



LWD MEMORY LOG

Gamma Ray

Scale:	Company: Confluence Resources												
1:240		Well: 70 RANCH 10-13-2L											
Measured Depth		Field:		DJ Basin									
Depth Reference:		County:		Weld		Country: United States							
Driller's Depth		State:		Colorado									
Status:	Surface Location: Other Services:												
Final Print		Latitude:		040° 20' 05.172" N									
API No: 05123475910000		Longitude:		104° 25' 44.904" W									
Job ID: 109836630	SEC:		3		TWN:		4N		RGE:		63W		
Permanent Datum (P.D.):		Mean Sea Level		Elevation:		0.00 ft		Elev. KB:		N/A			
Log Measured From:		Rig Floor		Above P.D.:		4619.50 ft		Elev. DF:		4619.50 ft			
								Elev. GL:		4596.50 ft			
Dates		Interval				Magnetic Field Reference							
From: 2019-06-11		Drilled (ft)		Logged (ft)		Azi Reference North: True Dip Angle: (deg) 66.77							
To: 2019-06-15		Top: 23.00		Top: 1532.00		Total Magnetic Field Strength: (nT) 52210							
Spud: 2019-05-24		Bottom: 16451.00		Bottom: 16438.00		Mag to Reference North Correction: (deg) 8.00							
Borehole Record													
Hole Size (in)		From (ft)		To (ft)		Size (in)		Weight (lb/ft)		From (ft)		To (ft)	
13.500		23.00		1545.00		9.625		36.00		23.00		1535.00	
8.500		1545.00		16451.00									
Casing Record													
Deviation Record													
Type		From (ft)		To (ft)		Hole Size (in)		Interval (ft)		Inc Az (Start)		Inc Az (End)	
Water Based Mud		23.00		1545.00		13.500		1448.04		1.25 50.04		0.80 136.22	
Diesel-Oil Based Mud		1545.00		16451.00		8.500		14909.00		0.80 136.22		89.94 180.84	
Acquisition System													
Software Version		Other											
Cadence		RT 5.2				Rig:		Ensign 140					
DeliverableGen		1.0.8425.1				Contractor:		Ensign Drilling					
						District:		RMD		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
						Top	Bottom	From	To	Start Logging	End Logging	
						(ft)	(ft)	(ft)	(ft)			
1	1	13.500	PDC	6.00	Steerable	0.00	0.00	23.00	1545.00	N/A	N/A	8.01
2	2	8.500	PDC	3.00	AutoTrak Curve	1532.00	16438.00	1545.00	16451.00	2019-06-11 18:21	2019-06-15 07:47	80.06

Crew

Name	Arrive Wellsite	Depart Wellsite	Name	Arrive Wellsite	Depart Wellsite	Name	Arrive Wellsite	Depart Wellsite
Shawn McCaffrey	2019-06-11	2019-06-16						

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+ (%)
2019-05-24 06:34	1	23.00	Water Based Mud	8.4	2	7.4	0.0	0/100	Active Pit	40000	0.00
2019-06-11 09:28	2	1545.00	Diesel-Oil Based Mud	9.5	10	N/A	N/A	83/17	Active Pit	32000	0.00
2019-06-12 03:00	2	3050.00	Diesel-Oil Based Mud	9.3	8	N/A	N/A	81/19	Active Pit	32000	0.00
2019-06-13 01:00	2	6730.00	Diesel-Oil Based Mud	9.7	14	N/A	N/A	82/18	Active Pit	24000	0.00
2019-06-14 03:00	2	11503.00	Diesel-Oil Based Mud	9.8	16	N/A	N/A	82/18	Active Pit	28000	0.00
2019-06-15 15:30	2	16451.00	Diesel-Oil Based Mud	10.0	20	N/A	N/A	83/17	Active Pit	28000	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	NaviTrak	13249128	VSS	16.47	52.54	8.000	3.250
1	NaviTrak	13249128	Directional (mag)	16.47	52.54	8.000	3.250
2	AutoTrak Curve Steering Unit	14236902	Near Bit VSS	5.93	6.73	7.000	4.330
2	AutoTrak Curve Steering Unit	14236902	Near Bit Inclination	5.93	6.73	7.000	4.330
2	AutoTrak Curve MWD	14705223	Gamma (single)	2.77	12.90	7.000	3.250
2	AutoTrak Curve MWD	14705223	Directional (mag)	12.26	22.39	7.000	3.250

Service and Tool Mnemonics

Mnemonic	Name	Description
NTK	NaviTrak	Probe Based Directional Module, NaviTrak Platform
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

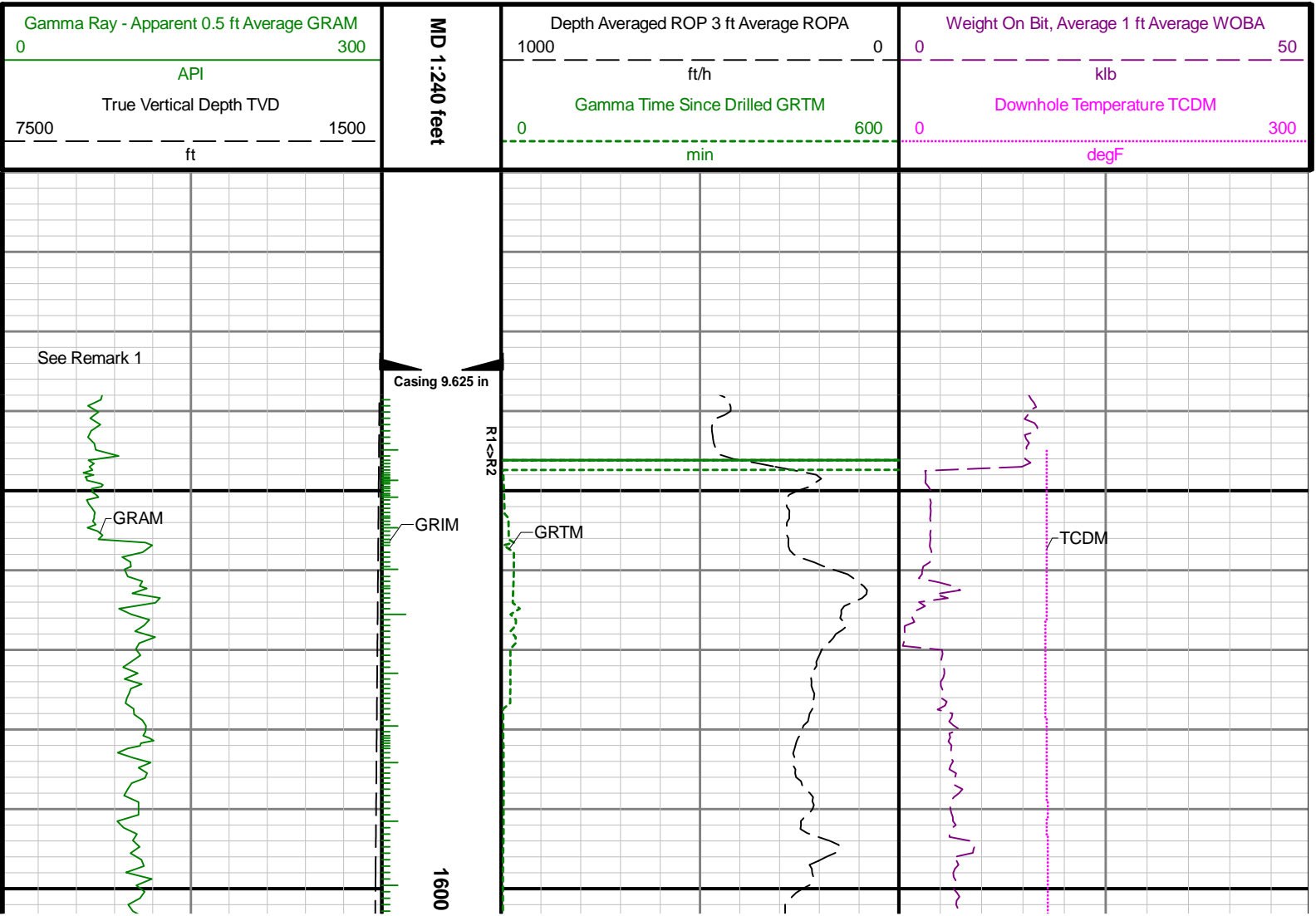
1	Depth measurements were obtained from a depth control system not supplied or operated by Baker Hughes, a GE company. Due to a lack of control by Baker Hughes, a GE company logging engineers, depth calibrations and measurements could not be independently verified and the unverified depths as supplied to Baker Hughes, a GE company are being used to present logging data.
2	Baker Hughes, a GE company run 1 utilized 8 inch Directional-only with NaviTrak service behind a 13 ½ inch bit an 8 inch steerable assembly from 23 to 1545 feet MD (23 to 1544 feet TVD) therefore, no logging data was acquired for this run.
3	Baker Hughes, a GE company run 2 utilized 6 ¾ inch NaviGamma services (Gamma Ray and Directional) behind 8 ½ inch bit and rotary steerable assembly from 1545 to 16451 feet MD (1545 to 6338 feet TVD).
4	Gamma Ray Apparent (GRAM) is presented 0 to 300 API per customer request.

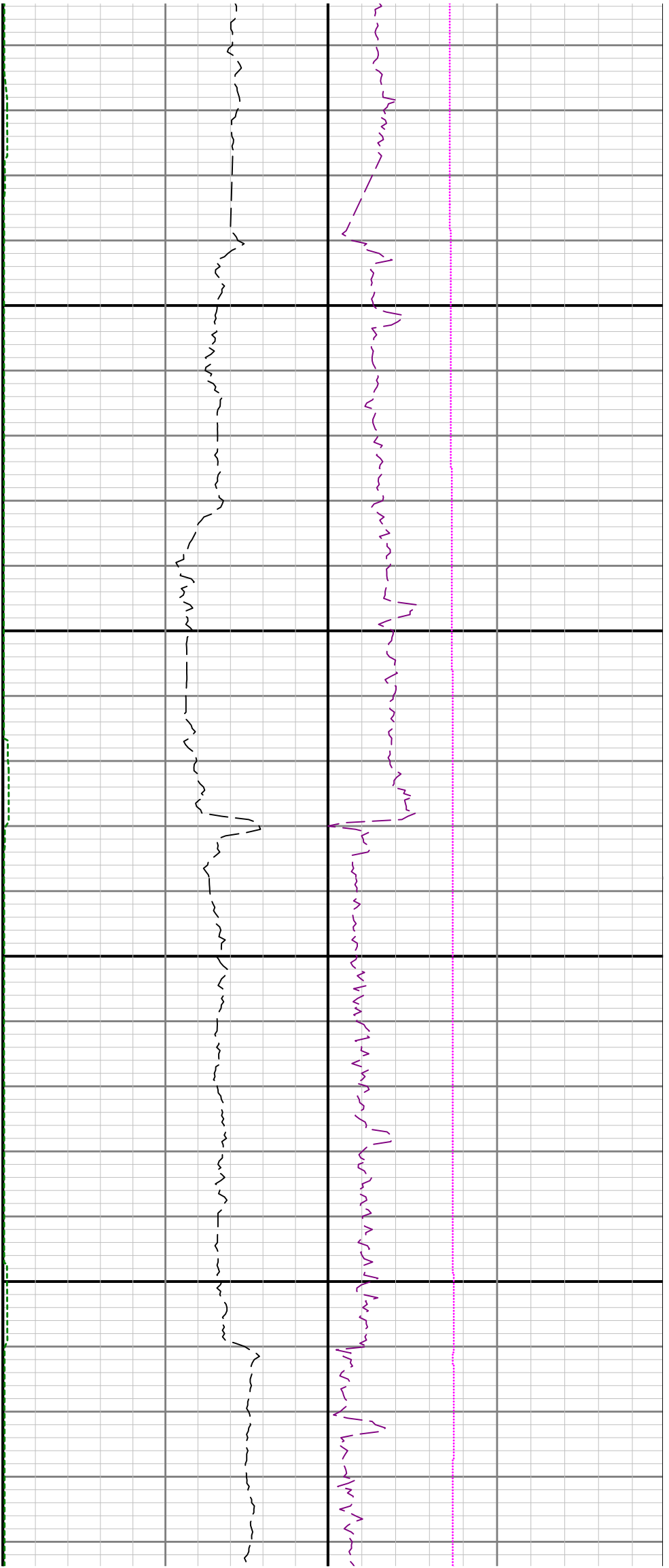
Remarks

Number	Depth (ft)	Hole Section (in)	Run No.	Remark
1	1545.00	8.500	2	Baker Hughes logging services began at 1545 feet MD (1544 feet TVD) per customer request.
2	16438.00	8.500	2	The interval from 16438 to 16451 feet MD (6338 feet TVD) was not logged due to sensor to bit offset at well TD.

Curve Mnemonics

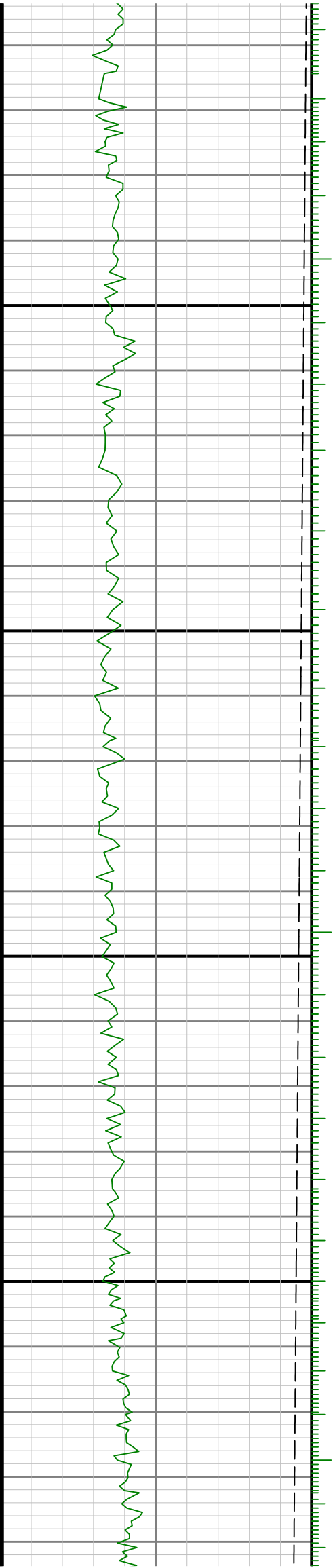
Presented Curves	Description	Units
ROPA	Depth Averaged ROP 3 ft Average	ft/h
TVD	True Vertical Depth	ft
WOBA	Weight On Bit, Average 1 ft Average	klb
GRAM	Gamma Ray - Apparent - Memory 0.5 ft Average	API
GRIM	Gamma Ray - Data Point Indicator - Memory	unitless
GRTM	Gamma Ray - Time Since Drilled - Memory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

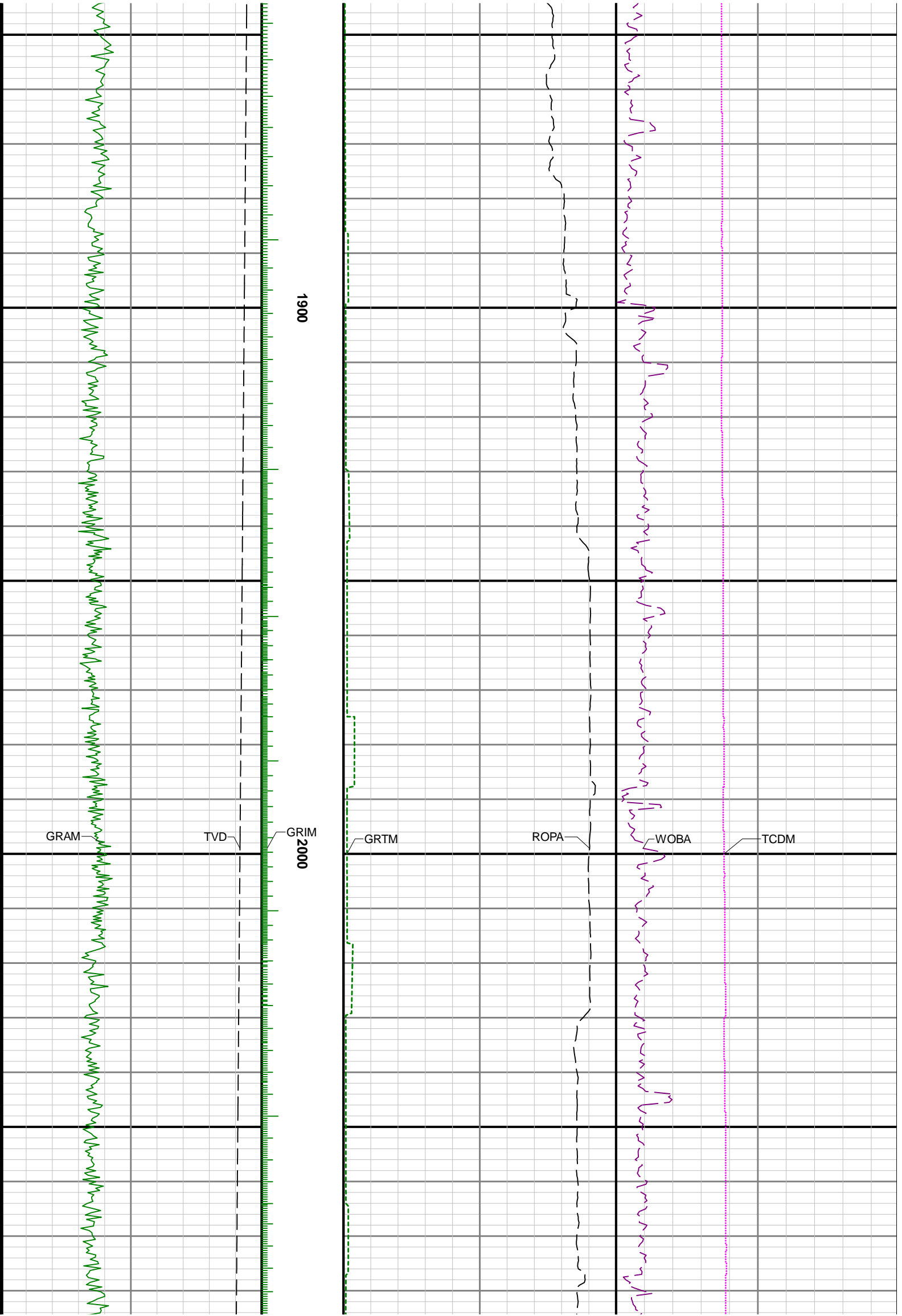


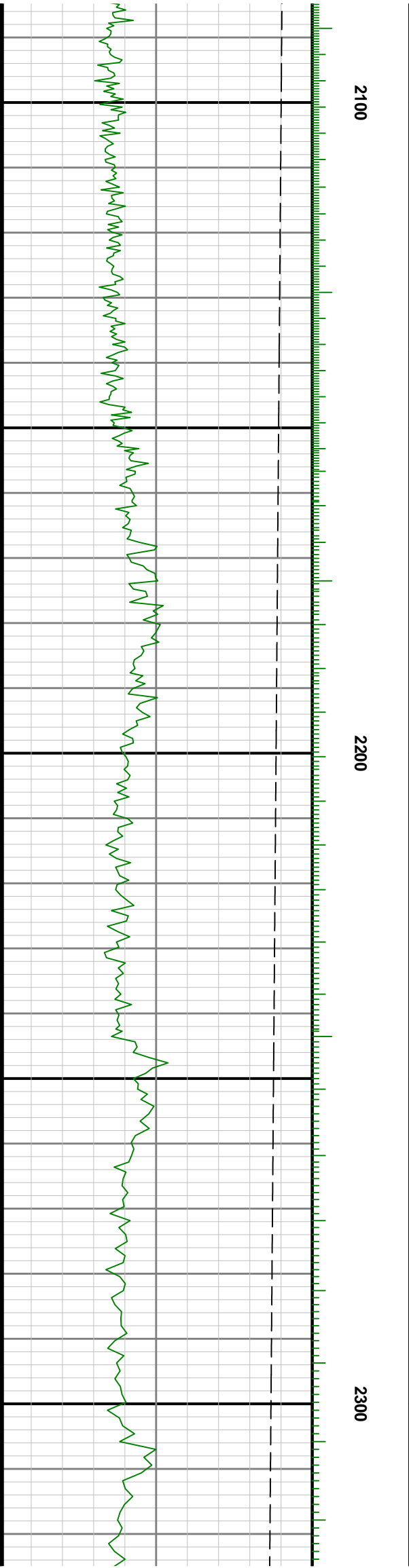


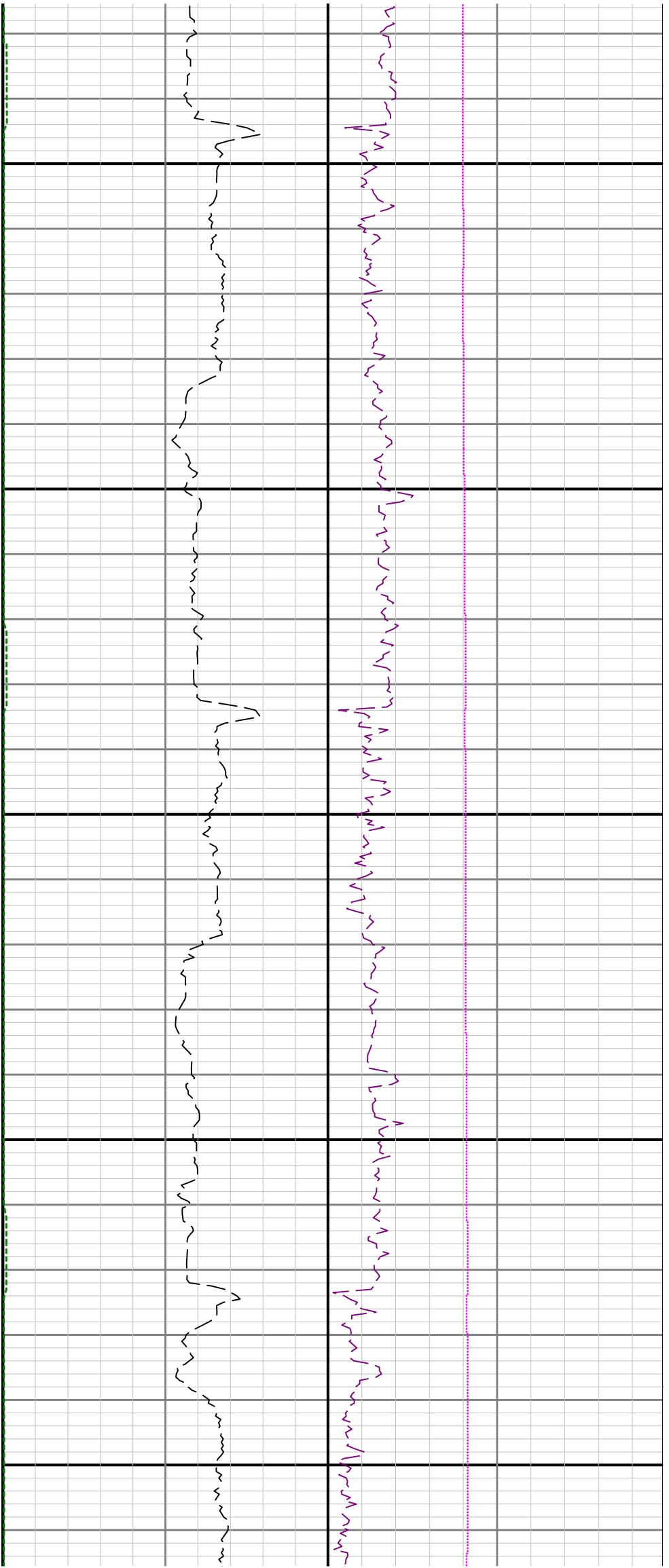
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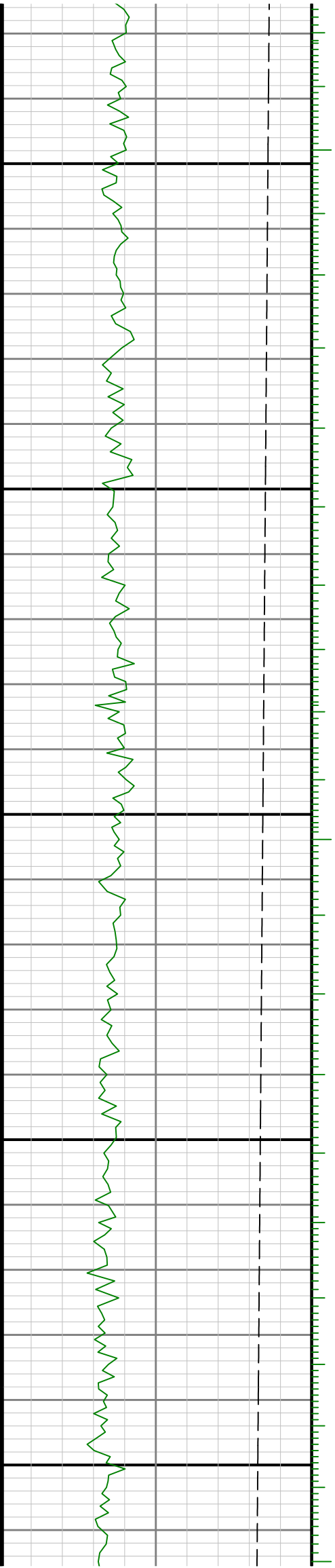


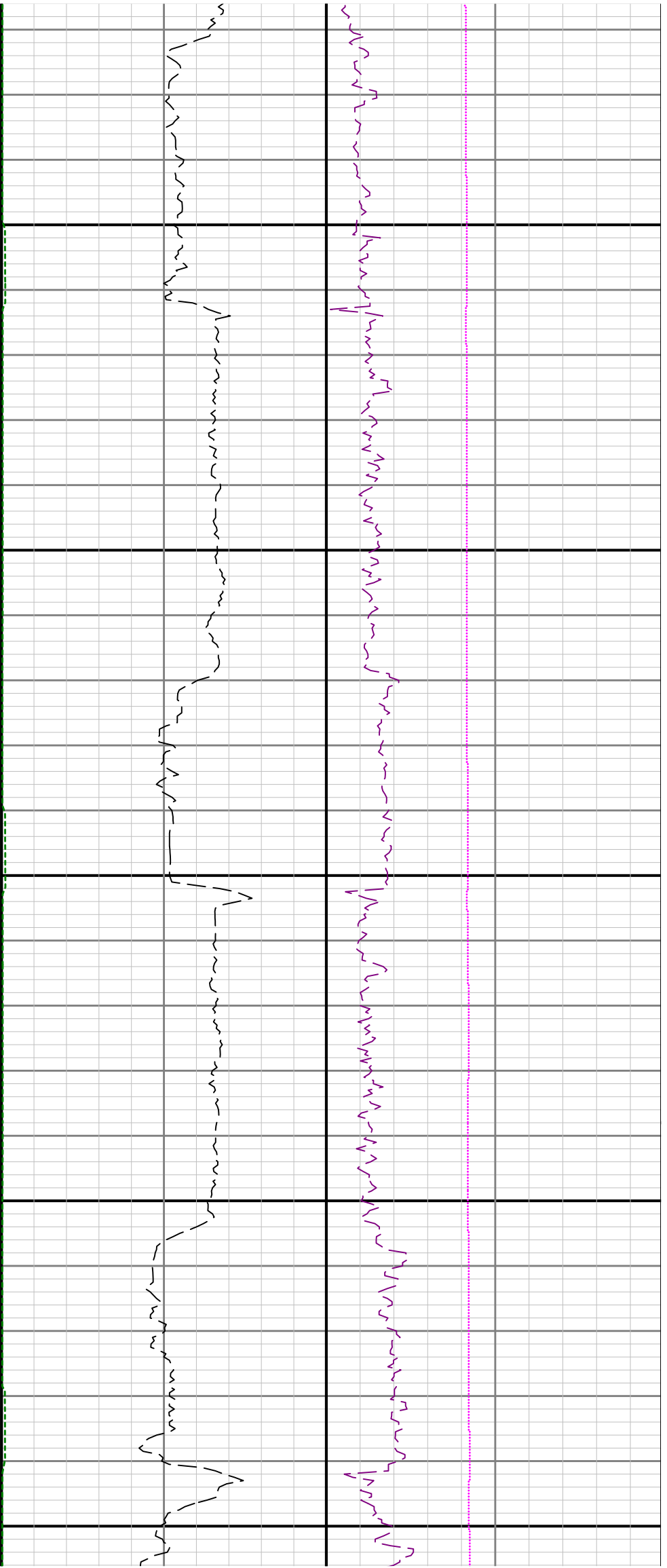




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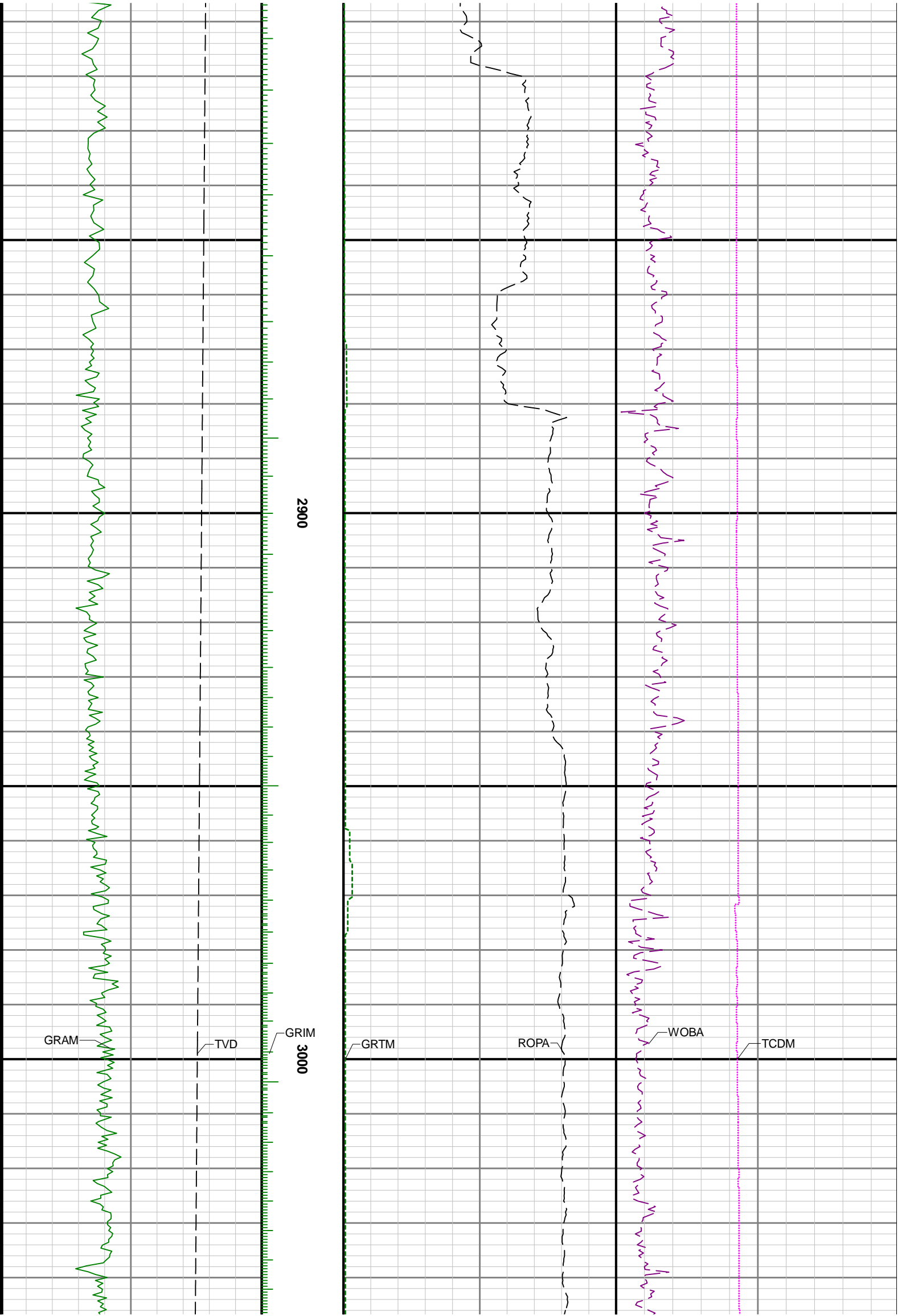


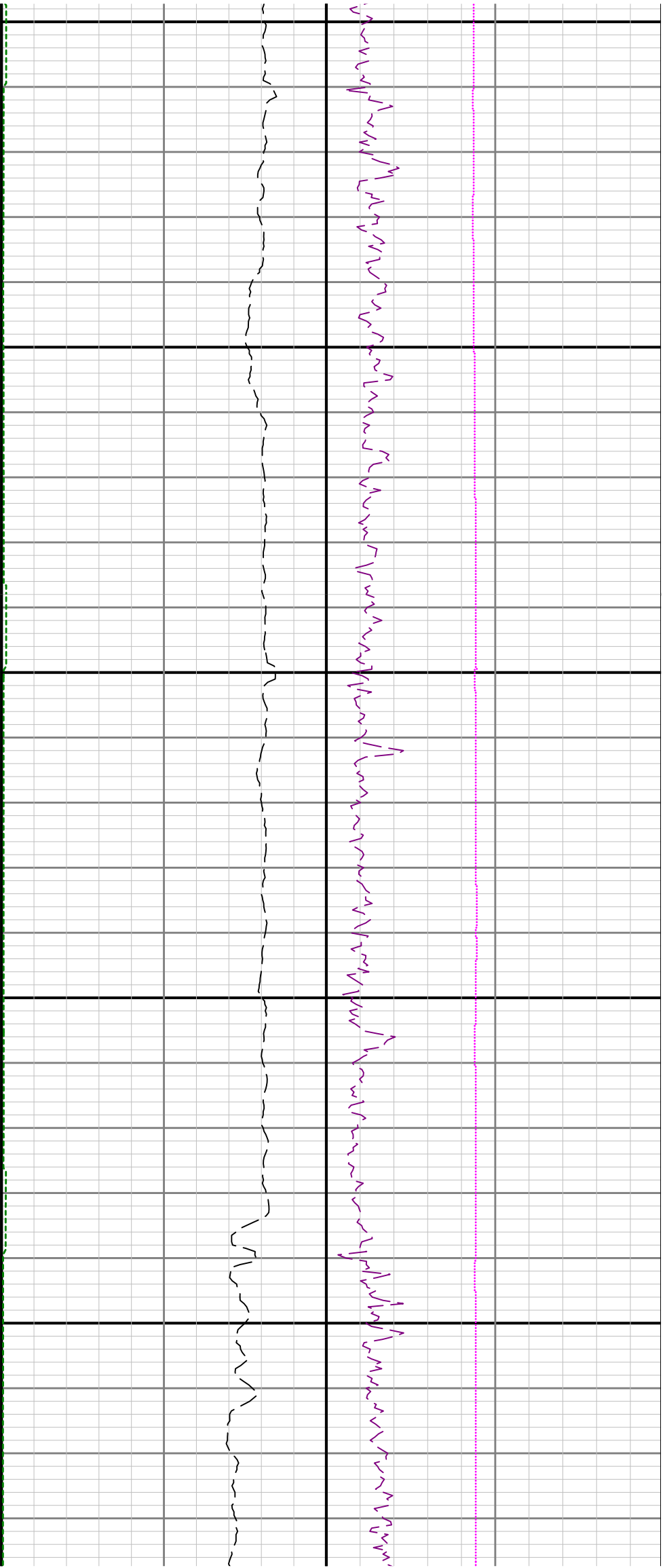


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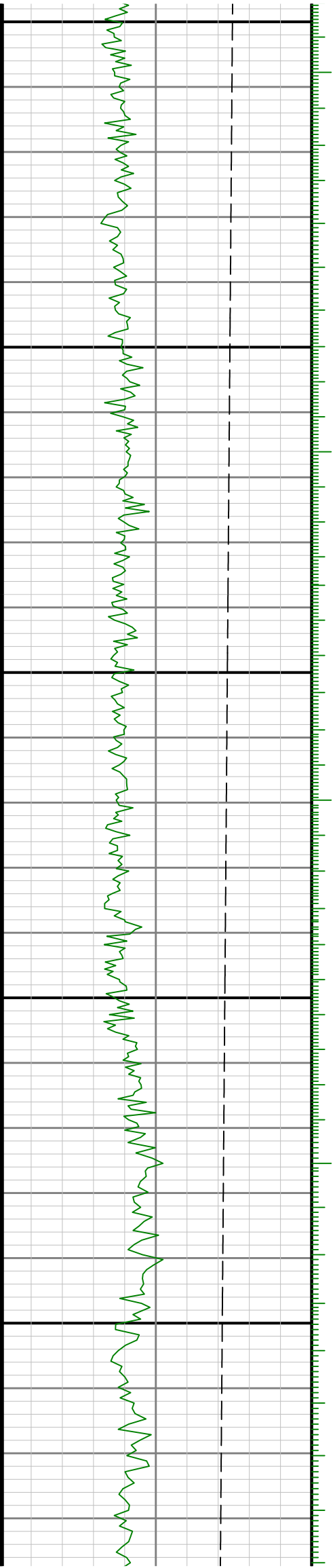
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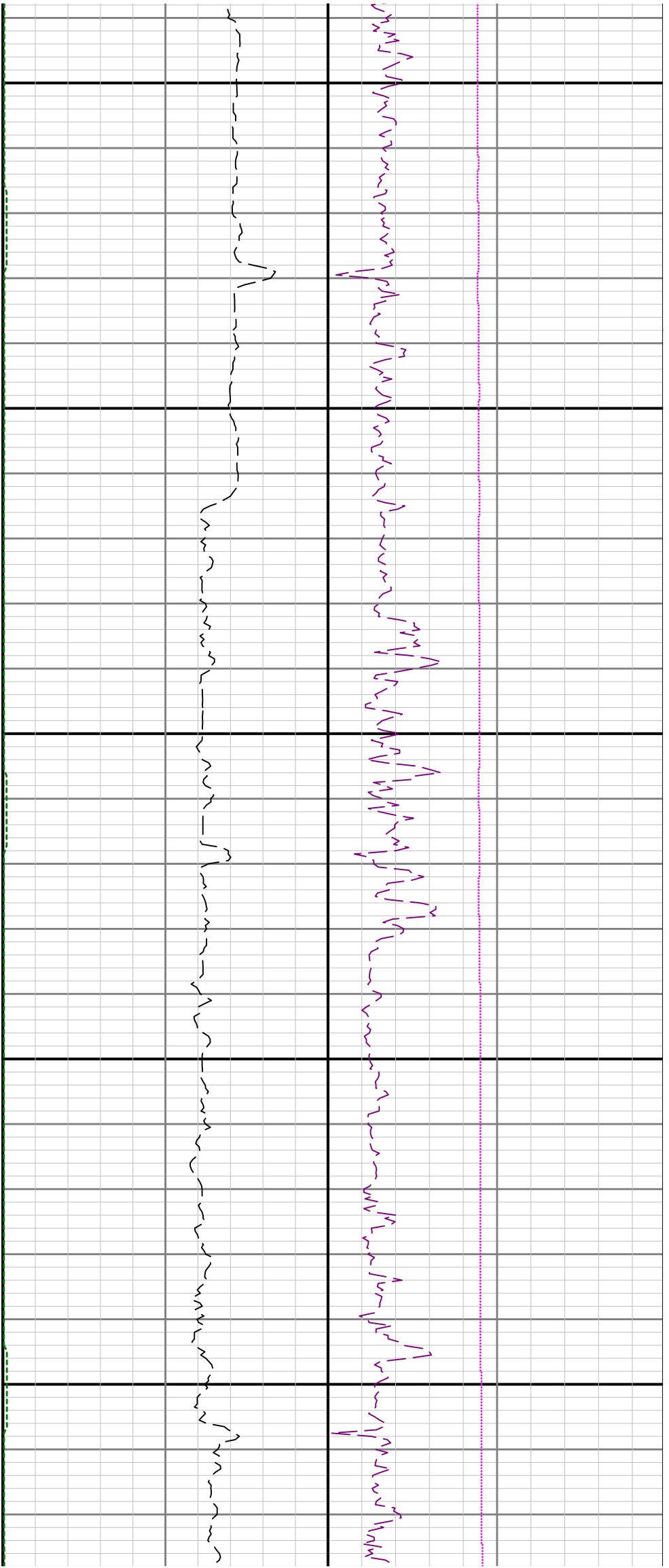




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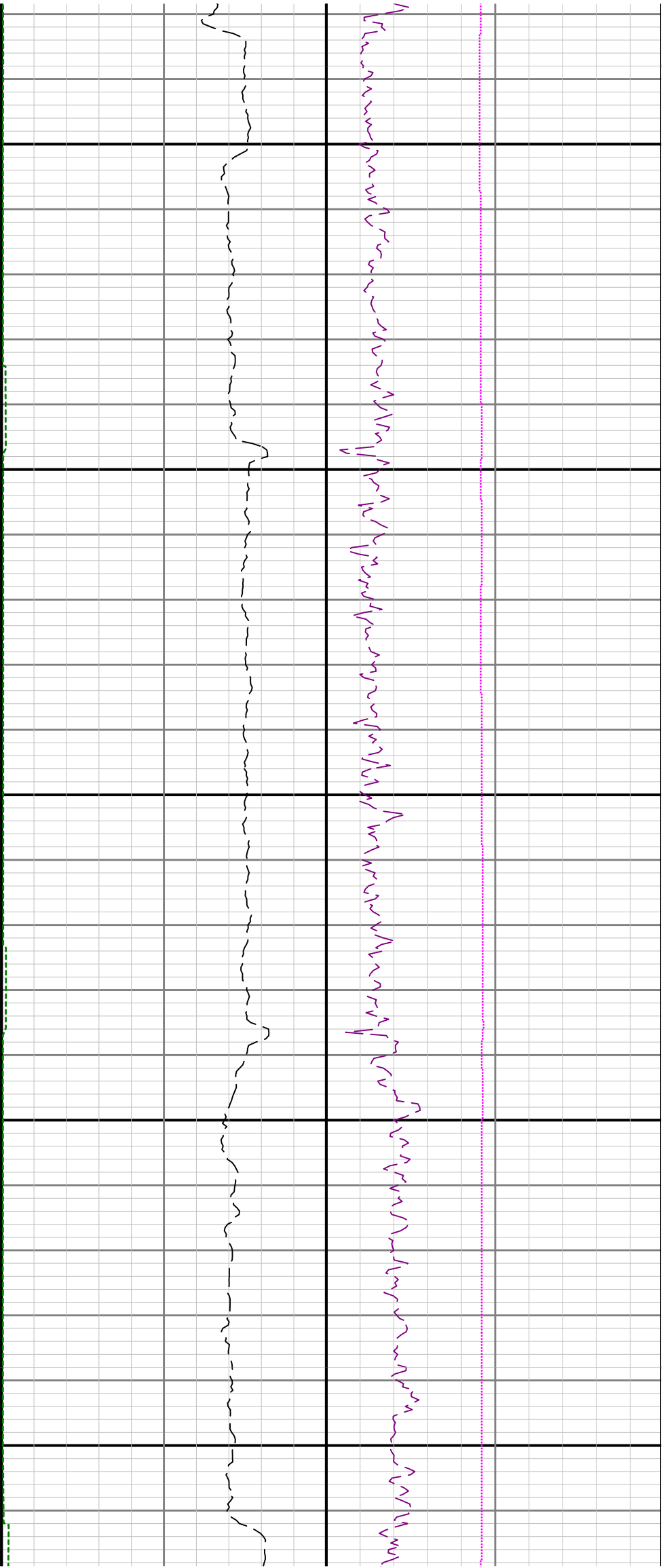




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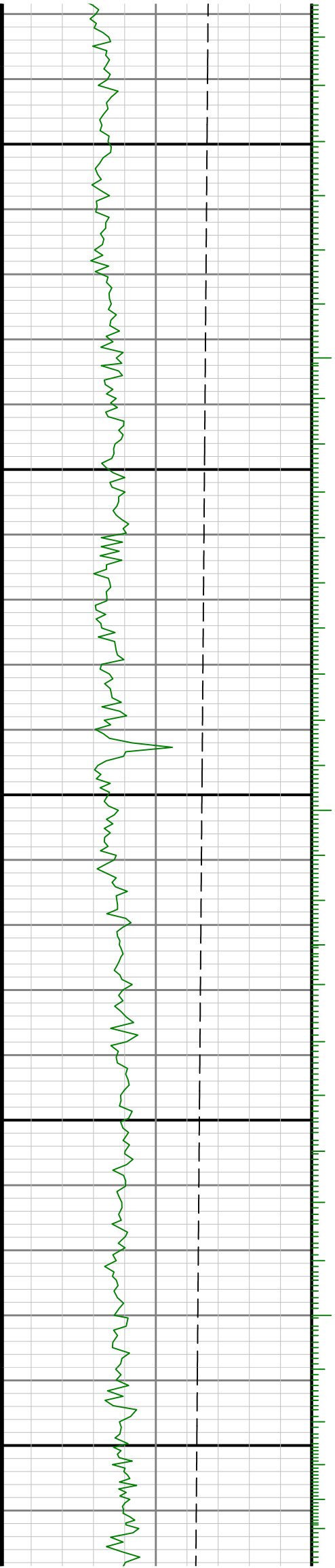
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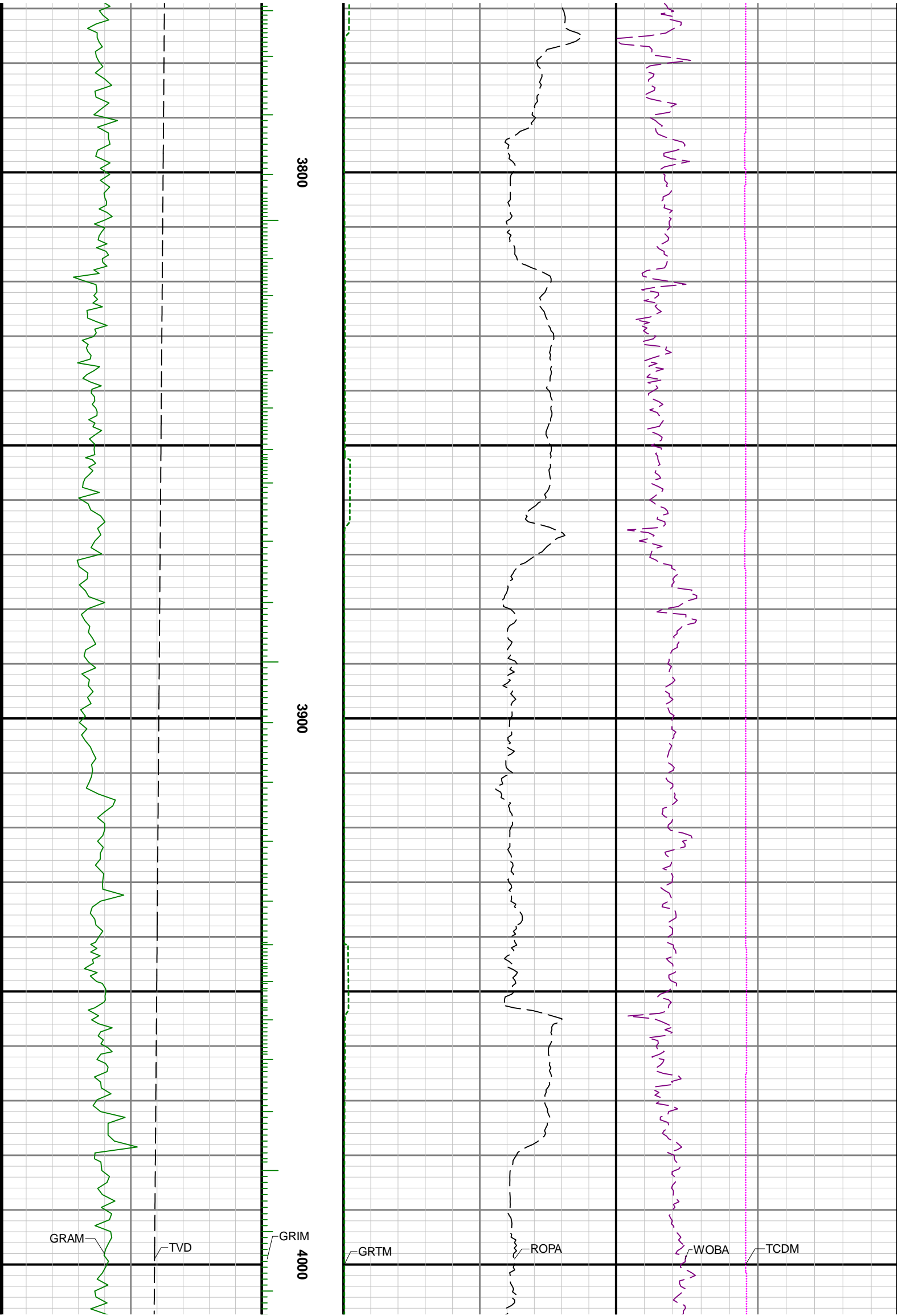
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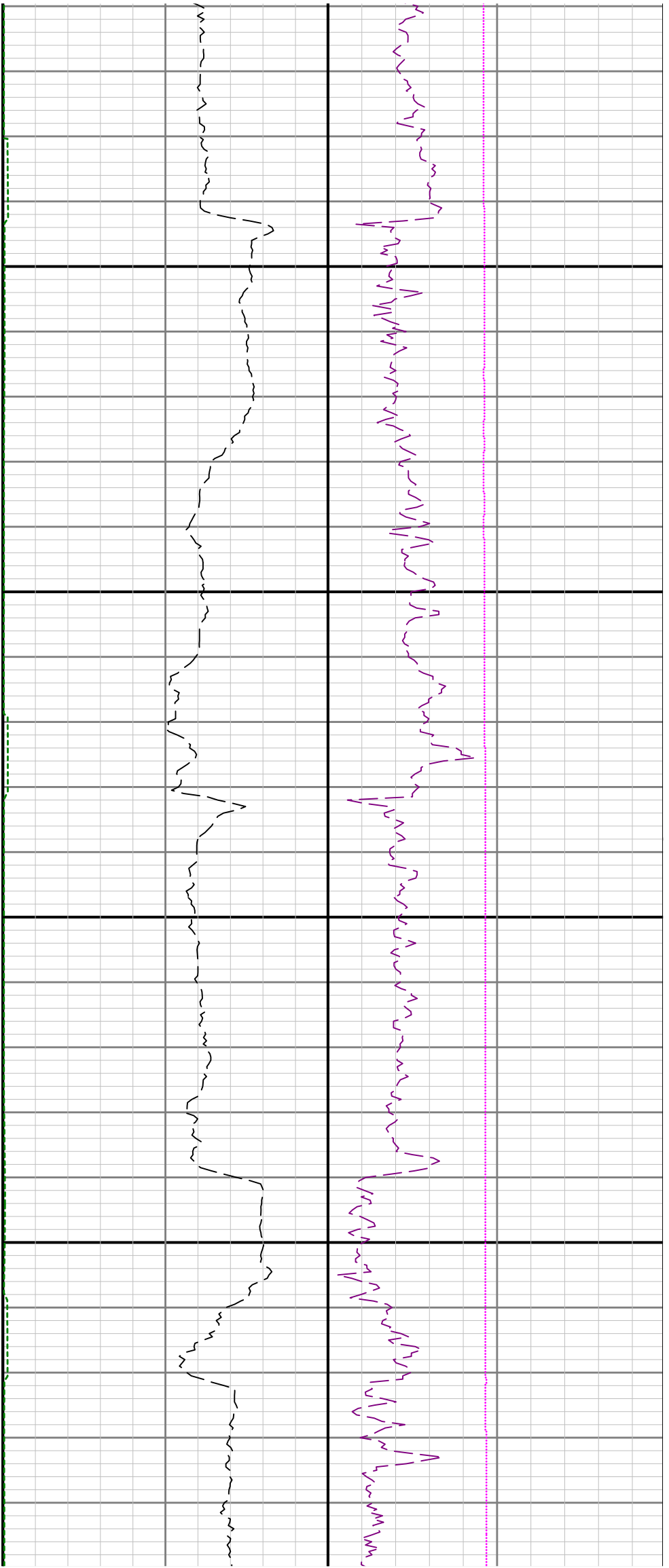


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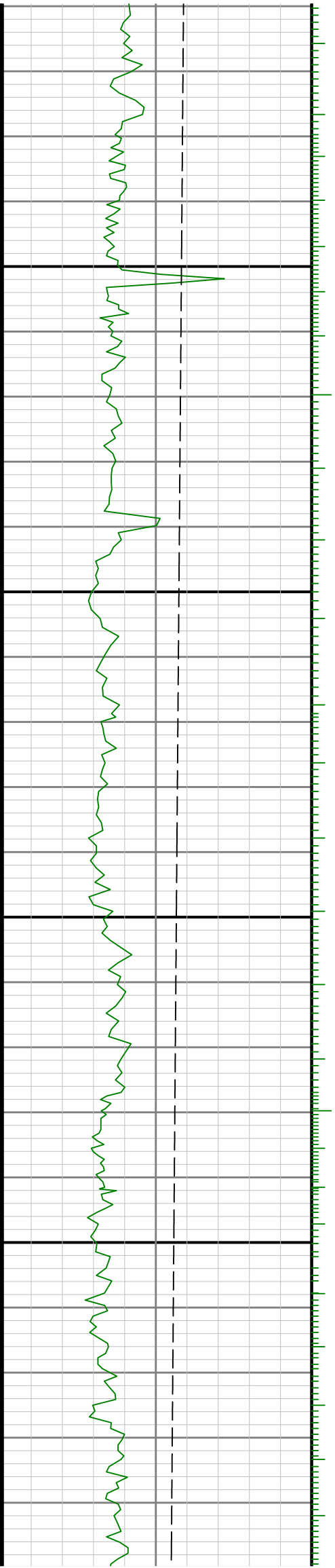


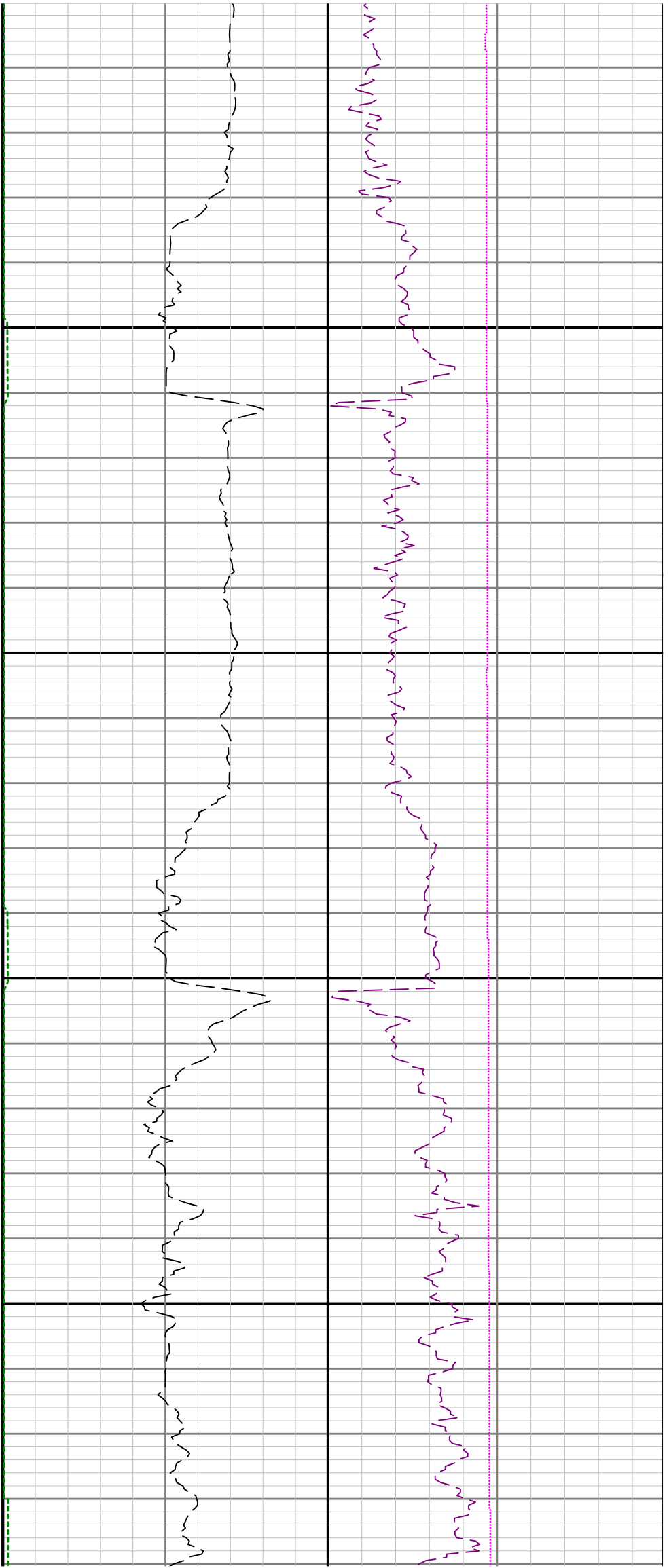




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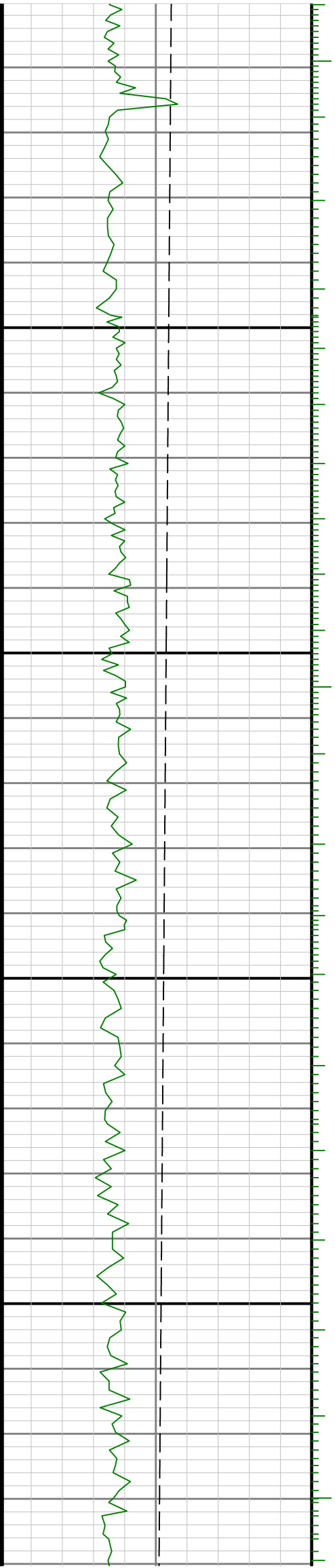
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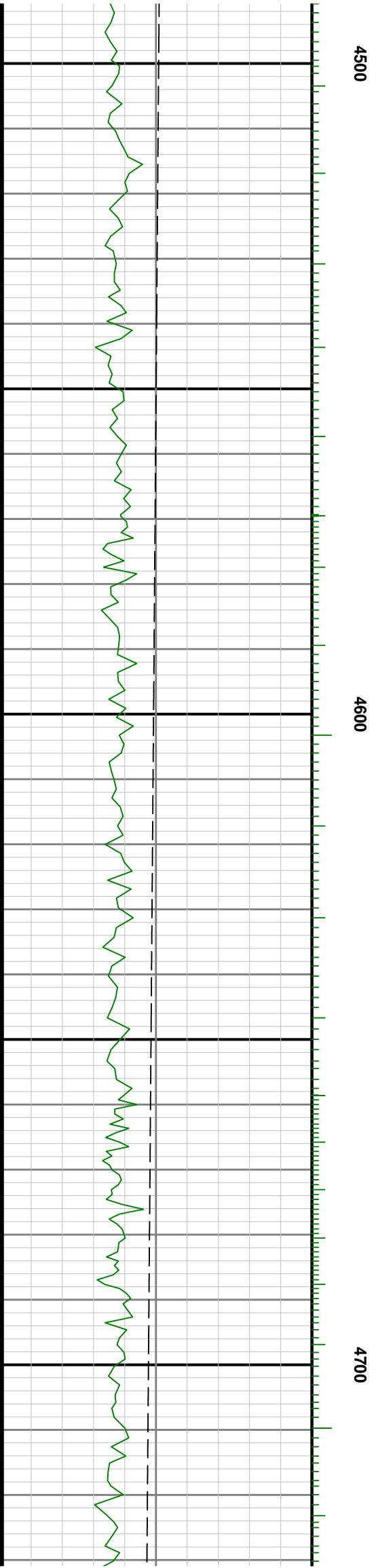
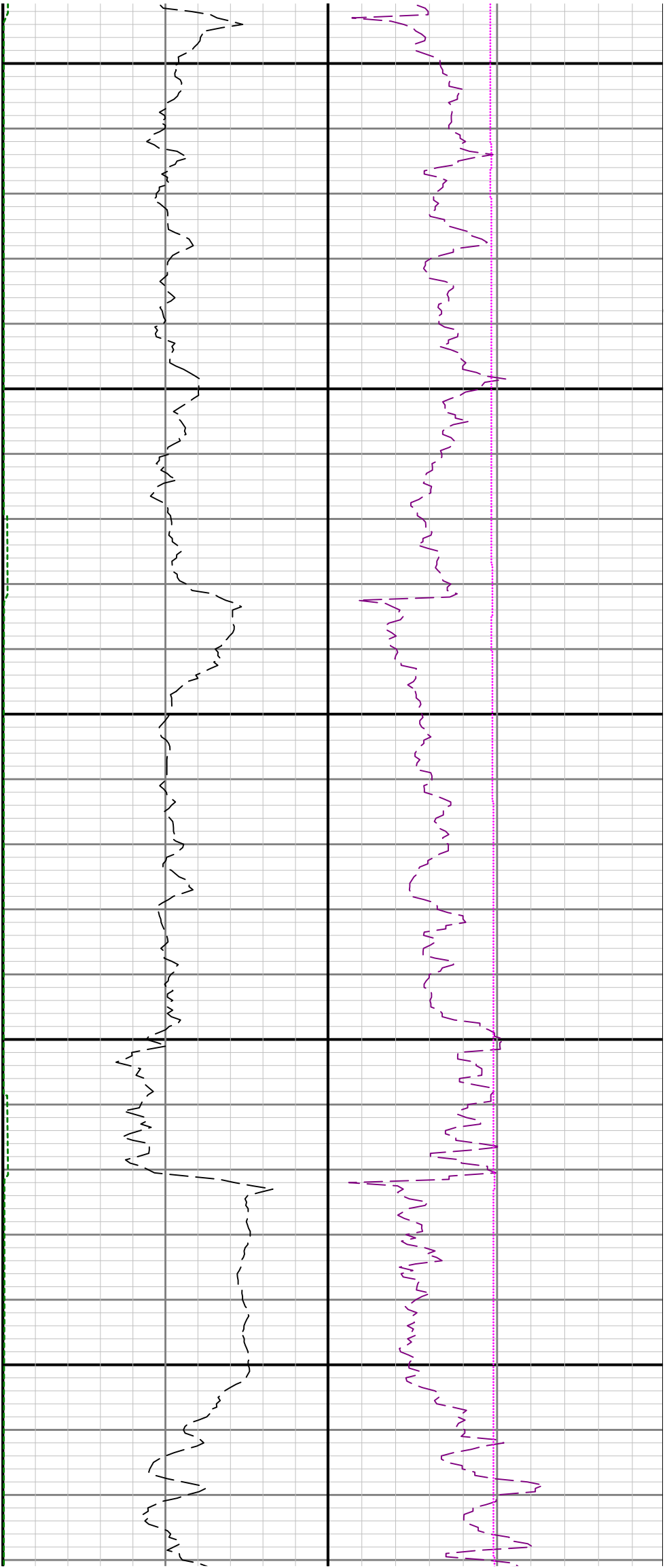


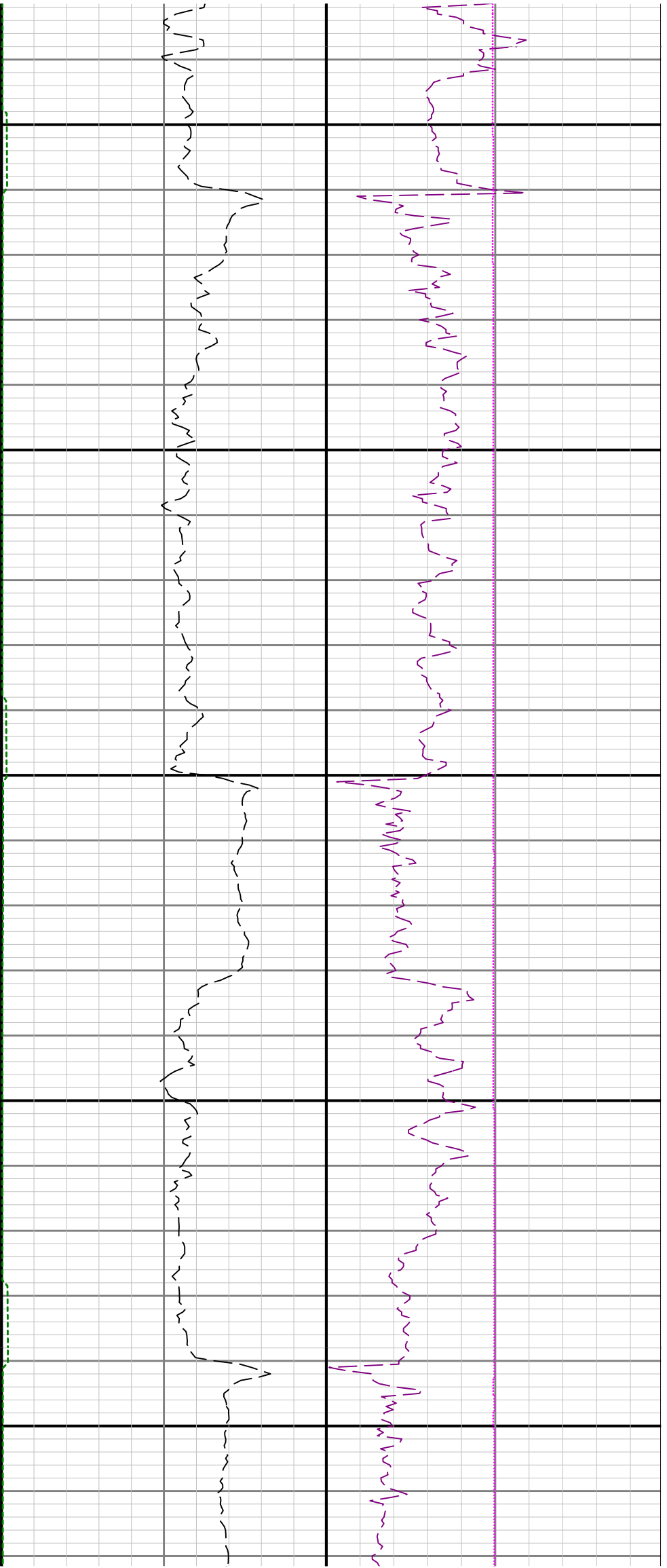


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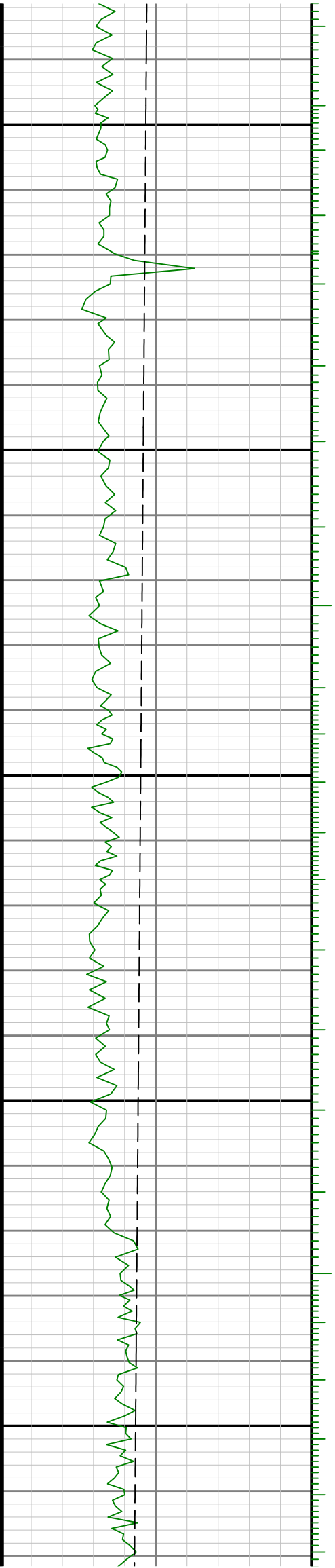


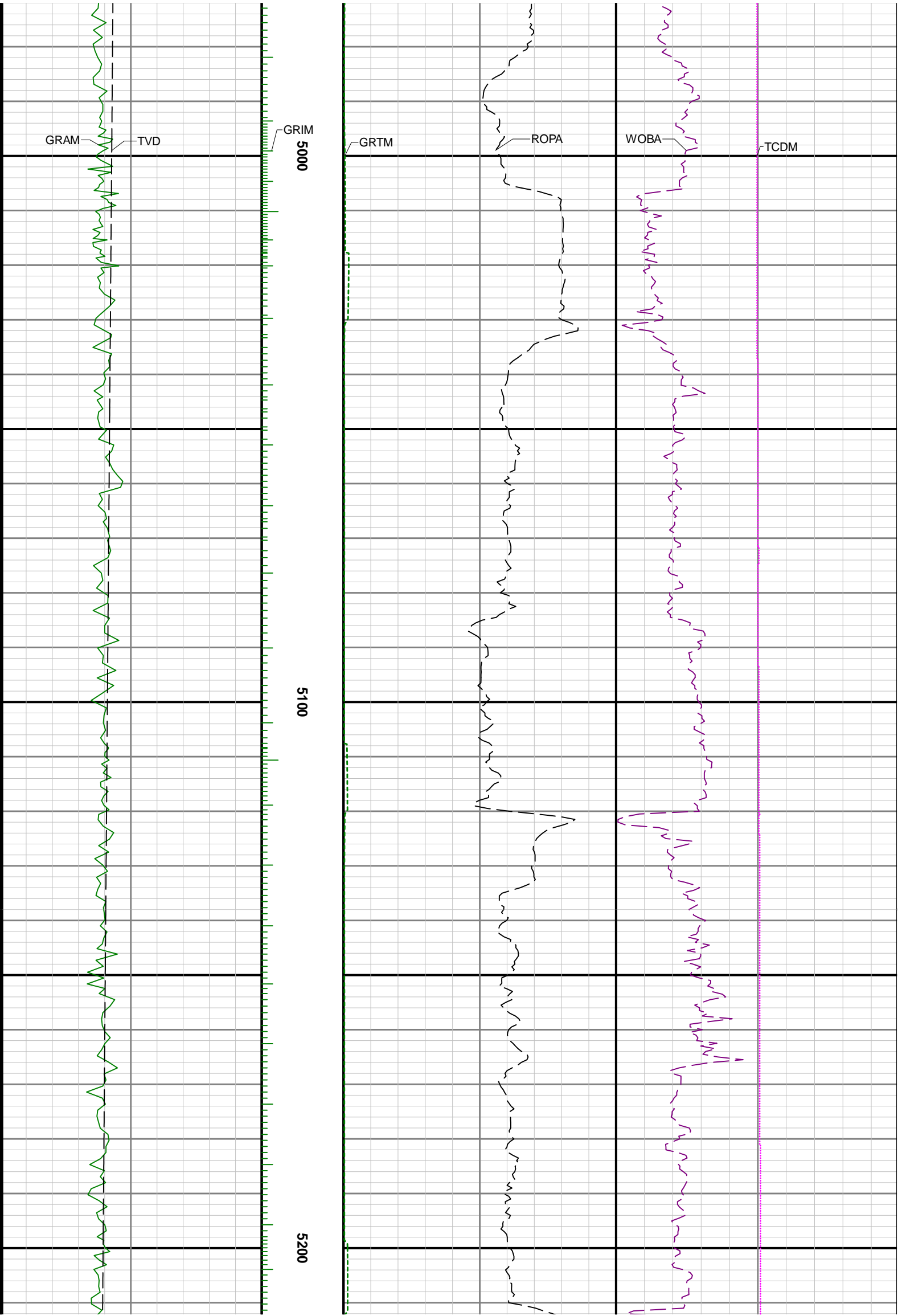




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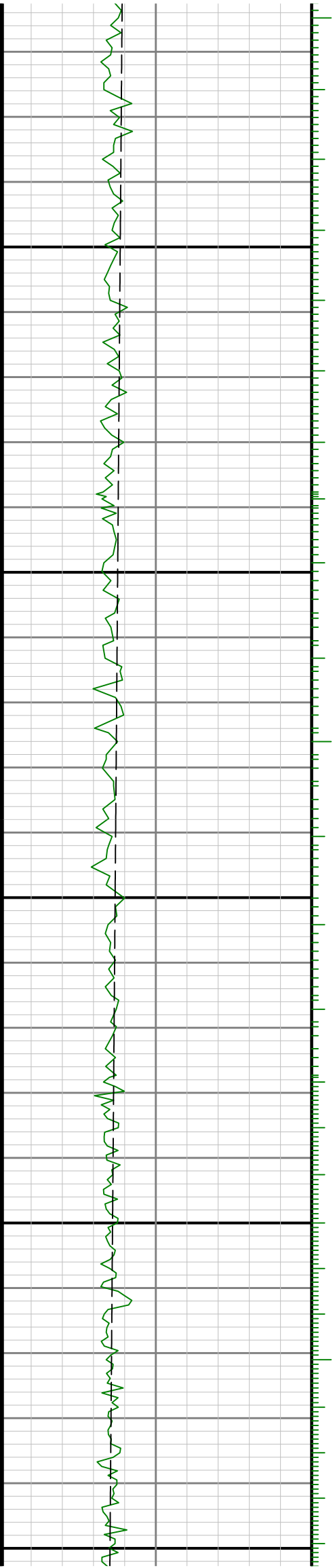


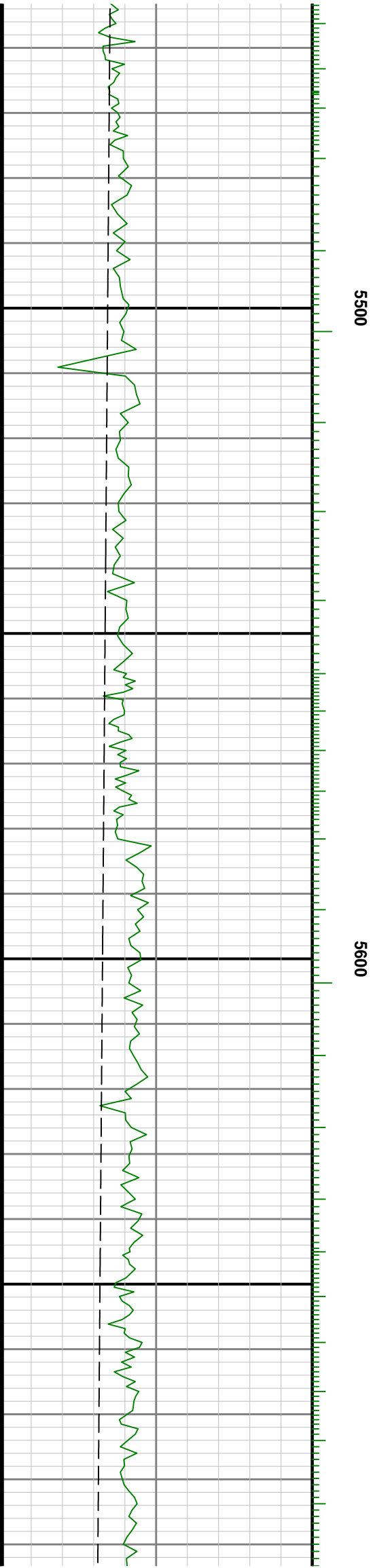
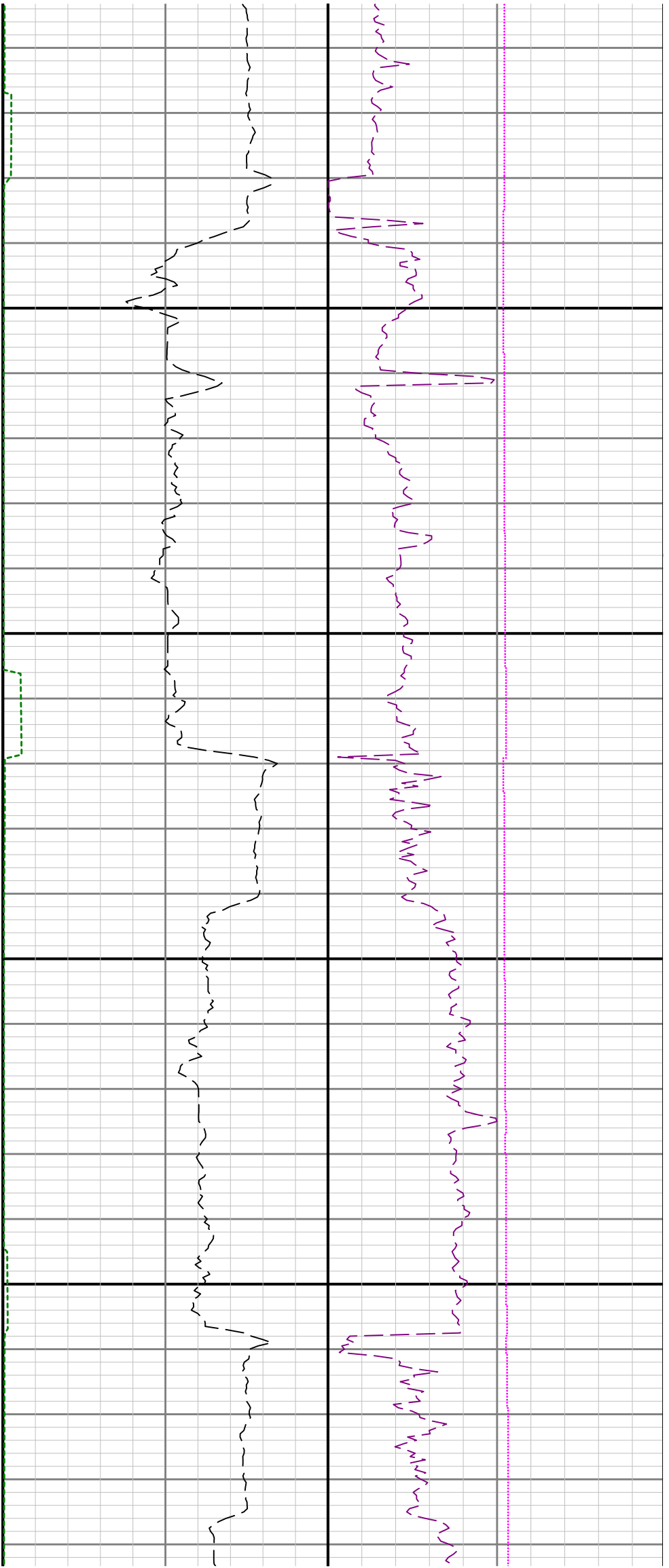


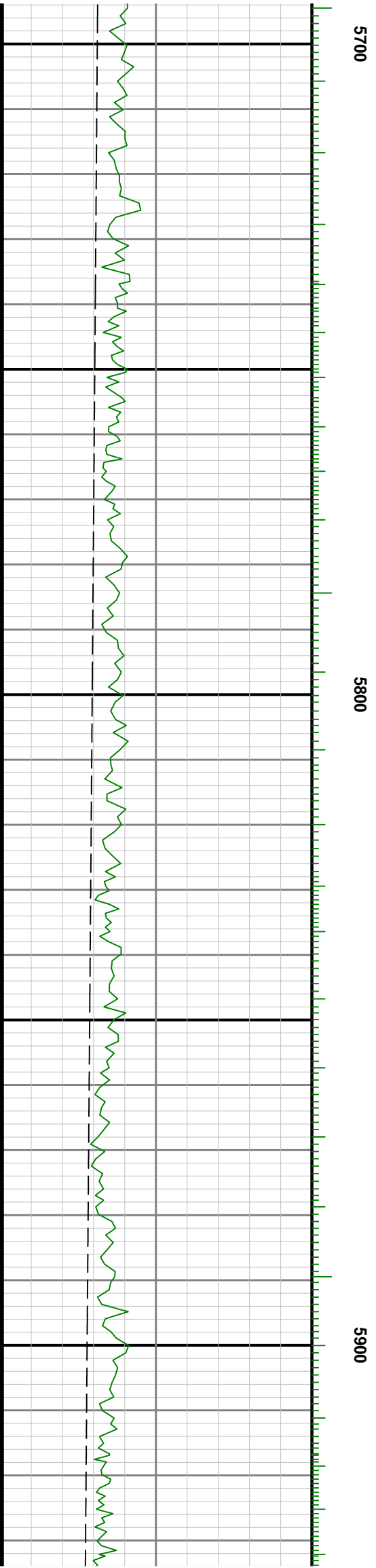
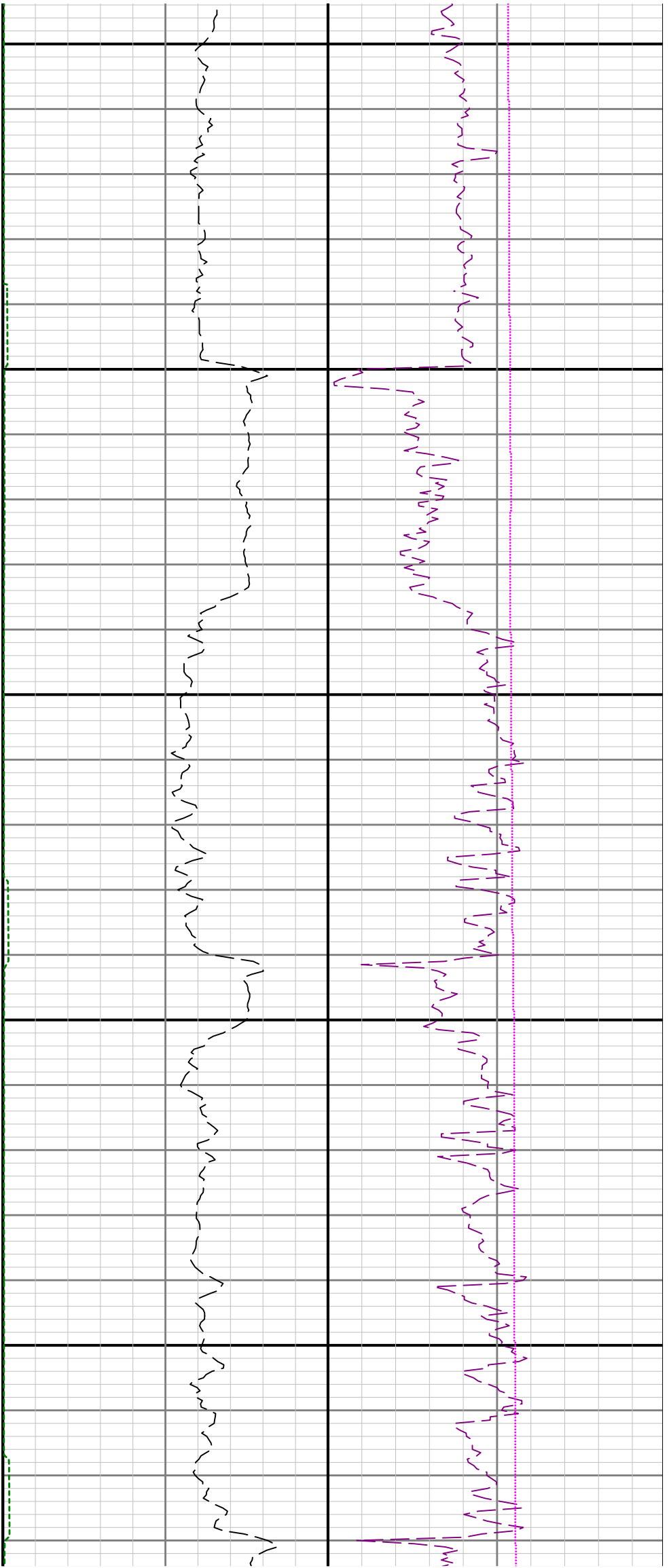


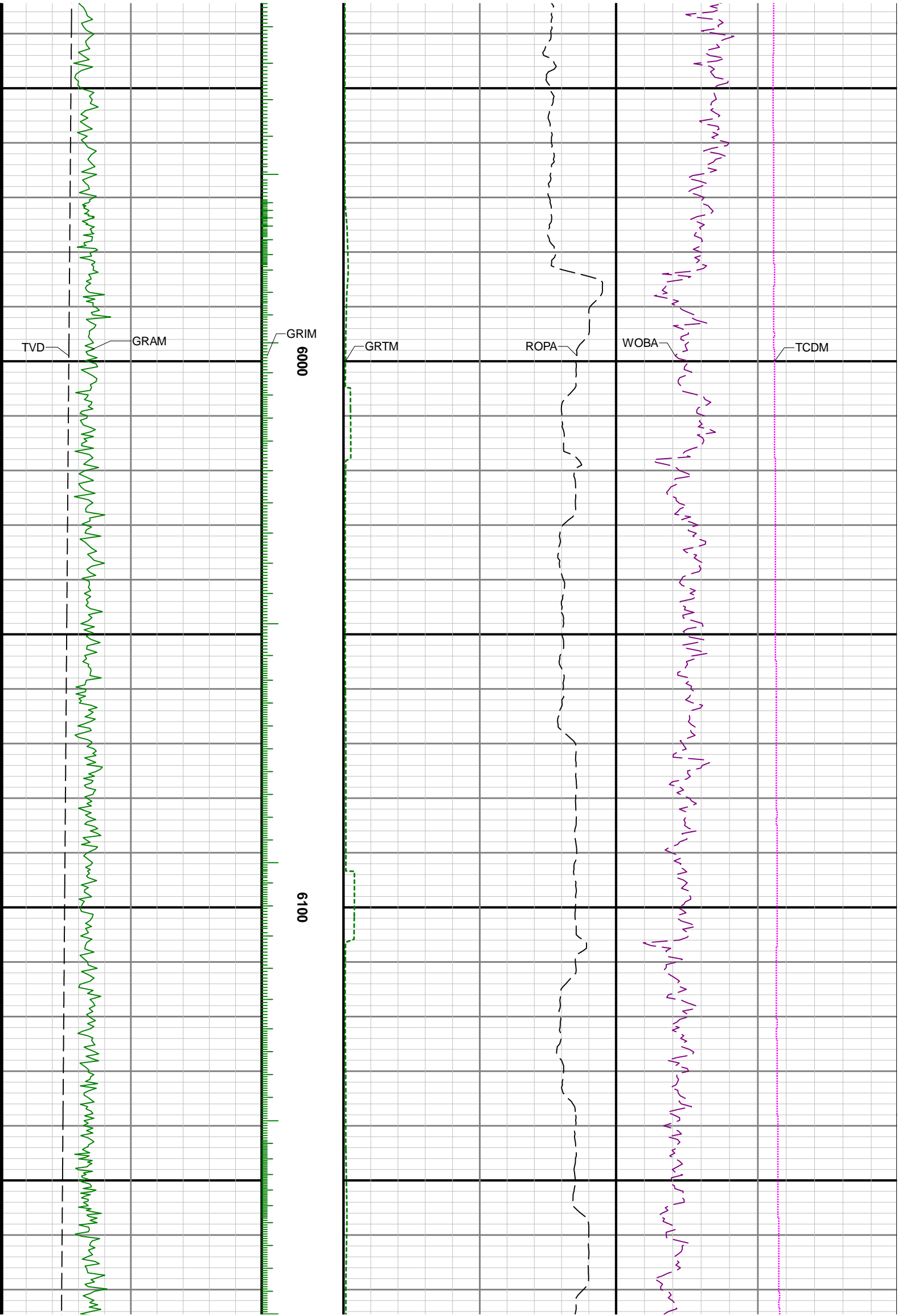
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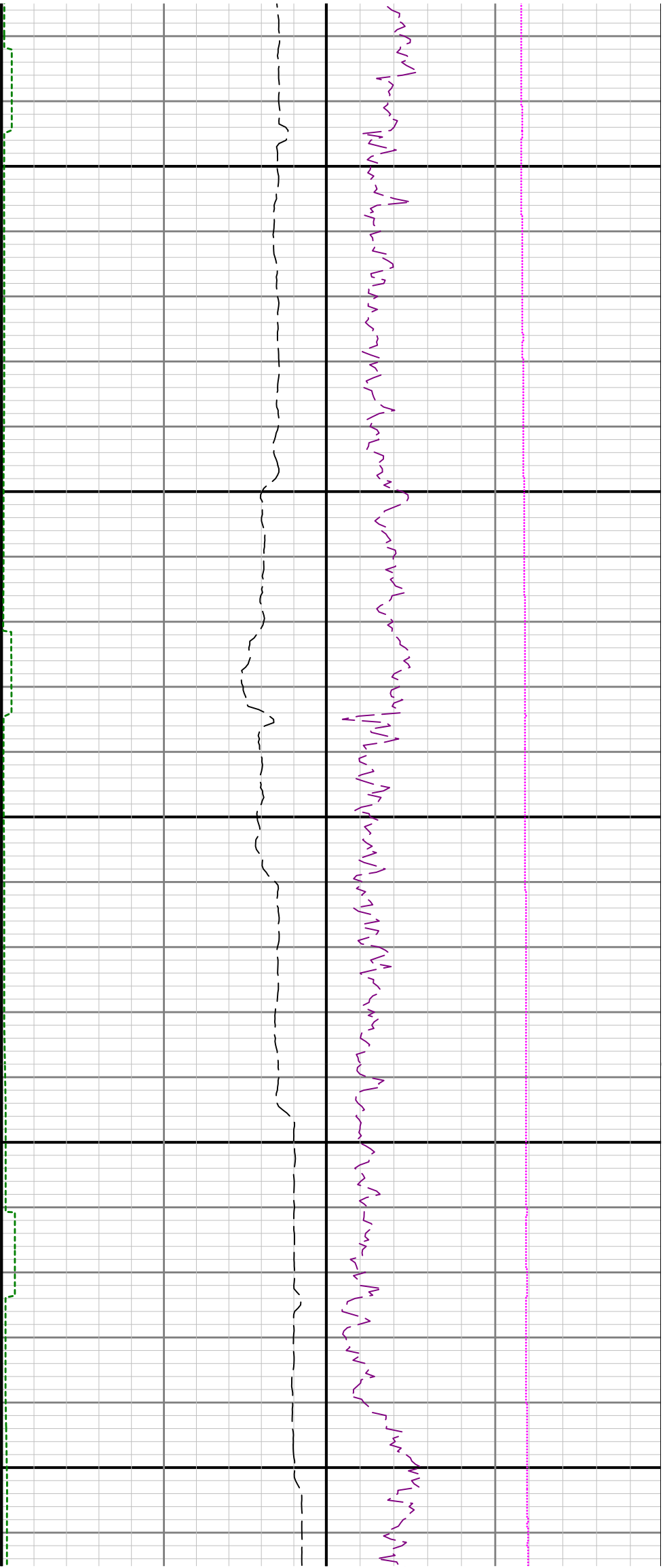
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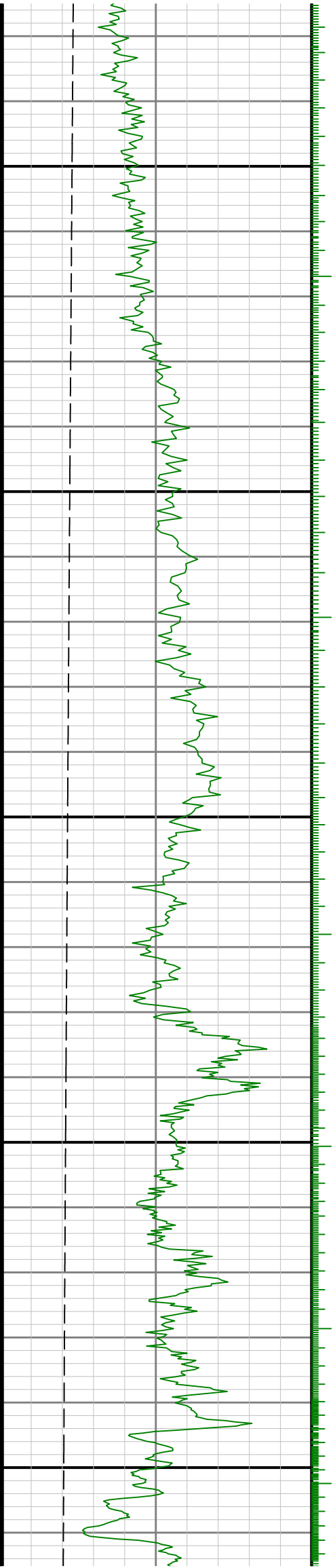


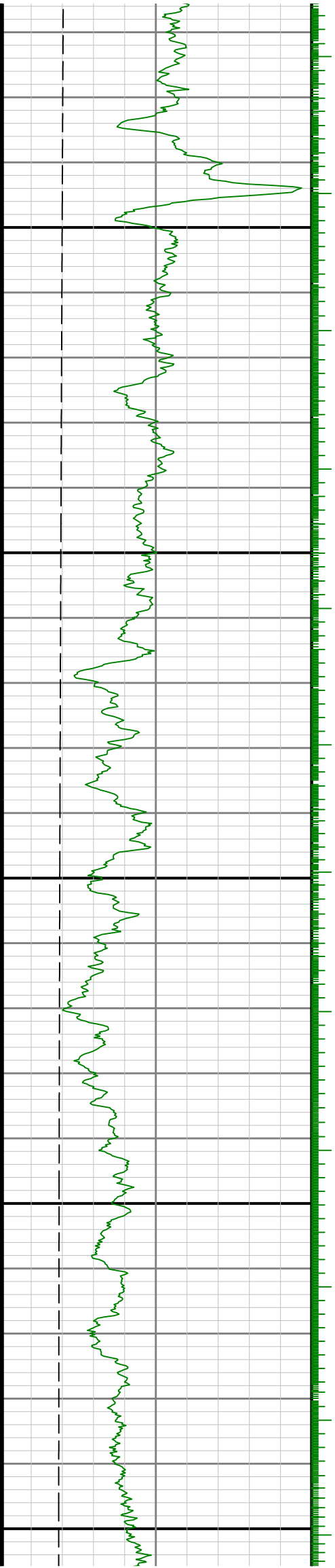


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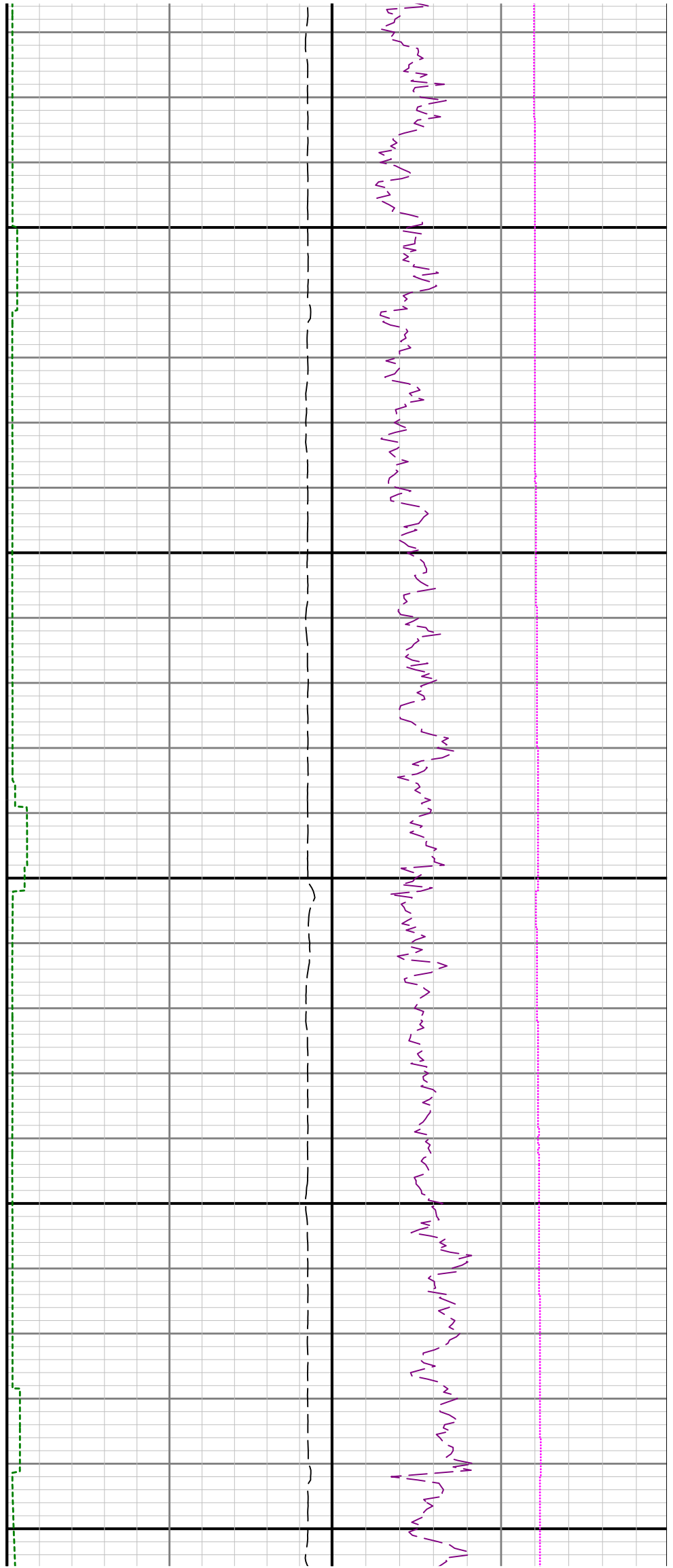
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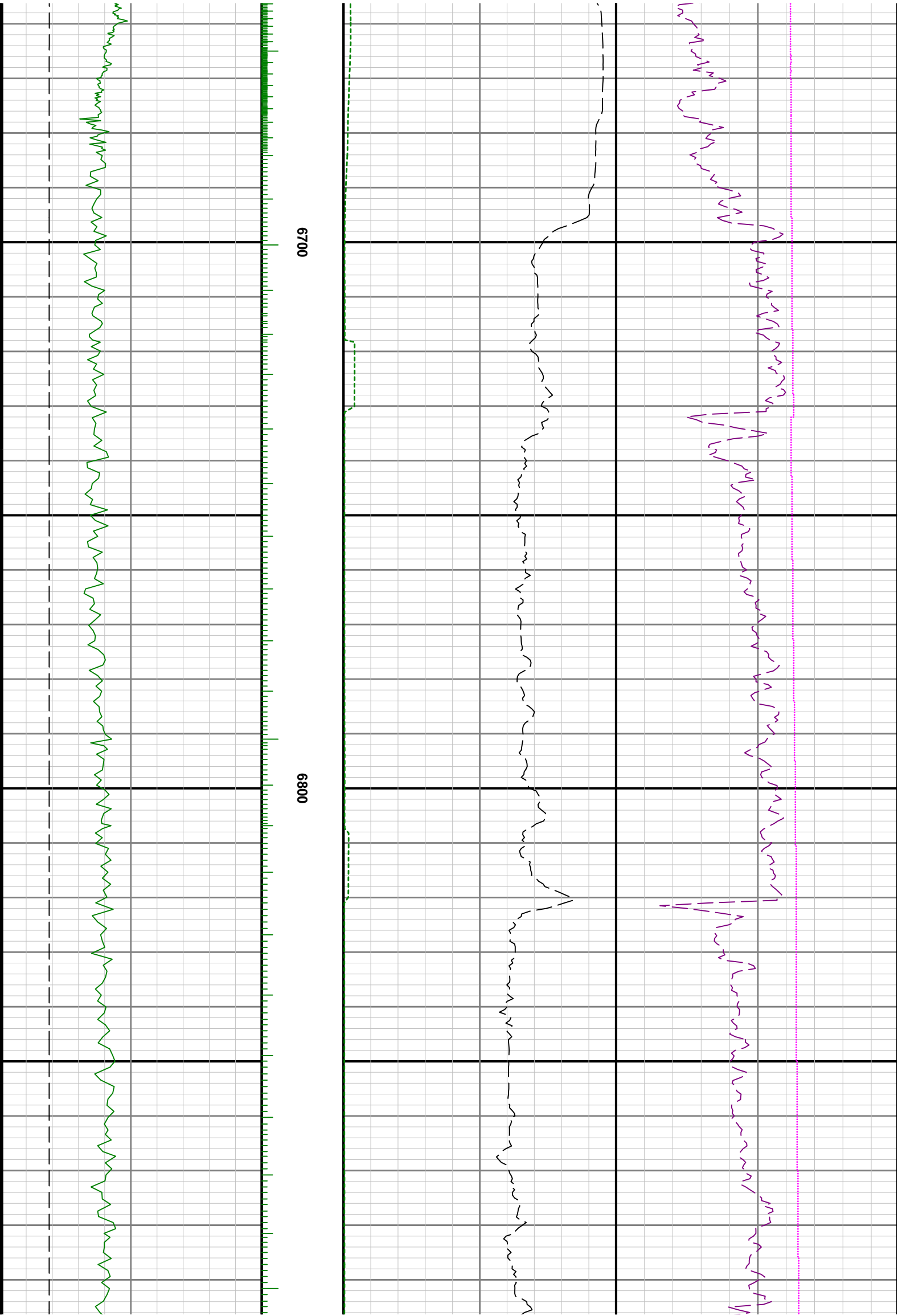


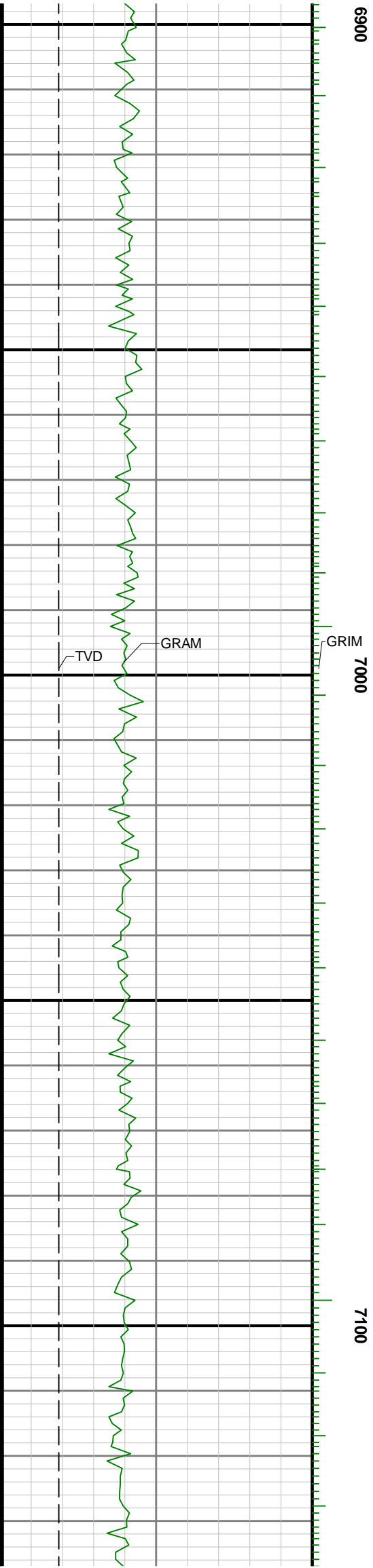
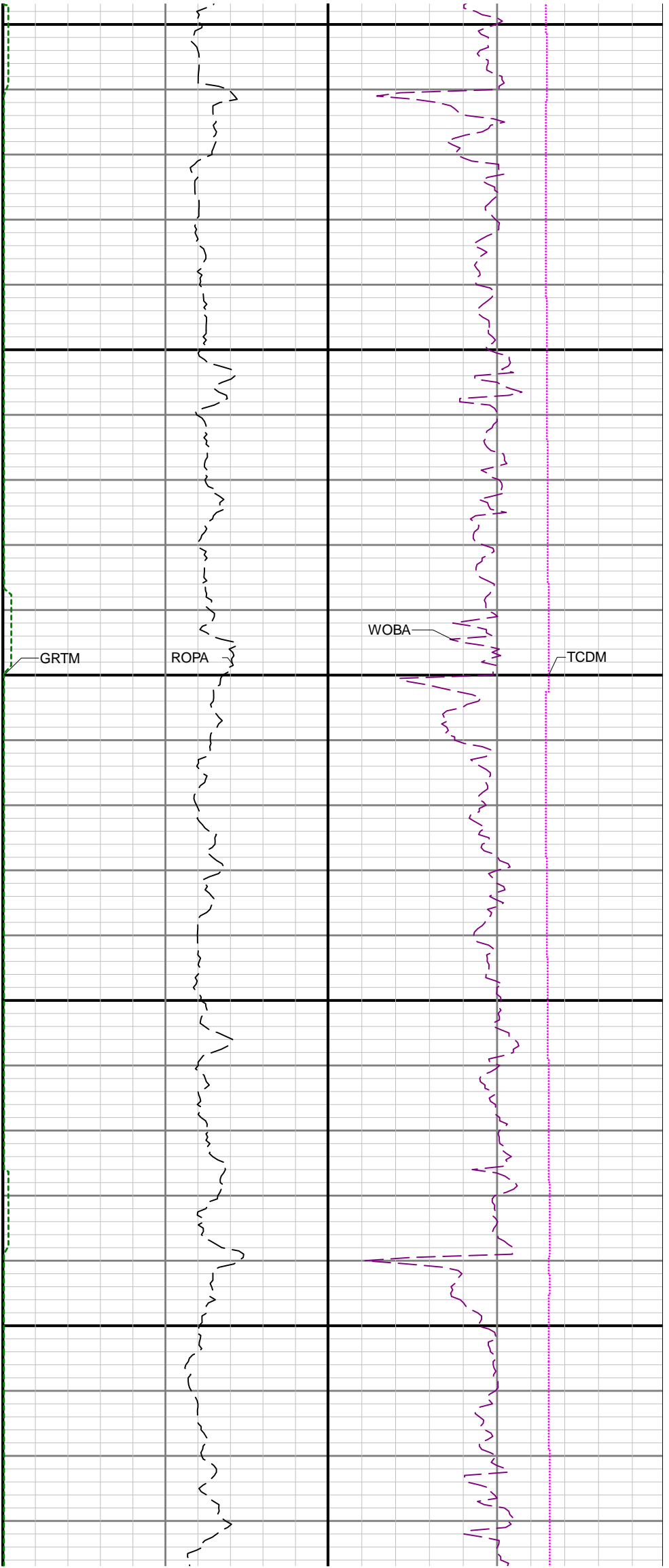


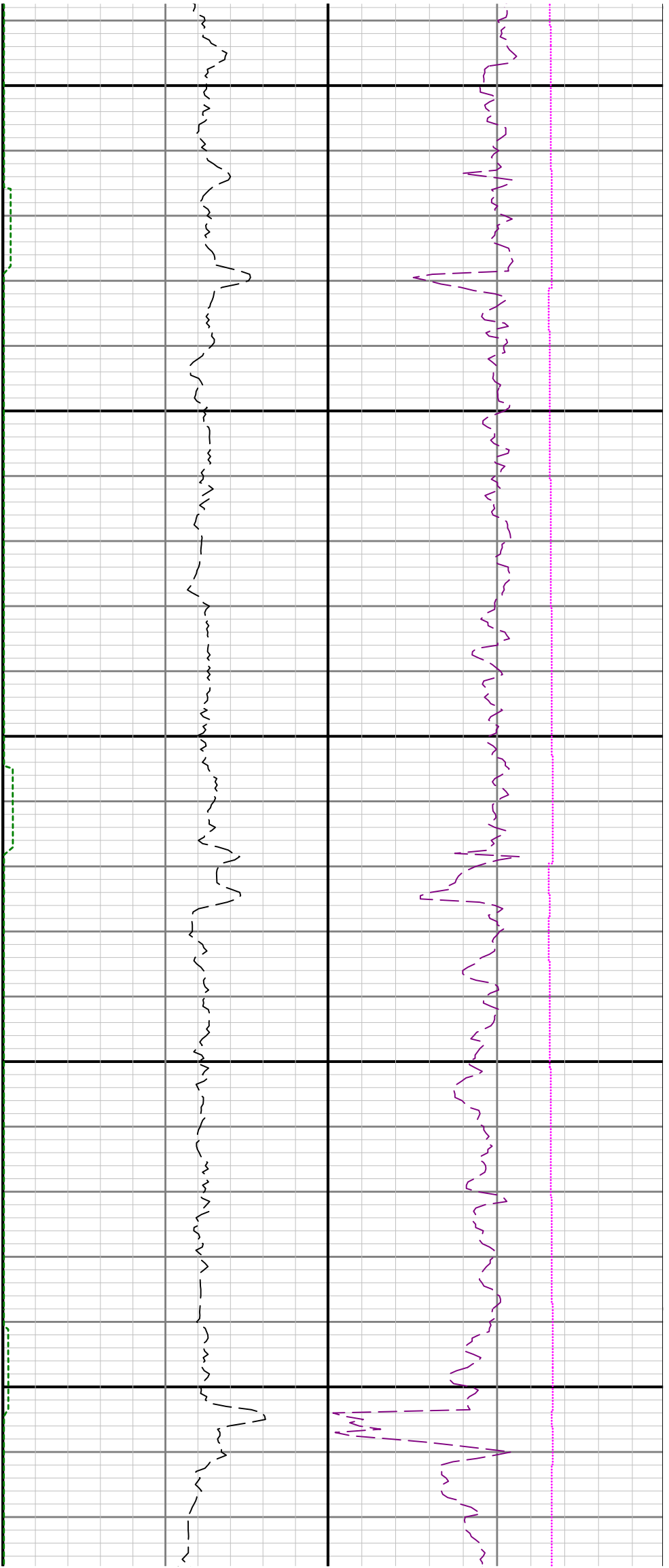
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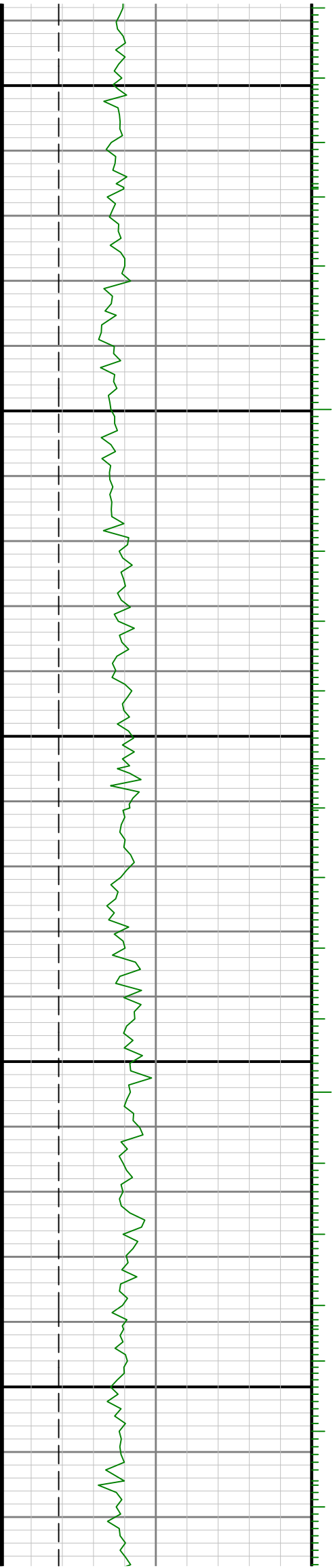


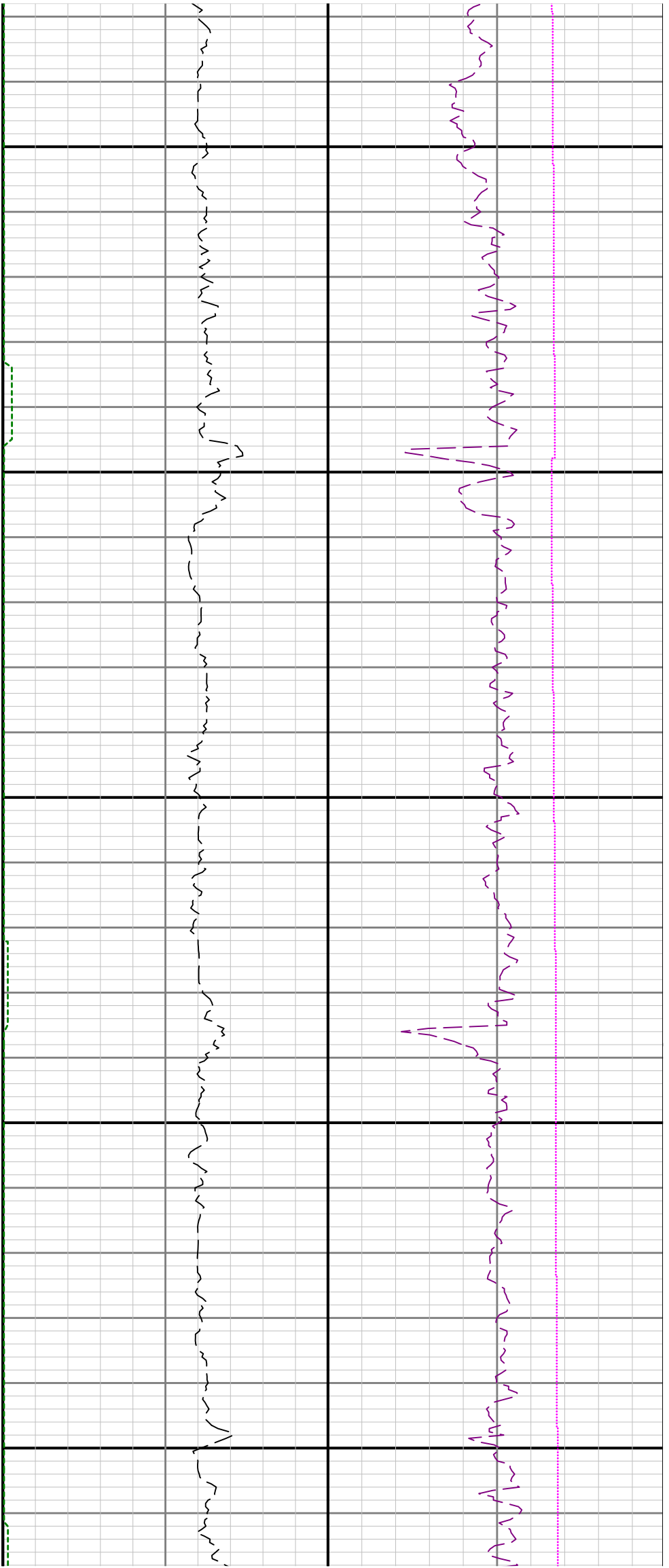




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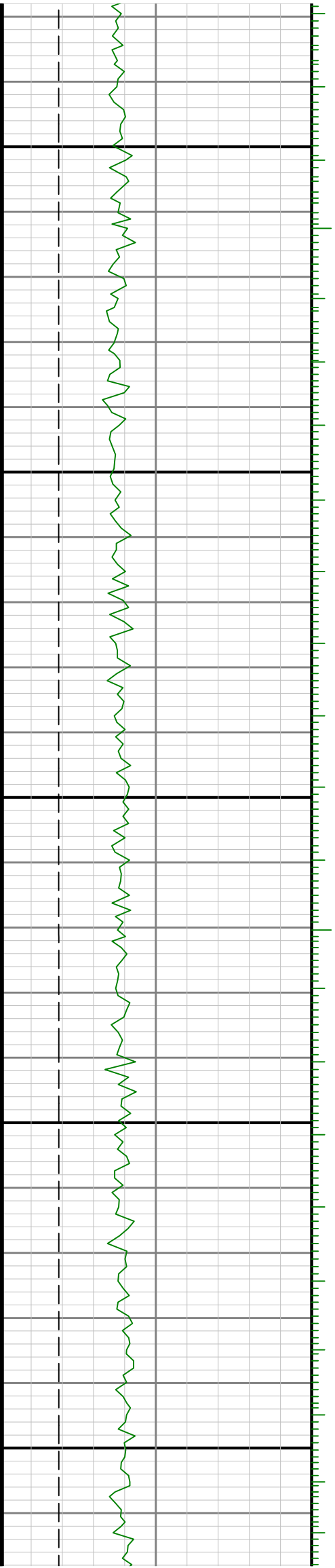


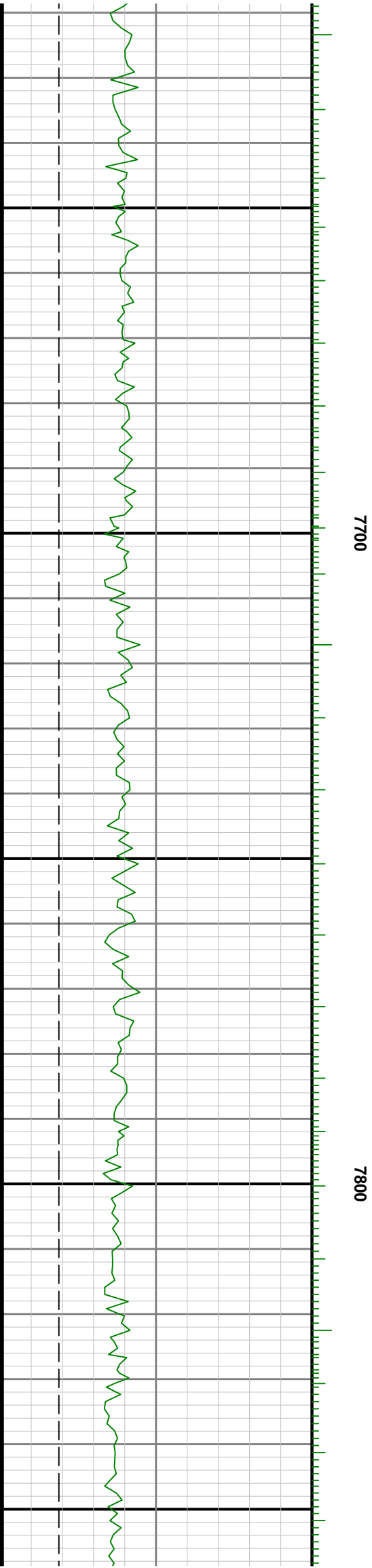
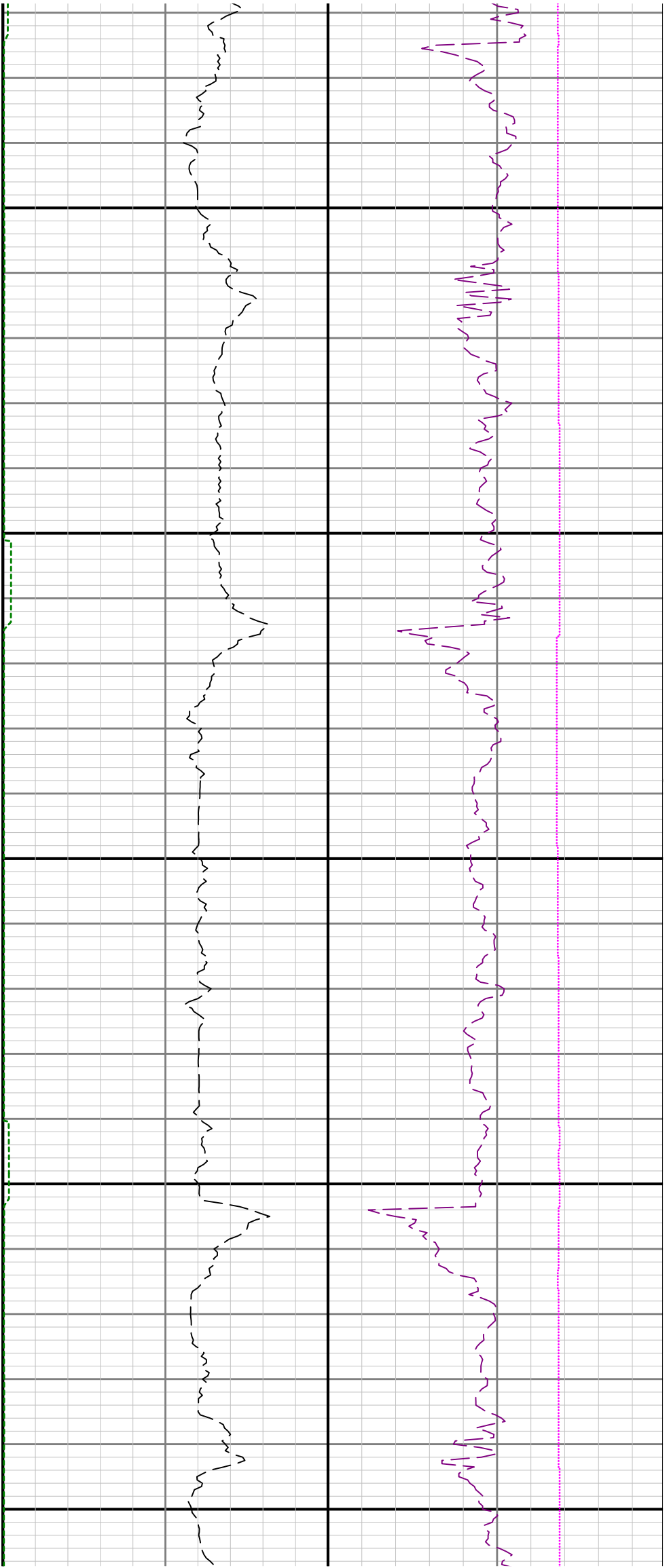


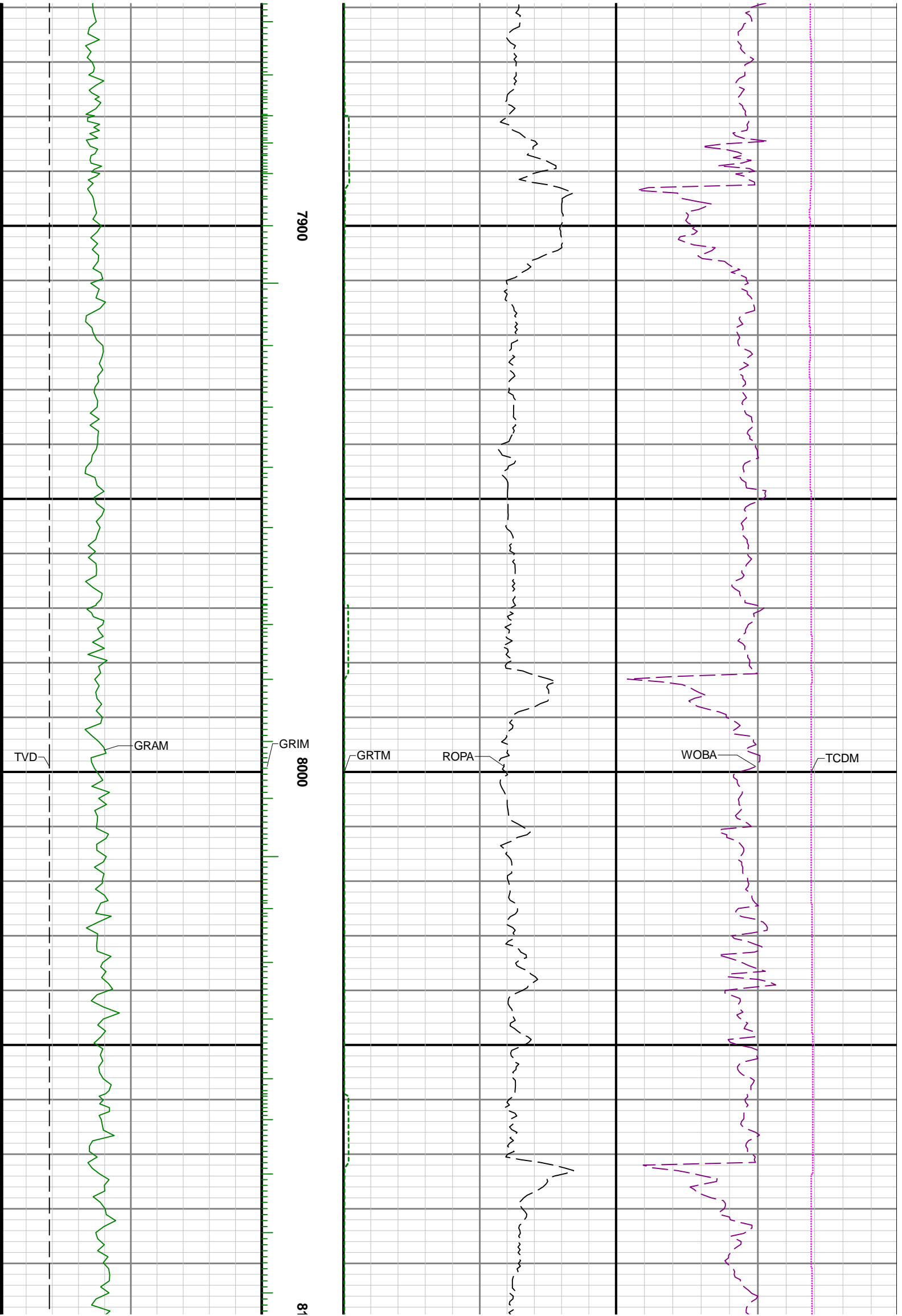
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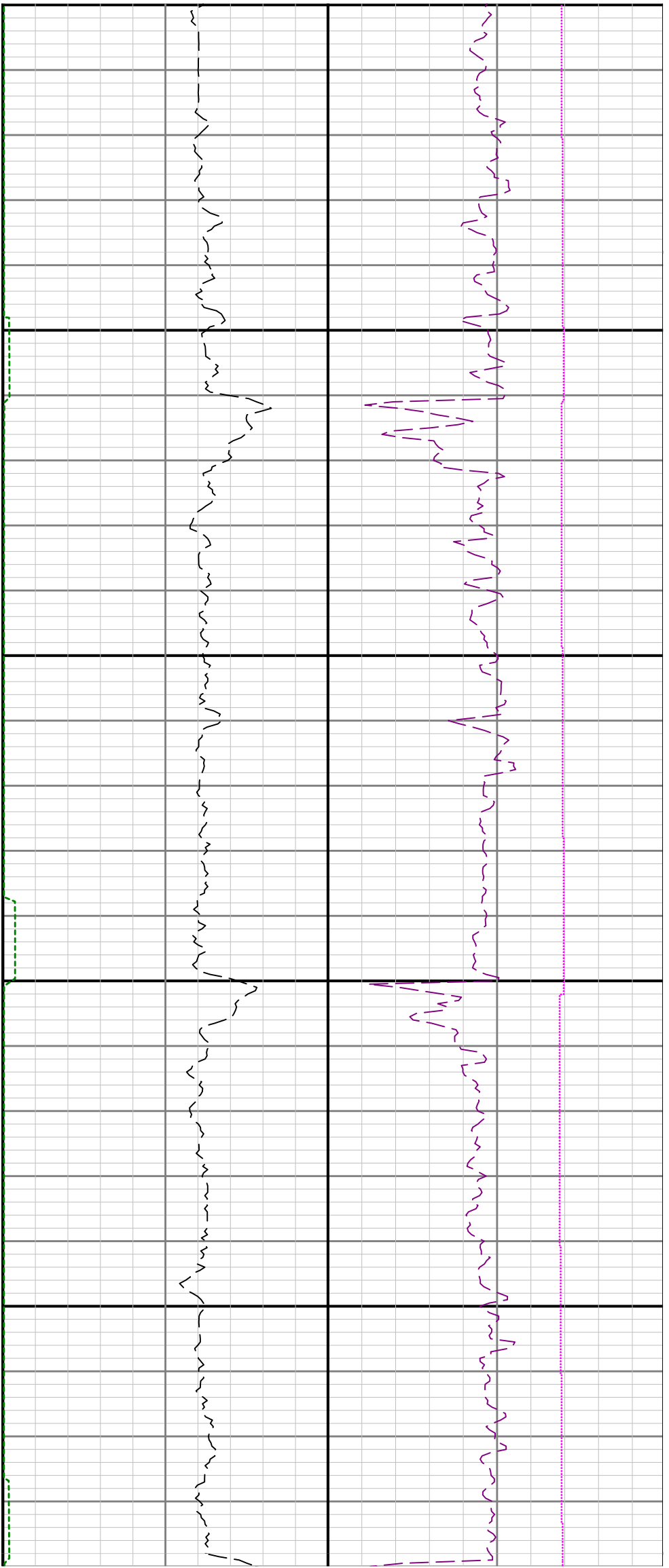
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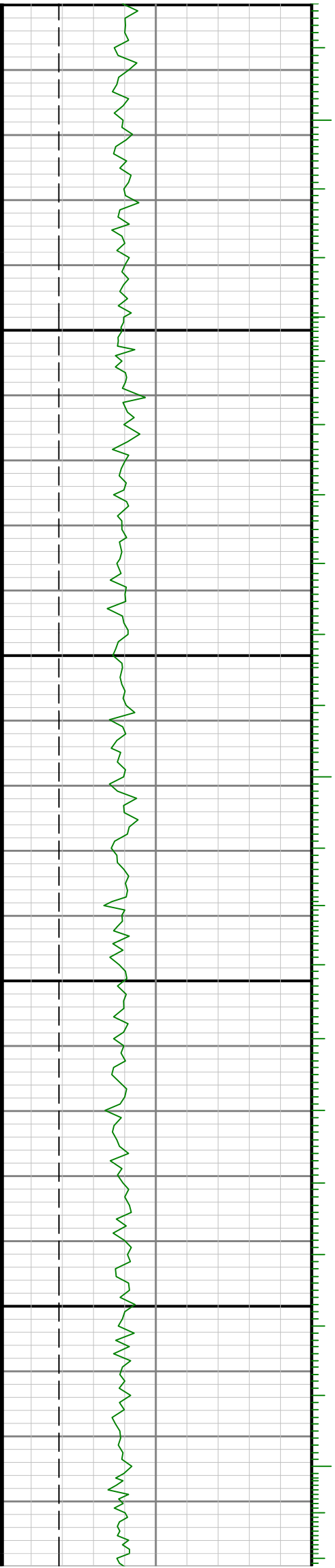


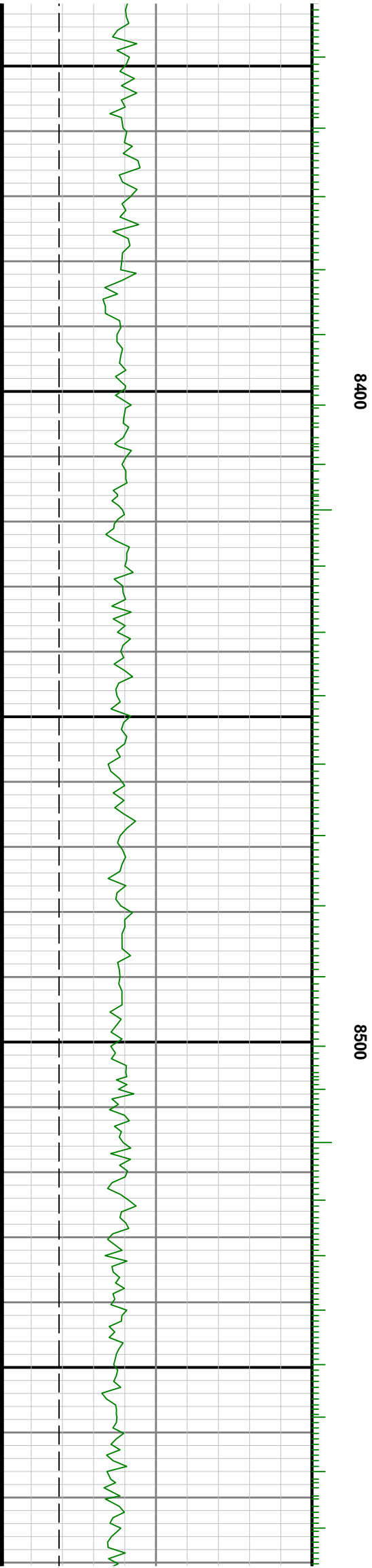
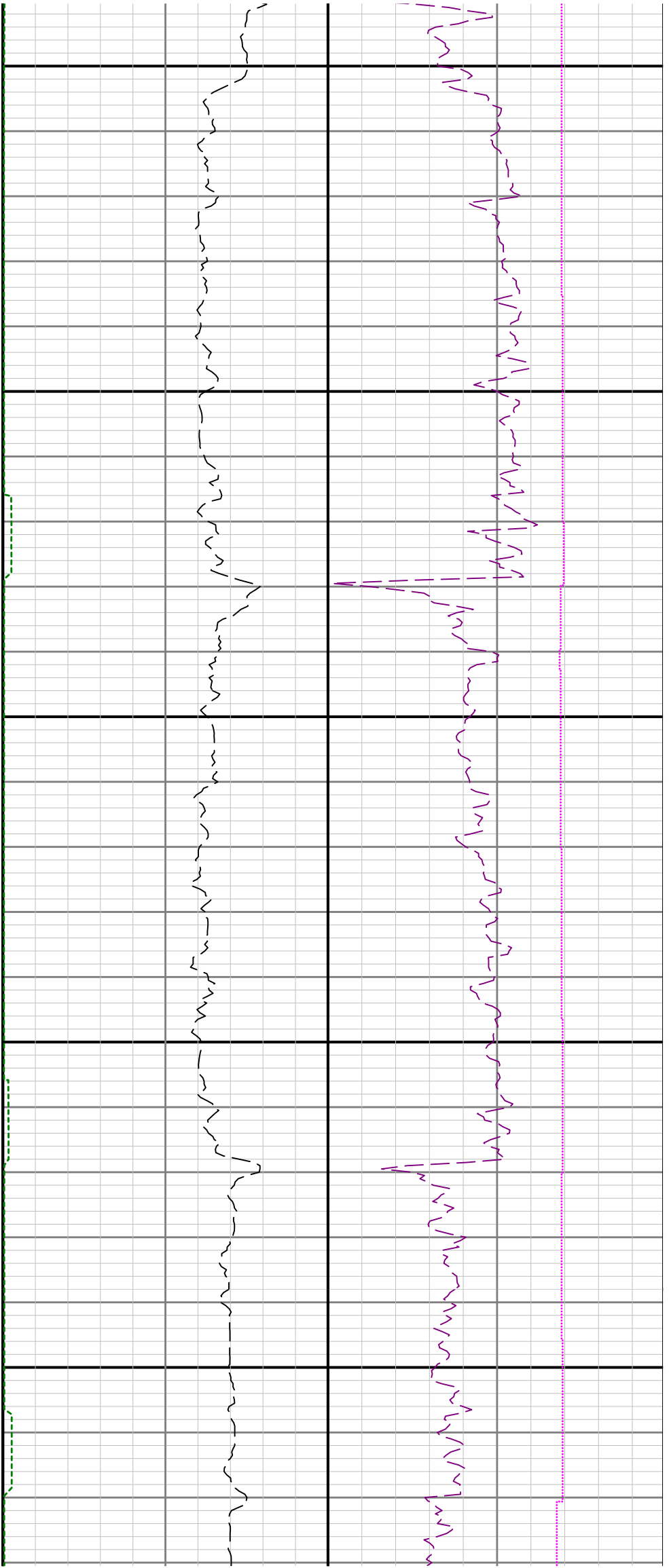


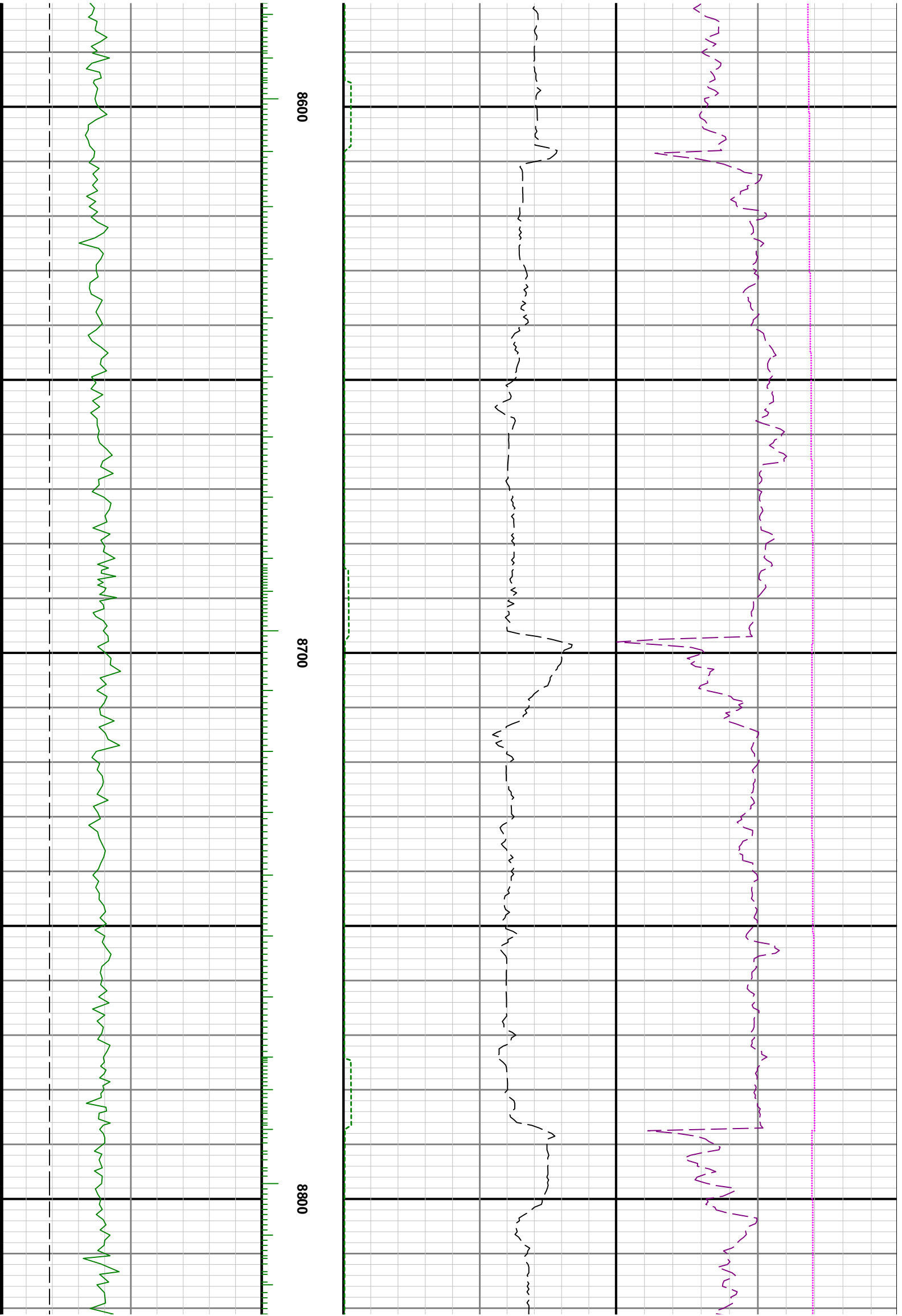
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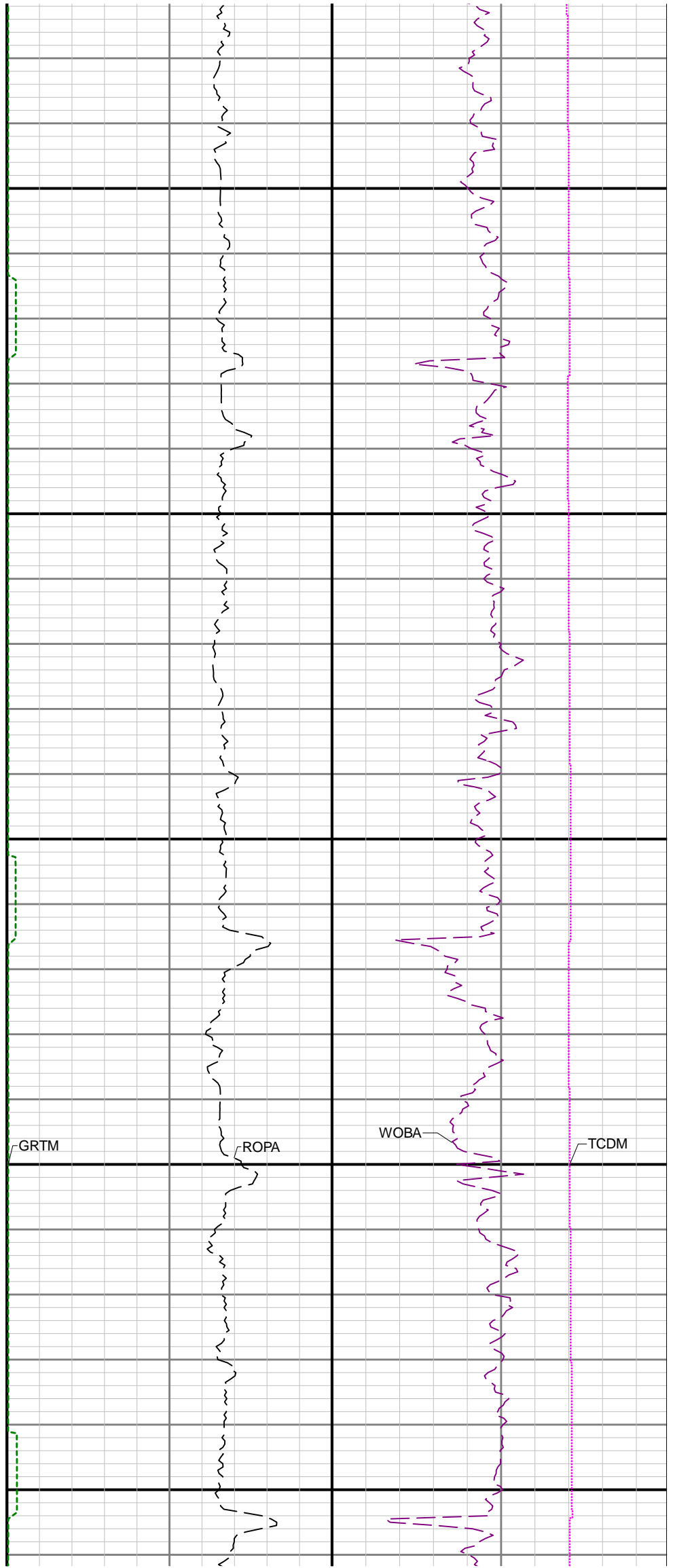
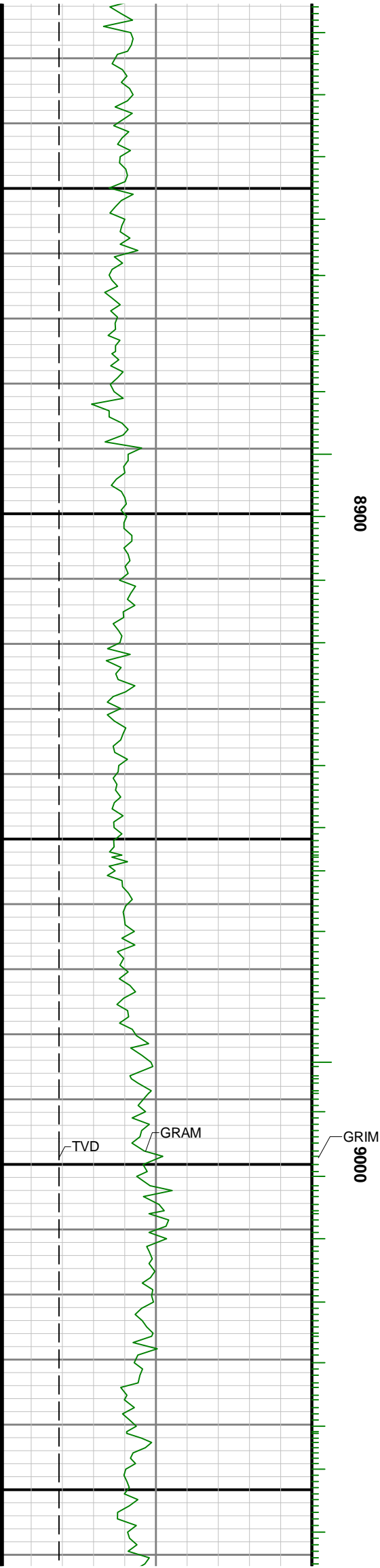
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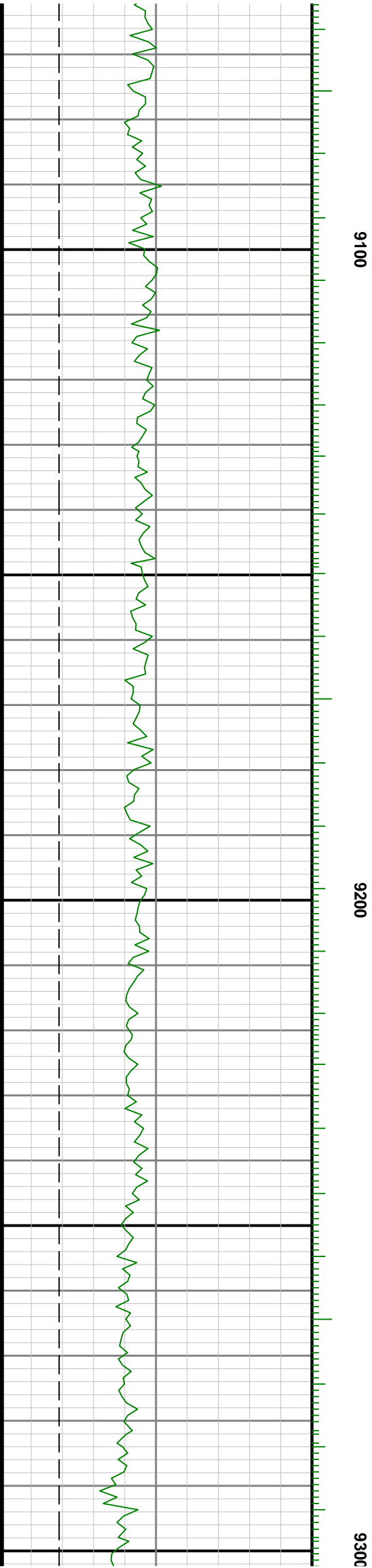
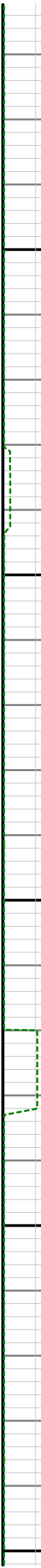
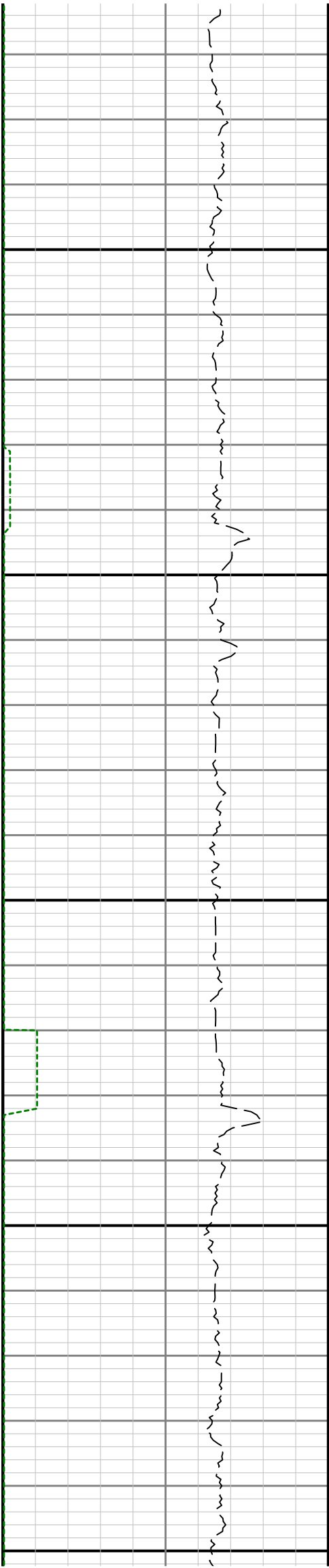
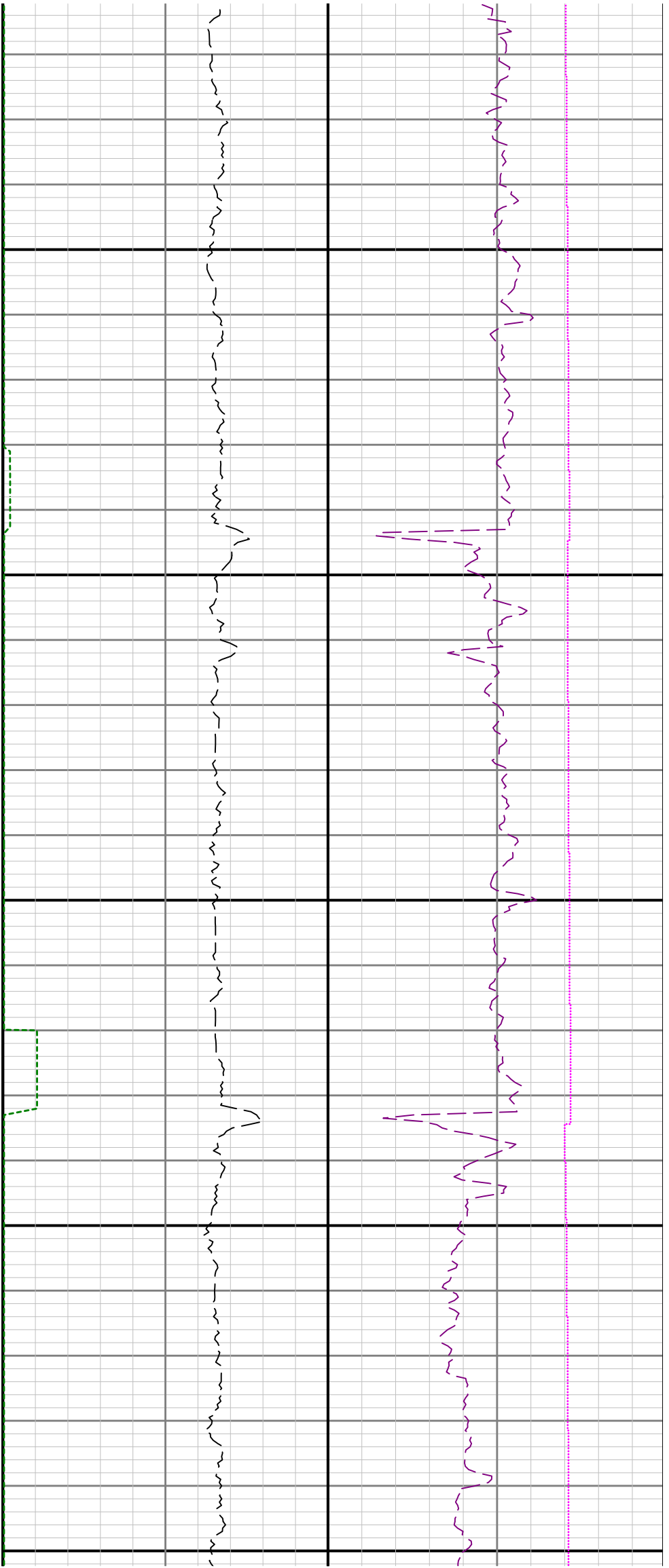
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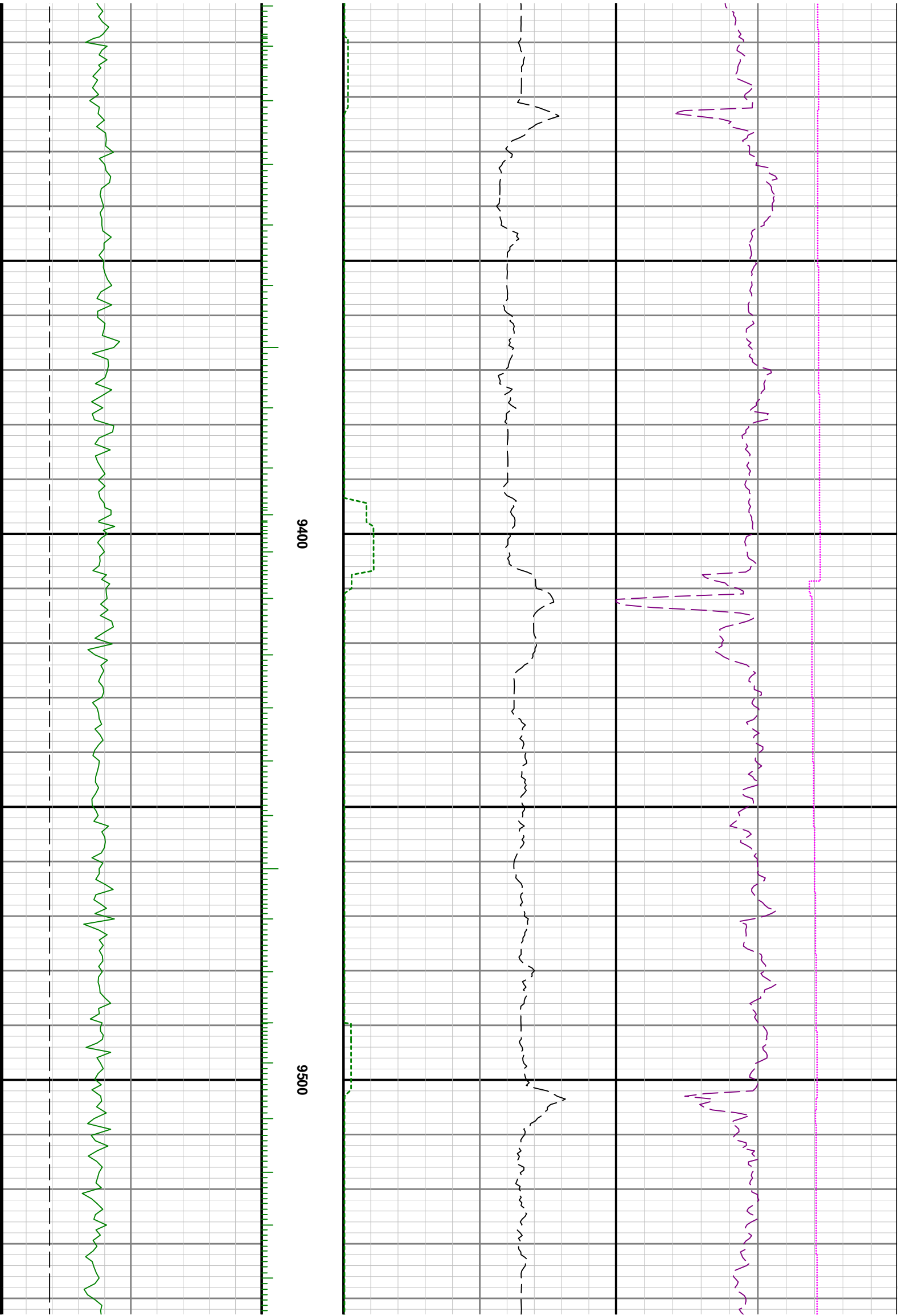


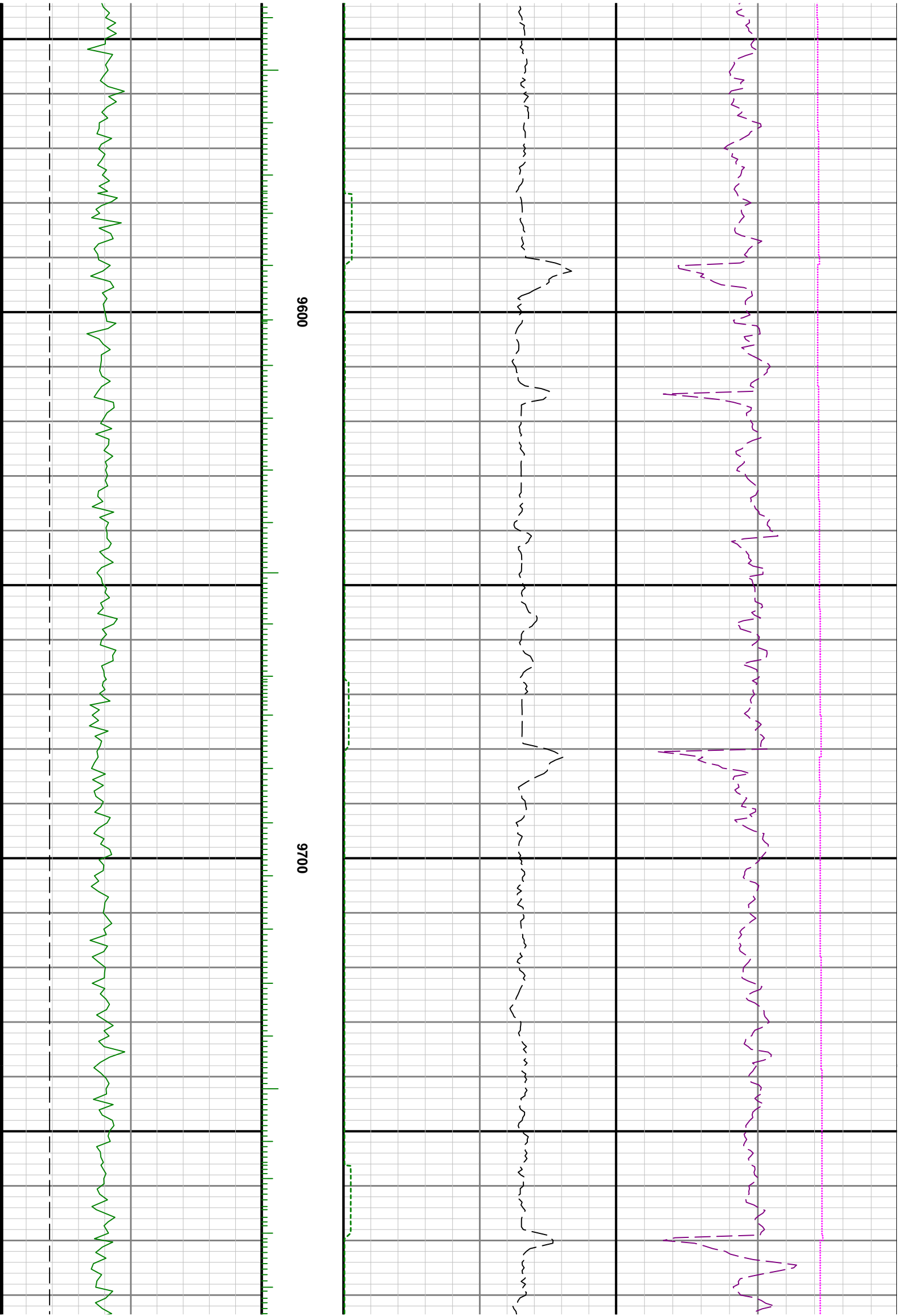


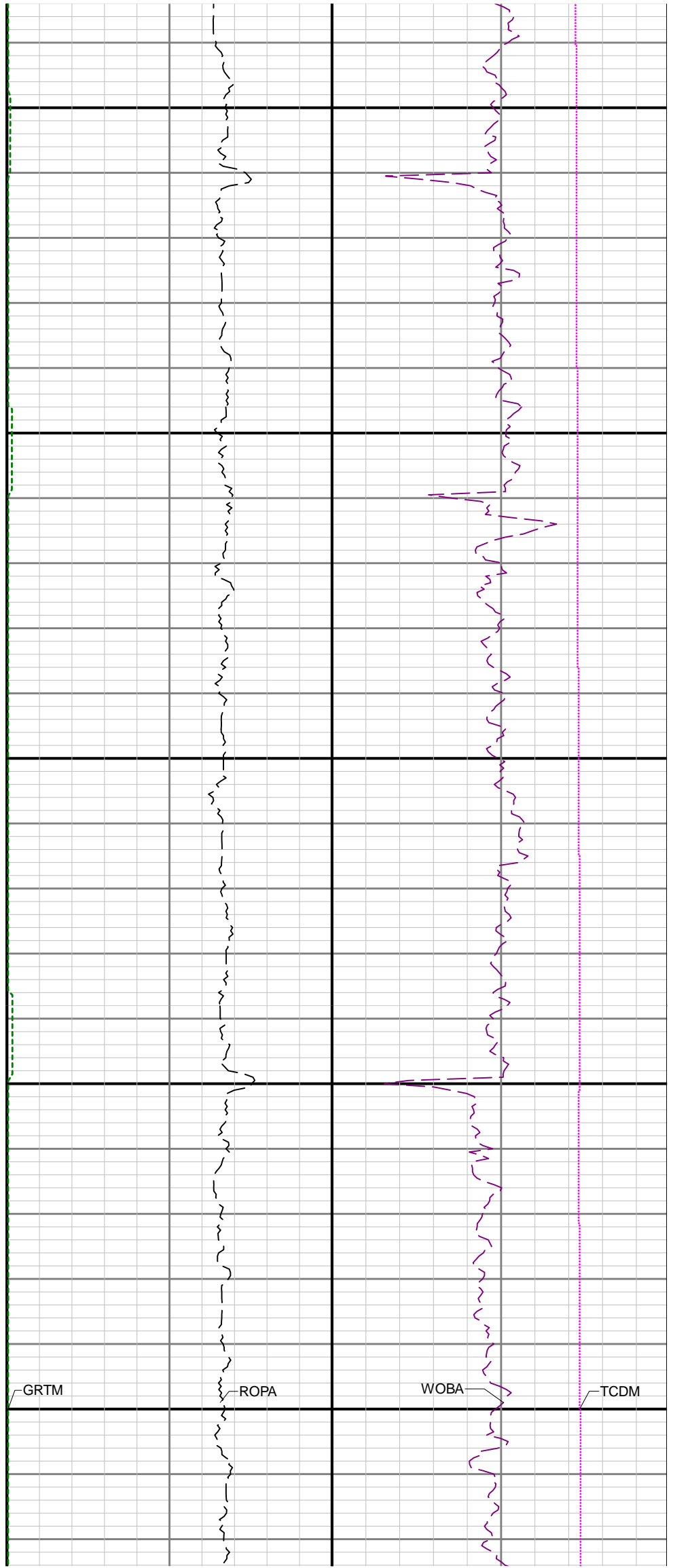
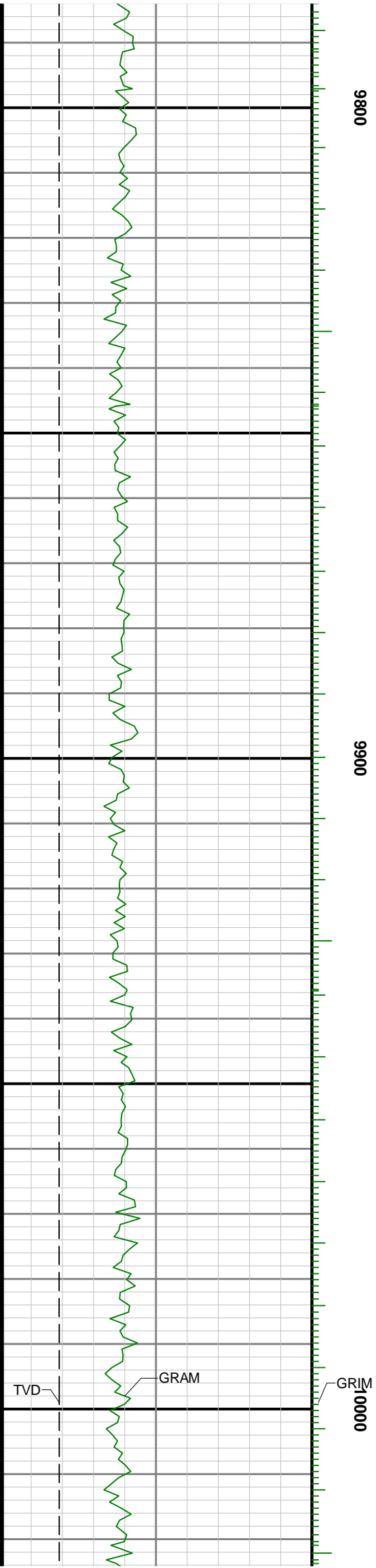


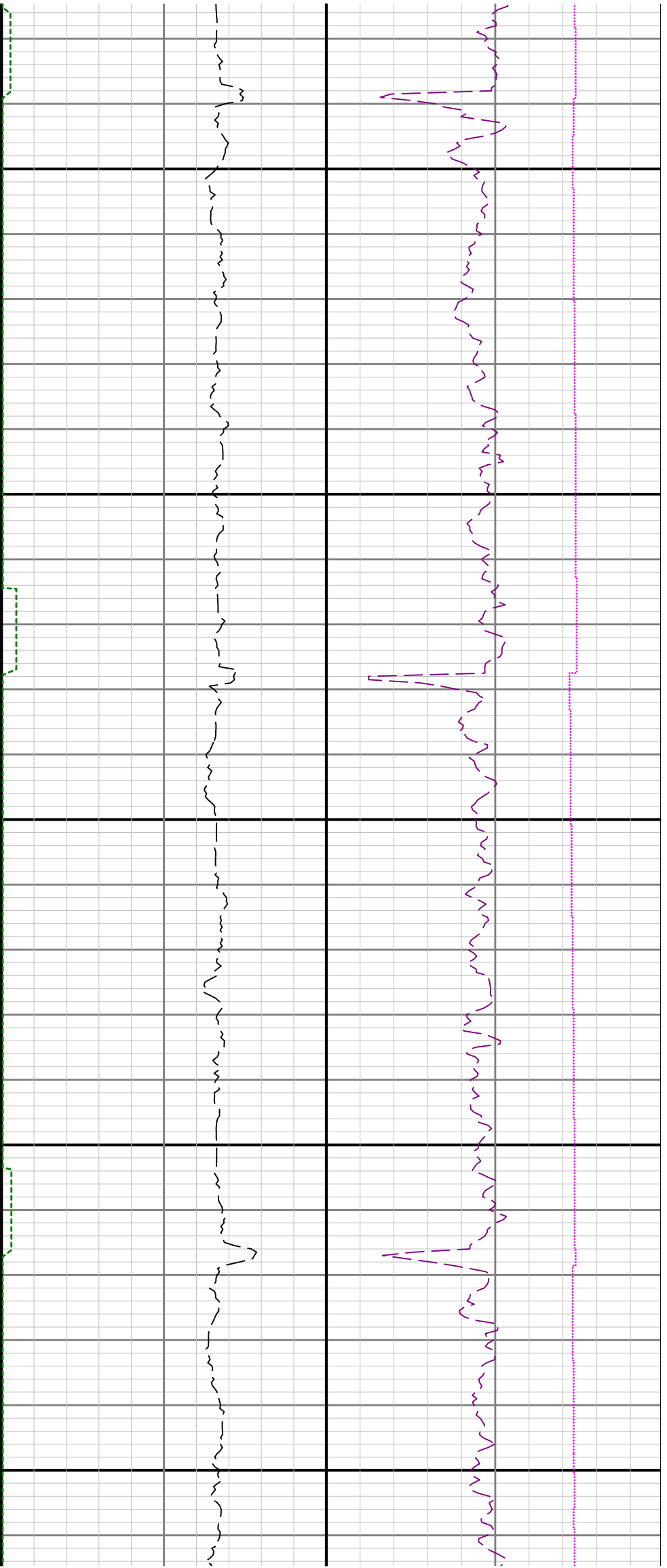






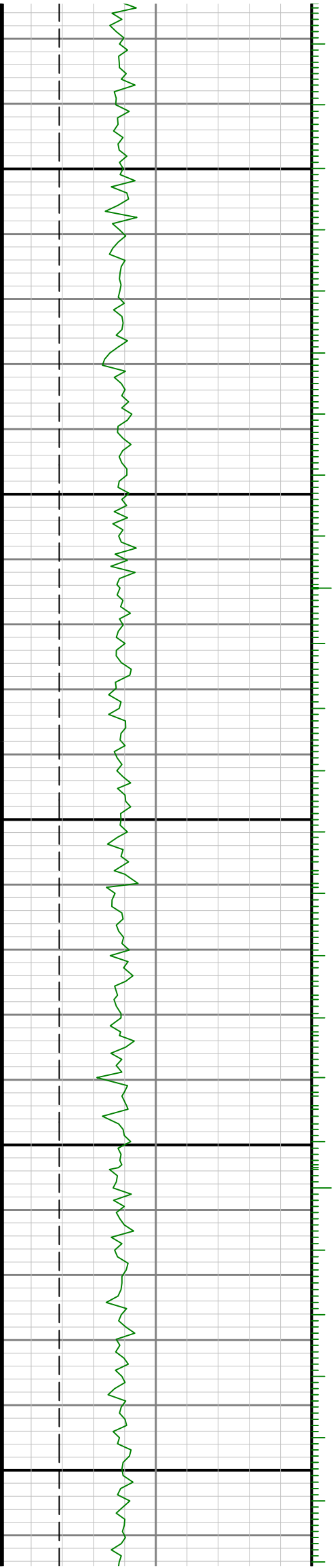


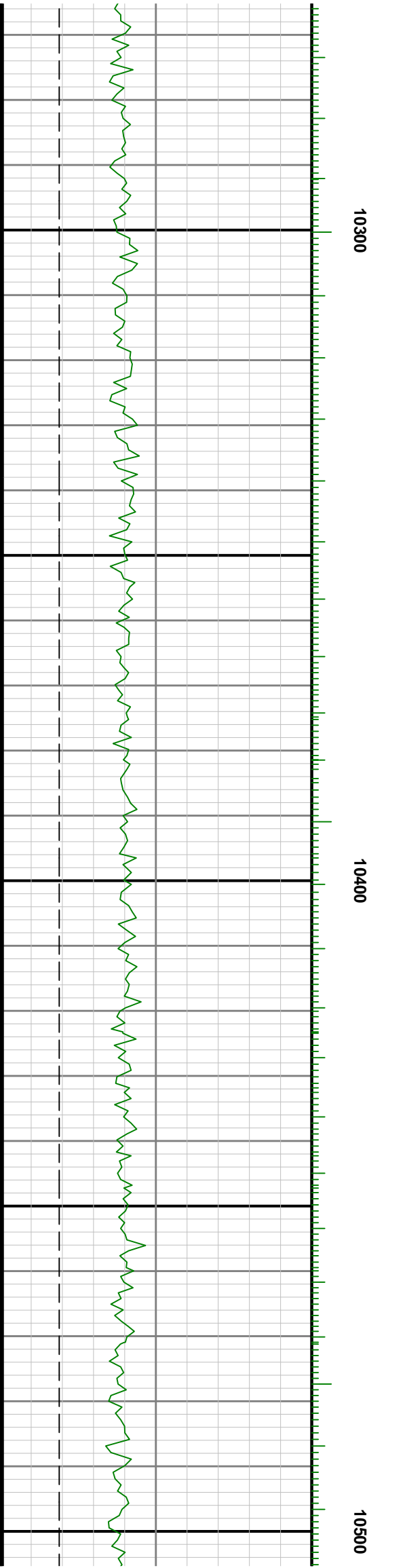
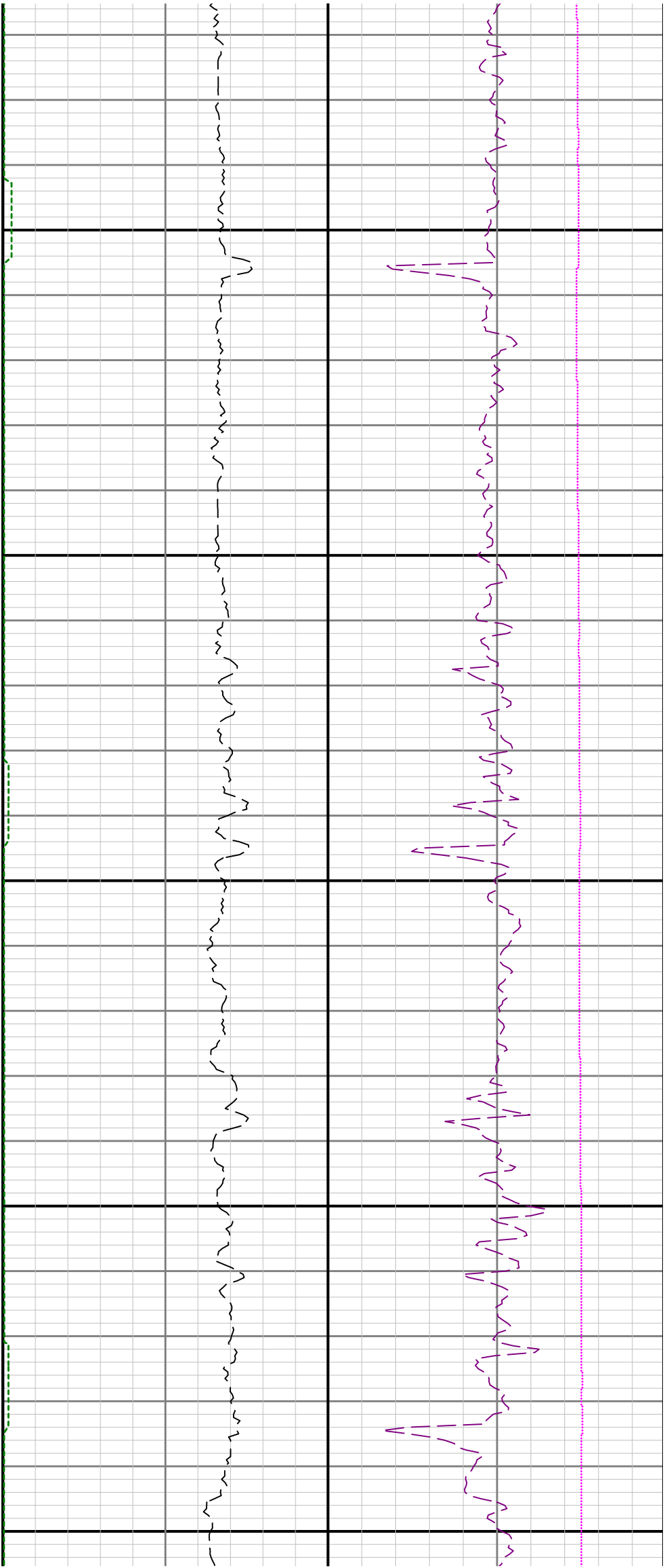


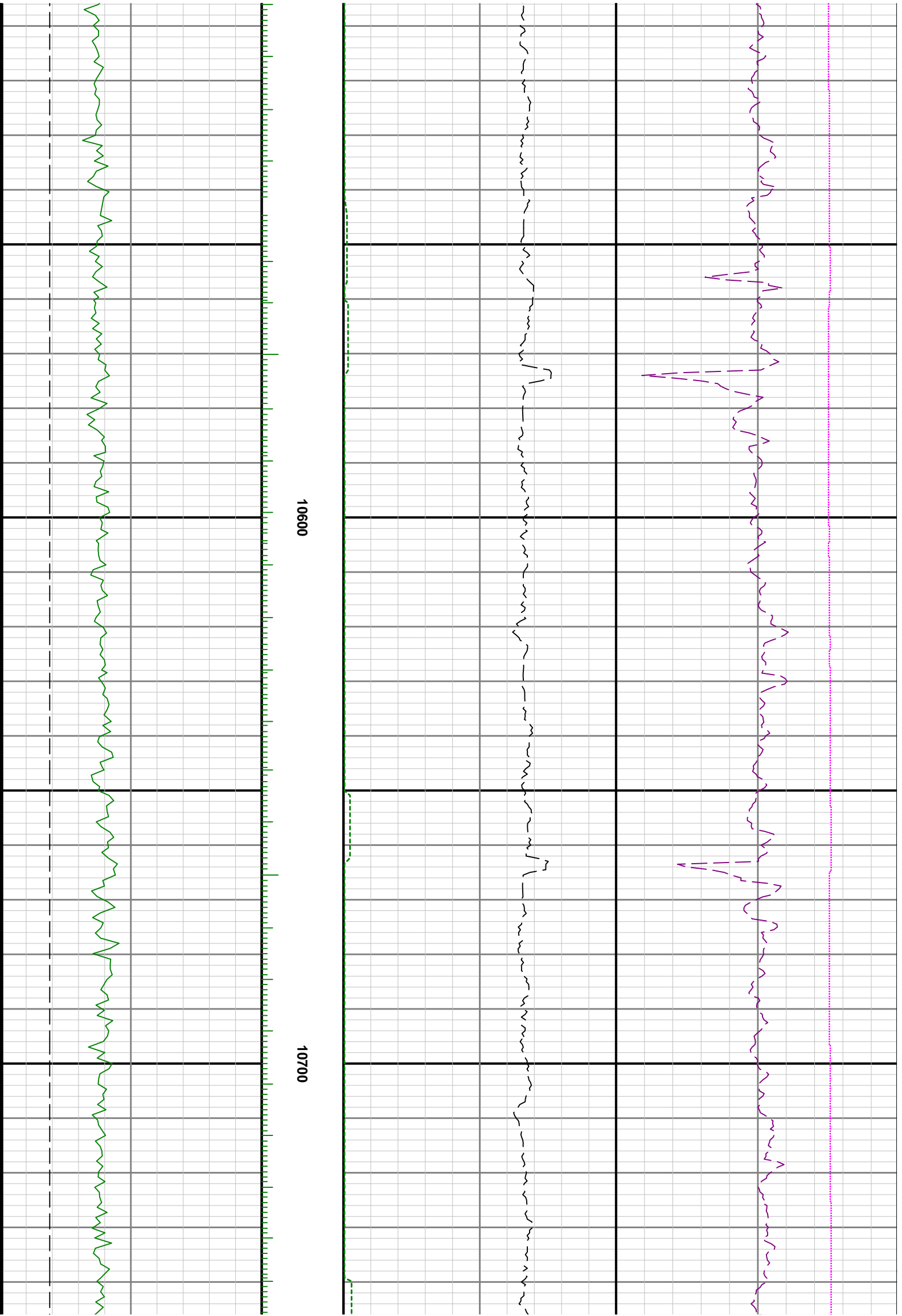


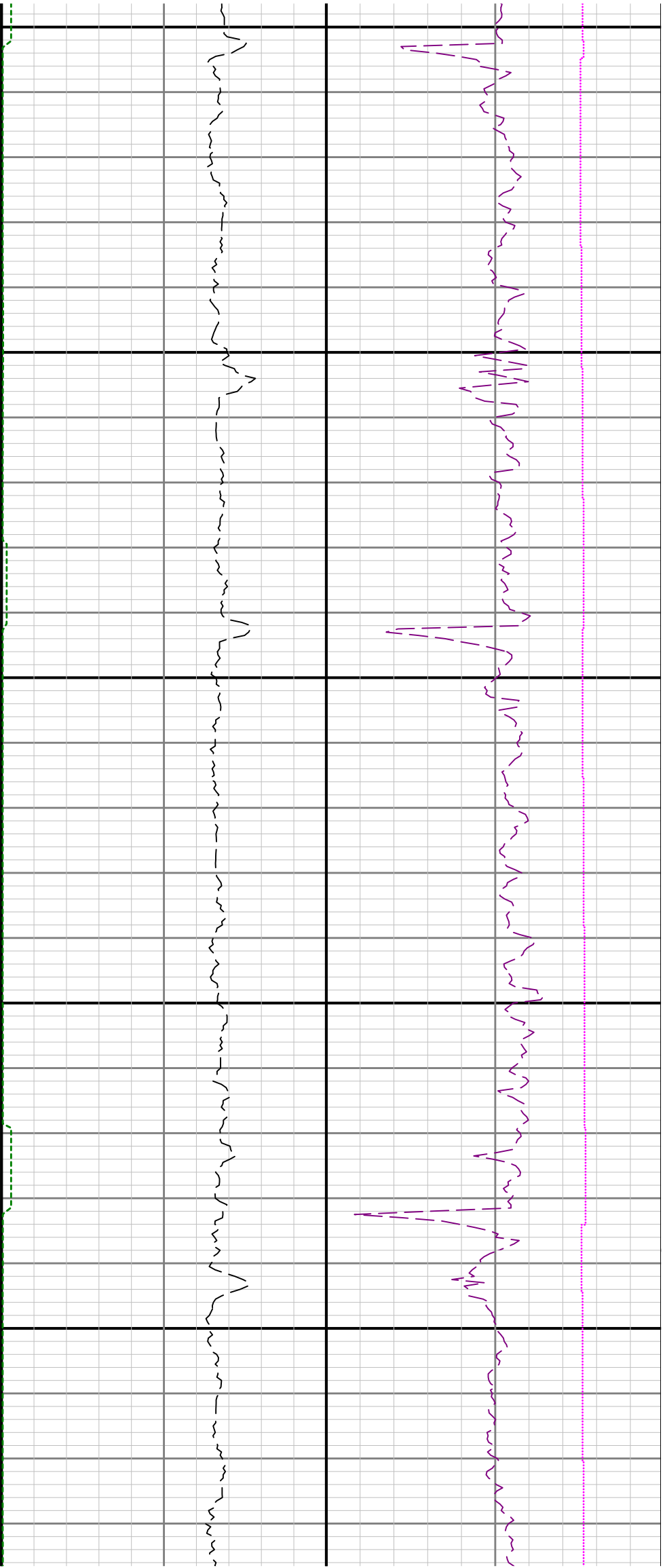
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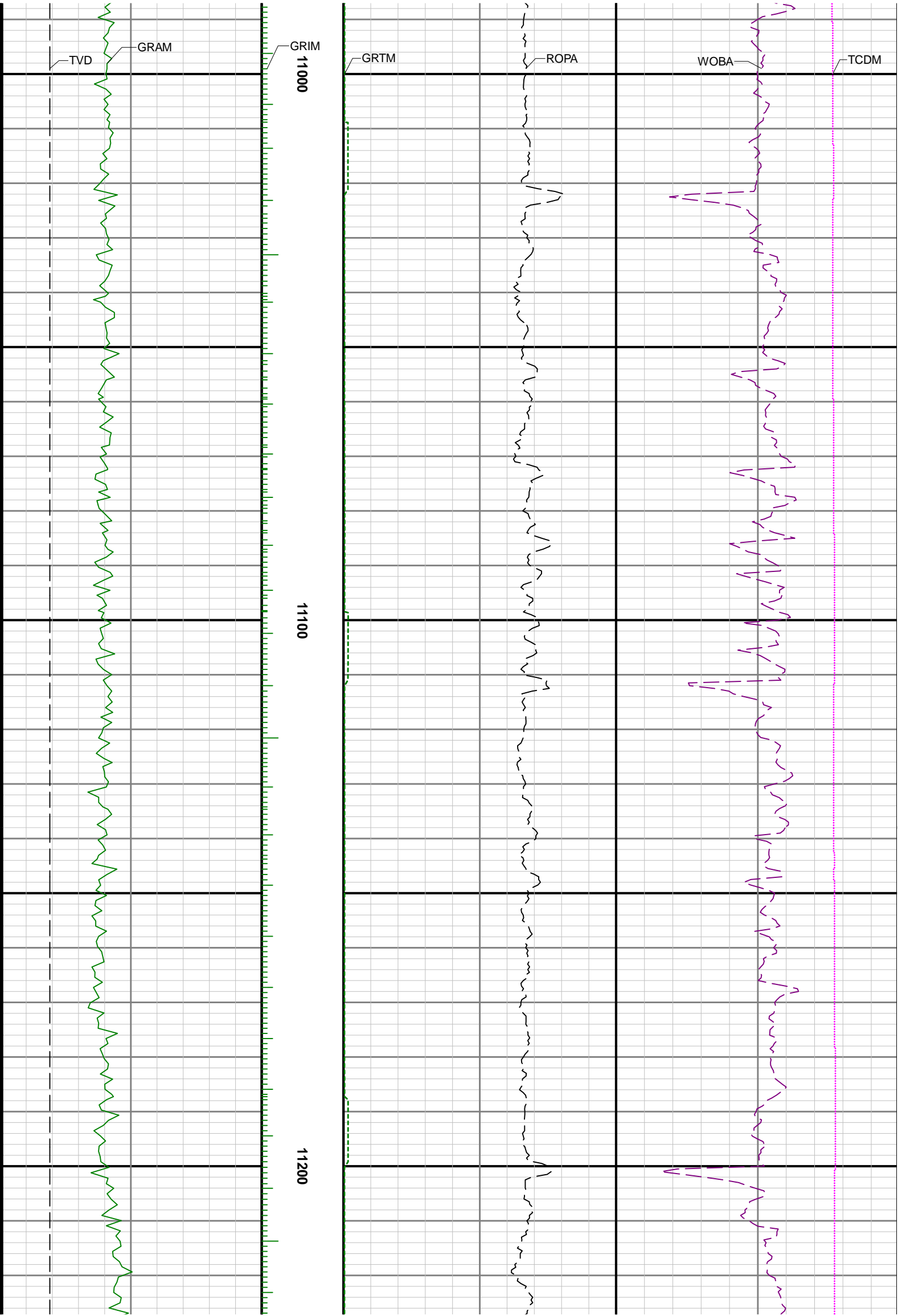


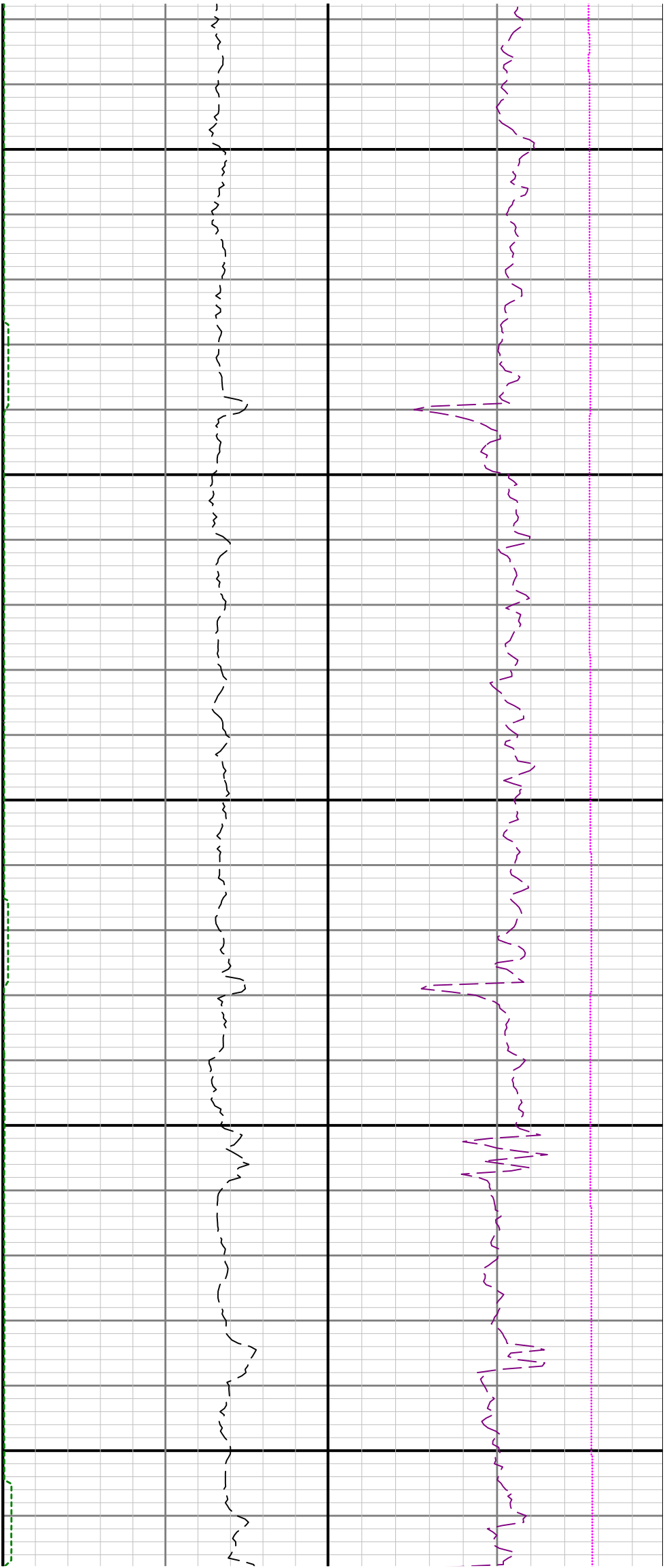




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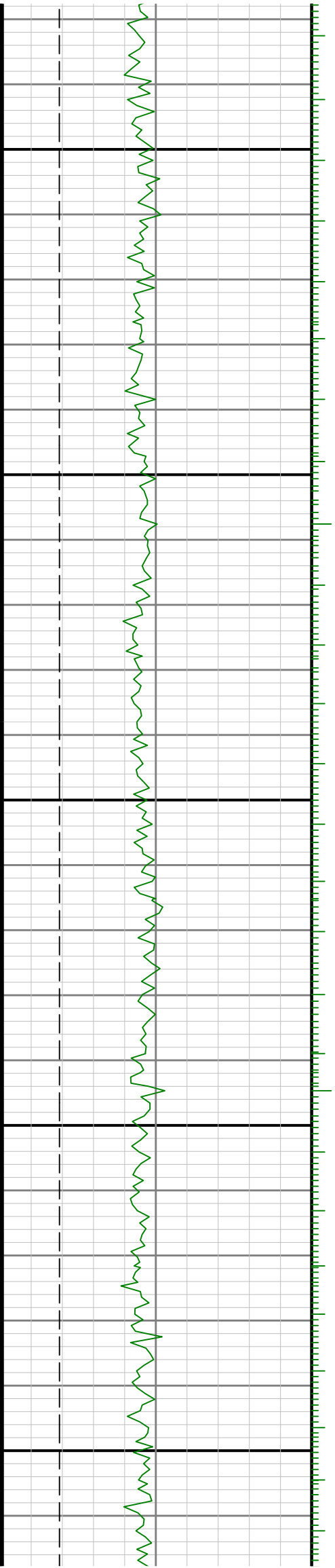
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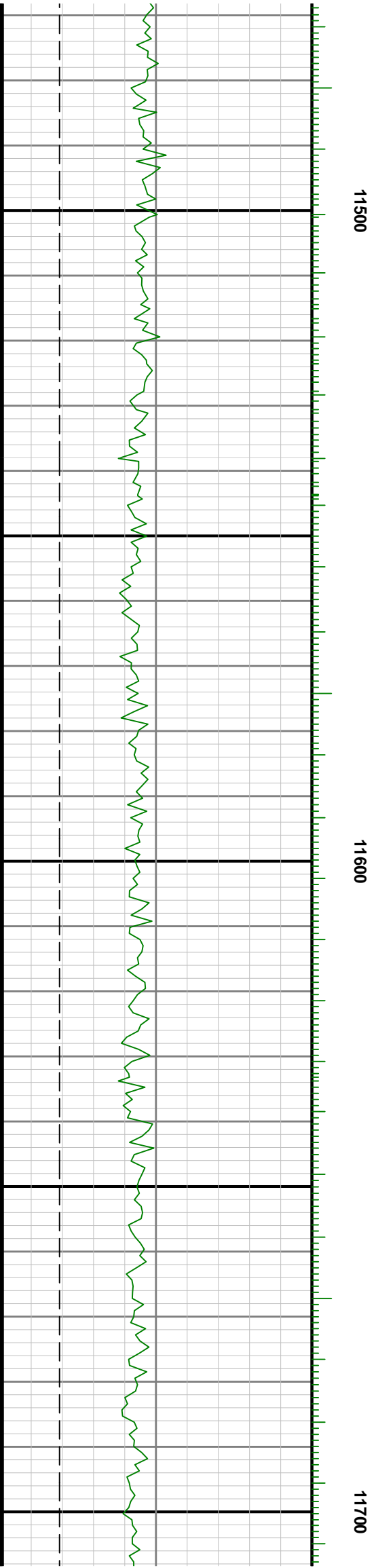
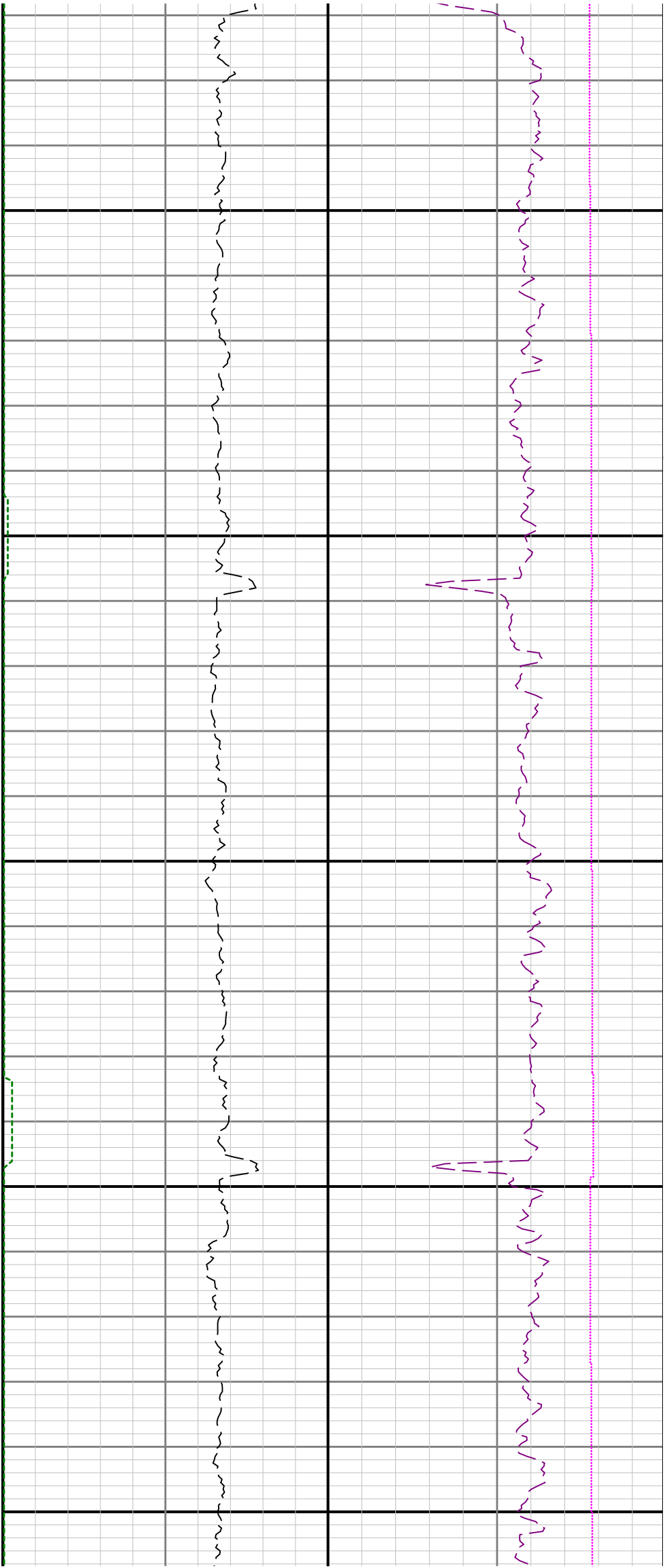


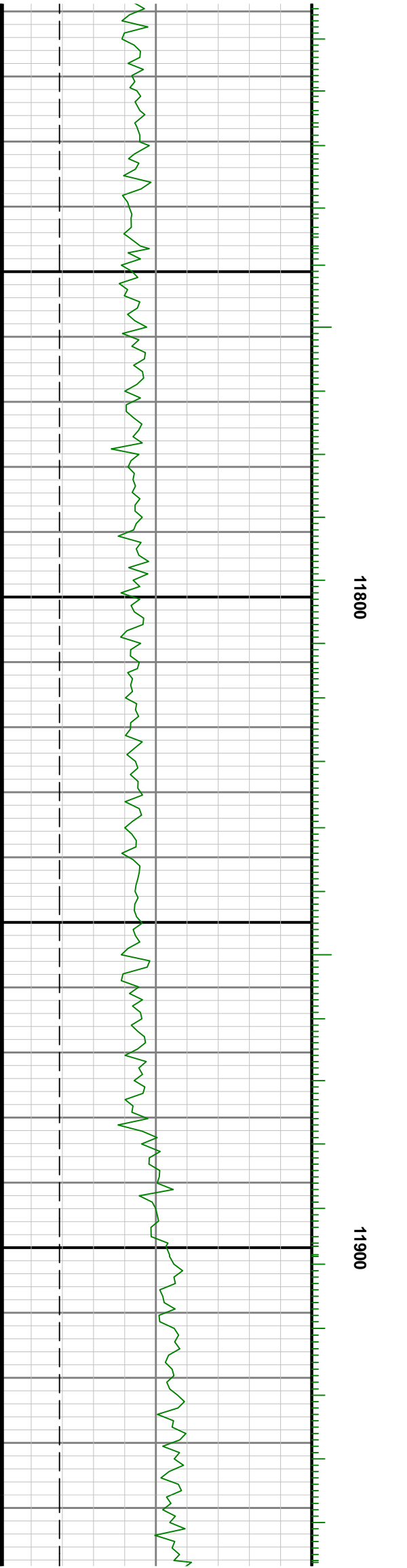
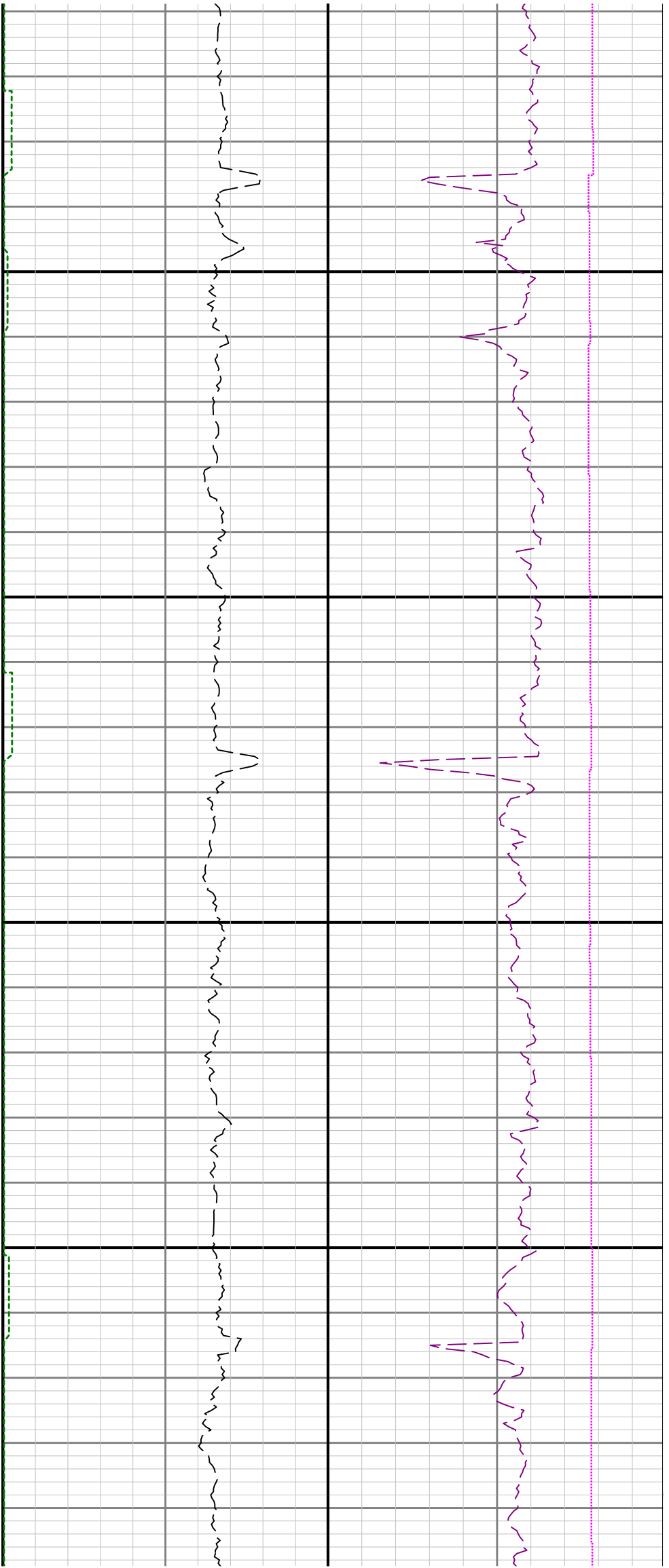


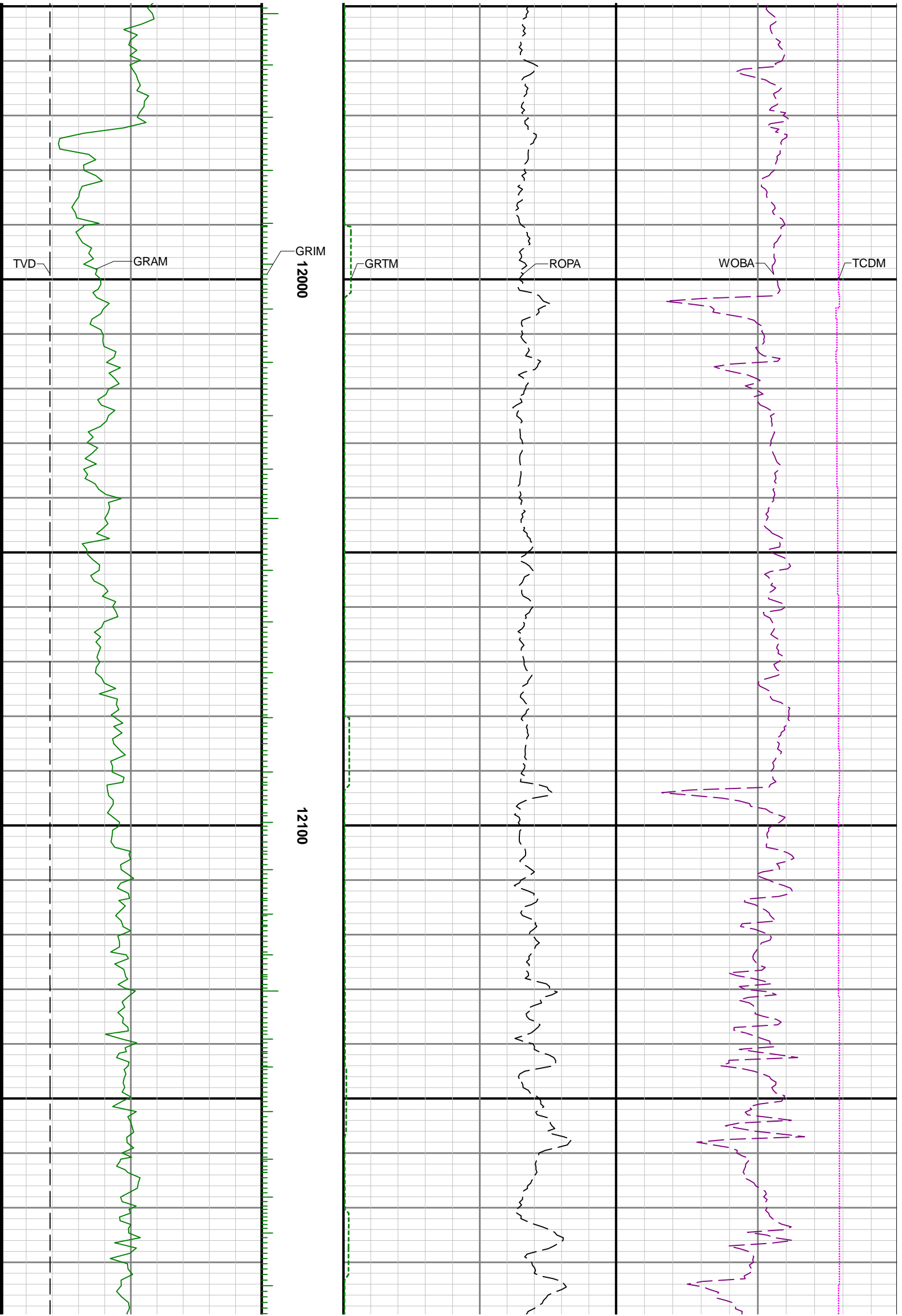
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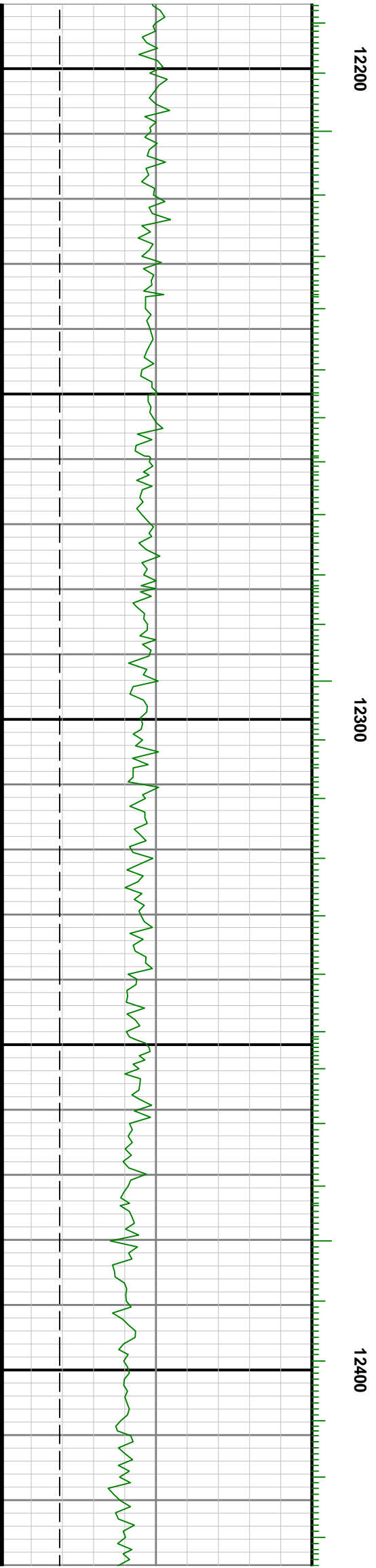
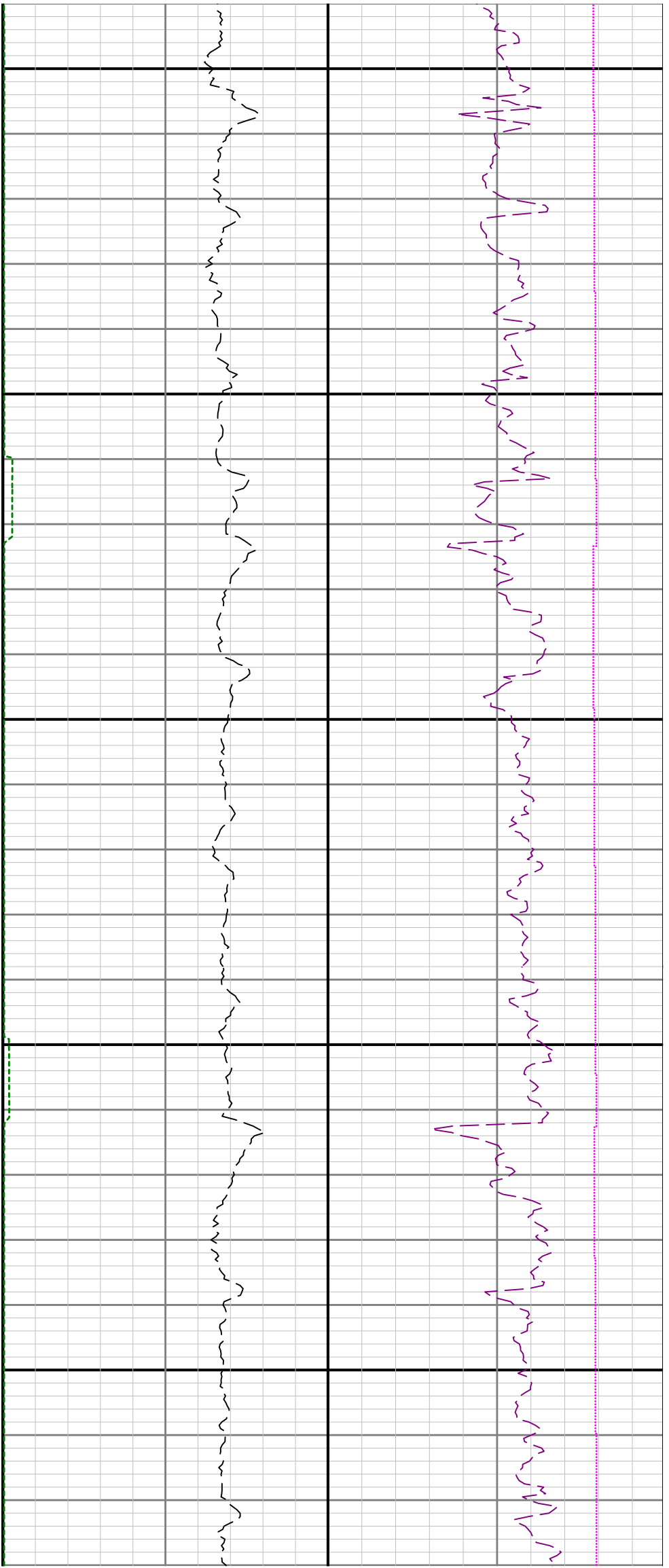
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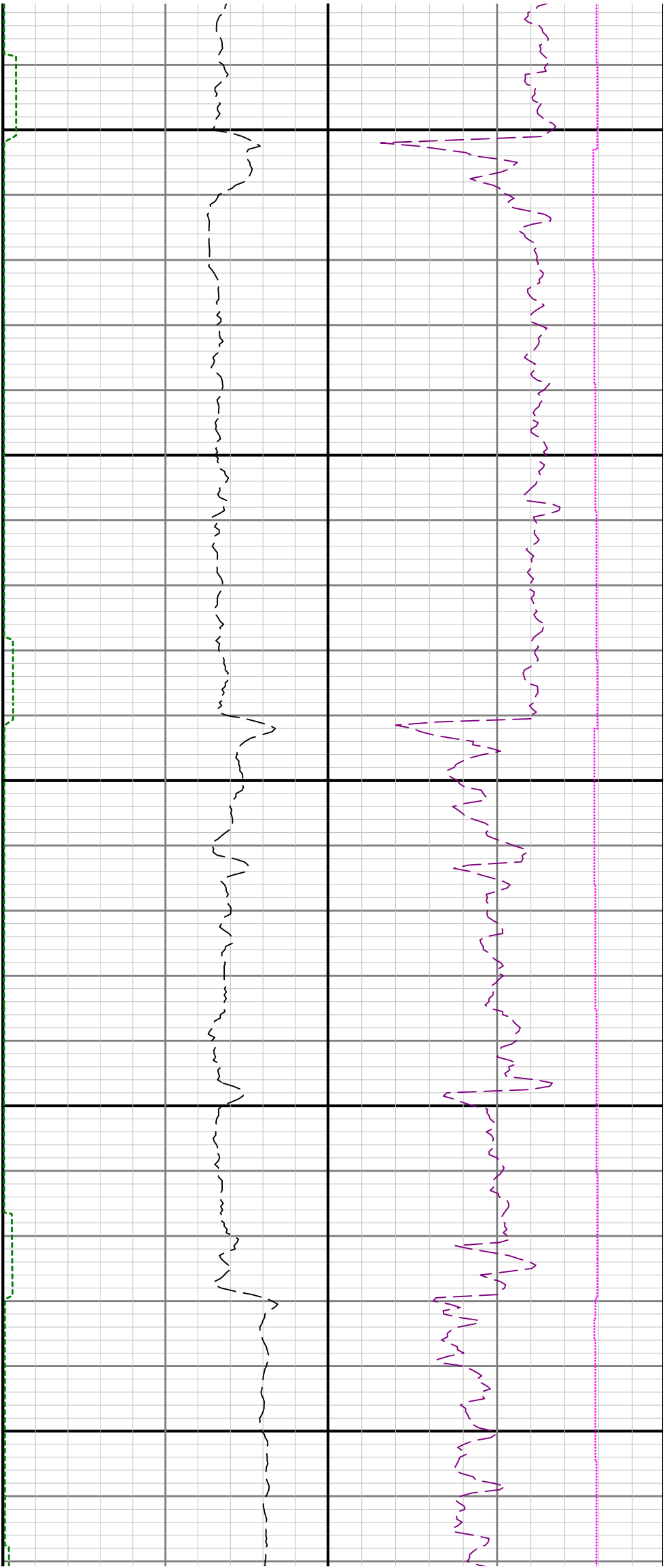






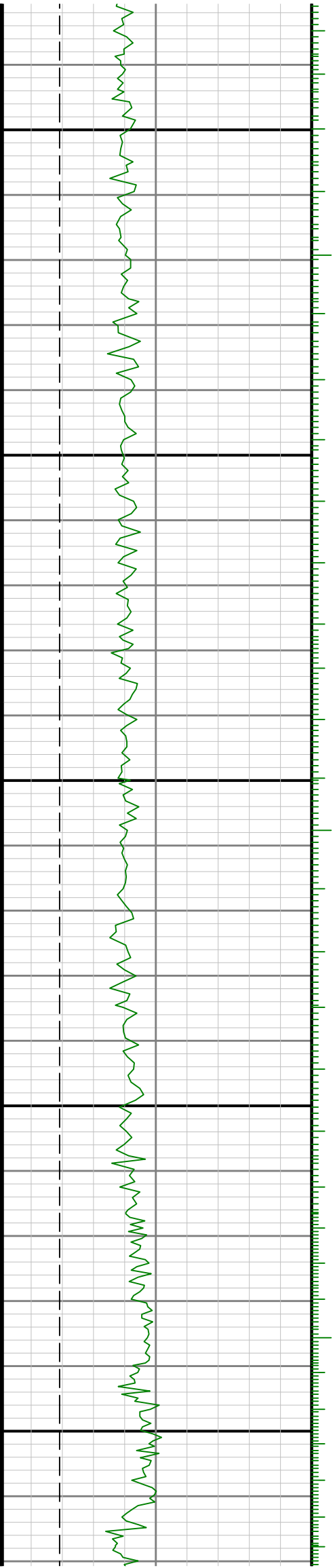


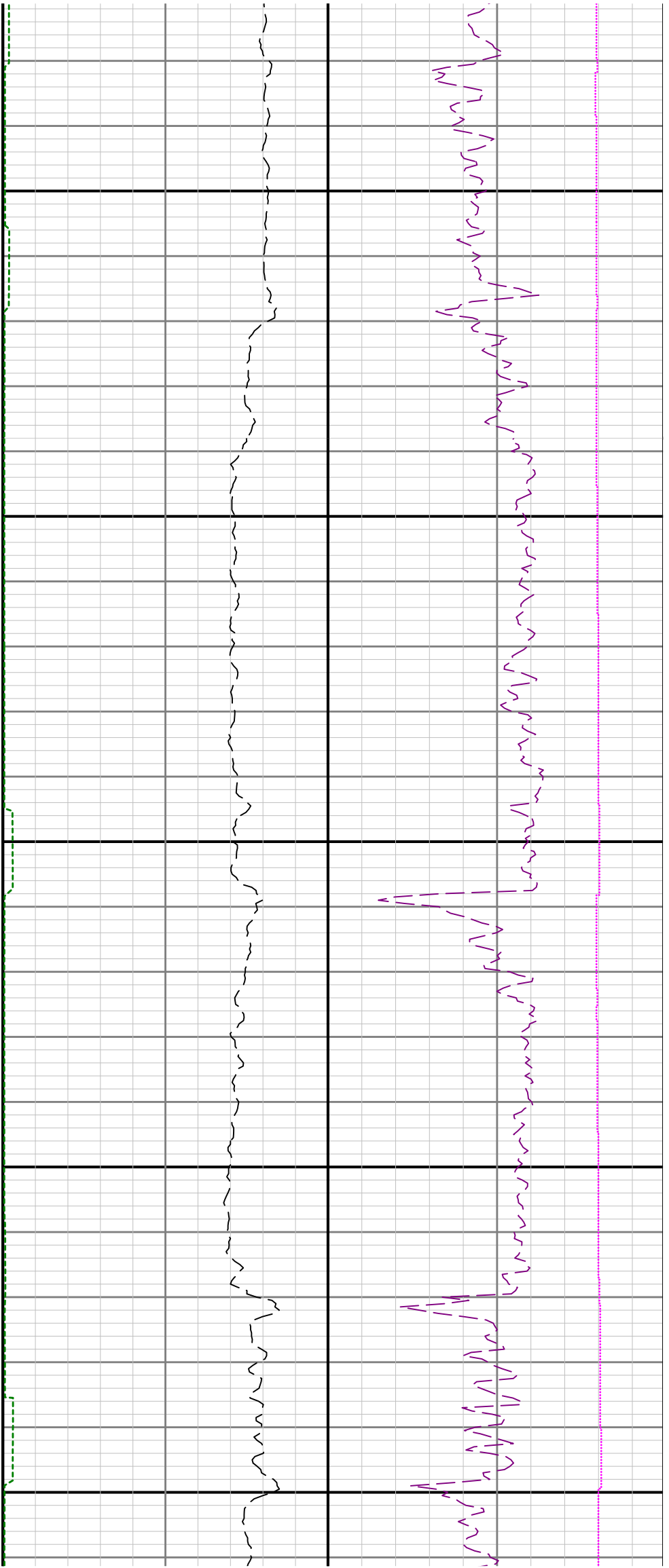




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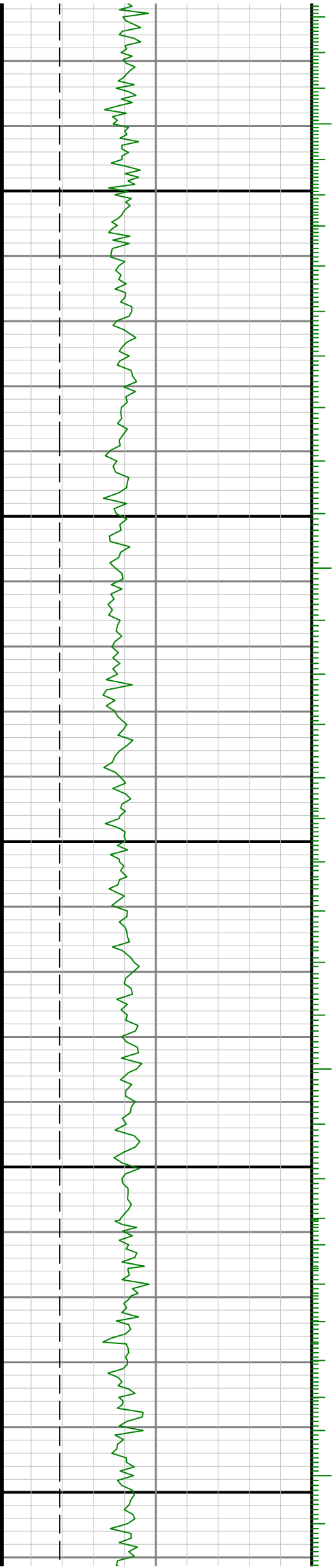


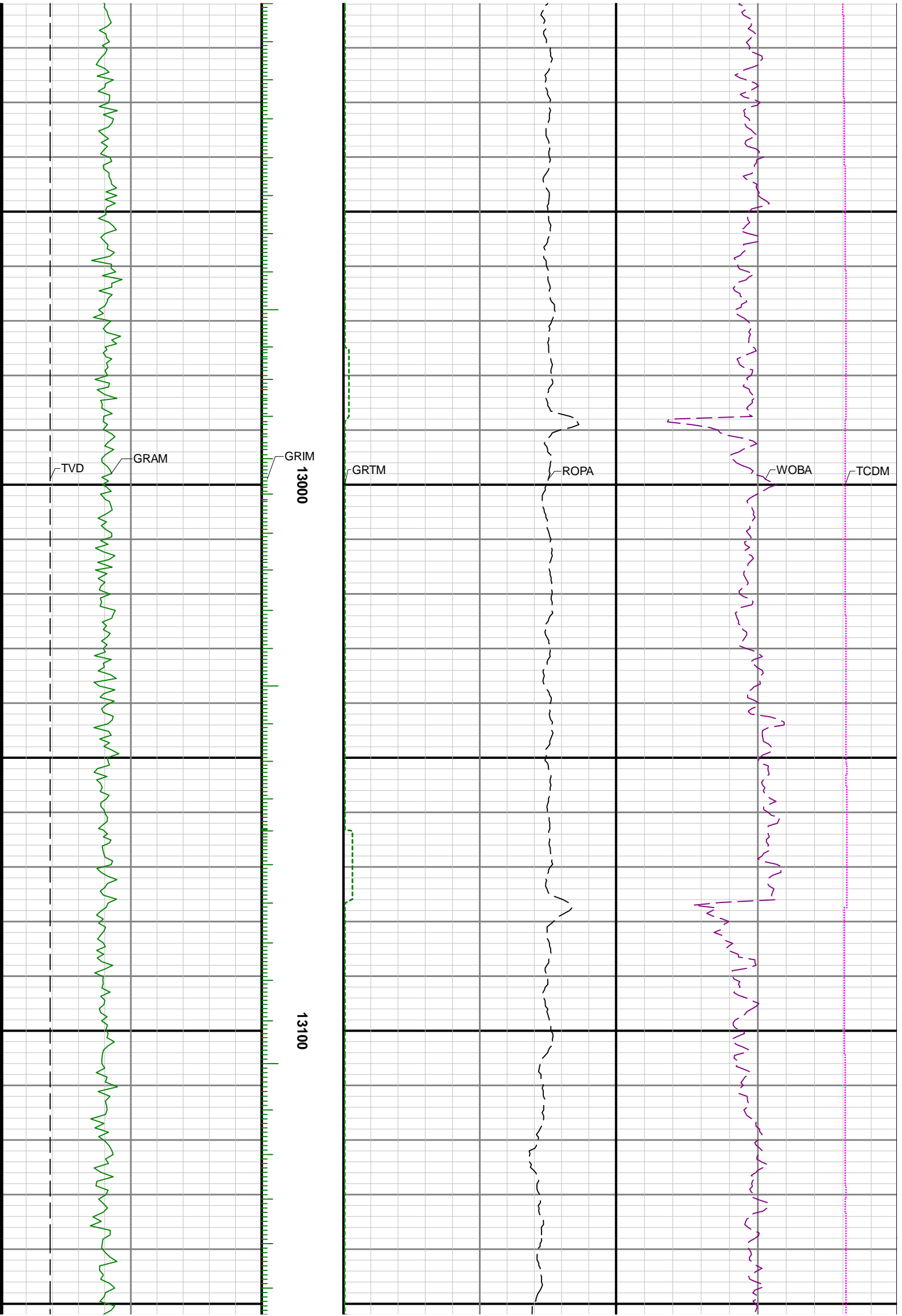


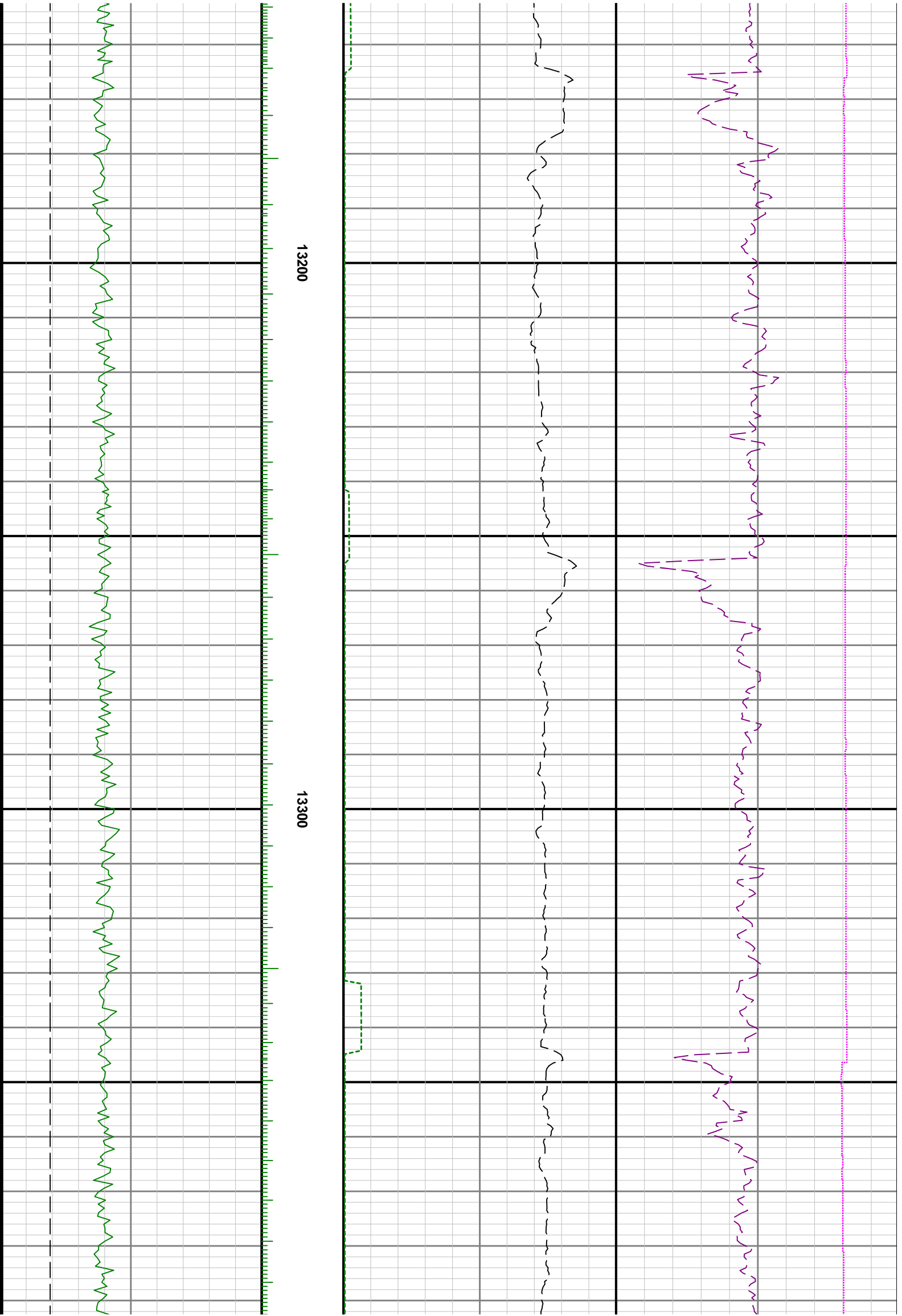
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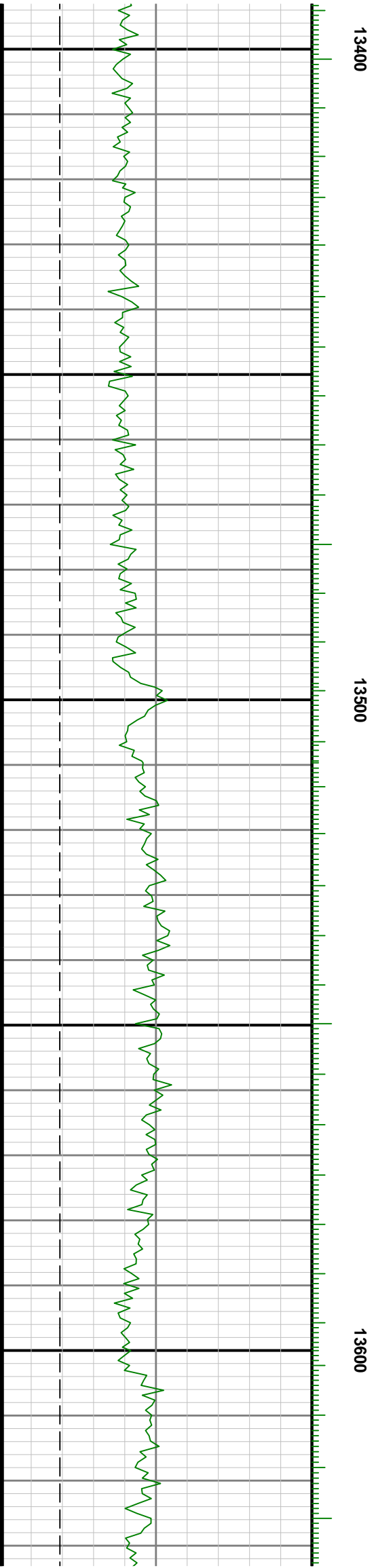
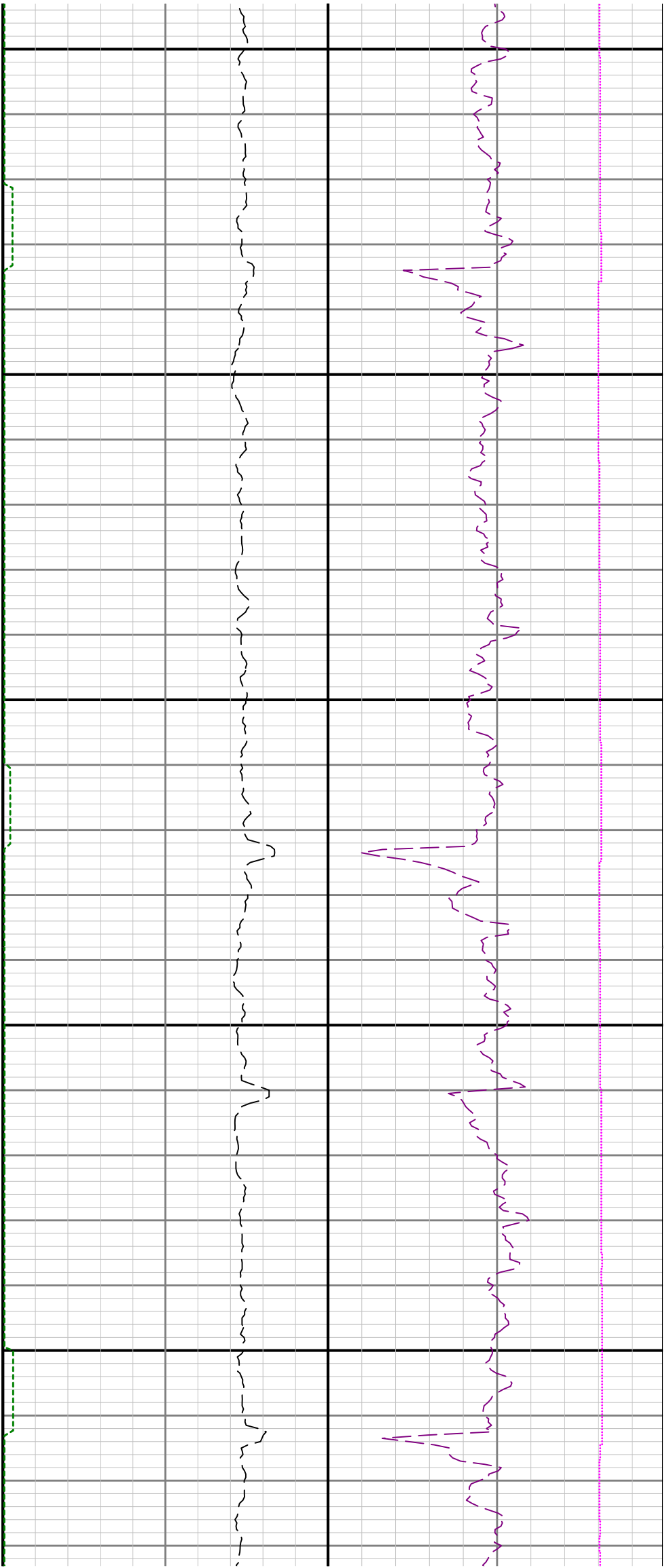
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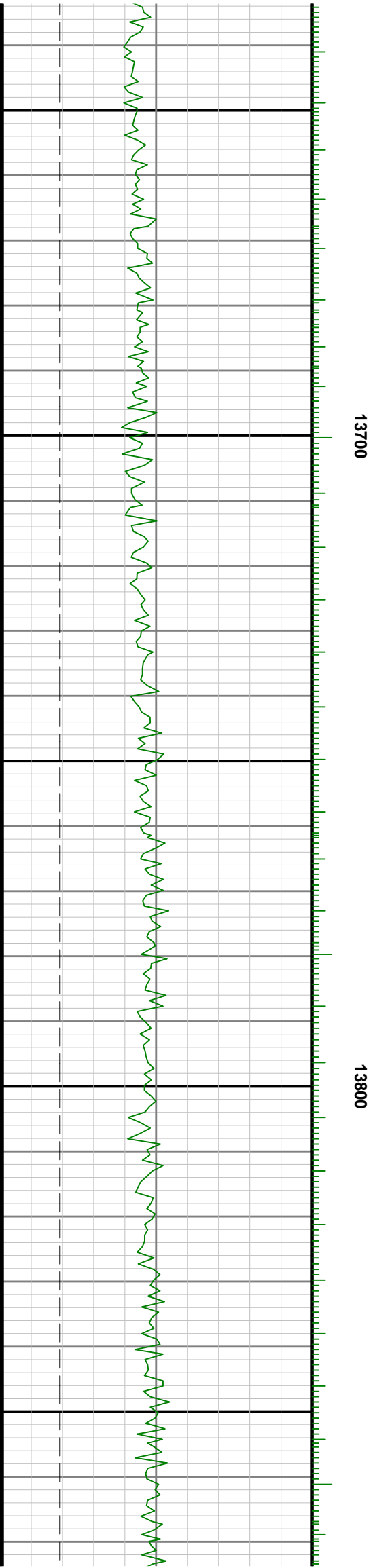
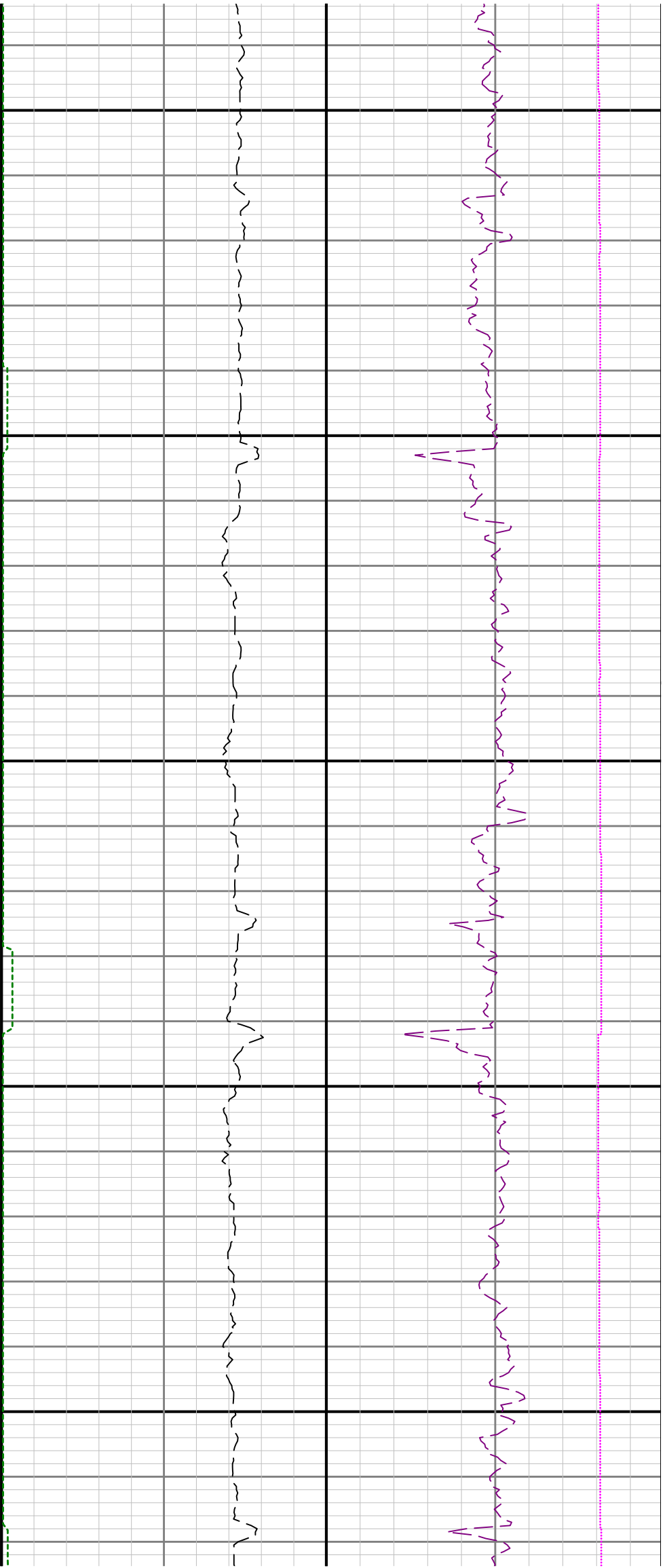
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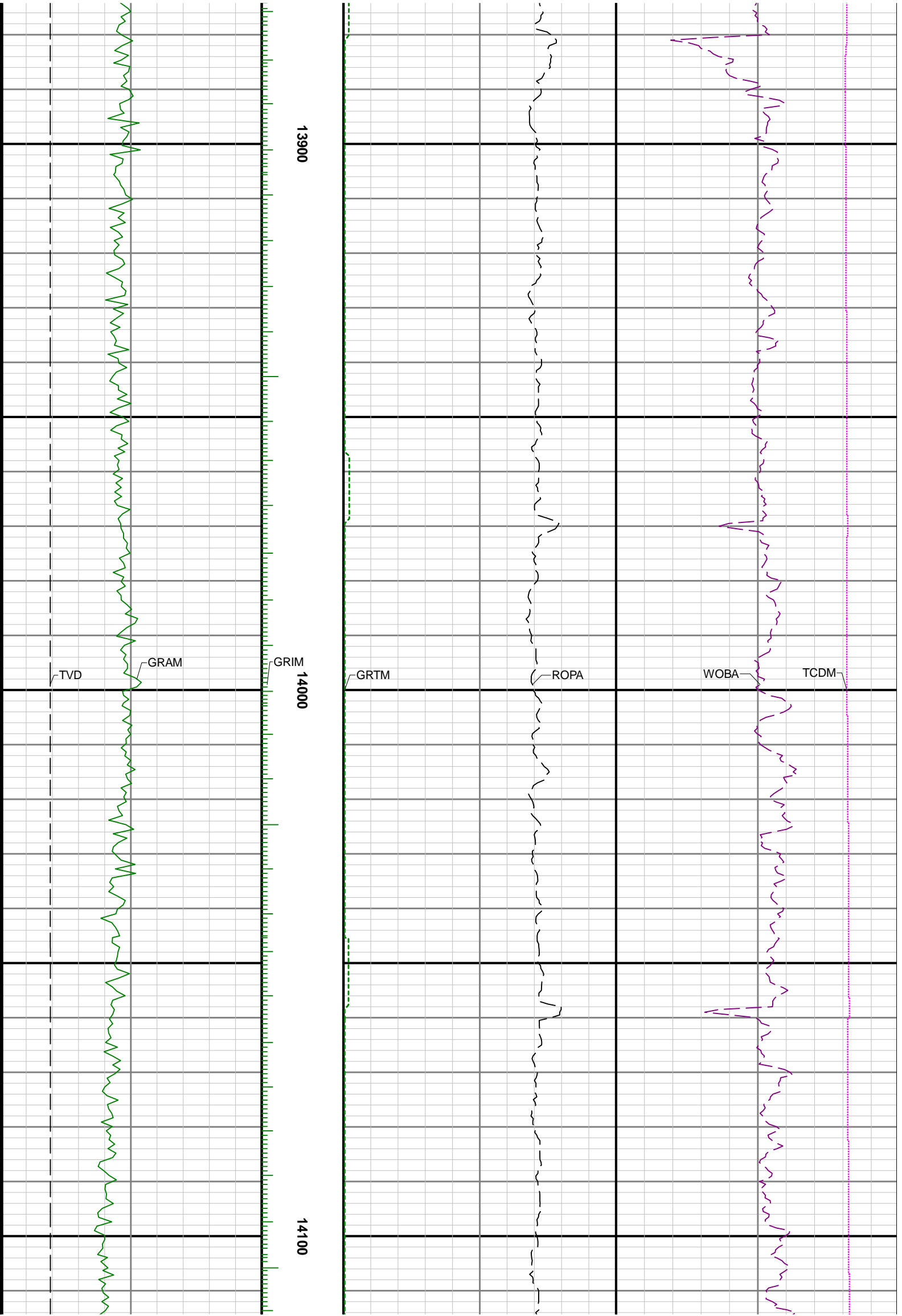


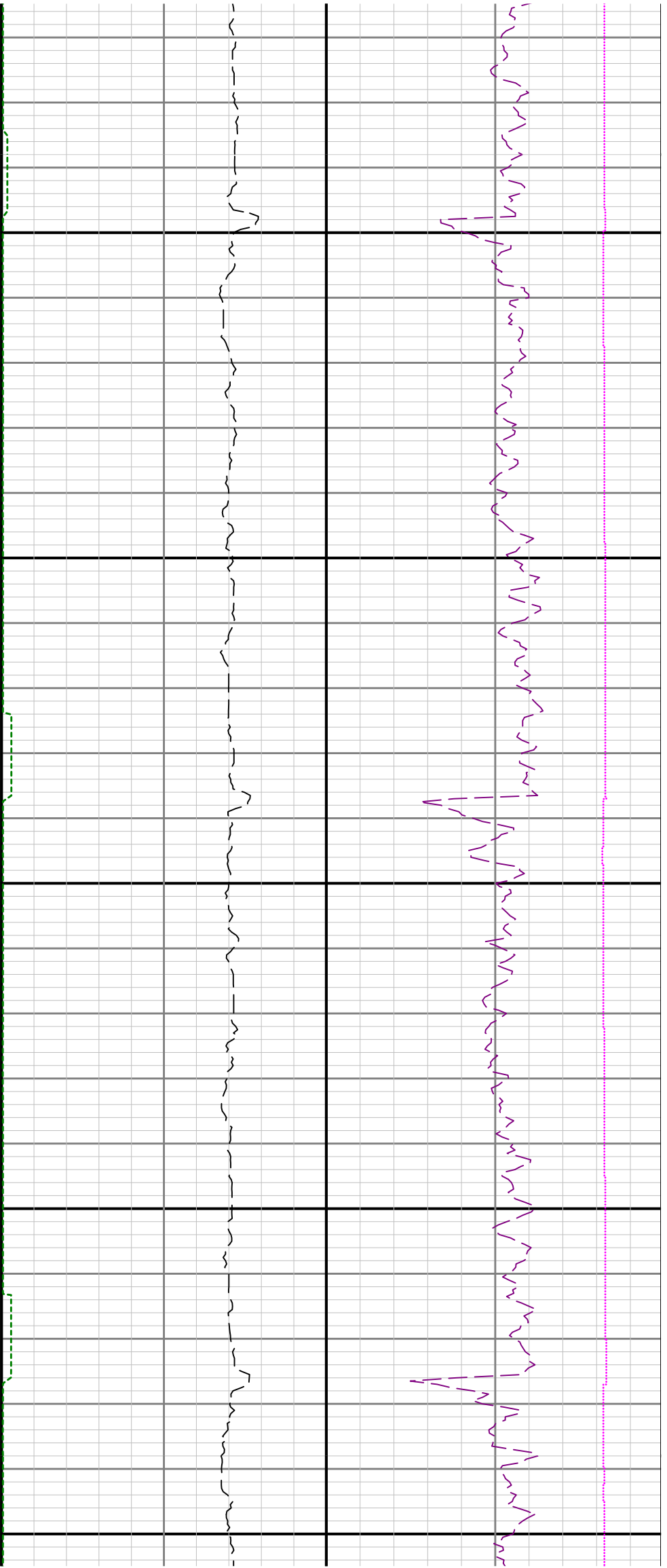






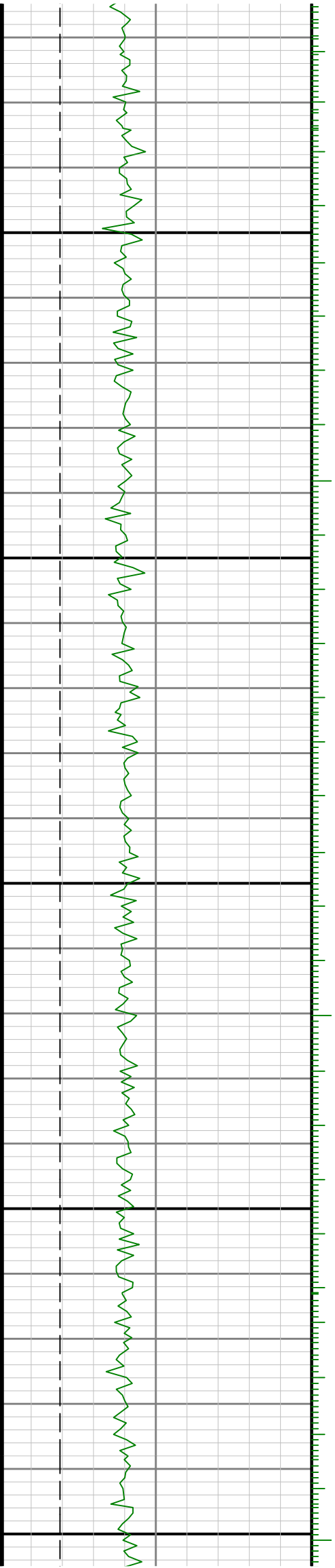


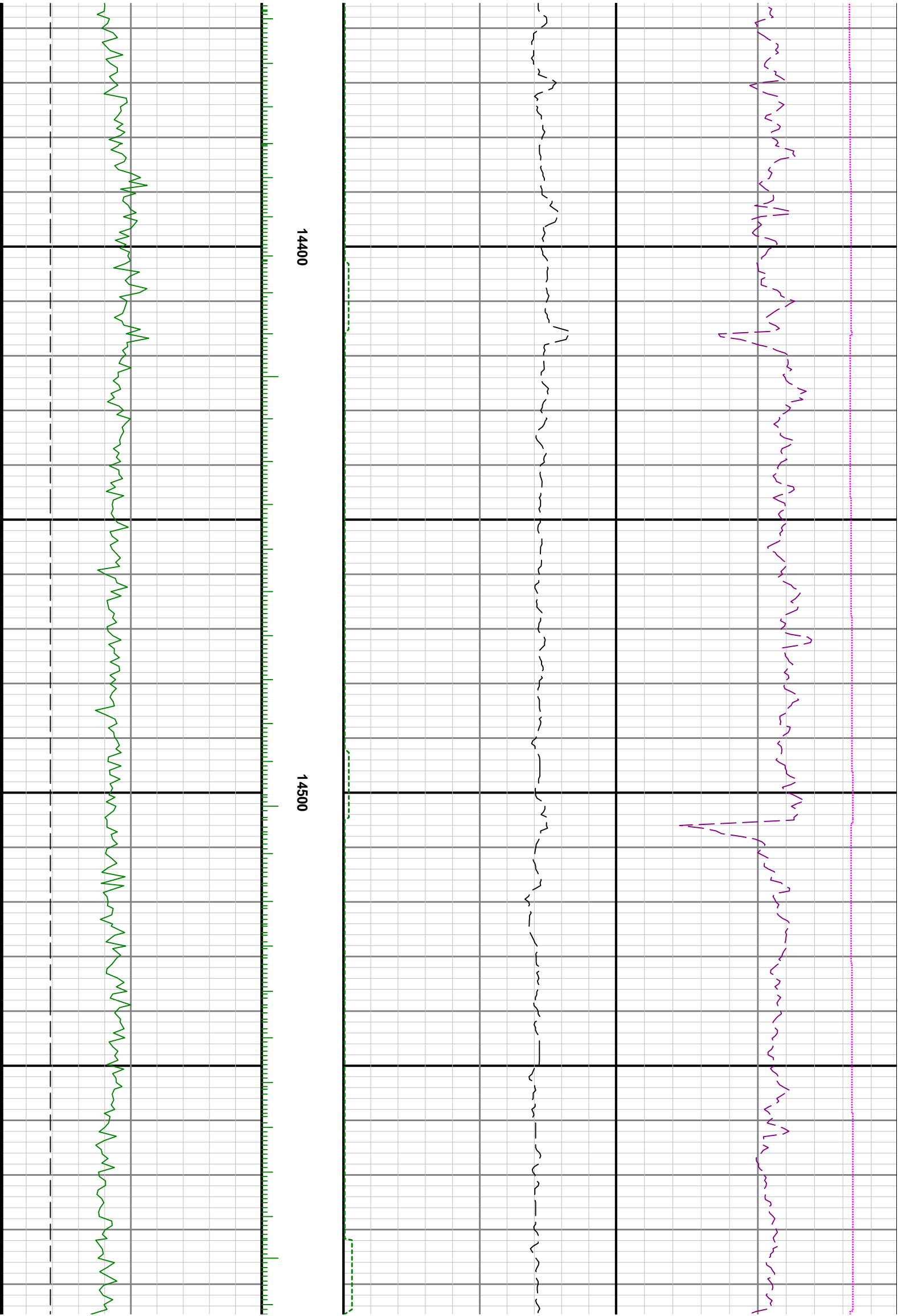


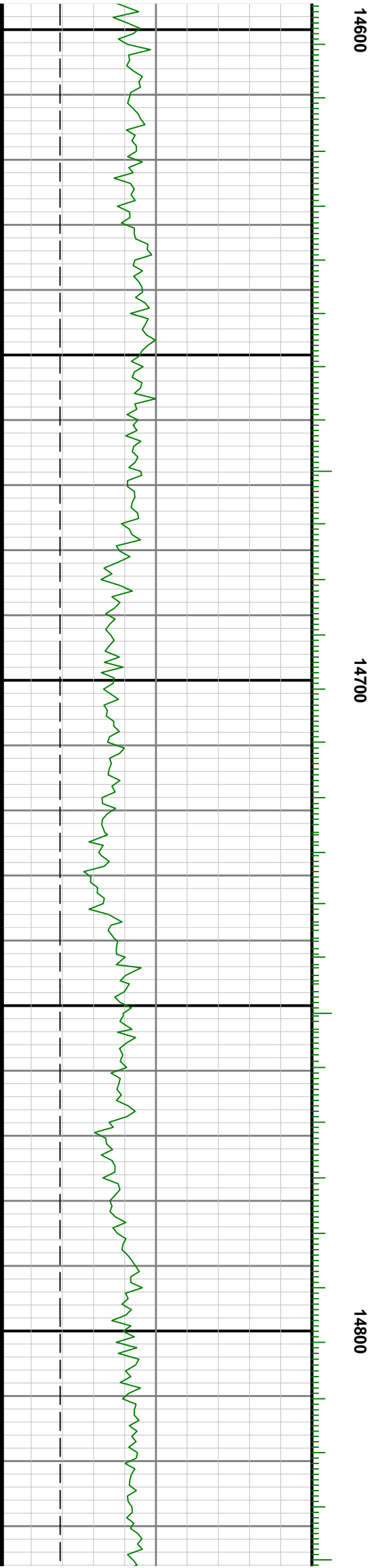
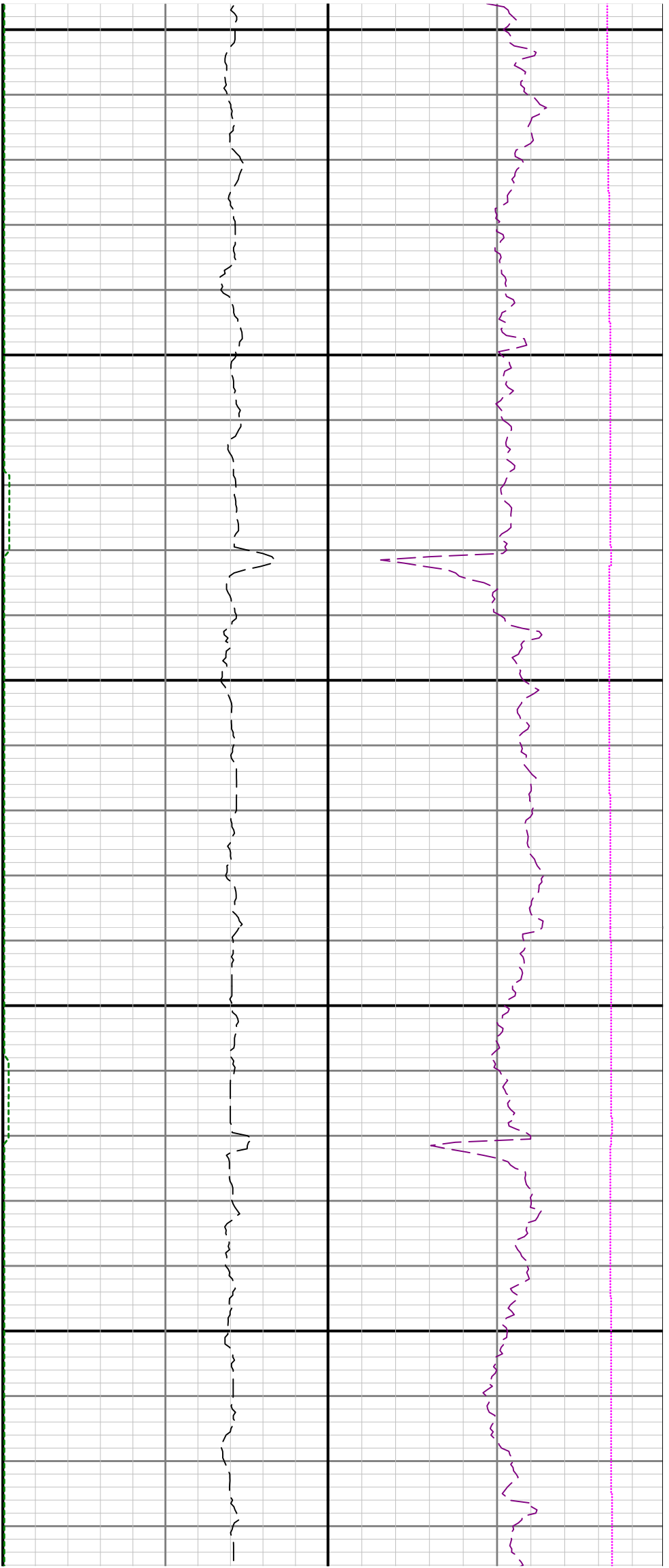


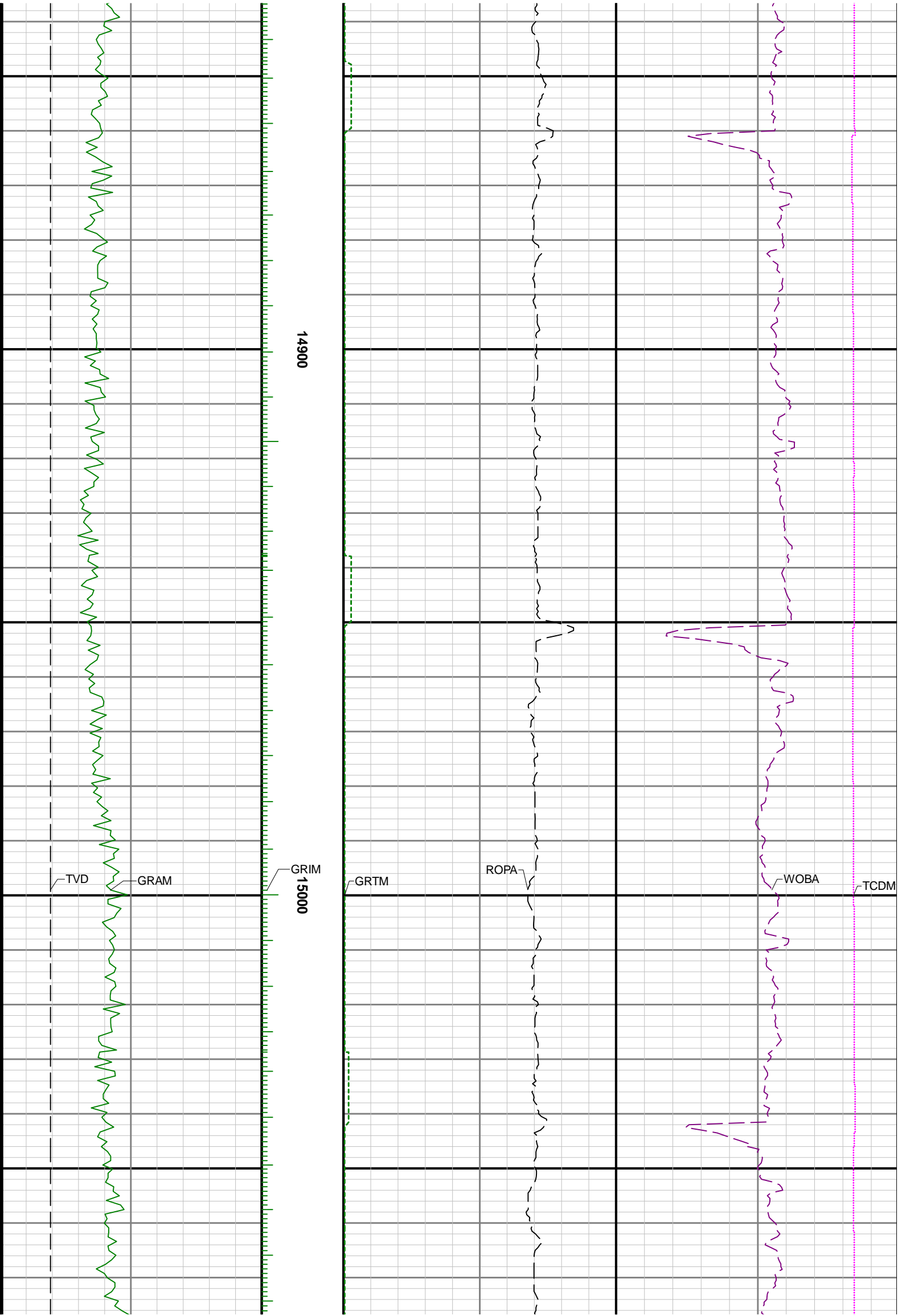
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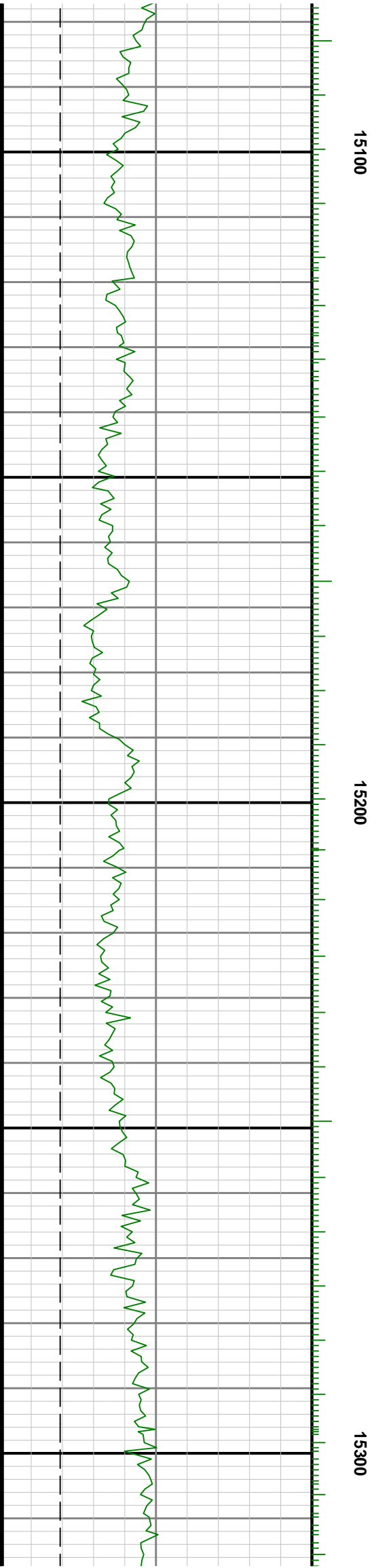
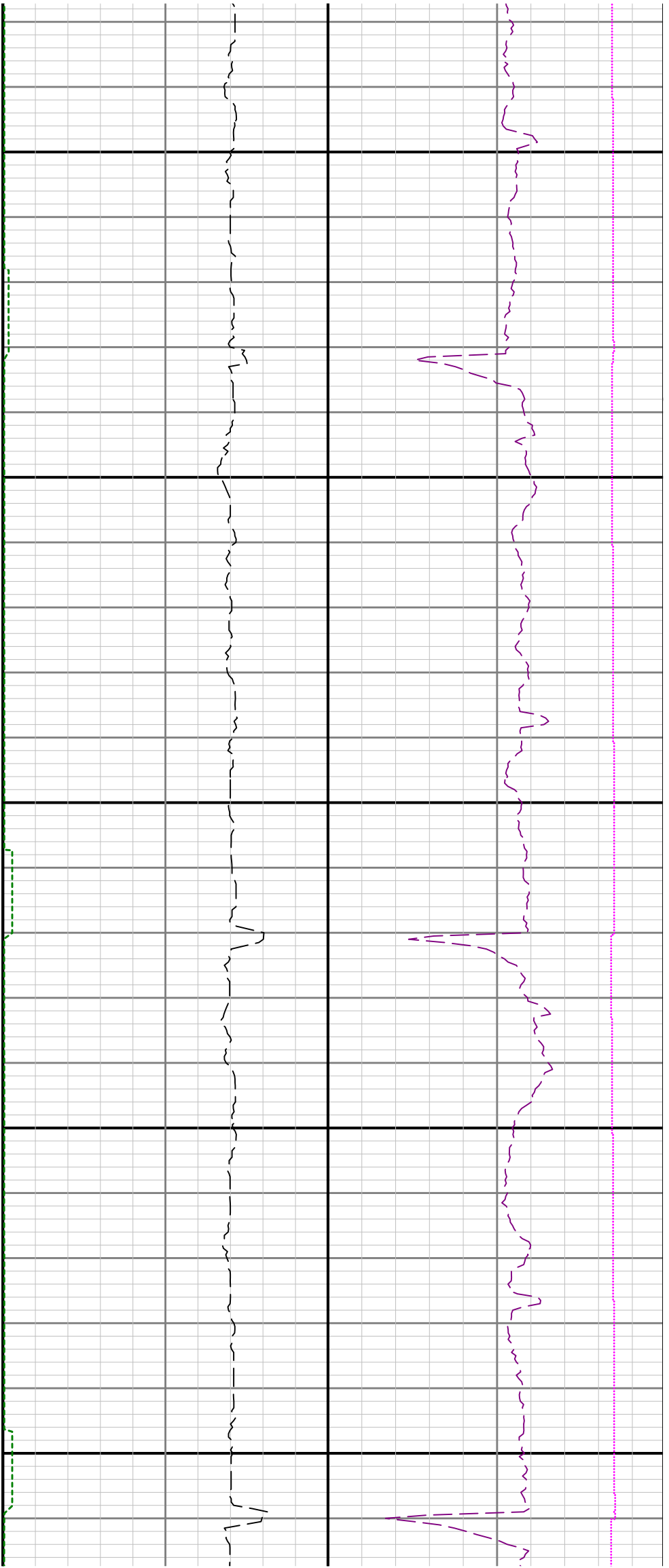
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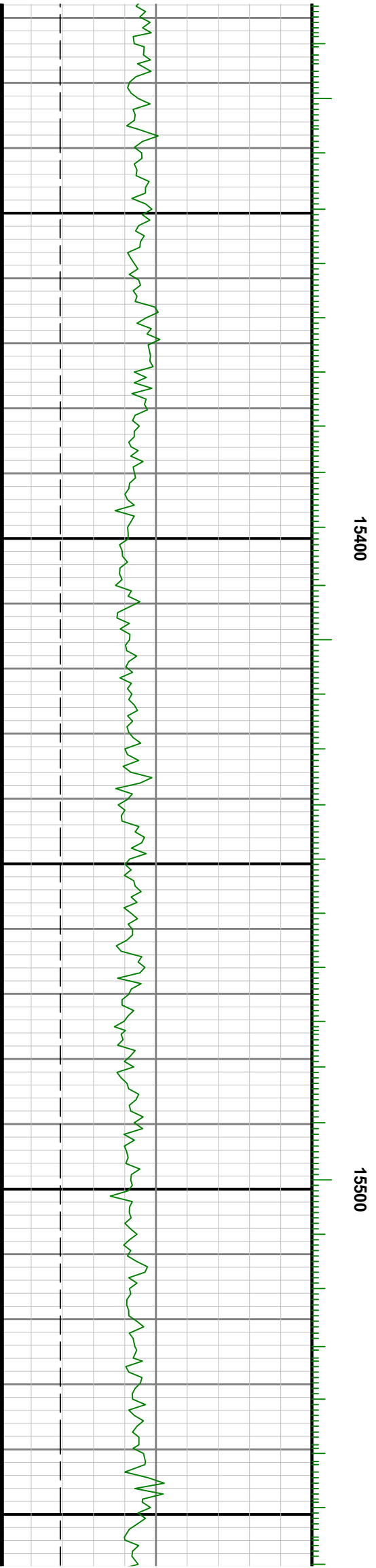
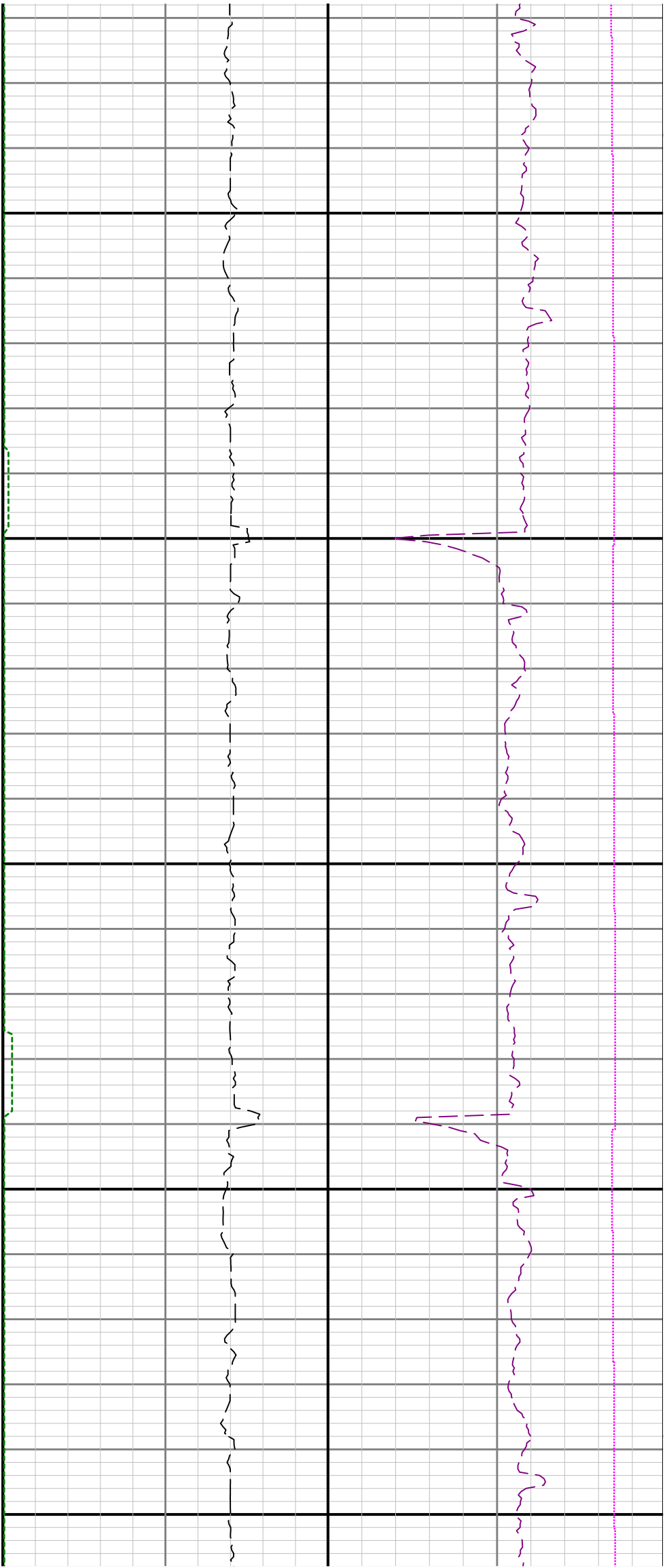


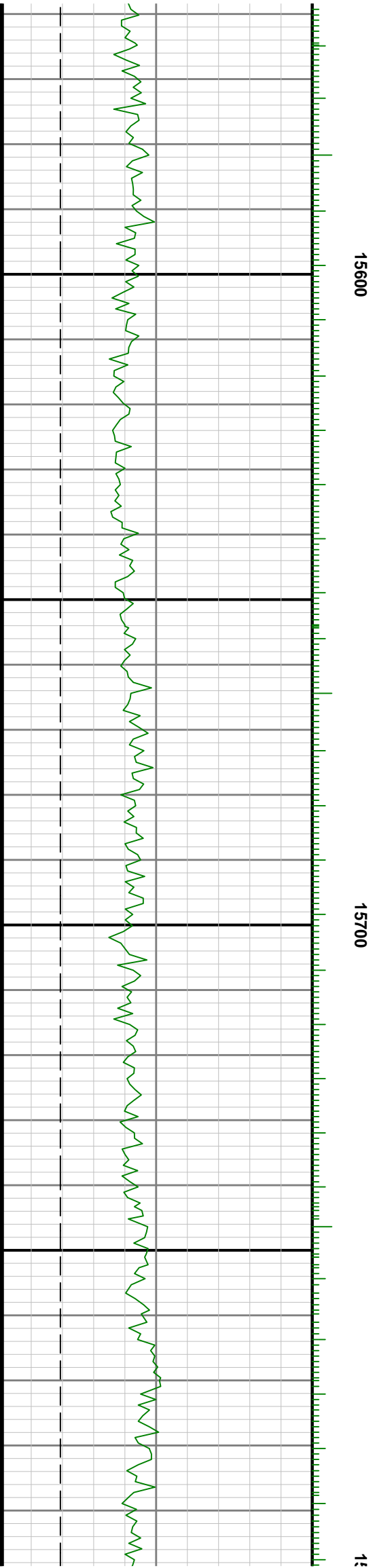
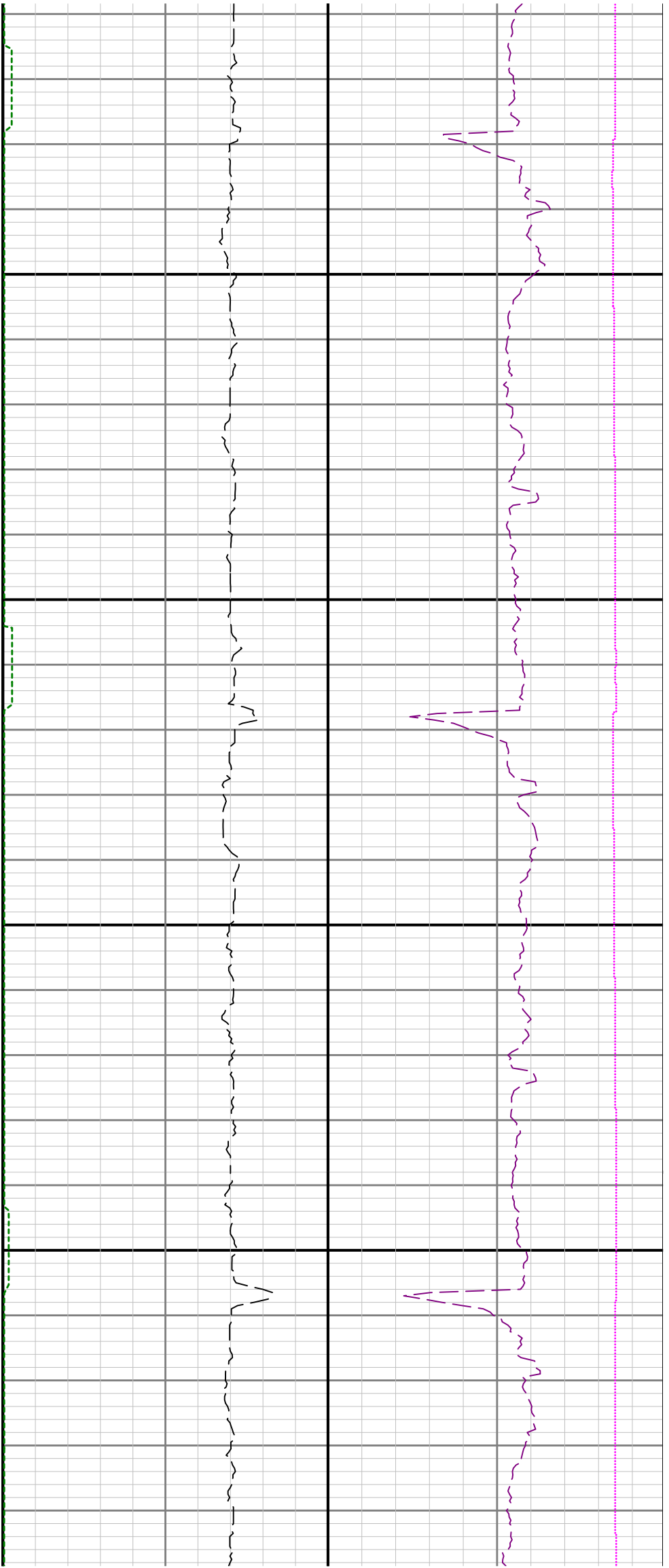


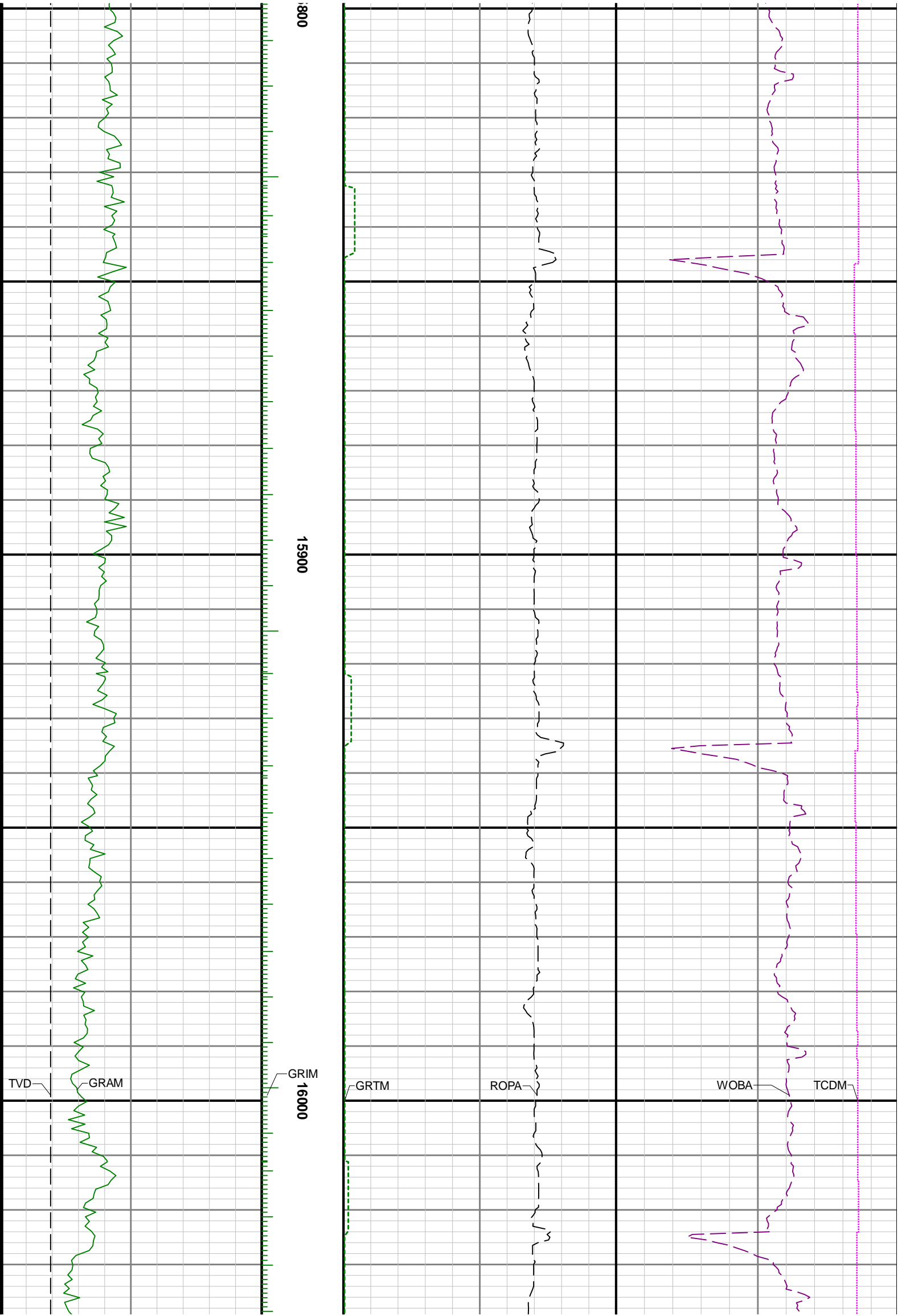


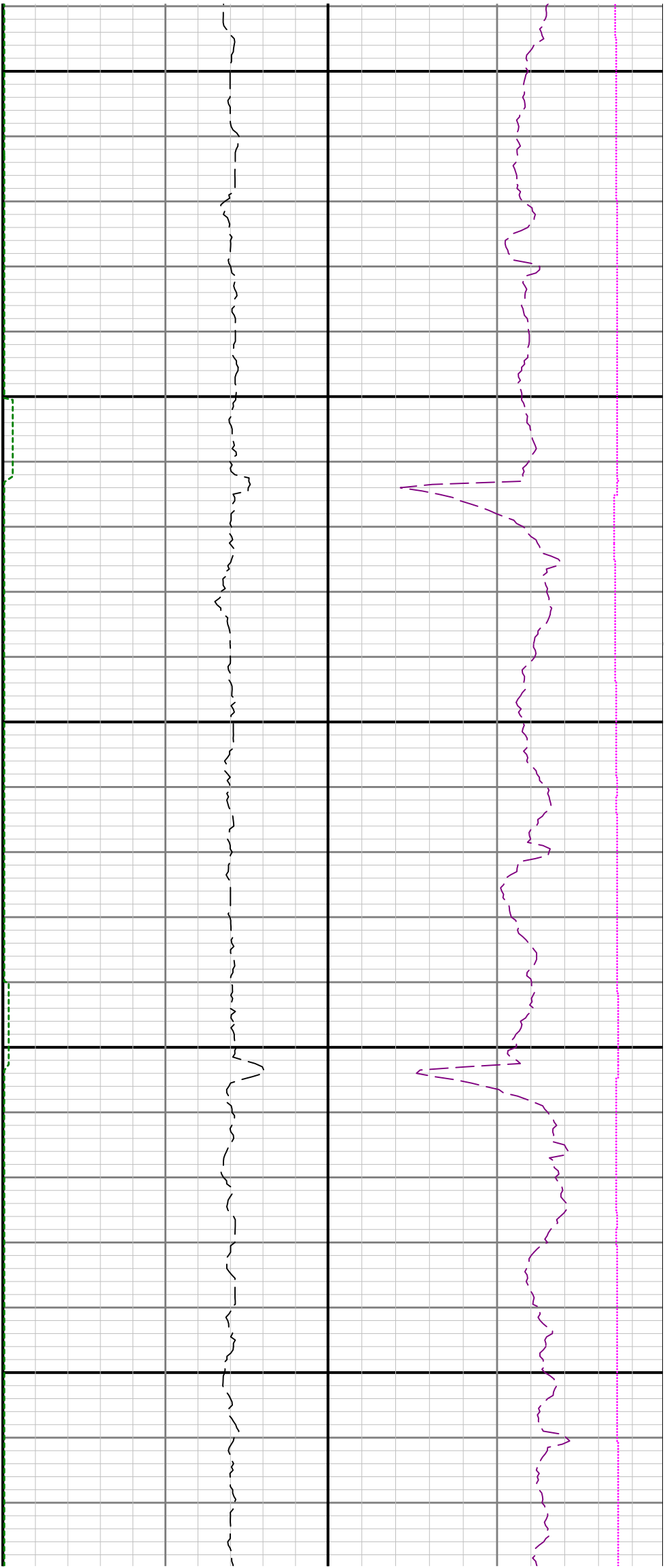












16100

16200

