



Real Time Log

Natural Formation Evaluation
Gamma Ray

Scale:

Company: Anadarko

1:240

Well: Howard 24N-22HZ

Measured Depth

Field: Weld County (Kerr McGee)

County: Weld County State: Colorado

Status:

Field Print

Surface Location:

Latitude: 40° 1' 1.398" N

Longitude: 104° 52' 13.667" W

Other Services:

API Number:

051233823300

SEC: 17 TWP: 1N RNG: 67W

Directional

Permanent Datum (P.D.): Ground Level Elevation: 5068.00 ft.

Elevations: N/A

Log Measured From: Rotary Table 16.00 ft. Above P.D.

KB: 5084.00 ft.
DF: 5068.00 ft.
GL:

Depth Reference:

Driller's Depth

GL:

Interval Logged

Dates

Magnetic Field Reference

Top: 6935.0 ft. Date From: 22 Oct 2013 Date To: 28 Oct 2013 Dip Angle: 66.34° Azi Reference North: True

Bottom: 14751.0 ft. Date To: 28 Oct 2013 Total Mag to Reference

Spud Date: 19 Oct 2013 Field Strength: 52740.0 nT North Correction: 8.47°

Borehole Record

Casing Record

Hole Size	From	To	Size	Weight	From	To
8.750 in.	1238.0 ft.	7900.0 ft.	9.625 in.	36.00 lb/ft	Surface	1238.0 ft.
6.125 in.	7900.0 ft.	14800.0 ft.	7.000 in.	26.00 lb/ft	Surface	7890.0 ft.

Mud Record

Deviation Record

Type	From	To	Hole Size	Interval	Inc / Az (Start)	Inc / Az (End)
LSND	1238.0 ft.	14800.0 ft.	8.750 in.	85.0 ft.	0.4 / 269.3°	0.5° / 80.5°
			8.750 in.	42.0 ft.	0.5° / 80.5°	82.9° / 2.5°
			6.125 in.	85.0 ft.	82.9° / 2.5°	92.1° / 357.2°
					/	/
					/	/
					/	/

Acquisition System Software Version

Other

Advantage	2.20U4	Rig: Xtreme 24	/ Advance Drilling
PATS	6.4.1.34	Job No: 5869203	/ 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	2.000	Steerable	6935.0	7532.0	7003.0	7586.0	22 Oct 2013 12:59	22 Oct 2013 20:16	31.6
2	2	2	8.750	PDC	2.000	Steerable	7532.0	7852.0	7586.0	7901.0	23 Oct 2013 06:51	23 Oct 2013 17:54	13
3	3	3	6.125	PDC	6.000	Steerable	7852.0	9299.0	7901.0	9350.0	25 Oct 2013 15:55	26 Oct 2014 07:31	16.8
4	4	4	6.125	PDC	6.000	Steerable	9299.0	14751.0	9350.0	14800.0	26 Oct 2013 17:45	28 Oct 2013 22:42	51.3

Crew

Name	Arrive	Depart	Name	Arrive	Depart	Name	Arrive	Depart
	Wellsite	Wellsite		Wellsite	Wellsite		Wellsite	Wellsite
Austin Small	21 Oct 2013	29 Oct 2013	Jason Williams	24 Oct 2013	29 Oct 2013	Marcus Boucher	19 Oct 2013	24 Oct 2013

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+ (%)
23 Oct 2013	6:00	1	7584.0	LSND	9.8	12	8.6	N/A	1.5/90.5	Active Pits	1,700	N/A
24 Oct 2013	6:00	2	7900.0	LSND	9.8	12	8.8	N/A	1.6/90.5	Active Pits	1,400	N/A
25 Oct 2013	6:00	3	7900.0	LSND	9.2	9	8.5	N/A	0/95.0	Active Pits	1,200	N/A
26 Oct 2013	6:00	3	9250.0	LSND	8.7	10	8.1	N/A	1/96	Active Pits	1,600	N/A
27 Oct 2013	6:00	4	11101.0	LSND	8.8	10	8.4	NA	1/95.3	Active Pits	1,800	N/A

Mnemonics

Curve	Description	Units
GRAX	Gamma Ray Apparent, 0.5 ft. Avg	API
GRIX	Gamma Ray Data Density	points
GRSI	Gamma Ray Sliding 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	12859420	Directional	55.93	6.750	2.938
1	SRIG	12600744	Gamma	52.56	6.750	2.938
2	DIR	12859420	Directional	52.96	6.750	2.938
2	SRIG	12600744	Gamma	49.59	6.750	2.938
3	DIR	12611873	Directional	53.67	4.750	2.500
3	SRIG	11703937	Gamma	50.29	4.750	2.500
4	DIR	12611873	Directional	53.67	4.750	2.500
4	SRIG	11703937	Gamma	50.25	4.750	2.500

Service and Tool Mnemonics

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

Comments

1.) Depth measurements were obtained from a depth control system not supplied or operated by Baker Hughes INTEQ. Due to lack of control by Baker Hughes INTEQ logging engineers, depth calibrations and measurements could not be independently verified and the unverified depths as supplied to INTEQ are being used to represent logging data.
2.) Baker Hughes INTEQ Runs 1 and 2 utilized a 6 1/2 inch NaviGamma (Directional and Gamma Ray) tool behind an 8 3/4 inch bit and steerable assembly from 7003 feet to 7901 feet MD (6937 feet to 7575 feet TVD).

3.) Baker Hughes INTEQ Runs 3 and 4 utilized a 4 3/4 inch NaviGamma (Directional and Gamma Ray) tool behind a 6 1/8 inch bit and steerable assembly from 7901 feet to 14800 feet MD (7575 feet to 7486 feet TVD).

4.) A sliding indicator is shown on the left side of track 1 as a heavy line. This indicator has been depth-shifted to the Gamma Ray sensor offset to correspond with Gamma Ray data acquired while sliding.

Remarks

Number	Measured Depth (ft)	Hole Section (in.)	LWD Run No.	Remark
1	7300	8.750	1	The interval from surface to 7003 feet MD(6937 feet TVD) was not logged since logging services began at kick off point.
2	7532	8.750	2	The Interval from 7532 feet to 7586 feet MD (7422 feet to 7461 feet TVD) was logged more than 10 hours after drilling due to tripping for a new BHA.
3	7901	8.750	3	The Interval from 7852 feet to 7901 feet MD (7573 feet to 7576 feet TVD) was logged more than 46 hours after drilling due to tripping for casing and a new BHA.
4	9300	6.125	4	The Interval from 9299 feet to 9350 feet MD (7544 feet to 7542 feet TVD)was logged more than 10 hours due to tripping for new motor and bit.
5	14751	6.125	4	The interval from 14751 feet to 14800 feet MD (7488 feet to 7486 feet TVD) was not logged due to bit sensor offset at TD.



Company : Anadarko

Well : Howard 24N-22HZ

Interval : 6920.00 - 14820.00 feet

Created : 29/Oct/2013 6:07:18 AM

Gamma Ray Apparent 0.5 ft Avg [GRAX]

0 150

API

True Vertical Depth [TVD]

7700 6700

ft

MD feet 1:240

Rate of Penetration 3.0 ft Avg [ROPA]

500 0

ft/hr

Gamma Time Since Drilled GRTX

0 600

min

Surface Weight On Bit 1.0 ft Avg [WOBA]

0 150

kibf

Downhole Temperature [TCDX]

100 300

degF

GRAX

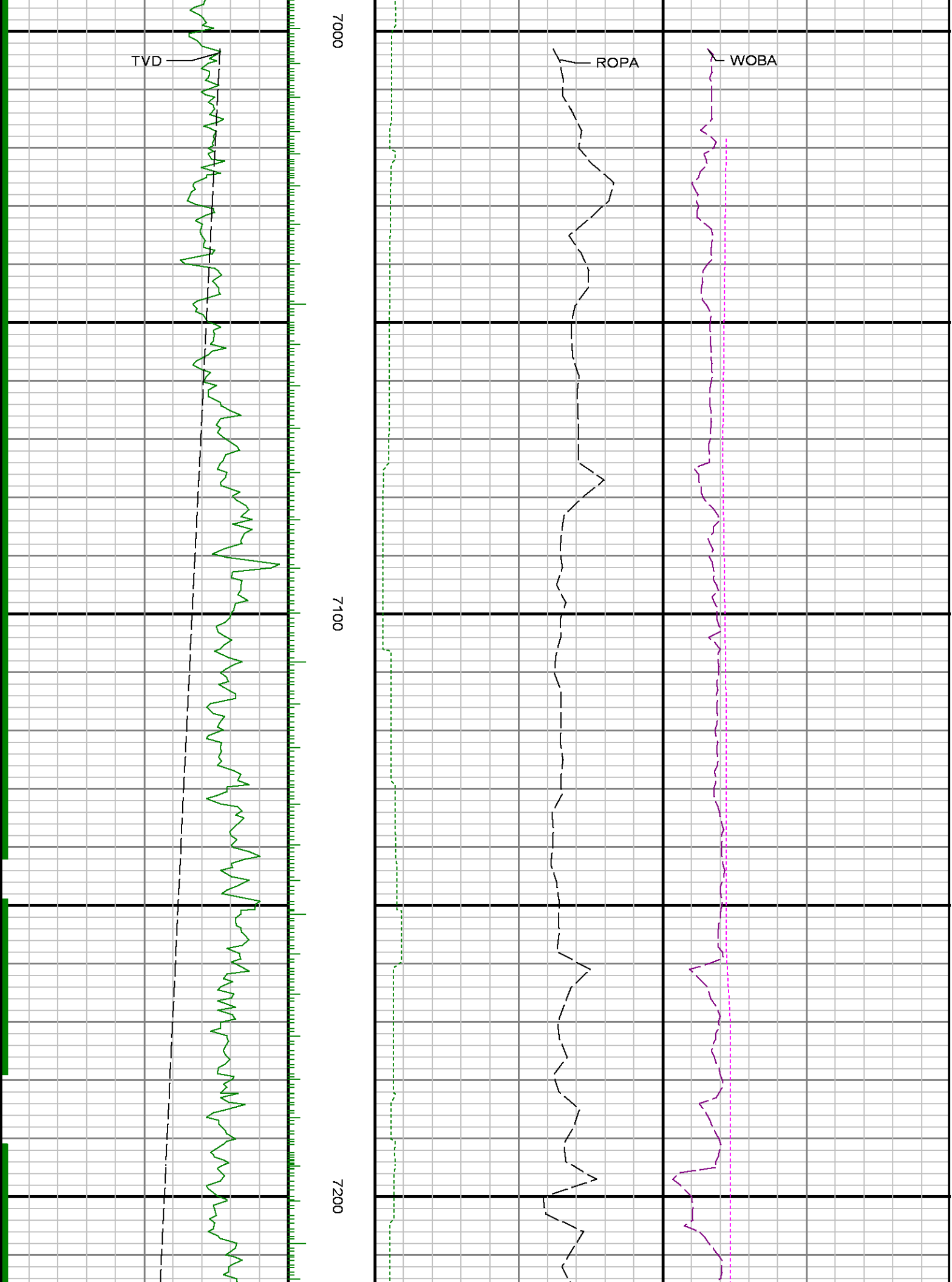
GRIX

> Run 1

GRTX

GRSI

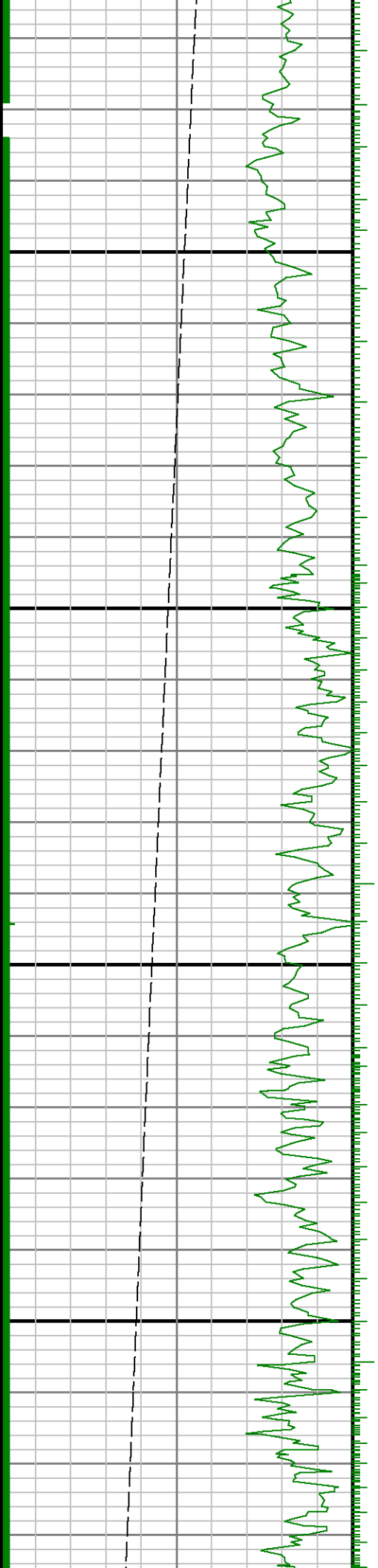
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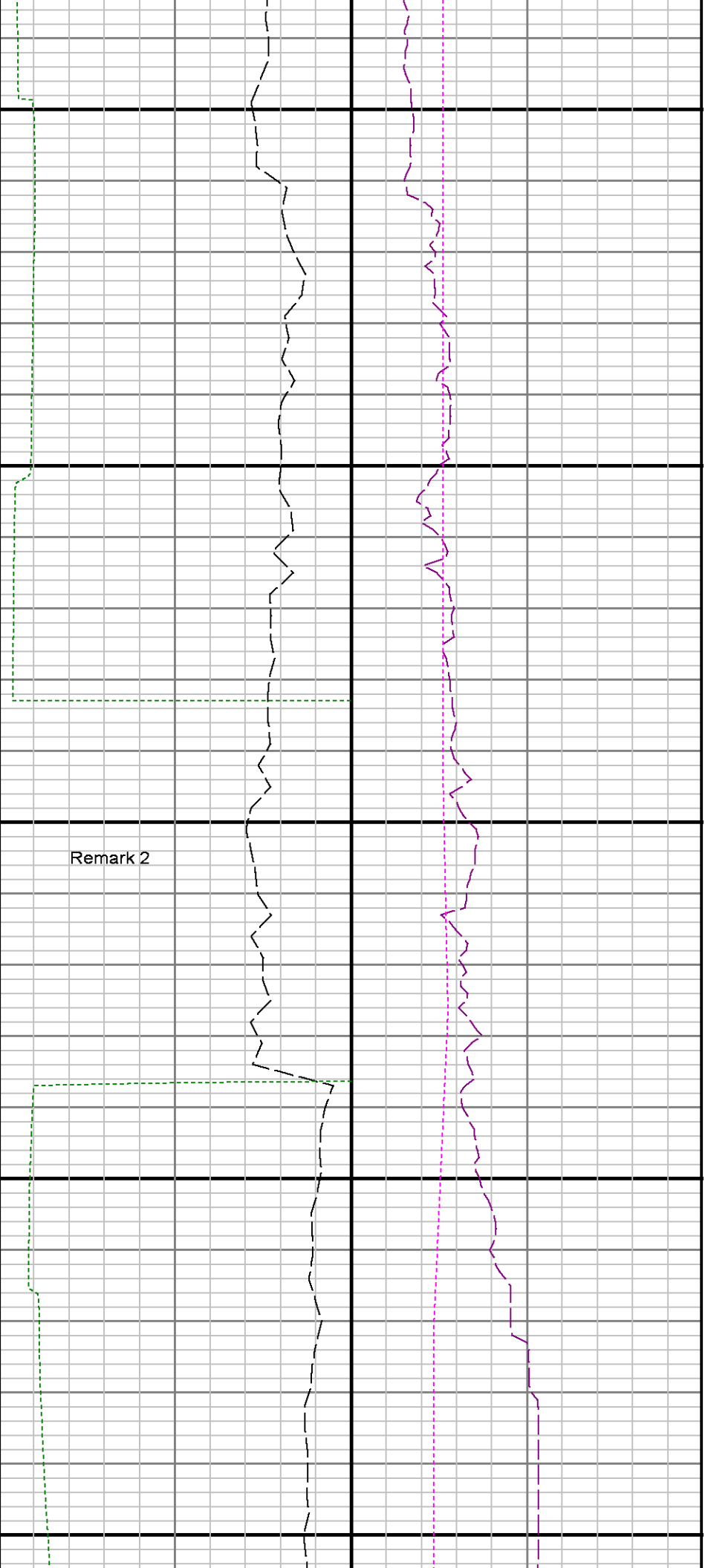




7300

7400



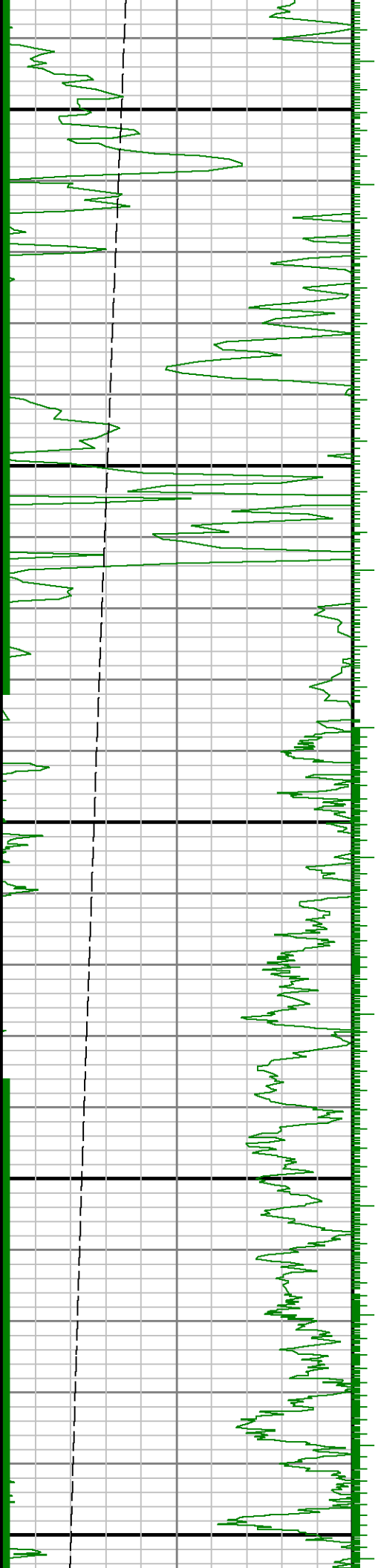


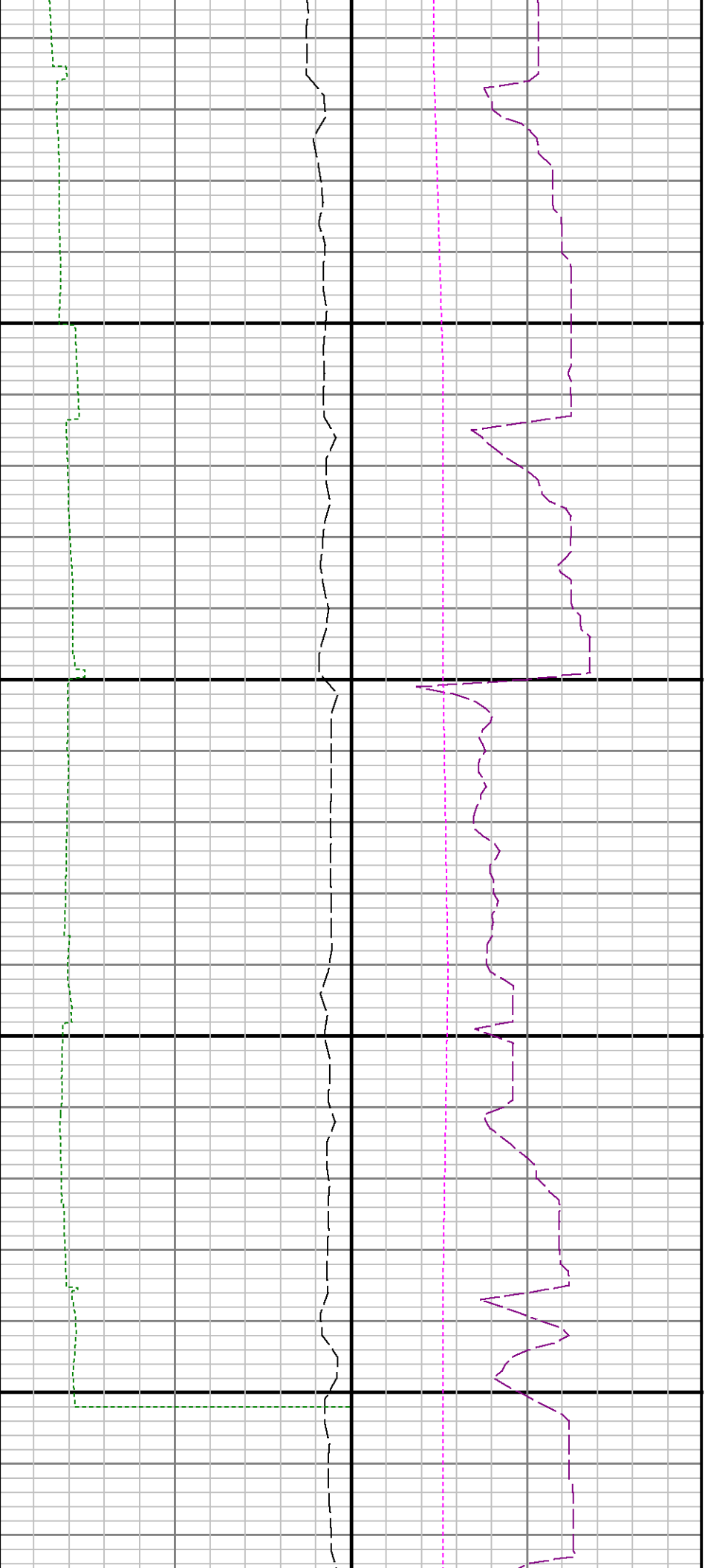
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7500

Run 1 ⇨ Run 2

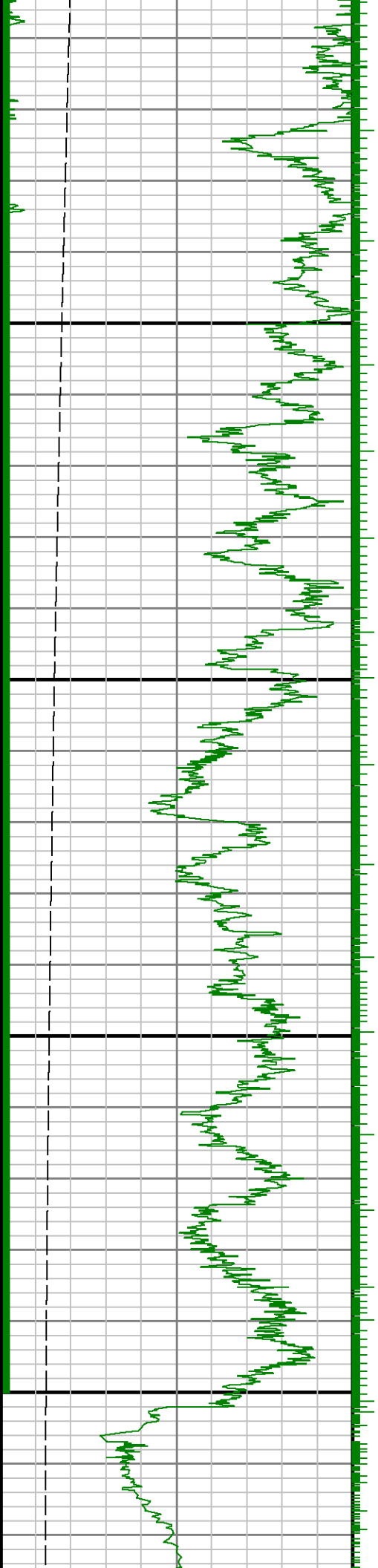
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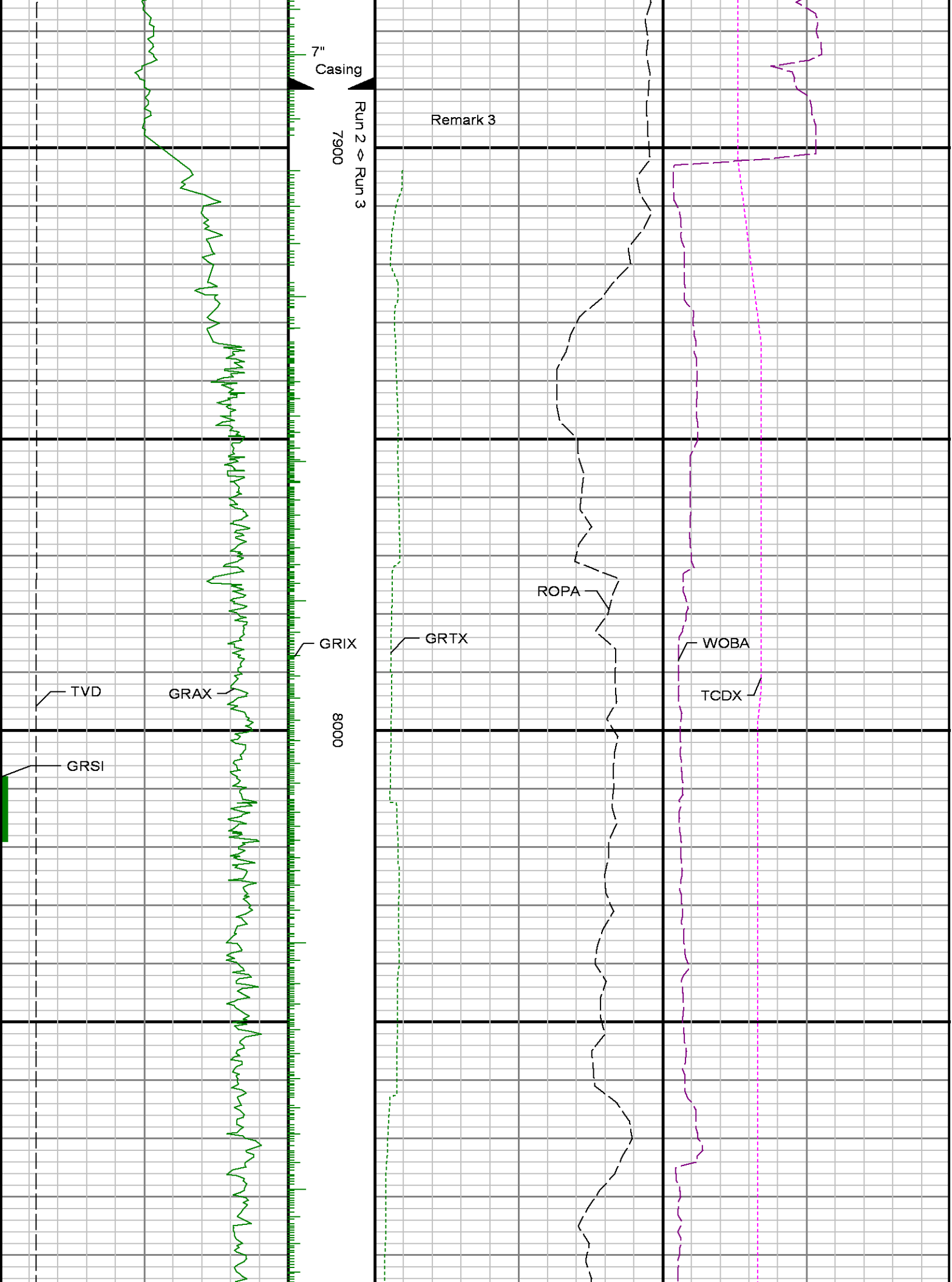




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7800



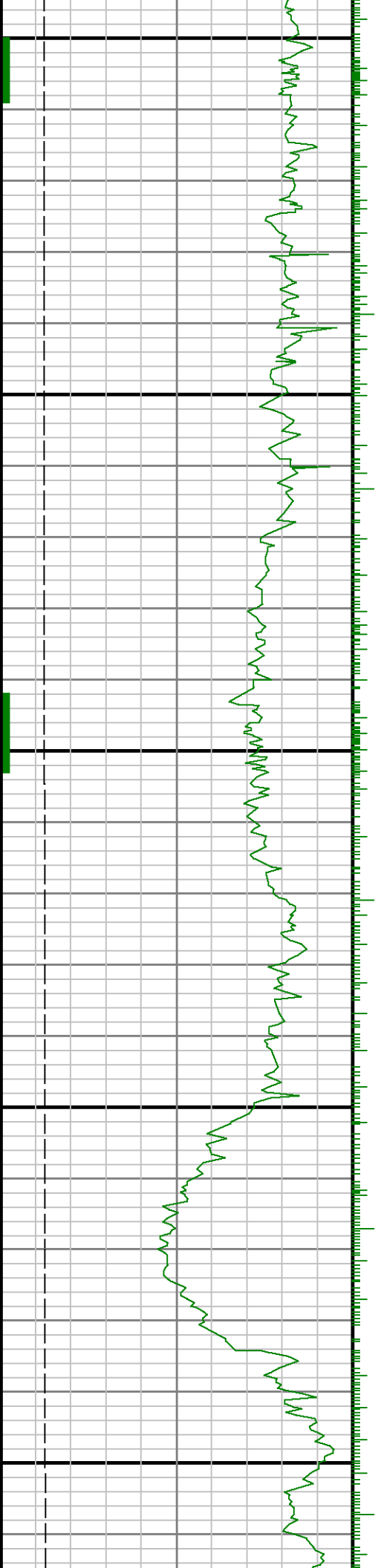


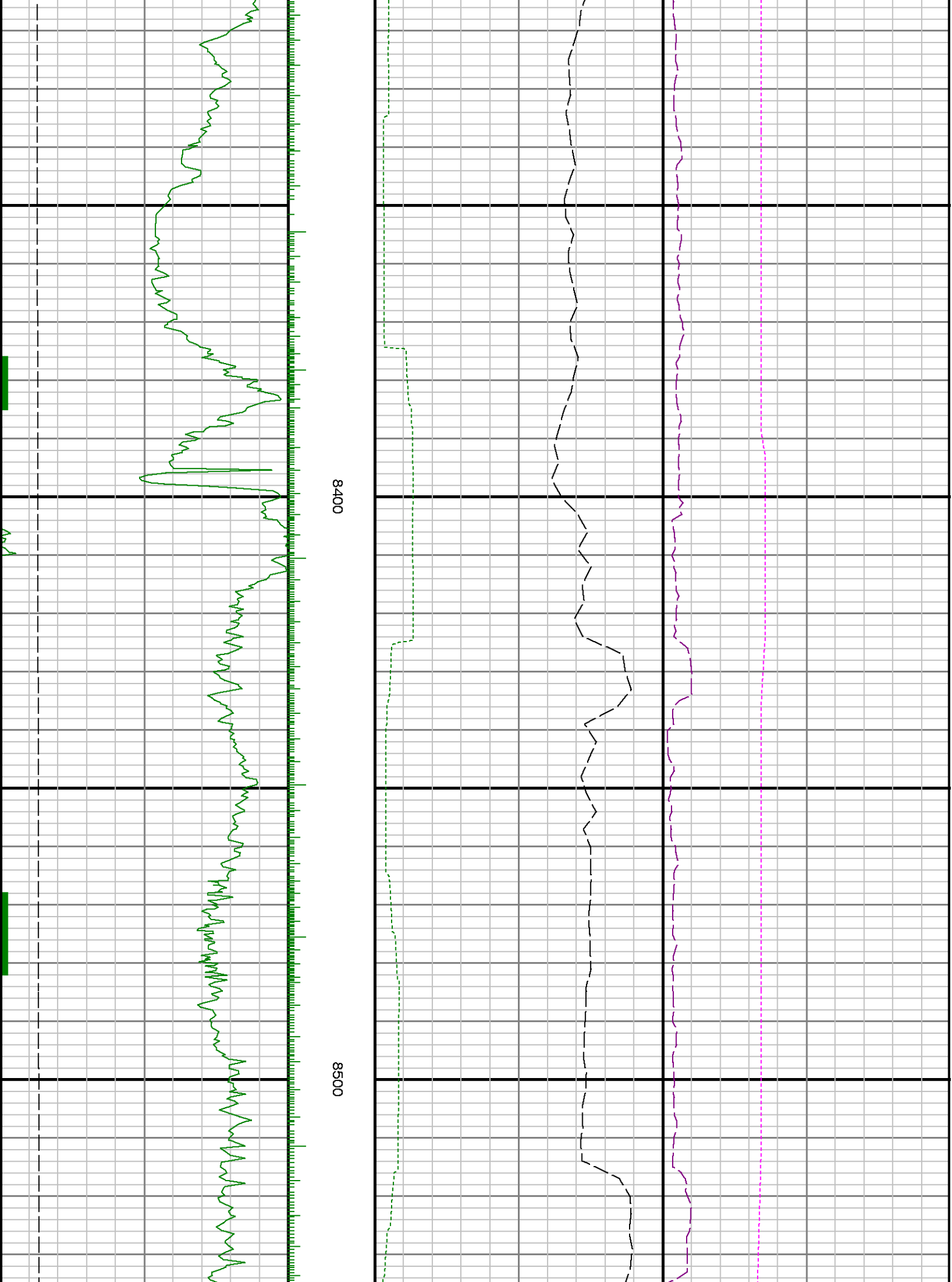


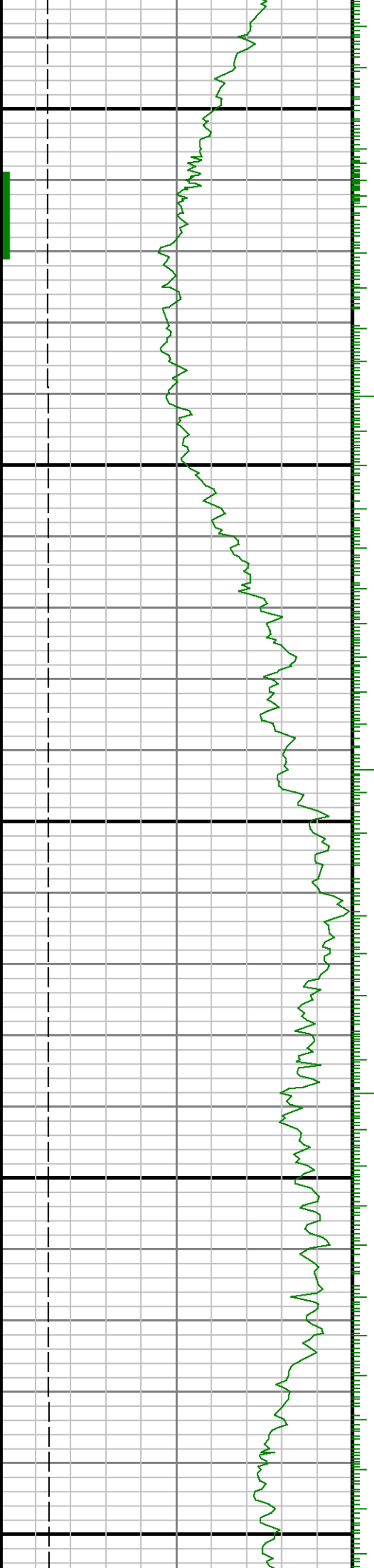
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8200

8300



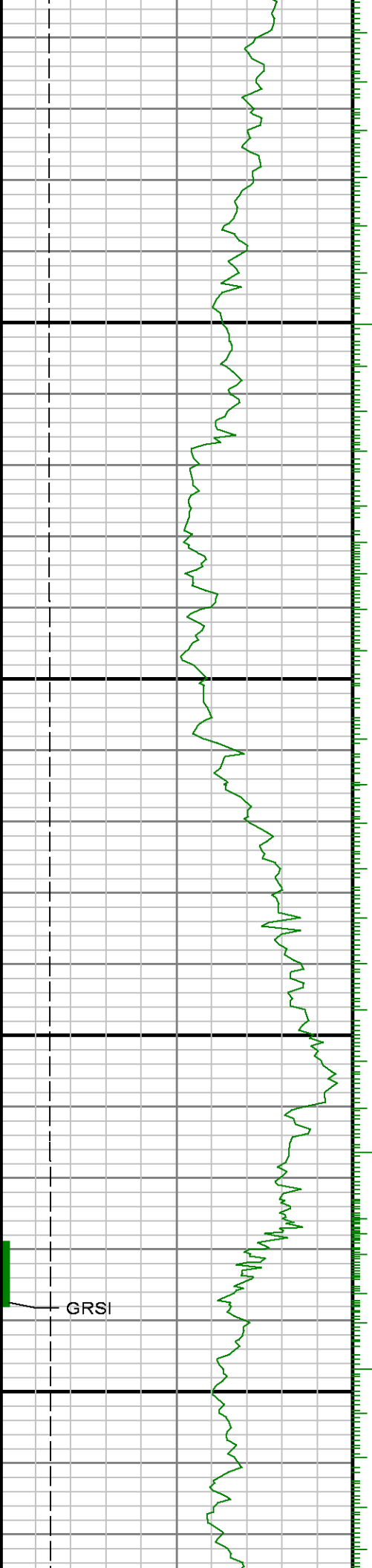




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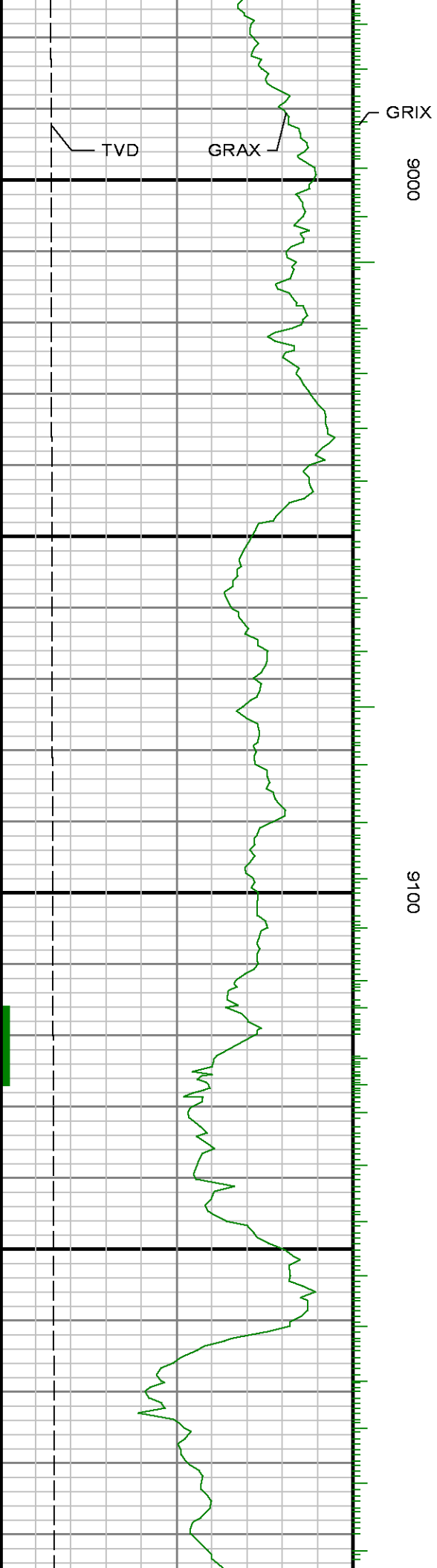


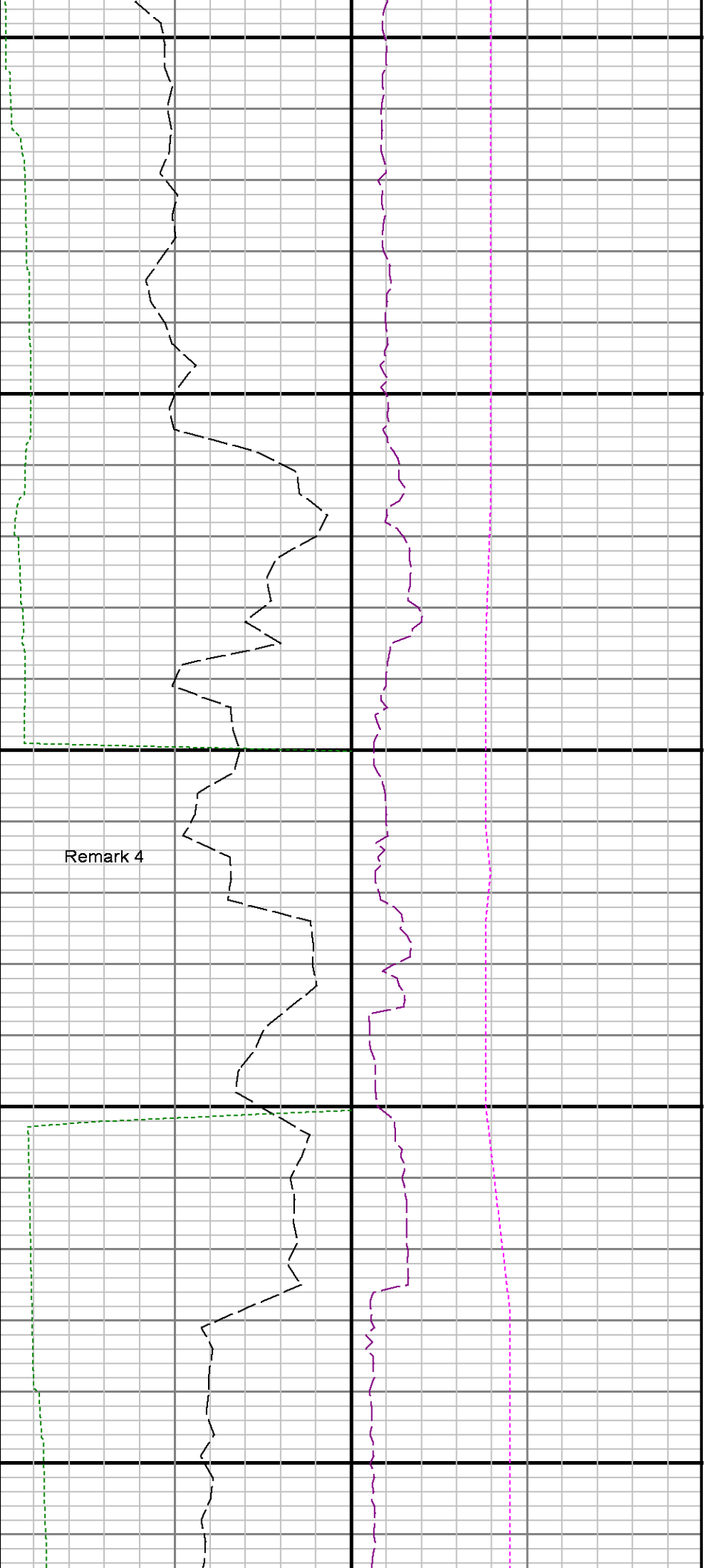


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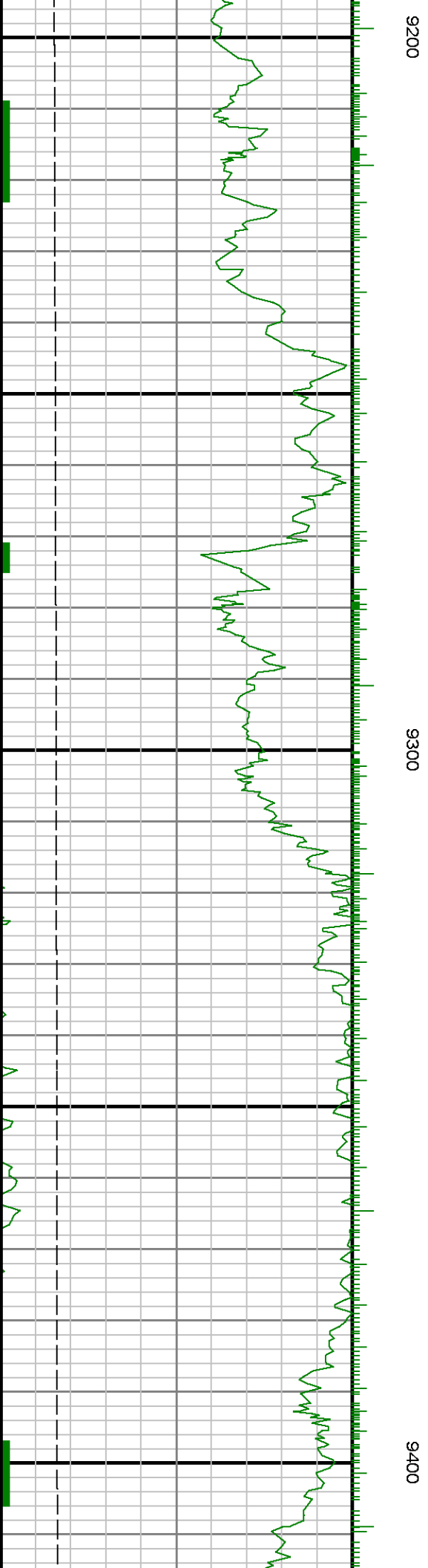


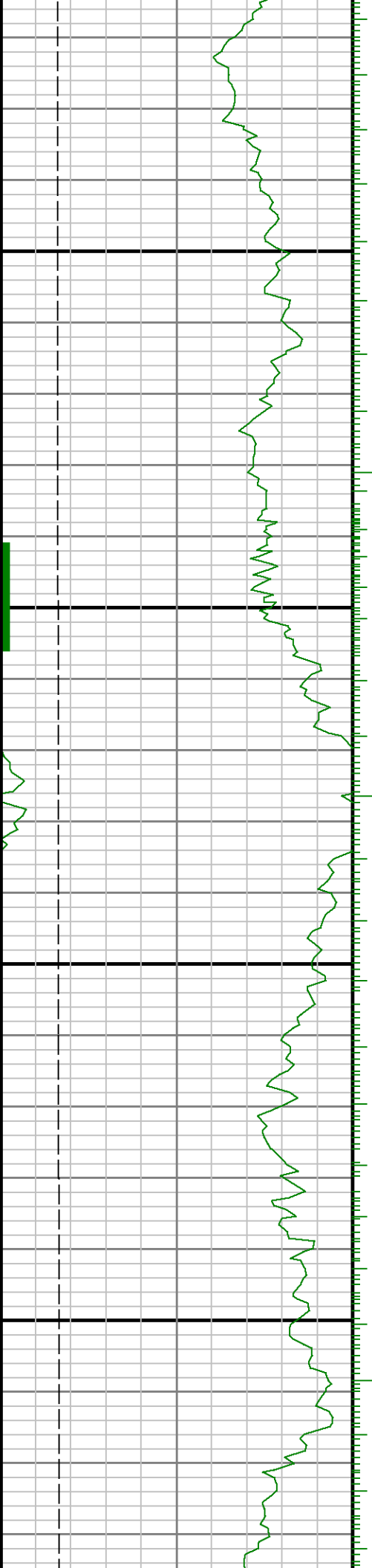




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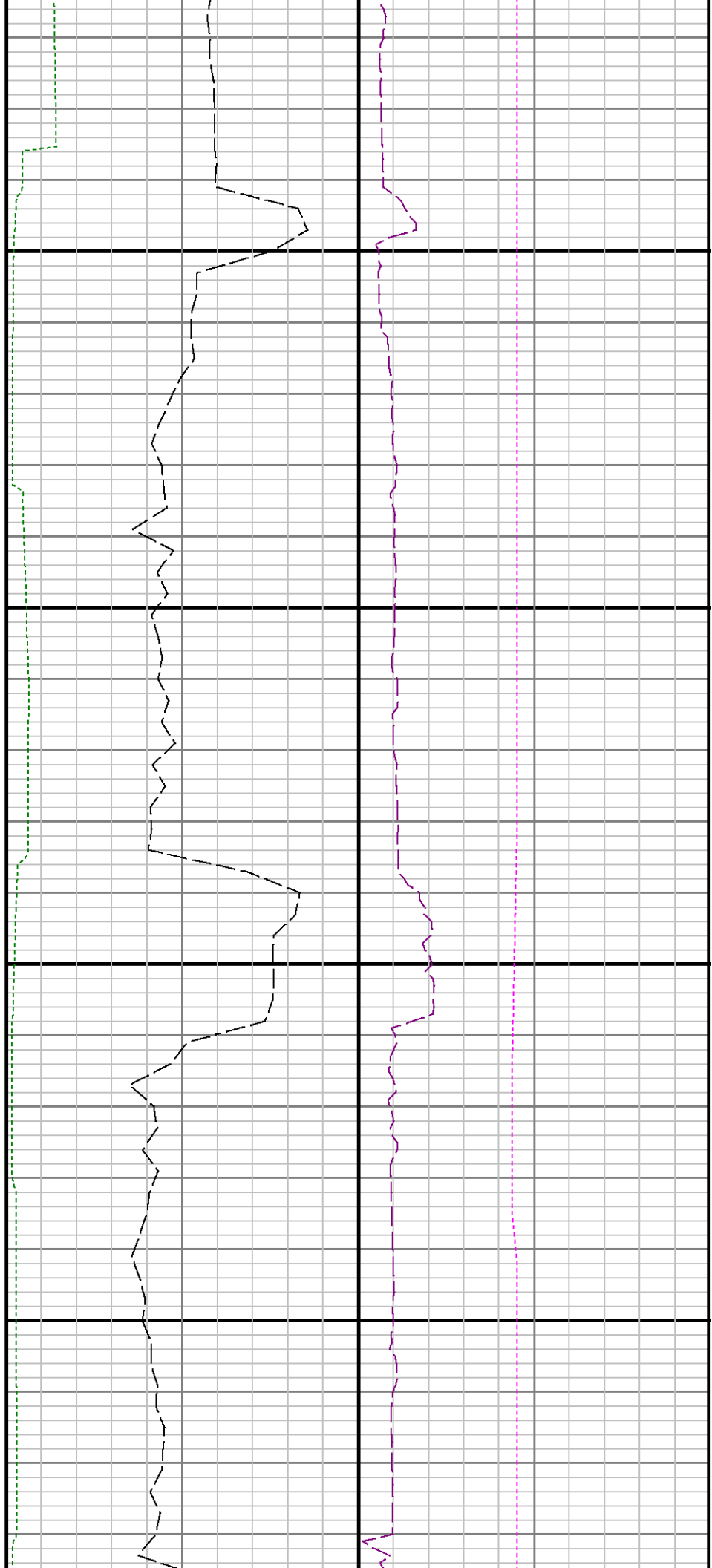
Run 3 \diamond Run 4

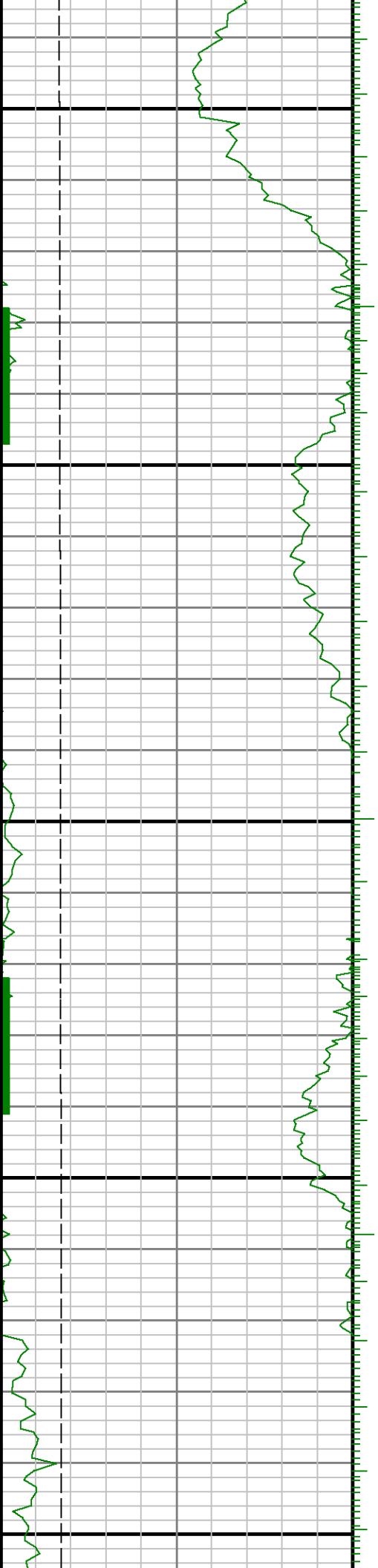




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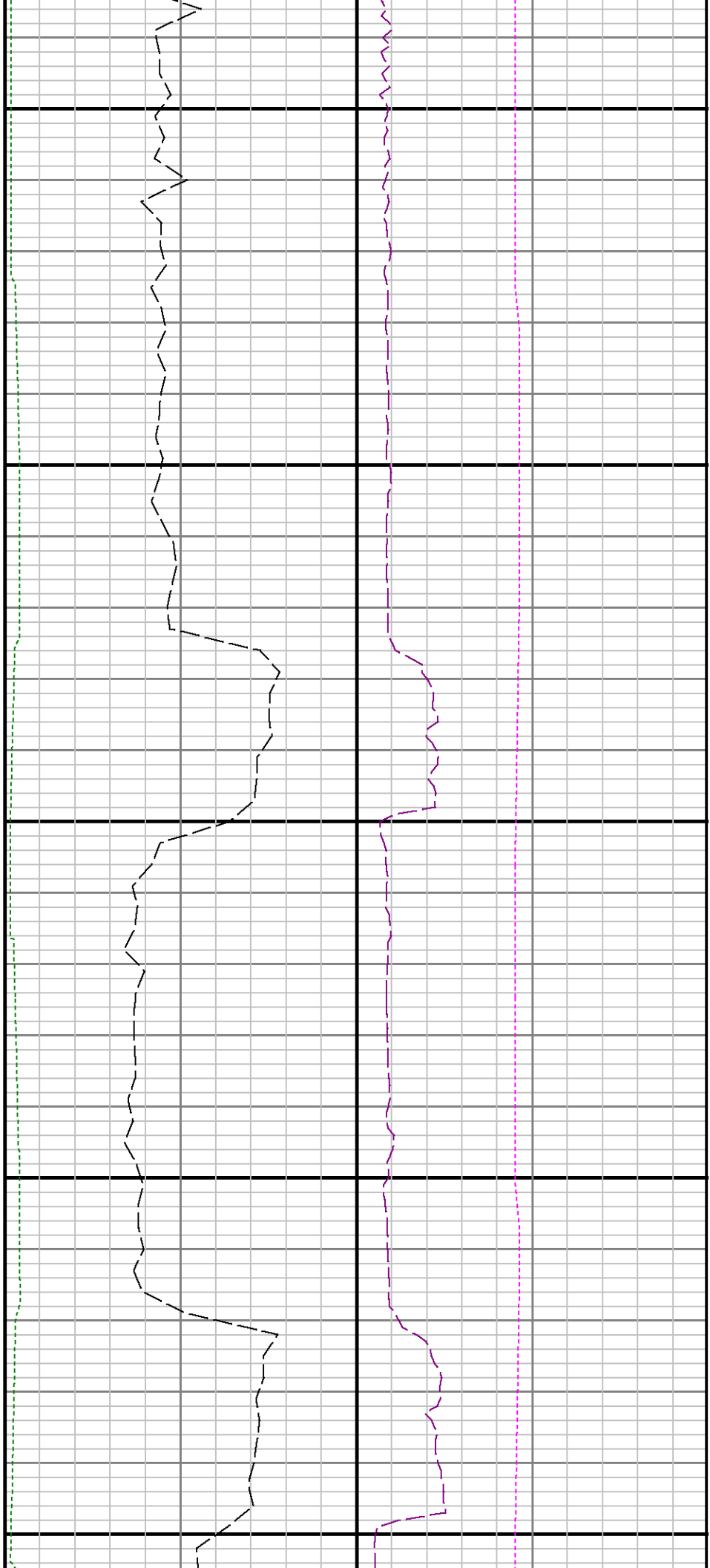
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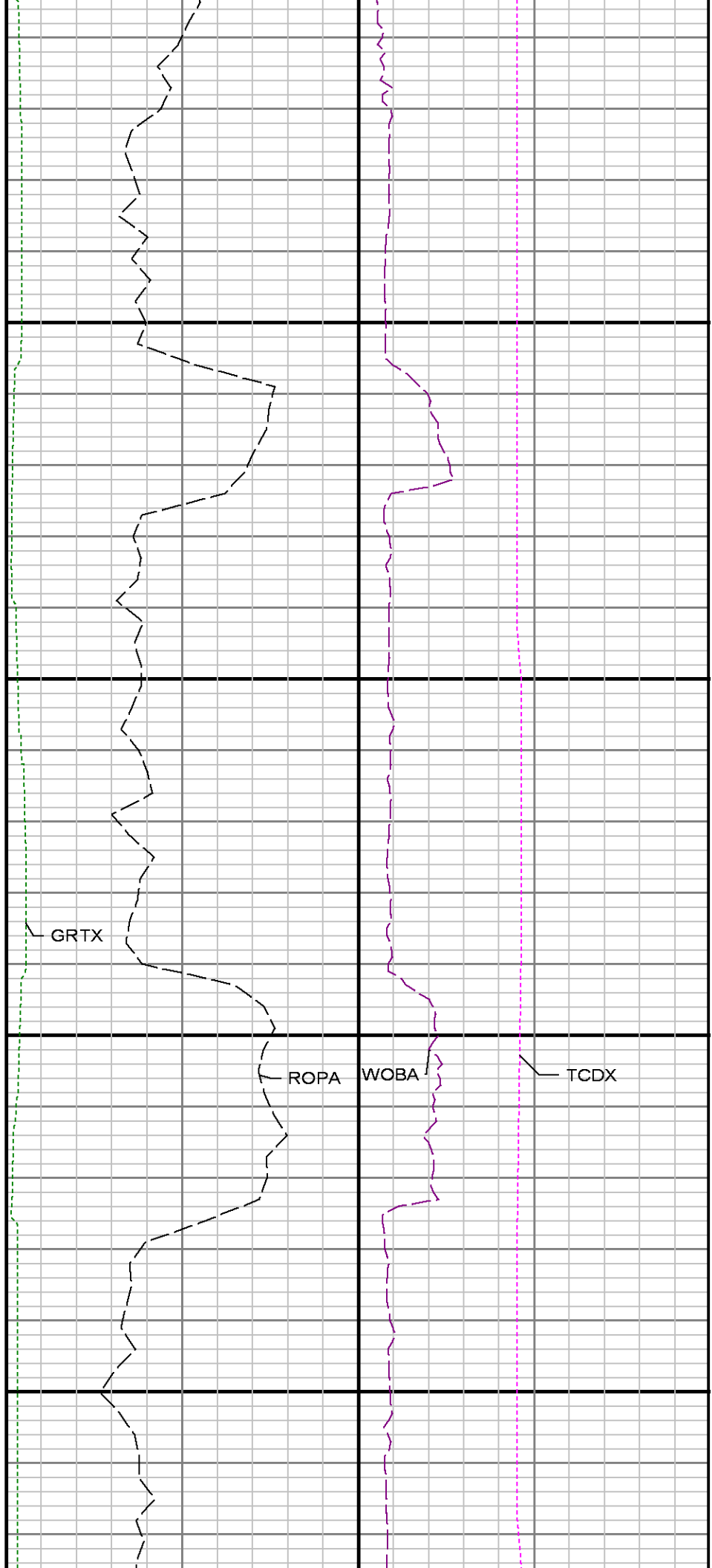
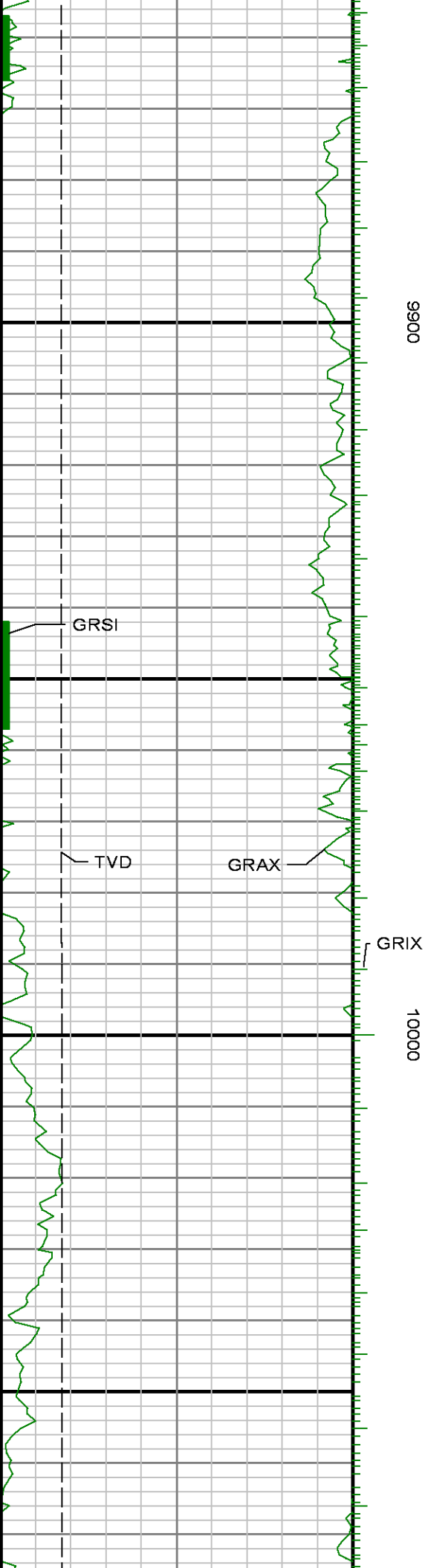




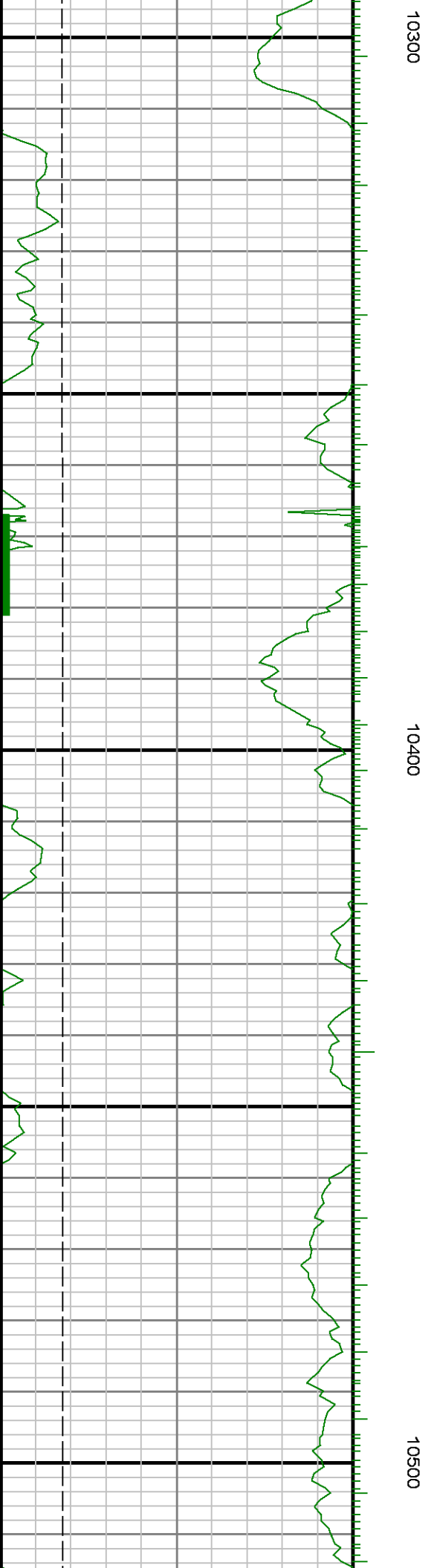
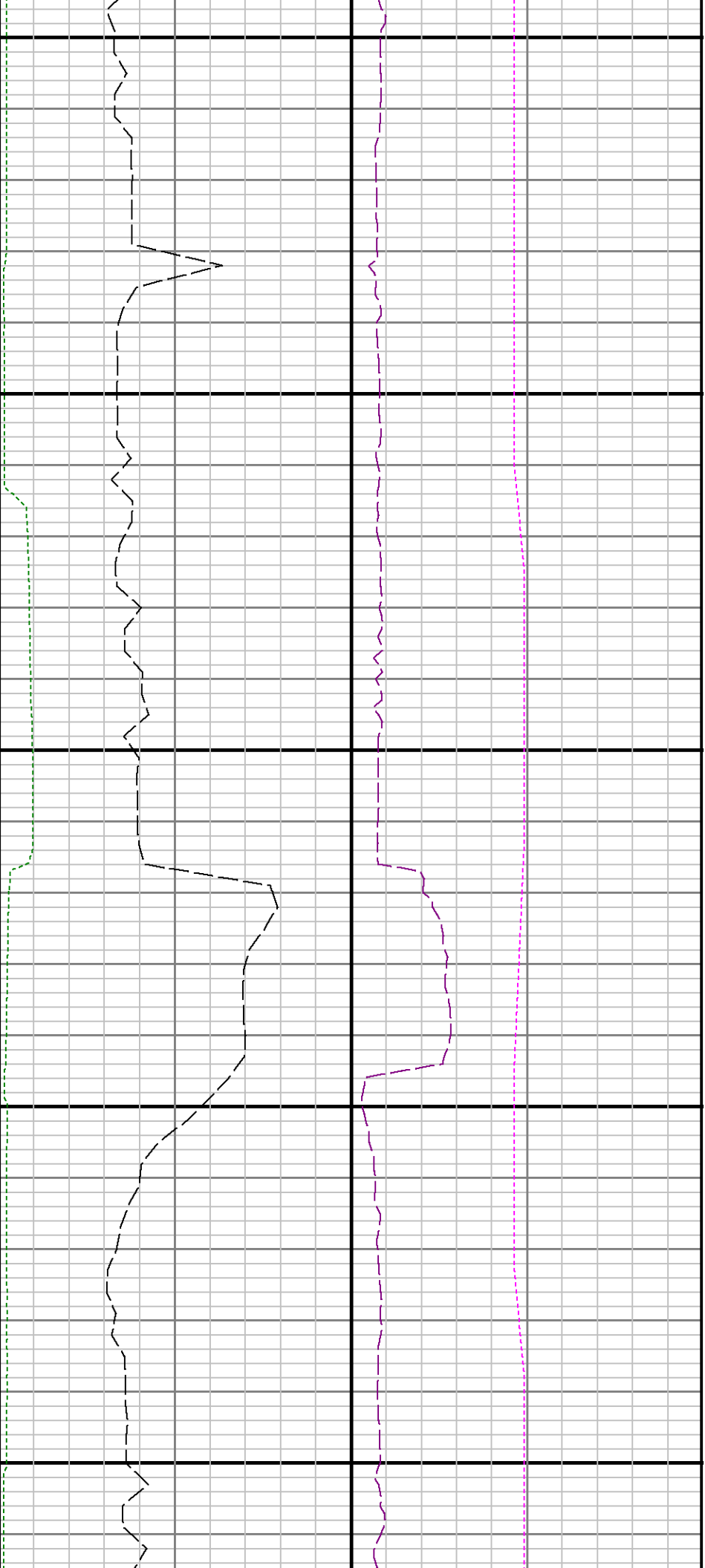
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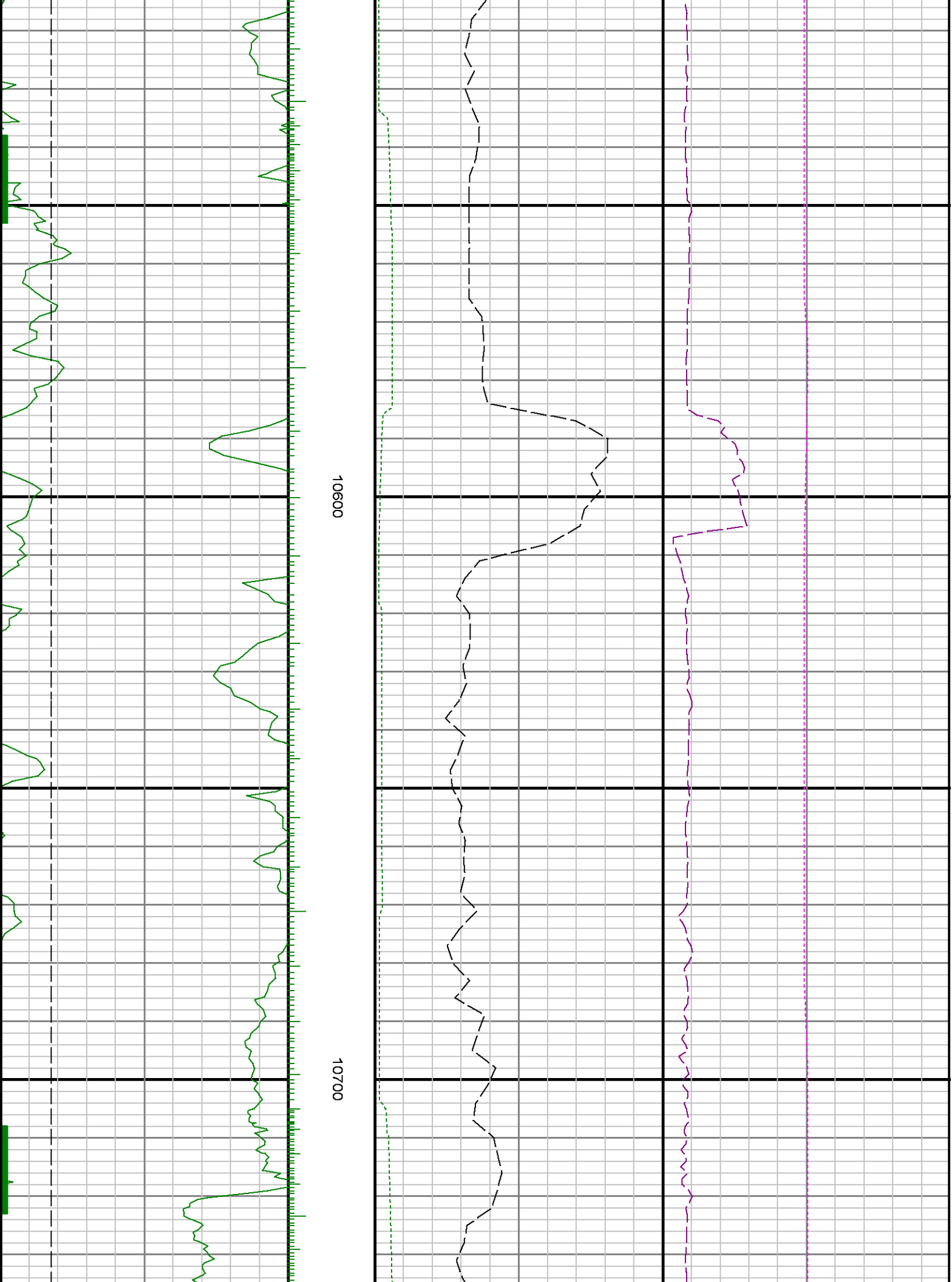
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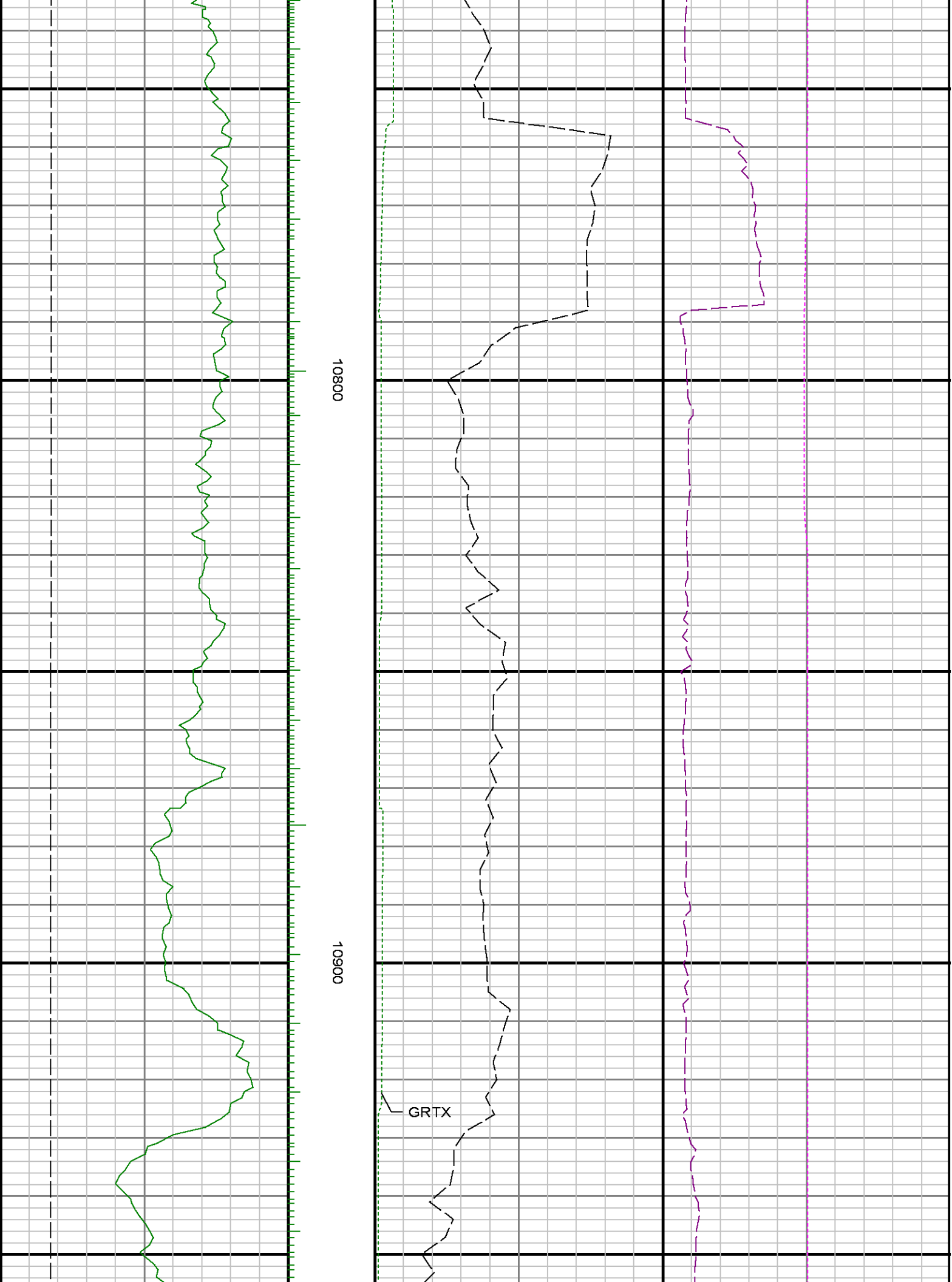


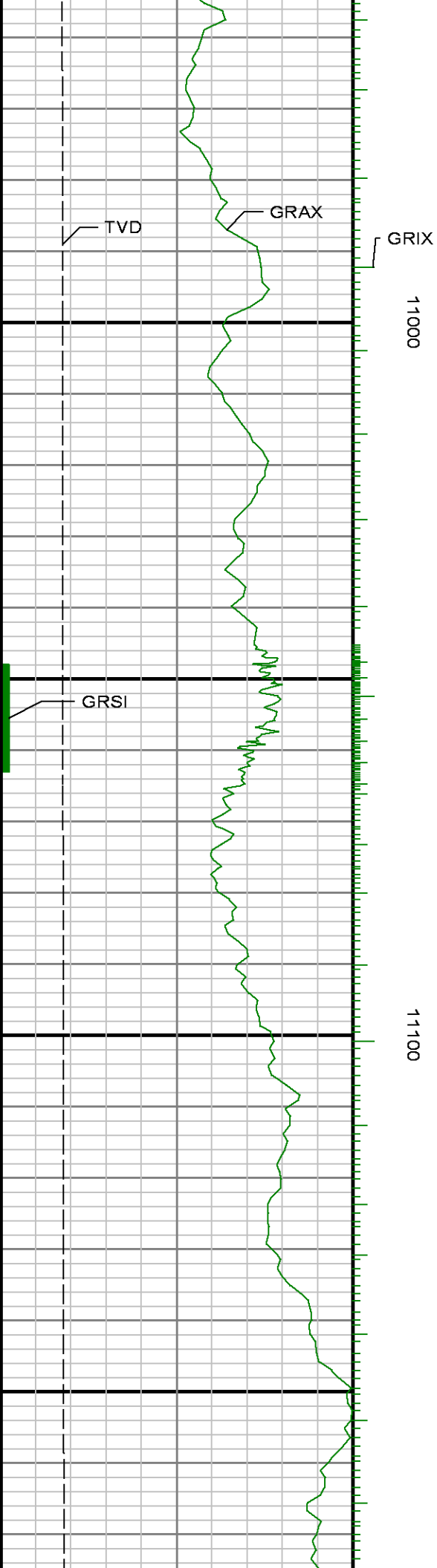


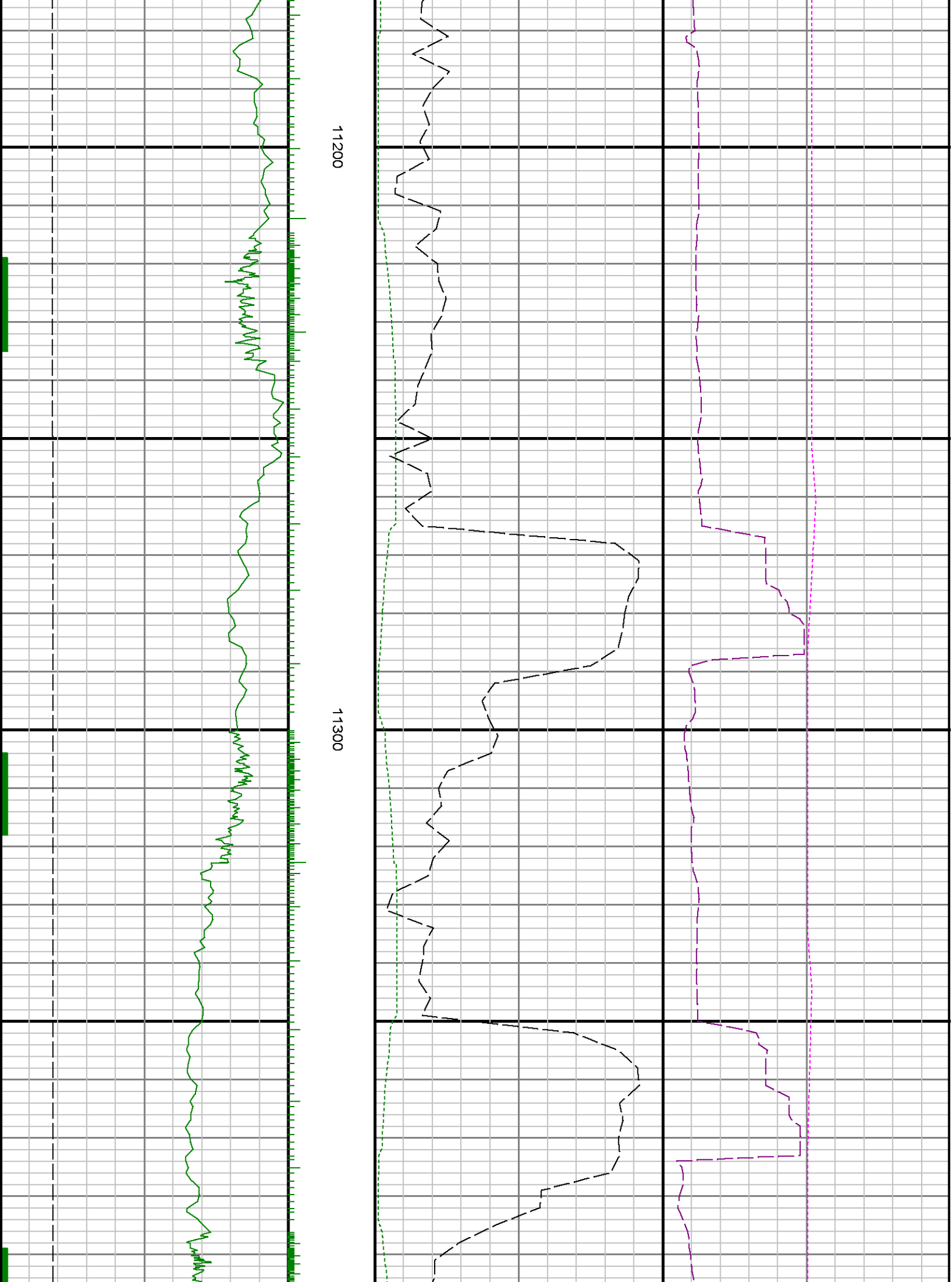










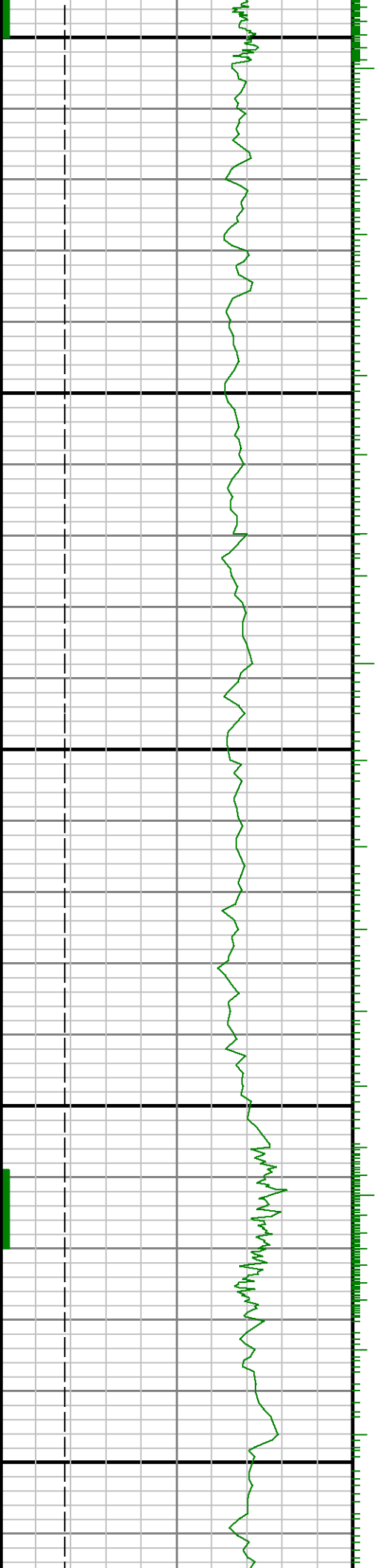




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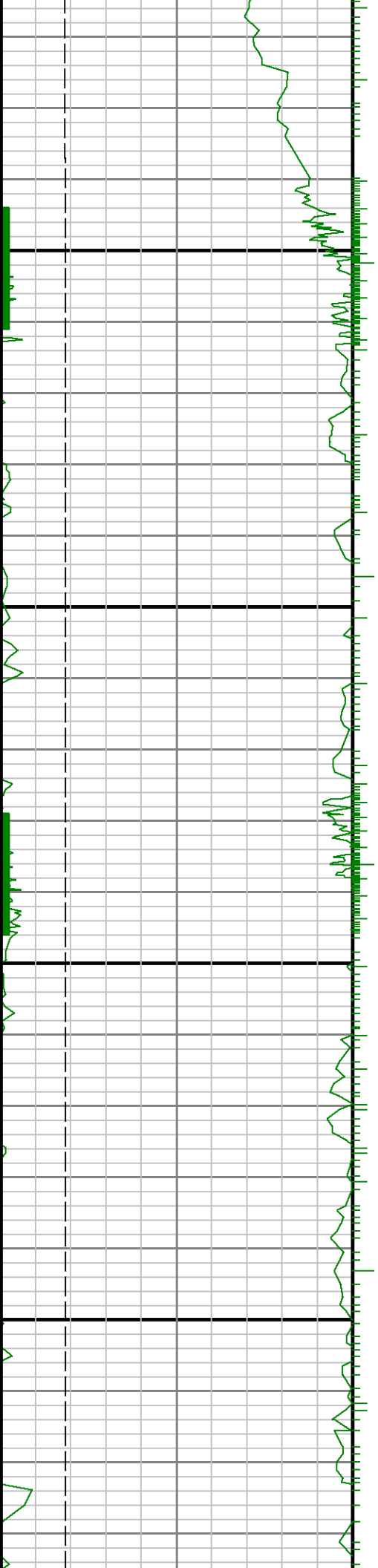
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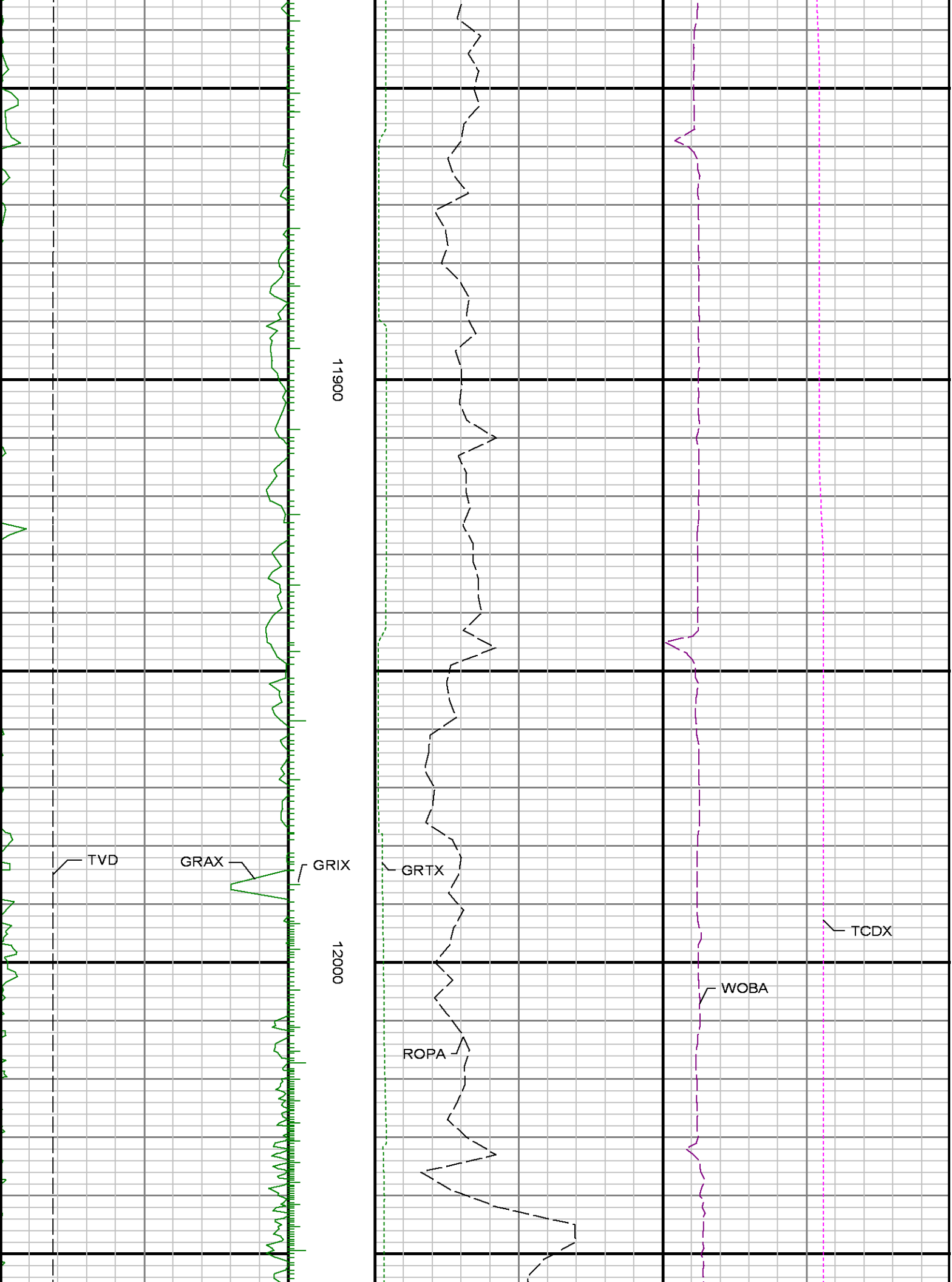


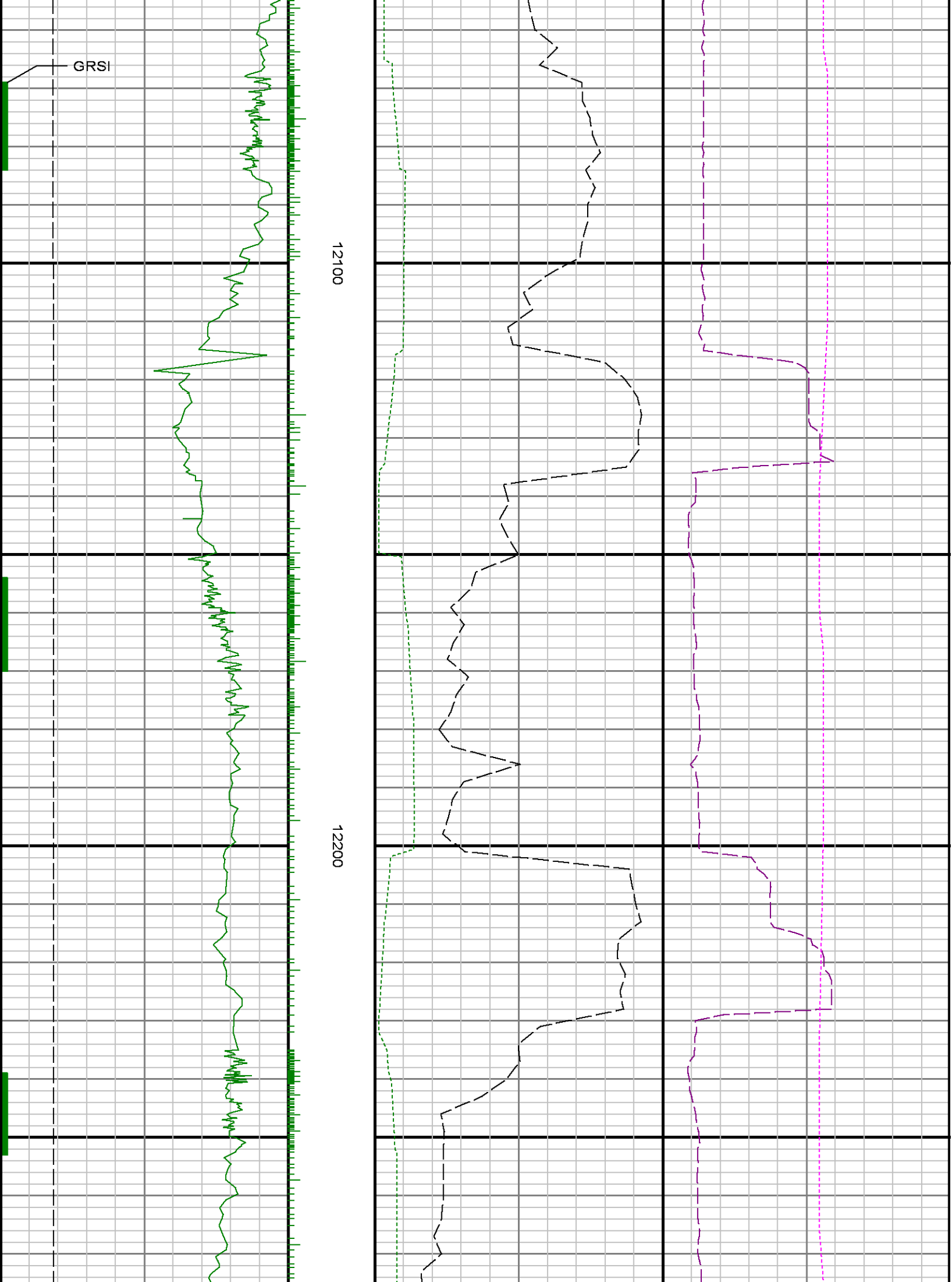


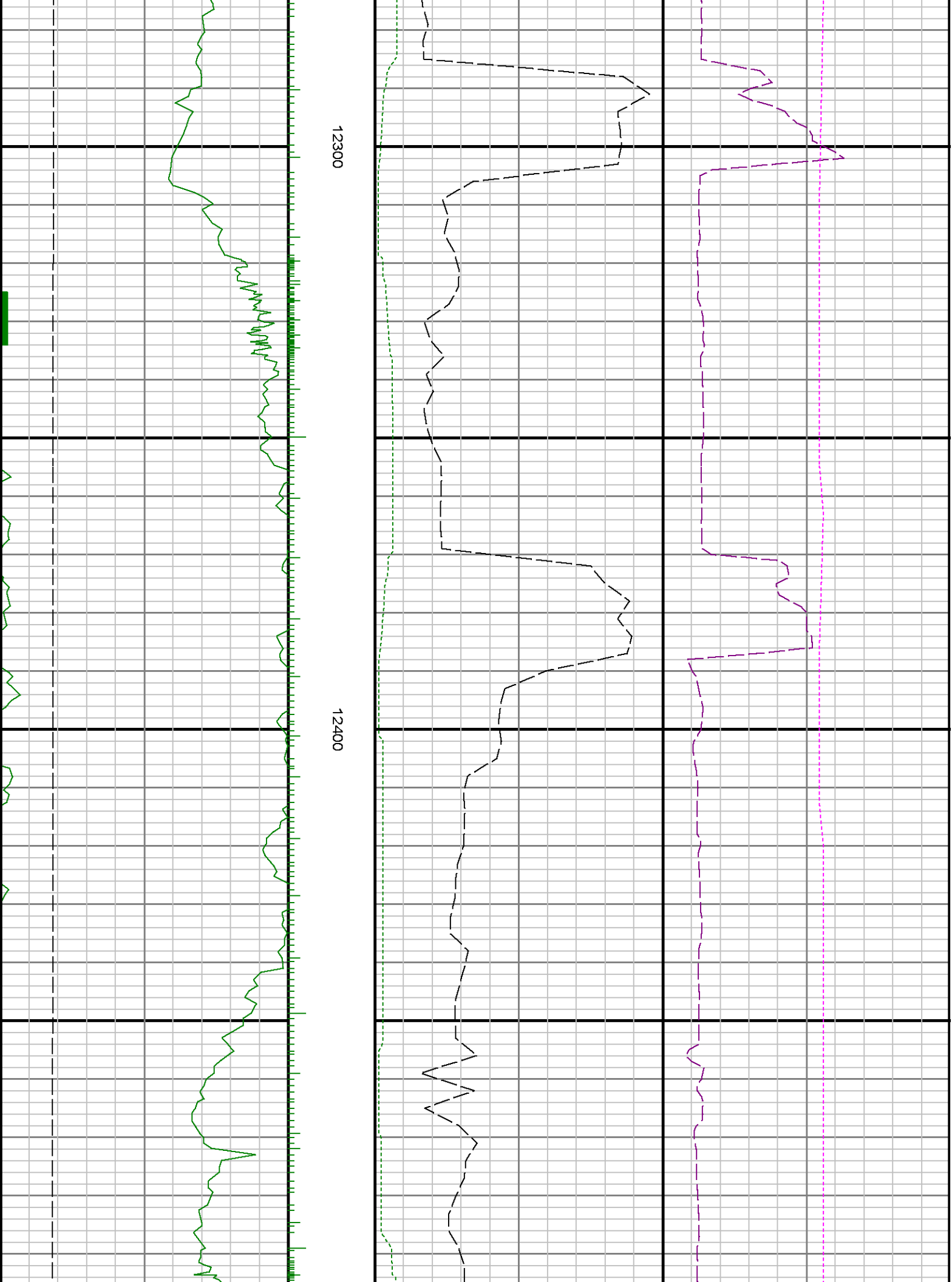
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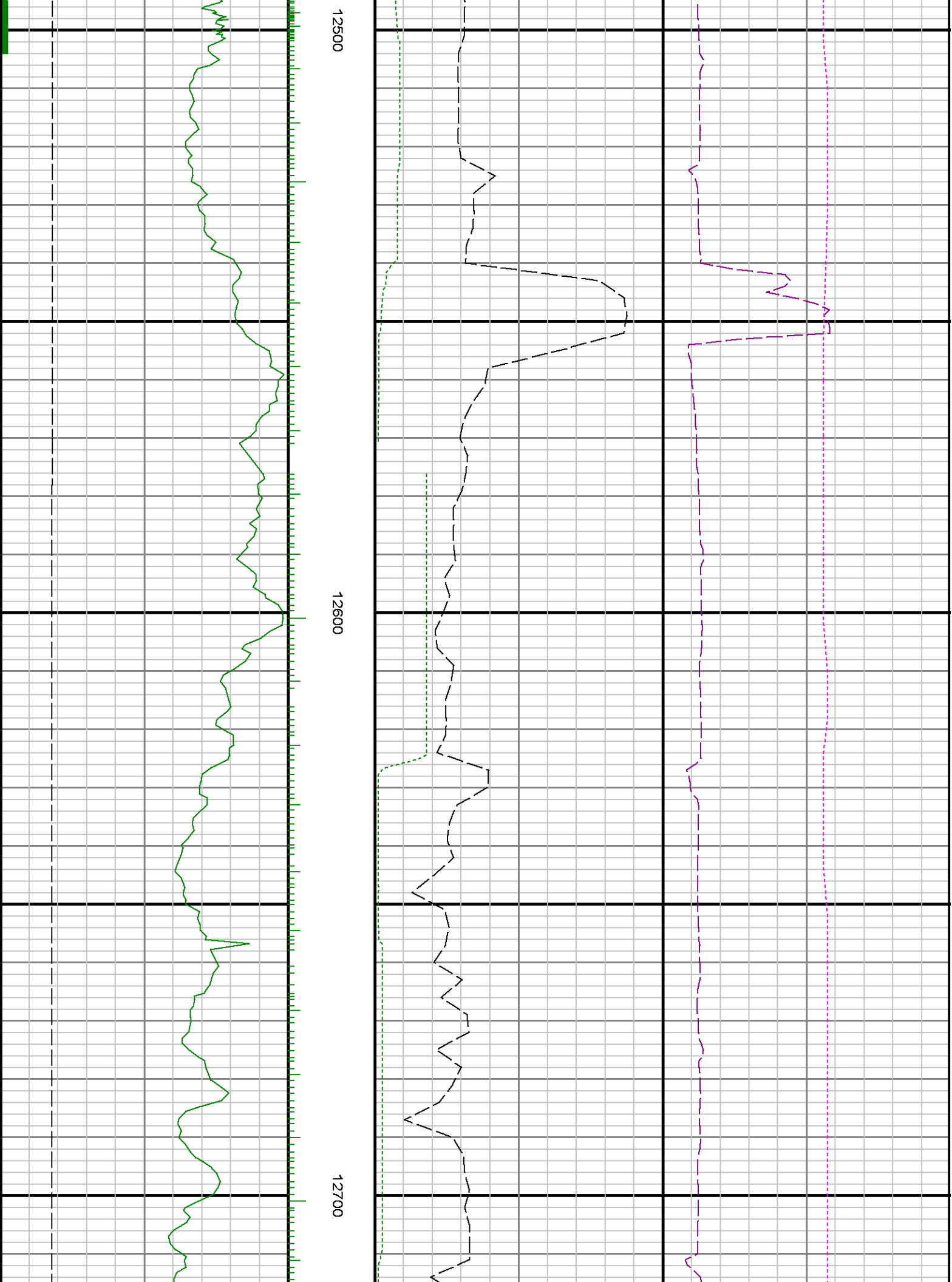
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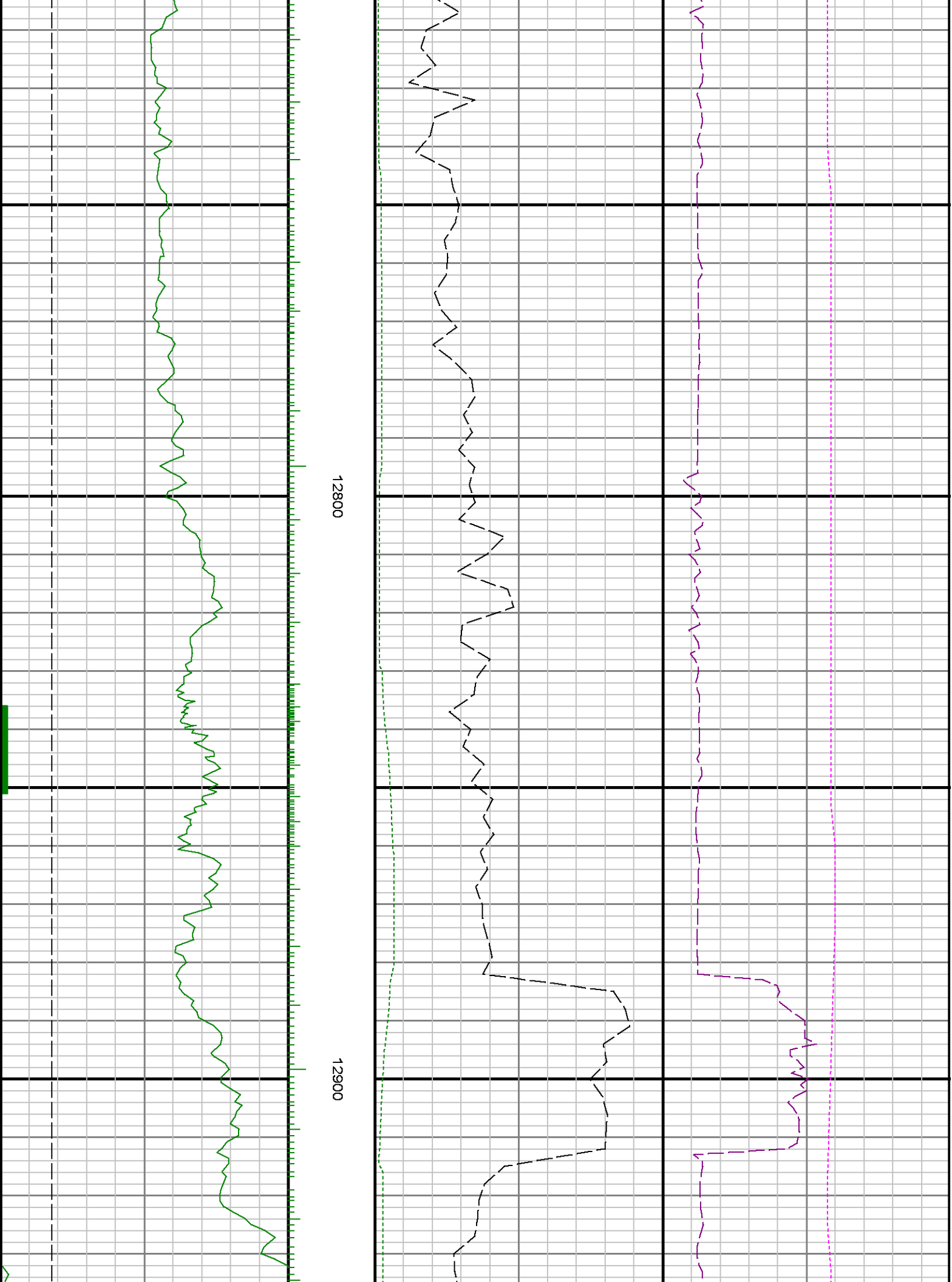


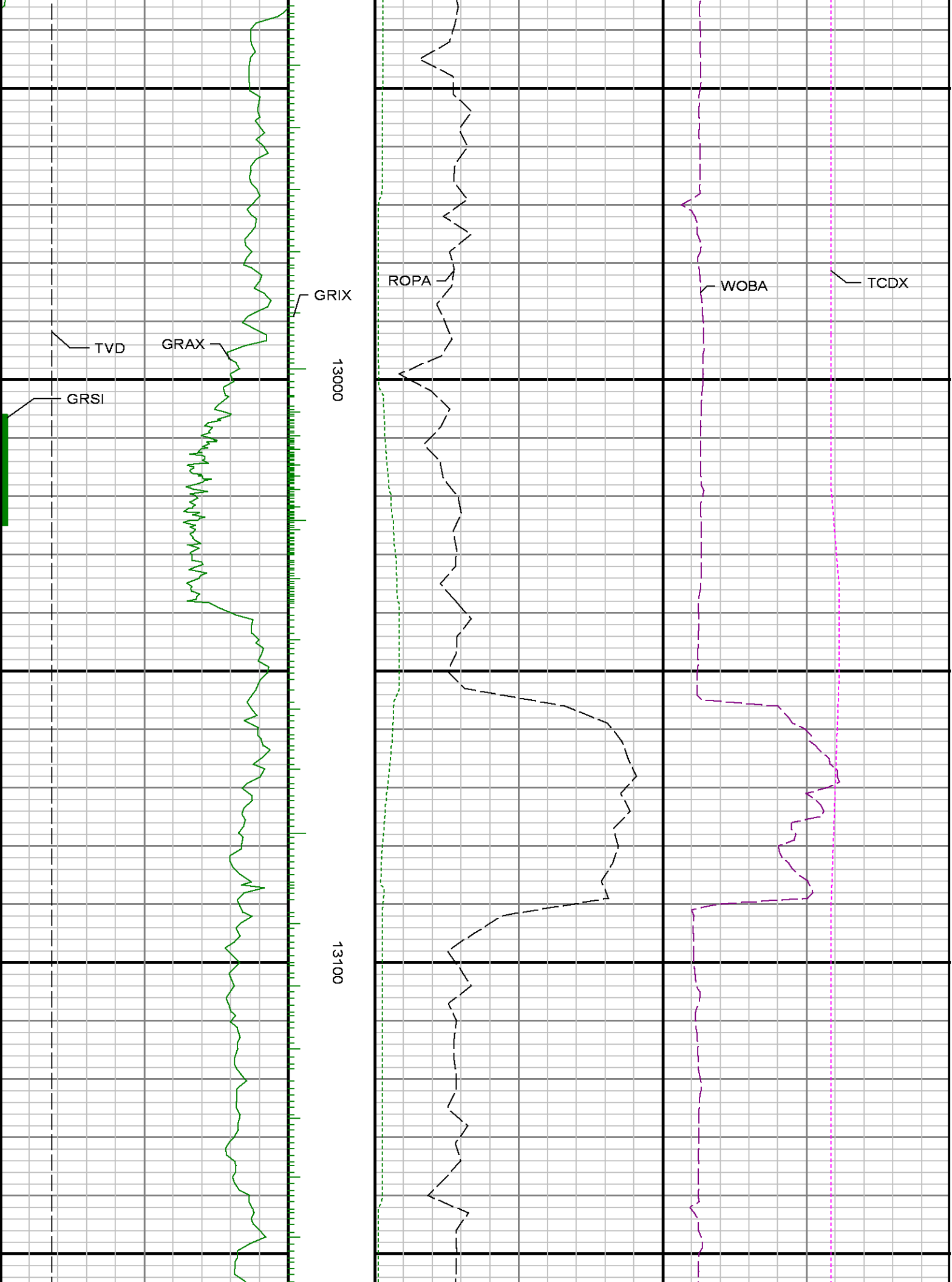


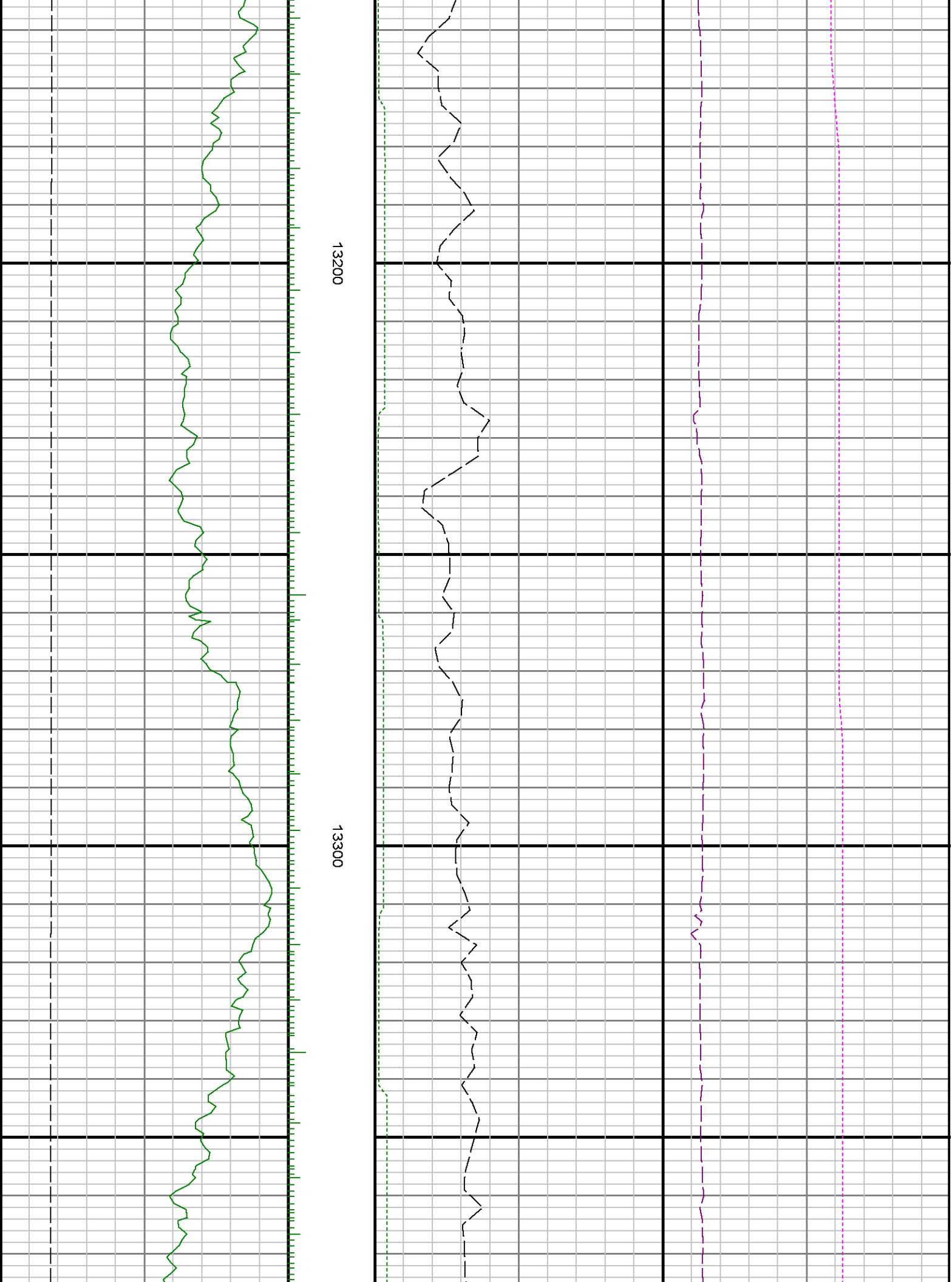


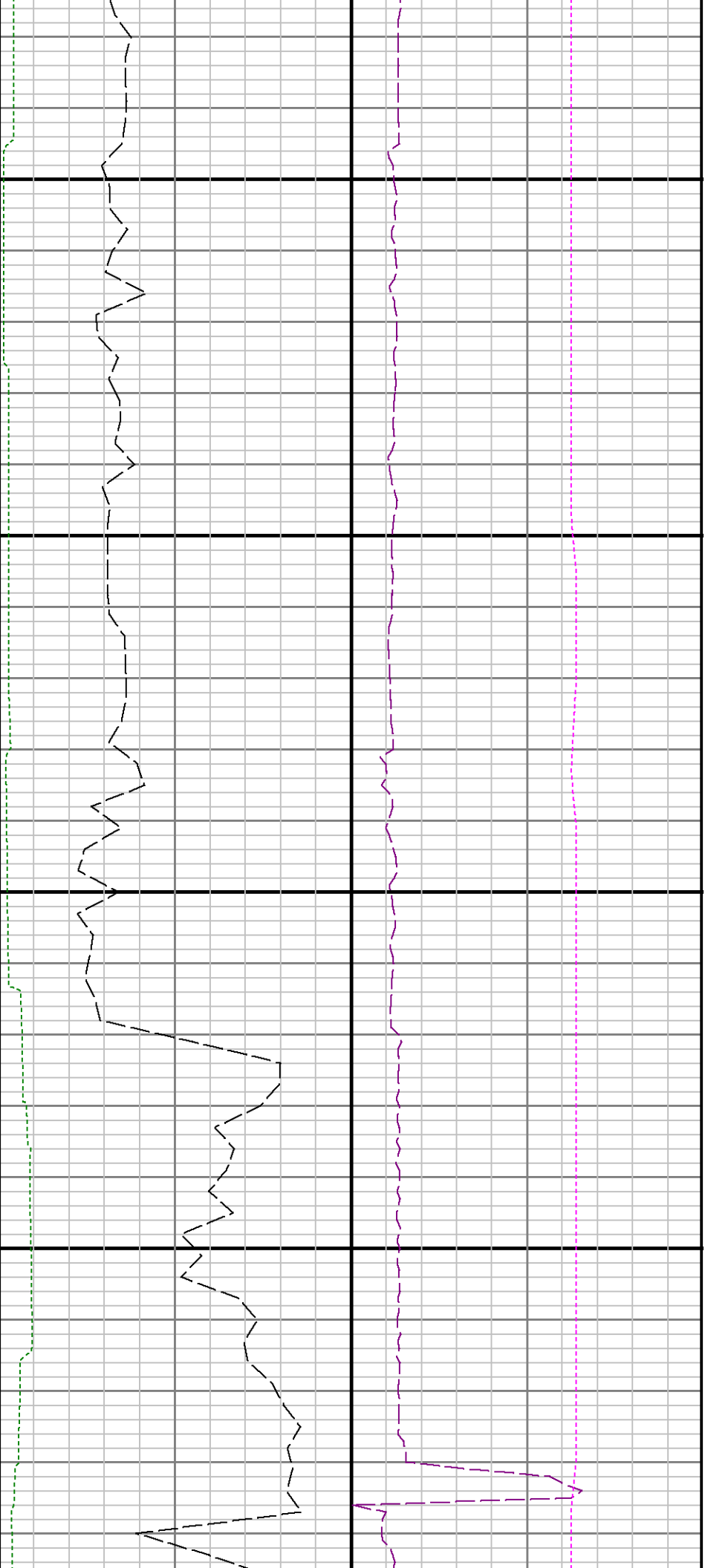






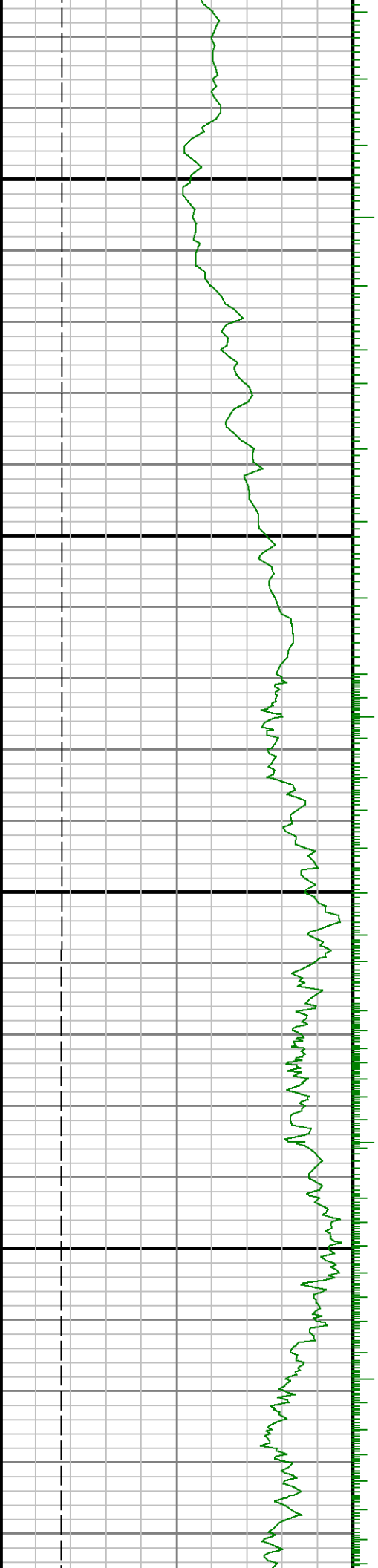






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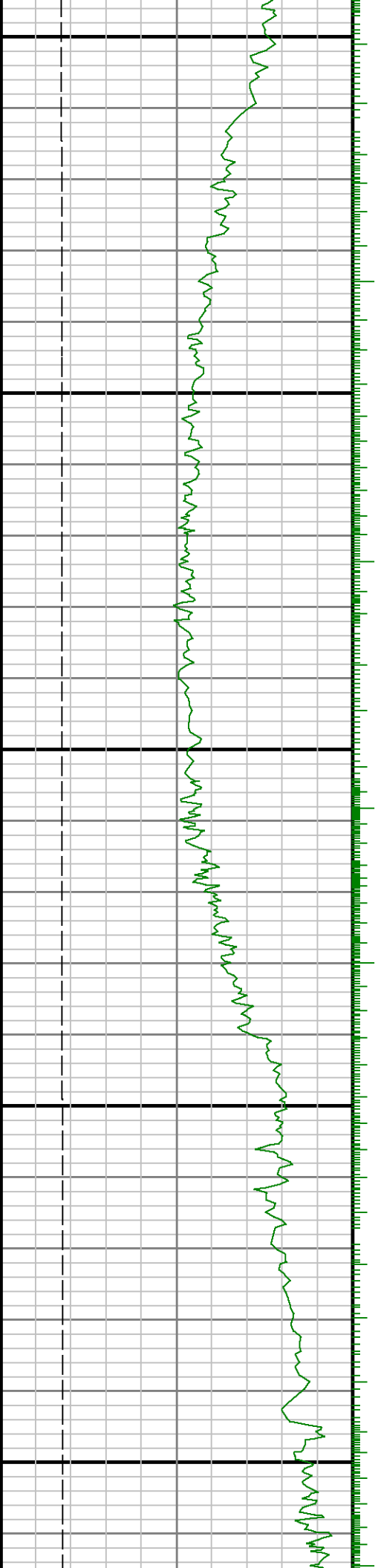


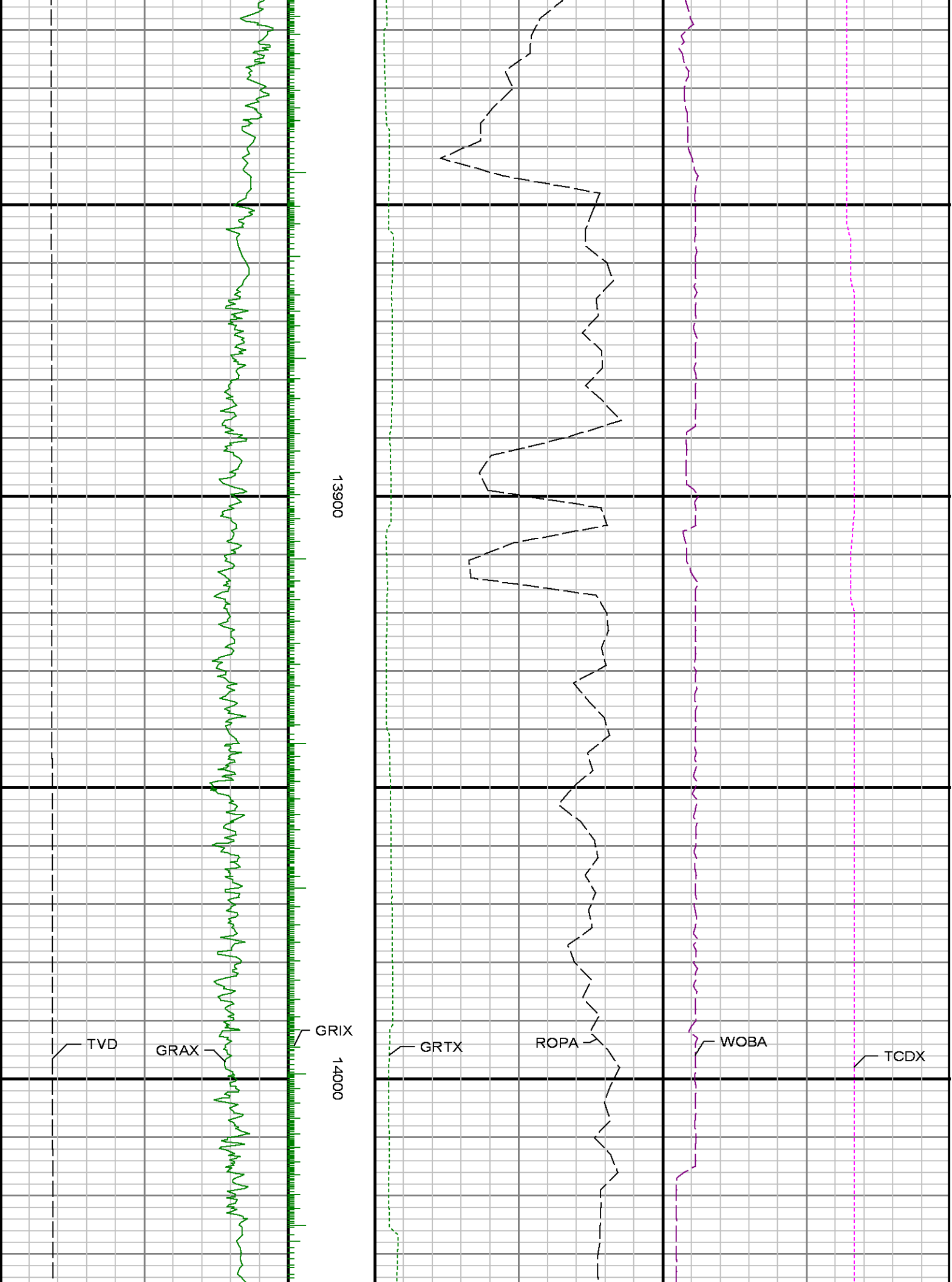


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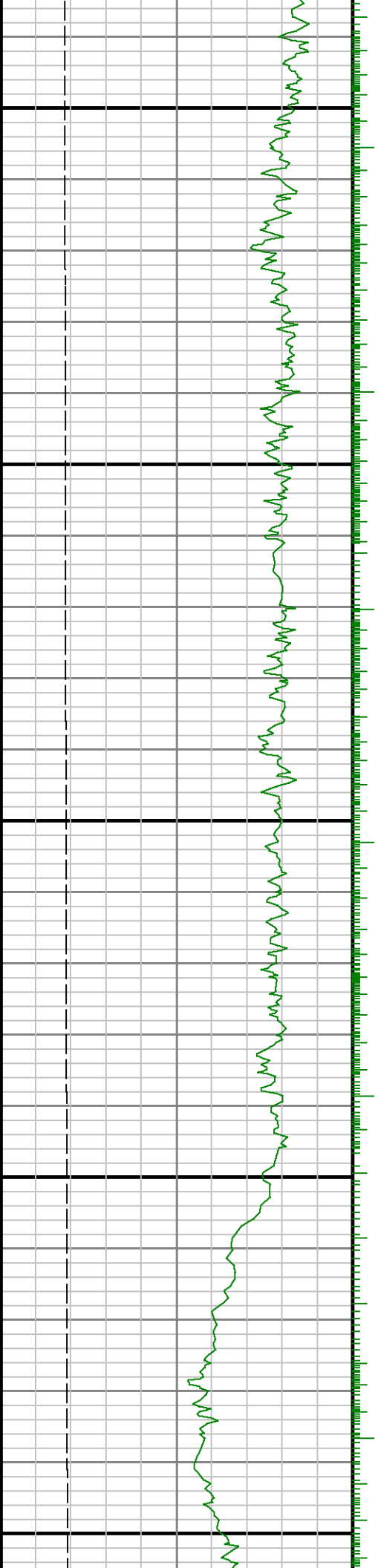


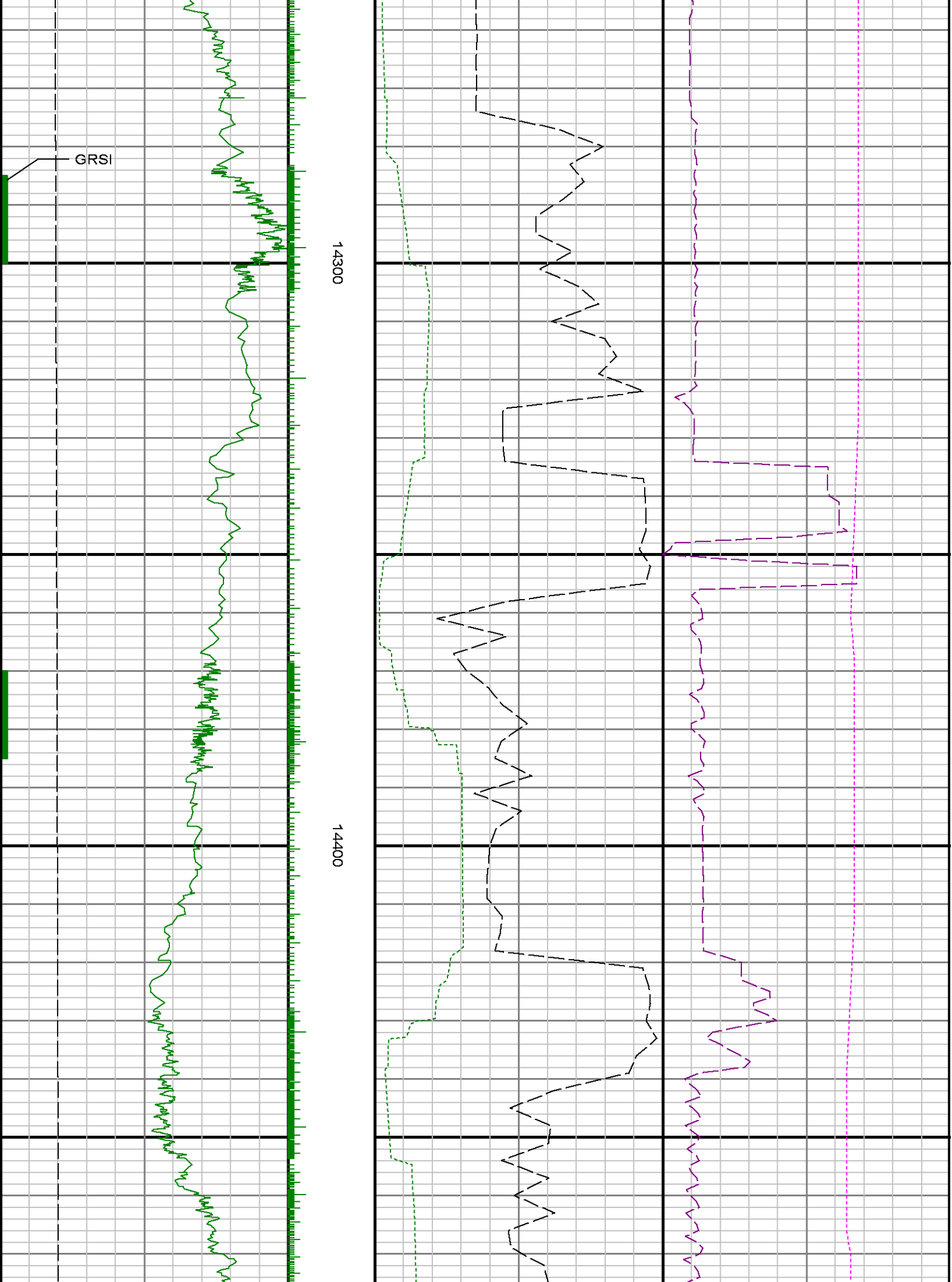


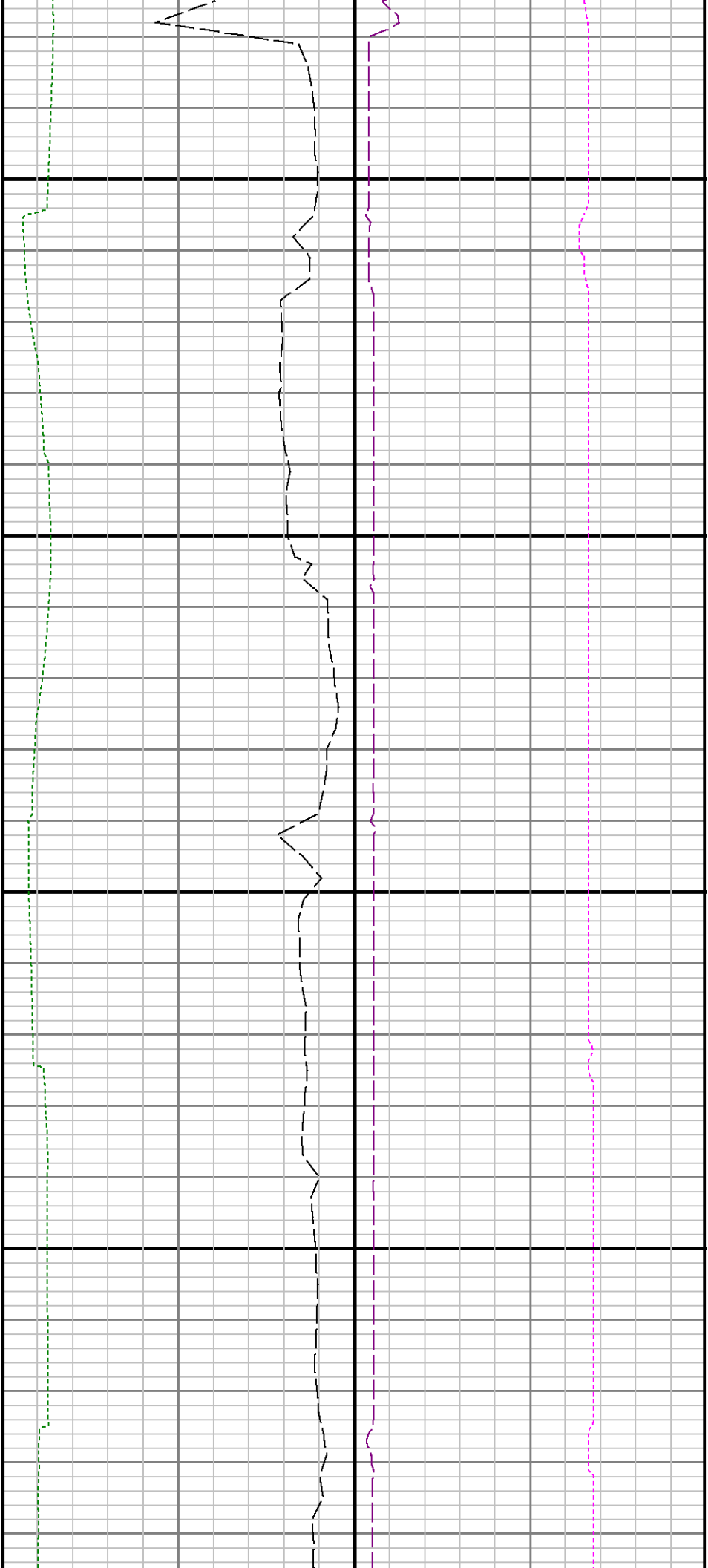


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