



LWD MEMORY LOG

Gamma Ray

Company: Noble Energy

Well: Gutteresen D23-711

Field: Wattenberg

County: Weld Country: United States

State: Colorado

Driller's Depth

State: Colorado

Country: United States

Other Services:

Final Print

Latitude: 040° 12' 20.484" N
Longitude: 104° 30' 51.012" W

Directional

API No: 05-123-48845-00

SEC: 23 TWN: 3N RGE: 64W

Elev. KB: 4810.00 ft
Elev. DF: 4840.00 ft
Elev. GL: 4810.00 ft

Job ID: 109870288

Ground Level

Elevation: 4810.00 ft

Permanent Datum (P.D.):

Rig Floor

Above P.D.: 30.00 ft

Log Measured From:

Rig Floor

Elev. KB: 4810.00 ft
Elev. DF: 4840.00 ft
Elev. GL: 4810.00 ft

Dates

Interval

Magnetic Field Reference

From: 2019-07-04

To: 2019-07-07

Spud: 2019-06-15

Drilled (ft)

Logged (ft)

Azi Reference North:

Grid Dip Angle: (deg)

Total Magnetic Field Strength: (nT)

Mag to Reference North Correction: (deg)

66.65

52085

7.44

Borehole Record

Casing Record

Hole Size (in)

From (ft)

To (ft)

Size (in)

Weight (lb/ft)

From (ft)

To (ft)

13.500

30.00

1952.00

9.625

36.00

30.00

1942.00

8.500

1952.00

17757.00

8.500

15805.00

0.48

14.66

89.85

3.16

Mud Record

Deviation Record

Type

From (ft)

To (ft)

Hole Size (in)

Interval (ft)

Inc | Az (Start)

Inc | Az (End)

Oil Based Mud

1952.00

17757.00

8.500

15805.00

0.48

14.66

89.85

3.16

Acquisition System

Software Version

Other

Cadence

RT 5.2

Plot Studio

5.2.8472.1

Rig: H&P 517

Contractor: Helmerich & Payne Drilling Co

District: RMA

Unit: D&E

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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	Rotary Steerable	1952.00	17744.00	1952.00	17757.00	2019-07-04 18:09	2019-07-07 06:10	55.06

Crew

Name	Arrive Wellsite	Depart Wellsite	Name	Arrive Wellsite	Depart Wellsite	Name	Arrive Wellsite	Depart Wellsite
Adam Schlenz	2019-07-04	2019-07-08						

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+ (%)
2019-07-04 11:42	1	1952.00	Oil Based Mud	9.3	12	N/A	19.0	72/18	Active Pit	27211	0.00
2019-07-05 02:15	1	4347.00	Oil Based Mud	9.1	12	N/A	19.0	72/18	Active Pit	27211	0.00
2019-07-05 13:00	1	7284.00	Oil Based Mud	9.5	13	N/A	20.0	70.3/18	Active Pit	27510	0.00
2019-07-06 02:30	1	11005.00	Oil Based Mud	9.5	12	N/A	20.0	70/17	Active Pit	26239	0.00
2019-07-06 13:30	1	13843.00	Oil Based Mud	9.5	13	N/A	22.0	72/15	Active Pit	25267	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	AutoTrak Curve Steering Unit	14881521	Near Bit Inclination	5.93	6.73	7.000	4.330
1	AutoTrak Curve Steering Unit	14881521	Near Bit VSS	5.93	6.73	7.000	4.330
1	AutoTrak Curve MWD	14313857	Gamma (single)	2.75	12.90	7.000	3.250
1	AutoTrak Curve MWD	14313857	Directional (mag)	12.27	22.42	7.000	3.250

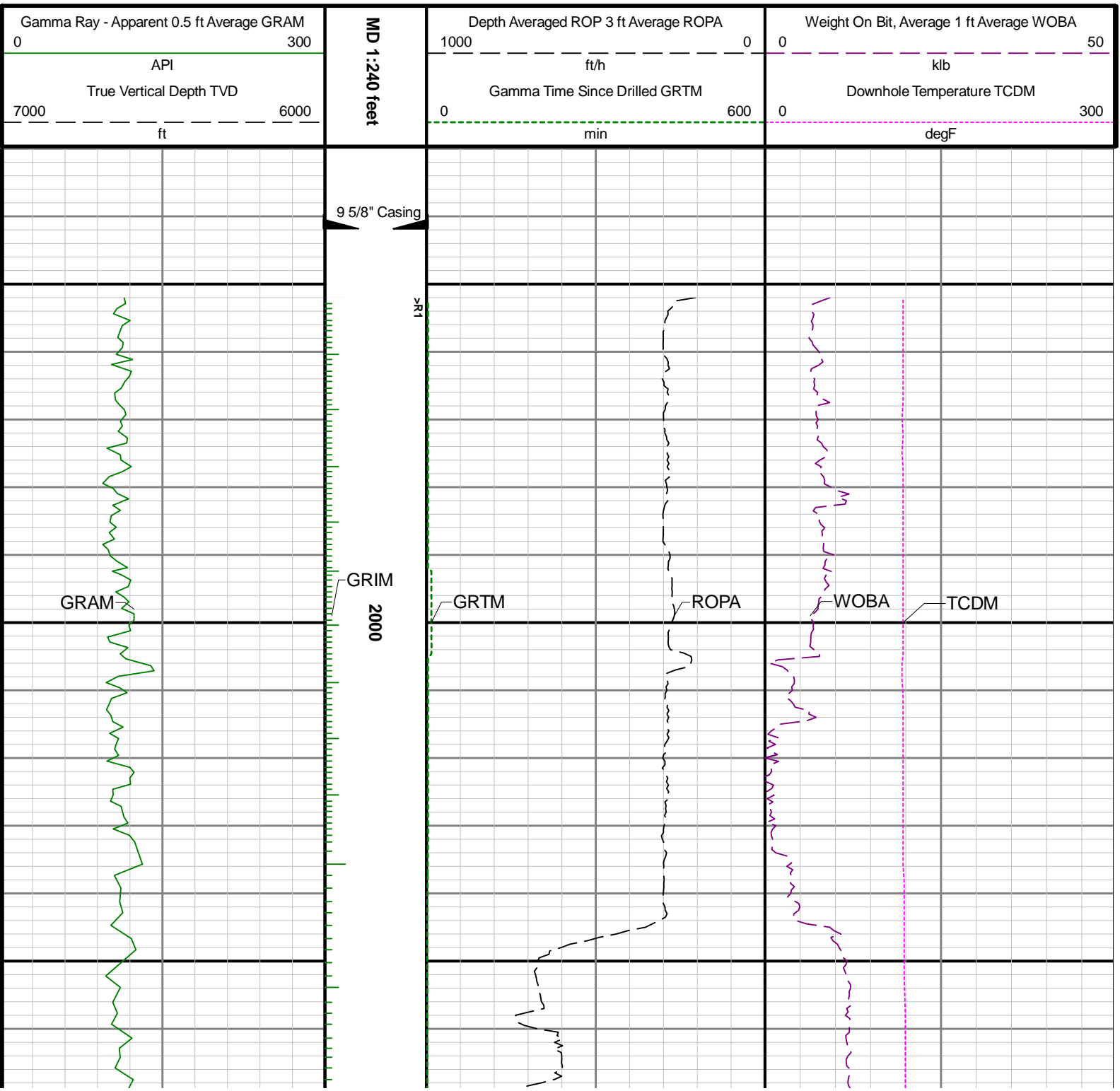
Service and Tool Mnemonics

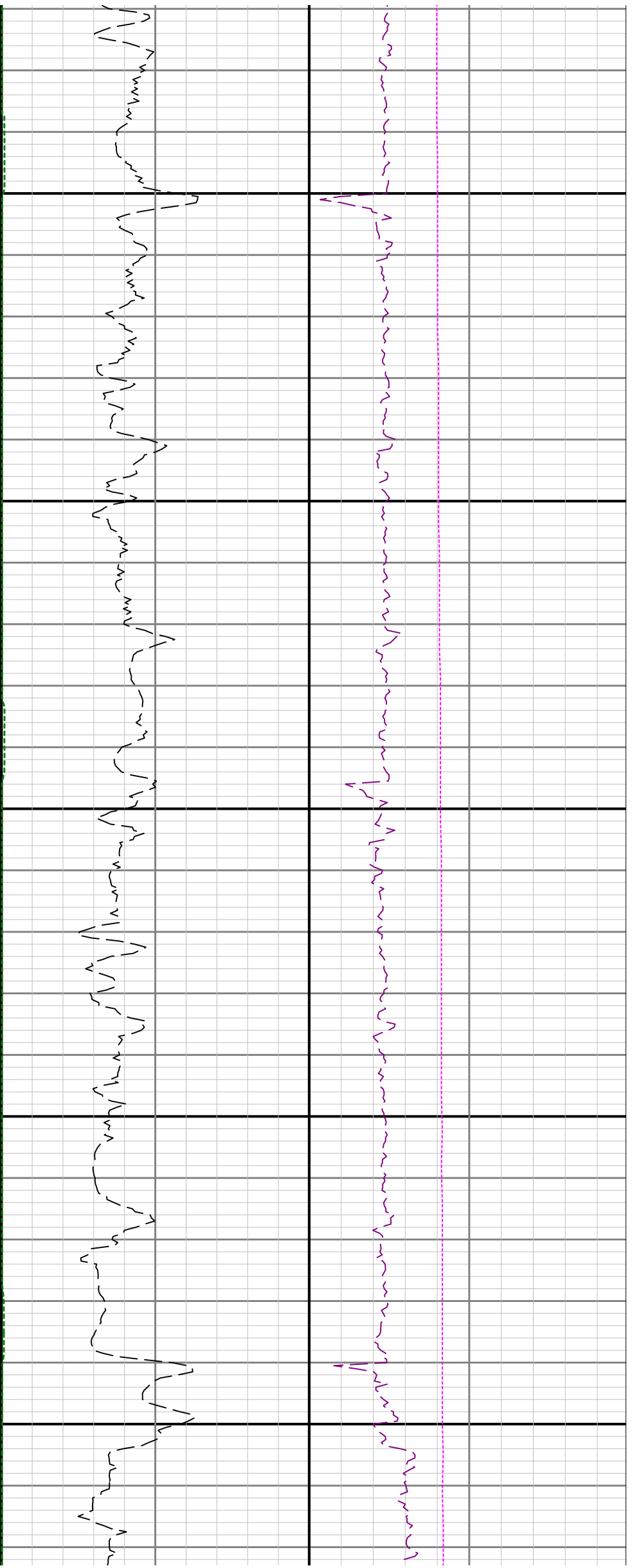
Mnemonic	Name	Description
ATC SU	AutoTrak Curve SU	Auto Trak Curve Steering Unit
ATC MWD	AutoTrak Curve MWD	Auto Trak Curve MWD
ATC LCPM	AutoTrak Curve LCPM	Auto Trak Curve LCPM

Comments	
1	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 service (Directional and Gamma Ray) behind a 8.5 inch bit and rotary steerable assembly from 1952 to 17757 feet MD (1952 to 6800 feet TVD).
3	The Gamma Ray Apparent (GRAM) data is presented 0 to 300 API, per the customer's request.

Remarks				
Number	Depth	Hole Section	Run No.	Remark
	(ft)	(in)		
1	17757.00	8.500	1	The interval from 17744 to 17757 feet MD (6800 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	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

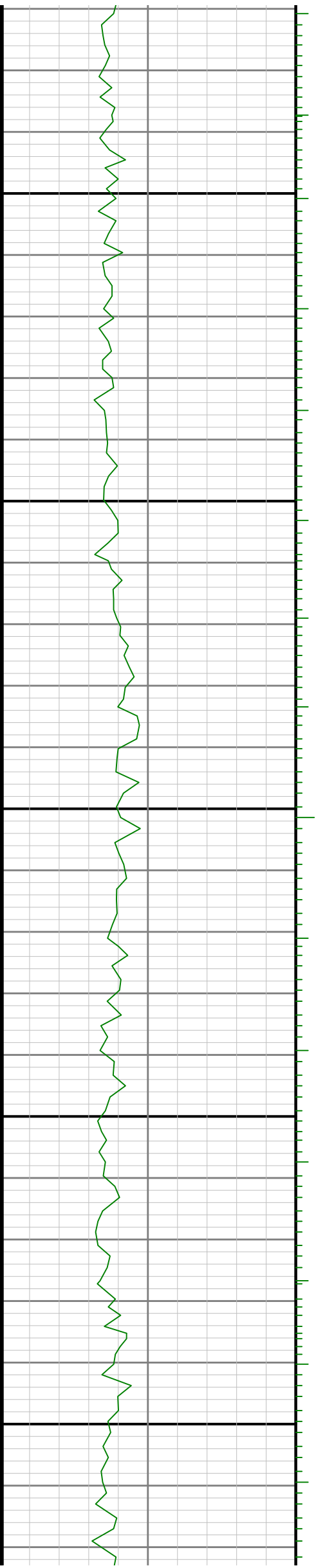


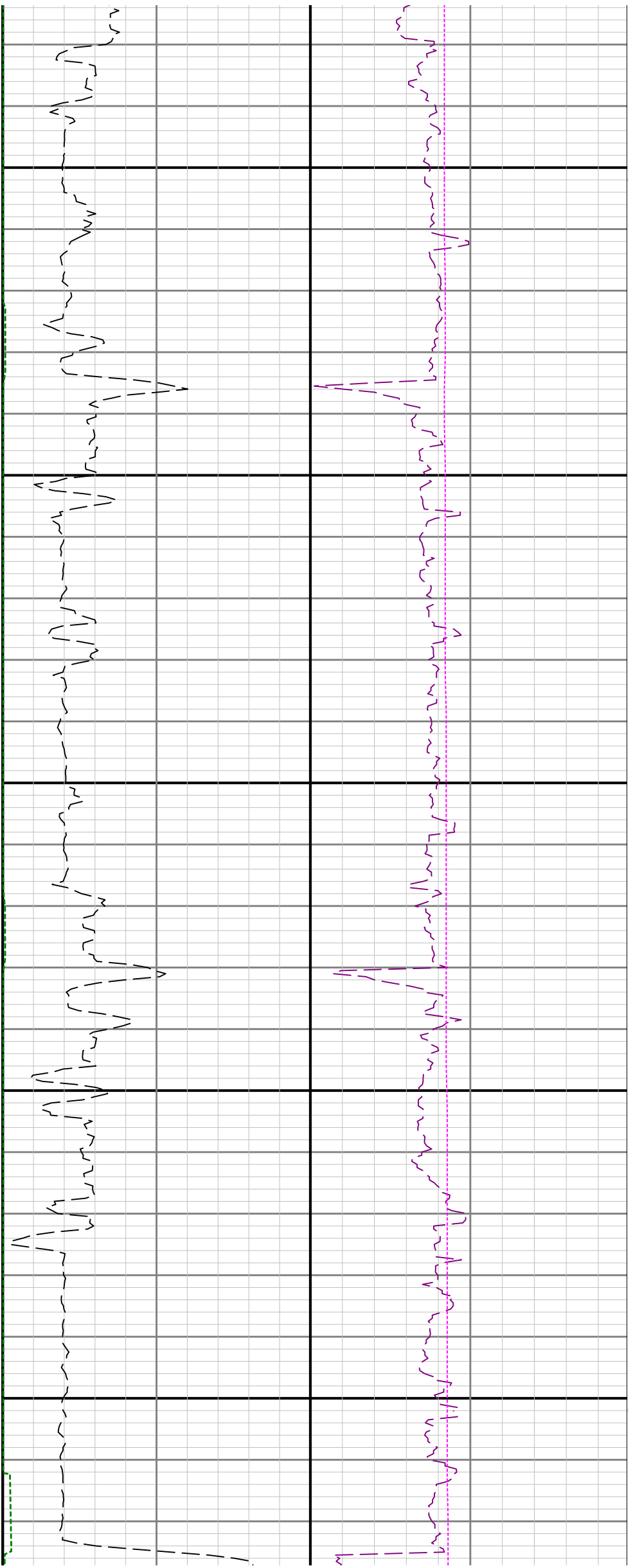


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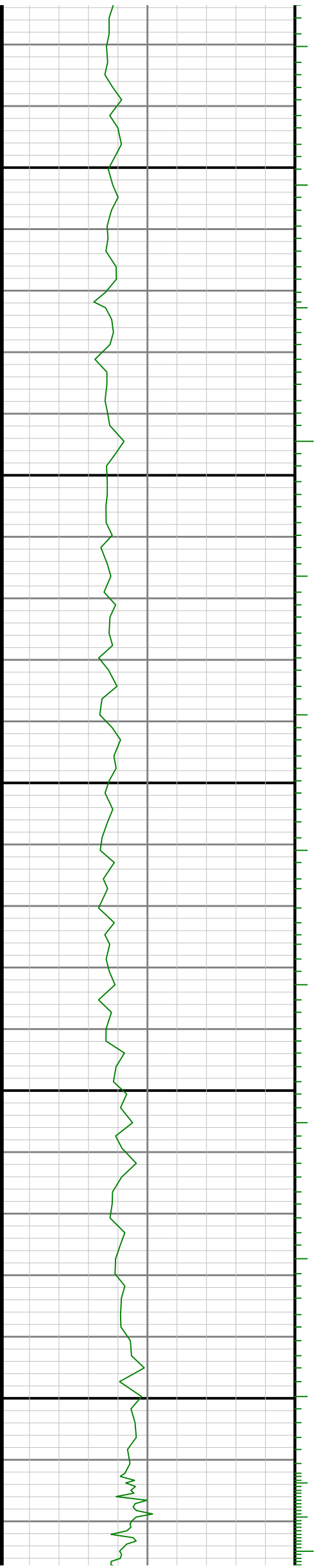
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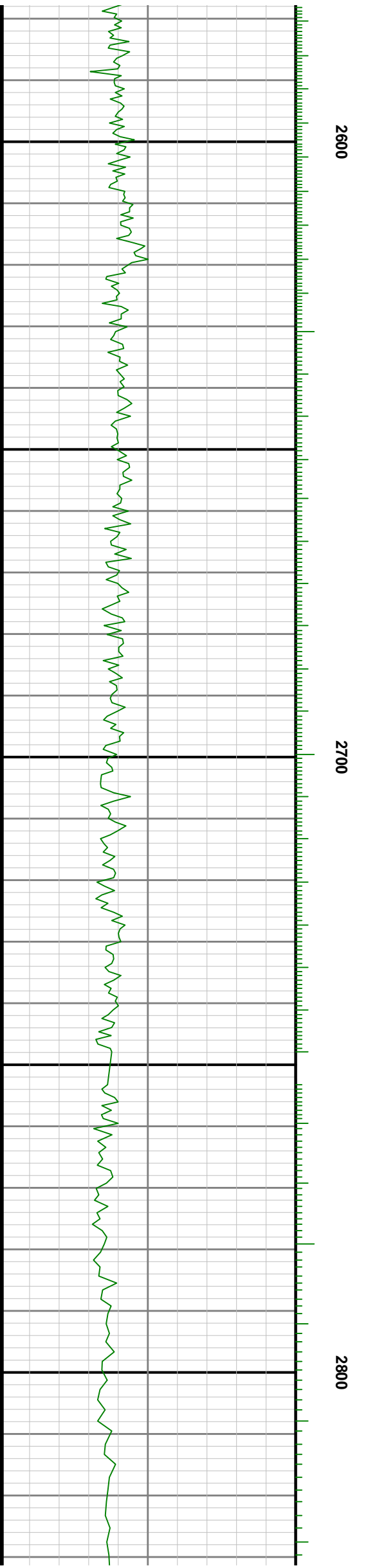
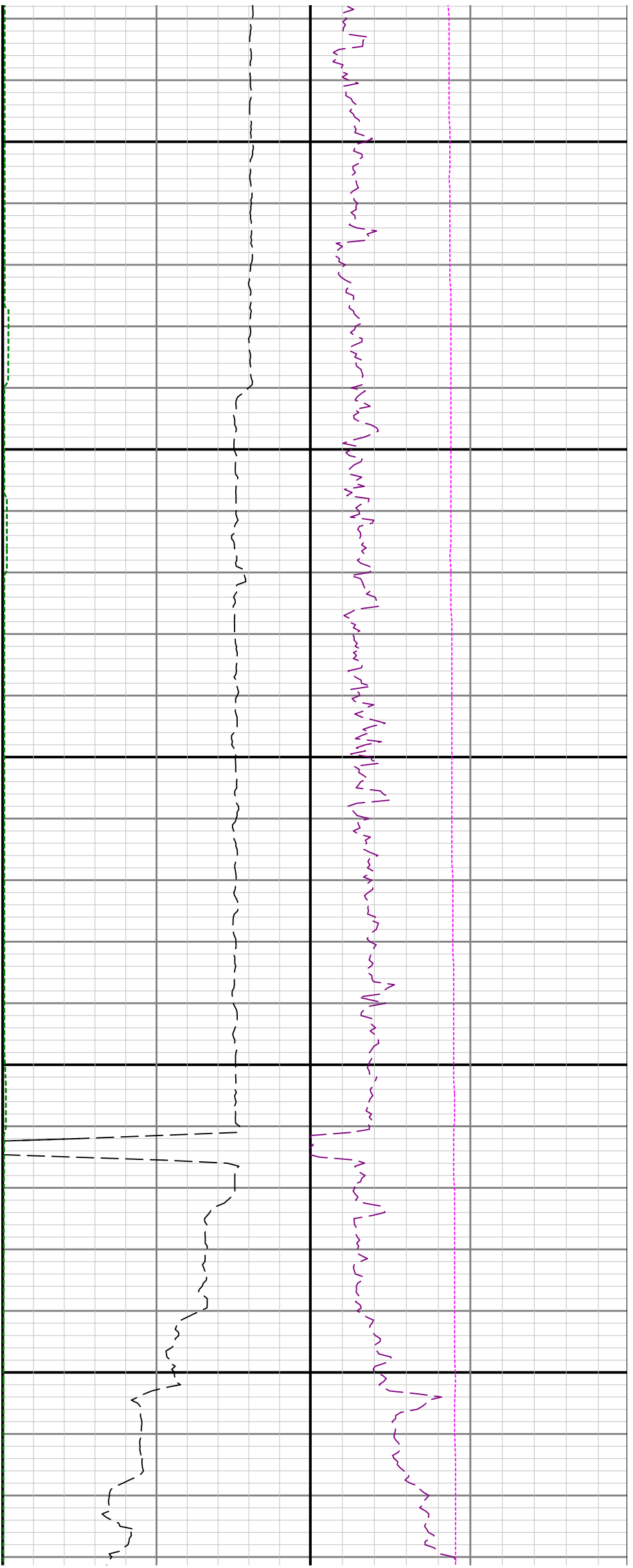


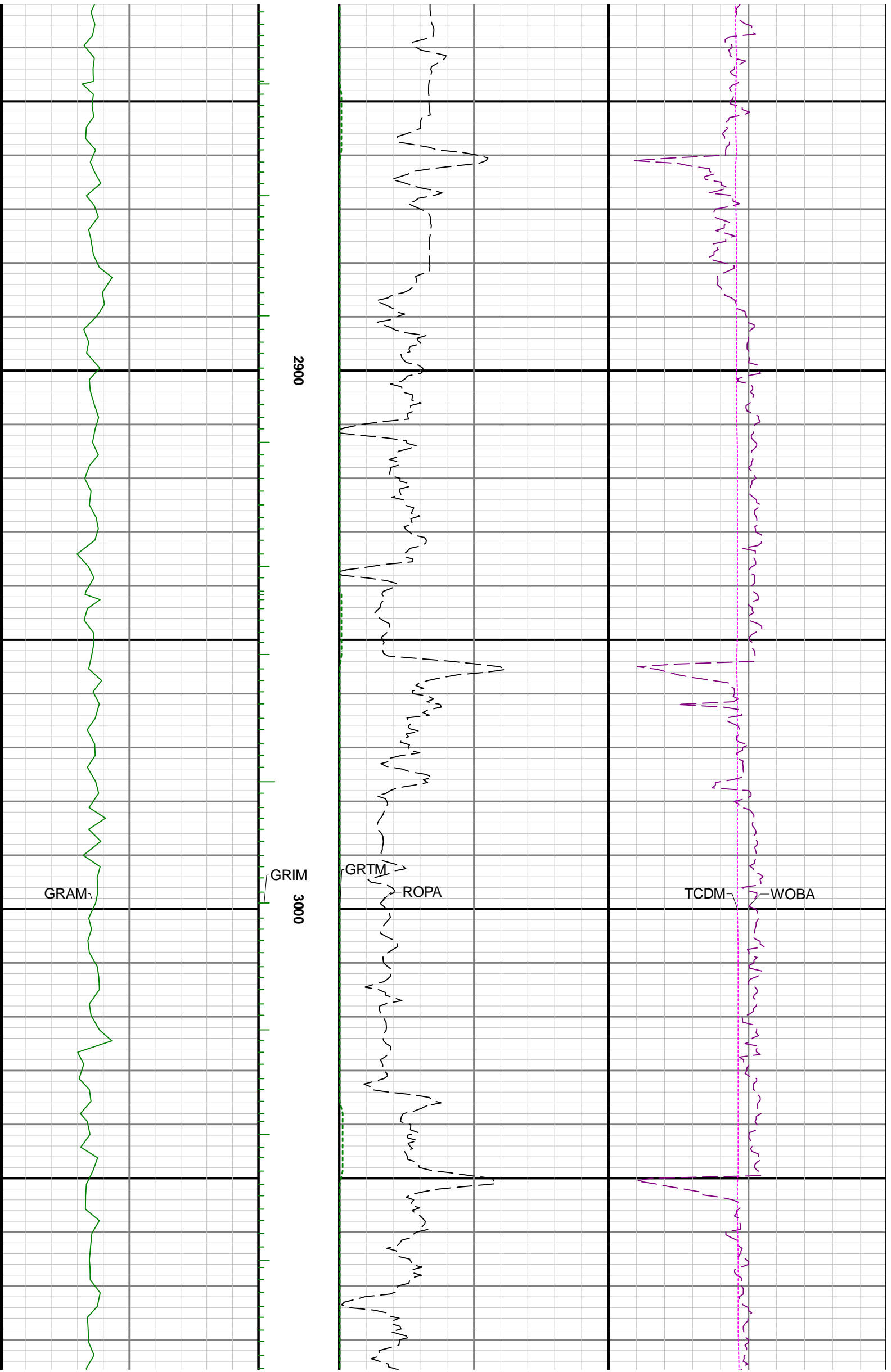


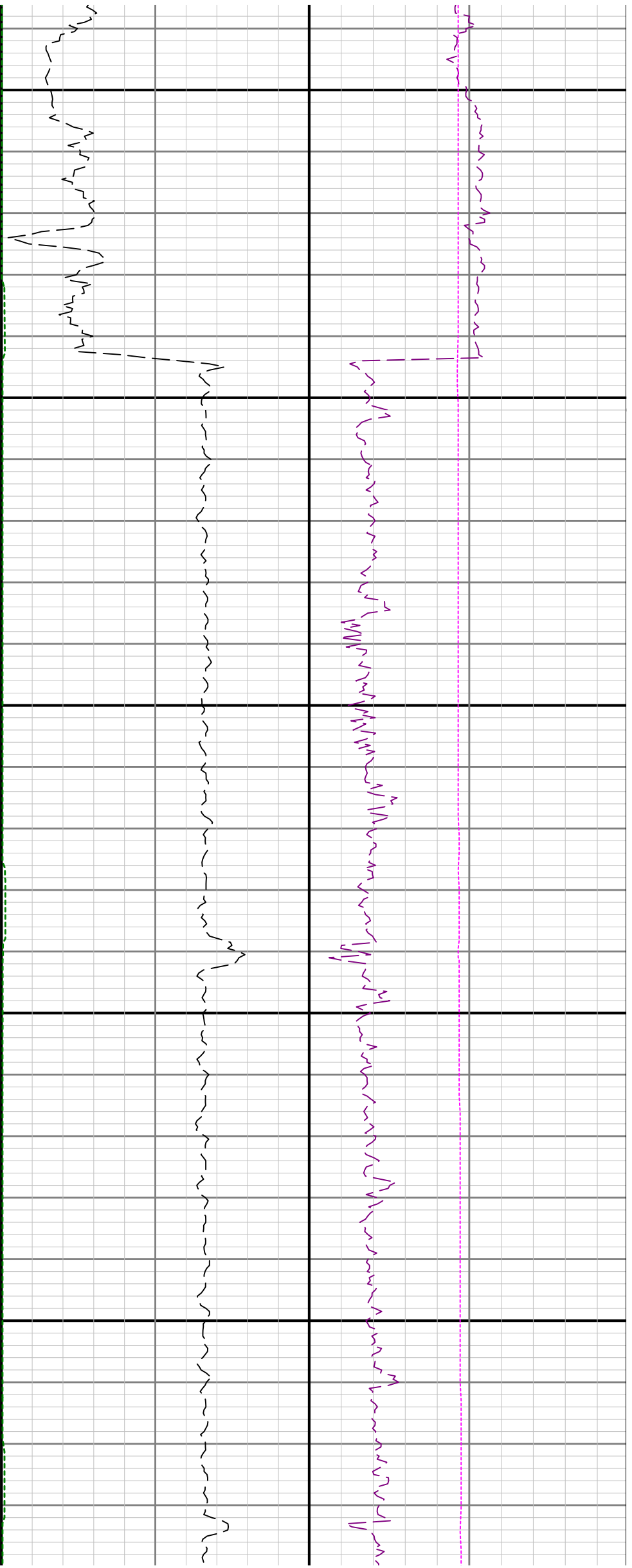
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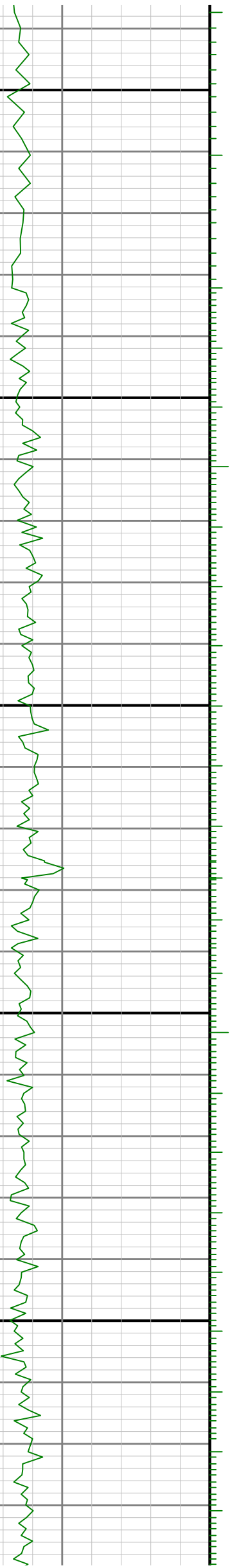


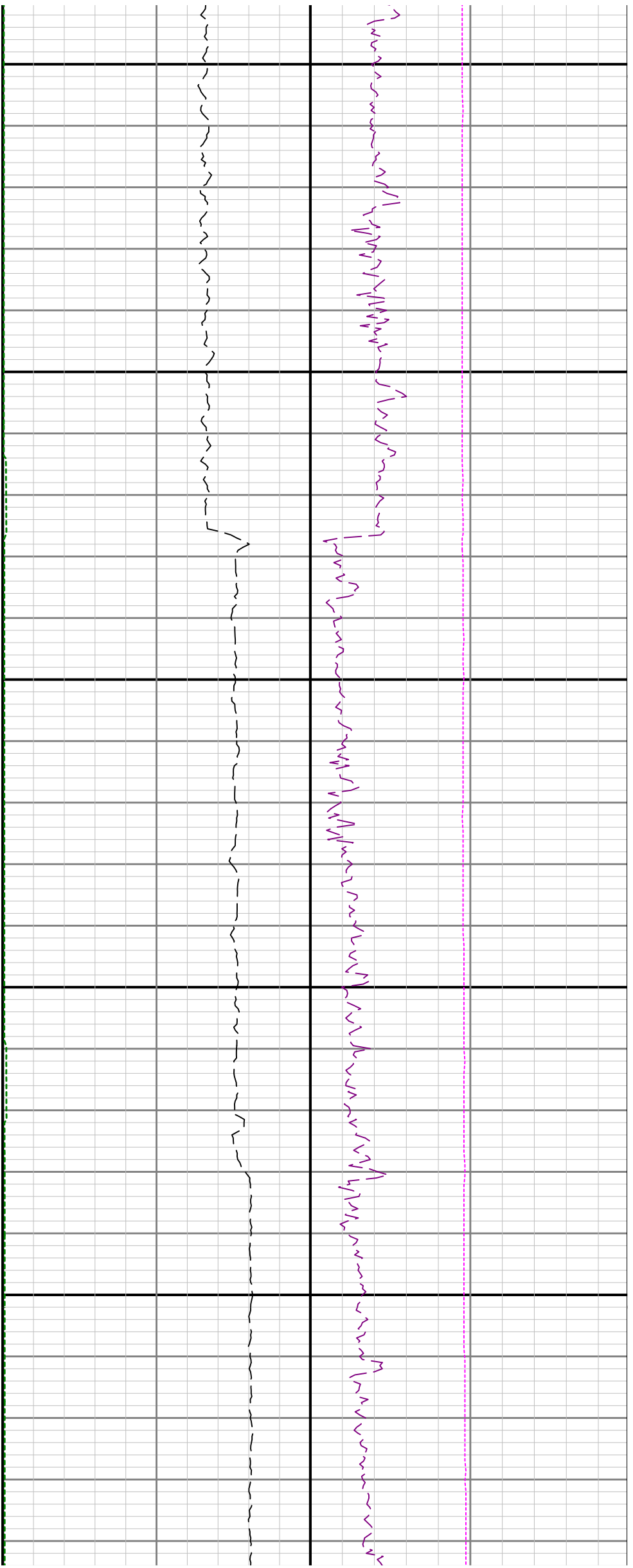


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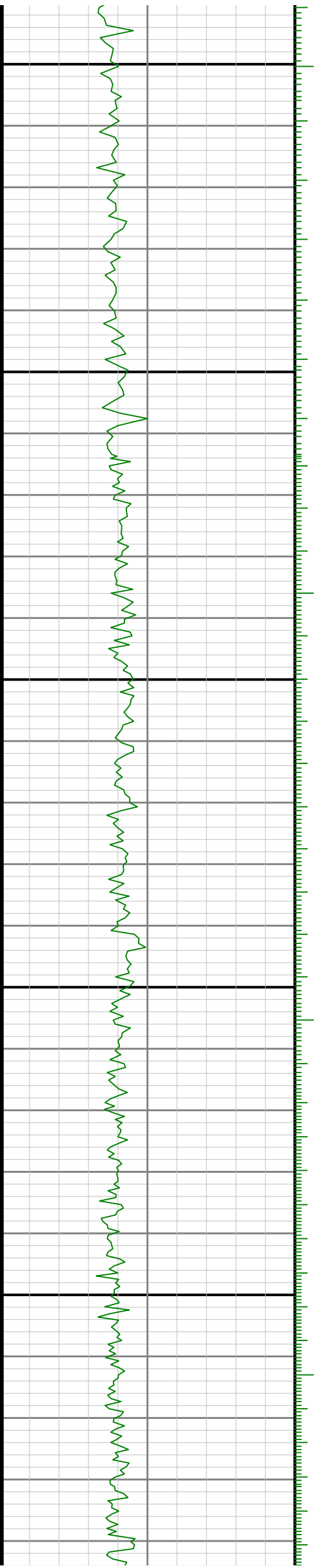
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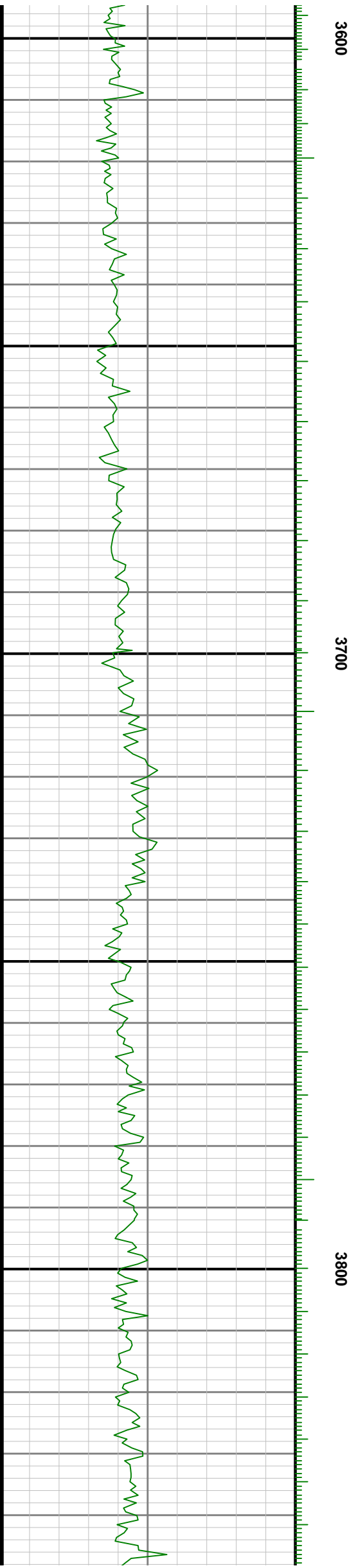
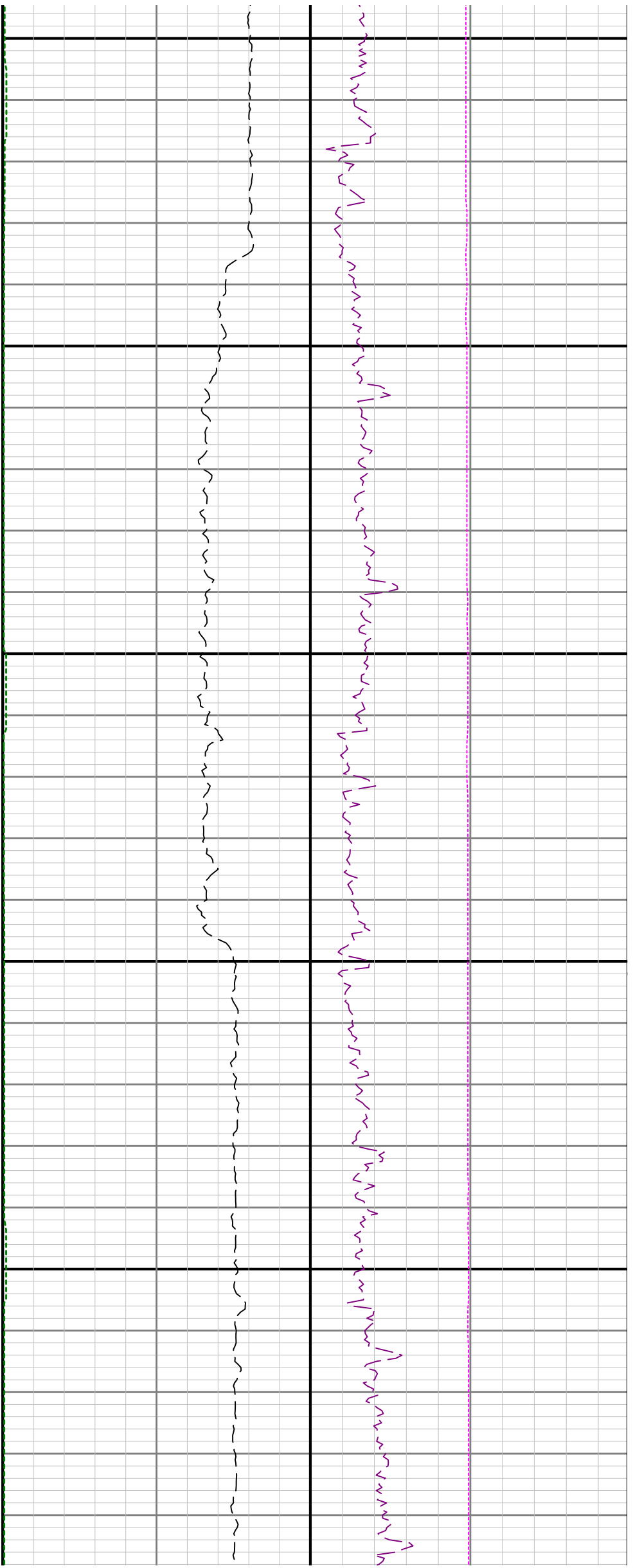


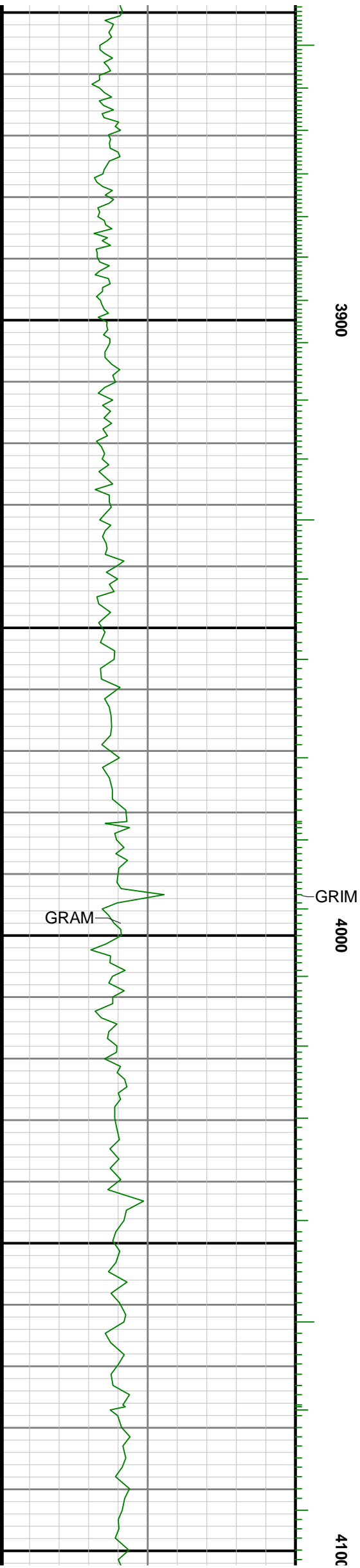
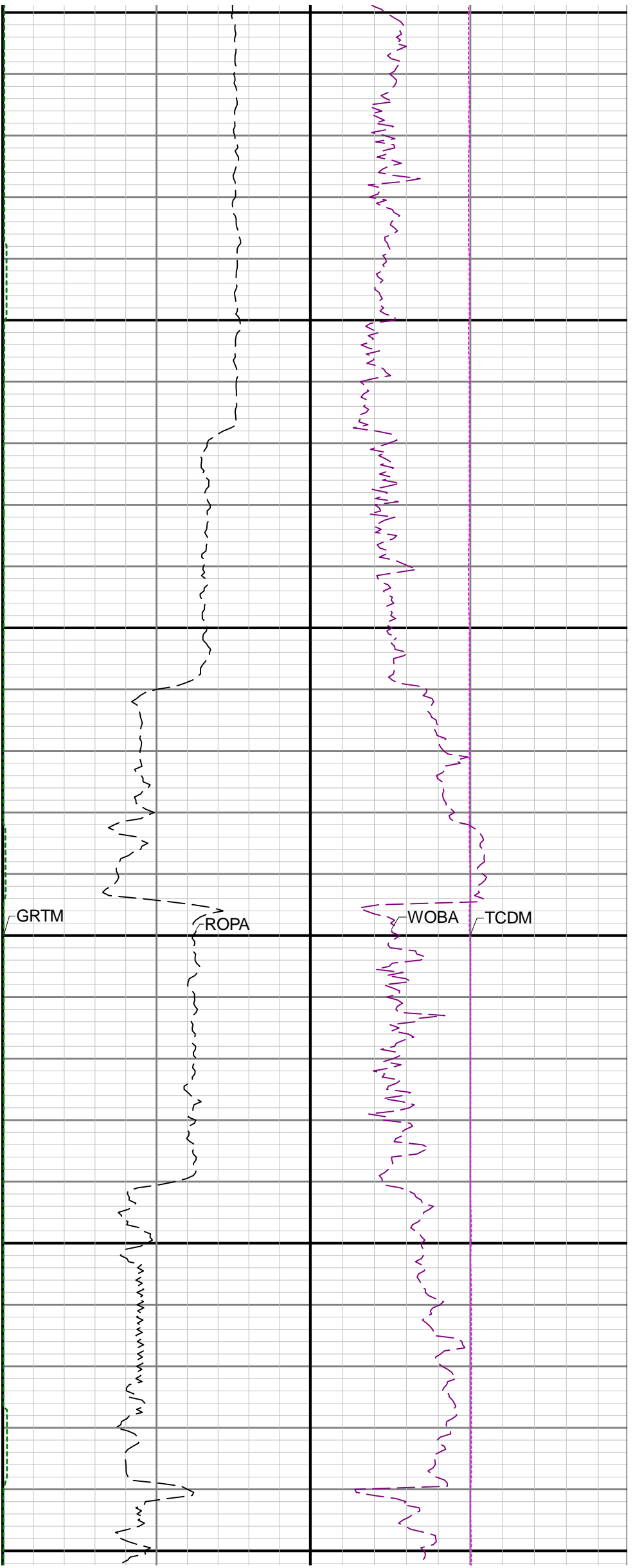


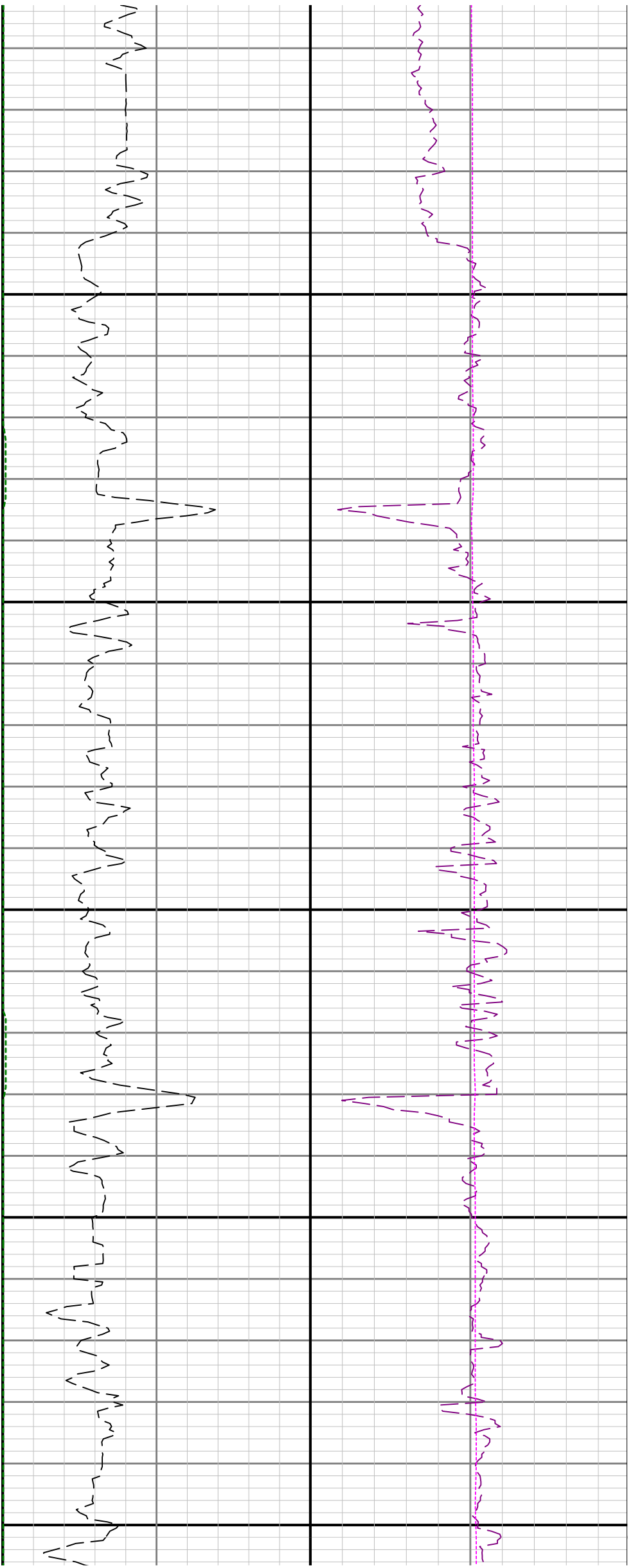
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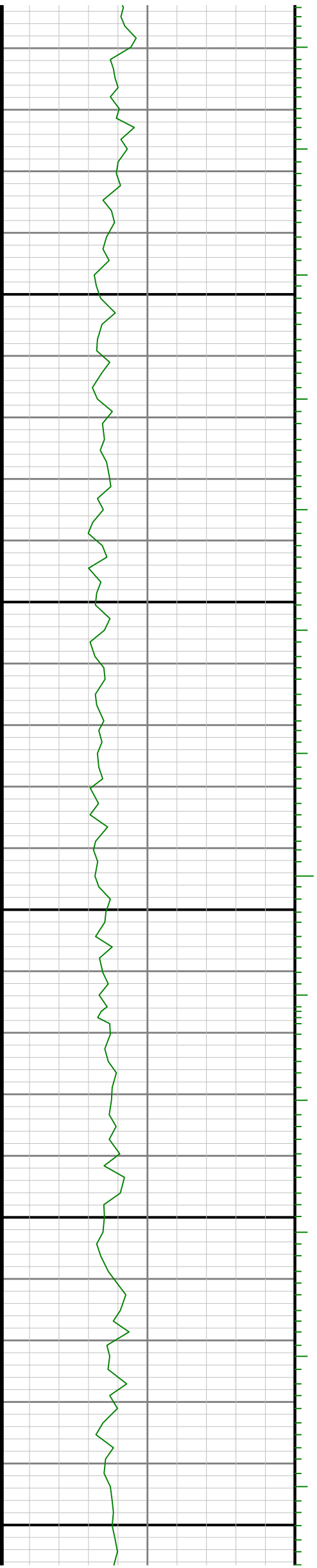


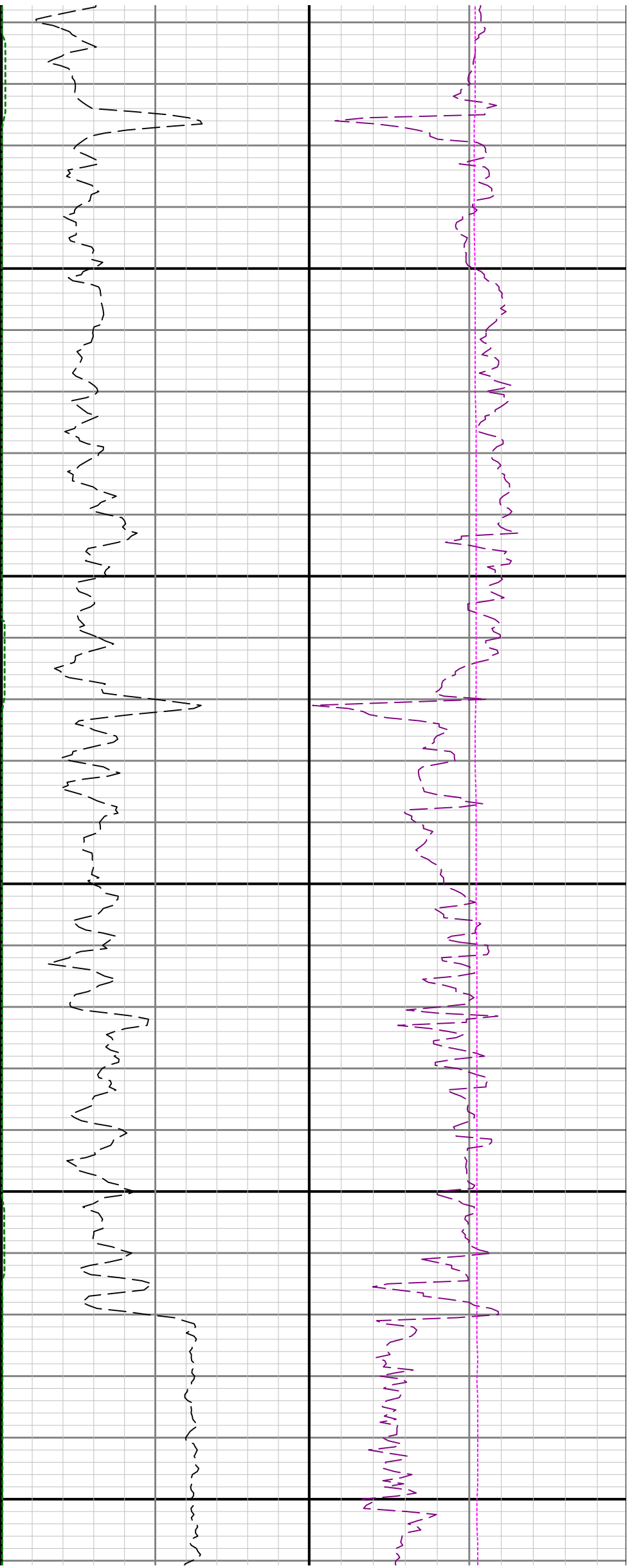




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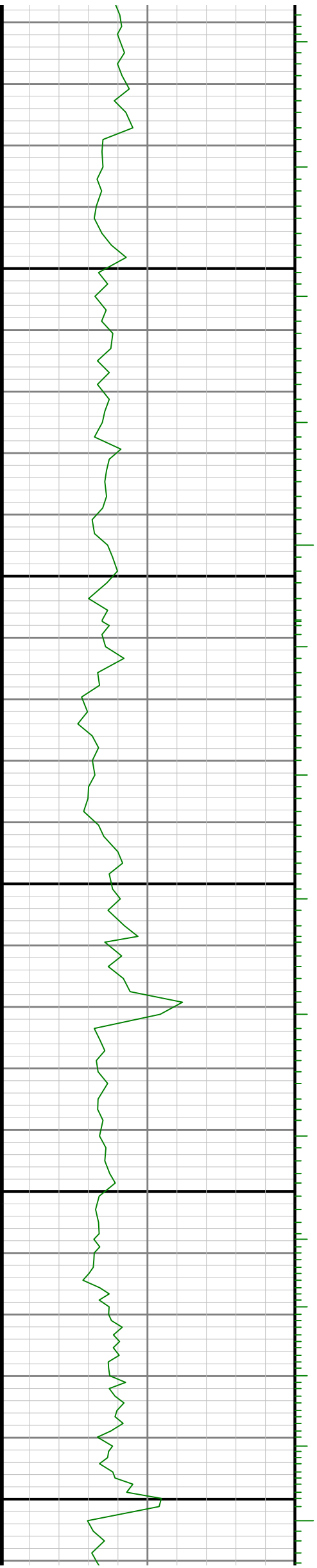


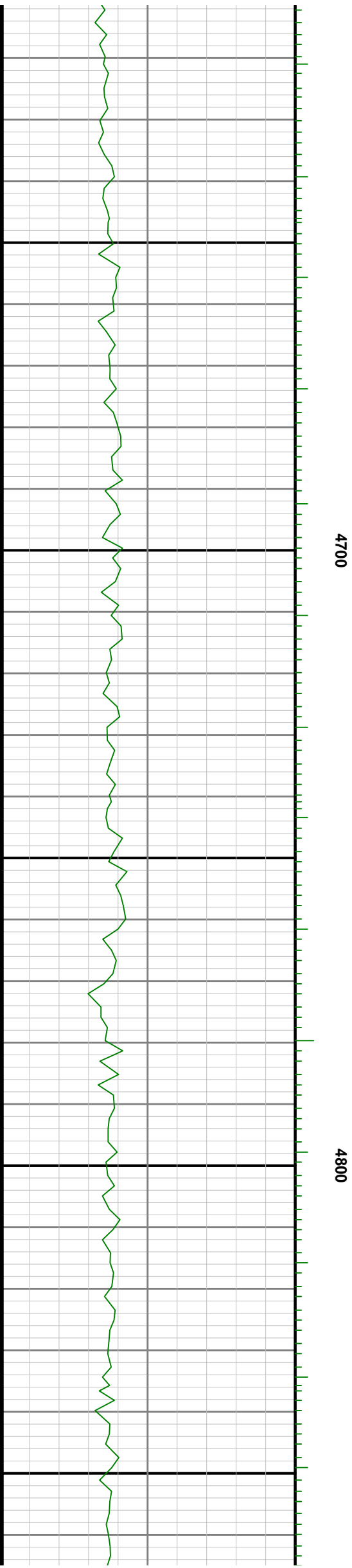
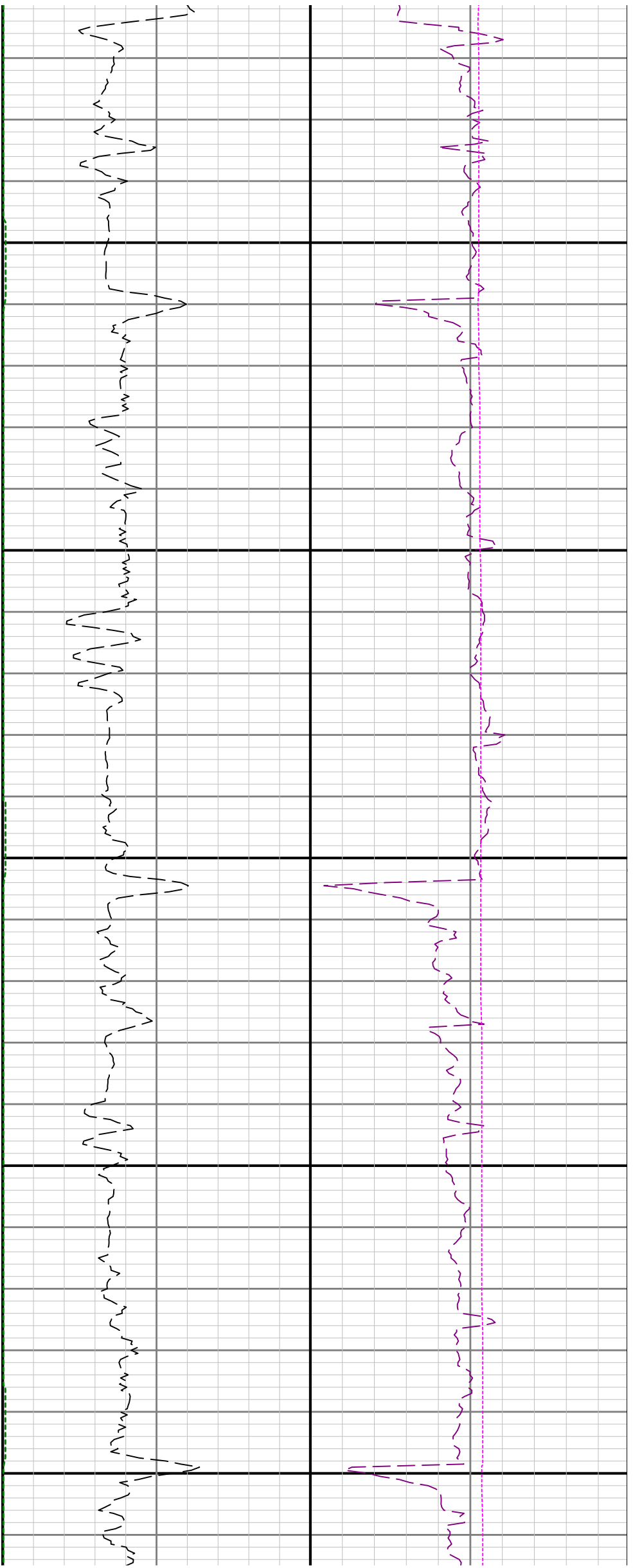


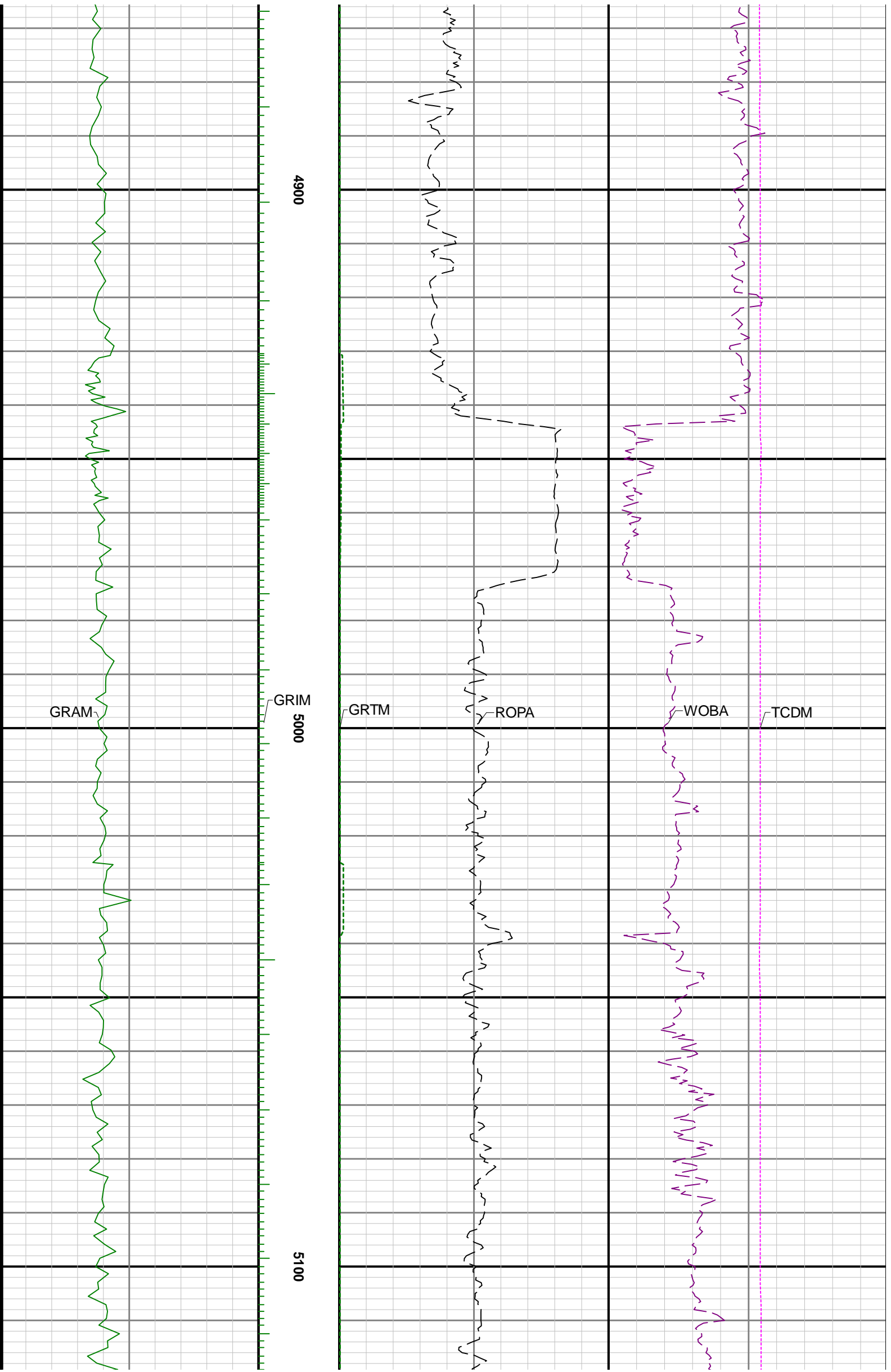
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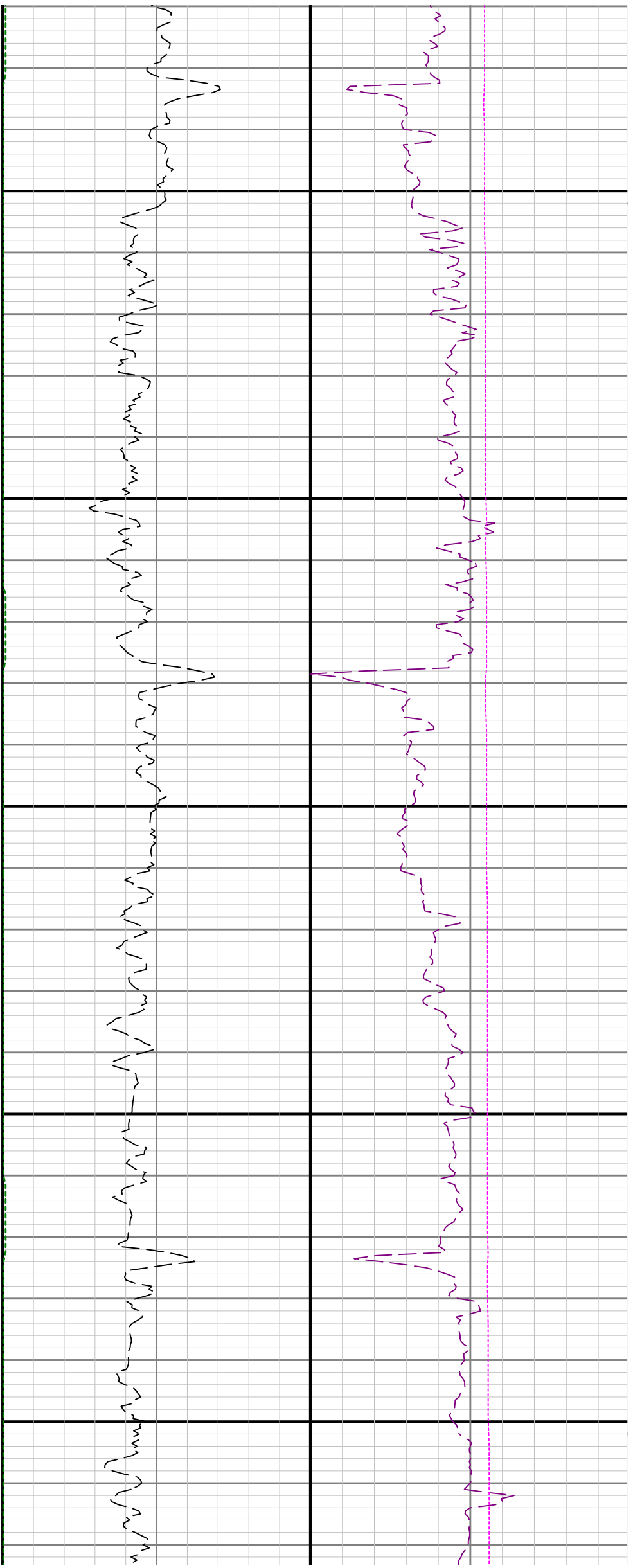
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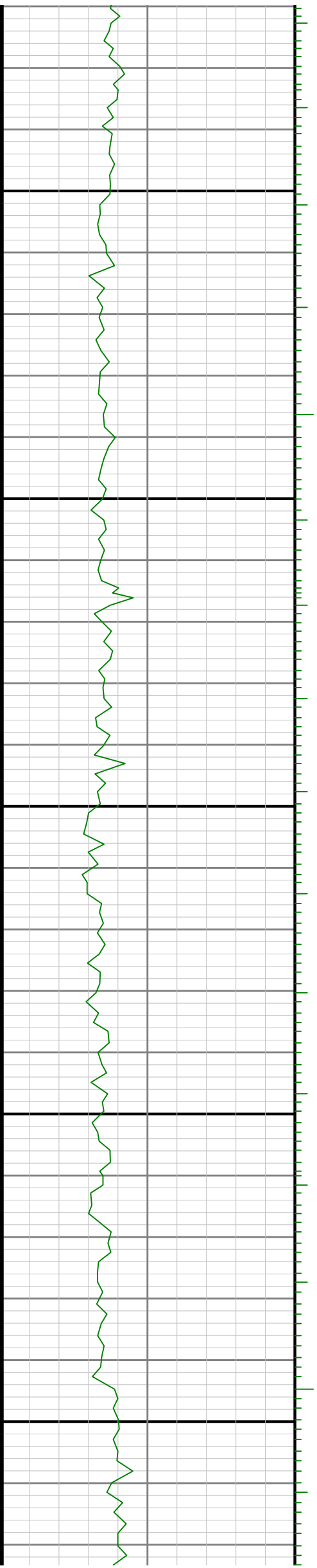


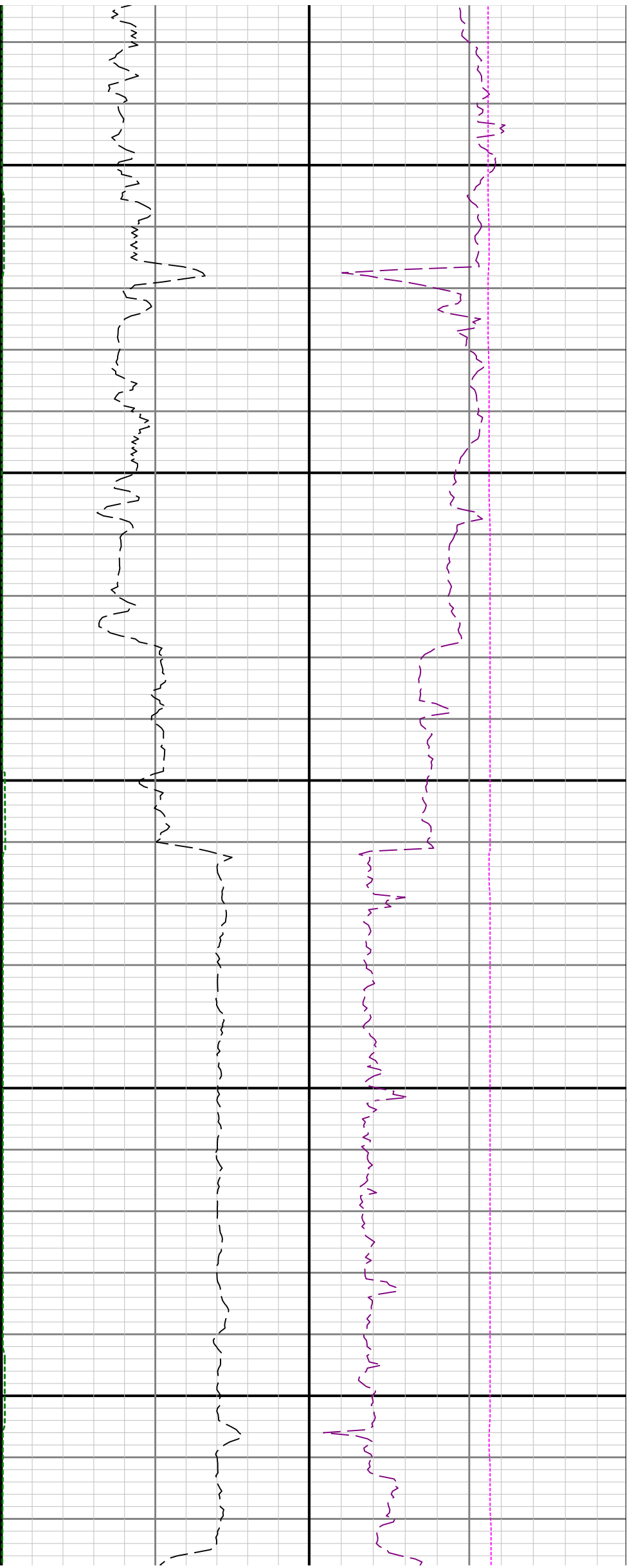




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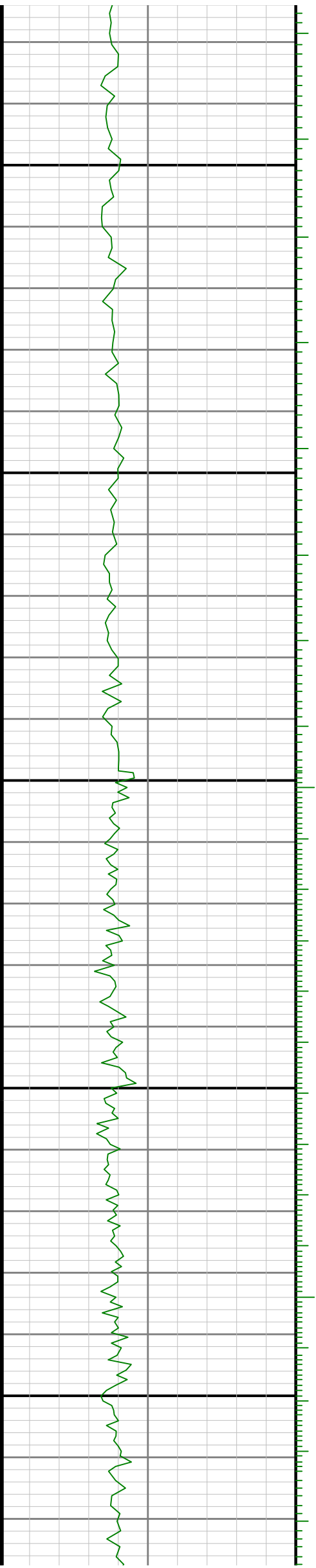


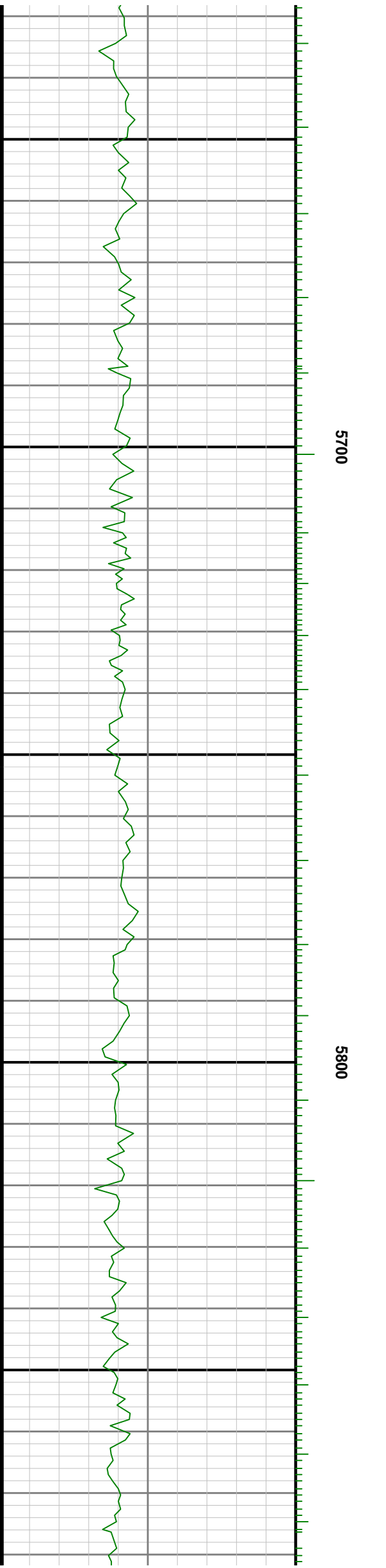
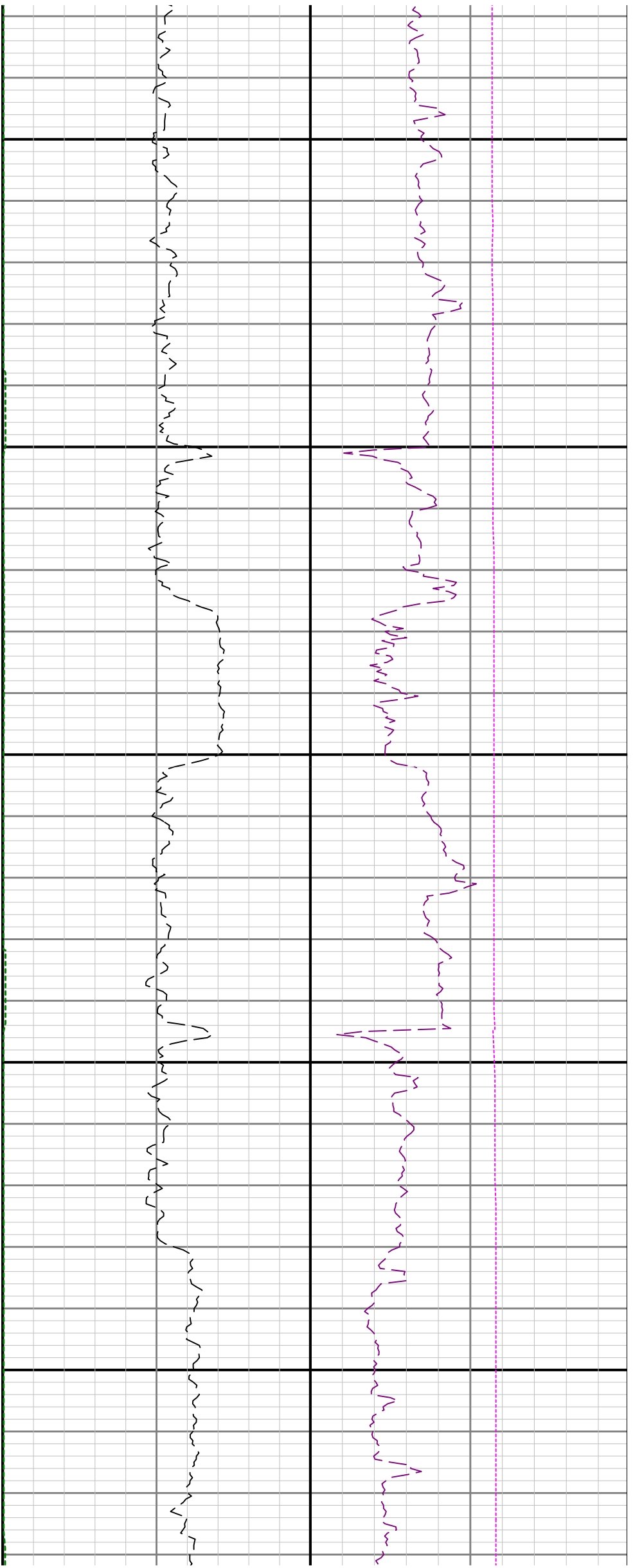


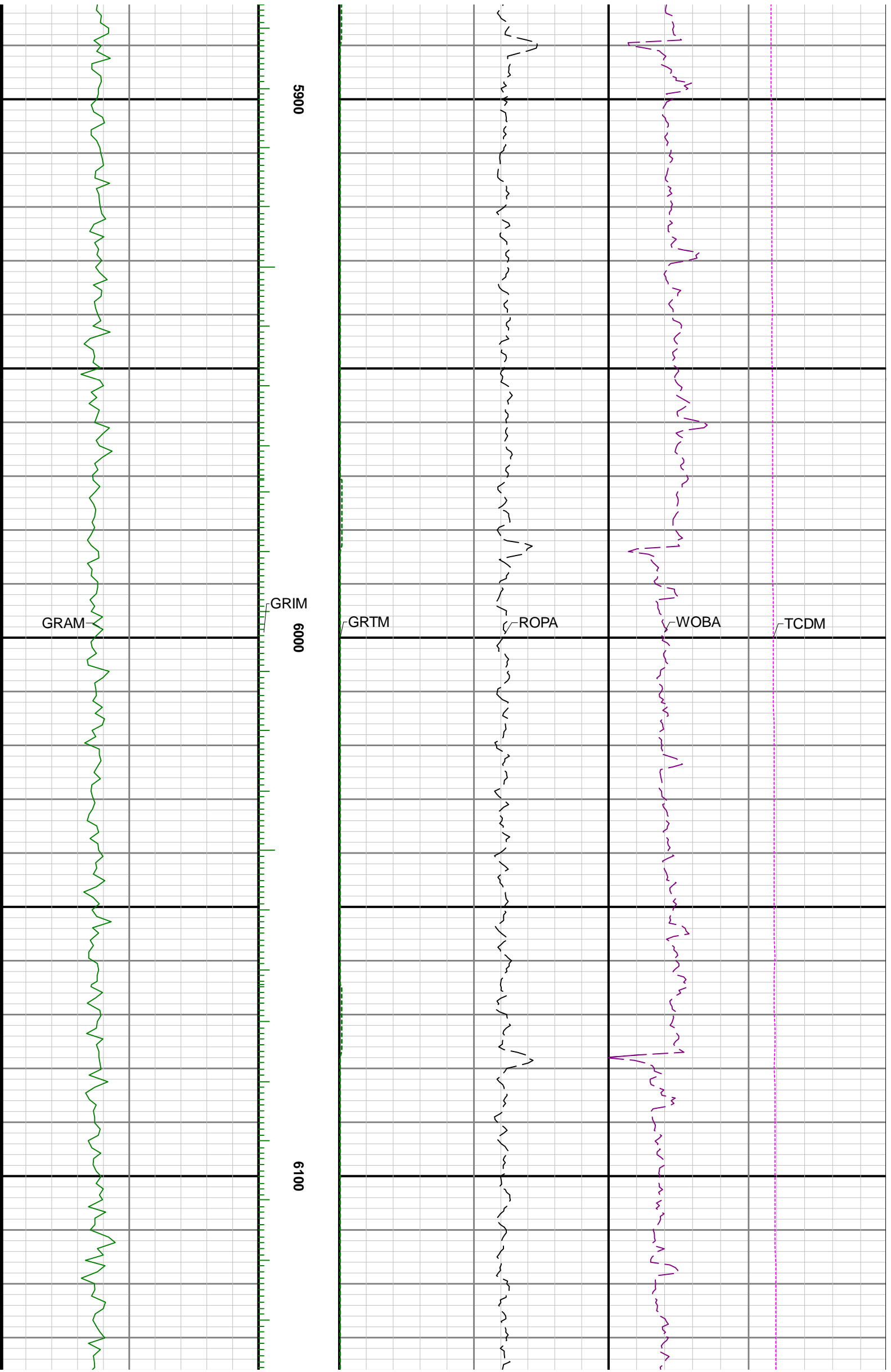
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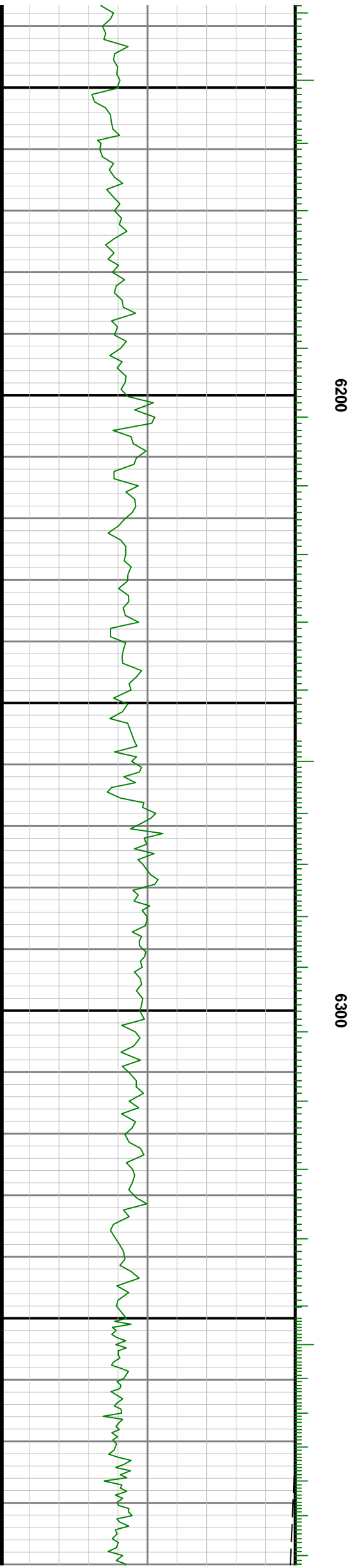
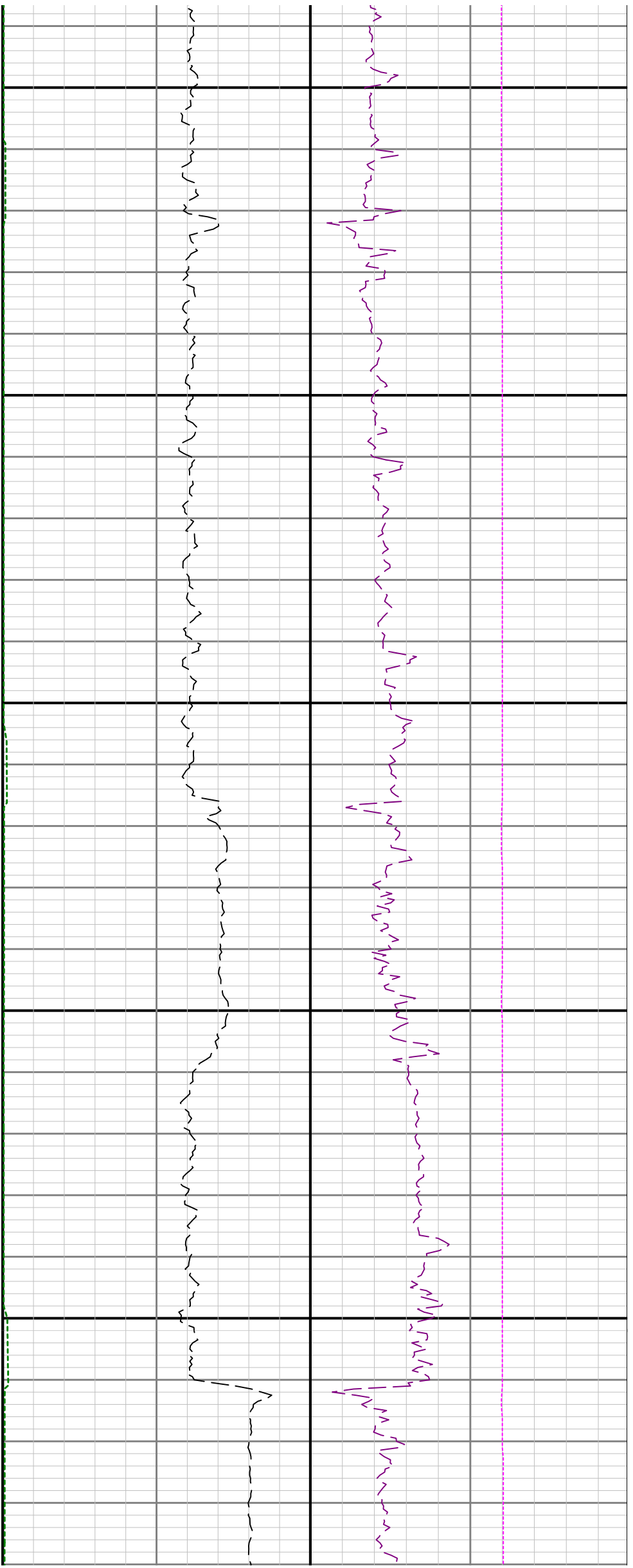
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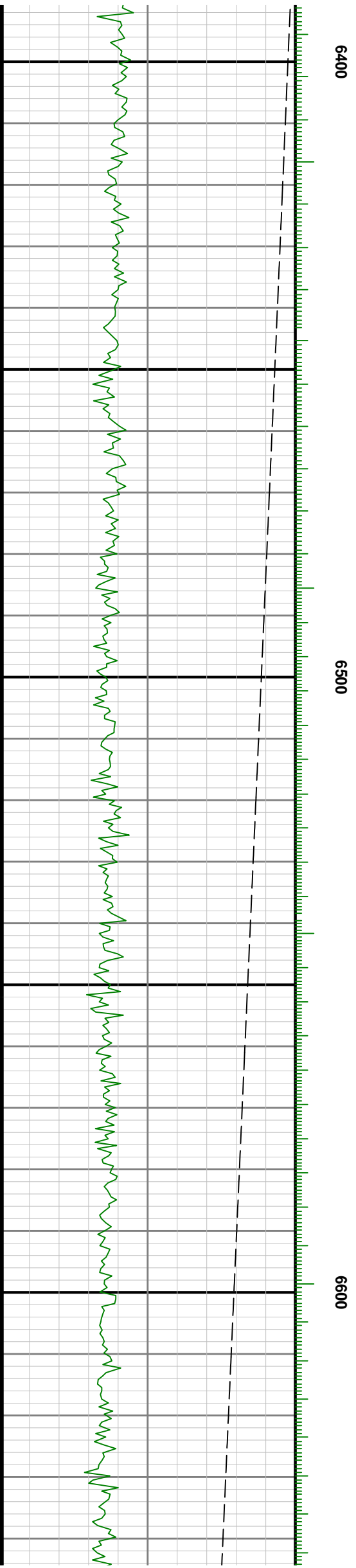
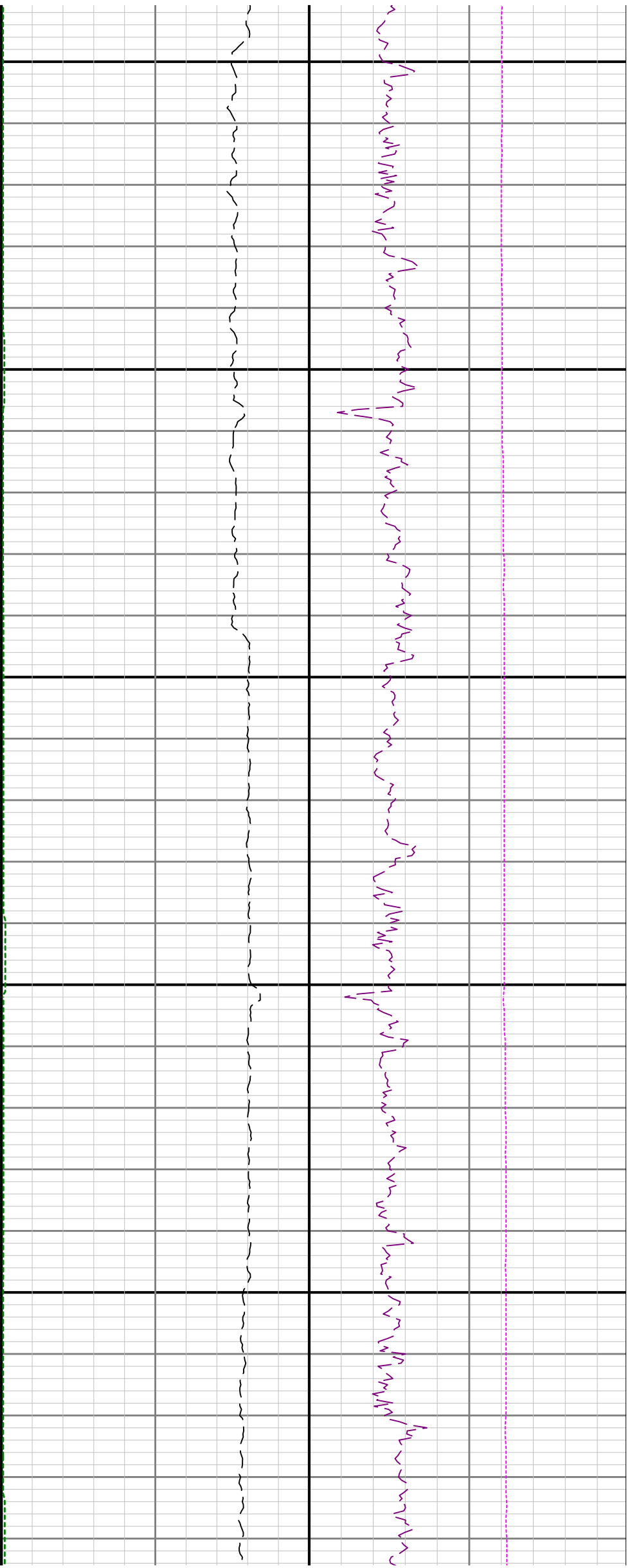
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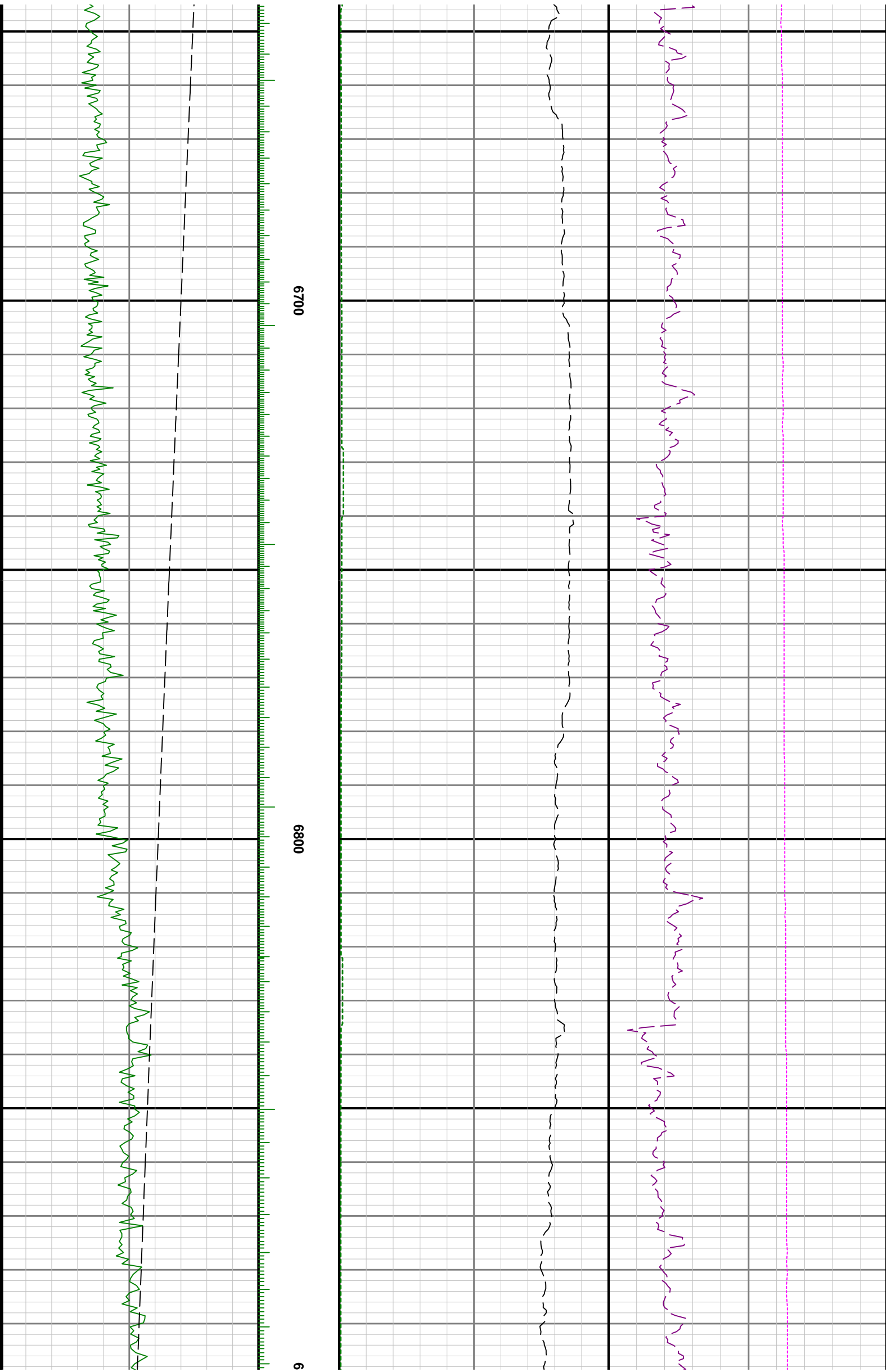








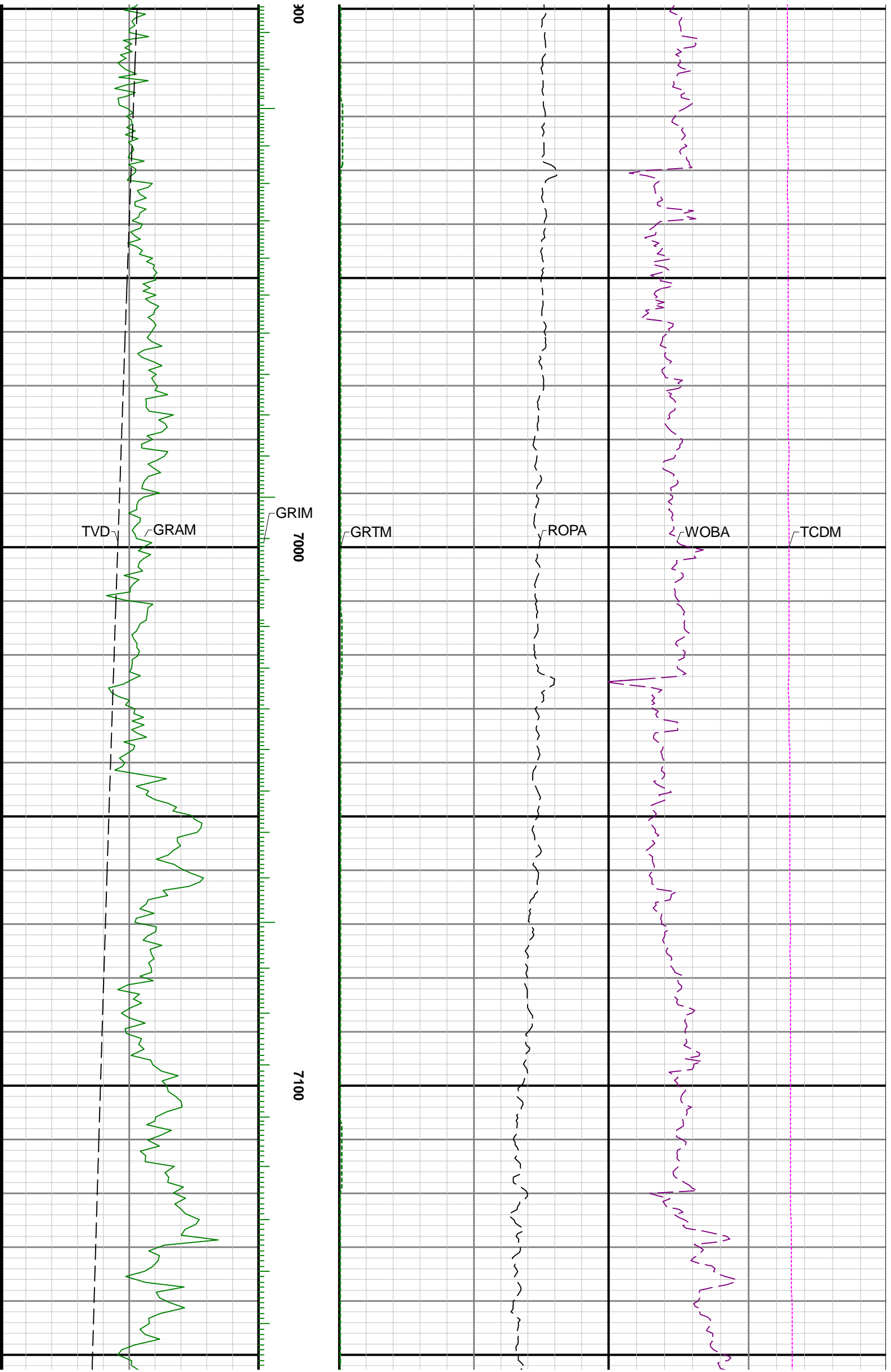


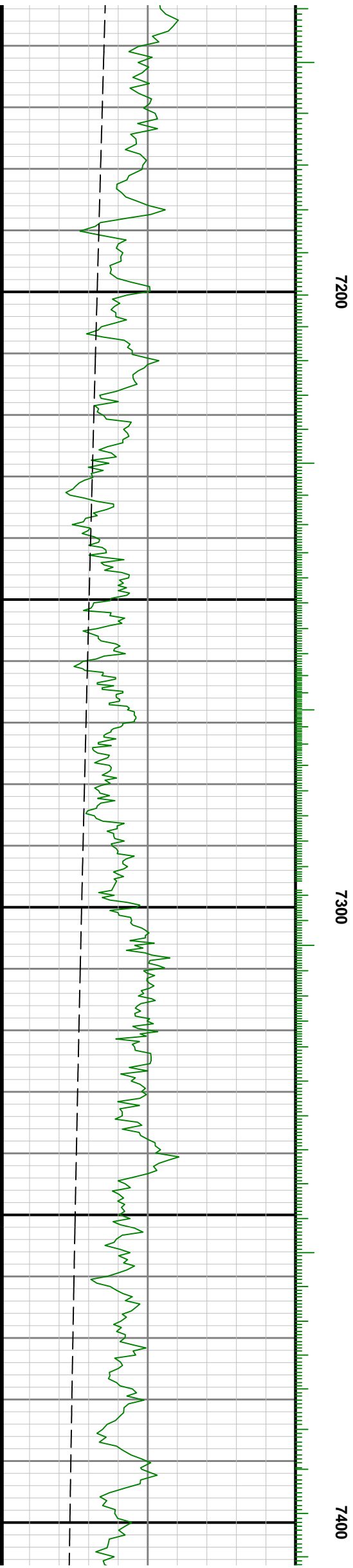
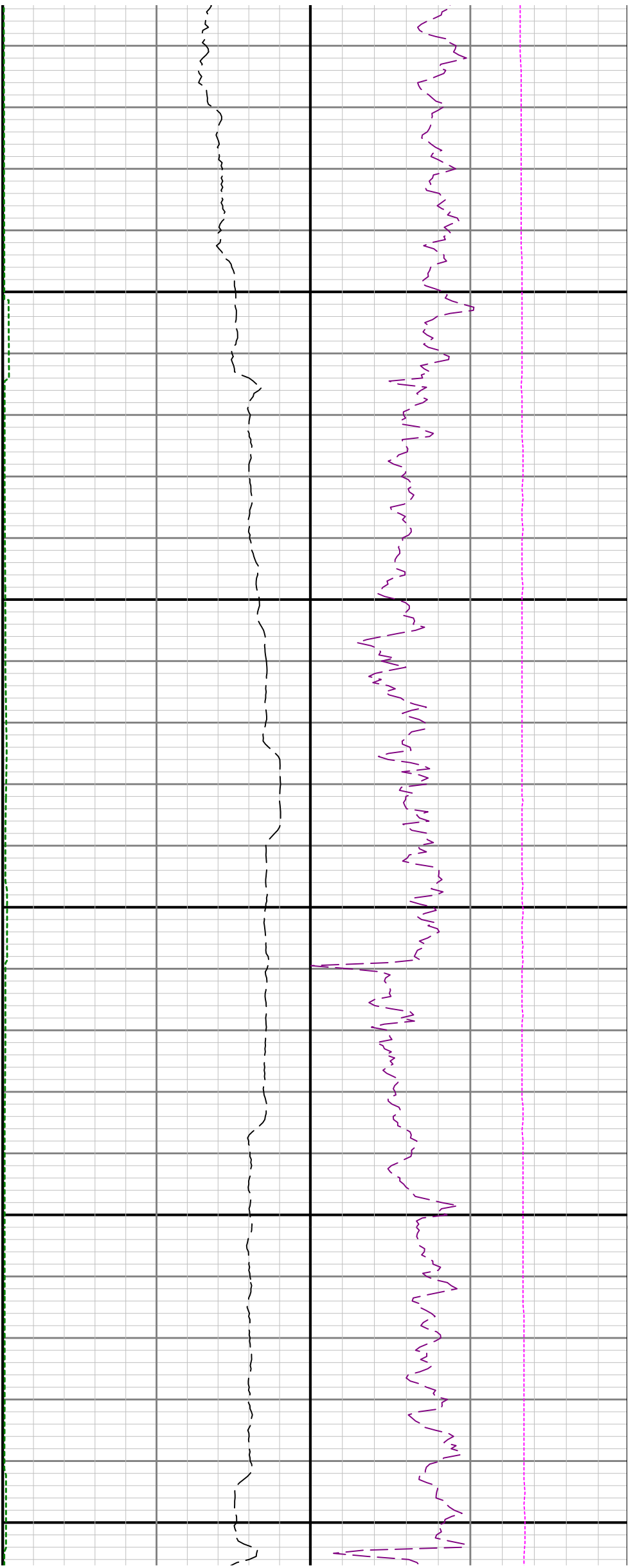


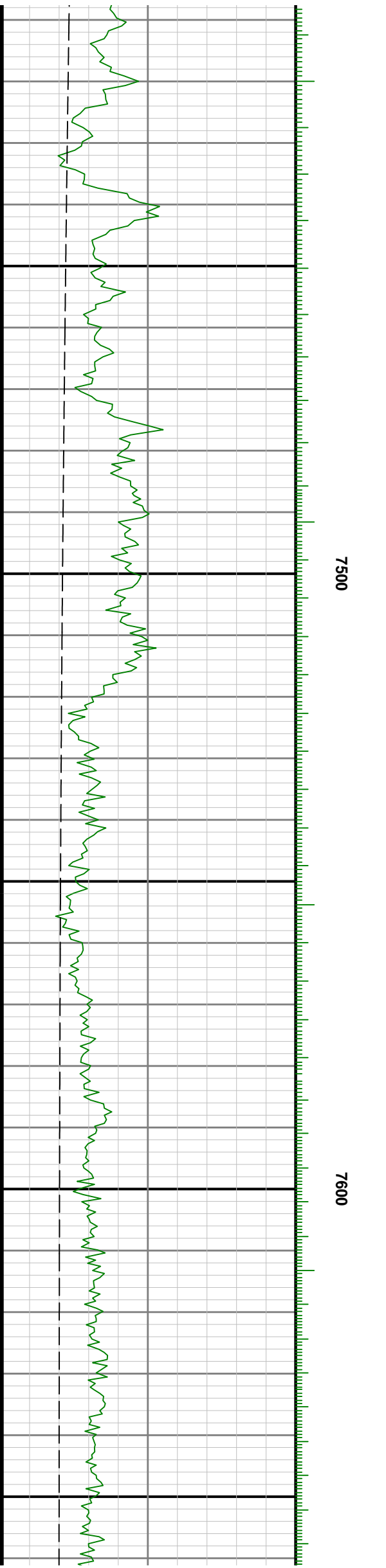
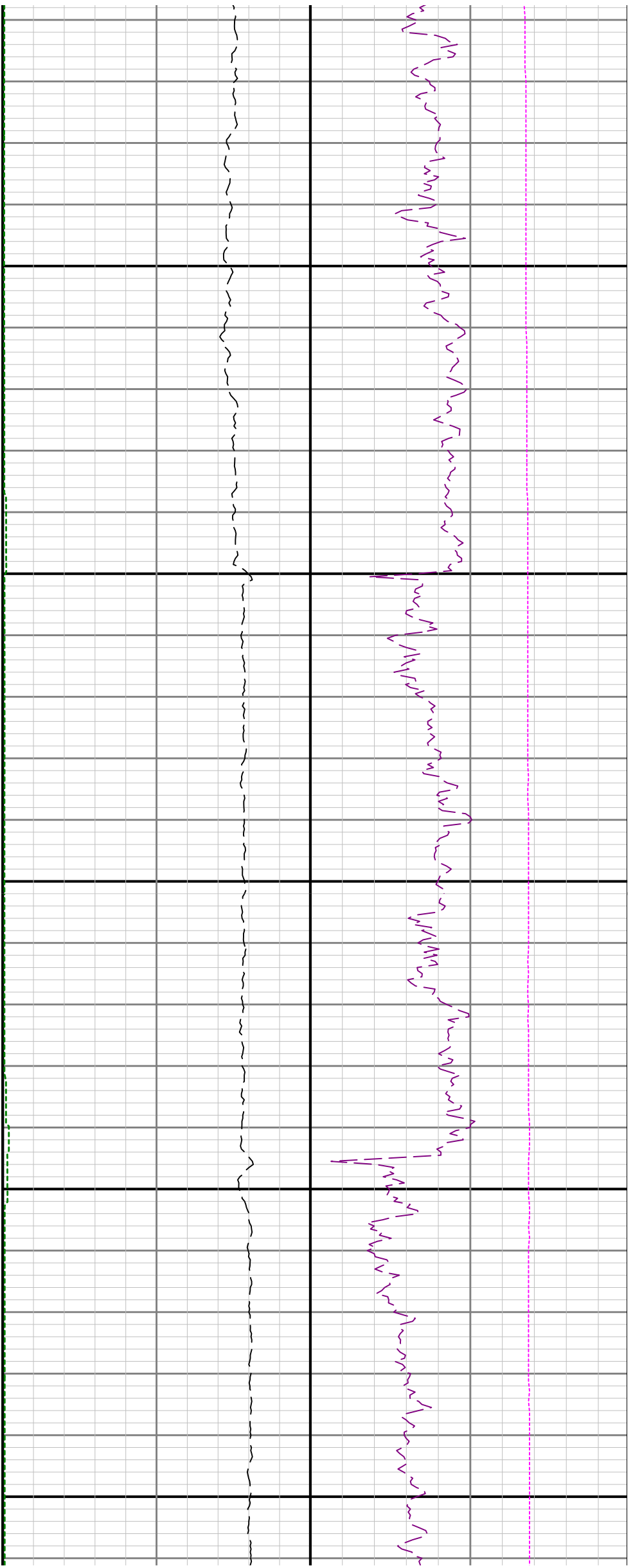
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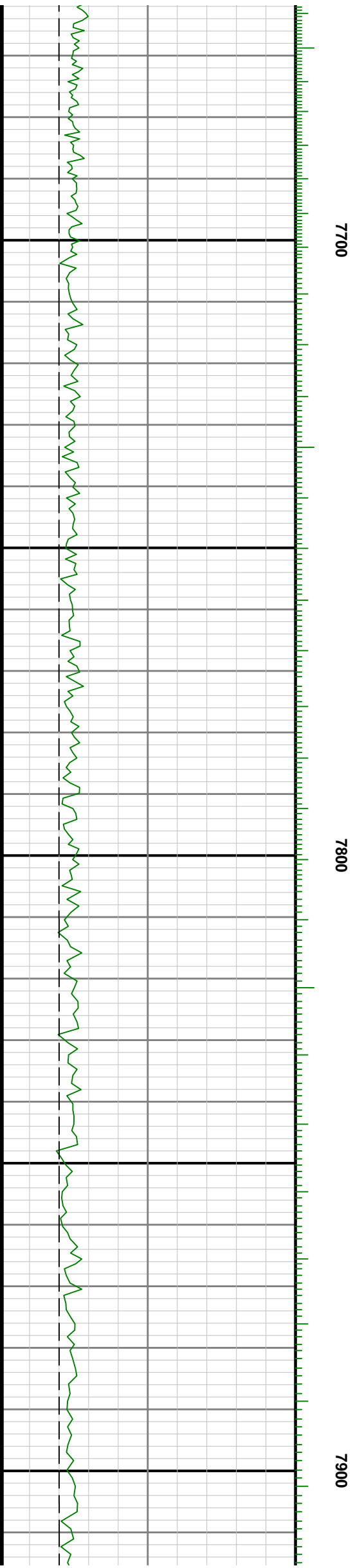
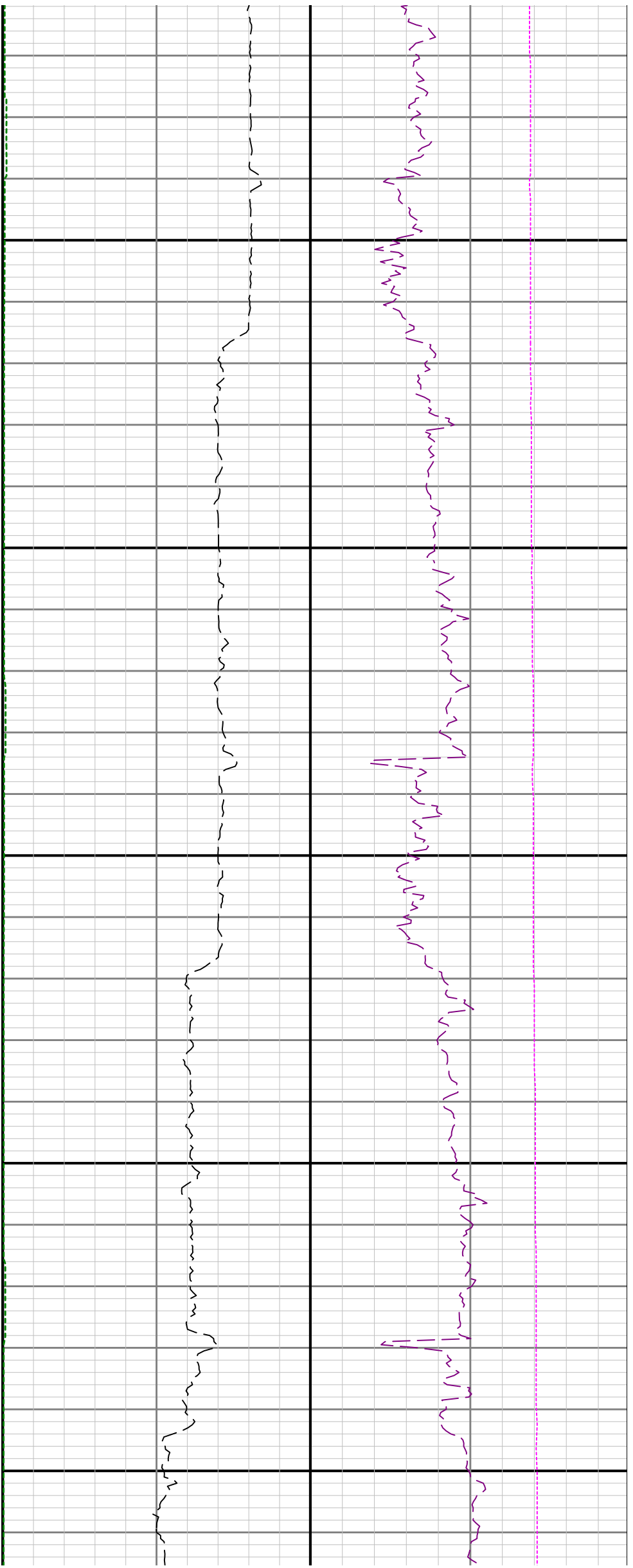
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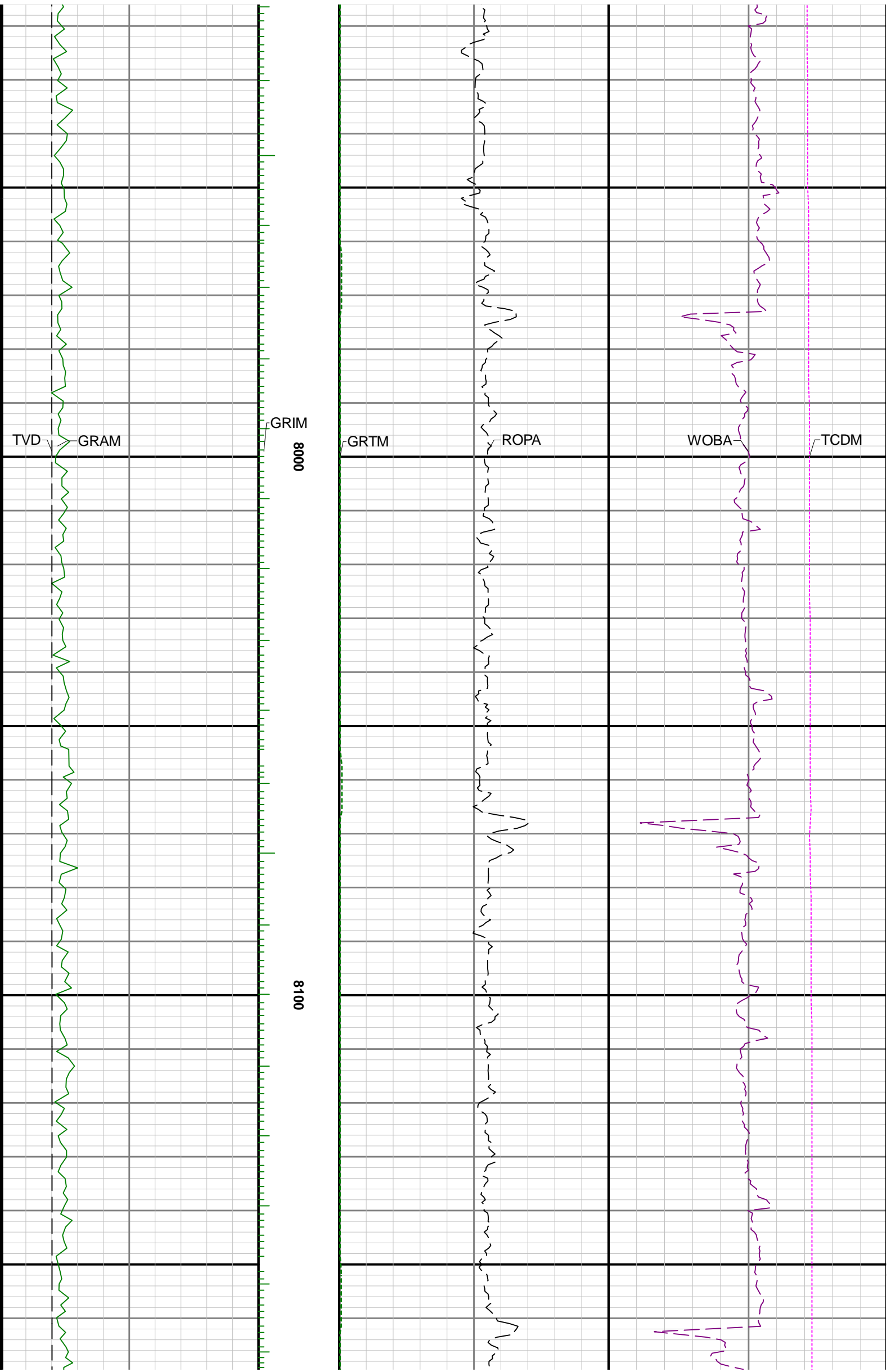
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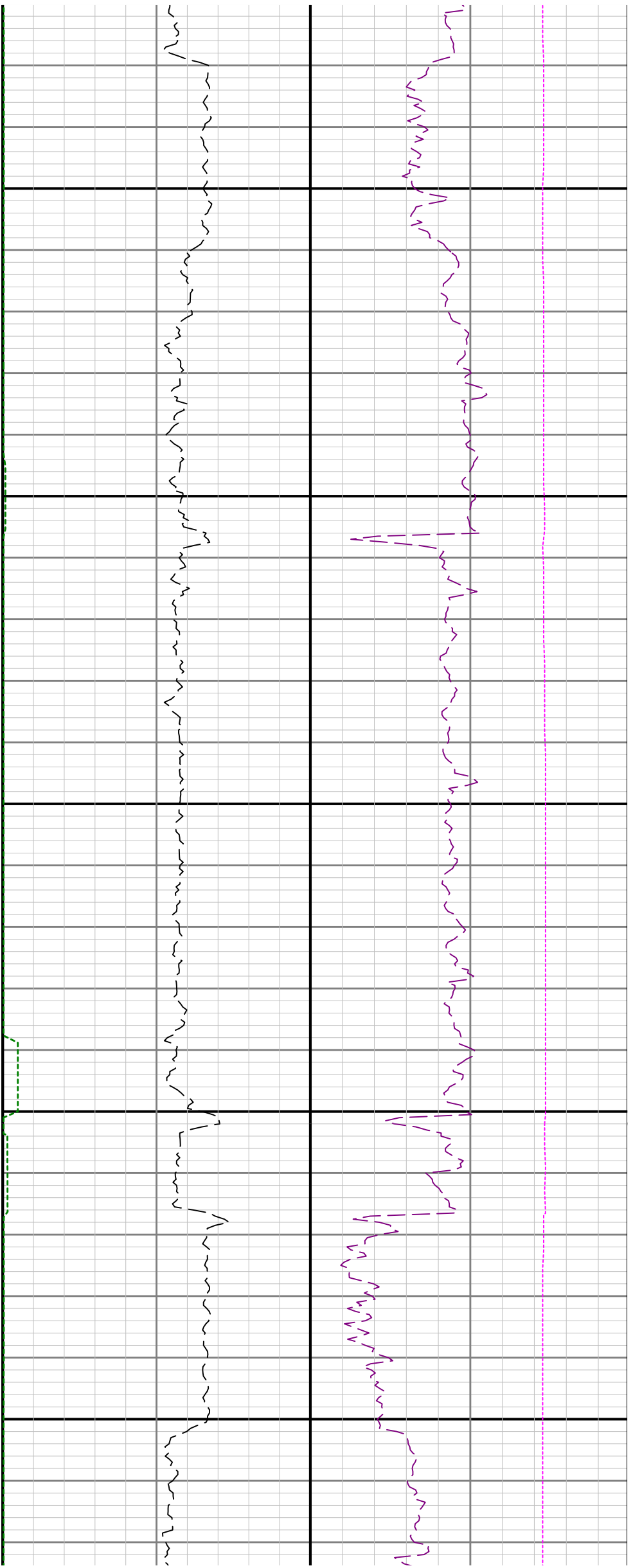








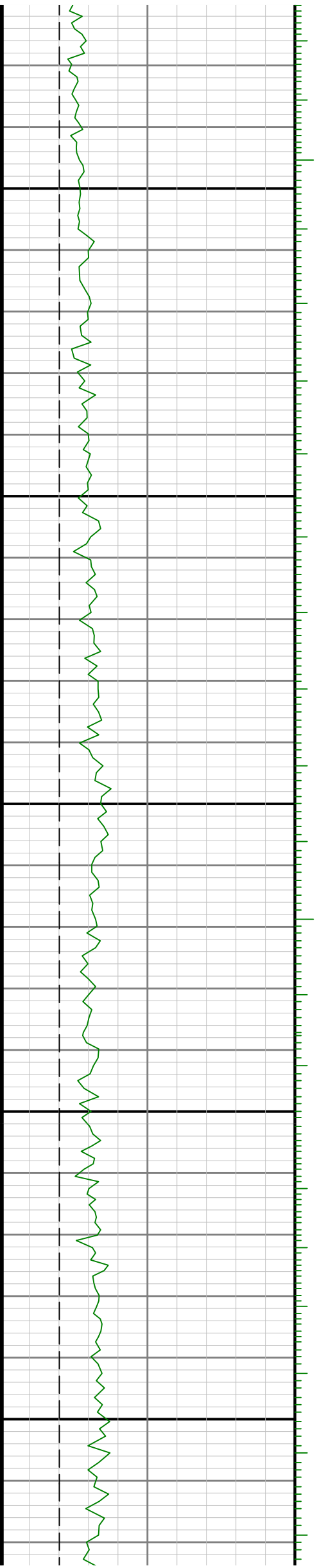


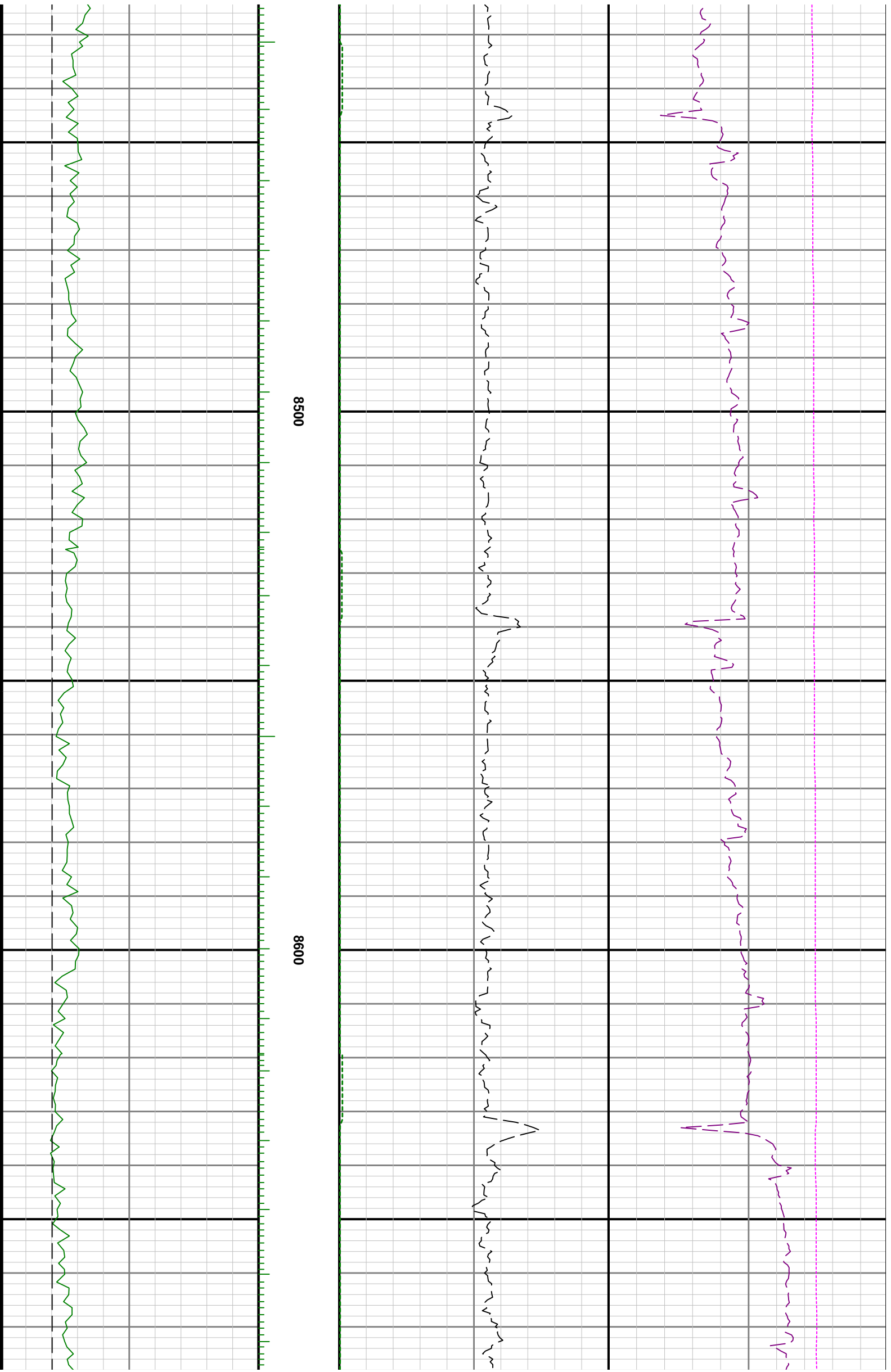


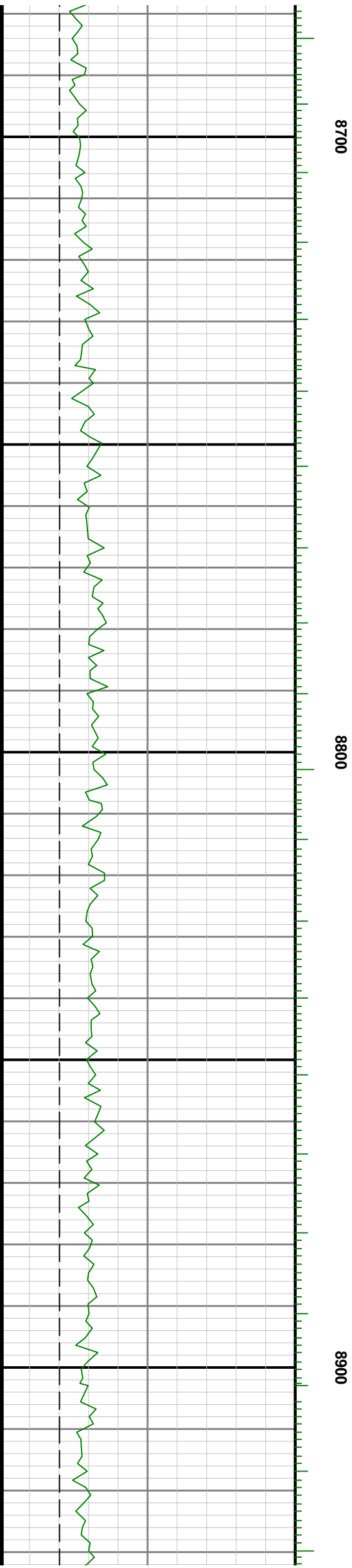
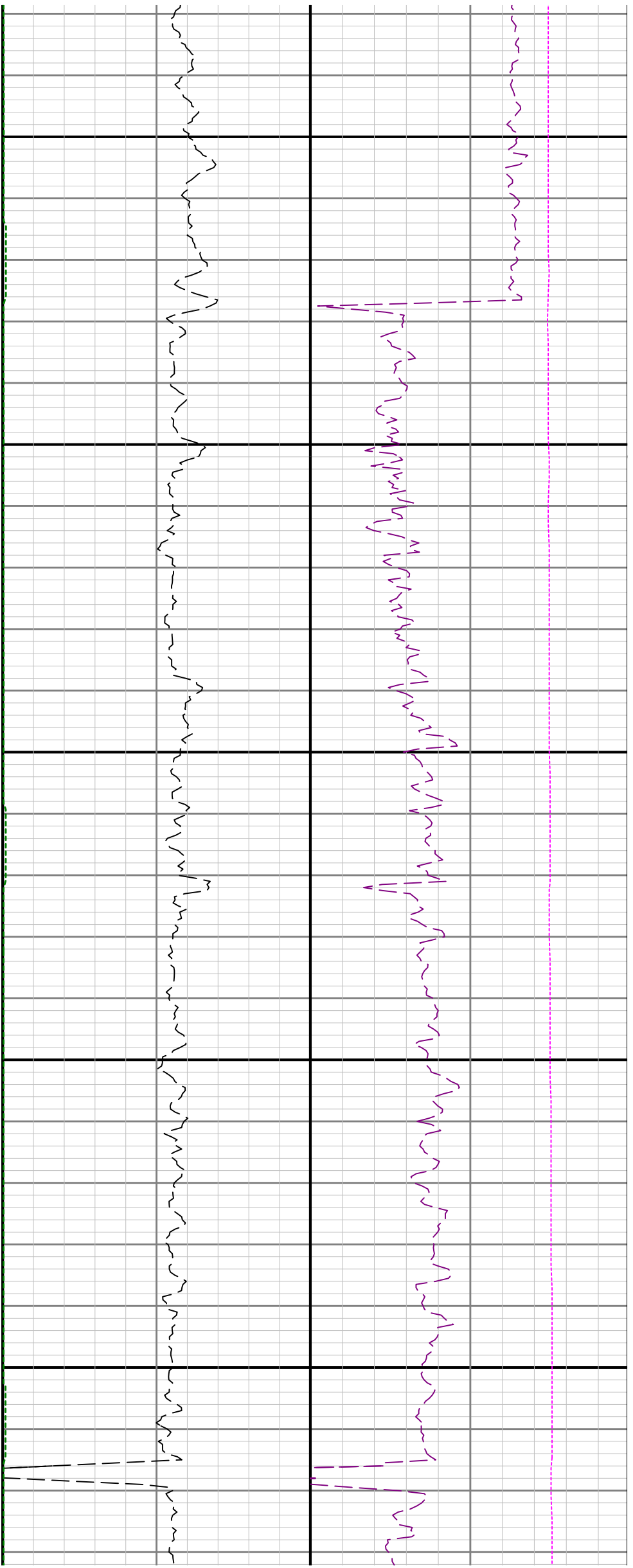
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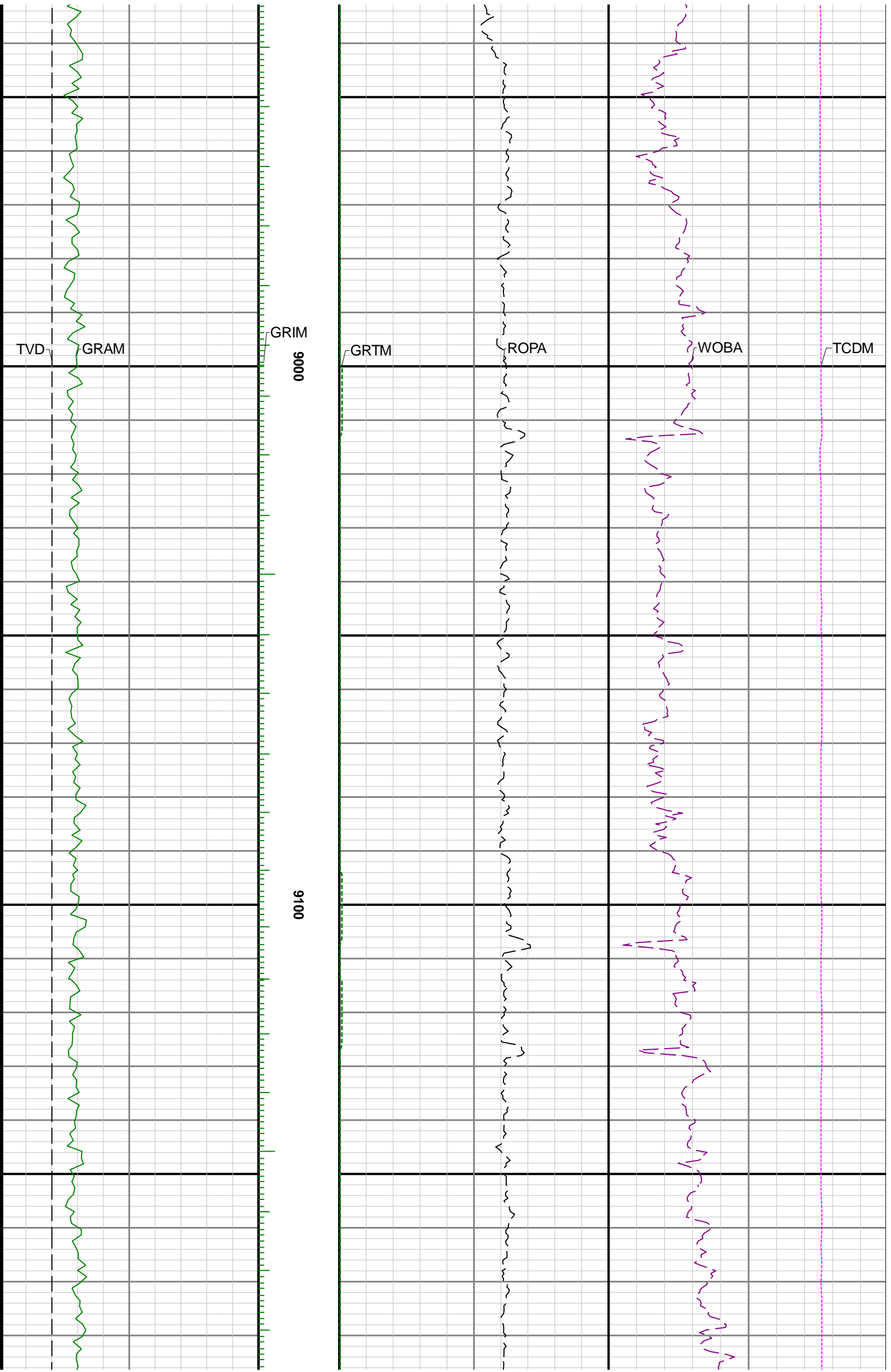
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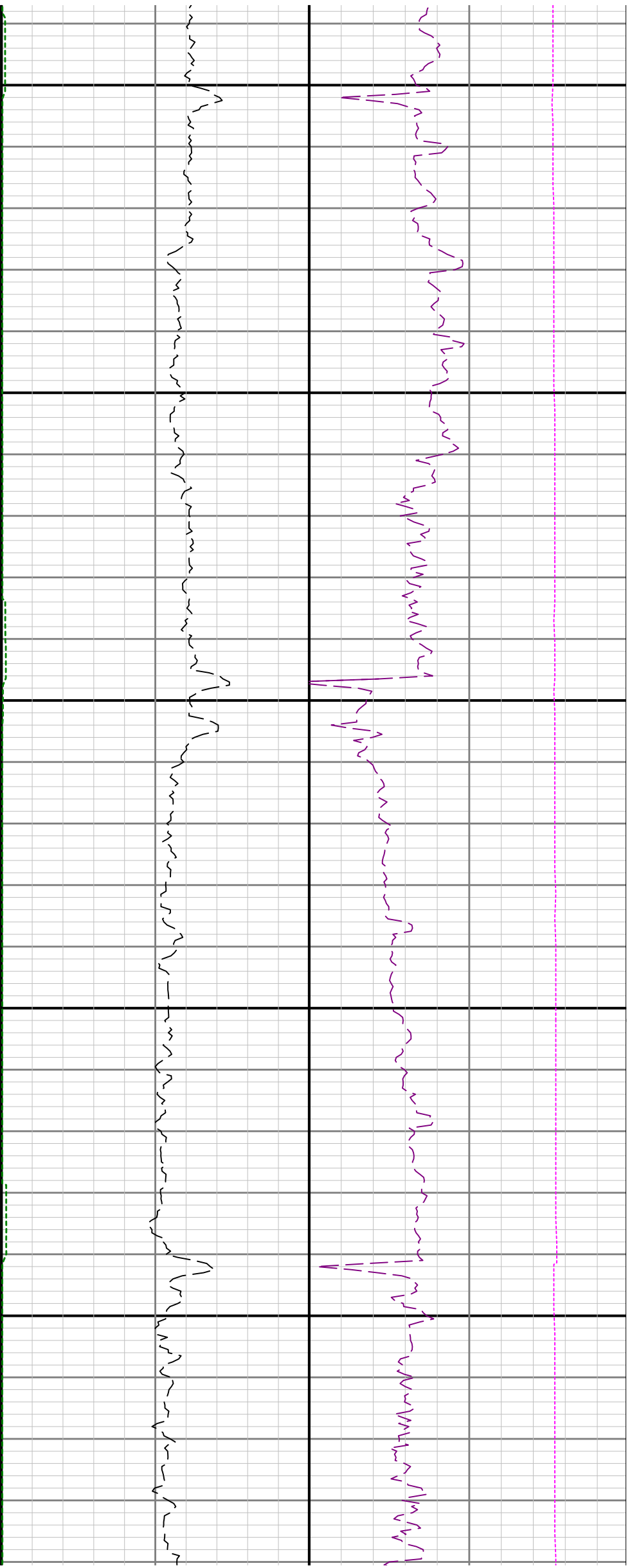
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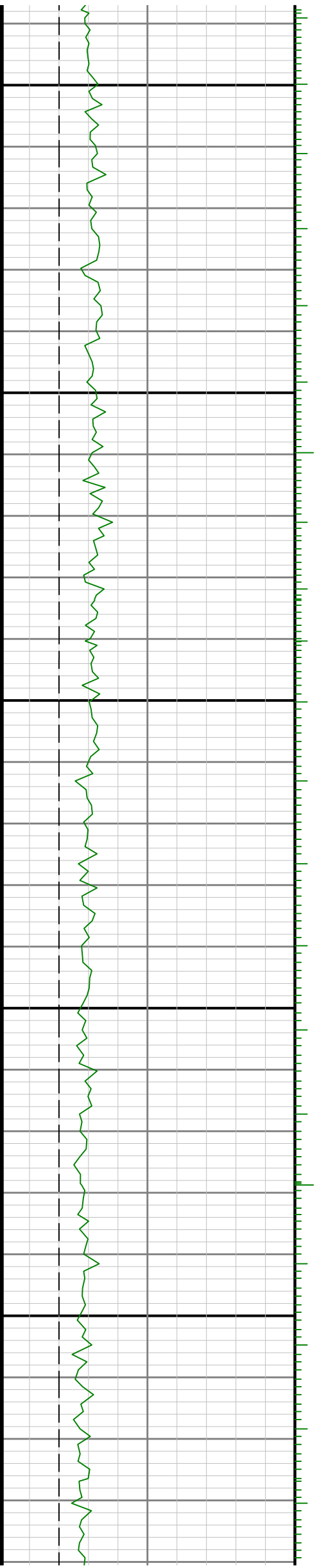


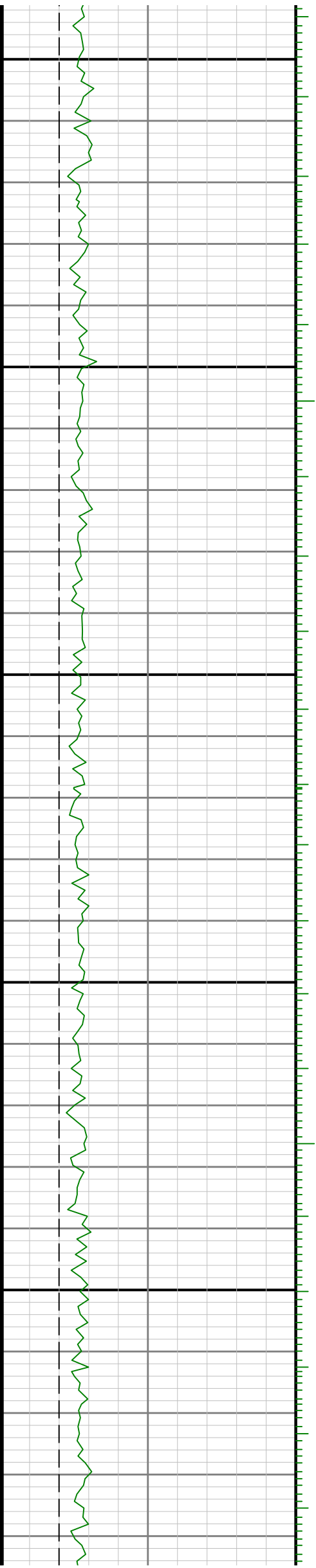


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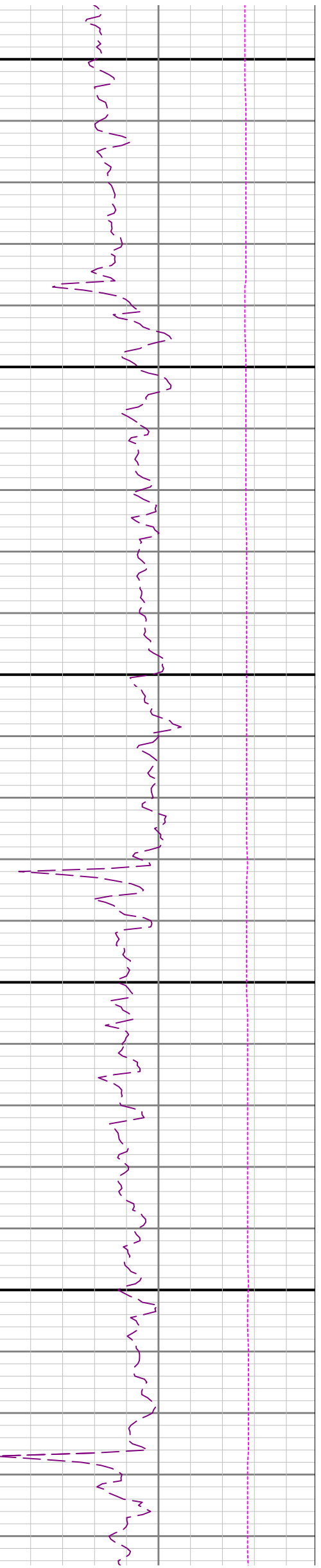
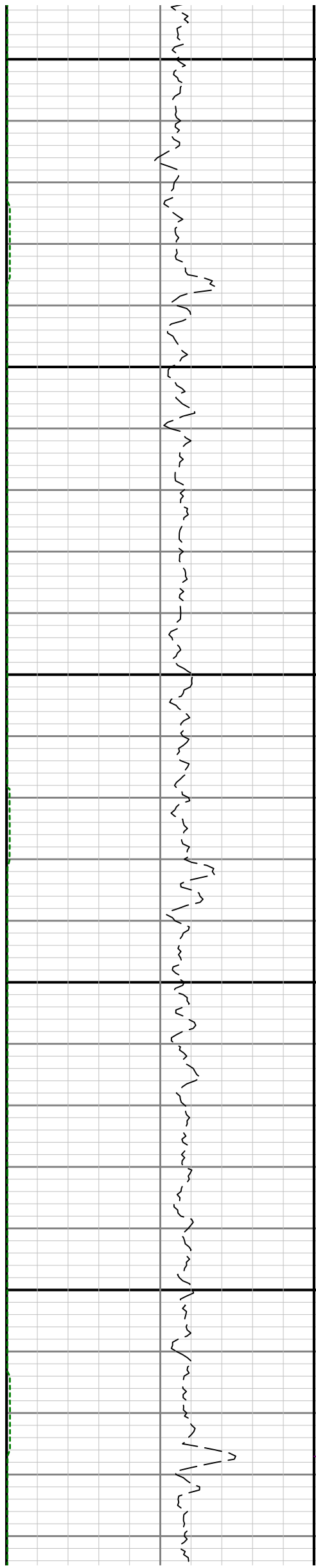
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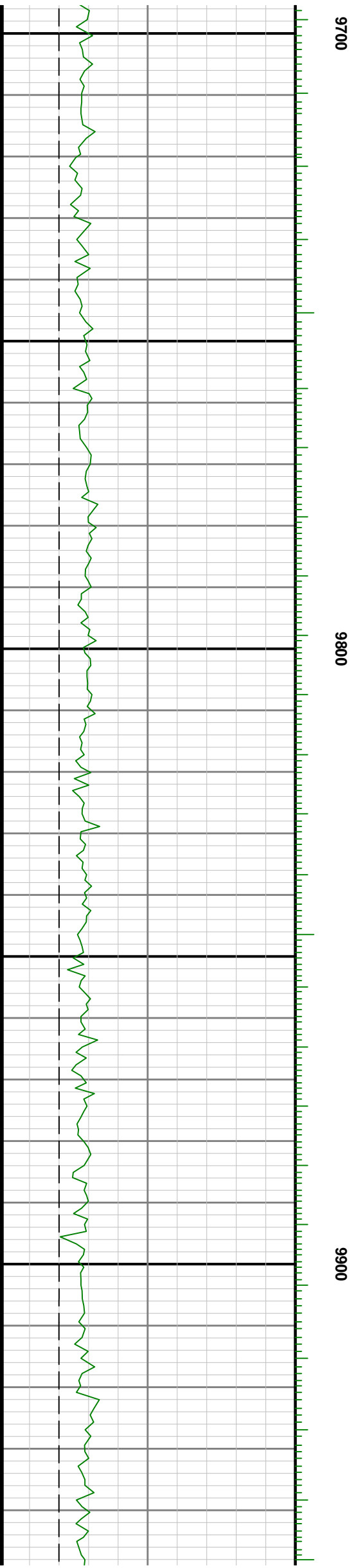
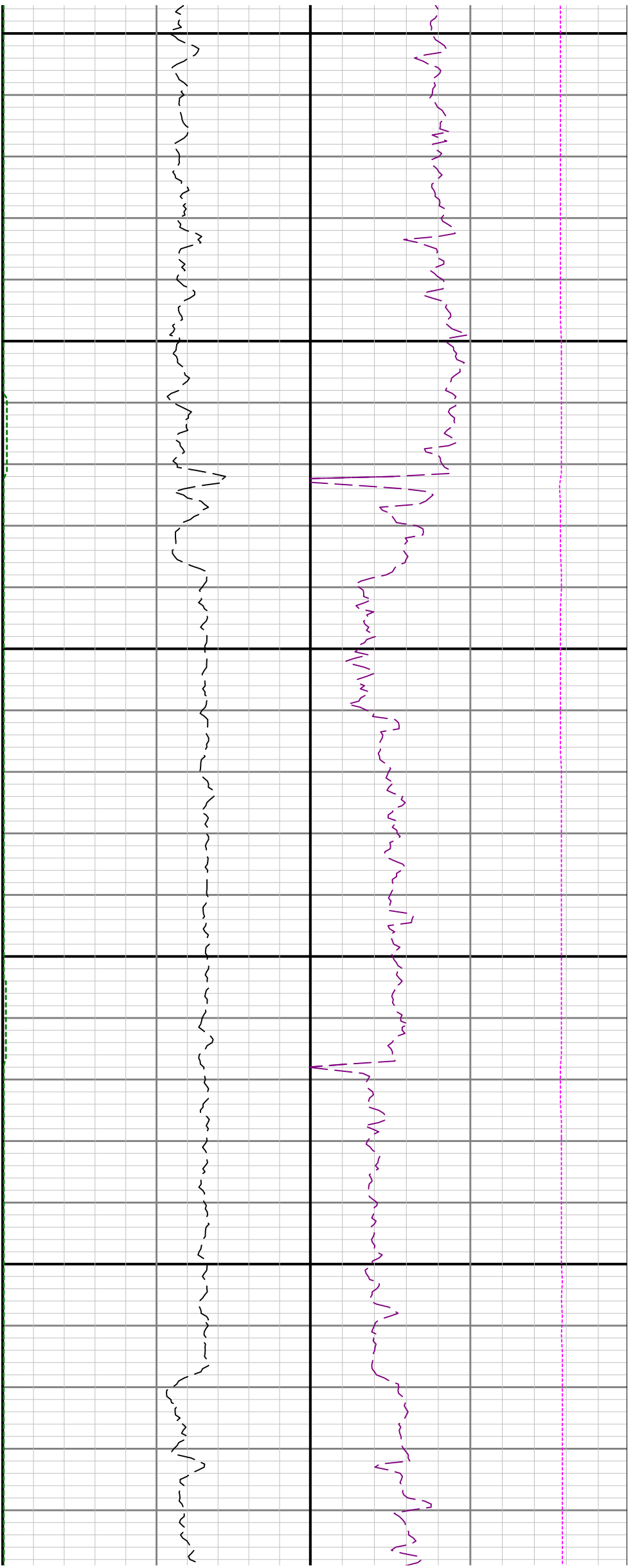


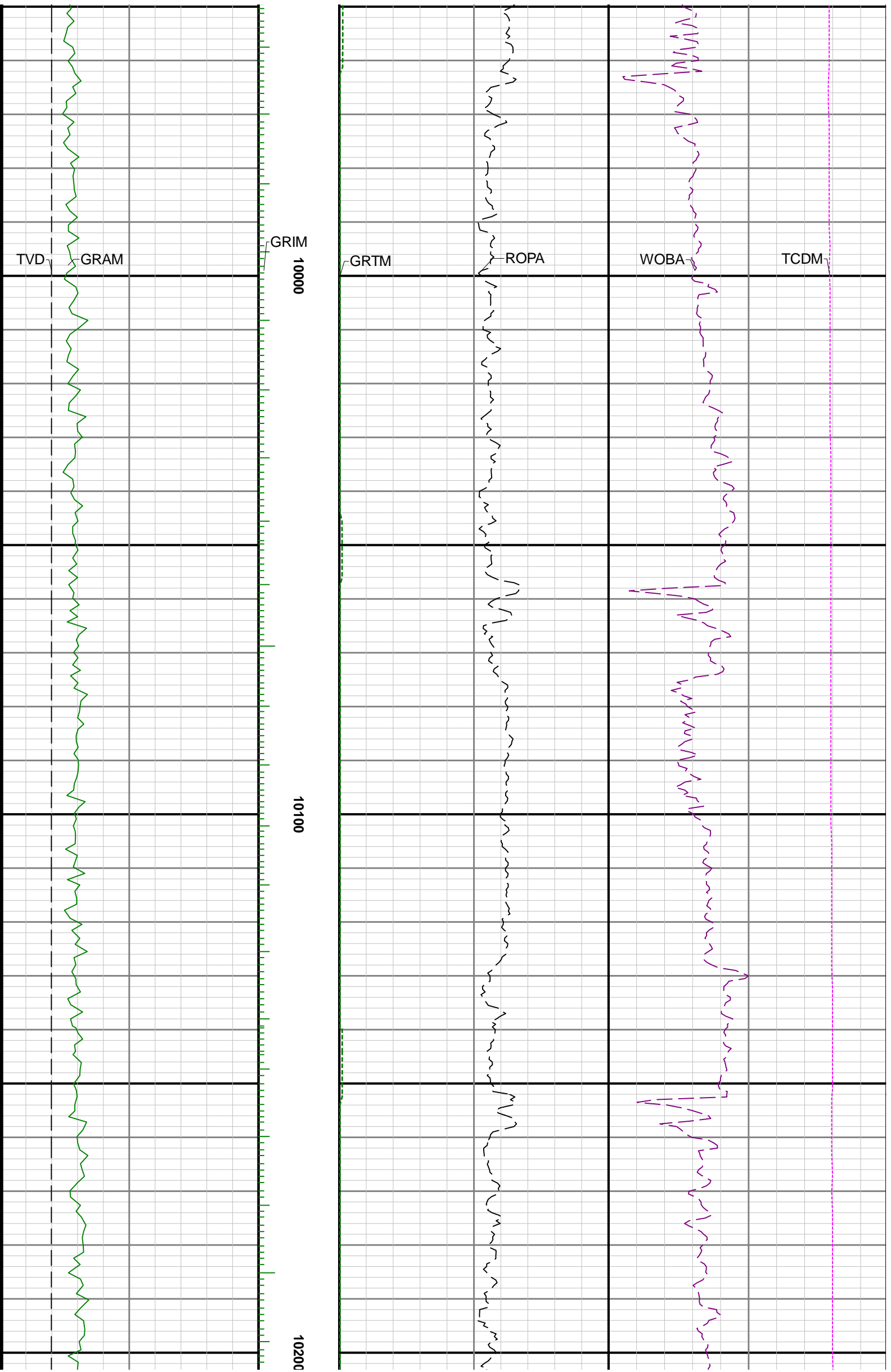


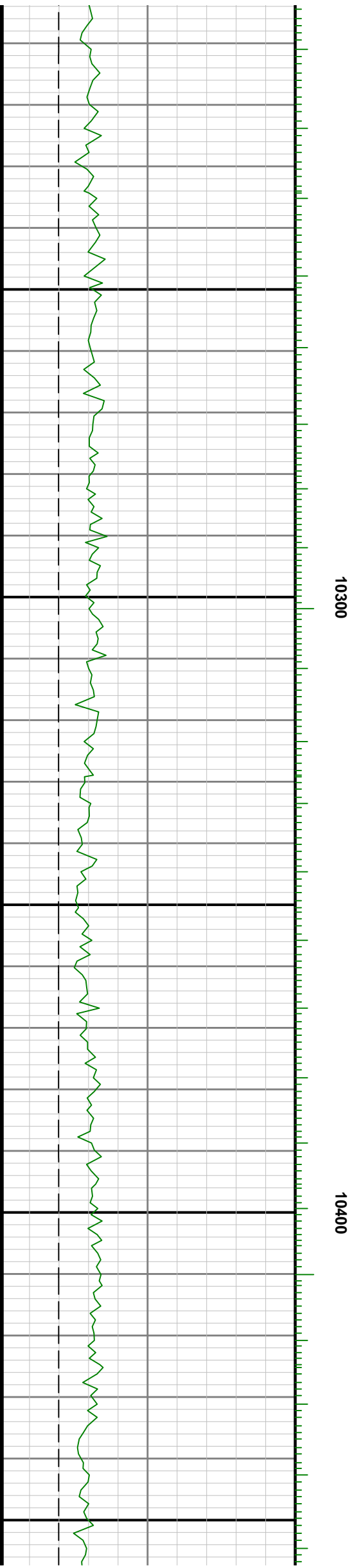
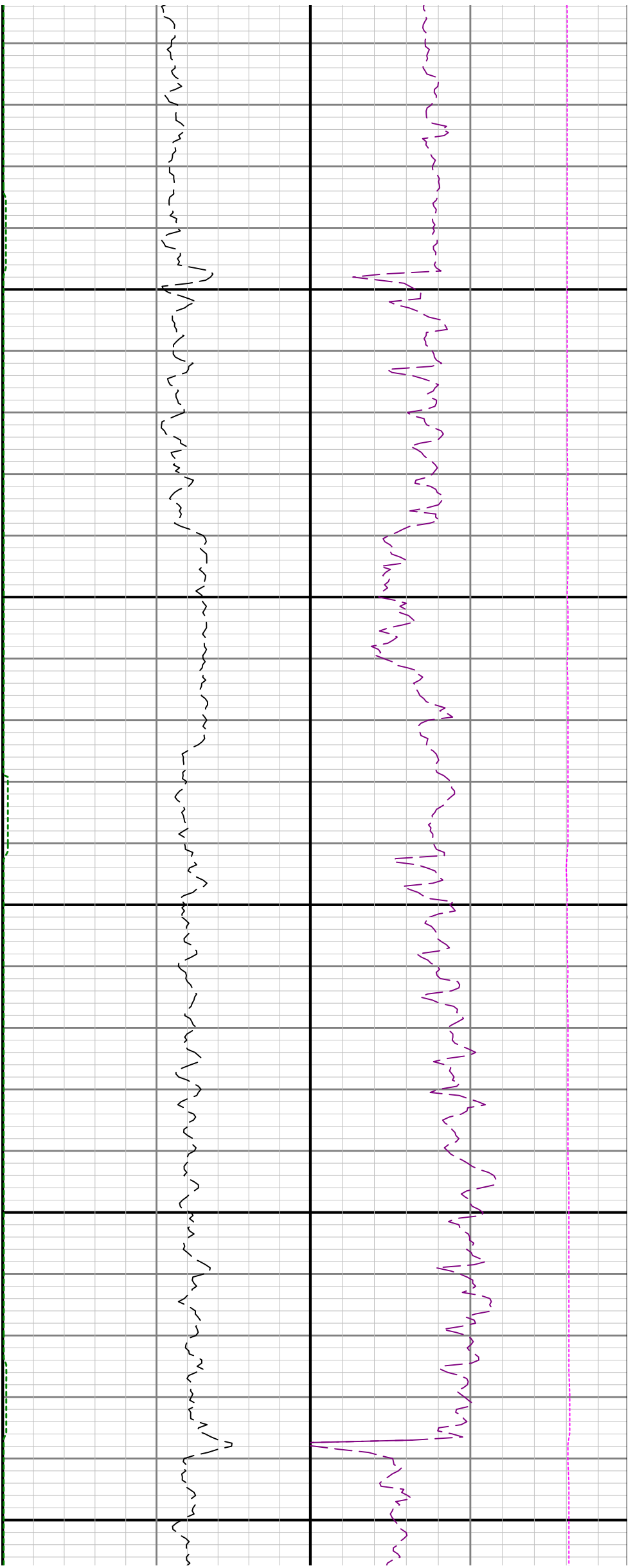
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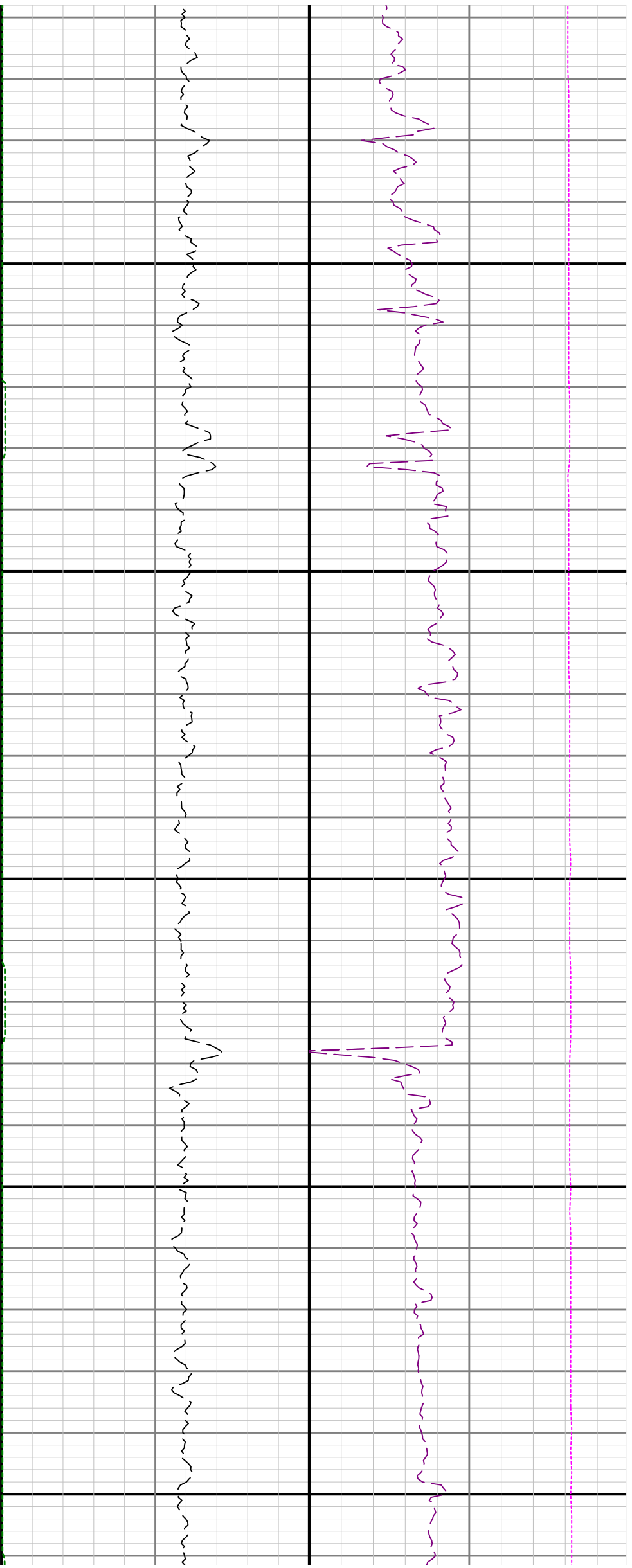
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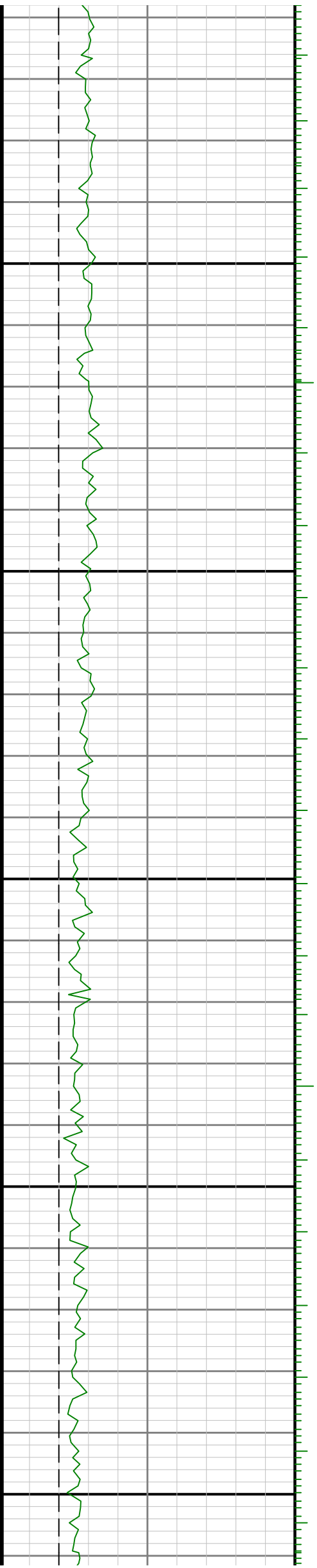


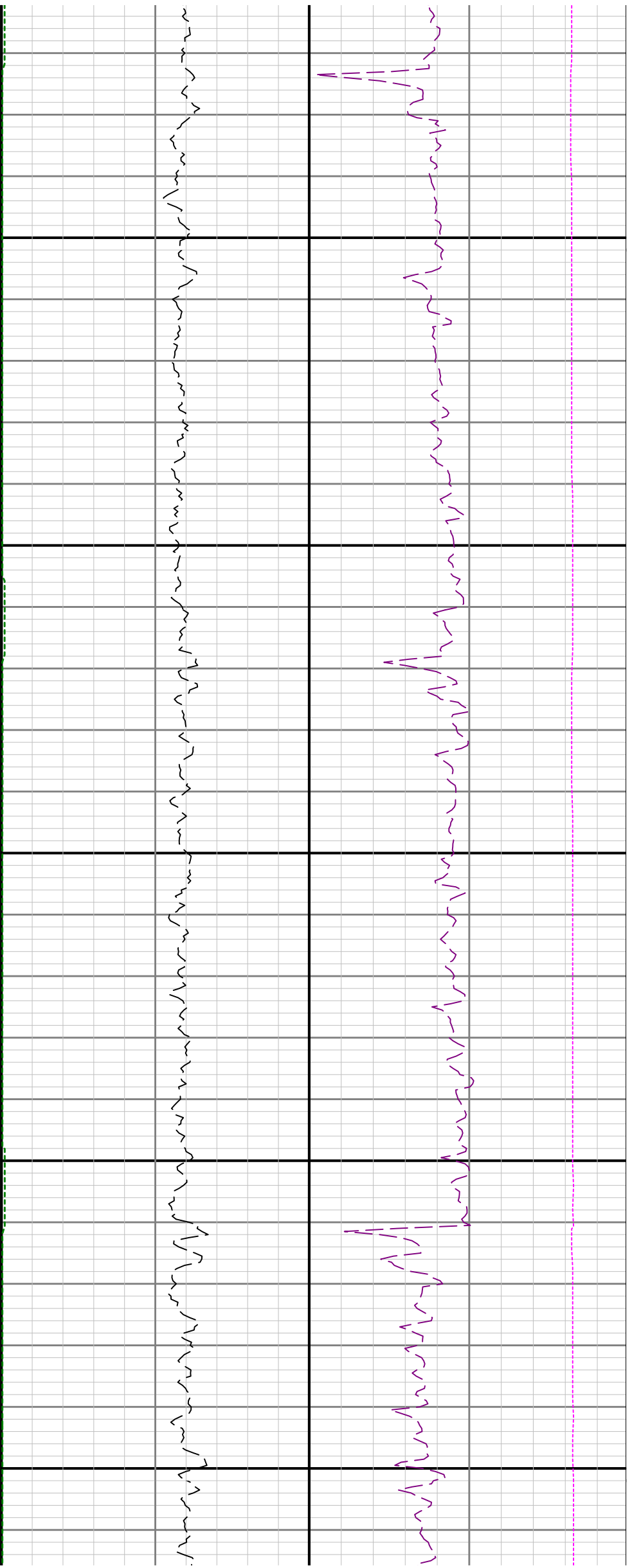


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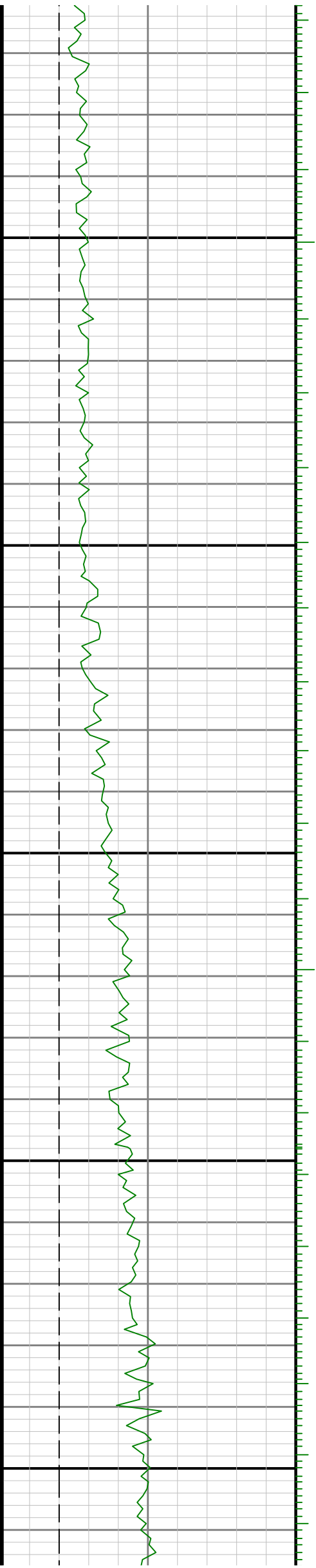
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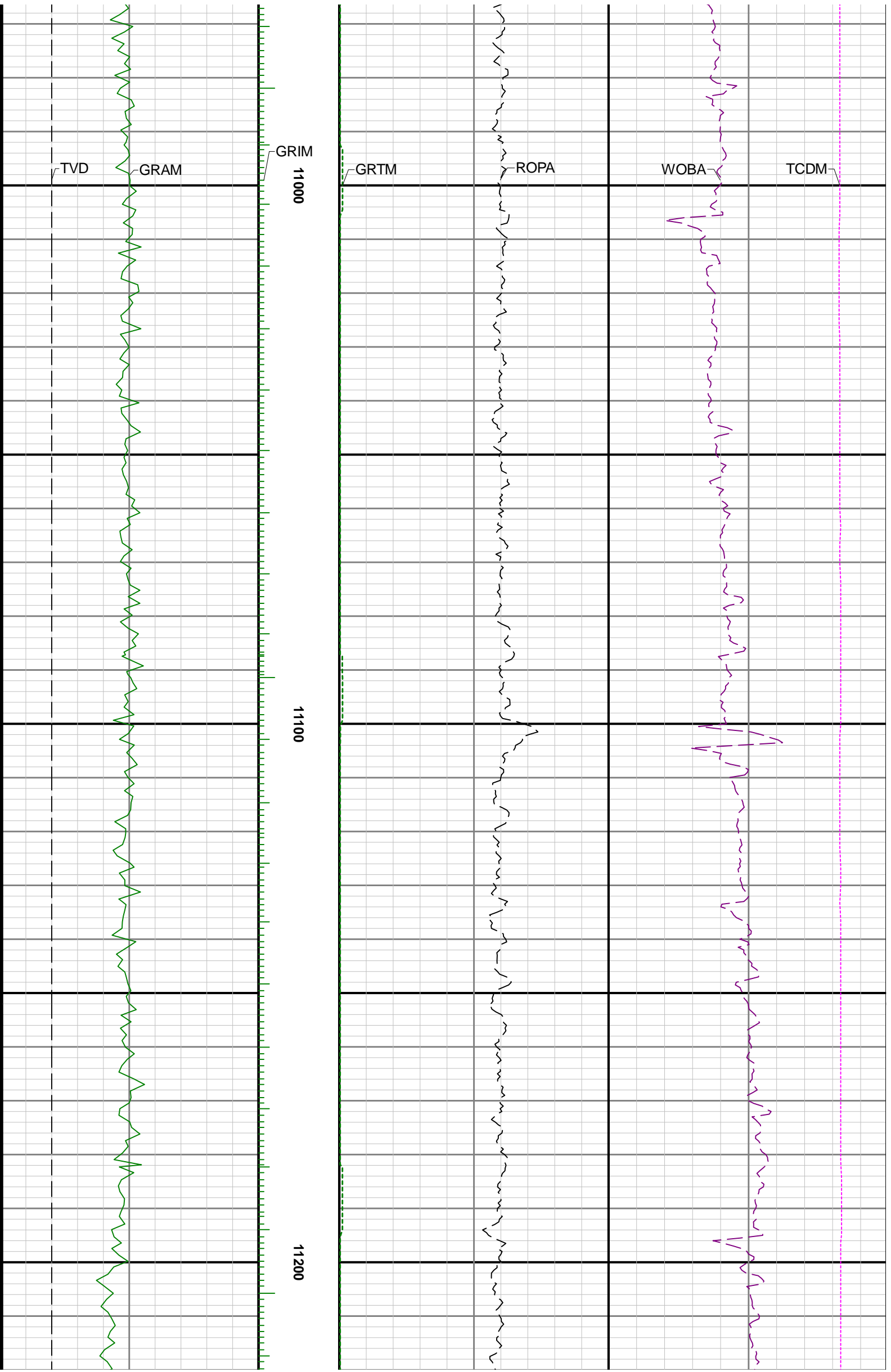


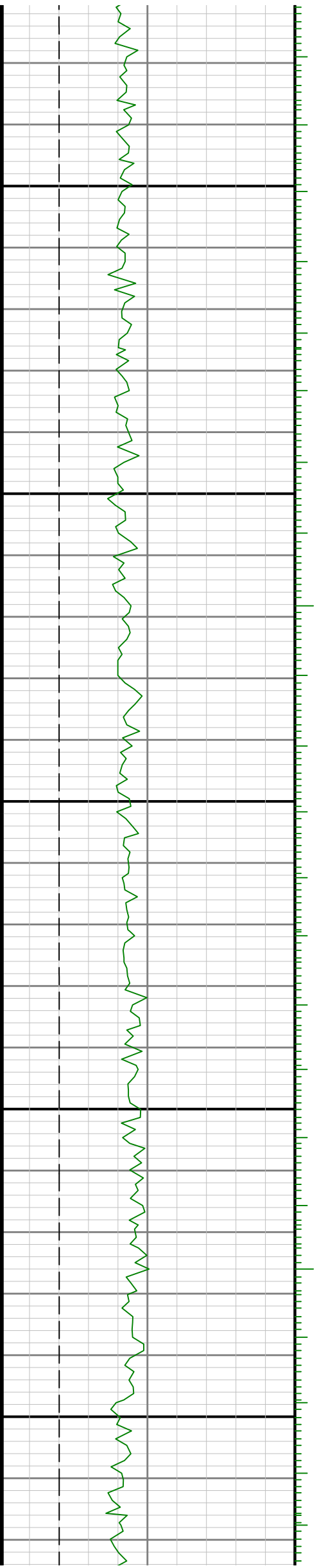
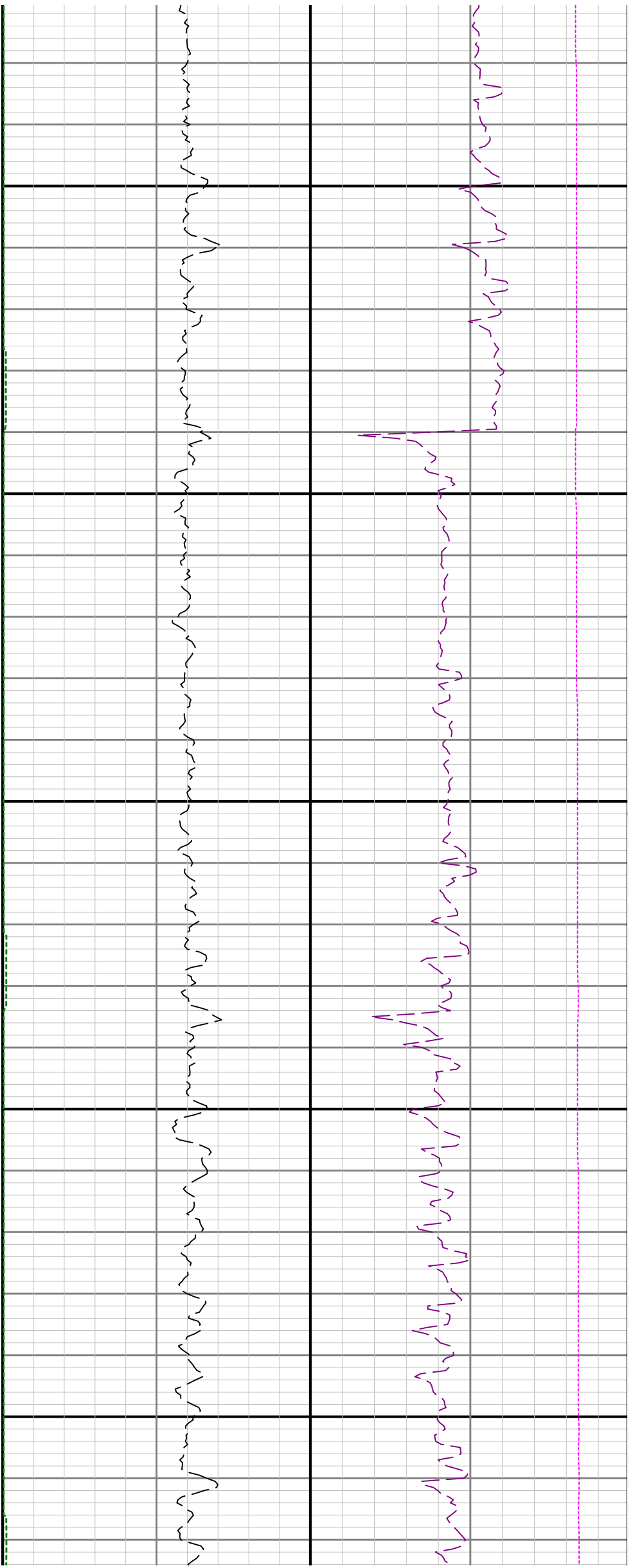


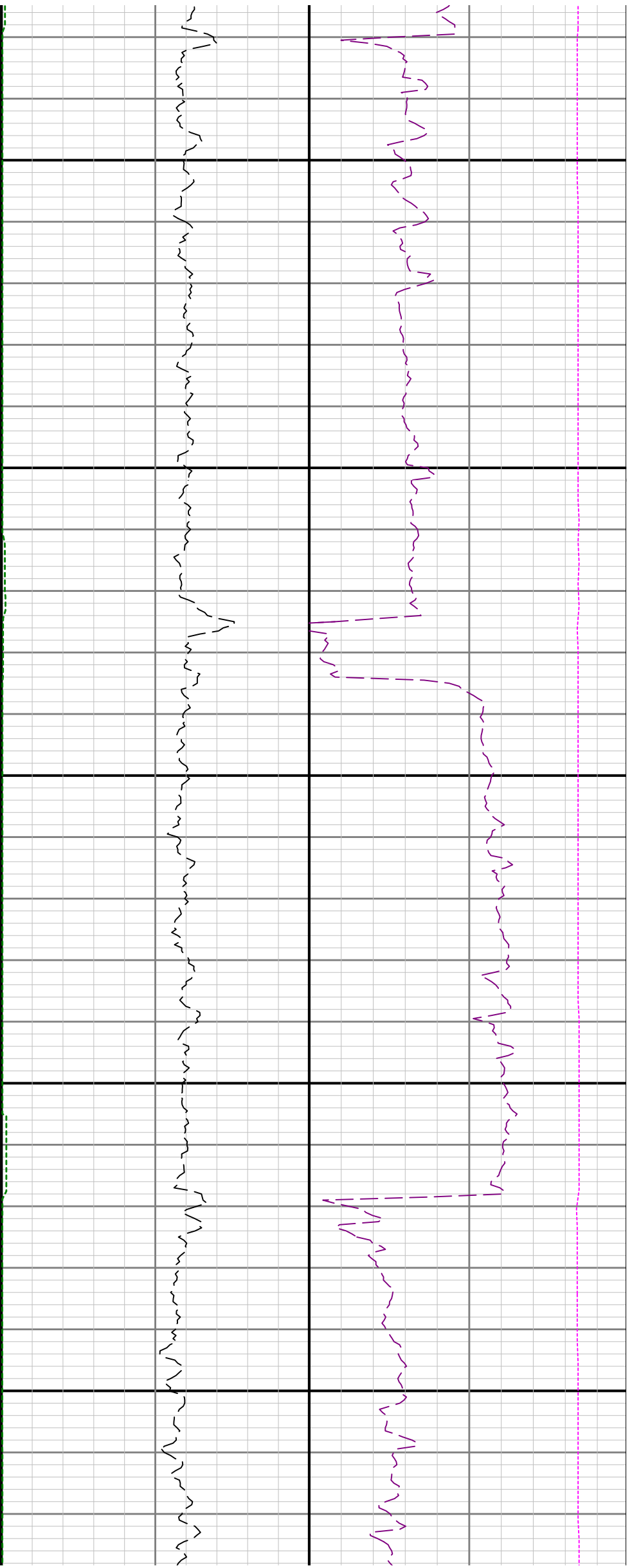
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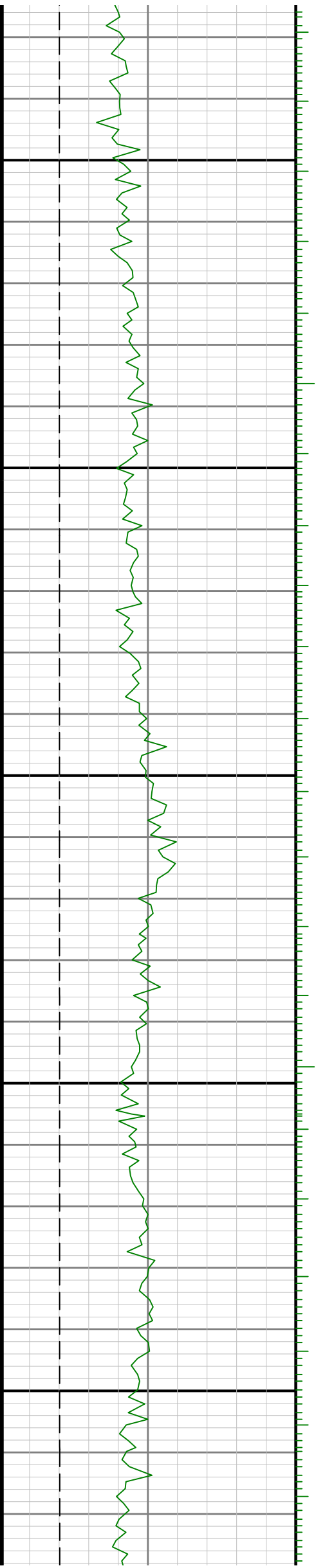


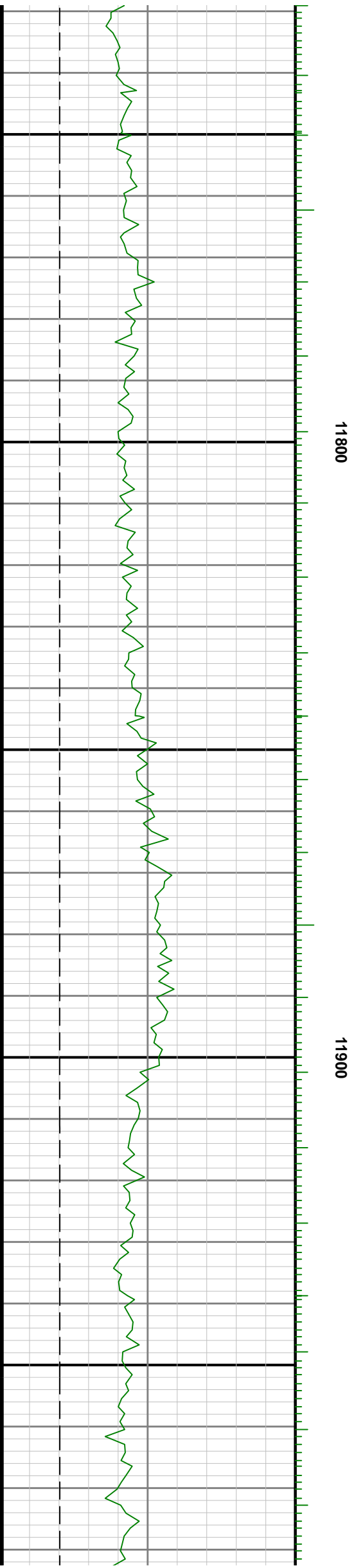
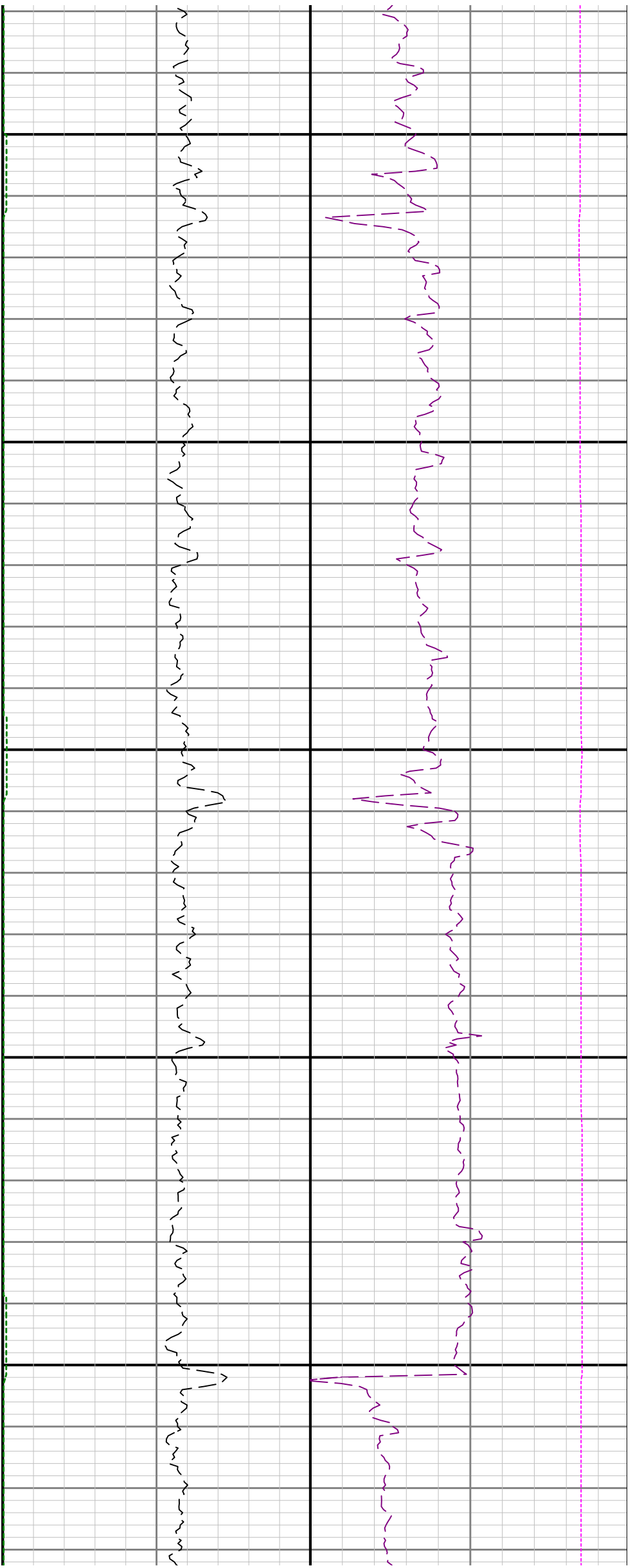


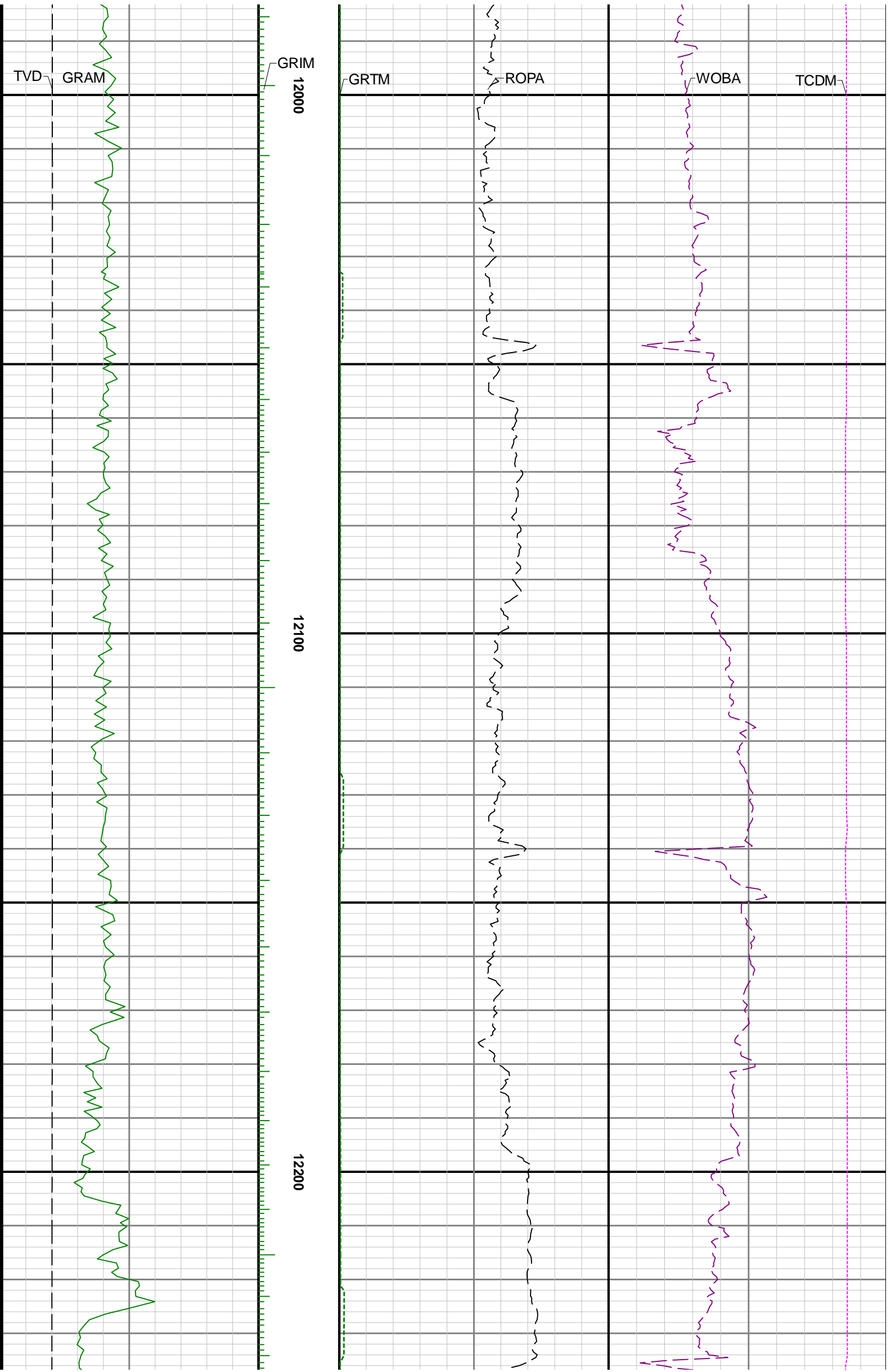
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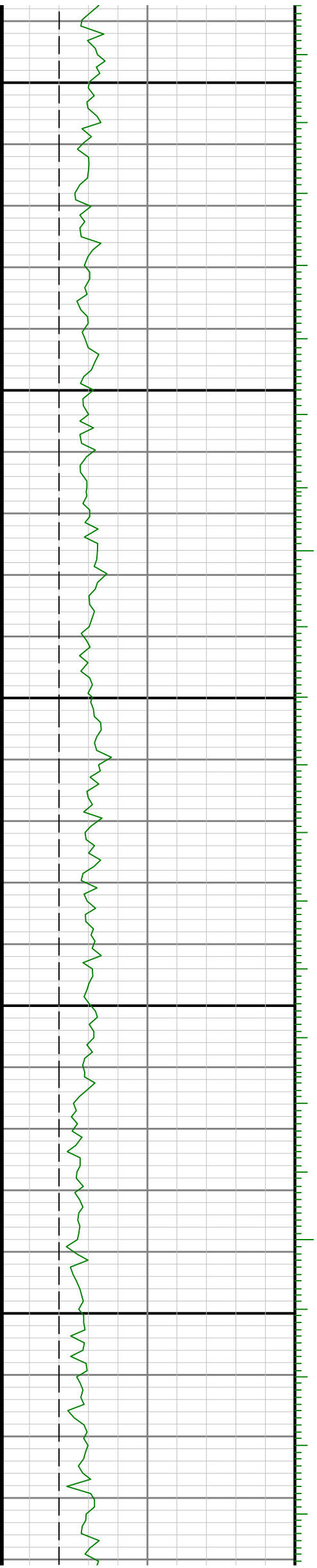
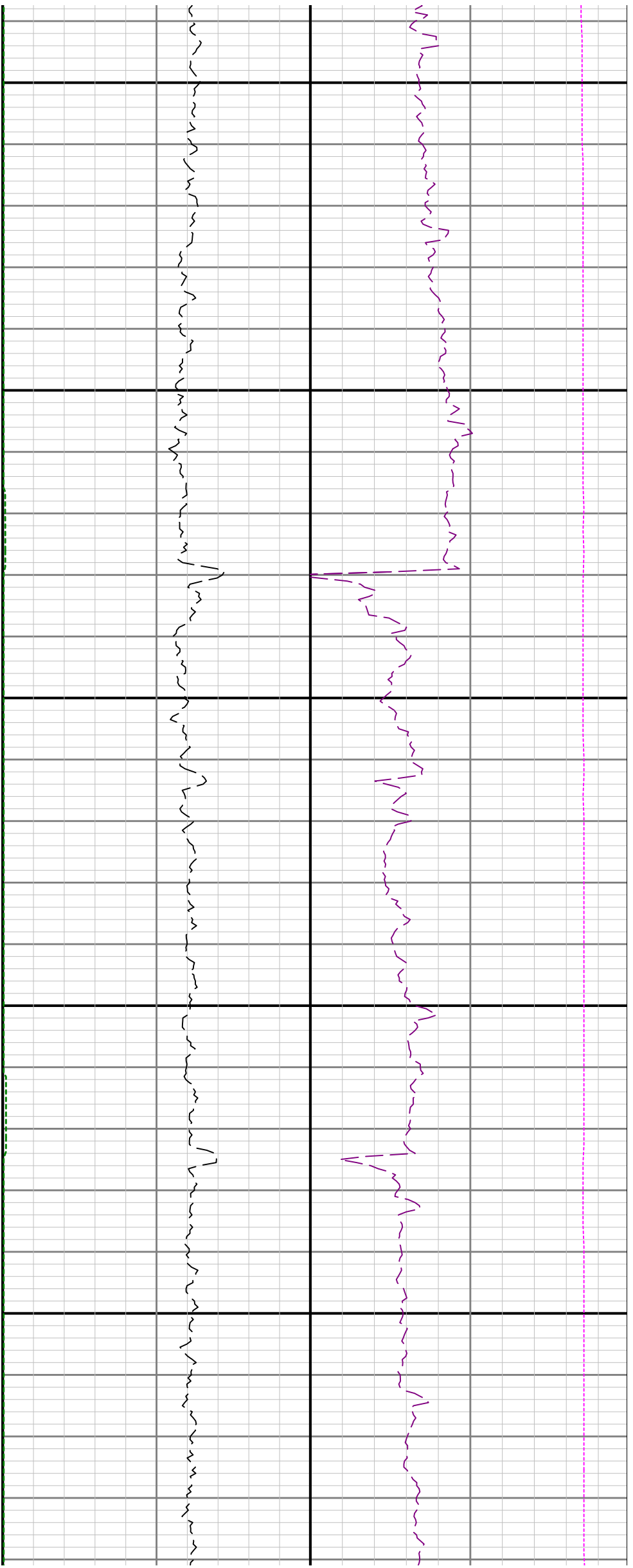
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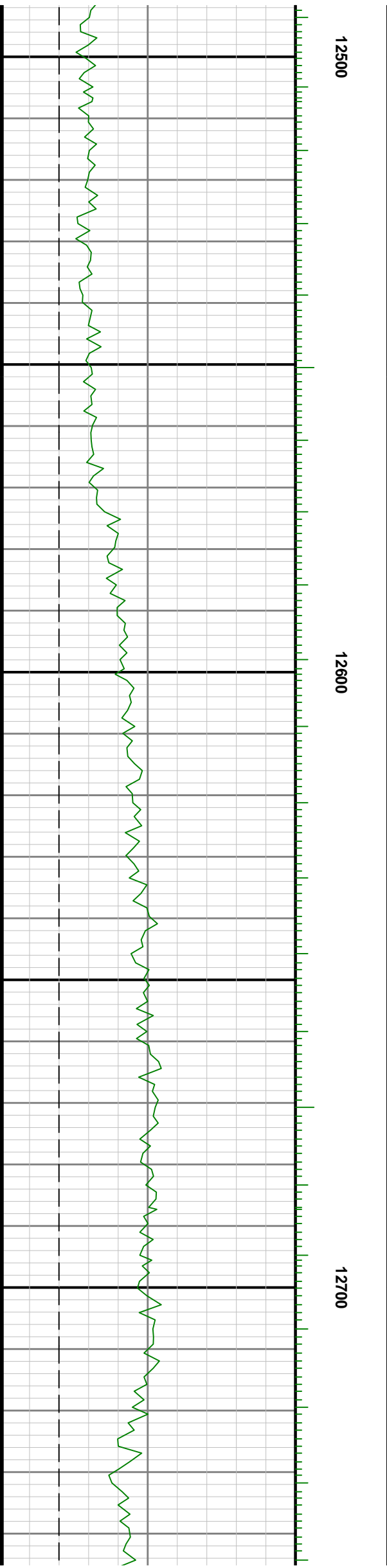
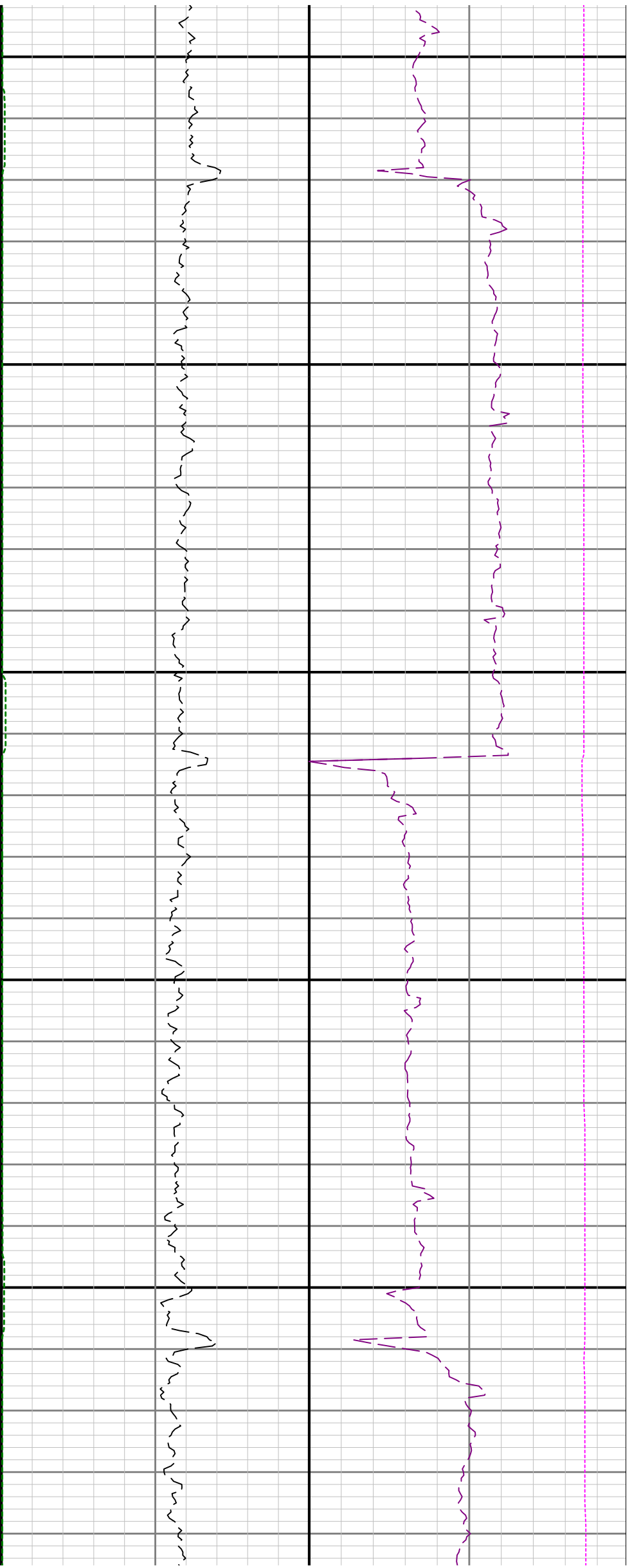
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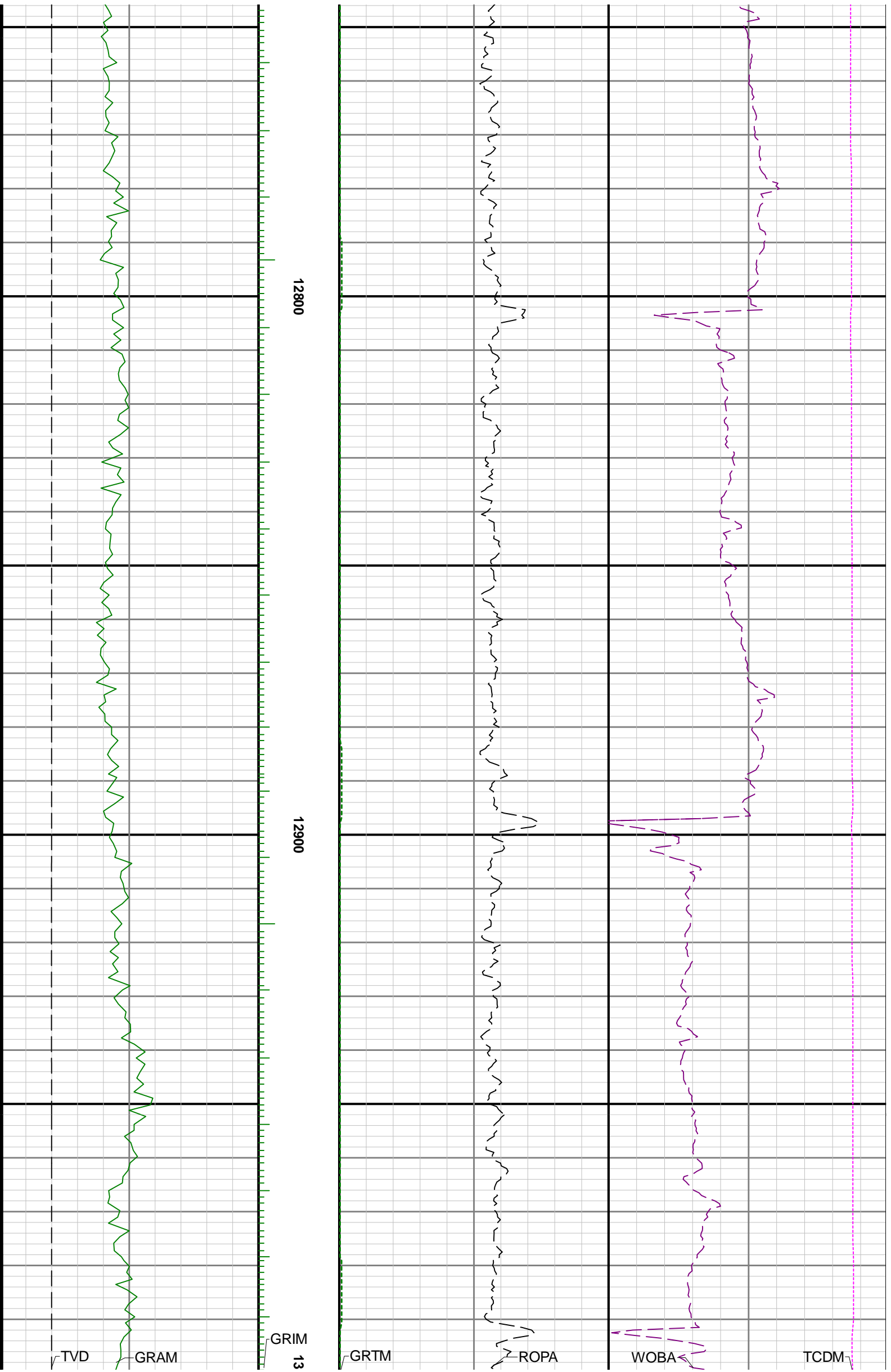


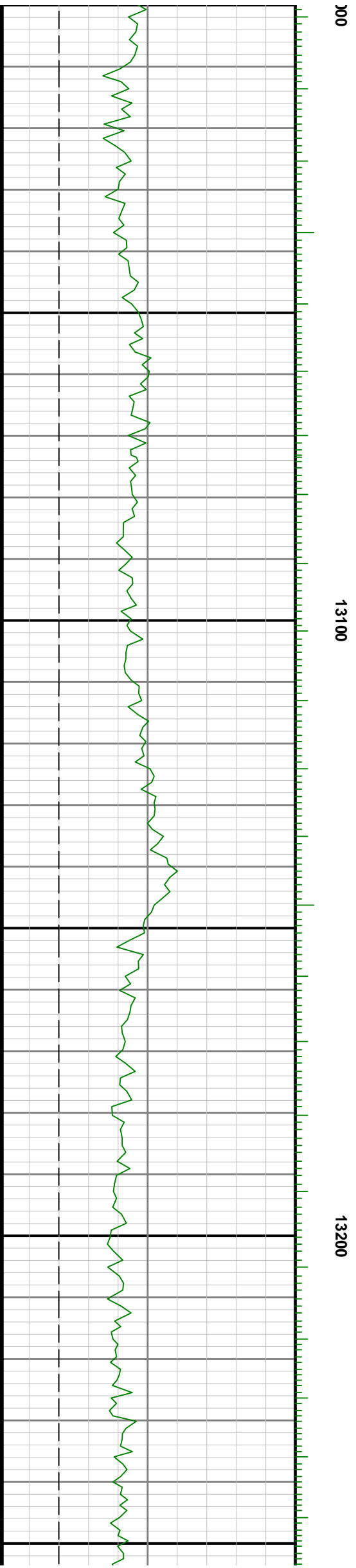
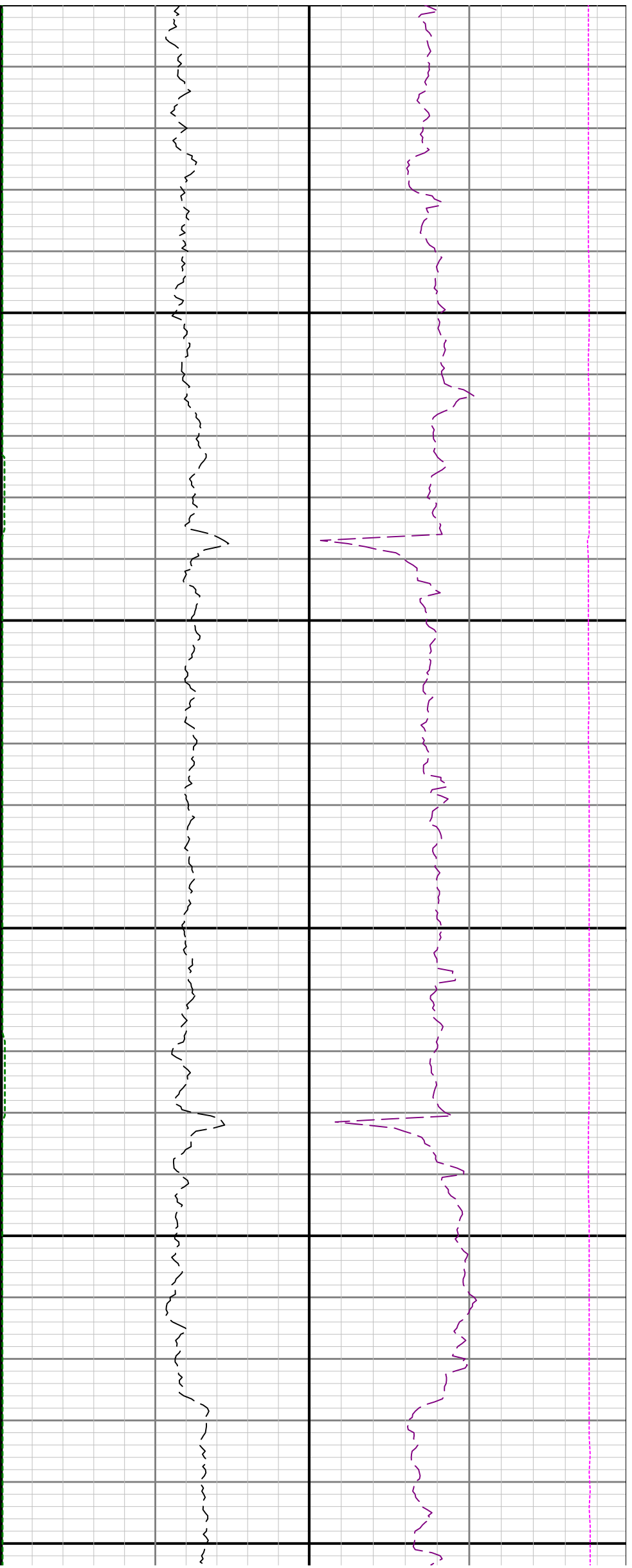


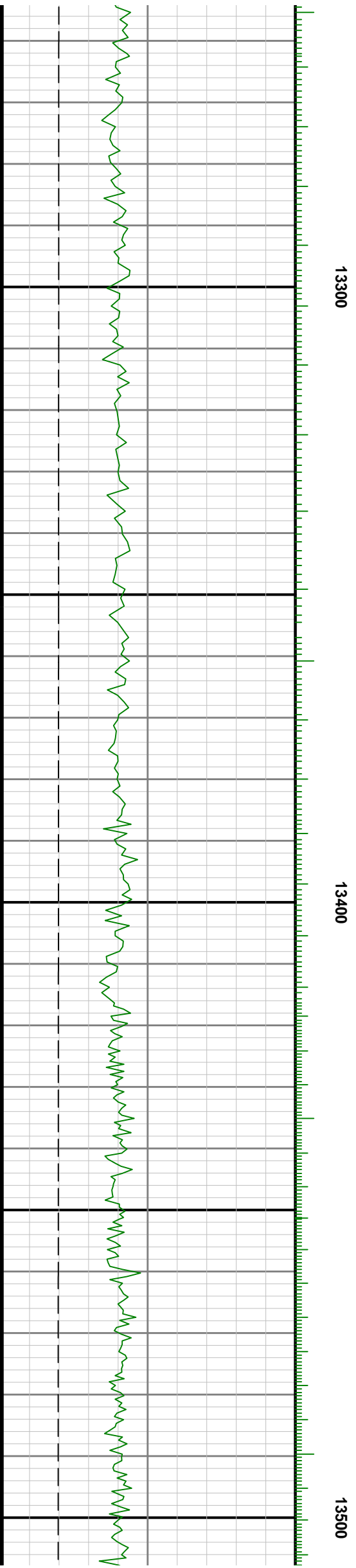
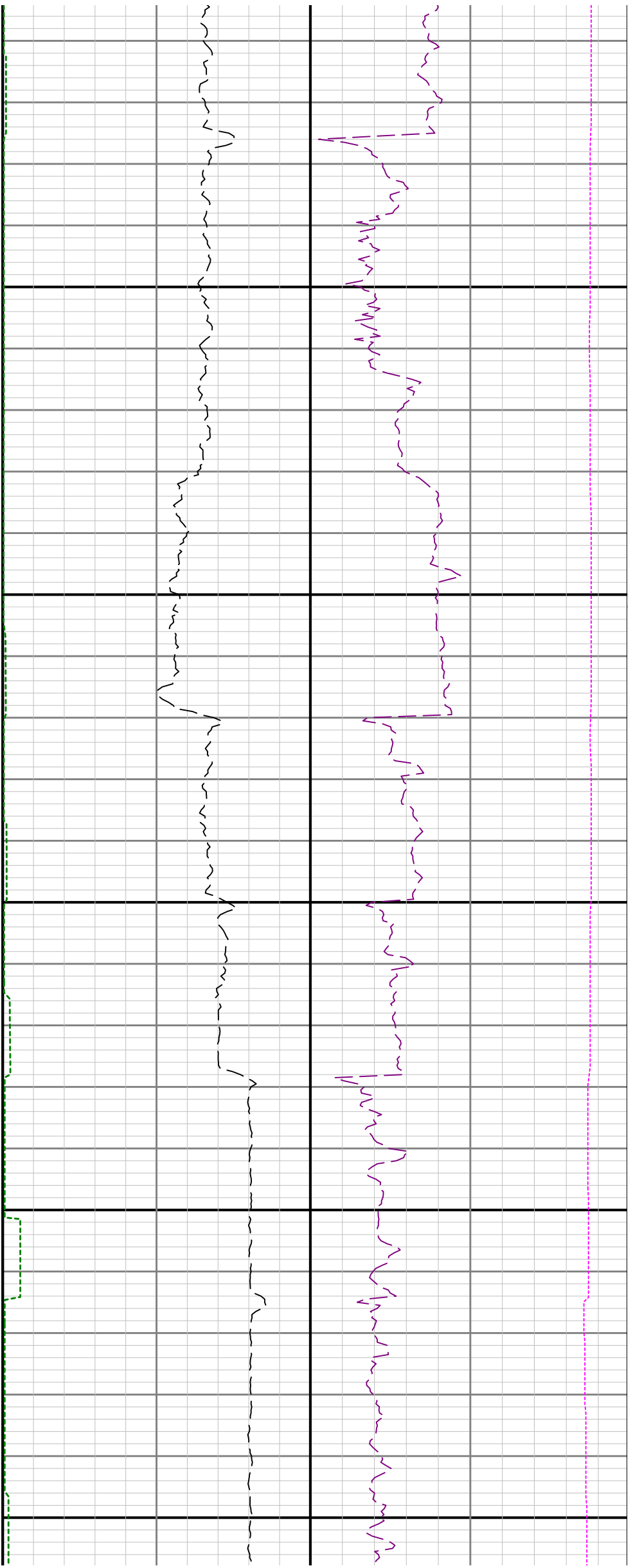


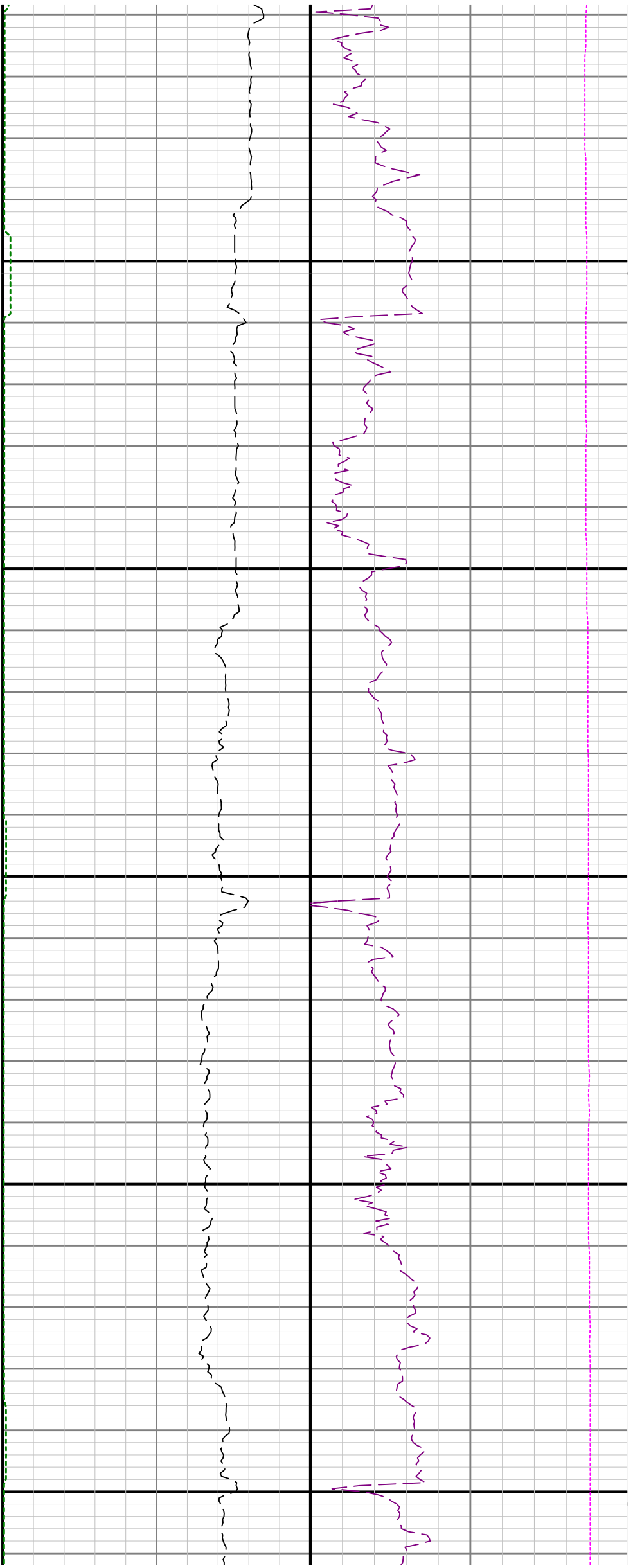






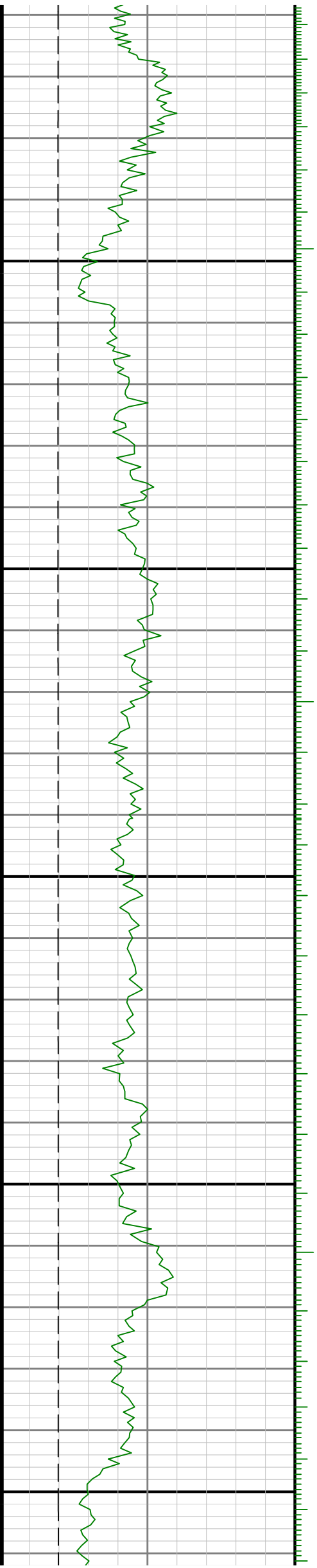


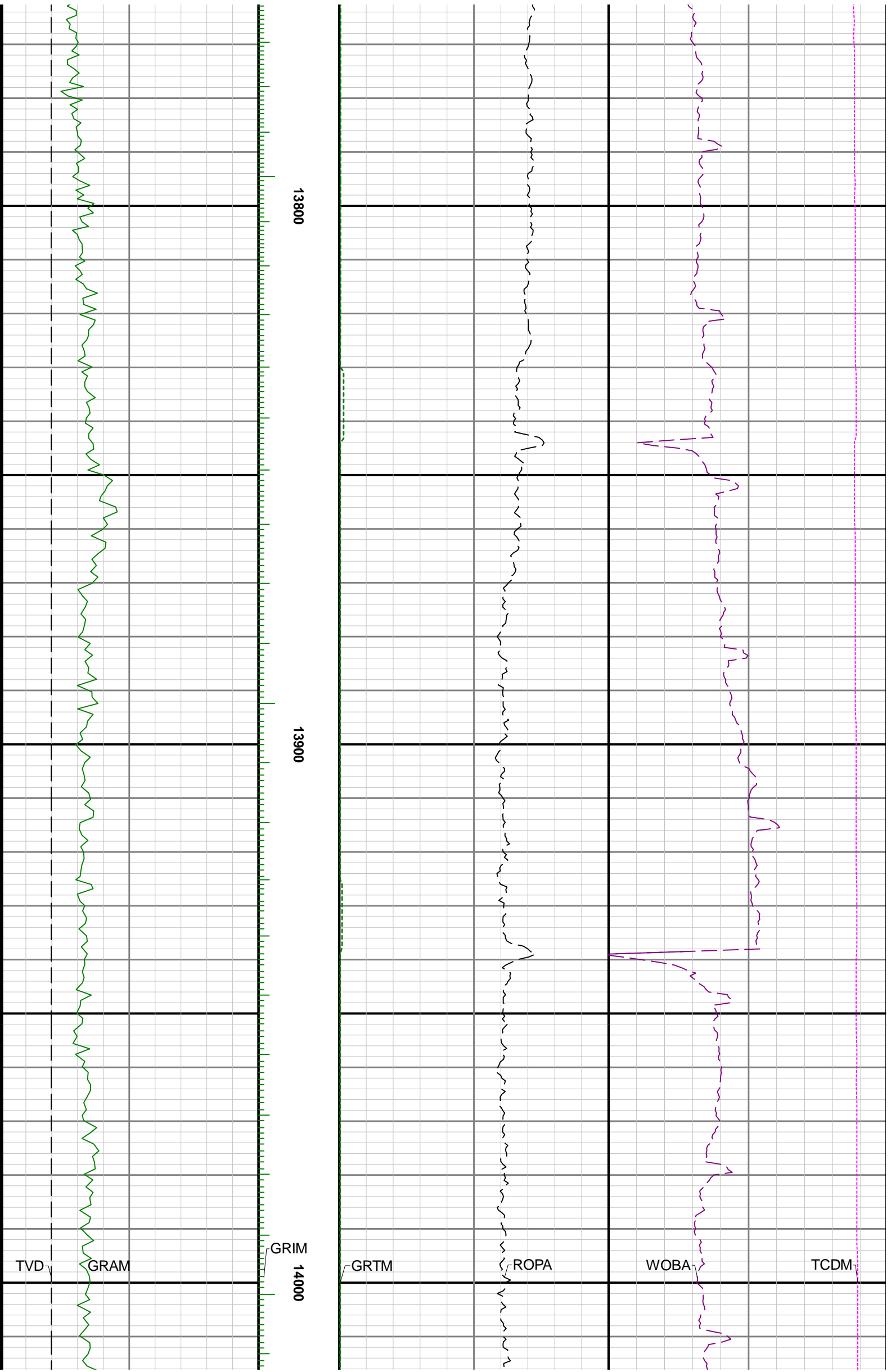


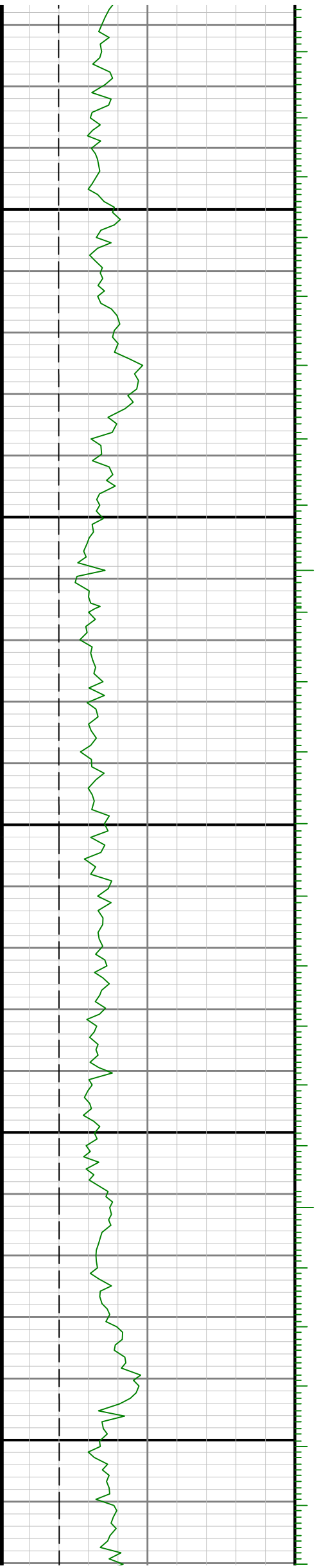
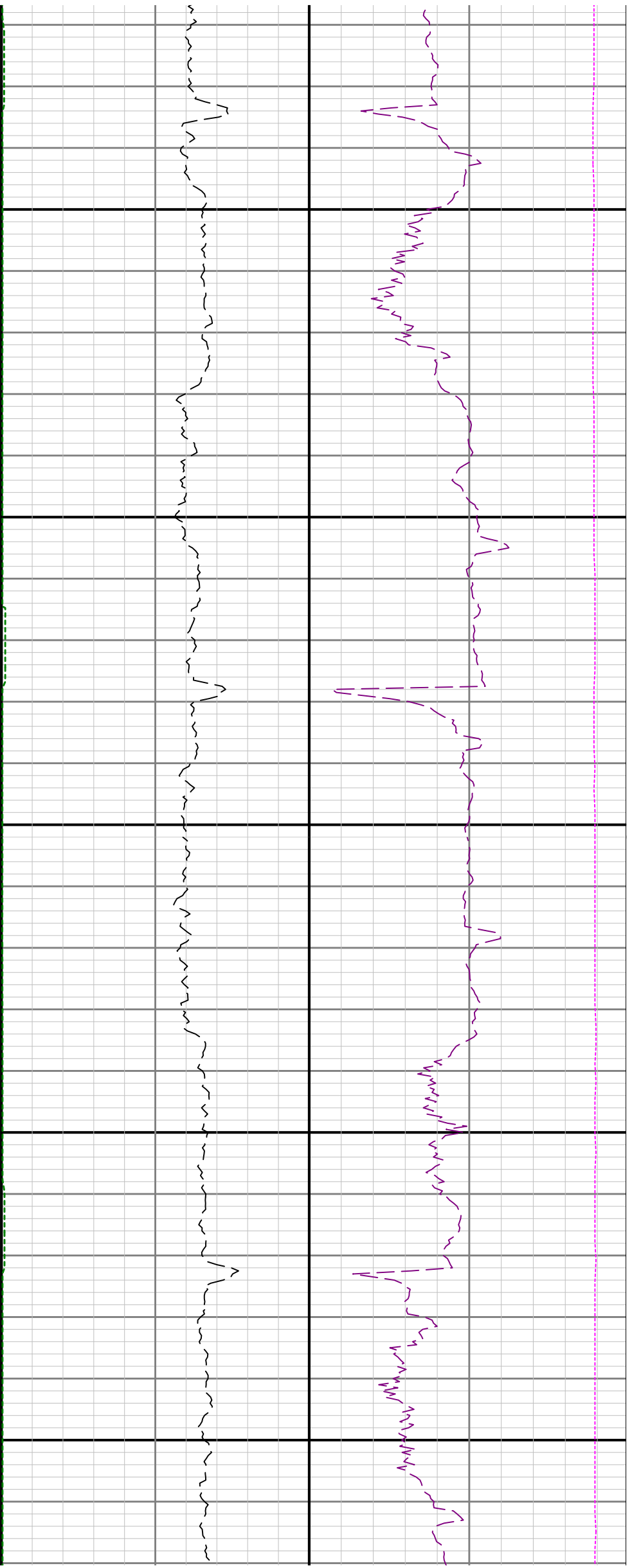


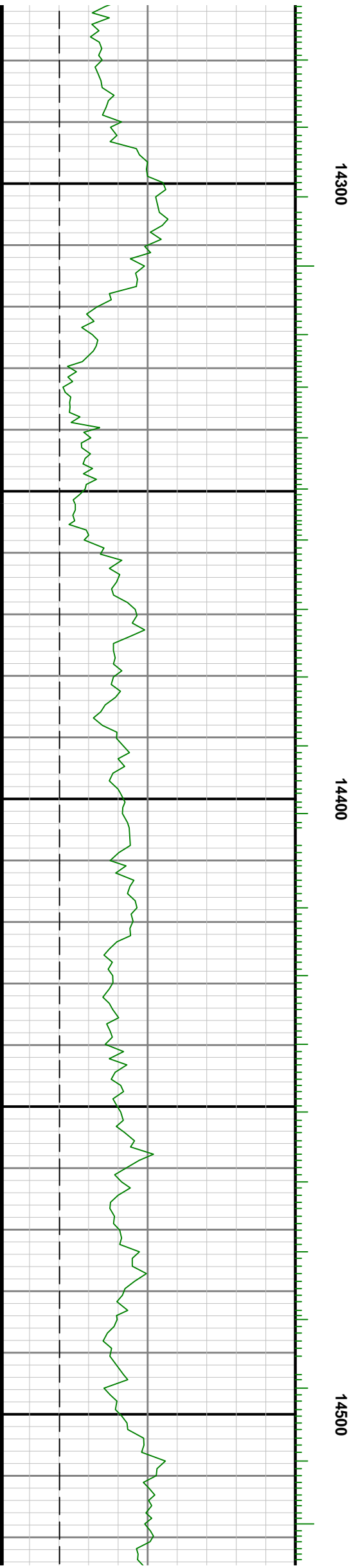
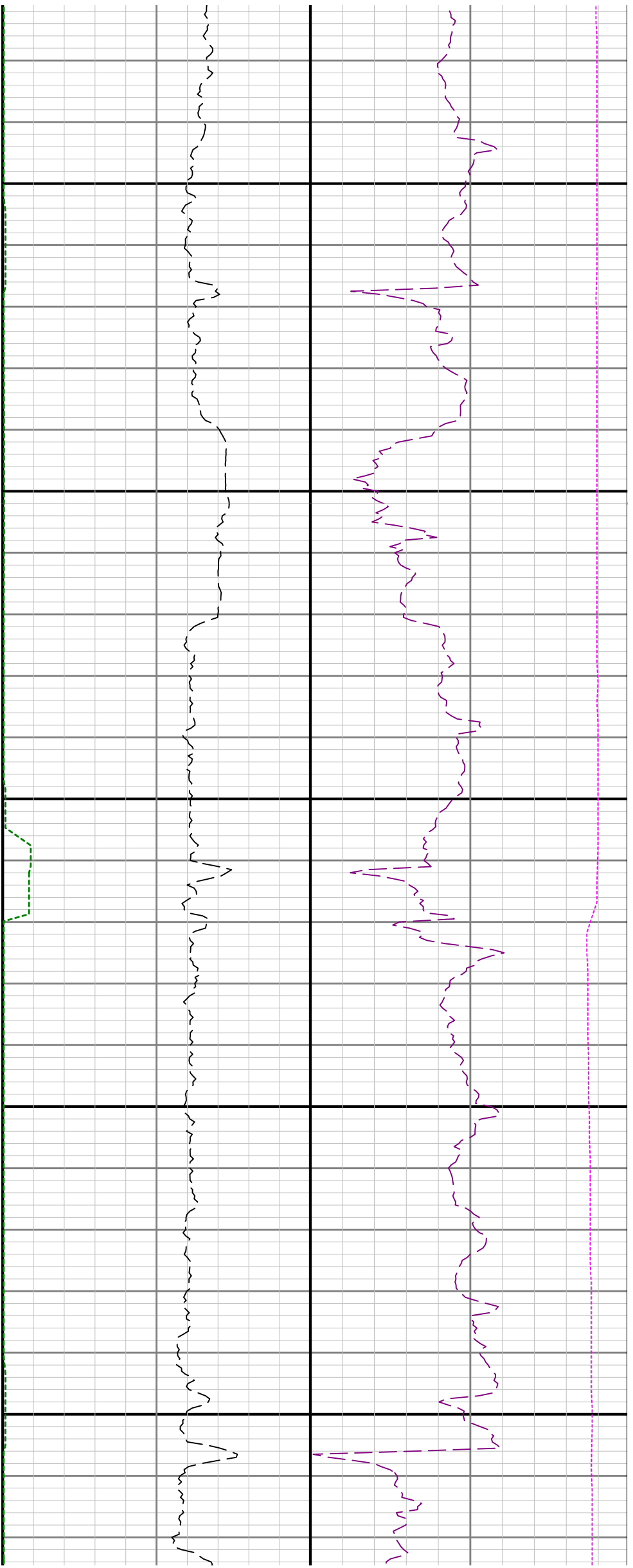
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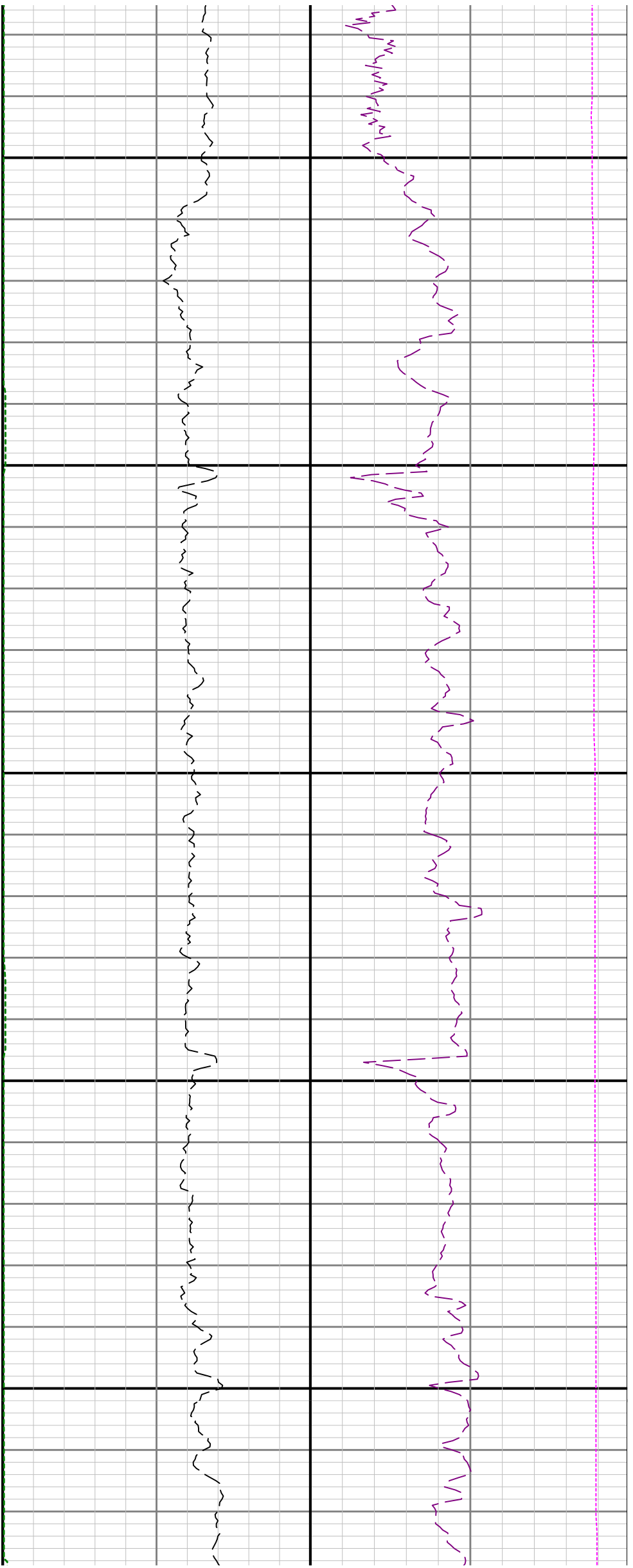
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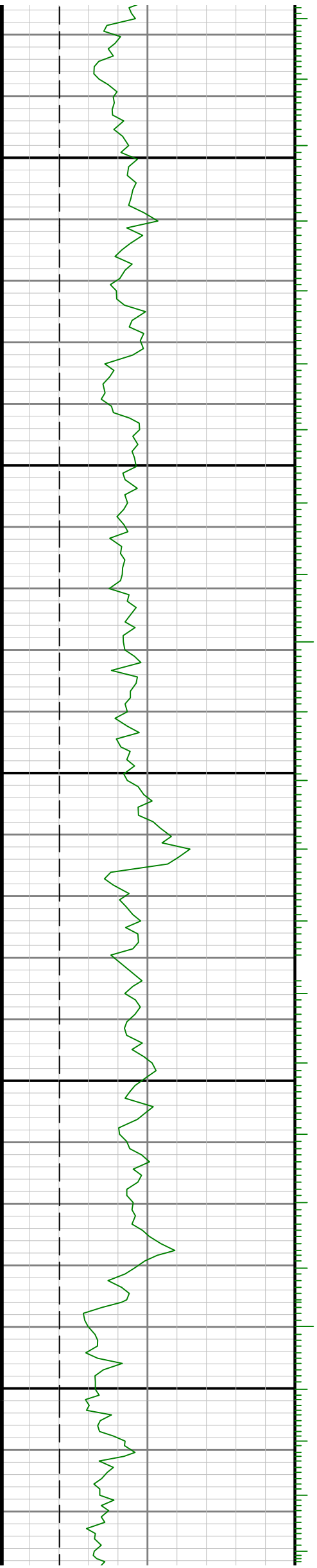


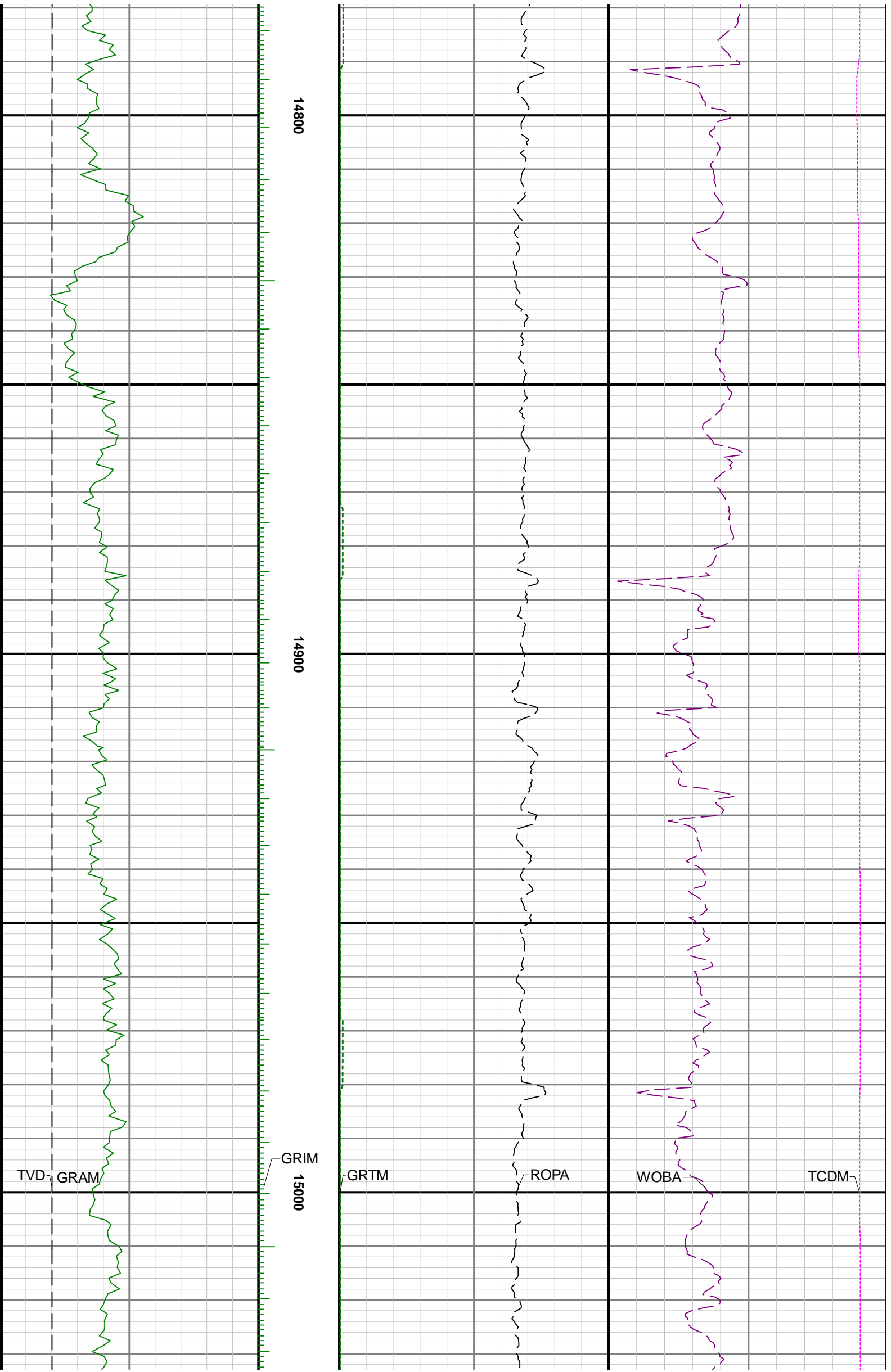


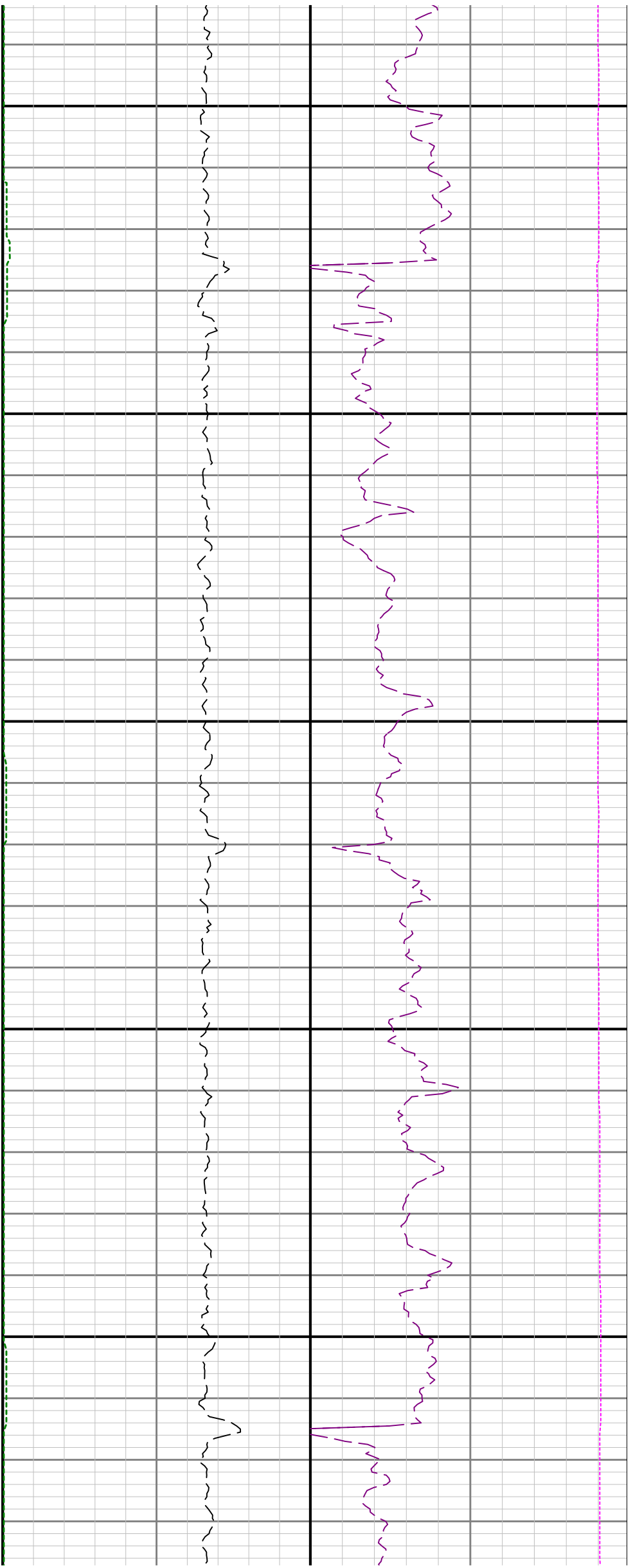


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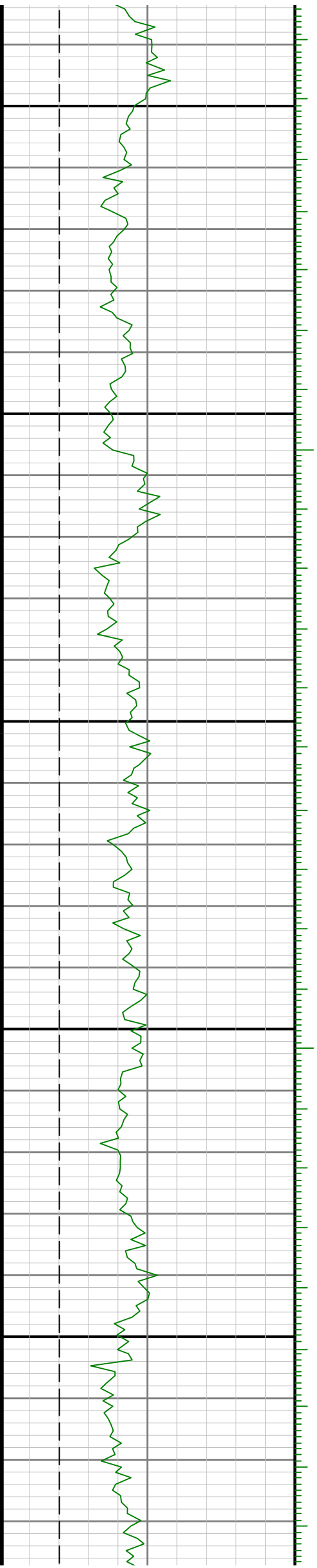


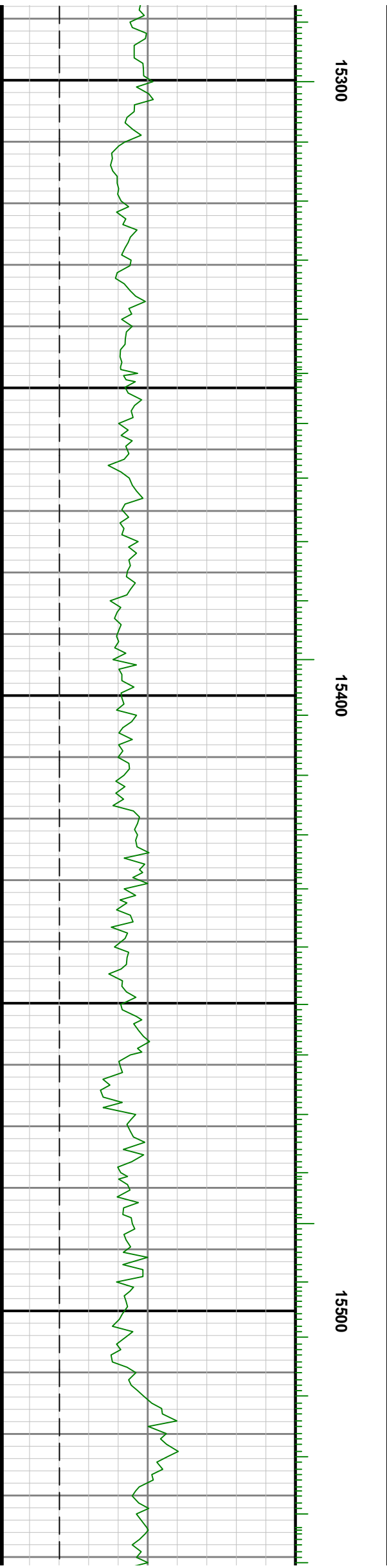
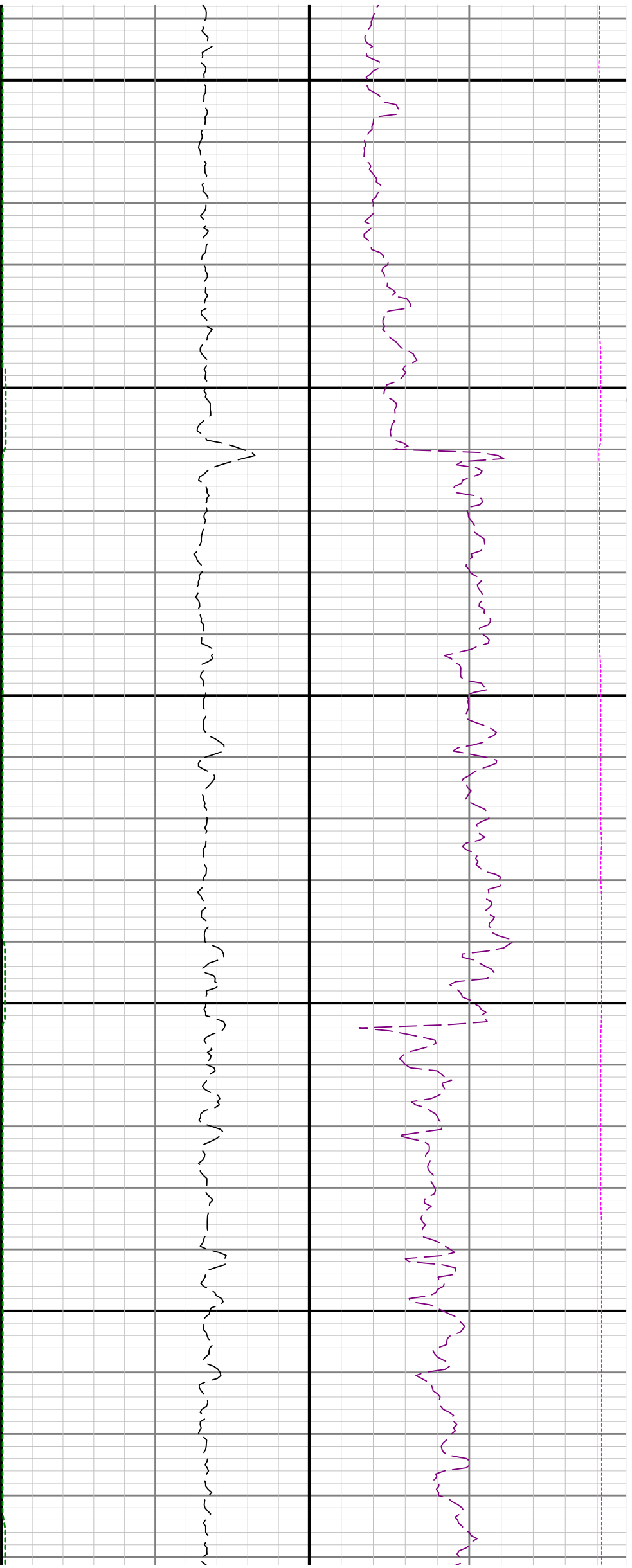


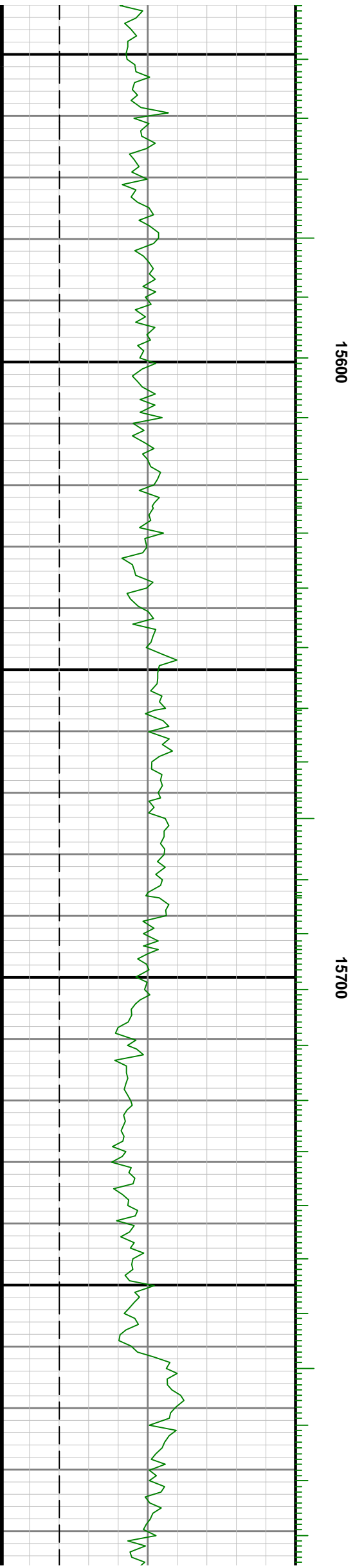
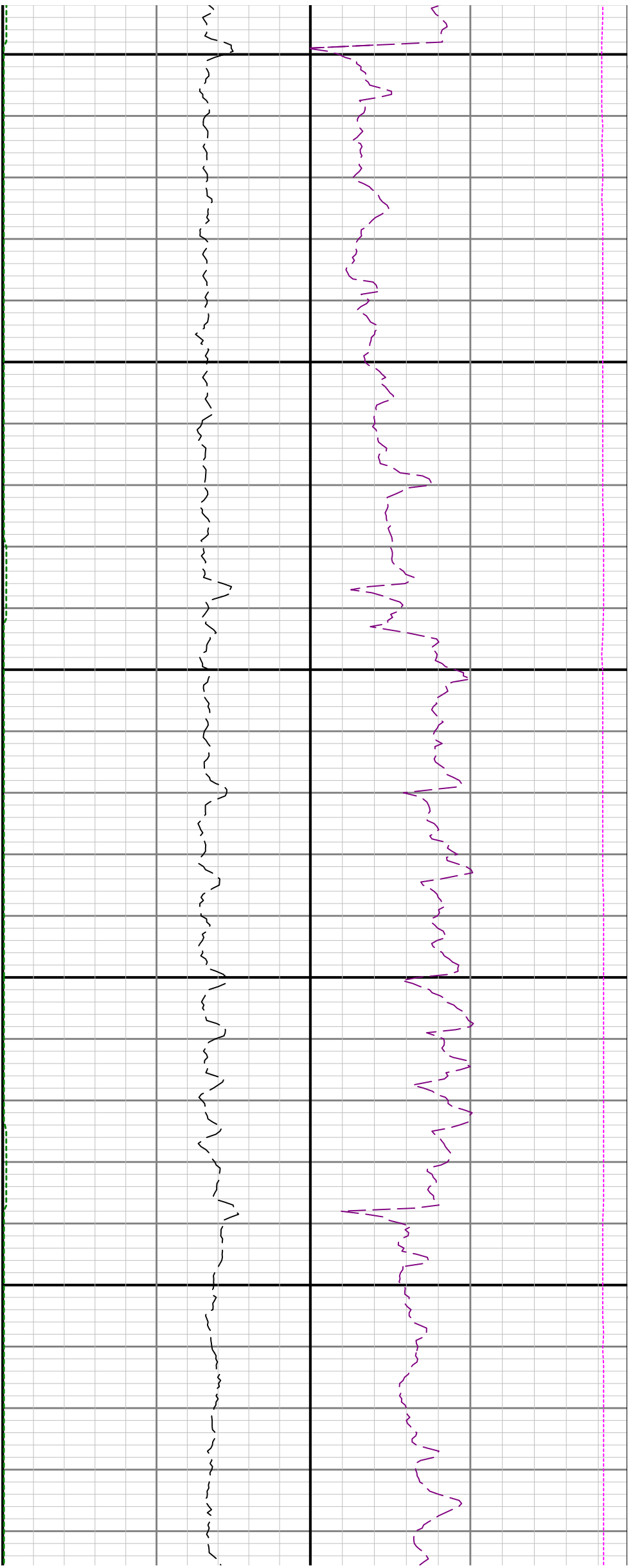


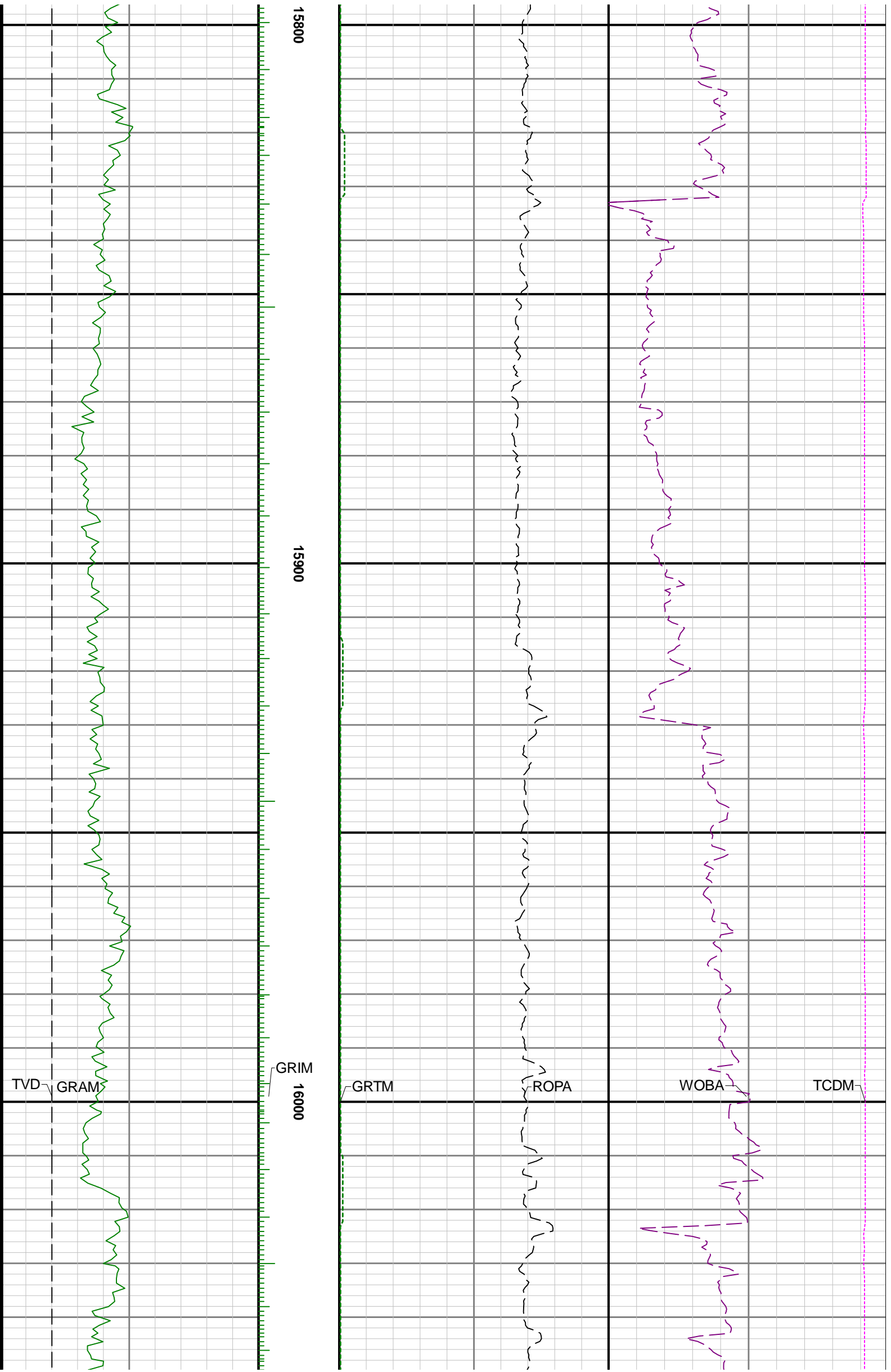
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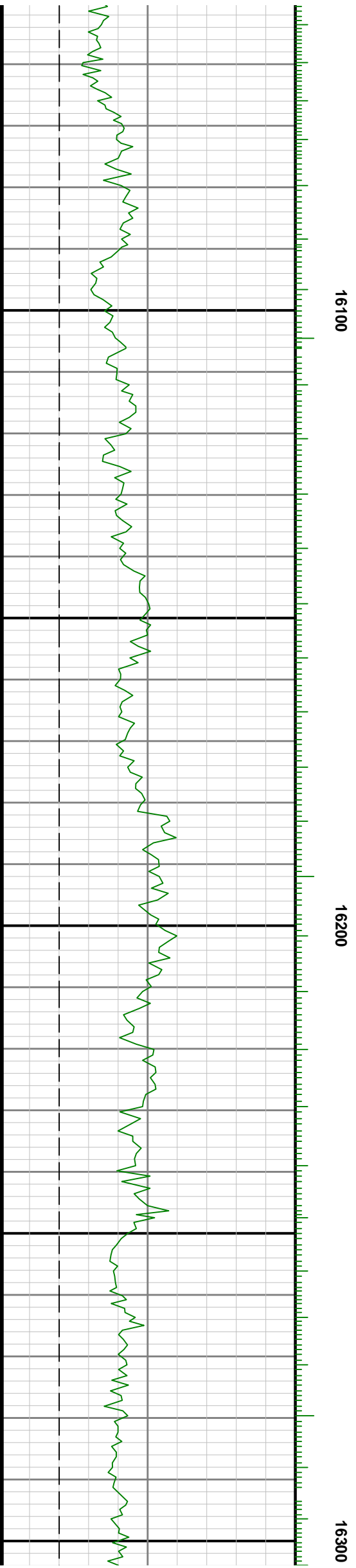
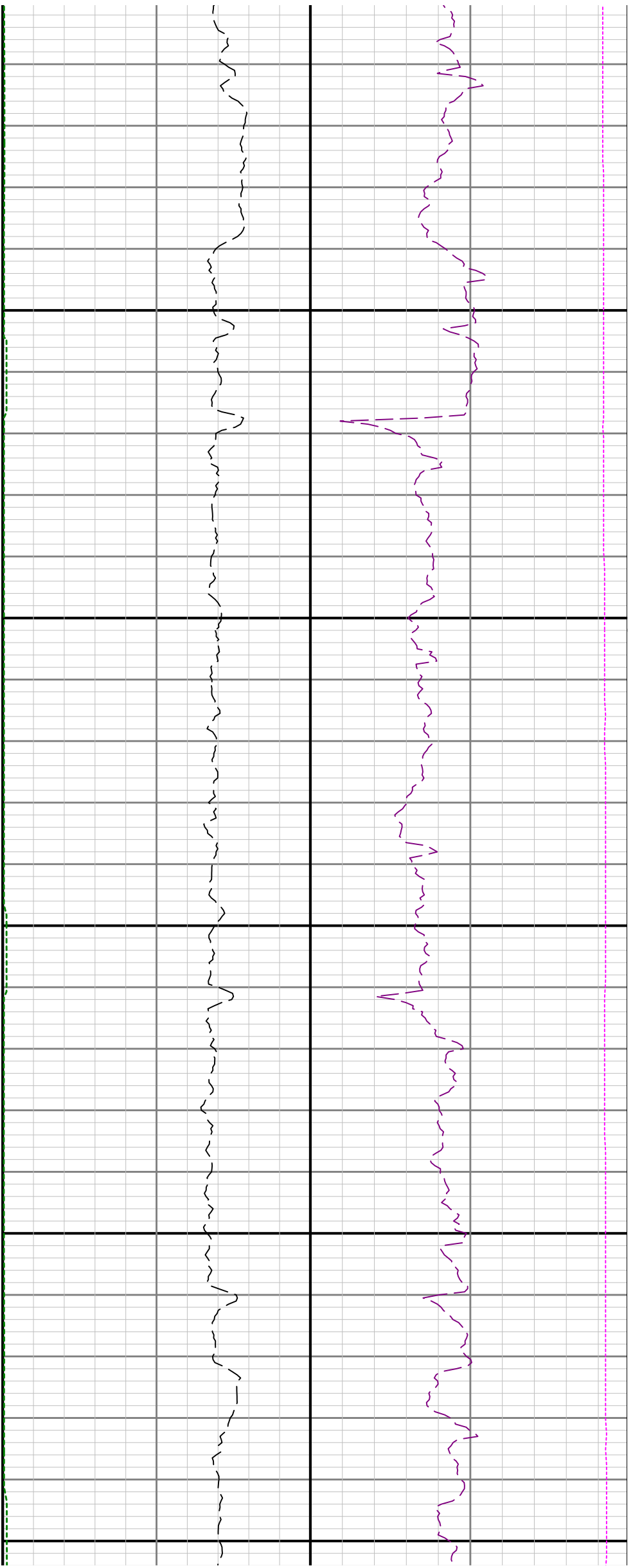
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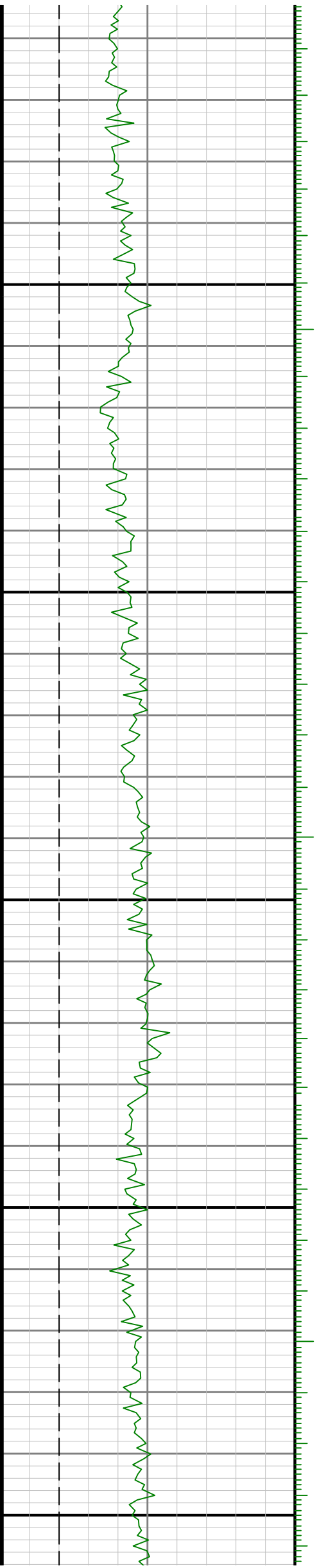
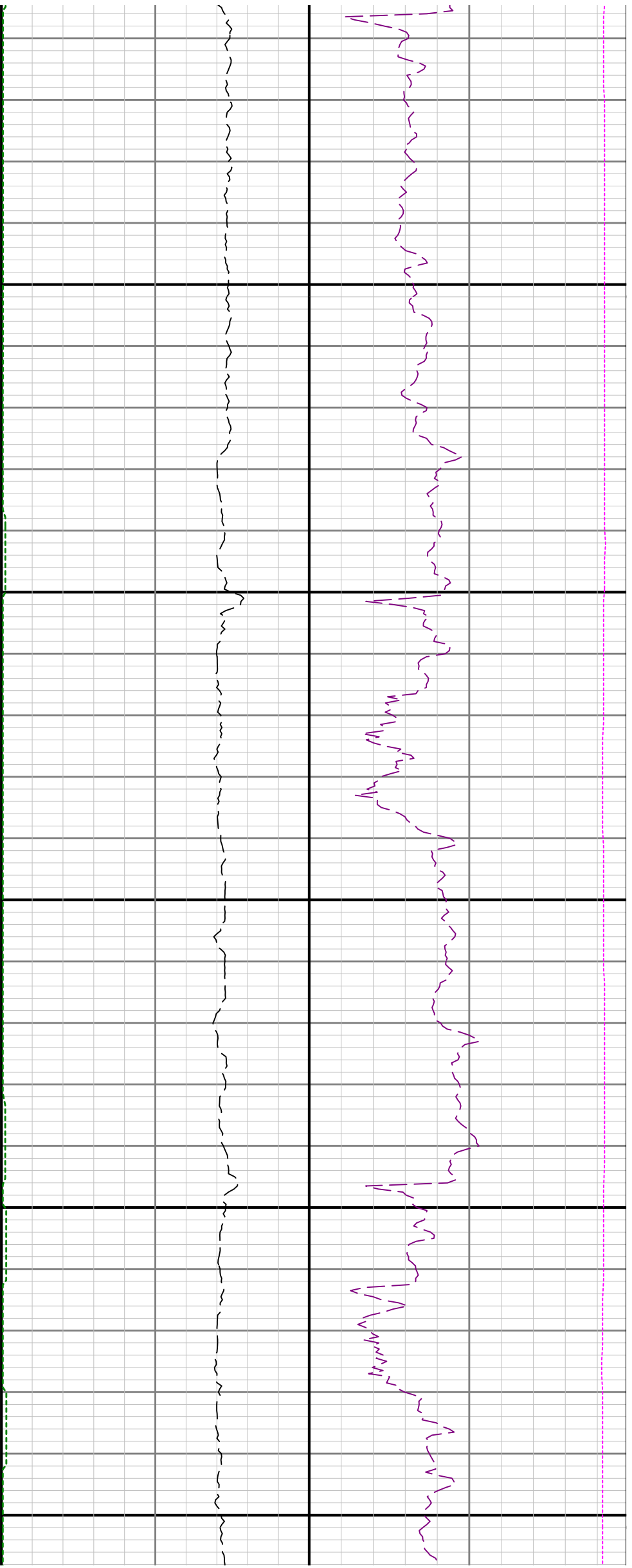


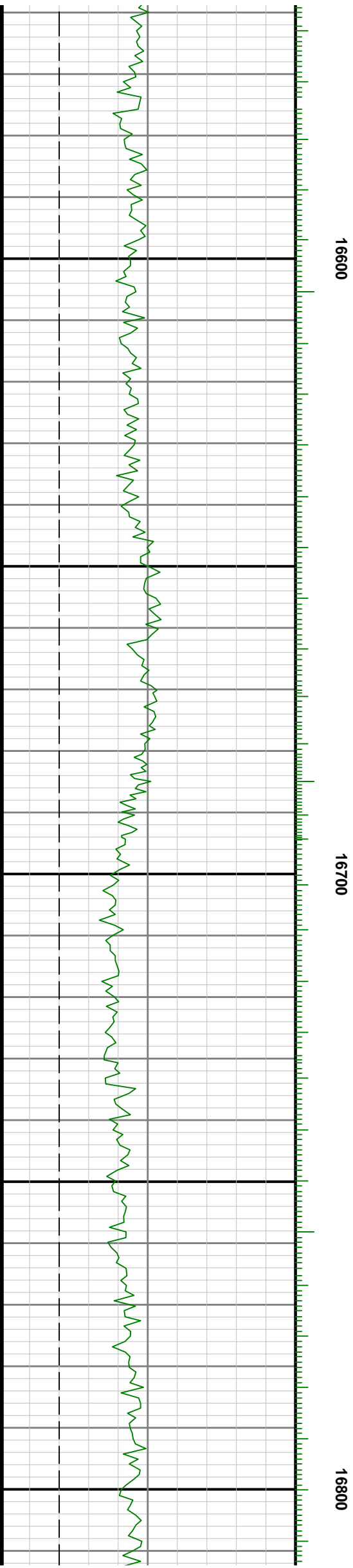
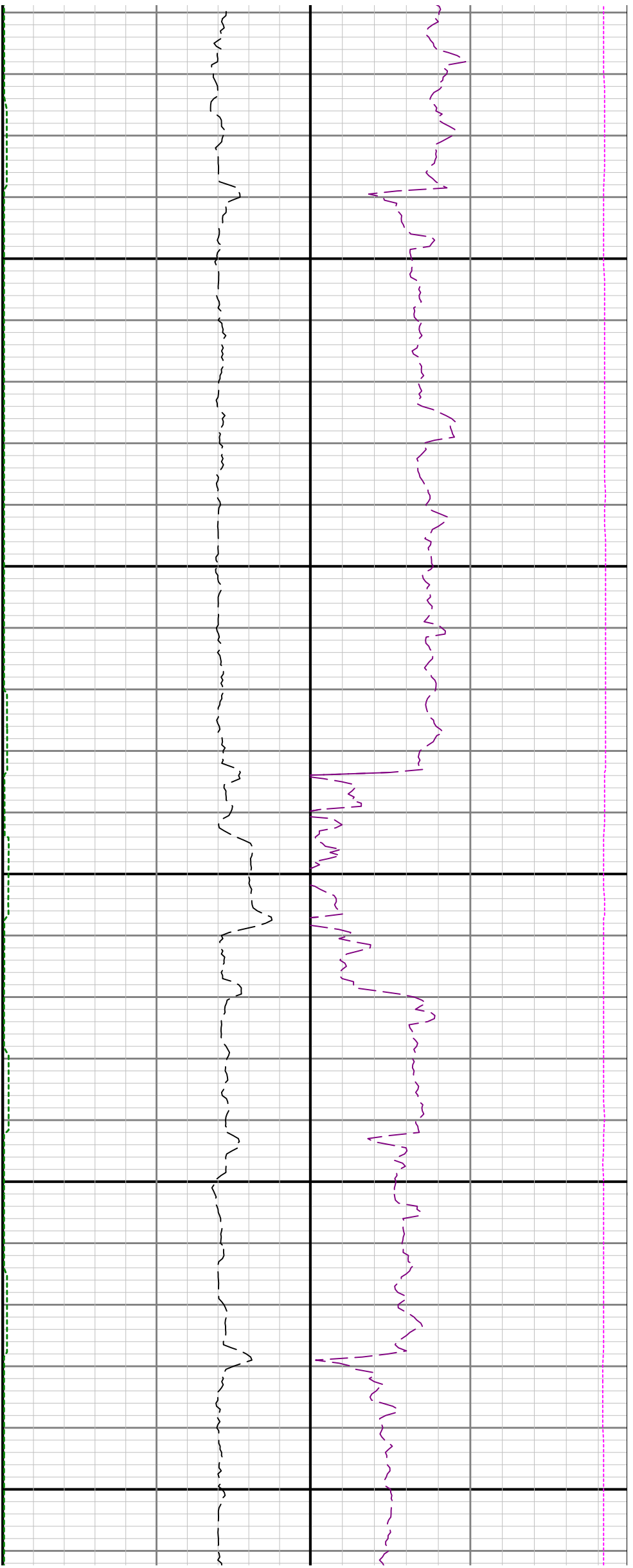


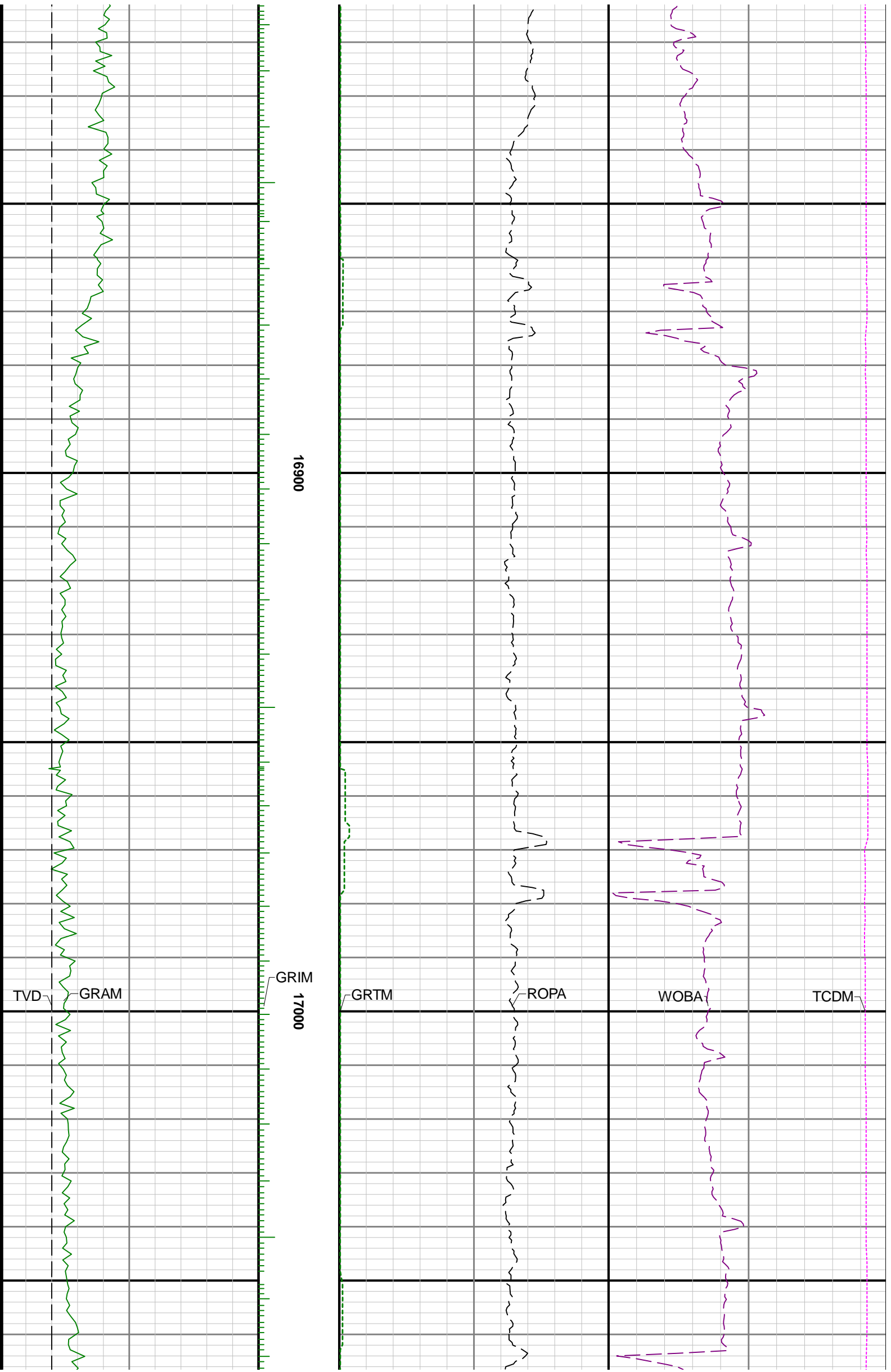


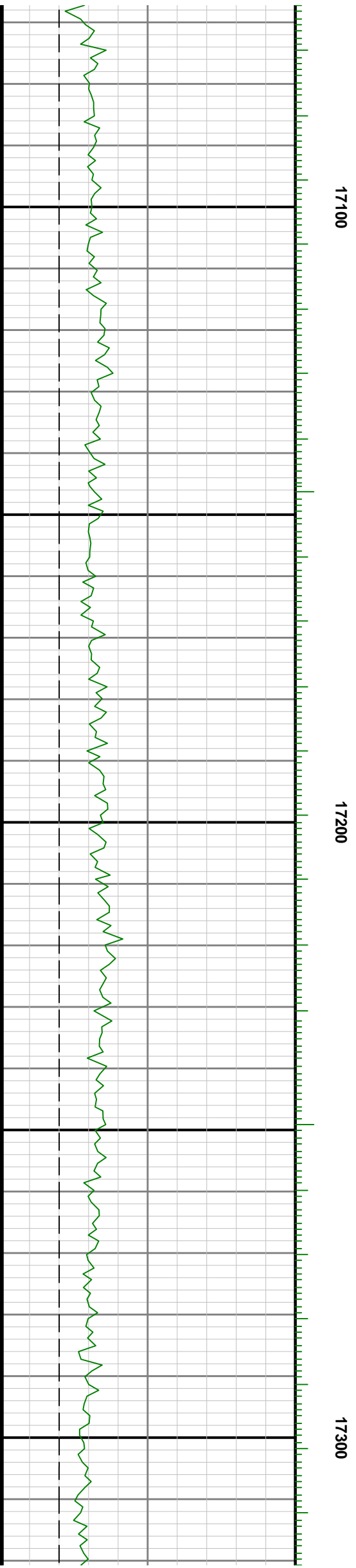
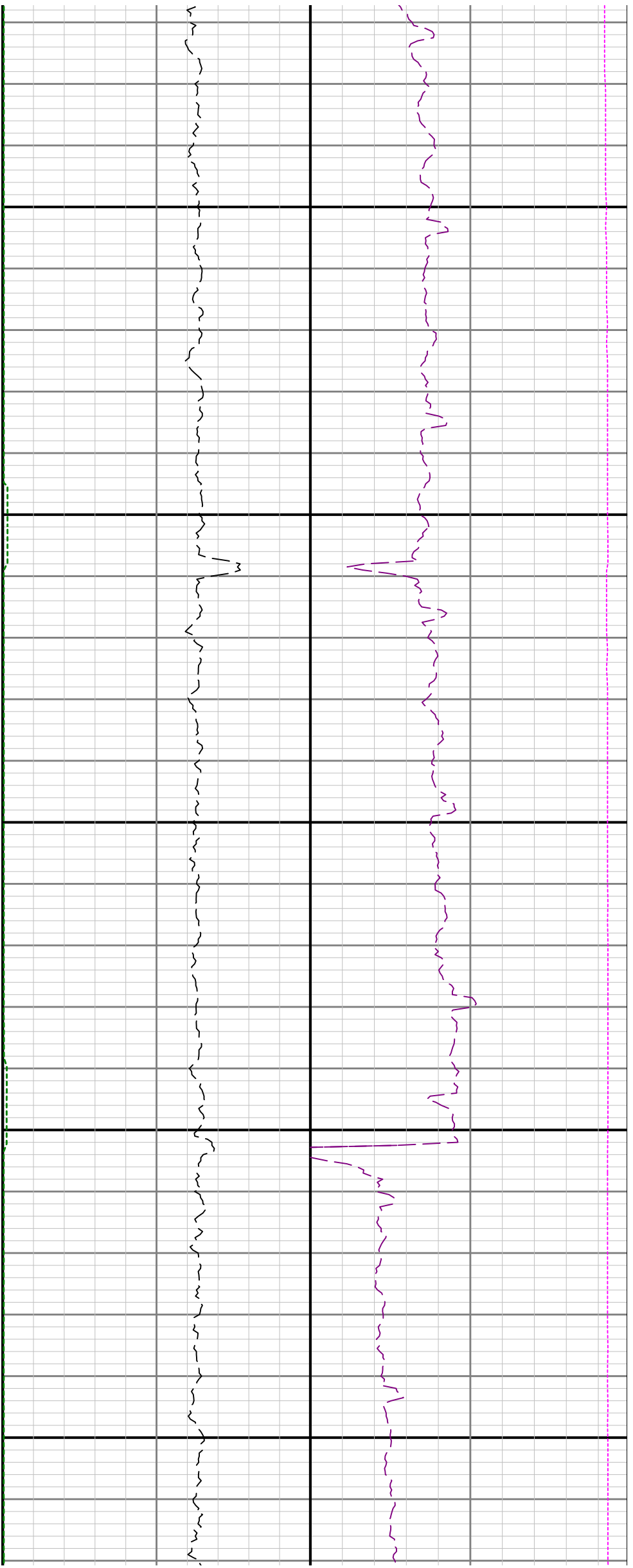


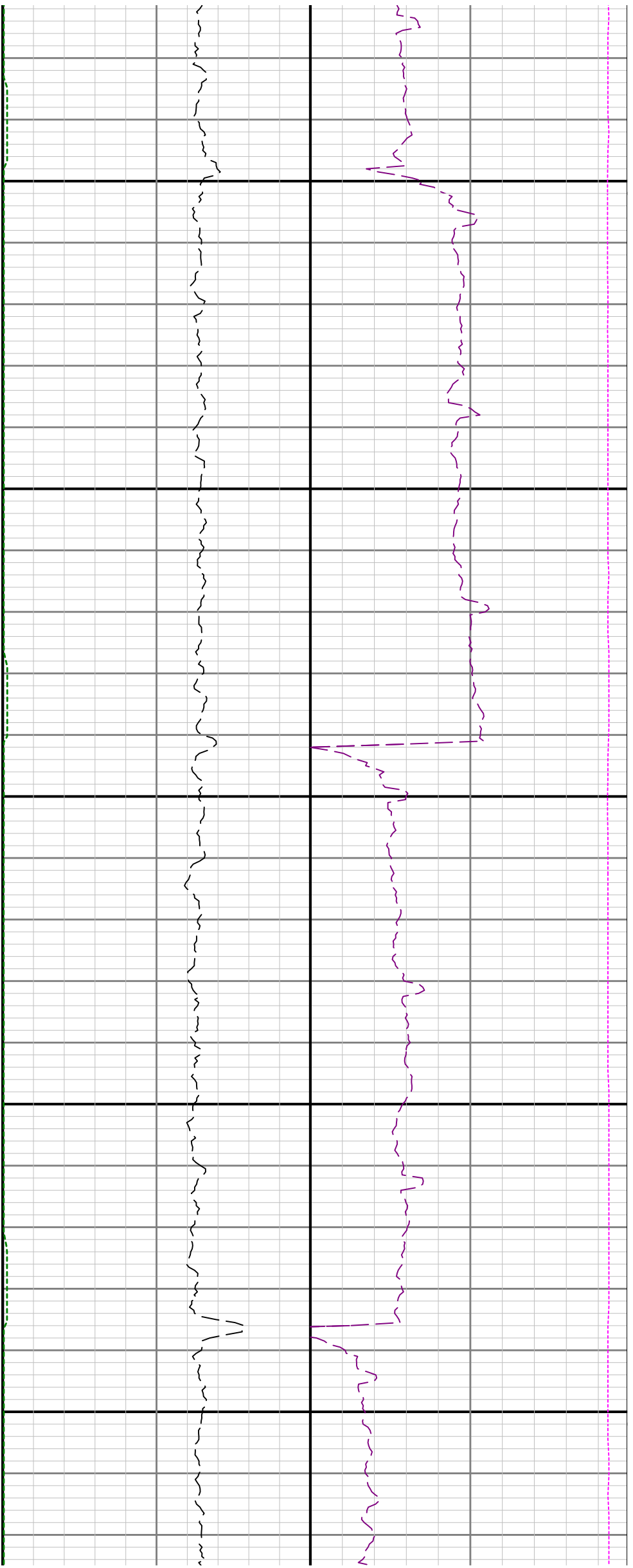












17400

17500

