



Gamma Ray

LWD MEMORY LOG

Scale: Company: Noble Energy

1:240 Well: Roth A32-779

Measured Depth Field: Wattenberg

County: Weld Country: United States

Driller's Depth State: Colorado

Status: Surface Location: 40° 27' 41.580" N Other Services:

Final Print Latitude: 104° 35' 04.776" W

API No: 05-123-51328-00 Longitude: Directional

Job ID: 111055139 SEC: 30 TWN: 6N RGE: 64W

Permanent Datum (P.D.): Mean Sea Level Elevation: 0.00 ft Elev. KB: N/A

Log Measured From: Rig Floor Above P.D.: 4728.00 ft Elev. DF: 4728.00 ft

Dates Interval Magnetic Field Reference

From: 2021-10-20 To: 2021-10-22 Drilled (ft) 1936.00 Logged (ft) 1936.00 Azi Reference North: Grid Dip Angle: (deg) 66.75

Spud: 2021-10-02 Bottom: 17172.00 Bottom: 17159.00 Total Magnetic Field Strength: (nT) 51888

Mag to Reference North Correction: (deg) 7.01

Borehole Record Casing Record

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

13.500 30.00 1936.00 9.625 36.00 30.00 1926.00

8.500 1936.00 17172.00

Mud Record Deviation Record

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

Oil Based Mud 1936.00 17172.00 8.500 15236.00 0.65 | 255.32 90.31 | 178.91

Acquisition System Software Version Other

Cadence RT 6.1 H&P 517

DeliverableGen 6.1.9214.1 Contractor: Helmerich & Payne Drilling Co Unit: D&E

District: RMA

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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	3.00	AutoTrak Curve	1936.00	17159.00	1936.00	17172.00	2021-10-20 03:41	2021-10-22 11:23	50.48

Crew

Name	Arrive Wellsite	Depart Wellsite	Name	Arrive Wellsite	Depart Wellsite	Name	Arrive Wellsite	Depart Wellsite
Carl Riehn	2021-10-19	2021-10-21	Jeremiah Samson	2021-10-19	2021-10-22	Michael Gurnsey	2021-10-19	2021-10-21
Sherman Pugh	2021-10-19	2021-10-21	Tien Bui	2021-10-19	2021-10-22	Anthony Russo	2021-10-21	2021-10-22
Chris Campbell	2021-10-21	2021-10-22	Marcos Favela	2021-10-21	2021-10-22			

Witness

Name	Run
Jim Turner	1

Mud Properties Record

Date / Time	Run No.	Depth (ft)	Mud Type	Density (ppg)	Viscosity (cP)	pH	Fluid Loss (cm3)	Oil / Water	Source	Total Chlorides (ppm)	K+ (%)
2021-10-19 12:42	1	1945.00	Oil Based Mud	9.3	10	N/A	16.5	79.5/20.5	Active Pit	25000	0.00
2021-10-21 08:31	1	9310.00	Oil Based Mud	10.1	15	N/A	17.8	80.1/19.9	Active Pit	30500	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)
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1	AutoTrak Curve Steering Unit	14986107	Near Bit VSS	5.93	6.76	7.000	4.330
1	AutoTrak Curve Steering Unit	14986107	Near Bit Inclination	5.93	6.76	7.000	4.330
1	AutoTrak Curve MWD	14256861	Gamma (single)	2.75	12.93	7.000	3.250
1	AutoTrak Curve MWD	14256861	Directional (mag)	12.27	22.45	7.000	3.250

Service and Tool Mnemonics

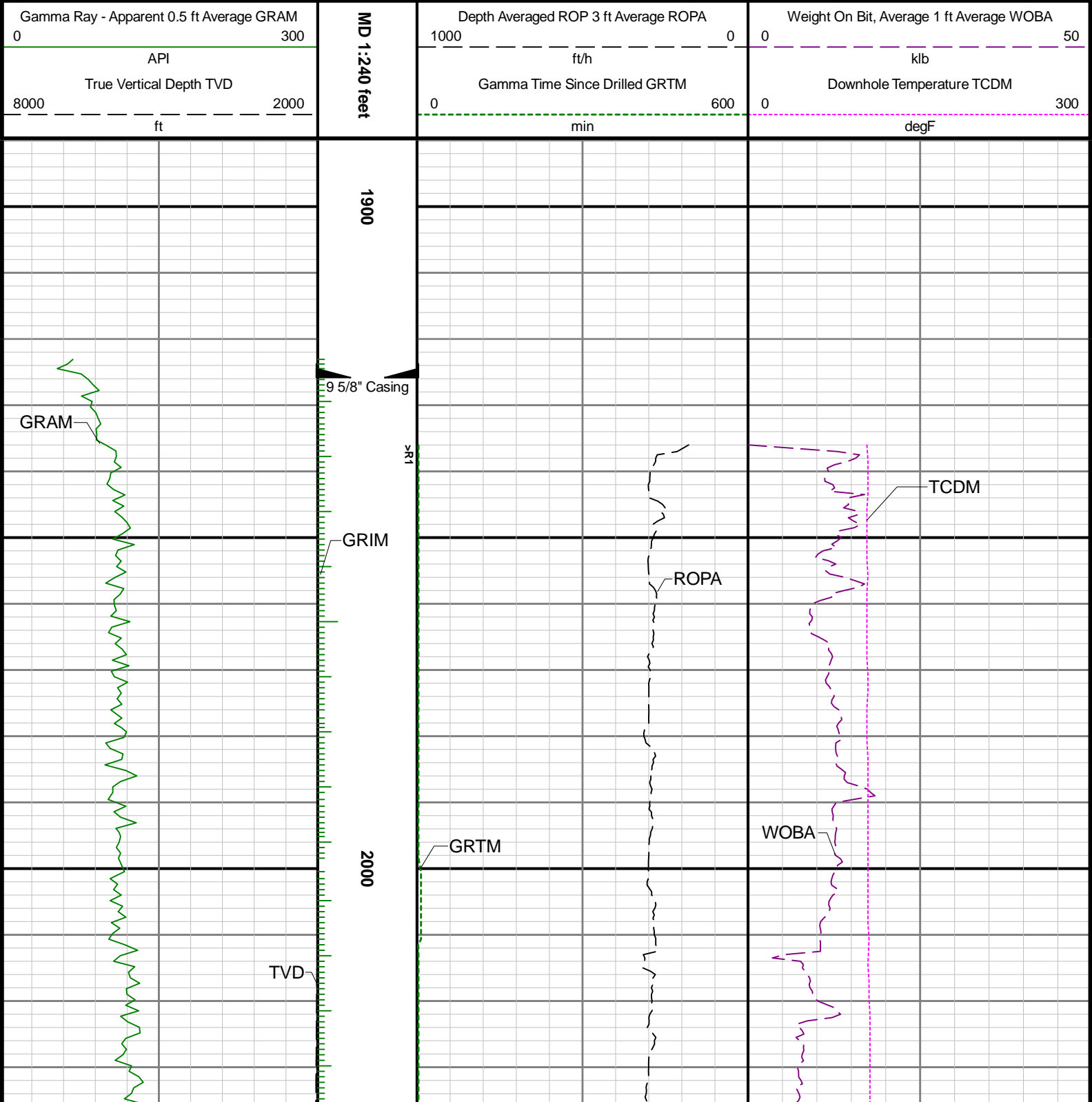
Mnemonic	Name	Description
ATC SU	AutoTrak Curve SU	Auto Trak Curve Steering Unit
ATC MWD	AutoTrak Curve MWD	Auto Trak Curve MWD
ATC LCPM	AutoTrak Curve LCPM	Auto Trak Curve LCPM

Comments

- 1 Baker Hughes Company Run 1 utilized 6 ¾ inch NaviGamma services (Gamma Ray and Directional) behind an 8 ½ inch PDC bit and rotary steerable assembly from 1936 to 17172 feet MD (1936 to 6827 feet TVD).
- 2 Depth measurements were obtained from a depth control system not supplied or operated by Baker Hughes Company. Due to a lack of control by Baker Hughes Company logging engineers, depth calibrations and measurements could not be independently verified and the unverified depths as supplied to Baker Hughes Company are being used to present logging data.
- 3 The Gamma Ray Apparent (GRAM) data is presented 0 to 300 API, per the customer's request.

Remarks

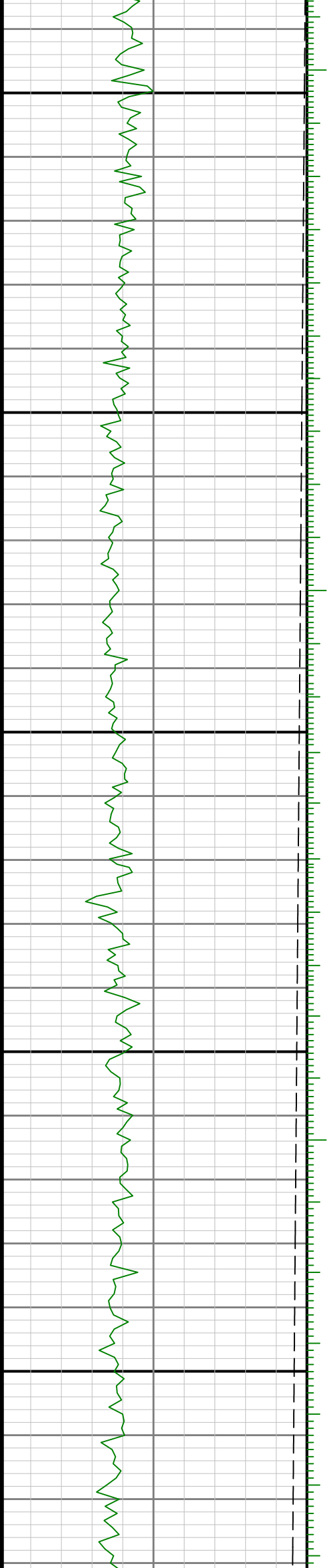
Number	Depth (ft)	Hole Section (in)	Run No.	Remark
1	17172.00	8.500	1	The interval from 17159 to 17172 feet MD (6827 to 6827 feet TVD) was not logged due to sensor to bit offset at well TD.

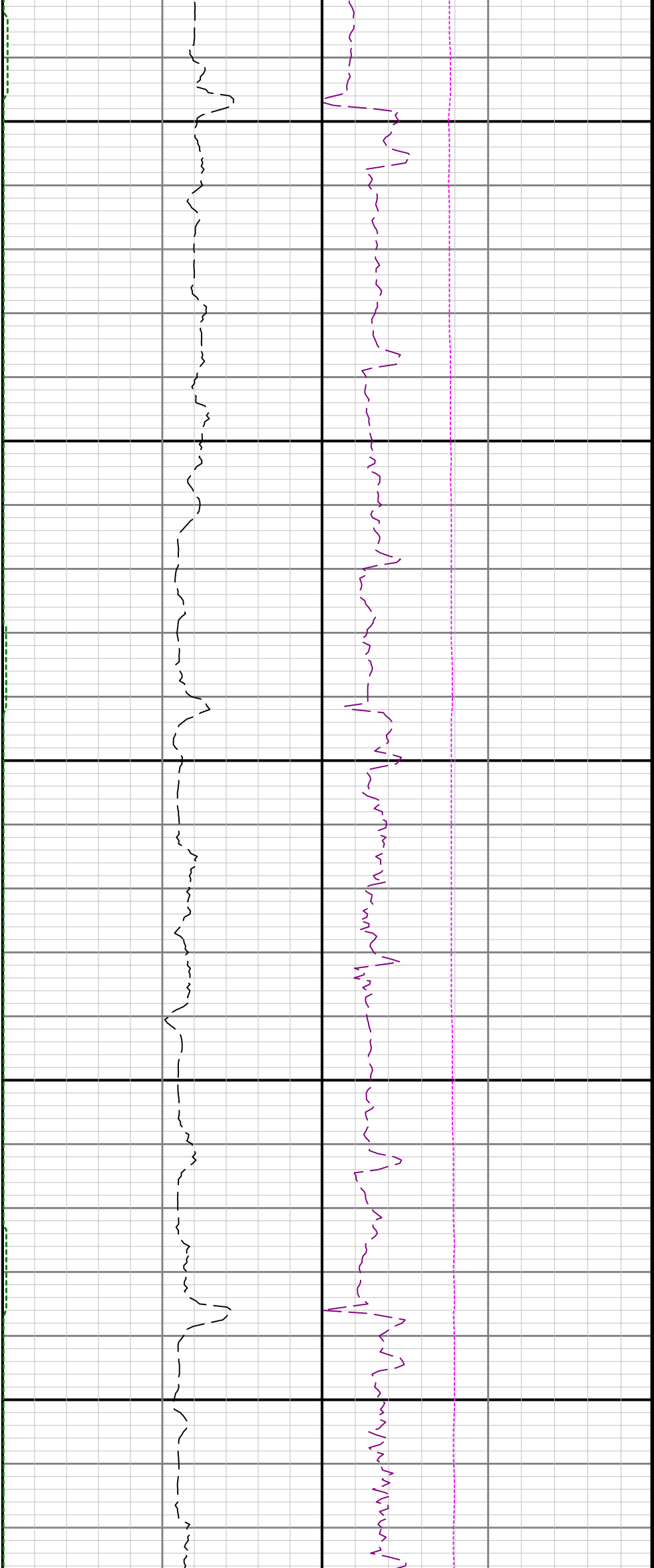




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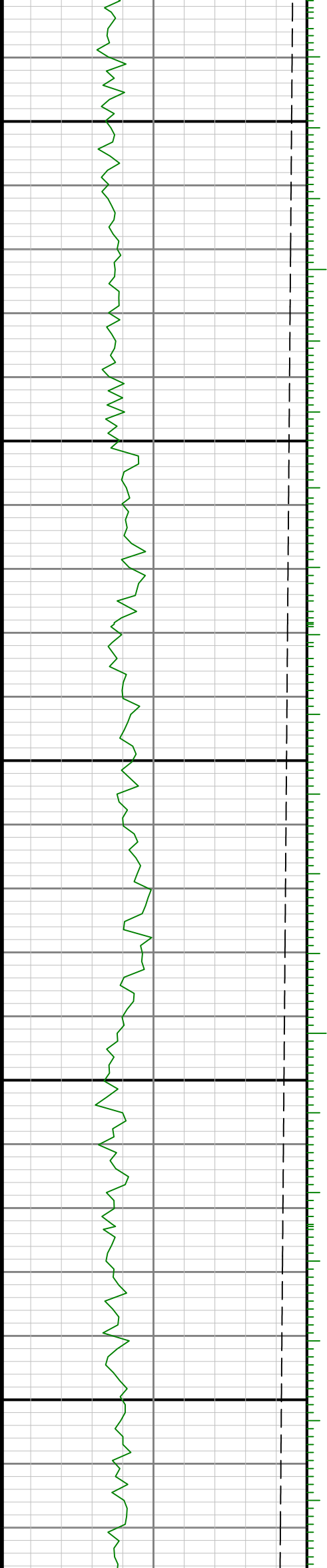


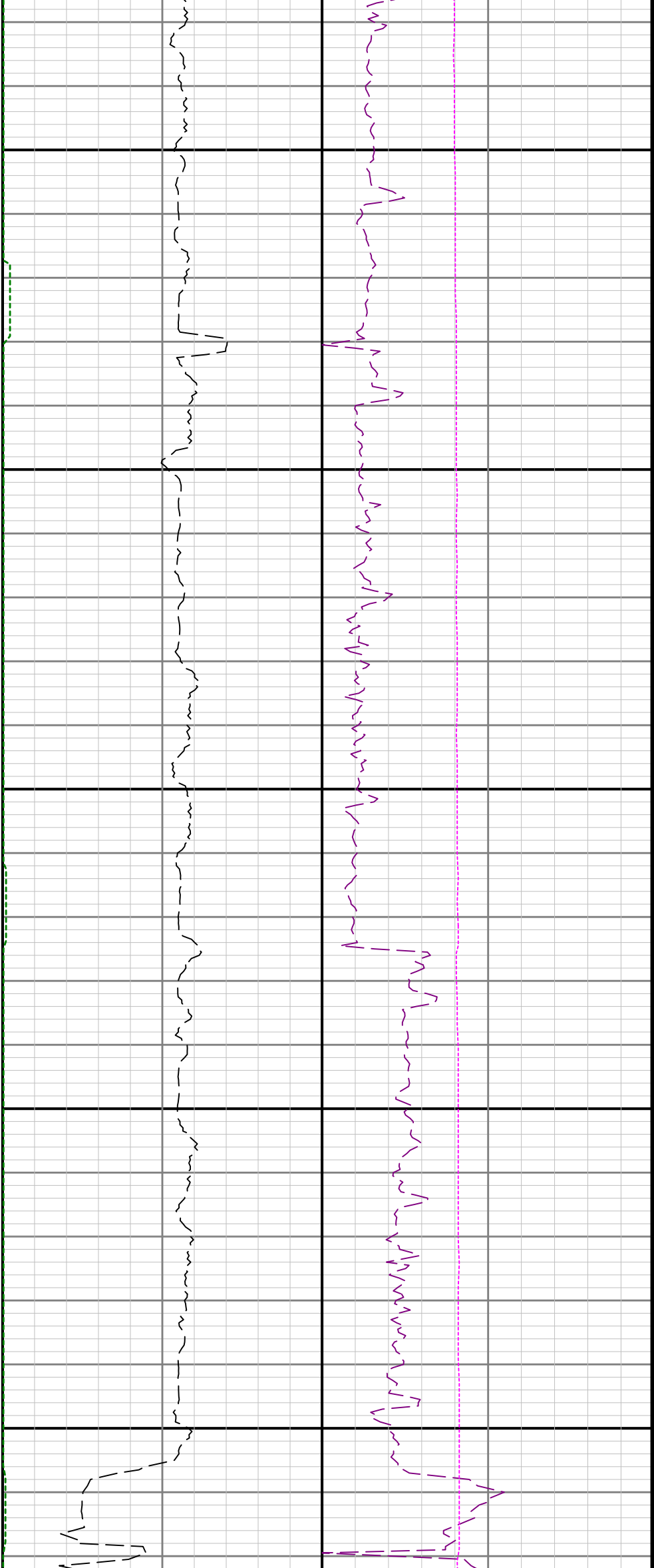


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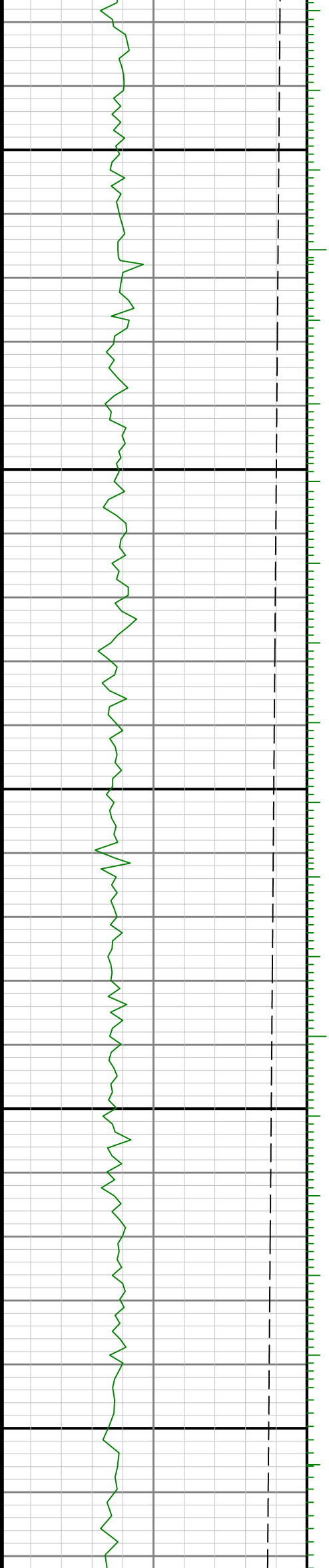
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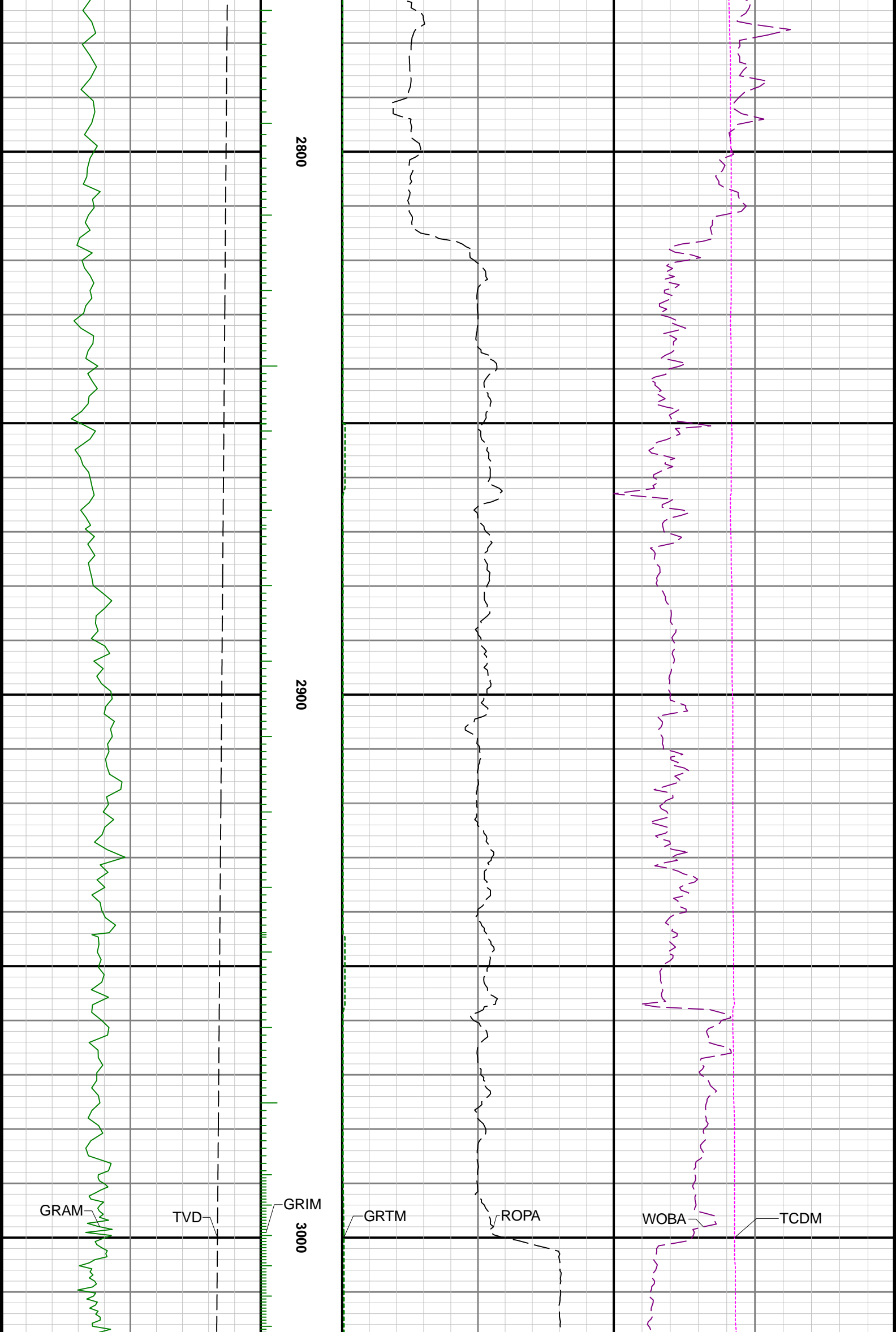


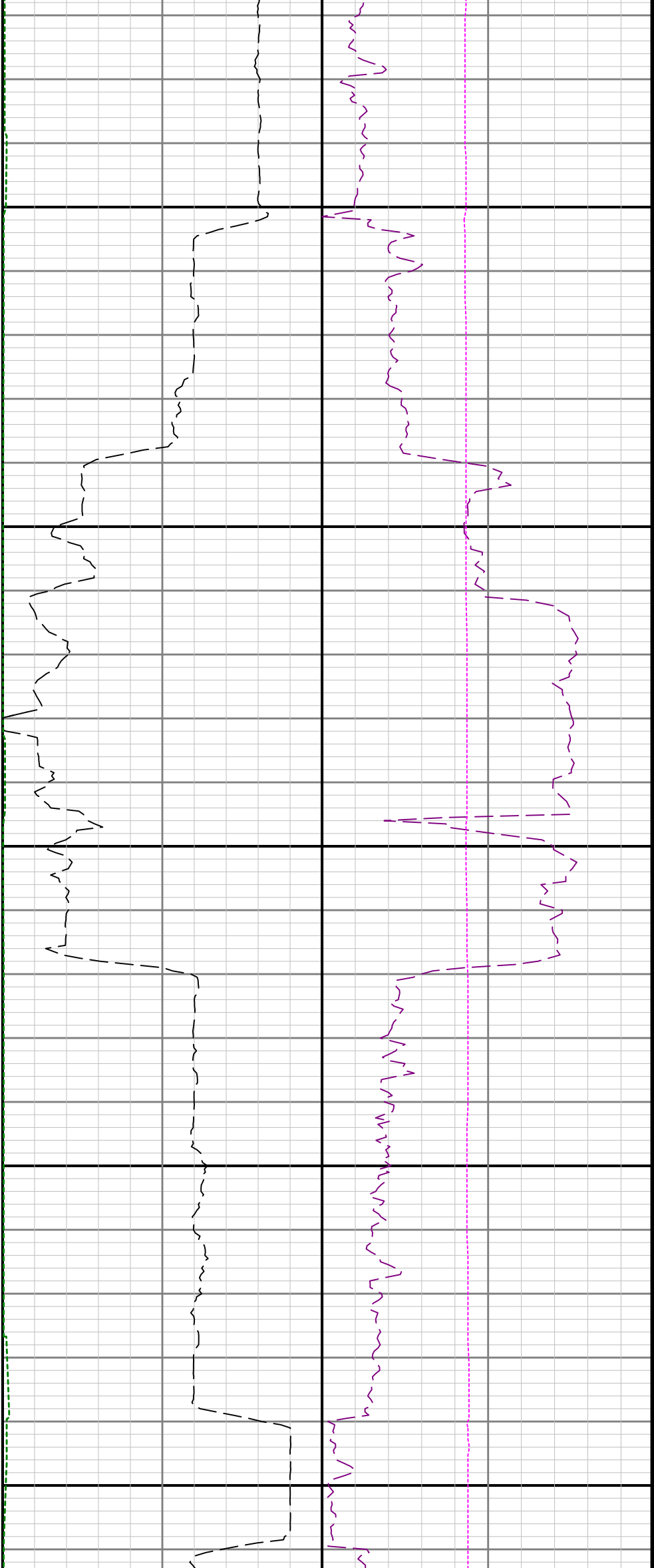


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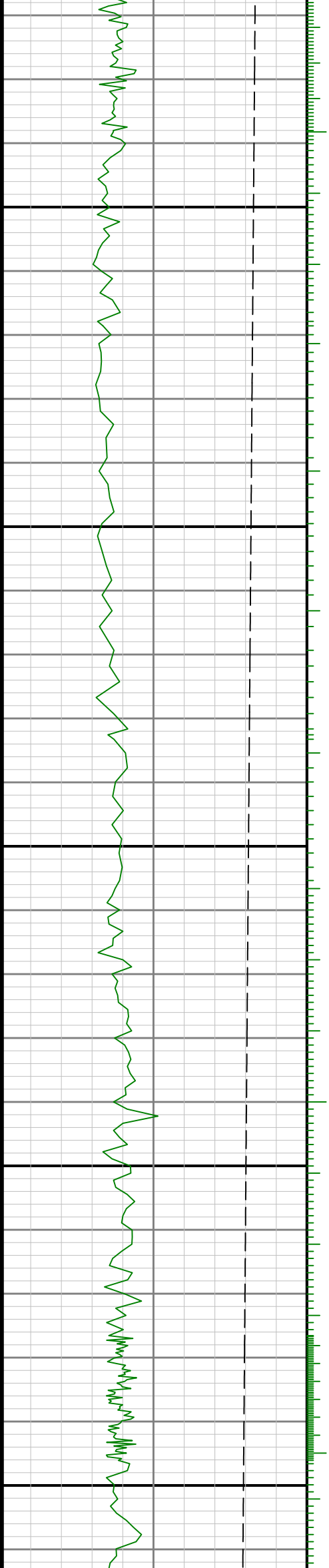


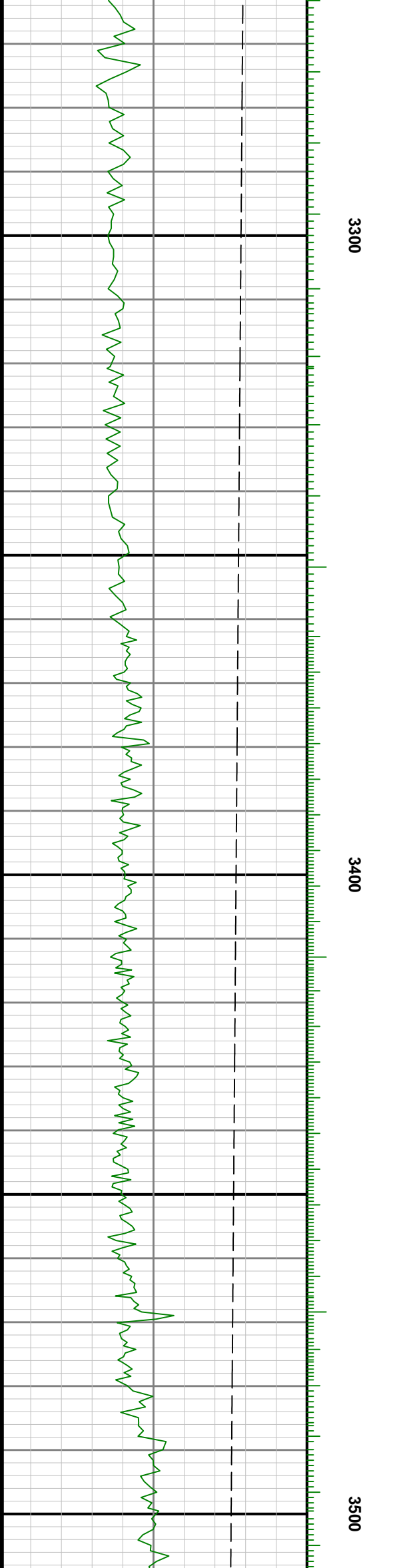
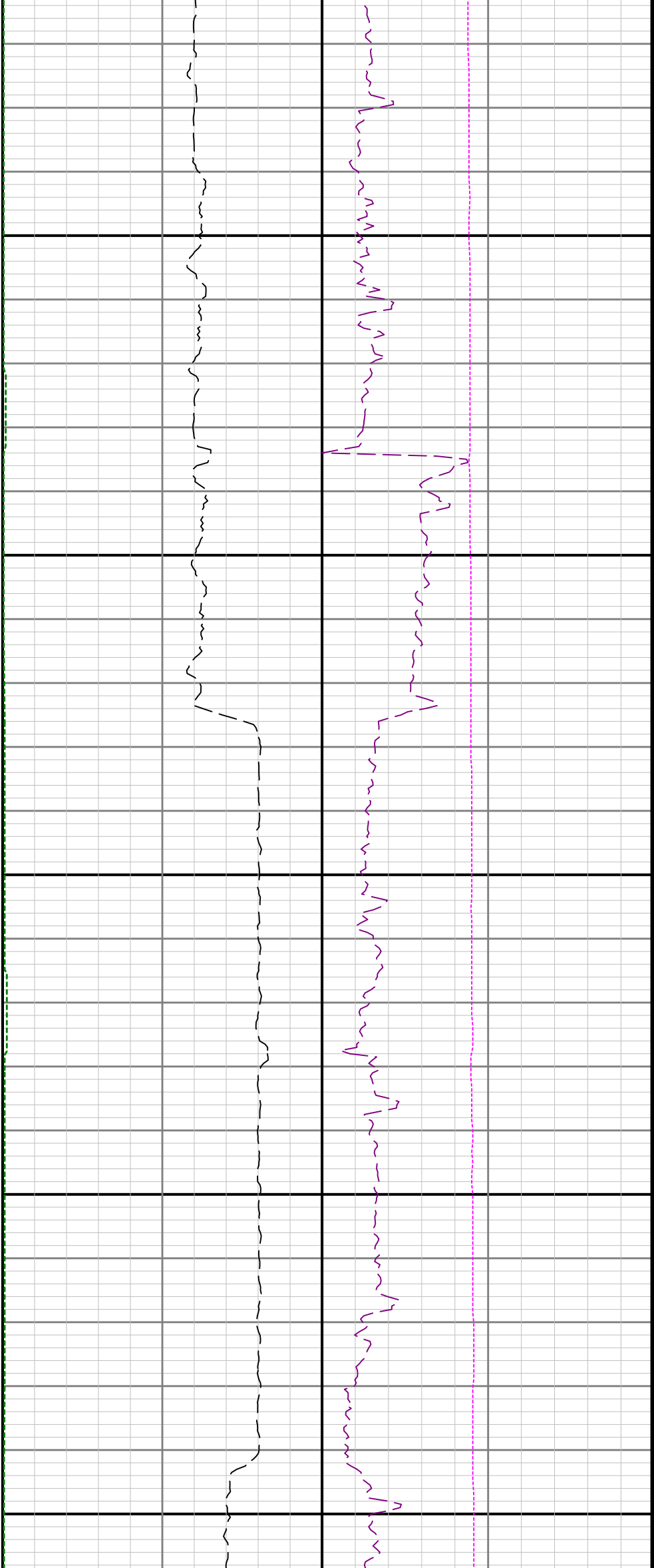




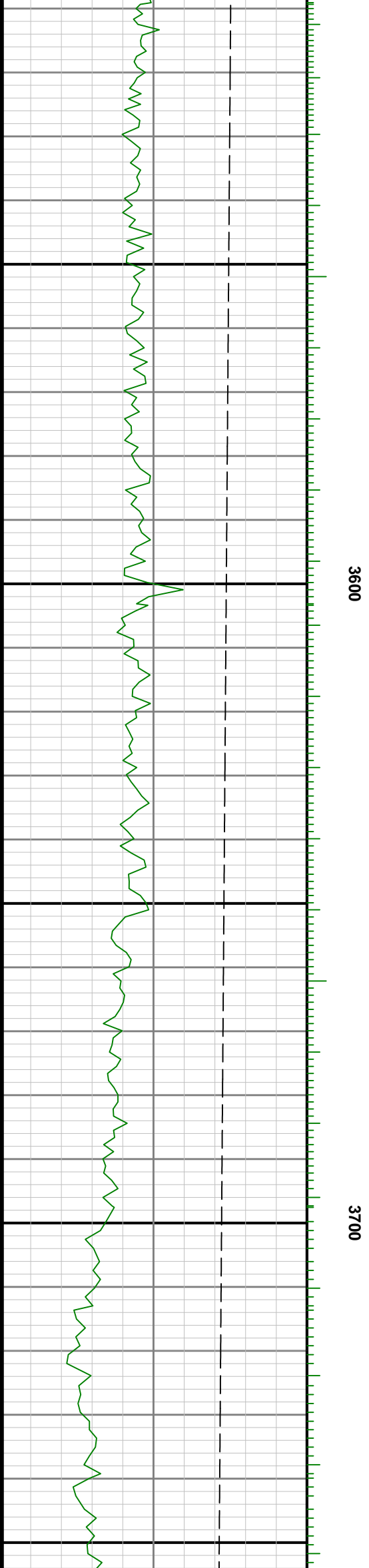
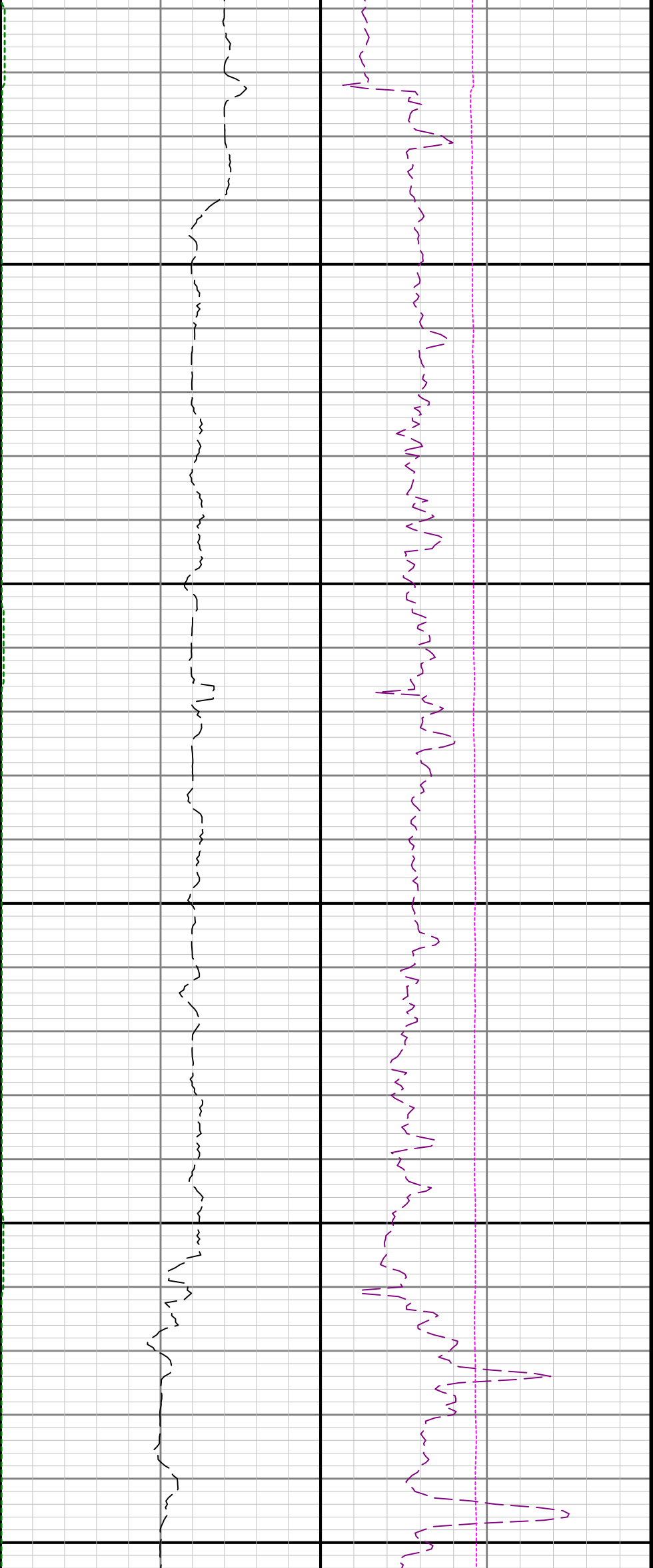
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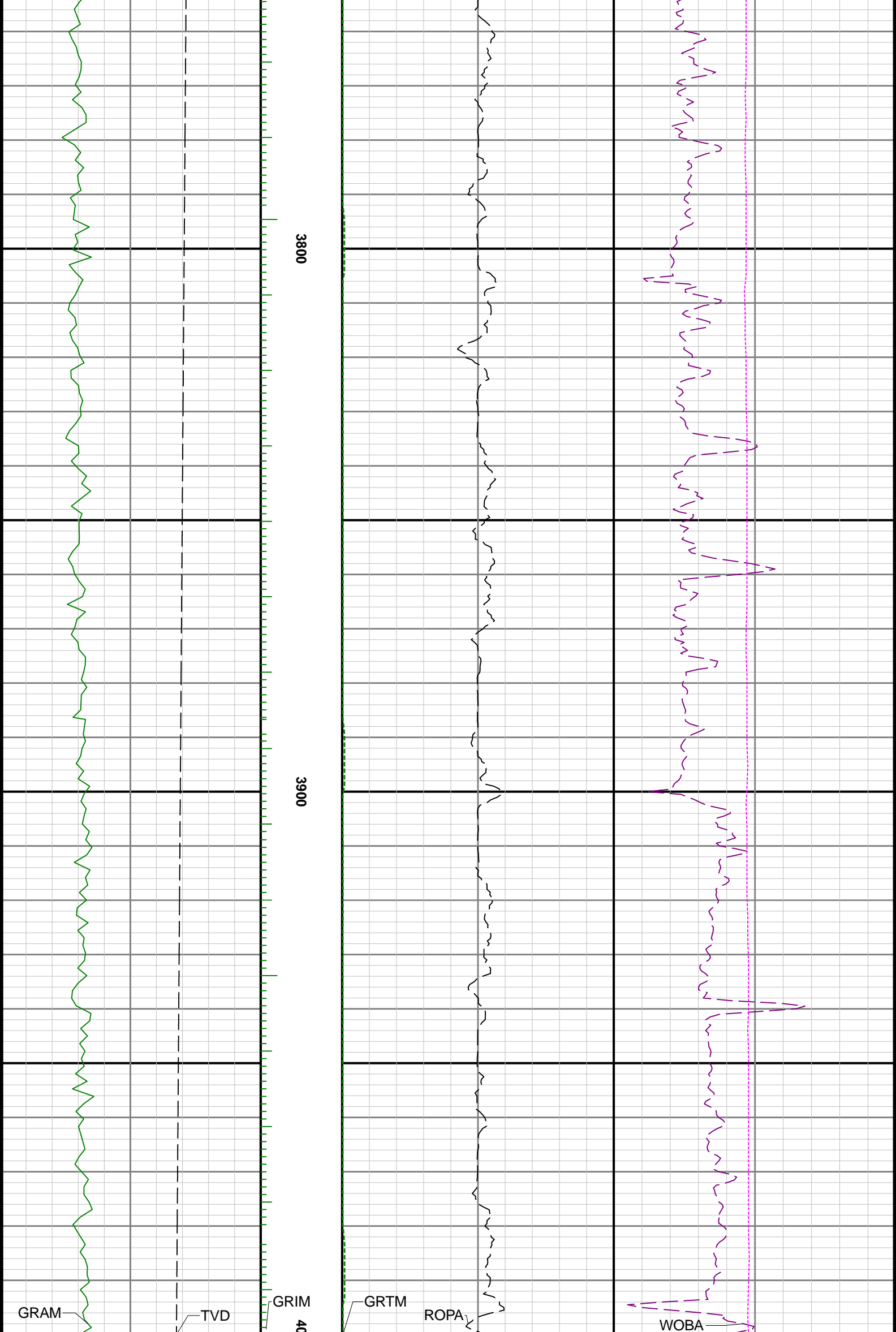
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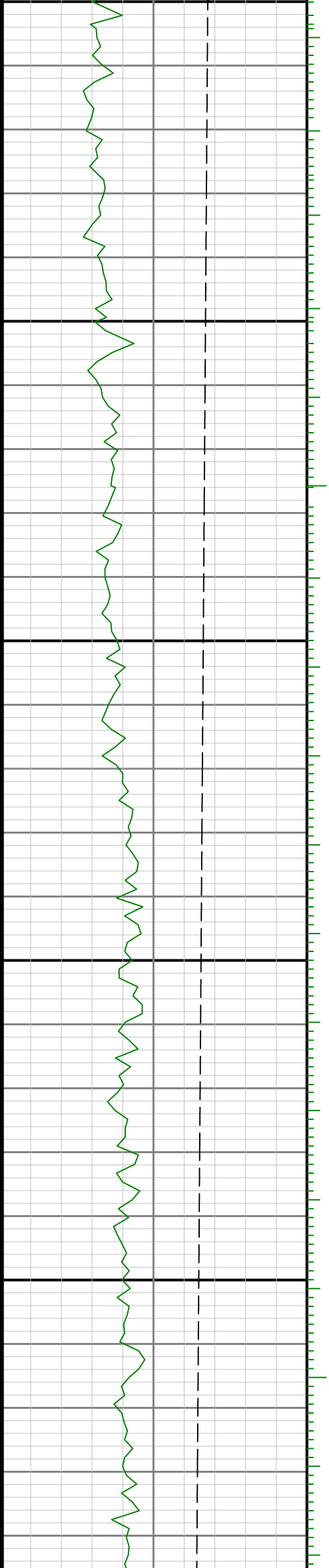


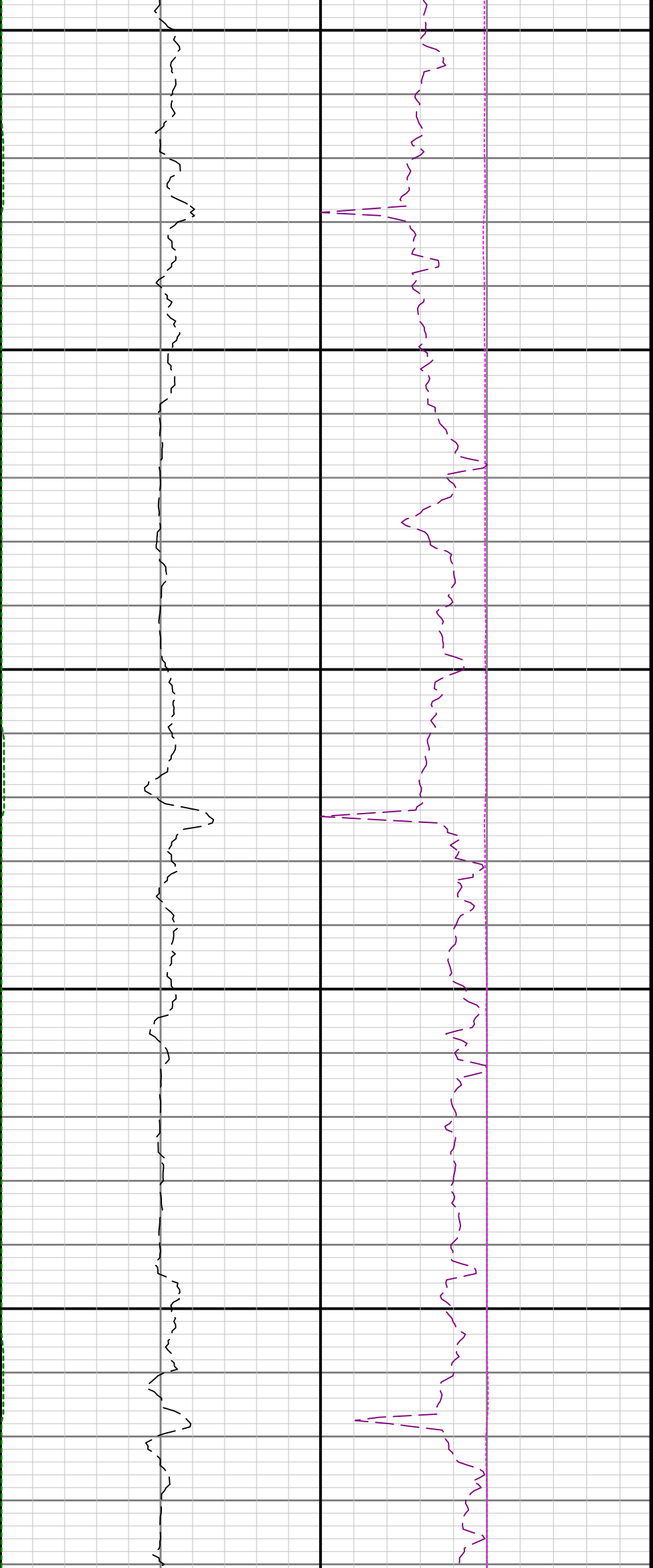


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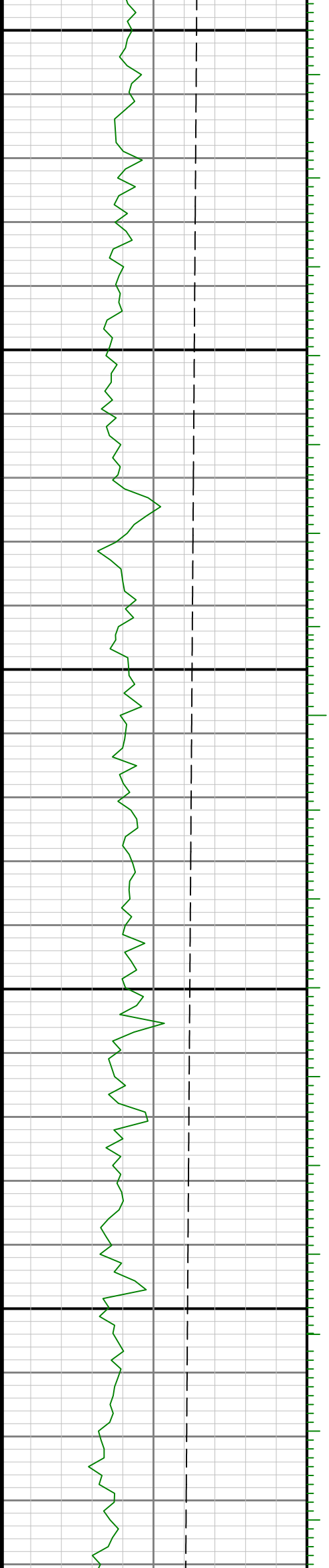
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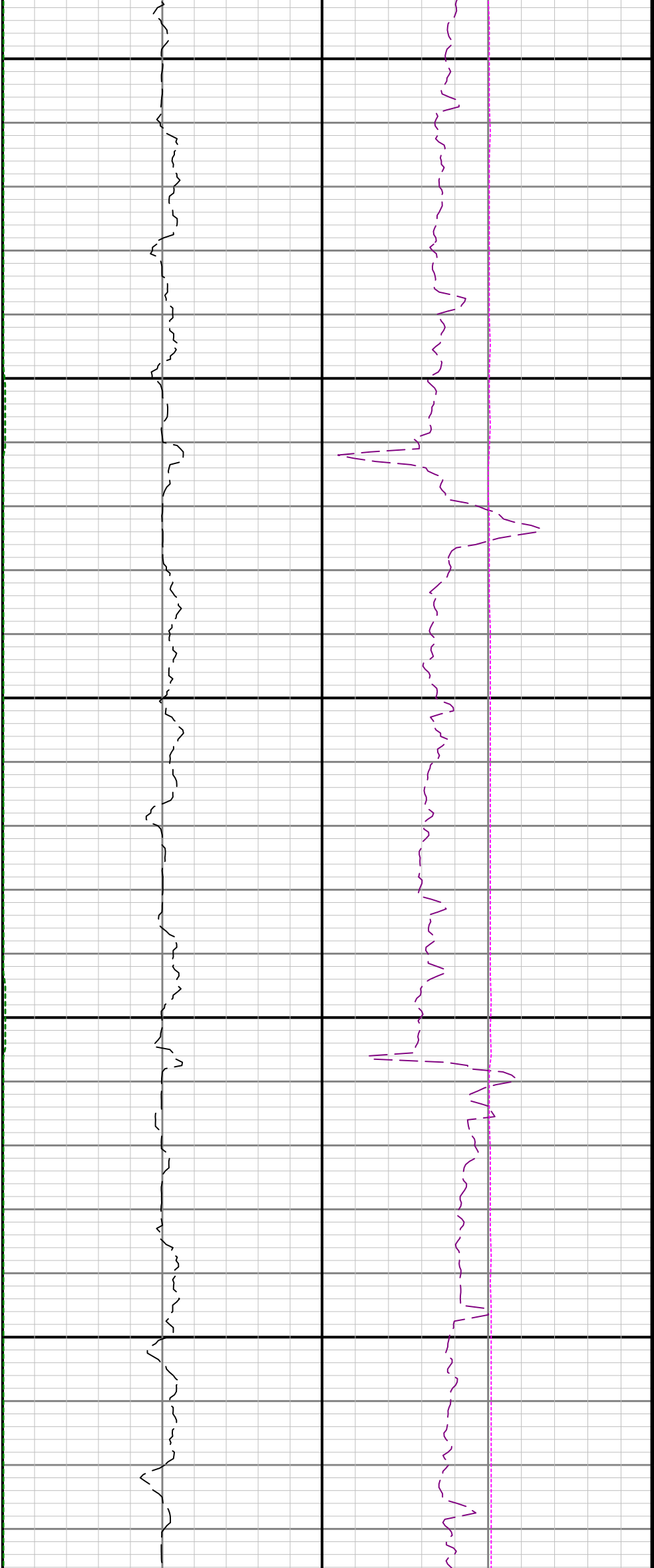




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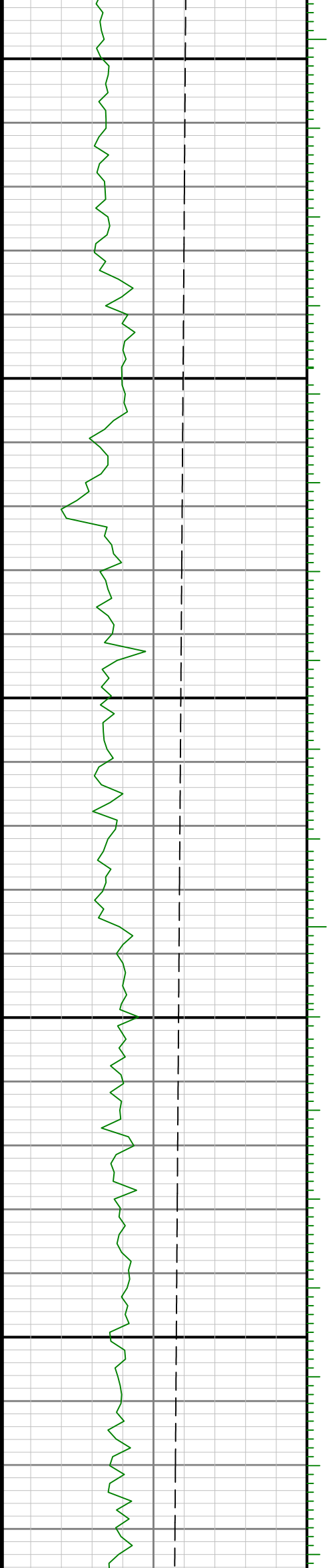


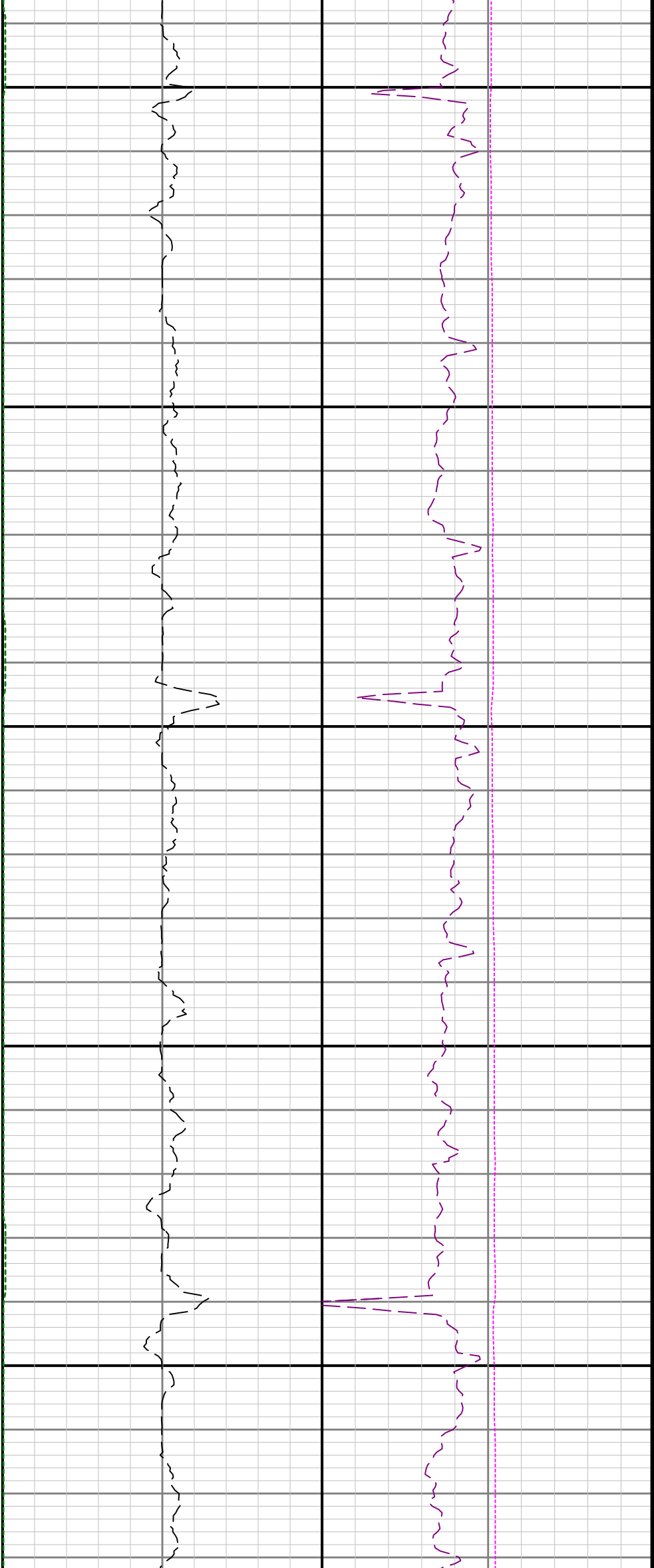


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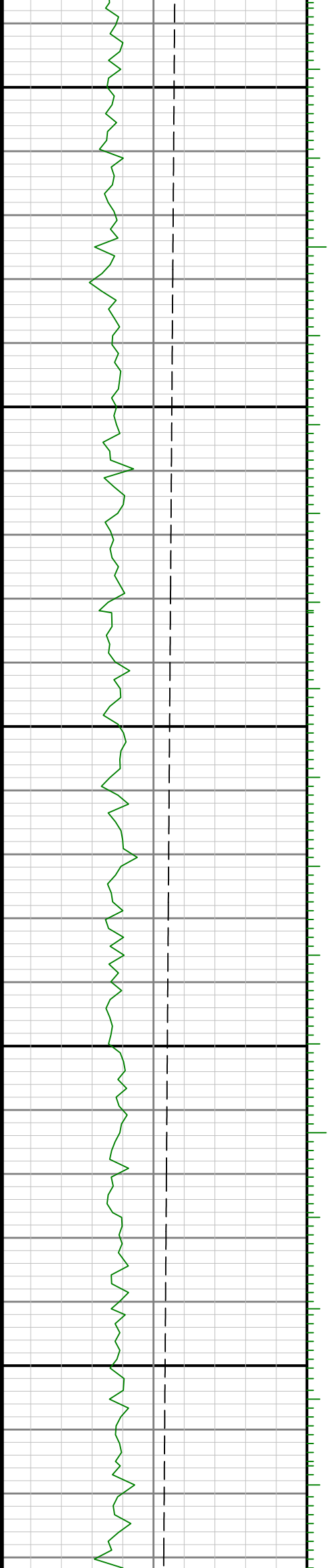
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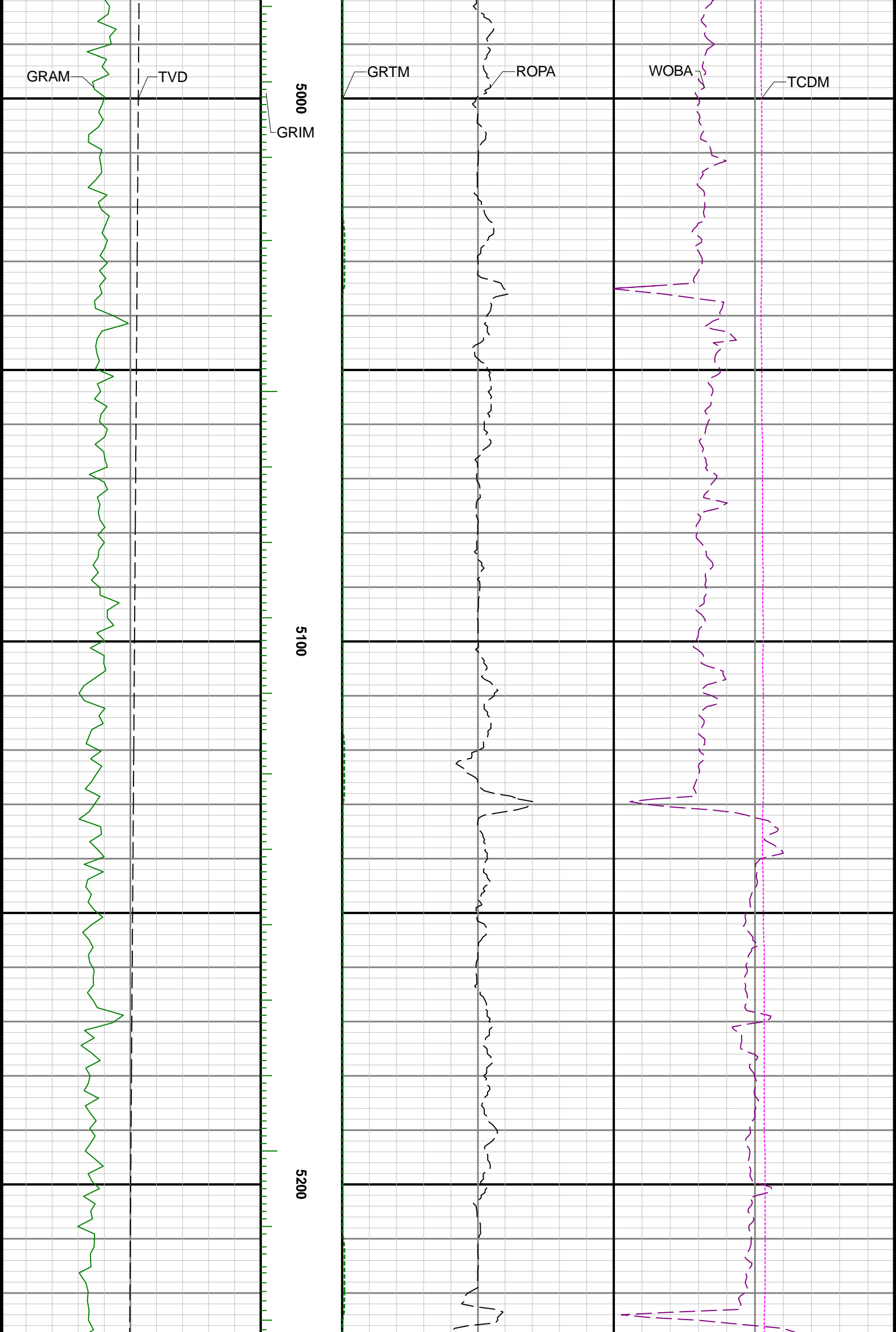


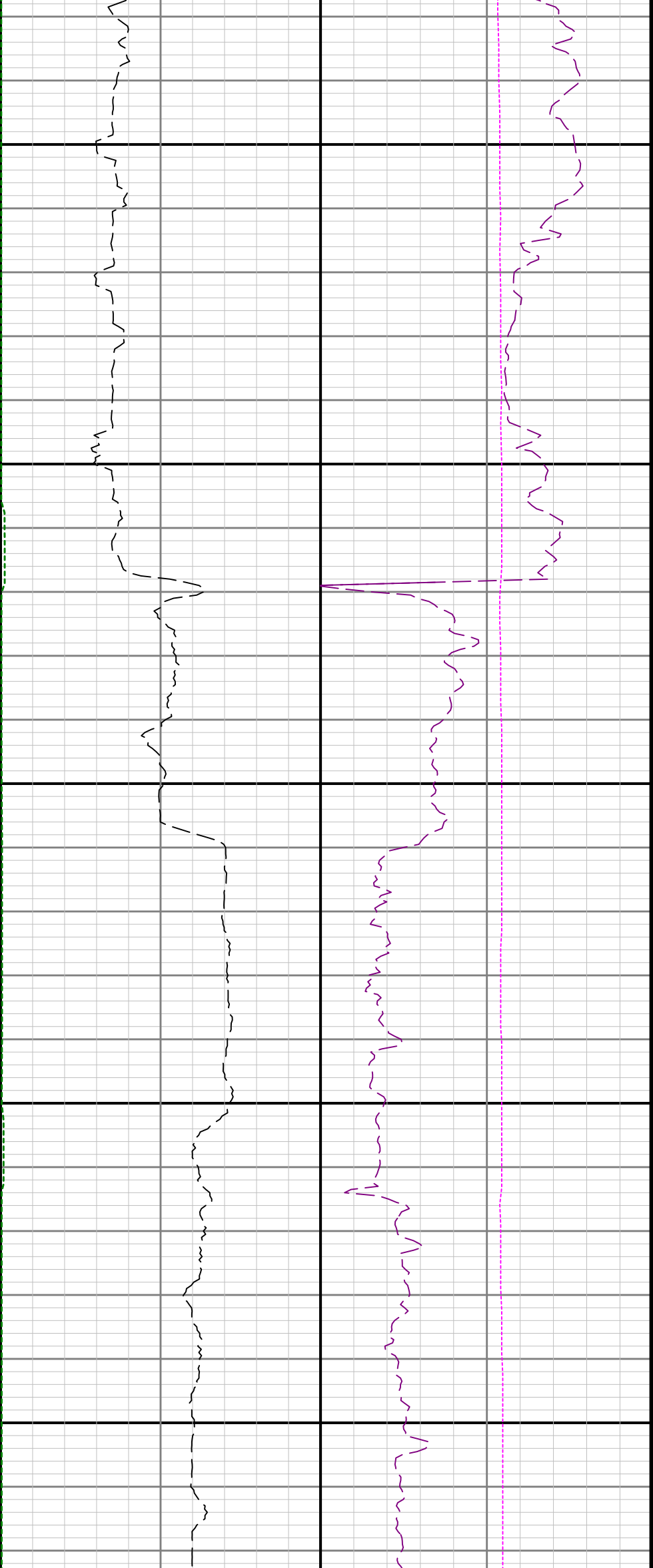


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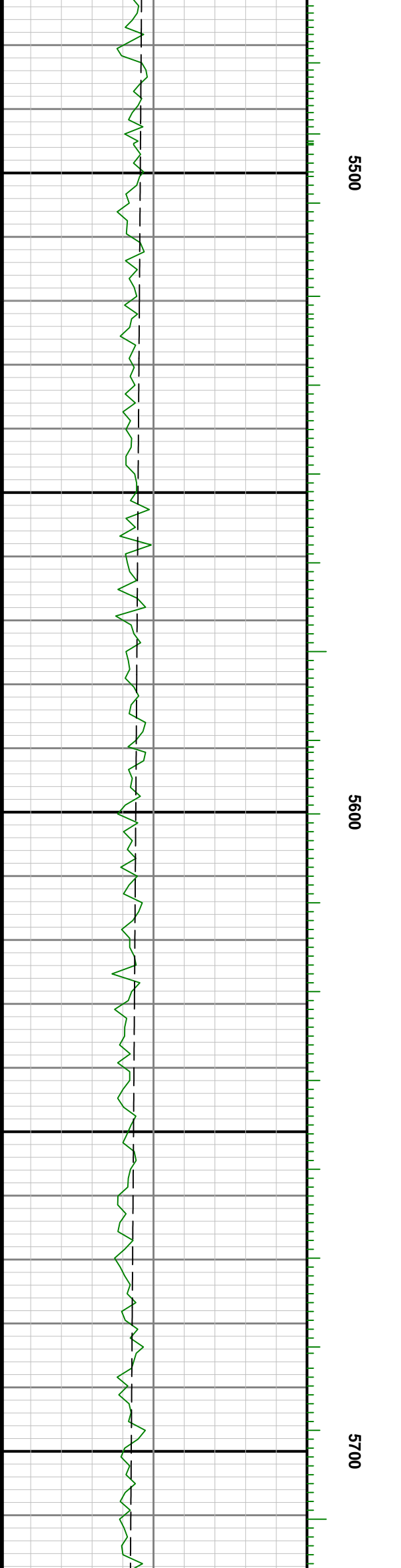
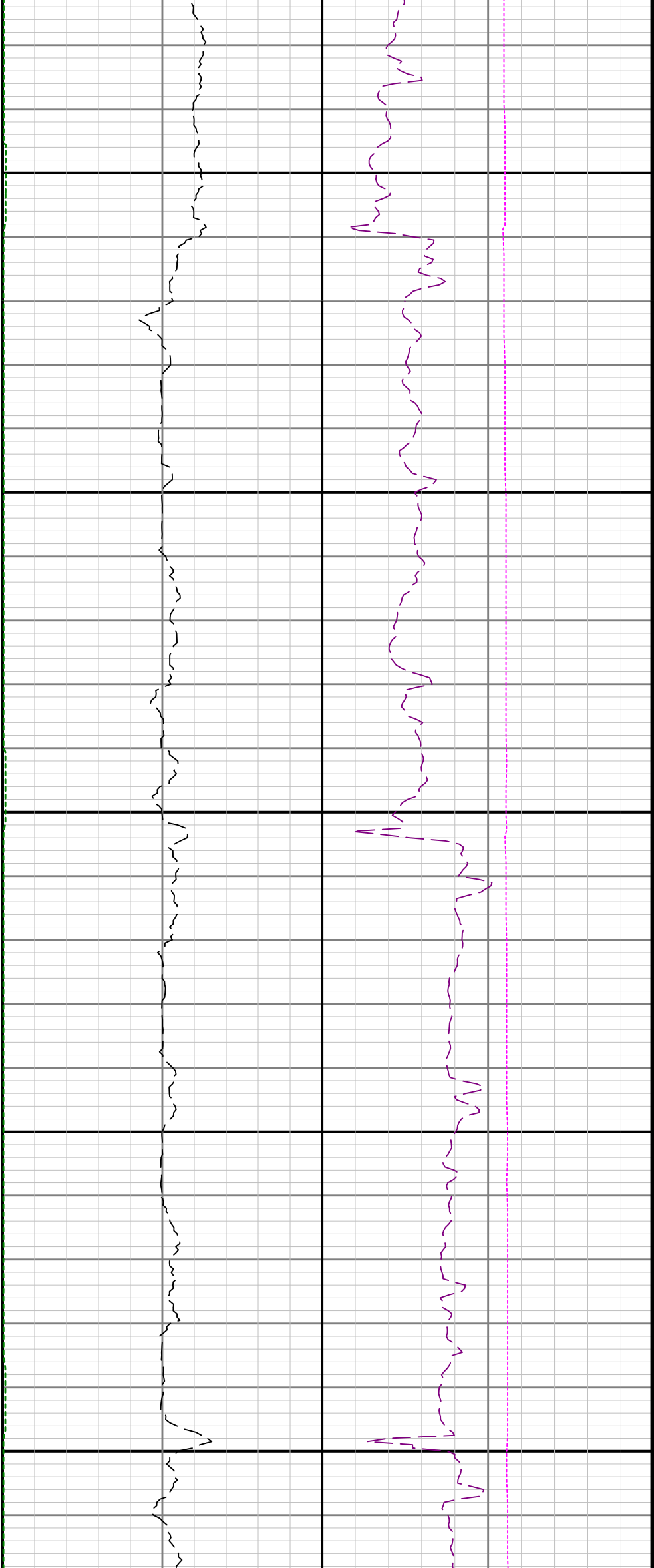


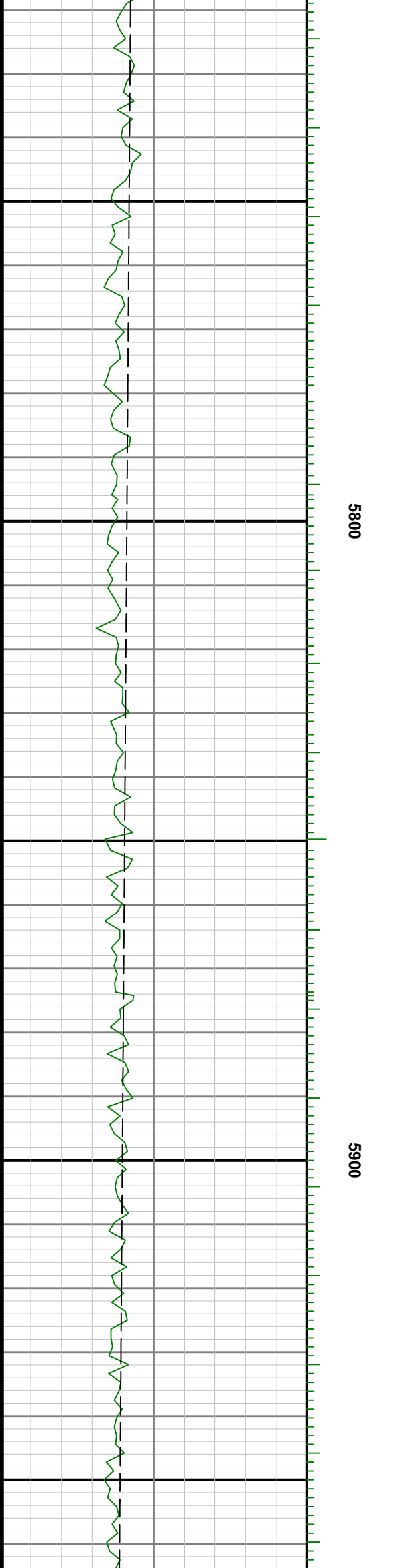
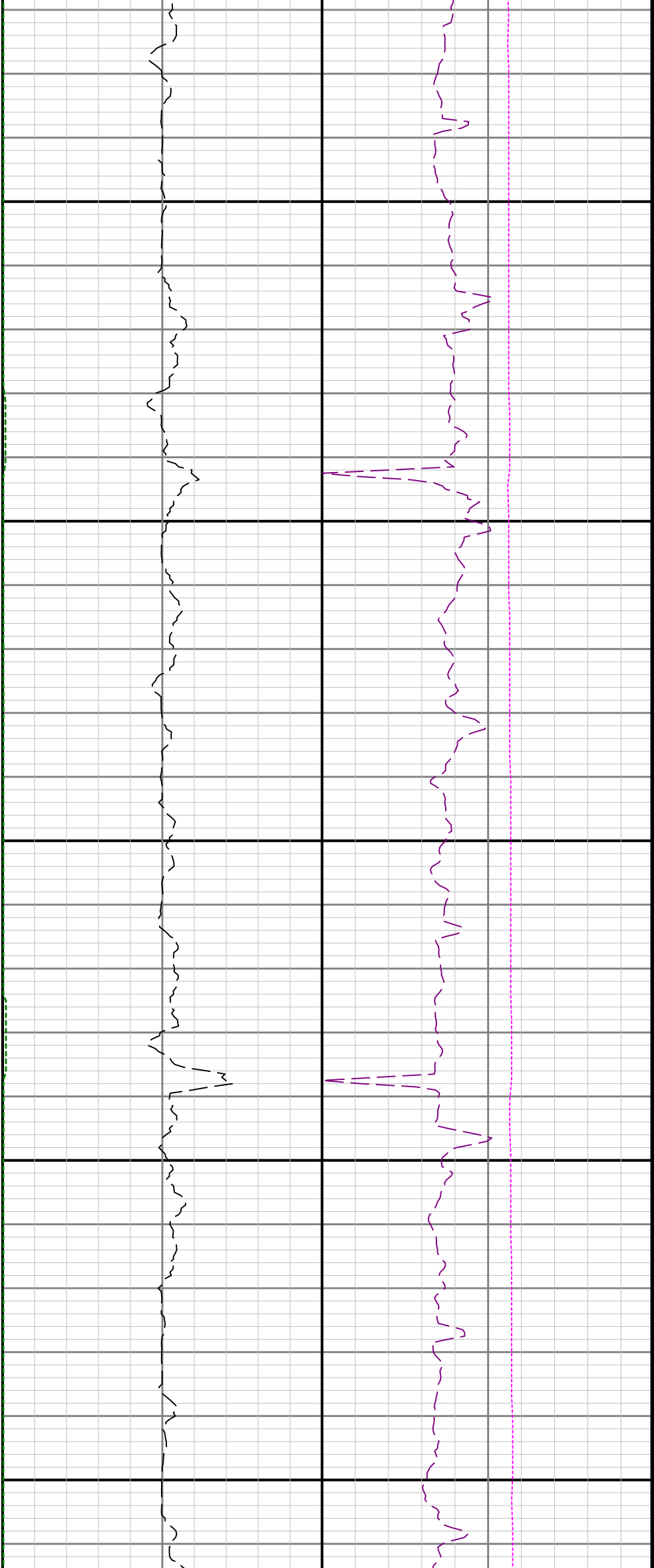


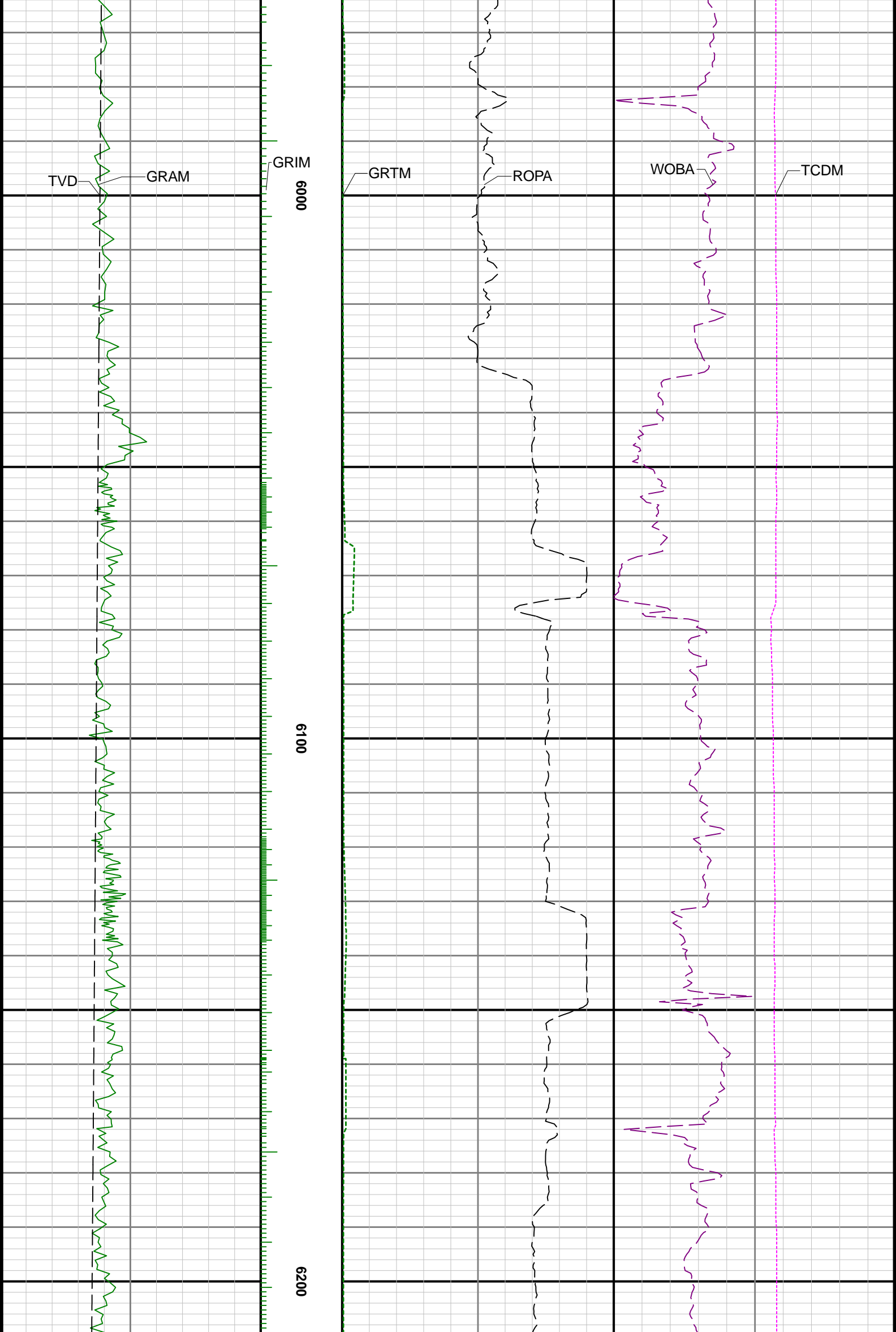
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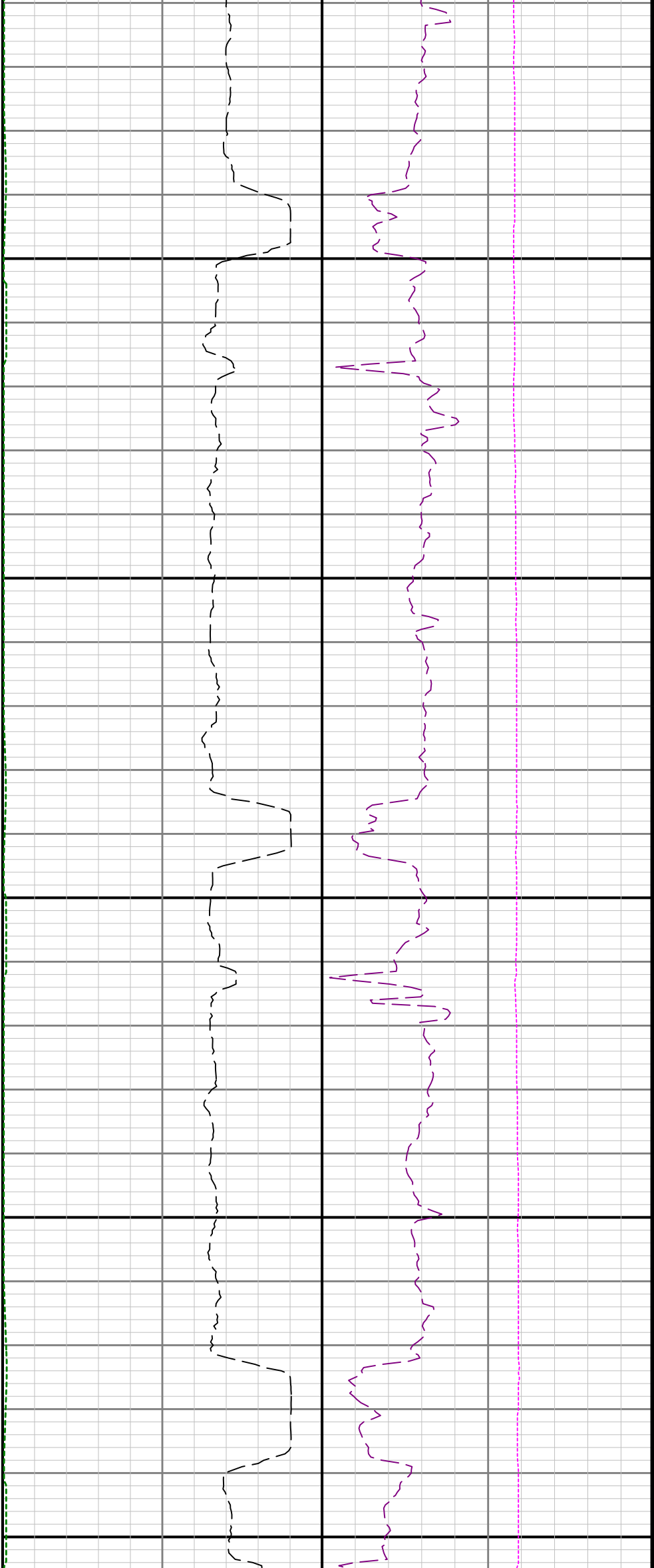
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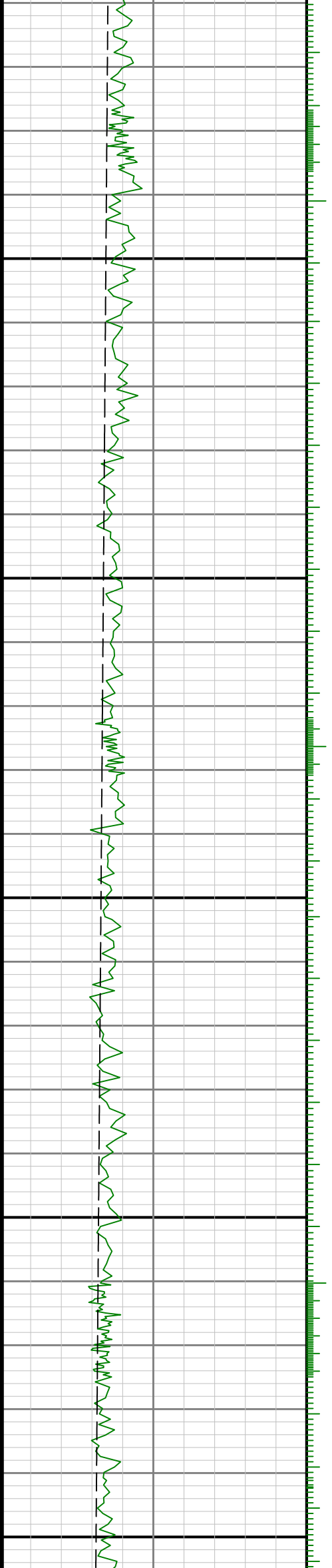


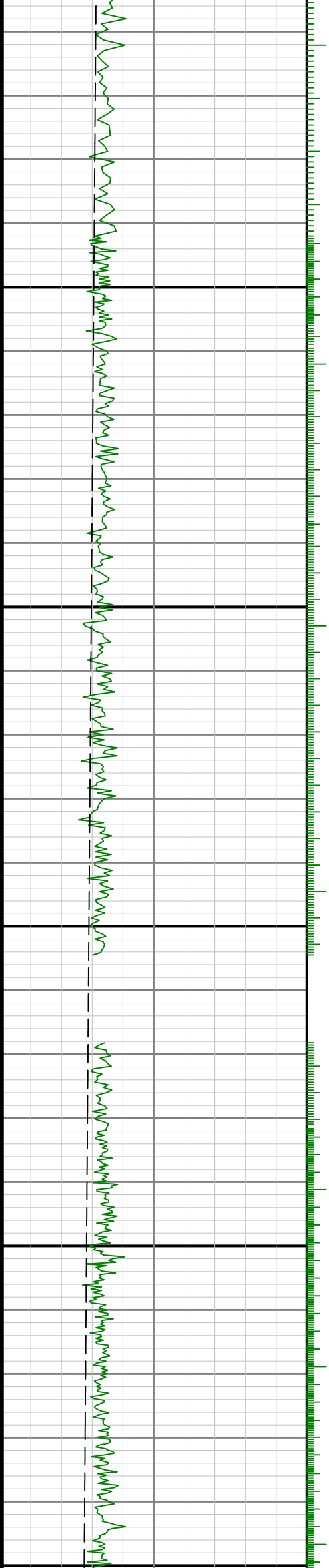




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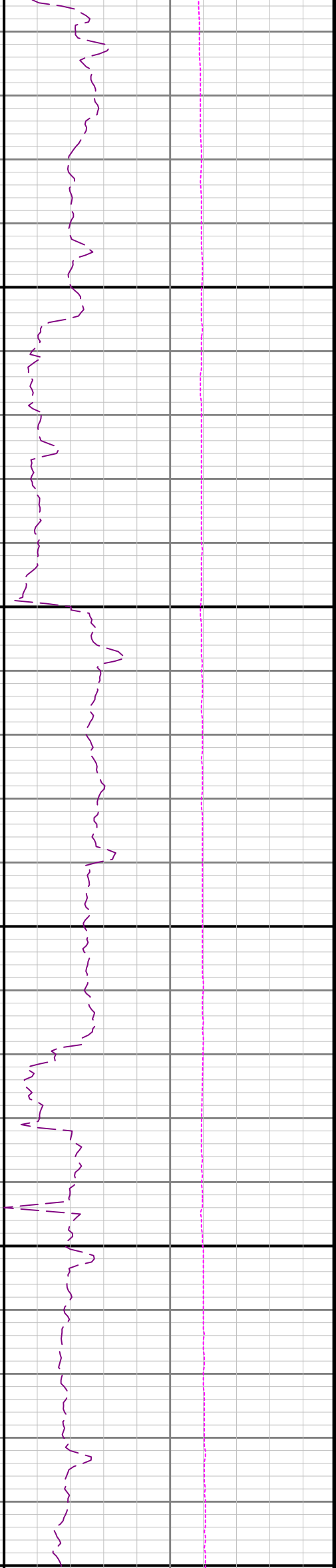
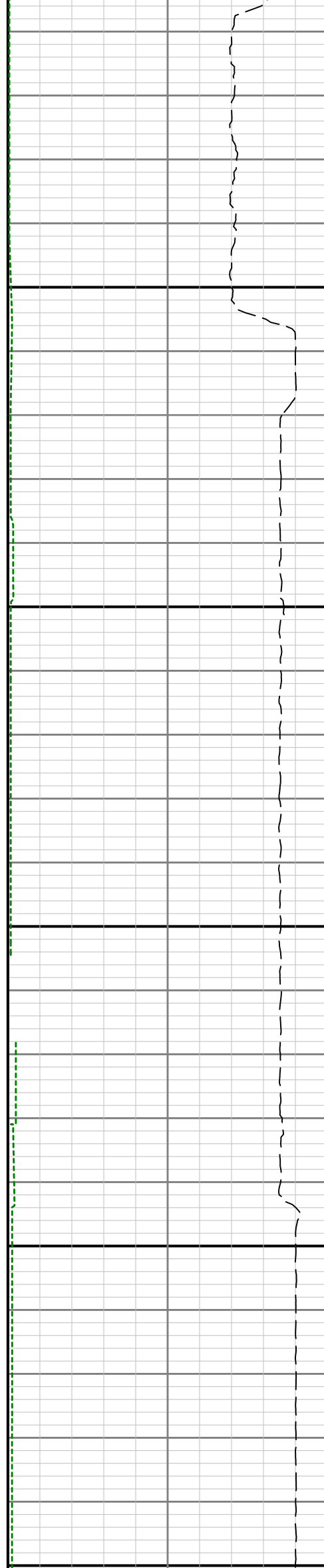


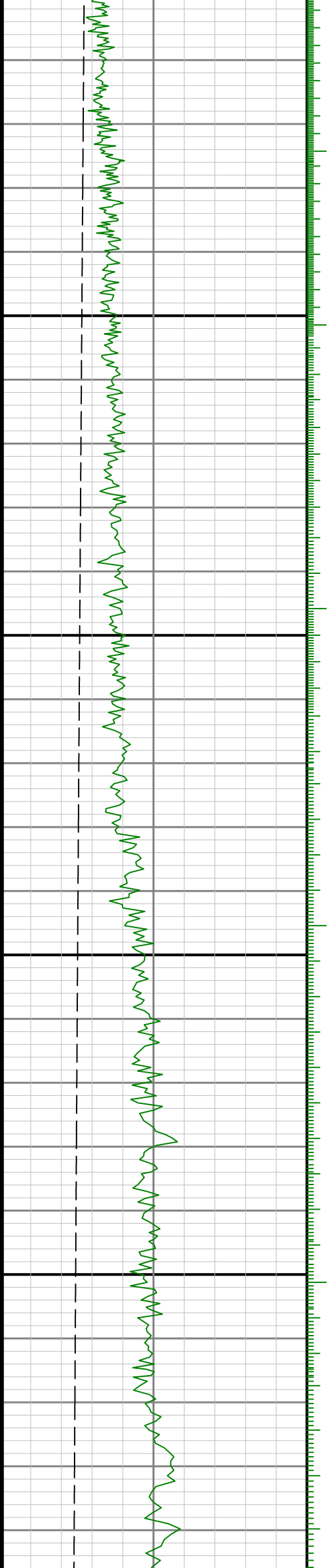


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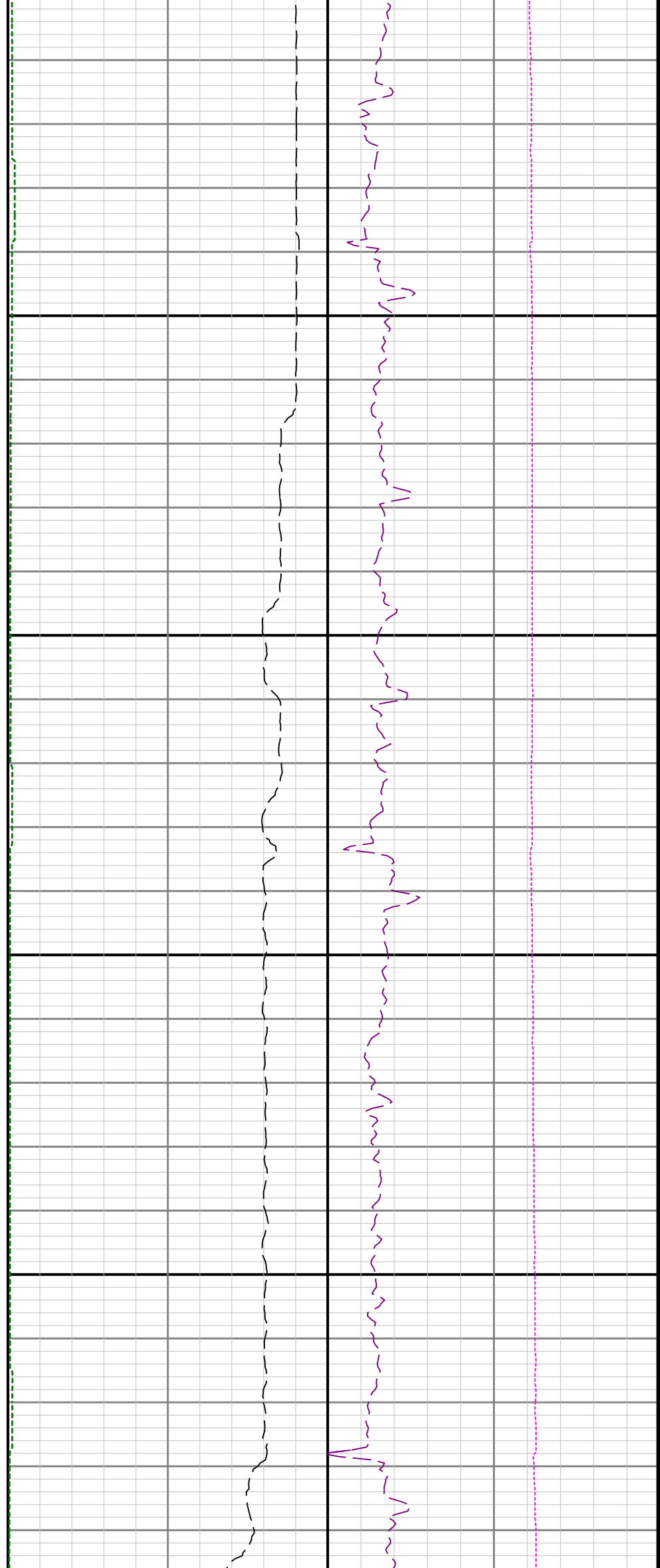
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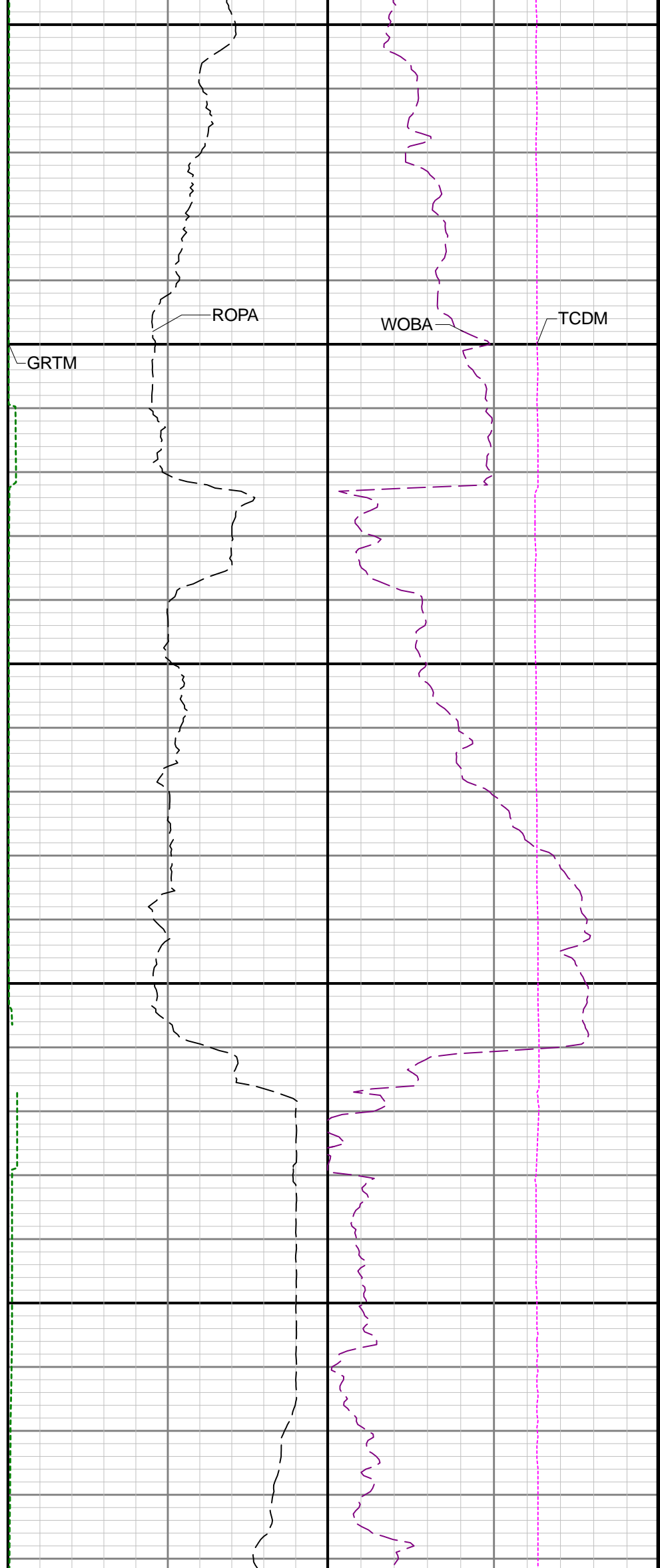
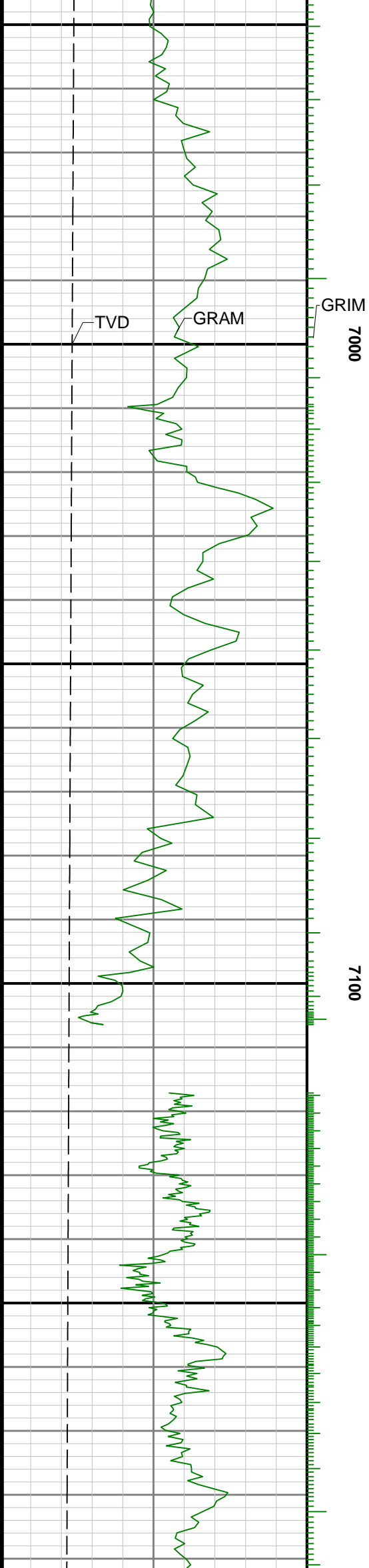
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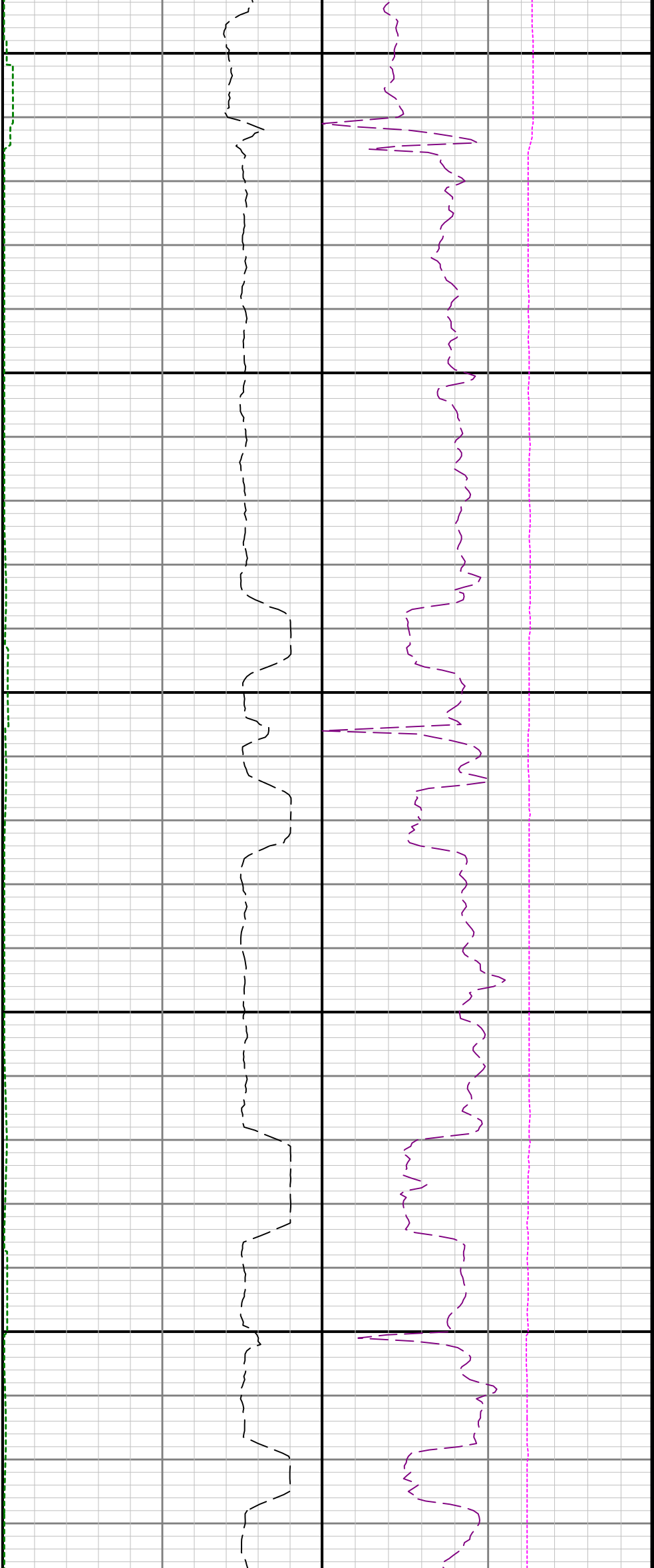




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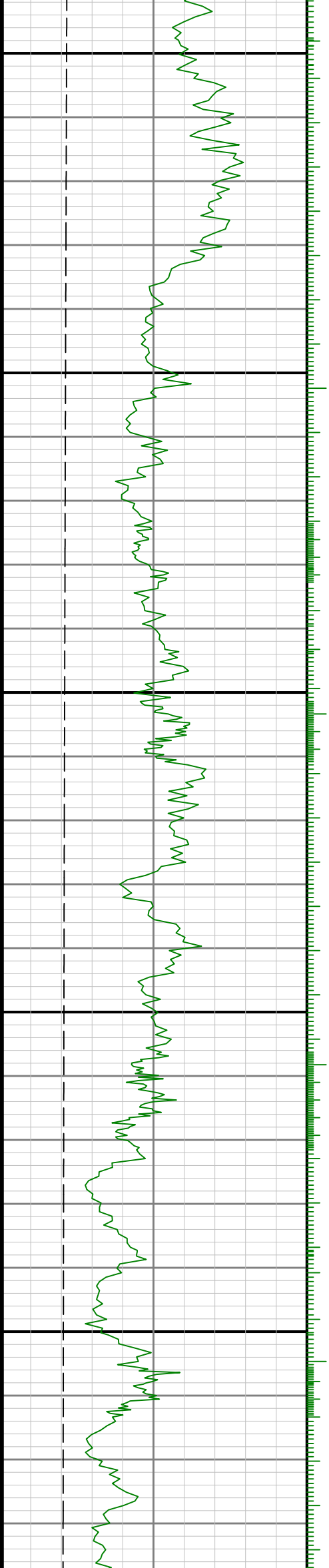




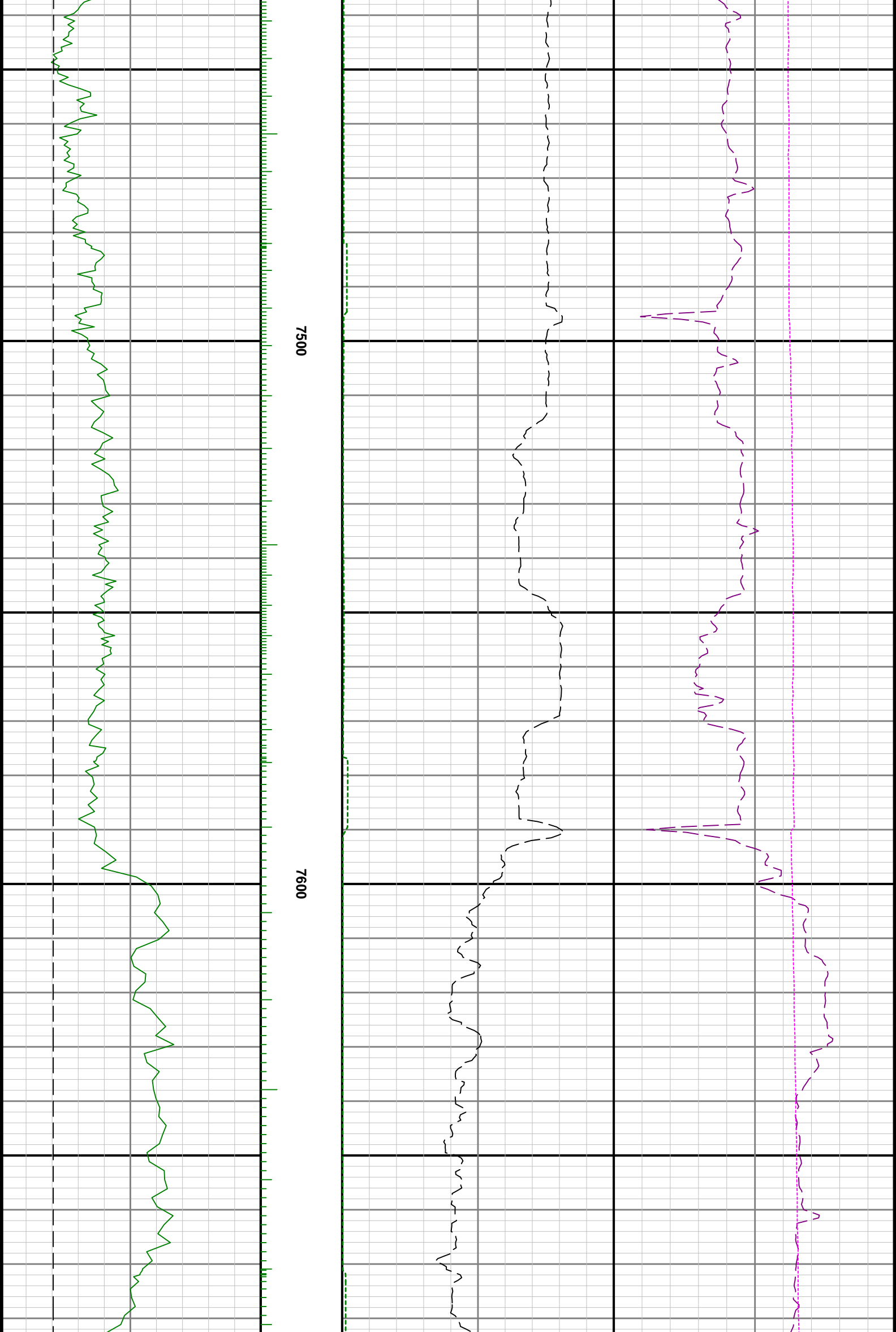
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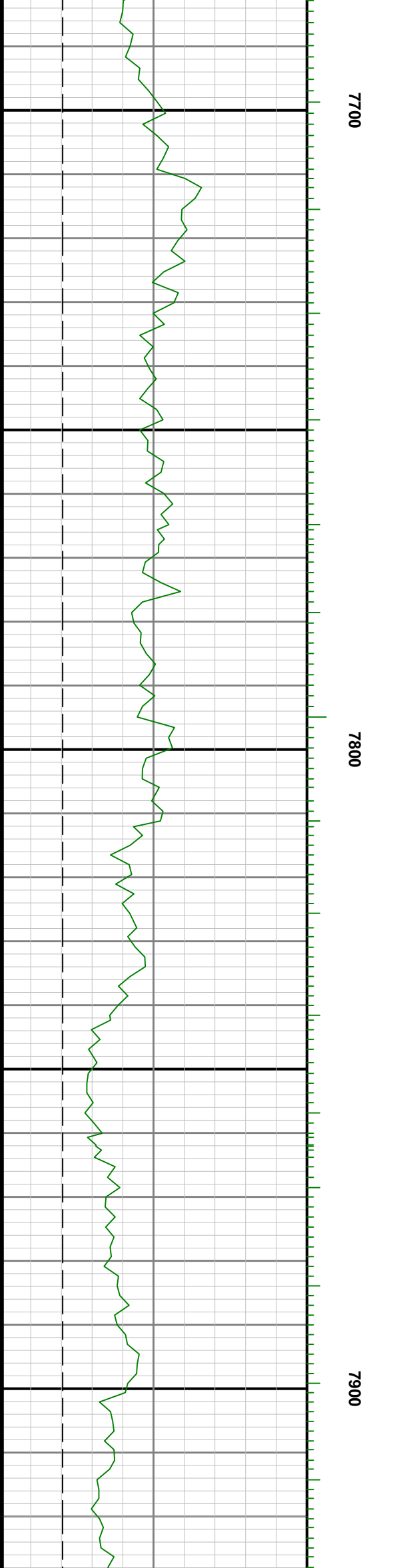
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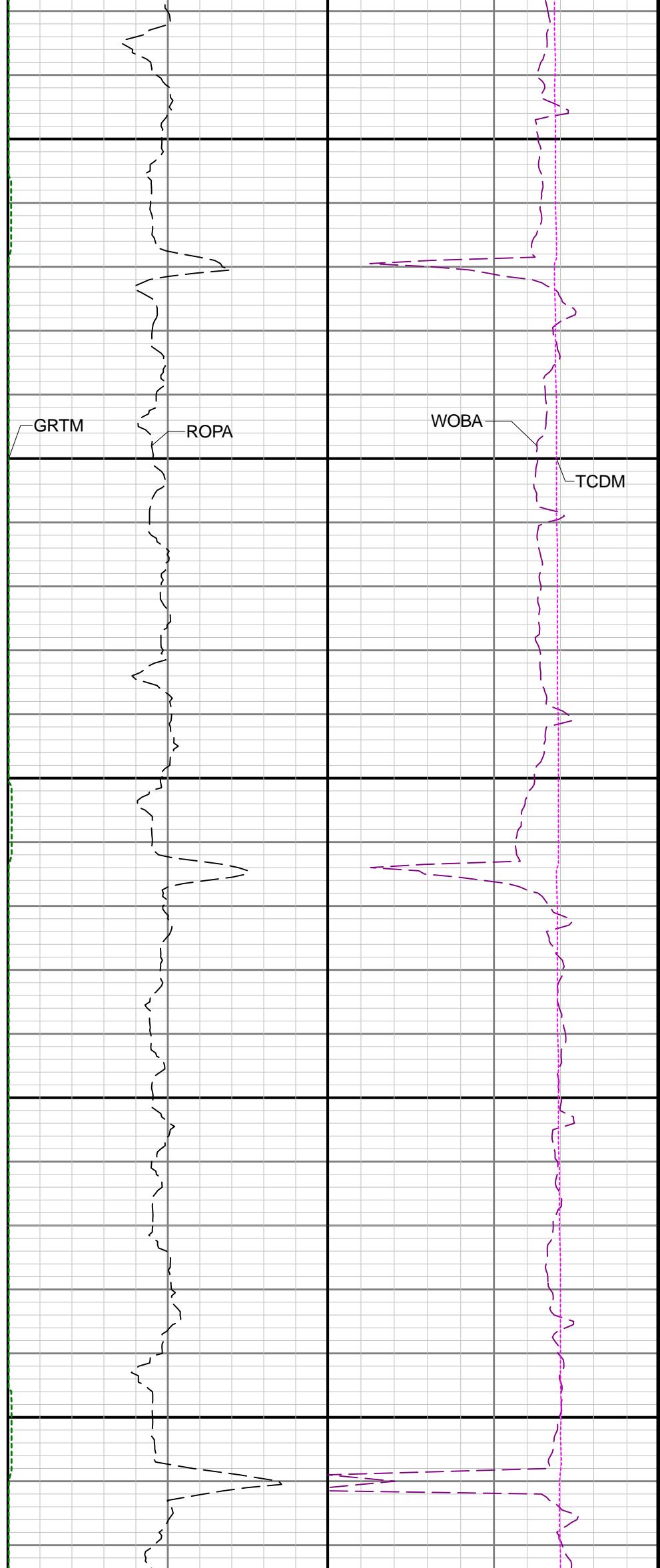
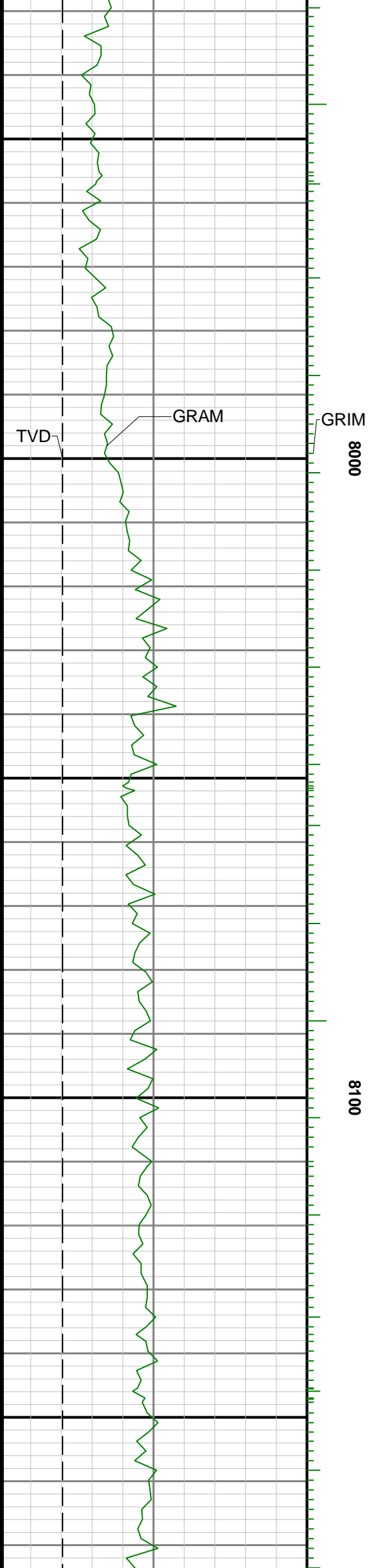
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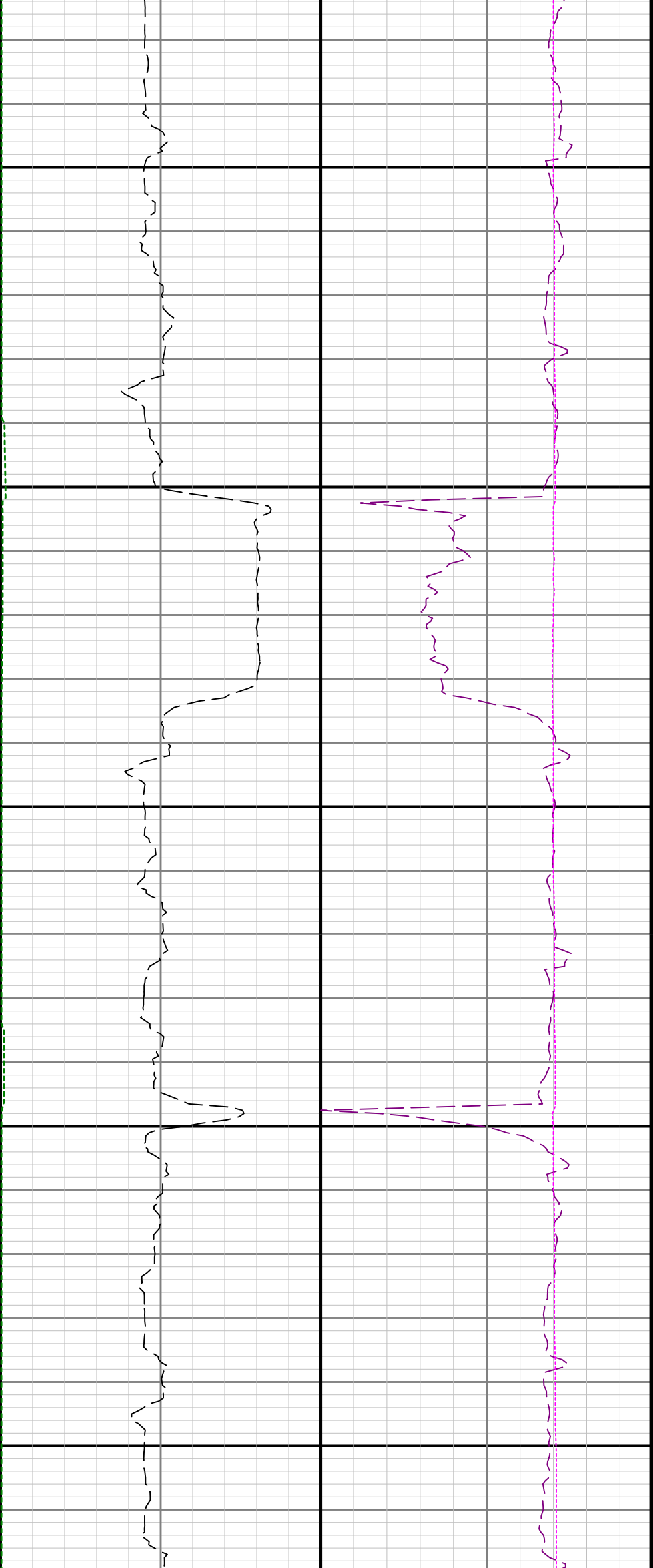








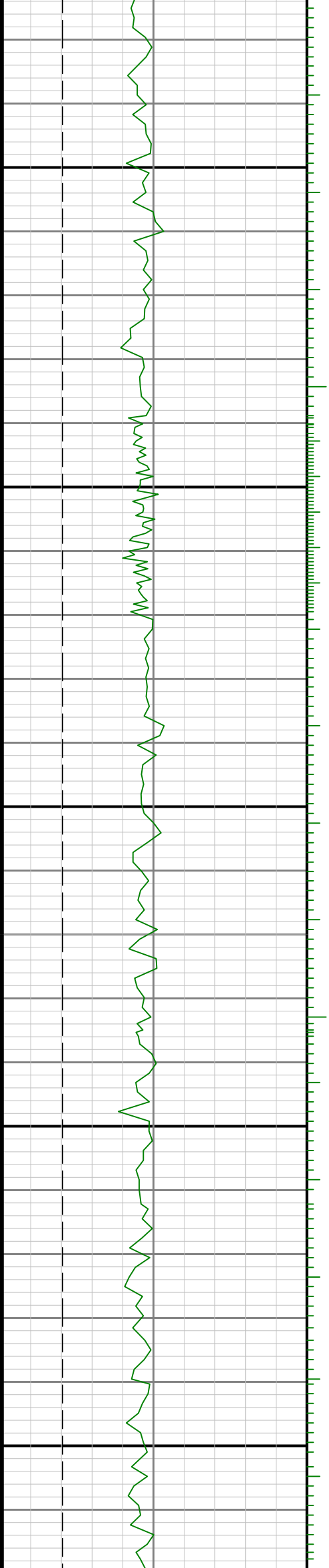


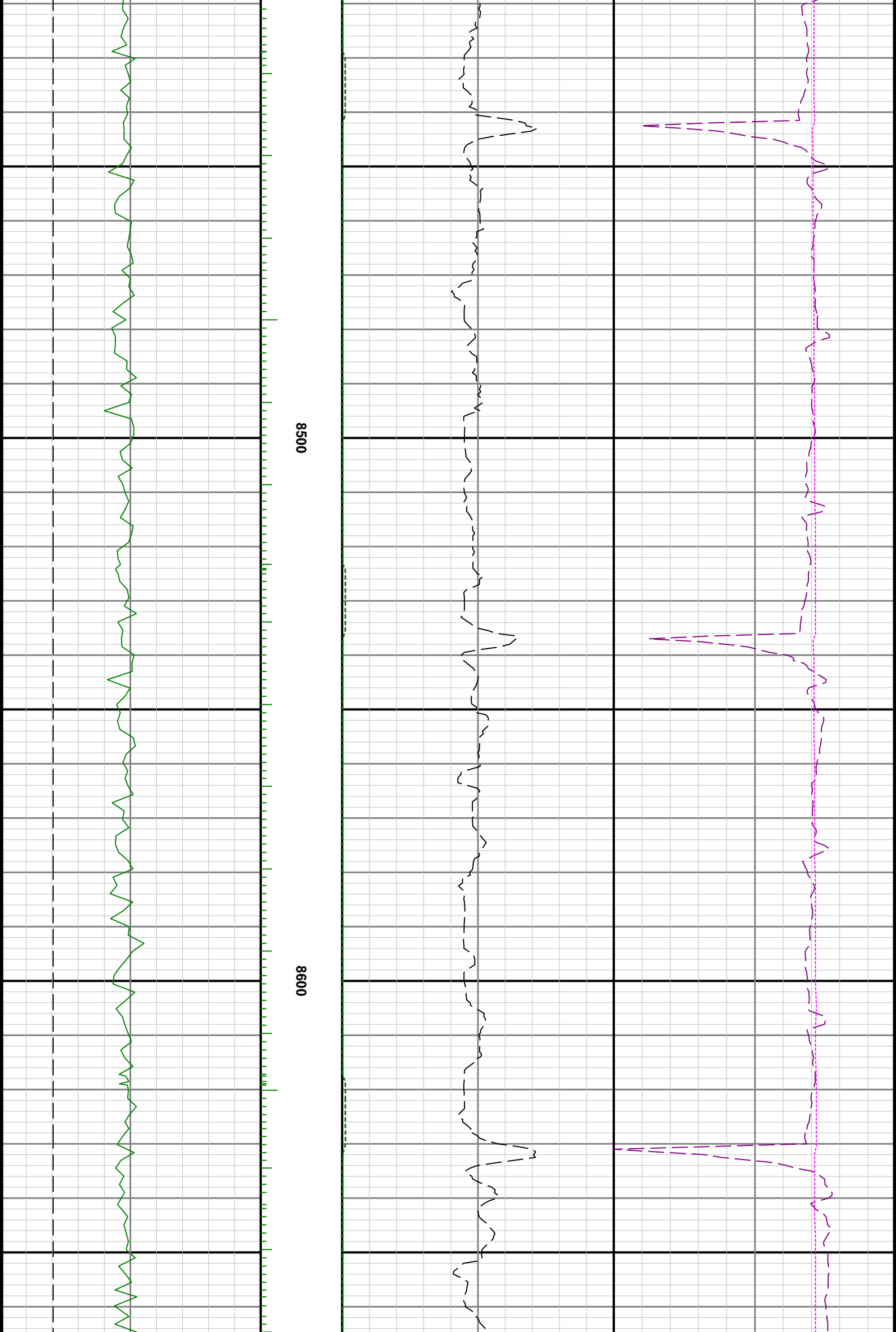


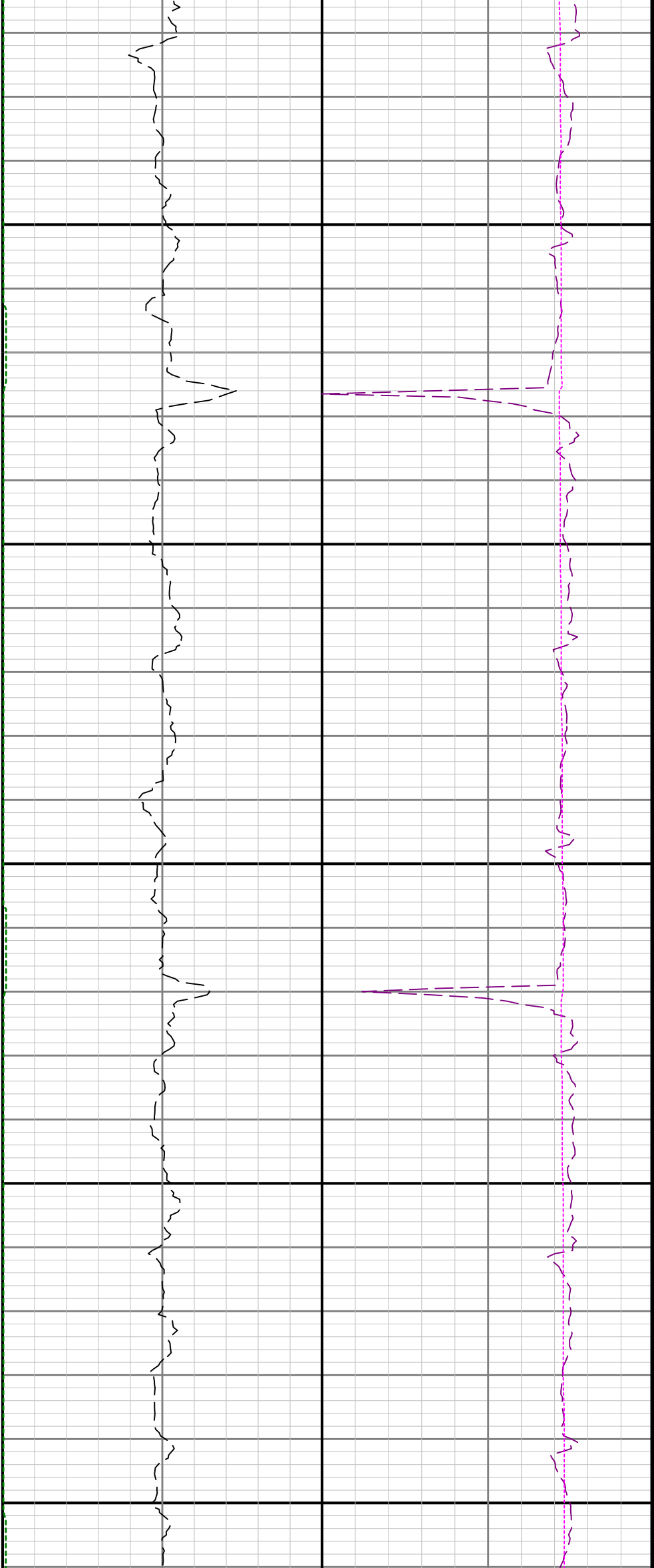
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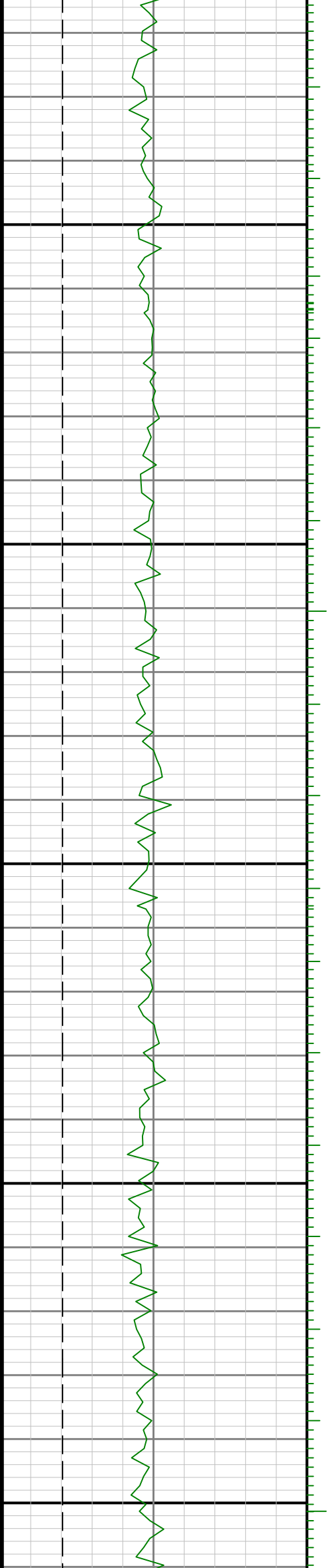


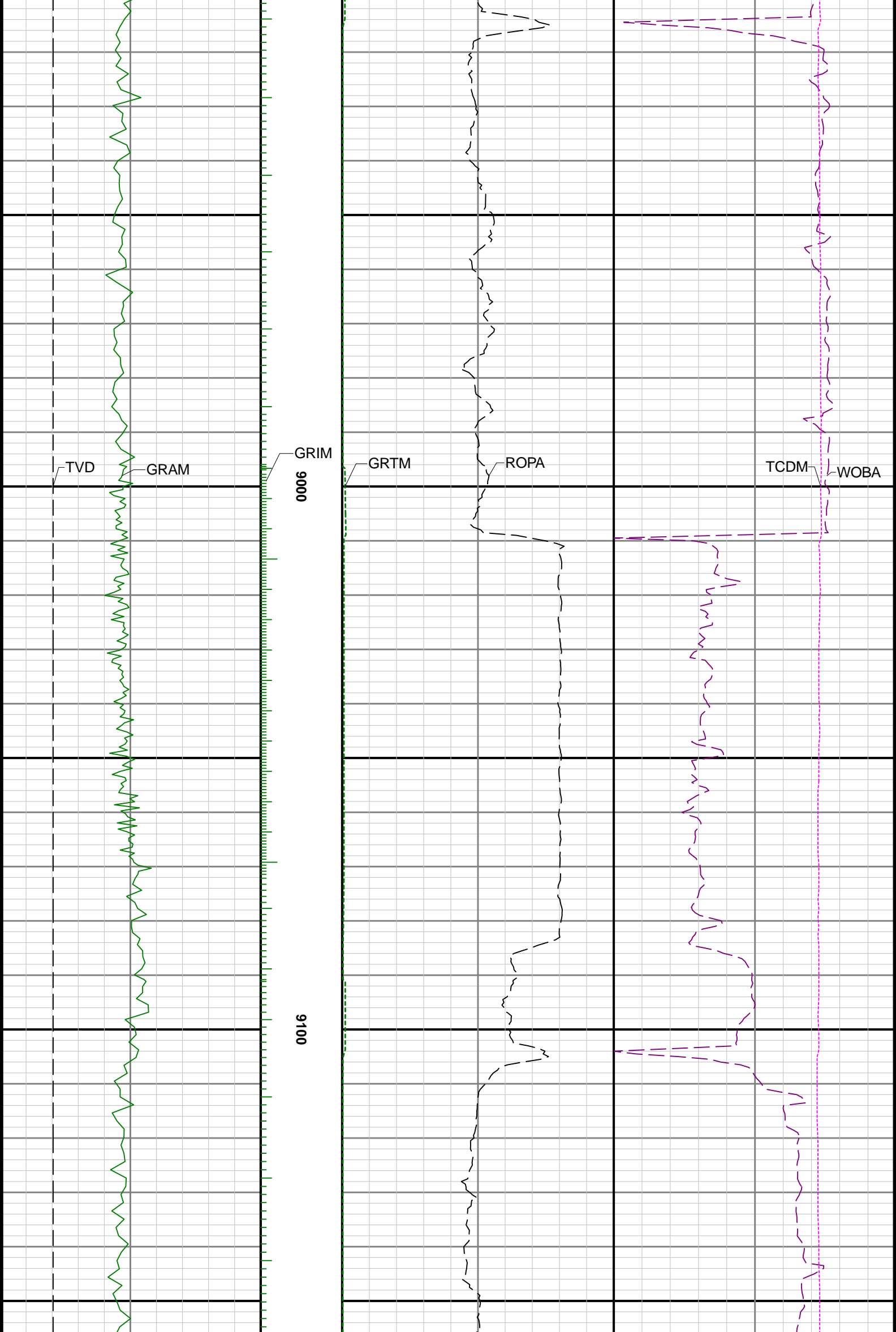


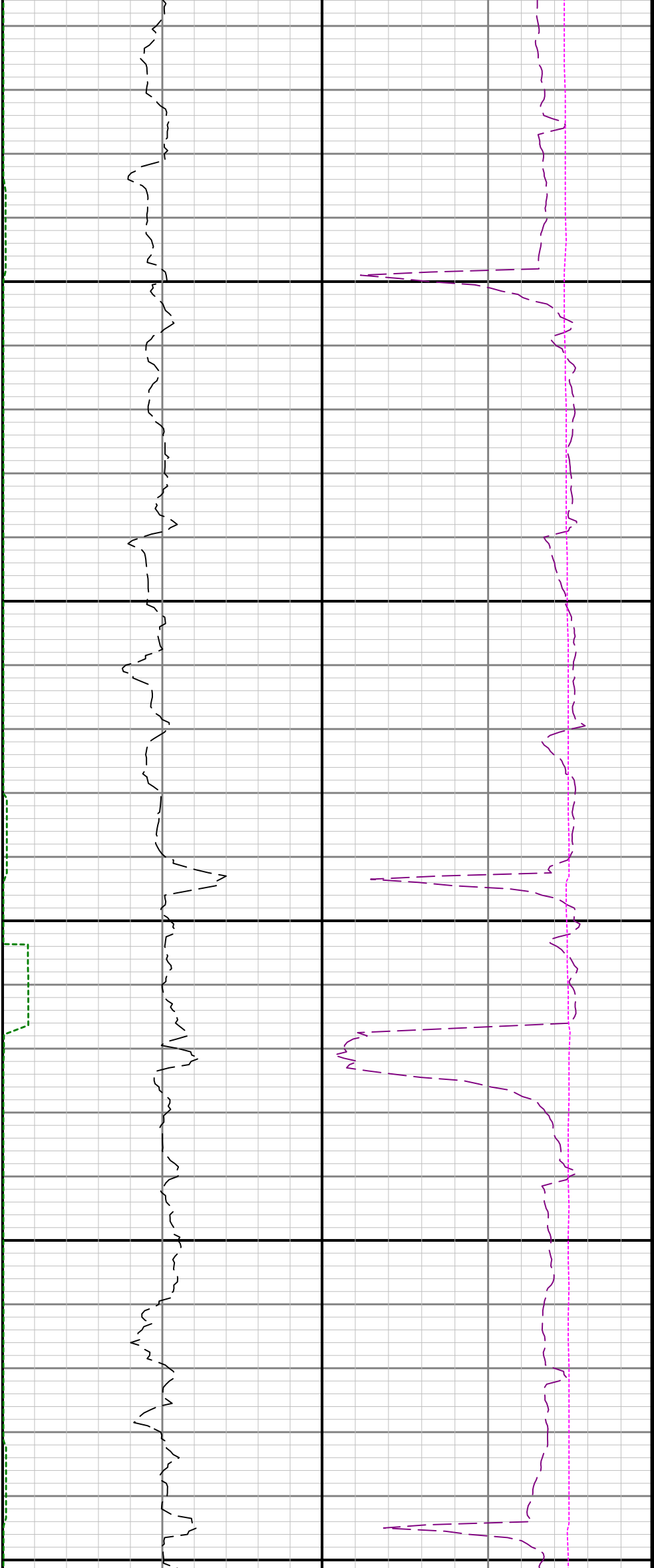
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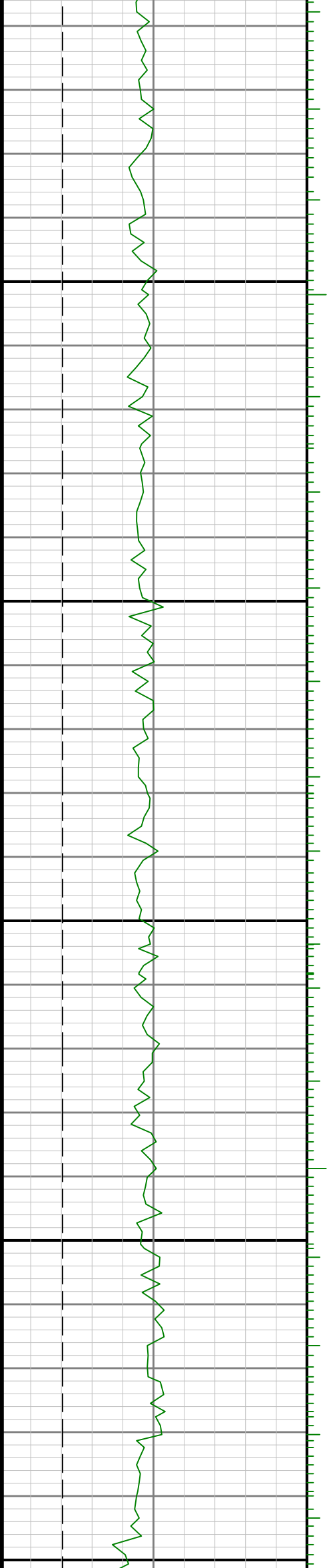




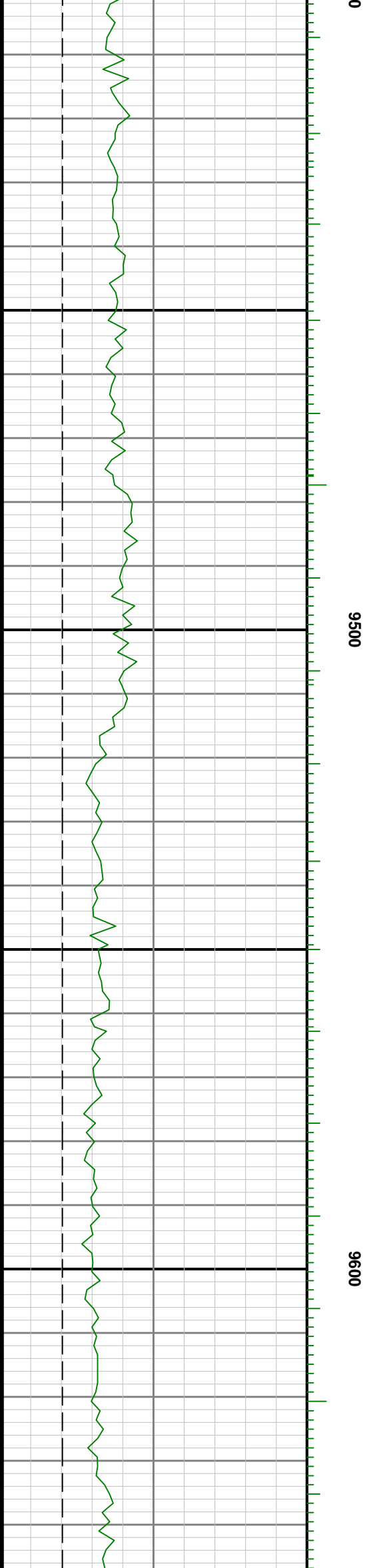
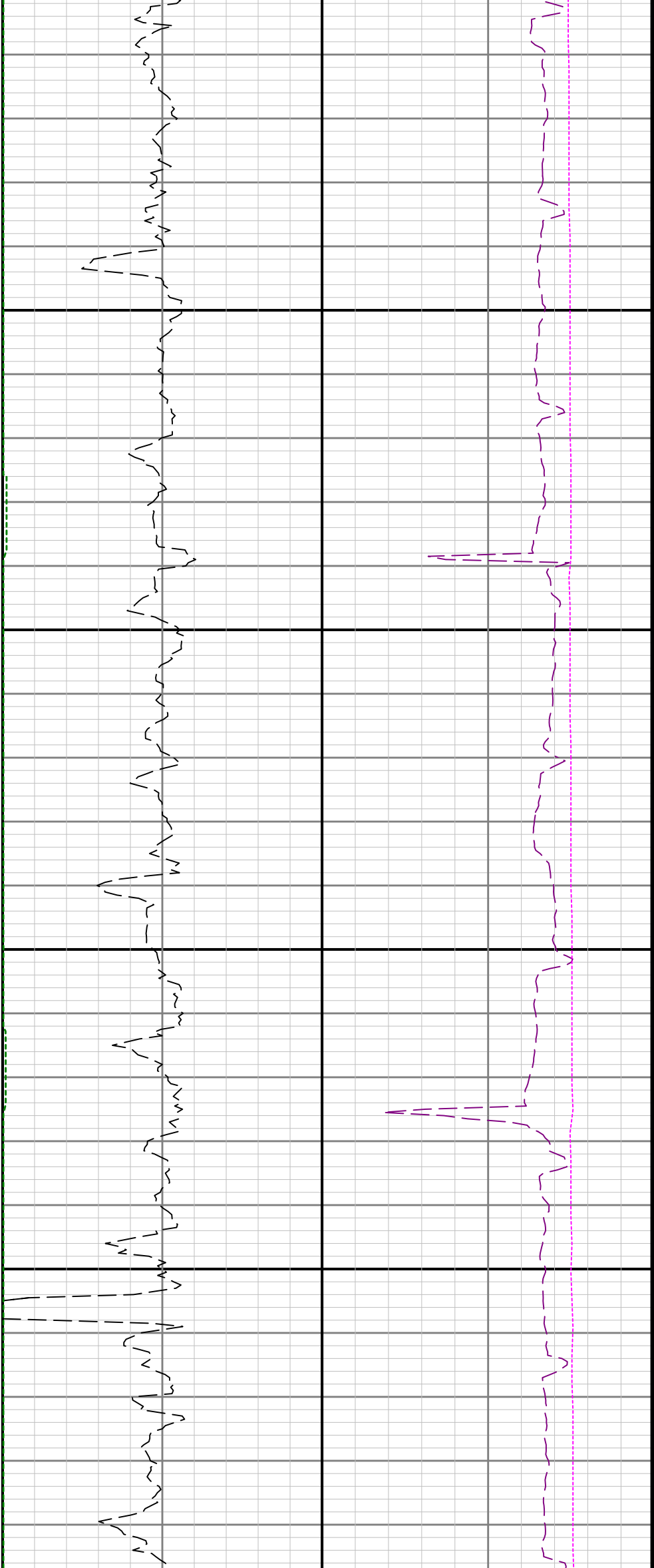
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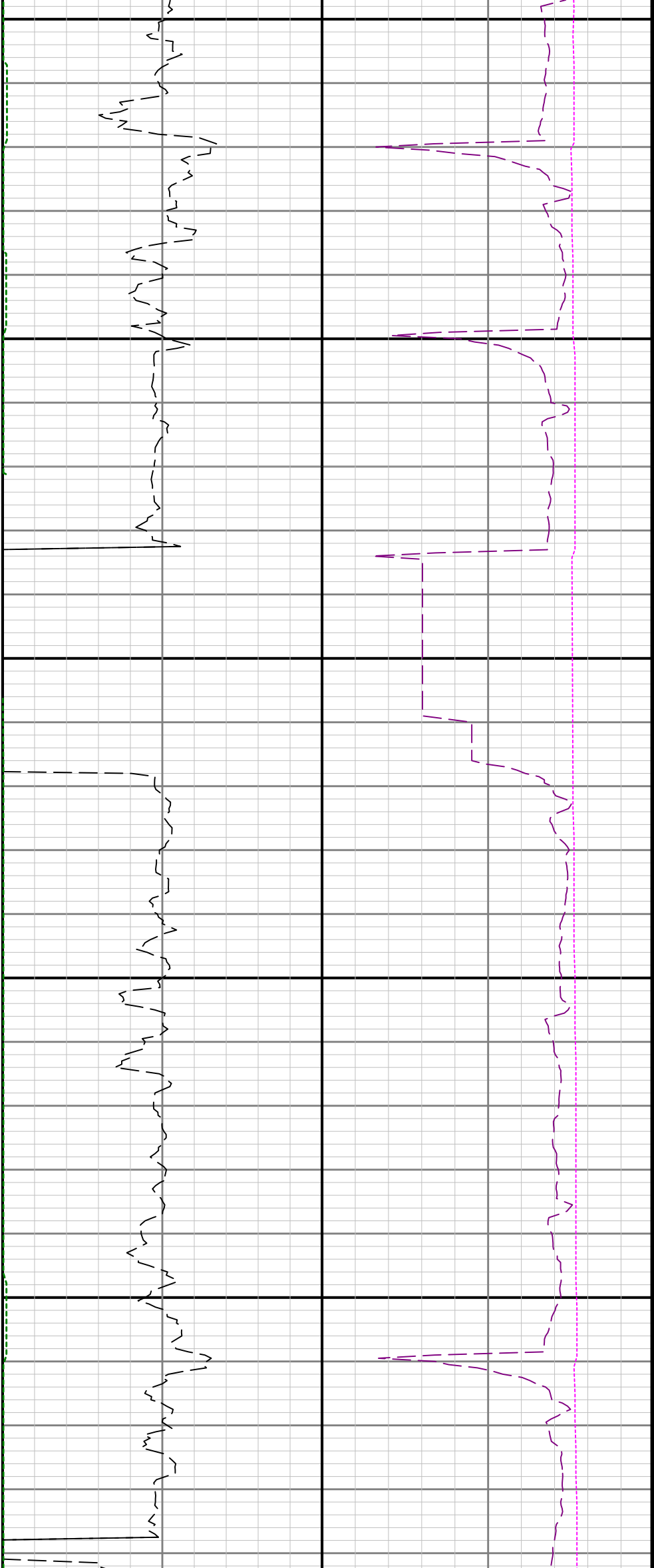
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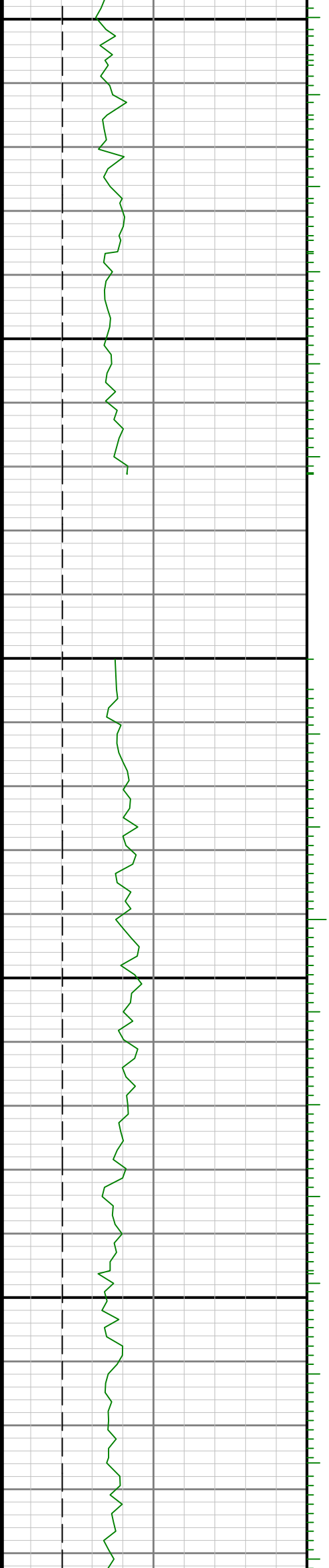


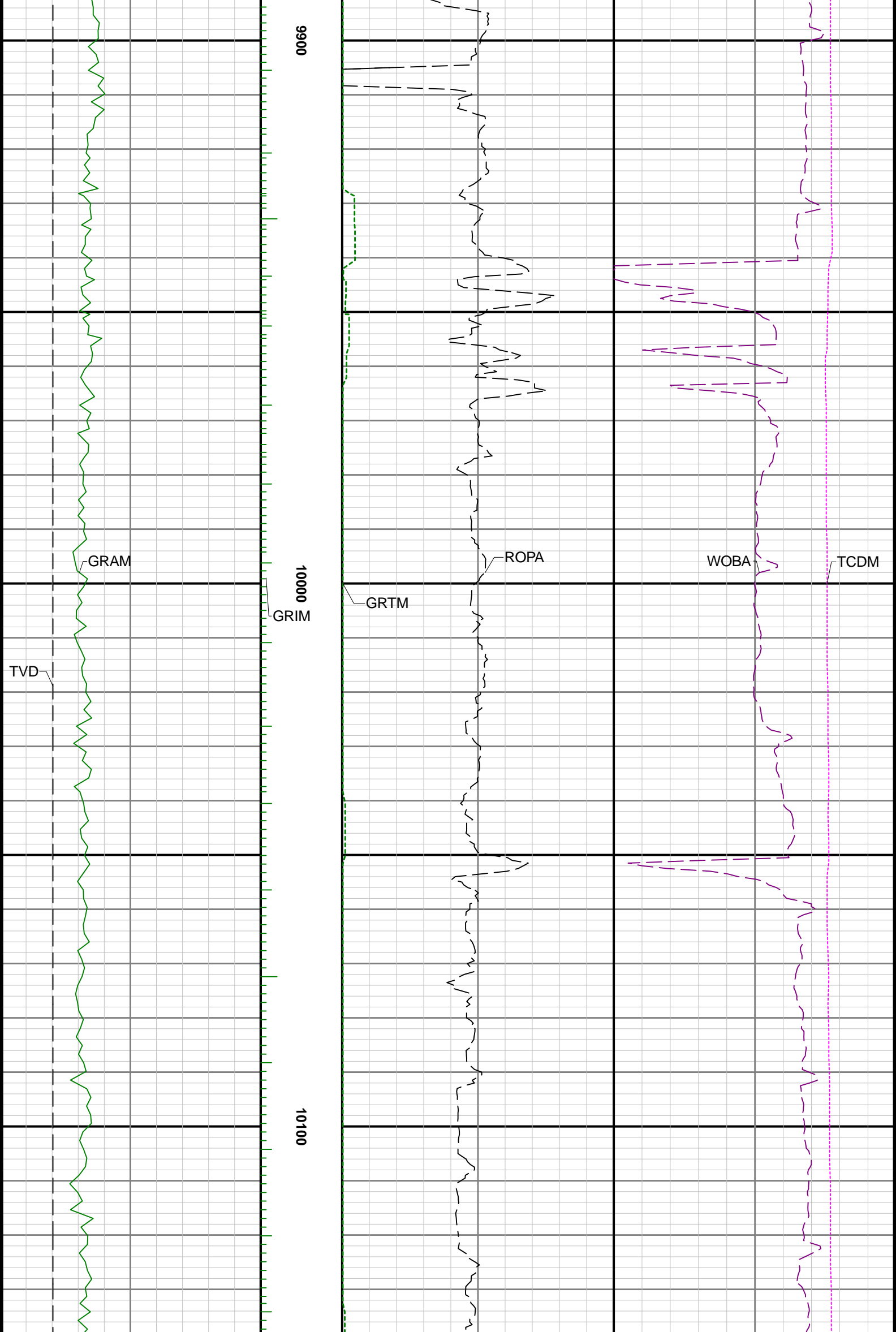


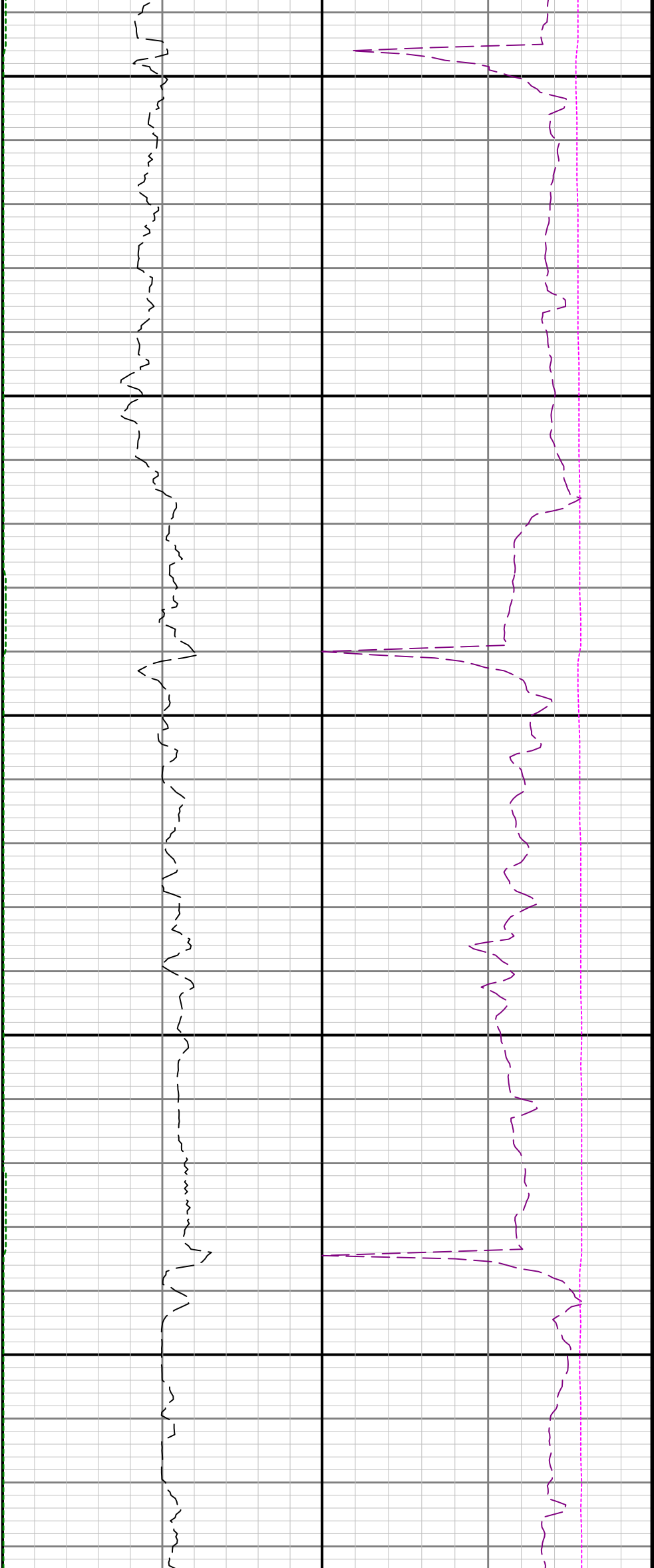


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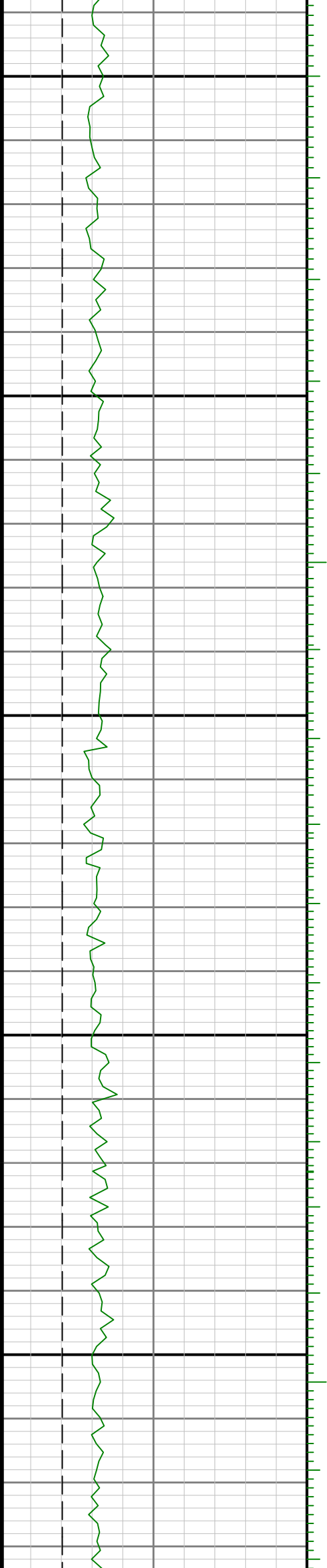






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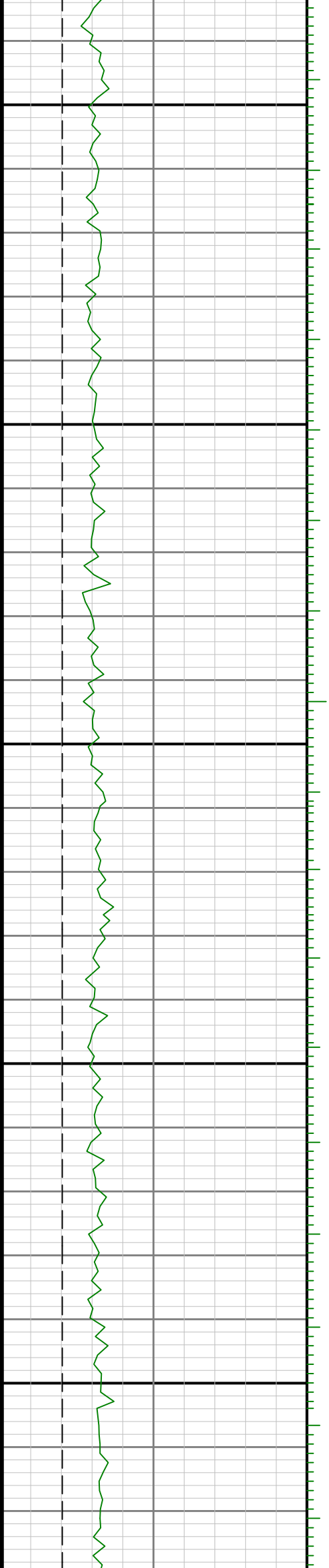


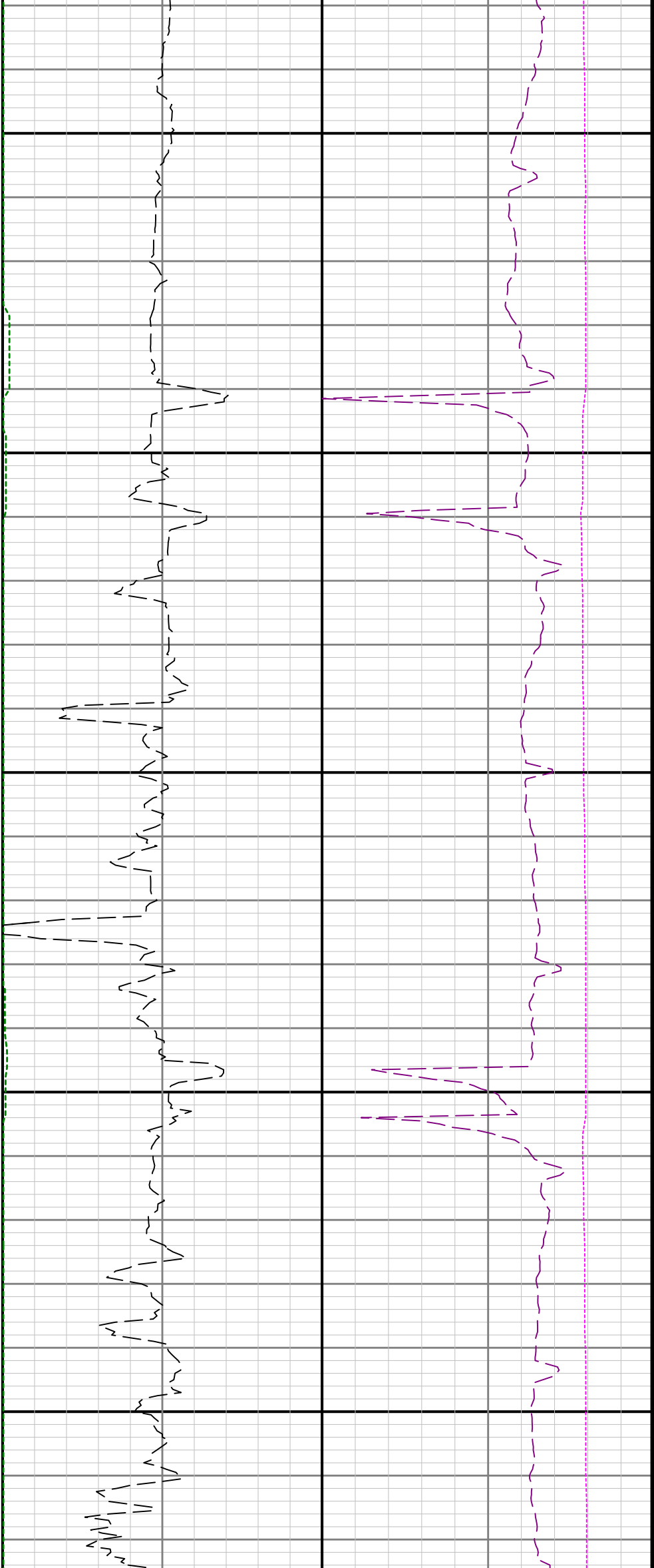


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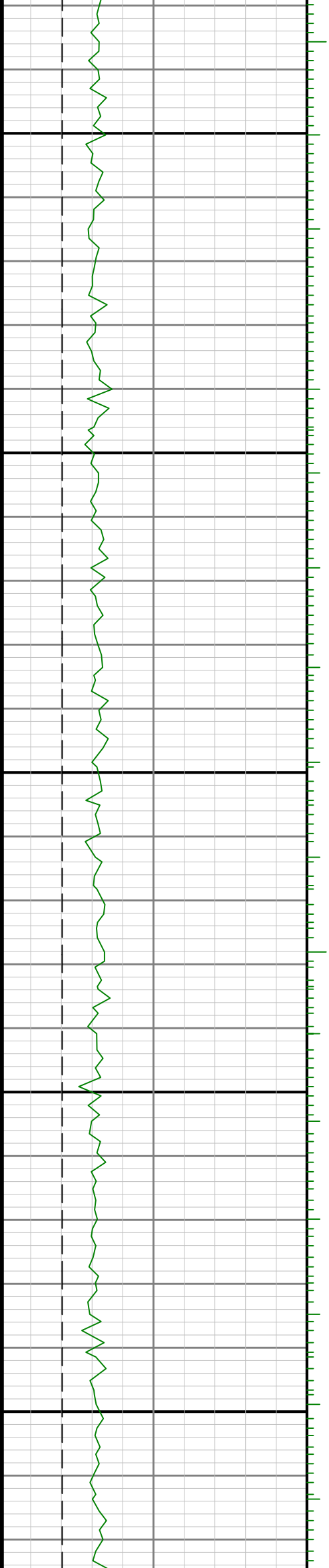
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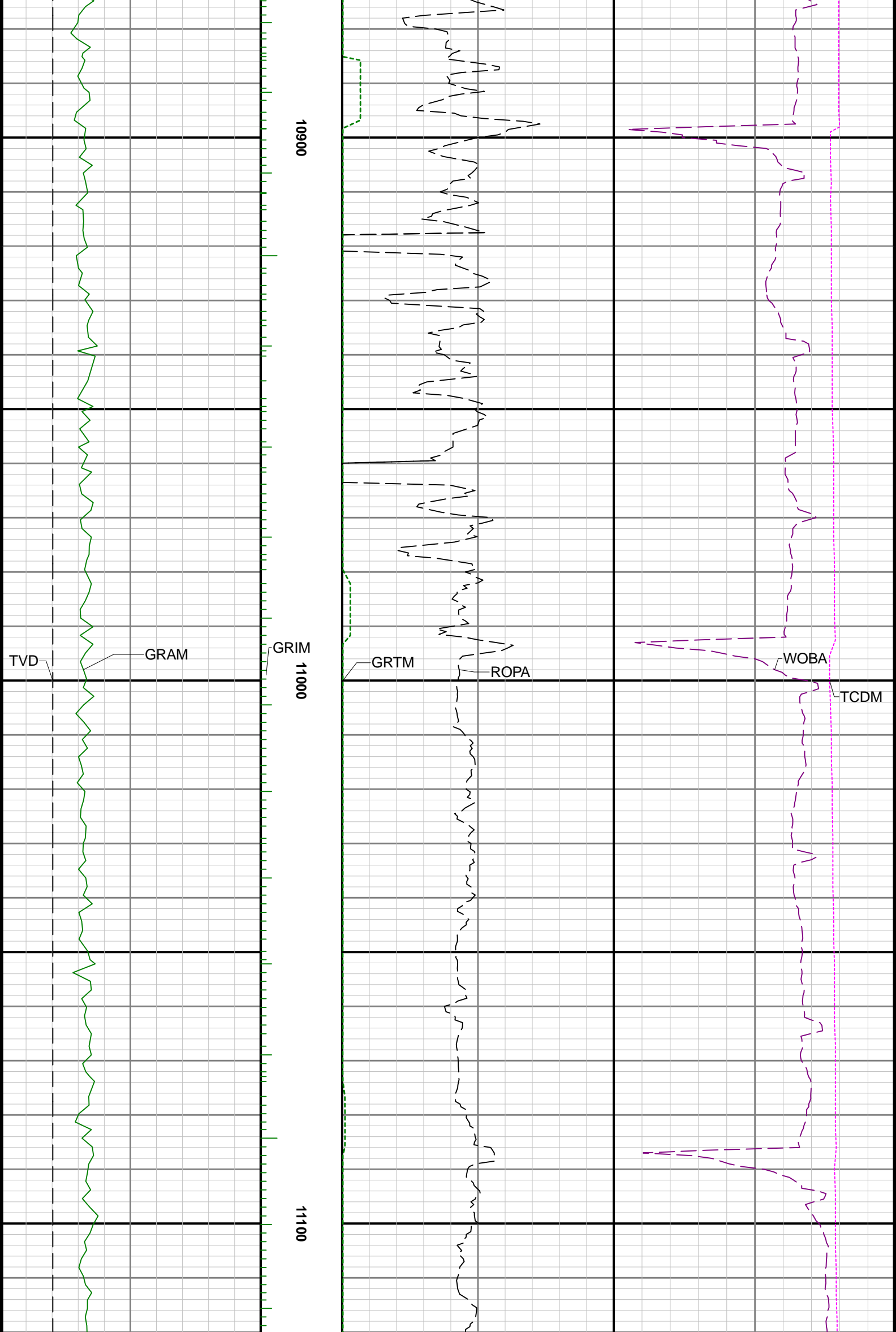


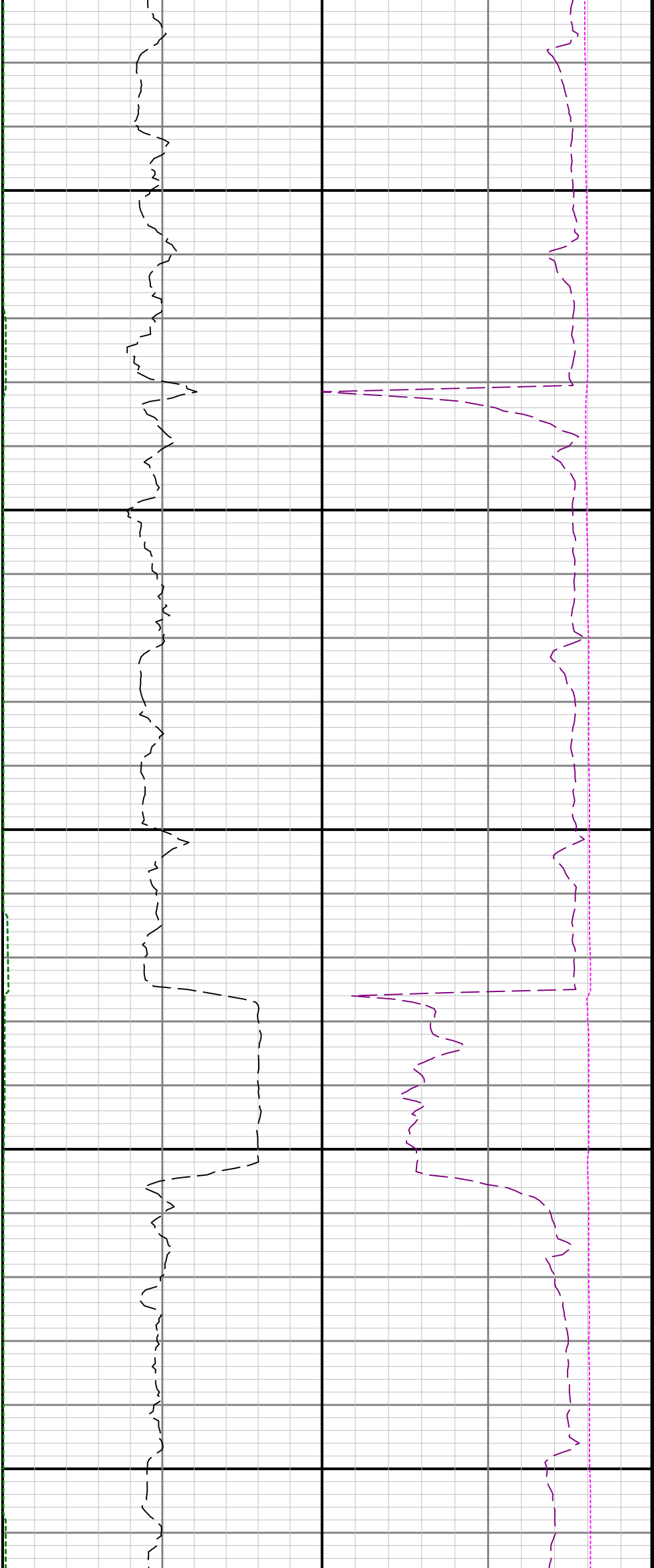


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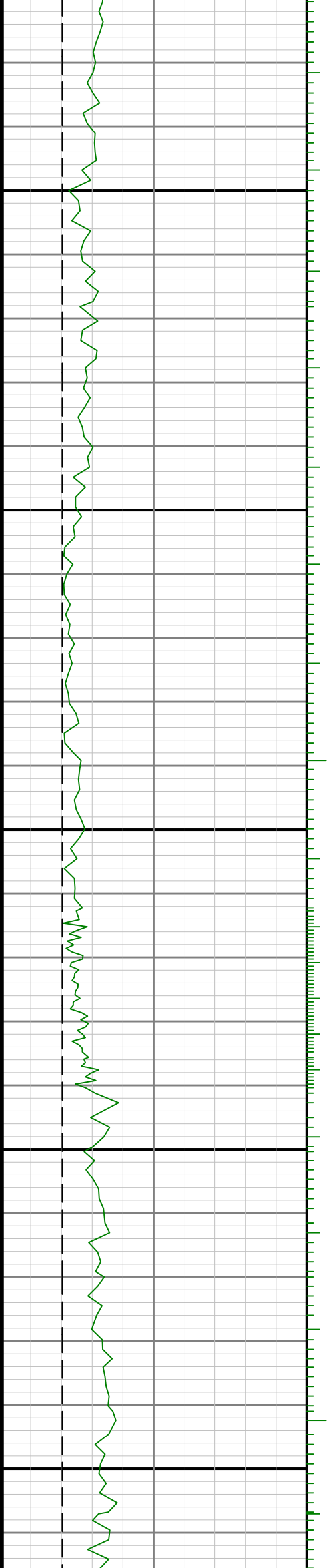




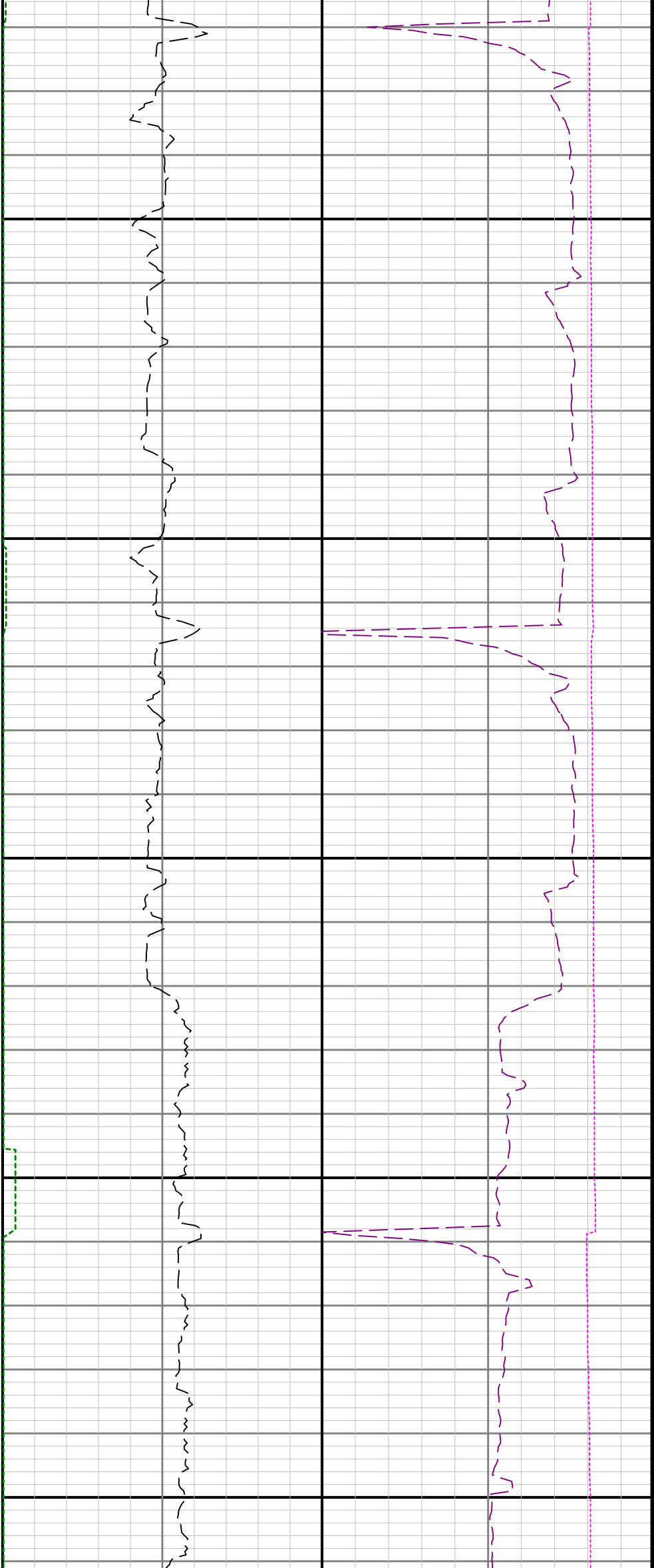


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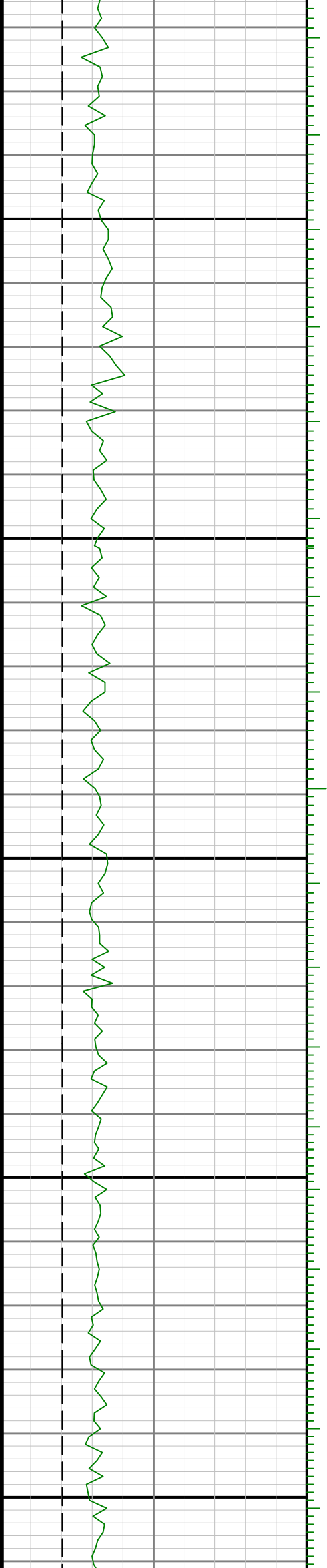


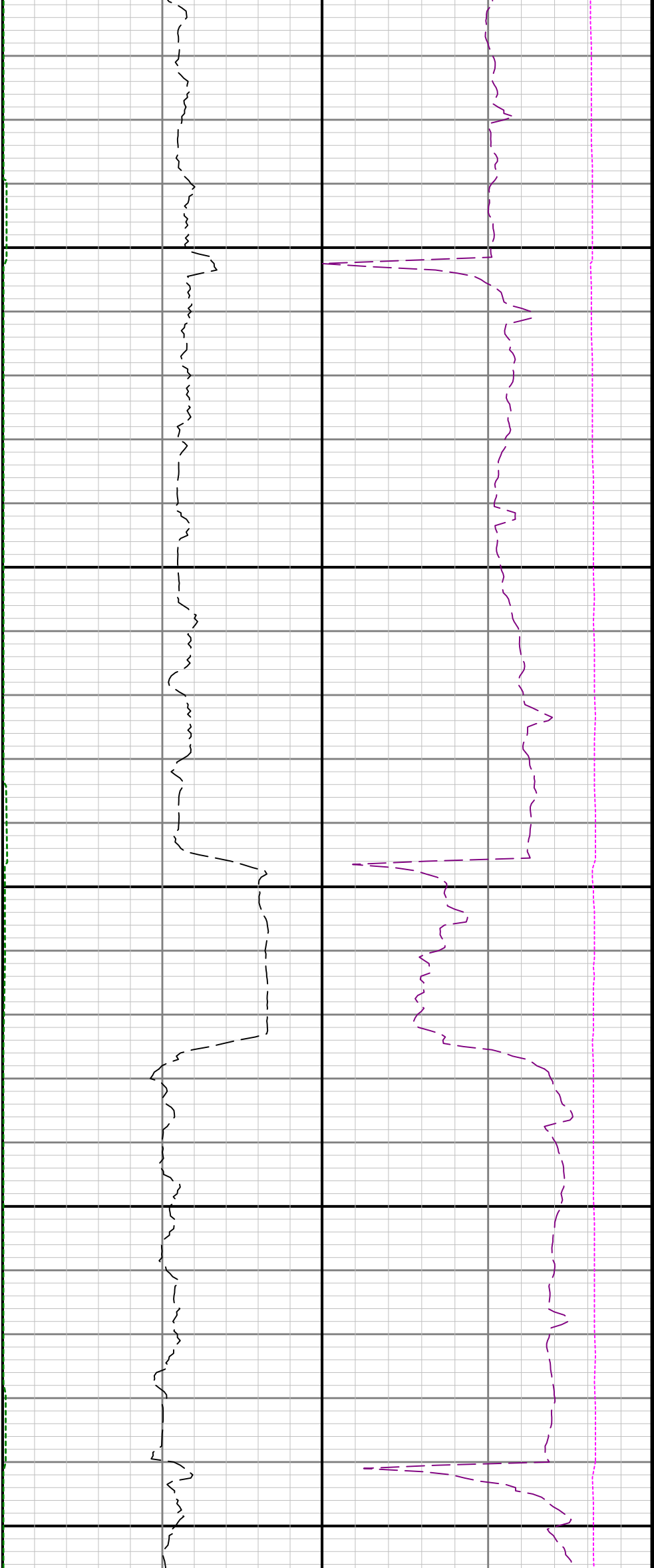


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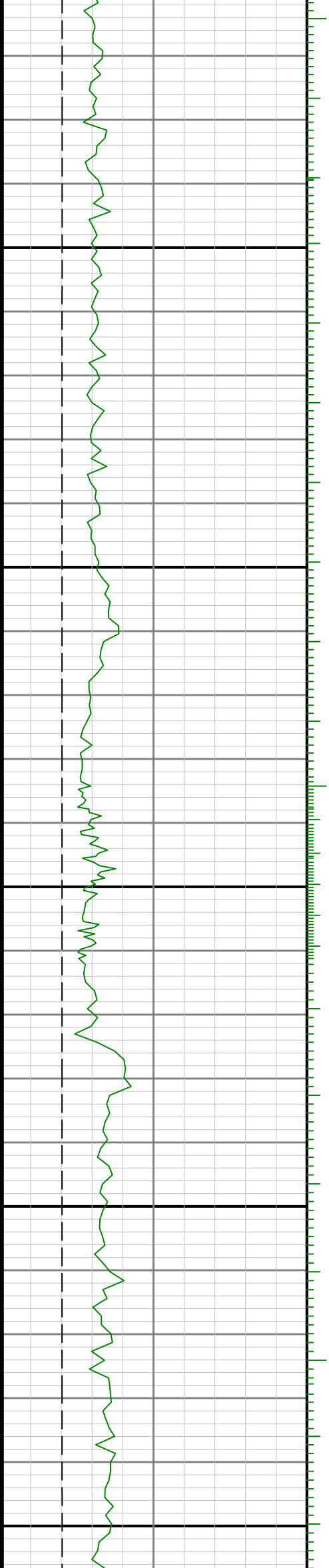
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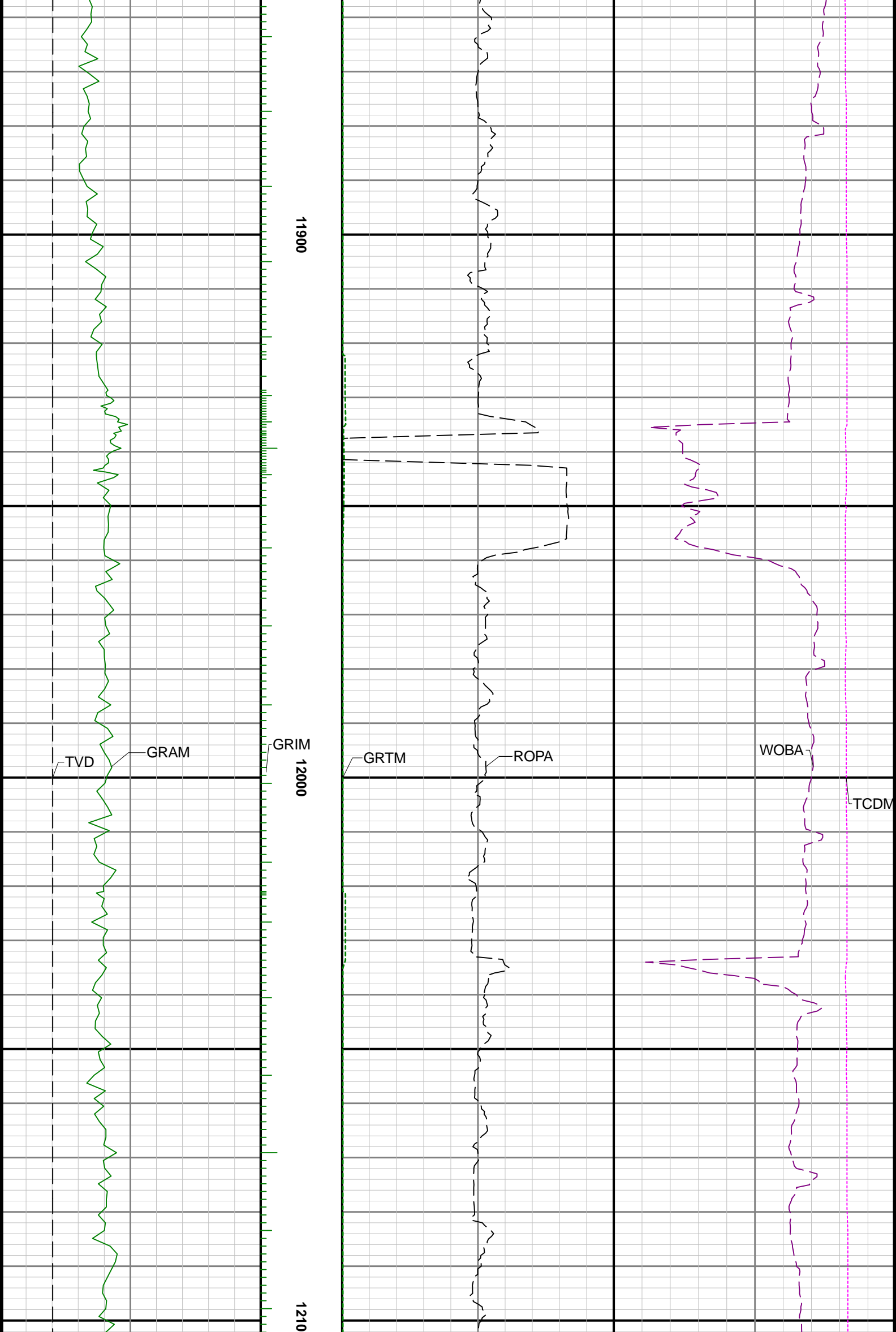


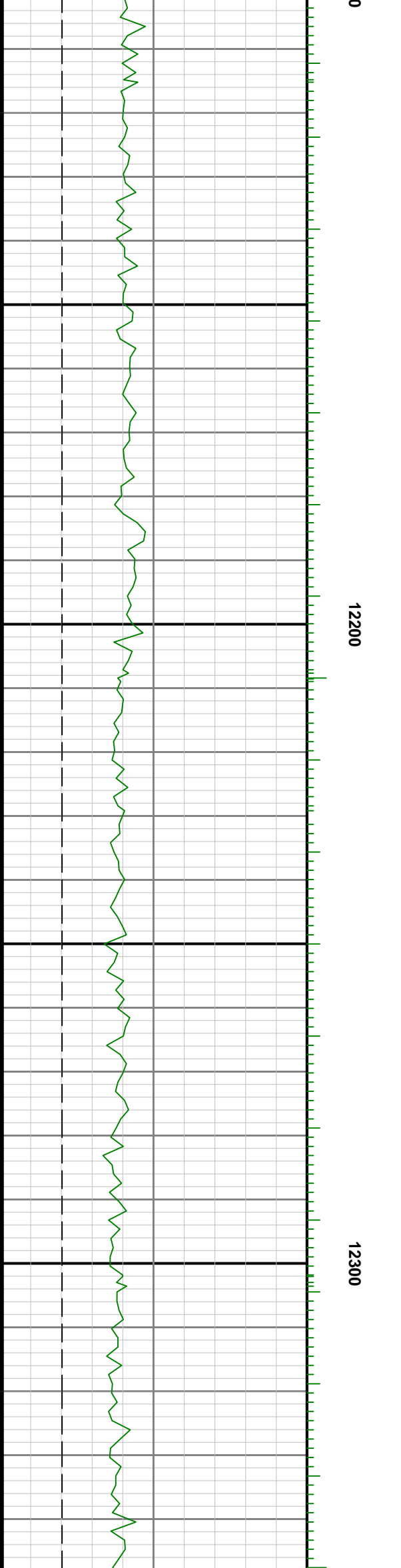


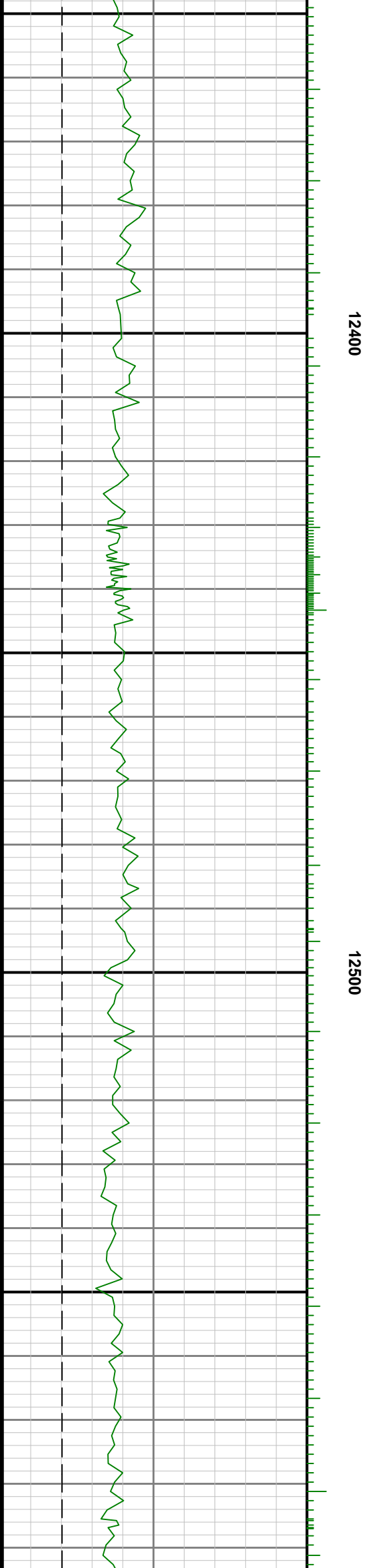
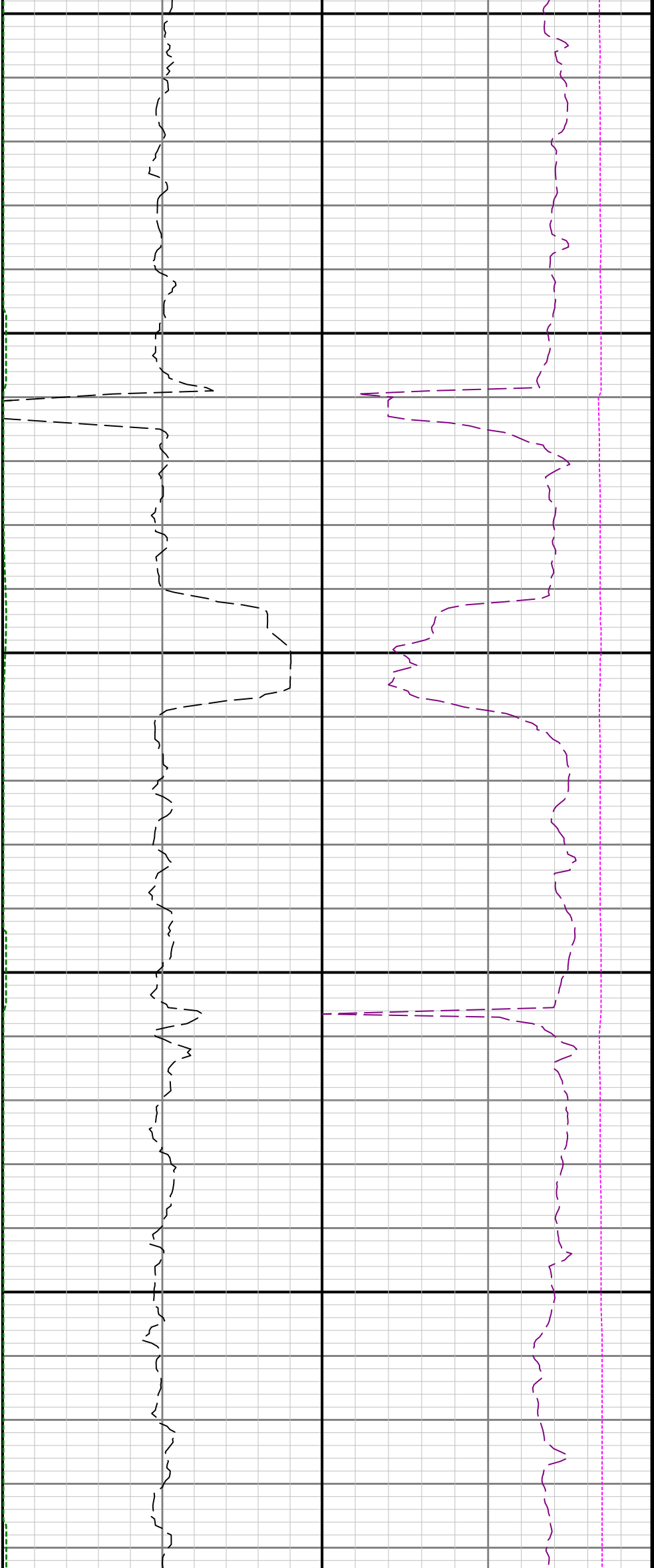
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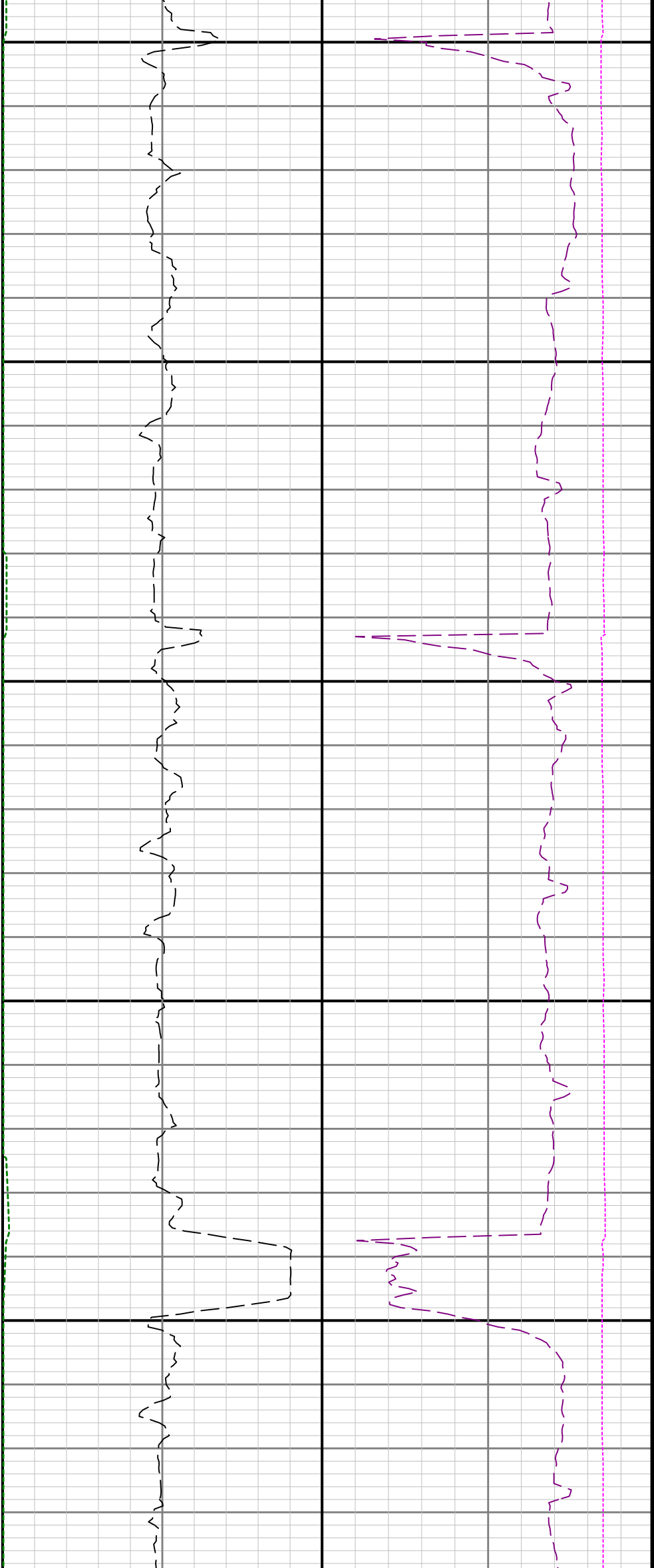
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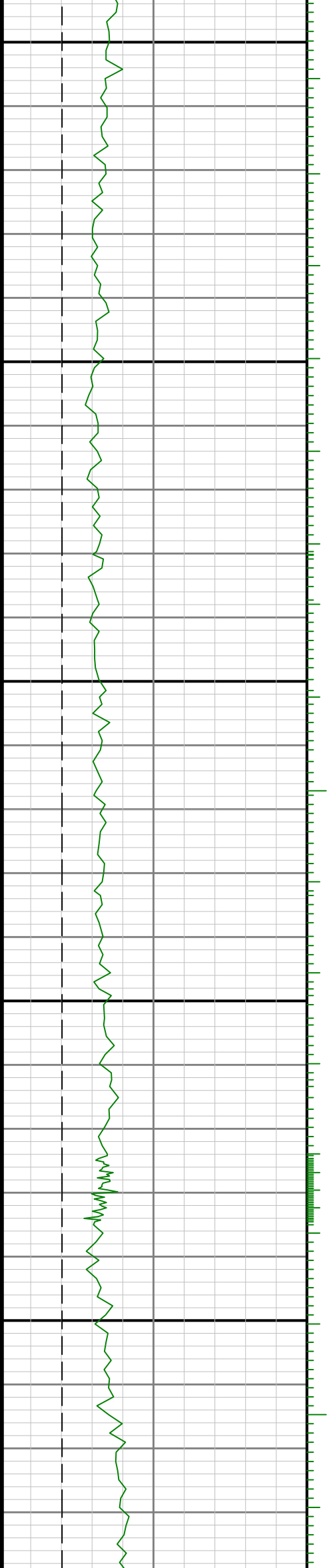


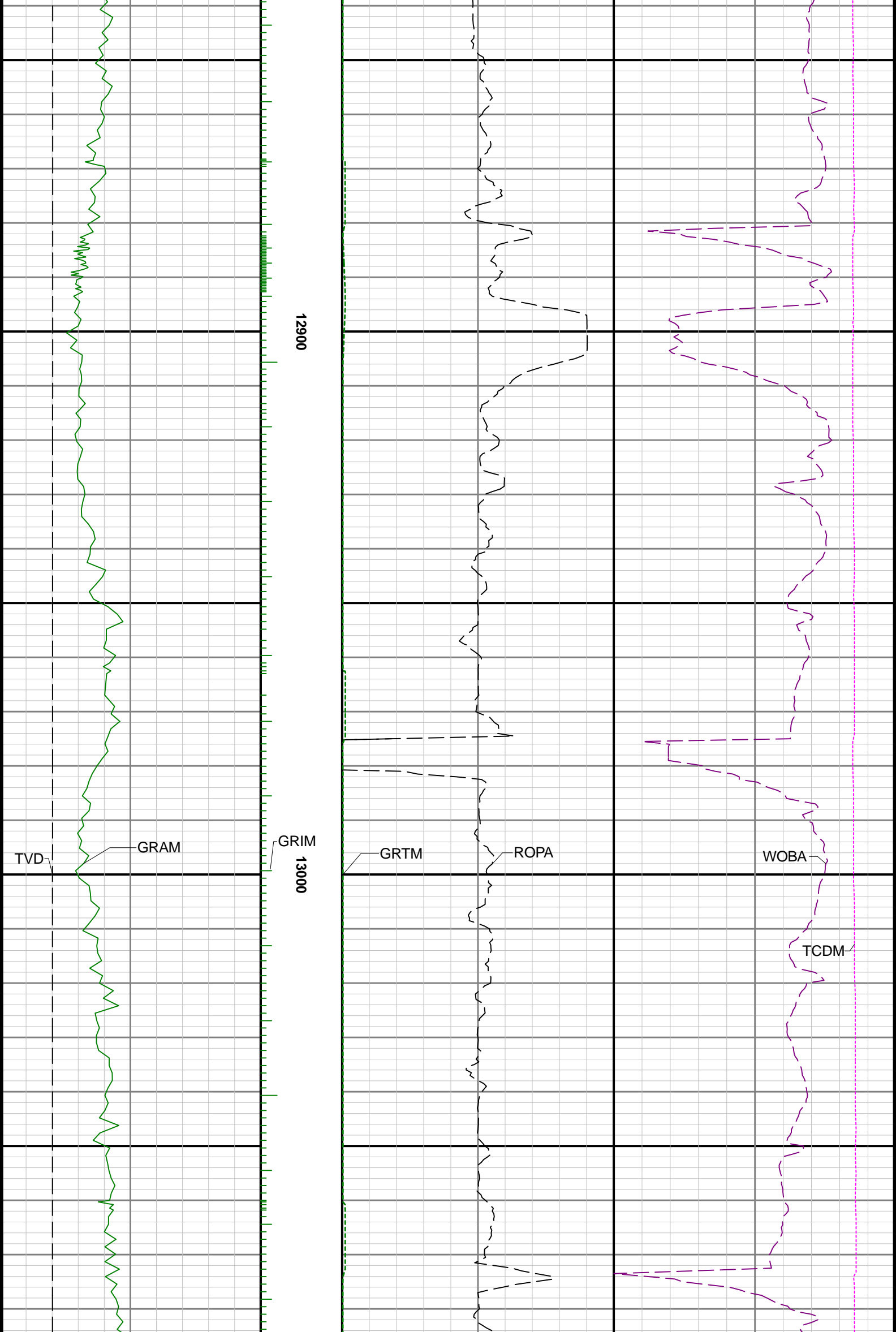


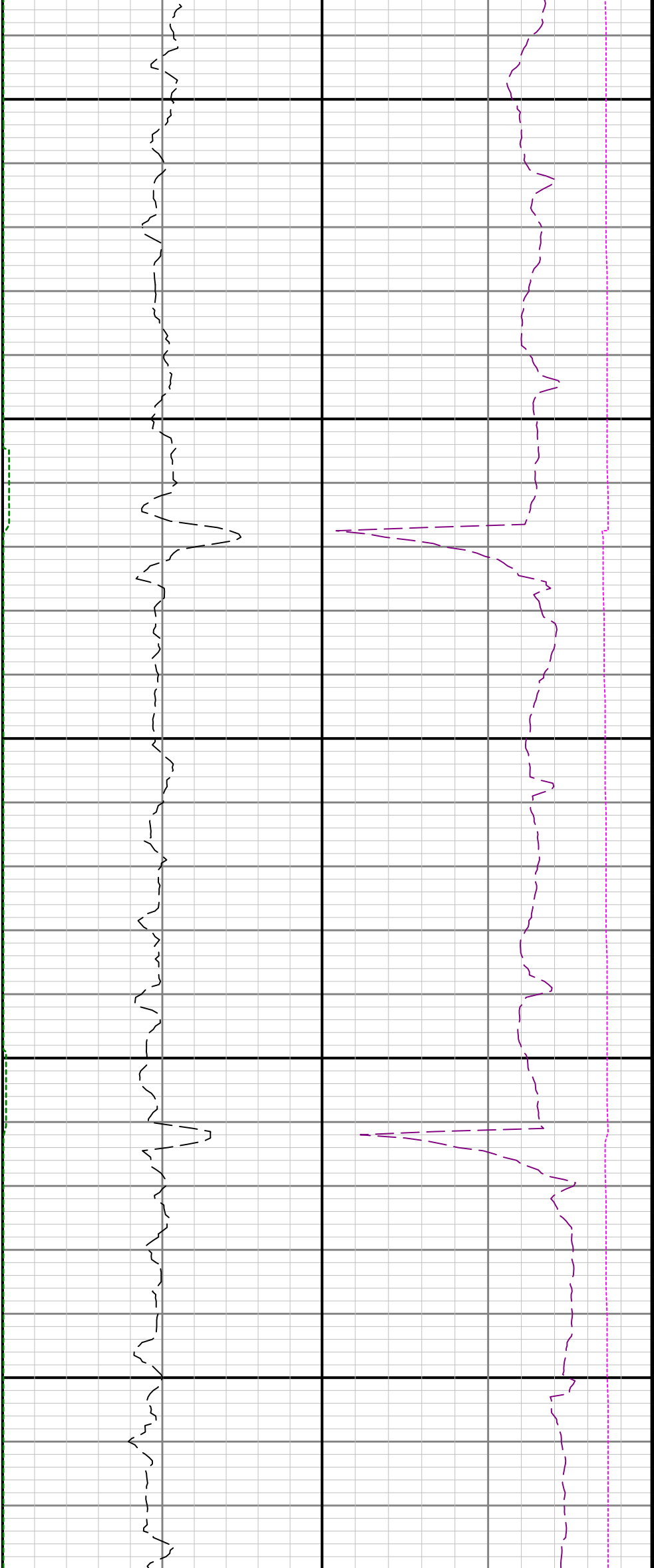
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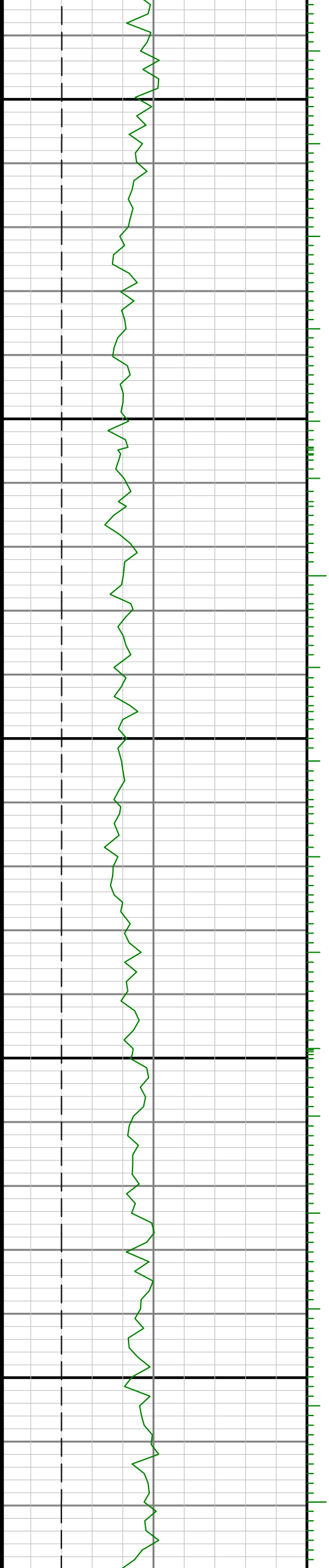




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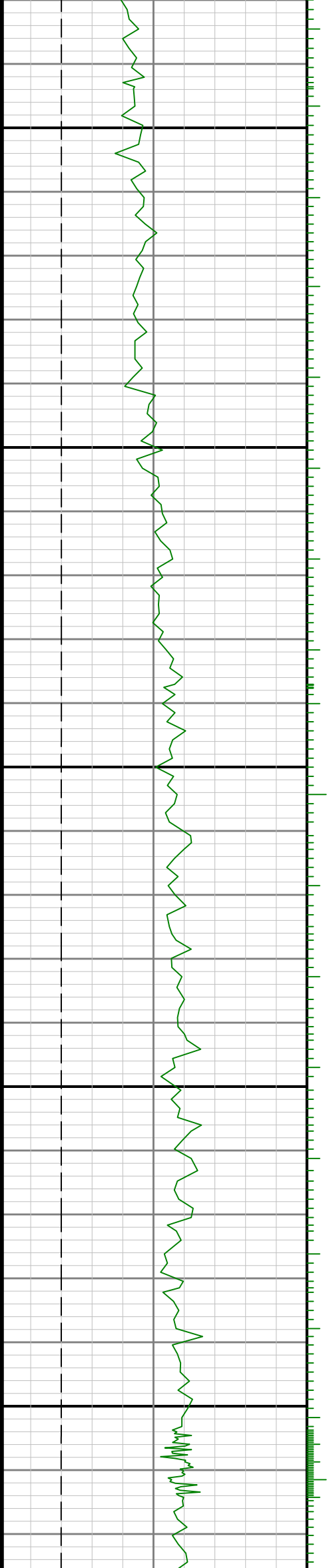


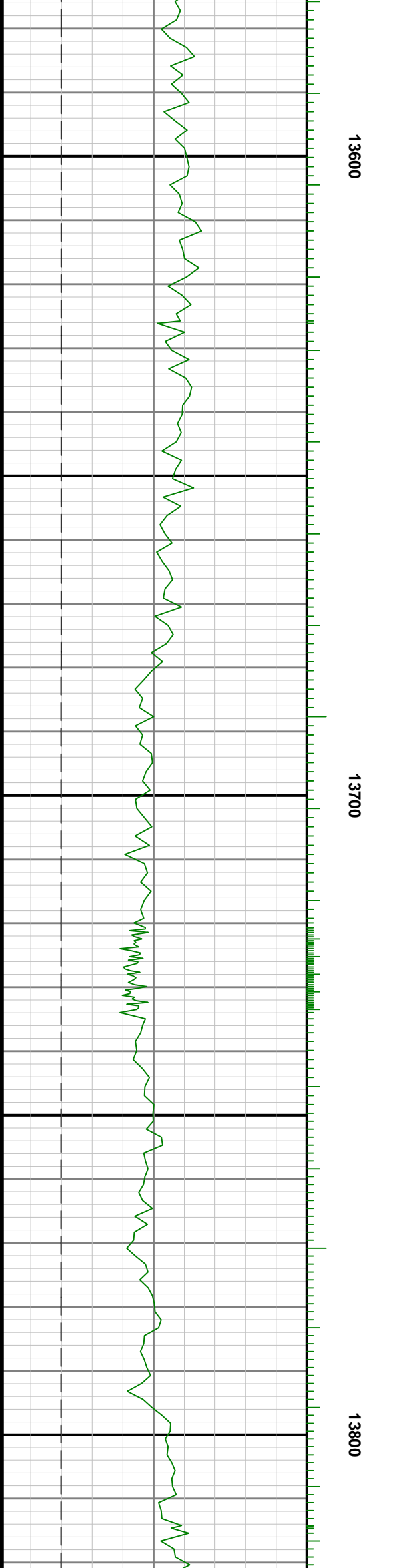
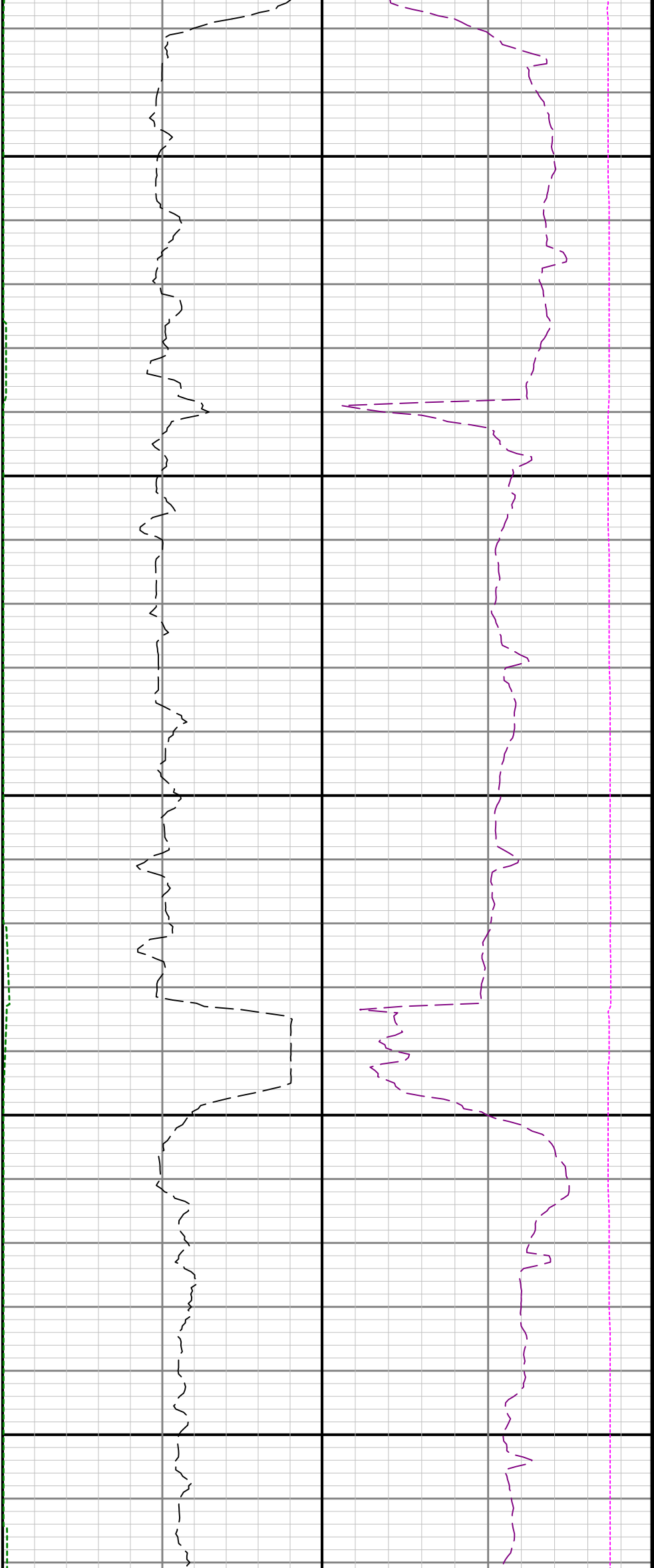


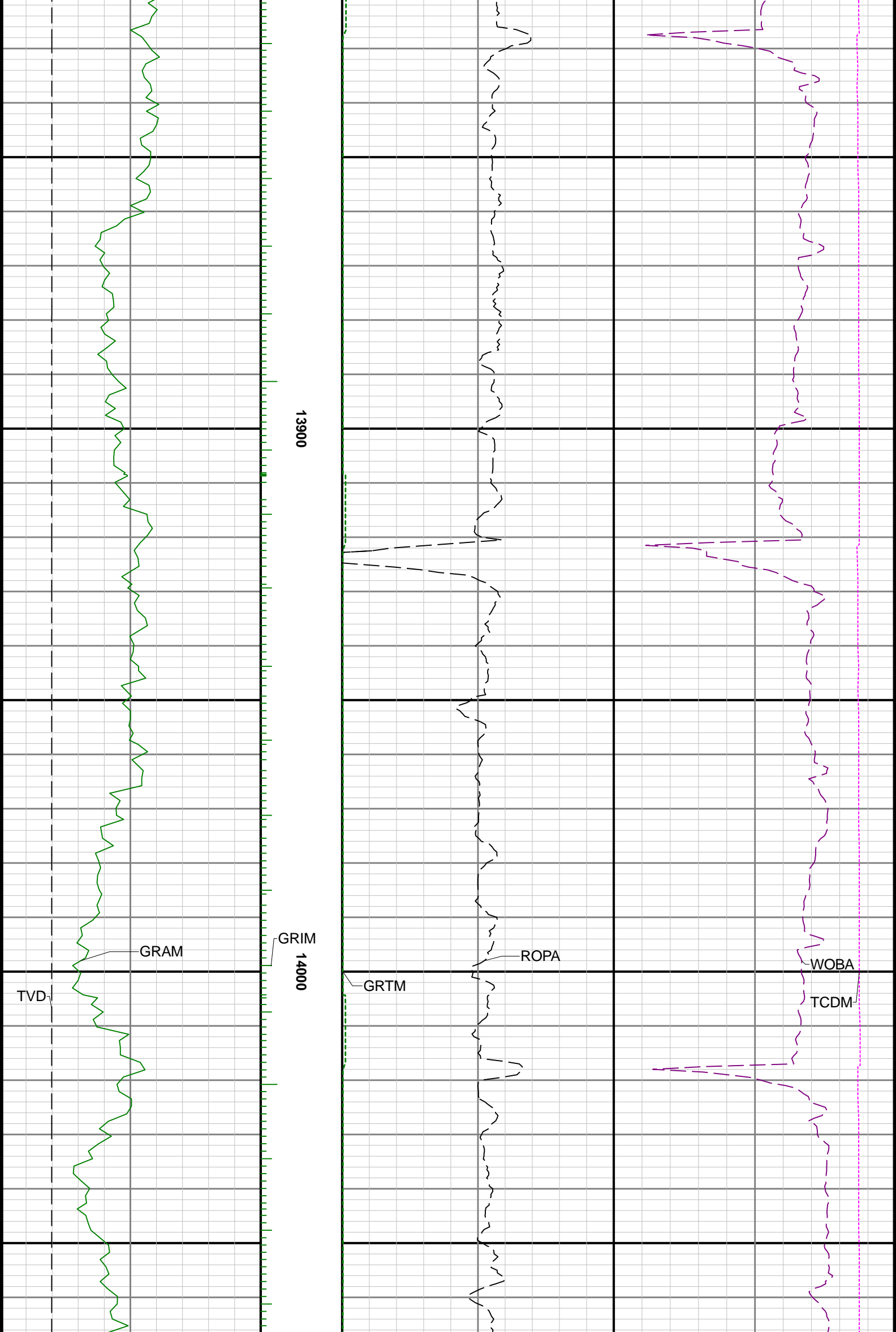


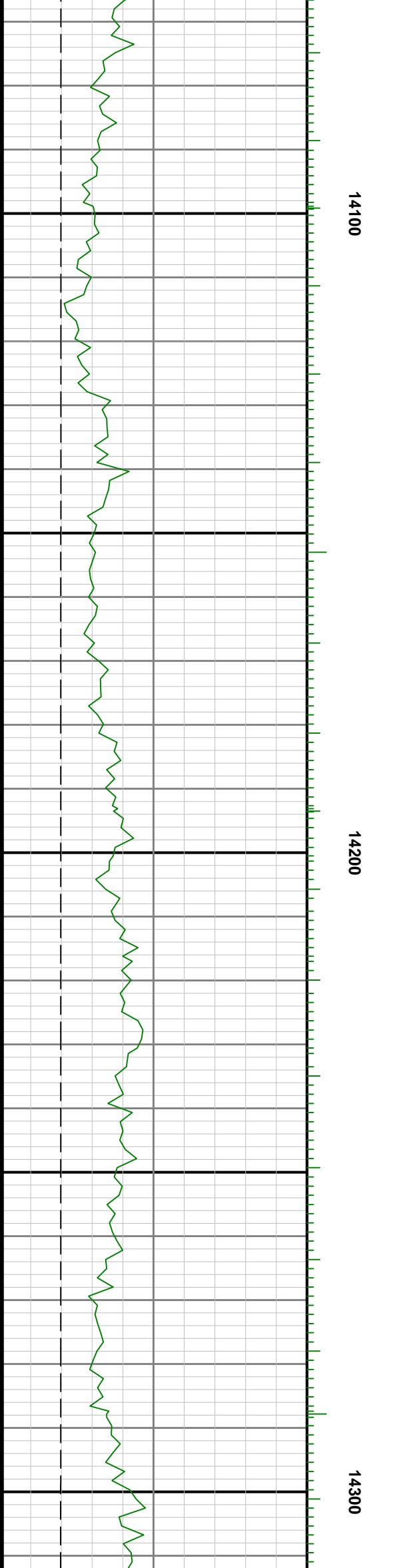
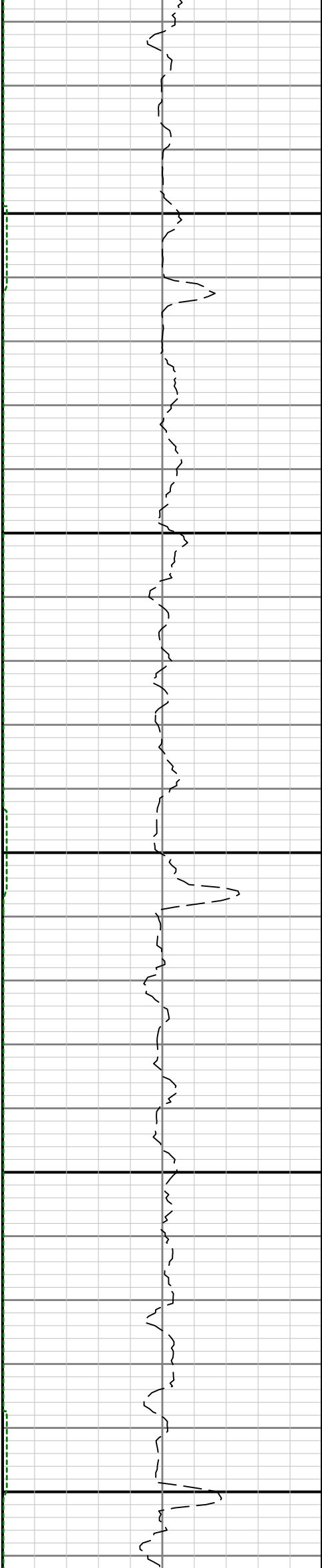
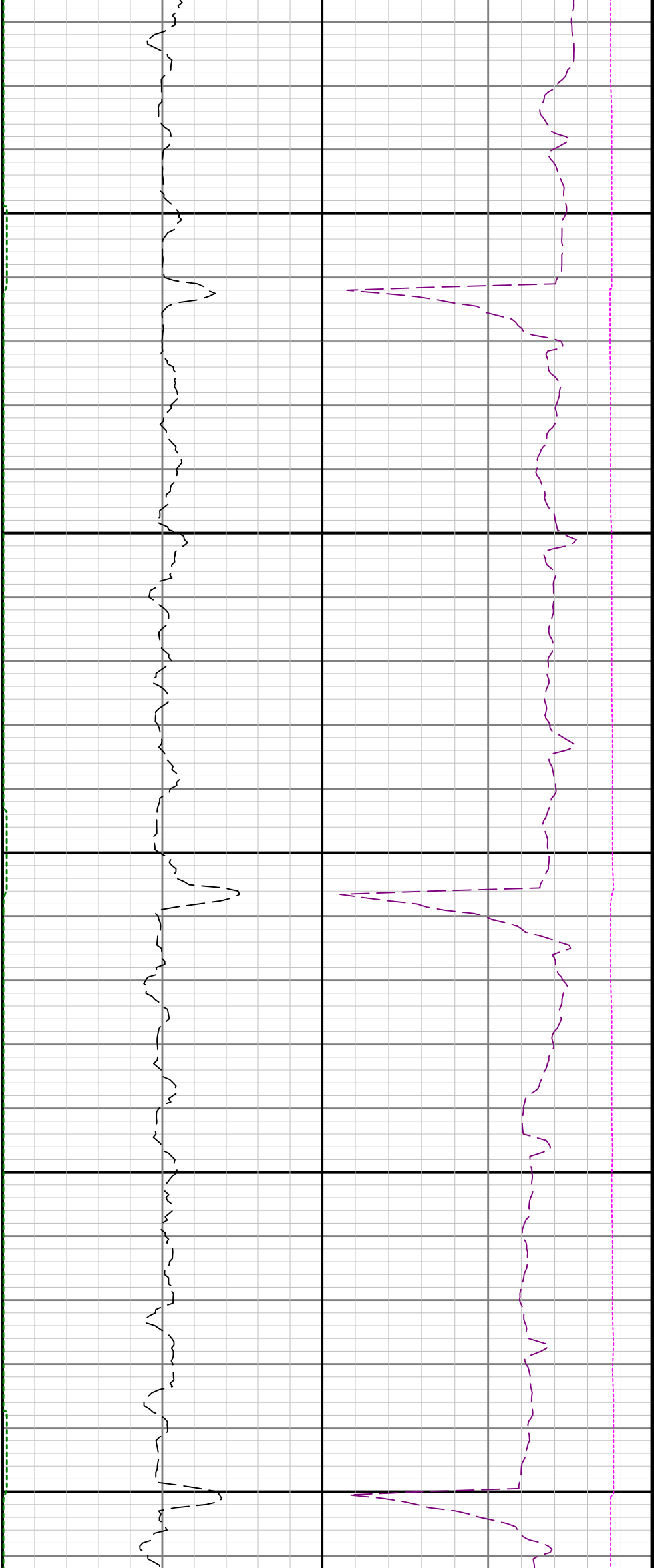
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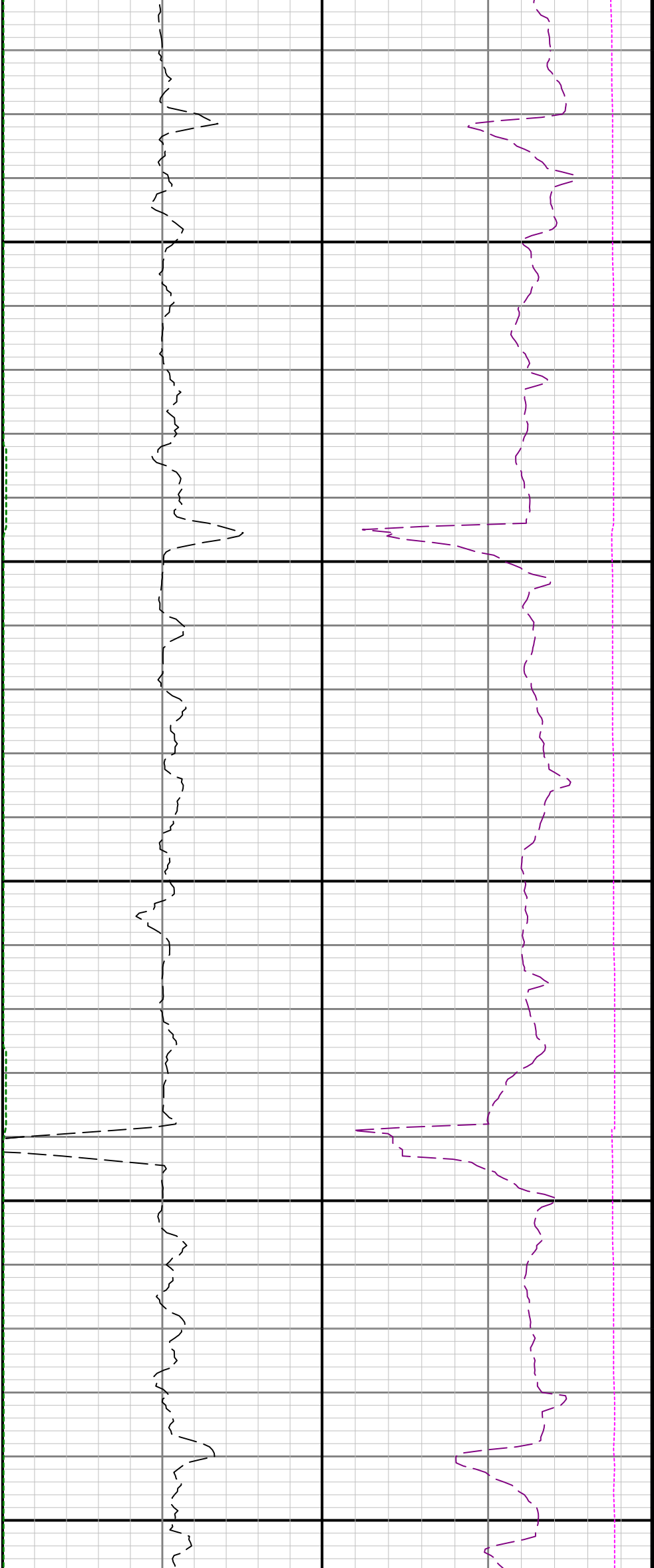
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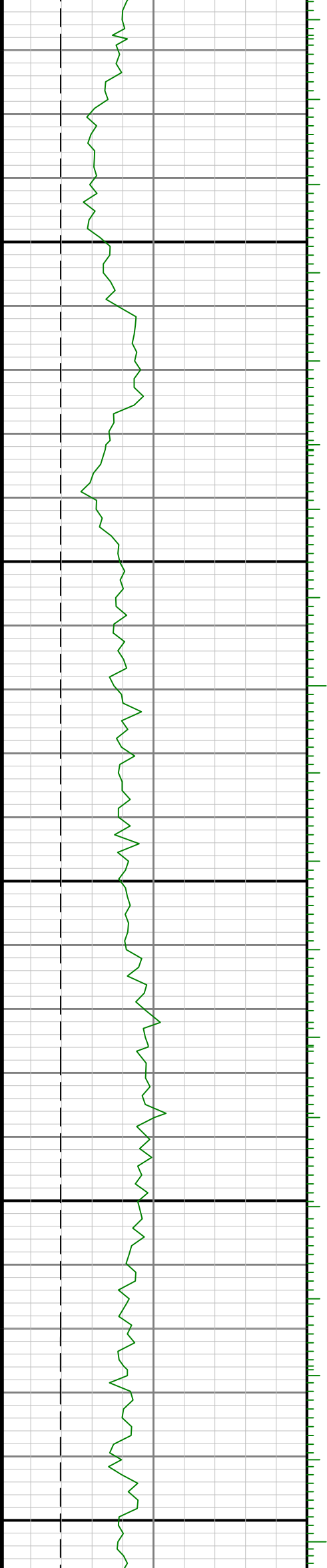


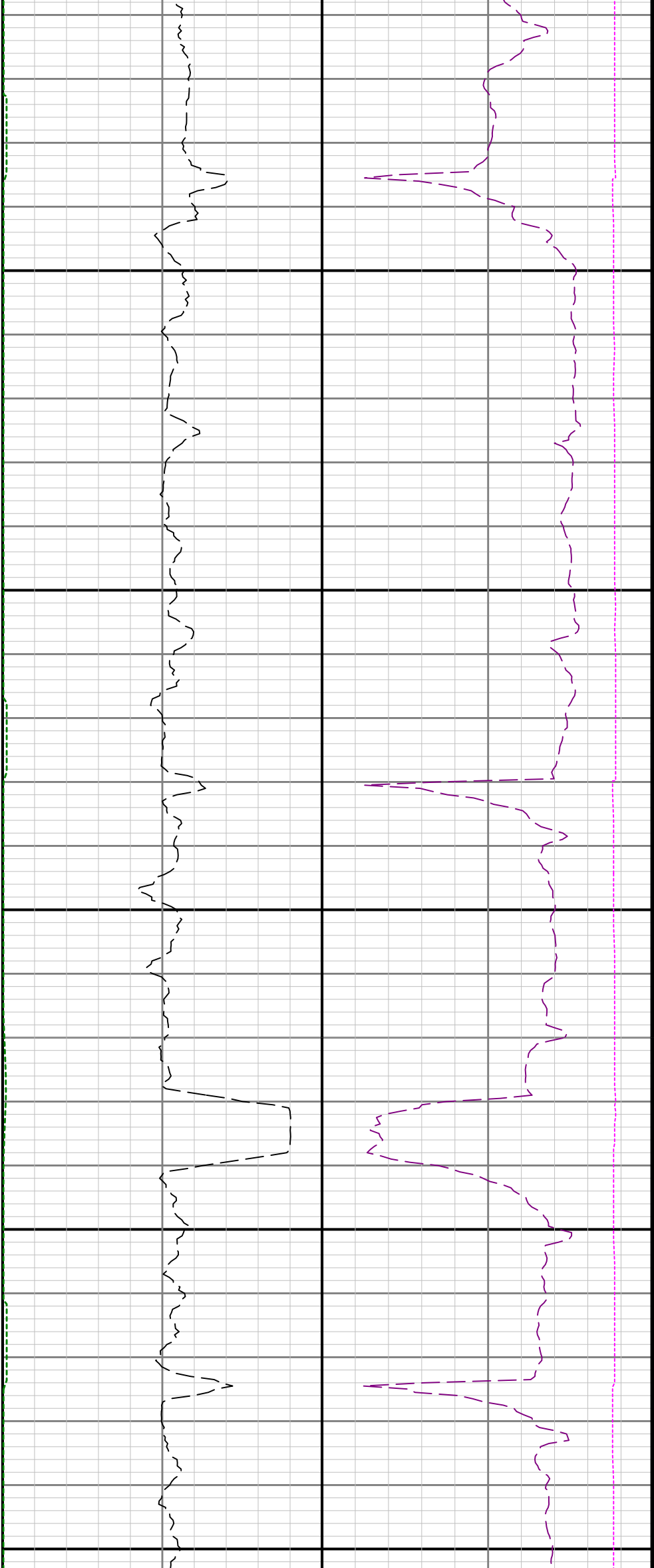




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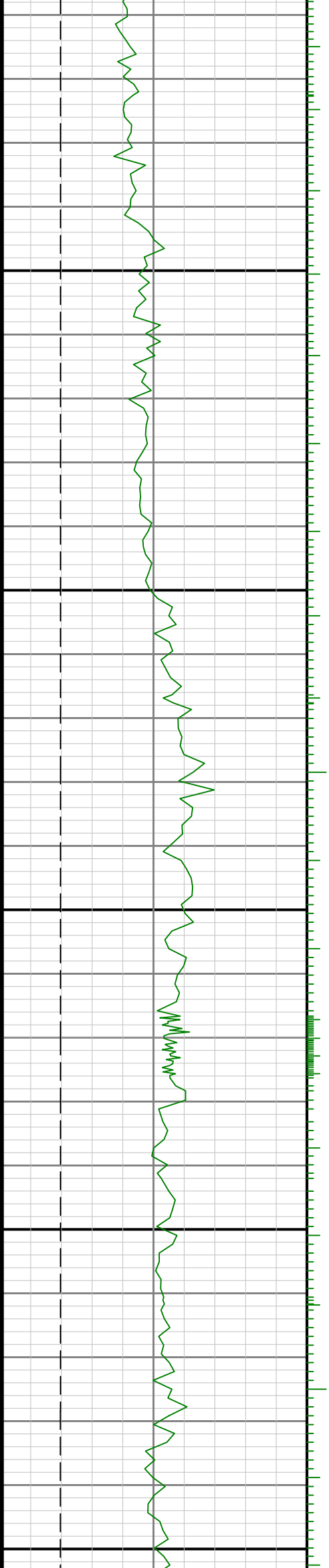


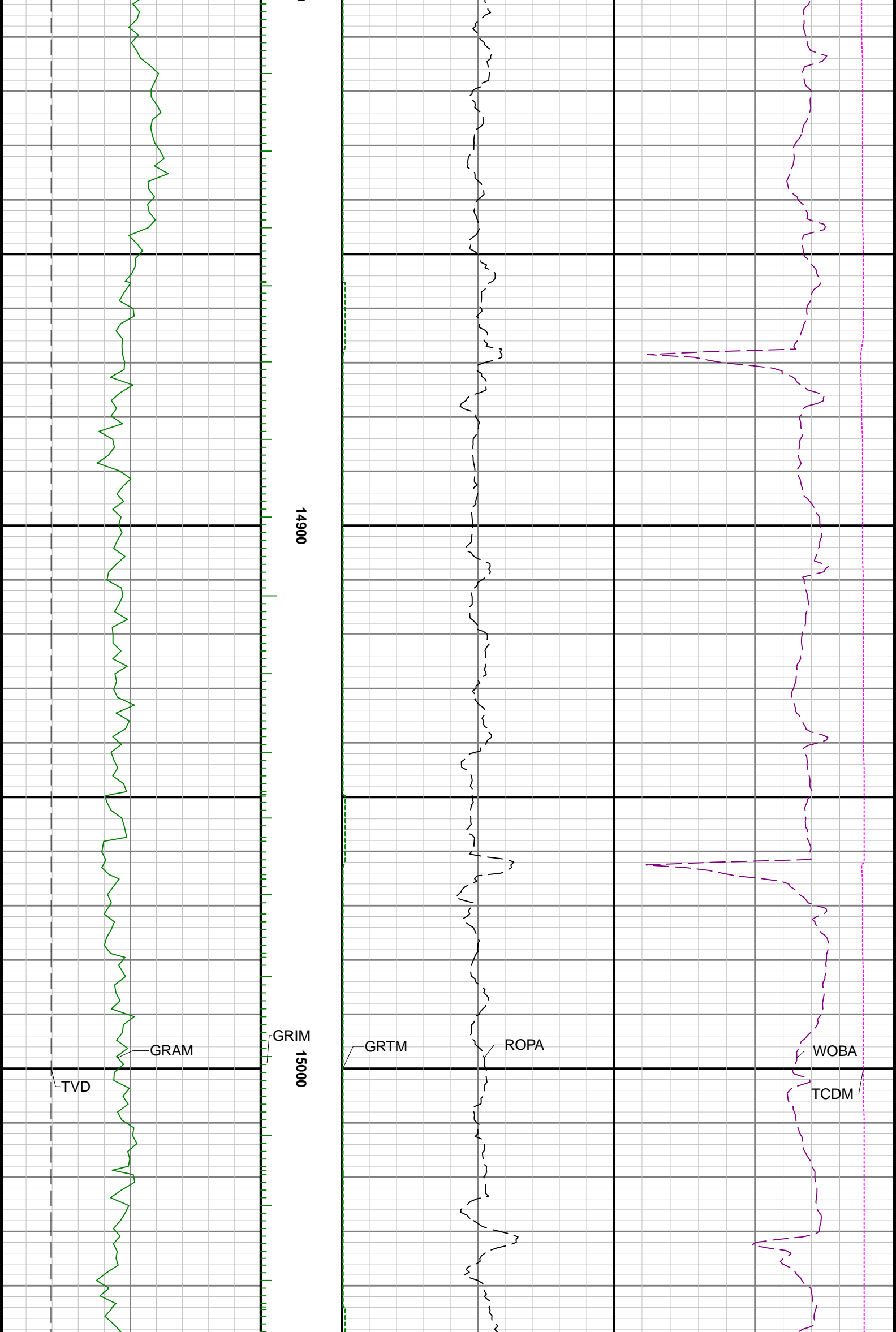


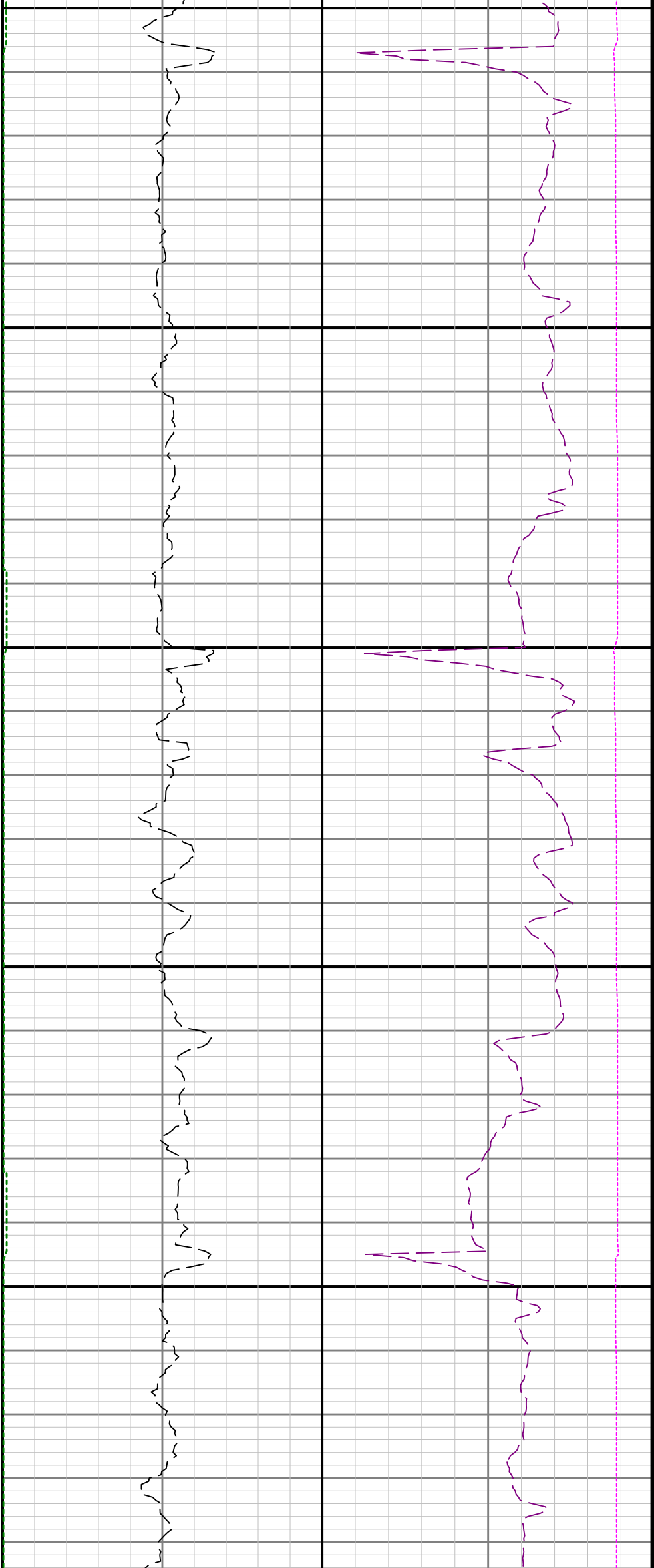
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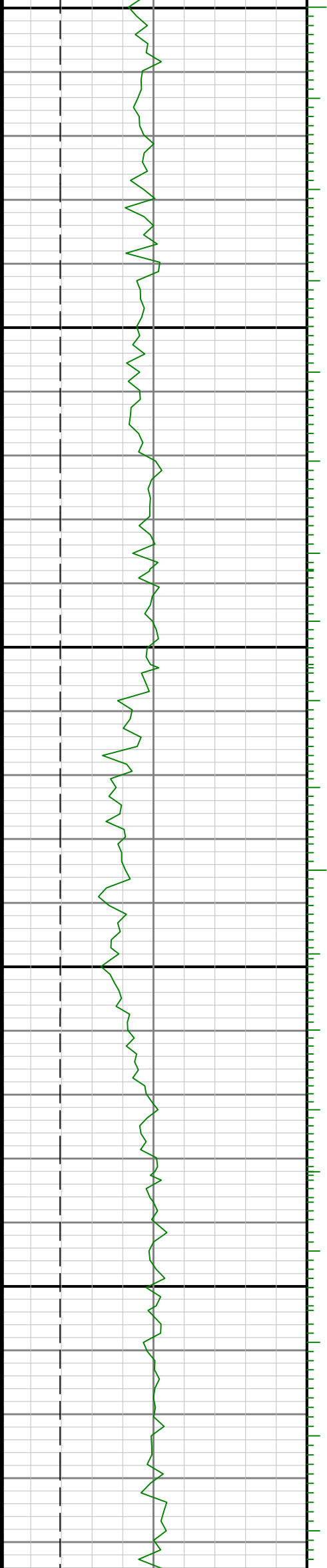




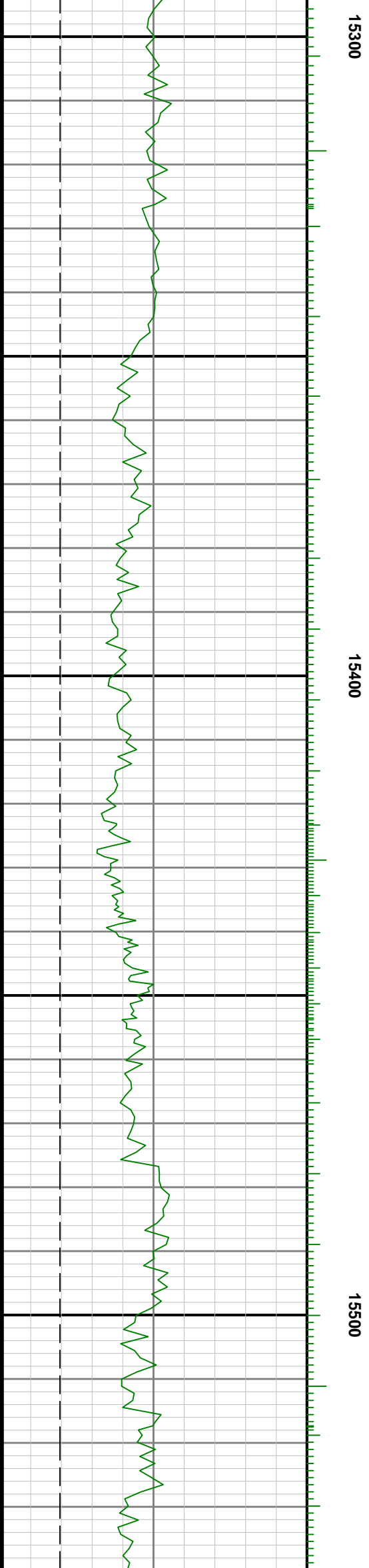
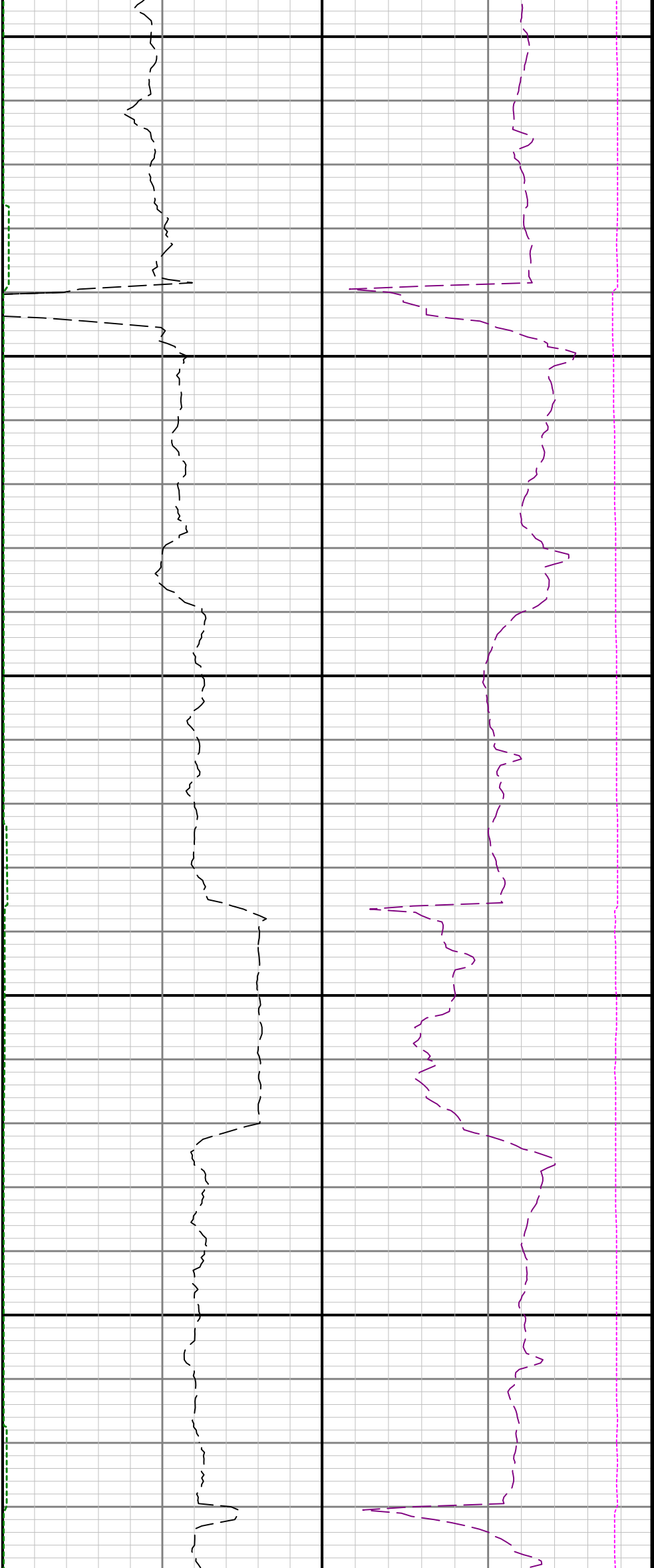


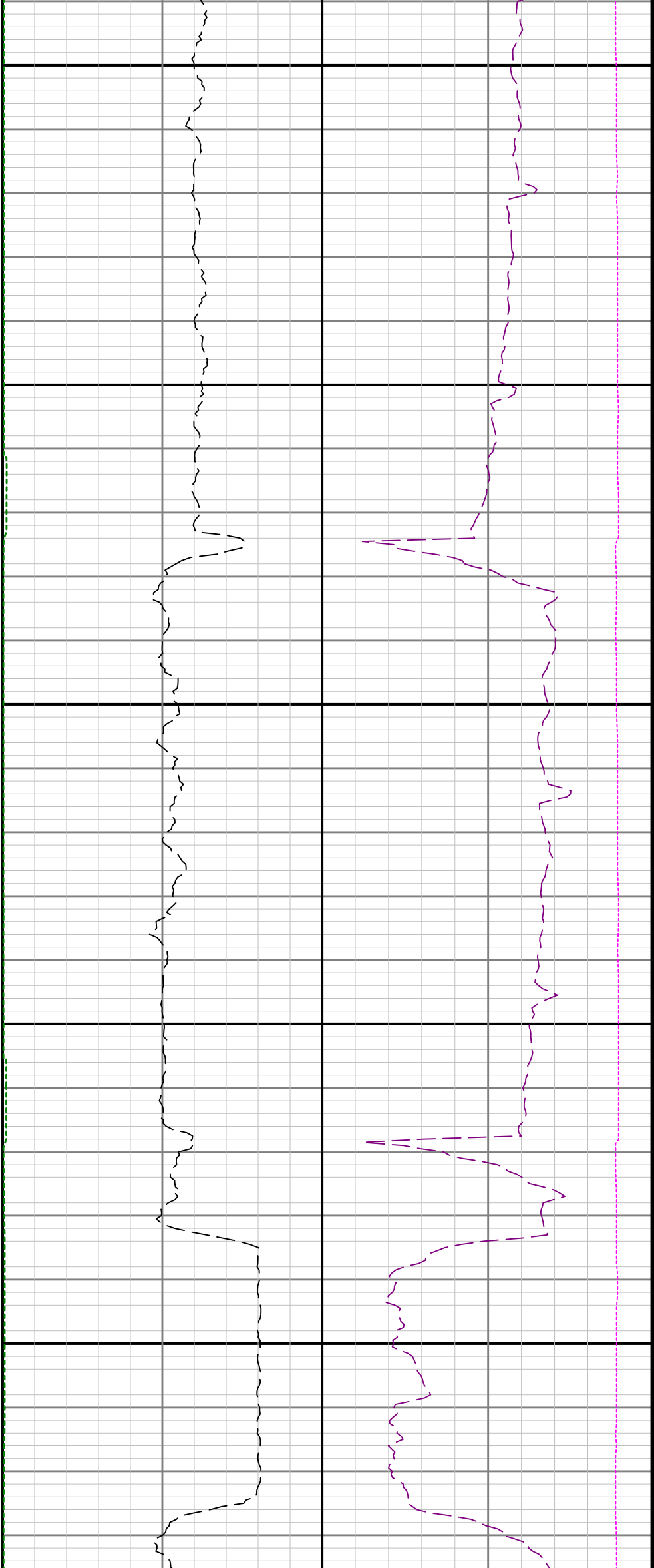
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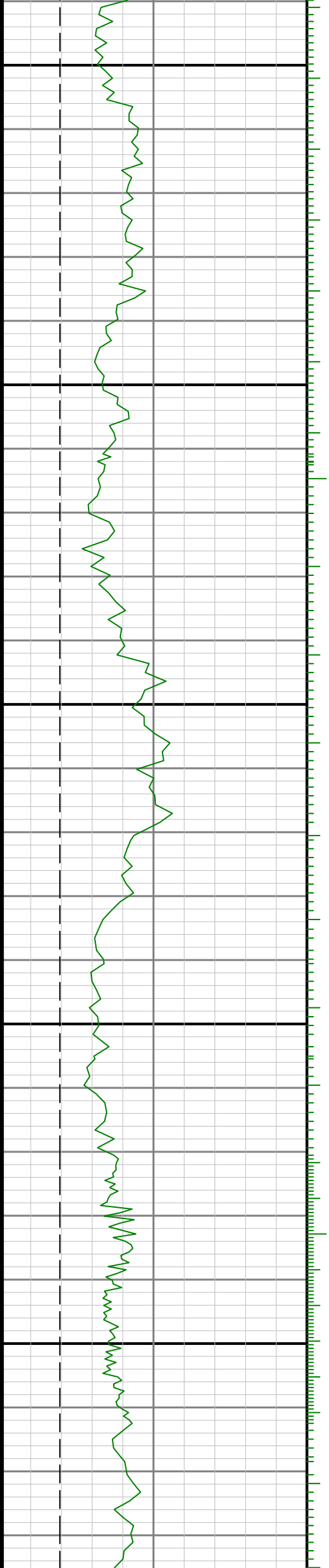


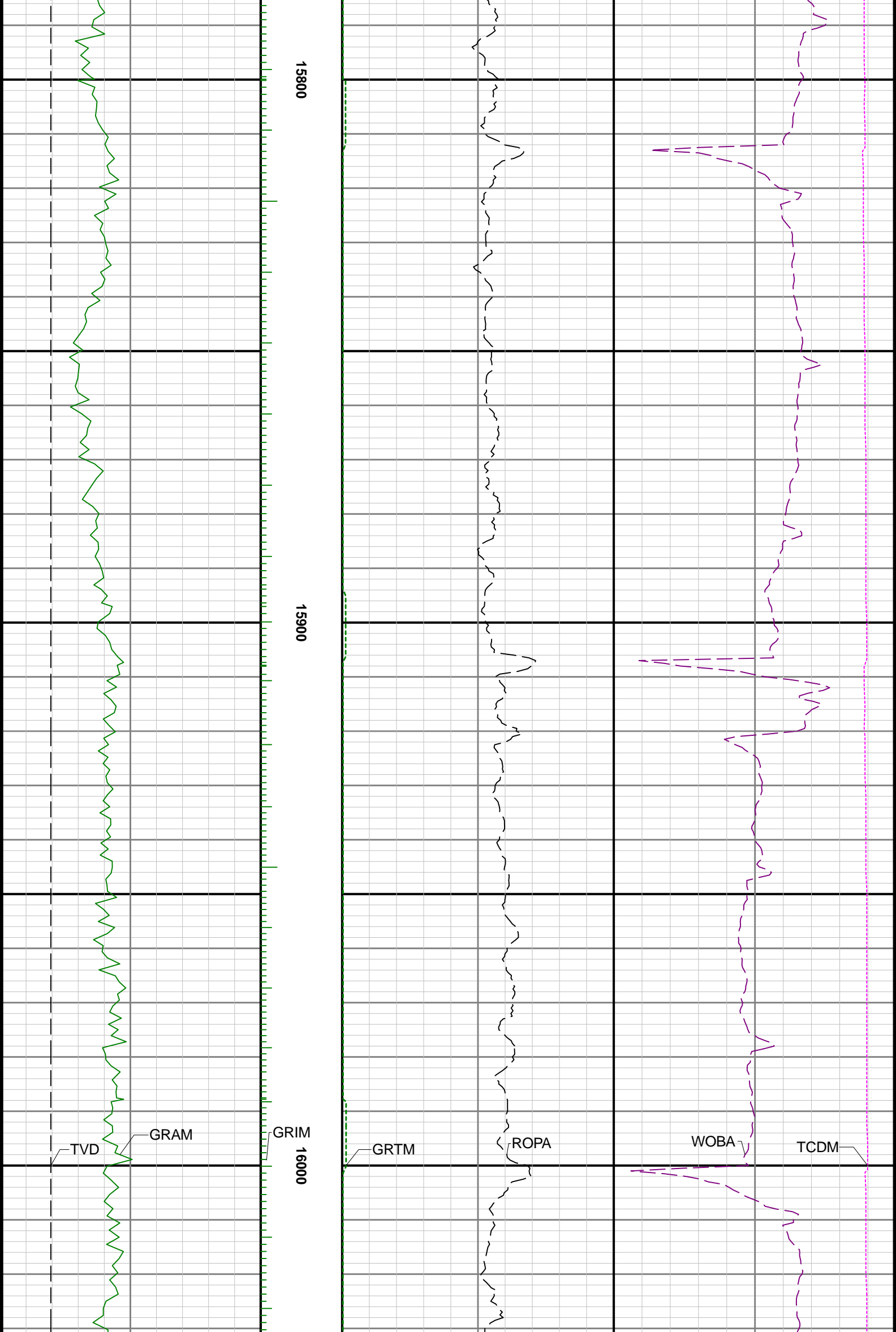


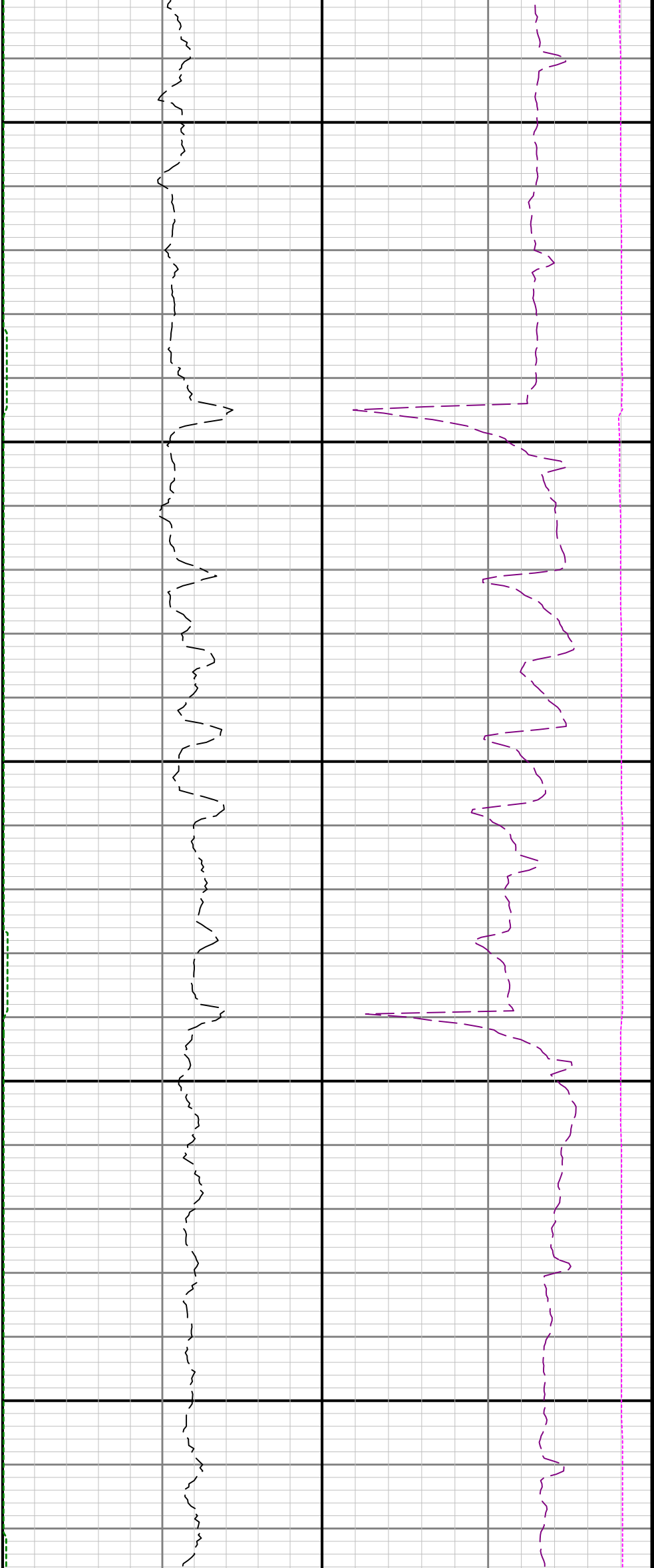


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16200

