



LWD Realtime Log

Natural Formation Evaluation
Gamma Ray

Scale:

Company: Anadarko

Well: Howard 38C-33HZ

Field: Weld County (Kerr McGee)

County: Weld State: Colorado

Status:

Final Print

Surface Location:

Latitude: 40° 1' 8.926" N

Longitude: 104° 53' 27.197" W

Other Services:

SEC: 28 TWP: 1N RNG: 67W

Directional
VSS

API Number:
05-123-38030-00

Permanent Datum (P.D.): Ground Level

Elevation: 5021.00 ft.

Elevations:

Log Measured From:

Rig Floor

5037.00 ft.

Above P.D.

KB:

DF:

GL:

Depth Reference:

Driller's Depth

KB:

DF:

GL:

Interval Logged

Dates

Magnetic Field Reference

Top: 7300.0 ft. Date From: 08/Feb/14 Date To: 16/Feb/14 Date To: 16/Feb/14 Dip Angle: 66.27° Azi Reference North: True

Bottom: 13151.0 ft. Date To: 16/Feb/14 Date To: 16/Feb/14 Total Mag to Reference

Spud Date: 08/Feb/14 Field Strength: 52630.0 nT North Correction: 8.45°

Borehole Record

Casing Record

Hole Size	From	To	Size	Weight	From	To
13,500 in.	Surface	1226.0 ft.	9.625 in.	36.00 lb/ft	Surface	1224.0 ft.
8,750 in.	1224.0 ft.	8262.0 ft.	7.000 in.	26.00 lb/ft	Surface	8252.0 ft.
6,125 in.	8252.0 ft.	13151.6 ft.				

Mud Record

Deviation Record

Type	From	To	Hole Size	Interval	Inc / Az (Start)	Inc / Az (End)
Water Based Mud	Surface	13151.0 ft.	13,500 in.	1226.0 ft.	0.0° / 0.0°	0.3° / 269.4°
			8,750 in.	7038.0 ft.	0.3° / 268.8°	88.8° / 178.3°
			6,125 in.	4899.6 ft.	88.3° / 178.3°	89.7° / 182.9°
					/	/
					/	/
					/	/
					/	/

Acquisition System

Software Version

Other

Advantage	2,20U4	Rig:	Xtreme 6	/ Xtreme Coil Drilling
PAIS	6.4.1.34	Job No:	5869500	
		District / Unit:	RMD	/ 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 (hrs.)
							Top (ft.)	Bottom (ft.)	From (ft.)	To (ft.)	Start	End	
1	1	2	8.750	PDC	6.000	Steerable	7300.0	8262.0	1224.0	8262.0	08/Feb/2014 11:30	11/Feb/2014 23:10	54.2
2	2	3	6.125	PDC	4.800	Steerable	8262.0	13151.0	8262.0	13151.0	13/Feb/2014 11:30	16/Feb/2014 04:00	39

Crew

Name	Arrive	Depart	Name	Arrive	Depart	Name	Arrive	Depart
	Wellsite	Wellsite		Wellsite	Wellsite		Wellsite	Wellsite
Matthew Delmore	06/Feb/2014	16/Feb/2014	David Campbell	06/Feb/2014	11/Feb/2014	Steven Cano	11/Feb/2014	13/Feb/2014
Prairie Handyside	13/Feb/2014	16/Feb/2014	David Campbell	15/Feb/2014	16/Feb/2014			

Mud Properties Record

Date / Time	LWD Run No.	Measured Depth (ft.)	Mud Type	Density (ppg)	Viscosity (cp)	pH	Fluid Loss (cc)	Oil / Water	Source	Total Chlorides (ppm)	K+ (%)
08/Feb/2014 22:00	1	1999.0	Water Based Mud	8.5	28	9.4	NA	0/99	Suction Line	1200	N/A
09/Feb/2014 22:00	1	5425.0	Water Based Mud	8.7	27	8.5	NA	0/98	Suction Line	1200	N/A
10/Feb/2014 22:00	1	7637.0	Water Based Mud	10.0	48	9.3	6.0	1/89	Suction Line	1500	N/A
11/Feb/2014 22:00	1	8262.0	Water Based Mud	10.0	58	9.7	4.3	1/89	Suction Line	2500	N/A
12/Feb/2014 08:00	1	8262.0	Water Based Mud	9.9	48	9.7	5.3	1/91	Suction Line	2500	N/A
13/Feb/2014 22:00	2	8663.0	Water Based Mud	9.3	40	10.0	5.0	1/93	Suction Line	2400	N/A
14/Feb/2014 22:00	2	11585.0	Water Based Mud	9.5	43	9.8	4.7	1/92	Active Pit	2500	N/A
15/Feb/2014 09:00	2	13129.0	Water Based Mud	9.6	46	9.4	4.1	0/93	Active Pit	2500	N/A

Mnemonics

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

Equipment and Service Data

LWD Run No.	Tool	Serial Number	Measurement	Bit Offset (ft)	Max O.D. (in.)	Min I.D. (in.)
1	DIR	12479852	Directional	47.24	6.750	3.250
1	SRIG	12432306	Gamma	43.87	6.750	3.250
2	DIR	10427973	Directional	51.00	4.750	1.750
2	SRIG	10658453	Gamma	47.62	4.750	1.750

Service and Tool Mnemonics

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

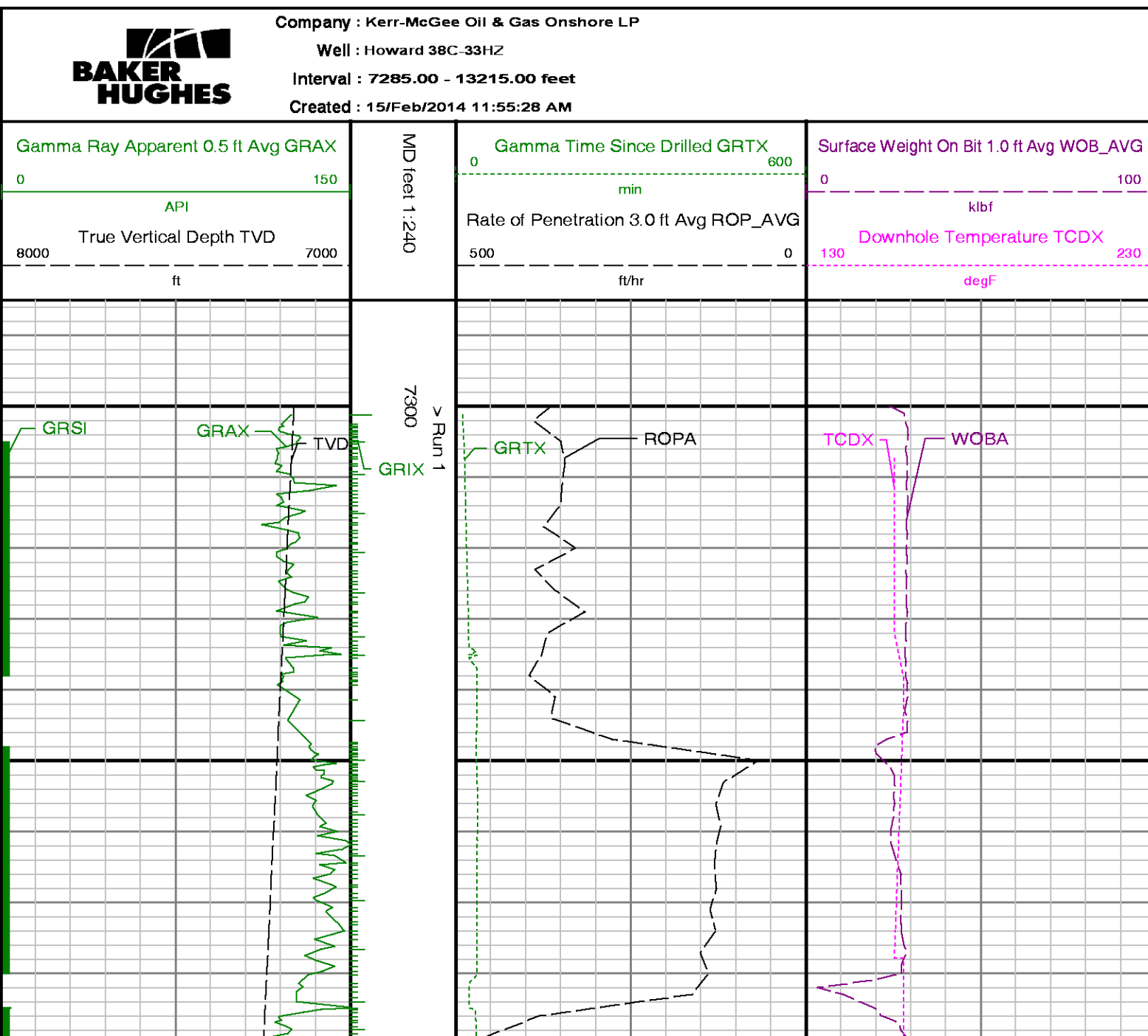
Comments

<p>1.) Baker Hughes LWD run 1 utilized 6 3/4 inch NaviTrak Services (VSS, Directional) behind an 8 3/4 inch bit and steerable assembly from 1224 to 7300 ft. MD (1224 to 7161.25 ft. TVD). NaviGamma Services (VSS, Directional, Gamma Ray) was also provided from 7300 to 8262 ft. MD (7161.25 to 7789.57 ft. TVD).</p> <p>2.) Baker Hughes LWD run 2 utilized 4 3/4 inch NaviGamma Services (VSS, Directional, Gamma Ray) behind an 6 1/8 inch bit and steerable assembly from 8262 to 13151 ft. MD (7161.25 to 7789.57 ft. TVD).</p> <p>3.) Additional information is available in the full wellbore survey report. The information is available in the full wellbore survey report.</p>

3.) A sliding indicator is shown to the left of track 1 as a heavy green line. The indicator has been depth-shifted to the gamma sensor onset to correspond with data acquired while sliding.

4.) Depth measurements were obtained from a depth tracking system not supplied or operated by Baker Hughes. Due to the lack of control by Baker Hughes LWD logging engineers, depth calibrations and measurements could not be independently verified and the unverified depths as supplied to Baker Hughes are being used to present logging data.

Remarks				
Number	Measured Depth (ft)	Hole Section (in.)	LWD Run No.	Remark
1	8230	6.125	2	The interval from 8222 to 8265 ft. MD (7787.99 to 7789.63 ft. TVD) was not logged for up to 56.25 hours after drilling due to a trip to surface for casing operations and a new BHA for run 2.
2	13125	6.125	2	The interval from 13104 to 13151 ft. MD (7779.17 to 7779.40 ft. TVD) has no GRAX, GRIX or GRTX due to bit to sensor offset.

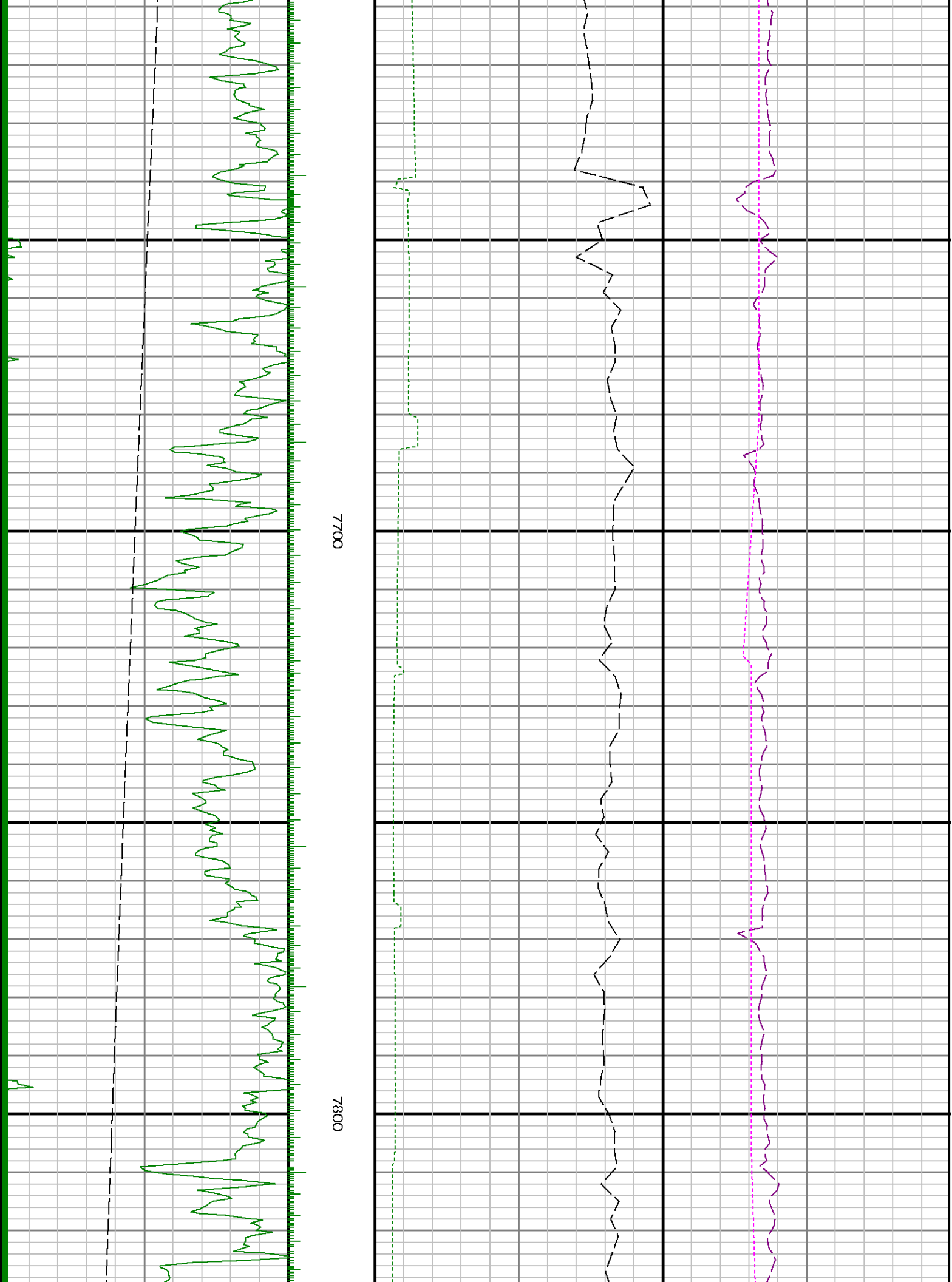


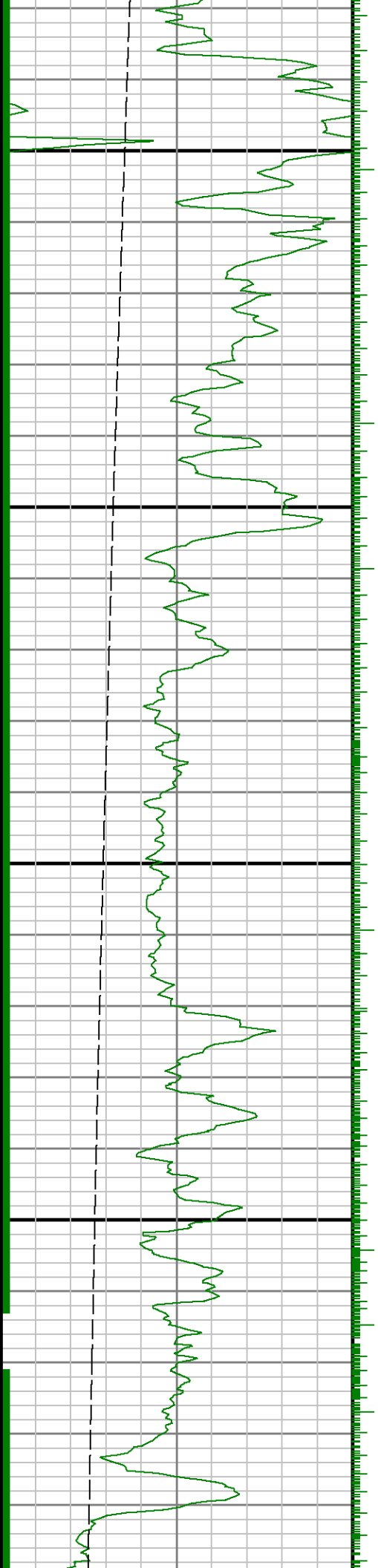


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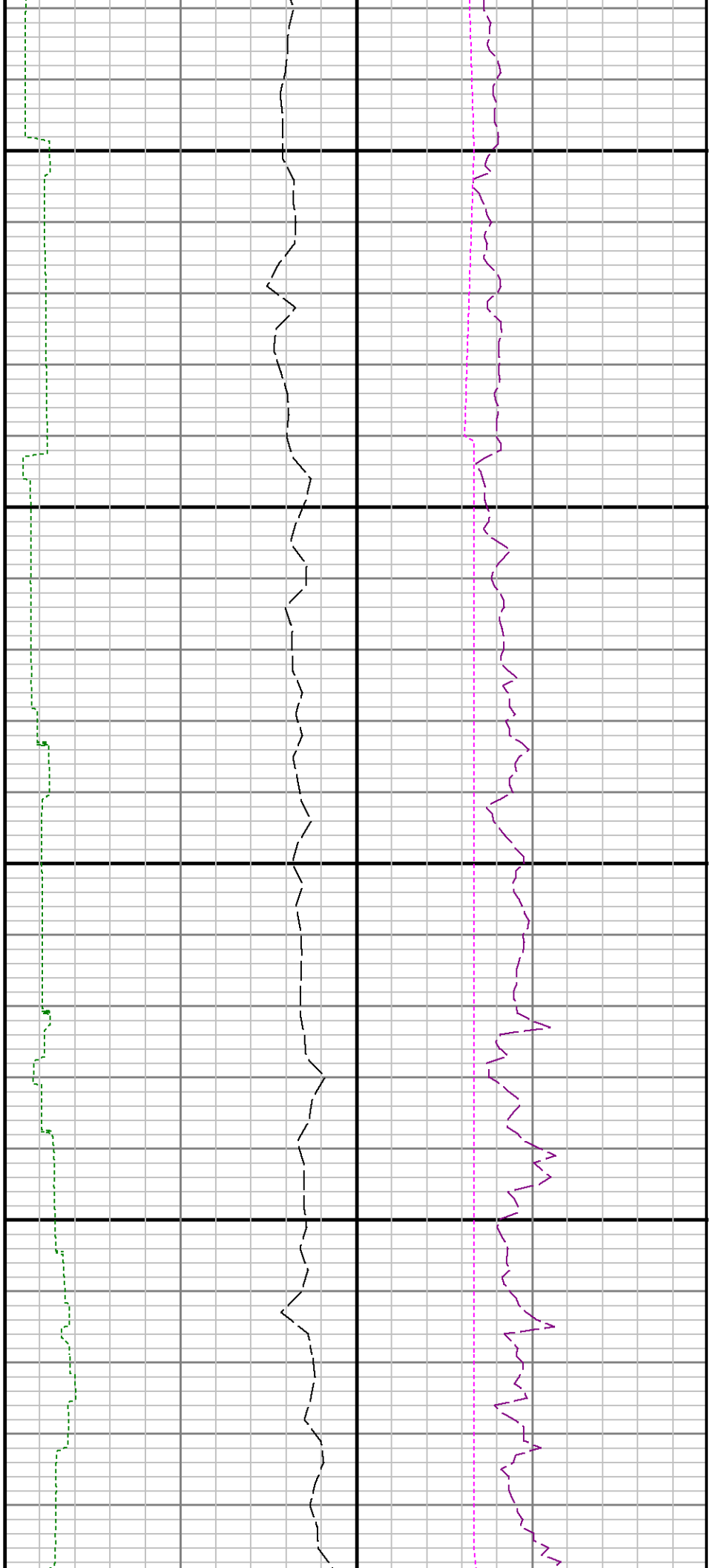
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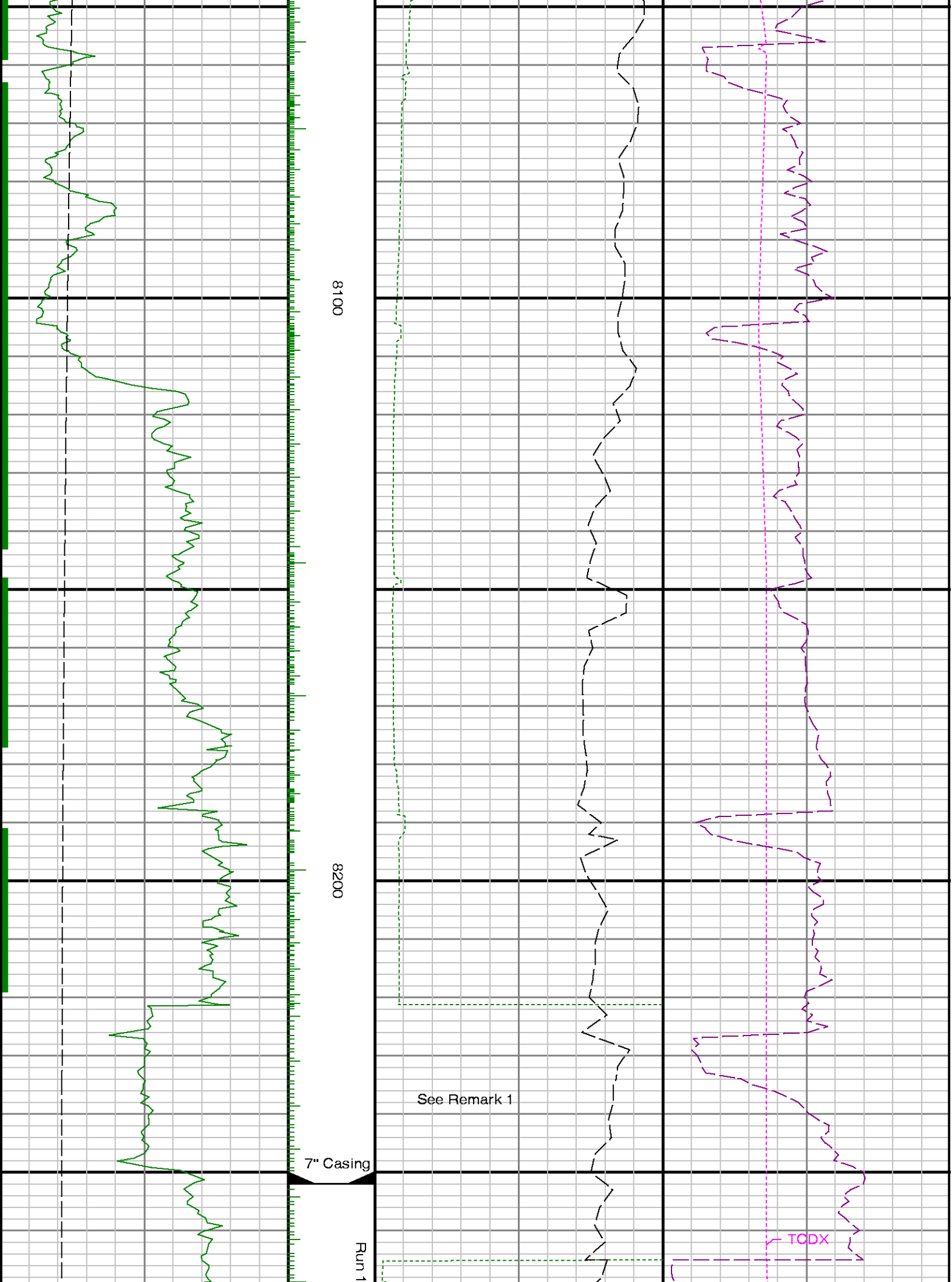


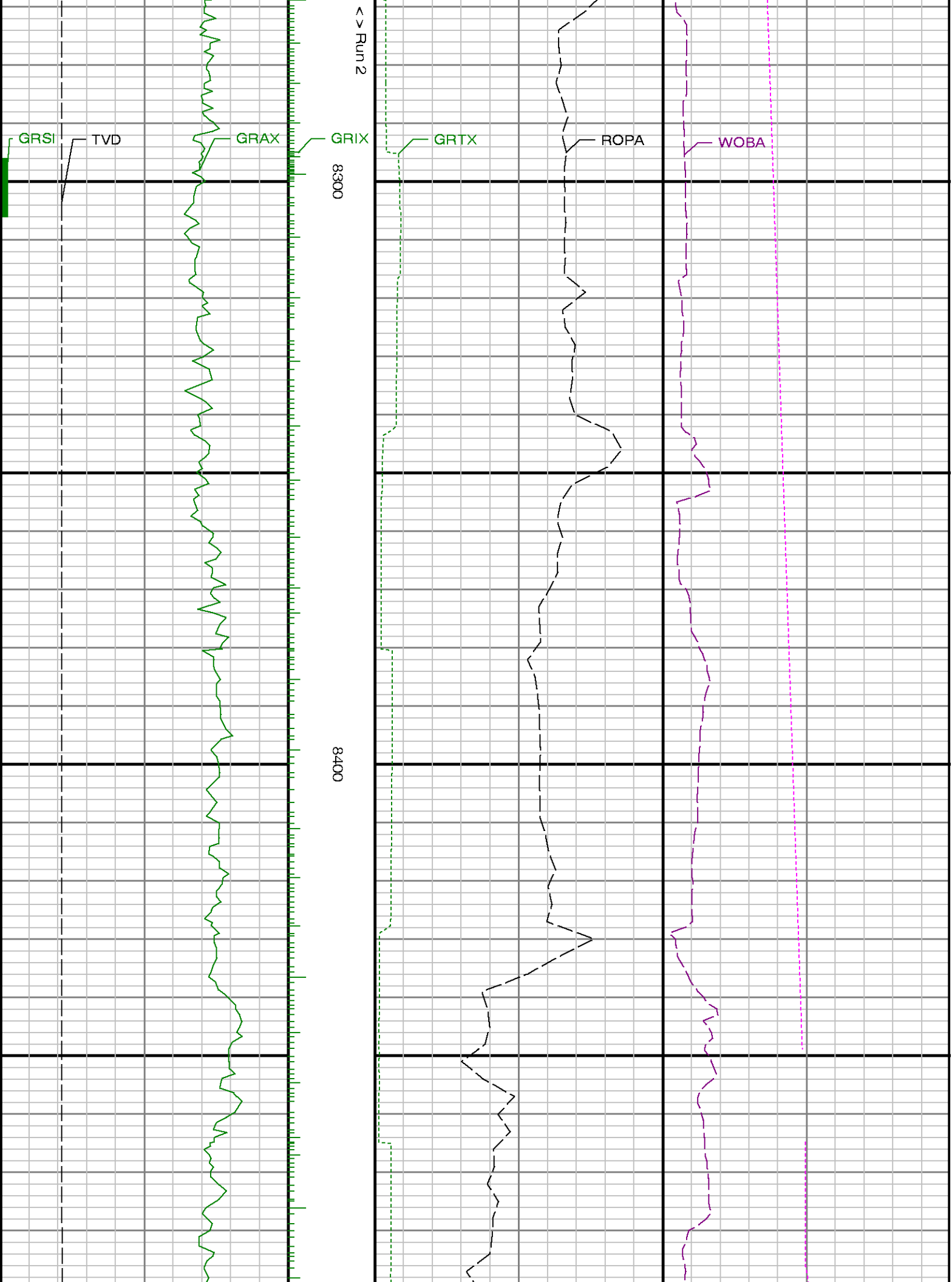


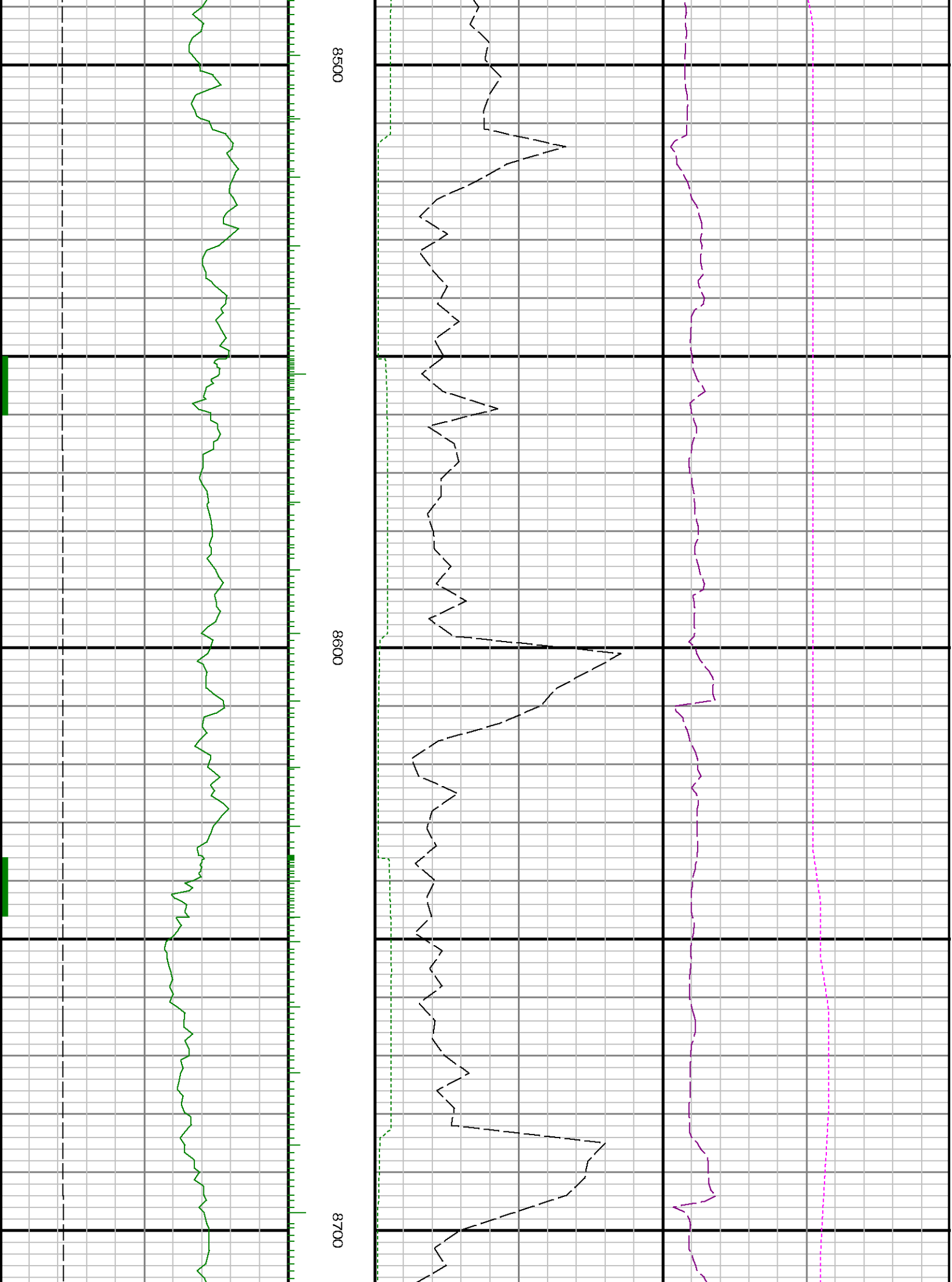
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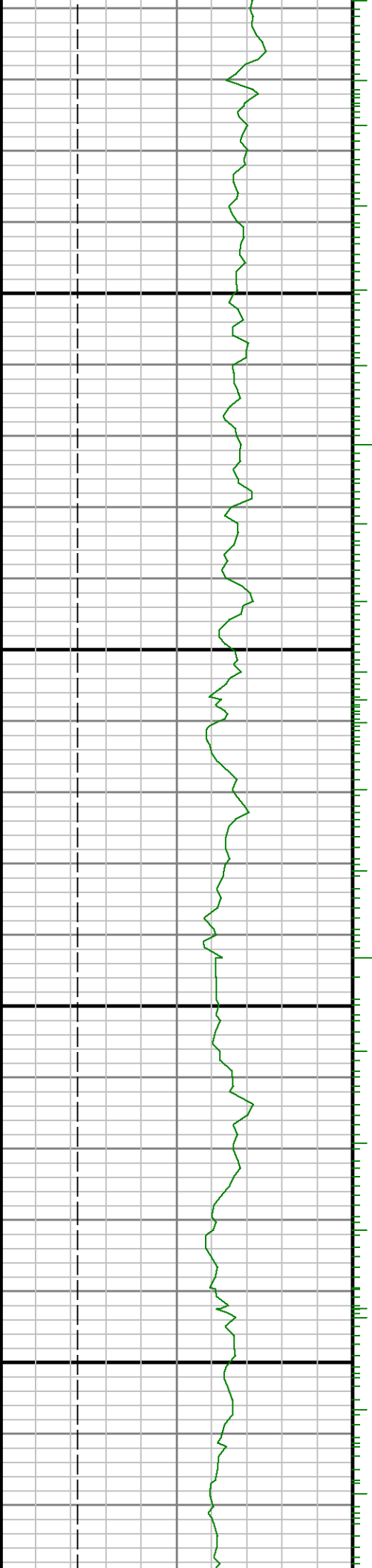
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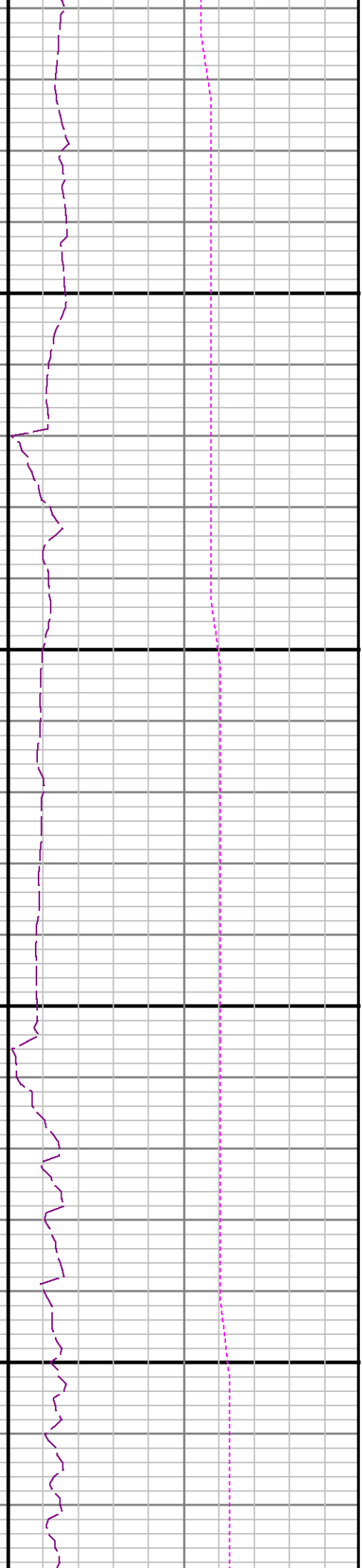
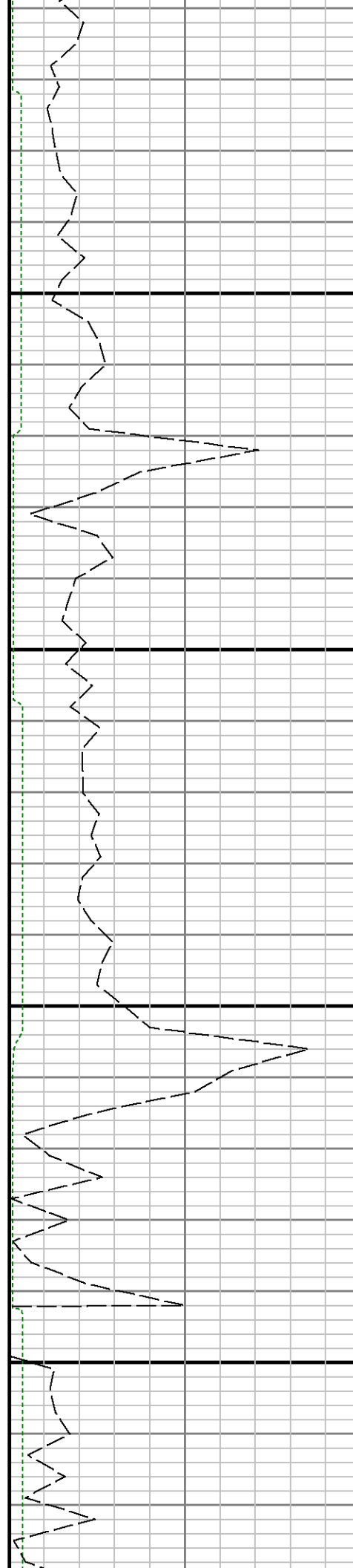


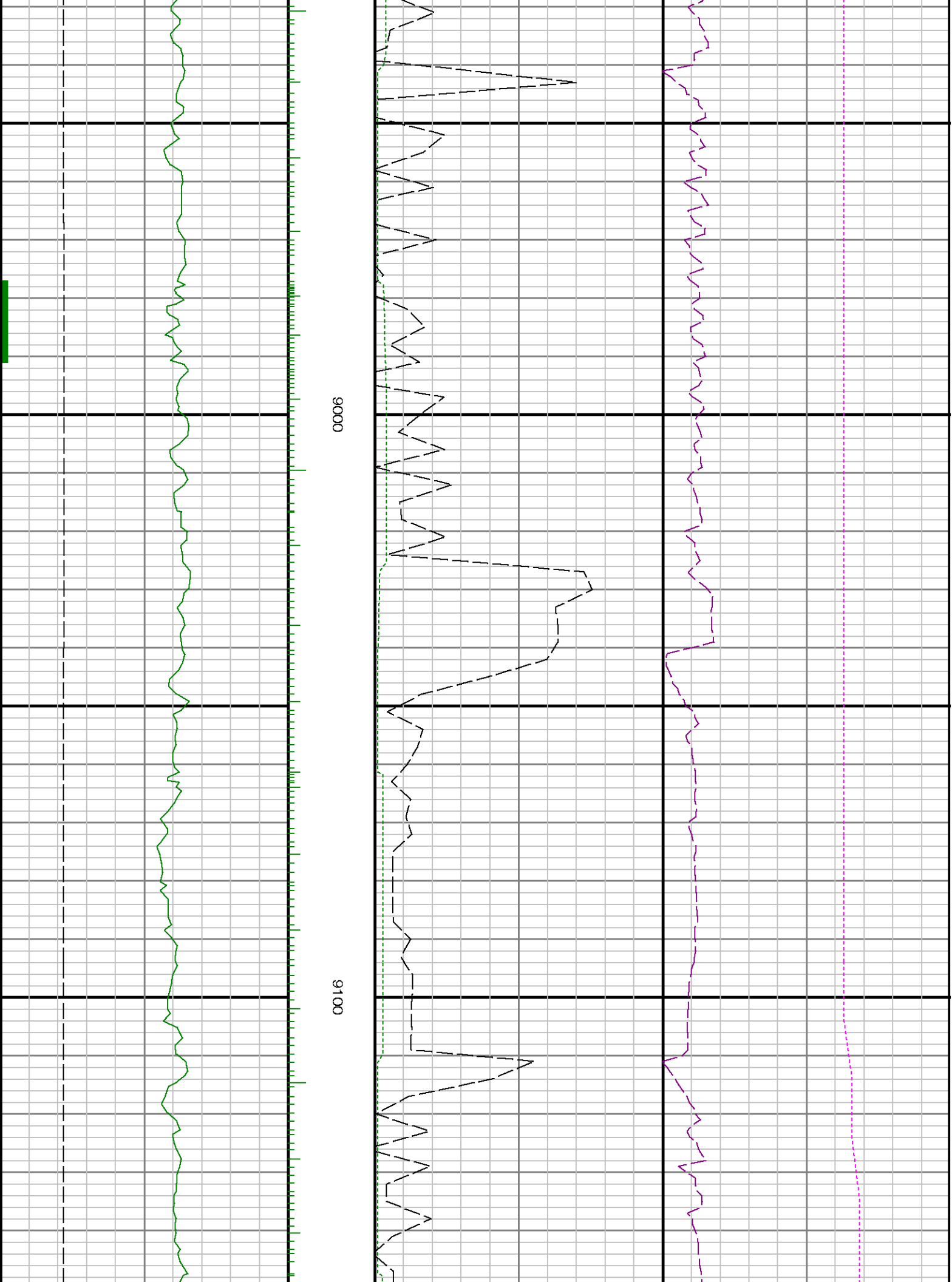


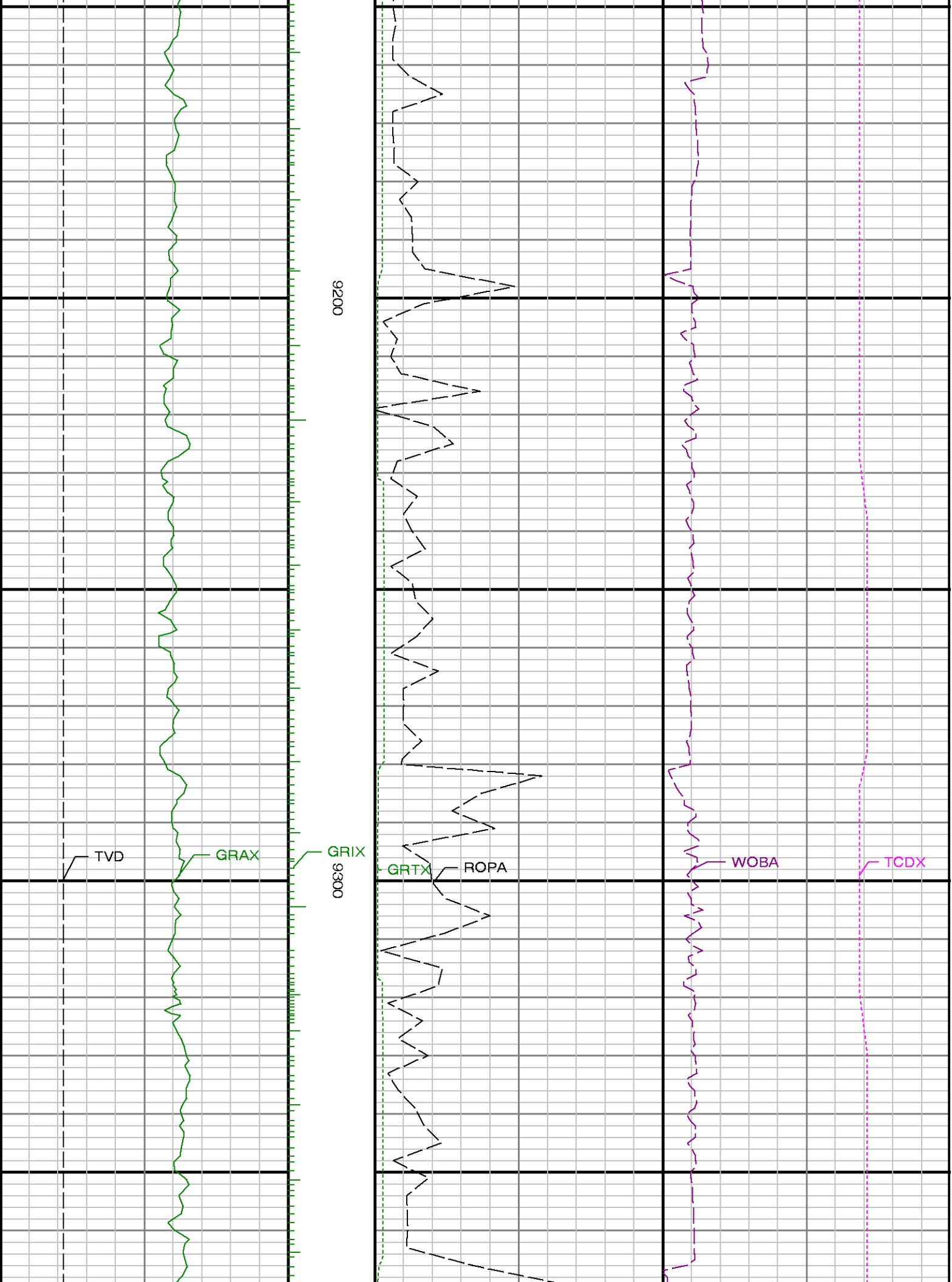


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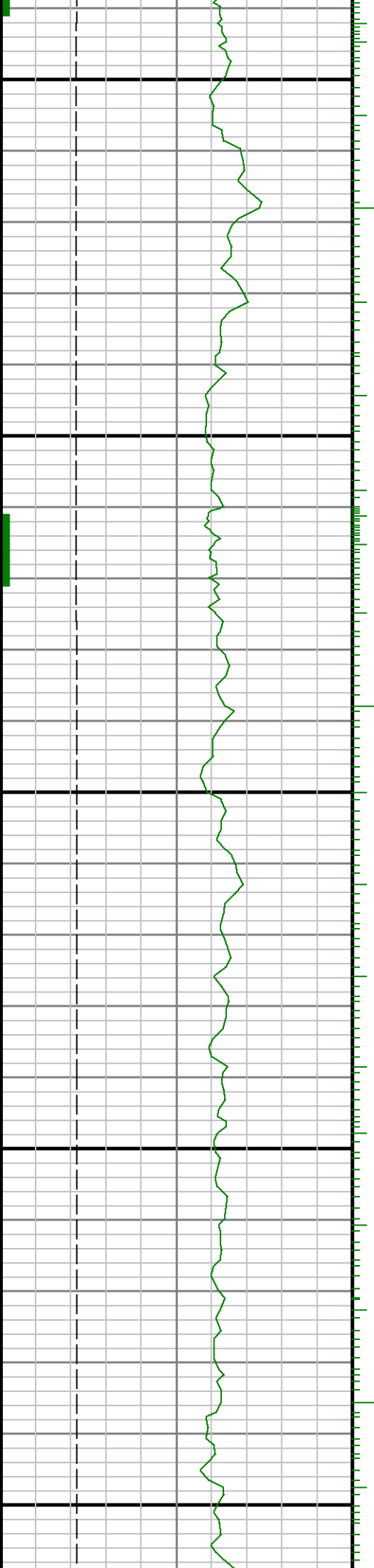
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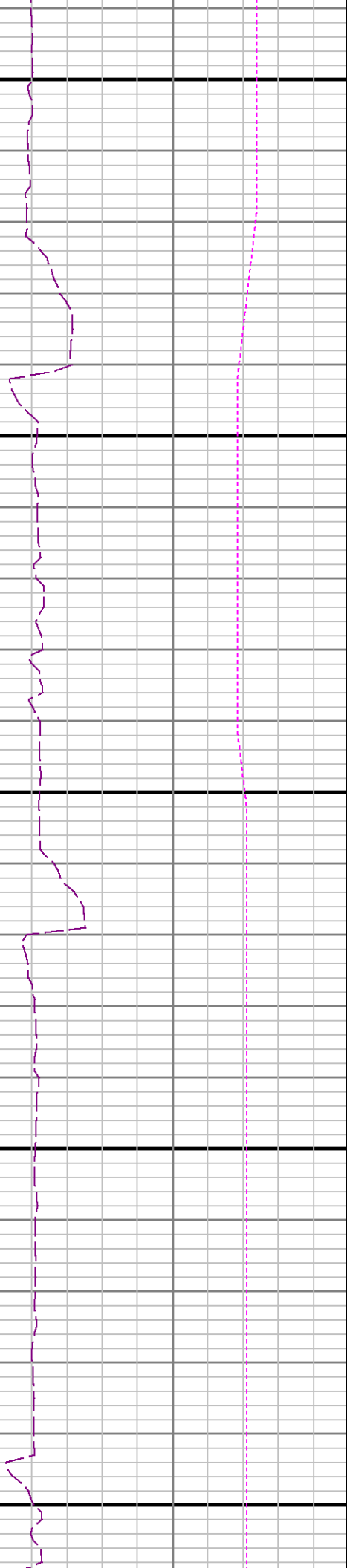


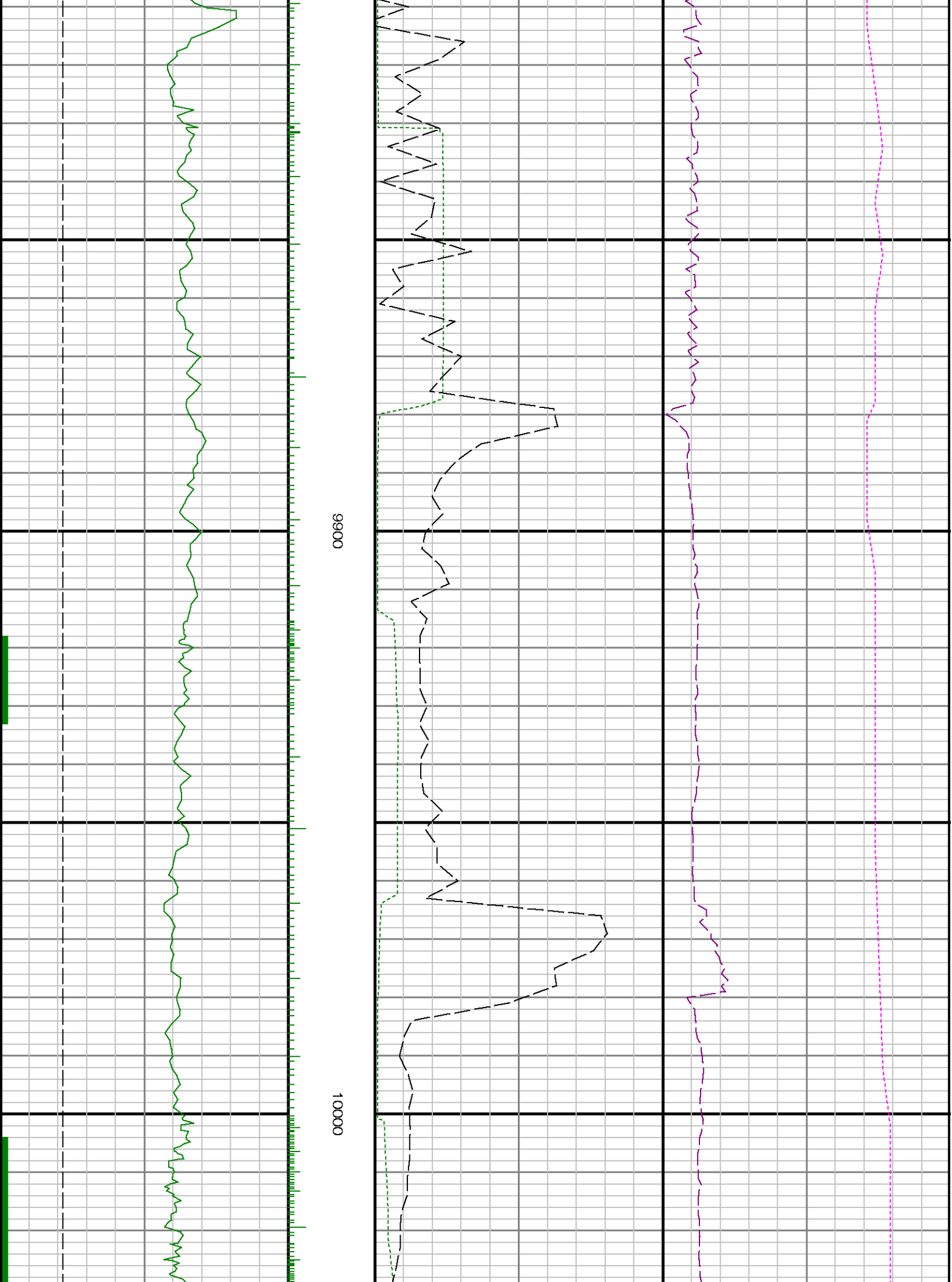


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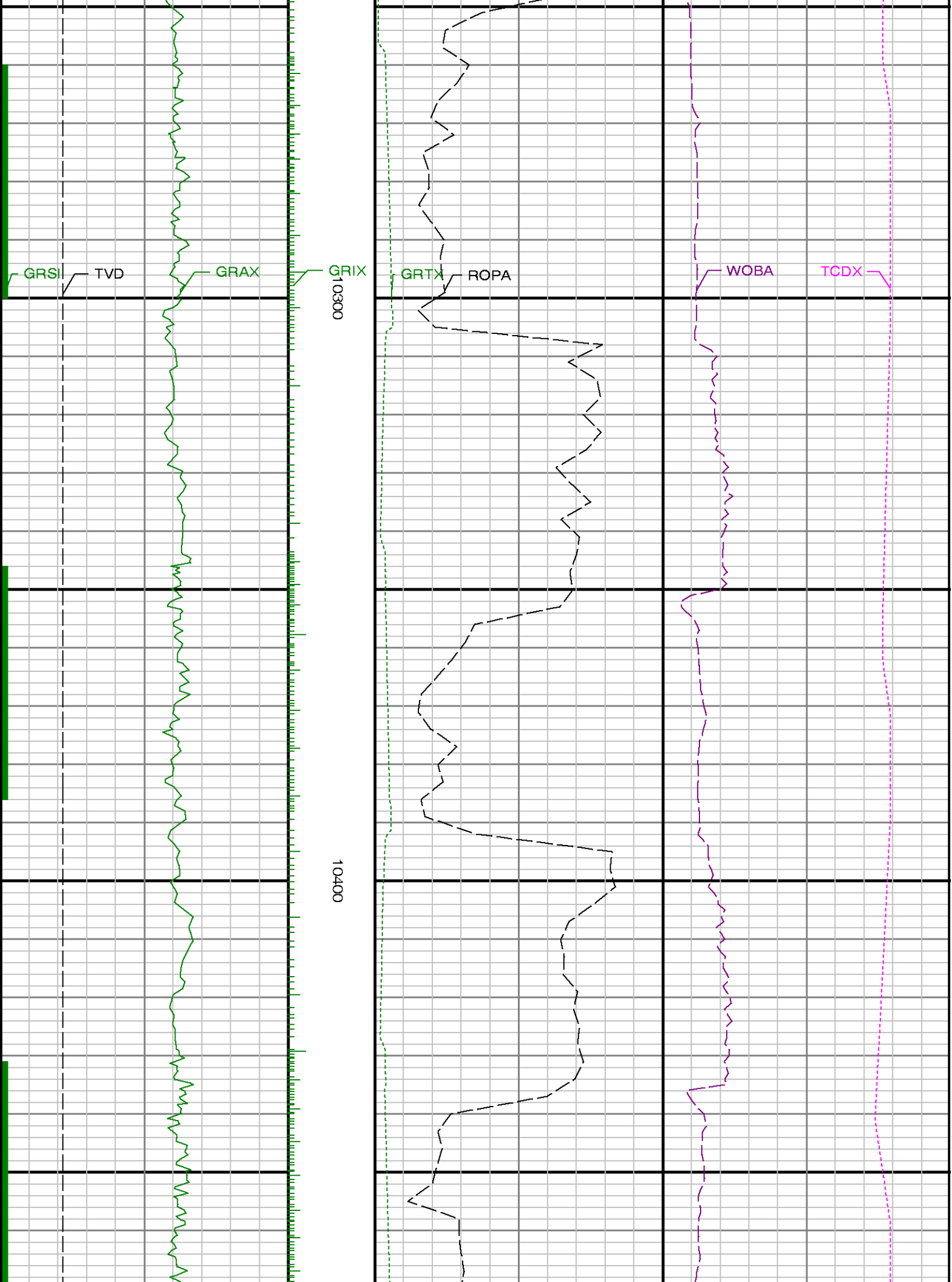
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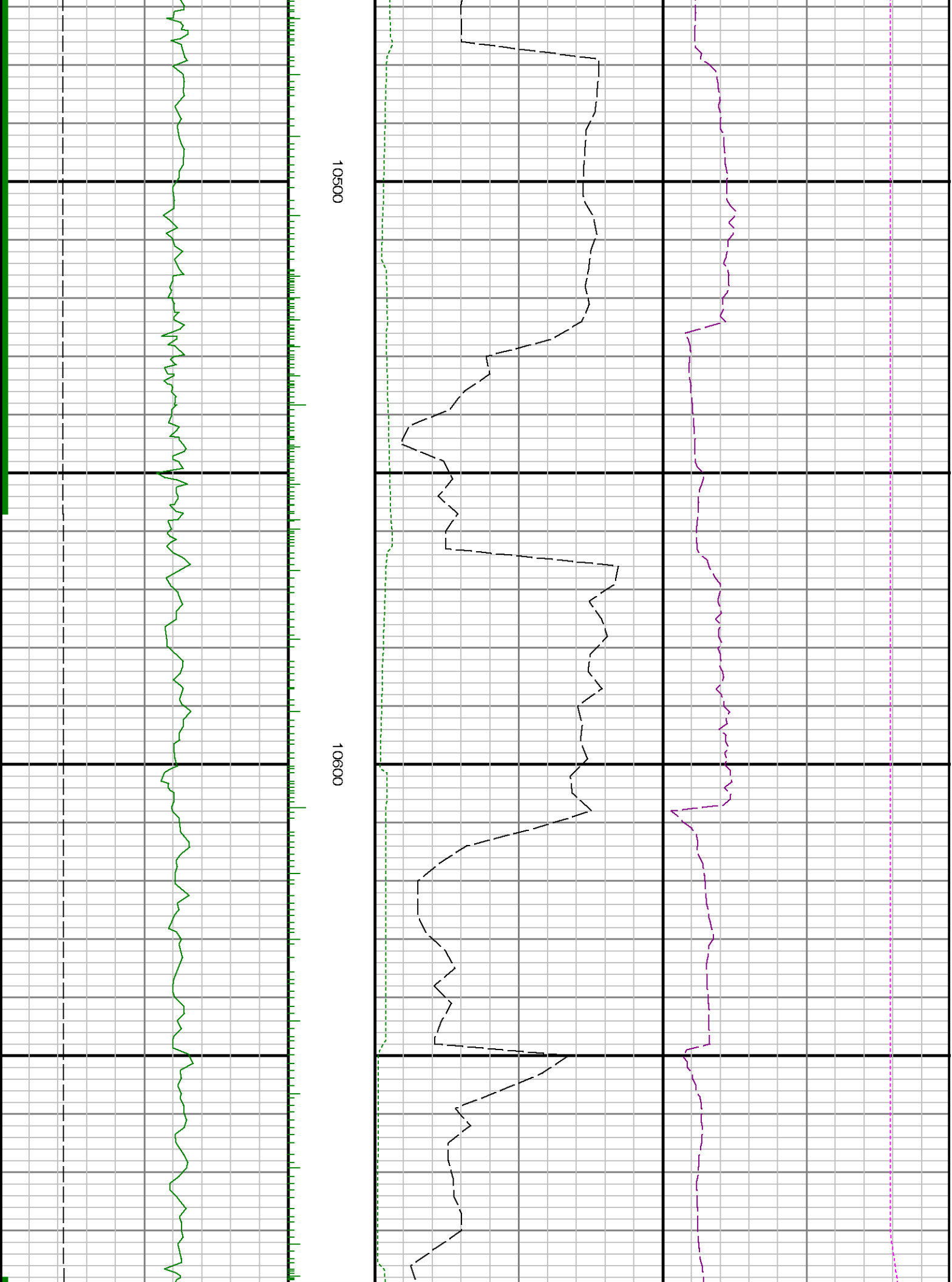
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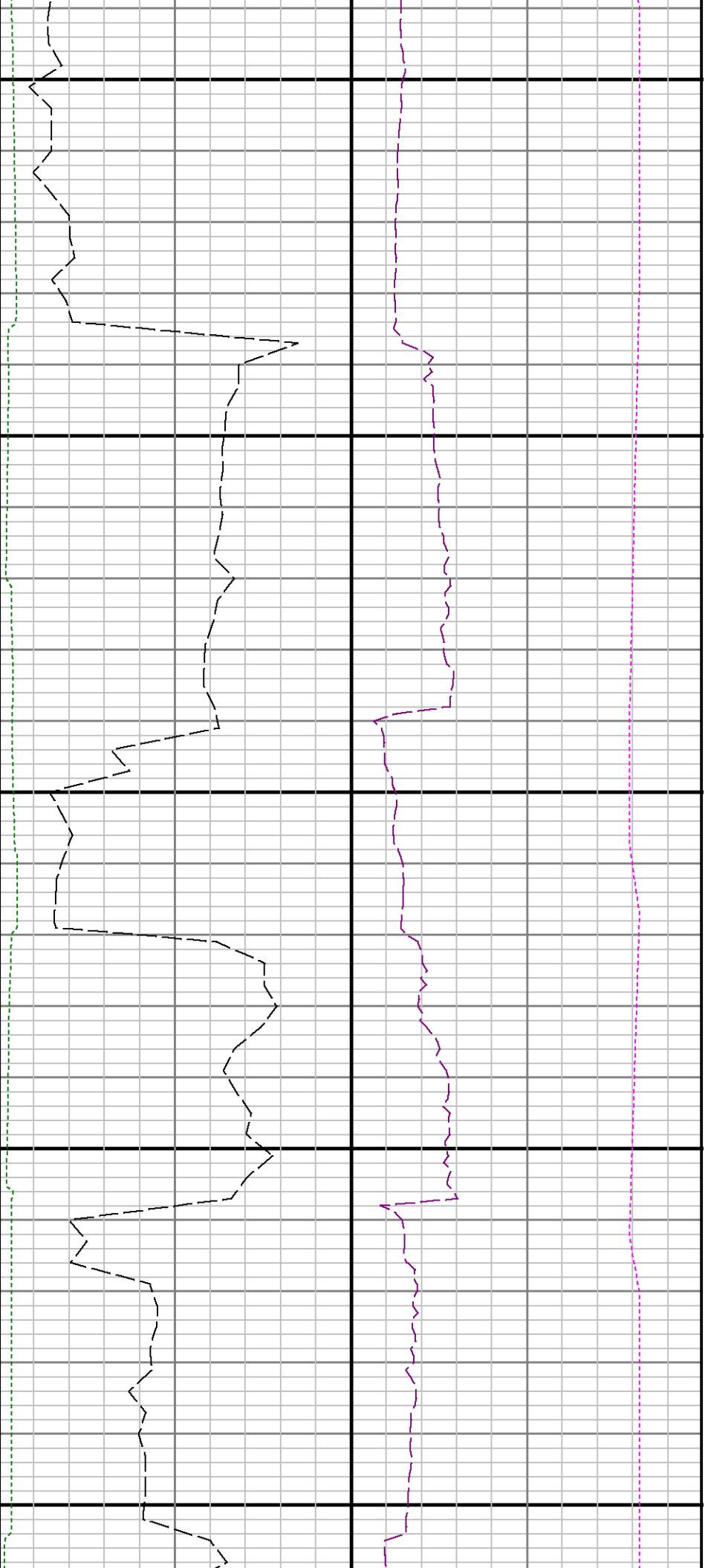








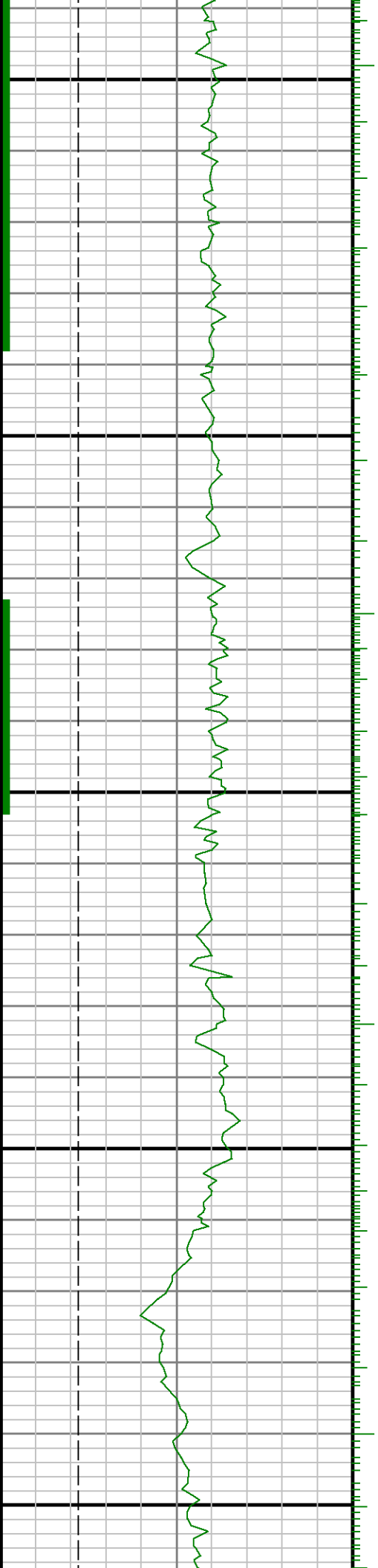


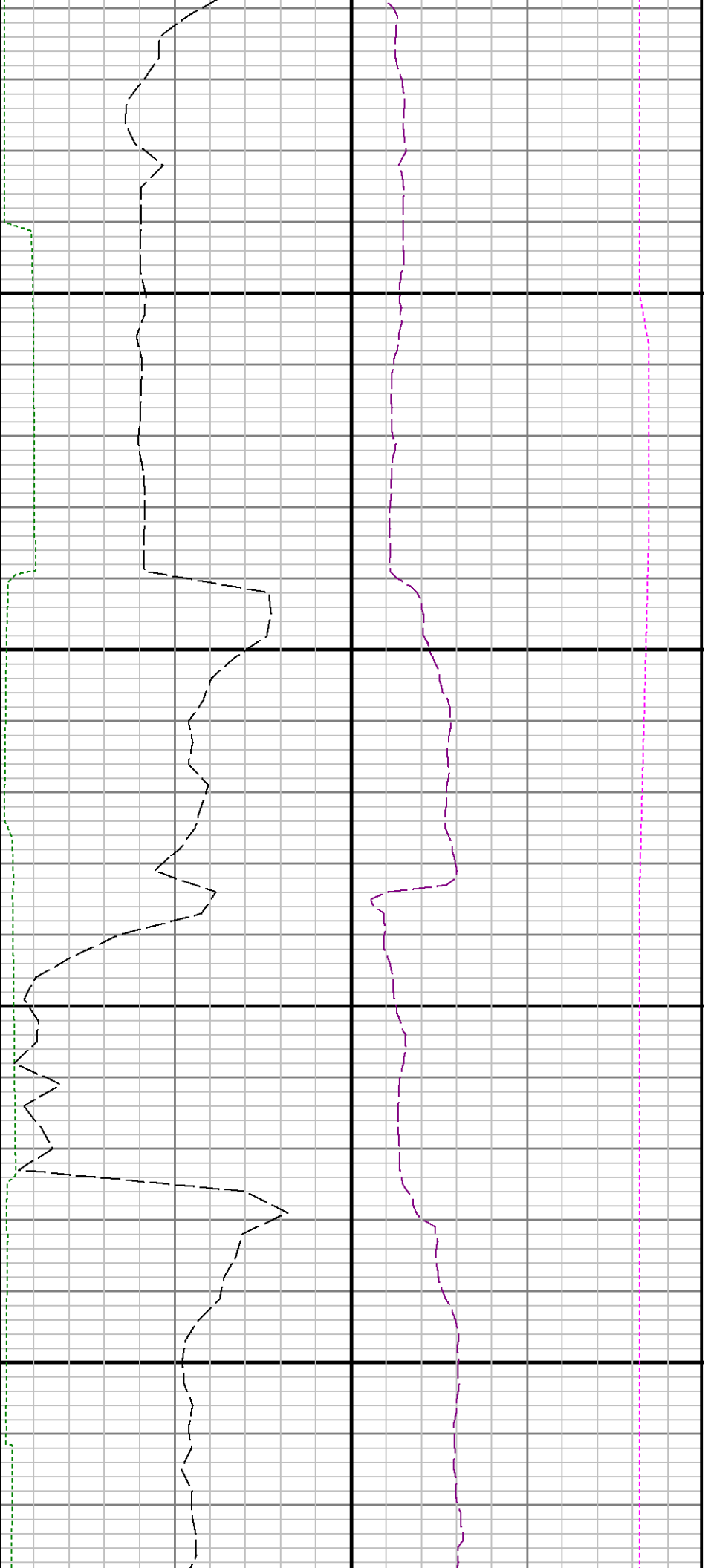


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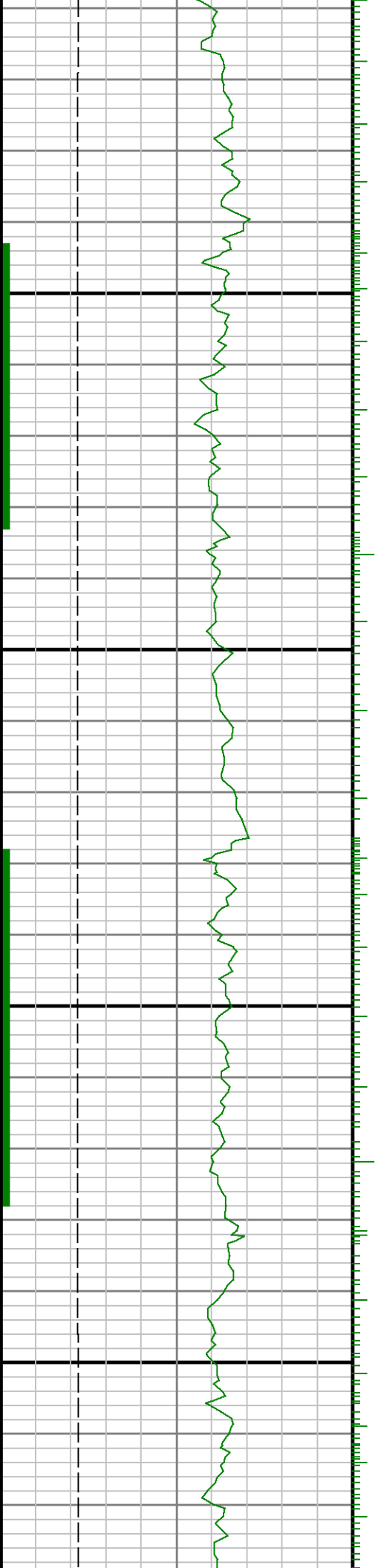
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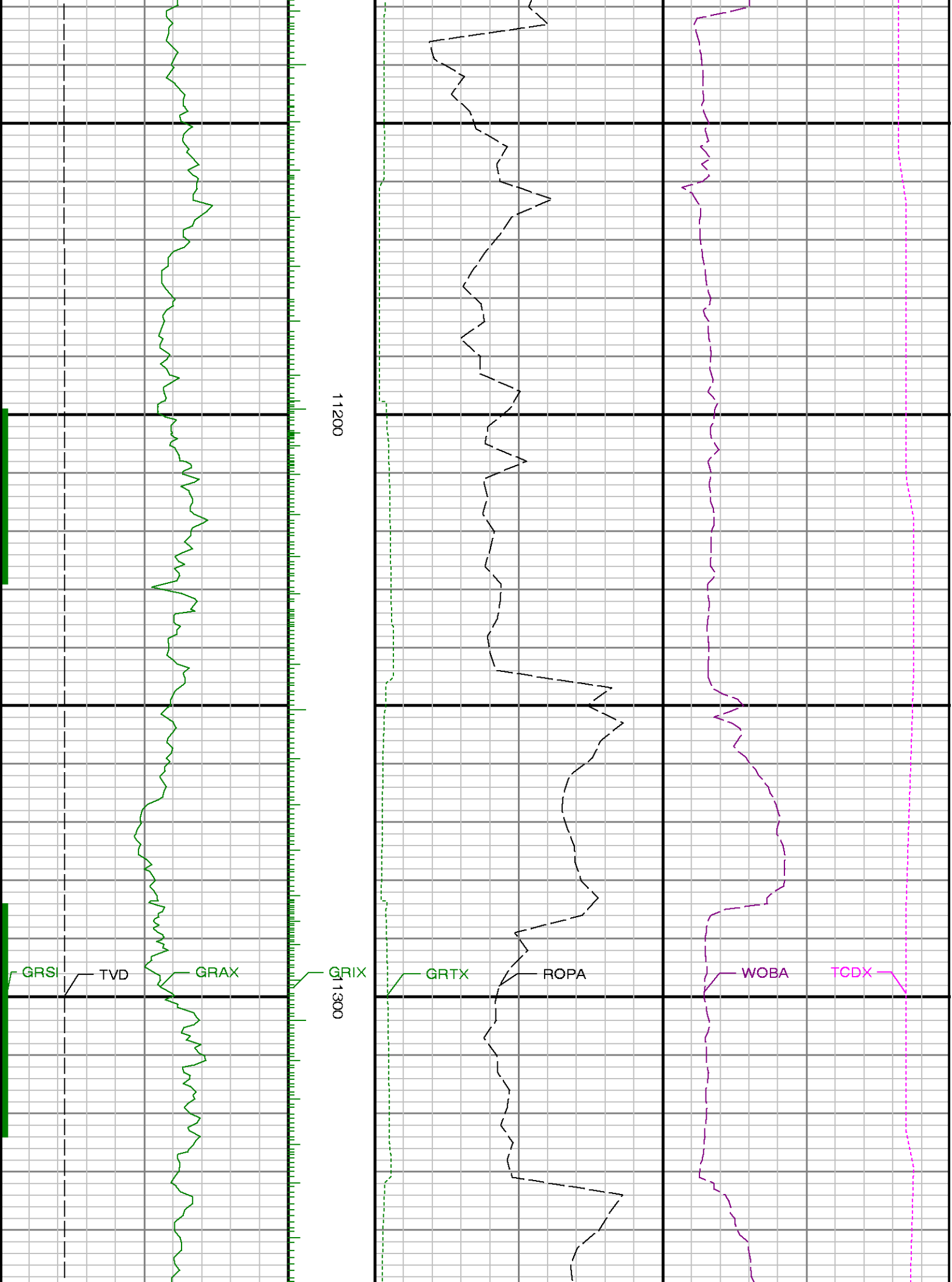


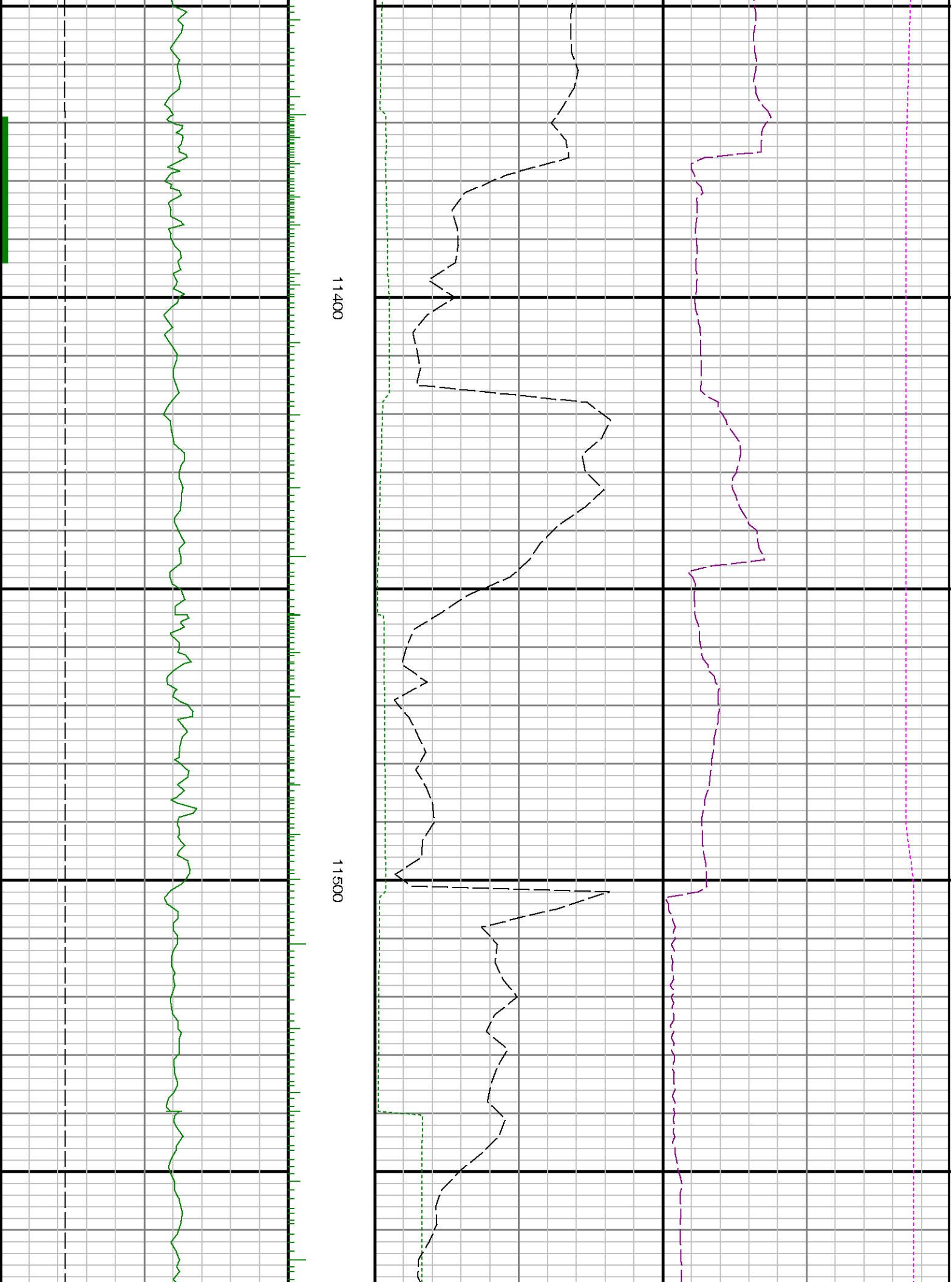


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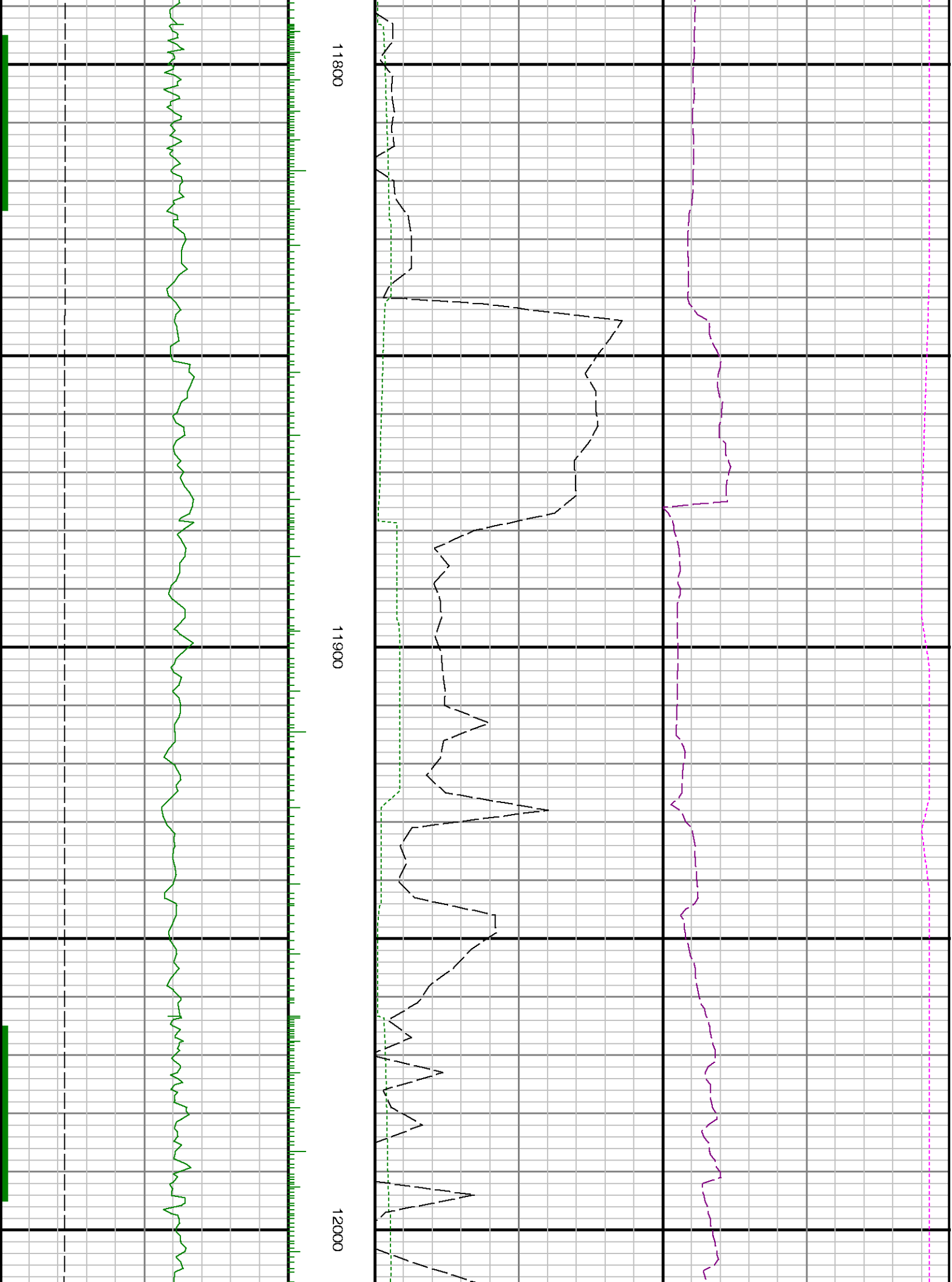
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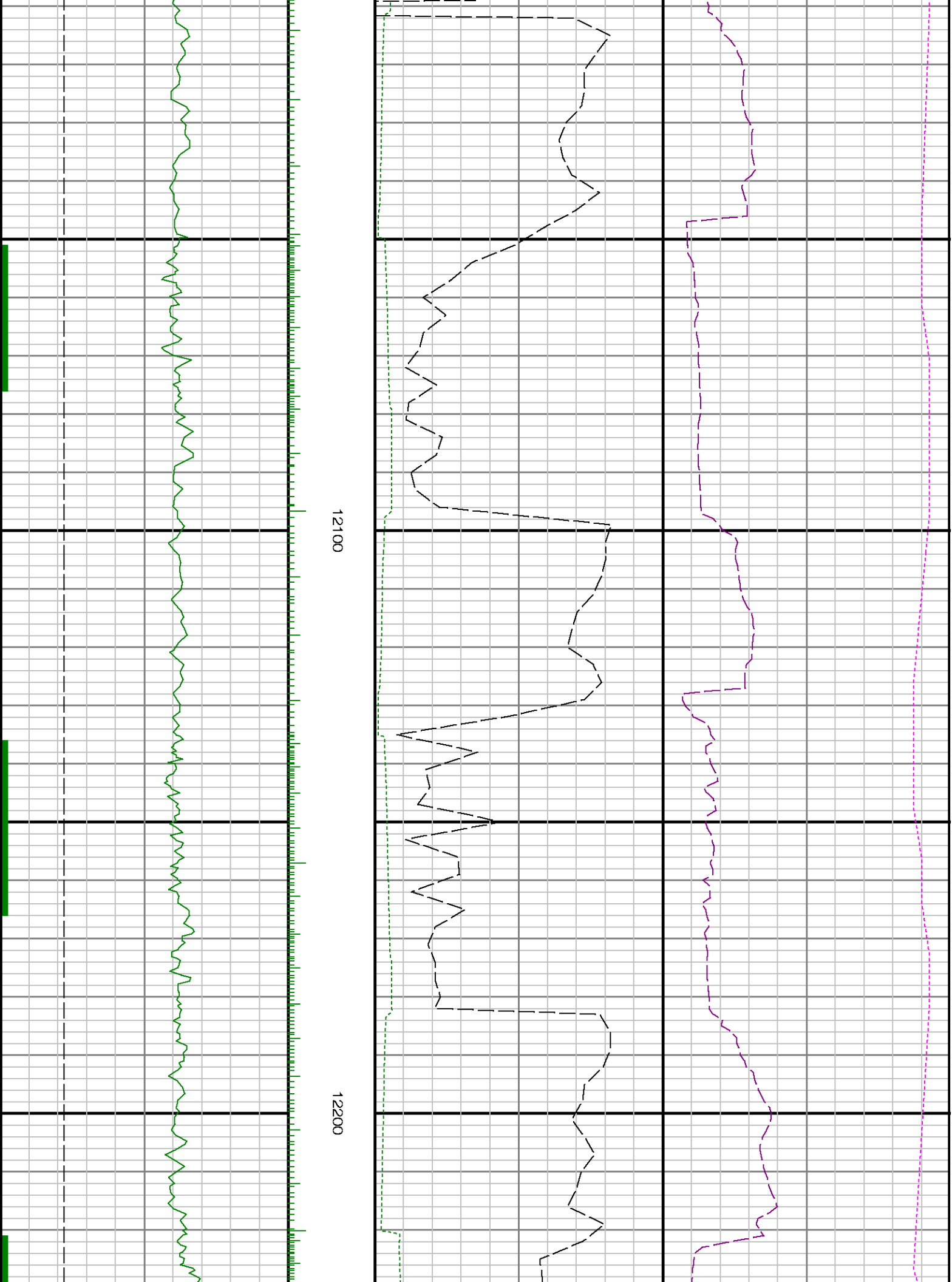


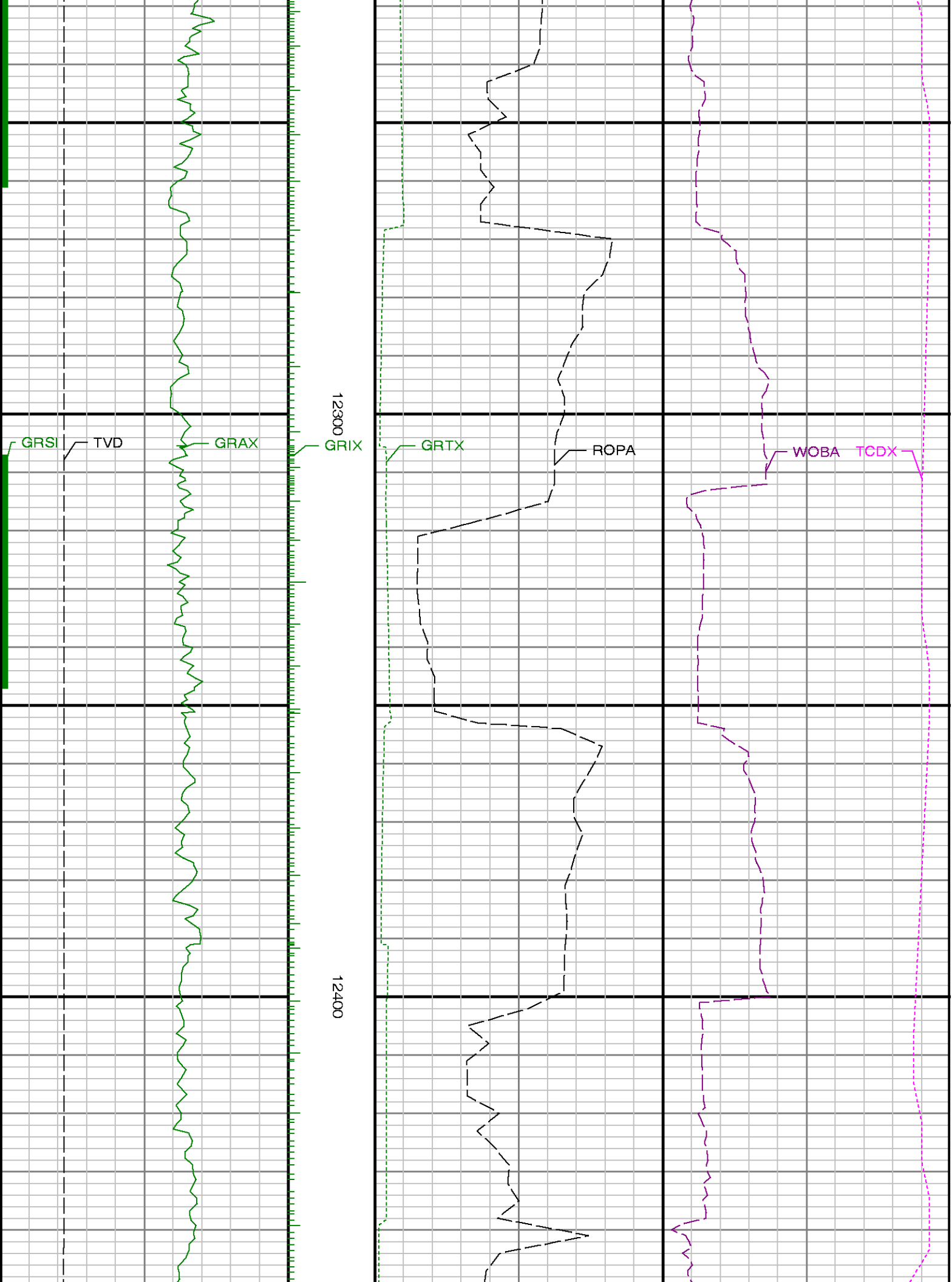


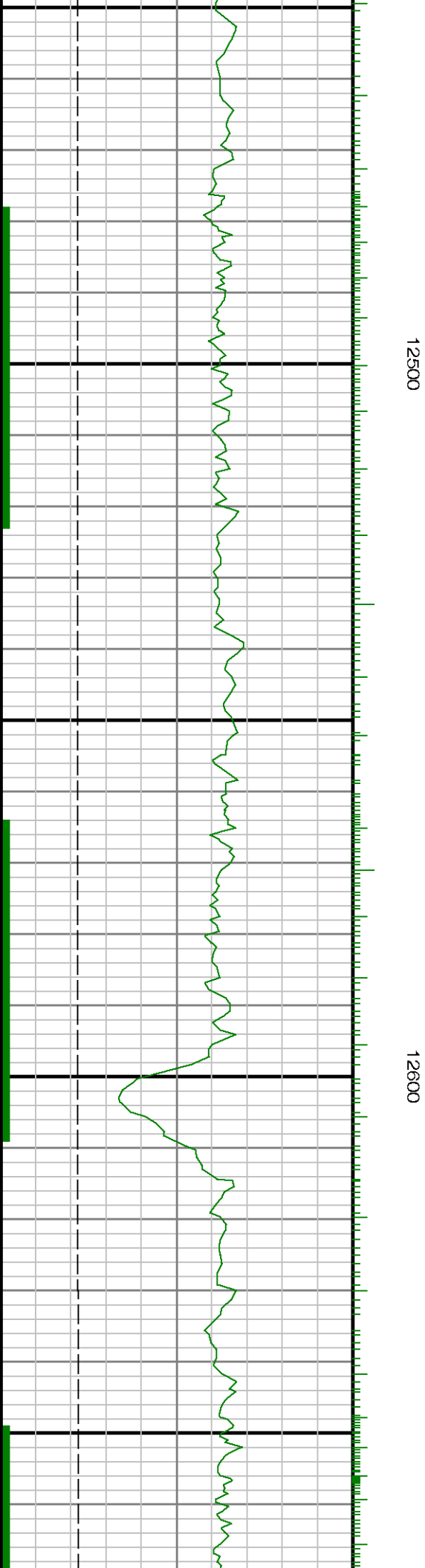
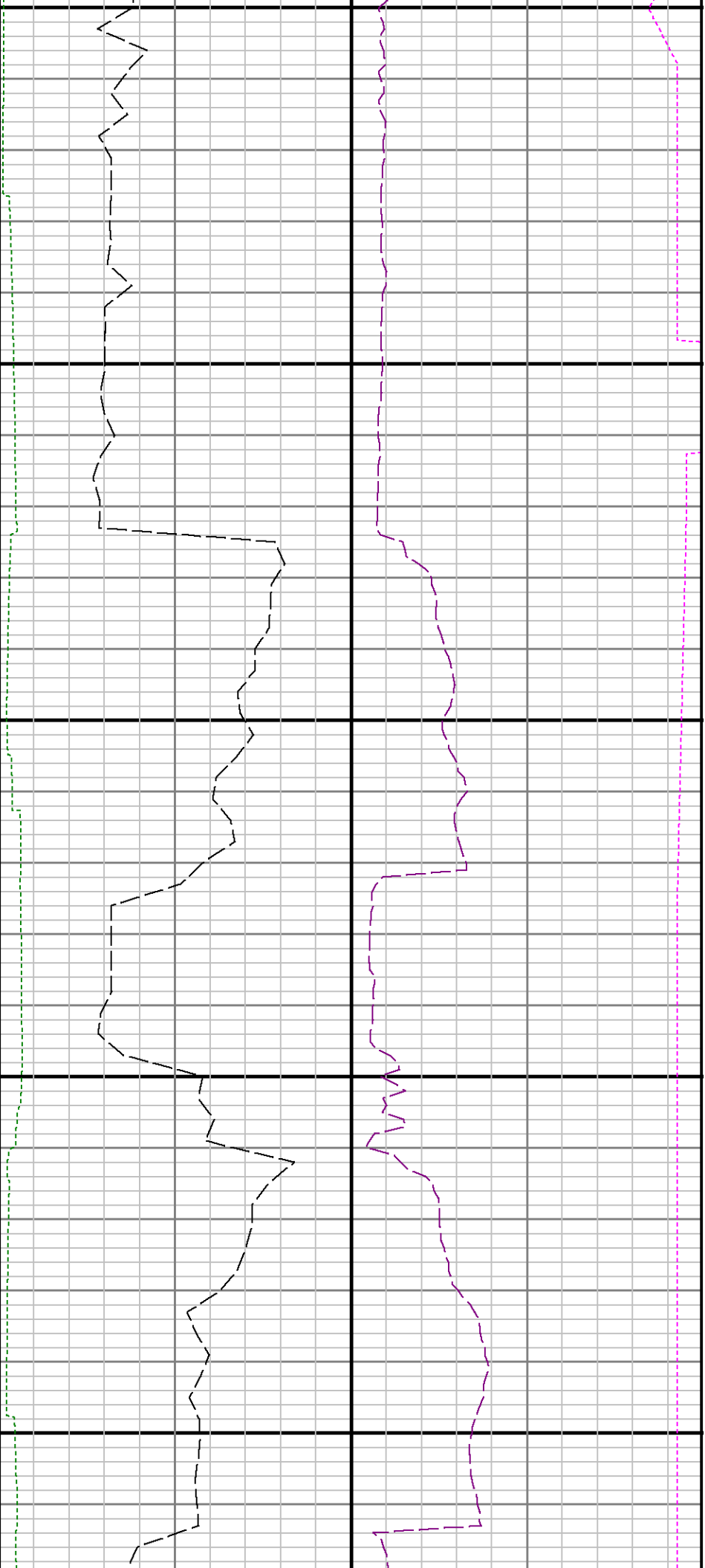


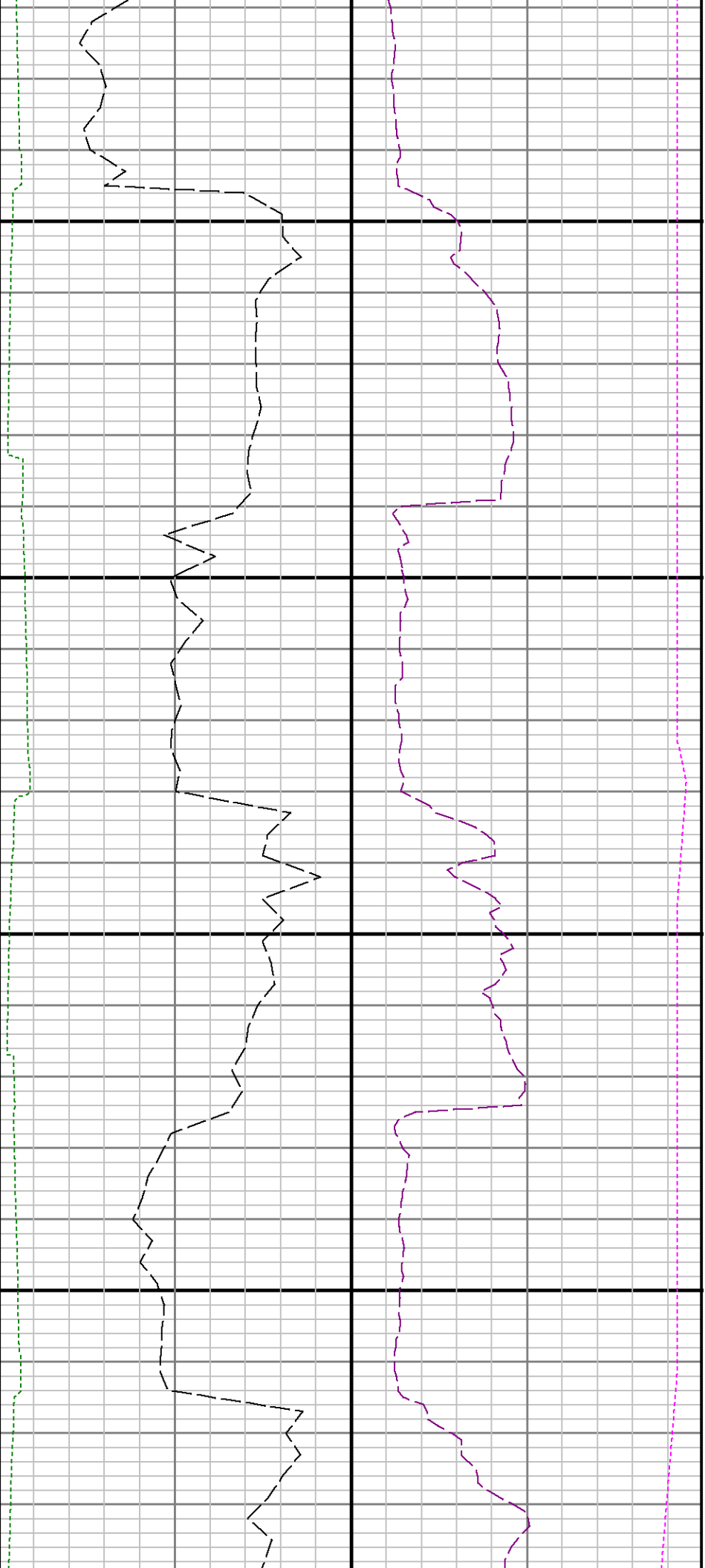












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