



Natural Formation Evaluation
Gamma Ray

Realtime Log

Scale:

Company: Anadarko

1:240

Well: Black Tiger 15C-27HZ

MEASURED DEPTH

Field: Weld County (Kerr McGee)

Region: Continental US State: Colorado

Status:

Final Print

Surface Location:

Latitude: 40° 7' 2.129" N

Longitude: 104° 52' 21.896" W

Other Services:

Directional
VSS

API Number:
05123394010000

Section 22 TWN: 2N Range 67E

Permanent Datum (P.D.): Mean Sea Level

Elevation: 5005.00 ft.

Elevations: N/A

Log Measured From:

Rig Floor

5005.00 ft.

Above P.D.

KB:

DF:

GL:

Depth Reference:

Driller's Depth

KB:

DF:

GL:

Interval Logged

Dates

Magnetic Field Reference

Top: 7000.0 ft. Date From: 11/Aug/14 Date To: 17/Aug/14 Dip Angle: 66.76° Azl Reference North: True

Bottom: 13575.0 ft. Date To: 17/Aug/14 Total Mag to Reference

Spud Date: 09/Aug/14 Field Strength: 52805.0 nT North Correction: 8.64°

Borehole Record

Casing Record

Hole Size	From	To	Size	Weight	From	To
8.750 in.	1759.0 ft.	7945.0 ft.	9.600 in.	46.00 lb/ft	Surface	1075.0 ft.
6.125 in.	7945.0 ft.	13575.0 ft.	7.000 in.	26.00 lb/ft	Surface	7938.0 ft.

Mud Record

Deviation Record

Type	From	To	Hole Size	Interval	Inc / Az (Start)	Inc / Az (End)
Water Based Mud	Surface	13575.0 ft.	8.750 in.	Vert/Curve	0.0° / 153.5°	82.4° / 181.4°
			6.125 in.	Lateral	82.4° / 181.4°	90.2° / 179.5°

Acquisition System Software Version

Other

Advantage	2.20U4	Rig / Contractor:	307	/ Helmerich & Payne Drilling Co		
PATS	6.4.1.34	Job No:	6510866			
		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 (m.)	Bottom (m.)	From (m.)	To (m.)	Start	End	
1	1	1	8.750	PDC		Steerable	N/A	N/A	1759.0	6671.0	10/Aug/2014 14:43	11/Aug/2014 12:45	18.6
2	2	2	8.750	PDC		Steerable	7000.0	7570.0	6671.0	7613.0	12/Aug/2014 03:30	12/Aug/2014 12:04	11.7
3	3	3	8.750	PDC		Steerable	7570.0	7909.0	7614.0	7946.0	13/Aug/2014 04:30	13/Aug/2014 21:30	17.9
4	4	4	6.125	PDC		Steerable	7910.0	13525.0	7946.0	13575.0	15/Aug/2014 17:50	15/Aug/2014 03:35	31.7

Crew

Name	Arrive	Depart	Name	Arrive	Depart	Name	Arrive	Depart
	Wellsite	Wellsite		Wellsite	Wellsite		Wellsite	Wellsite
Andrew King	08/10/14	08/18/14	Hans Cary	08/10/14	08/11/14	Scott Sanford	08/11/14	08/18/14

Dale Miranda	08/10/14	08/18/14	Bill Herbers	08/10/14	08/18/14			

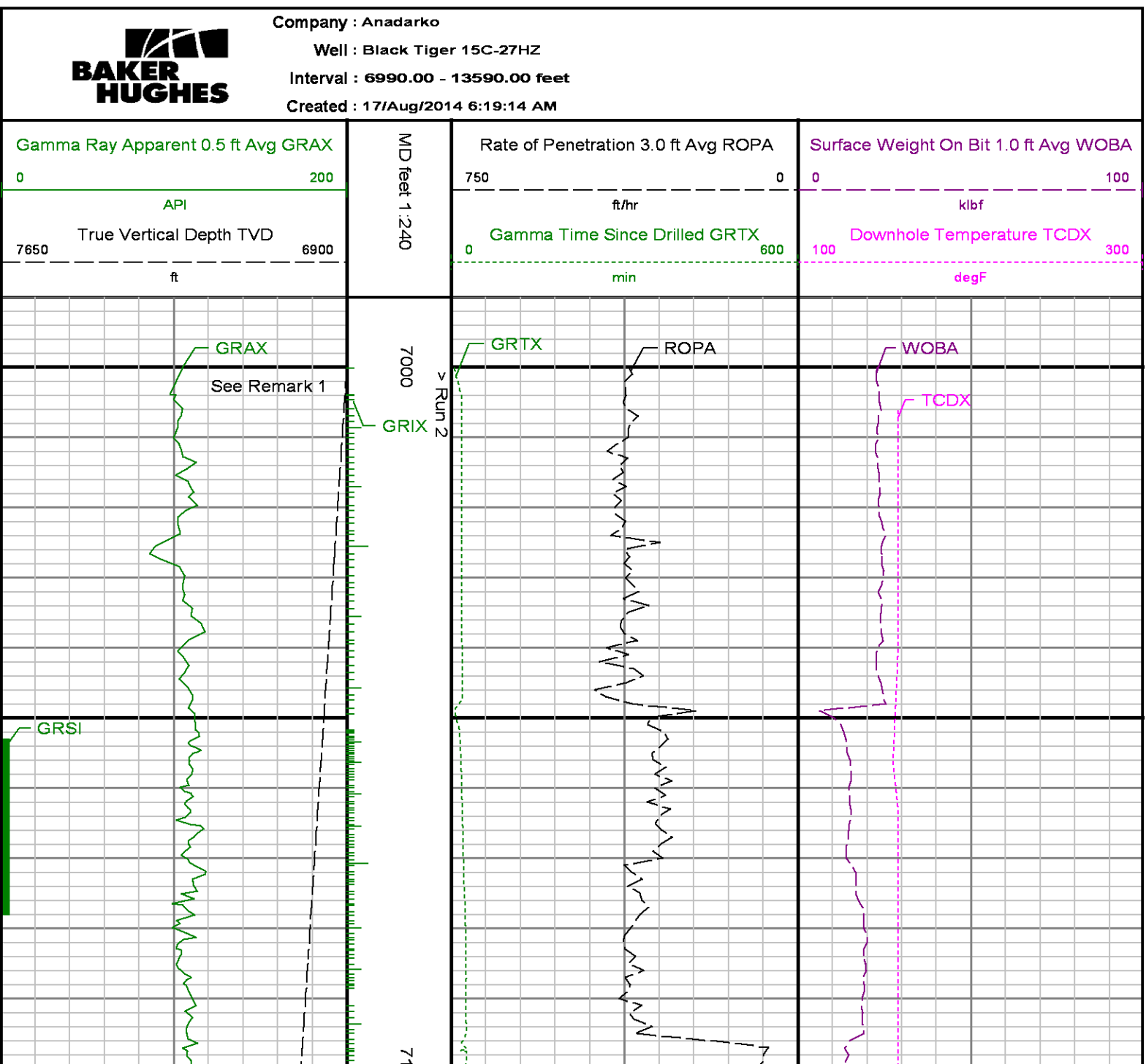
Mnemonics		
Curve	Description	Units
GRAX	Gamma Ray Apparent, 0.5 ft. Avg.	API
GRTX	Gamma Ray Time Since Drilled	Min.
GRIX	Gamma Ray Density, Points	unitless
GRSI	Gamma Ray Slide Indicator	unitless
ROPA	Rate of Penetration, 3.0 ft. Avg.	Ft./Hr.
TCDX	Downhole Temperature	Deg. F.
TVD	True Vertical Depth	Ft.
WOBA	Surface Weight on Bit, 1.0 ft. Avg.	K. lbs.

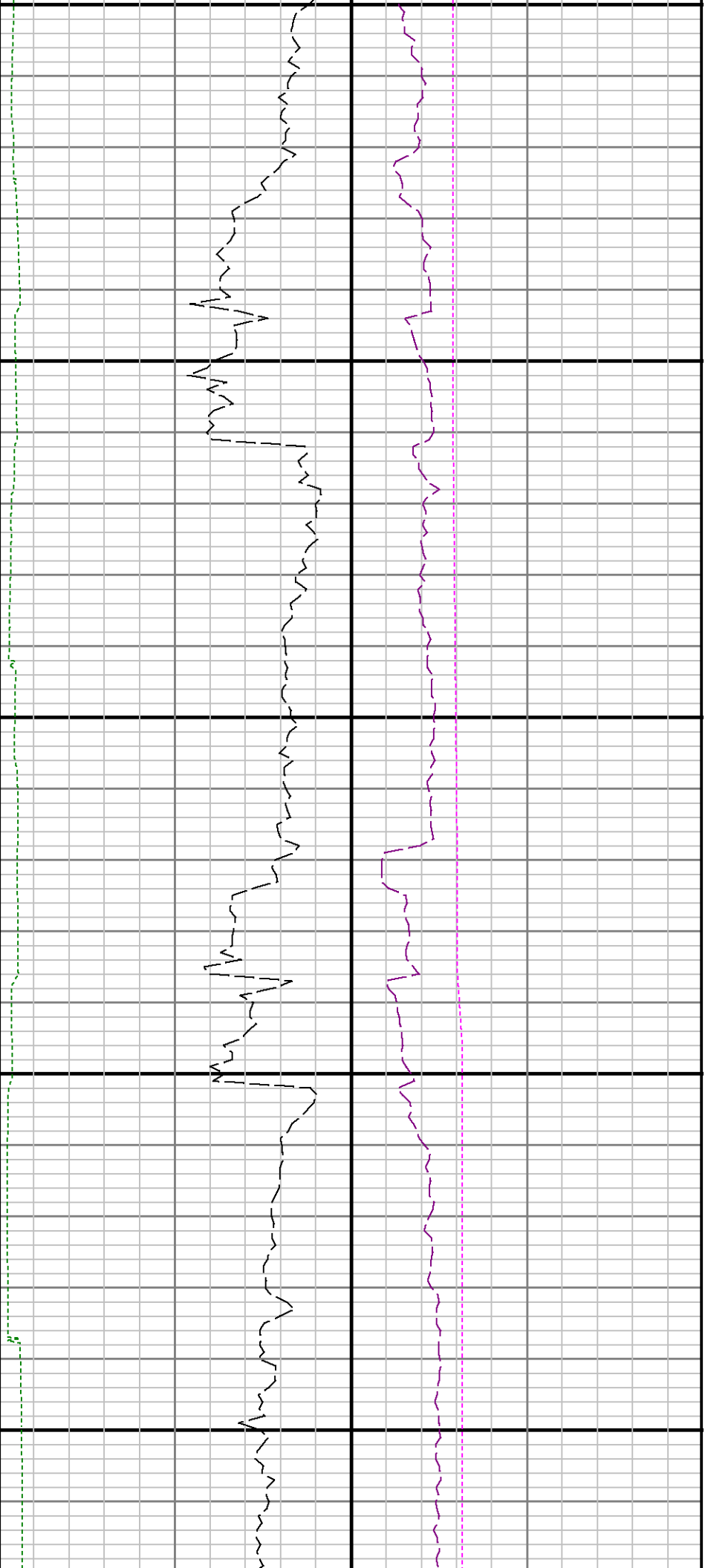
Equipment and Service Data						
LWD Run No.	Tool	Serial Number	Measurement	Bit Offset (m.)	Max O.D. (in.)	Min I.D. (in.)
1	DIR	12440860	Directional	46.02	6.750	3.130
1	SRIG	12622668	Gamma	42.64	6.750	3.130
2	DIR	12168813	Directional	46.34	6.750	3.250
2	SRIG	12554666	Gamma	42.97	6.750	3.250
3	DIR	12168813	Directional	39.89	6.750	3.250
3	SRIG	12554666	Gamma	36.52	6.750	3.250
4	DIR	12168818	Directional	53.04	4.750	2.750
4	SRIG	12600744	Gamma	49.66	4.750	2.750

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 INTEQ run 1 utilized 6 3/4 inch NaviGamma services (Gamma Ray and Directional) behind an 8 3/4 inch bit and steerable assembly from 1759 to 6671 ft MD (1758 to 6570 ft TVD).</p> <p>(2) Baker Hughes INTEQ run 2 utilized 6 3/4 inch NaviGamma services (Gamma Ray and Directional) behind a 8 3/4 inch bit and steerable assembly from 6671 to 7613 ft MD (6570 to 7476 ft TVD).</p> <p>(3) Baker Hughes INTEQ run 3 utilized 6 3/4 inch NaviGamma services (Gamma Ray and Directional) behind a 8 3/4 inch bit and steerable assembly from 7614 to 7946 ft MD (7477 to 7610 ft TVD).</p> <p>(4) Baker Hughes INTEQ run 4 utilized 4 3/4 inch NaviGamma services (Gamma Ray and Directional) behind a 6 1/8 inch bit and steerable assembly from 7946 to 13575 ft MD (7610 to 7629 ft TVD).</p> <p>(5) 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>(6) A sliding indicator is shown to the left side of track 1 as a heavy line and corresponds to the Gamma Ray sensor offset from the bit.</p>

Remarks	Number	Measured Depth (m.)	Hole Section (in.)	LWD Run No.	Remark
	1	7000	8.750	2	Began logging Gamma from the top of the build section at 7000 ft MD (6899 ft TVD).
	2	7572	8.750	3	The interval from 7570 to 7614 ft MD (7443 to 7477 ft TVD) was logged up to 28.5 hours after being drilled due to trip out of the hole to pick up new motor and bit assembly at the beginning of Run 3.
	3	7911	6.125	4	The interval from 7909 to 7946 ft MD (7607 to 7610 ft TVD) was logged up to 44 hours after being drilled due to trip out of the hole to pick up lateral assembly at the beginning of Run 4.
	4	13575	6.125	4	The interval from 13525 to 13575 ft MD (7627 to 7626 ft TVD) was not logged due to Gamma Ray sensor offset.

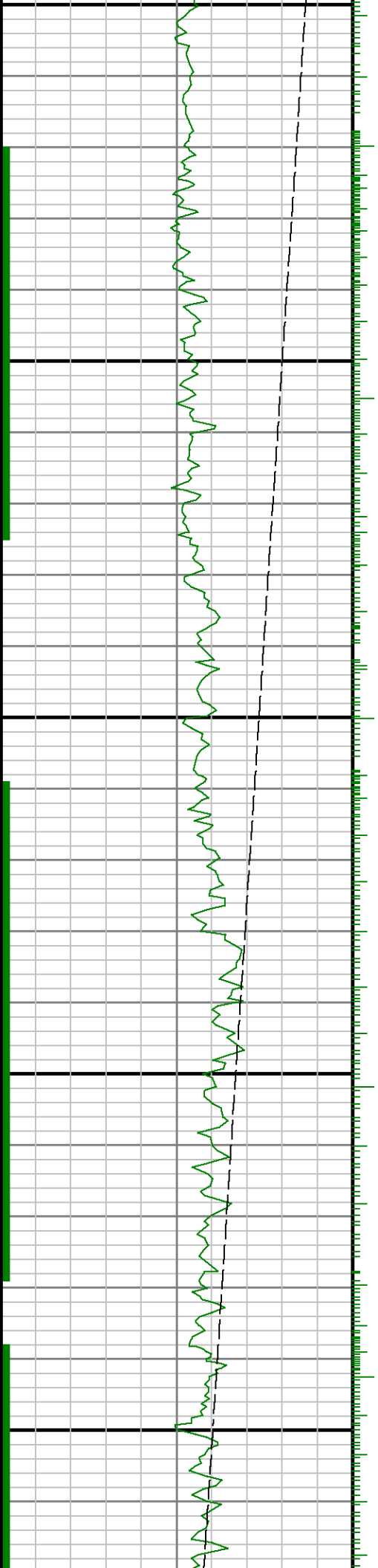


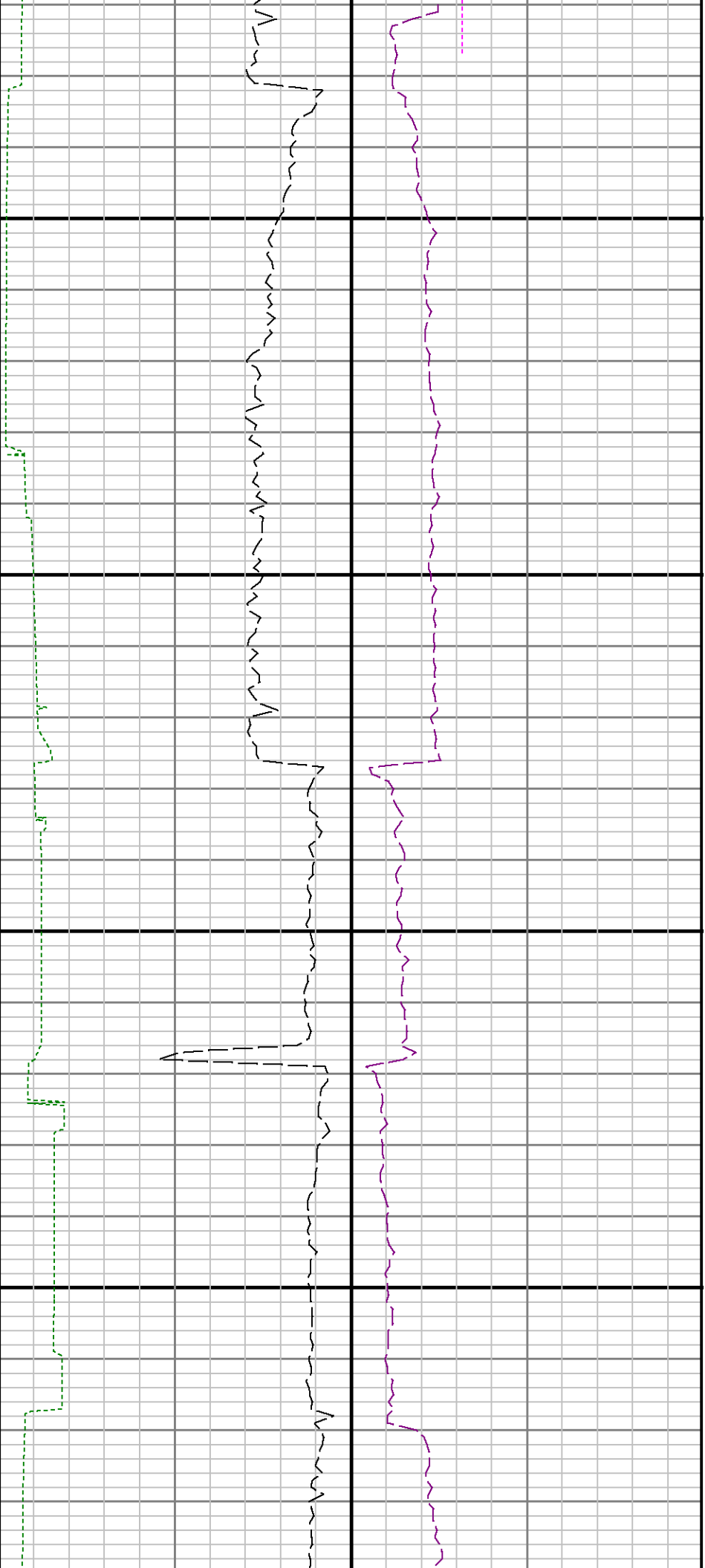


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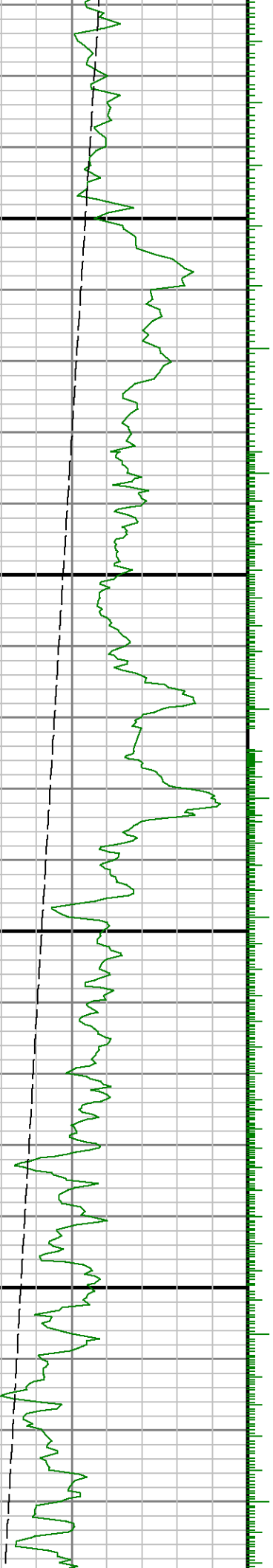
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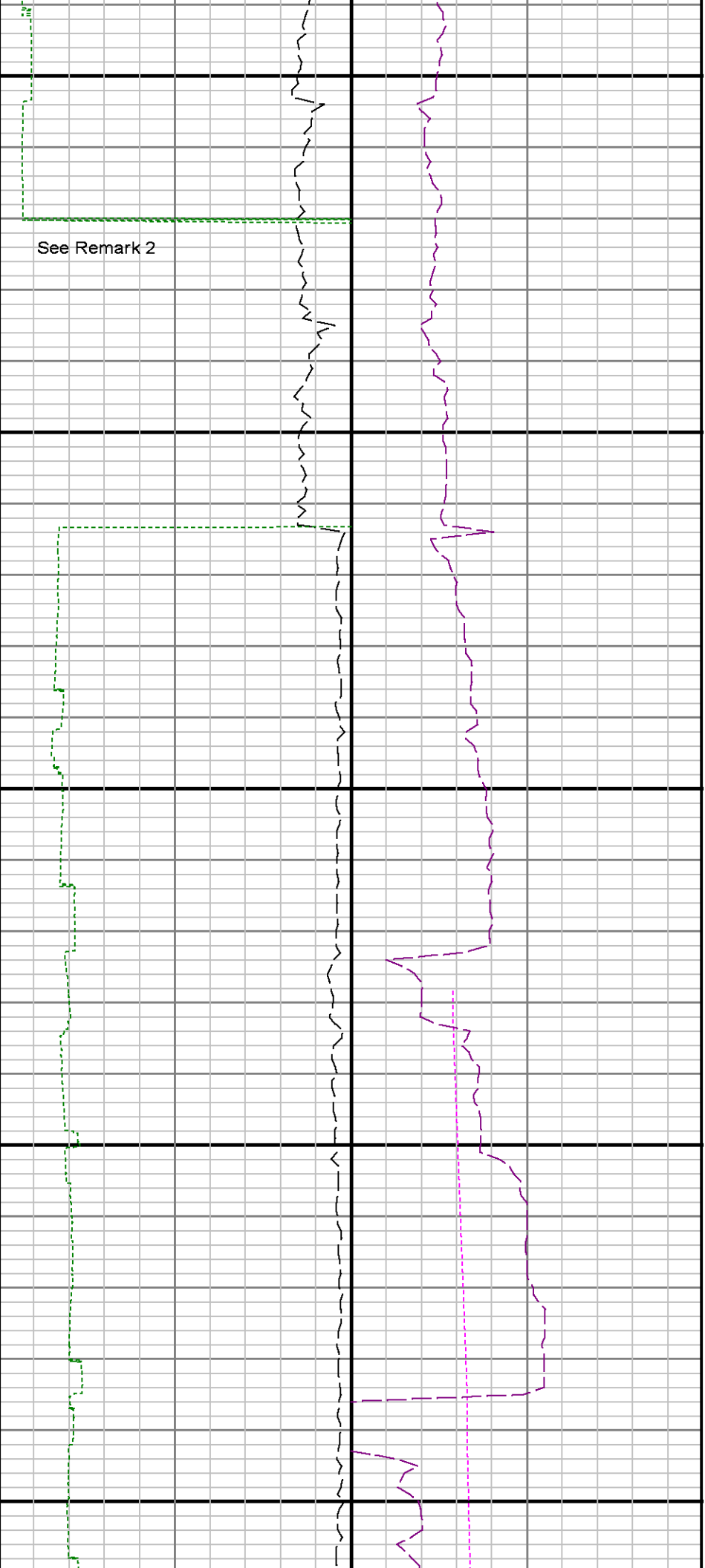




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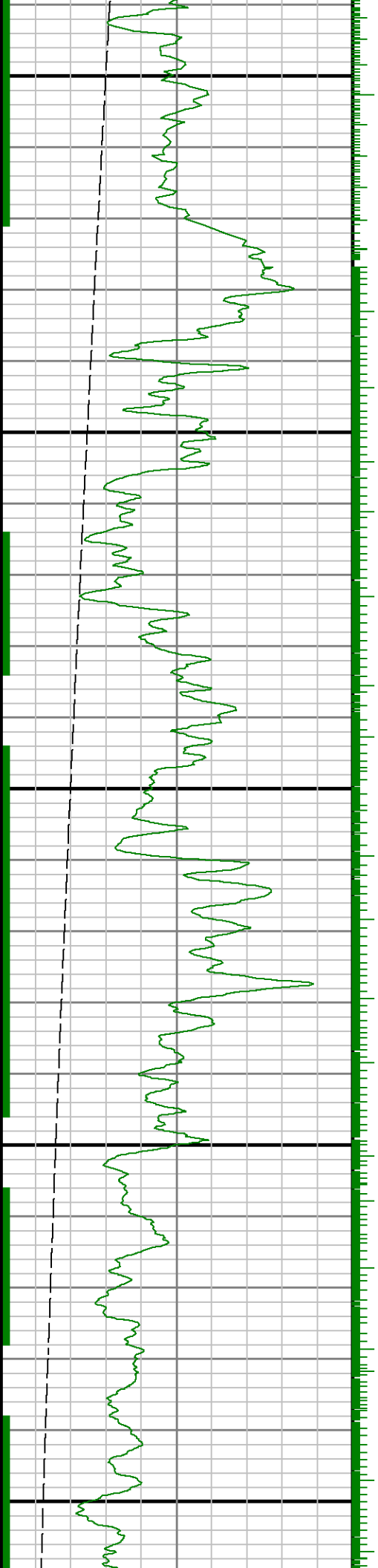


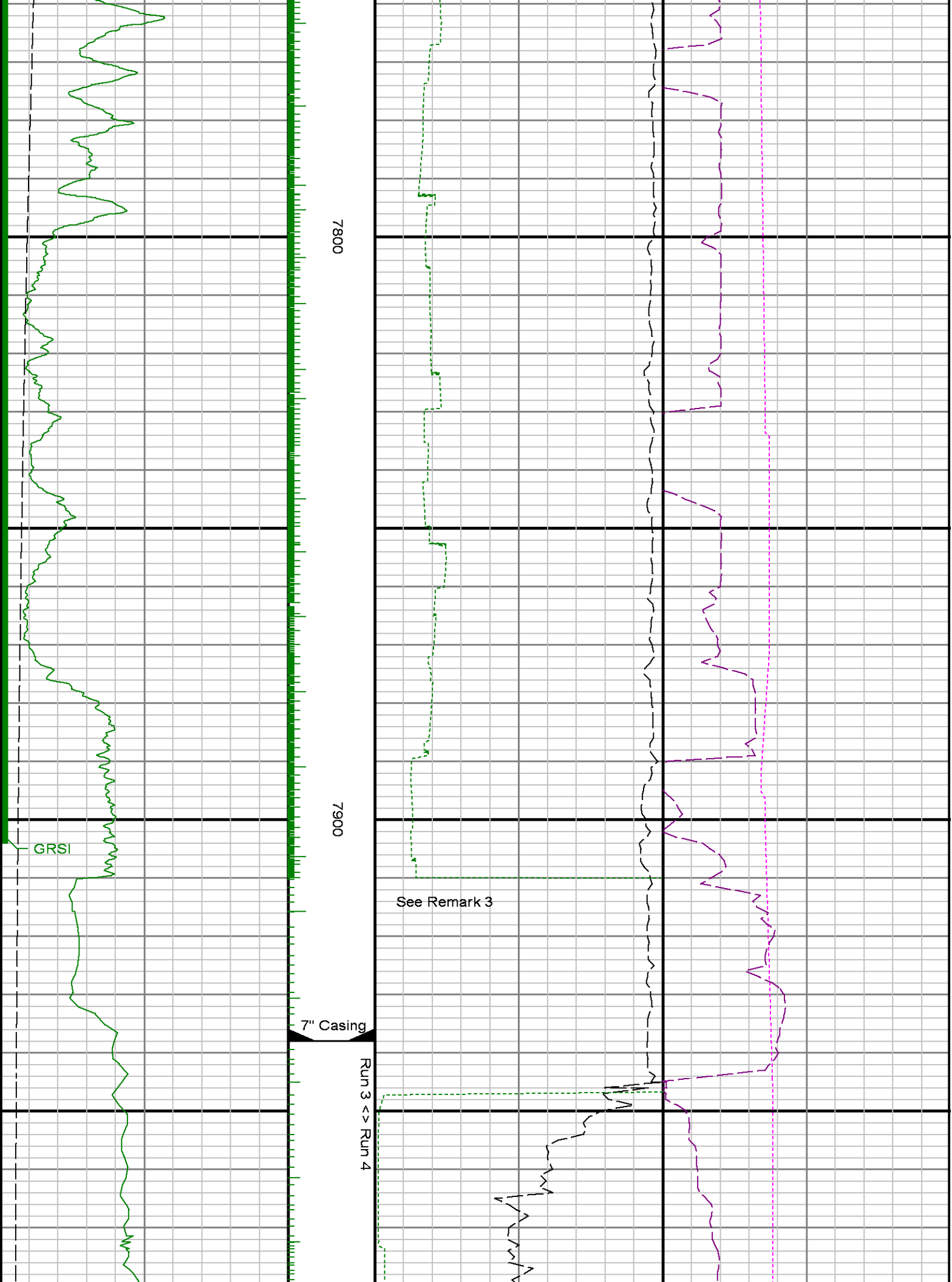


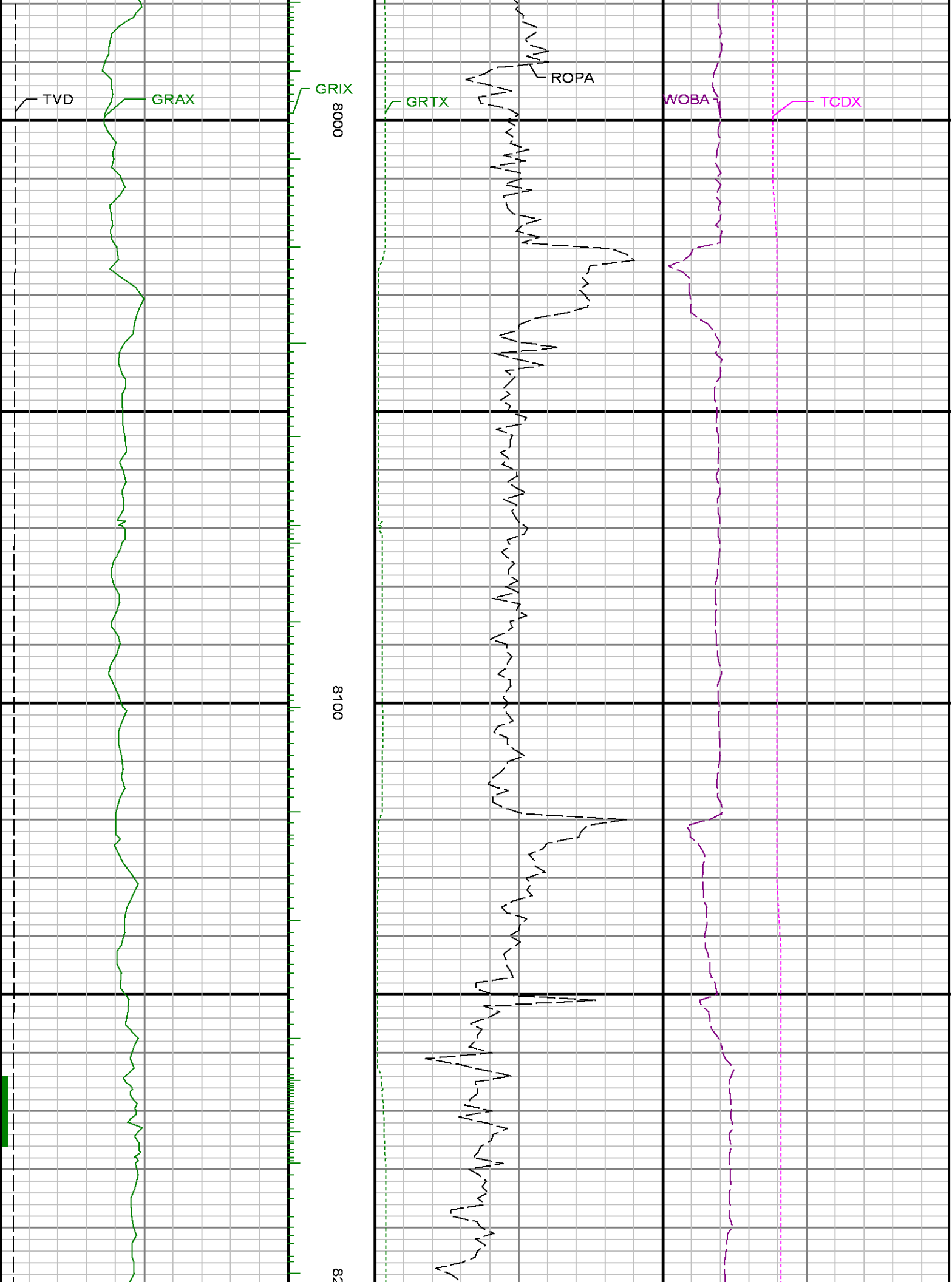
Run 2 <> Run 3

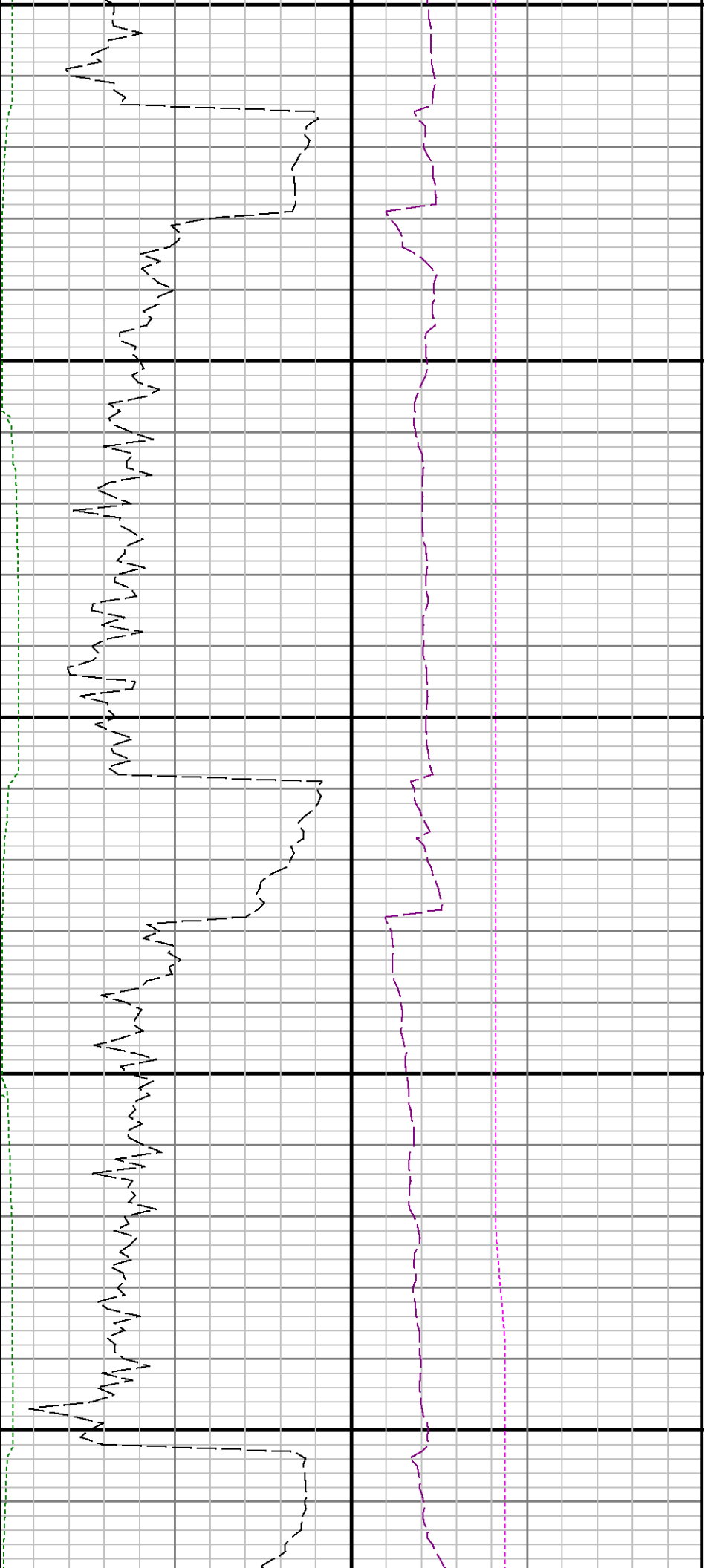
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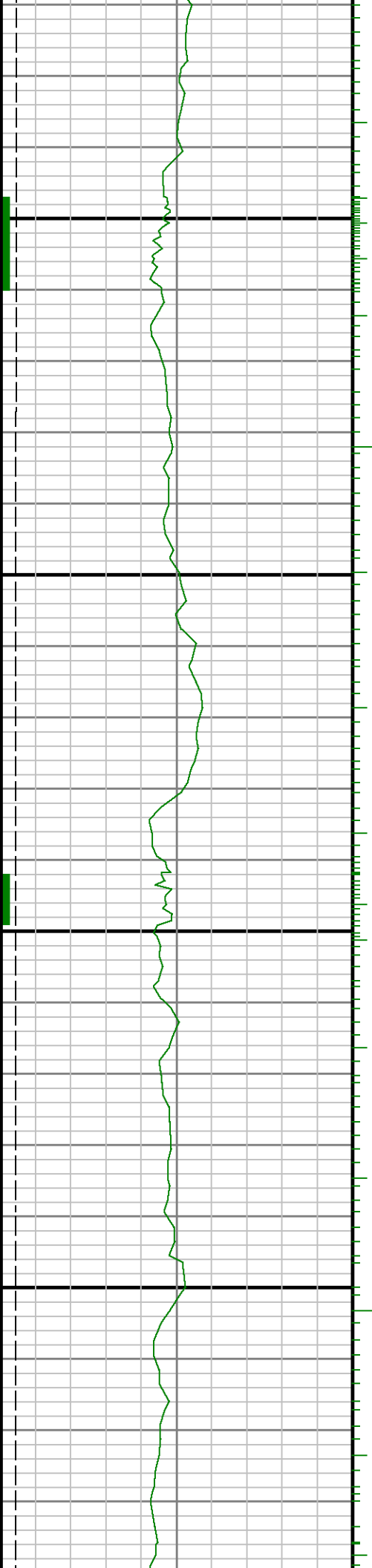




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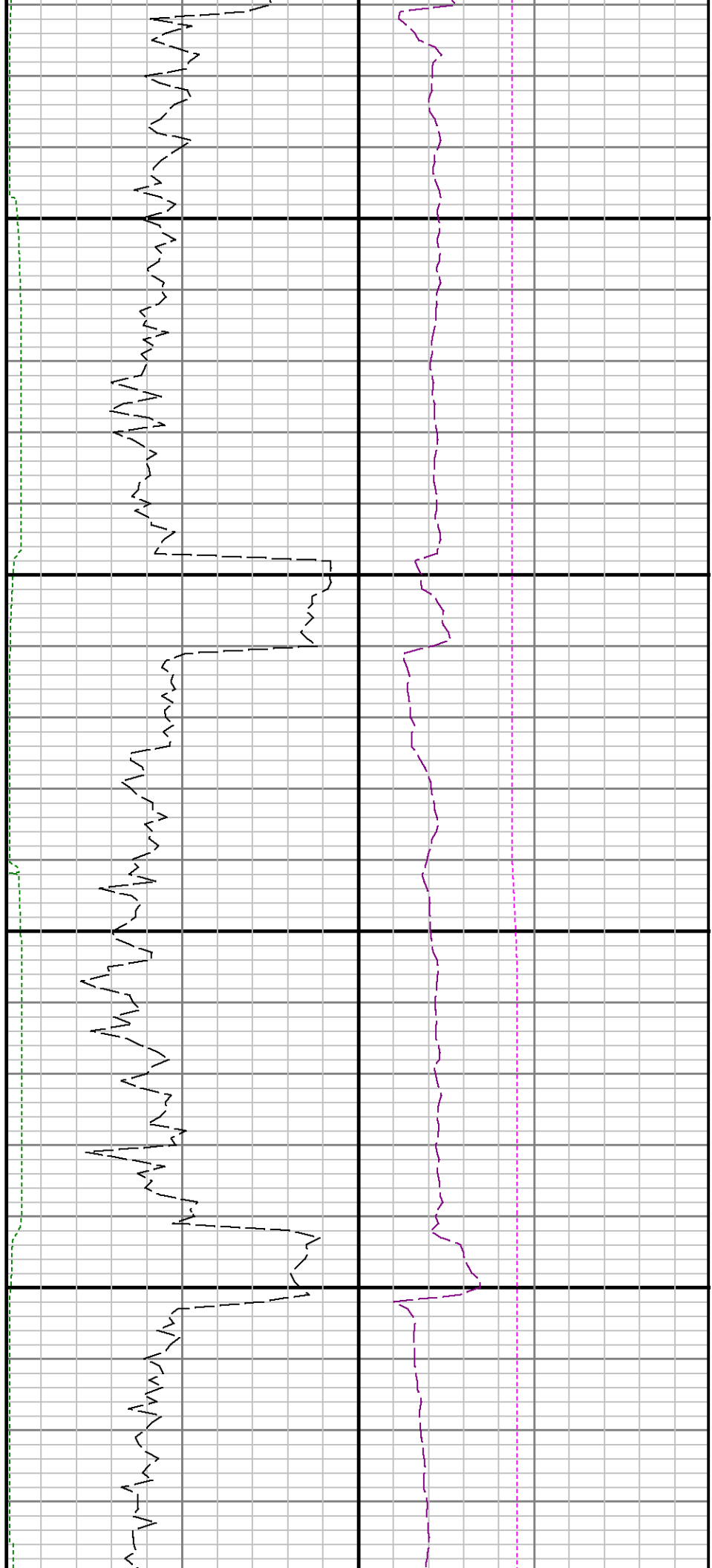
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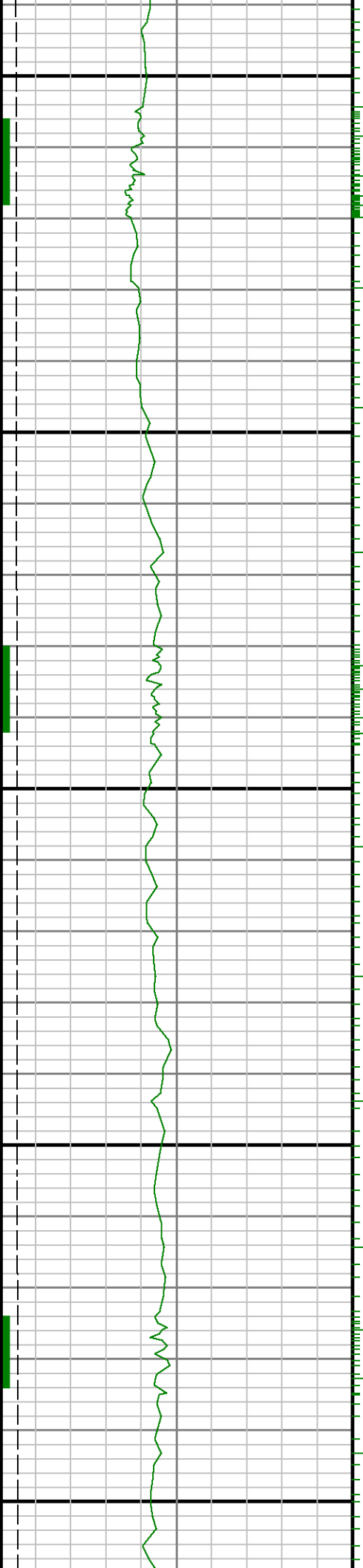
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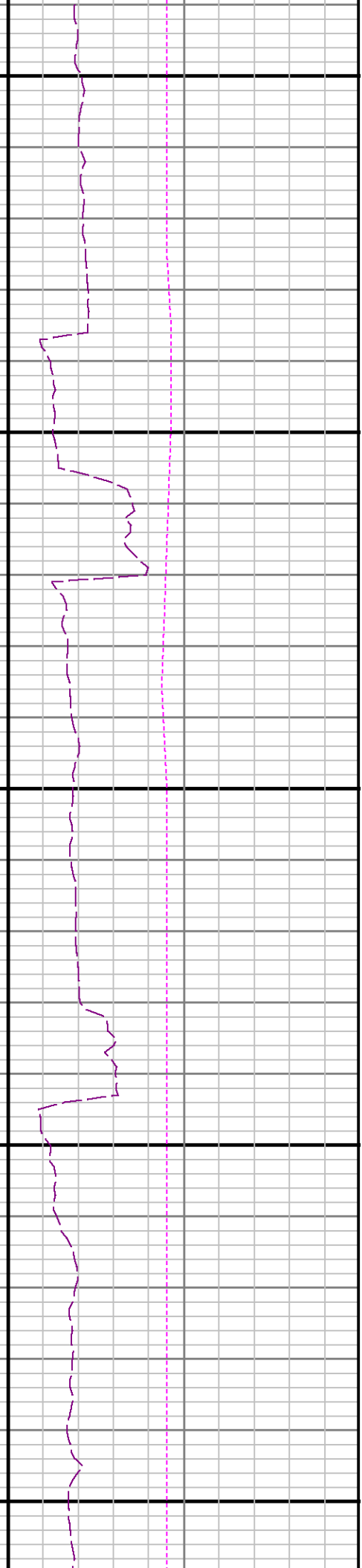
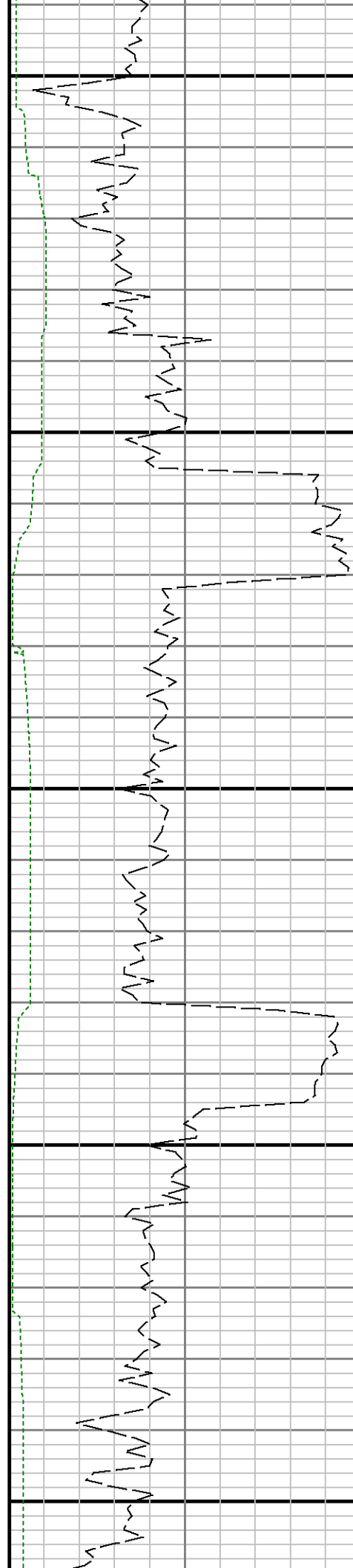
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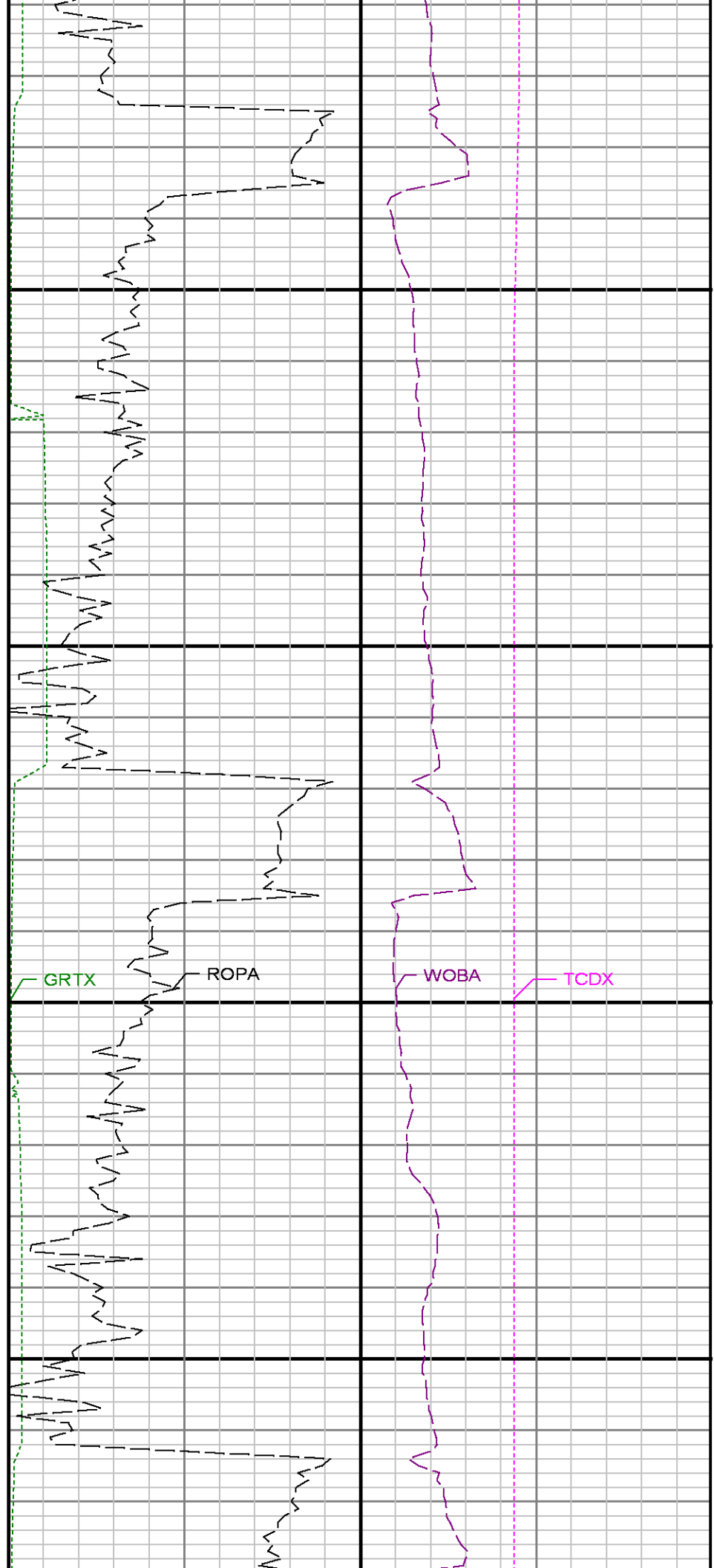
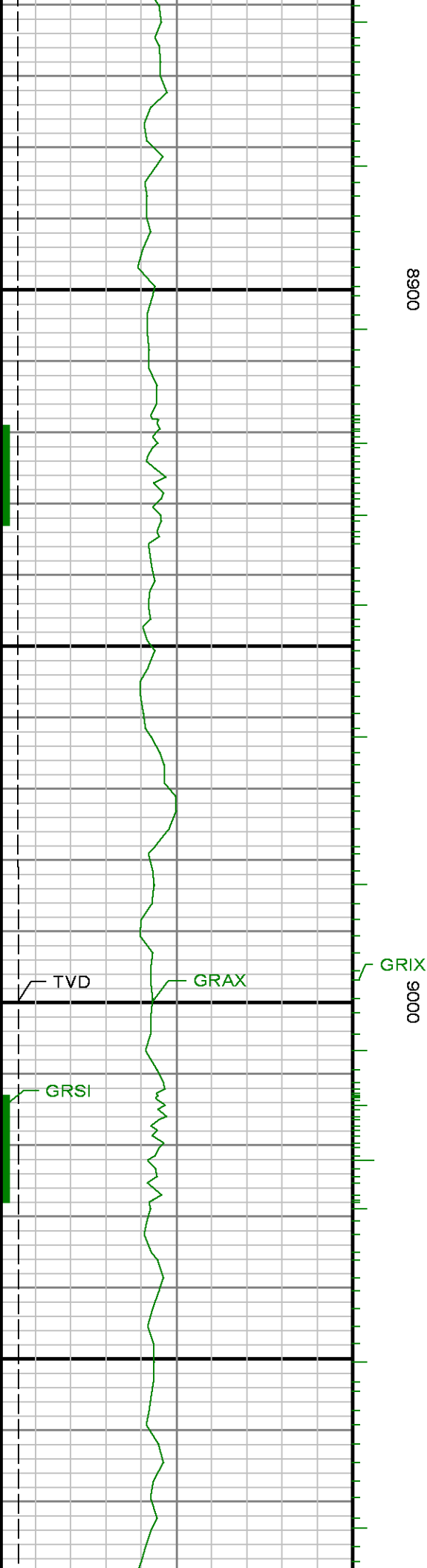


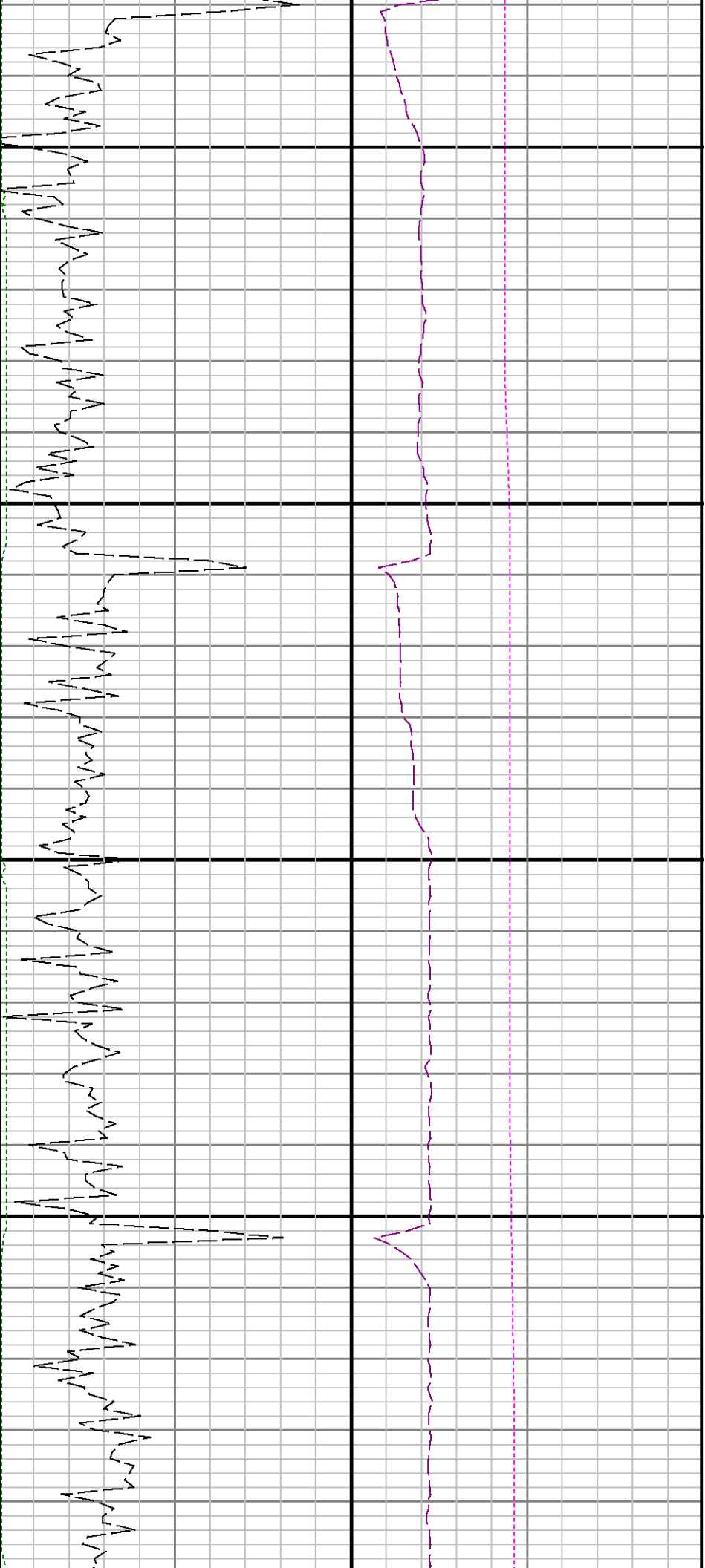


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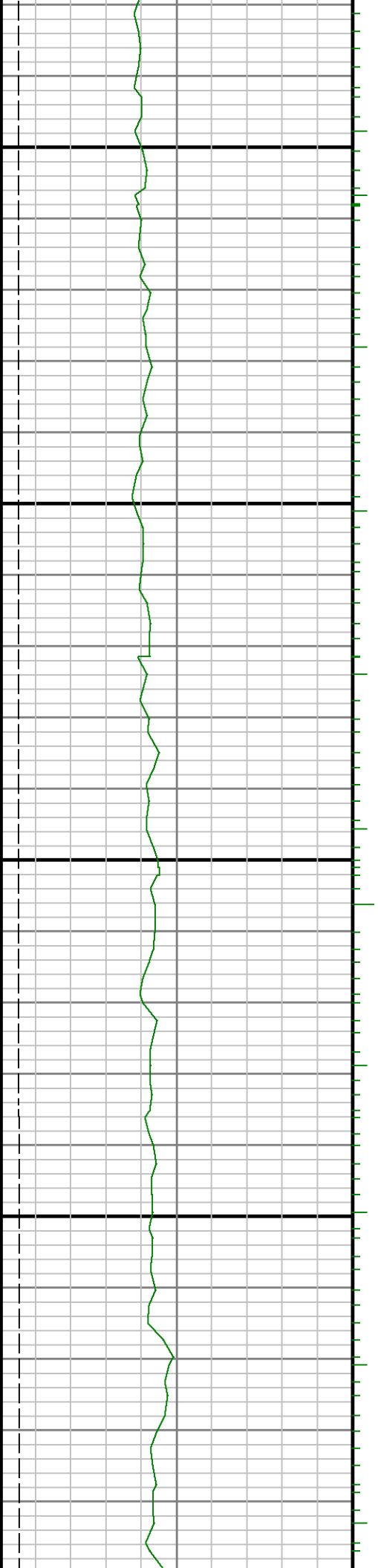


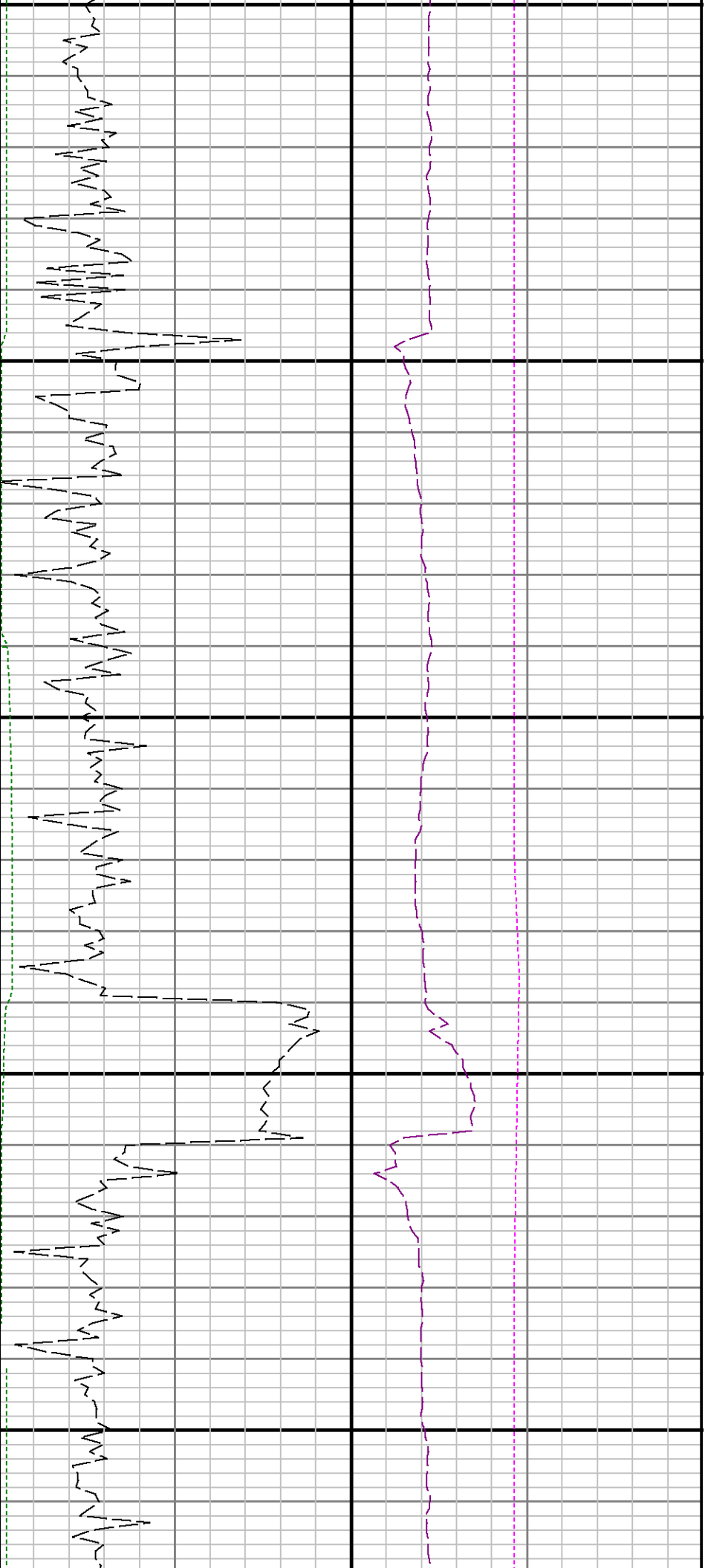


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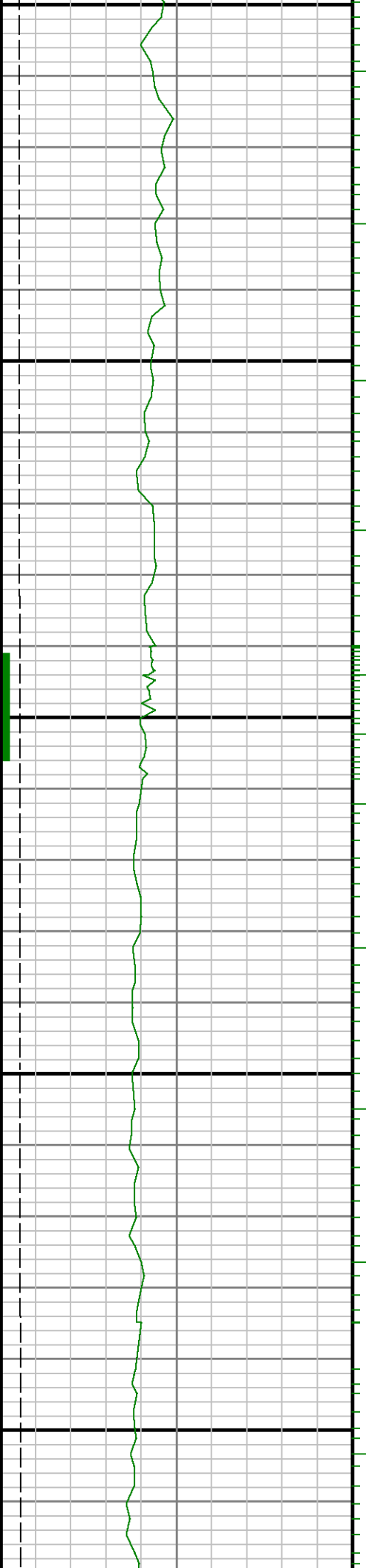


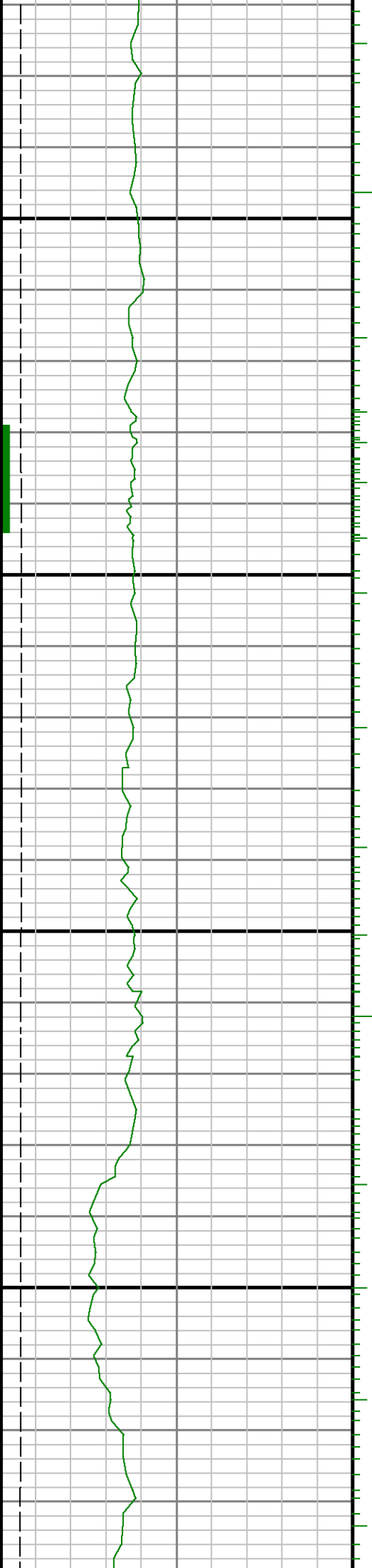


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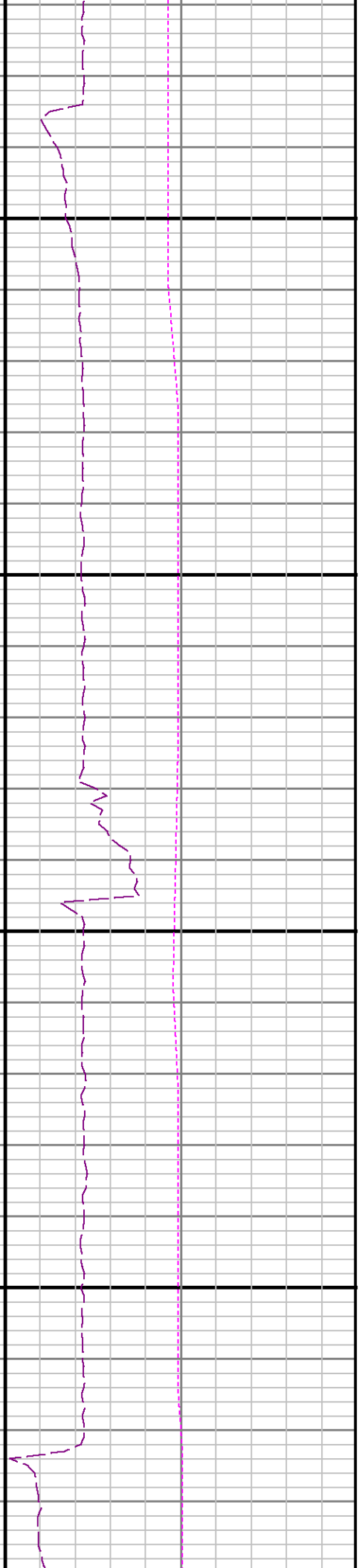
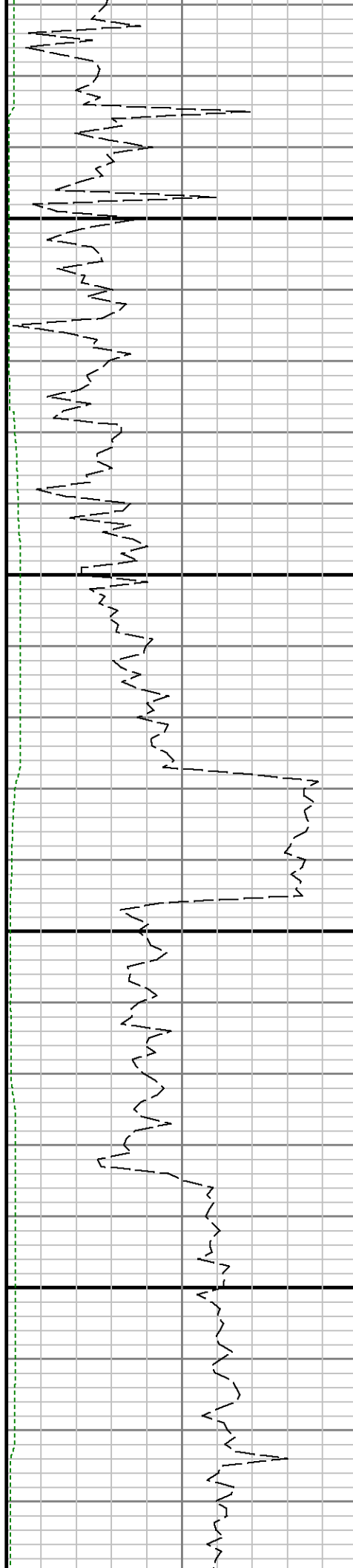
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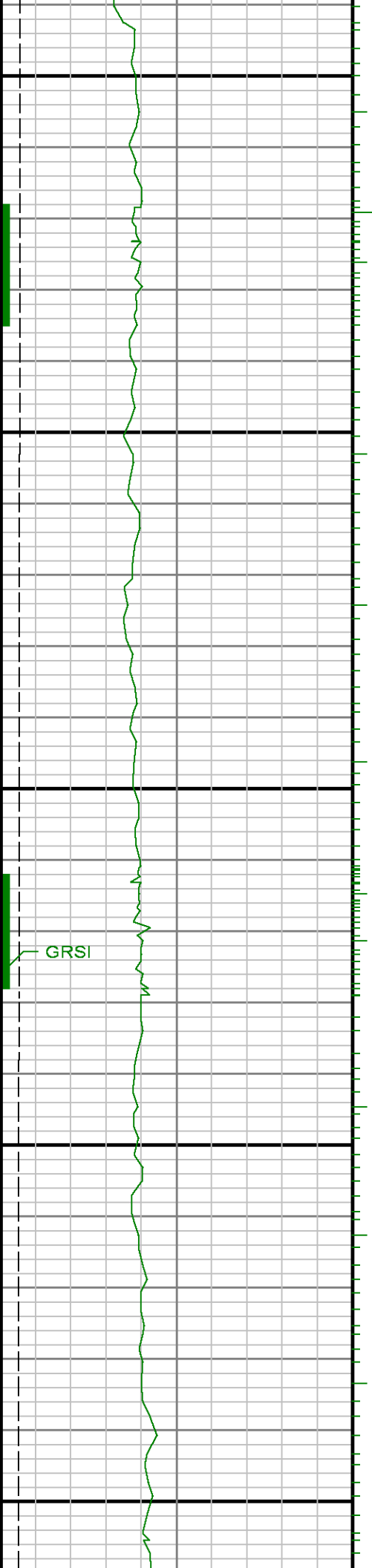




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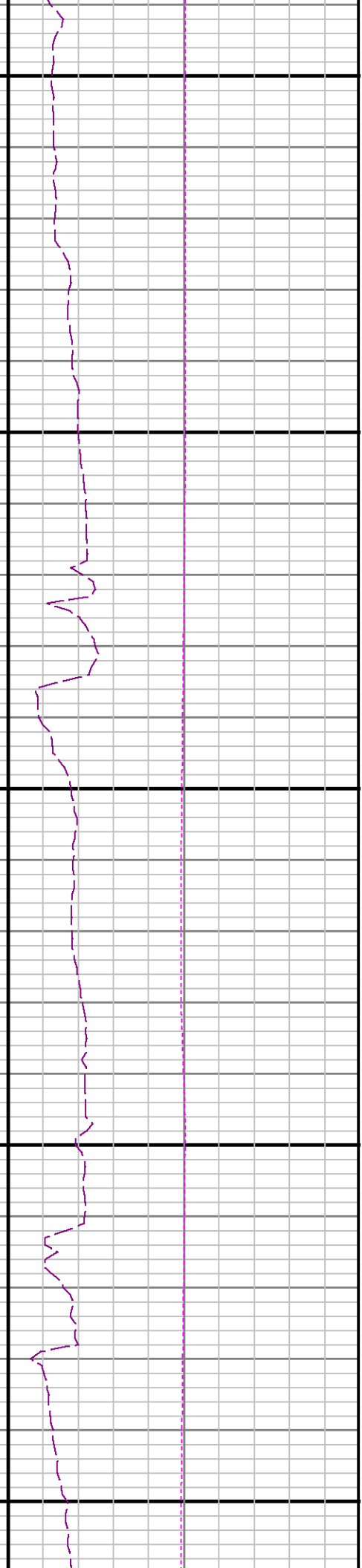
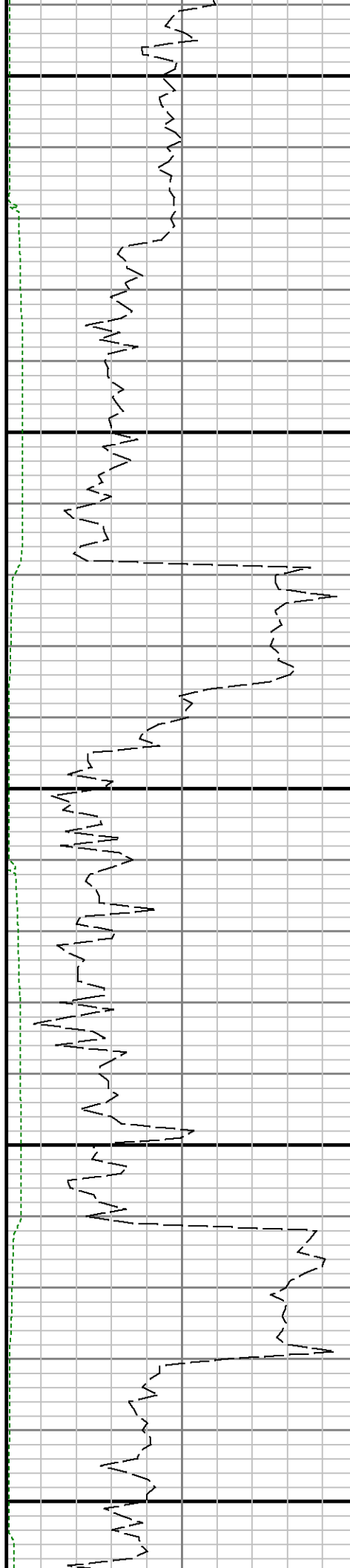
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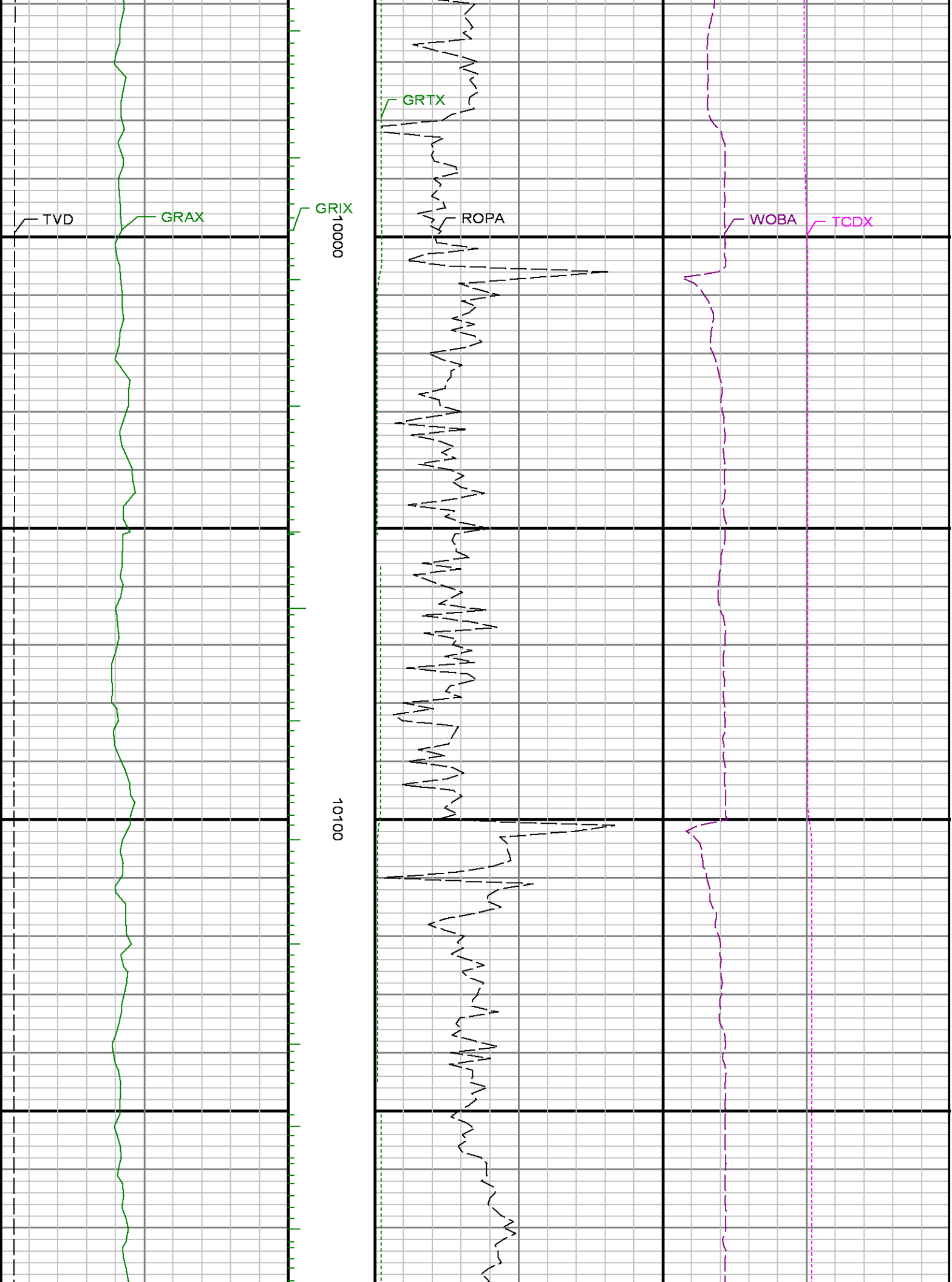


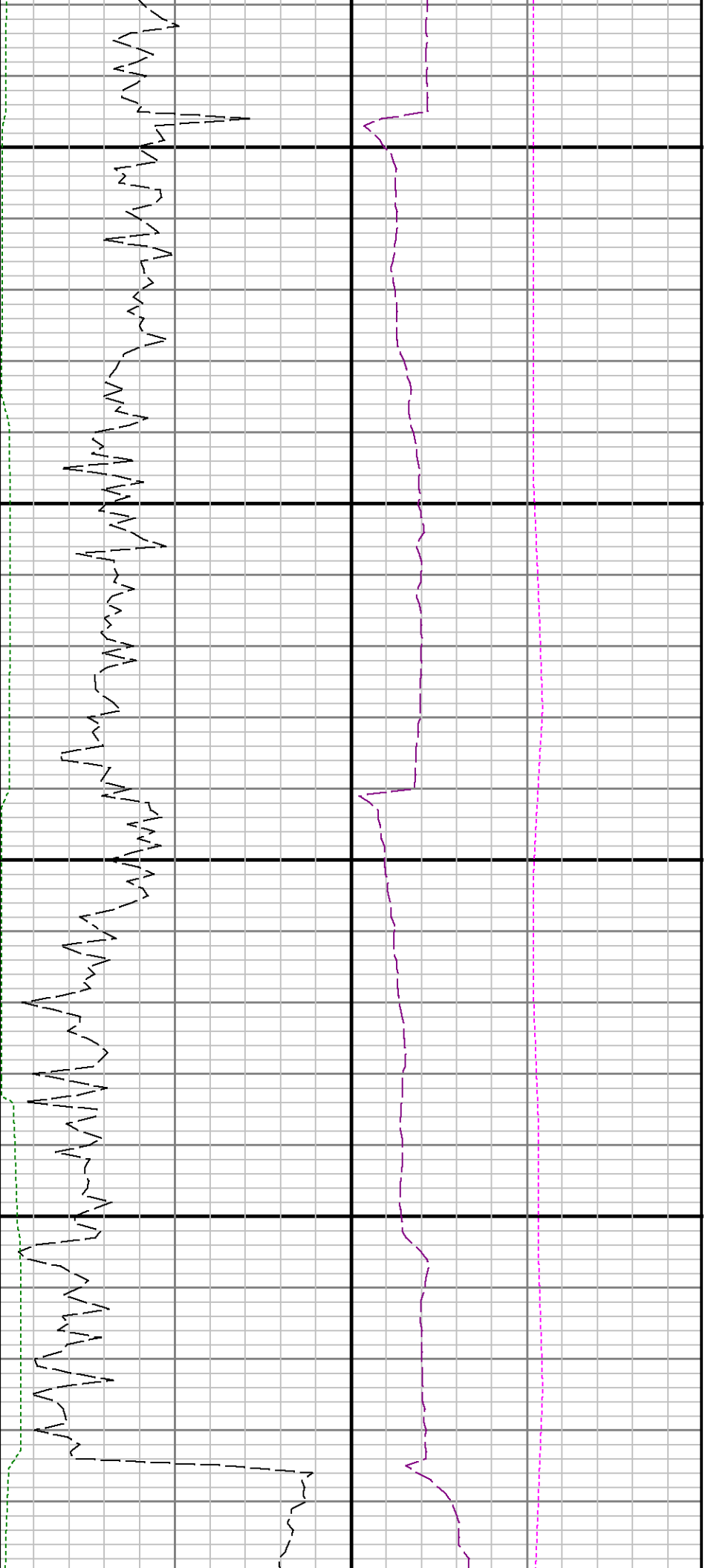


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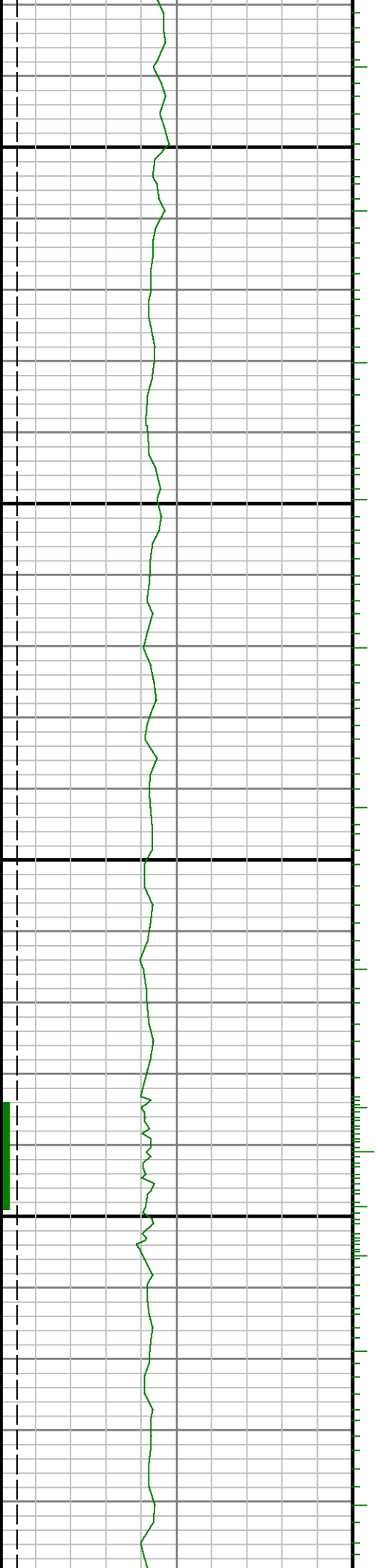


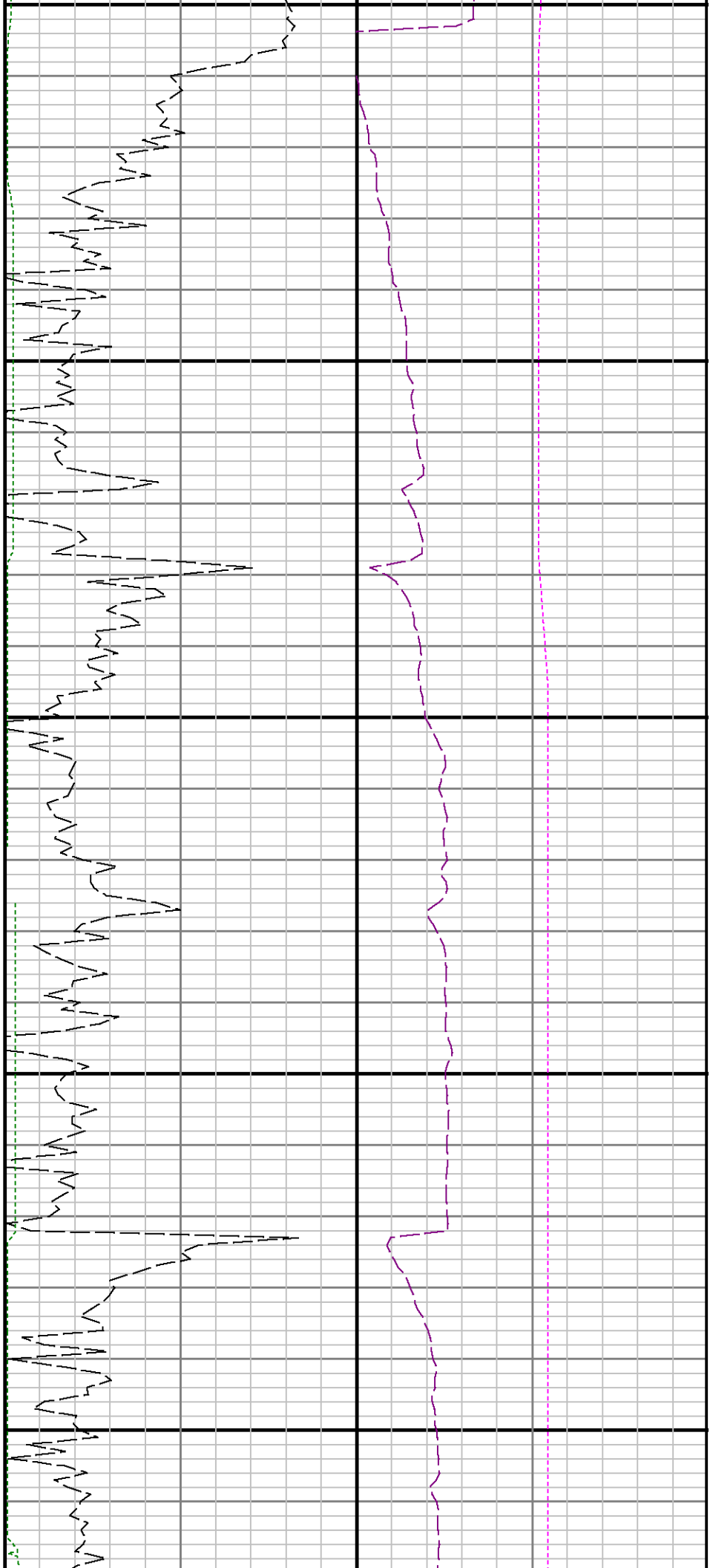


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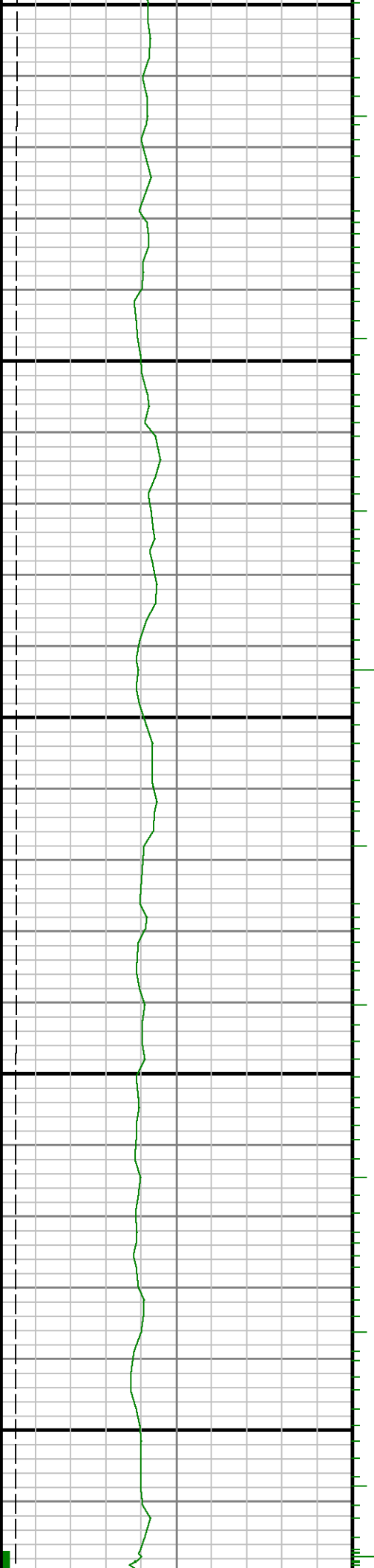


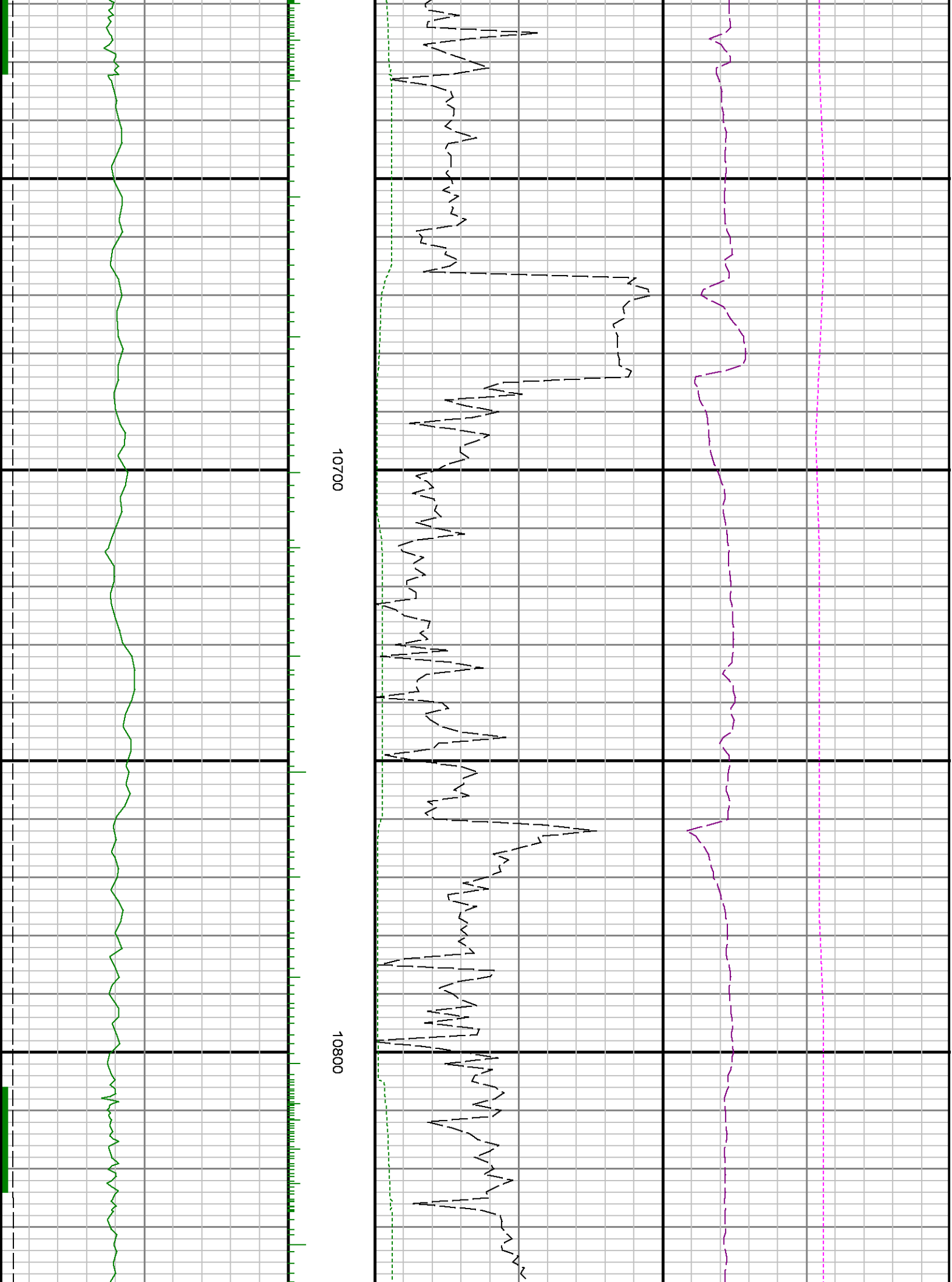


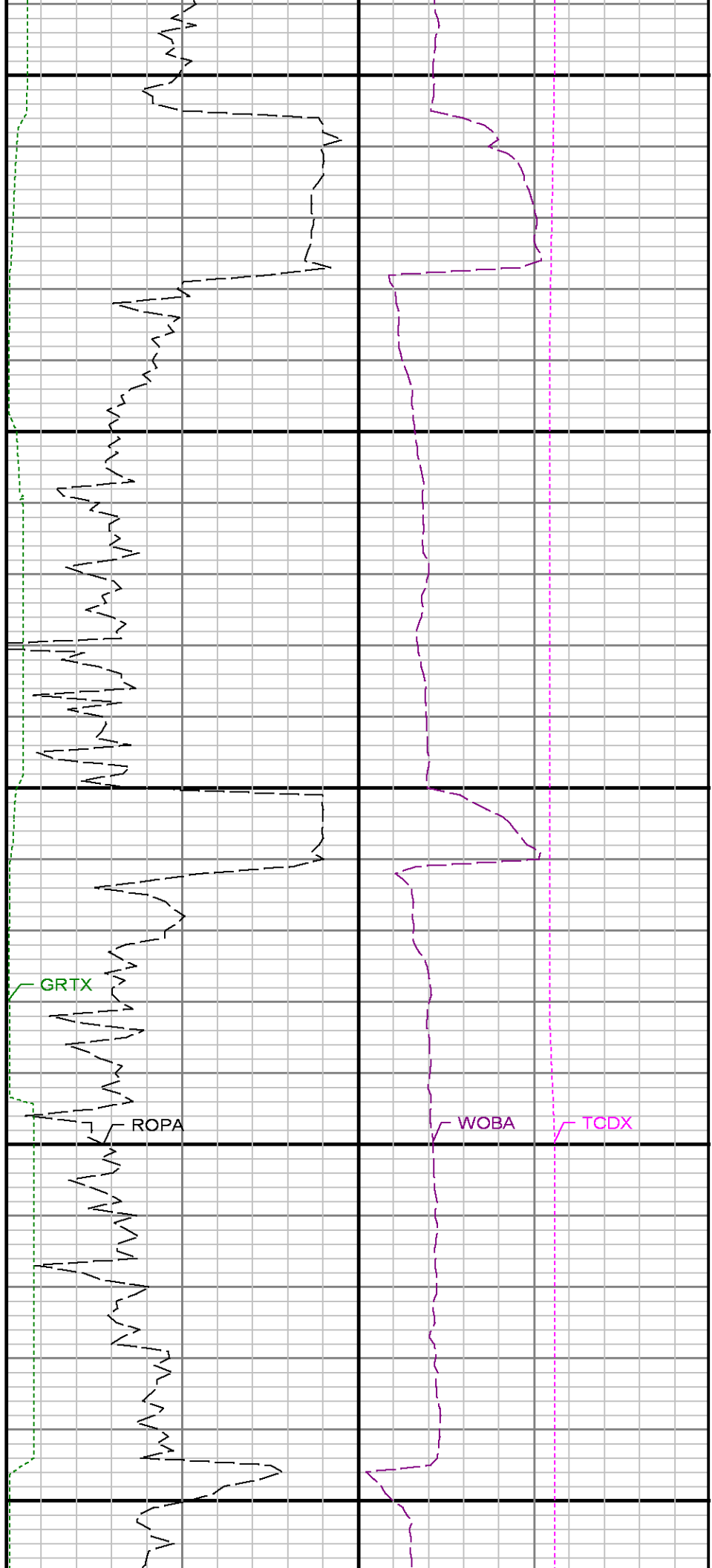
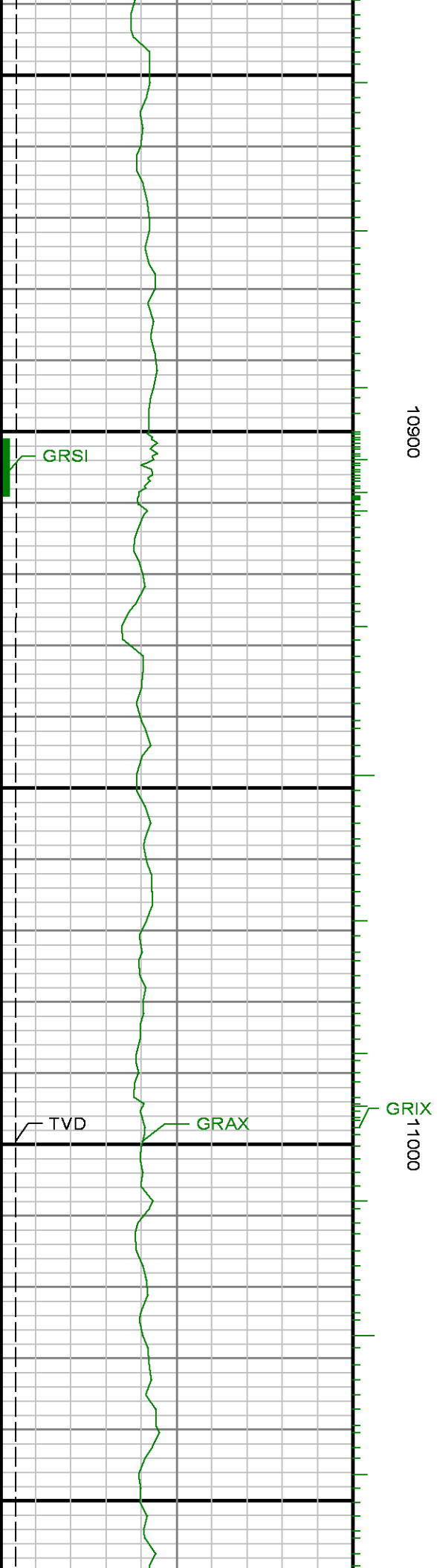
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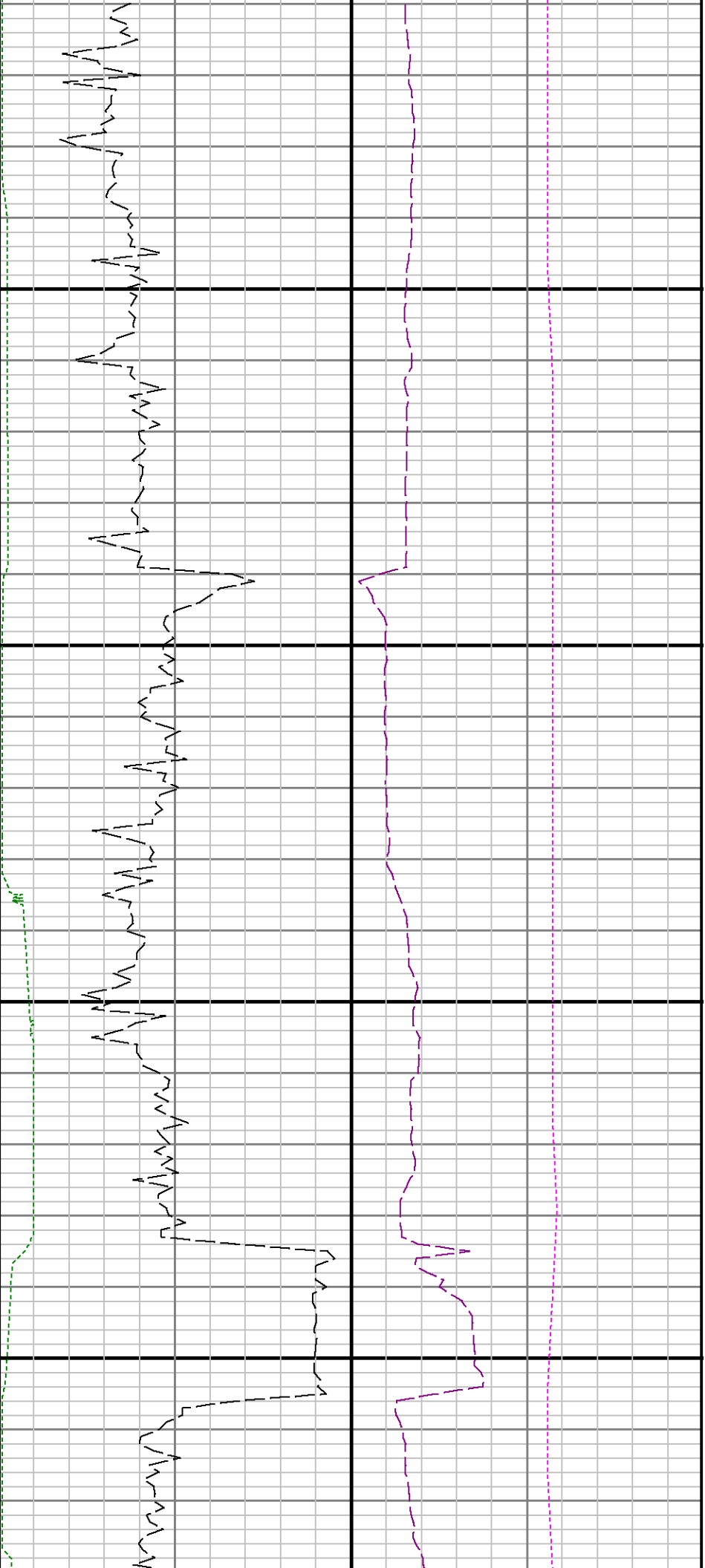
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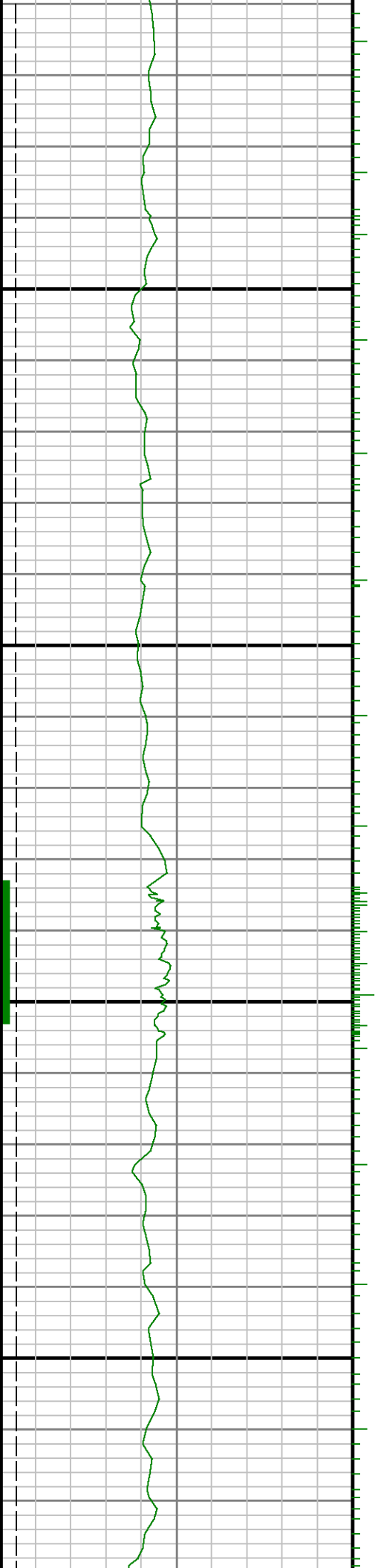


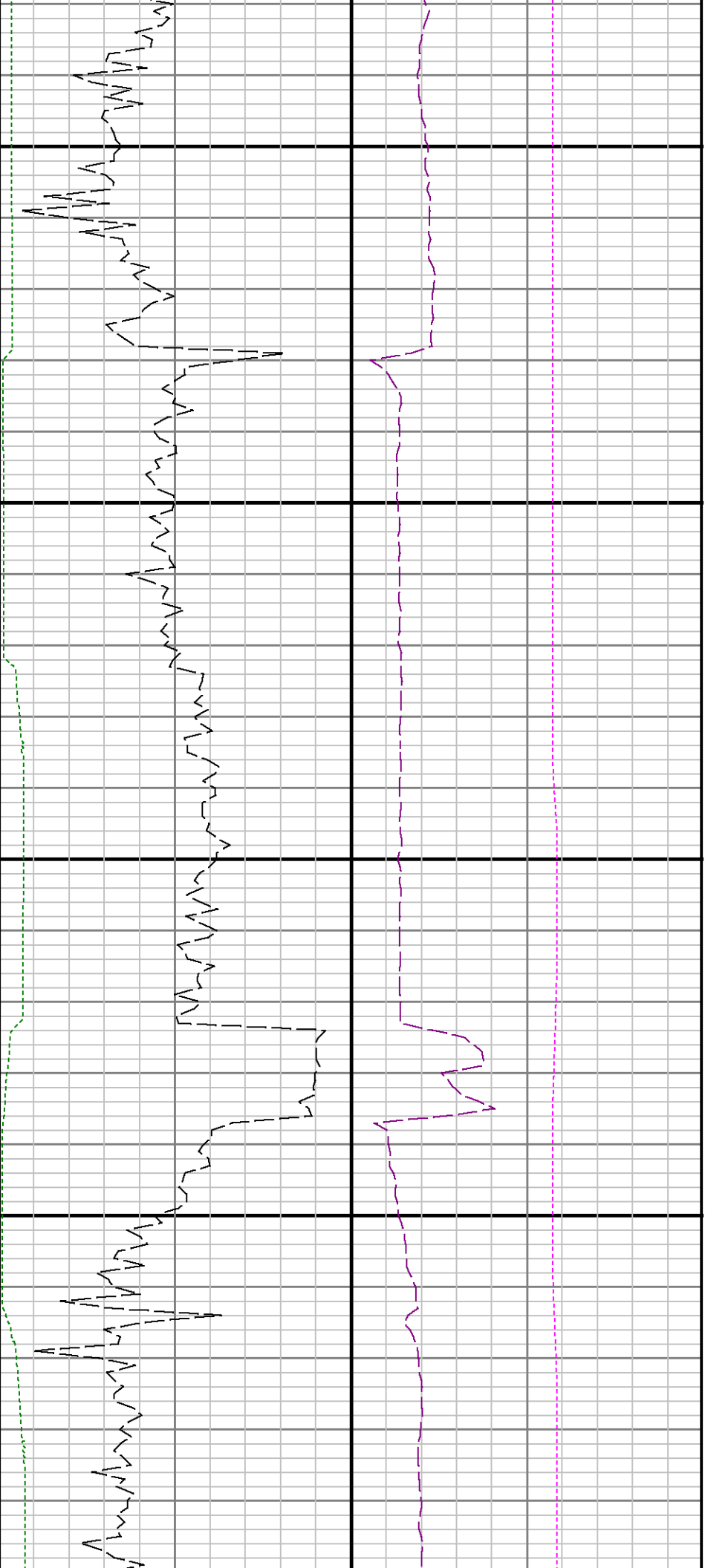




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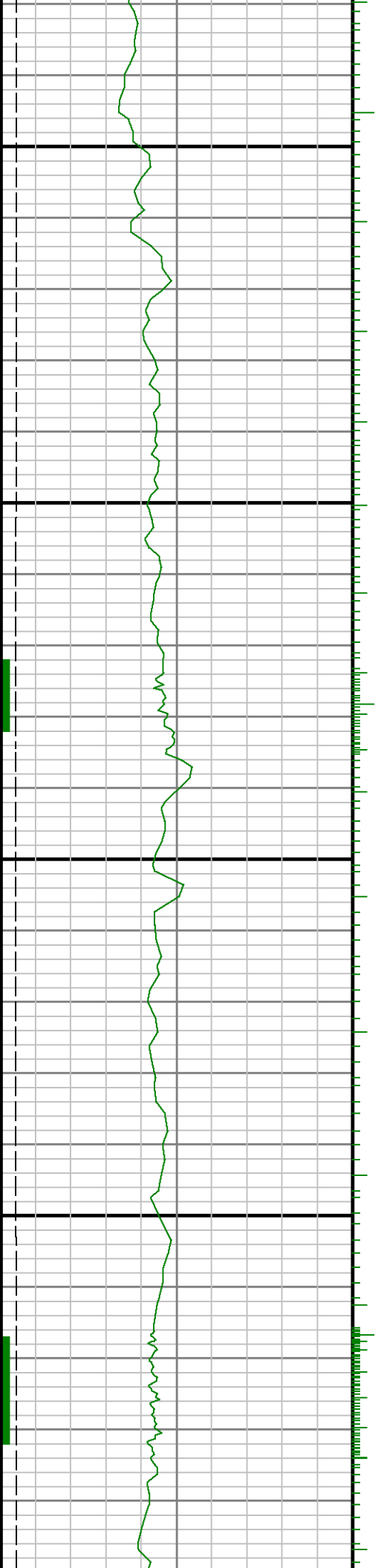


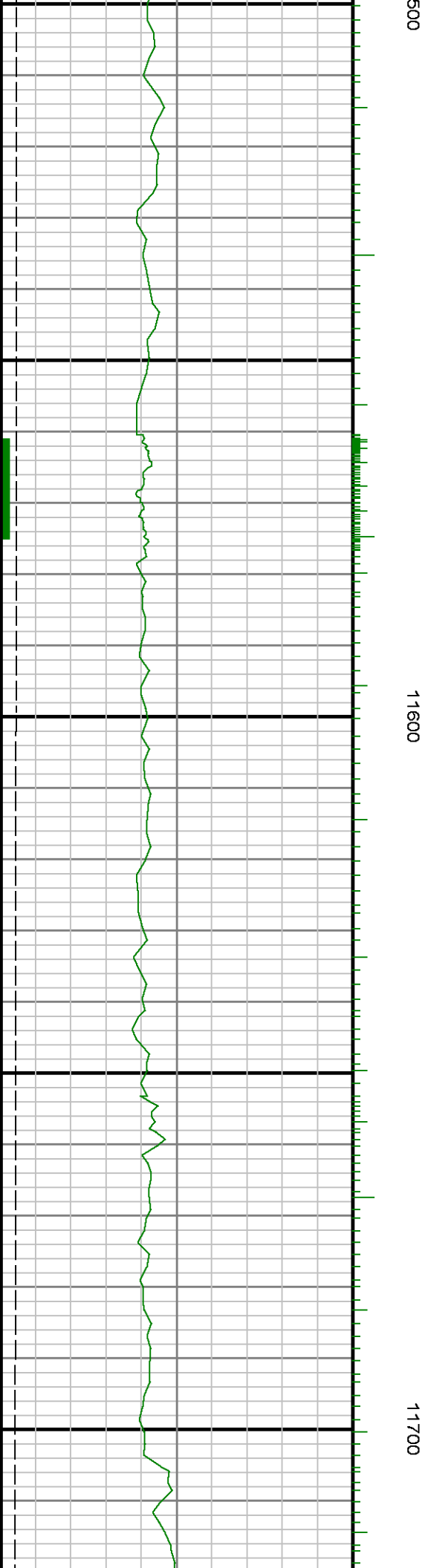
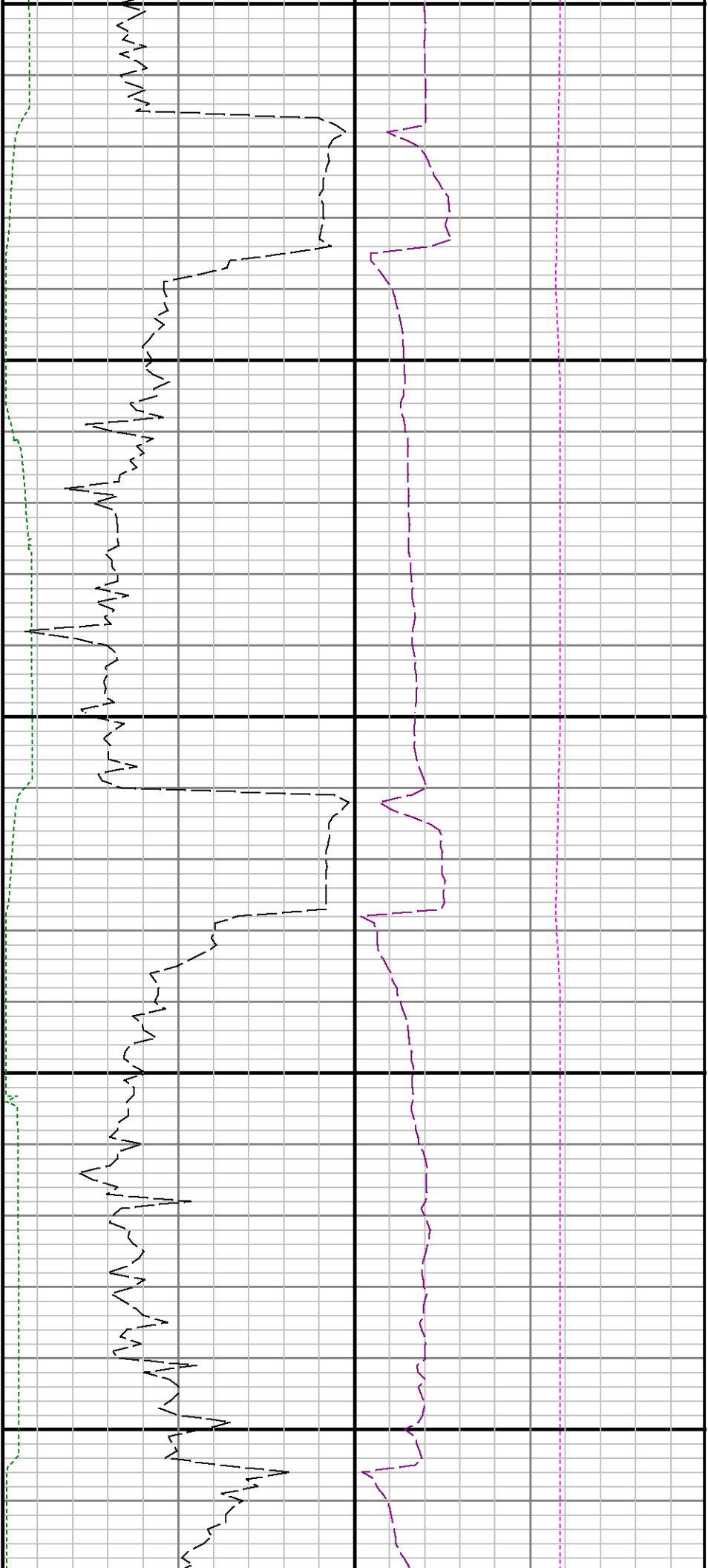


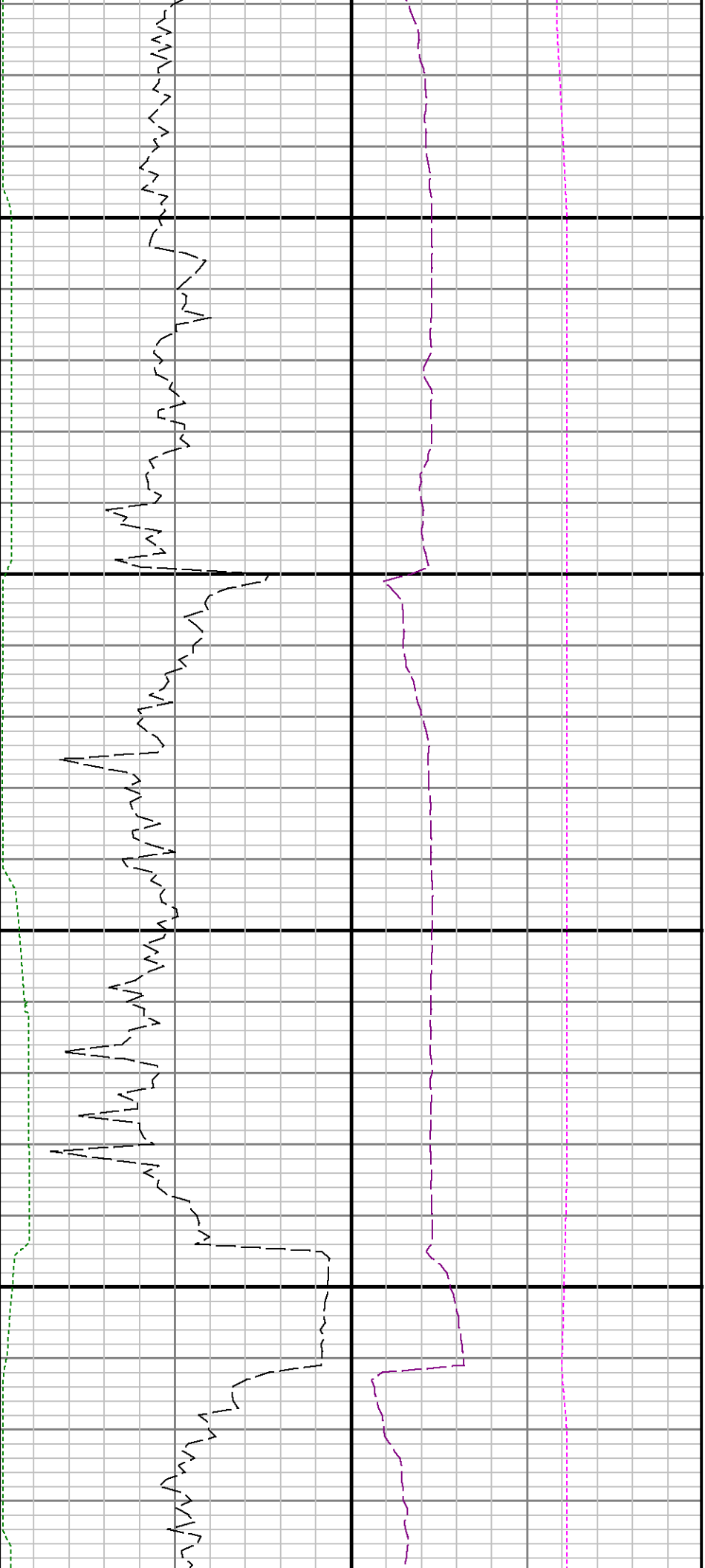
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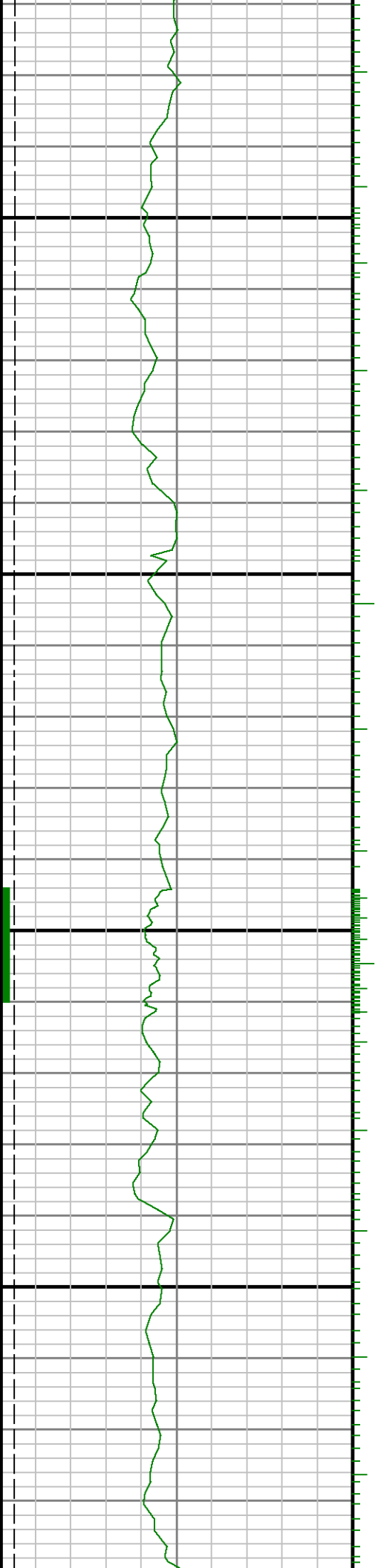




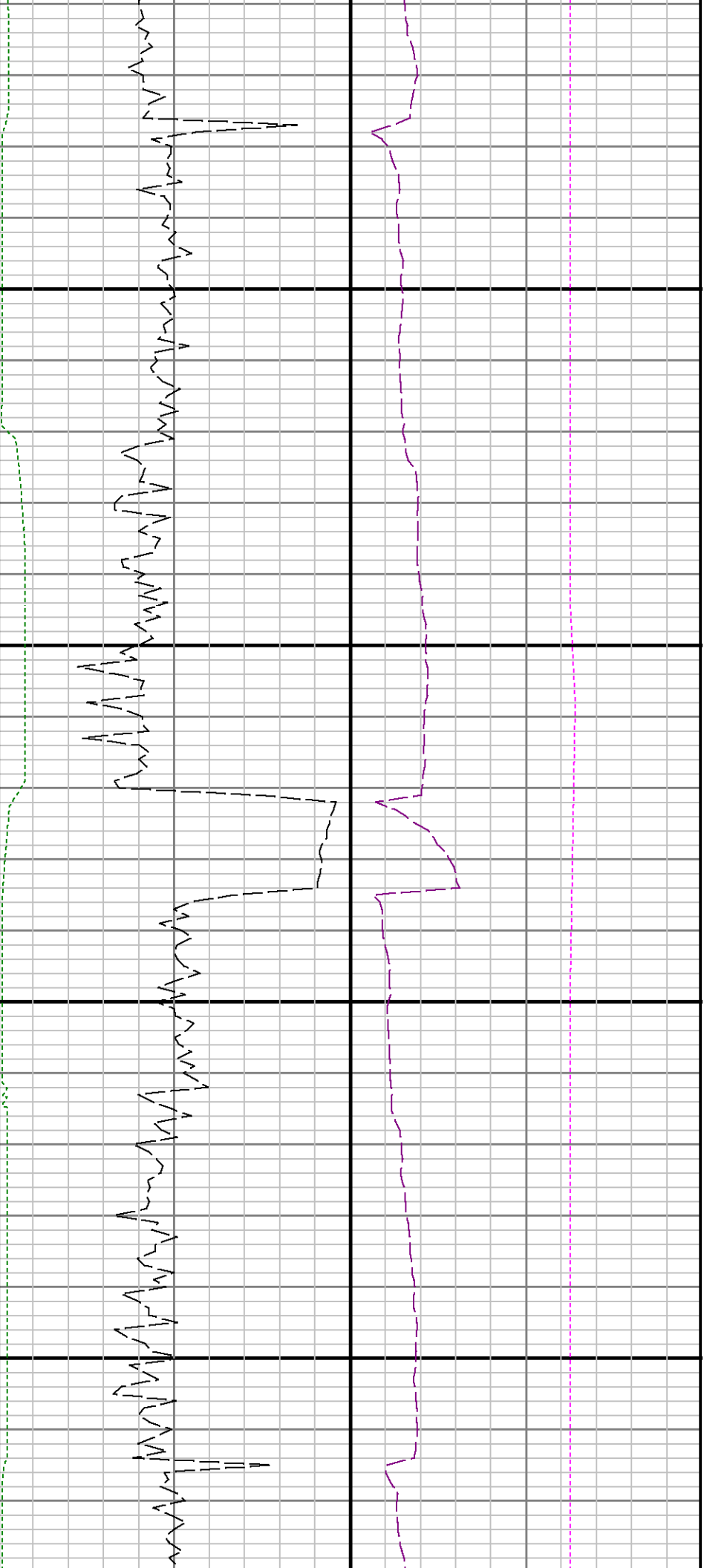


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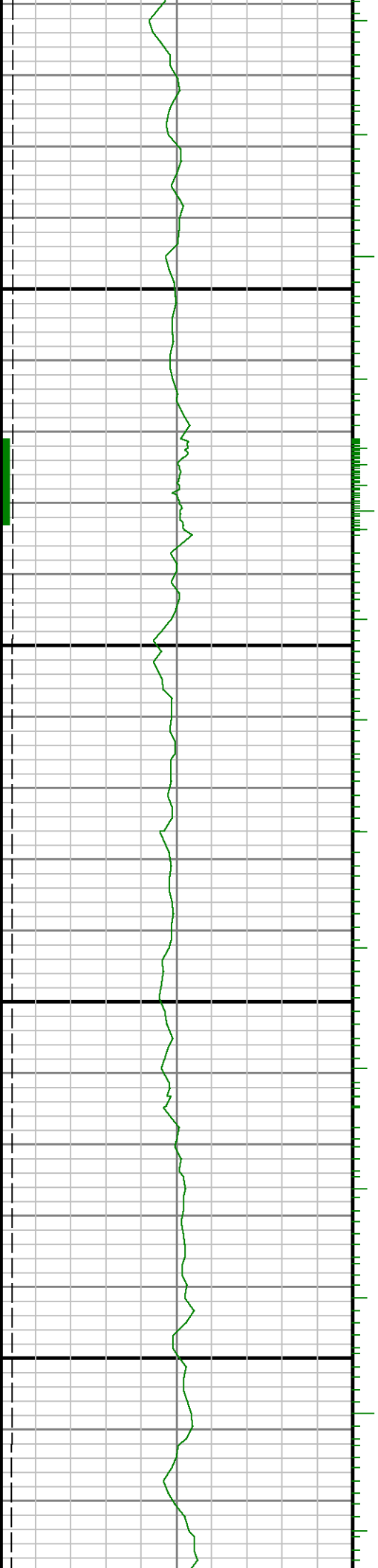


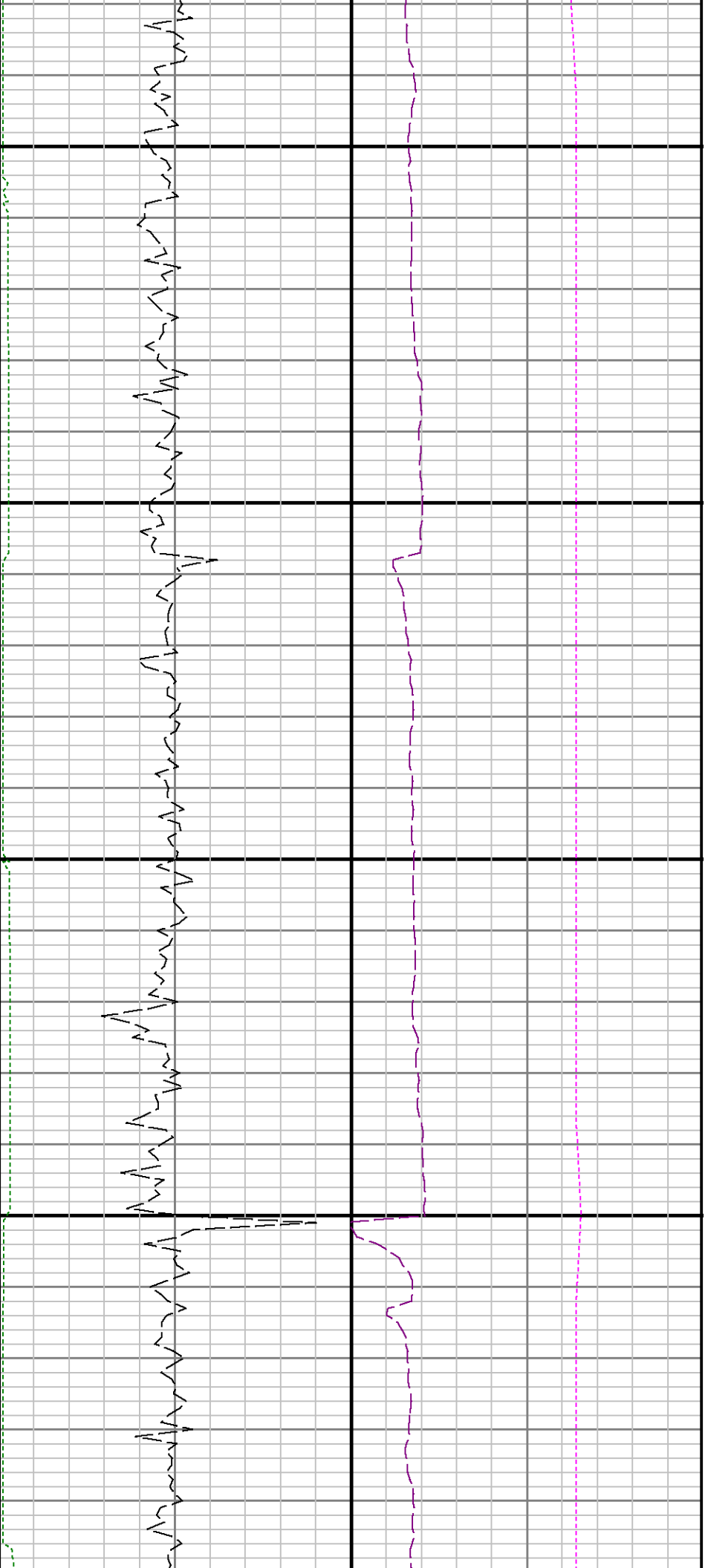




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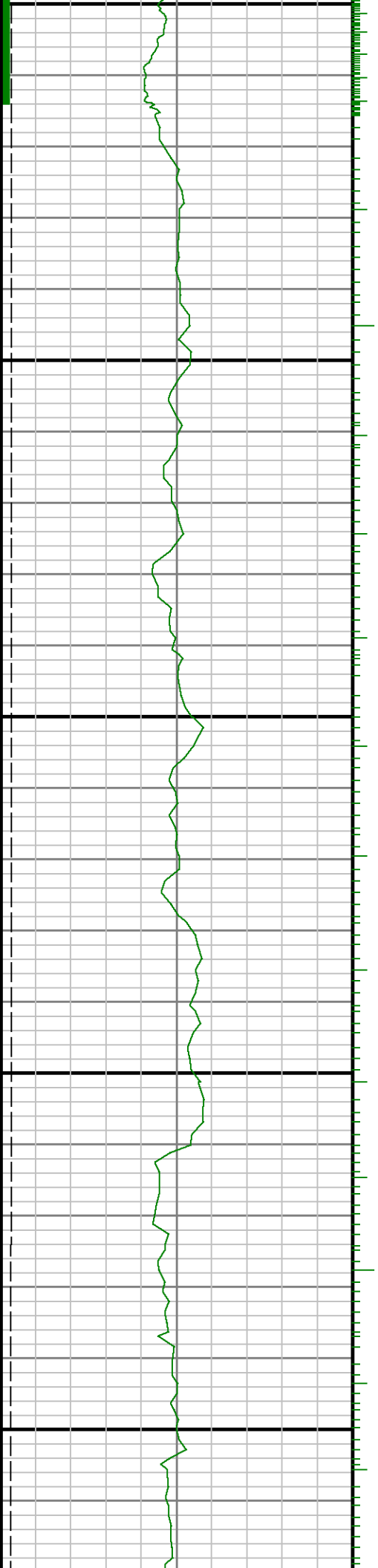
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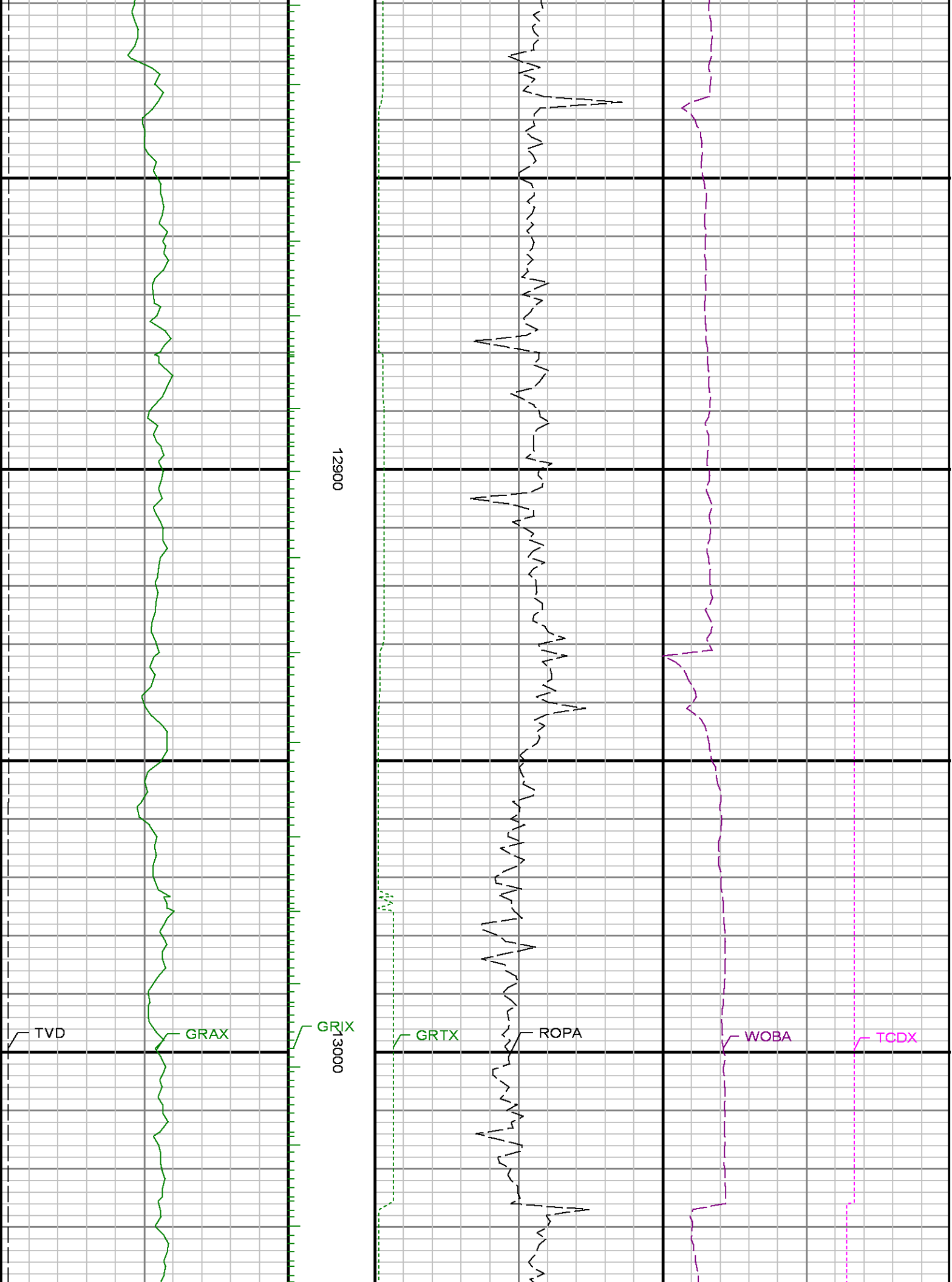


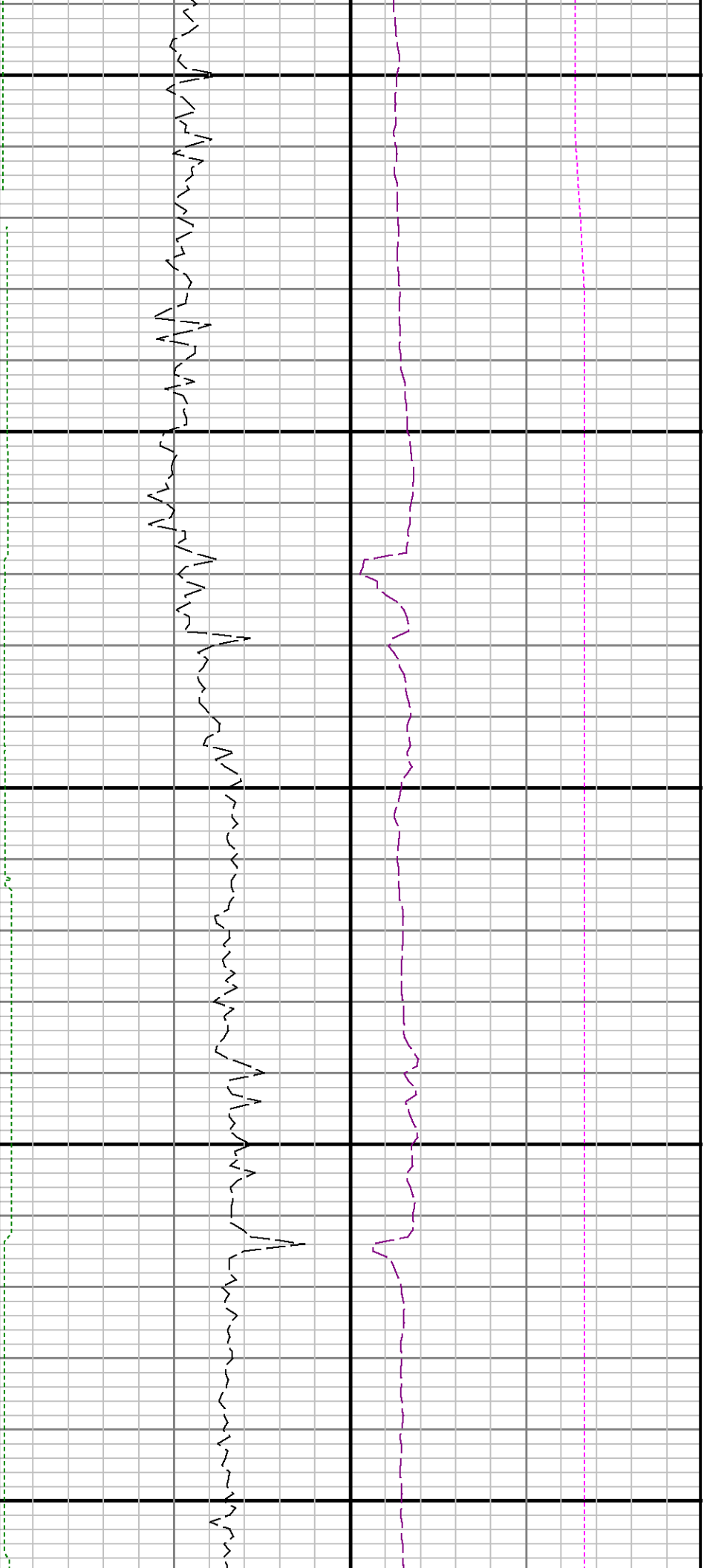
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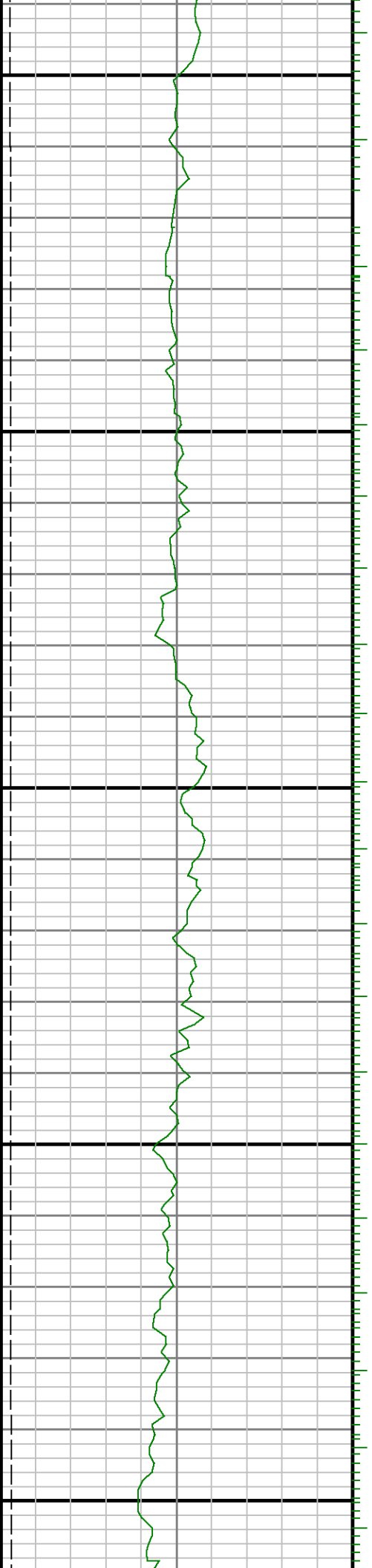


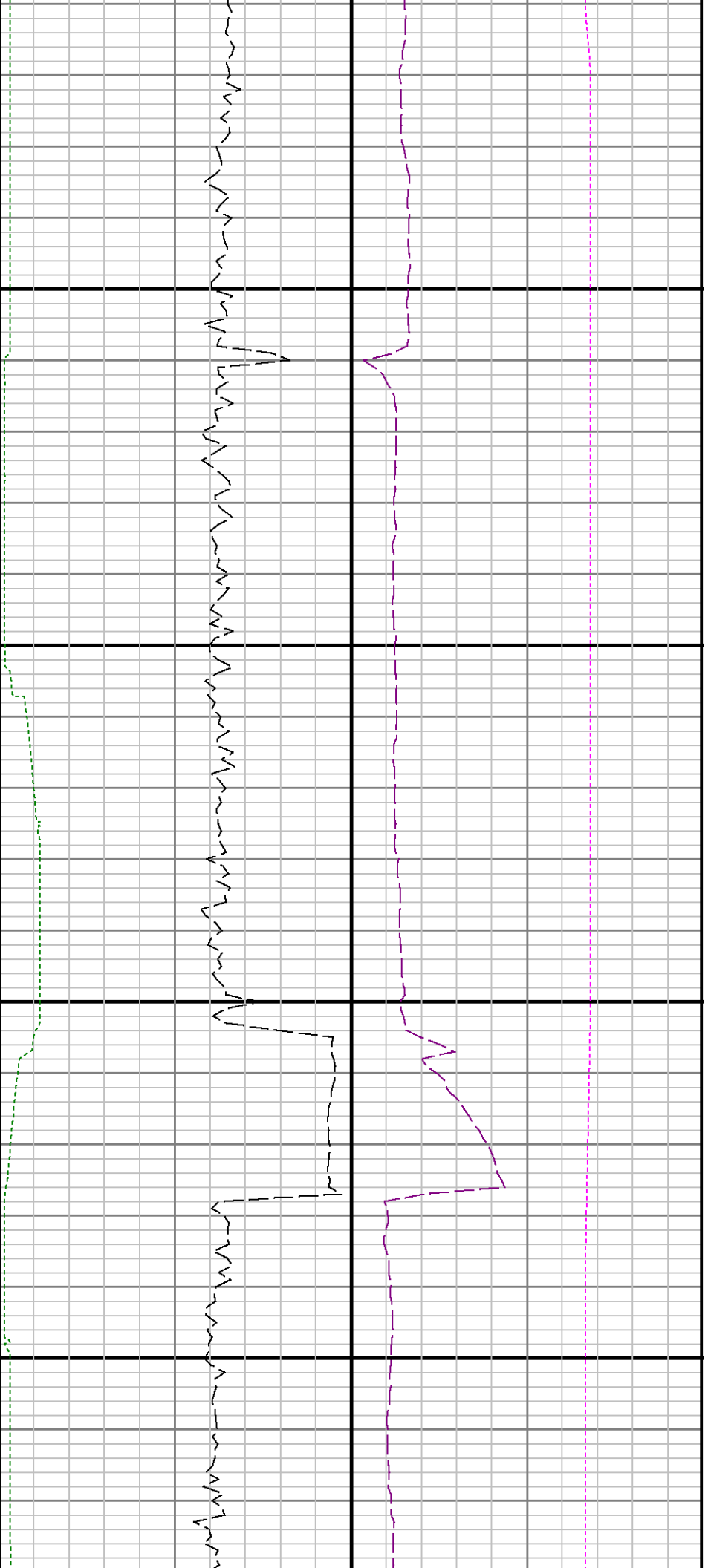




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