



Gamma Ray

LWD MEMORY LOG

Scale: 1:240

Measured Depth

Company: Noble Energy
Well: Gutteresen D09-785

Field: Wattenberg

County: Weld Country: United States

Driller's Depth

State: Colorado

Status: Final Print

API No: 05-123-48949-00

Job ID: 110661673

Permanent Datum (P.D.): Mean Sea Level

Log Measured From: Rig Floor

Elevation: 0.00 ft

Elev. KB: 4755.00 ft

Elev. DF: 4755.00 ft

Elev. GL: 4725.00 ft

Dates

From: 2020-11-28 To: 2020-11-30 Spud: 2020-11-28

Drilled (ft)

Top: 1937.00

Bottom: 17511.00

Logged (ft)

Top: 1937.00

Bottom: 17498.00

Azi Reference North: Grid Dip Angle: (deg)

Total Magnetic Field Strength: (nT)

Mag to Reference North Correction: (deg)

Borehole Record

Casing Record

Hole Size (in) From (ft) To (ft)

13.500 30.00 1937.00

8.500 1937.00 17511.00

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

9.625 36.00 30.00 1927.00

Mud Record

Deviation Record

Type From (ft) To (ft)

Oil Based Mud 1937.00 17511.00

Hole Size (in) Interval (ft) Inc | Az (Start)

8.500 15574.00 1.52 | 236.99

Inc | Az (End)

89.97 | 178.70

Acquisition System

Software Version

Other

Cadence RT 5.7

DeliverableGen 5.7.8878.1

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	2.50	Rotary Steerable	1937.00	17498.00	1937.00	17511.00	2020-11-28 09:50	2020-11-30 08:55	44.27

Crew

Name	Arrive Wellsite	Depart Wellsite	Name	Arrive Wellsite	Depart Wellsite	Name	Arrive Wellsite	Depart Wellsite
Adam Schlenz	2020-11-27	2020-11-30	Tien Bui	2020-11-30	2020-11-30			

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+ (%)
2020-11-28 08:20	1	1937.00	Oil Based Mud	9.6	17	N/A	20.8	65.2/23	Active Pit	27211	0.00
2020-11-28 14:30	1	3333.00	Oil Based Mud	9.3	14	N/A	17.8	68.6/21.2	Active Pit	28475	0.00
2020-11-29 03:30	1	6872.00	Oil Based Mud	9.5	11	N/A	17.4	69/20.6	Active Pit	28475	0.00
2020-11-29 14:30	1	10815.00	Oil Based Mud	9.6	12	N/A	18.0	69.6/19	Active Pit	26725	0.00
2020-11-30 05:00	1	16181.00	Oil Based Mud	9.6	12	N/A	18.2	68.6/19	Active Pit	24781	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	14236913	Near Bit Inclination	5.93	6.83	7.000	4.330
1	AutoTrak Curve Steering Unit	14236913	Near Bit VSS	5.93	6.83	7.000	4.330
1	AutoTrak Curve MWD	14705407	Gamma (single)	2.75	13.01	7.000	3.250
1	AutoTrak Curve MWD	14705407	Directional (mag)	12.27	22.53	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

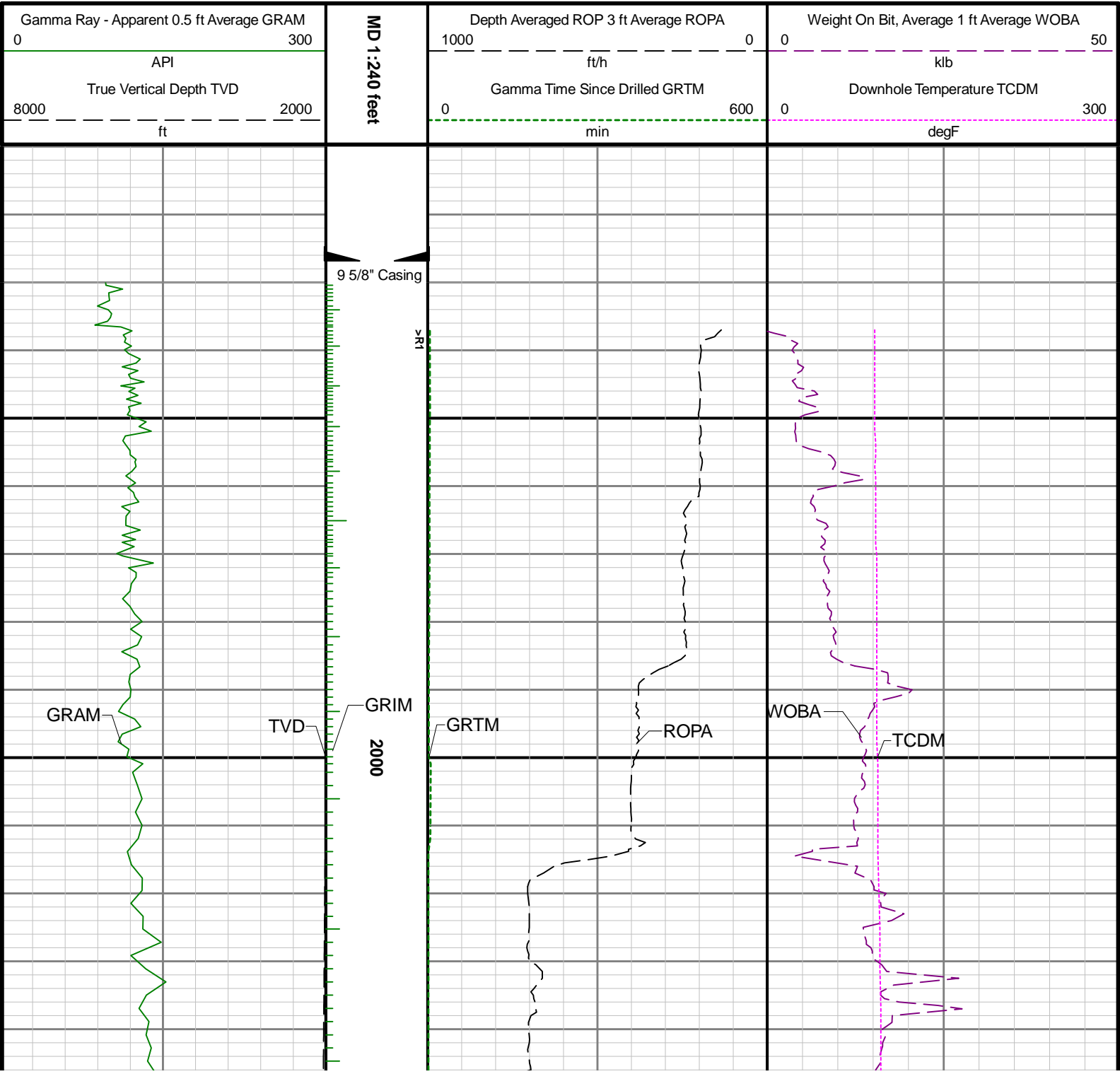
1	Depth measurements were obtained from a depth control system not supplied or operated by Baker Hughes. Due to the lack of control by Baker Hughes, depth calibrations and measurements could not be independently verified.
2	Baker Hughes LWD run 1 utilized a 6.75 inch NaviGamma service (Directional and Gamma Ray) behind a 8.5 inch bit and rotary steerable assembly from 1937 to 17511 feet MD (1937 to 6814 feet TVD).
3	The Gamma Ray Apparent (GRAM) data is presented 0 to 300 API, per the customer's request.

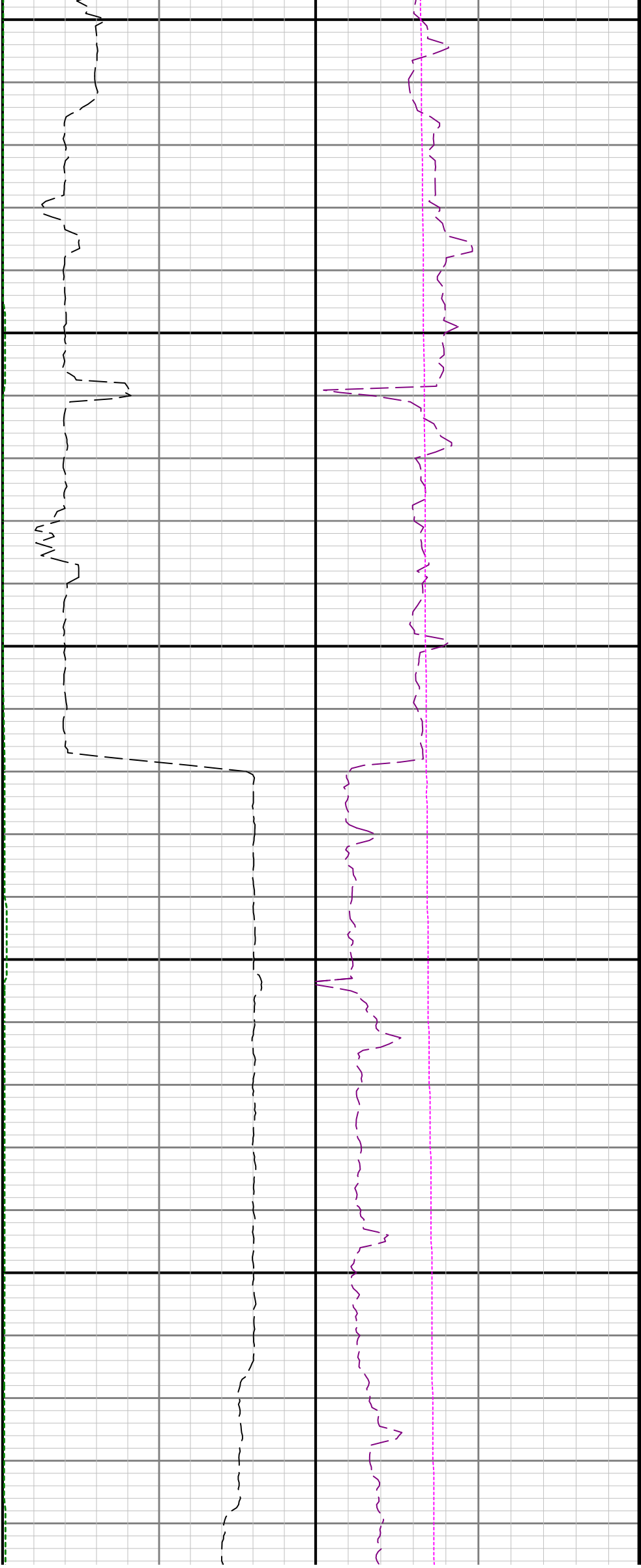
Remarks

Number	Depth (ft)	Hole Section (in)	Run No.	Remark
1	17511.00	8.500	1	The interval from 17498 to 17511 feet MD (6814 feet TVD) was not logged after being drilled due to sensor to bit offset at well TD.

Curve Mnemonics

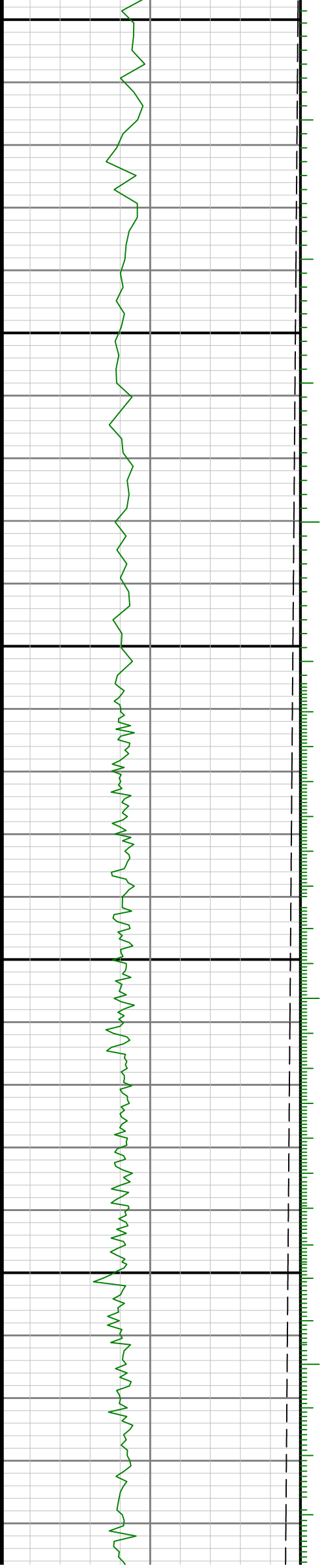
Presented Curves	Description	Units
ROPA	Depth Averaged ROP 3 ft Average	ft/h
TVD	TVD	ft
WOBA	Weight On Bit 1 ft Average	klb
GRAM	Gamma Ray - Apparent - Memory 0.5 ft Average	API
GRIM	Gamma Ray - Data Point Indicator - Memory	unitless
GRTM	Gamma Ray - Time Since Drilled - Memory	min
TCDM	Directional Real-Time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

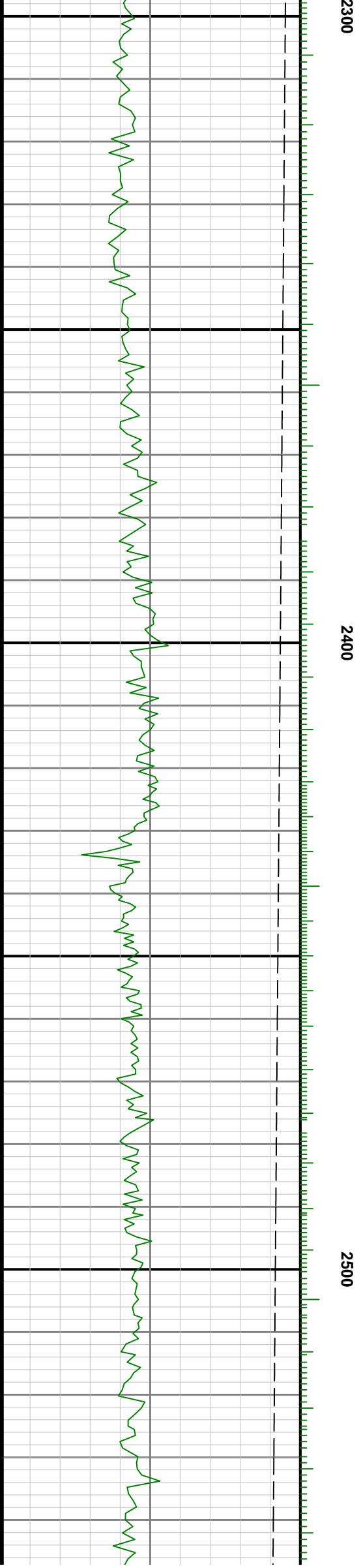
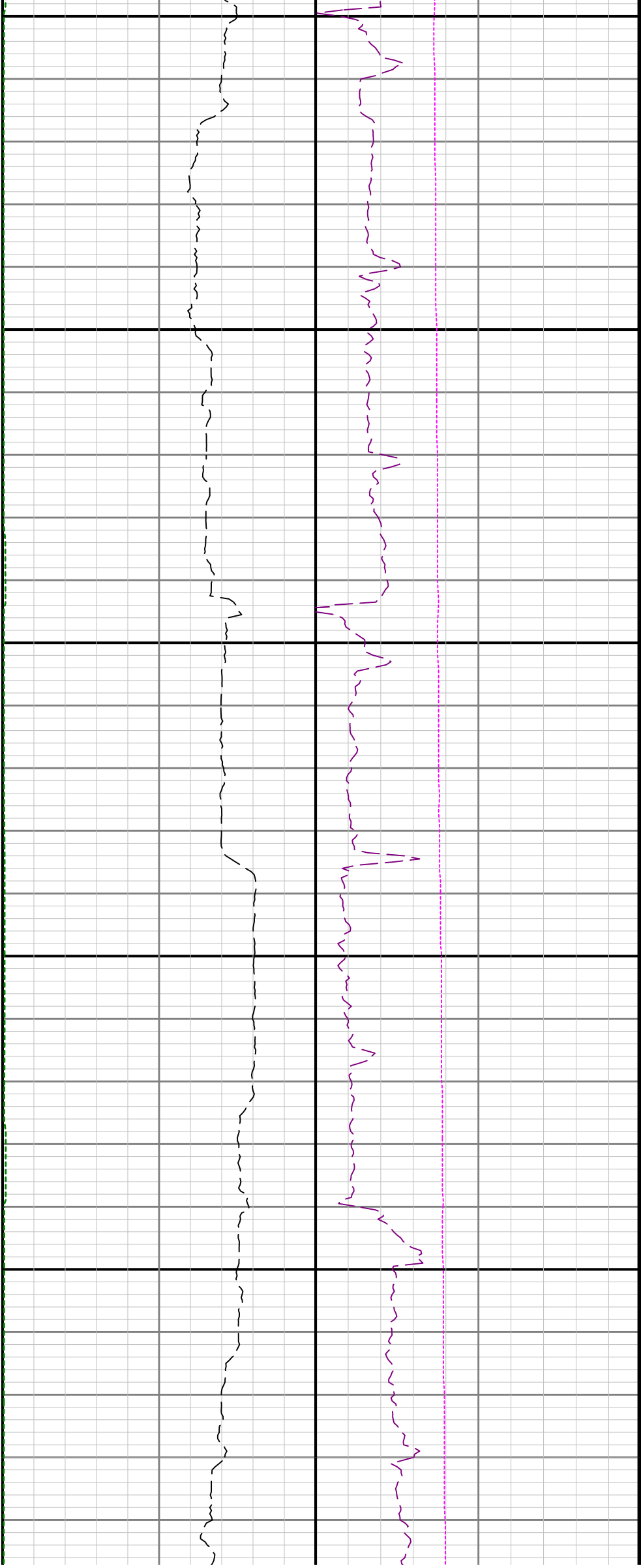


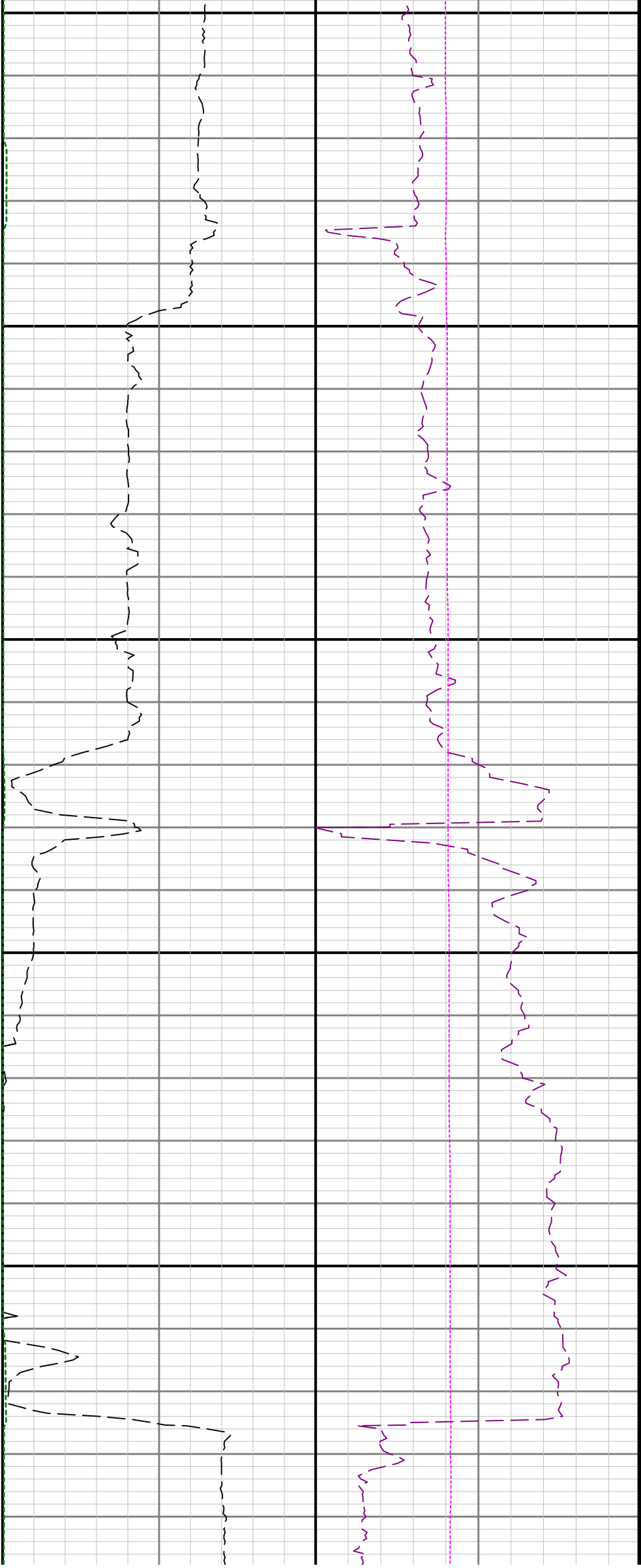


2100

2200

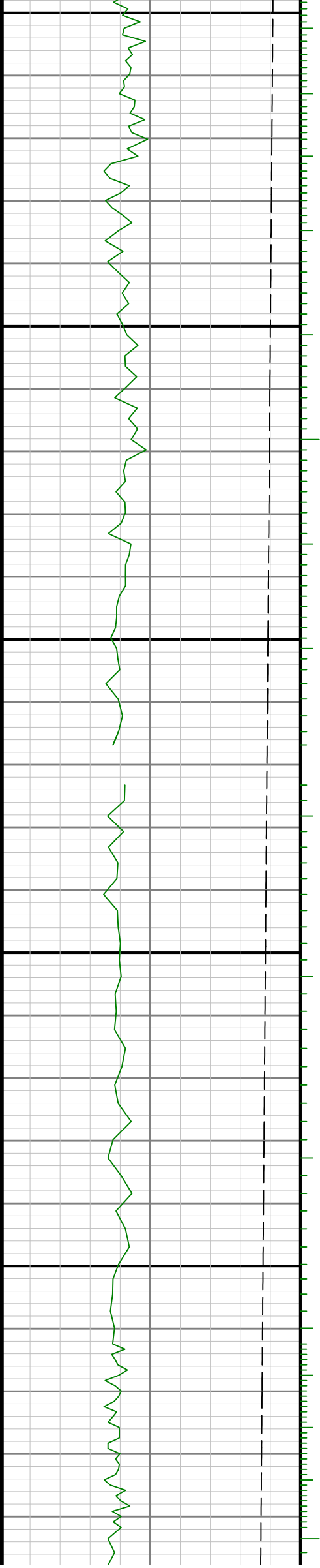


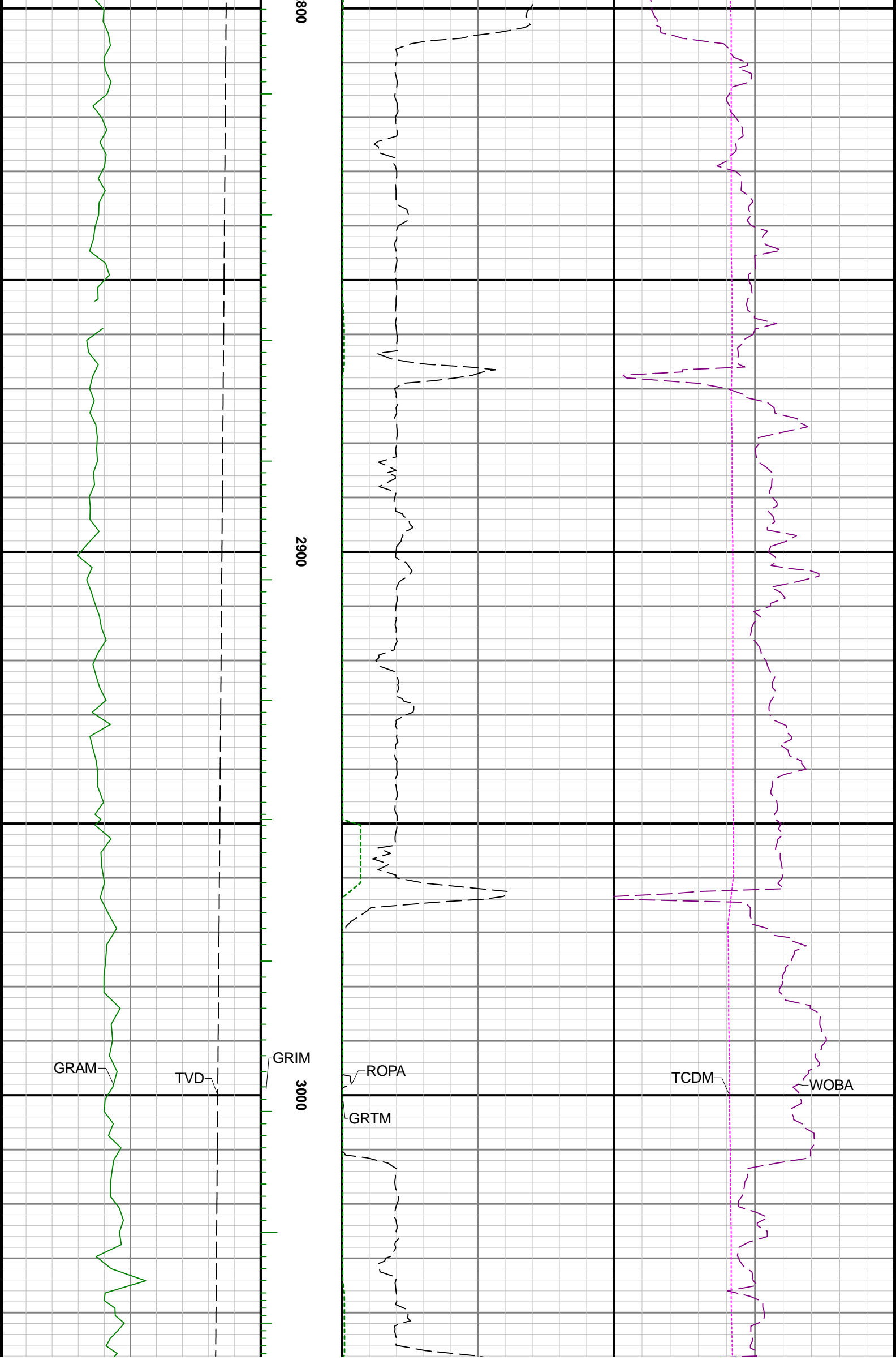




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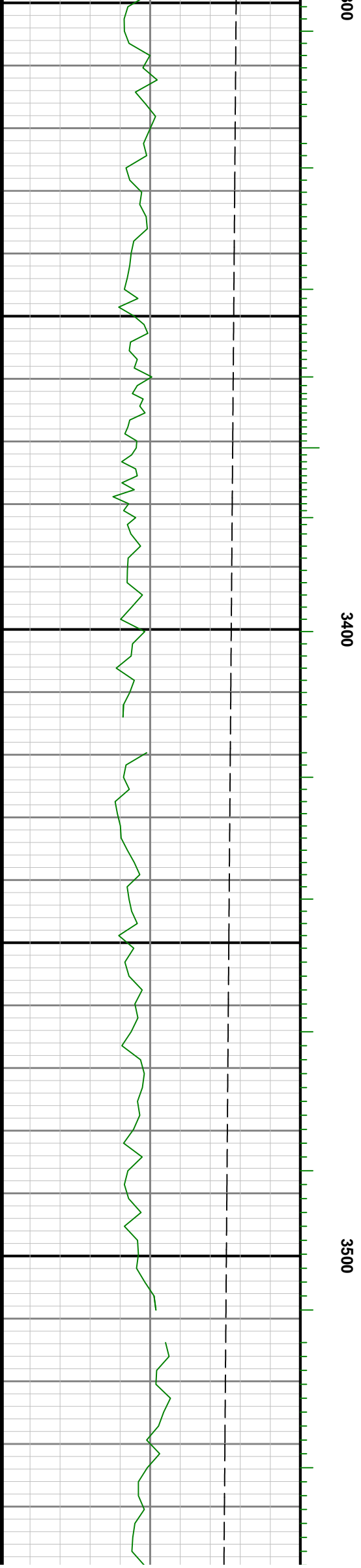
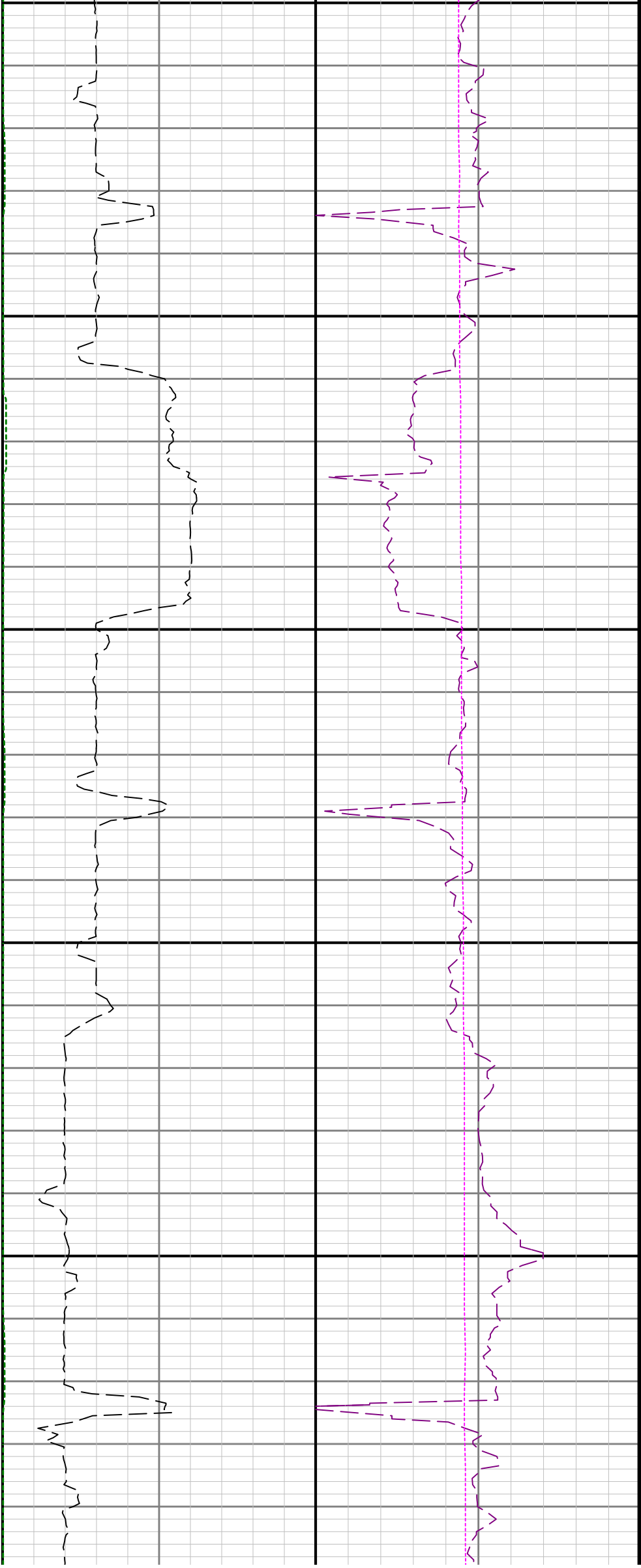


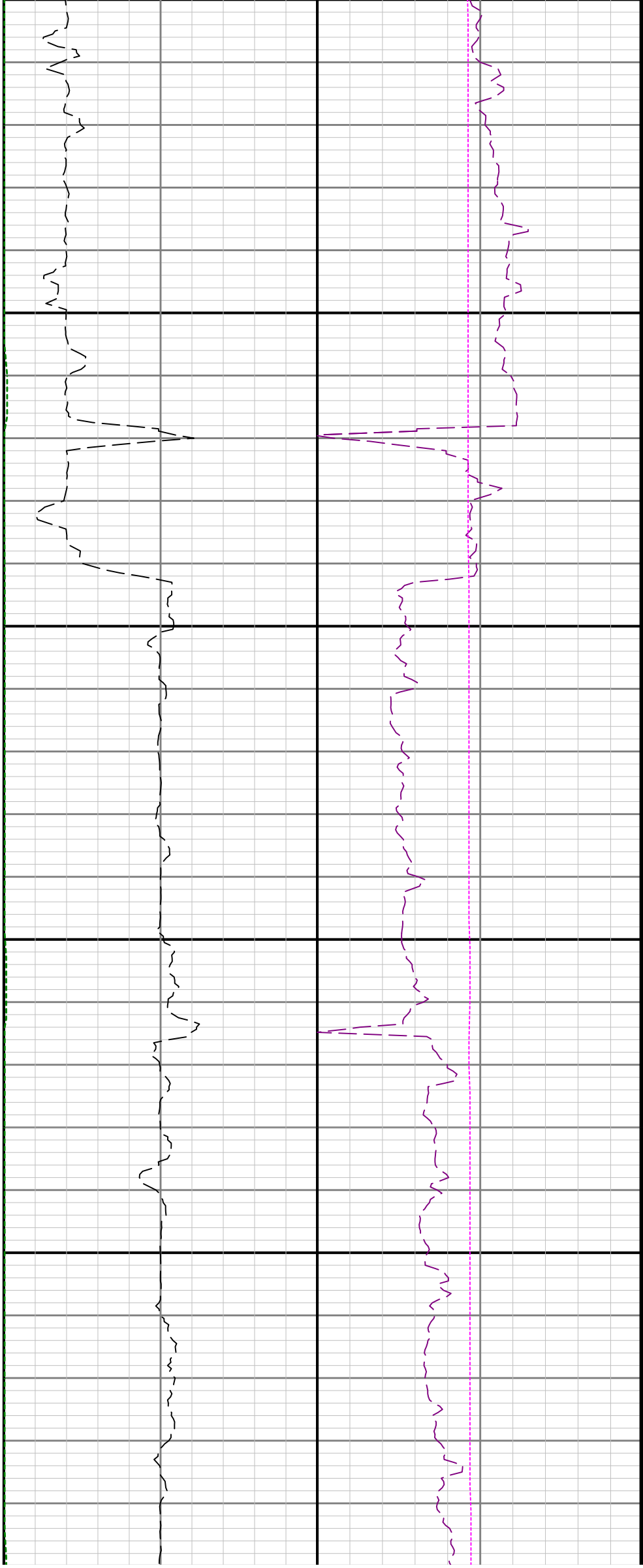




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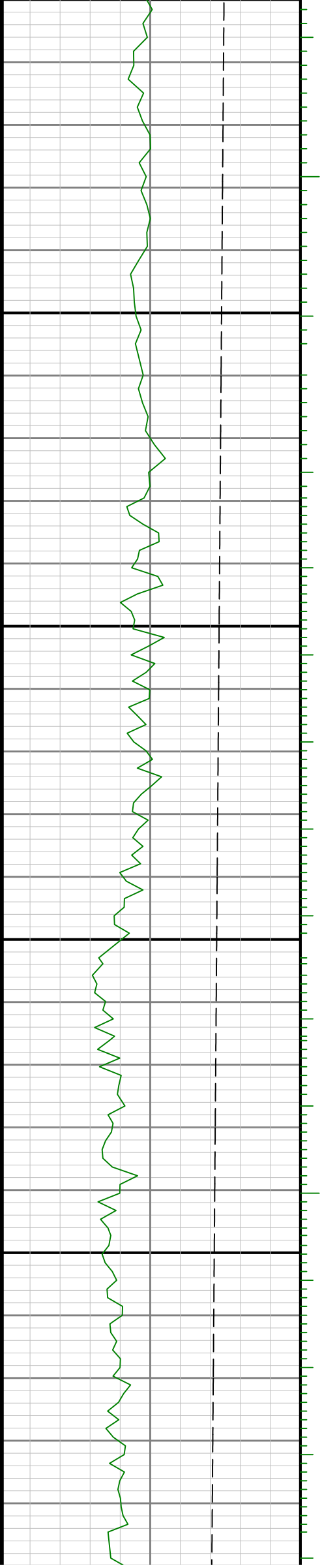


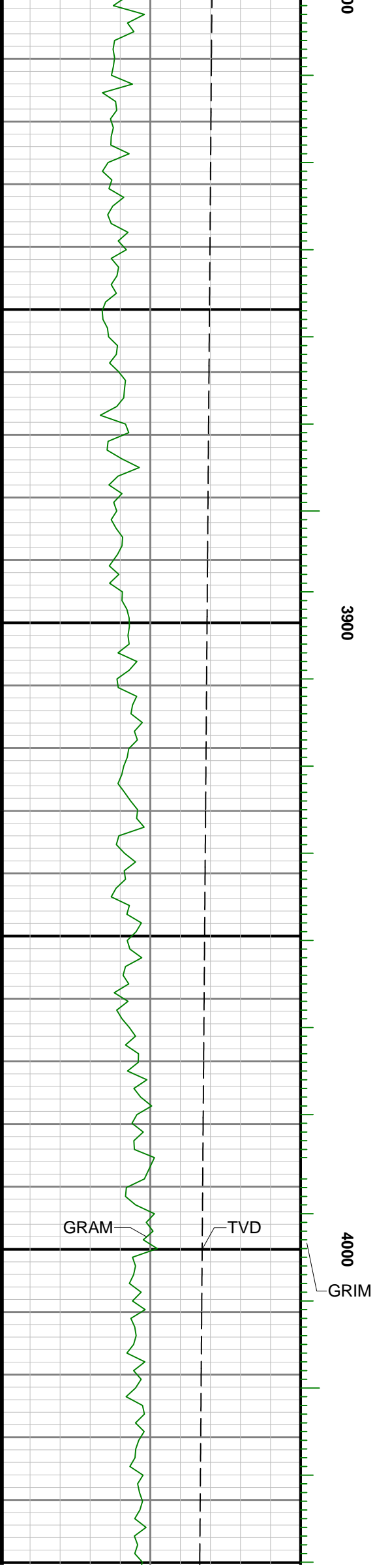
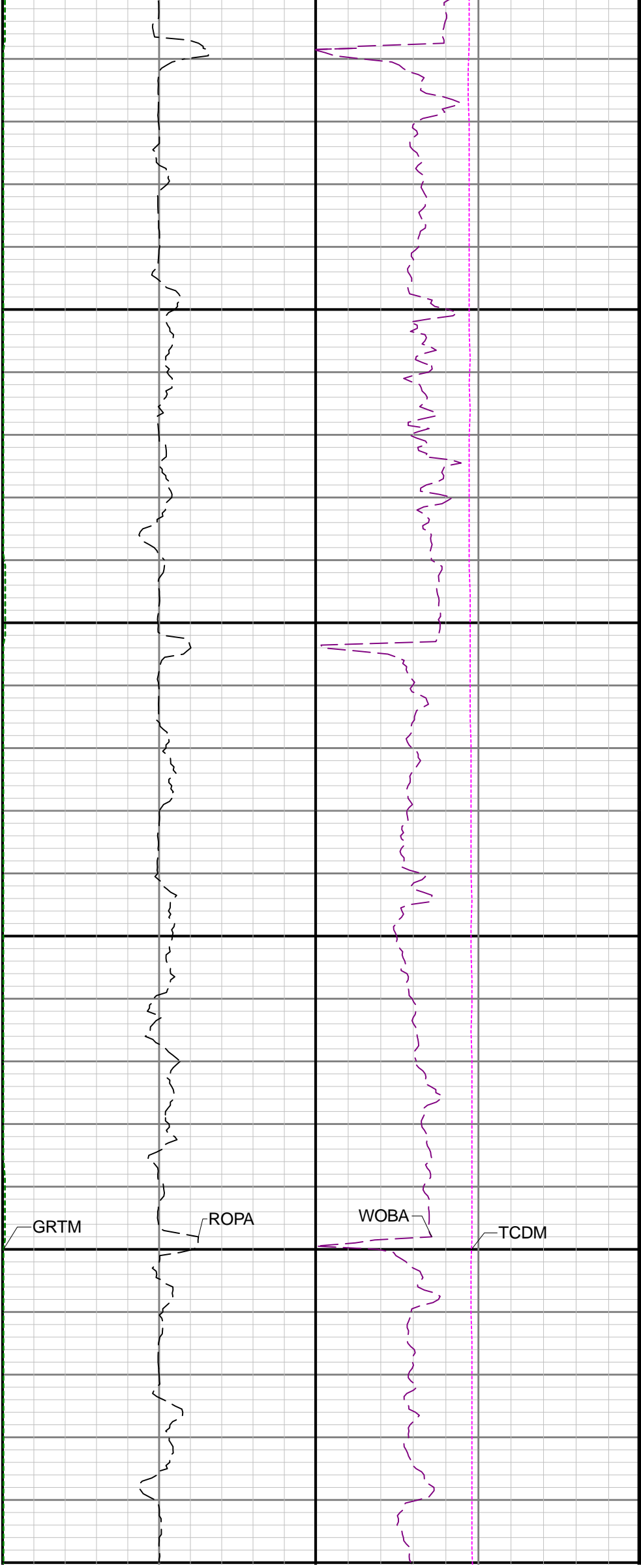


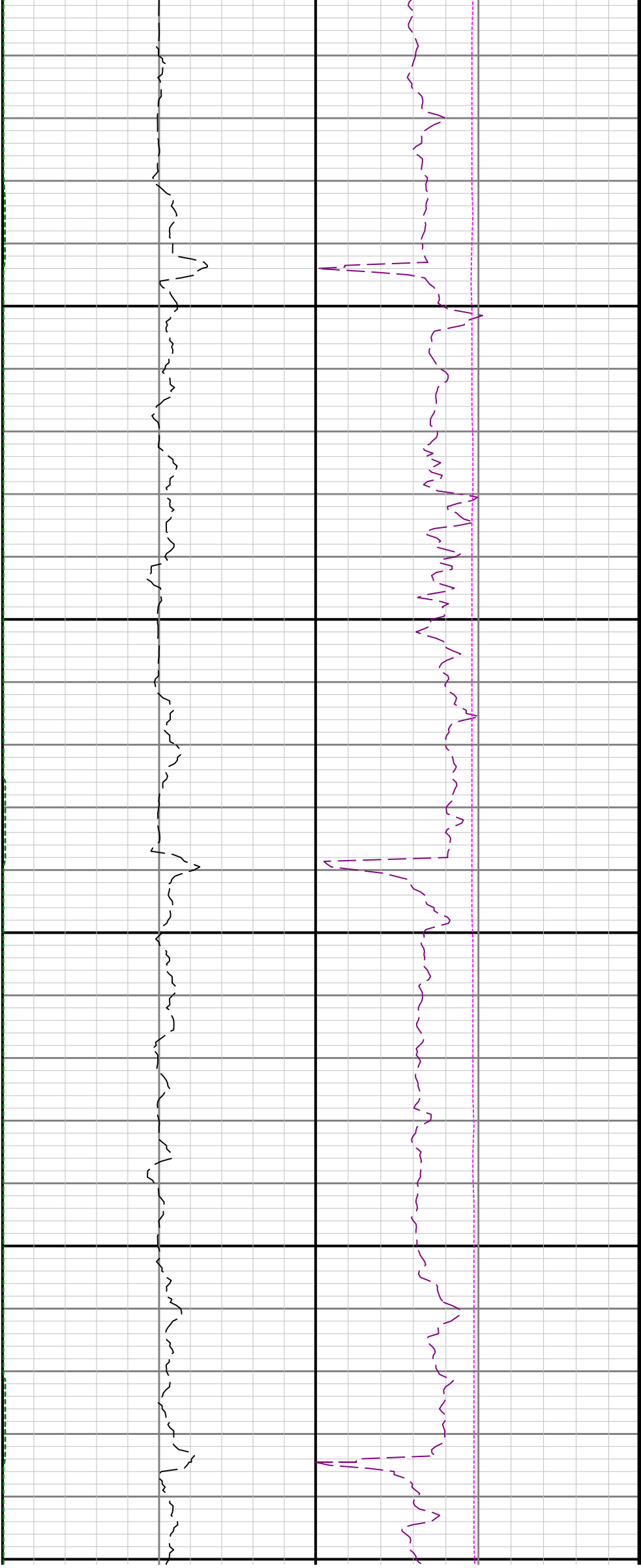
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38



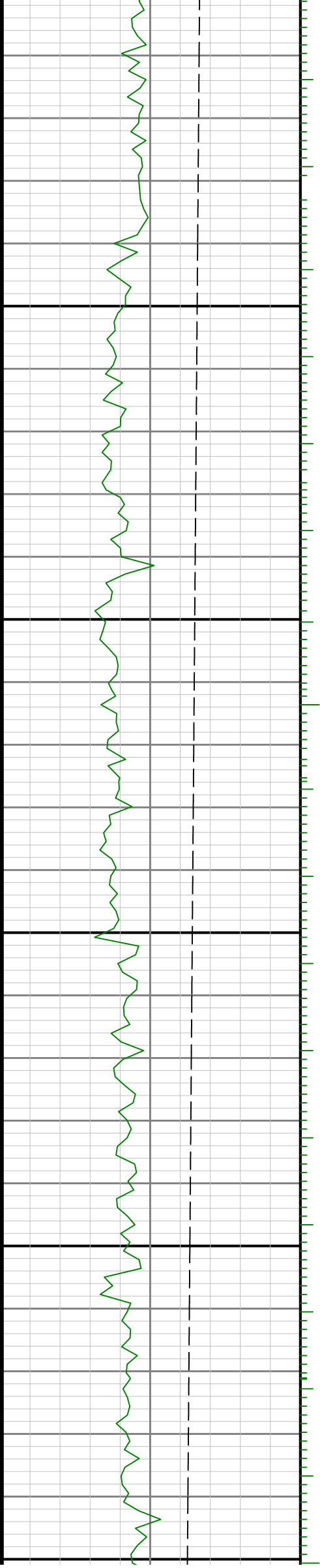


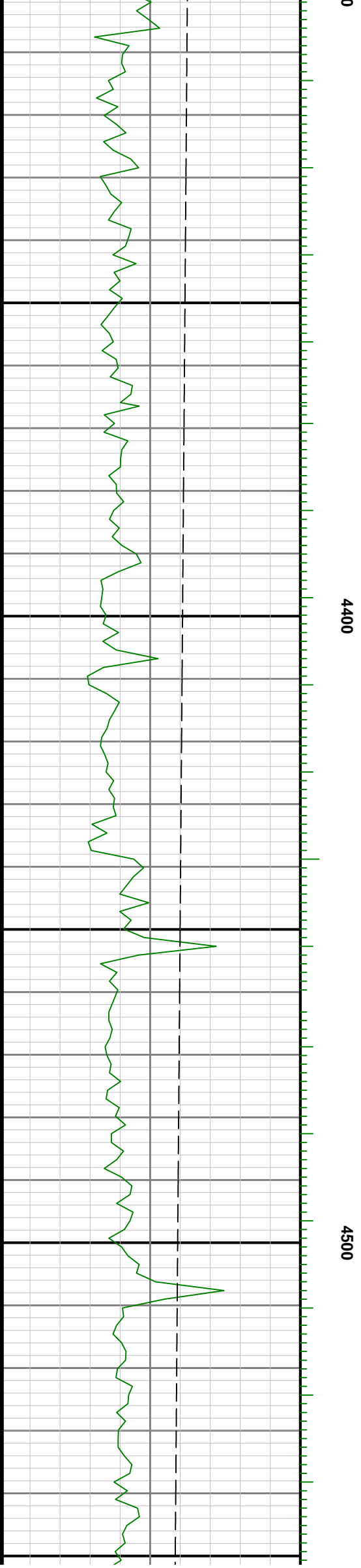
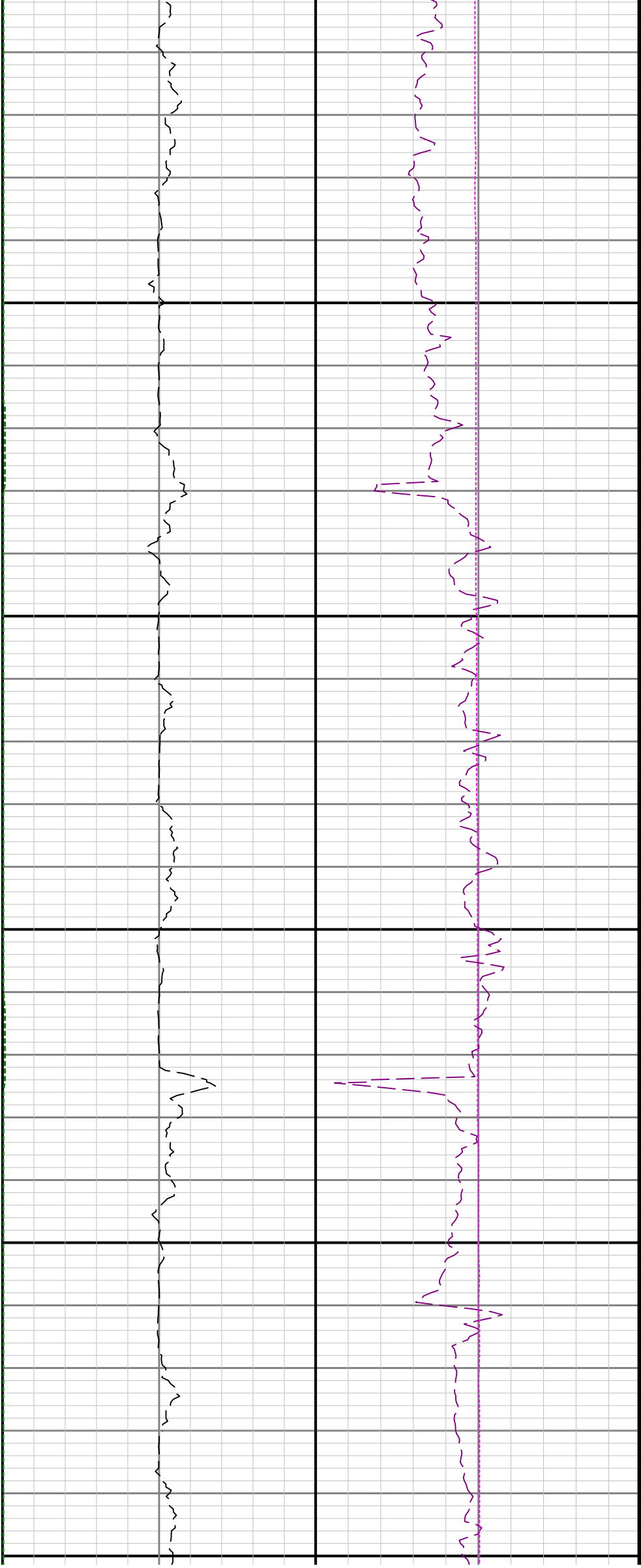


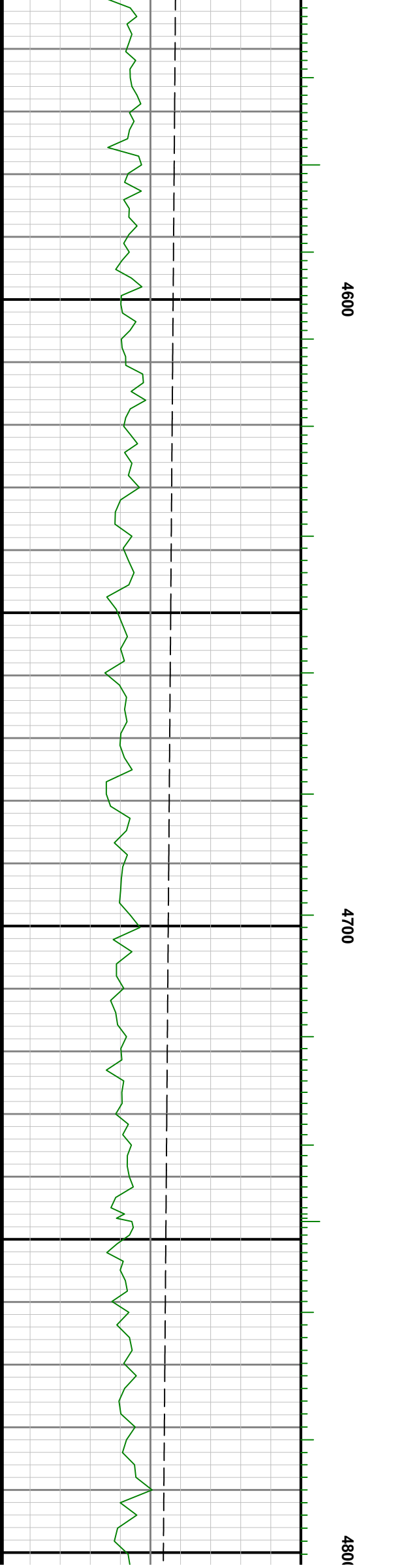
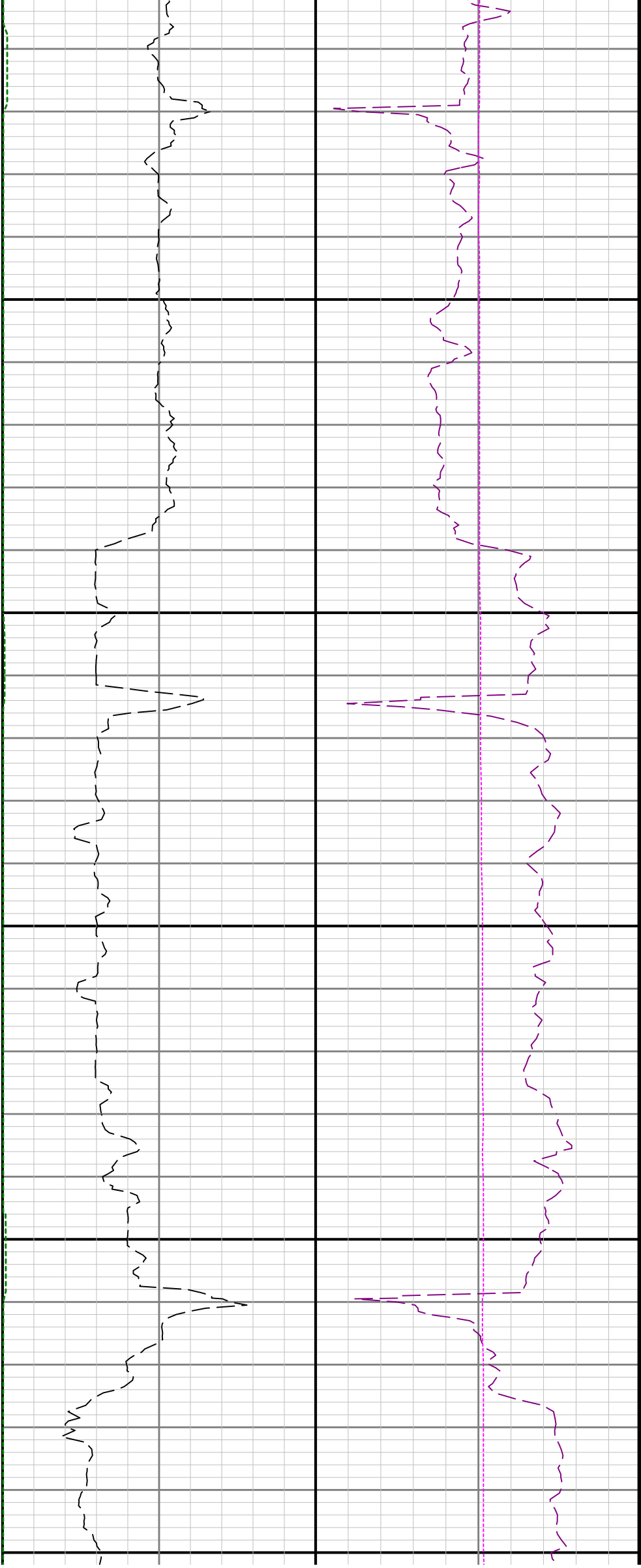
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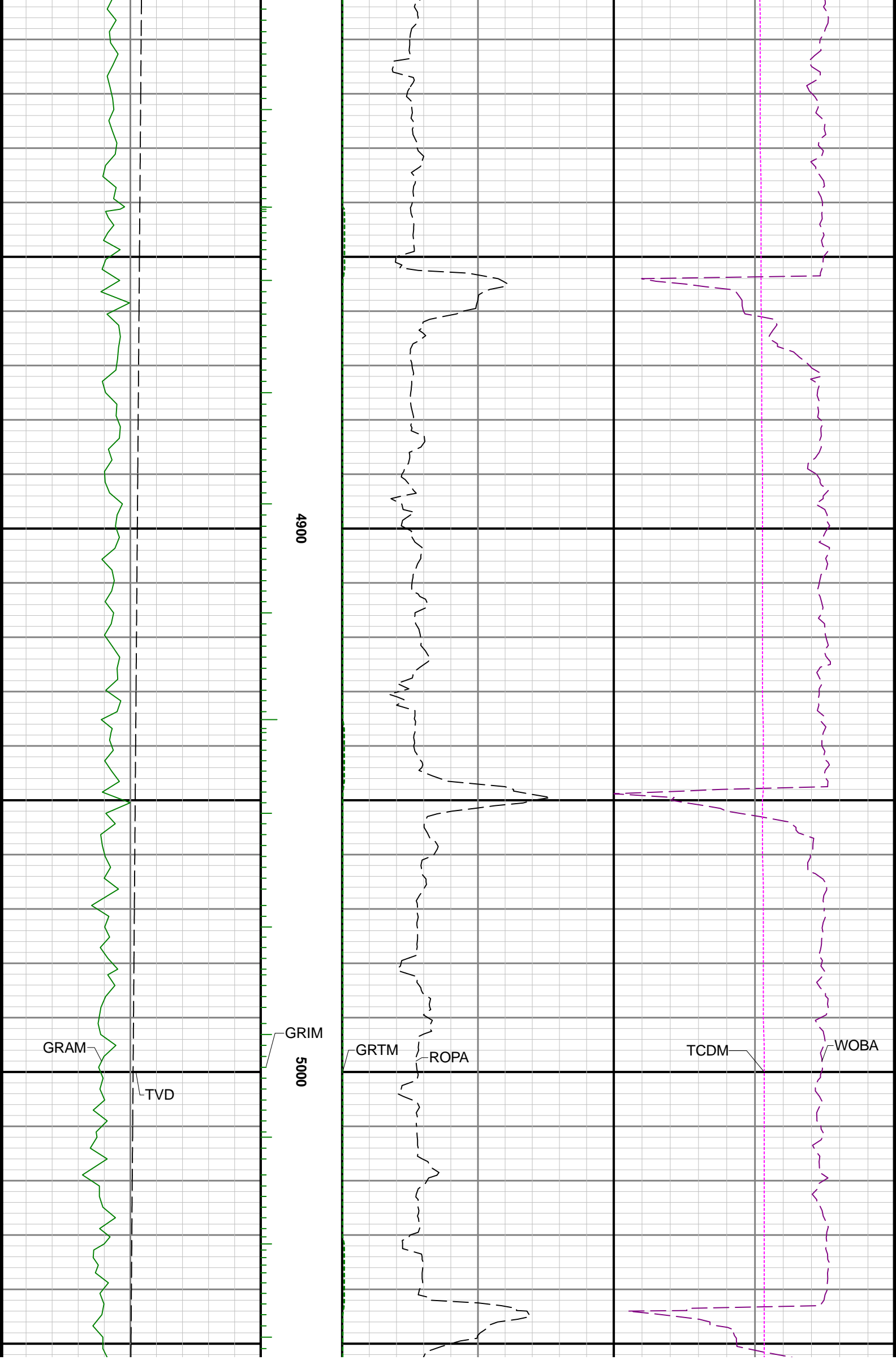
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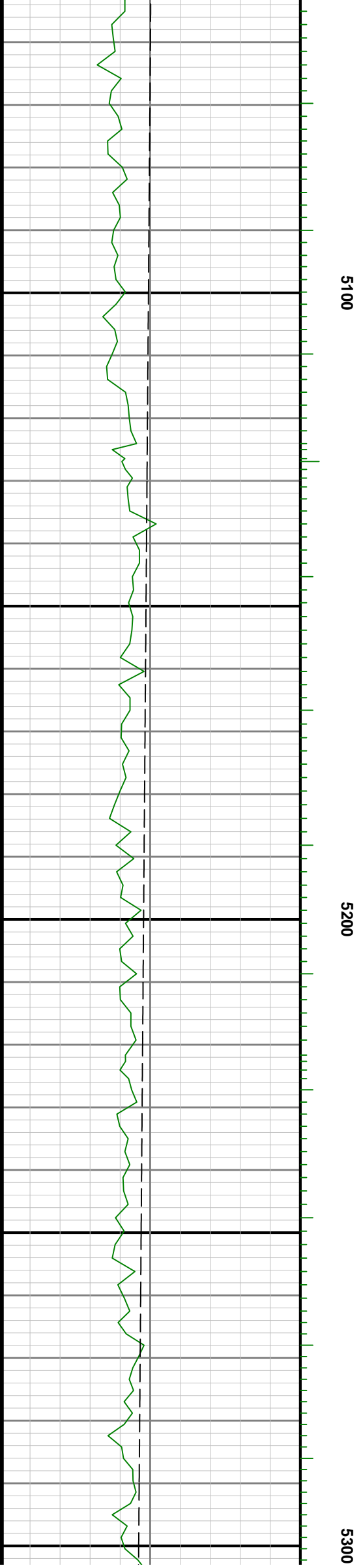
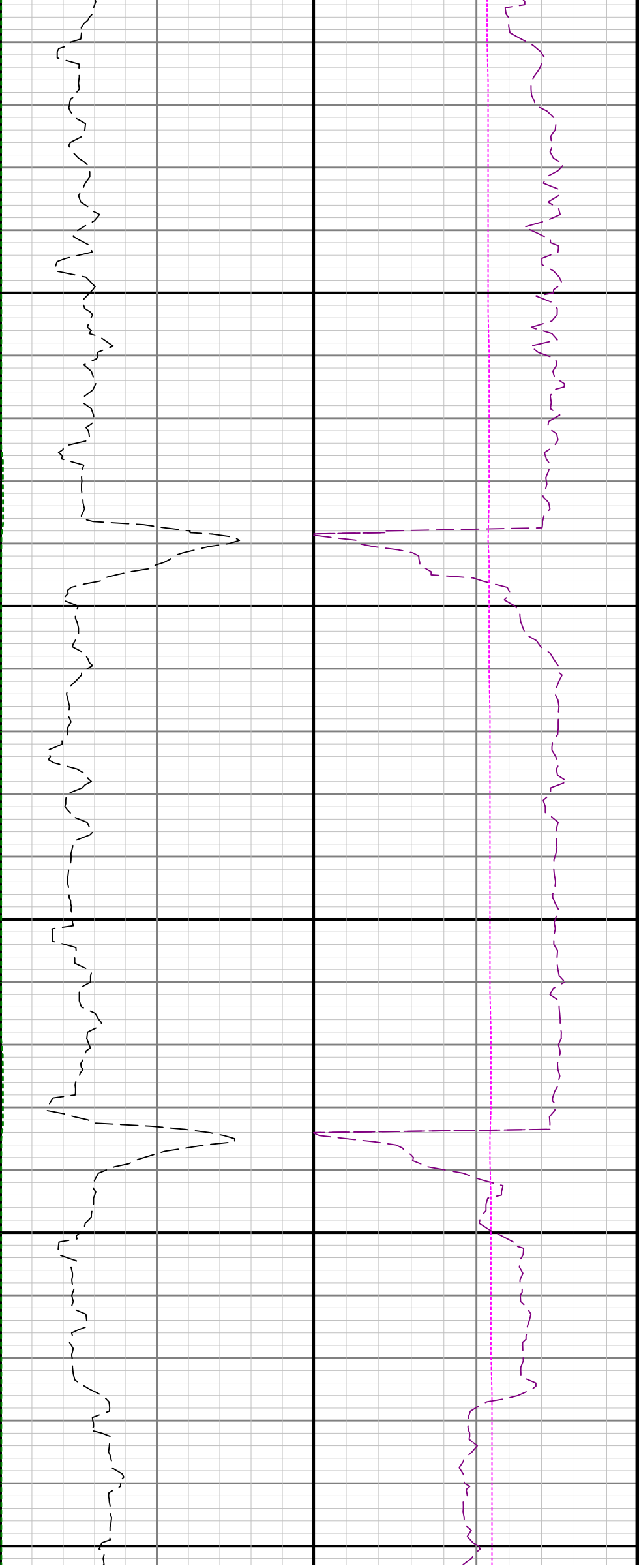
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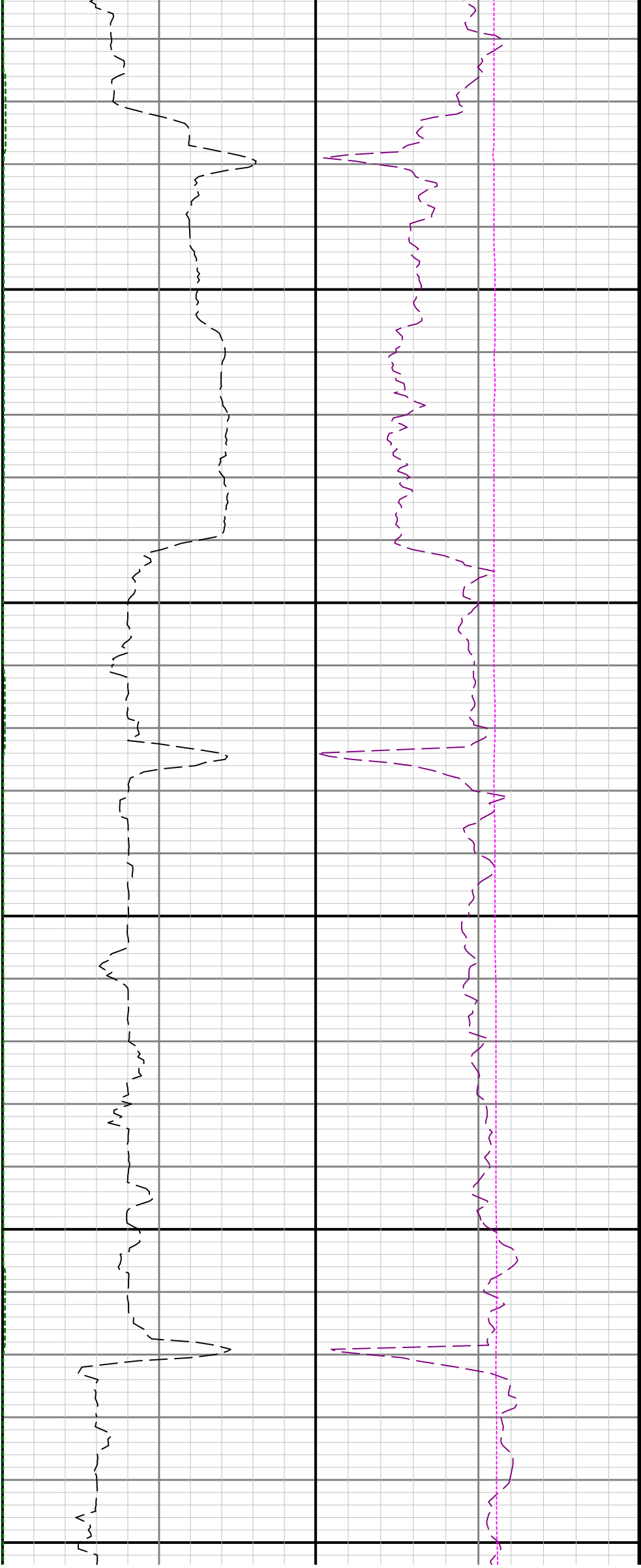






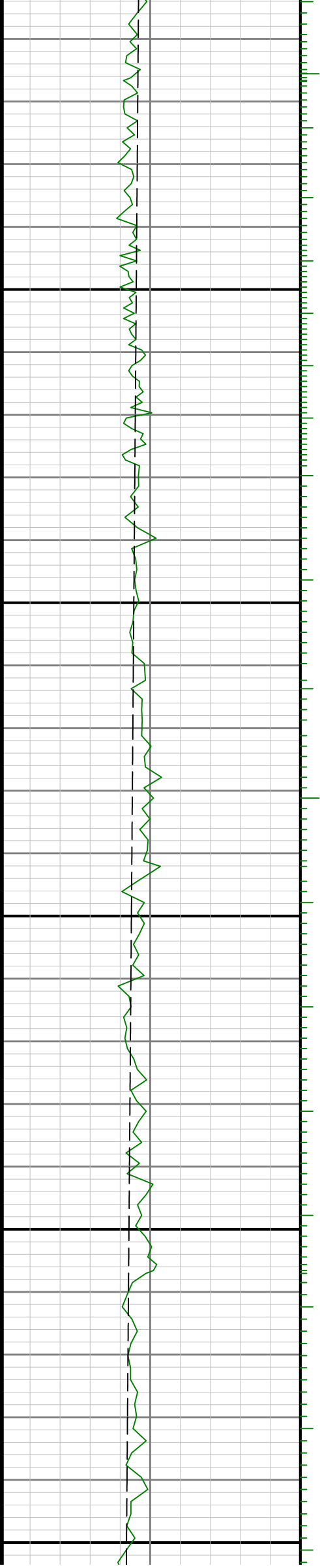


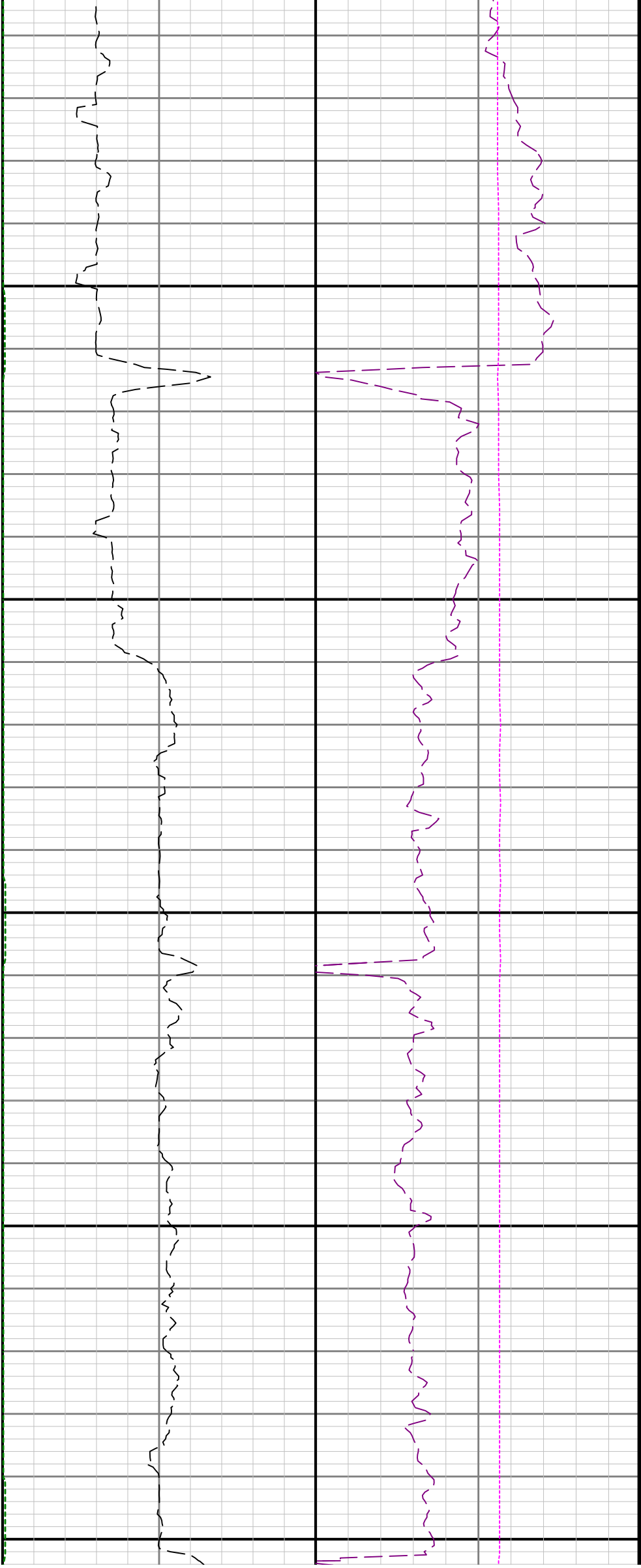




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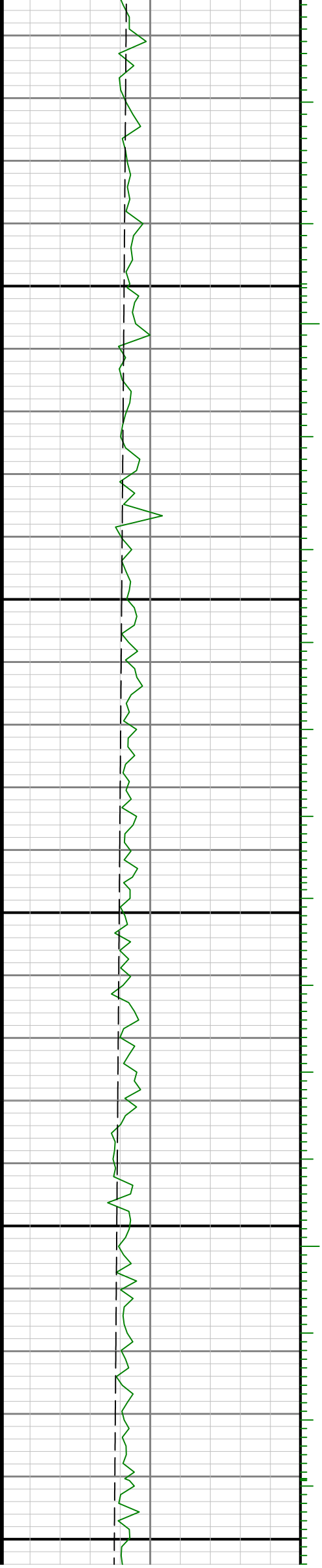


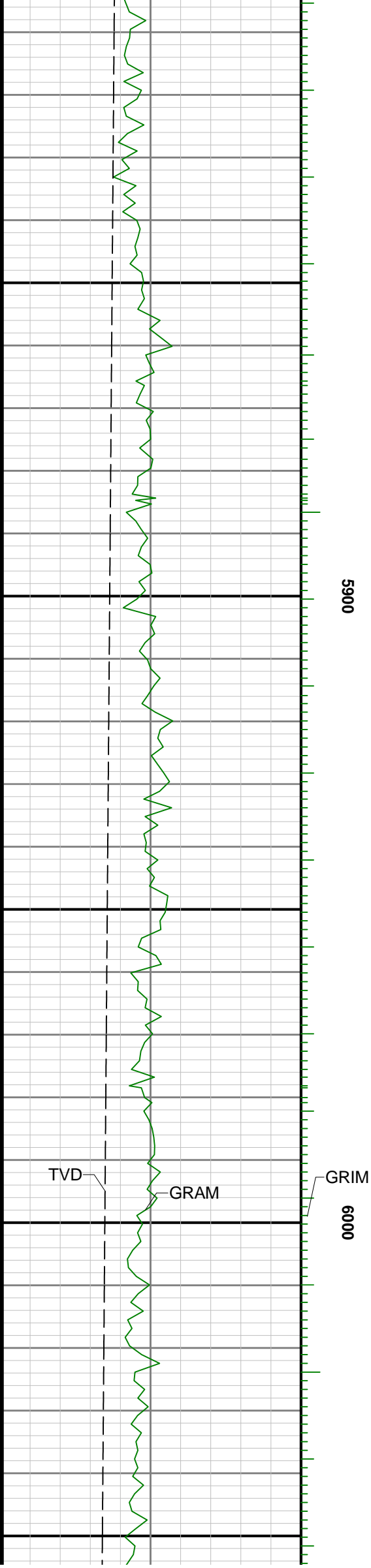


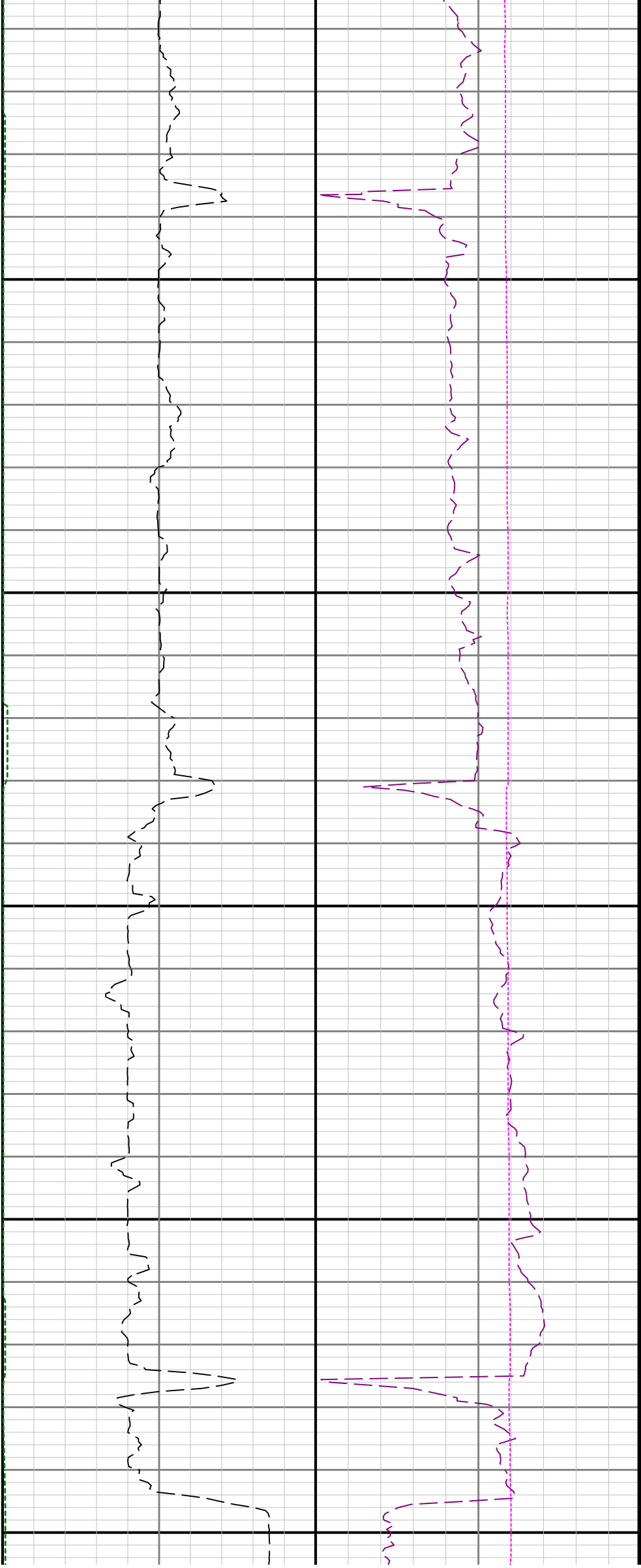
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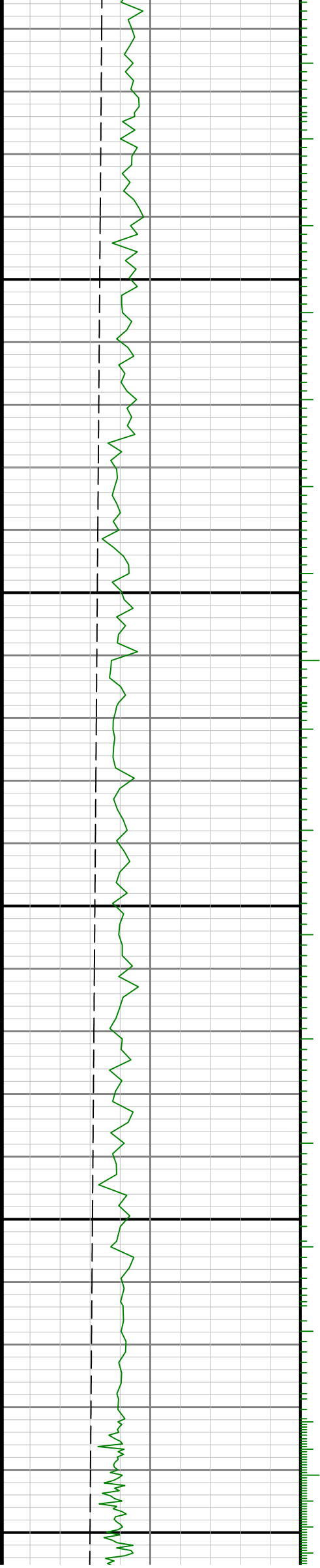


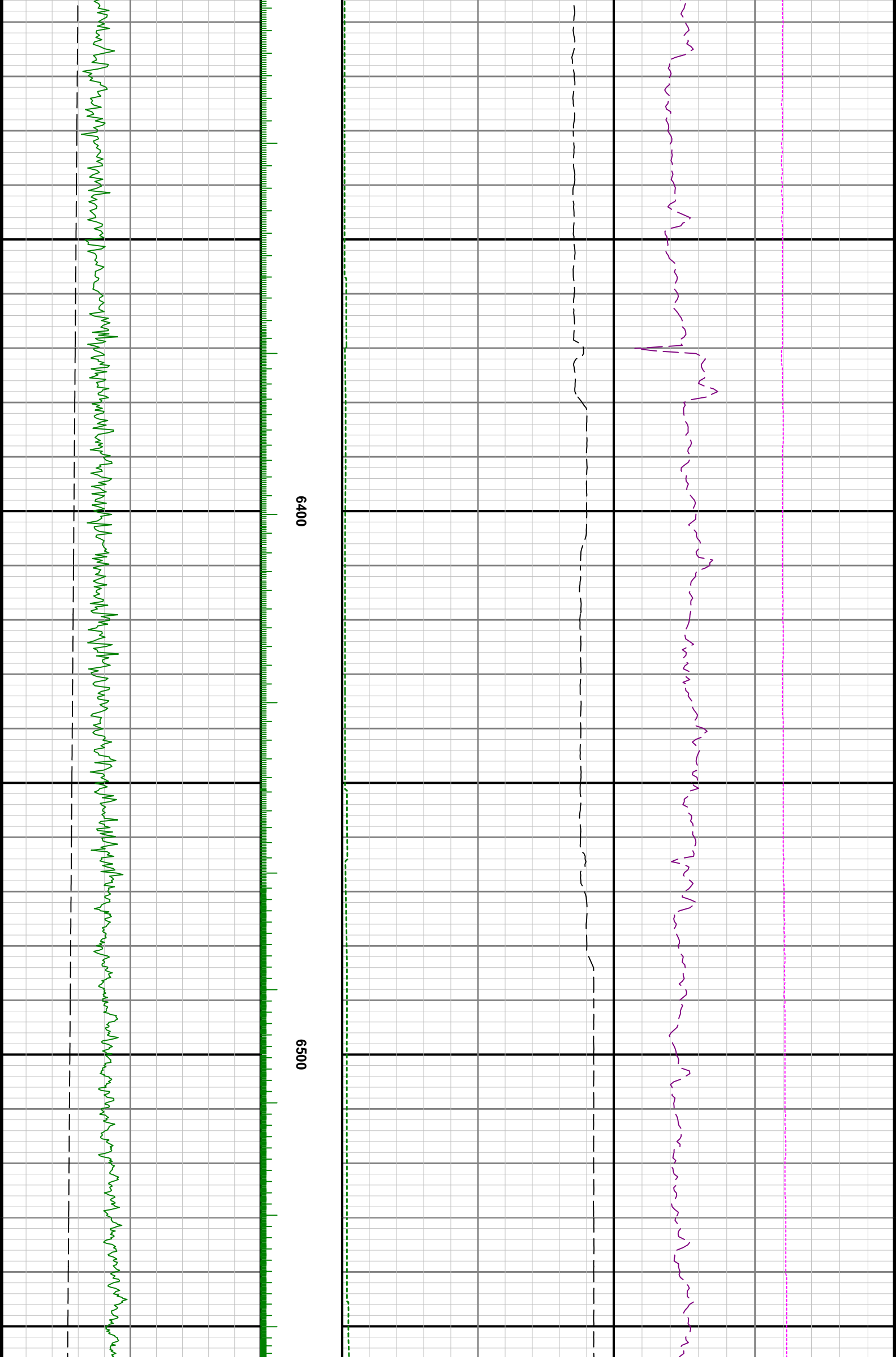


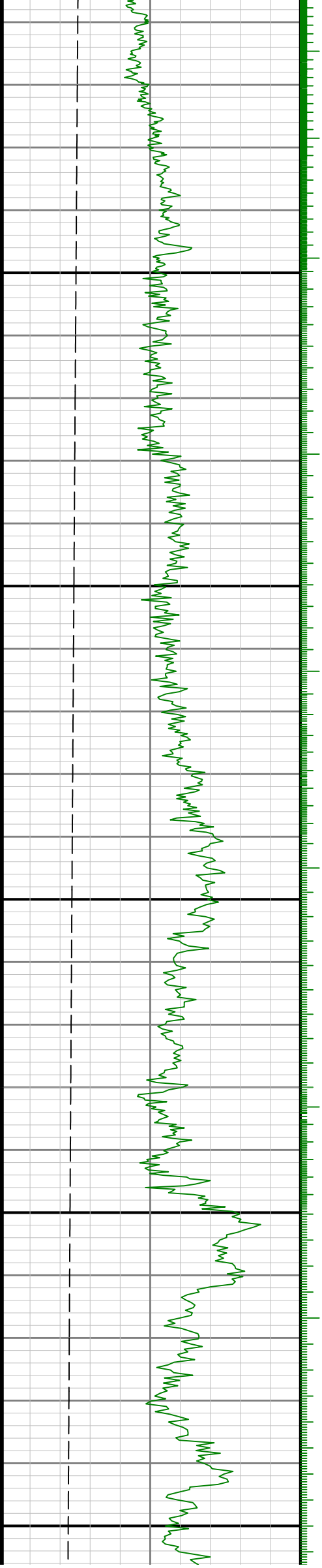
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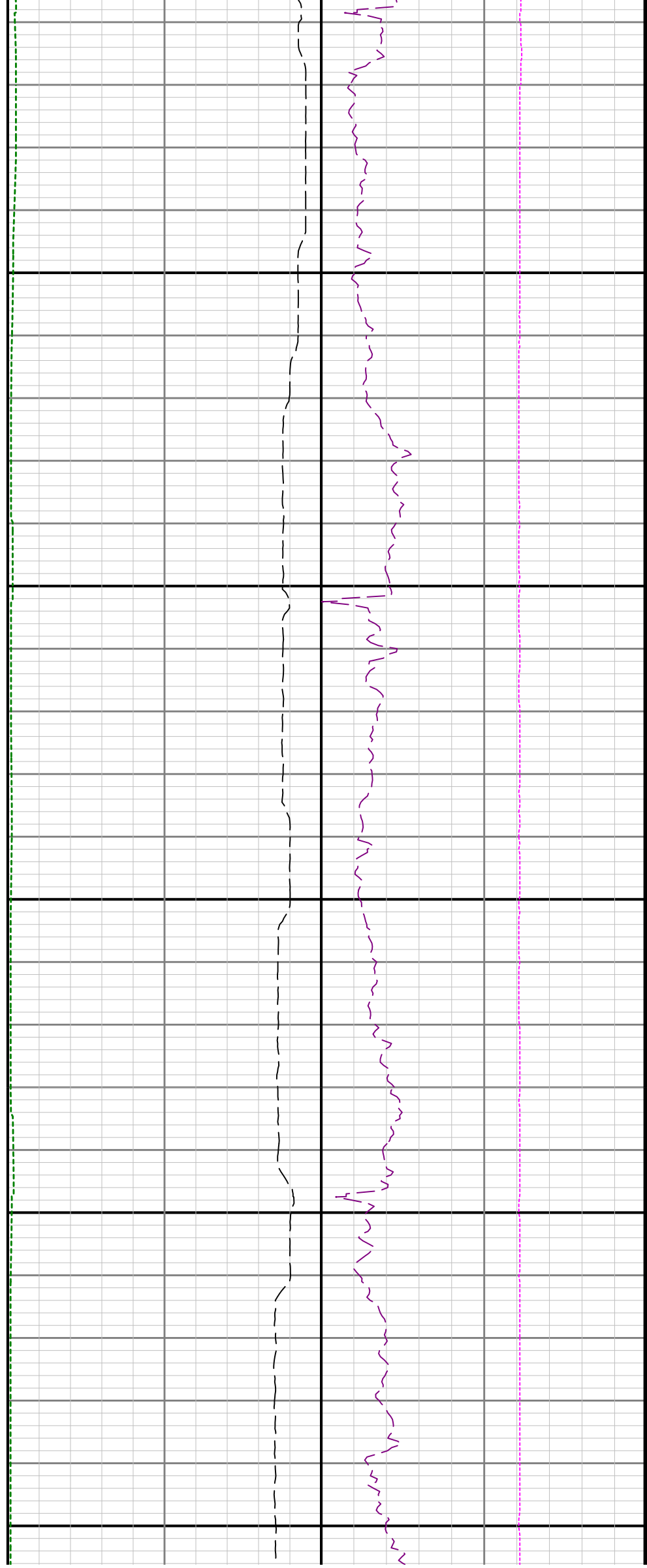


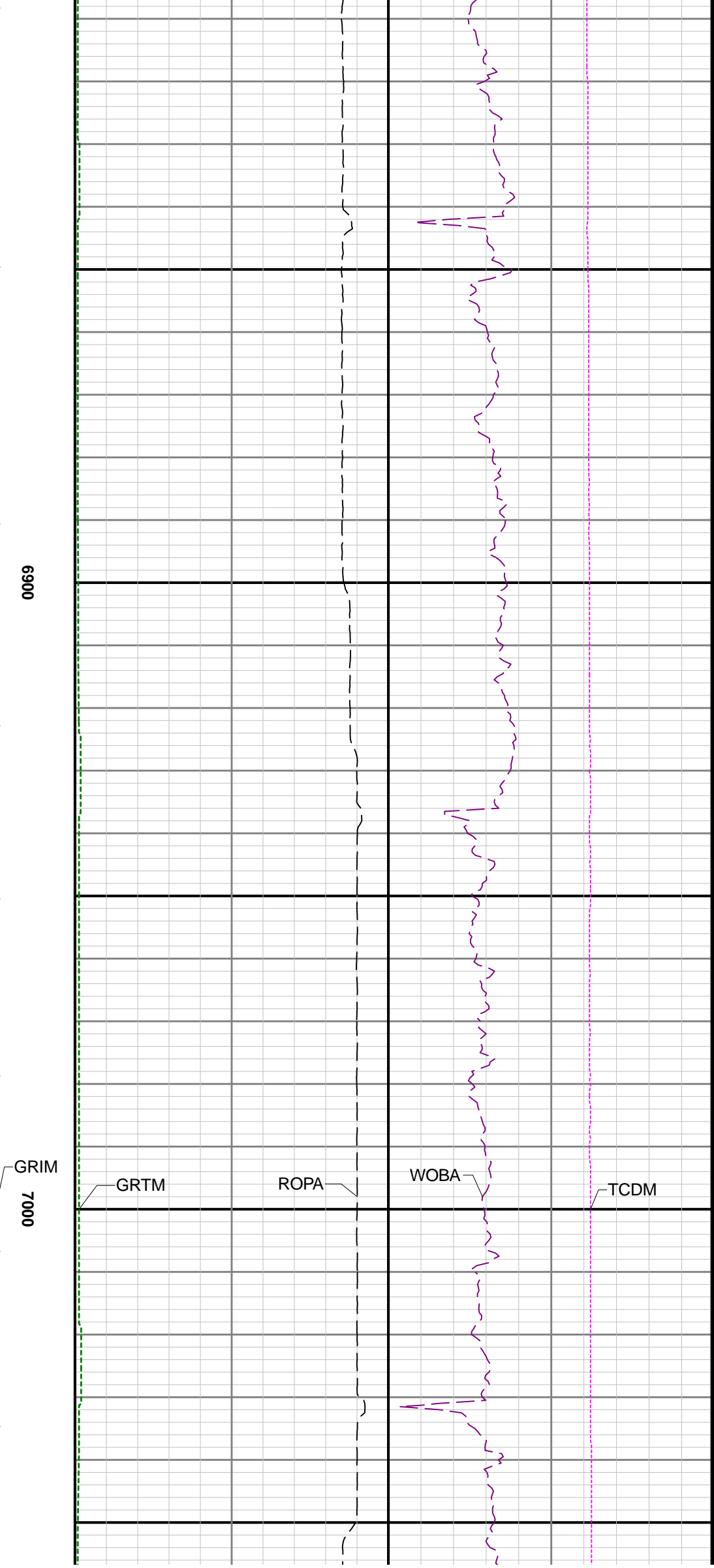
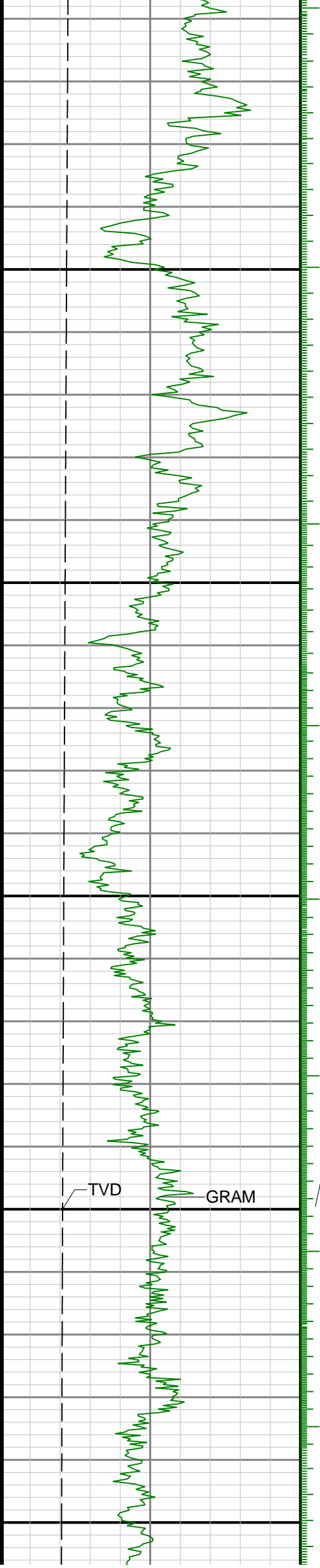


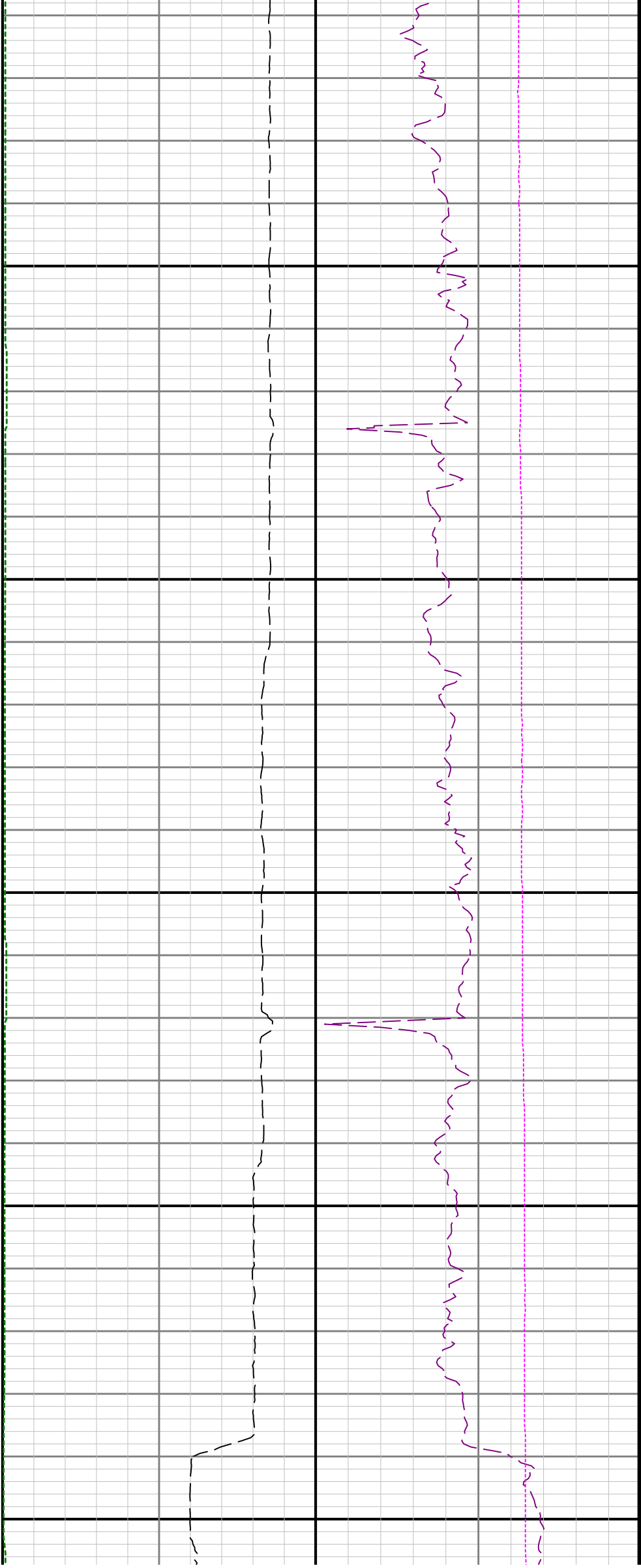
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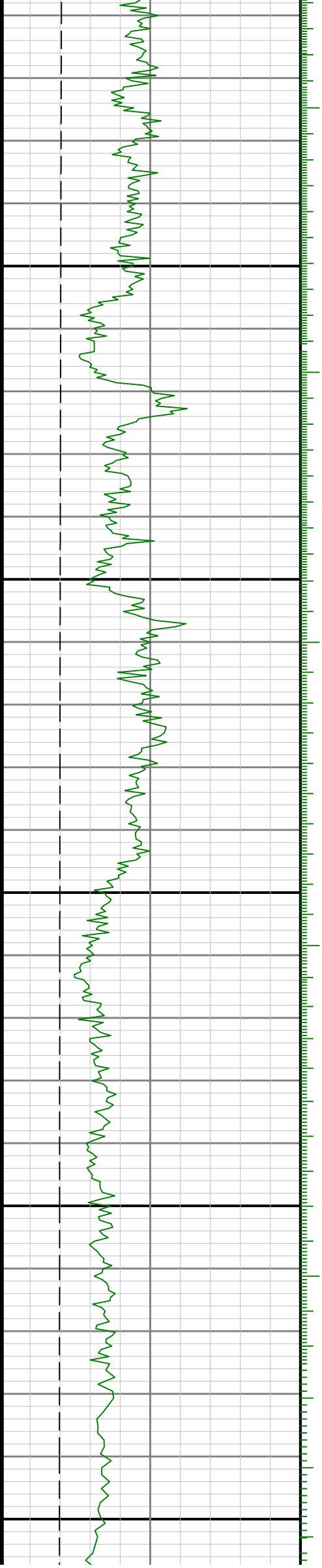




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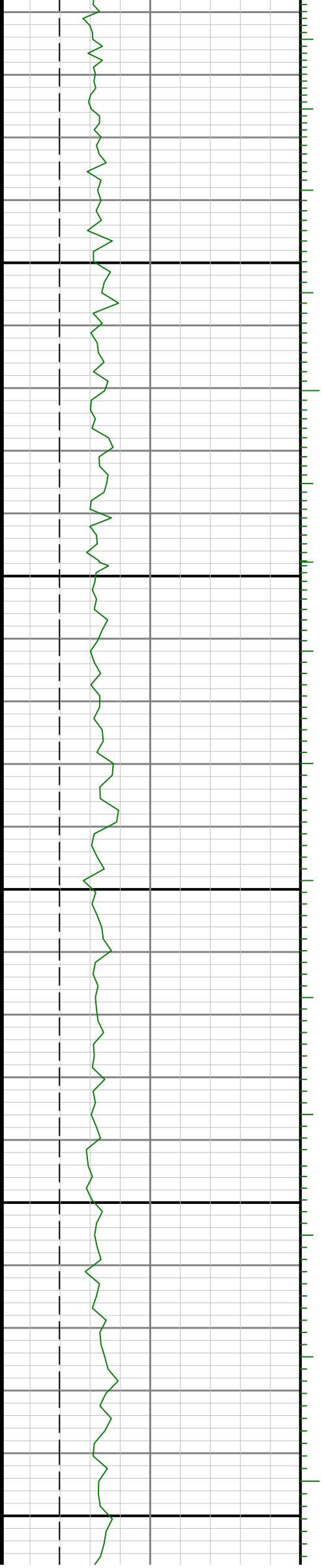
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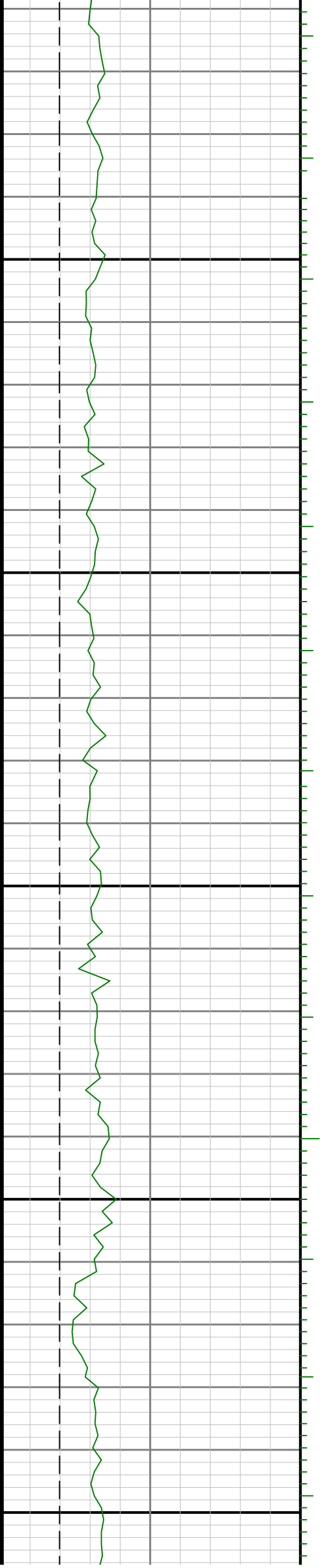


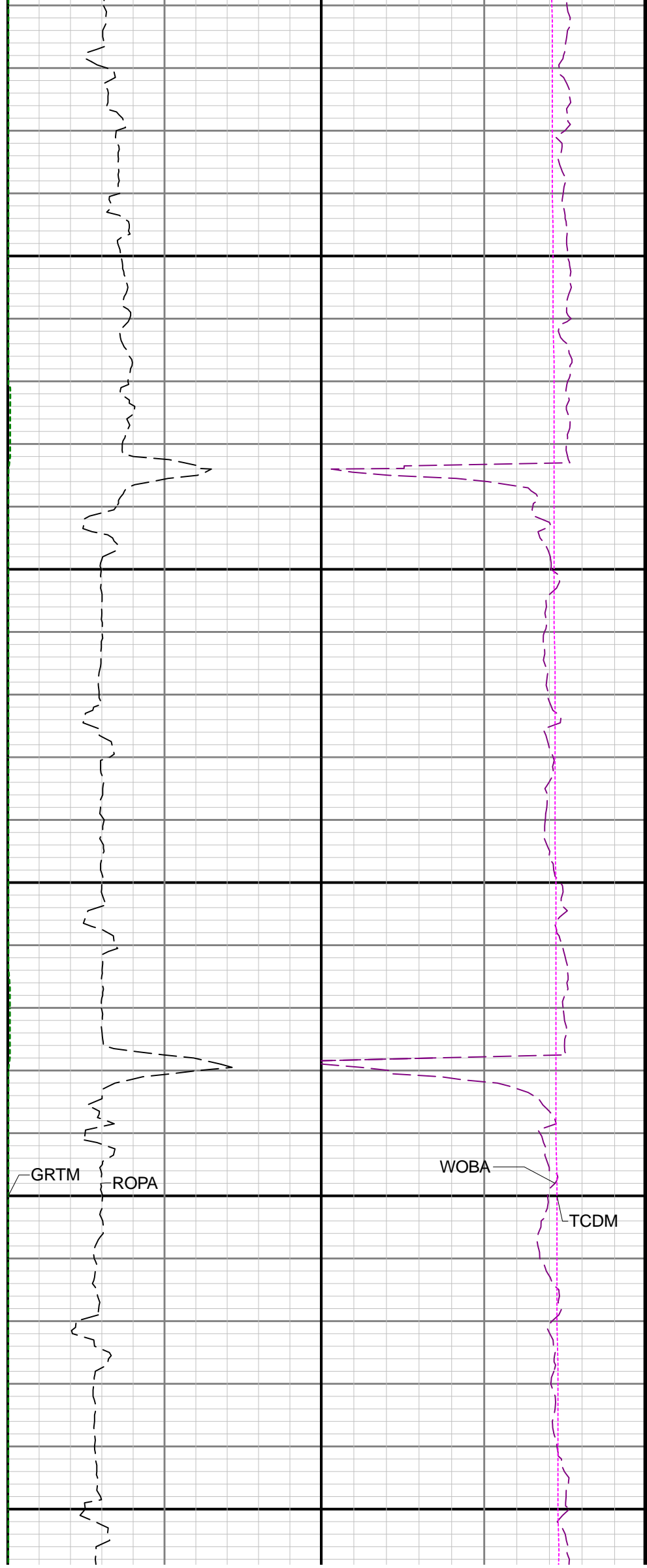
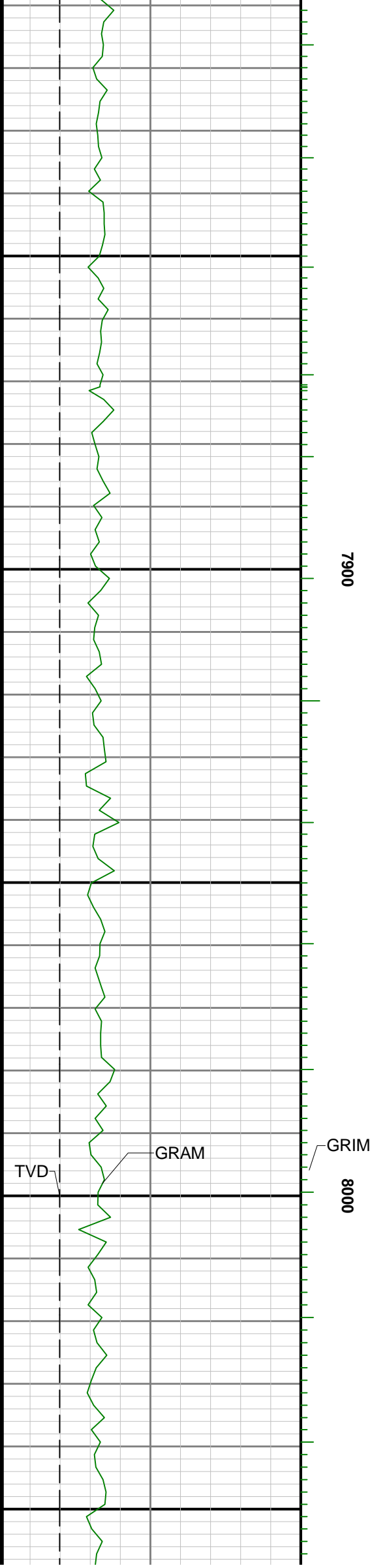


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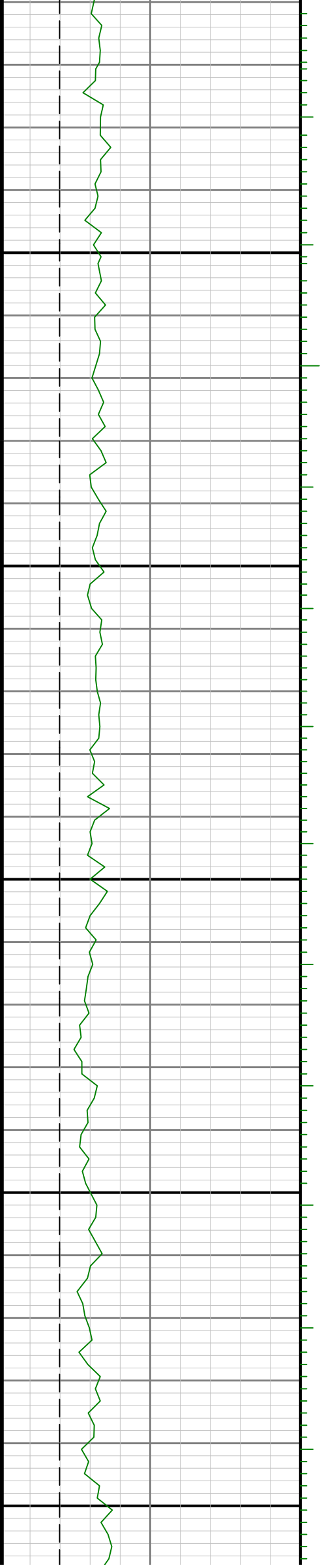


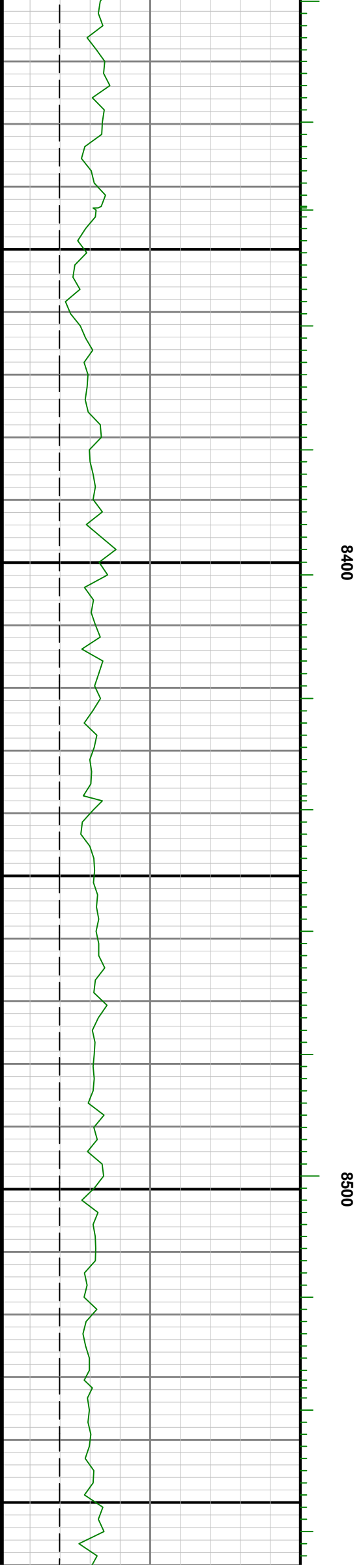


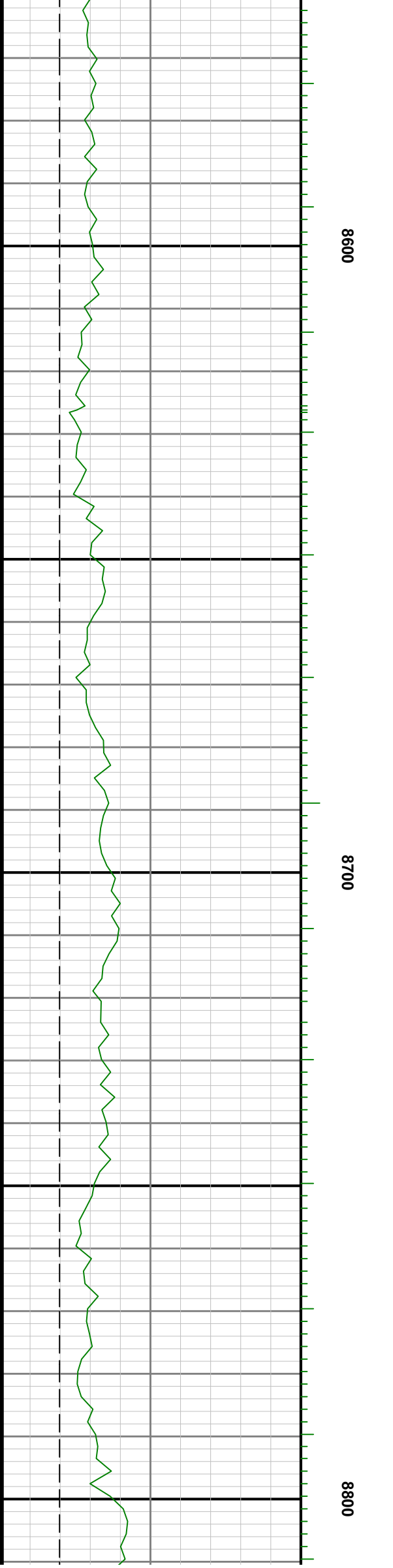
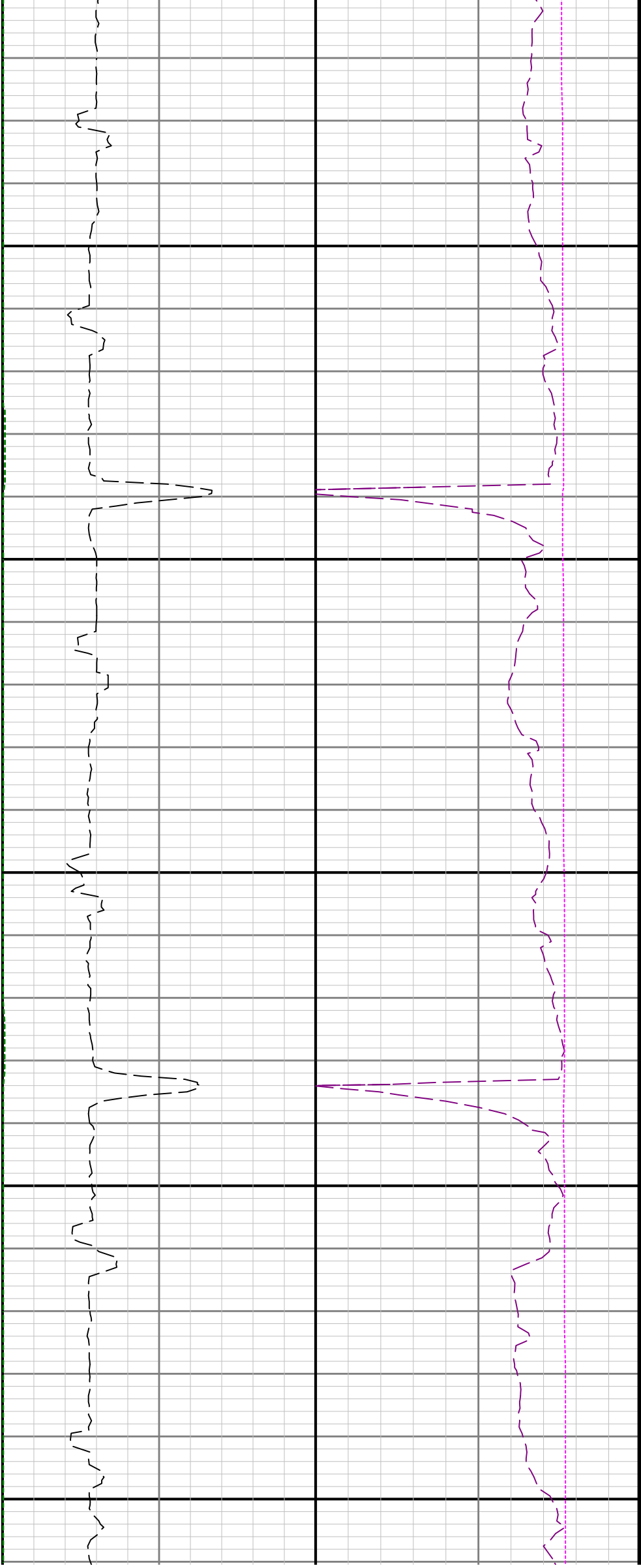
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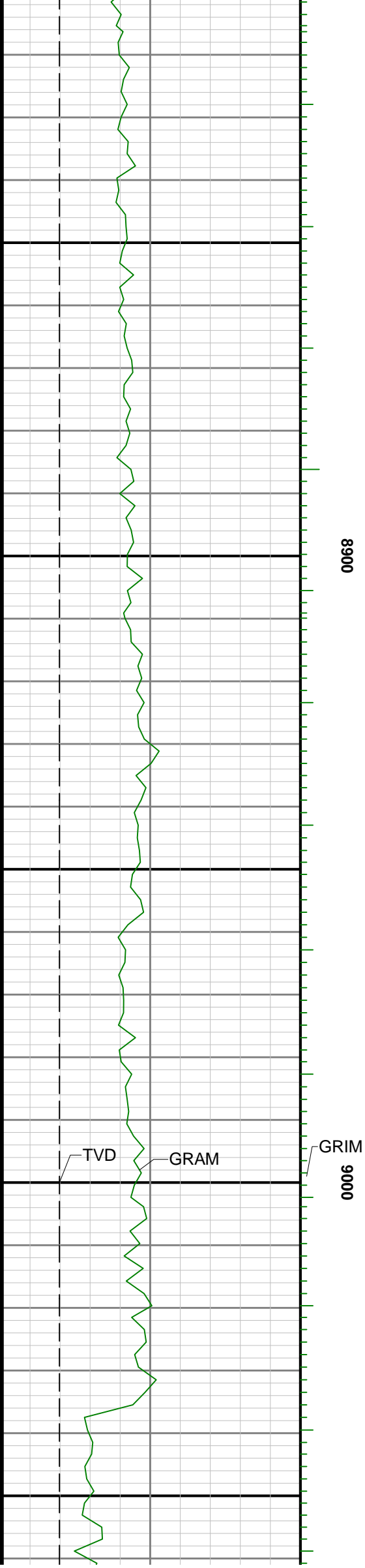
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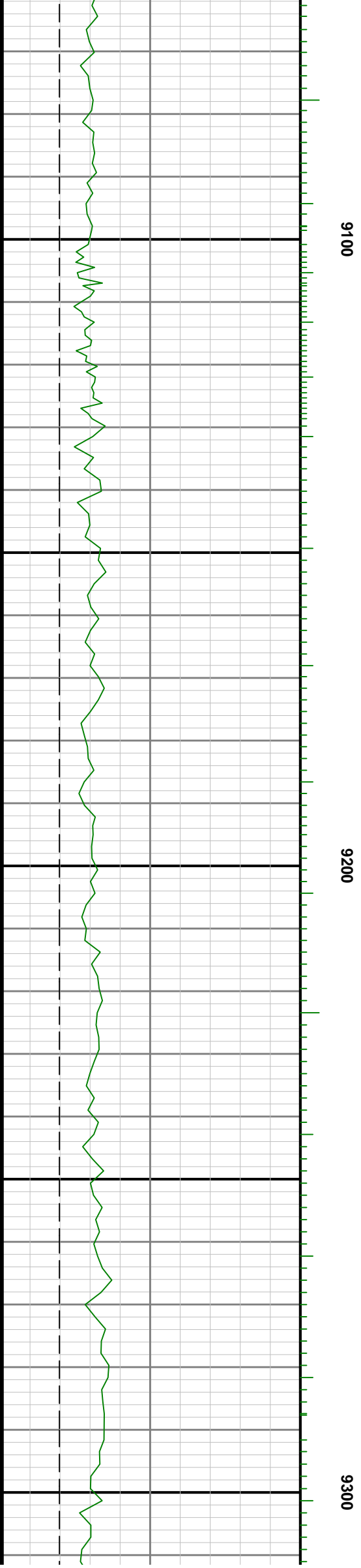
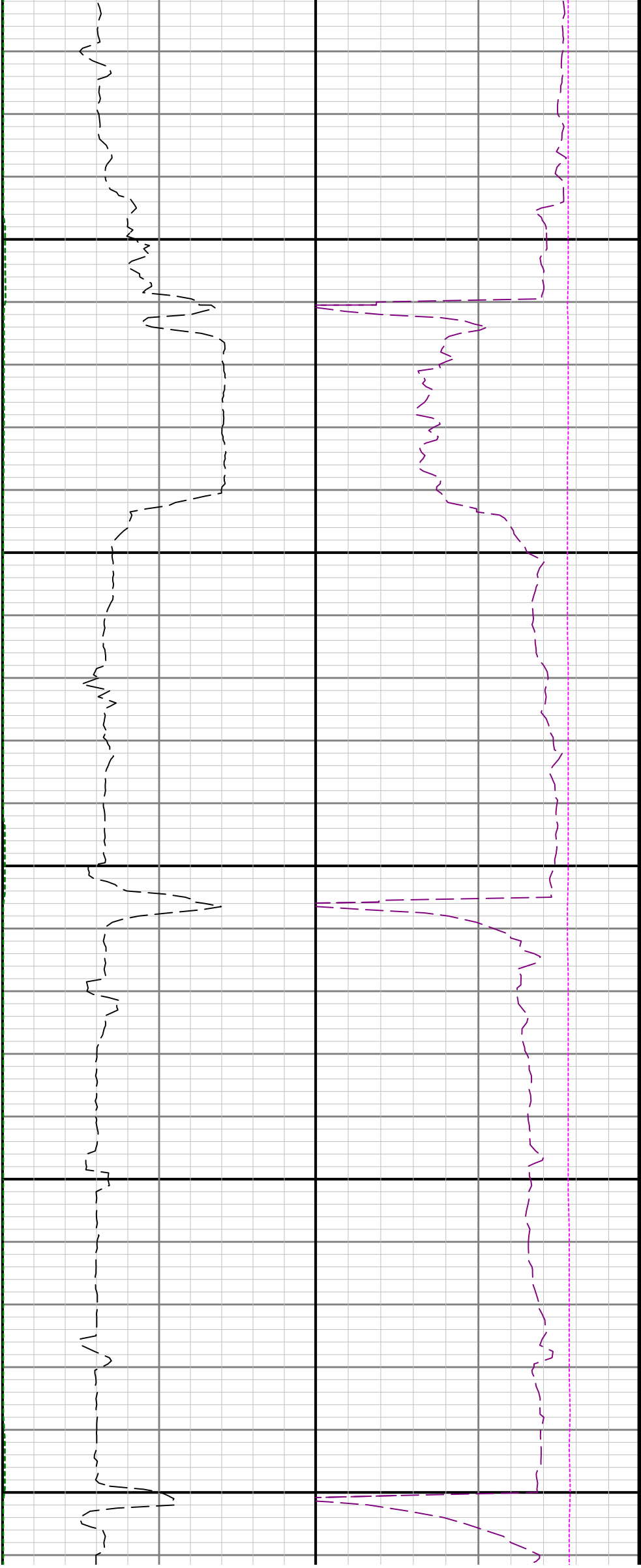
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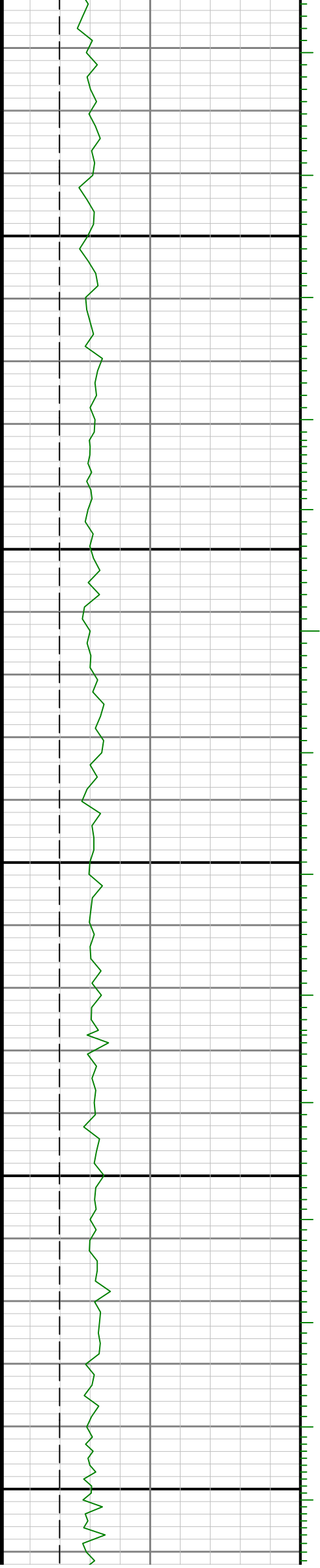
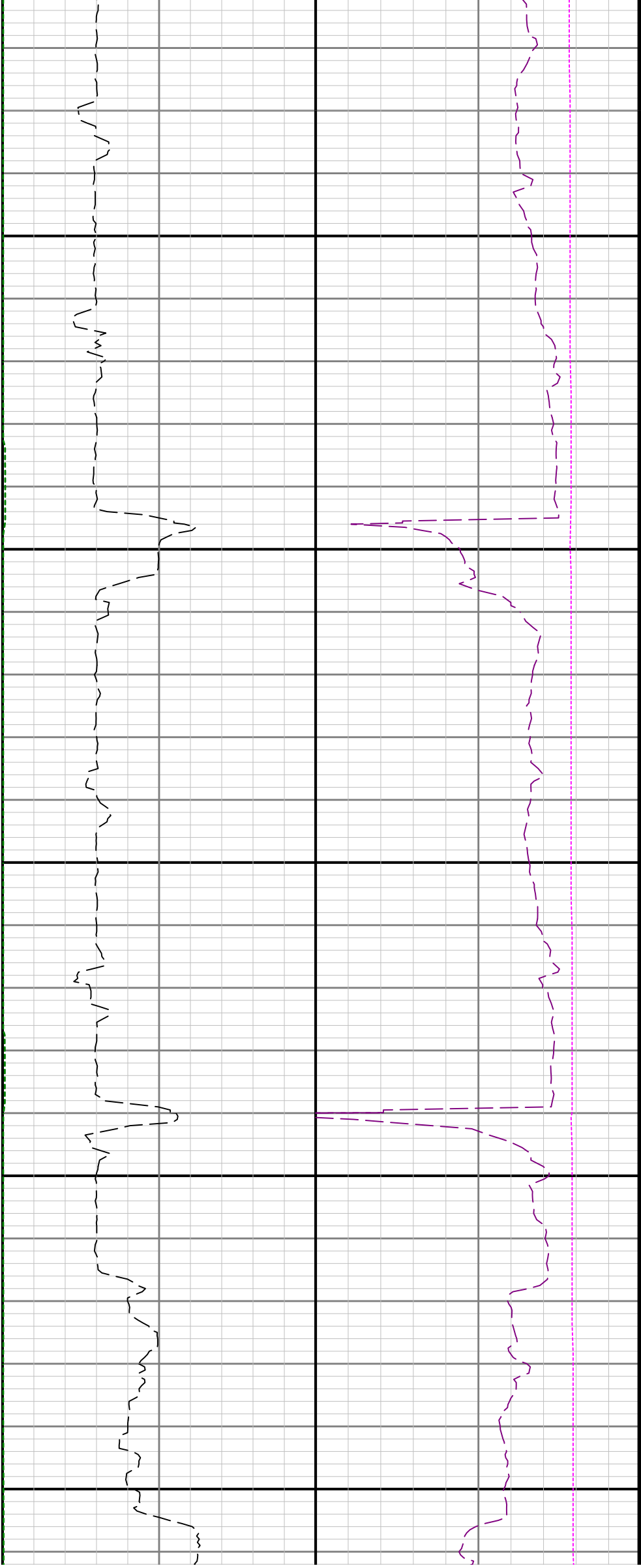




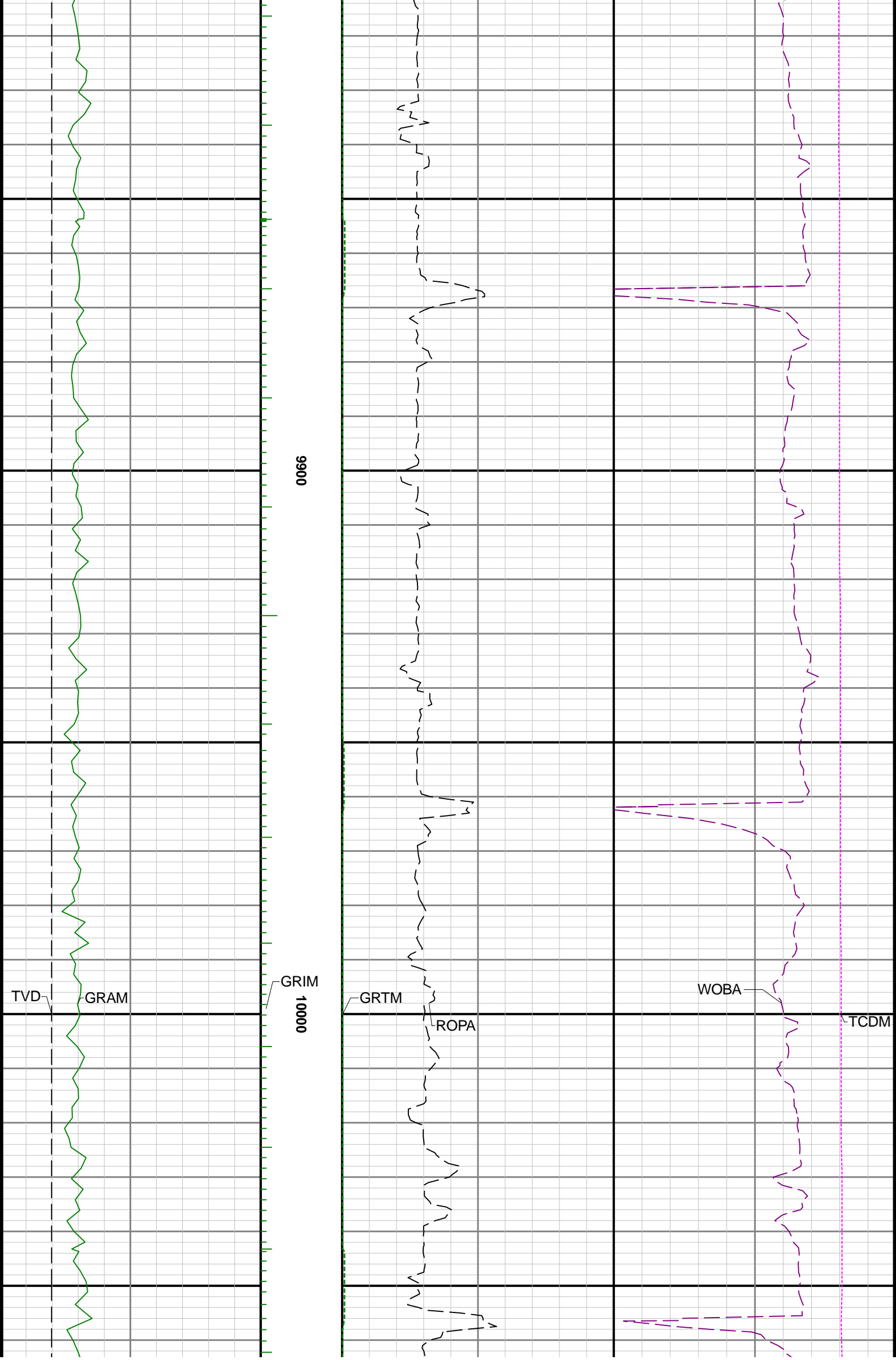


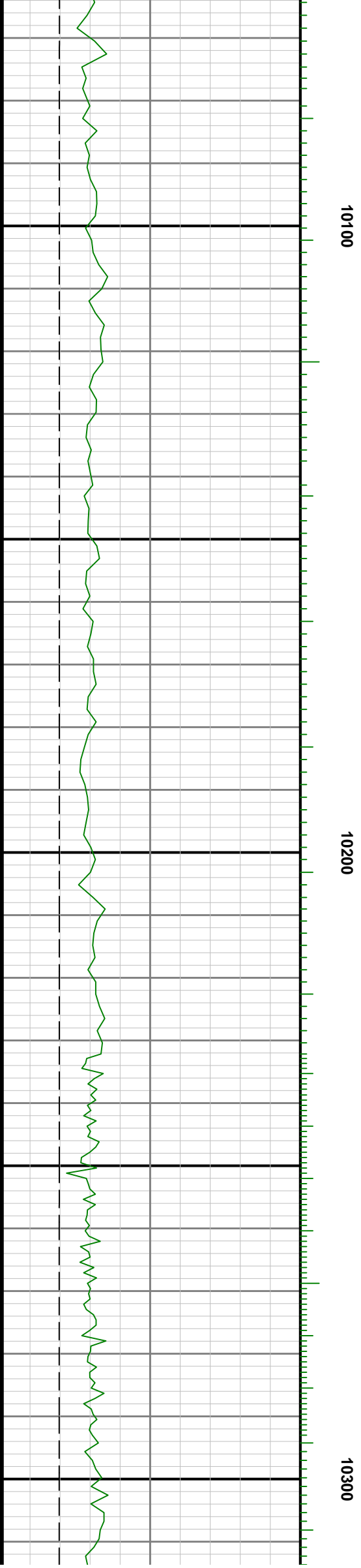








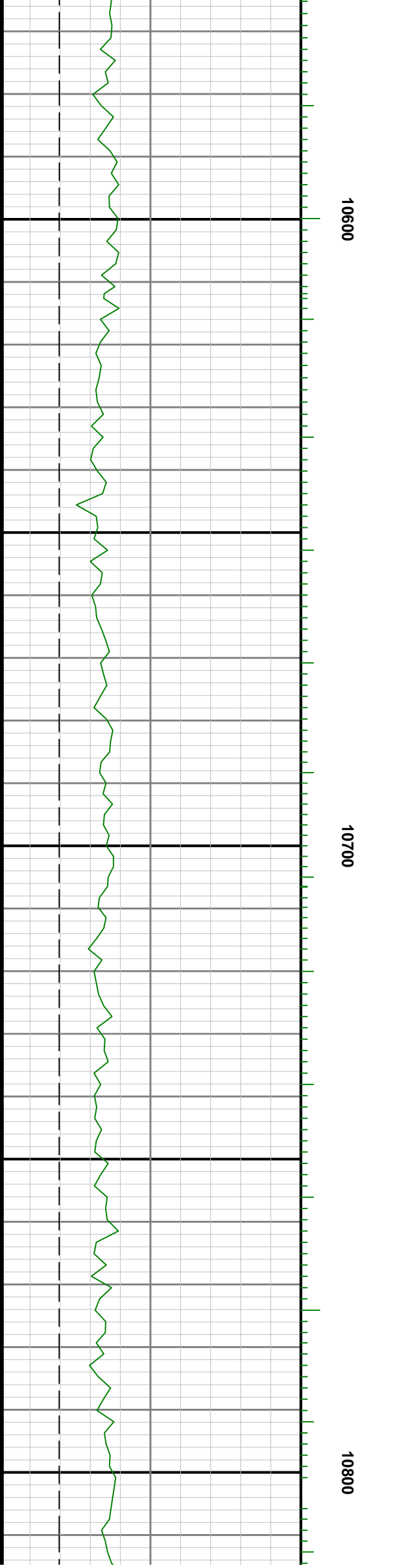
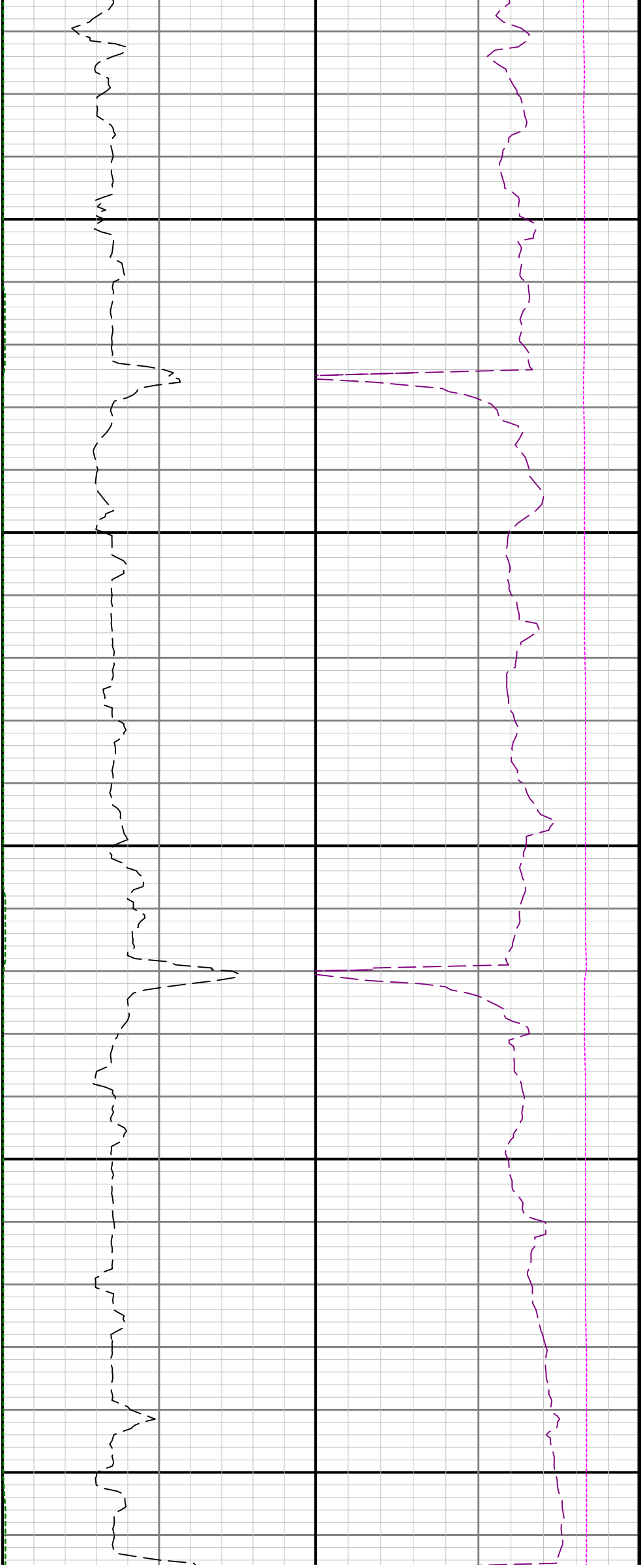


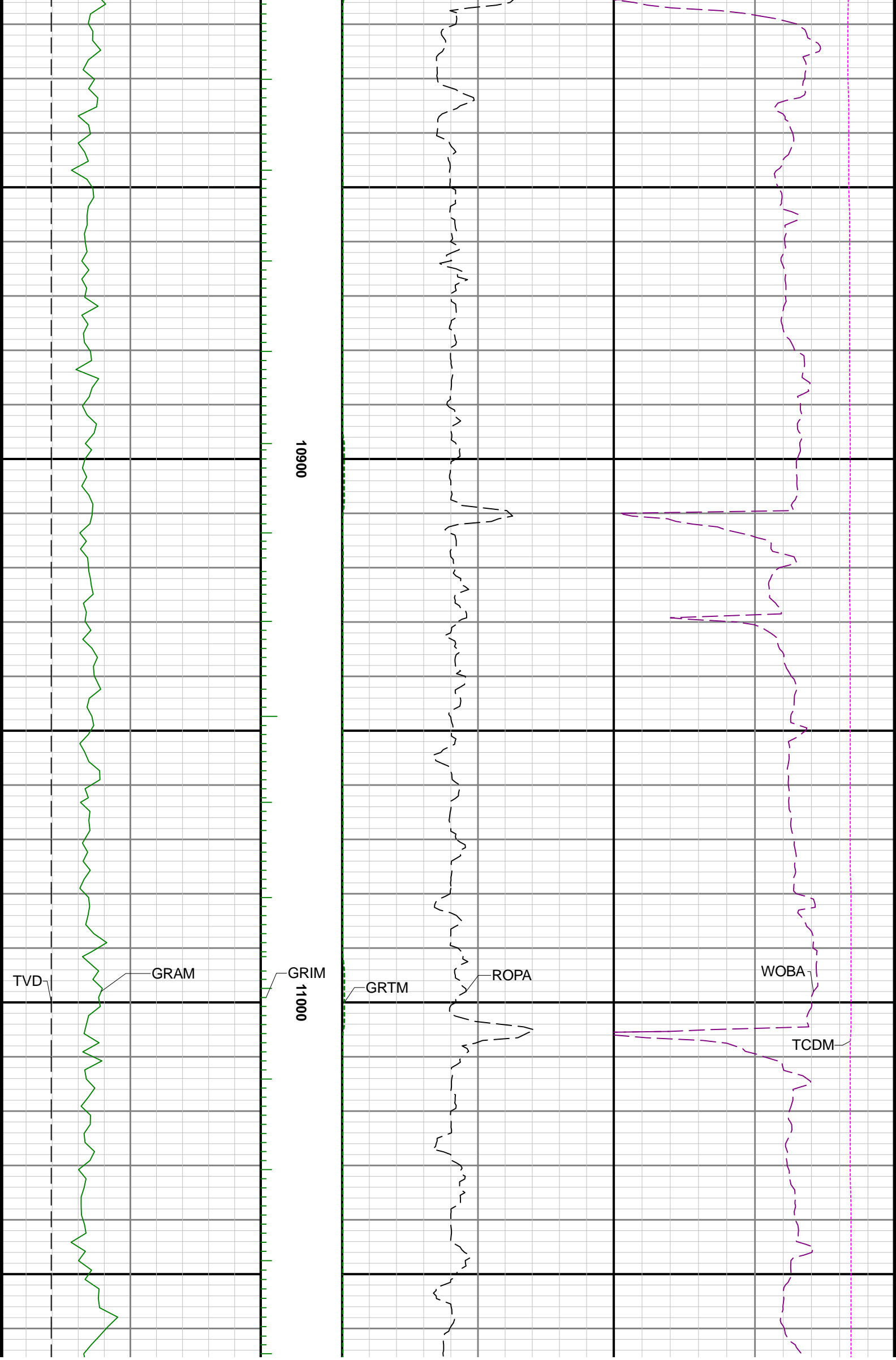


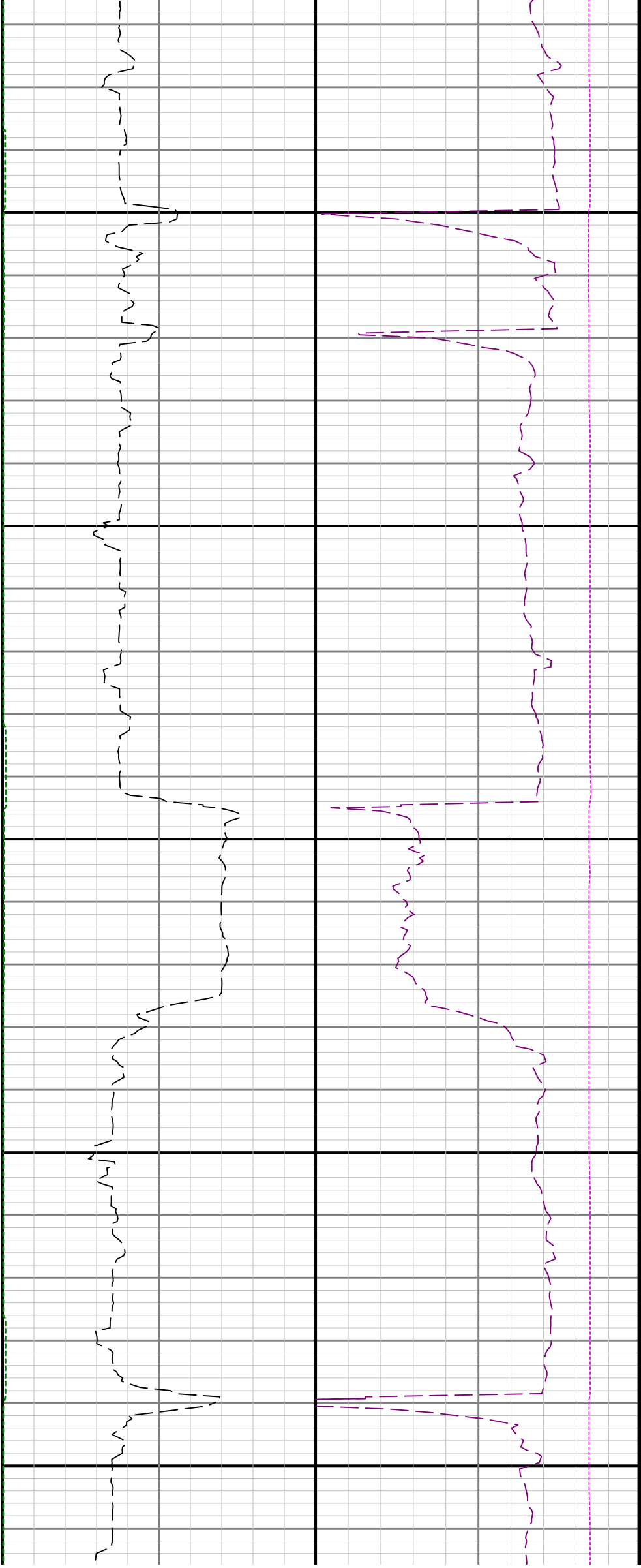


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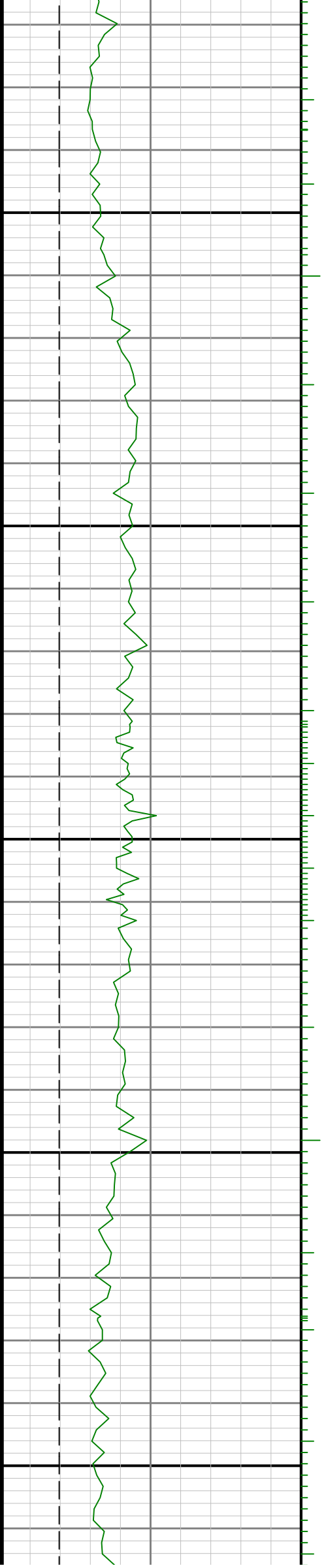


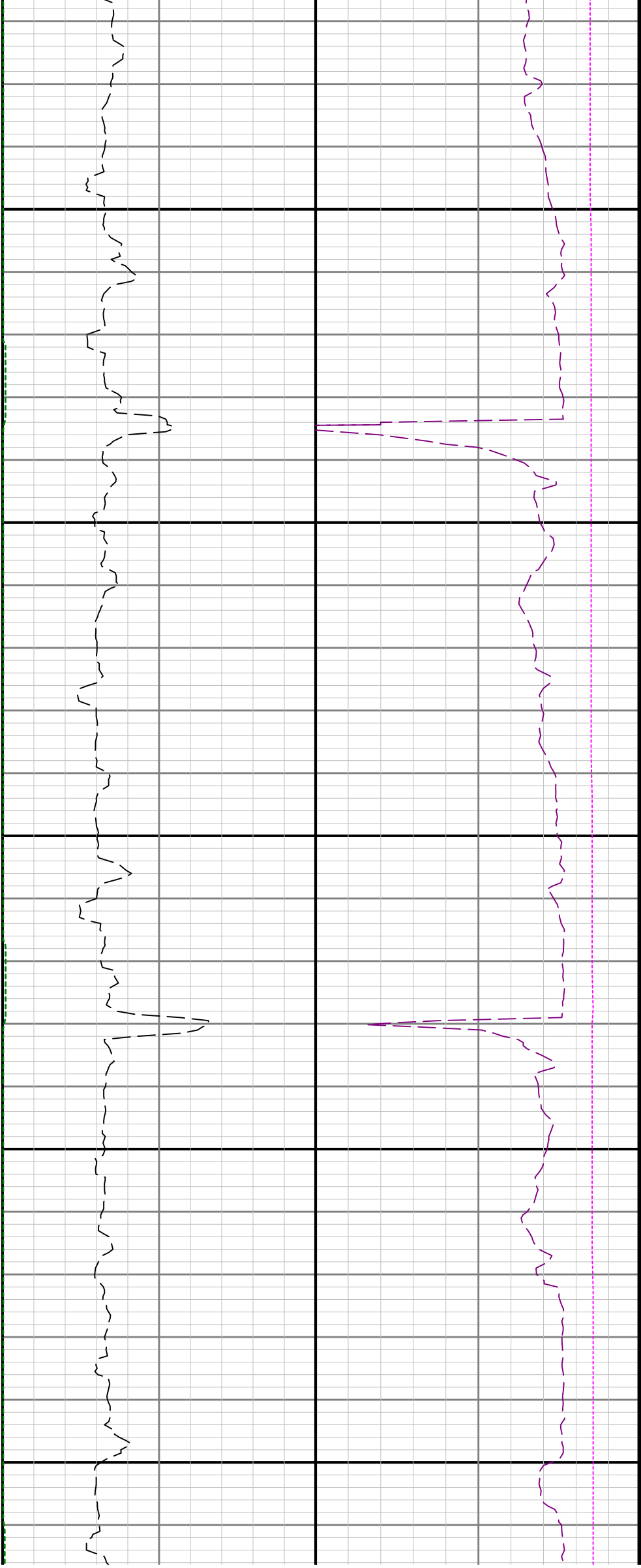


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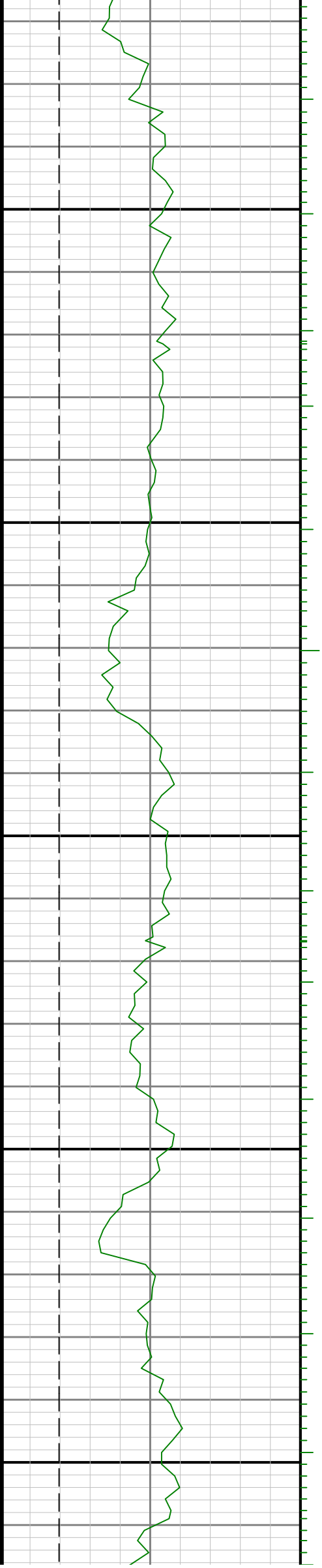
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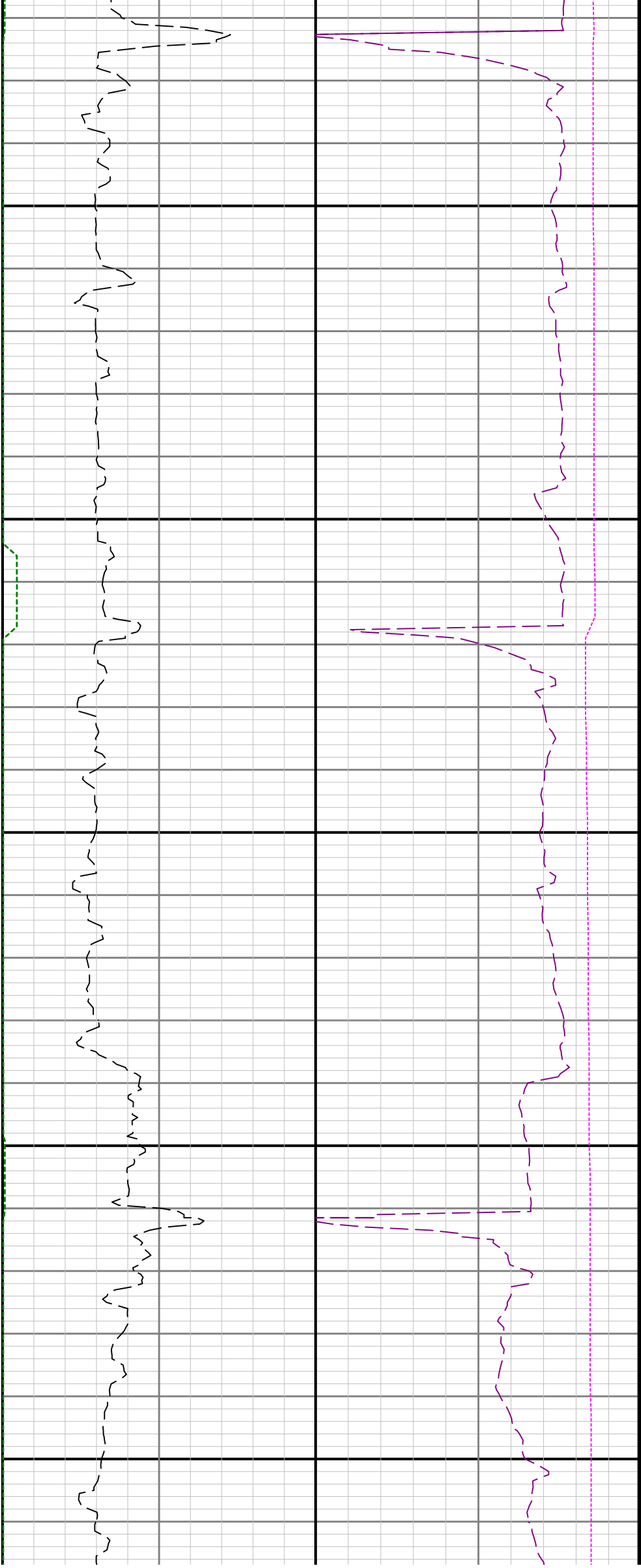




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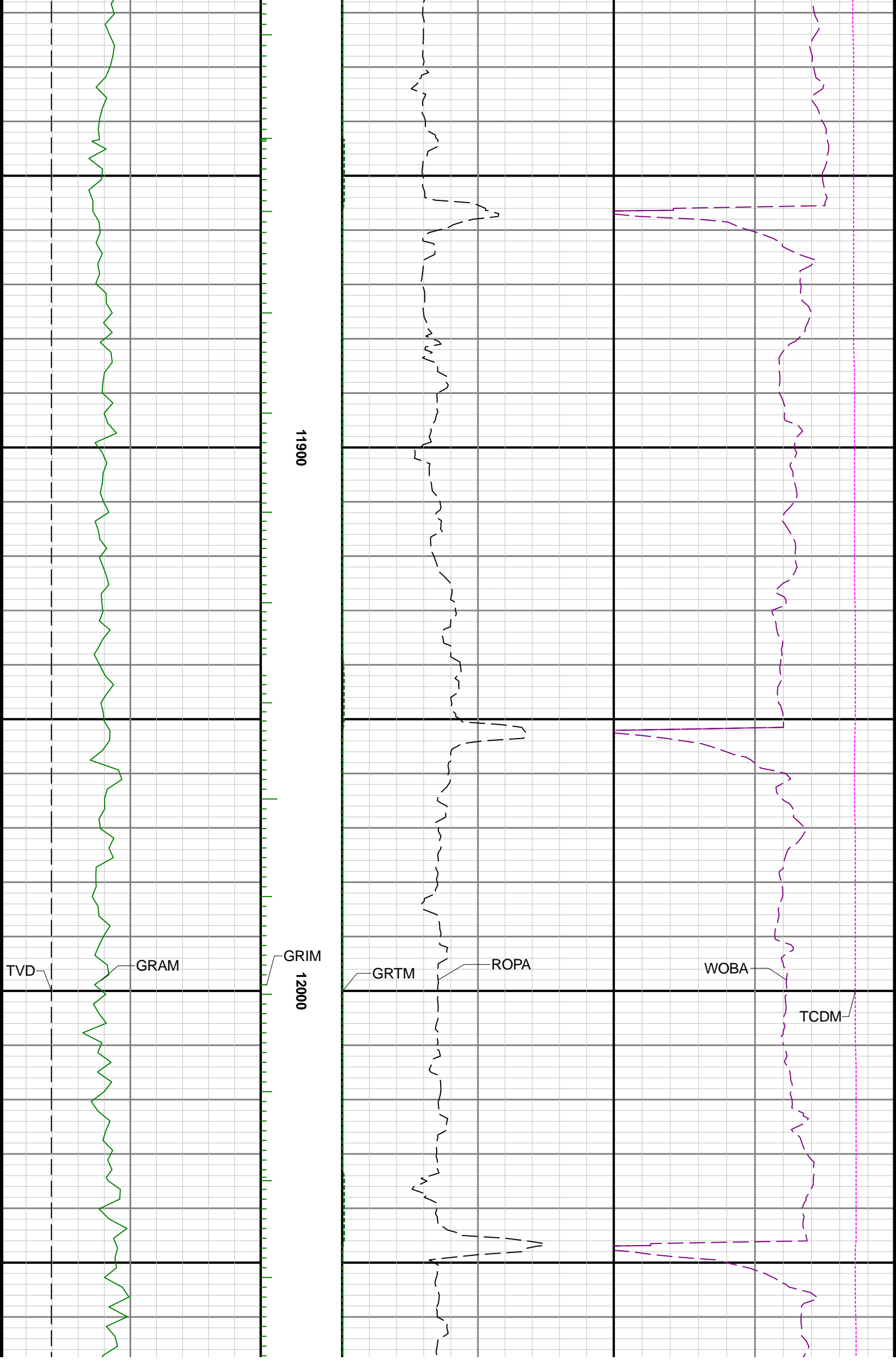


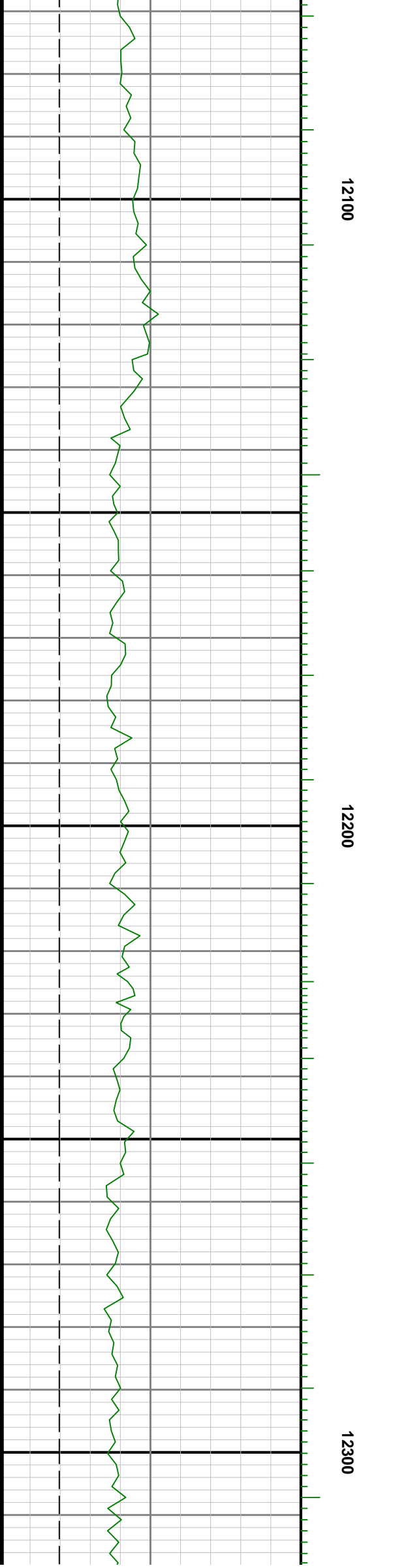
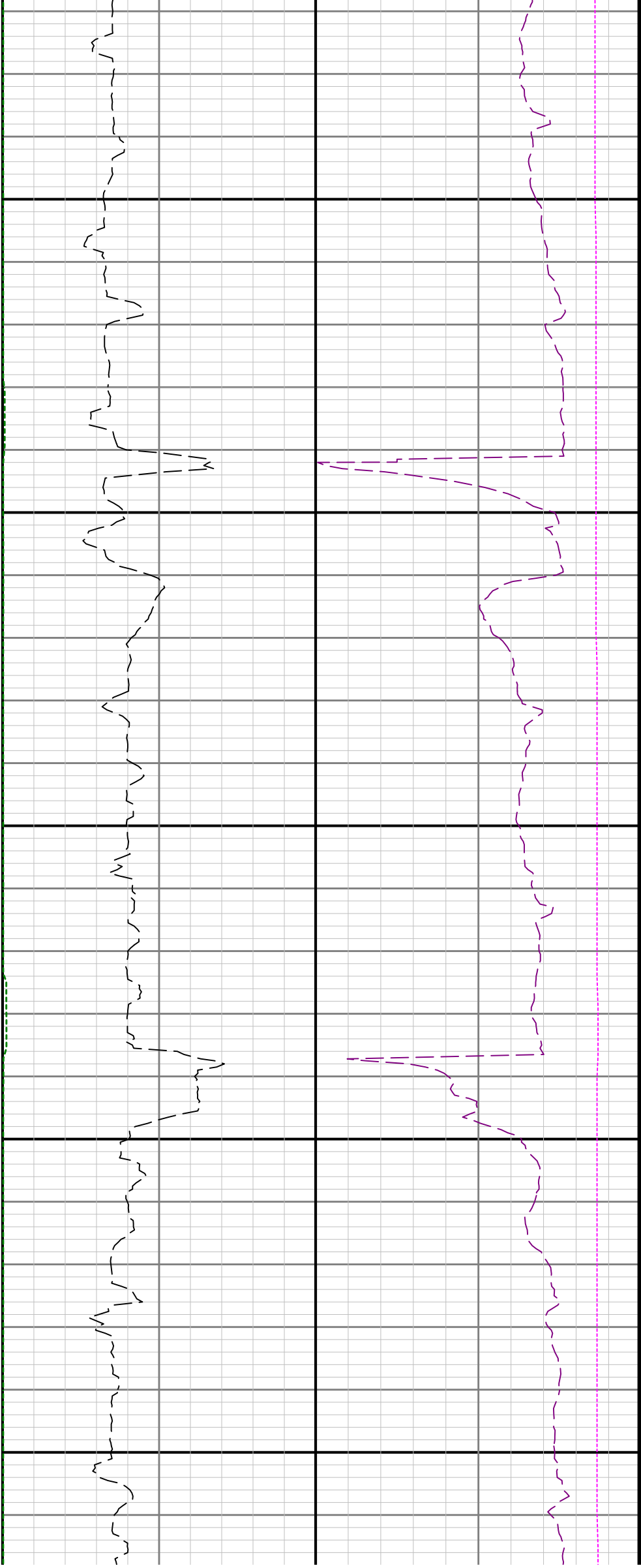


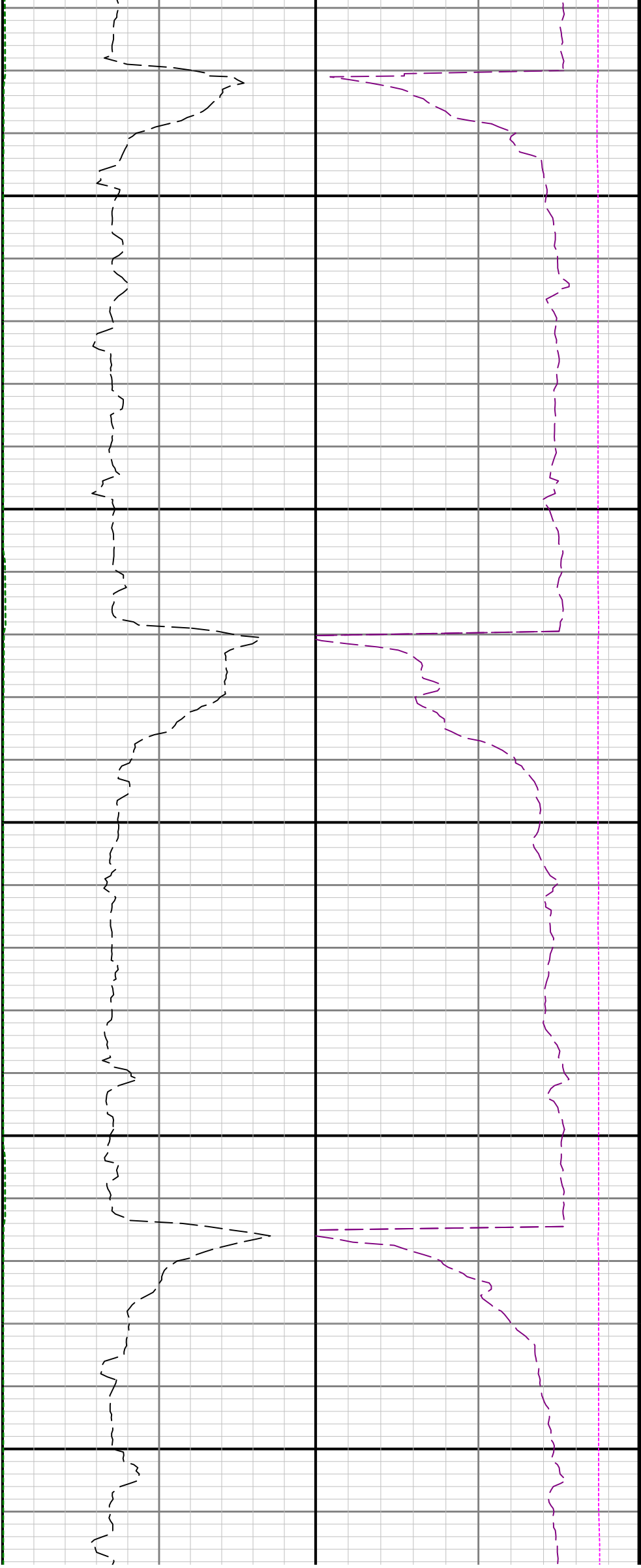
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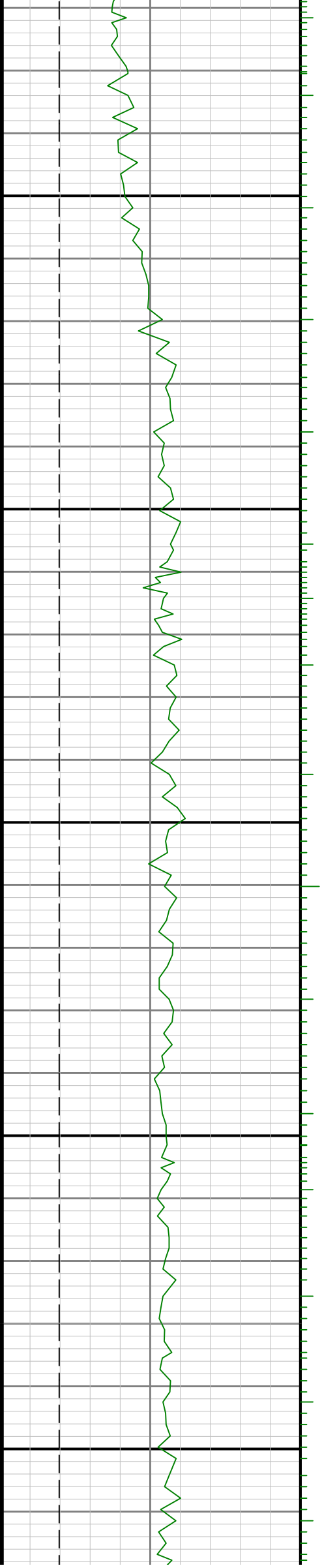


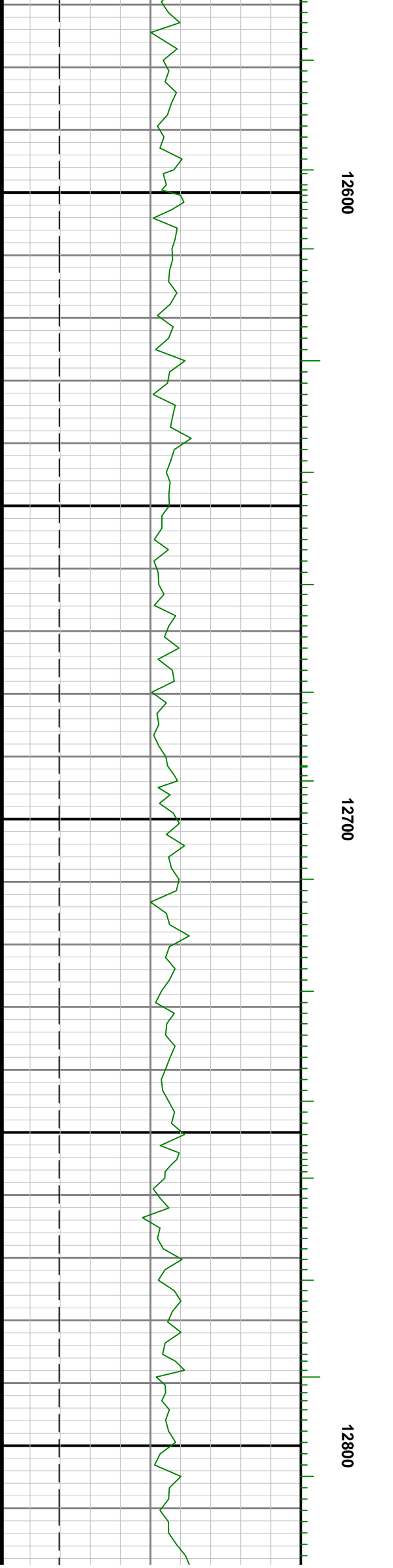
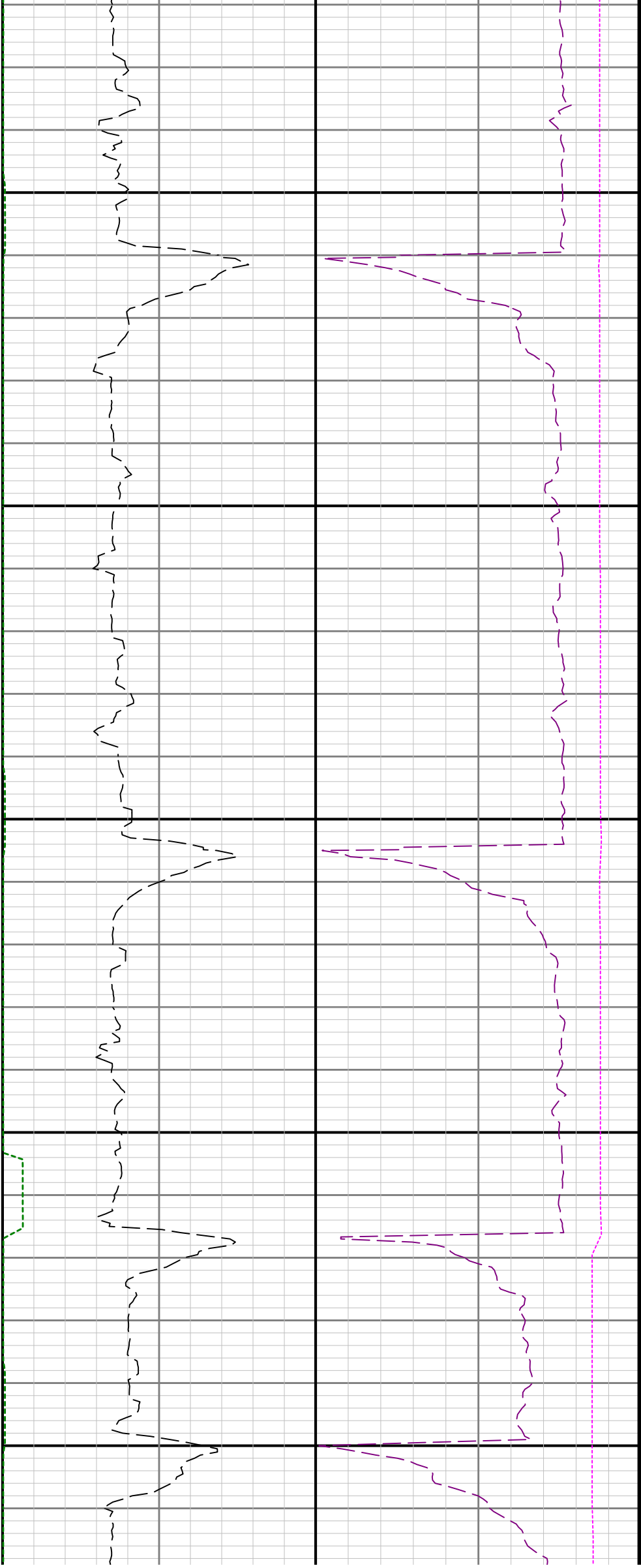


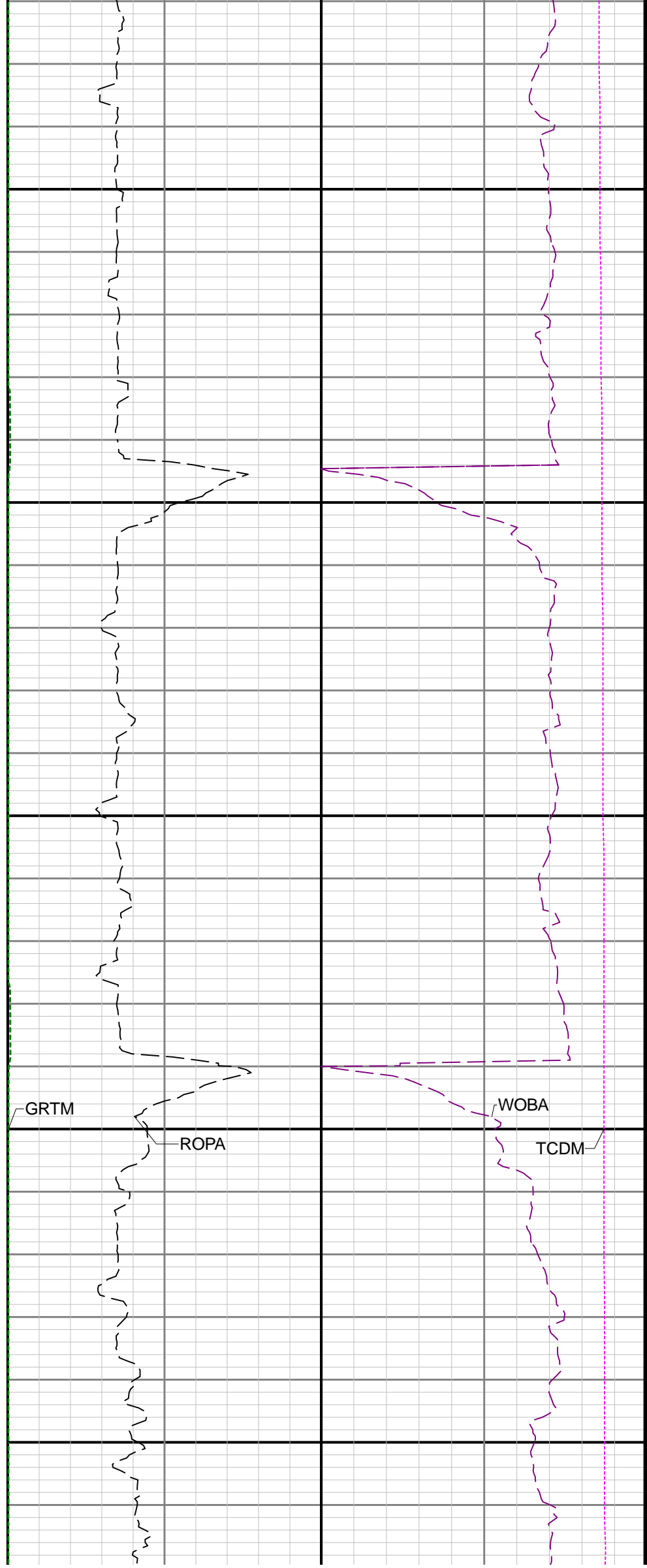
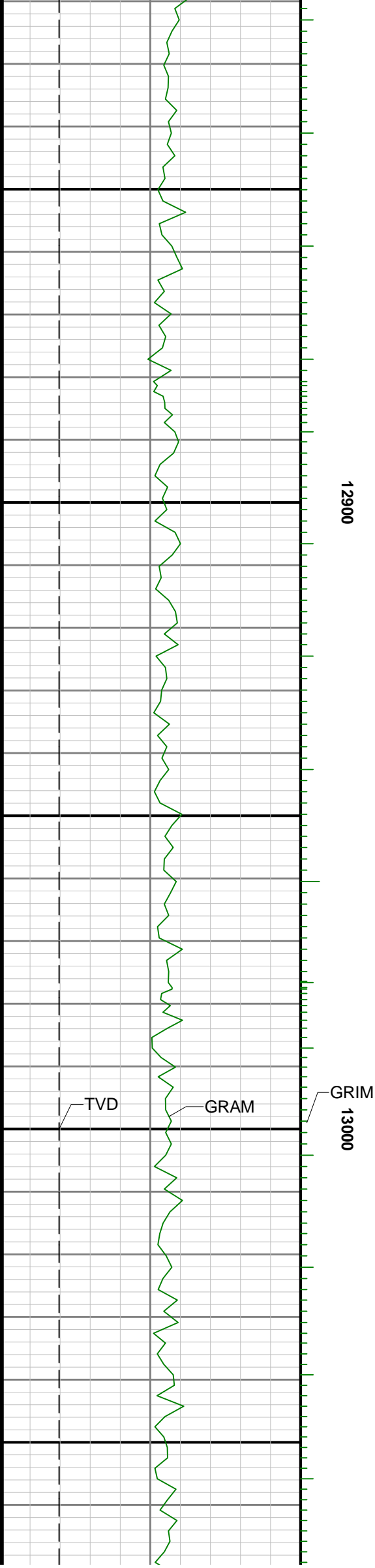


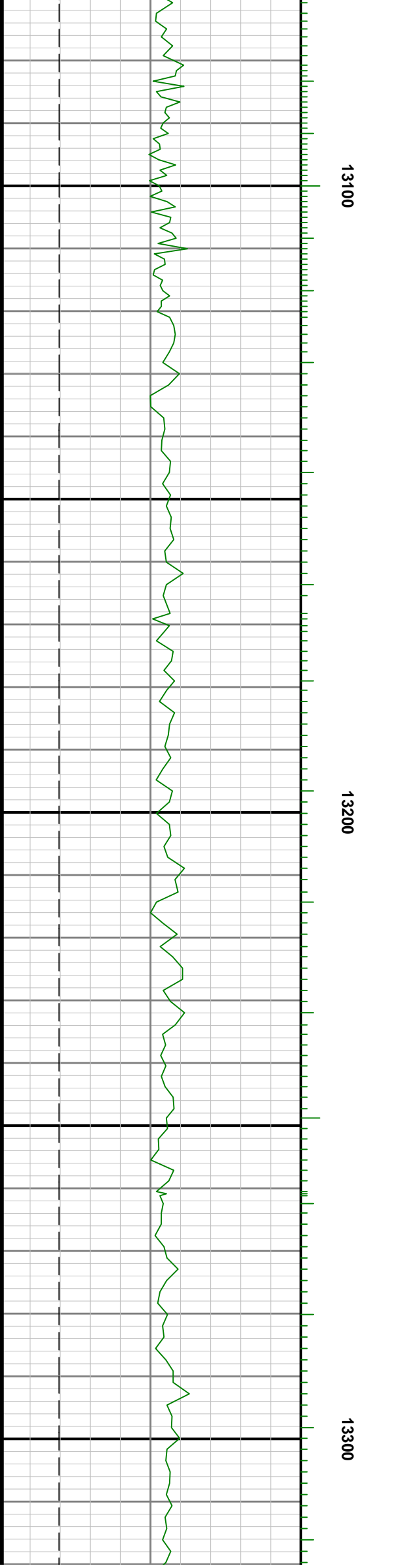
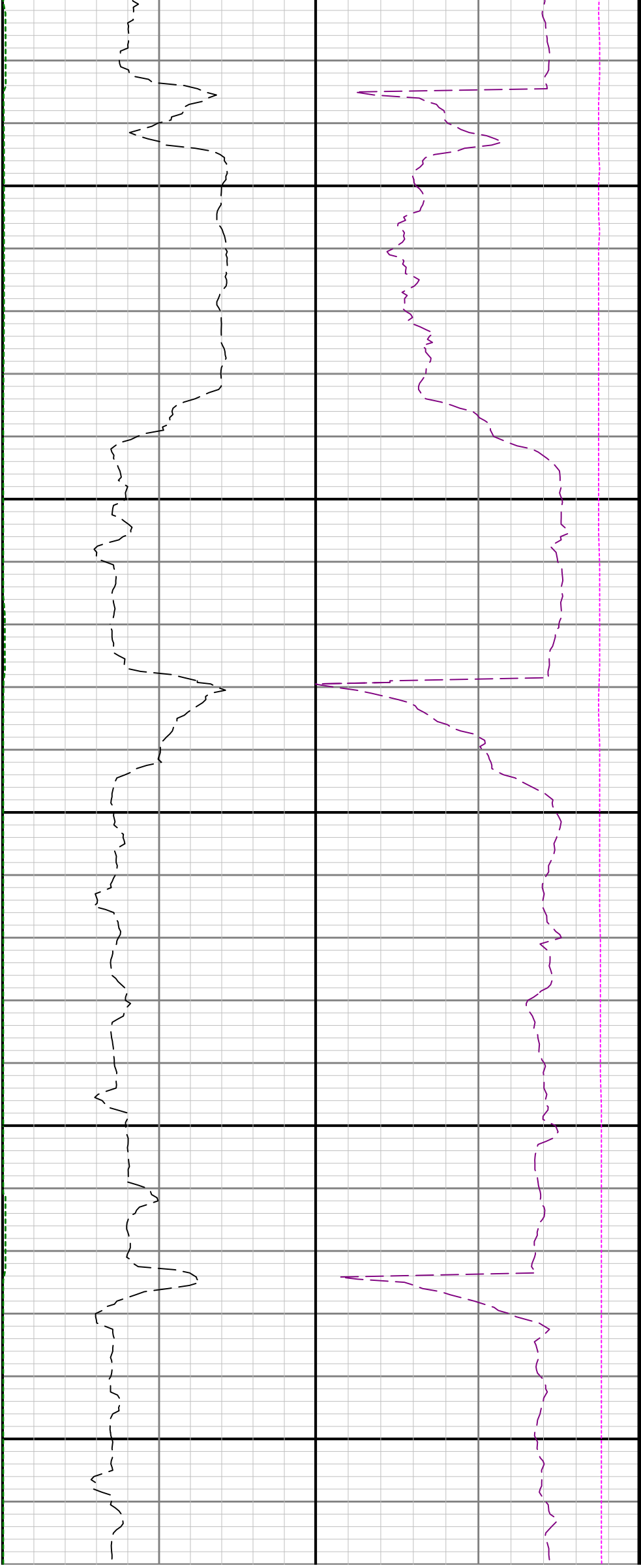
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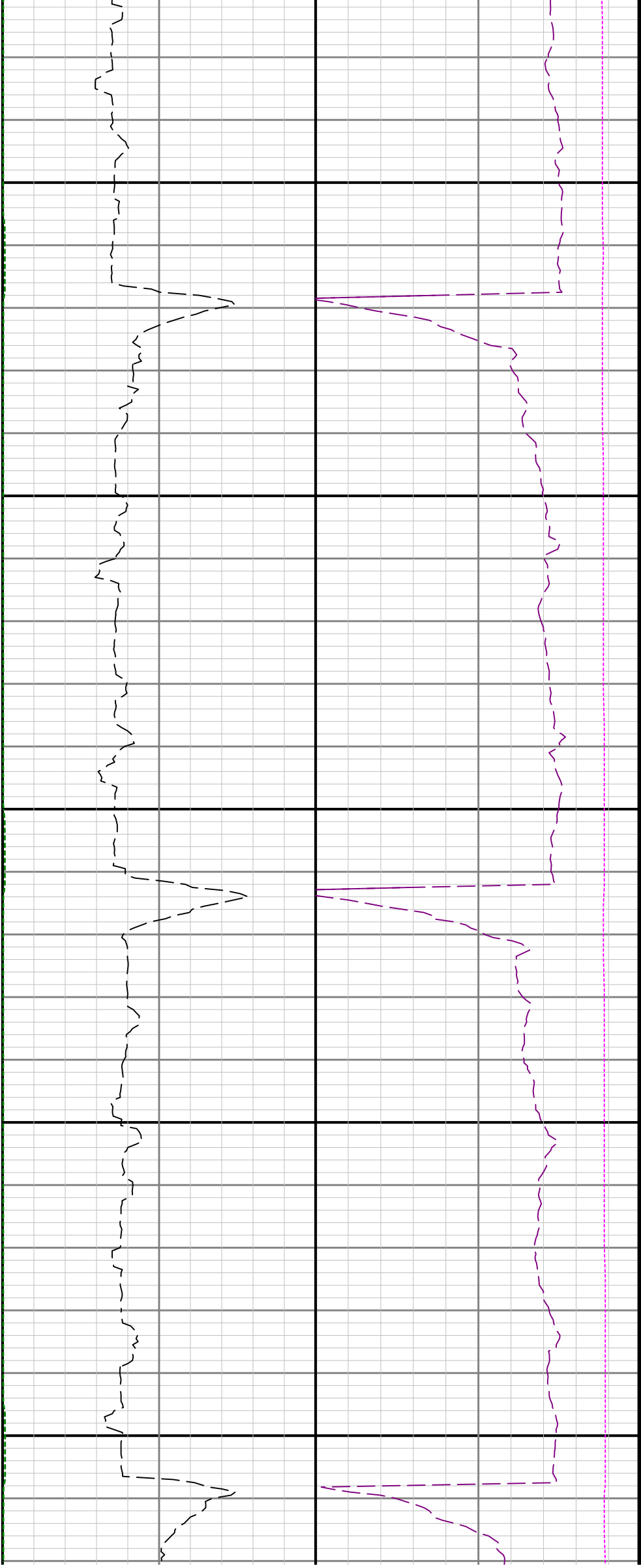
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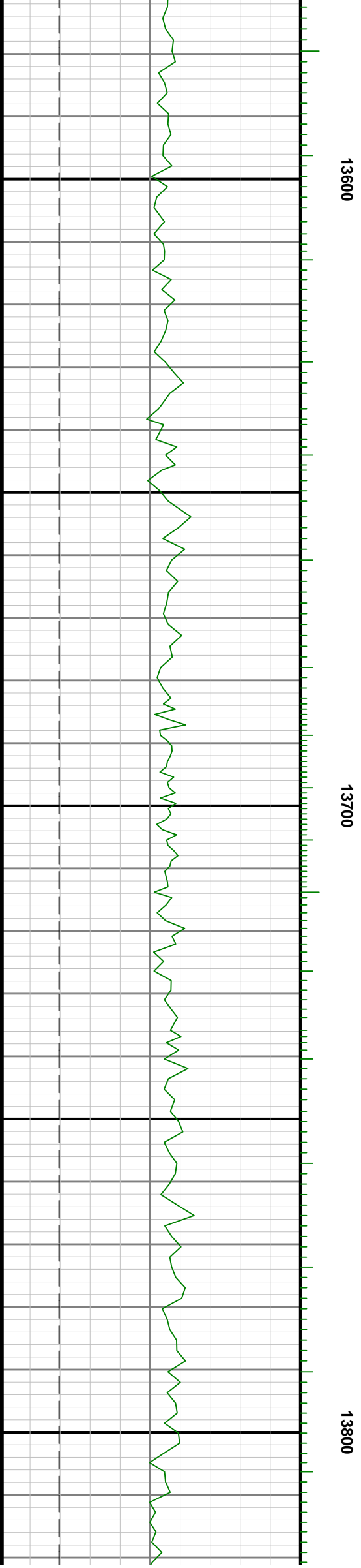
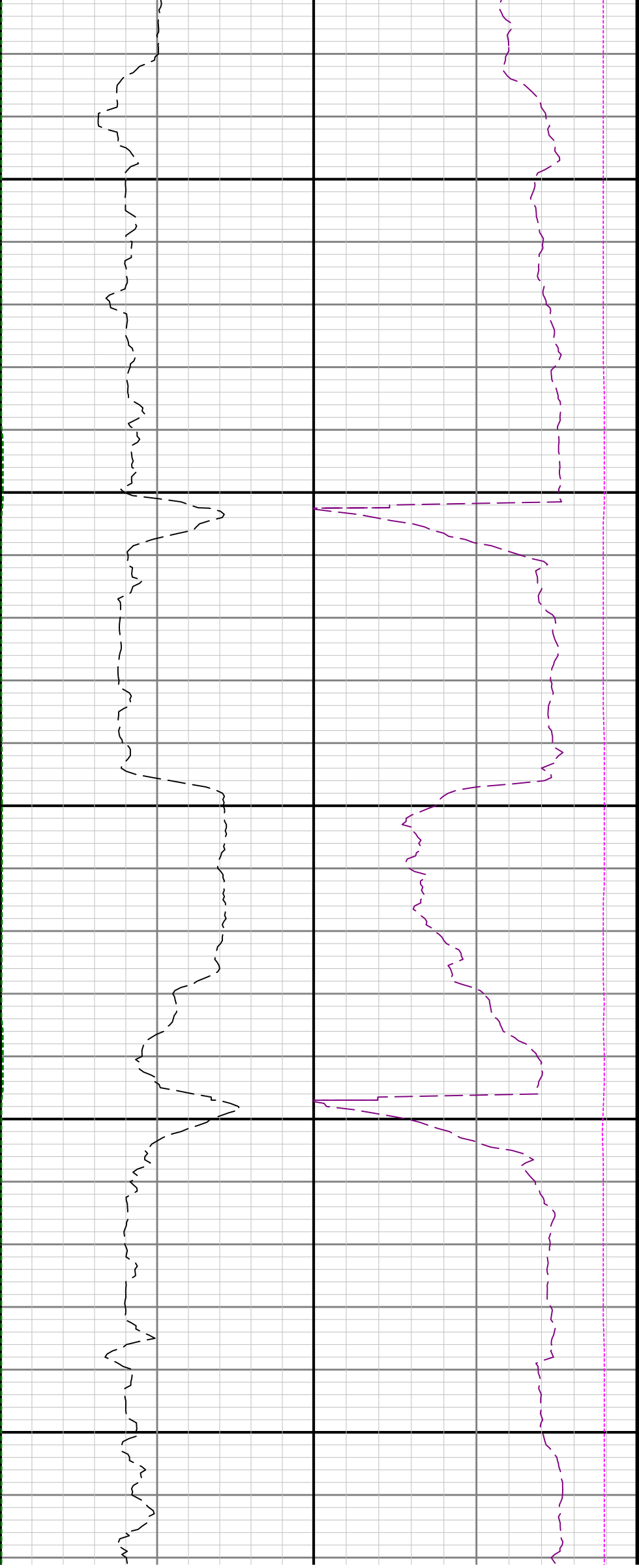


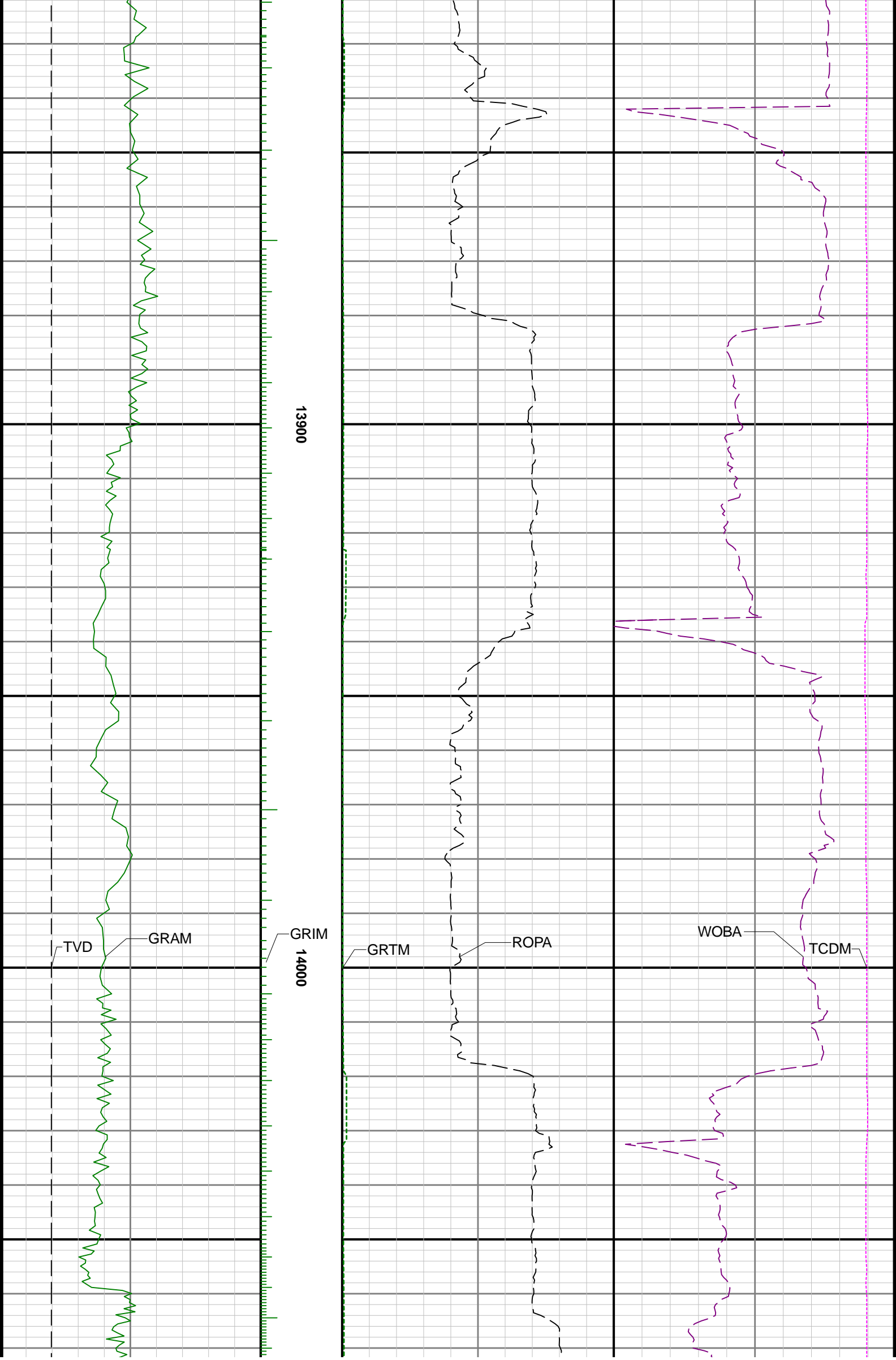


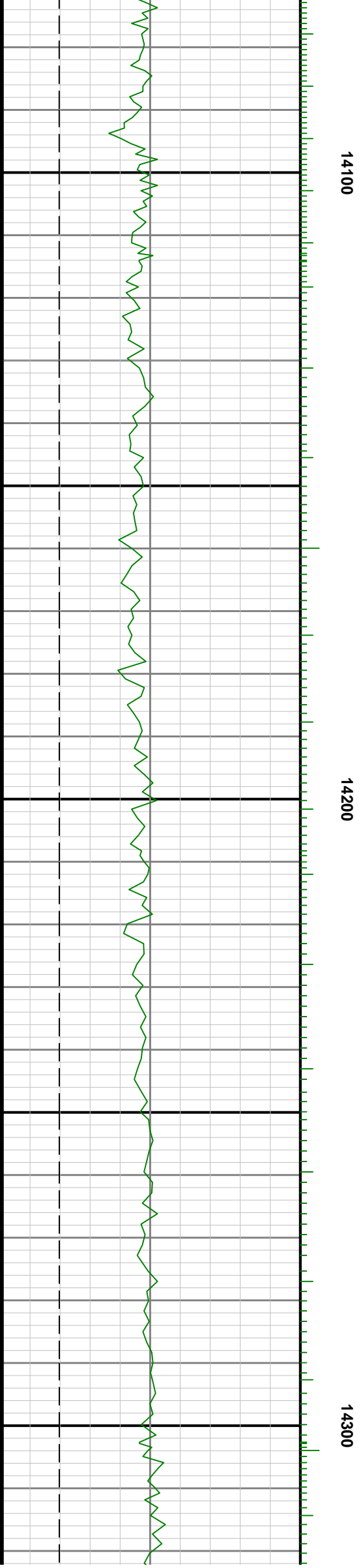
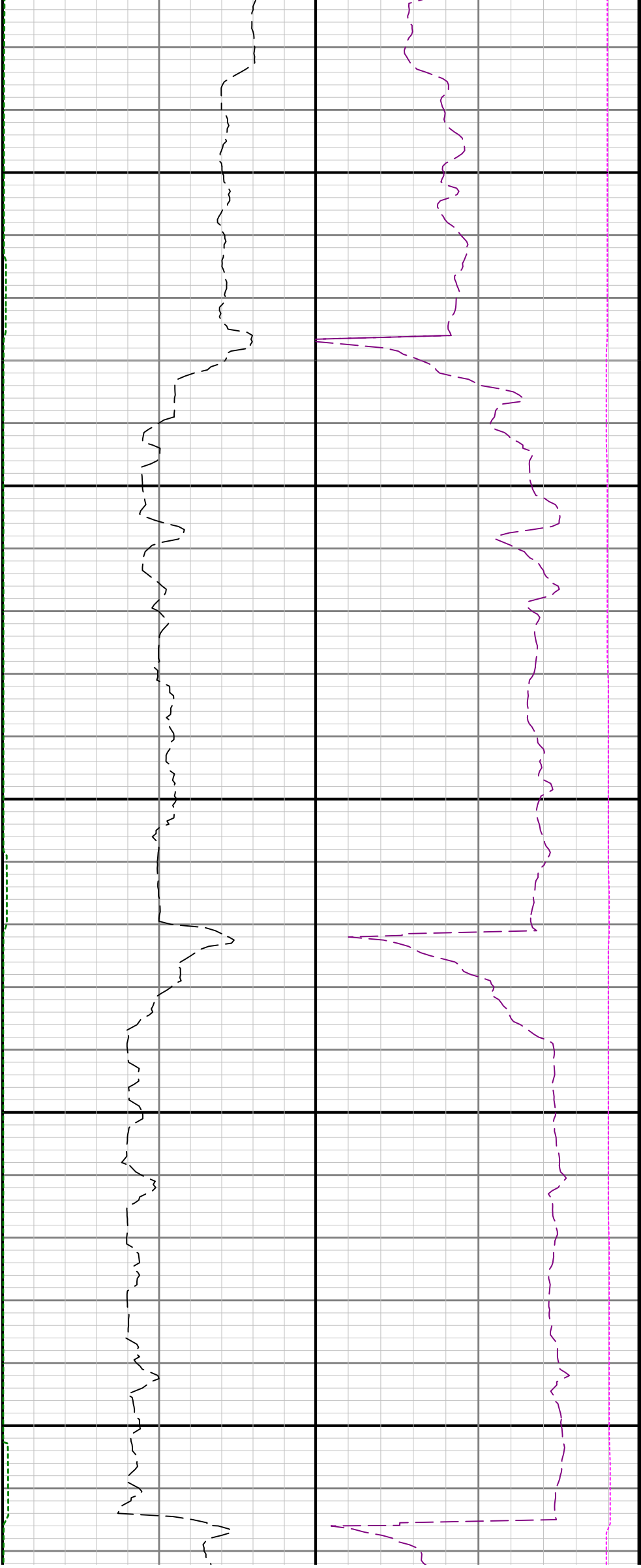


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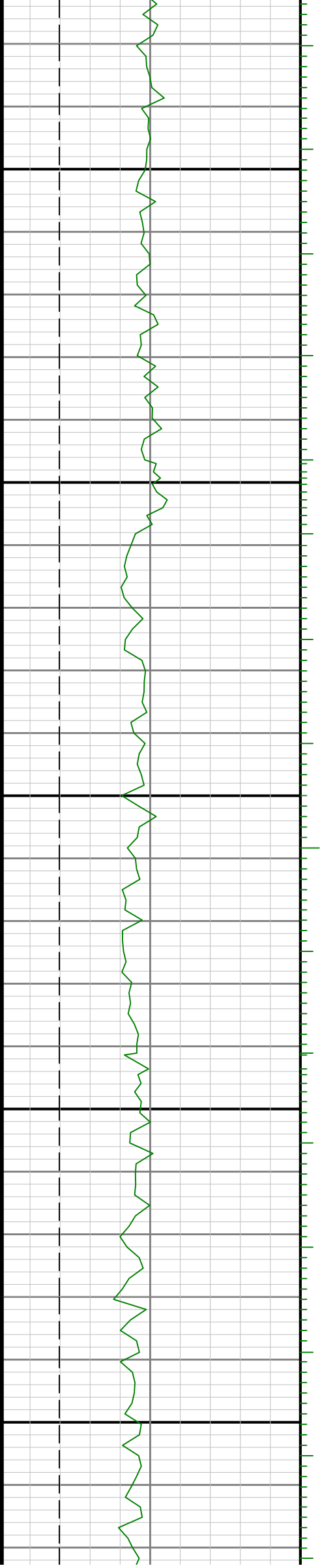


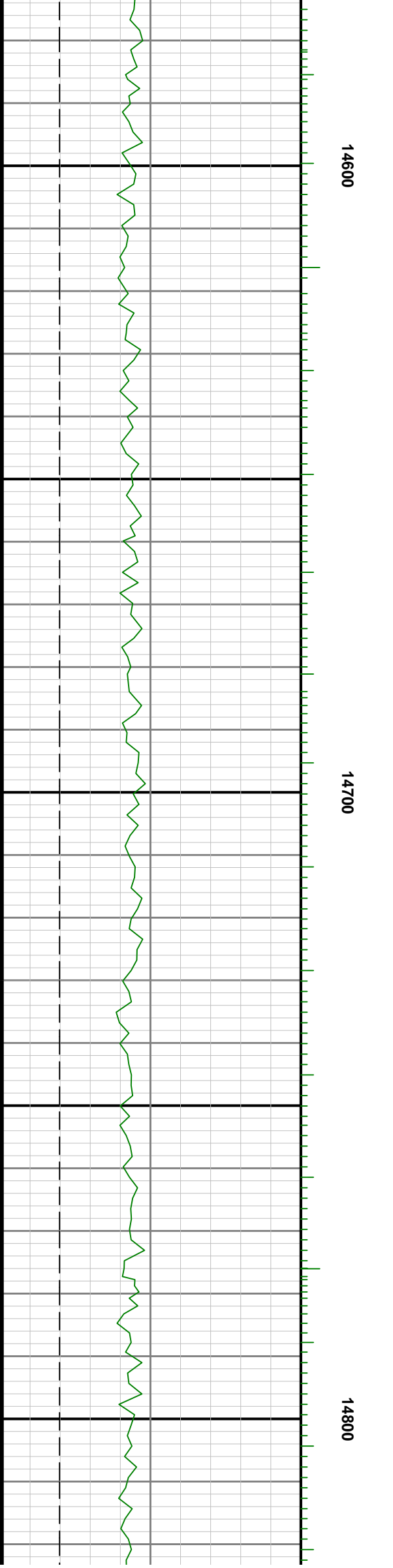


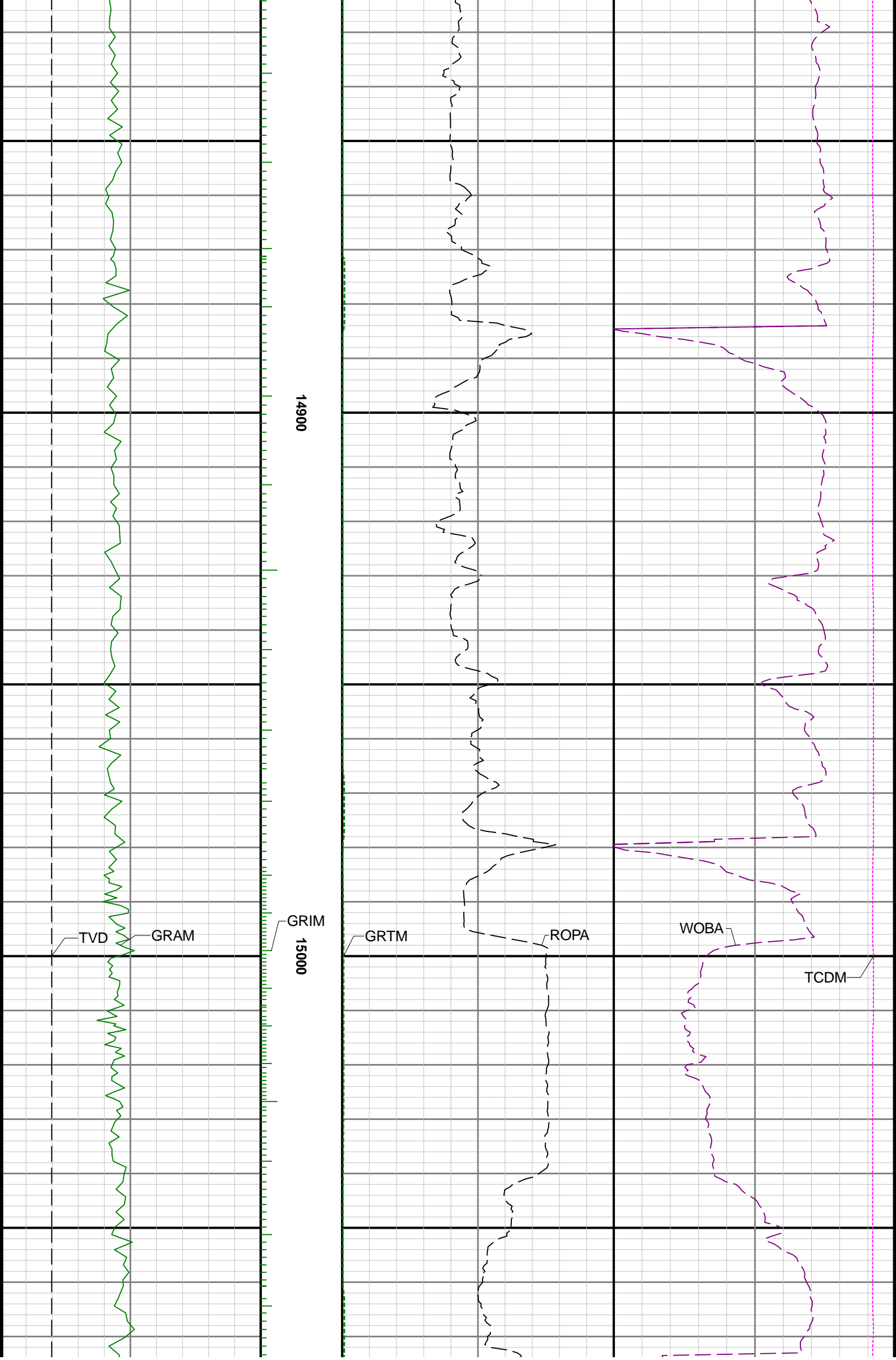


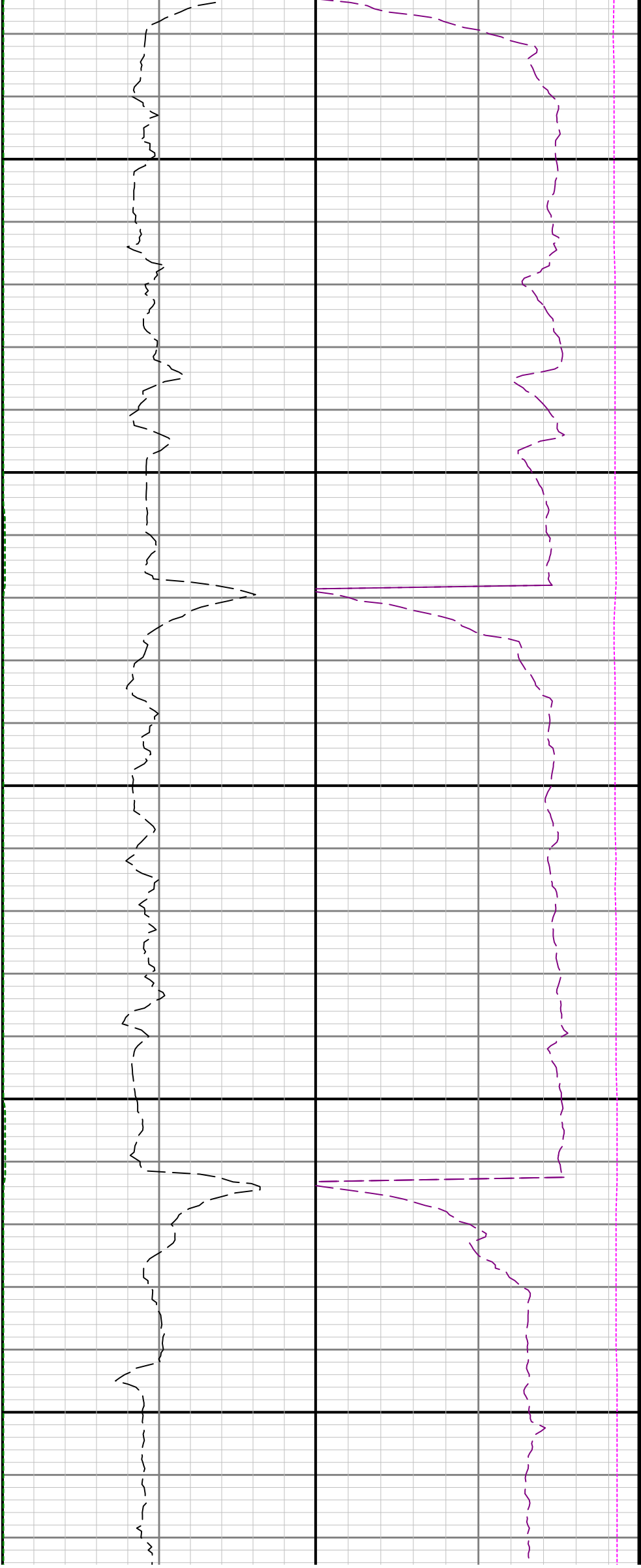
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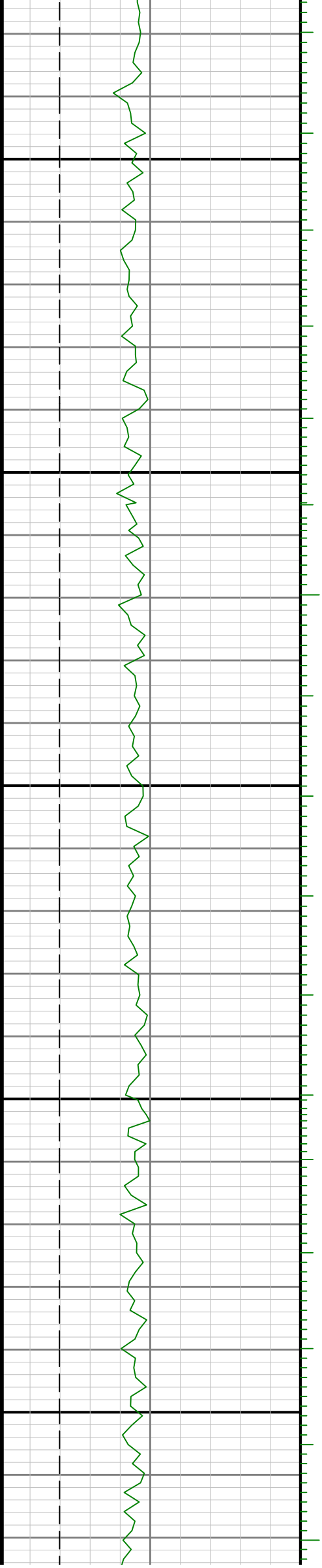


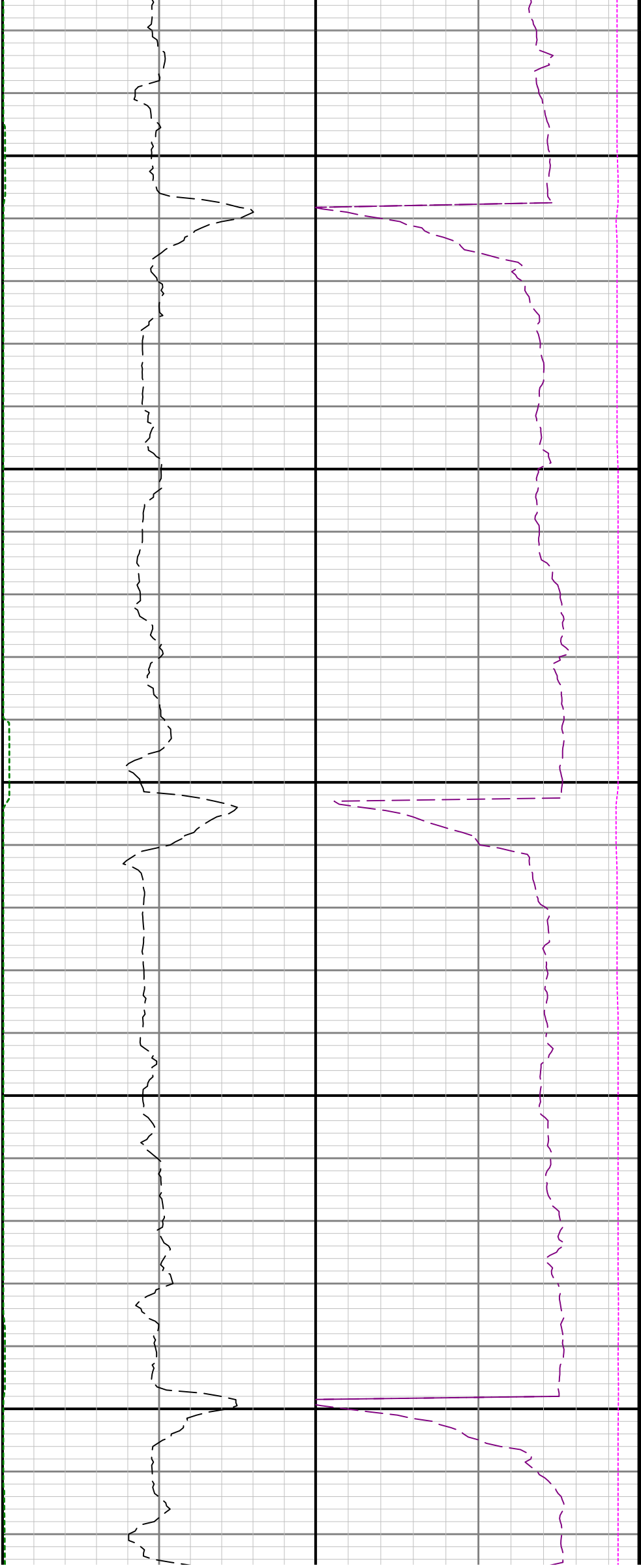


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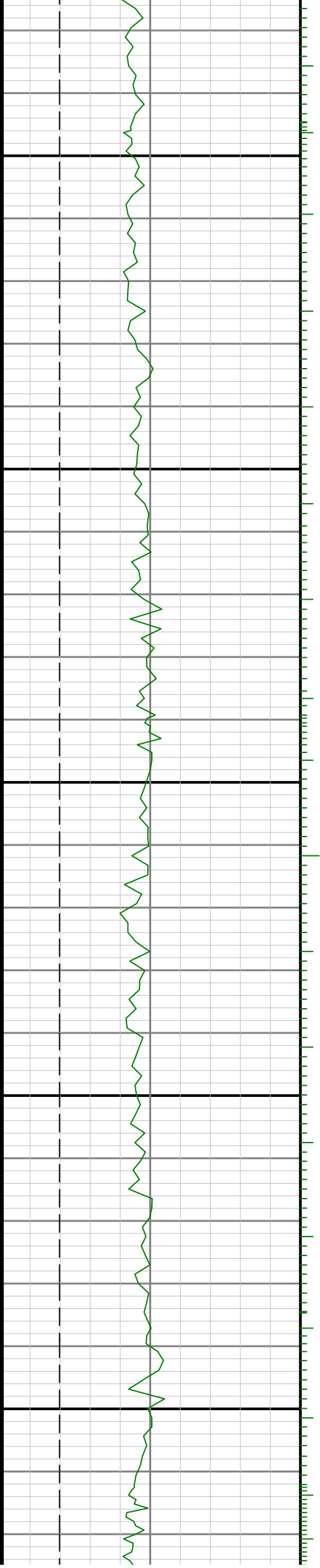
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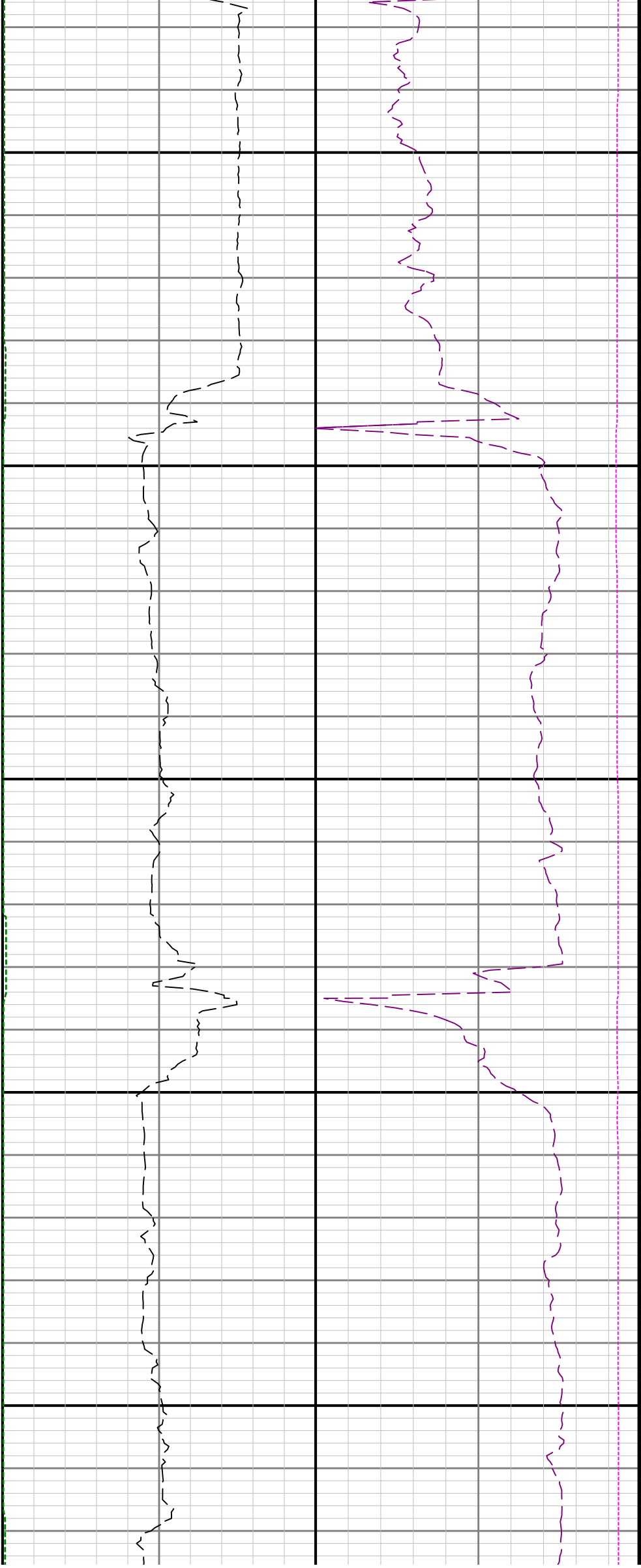




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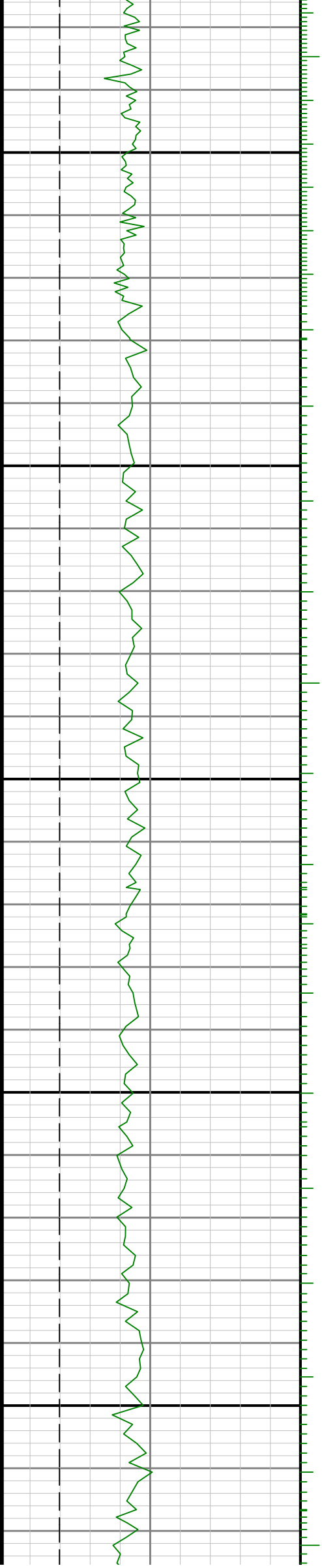


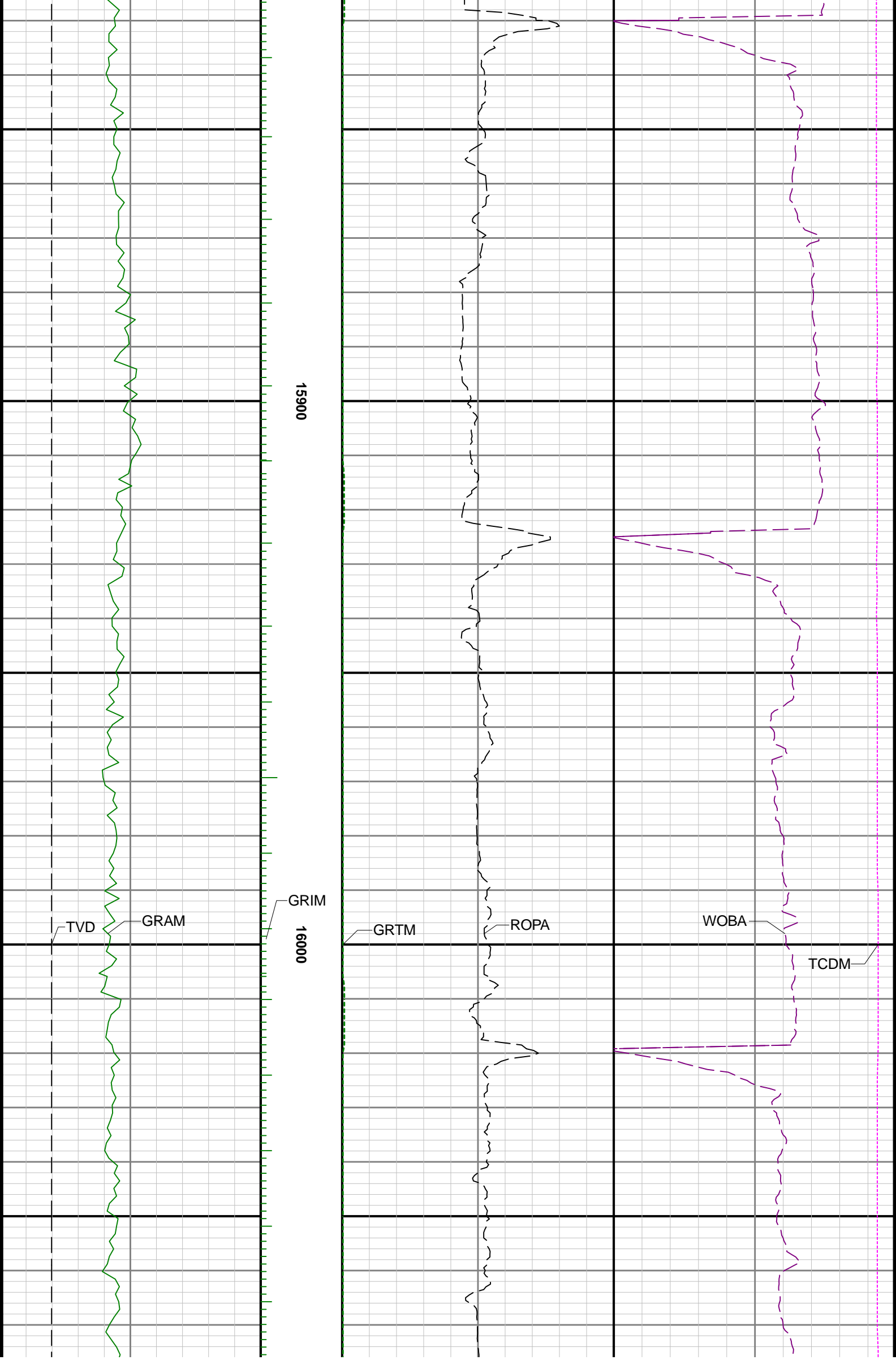


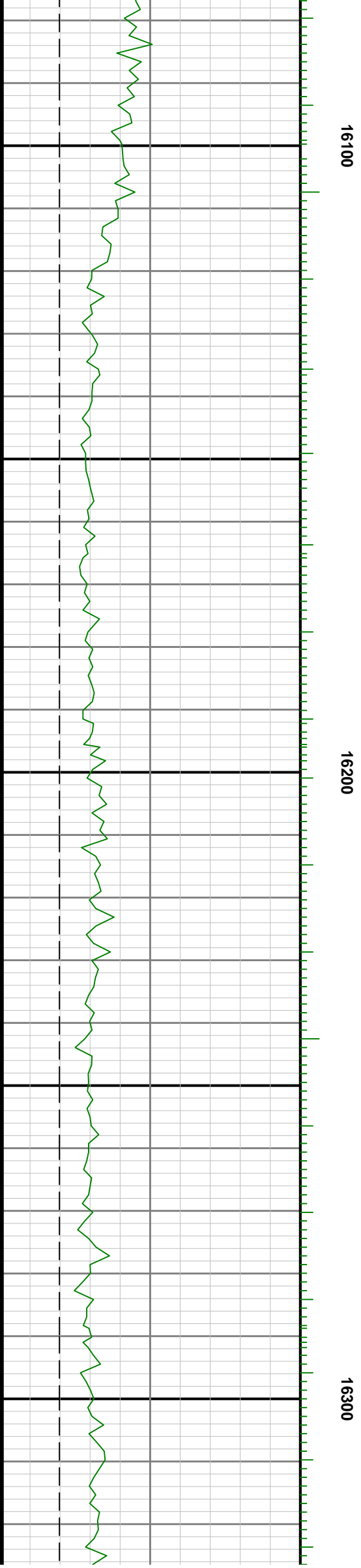
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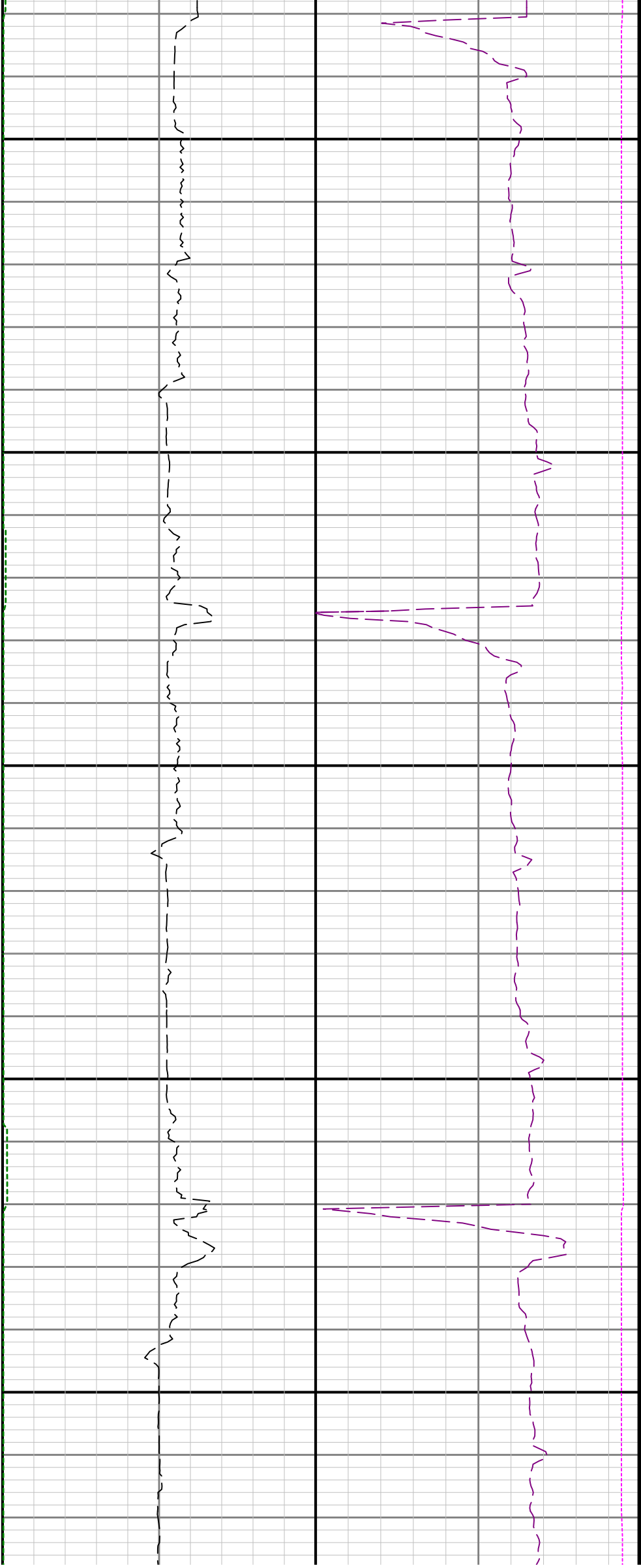
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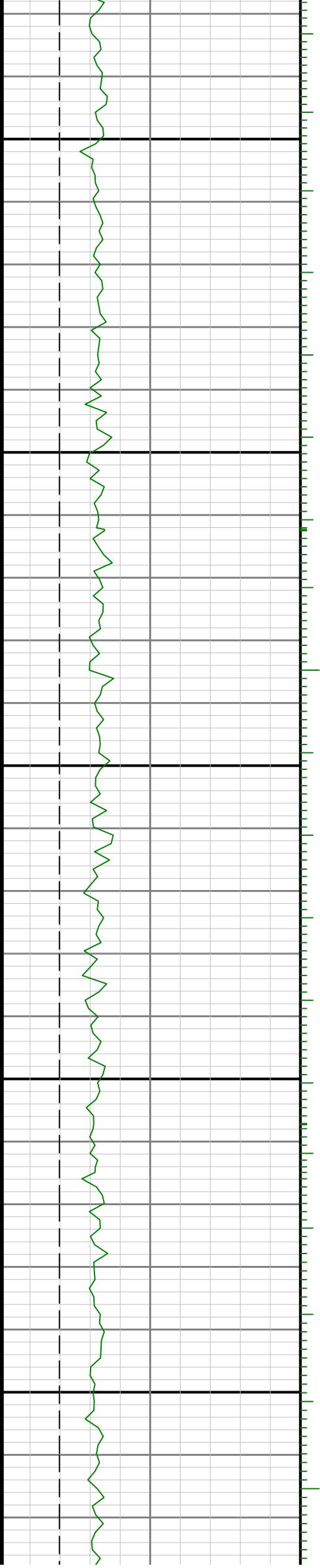


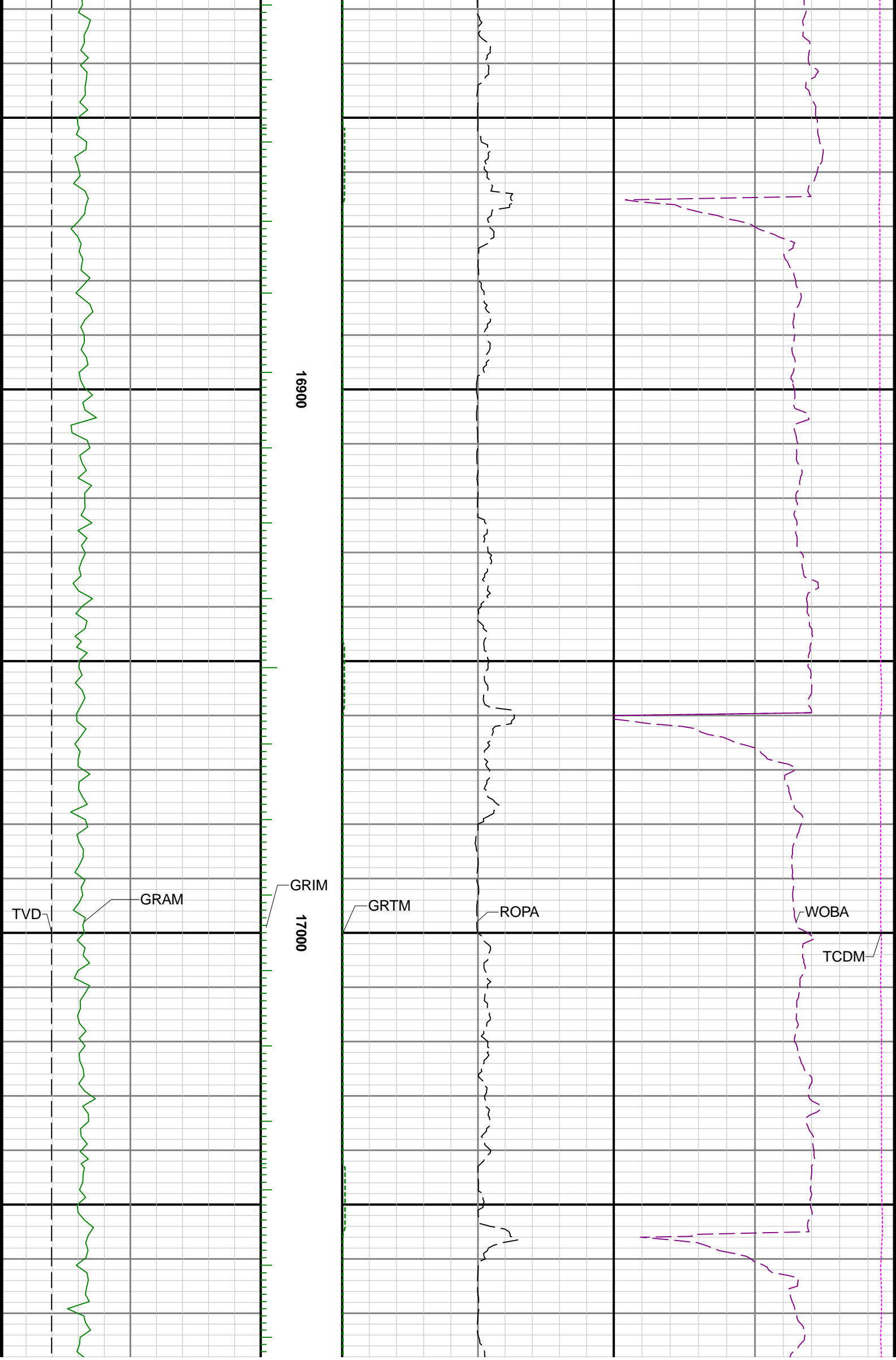


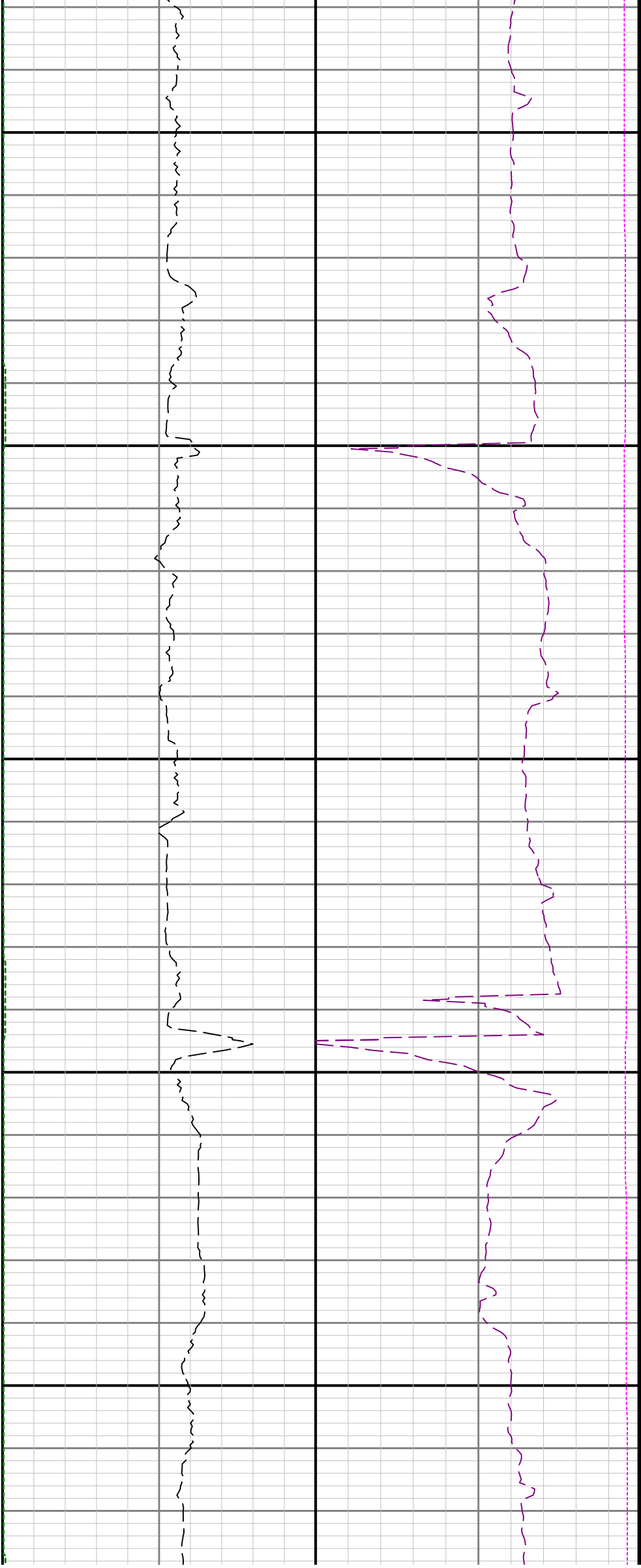
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