



LWD MEMORY LOG

Gamma Ray

Company: Noble Energy

Well: Hurley H26-783

Field: Wattenberg

Country: Weld Country: United States

State: Colorado

Status: Final Print

Surface Location: 040° 11' 49.560" N

Longitude: 104° 38' 08.340" W

Other Services: N/A

API No: 05-123-46764-00

Job ID: 9176903

SEC: 26 TWN: 3N RGE: 65W

Permanent Datum (P.D.): Ground Level

Elevation: 4821.00 ft

Elev. KB: 4851.00 ft

Elev. DF: 4821.00 ft

Elev. GL: 4821.00 ft

Log Measured From: Rig Floor

Above P.D.

Interval Drilled

Magnetic Field Reference

Date From: 2018-06-17 Top: (ft) 1954.00

Date To: 2018-06-21 Bottom: (ft) 16075.00

Spud Date: 2018-06-16

Azi Reference North: Grid

Total Magnetic Field Strength: (nT) 52116

Mag to Reference North Correction: (deg) 7.55

Dip Angle: (deg) 66.73

Borehole Record

Casing Record

Hole Size (in)	From (ft)	To (ft)	Size (in)	Weight (lb/ft)	From (ft)	To (ft)
13.500	30.00	1954.00	9.625	36.00	30.00	1944.00
8.500	1954.00	16075.00				

Mud Record

Deviation Record

Type	From (ft)	To (ft)	Hole Size (in)	Interval (ft)	Inc Az (Start)	Inc Az (End)
Oil Based Mud	1954.00	16075.00	8.500	14121.00	0.50 345.49	89.91 0.18

Software Version

Other

Baker Hughes Cadence RT 4.2 4.2.8155.1

Rig: H&P 517

Contractor: Helmerich & Payne Drilling Co

District: RMA

Unit: D&E

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Log Run Summary

Run No	Bit Run No	Bit Size (in)	Bit Type	Bit Gauge Length (in)	Assembly Type	Logged Interval		Bit Depth Interval		Date / Time		Circ. Hours (h)
						Top (ft)	Bottom (ft)	From (ft)	To (ft)	Start Logging	End Logging	
1	1	8.500	PDC	4.50	Rotary Steerable	1954.00	2011.00	1954.00	2024.00	2018-06-17 04:28	2018-06-17 05:00	2.78
2	1RR	8.500	PDC	4.50	Rotary Steerable	2011.00	16062.00	2024.00	16075.00	2018-06-17 10:18	2018-06-19 20:03	64.86

Crew

Name	Arrive Wellsite	Depart Wellsite	Name	Arrive Wellsite	Depart Wellsite	Name	Arrive Wellsite	Depart Wellsite
Adam Schlenz	2018-06-16	2018-06-20						

Mud Properties Record

Date / Time	Run No.	Measured Depth (ft)	Mud Type	Density (ppg)	Viscosity (cP)	pH	Fluid Loss (cm3)	Oil / Water	Source	Total Chlorides (ppm)	K+ (%)
2018-06-16 19:31	1	1954.00	Oil Based Mud	9.3	11	N/A	14.4	72.5/16	Active Pit	25000	0.00
2018-06-17 02:45	2	2024.00	Oil Based Mud	9.3	11	N/A	14.4	72.5/16	Active Pit	25000	0.00
2018-06-17 12:15	2	2300.00	Oil Based Mud	9.4	11	N/A	14.0	72.5/16	Active Pit	23000	0.00
2018-06-18 02:00	2	5759.00	Oil Based Mud	9.1	10	N/A	14.0	75/15	Active Pit	23000	0.00
2018-06-18 12:15	2	7566.00	Oil Based Mud	9.3	11	N/A	14.0	75/14.5	Active Pit	22000	0.00
2018-06-19 02:15	2	11592.00	Oil Based Mud	9.5	13	N/A	20.0	71.8/16	Active Pit	22000	0.00

Equipment and Service Data

Run No.	Tool	Serial Number	Measurement	Sensor Offset (ft)	Bit Offset (ft)	Max O.D. (in)	Min I.D. (in)
1	ATC_SU	14292977	Near Bit VSS	5.93	6.73	7.000	4.330
1	ATC_SU	14292977	Near Bit Inclination	5.93	6.73	7.000	4.330
1	ATC_MWD	14367853	Gamma (single)	2.76	12.90	7.000	3.250
1	ATC_MWD	14367853	Directional (mag)	12.27	22.41	7.000	3.250
2	ATC_SU	12273686	Near Bit Inclination	5.93	6.73	7.000	4.330
2	ATC_SU	12273686	Near Bit VSS	5.93	6.73	7.000	4.330
2	ATC_MWD	14179565	Gamma (single)	2.75	12.90	7.000	3.250
2	ATC_MWD	14179565	Directional (mag)	12.27	22.42	7.000	3.250

Service and Tool Mnemonics

Mnemonic	Name	Description
ATC_SU	ATC_SU	Auto Trak Curve Steering Unit
ATC_MWD	ATC_MWD	Auto Trak Curve MWD
ATC_LCPM	ATC_LCPM	Auto Trak Curve LCPM

Comments


- 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, depth calibrations and measurements could not be independently verified.
- Baker Hughes LWD runs 1 and 2 utilized a 6.75 inch NaviGamma service (Directional and Gamma Ray) behind a 8.5 inch bit and rotary steerable assembly from 1954 to 16075 feet MD (1954 to 6983 feet TVD).
- The Gamma Ray Apparent (GRAM) data is presented 0 to 300 API, per the customer's request.

Remarks

Number	Measured Depth (ft)	Hole Section (in)	Run No.	Remark
1	4988.00	8.500	2	The interval from 4934 to 4988 feet MD (4892 to 4946 feet TVD) does not have gamma ray data, due to a failed downlink terminating power to the rotary steerable assembly.
2	16075.00	8.500	2	The interval from 16062 to 16075 feet MD (6983 feet TVD) was not logged after being drilled due to sensor to bit offset at well TD.

Curve Mnemonics

Presented Curves	Description	Units
ROPA	Depth Averaged ROP 3 ft Average	ft/h
TVD	True Vertical Depth	ft
WOBA	Weight On Bit, Average 1 ft Average	klb
GRAM	Gamma Ray - Apparent - Memory 0.5 ft Average	API
GRIM	Gamma Ray - Data Point Indicator - Memory	unitless
GRTM	Gamma Ray - Time Since Drilled - Memory	min
TCDM	Directional Real-Time Survey Temperature	degF

	Company	Noble Energy	
	Well	Hurley H26-783	
	Interval	Date From: 2018-06-17 03:22	Top: 1954.00 ft
	Created	Date To: 2018-06-21 06:38	Bottom: 16075.00 ft
		Created 2018-06-21 06:47:00	

Gamma Ray - Apparent 0.5 ft Average GRAM 0 300	MD 1:240 feet	Depth Averaged ROP 3 ft Average ROPA 1000 0	Weight On Bit, Average 1 ft Average WOBA 0 50
API		ft/h	klb
True Vertical Depth TVD 7100 6100		Gamma Time Since Drilled GRTM 0 600	Downhole Temperature TCDM 0 300
ft		min	degF



GRAM

GRIM
2000

GRTM

ROPA

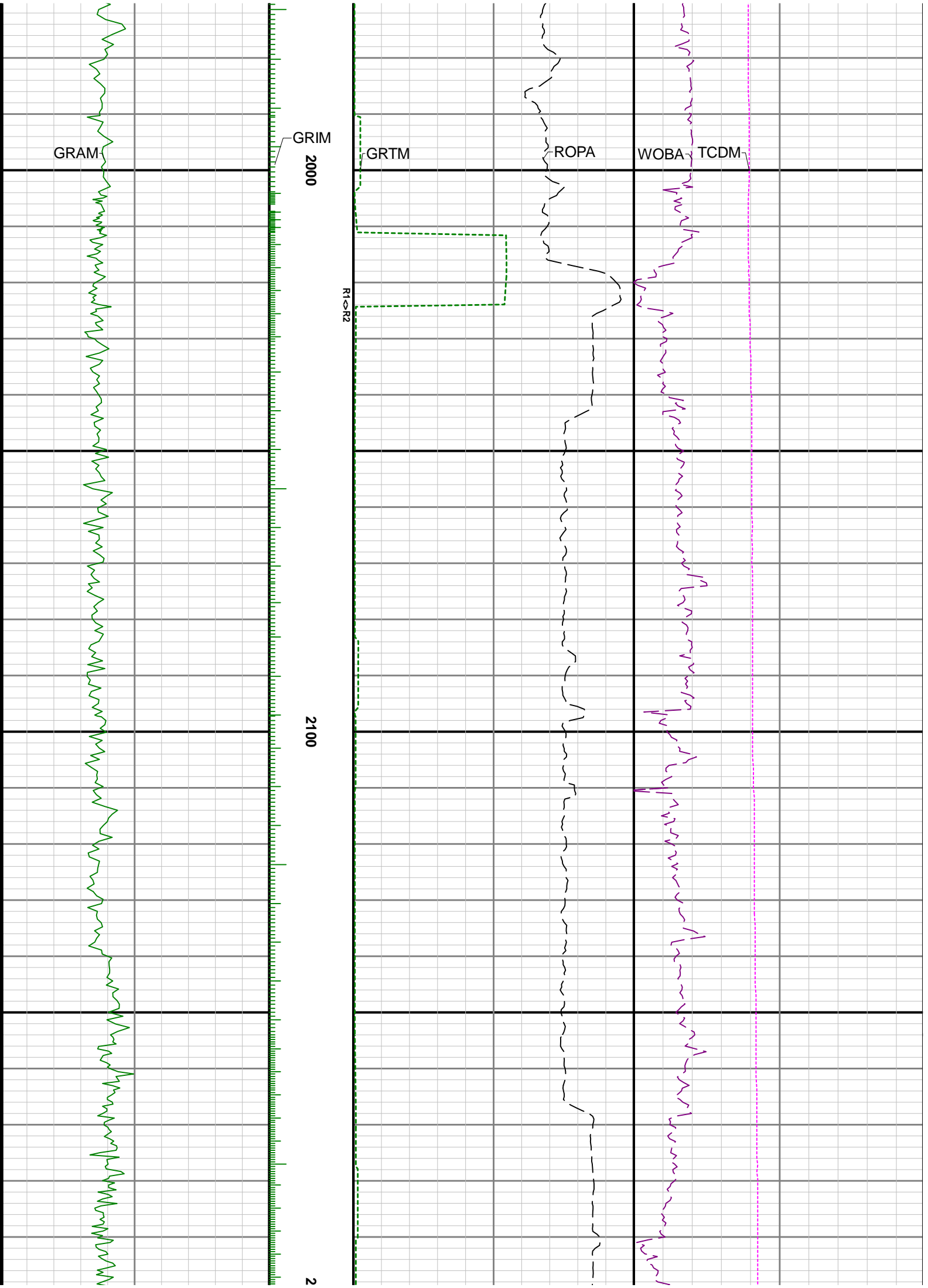
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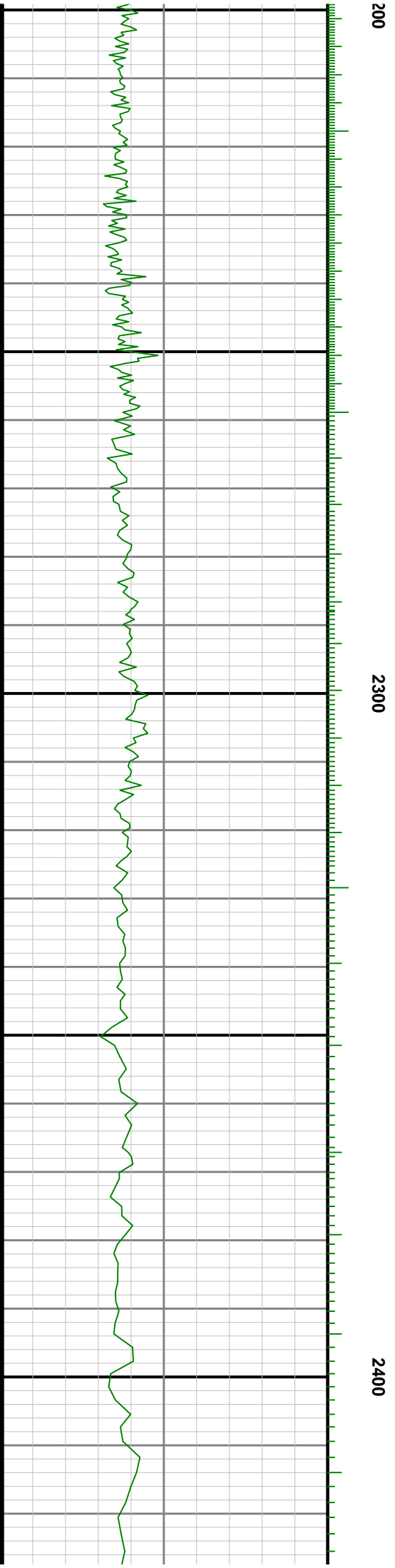
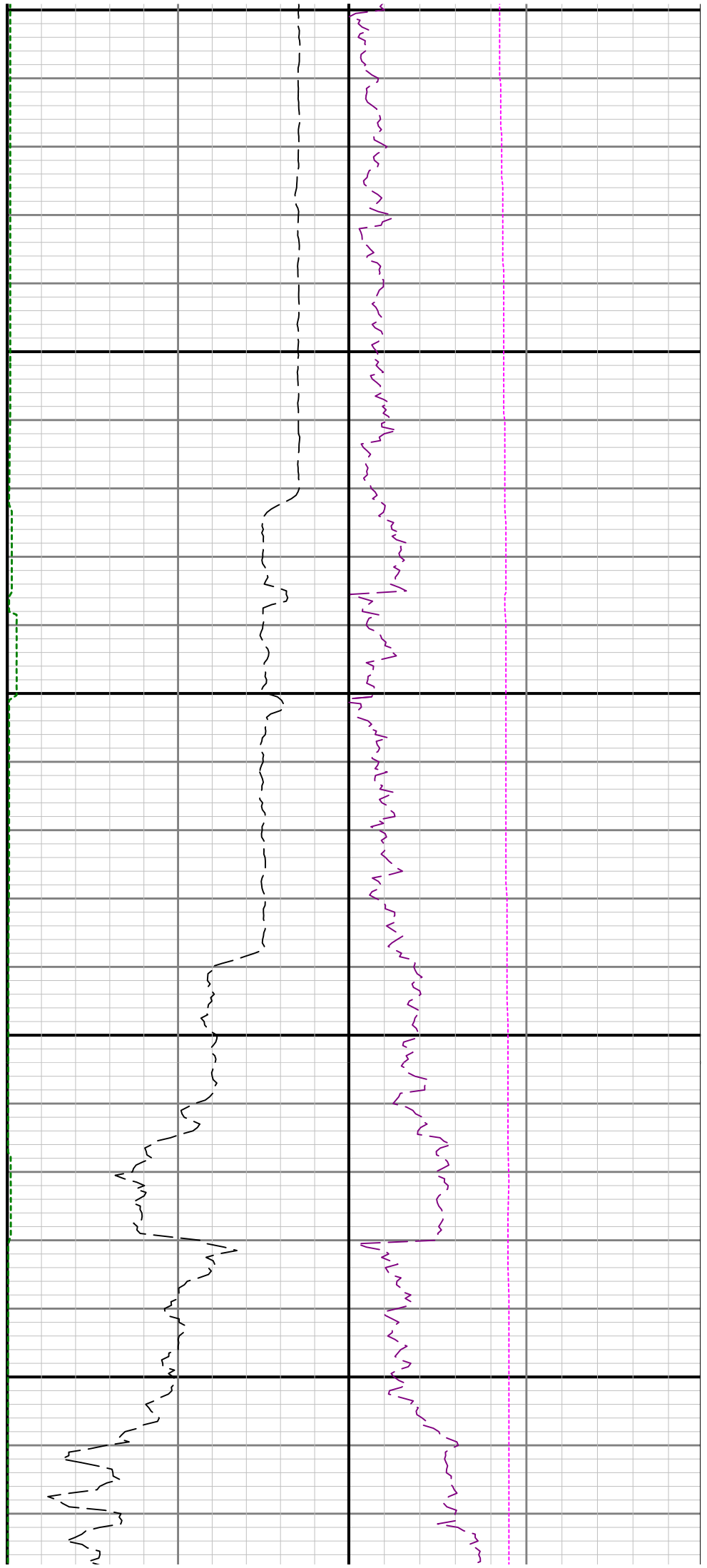
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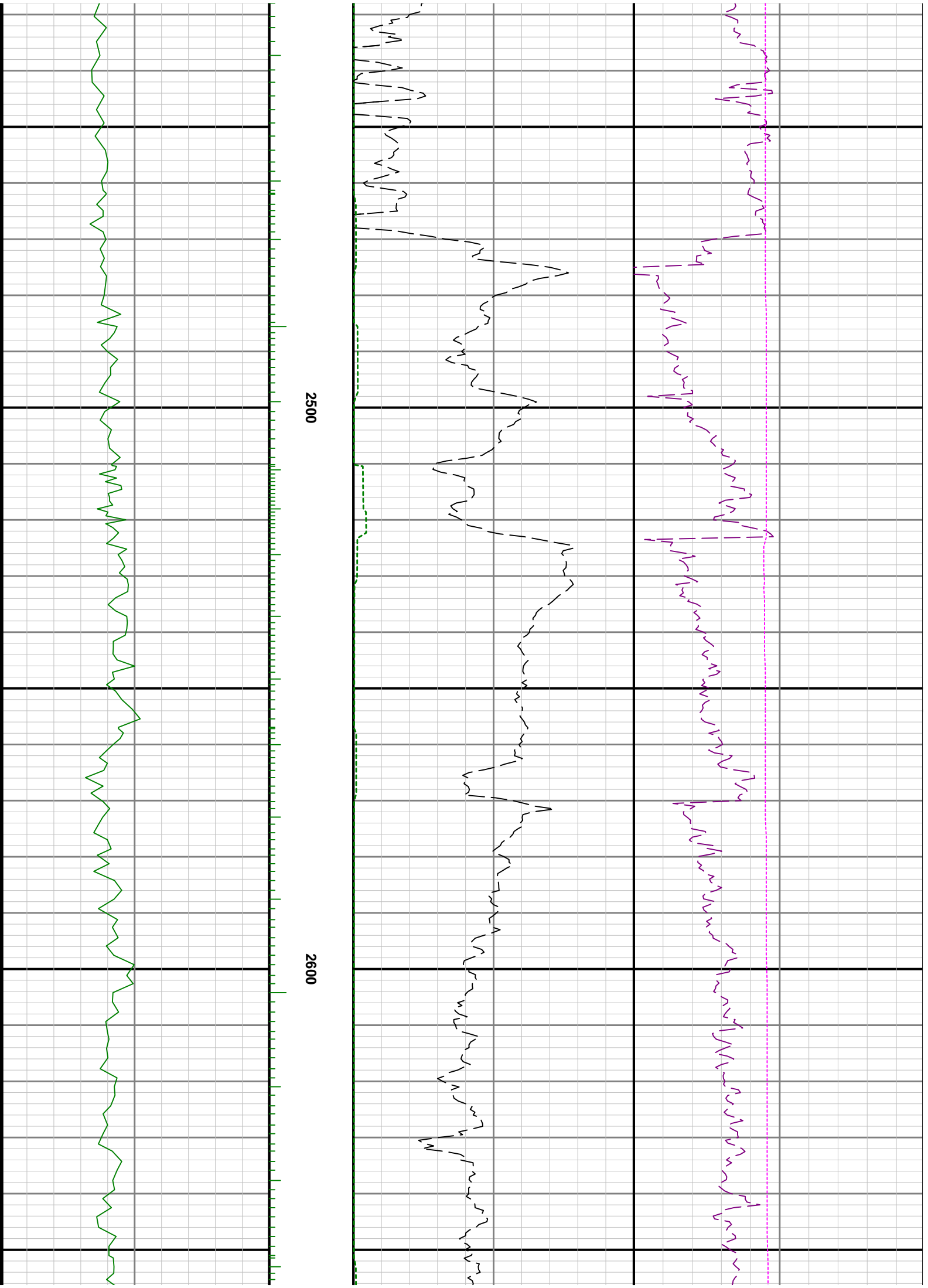
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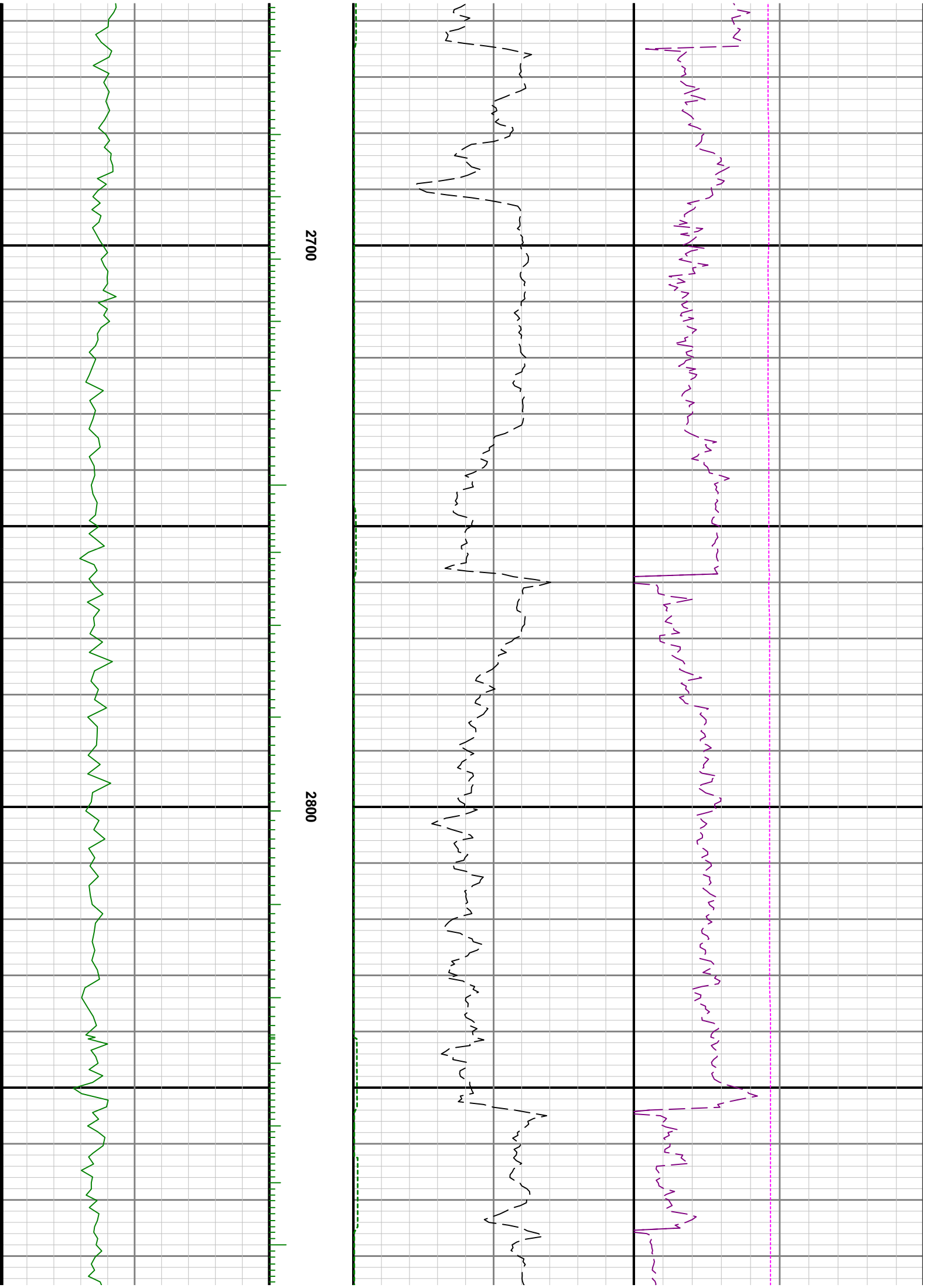
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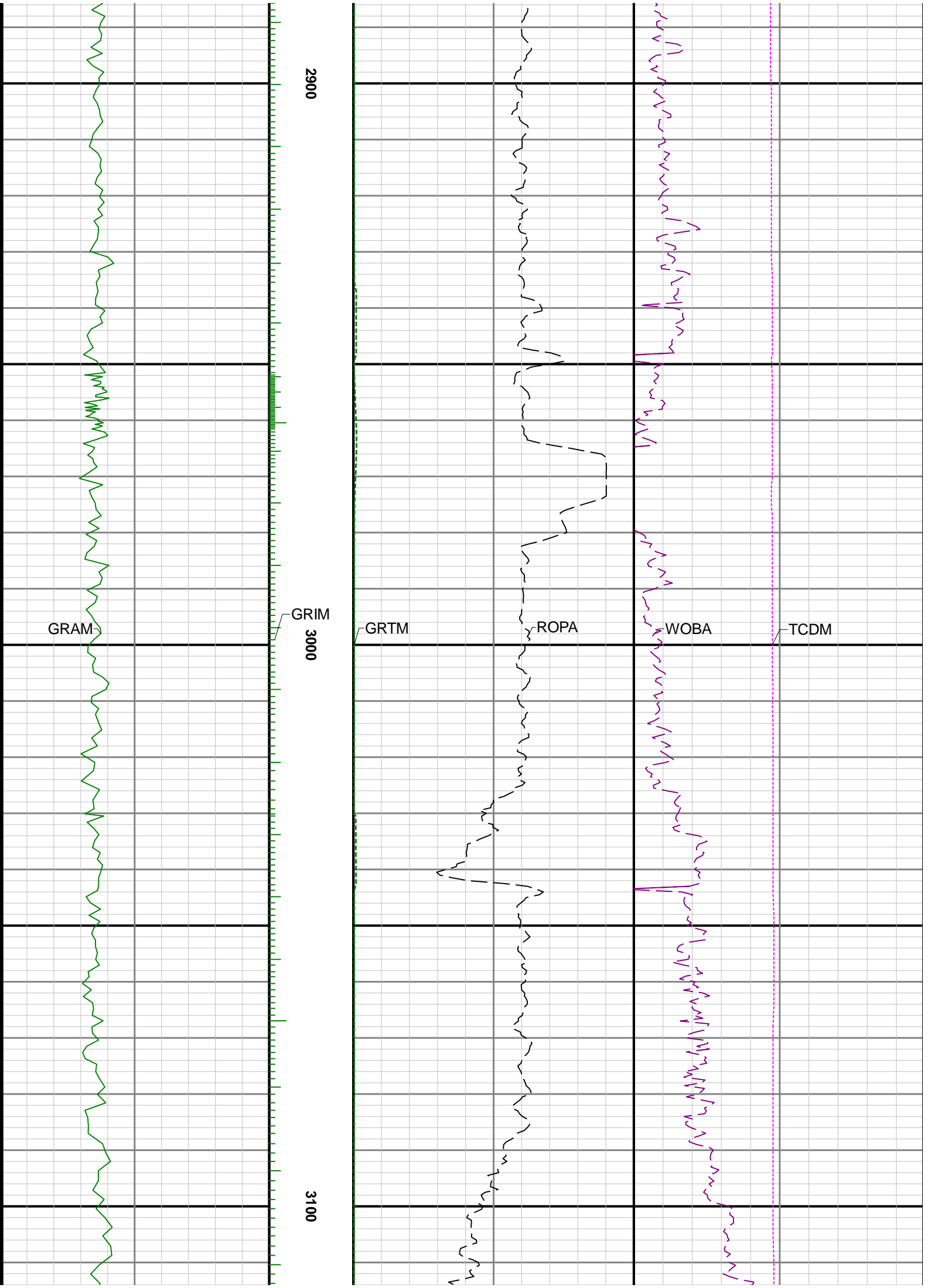
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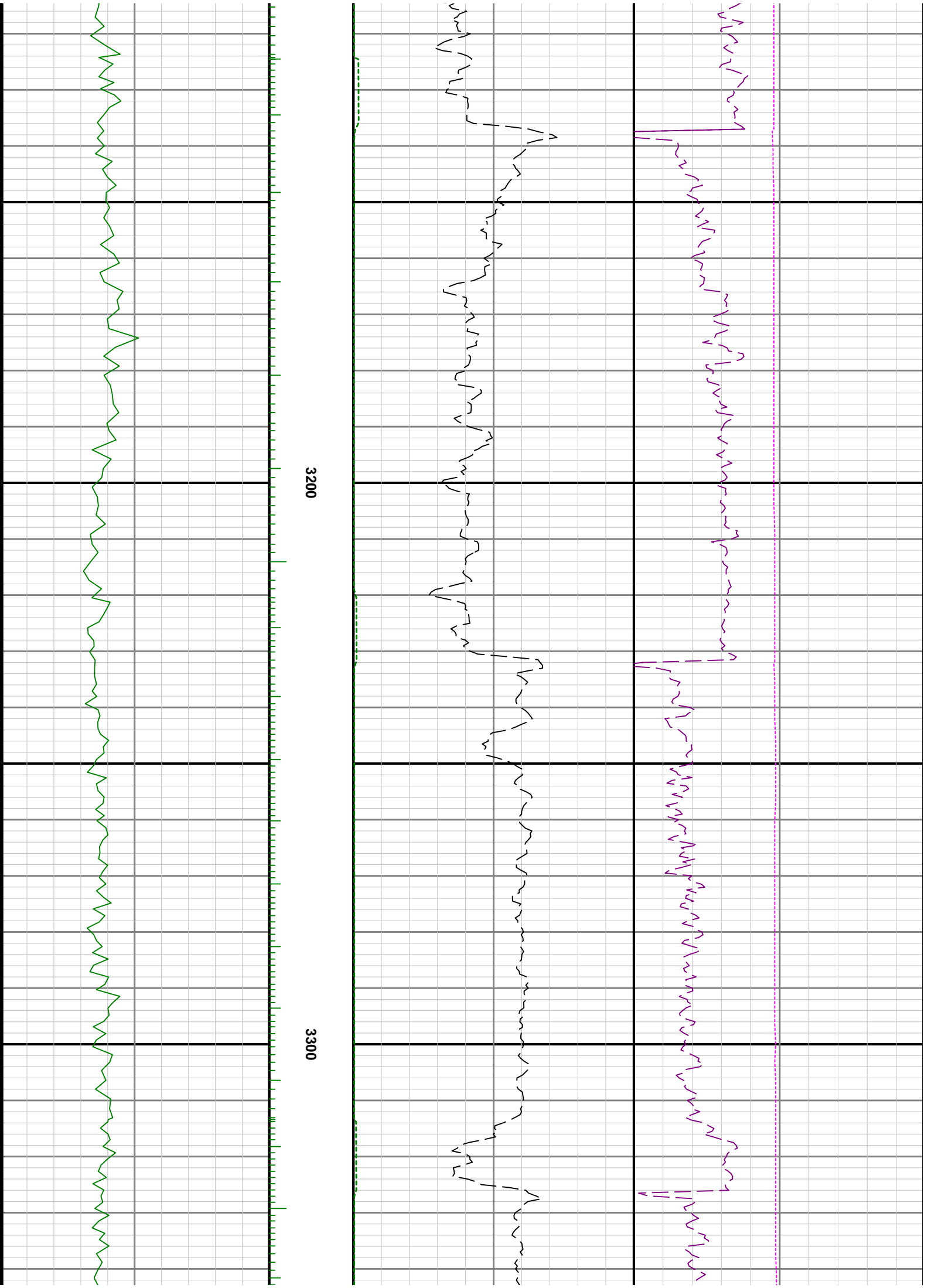


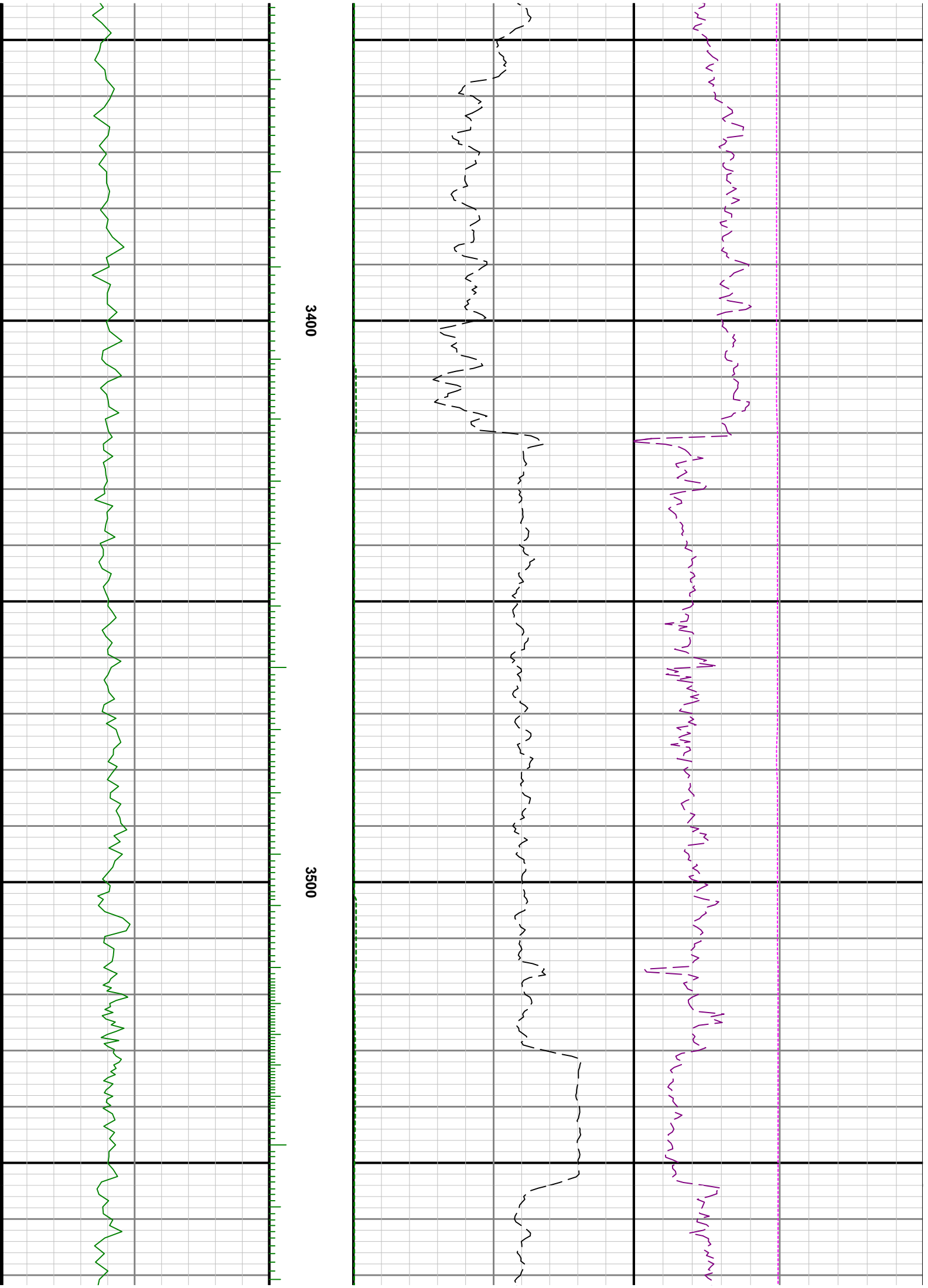


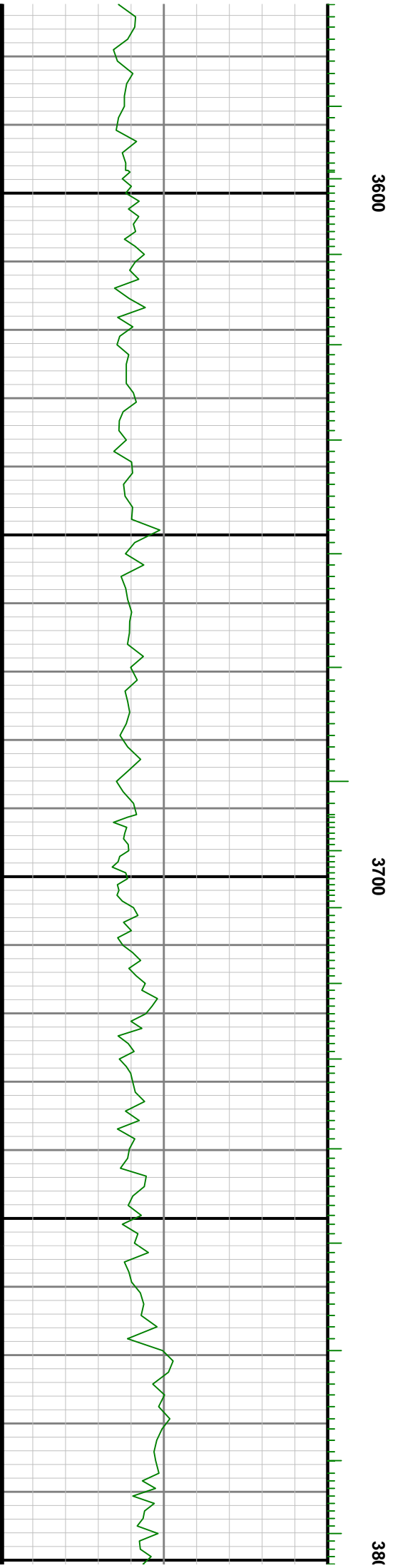
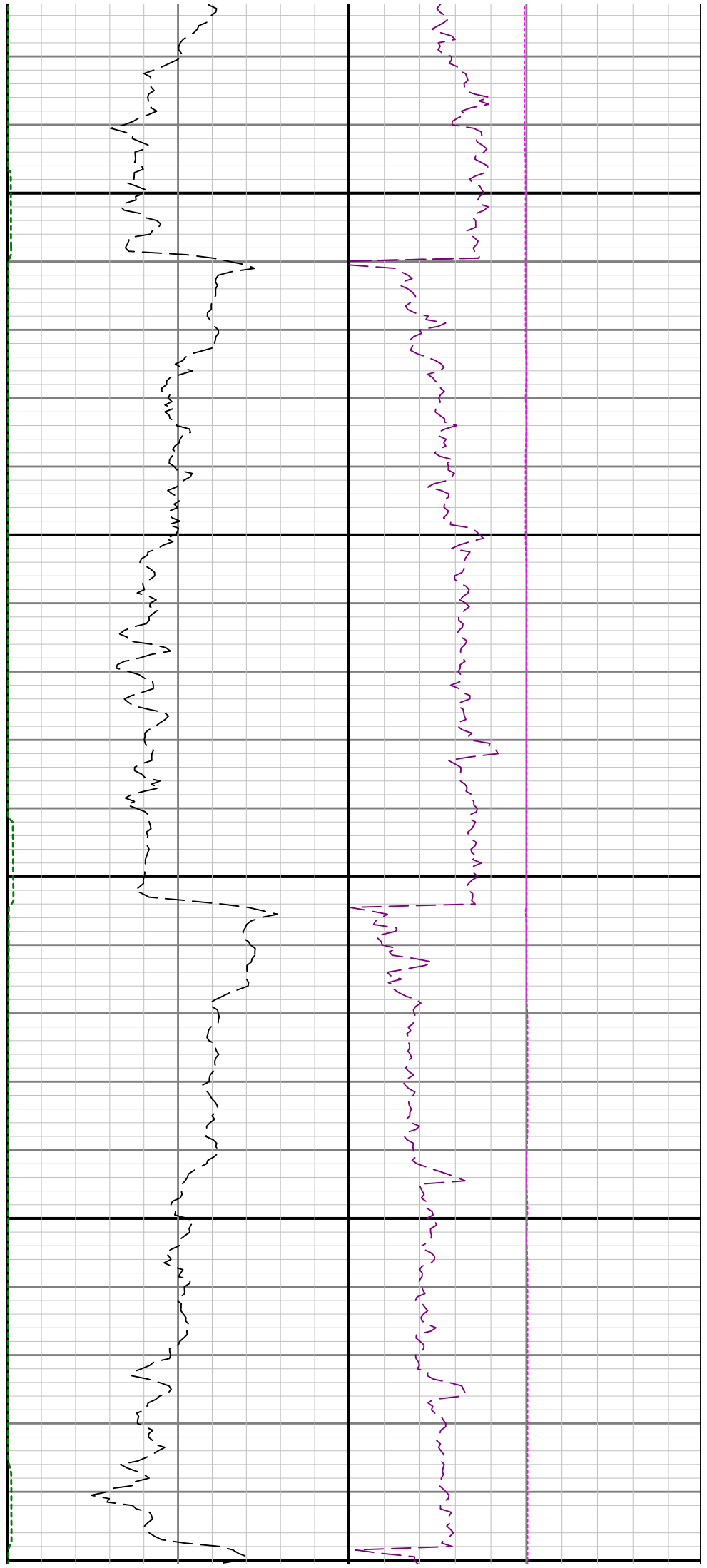


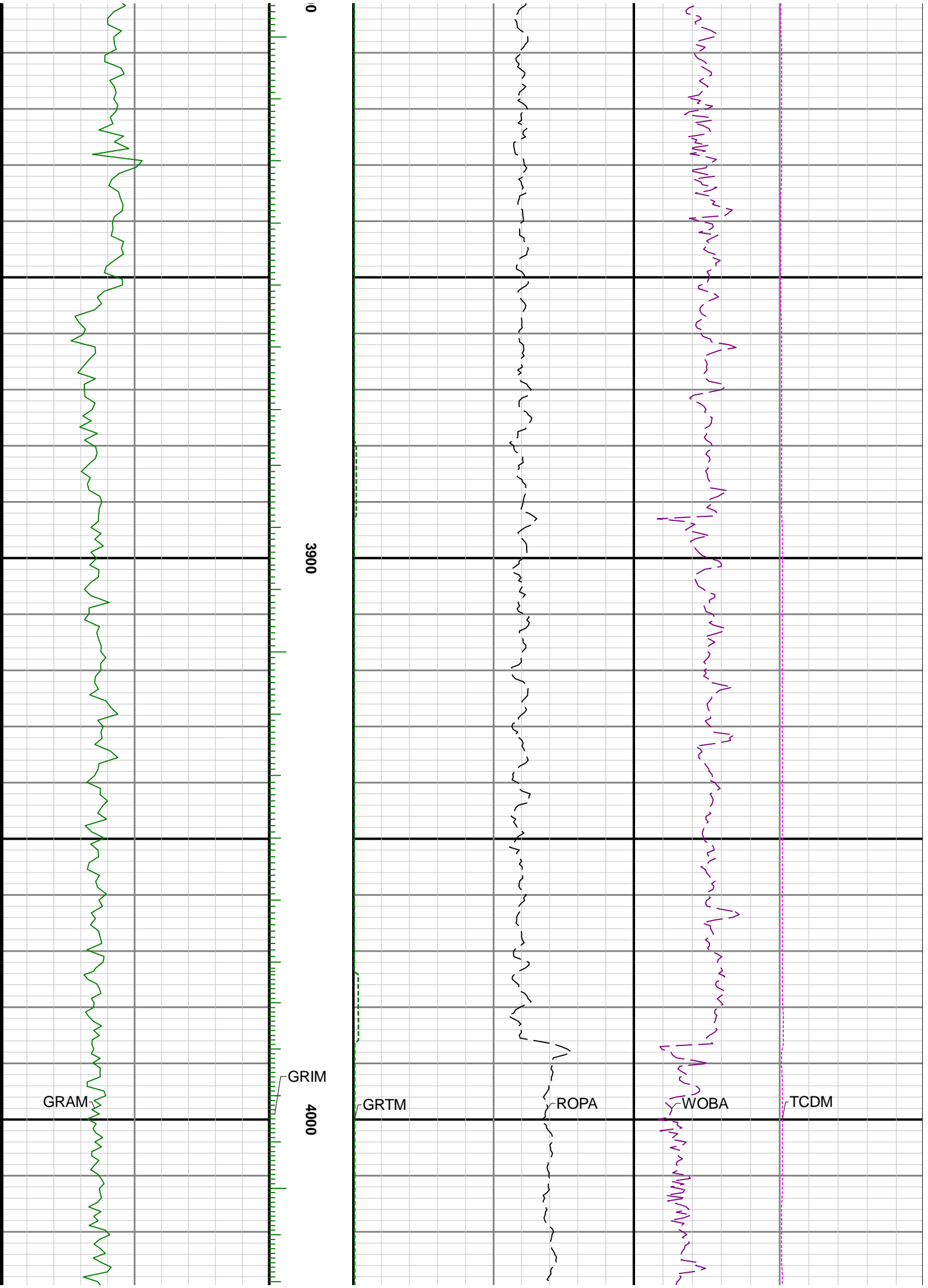


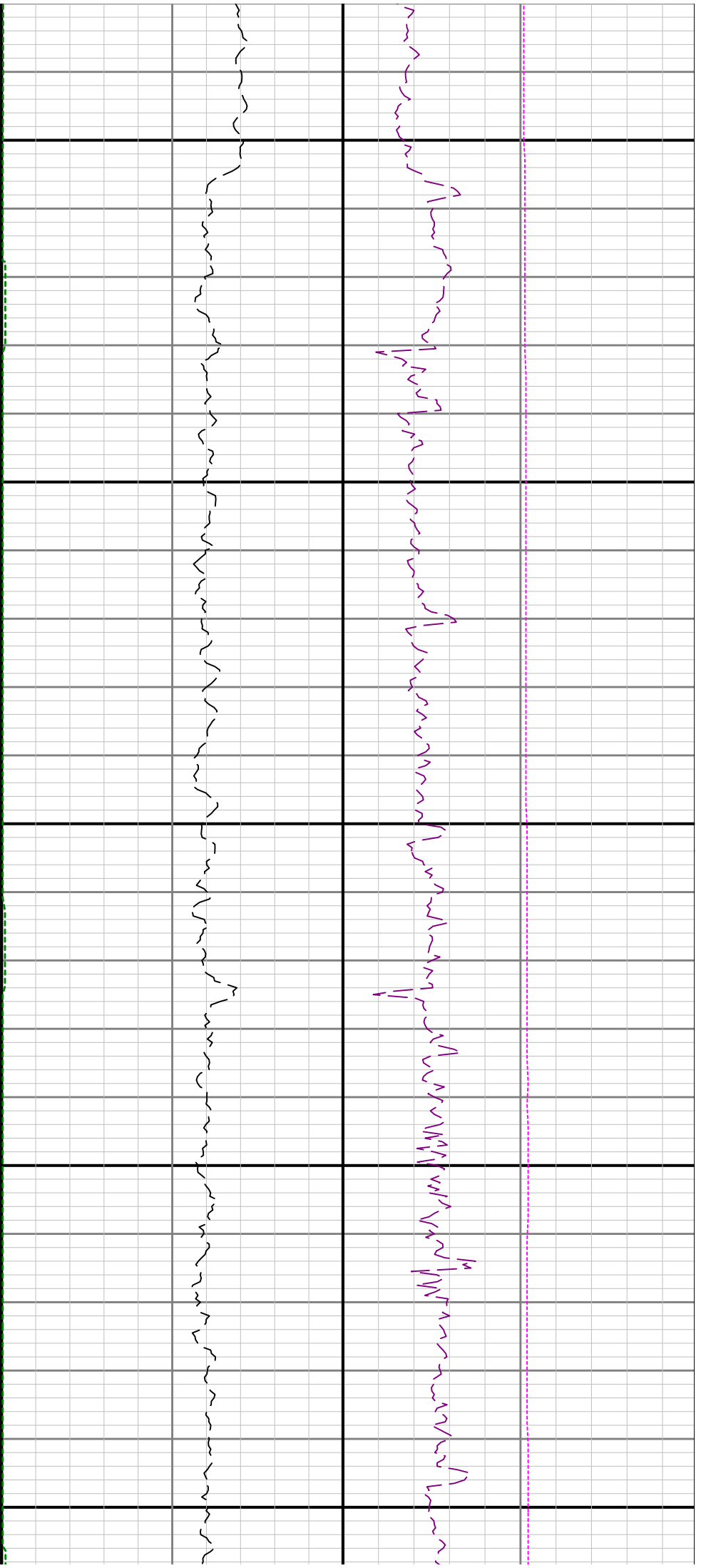






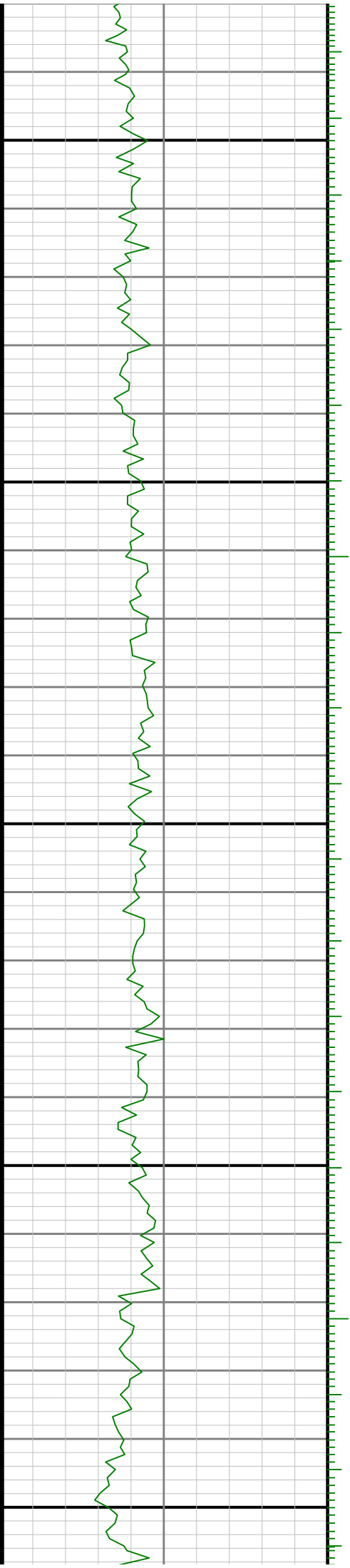


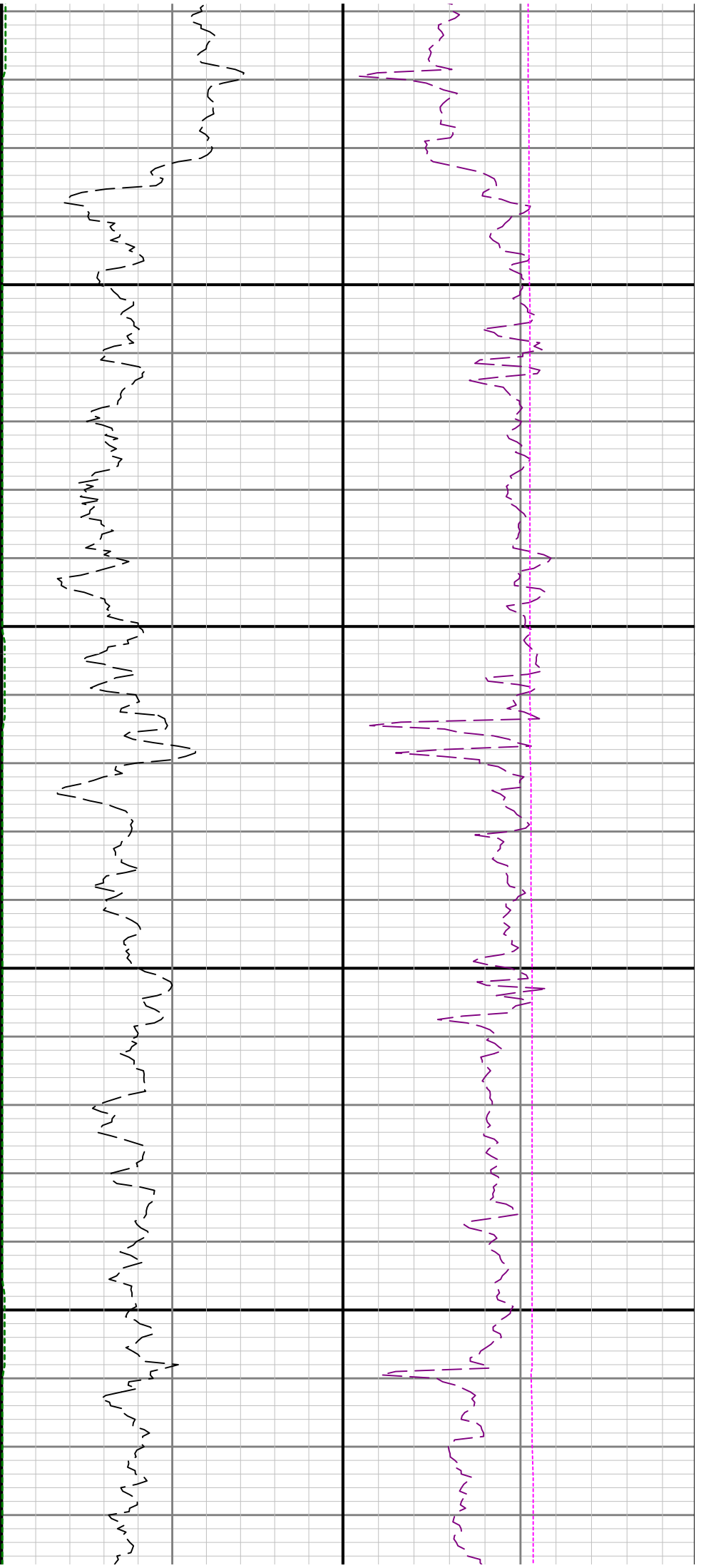




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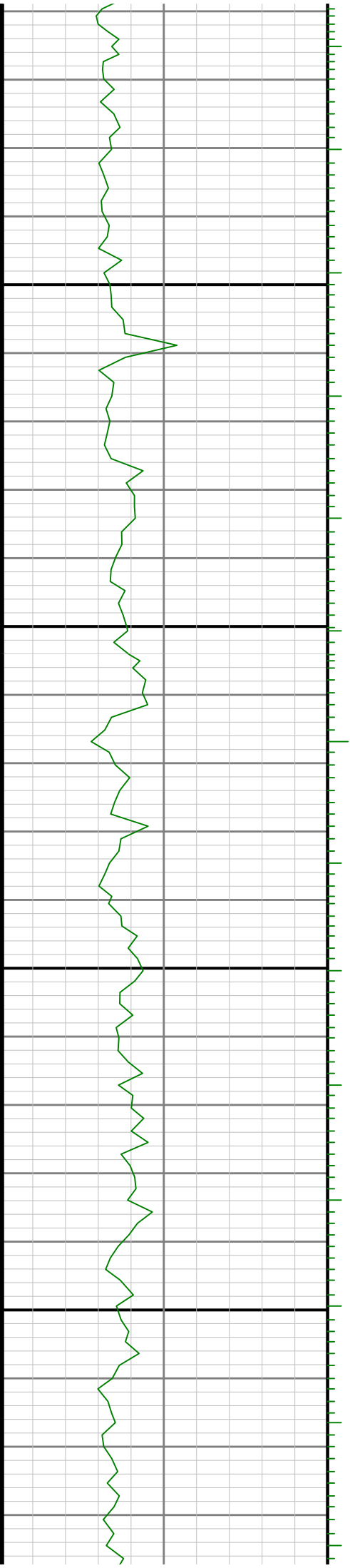
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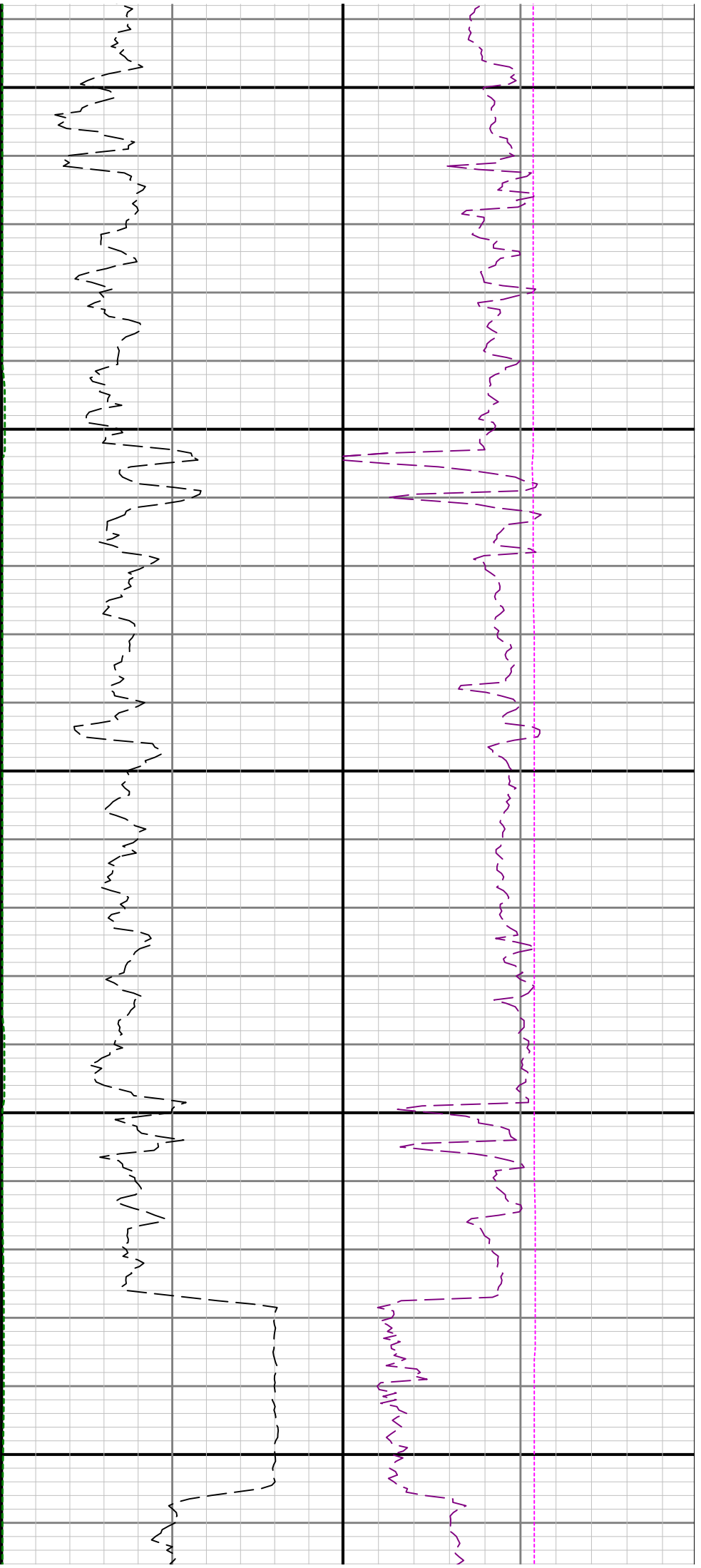




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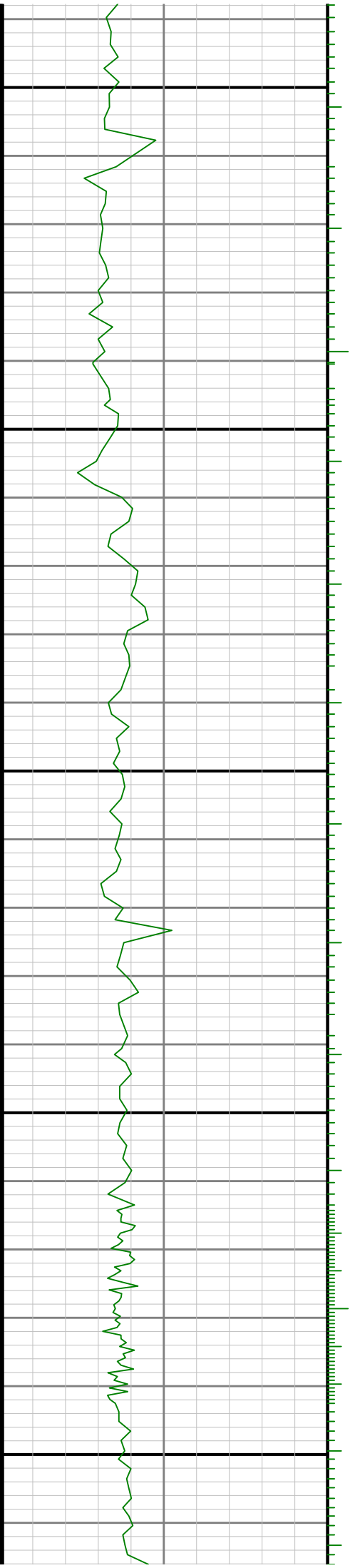


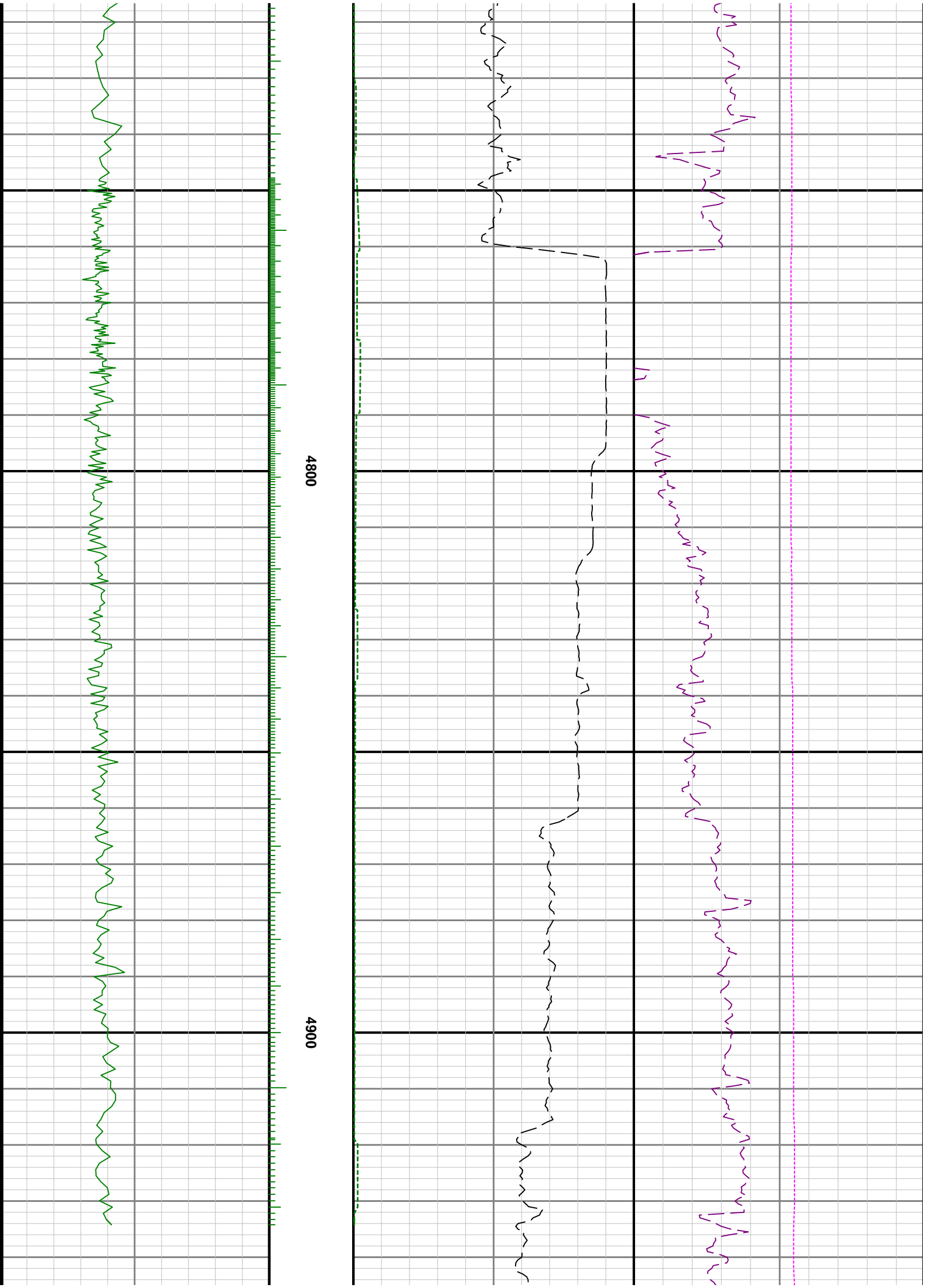


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4600

4700





4800

4900

See Remark 1

GRAM

GRIM

5000

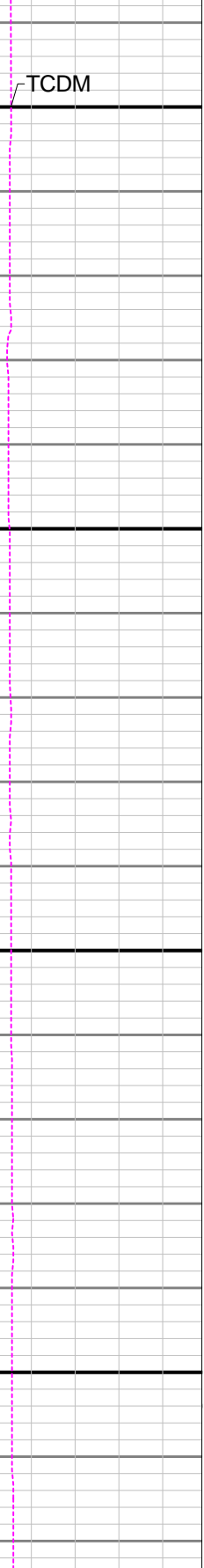
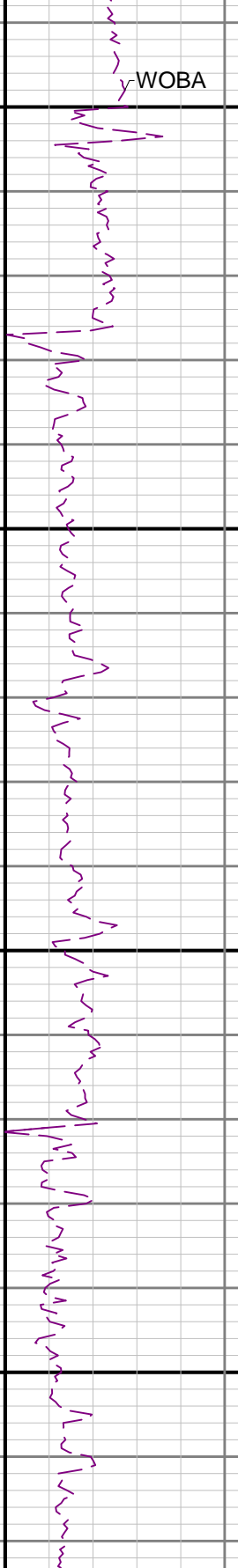
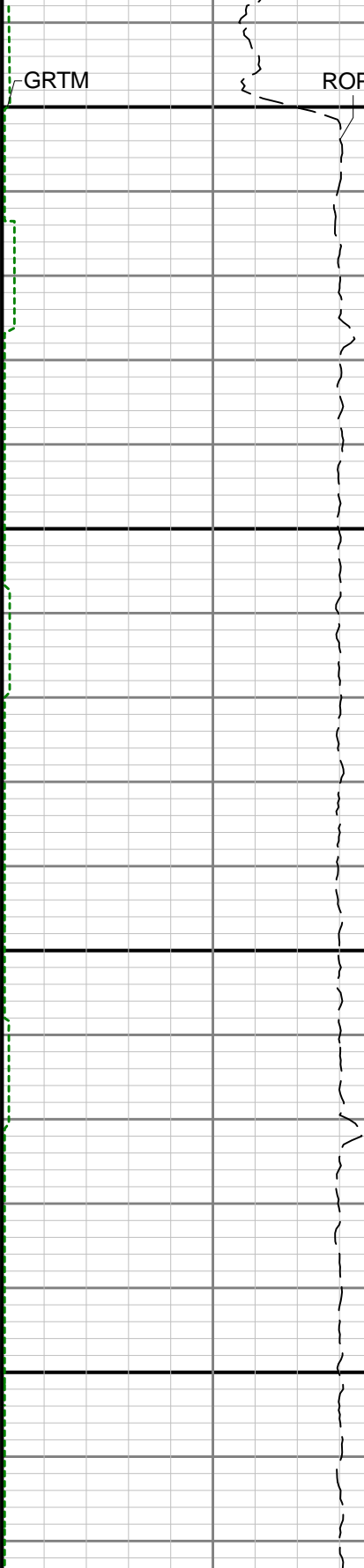
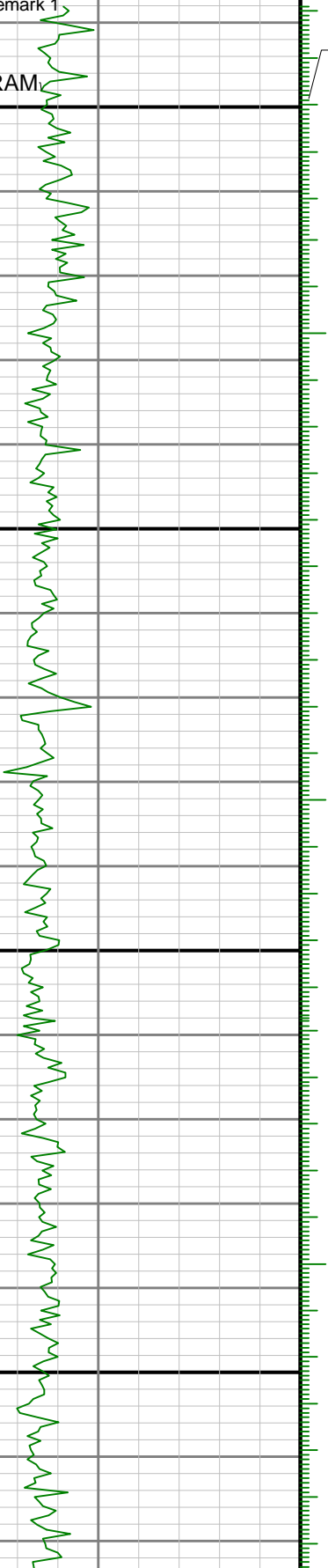
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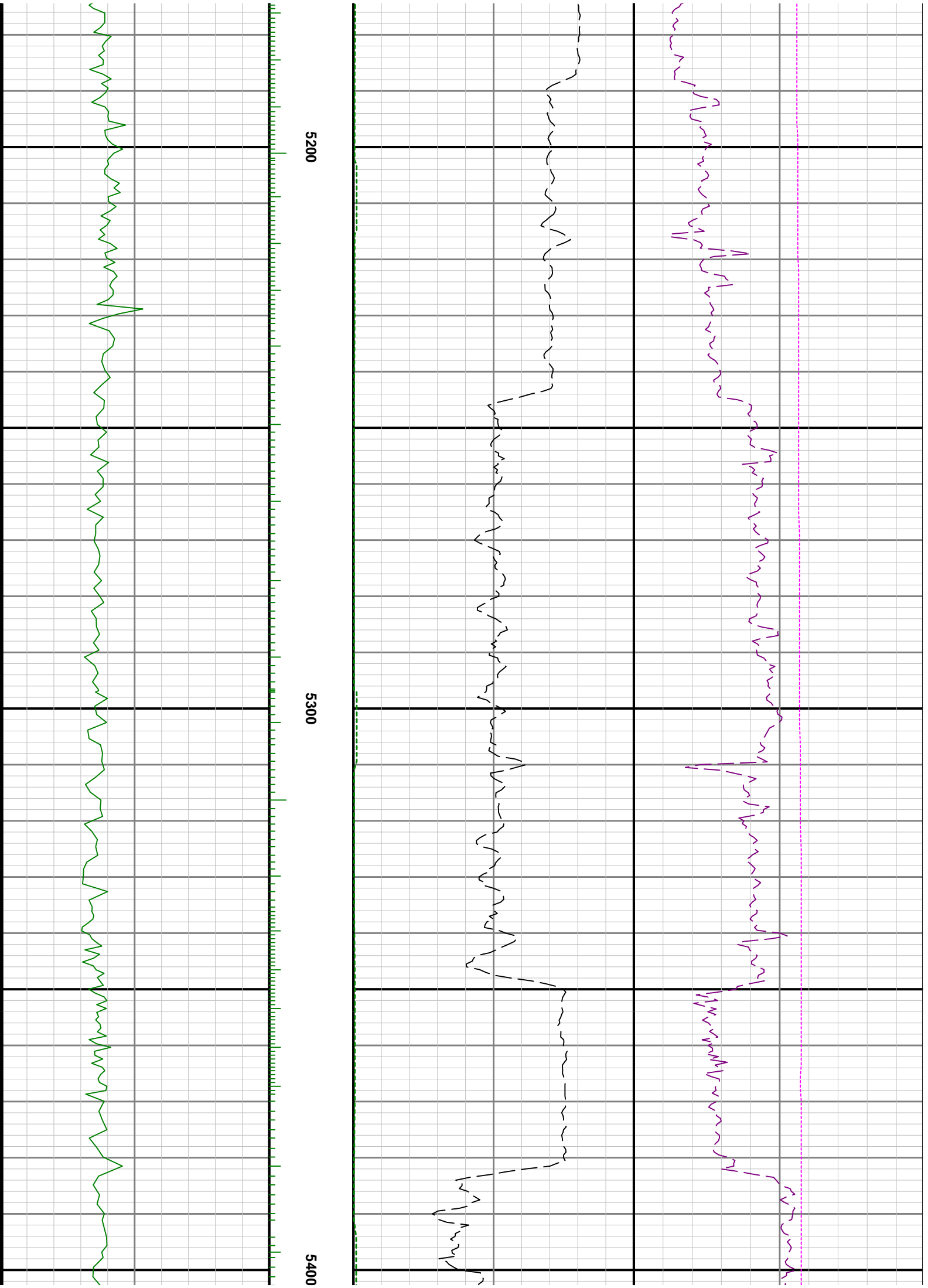
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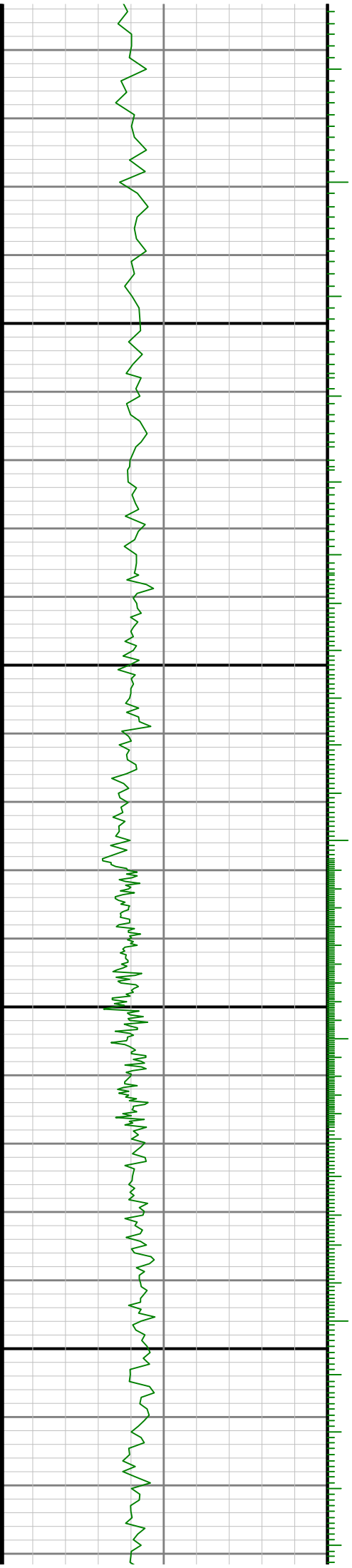
ROPA

WOBA

TCDM

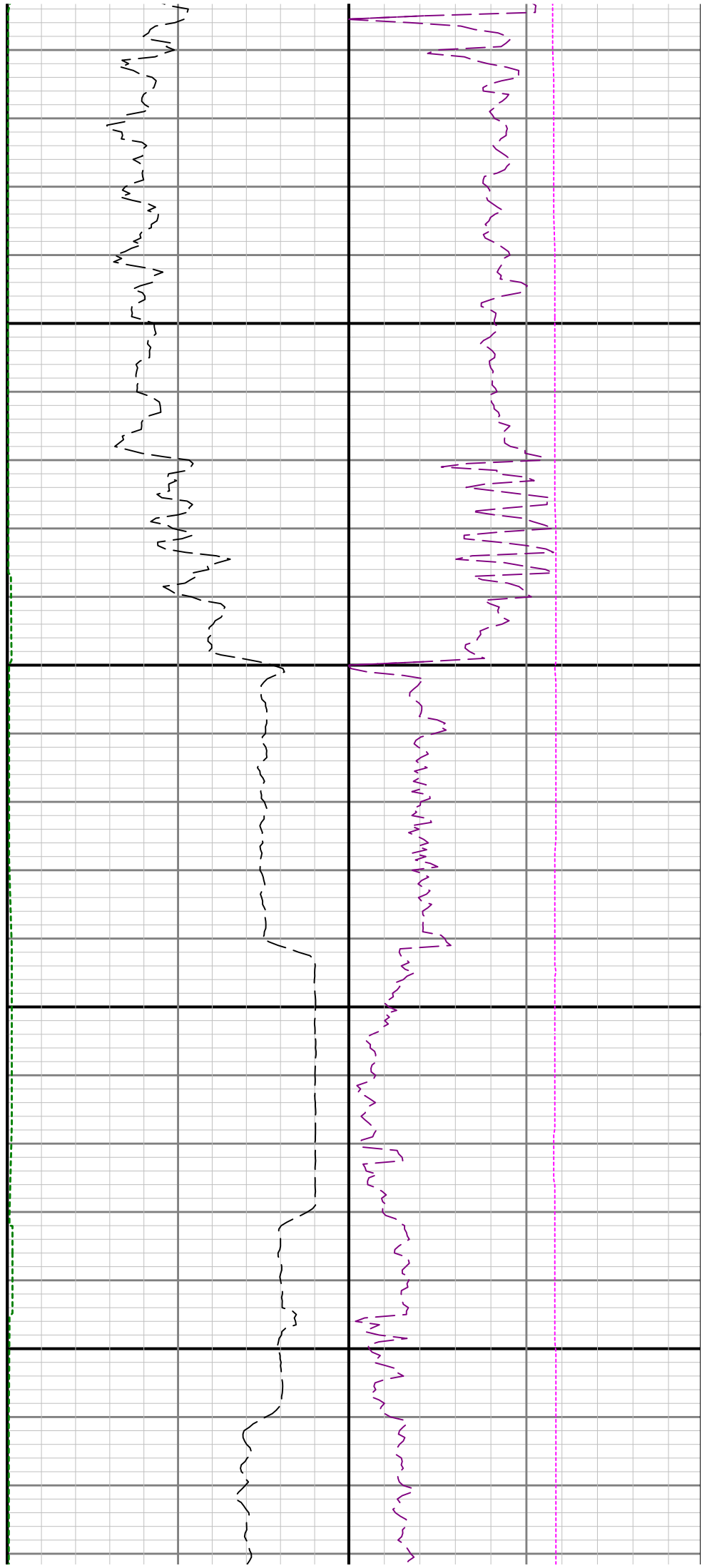


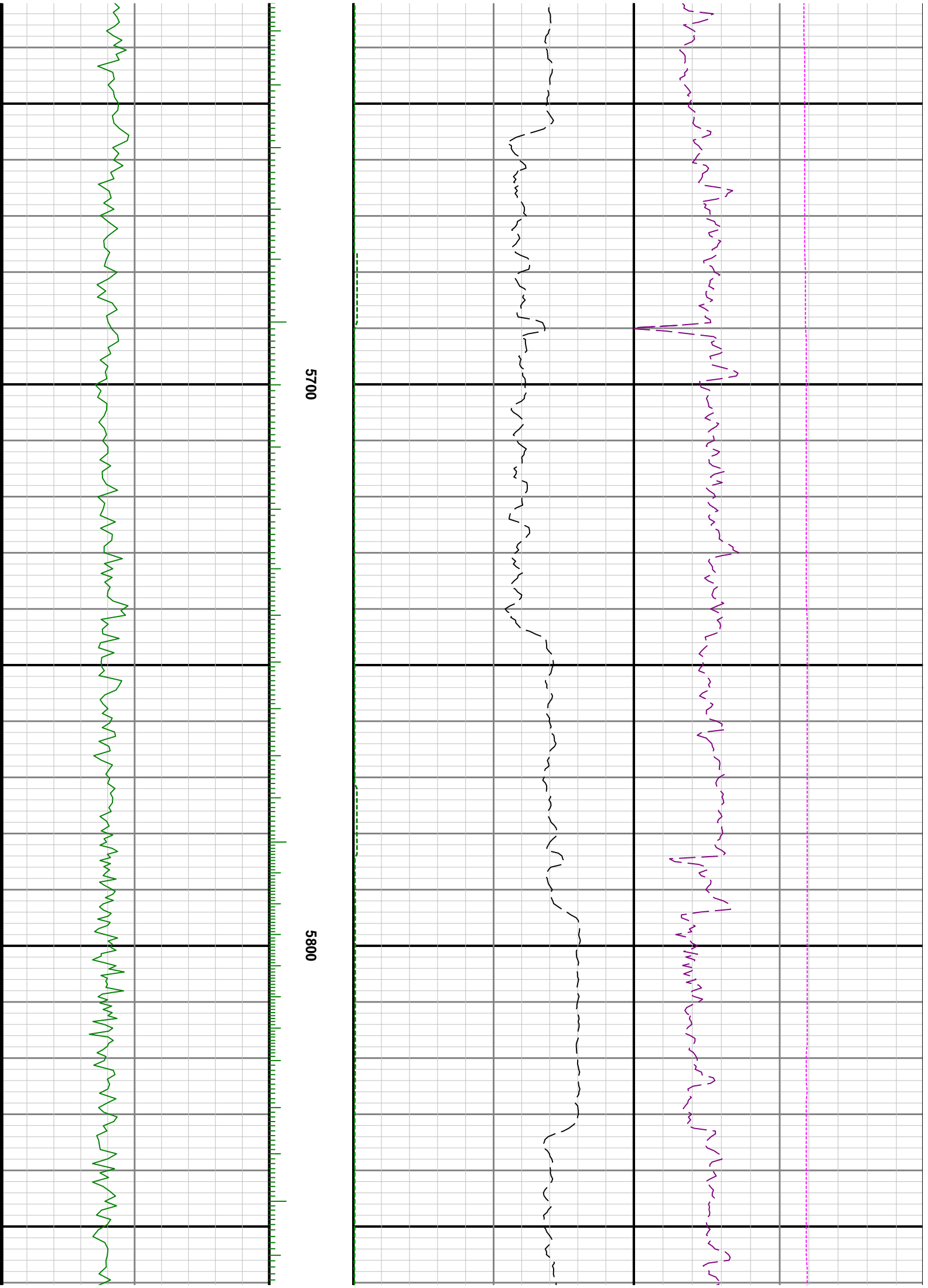




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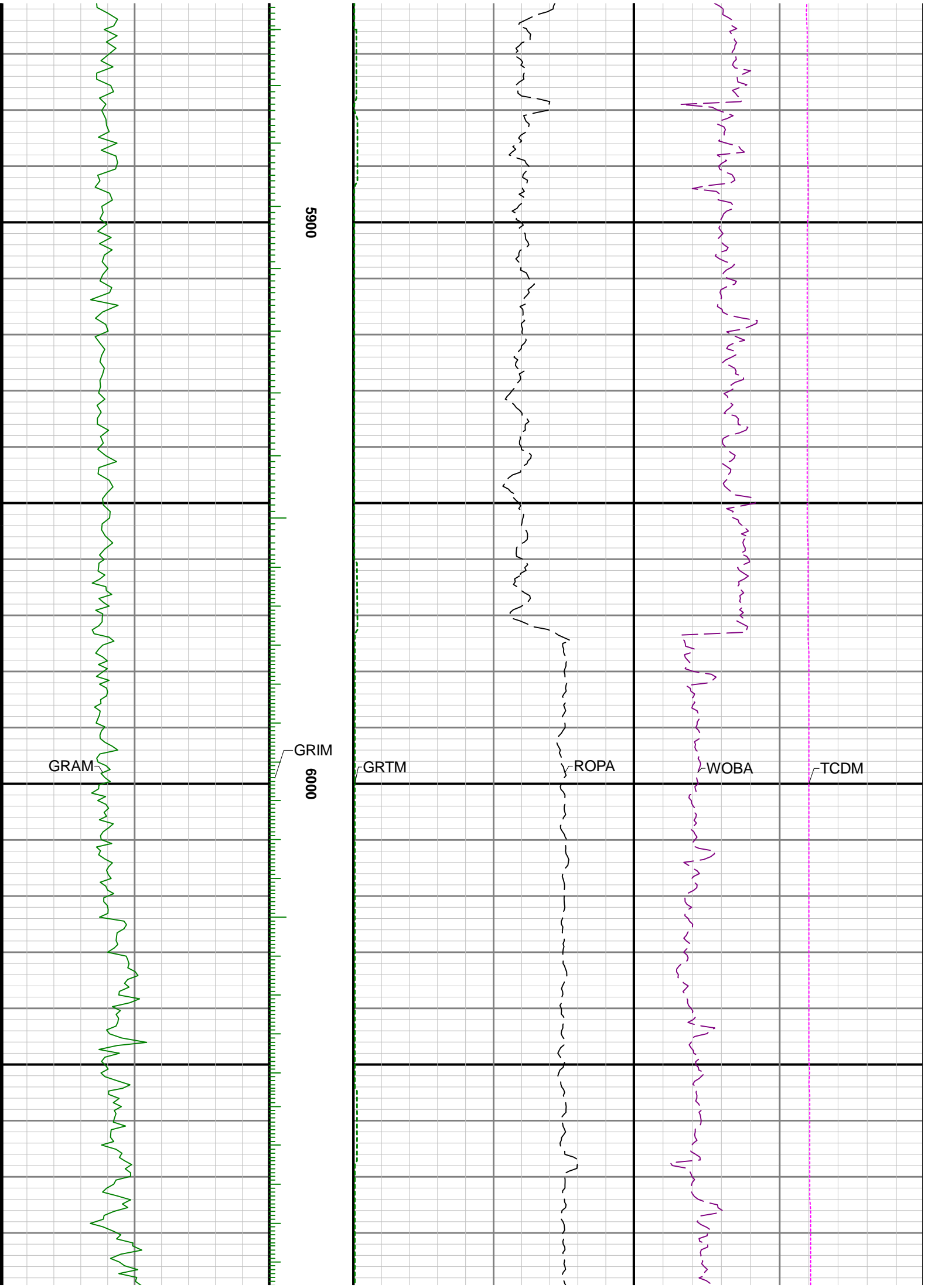
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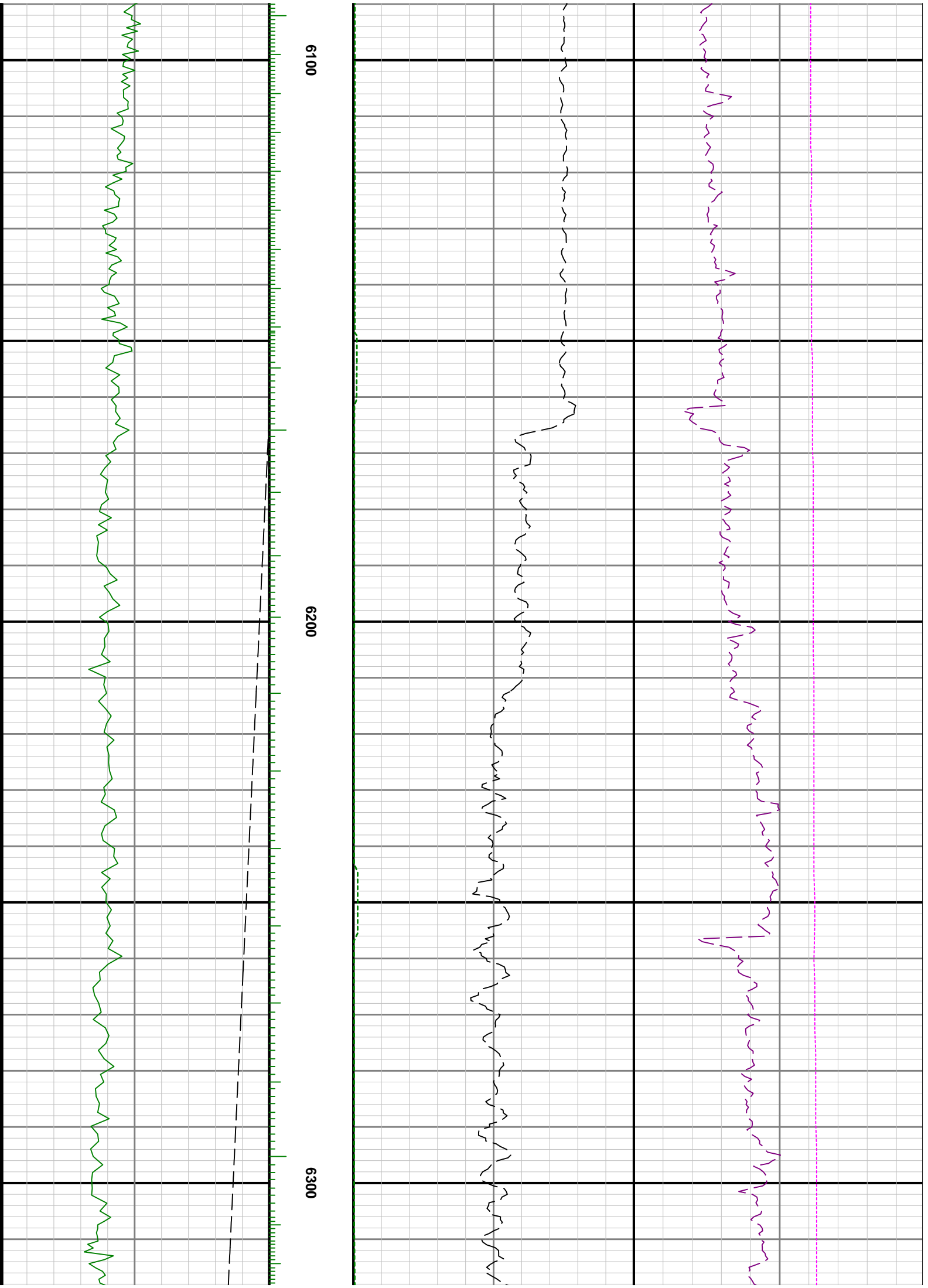


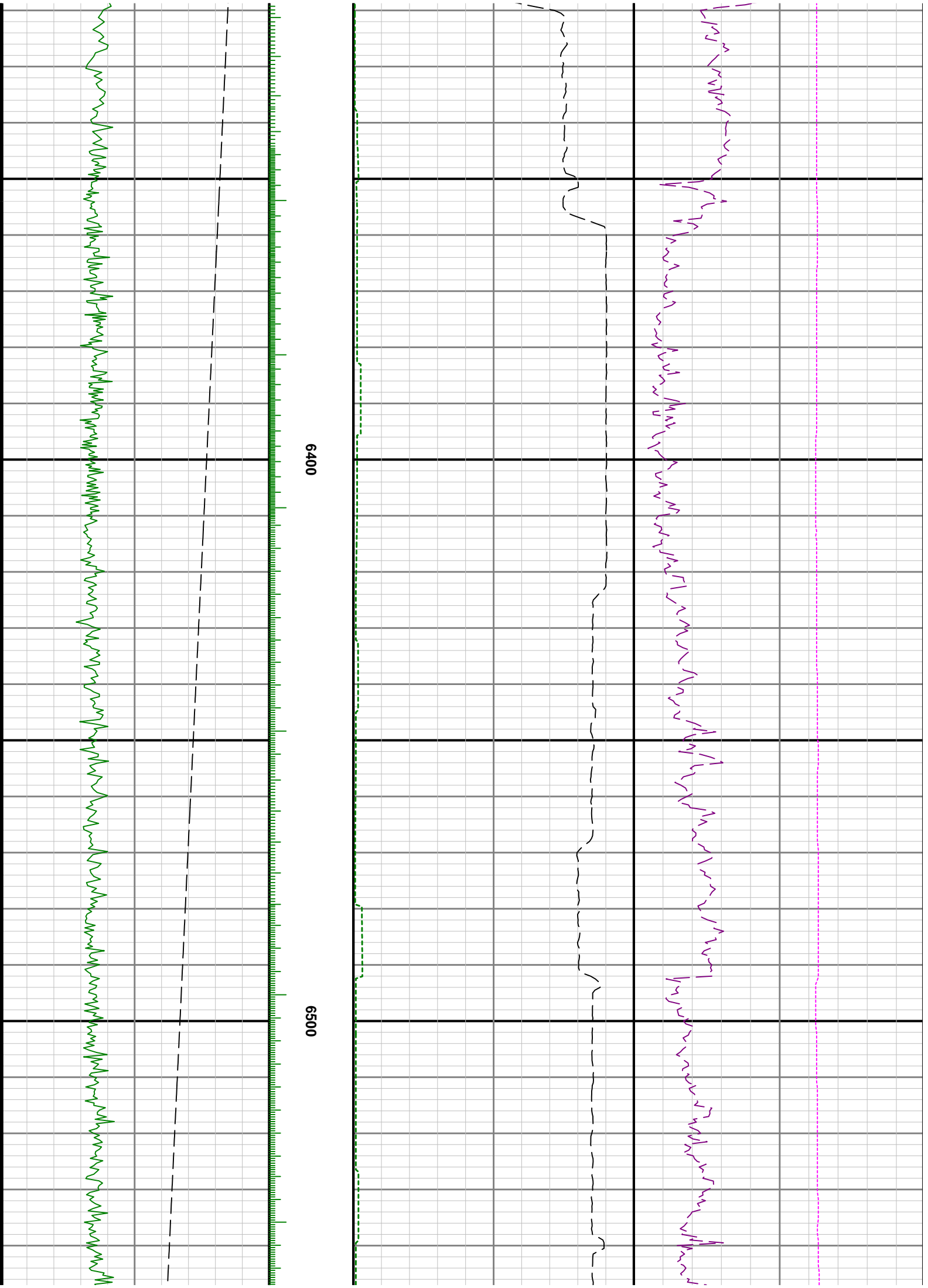


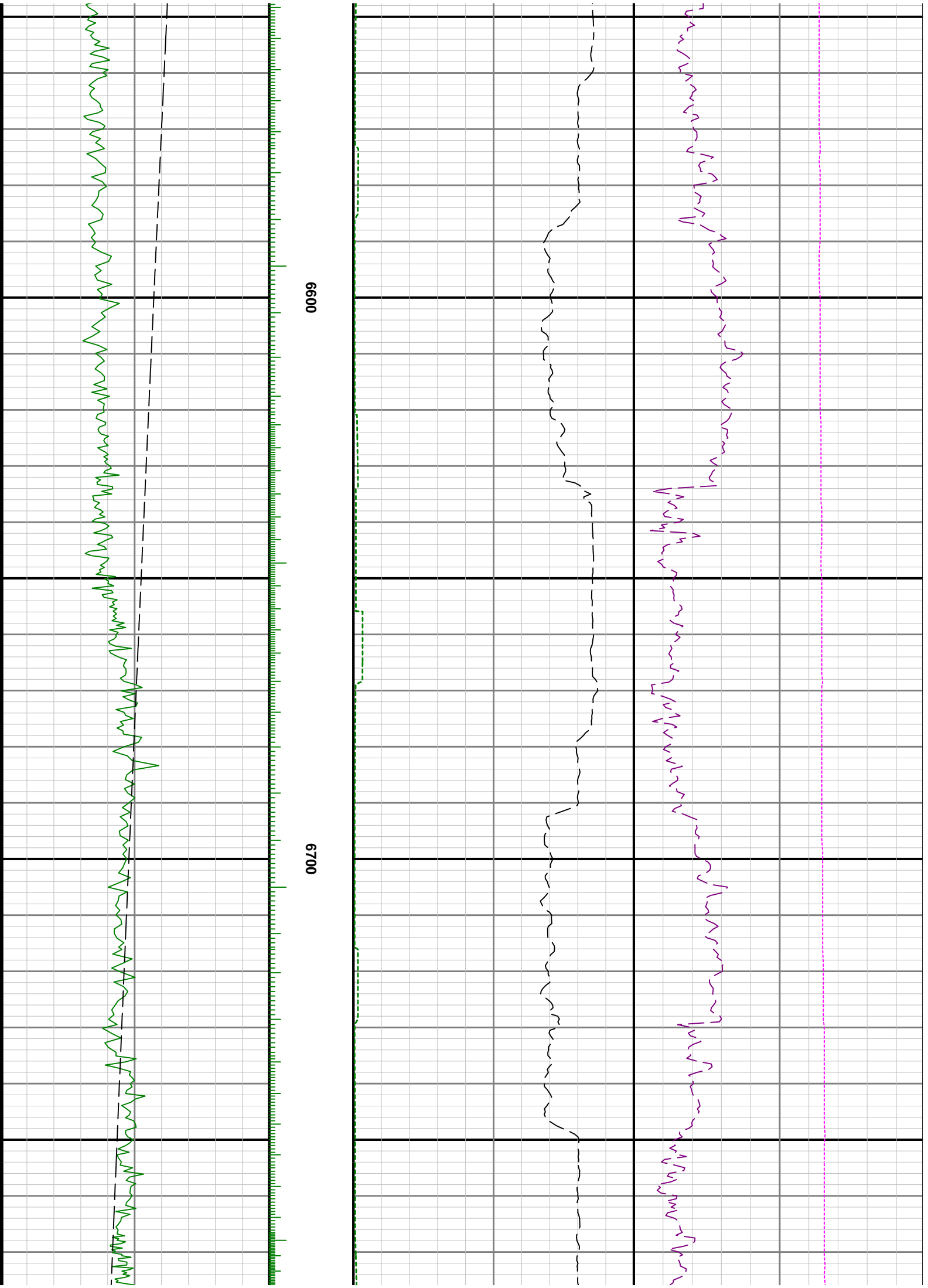
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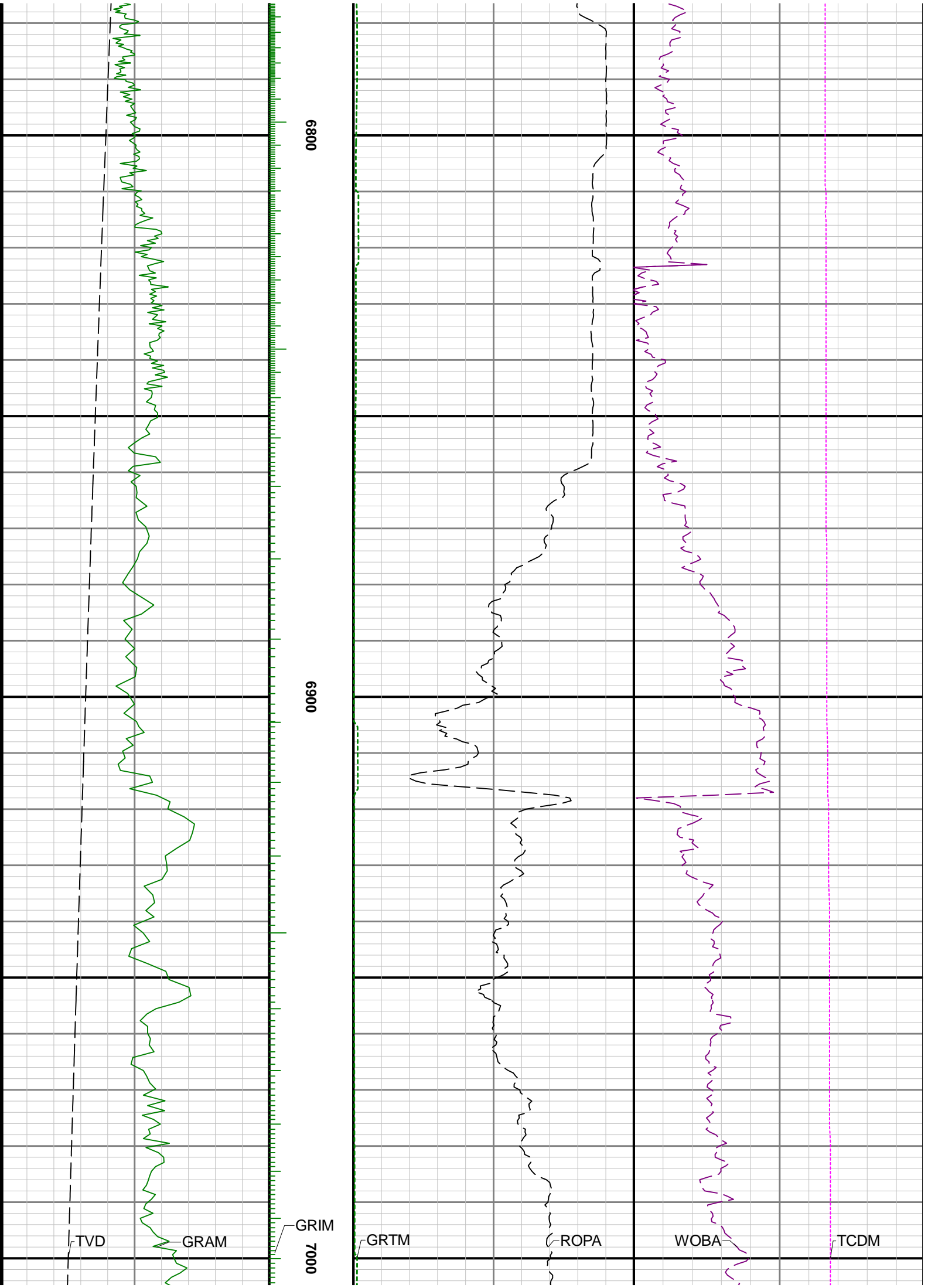
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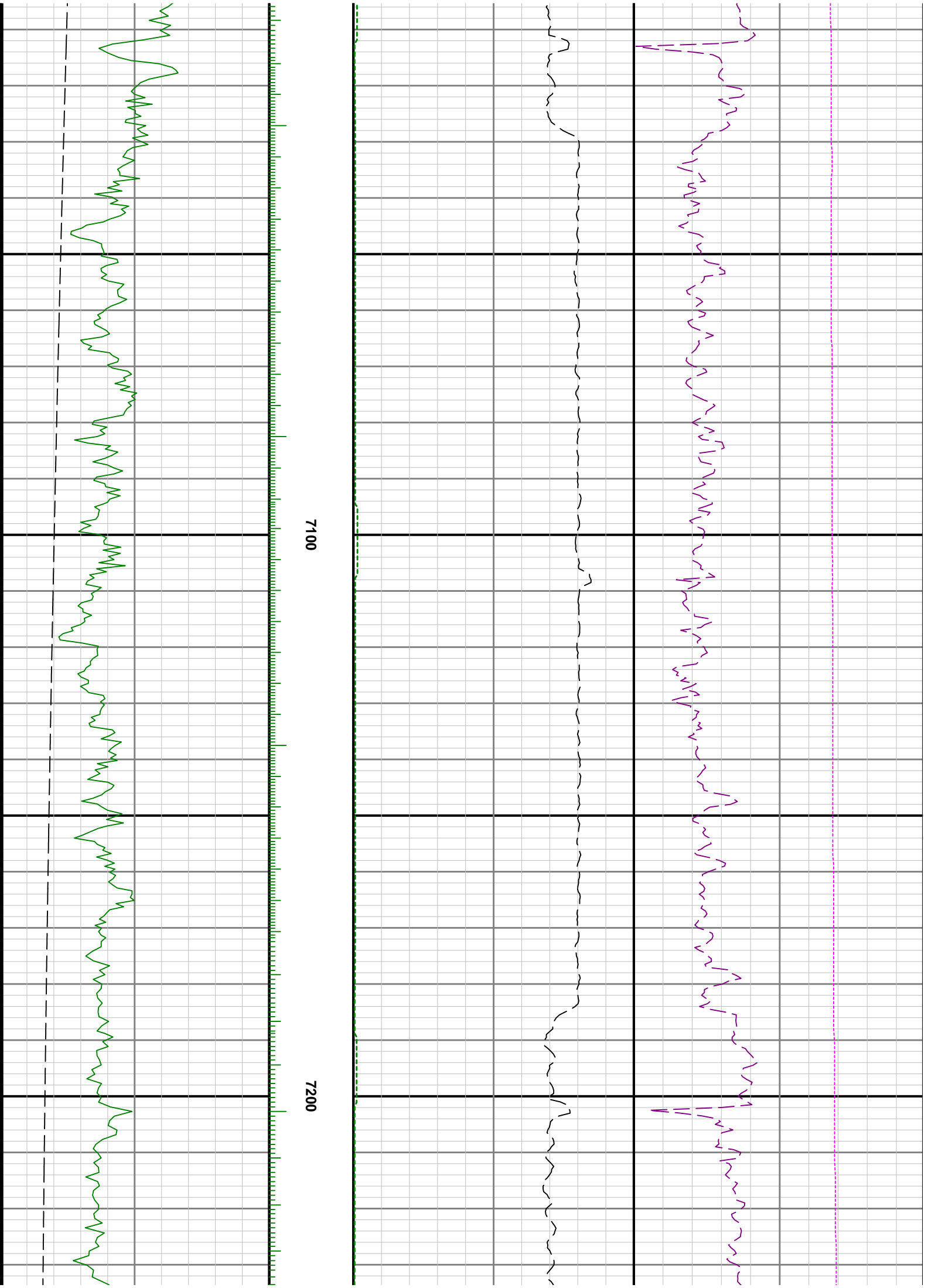






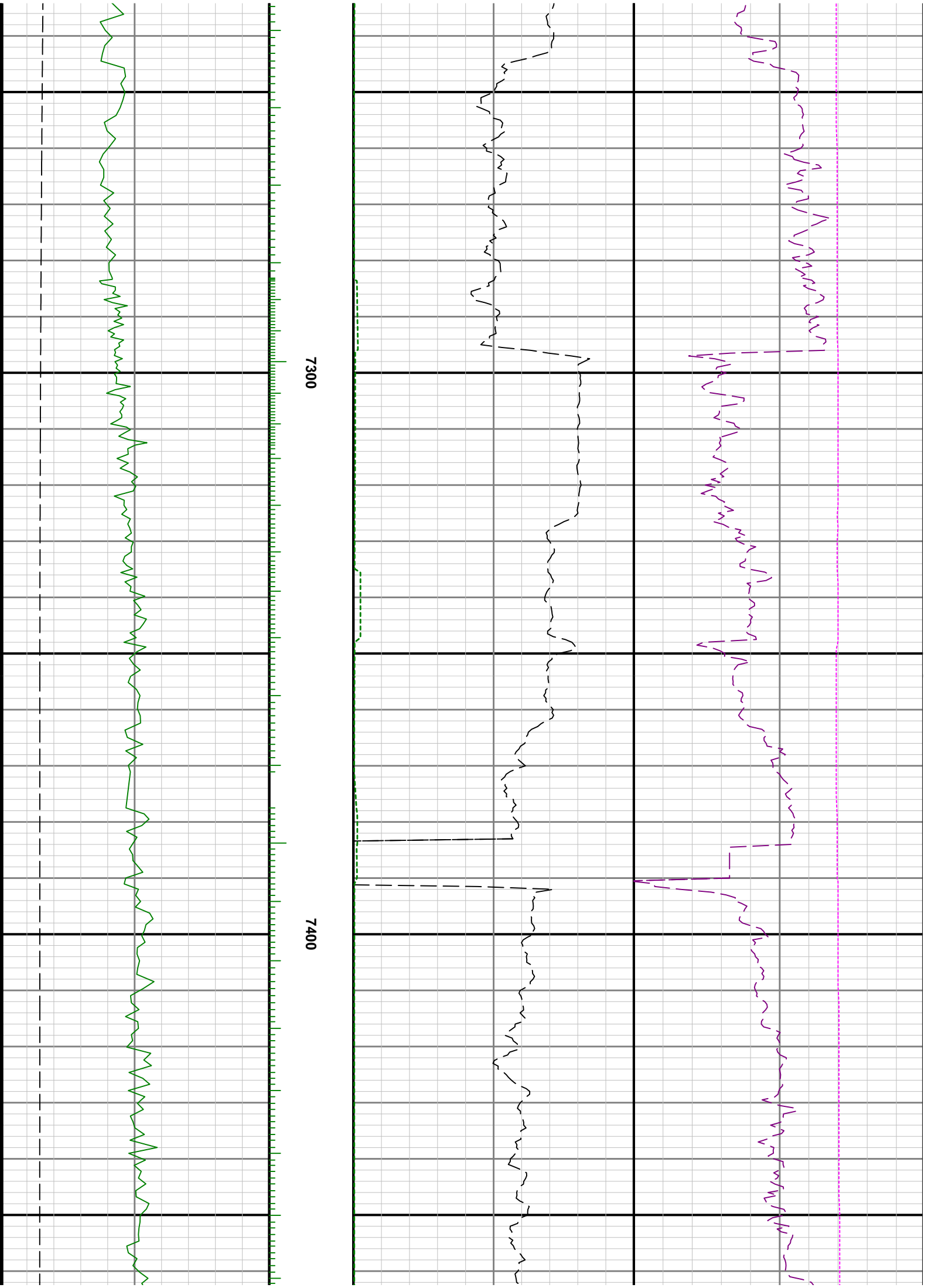


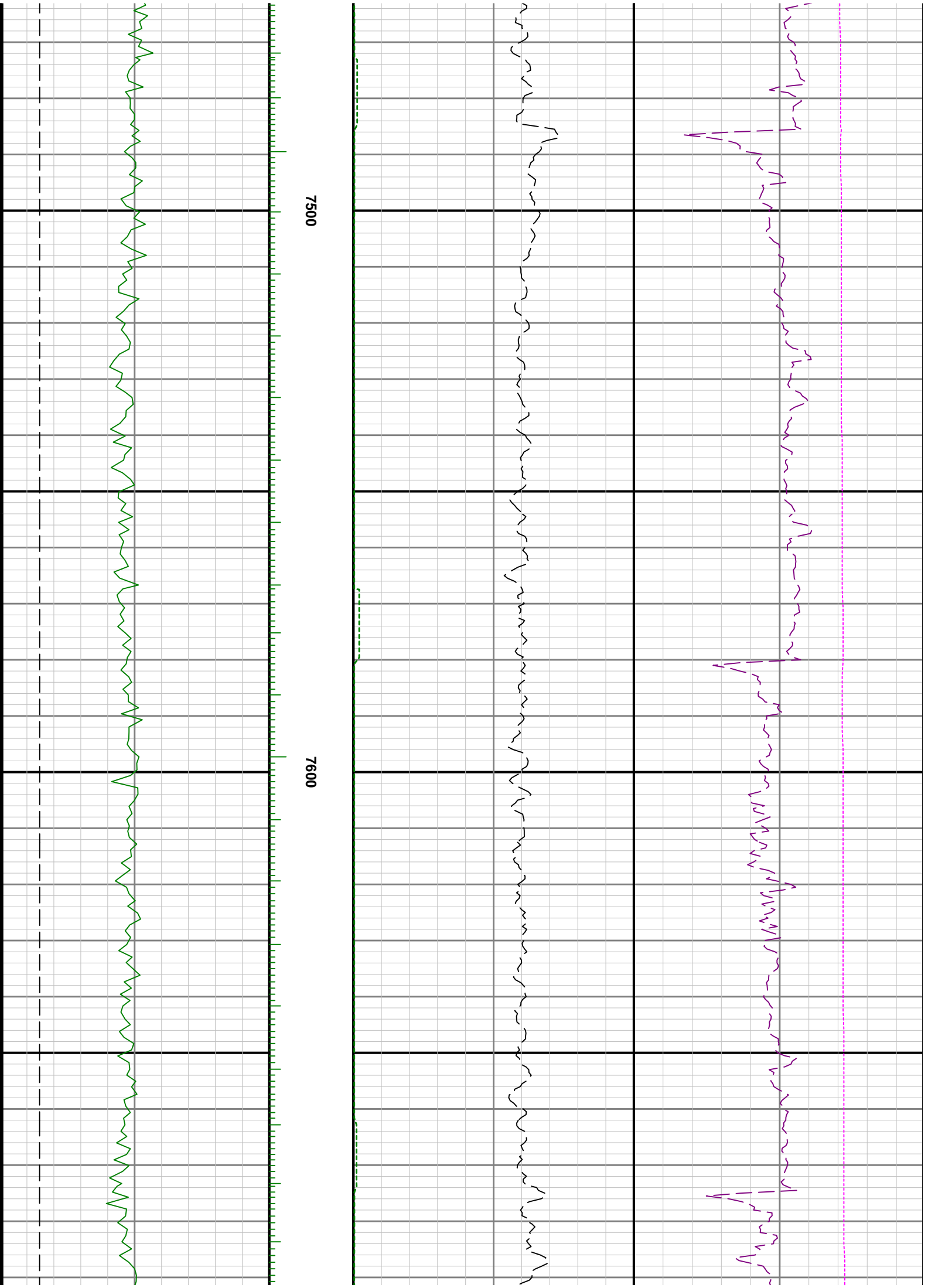




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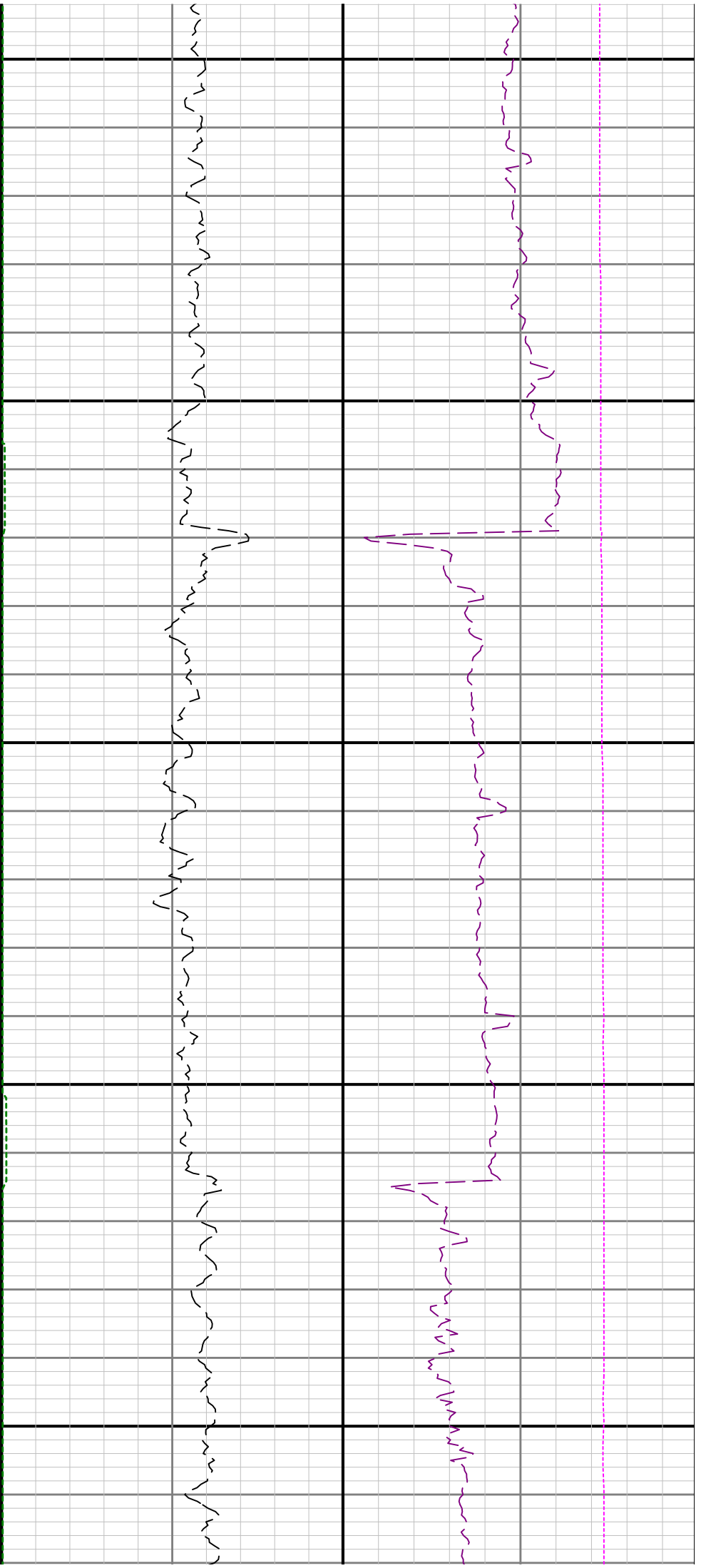
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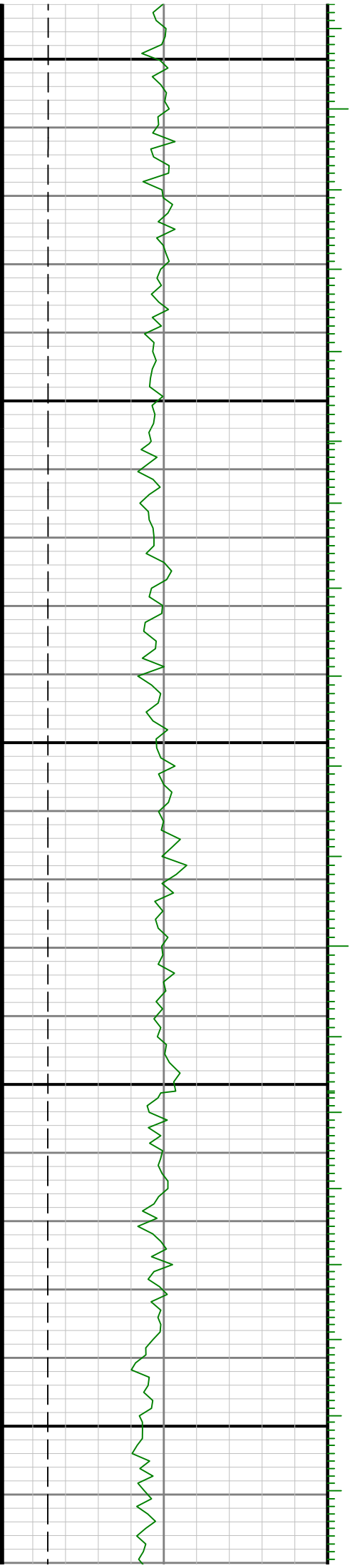
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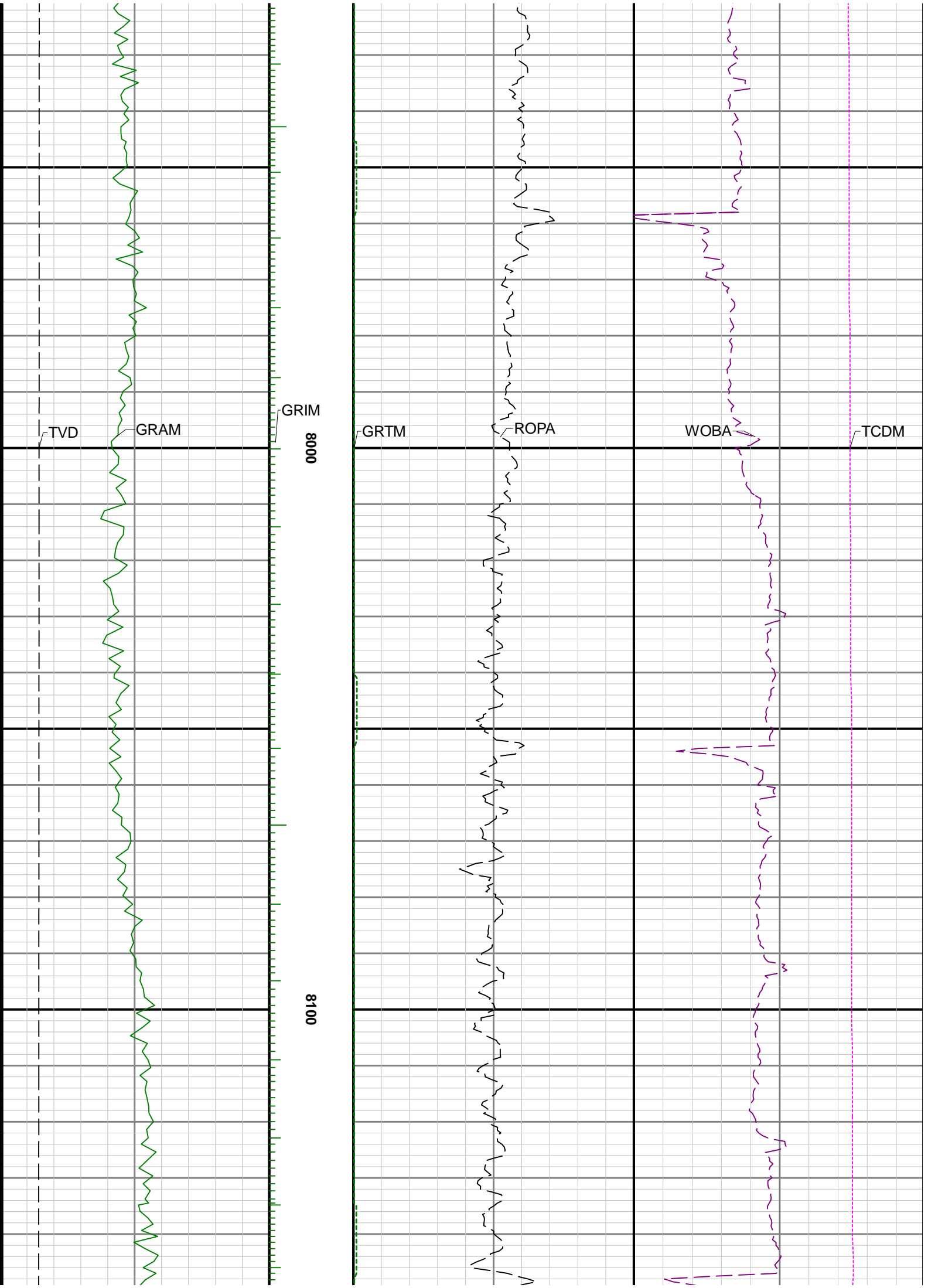


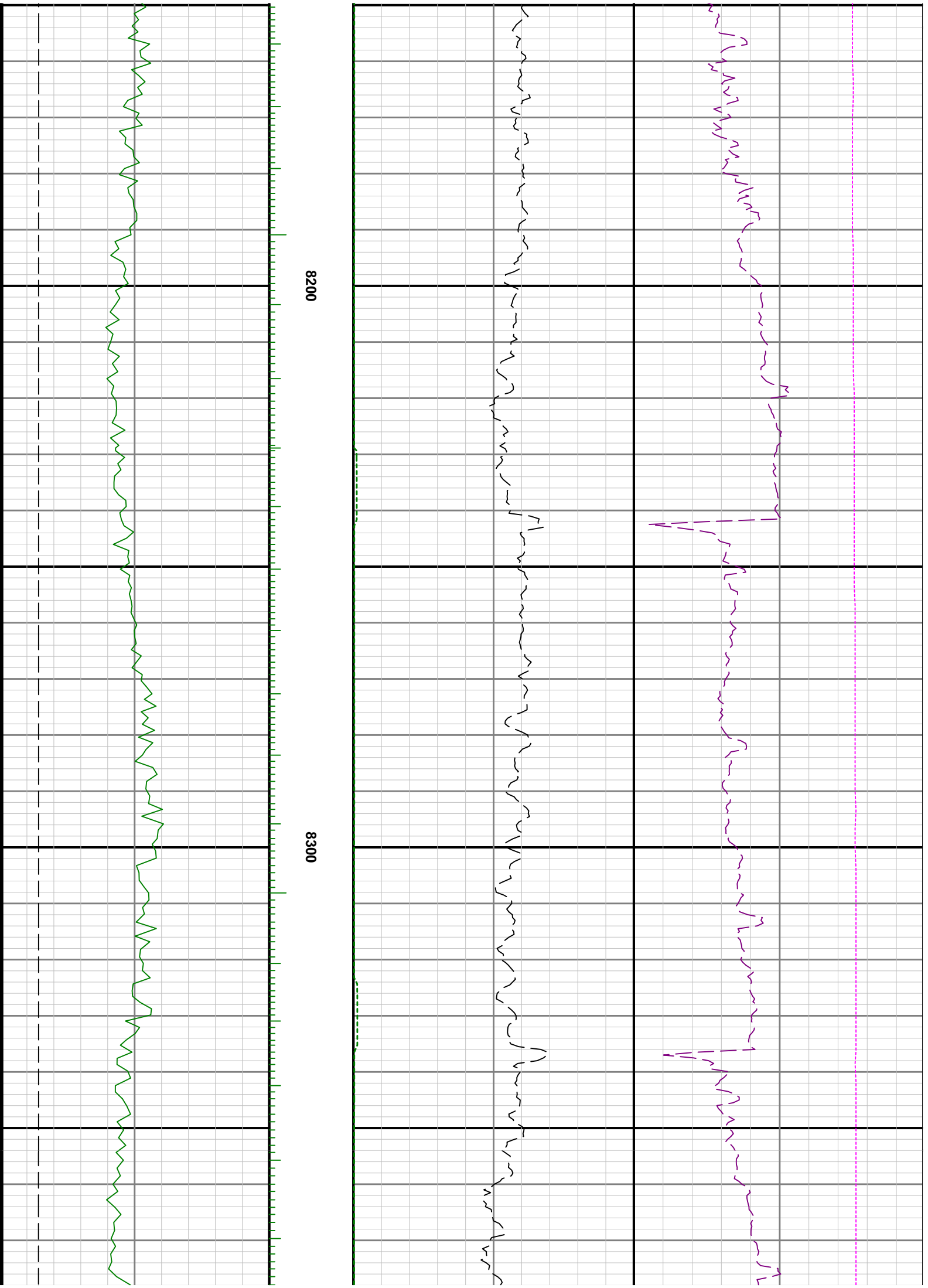
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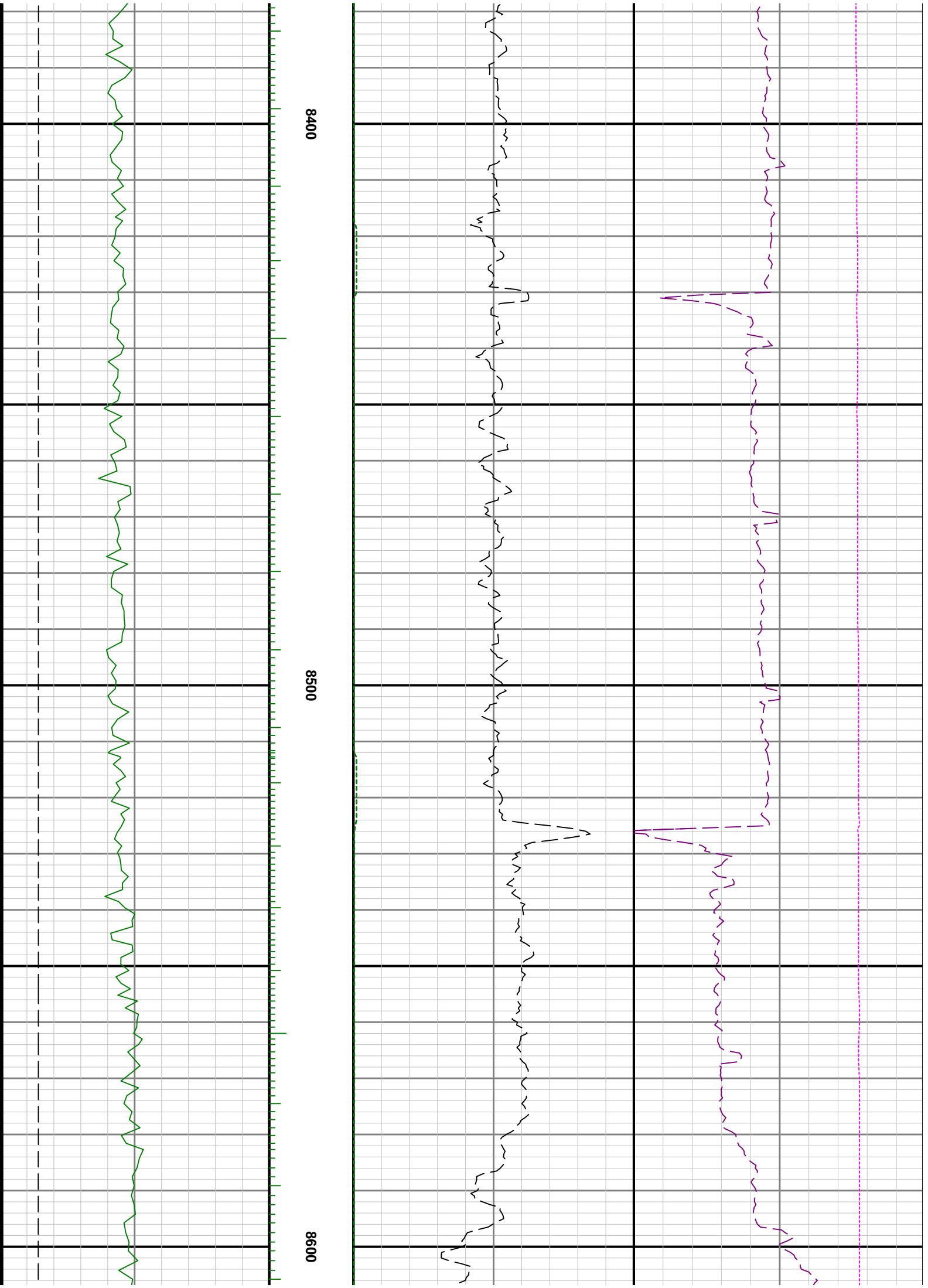
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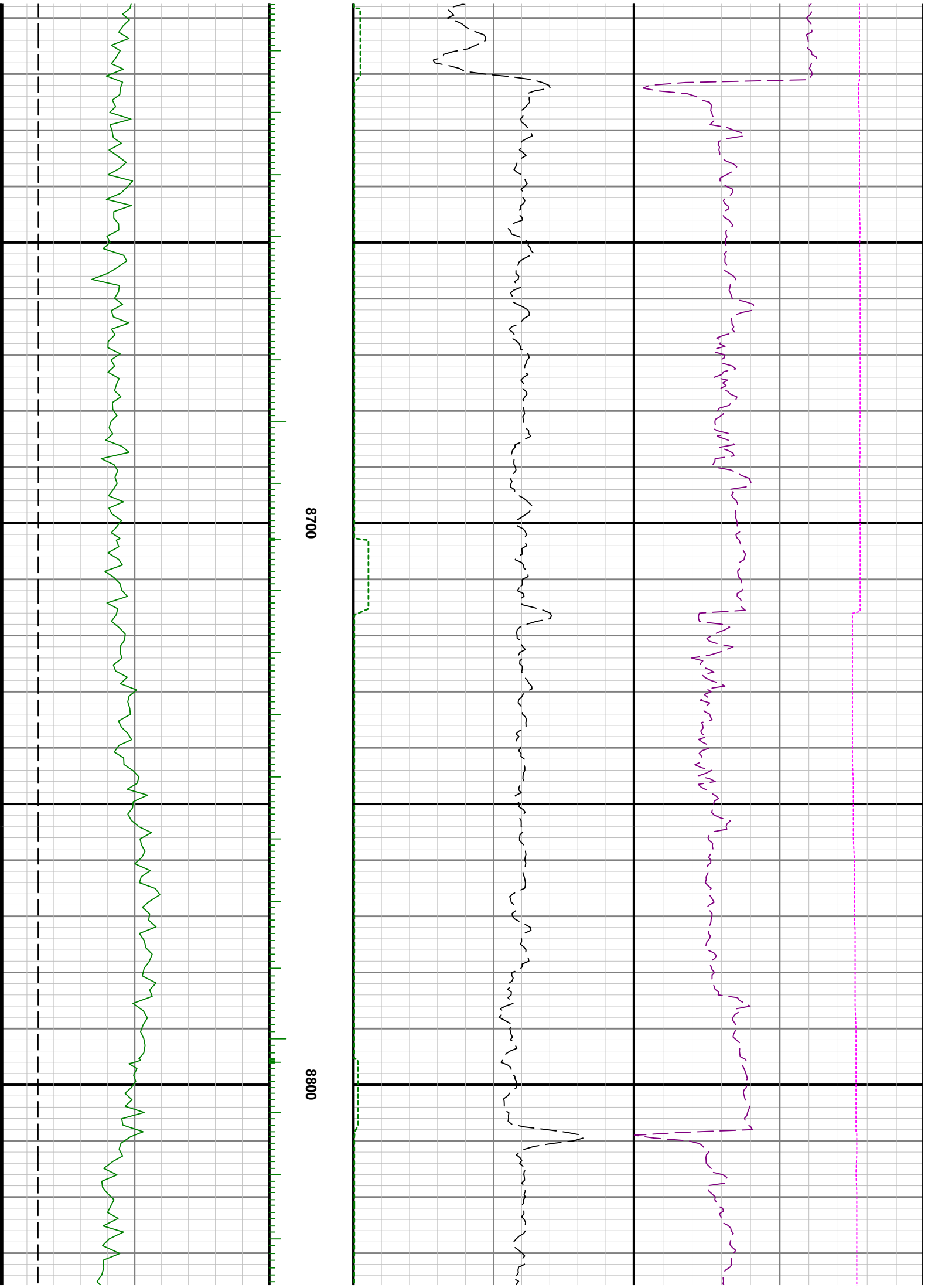


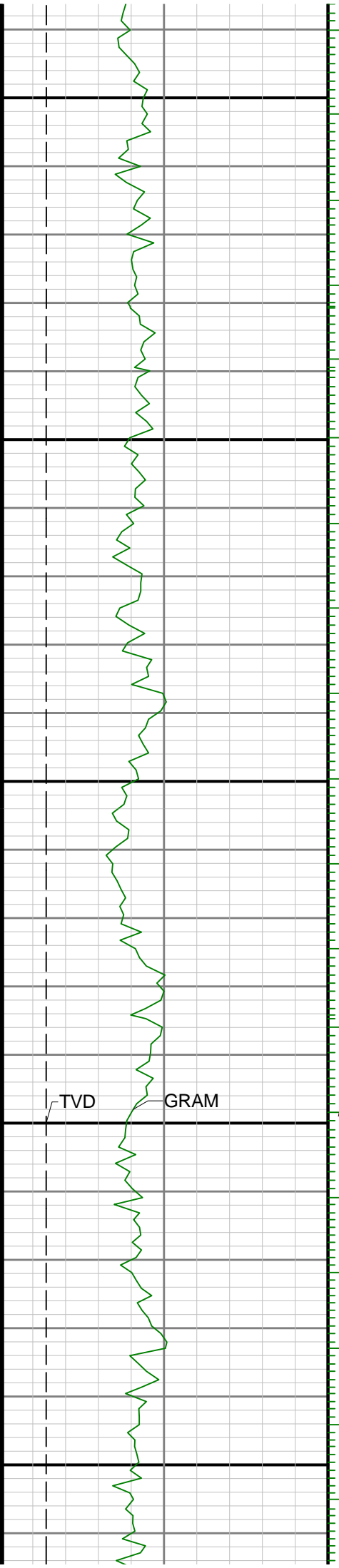


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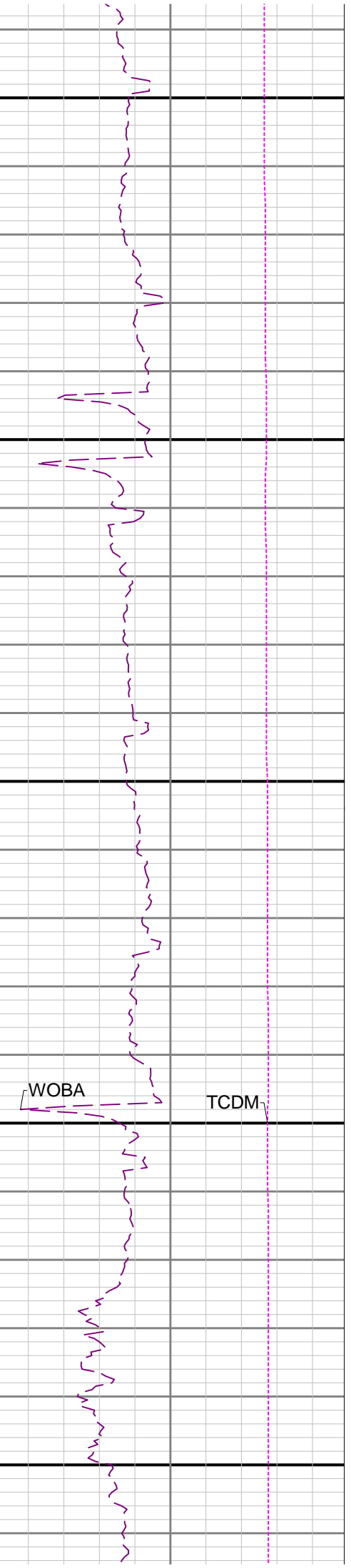
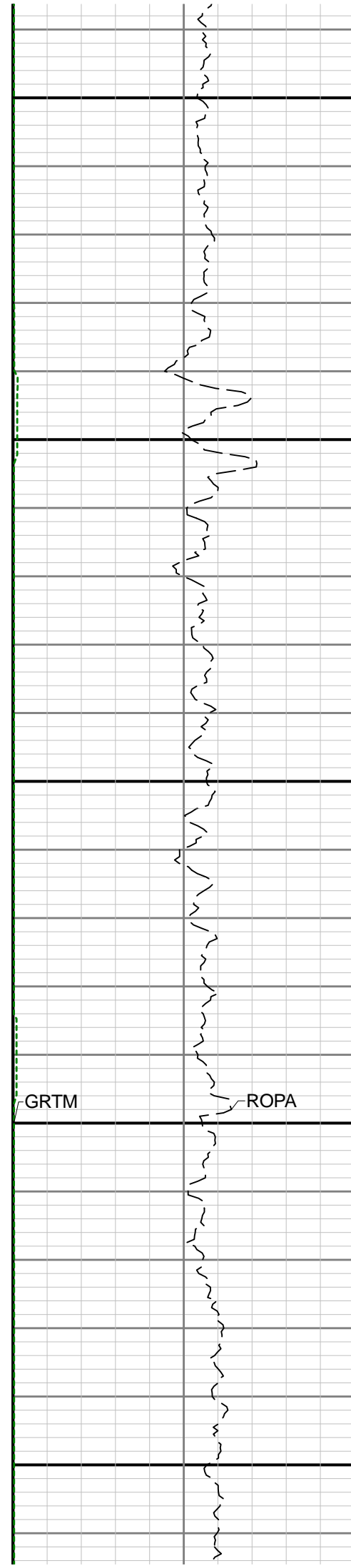
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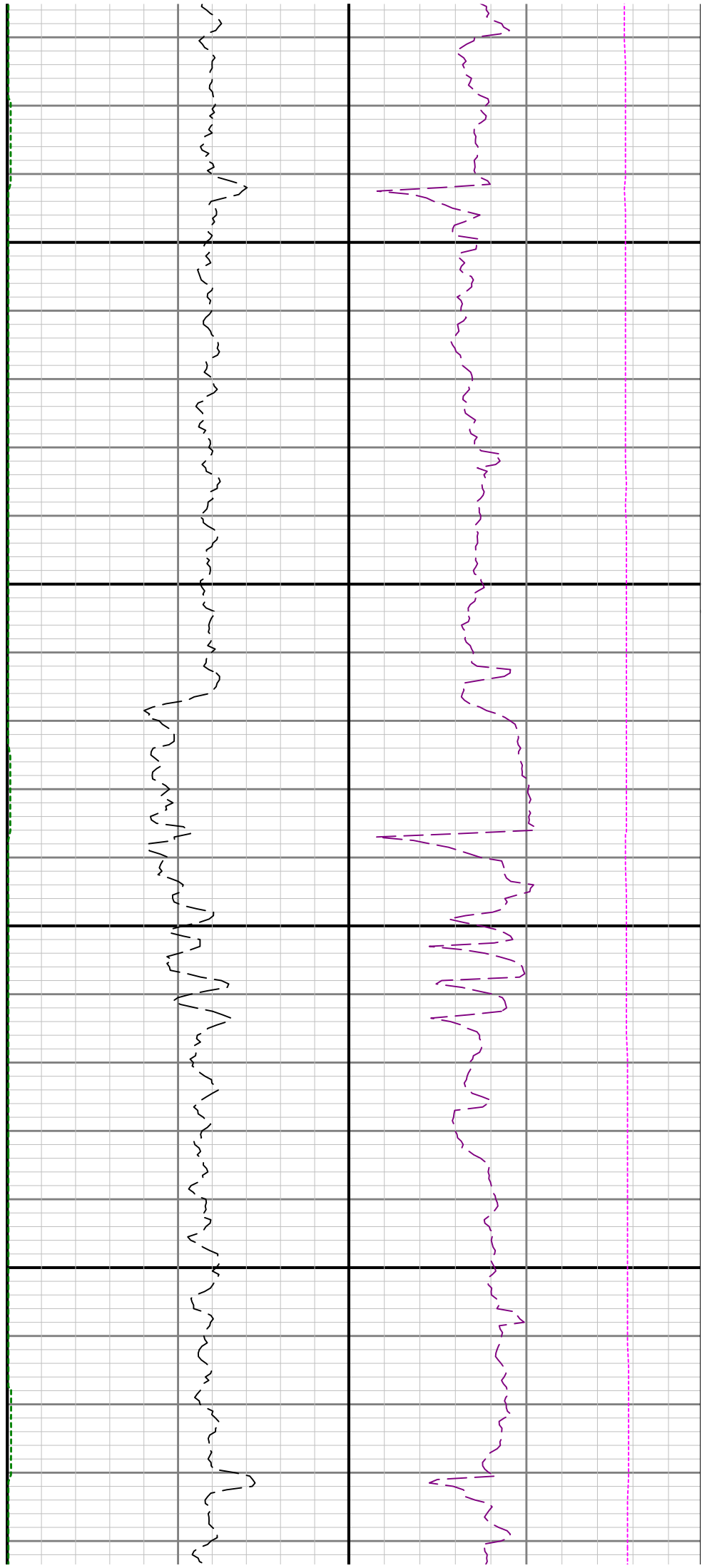
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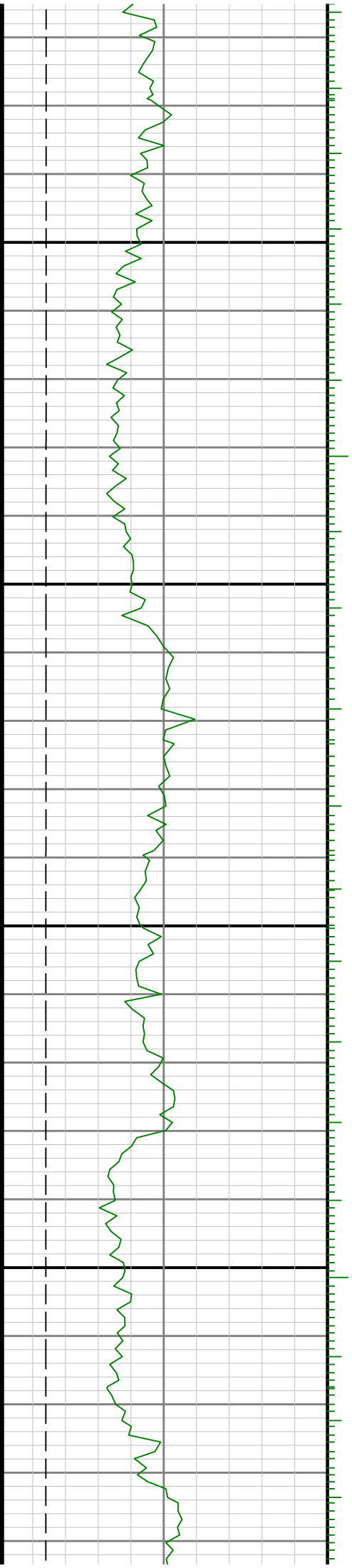
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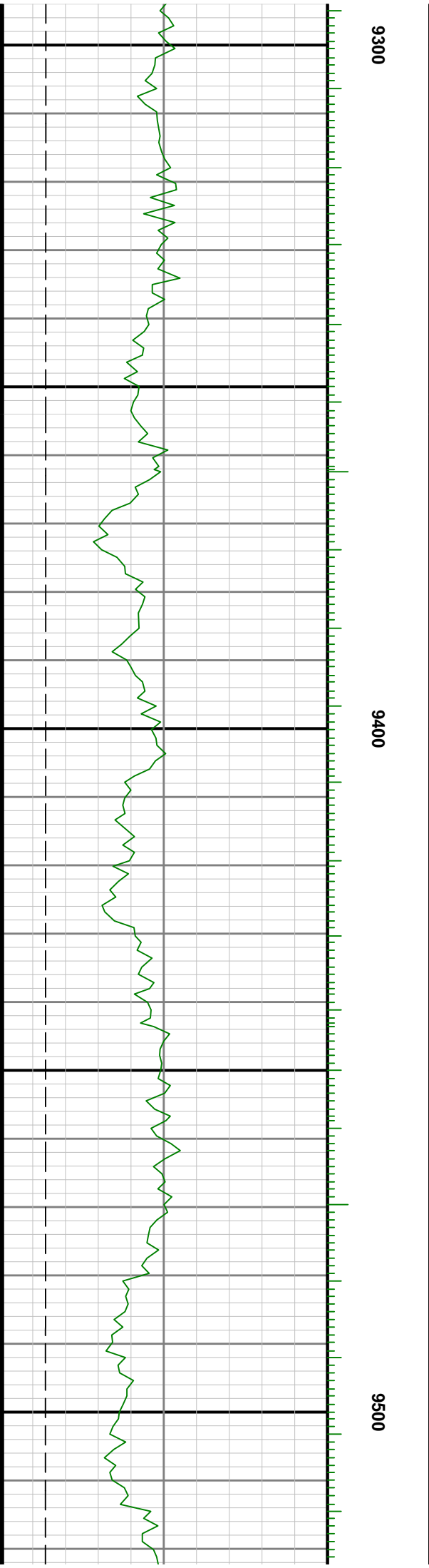
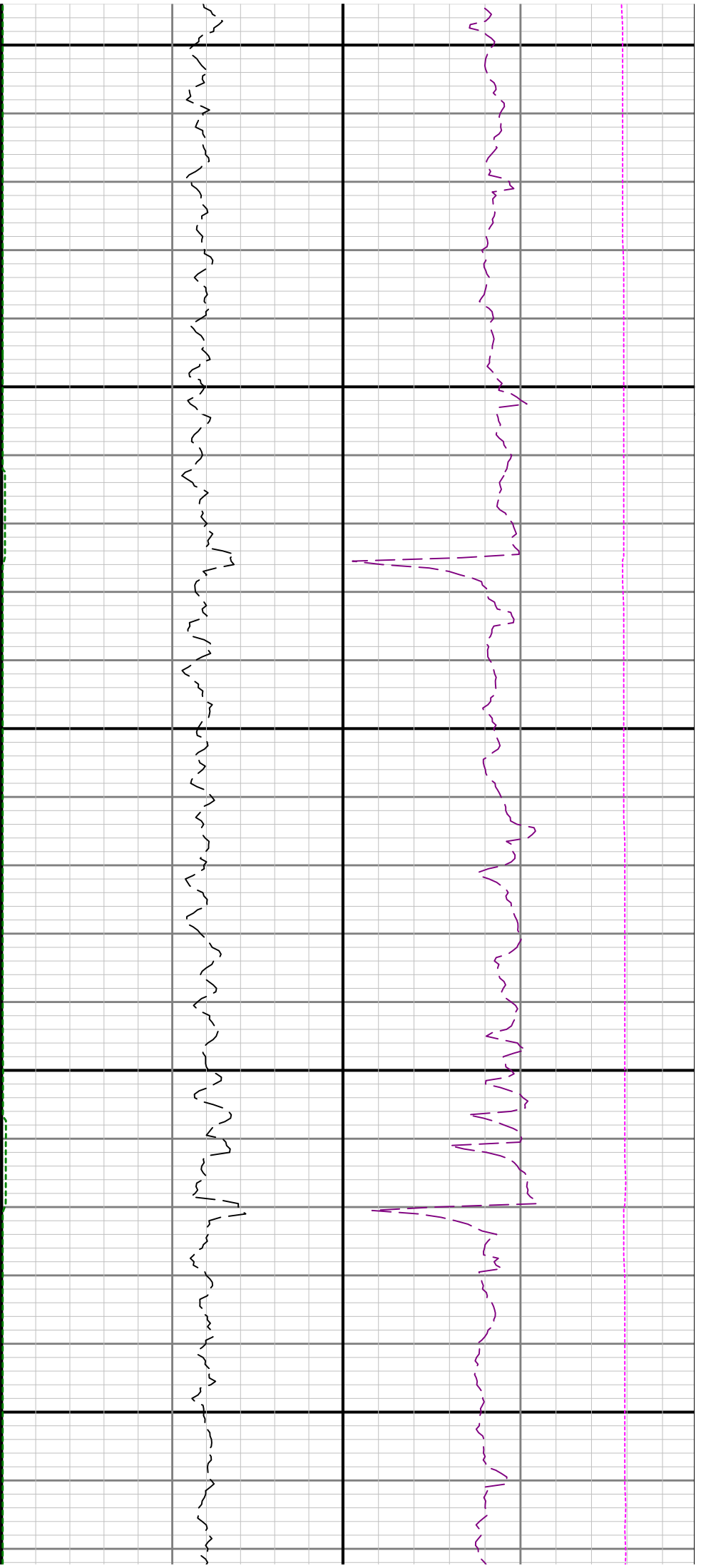


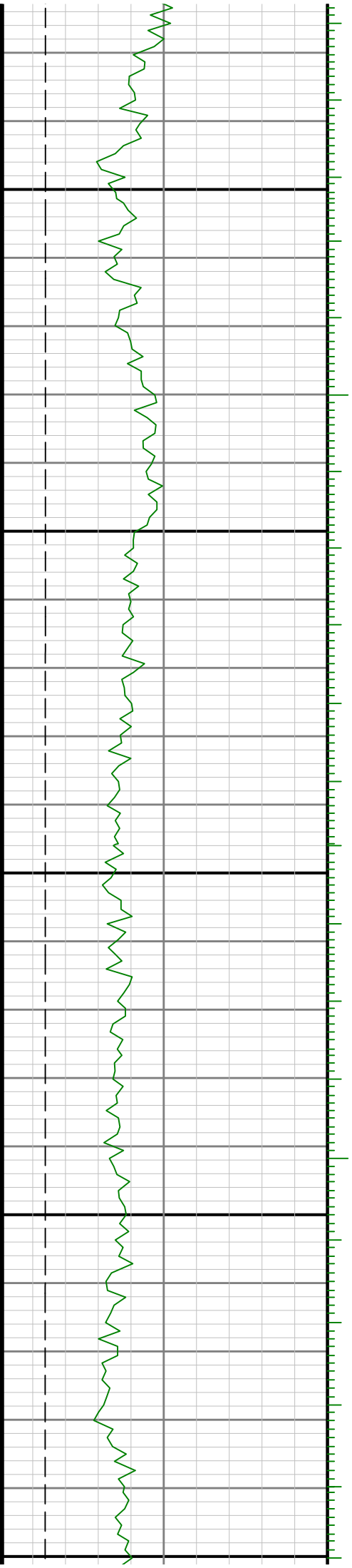


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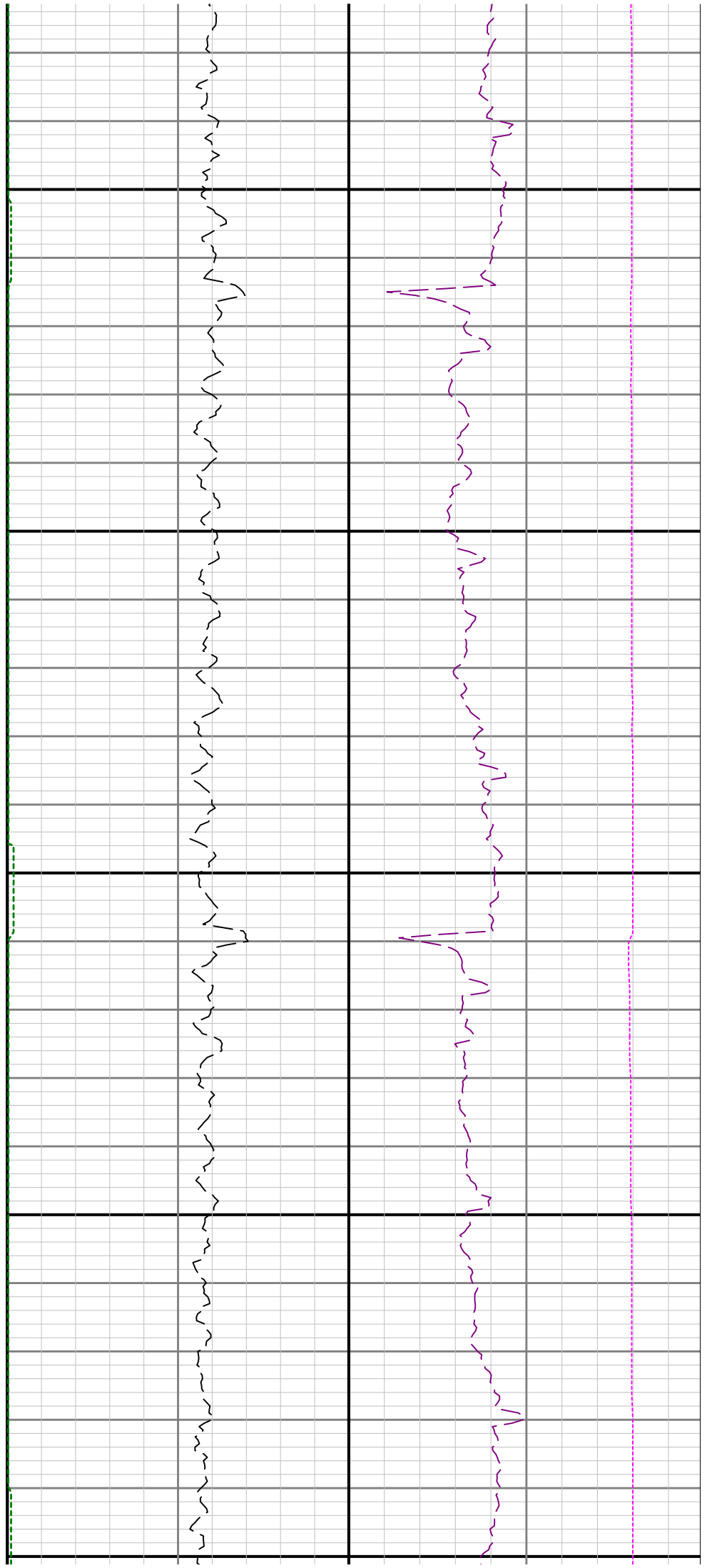


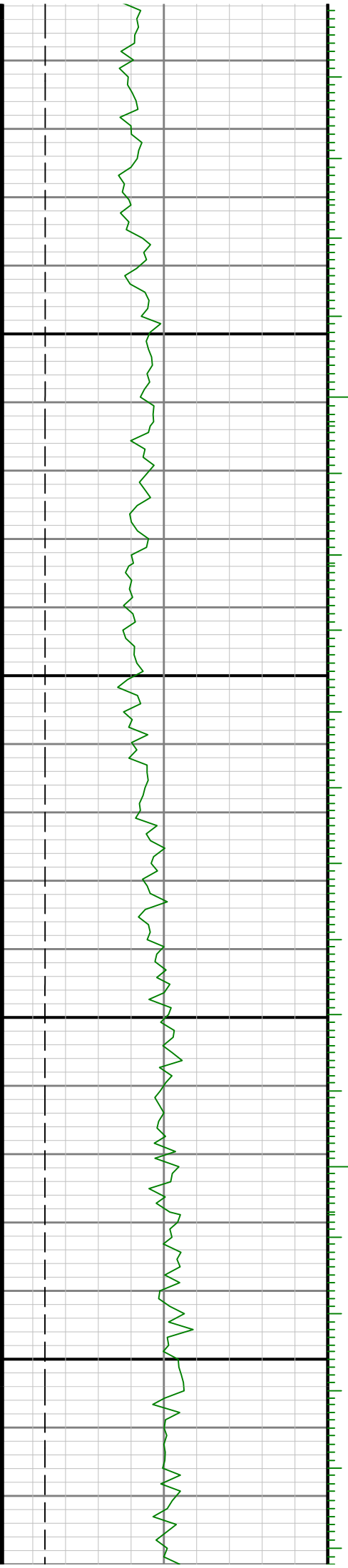




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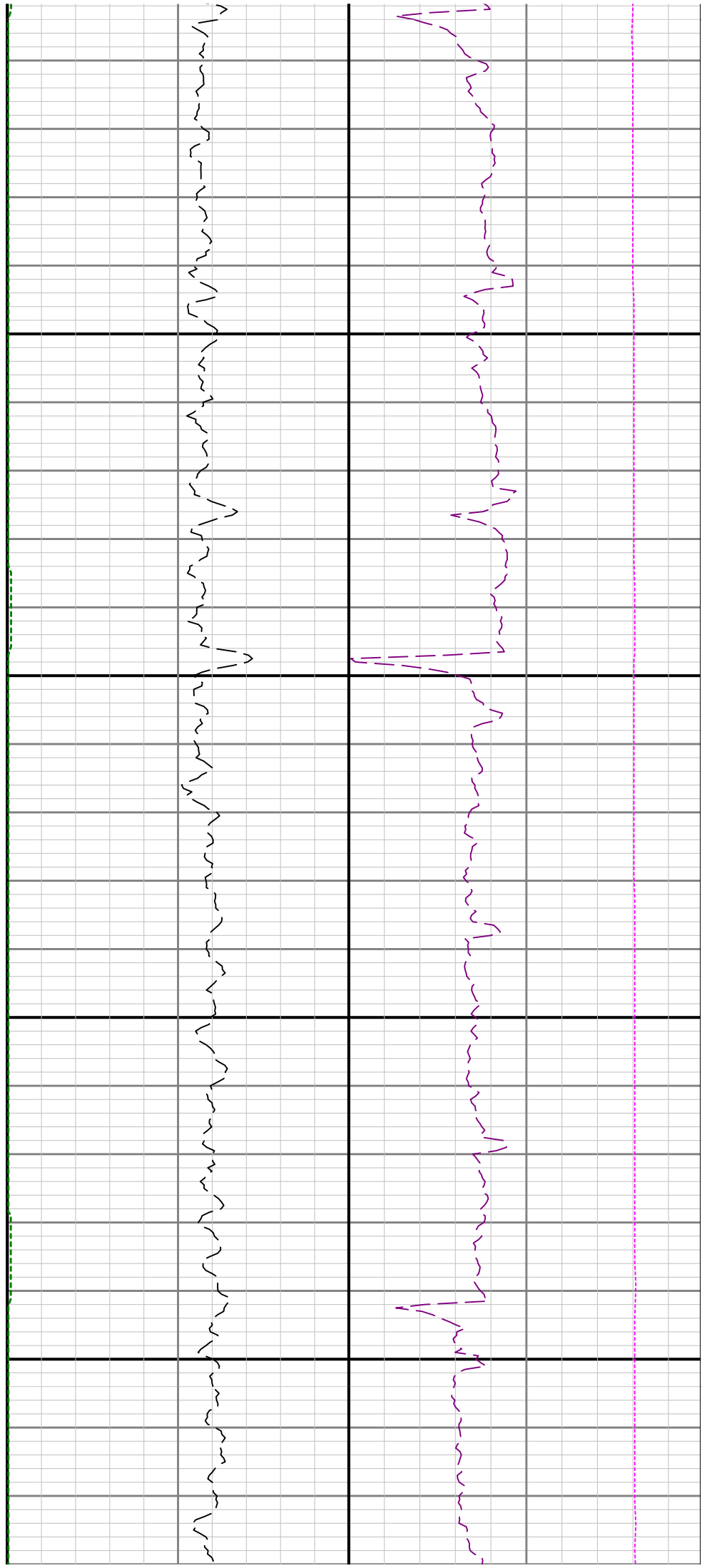
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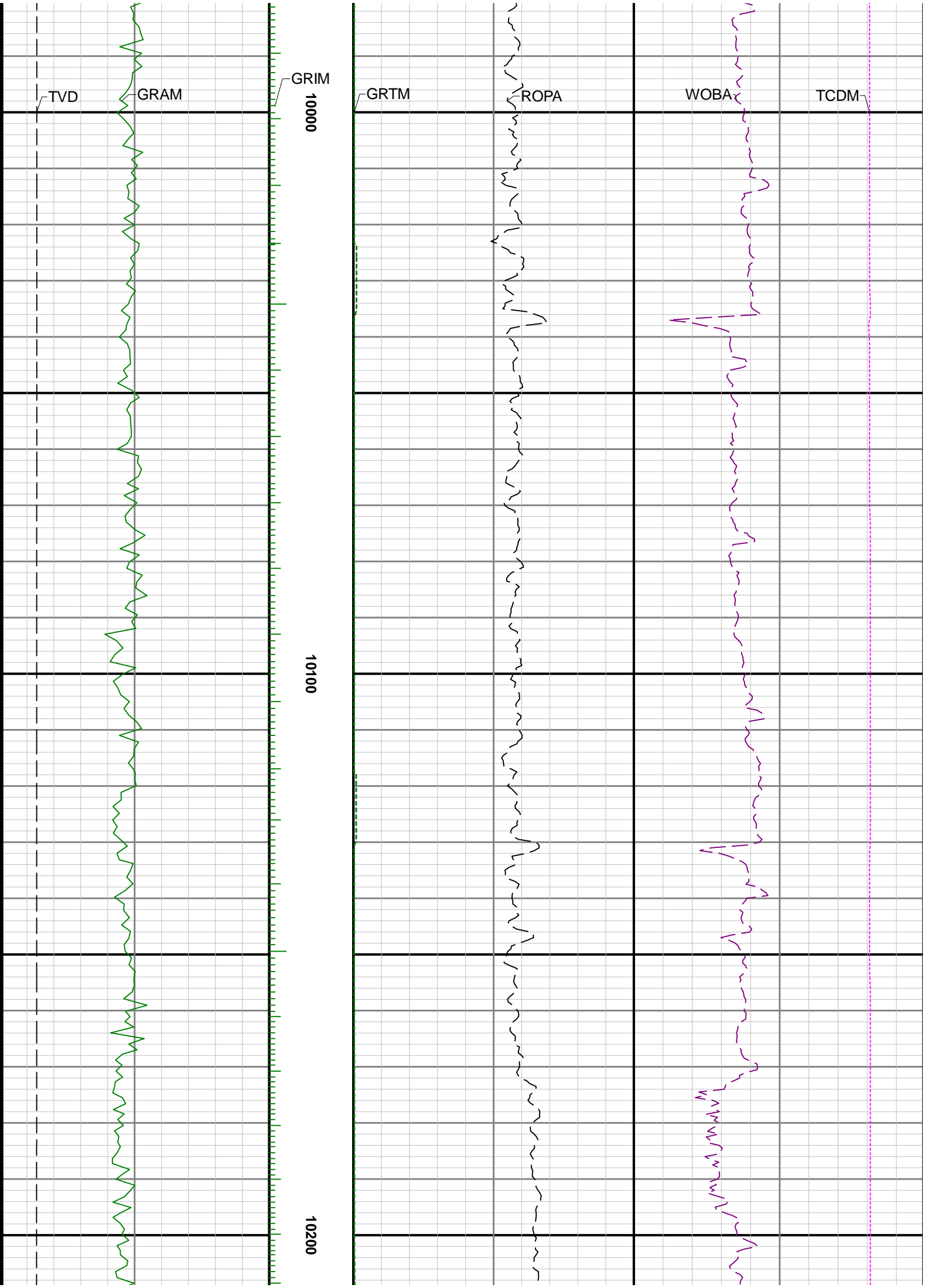


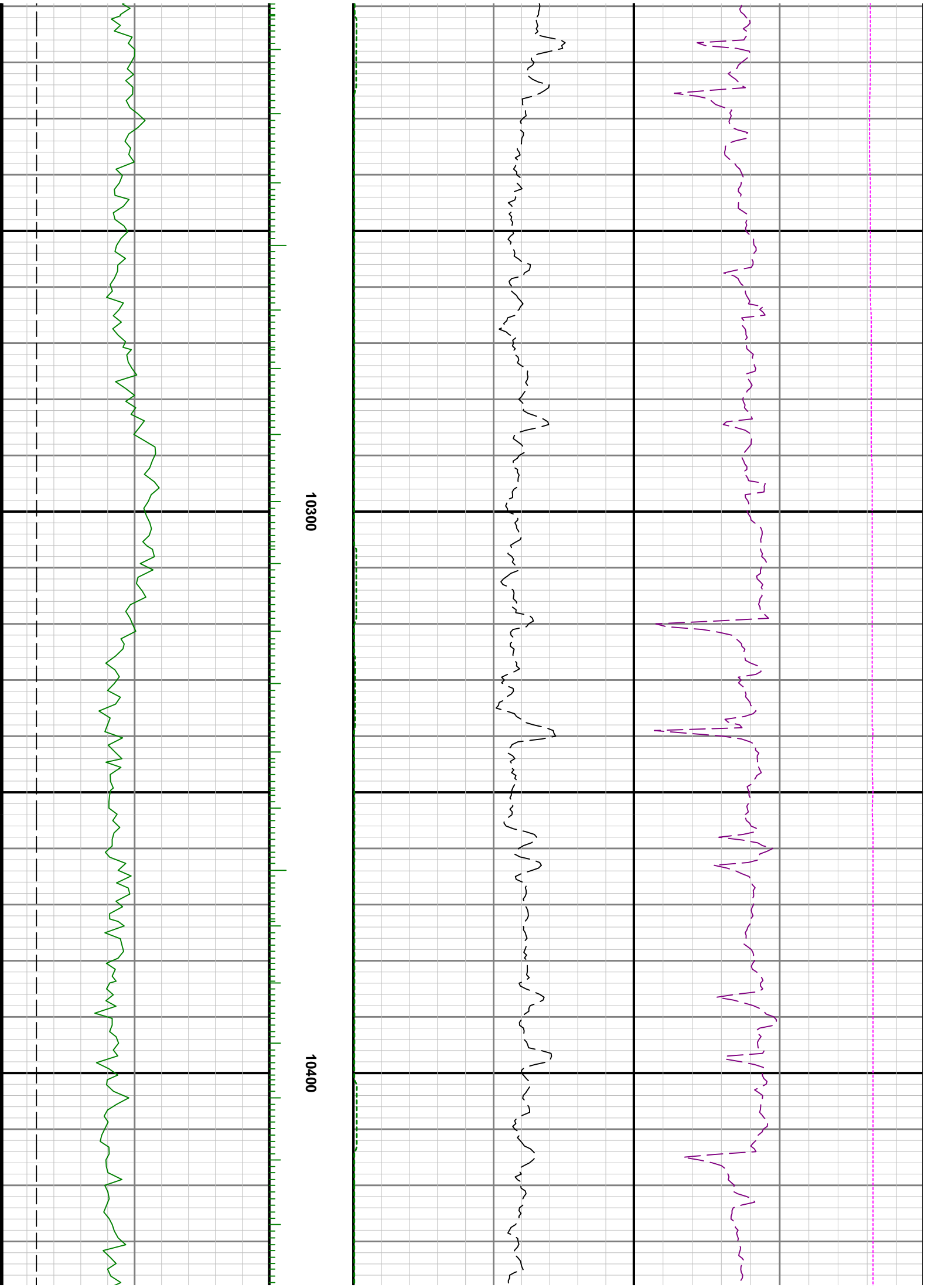


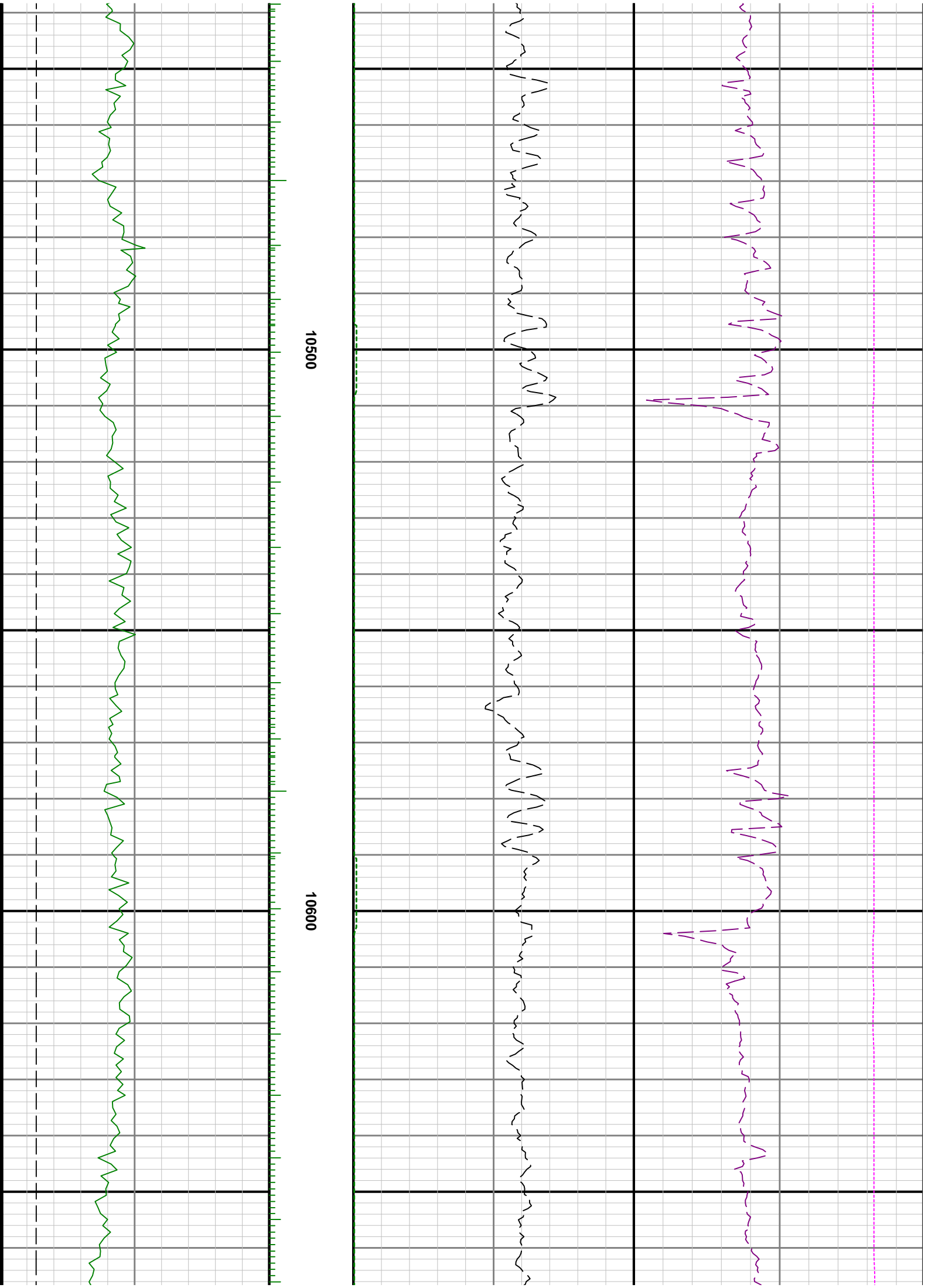
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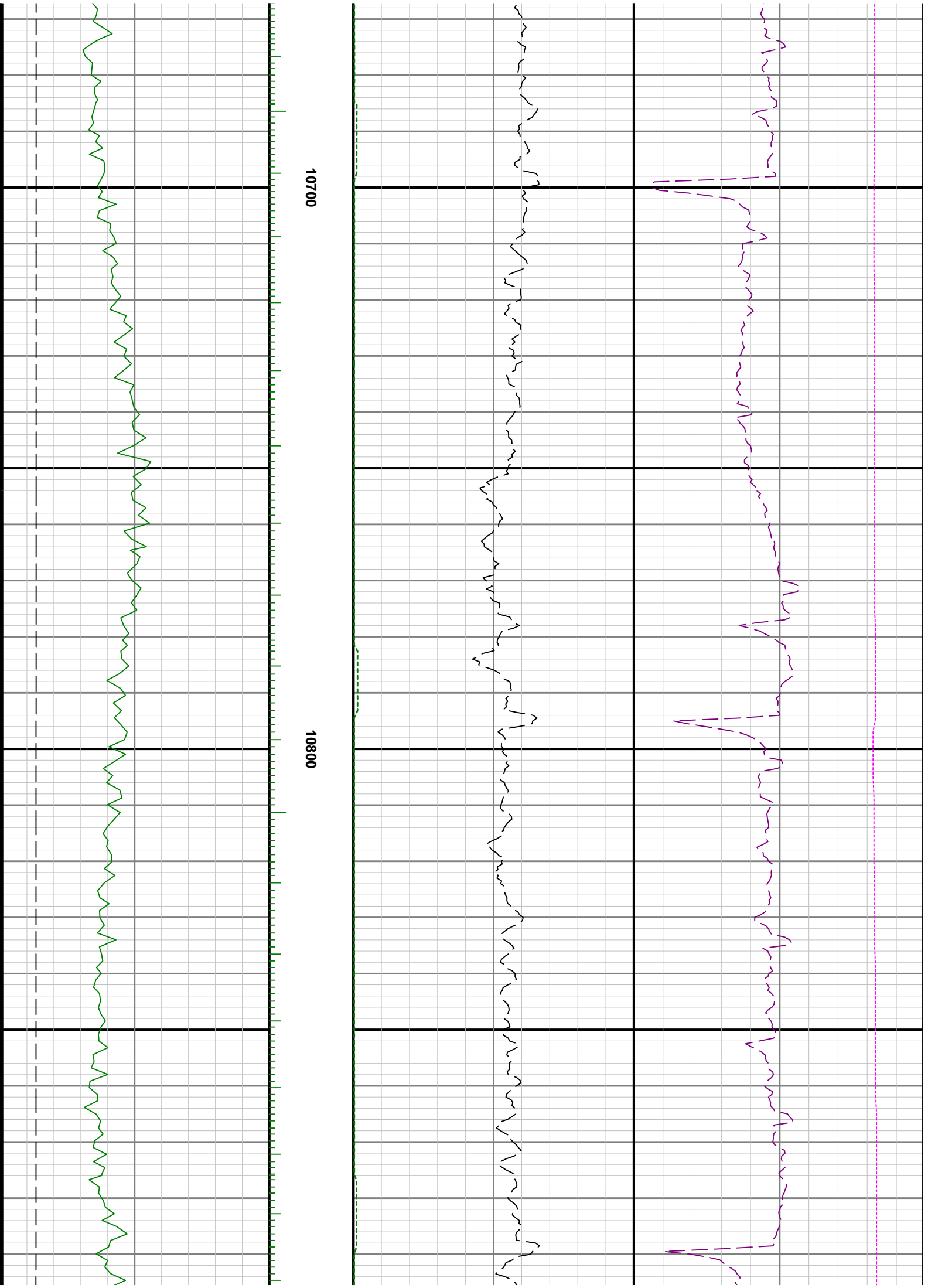


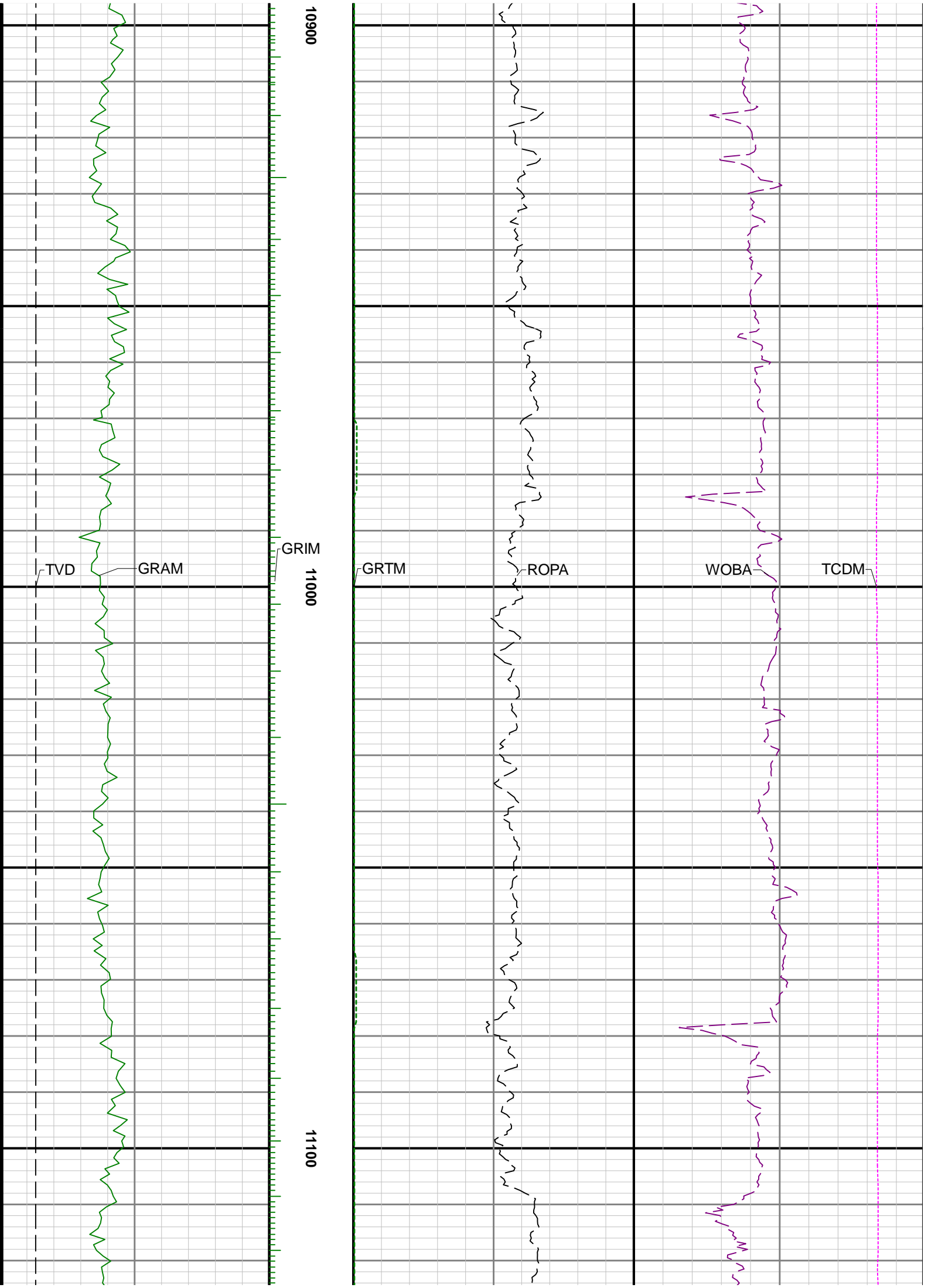


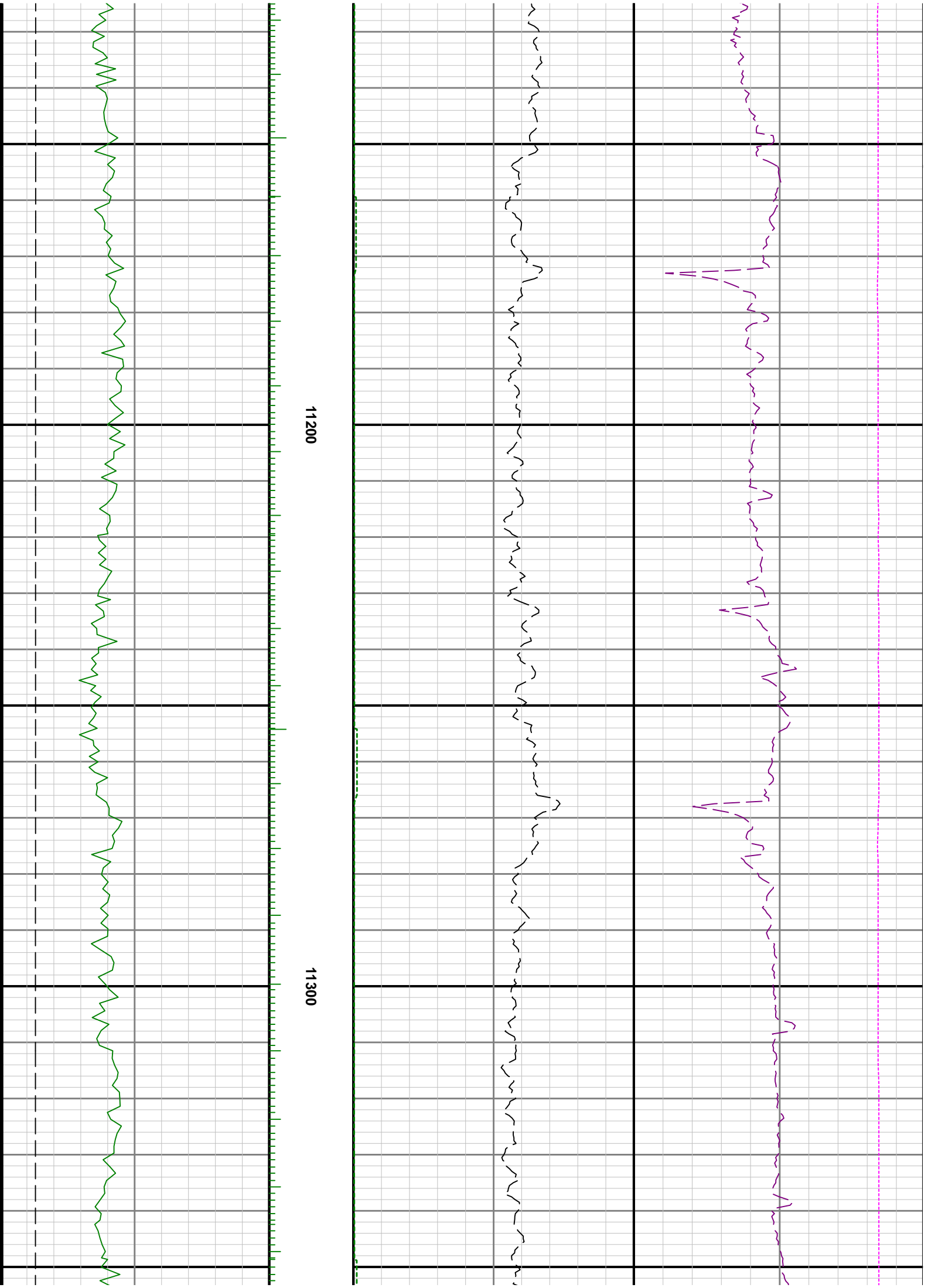


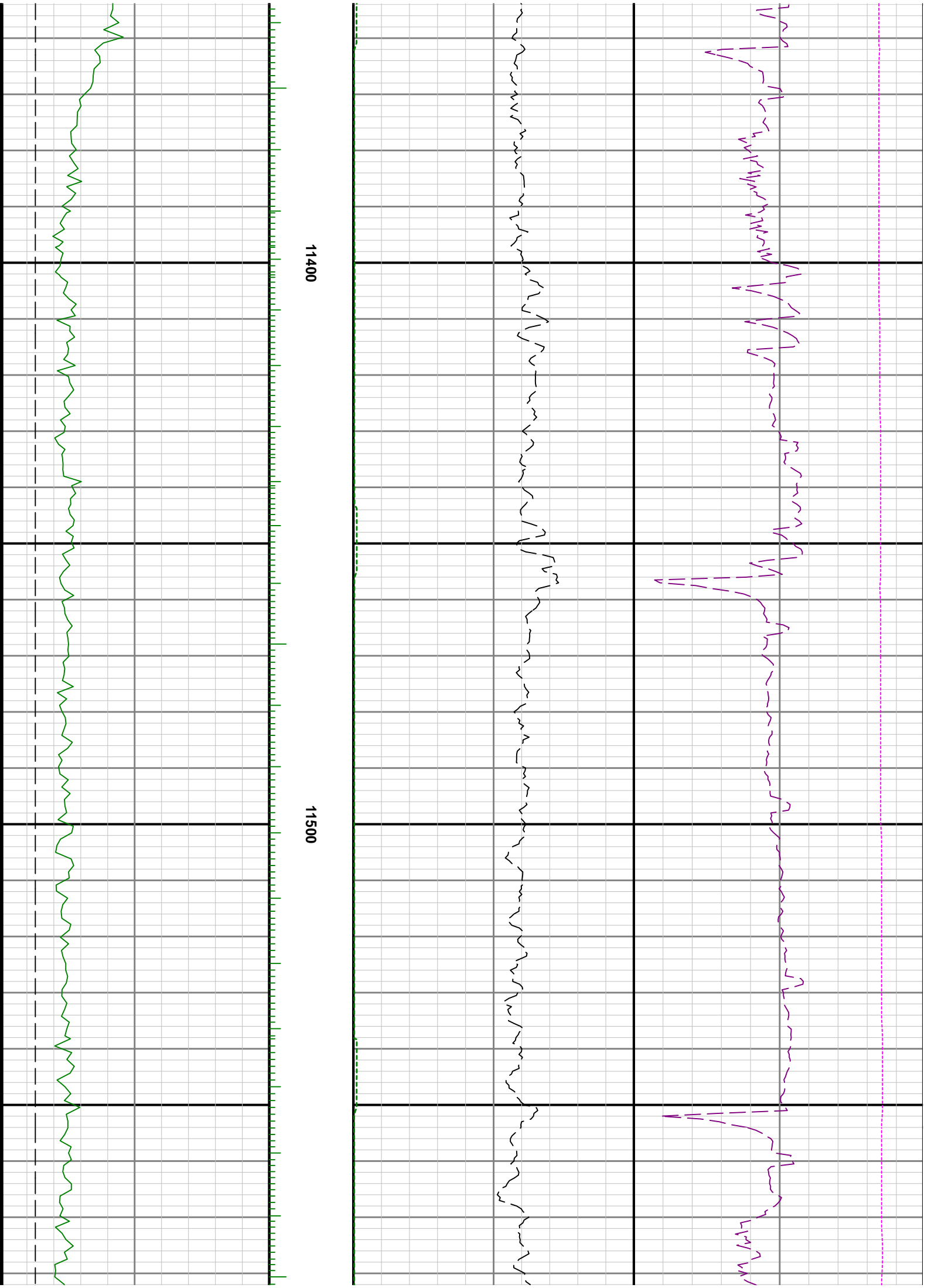
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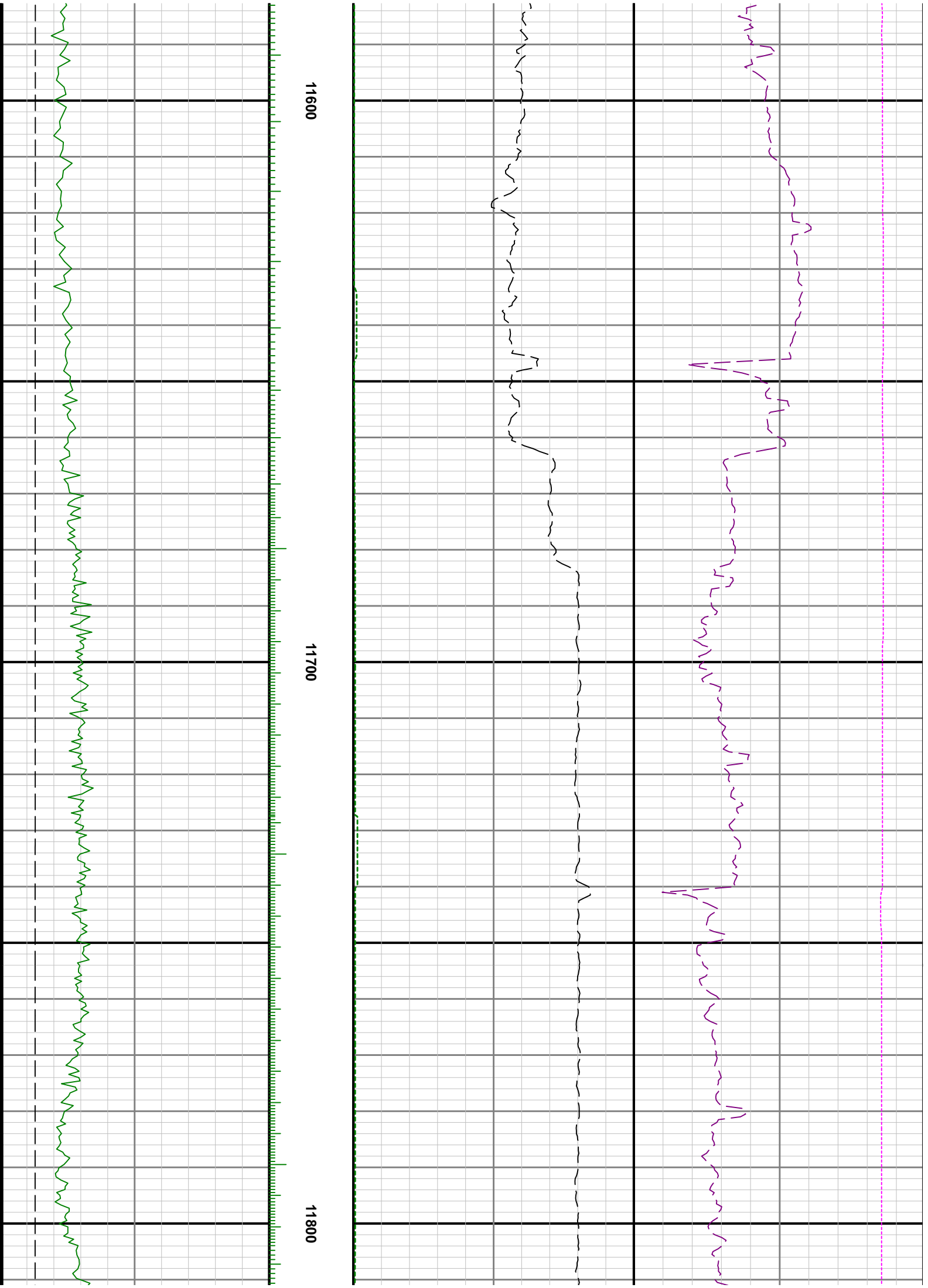


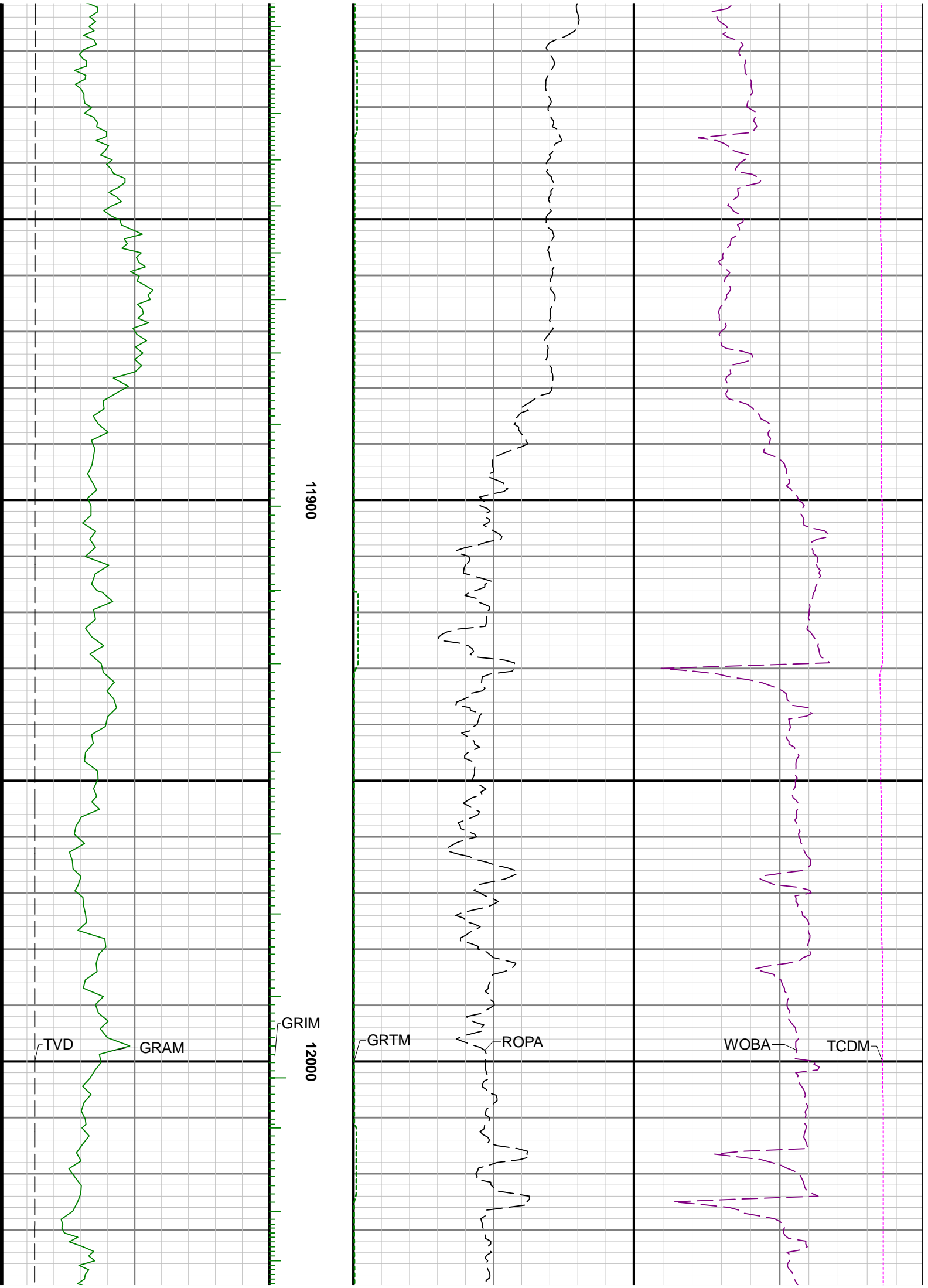


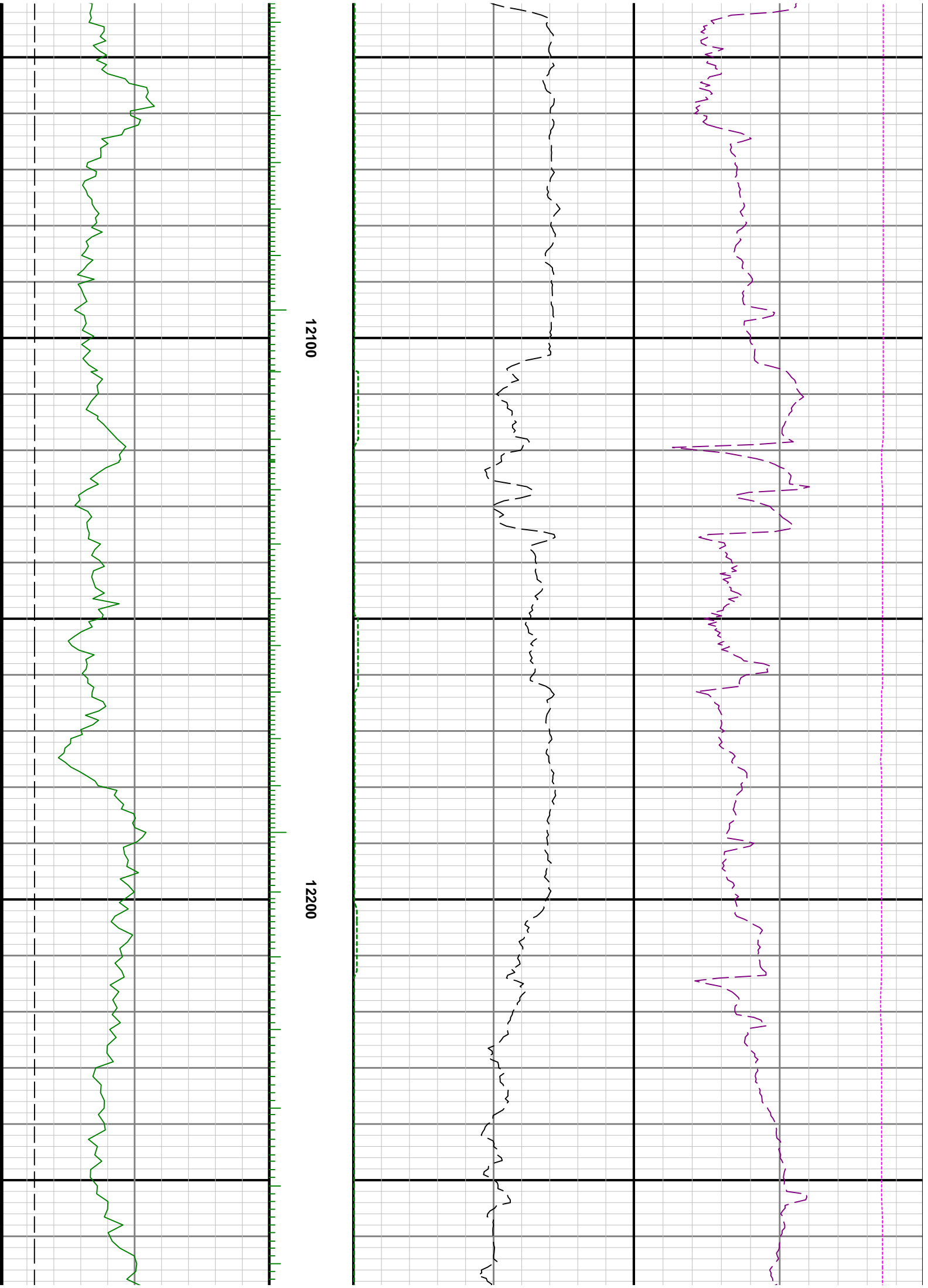


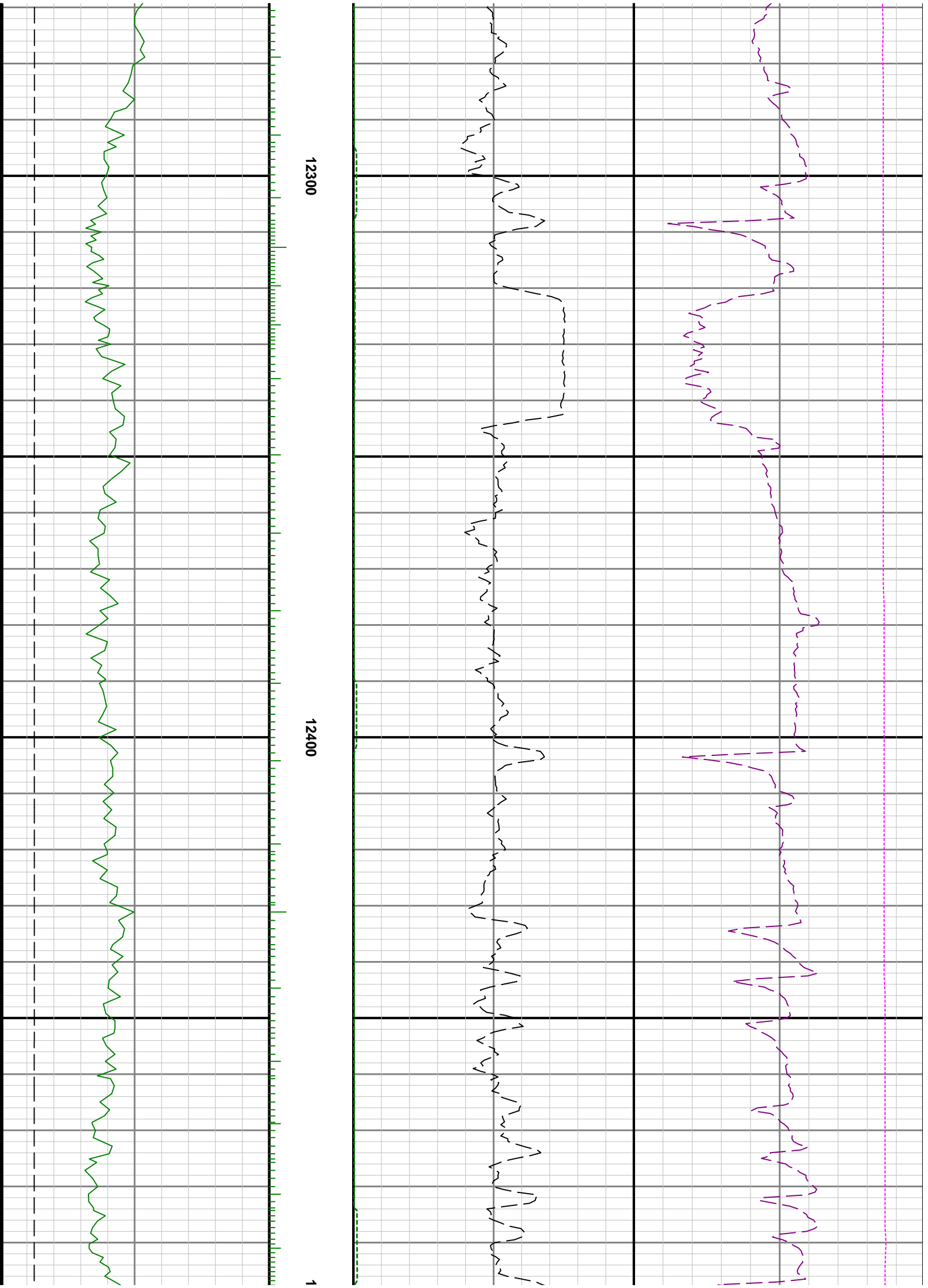
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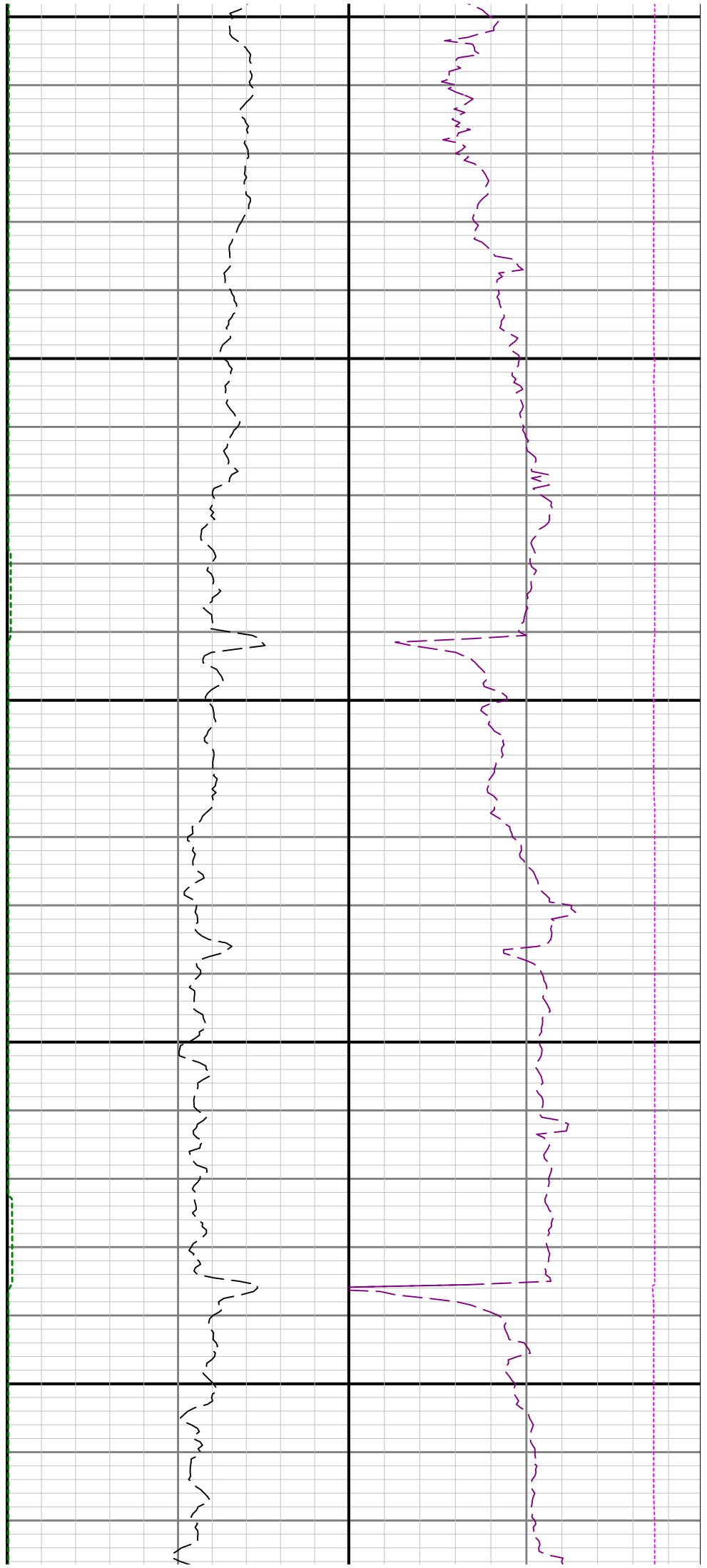




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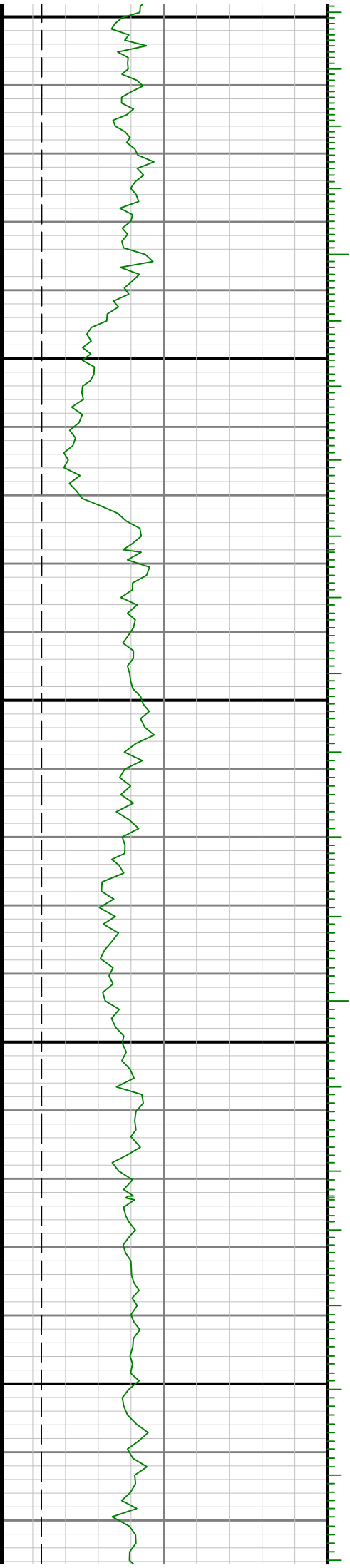
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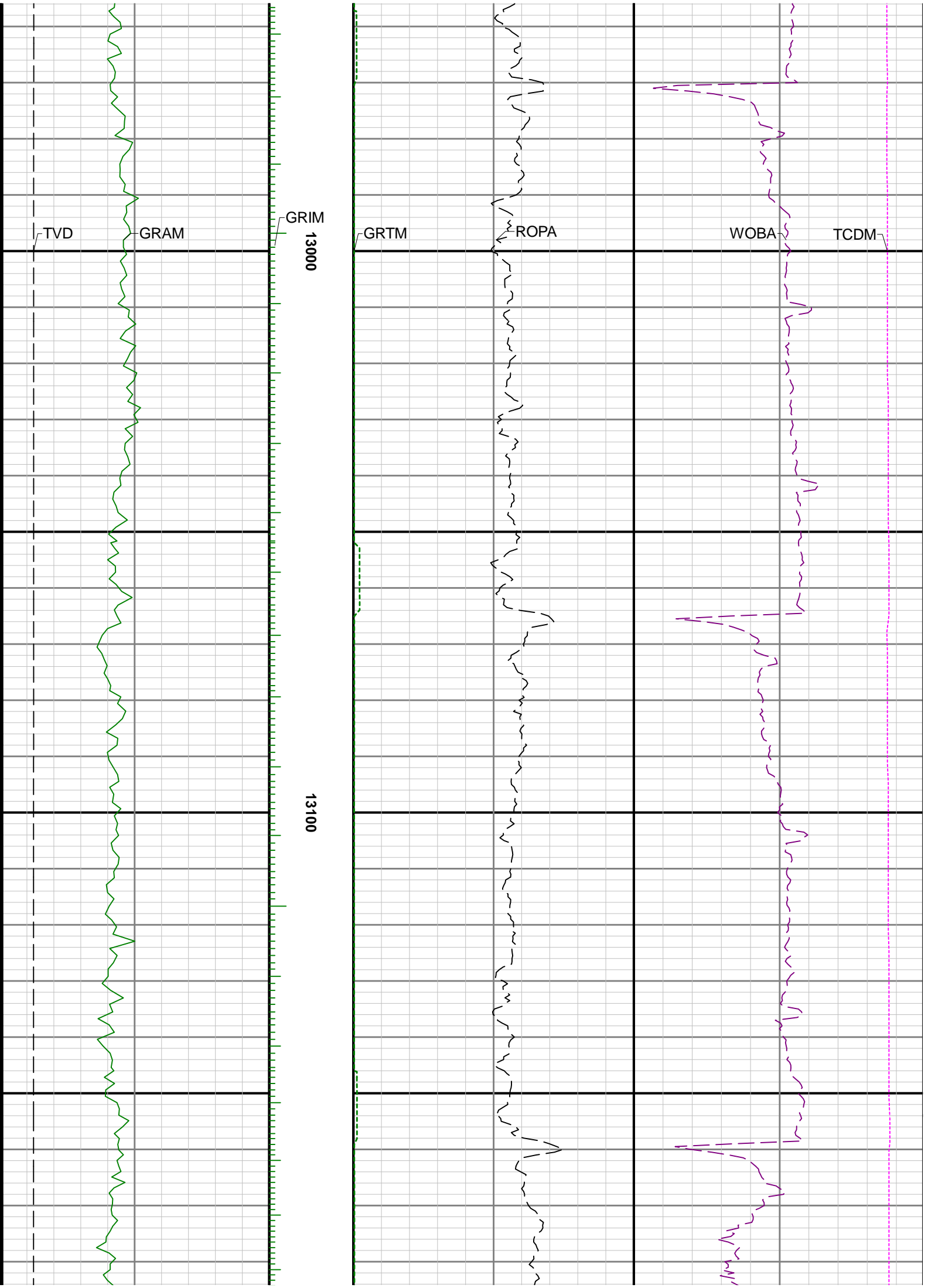
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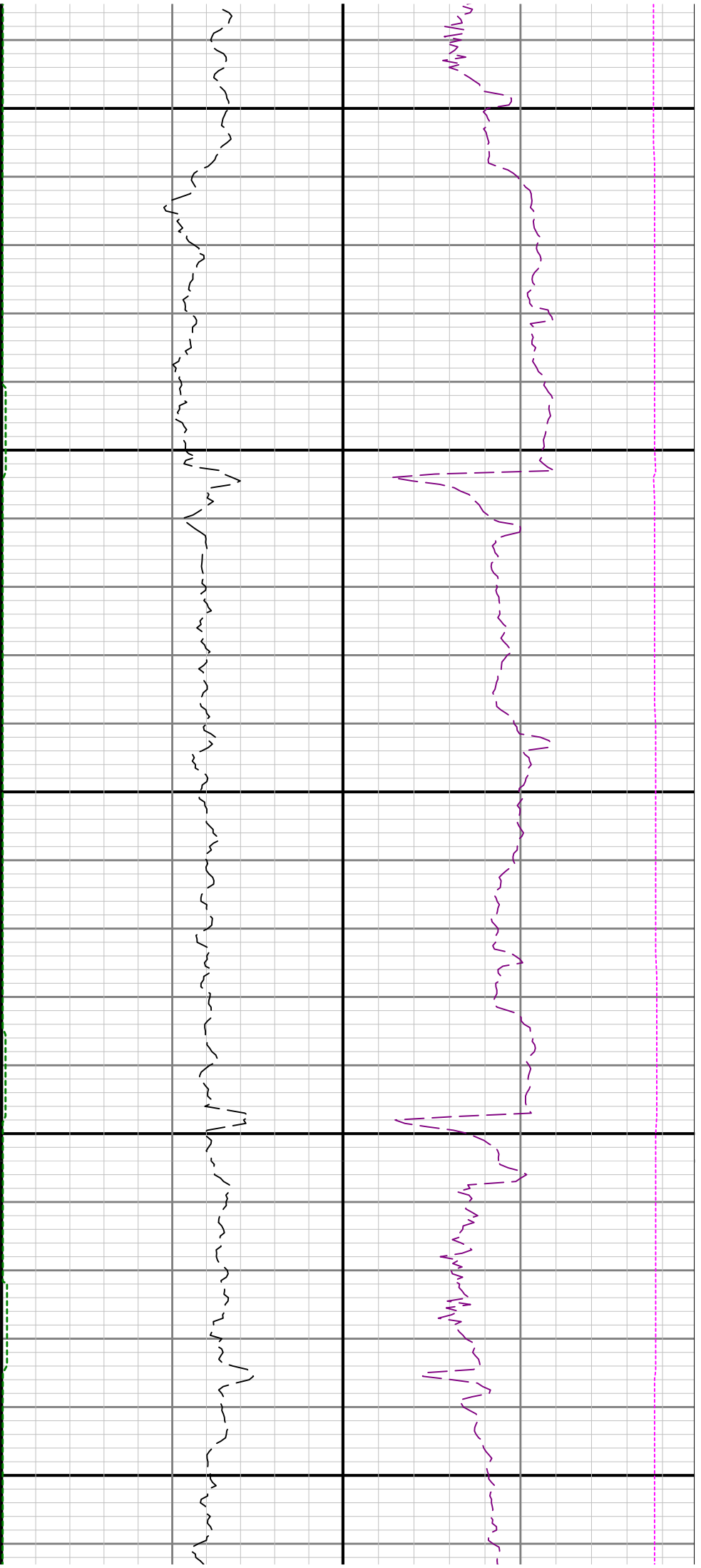
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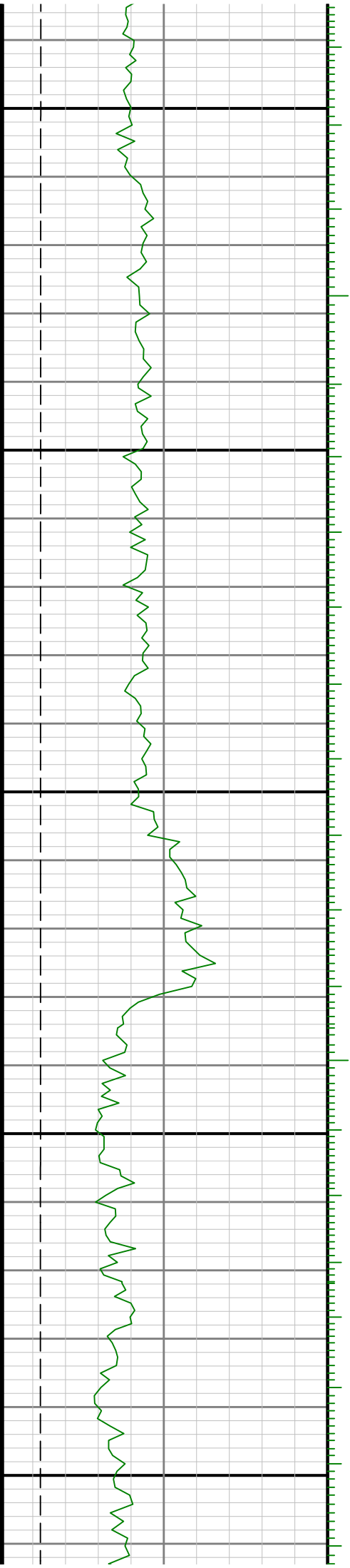


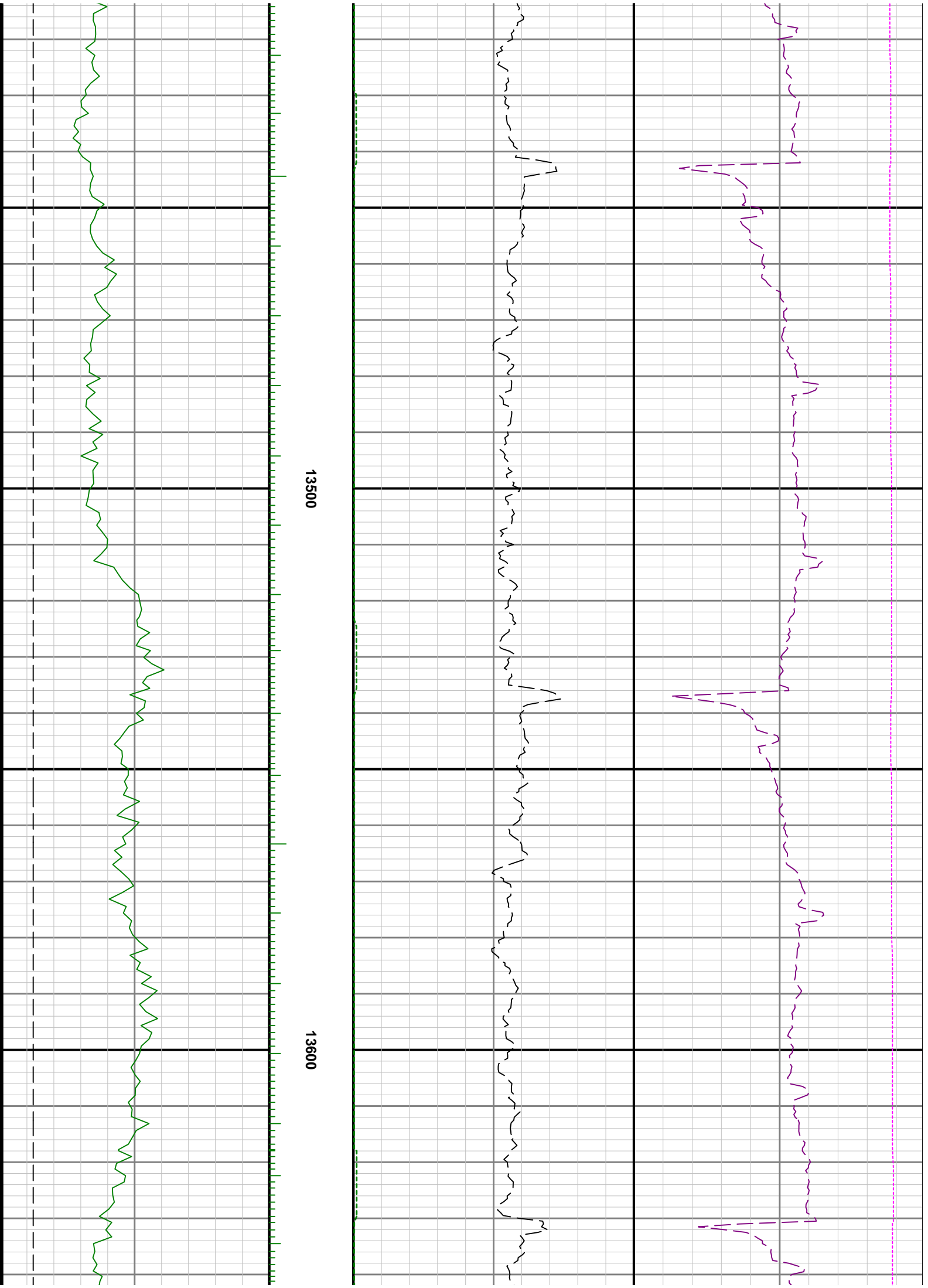


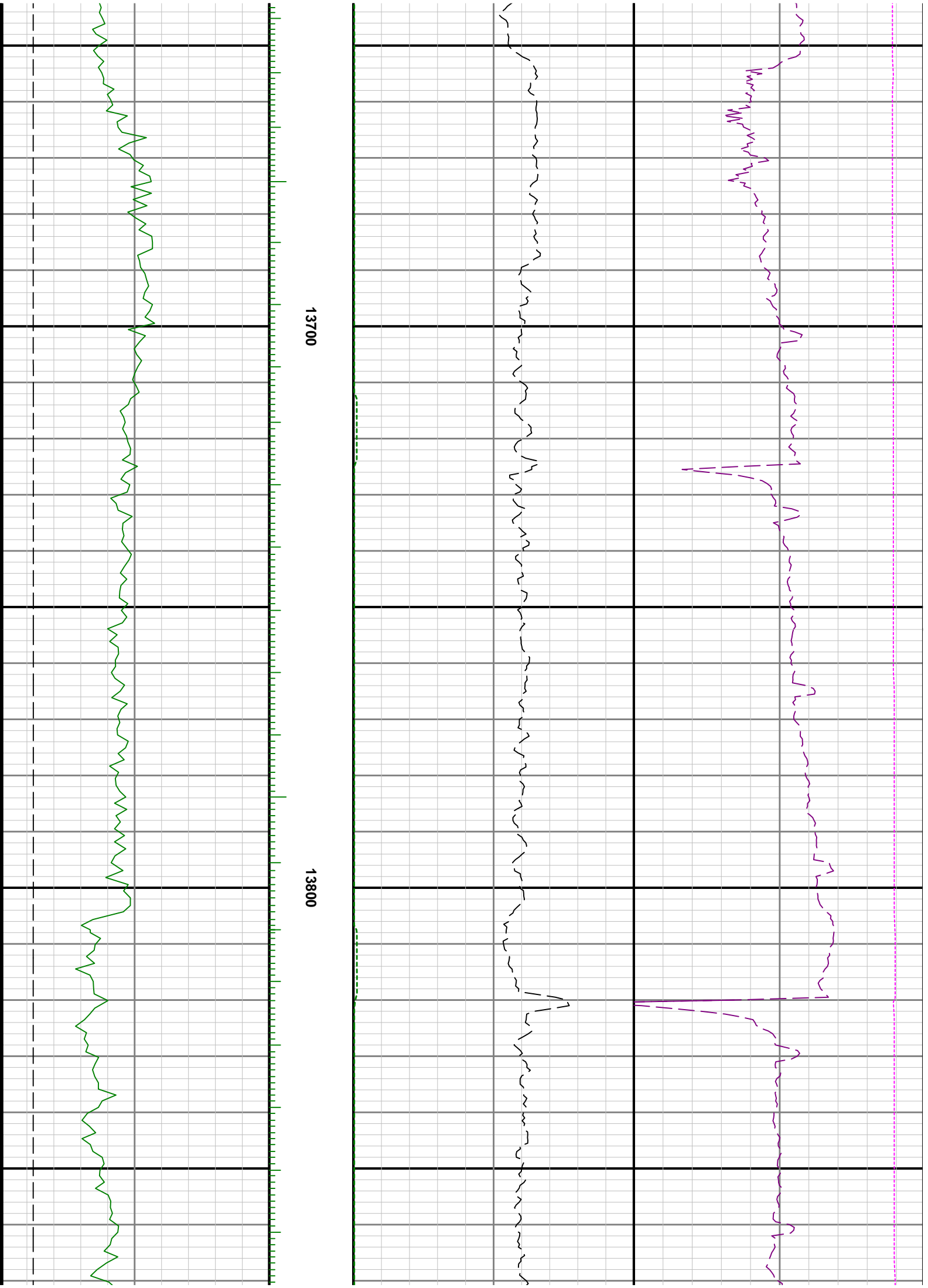
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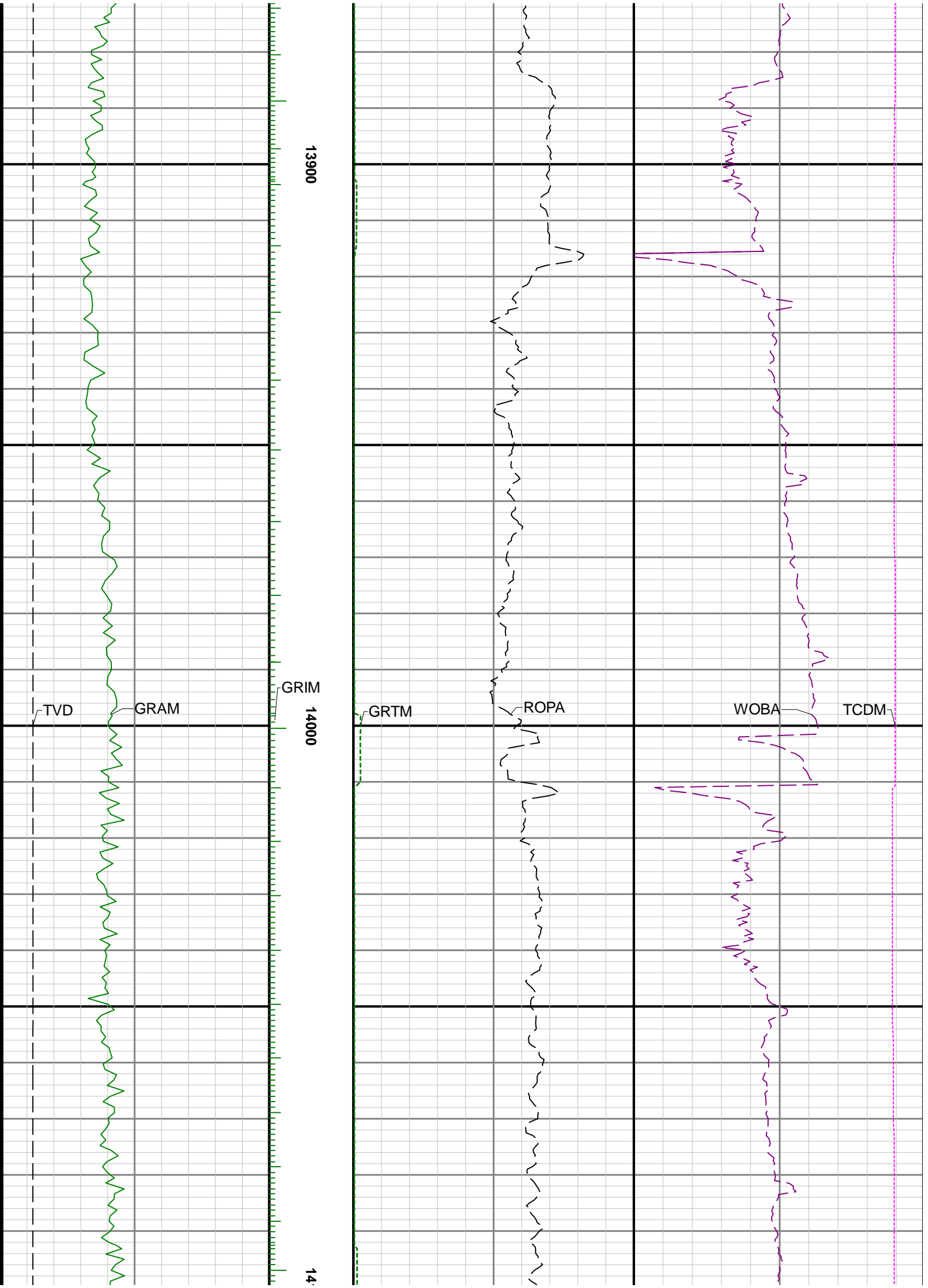


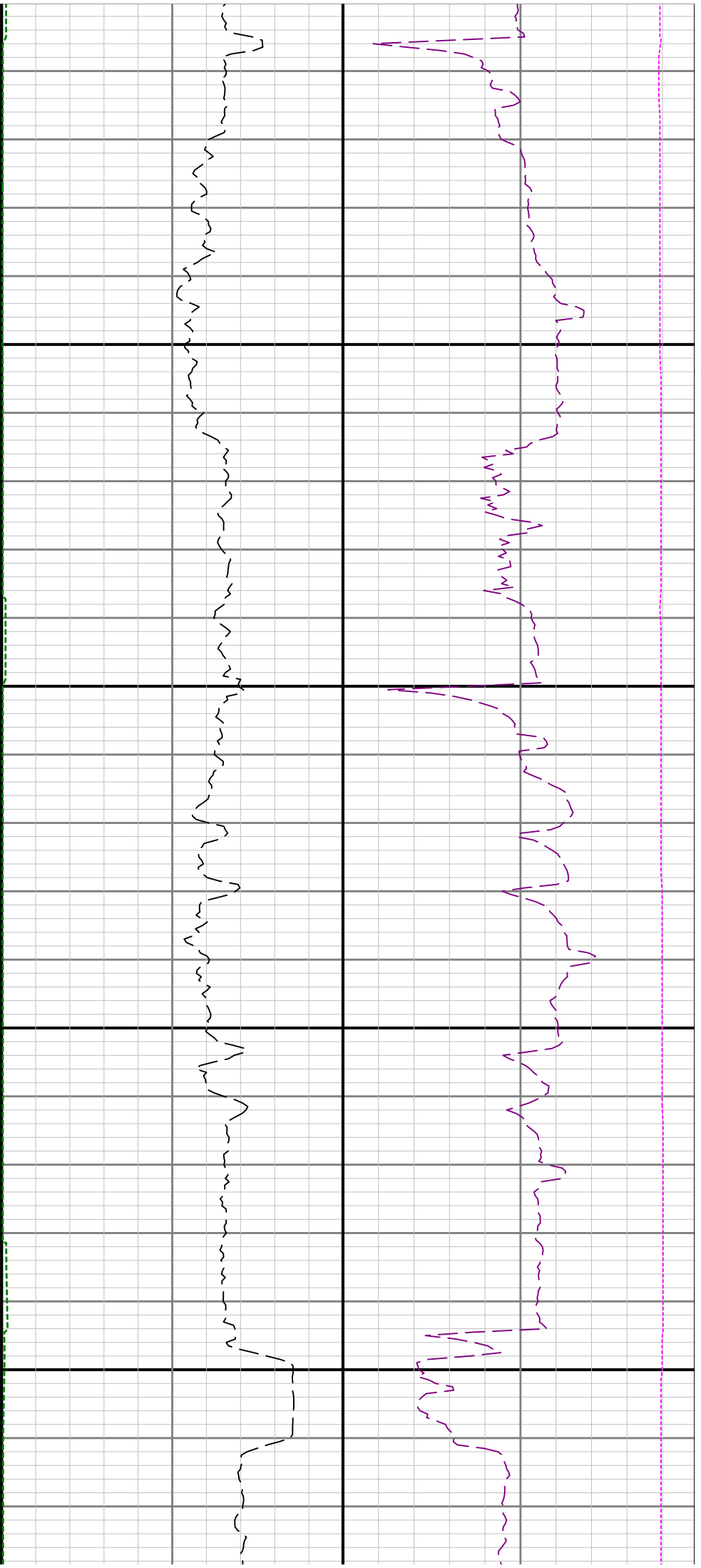




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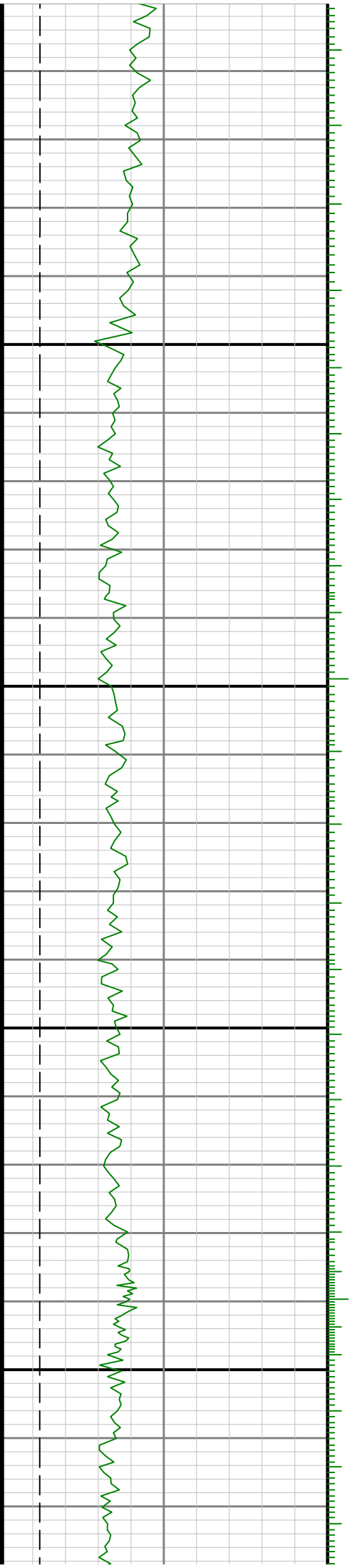


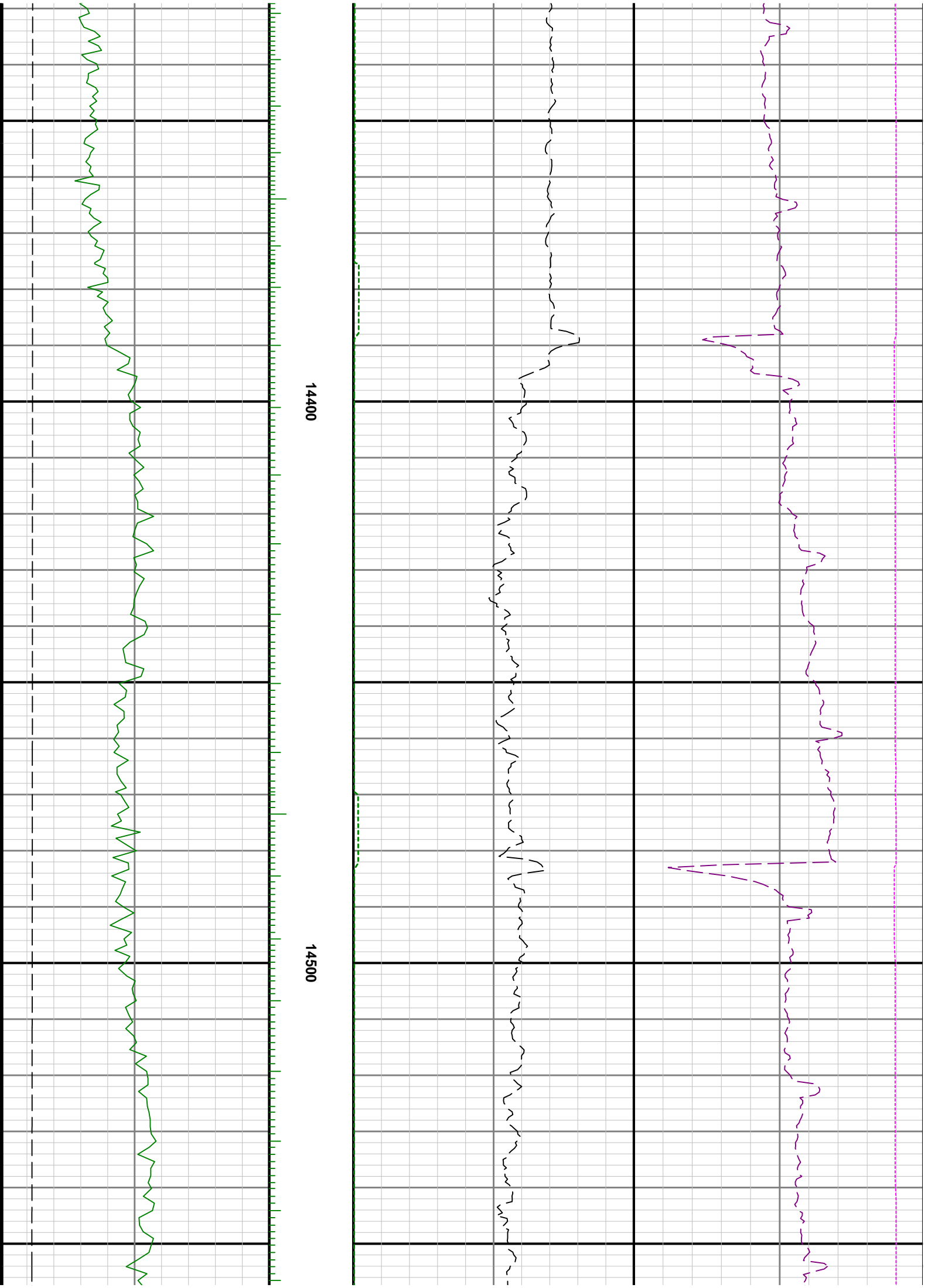


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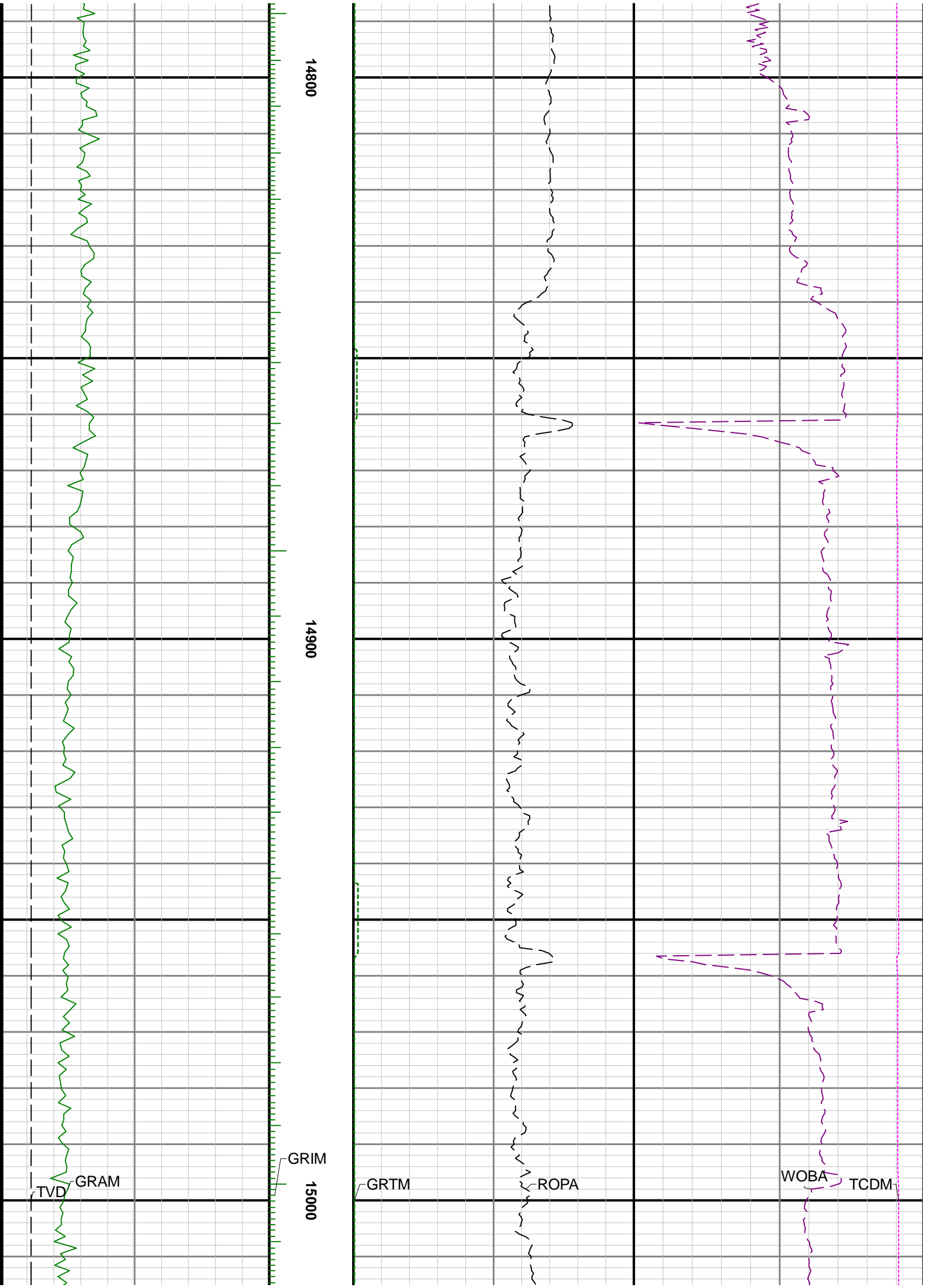
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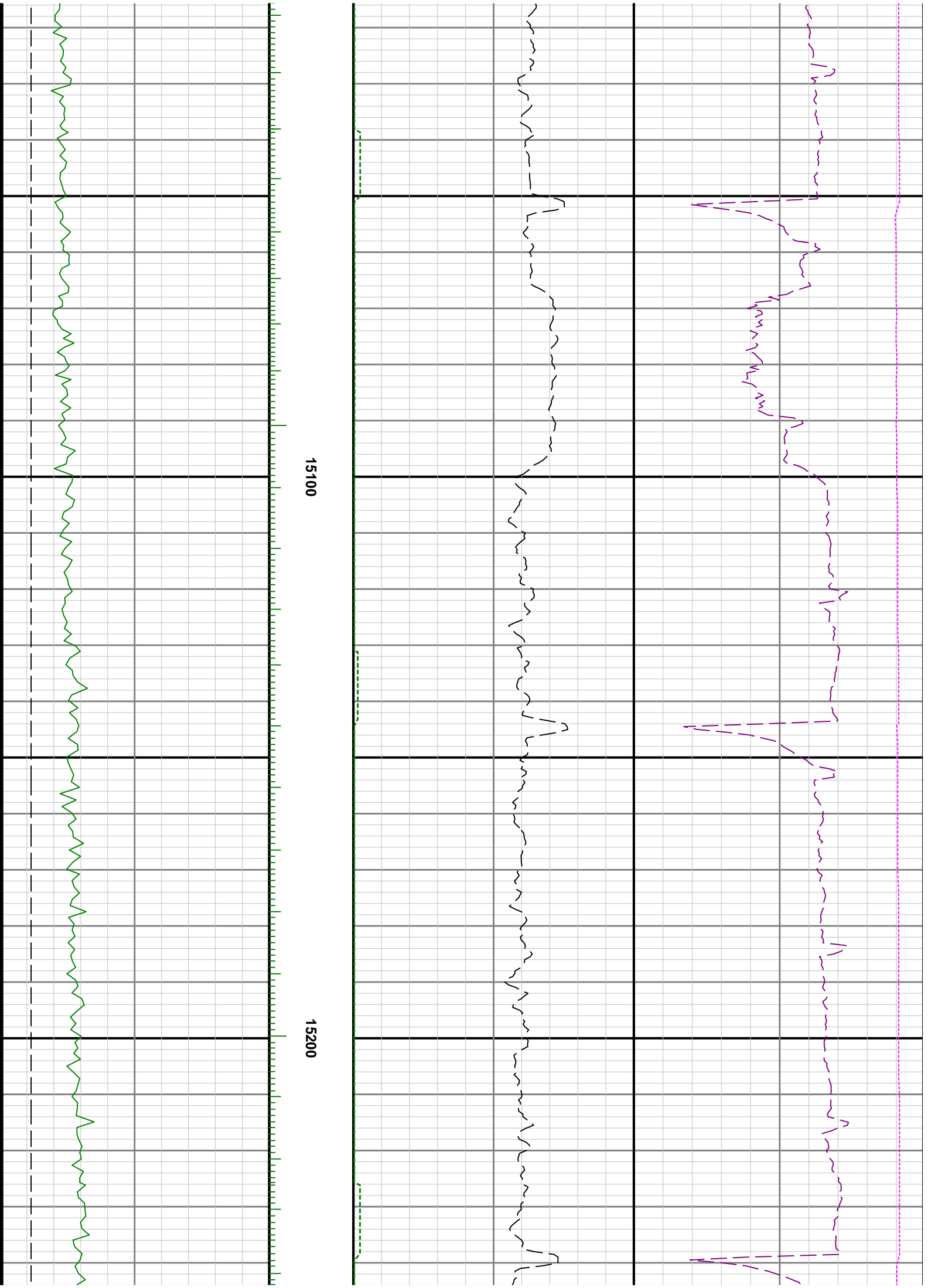




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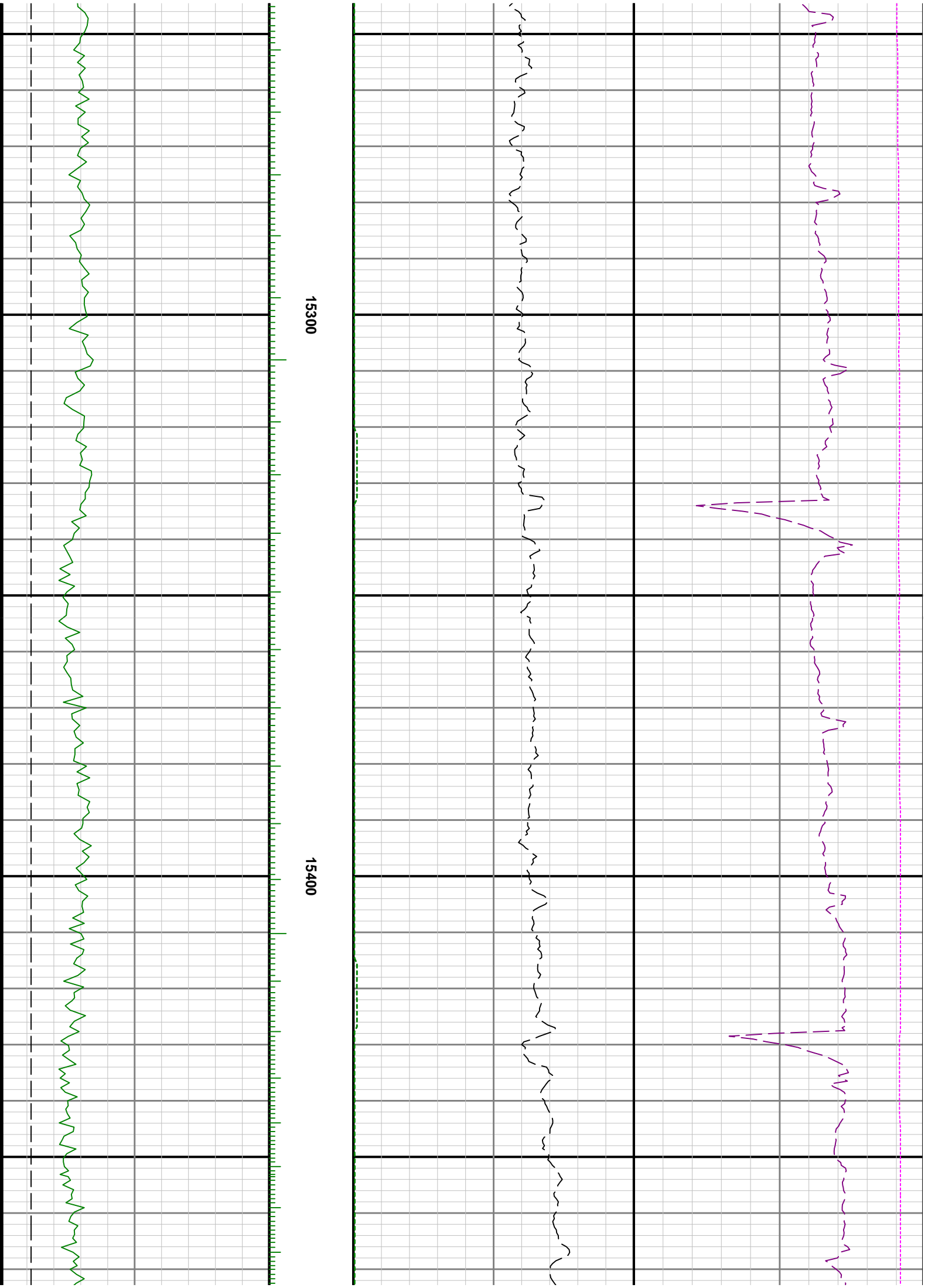
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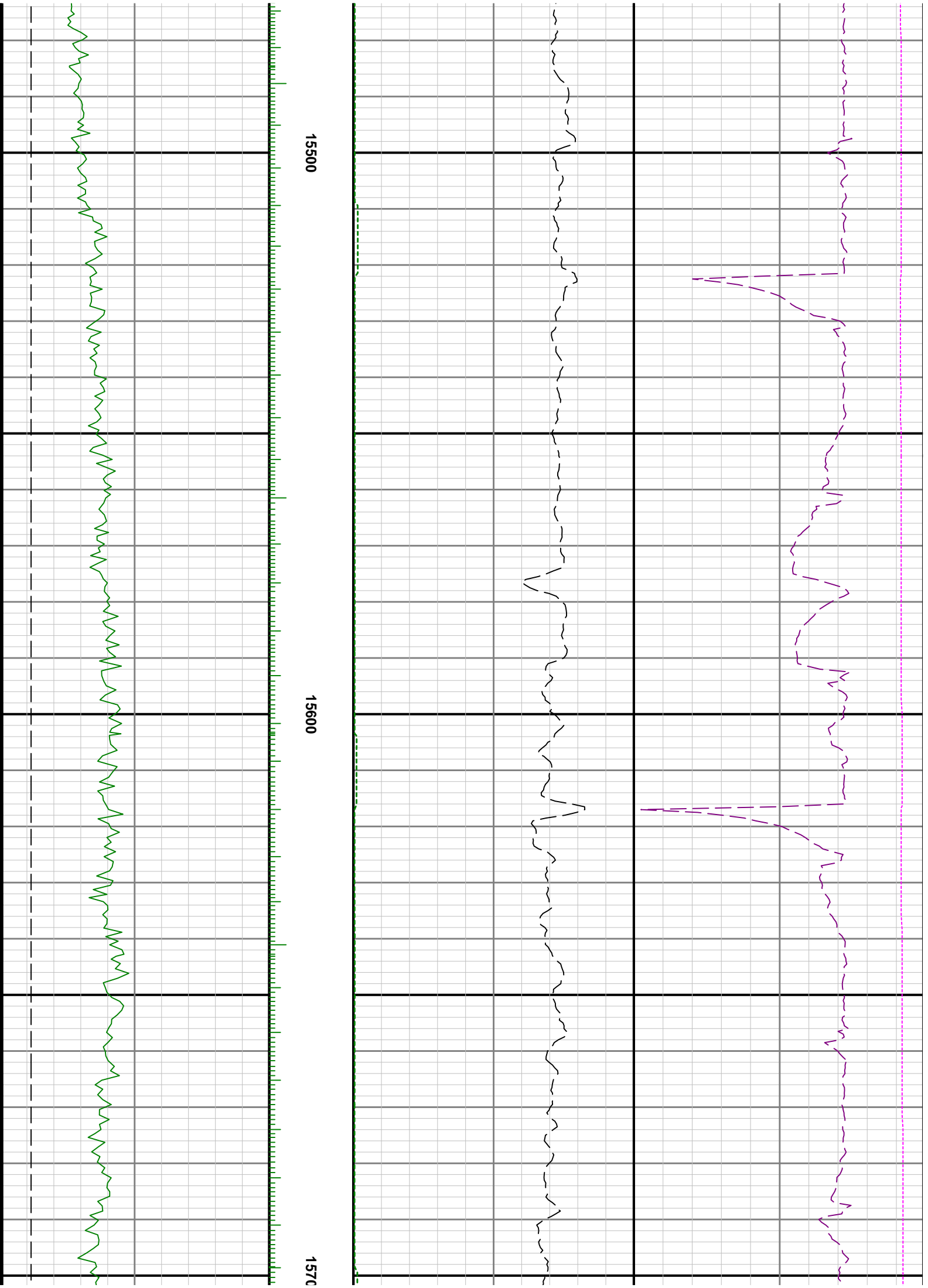
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