



Natural Formation Evaluation
Gamma Ray

Realtime Log

Scale:

Company: Anadarko

1:240

Well: Thomsen Federal 1N-31HZ

MEASURED DEPTH

Field: Weld County (Kerr McGee)

Region: Continental US State: Colorado

Status:

Final Print

Surface Location:

Latitude: 40° 9' 13.036" N

Longitude: 104° 42' 47.232" W

Other Services:

Directional
VSS

API Number:
05123405370000

Section: 7 TWN: 2N Range: 6SE

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

Elevation: 4972.00 ft.

Elevations: N/A

Log Measured From:

Rig Floor

25.00 ft.

Above P.D.

KB:

DF:

GL:

4972.00 ft.
4957.00 ft.

Depth Reference:

Drillers Depth

GL:

4957.00 ft.

Interval Logged

Dates

Magnetic Field Reference

Top: 6700 ft. Date From: 20/Dec/14 Date To: 25/Jan/15 Dip Angle: 66.95 ° Az: Reference North: True

Bottom: 16498 ft. Date To: 25/Jan/15 Total Mag to Reference

Spud Date: 20/Dec/14 Field Strength: 52584.0 nT North Correction: 8.48 °

Borehole Record

Casing Record

Hole Size	From	To	Size	Weight	From	To
8.750 in.	1369ft.	7852 ft.	9.600 in.	36.00 lb/ft	Surface	1359 ft.
6.125 in.	7852 ft.	16498 ft.	7.000 in.	26.00 lb/ft	Surface	7833 ft.

Mud Record

Deviation Record

Type	From	To	Hole Size	Interval	Inc / Az (Start)	Inc / Az (End)
Water based	Surface	7852 ft.	8.750 in.	Vert/Curve	0.7 ° / 182.0 °	85.3 ° / 2.7 °
Oil Based	7852 ft.	16498 ft.	6.125 in.	Lateral	89.5 ° / 2.5 °	89.2 ° / 0.14 °

Acquisition System Software Version

Other

Advantage 2.20U4 Rig: / Contractor: H&P 307 / Helmerich & Payne Drilling Co

PATS 6.4.1.34 Job No: 6869446 / D&E

District / Unit: RMD

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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	1	8.750	PDC		Mud Motor	6700	7808	1369	7851	22/Dec/2014 16:53	23/Dec/2014 15:07	50.1
2	2	2	6.125	PDC		Mud Motor	7808	12613	7852	12662	19/Jan/2015 23:40	21/Jan/2015 22:20	42.7
3	3	3	6.125	PDC		Mud Motor	12613	16448	12663	16498	22/Jan/2015 02:45	25/Jan/2015 07:44	52.2

Crew

Name	Arrive	Depart	Name	Arrive	Depart	Name	Arrive	Depart
	Wellsite	Wellsite		Wellsite	Wellsite		Wellsite	Wellsite
Andy King	18/Dec/2014	26/Jan/2015	Sumanth Belawadi	18/Dec/2014	22/Jan/2015	Jake Miller	22/Dec/2014	26/Jan/2015

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.

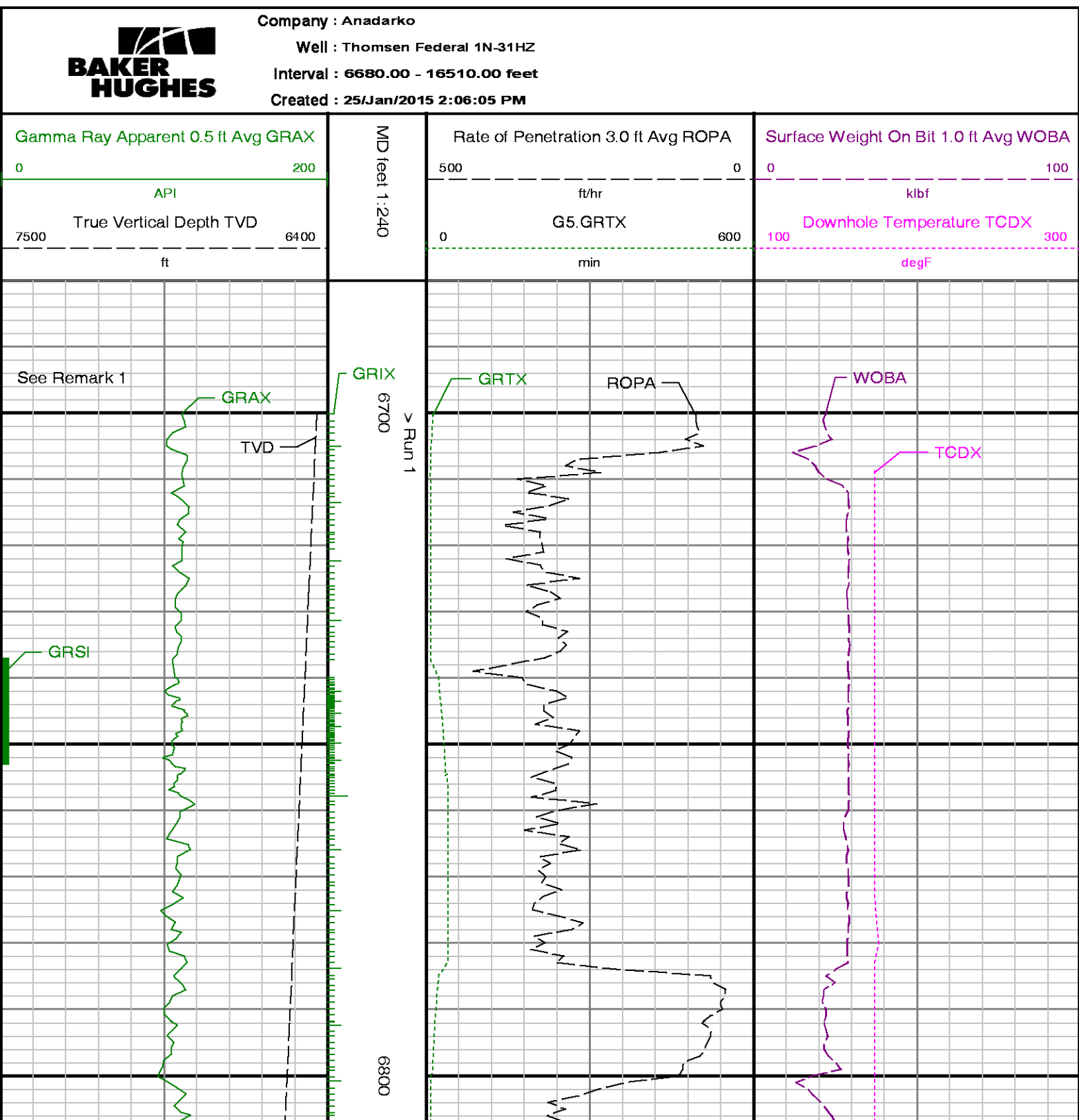
Equipment and Service Data						
LWD Run No.	Tool	Serial Number	Measurement	Bit Offset (ft.)	Max O.D. (in.)	Min I.D. (in.)
1	DIR	11730419	Directional	46.56	6.750	3.125
1	SRIG	12600748	Gamma	43.19	6.750	3.125
2	DIR	12546374	Directional	51.37	4.750	2.750
2	SRIG	12554666	Gamma	47.95	4.750	2.750
3	DIR	12456778	Directional	53.31	4.750	2.750
3	SRIG	10582603	Gamma	49.93	4.750	2.750

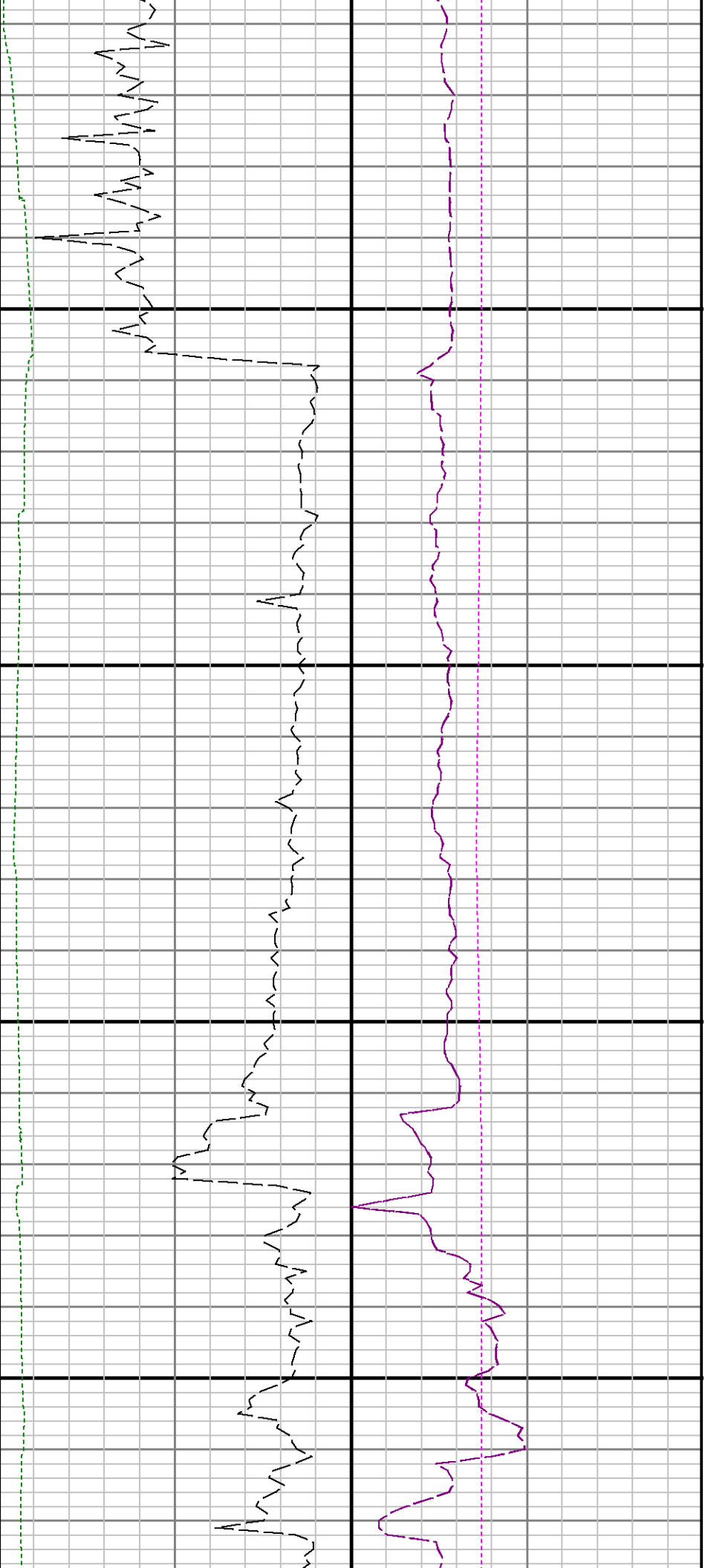
Service and Tool Mnemonics		
Mnemonic	Name	Description
DIR	Directional	Wellbore directional survey
SRIG	Inclination and Gamma	Probe based gamma ray and inclination module

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 1396 to 7852 ft MD (1366 to 7236 ft TVD).</p> <p>(2) Baker Hughes INTEQ runs 2 and 3 utilized 4 3/4 inch NaviGamma services (Gamma Ray and Directional) behind a 6 1/8 inch bit and steerable assembly from 7852 to 16498 ft MD (7236 to 7254 ft TVD).</p> <p>(3) 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 logging engineers, depth calibrations and measurements could not be independently verified.</p> <p>(4) 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 (ft.)	Hole Section (in.)	LWD Run No.	Remark
1	6700	8.750	1	Began logging Gamma above Build Section at 6700 ft MD (6436 ft TVD).
2	7820	8.750	2	The interval from 7809 to 7852 ft MD (7809 to 7236 ft TVD) was logged up to 27Days 8 Hours after being drilled due to a trip out of hole for casing and cement operations and to pick up Lateral BHA. 27 Days was due to batch drilling

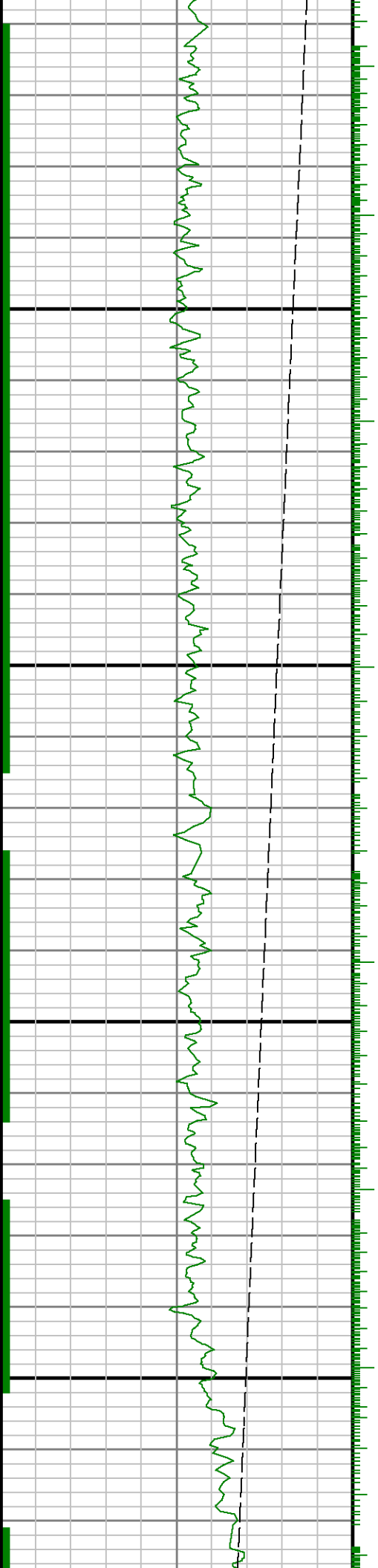
3	8370	6.125	2	The interval from 8351 to 8922 ft MD (7235 to 7227 ft TVD) contains no WOBA data due to rig sensor malfunction and subsequent repairs
4	12620	6.125	3	The interval from 12614 to 12663 ft MD (7241 to 7242 ft TVD) was logged up to 28 Hours after being drilled due to a trip out of hole to pick up new Lateral BHA.
5	13500	6.125	3	The interval from 13481 to 13505 ft MD (7241 to 7241 ft TVD) contains no WOBA and ROPA data due to TOTCO shutdown
6	16455	6.125	3	The interval from 16448 to 16498 ft MD (7254 to 7254 ft TVD) contains no GRAX due to sensor offset

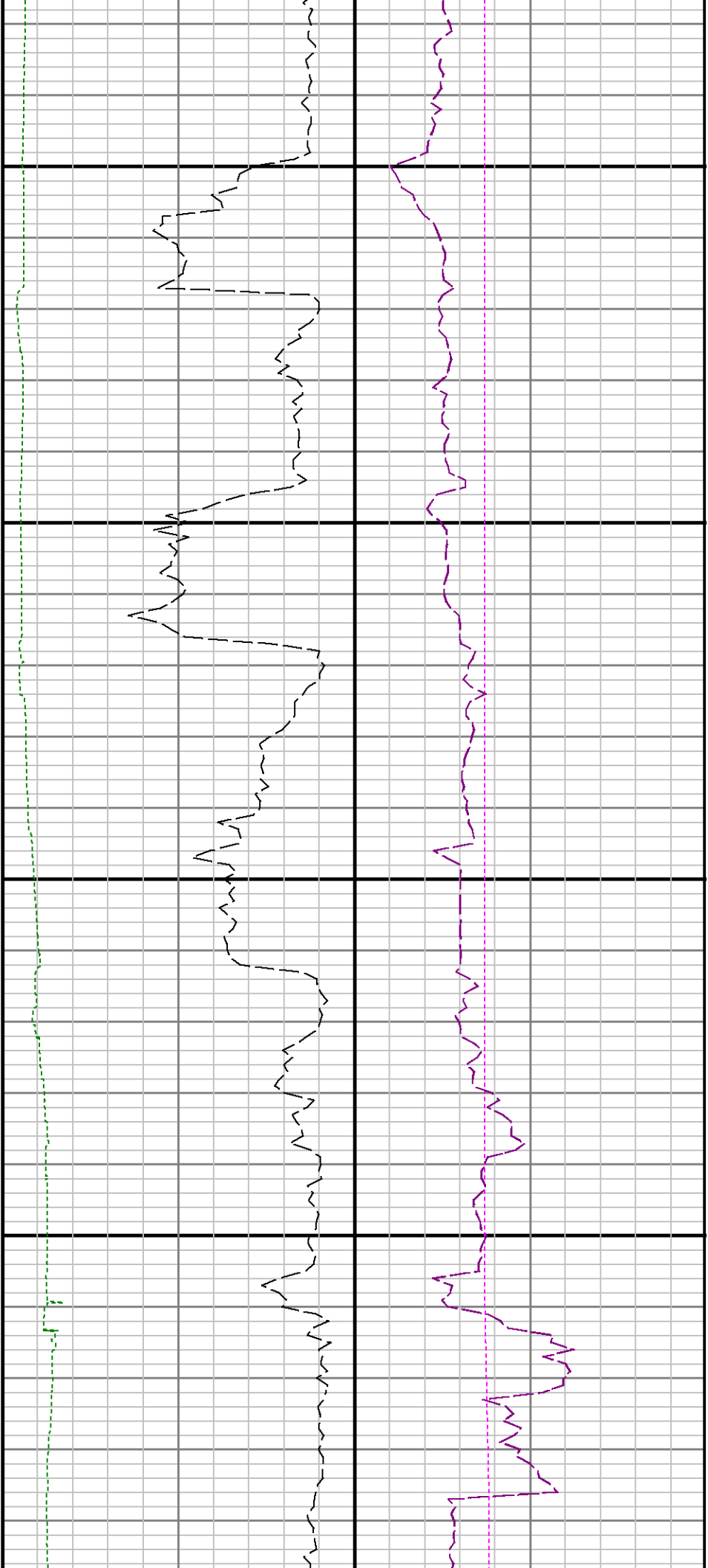




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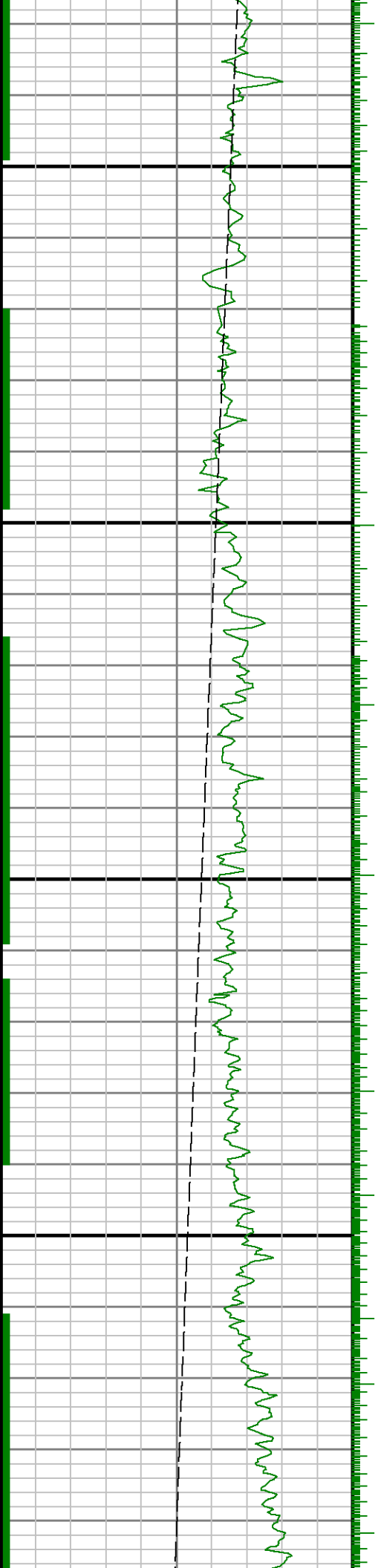
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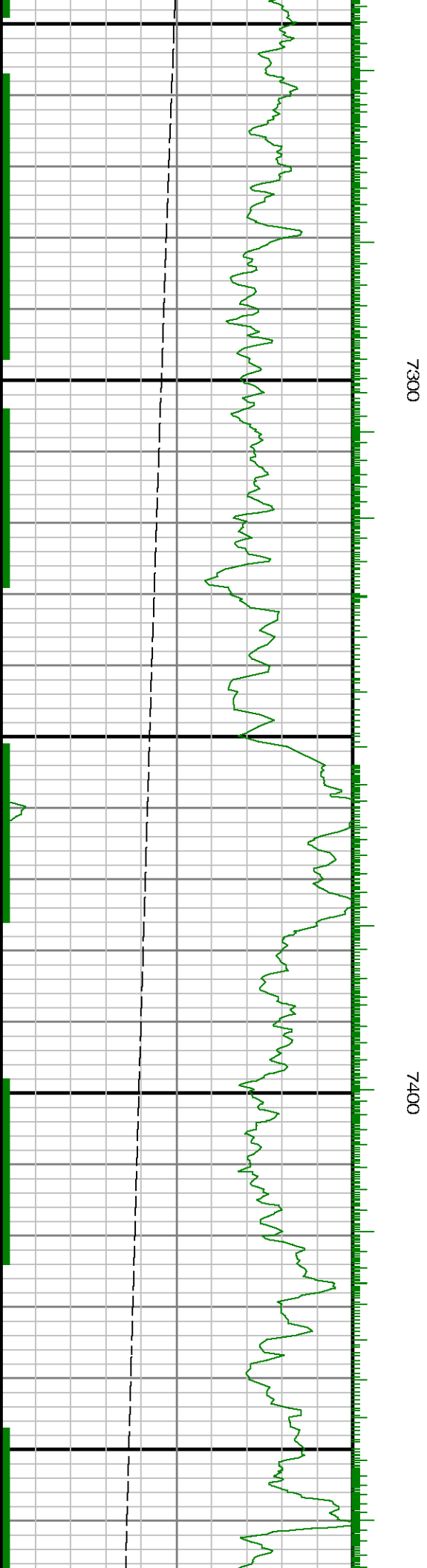


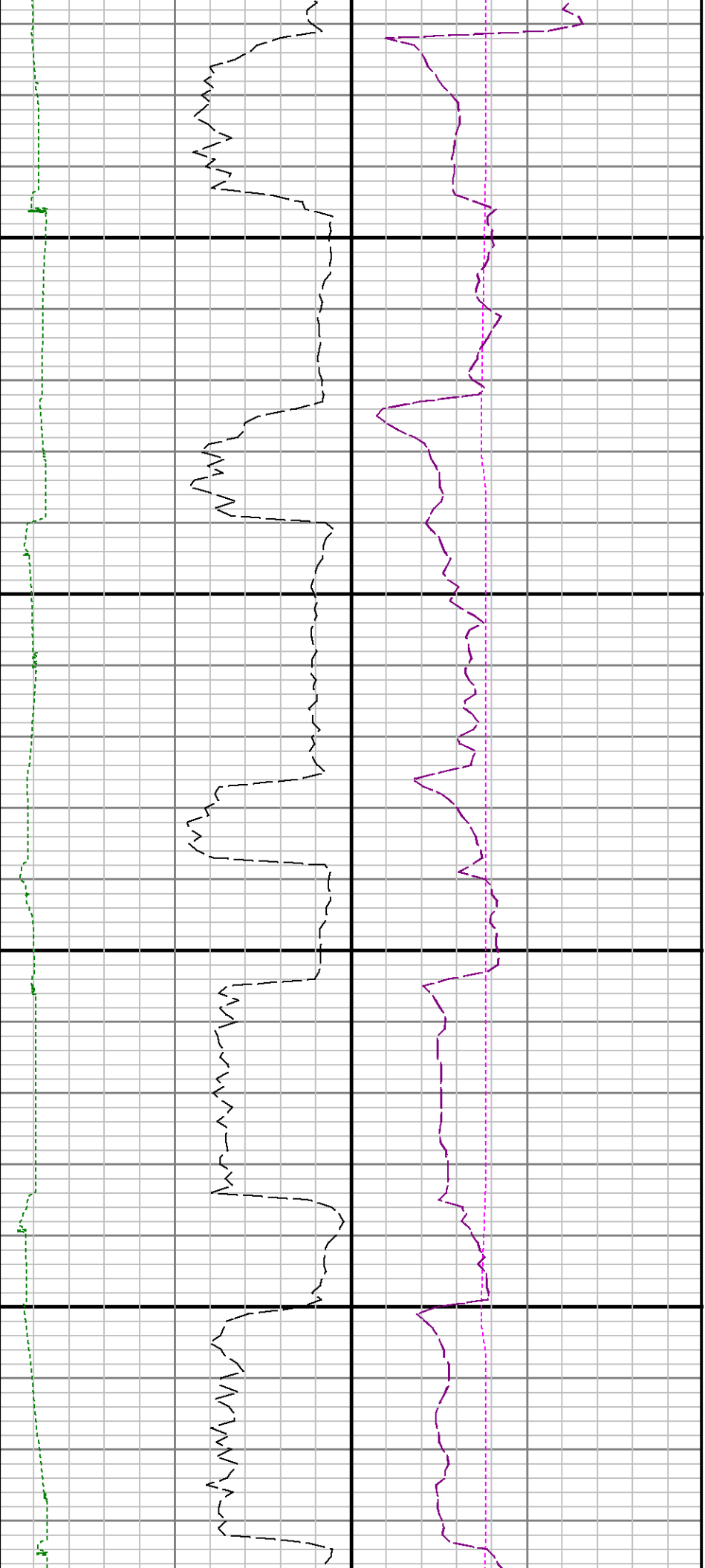


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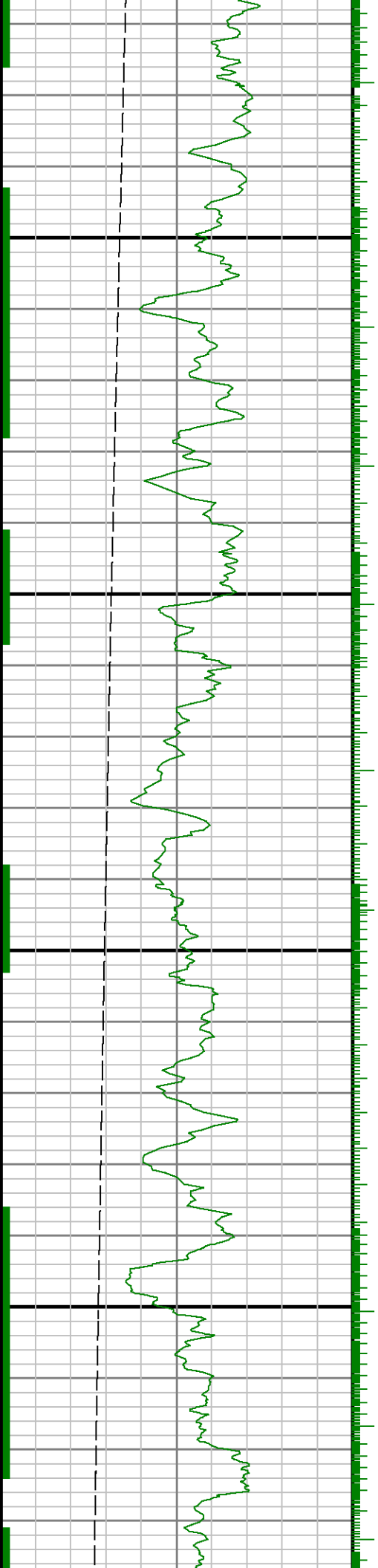


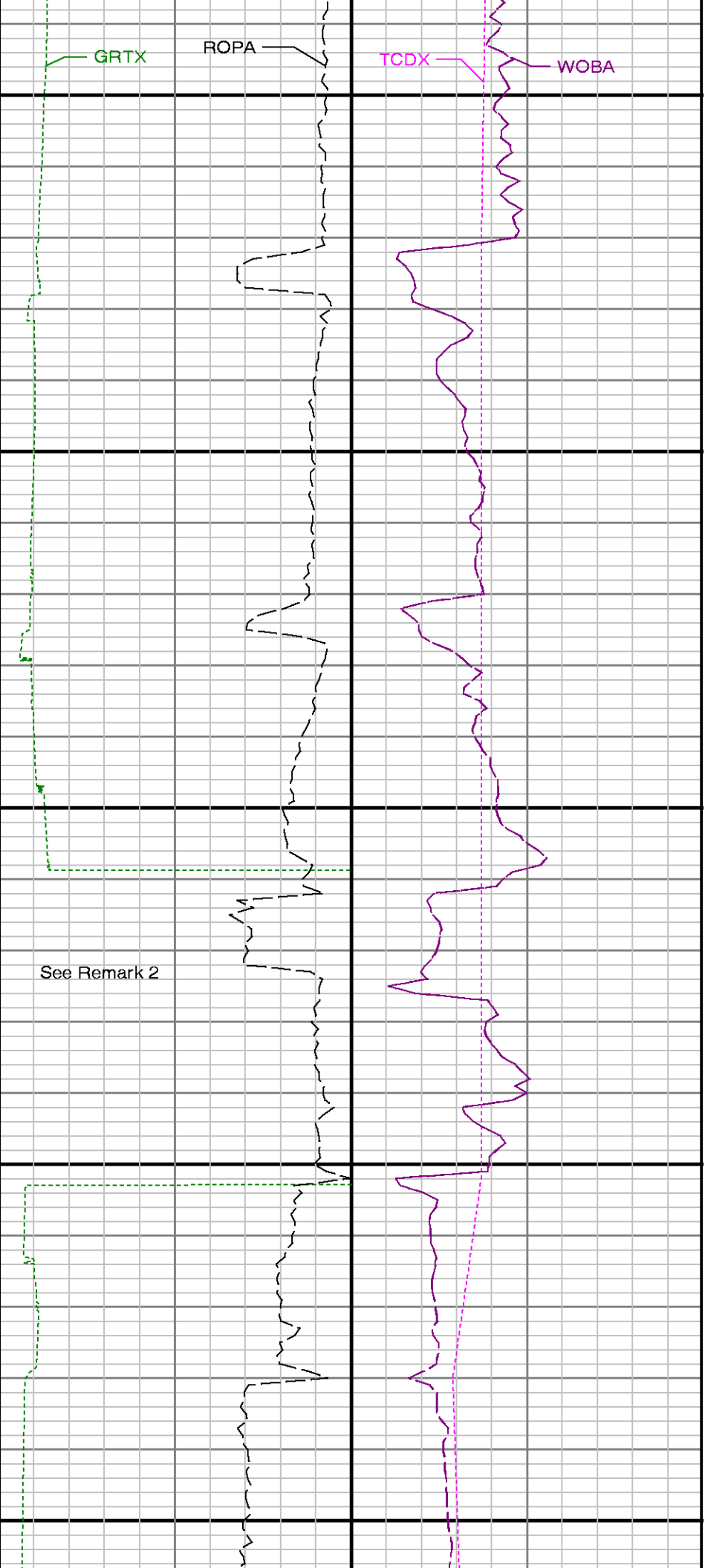
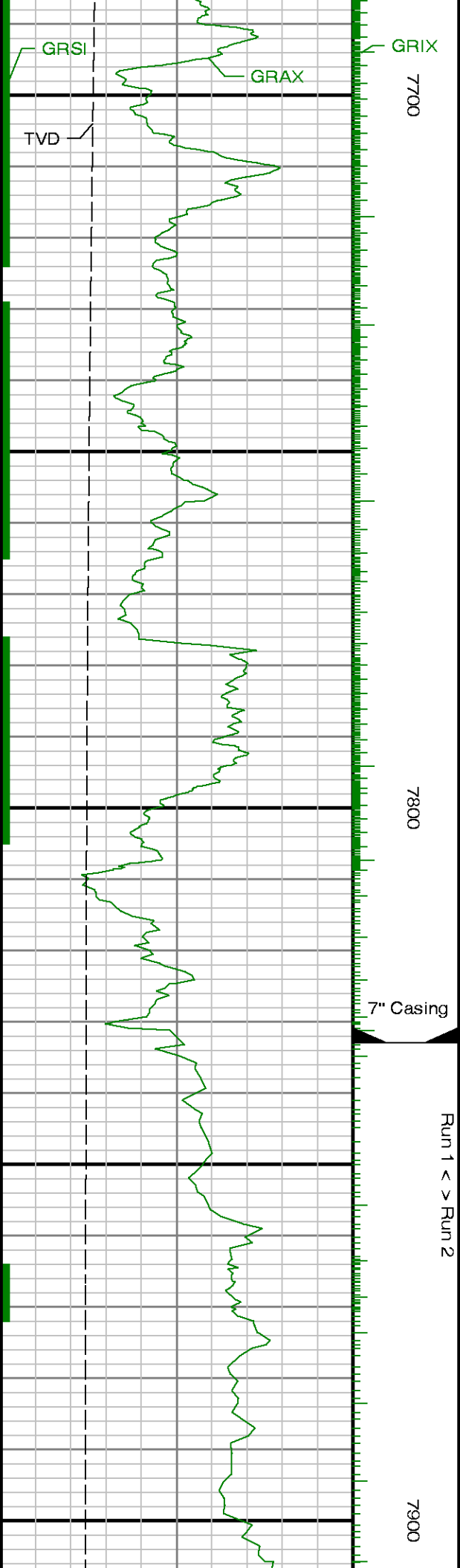




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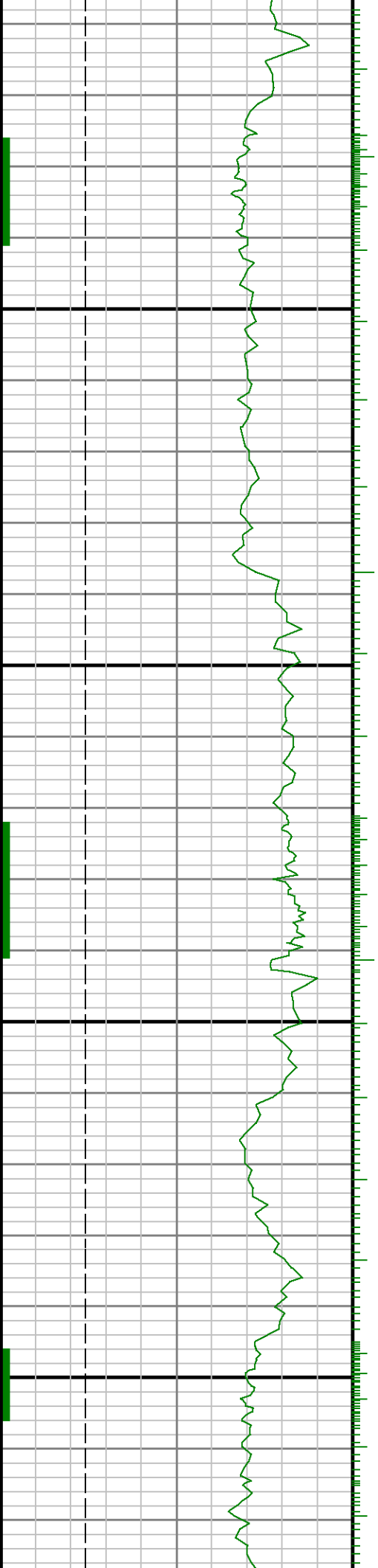


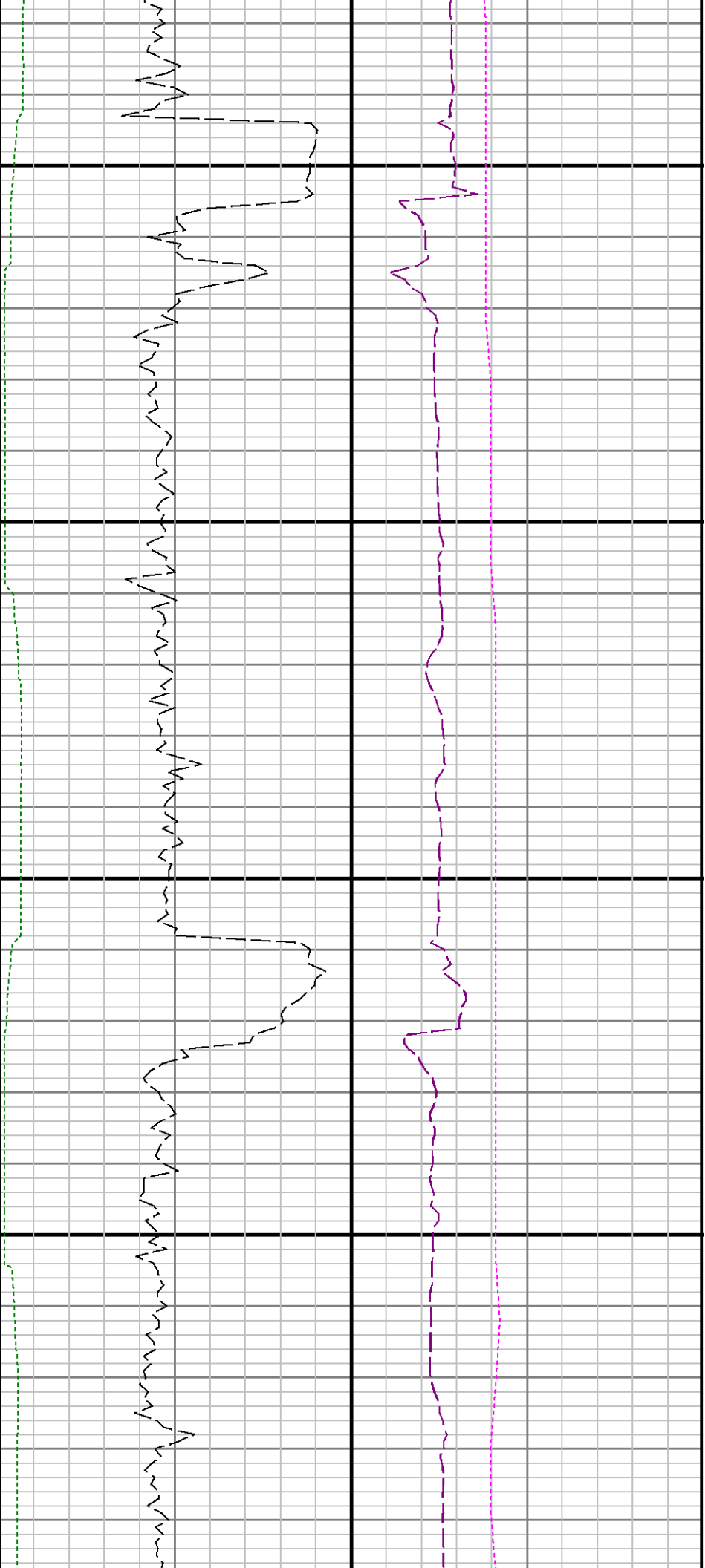




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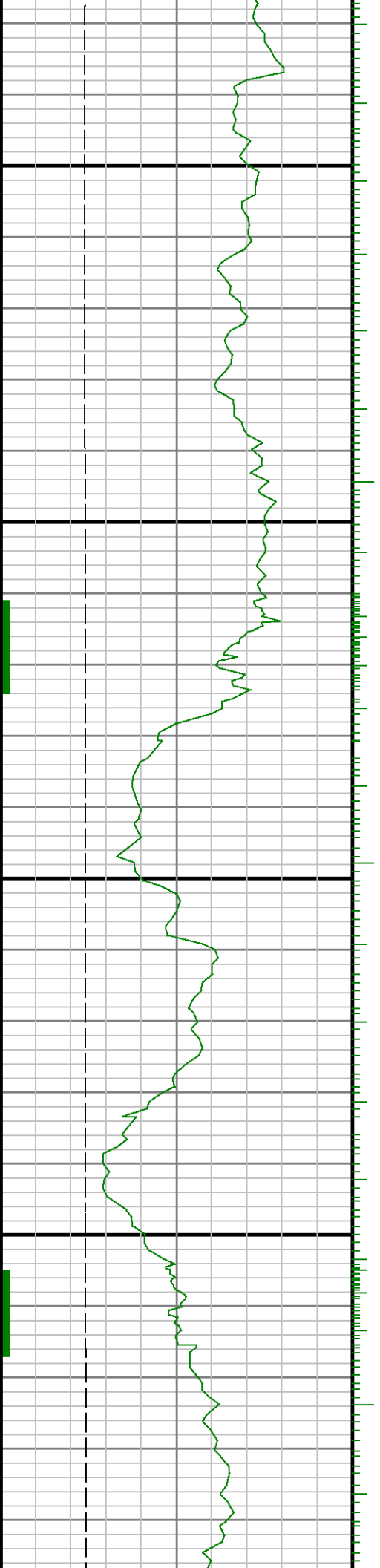
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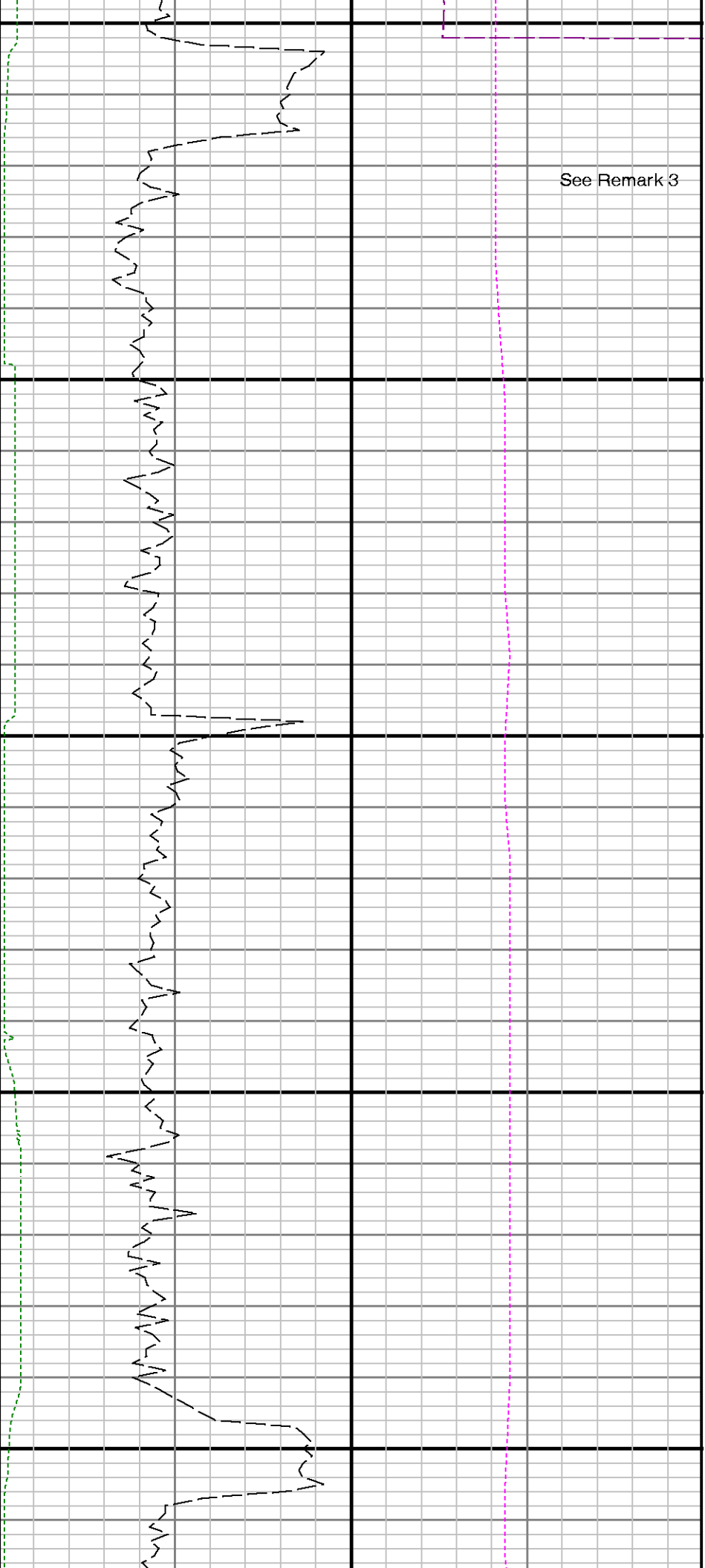


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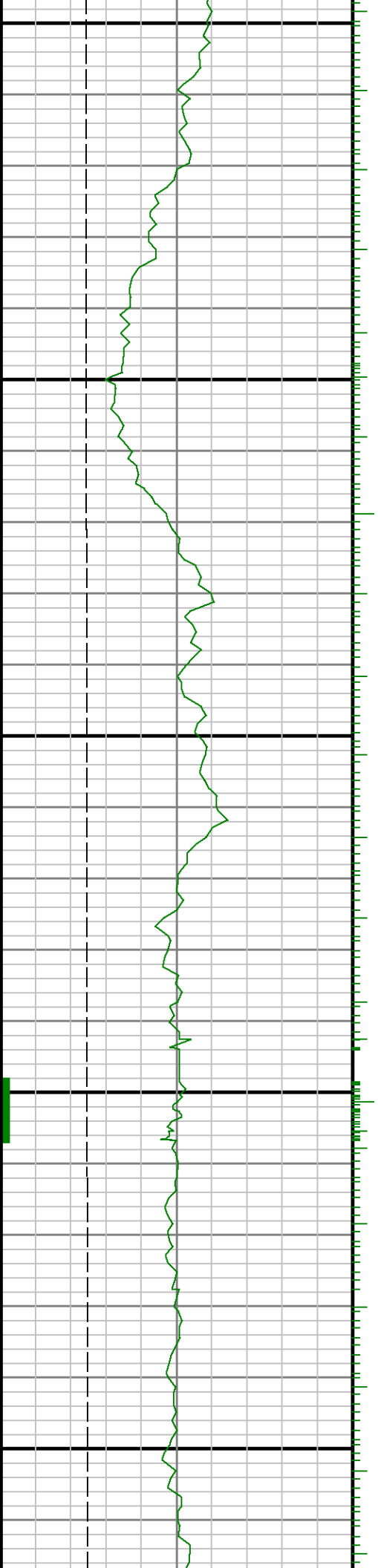


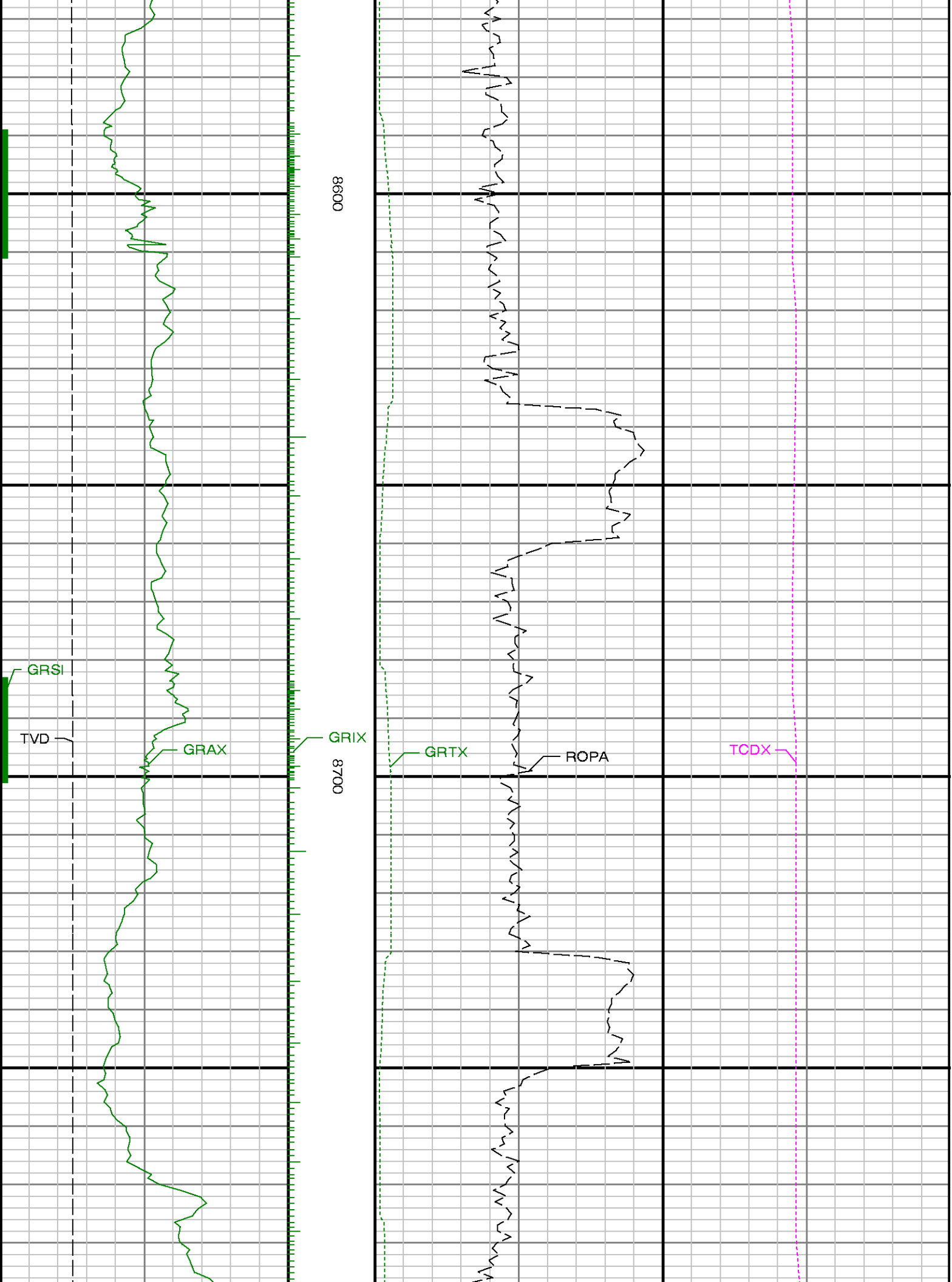
See Remark 3

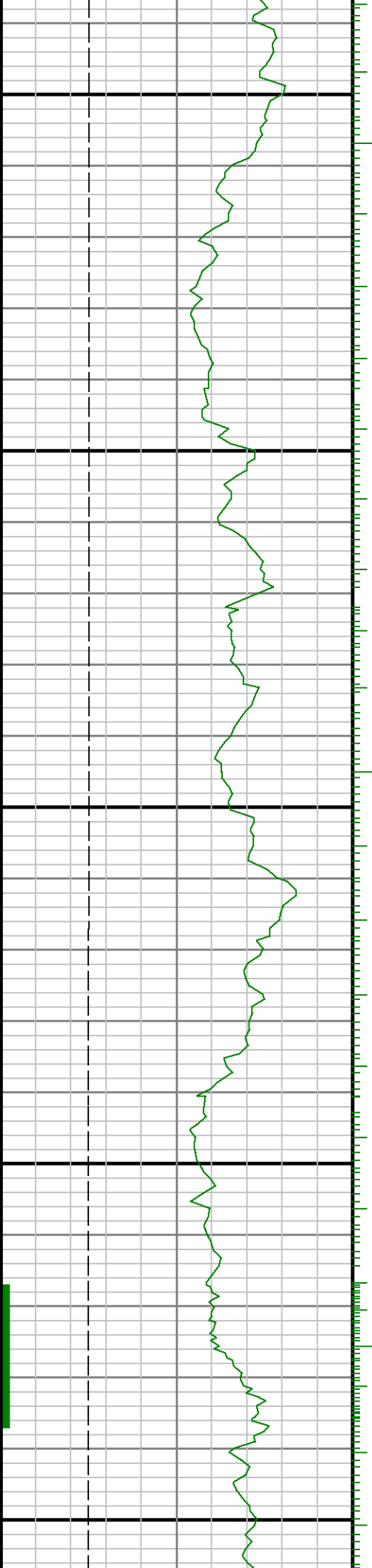


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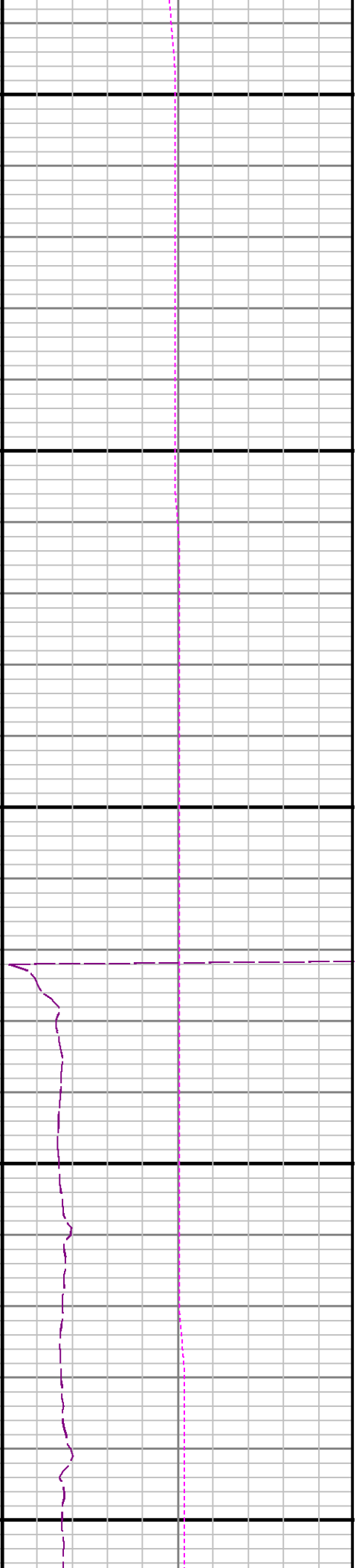
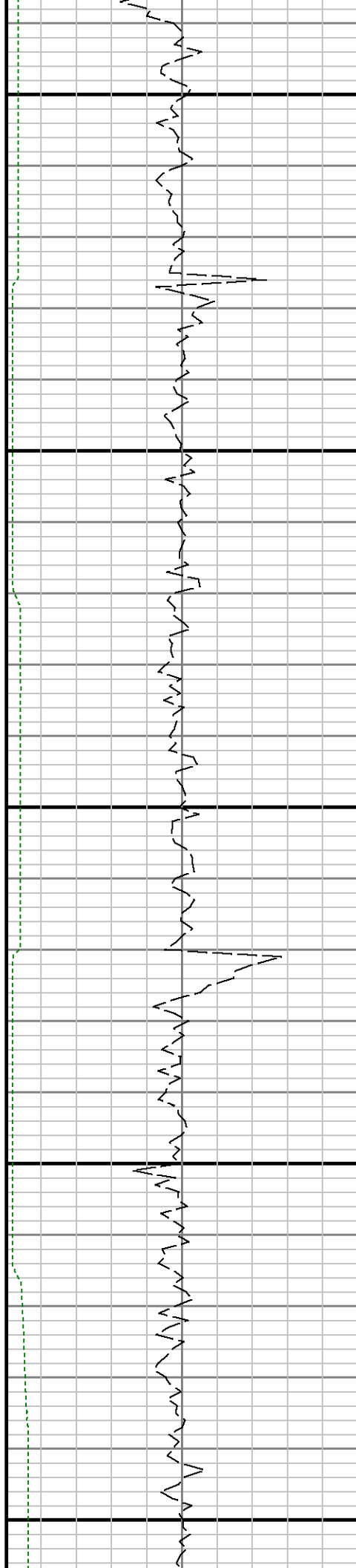




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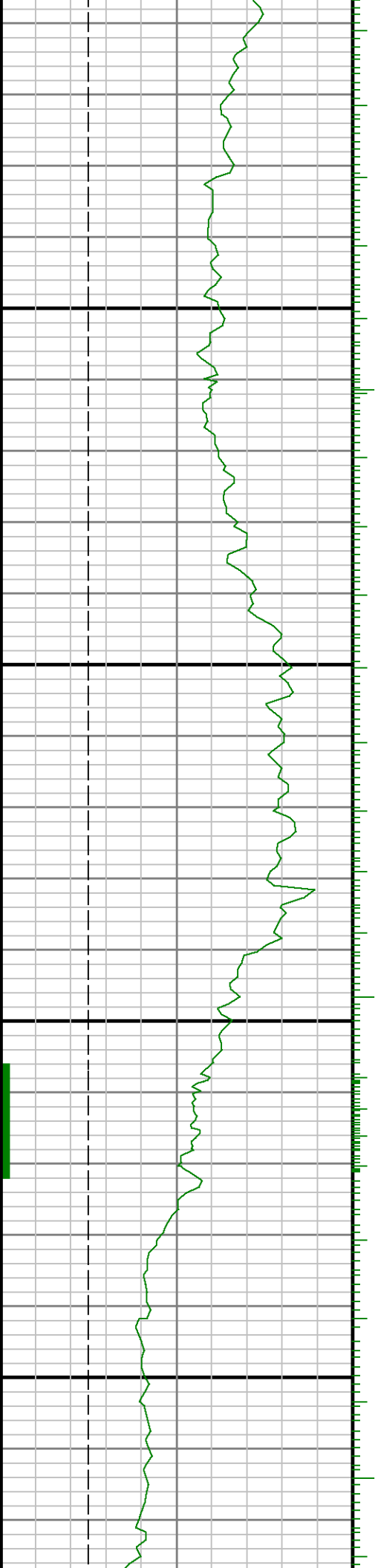
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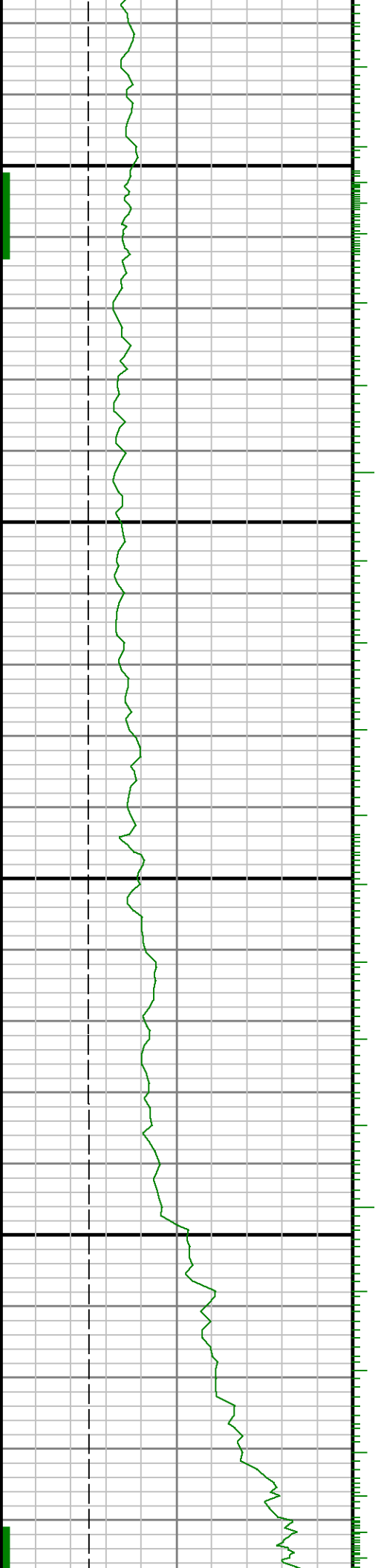
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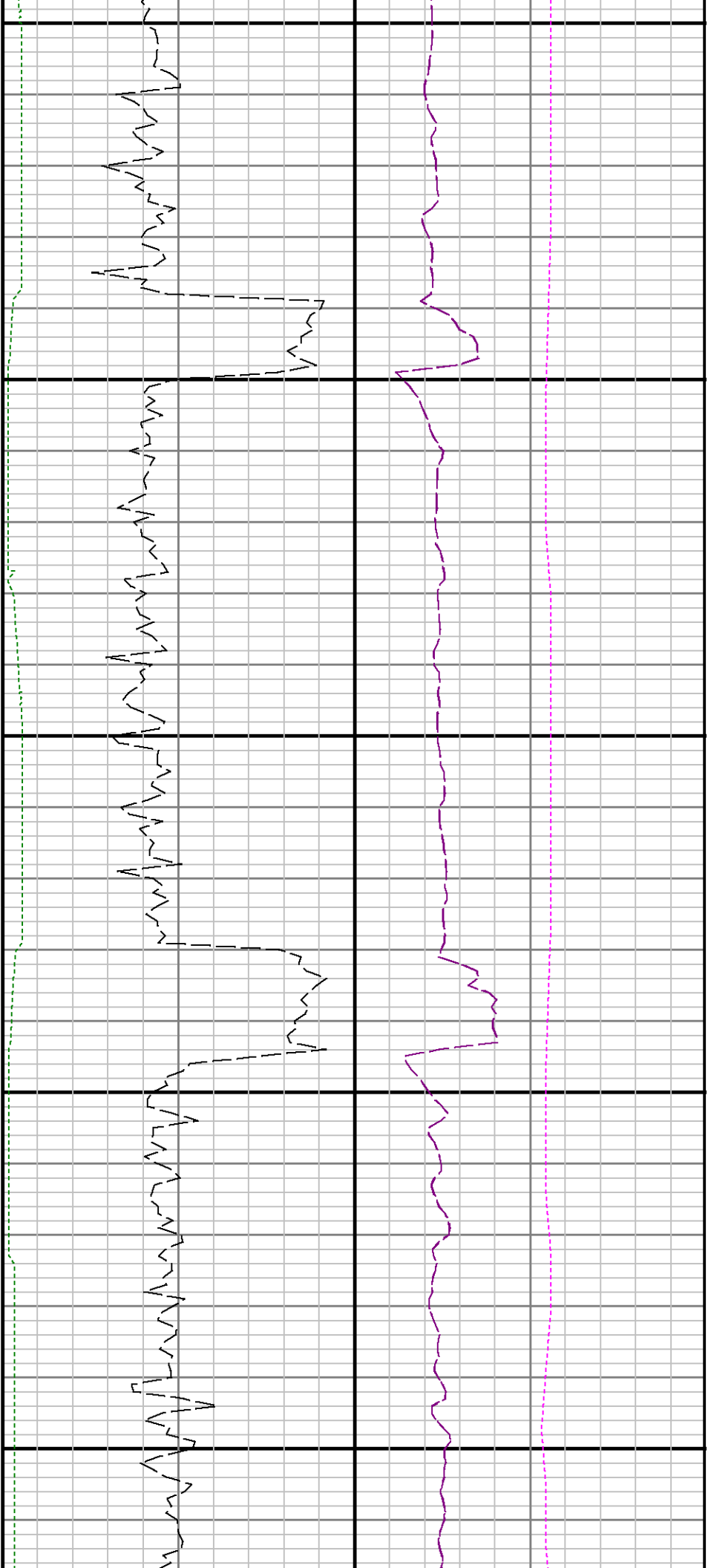




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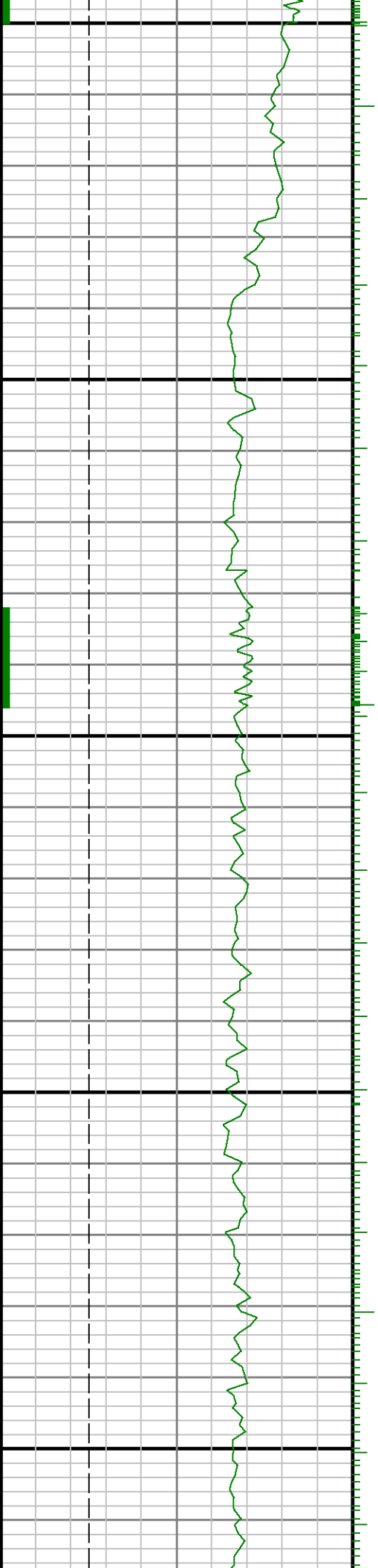
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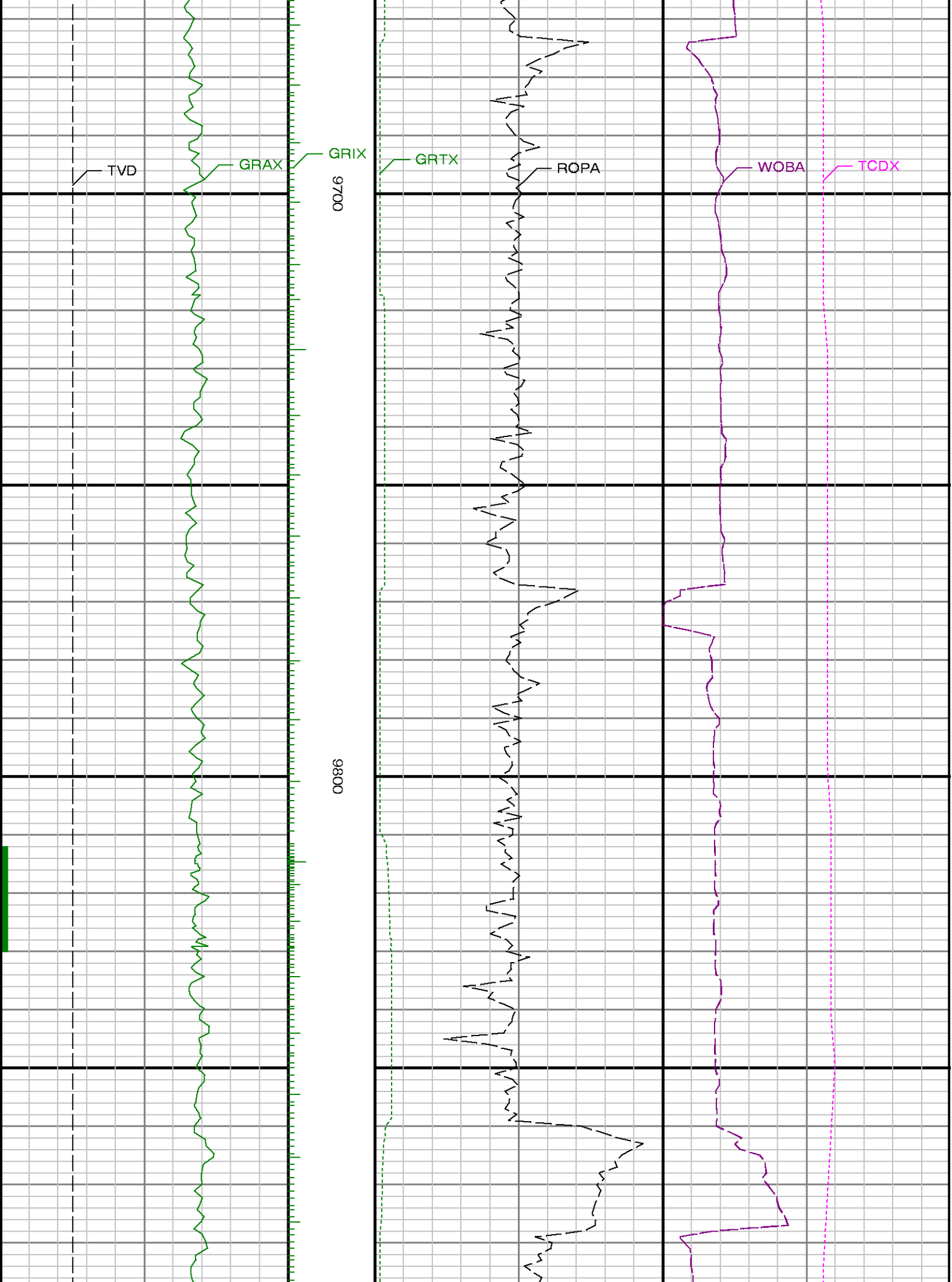


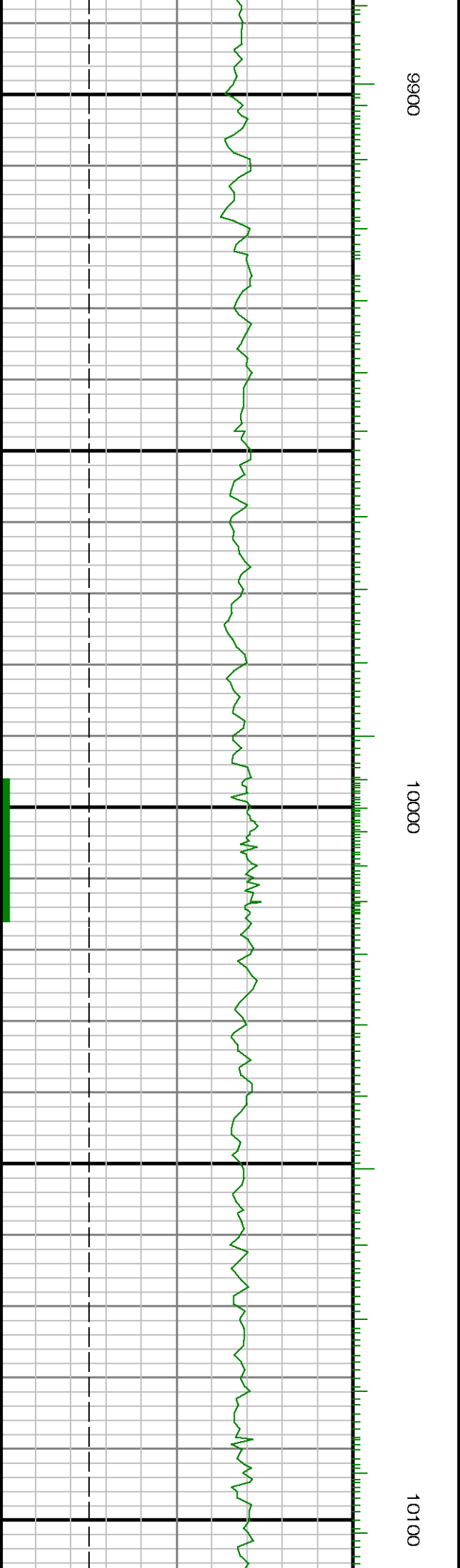
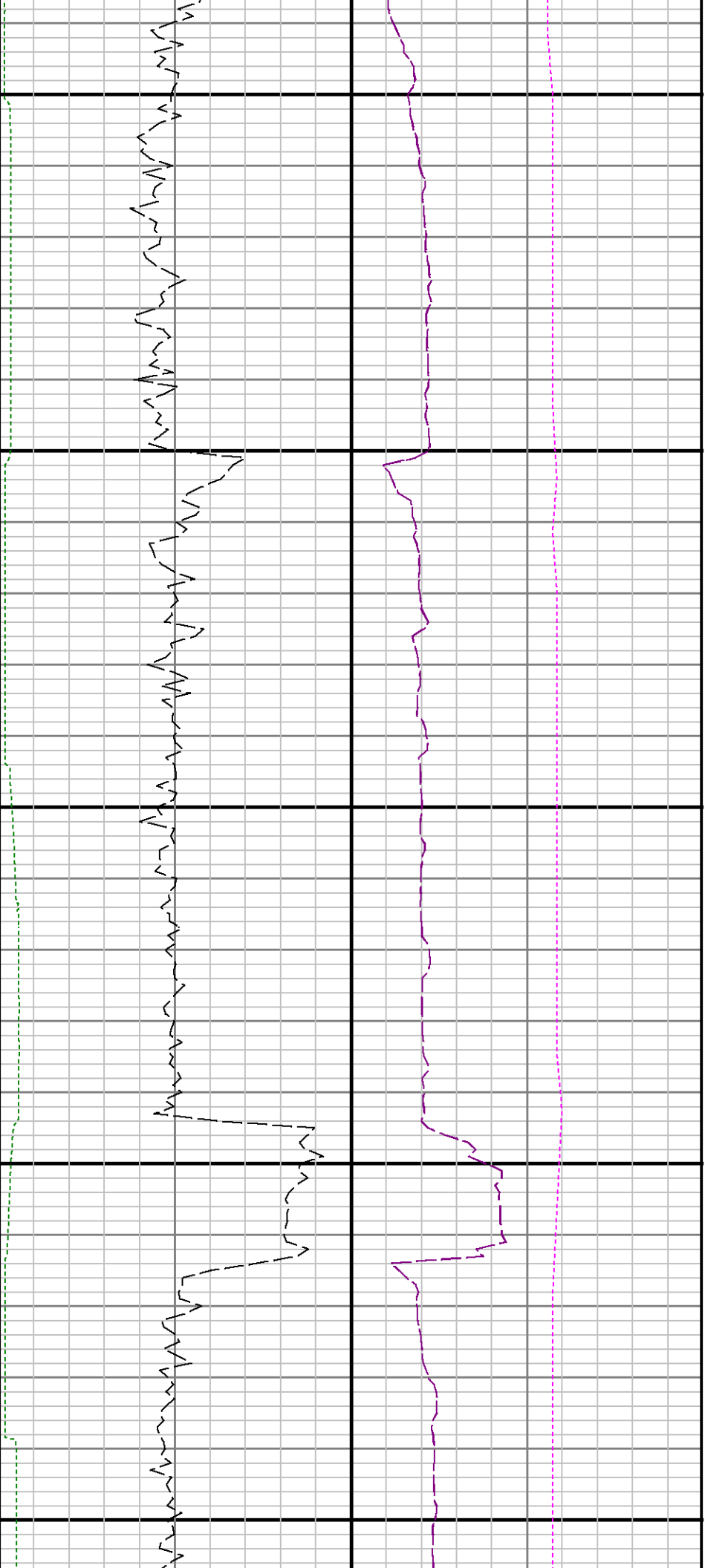


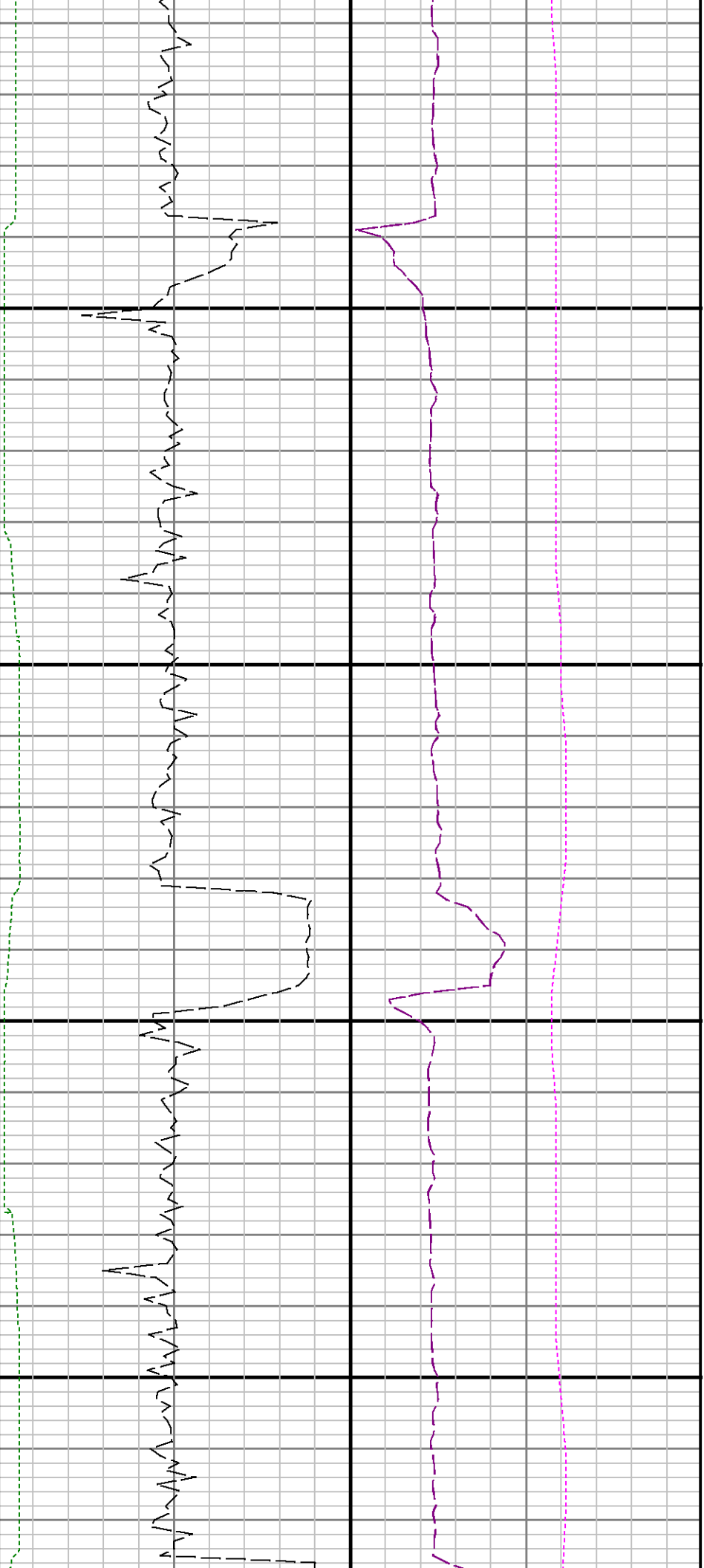
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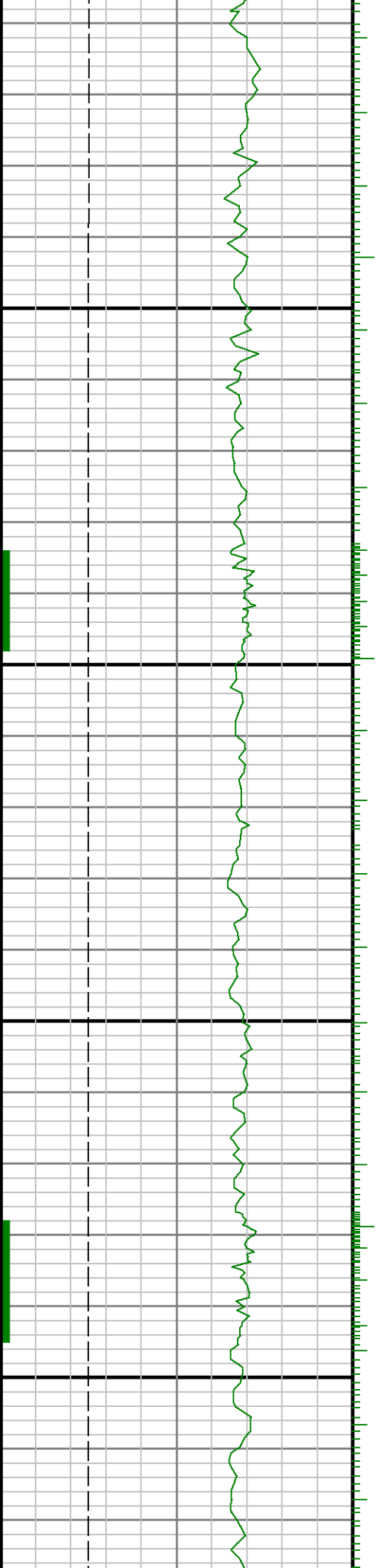


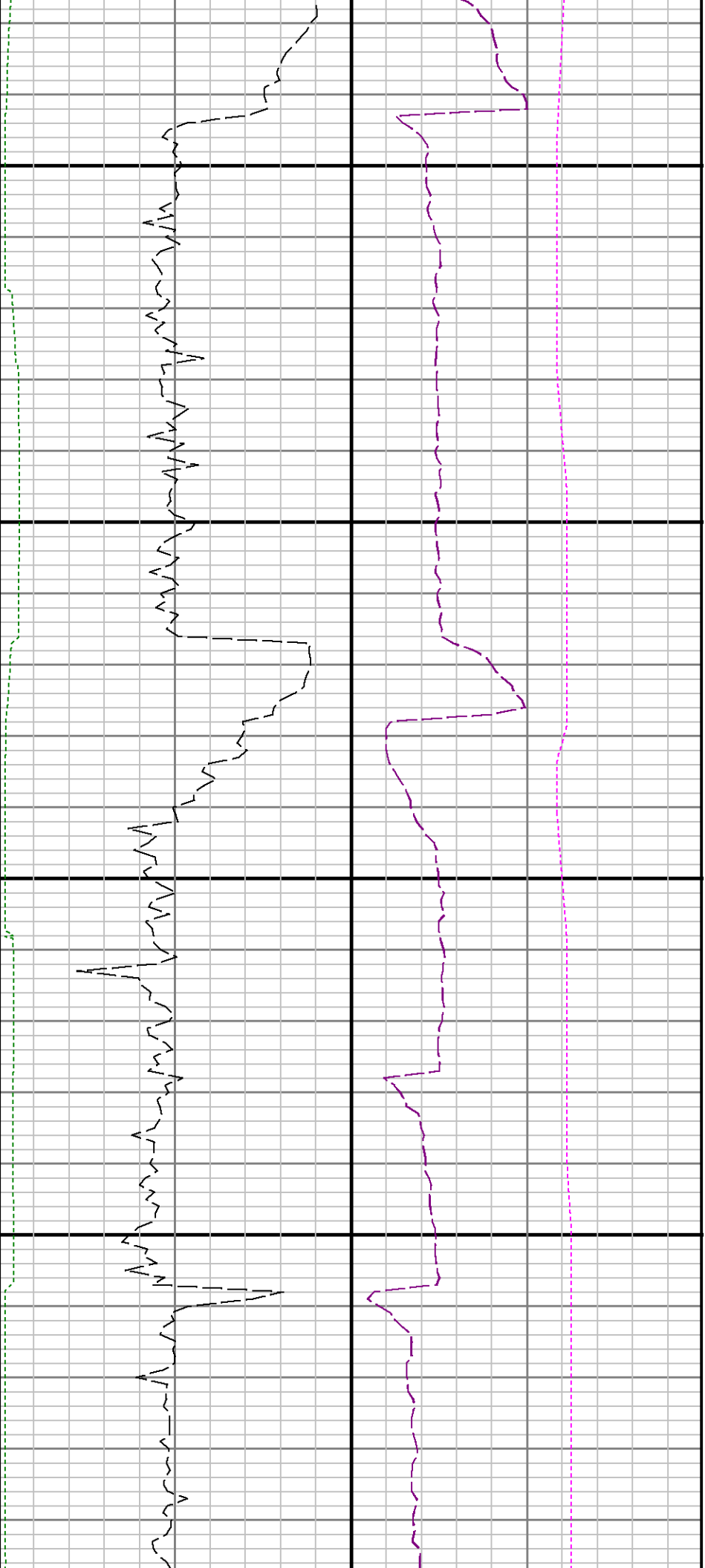




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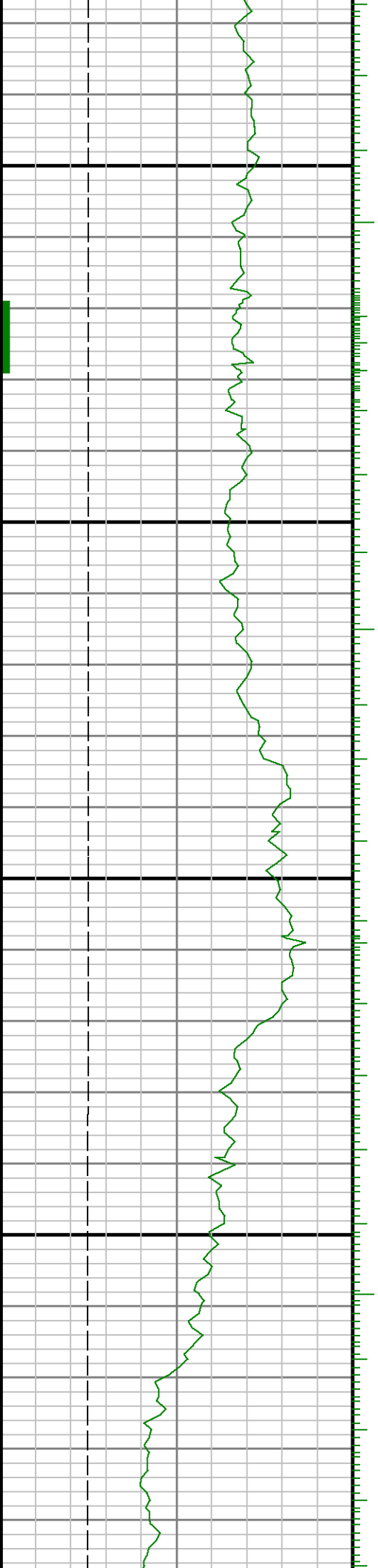
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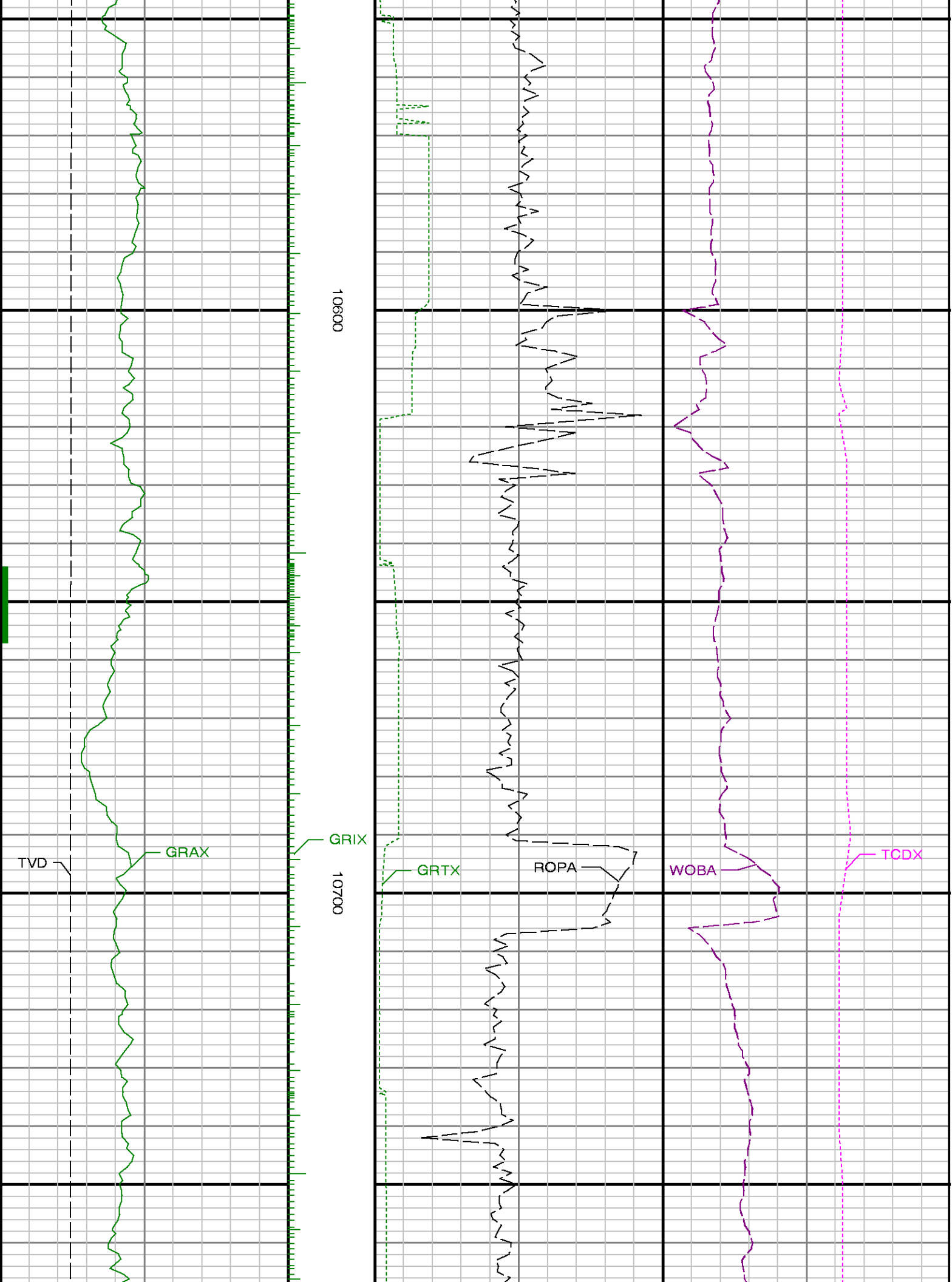


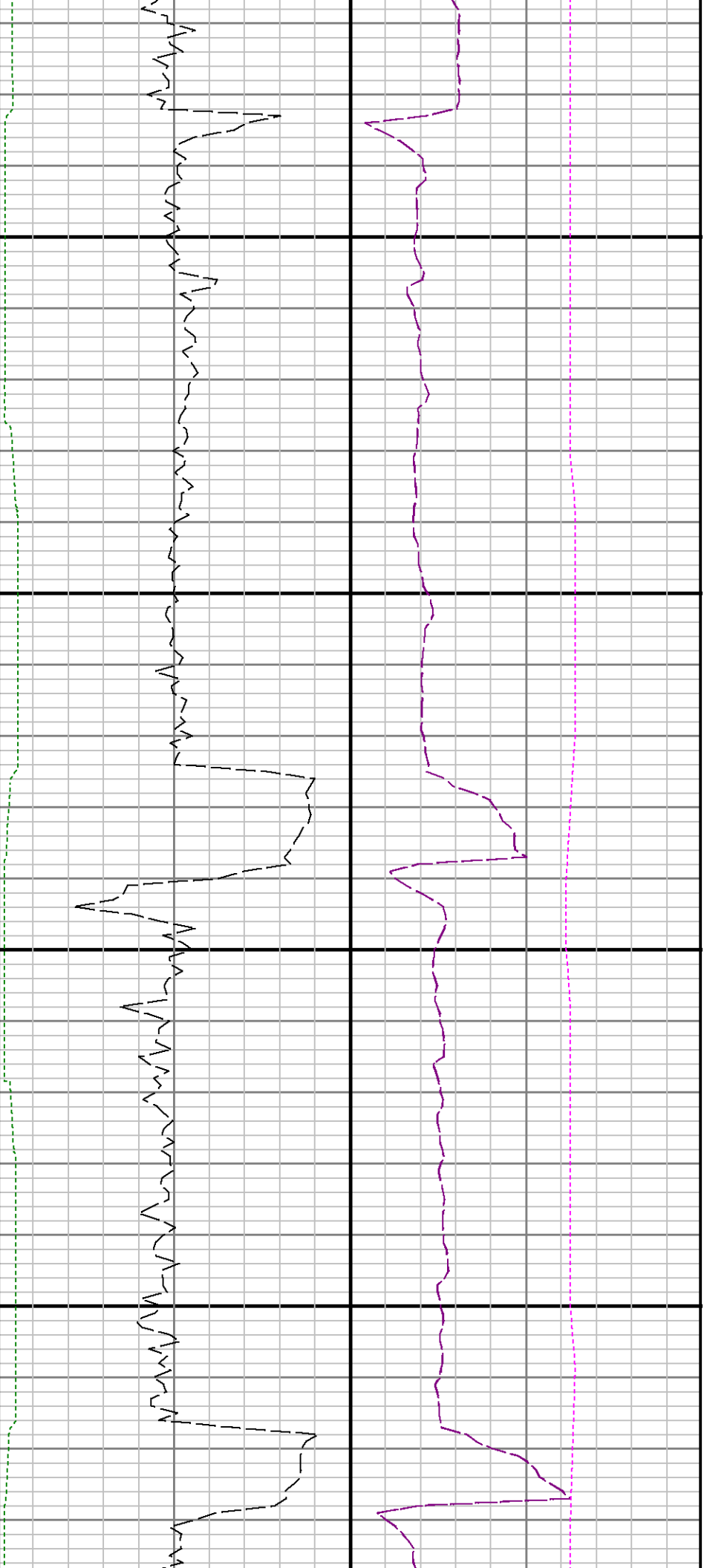


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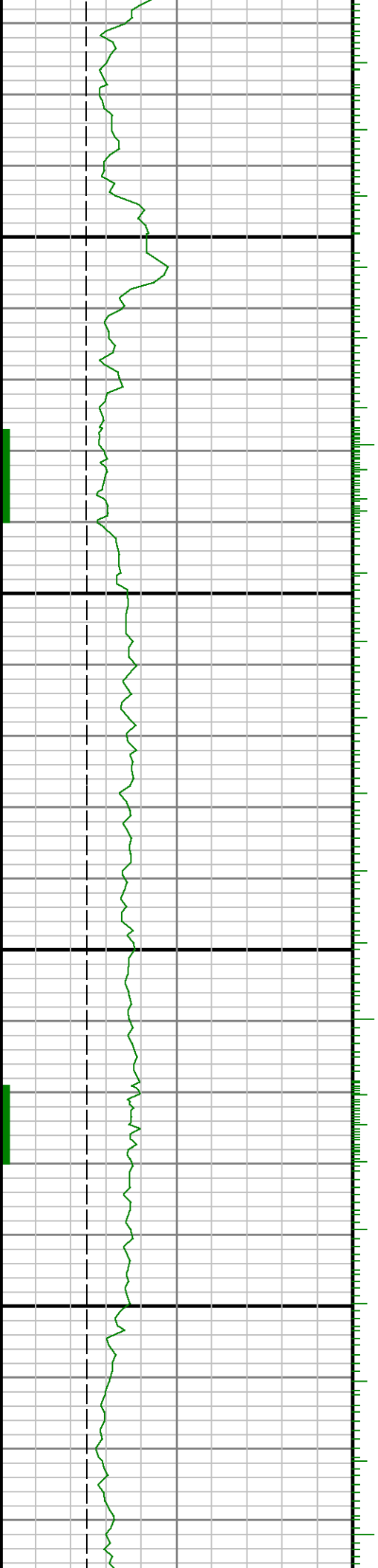


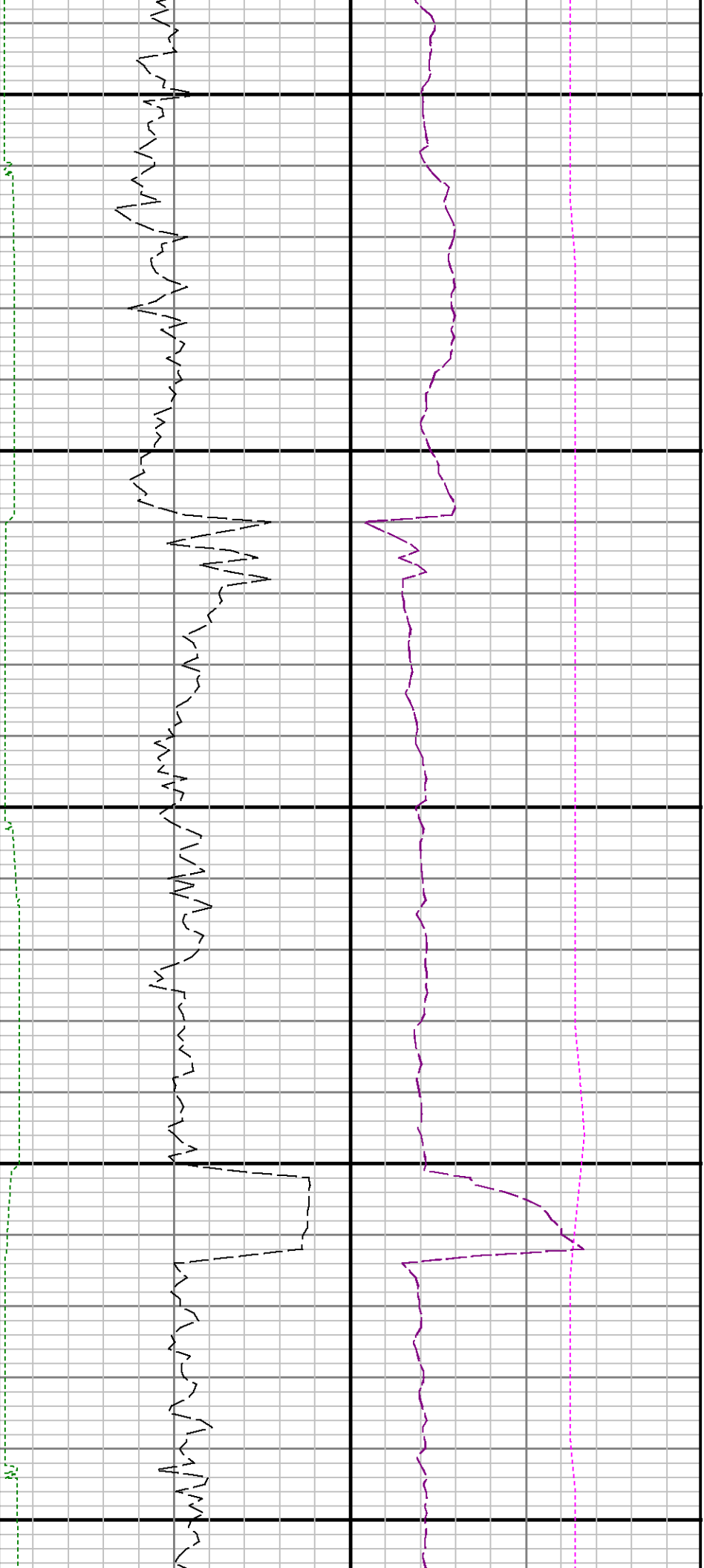




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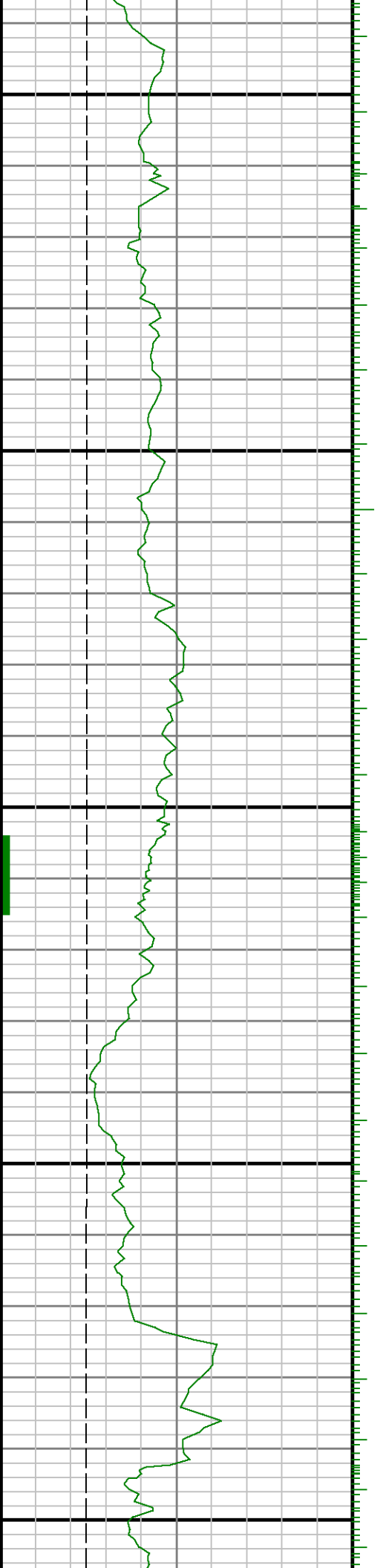


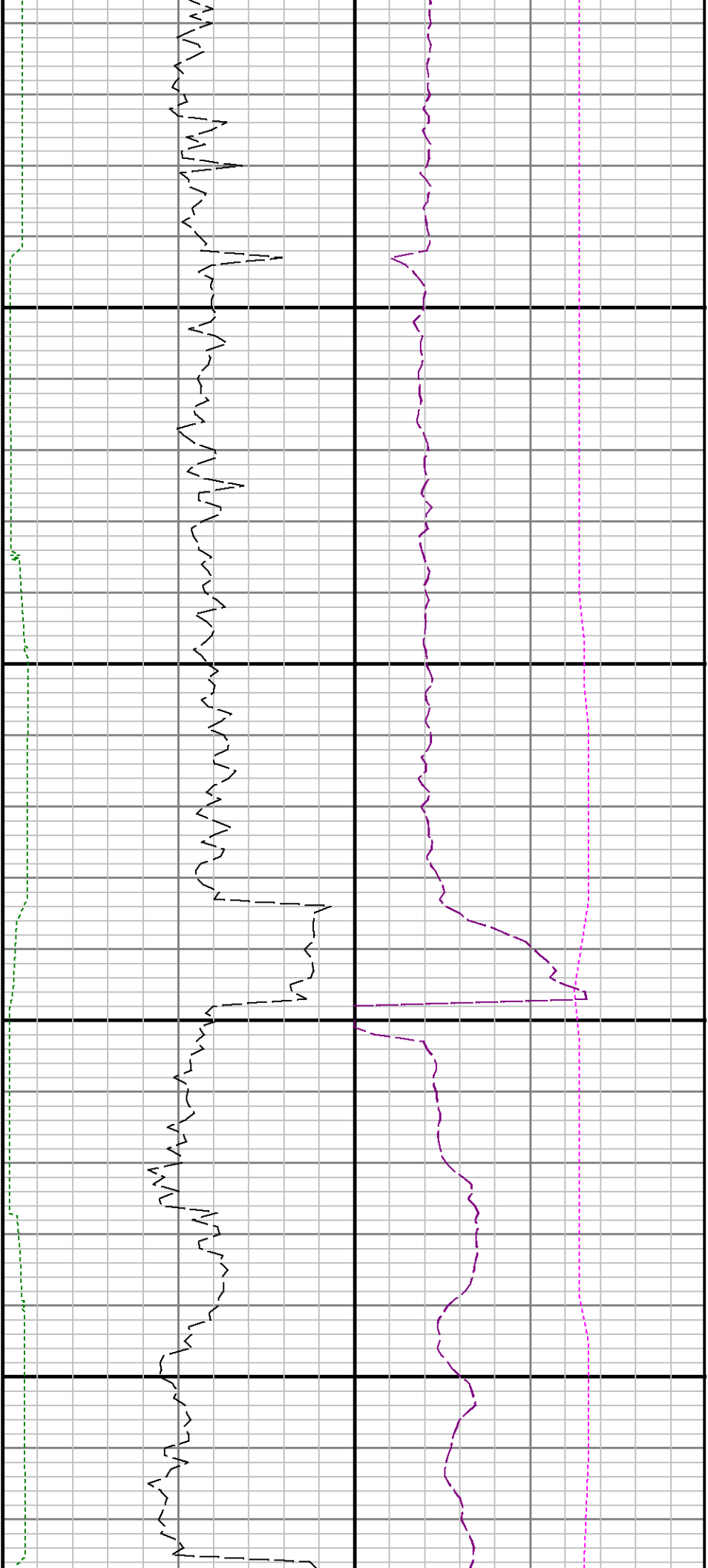


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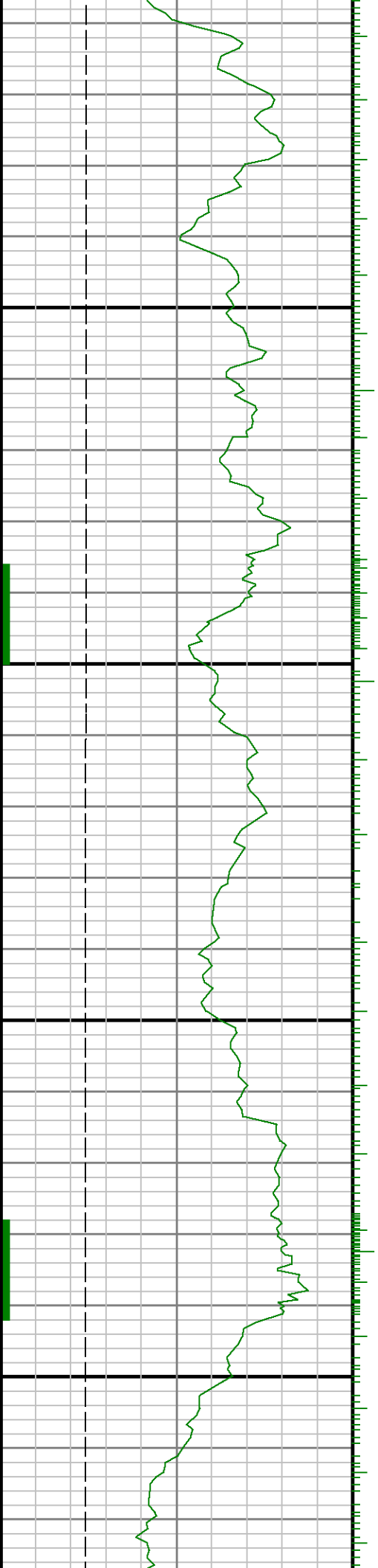
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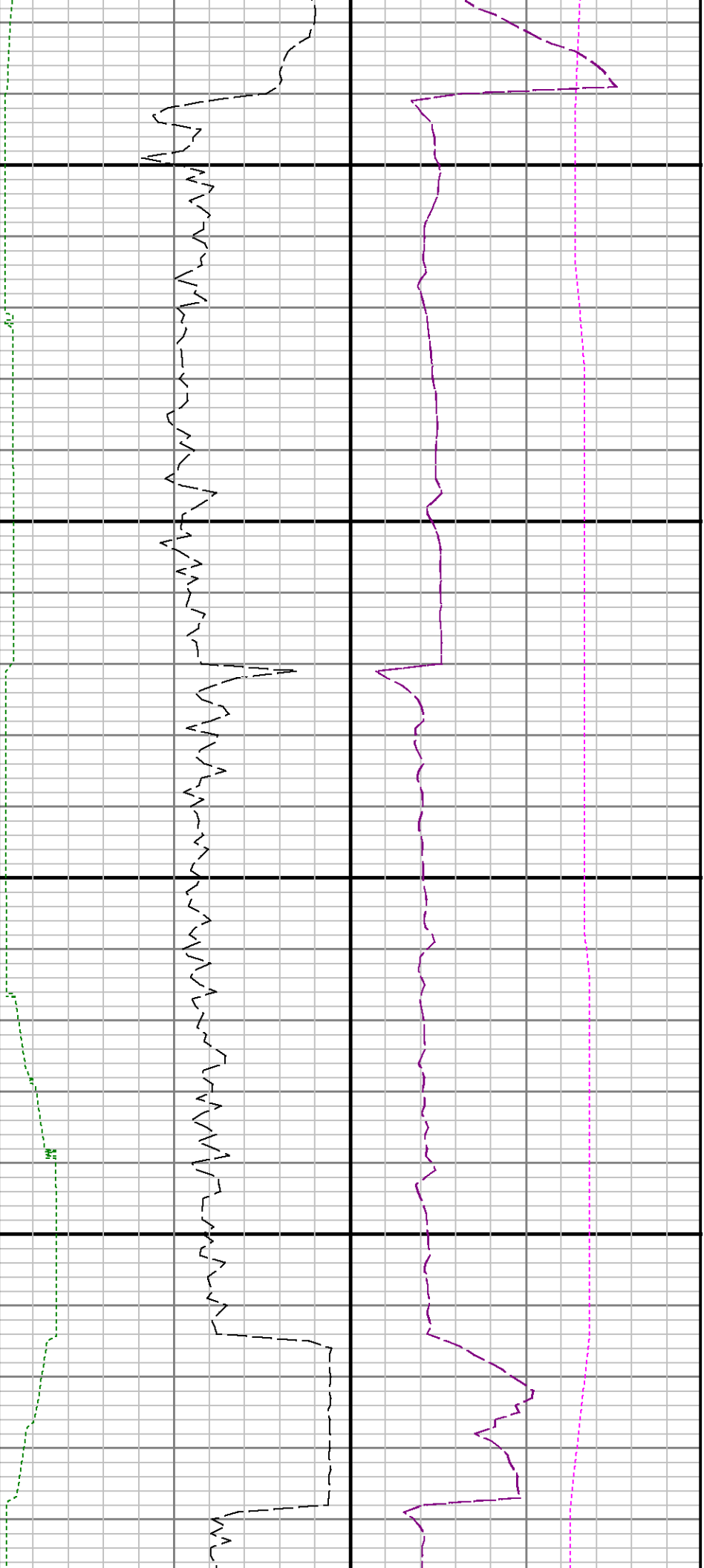




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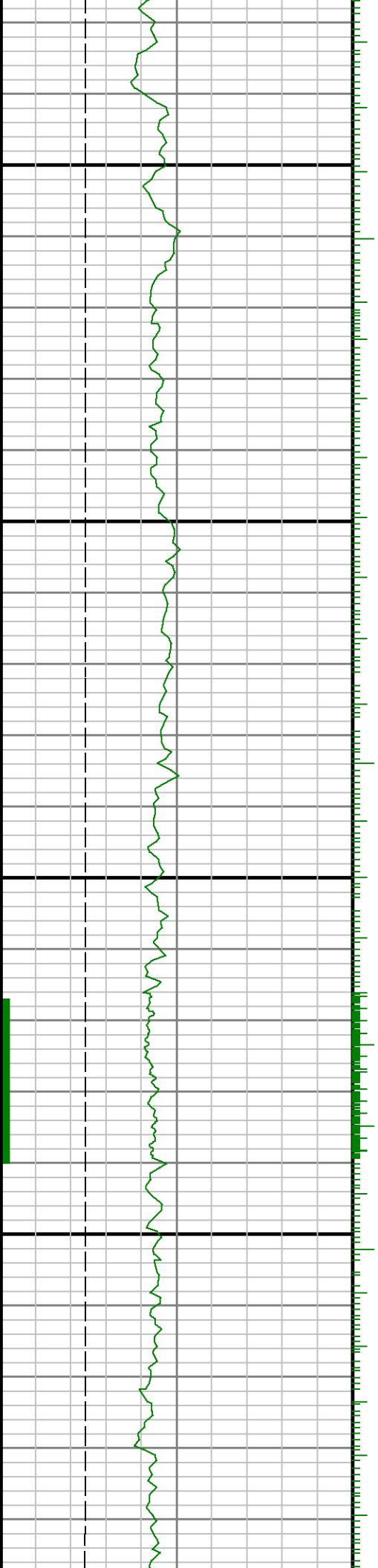
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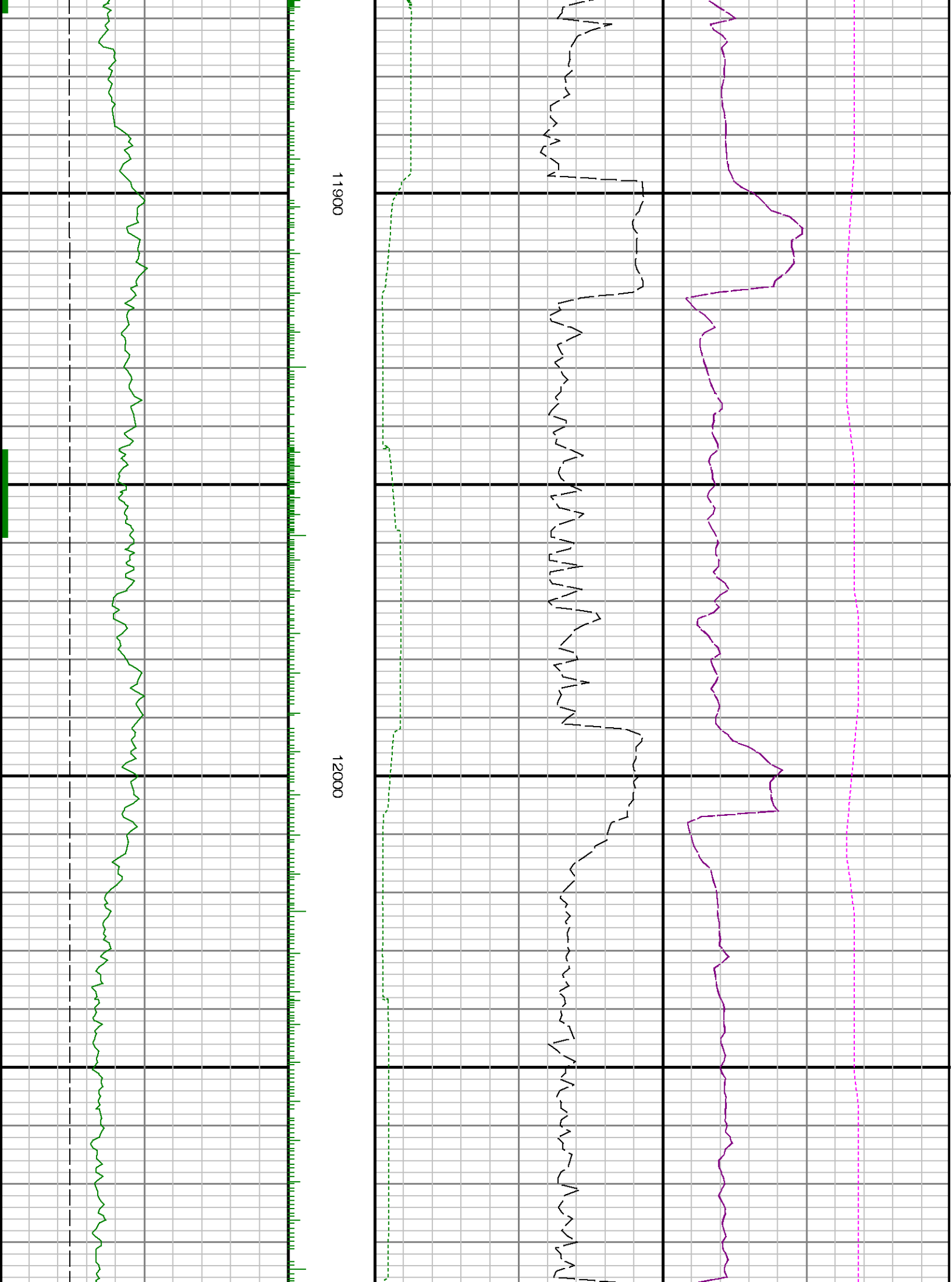


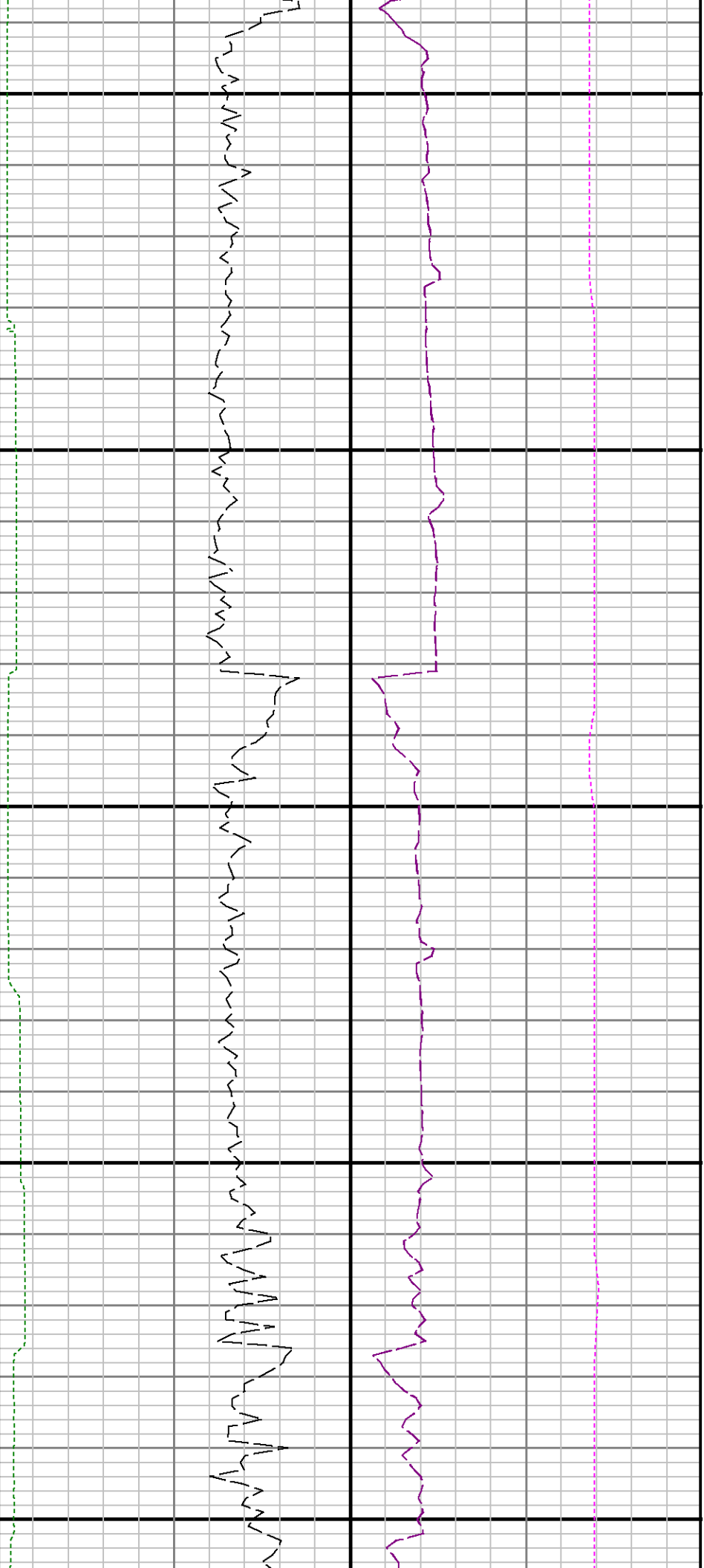
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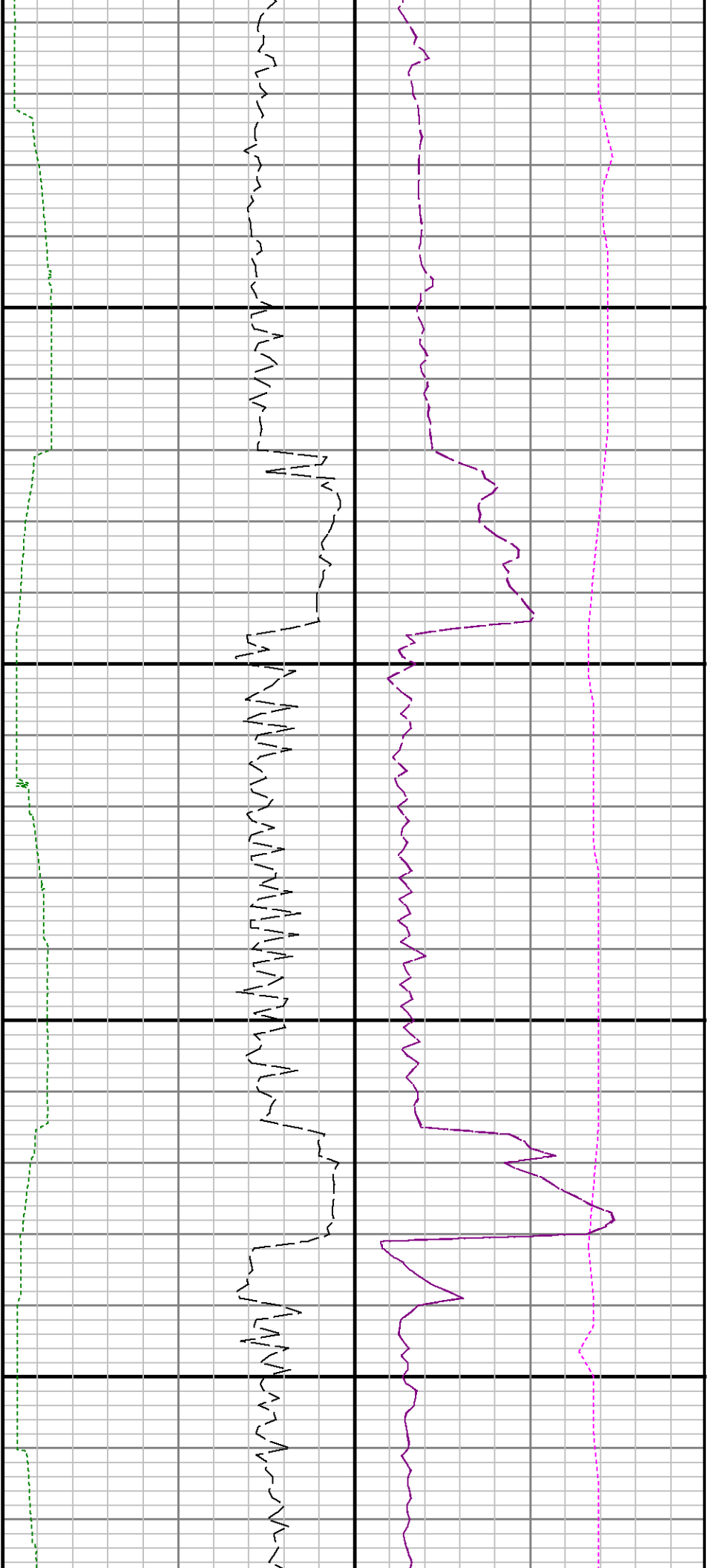




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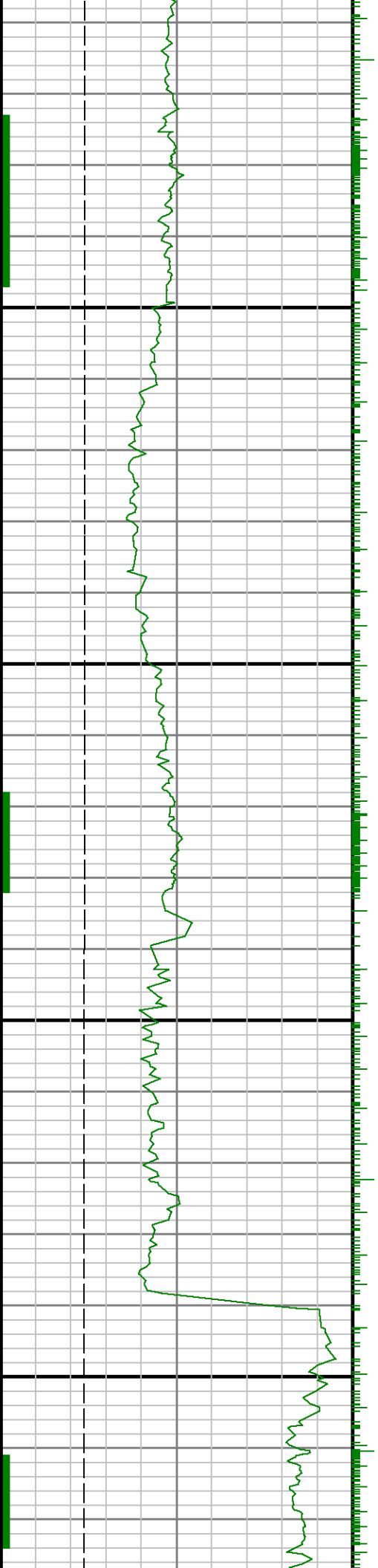
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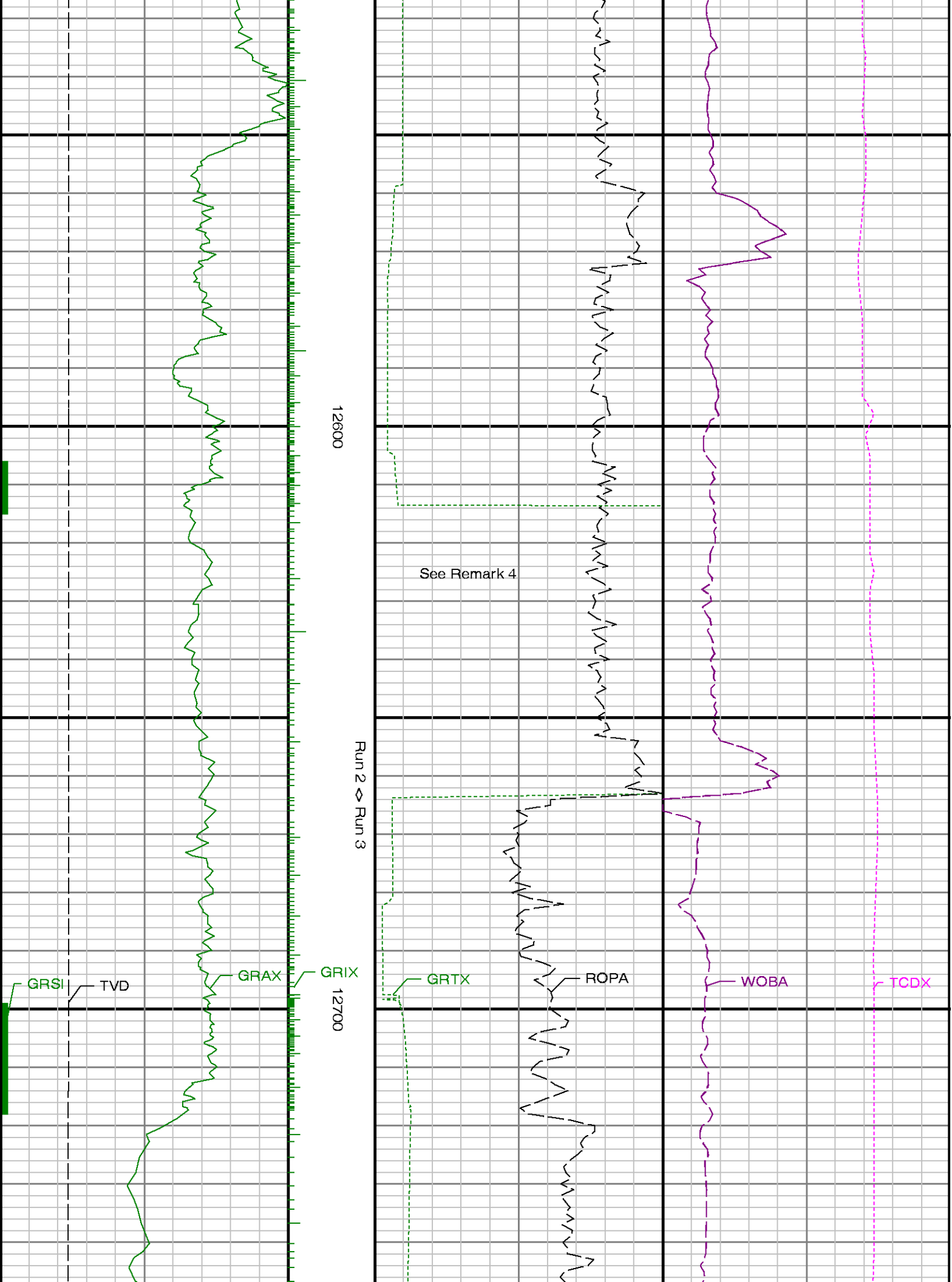
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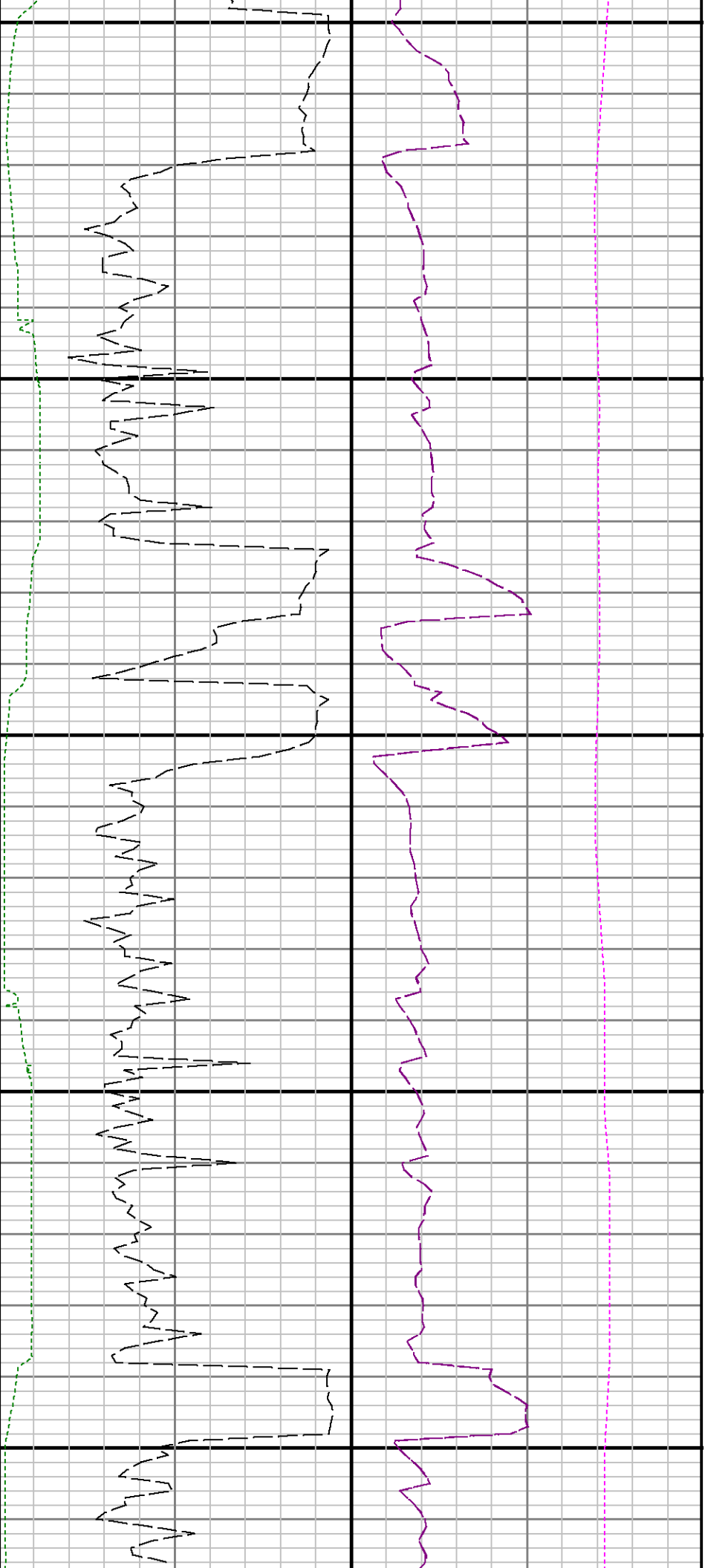


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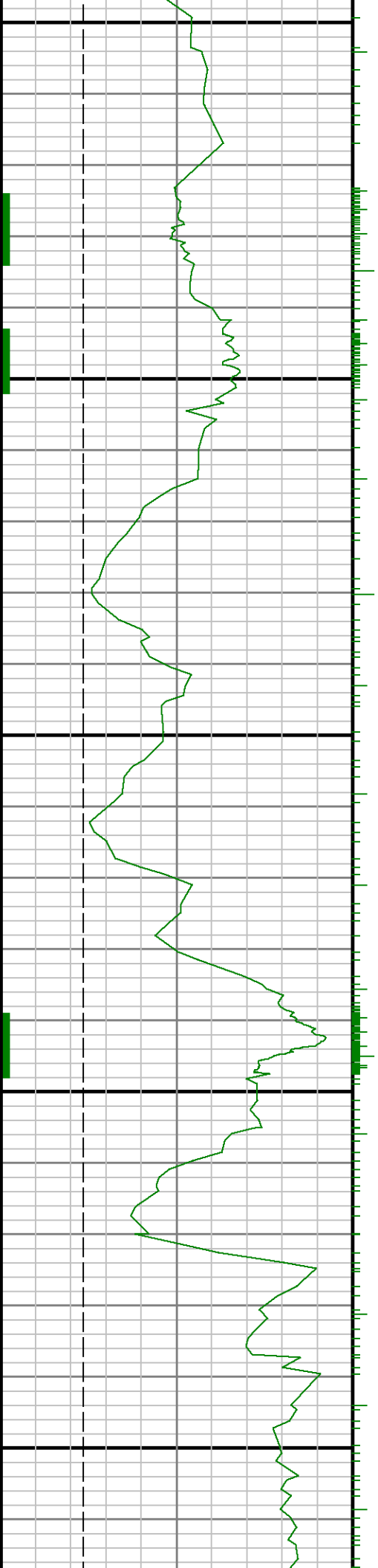






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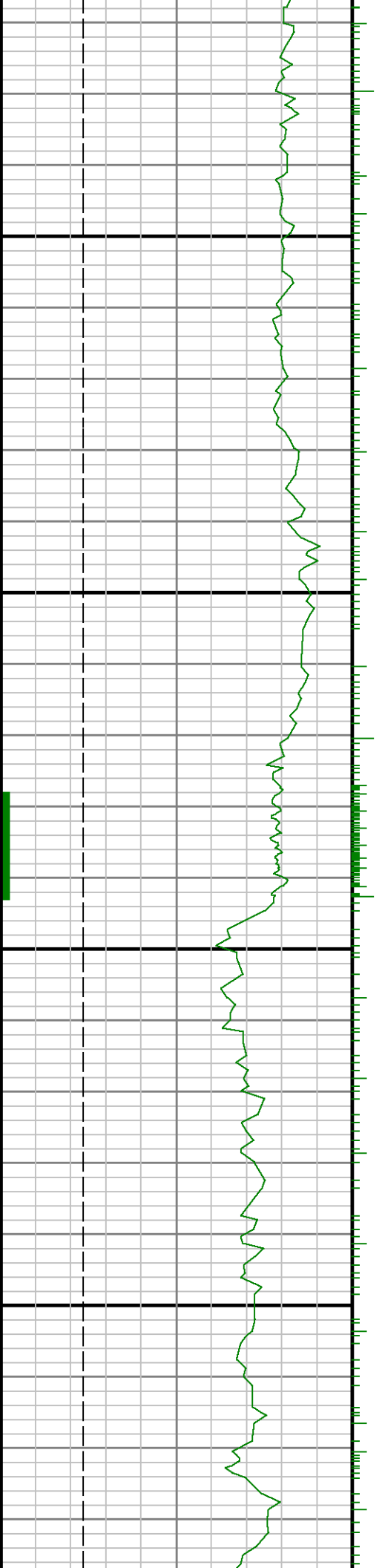
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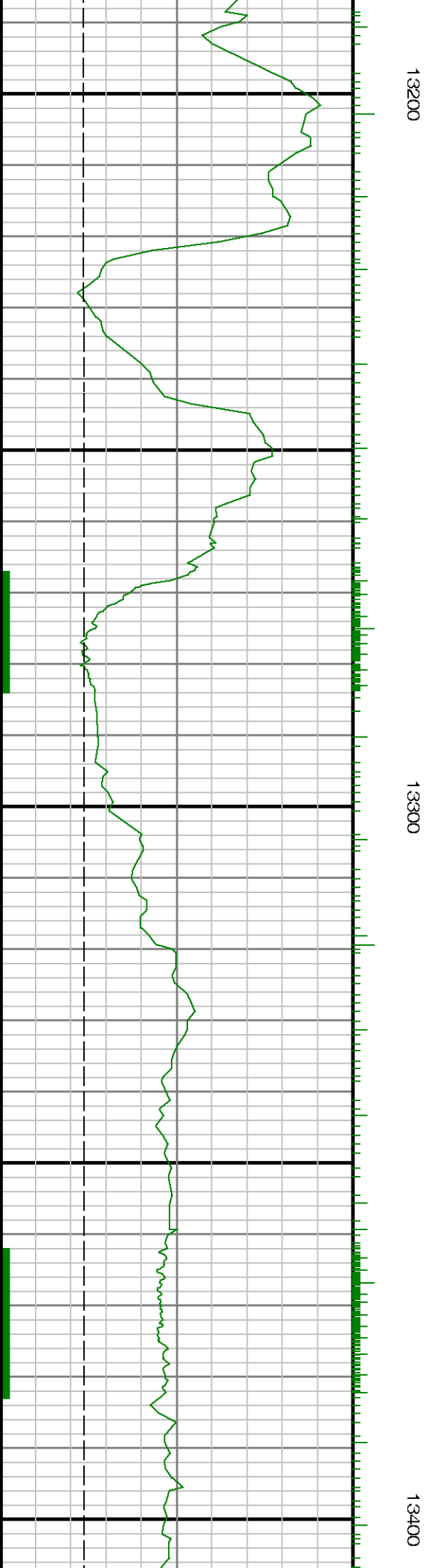
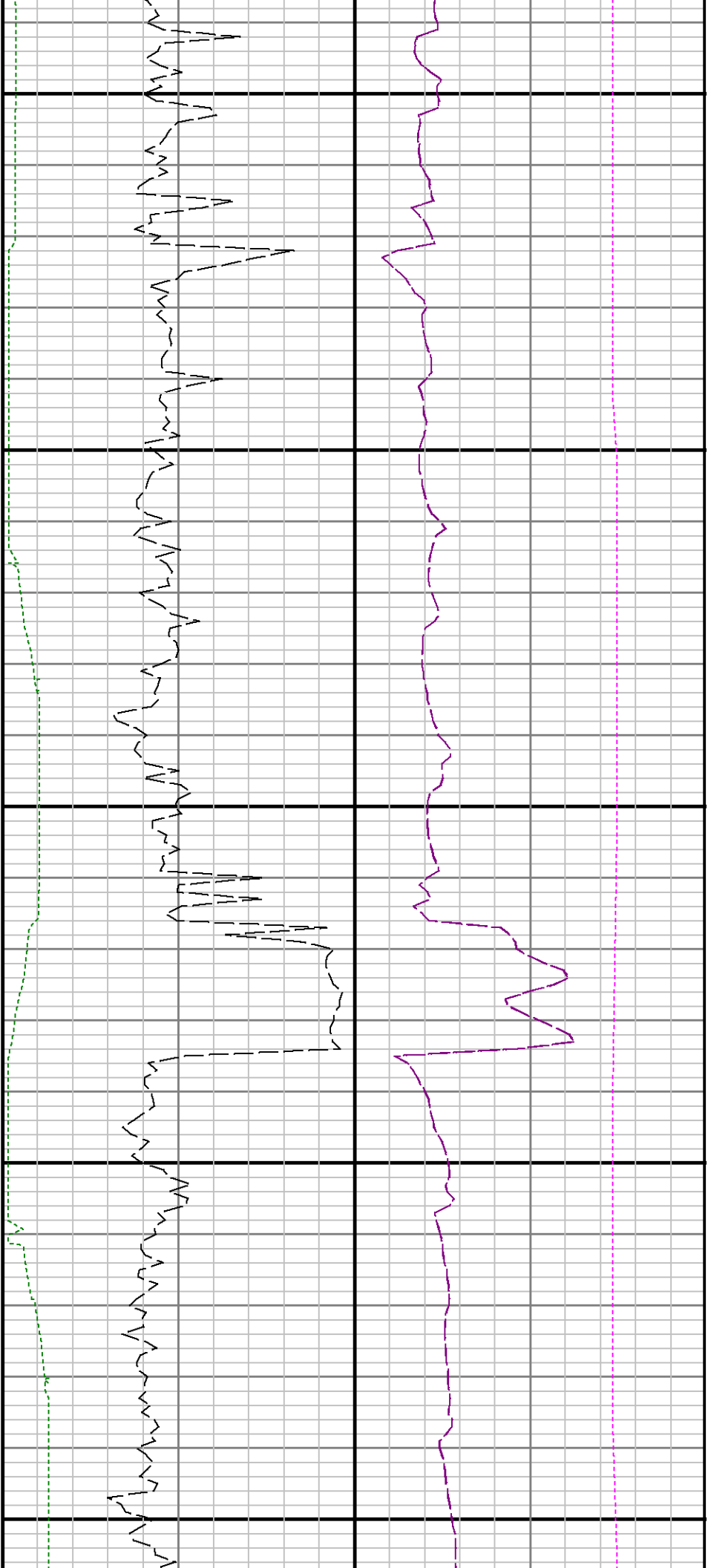


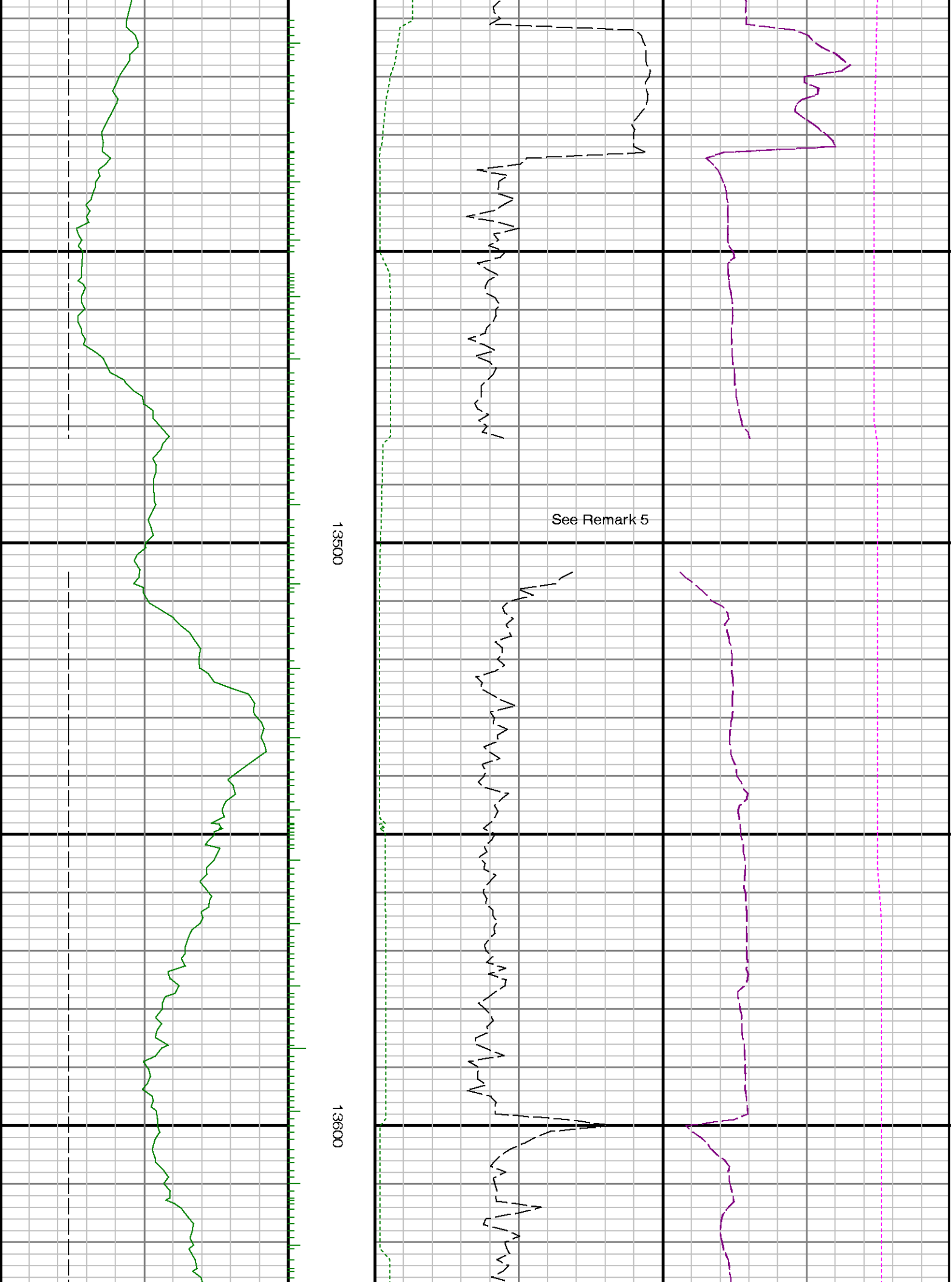


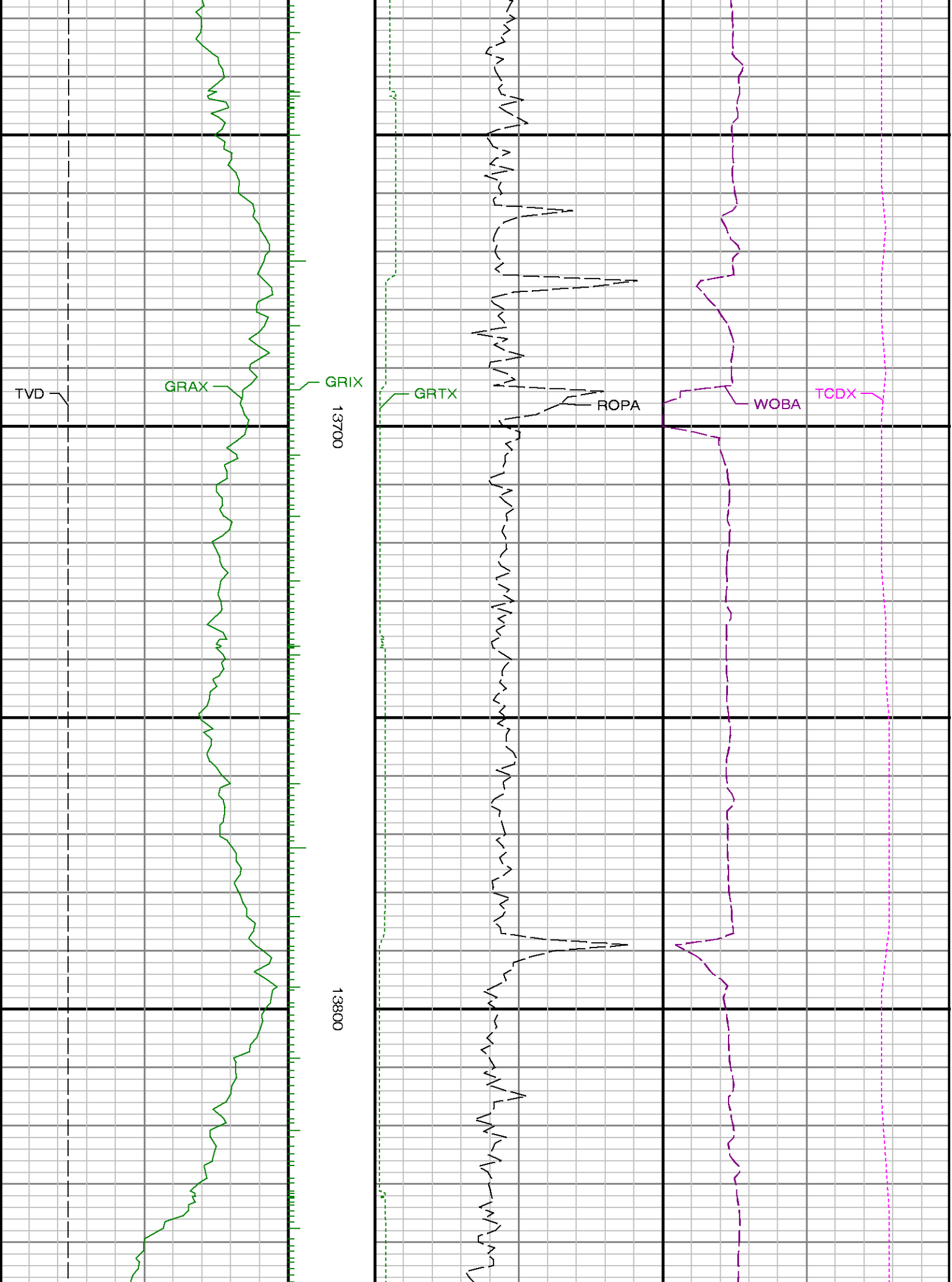
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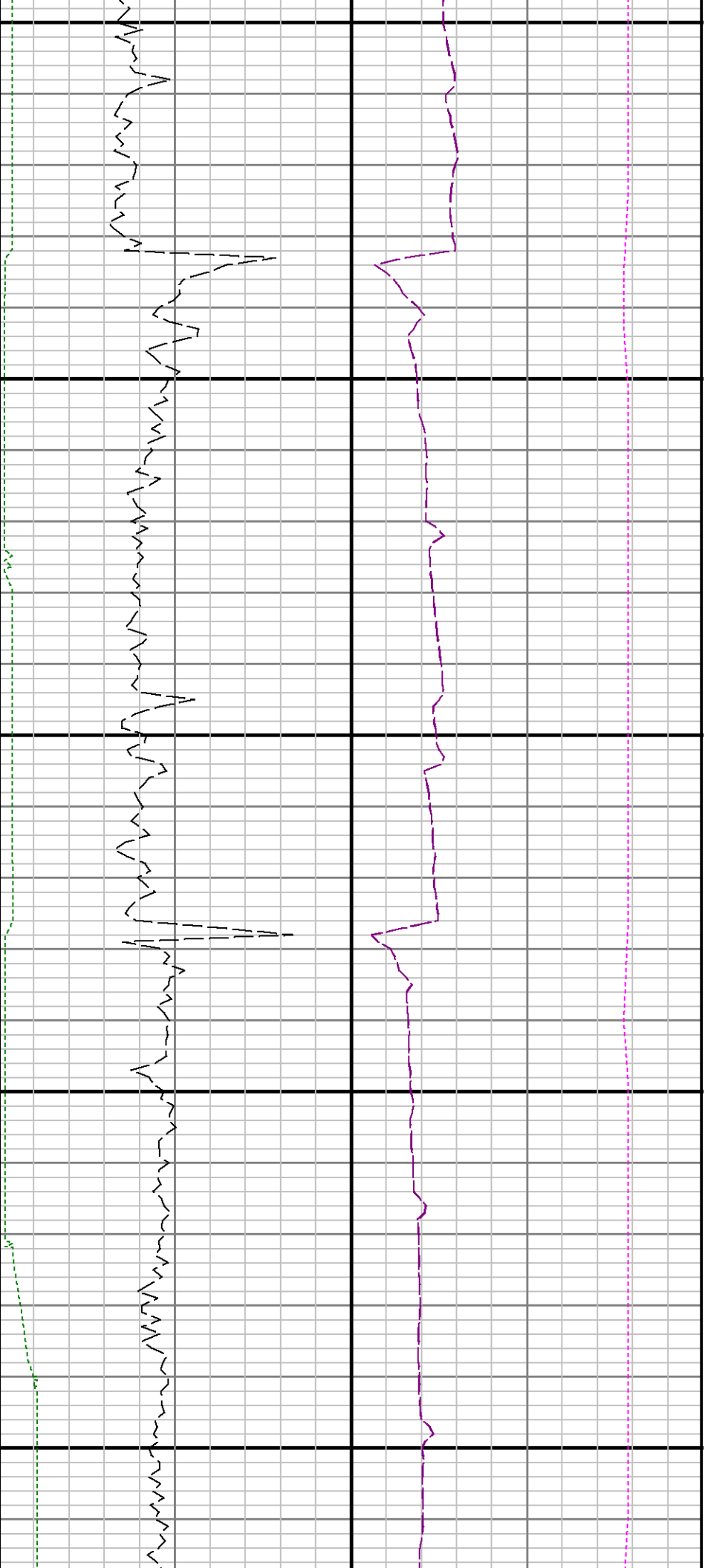
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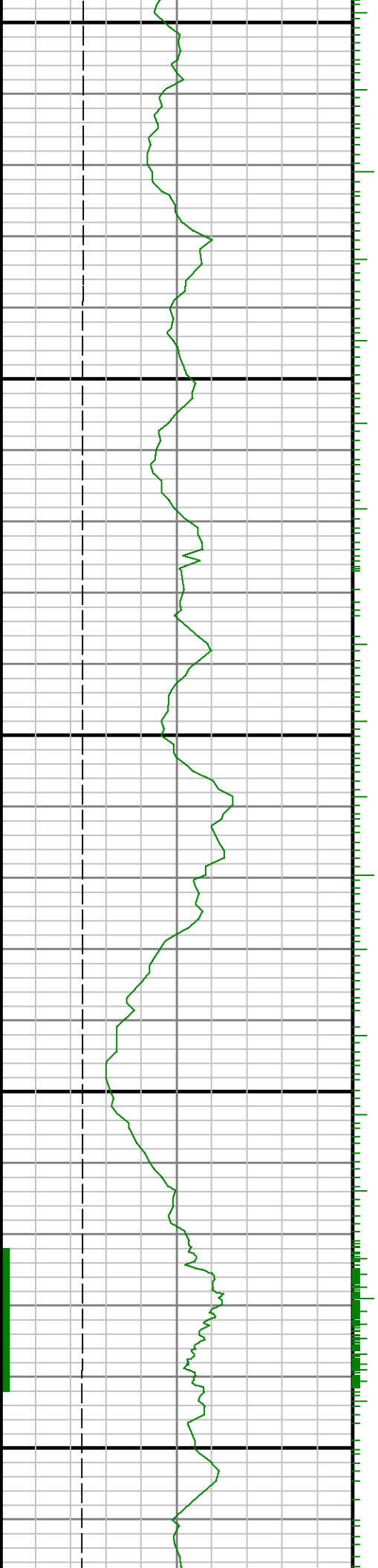


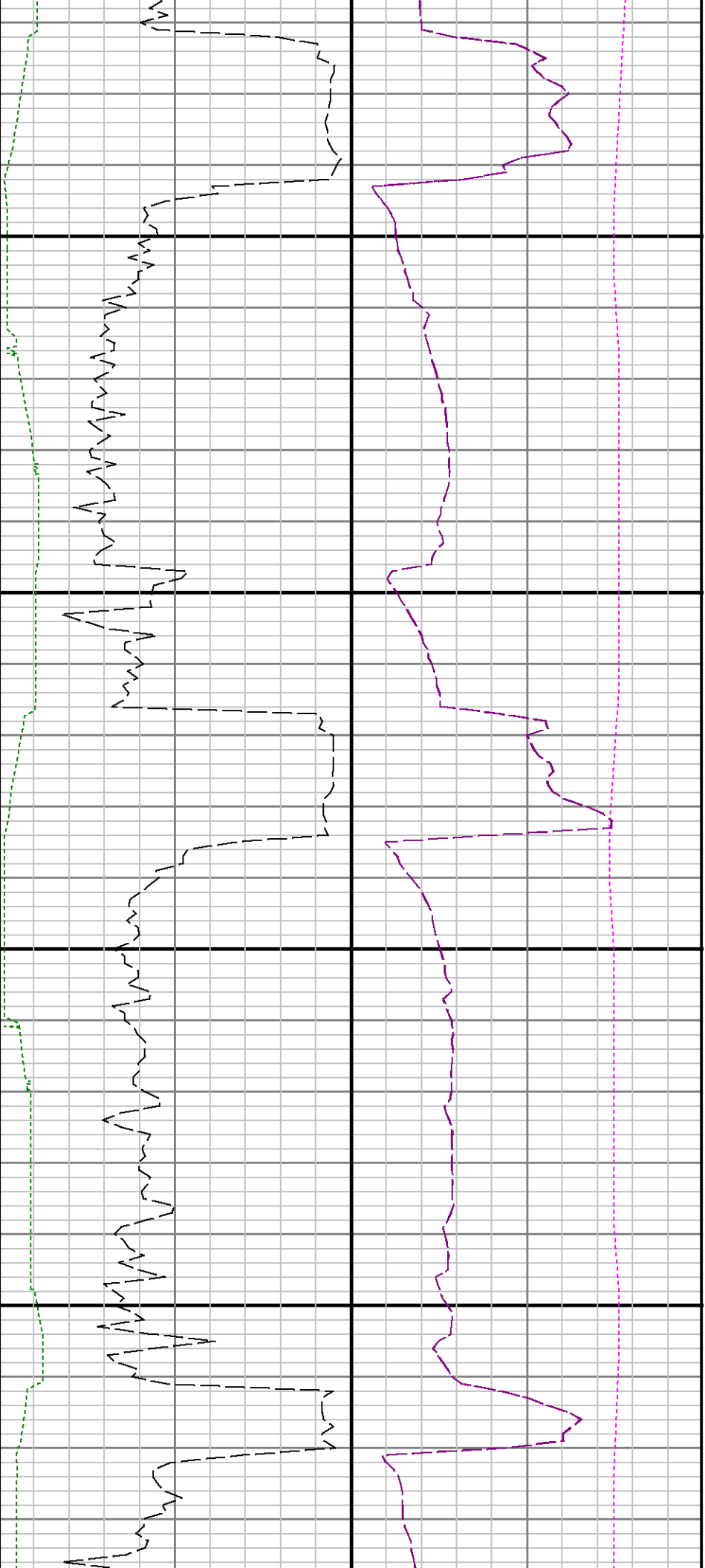




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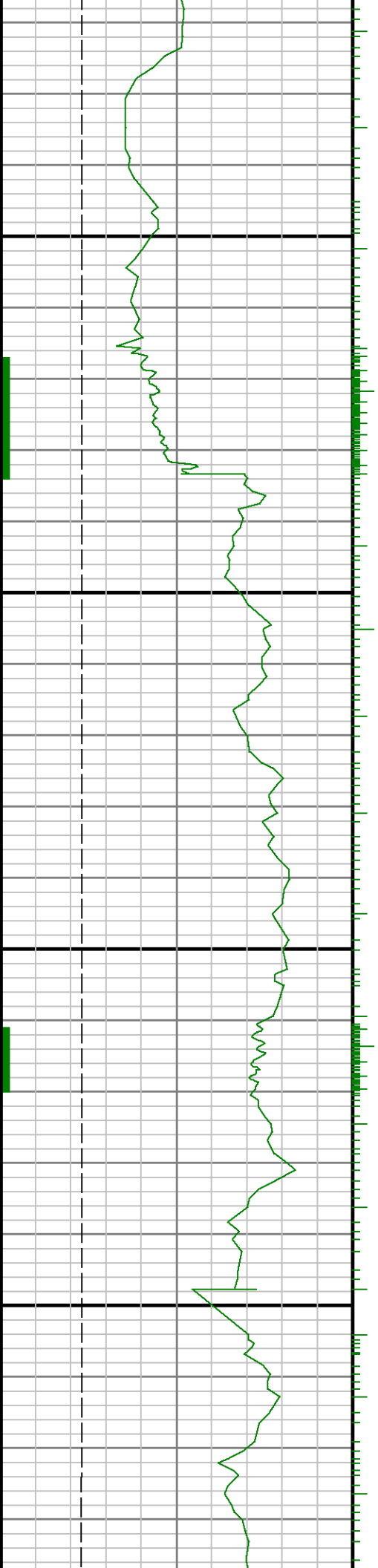
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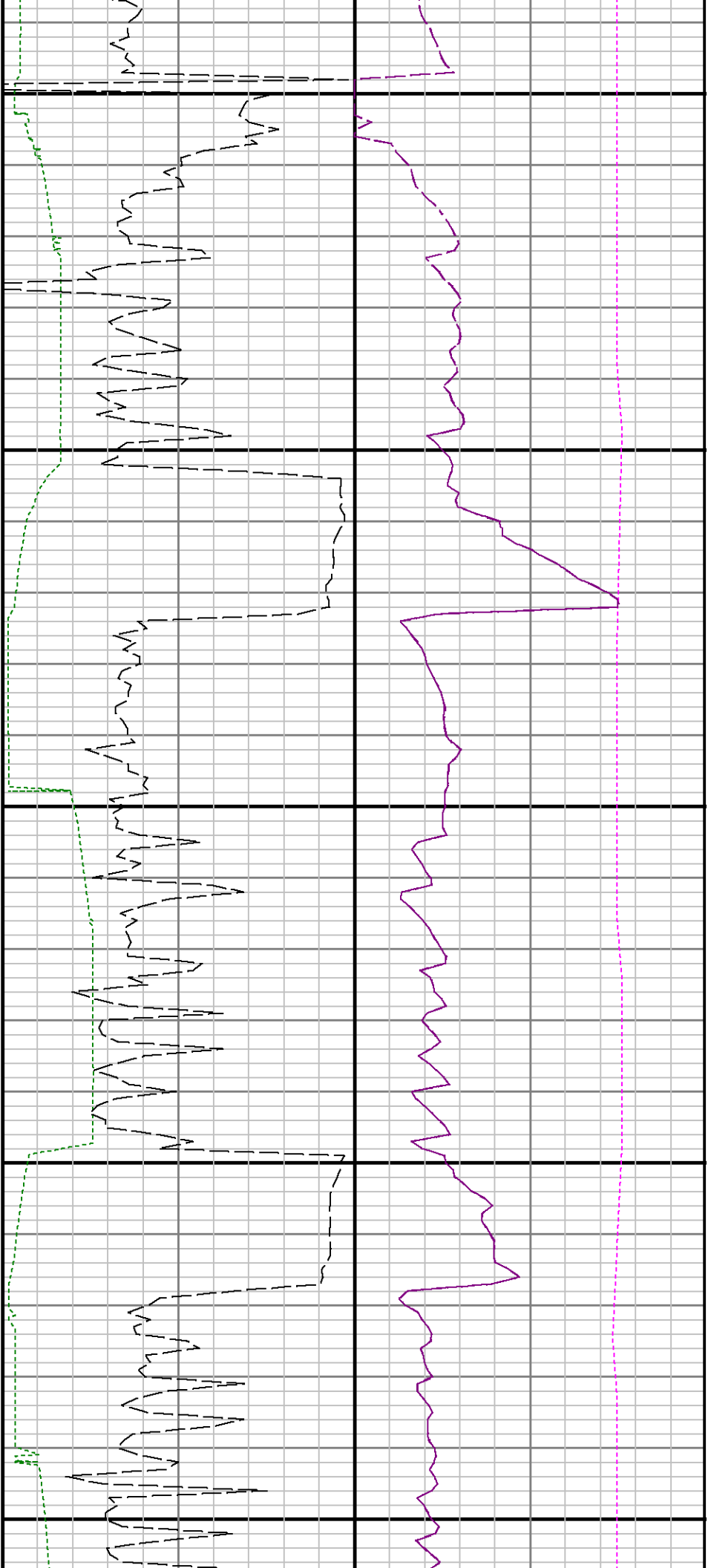




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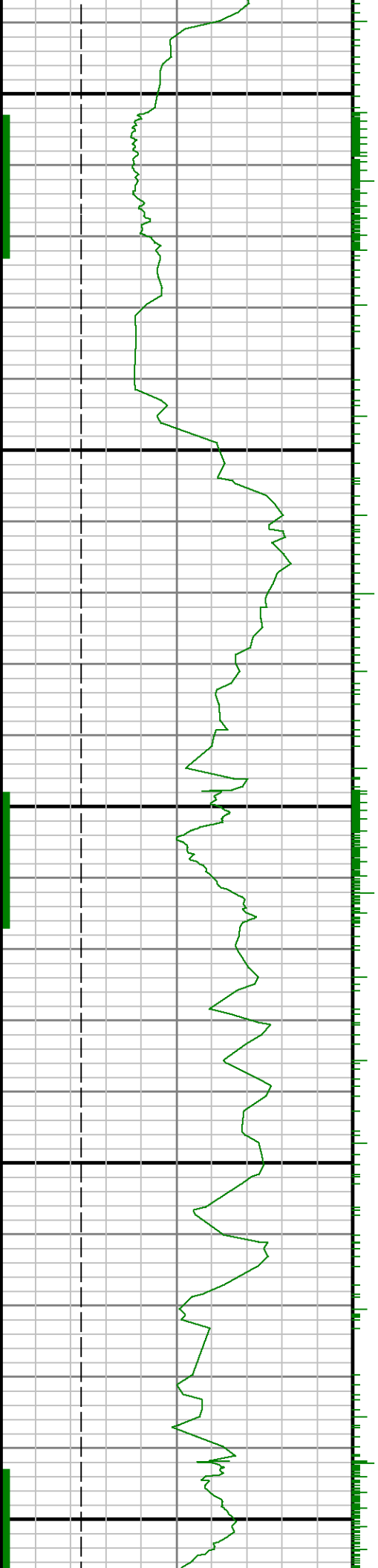


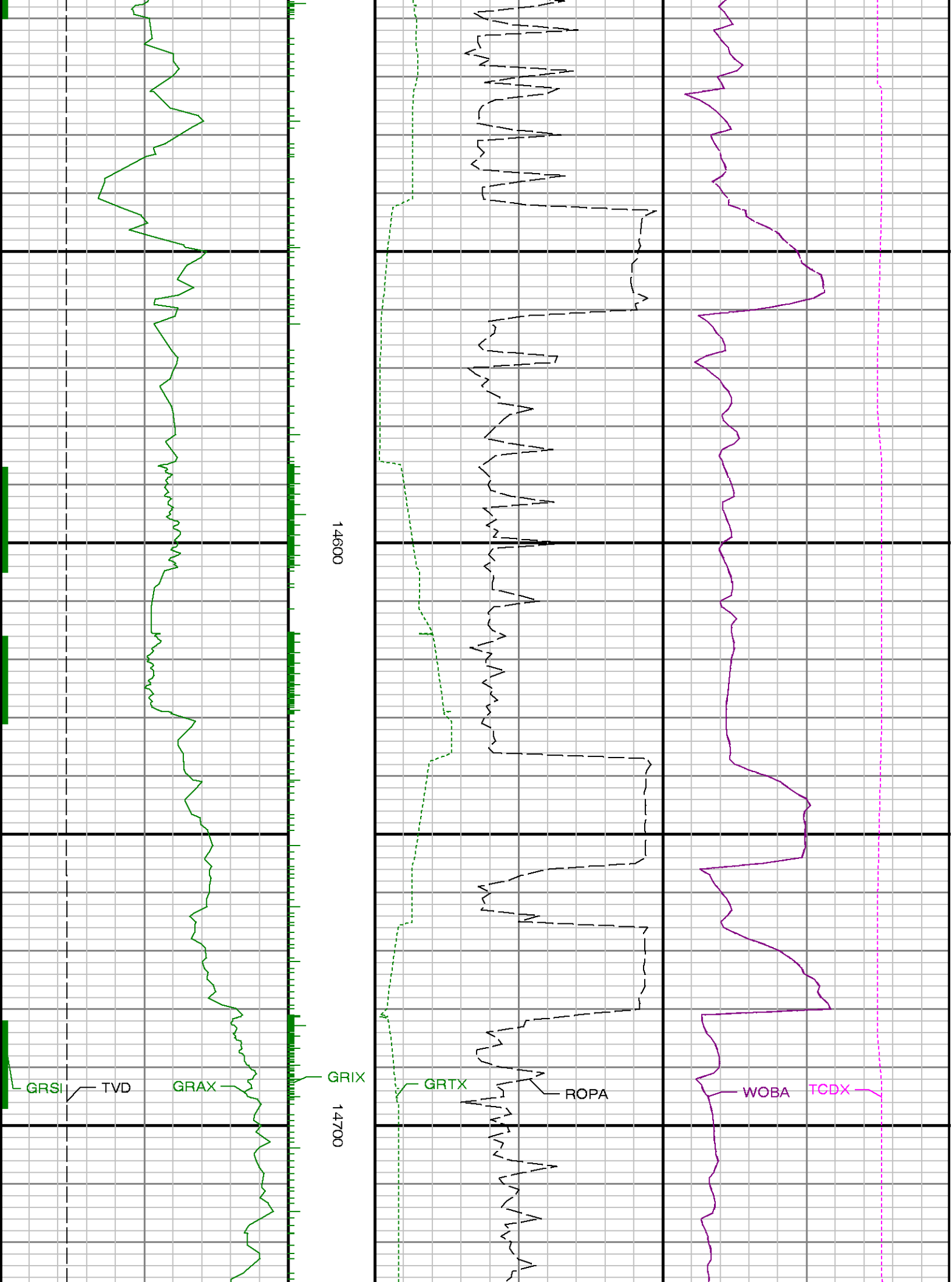


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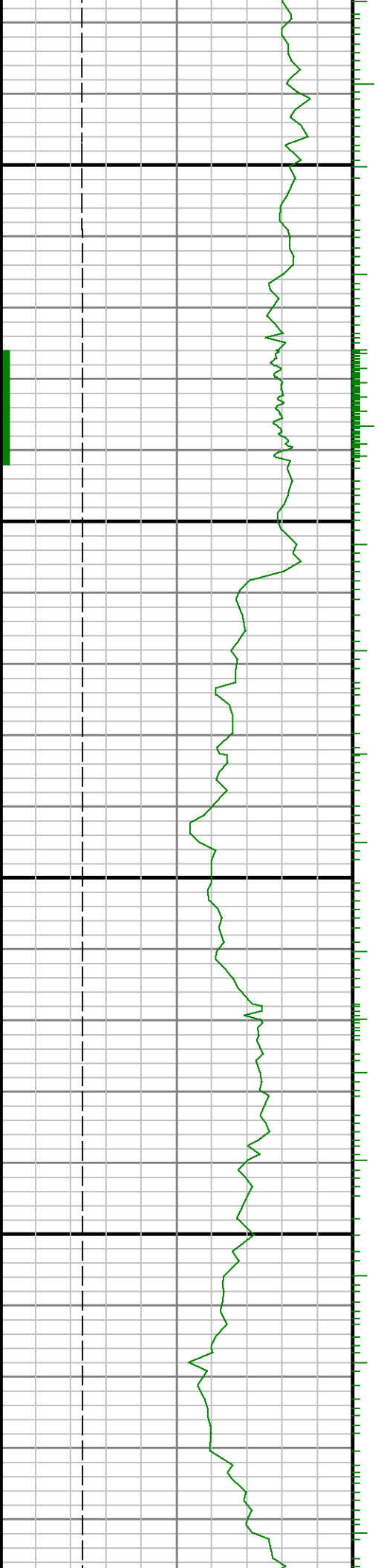


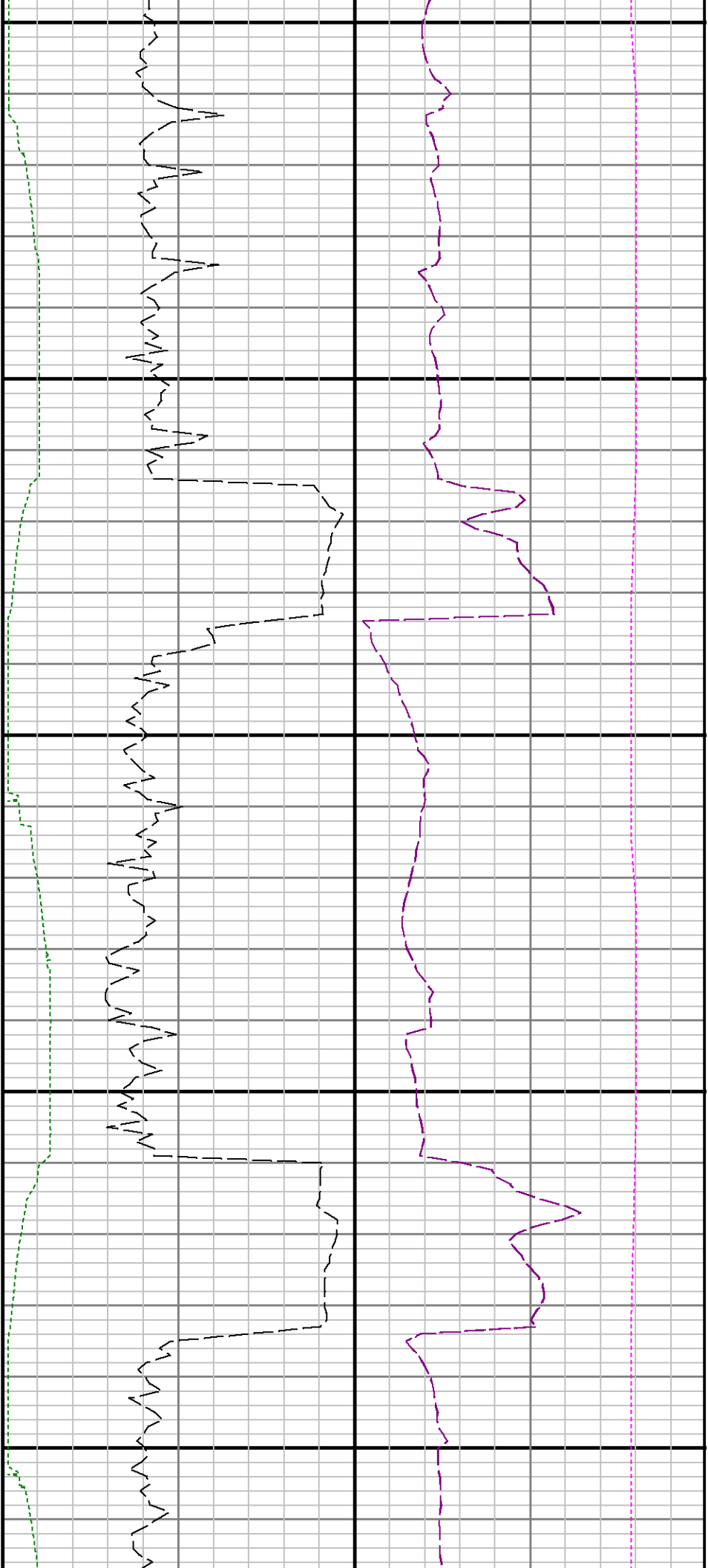




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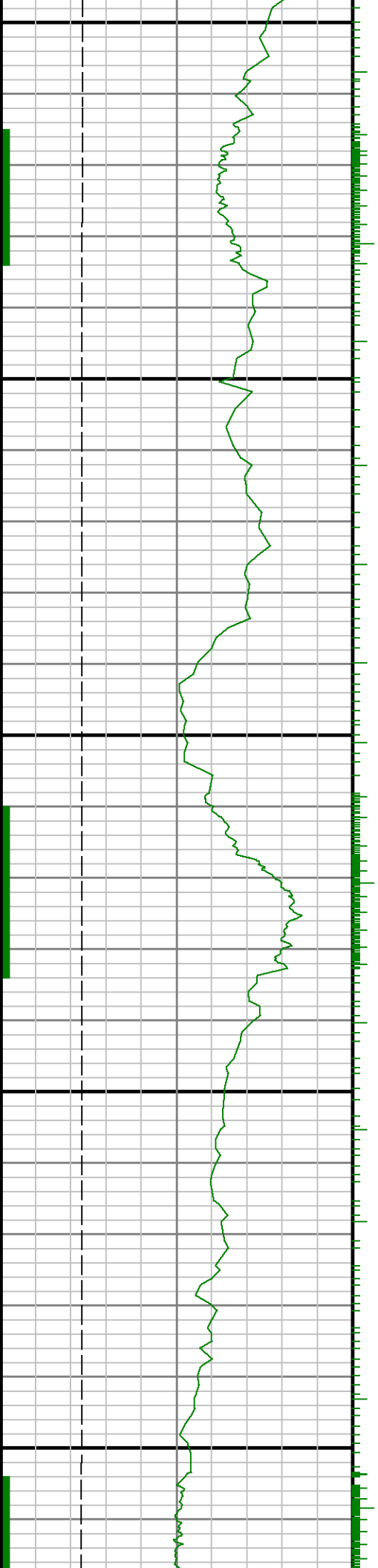
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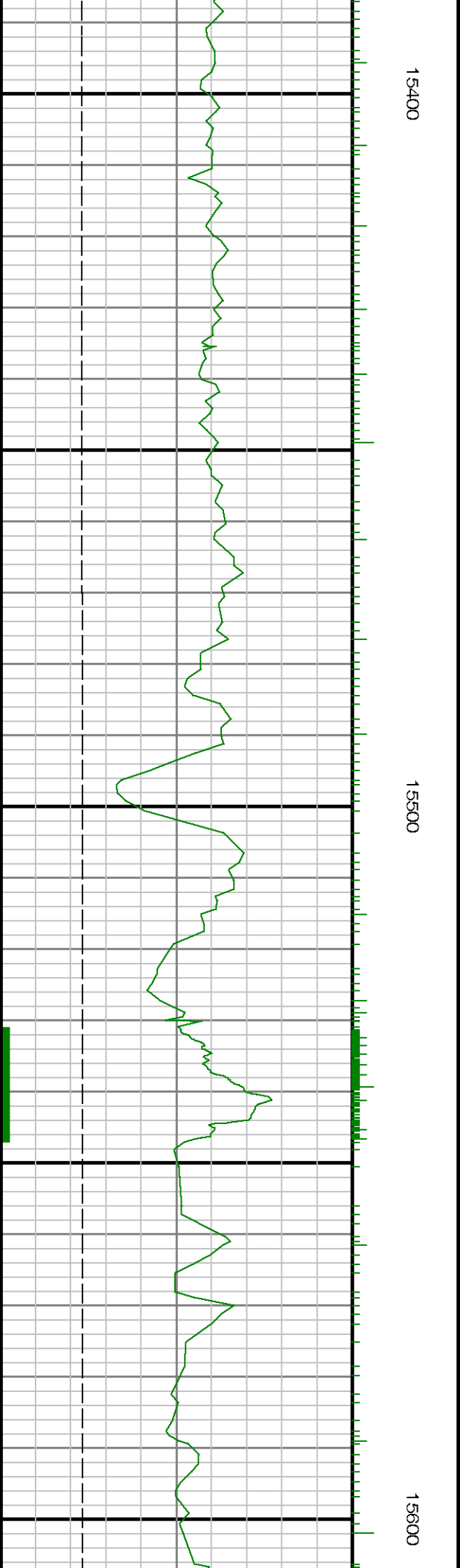
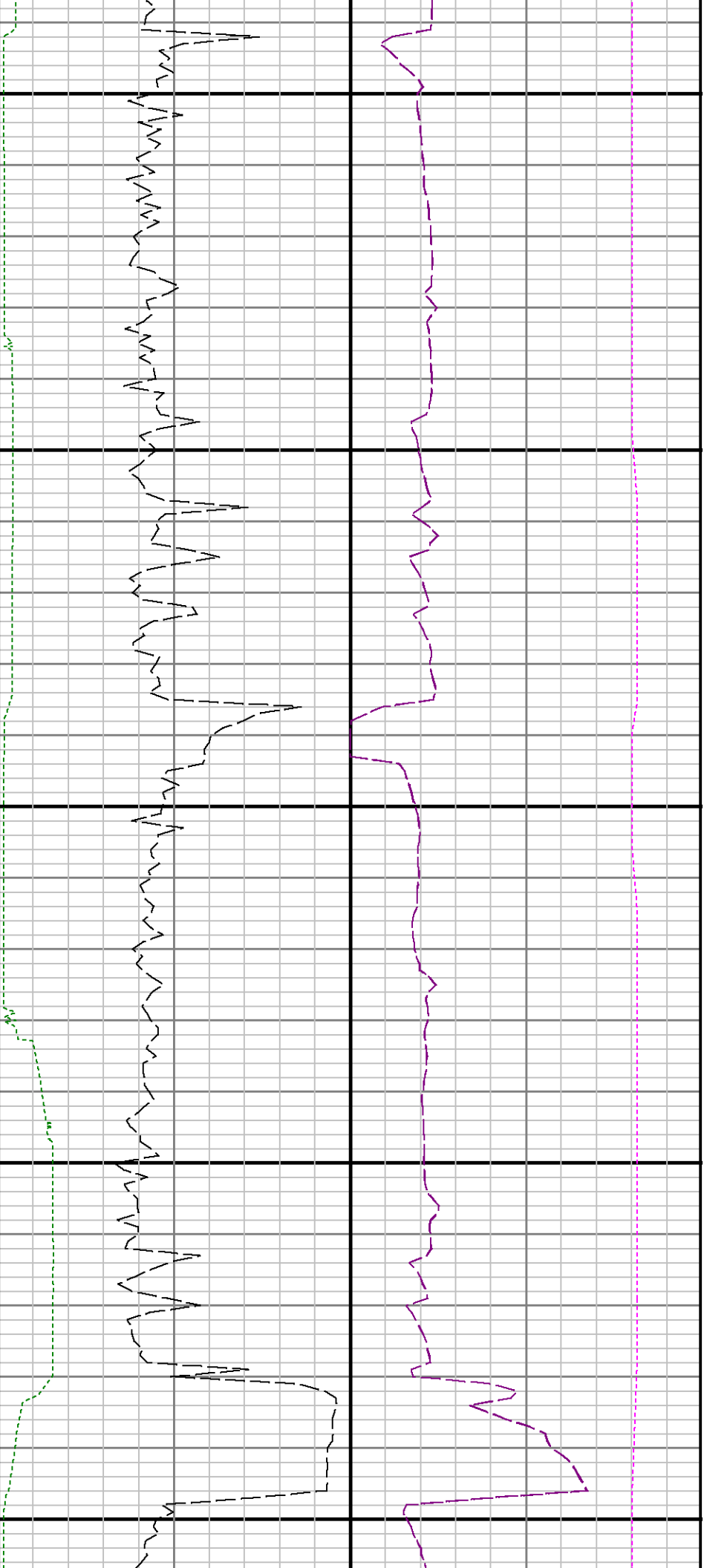


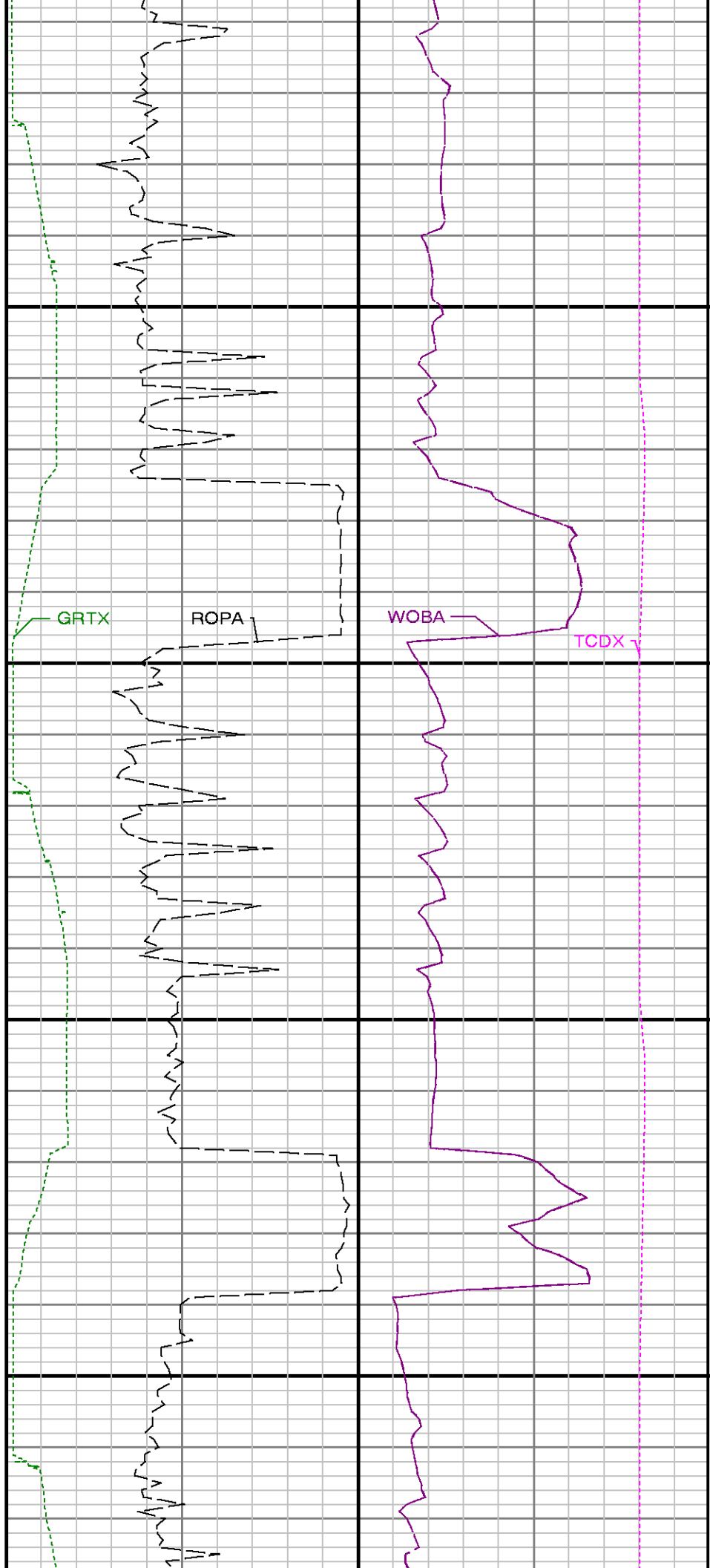
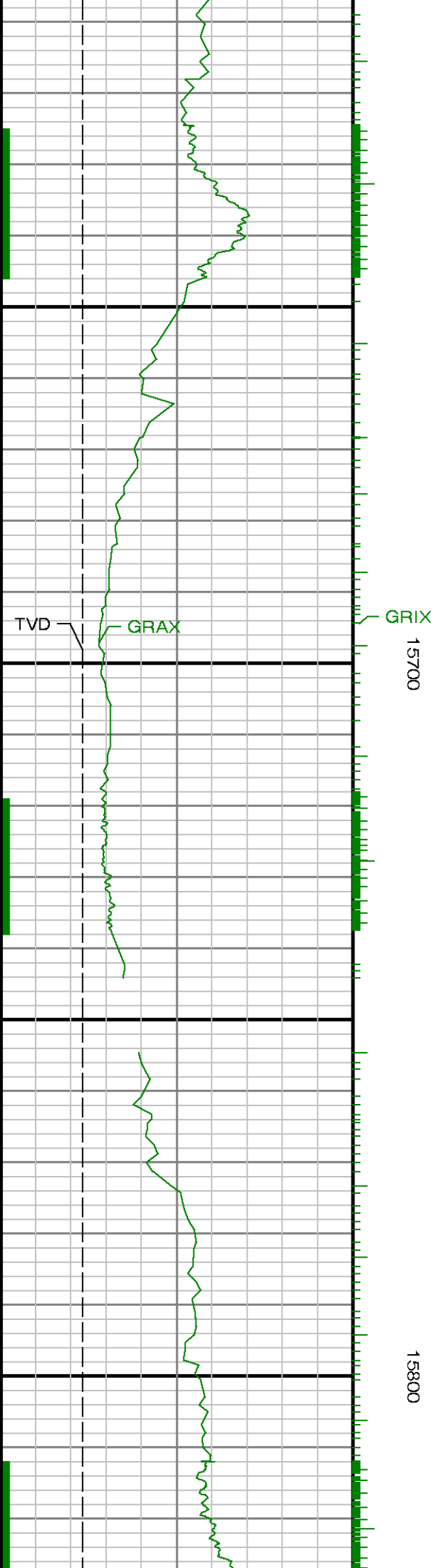
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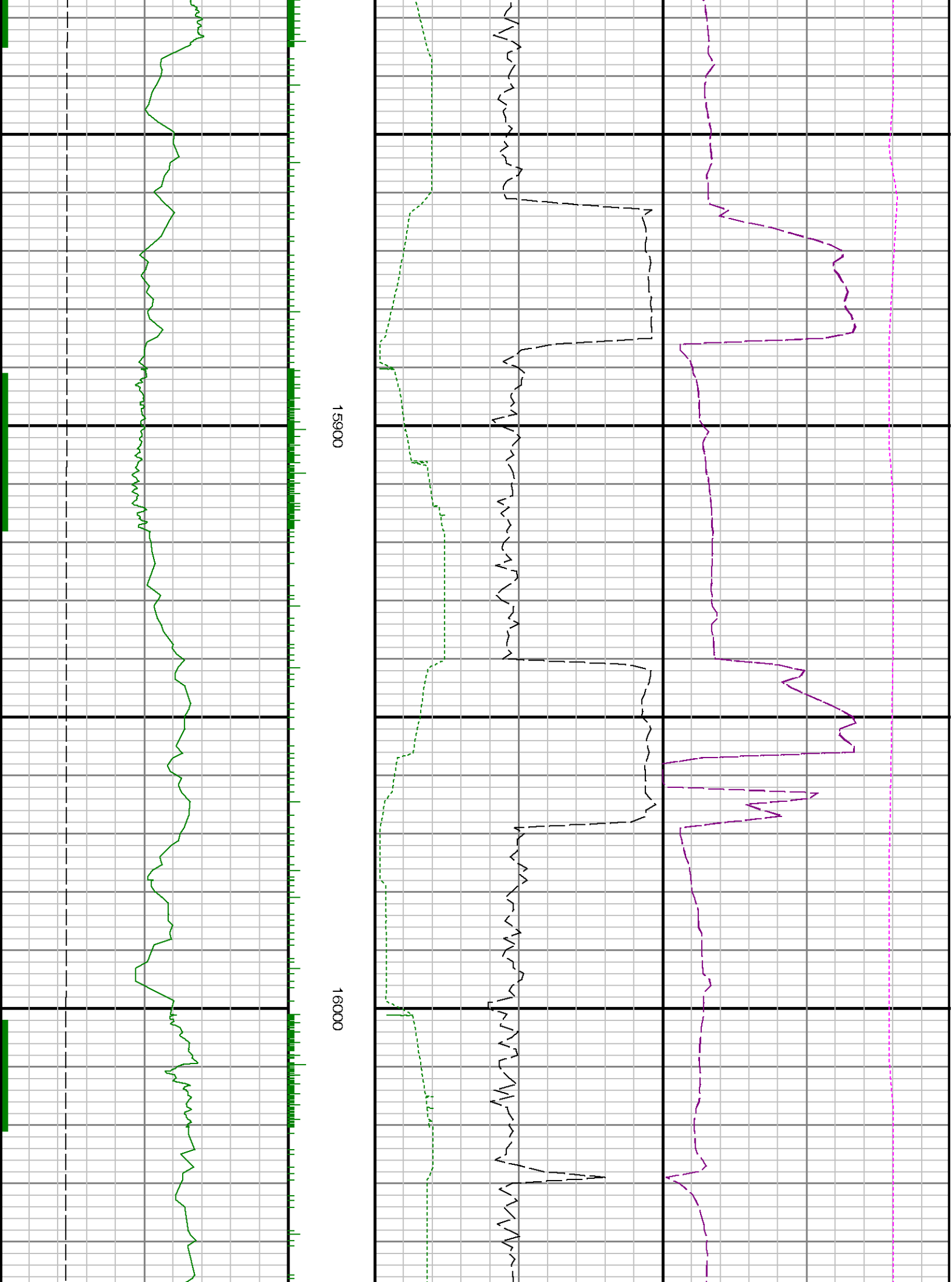
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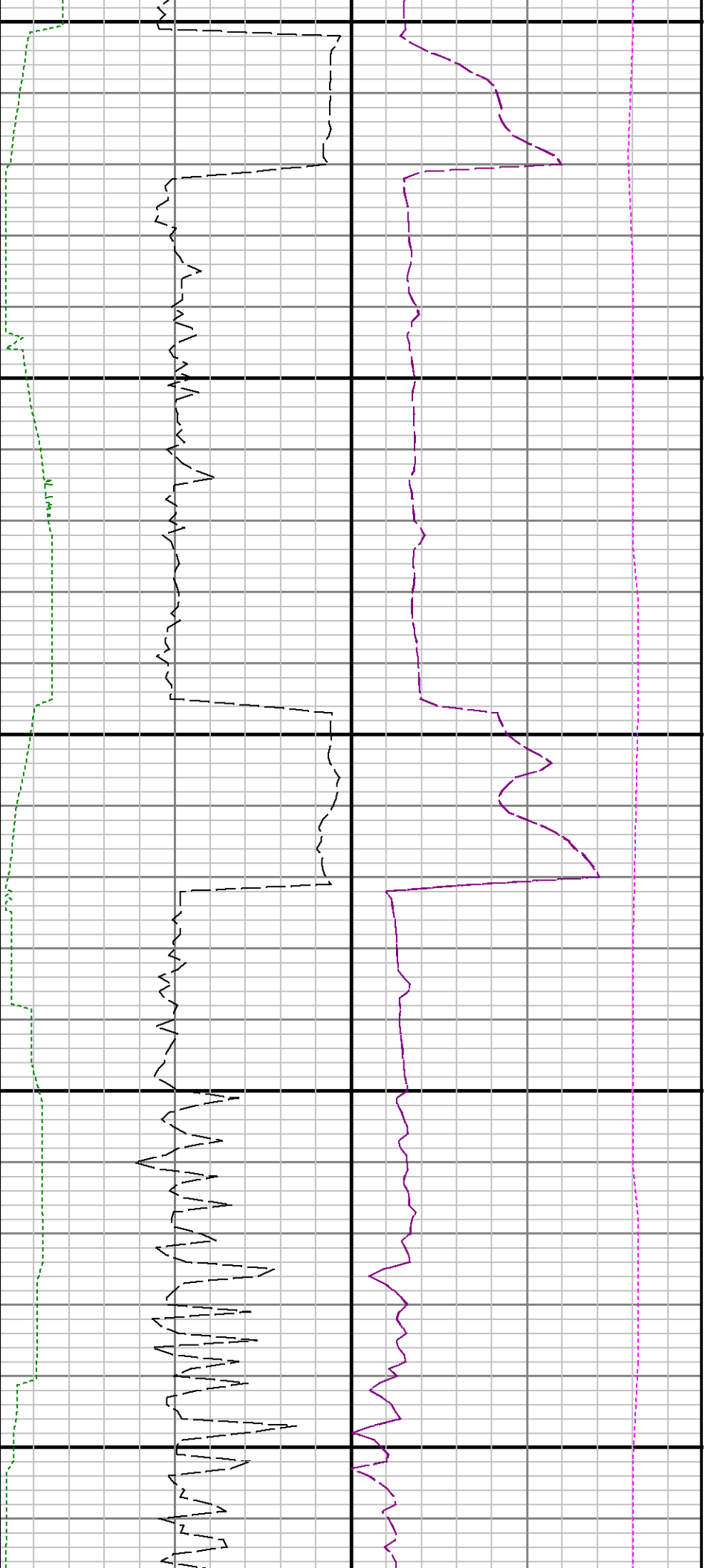






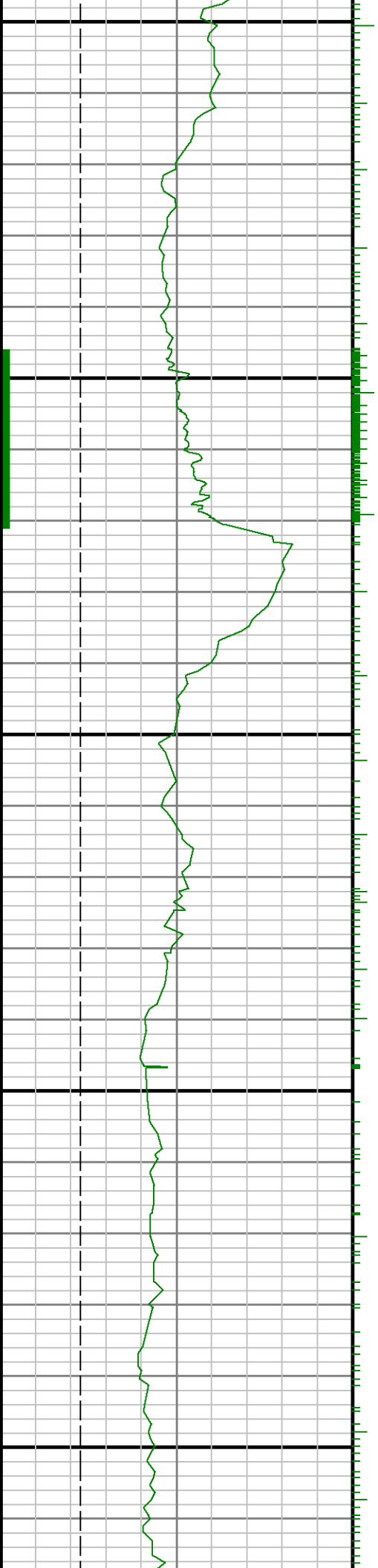


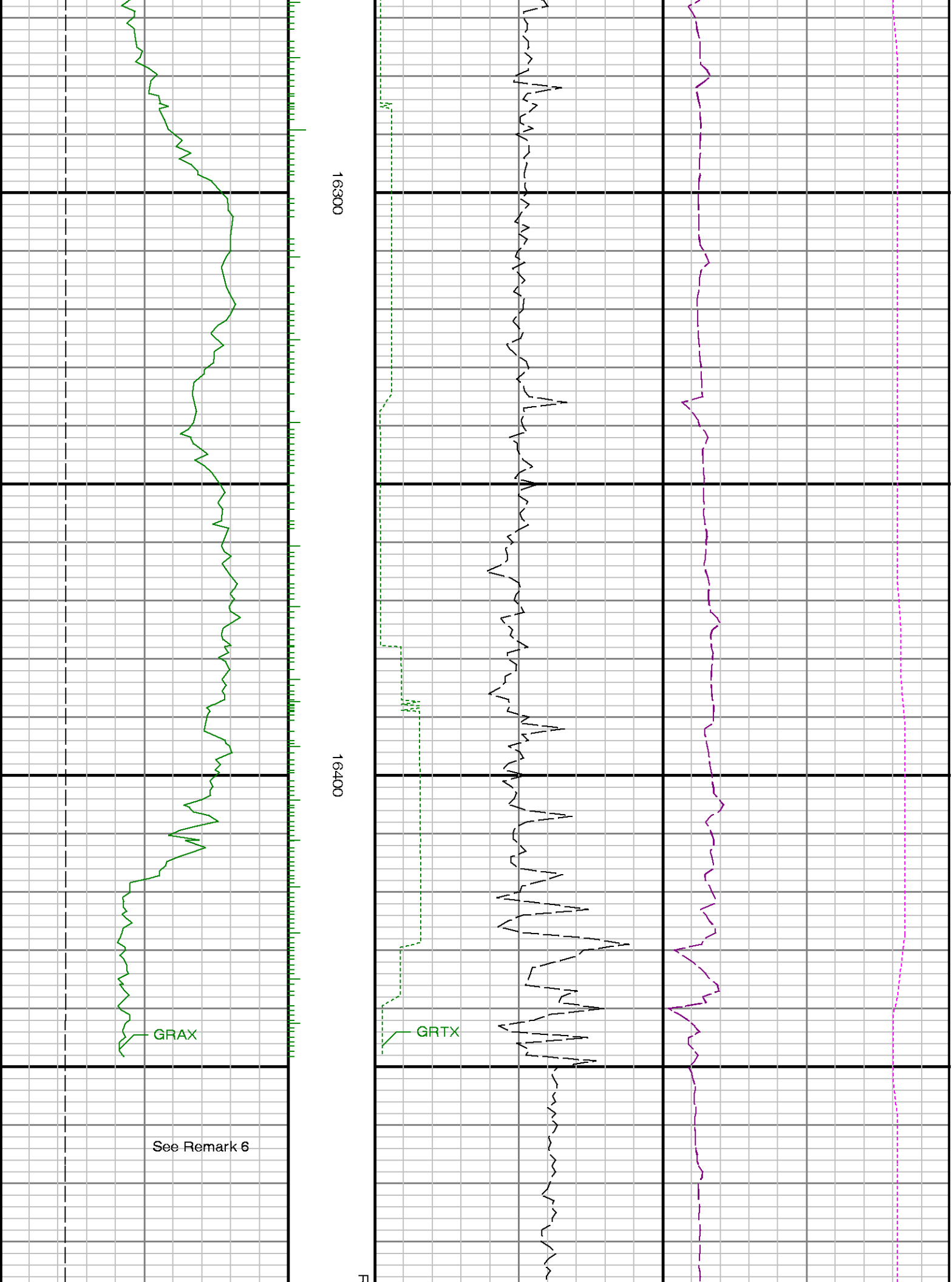








16100

16200





 TVD	TD 16500	 ROPA	 WOBA	 TCDX
Gamma Ray Apparent 0.5 ft Avg GRAX 0 200 API True Vertical Depth TVD 7500 6400 ft	MD feet 1:240	Rate of Penetration 3.0 ft Avg ROPA 500 0 ft/hr G5.GRTX 0 600 min	Surface Weight On Bit 1.0 ft Avg WOBA 0 100 klbf Downhole Temperature TCDX 100 300 degF	