



LWD MEMORY LOG

Gamma Ray

Scale: Company: SRC Energy

1:240 MD Well: Harvesters State 32N-16A-M

Depth Reference: Field: Weld County

Driller's Depth County: Weld Country: United States

State: Colorado

Status: Surface Location: Other Services:

Final Print Latitude: Longitude: Directional

API No: 05-123-46374-00 SEC: 15 TWN: 6N RGE: 66W

Job ID: 9052280 Elevation: 4802.00 ft Elev. KB: 4822.00 ft

Permanent Datum (P.D.): Ground Level Above P.D. Elev. GL: 4802.00 ft

Log Measured From: Rig Floor

Dates Interval Logged Magnetic Field Reference

Date From: 2018-05-31 Top: (ft) 1836.00 Azi Reference North: True Dip Angle: (deg) 66.87

Date To: 2018-06-02 Bottom: (ft) 14530.00 Total Magnetic Field Strength: (nT) 52451

Spud Date: 2018-03-24 Mag to Reference North Correction: (deg) 7.54 E

Borehole Record

Casing Record

Hole Size (in)	From (ft)	To (ft)	Size (in)	Weight (lb/ft)	From (ft)	To (ft)
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13.500	20.00	1836.00	9.625	36.00	20.00	1826.00
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8.500	1836.00	14543.00				
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Mud Record

Deviation Record

Type	From (ft)	To (ft)	Hole Size (in)	Interval (ft)	Inc Az (Start)	Inc Az (End)
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Water Based Mud	20.00	1836.00	13.500	1816.00	0.00 221.90	3.76 195.12
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Diesel-Oil Based Mud	1836.00	14543.00	8.500	12707.00	3.76 195.12	4.62 190.60
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Acquisition System Software Version

Other

Baker Hughes Cadence

RT4.1

PlotStudio 4.1.7763.3

Rig: Precision Drilling 462

Contractor: Precision Drilling

District: RMD

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	13.500	PDC	6.00	Steerable	0.00	0.00	20.00	1836.00	2018-03-24 01:30	2018-03-24 09:00	12.28
2	2	8.500	PDC	3.00	AutoTrak Curve	1836.00	14530.00	1836.00	14543.00	2018-05-31 03:13	2018-06-02 10:24	48.29

Crew								
Name	Arrive Wellsite	Depart Wellsite	Name	Arrive Wellsite	Depart Wellsite	Name	Arrive Wellsite	Depart Wellsite
John Moisan	2018-03-24	2018-03-24	John Byrson	2018-05-31	2018-06-02	Jon Koustrup	2018-05-31	2018-06-02

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+ (%)
2018-03-23 16:59	1	20.00	Water Based Mud	8.4	1	N/A	N/A	0/100	Flow Line	800	0.00
2018-05-30 21:00	2	1836.00	Diesel-Oil Based Mud	9.1	10	N/A	5.4	90/10	Suction	20500	0.00
2018-05-31 15:30	2	6083.00	Diesel-Oil Based Mud	10.2	16	N/A	16.0	86/13	Suction	31000	0.00
2018-06-01 15:30	2	11201.00	Diesel-Oil Based Mud	10.2	22	N/A	20.0	84/16	Suction	38000	0.00
2018-06-02 03:30	2	13620.00	Diesel-Oil Based Mud	10.3	26	N/A	17.0	84/16	Suction	38000	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	Sensor Sub	ZAPS230949	VSS	12.17	61.94	8.000	3.250		
1	Sensor Sub	ZAPS230949	Directional (mag)	12.17	61.94	8.000	3.250		
1	Sensor Sub	ZAPS230949	Pressure	32.77	82.54	8.000	3.250		
2	ATC_SU	14236902	Near Bit VSS	5.93	6.73	7.000	4.330		
2	ATC_SU	14236902	Near Bit Inclination	5.93	6.73	7.000	4.330		
2	ATC_MWD	12141354	Gamma (single)	2.74	12.90	7.000	3.250		
2	ATC_MWD	12141354	Directional (mag)	12.27	22.43	7.000	3.250		


Service and Tool Mnemonics		
Mnemonic	Name	Description
GAM	APS	APS EM Module
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	
1	Depth measurements obtained from a depth control system not supplied or operated by Baker Hughes. Due to lack of control by Baker Hughes logging engineers, depth calibrations and measurements could not be independently verified.
2	Baker Hughes LWD Run 1 utilized 8 inch APS EM Services (Directional only) behind a 13 1/2 inch bit and steerable assembly from surface to 1836 feet MD (surface to 1832 feet TVD). No logging data was acquired during this run.
3	Baker Hughes LWD Run 2 utilized 6 3/4 inch NaviGamma services (Gamma Ray and Directional) behind an 8 1/2 inch bit and rotary steerable assembly from 1836 to 14543 feet MD (1832 to 6933 feet TVD).
4	Gamma Ray Curve (GRAM) is presented 0 to 300 API per customer request.

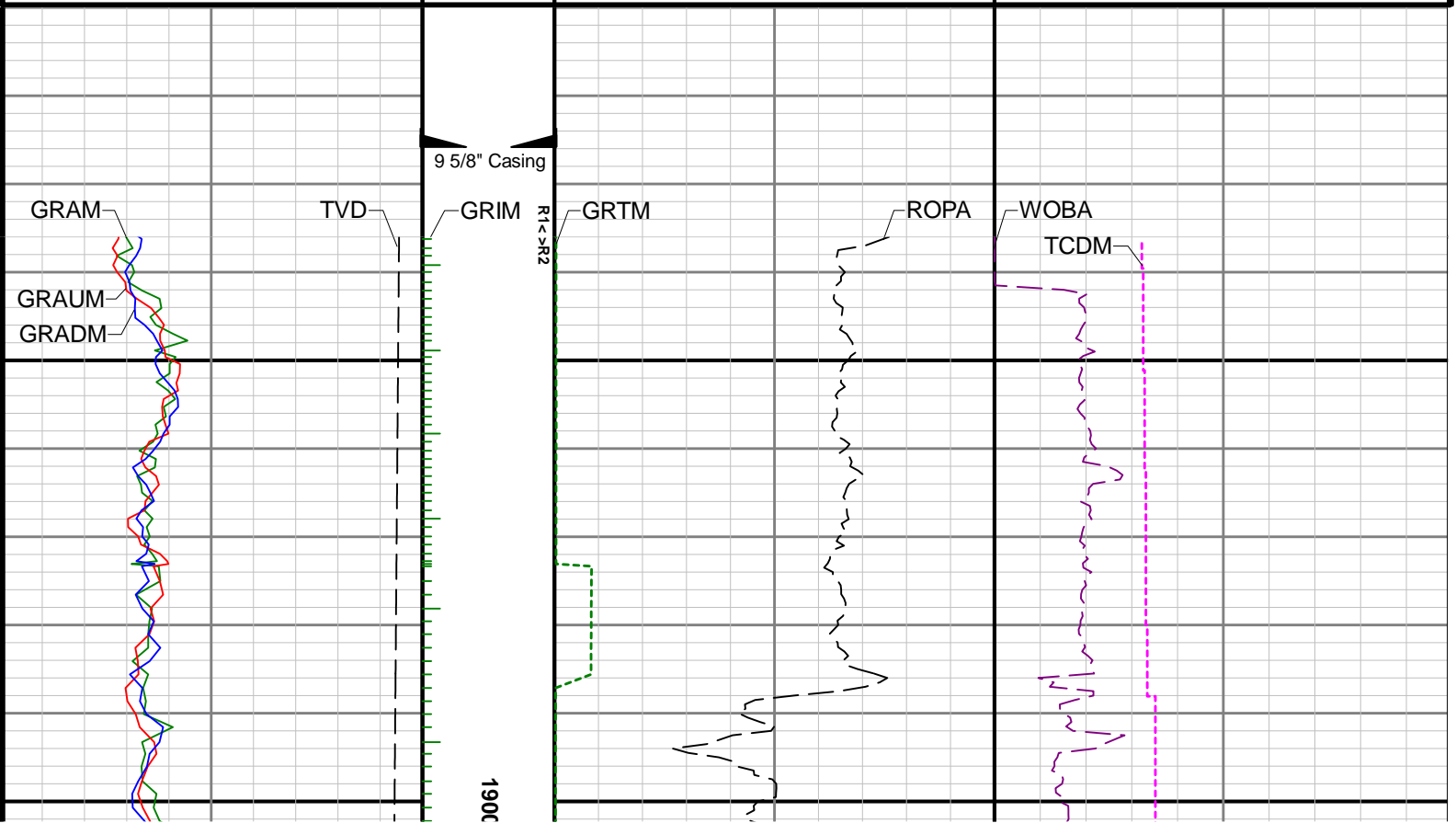
Remarks				
Number	Measured Depth (ft)	Hole Section (in)	Run No.	Remark
1	11224.00	8.500	2	The interval from 11224 to 11243 feet MD (7019 feet TVD) has missing data due to the surface computers crashing while drilling ahead.
2	14530.00	8.500	2	The interval from 14530 to 14543 feet MD (6933 feet TVD) was not logged due to sensor to bit offset at well TD.

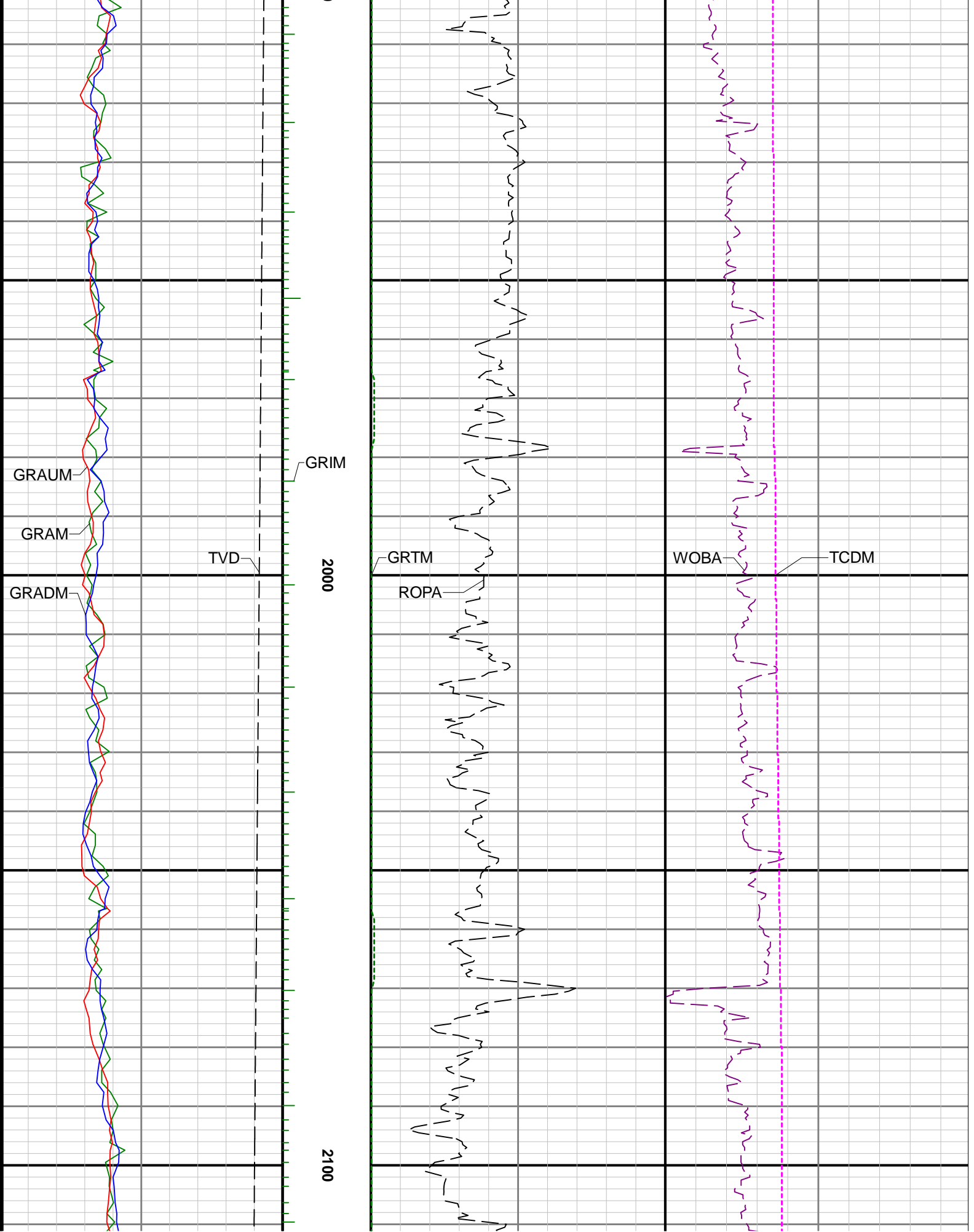
Curve Mnemonics		
Presented Curves	Description	Units

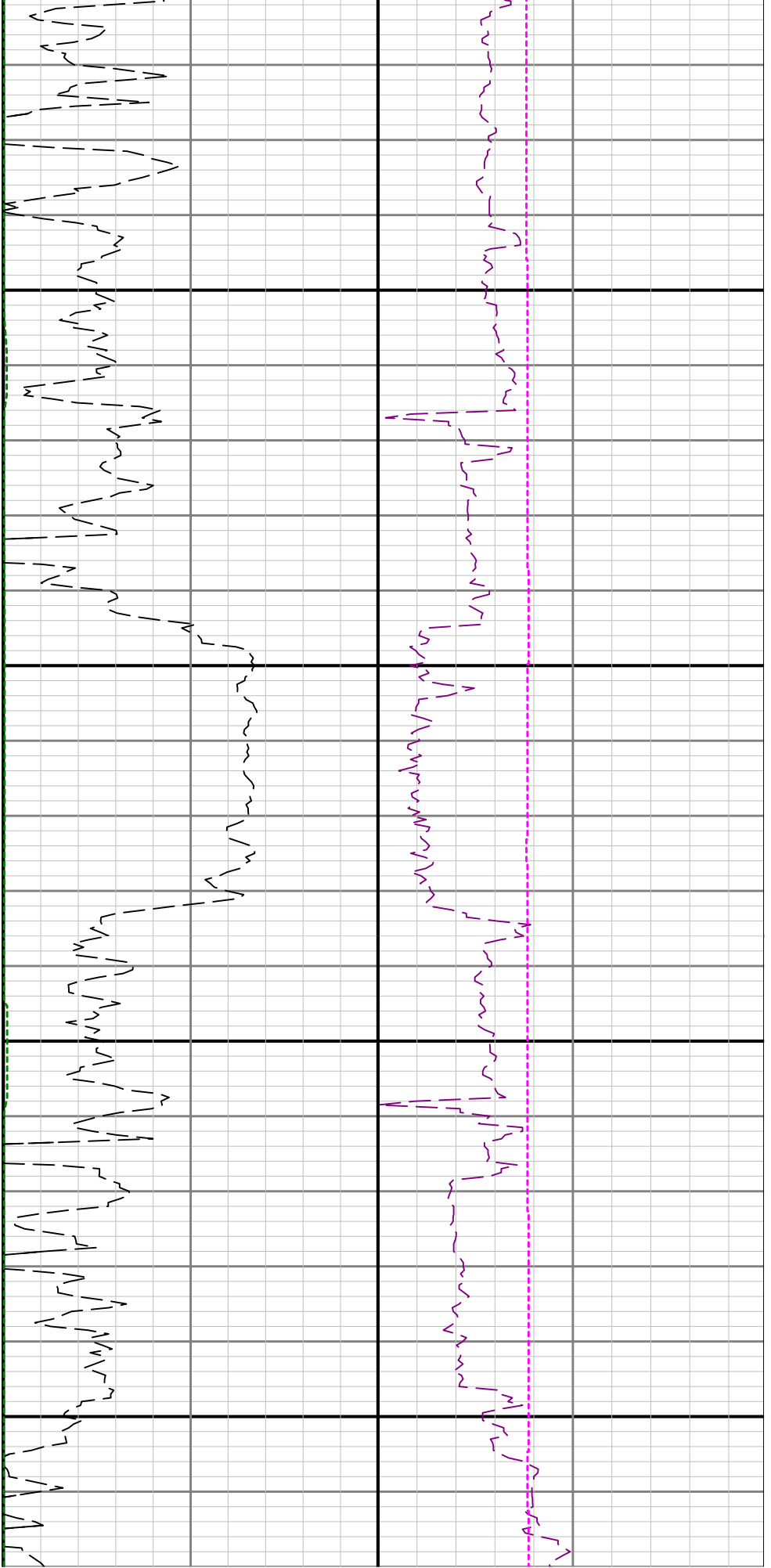
Associated Curves	Description	Units
ROPA	Depth Averaged ROP 3 ft Average	ft/h
TVD	True Vertical Depth	ft
WOBA	Weight On Bit, Average 1 ft Average	klb
GRAM	Gamma Ray - Apparent - Memory 0.5 ft Average	API
GRIM	Gamma Ray - Data Point Indicator - Memory	unitless
GRTM	Gamma Ray - Time Since Drilled - Memory	min
GRADM	Gamma Ray - Apparent - Down Quadrant - Memory 0.5 ft Average	API
GRAUM	Gamma Ray - Apparent - Up Quadrant - Memory 0.5 ft Average	API
TCDM	Downhole Temperature	degF

<div><div><div>BAKER HUGHES</div><div>a GE company</div></div><div></div></div>	Company	SRC Energy			
	Well	Harvesters State 32N-16A-M			
	Interval	Date From:	2018-05-31 03:13:29	Top:	1836.00
		Date To:	2018-06-02 04:24:29	Bottom:	14543.00
	Created	2018-06-03 11:28:41			

Gamma Ray - Apparent 0.5 ft Average GRAM	MD 1:240 feet	Depth Averaged ROP 3 ft Average ROPA	Weight On Bit, Average 1 ft Average WOBA
0 300		1000 0	0 50
API		ft/h	klb
Azimuthal Gamma Ray - Apparent - Up Quadrant 0.5 ft Average GRAUM		Gamma Time Since Drilled GRTM	Downhole Temperature TCDM
0 300		0 600	0 300
API		min	degF
Azimuthal Gamma Ray - Apparent - Down Quadrant 0.5 ft Average GRADM			
0 300			
API			
True Vertical Depth TVD			
7500 1500			
ft			

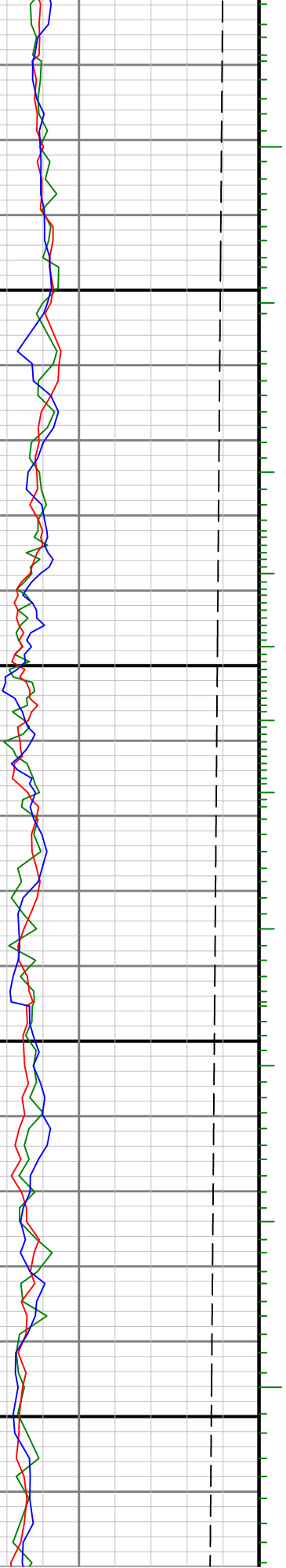


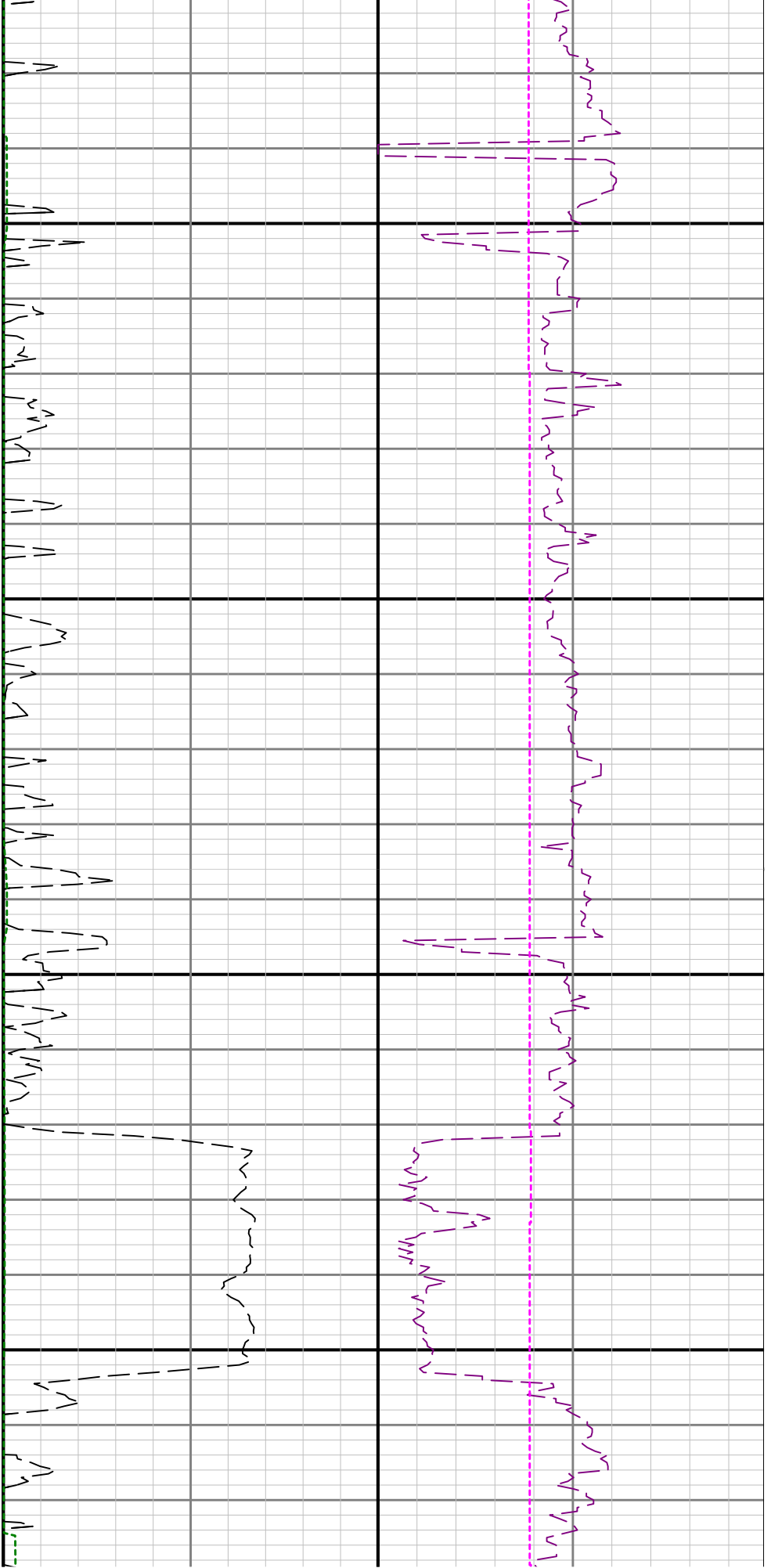




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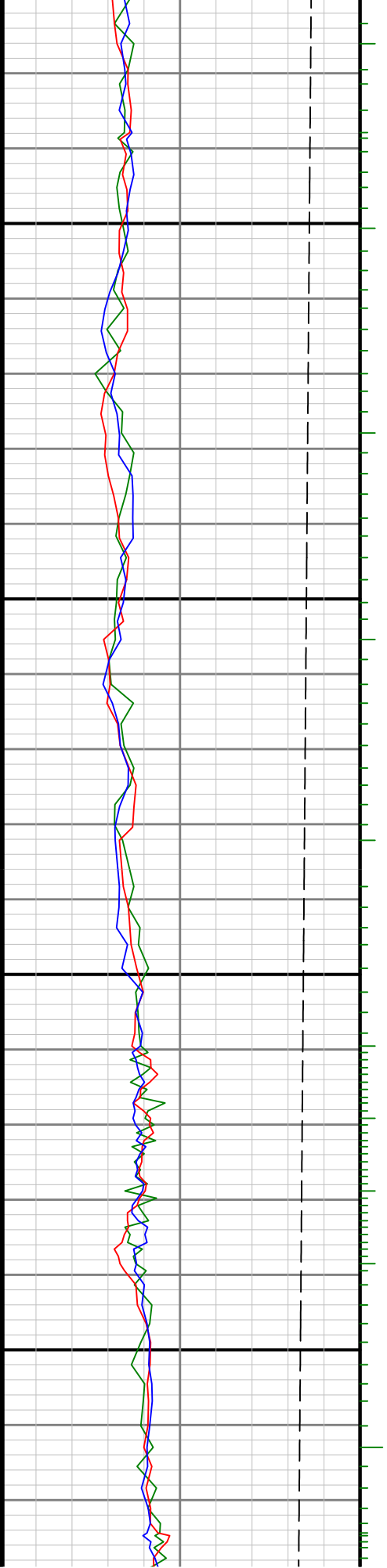
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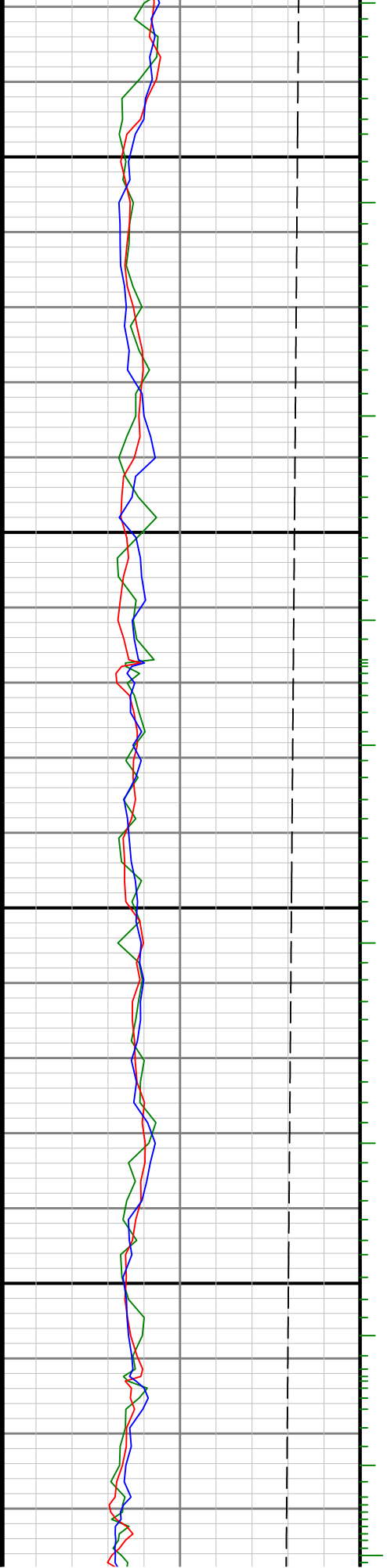
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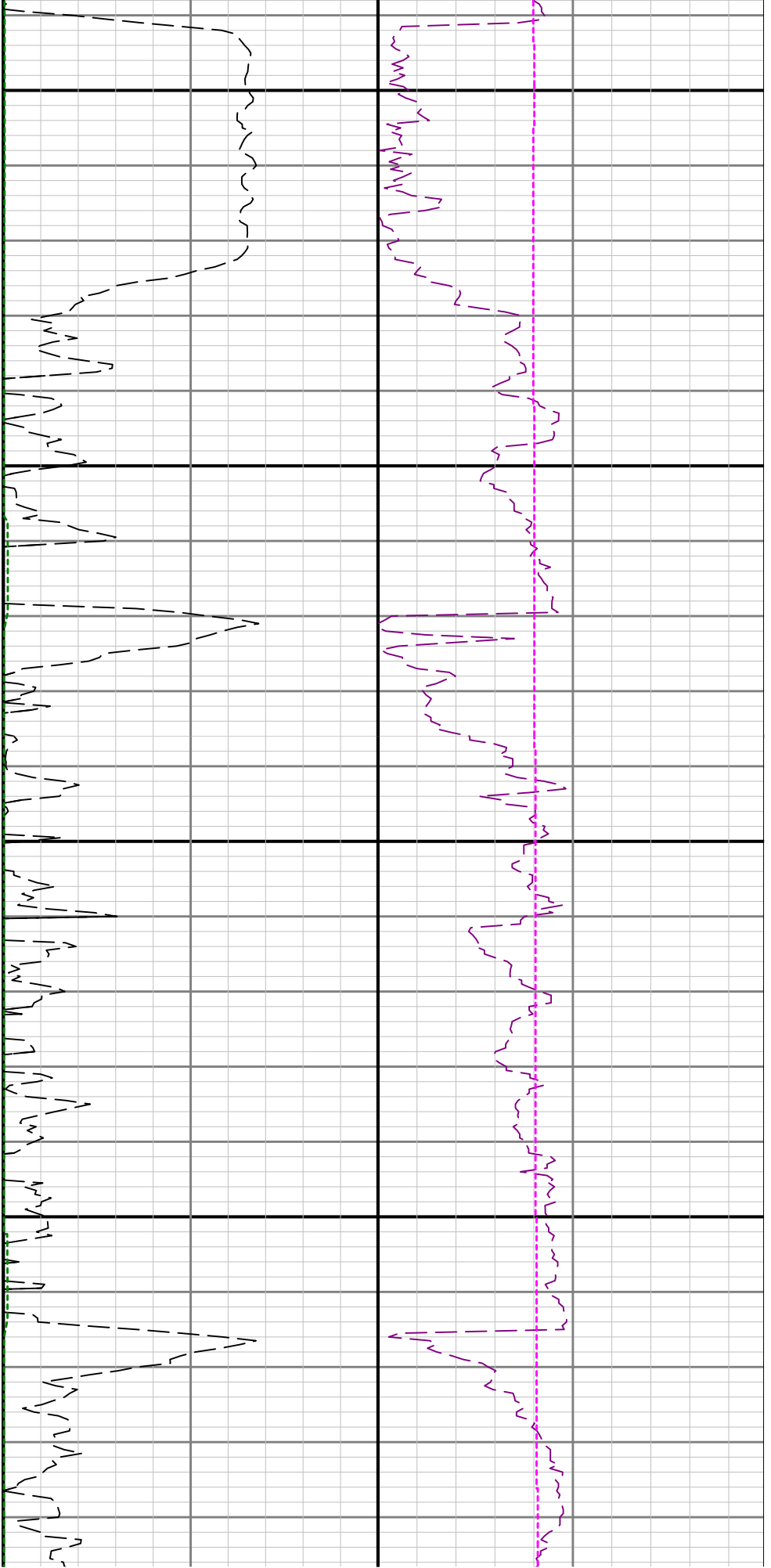




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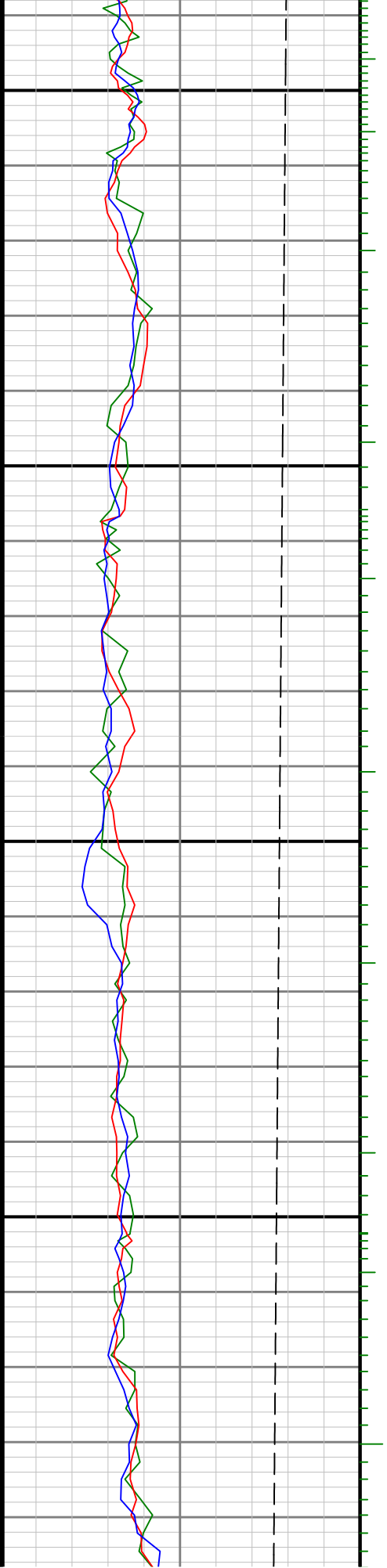
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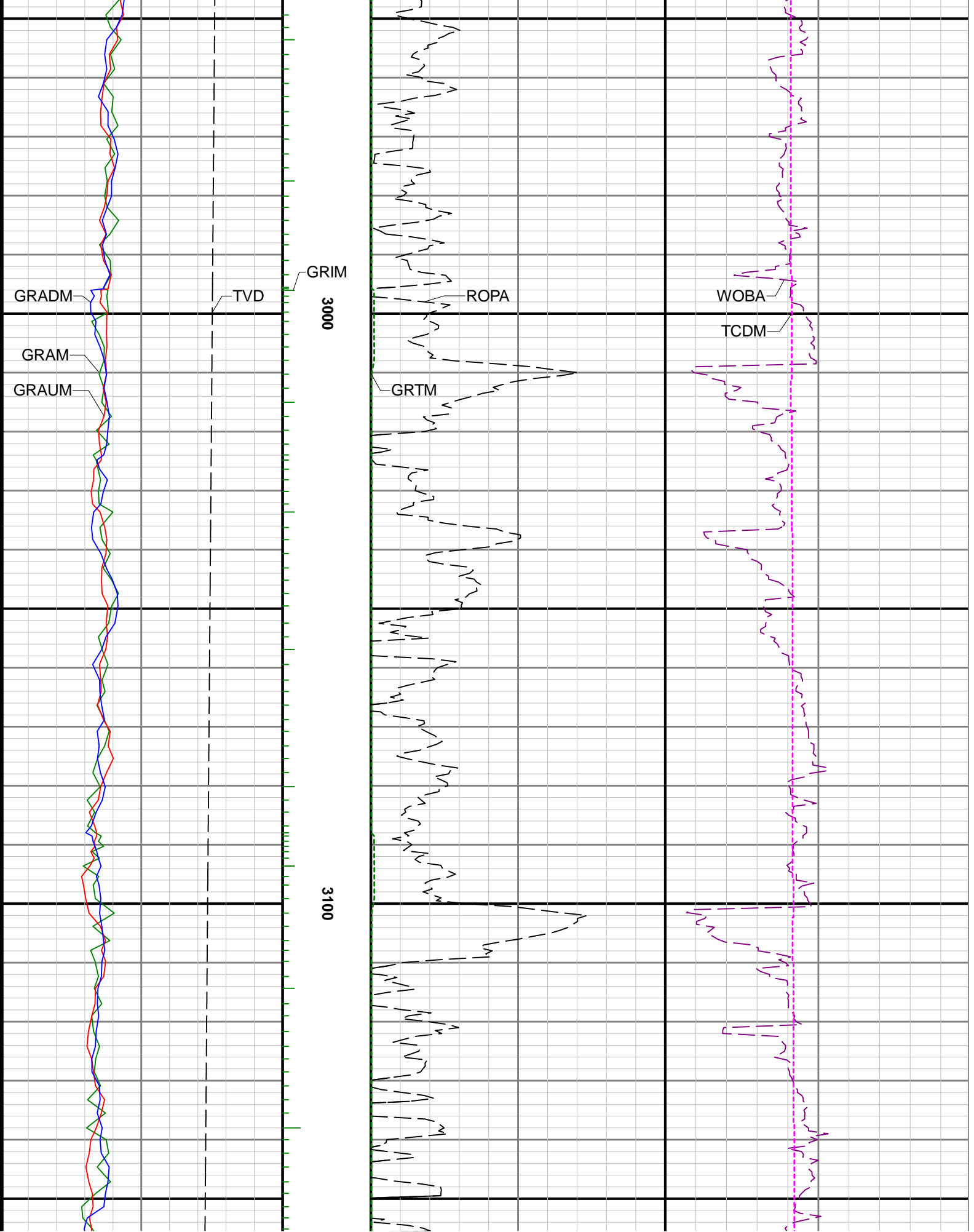


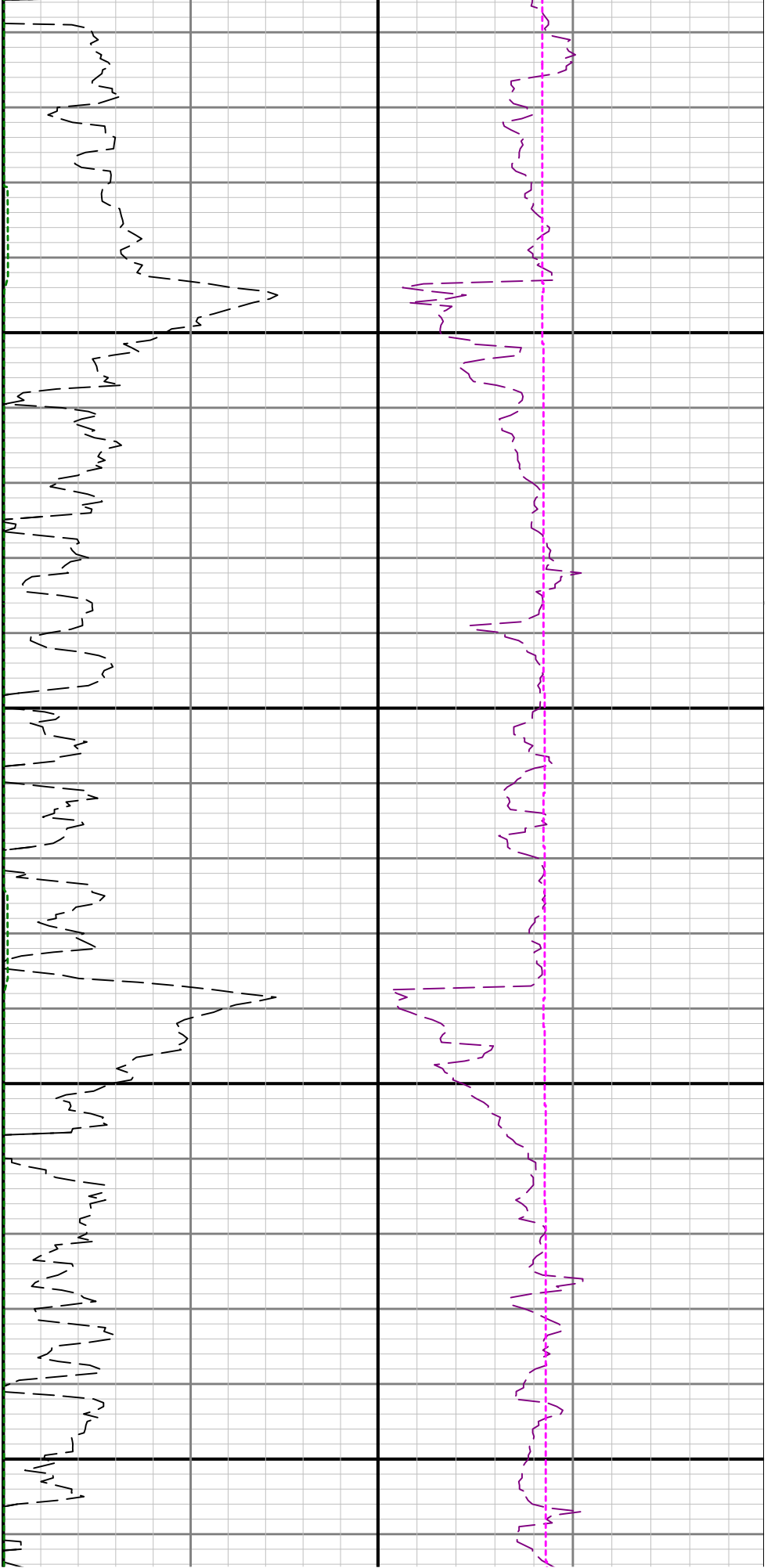


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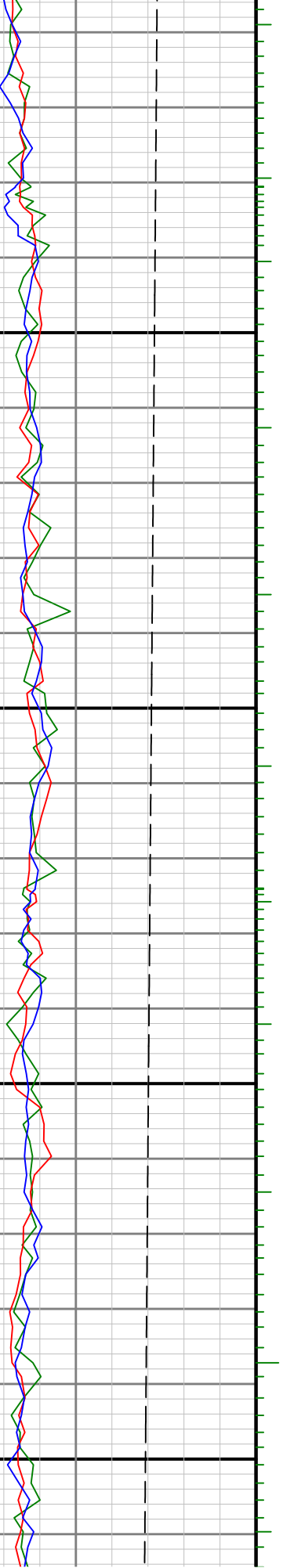


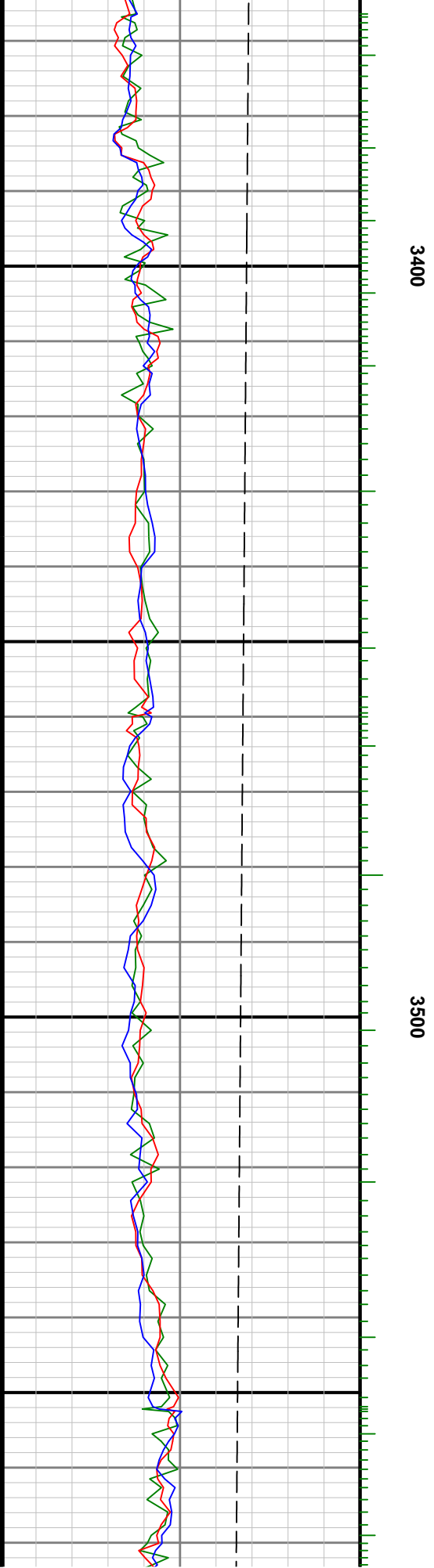
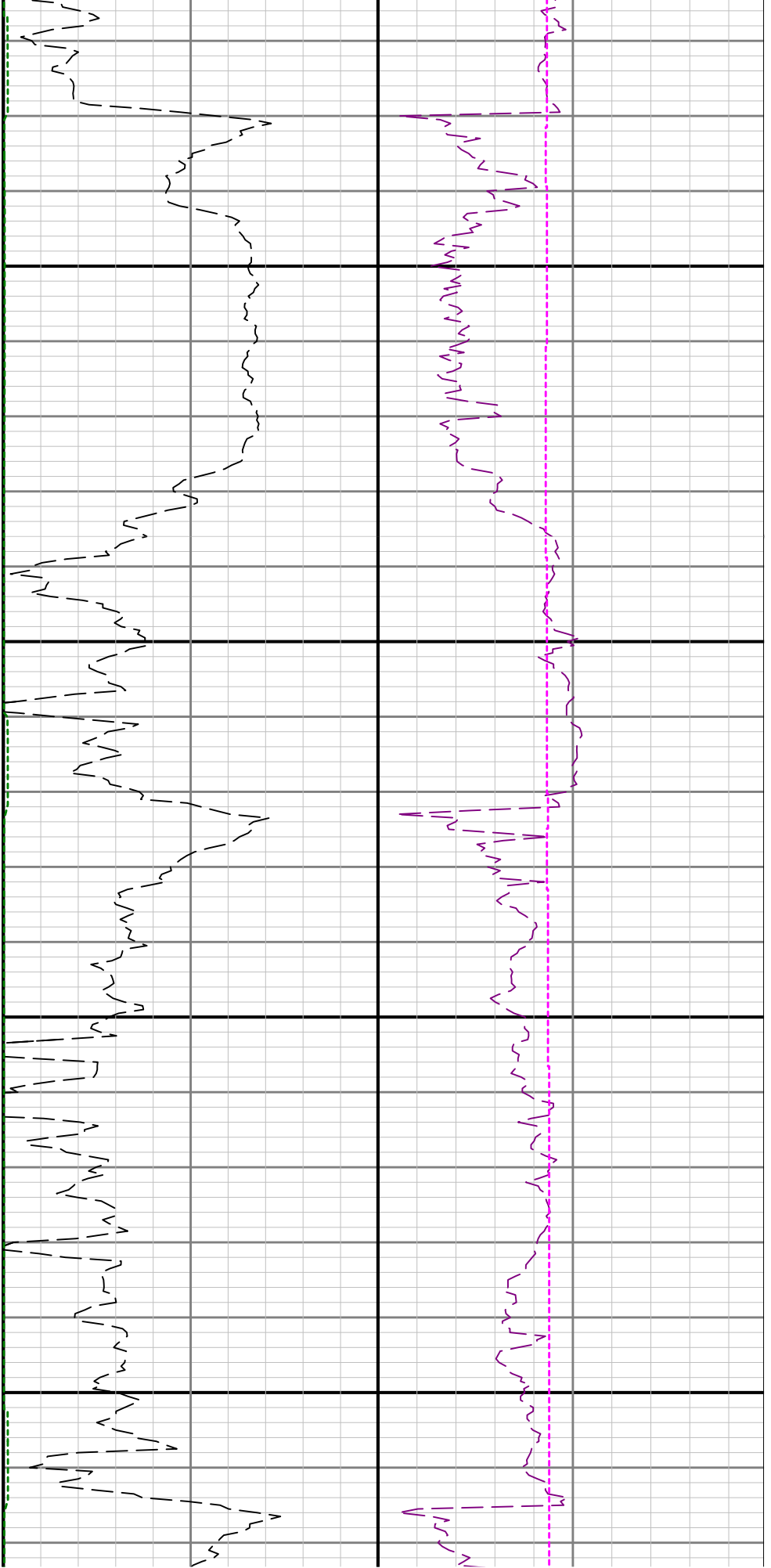


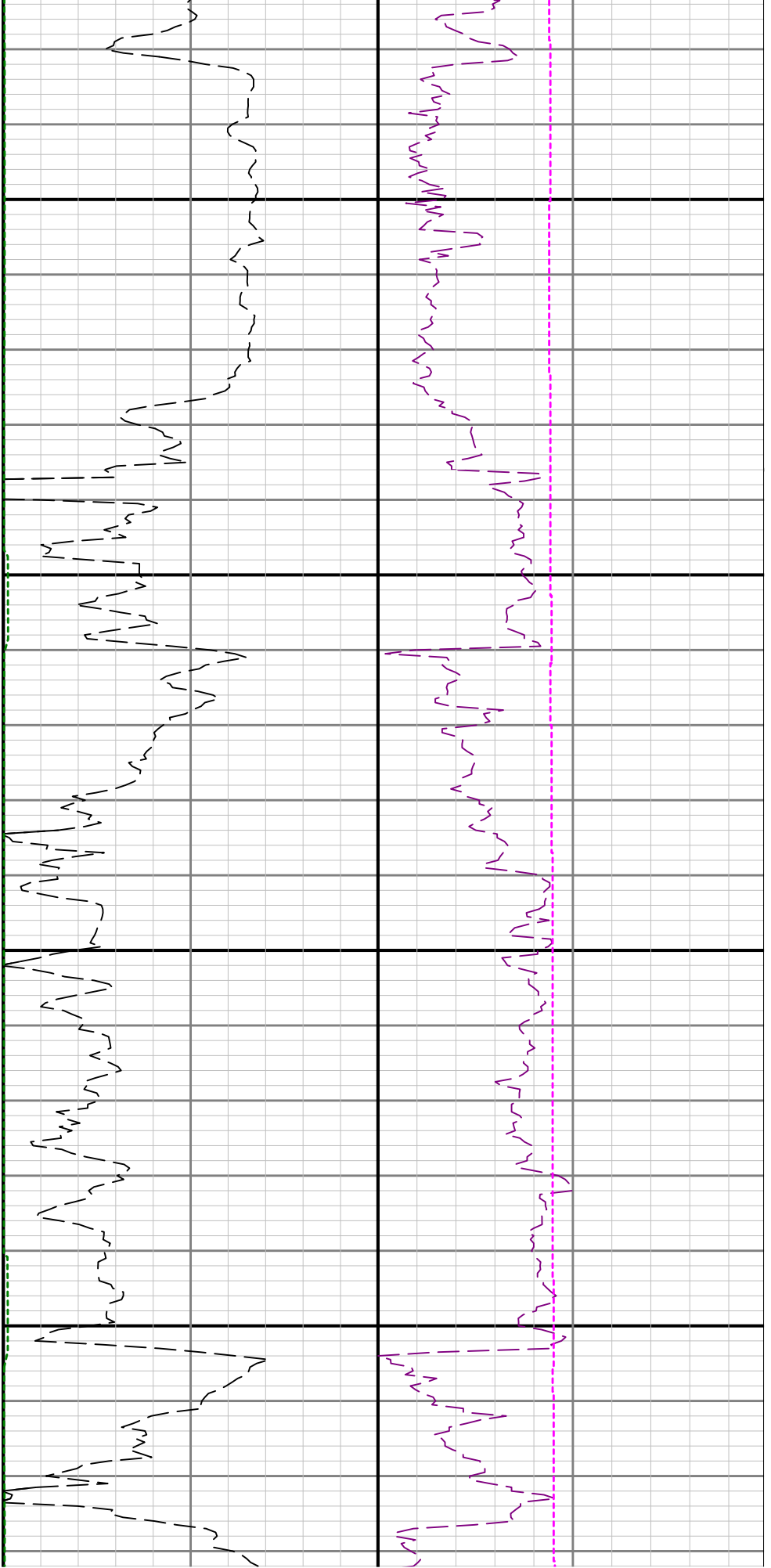


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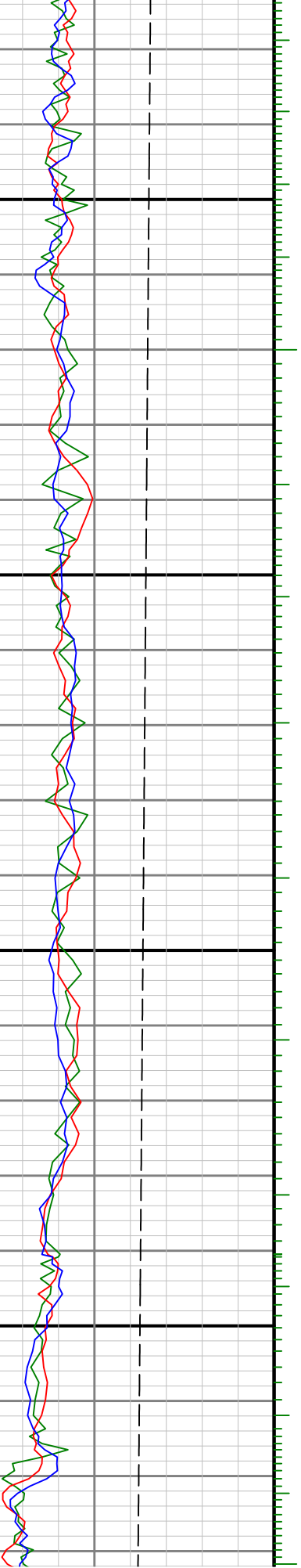


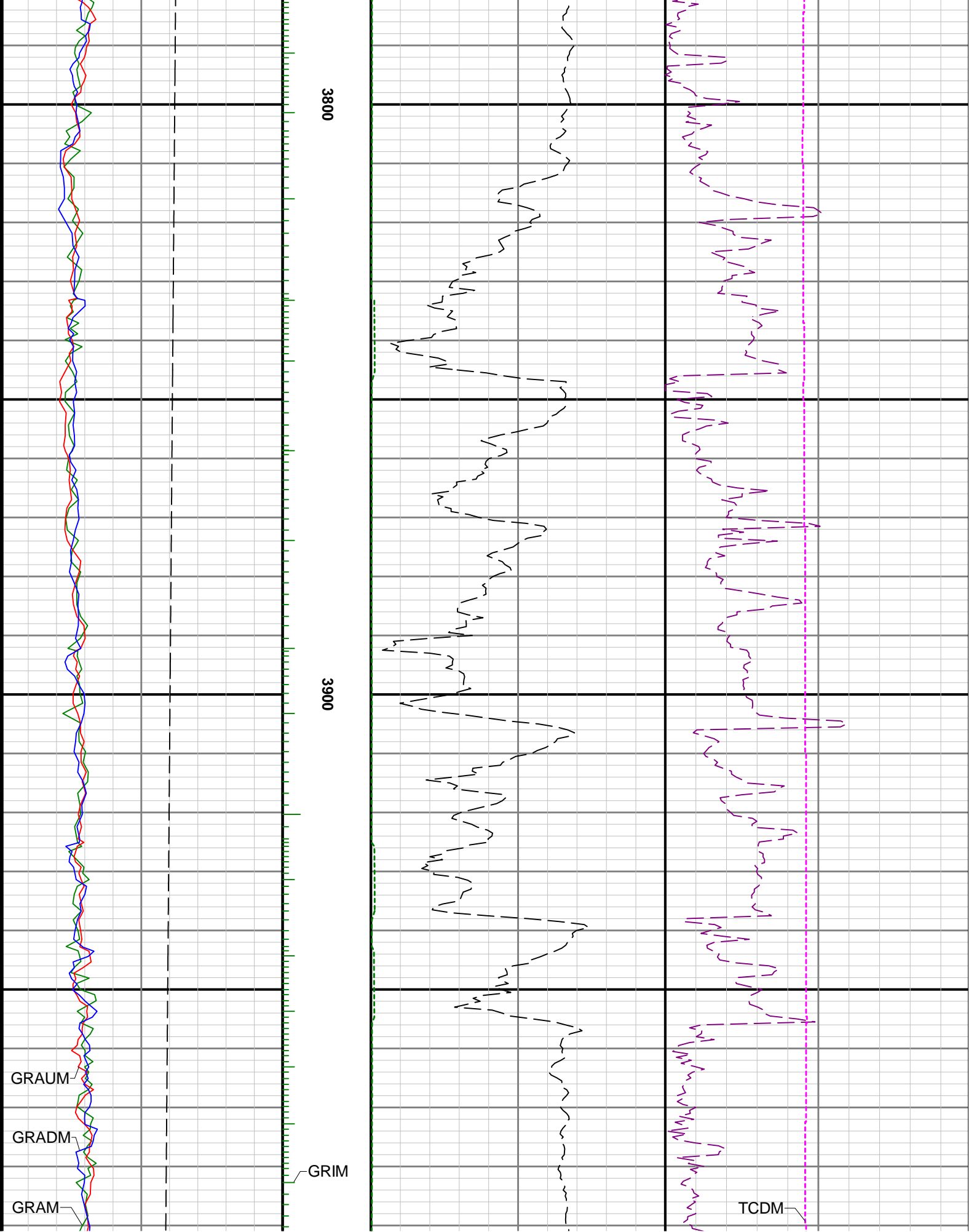


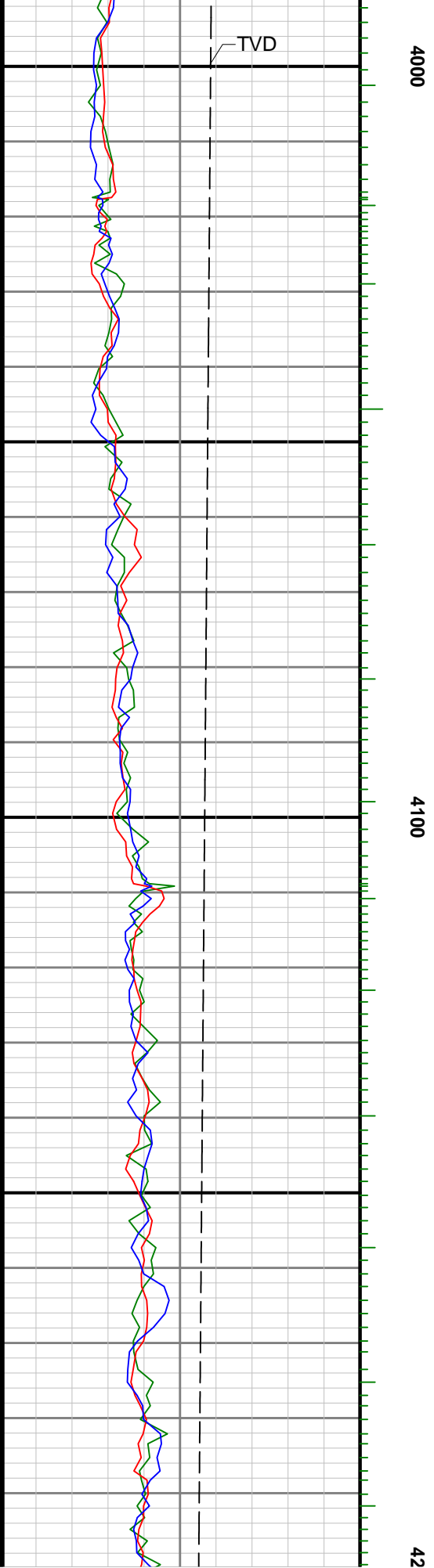
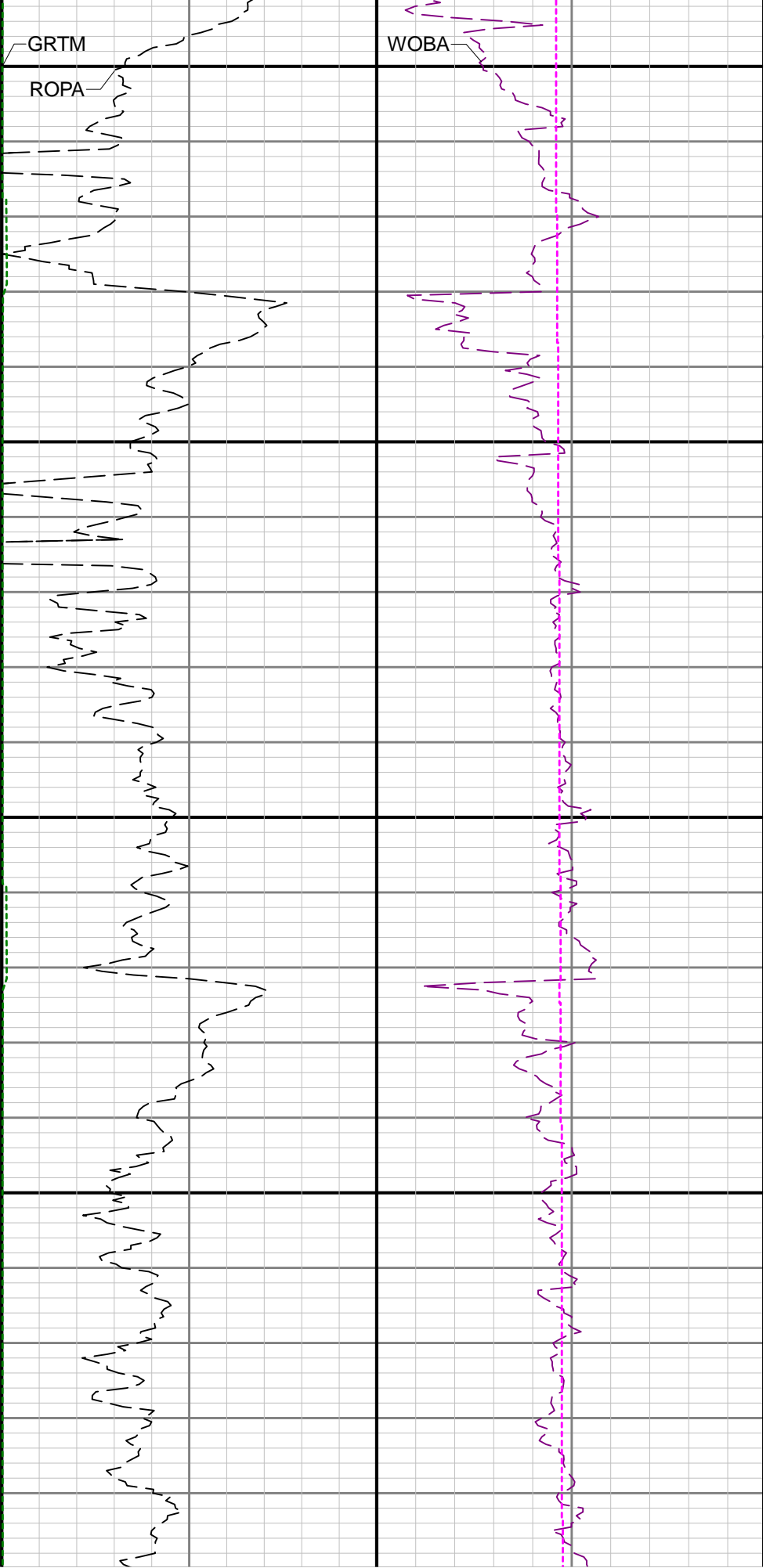


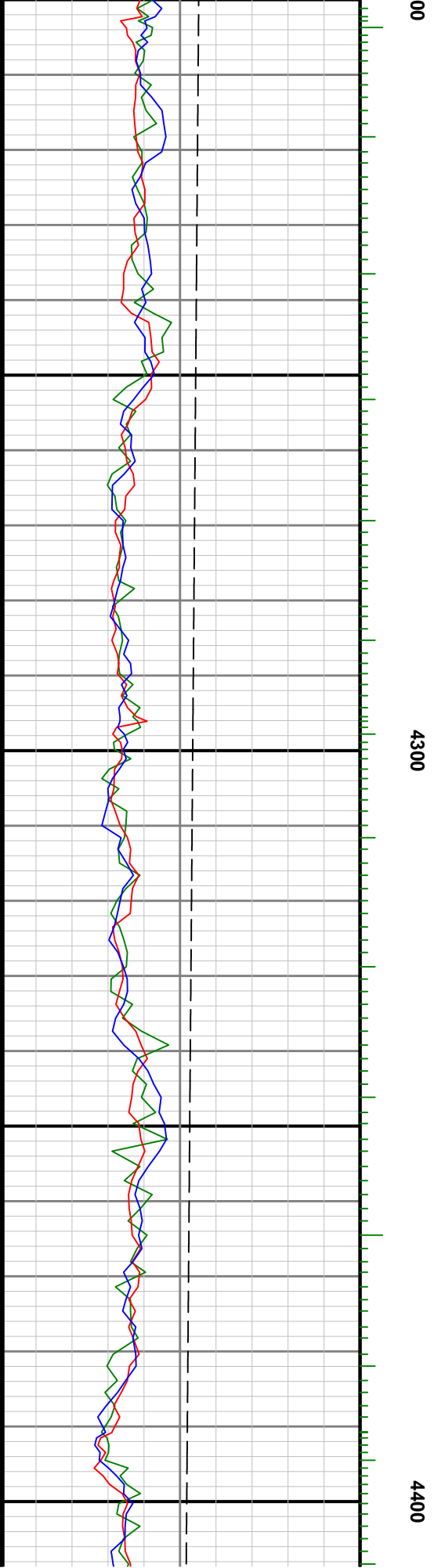
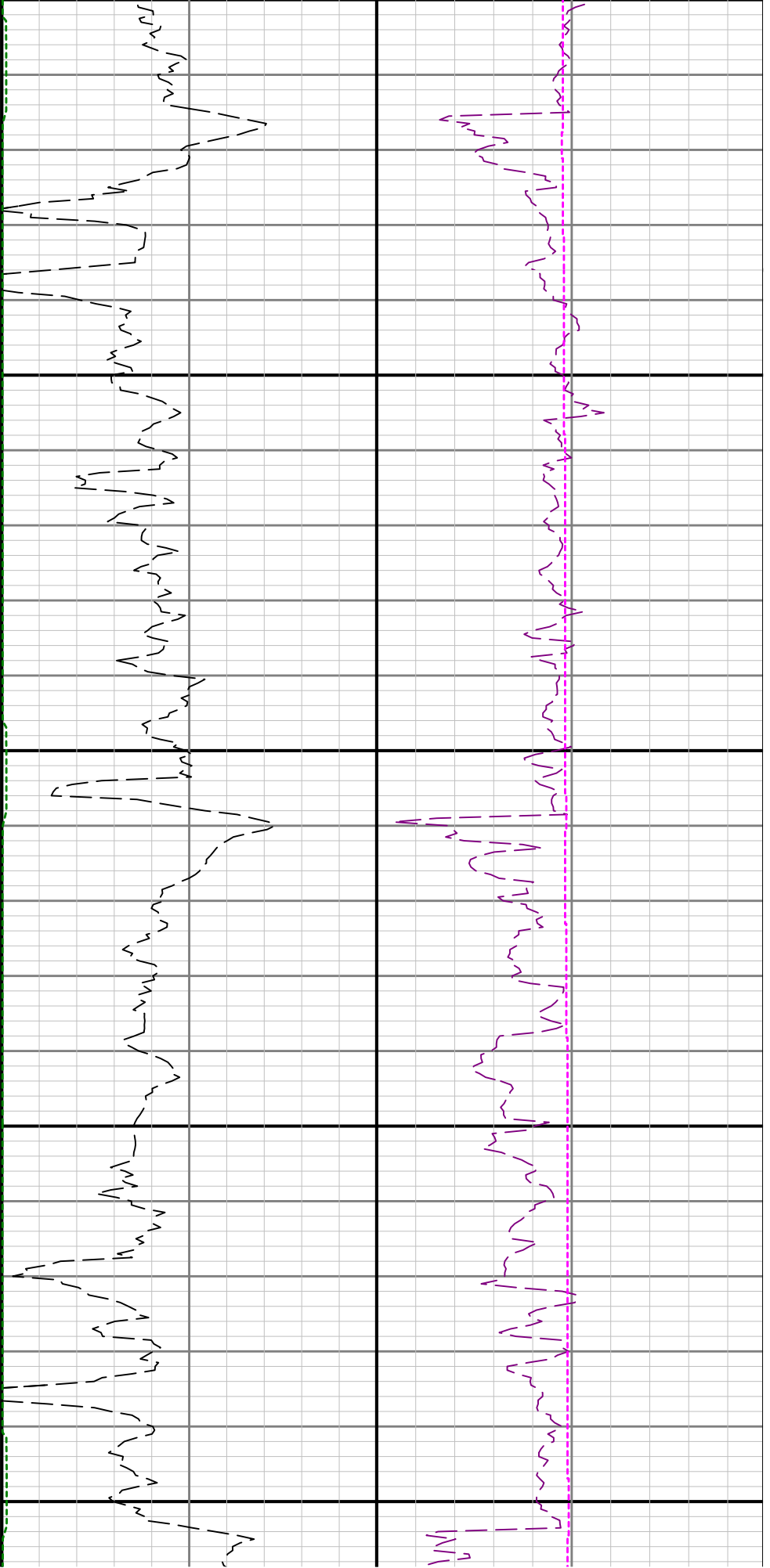
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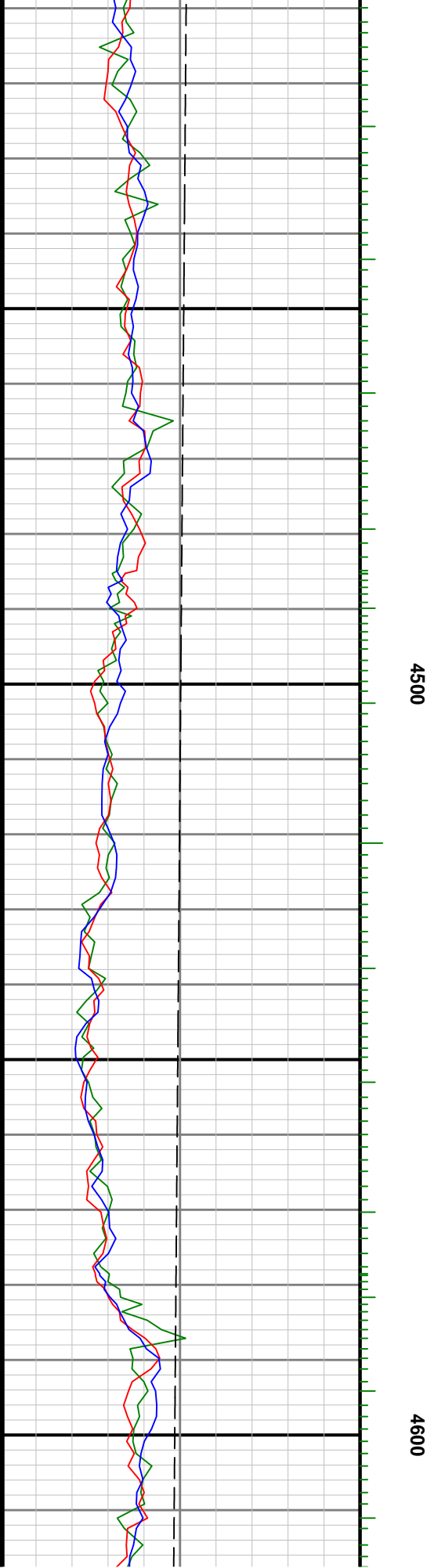
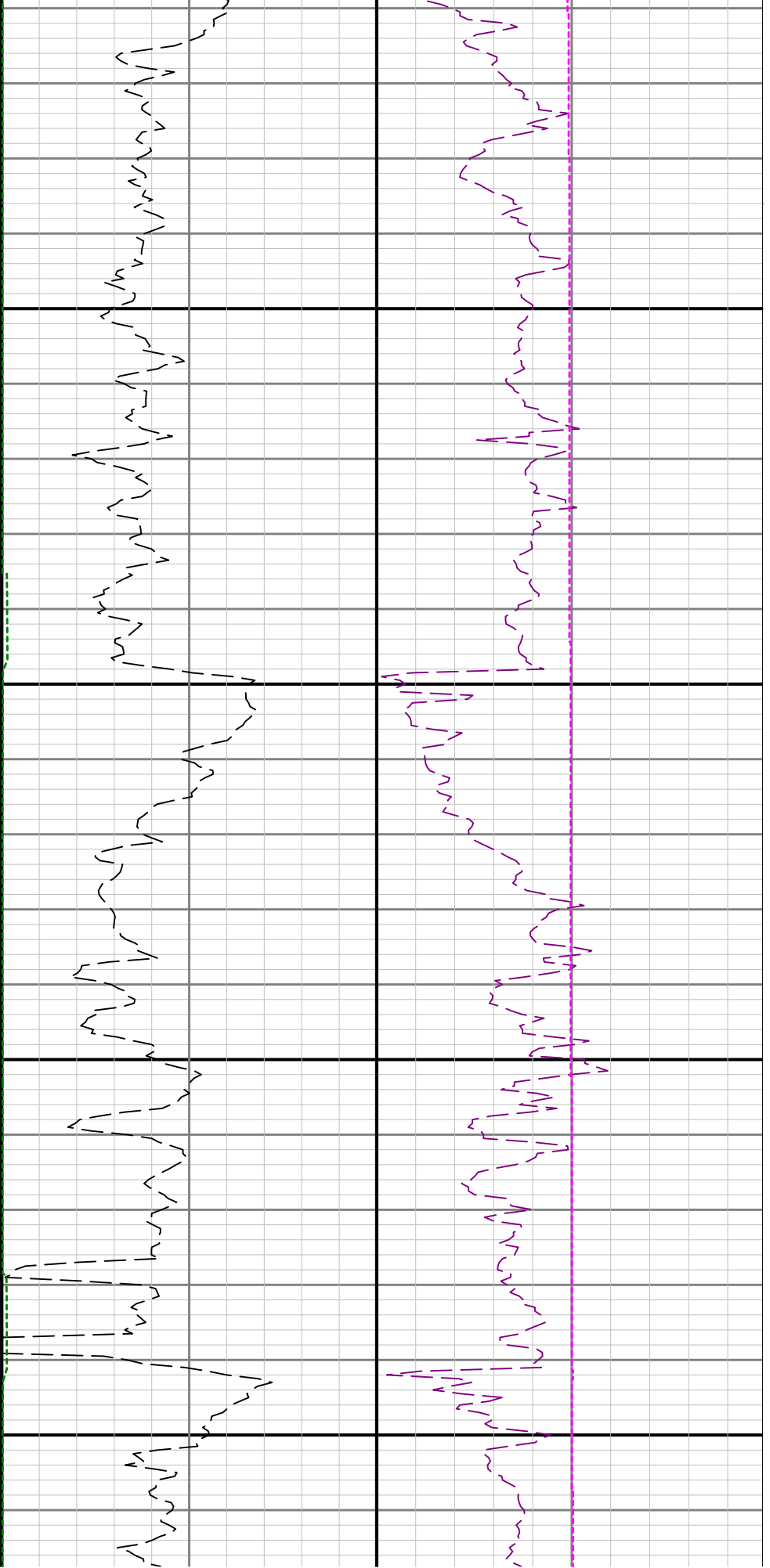
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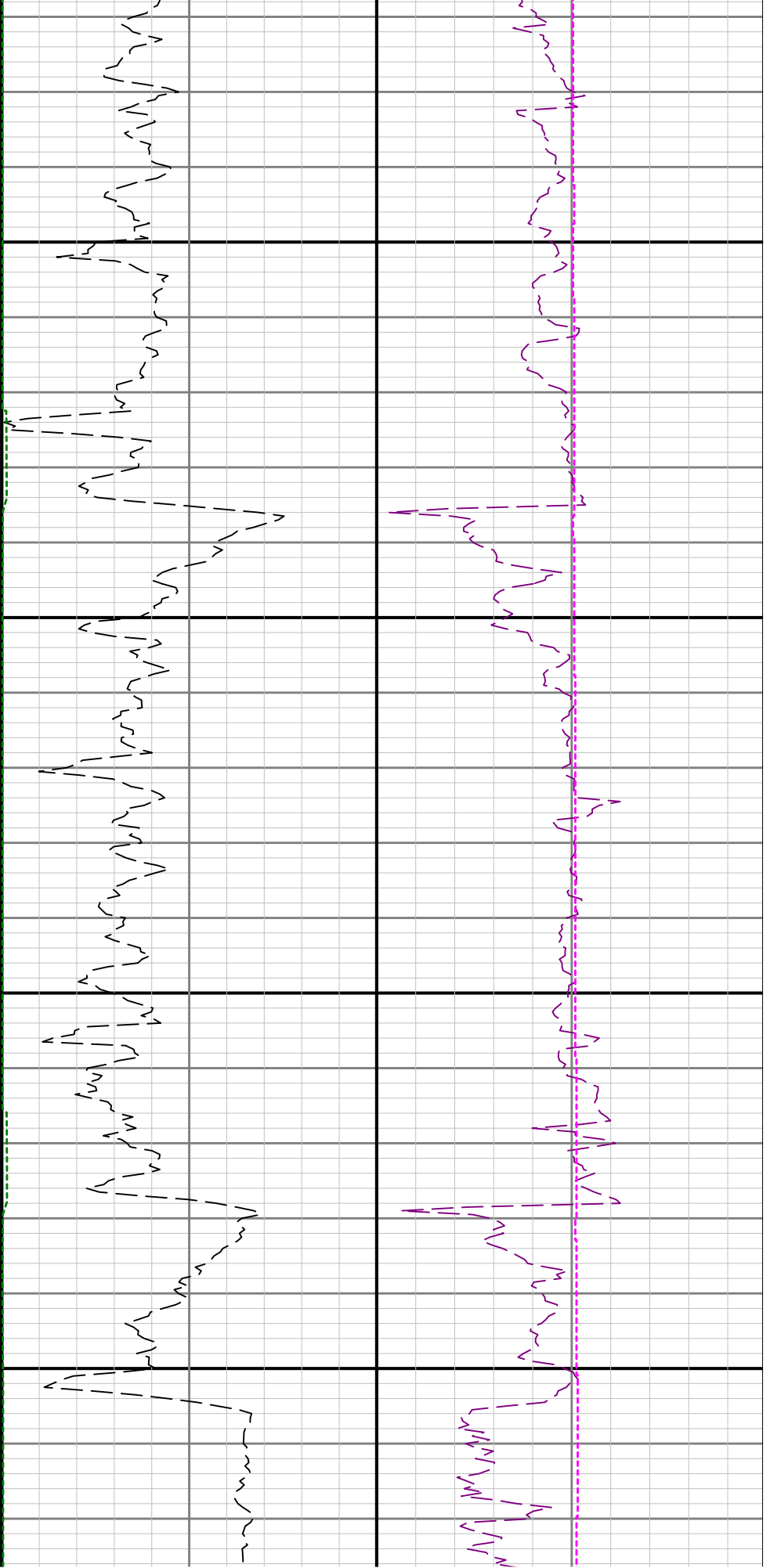






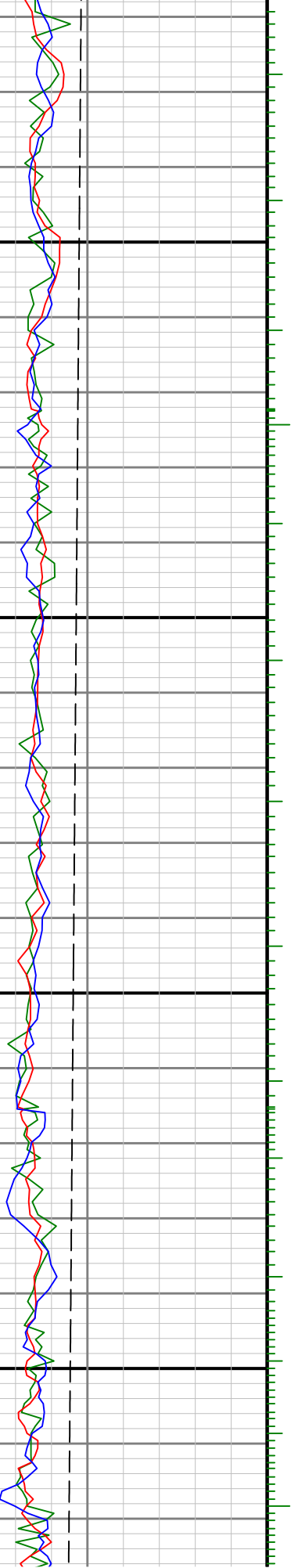


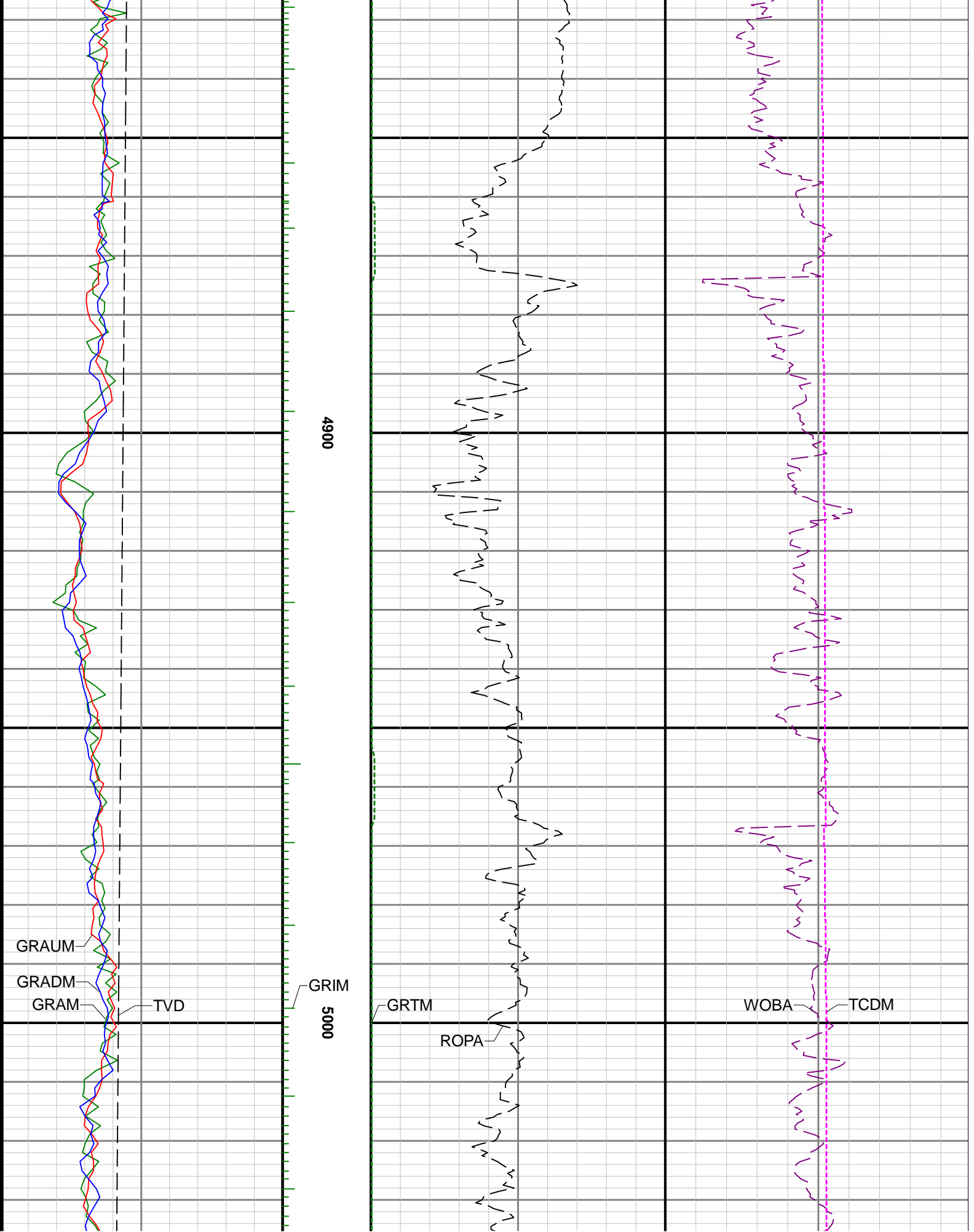


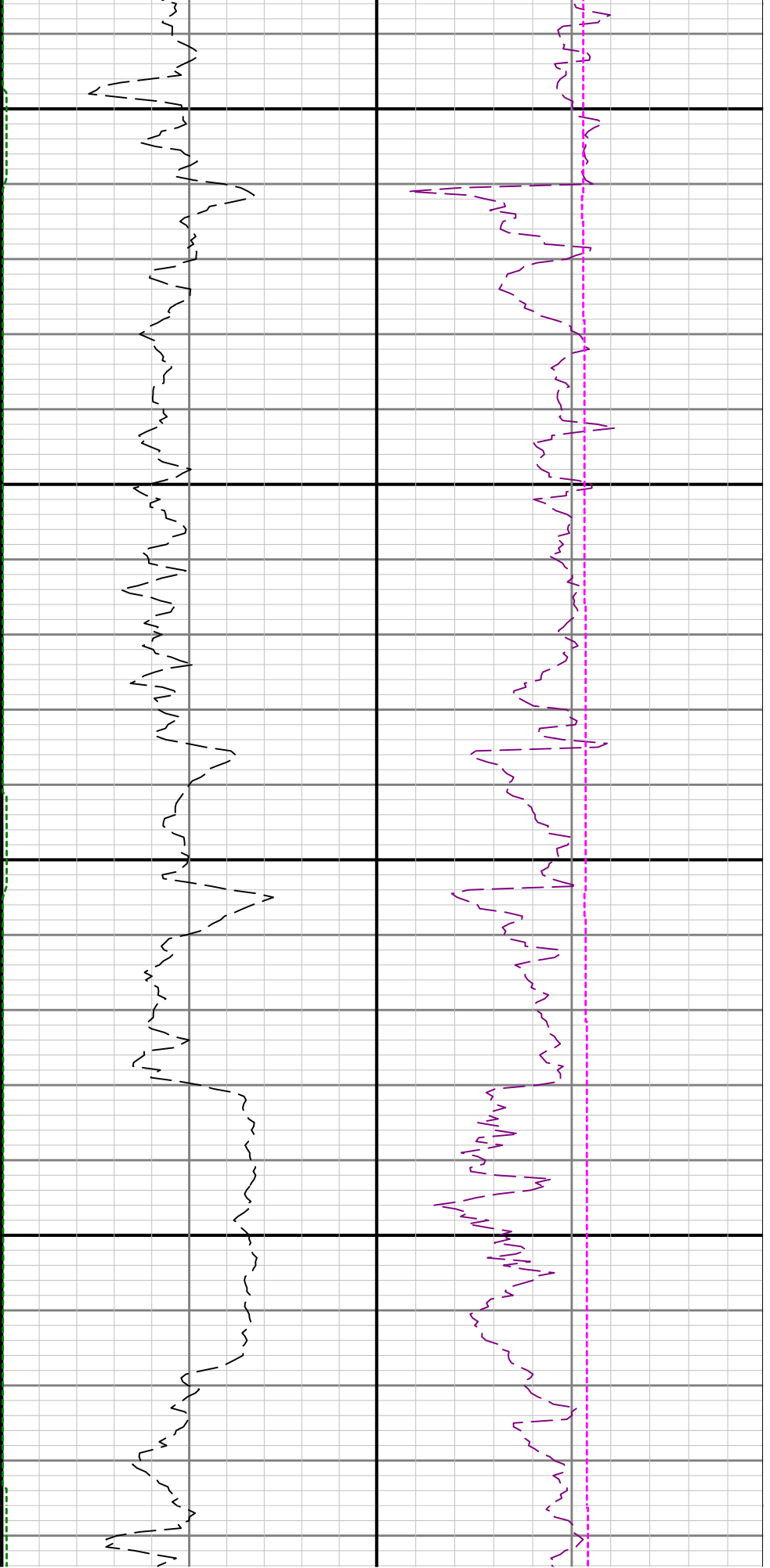


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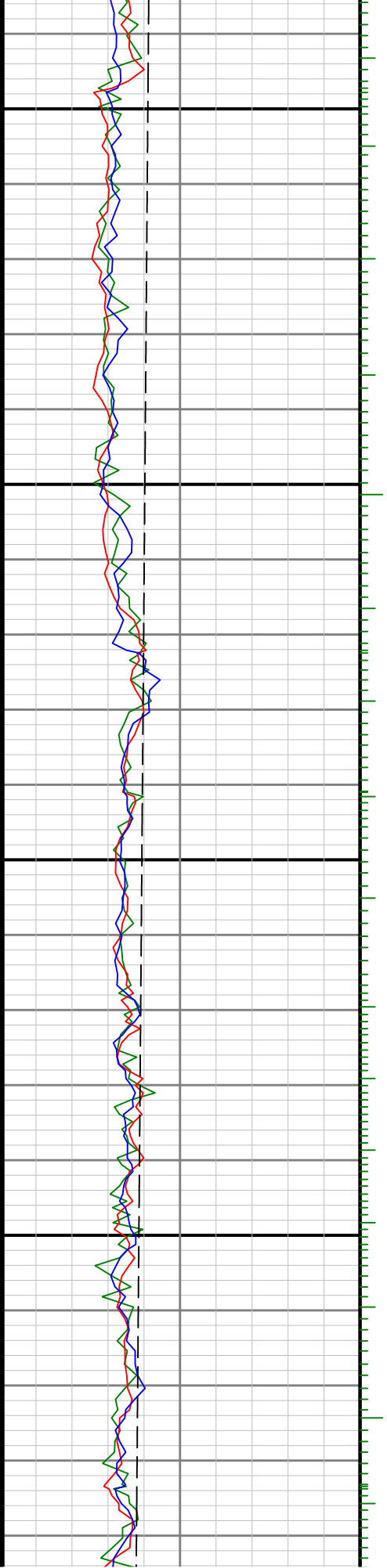


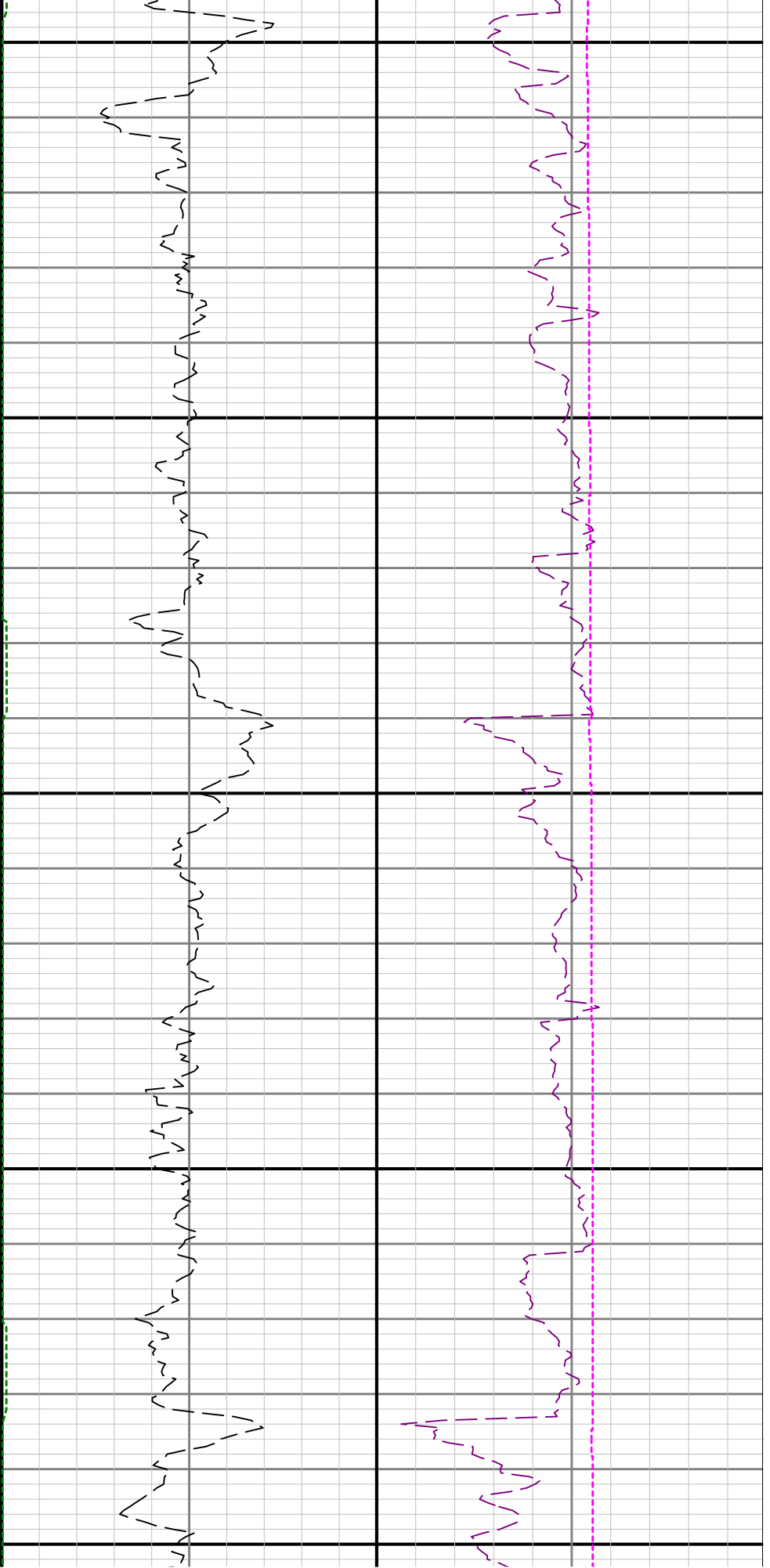




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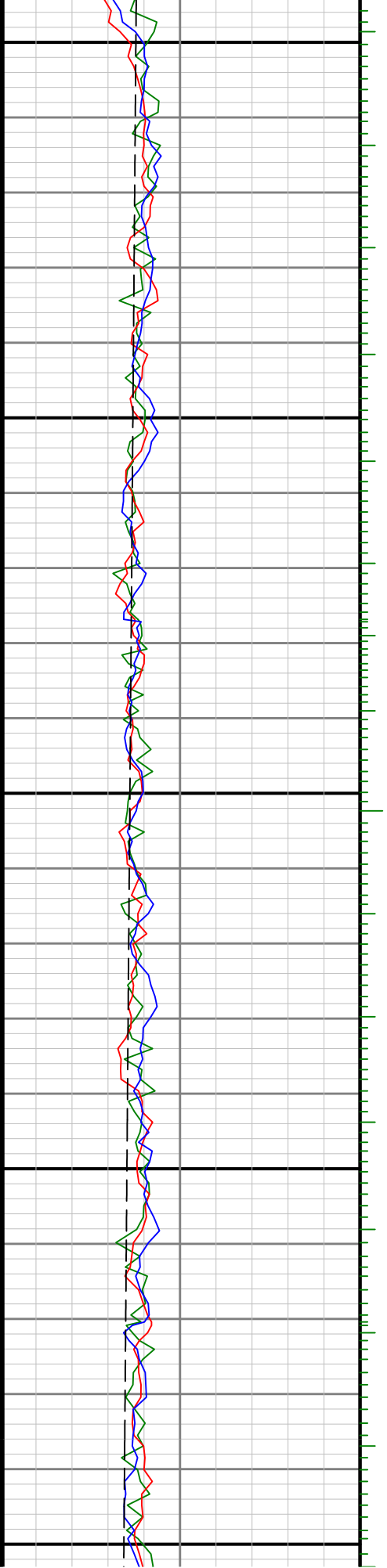
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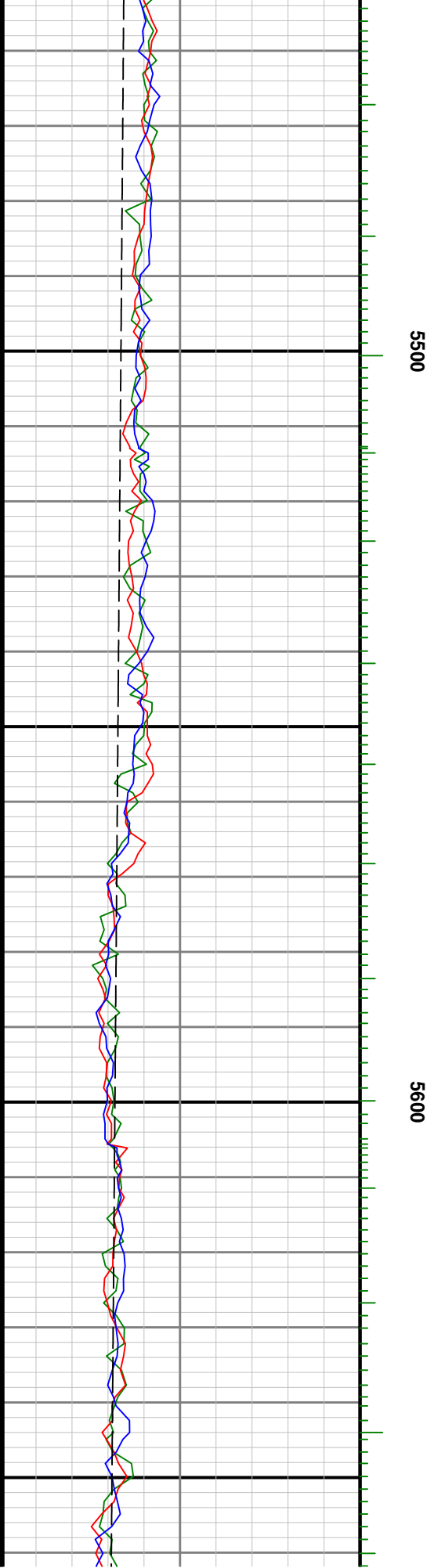
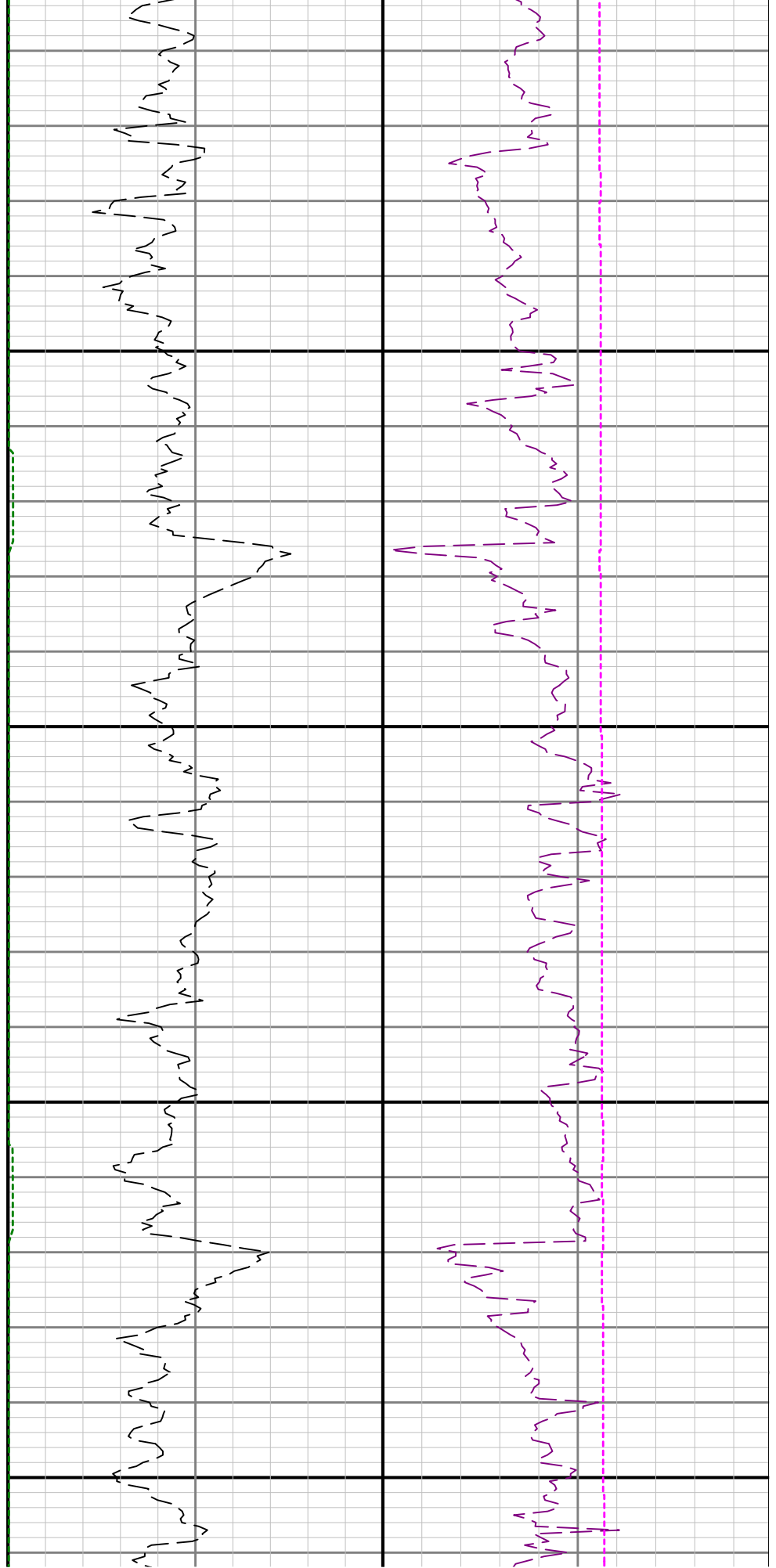


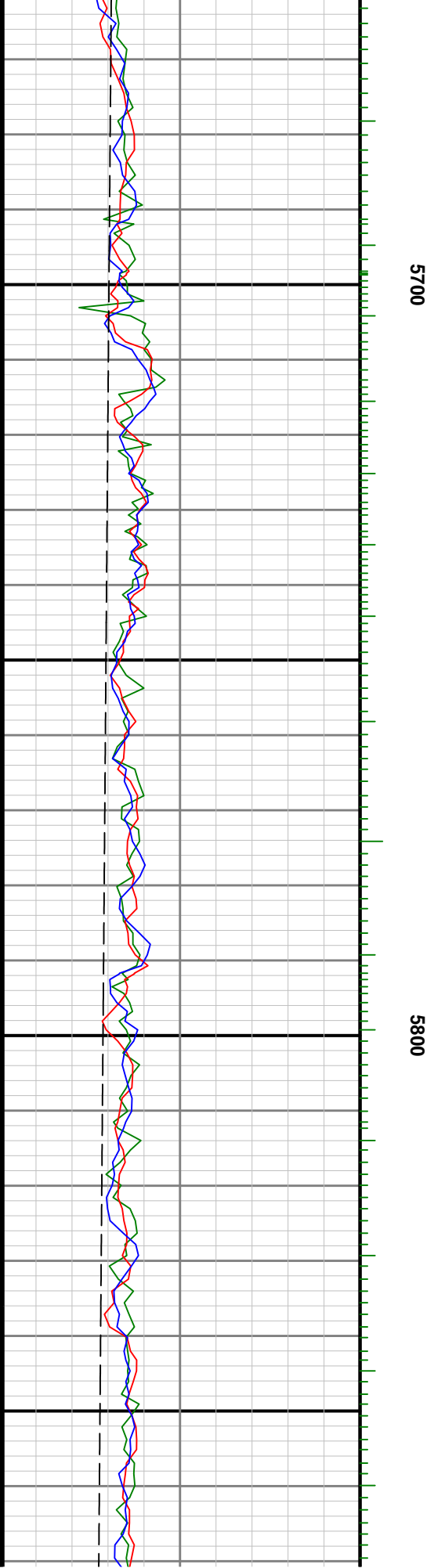
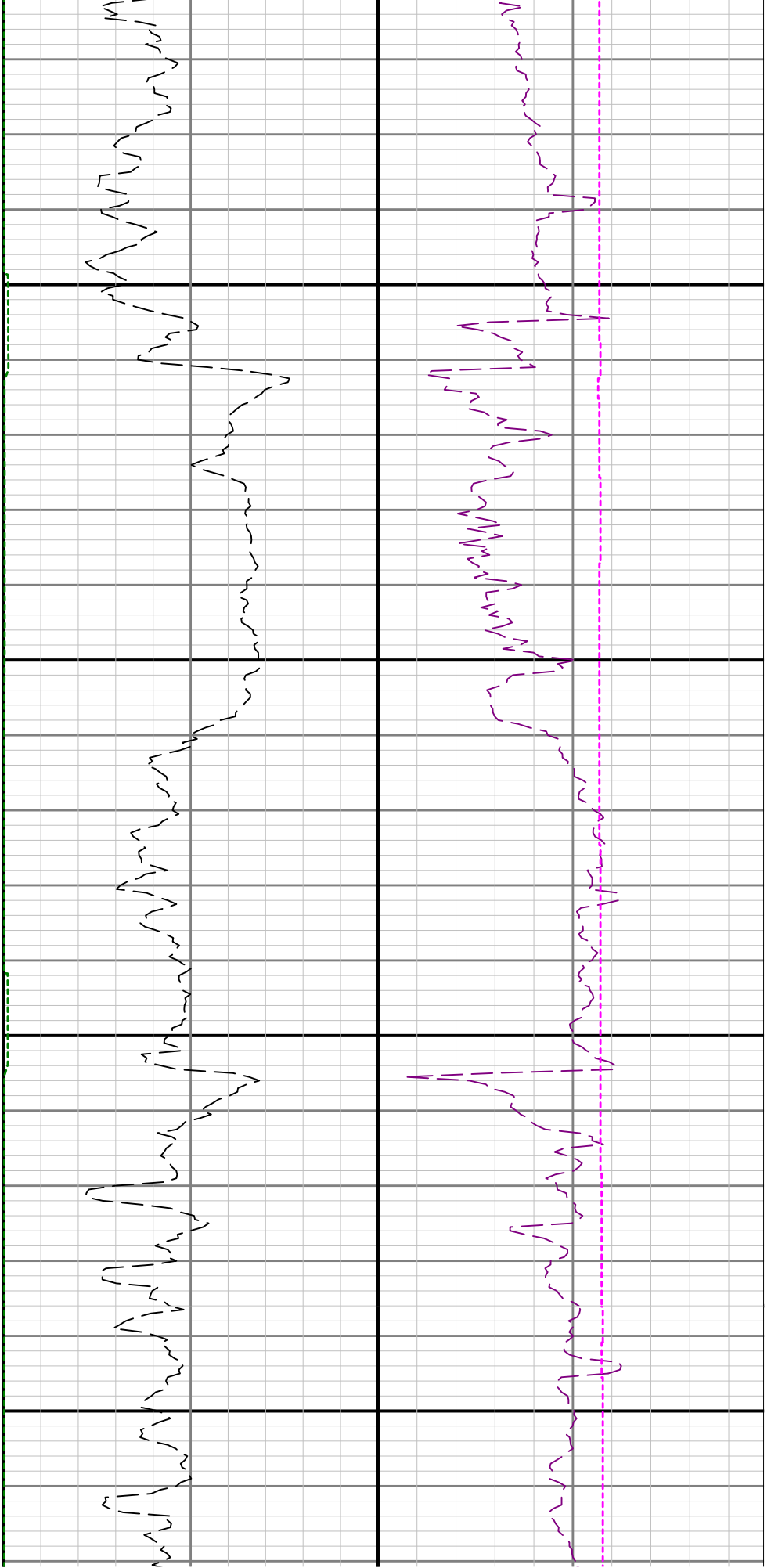


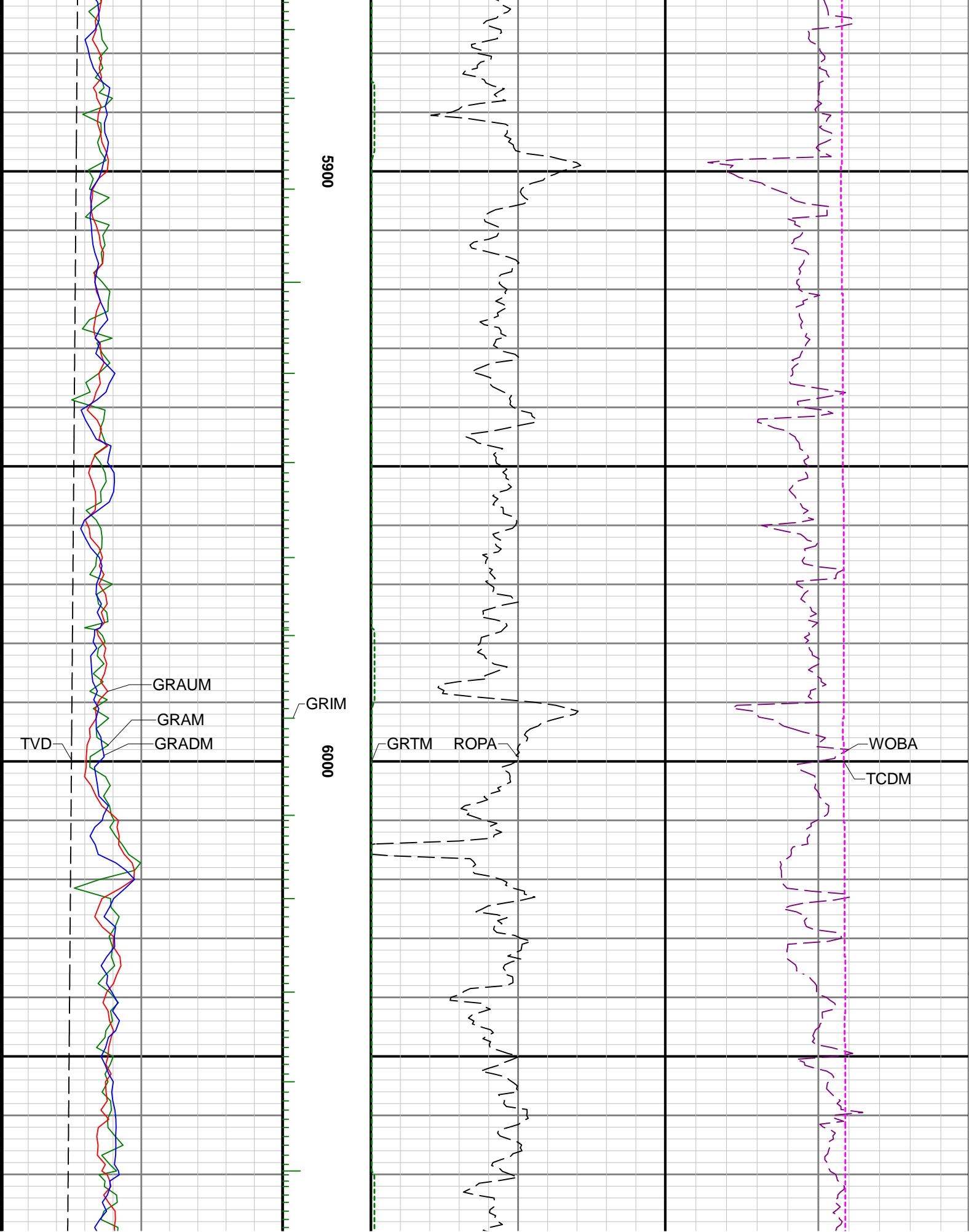
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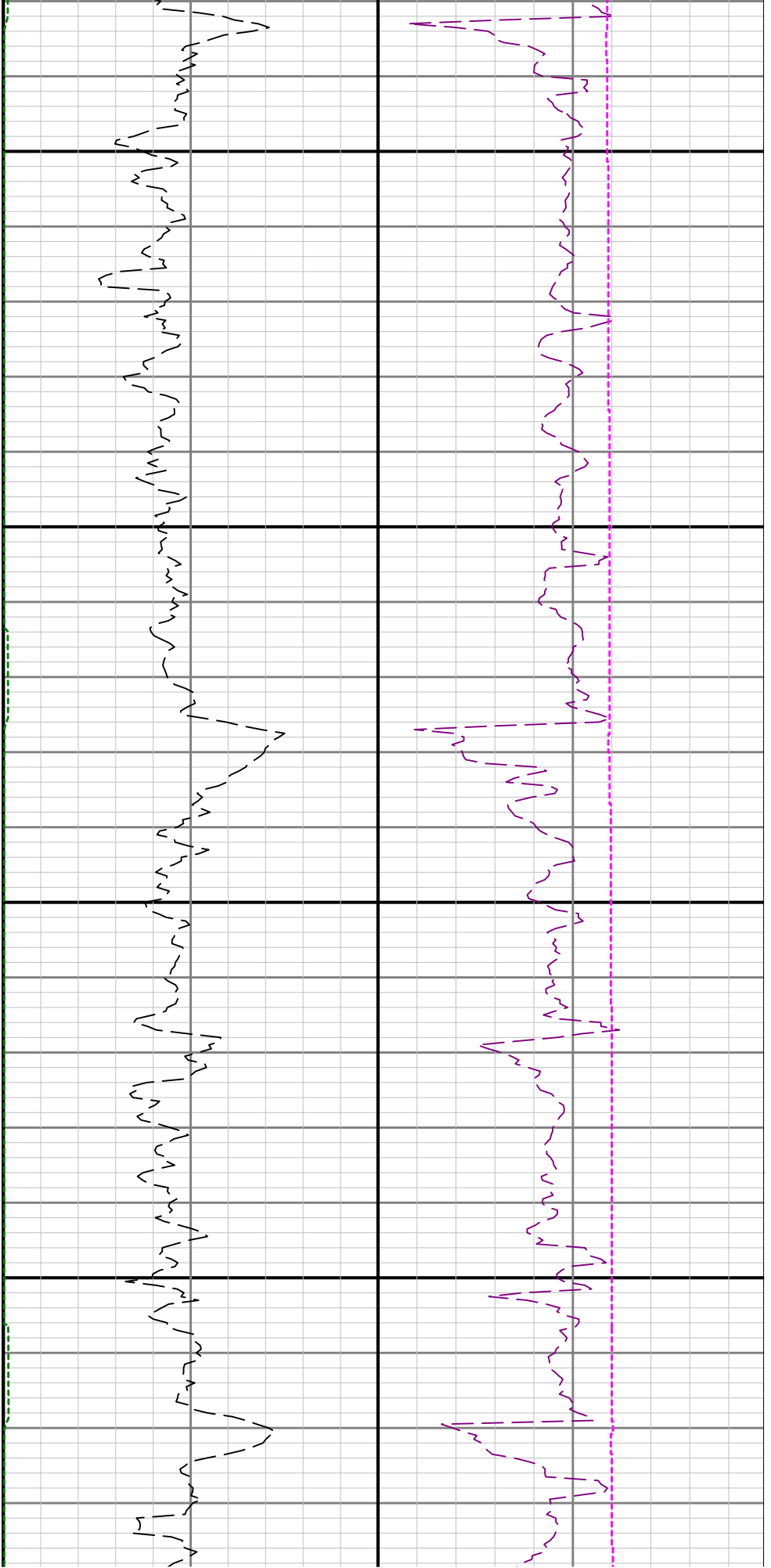
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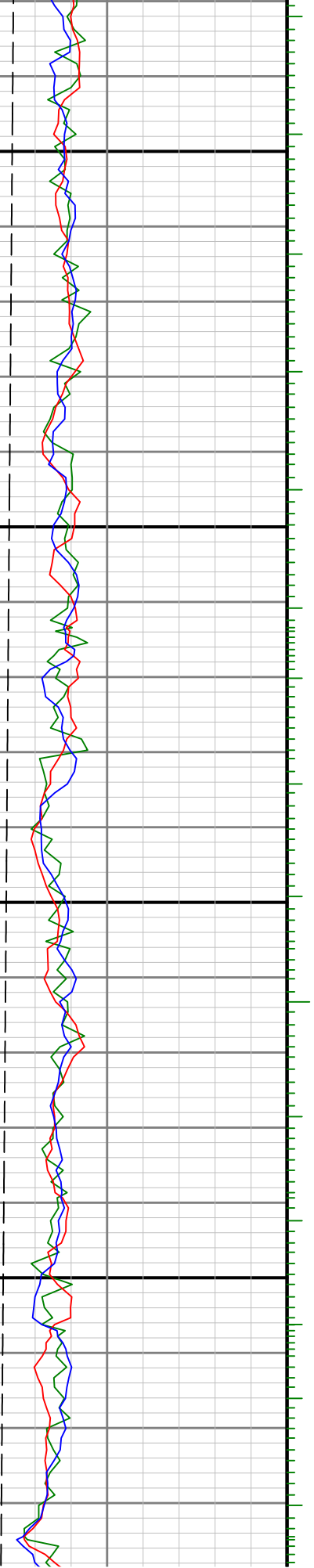


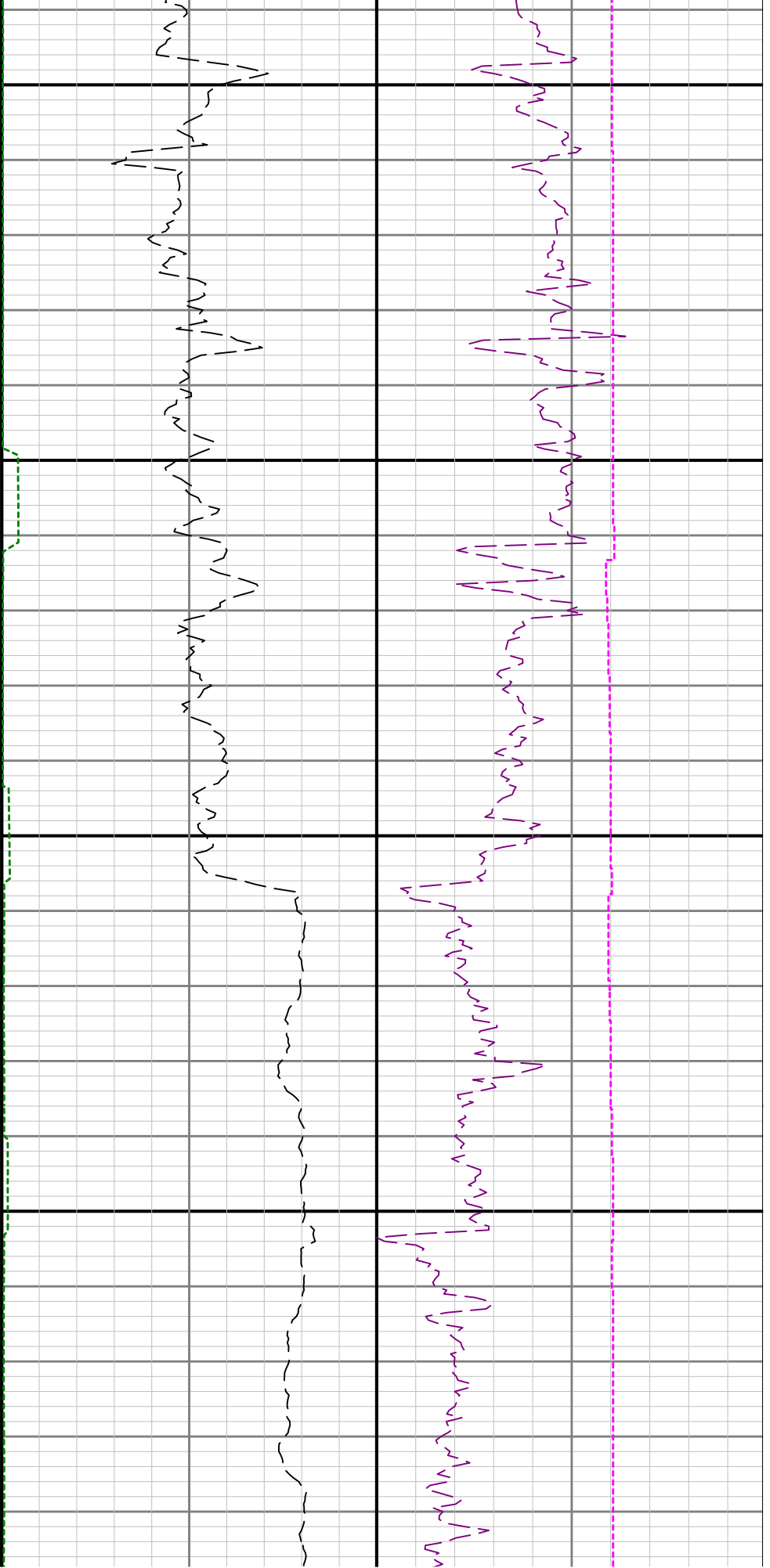




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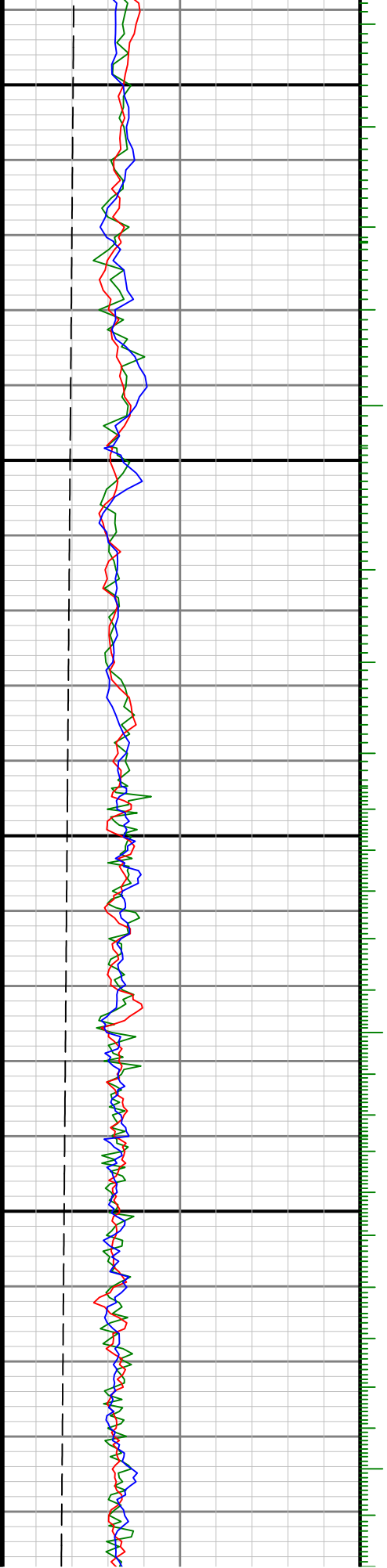
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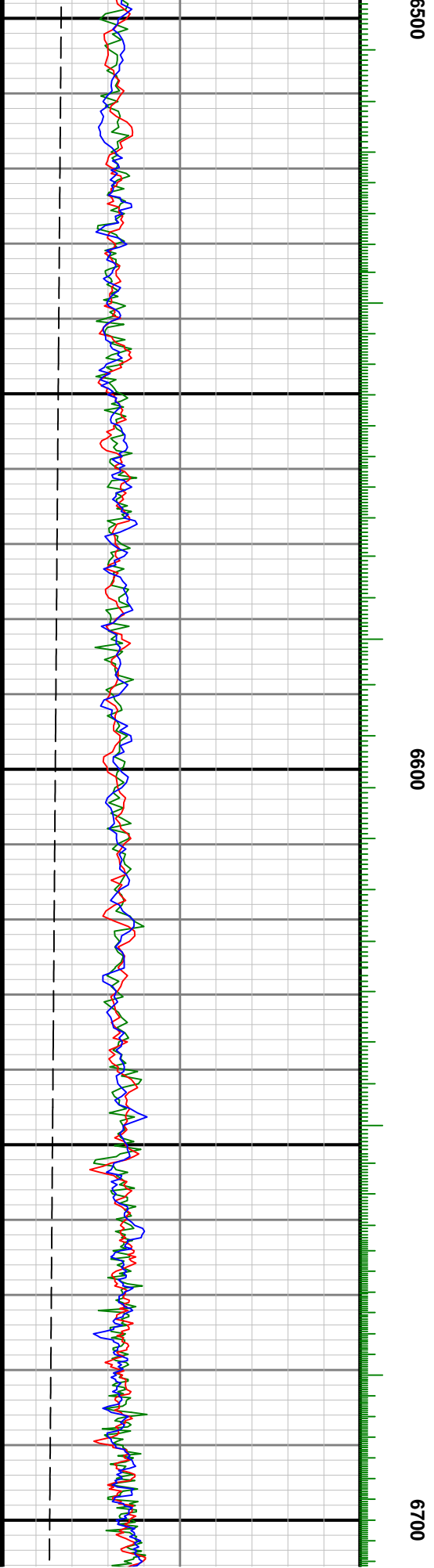
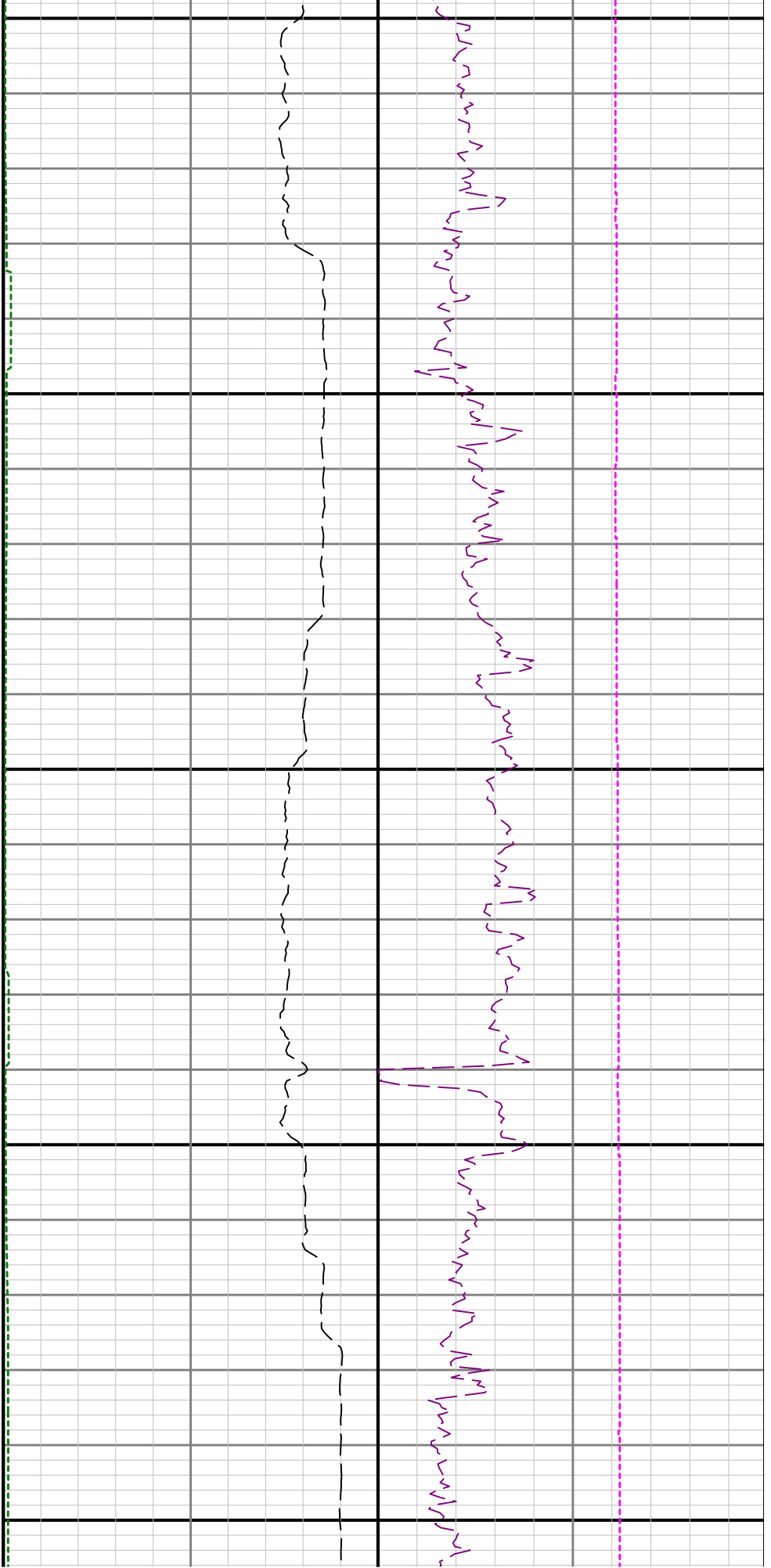


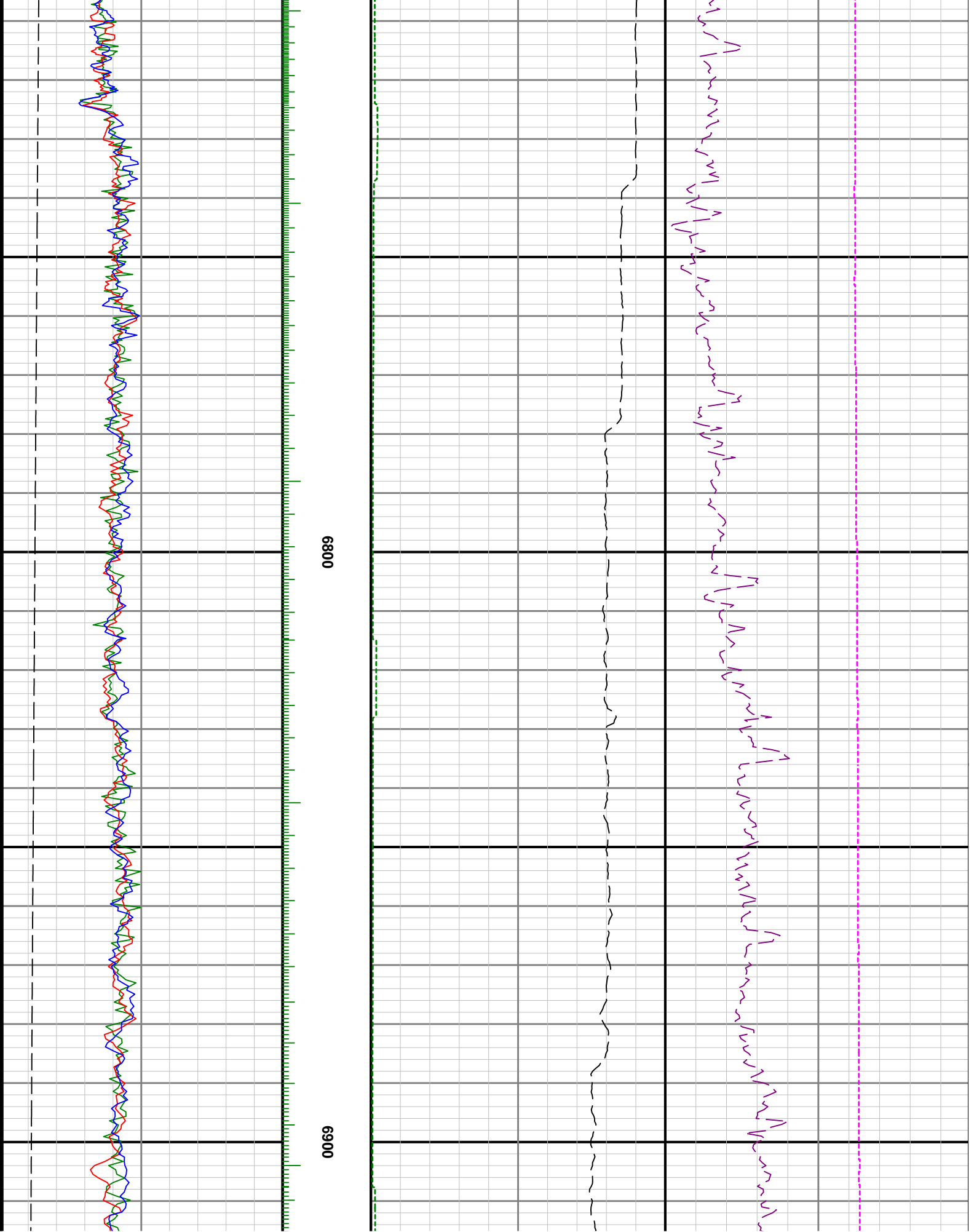


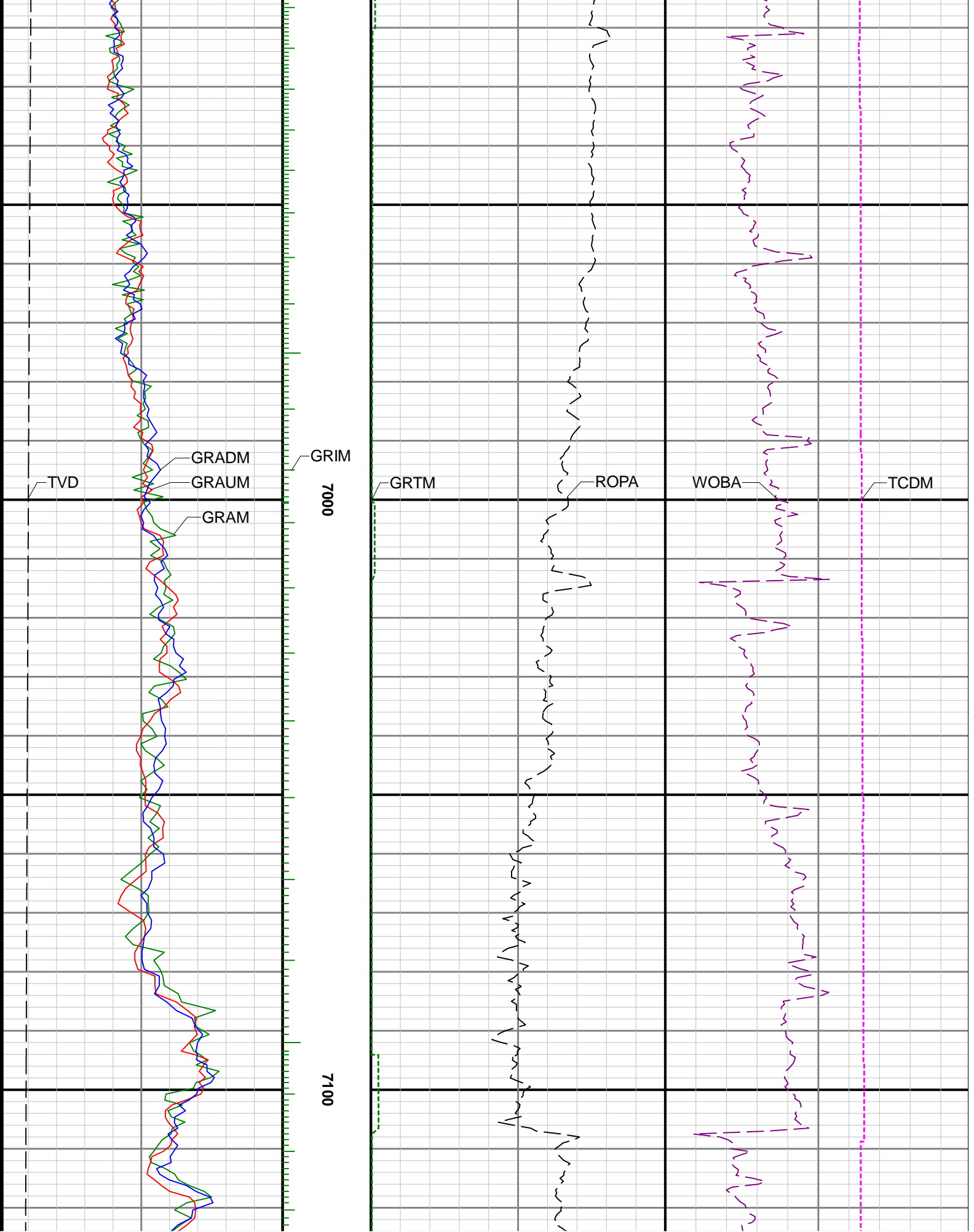
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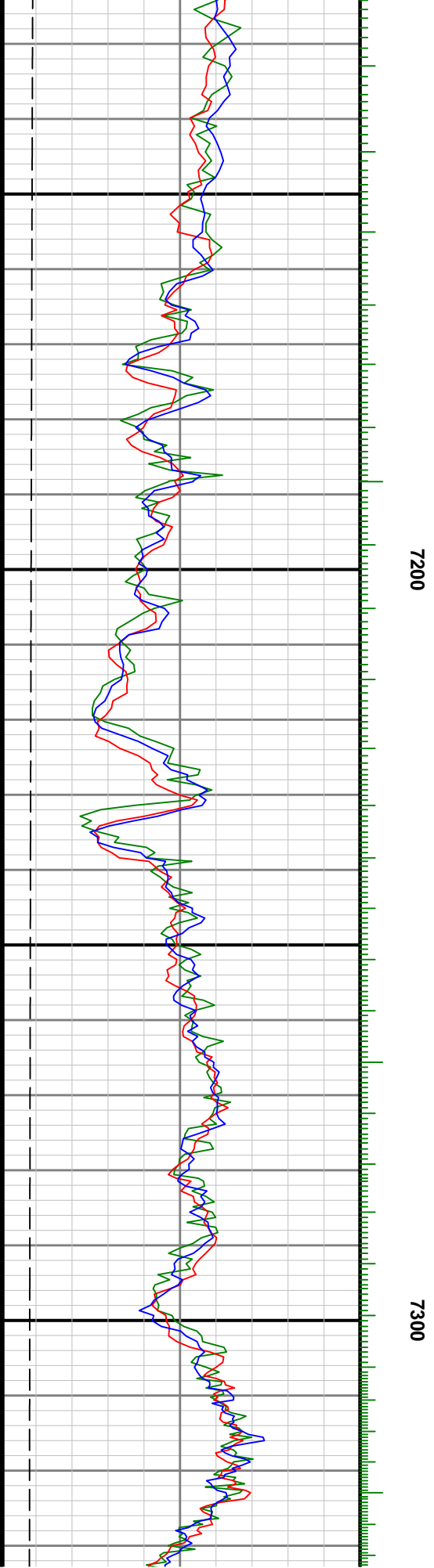
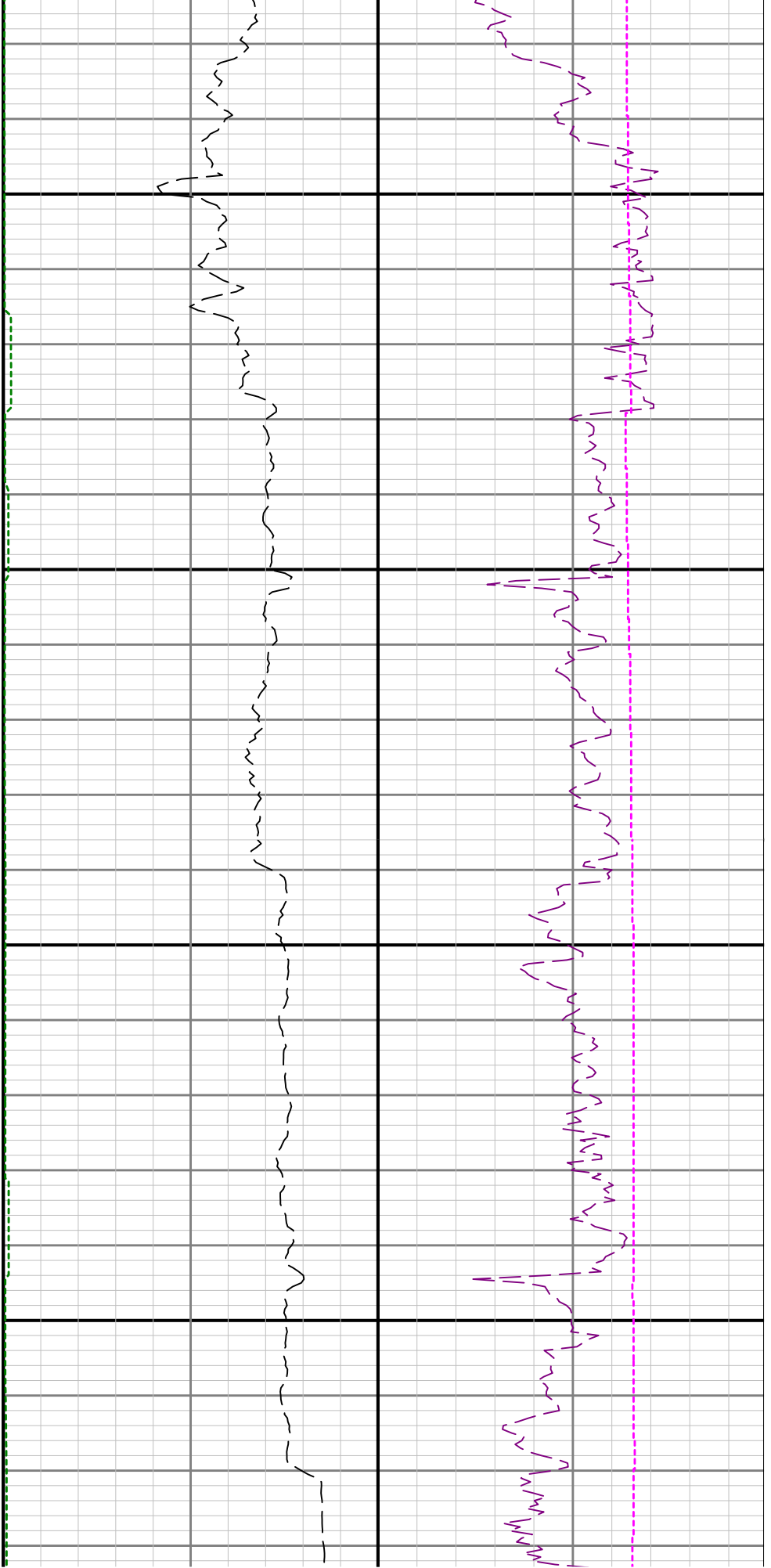
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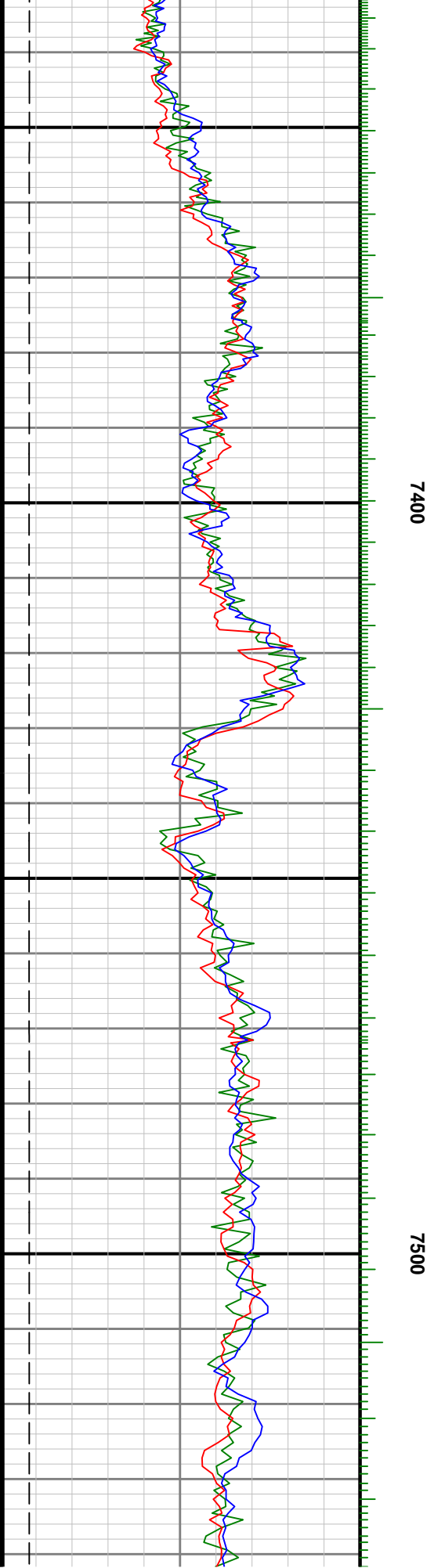
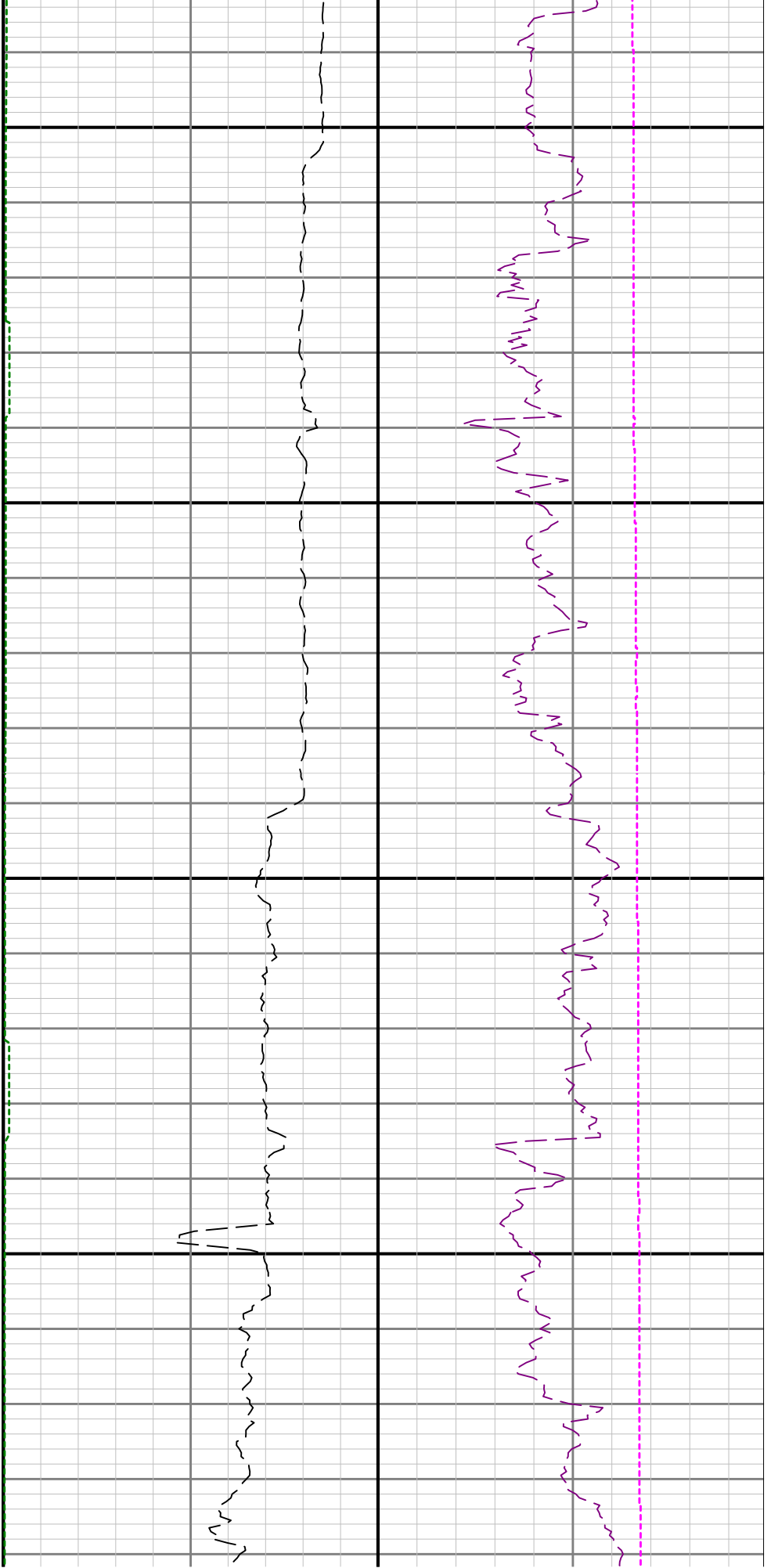


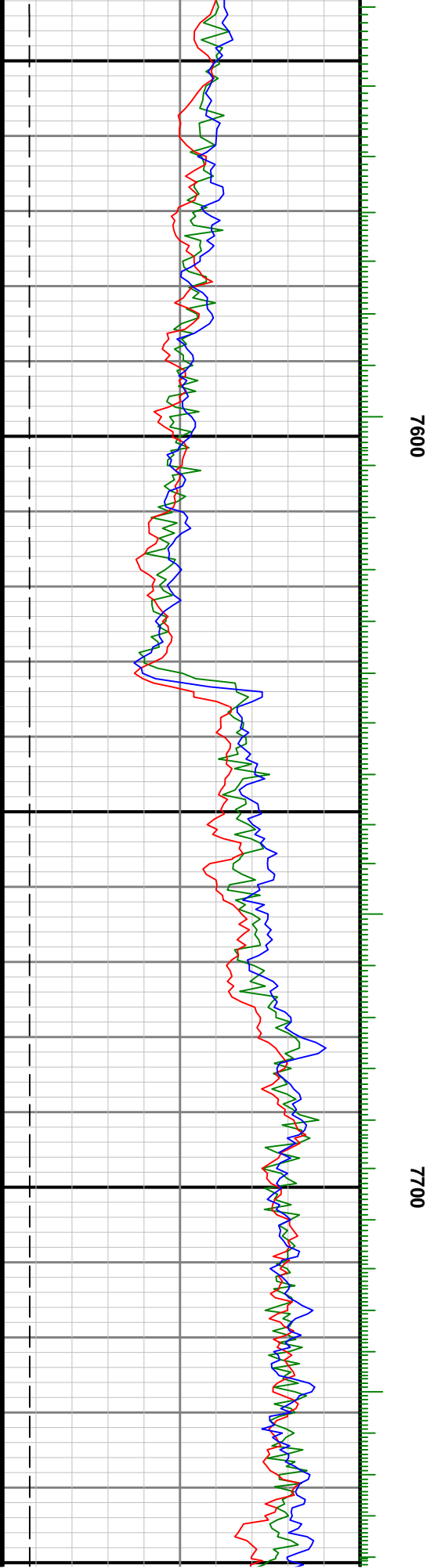
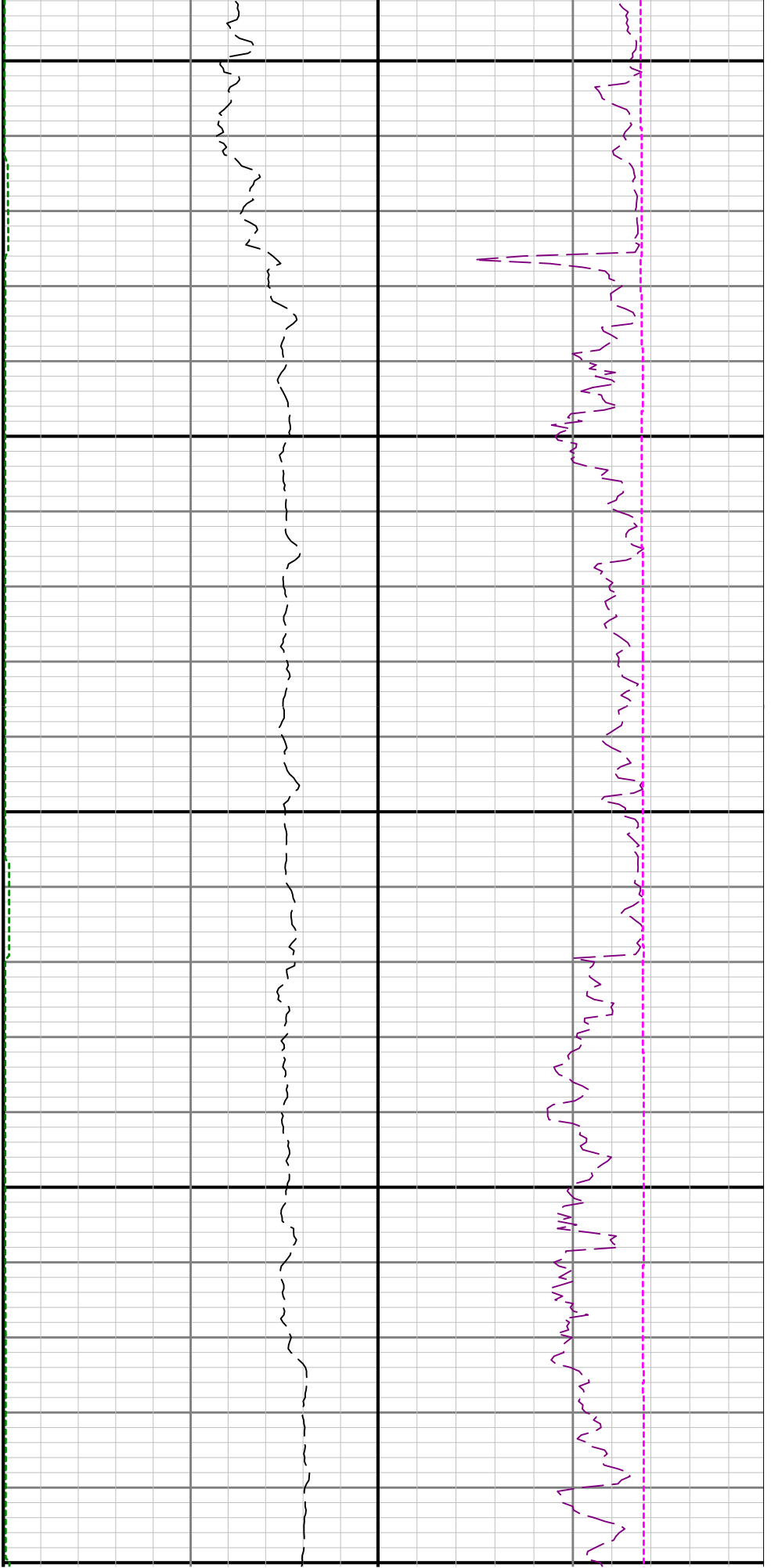


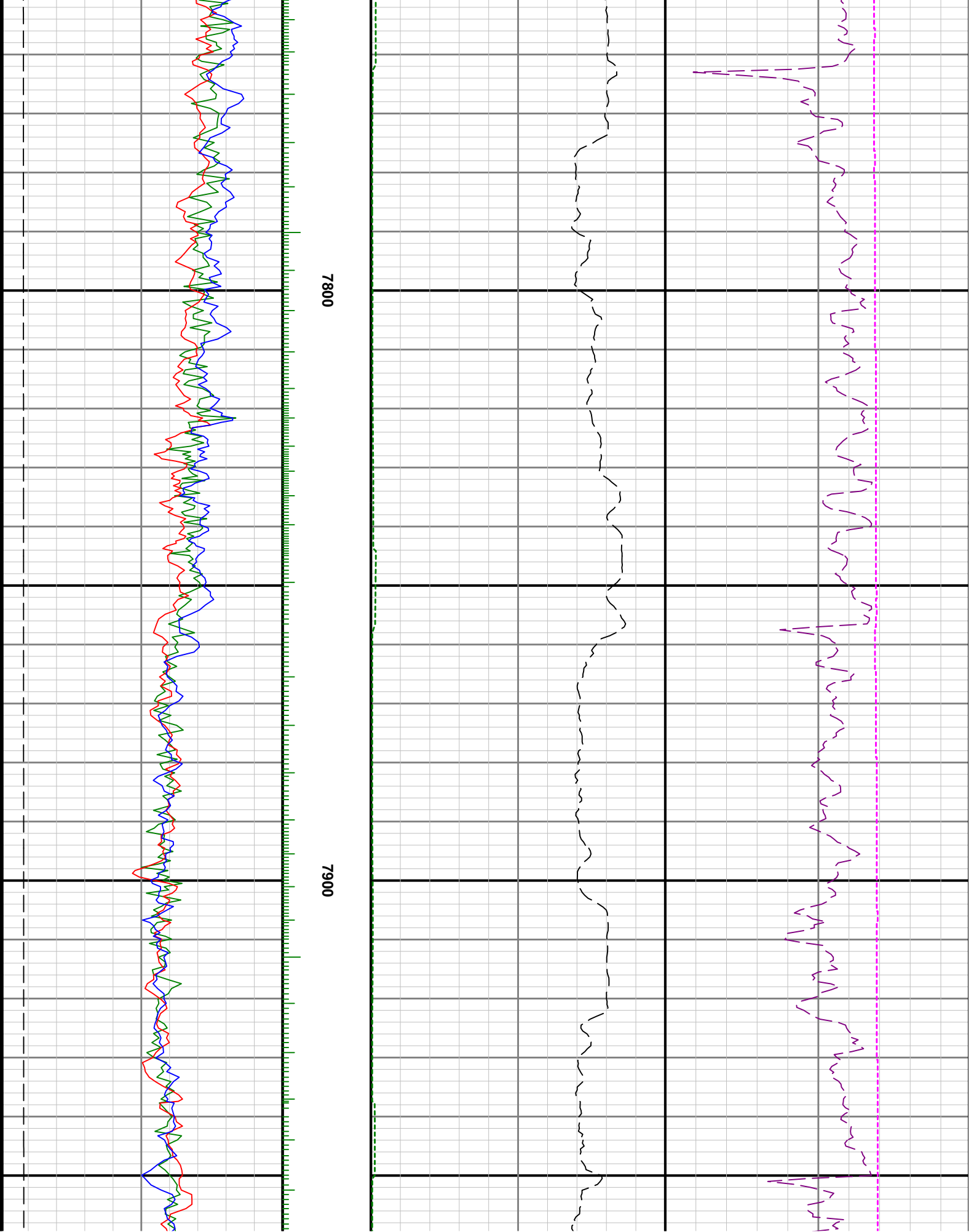


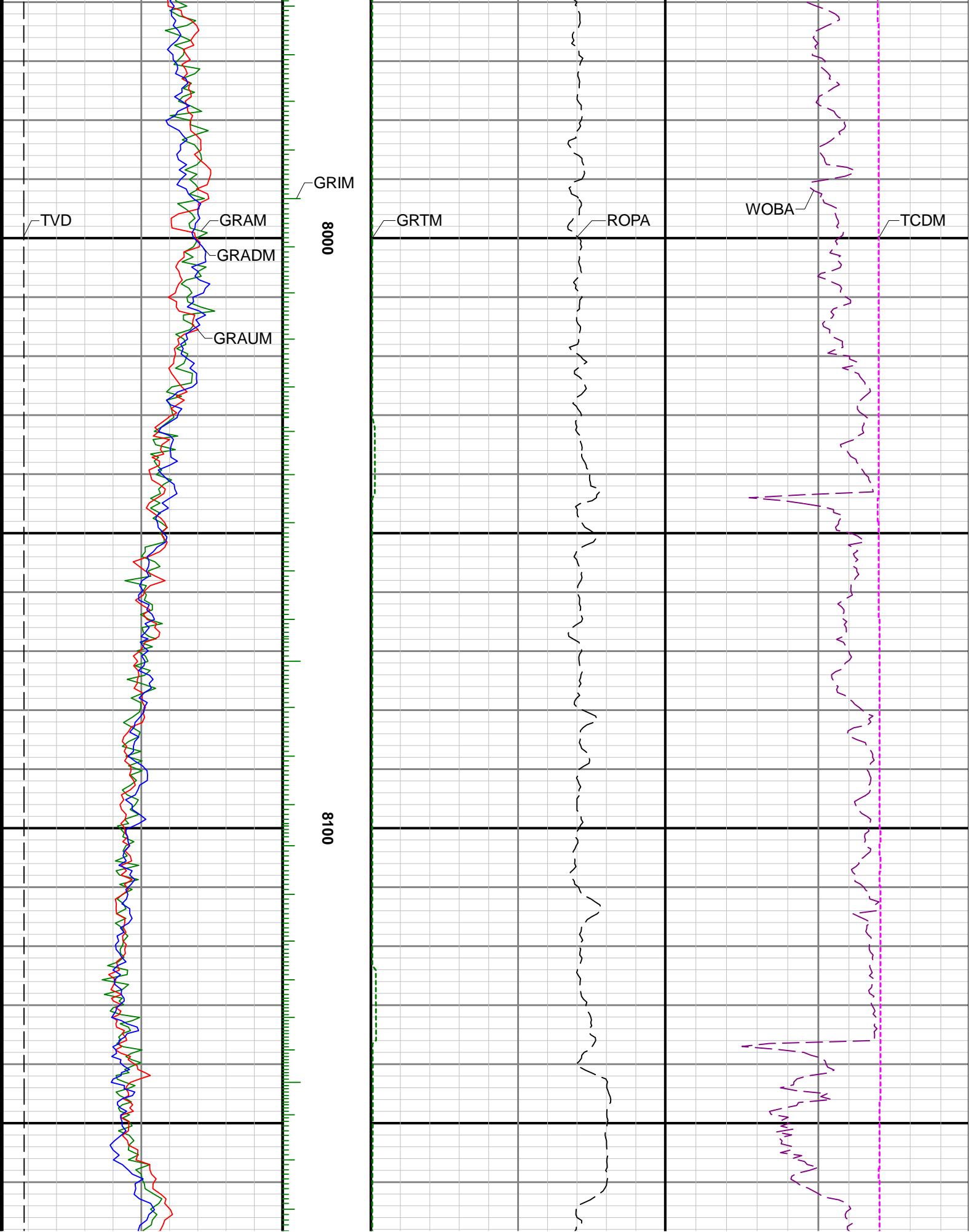


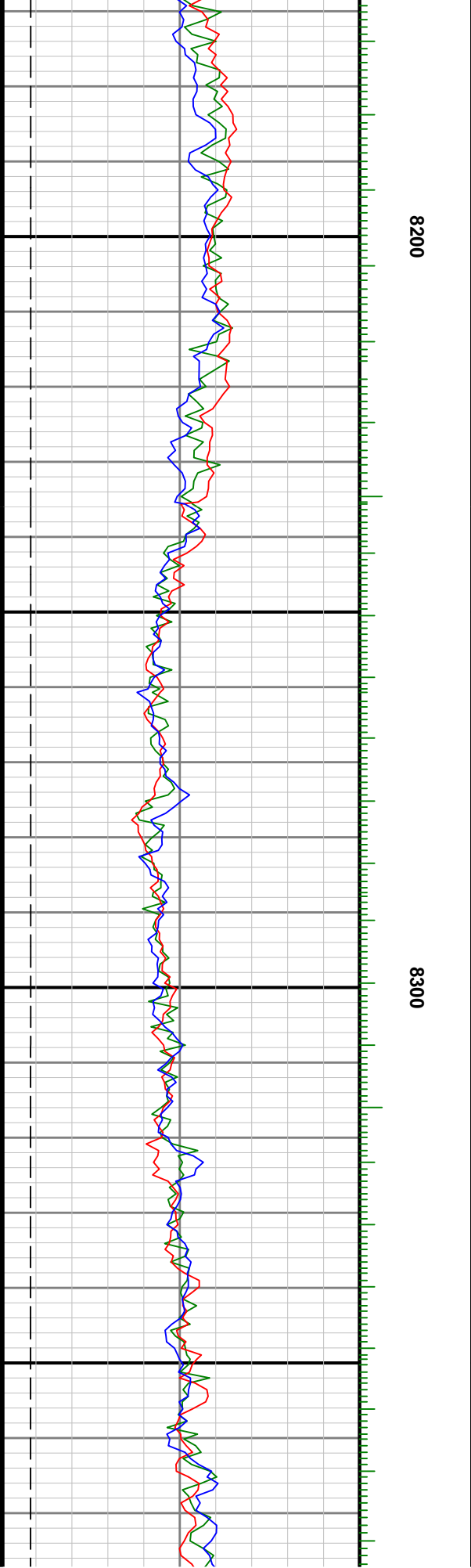
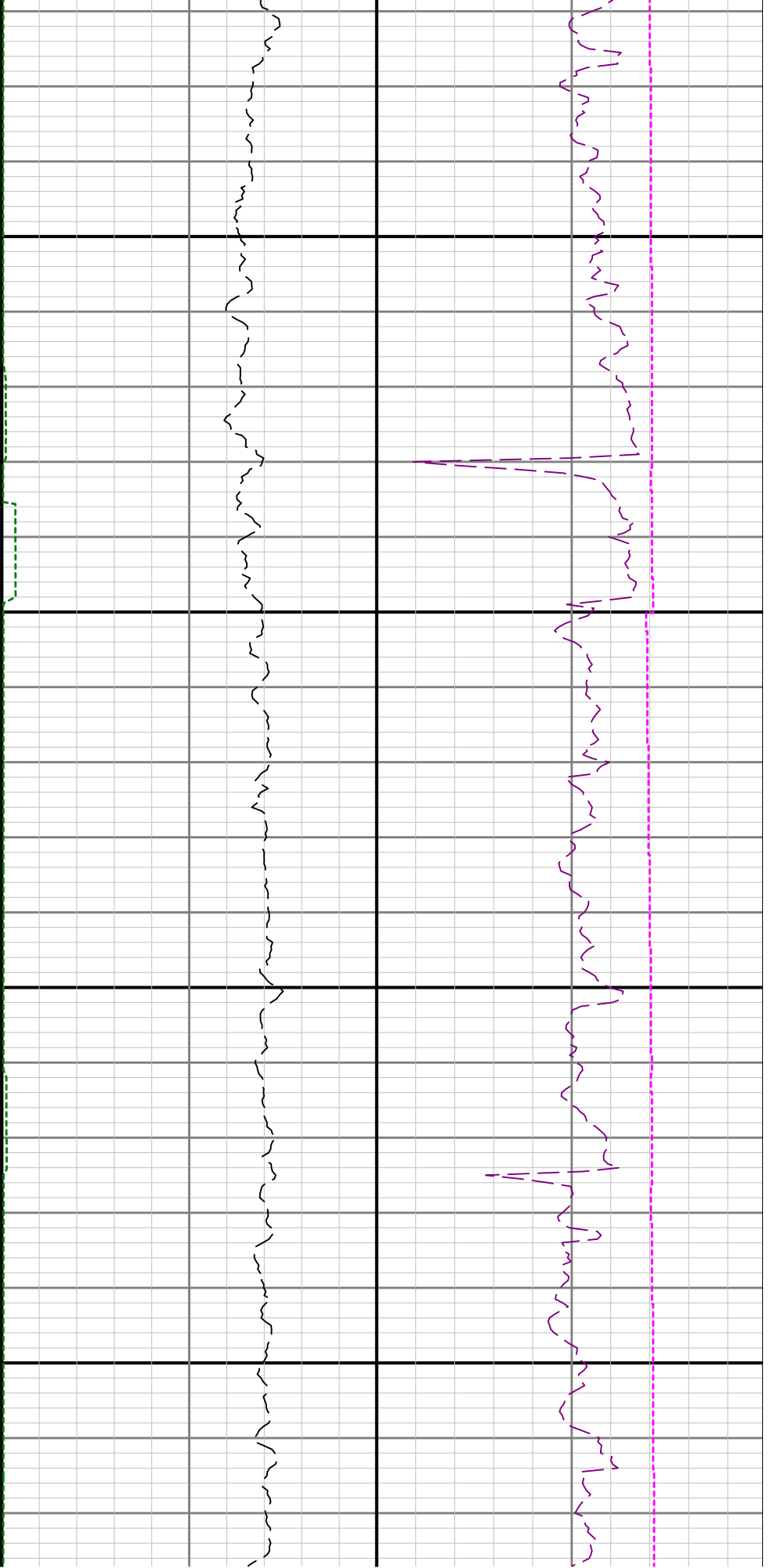


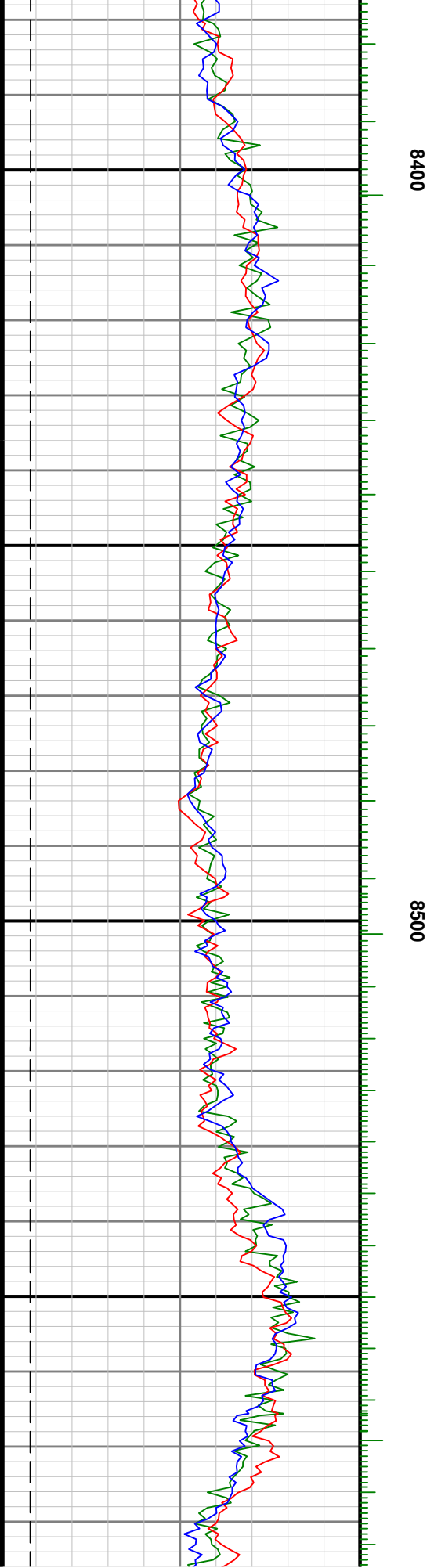
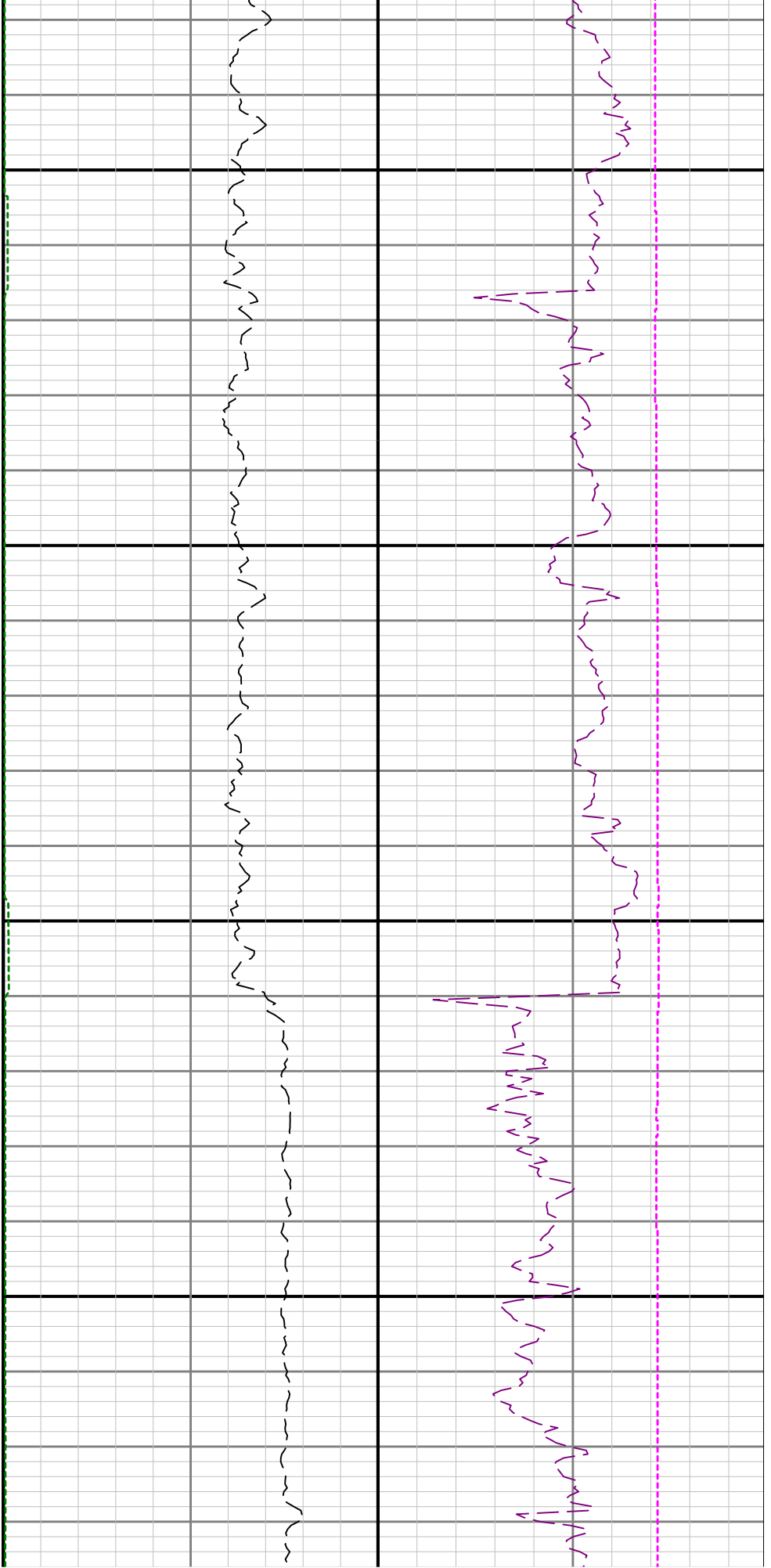


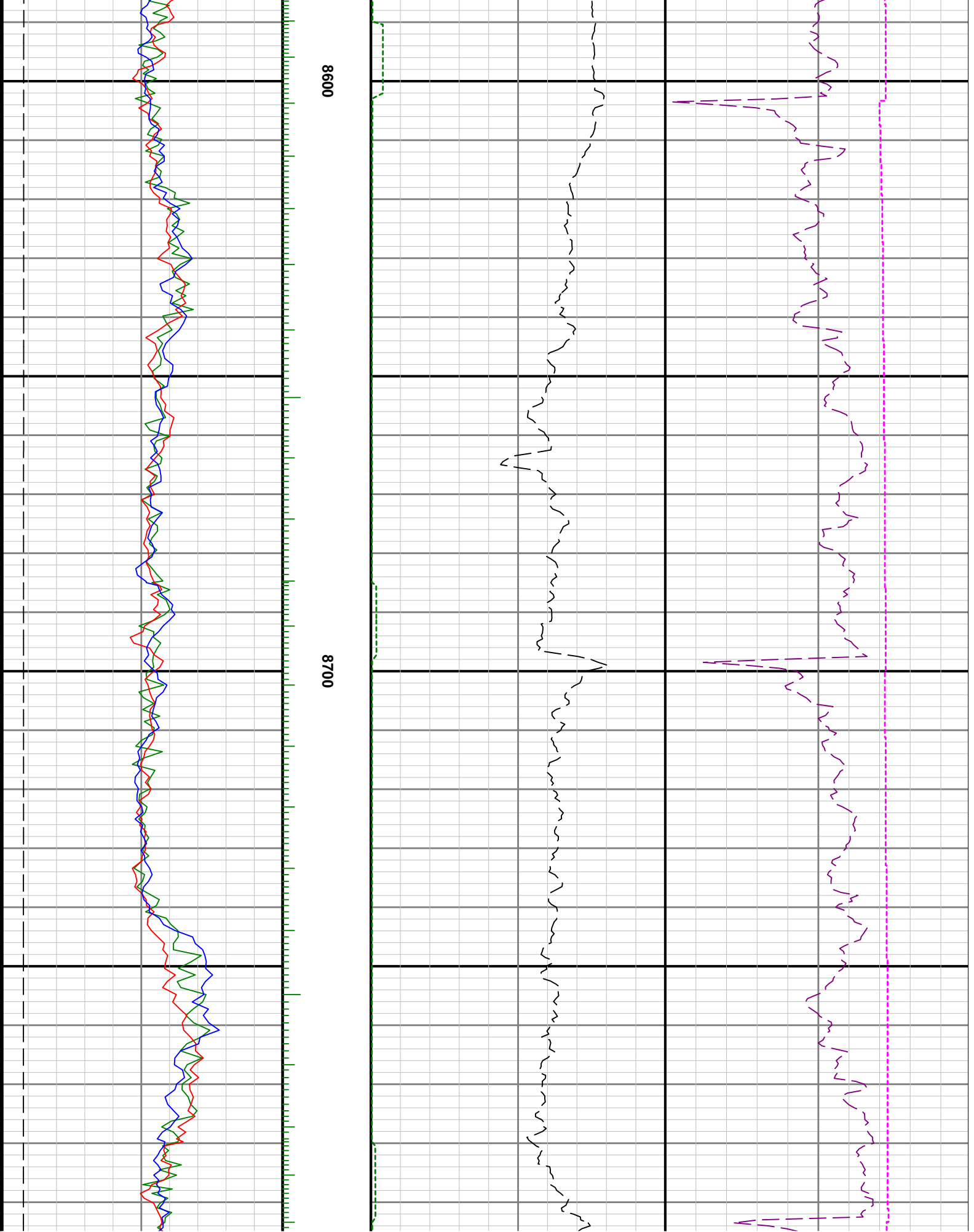


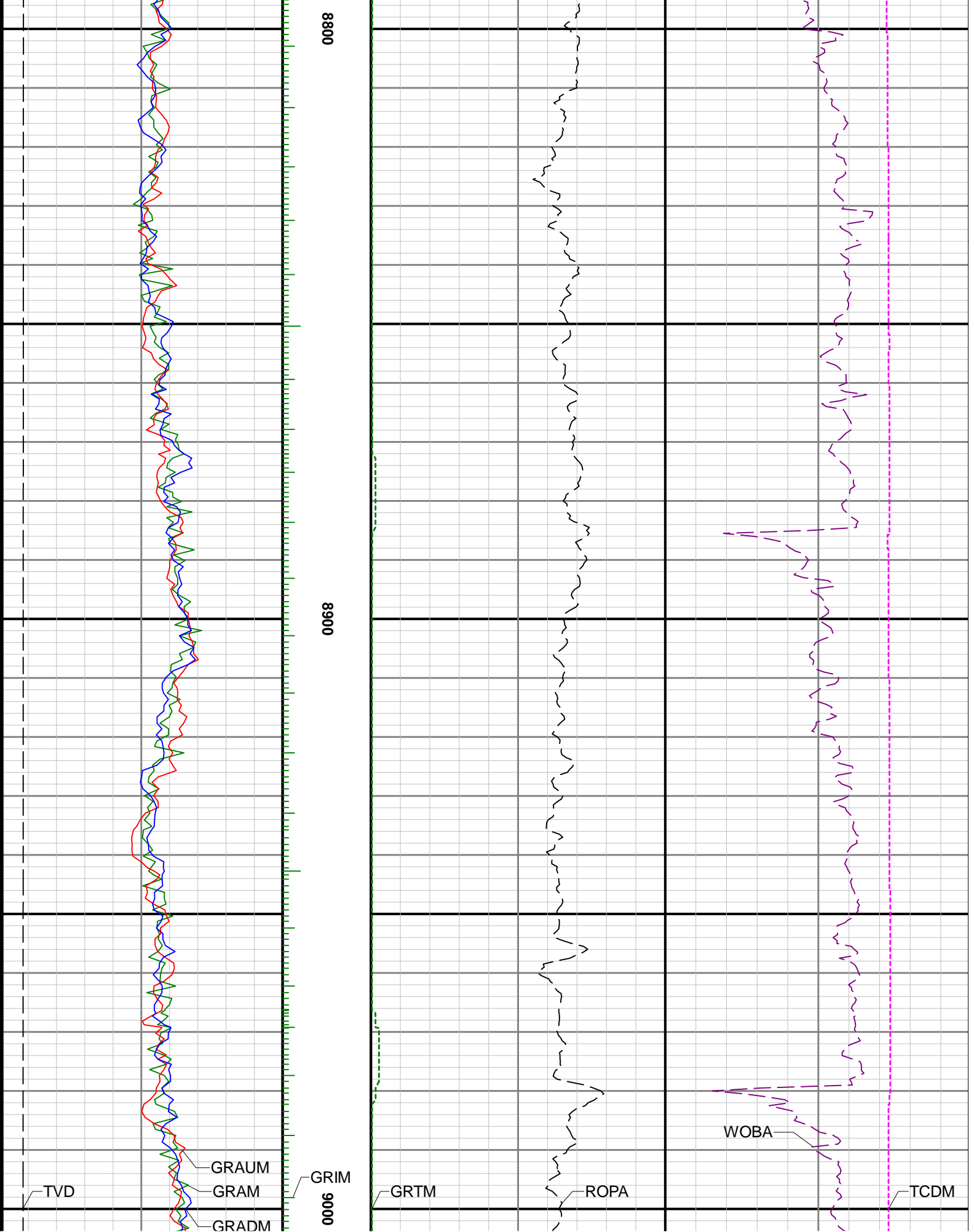


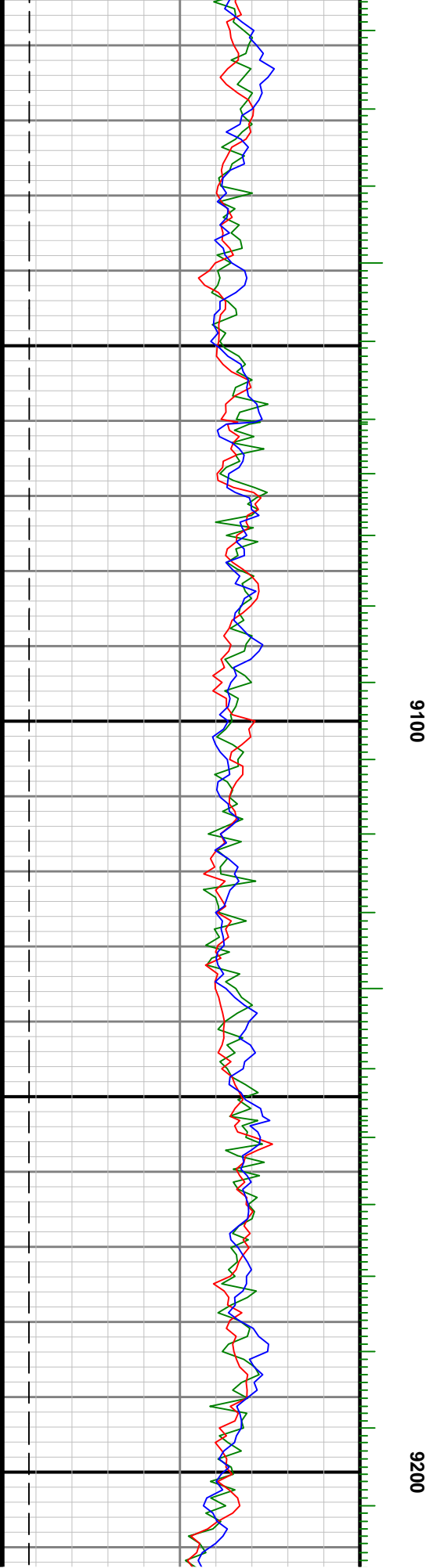
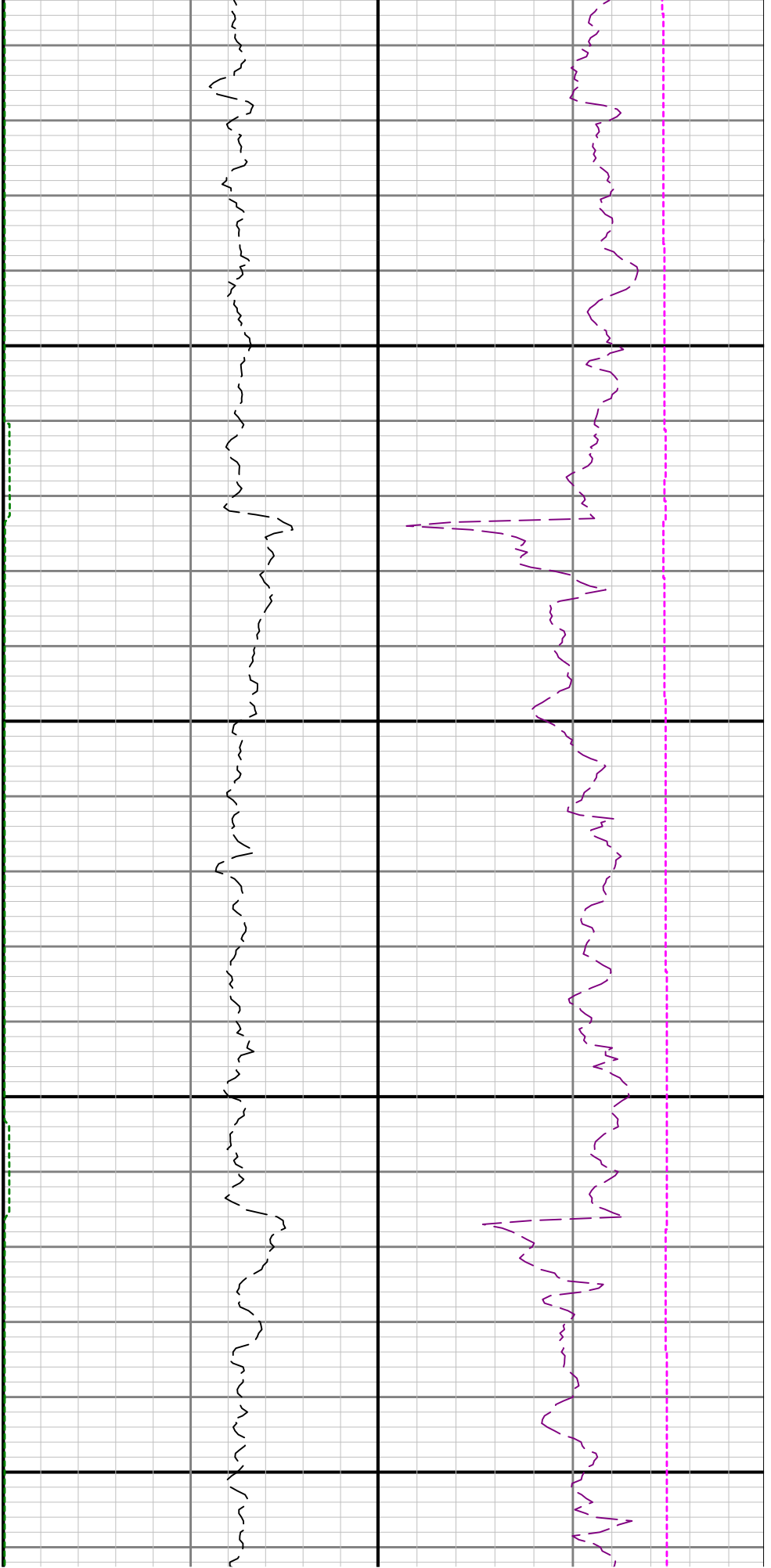


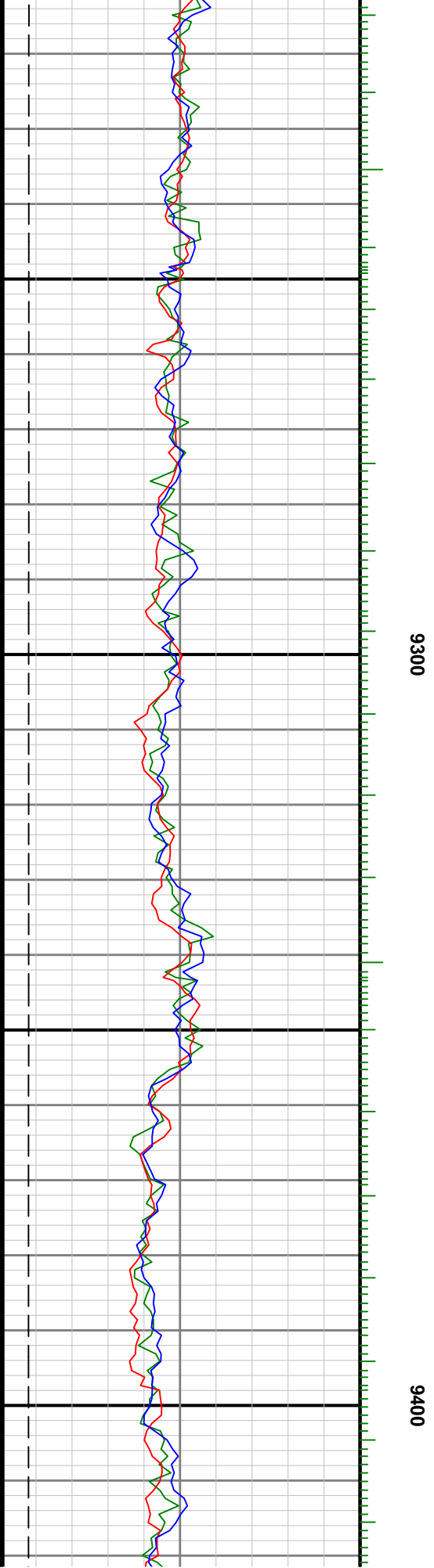
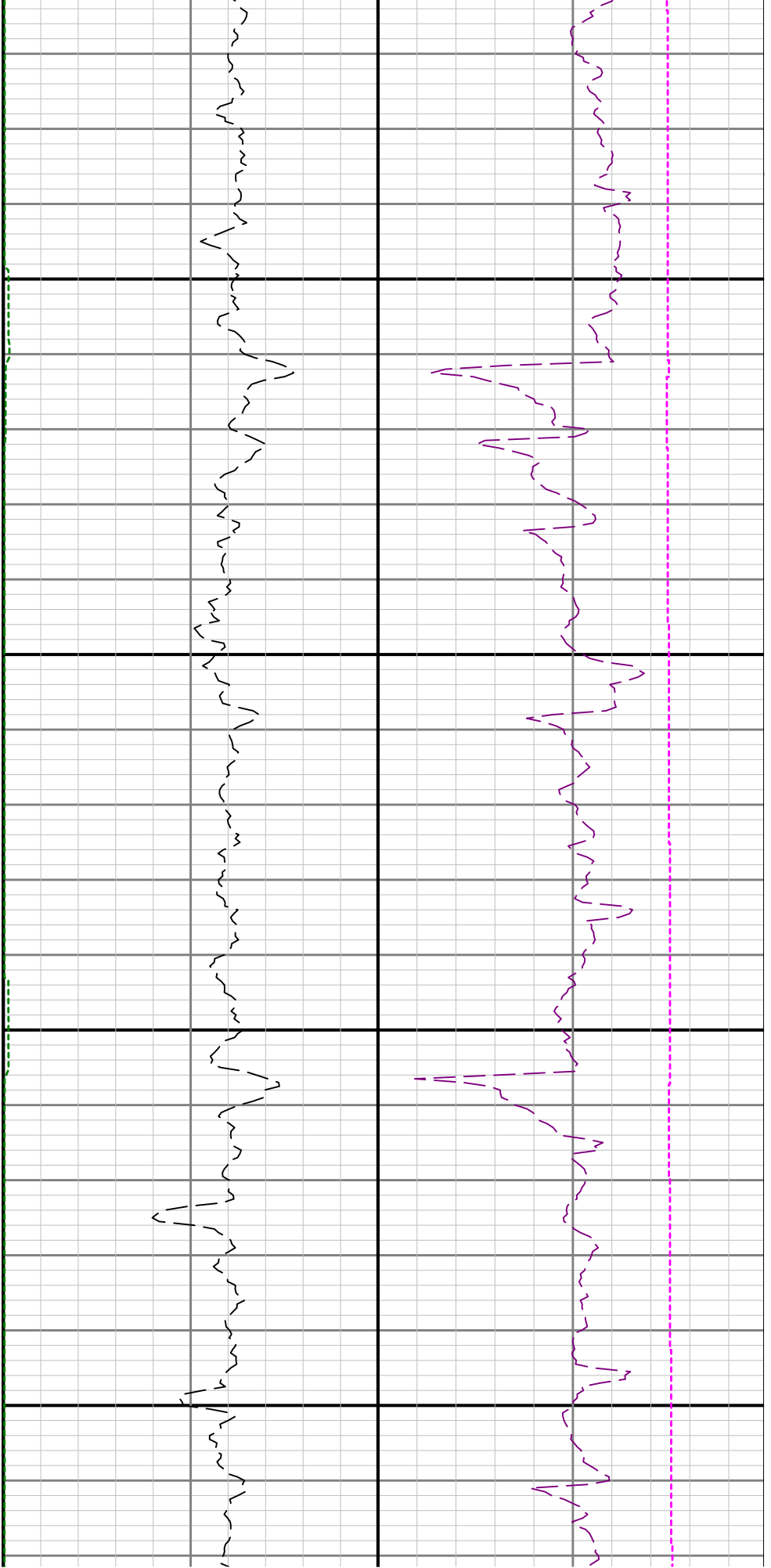


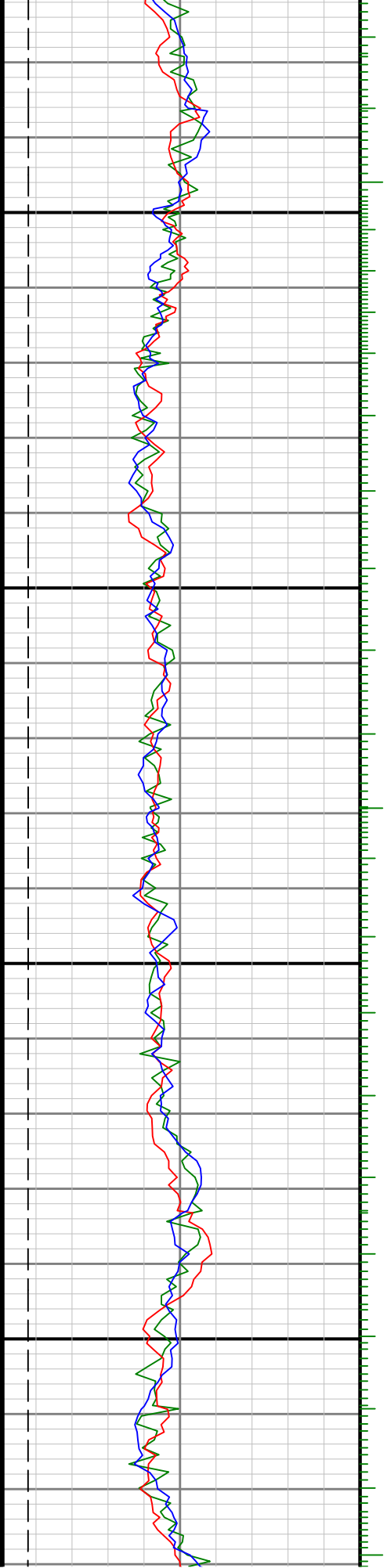






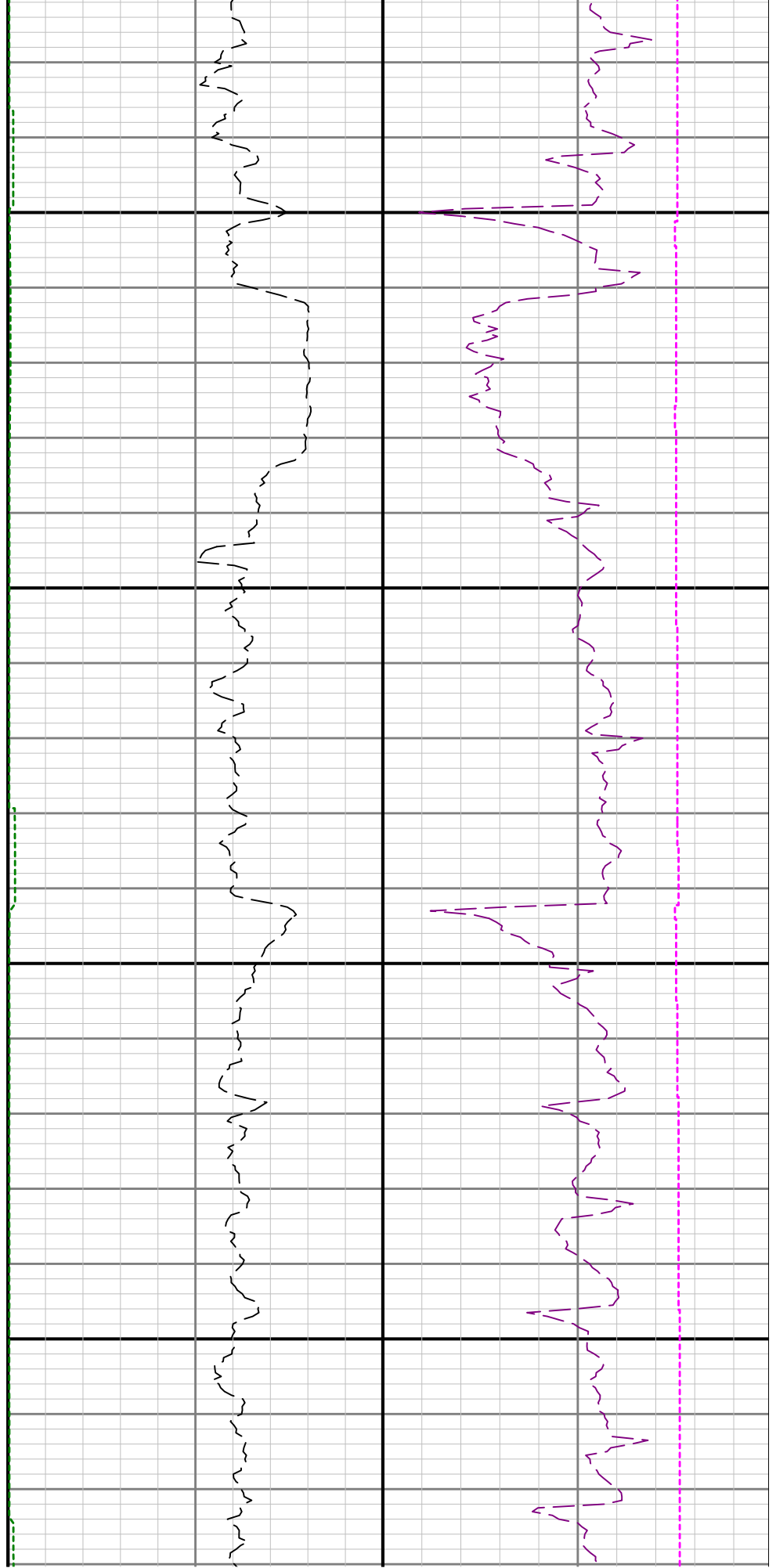


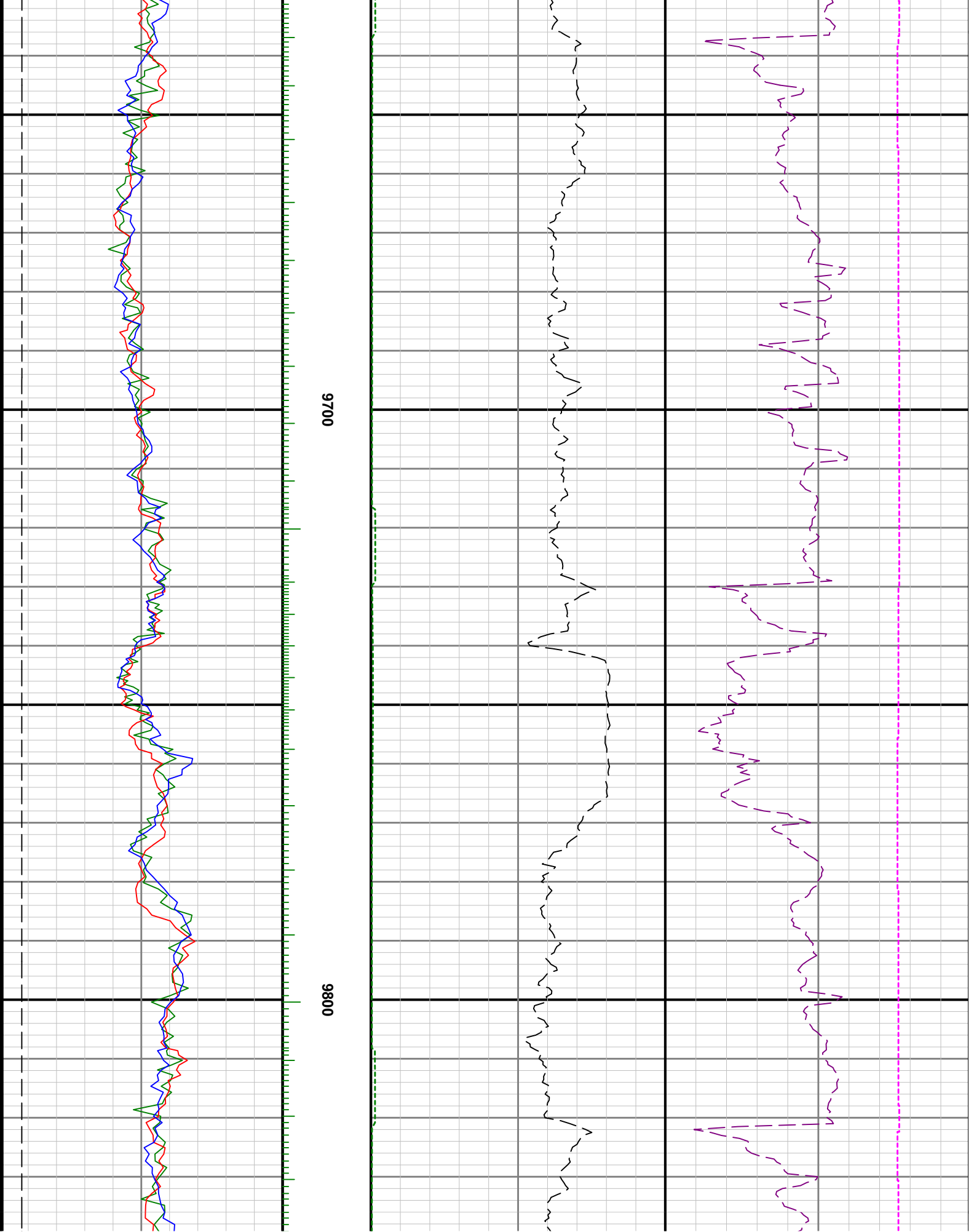


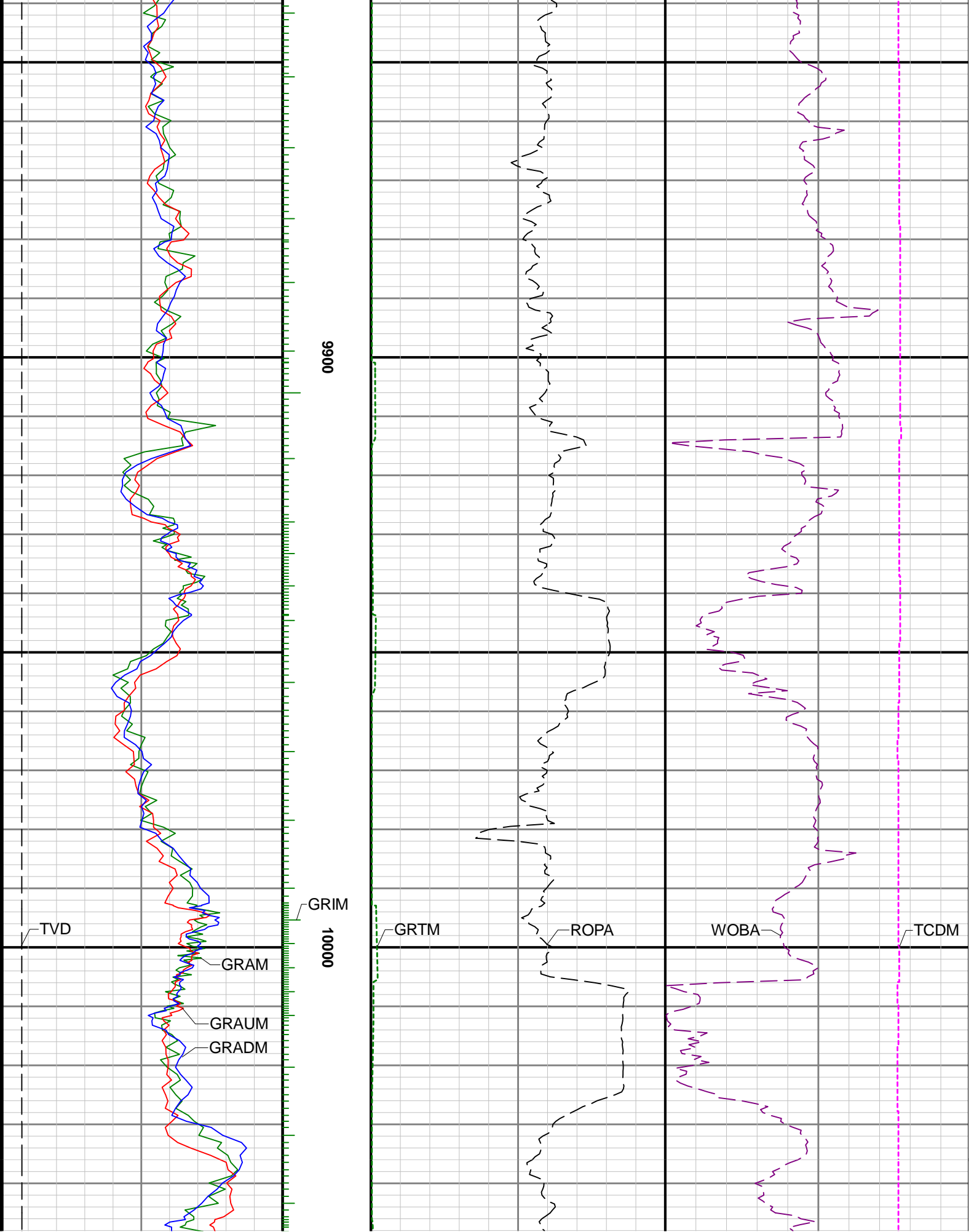


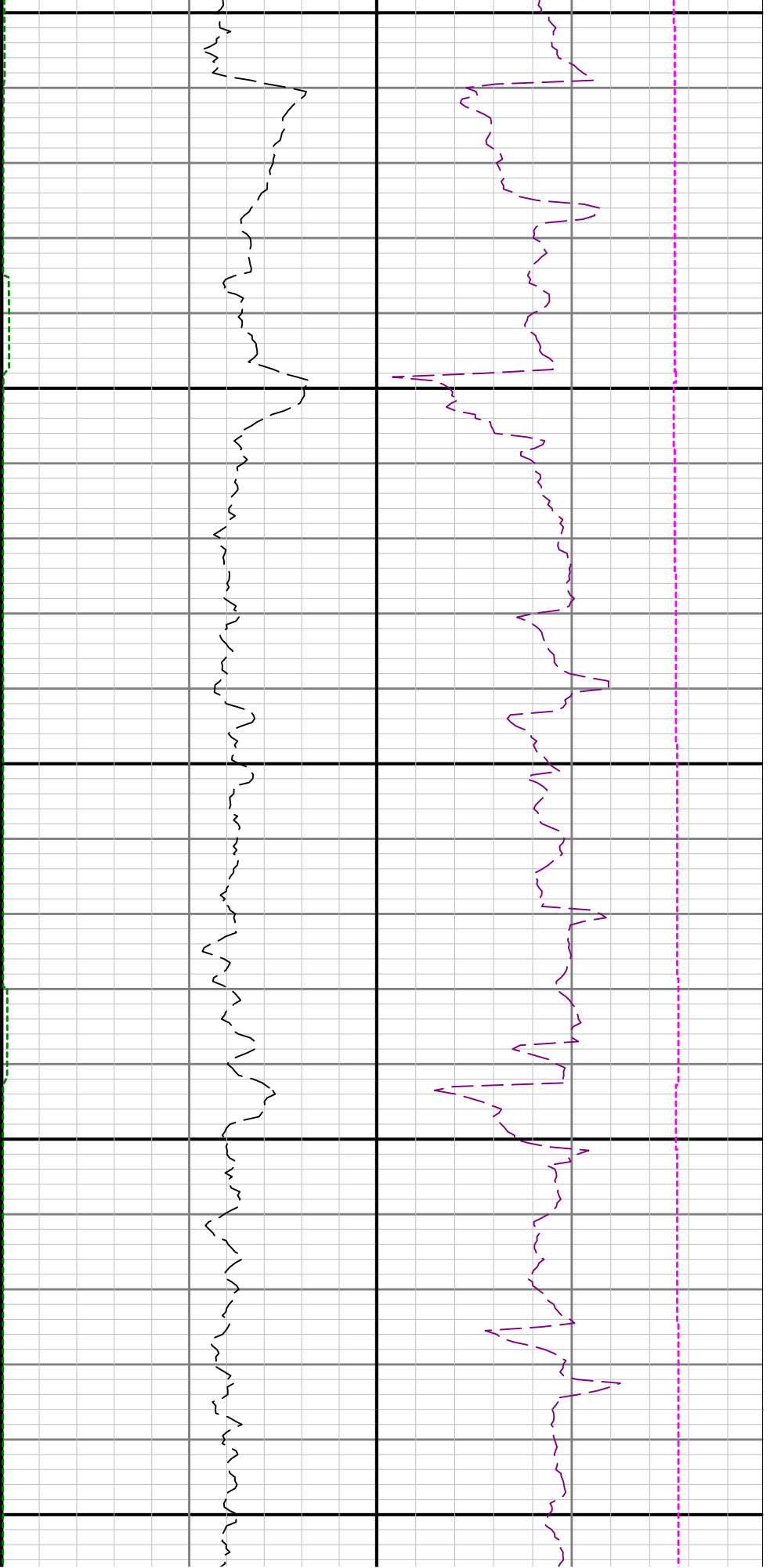
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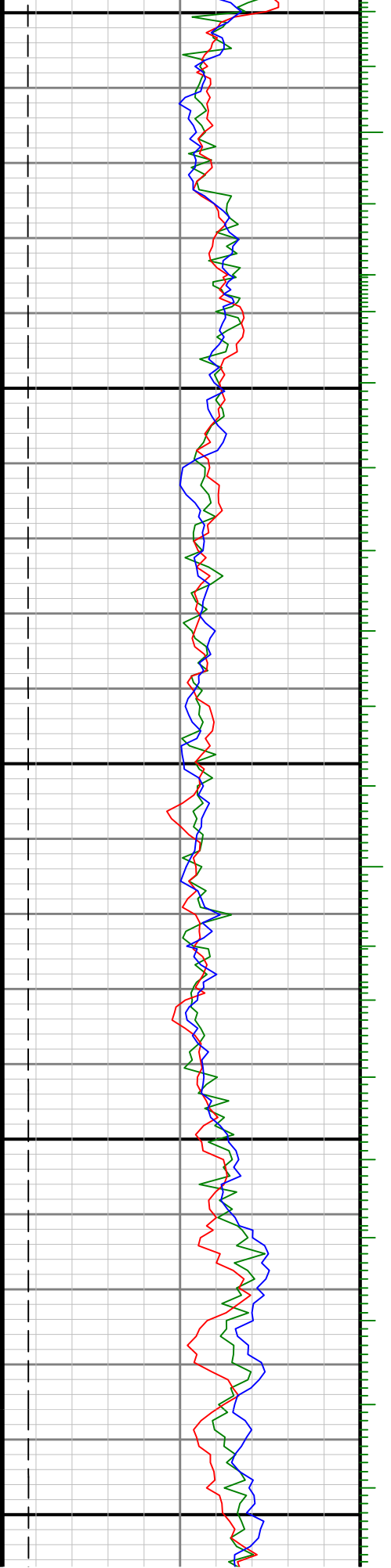


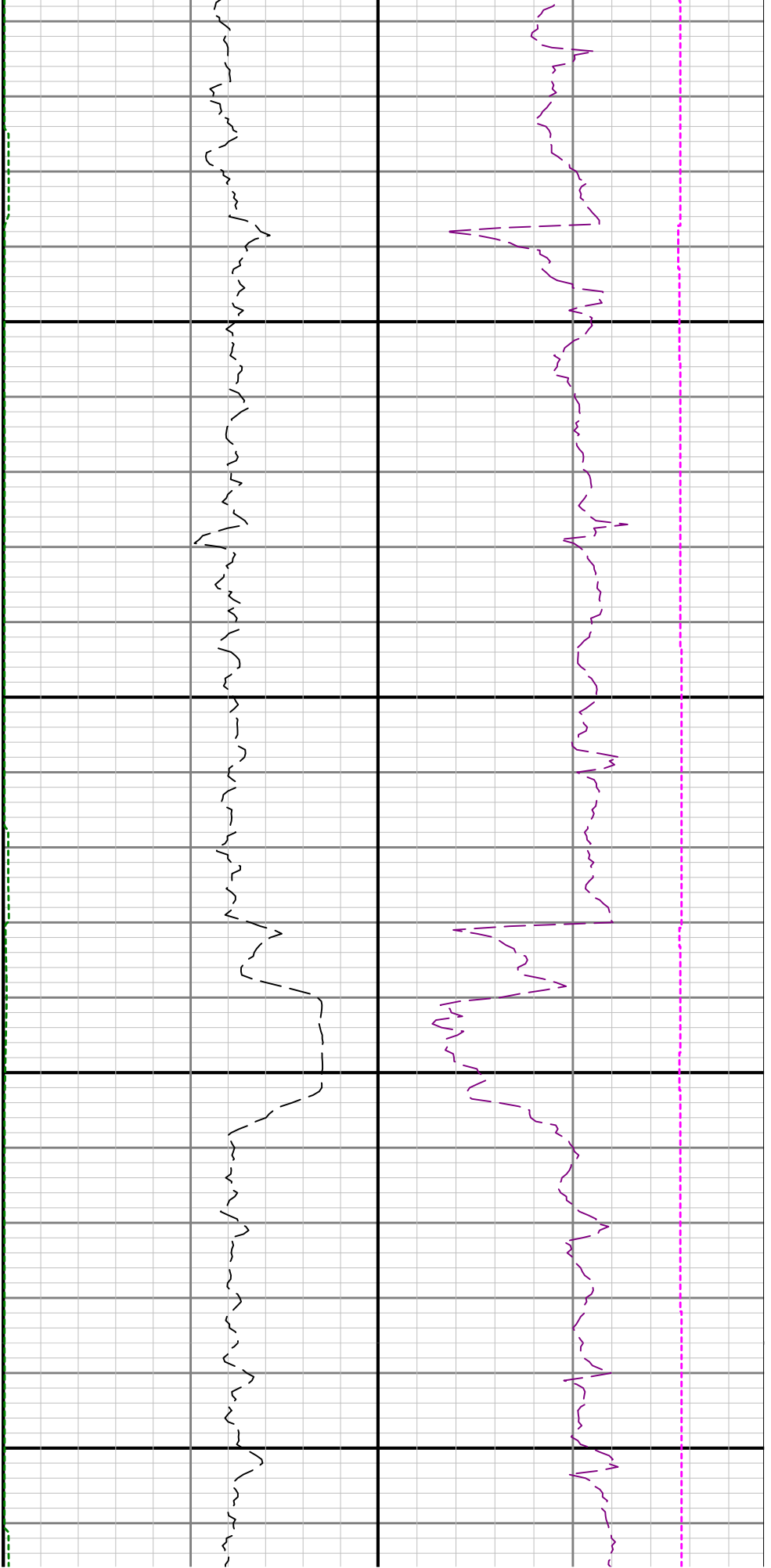




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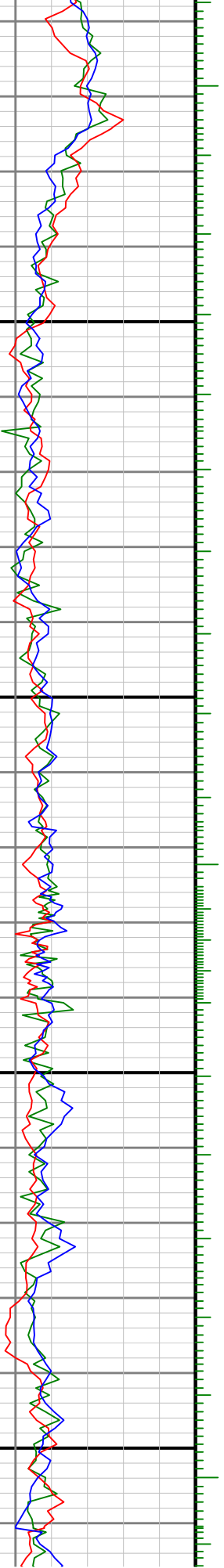
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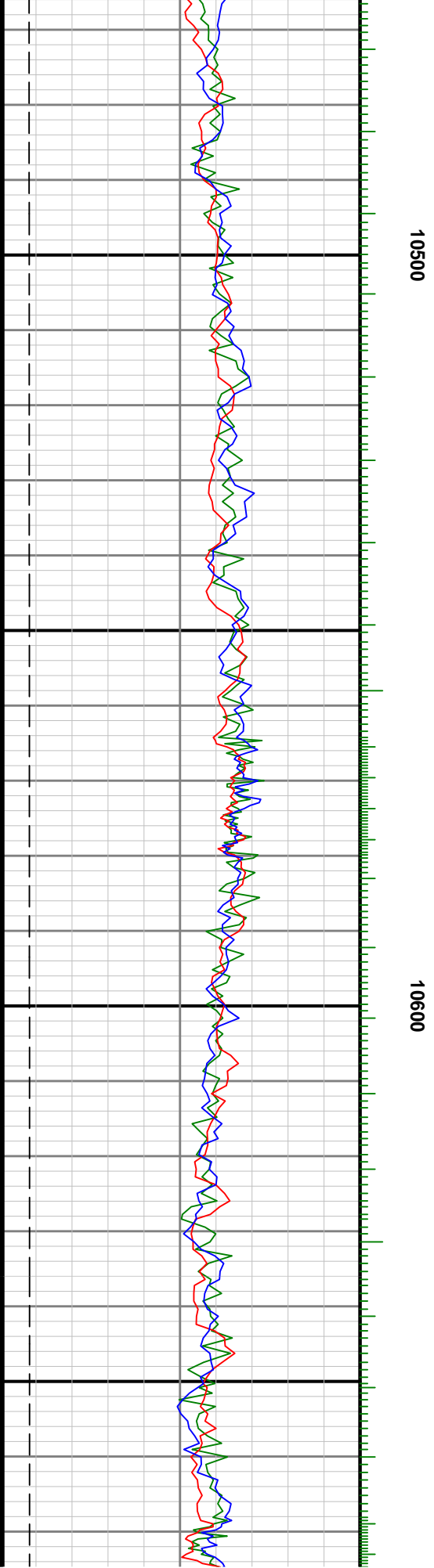
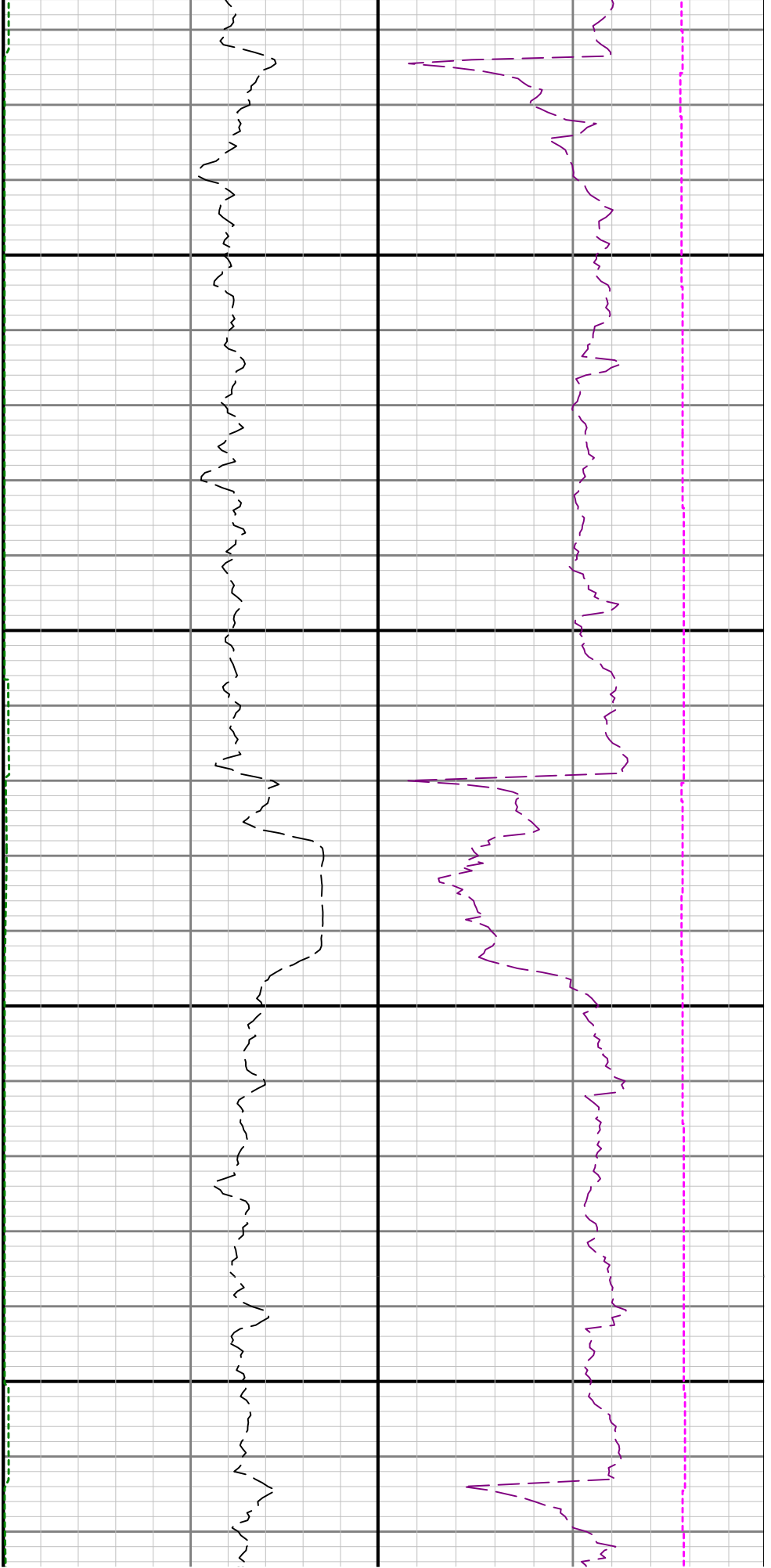


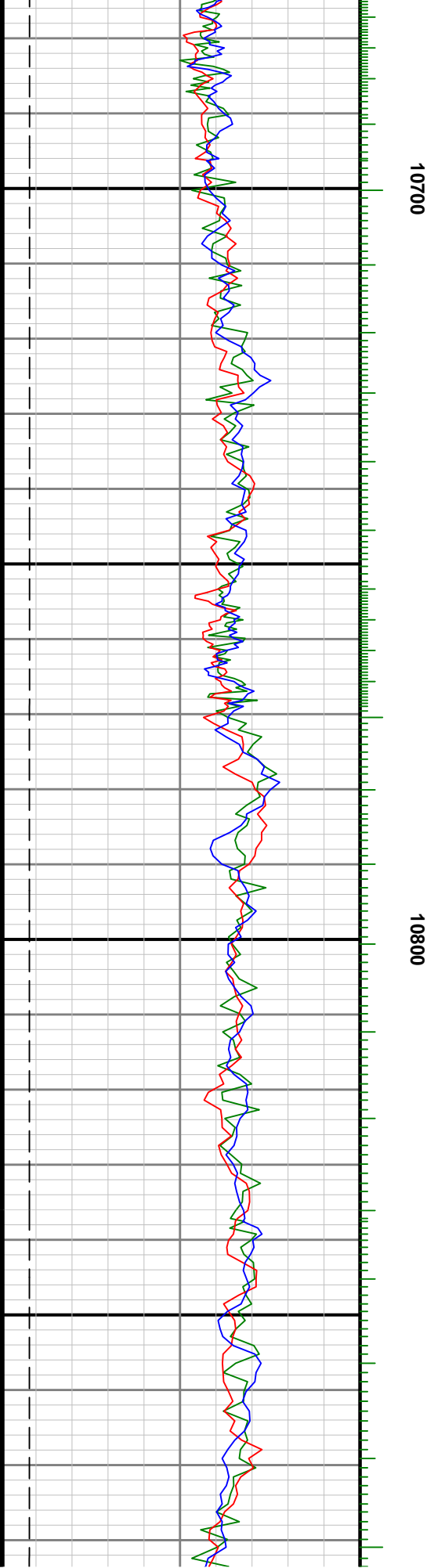
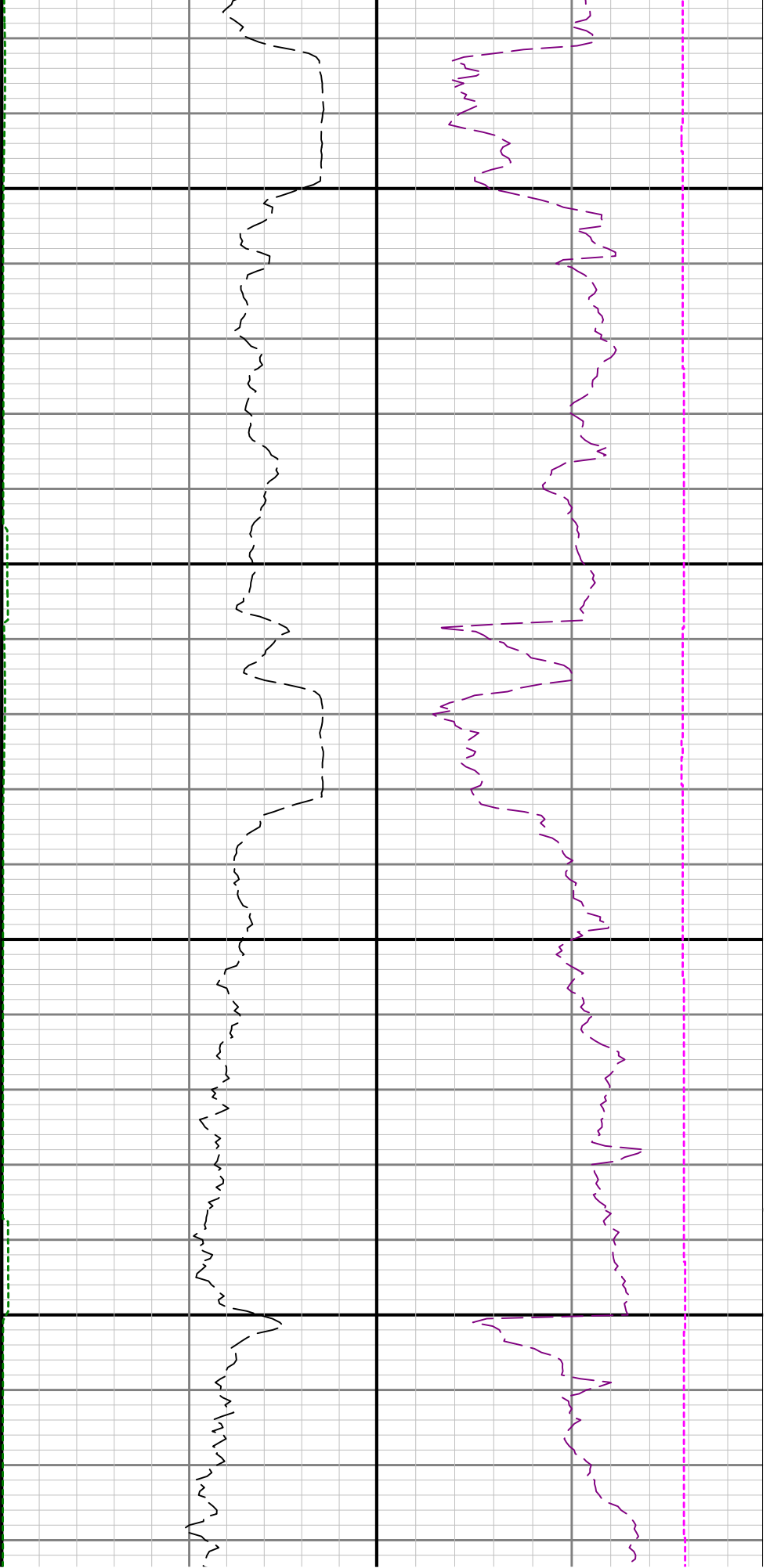


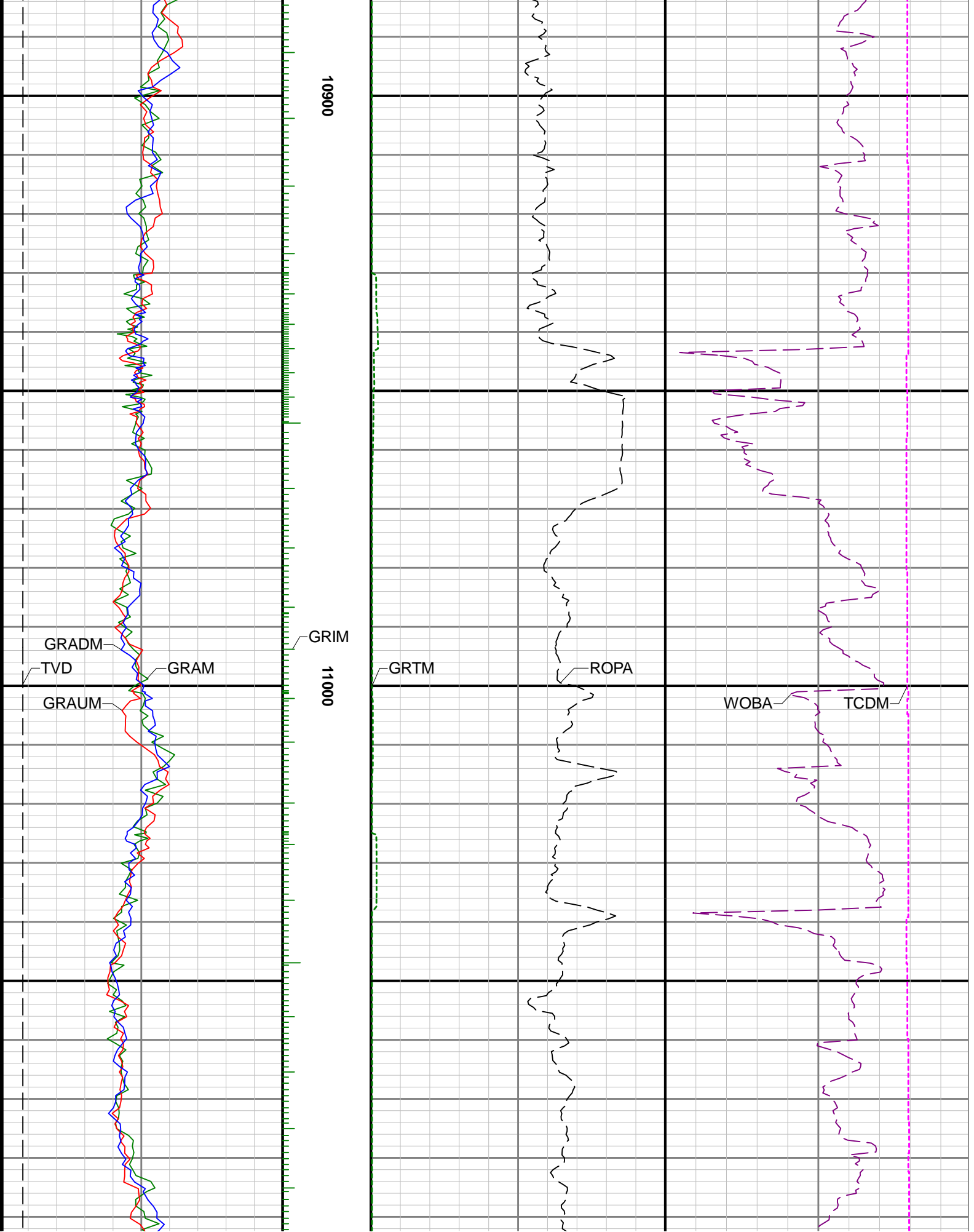
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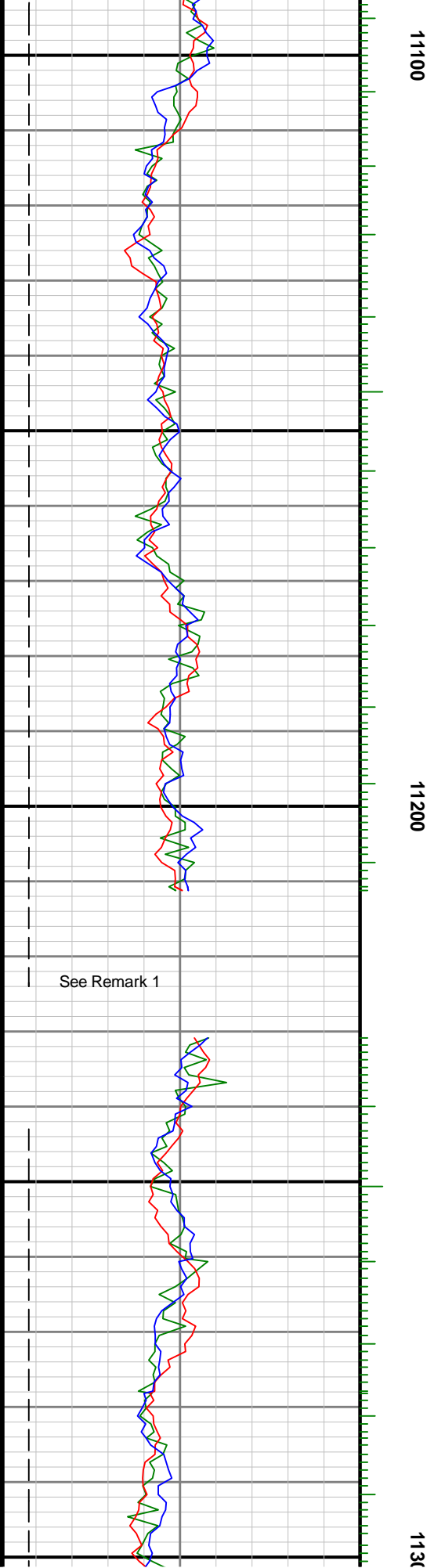
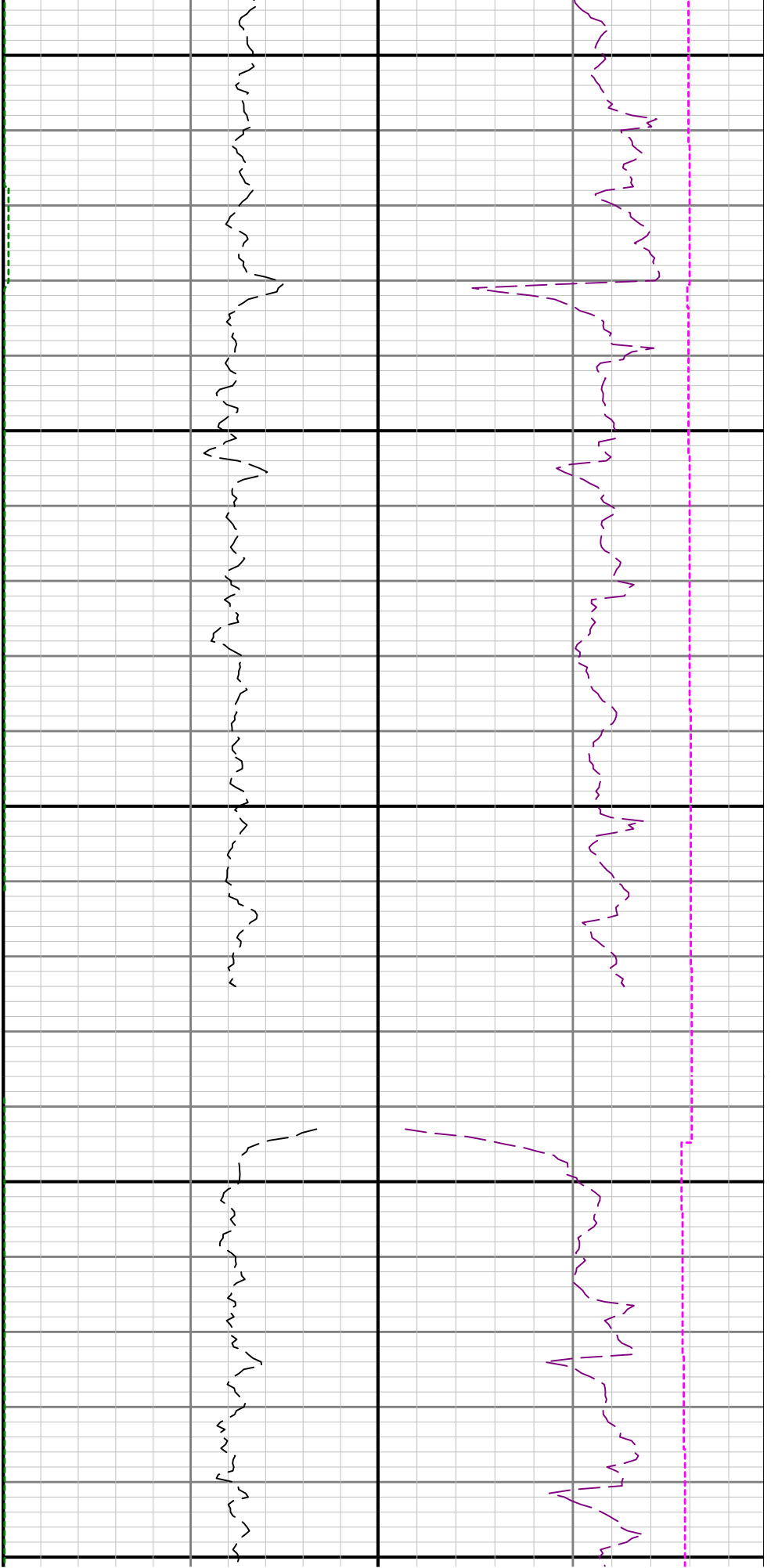
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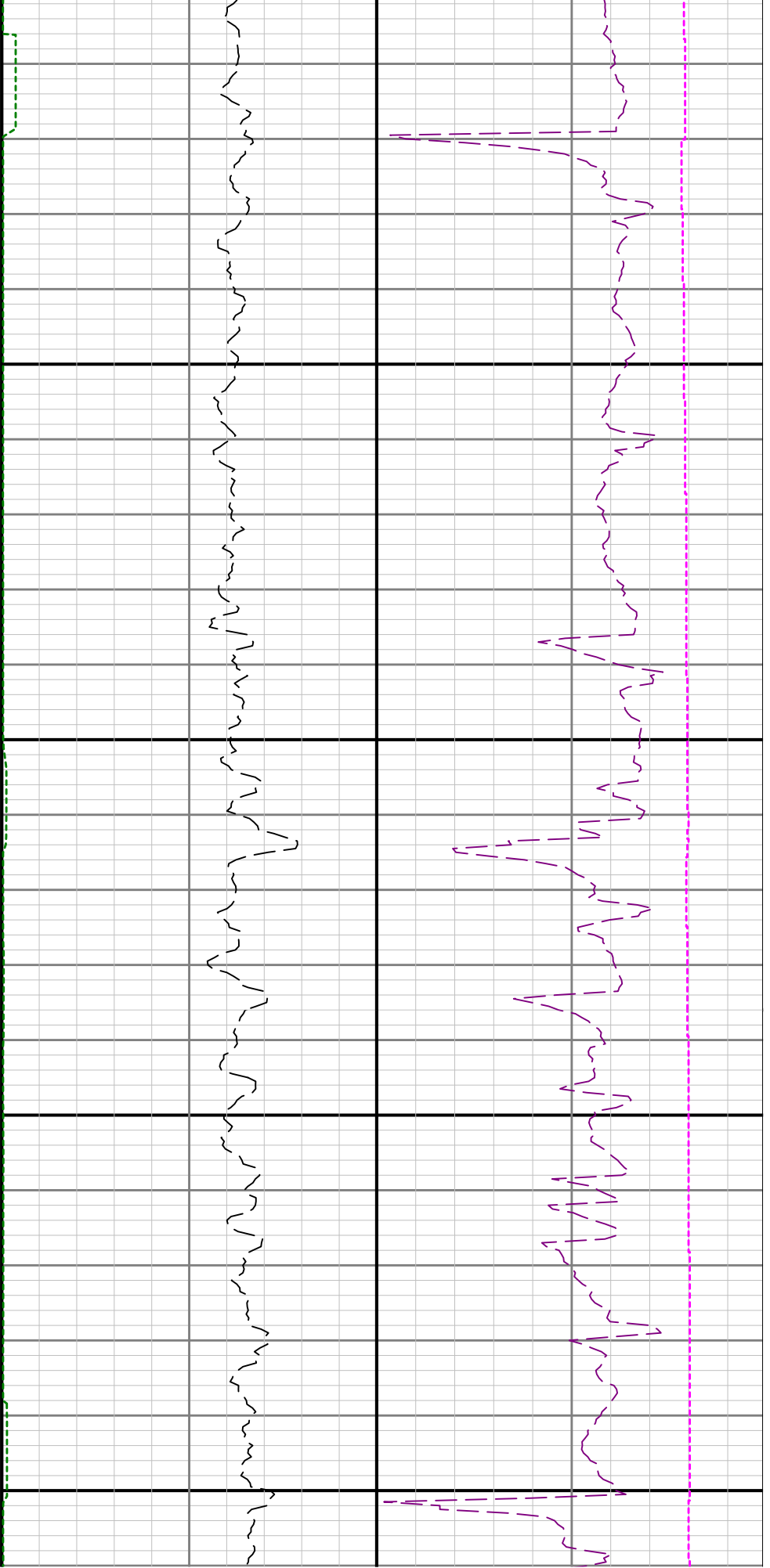




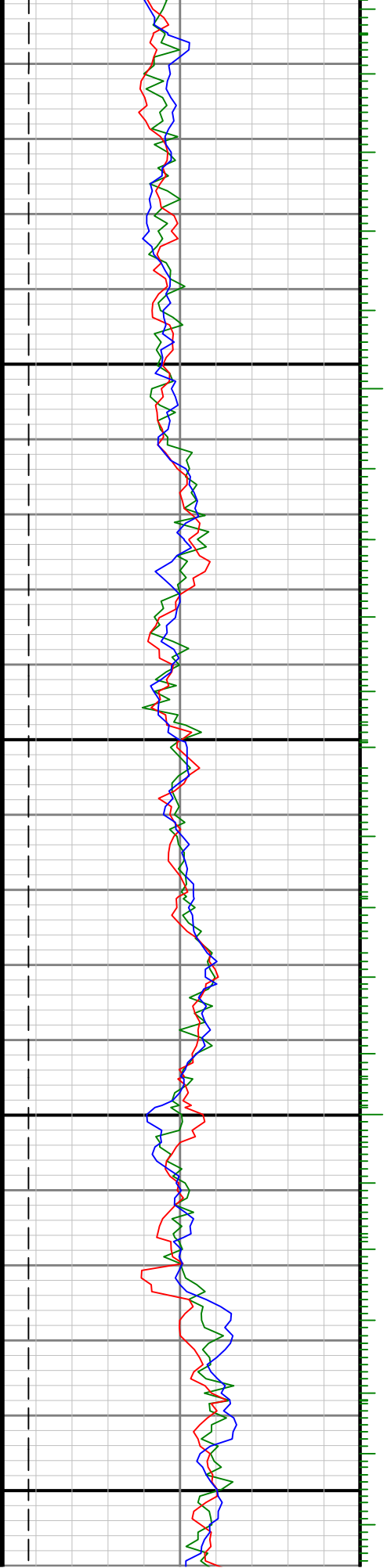


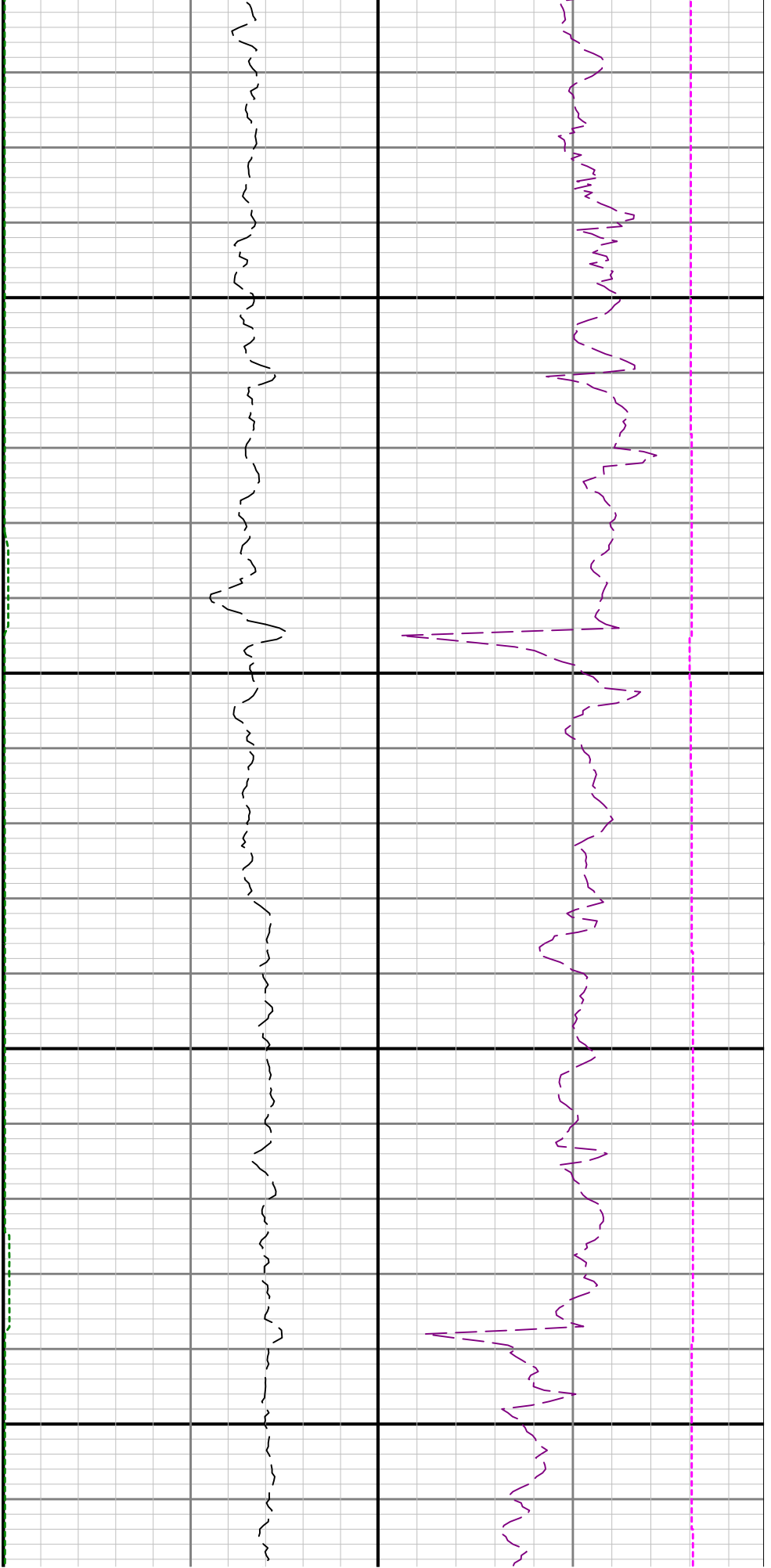






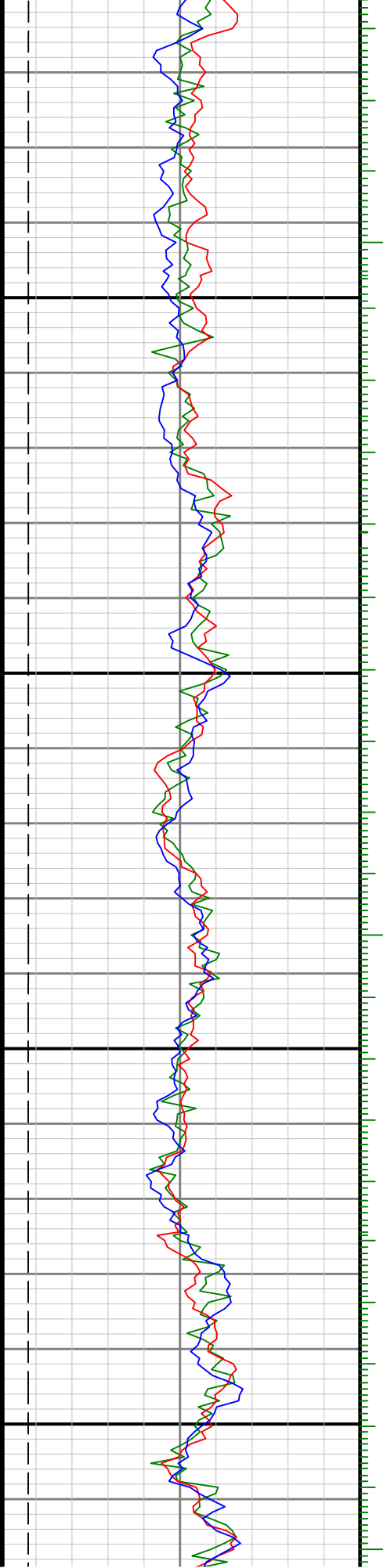
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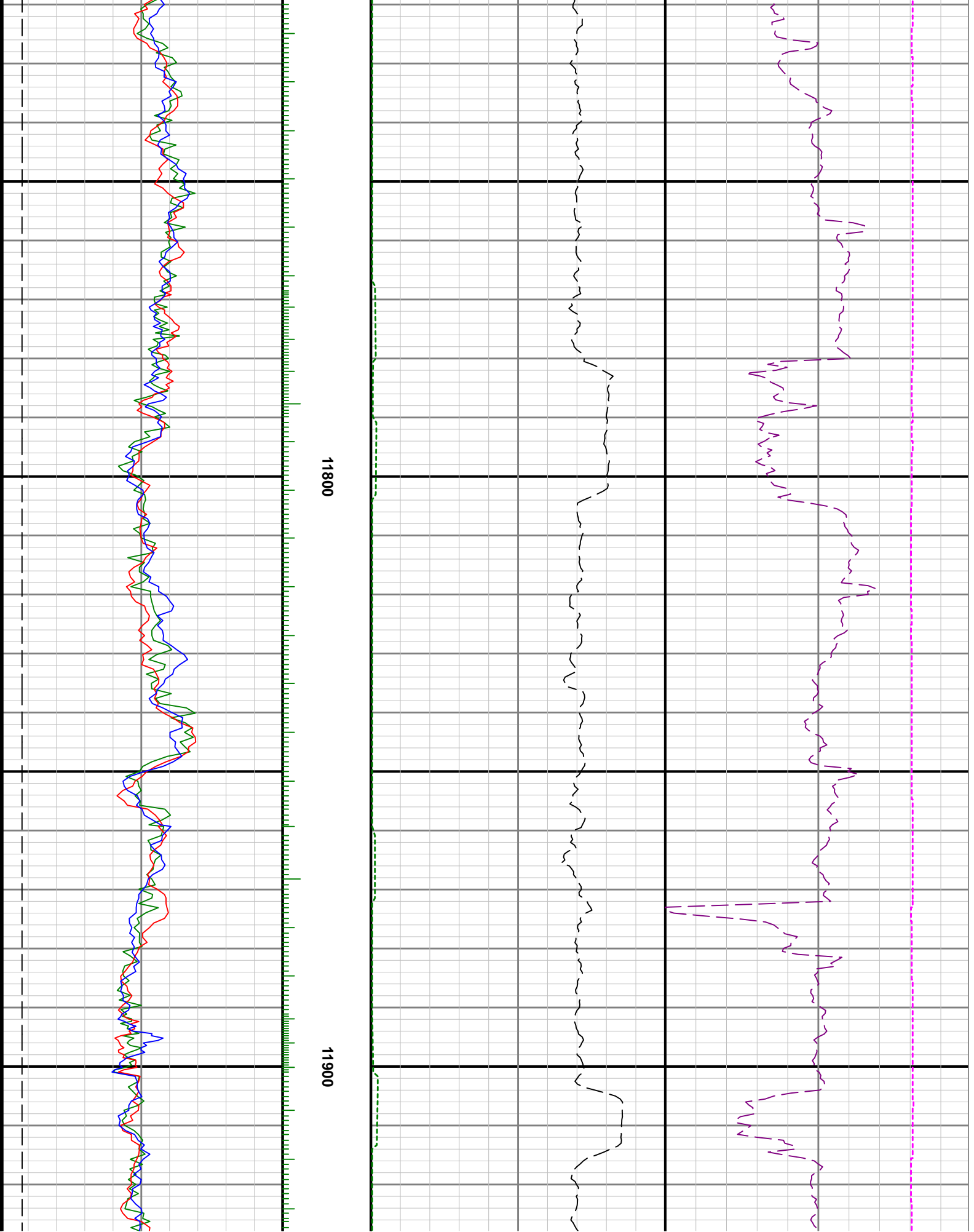


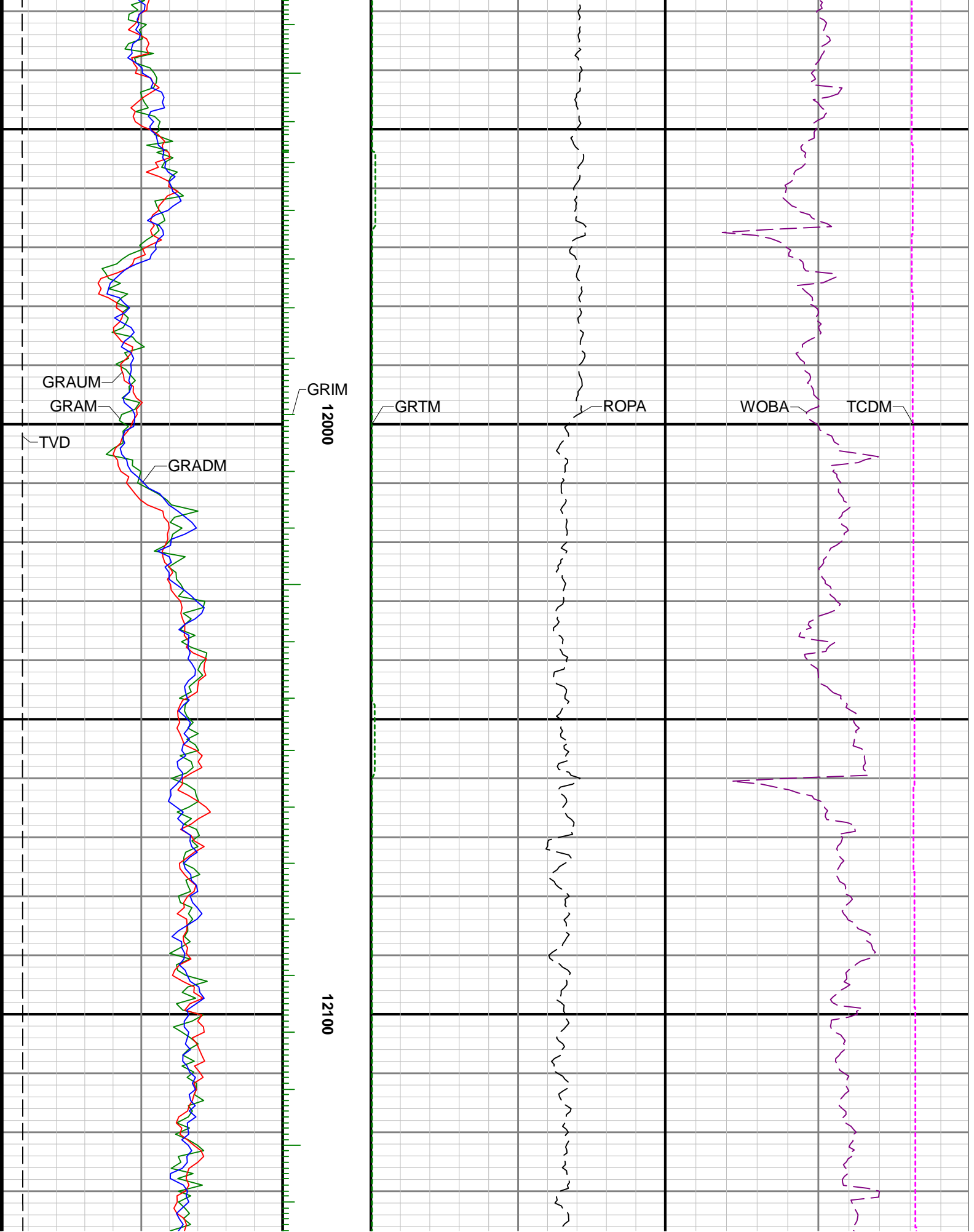


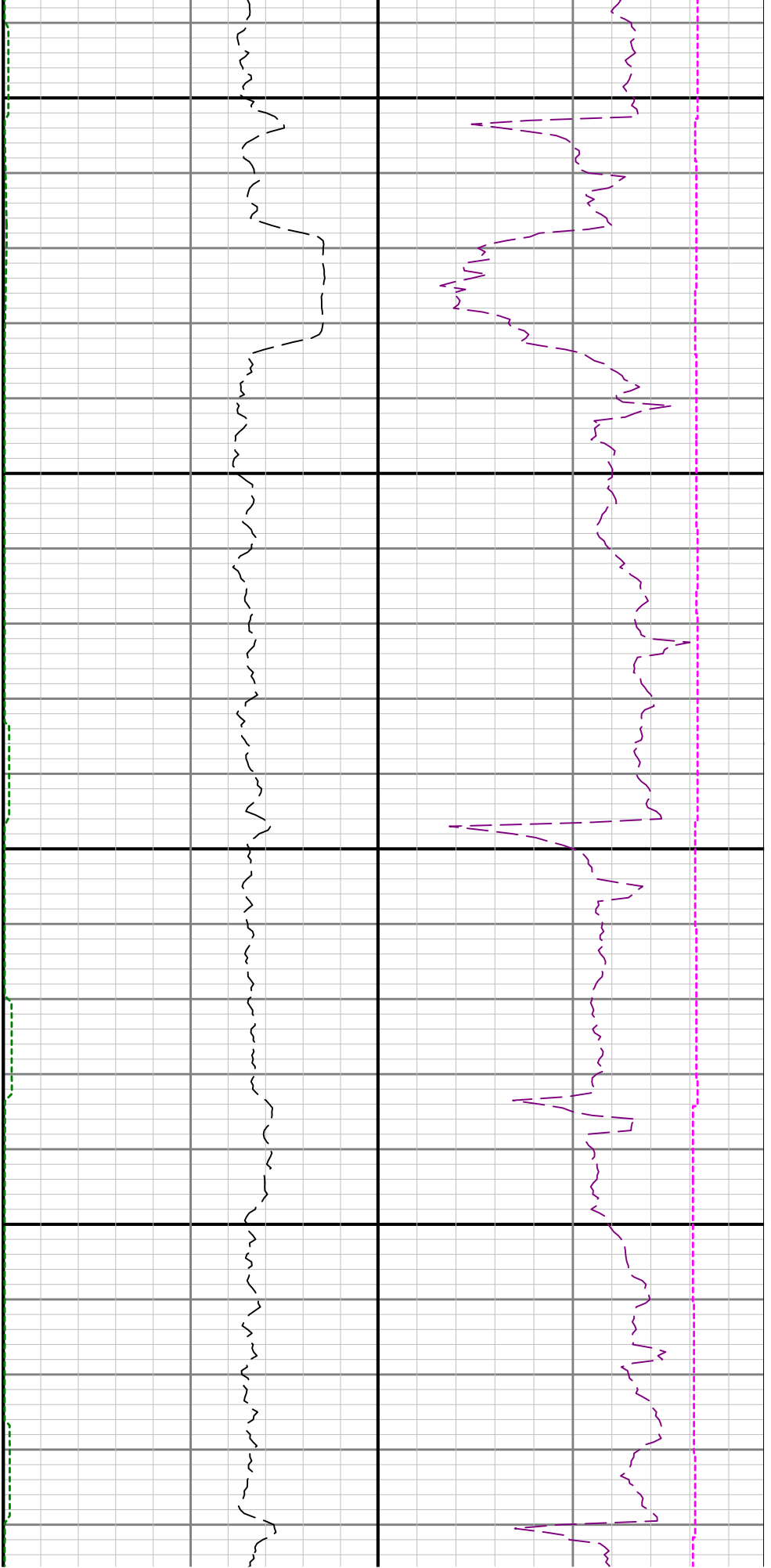
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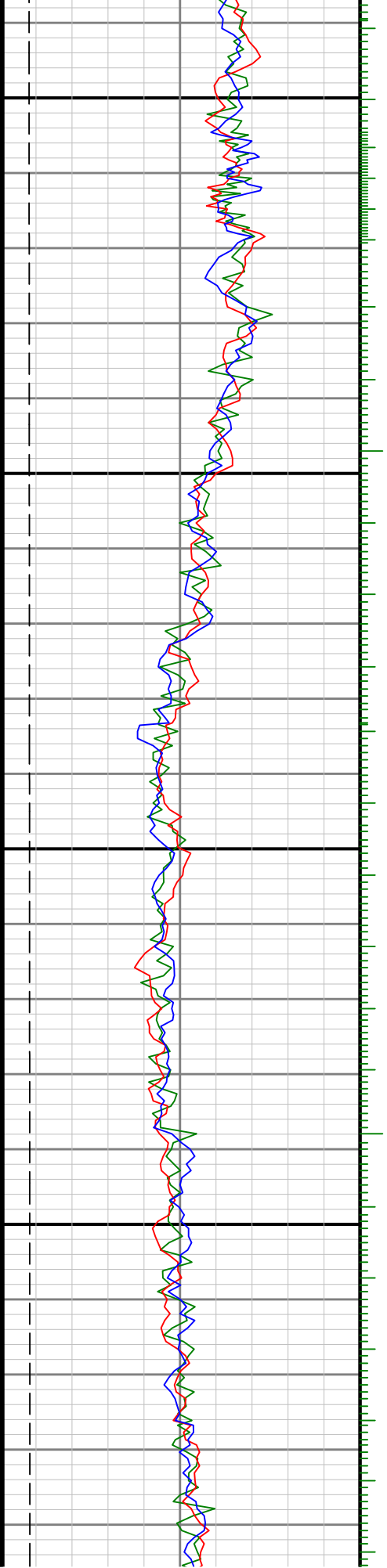


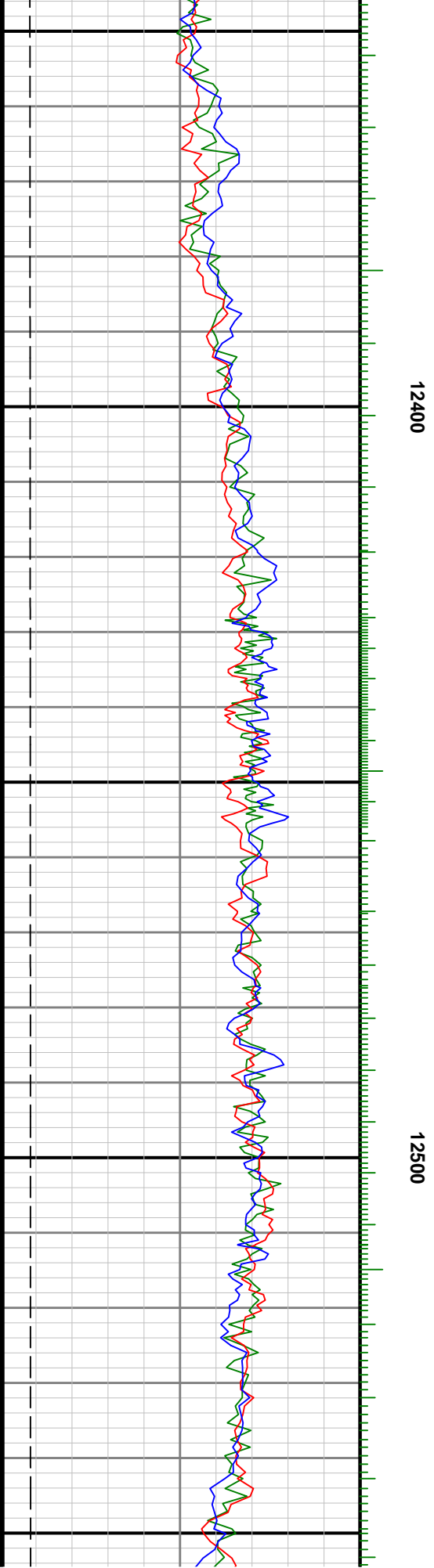
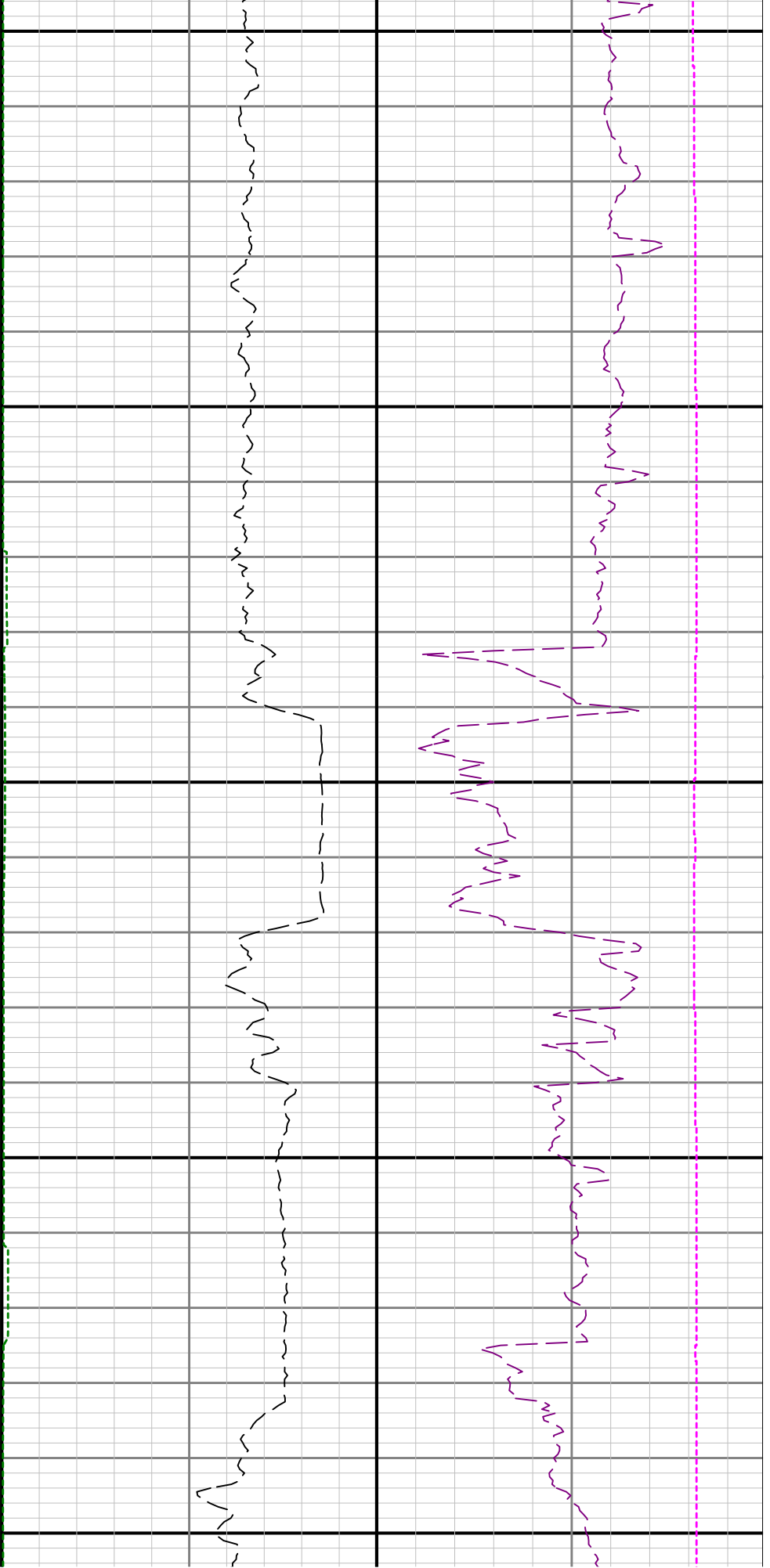


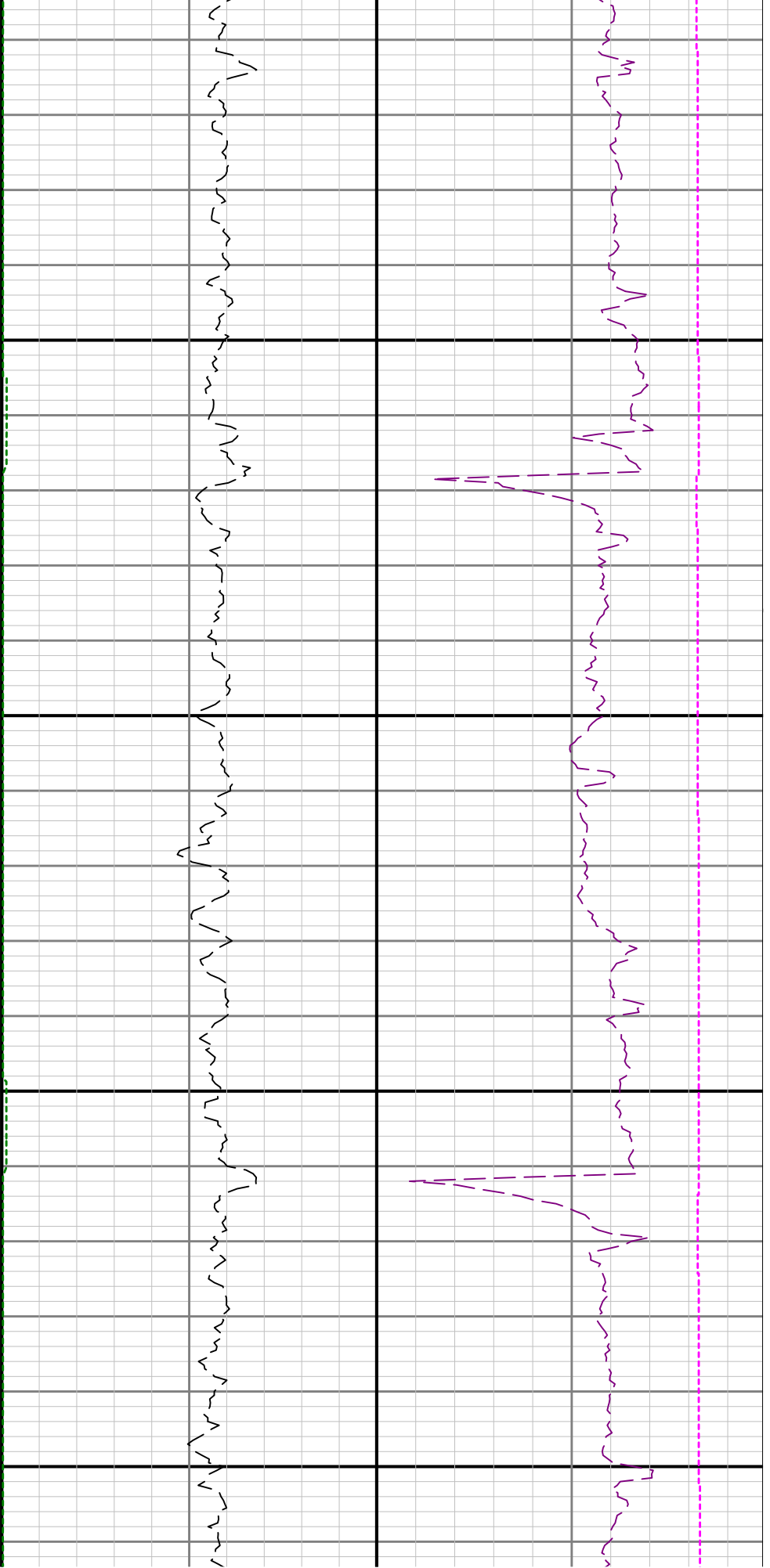


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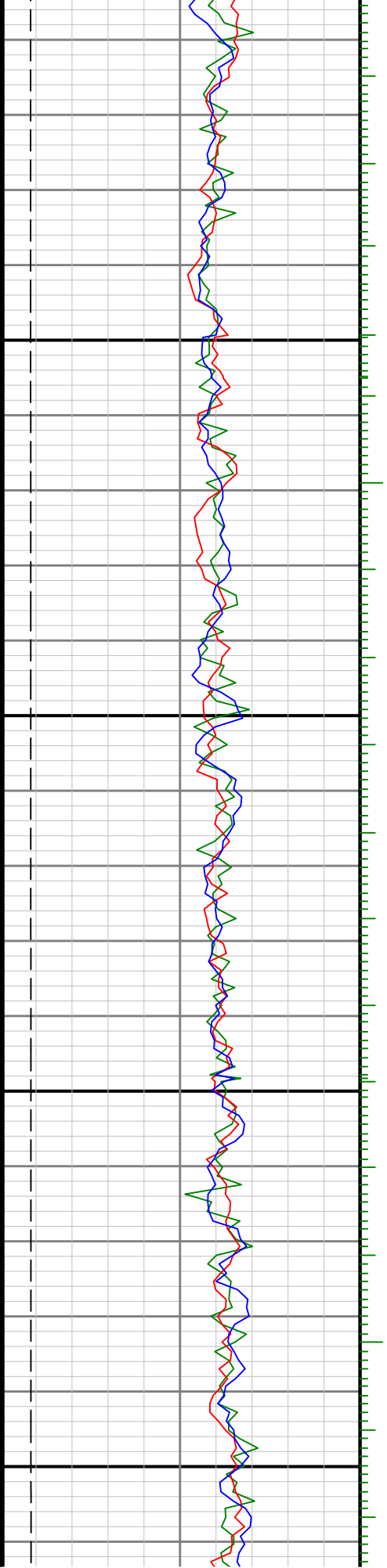


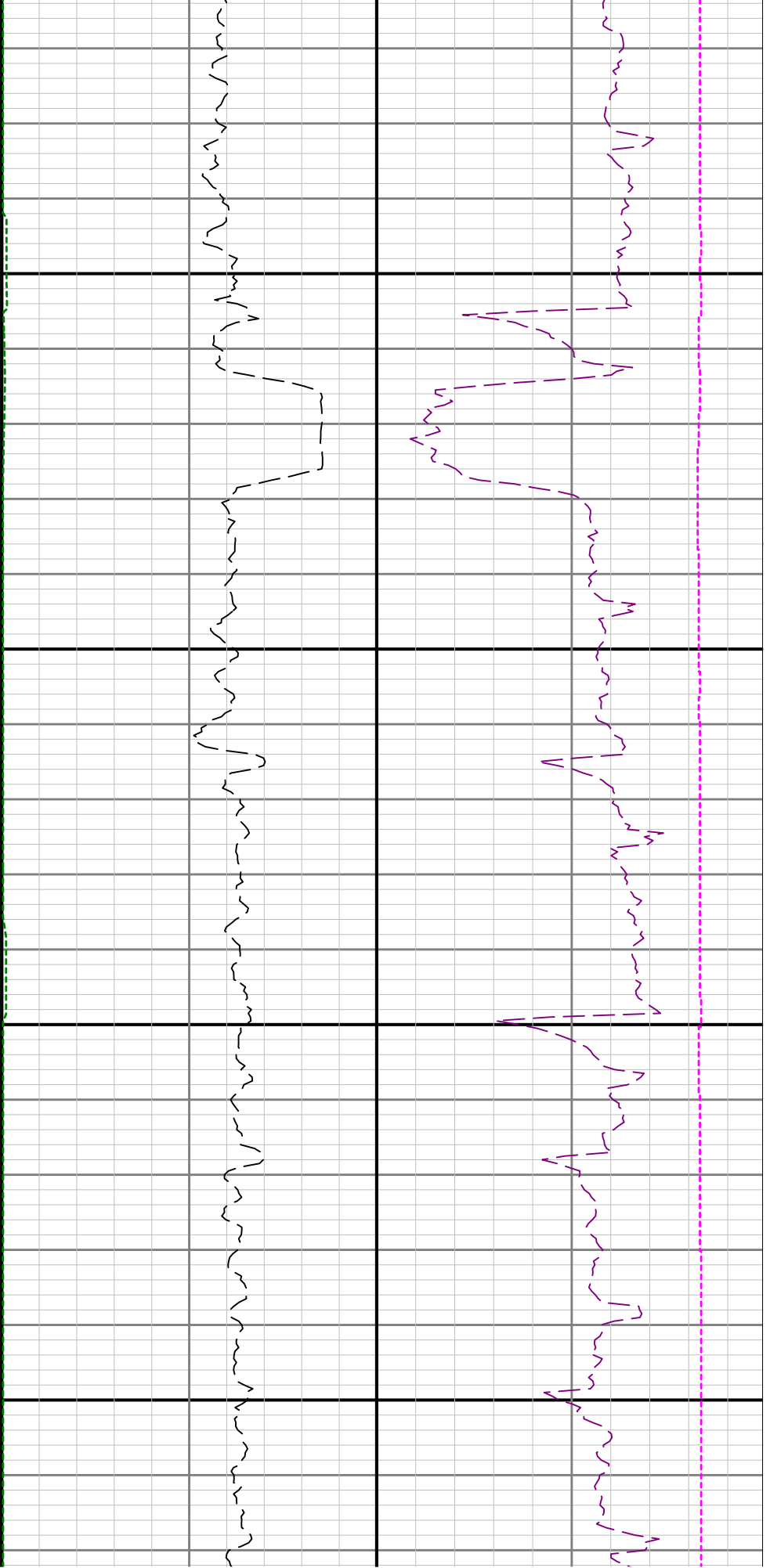




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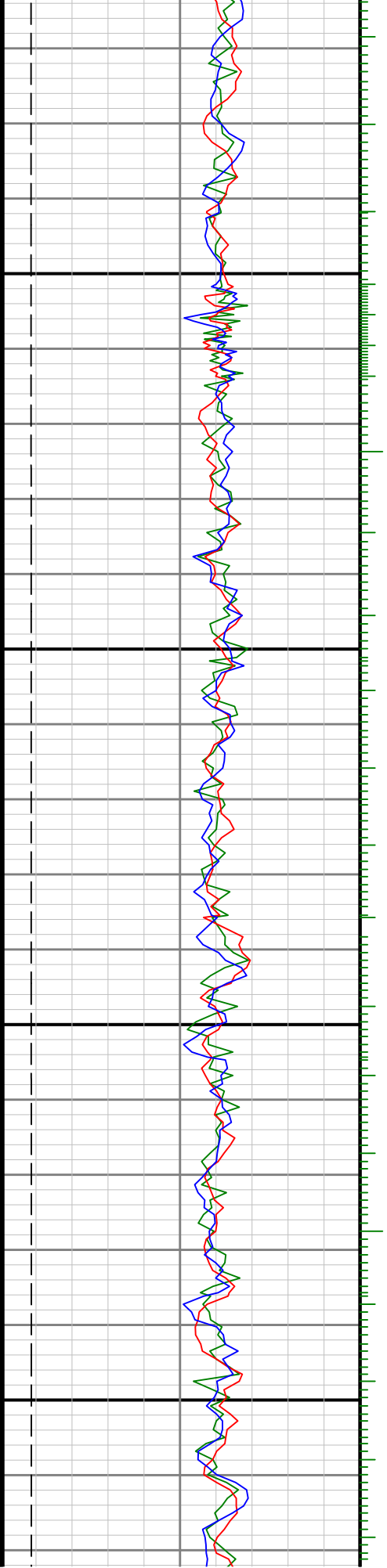
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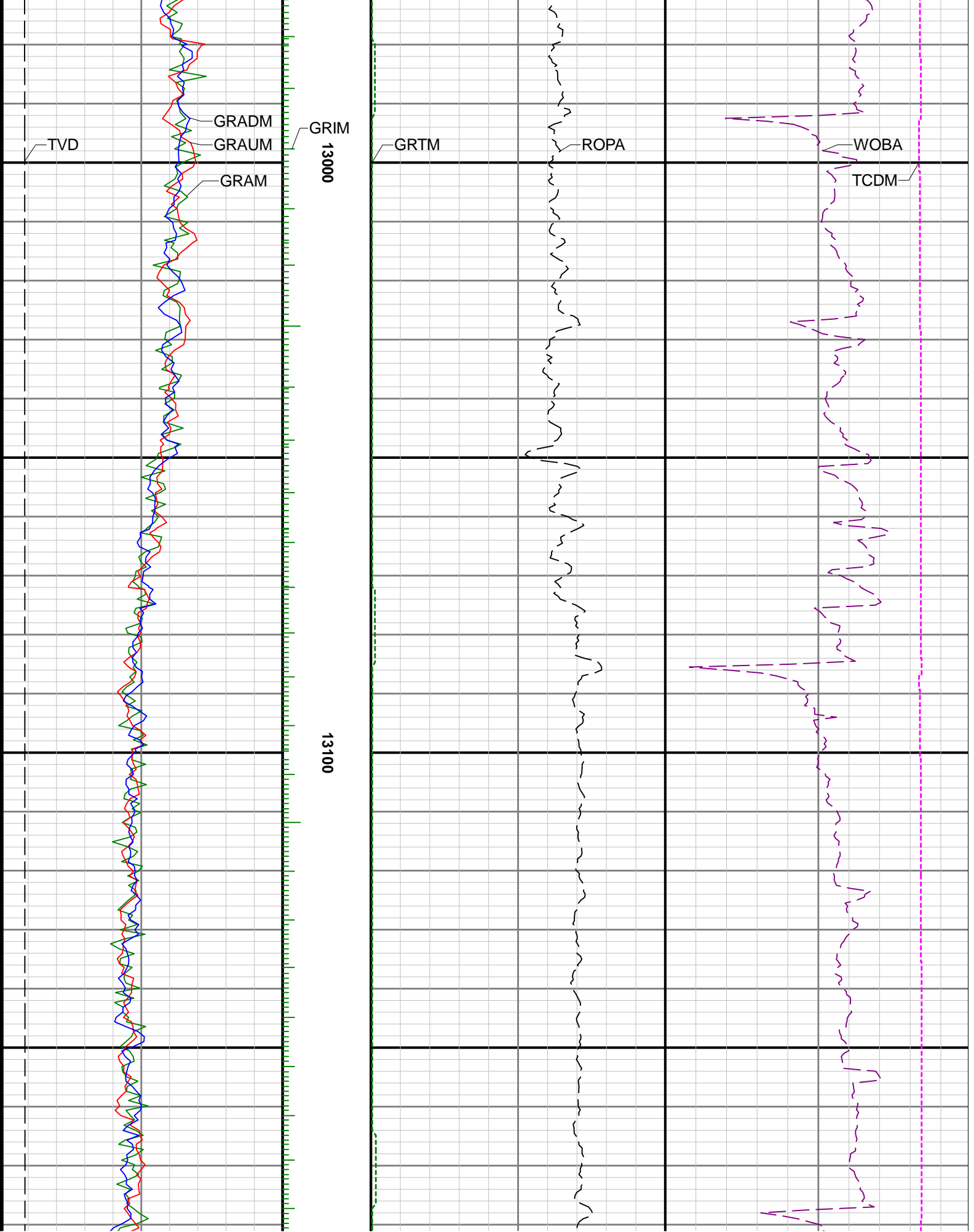


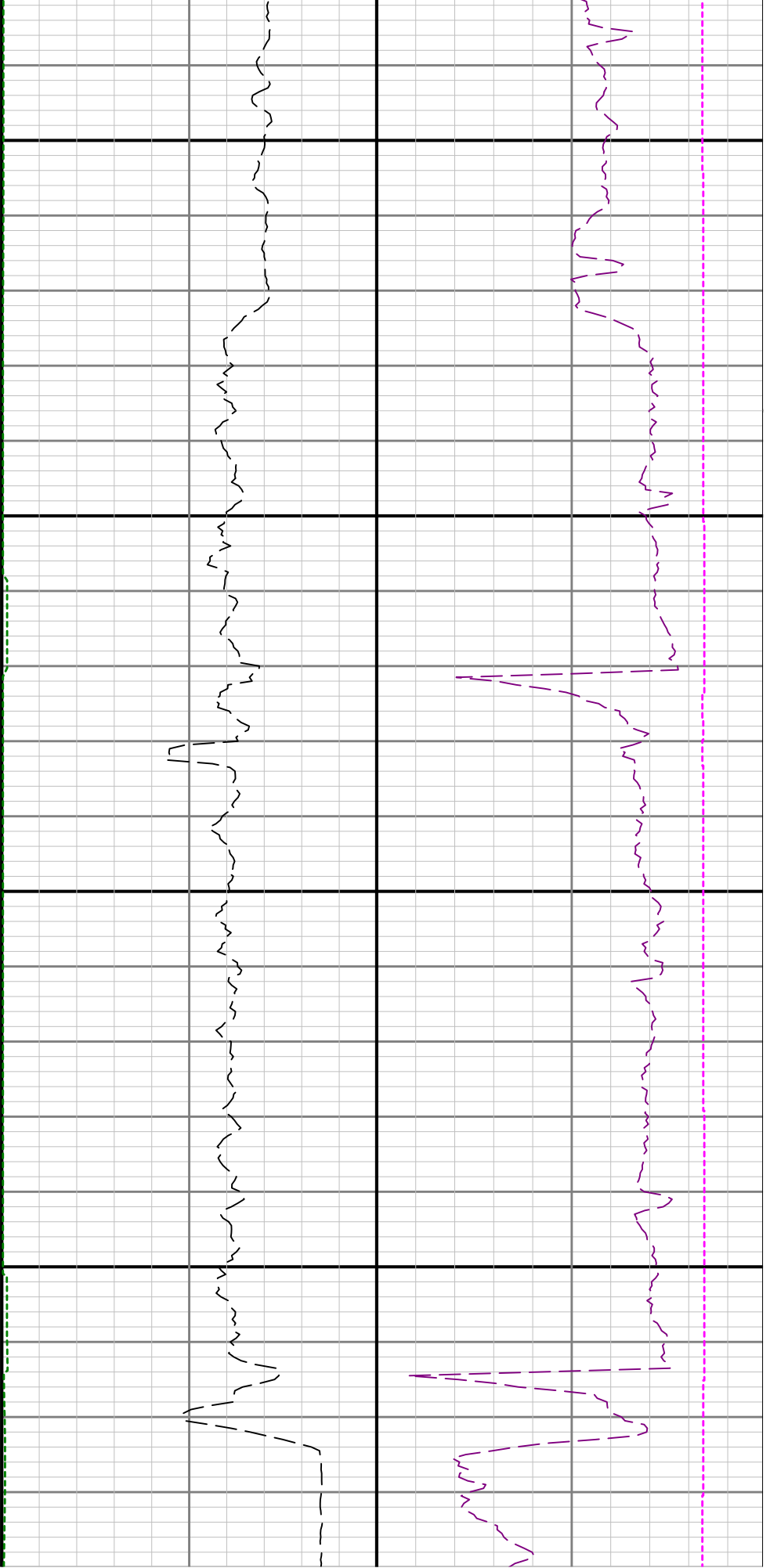


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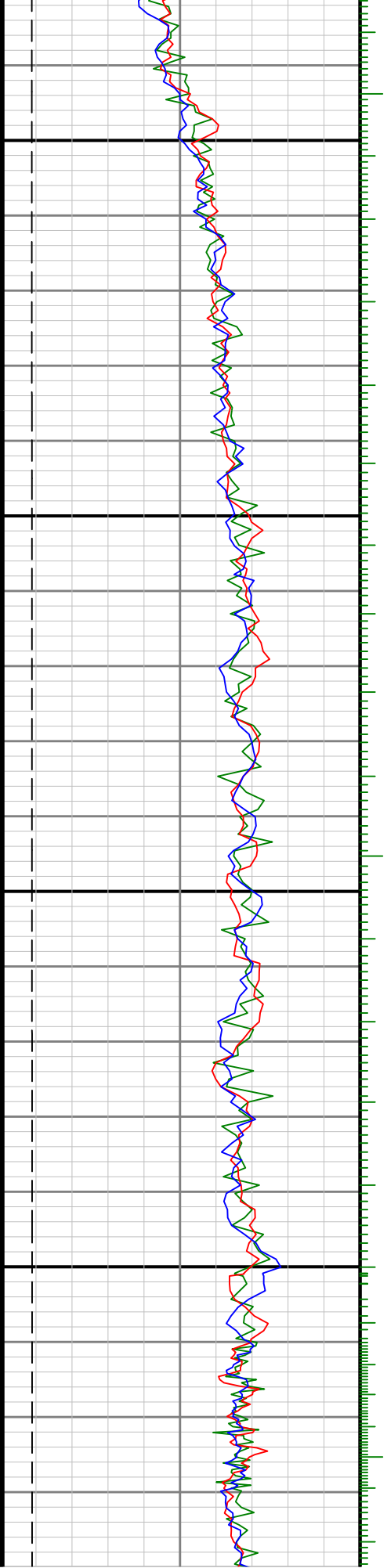


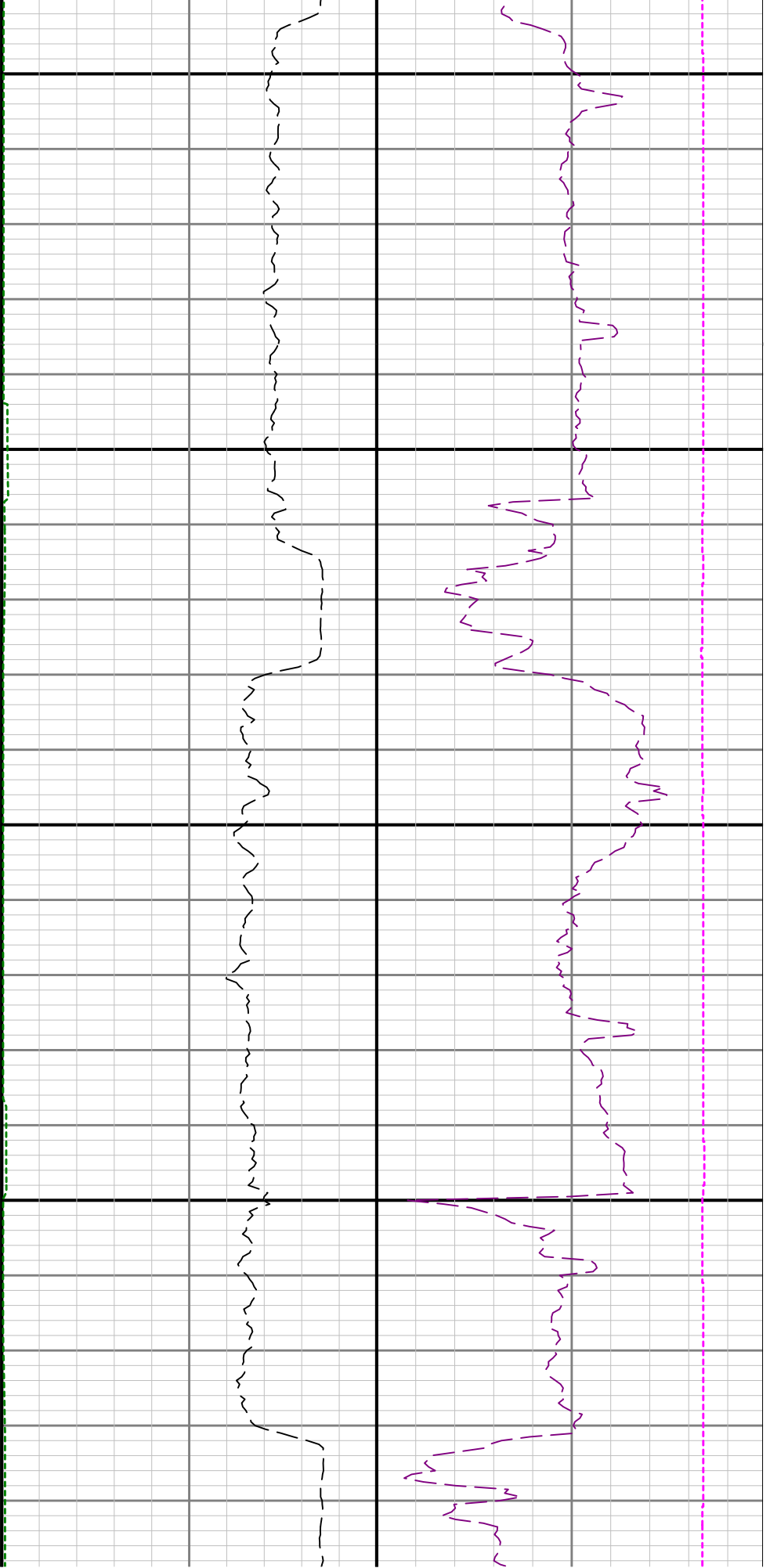




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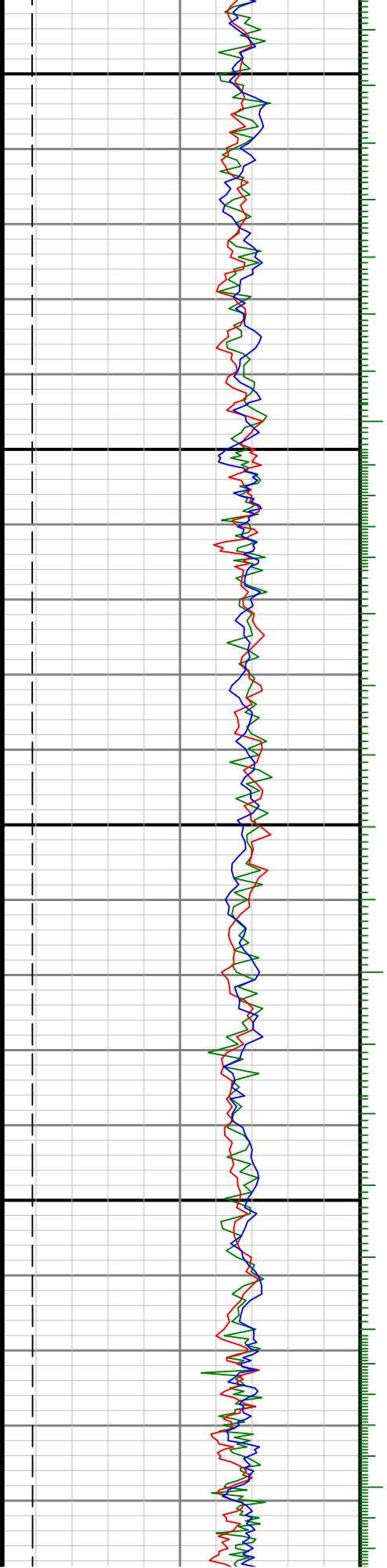


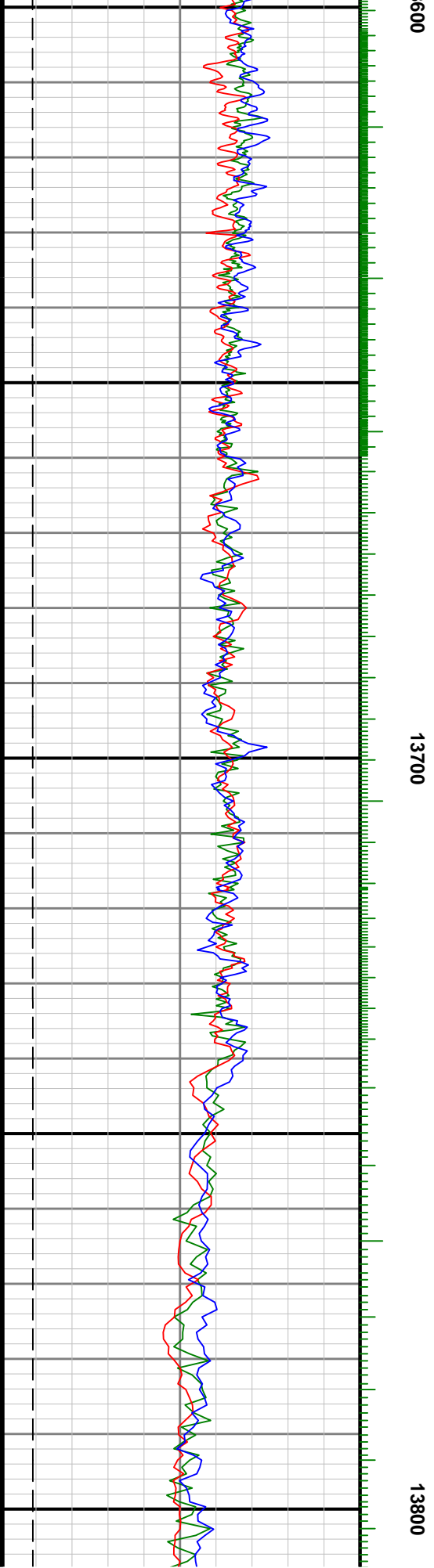


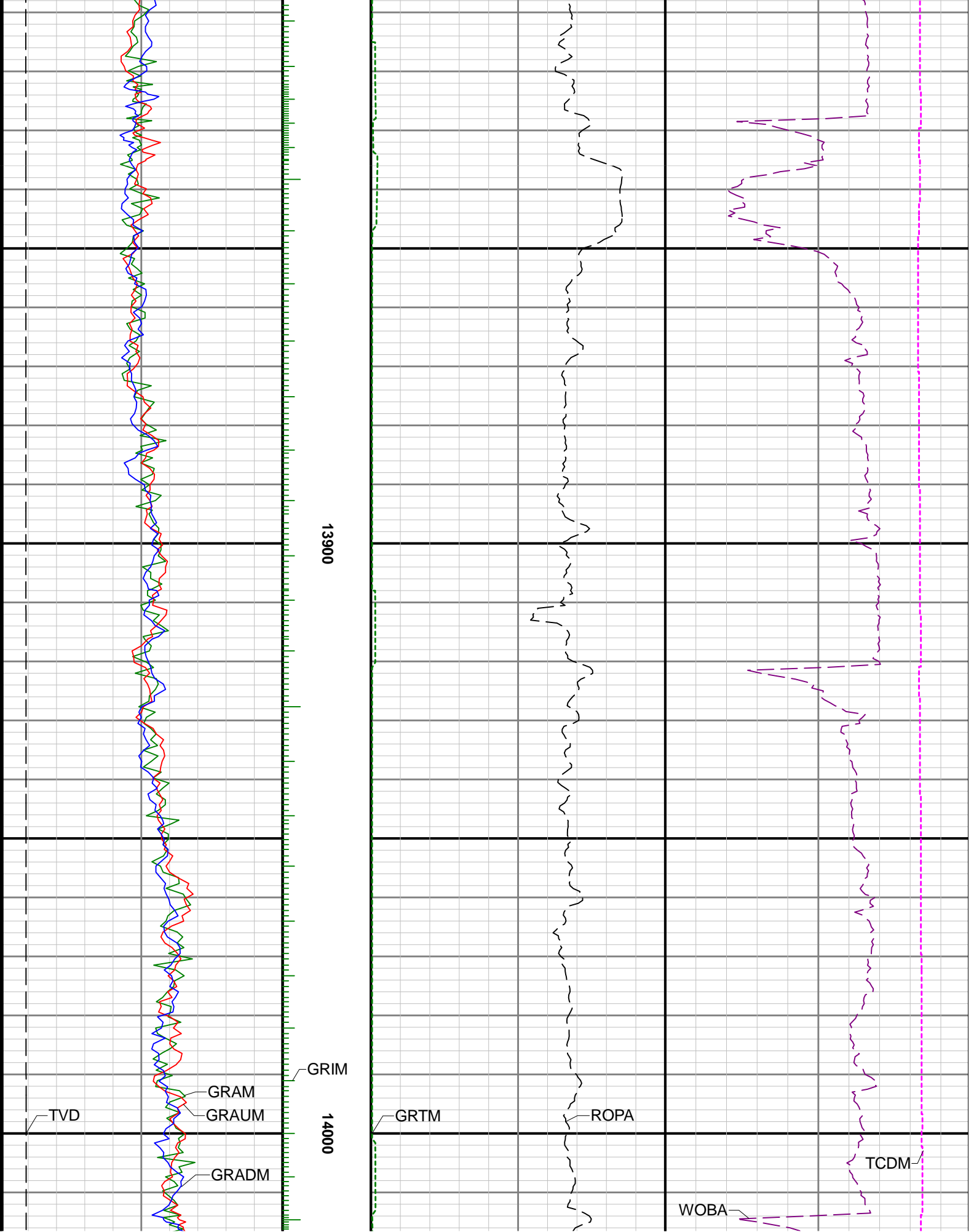
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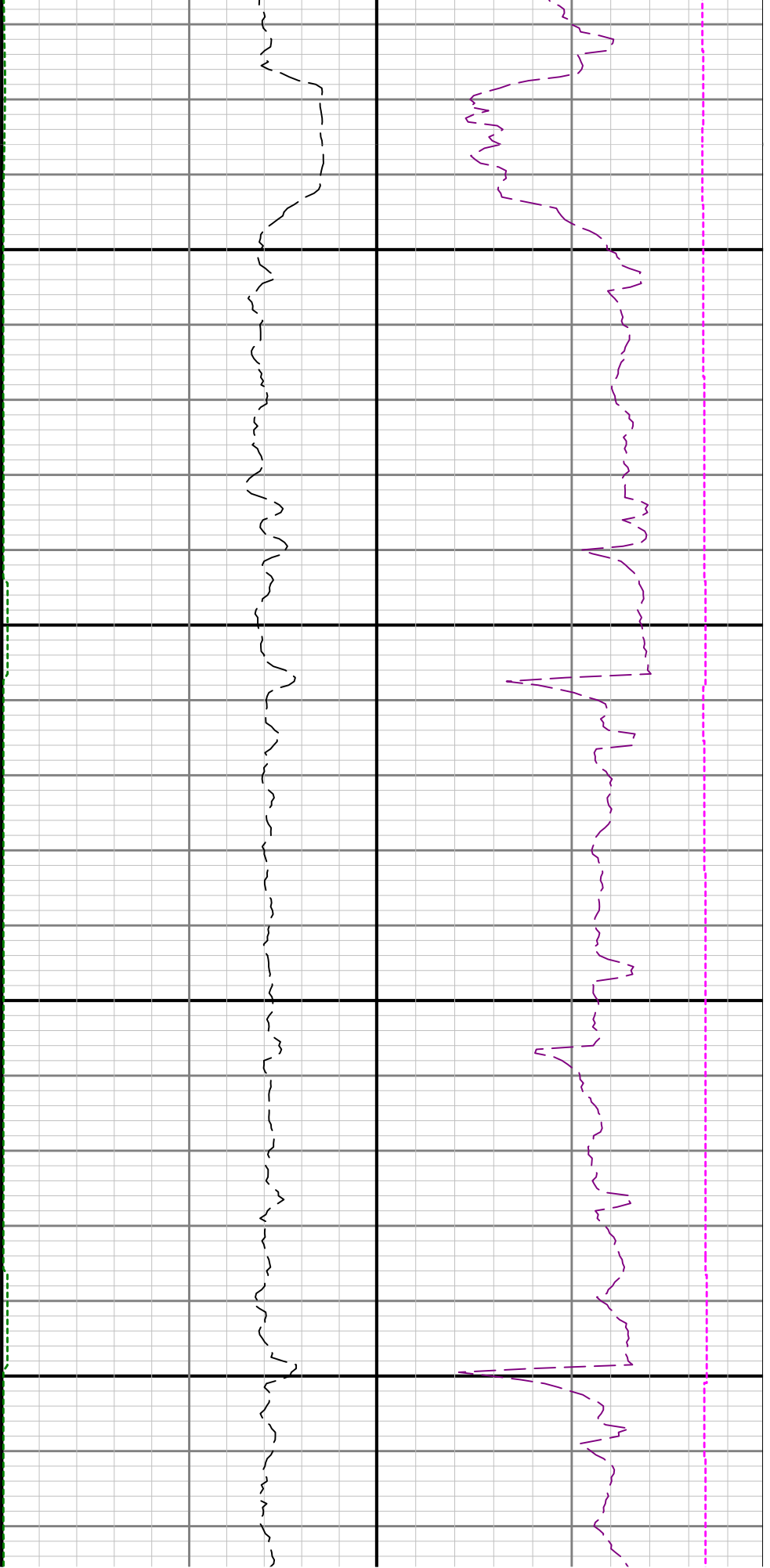
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13









14100

14200

