



Realtime Log

Natural Formation Evaluation
Gamma Ray

Scale: Company: Anadarko

1:240 Well: Howard 37N-33HZ

Measured Depth Field: Weld County (Kerr McGee)

Region: Continental US Country: United States

Status: Surface Location: Other Services:

Final Print Latitude: 40 ° 1 ' 9.494" N

API Number: 05-123-38032-0 Longitude: 104 ° 53 ' 28.086" W

Section28 TWN: 1N Range67W

Directional
VSS

Permanent Datum (P.D.): Ground Level Elevation: 5021.00 ft.

Log Measured From: Drill Floor 16.00 ft. Above P.D.

Depth Reference: Driller's Depth Elevations: N/A

KB: 5037.00 ft.
DF: 5021.00 ft.
GL:

Interval Logged Dates Magnetic Field Reference

Top: 7129ft. Date From: 03/Jan/14 Dip Angle: 66.28 ° Azi Reference North: True

Bottom: 12402.0 ft. Date To: 10/Jan/14 Total Mag to Reference

Spud Date: 02/Jan/14 Field Strength: 52640.0 nT North Correction: 8.46 °

Borehole Record

Casing Record

Hole Size	From	To	Size	Weight	From	To
13,500 in.	0.0 ft.	1046.0 ft.	9.625 in.	36.00 lb/ft	Surface	802.0 ft.
8,750 in.	1046.0 ft.	8162.0 ft.	7.000 in.	26.00 lb/ft	Surface	8149.0 ft.
6,125 in.	8162.0 ft.	12402.0 ft.				

Mud Record

Deviation Record

Type	From	To	Hole Size	Interval	Inc / Az (Start)	Inc / Az (End)
Water Based - Fresh	8352.0 ft.	12402.0 ft.	13,500 in.	1046.0 ft.	0.0 ° / 0.0 °	0.3 ° / 286.9 °
			8,750 in.	7116.0 ft.	0.5 / 286.3 °	83.5 ° / 180.3 °
			6,125 in.	12402.0 ft.	89.0 ° / 180.9 °	90.7 ° / 179.5 °
					/	/
					/	/
					/	/
					/	/

Acquisition System Software Version

Other

Advantage	2.20U4	Rig / Contractor:	Xtreme 6	/	Xtreme Coil Drilling
PATS	6.4.1.34	Job No:	5869295		
		District / Unit:	Rocky Mountain	/	D&E

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Log Run Summary

LWD Run No.	BHA Run No.	Bit Run No.	Bit Size (in.)	Bit Type	Bit Gauge Length (in.)	Assembly Type	Logged Interval		Bit Depth Interval		Date / Time		Circ. Time
							Top	Bottom	From	To	Start	End	(hrs.)
							(f.)	(f.)	(f.)	(f.)			
1	2	2	8.750	PDC	2.500	Steerable	7129.0	8118.0	1046.0	8162.0	05/Jan/2014 01:32	05/Jan/2014 14:07	44.4
2	2	2	6.125	PDC	3.000	Steerable	8119.0	12355.0	8162.0	12402.0	08/Jan/2014 17:25:18	10/Jan/2014 05:49:29	36

Crew

Name	Arrive	Depart	Name	Arrive	Depart	Name	Arrive	Depart
	Wellsite	Wellsite		Wellsite	Wellsite		Wellsite	Wellsite
David Campbell	01/05/14	01/11/14	Matthew Delmore	01/01/14	01/08/14	Nathan Leopold	01/08/14	01/11/14

Mud Properties Record

Date / Time	LWD Run No.	Measured Depth (f)	Mud Type	Density (sg)	Viscosity (cp)	pH	Fluid Loss (cc)	Oil / Water	Source	Total Chlorides (ppm)	K+ (%)
08/Jan/2014 18:37	2	8352.0	Water Based - Fresh	10.4	45	9.0	5.6	2 / 89	Active Mud Pit	1400	0.0

Mnemonics

Curve	Description	Units
GRAX	Gamma Ray Apparent, 0.5 ft. Avg.	API
GRIX	Gamma Ray Data Density	point
GRSI	Gamma Ray Sliding Indicator	unitless
GRTX	Gamma Ray Time Since Drilled	min
ROP_AVG	Rate of Penetration, 3.0 ft. Avg.	ft/hr
TCDX	Downhole Temperature	degF
TVD	True Vertical Depth	ft
WOB_AVG	Surface Weight on Bit, 1.0 ft. Avg.	klbs

Equipment and Service Data

LWD Run No.	Tool	Serial Number	Measurement	Bit Offset (m.)	Max O.D. (in.)	Min I.D. (in.)
1	DIR	11946291	Directional	47.39	6.750	3.250
1	SRIG	12595025	Gamma	44.02	6.750	3.250
2	DIR	11852218	Directional	48.43	4.750	2.875
2	SRIG	12622668	Gamma	45.05	4.750	2.875

Service and Tool Mnemonics

Mnemonic	Name	Description
DIR	Directional	Wellbore directional survey
SRIG	Inclination and Gamma	Probe based gamma ray and inclination module

Comments

<p>1.) Depth measurements obtained from a depth control system not supplied or operated by Baker Hughes. Due to the lack of control by Baker Hughes logging engineers, depth calibrations and measurements could not be independently verified.</p> <p>2.) Baker Hughes run 1 utilized 6 3/4 inch NaviGamma services (Gamma Ray and Directional) behind an 8 3/4 inch bit and steerable assembly from 1046 to 8162 feet MD (1045 to 7540 feet TVD).</p> <p>3.) Baker Hughes run 2 utilized 4 3/4 inch NaviGamma services (Gamma Ray and Directional) behind an 6 1/8 inch bit and steerable assembly from 8162 to 12402 feet MD (7540 to 7582 feet TVD).</p> <p>4.) The interval from 1046 to 7129 feet MD (1045 to 6950 feet TVD) was not logged due to directional only services being provided through the straight-hole and nudge section for Baker Hughes run 1.</p>

Remarks

Number	Measured Depth (m.)	Hole Section (in.)	LWD Run No.	Remark
1	7129	8.750	1	The interval from 1046 to 7129 feet MD (1045 to 6950 feet TVD) was not logged due to directional only services being provided through the straight-hole and nudge section for Baker Hughes run 1.

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2	8150	8.750	1	The interval from 8120 to 8163 feet MD (7537 to 7540 ft TVD) was logged up to 75.3 hours after being drilled due to a trip out for casing.
3	12250	6.125	2	The interval from 12234 to 12271 feet MD was not logged due to a surface gear issue.
4	12375	6.125	2	The interval from 12355 to 12402 feet MD was not logged due to sensor offset to bit at TD of the well.

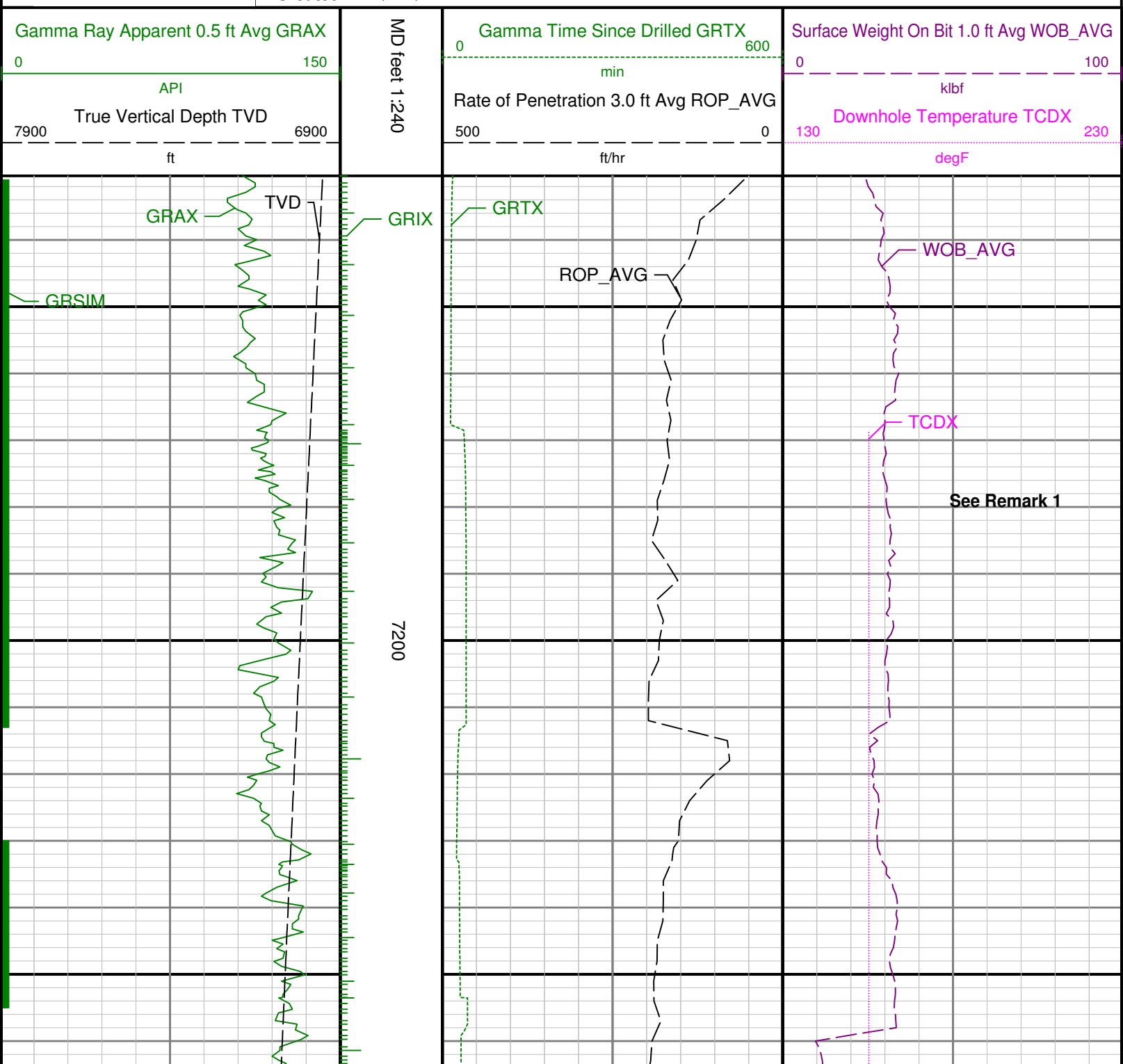


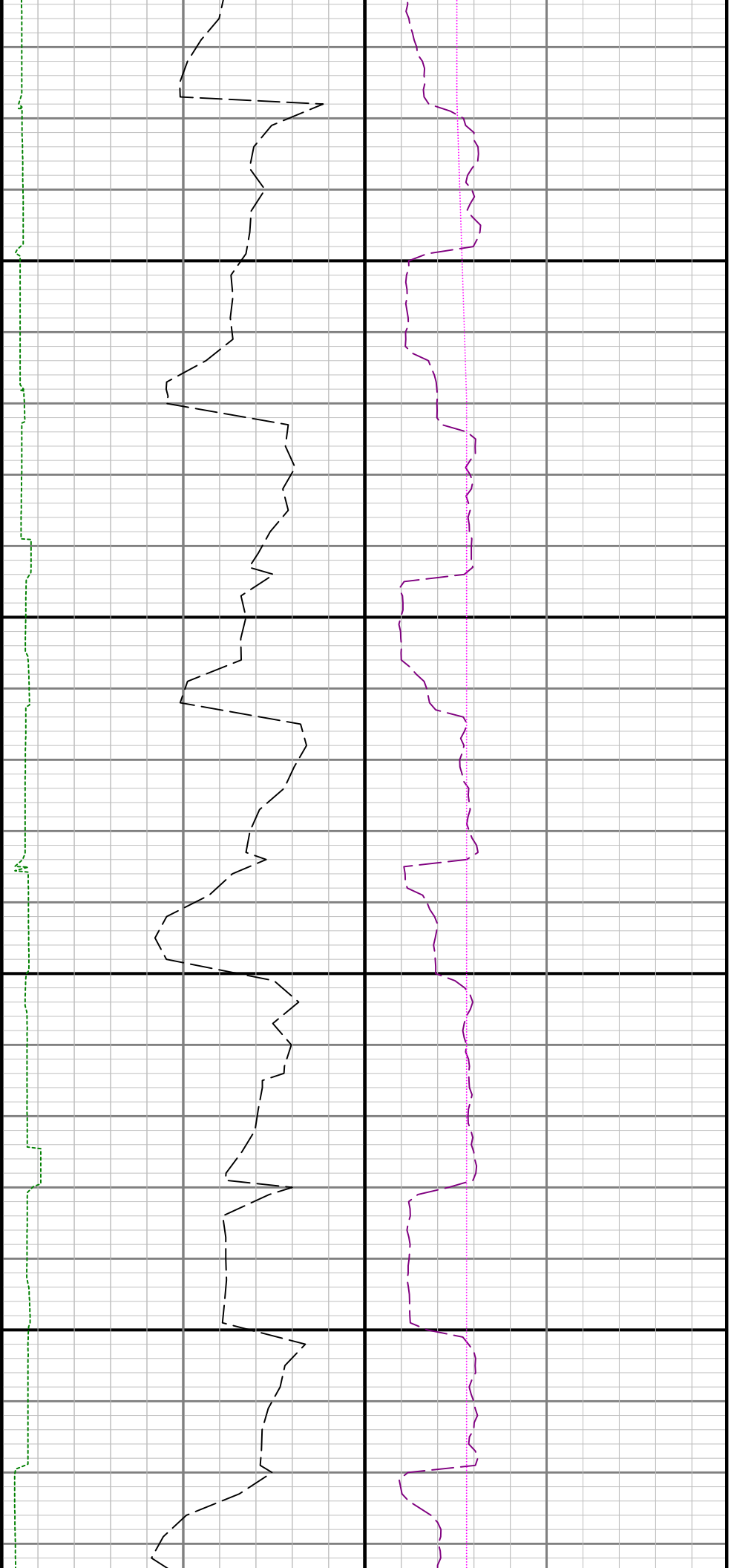
Company : Anadarko

Well : Howard 37N-33HZ

Interval : 7130.40 - 12410.00 feet

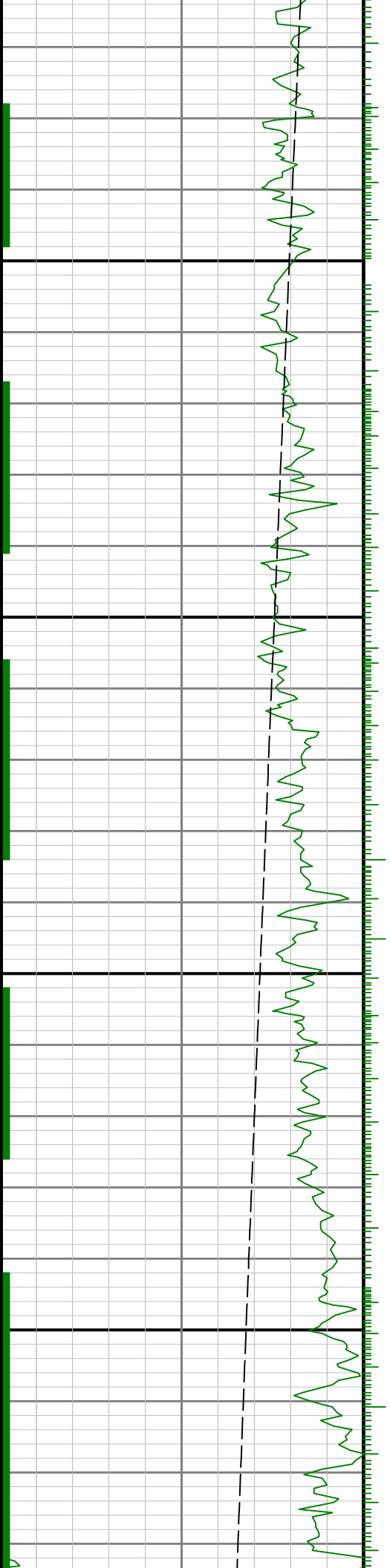
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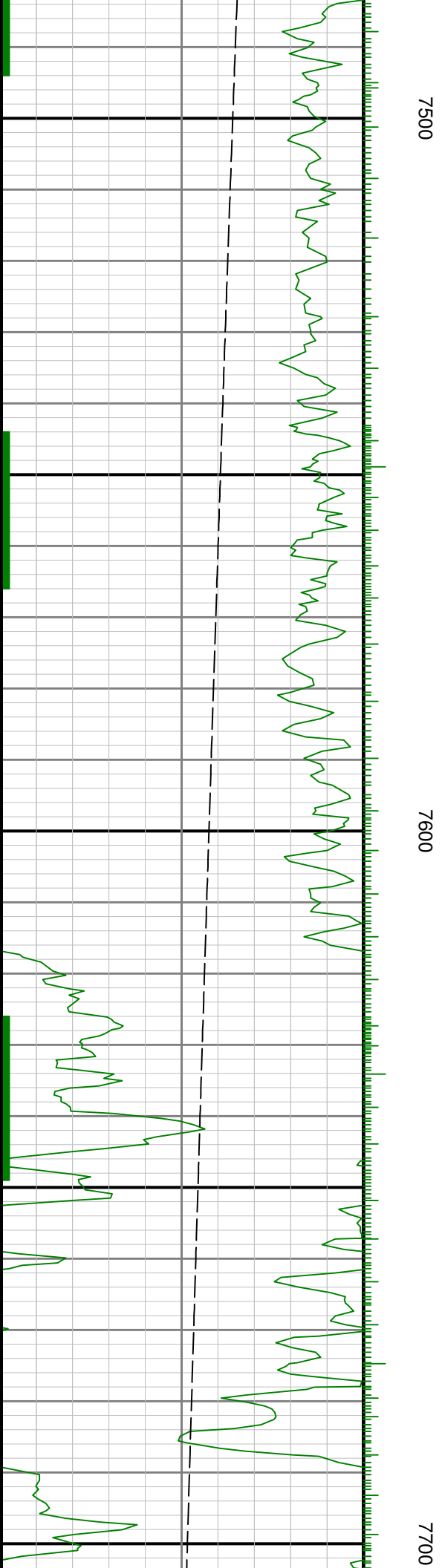
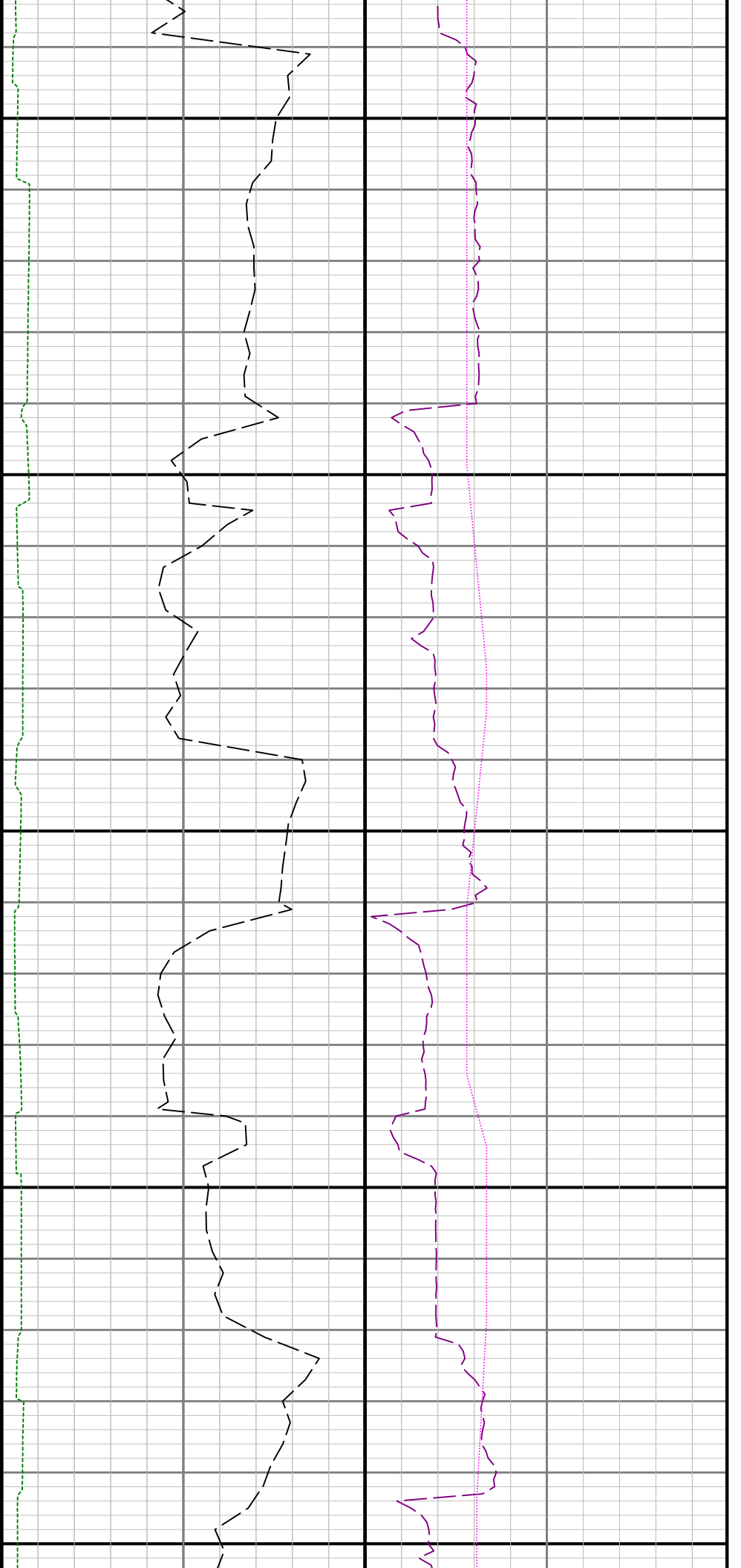


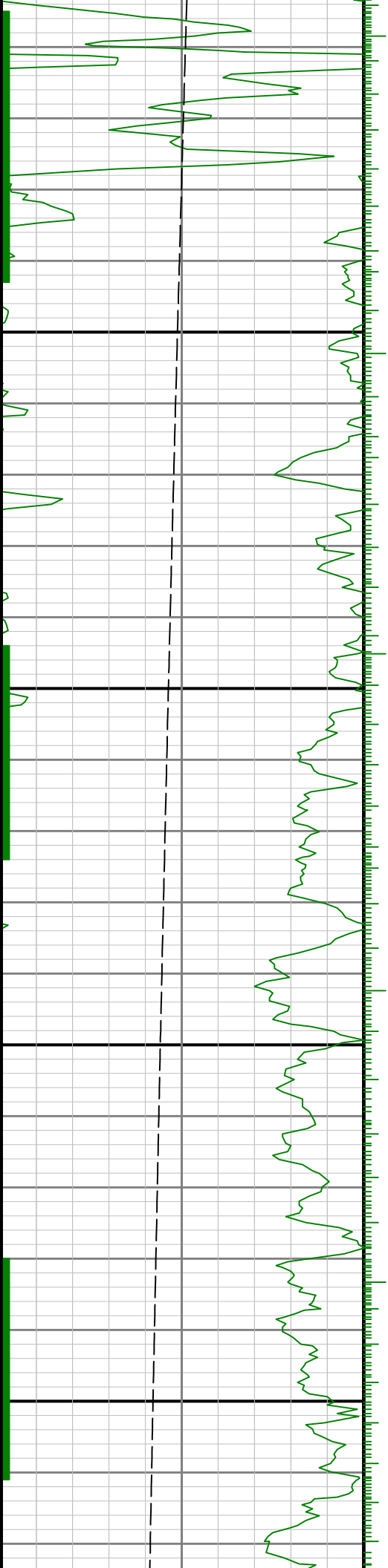


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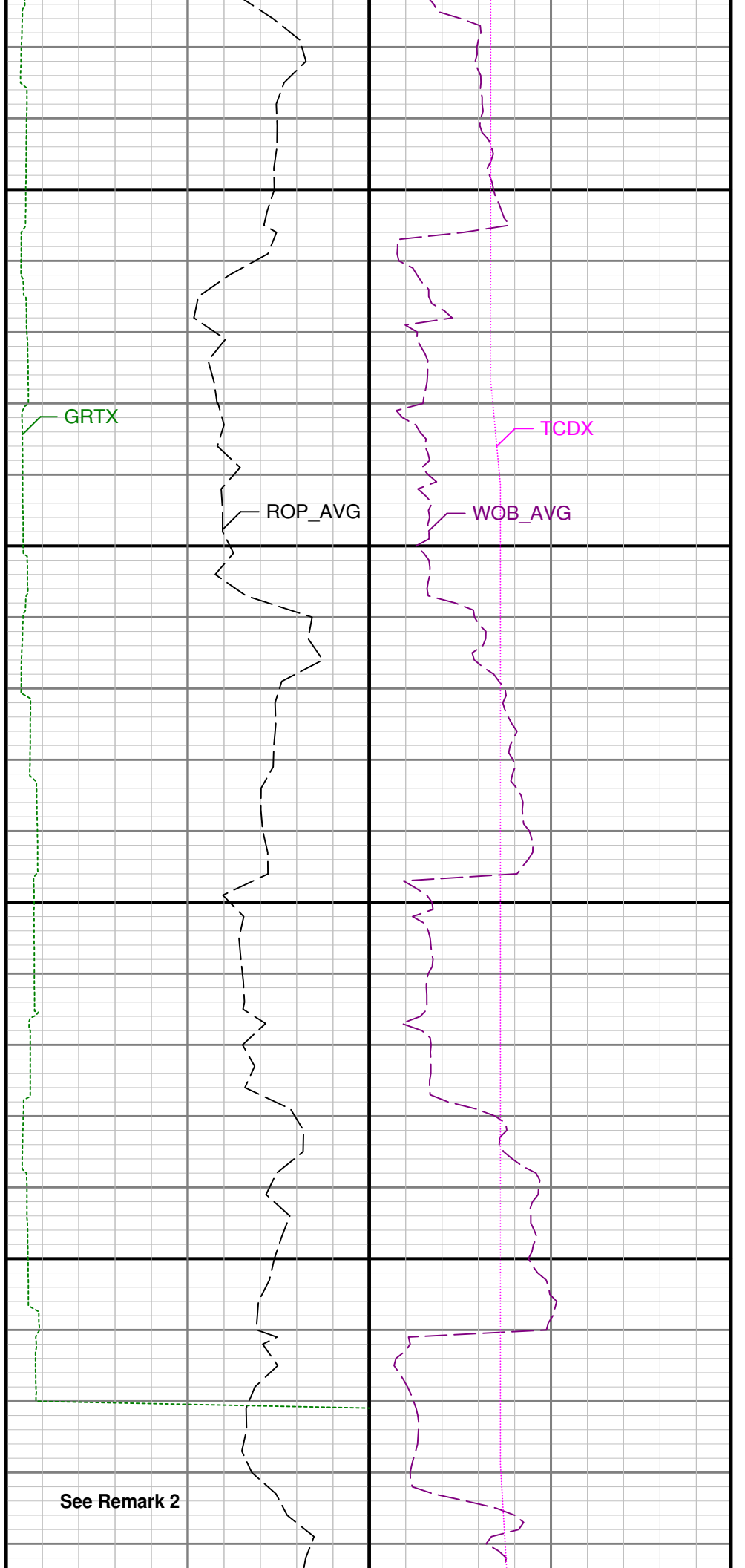
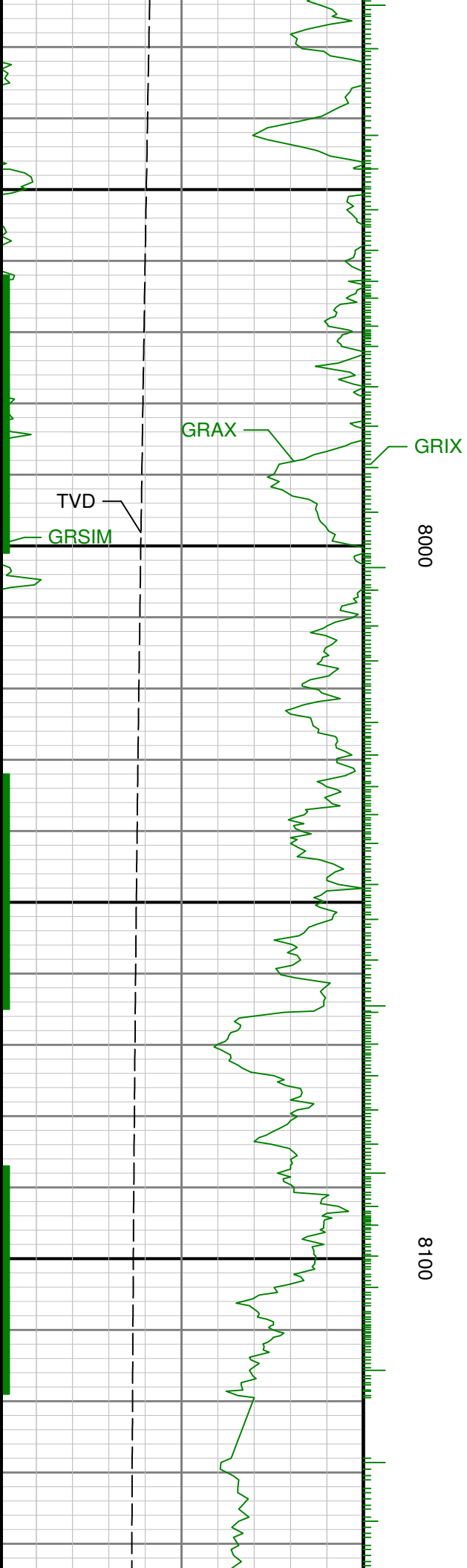


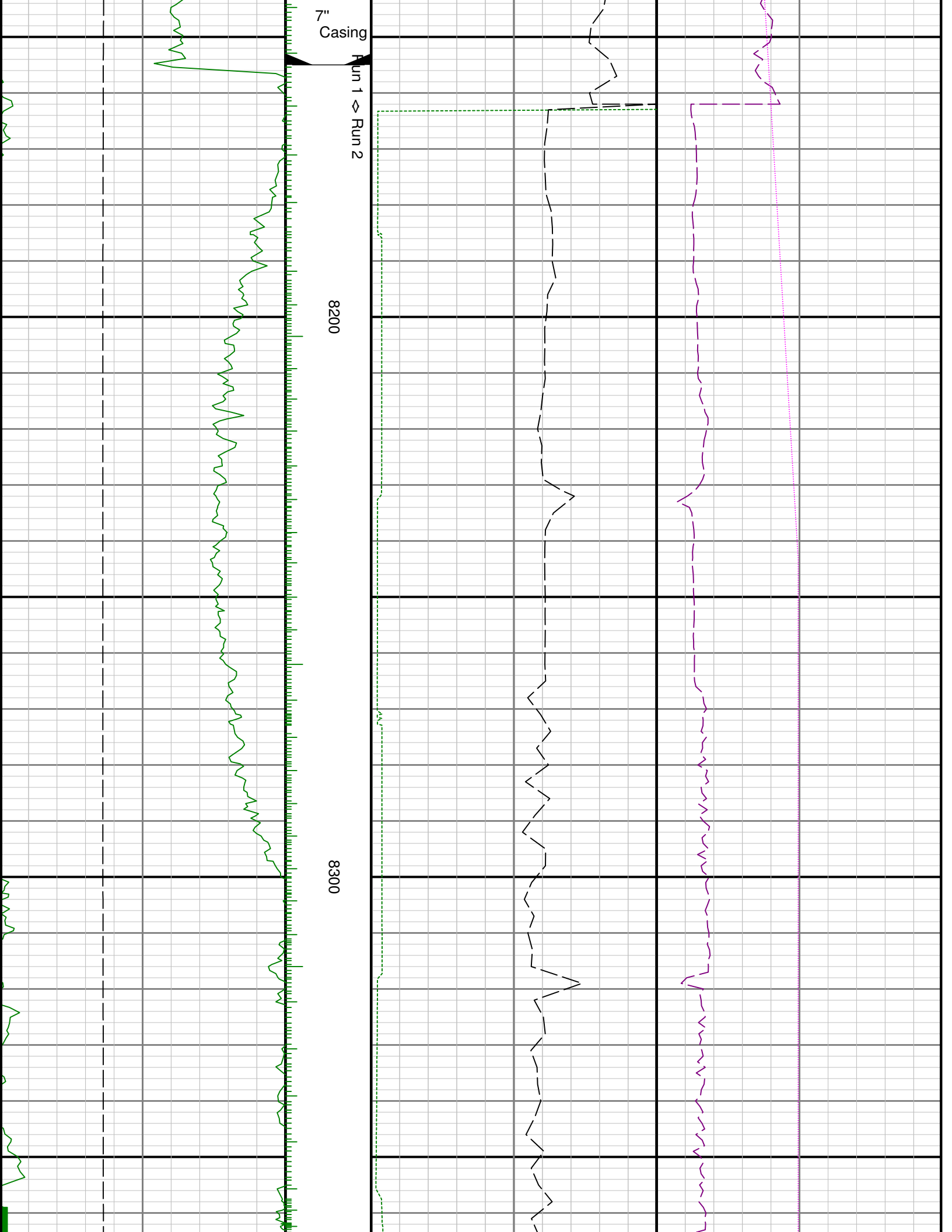


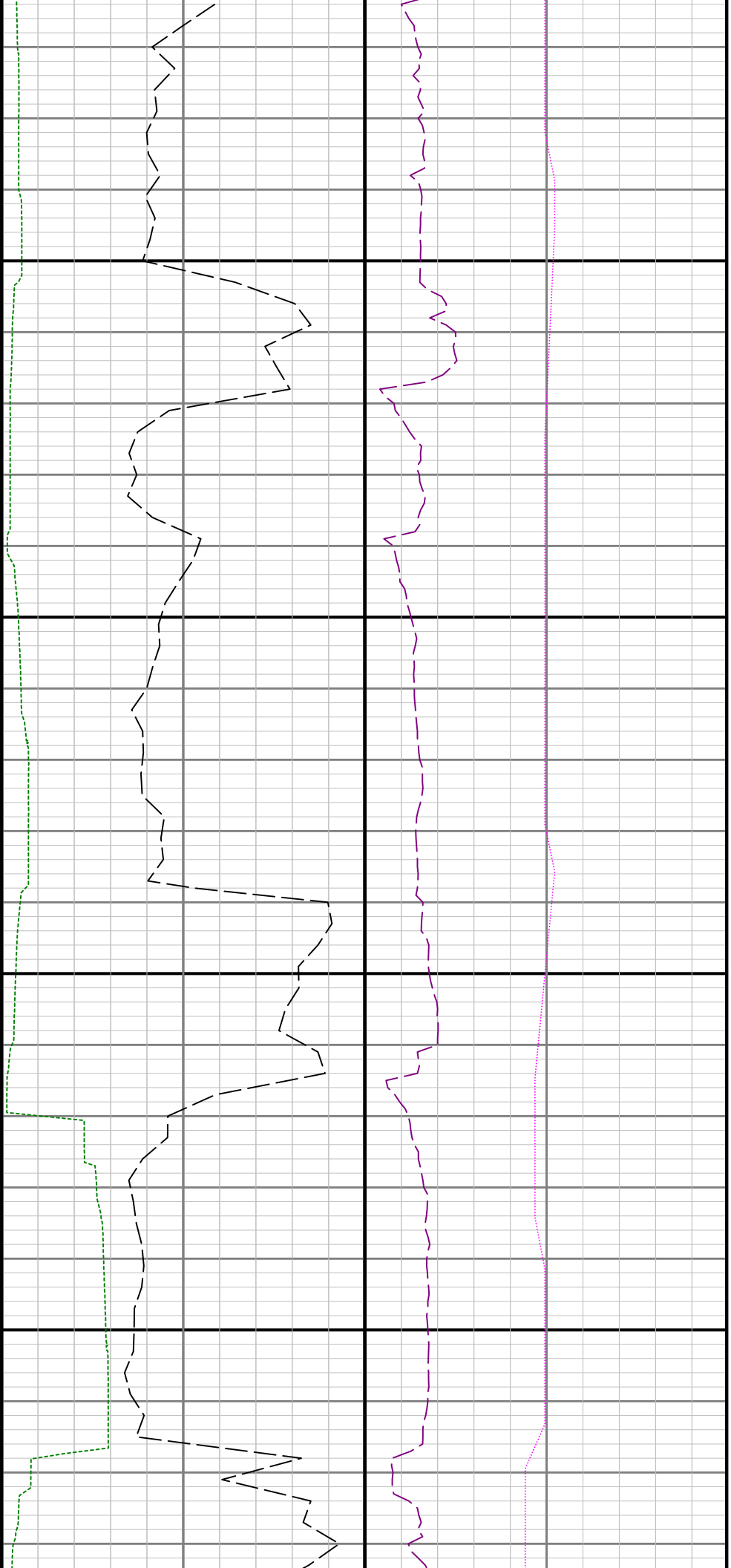
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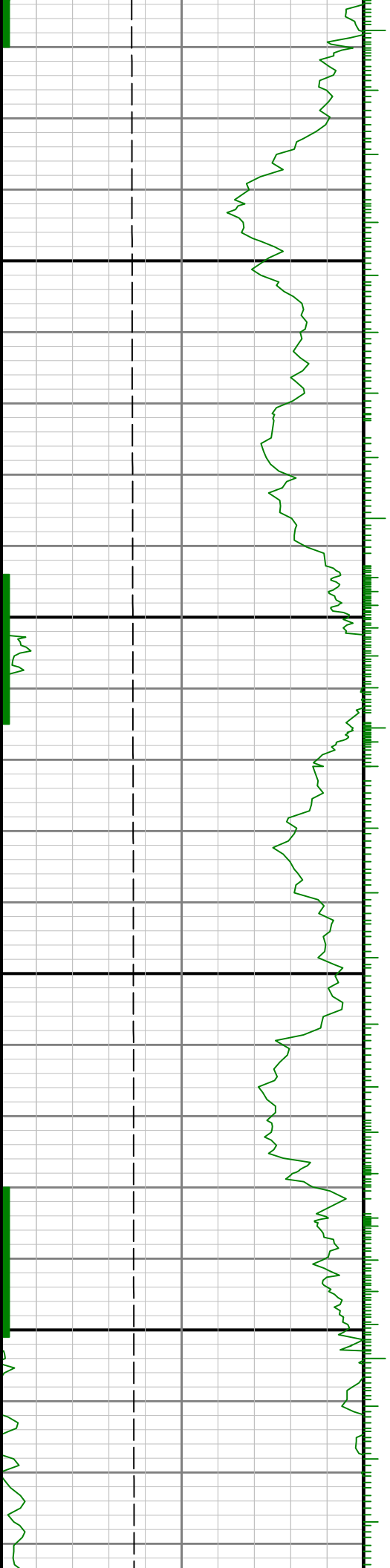


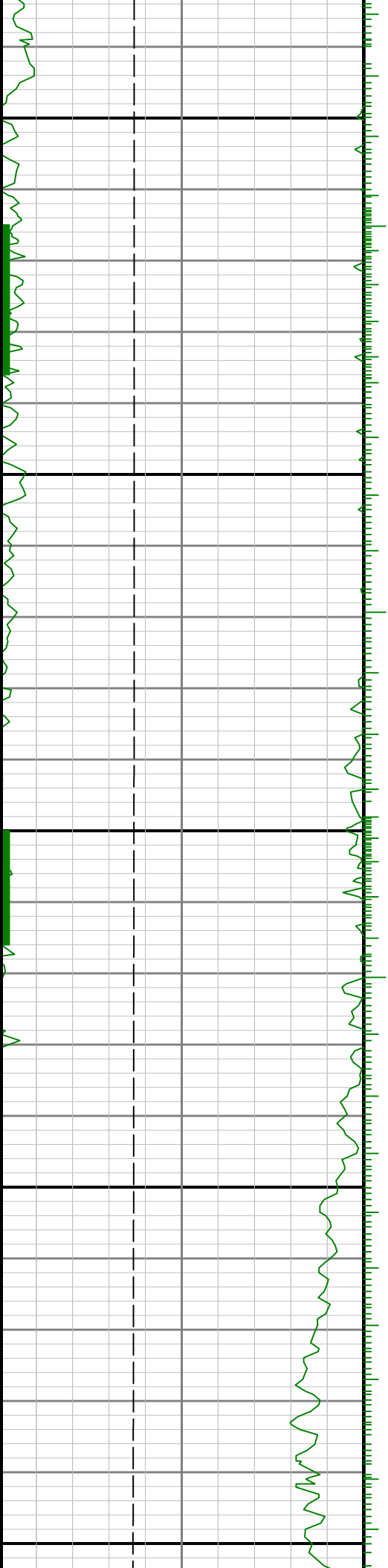




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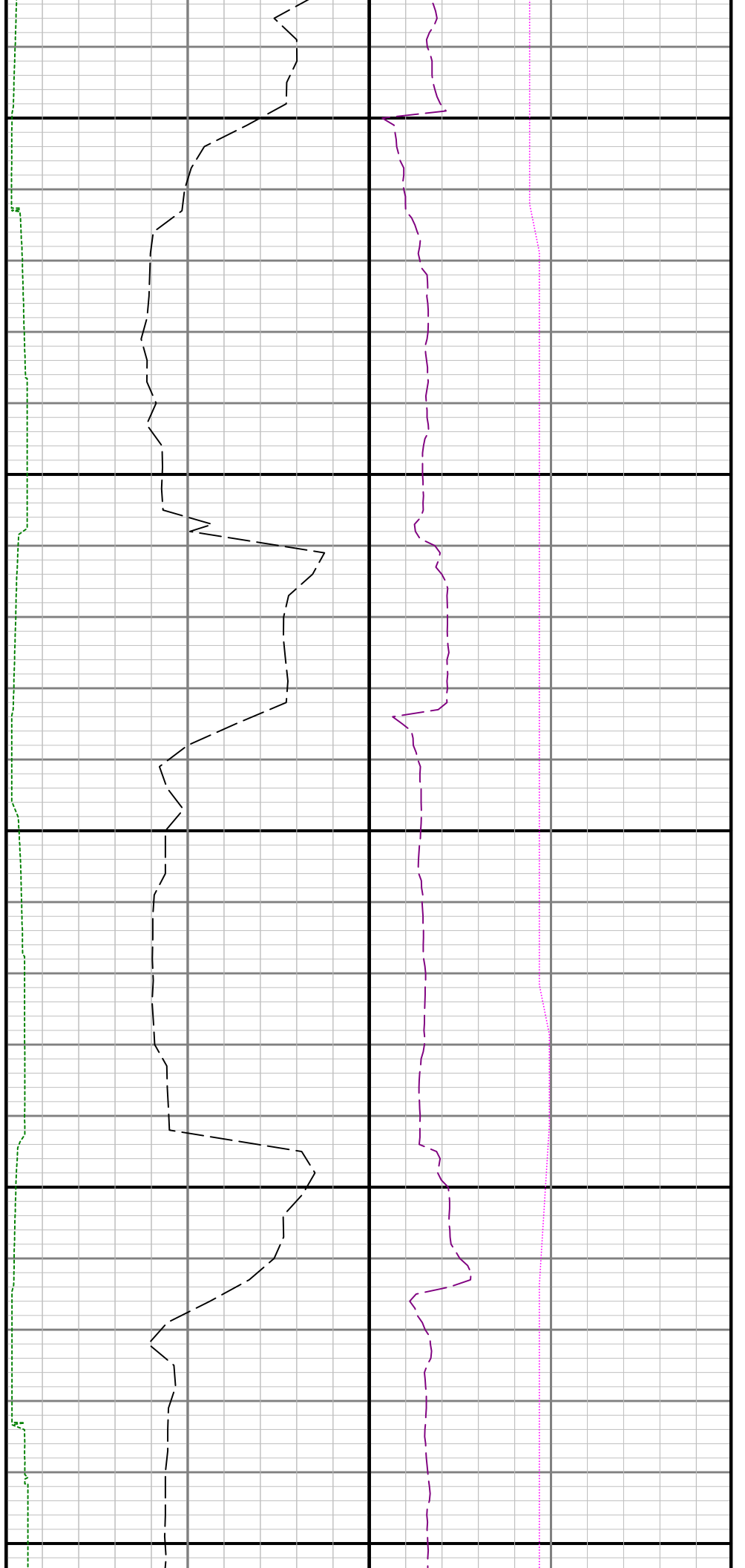


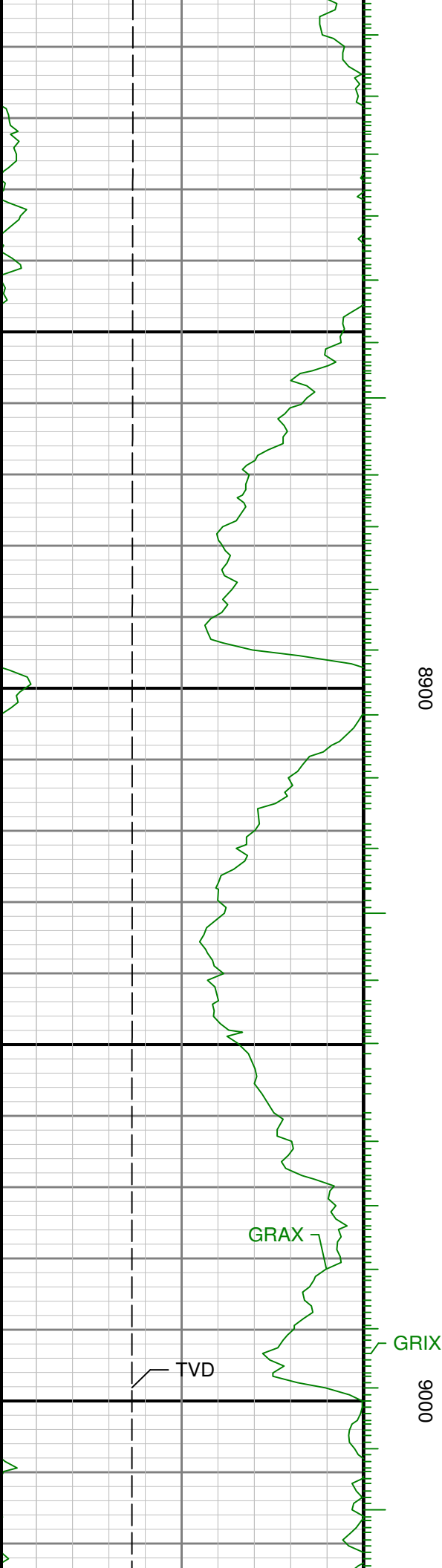


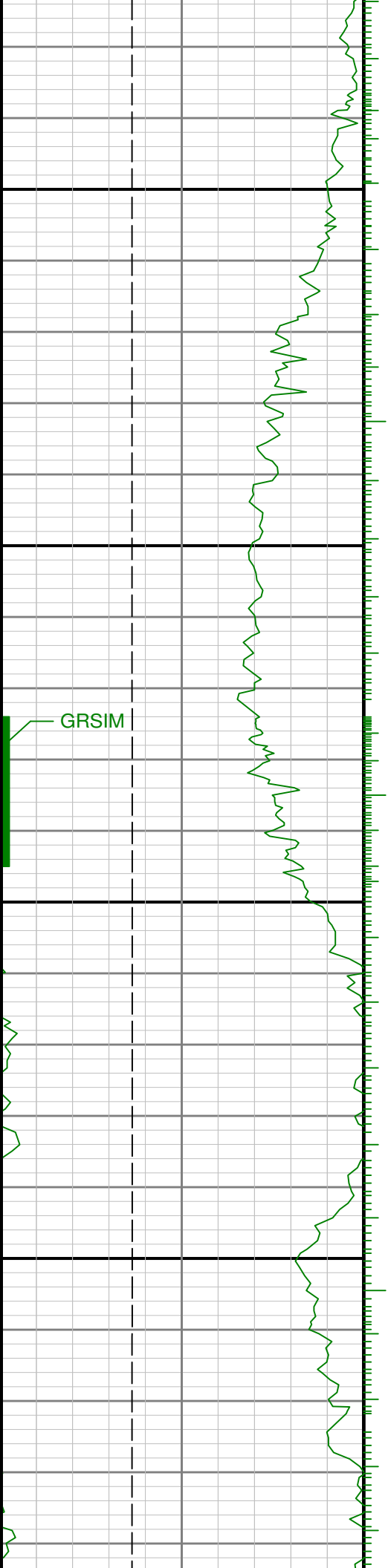
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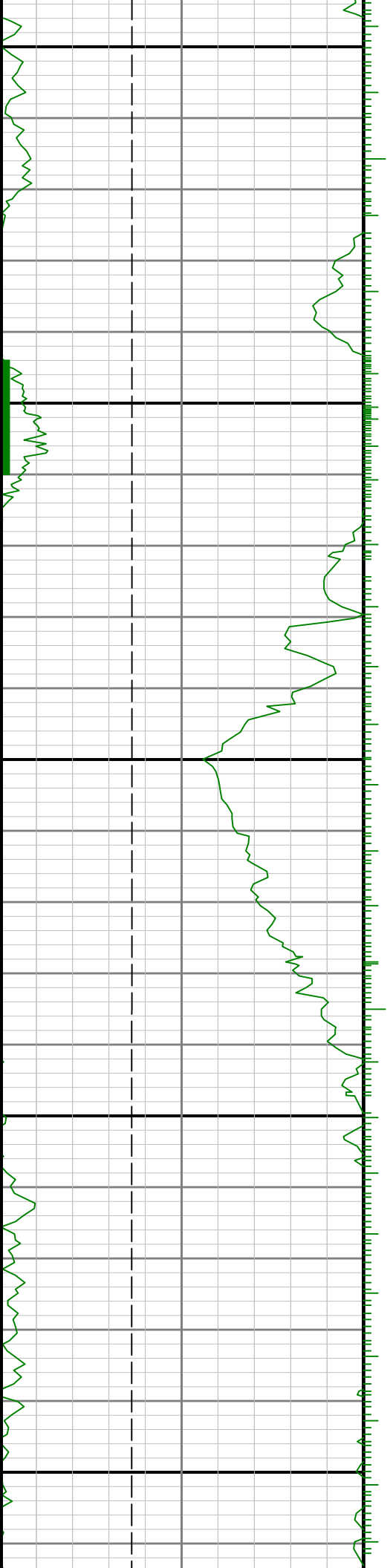
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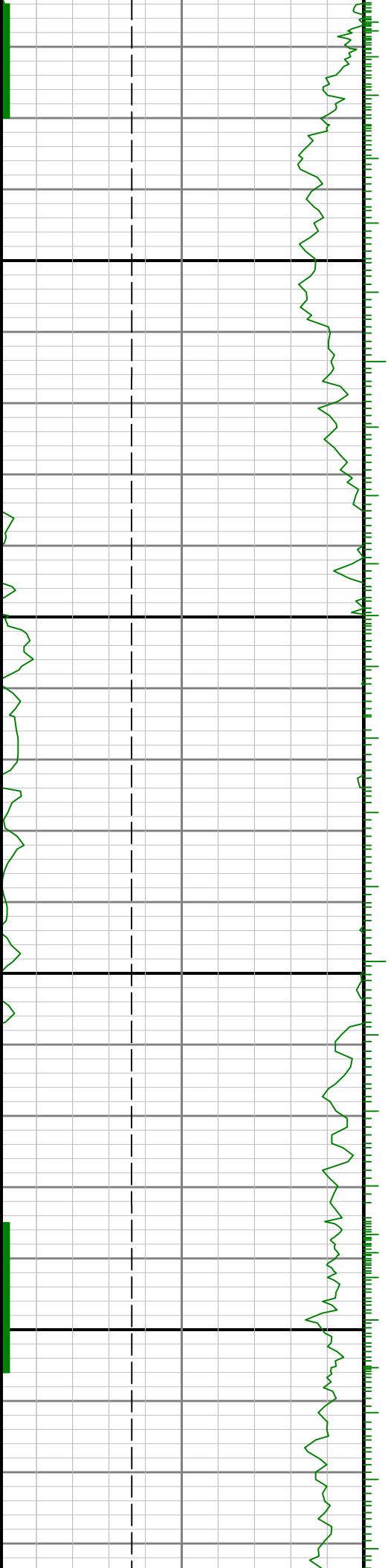




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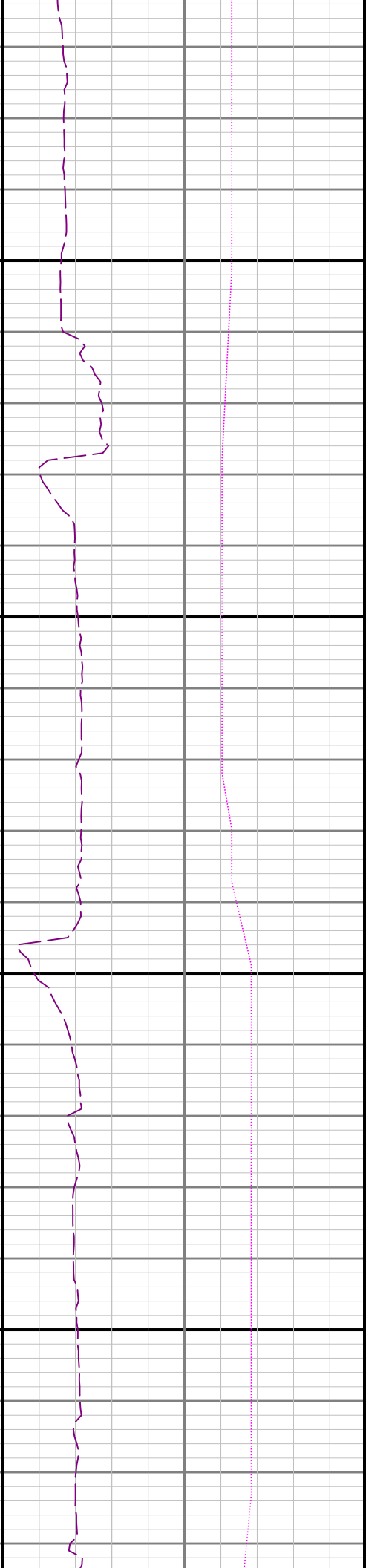
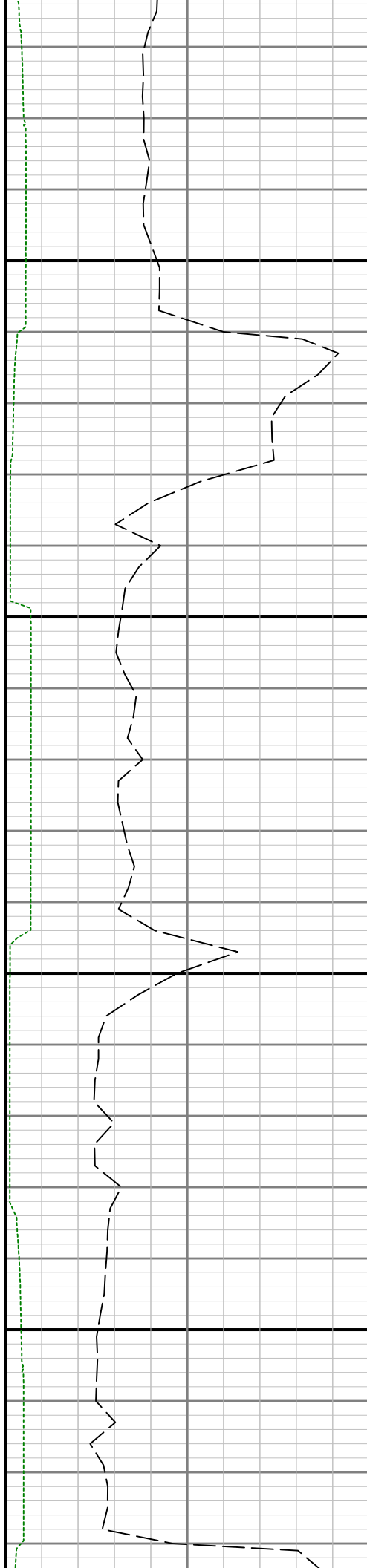
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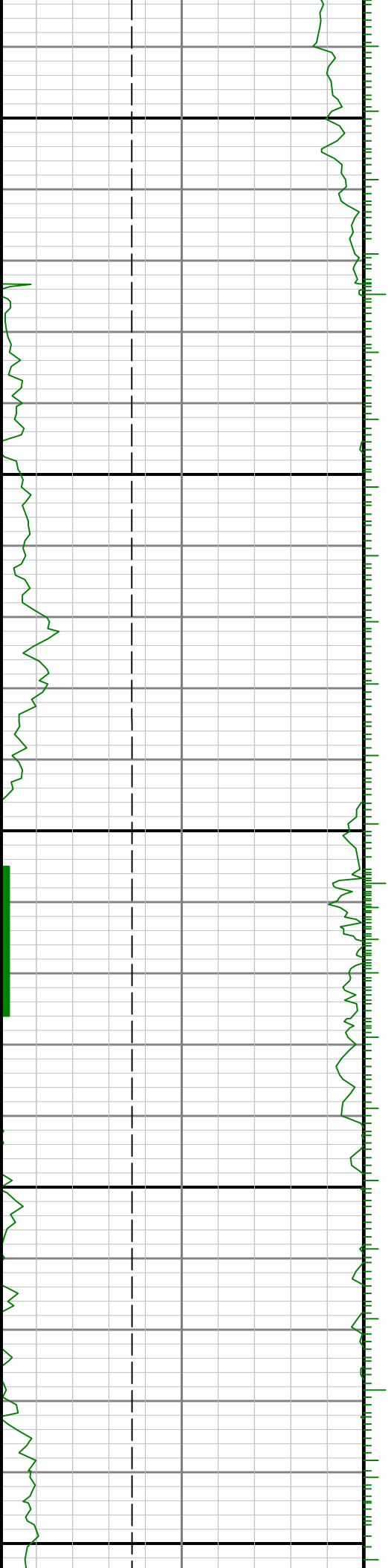




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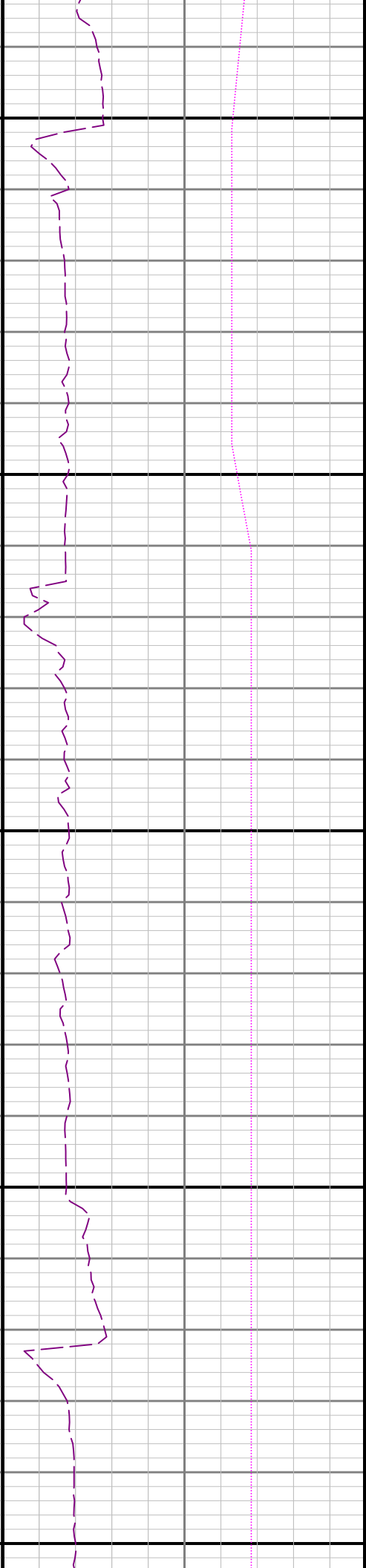
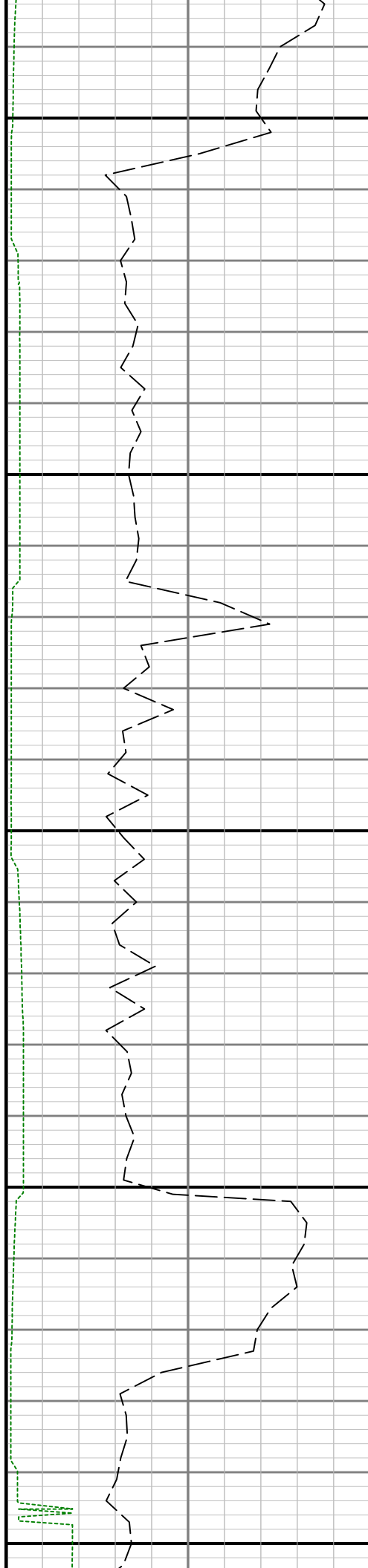


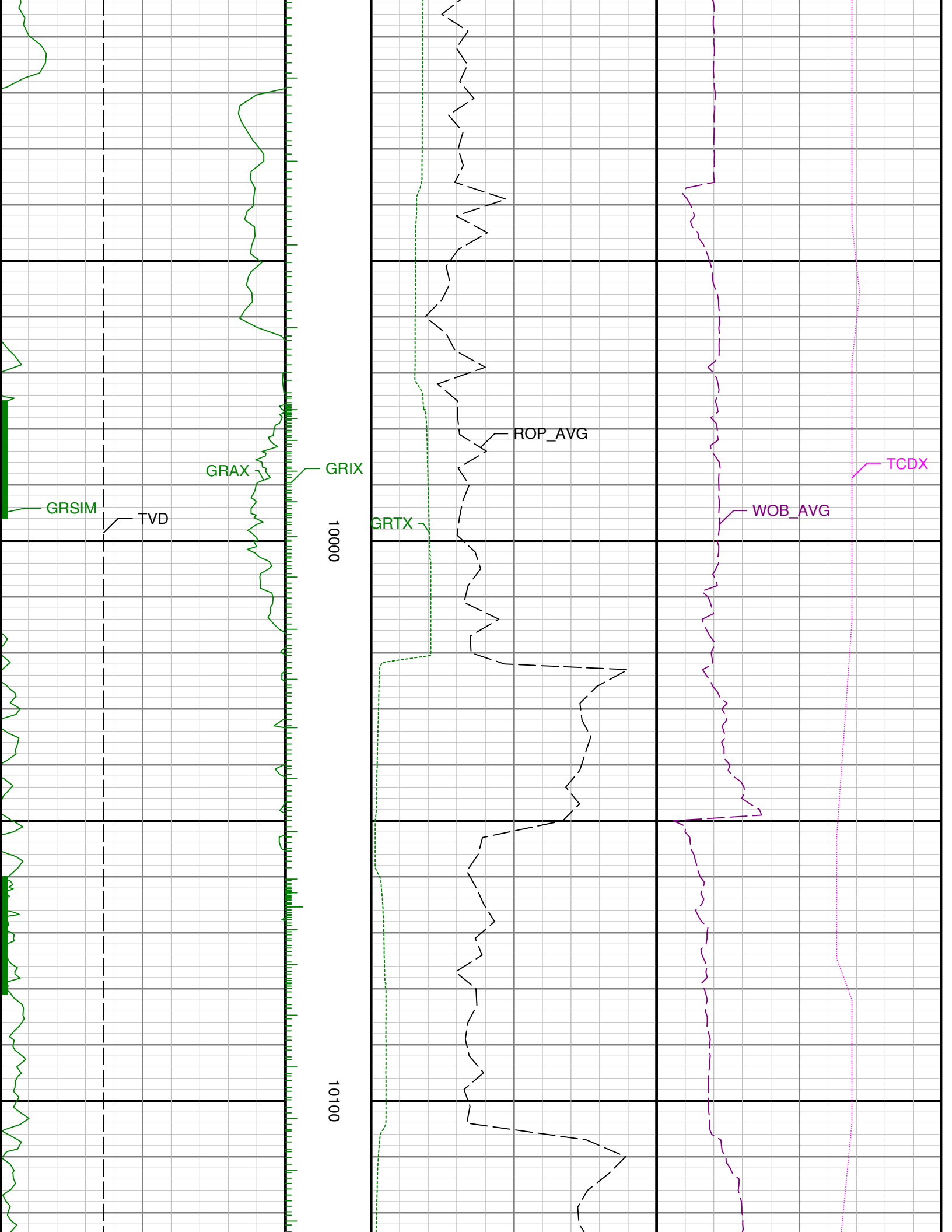


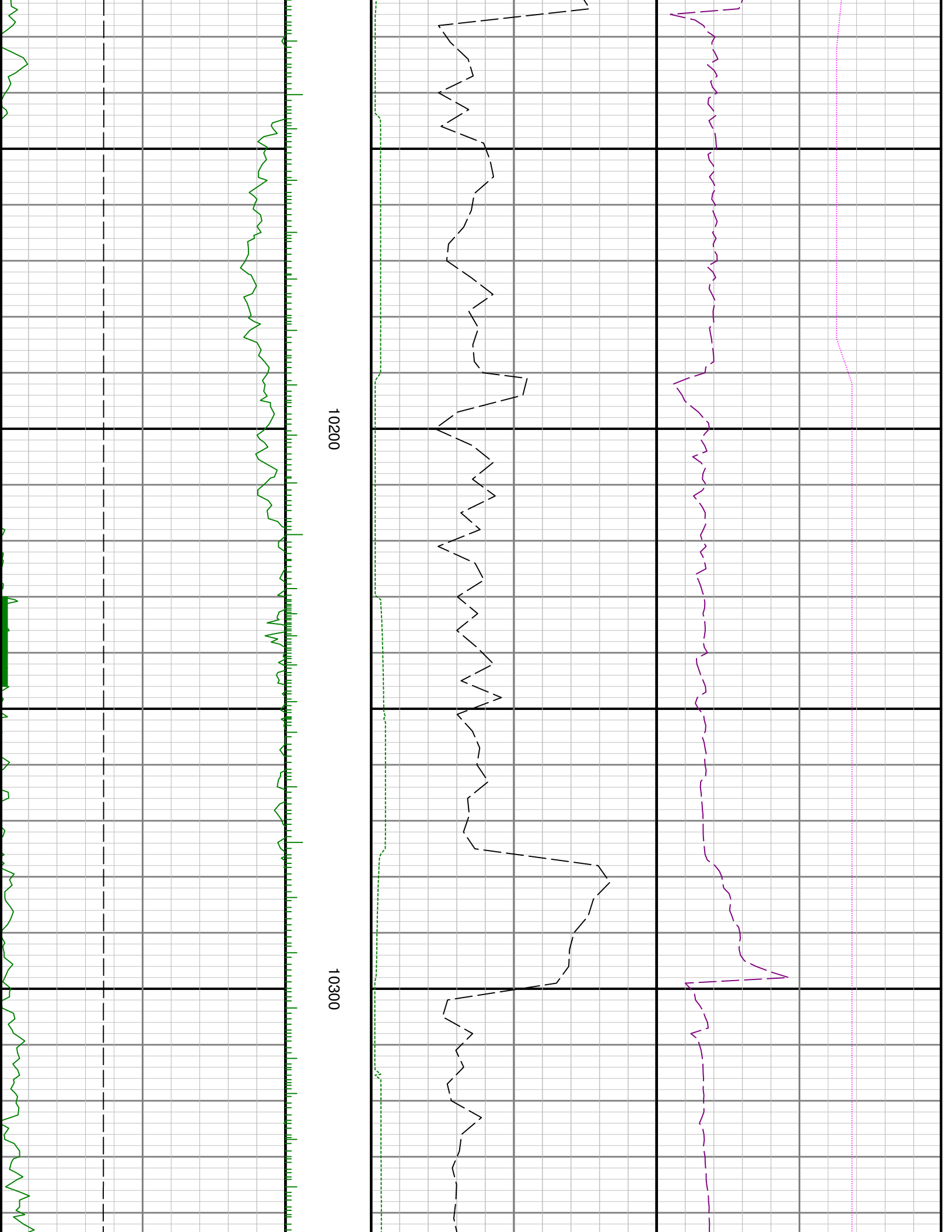
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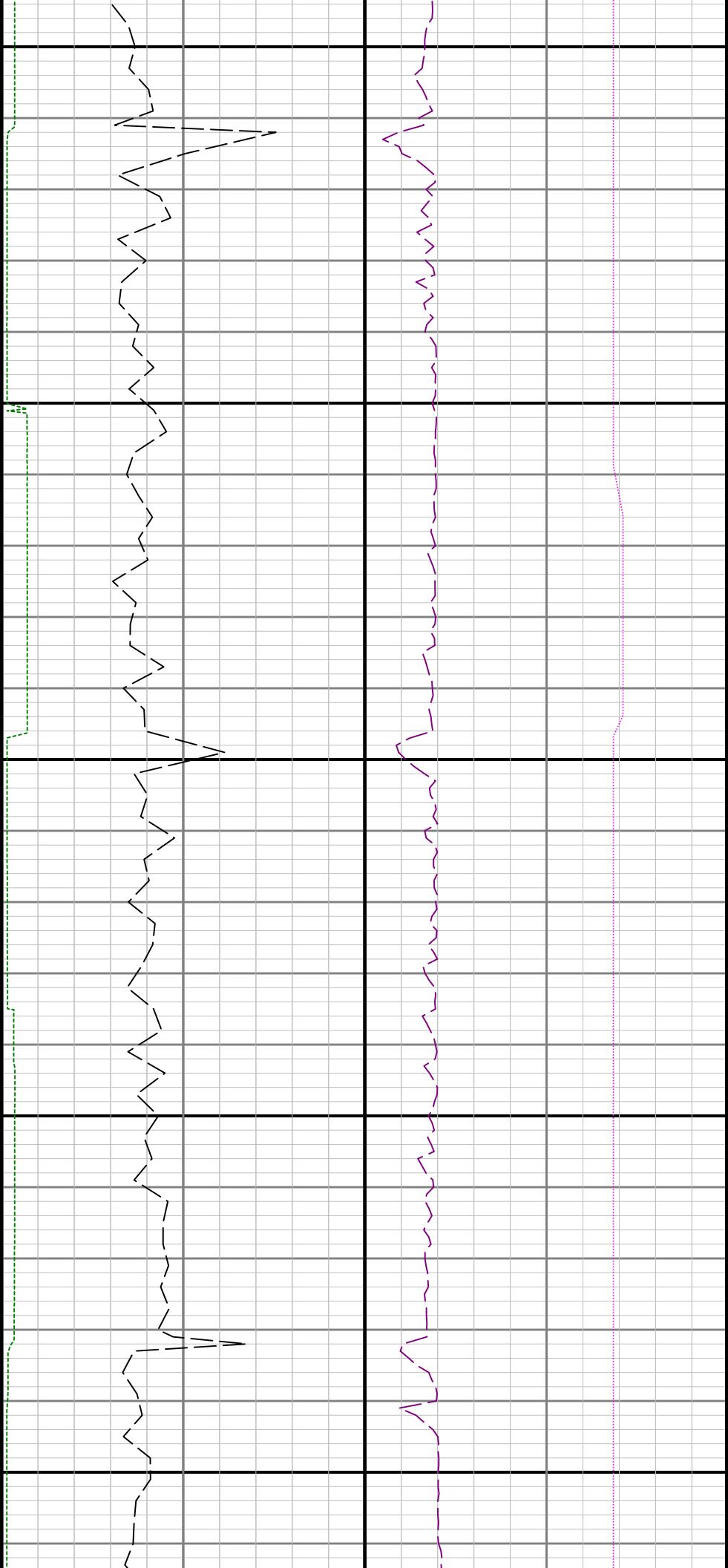
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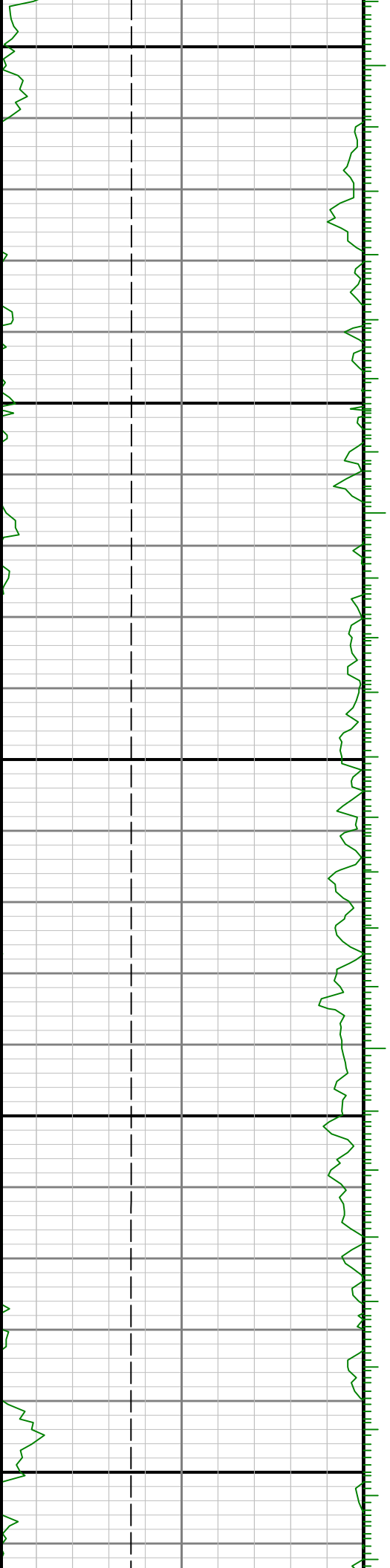


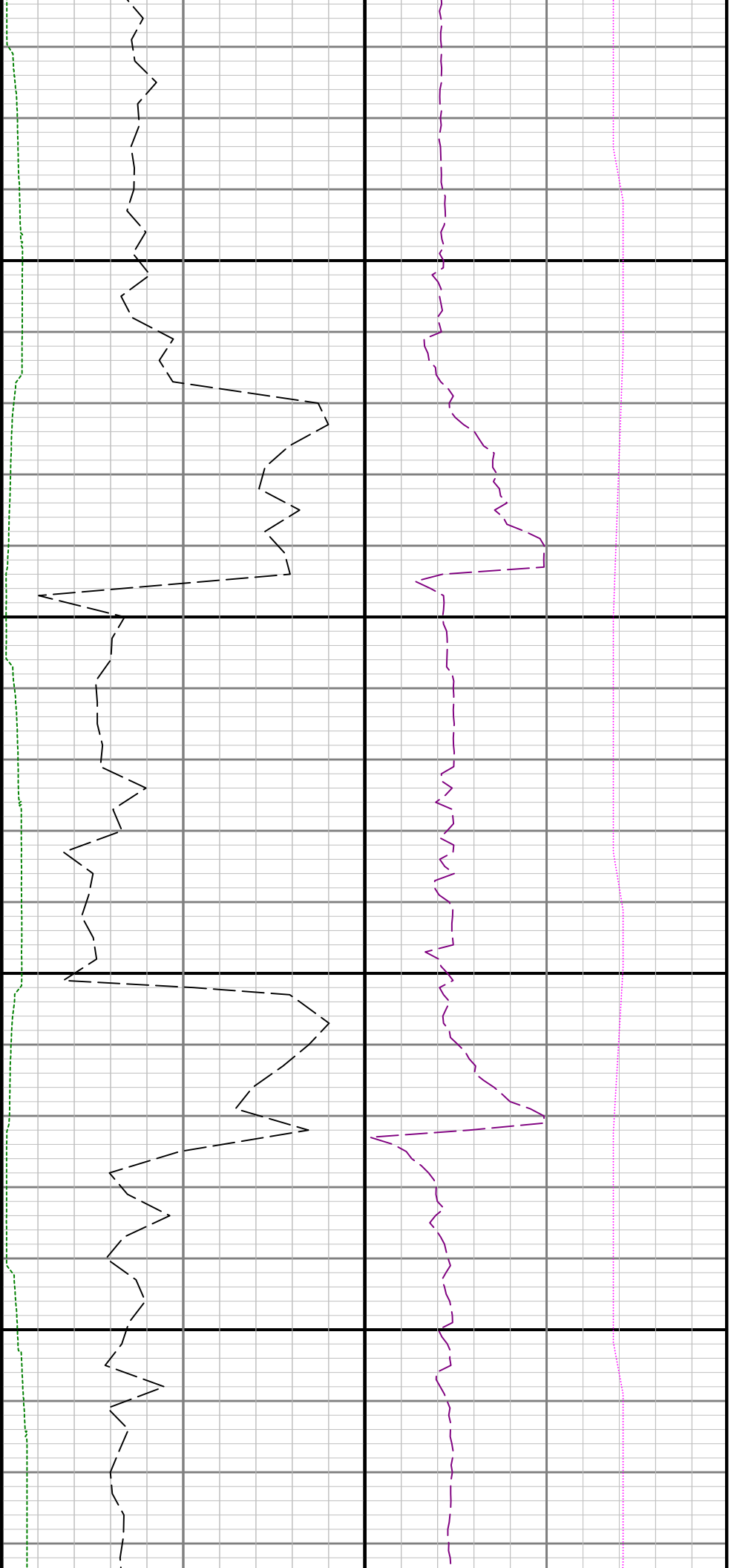




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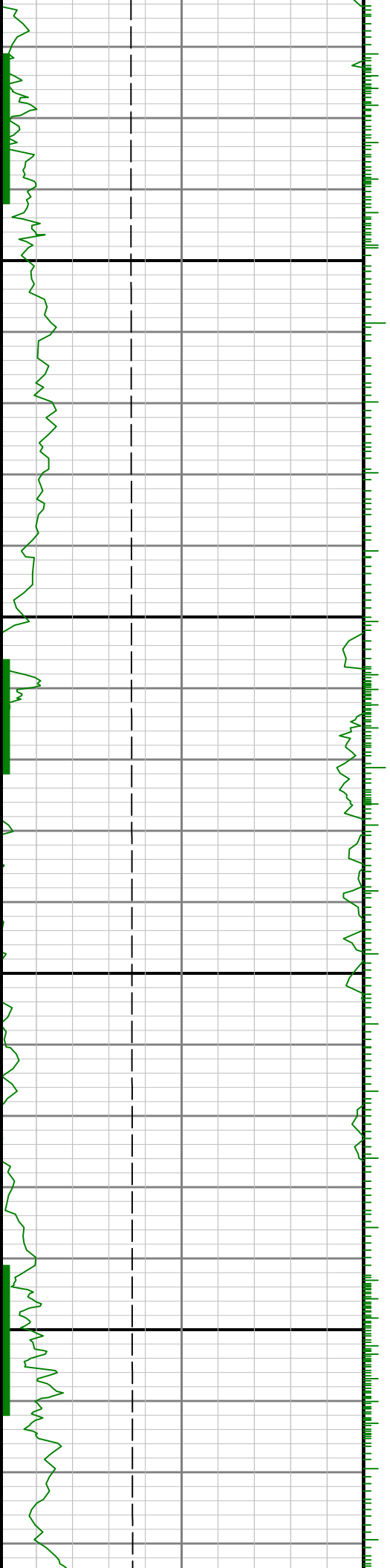
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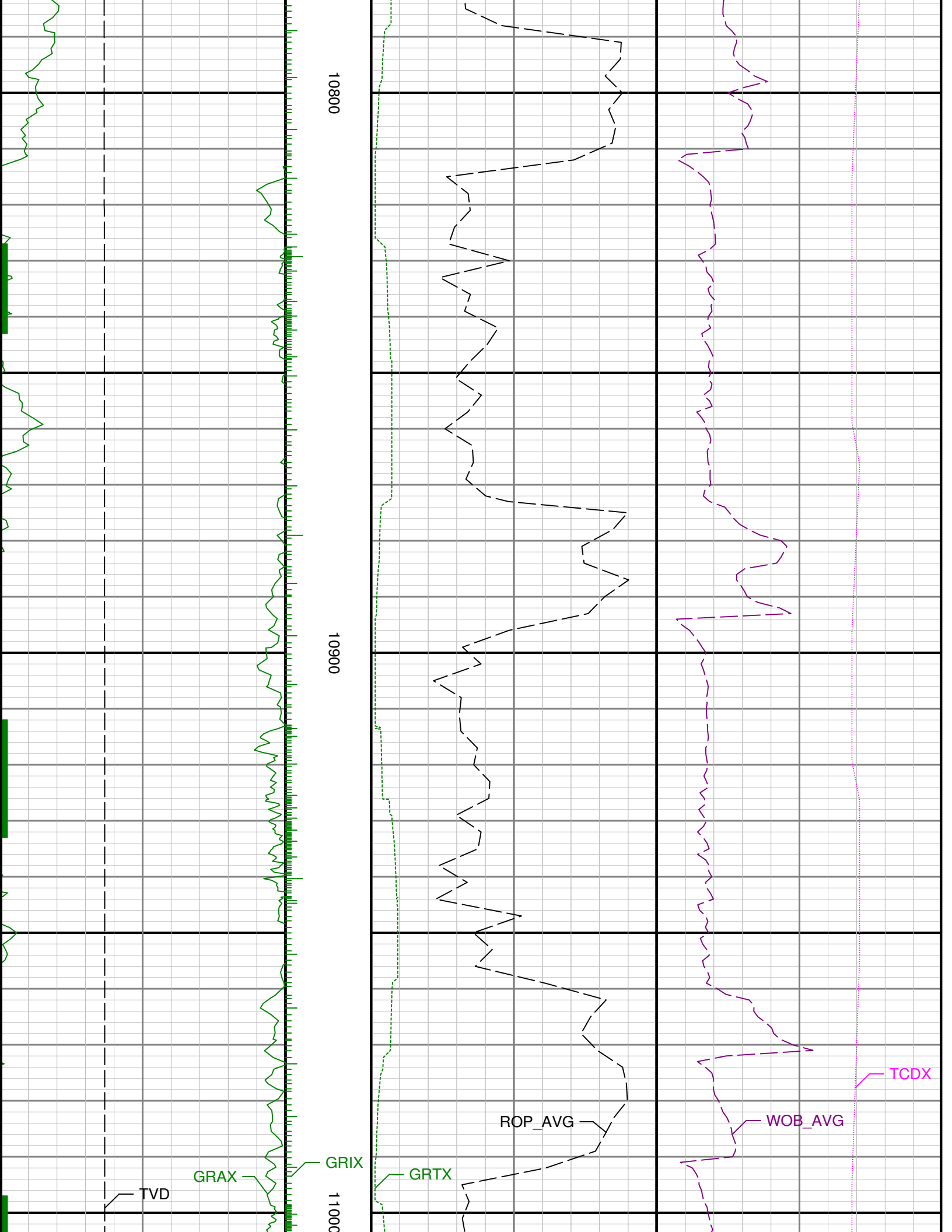


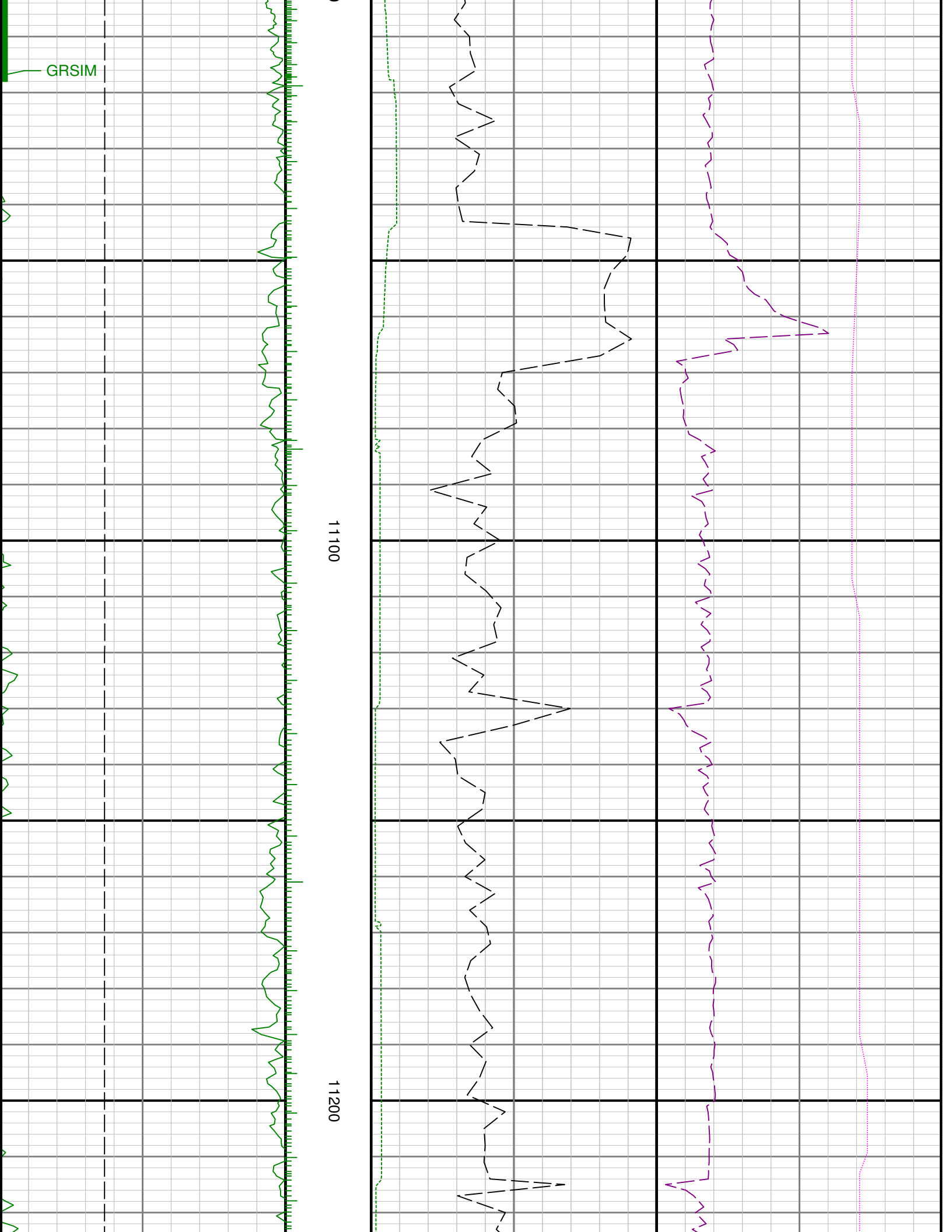


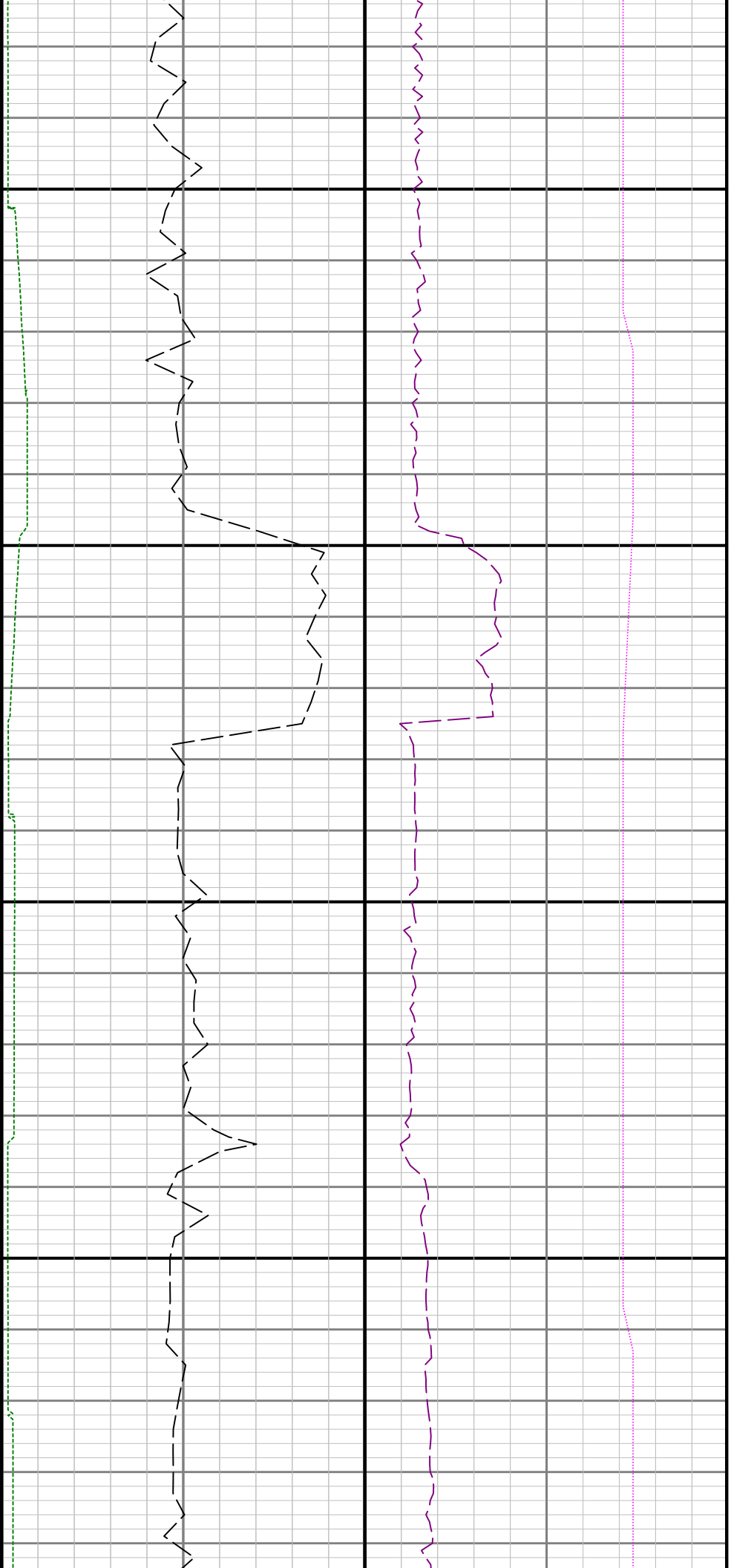
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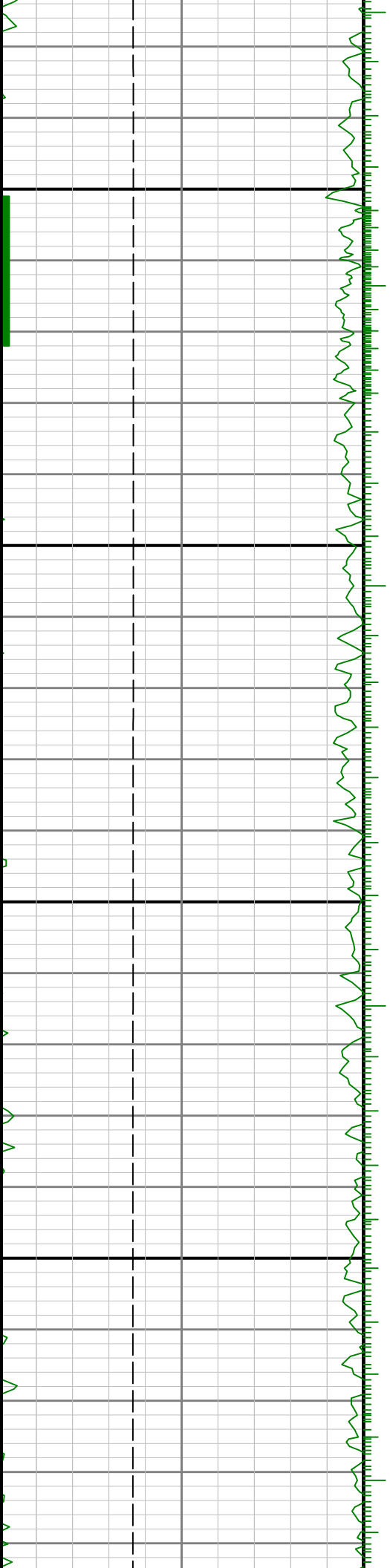


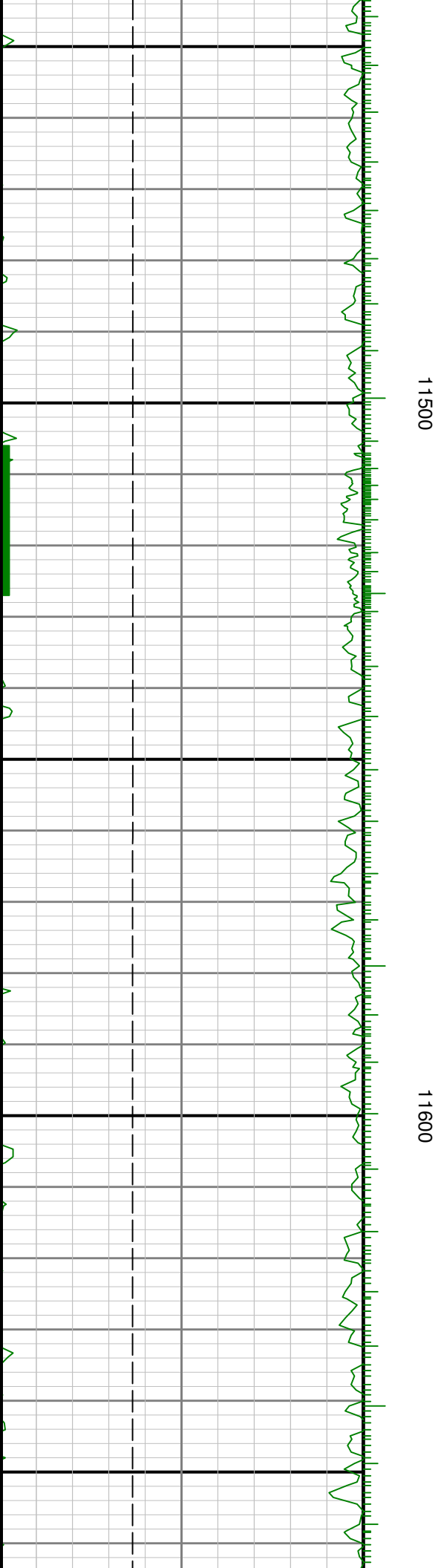
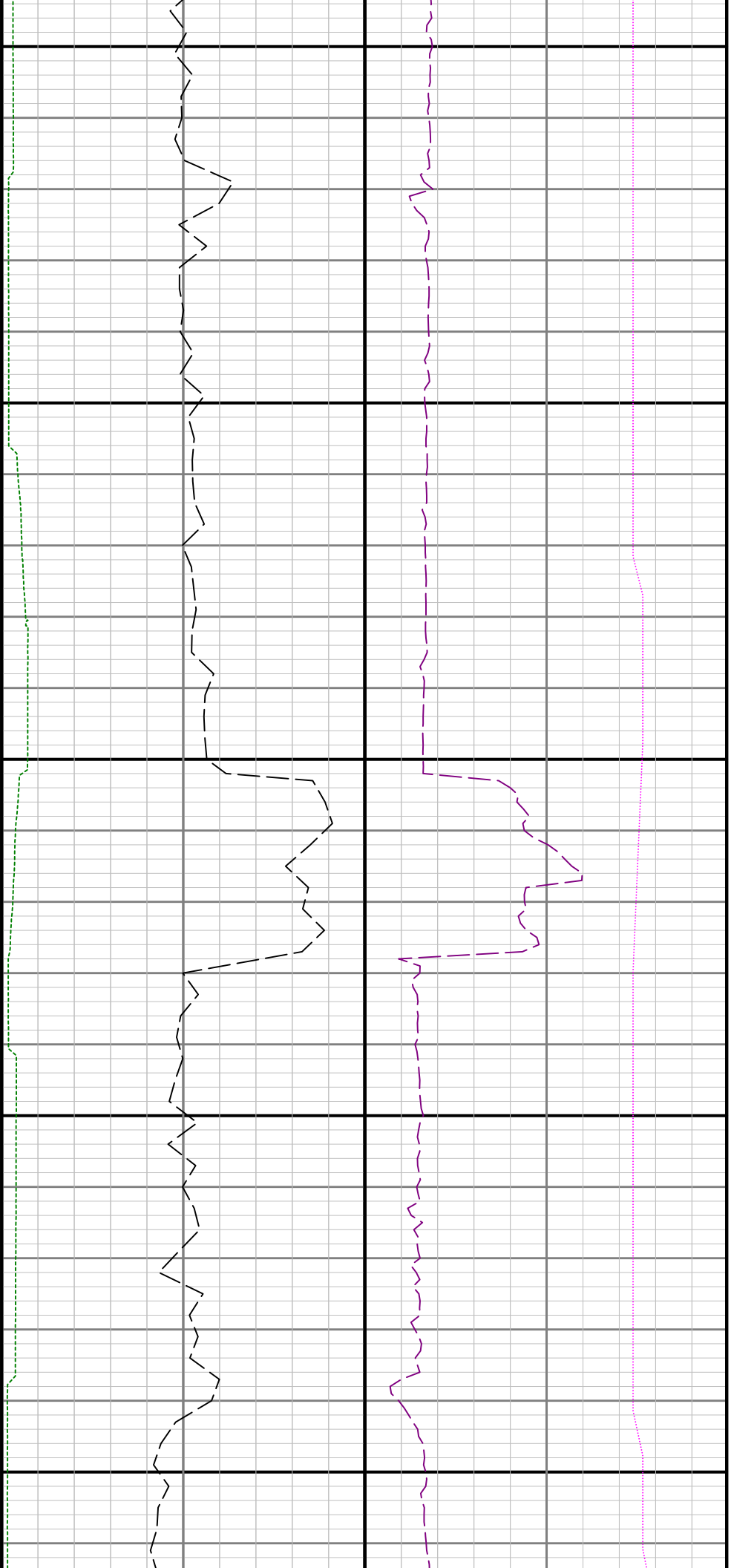


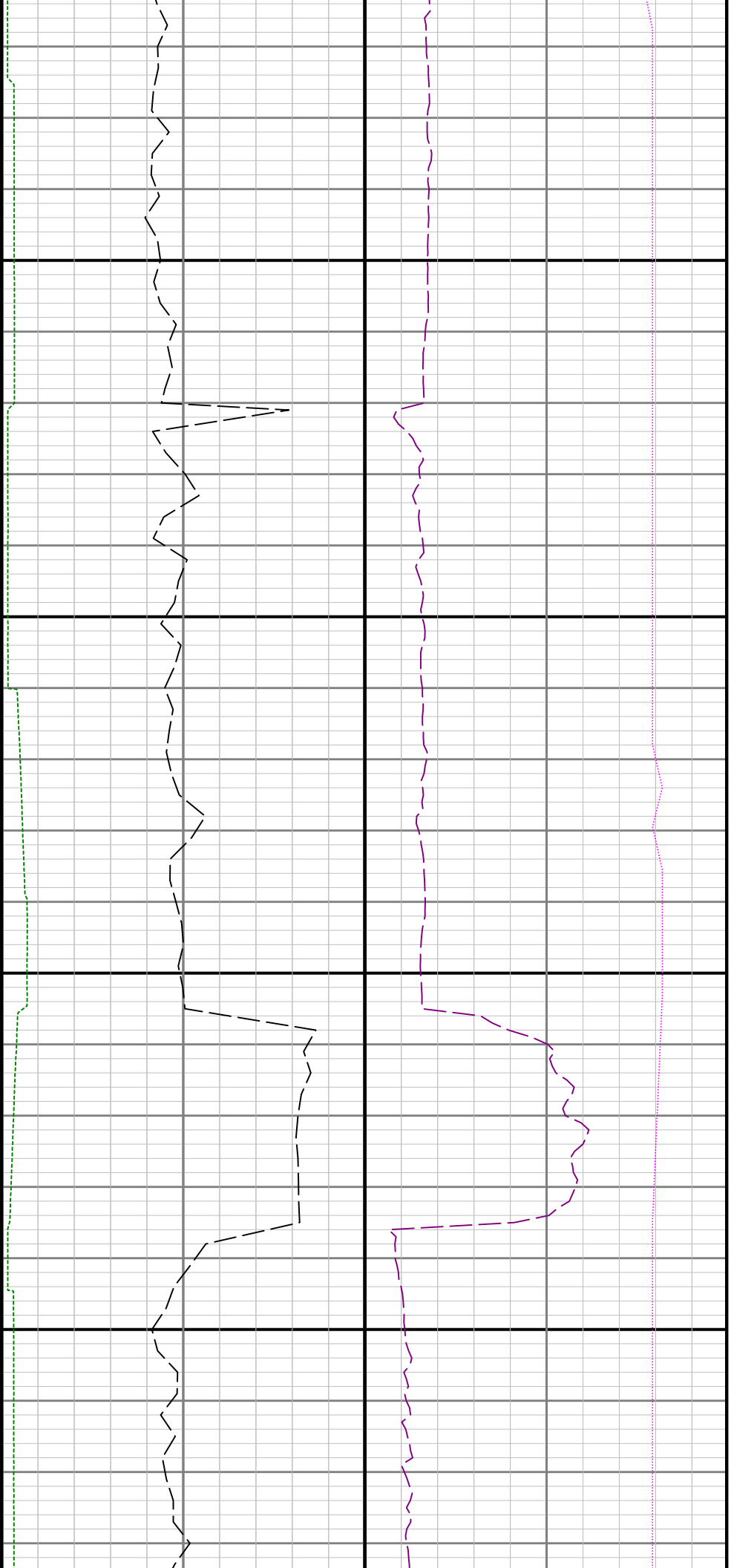


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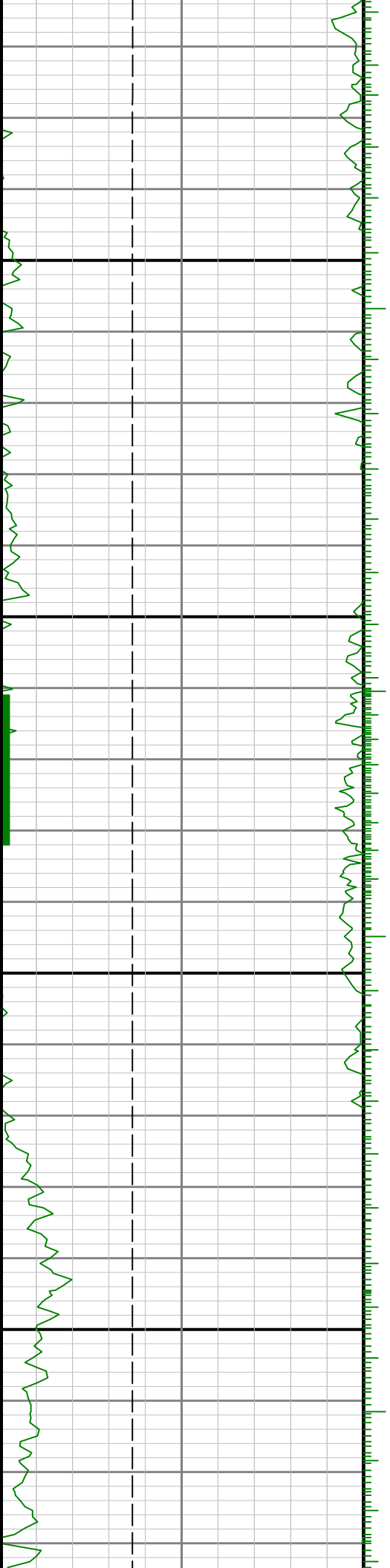


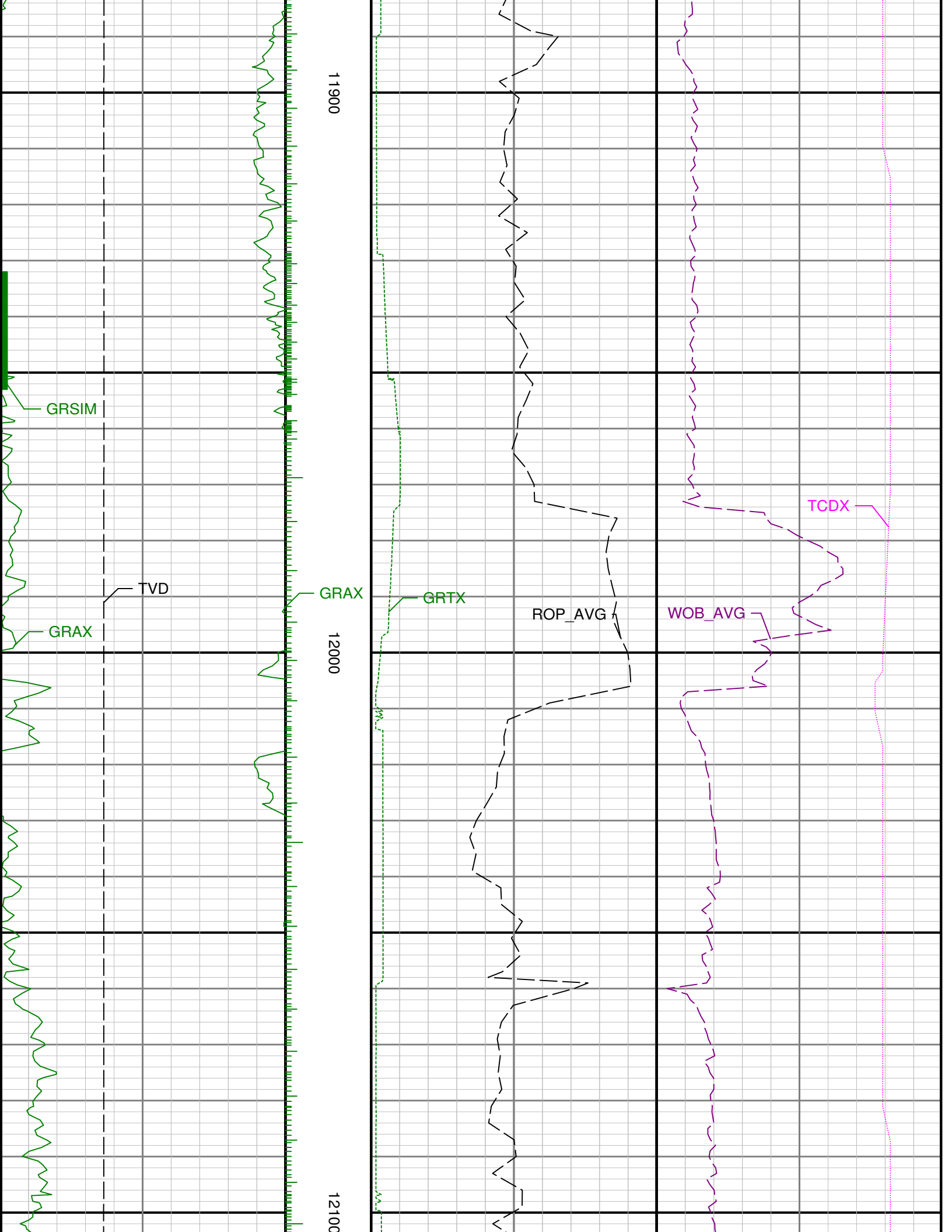


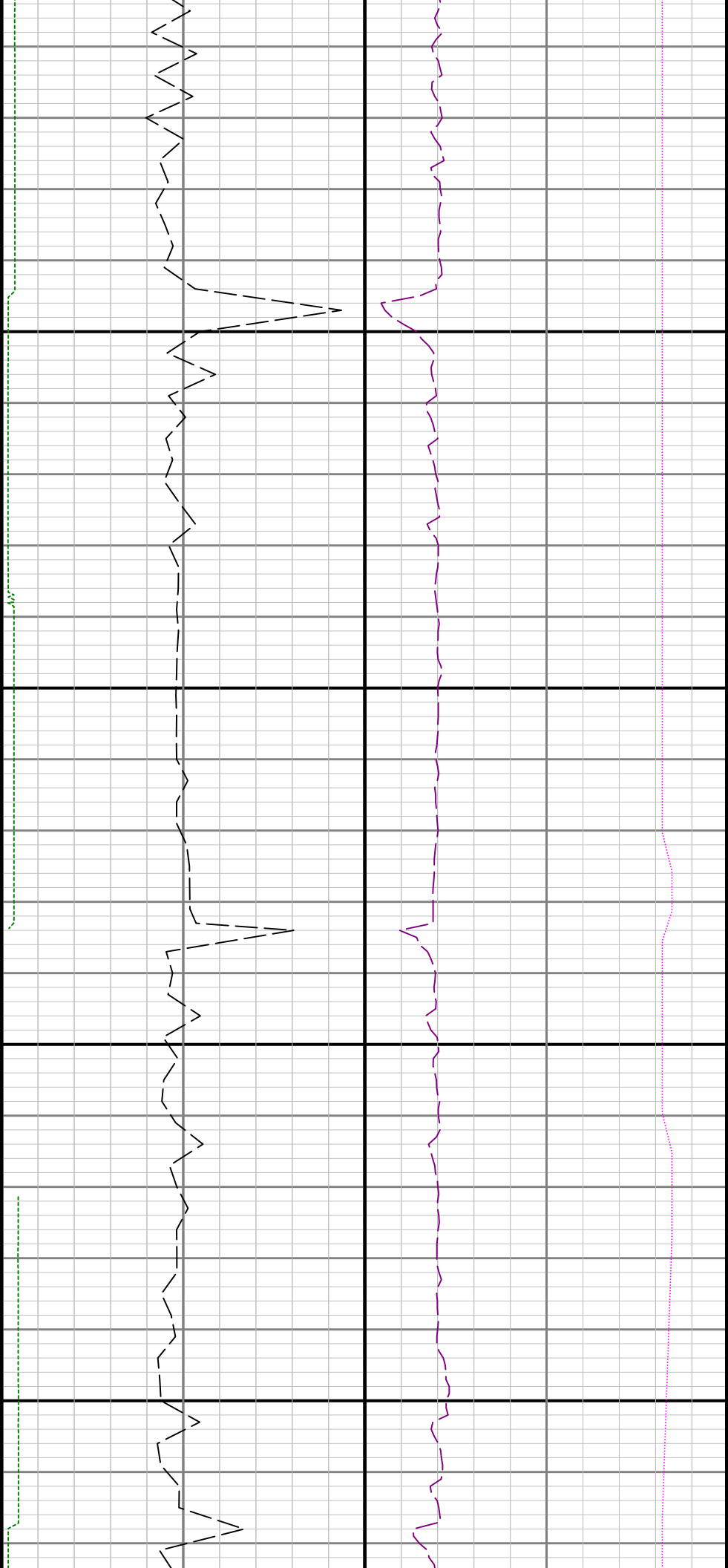


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See Remark 3

