



# LWD MEMORY LOG

# Gamma Ray

Scale:  1:240  Measured Depth	Company: Great Western Operating Company LLC							
	Well:		Schneider HD 11-022HN					
	Field:		Weld County					
	County:		Weld		Country: United States			
	Depth Reference:		State: Colorado					
Driller's Depth								
Status:	Surface Location:					Other Services:		
Final Print		Latitude:		40° 19' 26.580" N			Directional	
API No: 05-123-46416		Longitude:		104° 49' 36.510" W				
Job ID: 110030348		SEC:		7	TWN:	4N	RGE:	66W
Permanent Datum (P.D.):		Mean Sea Level		Elevation:		0.00 ft		
Log Measured From:		Rig Floor		Above P.D.:		4755.00 ft		
						Elev. KB:		N/A
						Elev. DF:		4755.00 ft
						Elev. GL:		4735.00 ft

Dates		Interval		Magnetic Field Reference	
From:	2019-09-25	Drilled (ft)	Logged (ft)	Azi Reference North:	True Dip Angle: (deg)
To:	2019-09-28	Top: 1612.00	Top: 1612.00	Total Magnetic Field Strength: (nT)	52076
Spud:	2019-08-30	Bottom: 17986.00	Bottom: 17973.00	Mag to Reference North Correction: (deg)	8.18

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Acquisition System		Software Version	Other	
Cadence	RT 5.4	Rig:	PD 460	
Plot Studio	5.4.8625.2	Contractor:	Precision Drilling	
		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
						Top	Bottom	From	To	Start Logging	End Logging	
						(ft)	(ft)	(ft)	(ft)			
1	1	8.500	PDC	2.00	AutoTrak Curve	1612.00	17973.00	1612.00	17986.00	2019-09-25 09:51	2019-09-28 12:04	69.82

## Crew

Name	Arrive Wellsite	Depart Wellsite	Name	Arrive Wellsite	Depart Wellsite	Name	Arrive Wellsite	Depart Wellsite
Alain Atemoh	2019-09-25	2019-09-28	Garrett Gerdson	2019-09-25	2019-09-28			

## 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+ (%)
2019-09-25 12:00	1	2032.00	Diesel-Oil Based Mud	10.5	26	N/A	10.5	74/26	Active Pit	24295	0.00
2019-09-26 12:00	1	8810.00	Diesel-Oil Based Mud	10.5	28	N/A	10.5	74/26	Active Pit	24295	0.00
2019-09-26 19:00	1	10045.00	Diesel-Oil Based Mud	10.5	30	N/A	10.5	74/26	Active Pit	23810	0.00
2019-09-27 12:00	1	13631.00	Diesel-Oil Based Mud	10.6	32	N/A	10.5	73/27	Active Pit	23810	0.00
2019-09-28 01:00	1	16229.00	Diesel-Oil Based Mud	10.5	32	N/A	10.4	73/27	Active Pit	23810	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	12653420	Near Bit VSS	5.93	6.77	7.000	4.330
1	AutoTrak Curve Steering Unit	12653420	Near Bit Inclination	5.93	6.77	7.000	4.330
1	AutoTrak Curve MWD	14334277	Gamma (single)	2.75	12.94	7.000	3.250
1	AutoTrak Curve MWD	14334277	Directional (mag)	12.27	22.46	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
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Comments

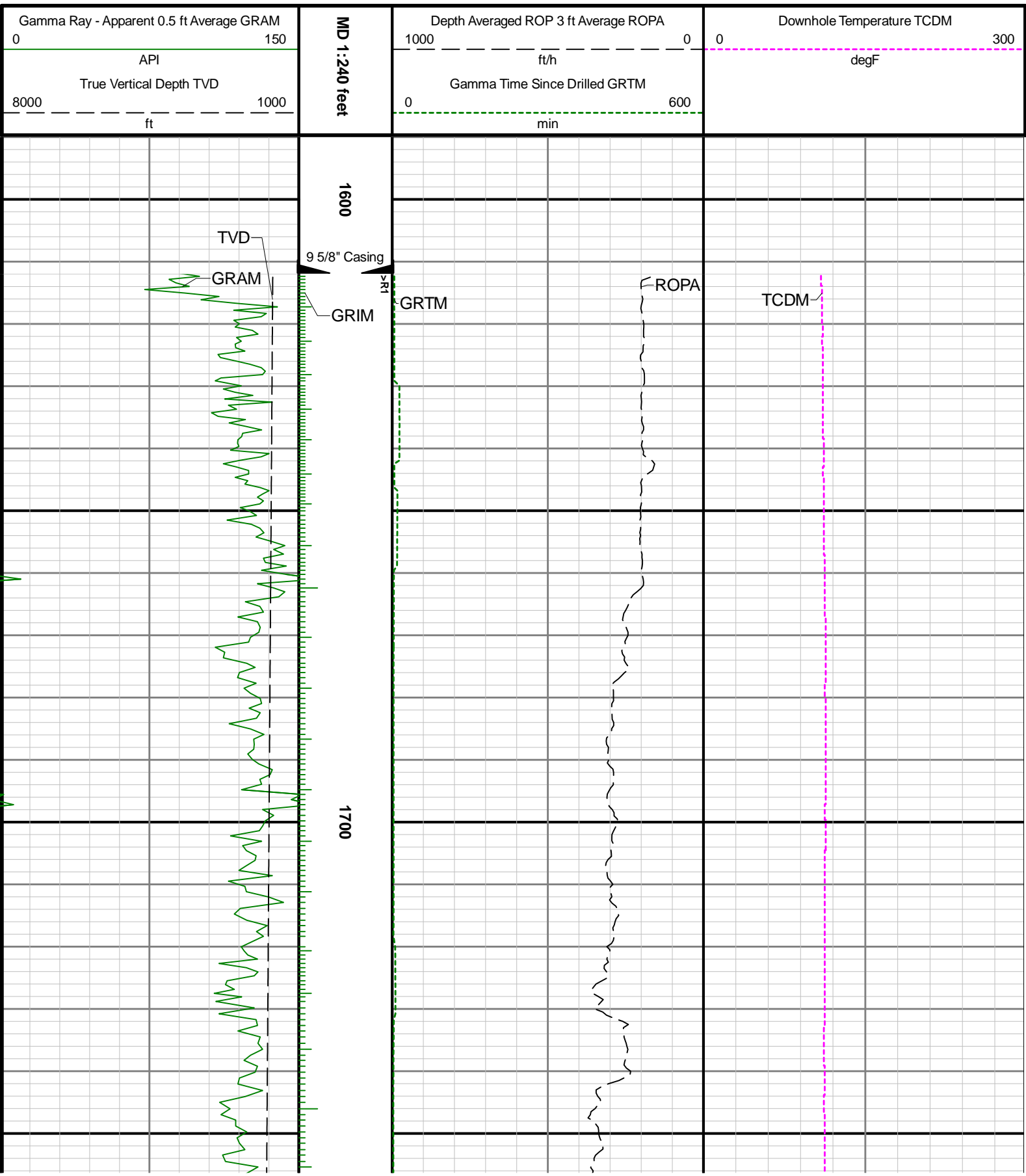
- 1
- Depth measurements were obtained from a depth control system not supplied or operated by Baker Hughes, a GE Company (BHGE). Due to the lack of control by Baker Hughes, depth calibrations and measurements could not be independently verified.
- 2
- BHGE LWD run 1 utilized a 6.75 inch NaviGamma service (Directional and Gamma Ray) behind a 8.5 inch bit and rotary steerable assembly from 1612 to 17986 feet MD (1561 to 7006 feet TVD).
- 3
- "Date To" indicates the date and time the well reached Total Depth (TD) and logging services ended.

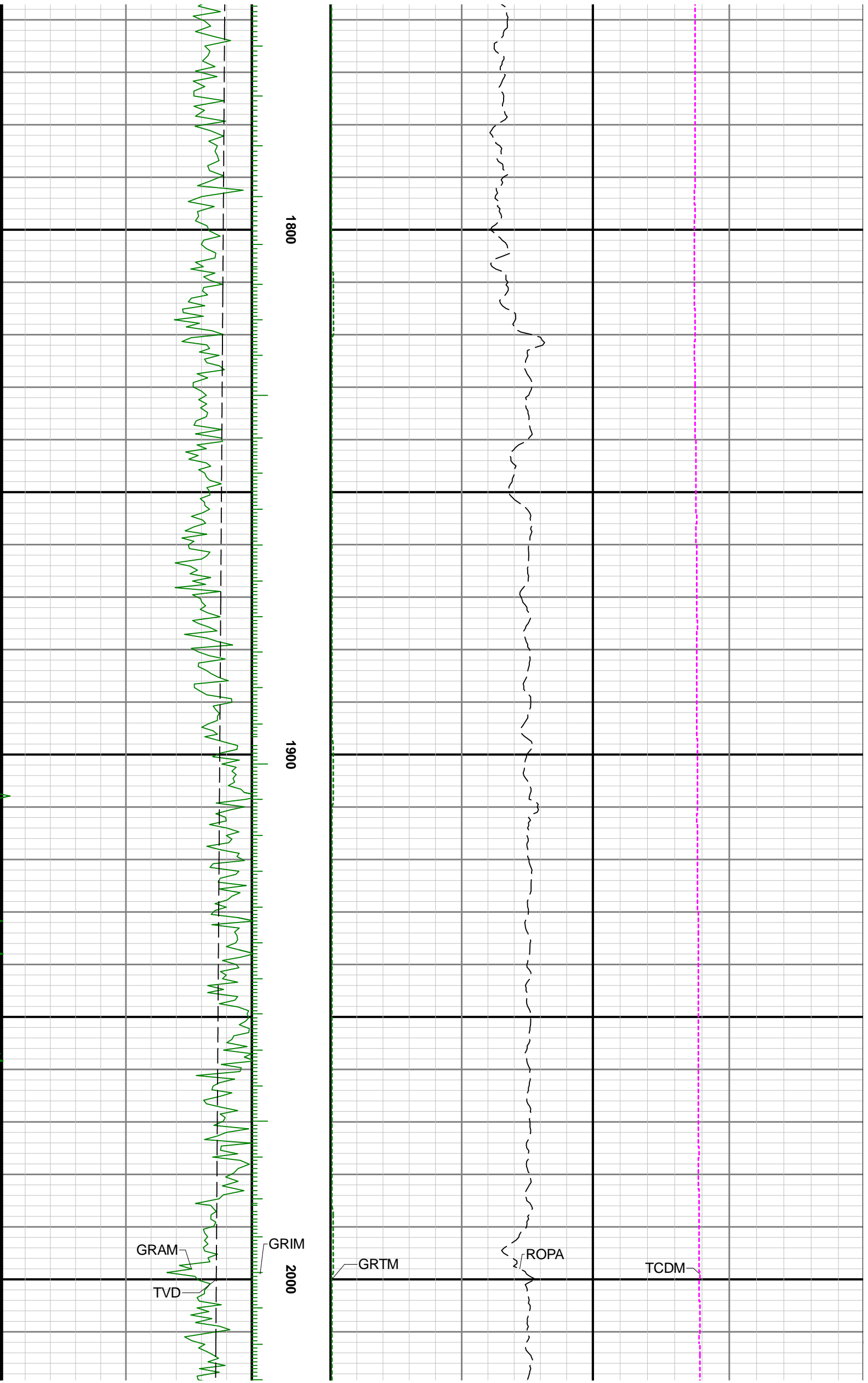
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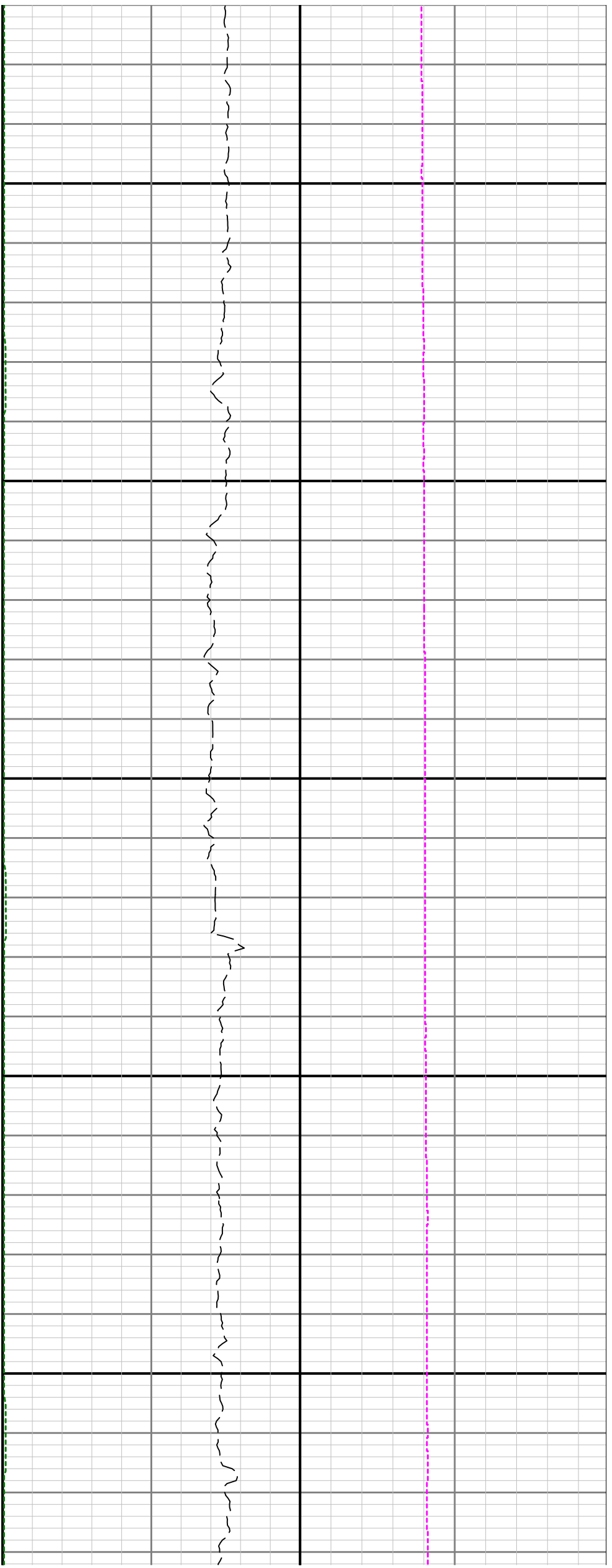
Number	Depth (ft)	Hole Section (in)	Run No.	Remark
1	17980.00	8.500	1	The interval from 17973 to 17986 feet MD (7006 feet TVD) was not logged after being drilled due to sensor to bit offset at well TD.

Curve Mnemonics

Presented Curves	Description	Units
ROPA	Depth Averaged ROP 3 ft Average	ft/h
TVD	True Vertical Depth	ft
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

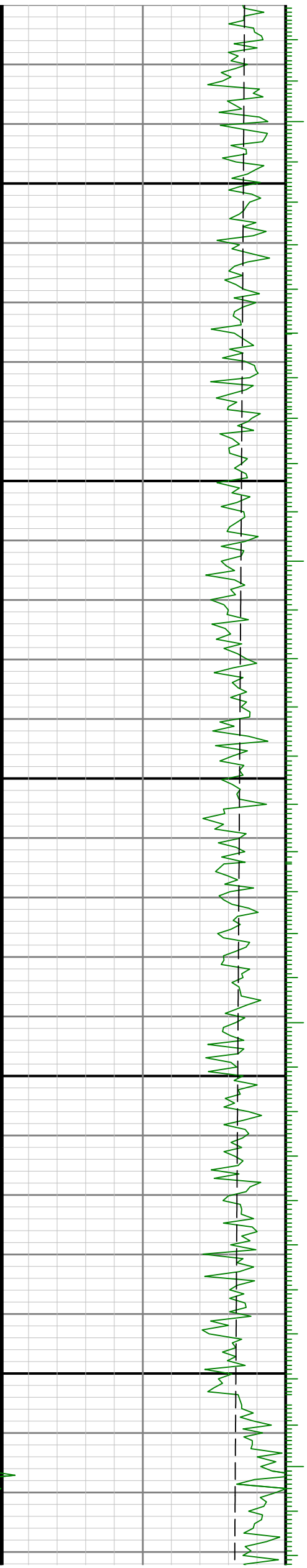


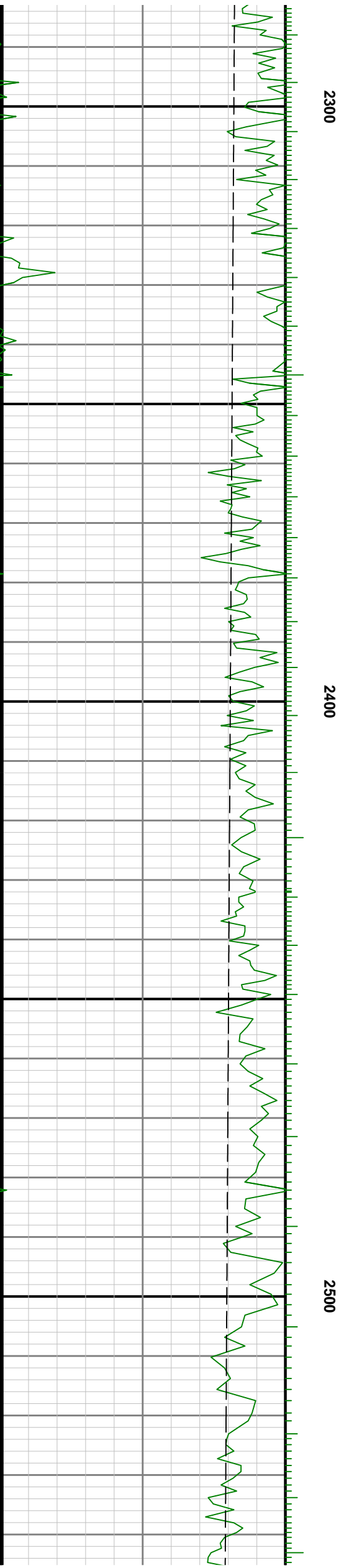
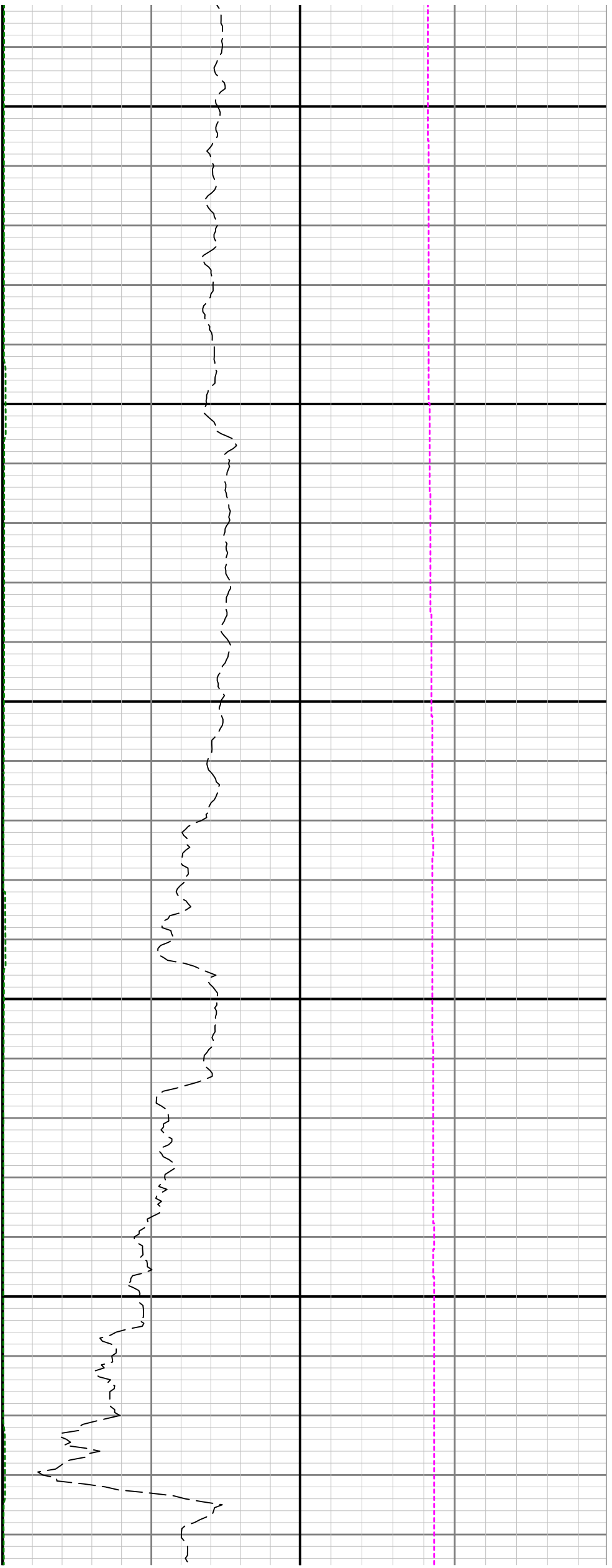


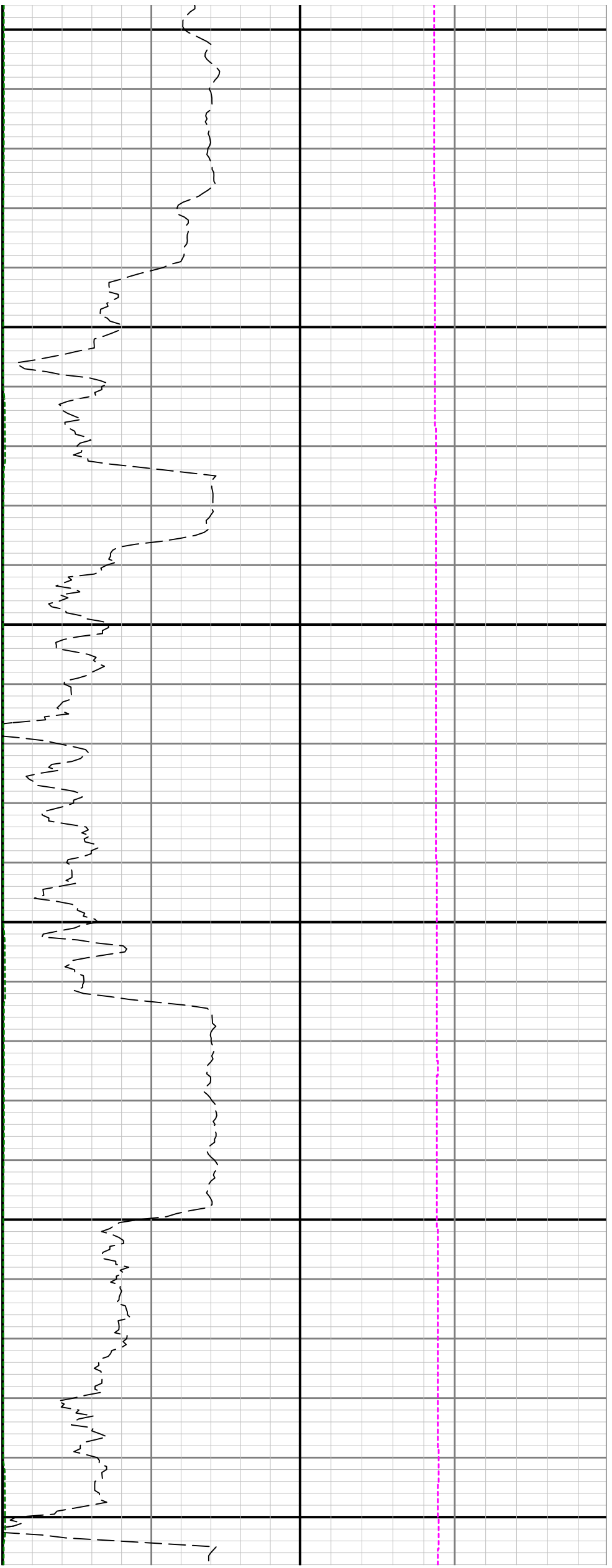


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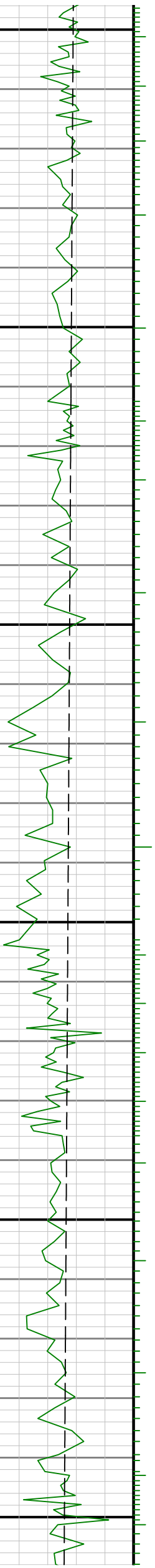


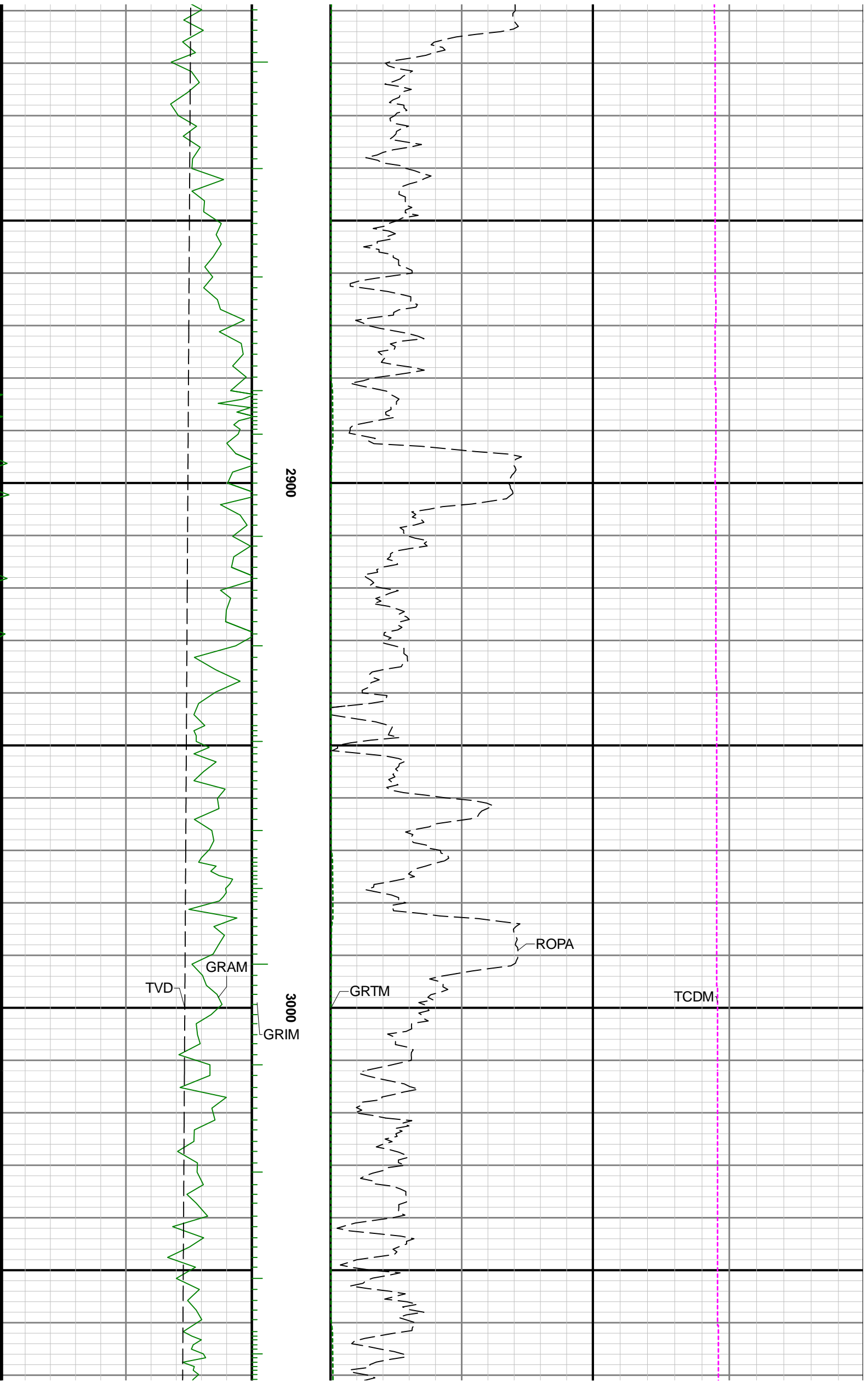


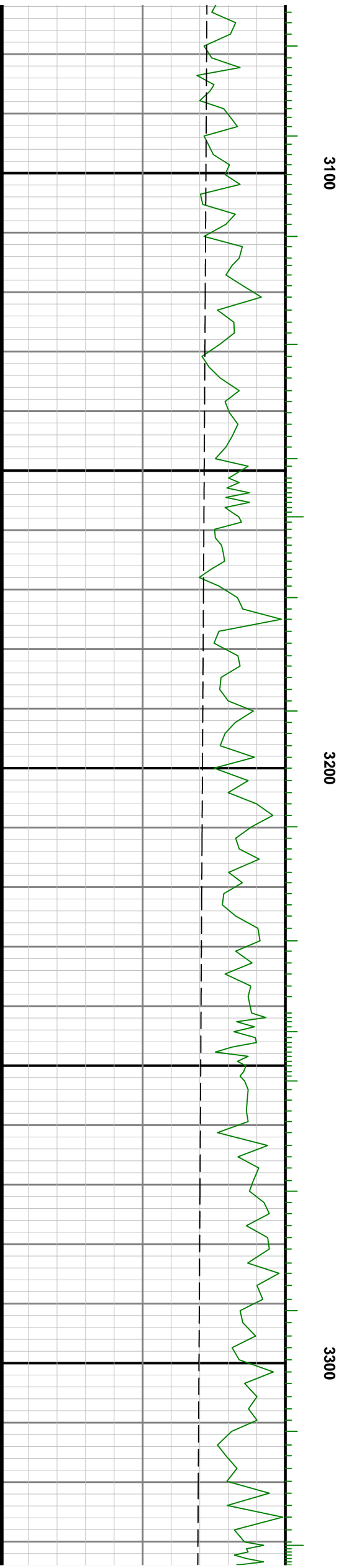
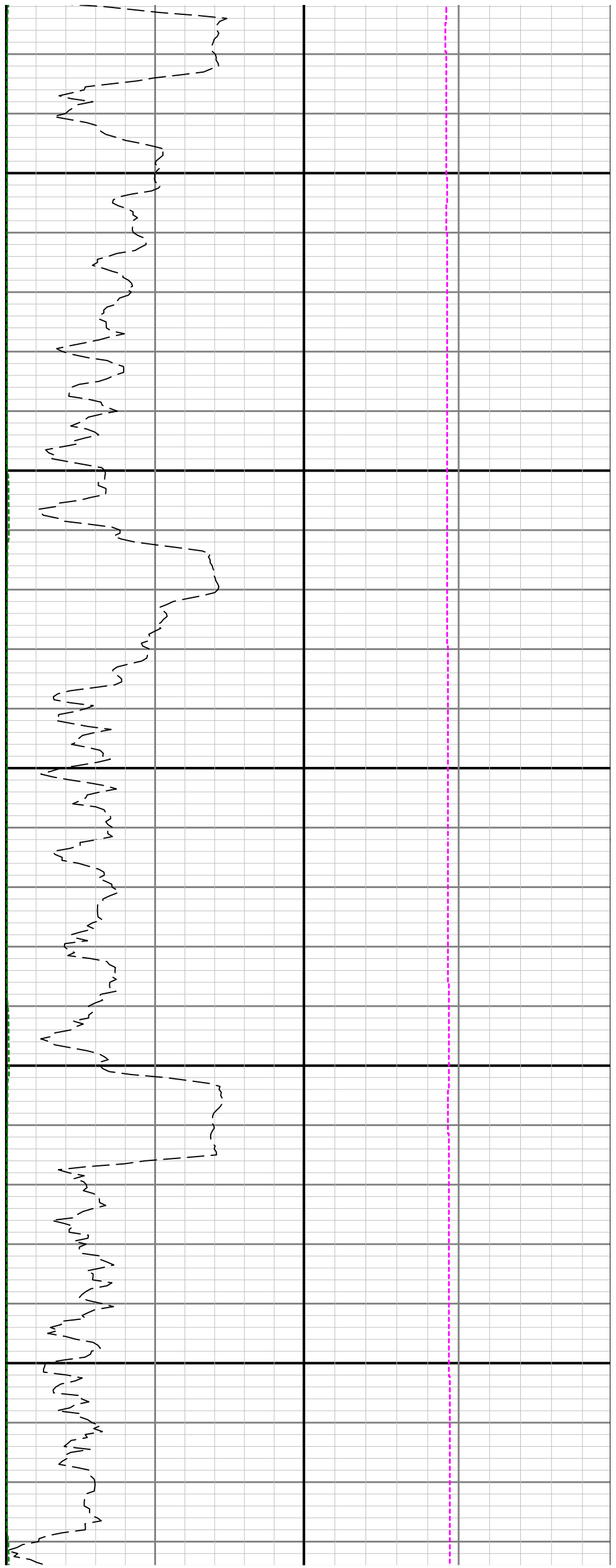
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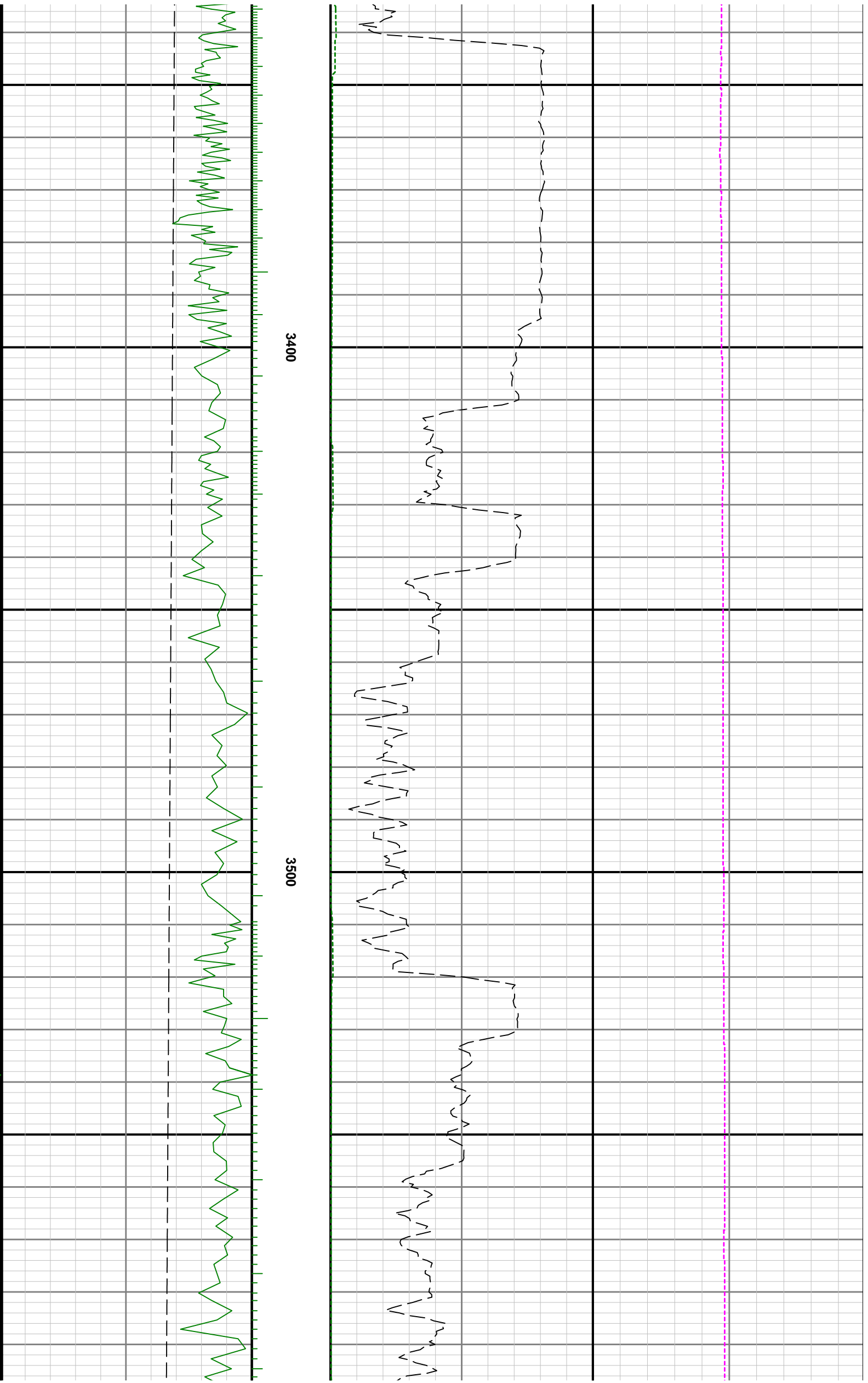
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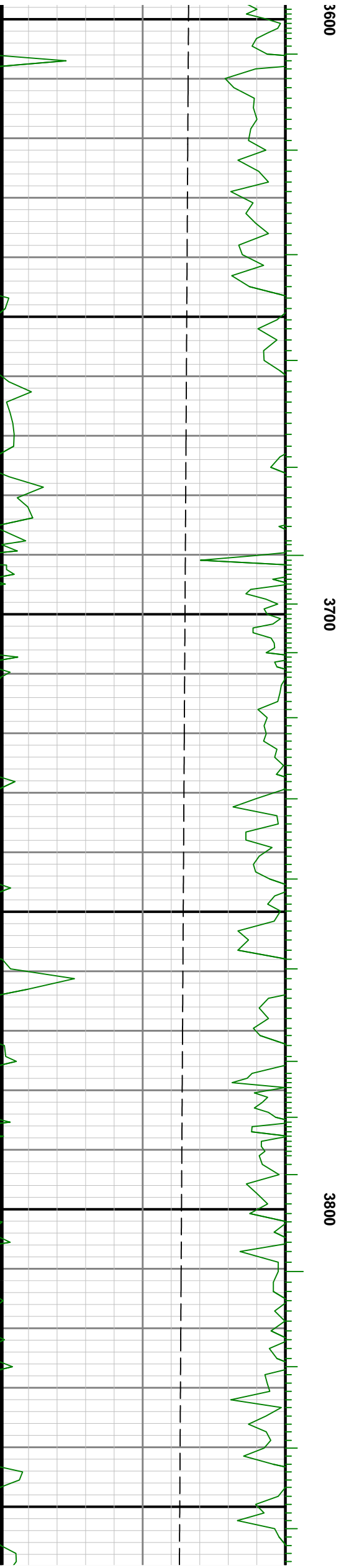
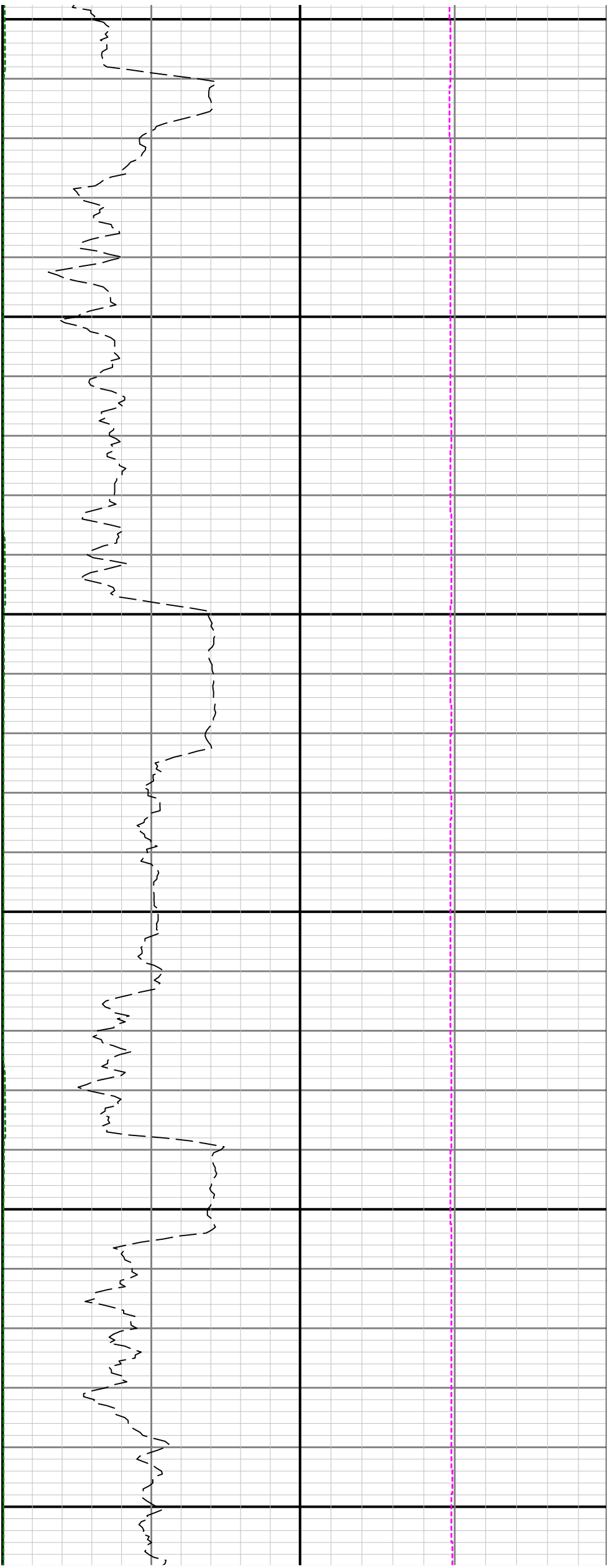


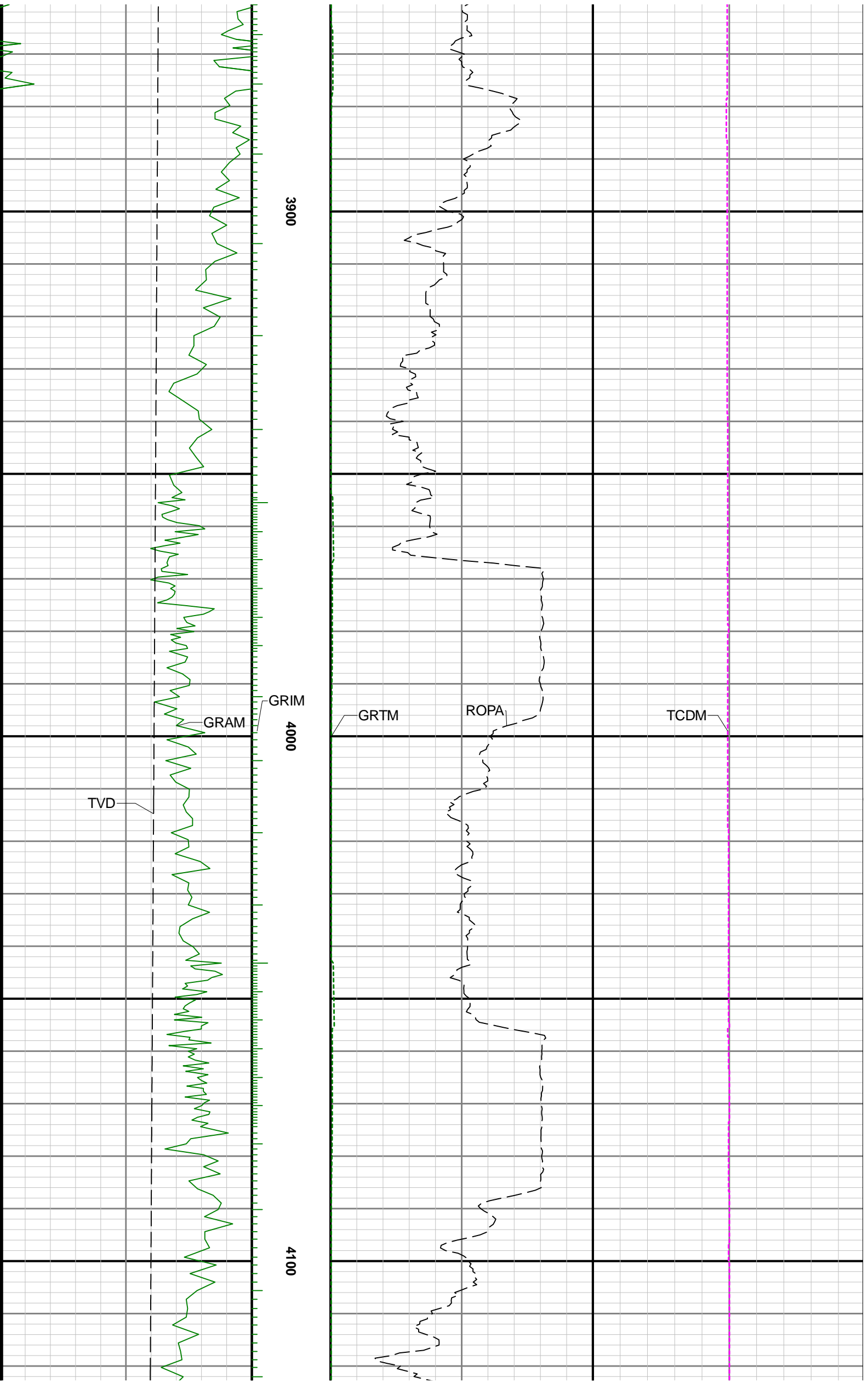


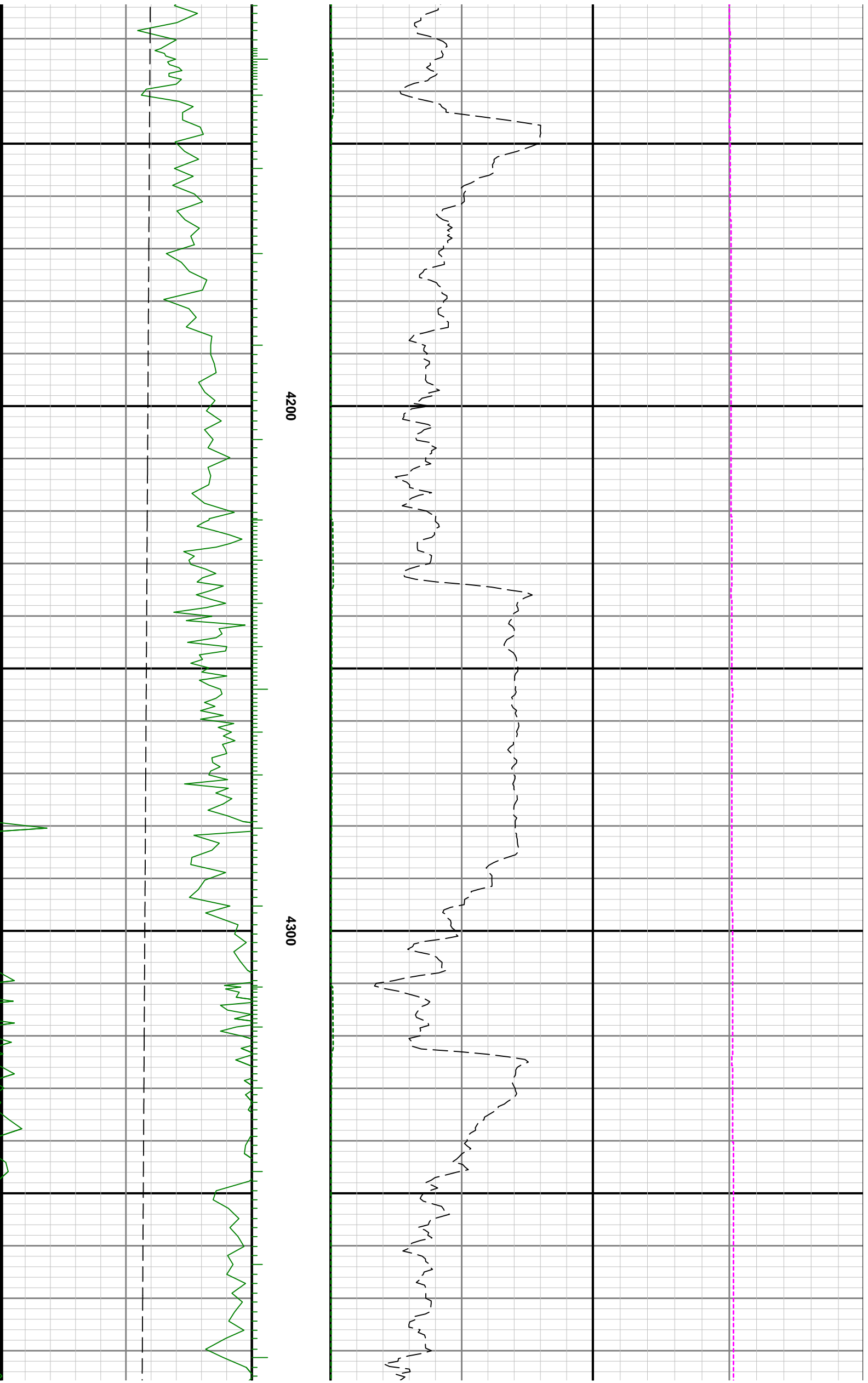


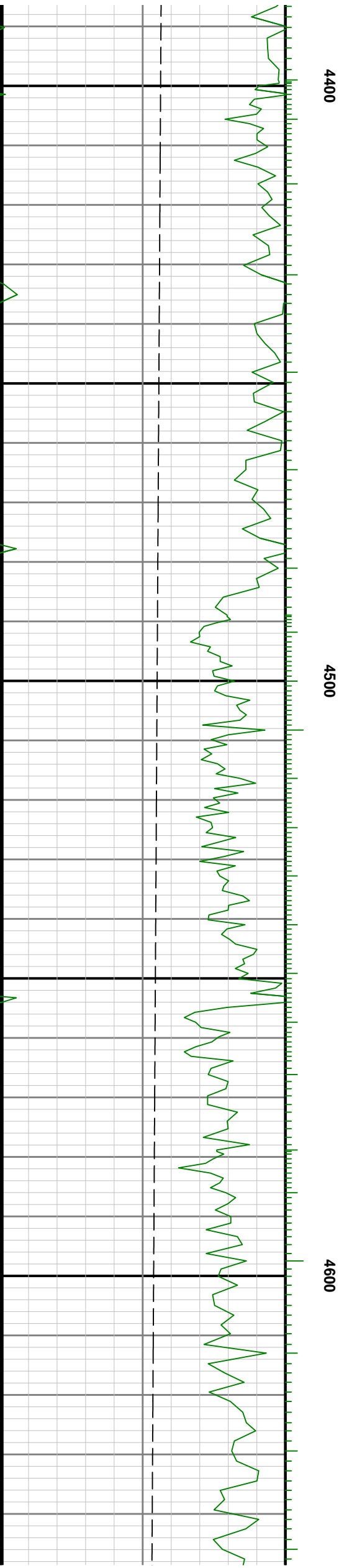
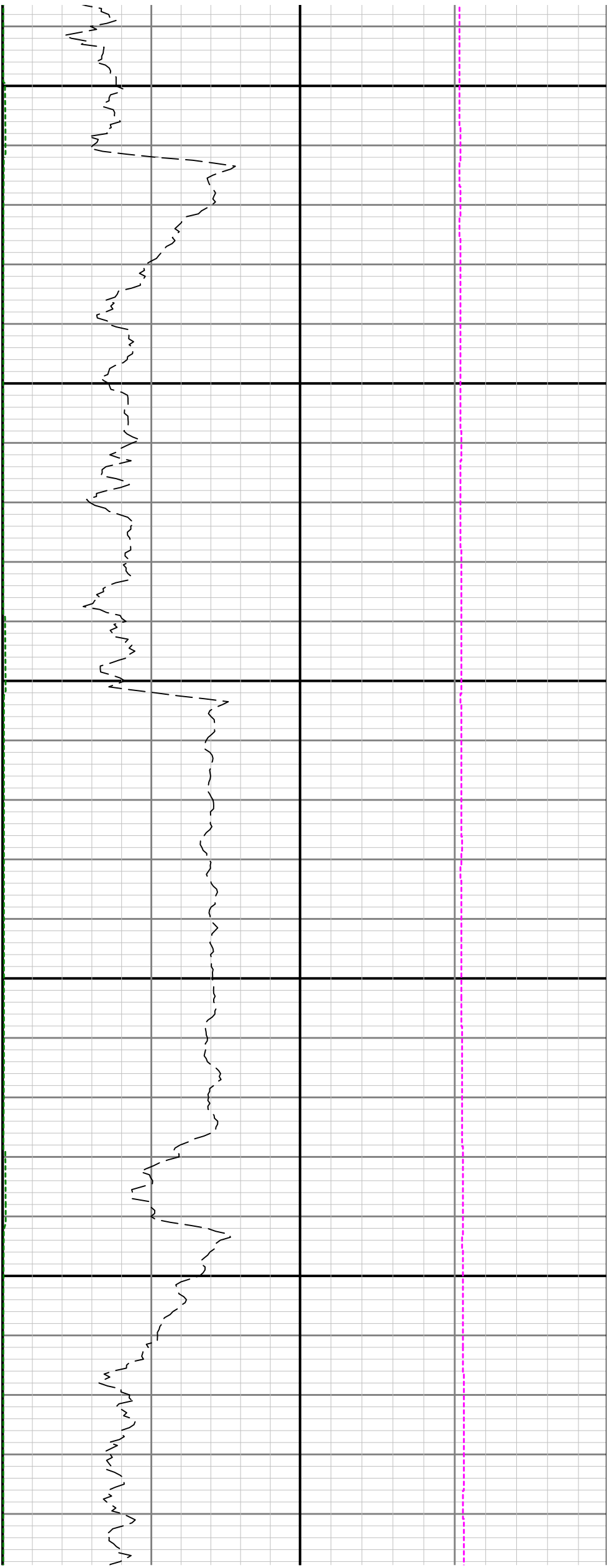


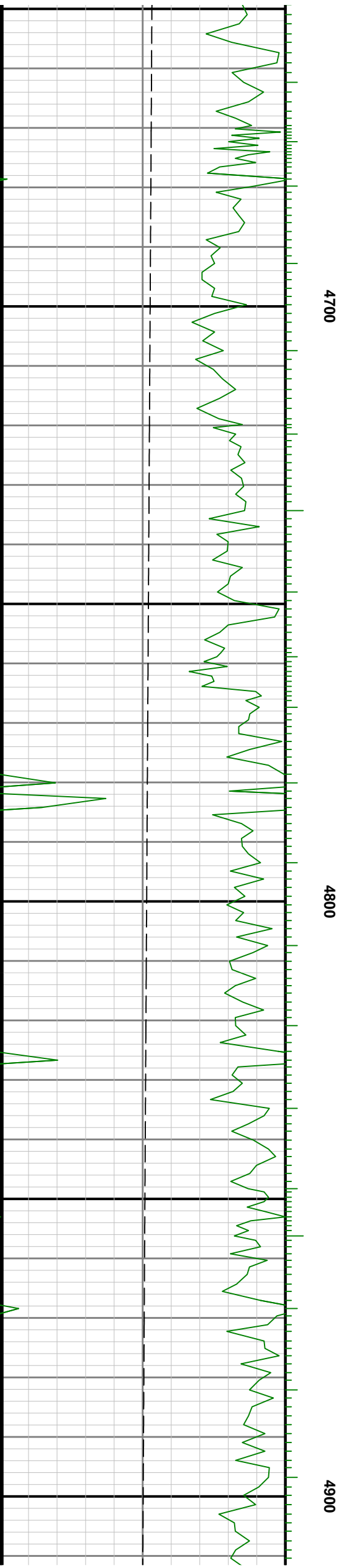
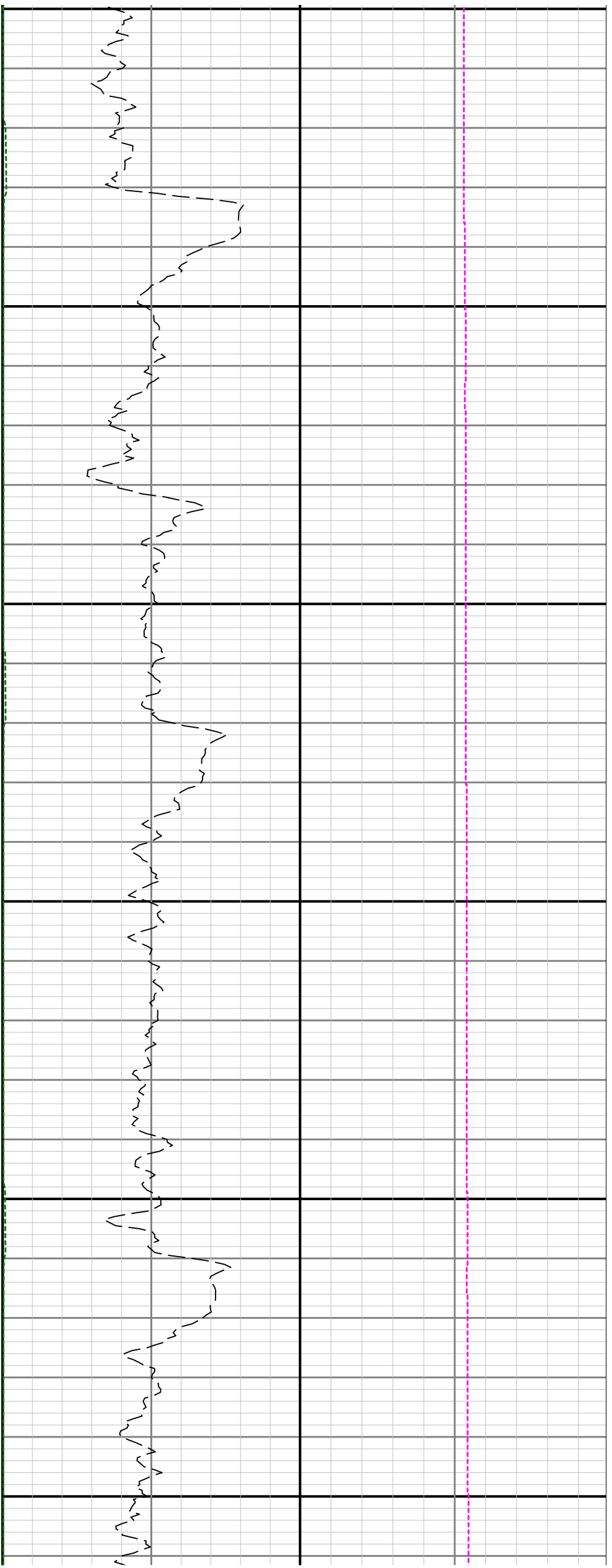


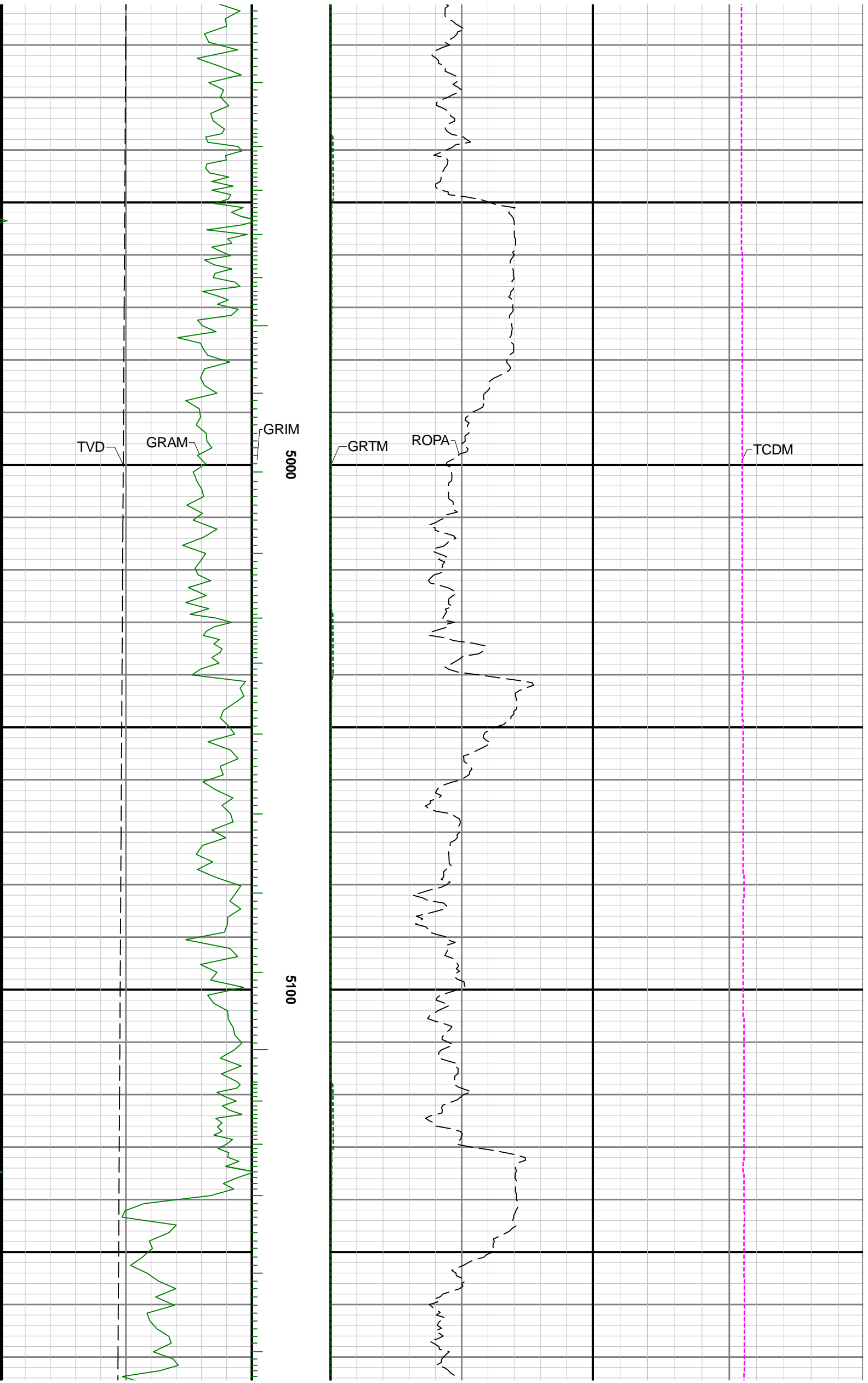


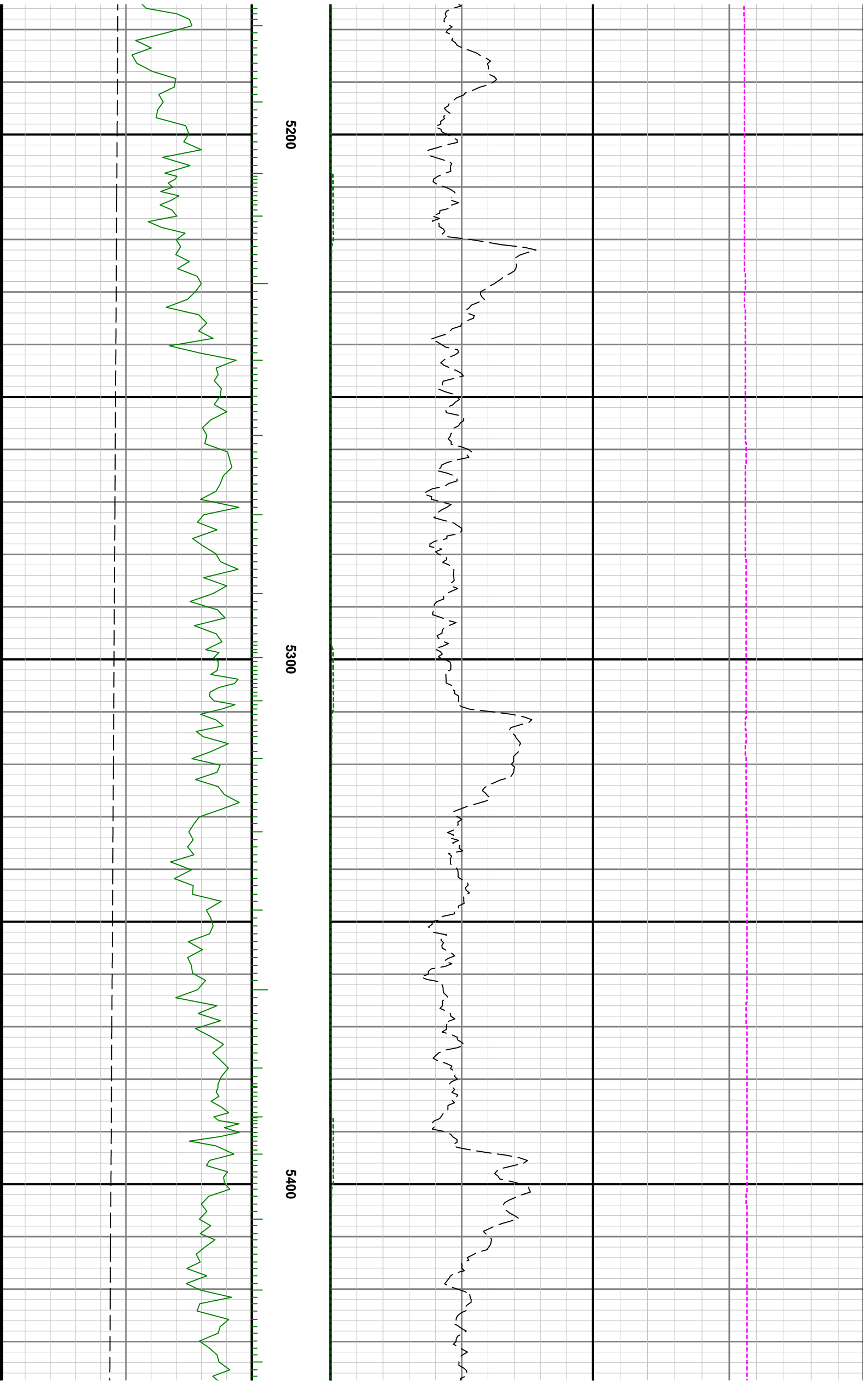




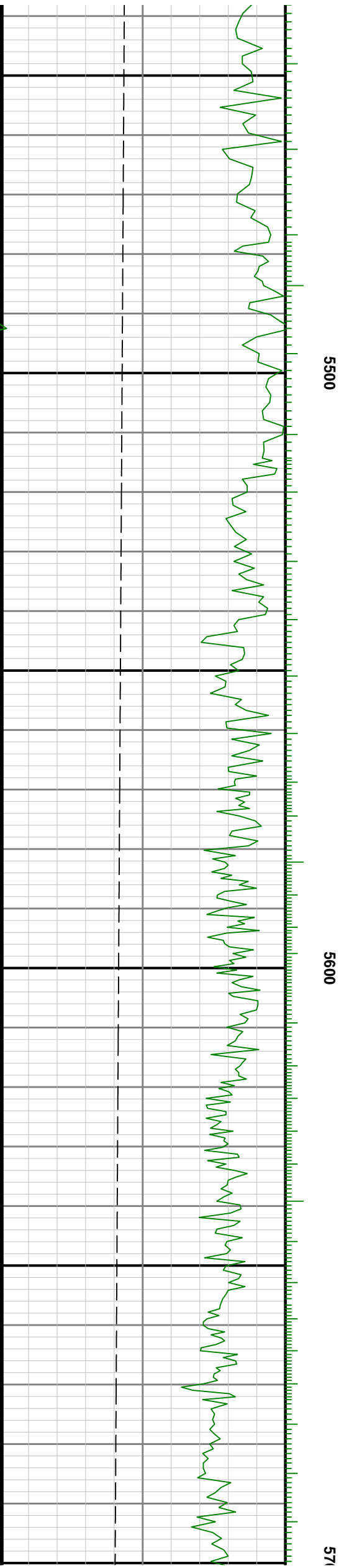
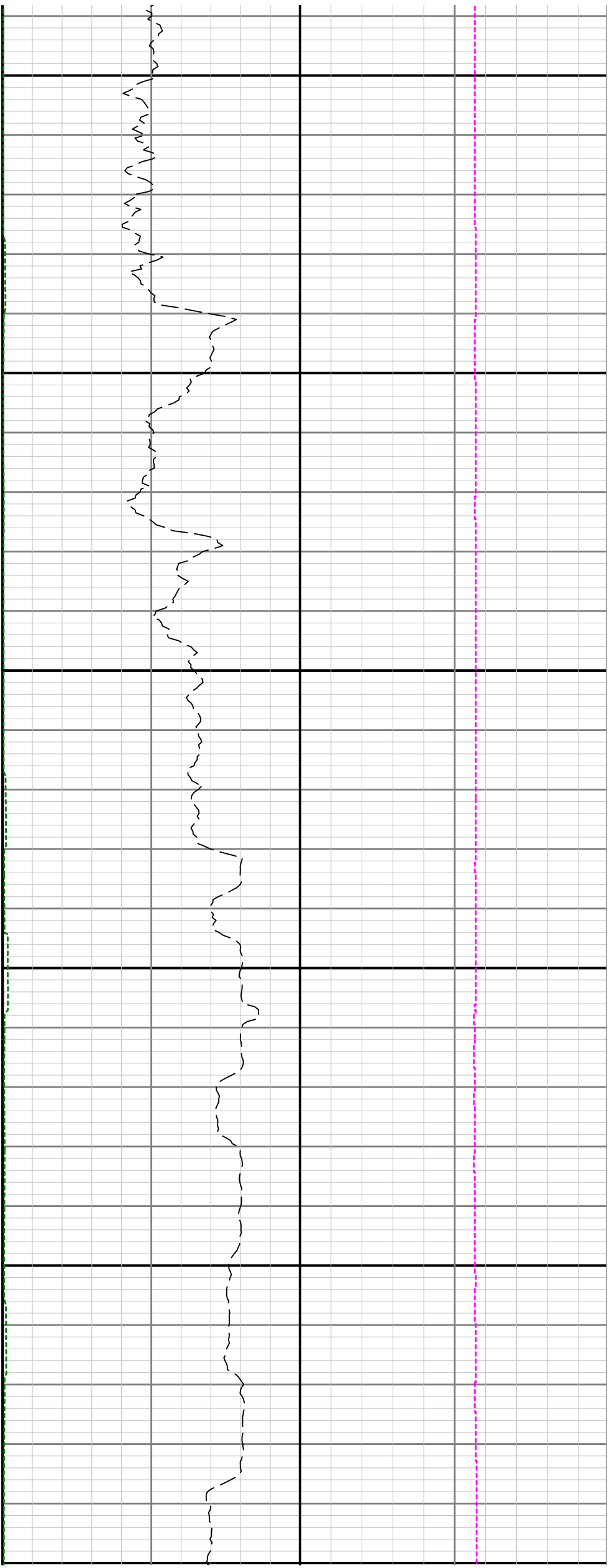


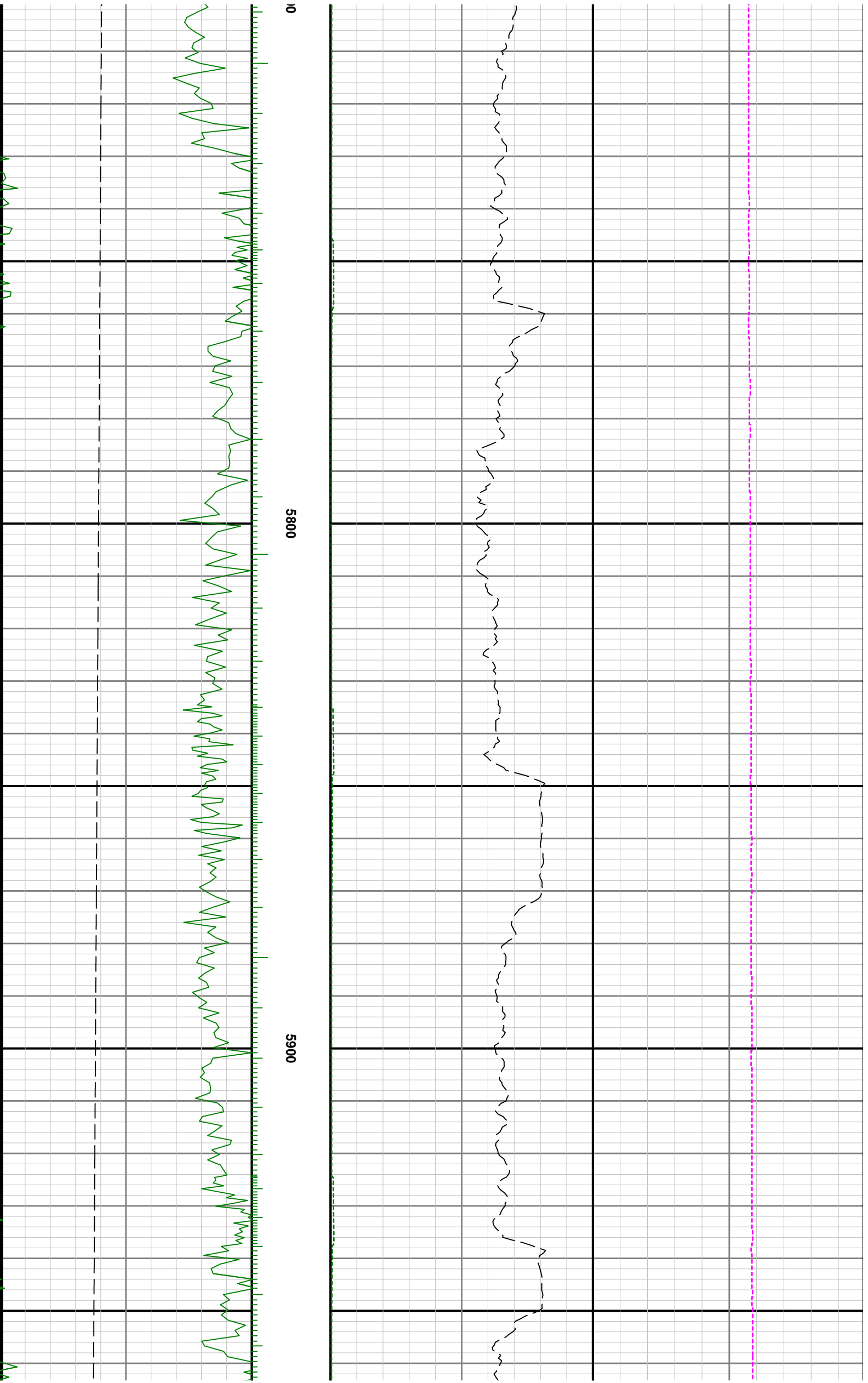


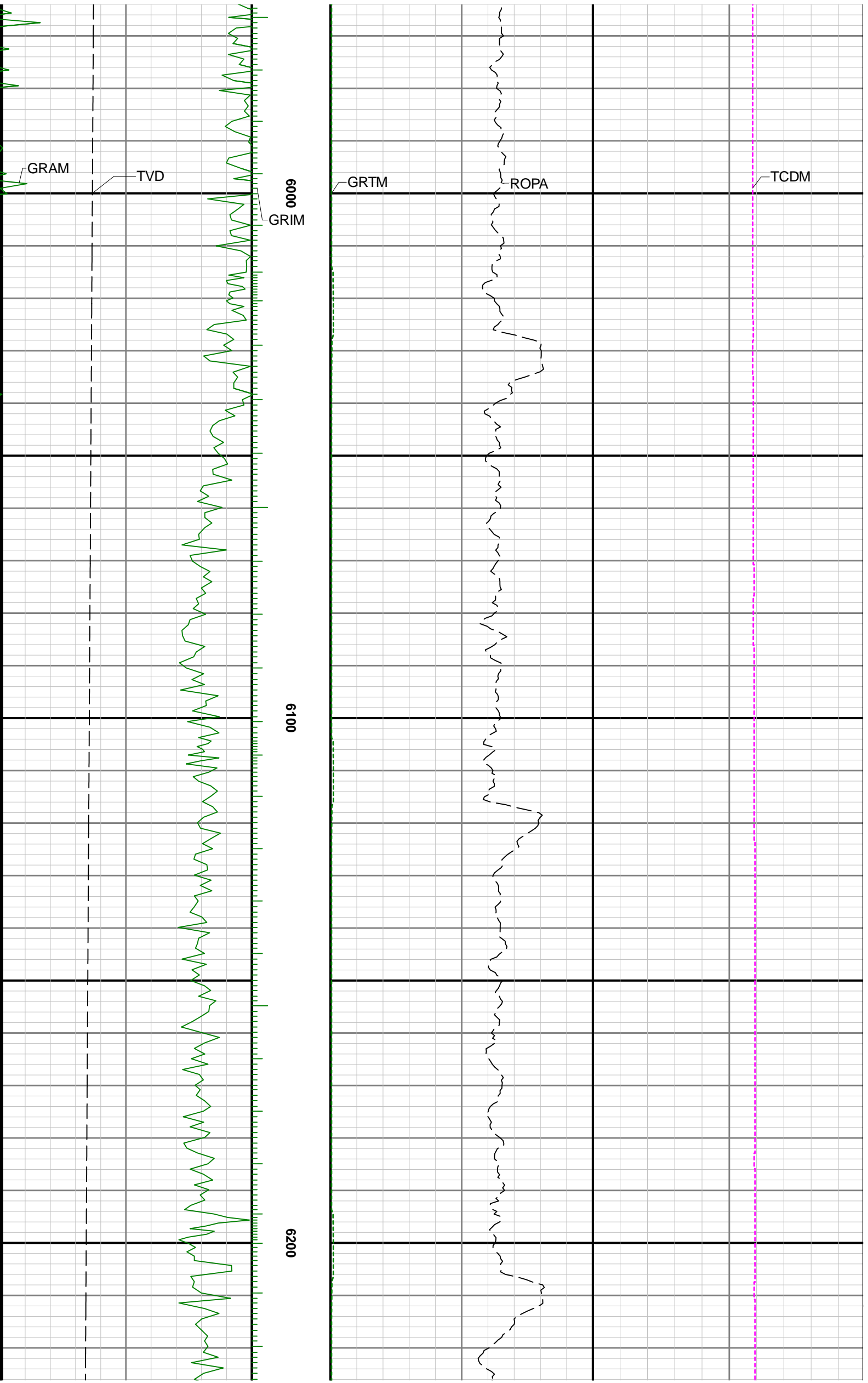


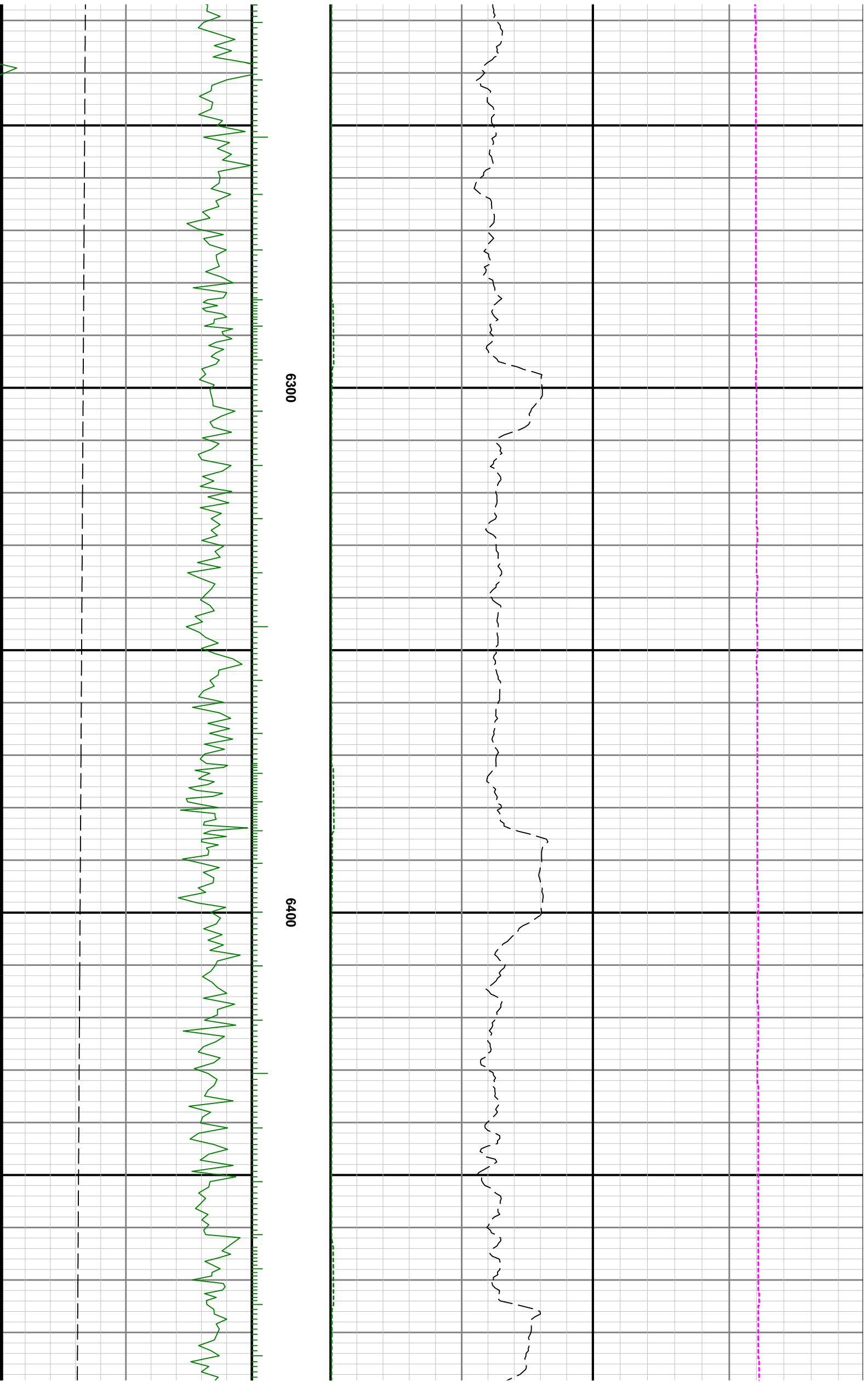


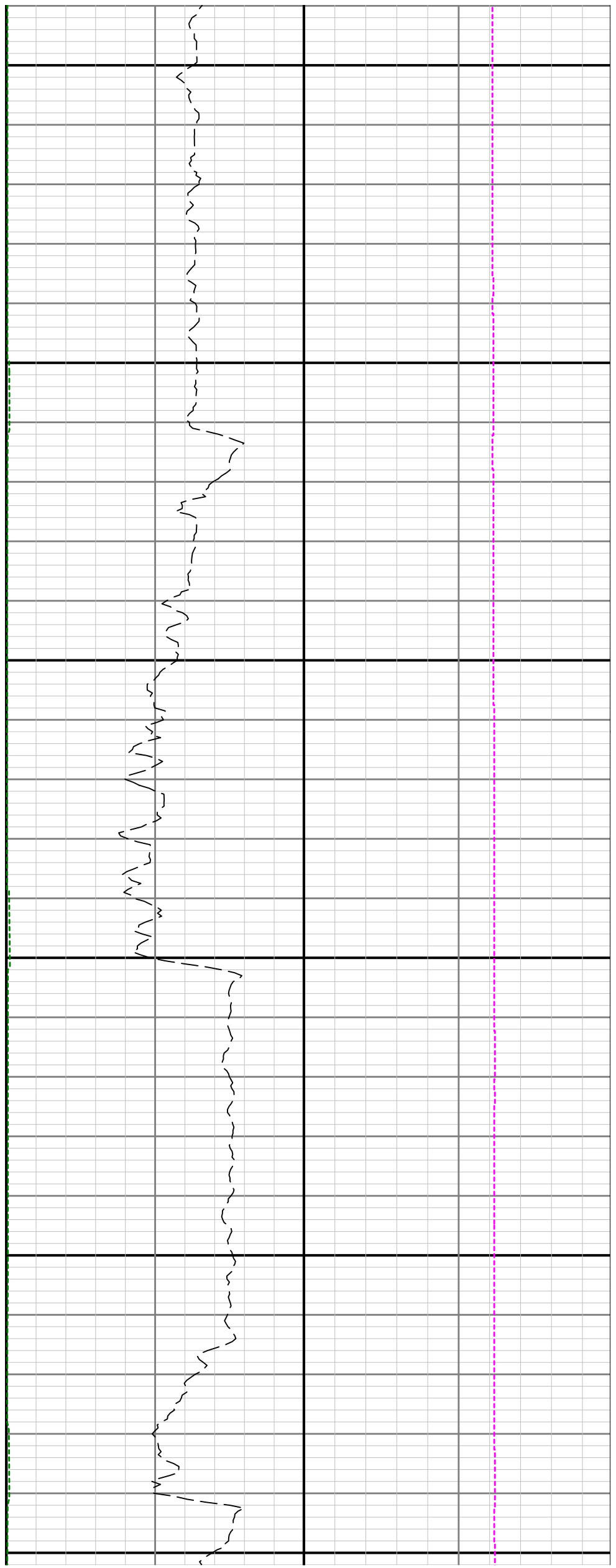
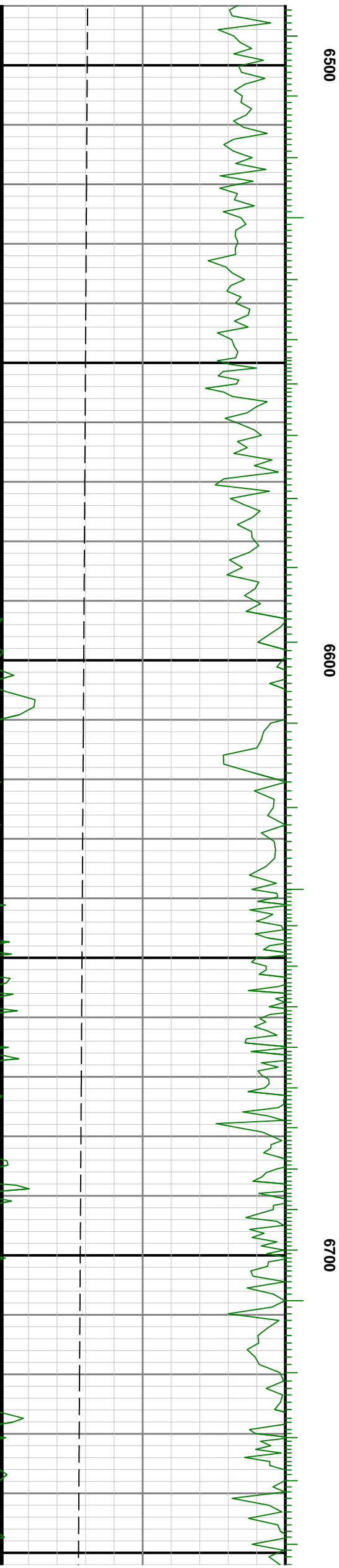


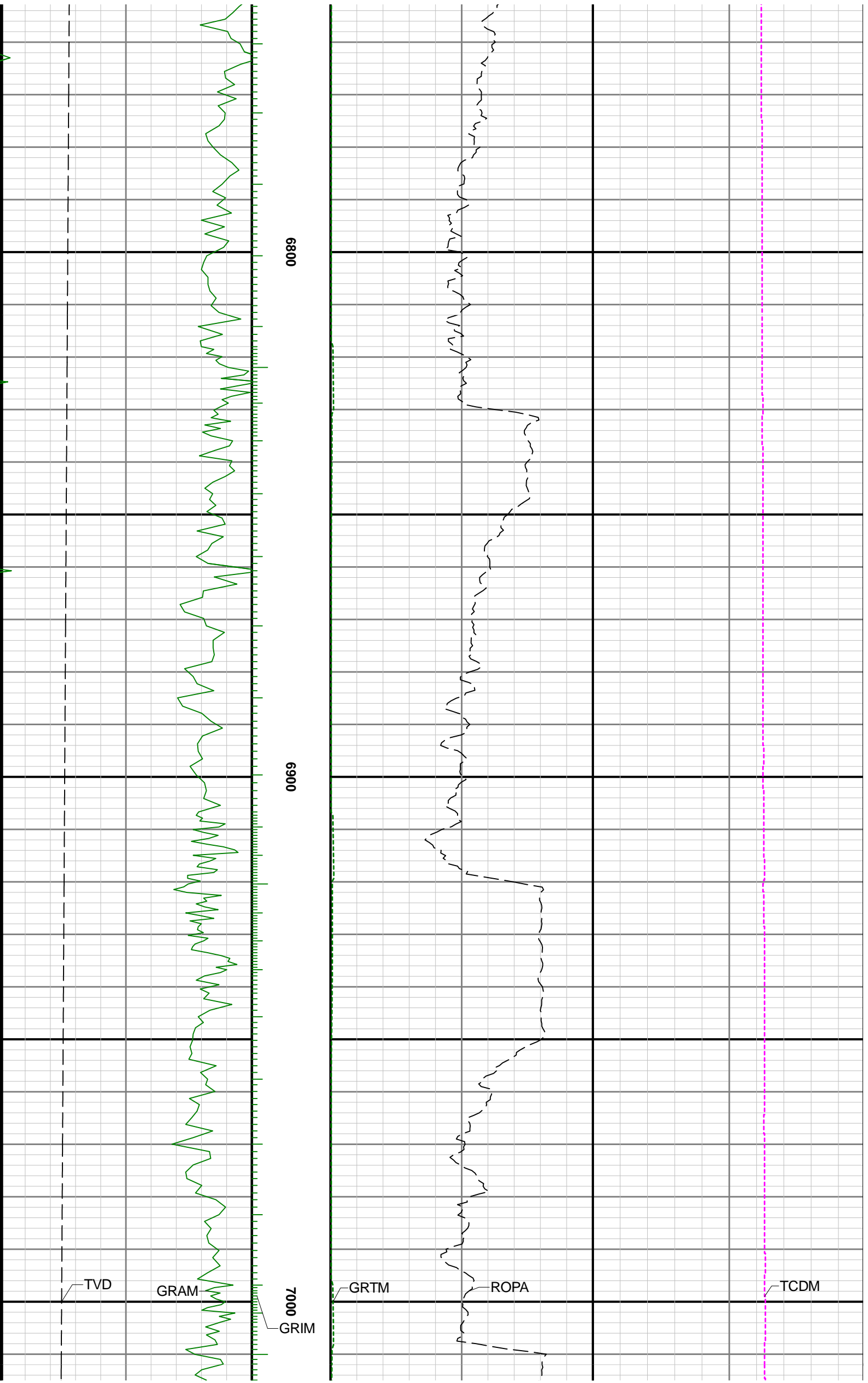


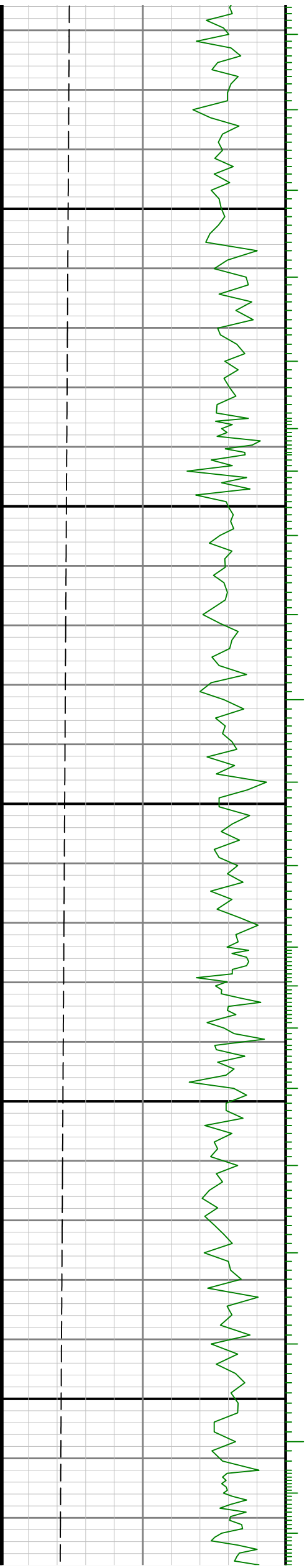
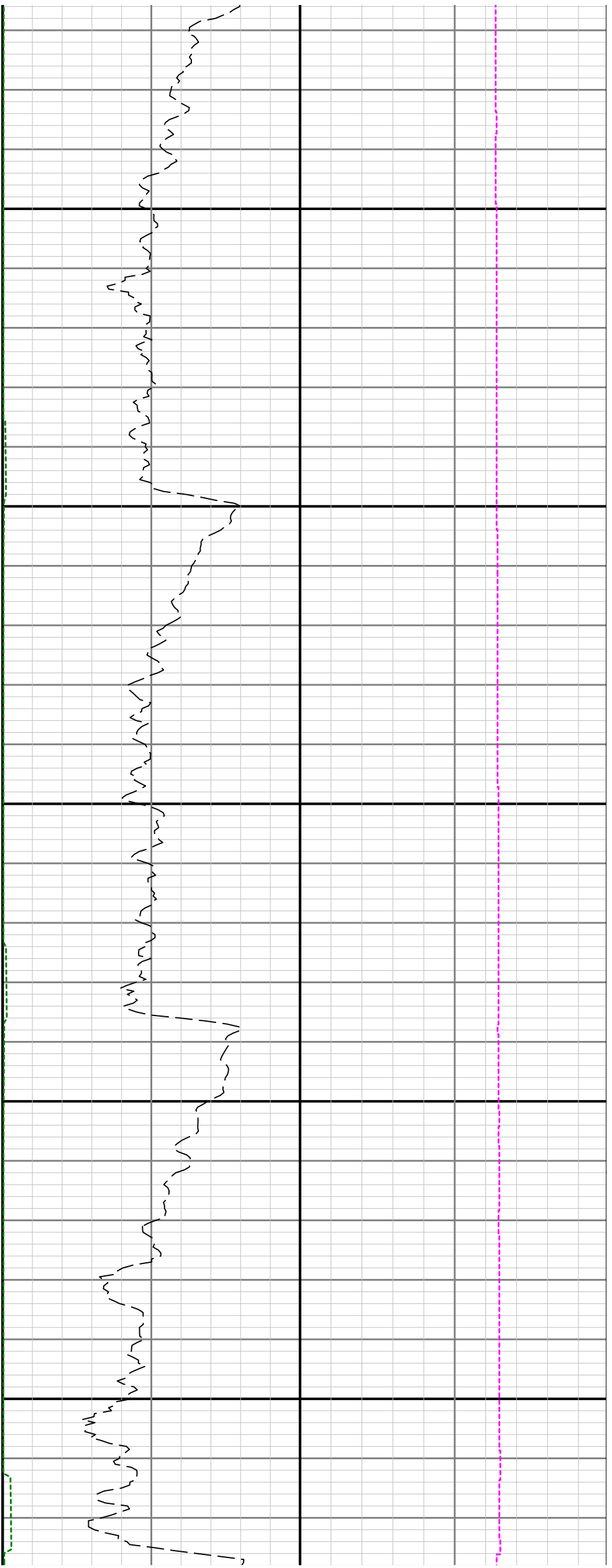


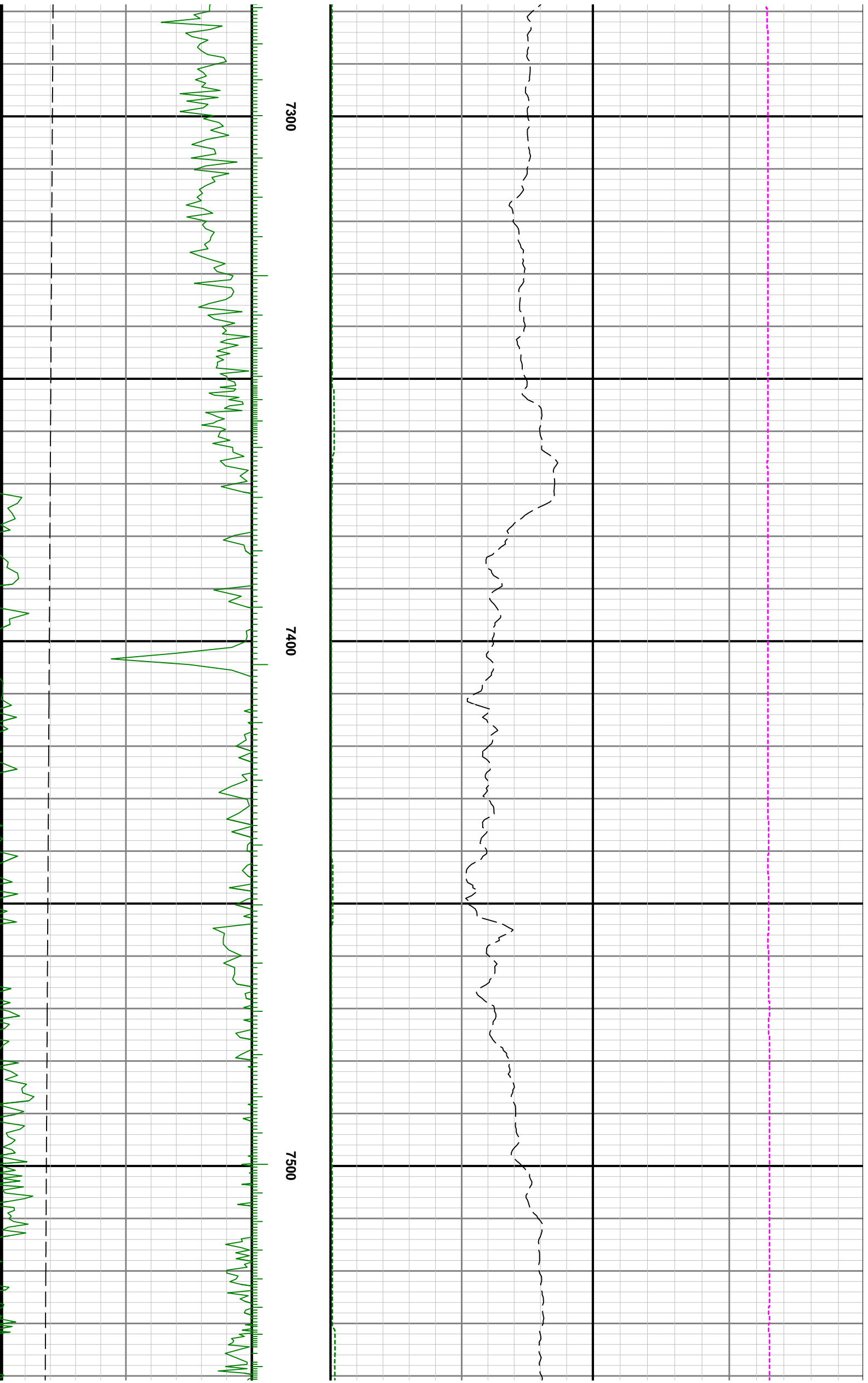












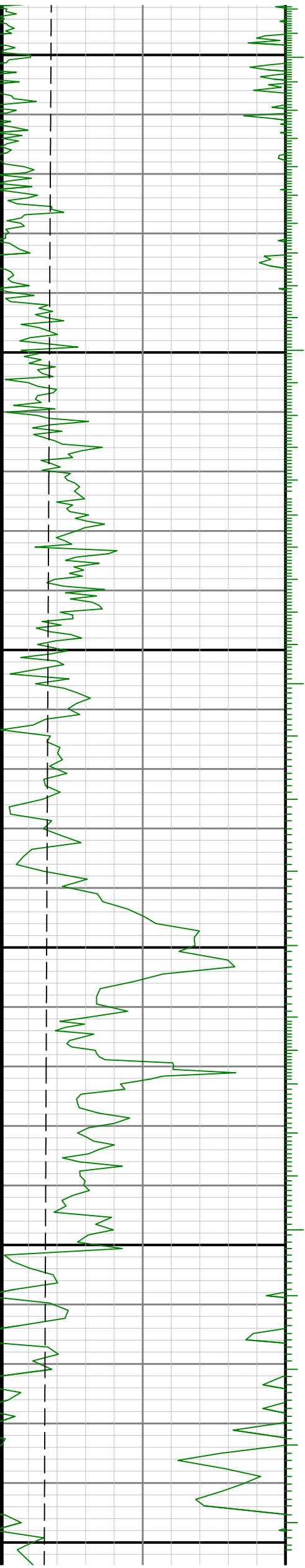


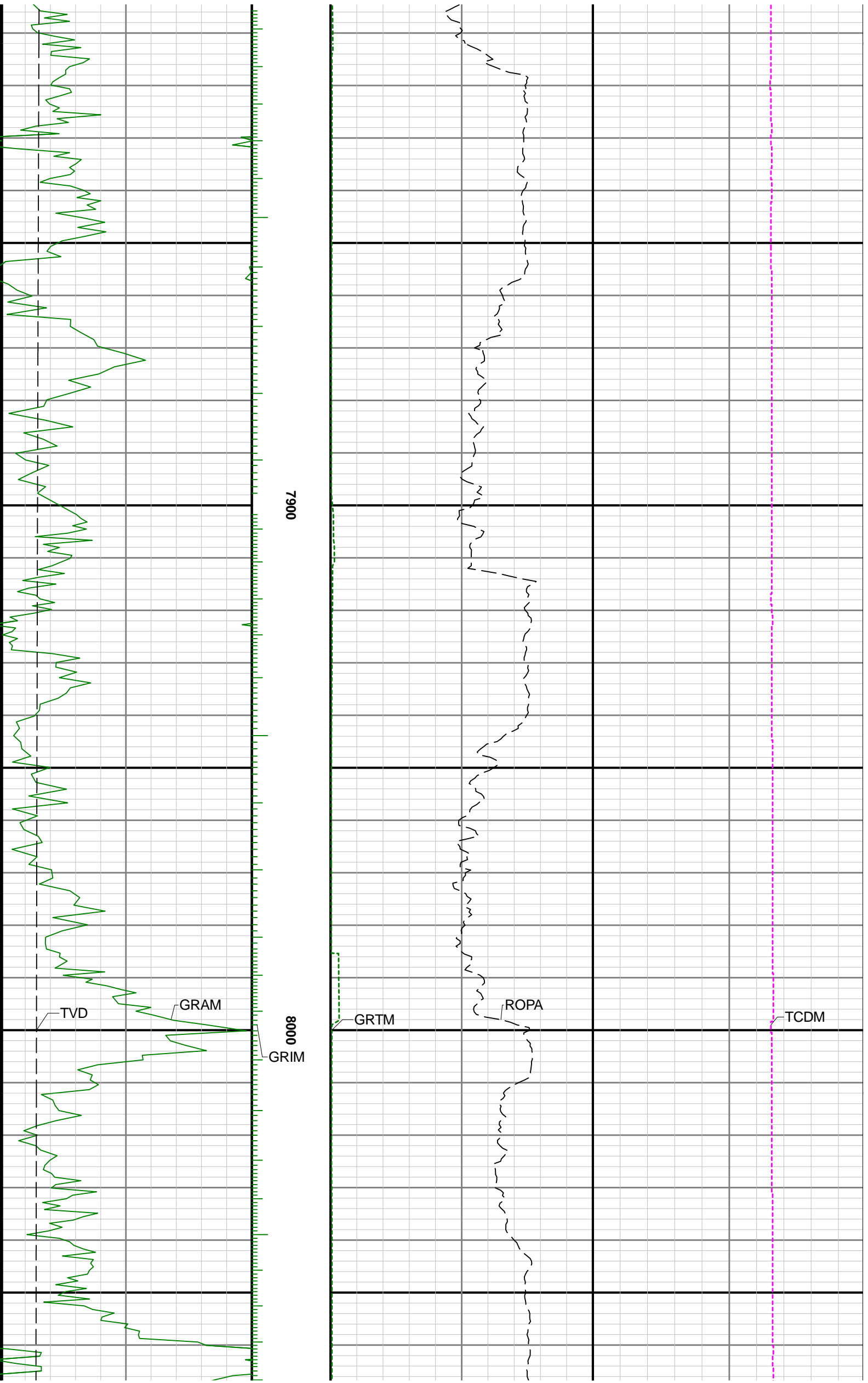


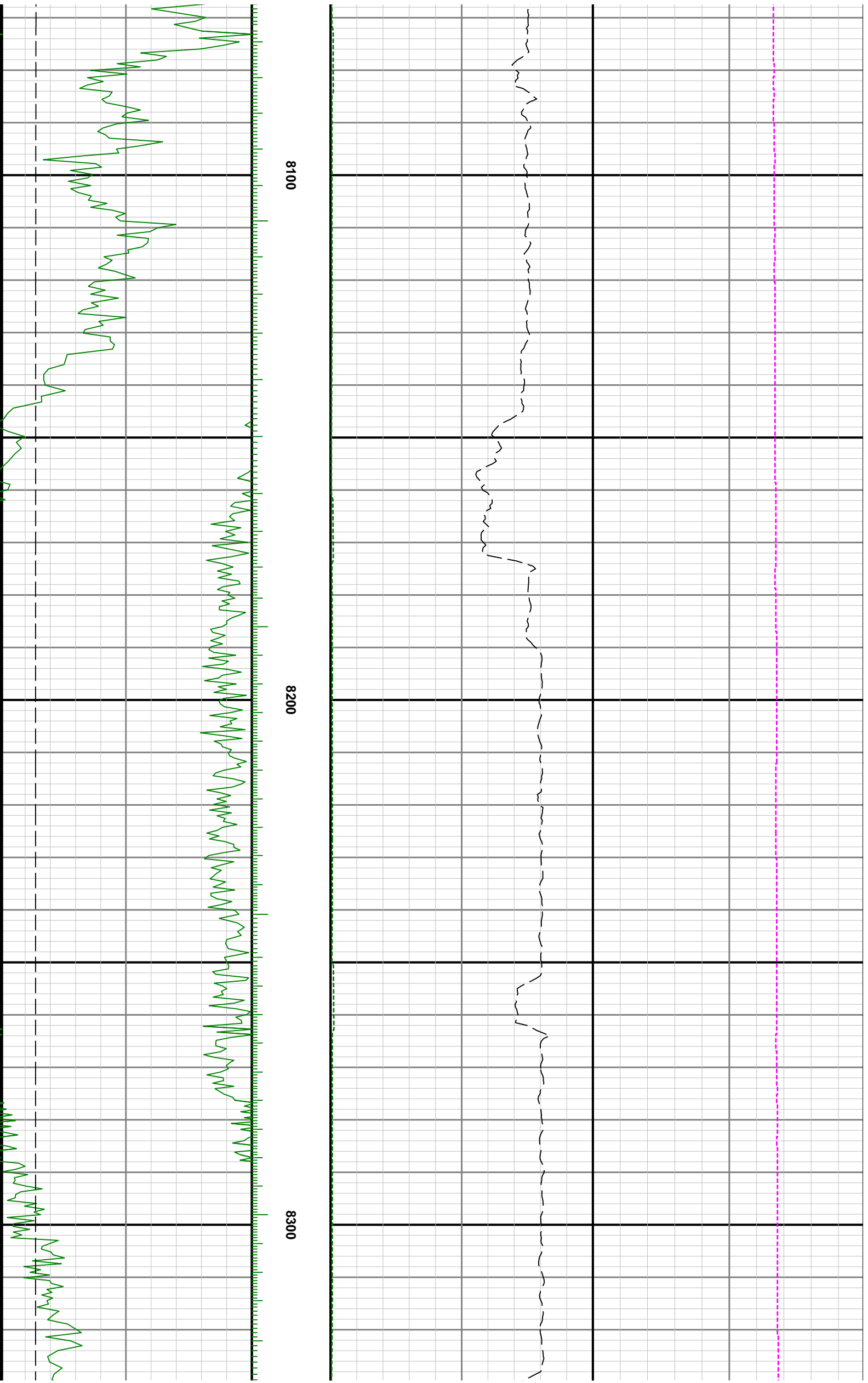
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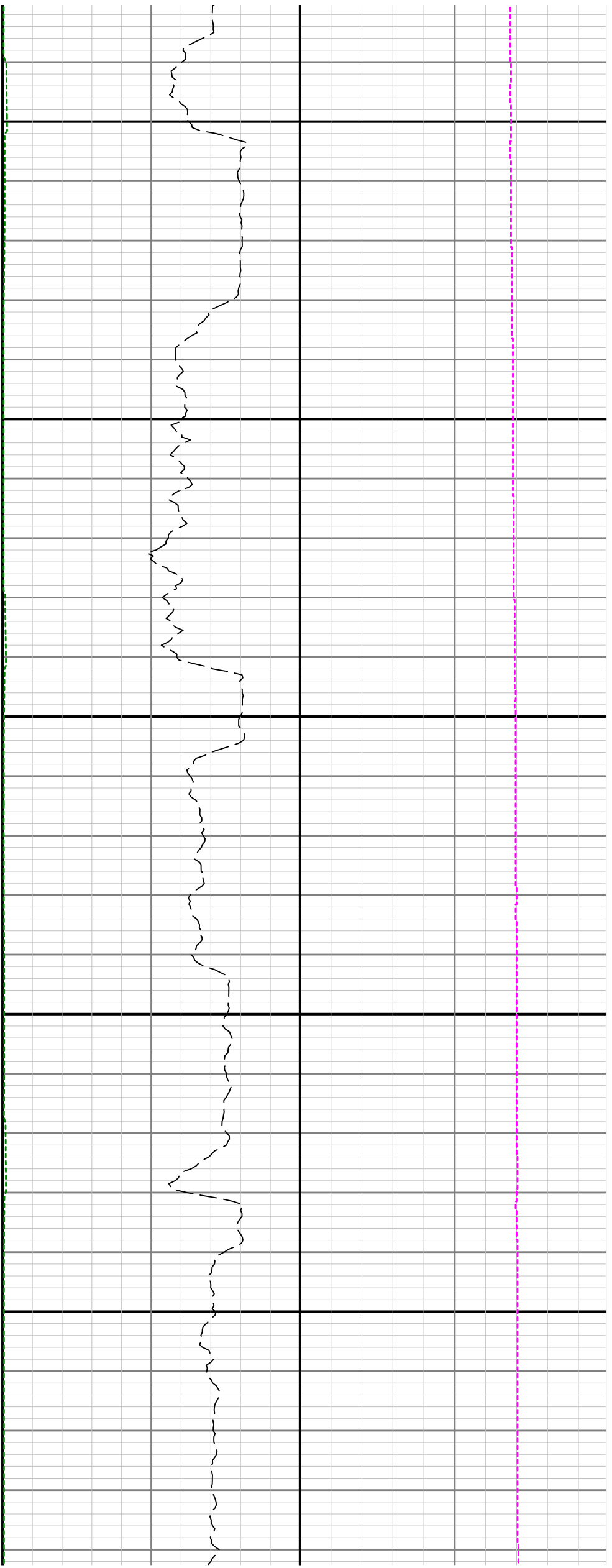
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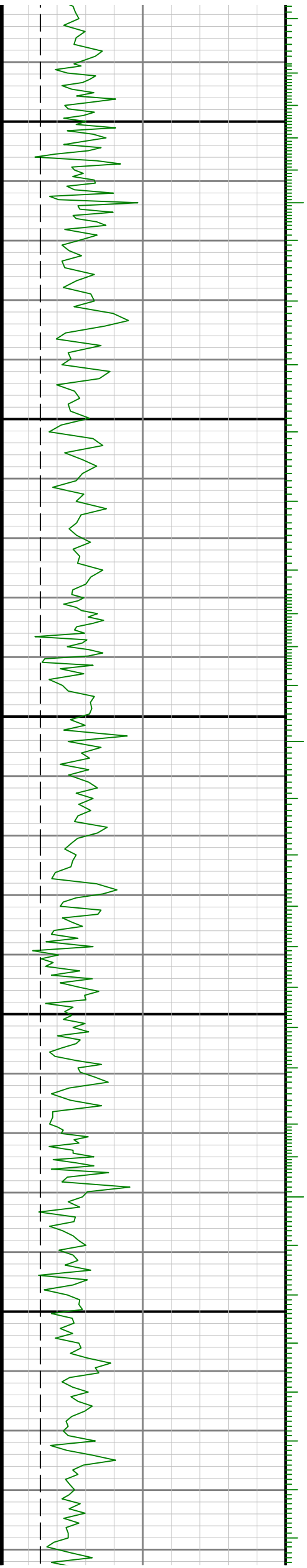


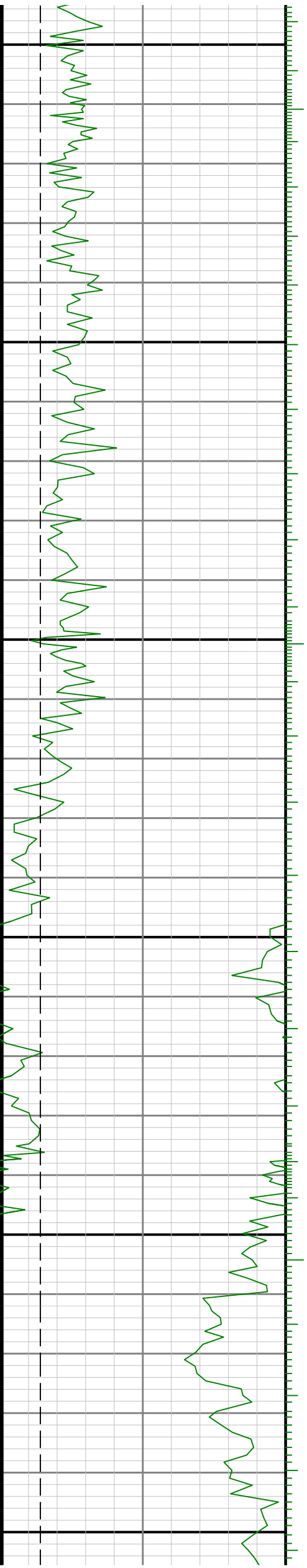




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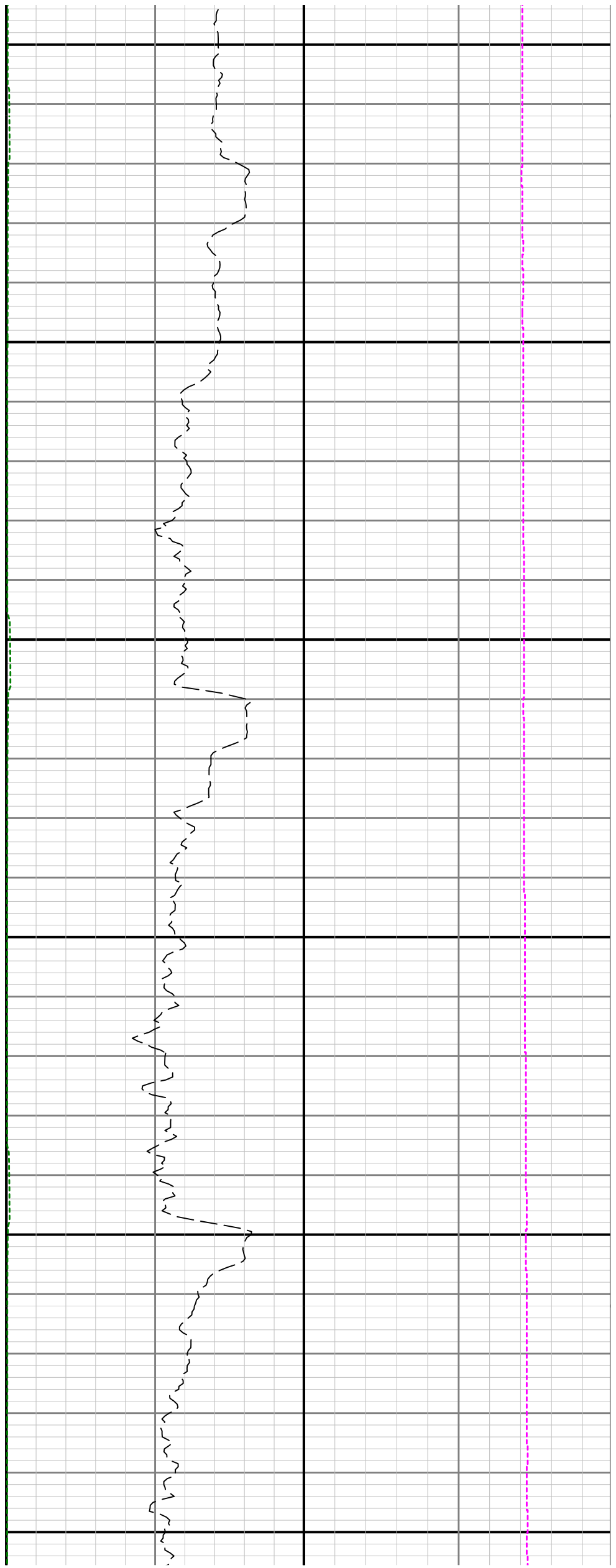


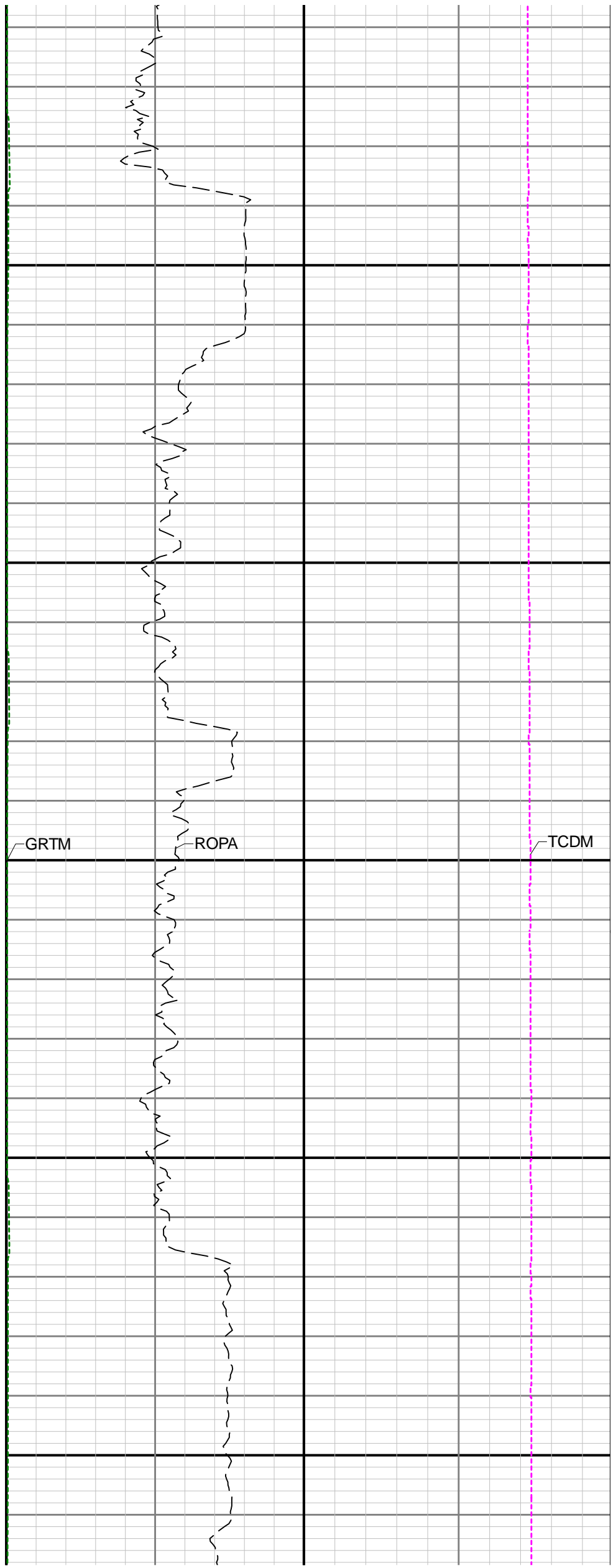
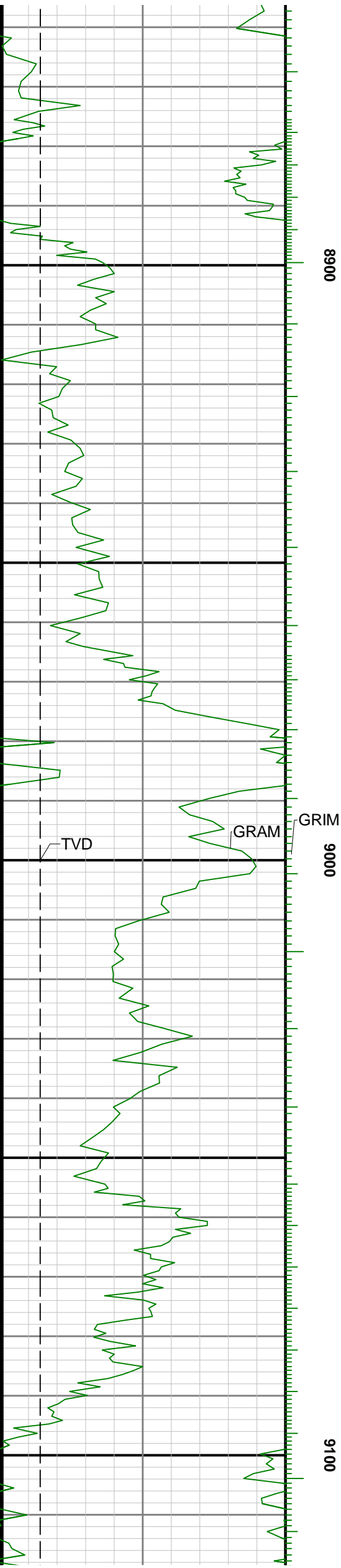


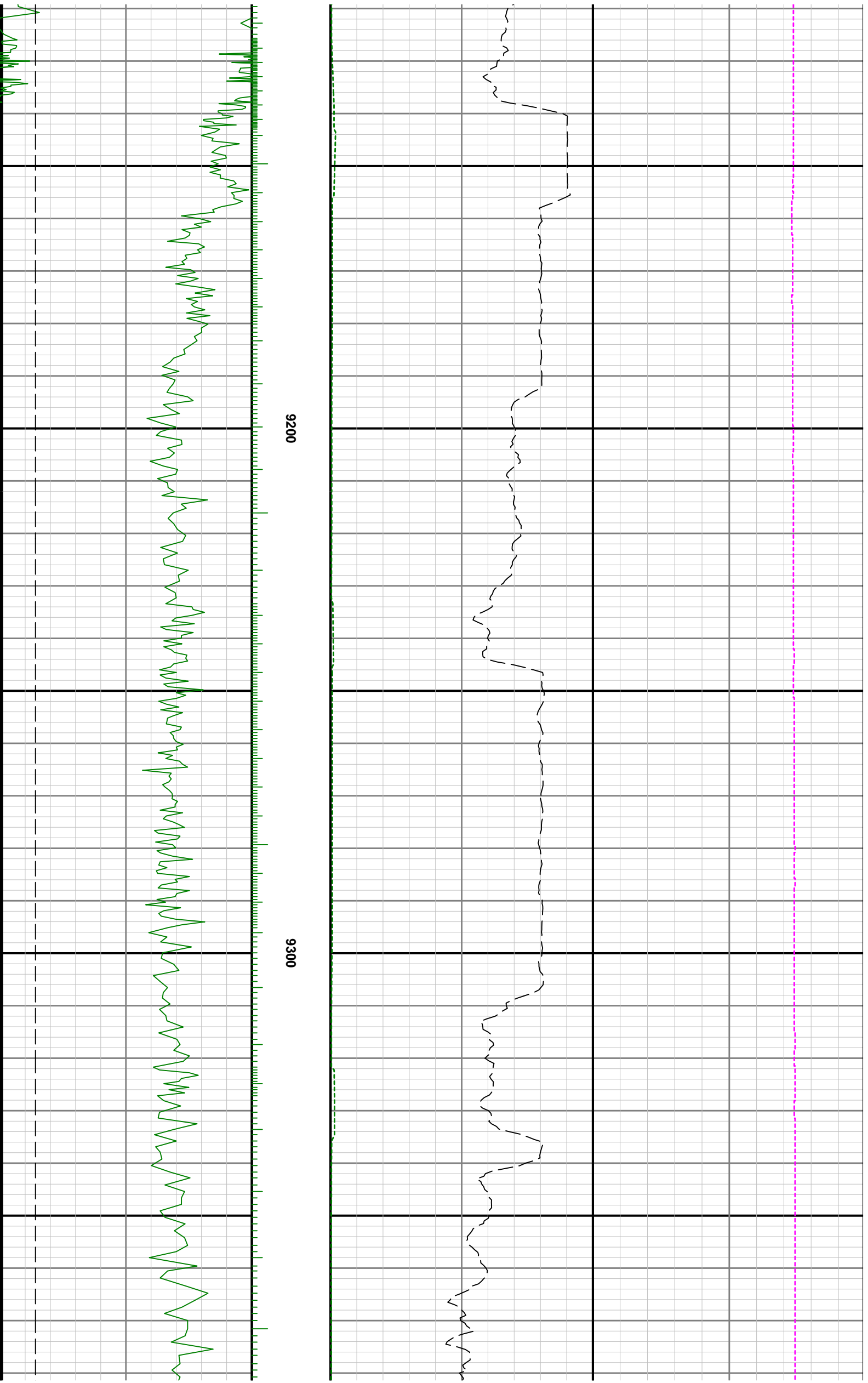
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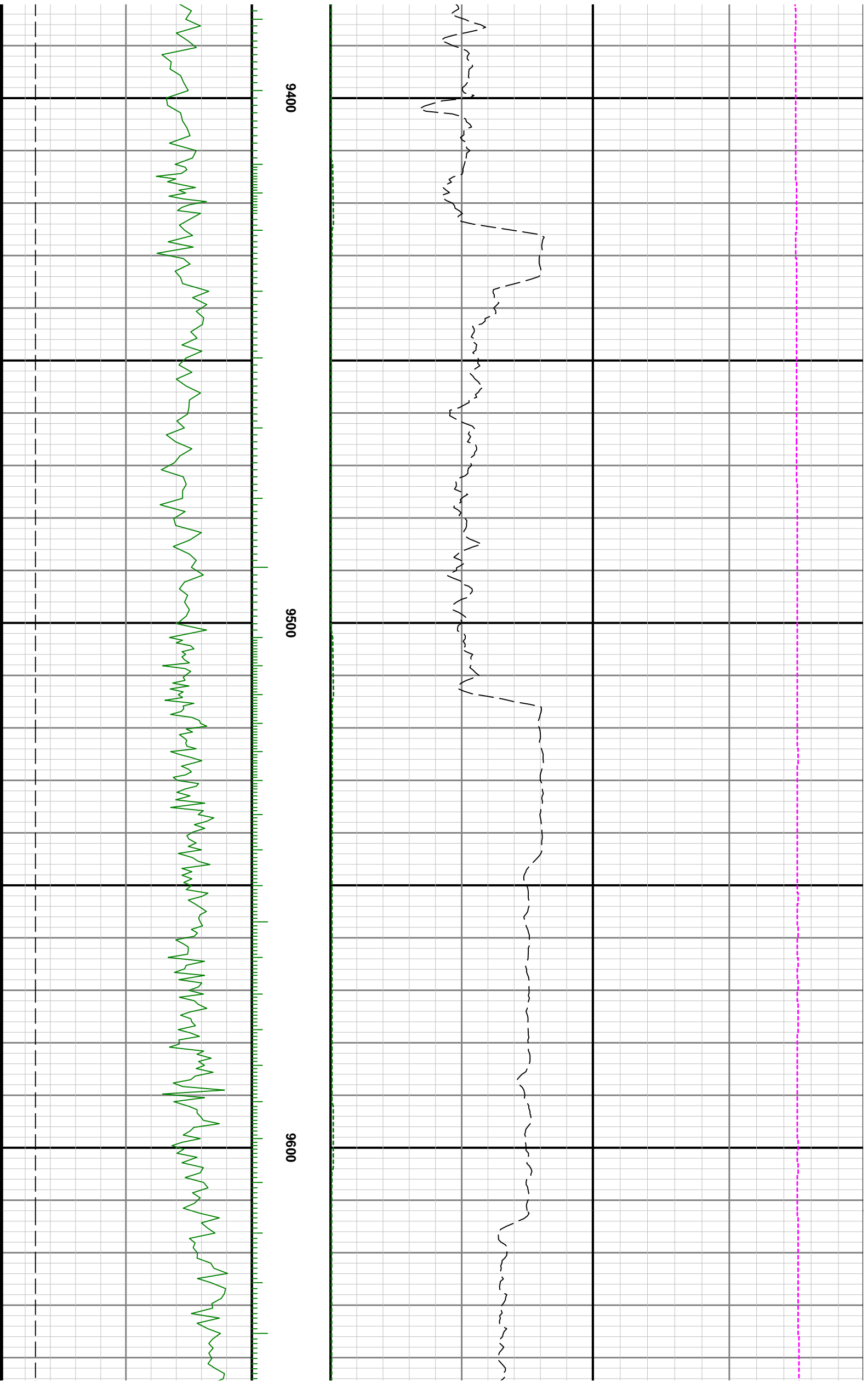
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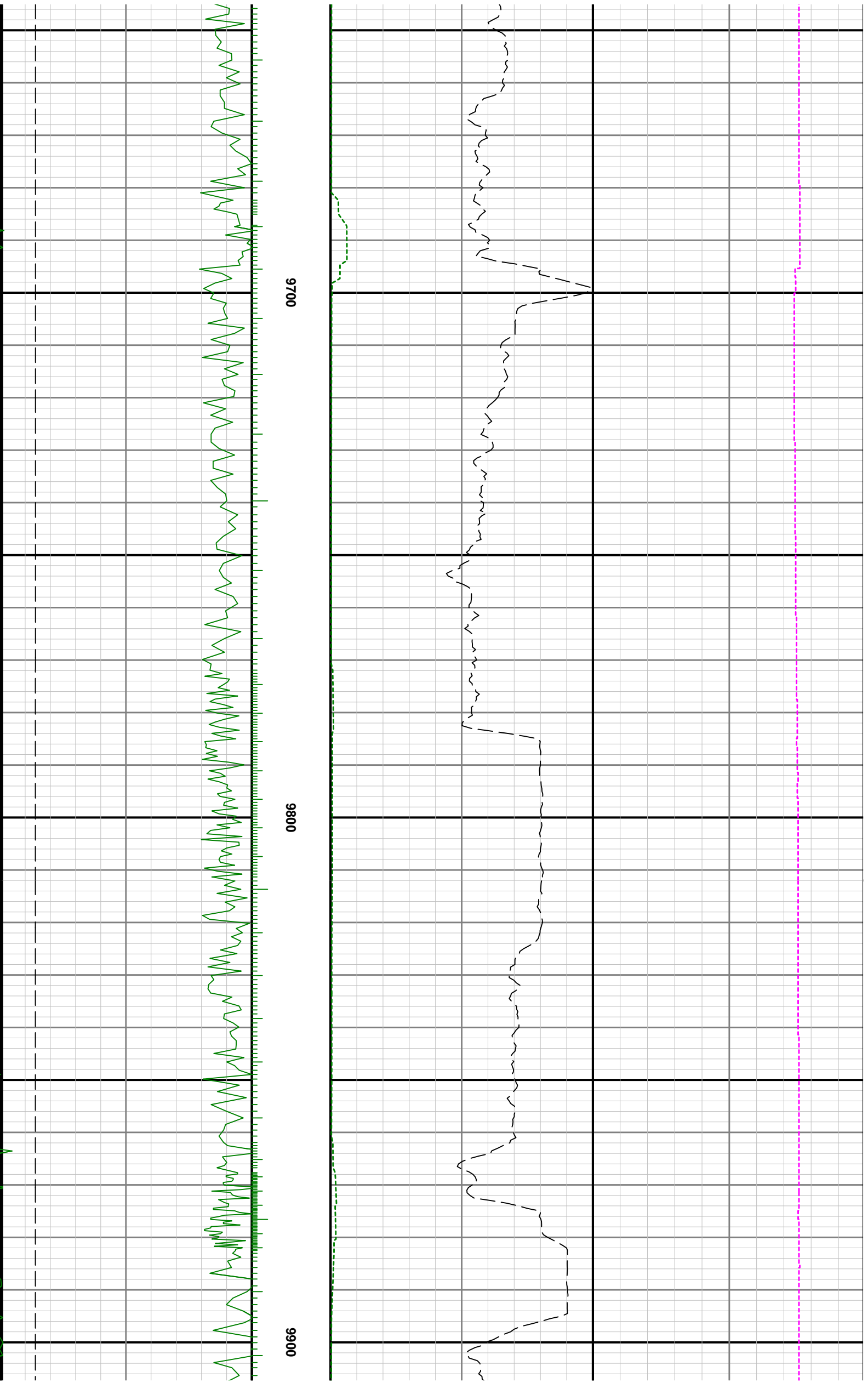


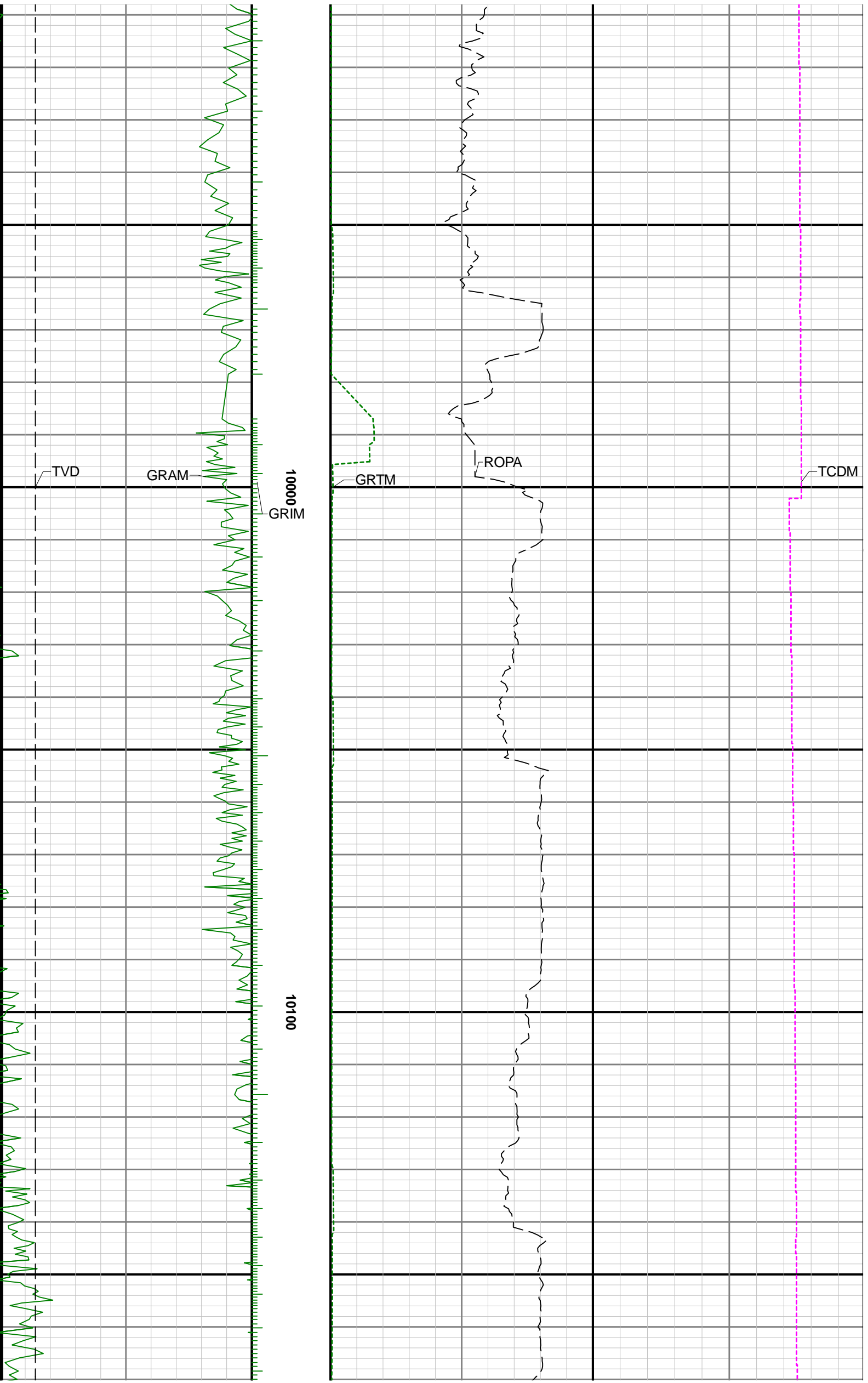


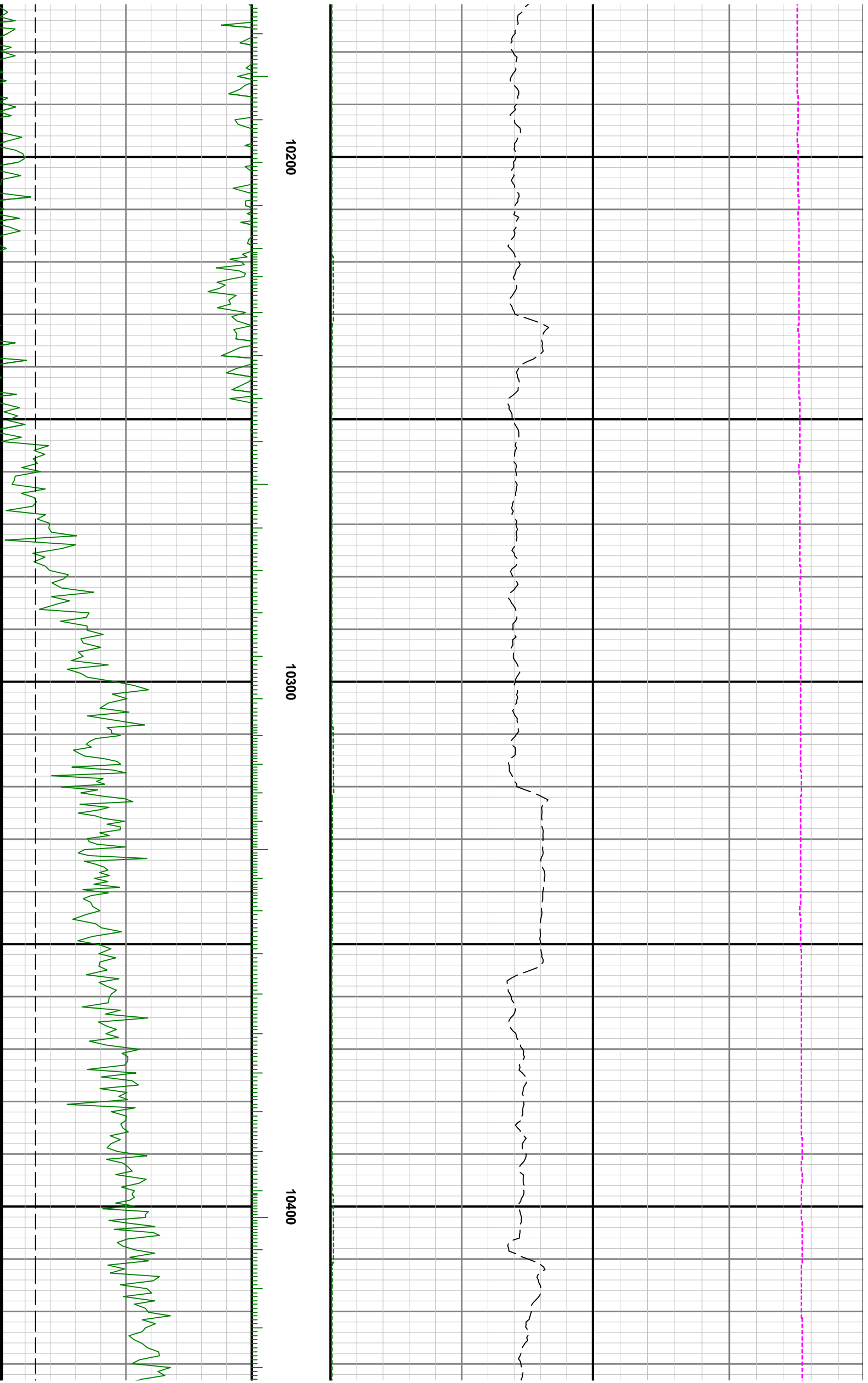


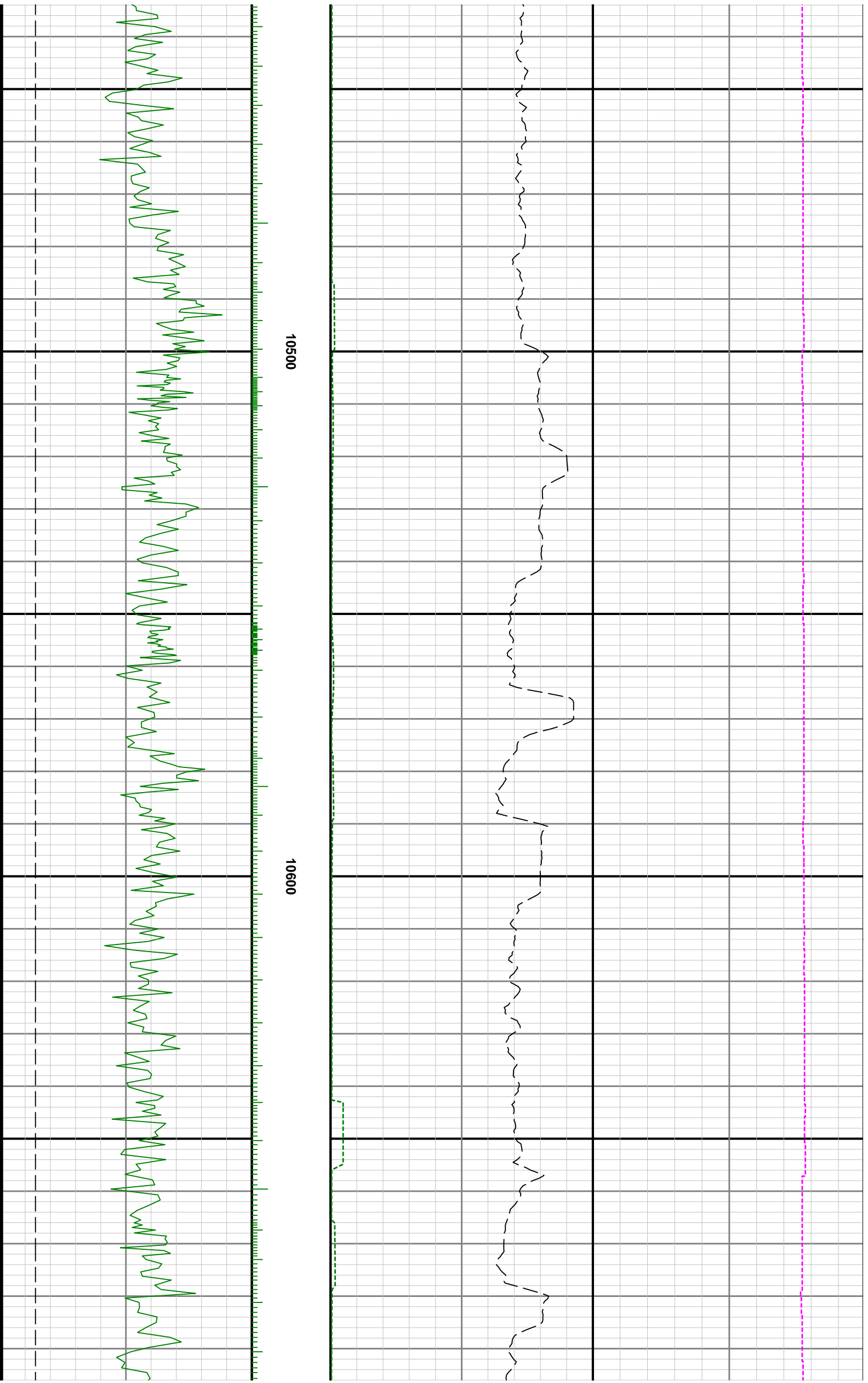


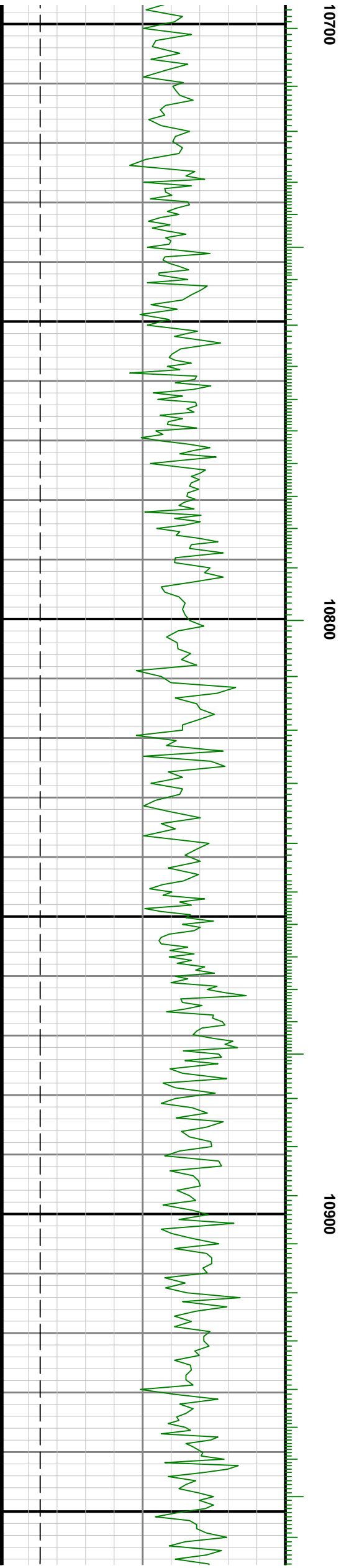
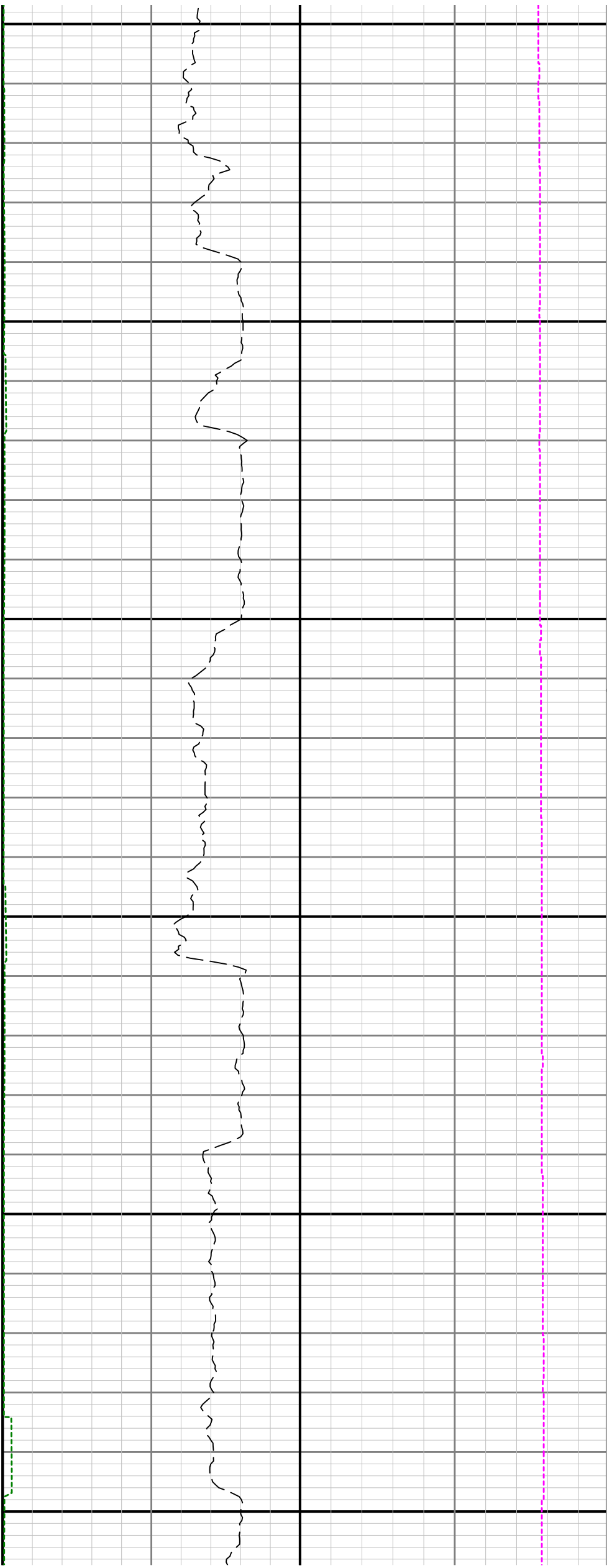


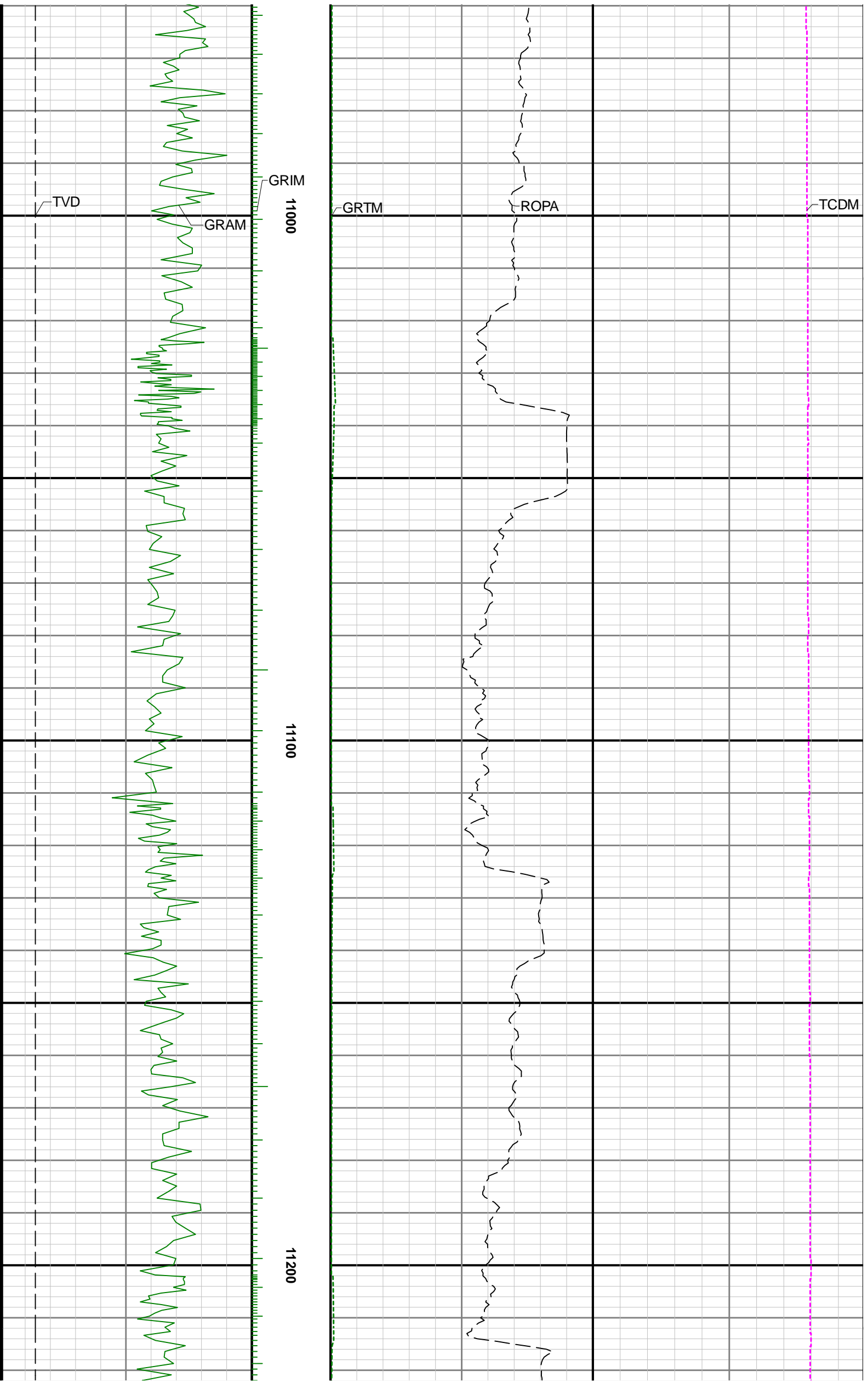


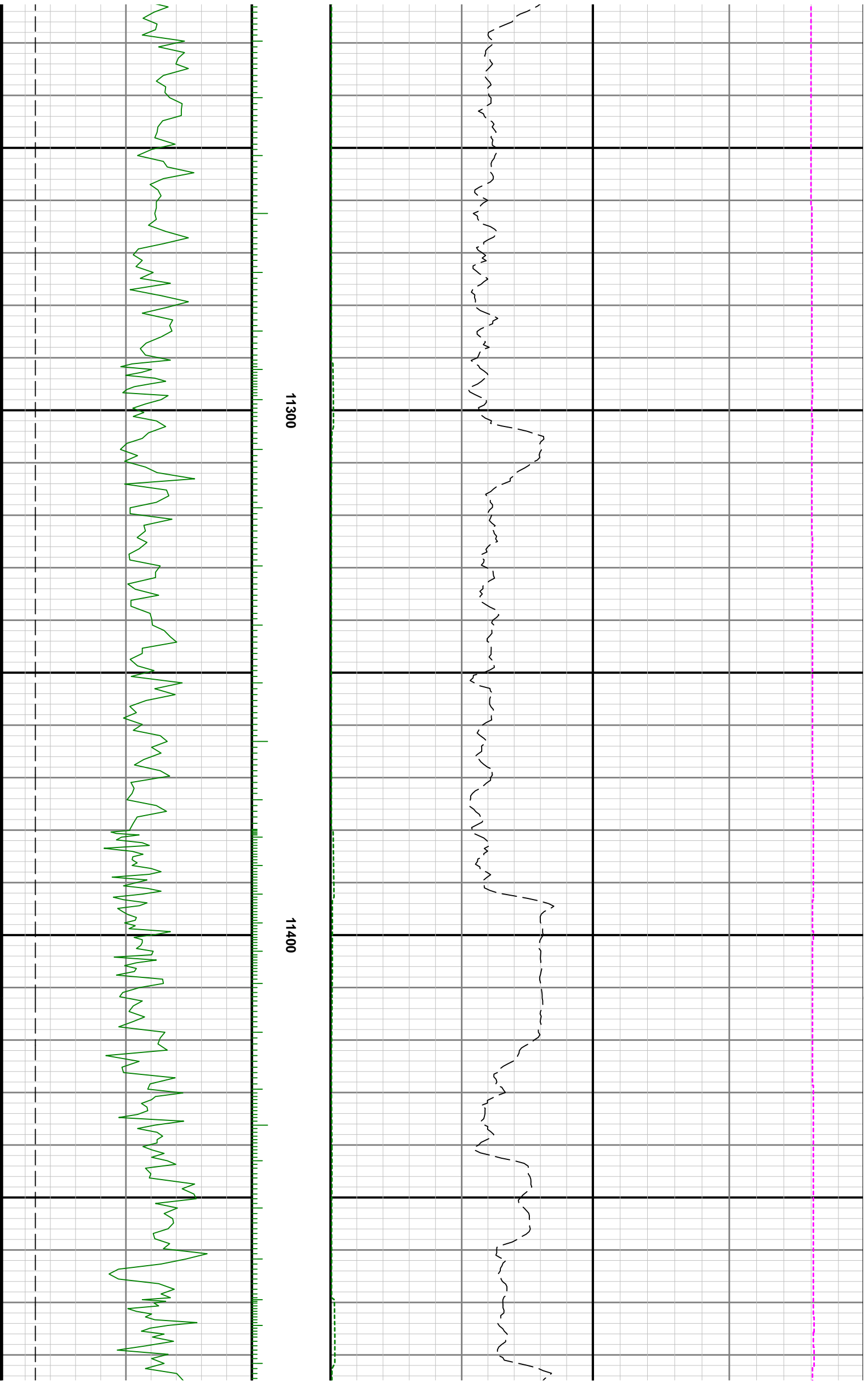


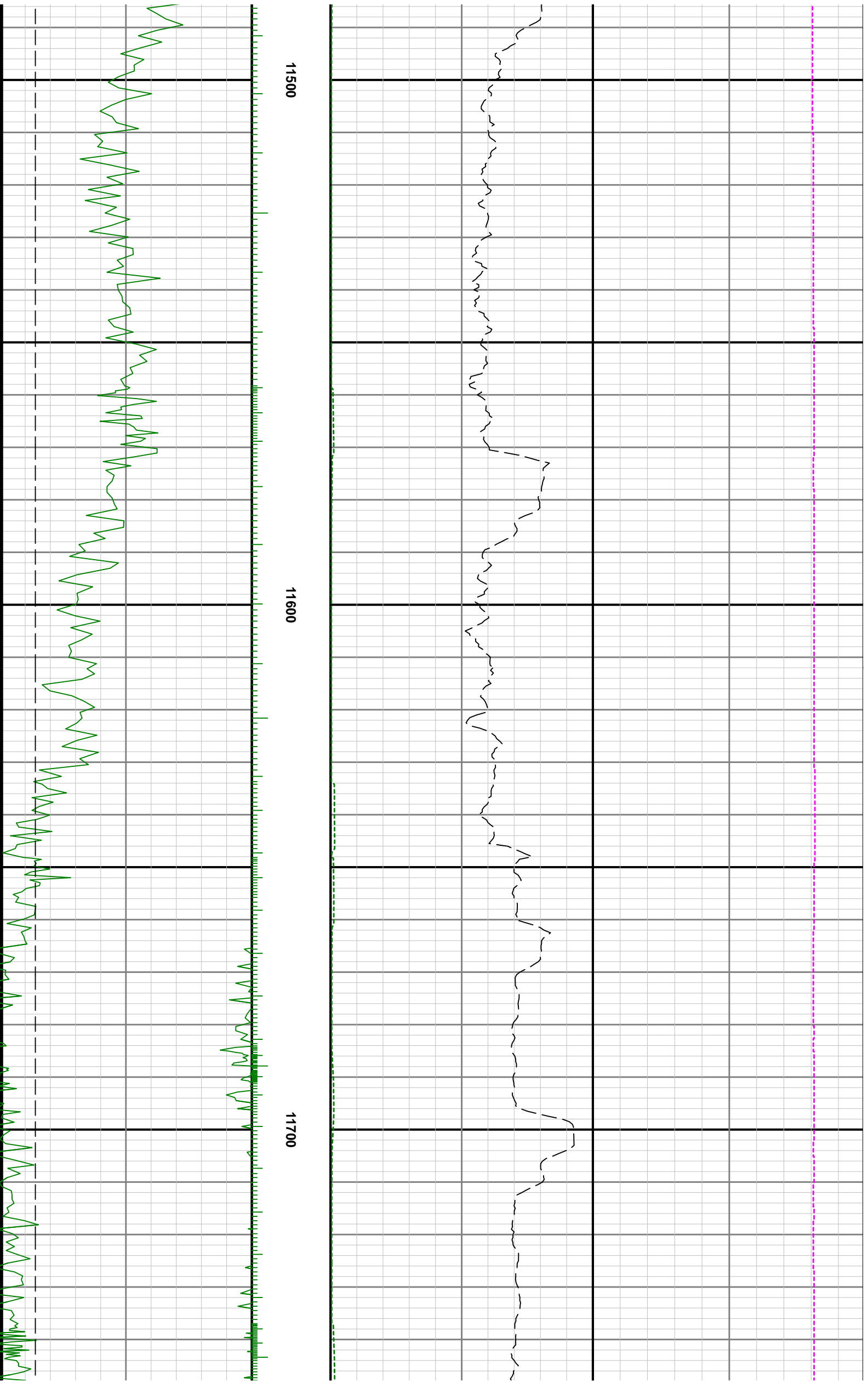




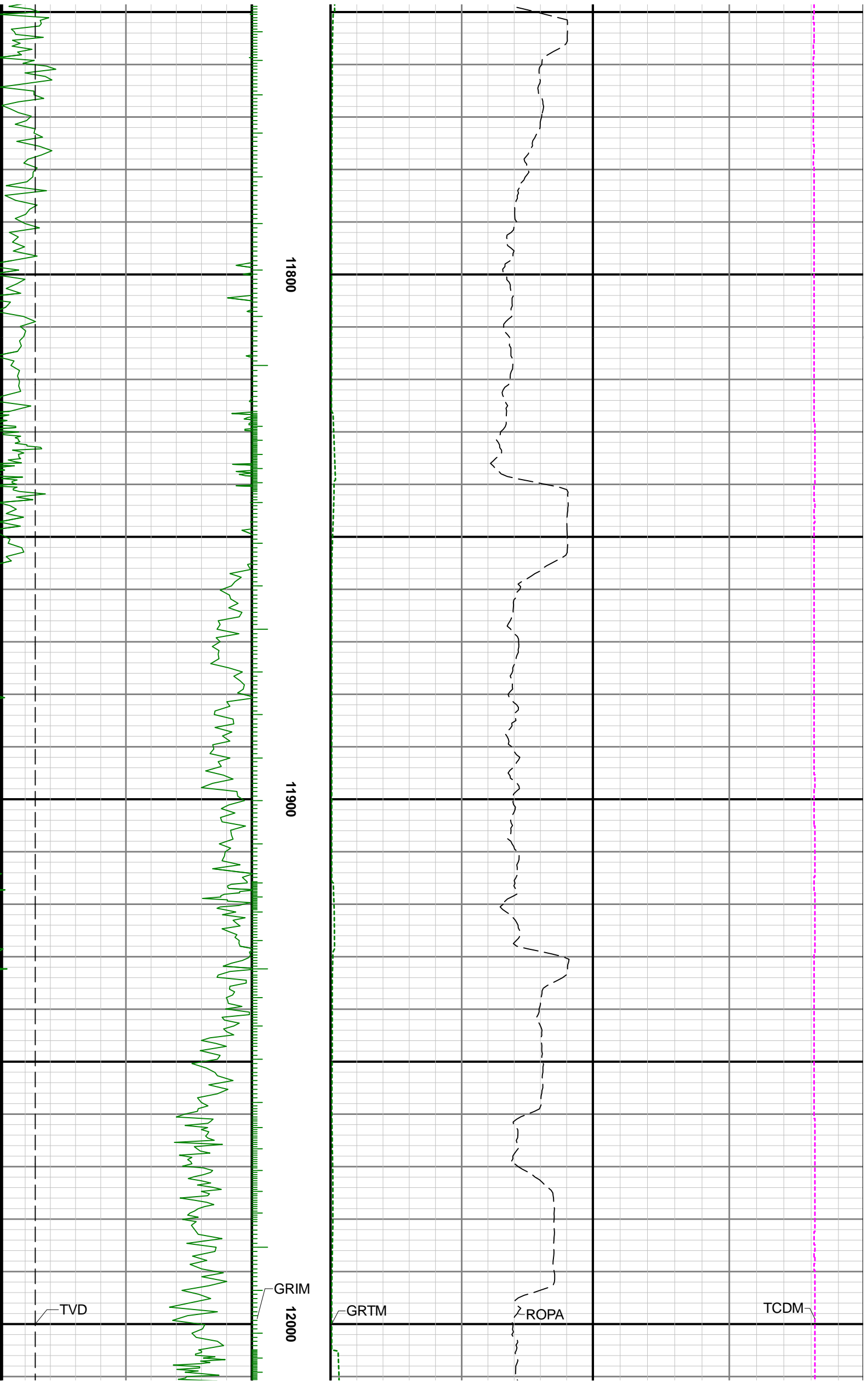


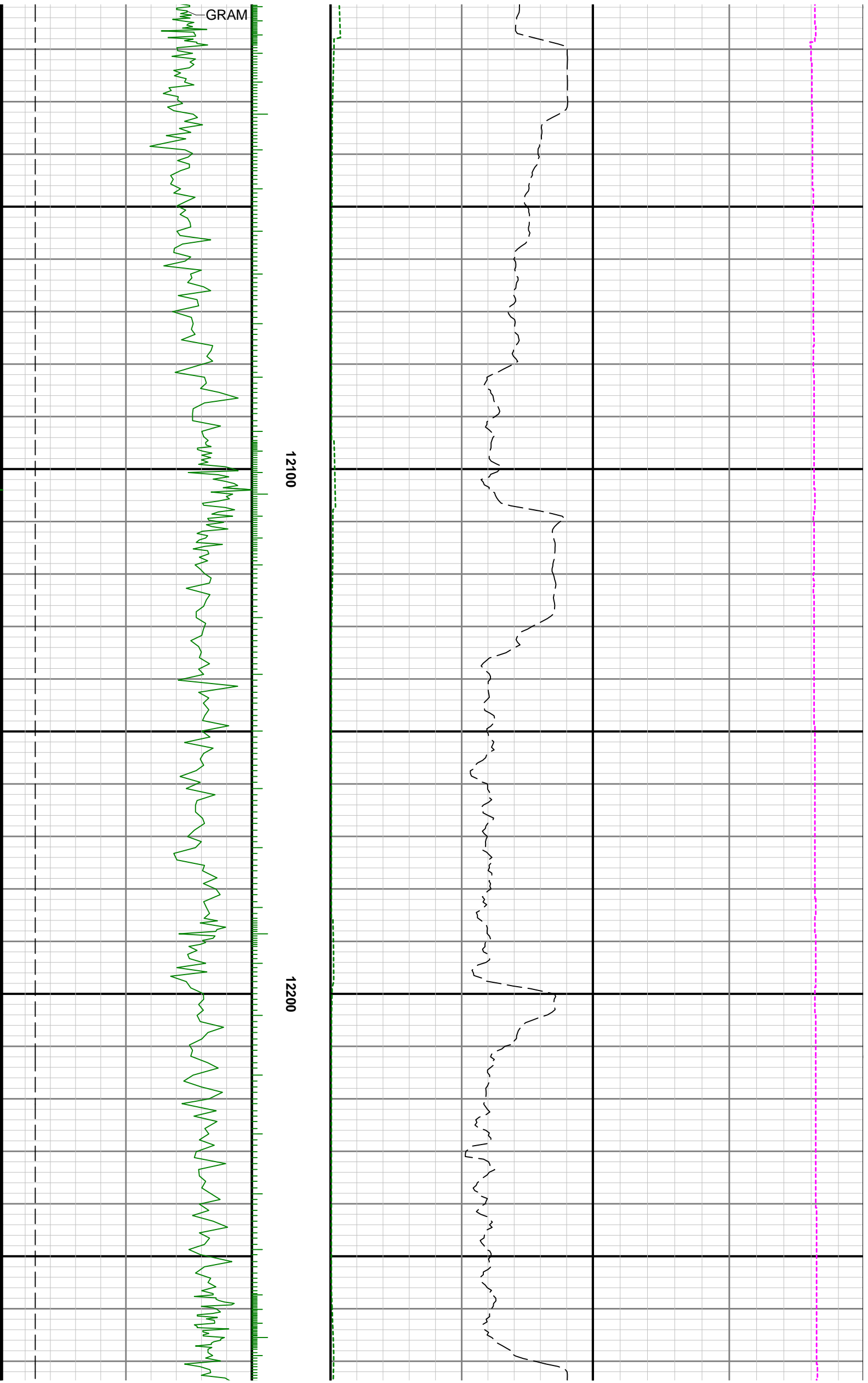


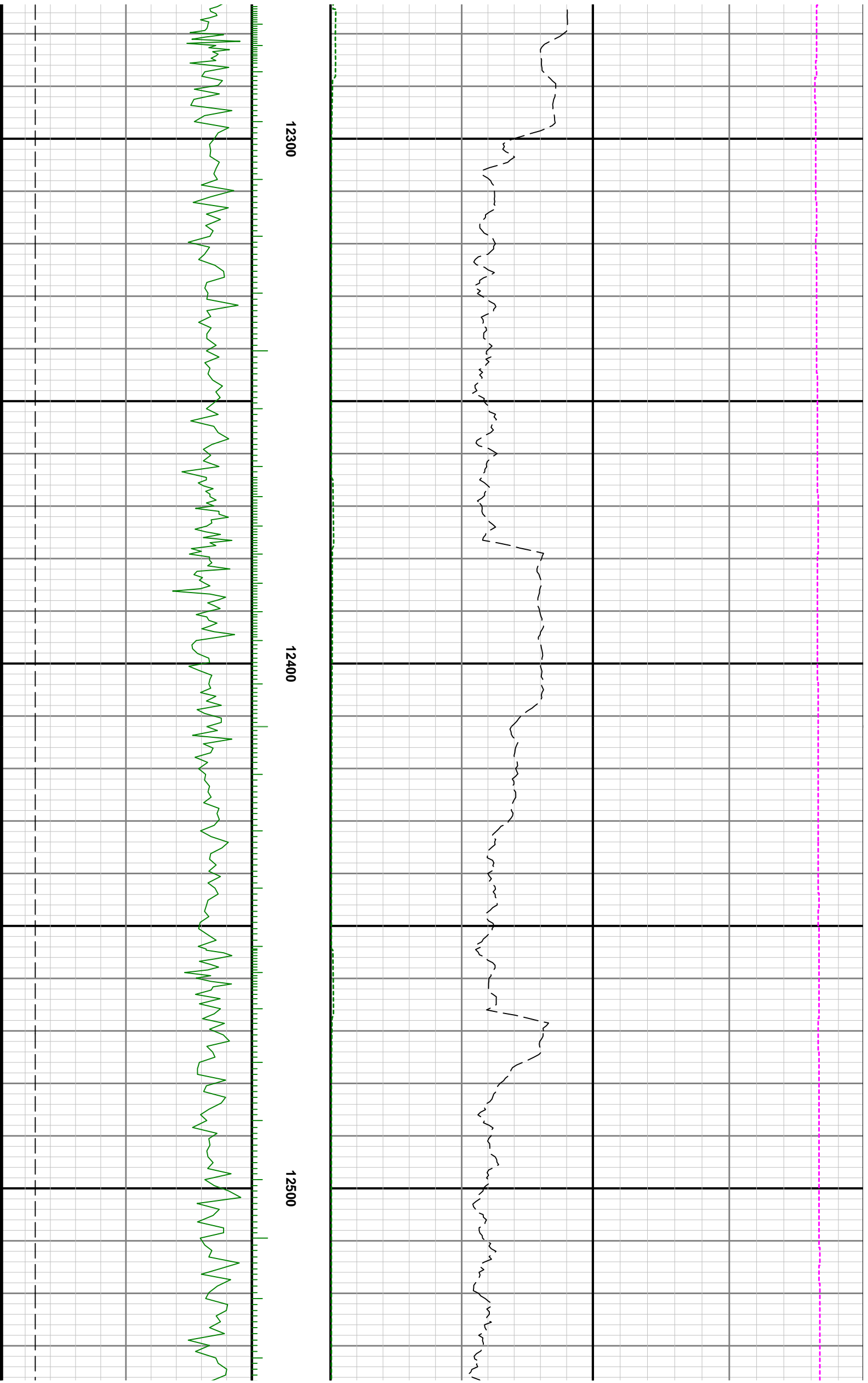


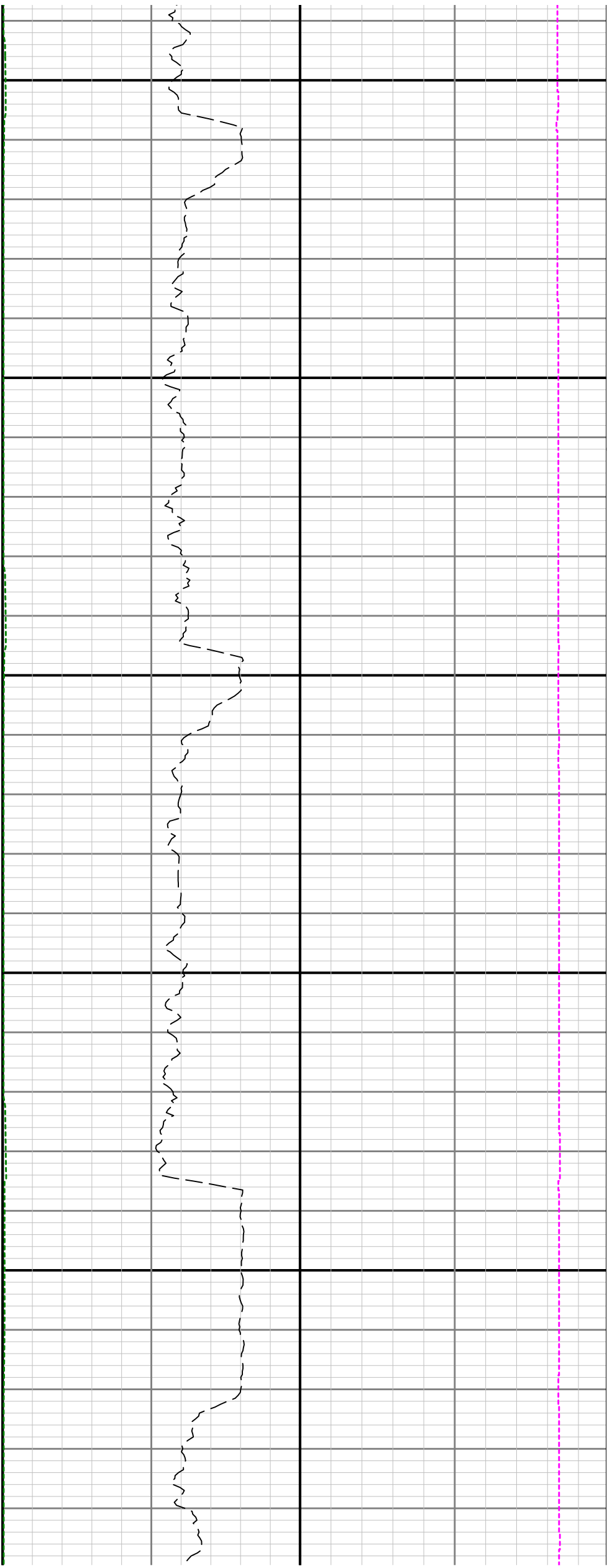








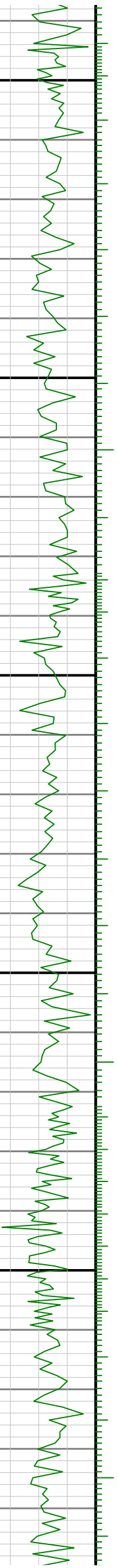


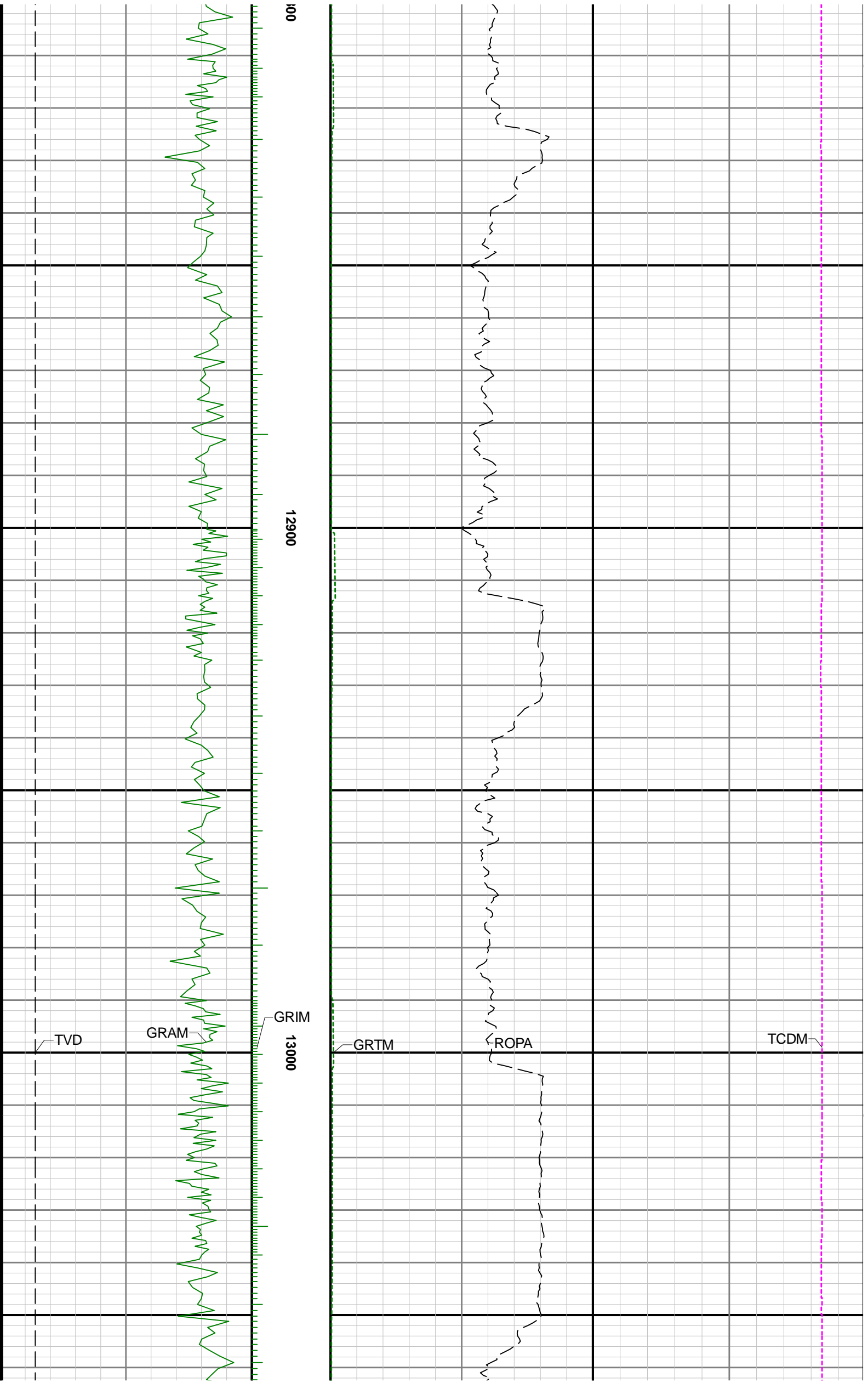


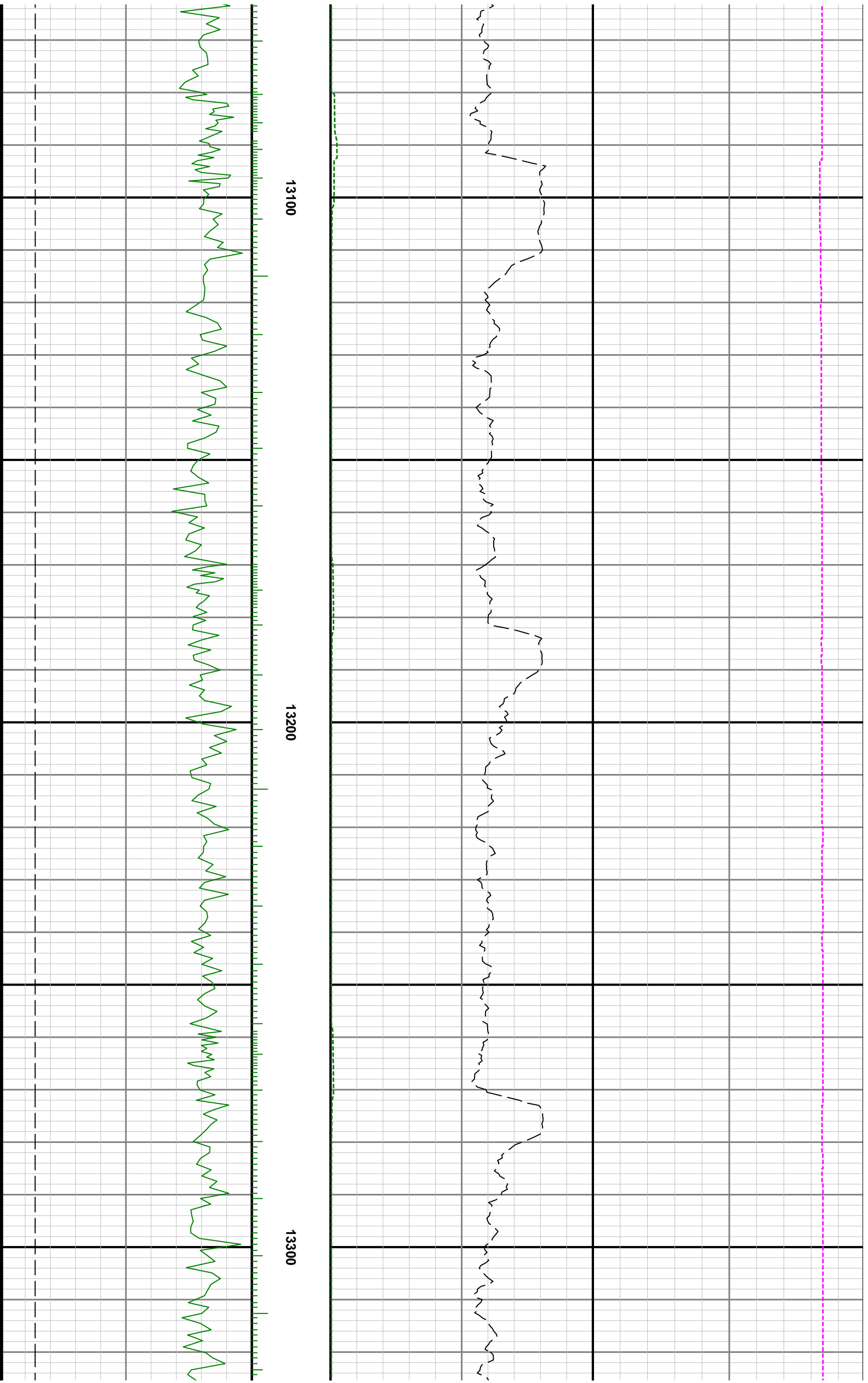
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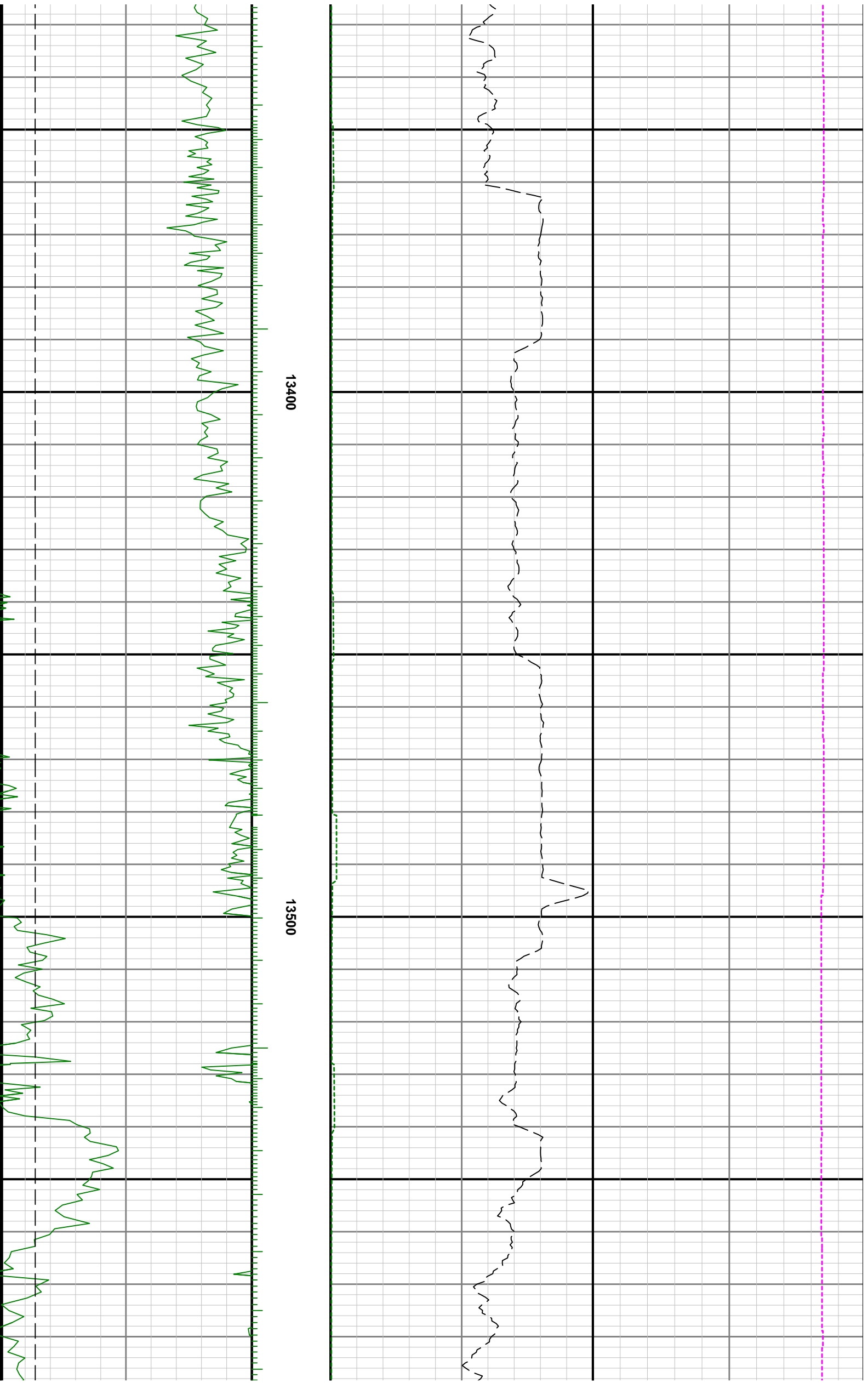
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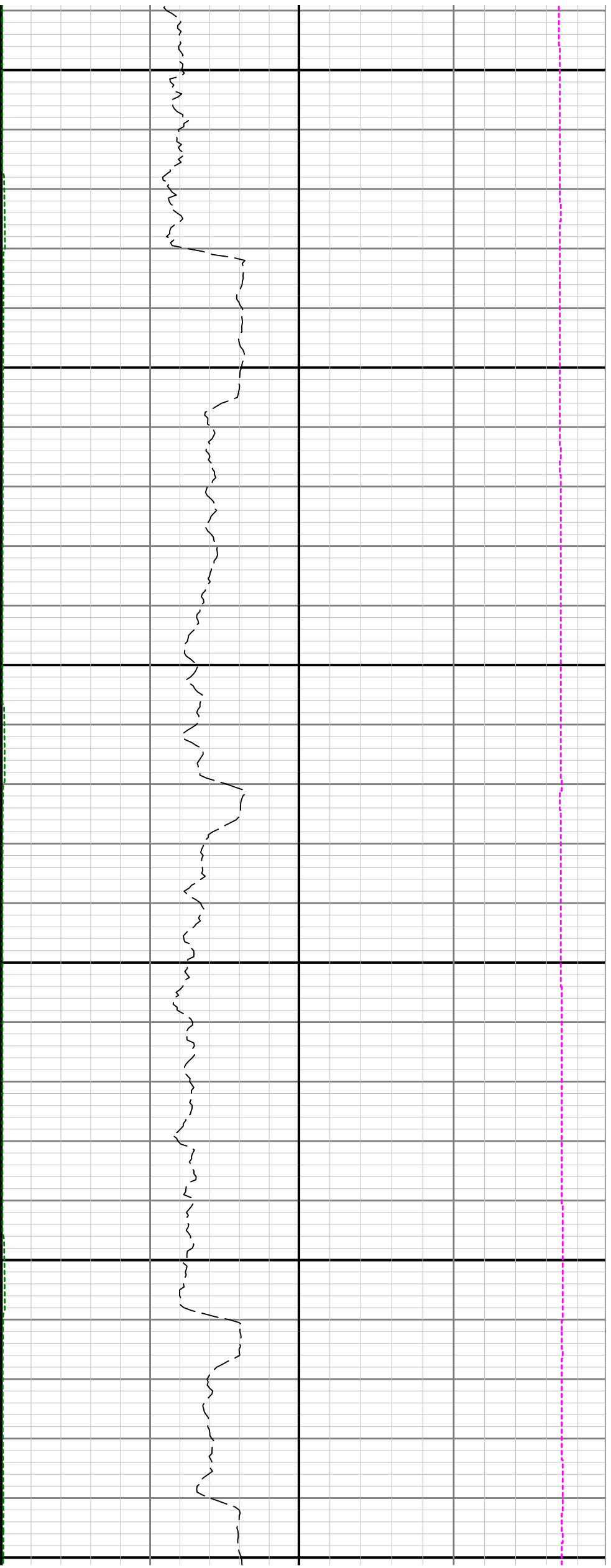
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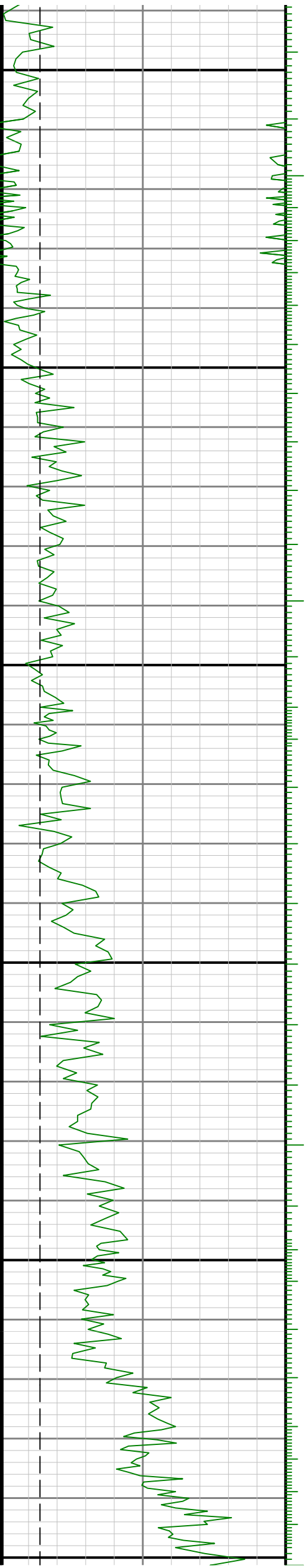




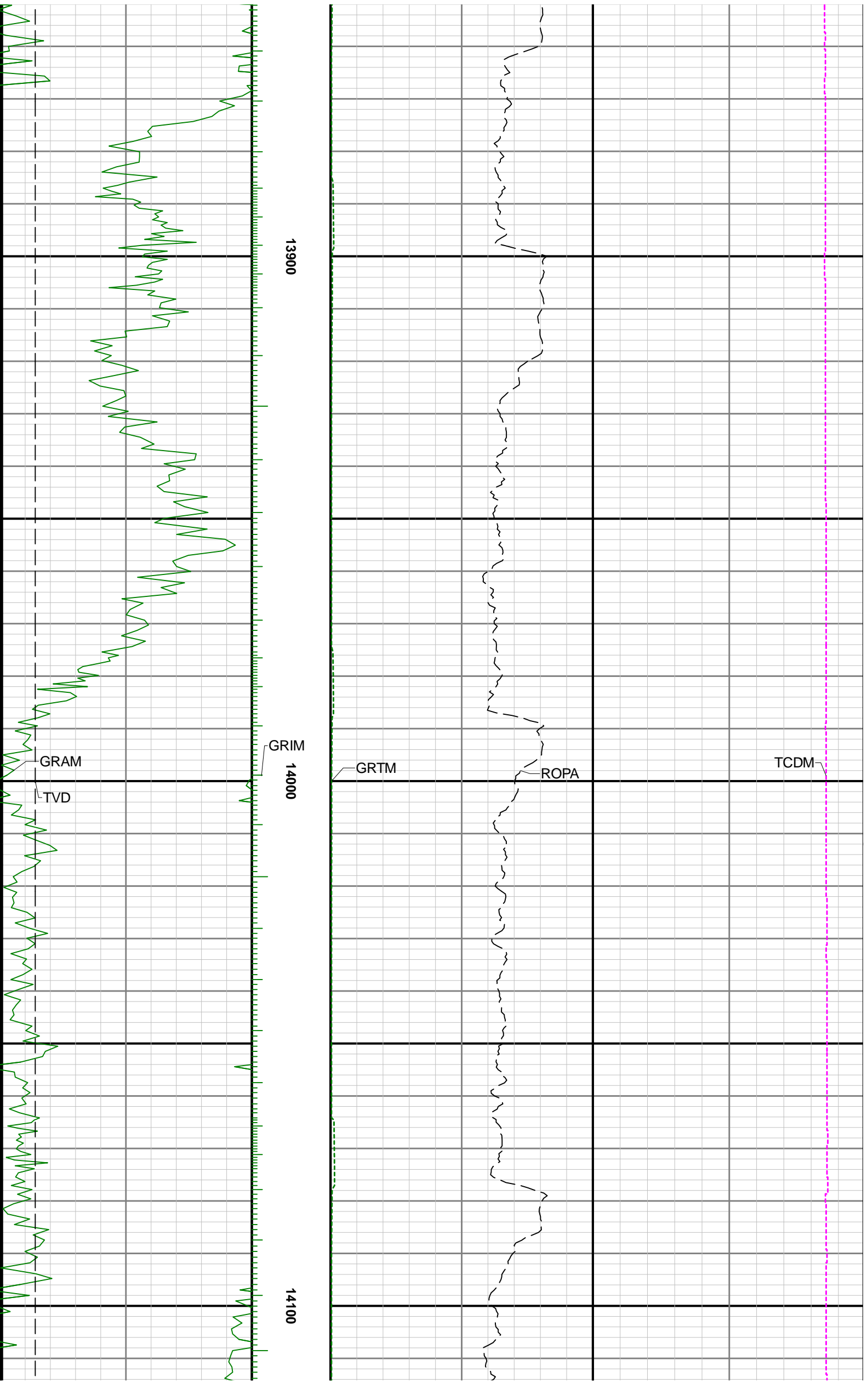
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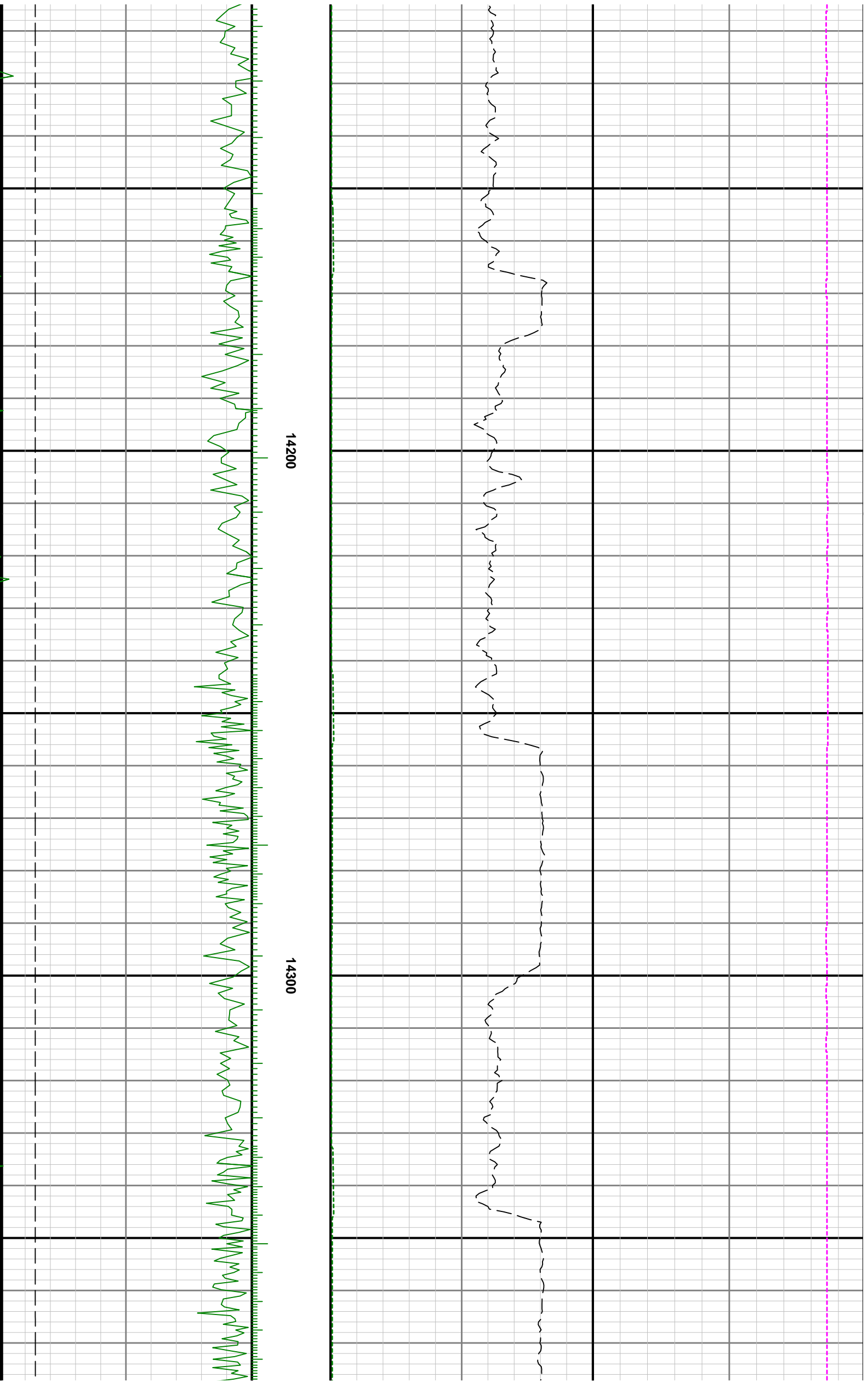
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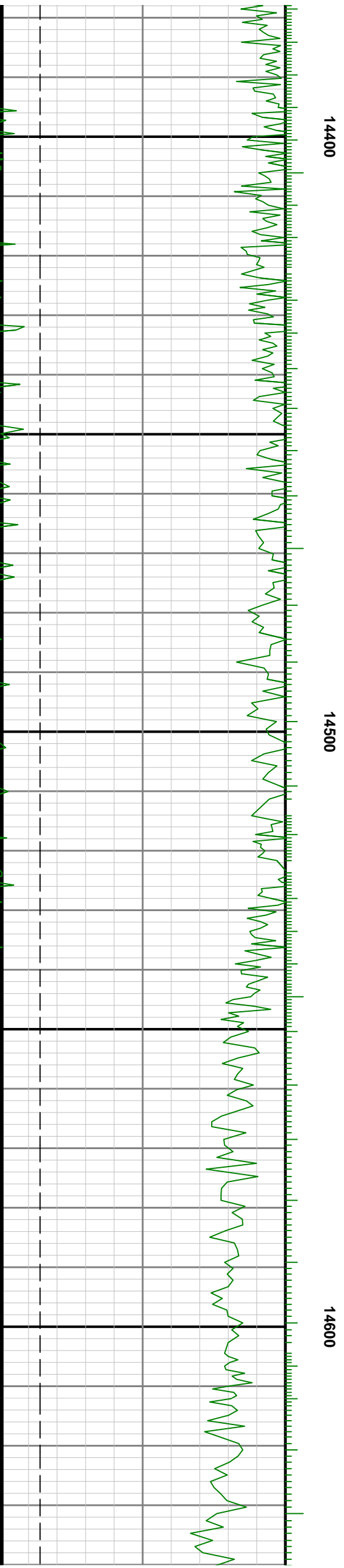
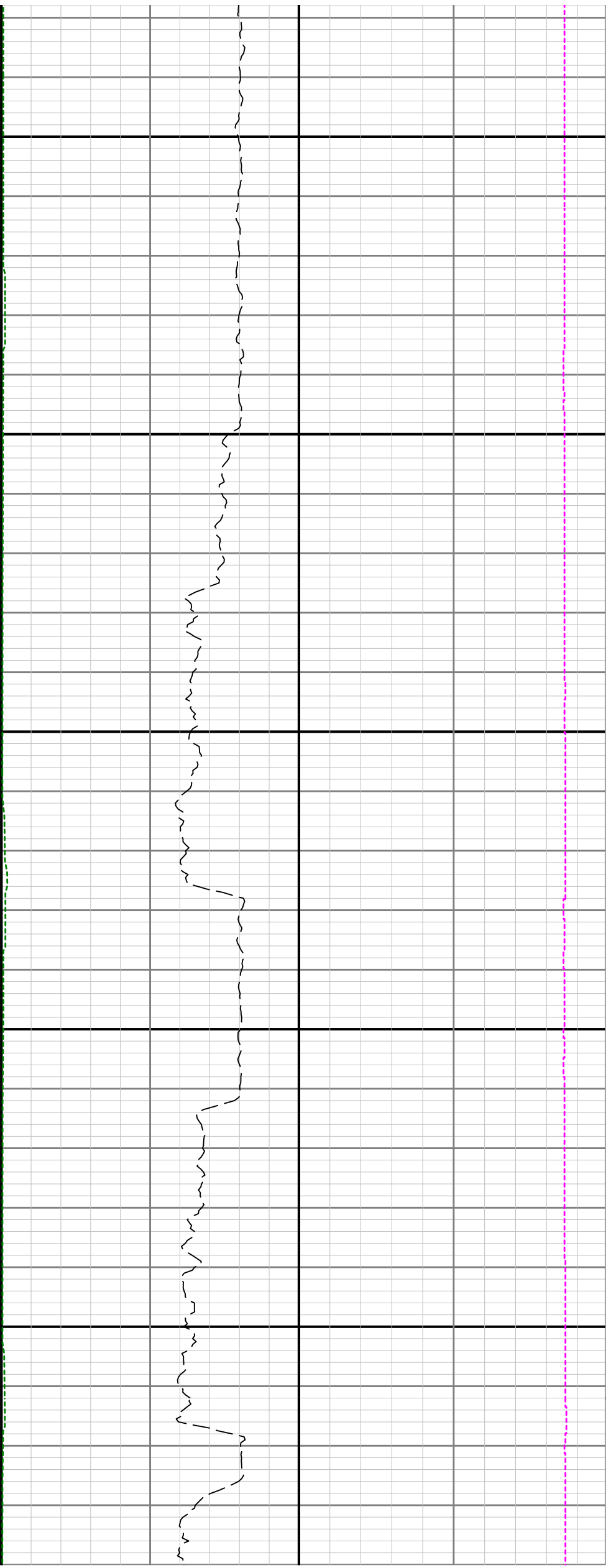
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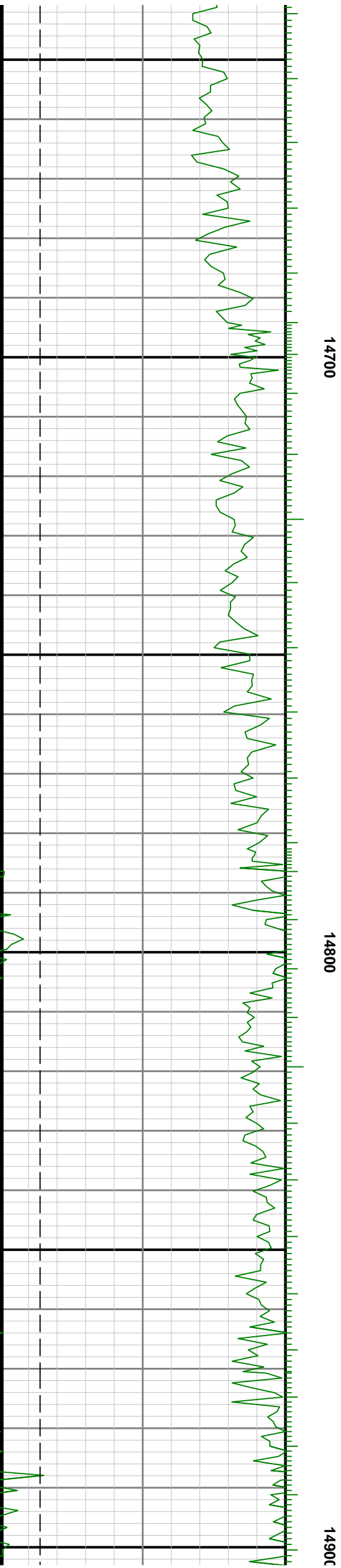
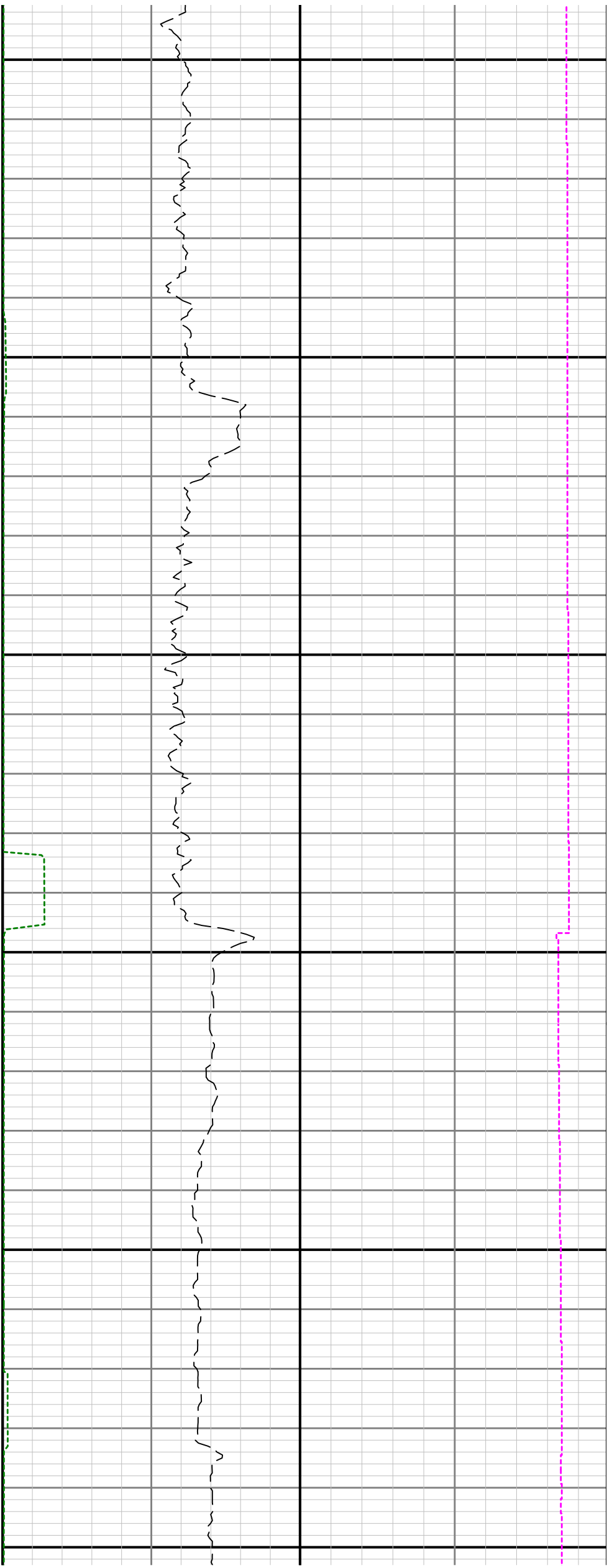


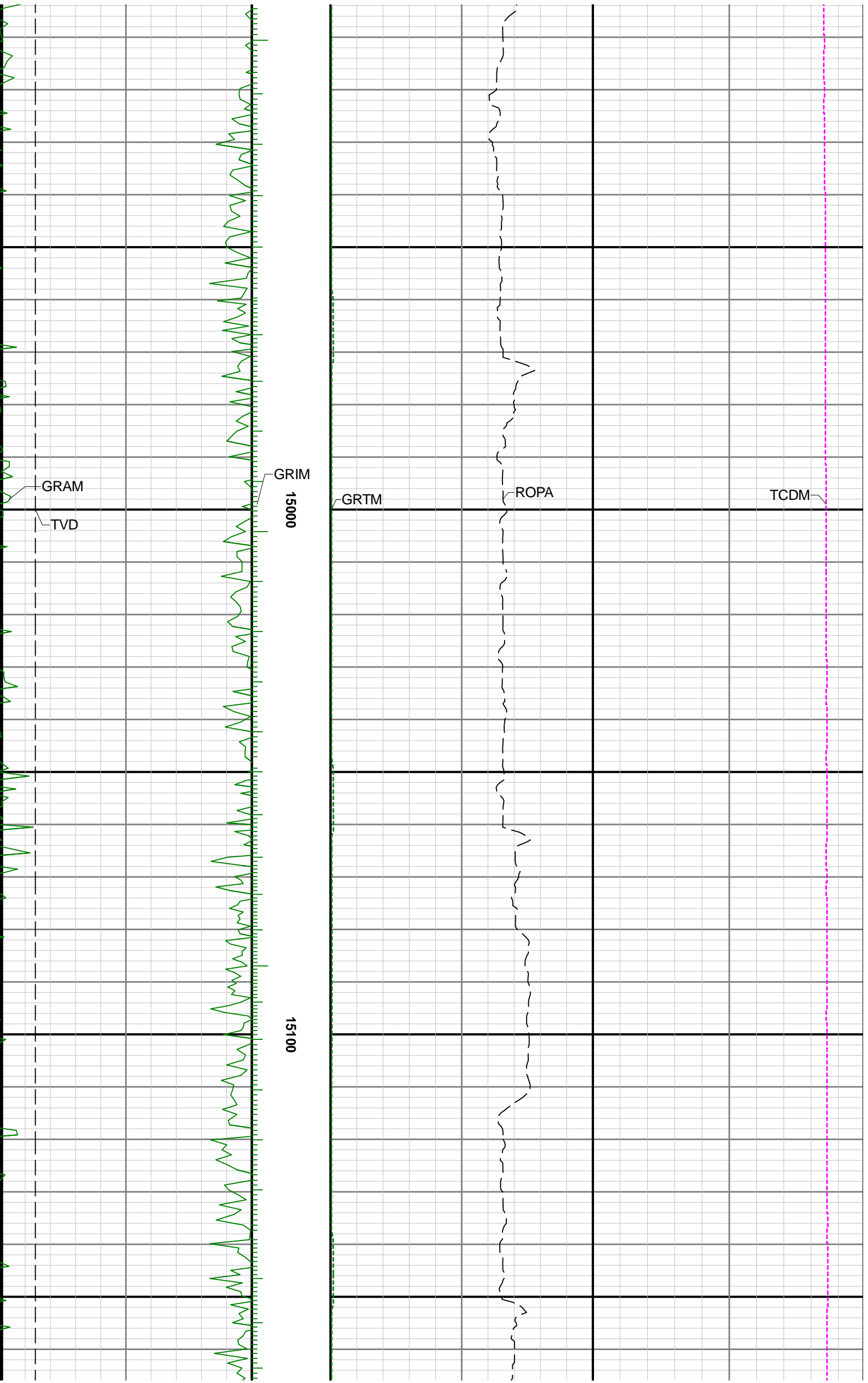


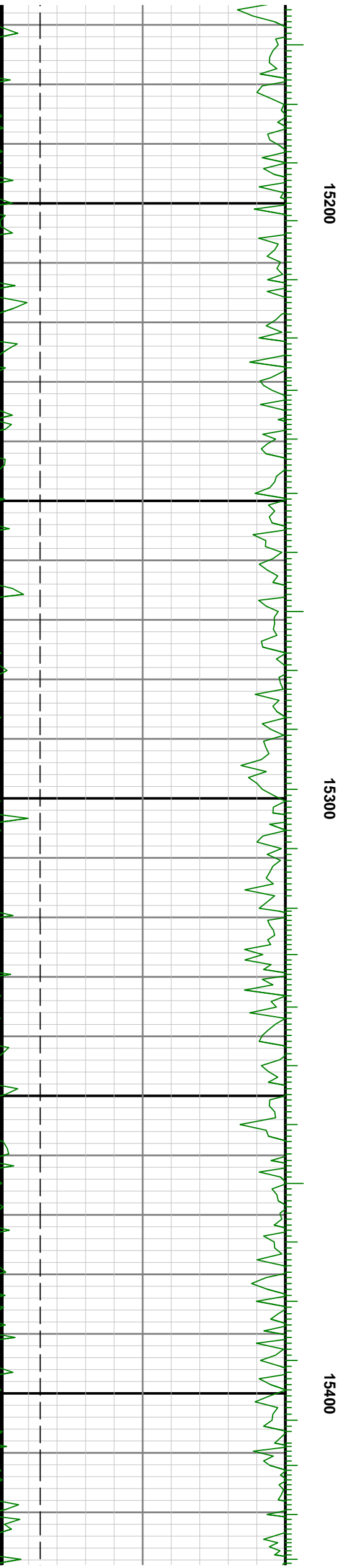
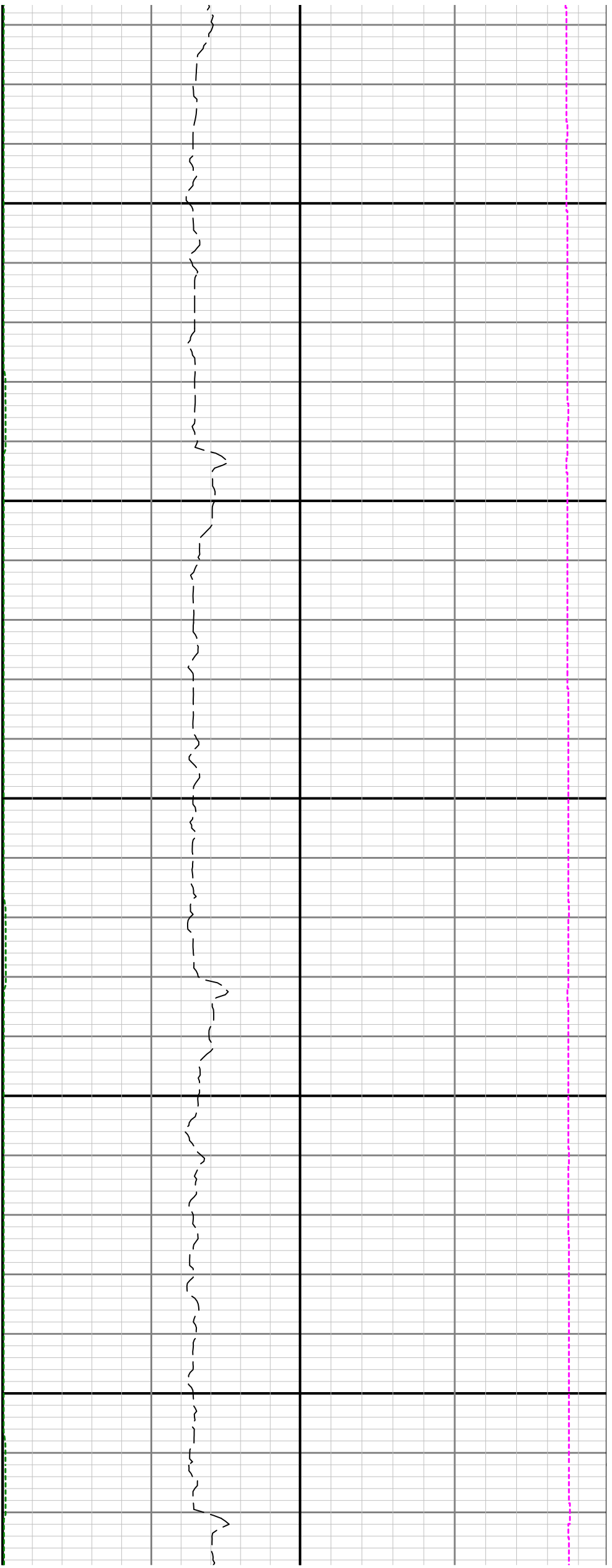


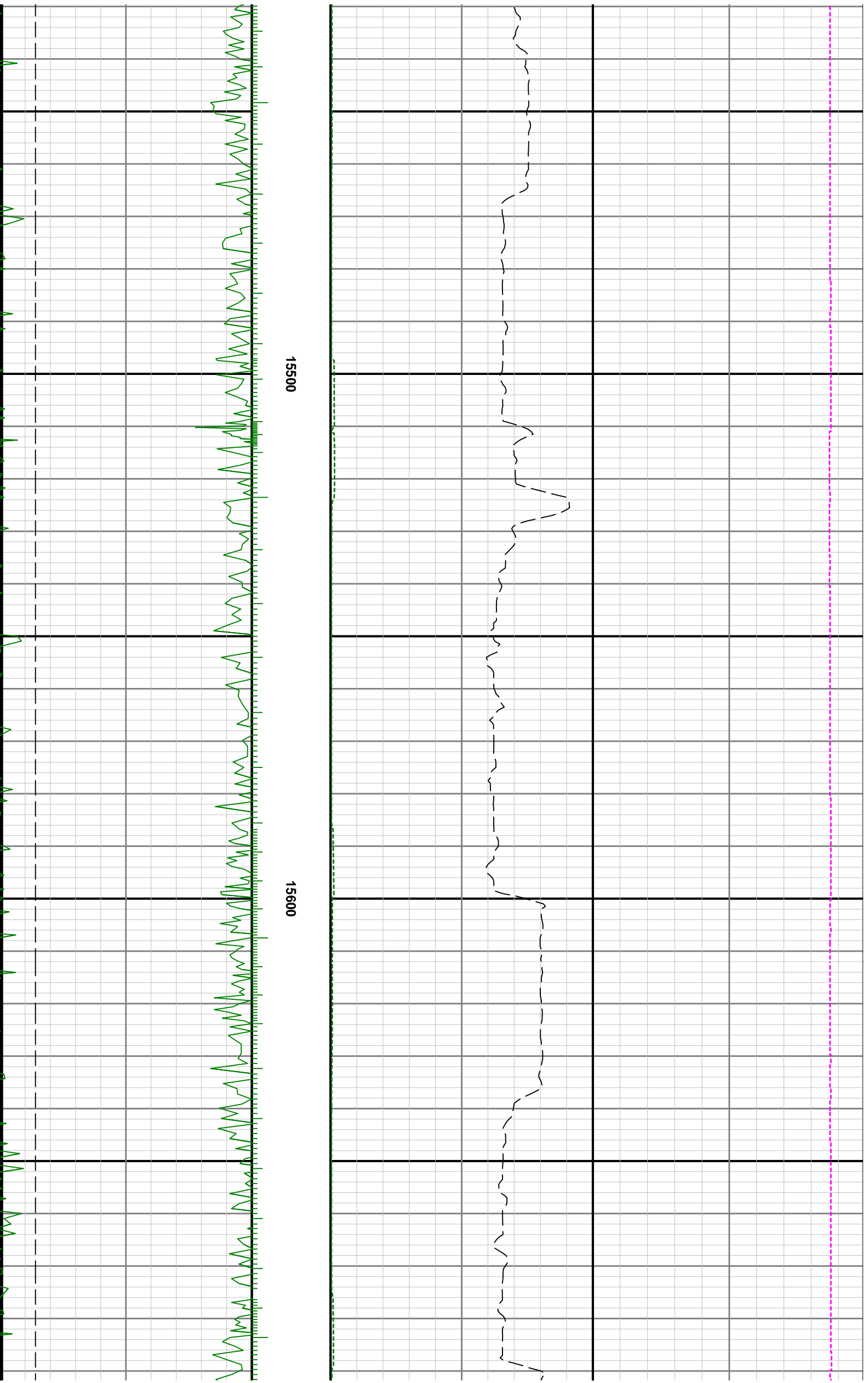


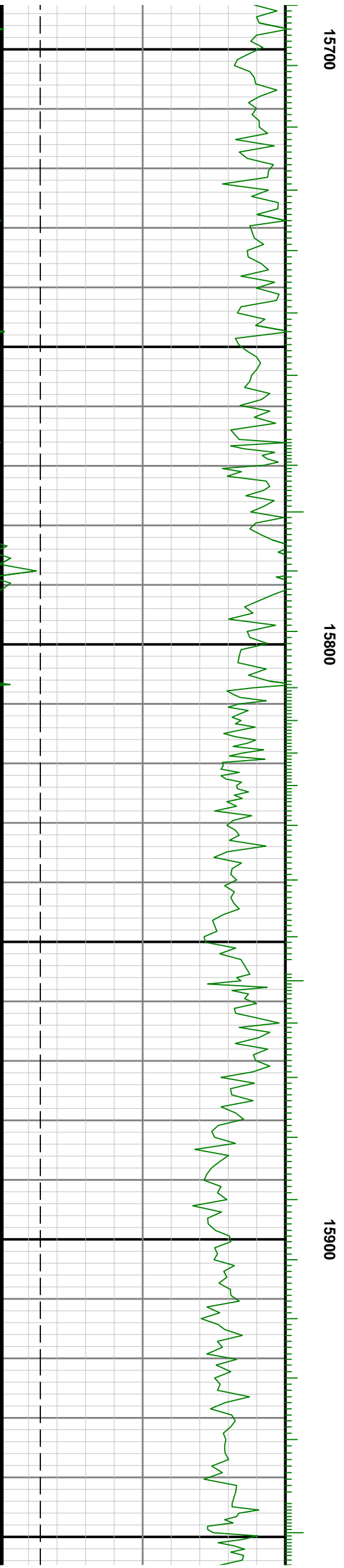
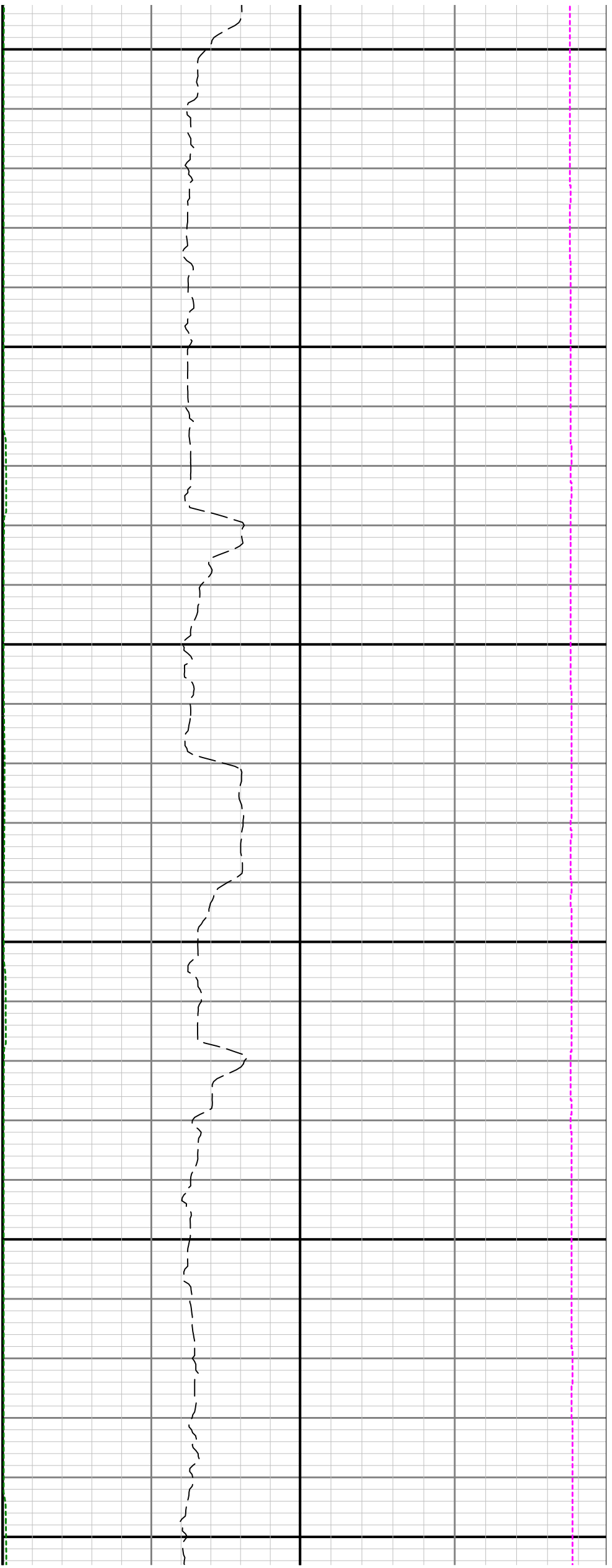






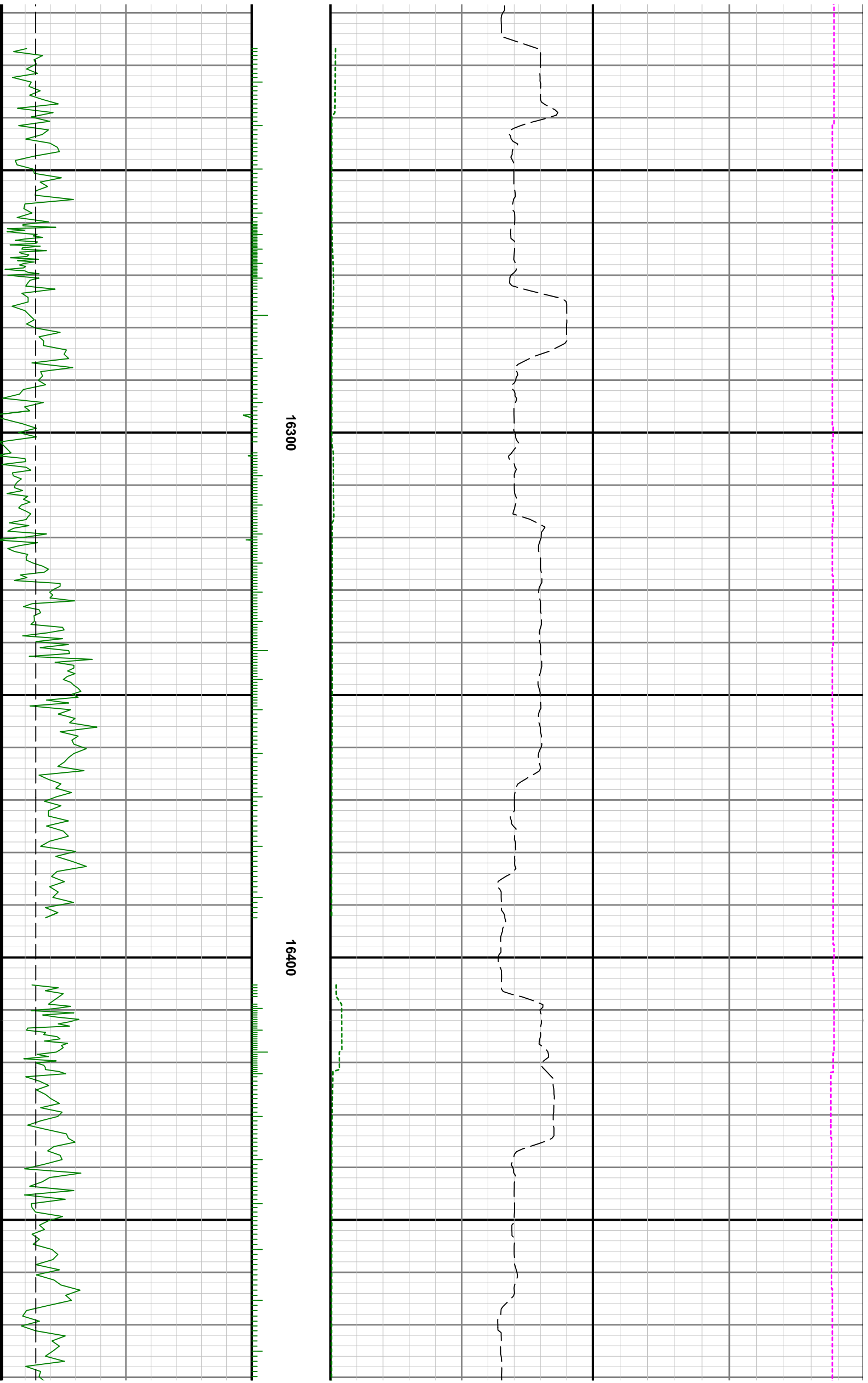


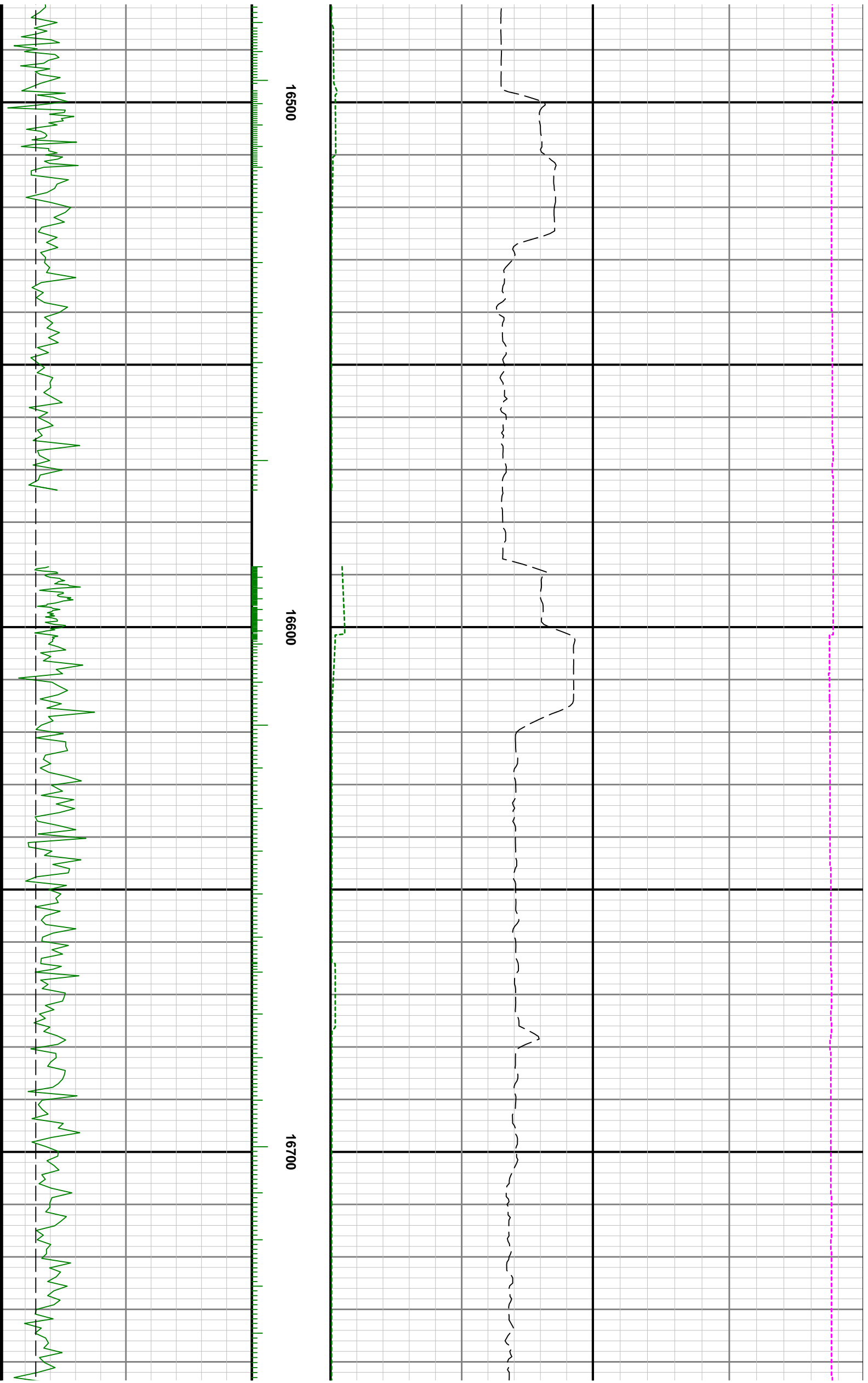


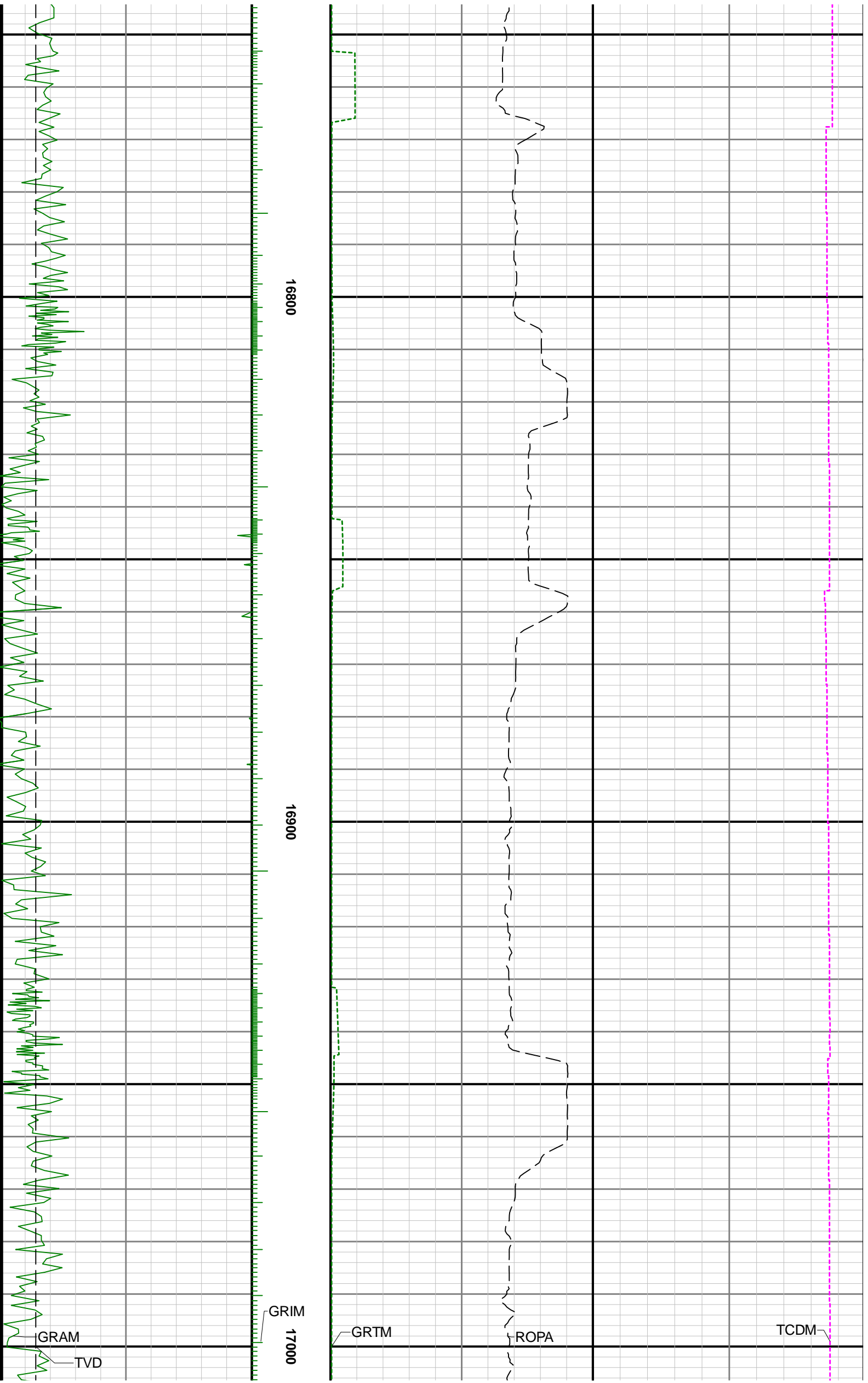














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