

BAKER HUGHES				LWD MEMORY LOG											
Gamma Ray															
Scale:		Company: Noble Energy													
1:240 MD		Well: Wells Ranch State AA33-725													
Depth Reference:		Field: Weld County (Noble NAD 83 Grid)													
Driller's Depth		County: WELD COUNTY		State: Colorado											
Status:		Surface Location:				Other Services:									
Final Print		Latitude:				Directional									
API No: 05-123-43917-00		Longitude:													
Job ID: 8391869		UTM: N/A		SEC: 21		TVN: 6N		RGE: 63W		N/A					
Permanent Datum (P.D.): Ground Level		Elevation: 4742.00 ft		KB: N/A											
Log Measured From: Rig Floor		Above P.D. 30.00 ft		DF: 4772.00 ft											
				GL: 4742.00 ft											
Dates				Interval Logged				Magnetic Field Reference							
Date From: 2017-04-02		Top: (ft) 1913.00		Azi Reference North:		Grid		Dip Angle: (deg)		67.12					
Date To: 2017-04-04		Bottom: (ft) 16408.00		Total Magnetic Field Strength: (nT)						52318					
Spud Date: 2017-04-01				Mag to Reference North Correction: (deg)						7.23 E					
Borehole Record				Casing Record											
Hole Size (in)		From (ft)		To (ft)		Size (in)		Weight (lb/ft)		From (ft)		To (ft)			
13.500		30.00		1923.00		9.625		36.00		30.00		1913.00			
8.500		1923.00		16421.00											
Mud Record				Deviation Record											
Type		From (ft)		To (ft)		Hole Size (in)		Interval (ft)		Inc   Az (Start)		Inc   Az (End)			
Oil Based Mud		1923.00		16421.00		8.500		14498.00		0.23   109.48		90.31   179.39			
Acquisition System				Software Version				Other							
Baker Hughes Cadence		RT4.1		4.0.7570.8		Rig: H&P 517		Contractor: Helmerich & Payne Drilling Co		District: R.M.A.		Unit: D & E			

Date / Time	Run No.	Measured Depth (ft)	Mud Type	Density (ppg)	viscosity (cP)	pH	Fluid Loss (cm3)	Oil / Water	Source	total Chlorides (ppm)	K+ (%)
2017-04-01 15:00	1	1923.00	Oil Based Mud	8.8	29	N/A	47.0	80/20	Active Pit	19000	0.00
2017-04-02 05:00	1	3147.00	Oil Based Mud	9.2	57	N/A	193.0	80.1/19.9	Active Pit	19000	0.00
2017-04-03 03:00	1	9765.00	Oil Based Mud	9.3	40	N/A	274.0	82.7/17.3	Active Pit	22500	0.00
2017-04-03 15:00	1	13173.00	Oil Based Mud	9.5	40	N/A	271.0	83.7/16.3	Active Pit	20500	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	ATC_SU	12232312	Near Bit VSS	5.93	6.73	7.000	4.330
1	ATC_SU	12232312	Near Bit Inclination	5.93	6.73	7.000	4.330
1	ATC_MWD	12418051	Gamma (single)	2.20	12.35	7.000	3.250
1	ATC_MWD	12418051	Directional (mag)	12.27	22.42	7.000	3.250

Service and Tool Mnemonics

Mnemonic	Name	Description
ATC_SU	ATC_SU	Auto Trak Curve Steering Unit
ATC_MWD	ATC_MWD	Auto Trak Curve MWD
ATC_LCPM	ATC_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 services (Directional and Gamma Ray) behind a 8.5 inch bit and rotary steerable assembly from 1923 to 16421 feet MD (1923 to 6605 feet TVD).
3	Unusable data for 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.

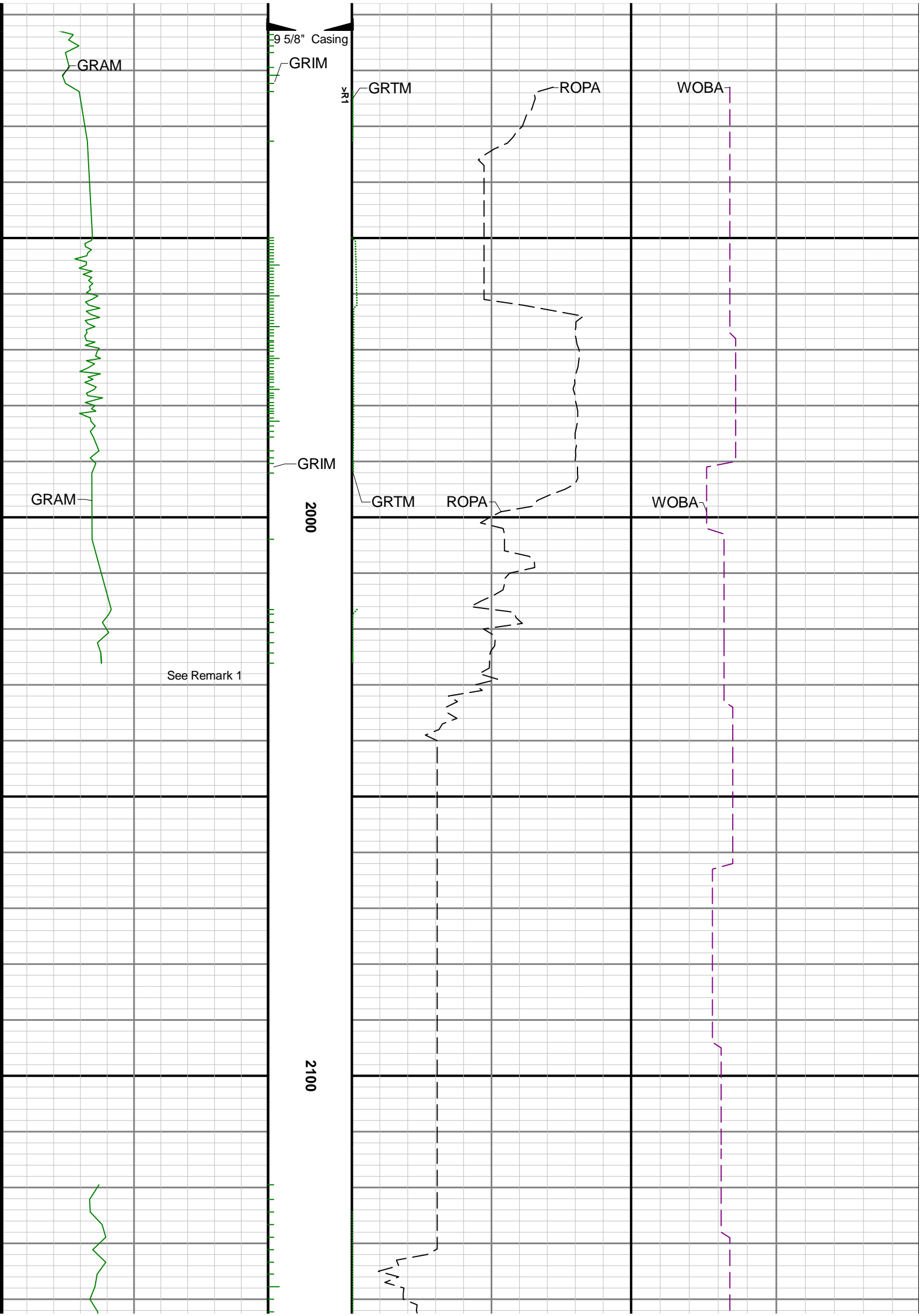
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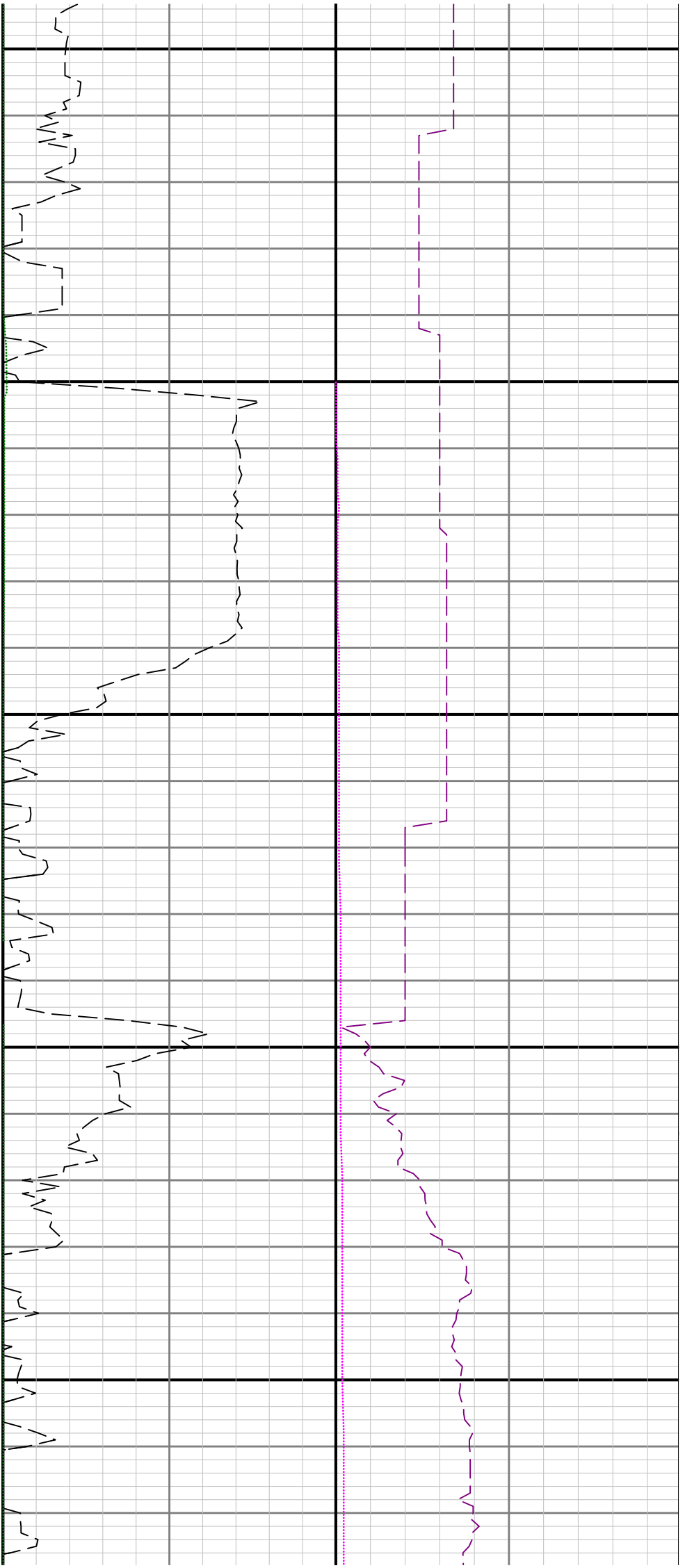
Number	Measured Depth (ft)	Hole Section (in)	Run No.	Remark
1	2026.00	8.500	1	The interval from 2026 to 2120 feet MD (2026 to 2120 feet TVD) has a gap in gamma ray data due to, the 3rd party depth tracking system not functioning.
2	16410.00	8.500	1	The interval from 16408 to 16421 feet MD (6605 feet 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 0.5 ft Average	API
GRIM	Gamma Ray Data Point Indicator	unitless
GRTM	Gamma Time Since Drilled	min
TCDM	Downhole Temperature	degF

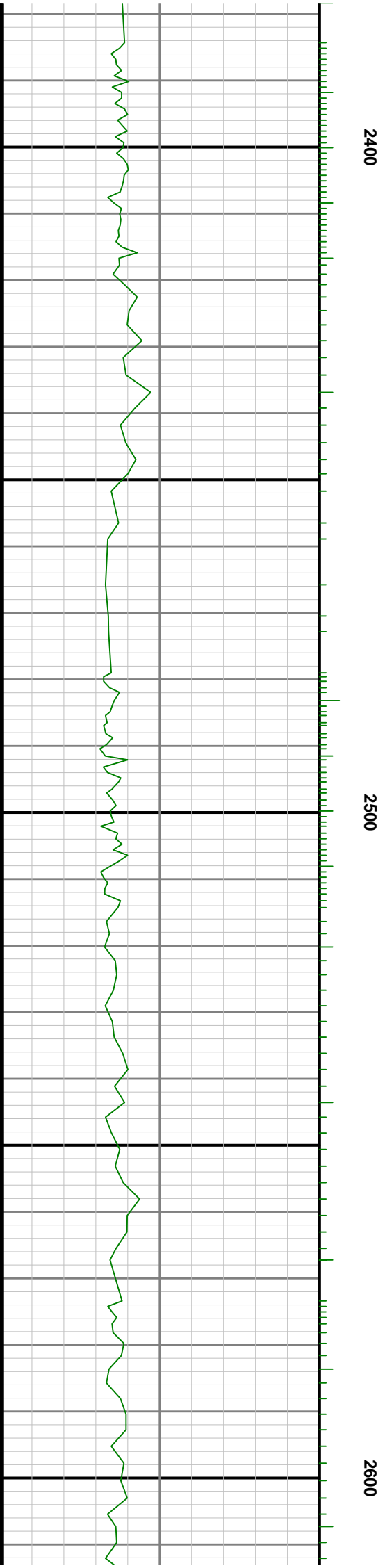
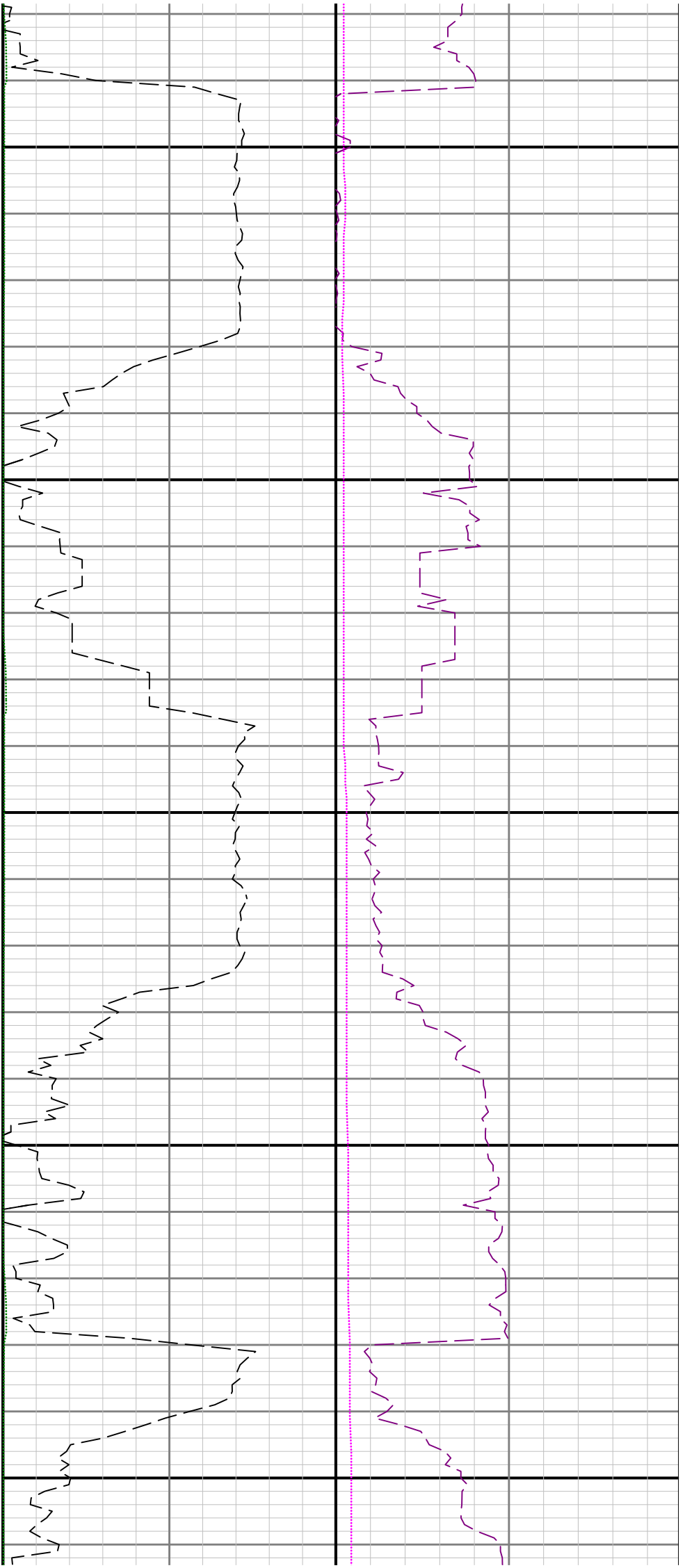
Gamma Ray - Apparent 0.5 ft Average GRAM	MD 1:240 feet	Depth Averaged ROP 3 ft Average ROPA	Weight On Bit, Average 1 ft Average WOBA
0 300		1000 0	0 50
API		ft/h	klb
True Vertical Depth TVD		Gamma Time Since Drilled GRTM	Downhole Temperature TCDM
7000 6000	1900	0 600	100 300
ft		min	degF

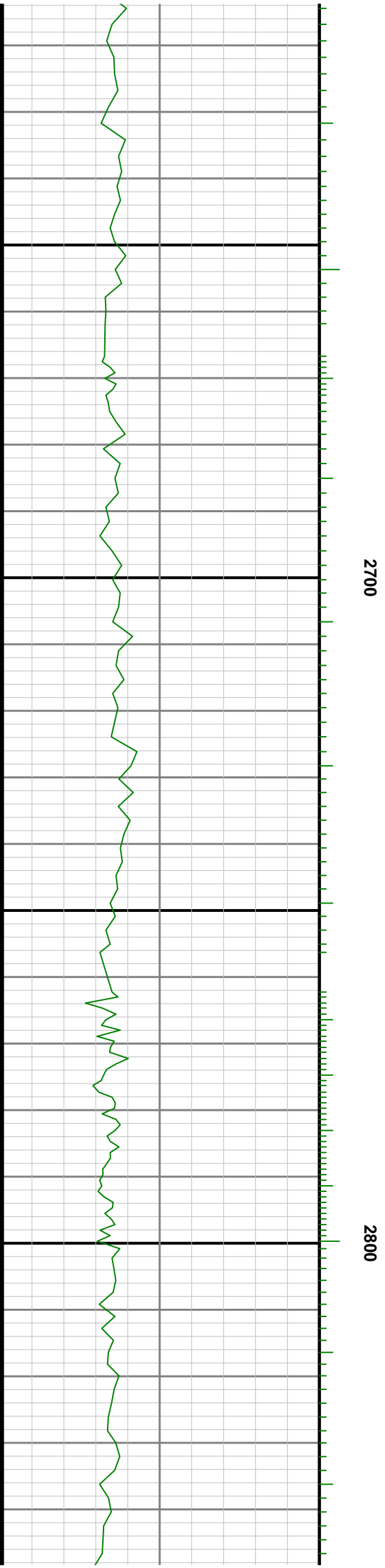
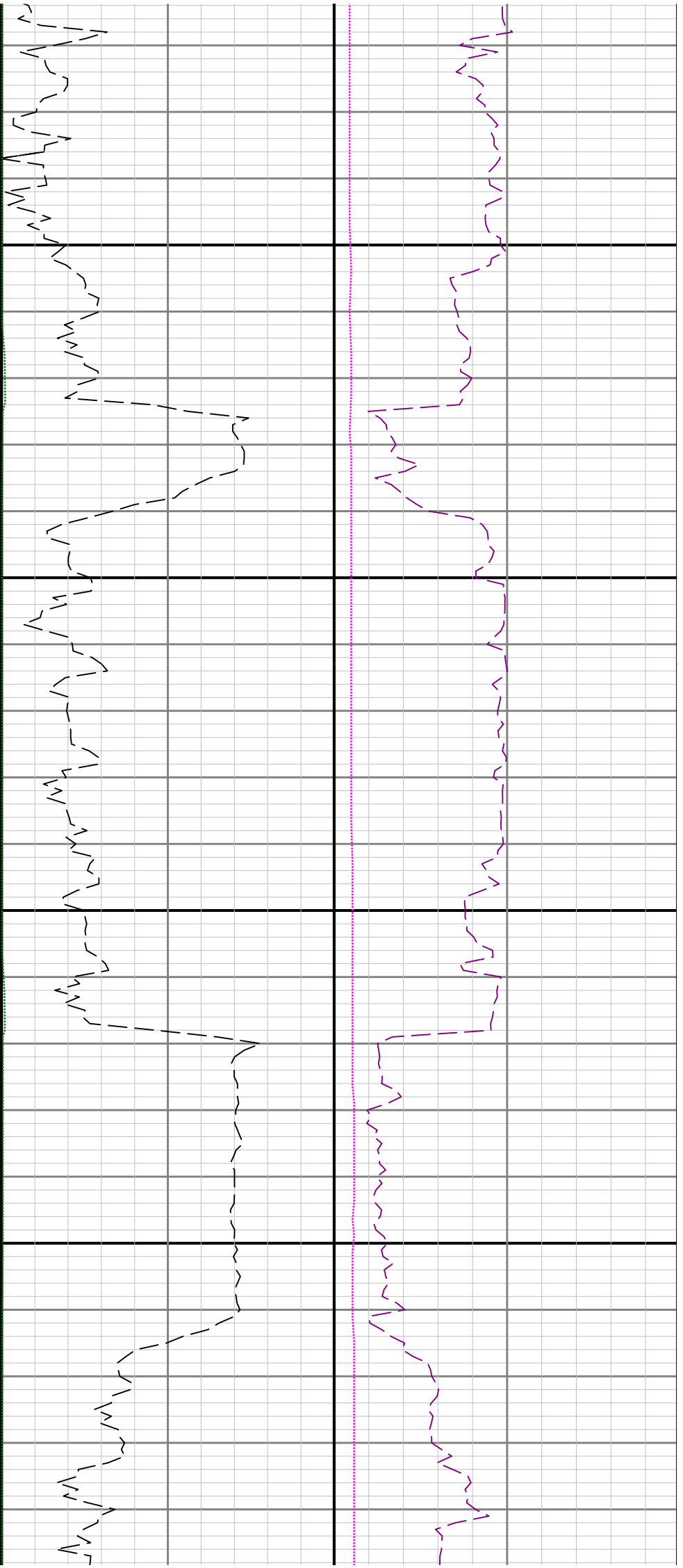


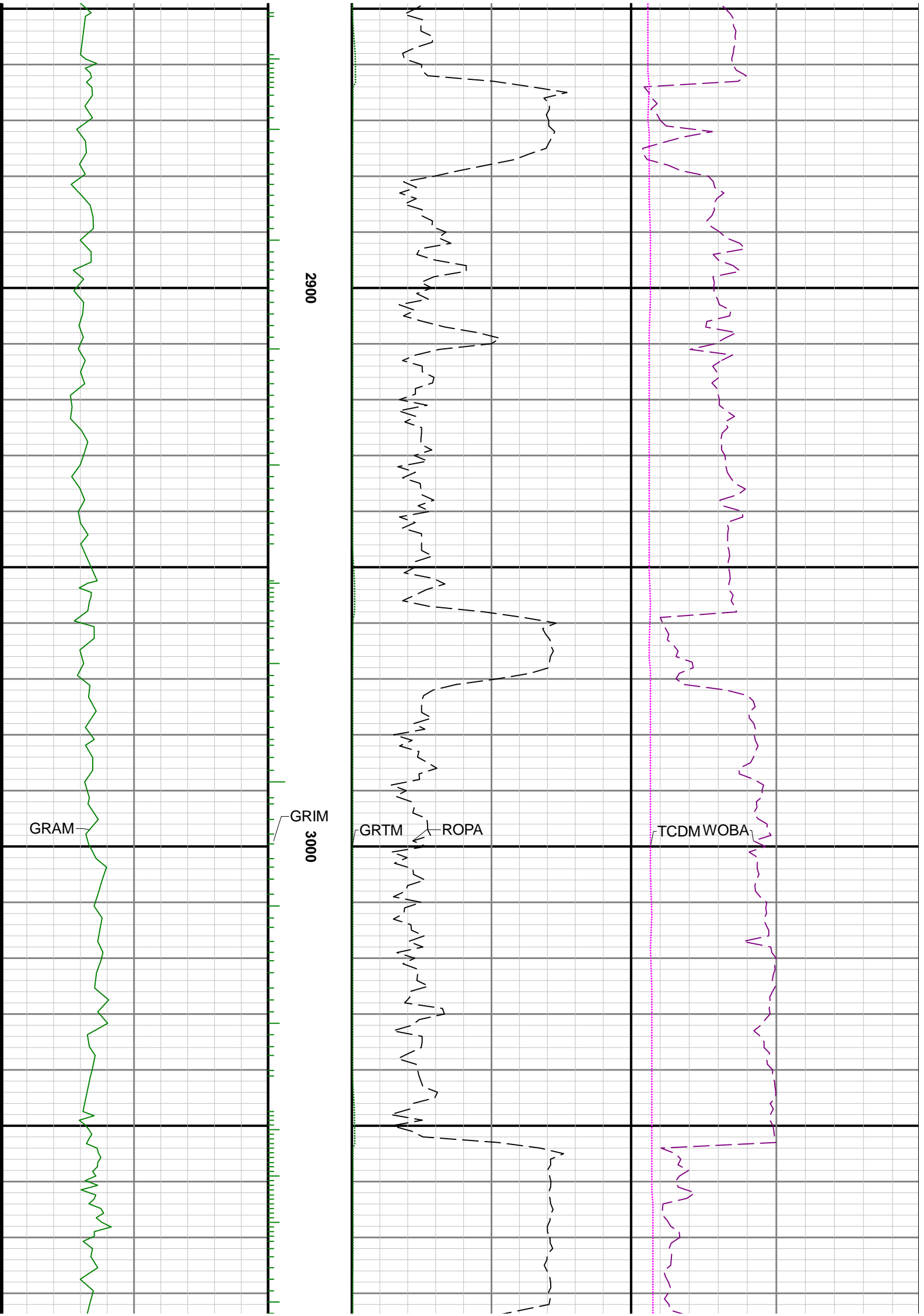


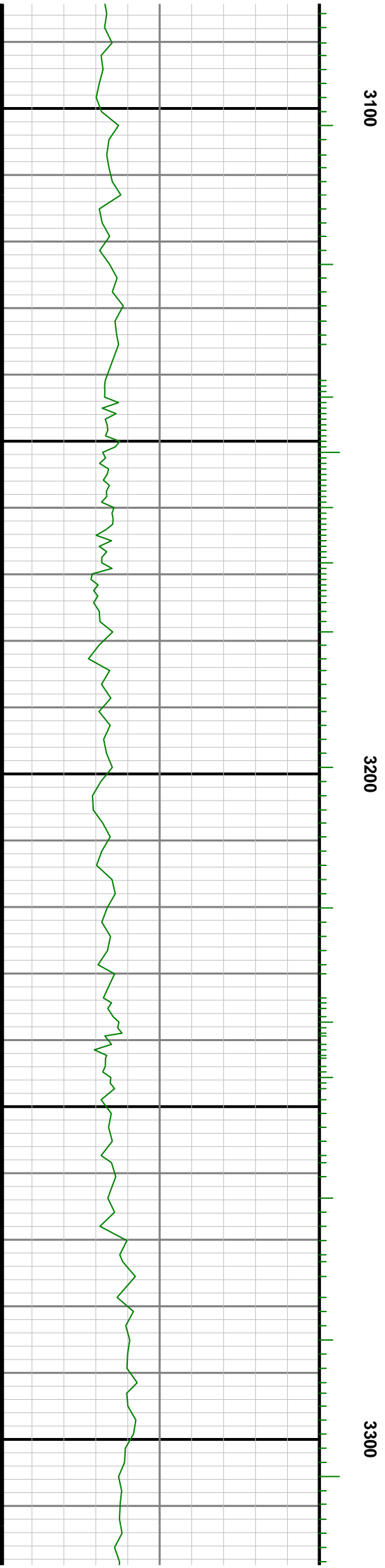
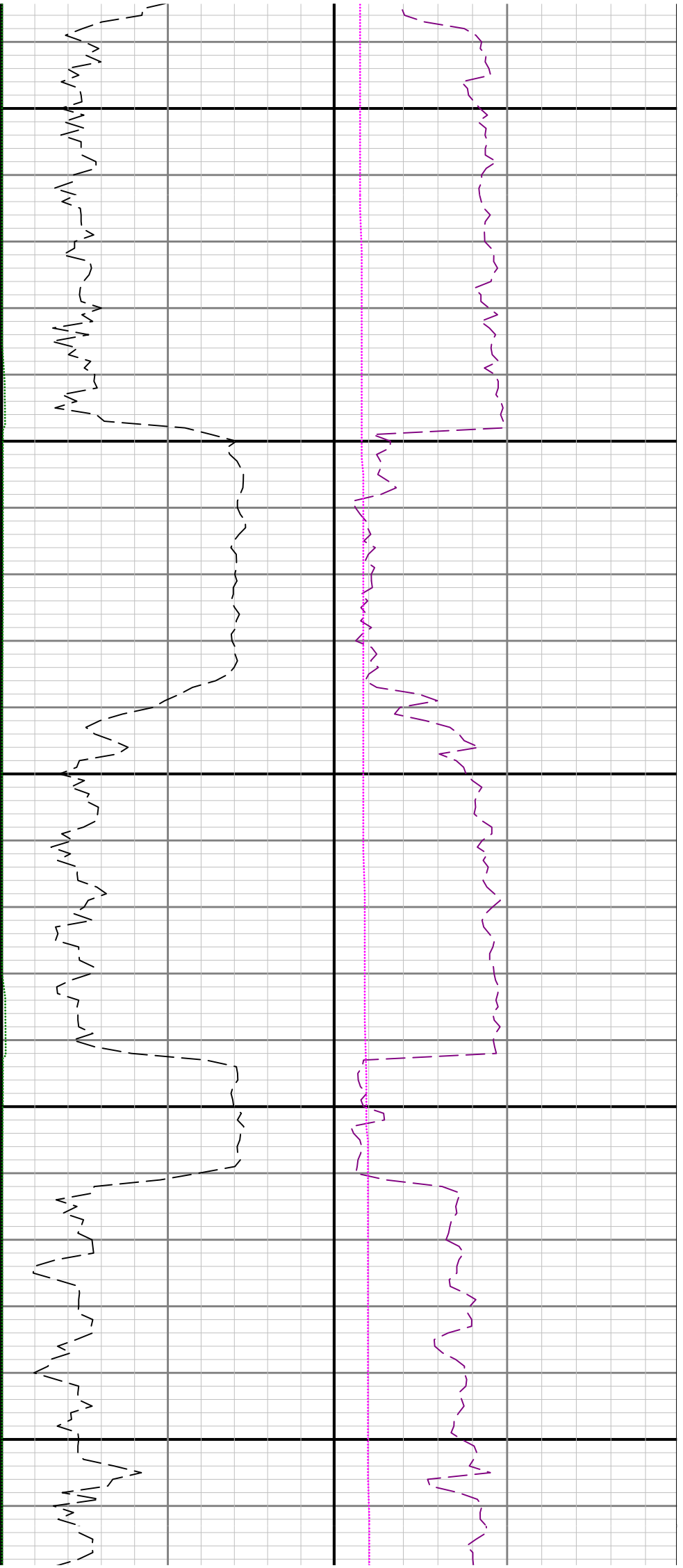
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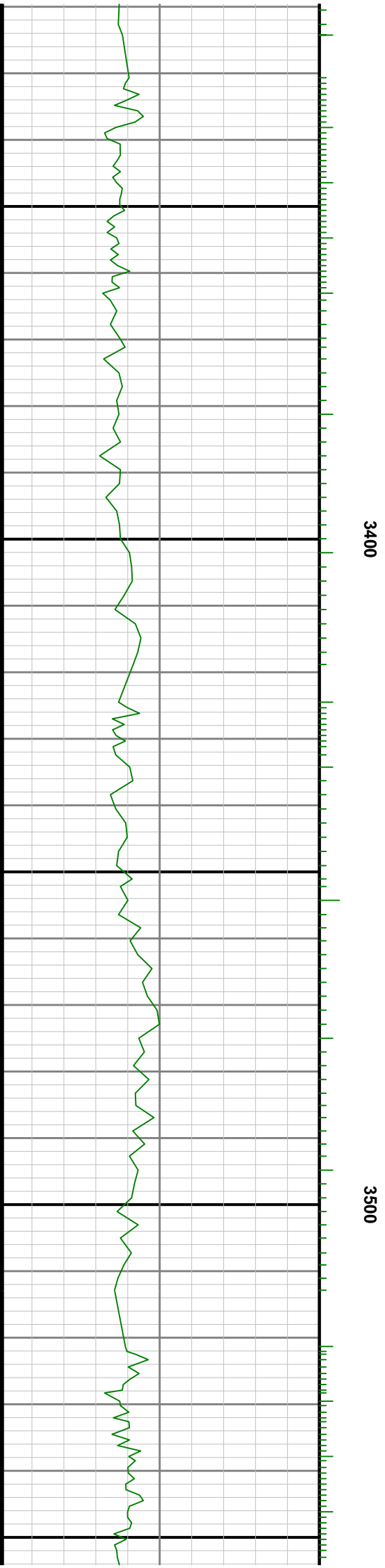
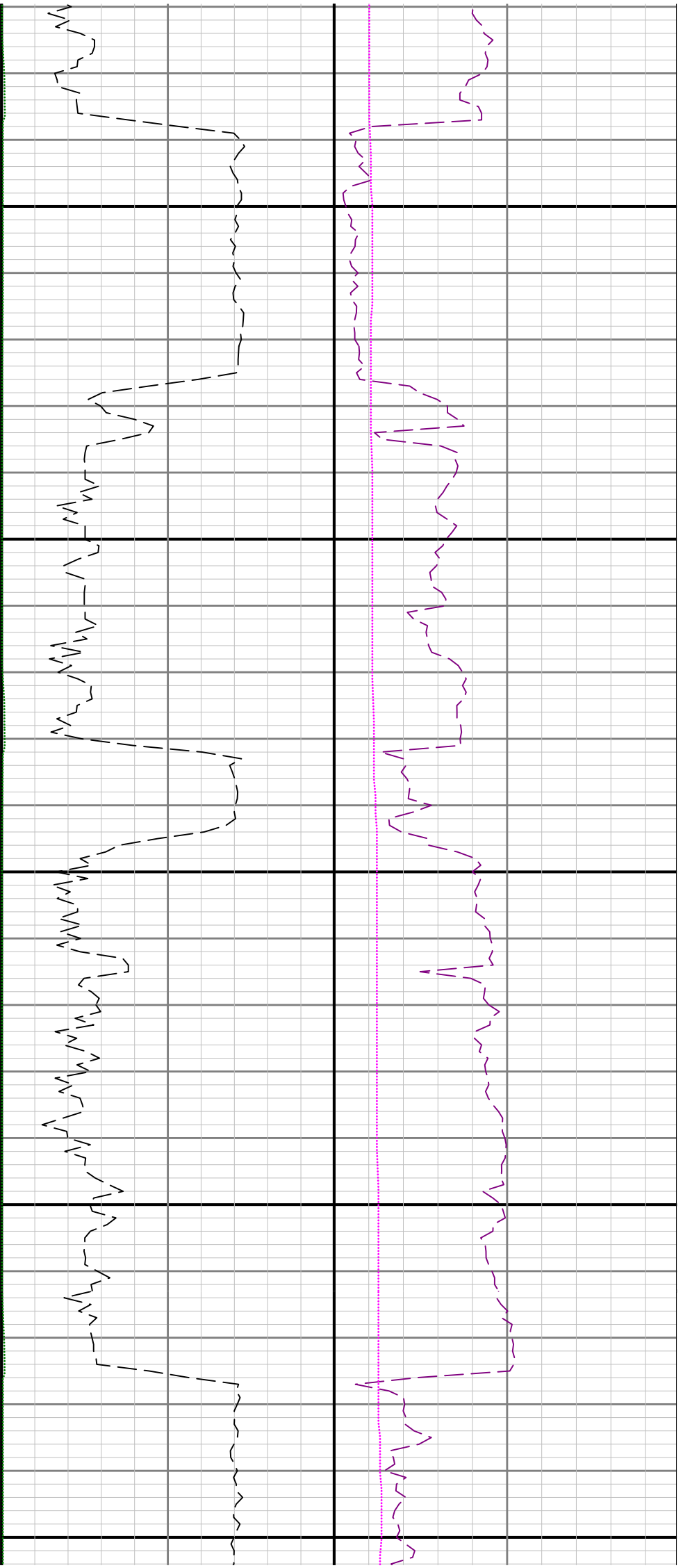


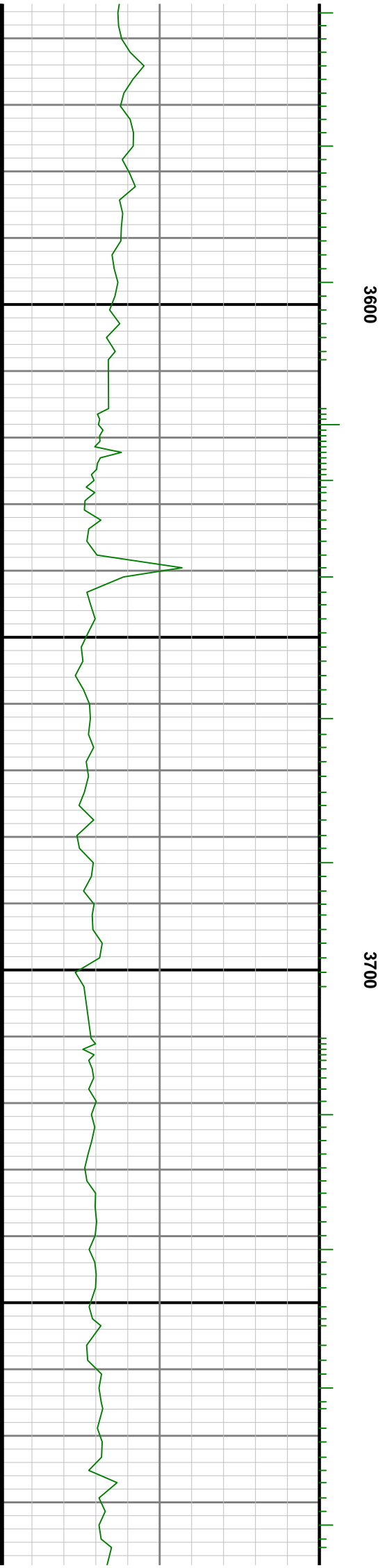
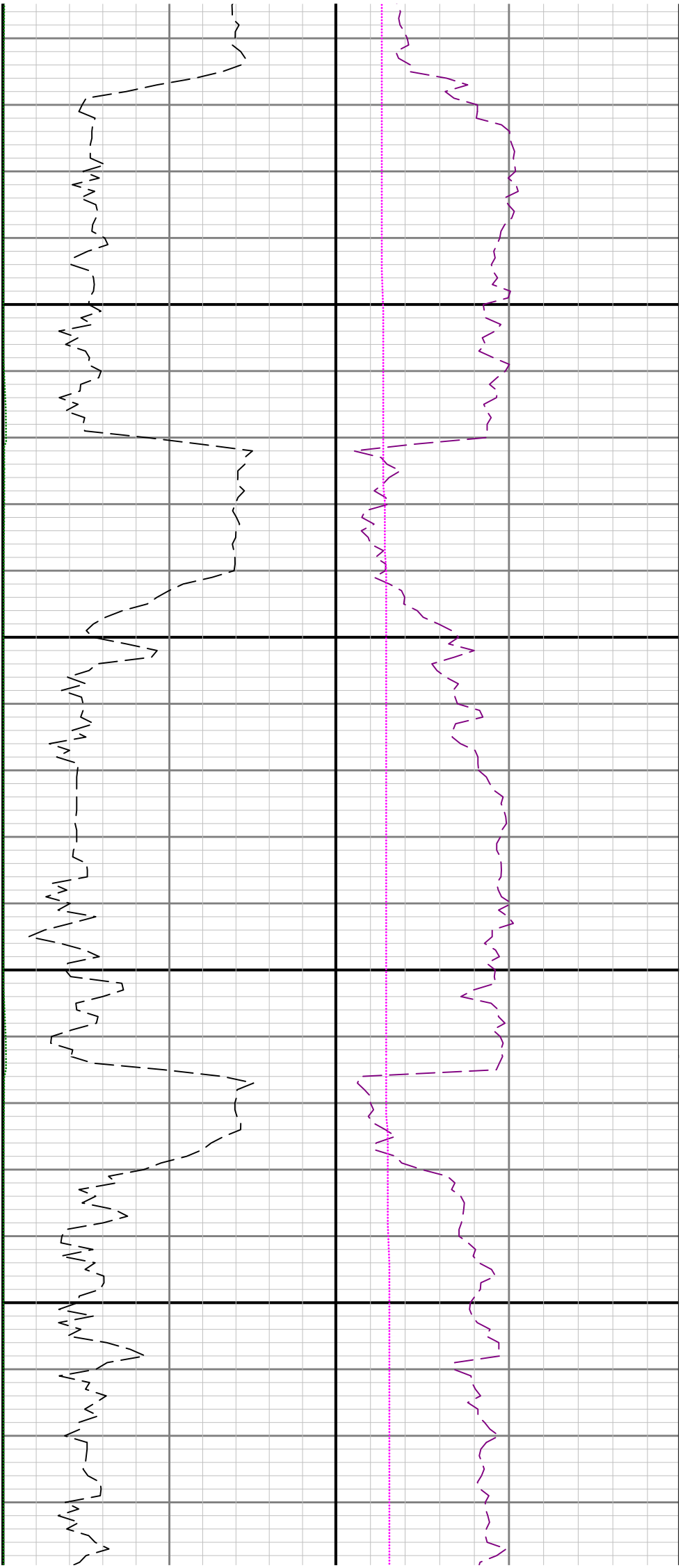


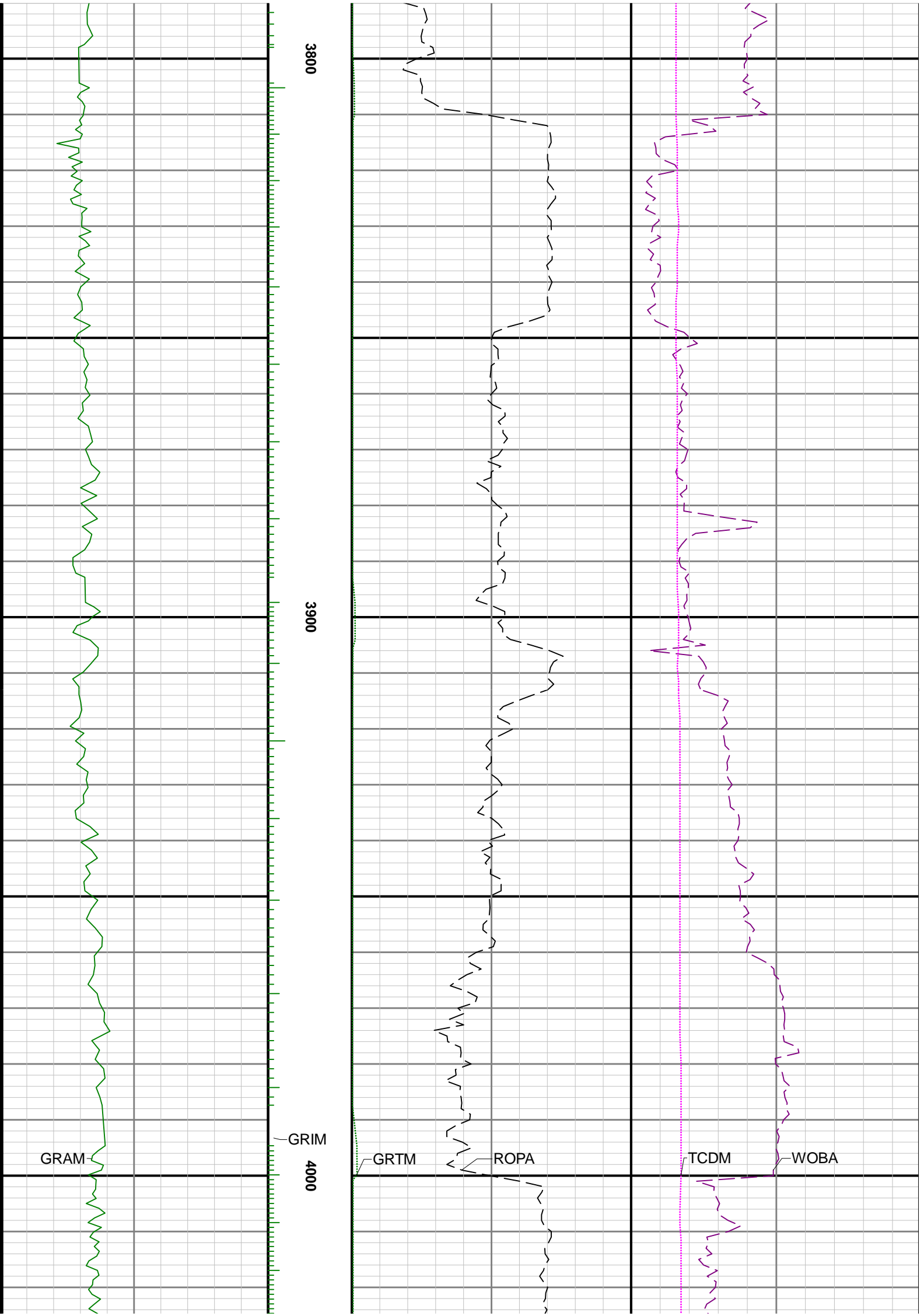


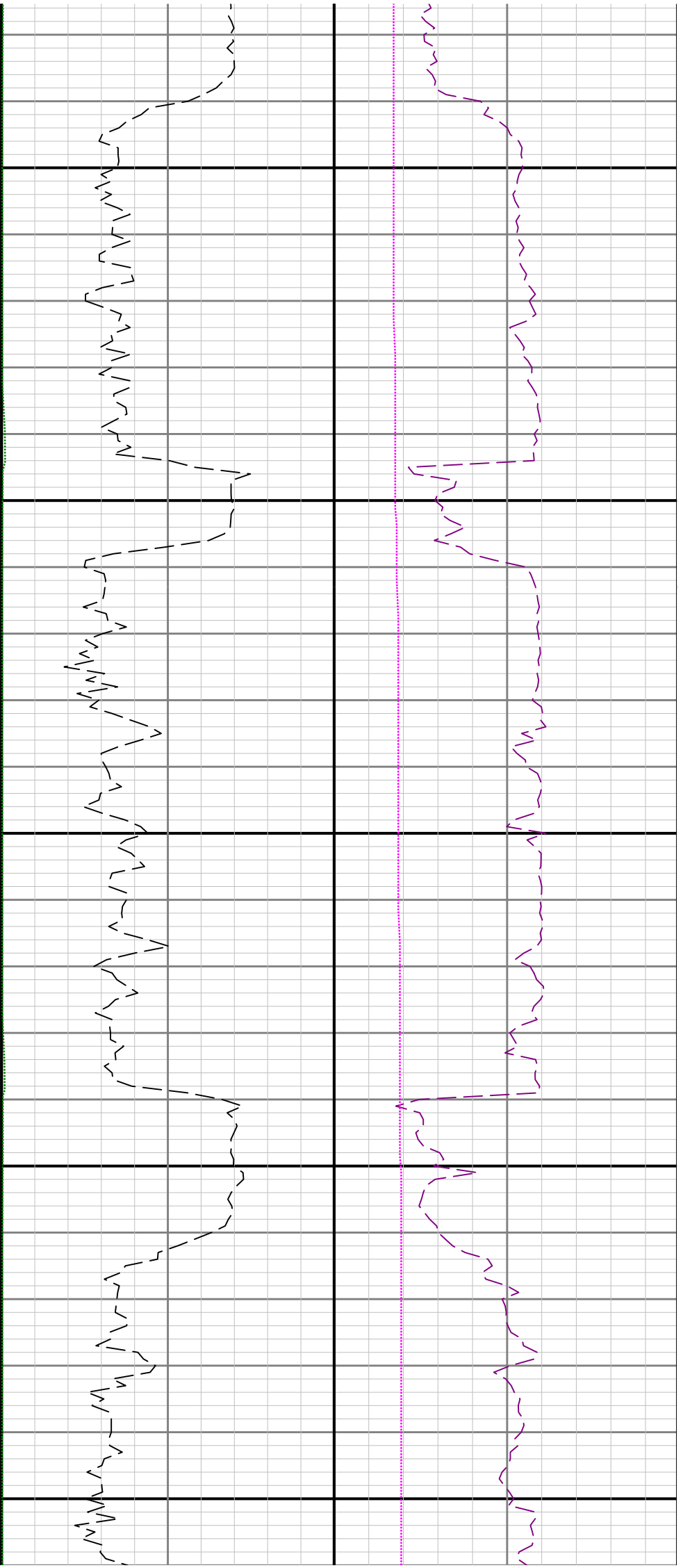






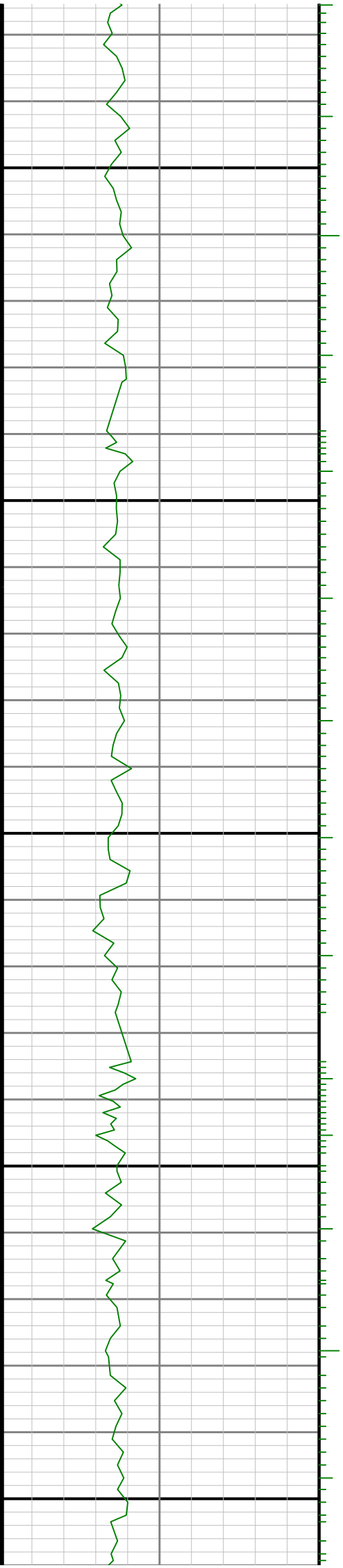


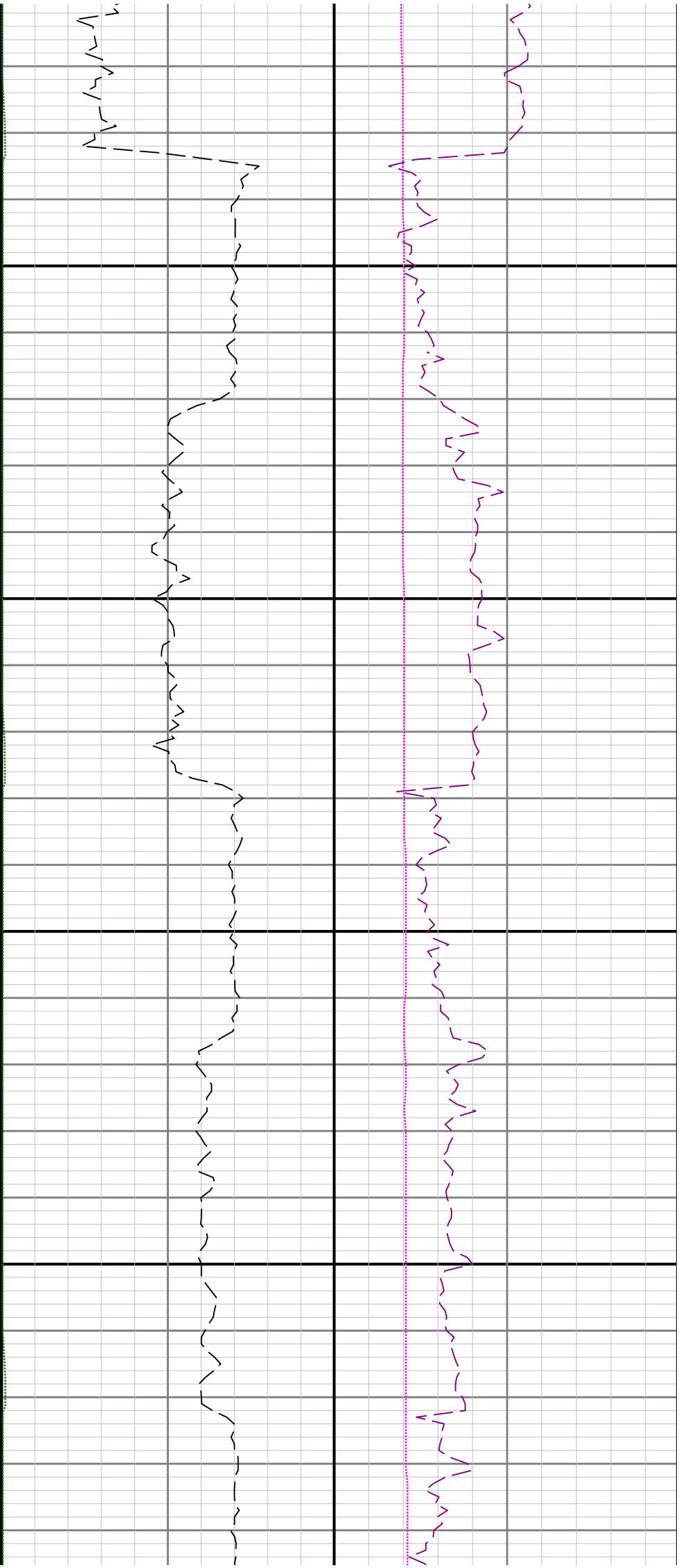




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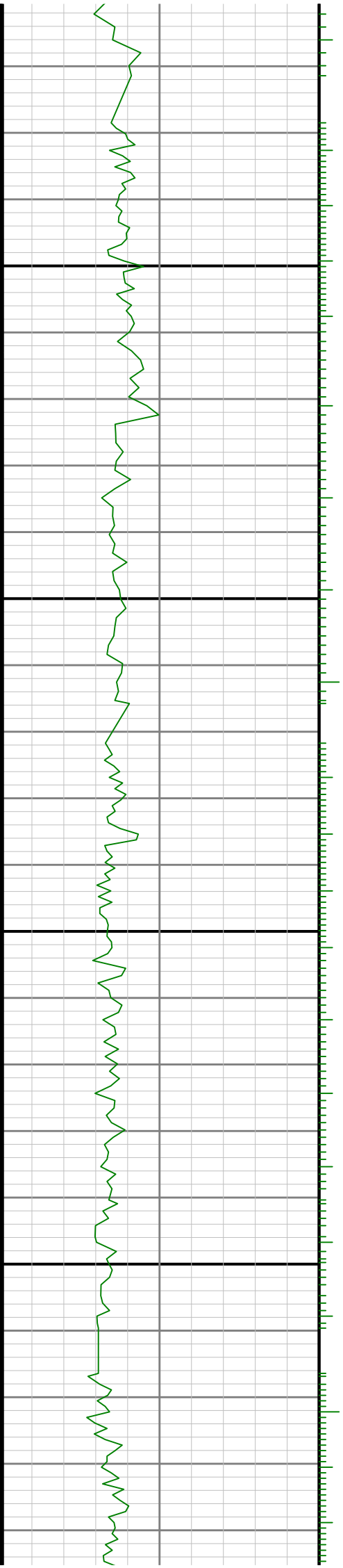
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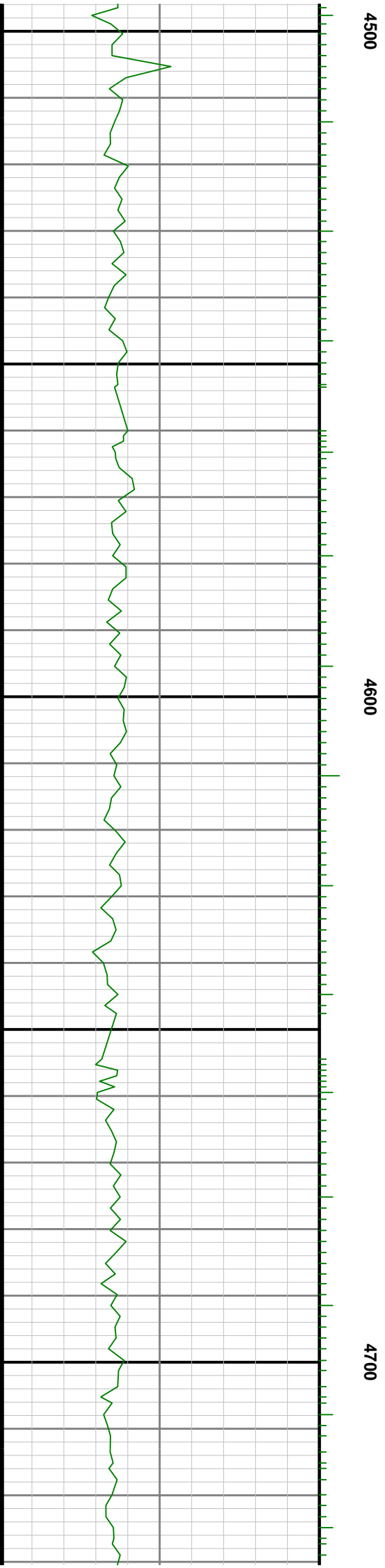
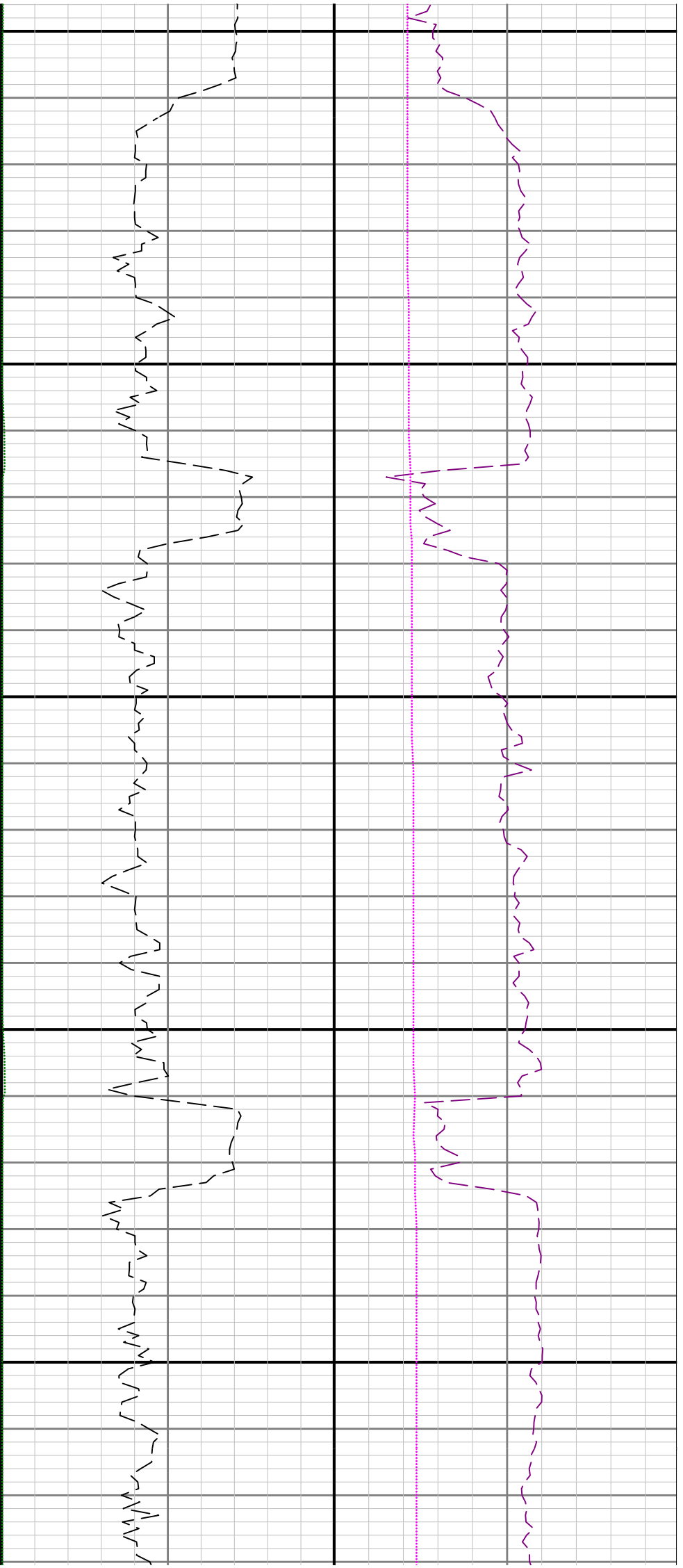


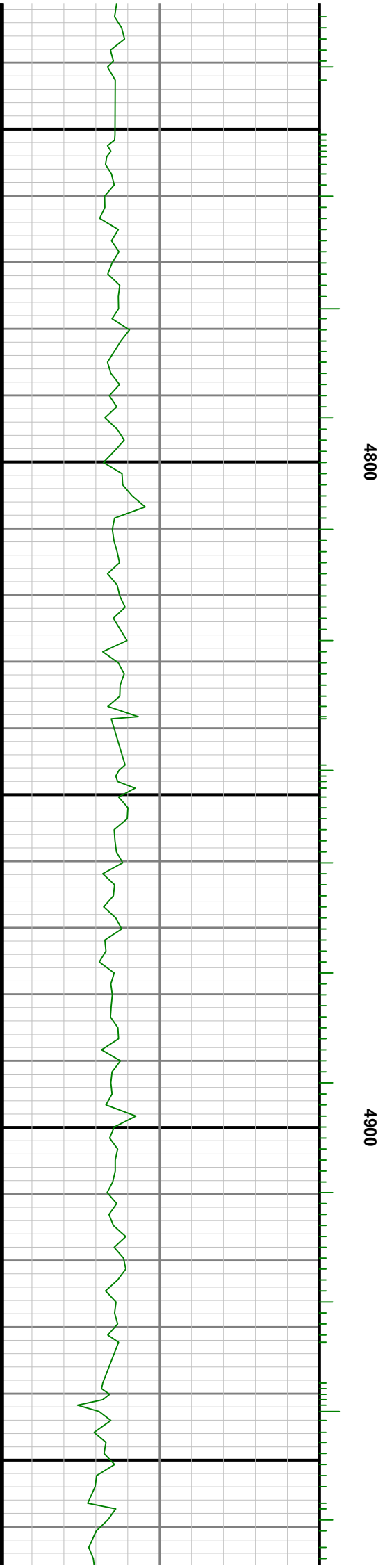
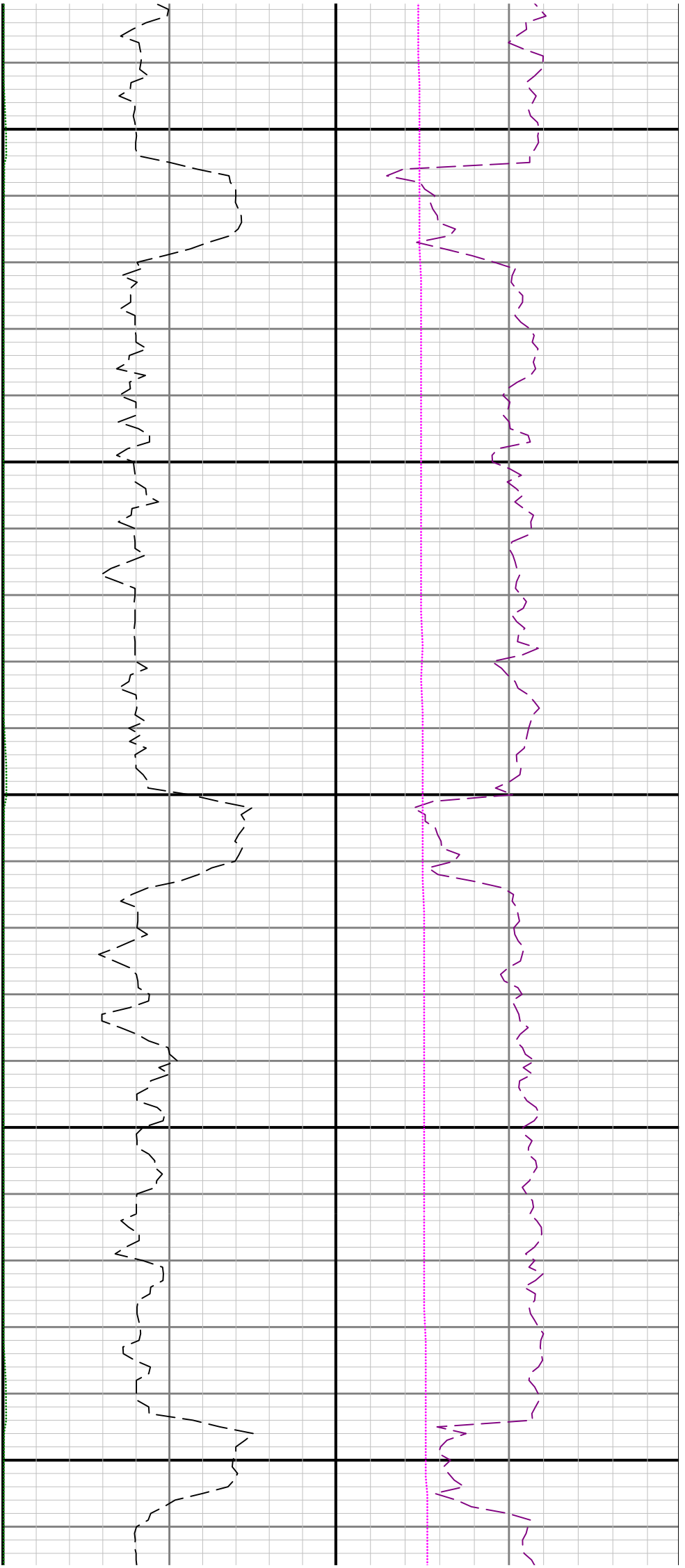


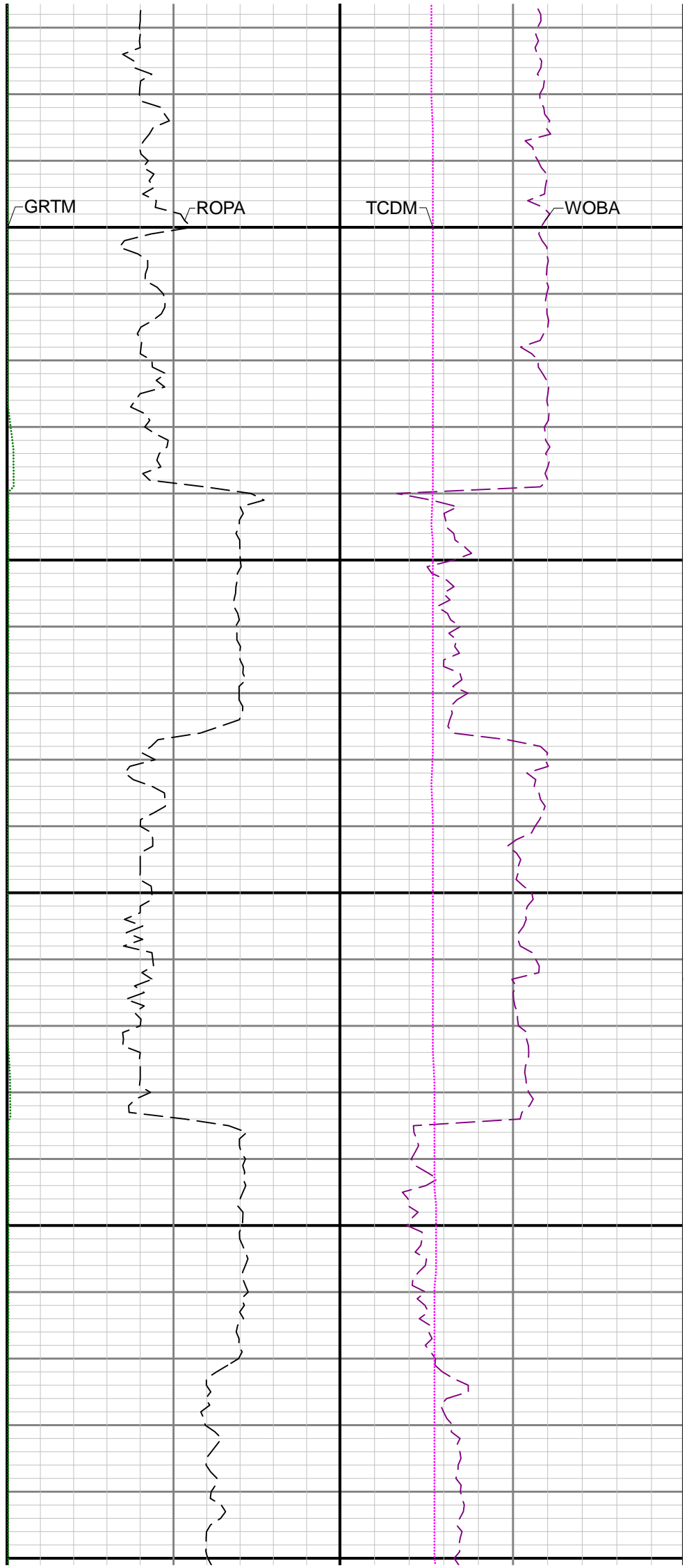
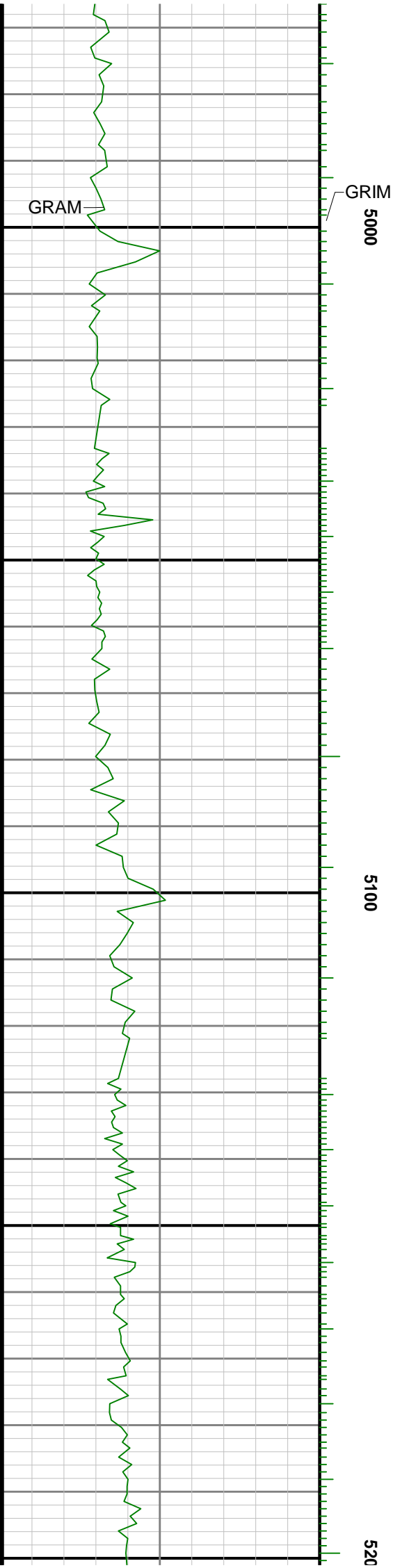
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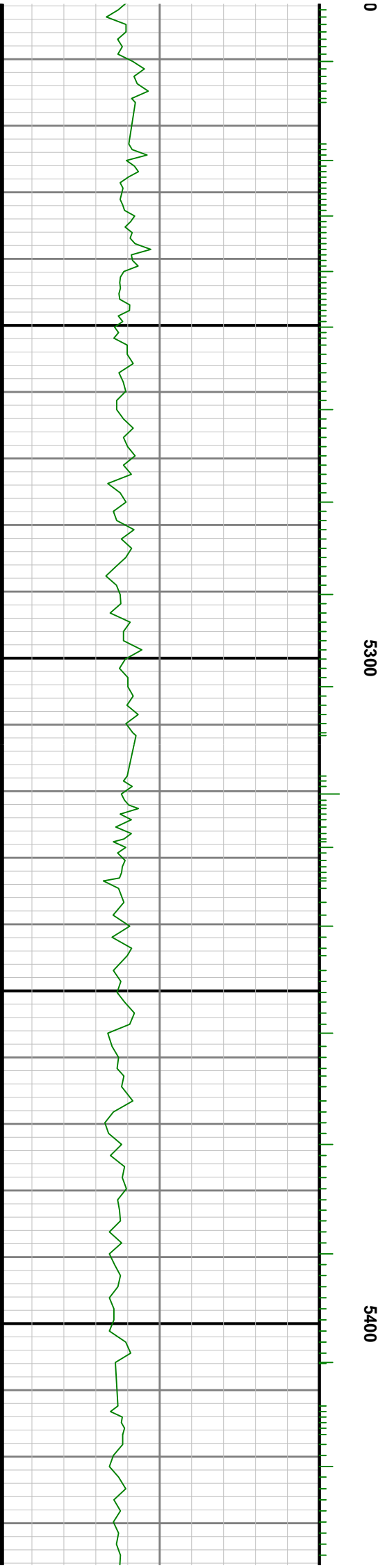
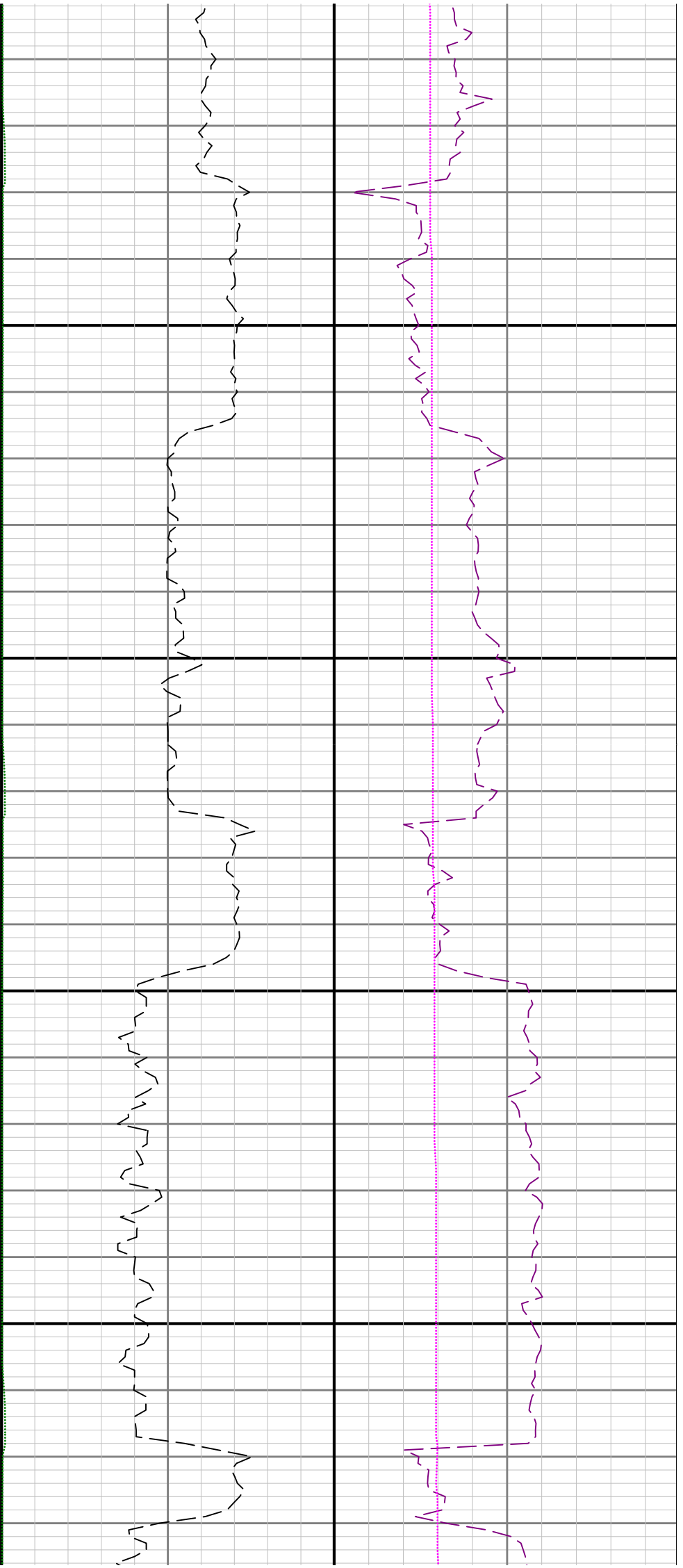


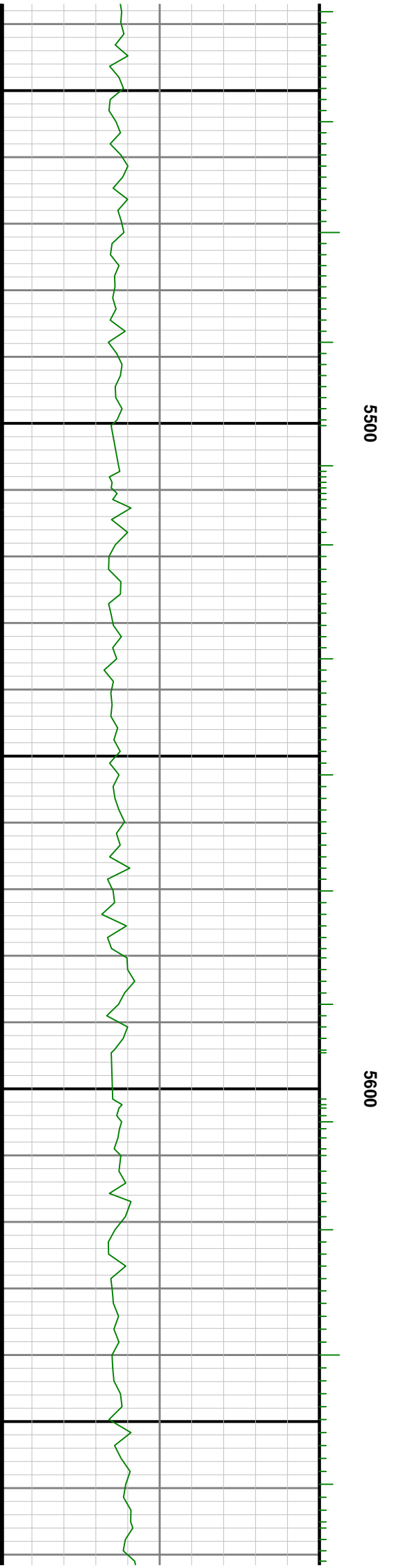
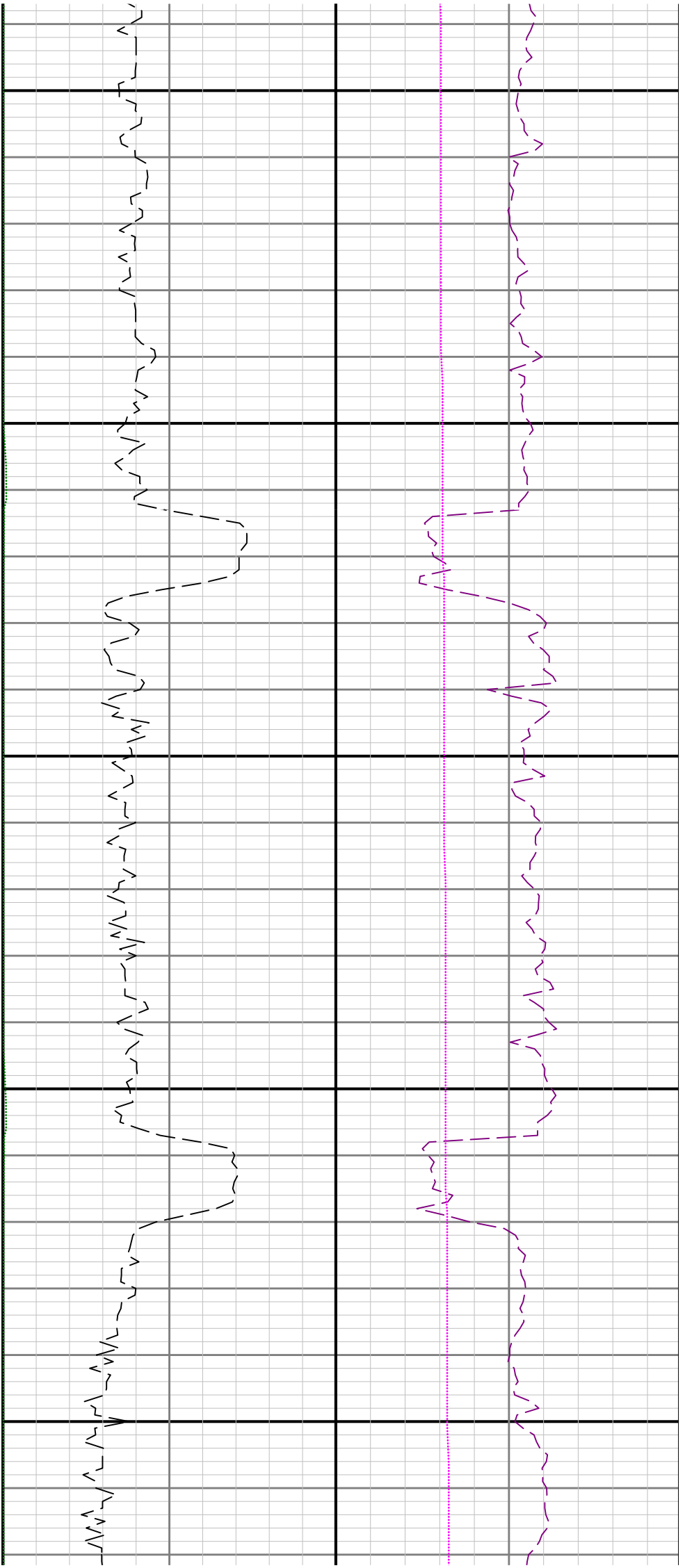


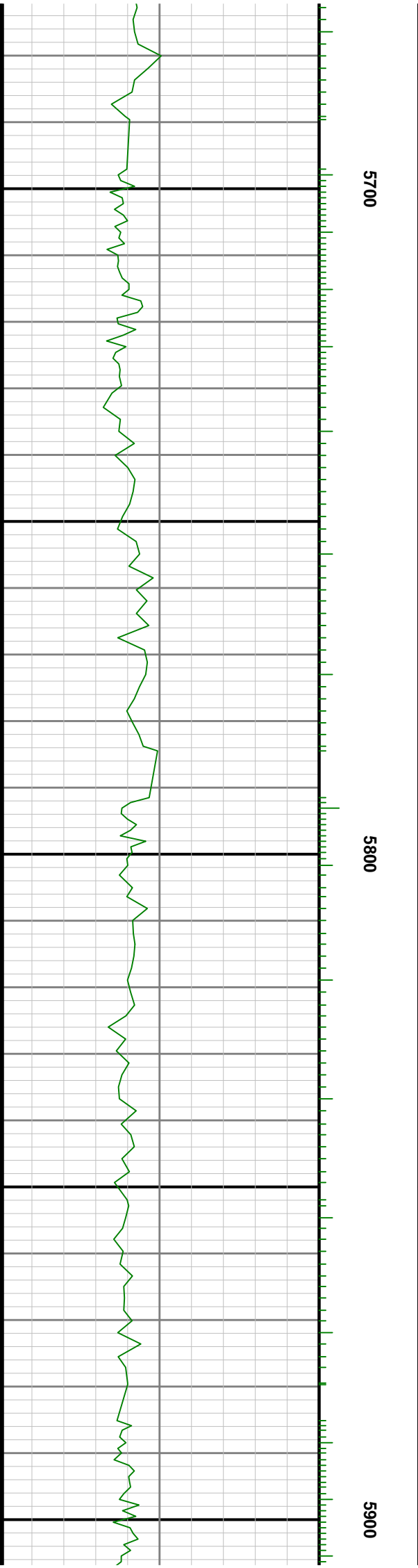
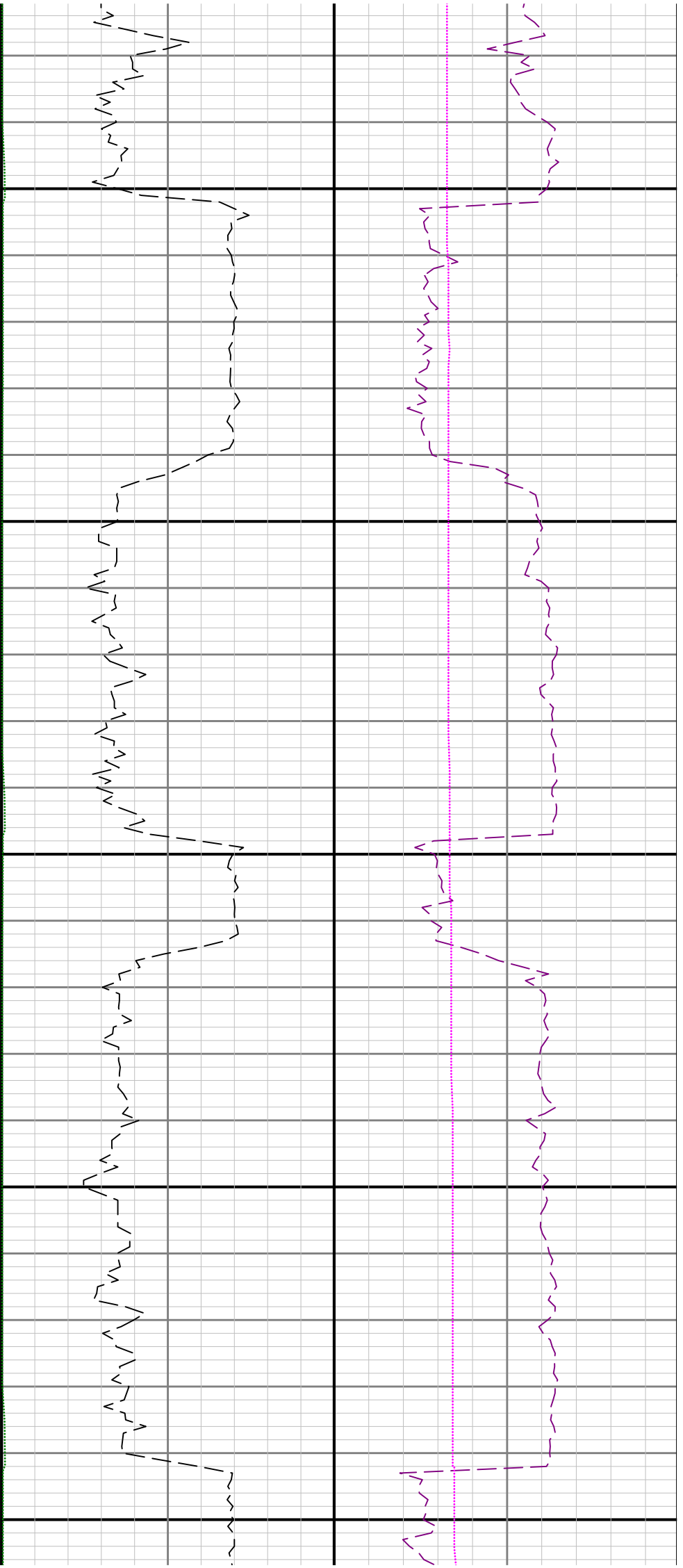


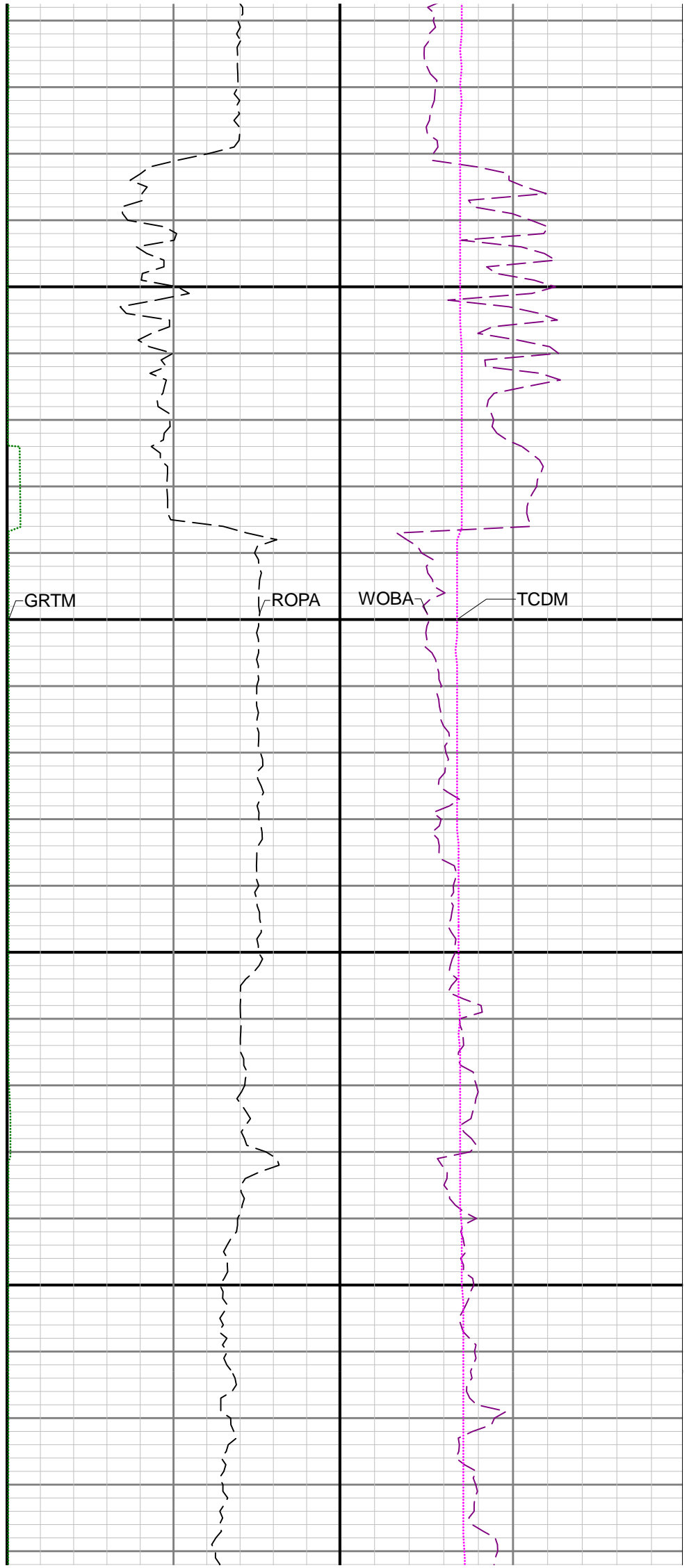
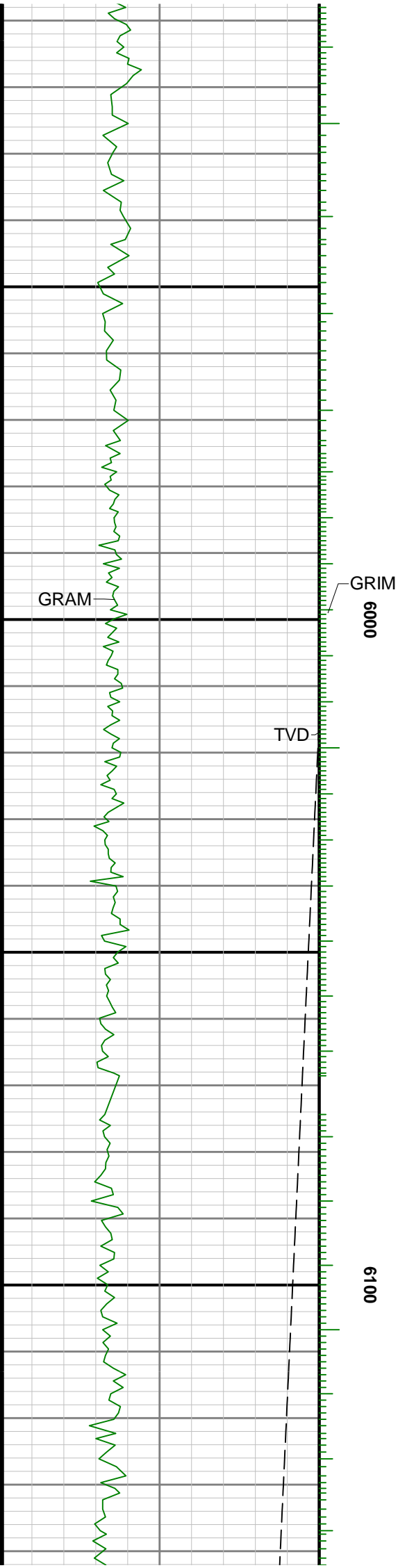


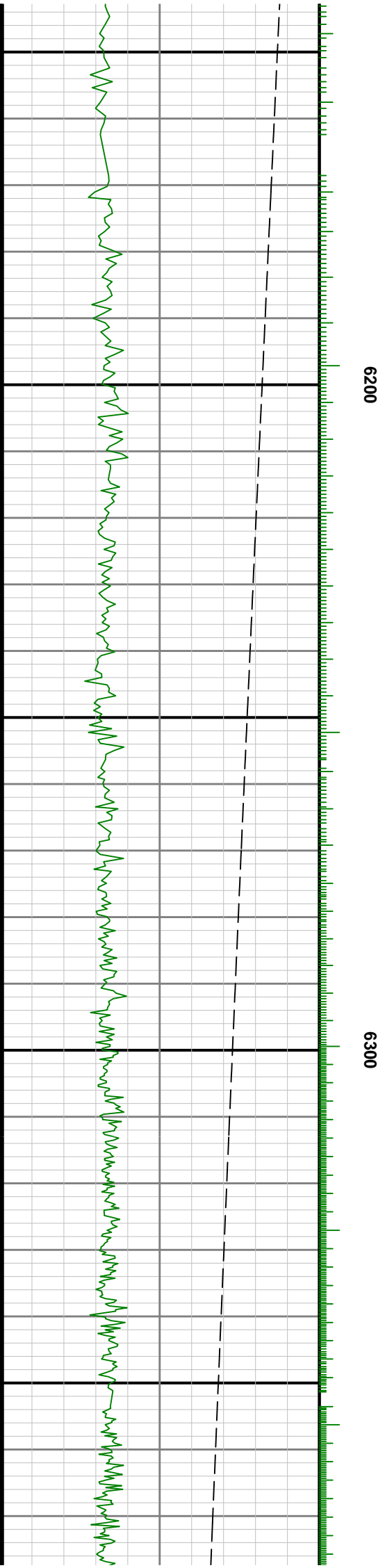
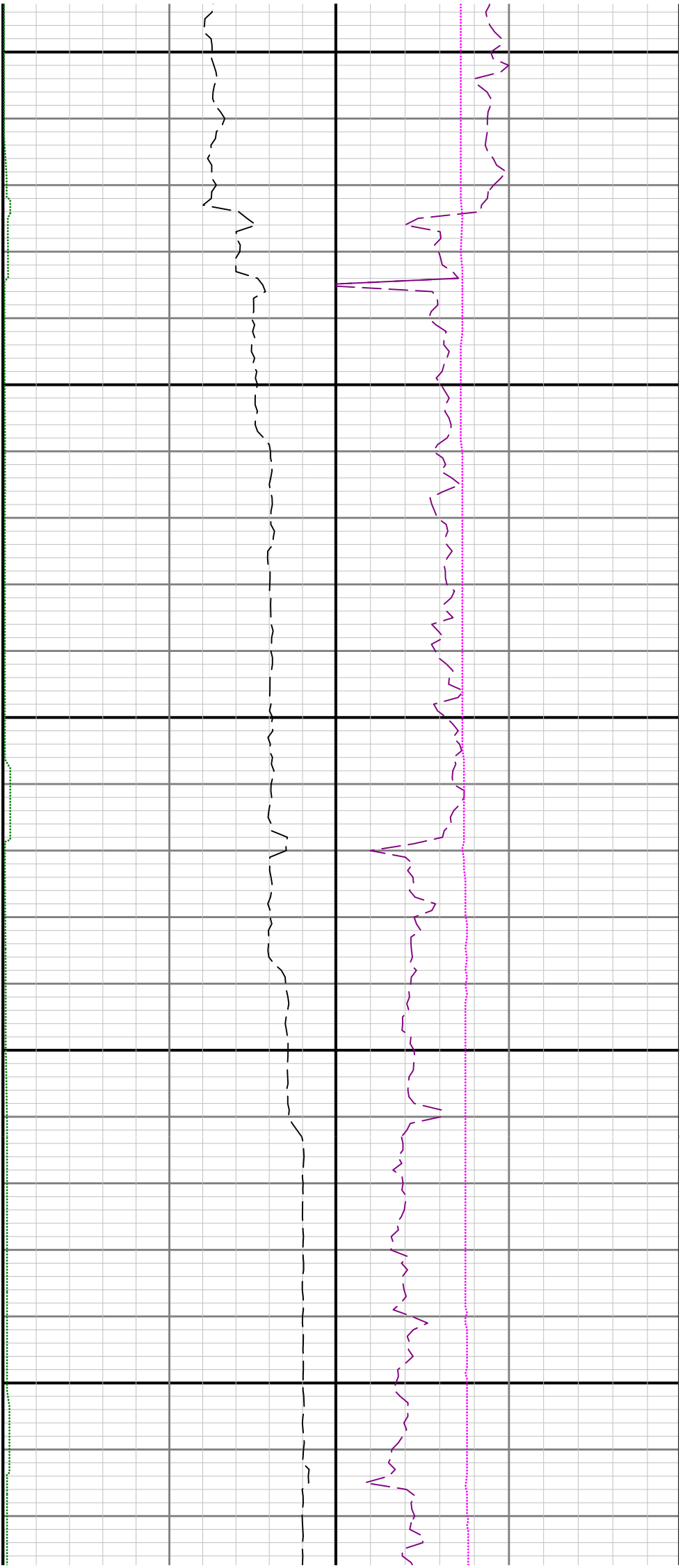


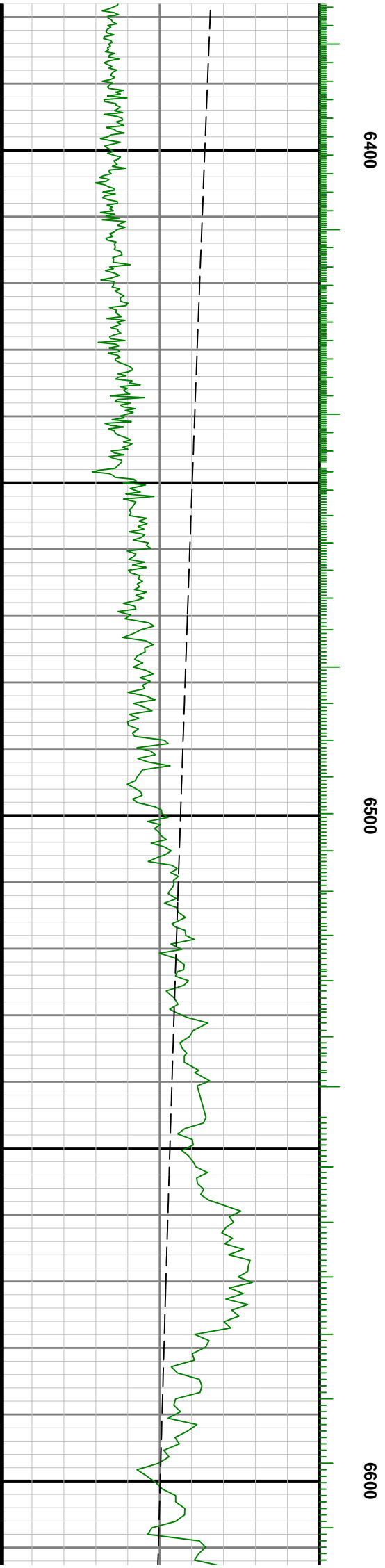
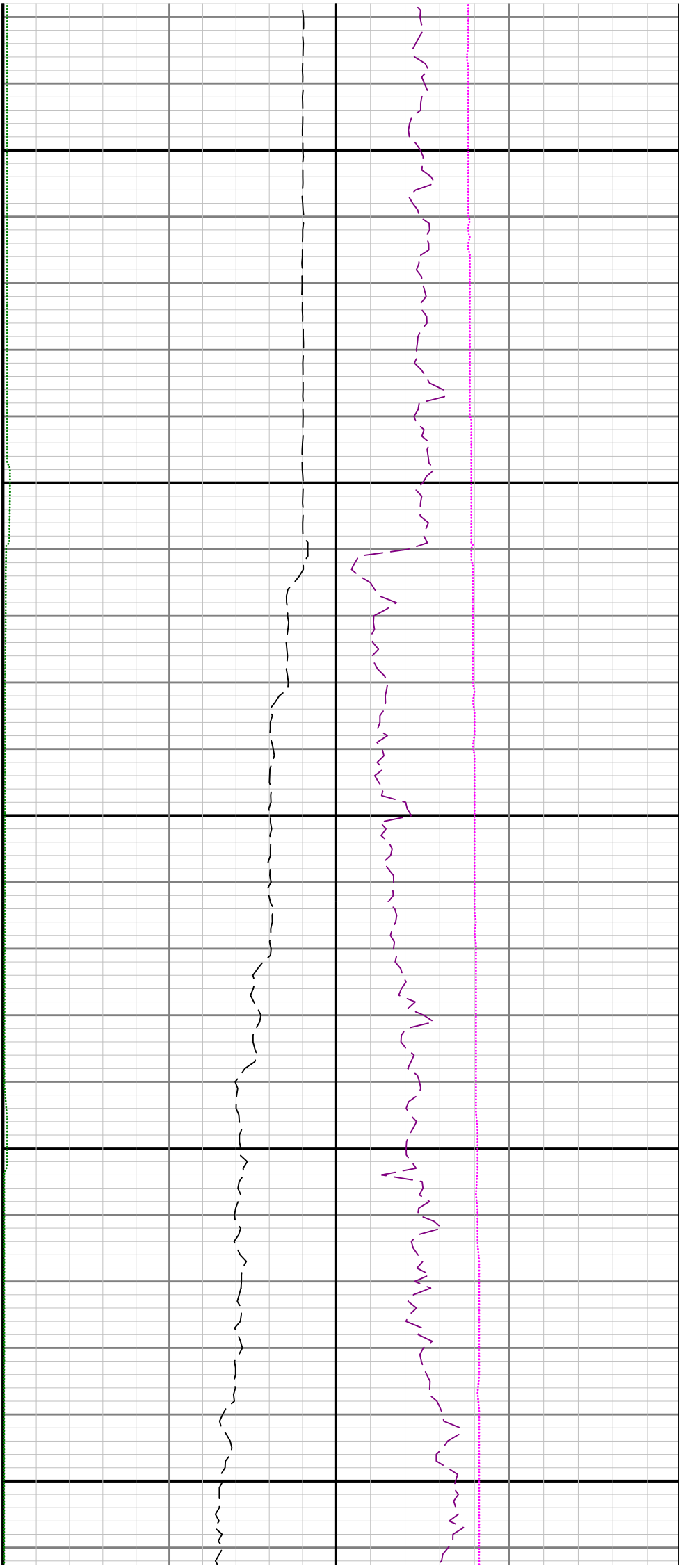


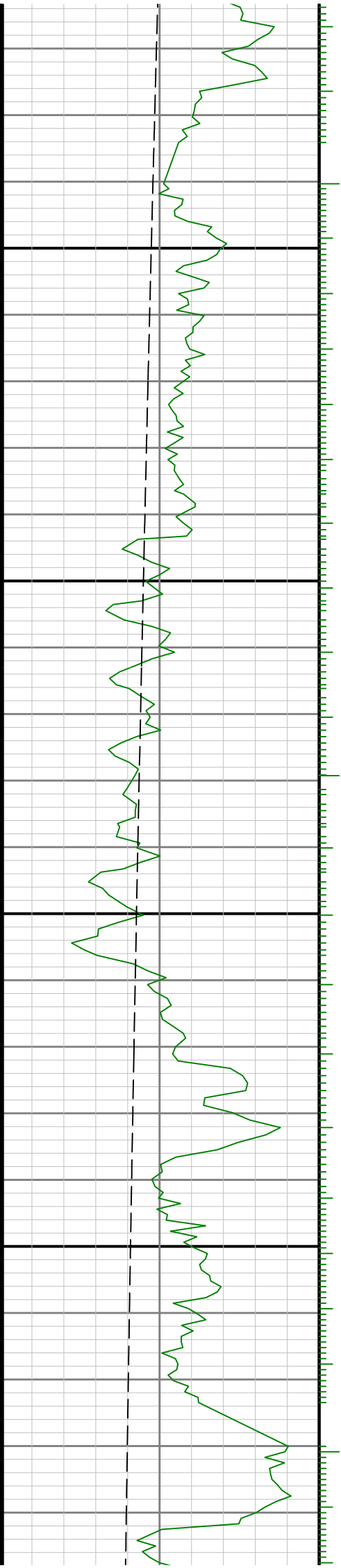






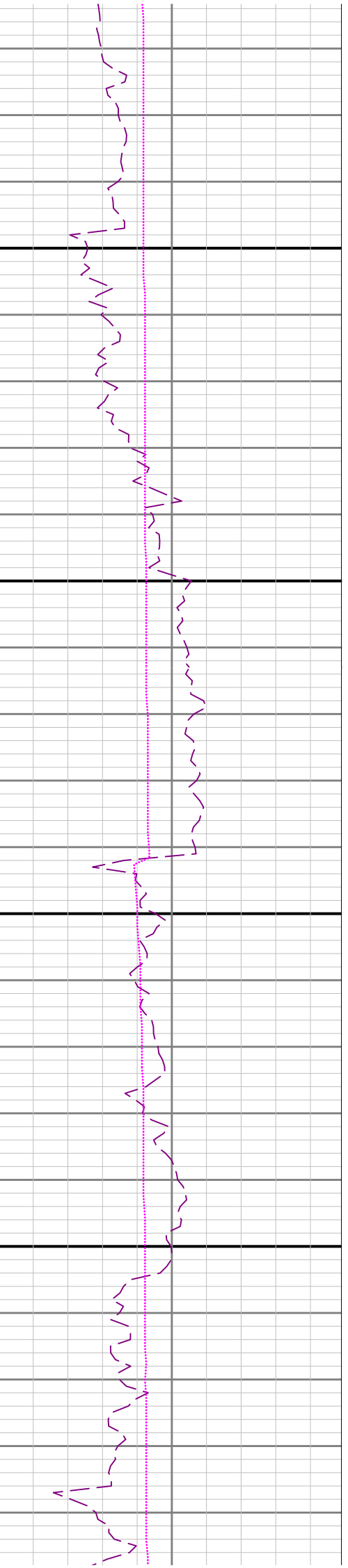
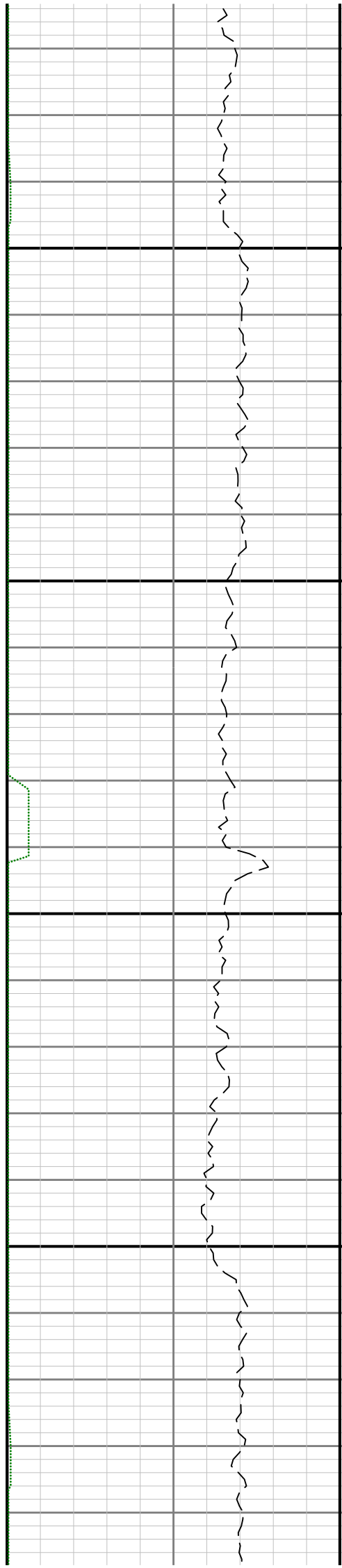


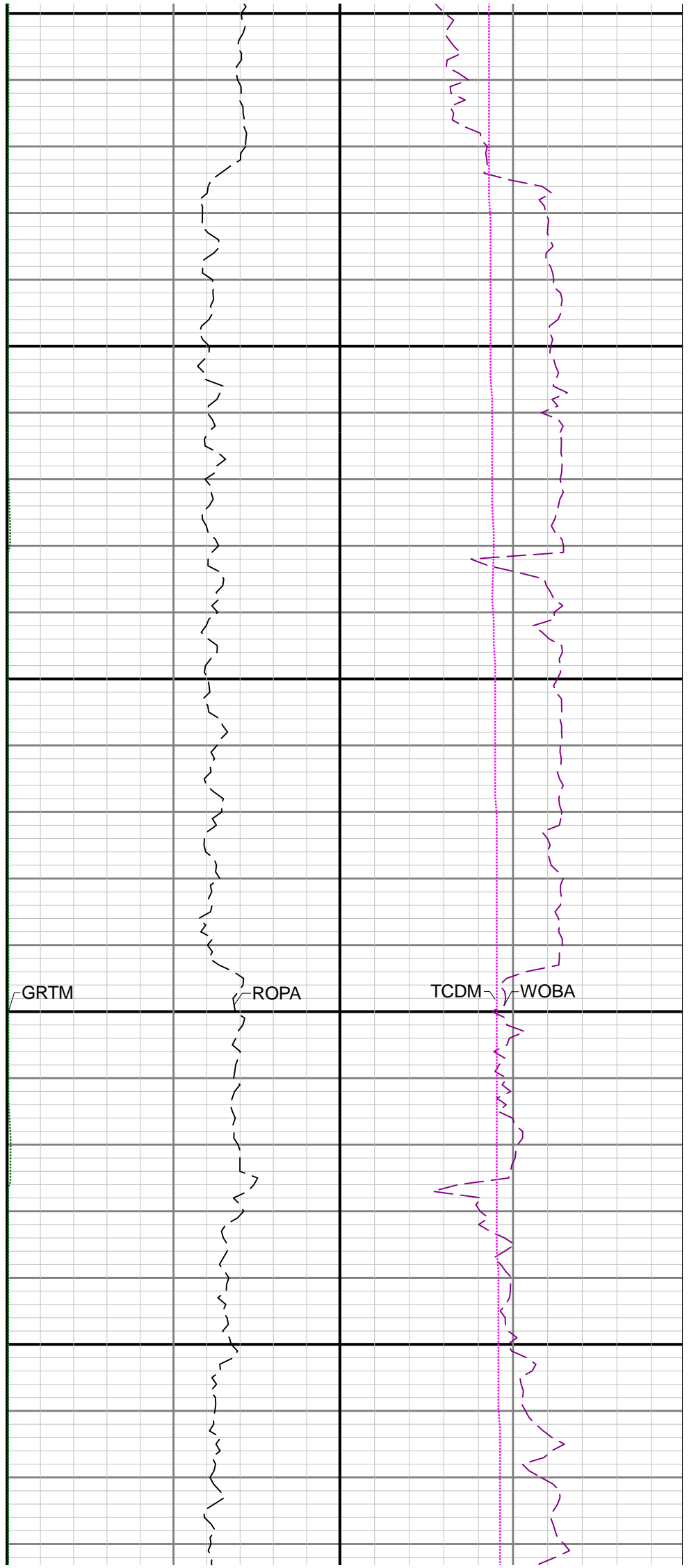
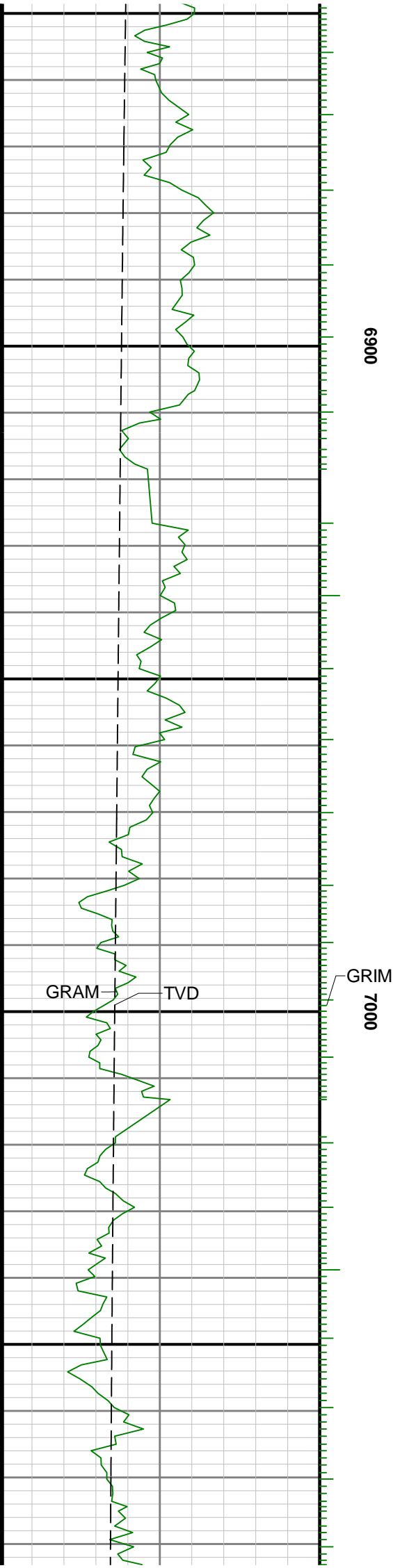




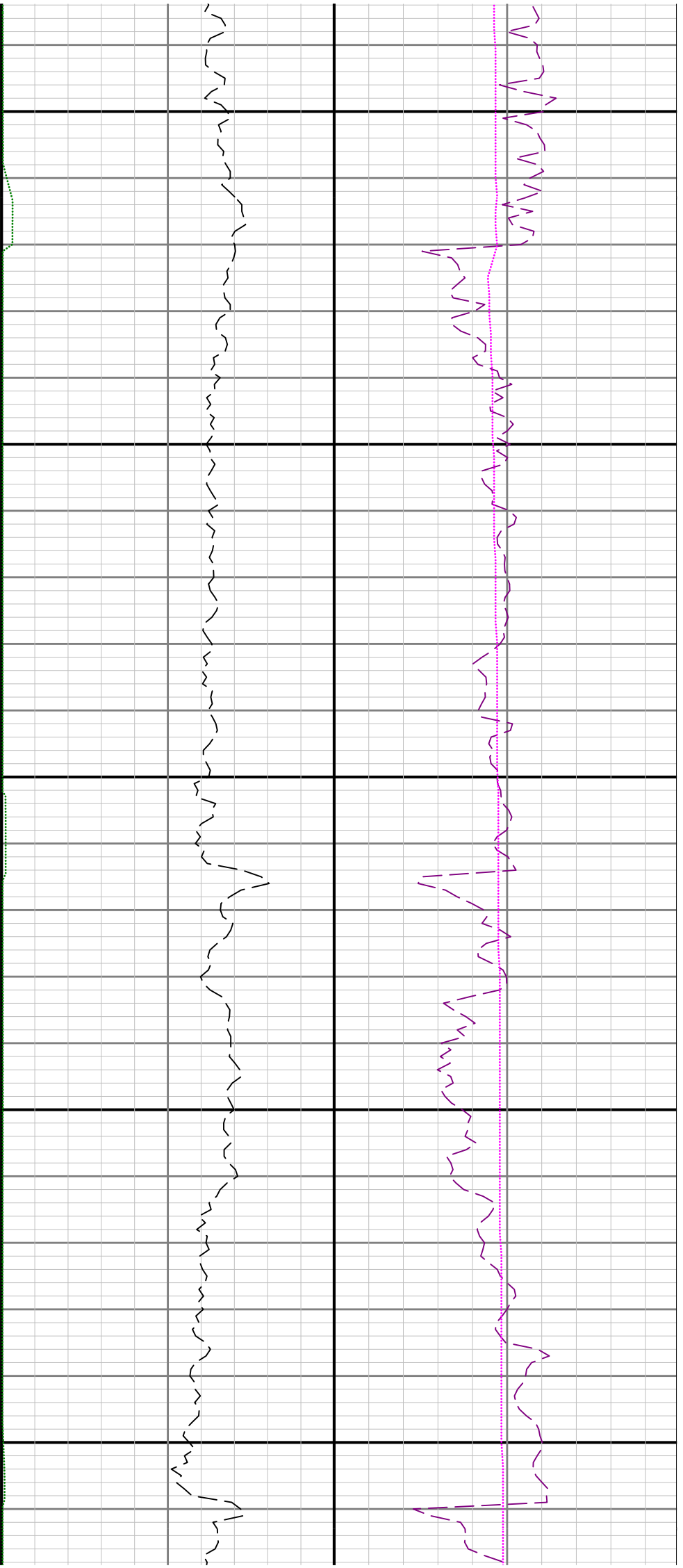
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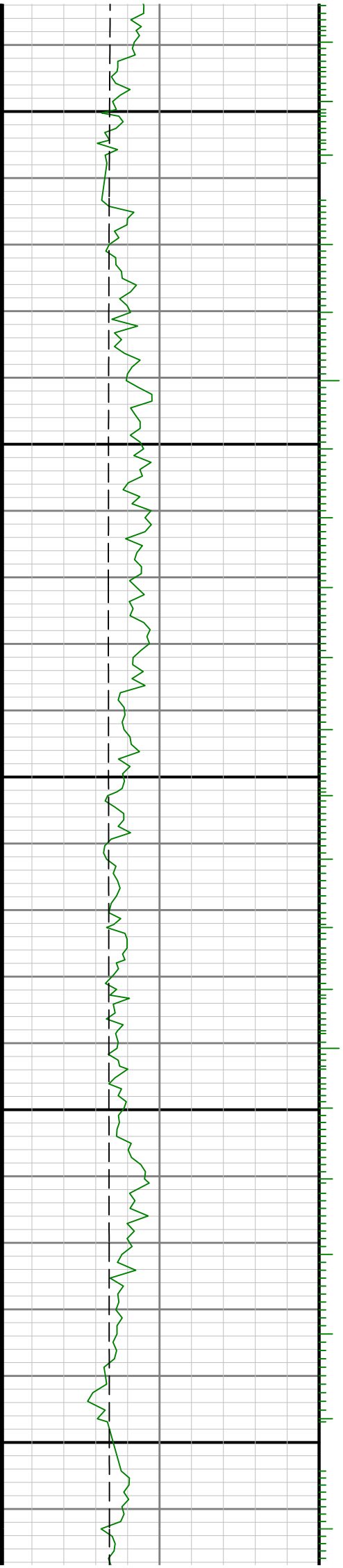


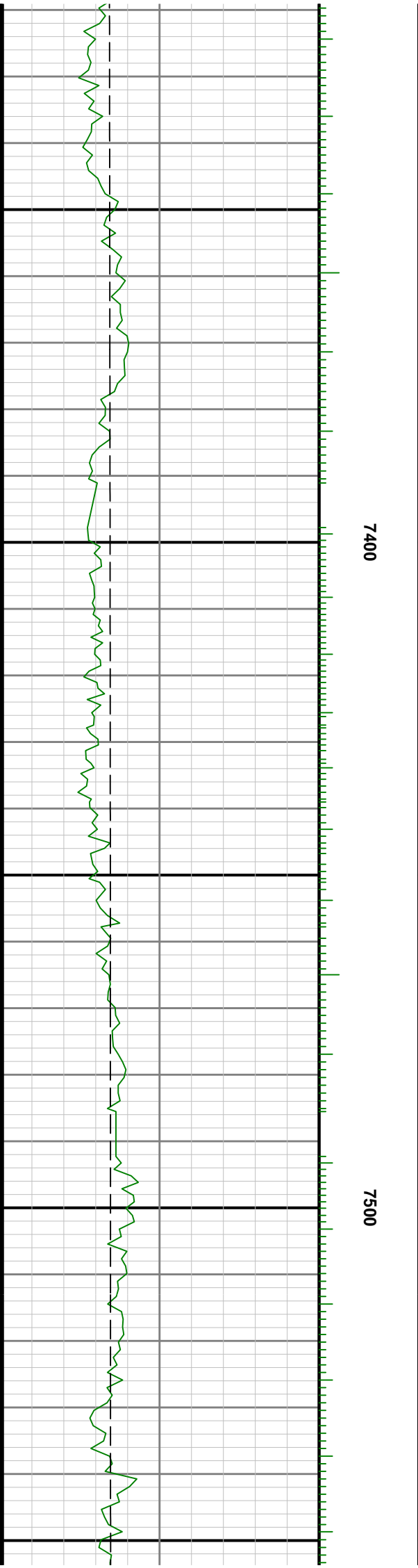
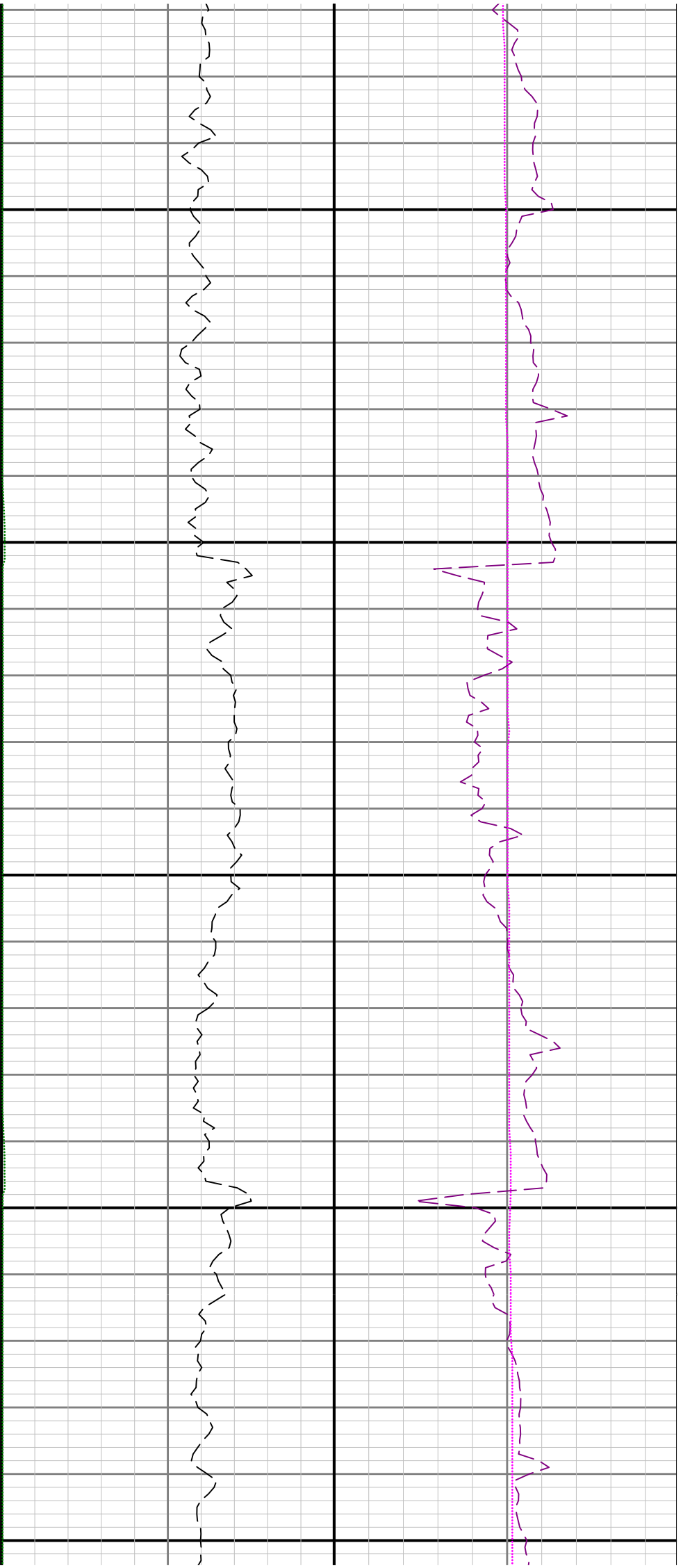


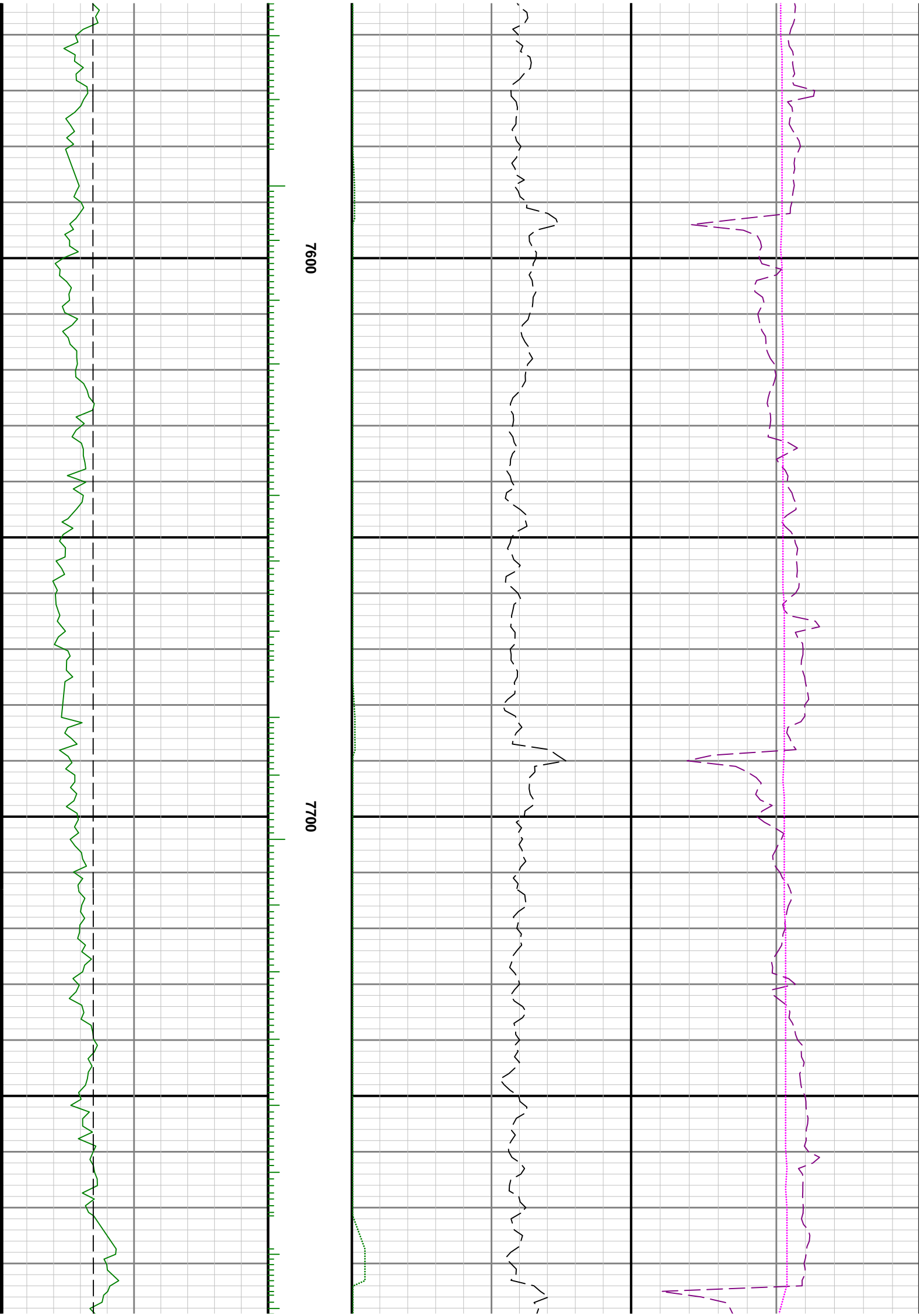
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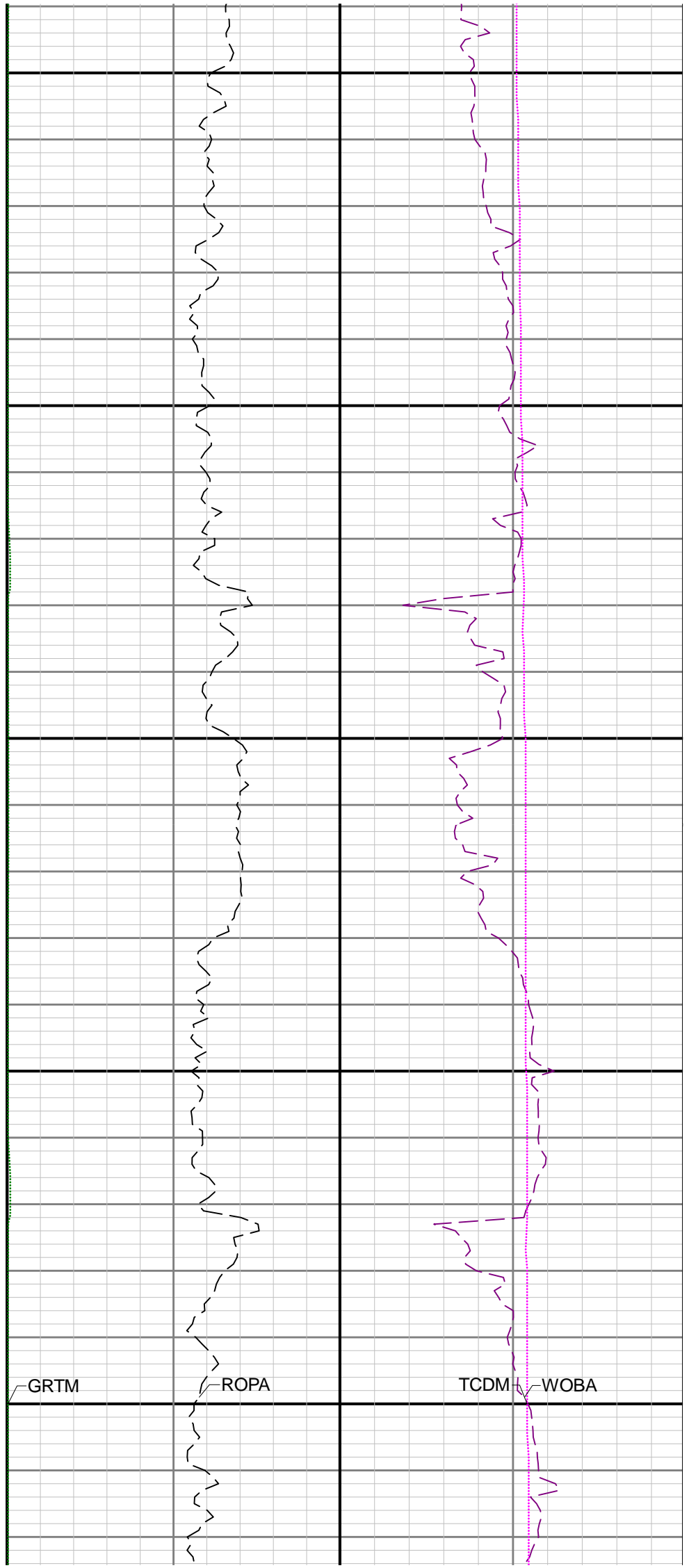
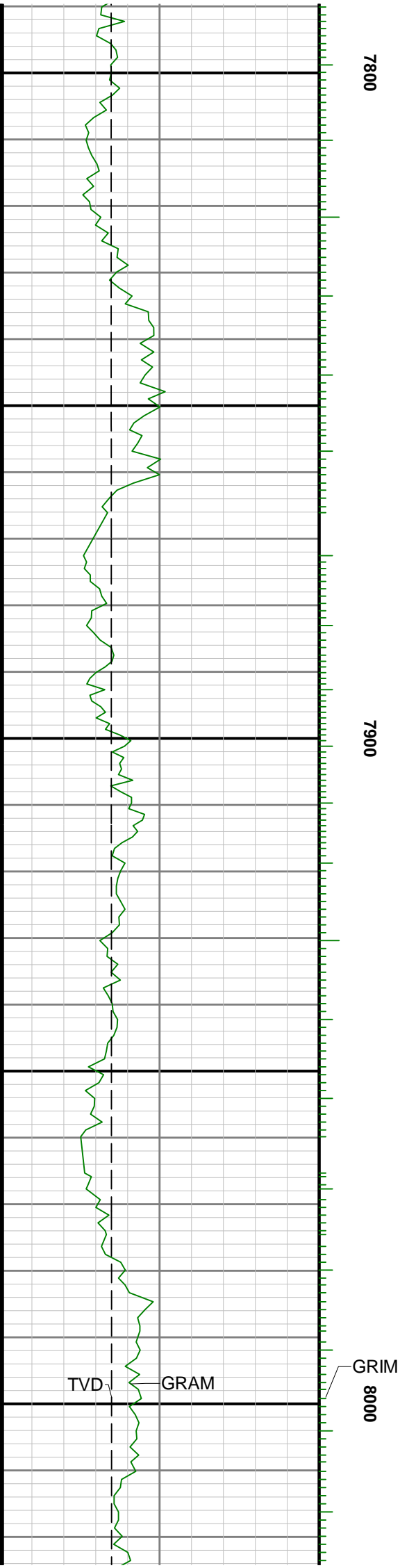
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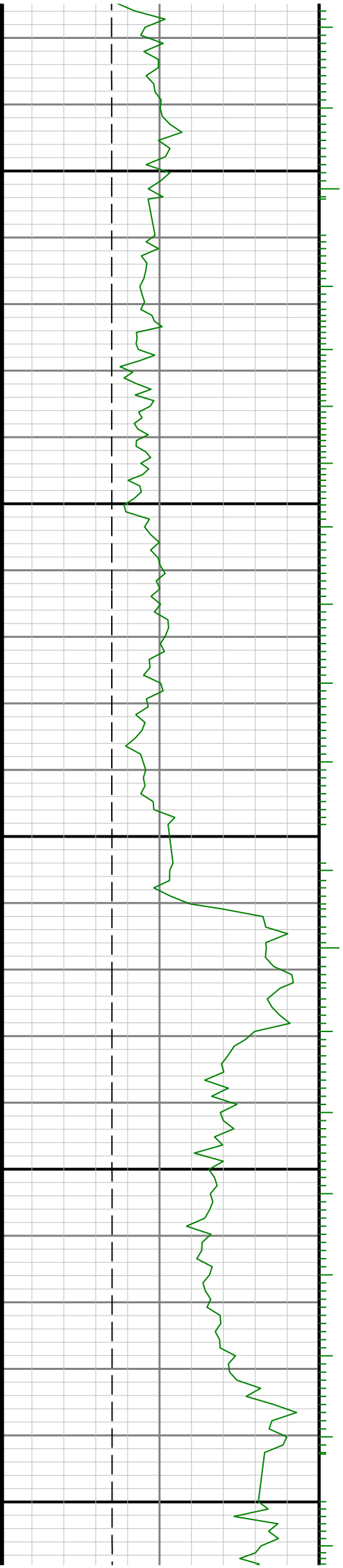


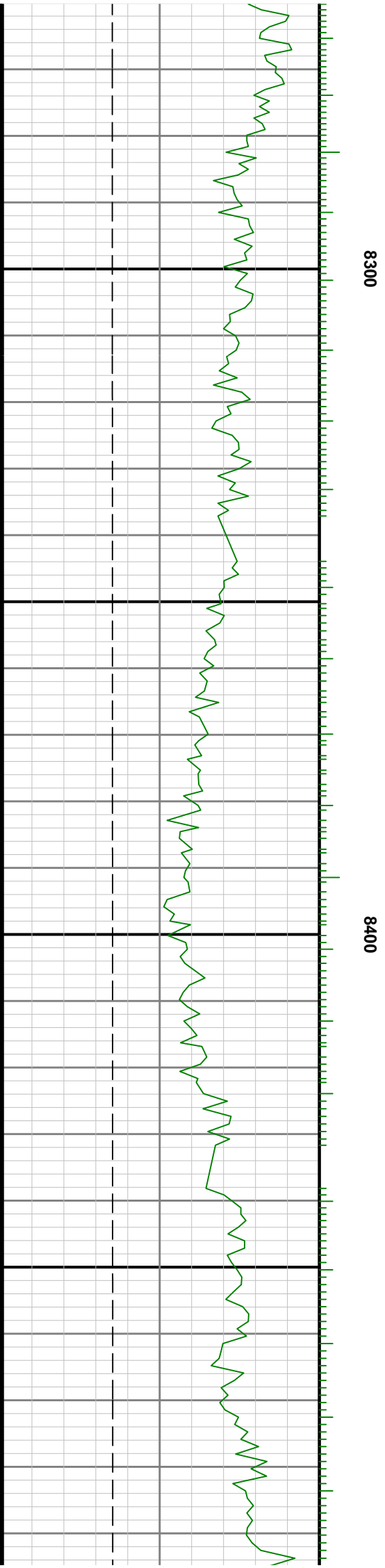


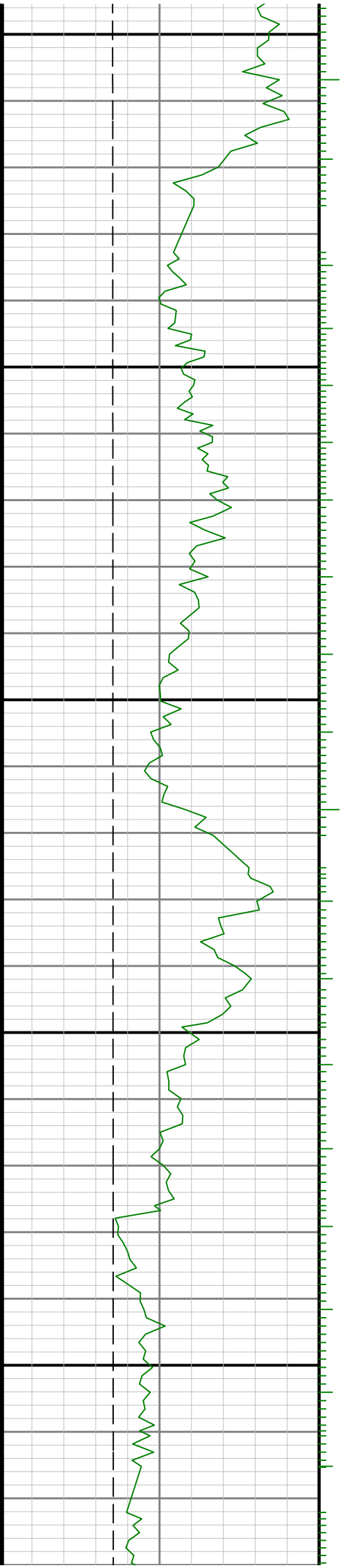


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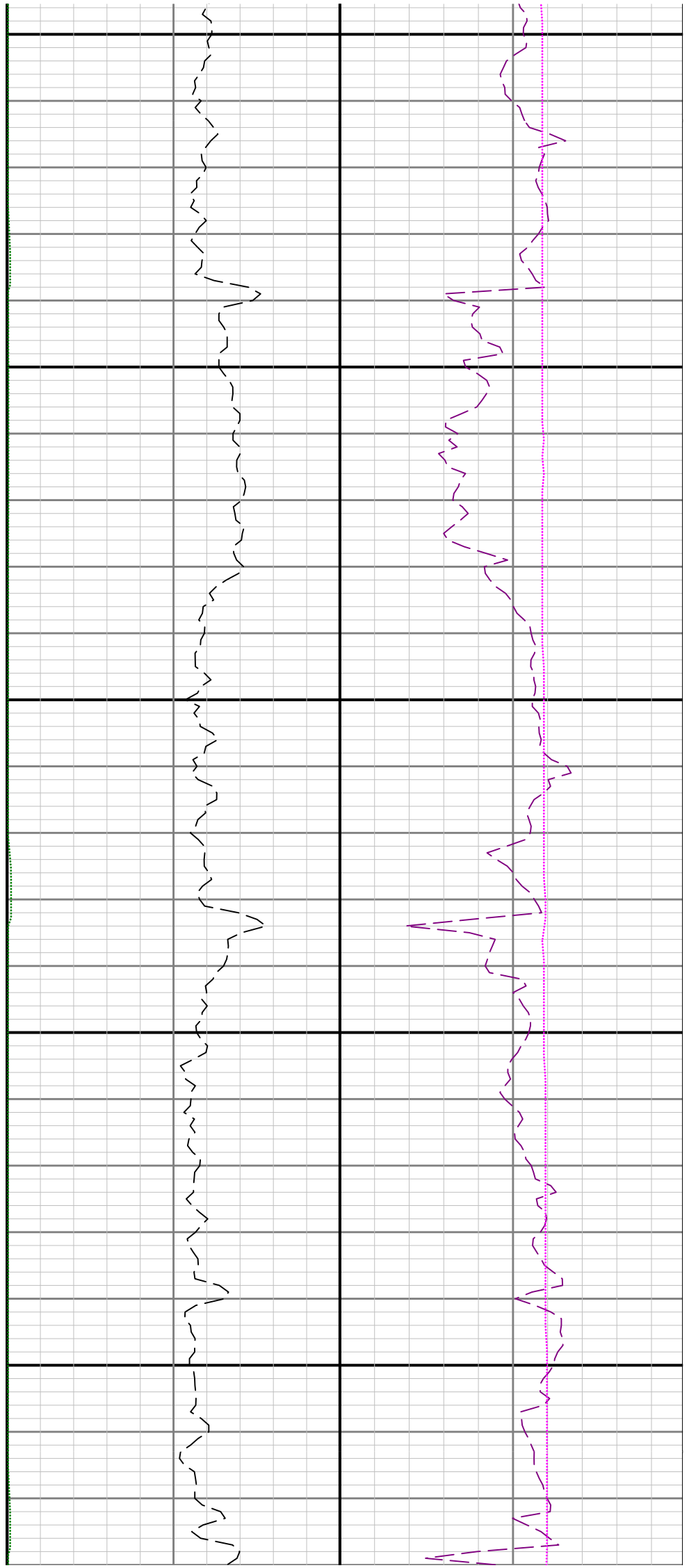


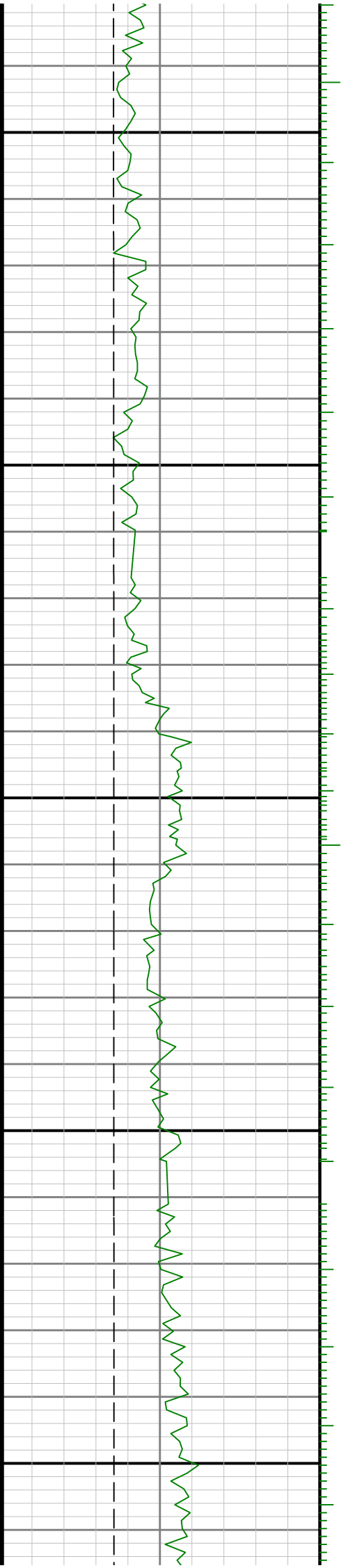


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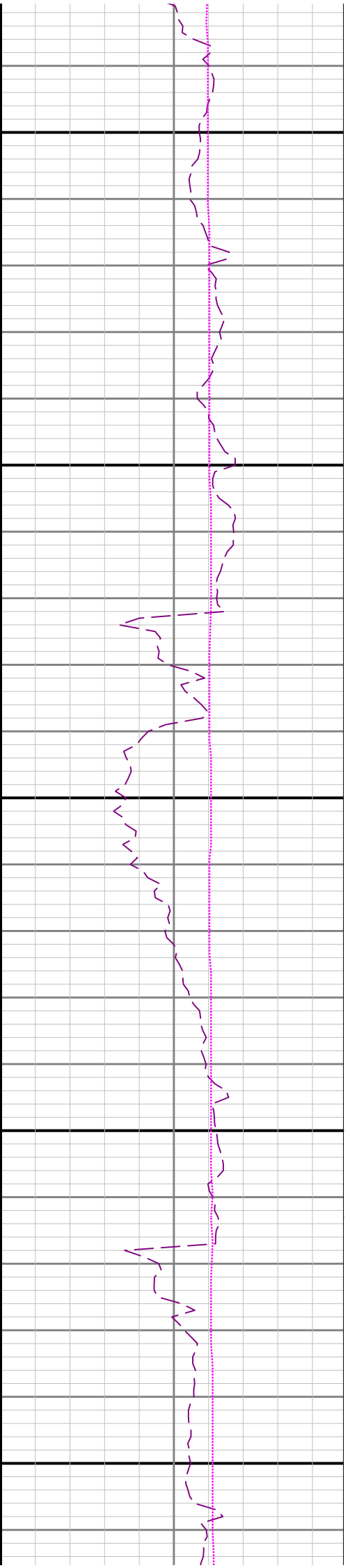
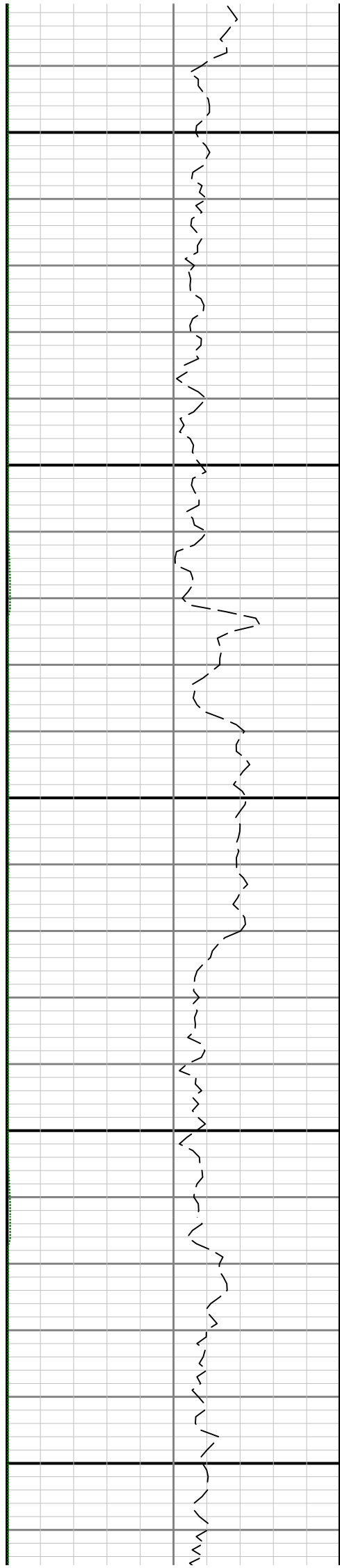
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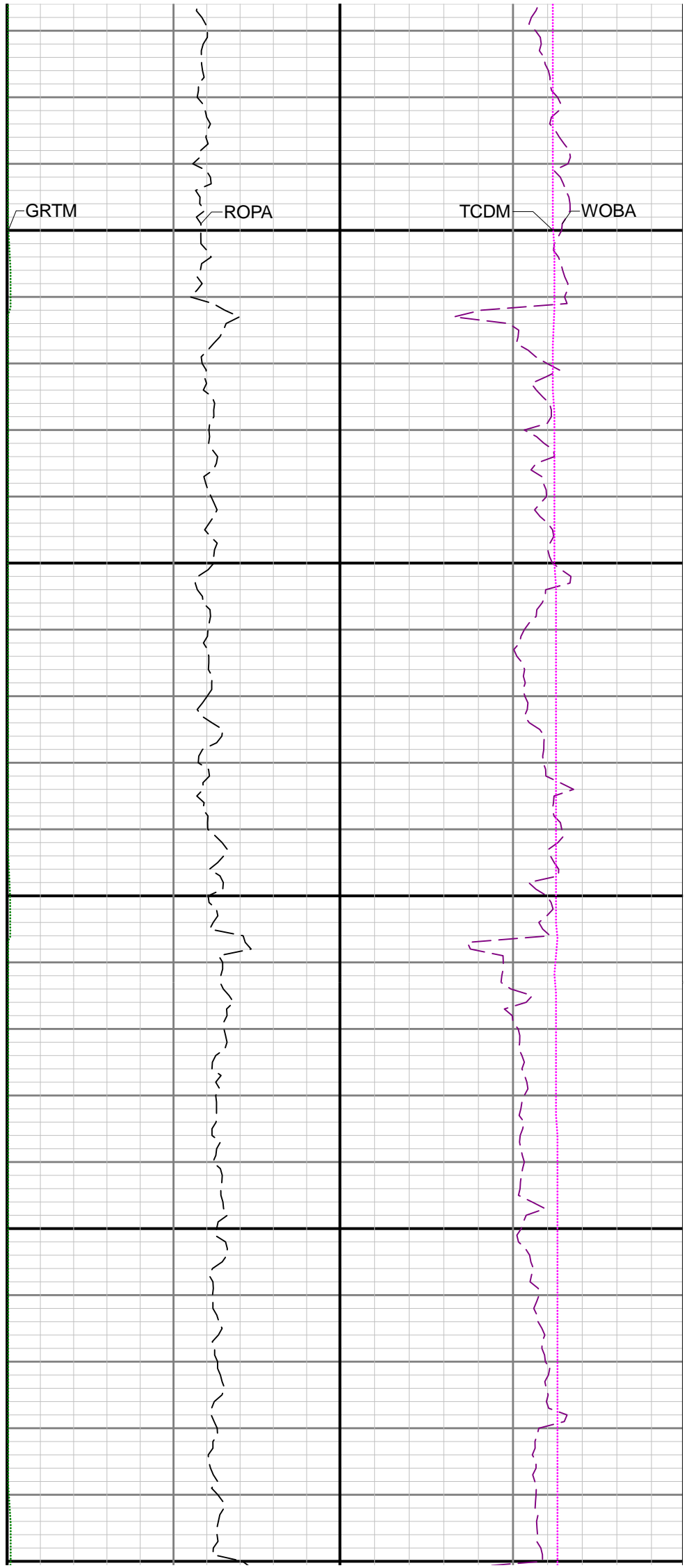
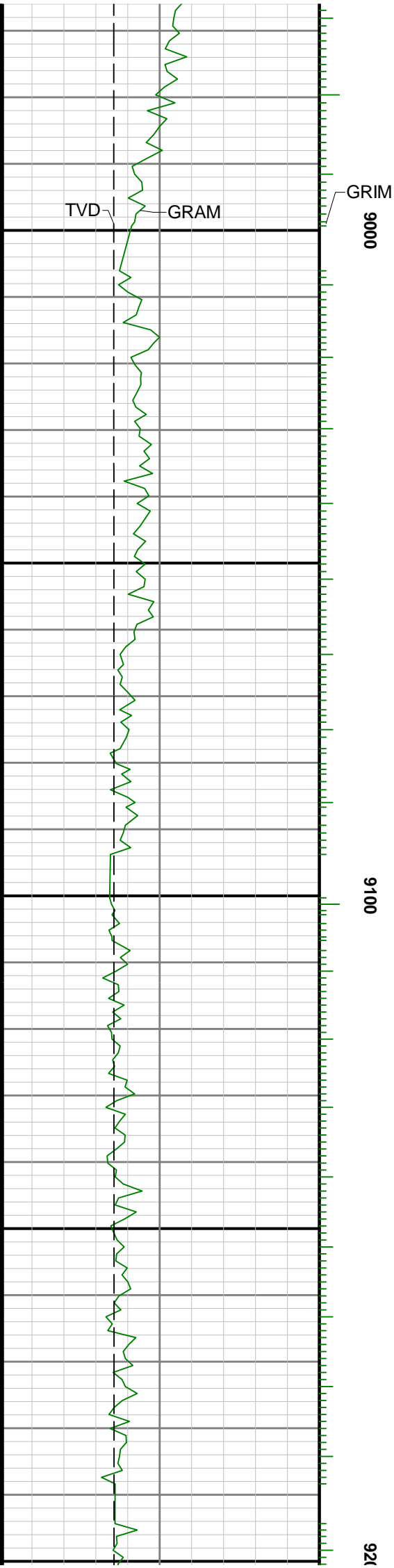


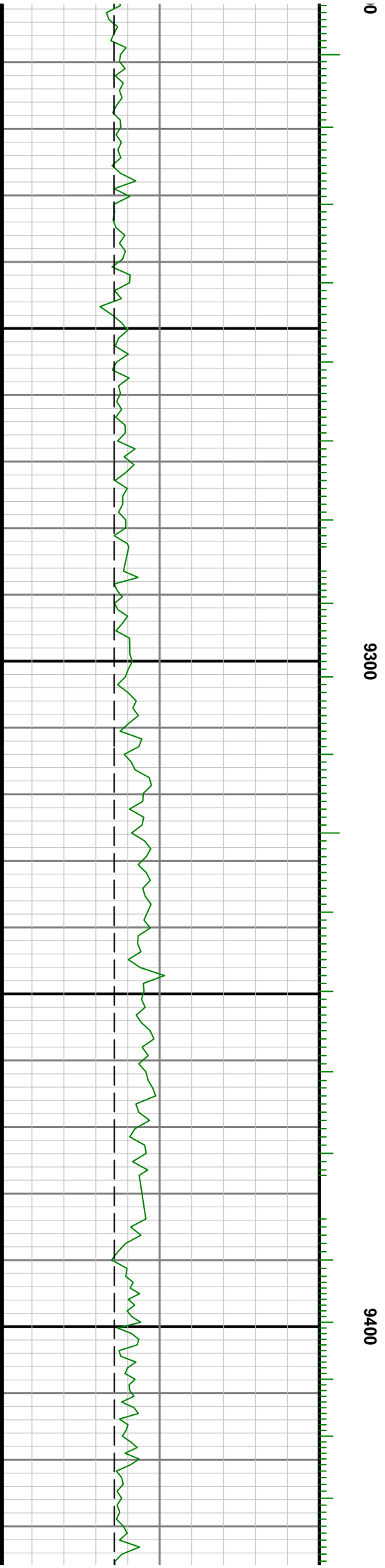
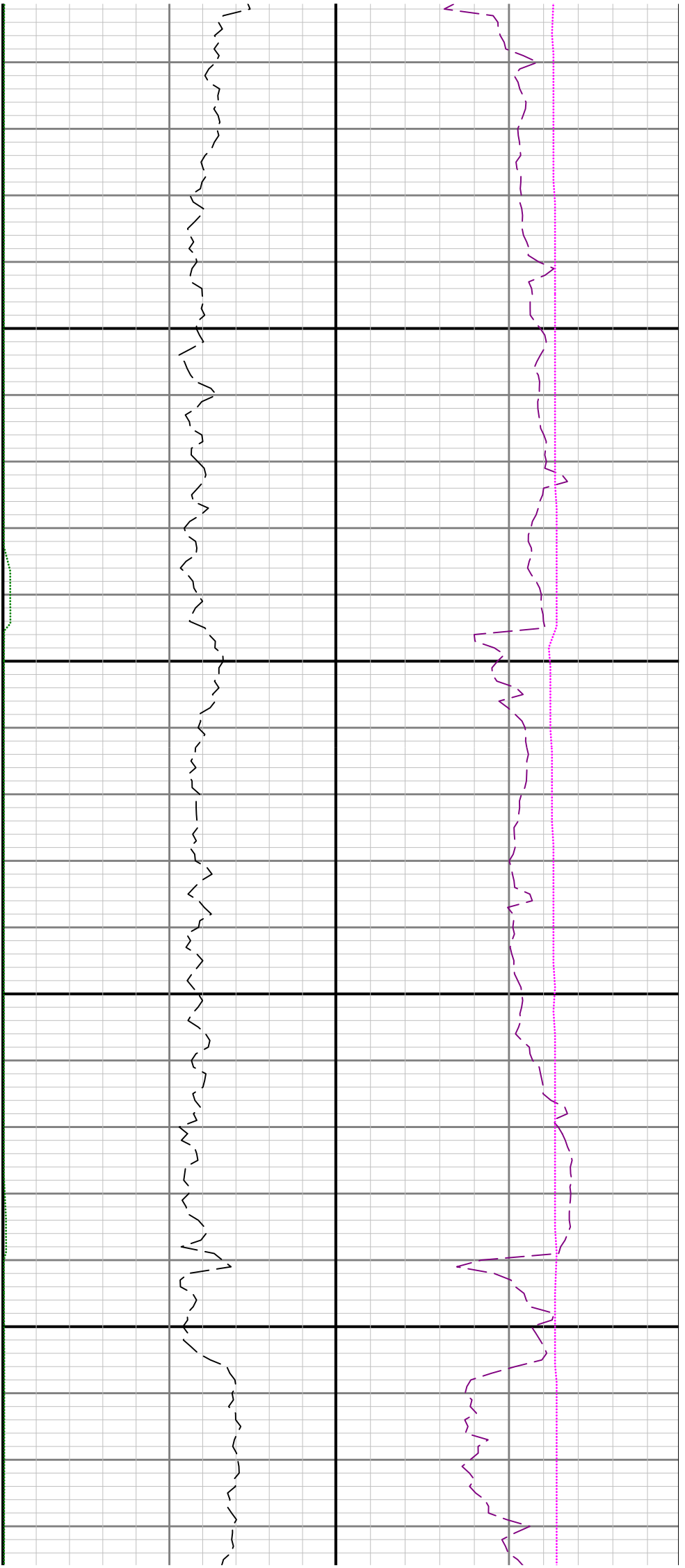
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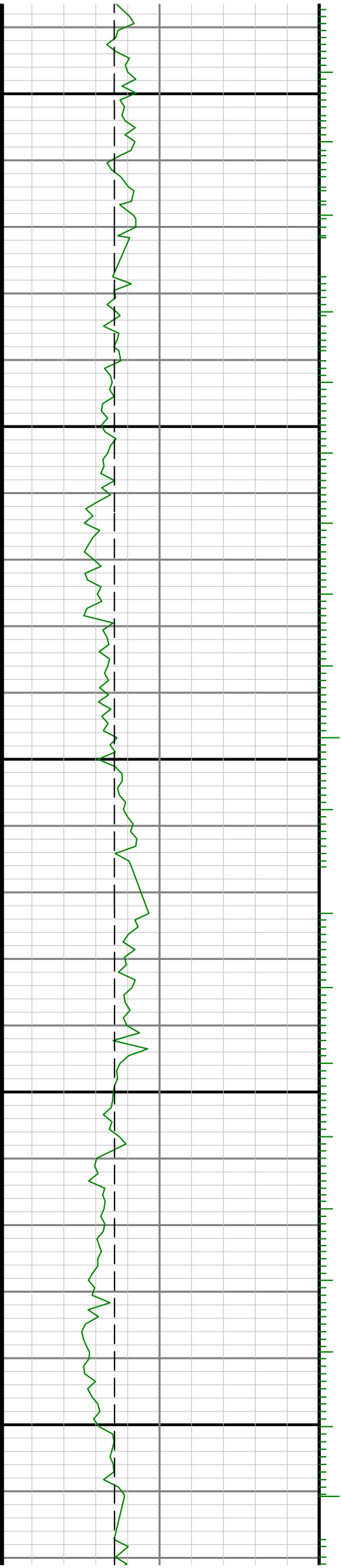
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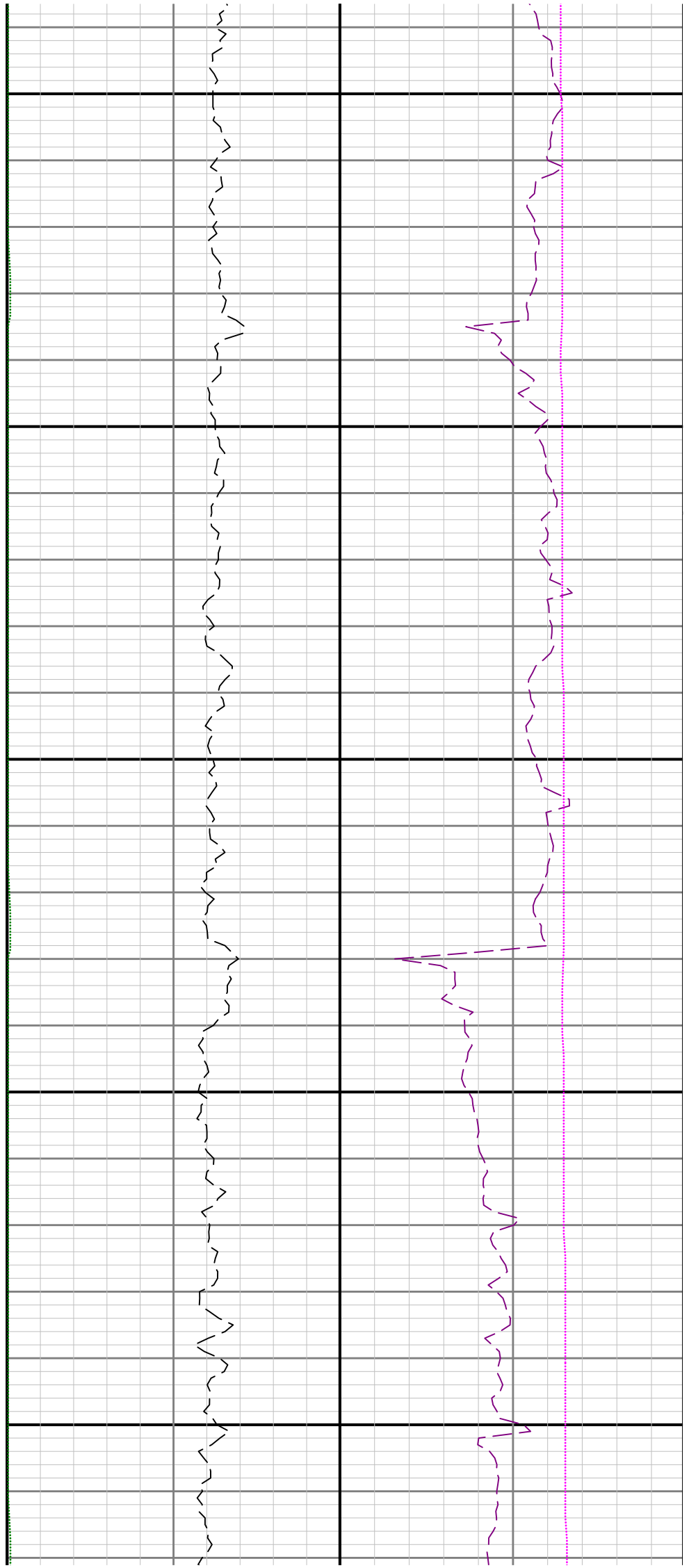


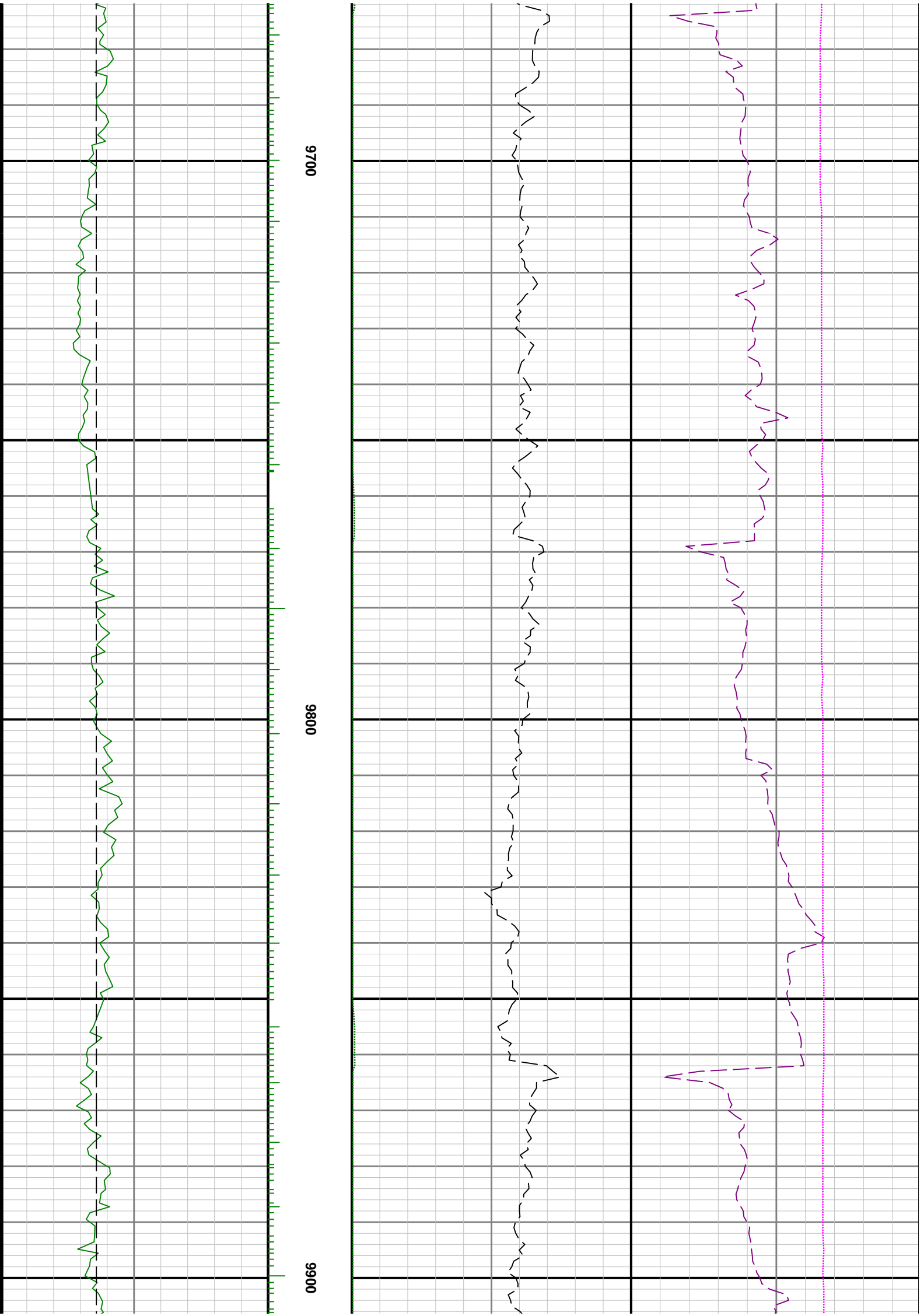


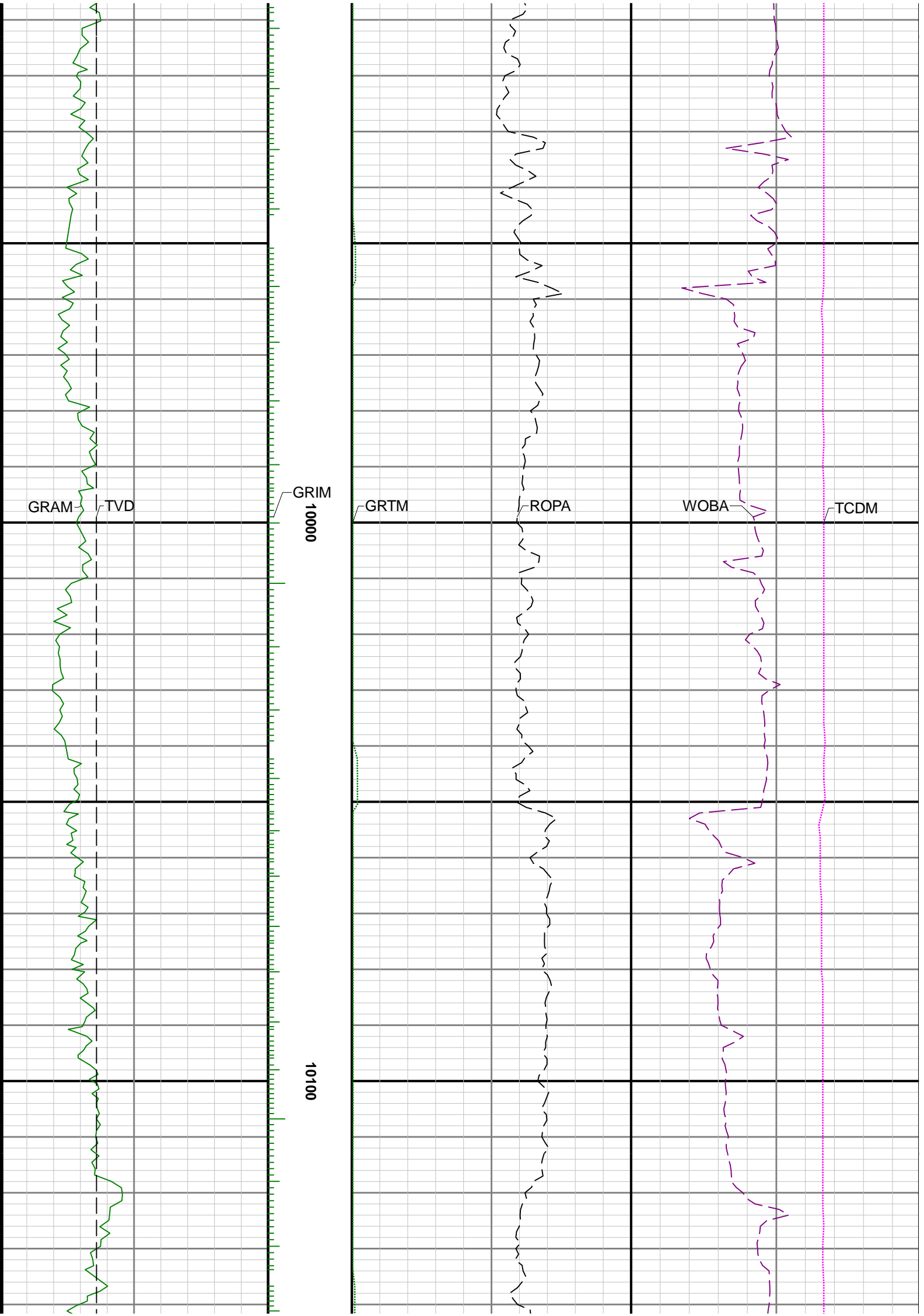


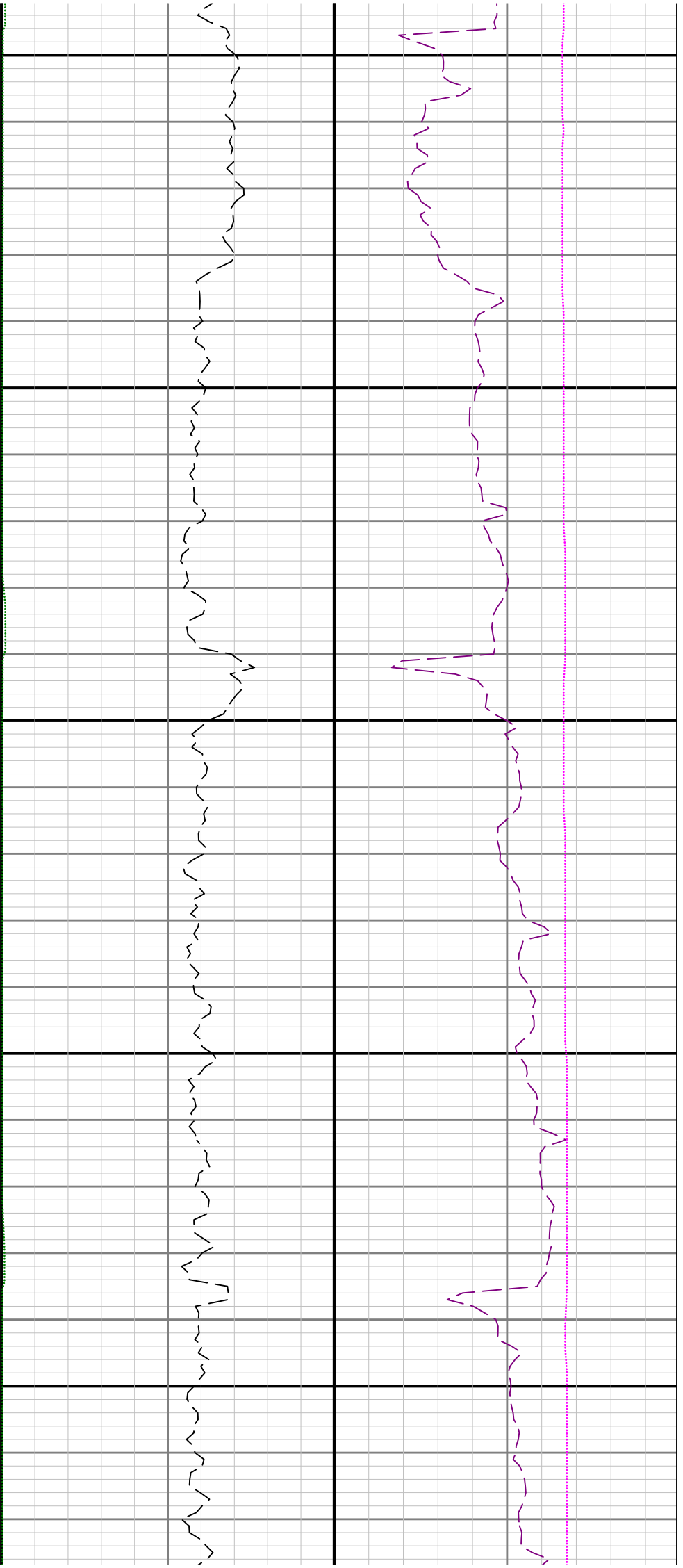
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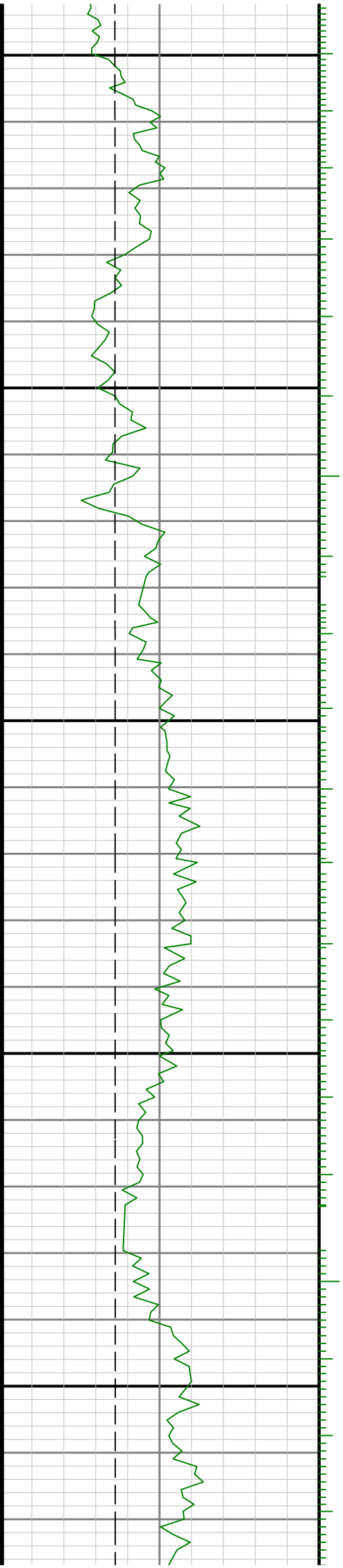


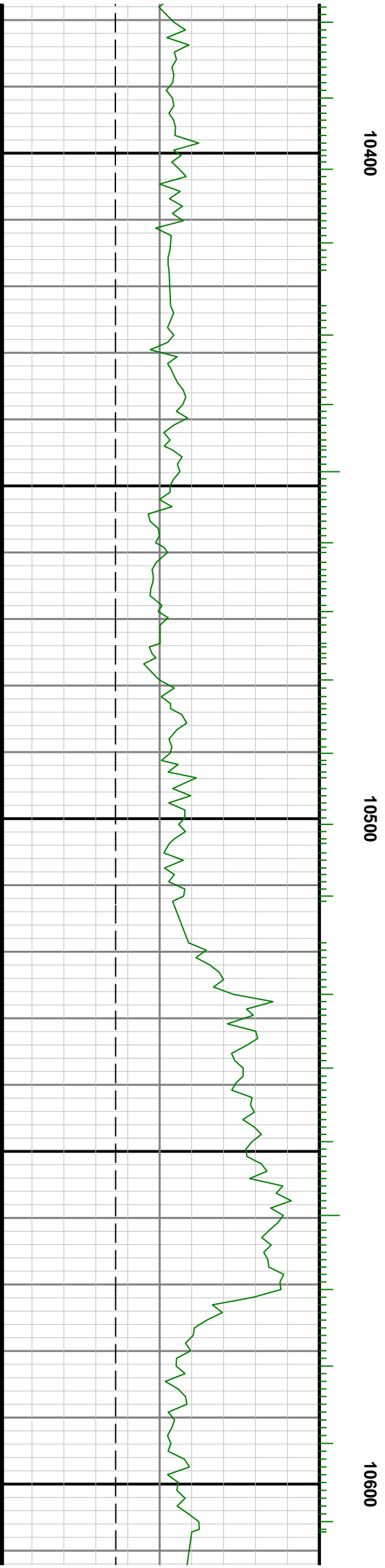
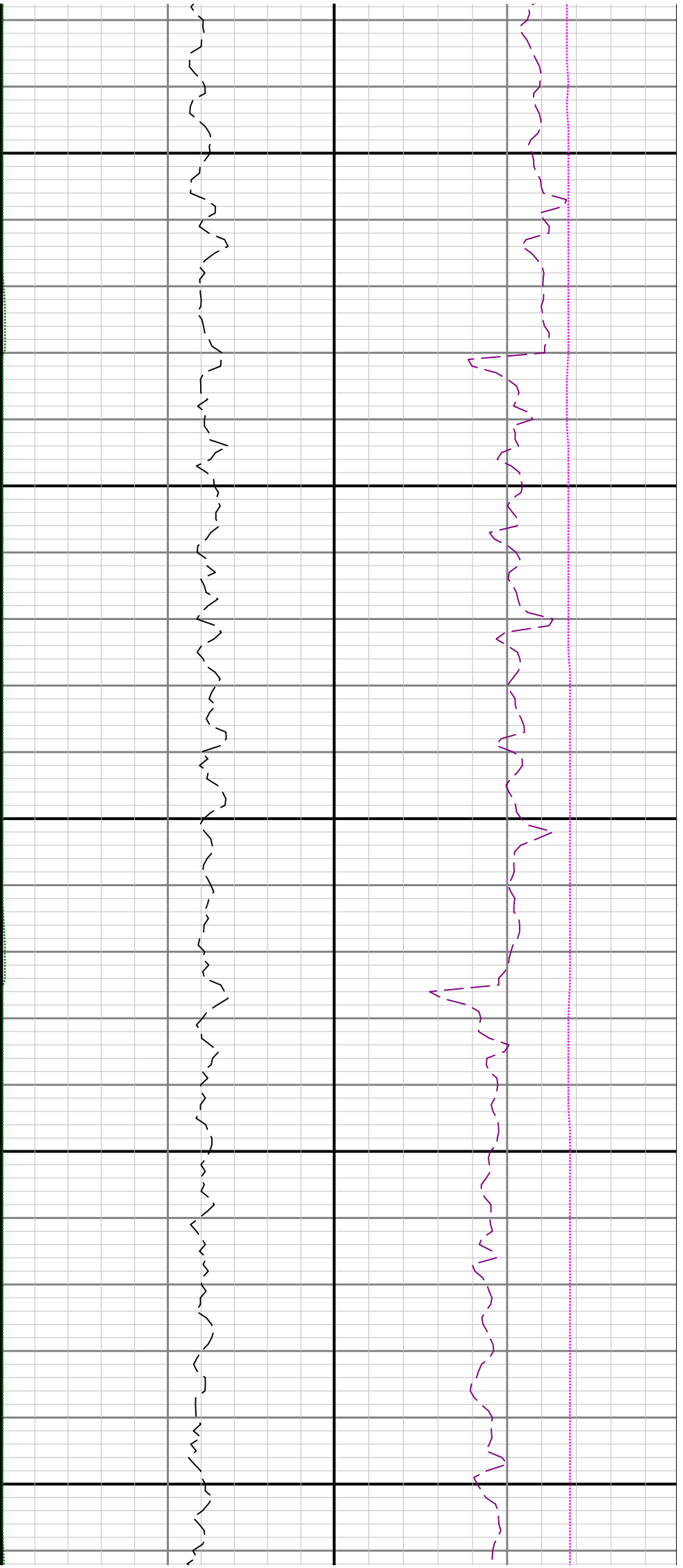


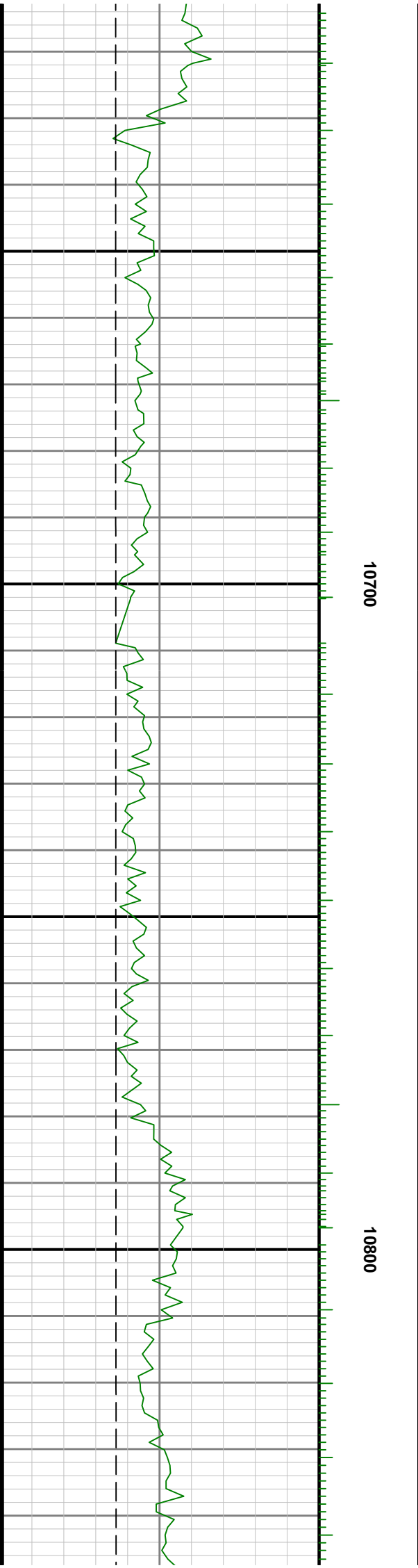


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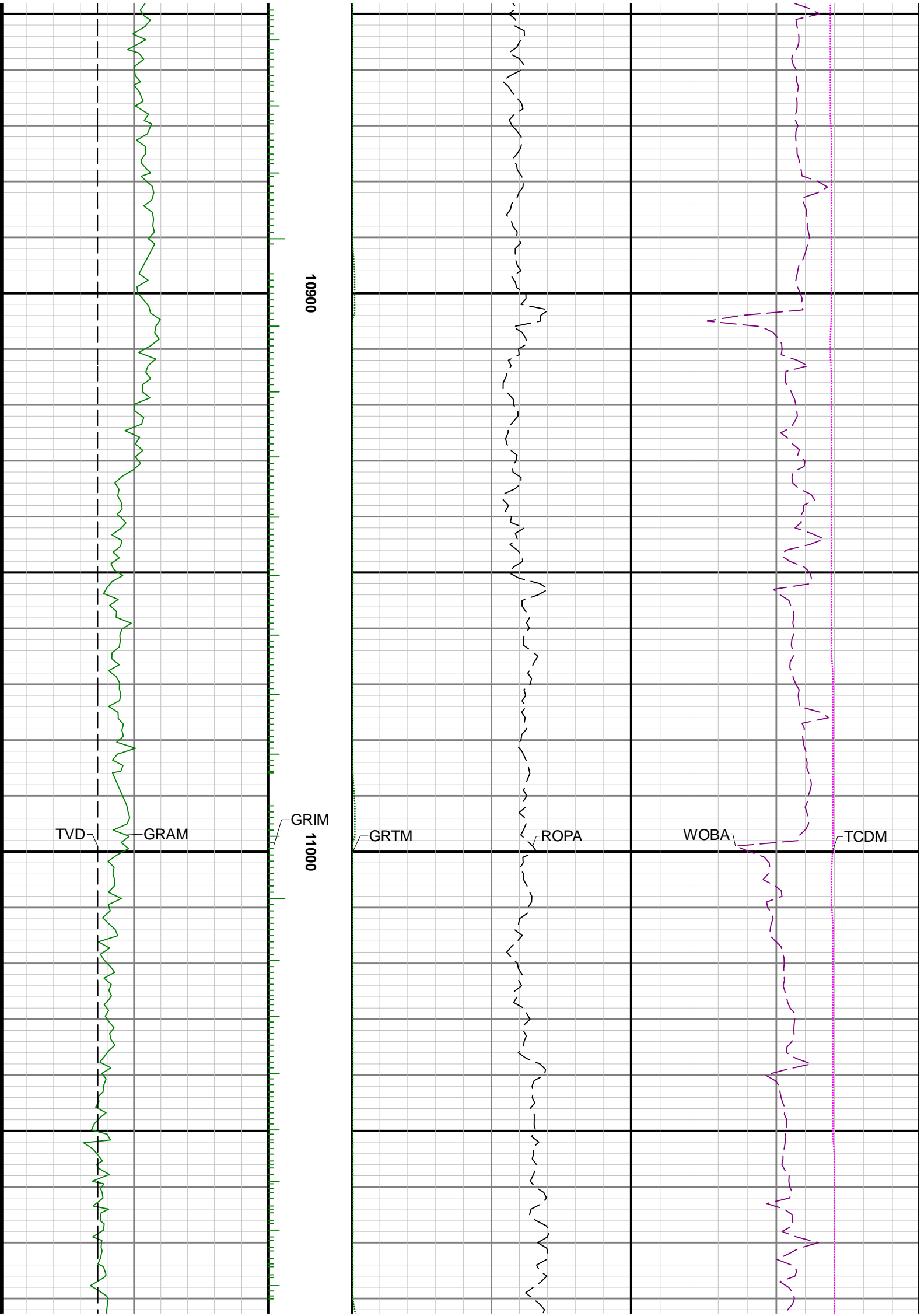
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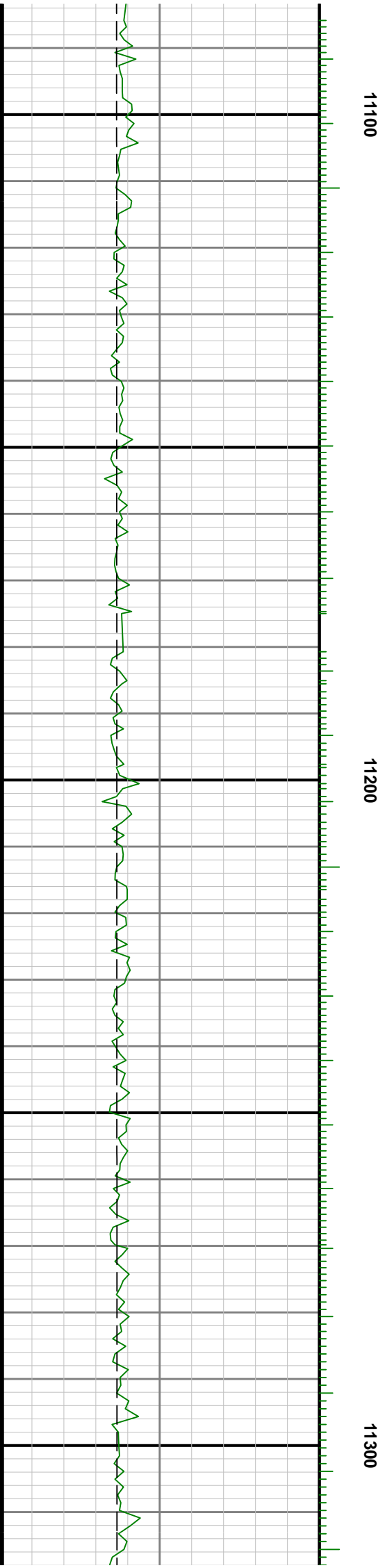
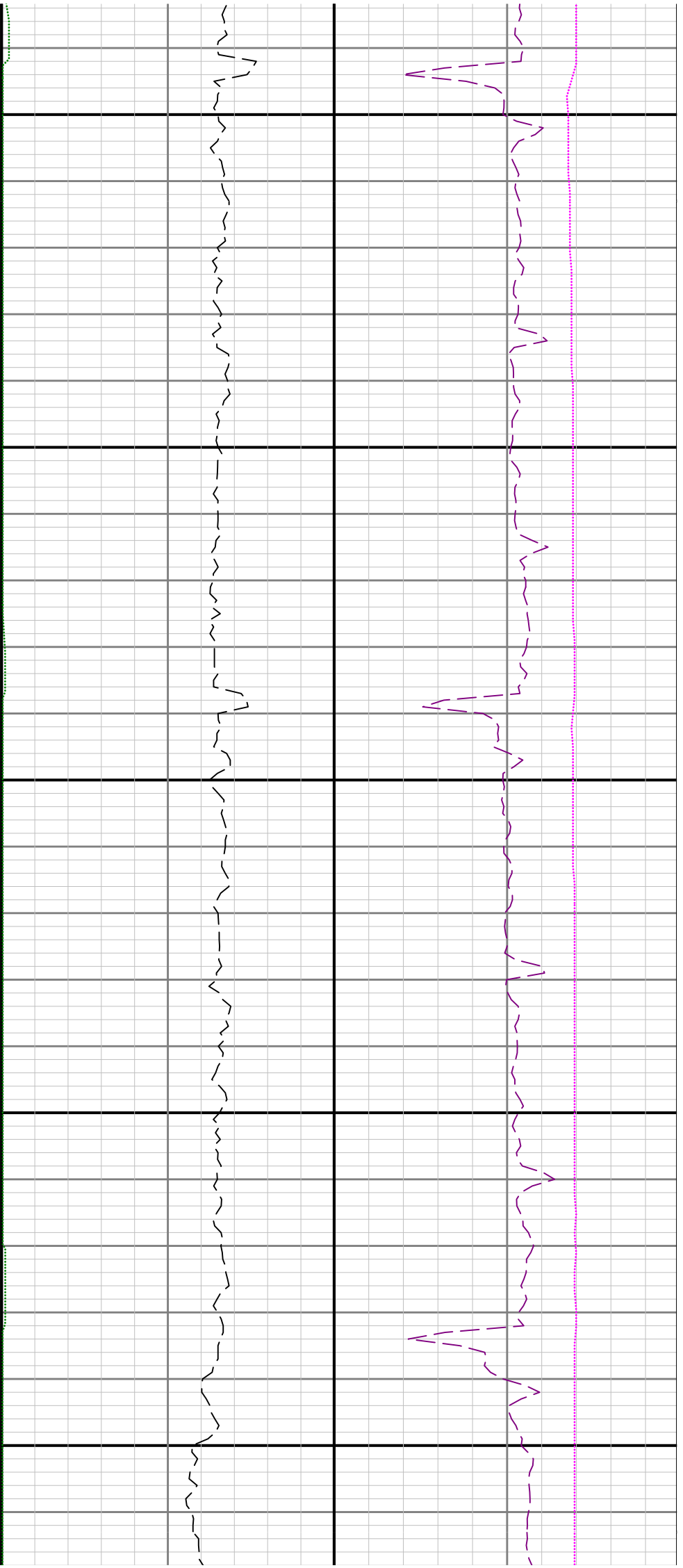


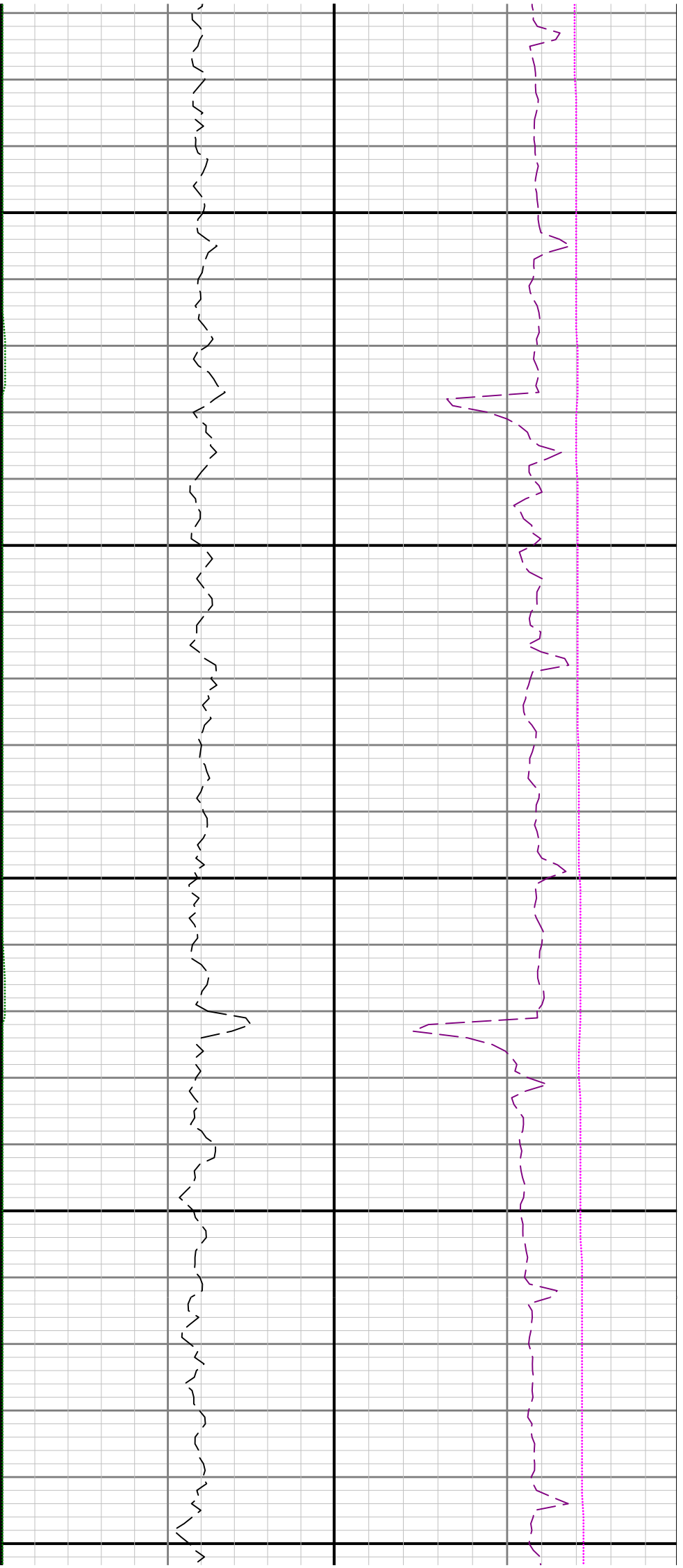






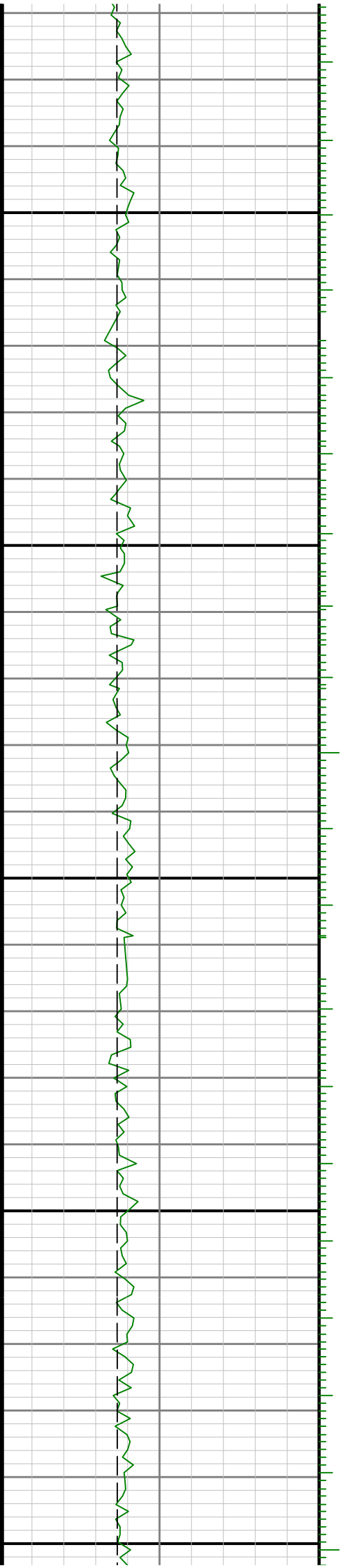


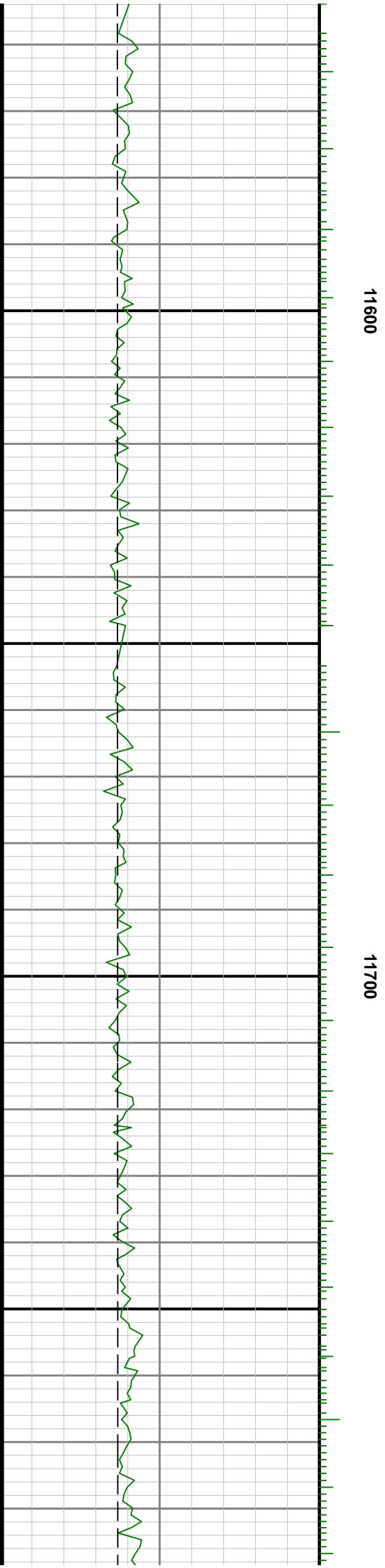
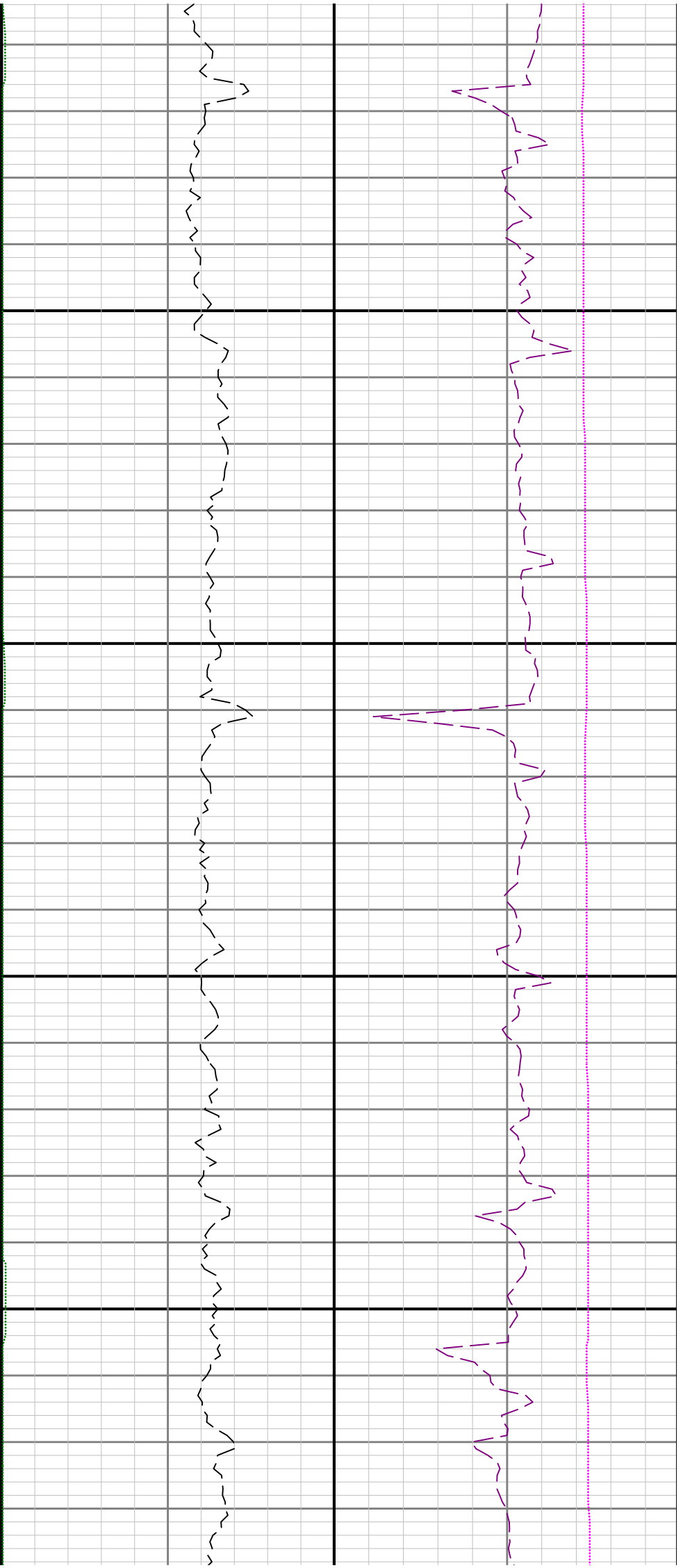




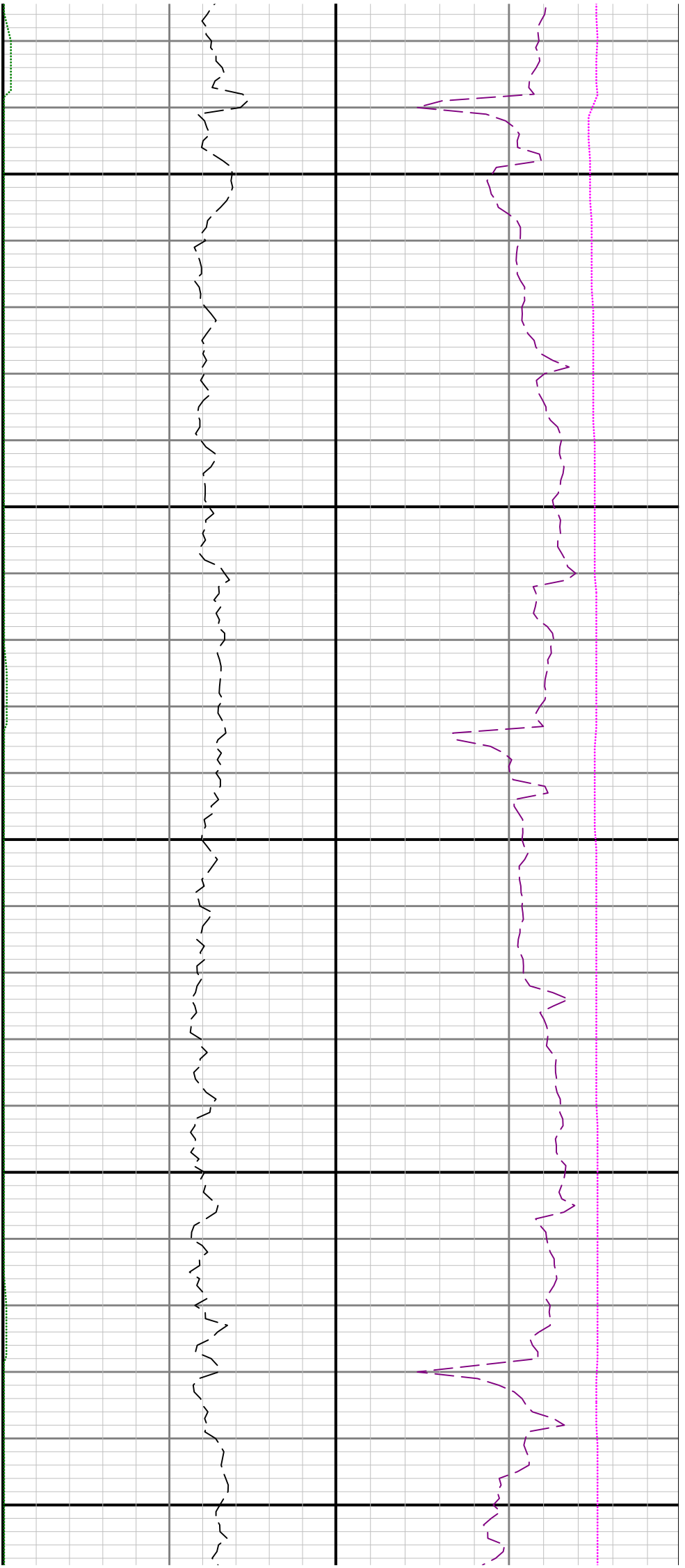
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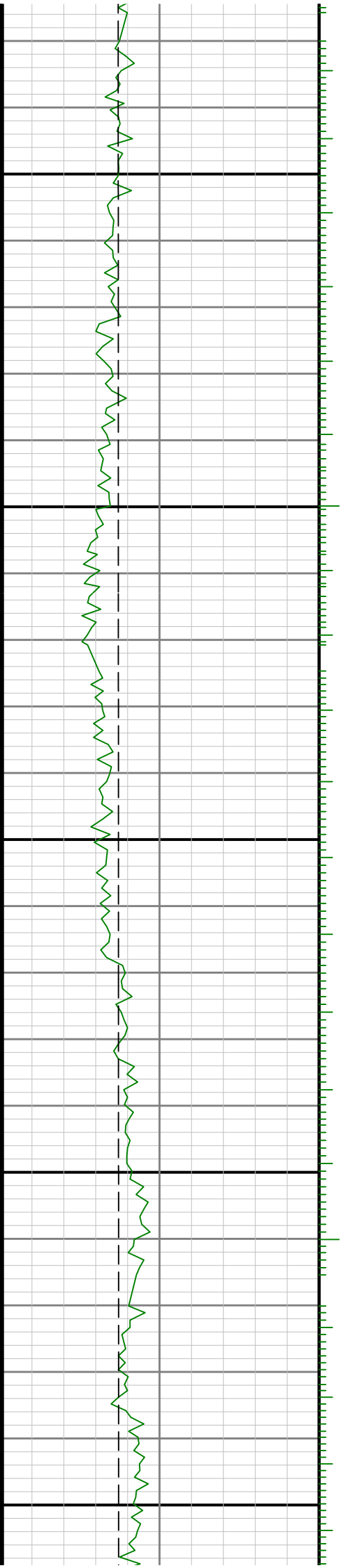


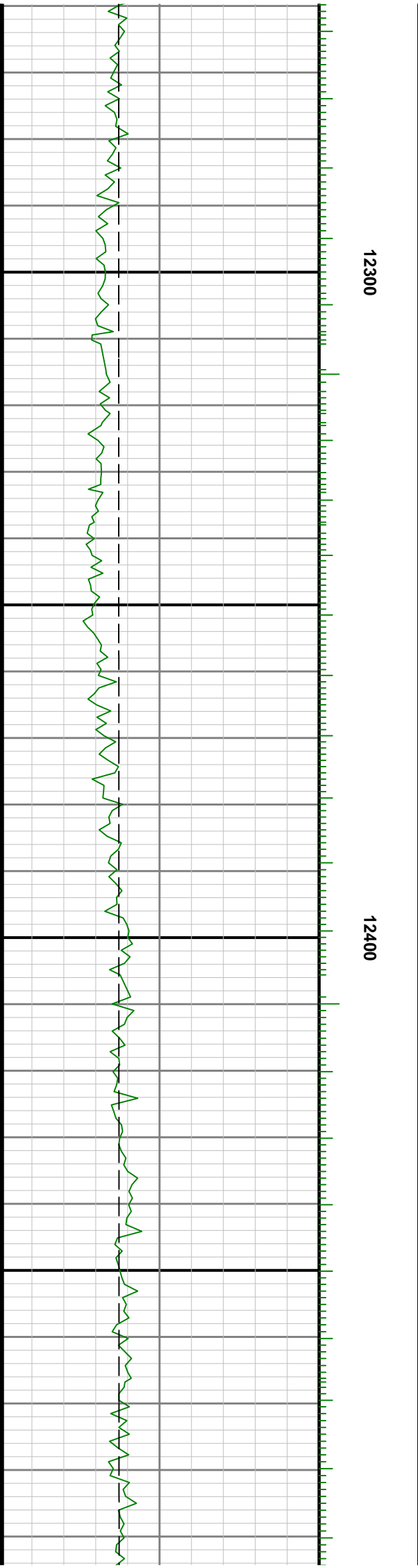
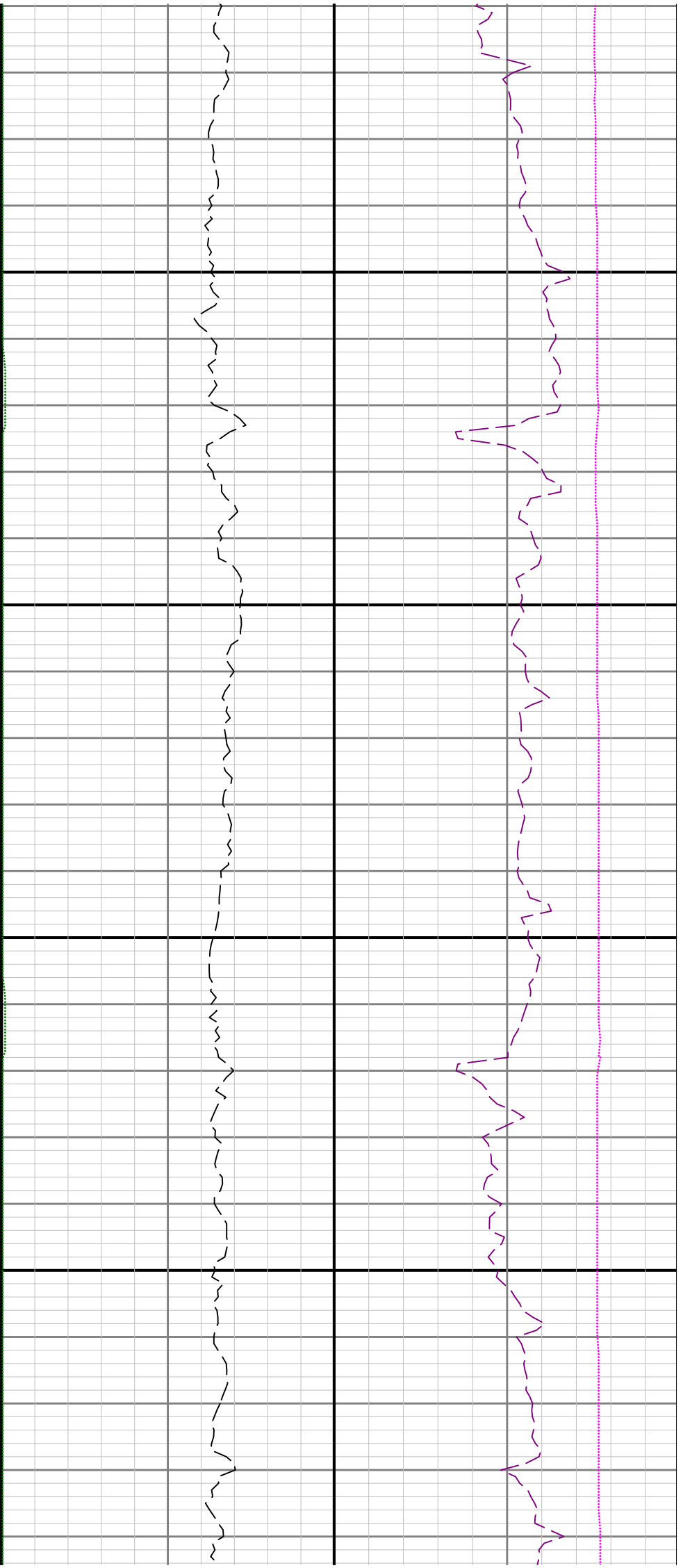


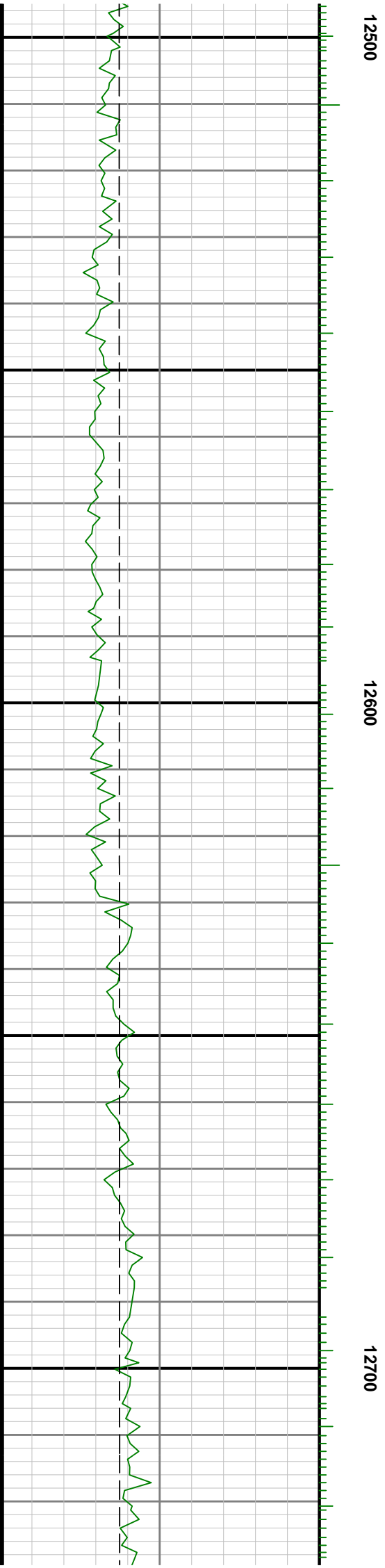
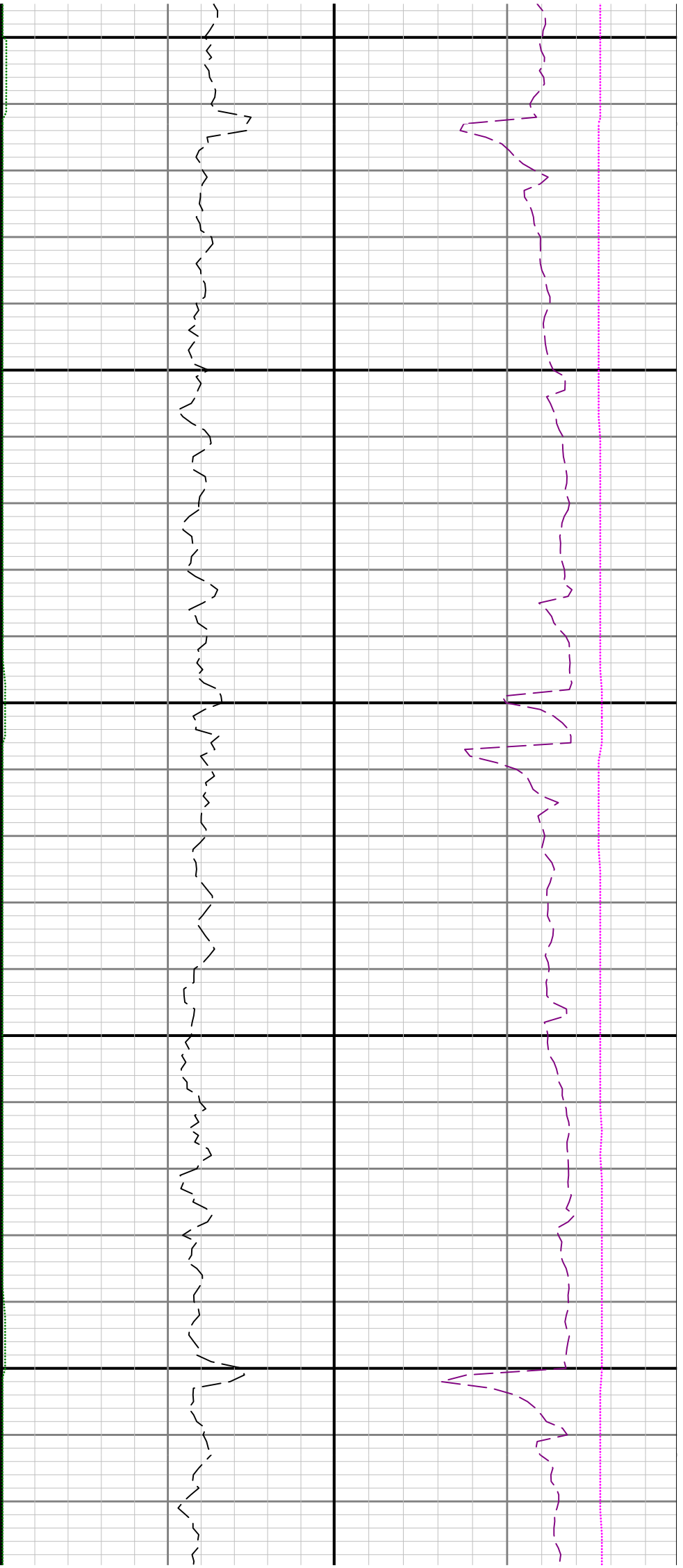


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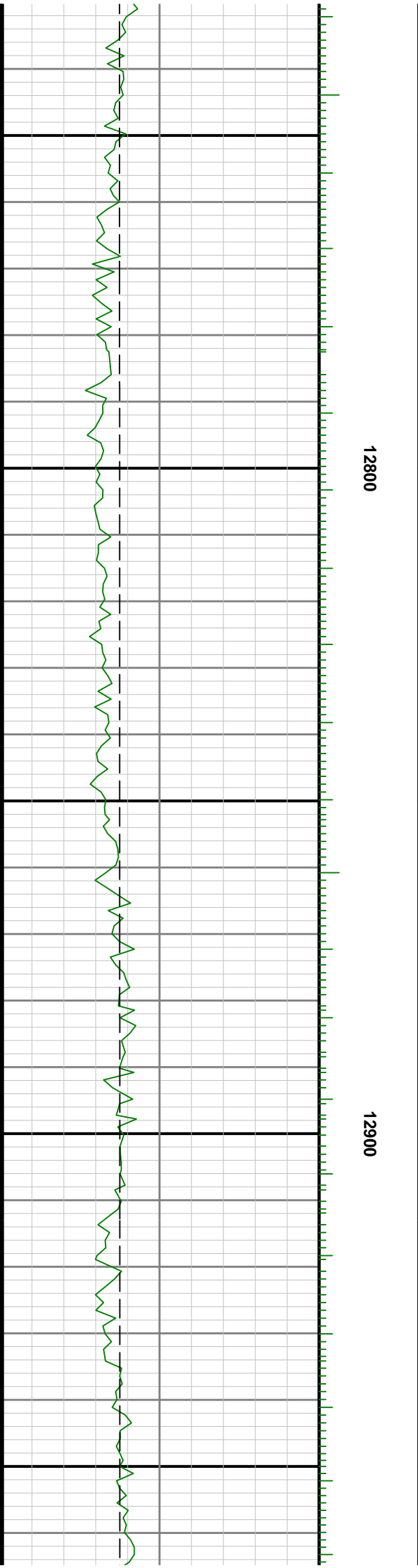
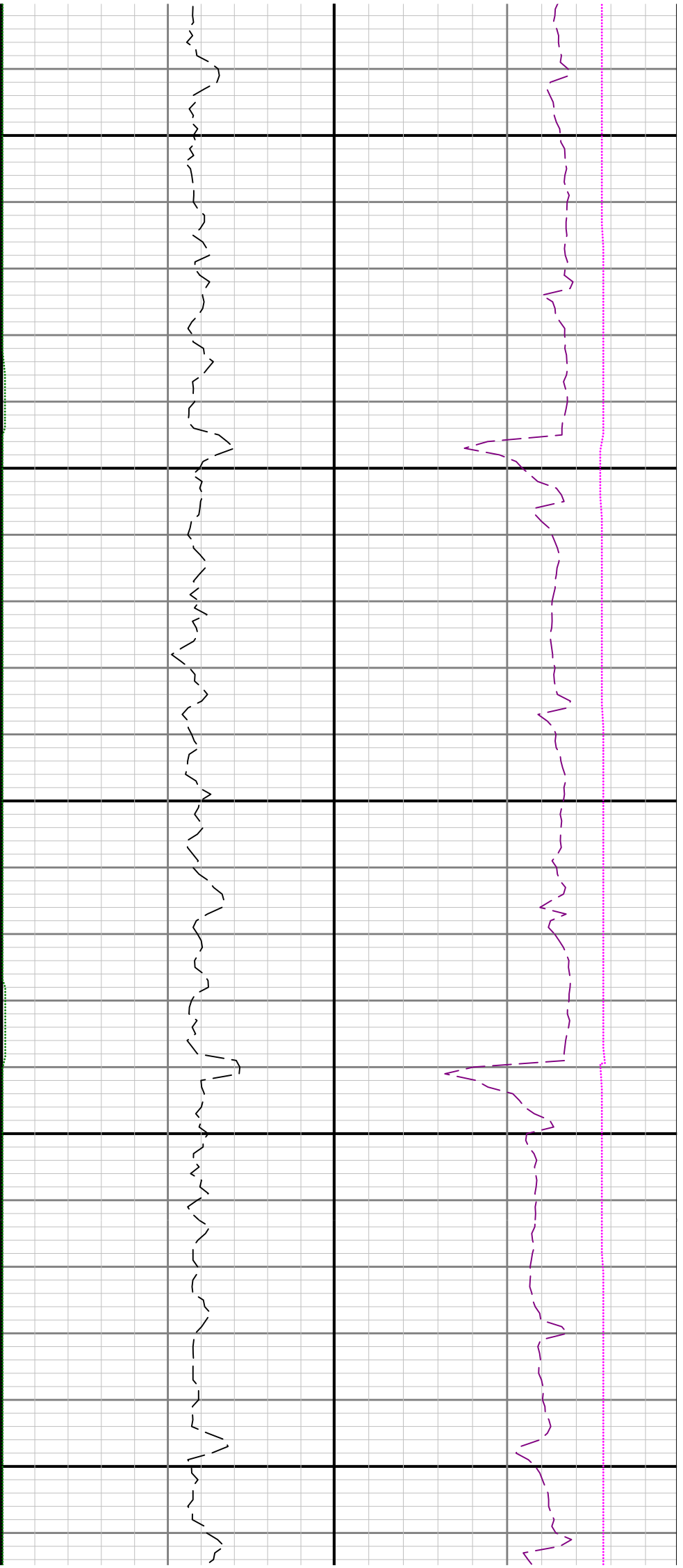
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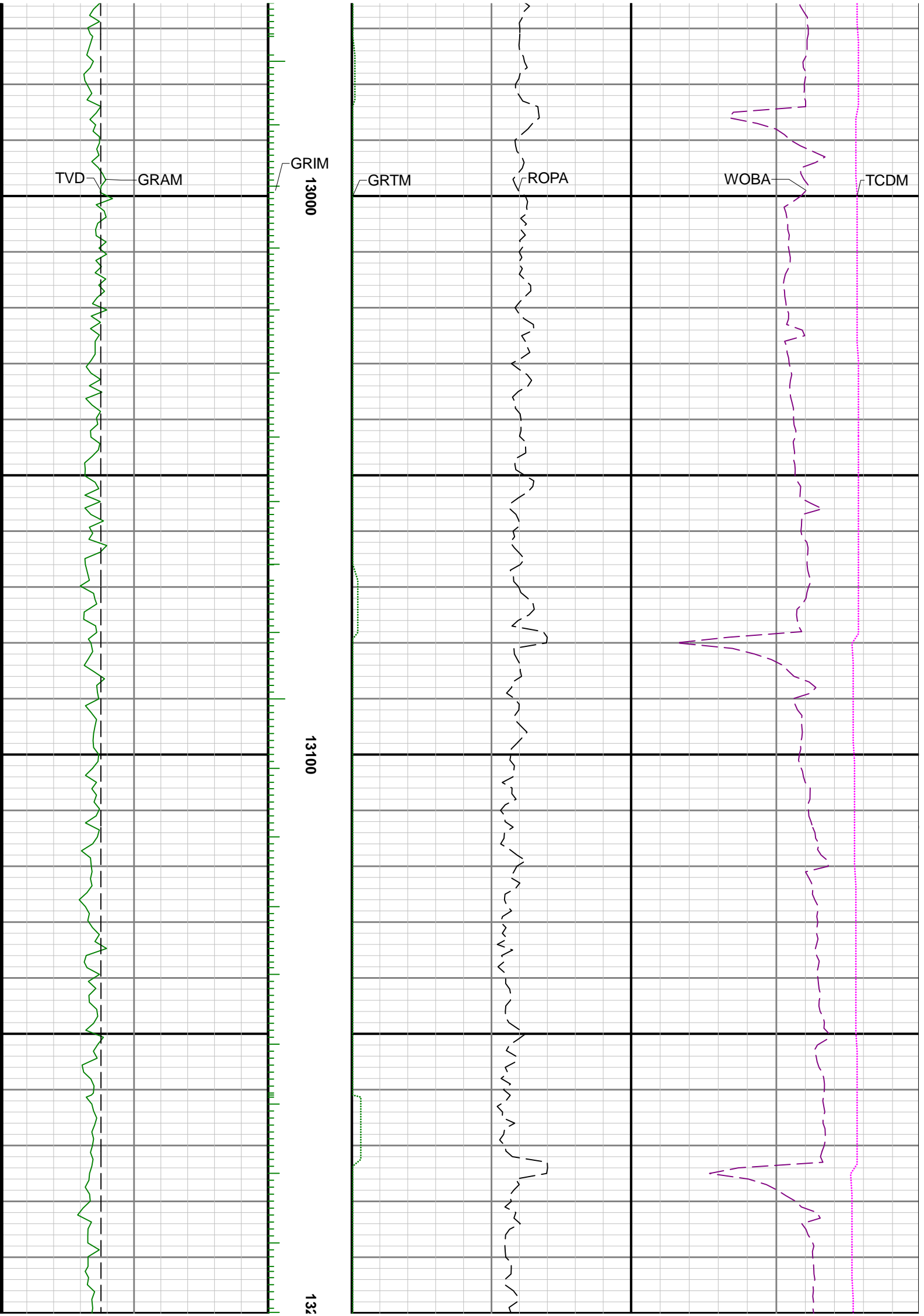


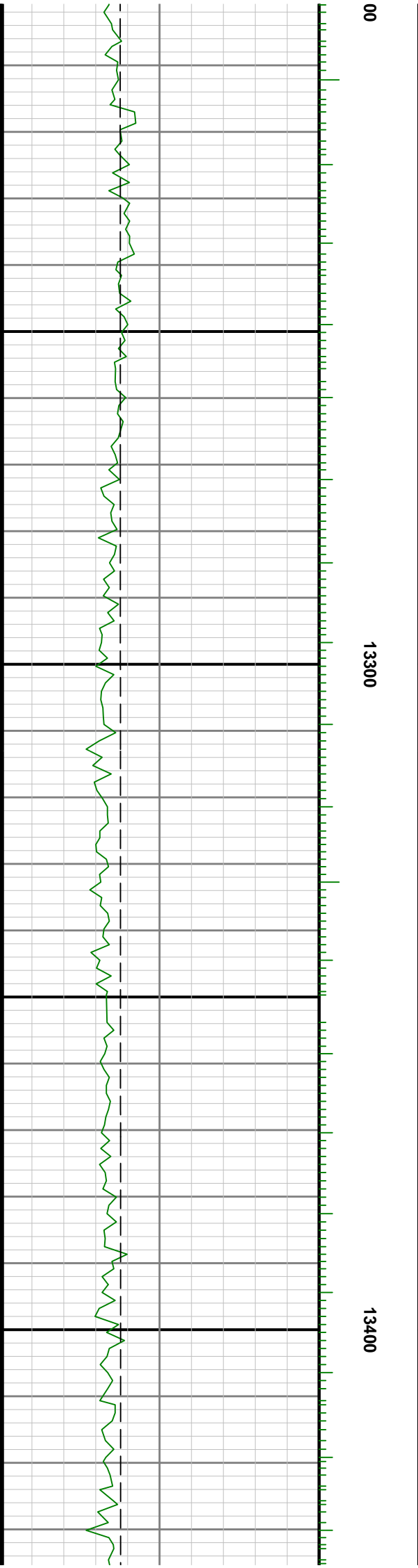


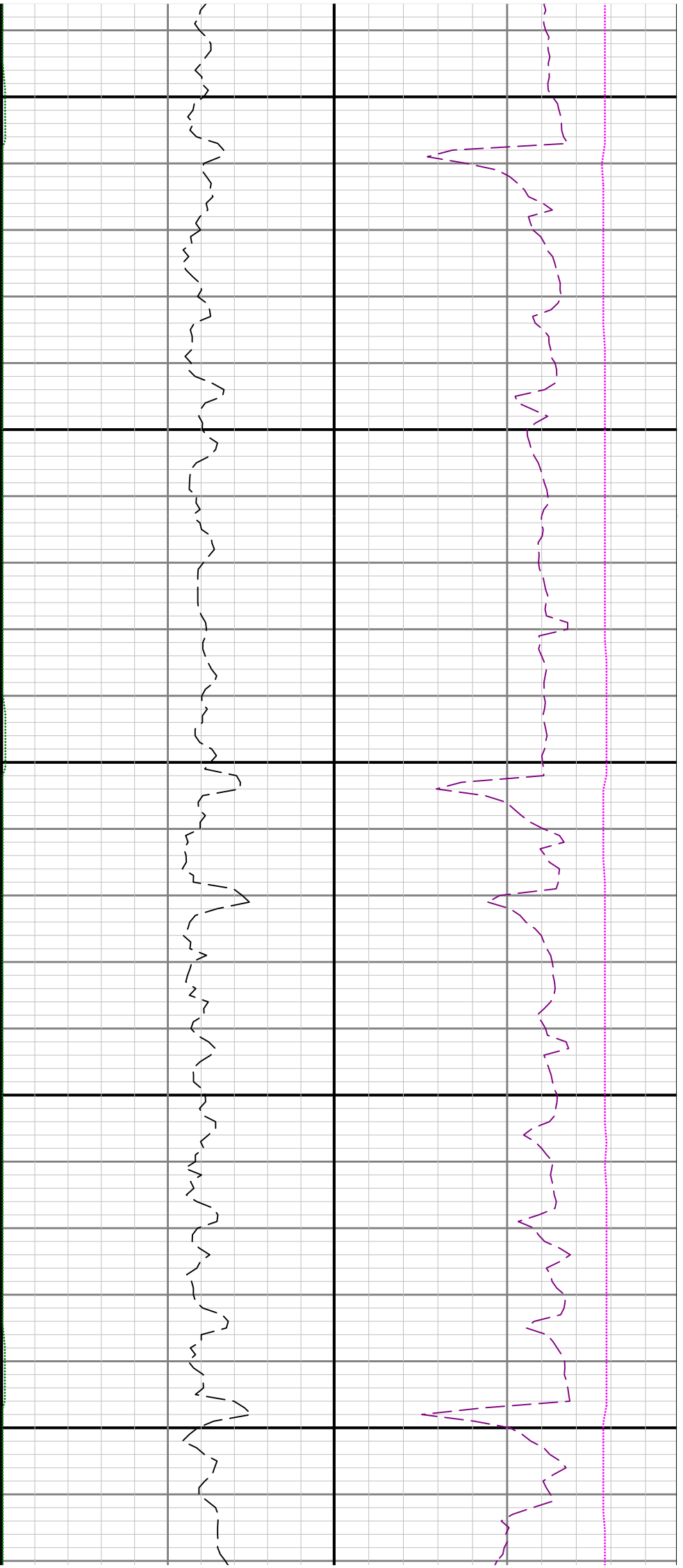






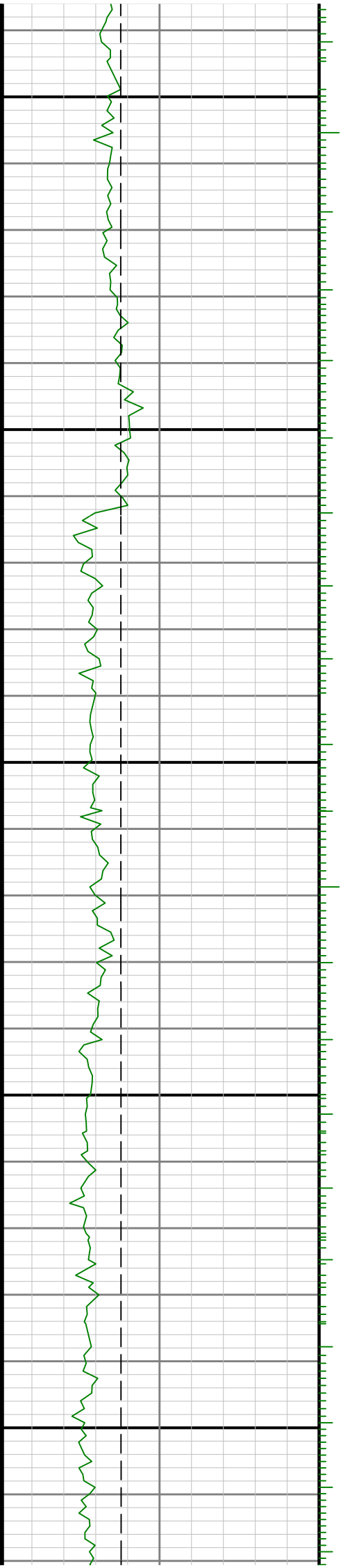


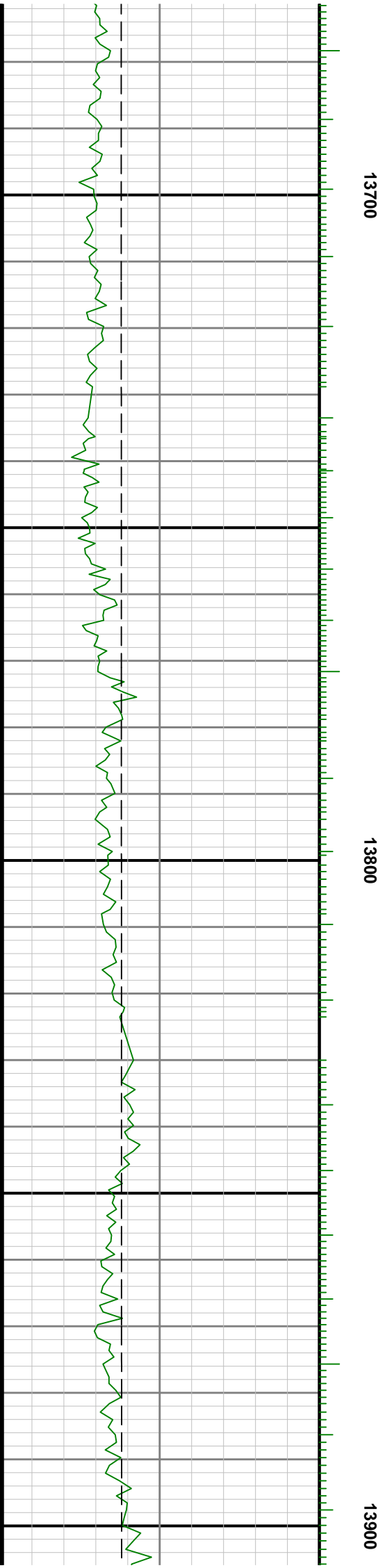
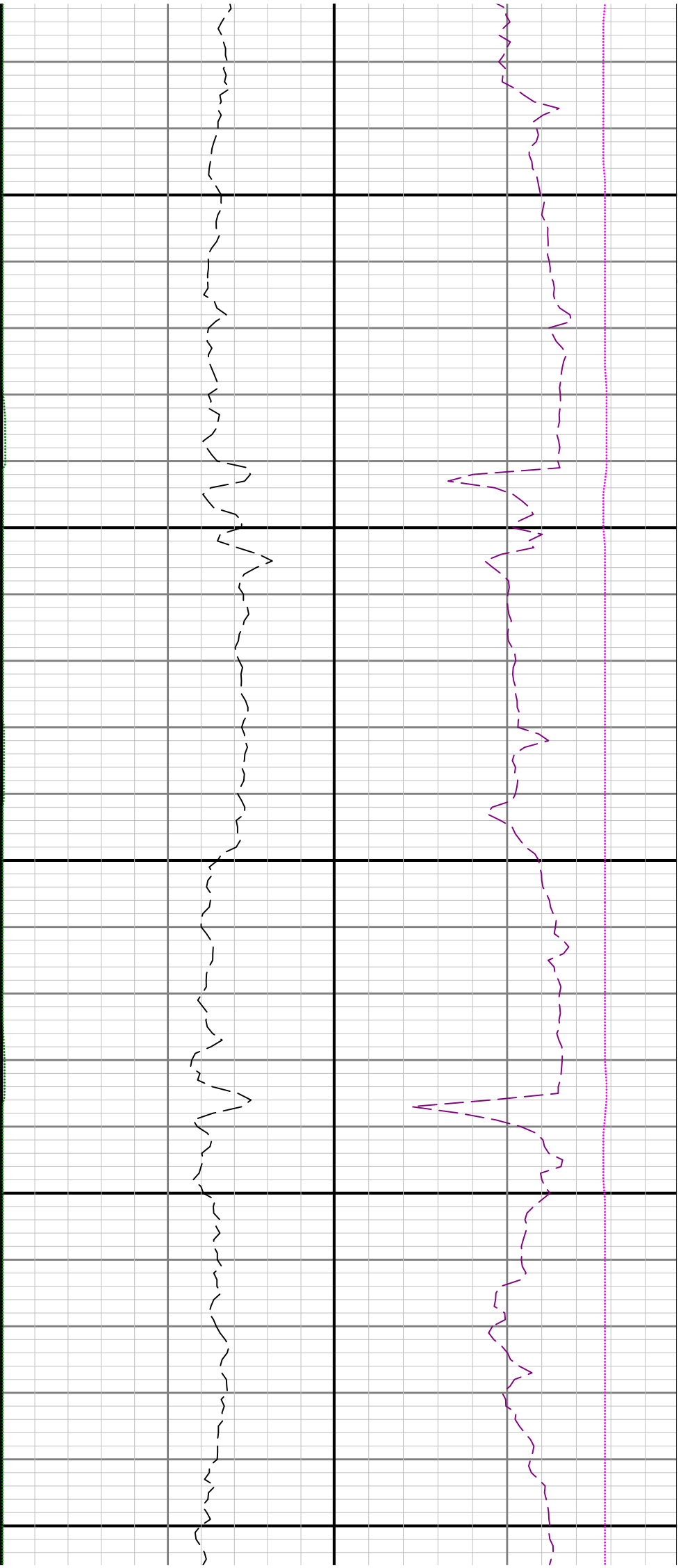


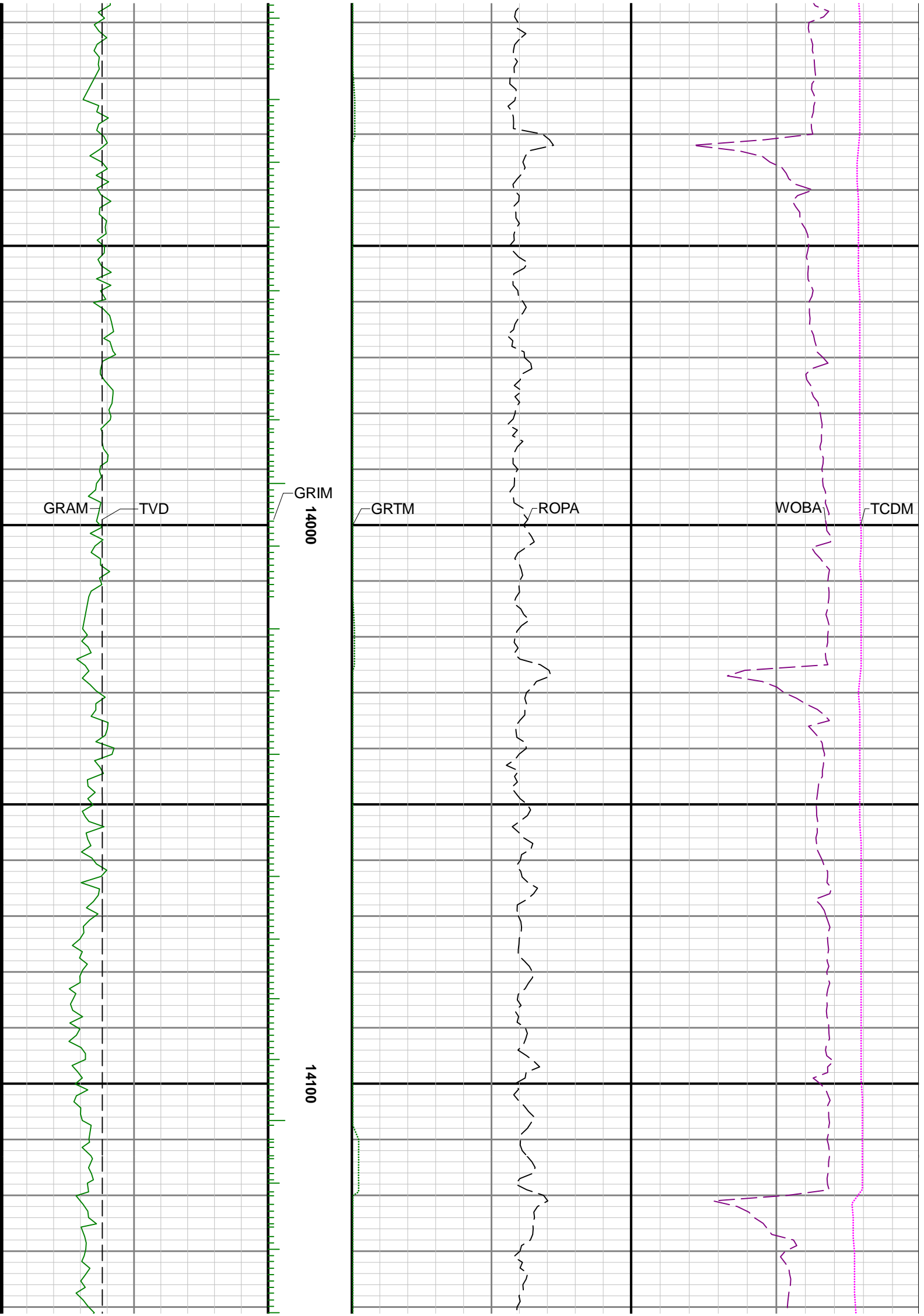


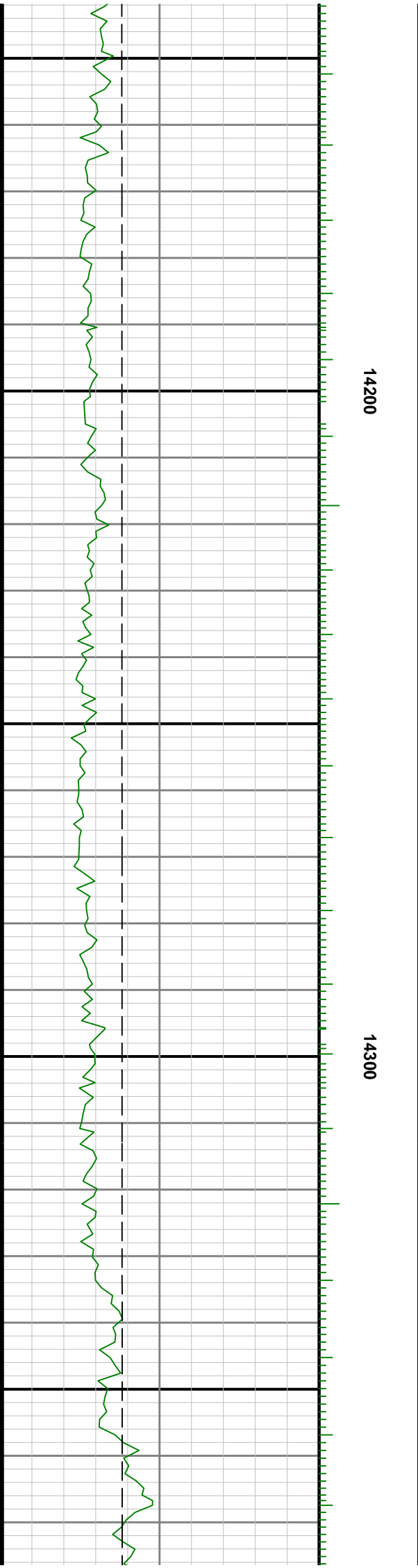
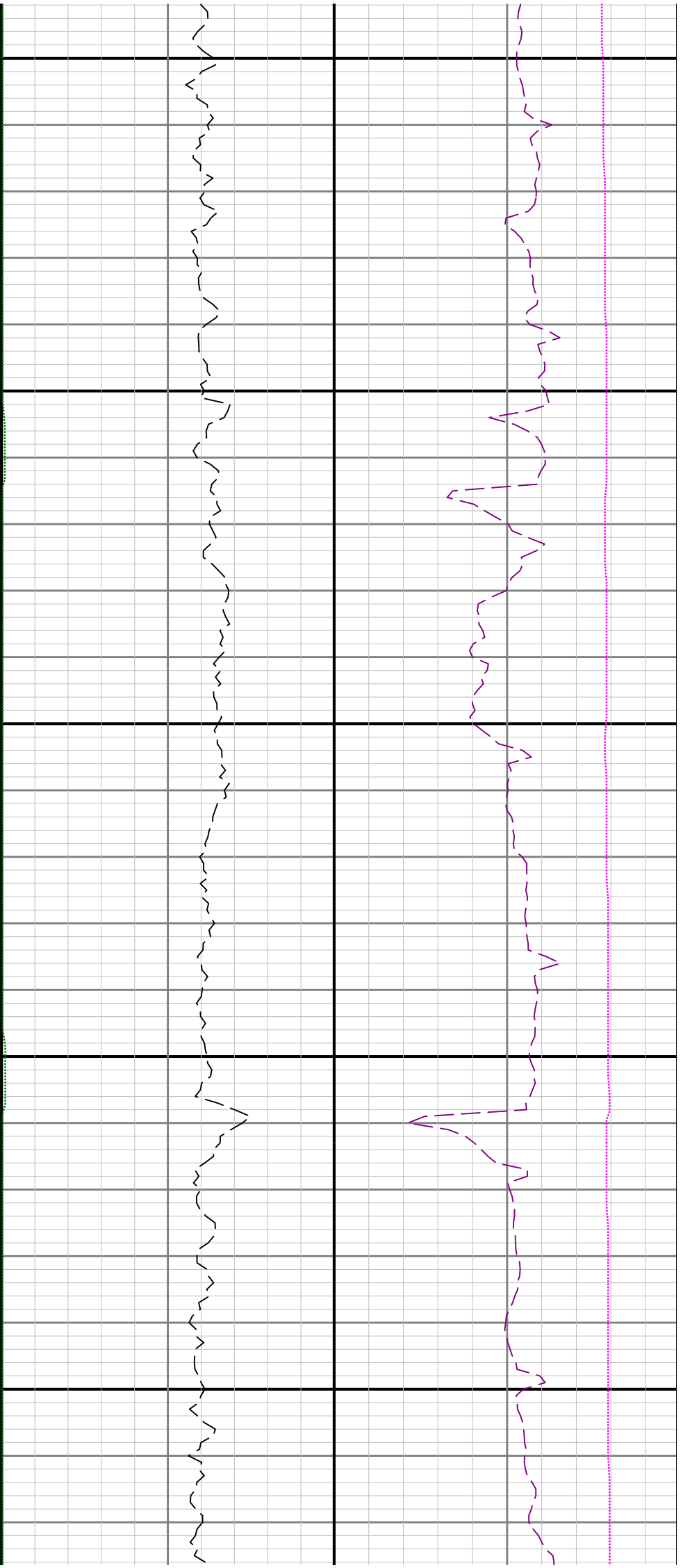
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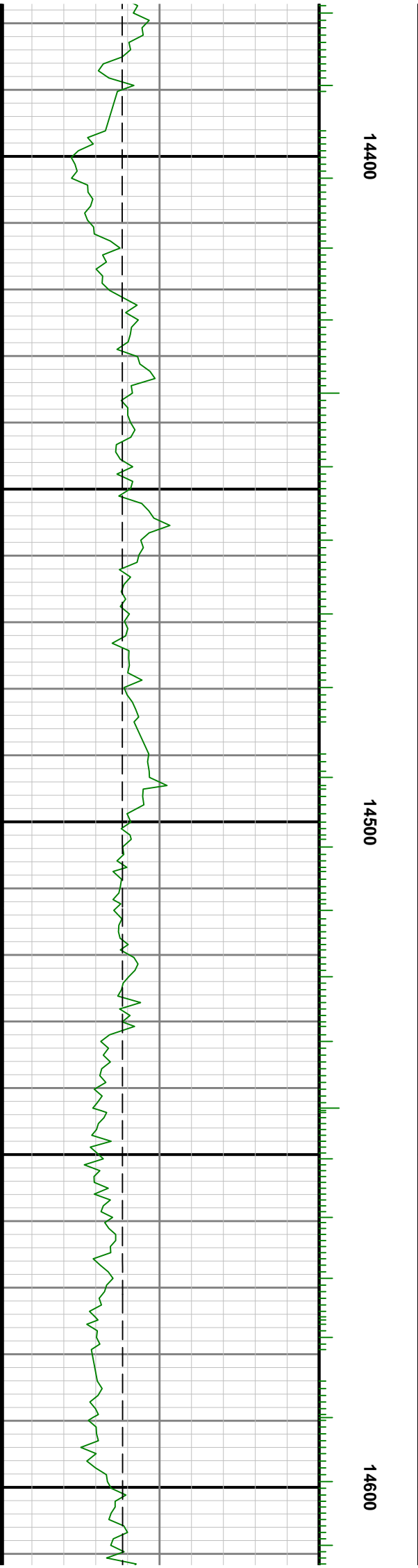
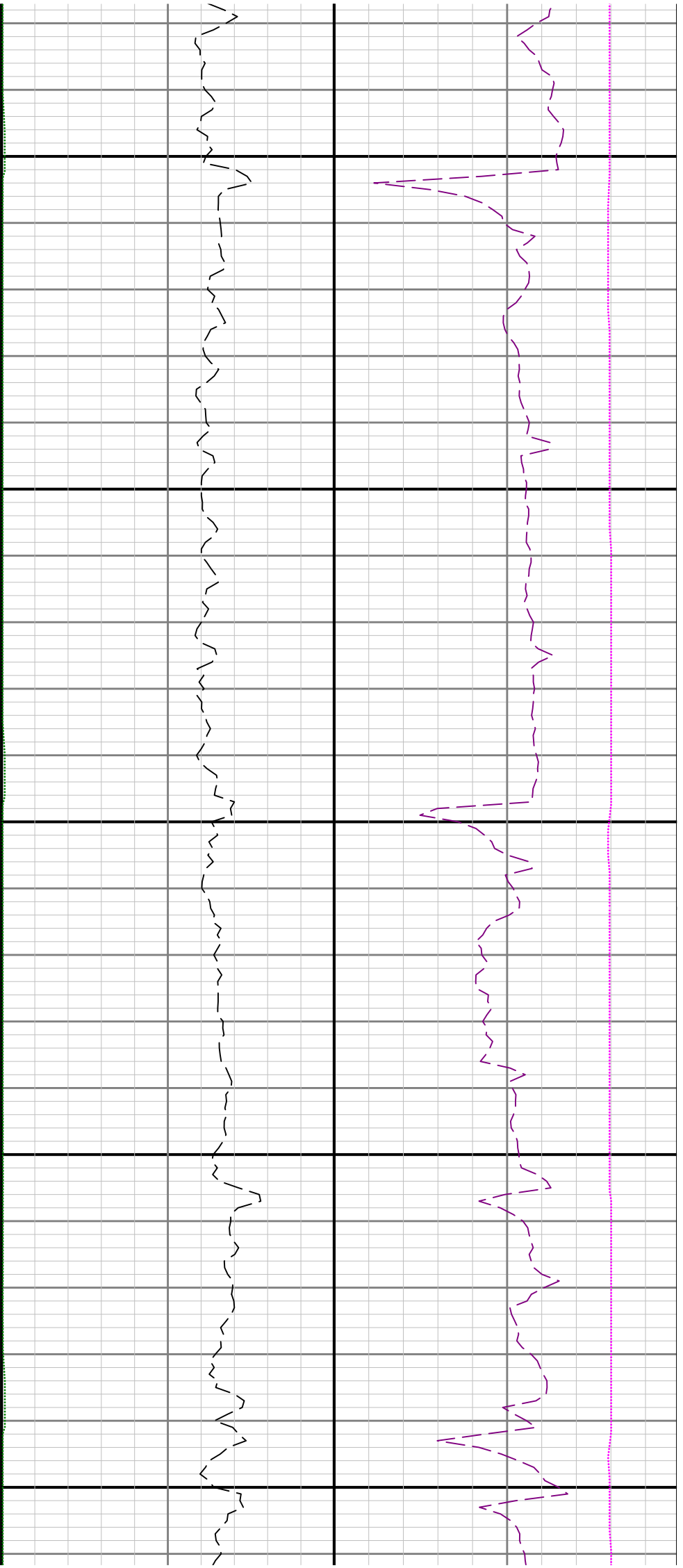
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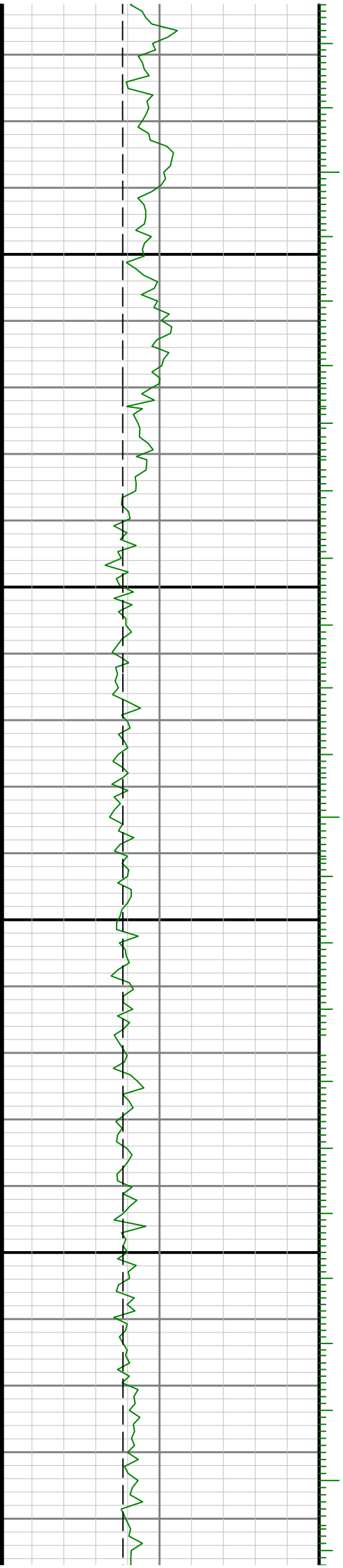
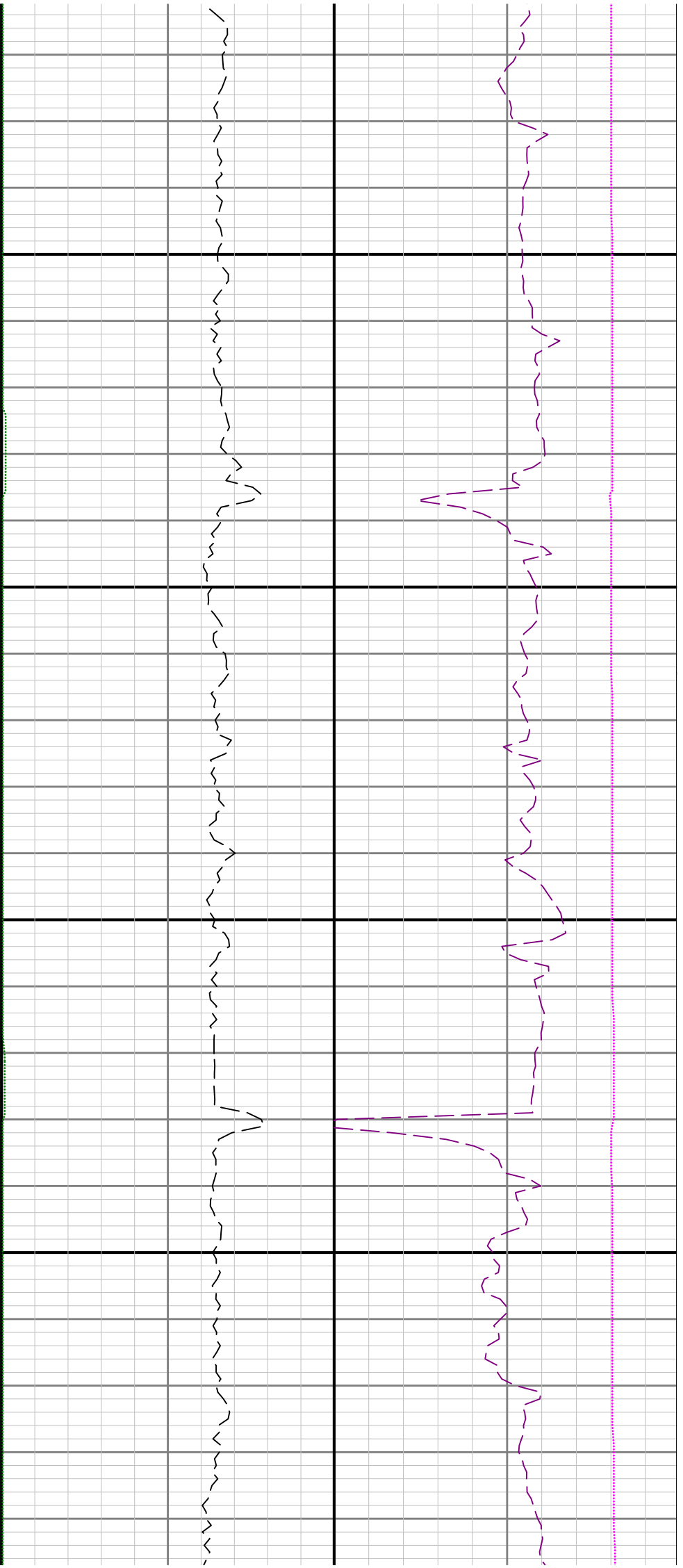


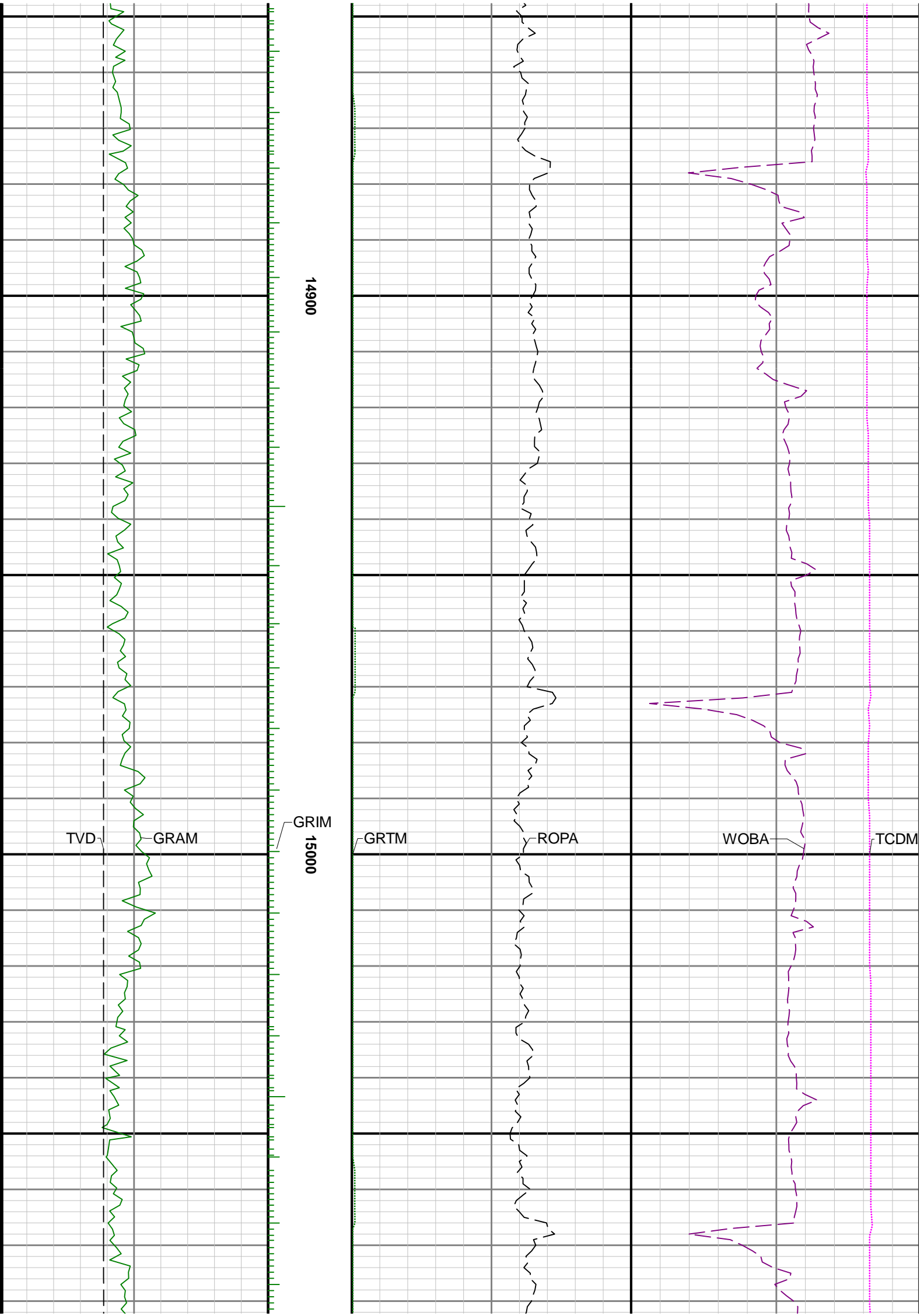


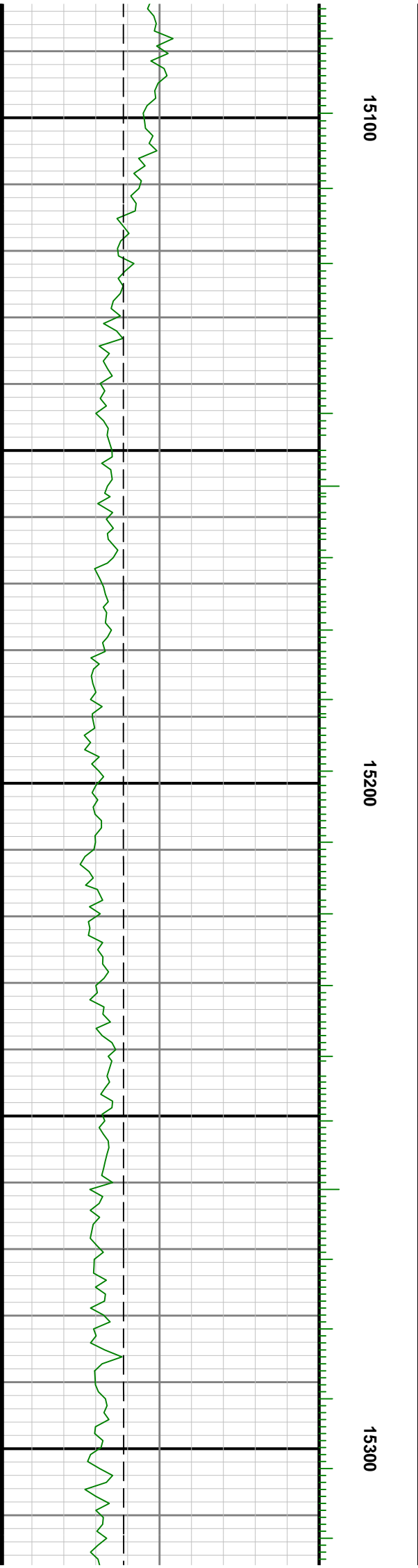
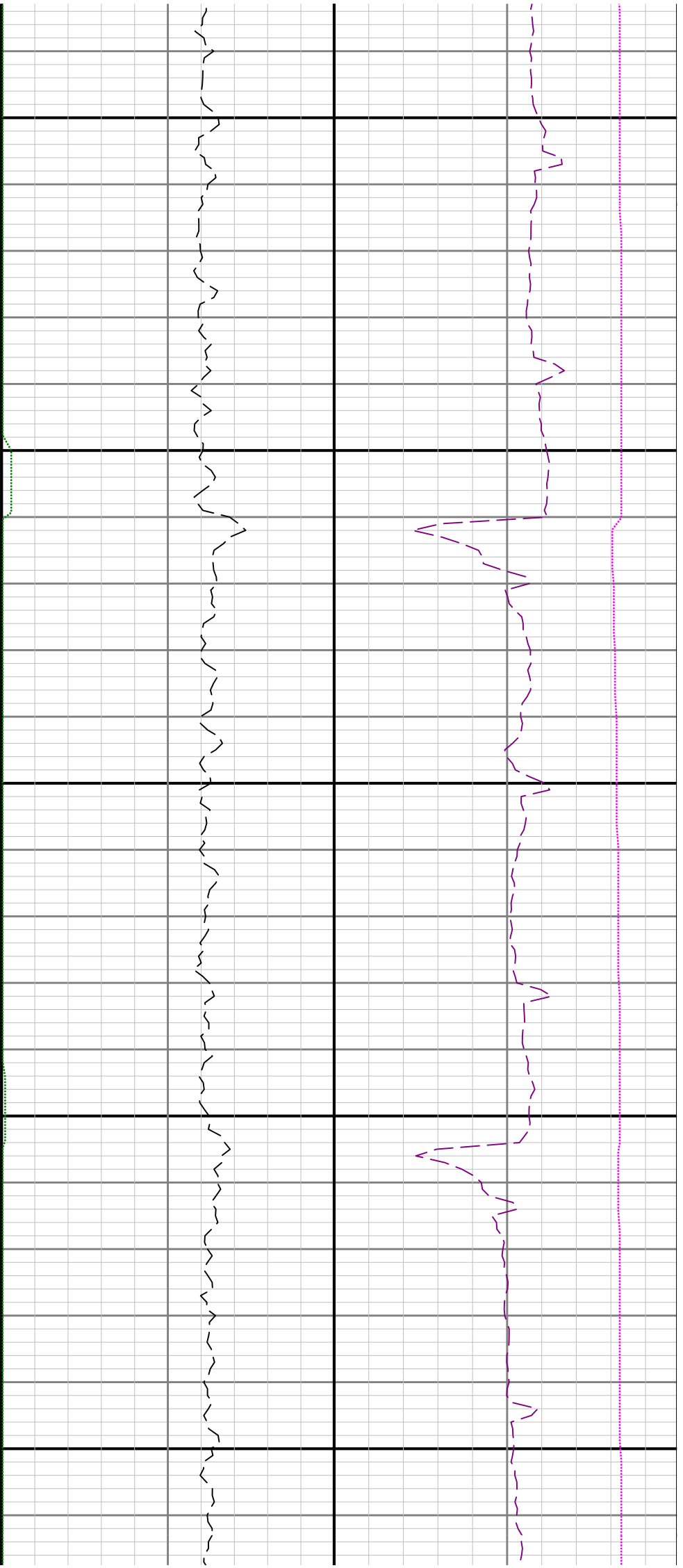


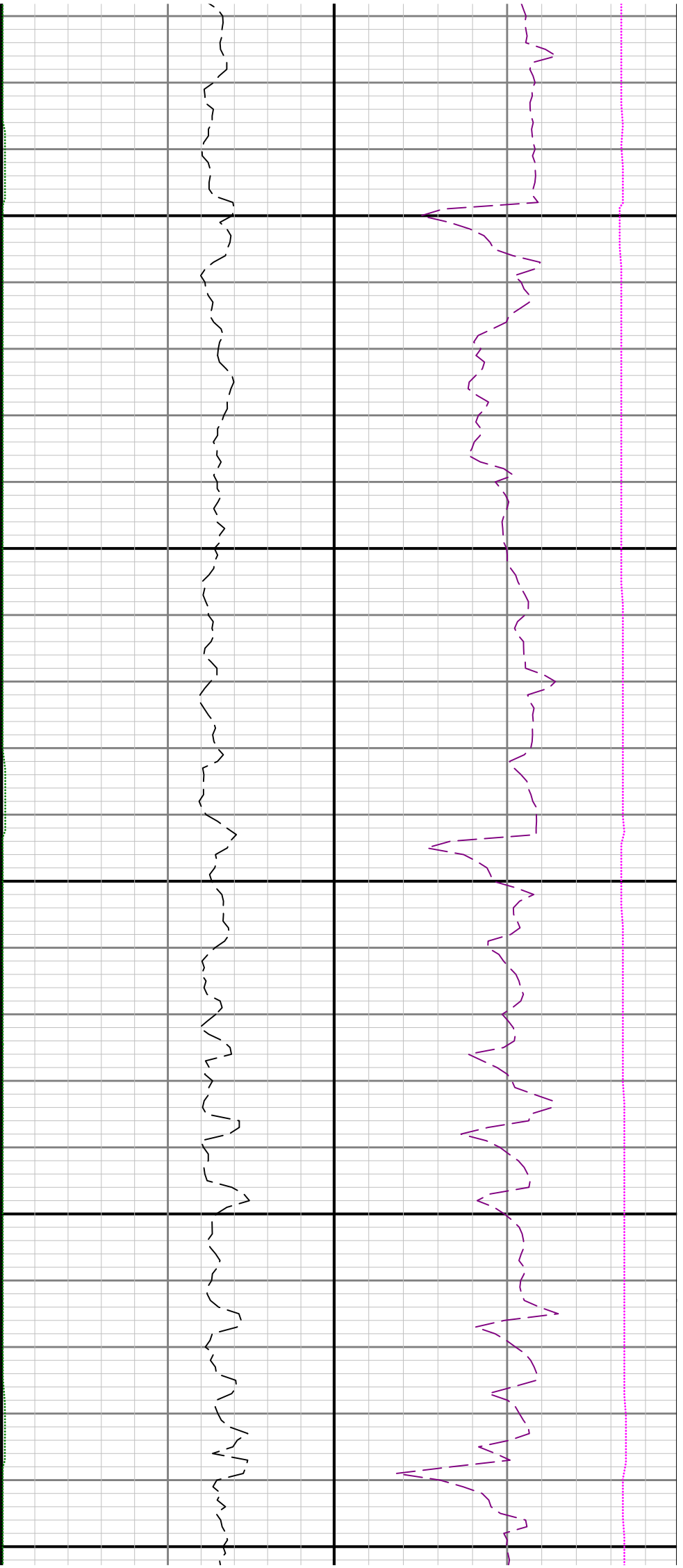






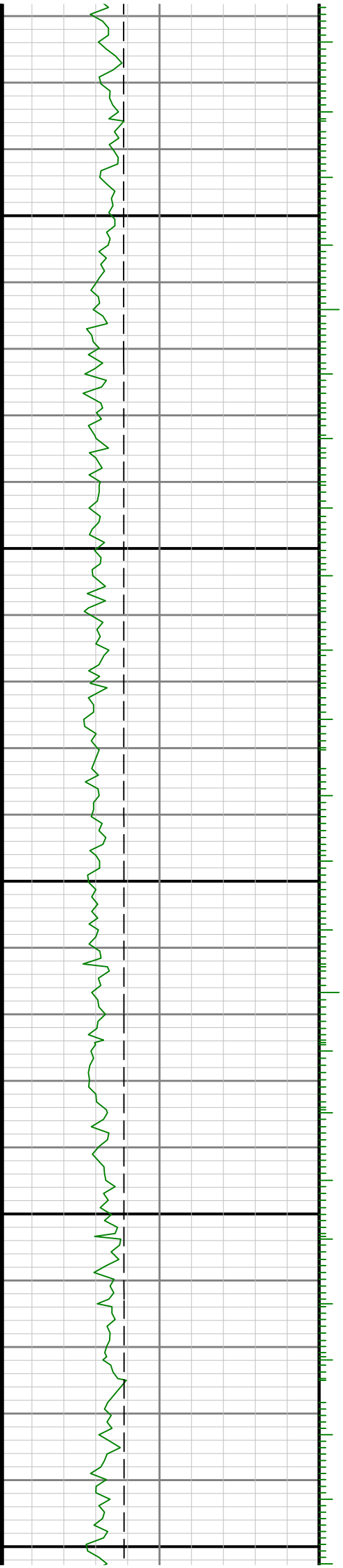


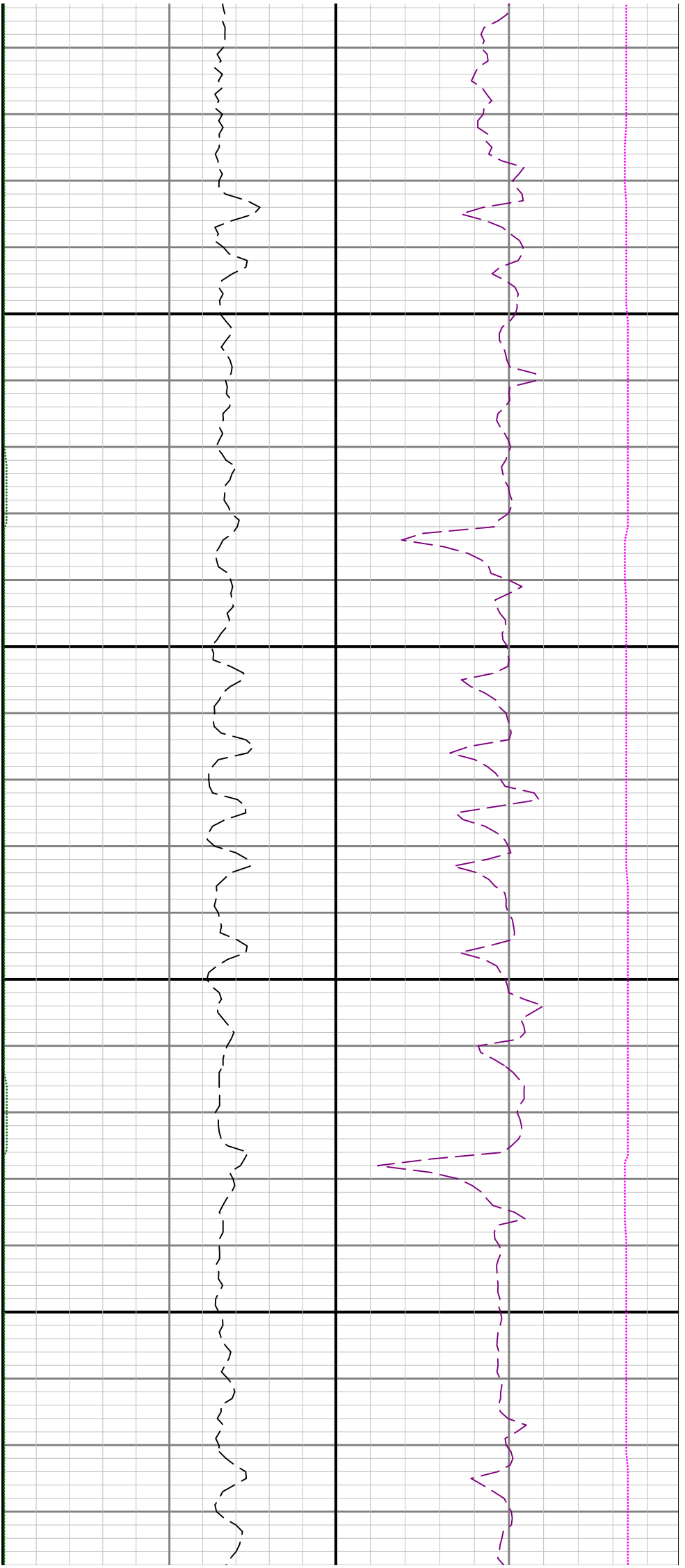




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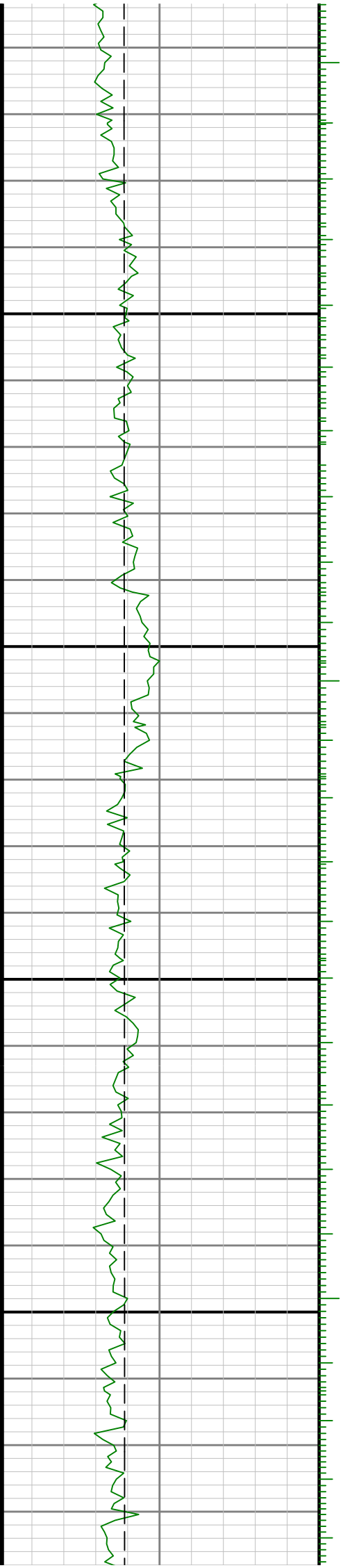
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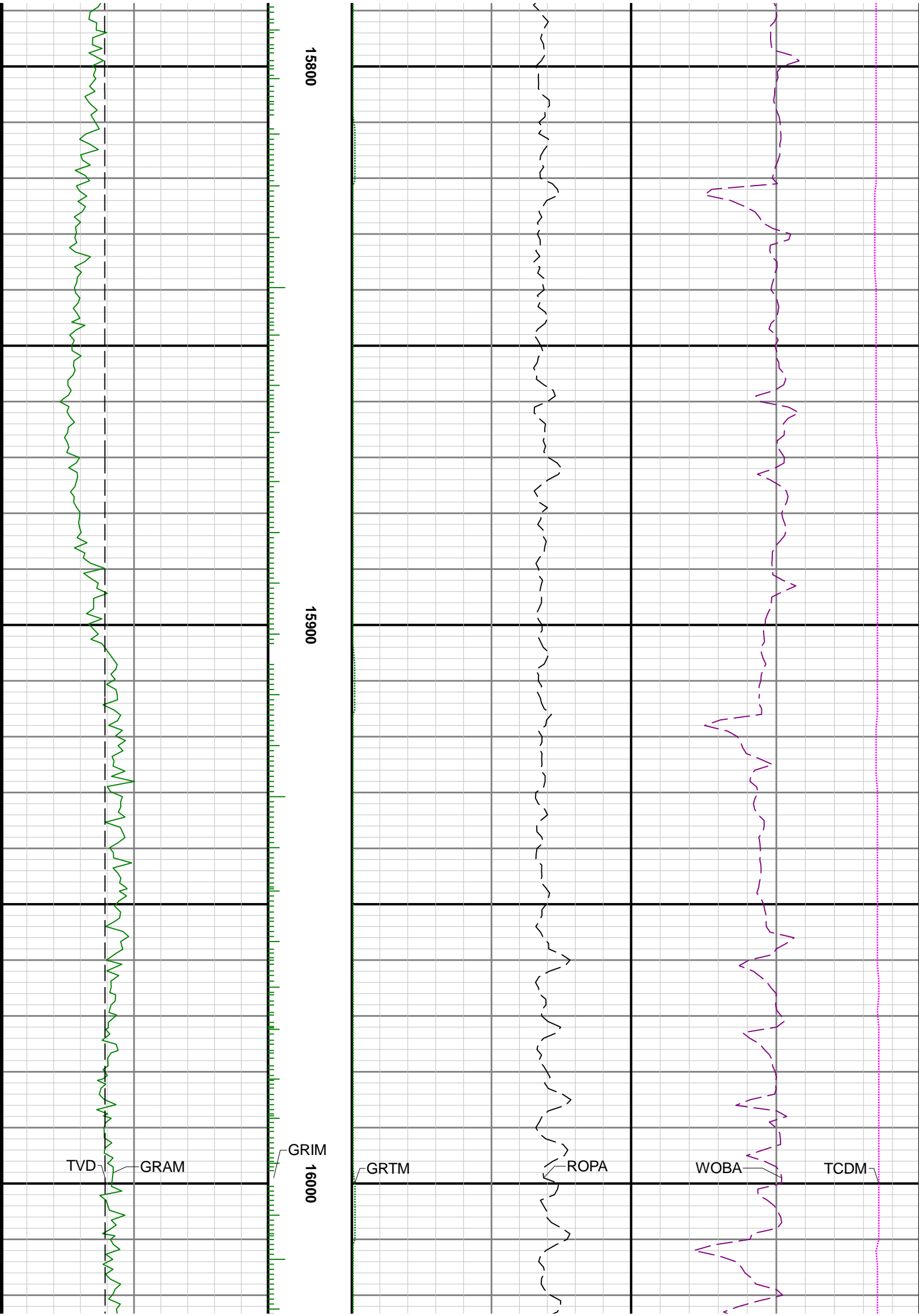


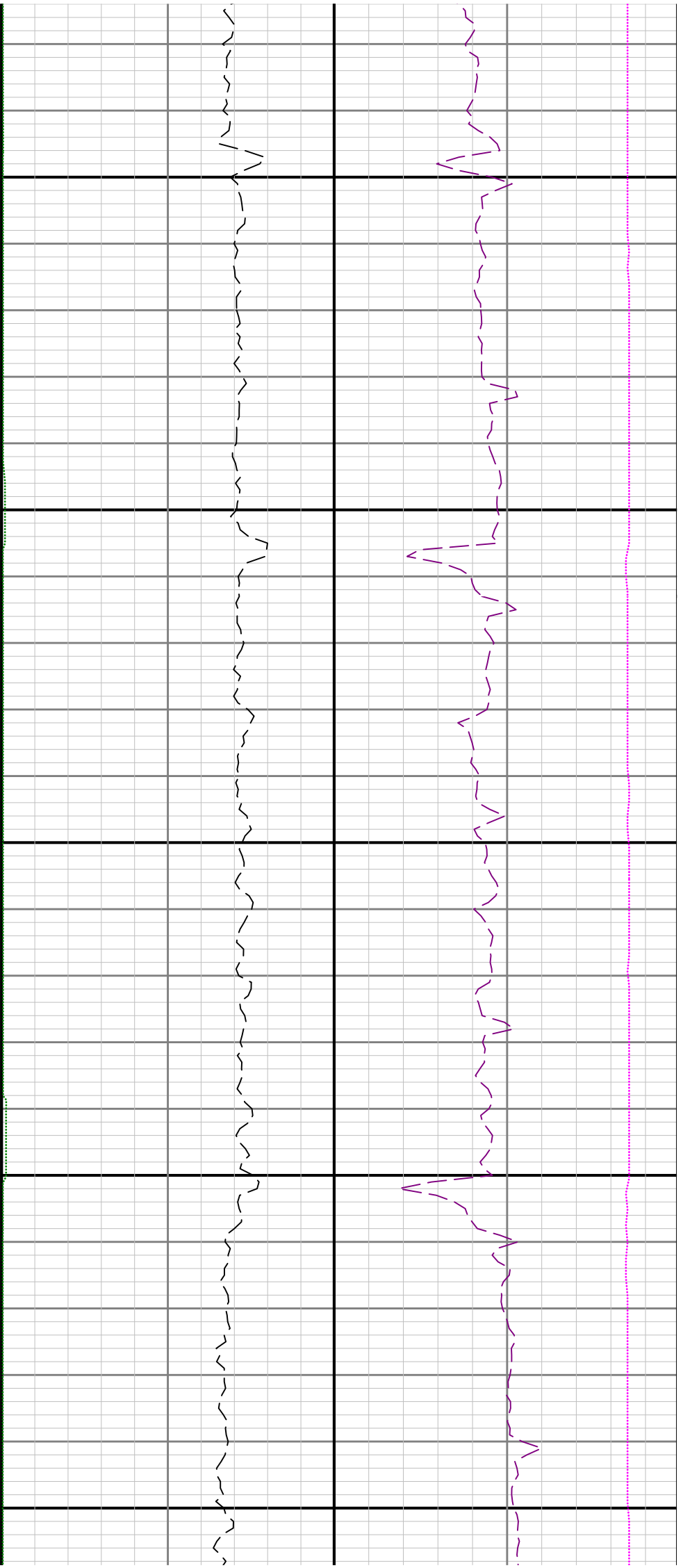


15600

15700







16100

16200

