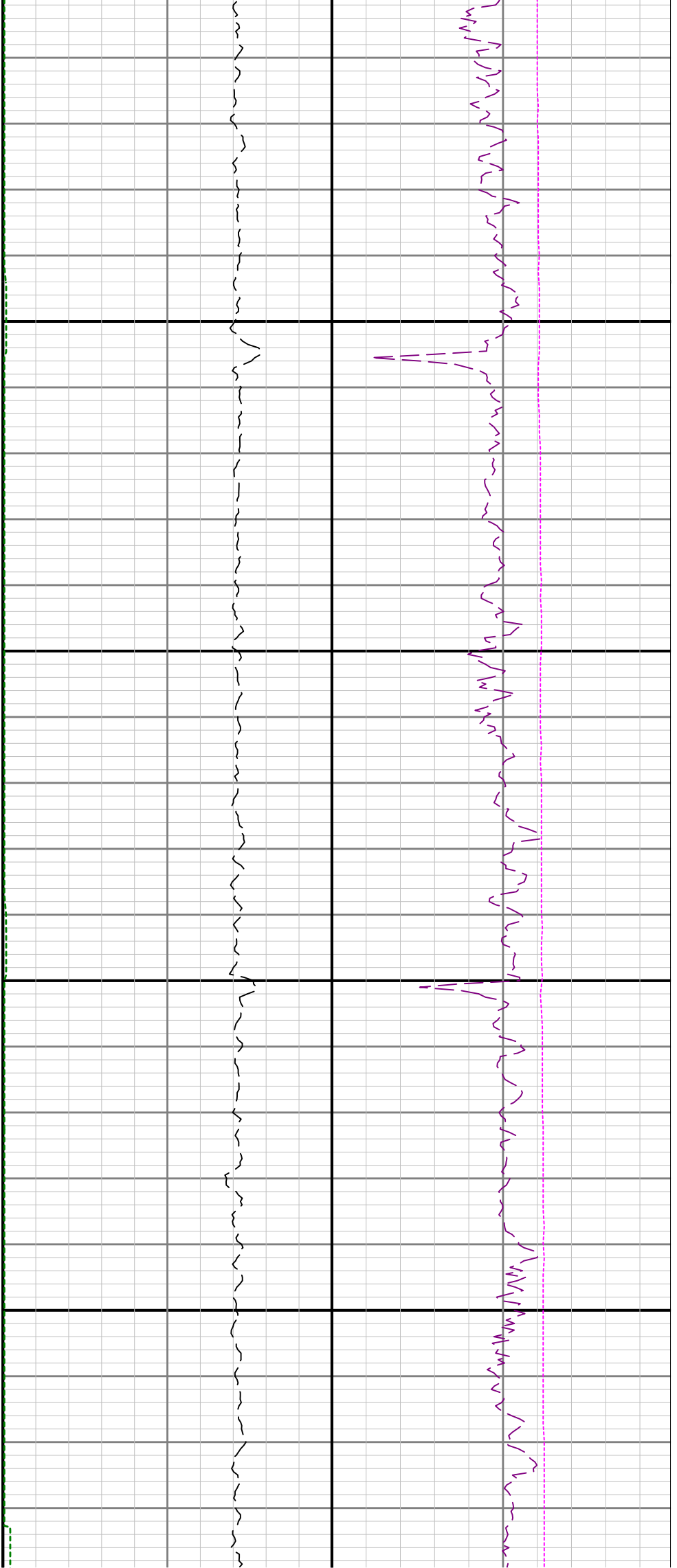


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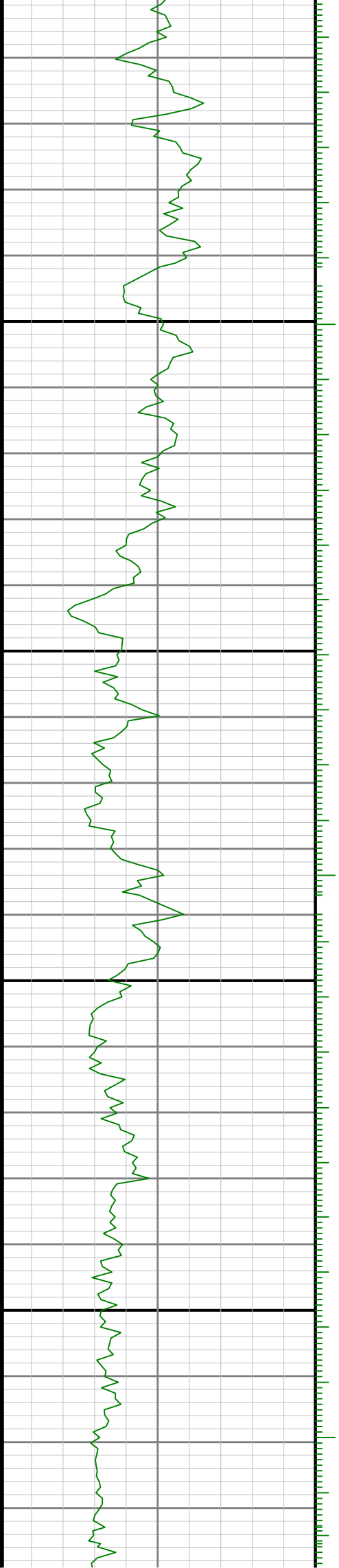
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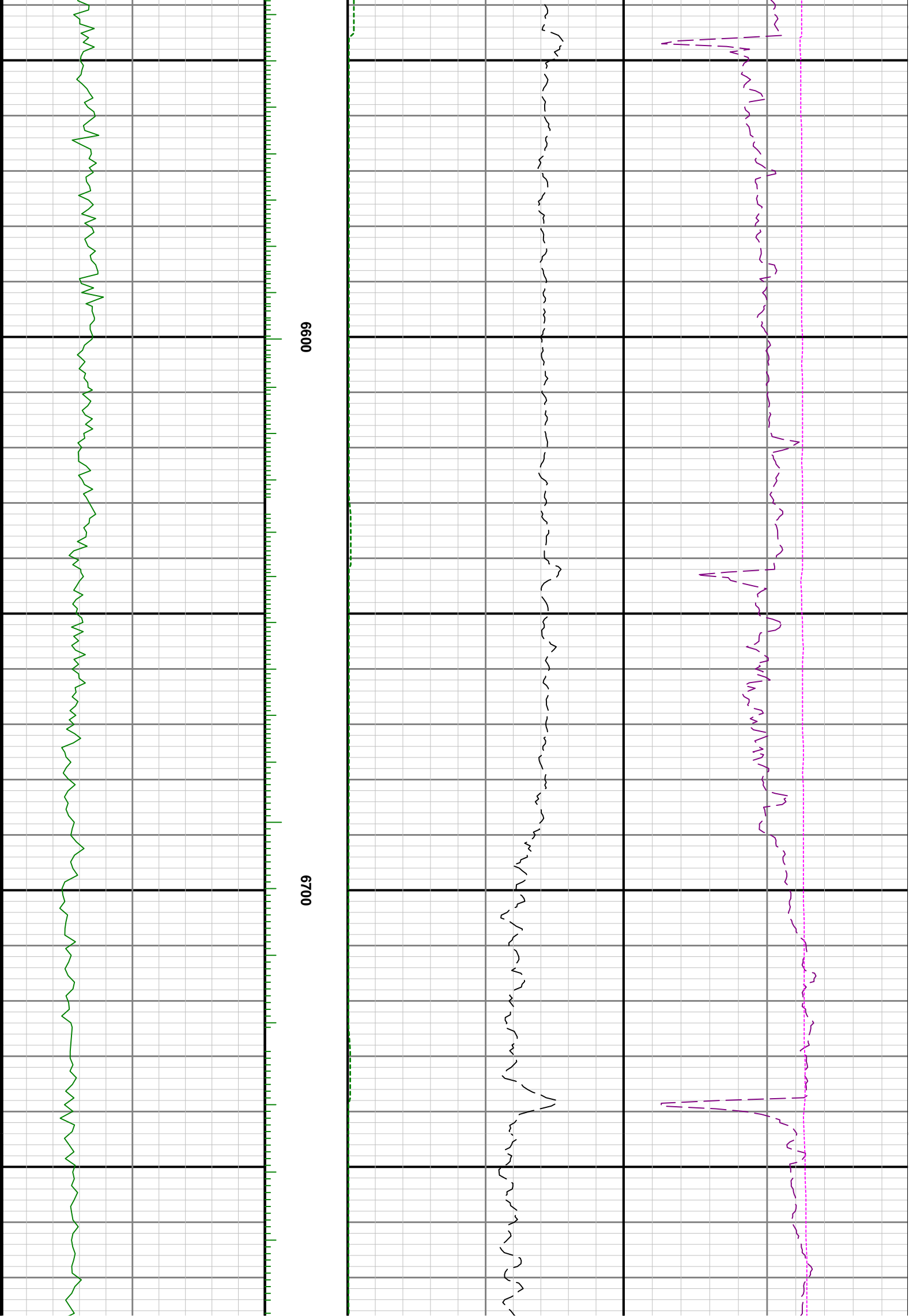


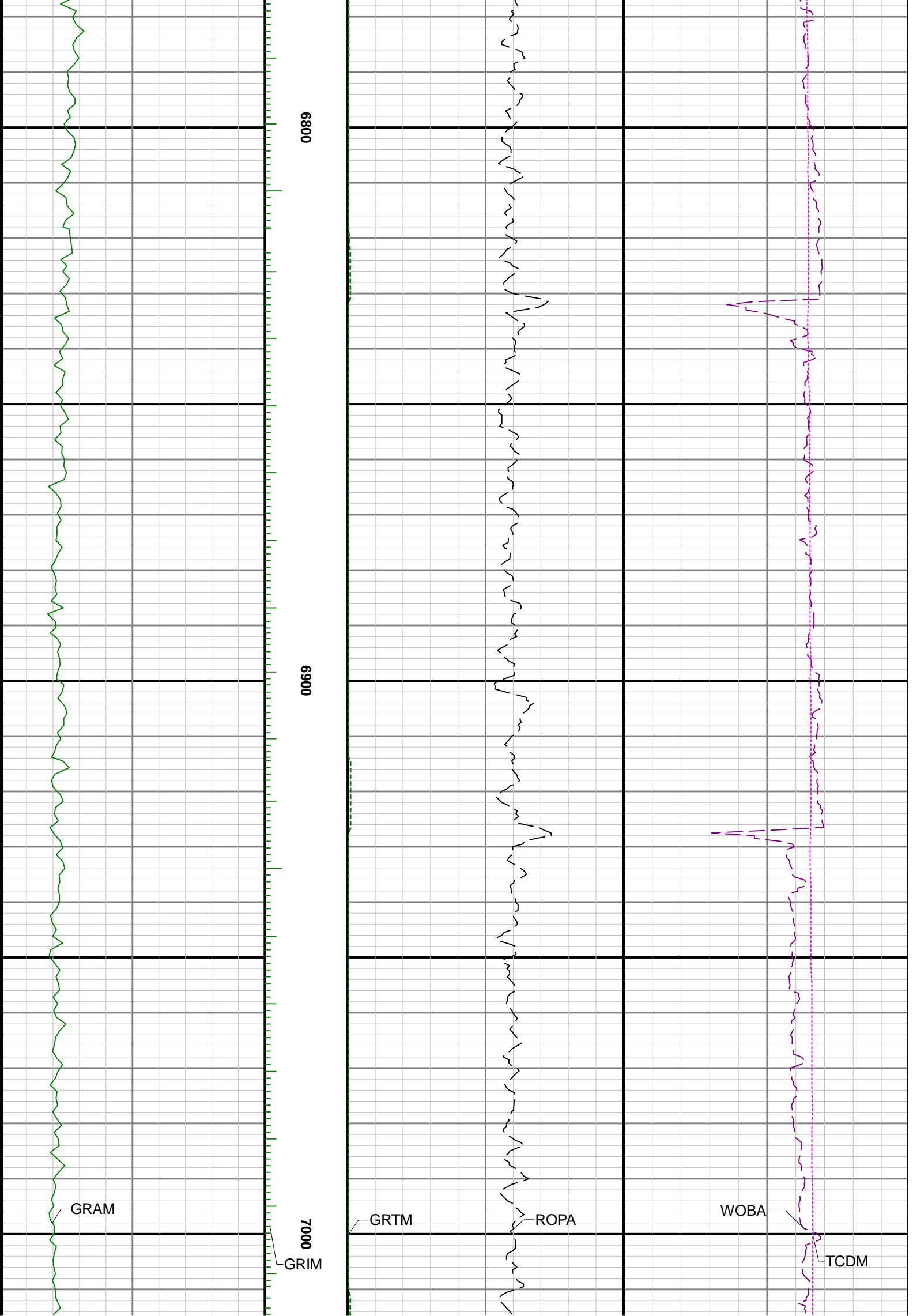


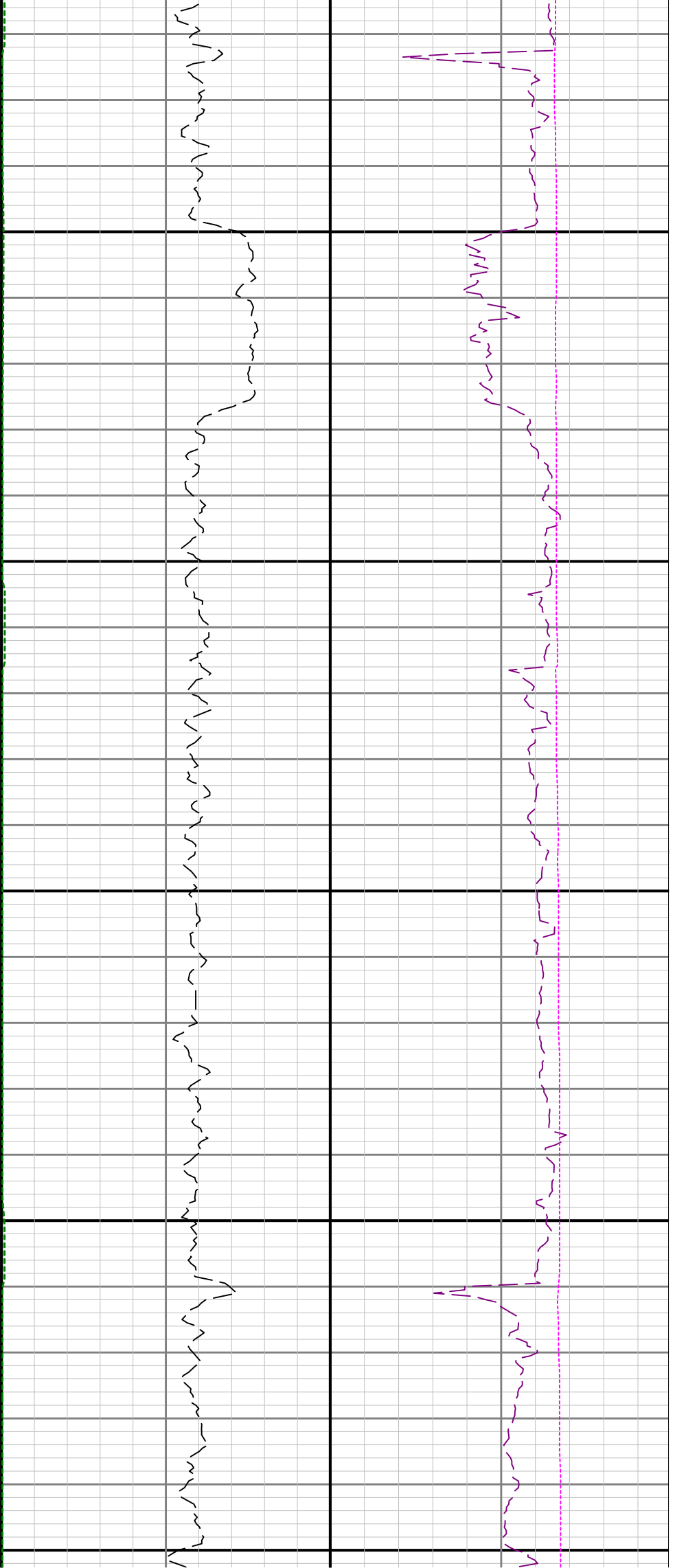
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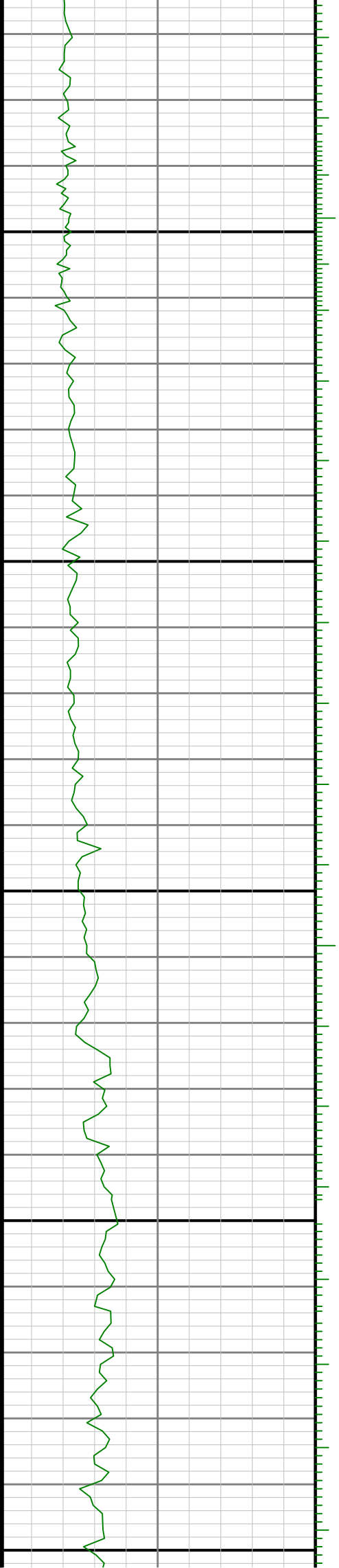


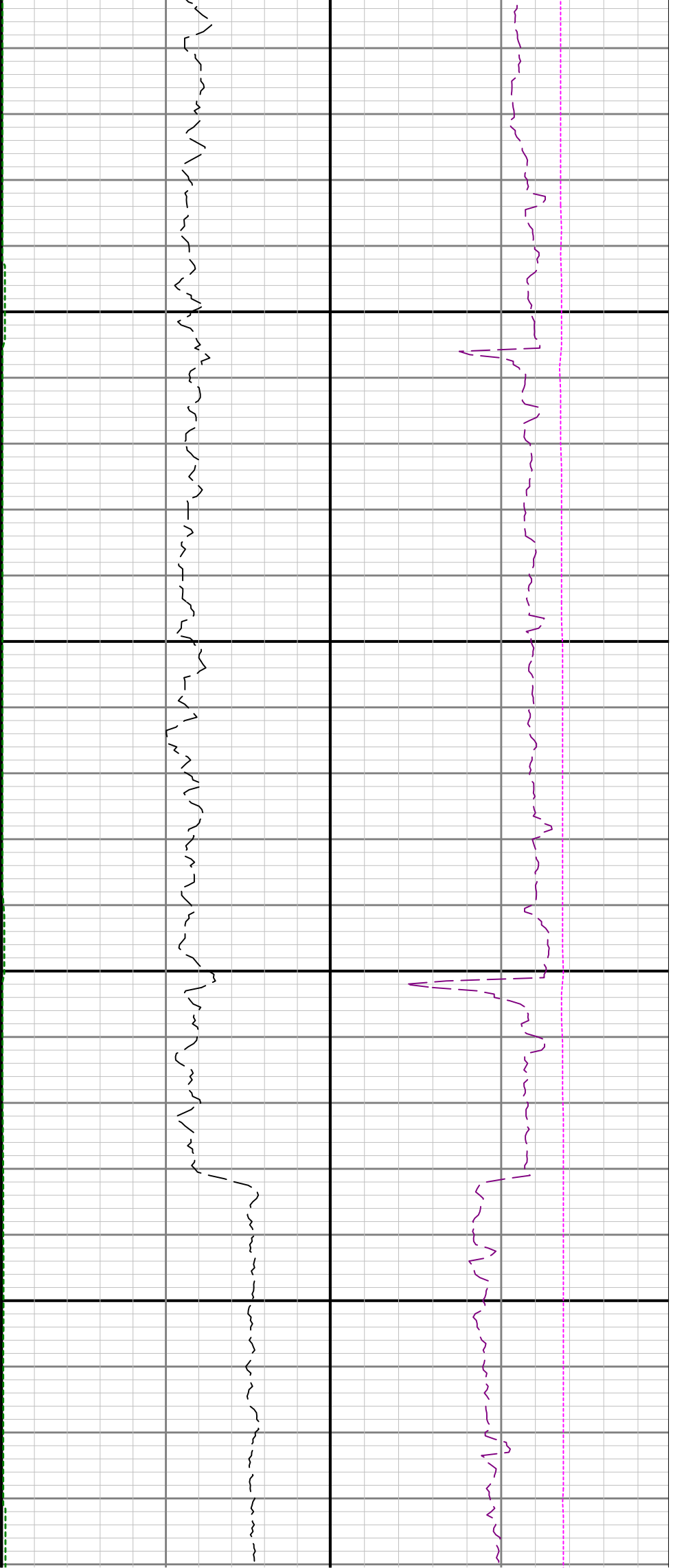




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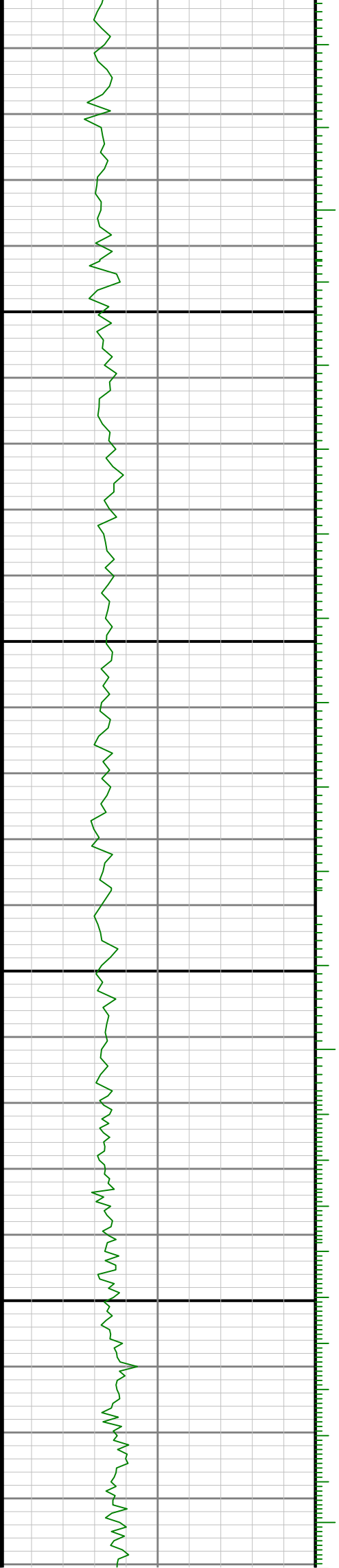
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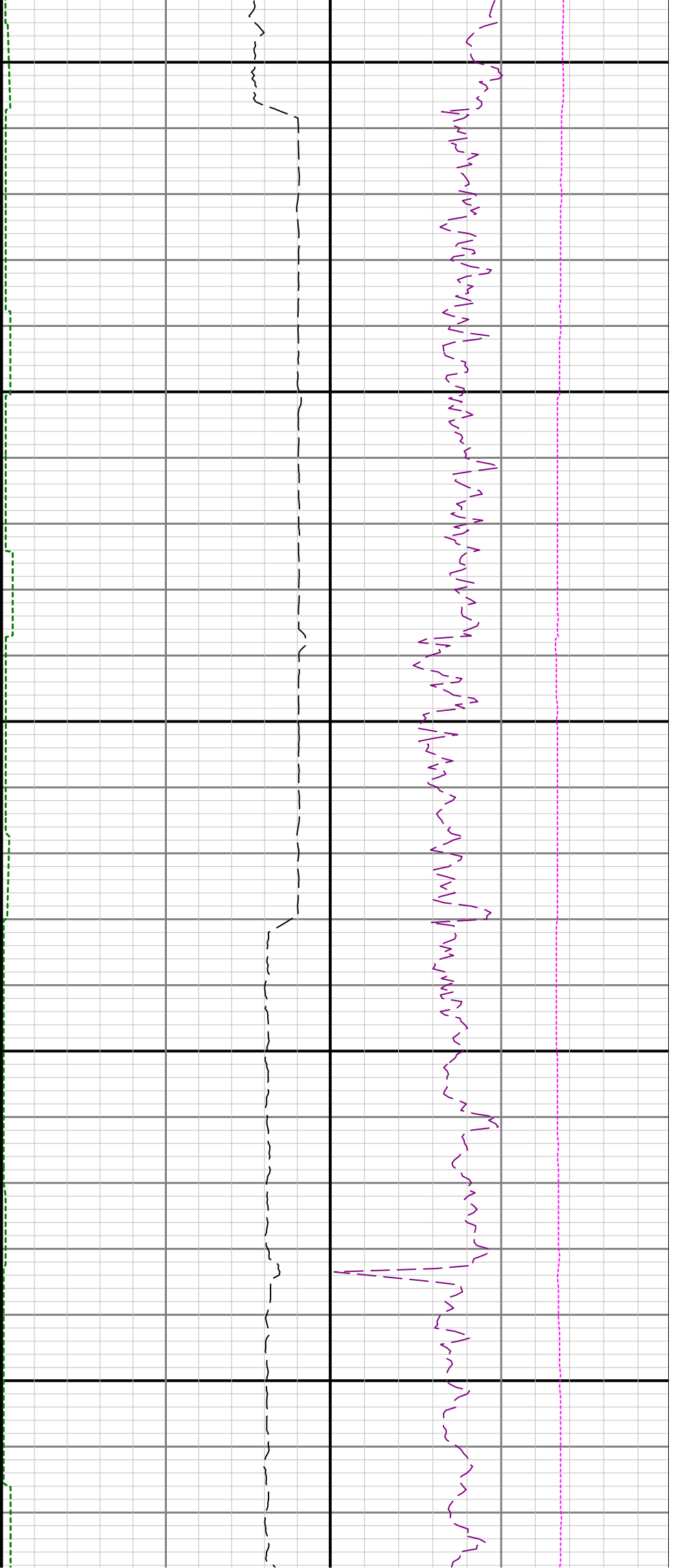




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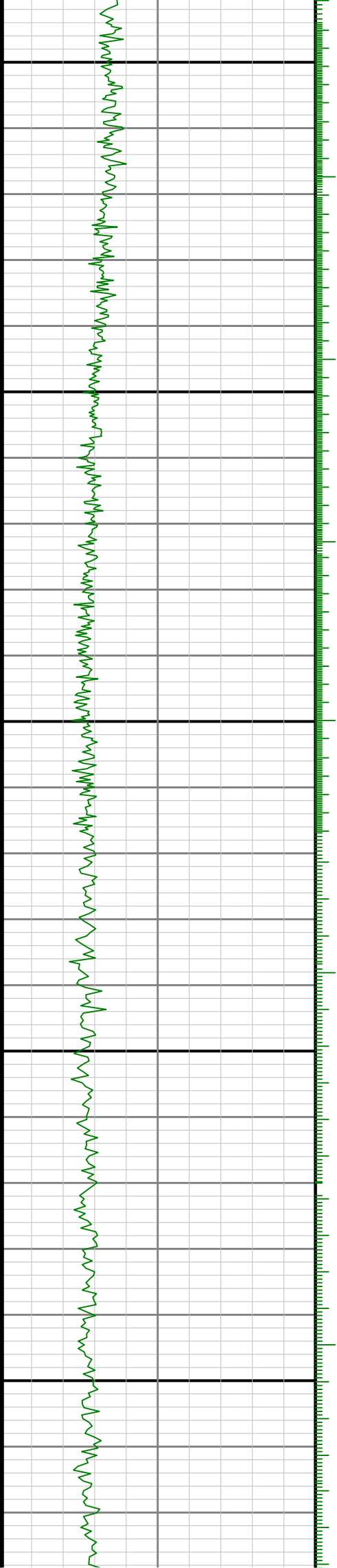


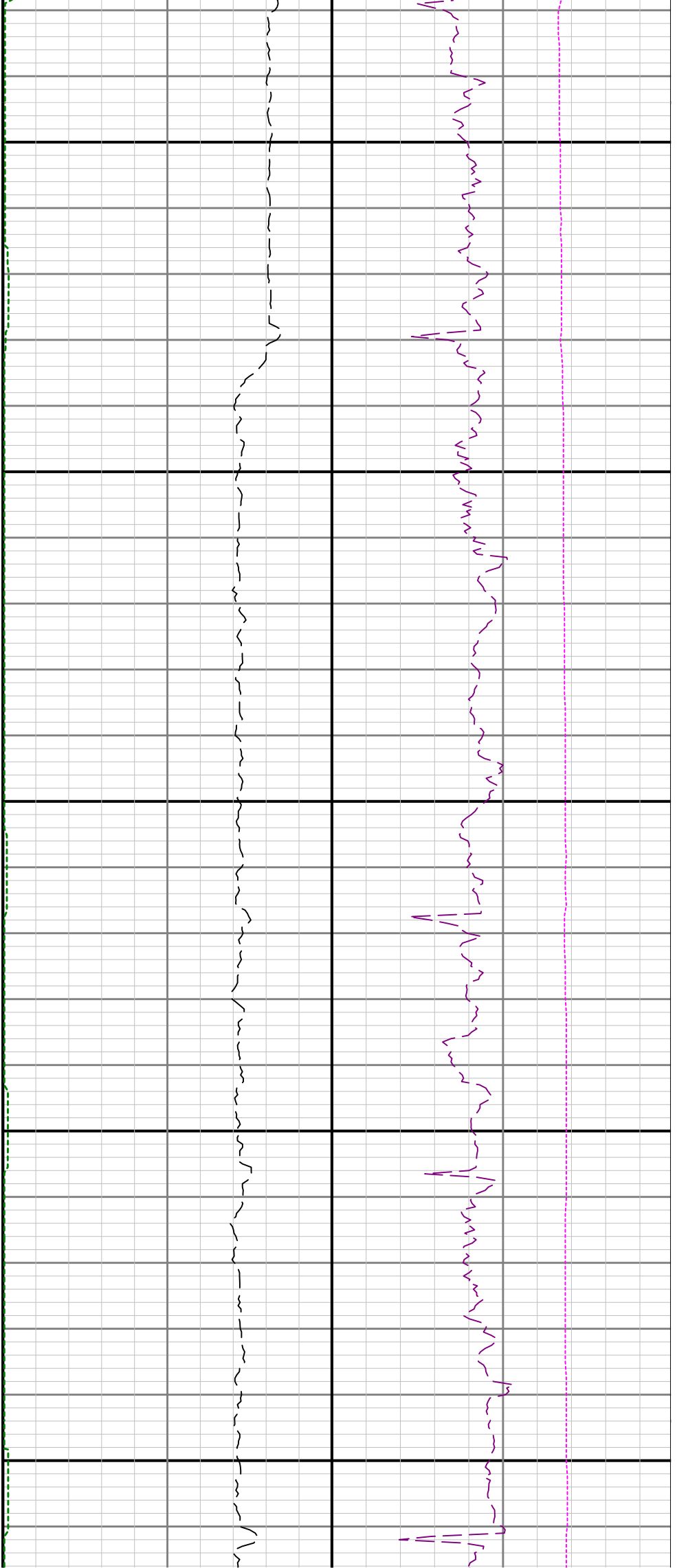


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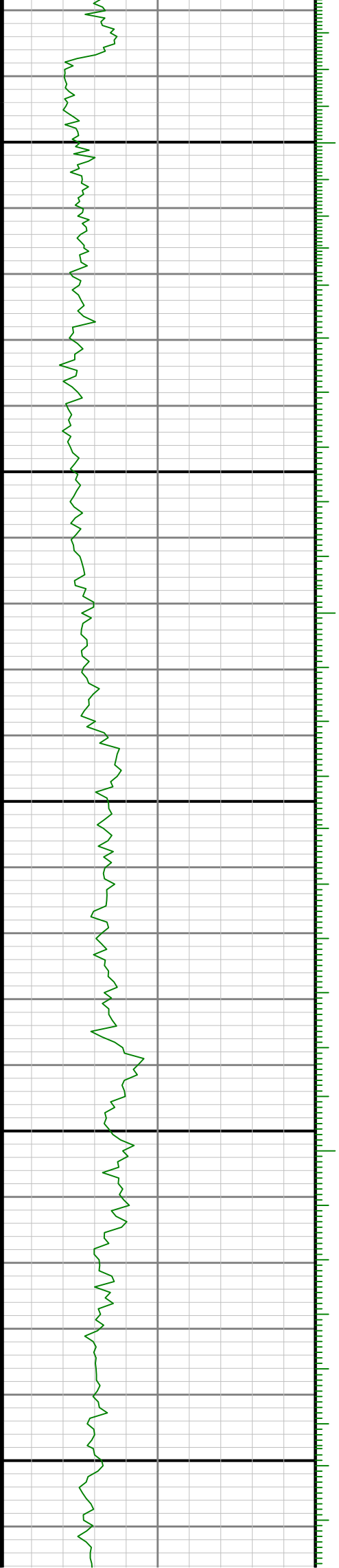
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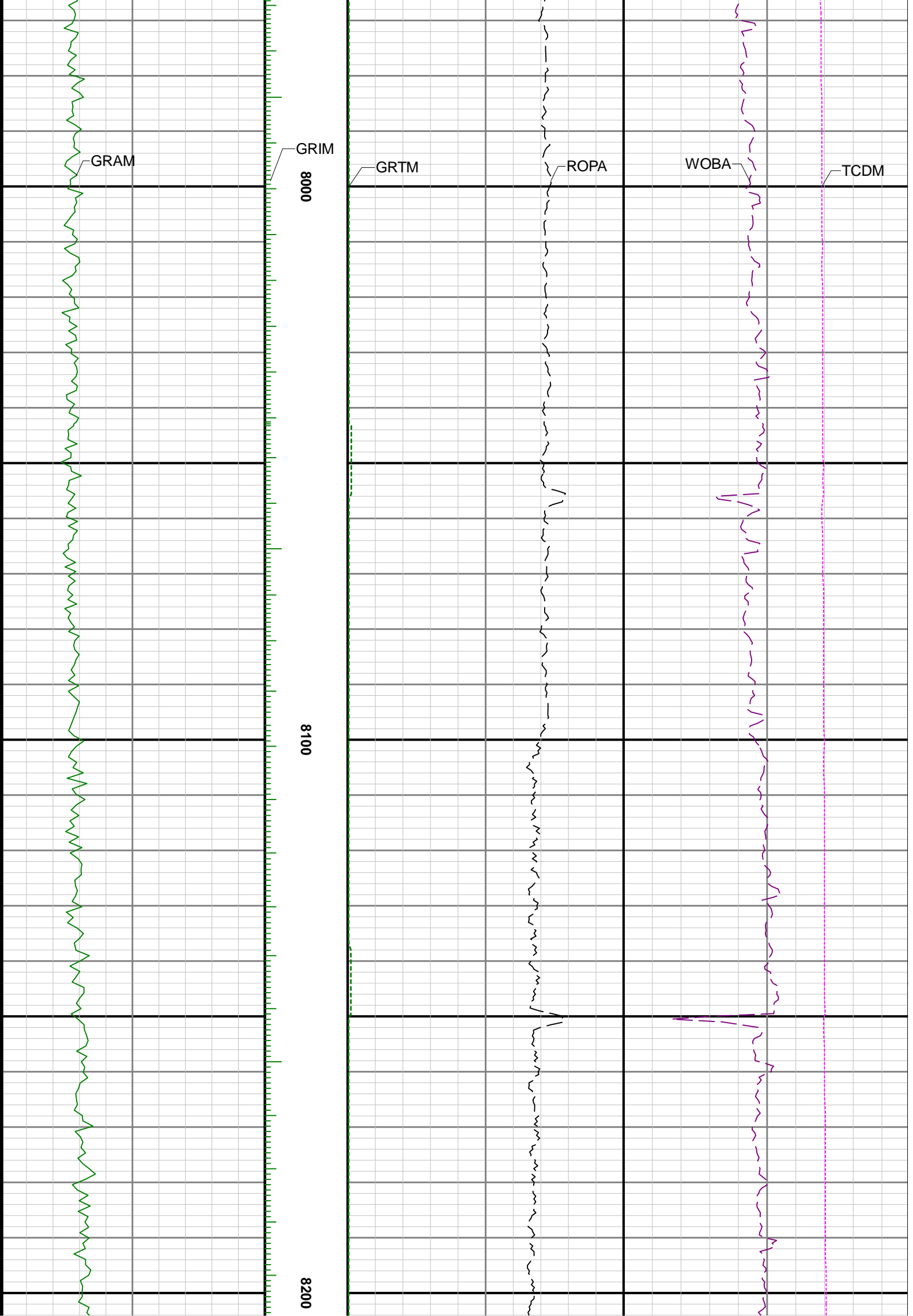


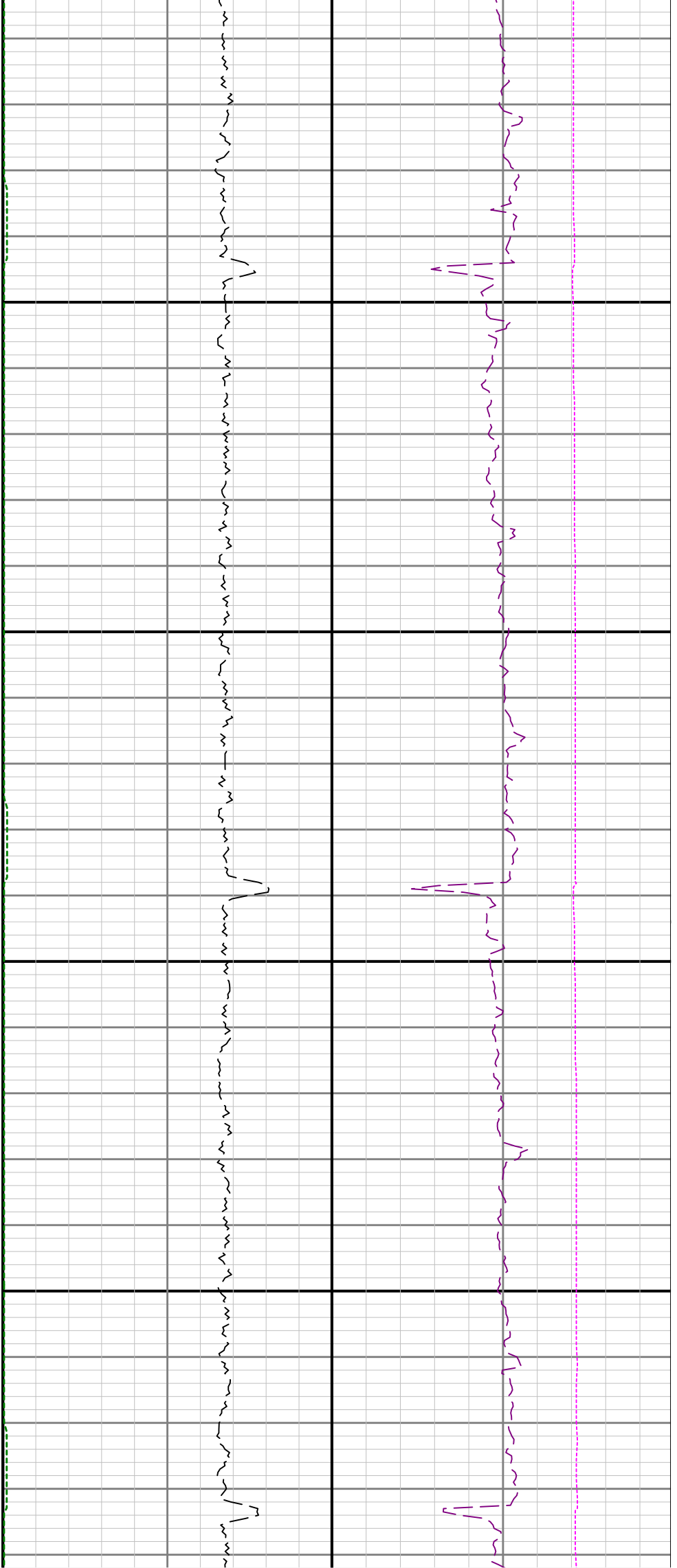


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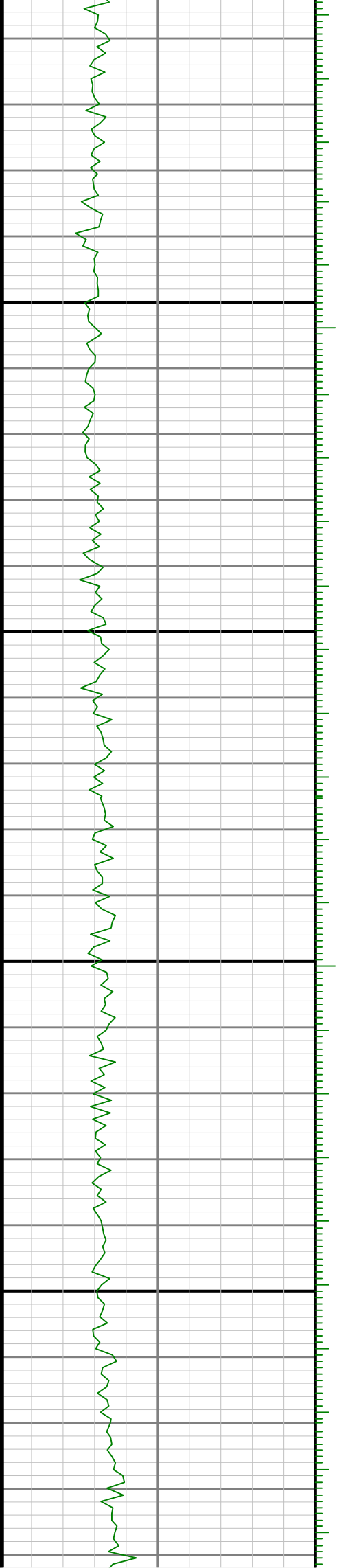




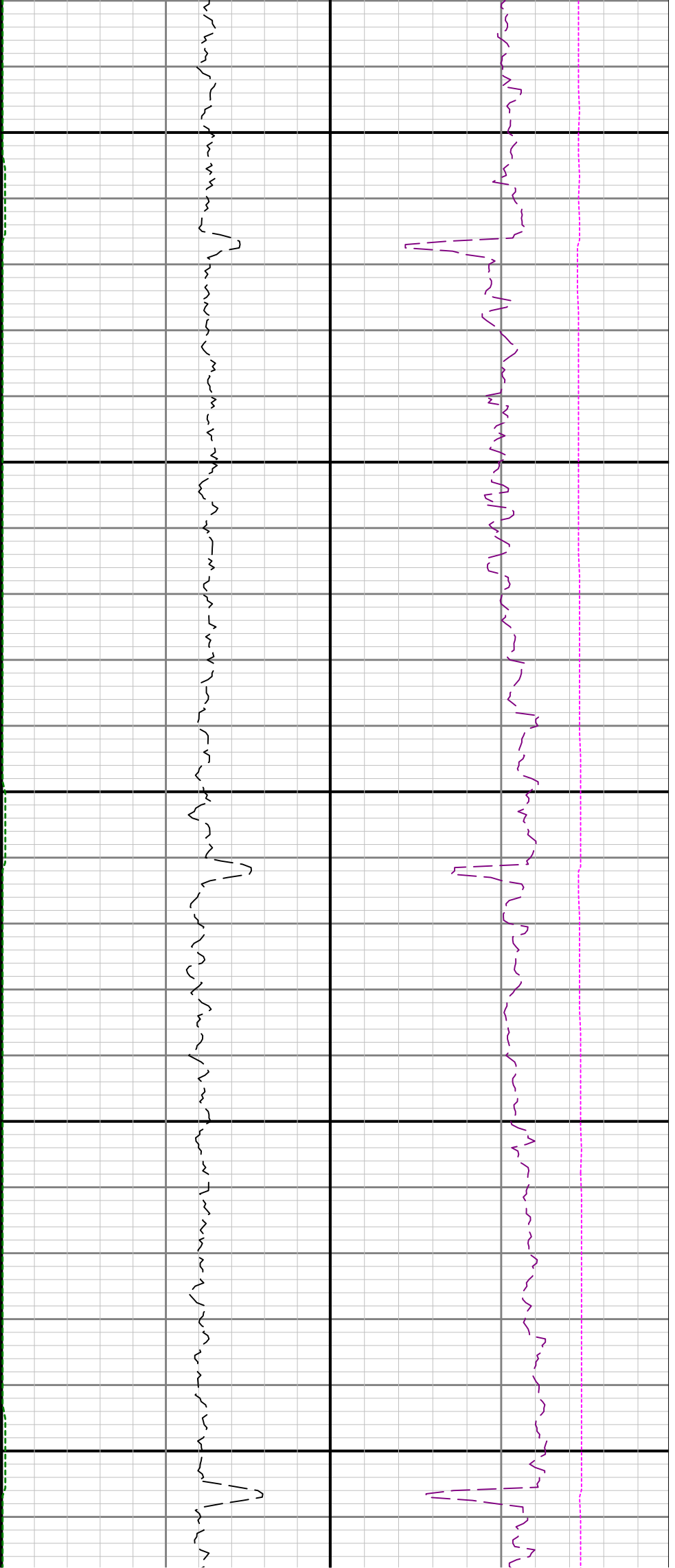


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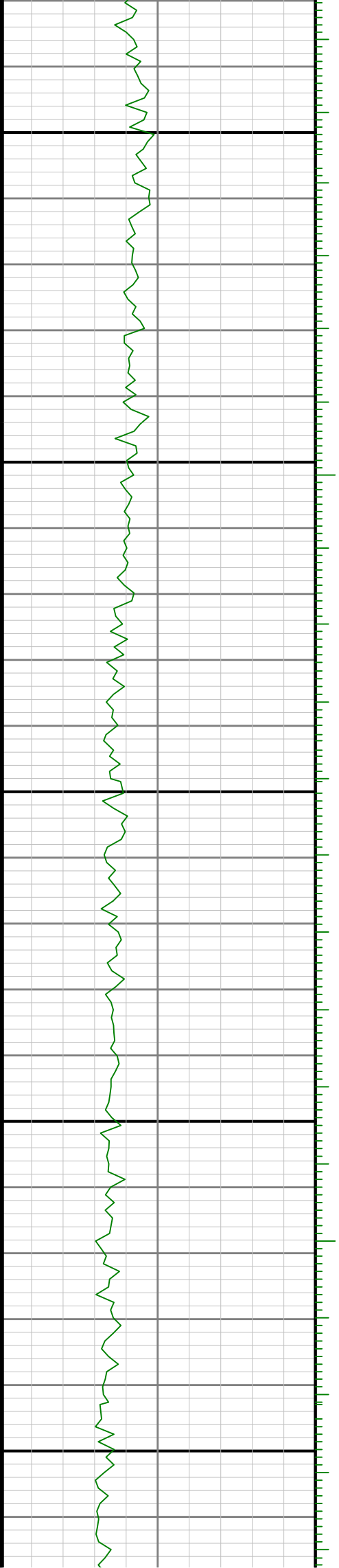


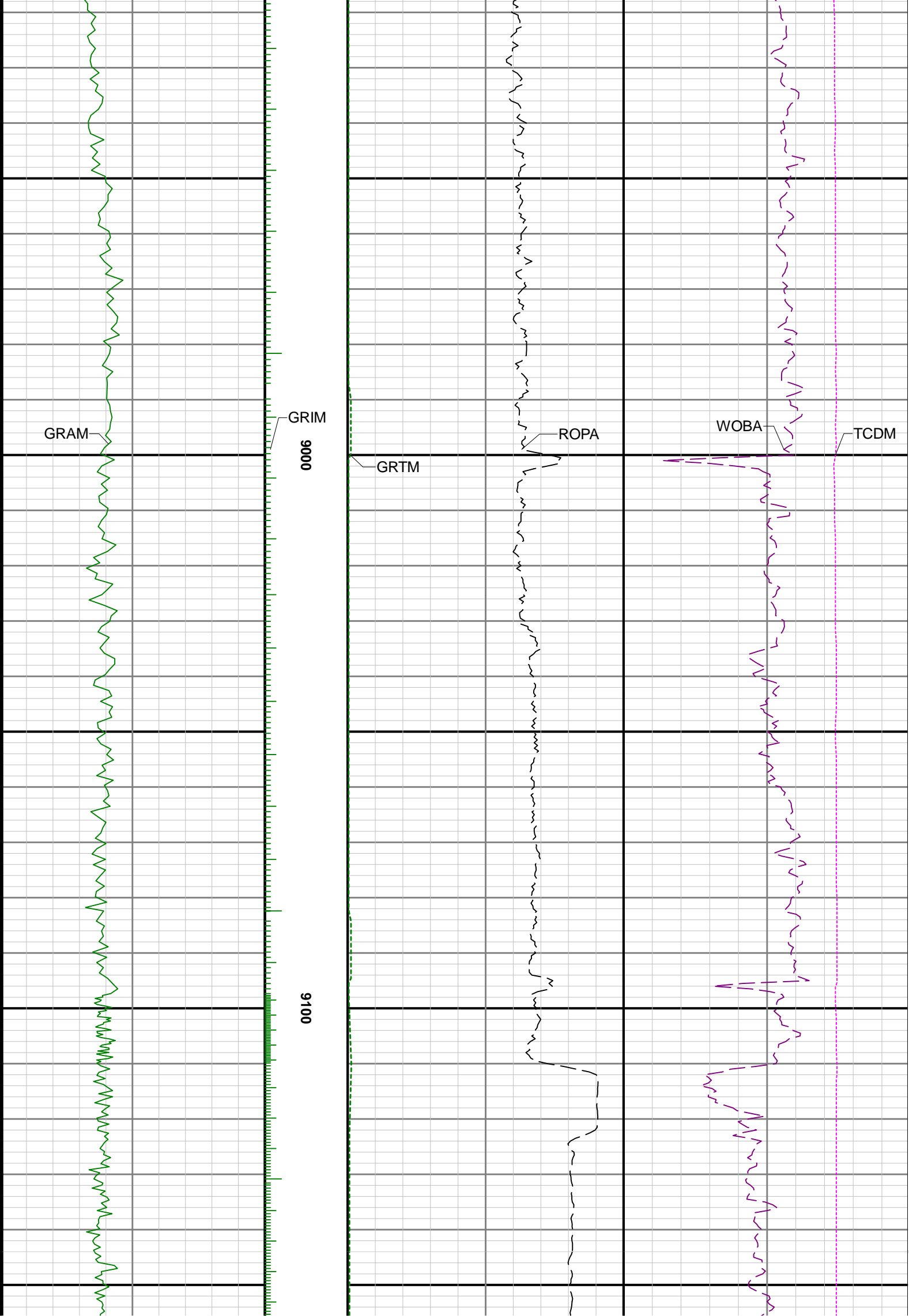


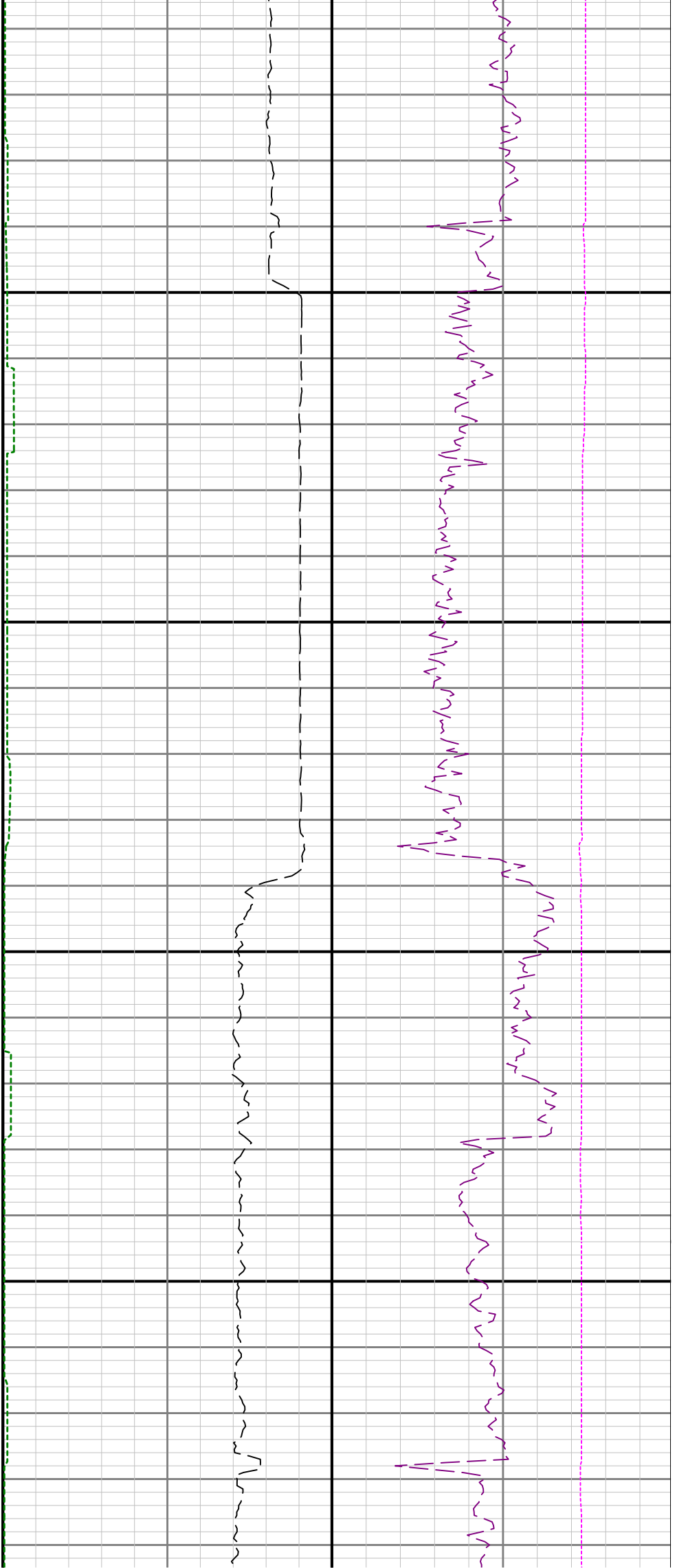
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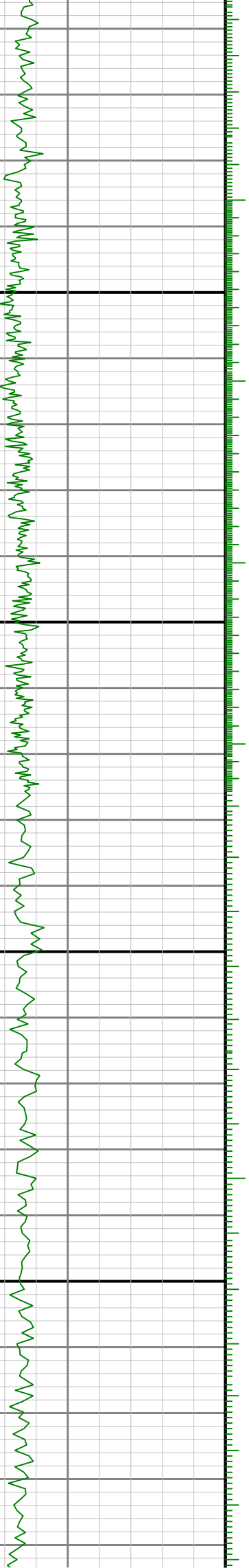


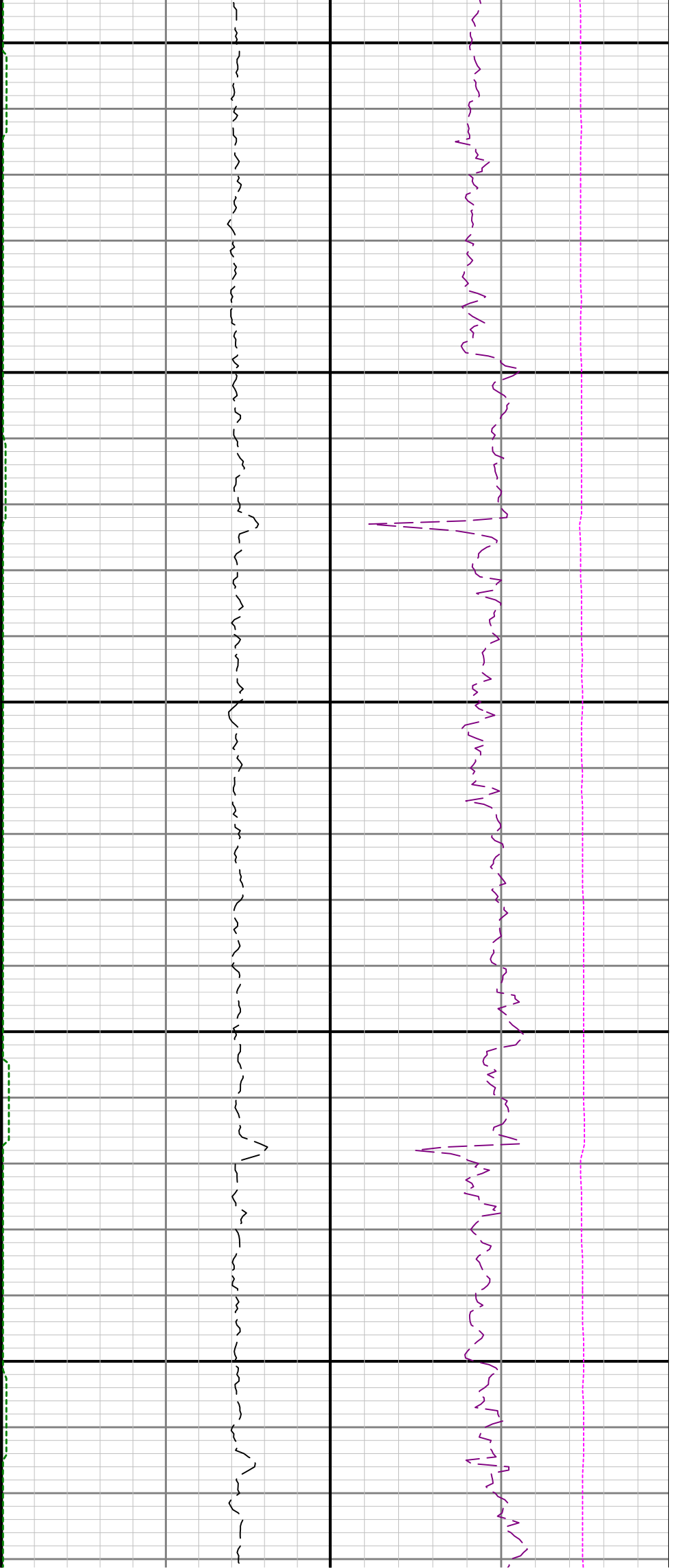




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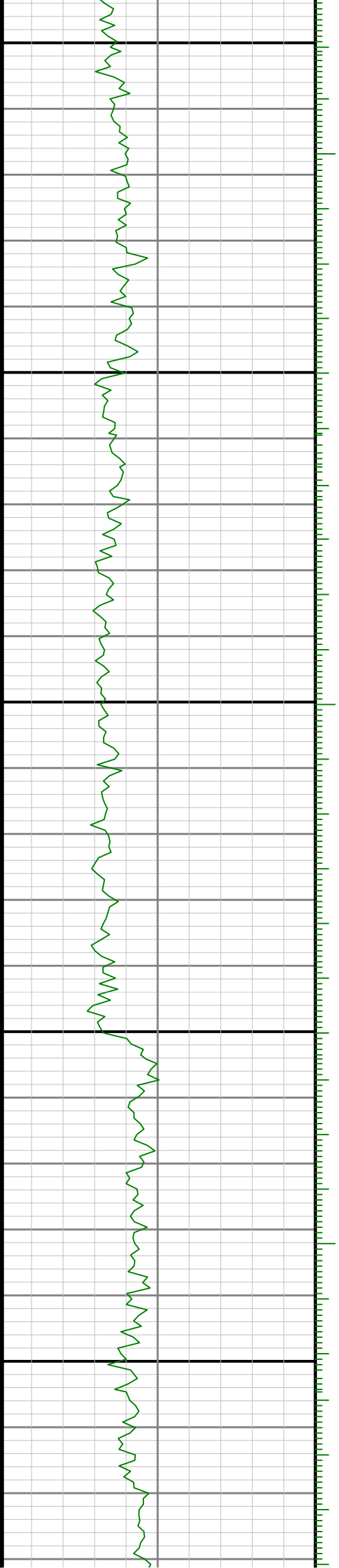


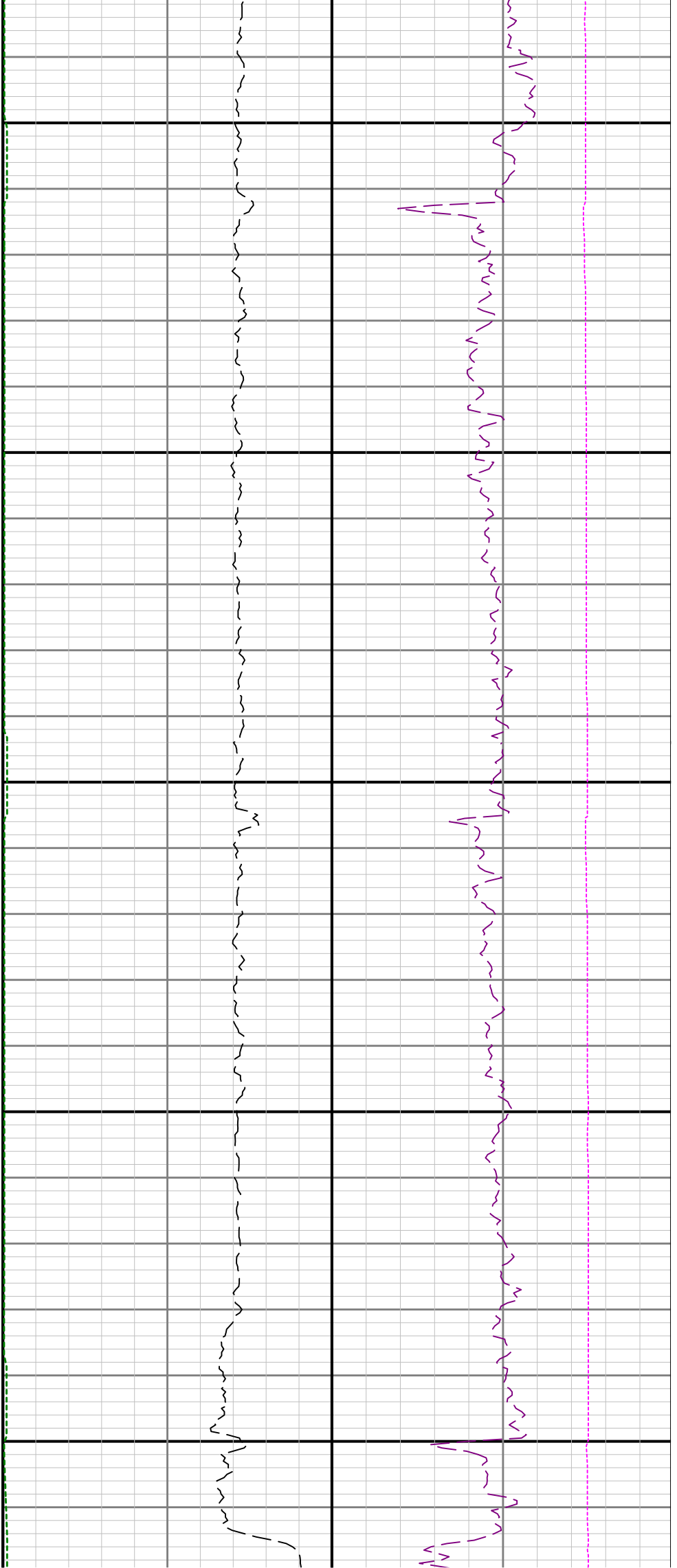


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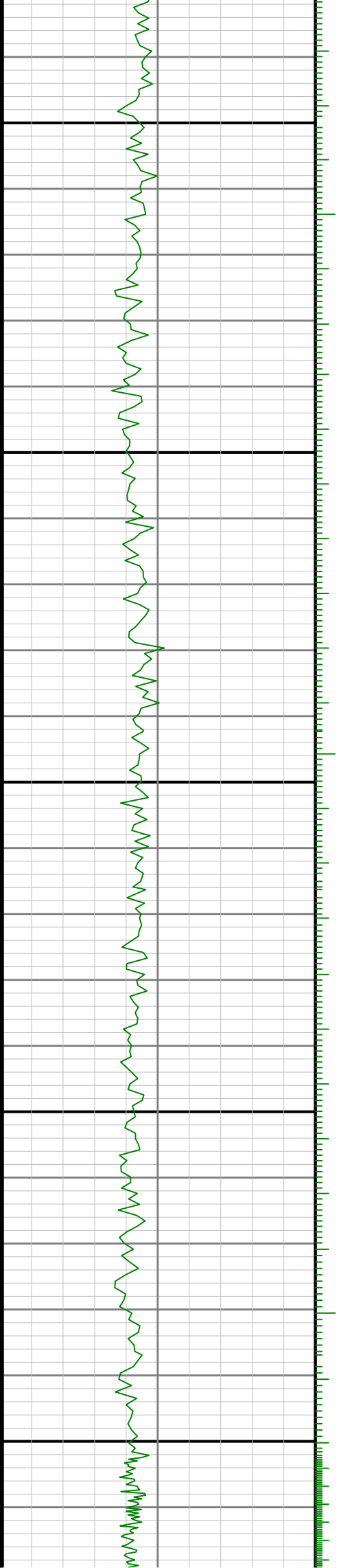
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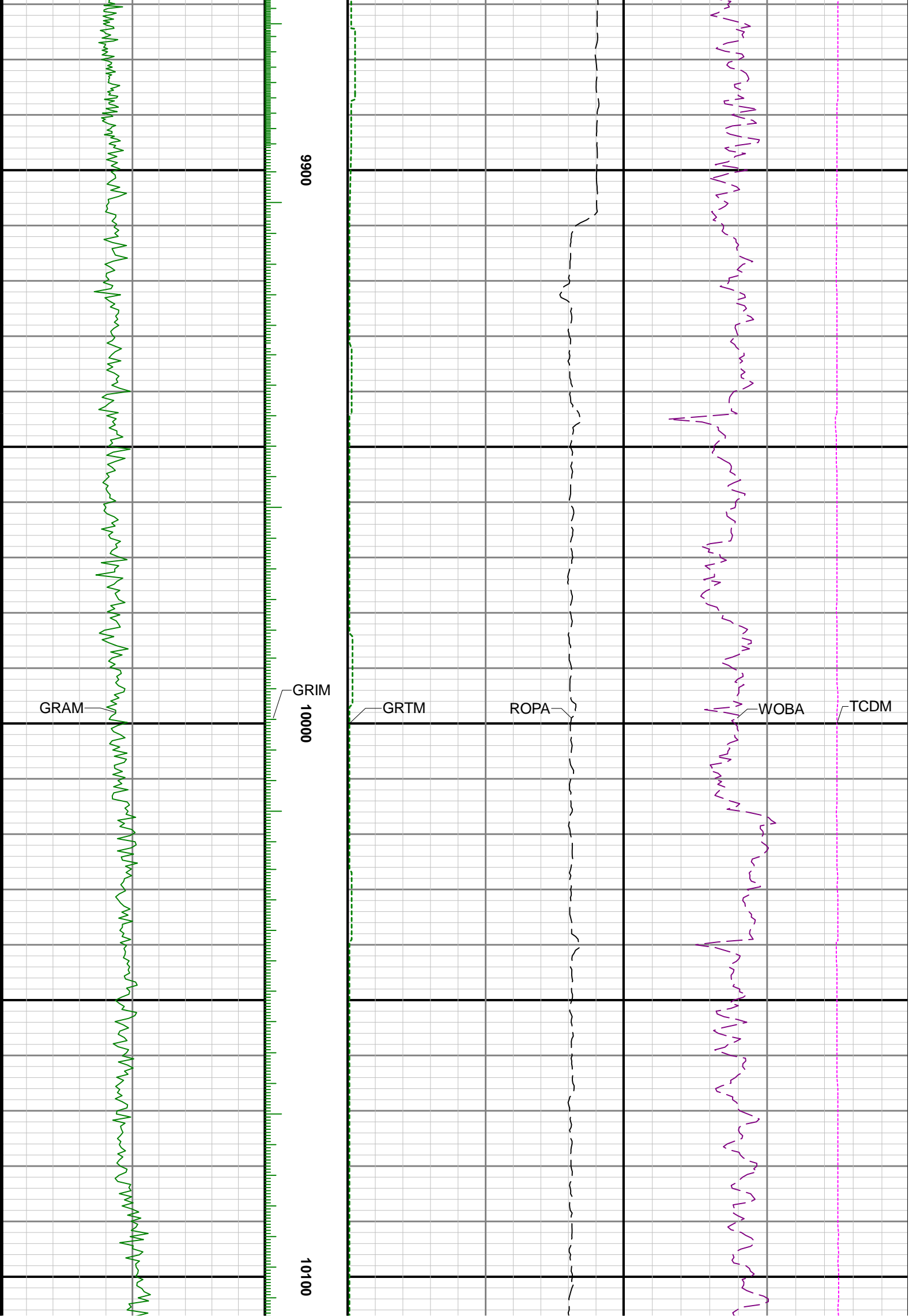


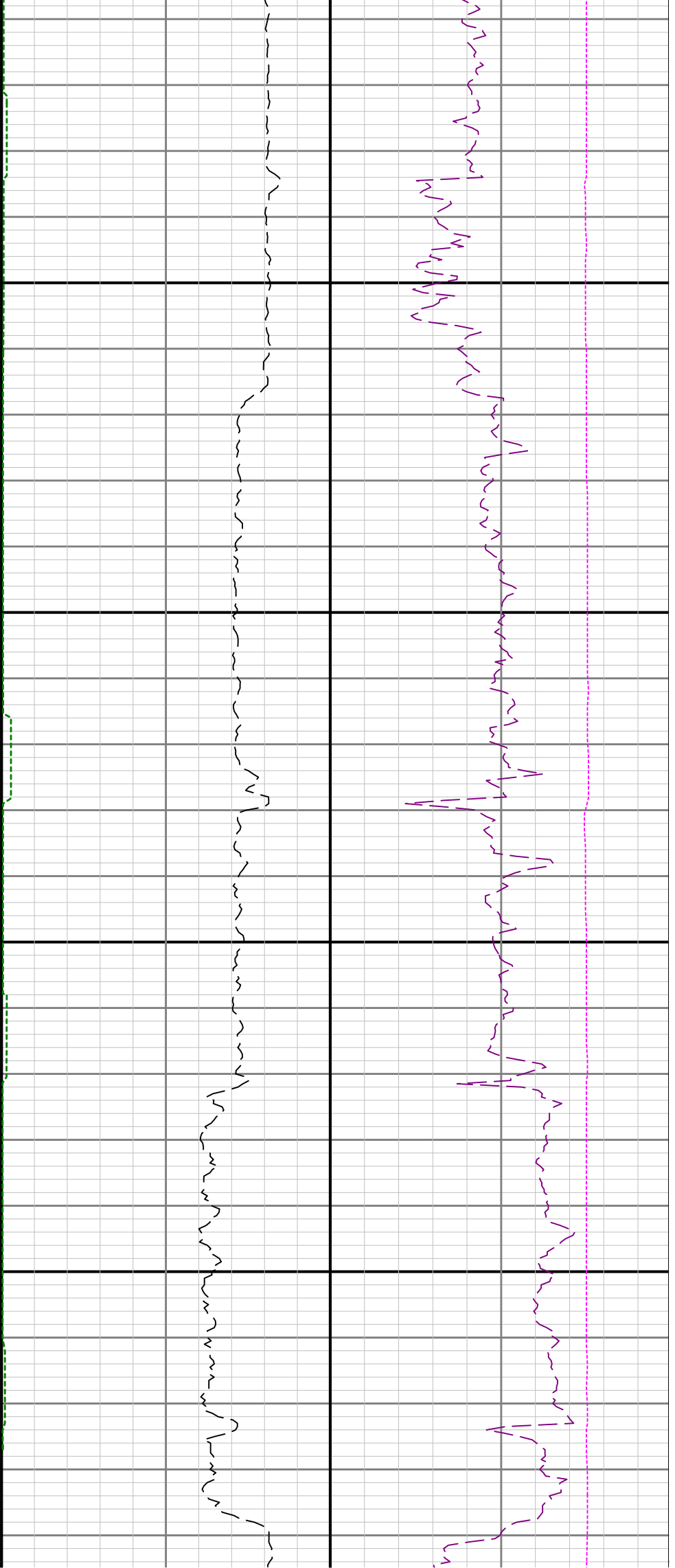


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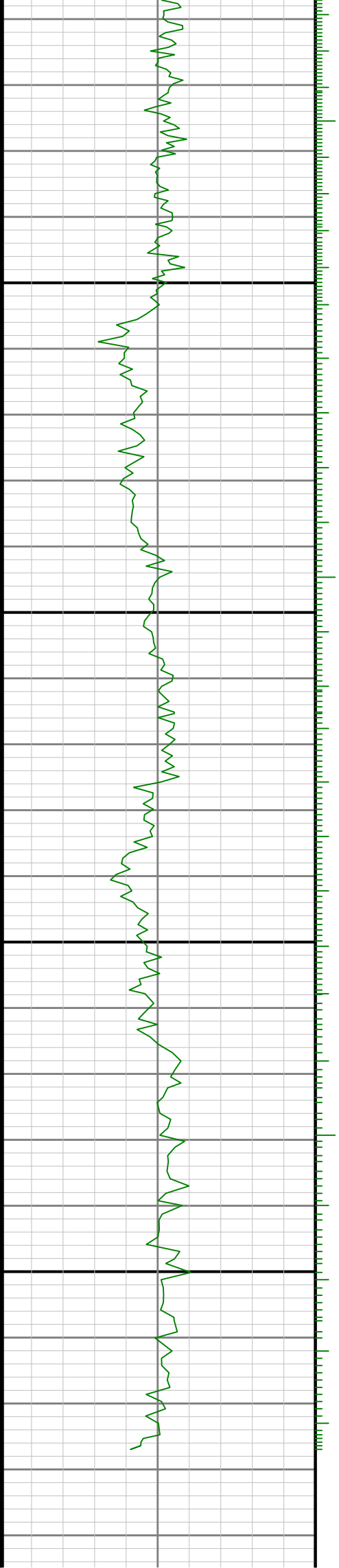


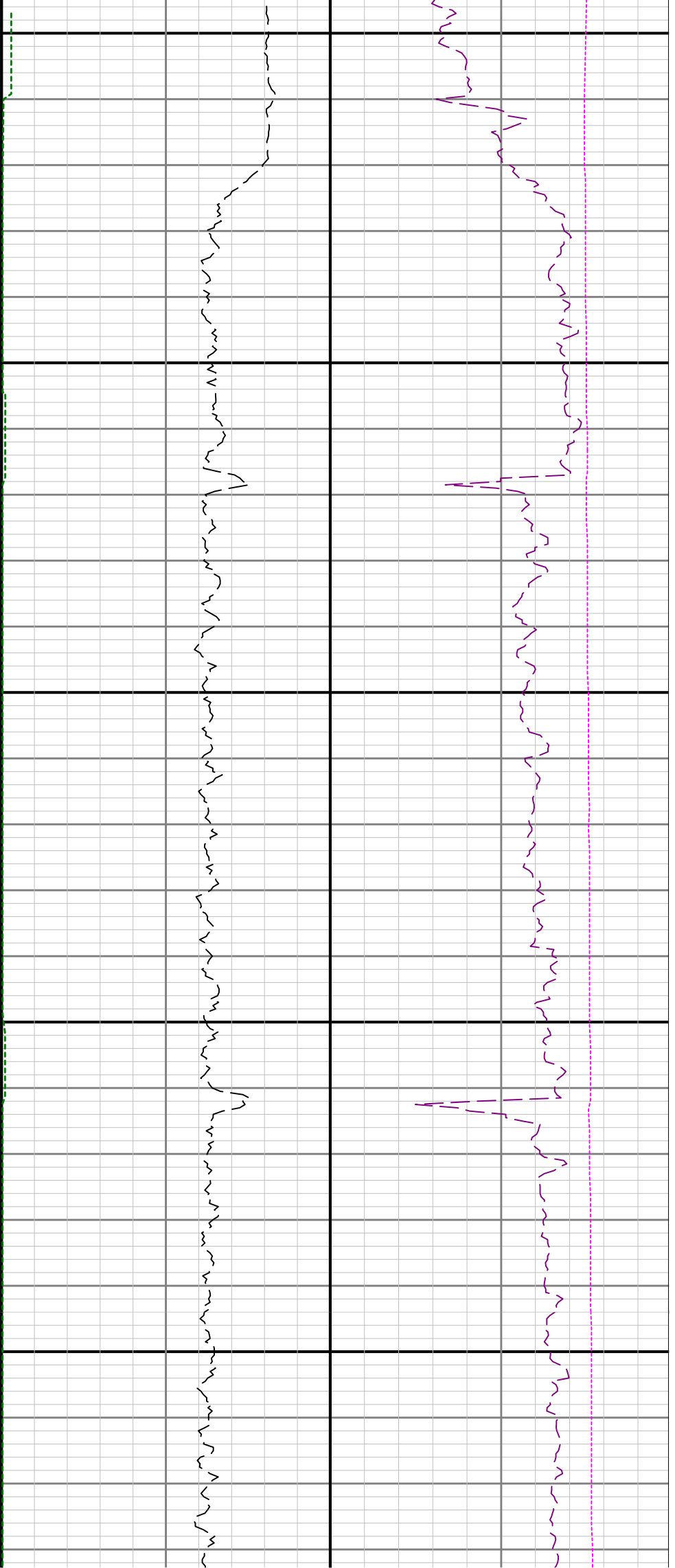




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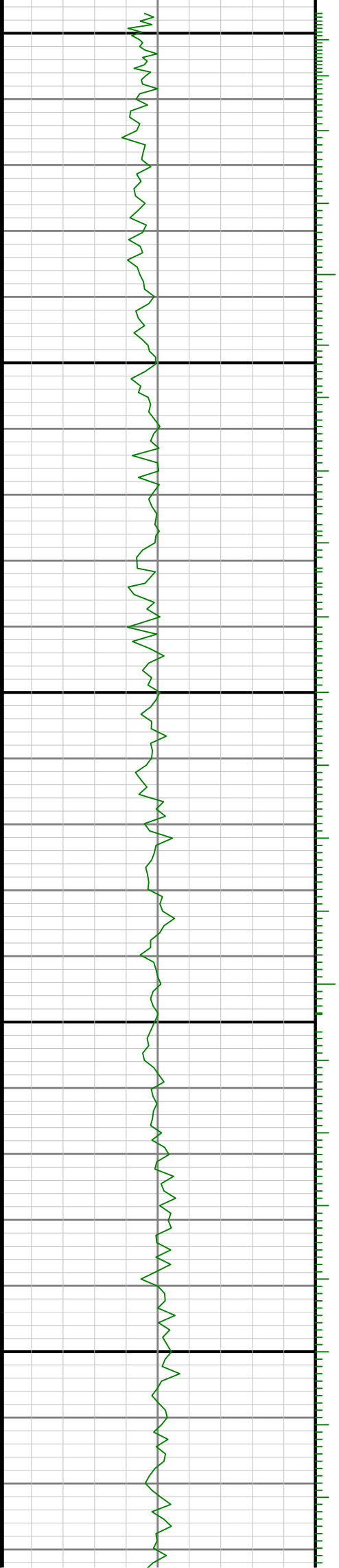
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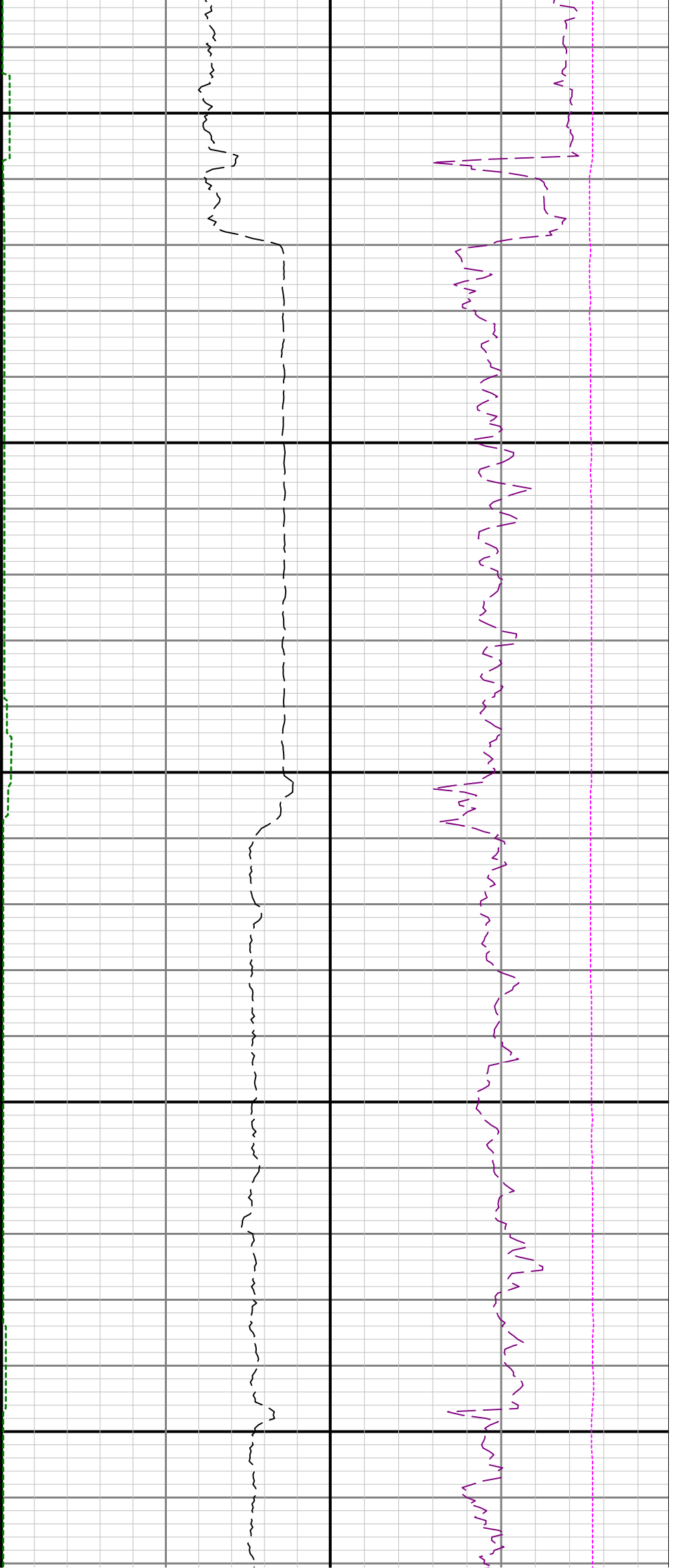




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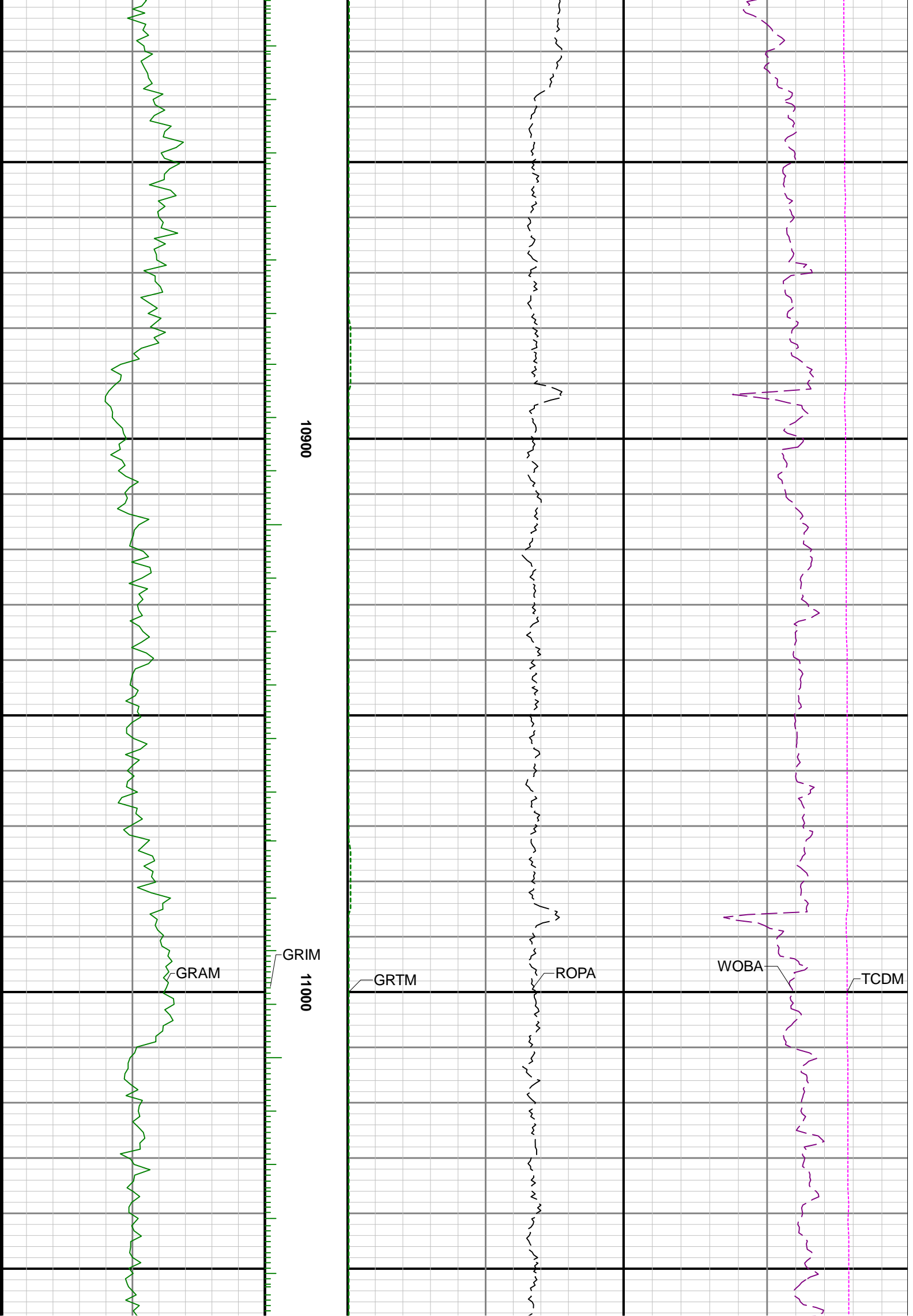


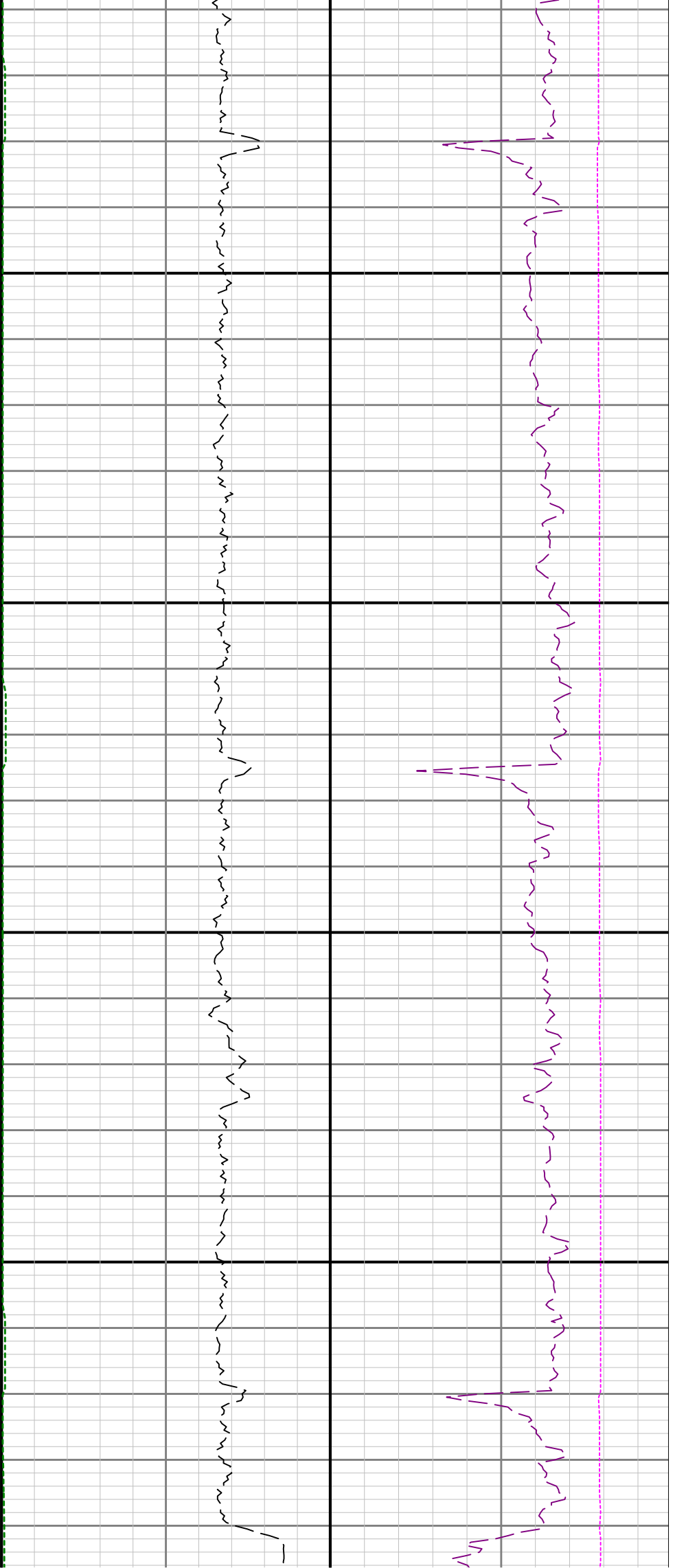


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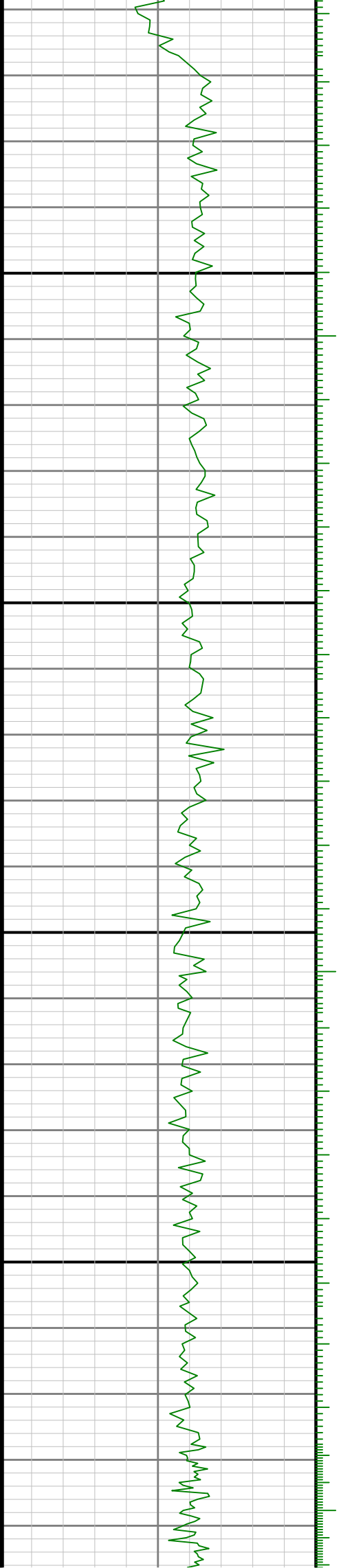
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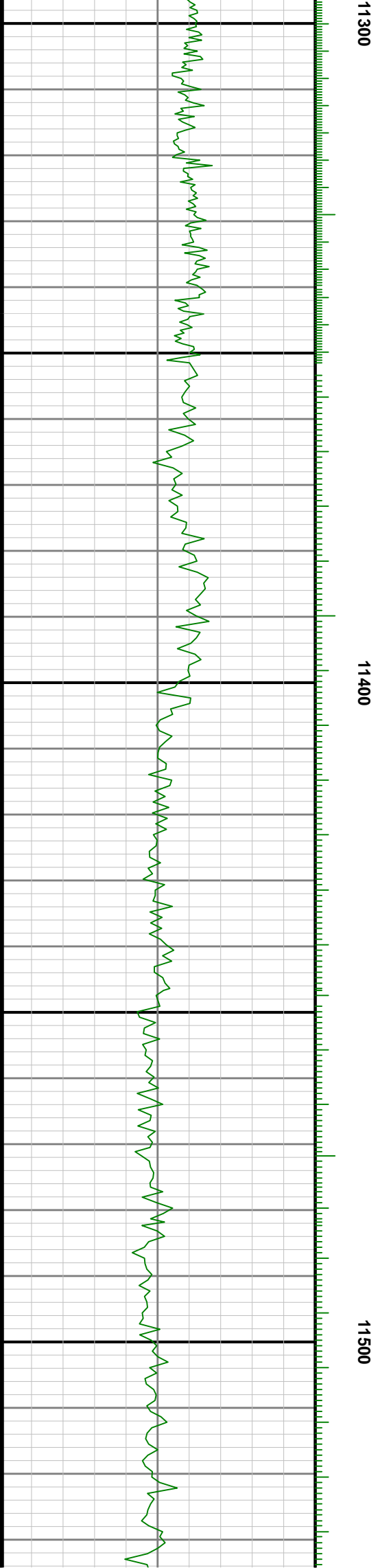
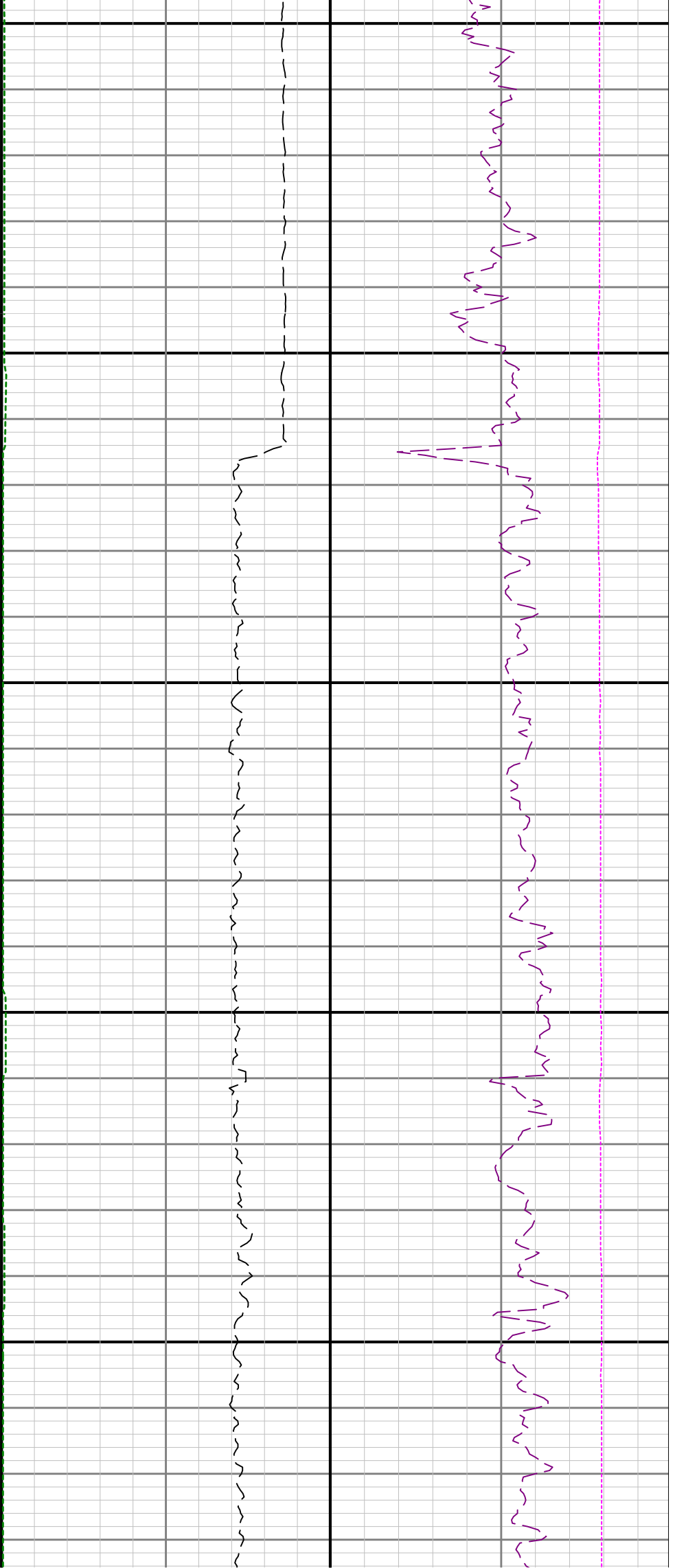


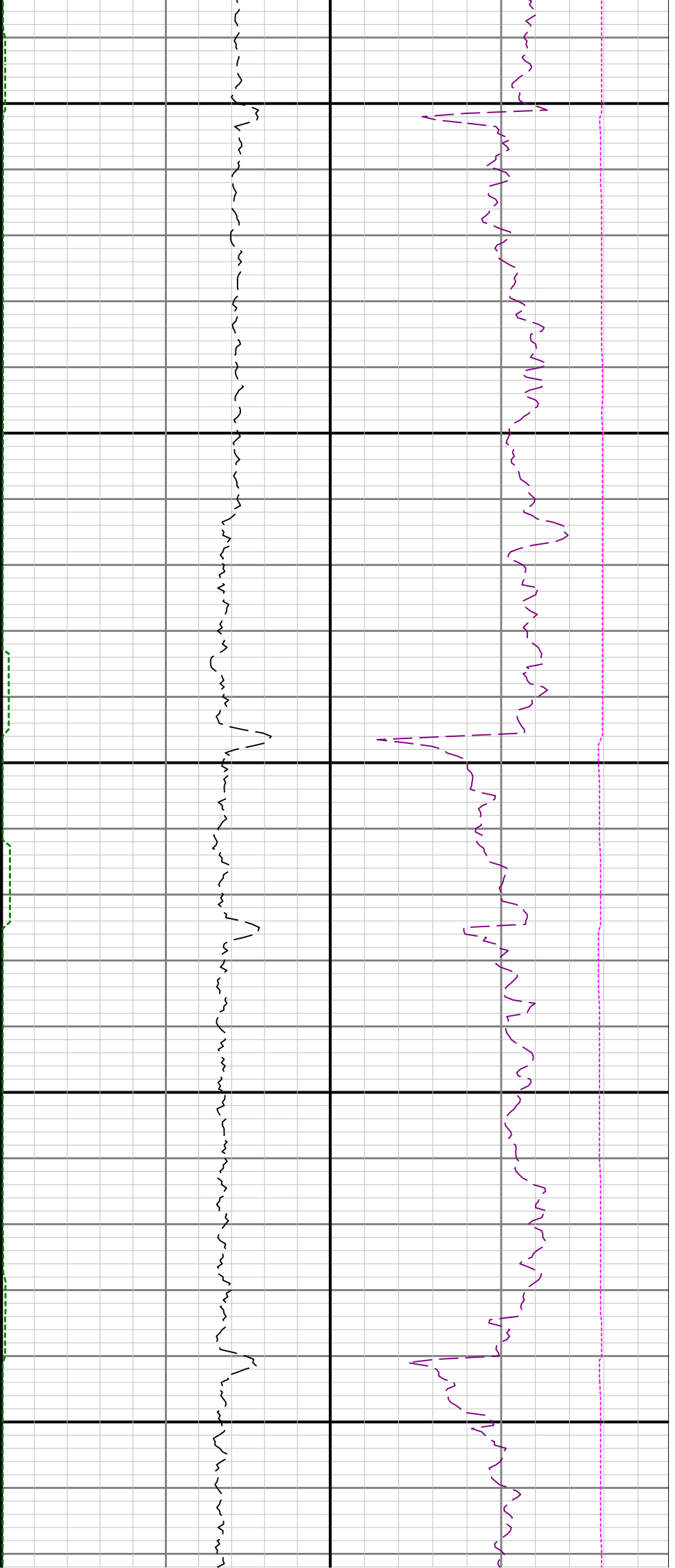


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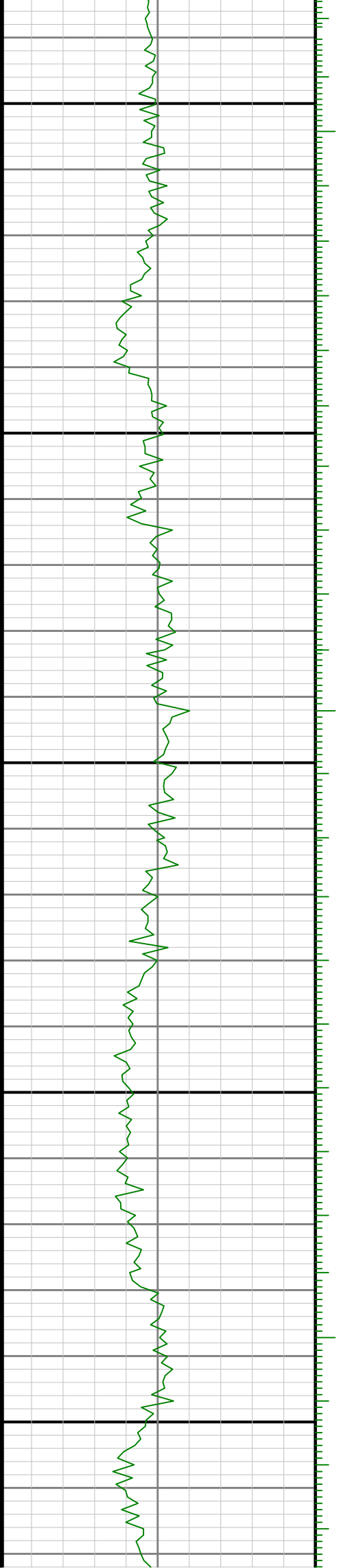


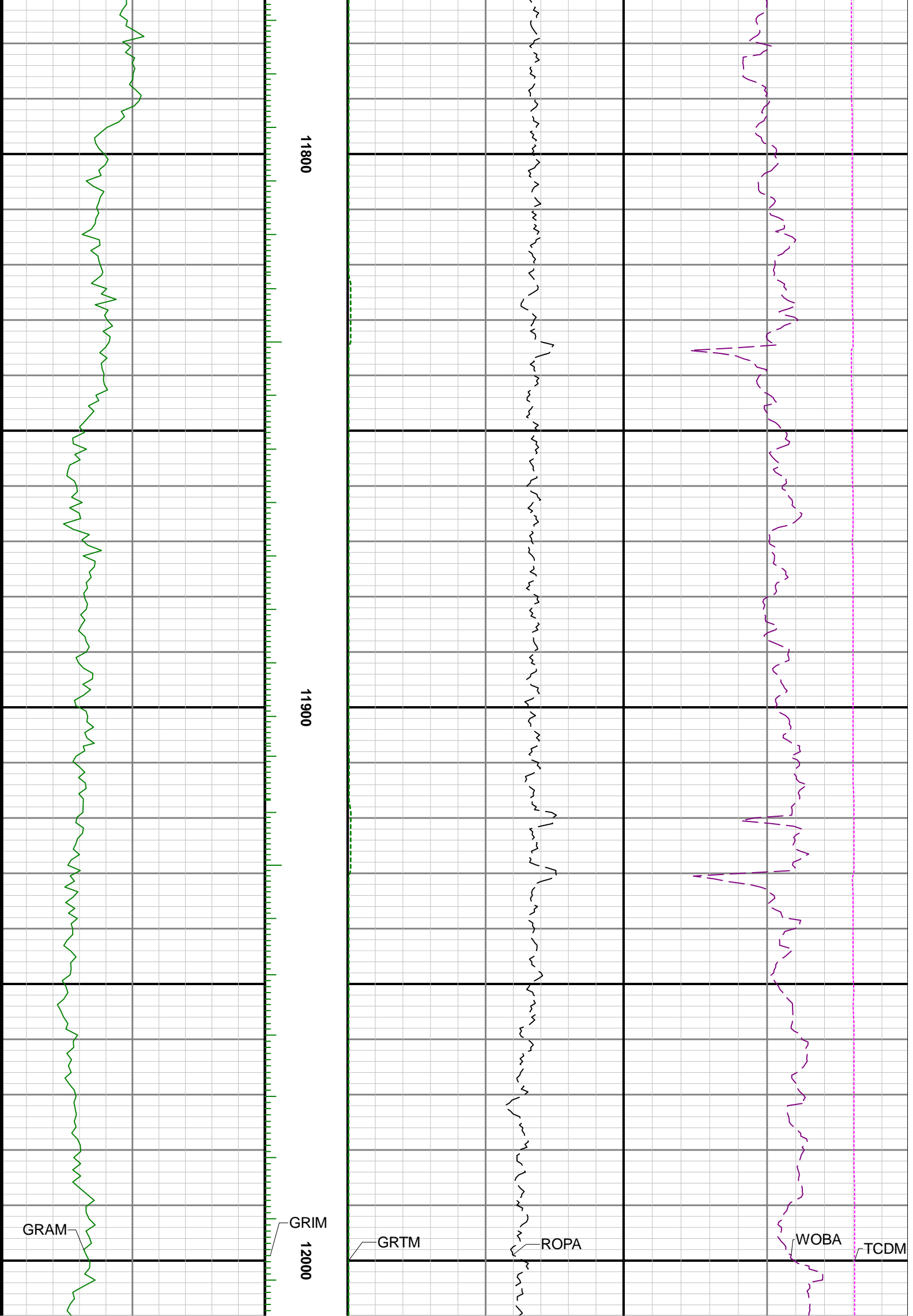


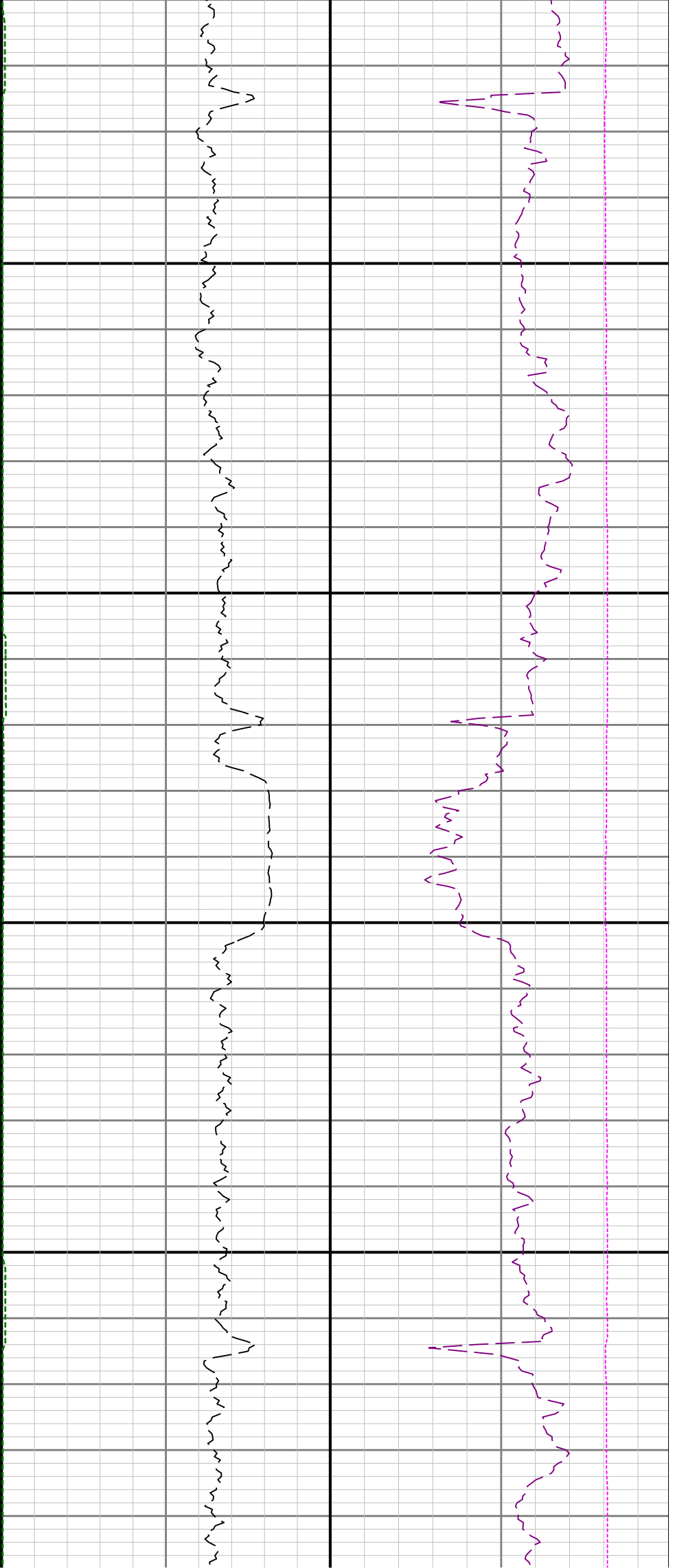


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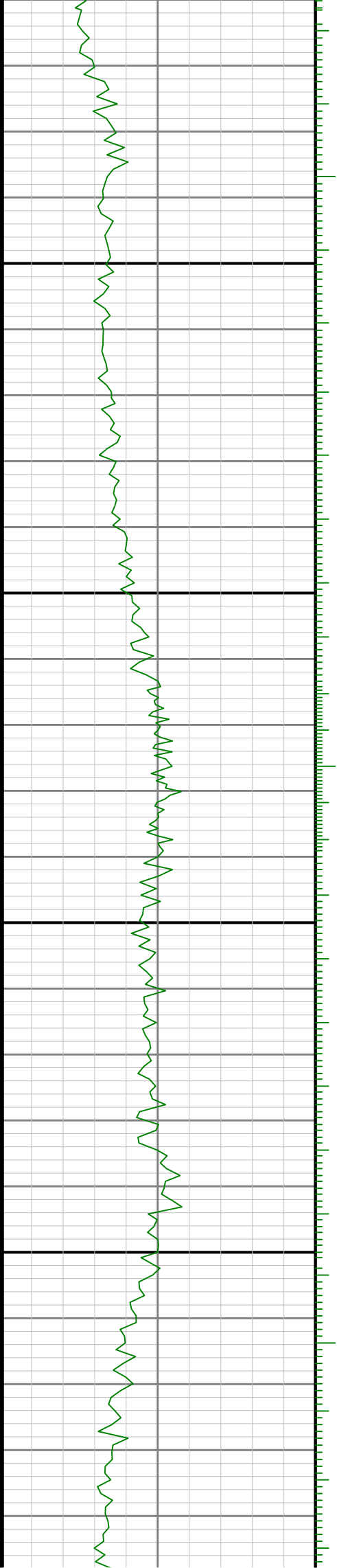


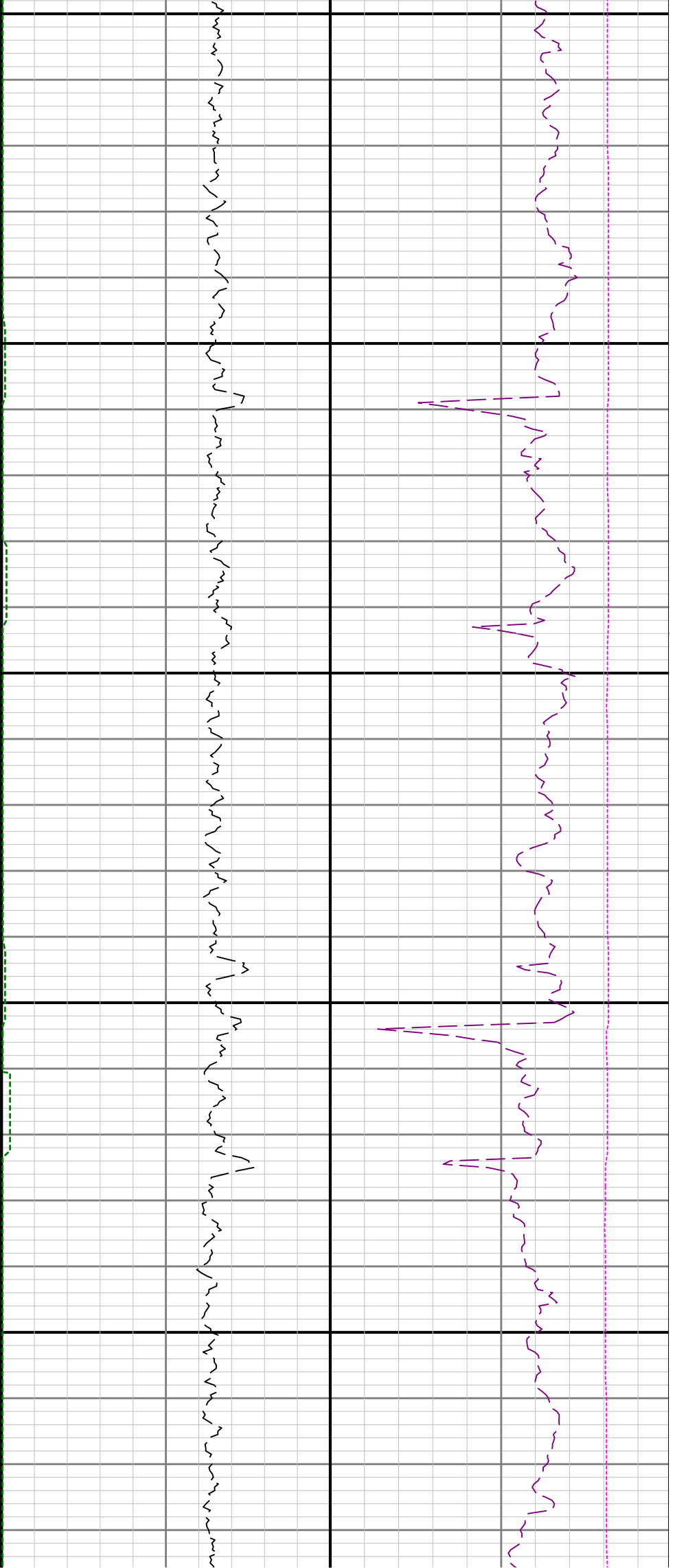




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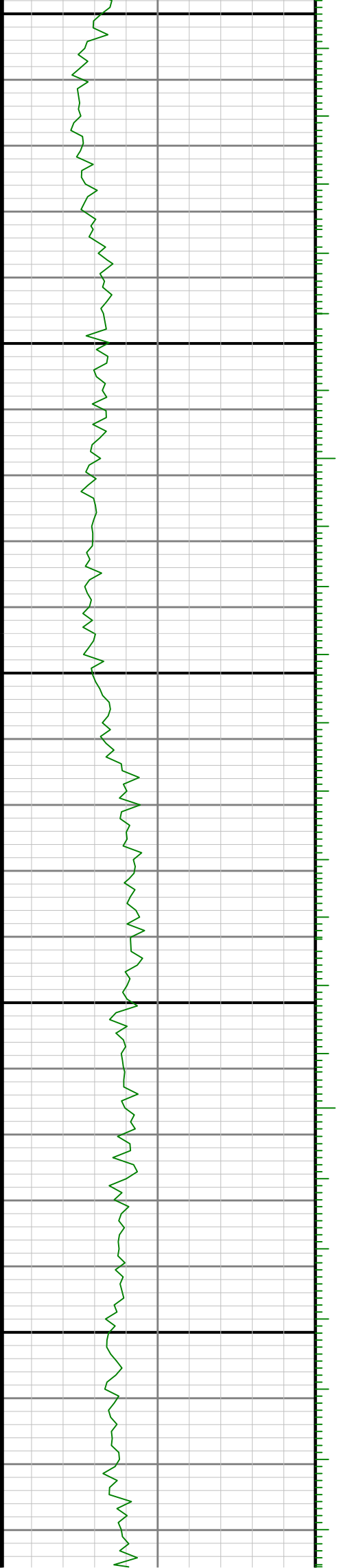
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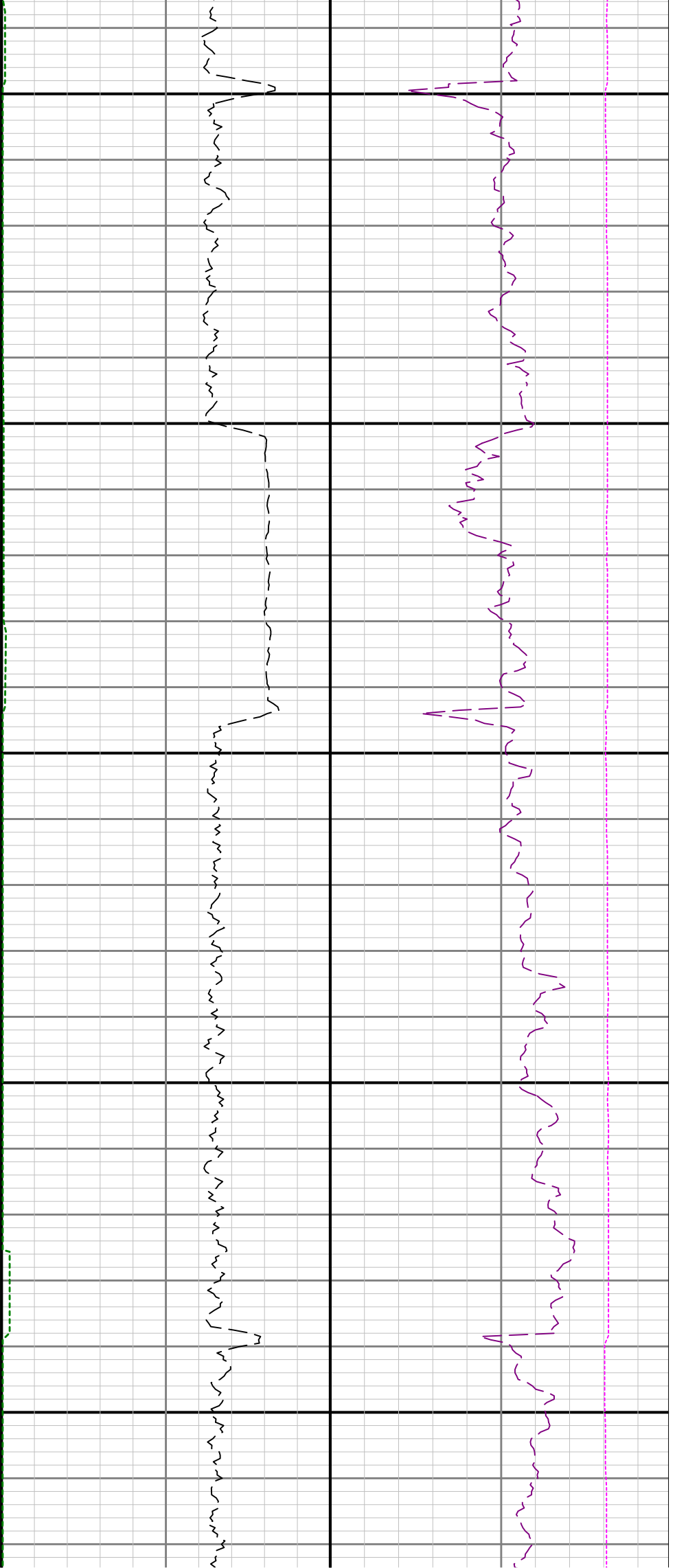




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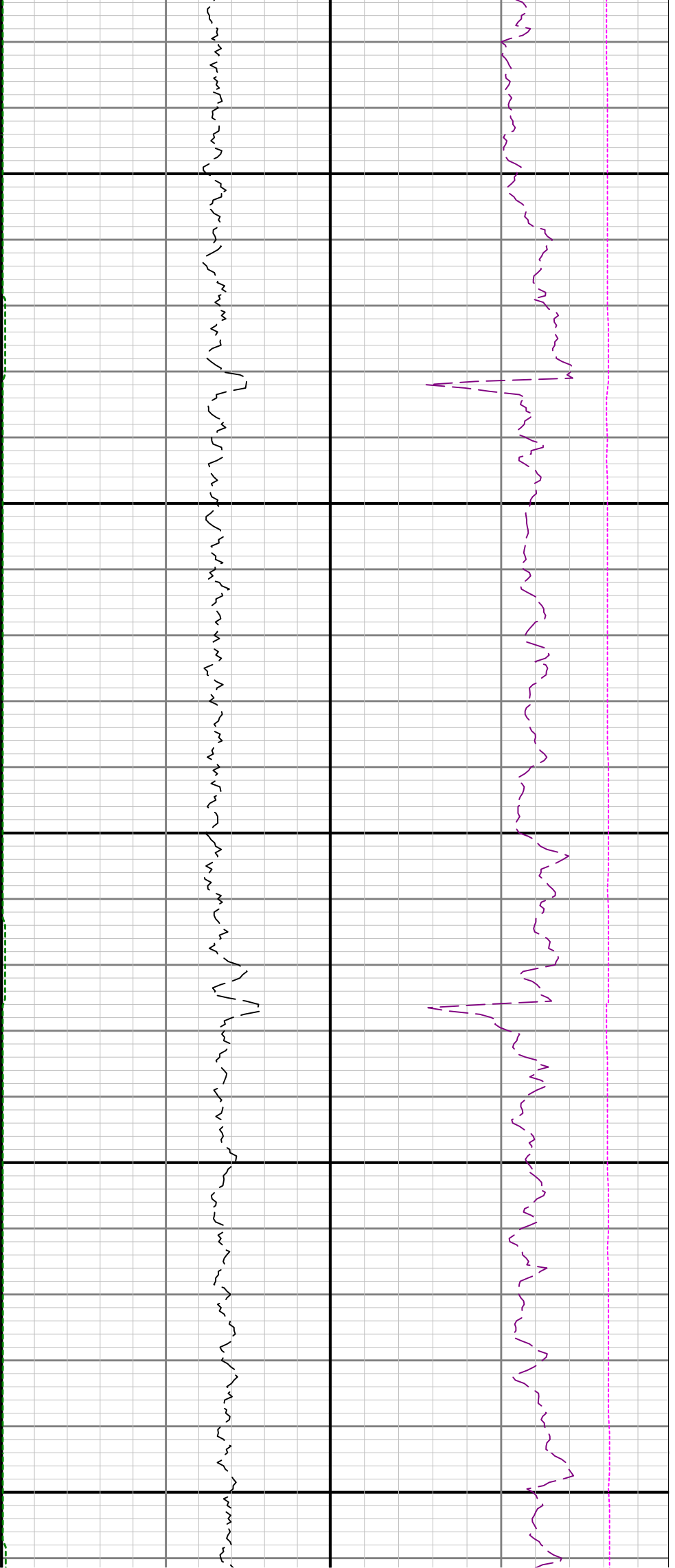




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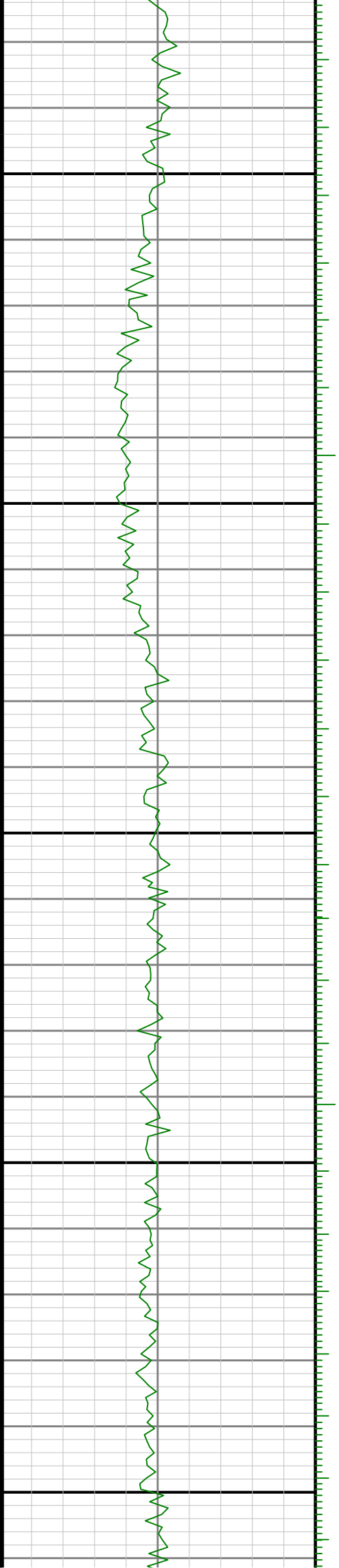
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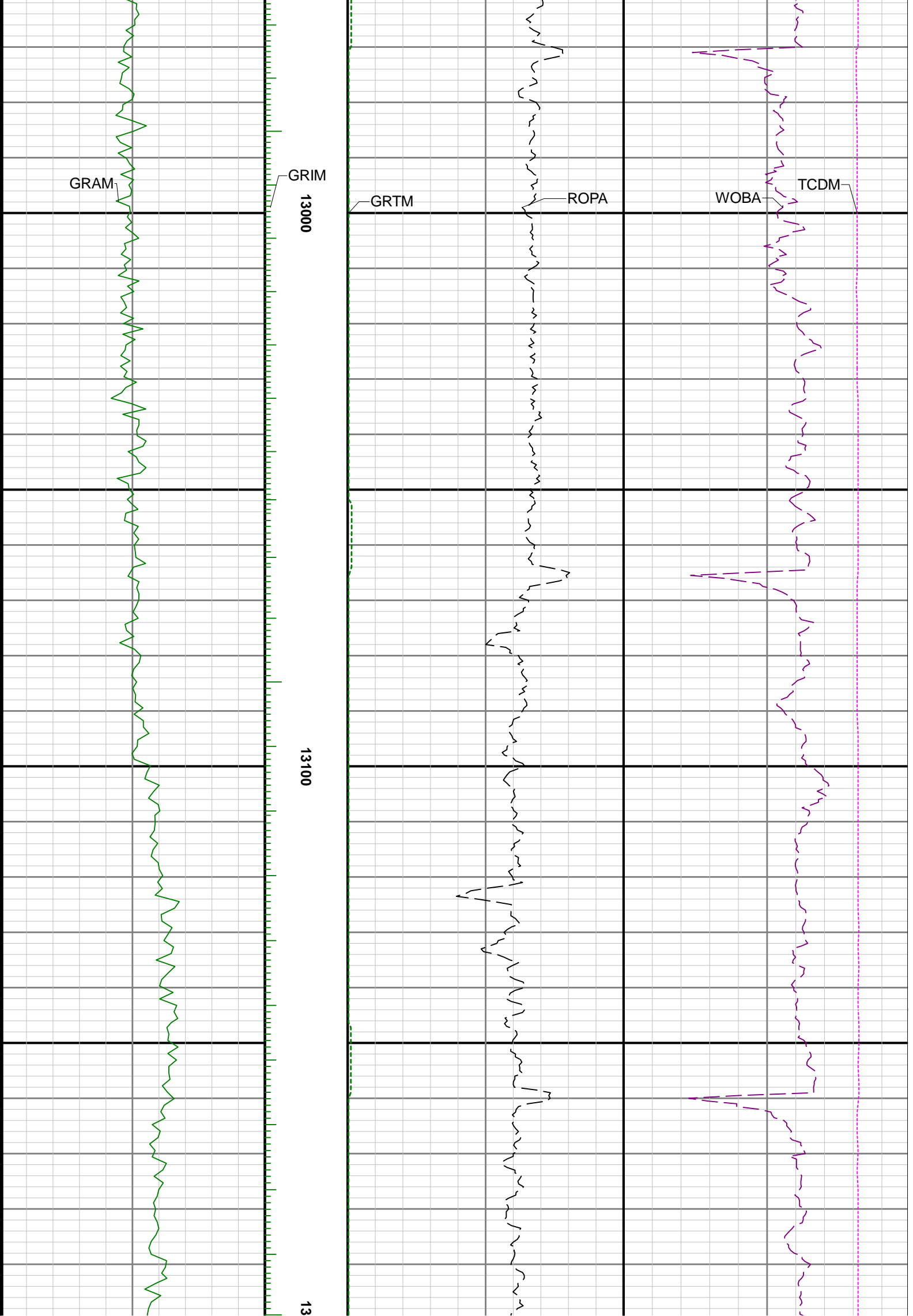
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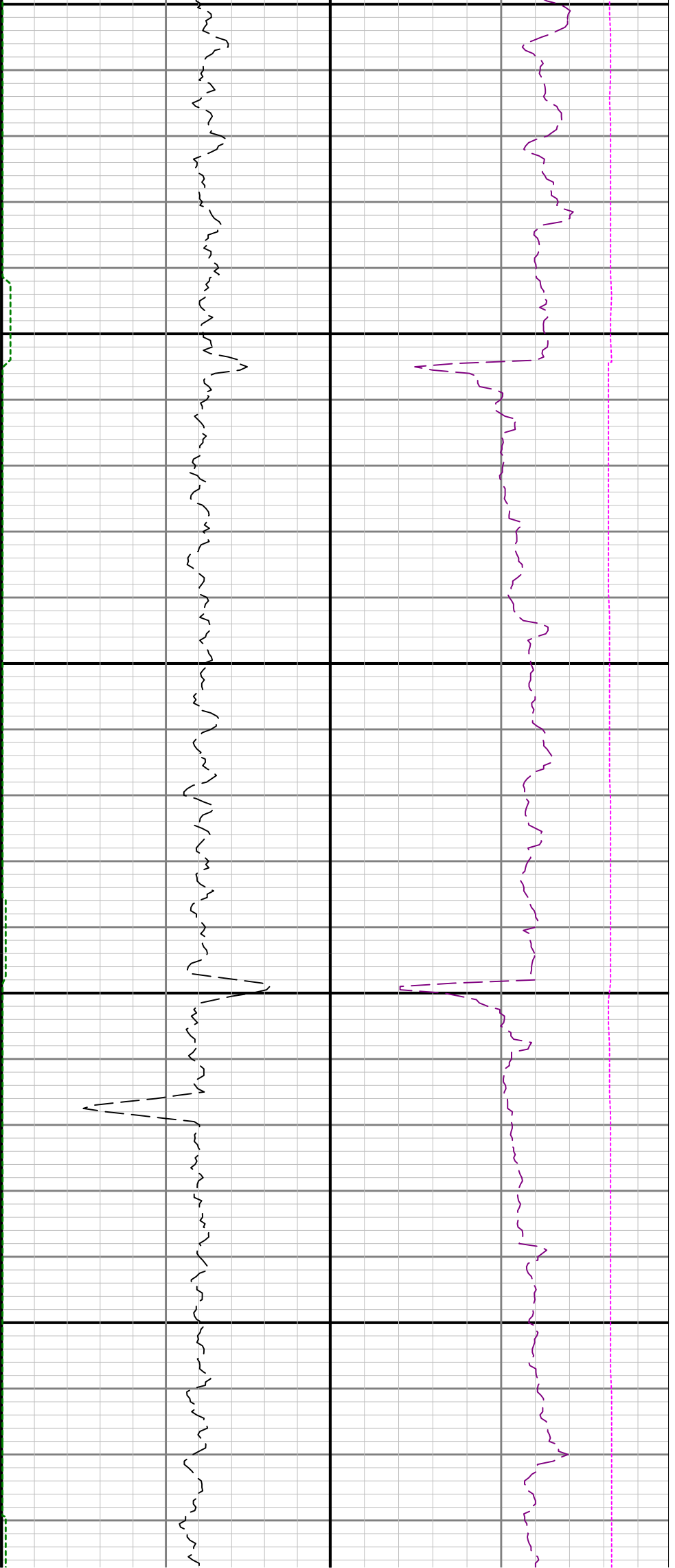


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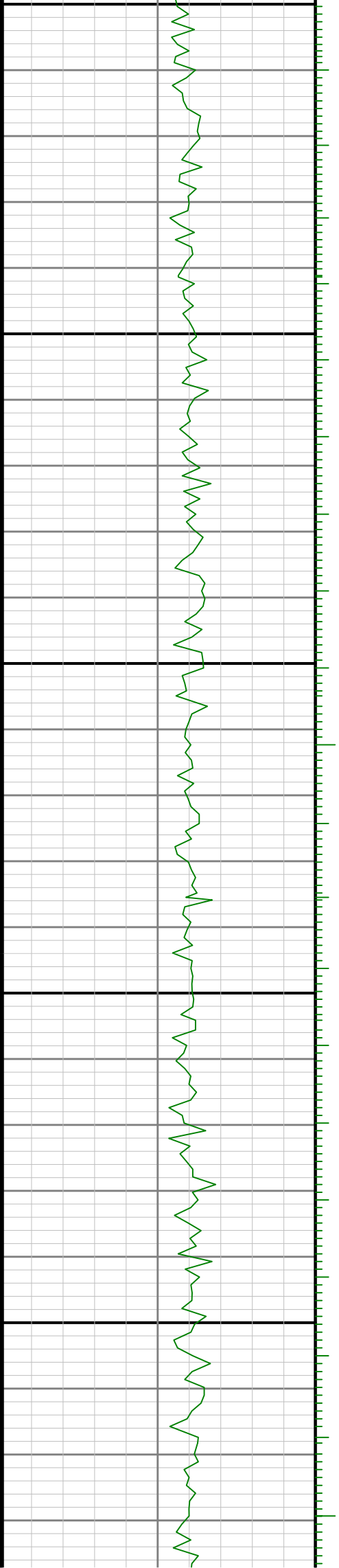


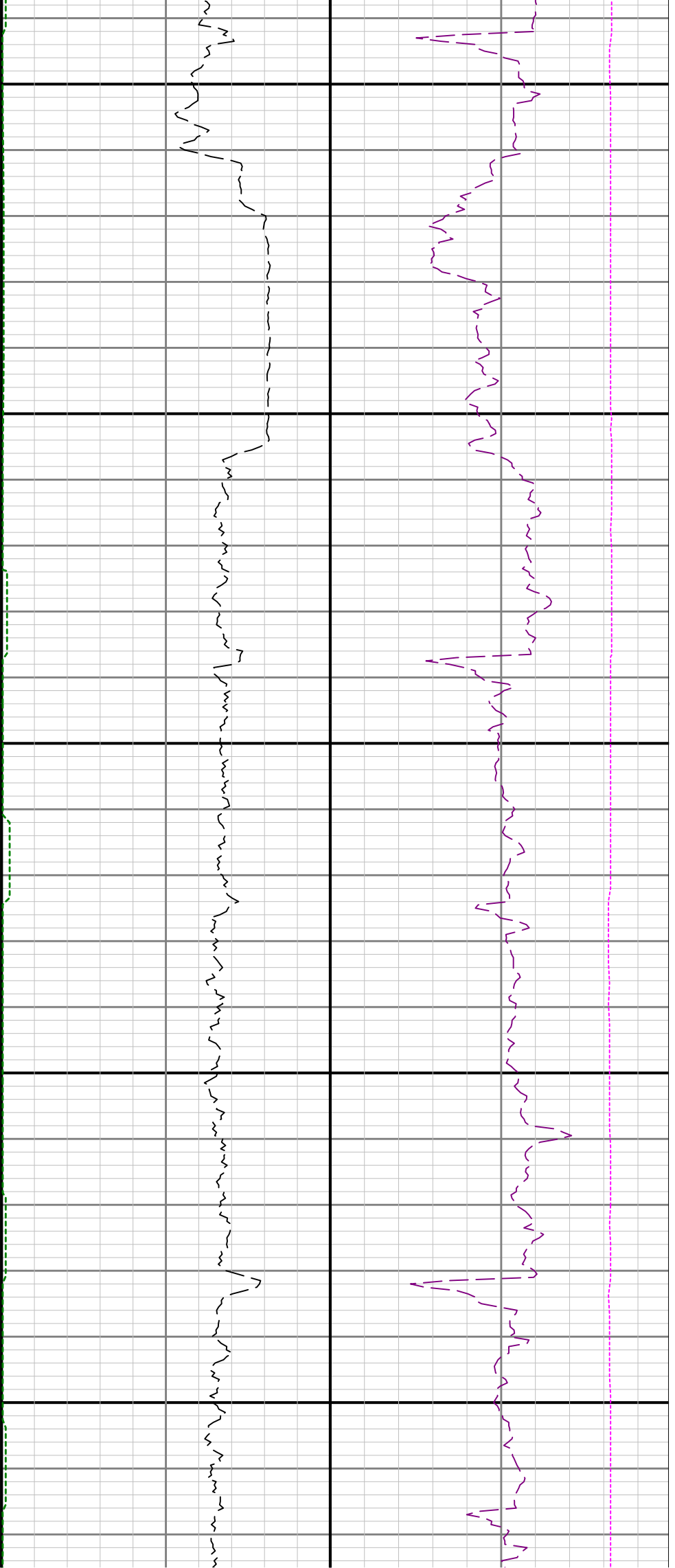


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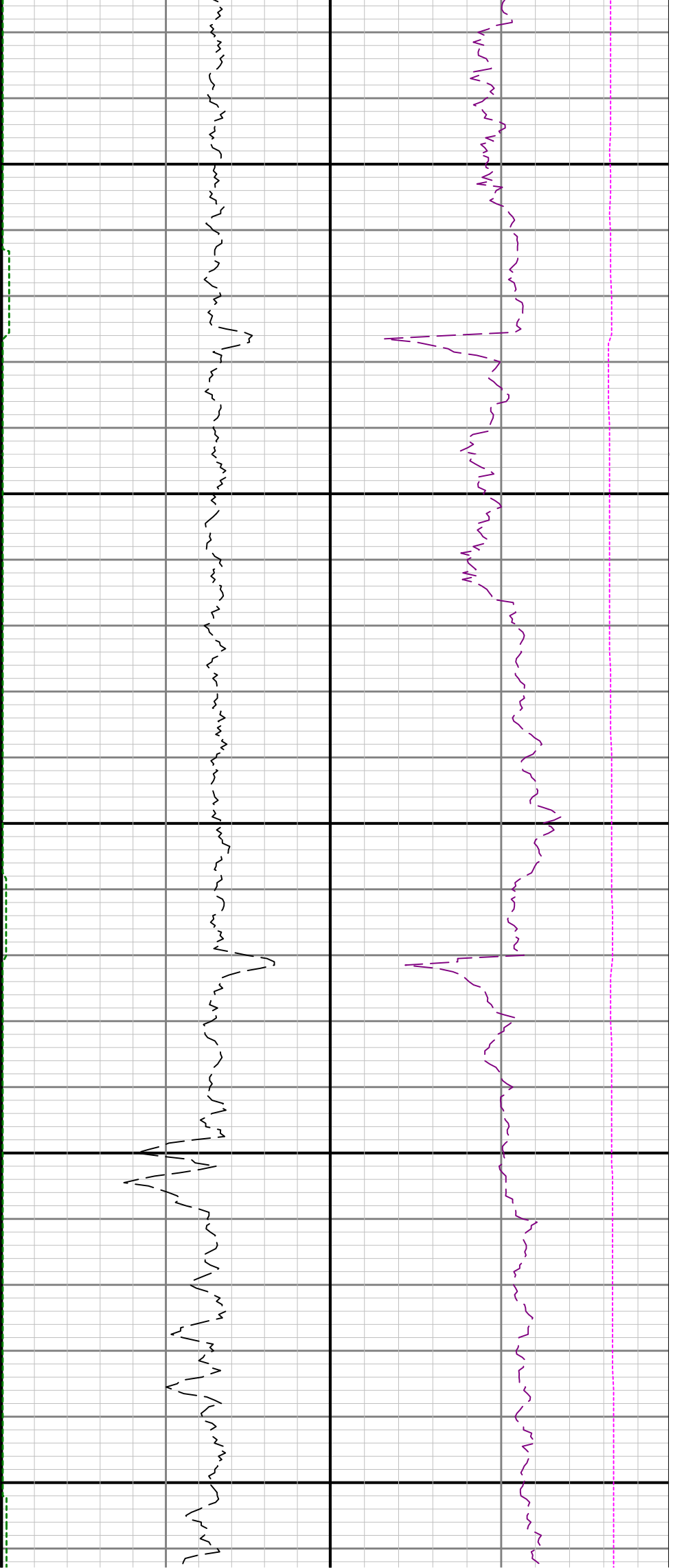
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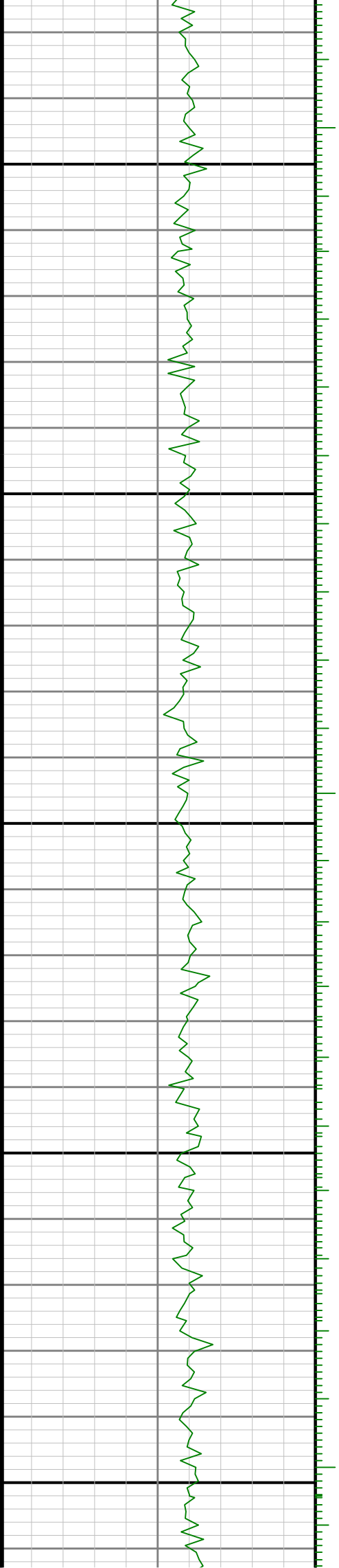
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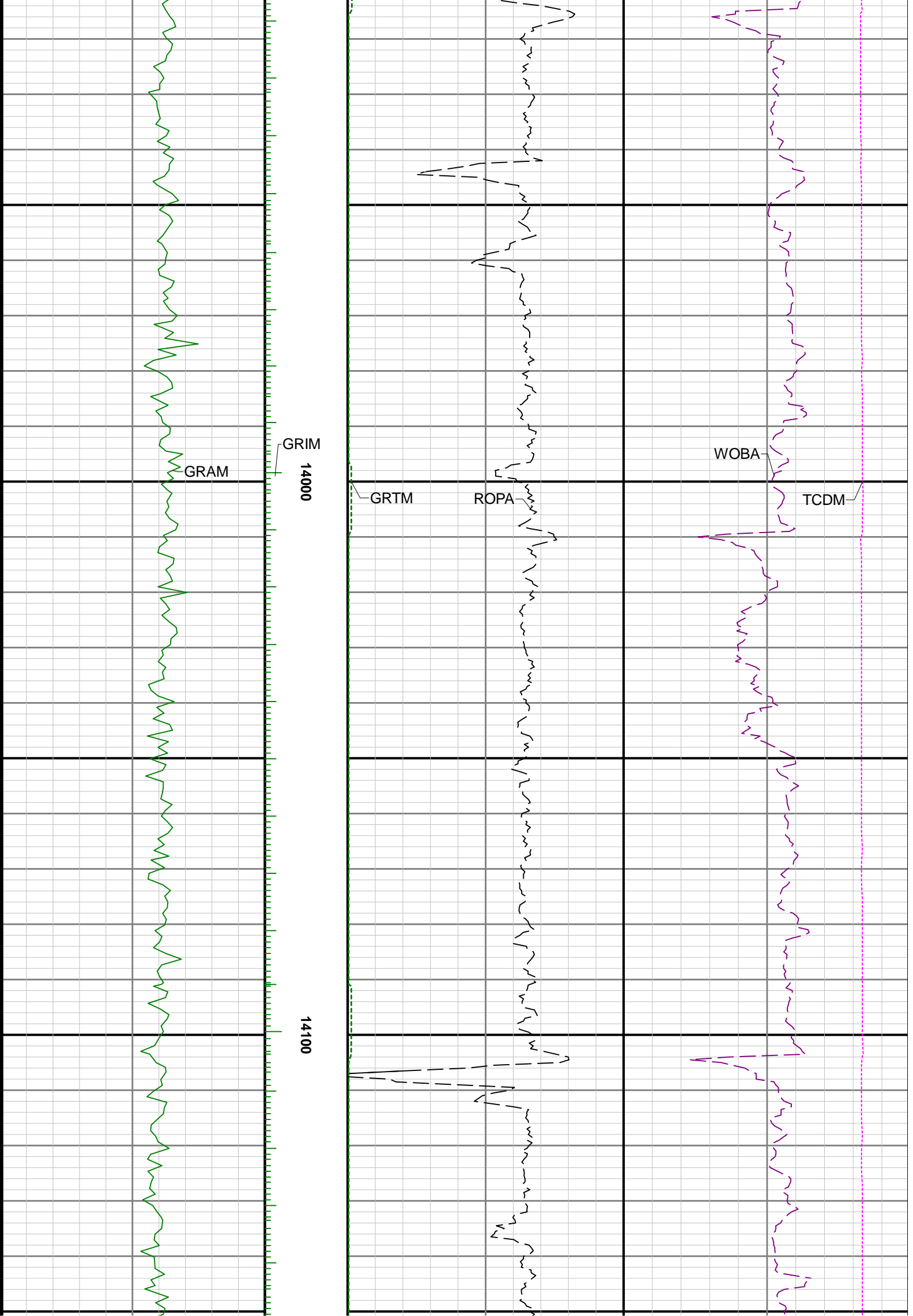


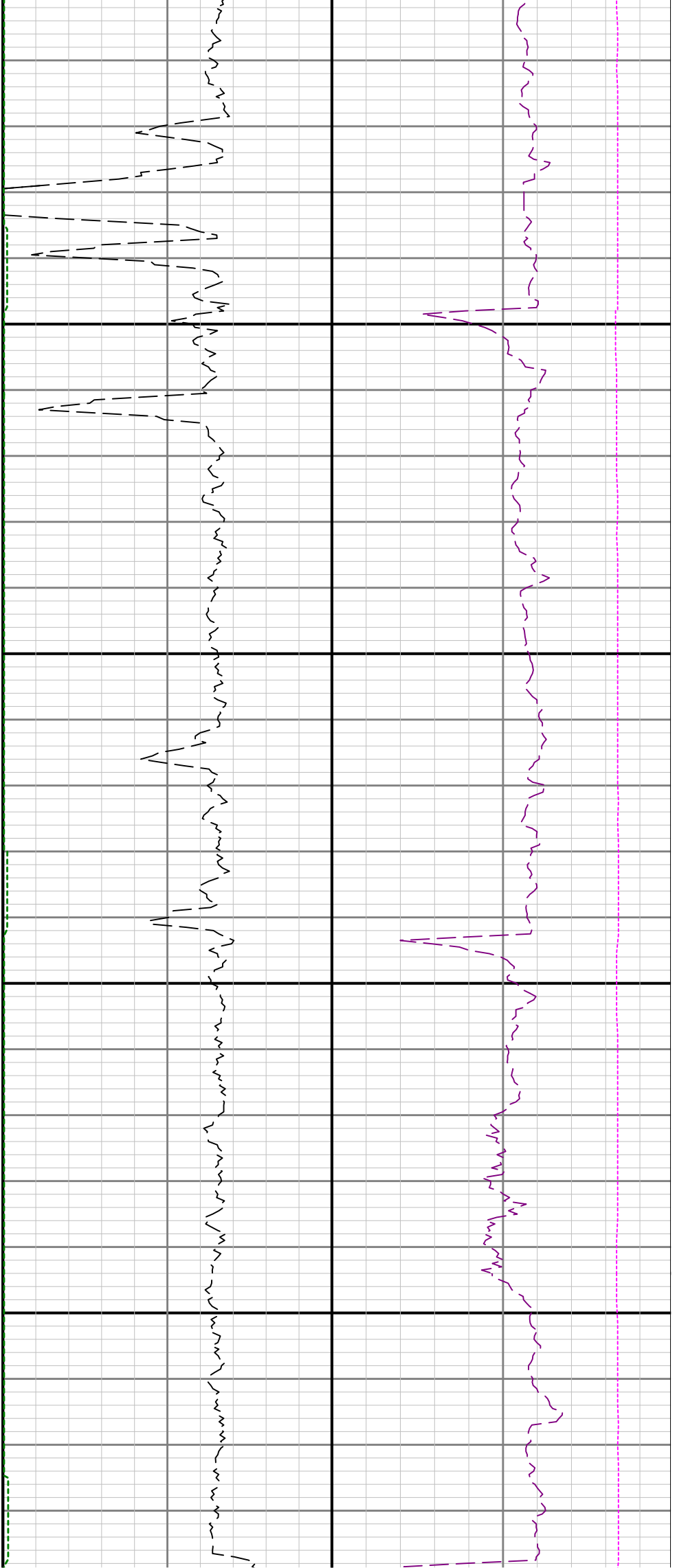
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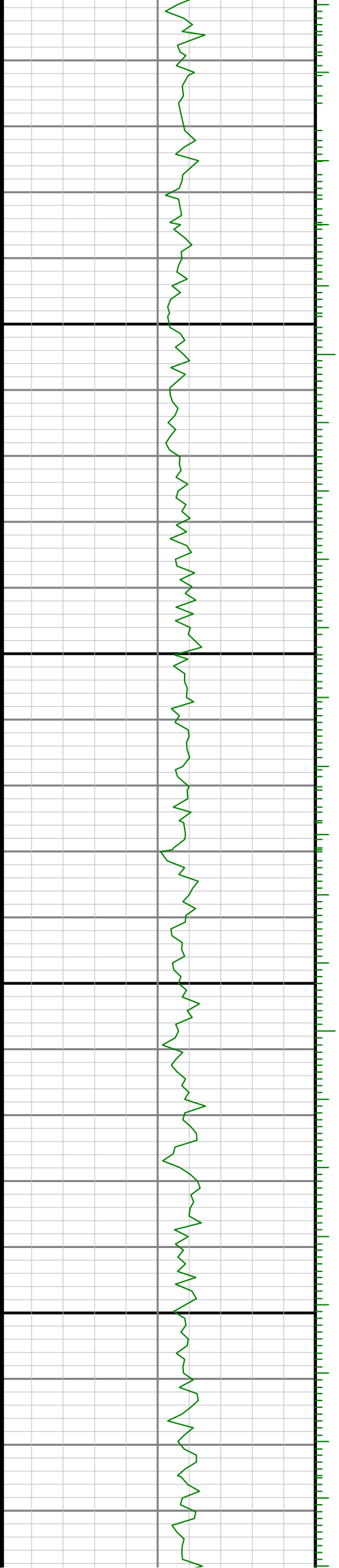


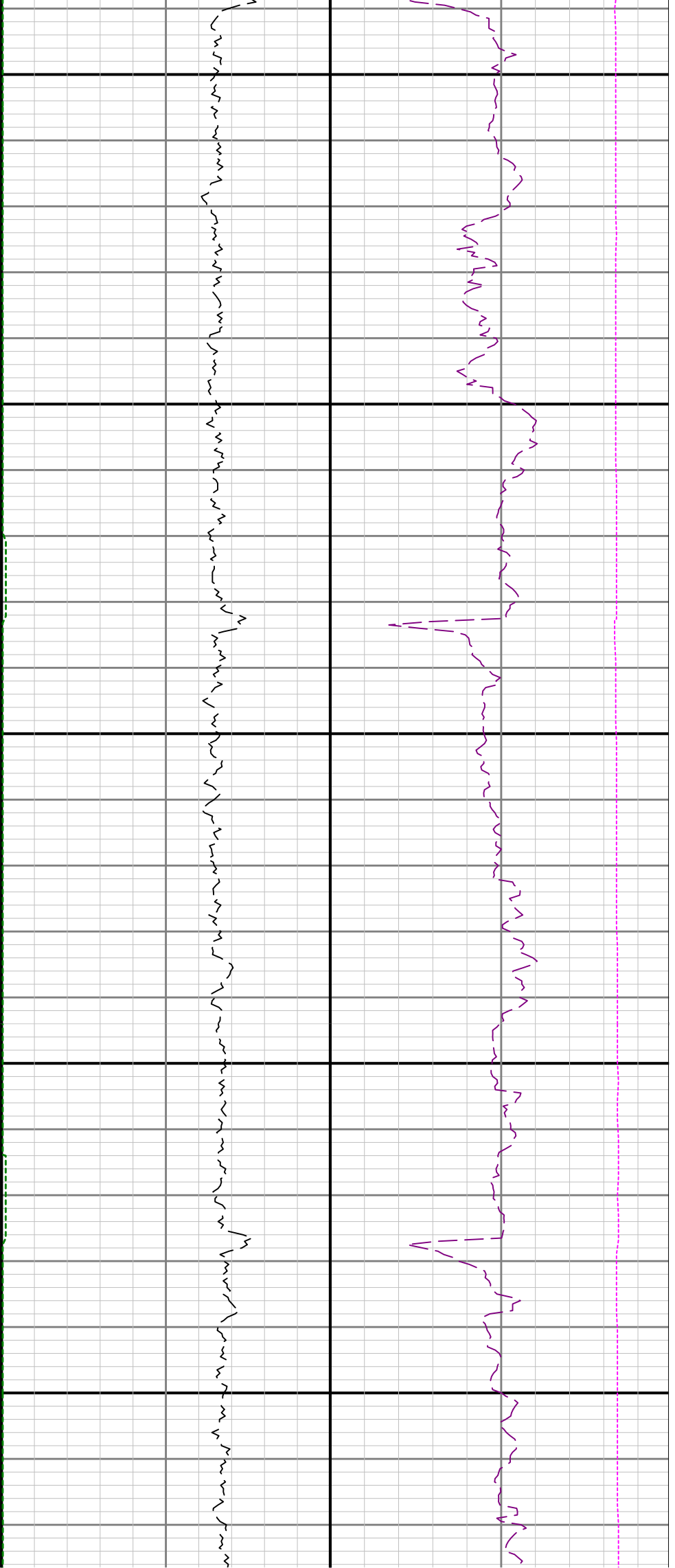


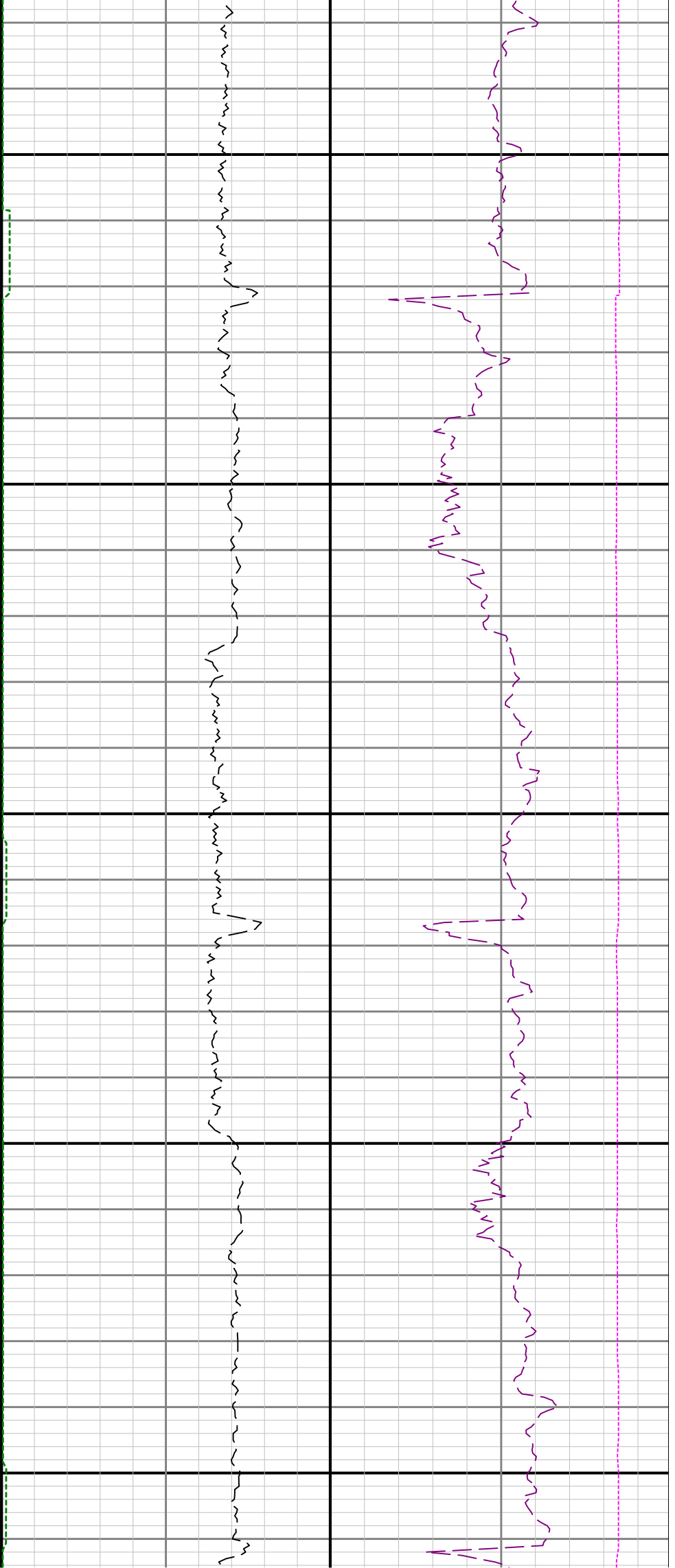


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14300

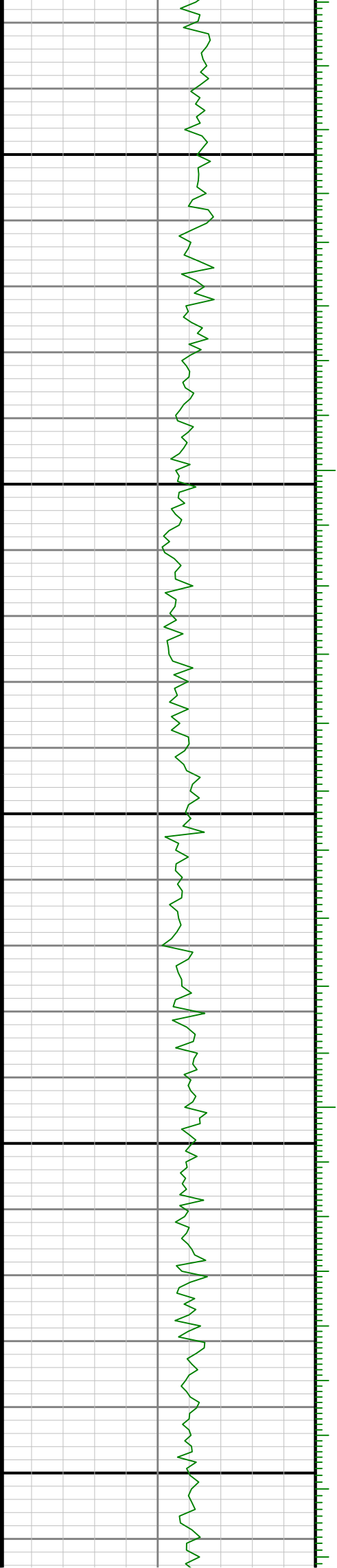


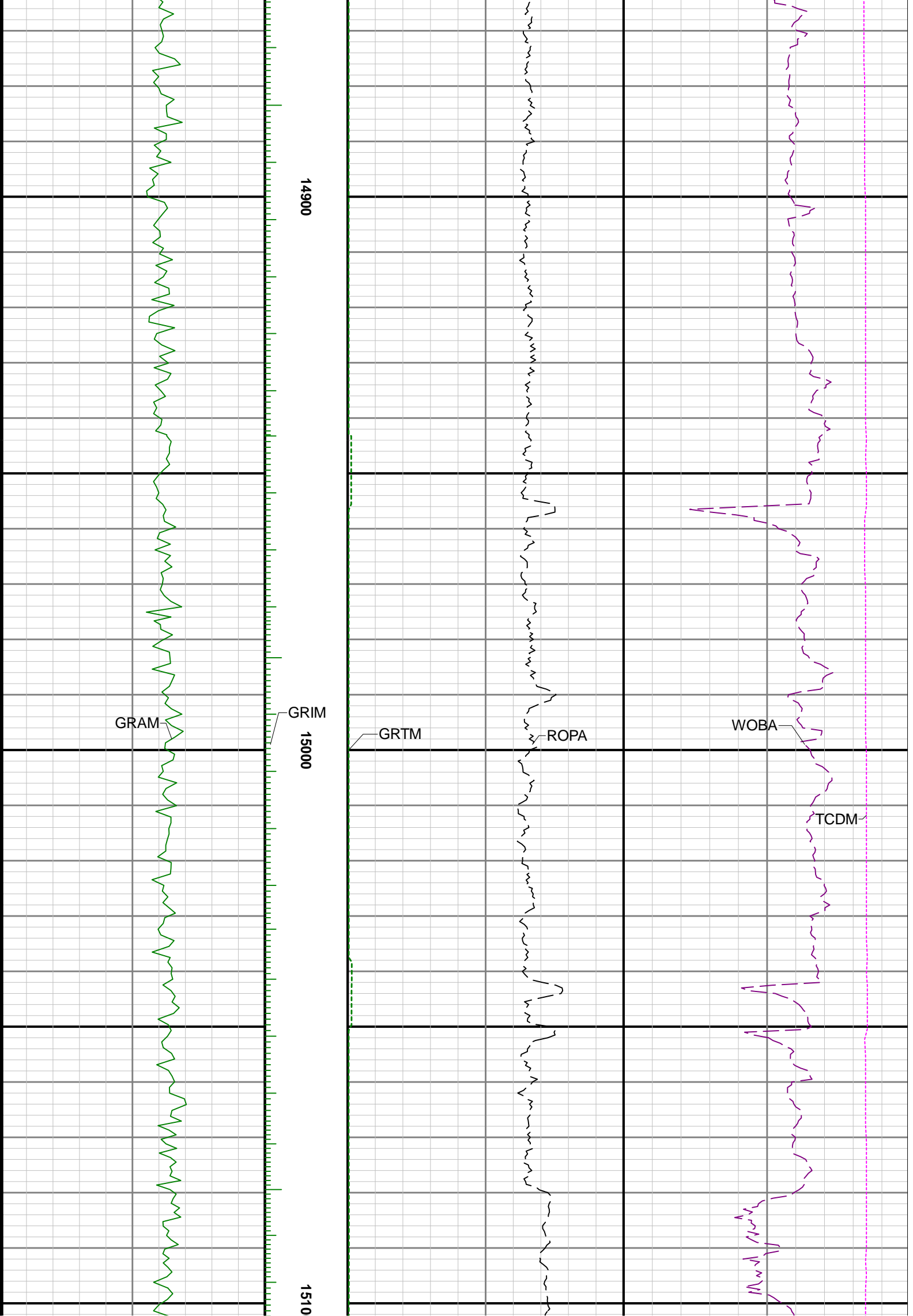


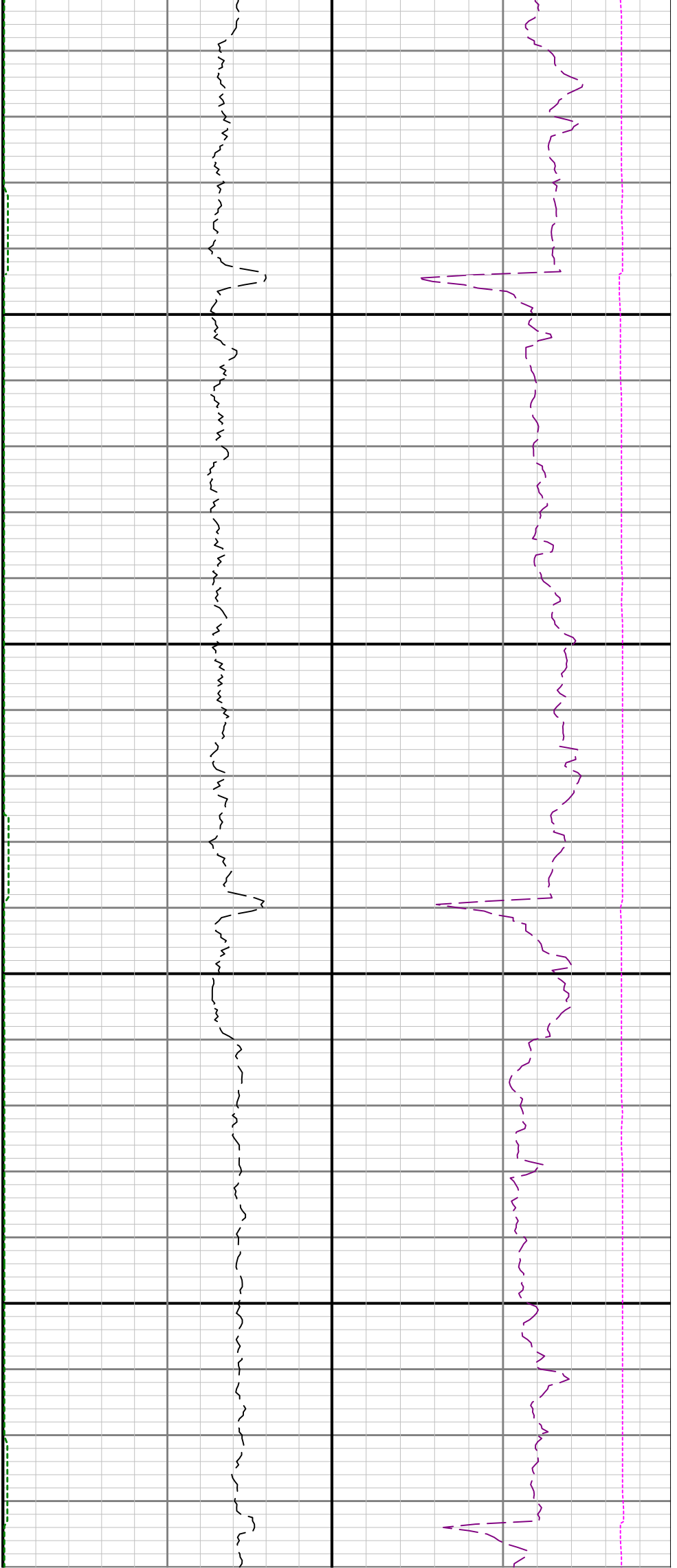


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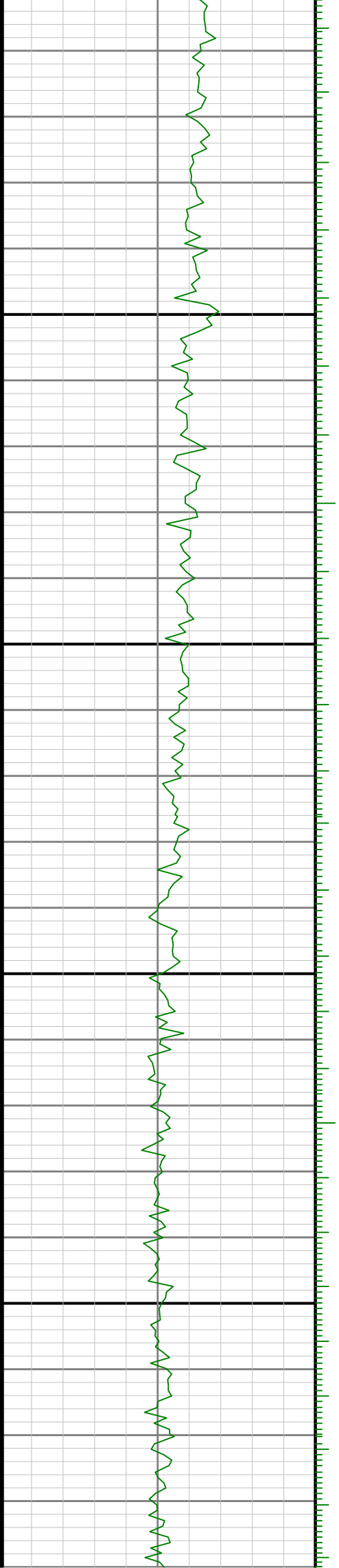


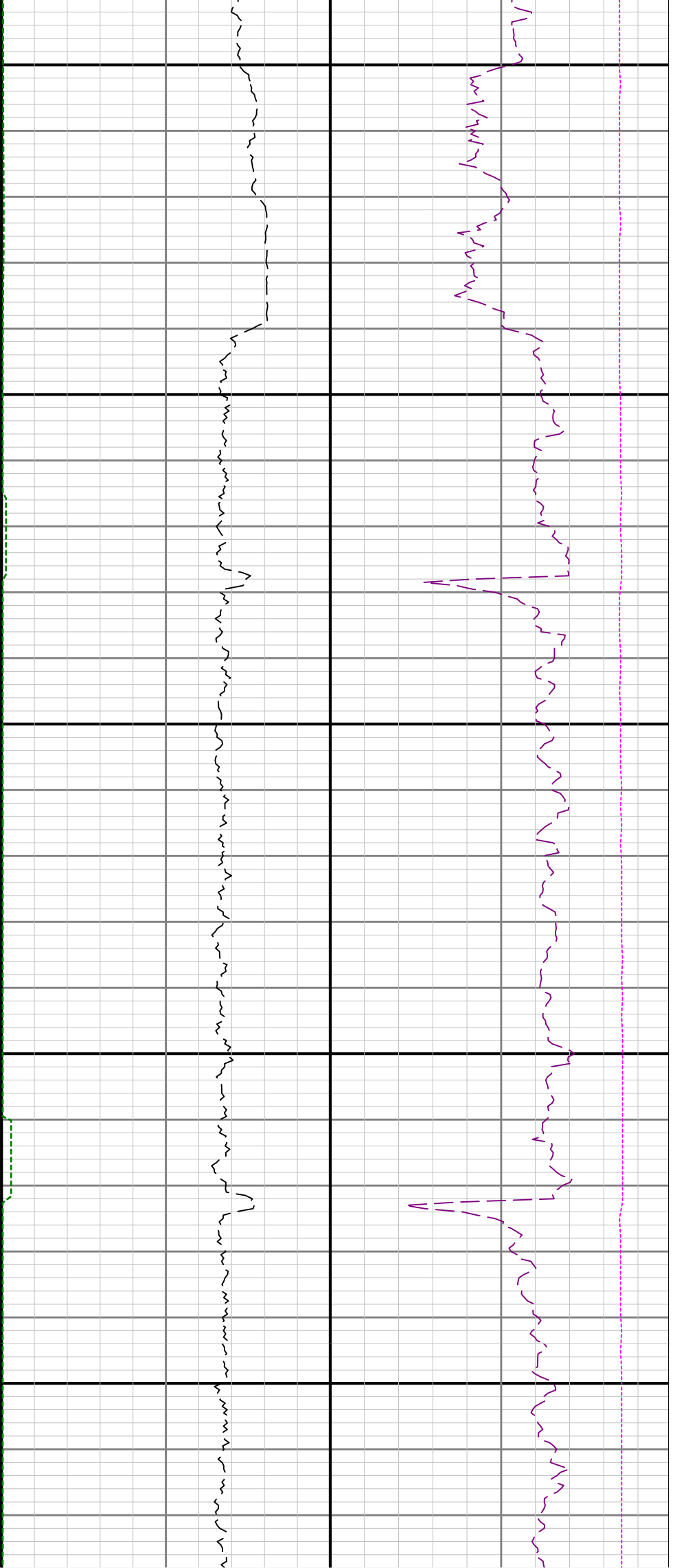




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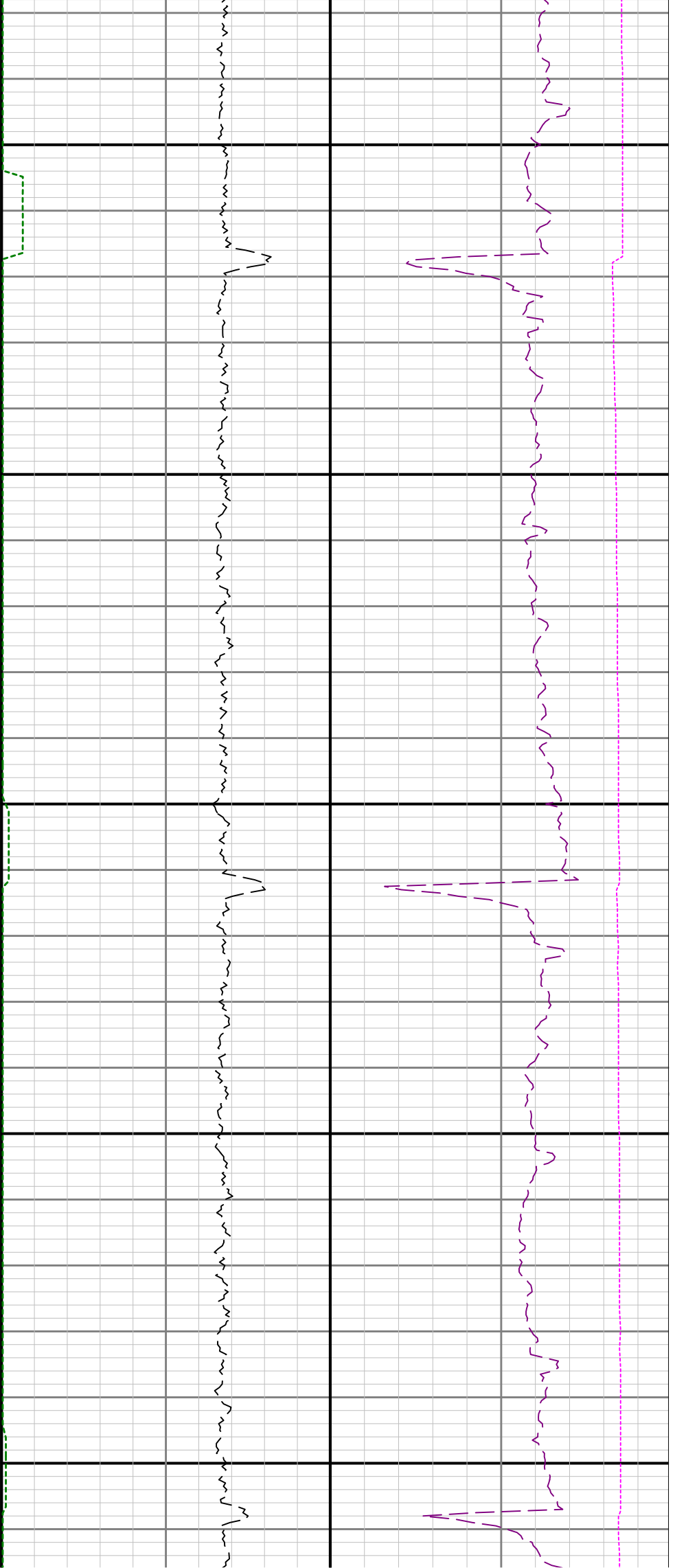
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