



LWD MEMORY LOG

Gamma Ray

Scale: Company: SRC Energy

1:240 Well: Sanford 31N-30B-M

Measured Depth Field: DJ Basin

Depth Reference: County: Weld County Country: United States

Driller's Depth State: Colorado

Status: Surface Location: Other Services:

Final Print Latitude: 040° 22' 32.297" N

Longitude: 104° 48' 15.739" W

API No: 51234992900000 Directional

Job ID: 109719619 SEC: 29 TWN: 5N RGE: 66W

Permanent Datum (P.D.): Ground Level Elevation: 4904.00 ft Elev. KB: N/A

Log Measured From: Rig Floor Above P.D.: 20.00 ft Elev. DF: 4924.00 ft

Dates Interval Magnetic Field Reference

From: 2019-03-22 Drilled (ft) Logged (ft) Azi Reference North: True Dip Angle: (deg) 66.59

To: 2019-05-16 Top: 20.00 Top: 1821.00 Total Magnetic Field Strength: (nT) 52074

Spud: 2019-03-22 Bottom: 15465.00 Bottom: 15452.00 Mag to Reference North Correction: (deg) 7.78

Borehole Record

Casing Record

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

13.500 20.00 1821.00 9.625 36.00 20.00 1811.00

8.500 1821.00 15465.00

Mud Record

Deviation Record

Type From (ft) To (ft) Hole Size (in) Interval (ft) Inc | Az (Start) Inc | Az (End)

Water Based Mud 20.00 1821.00 13.500 1801.00 0.15| 93.59 8.79 | 134.93

Diesel-Oil Based Mud 1821.00 15465.00 8.500 13664.00 8.79| 134.93 90.28 | 270.15

Acquisition System

Software Version

Other

Baker Hughes Cadence

RT 5.1

DeliverableGen 1.0.8304.1

Rig: Precision 462

Contractor: Precision Drilling

Unit: D&E

District: RMD

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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	13.500	PDC	6.00	Steerable	0.00	0.00	20.00	1821.00	2019-03-22 17:25	2019-03-23 01:45	11.95
2	2	8.500	PDC	3.00	Rotary Steerable	1821.00	15452.00	1821.00	15465.00	2019-05-13 16:30	2019-05-16 09:25	57.08

Crew

Name	Arrive Wellsite	Depart Wellsite	Name	Arrive Wellsite	Depart Wellsite	Name	Arrive Wellsite	Depart Wellsite
John Moisan	2019-05-13	2019-05-17						

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+ (%)
2019-03-23 06:00	1	1821.00	Water Based Mud	8.4	1	0	0.0	0/100	Active Pit	794	0.00
2019-05-13 16:00	2	1821.00	Diesel-Oil Based Mud	9.4	10	0	12.2	80/8.5	Active Pit	20568	0.00
2019-05-14 04:00	2	4478.00	Diesel-Oil Based Mud	9.5	17	0	16.8	74.2/14	Active Pit	28958	0.00
2019-05-14 16:00	2	7105.00	Diesel-Oil Based Mud	9.6	18	0	17.8	74/13	Active Pit	26725	0.00
2019-05-15 04:00	2	9432.00	Diesel-Oil Based Mud	9.8	18	0	17.8	75/11	Active Pit	26239	0.00

2019-05-13 04:00	2	9432.00	Diesel-Oil Based Mud	9.8	19	0	17.8	73/11	Active Pit	26239	0.00
2019-05-15 14:00	2	10850.00	Diesel-Oil Based Mud	9.8	19	0	18.0	75/11	Active Pit	27992	0.00
2019-05-16 03:30	2	14509.00	Diesel-Oil Based Mud	10.1	19	0	18.0	74.2/10.1	Active Pit	26239	0.00
2019-05-16 15:30	2	15465.00	Diesel-Oil Based Mud	10.2	20	0	19.2	73.9/10.3	Active Pit	27211	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	Sensor Sub	ZAPS230948	Pressure	34.67	83.28	8.000	3.250
1	Sensor Sub	ZAPS230948	VSS	7.40	56.01	8.000	3.250
1	Sensor Sub	ZAPS230948	Directional (mag)	7.40	56.01	8.000	3.250
2	AutoTrak Curve Steering Unit	14564691	Near Bit VSS	5.93	6.93	7.000	4.330
2	AutoTrak Curve Steering Unit	14564691	Near Bit Inclination	5.93	6.93	7.000	4.330
2	AutoTrak Curve MWD	14705263	Gamma (single)	2.75	13.10	7.000	3.250
2	AutoTrak Curve MWD	14705263	Directional (mag)	12.27	22.62	7.000	3.250

Service and Tool Mnemonics

Mnemonic	Name	Description
GAM	APS	APS EM Module
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	Depths measurements were obtained from a depth control system not supplied or operated by Baker Hughes. Due to lack of control by Baker Hughes logging engineers, depth calibrations and measurements could not be independently verified. These unverified depths are being used to represent logging data.
2	Baker Hughes LWD Run 1 utilized 8 inch NaviTrak service (Directional-Only) behind a 13 ½ inch bit and steerable assembly from Surface to 1821 feet MD (Surface to 1804 feet TVD). No logging data was acquired during this run.
3	Baker Hughes LWD Run 2 utilized 6 ¾ inch NaviGamma services (Gamma Ray and Directional) behind 8 ½ inch bit and rotary steerable assembly from 1821 to 15465 feet MD (1804 to 7214 feet TVD).
4	Gamma Ray Apparent (GRAM) is presented 0 to 300 API per customer request.

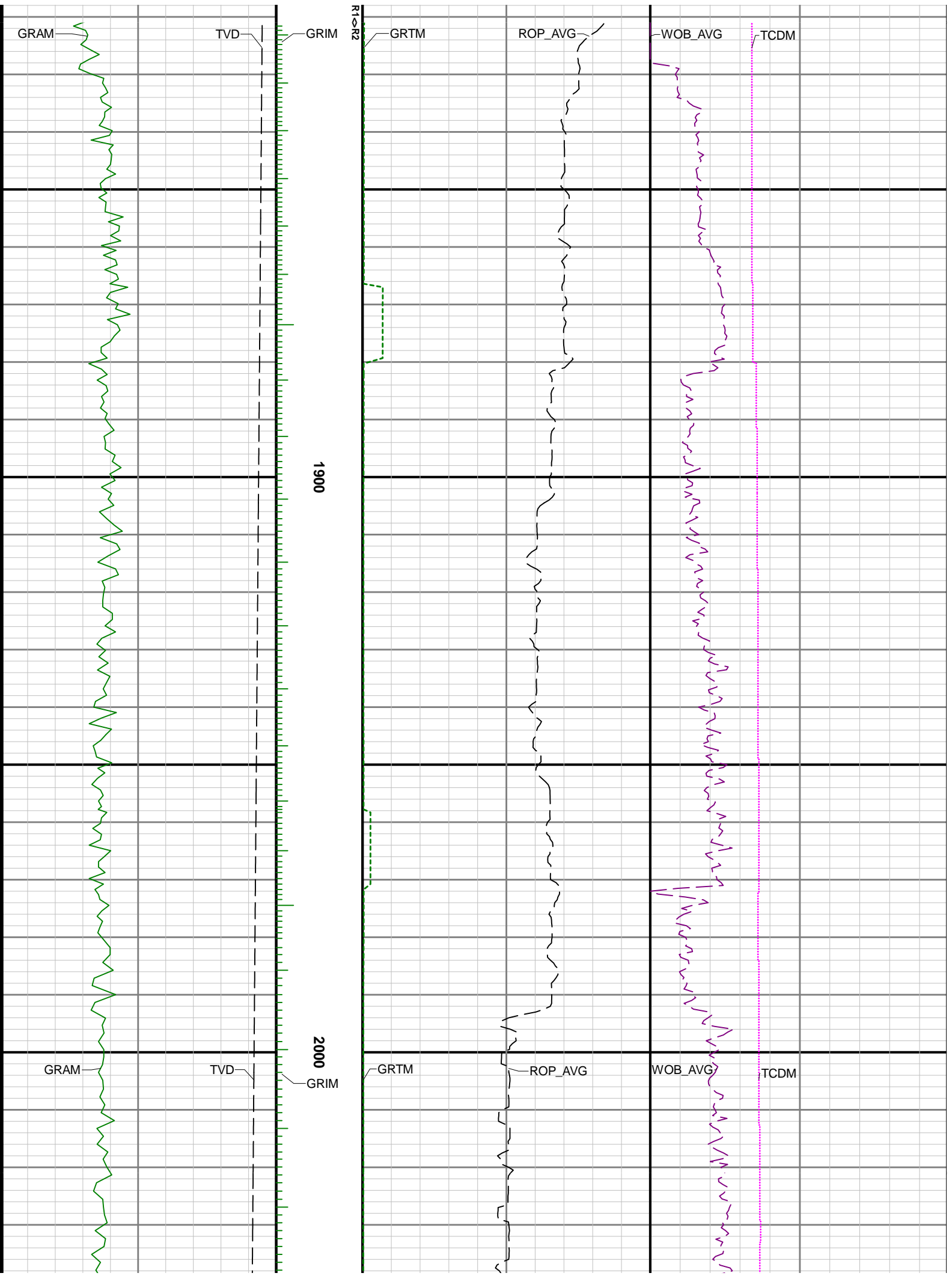
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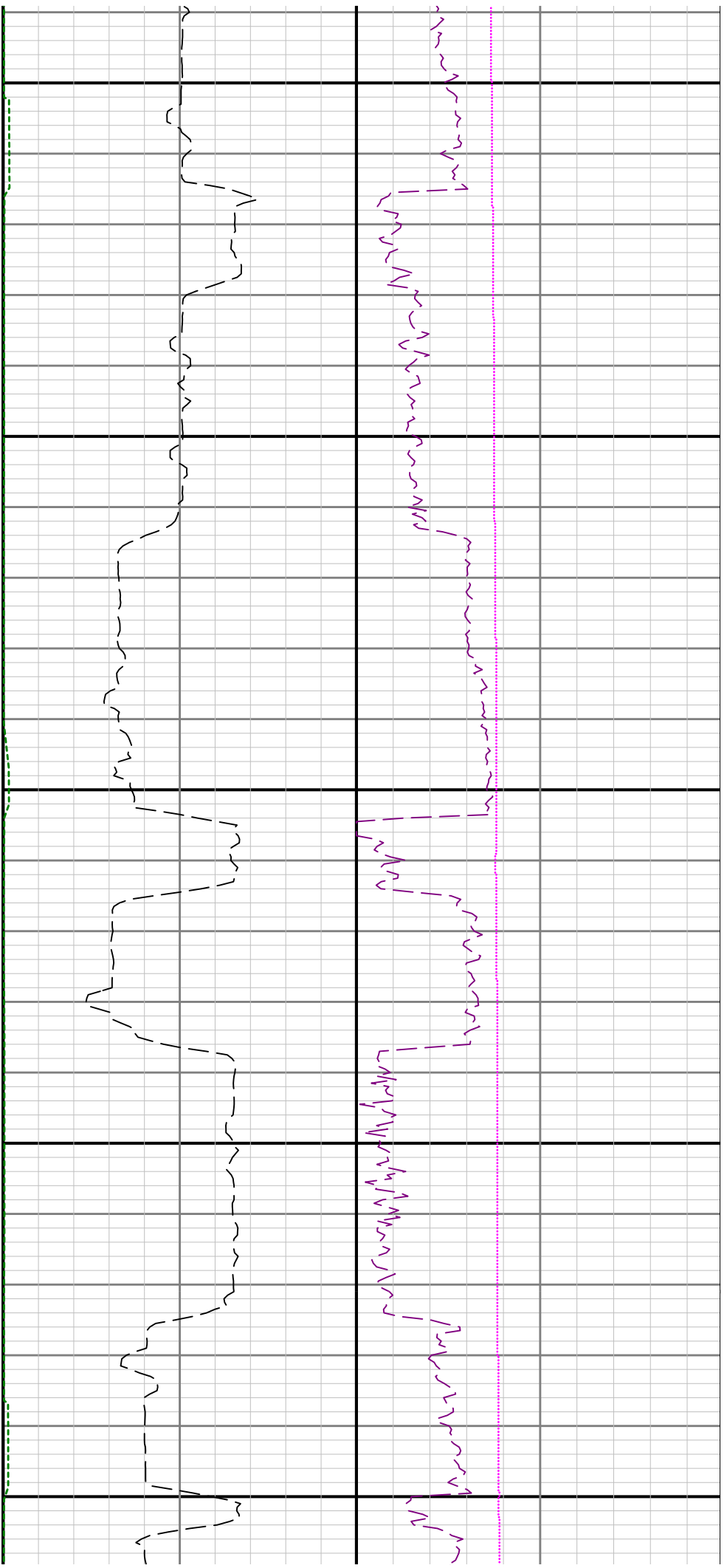
Number	Depth (ft)	Hole Section (in)	Run No.	Remark
1	1821.00	8.500	2	Baker Hughes logging services began at 1821 feet MD (1804 feet TVD) per customer request.
2	15452.00	8.500	2	The interval from 15452 to 15465 feet MD (7214 feet TVD) was not logged due to sensor to bit offset at well TD.

Curve Mnemonics

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

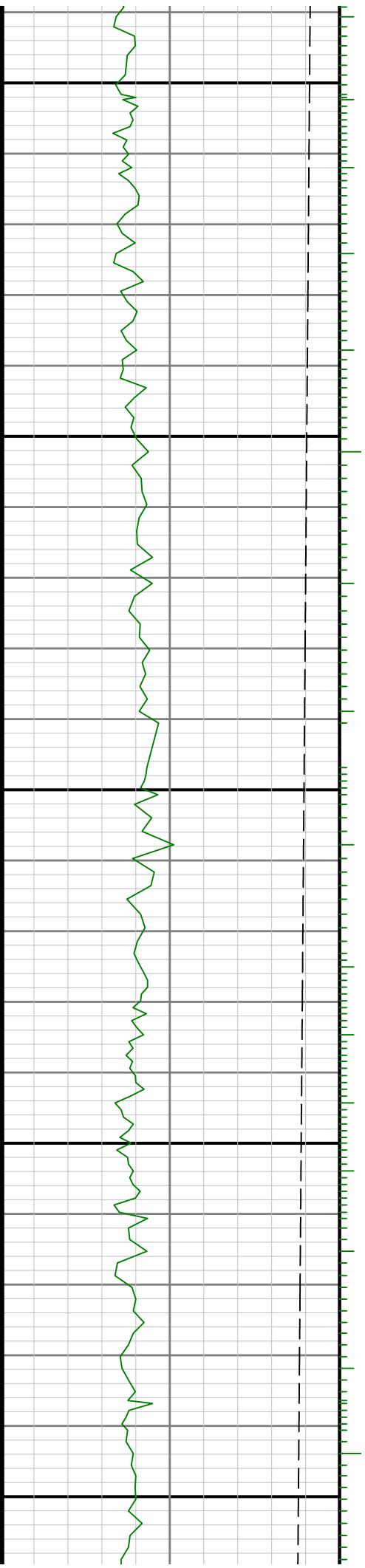
<div><div><div>BAKER HUGHES</div><div>a GE company</div></div><div></div></div>		Company	SRC Energy			
		Well	Sanford 31N-30B-M			
		Interval	Date From:	2019-03-22 16:52	Top:	20.00 ft
		Created	Date To:	2019-05-16 21:53	Bottom:	15465.00 ft
			2019-05-16 22:54:25			
Gamma Ray - Apparent 0.5 ft Average GRAM 0300		MD 1:240 feet	Depth Averaged ROP 3 ft Average ROP_AVG 10000		Weight On Bit, Average 1 ft Average WOB_AVG 050	
API True Vertical Depth TVD 75001500 ft			ft/h		klb	
			Gamma Time Since Drilled GRTM 0600 min		Downhole Temperature TCDM 0300 degF	
		1800				
		9 5/8" Casing				
See Remark 1						

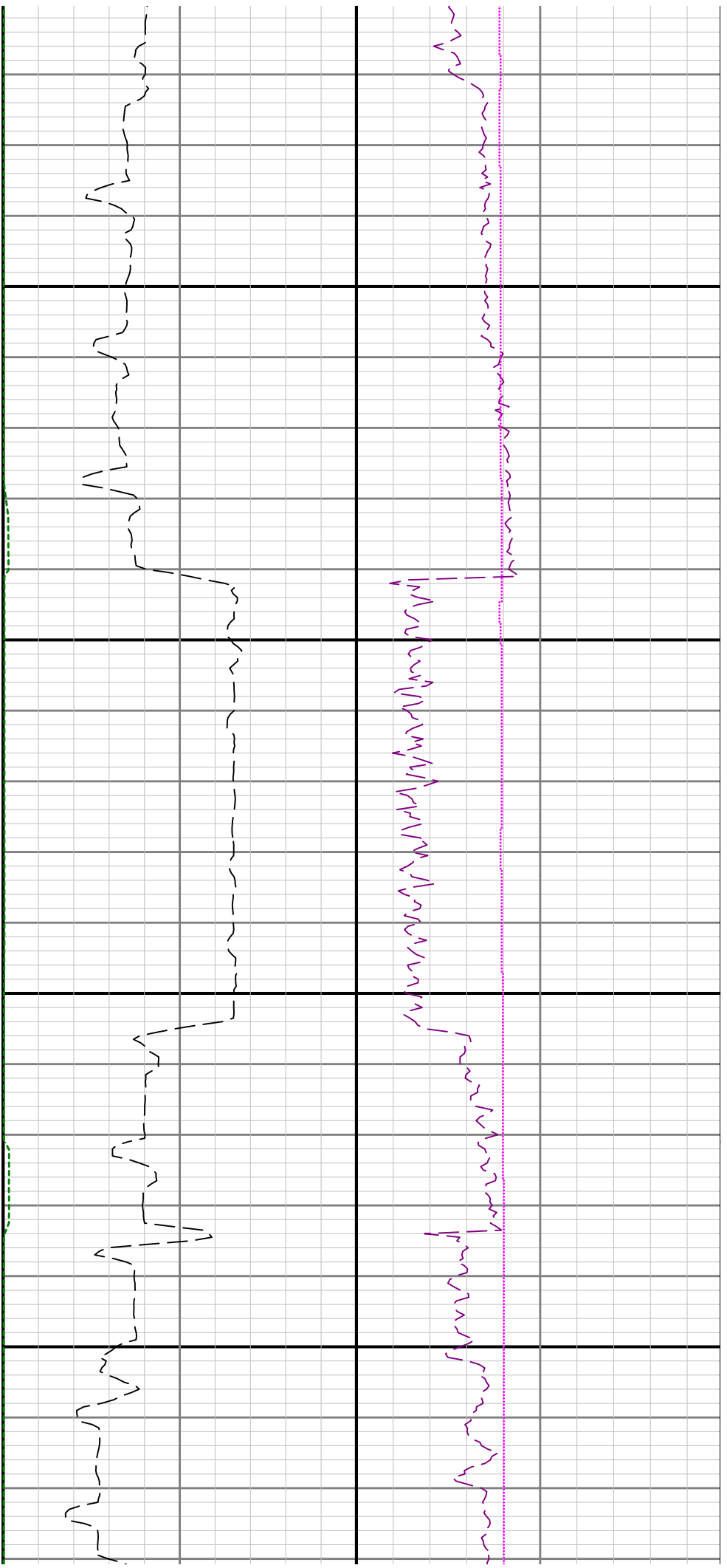




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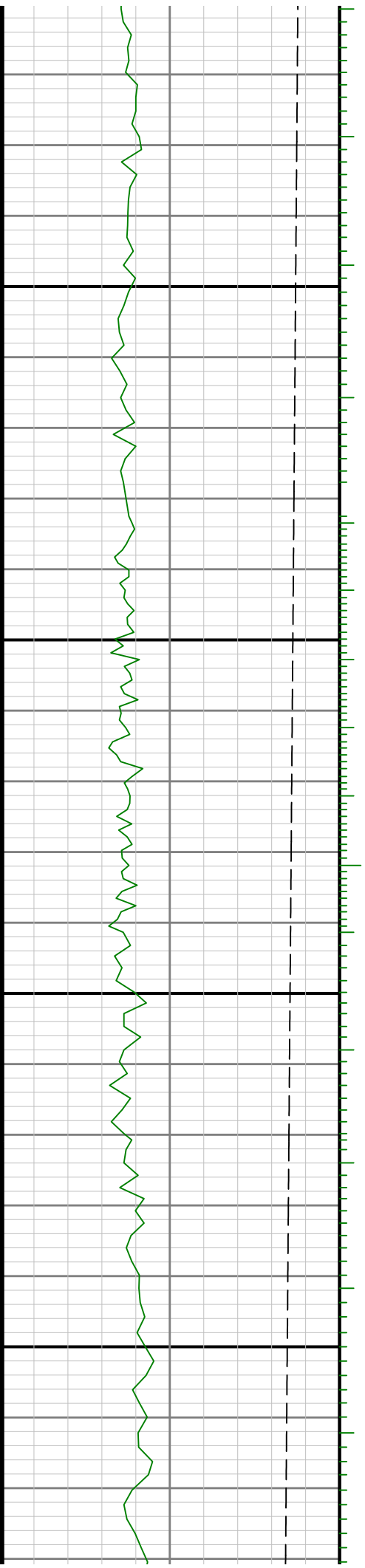
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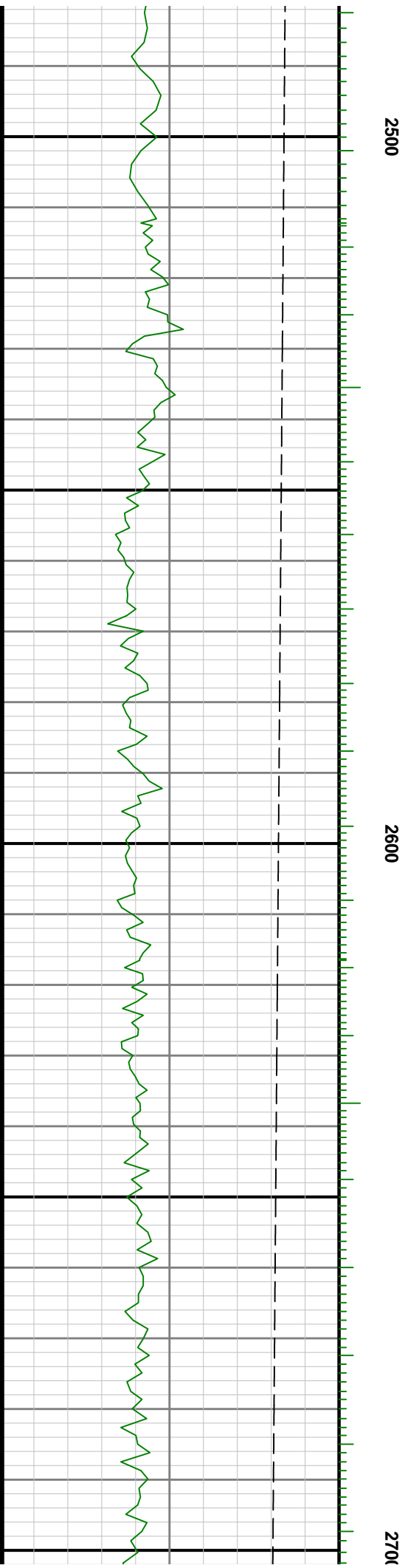
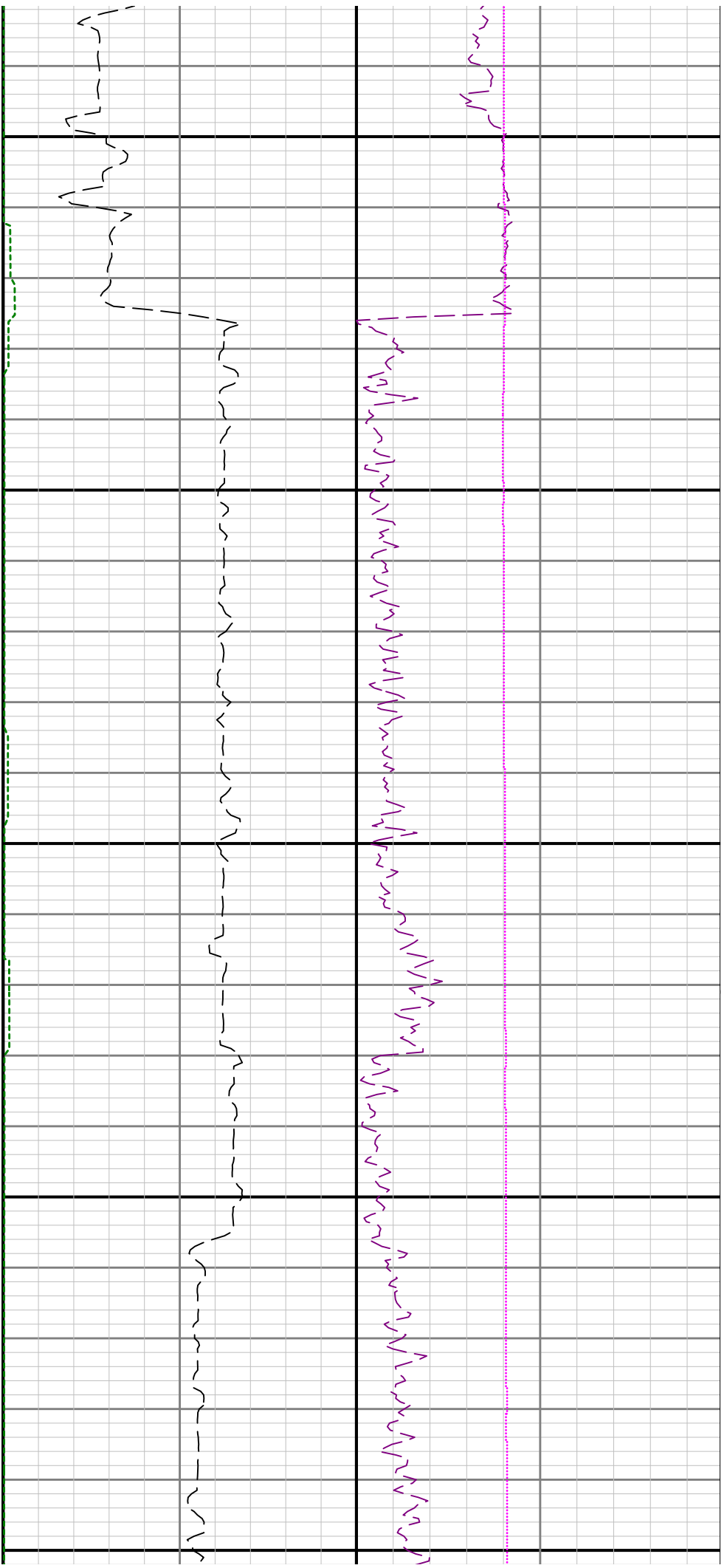


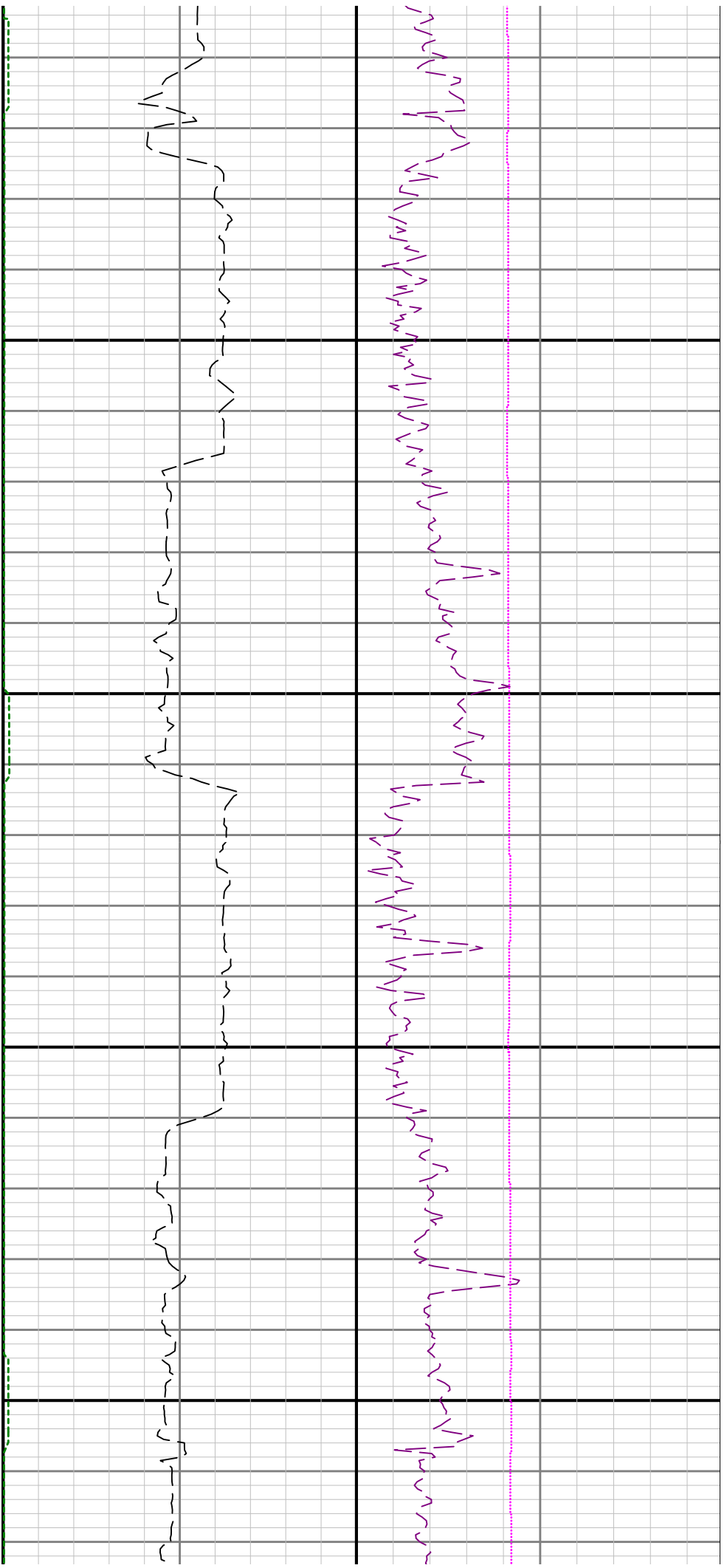


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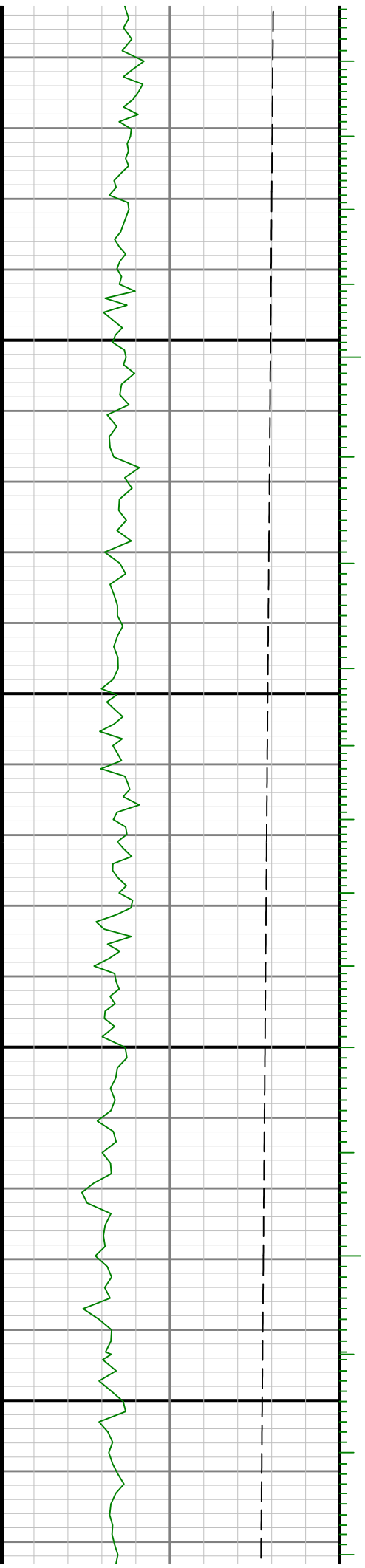


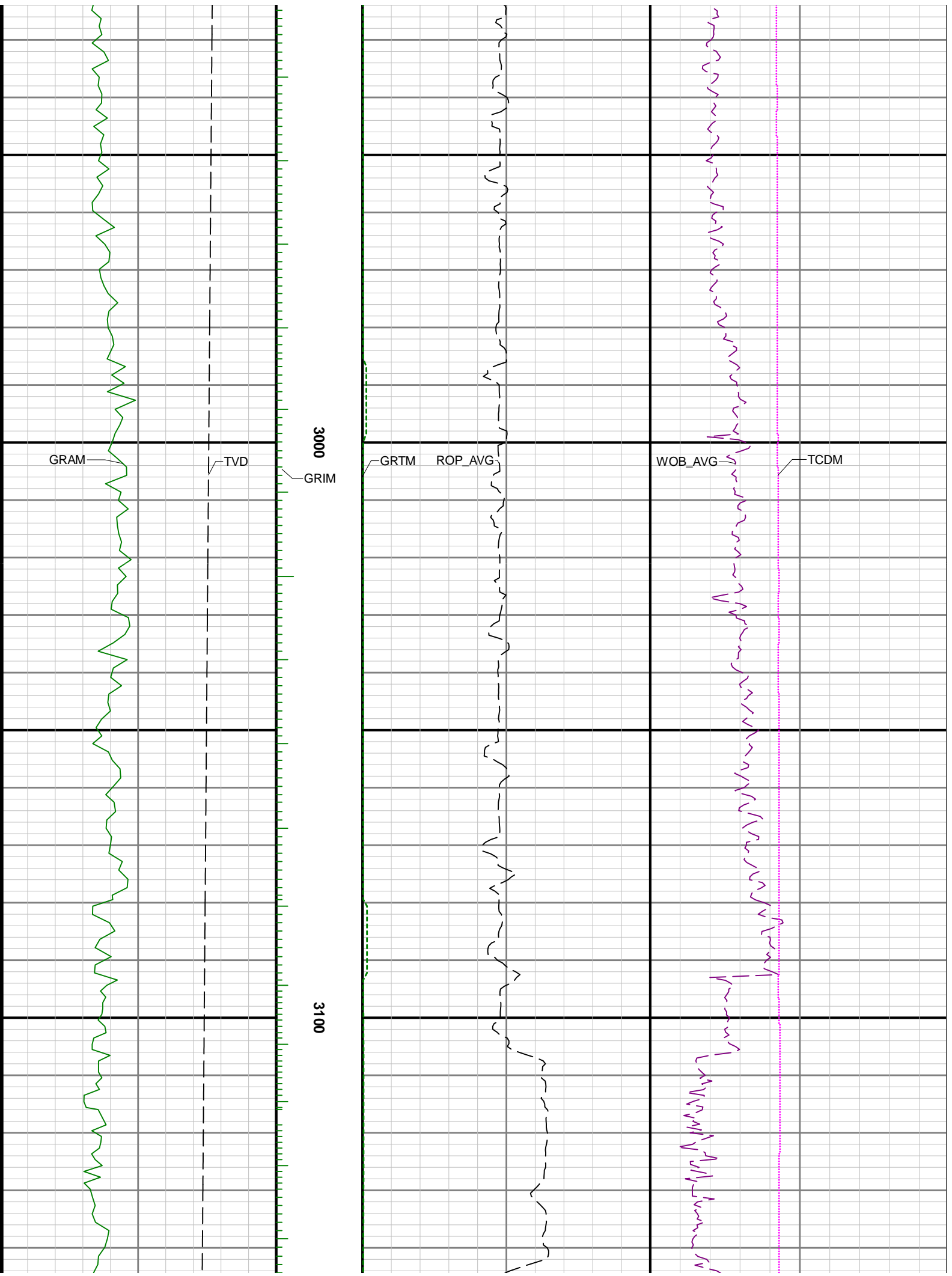


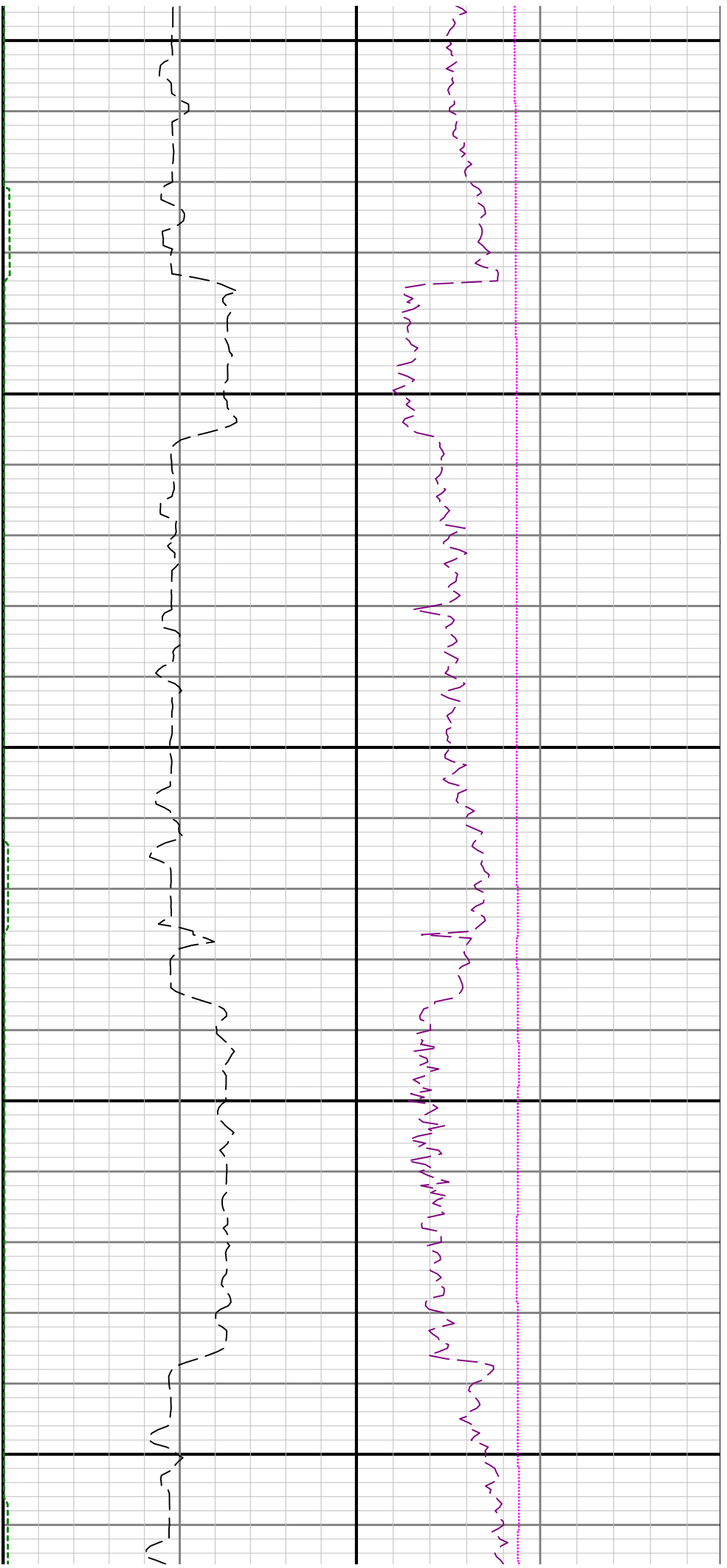


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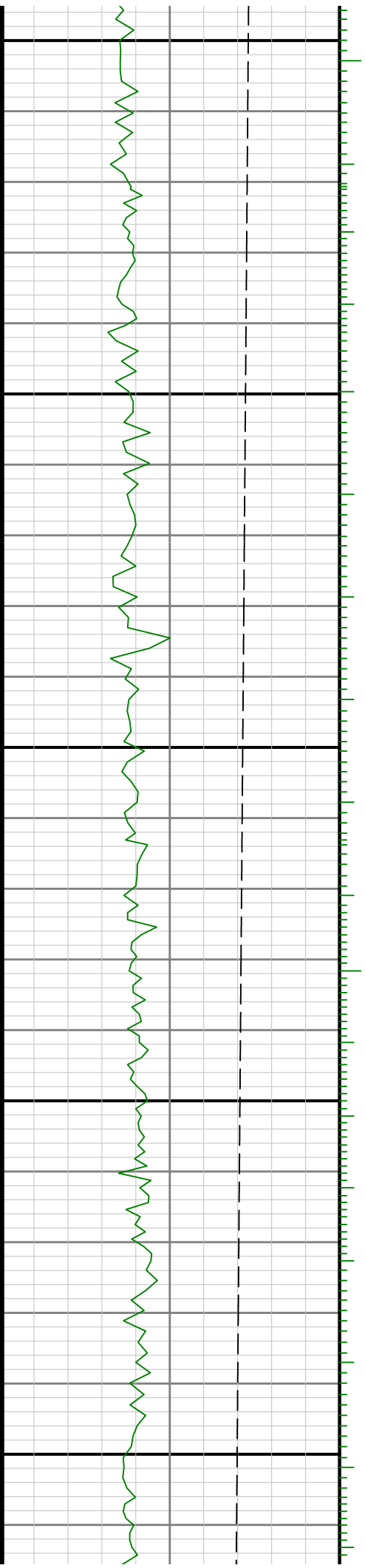


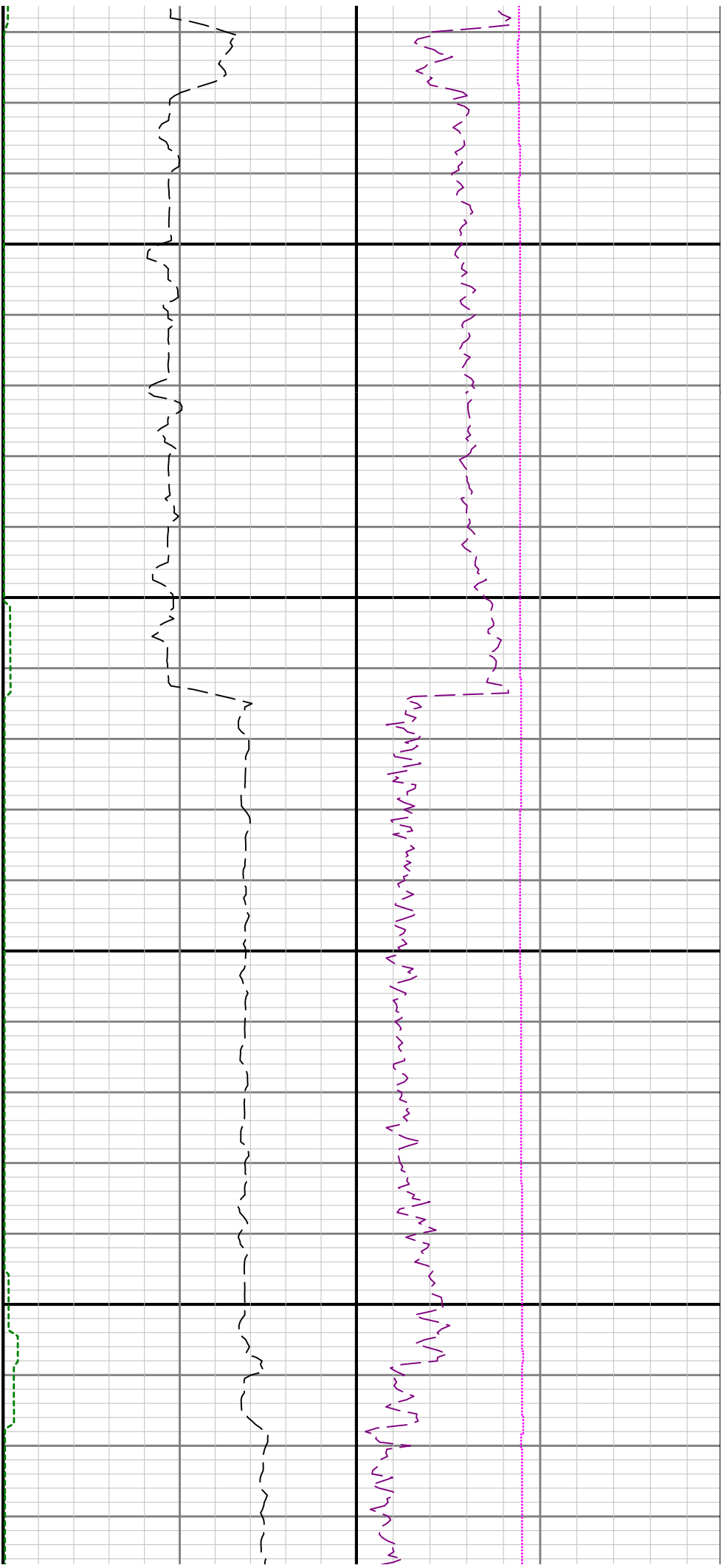




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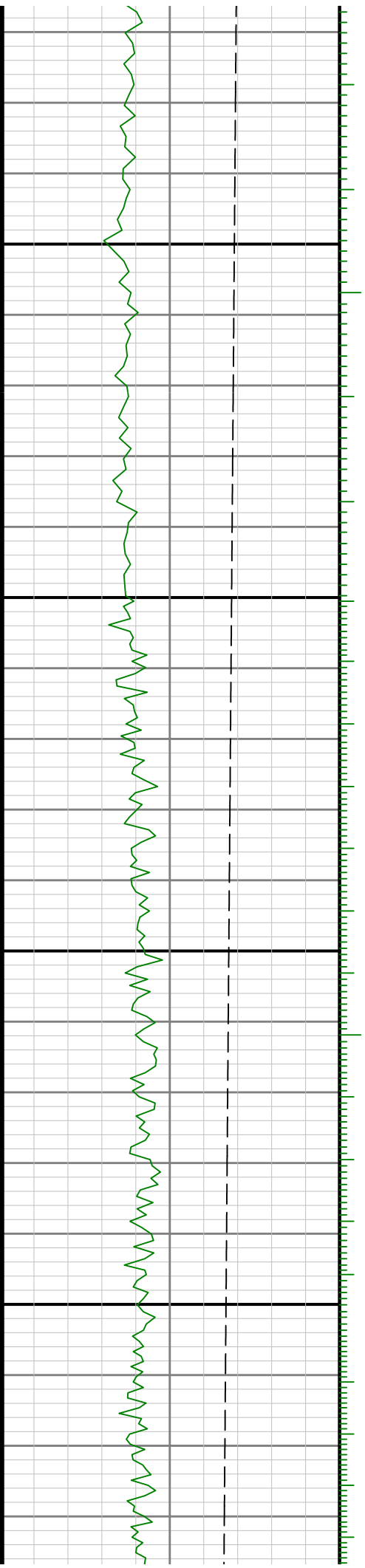
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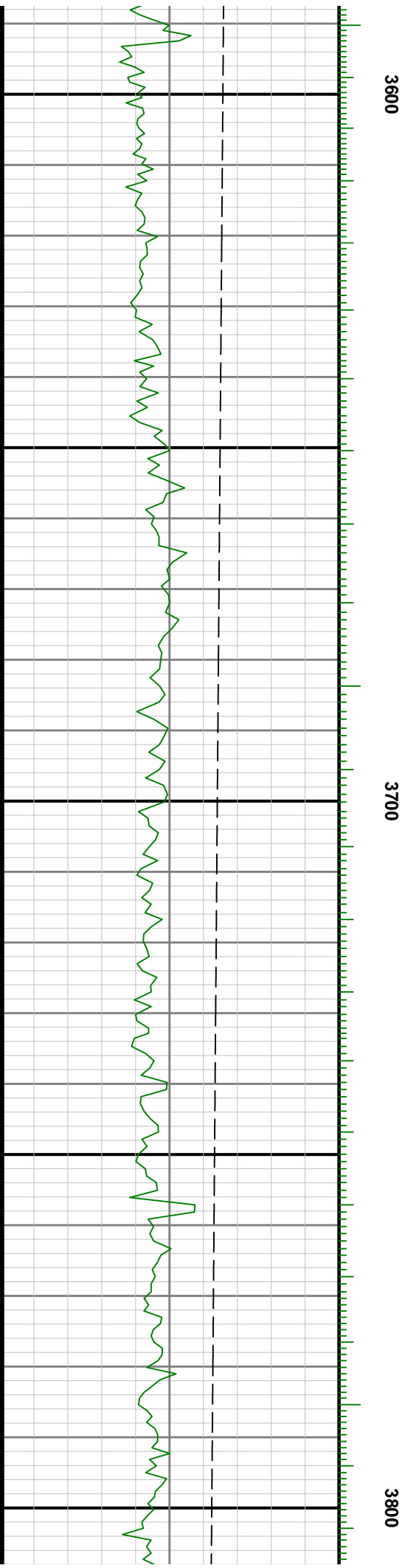
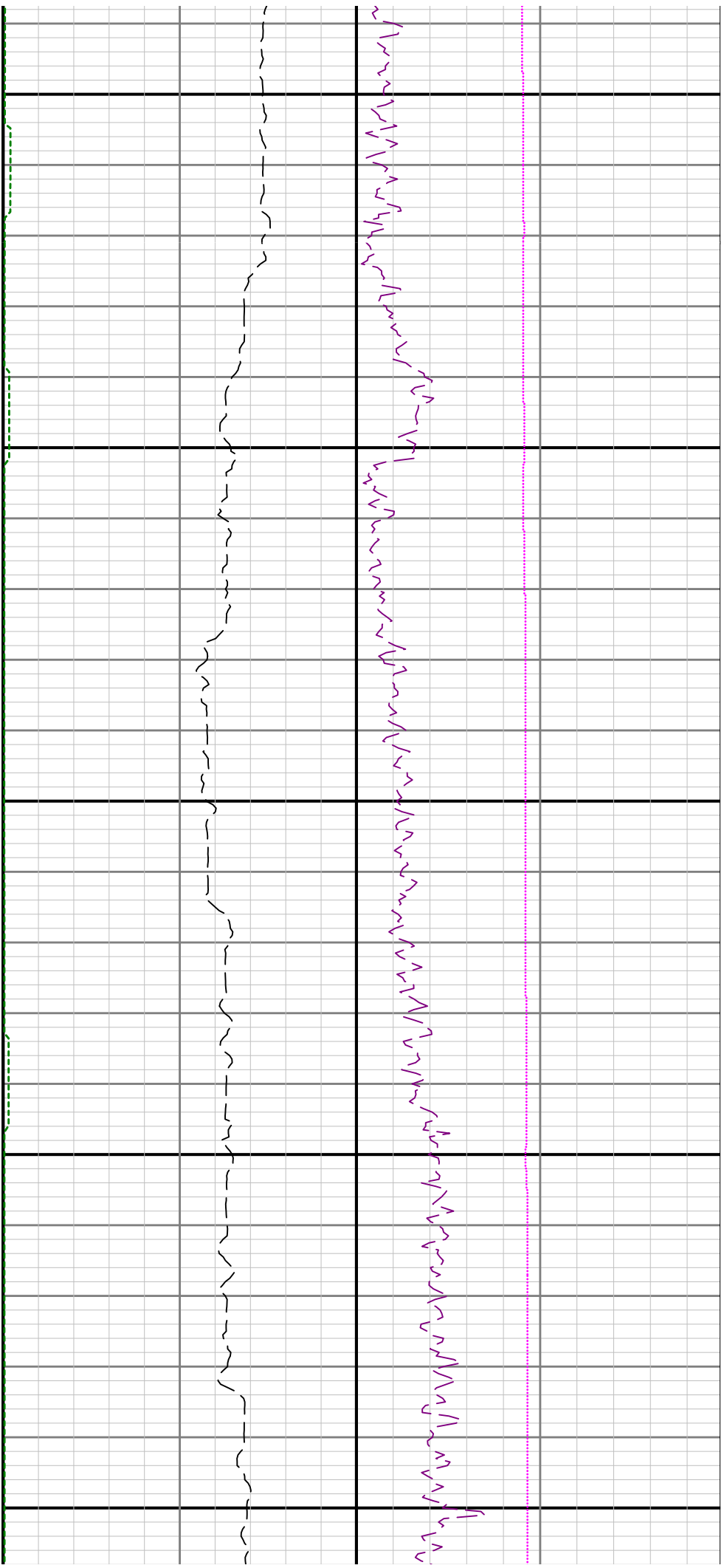


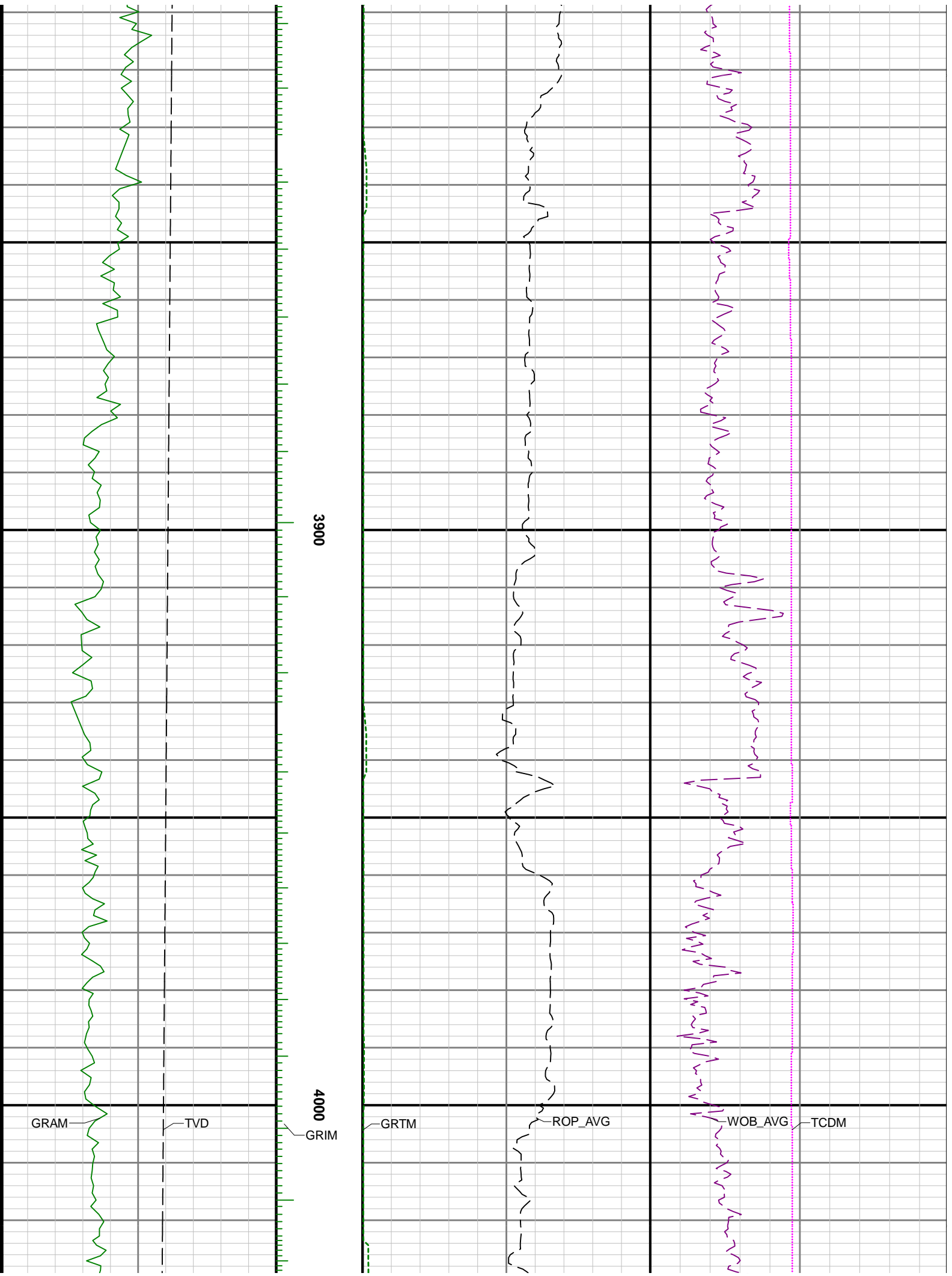


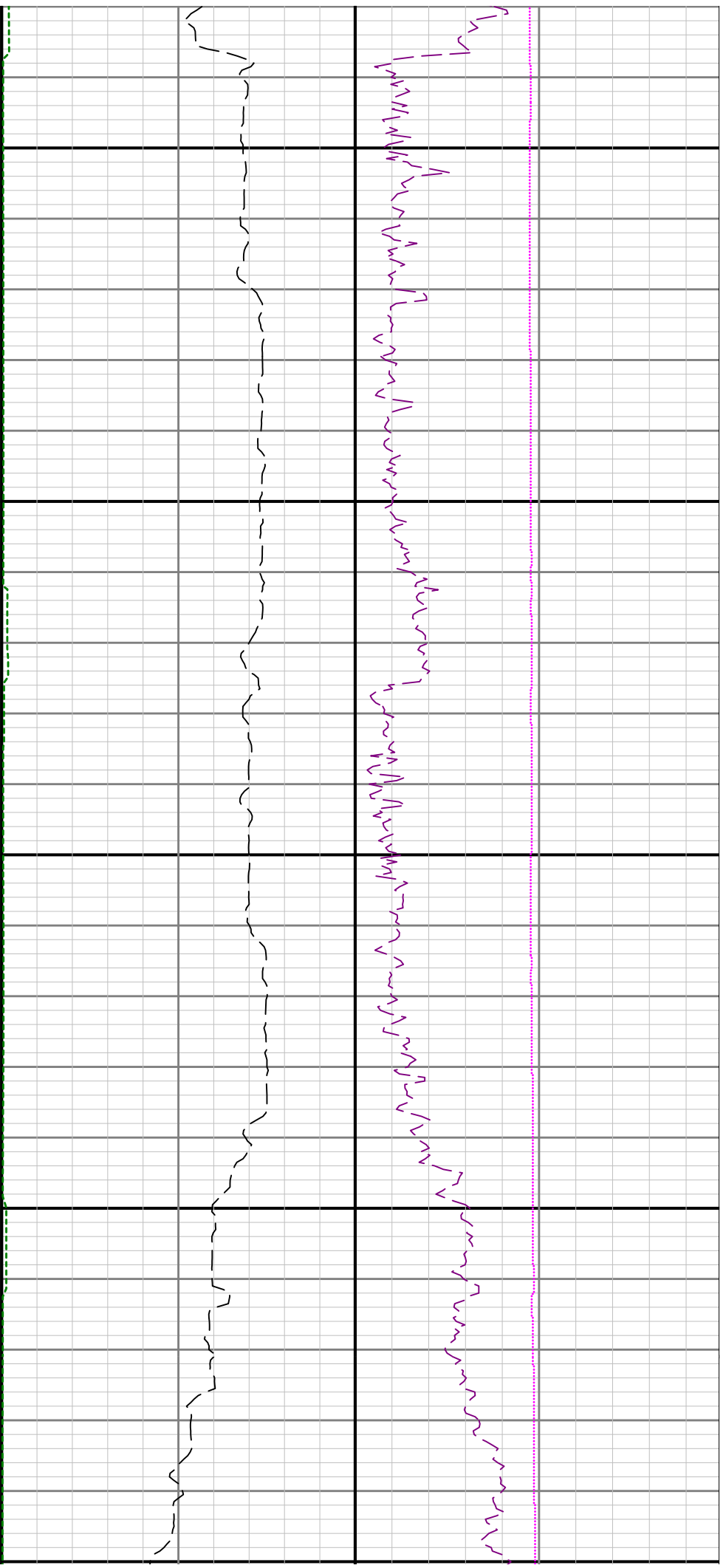
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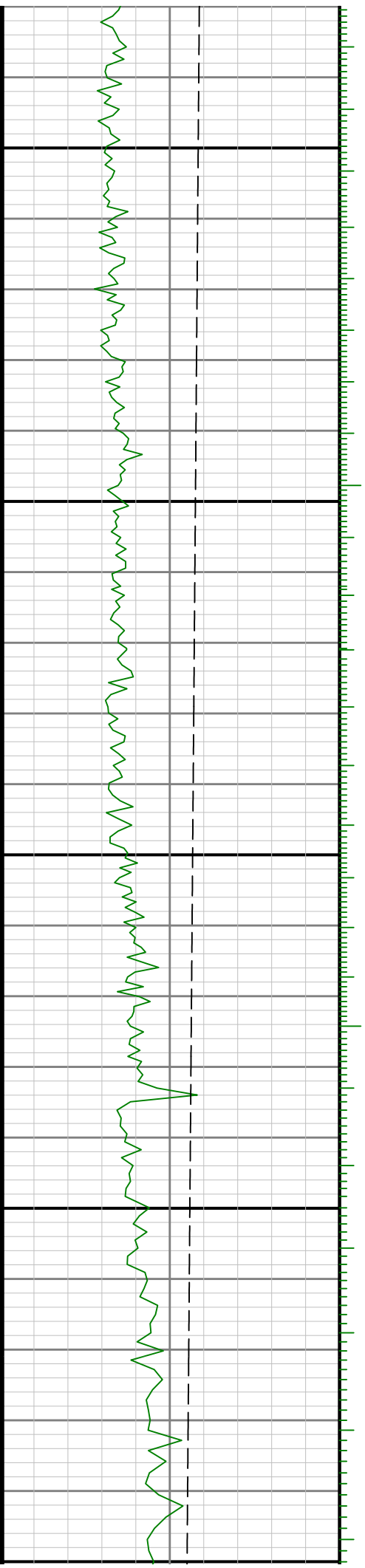


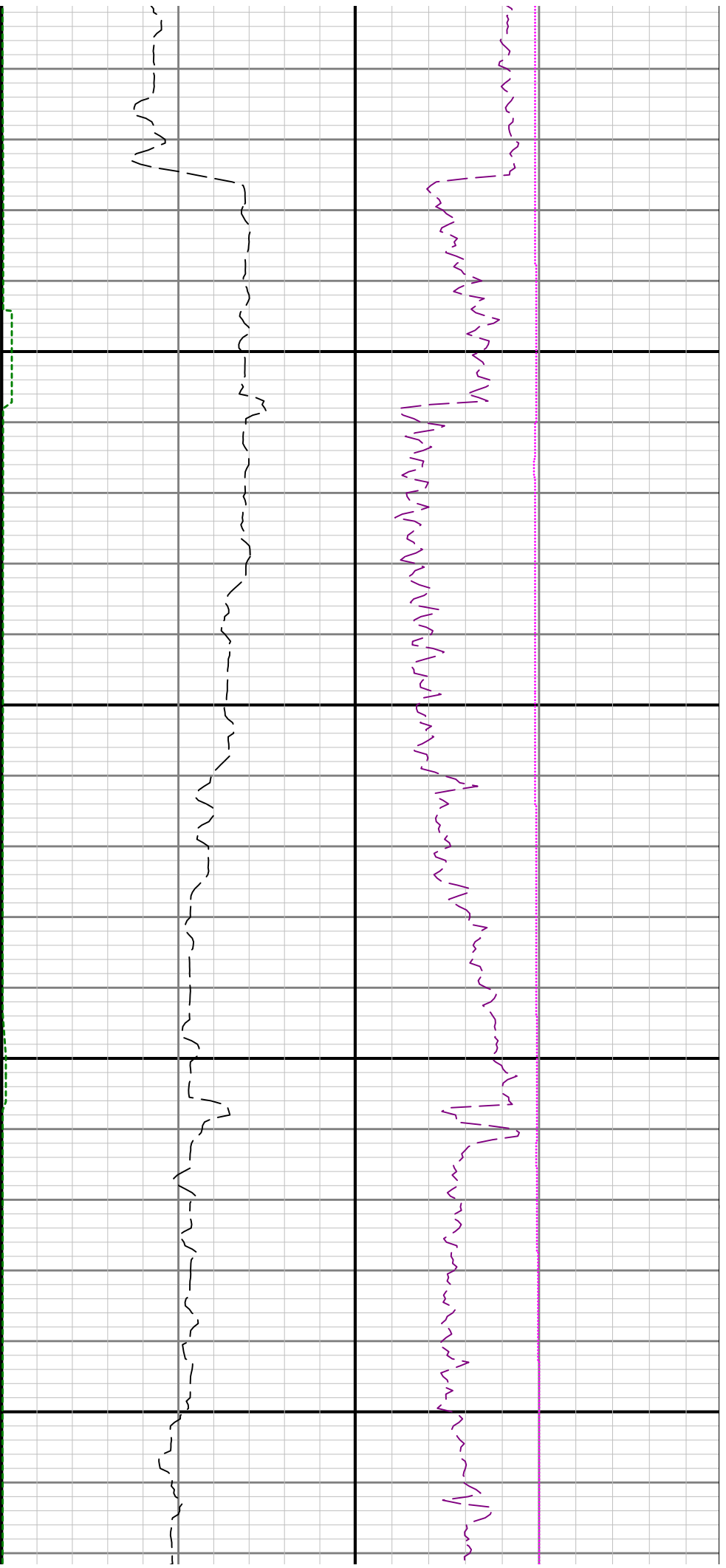




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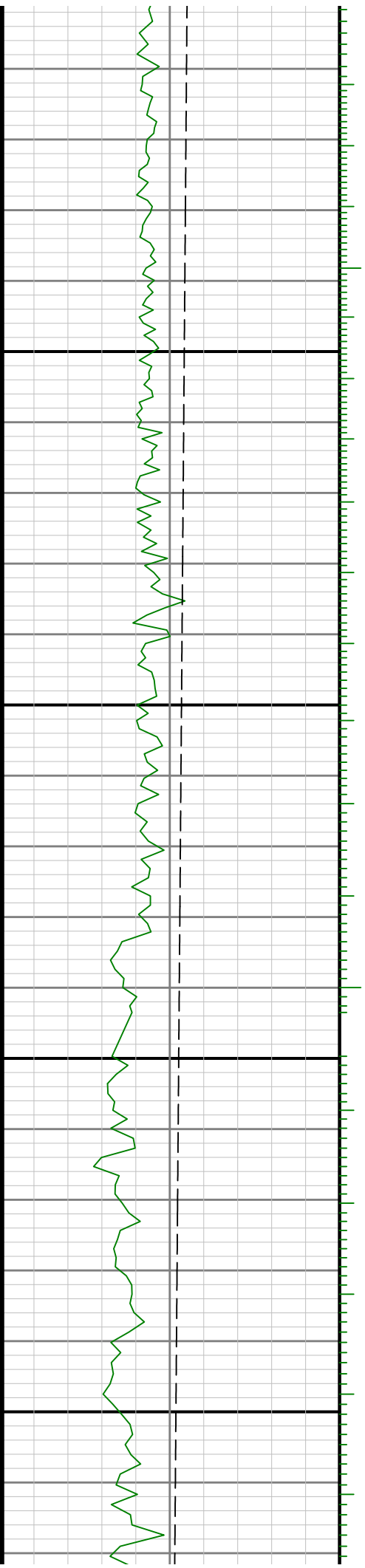
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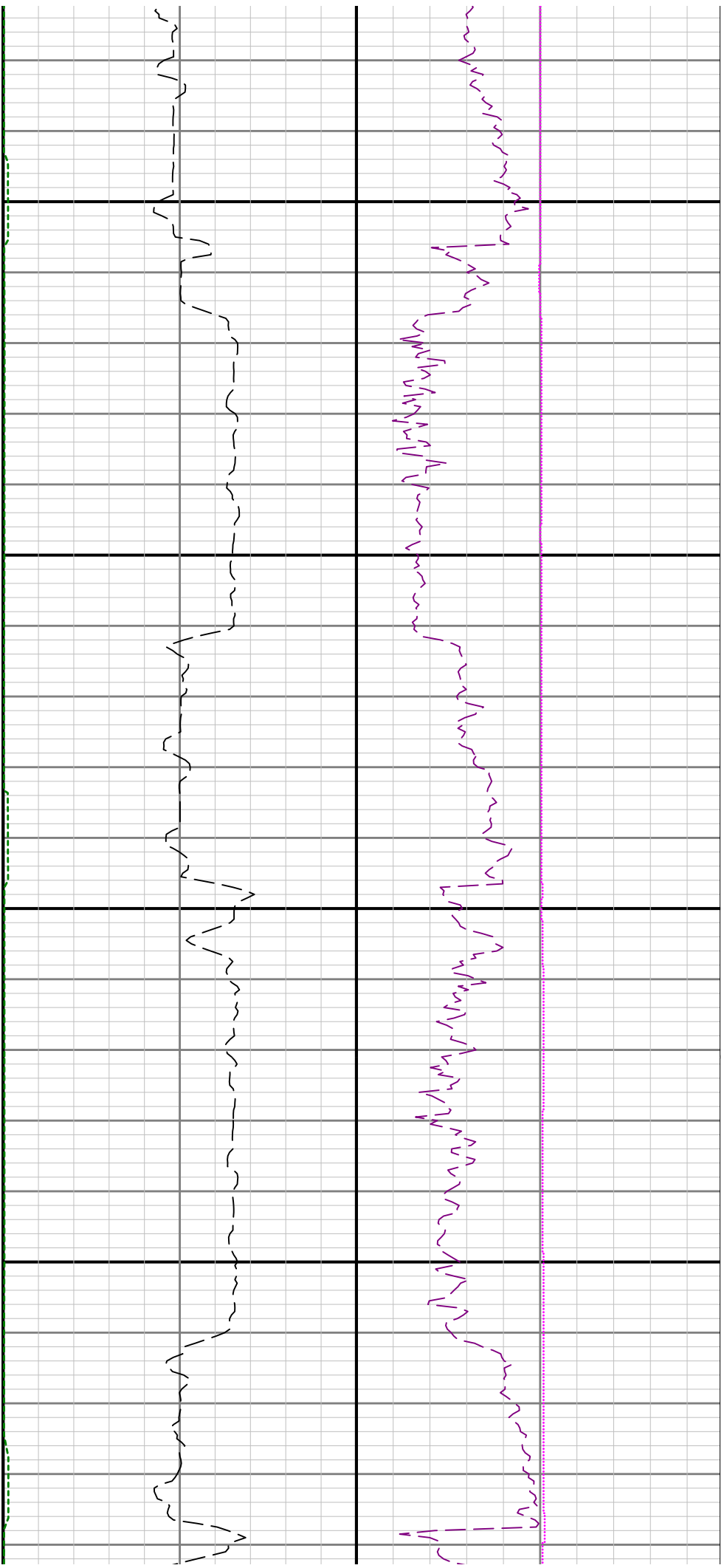




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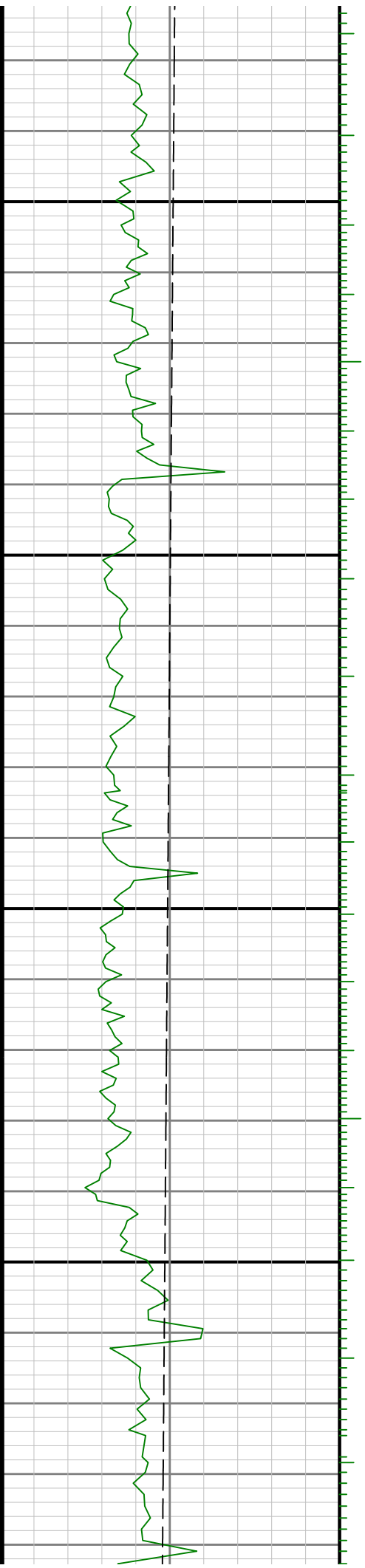
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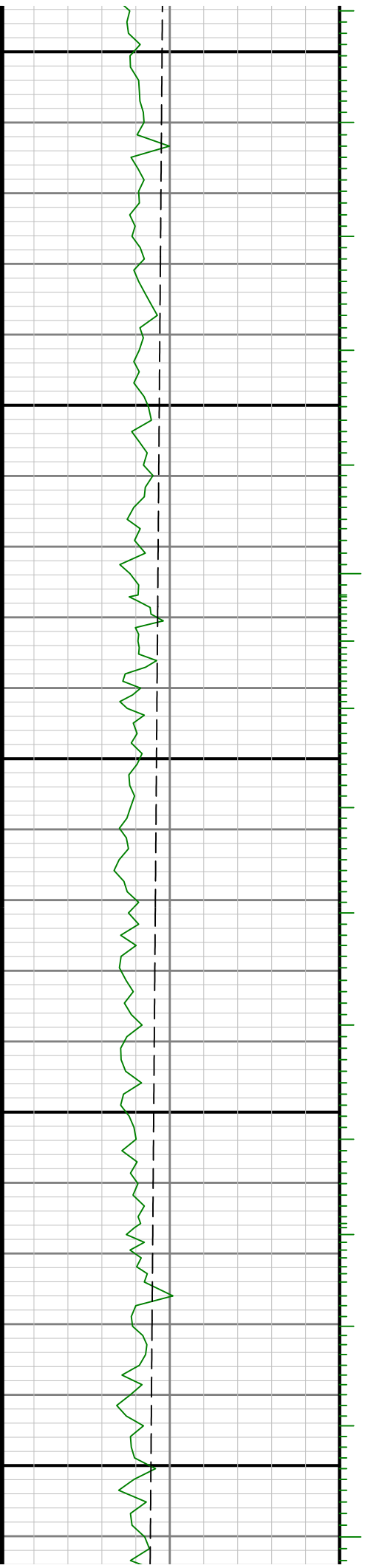


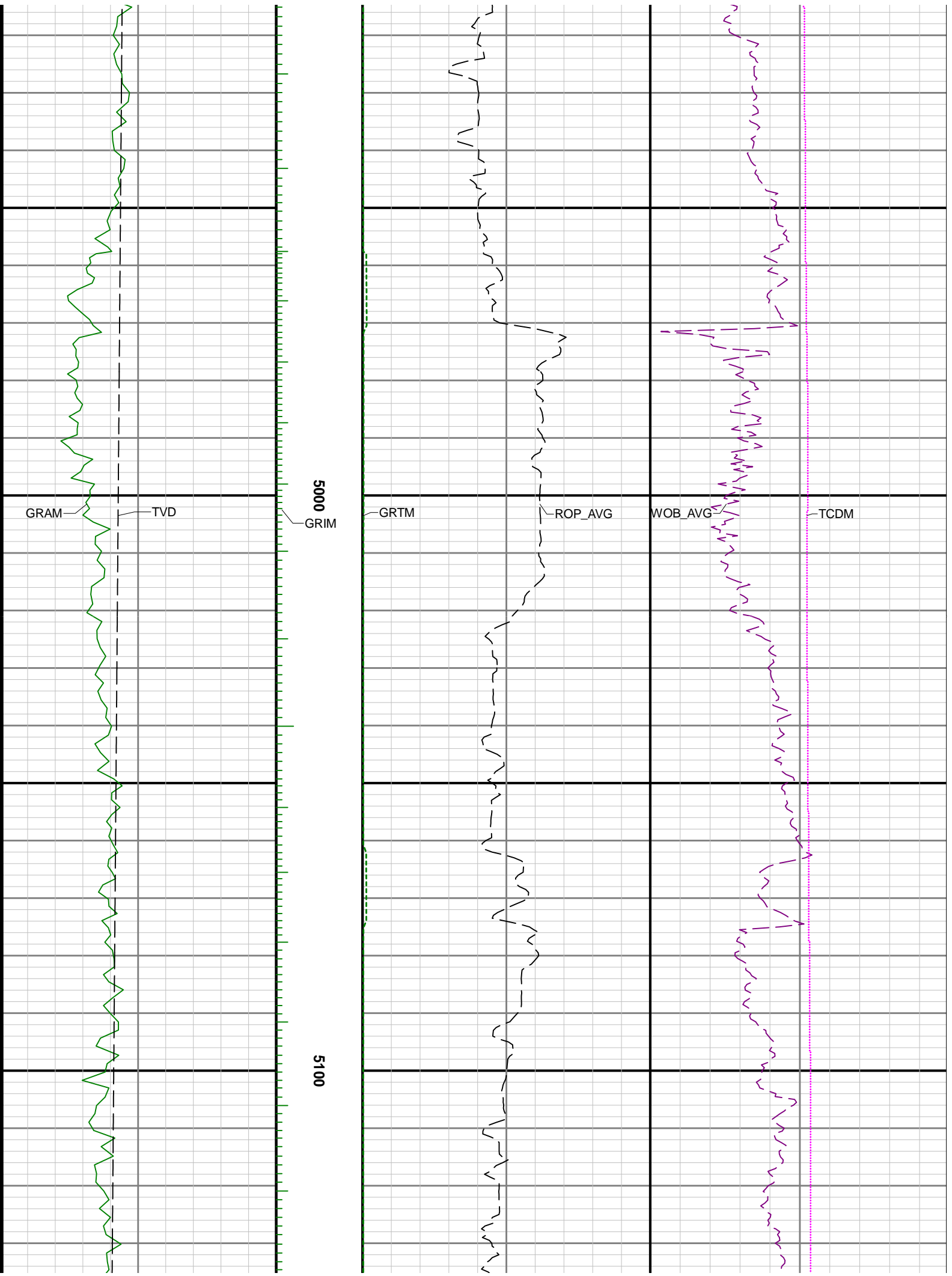


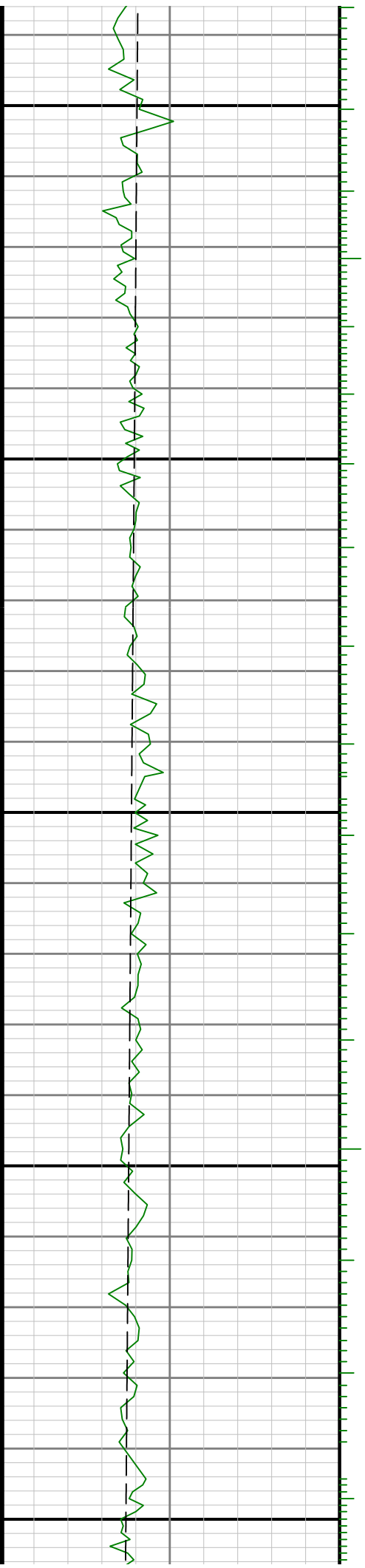
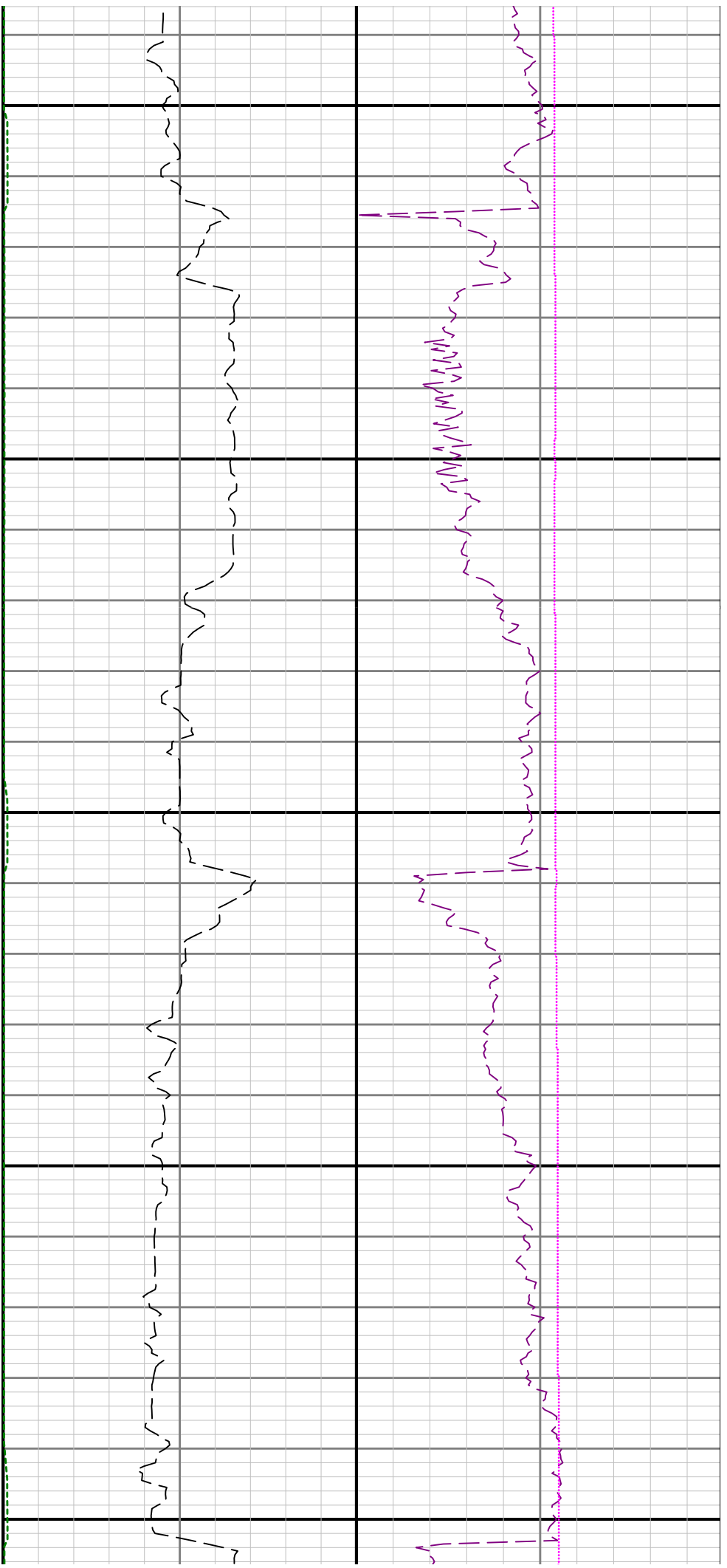
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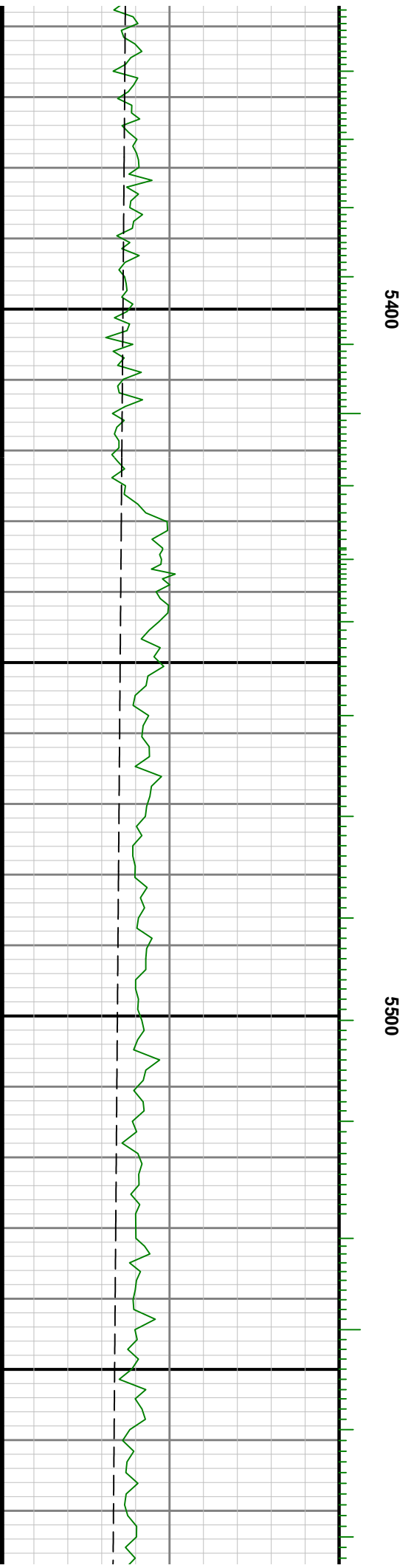
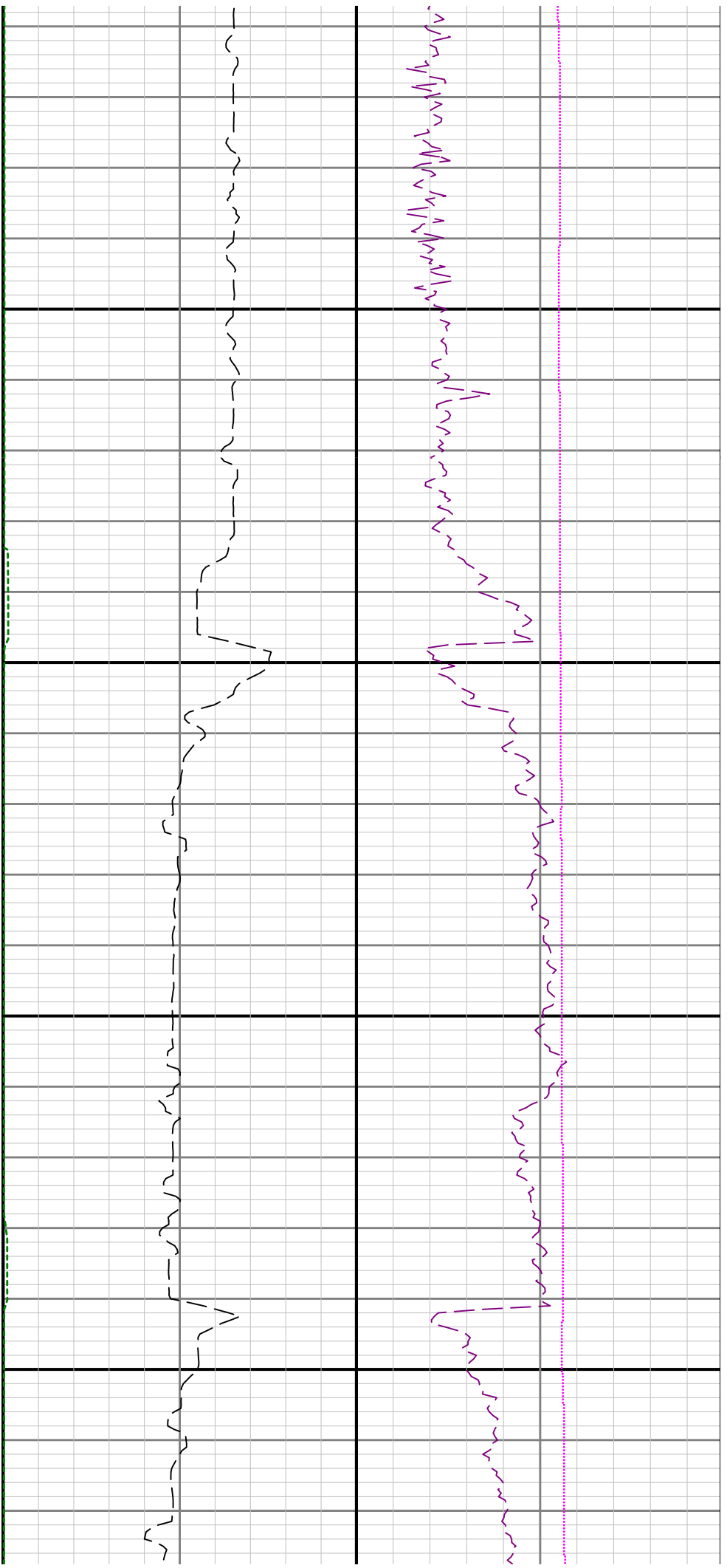
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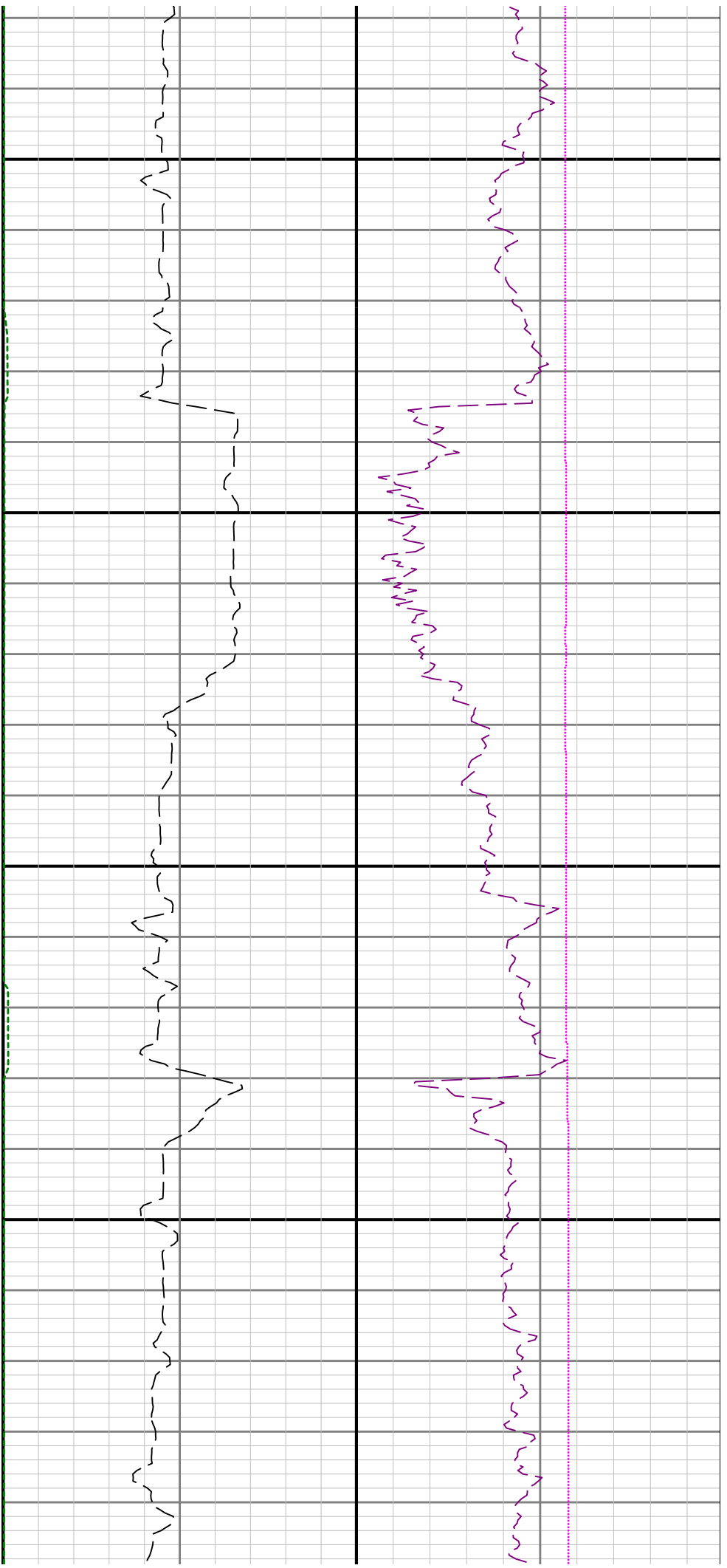
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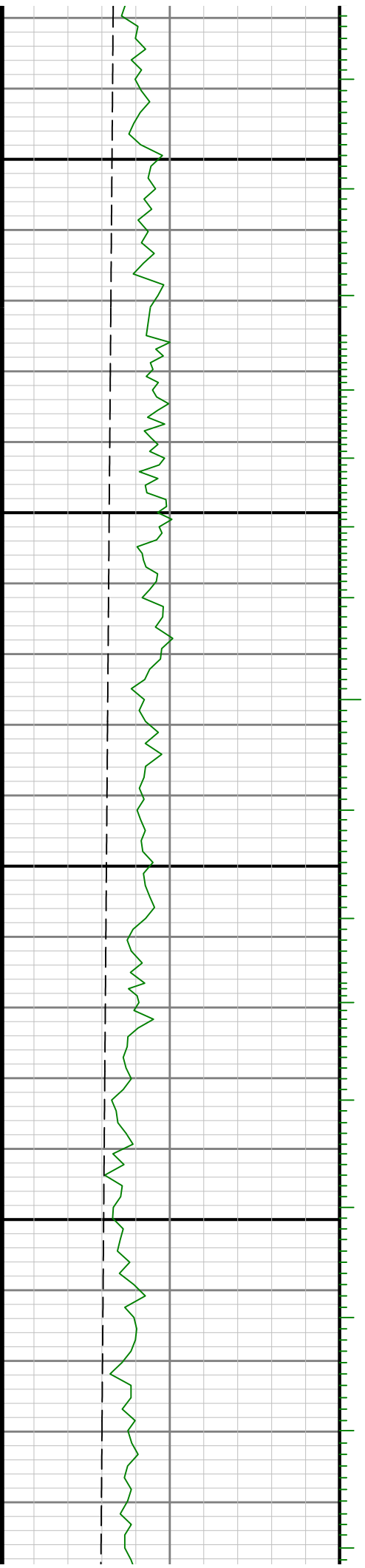


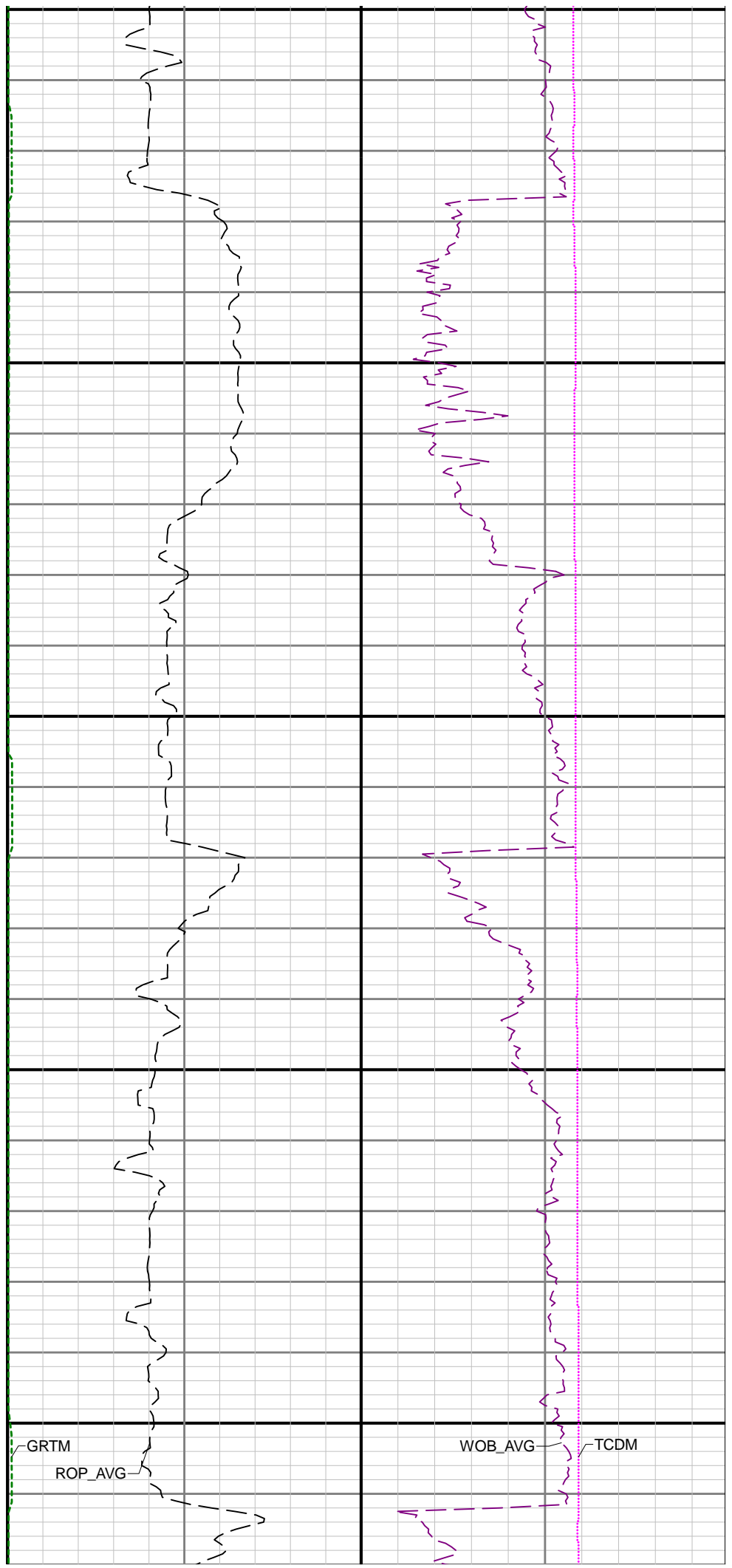
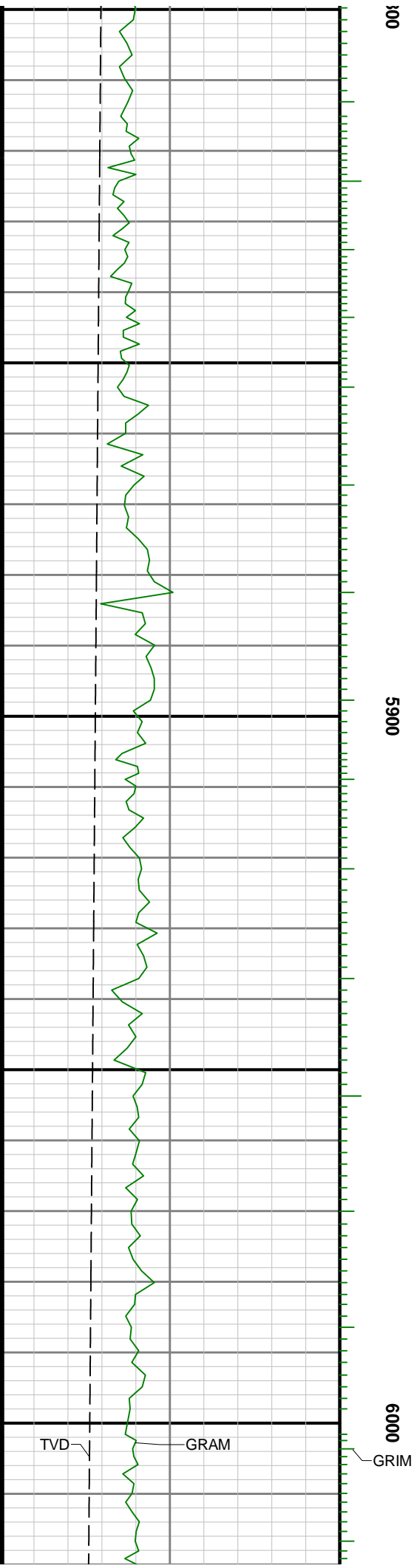


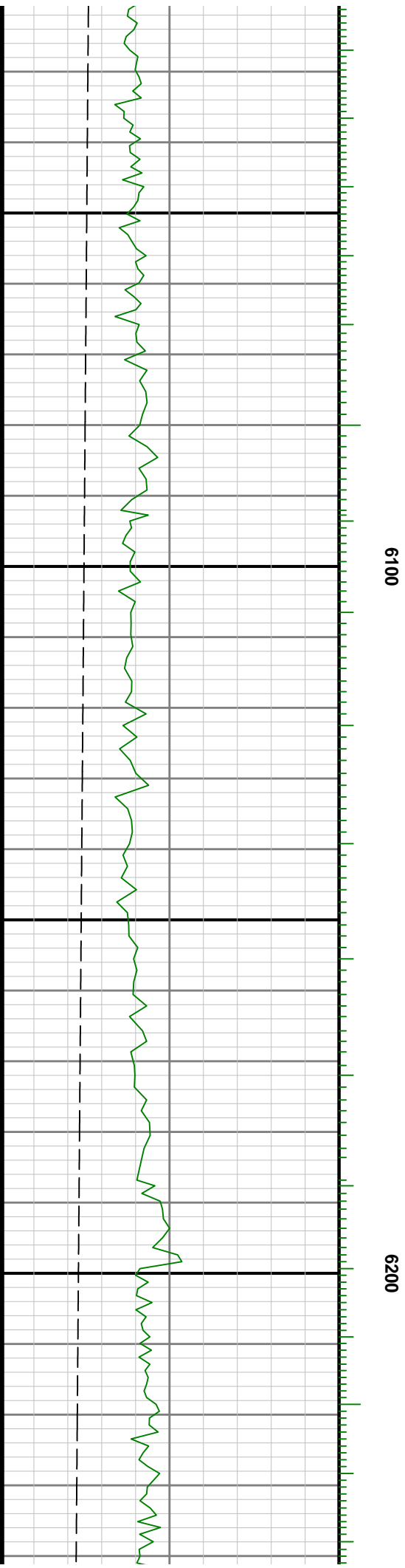
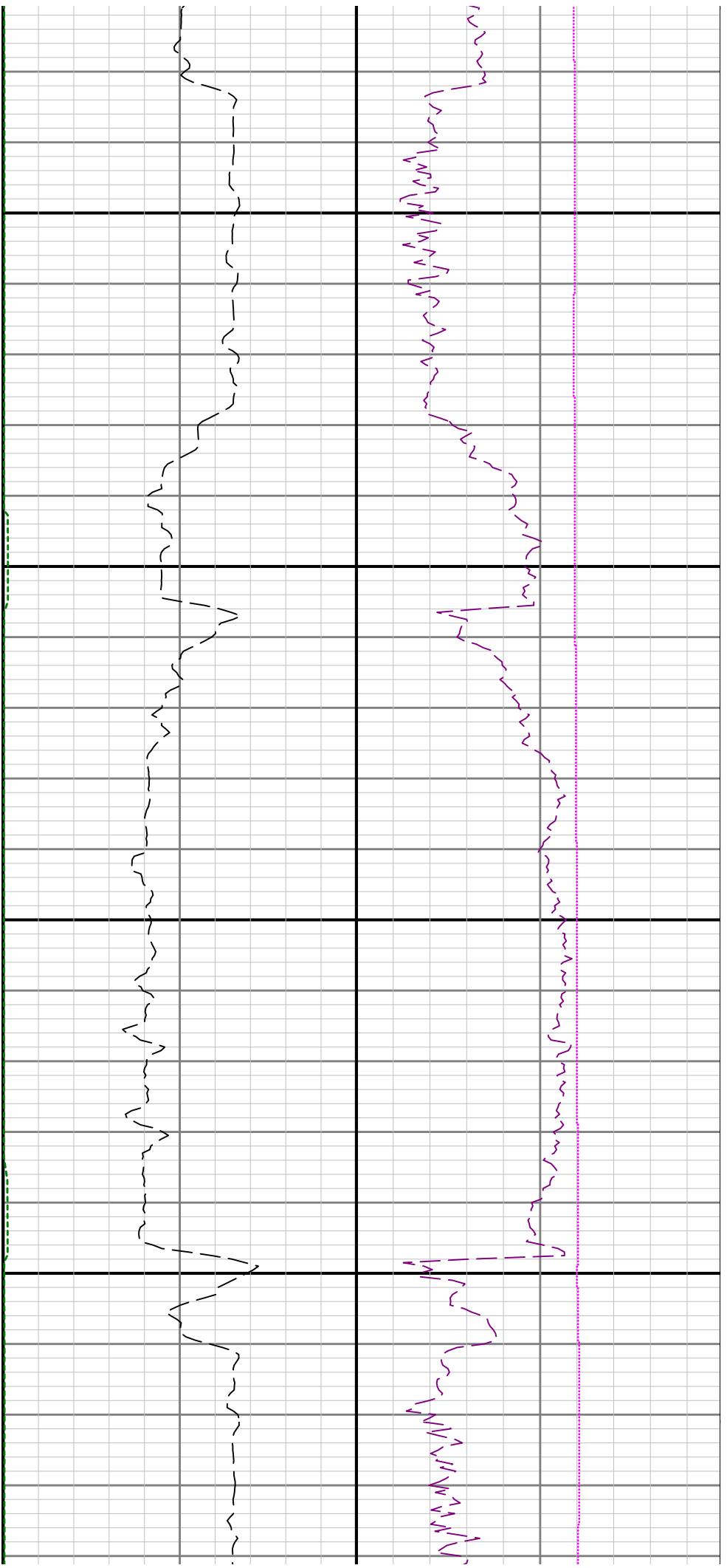
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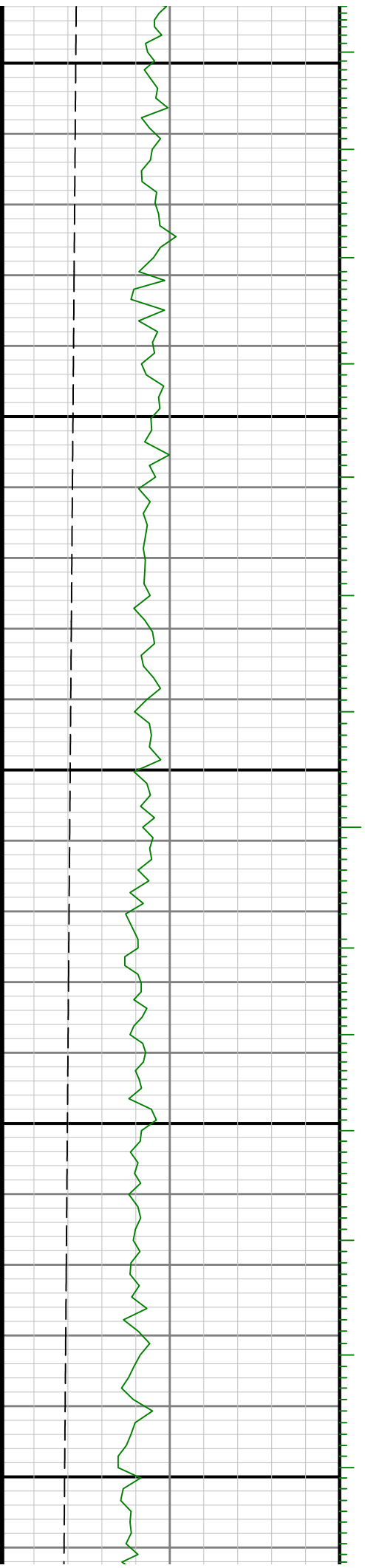


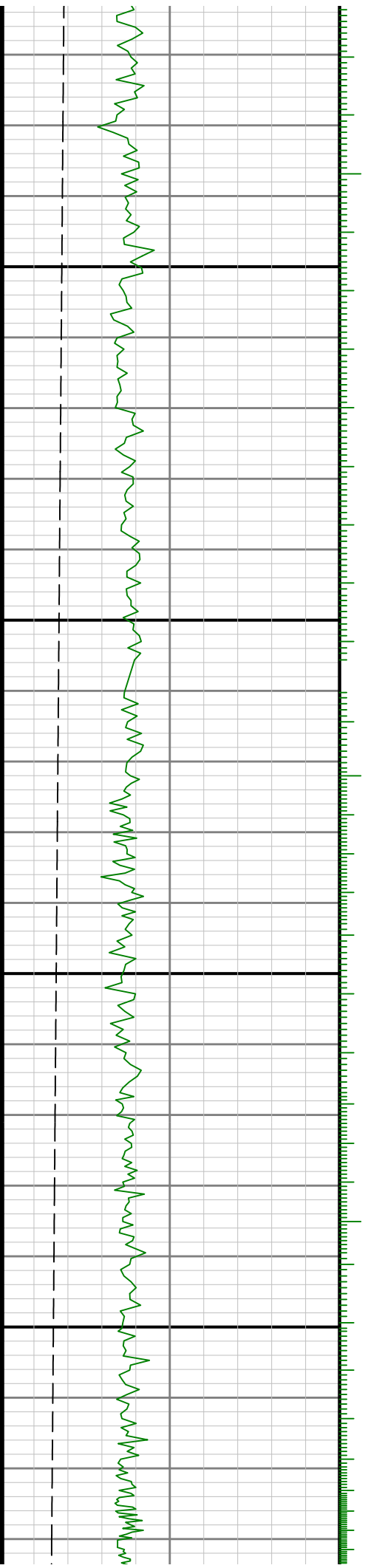




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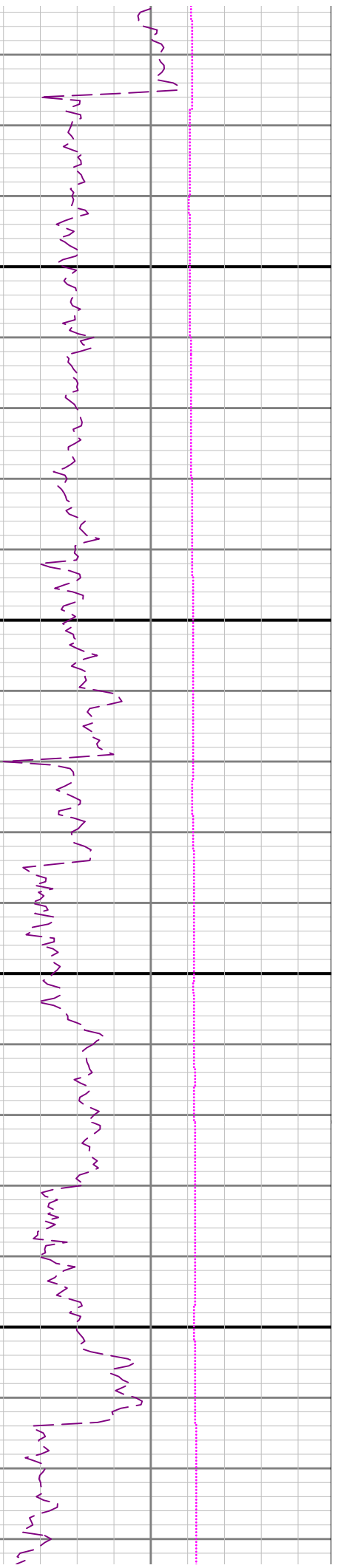
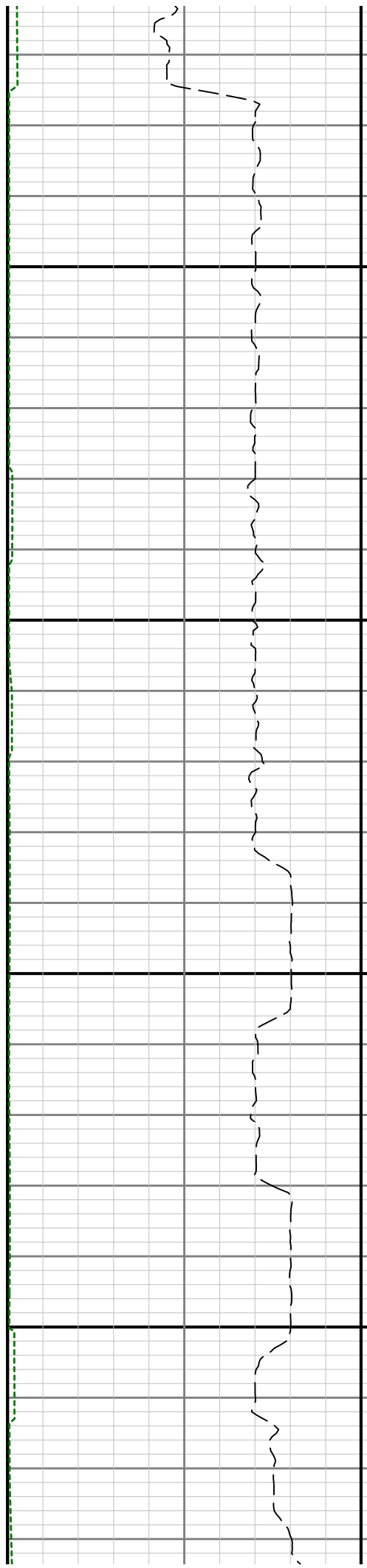
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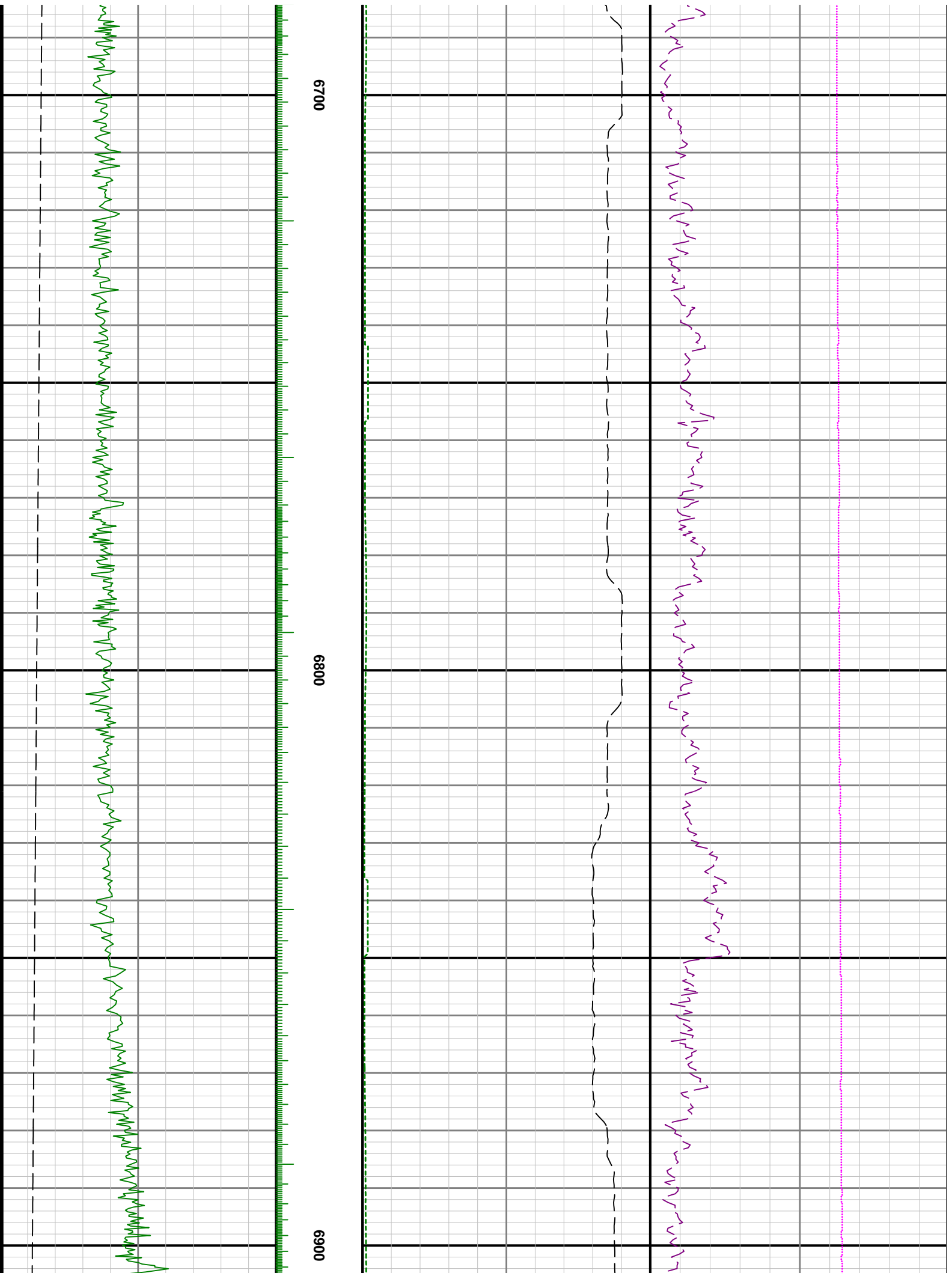


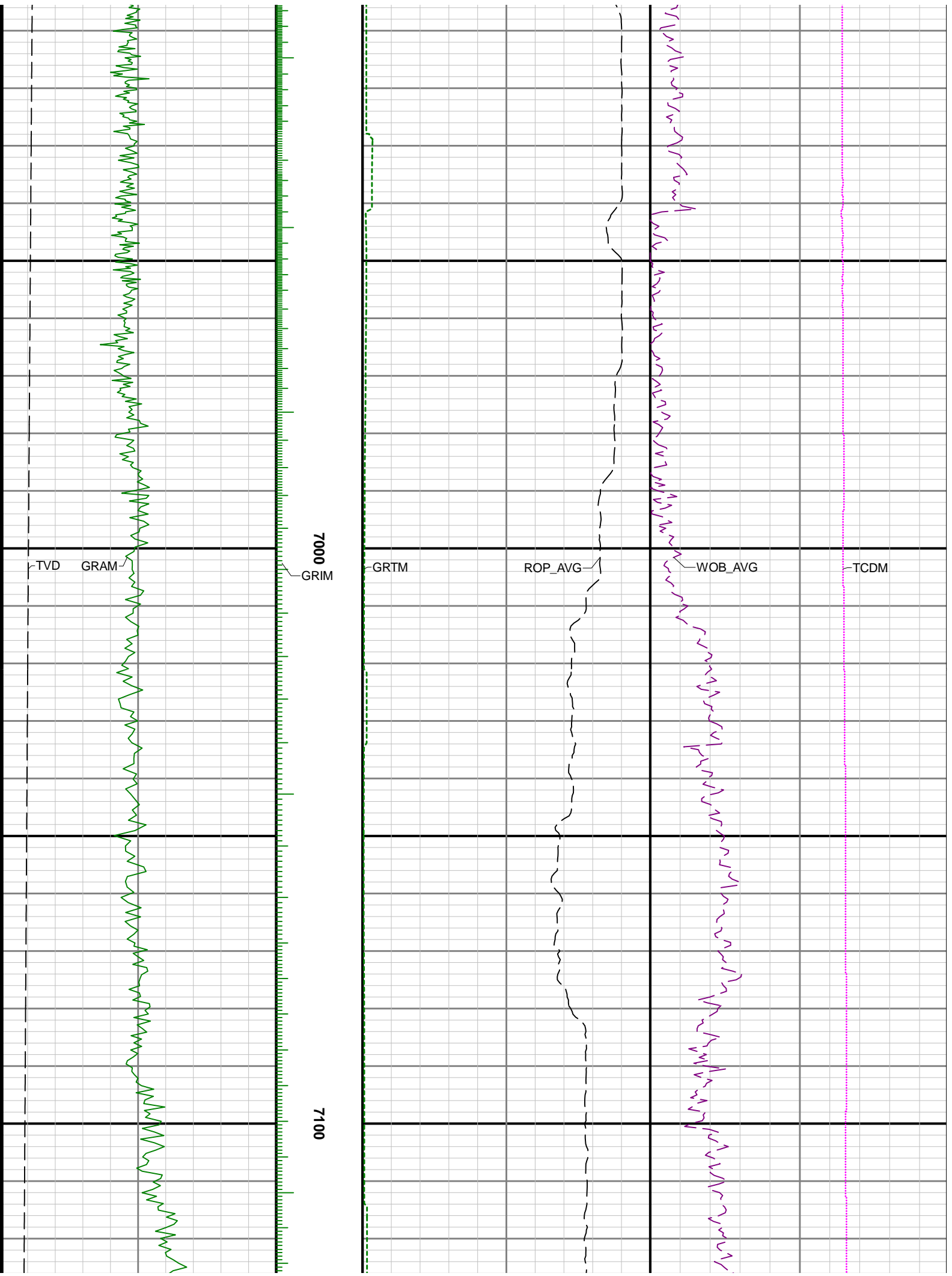


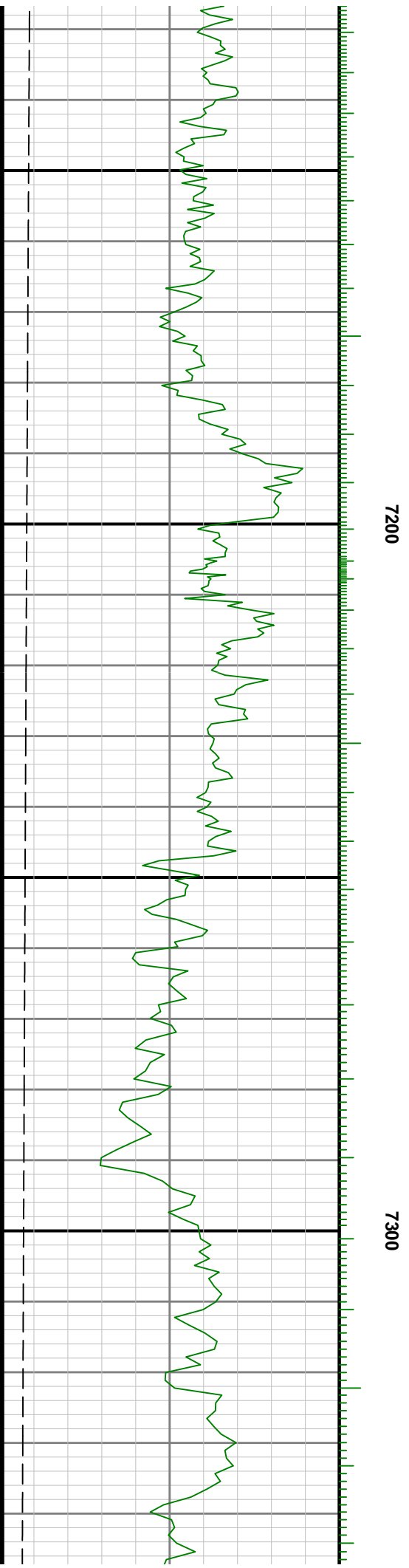
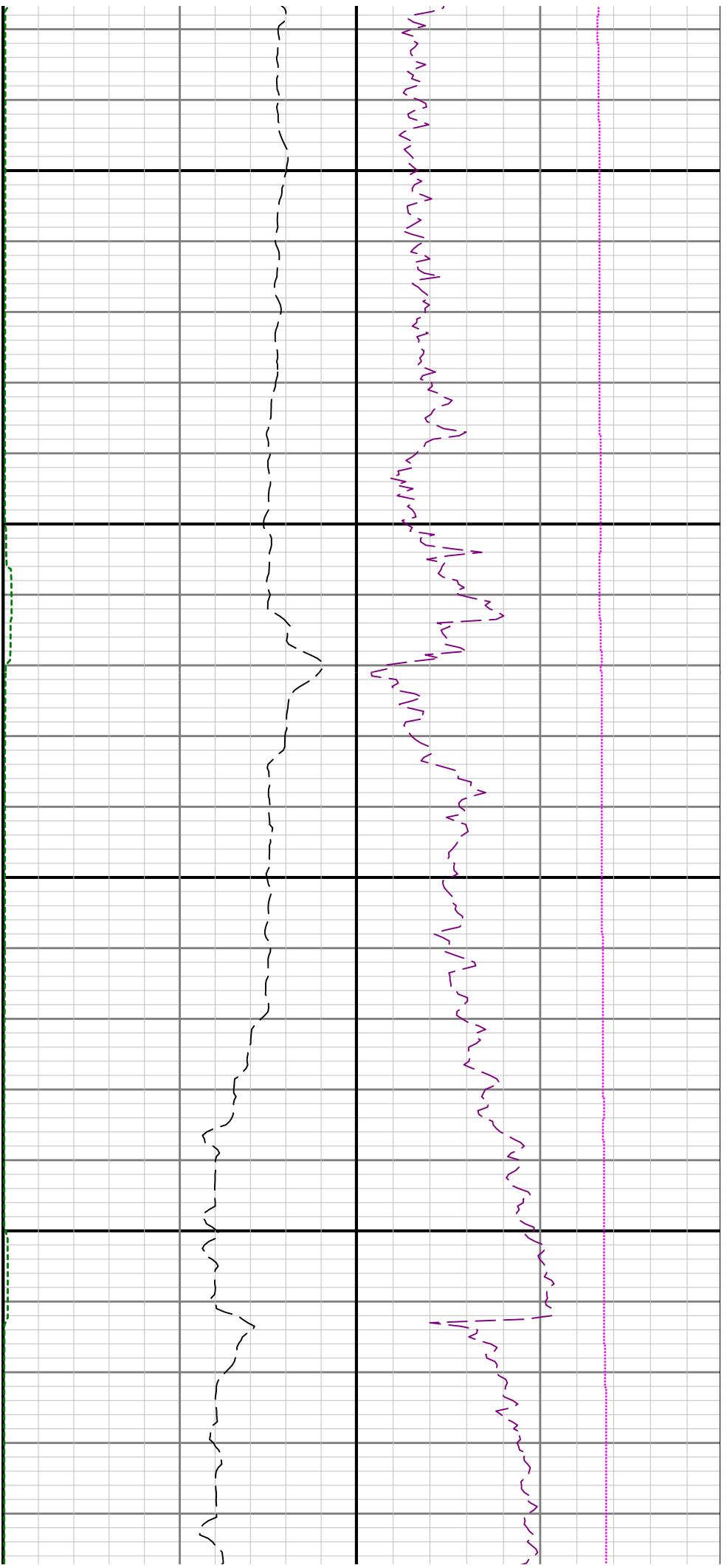
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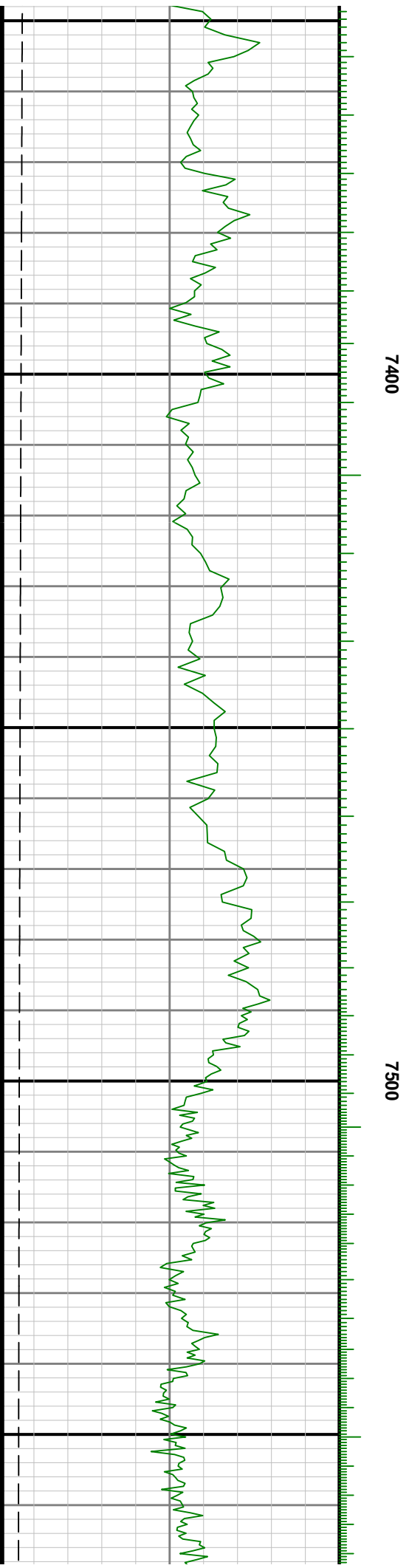
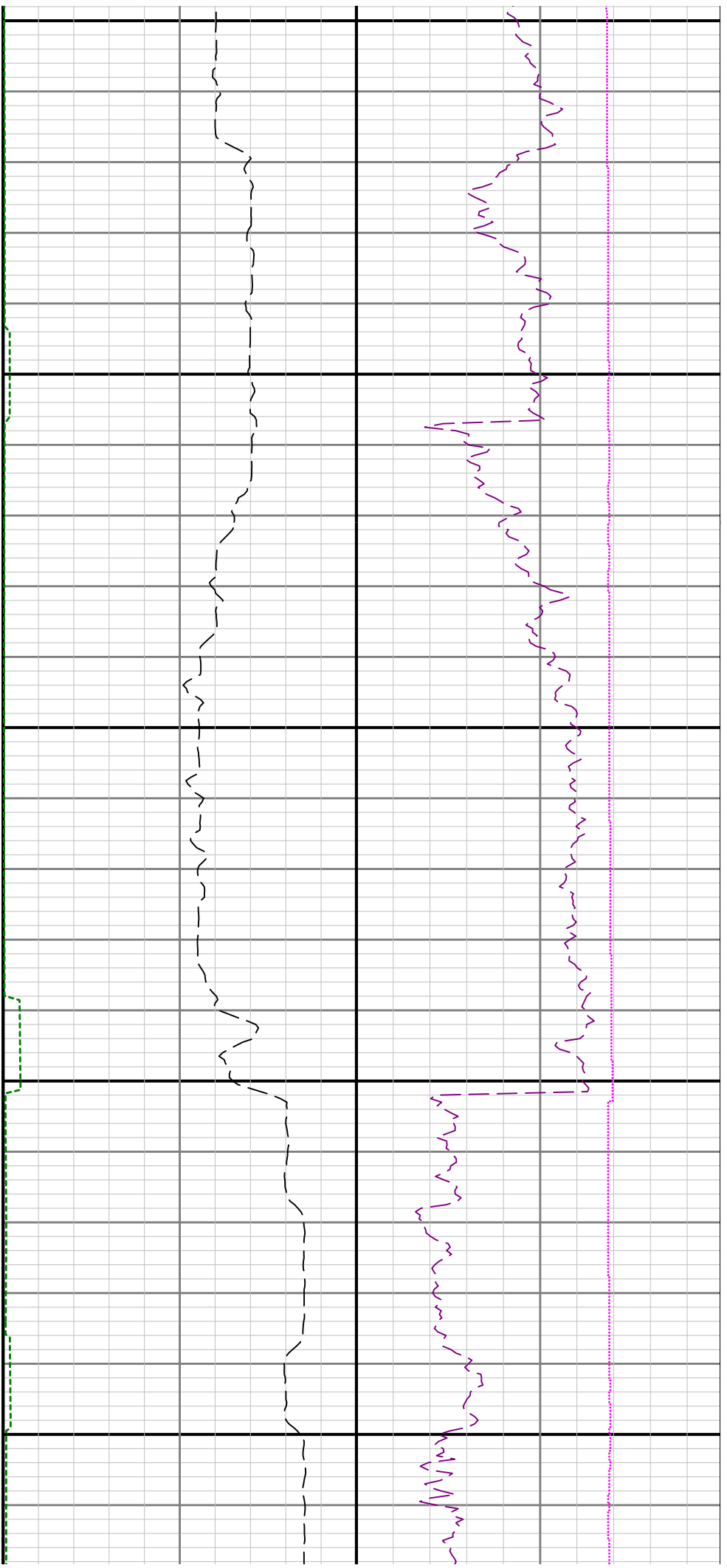
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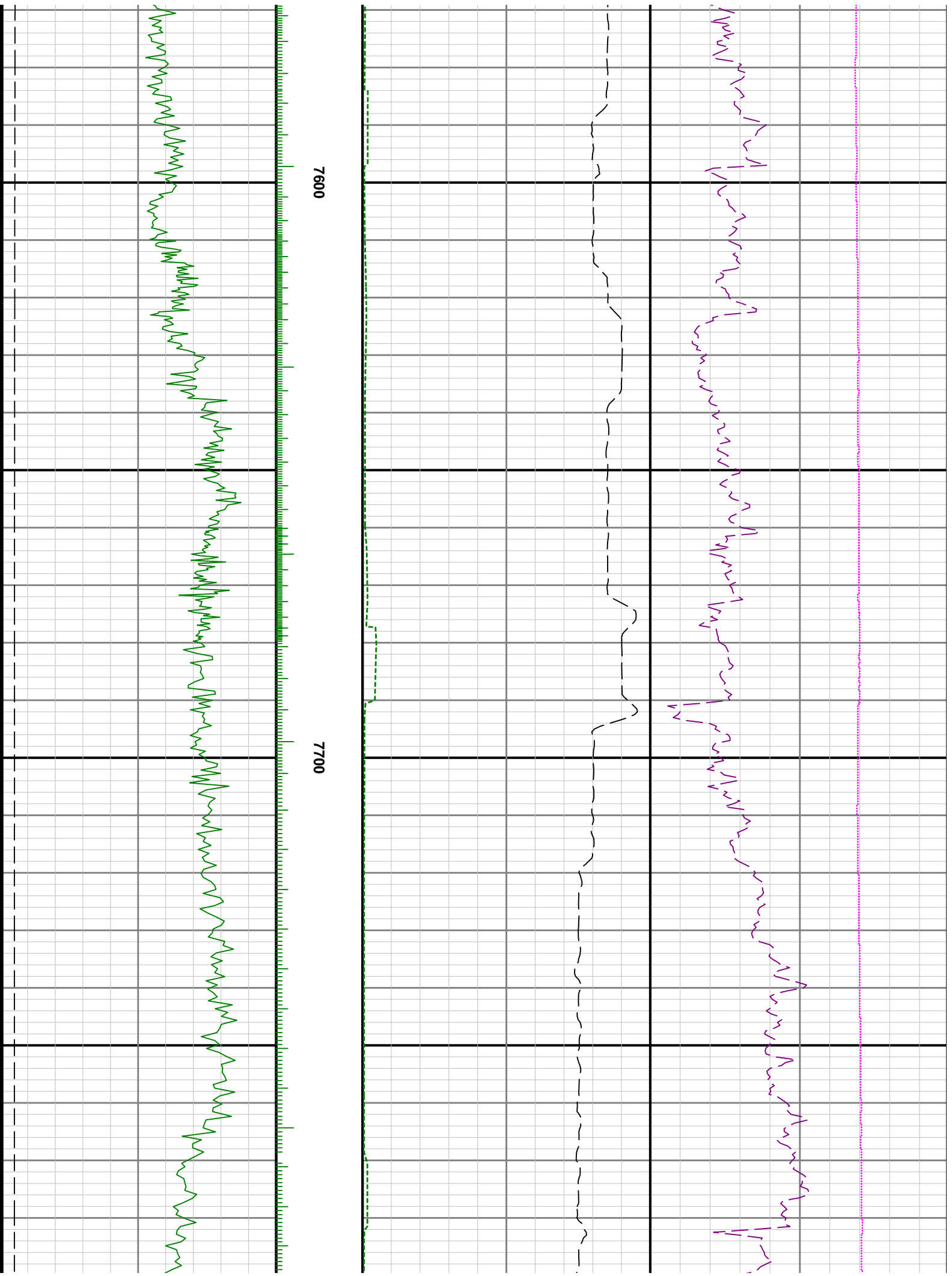


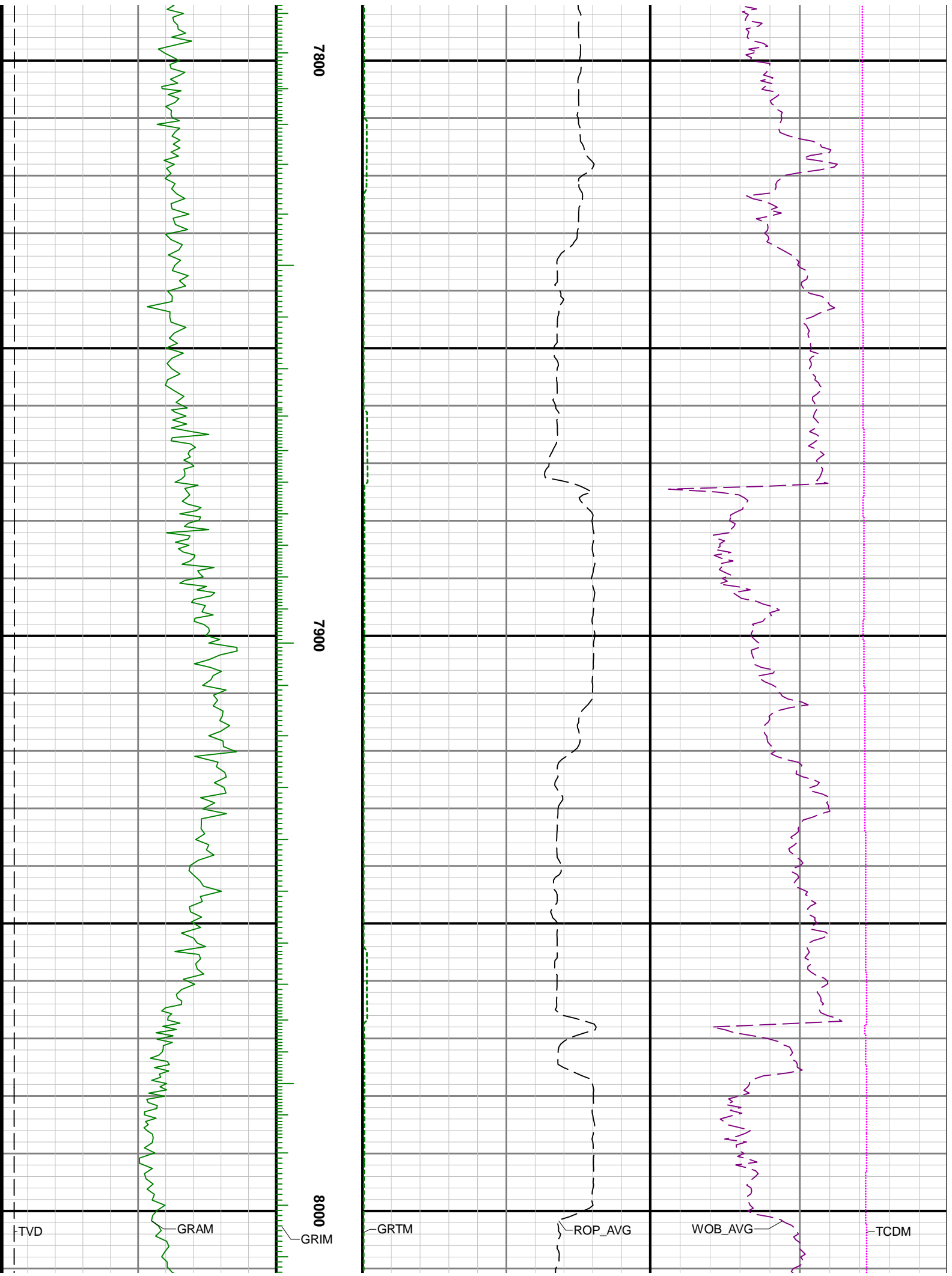


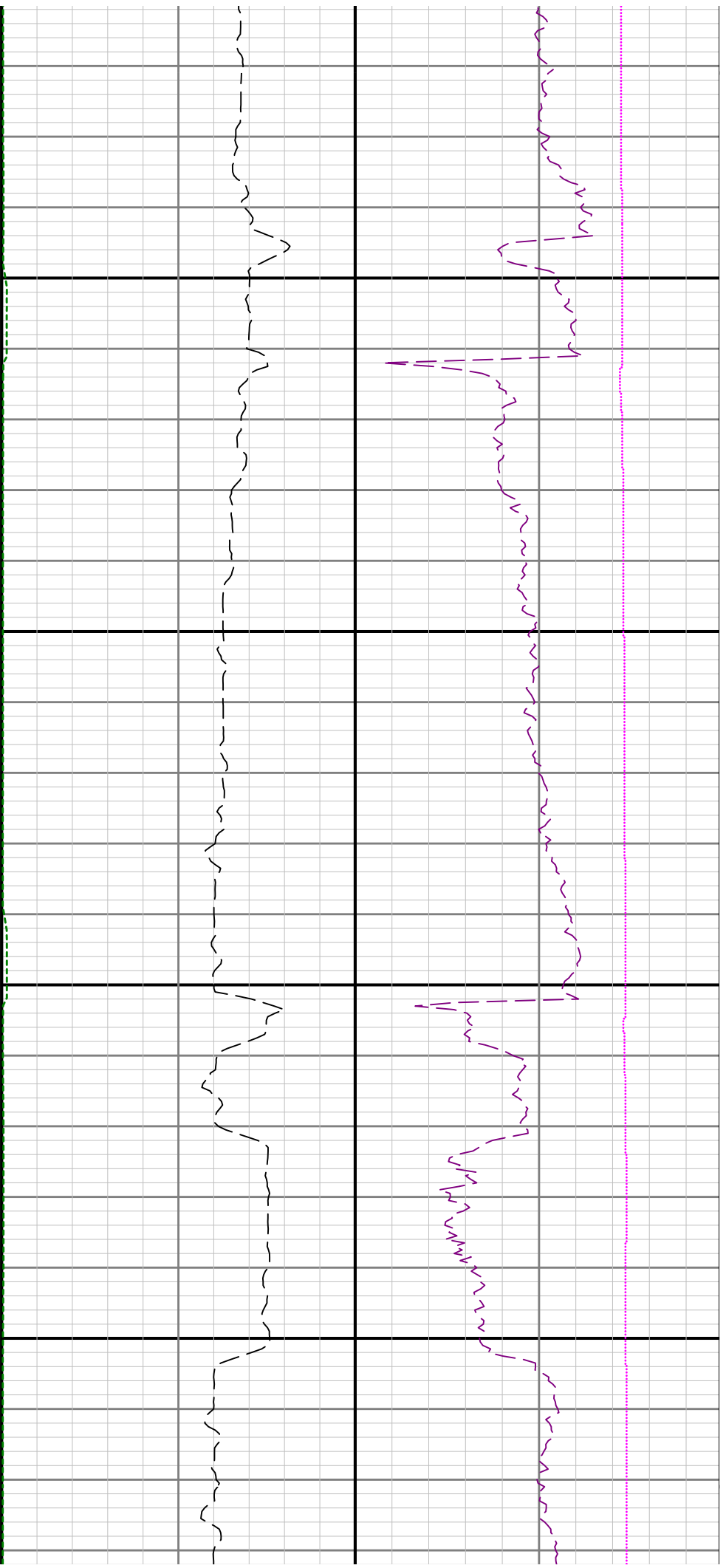






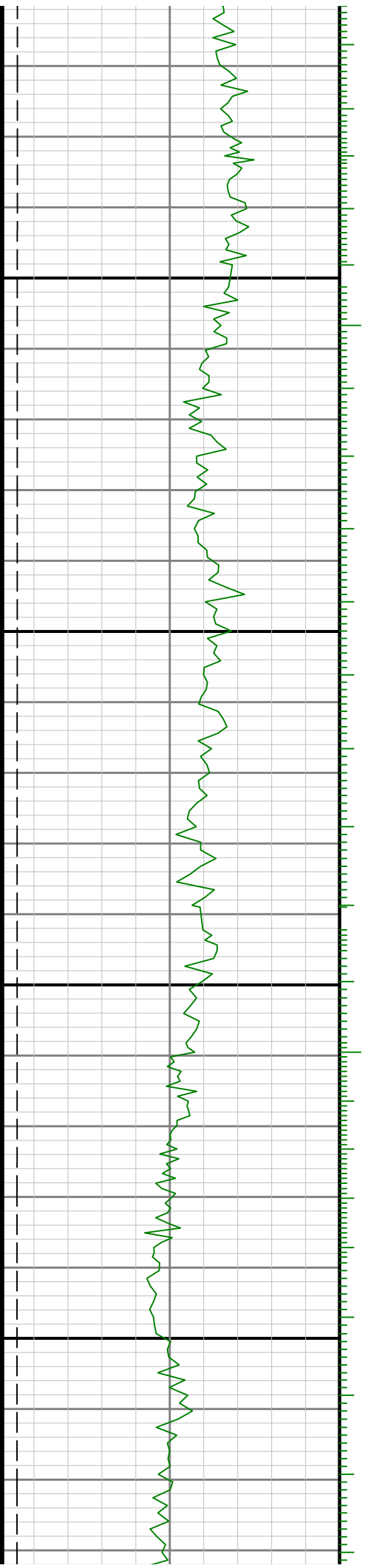


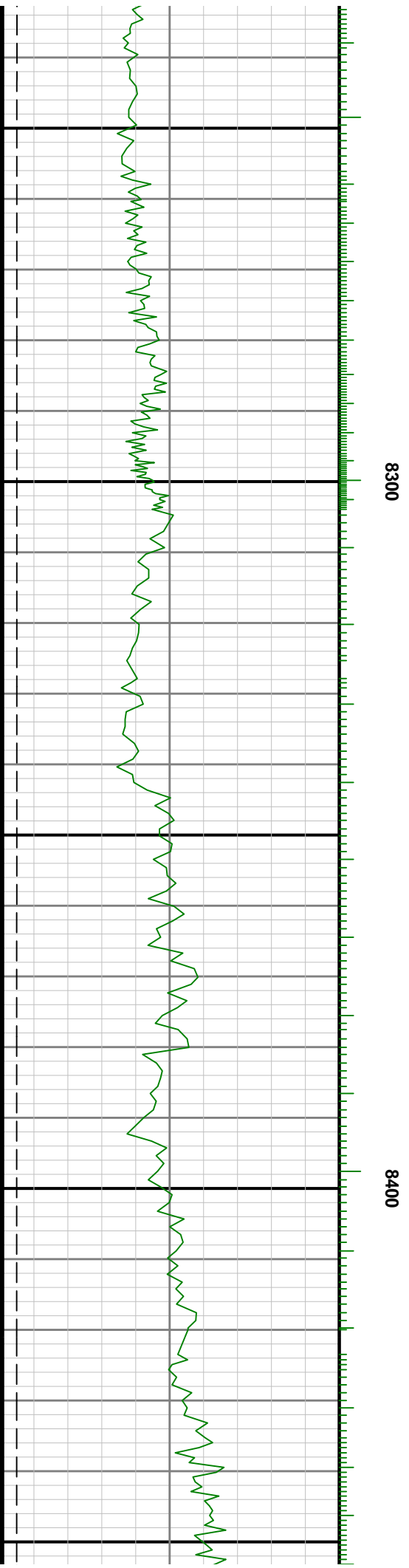
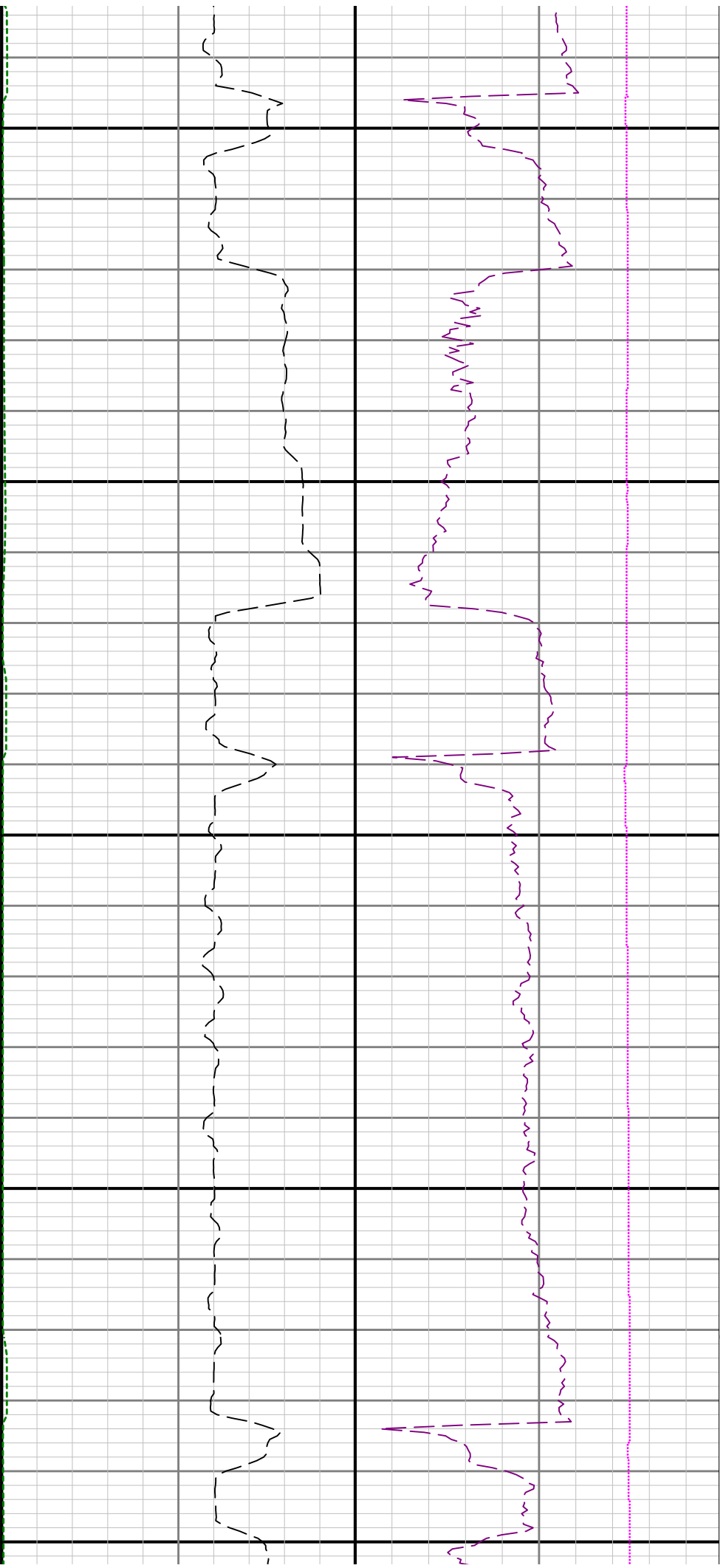


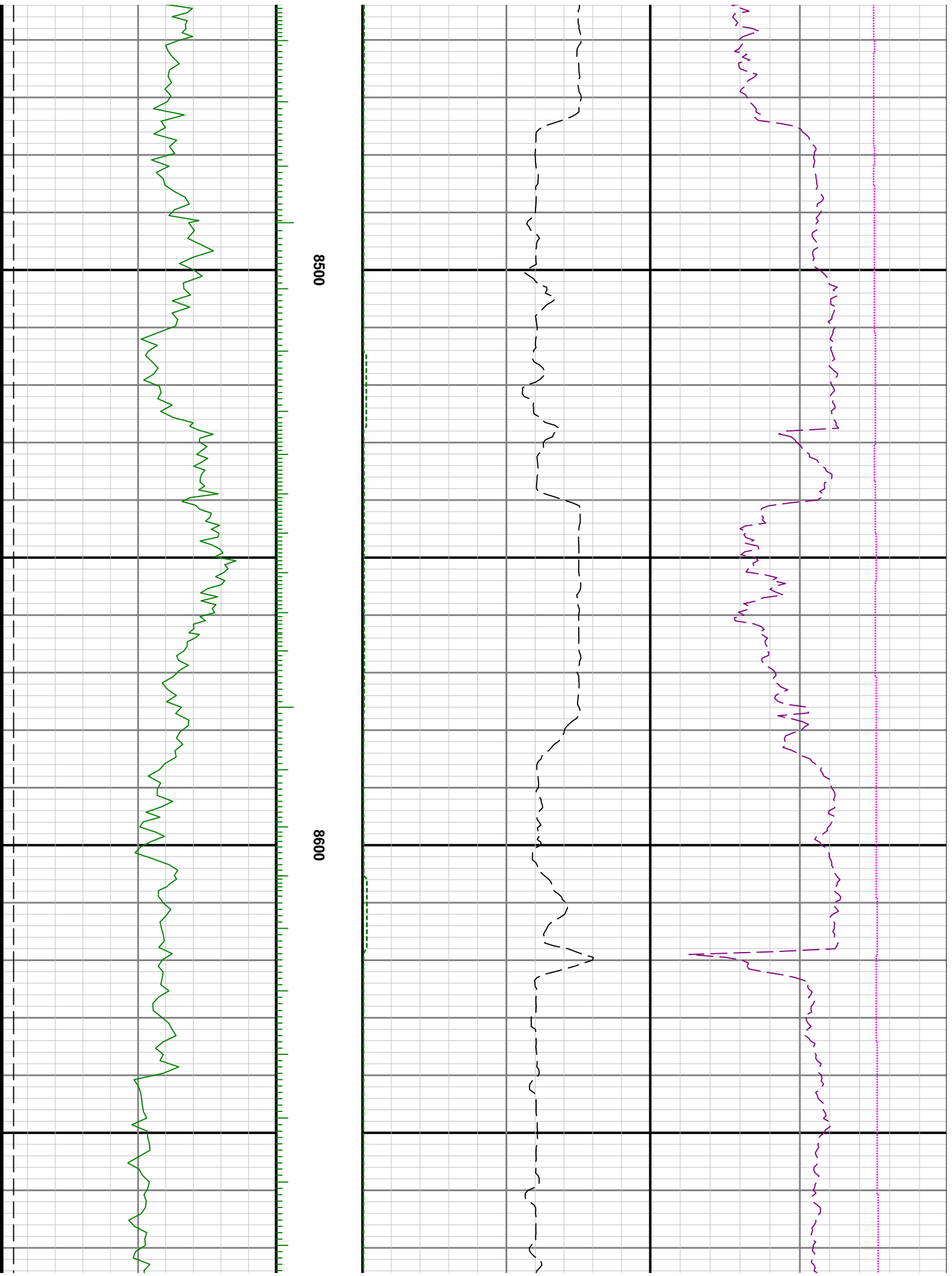


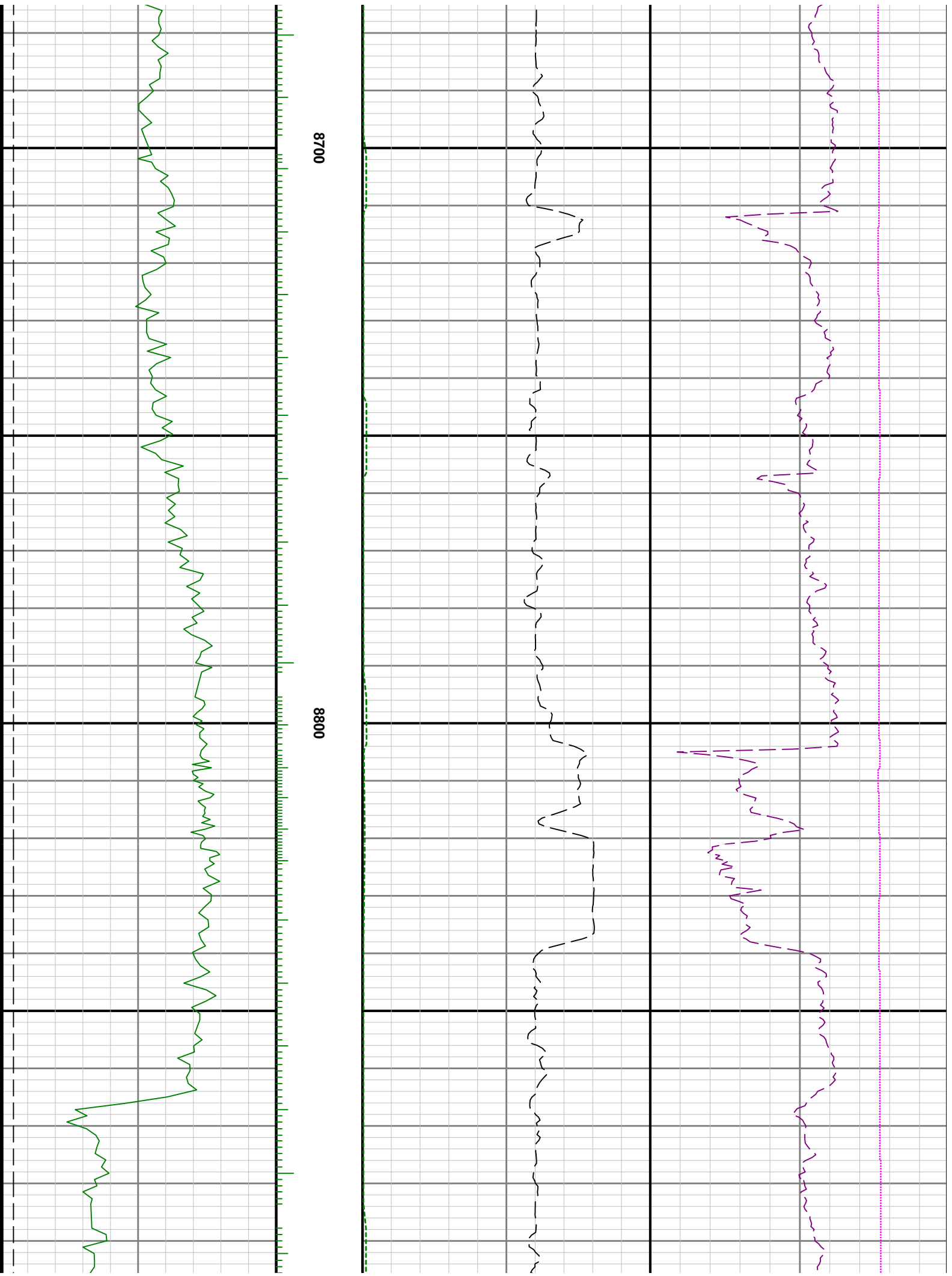
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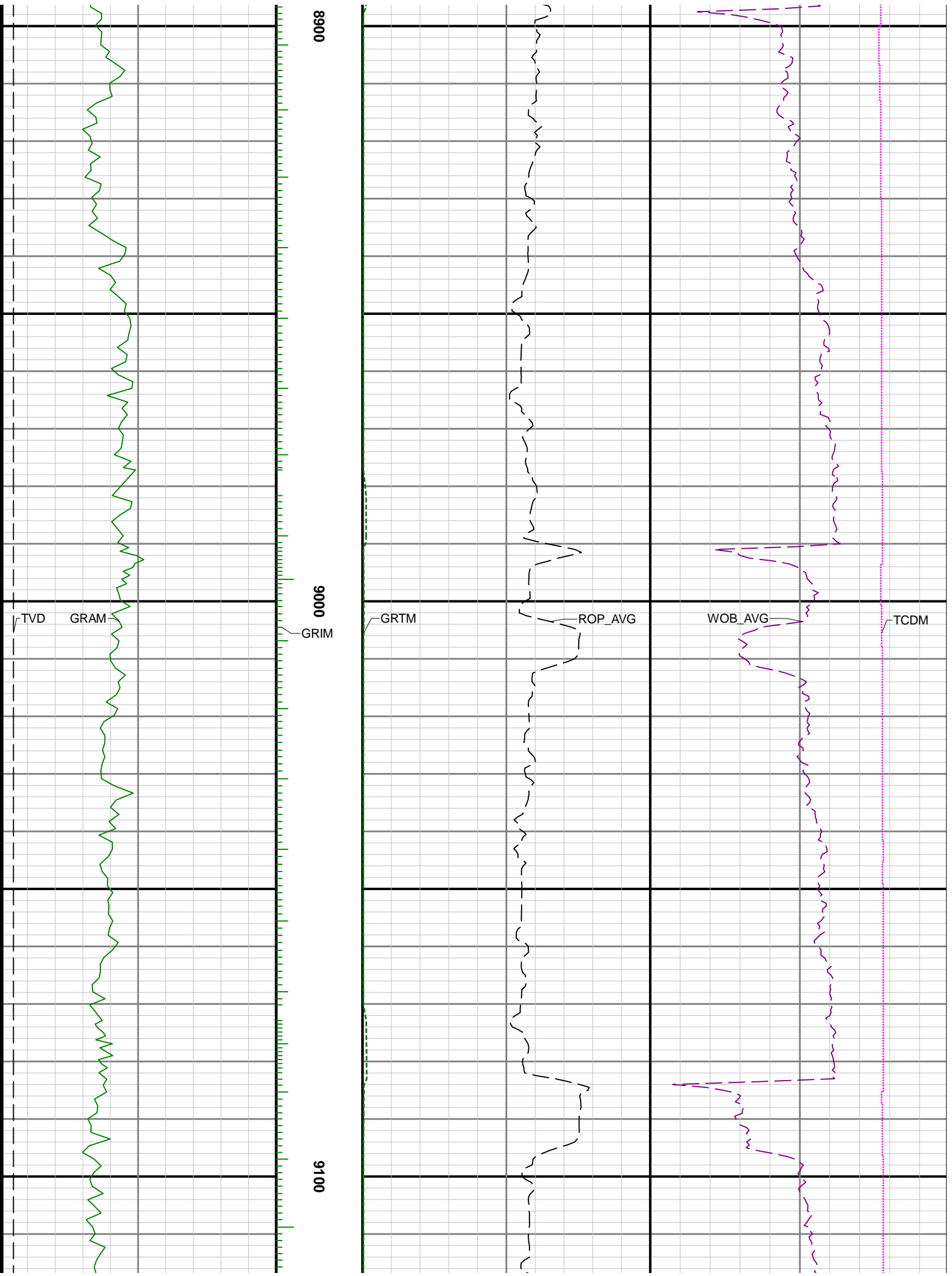
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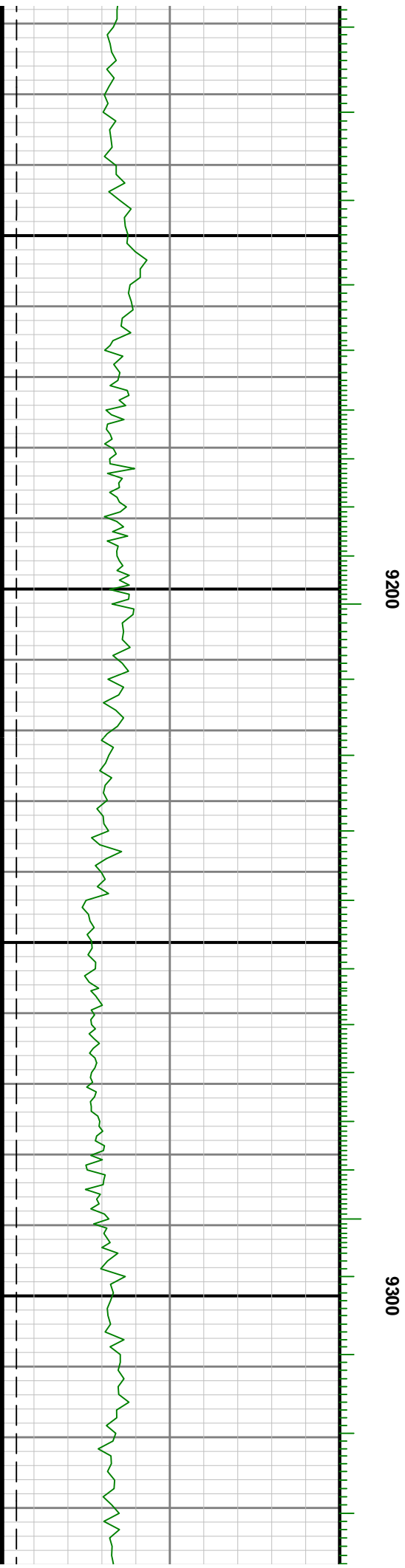
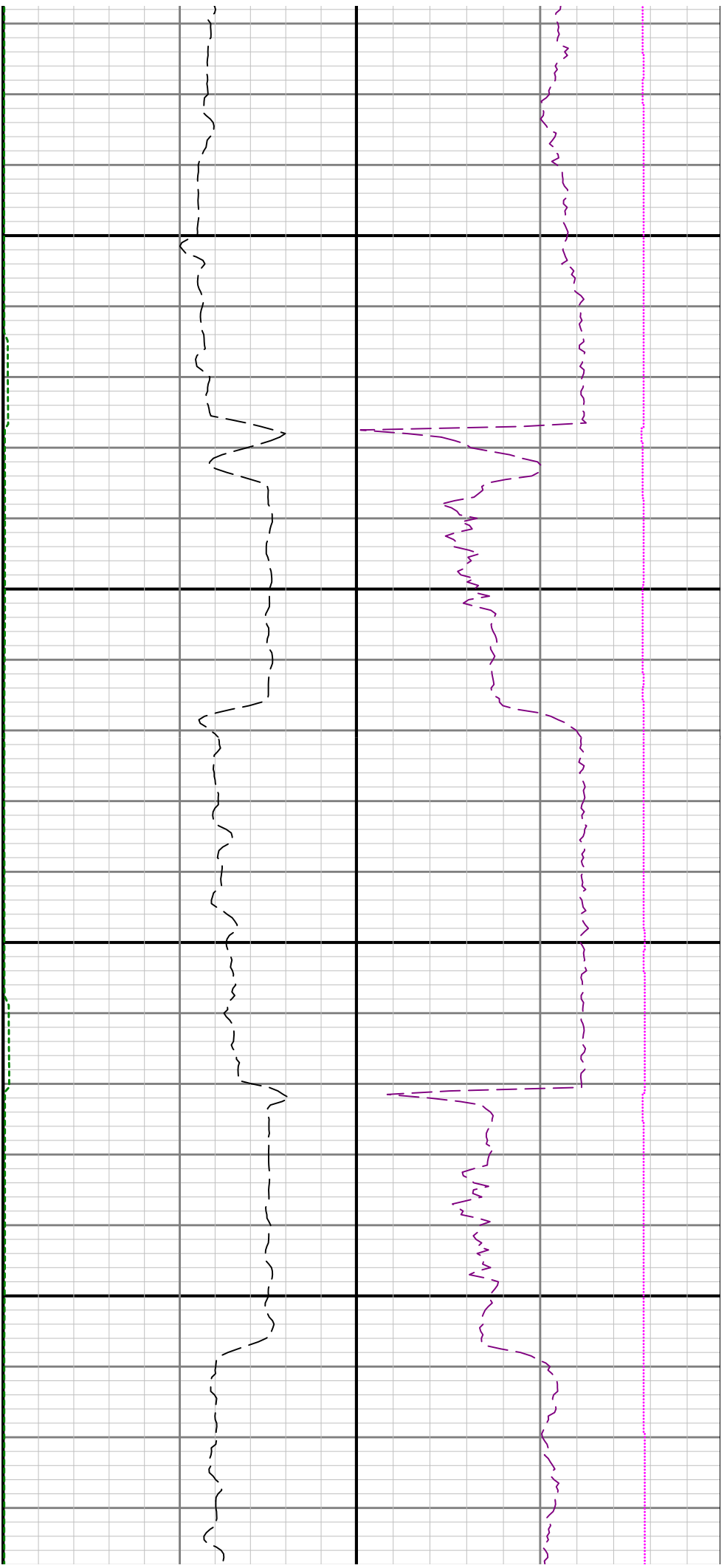


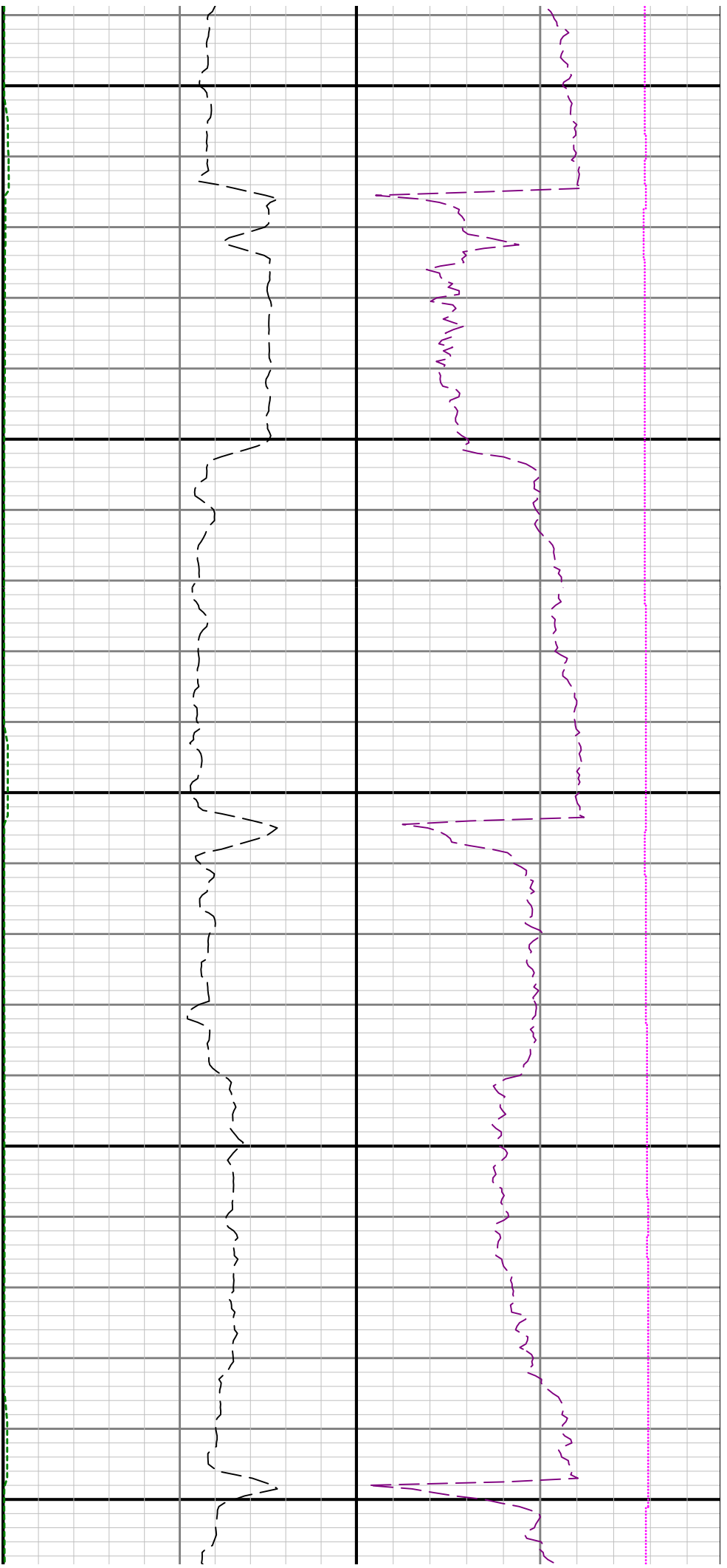






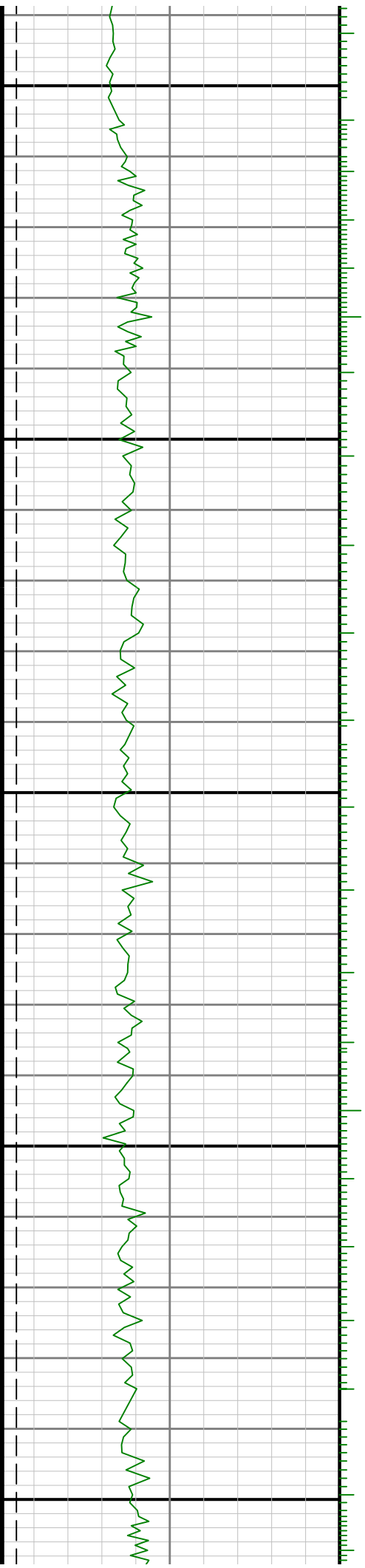


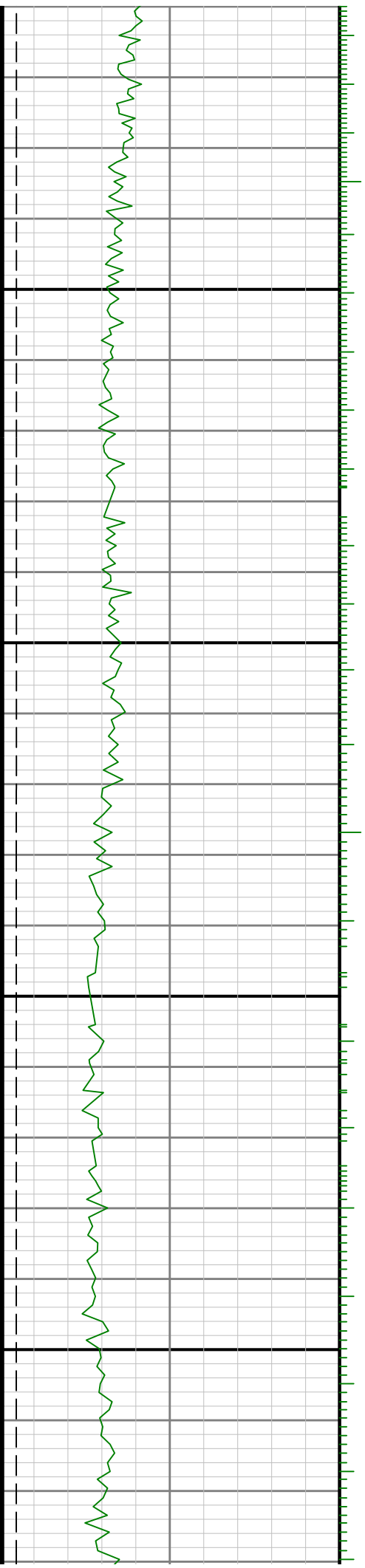




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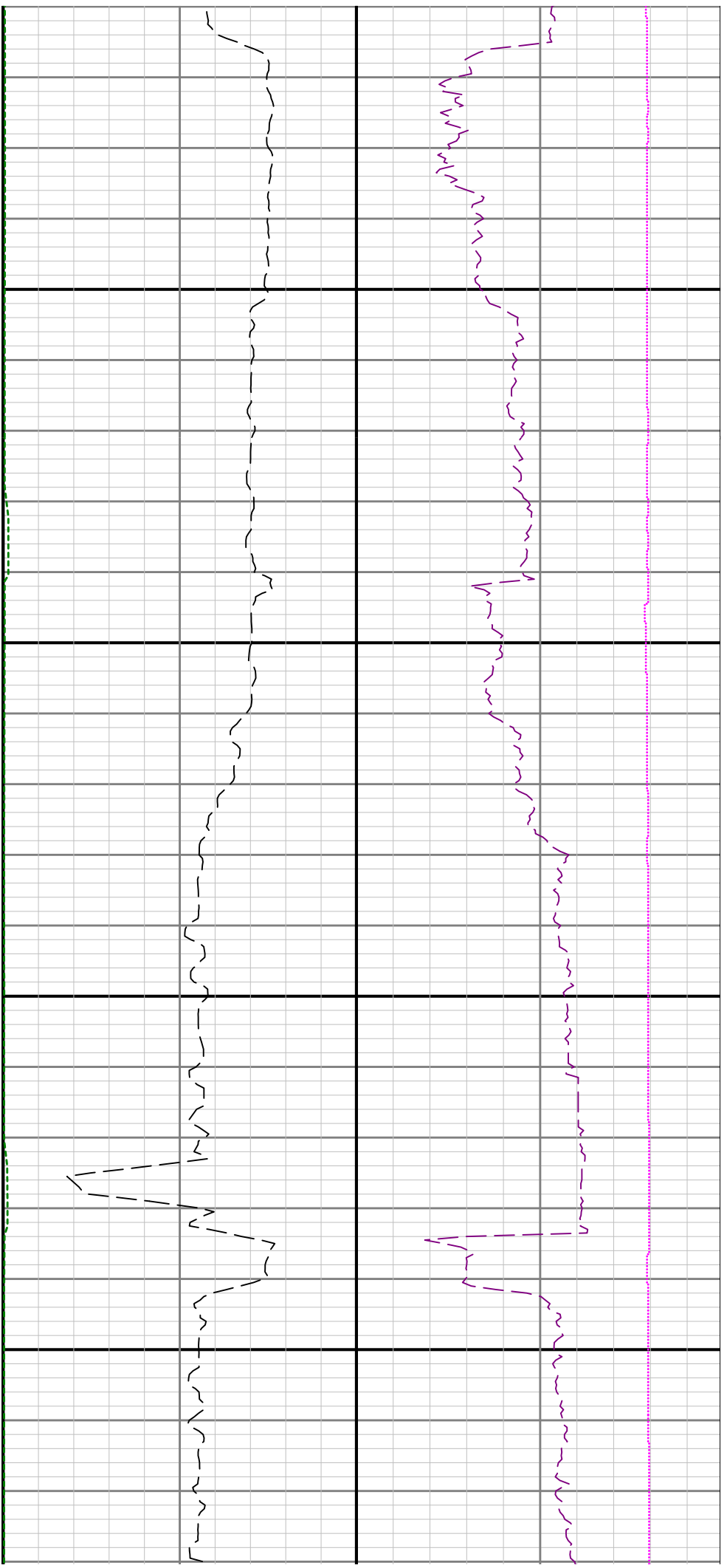
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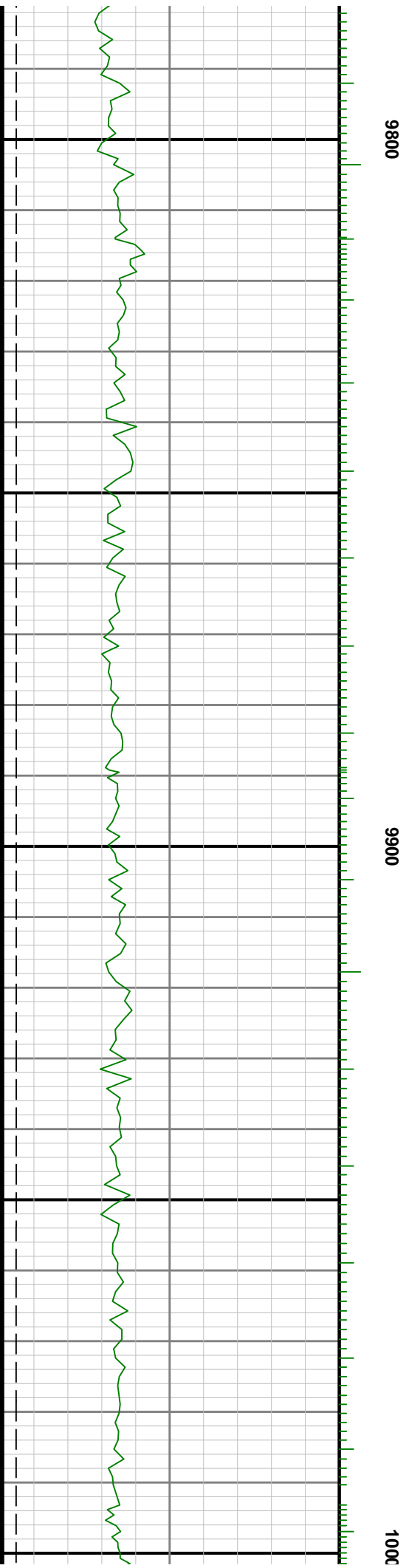




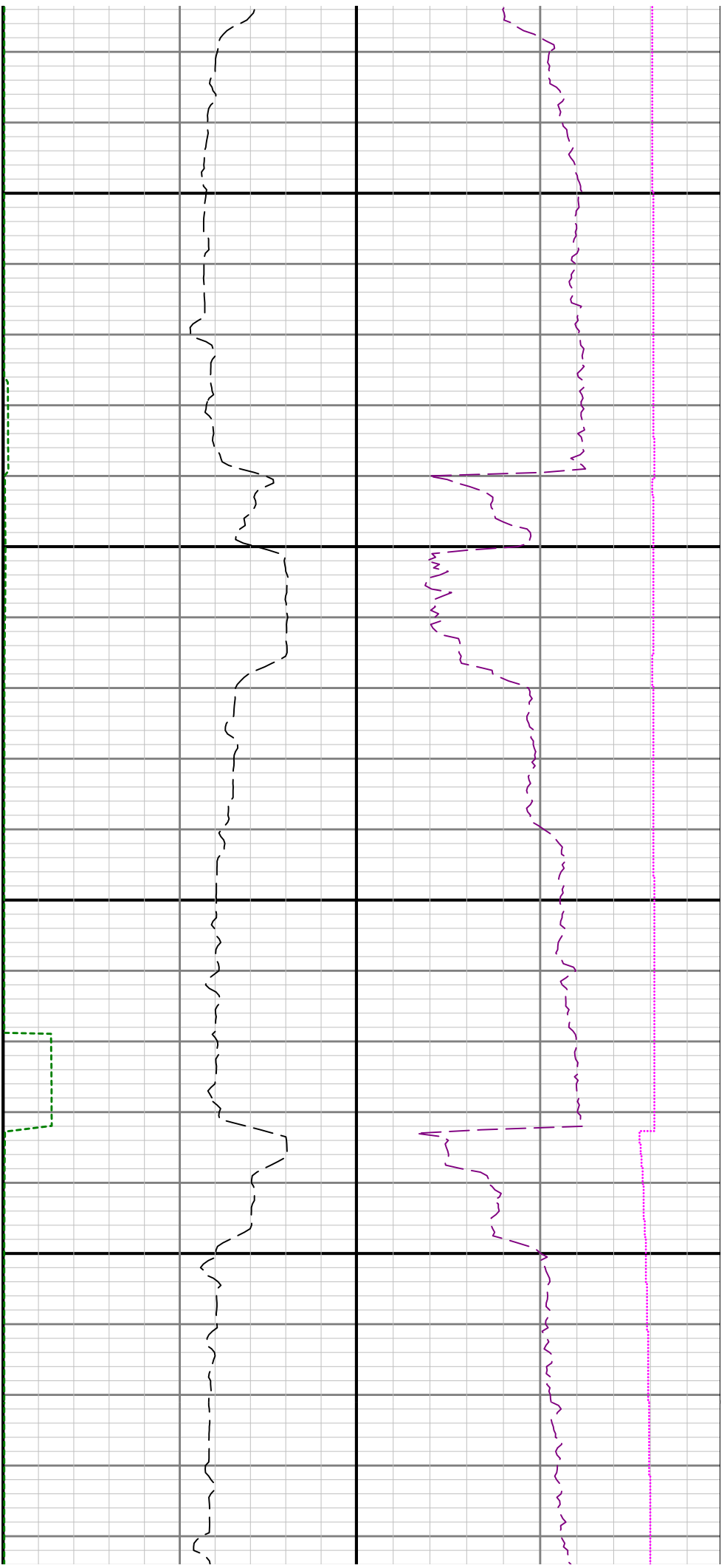
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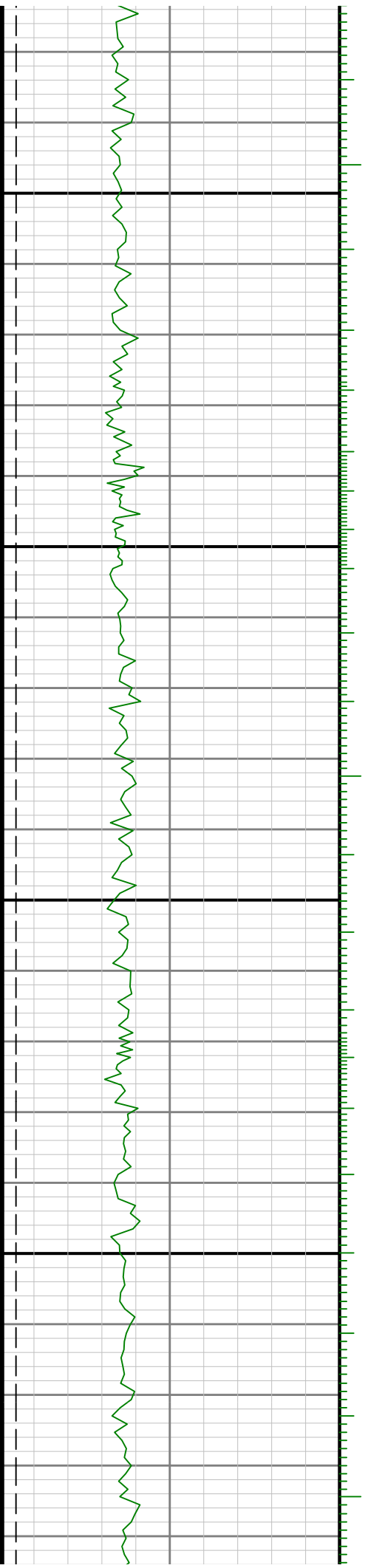


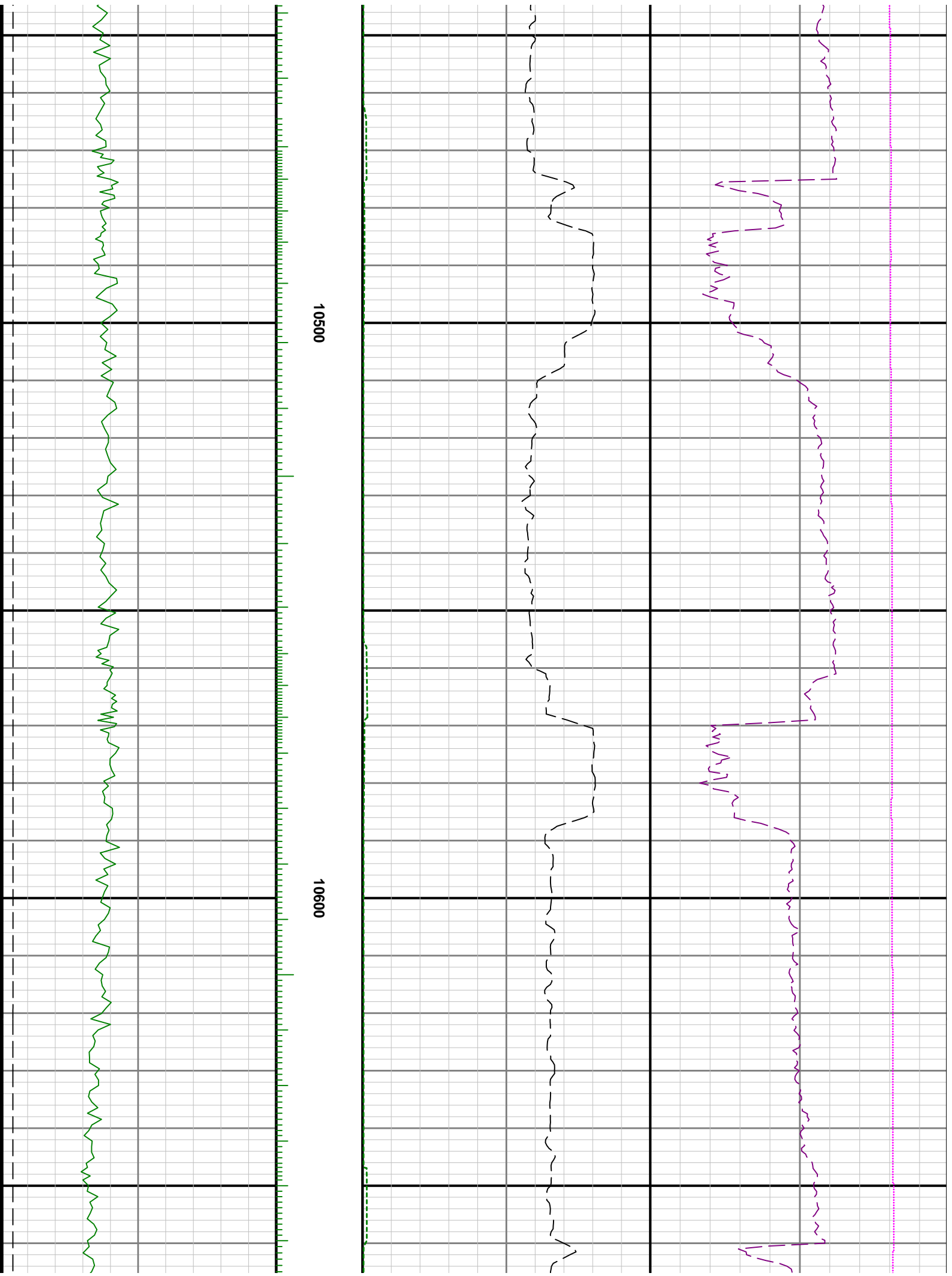


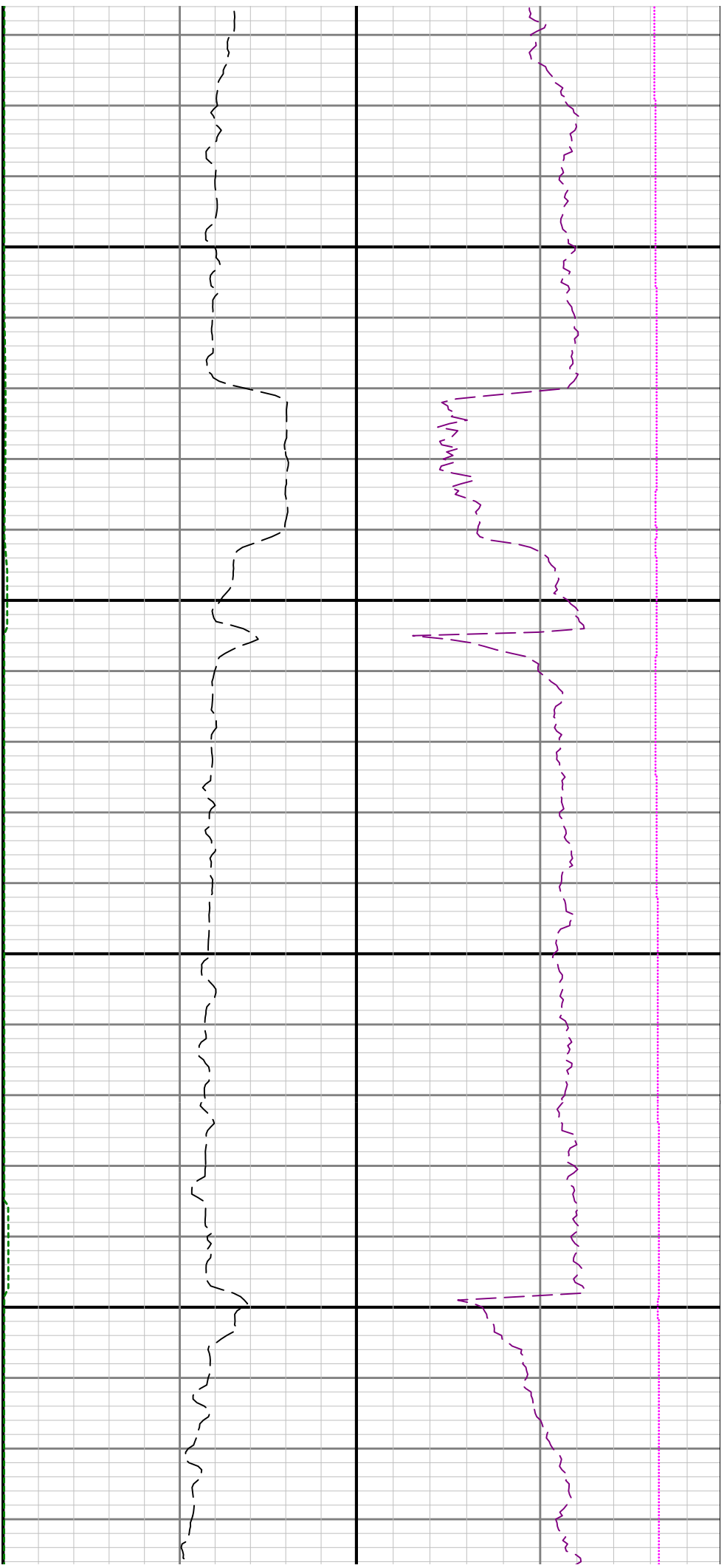


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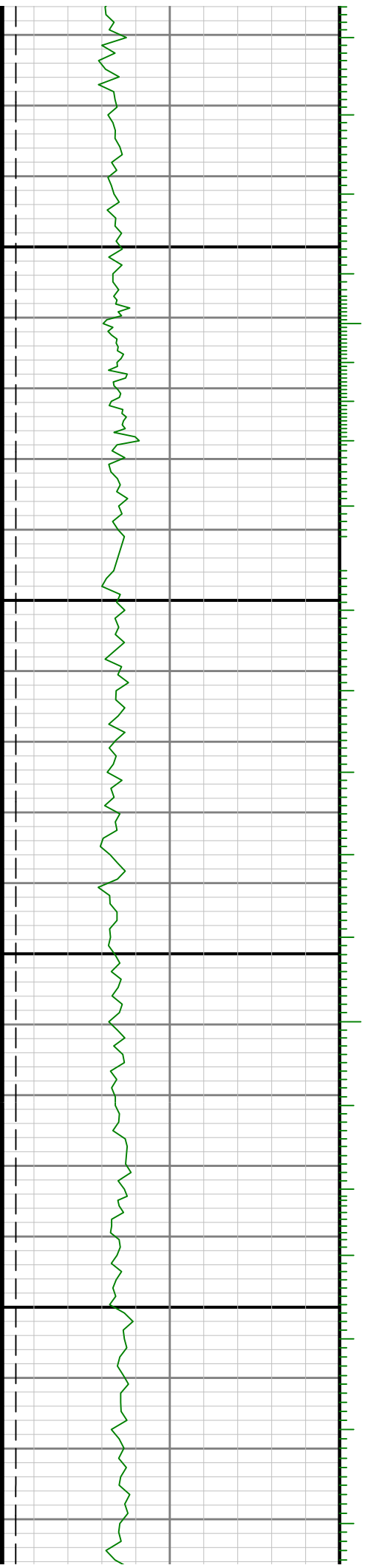


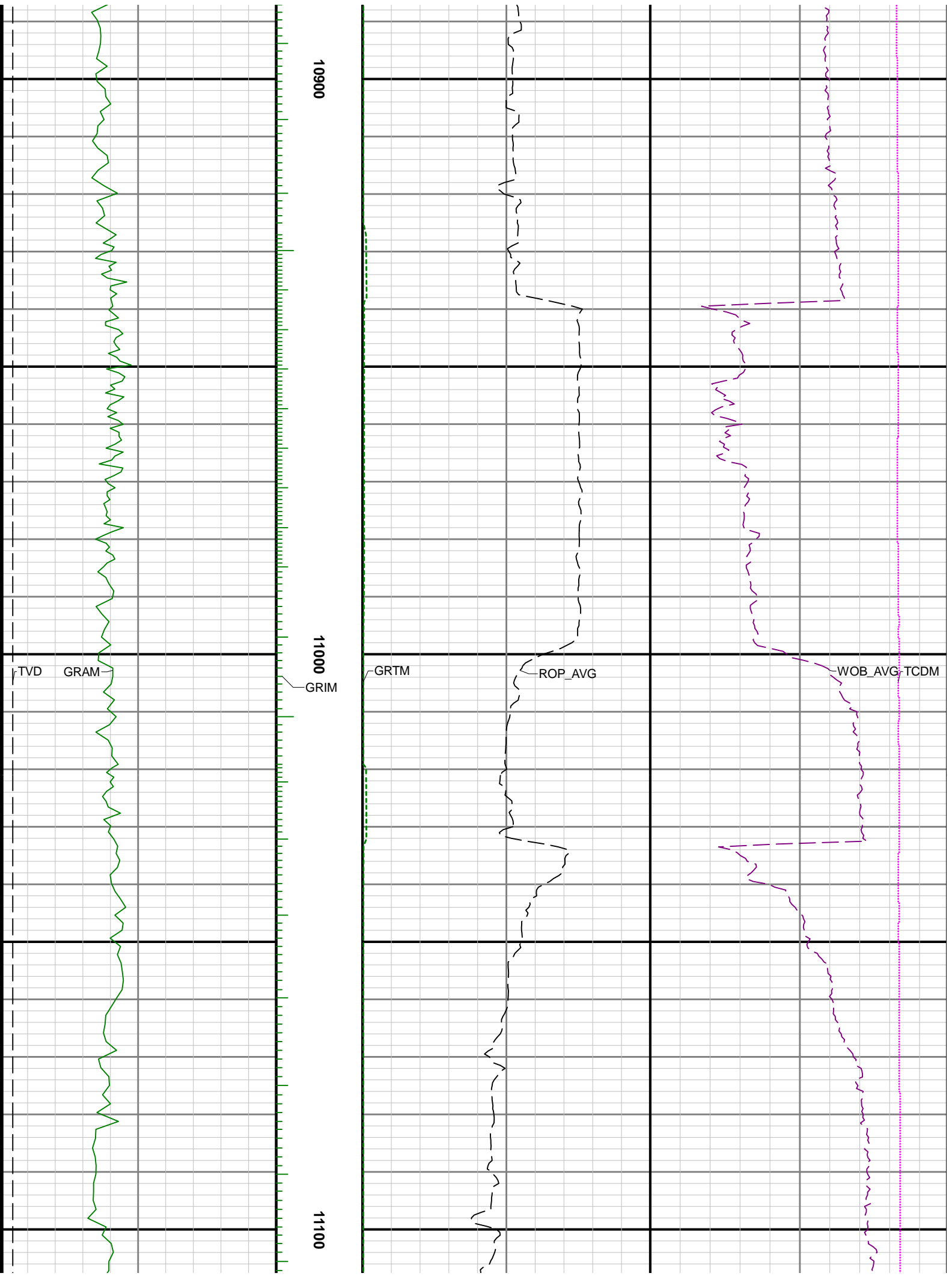




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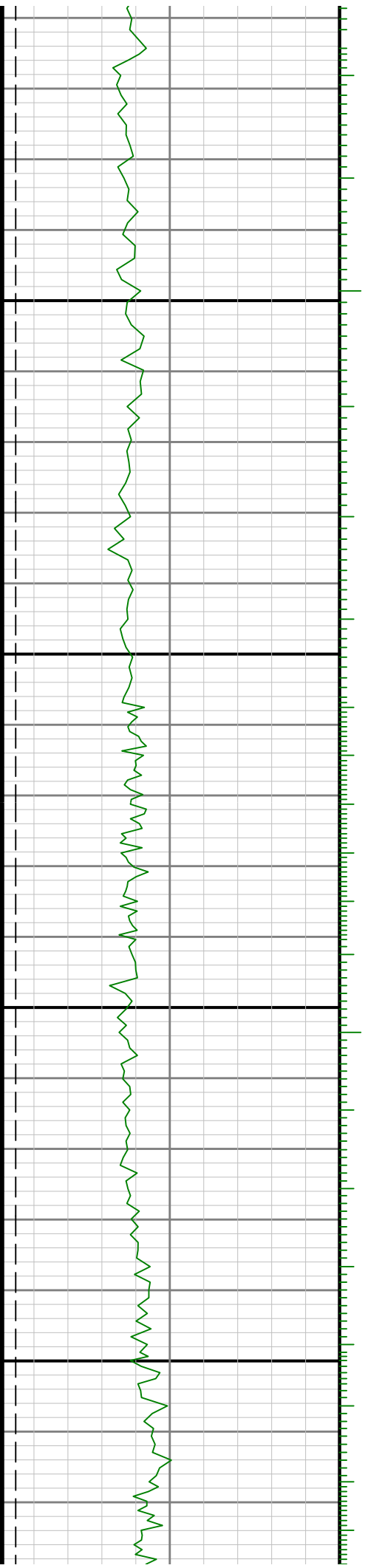


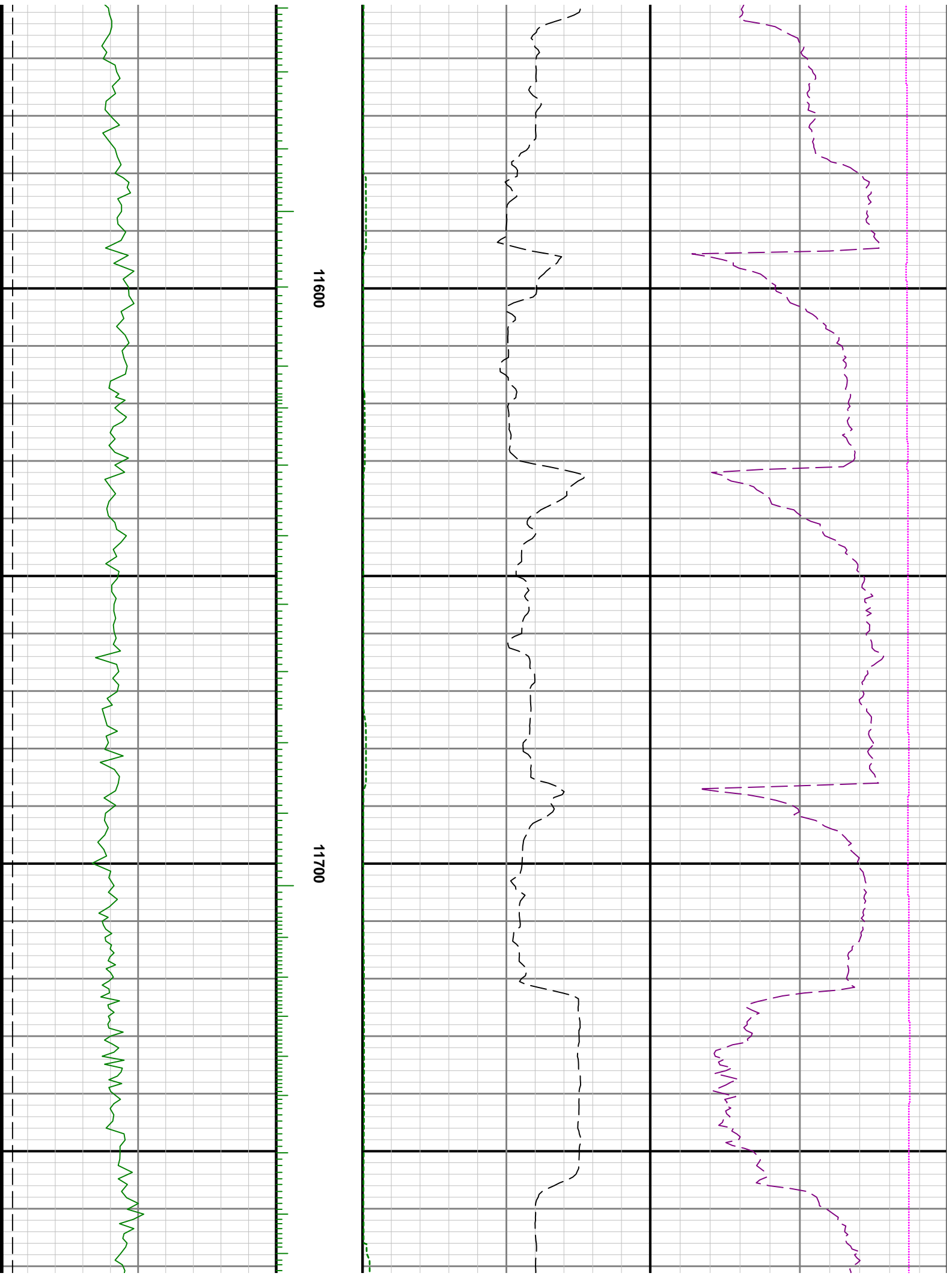




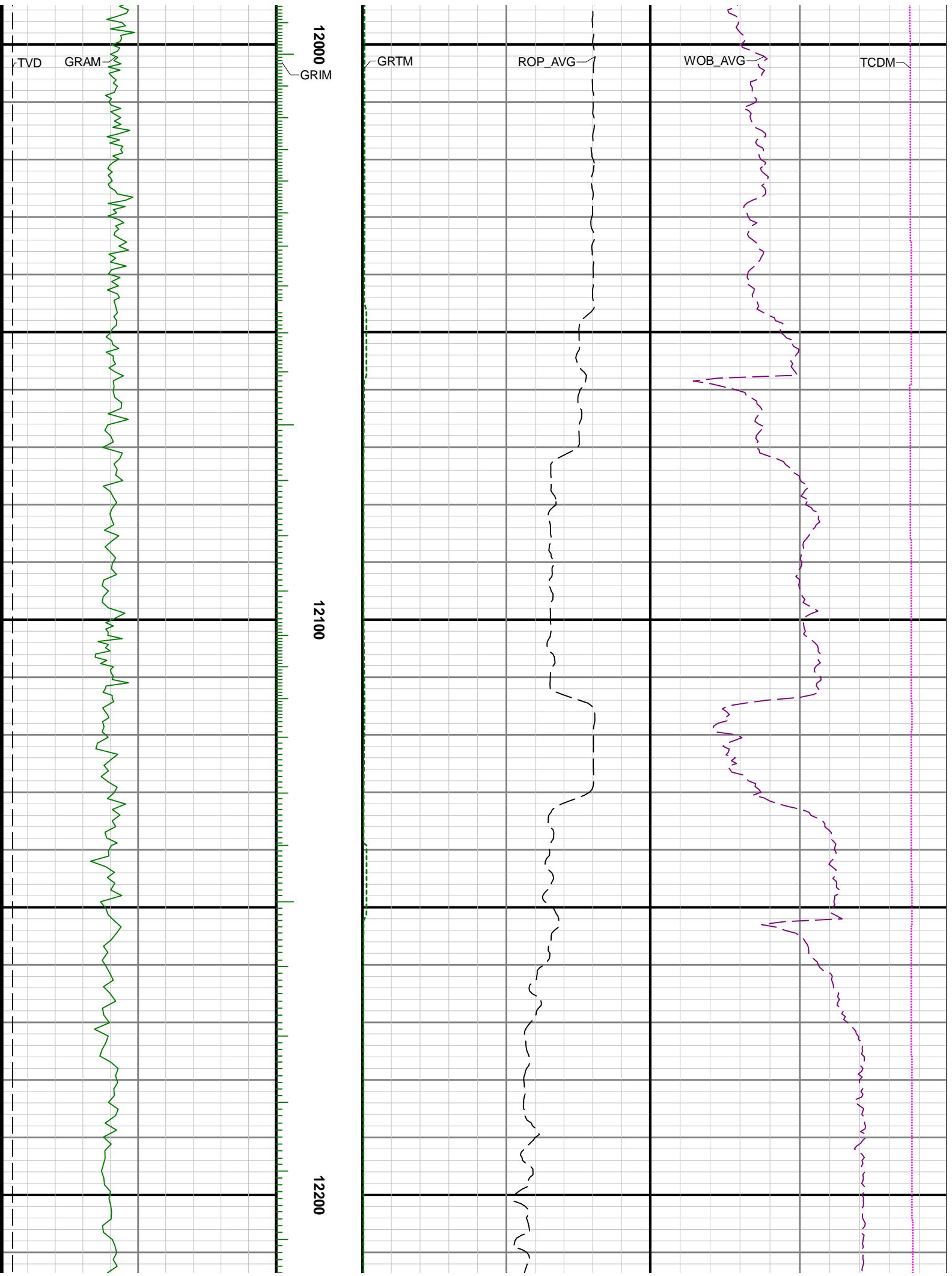
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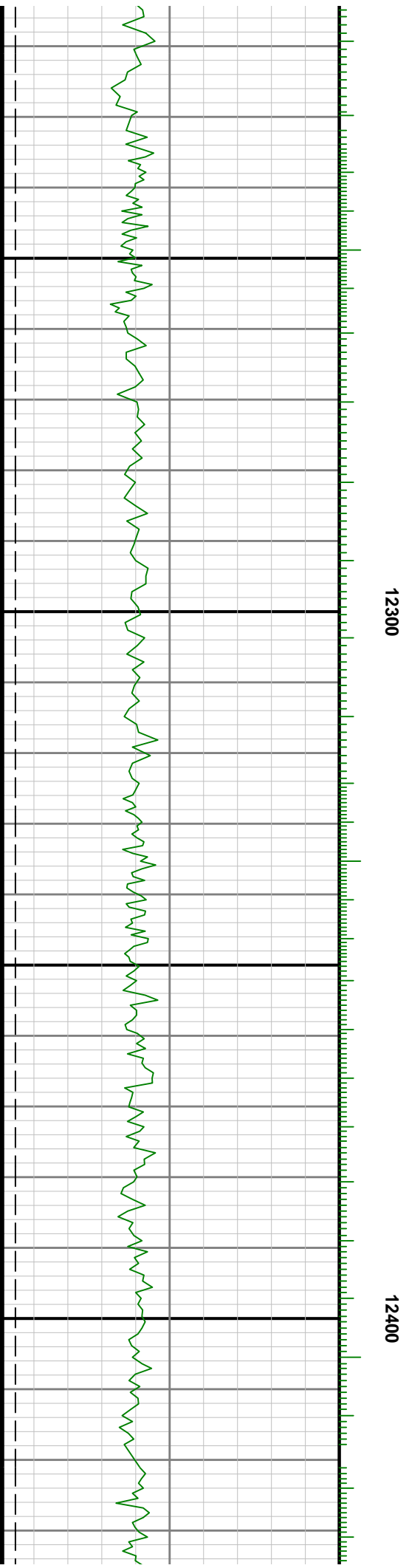
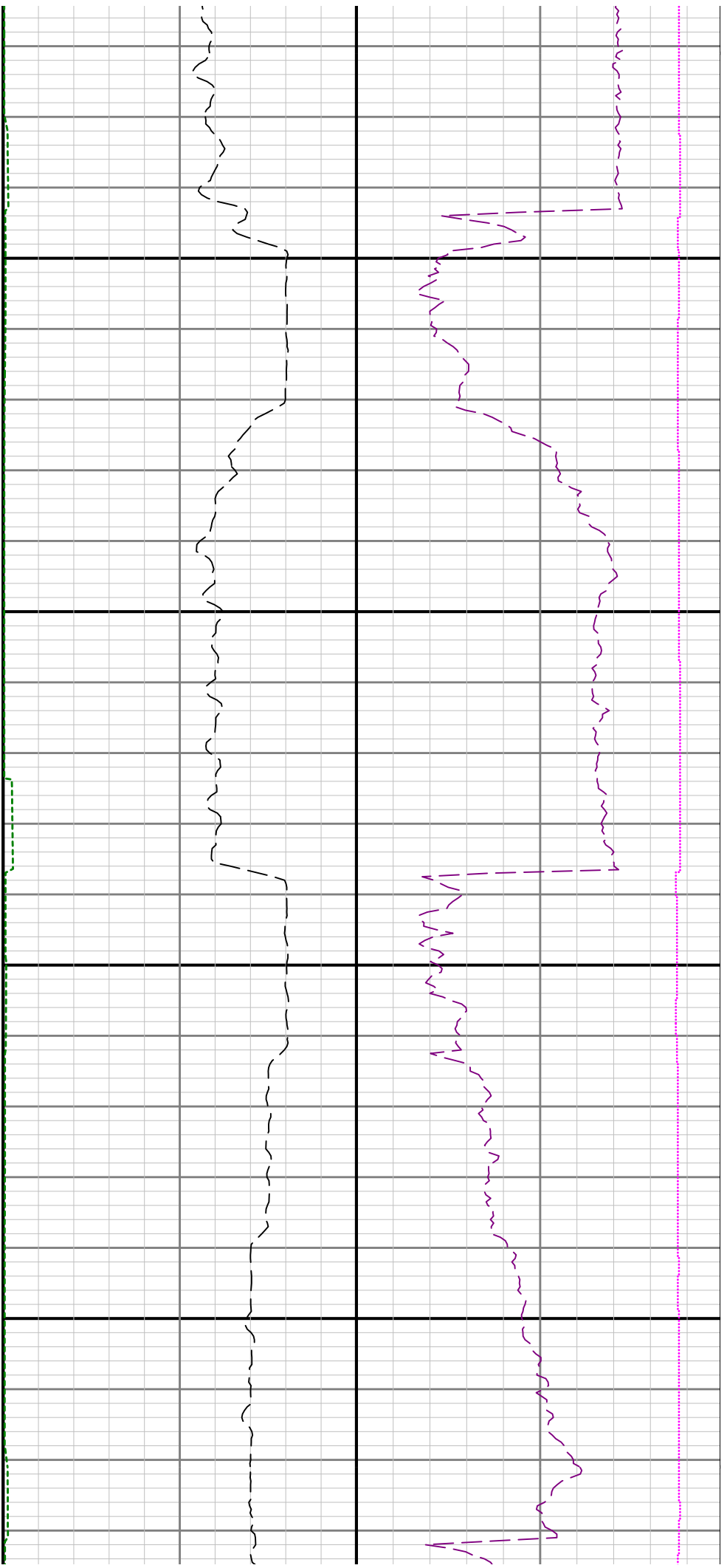
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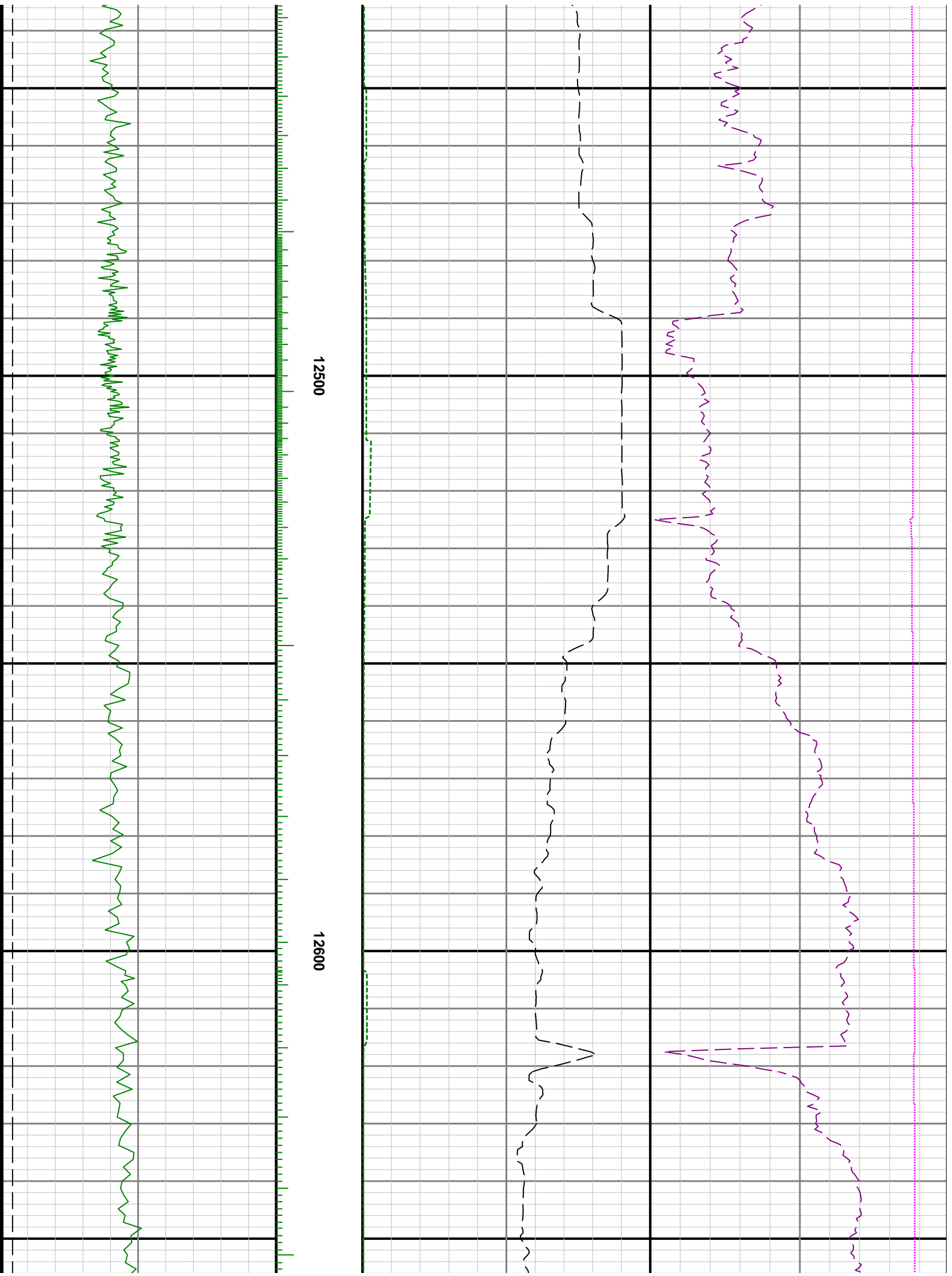




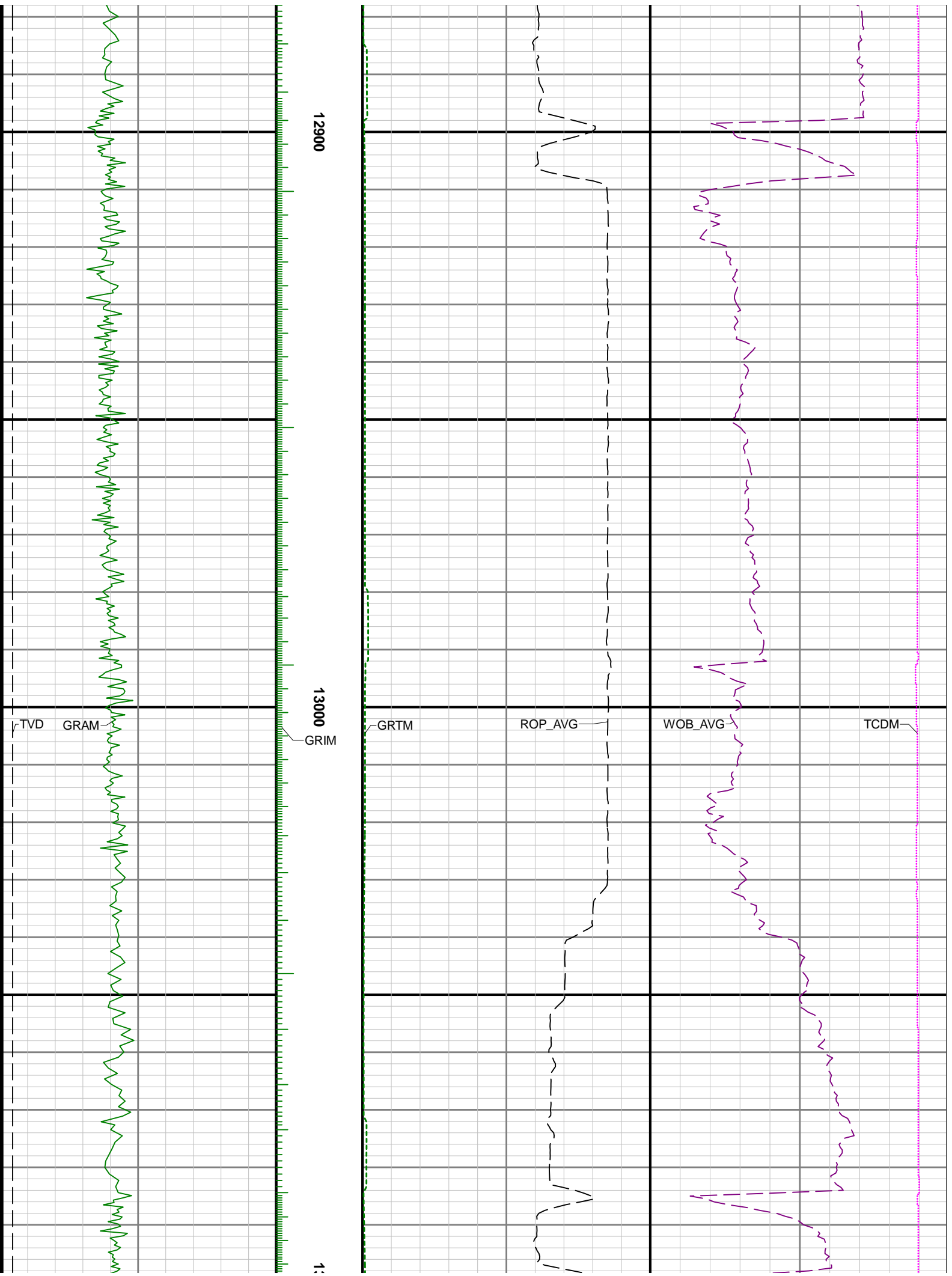


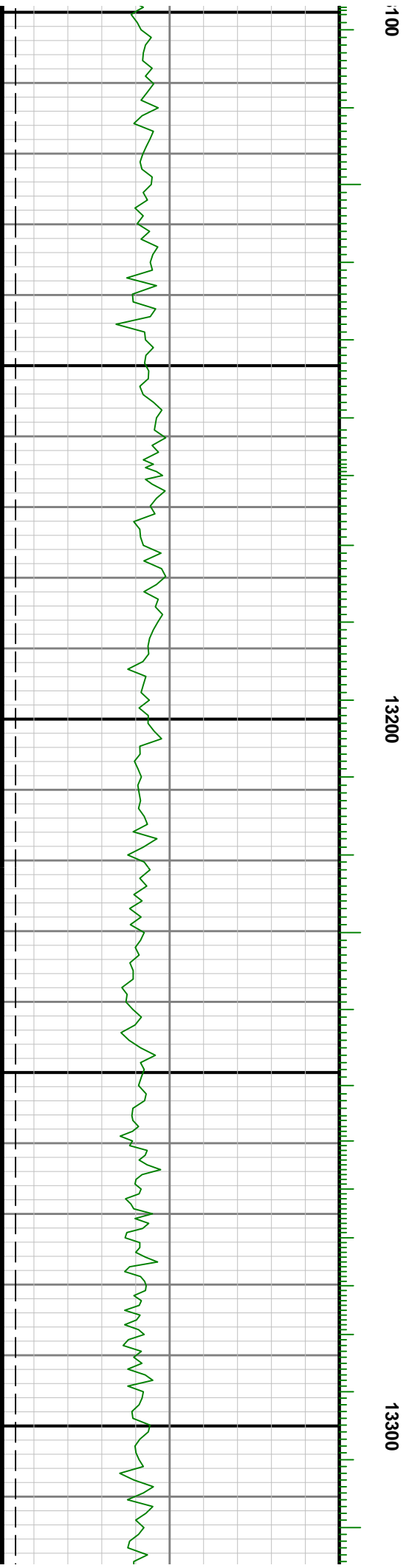


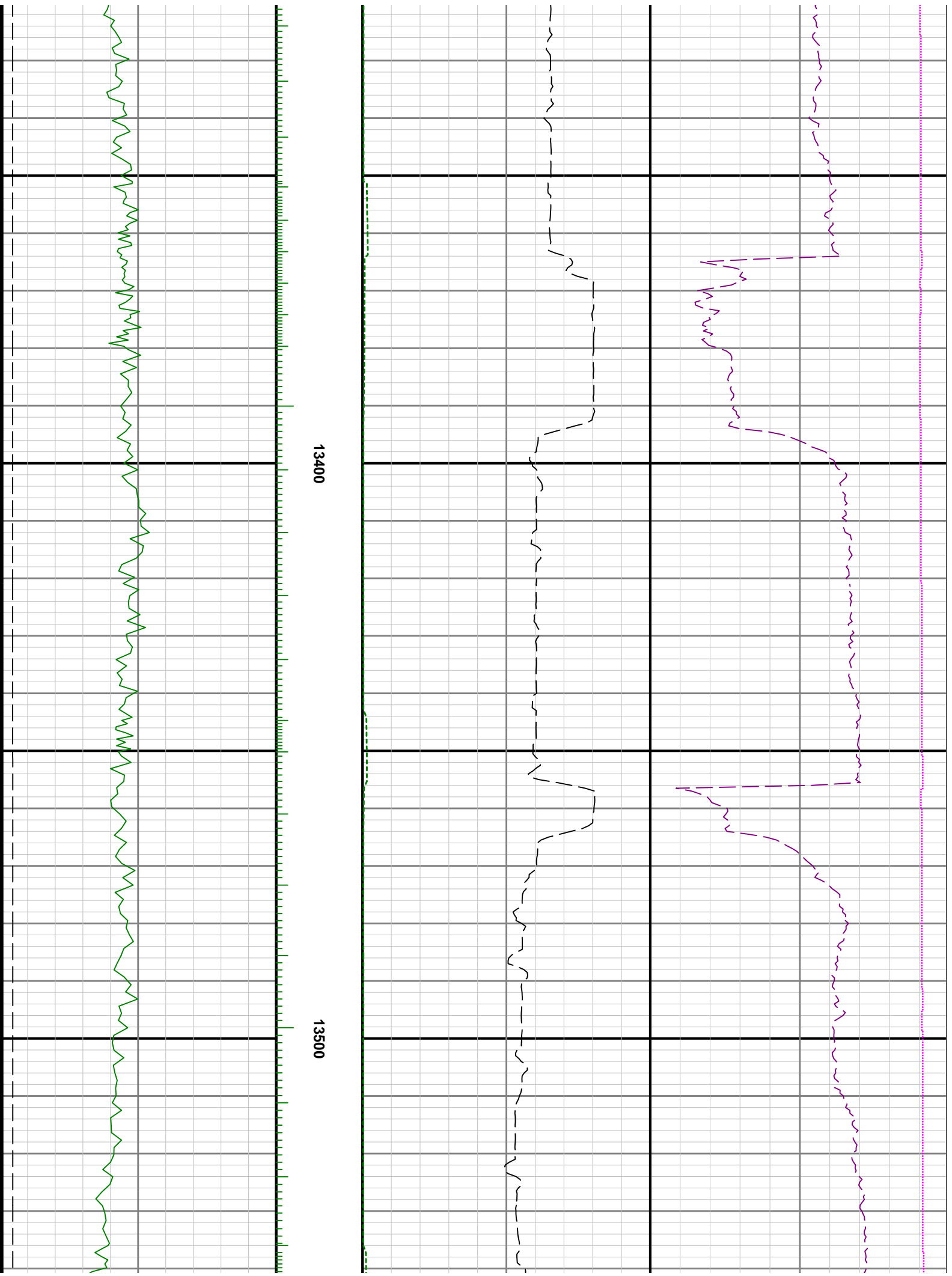








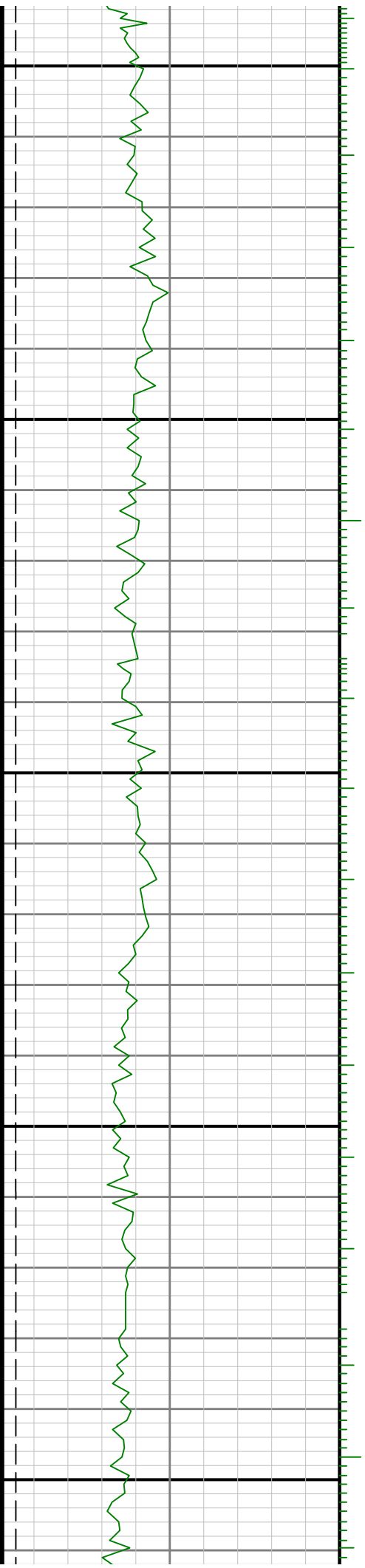


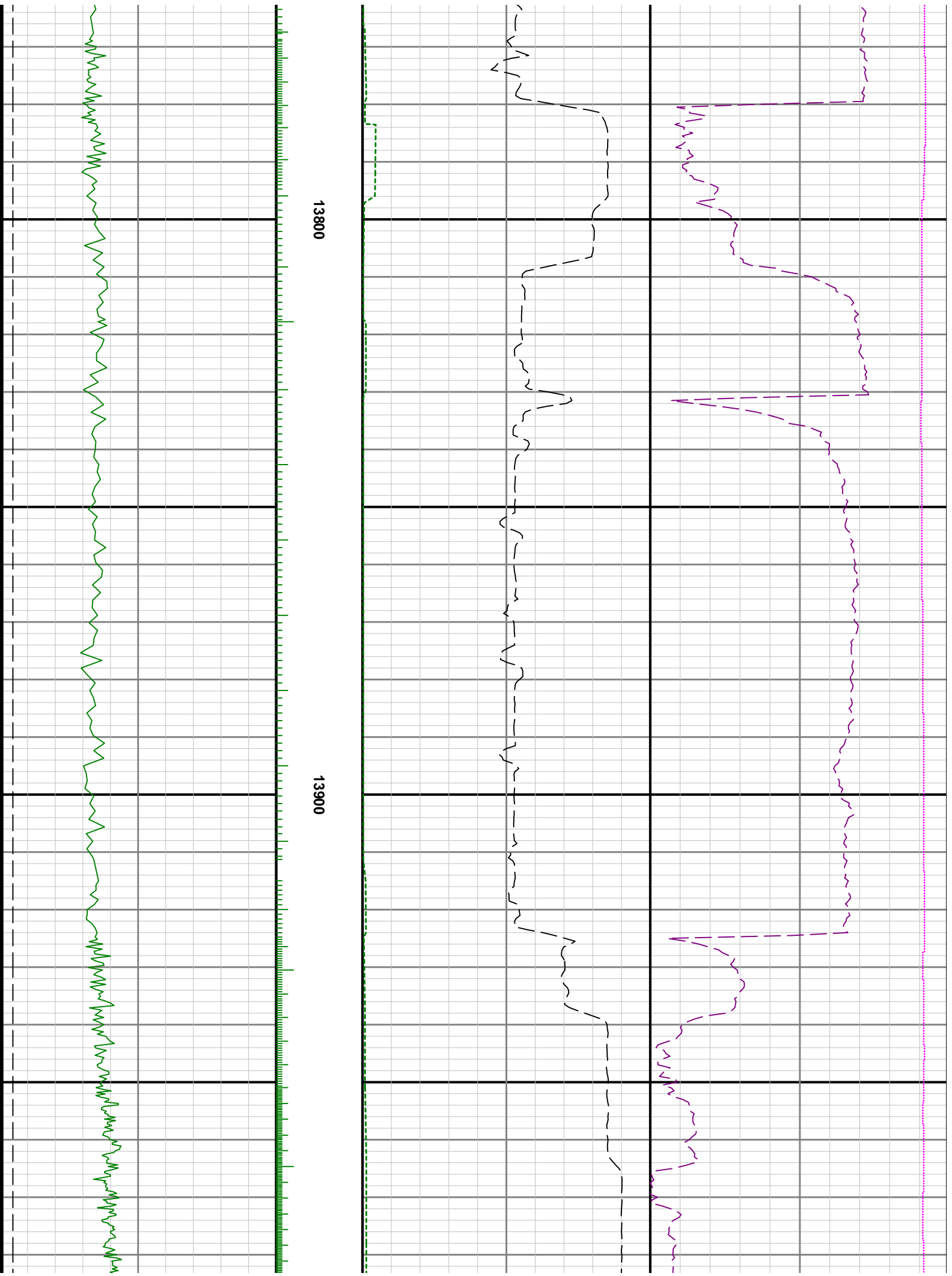


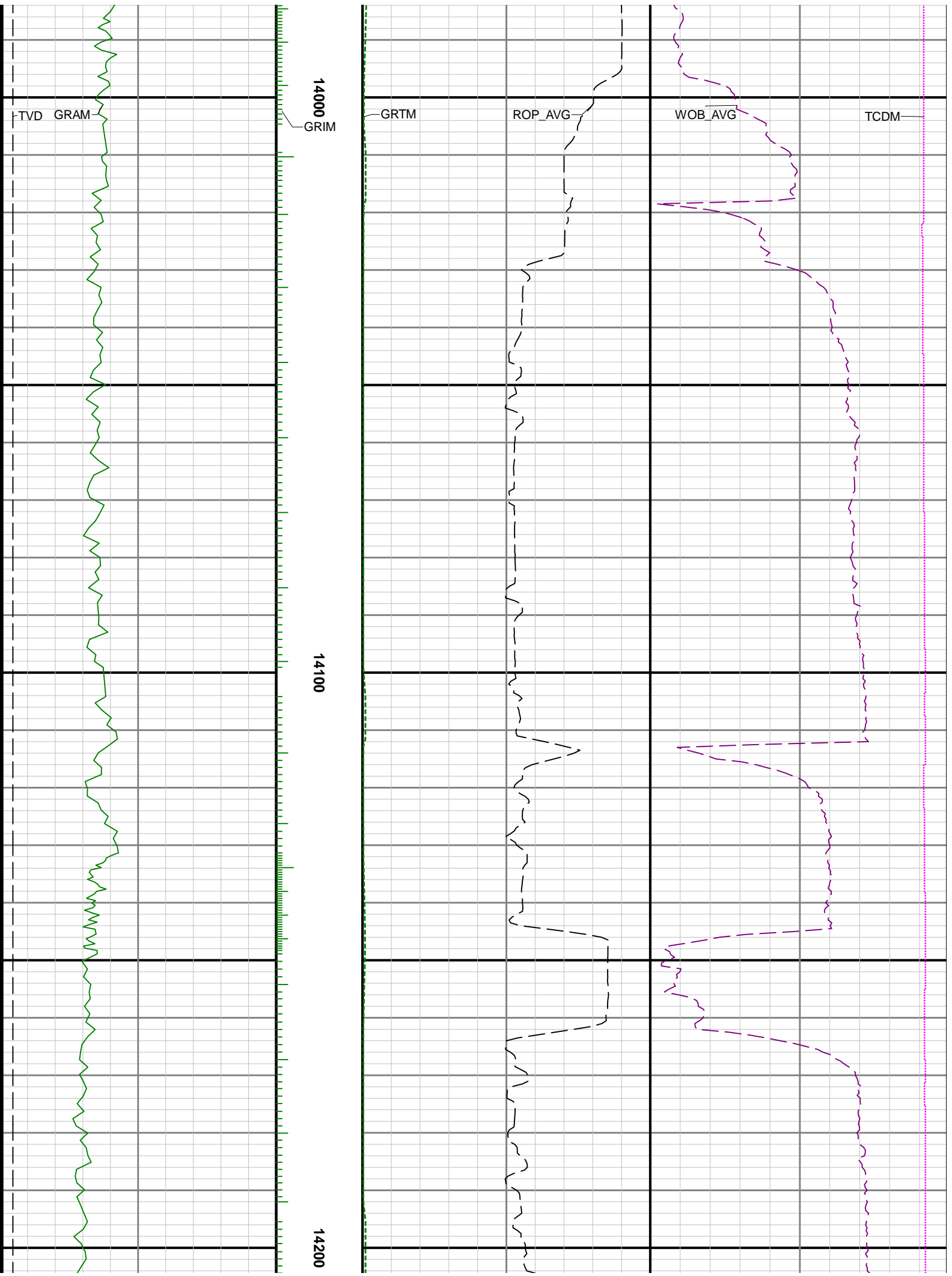


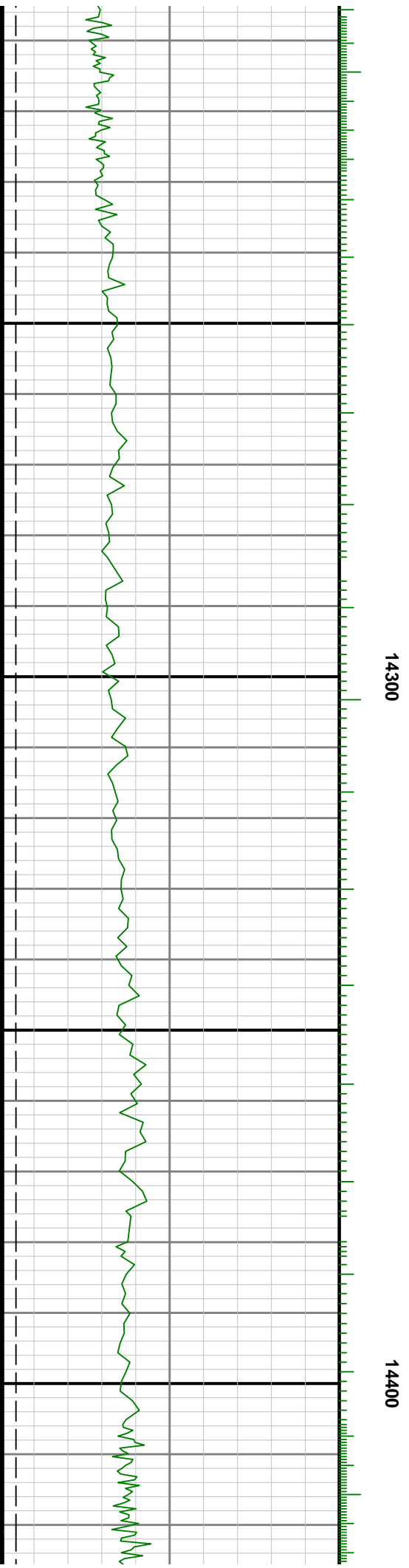
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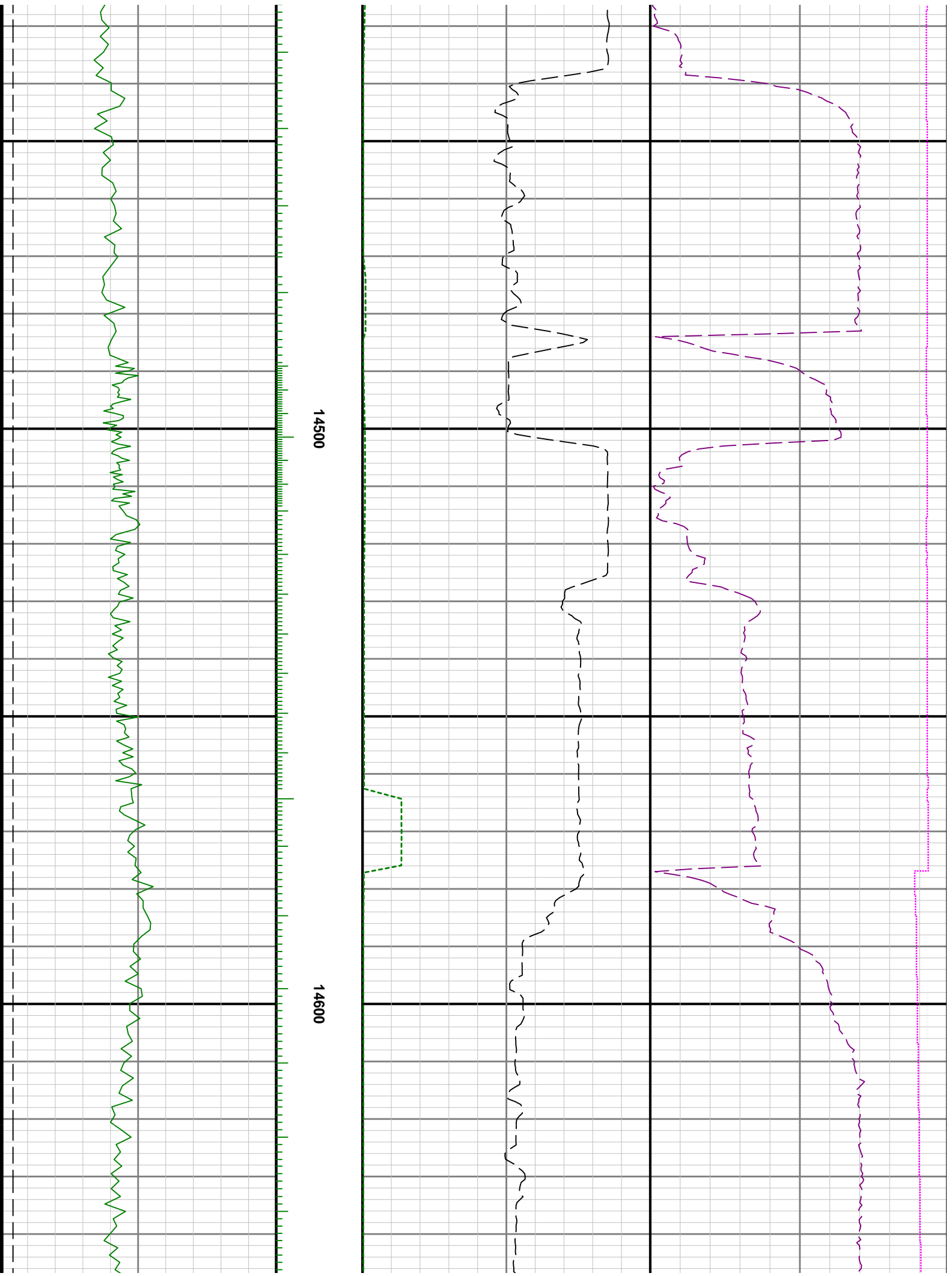
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14700

14800

