



Gamma Ray

LWD MEMORY LOG

Scale: Company: Noble Energy

1:240 Well: Gutersen CC32-775

Measured Depth Field: Wattenberg

Depth Reference: County: Weld Country: United States

Driller's Depth State: Colorado

Status: Surface Location: Other Services:

Final Print Latitude: 40° 16' 58.584" N

Longitude: 104° 27' 56.700" W

API No: 05-123-49268-00 SEC: 29 TWN: 4N RGE: 63W

Job ID: 111313201 Elevation: 4762.00 ft Elev. KB: 4792.00 ft

Permanent Datum (P.D.): Mean Sea Level Above P.D.: 4791.00 ft Elev. DF: 4791.00 ft

Log Measured From: Rig Floor 4791.00 ft Elev. GL: 4761.00 ft

Dates Interval Magnetic Field Reference

From: 2022-05-15	Drilled (ft)	Logged (ft)	Azi Reference North: Grid Dip Angle: (deg)	
To: 2022-05-25	Top: 110.00	Top: 1955.00	Total Magnetic Field Strength: (nT)	
Spud: 2022-05-15	Bottom: 14537.00	Bottom: 14524.00	Mag to Reference North Correction: (deg)	

Borehole Record

Casing Record

Hole Size (in)	From (ft)	To (ft)	Size (in)	Weight (lb/ft)	From (ft)	To (ft)
13.500	30.00	1955.00	9.625	36.00	30.00	1945.00
8.500	1955.00	14537.00				

Mud Record

Deviation Record

Type	From (ft)	To (ft)	Hole Size (in)	Interval (ft)	Inc Az (Start)	Inc Az (End)
Water Based Mud	110.00	1955.25	8.500	12582.00	0.13 327.95	90.12 178.93
Oil Based Mud	1955.25	14537.15				

Acquisition System Software Version

Other

Cadence RT 6.4	Rig: H&P 517
Plot Studio 6.4.9541.2	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	1RR	13.500	PDC	4.00	Motor	110.00	1955.00	110.00	1955.00	2022-05-15 22:31	2022-05-16 06:08	6.97
2	1	8.500	PDC	3.00	AutoTrak Curve	1942.55	2202.55	1955.50	2215.50	2022-05-21 08:34	2022-05-21 09:30	2.04
3	3	8.500	PDC	3.00	AutoTrak Curve	2203.05	5181.55	2216.00	5194.50	2022-05-21 17:37	2022-05-22 02:01	7.79
4	4	8.500	PDC	3.00	AutoTrak Curve	5182.05	14524.05	5195.00	14537.00	2022-05-22 08:26	2022-05-25 02:33	63.66

Crew

Name	Arrive Wellsite	Depart Wellsite	Name	Arrive Wellsite	Depart Wellsite	Name	Arrive Wellsite	Depart Wellsite
Tien Bui	2022-05-15	2022-05-24						

Mud Properties Record

Date / Time	Run No.	Depth (ft)	Mud Type	Density (ppg)	Viscosity (cP)	pH	Fluid Loss (cm3)	Oil / Water	Source	Chlorides (ppm)	K+ (%)
2022-05-15 20:11	1	110.00	Water Based Mud	9.0	2	8	N/A	0/100	Active Pit	500	0.00
2022-05-20 08:12	2	1955.00	Oil Based Mud	9.3	10	N/A	18.0	79.5/20.5	Active Pit	25000	N/A
2022-05-21 11:36	3	2215.00	Oil Based Mud	9.3	10	N/A	18.0	79.5/20.5	Active Pit	25000	N/A
2022-05-22 05:05	4	5195.00	Oil Based Mud	9.5	13	N/A	21.6	80.2/19.8	Active Pit	25000	N/A

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	NaviTrak	ZDHP899	VSS	14.64	50.82	8.062	3.250
1	NaviTrak	ZDHP899	Directional (mag)	14.64	50.82	8.062	3.250
2	AutoTrak Curve Steering Unit	15208060	Near Bit VSS	5.93	6.78	7.000	4.330
2	AutoTrak Curve Steering Unit	15208060	Near Bit Inclination	5.93	6.78	7.000	4.330
2	AutoTrak Curve MWD	12656414	Gamma (single)	2.71	12.95	7.000	3.250
2	AutoTrak Curve MWD	12656414	Directional (mag)	12.27	22.51	7.000	3.250
3	AutoTrak Curve Steering Unit	14262243	Near Bit Inclination	5.93	6.78	7.000	4.330
3	AutoTrak Curve Steering Unit	14262243	Near Bit VSS	5.93	6.78	7.000	4.330
3	AutoTrak Curve MWD	14263426	Gamma (single)	2.75	12.95	7.000	3.250
3	AutoTrak Curve MWD	14263426	Directional (mag)	12.27	22.47	7.000	3.250
4	AutoTrak Curve Steering Unit	14262243	Near Bit VSS	5.93	6.78	7.000	4.330
4	AutoTrak Curve Steering Unit	14262243	Near Bit Inclination	5.93	6.78	7.000	4.330
4	AutoTrak Curve MWD	14263426	Gamma (single)	2.75	12.95	7.000	3.250
4	AutoTrak Curve MWD	14263426	Directional (mag)	12.27	22.47	7.000	3.250

Service and Tool Mnemonics

Mnemonic	Name	Description
NTK	NaviTrak	Probe Based Directional Module, NaviTrak Platform
ATC SU	AutoTrak Curve SU	Auto Trak Curve Steering Unit
ATC MWD	AutoTrak Curve MWD	Auto Trak Curve MWD
ATC LCPM	AutoTrak Curve LCPM	Auto Trak Curve LCPM

Comments

1 Baker Hughes Company run 1 utilized 8 inch NaviGamma services (Gamma Ray and Directional) behind an 13 1/2 inch PDC bit and steerable assembly from 110 to 1955 feet MD (110 to 1955 feet TVD).

2 Baker Hughes Company runs 2 and 4 utilized 6 ¾ inch NaviGamma services (Gamma Ray and Directional) behind an 8 ½ inch PDC bit and rotary steerable assembly from 1955 to 14537 feet MD (1955 to 6661 feet TVD).

3 Depth measurements were obtained from a depth control system not supplied or operated by Baker Hughes. Due to a lack of control by Baker Hughes logging engineers, depth calibrations and measurements could not be independently verified and the unverified depths as supplied to Baker Hughes are being used to present logging data.

4 The Gamma Ray Apparent (GRAM) data is presented 0 to 300 API, per the customer's request.

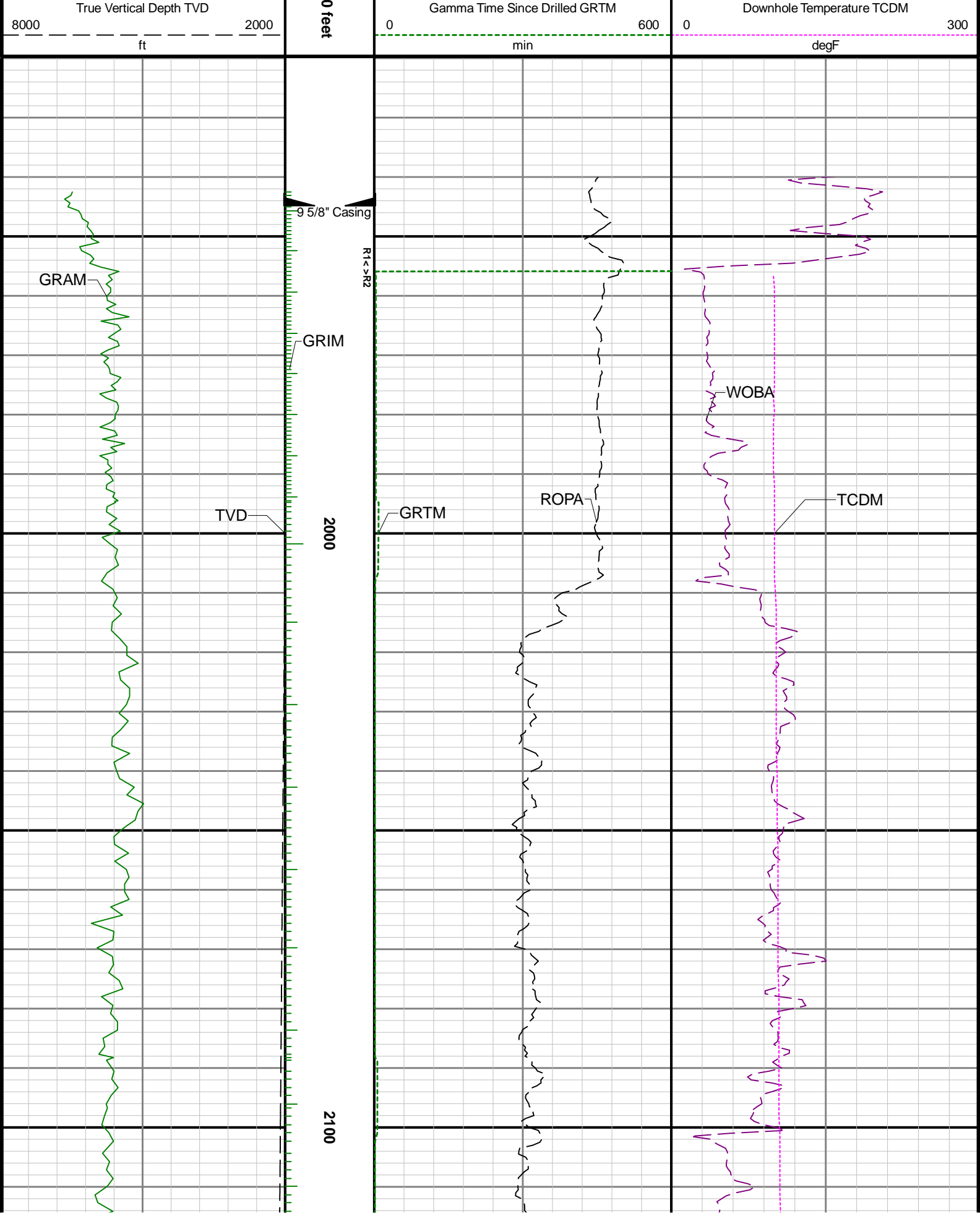
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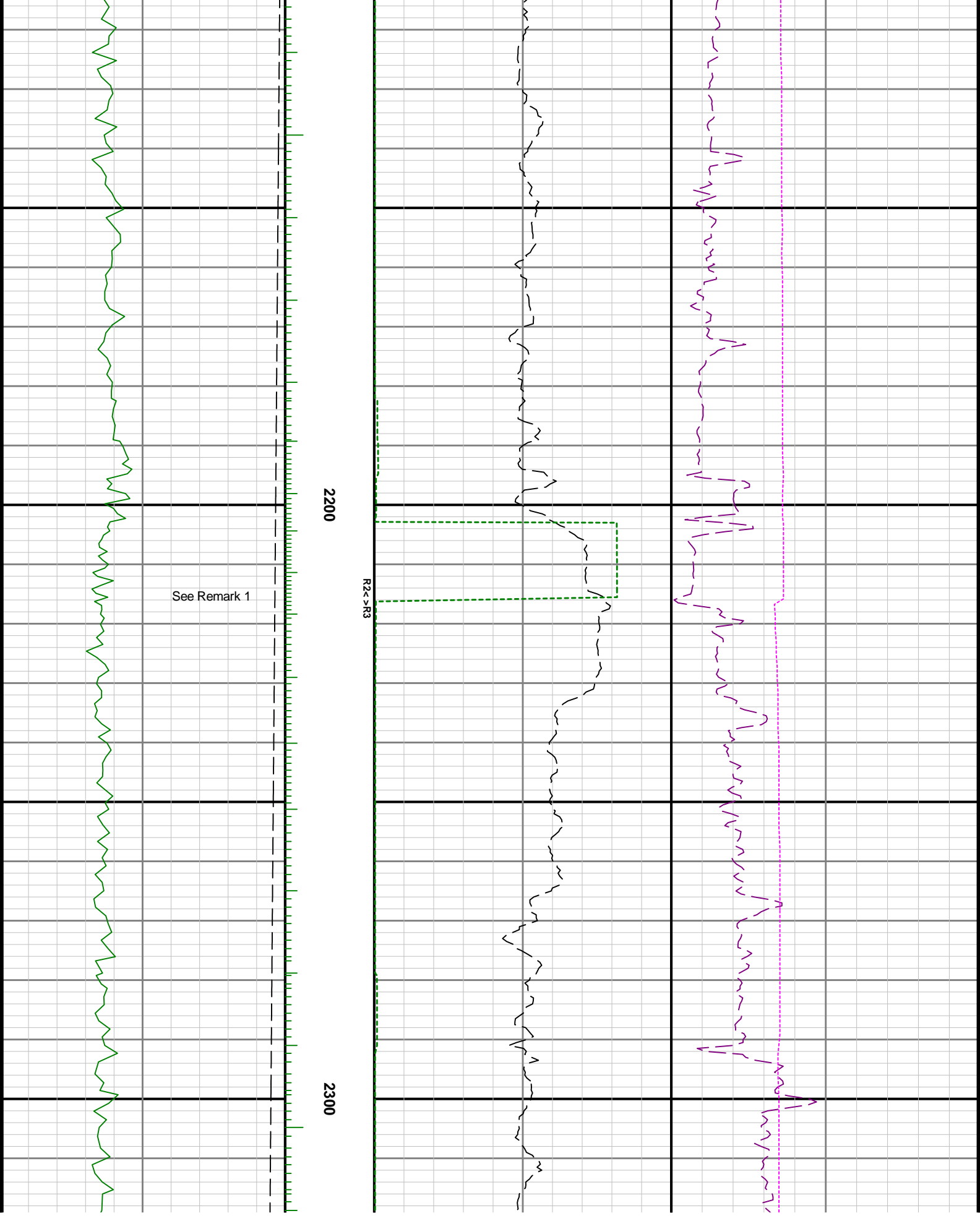
Number	Depth (ft)	Hole Section (in)	Run No.	Remark
1	2215.00	8.500	3	The interval from 2202 to 2215 feet MD (2202 to 2215 feet TVD) was logged up to 7 hours after being drilled due to trip out of hole to change BHA.
2	5184.00	8.500	4	The interval from 5184 to 5195 feet MD (5135 to 5146 feet TVD) was logged up to 6.5 hours after being drilled due to trip out of hole to change BHA.
3	14524.00	8.500	4	The interval from 14524 to 14537 feet MD (6661 to 6661 feet TVD) was not logged due to sensor to bit offset at well TD.

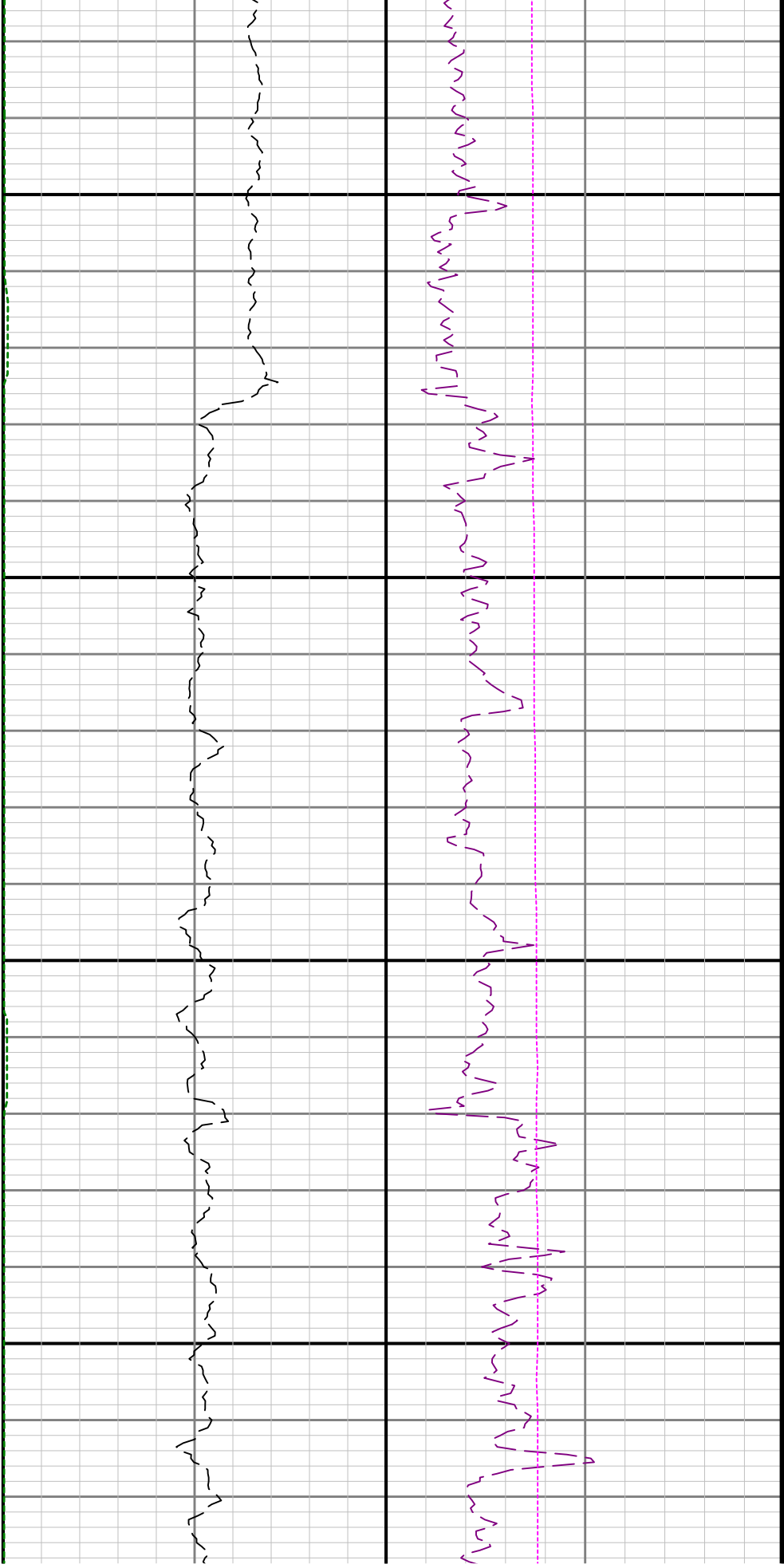
Curve Mnemonics

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

Gamma Ray - Apparent 0.5 ft Average GRAM	MD 1:24	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

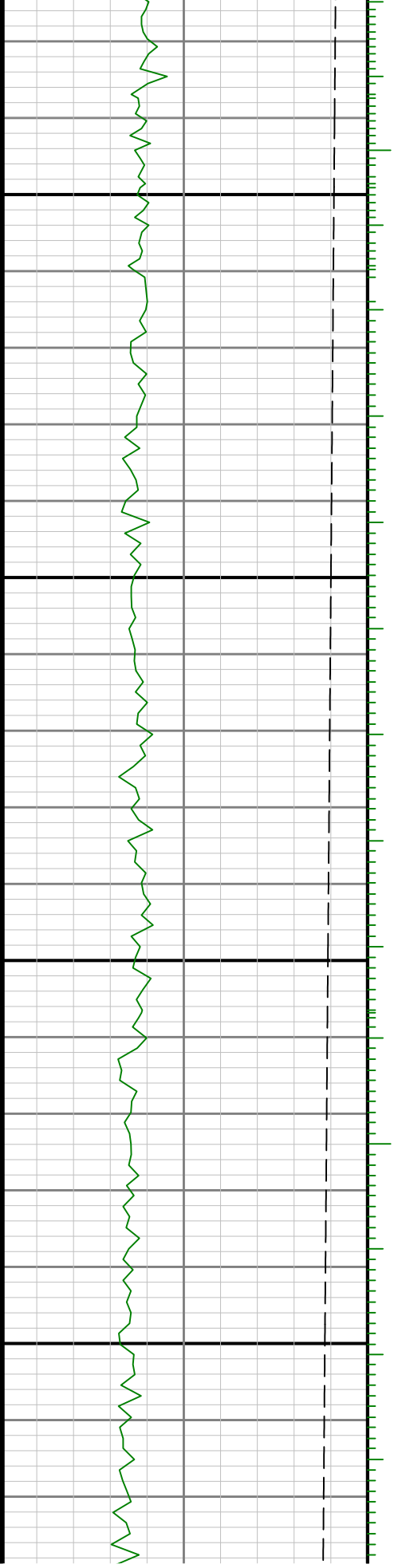


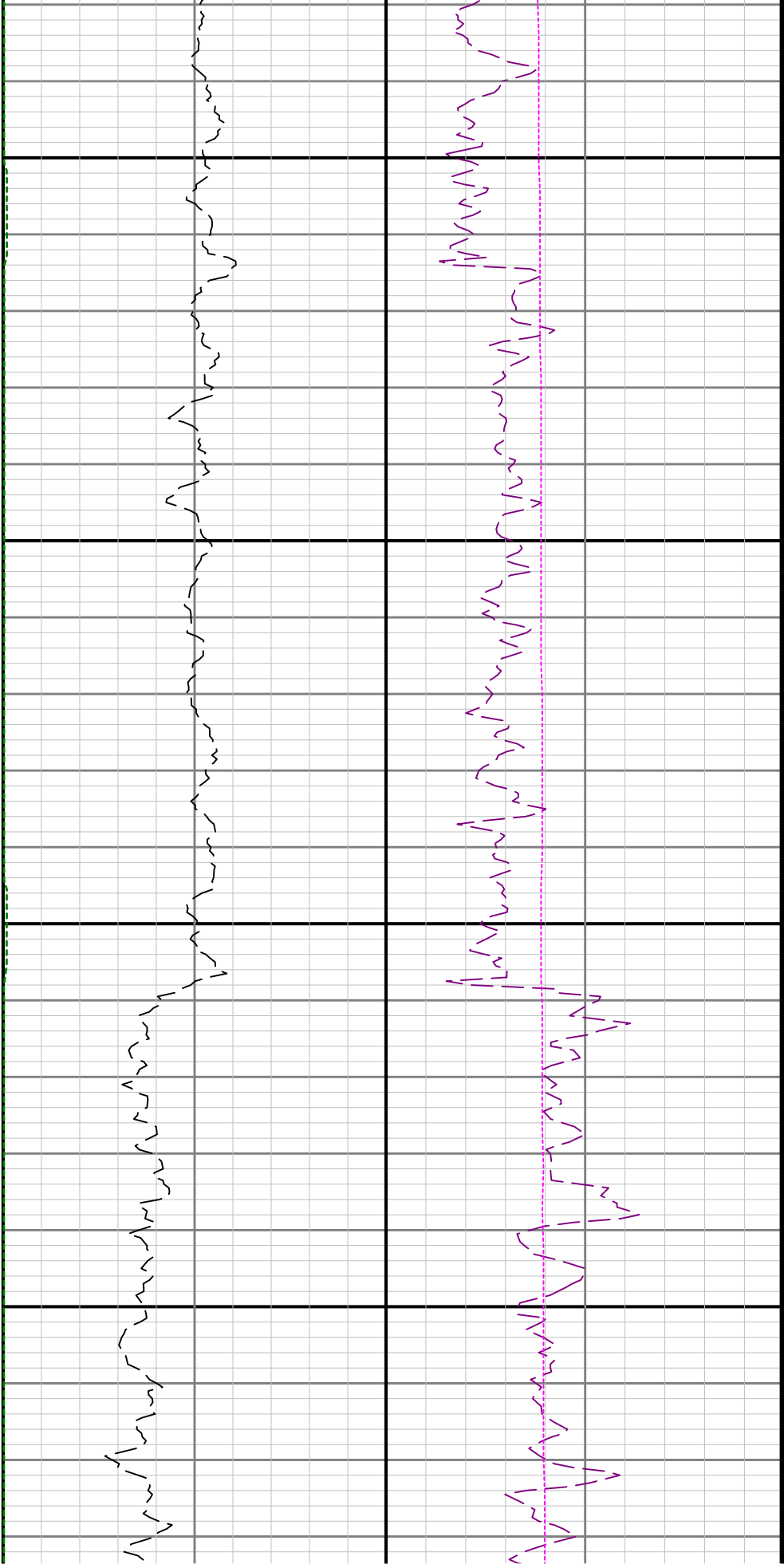




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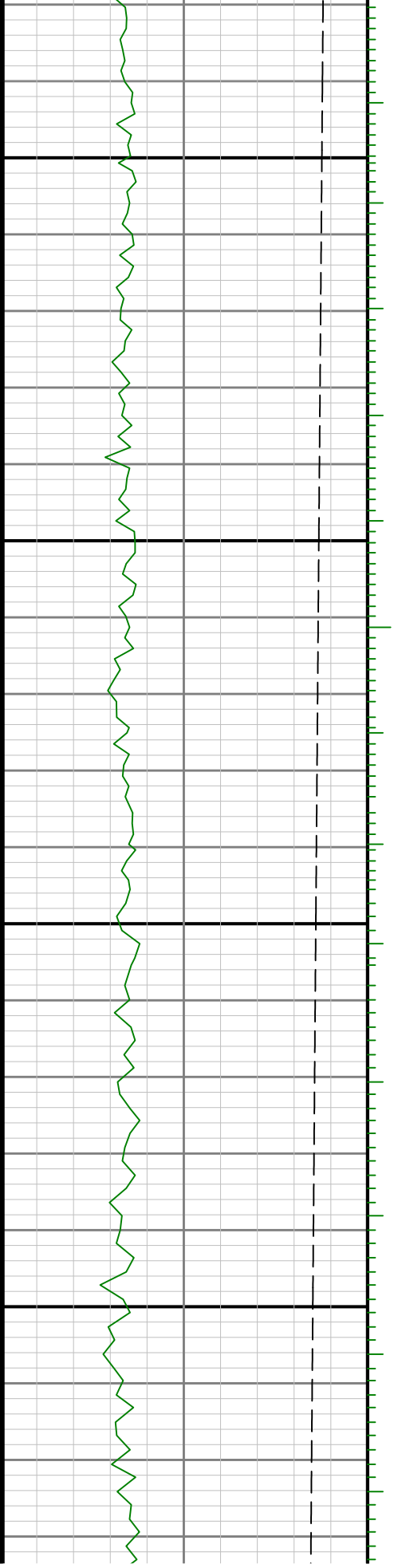
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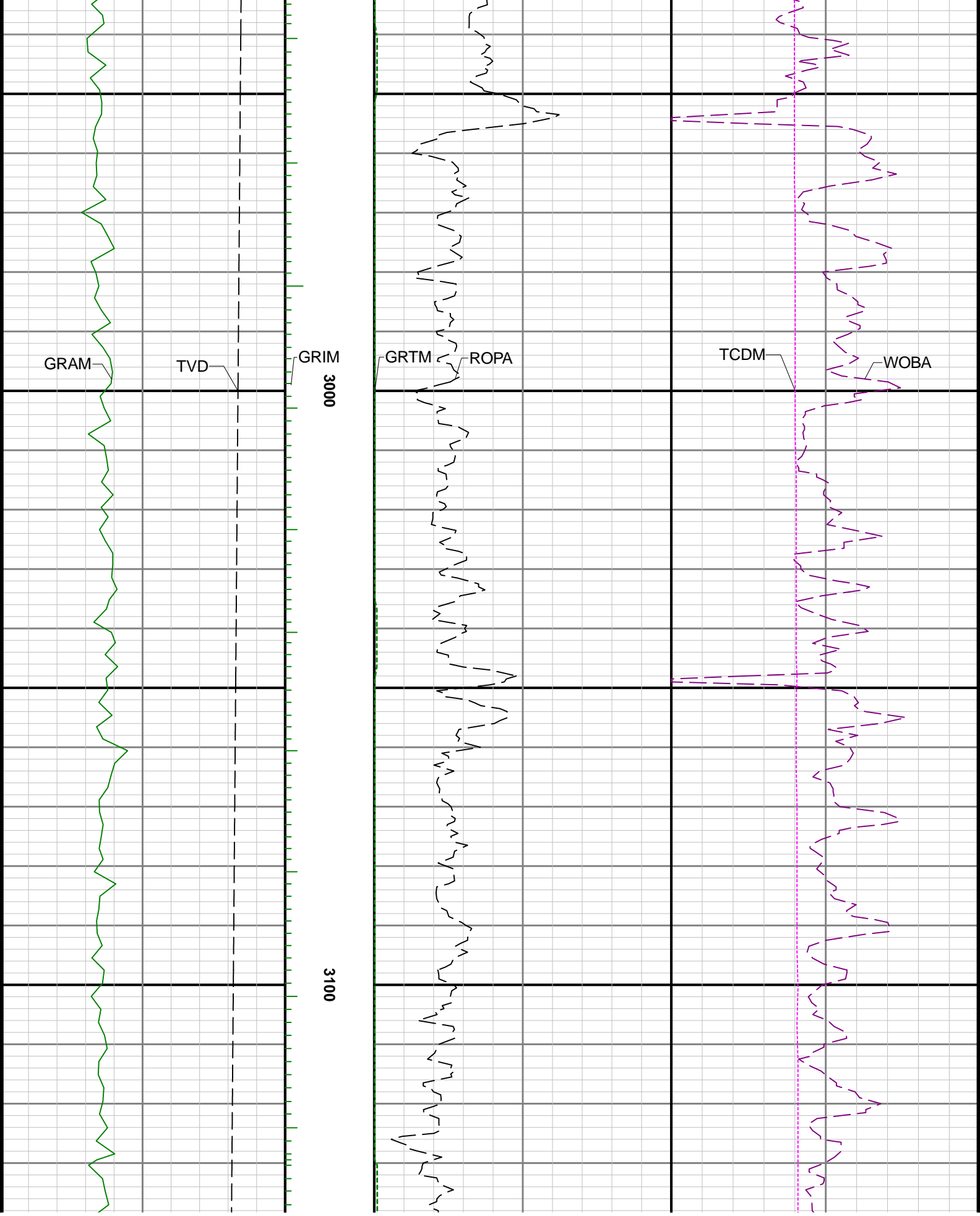


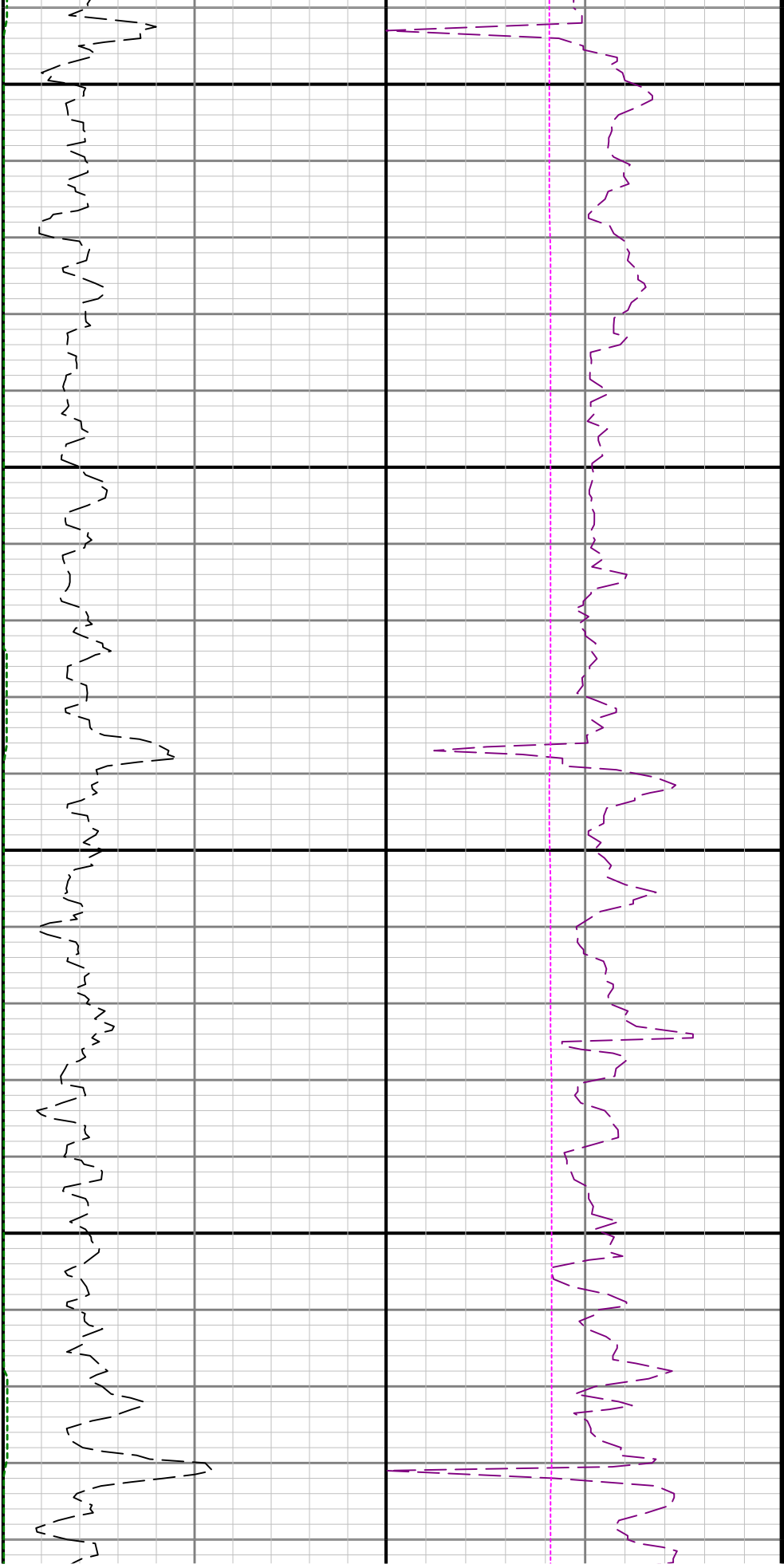


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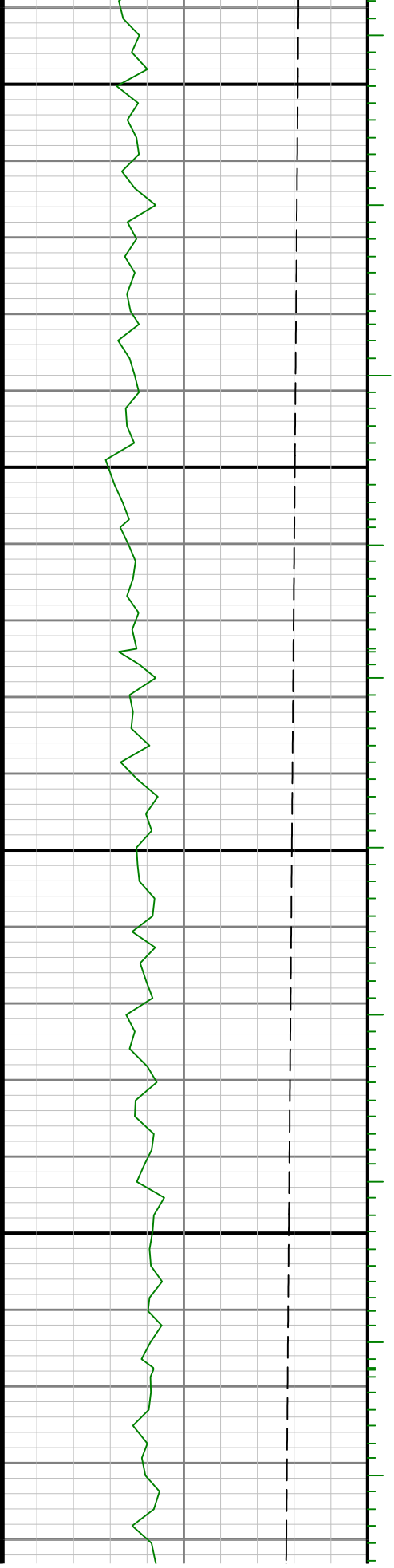


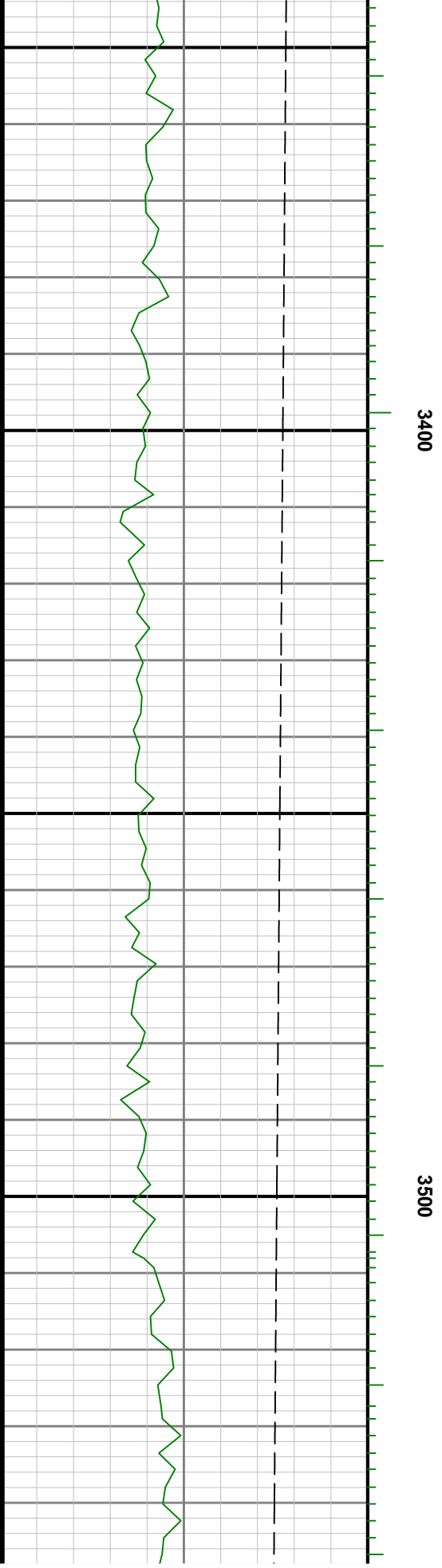
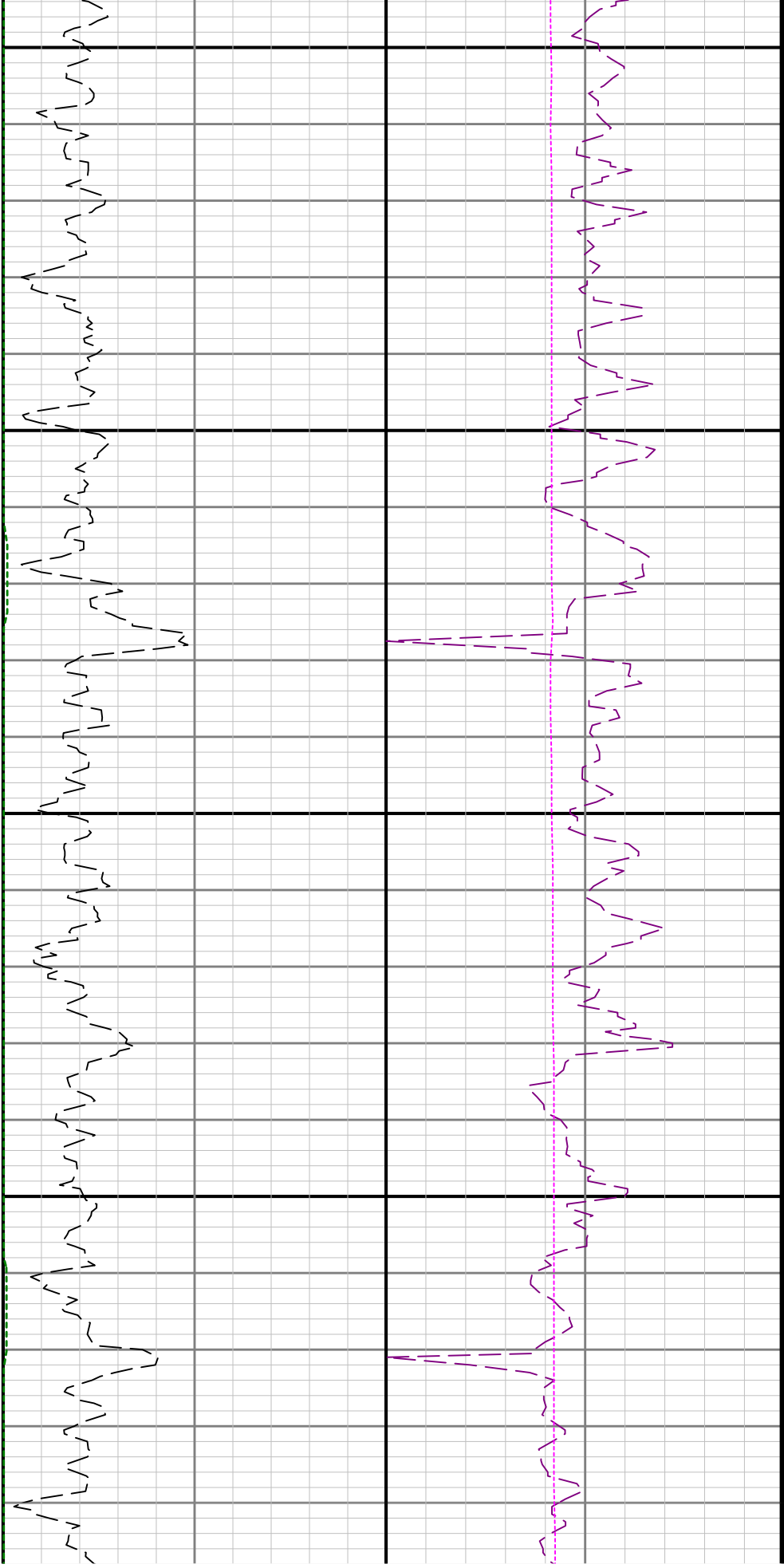


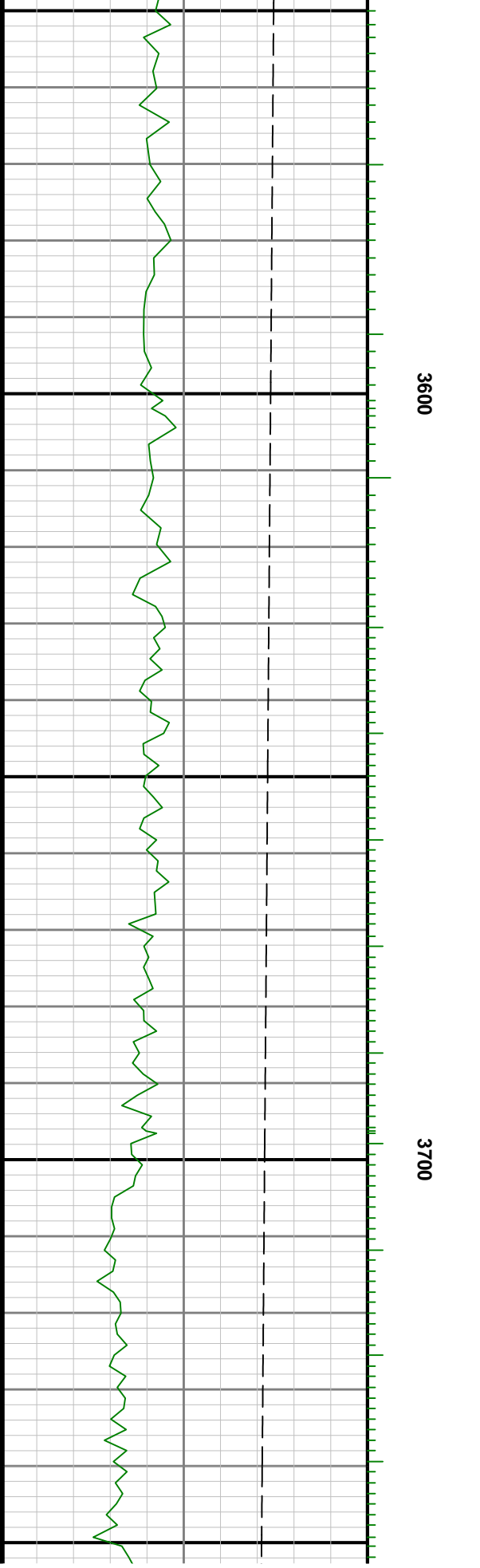
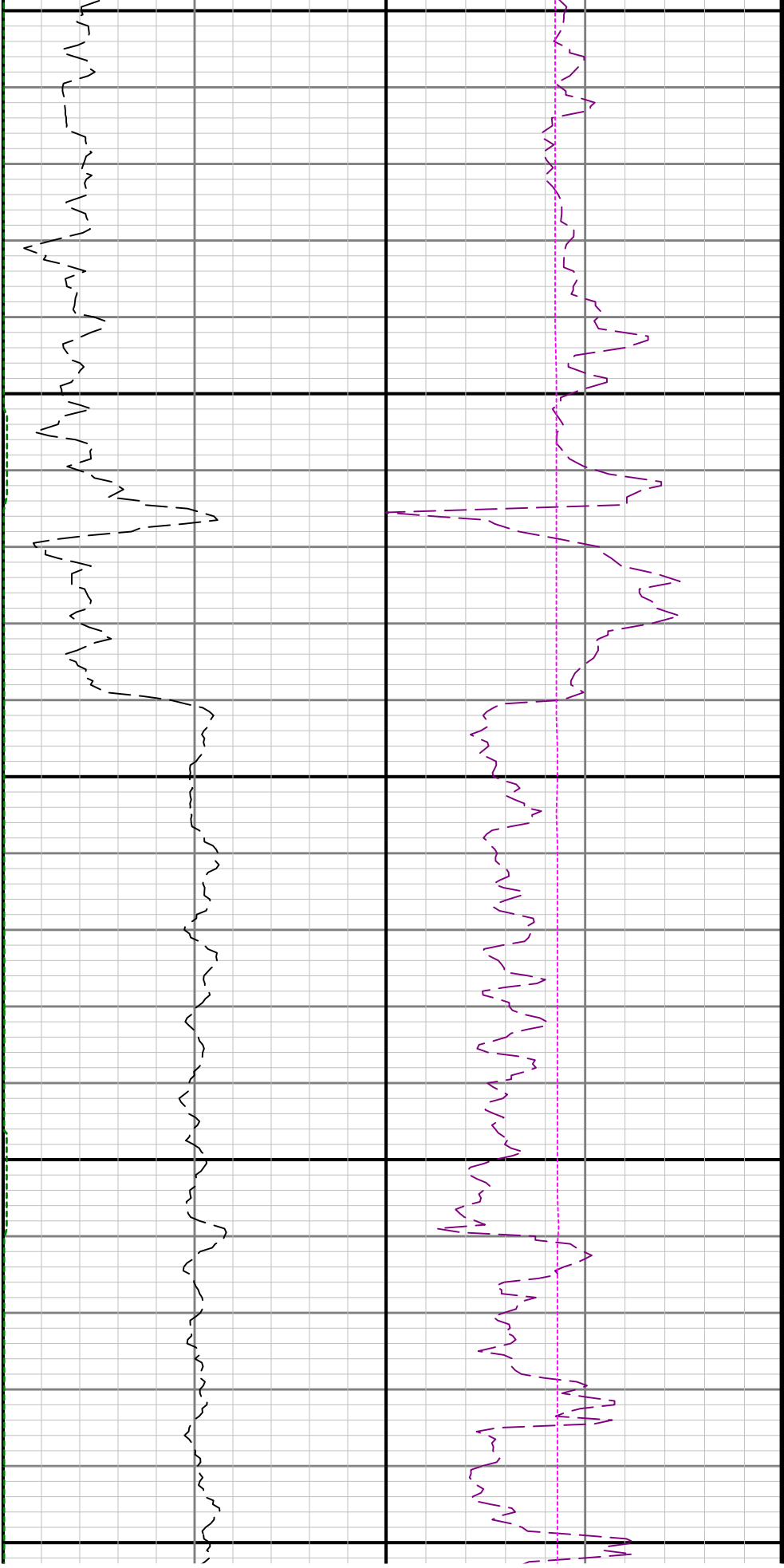


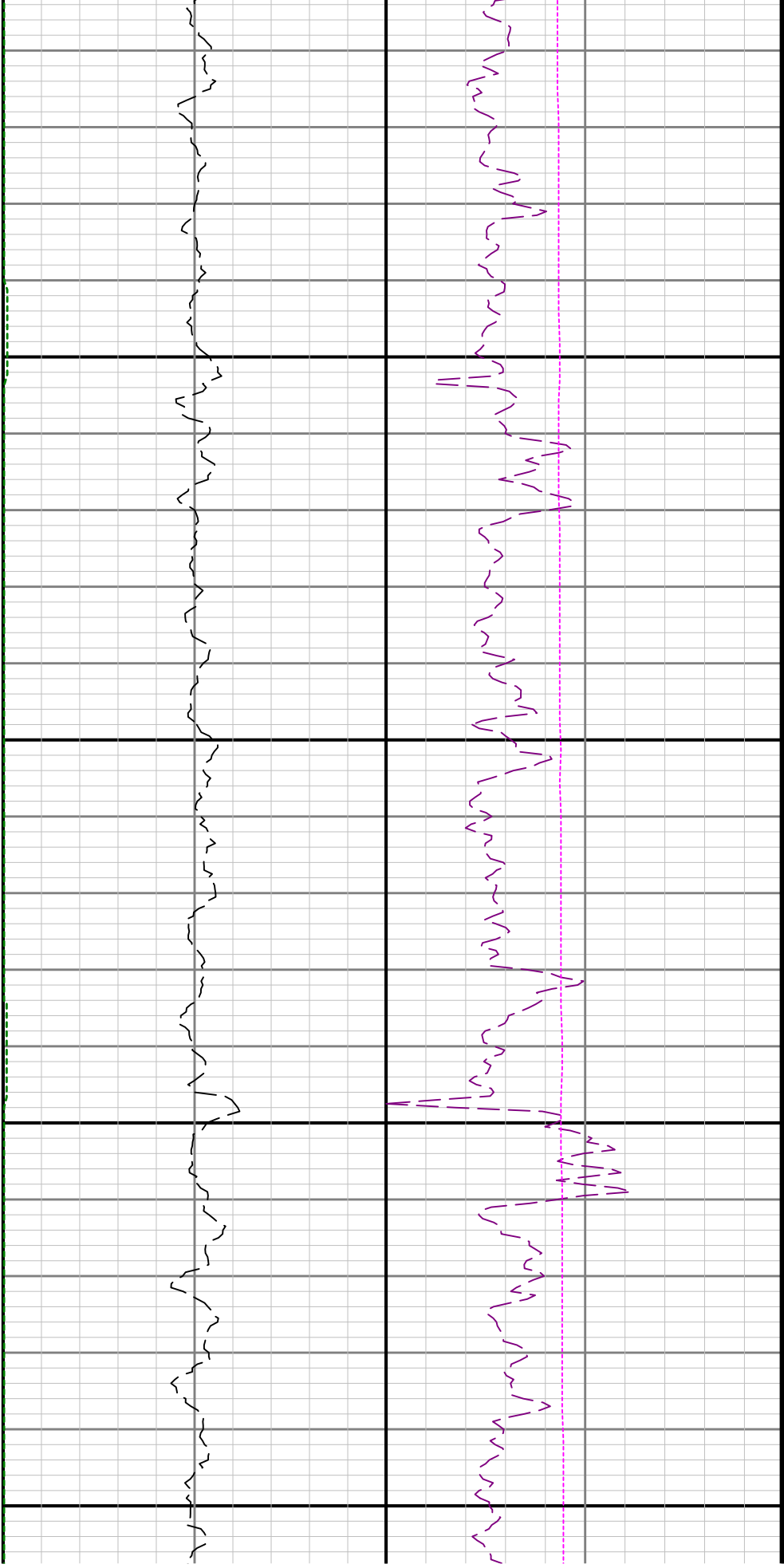
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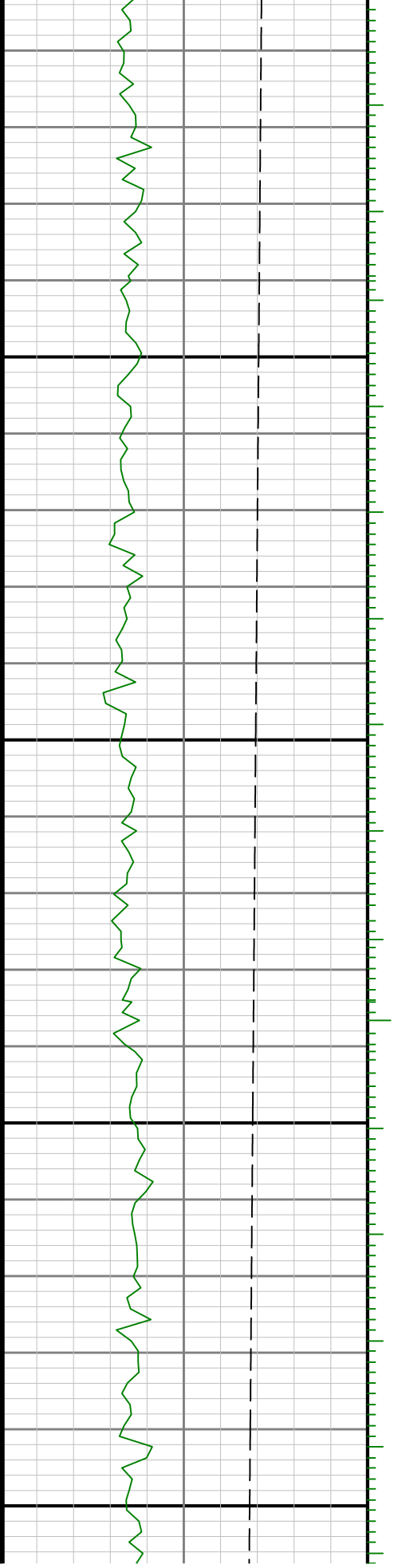


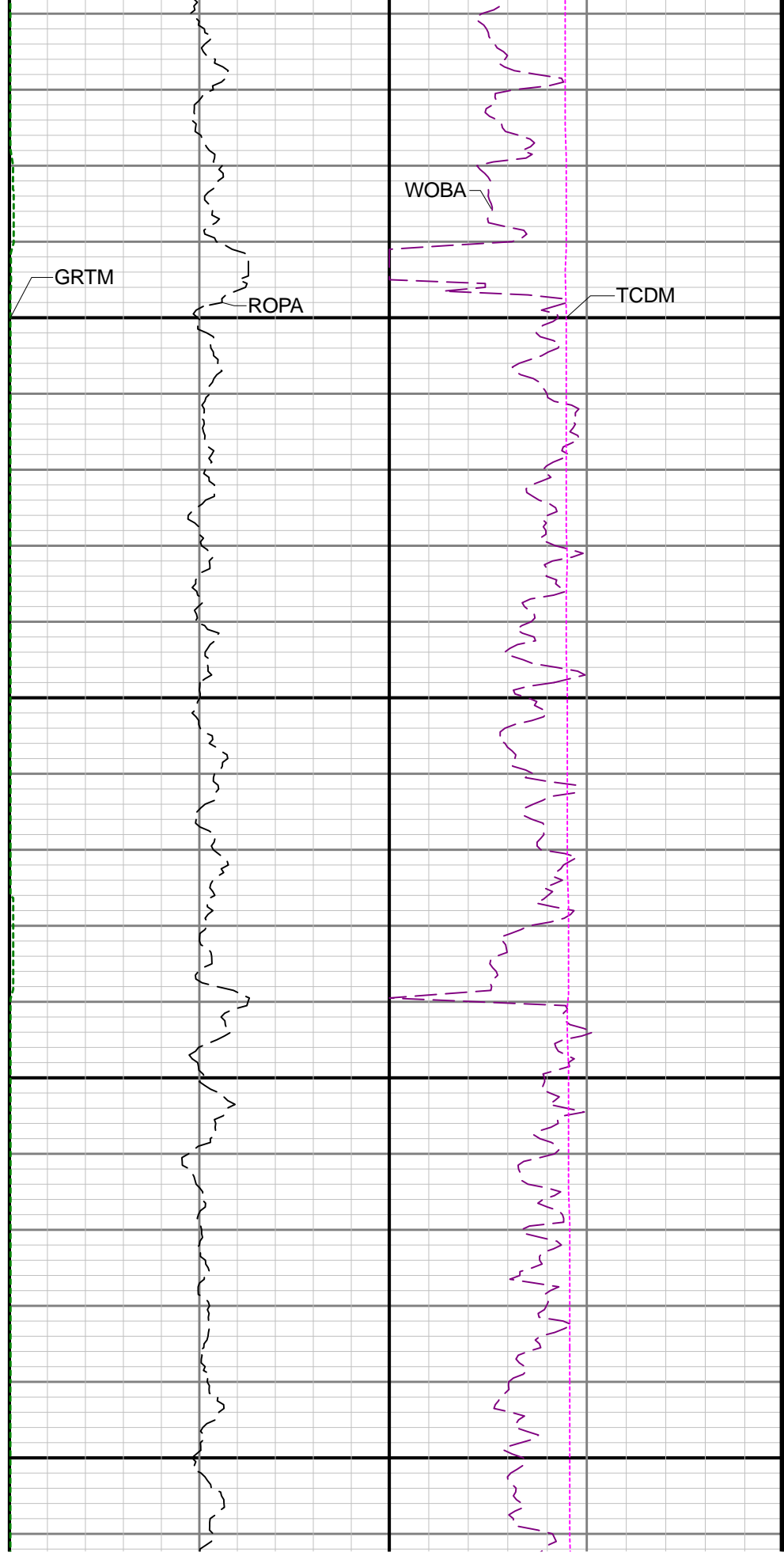
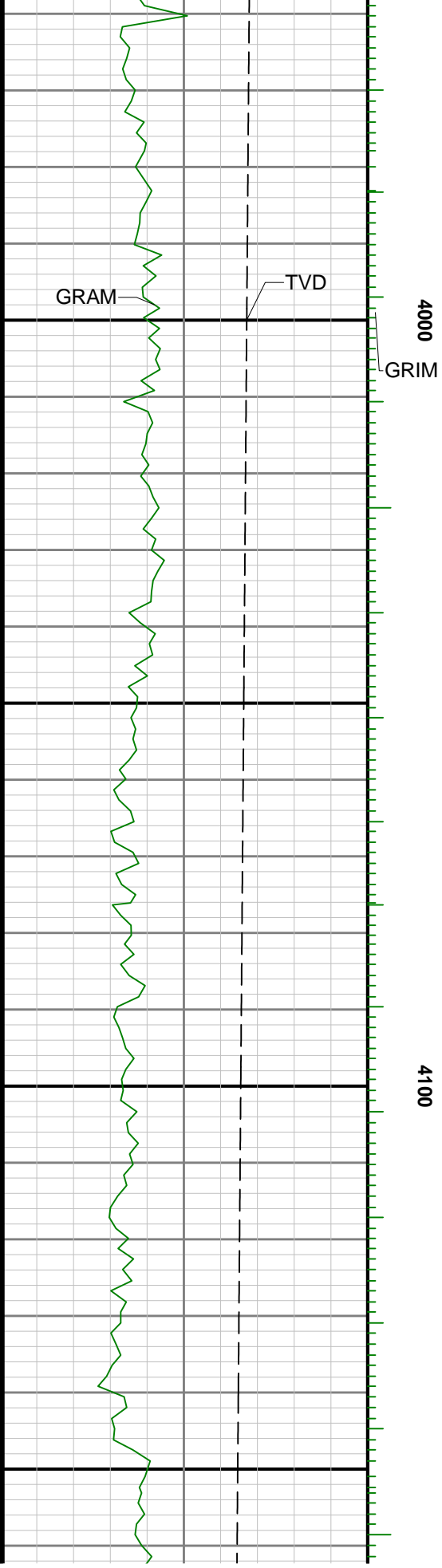


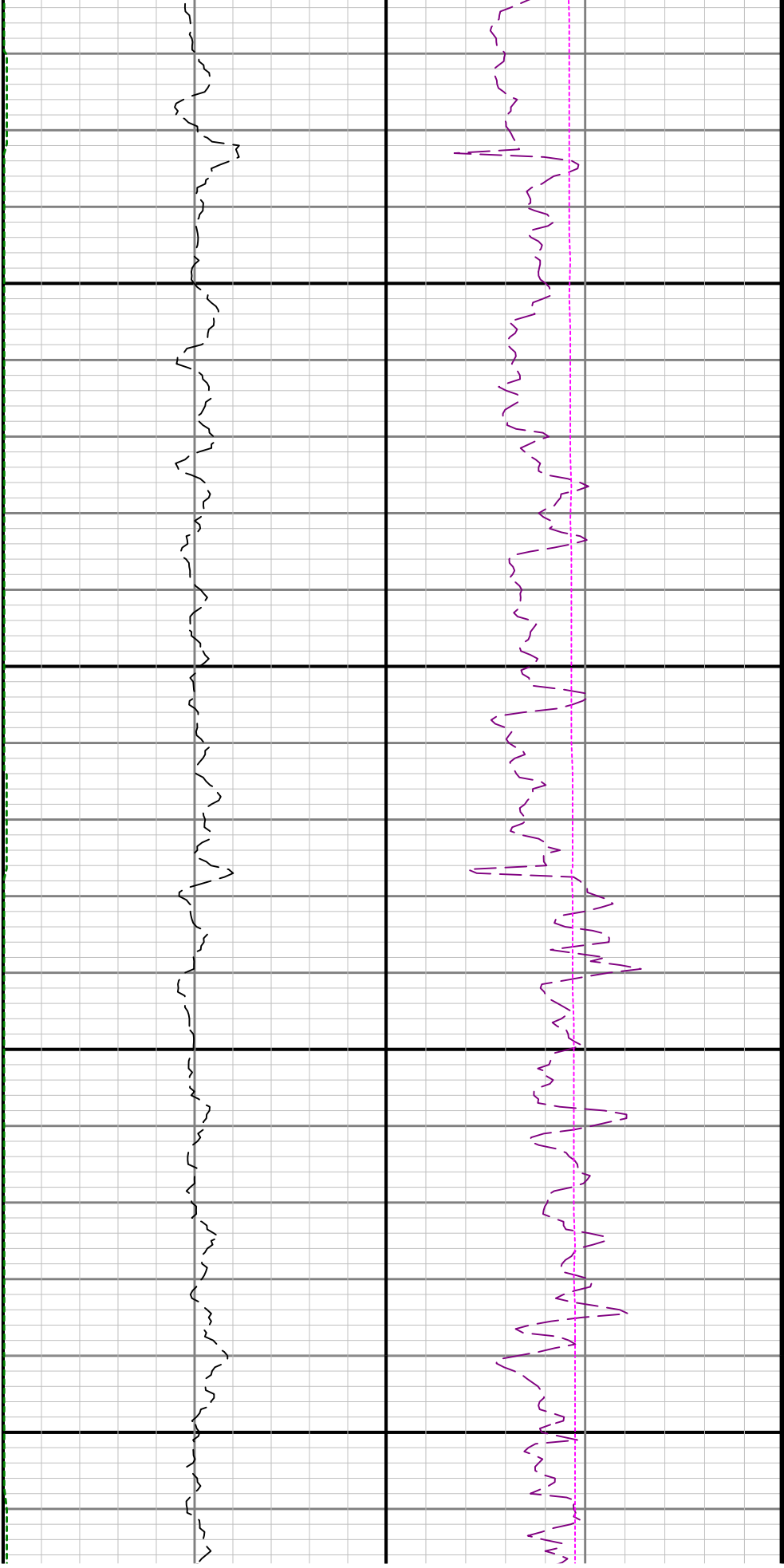


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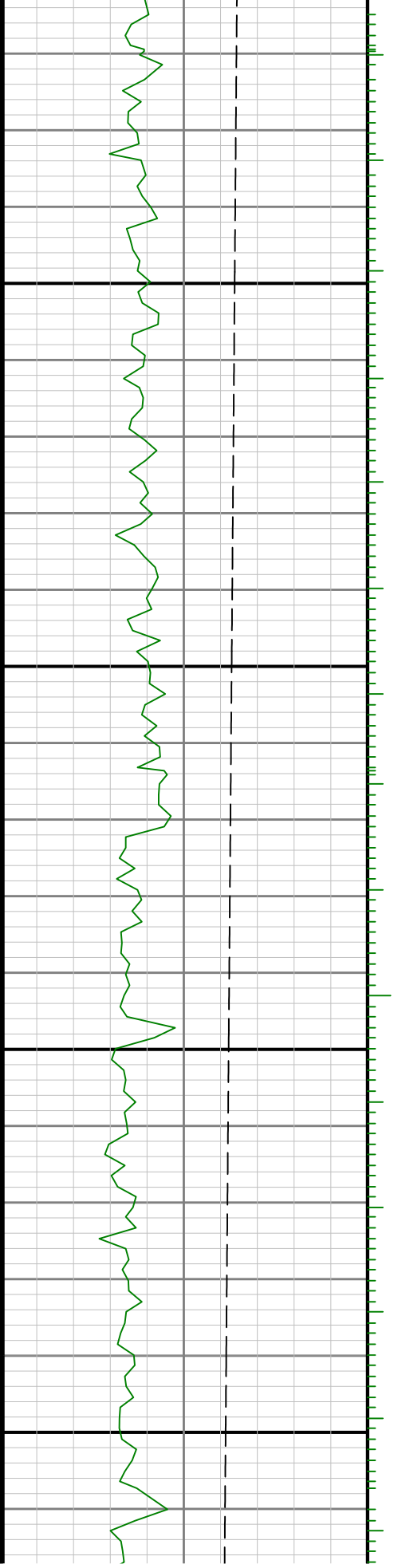


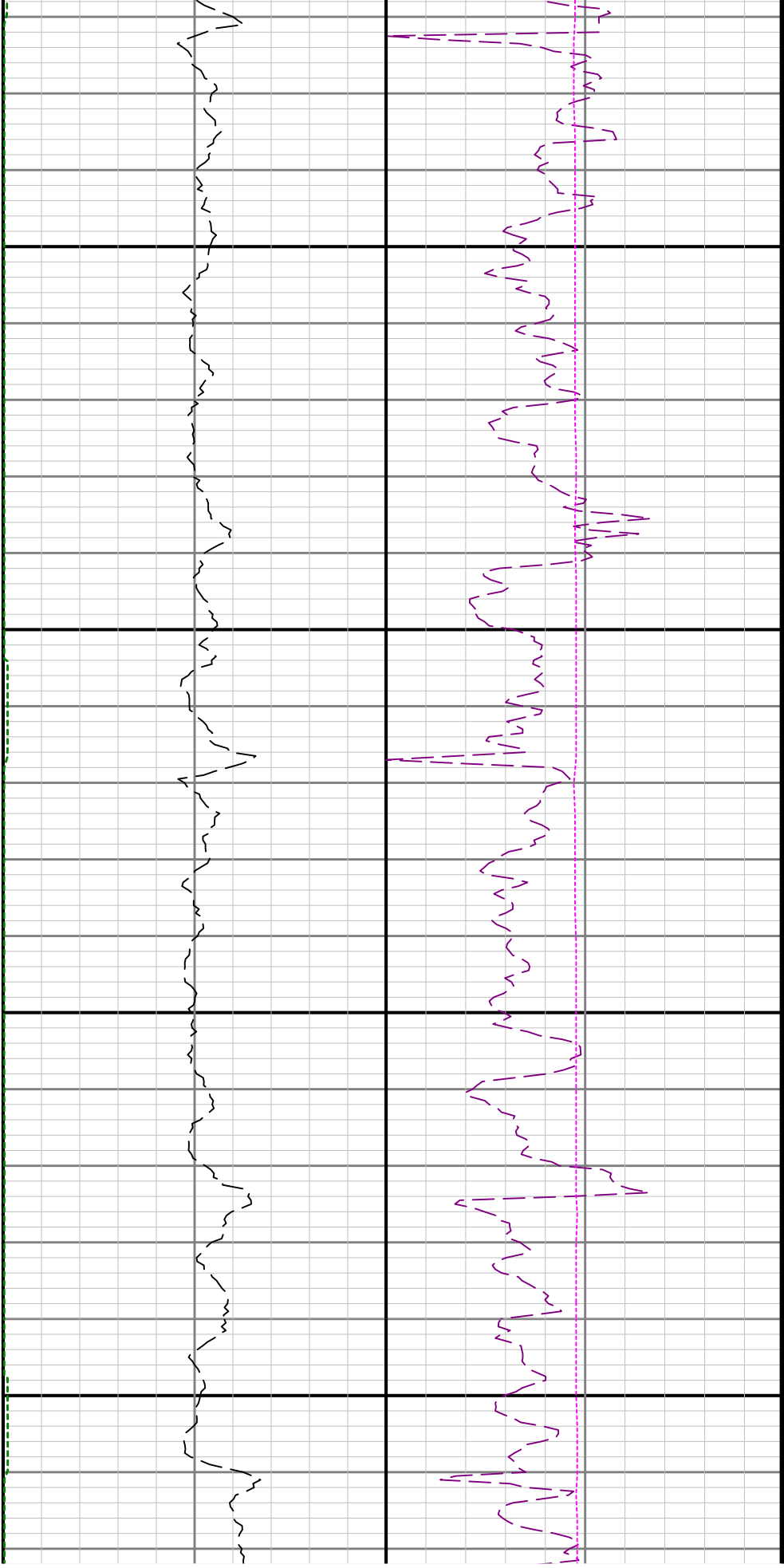




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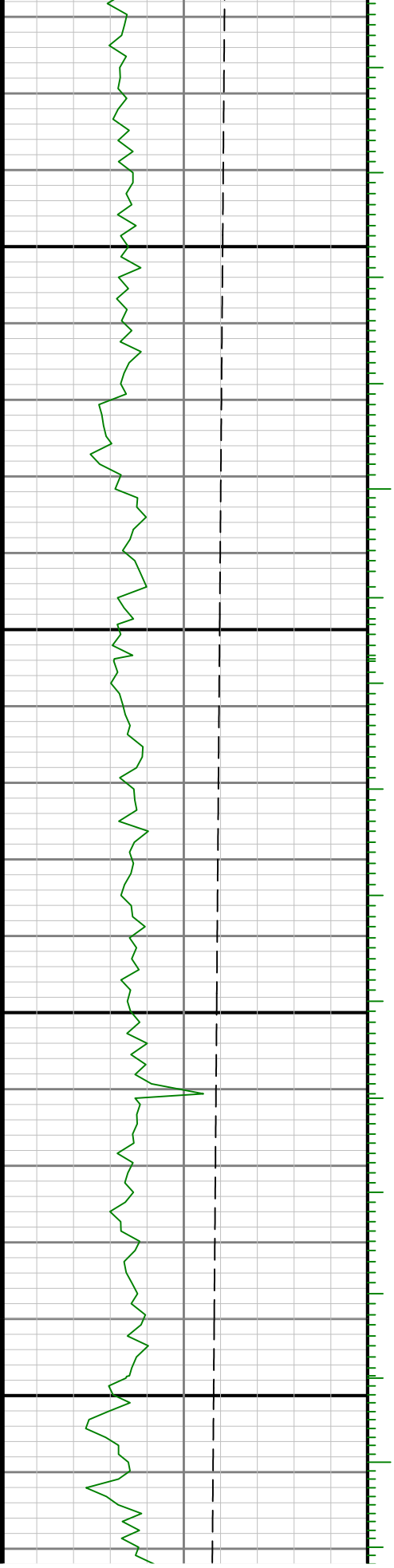
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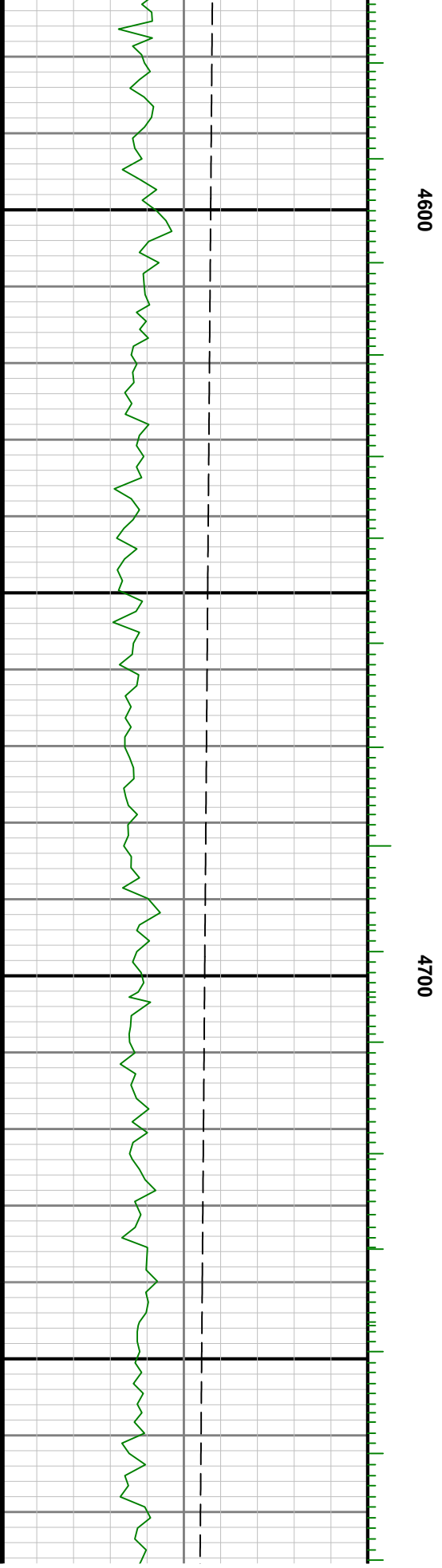
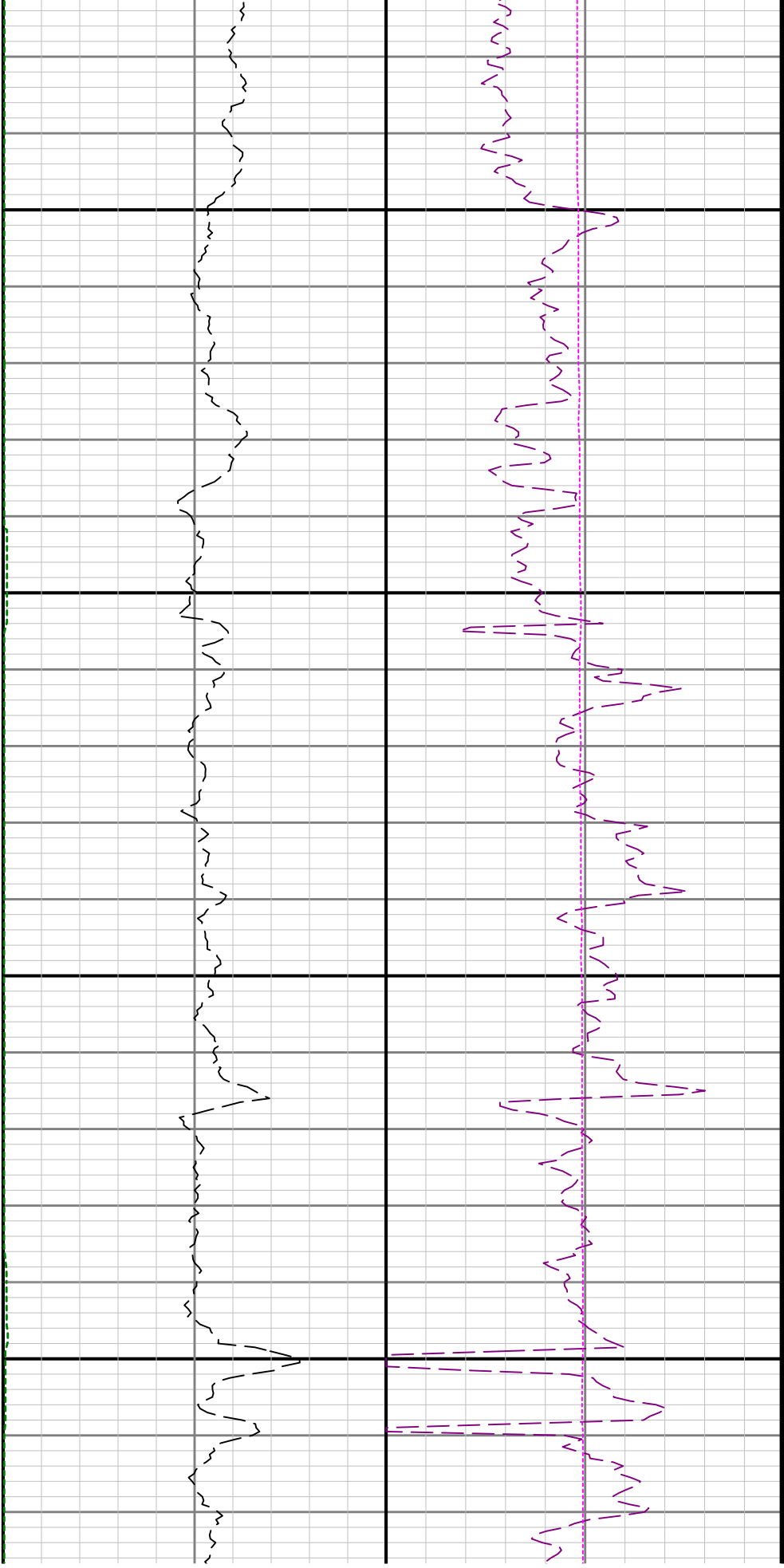


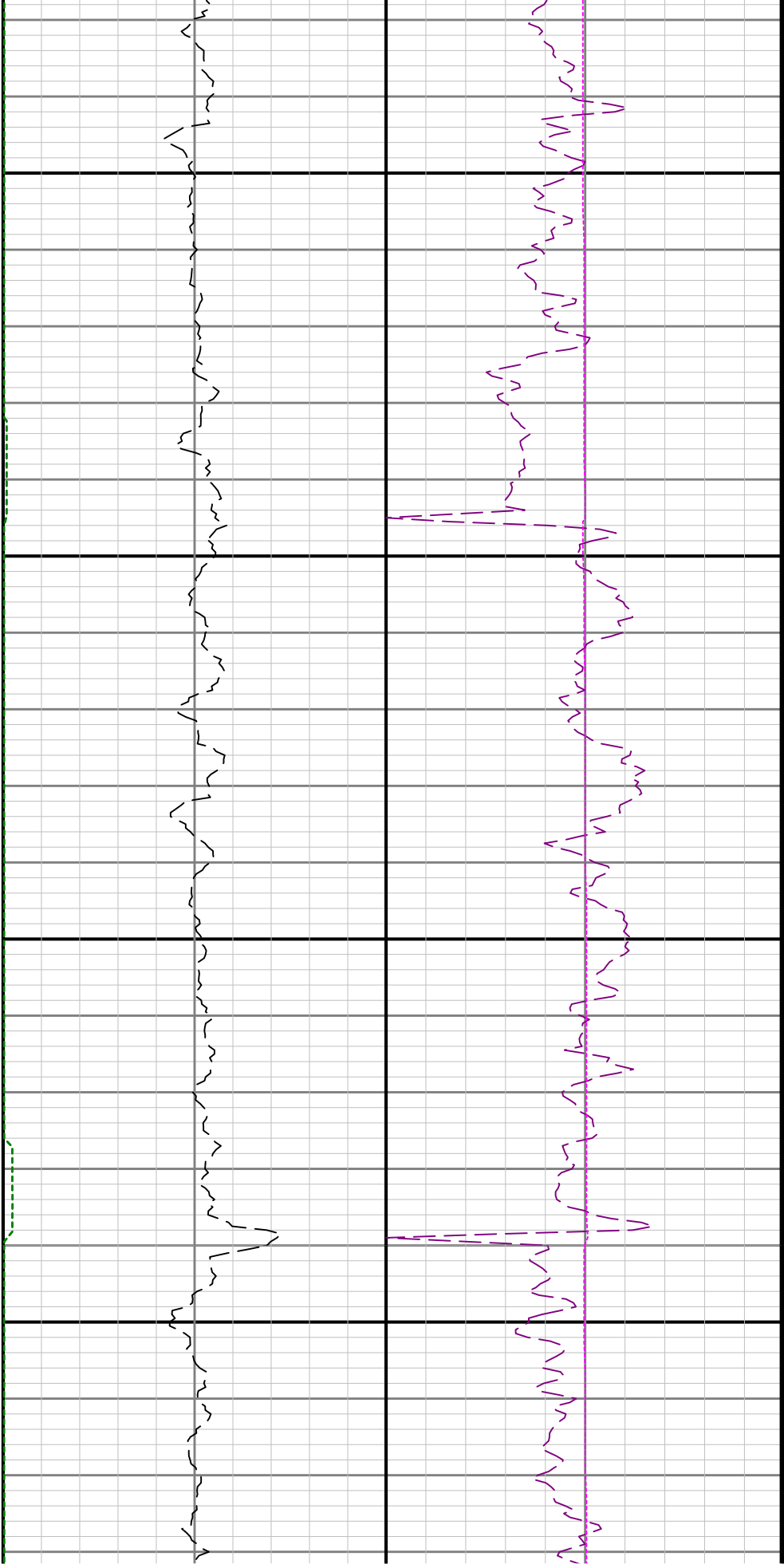


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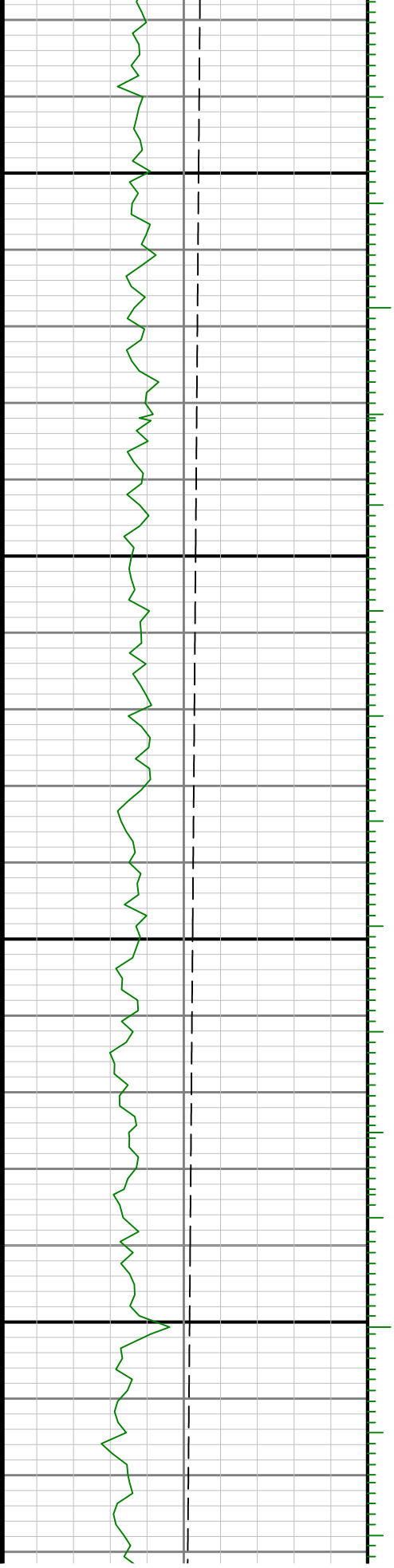


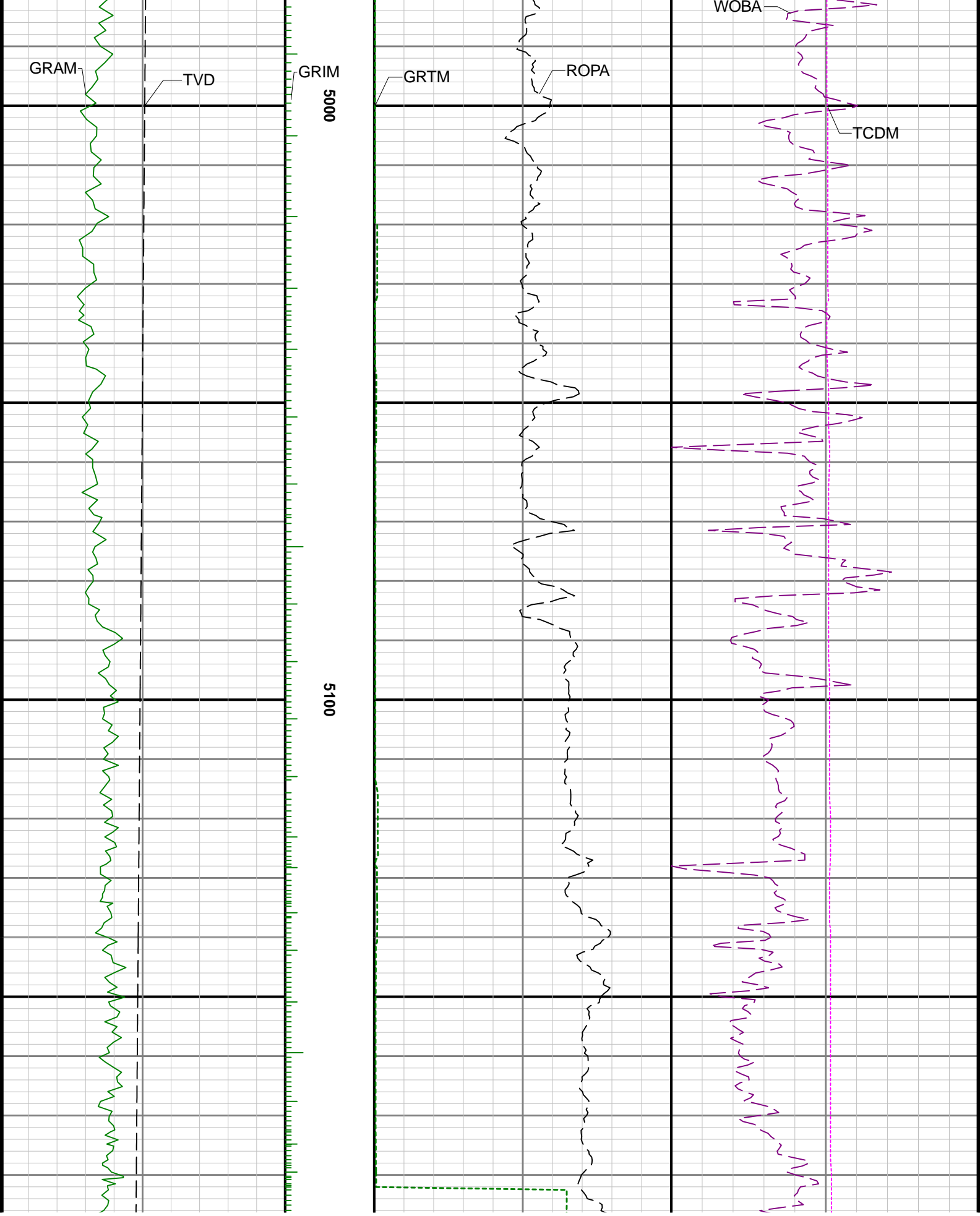




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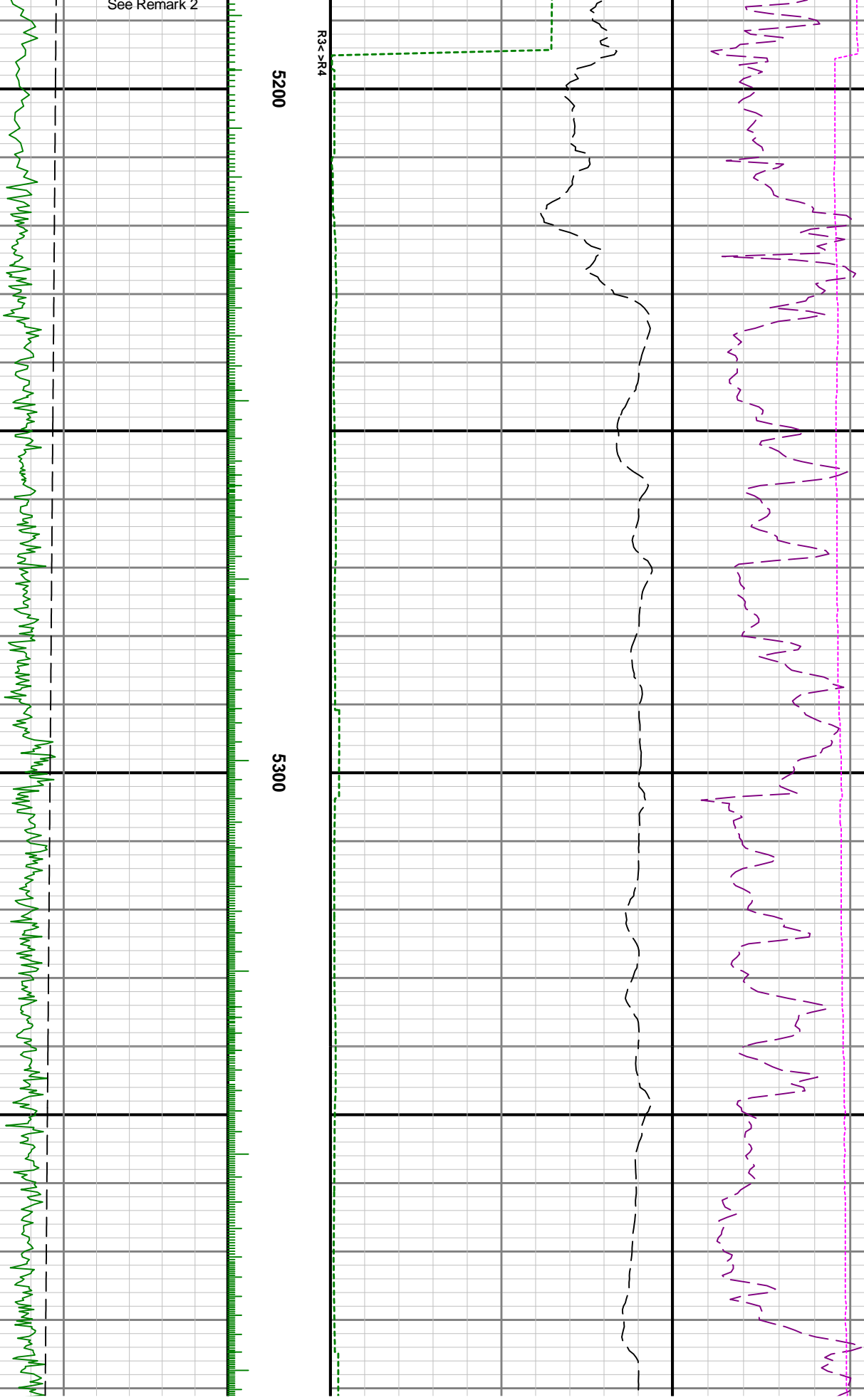


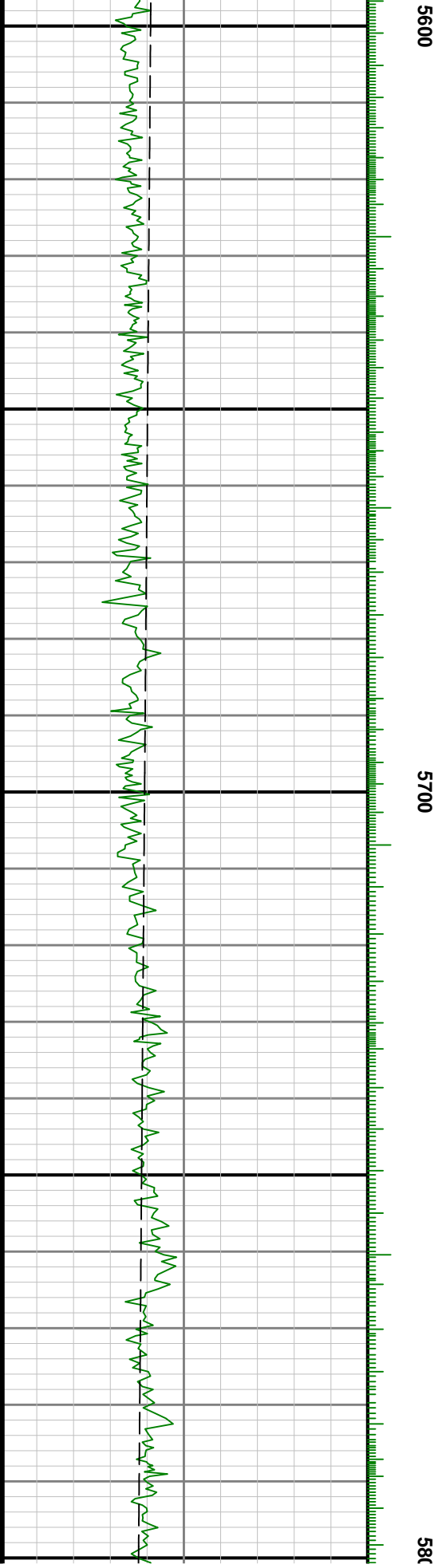
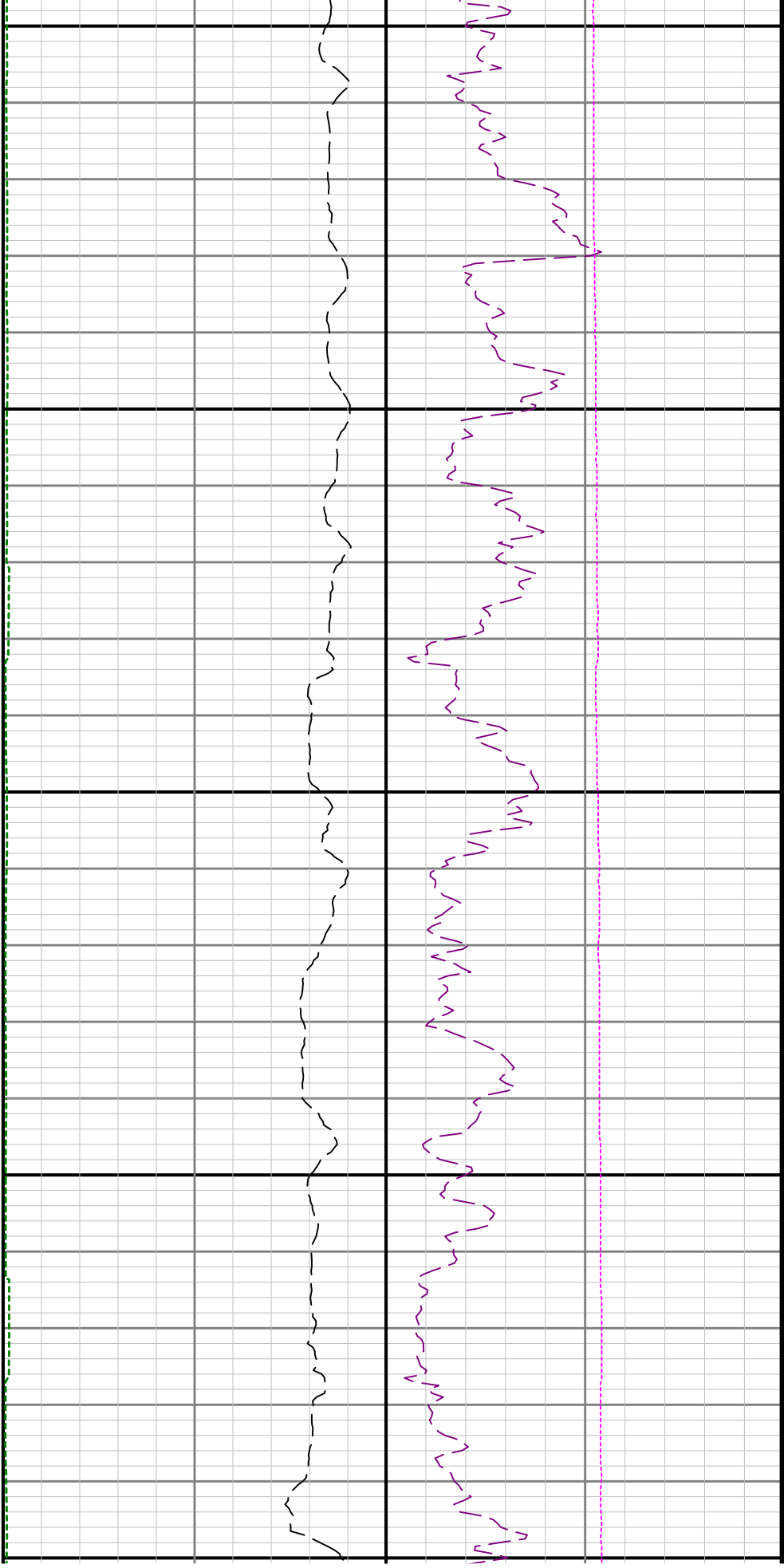
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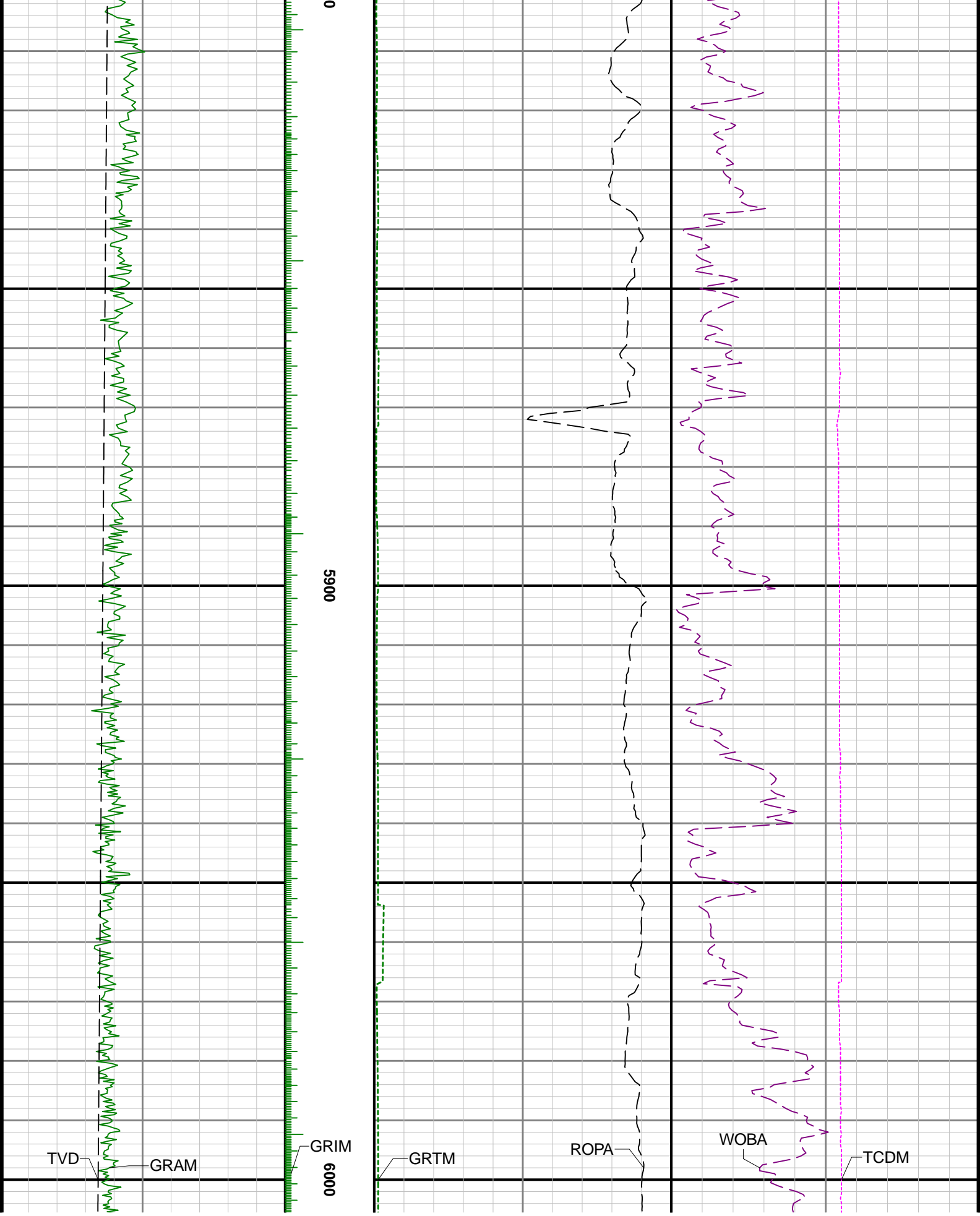
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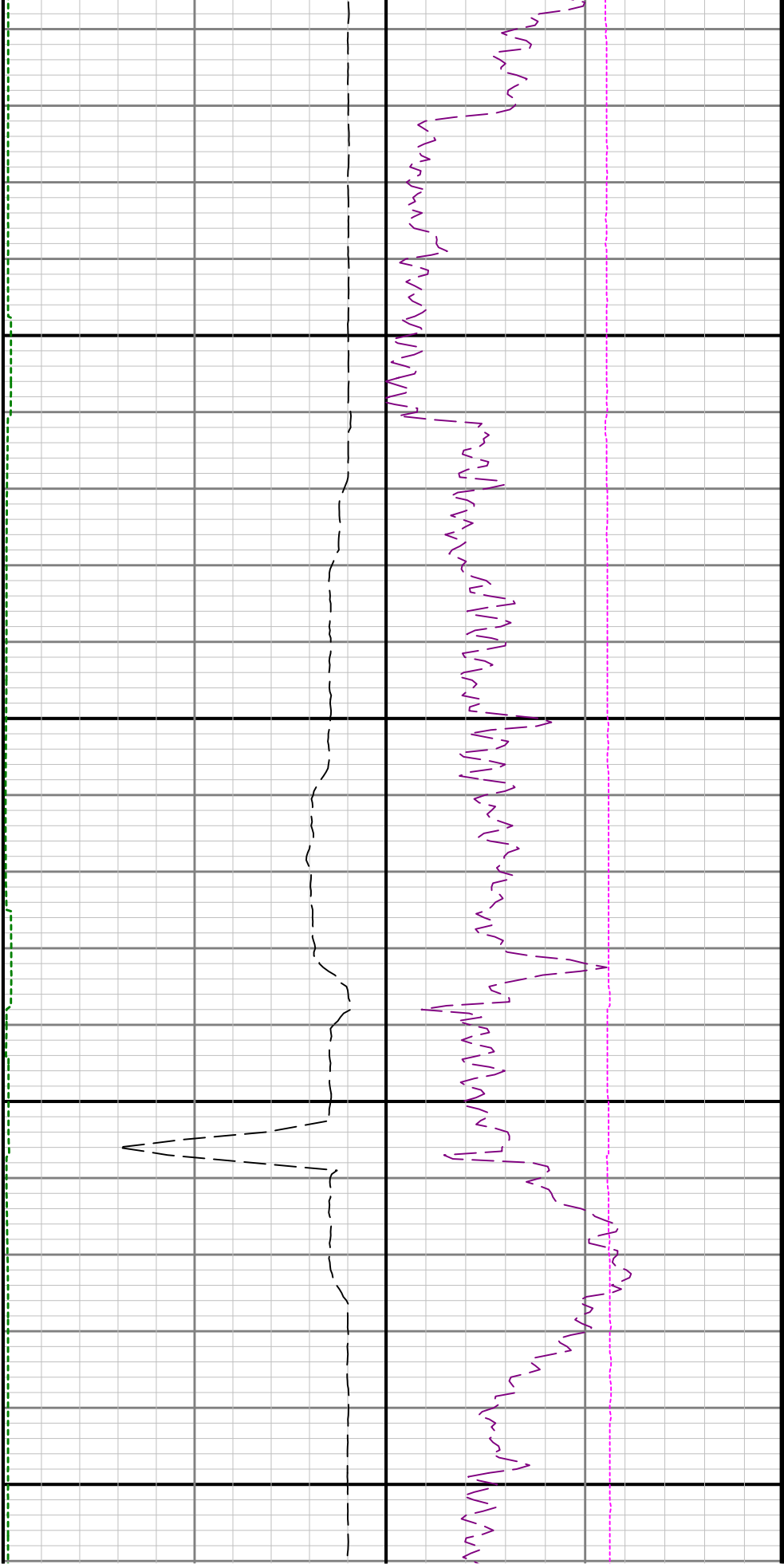
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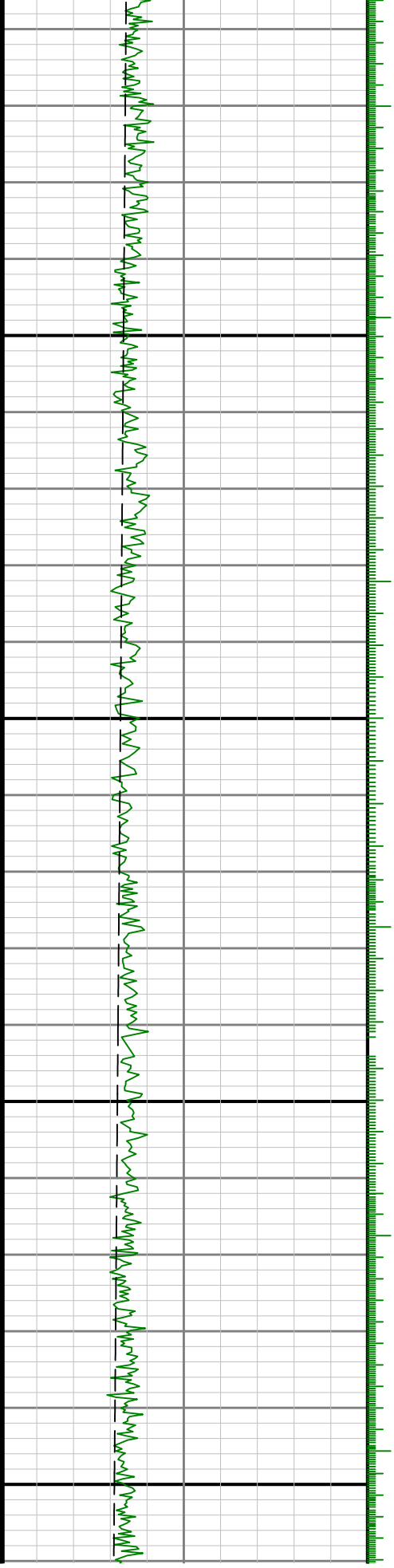


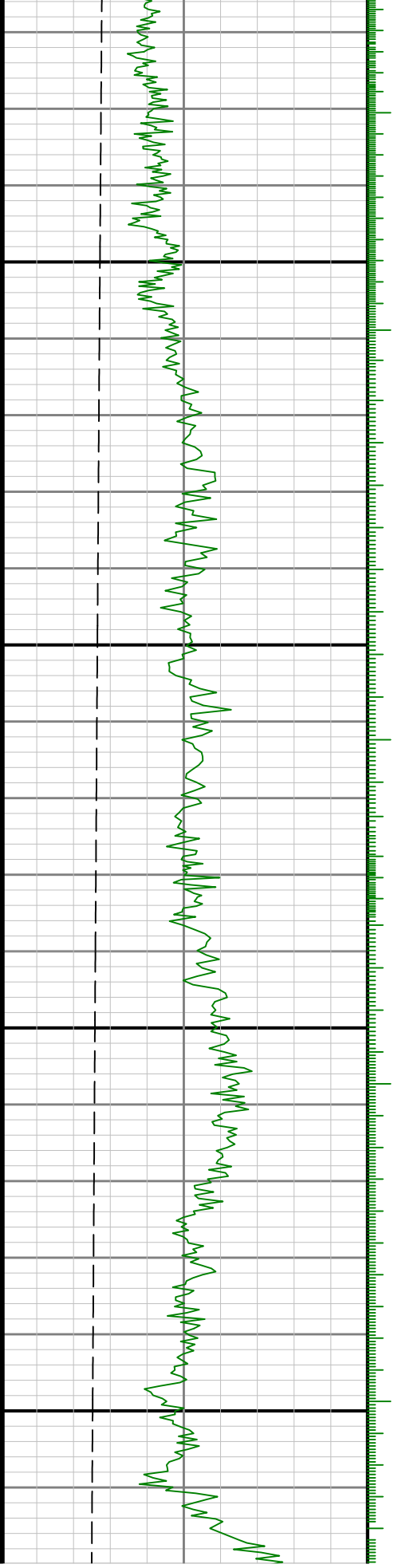




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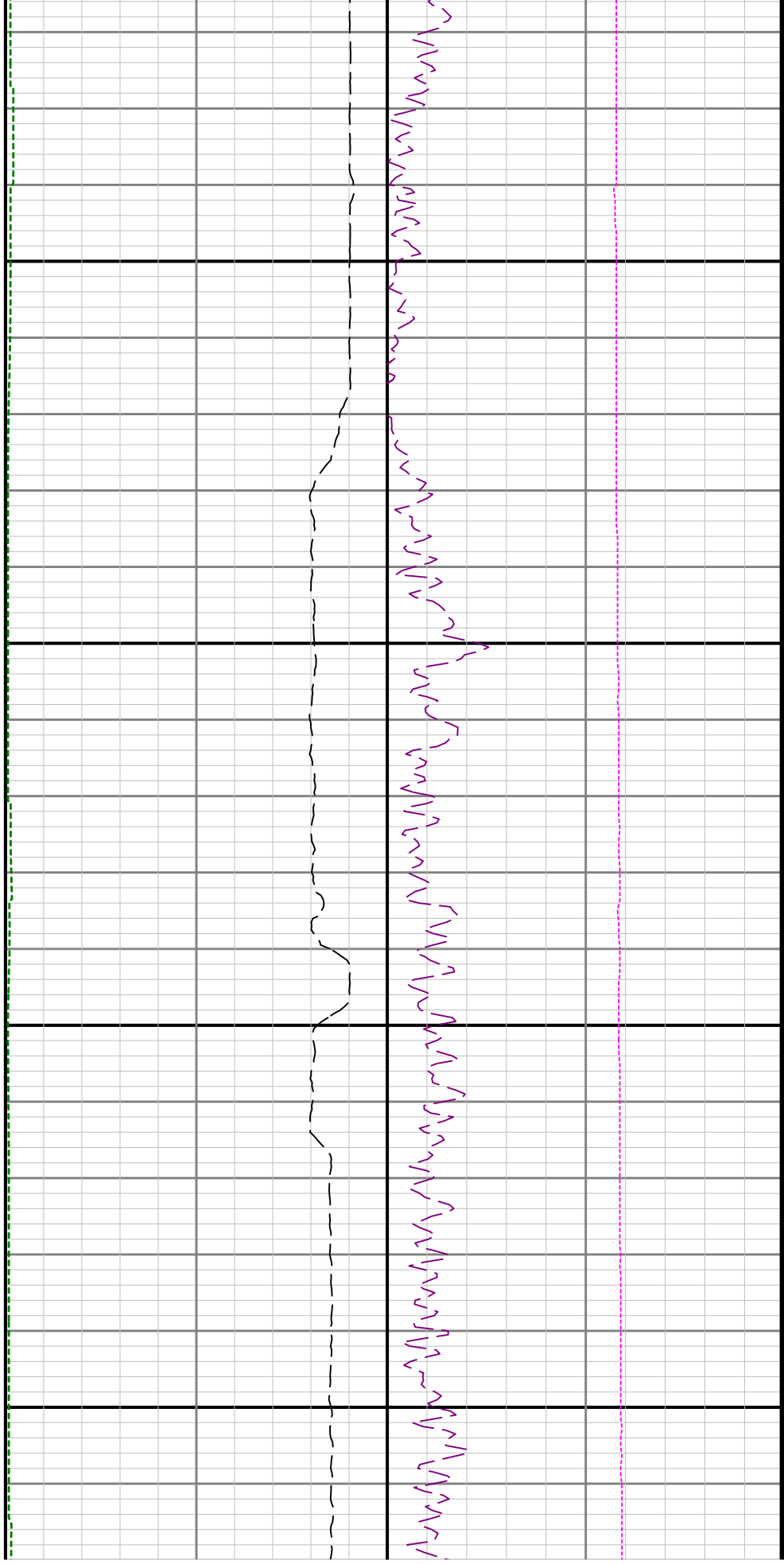
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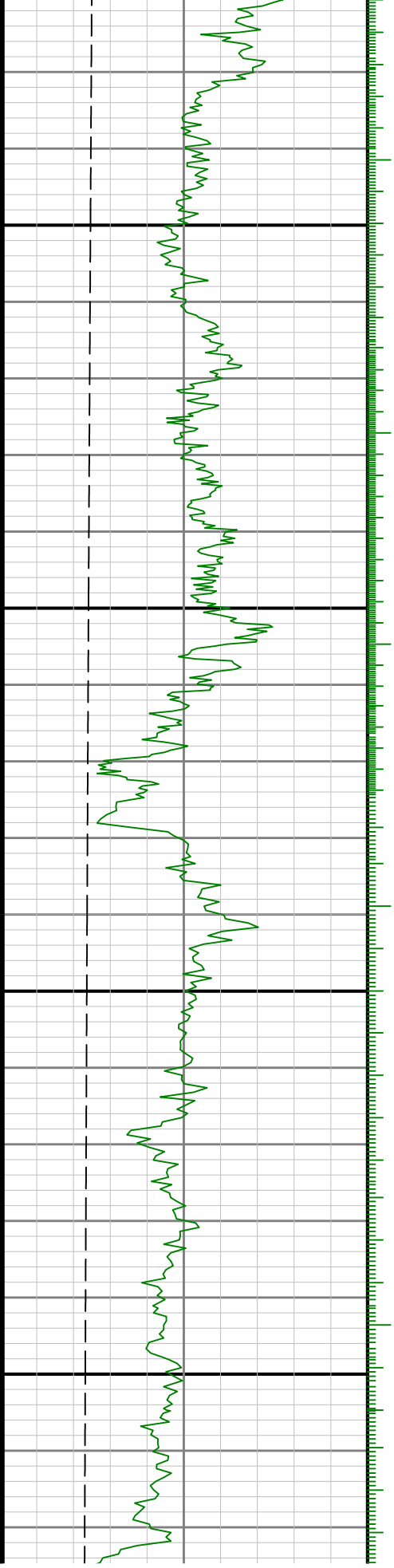




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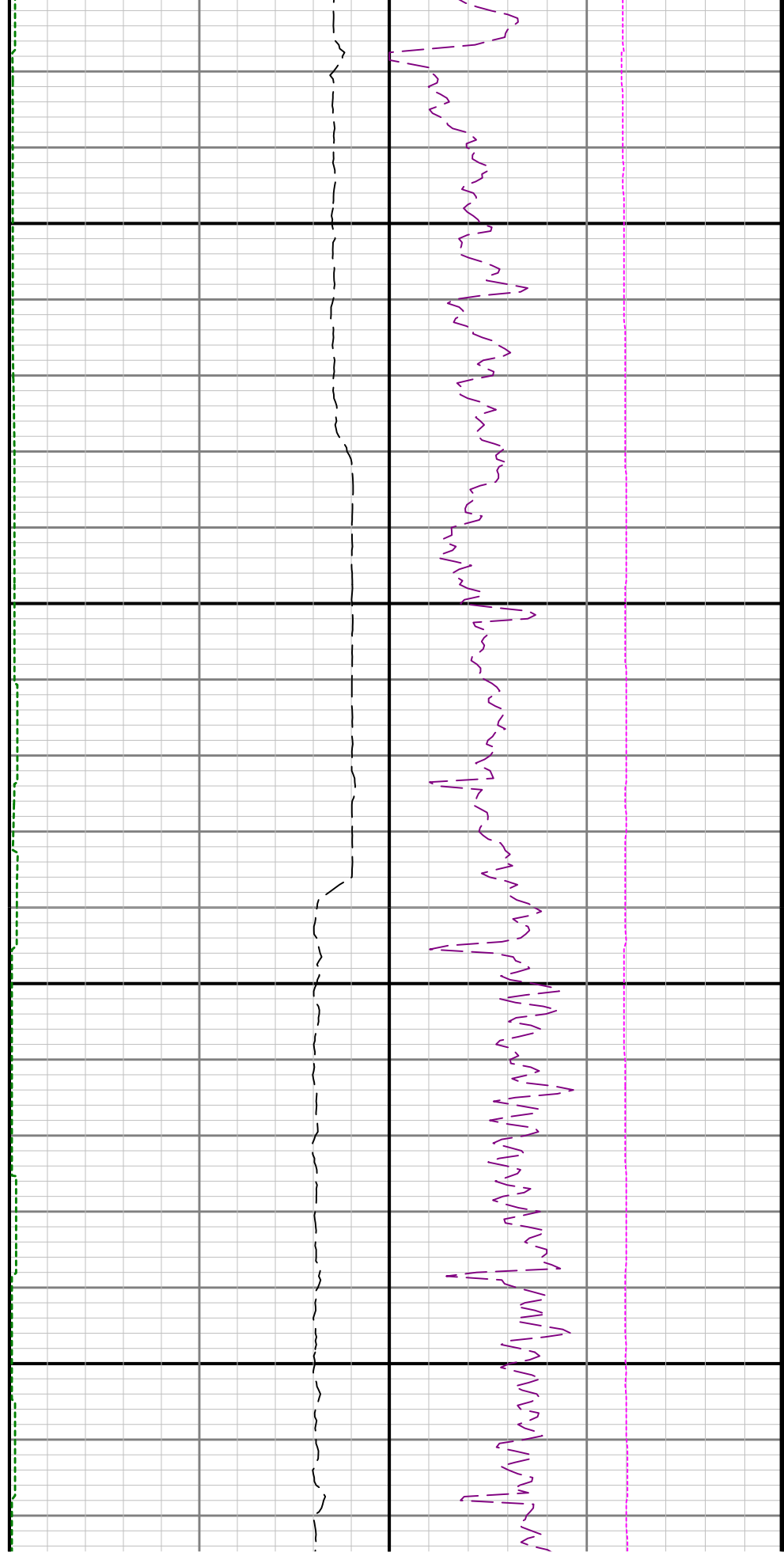
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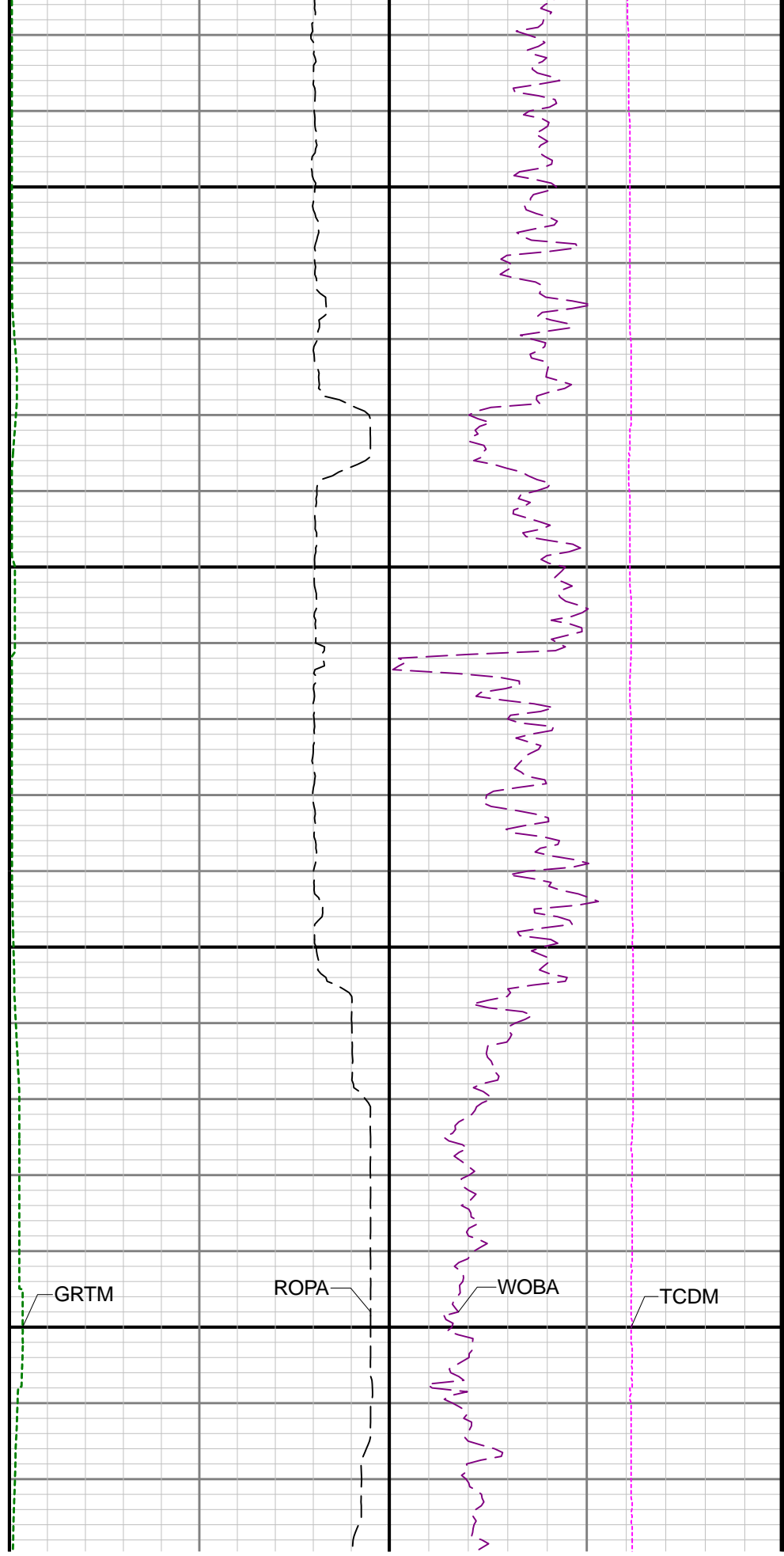
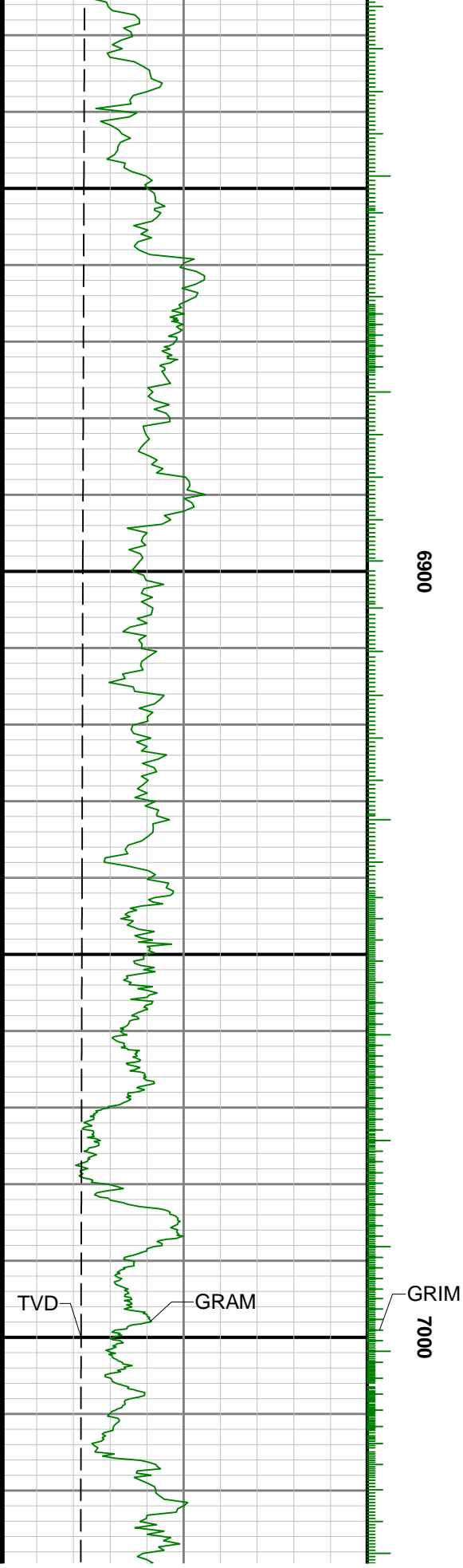


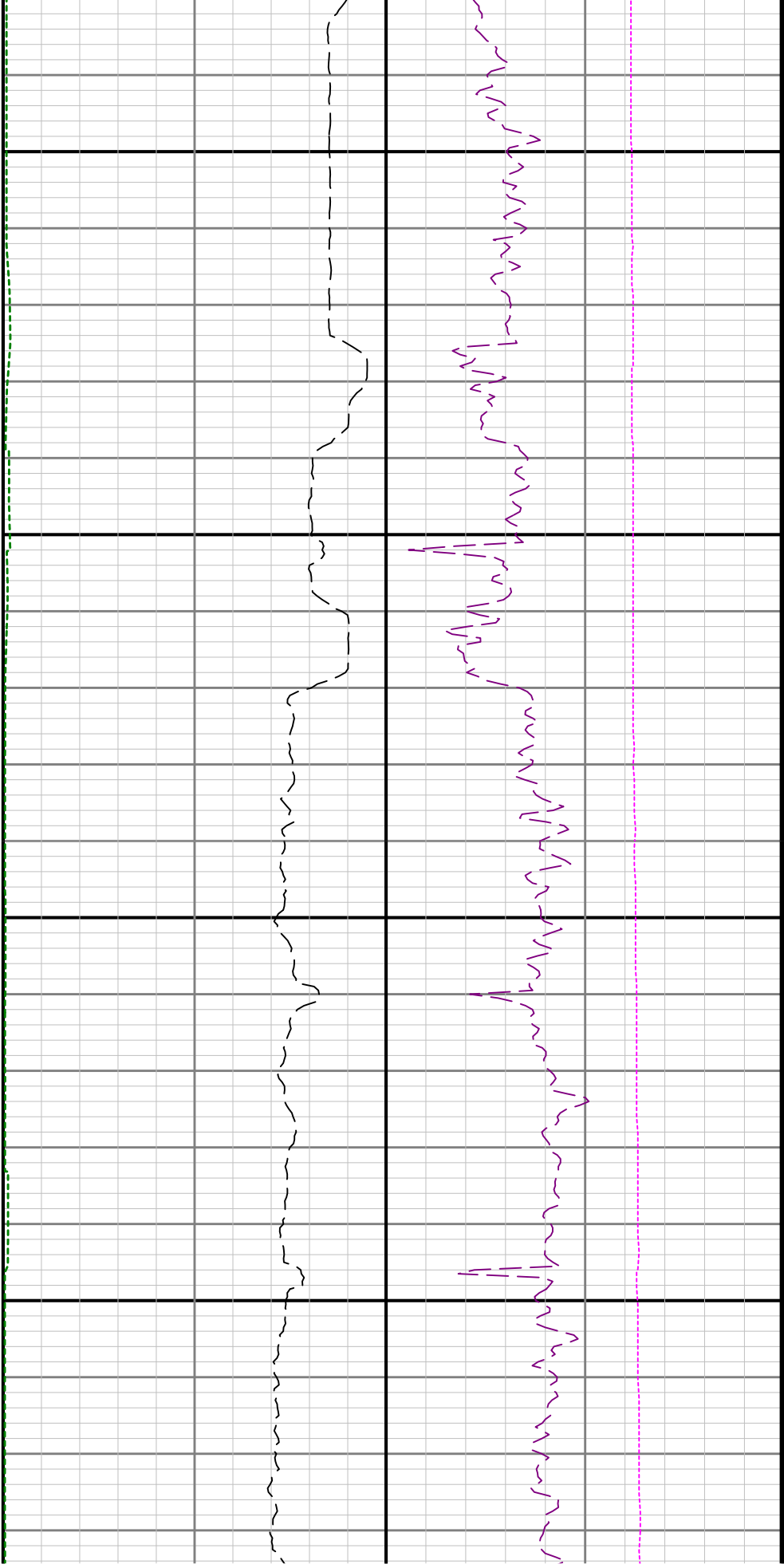


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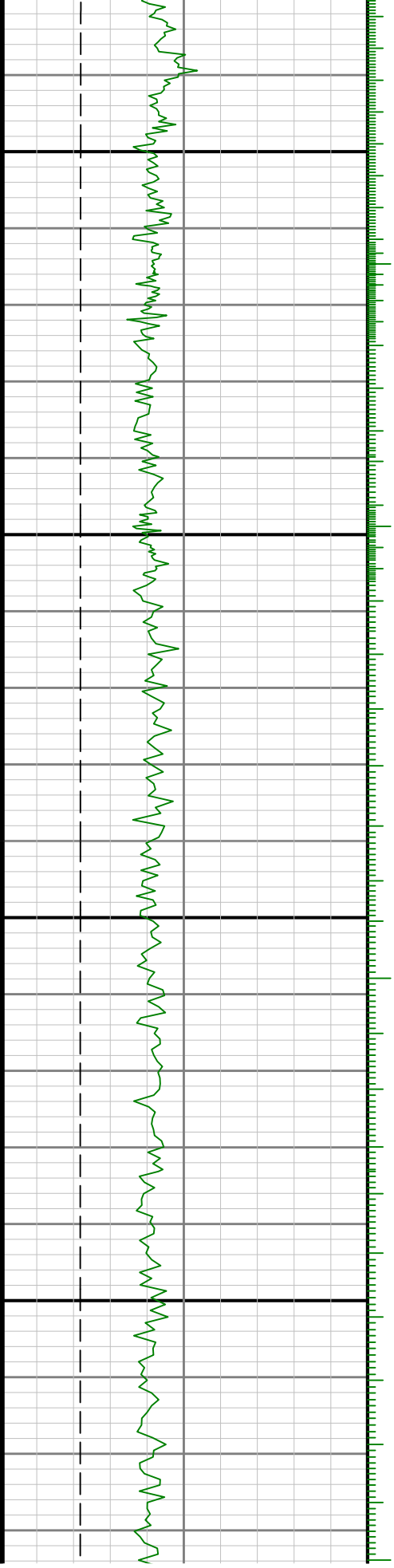


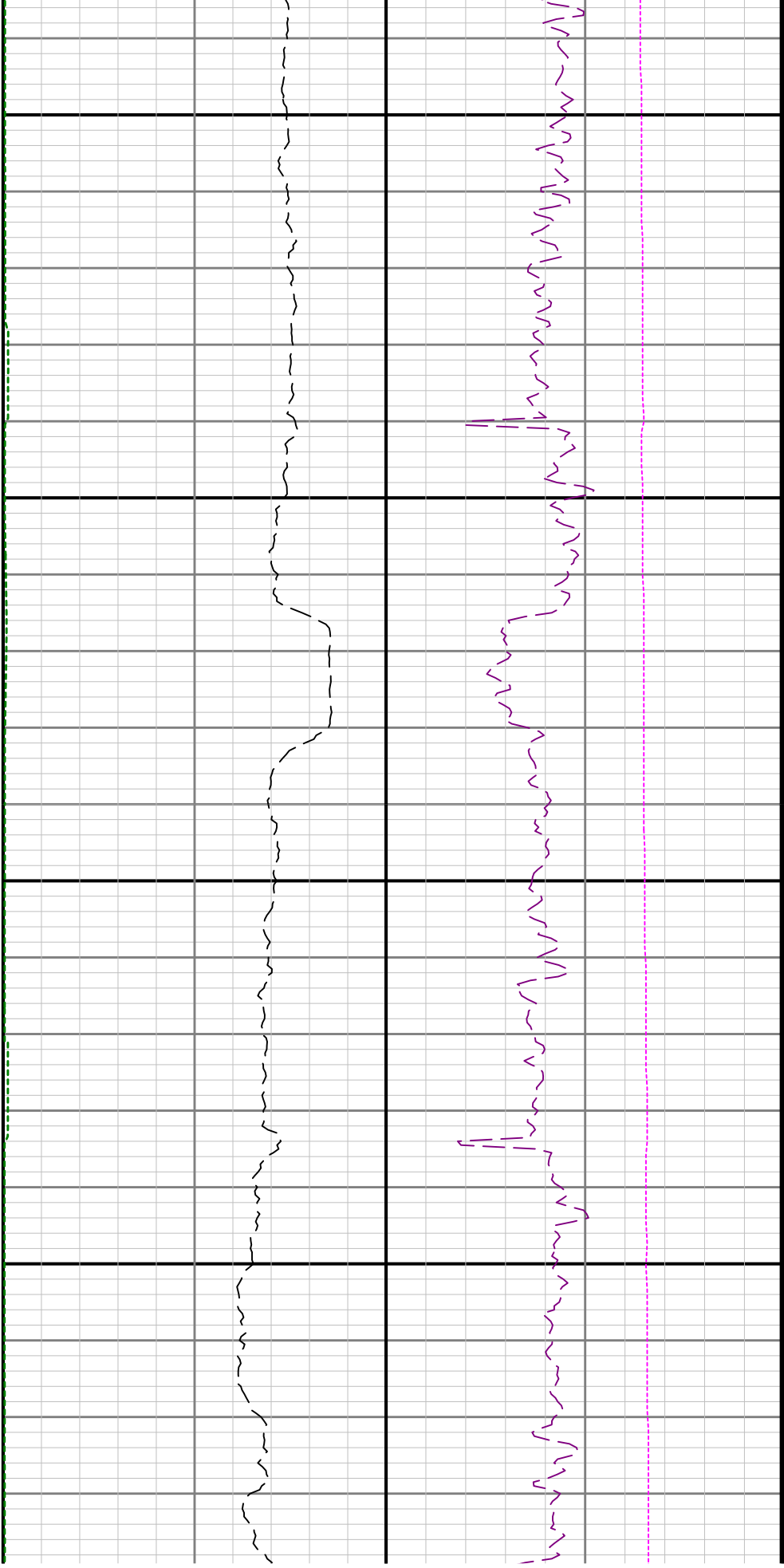




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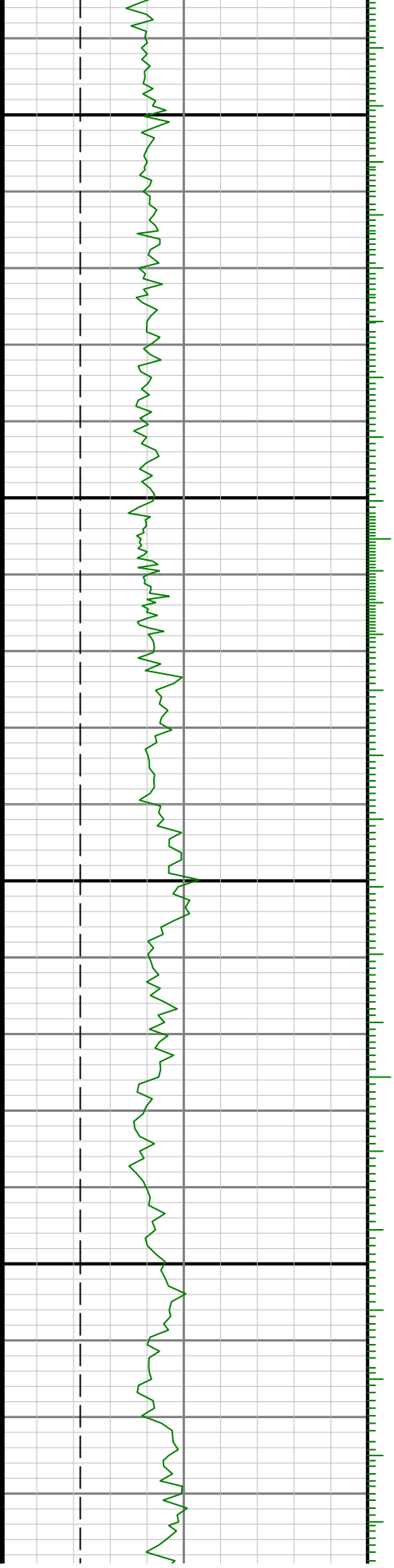
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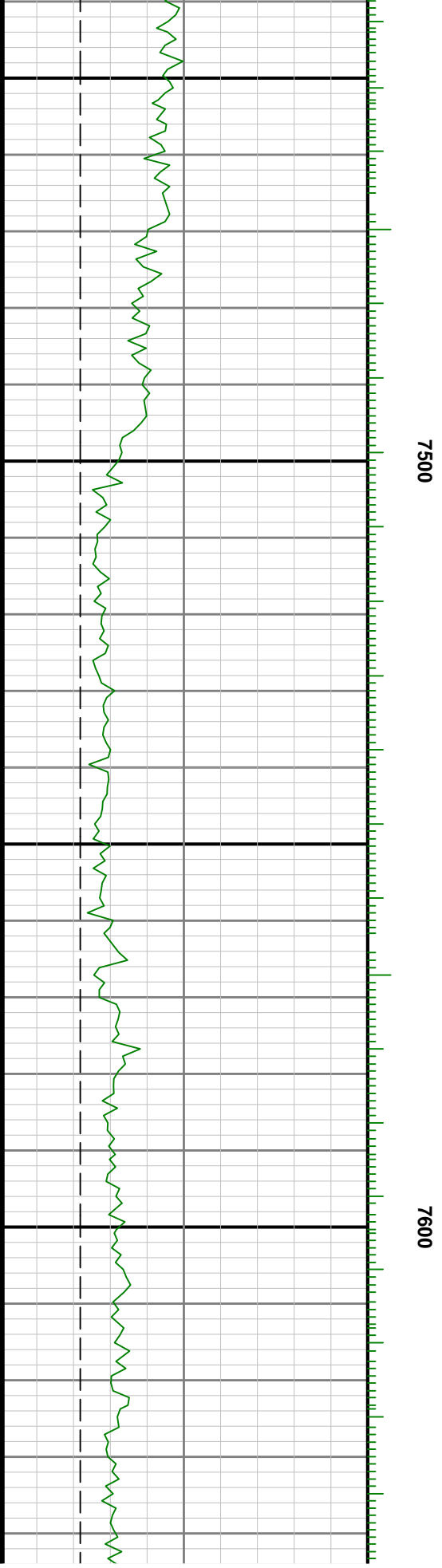
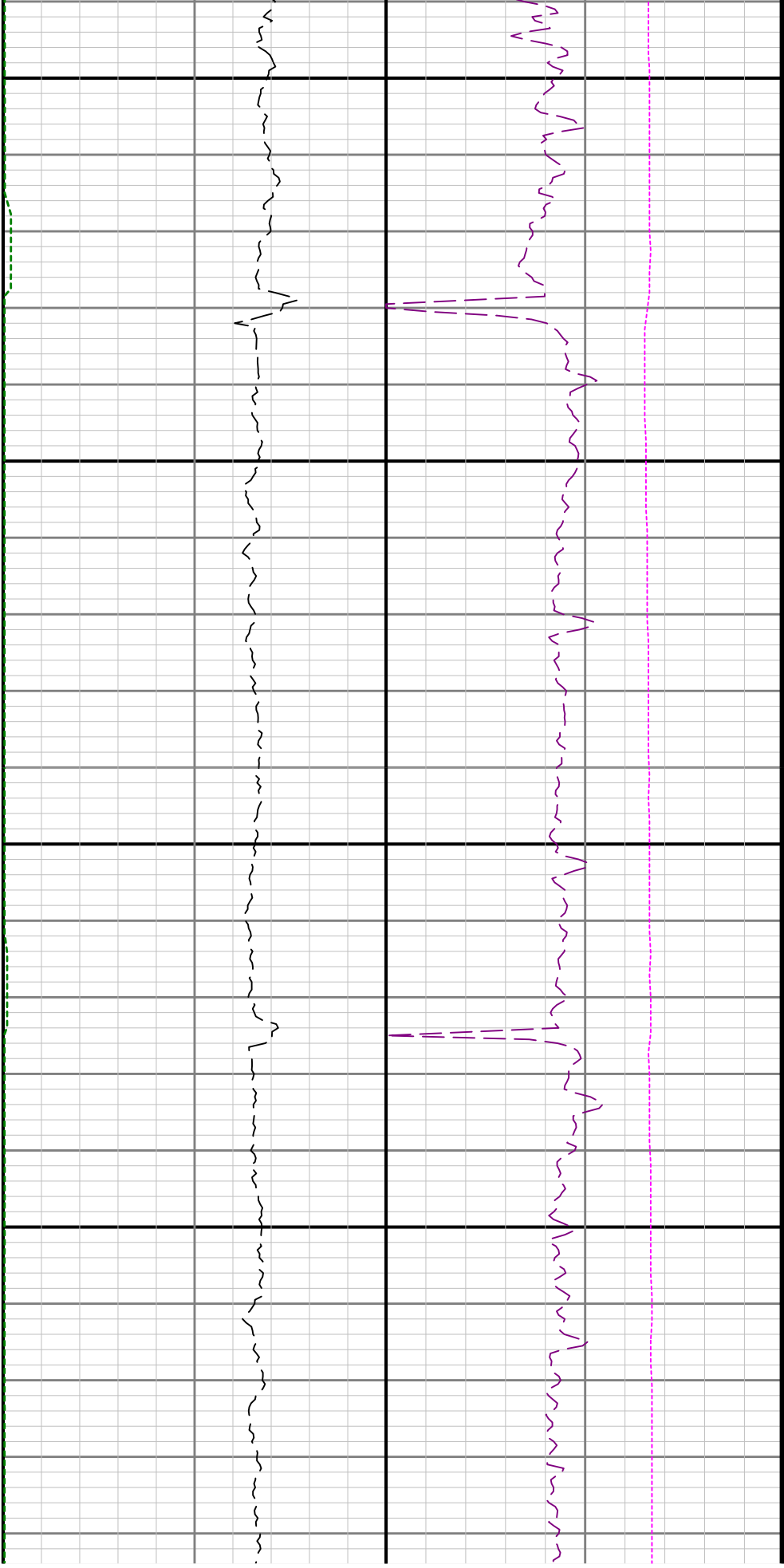


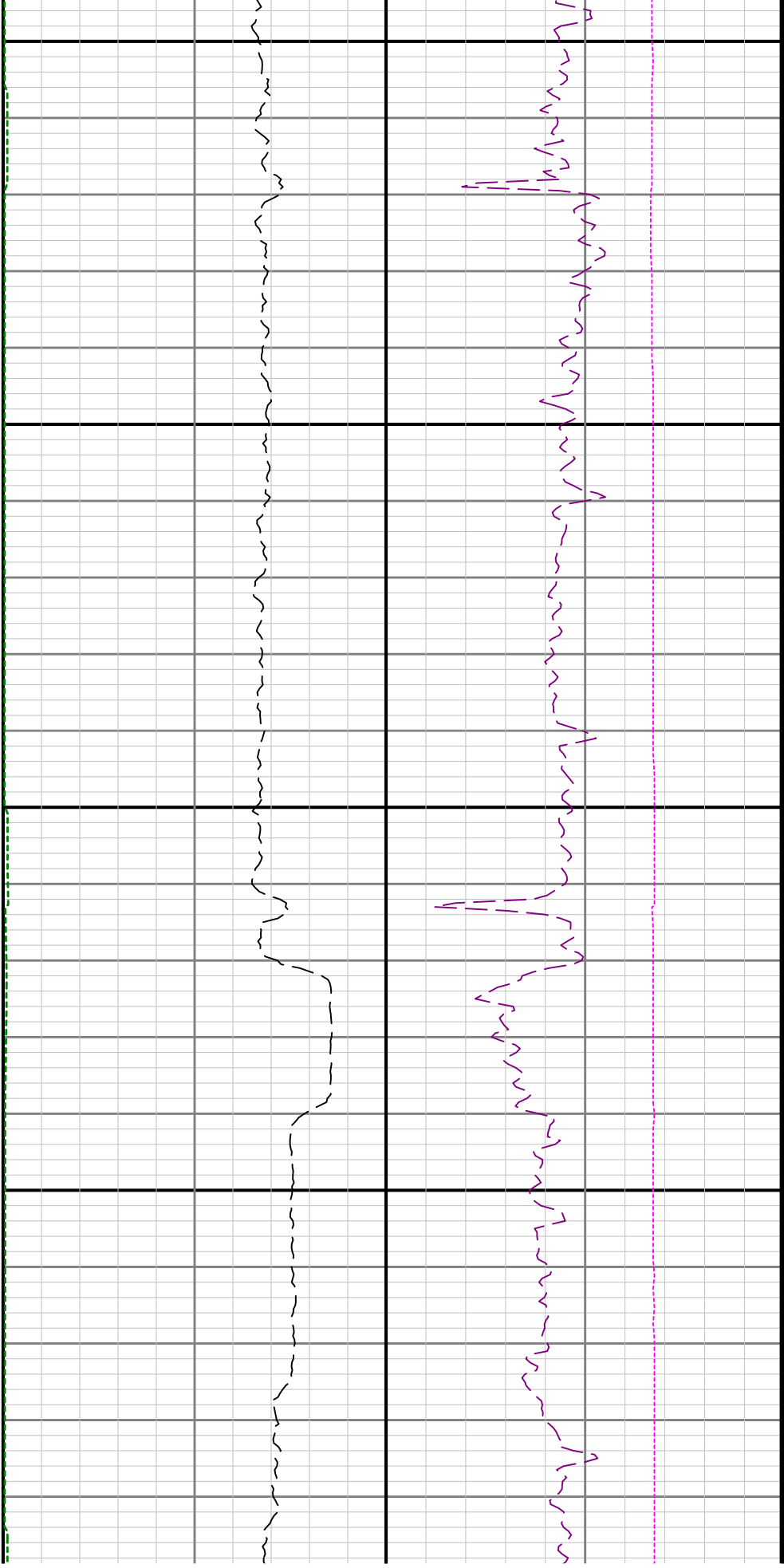


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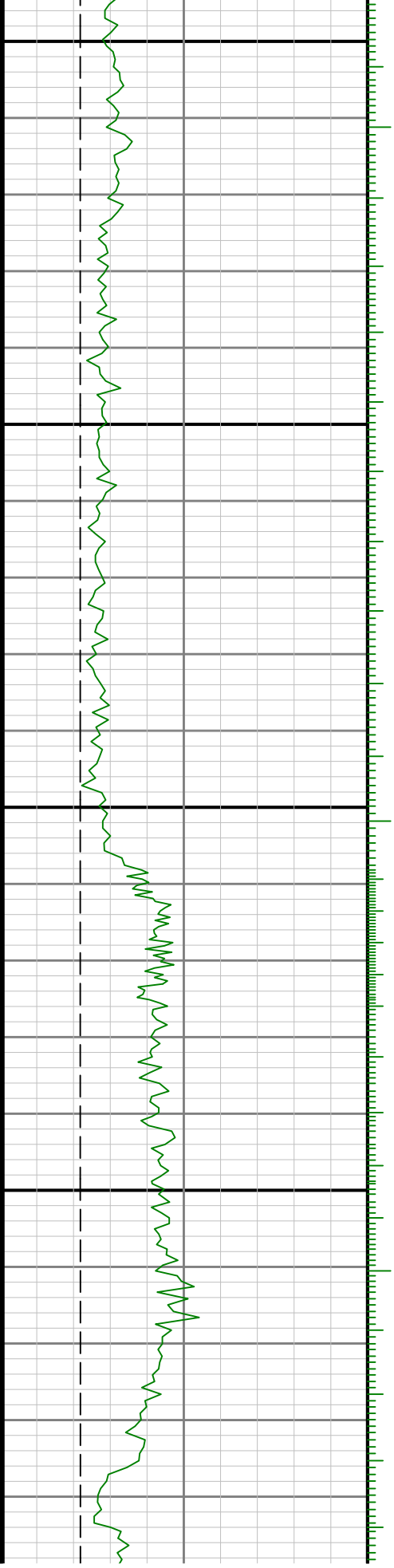


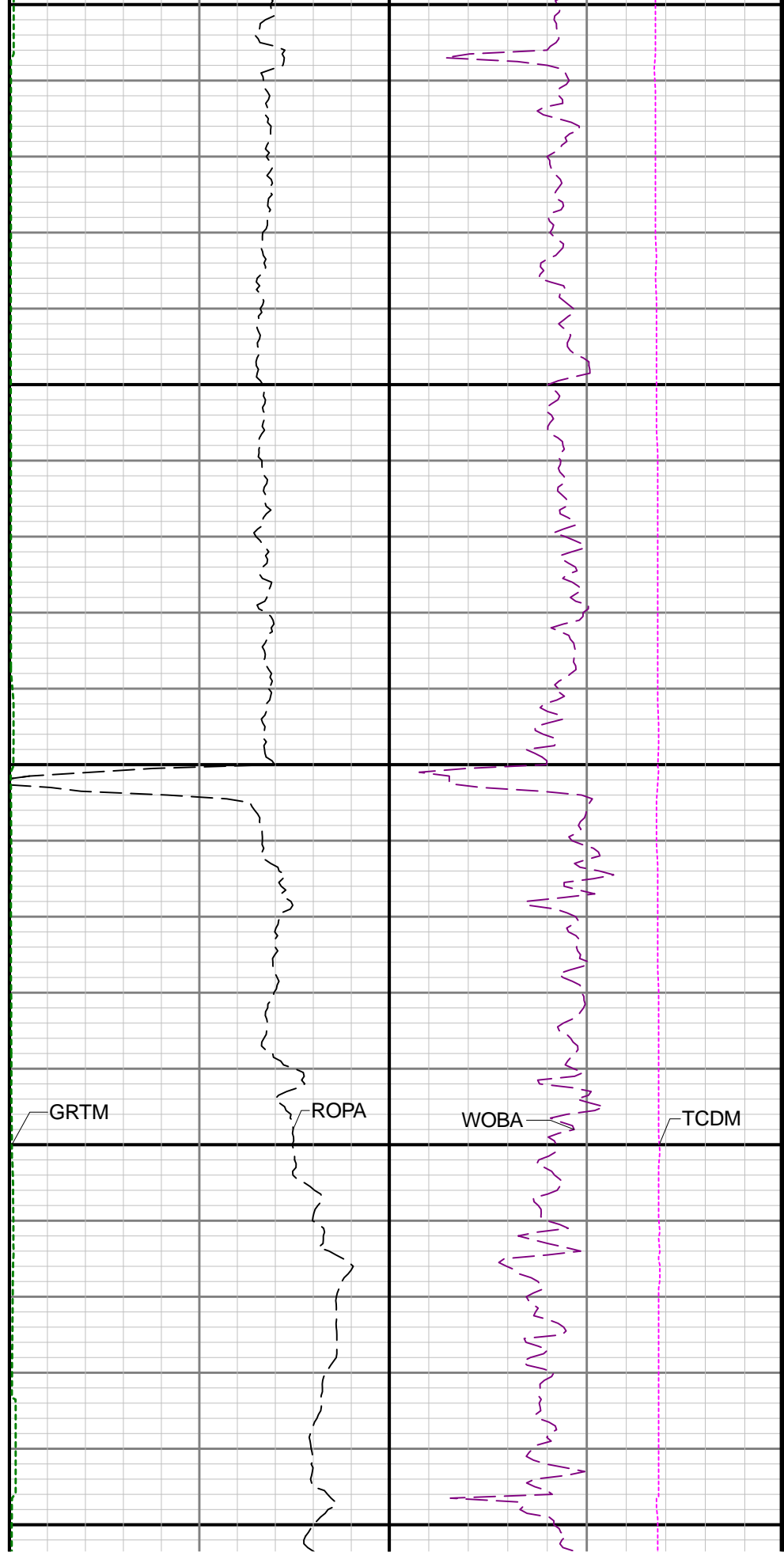
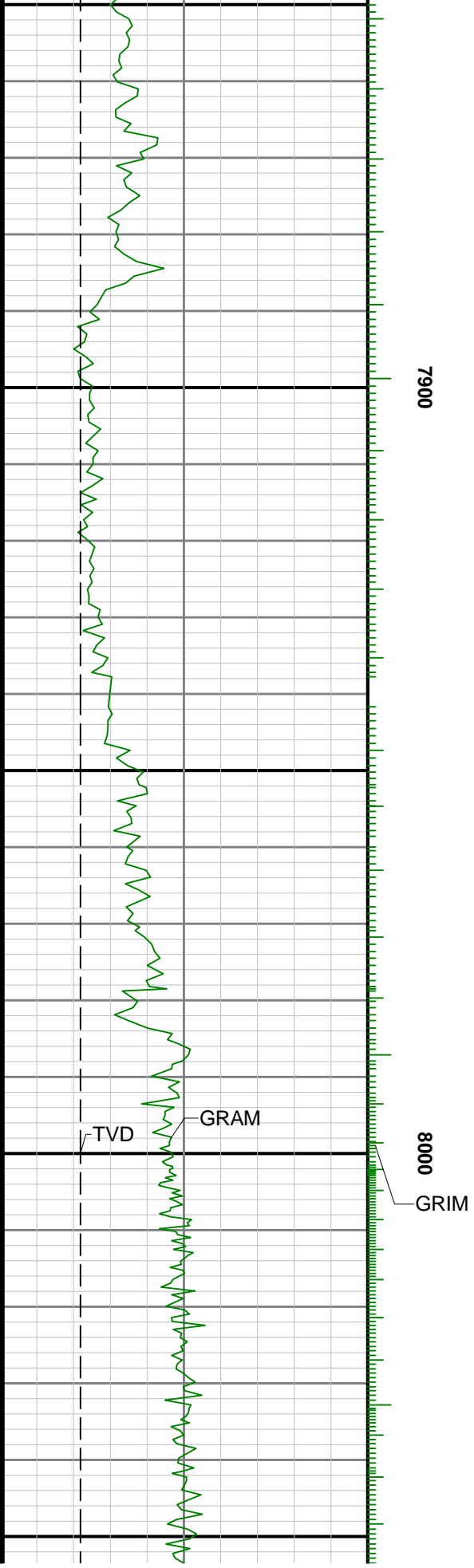


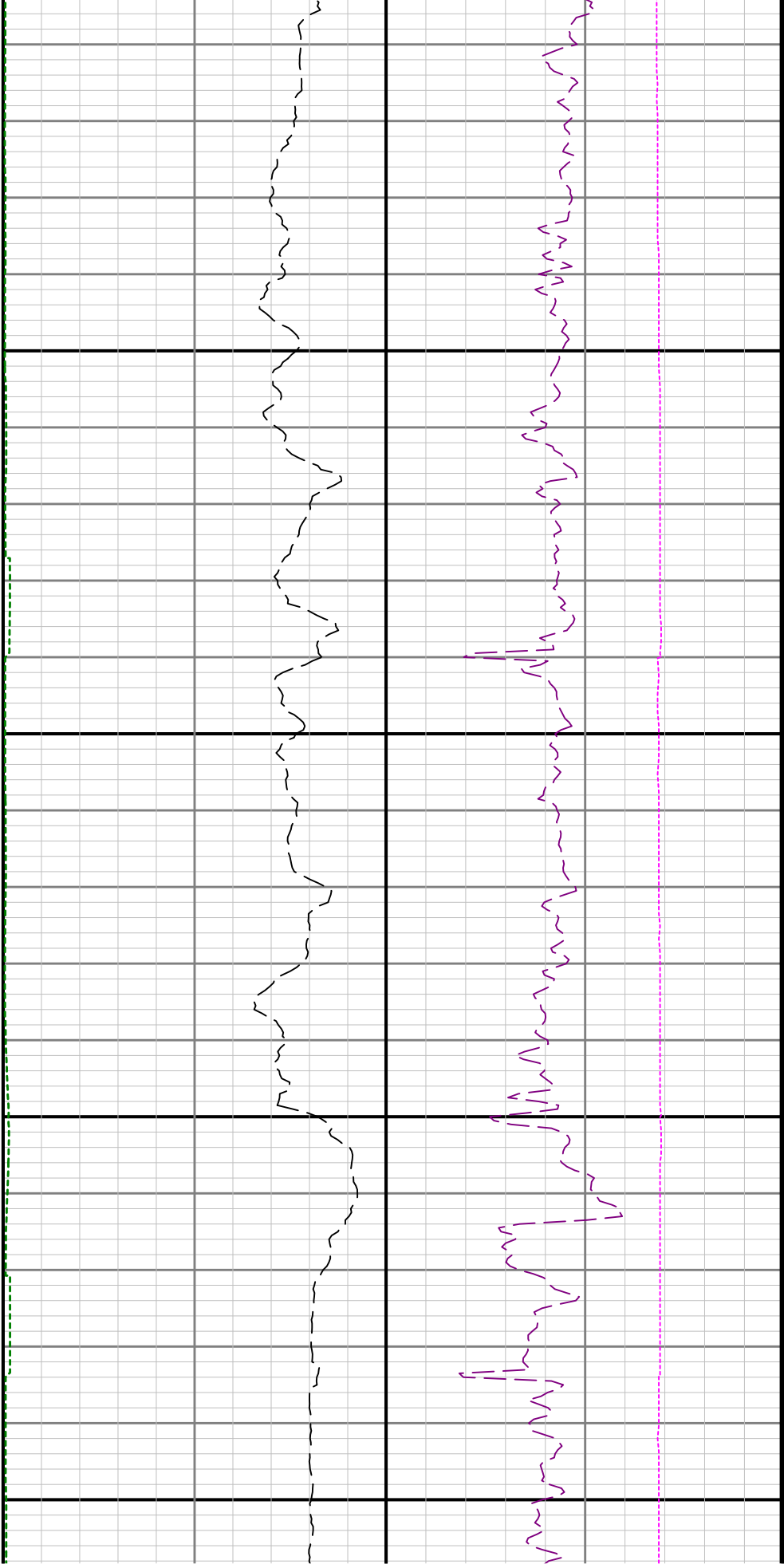


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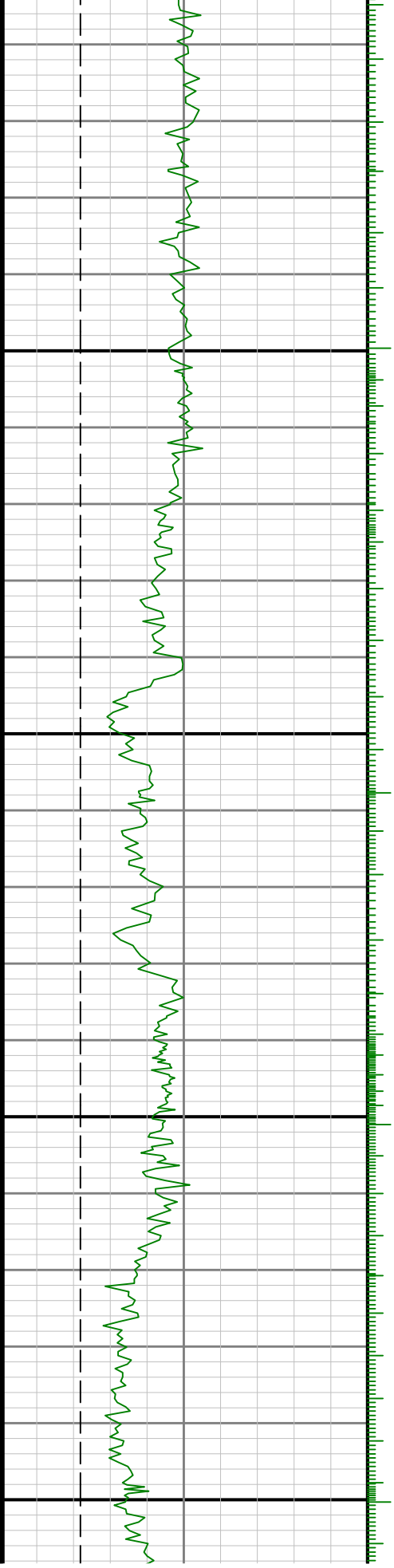


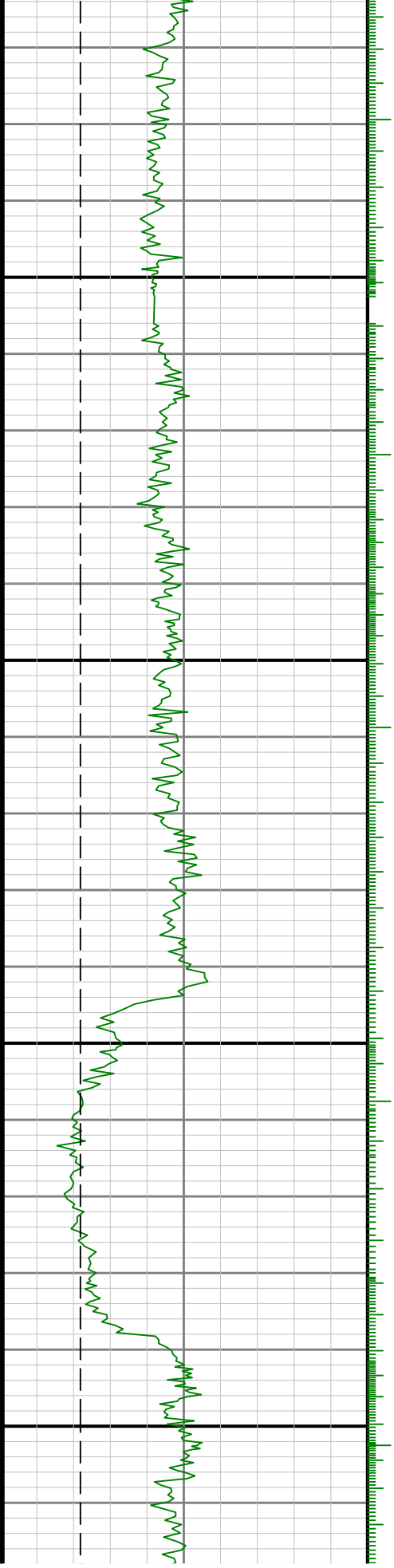




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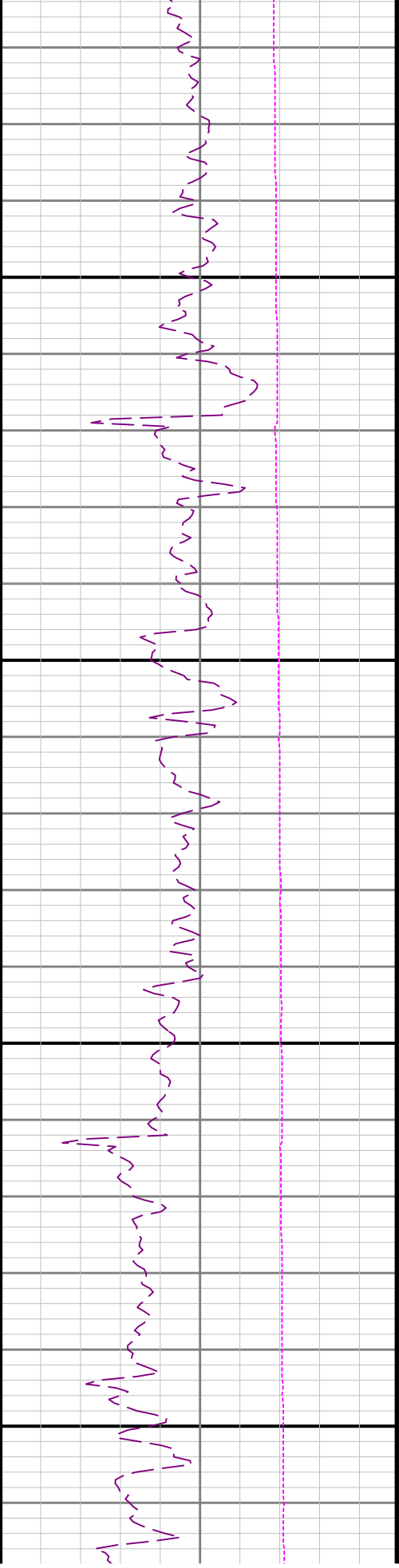
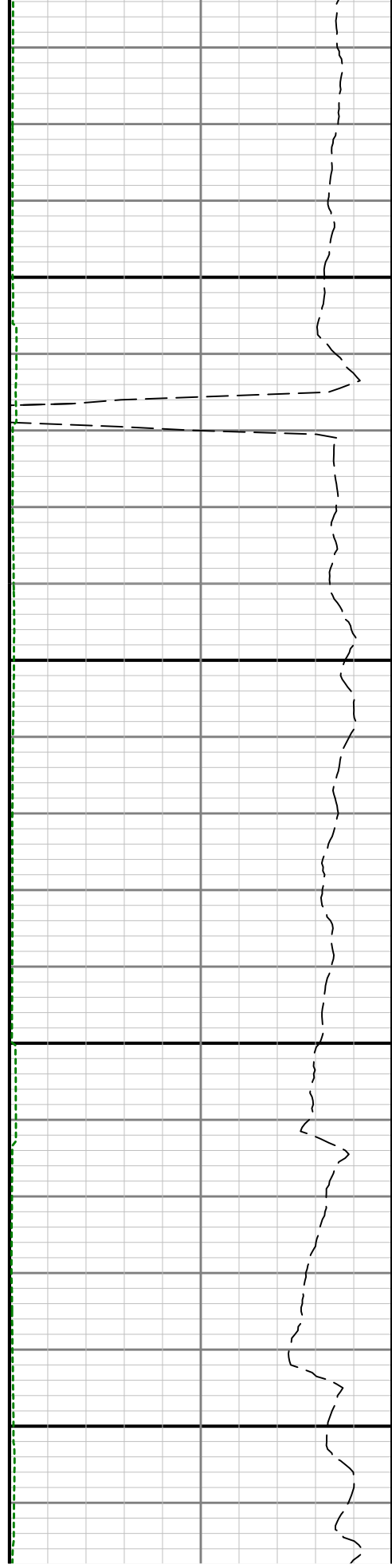
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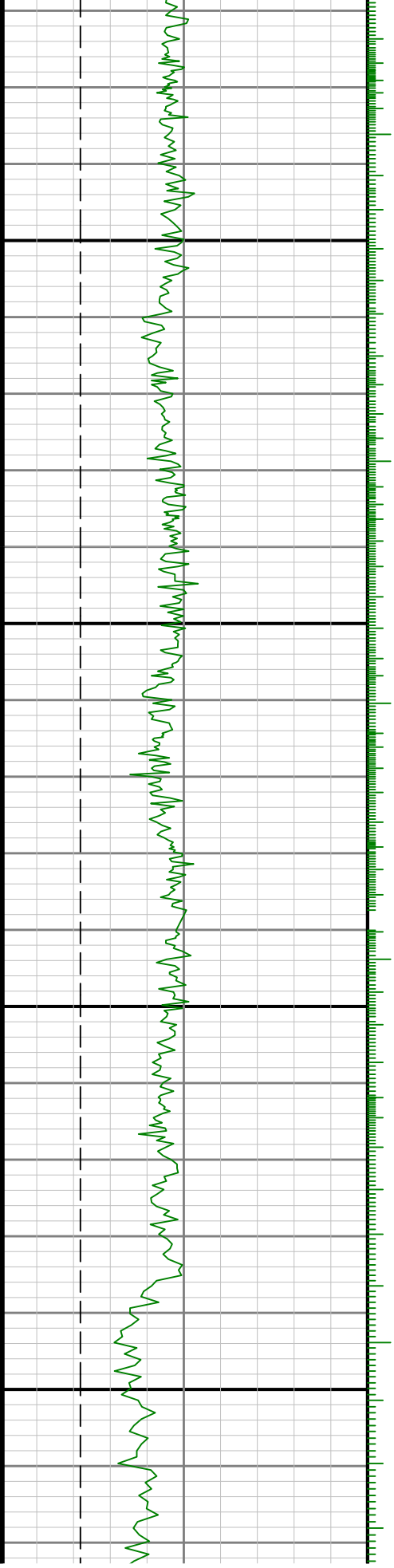




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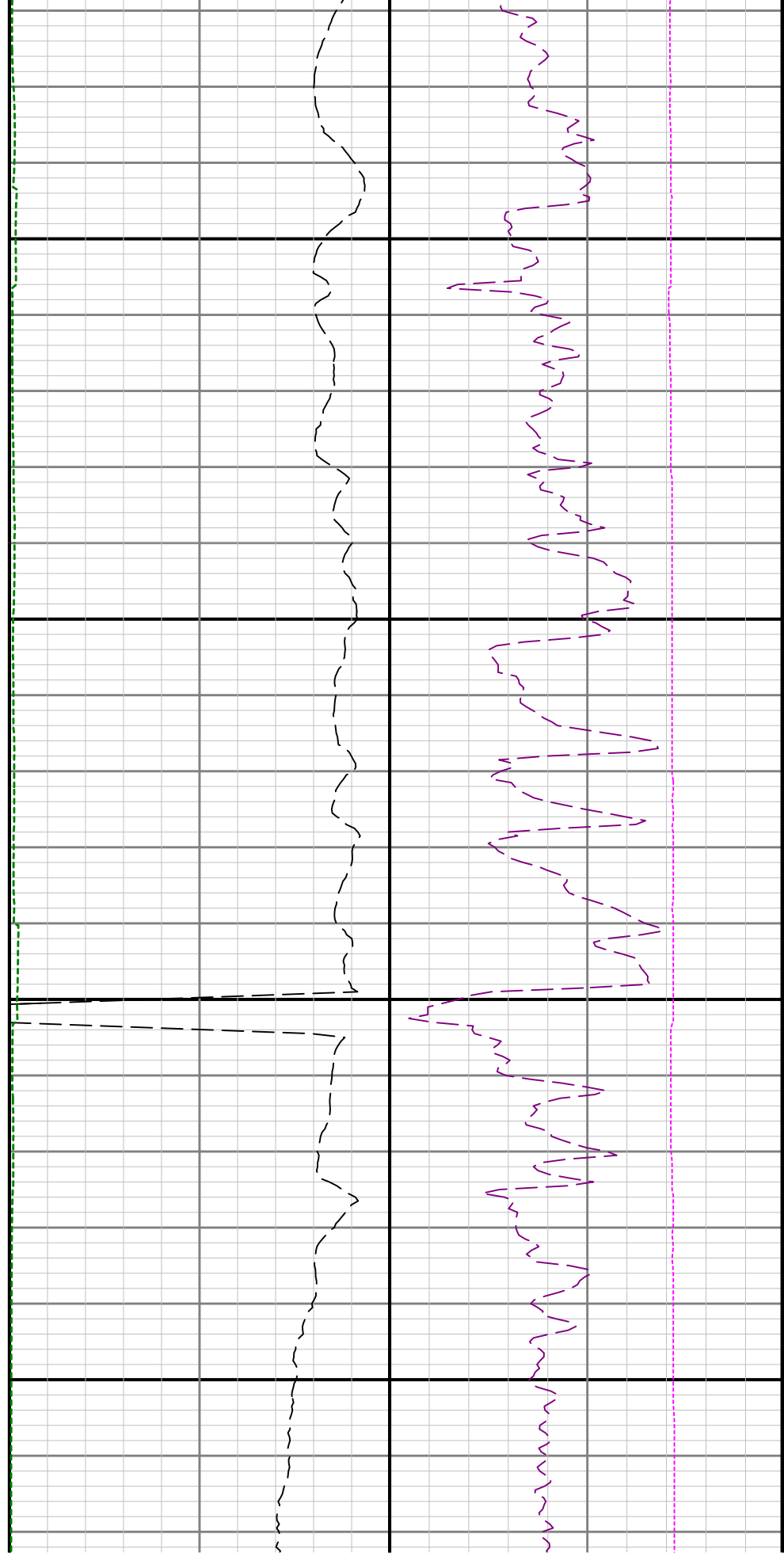
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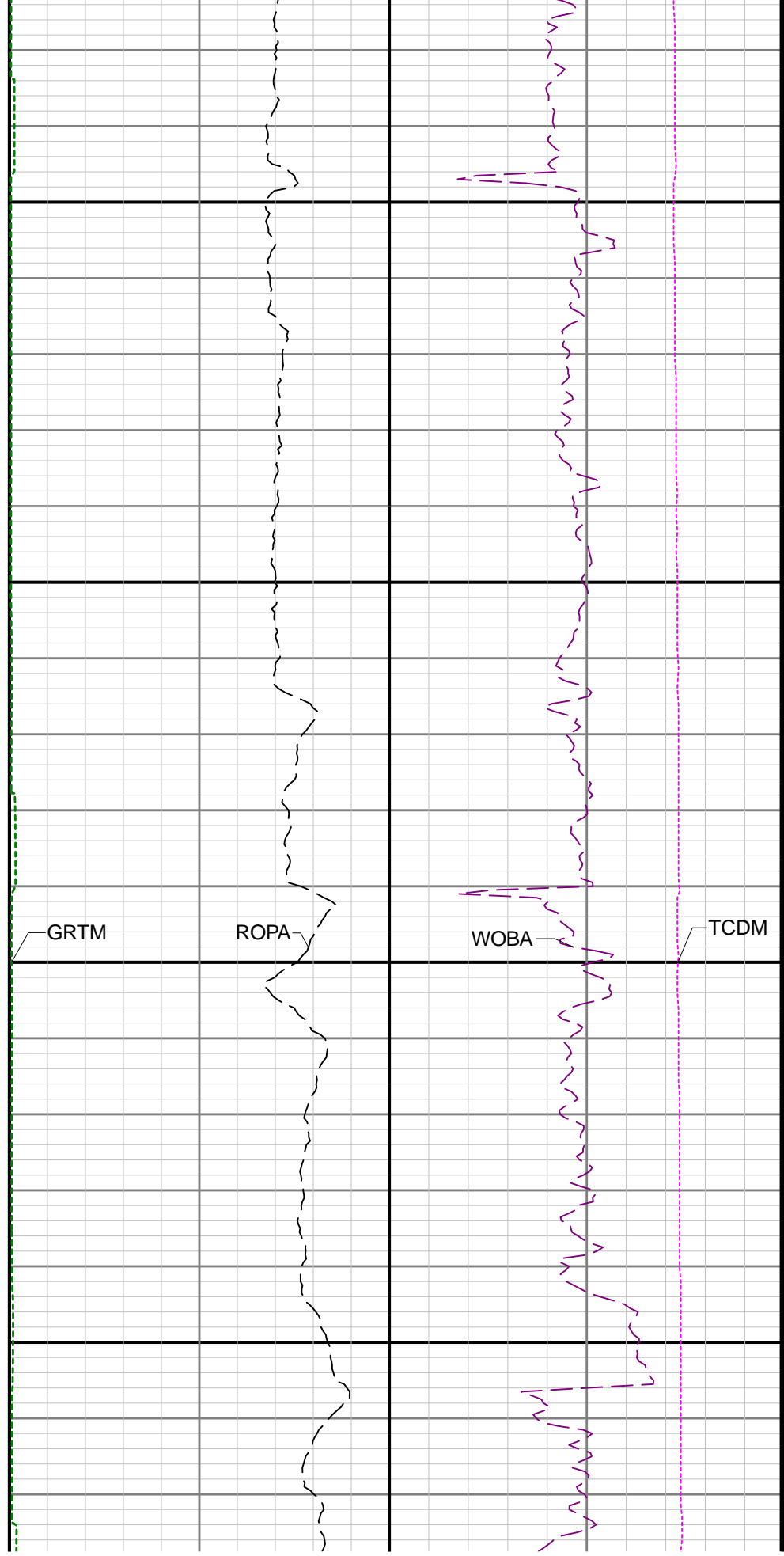
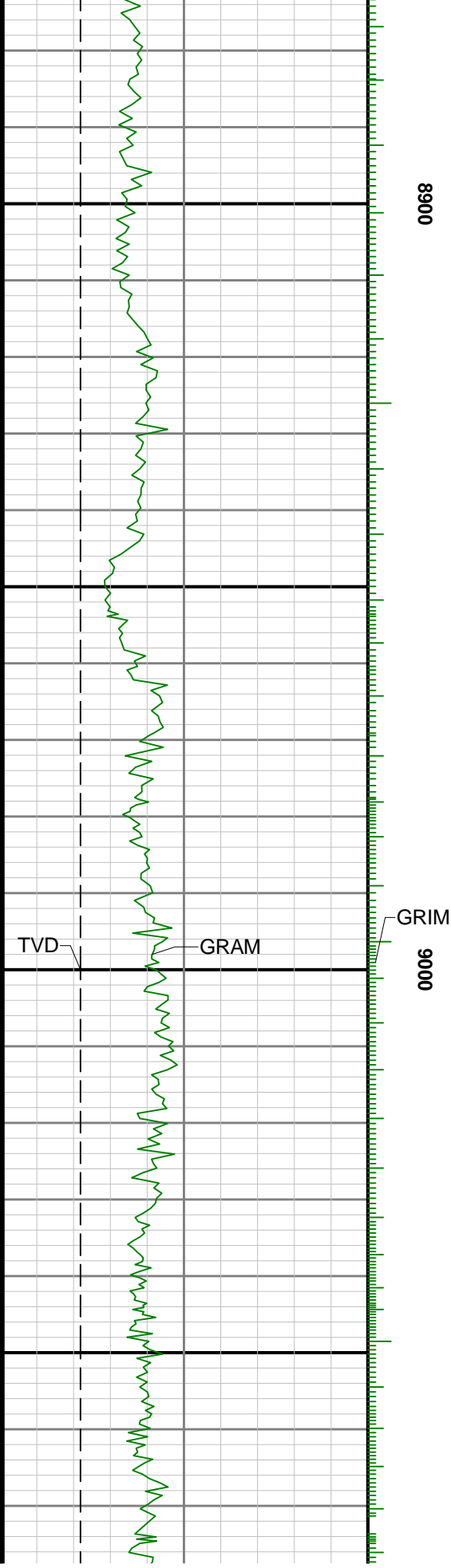


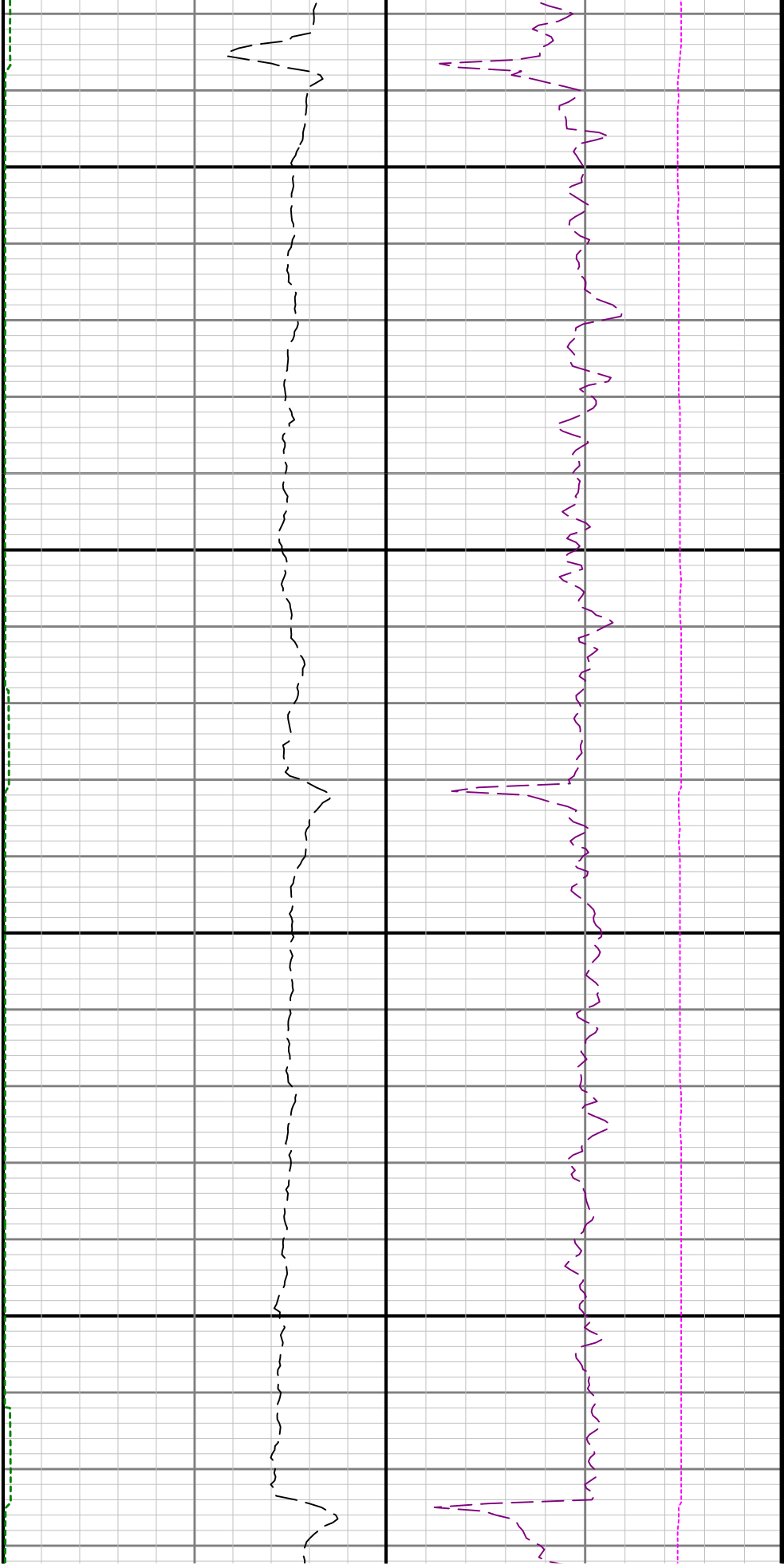


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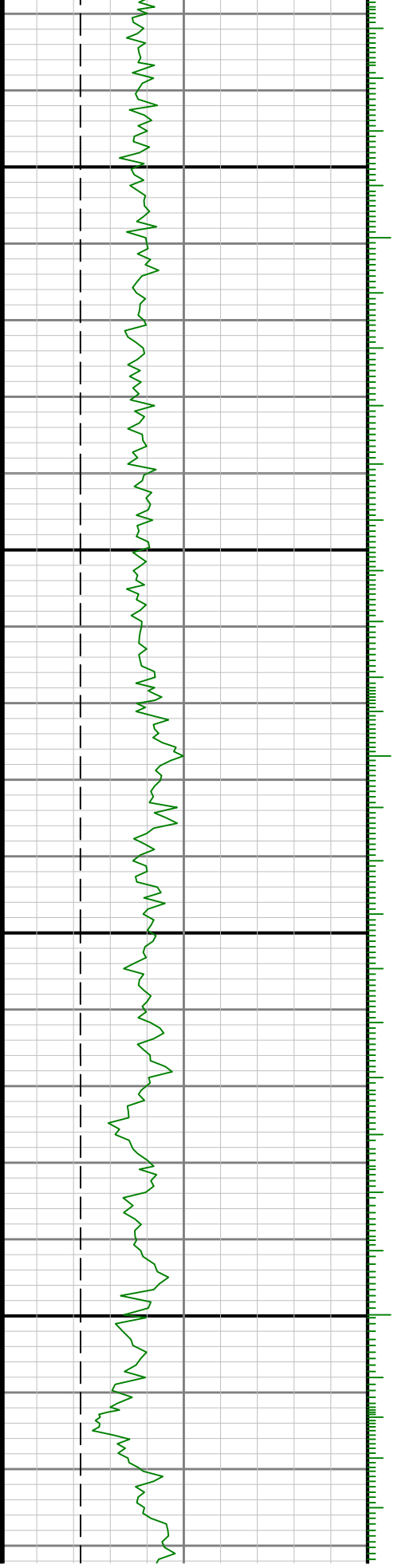


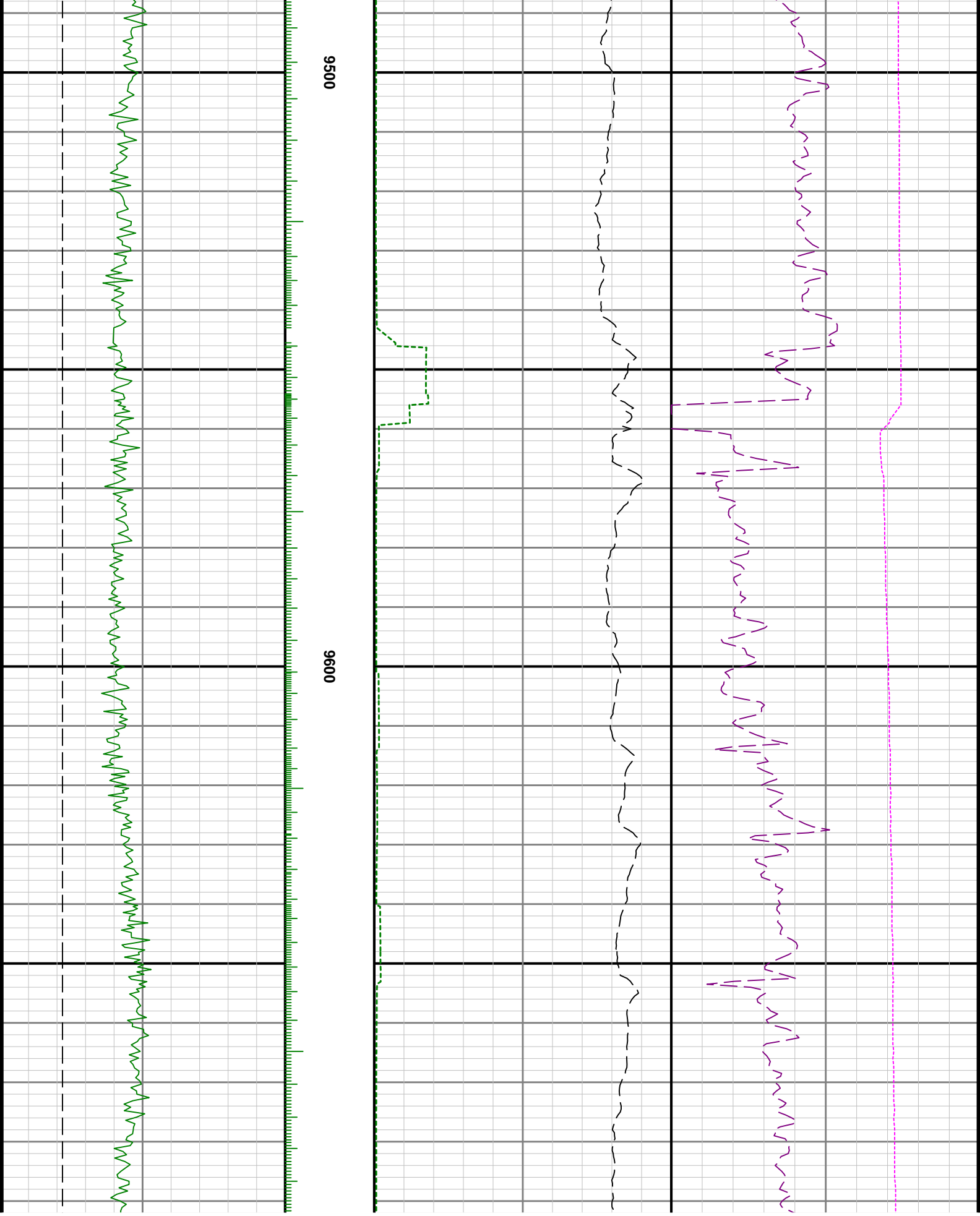


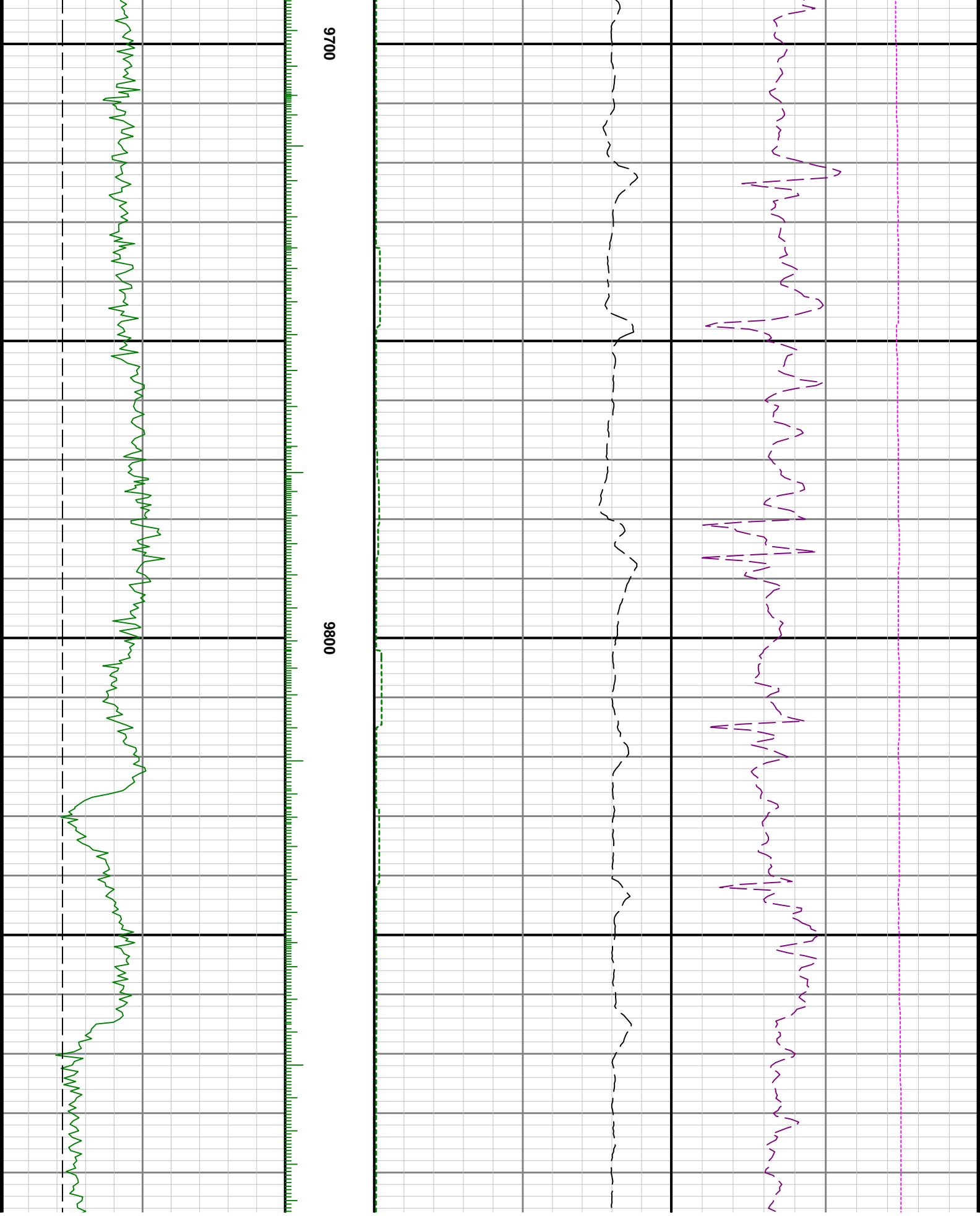


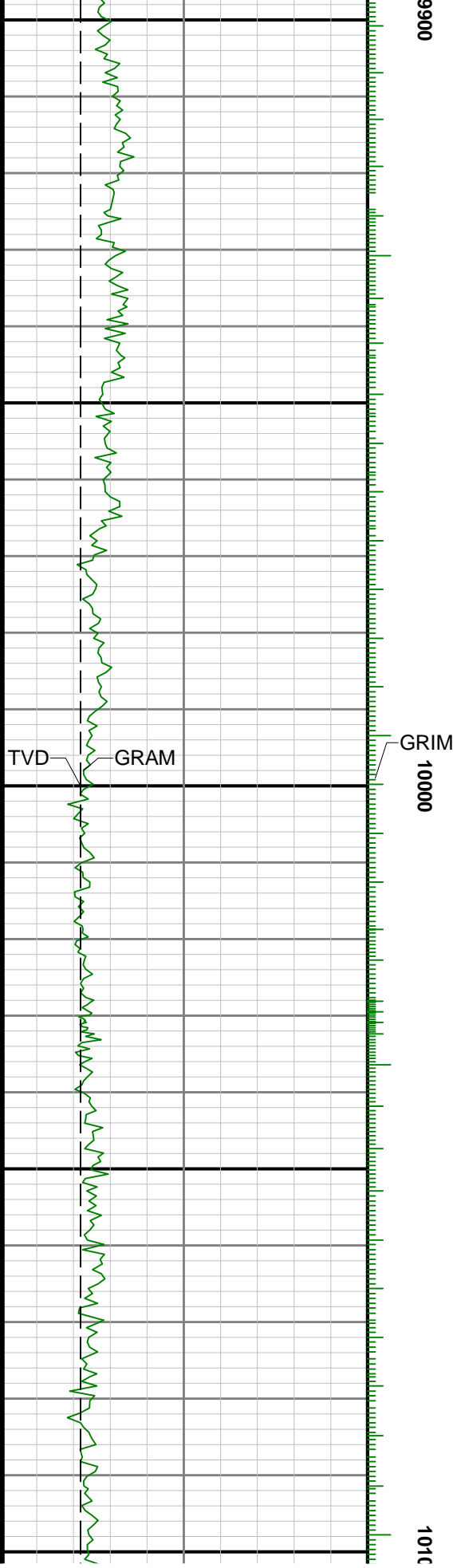
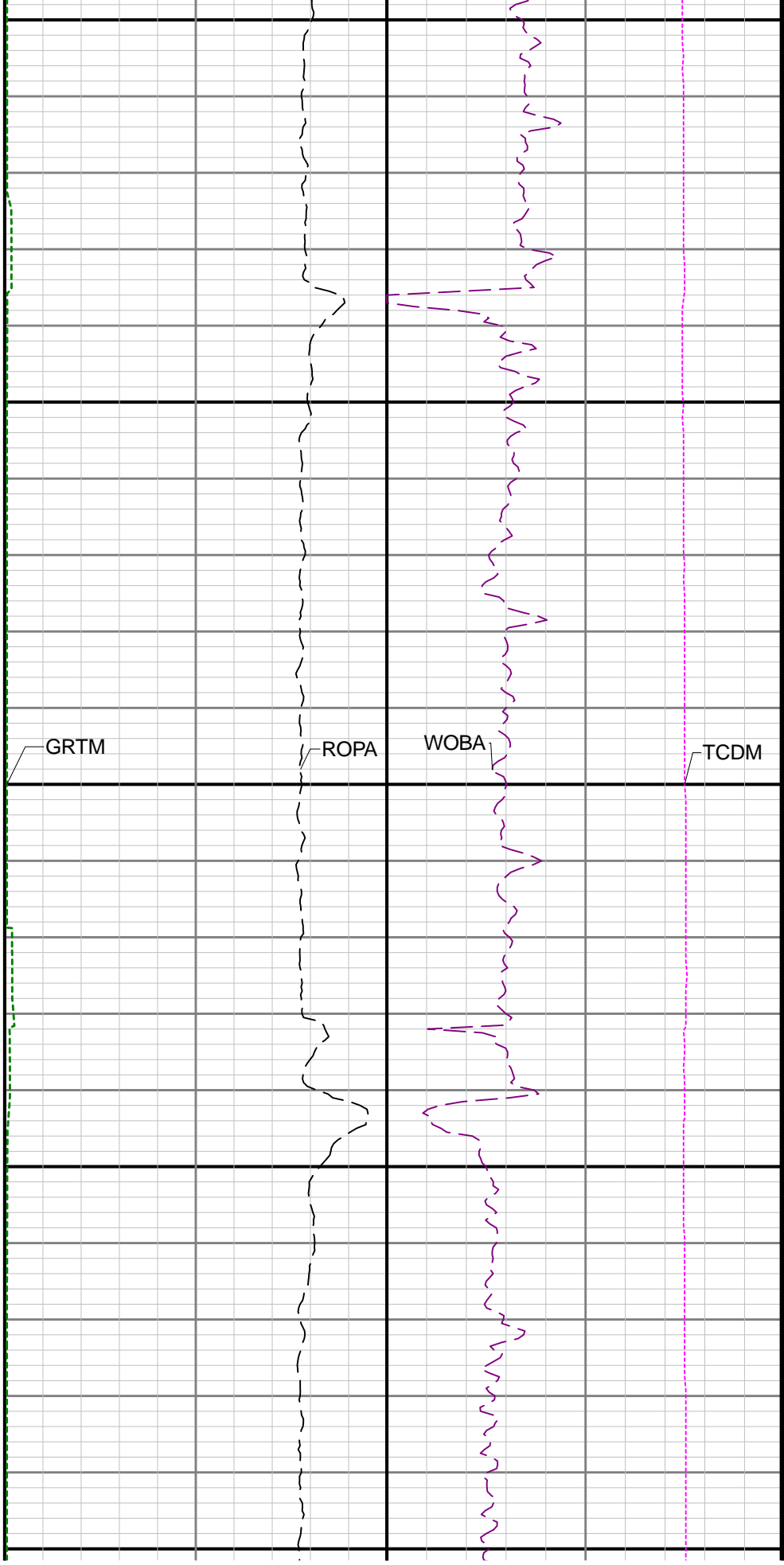
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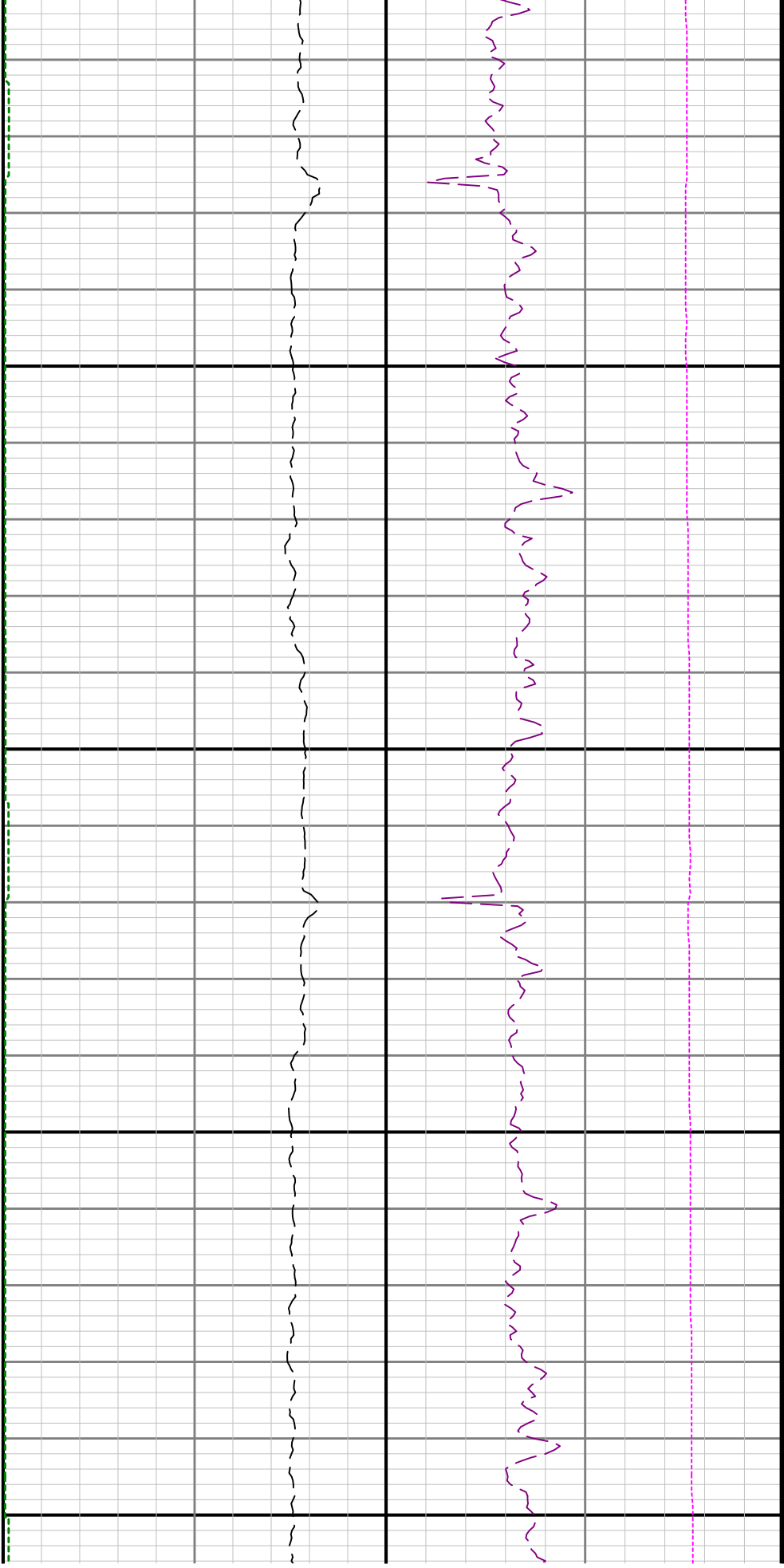
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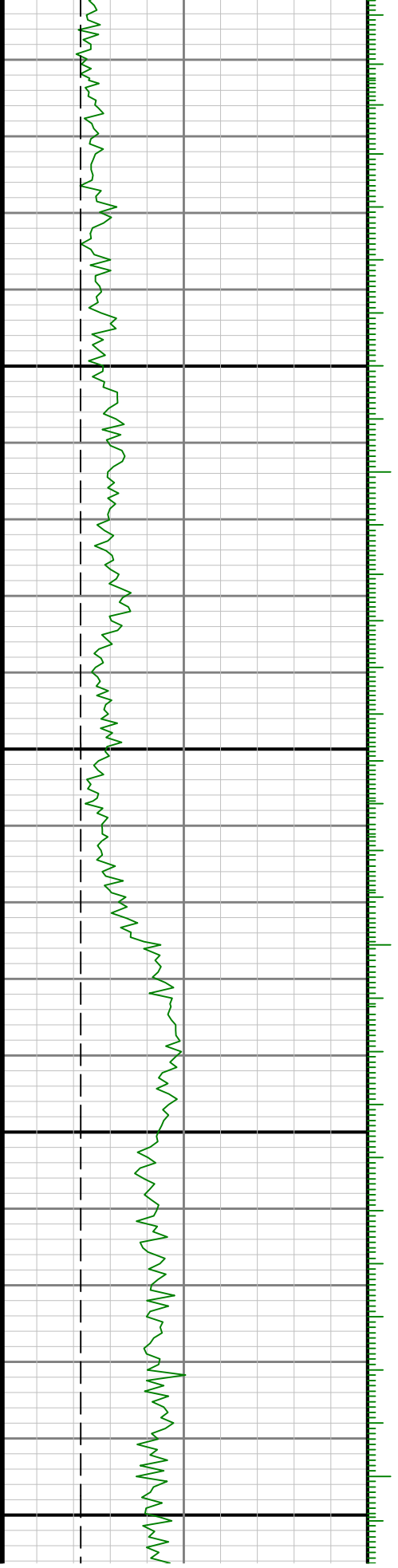


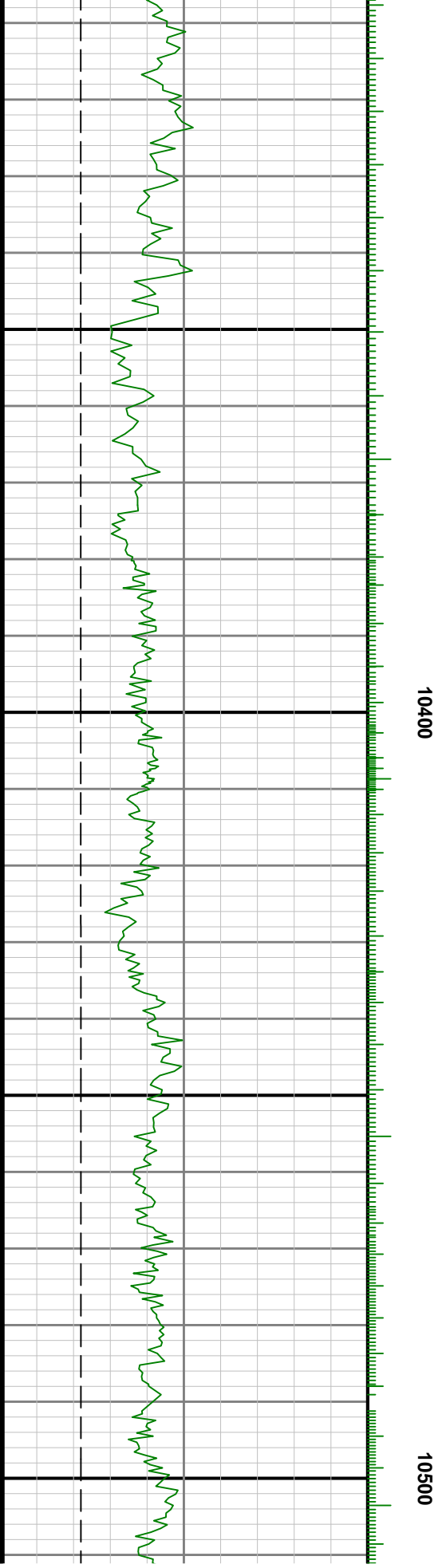
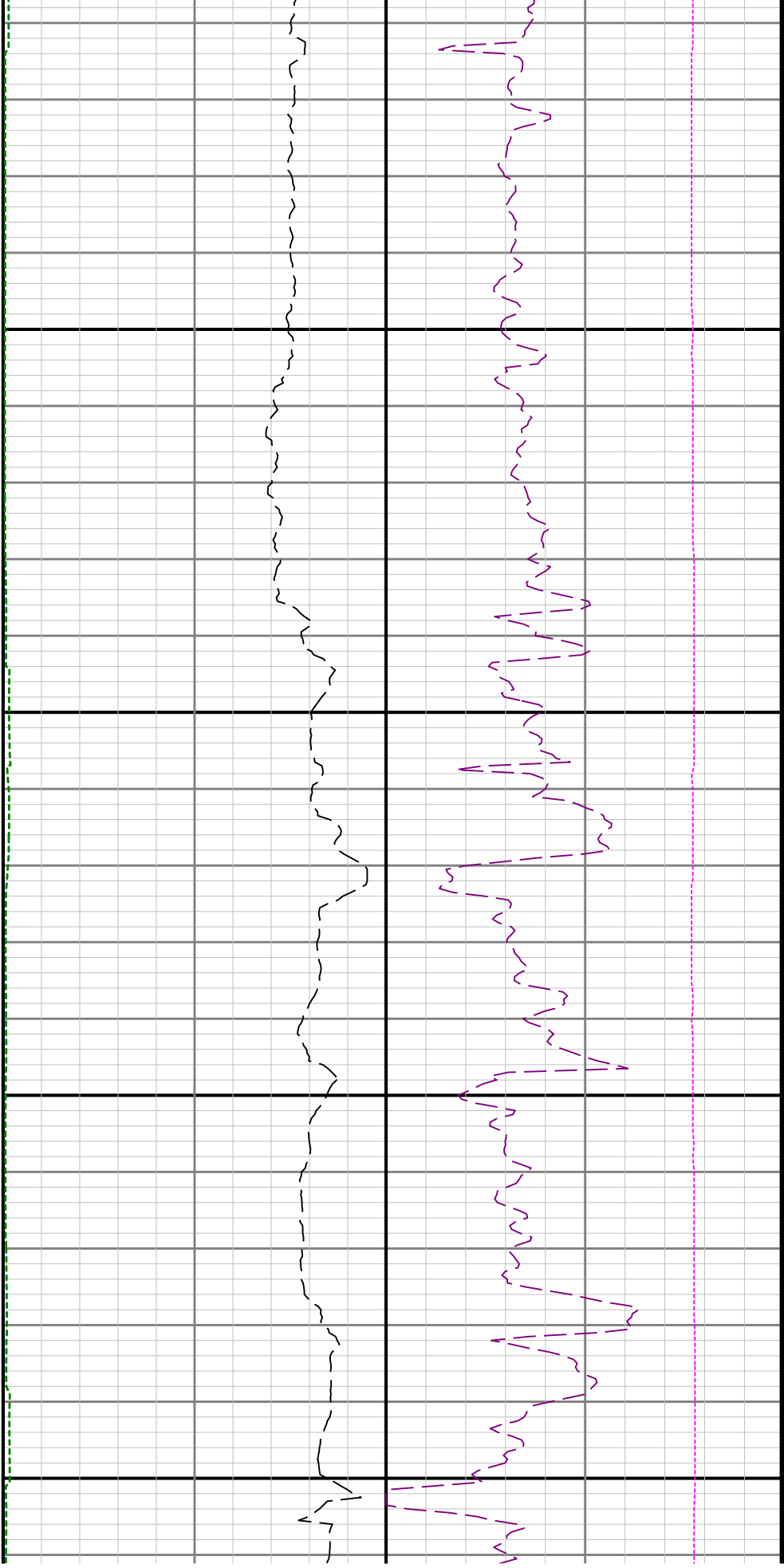


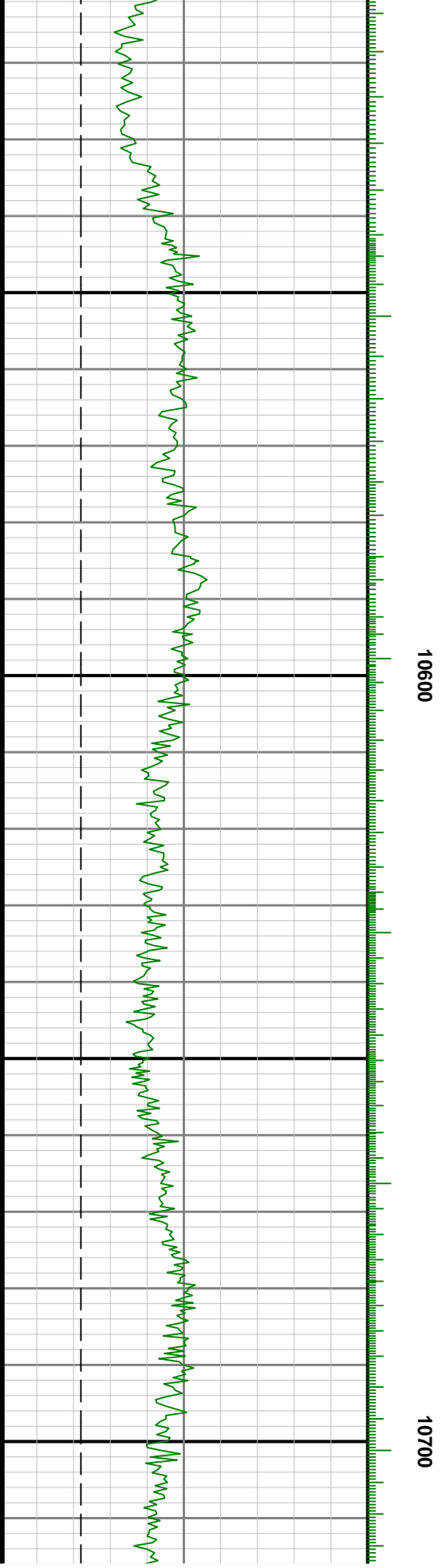
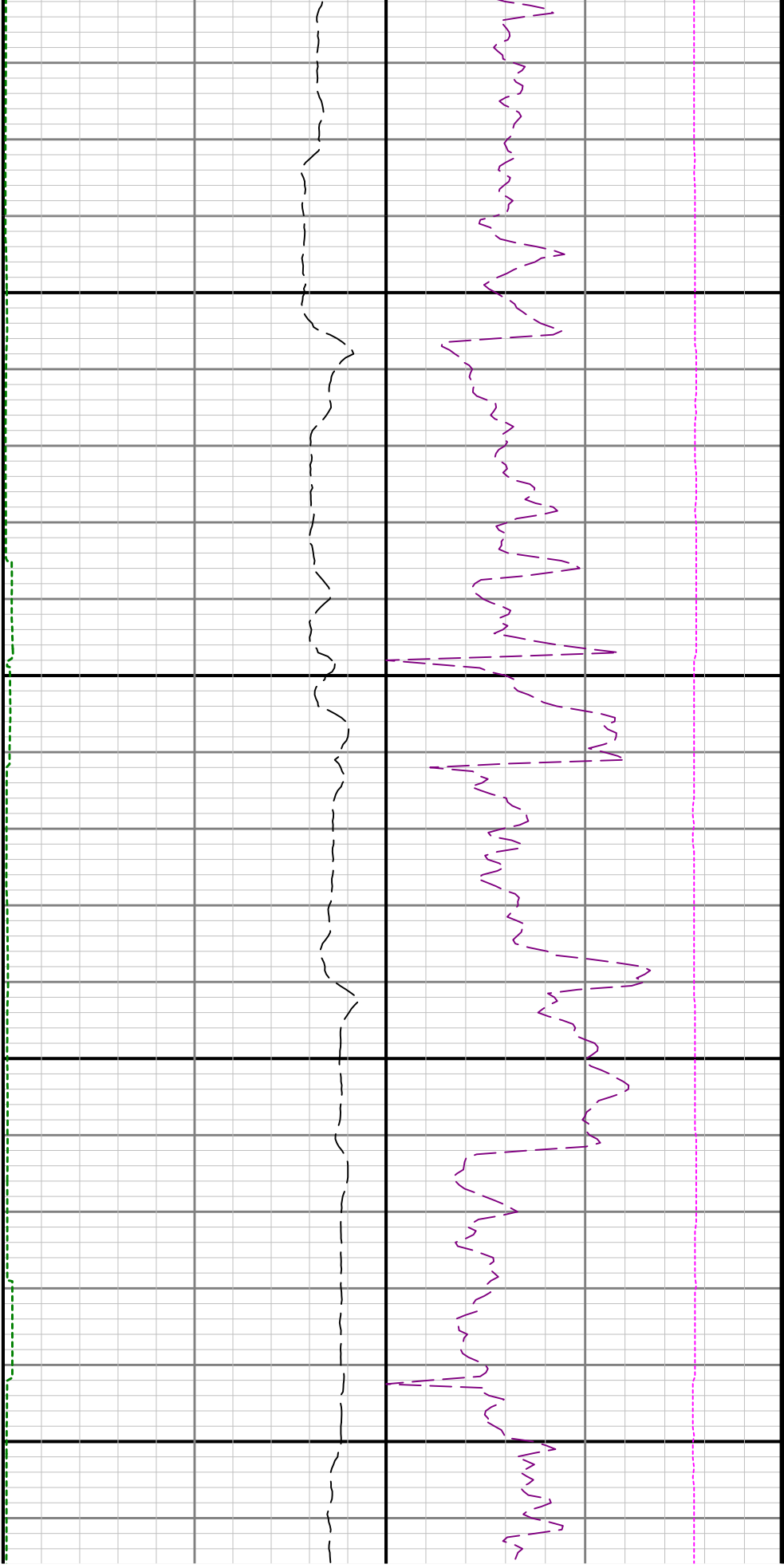


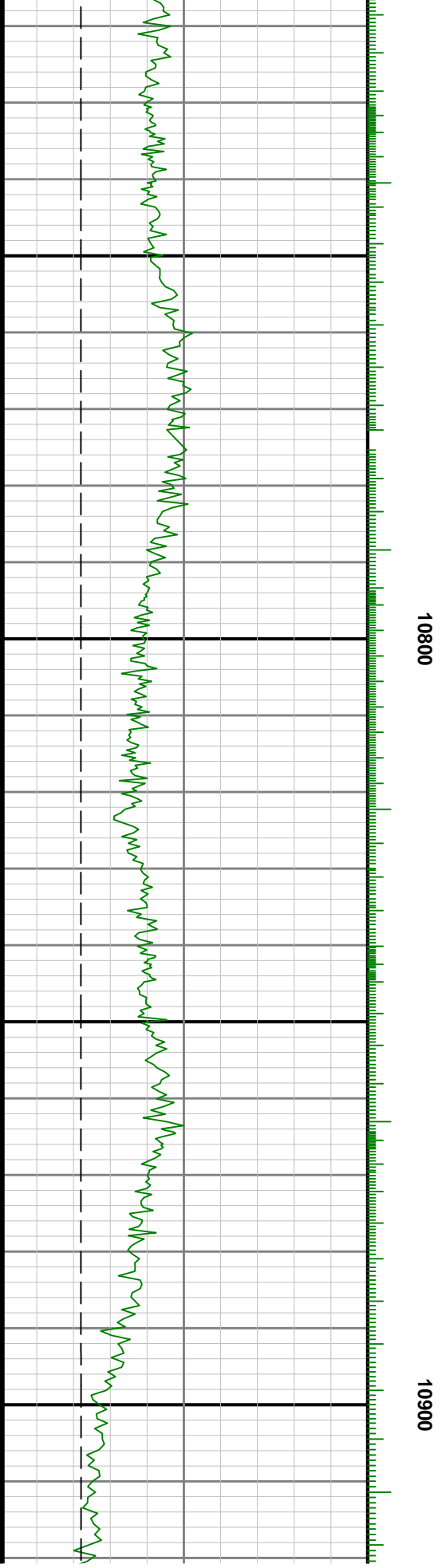
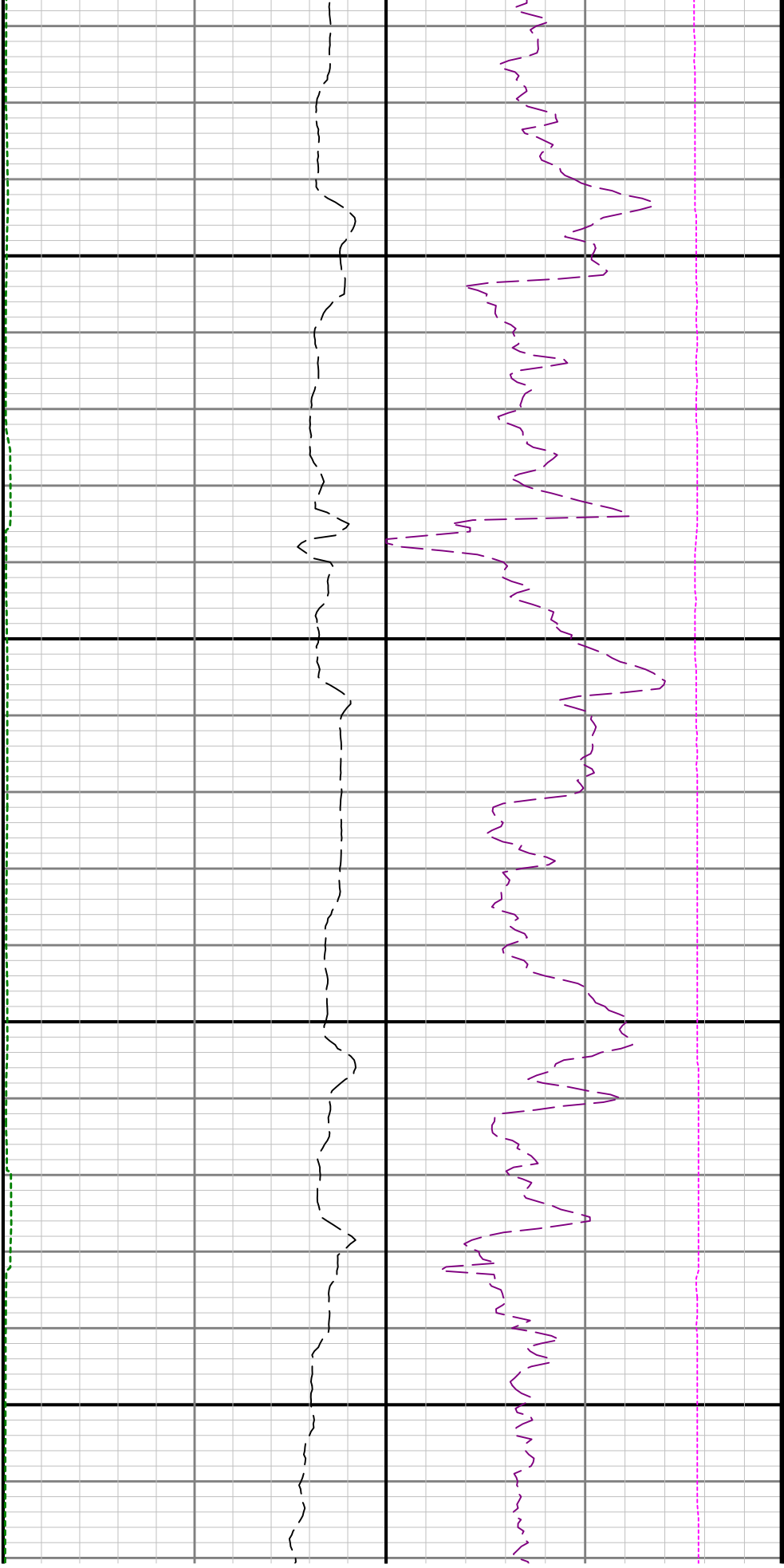


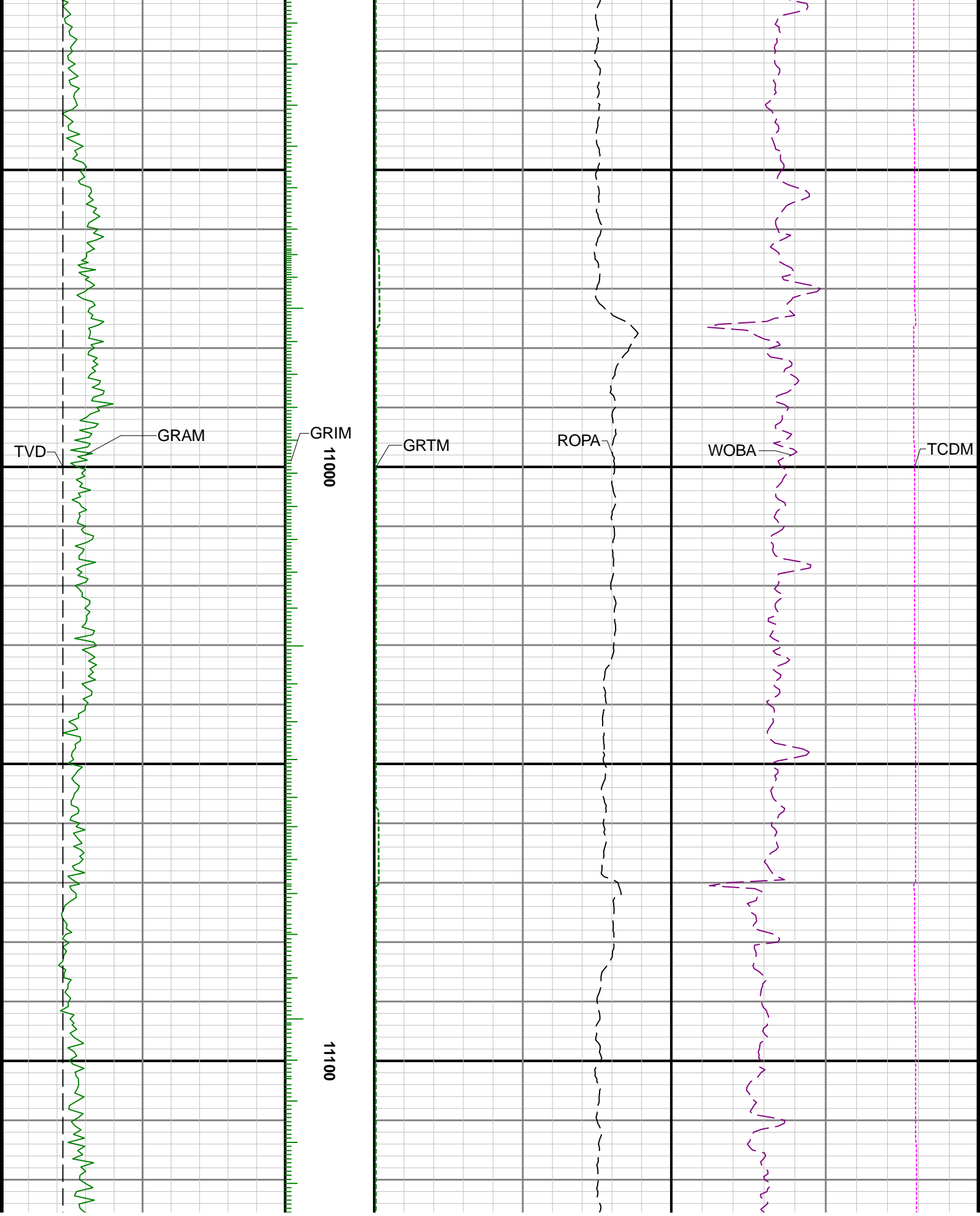
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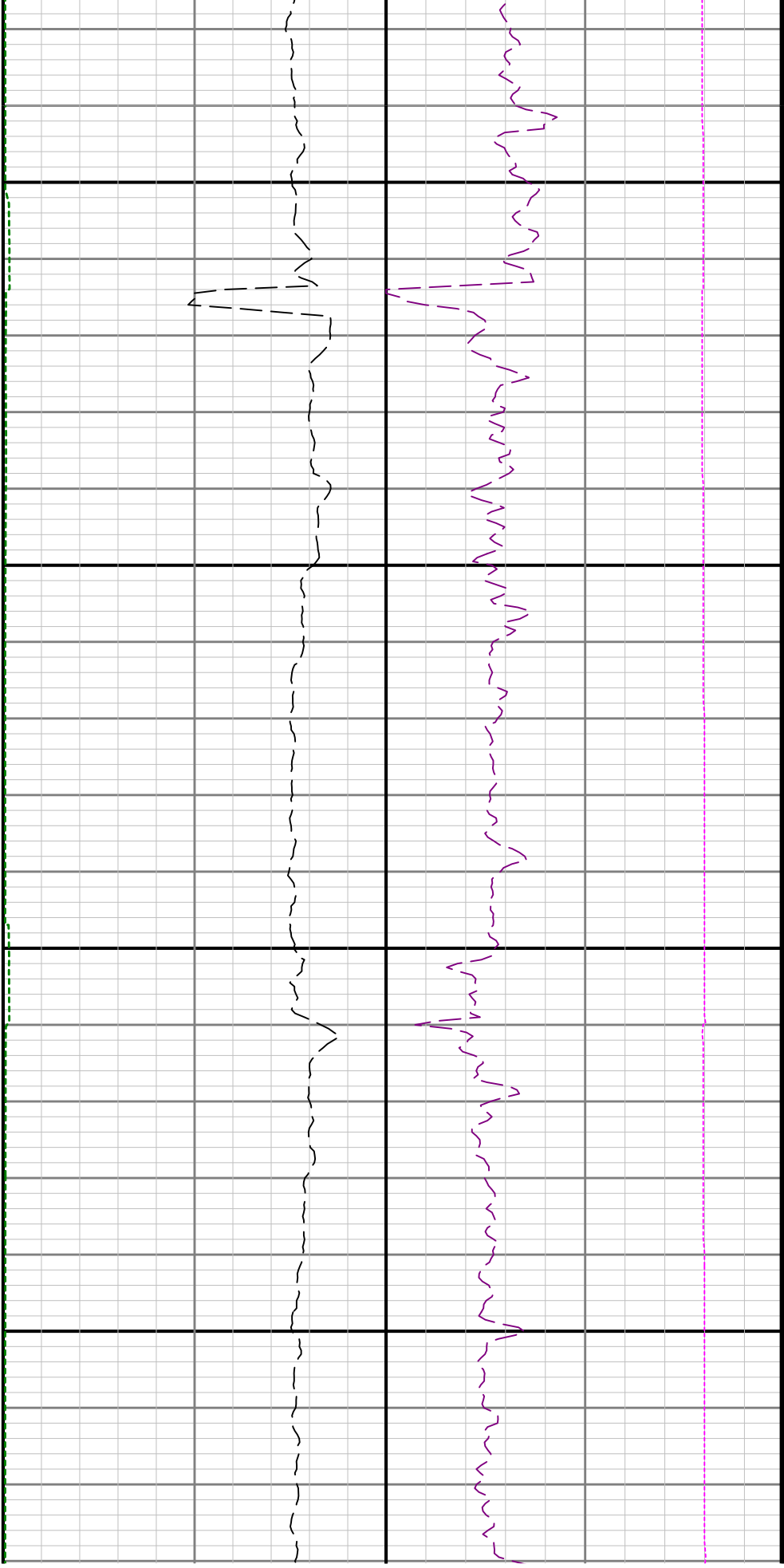






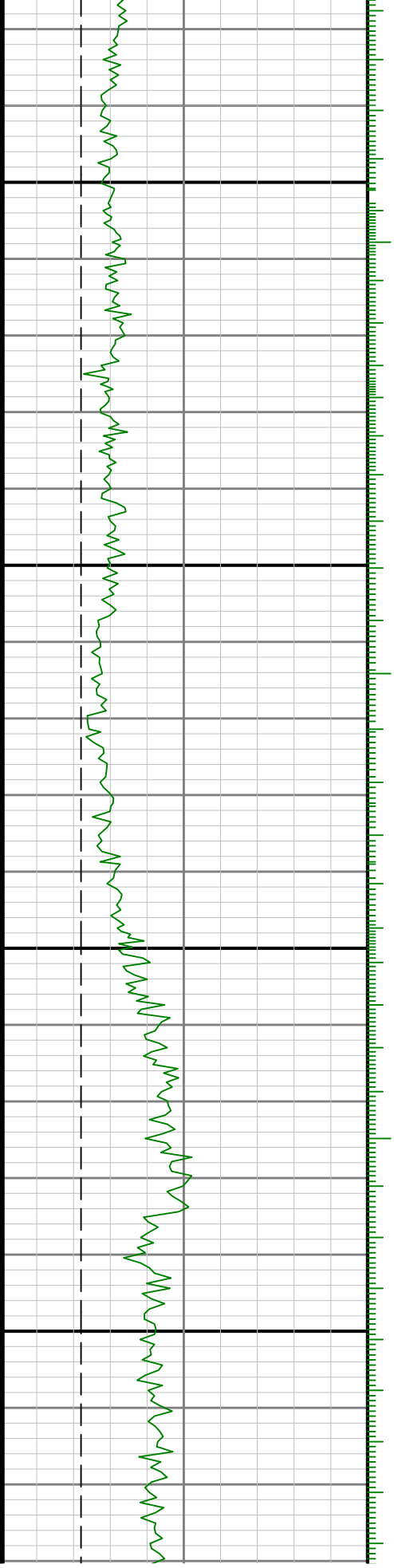


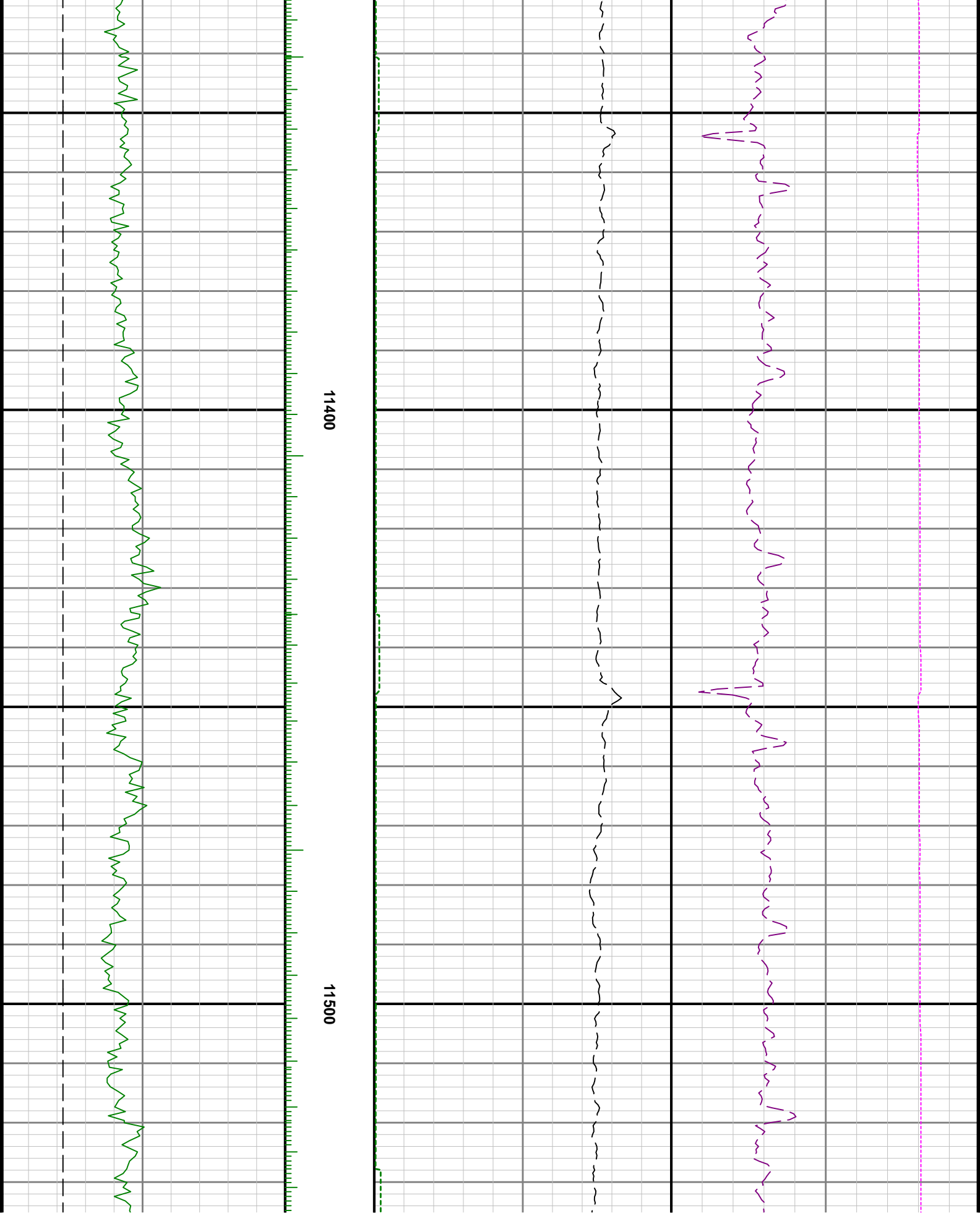


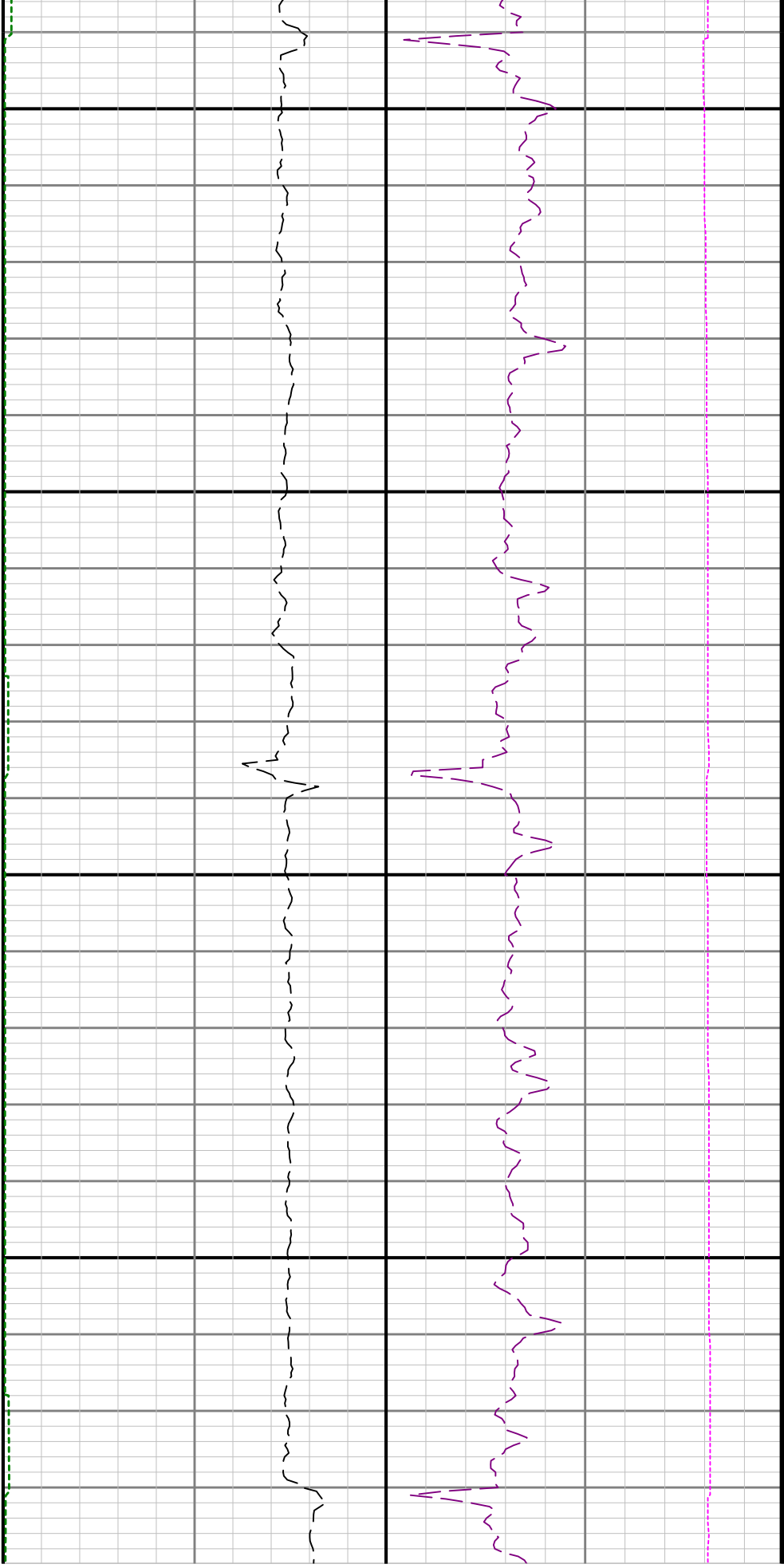


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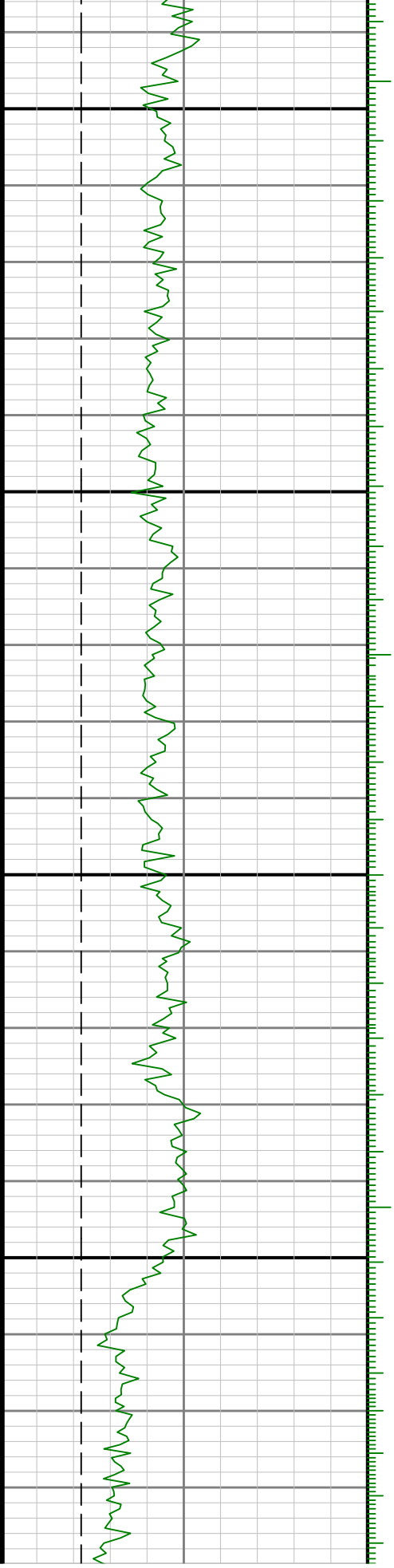


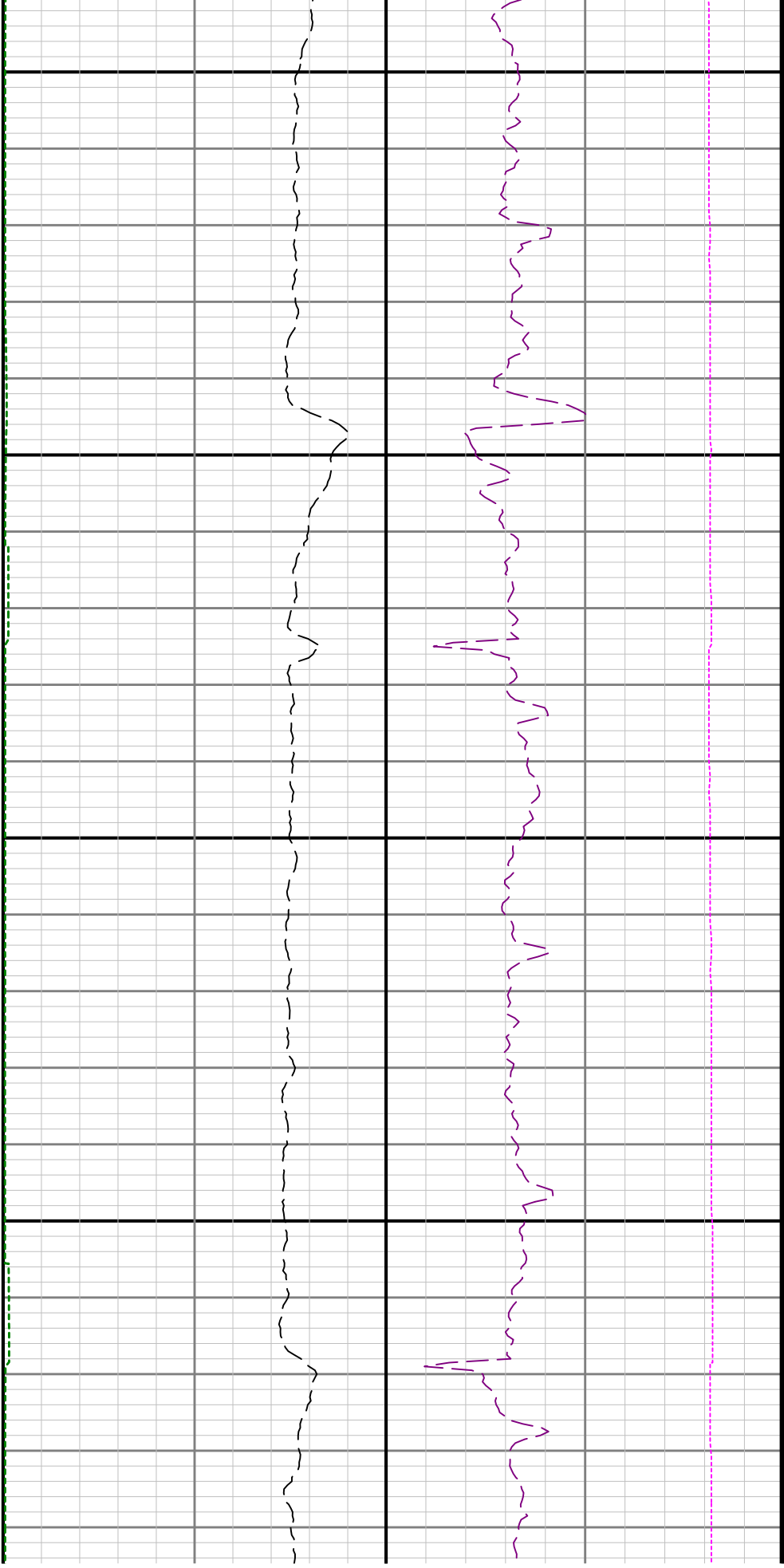




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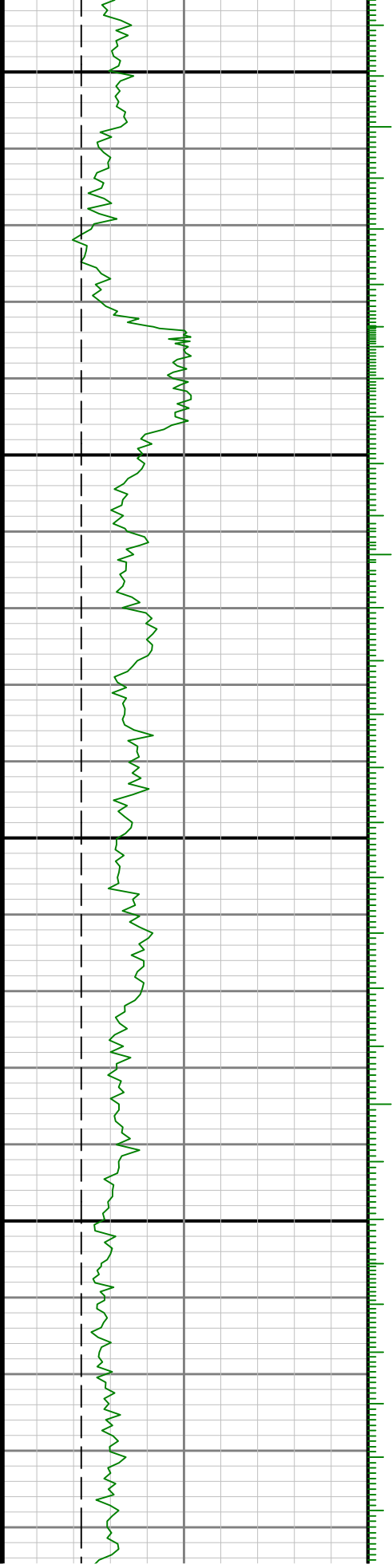
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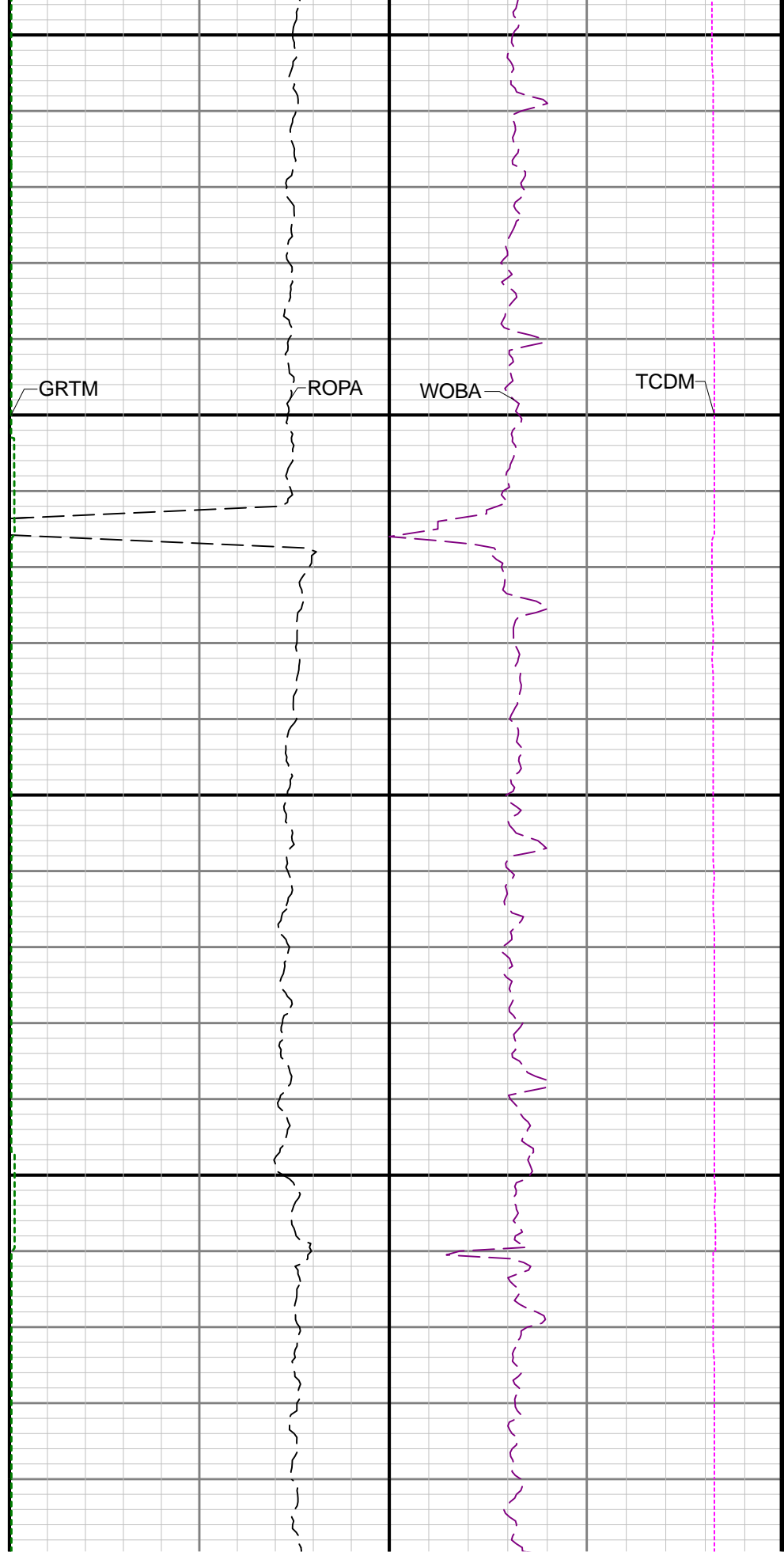
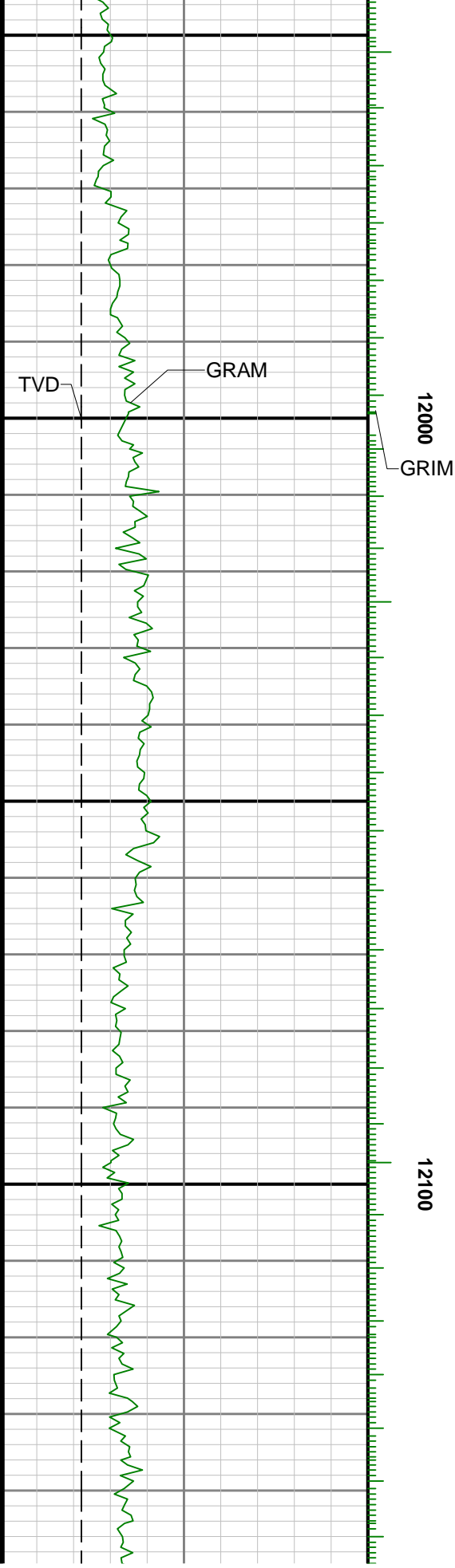


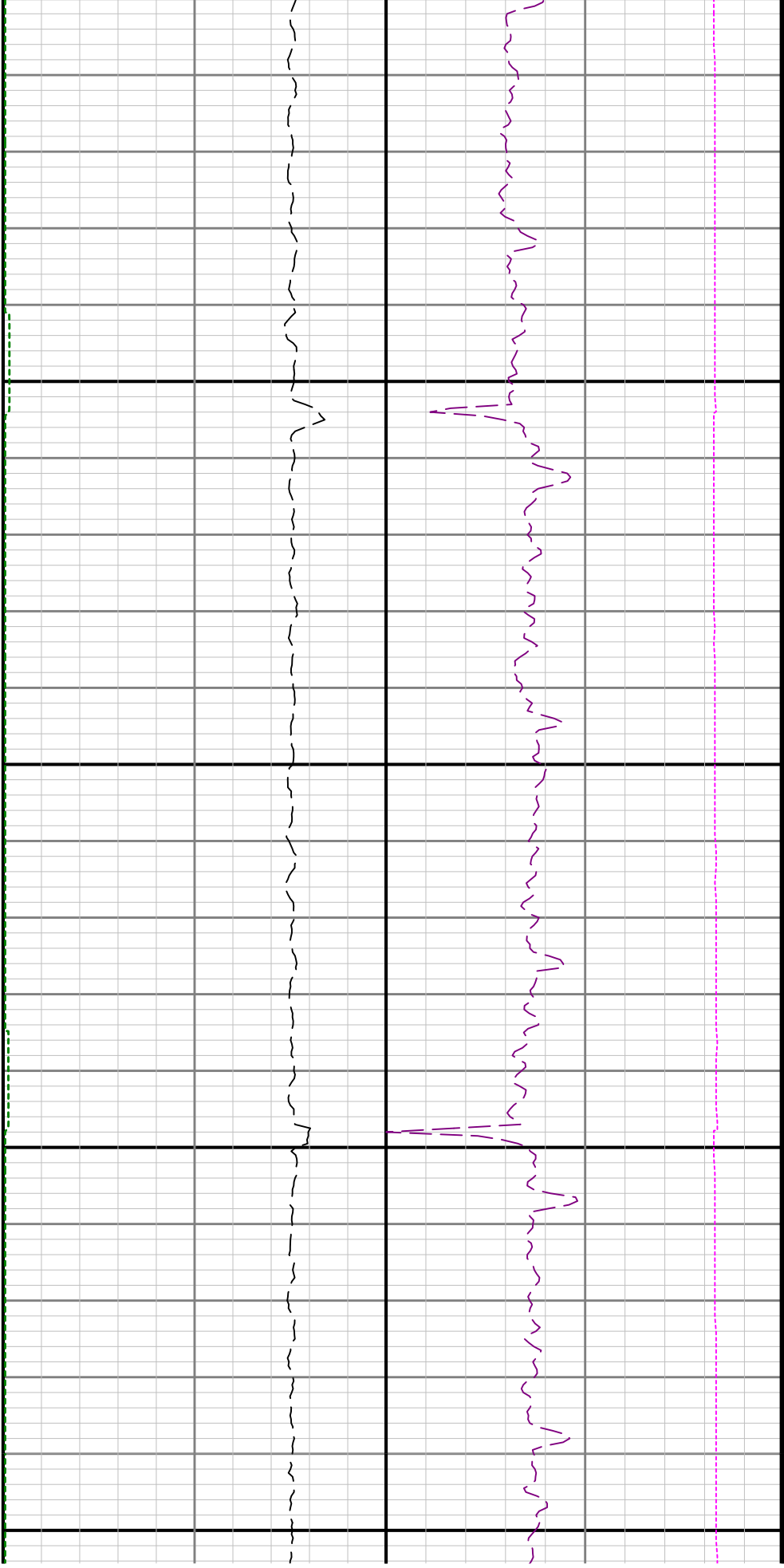


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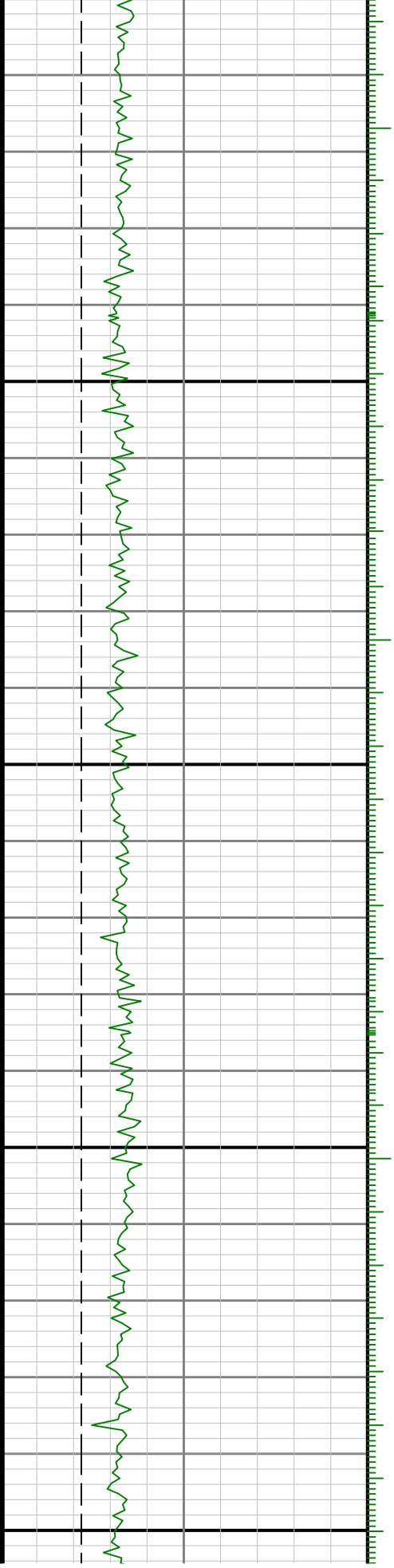


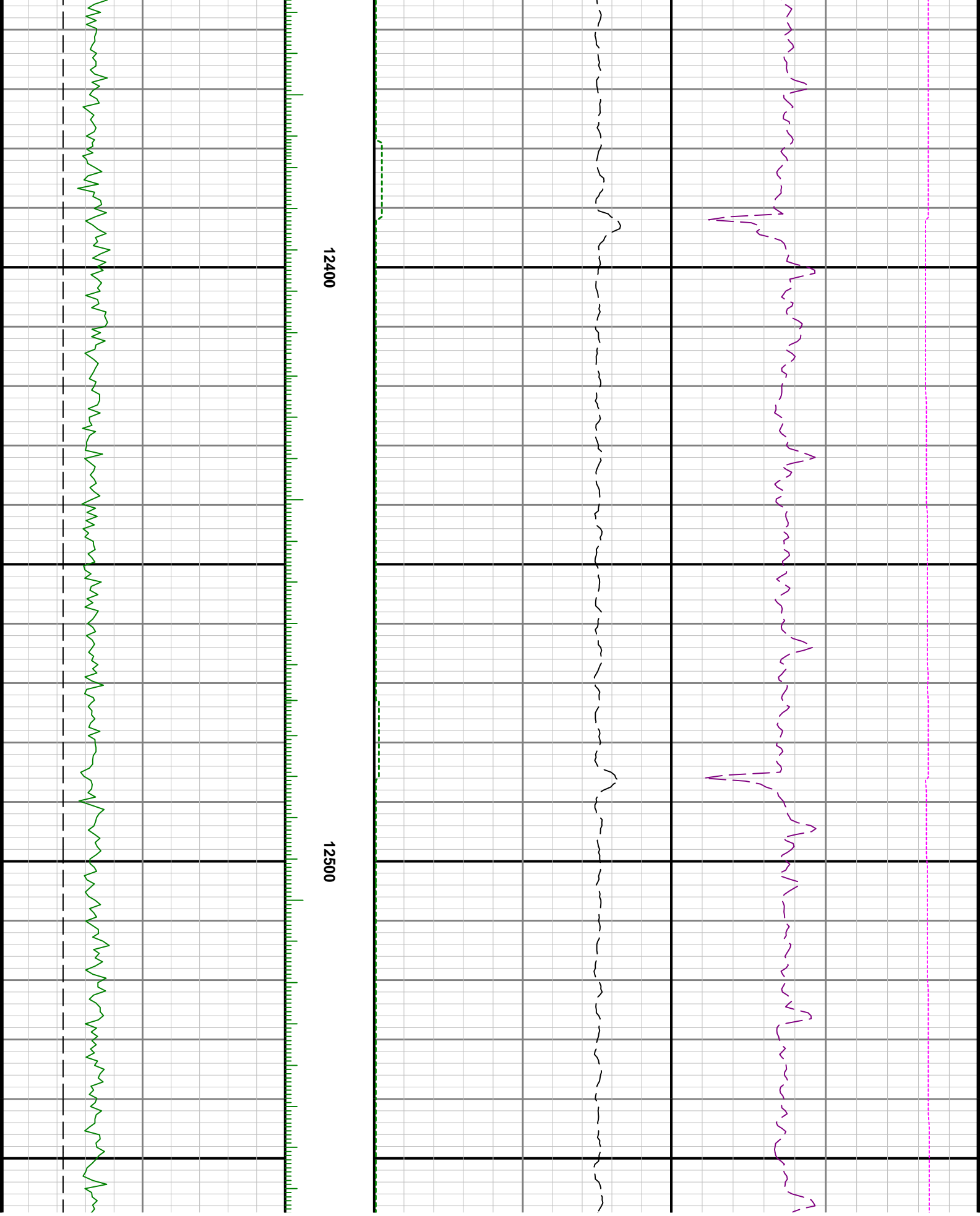


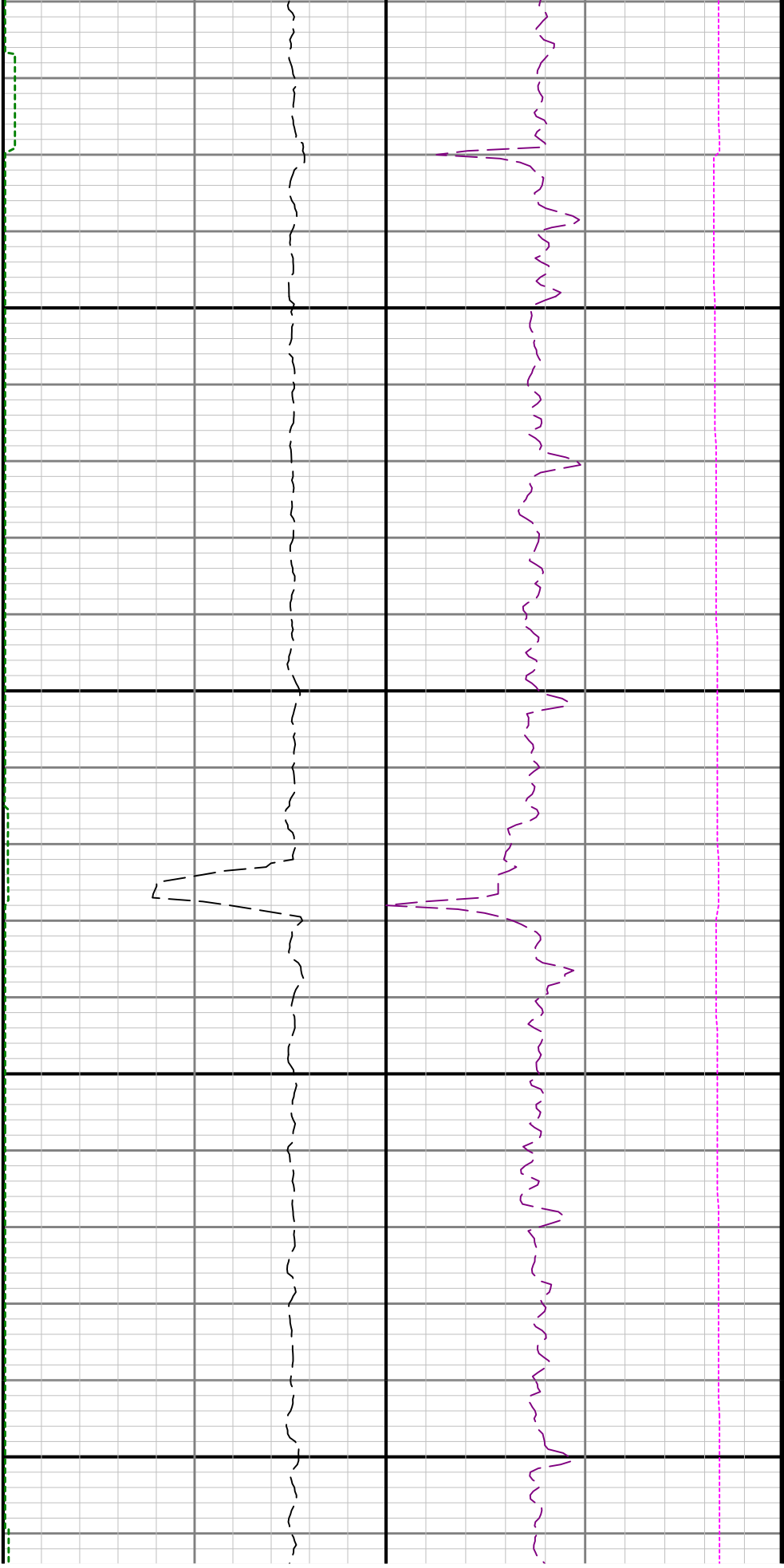


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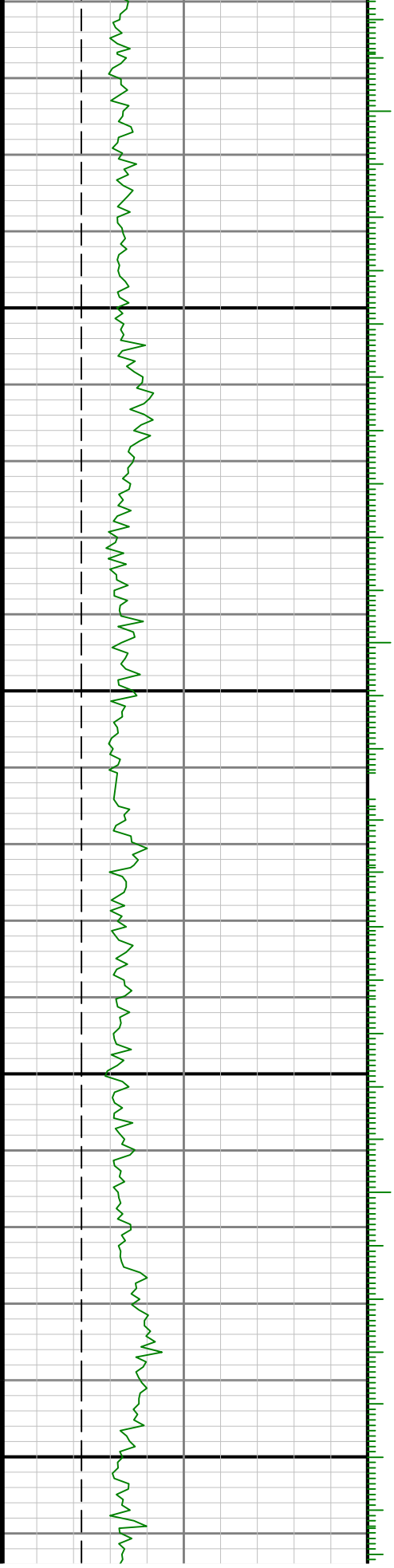


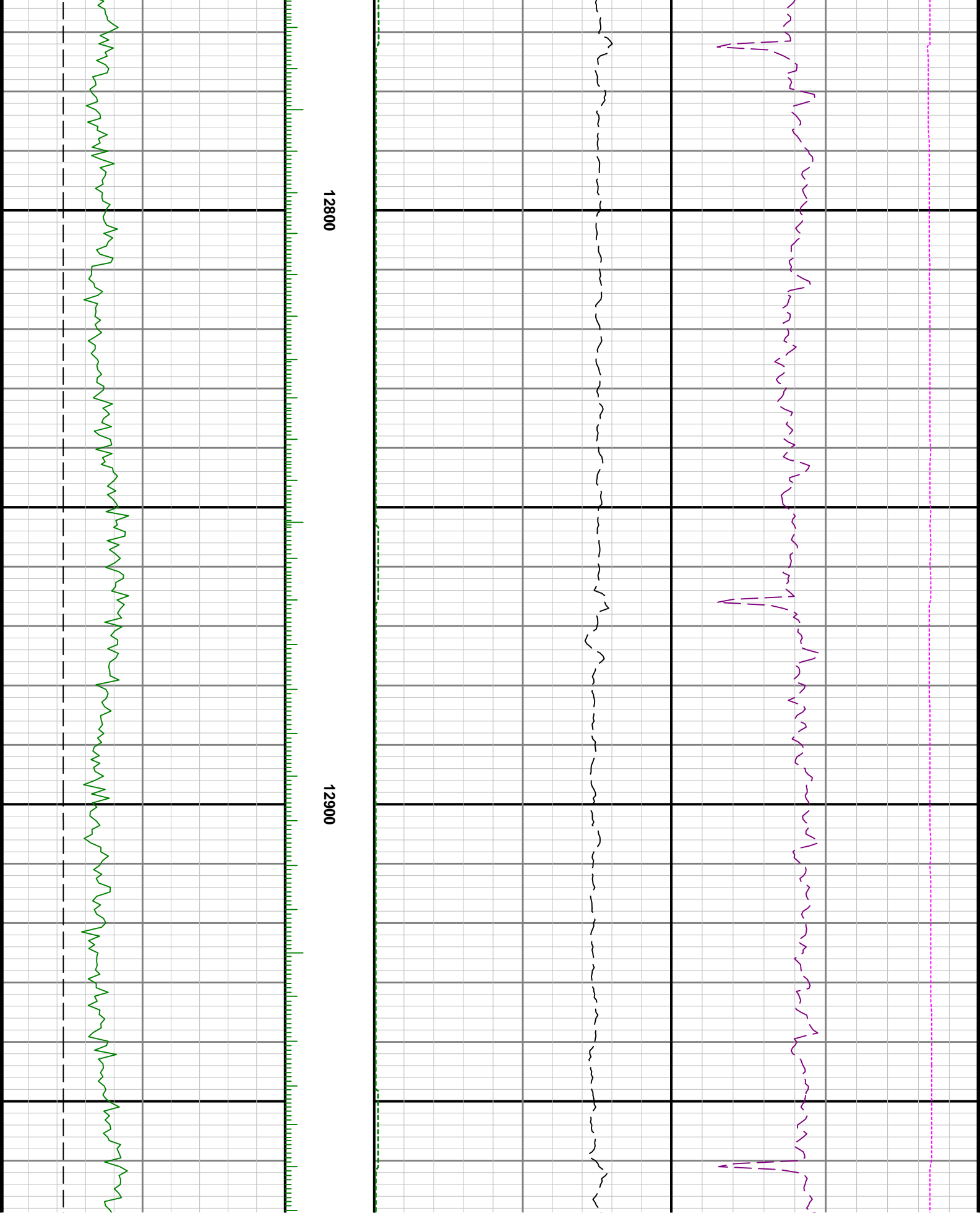


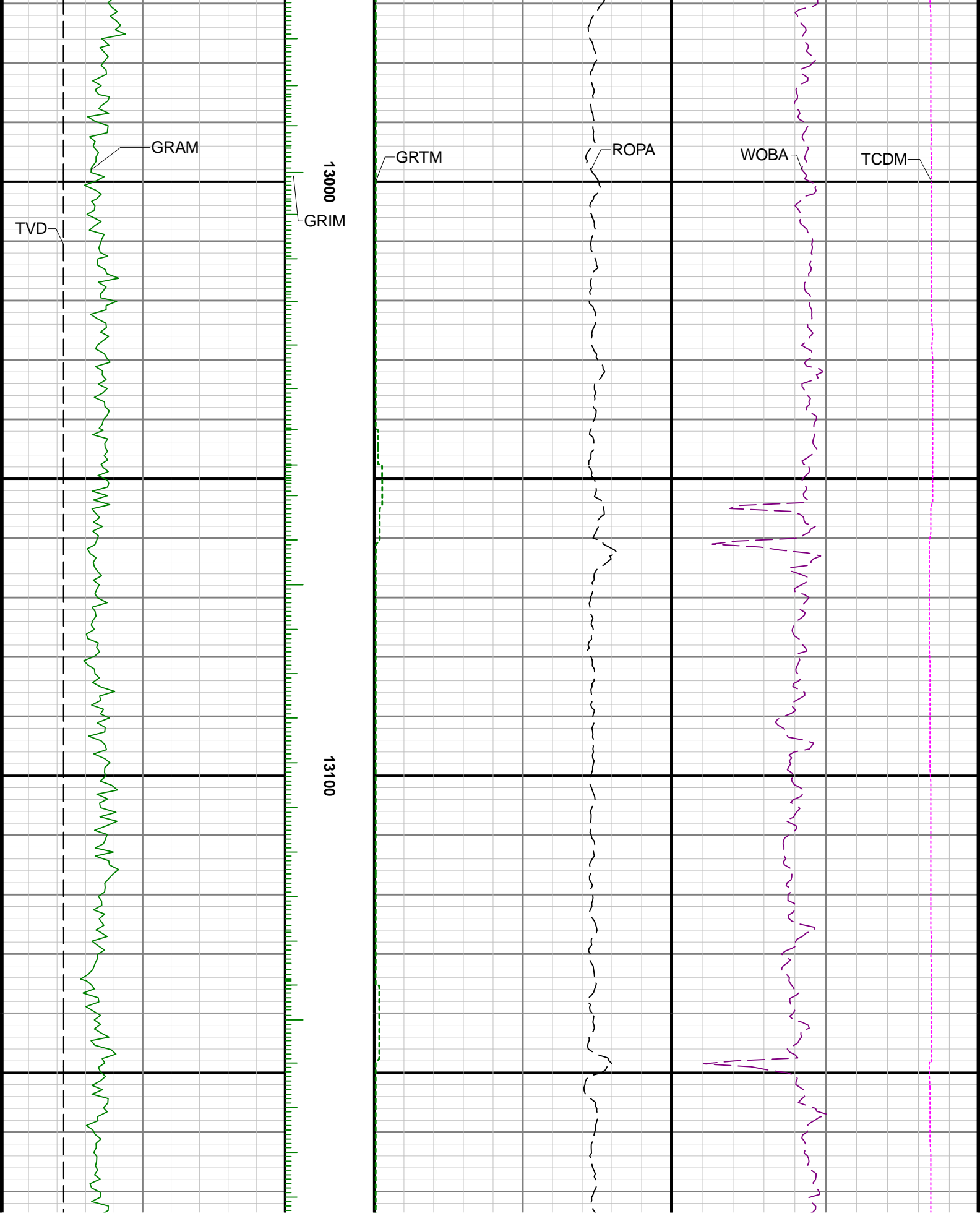


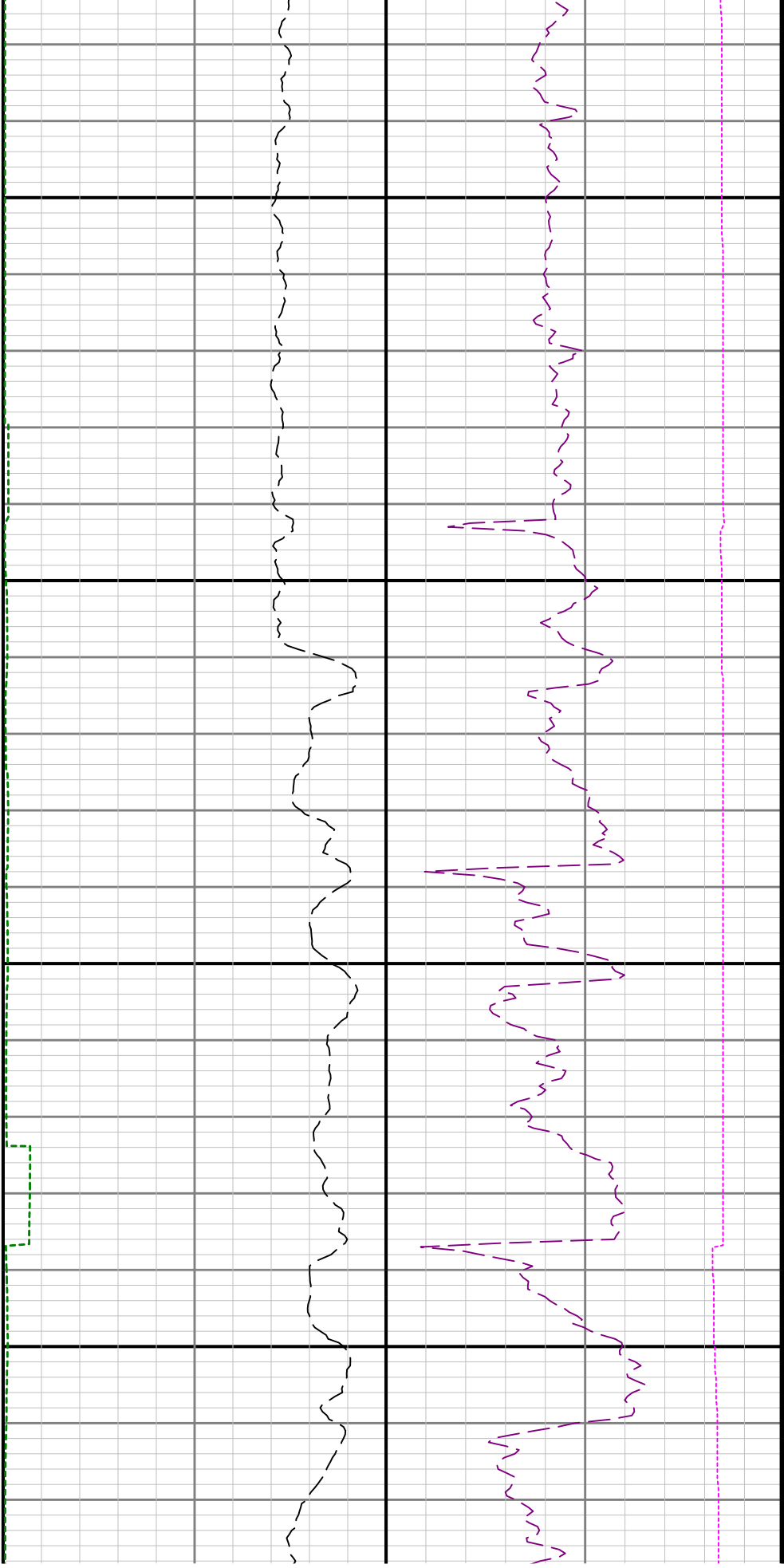
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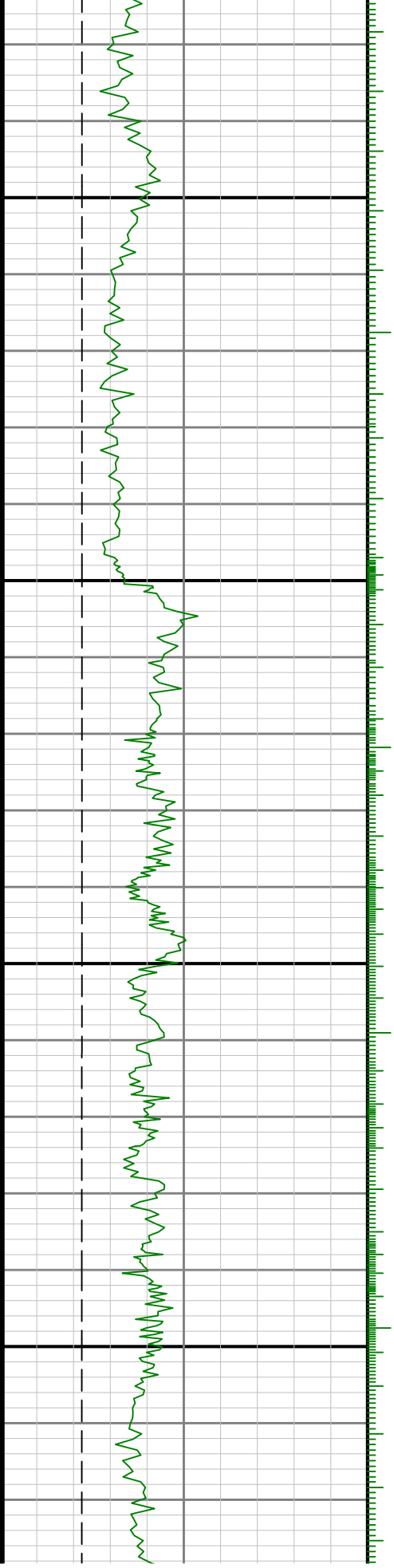


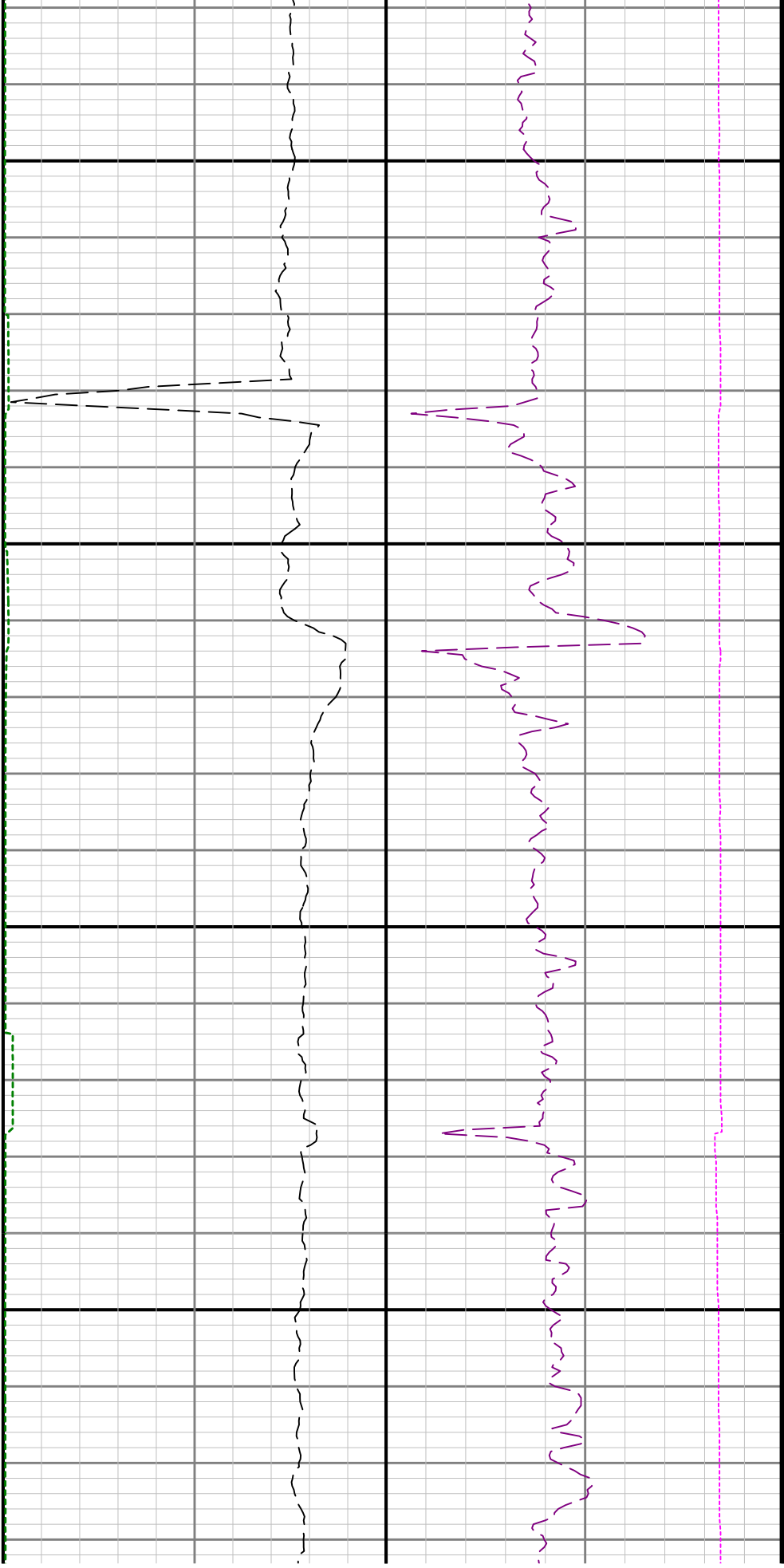




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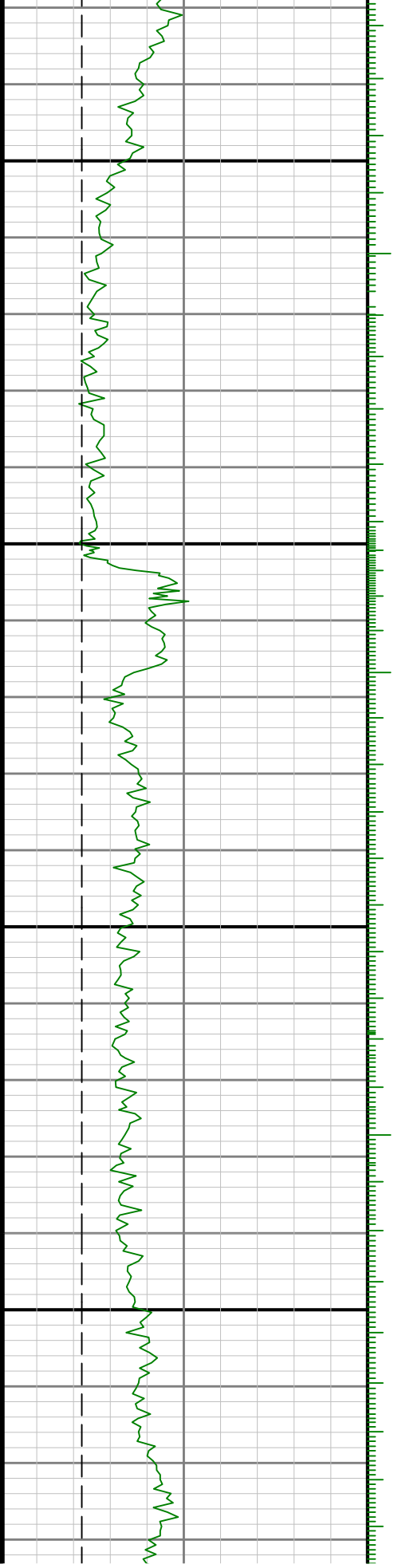
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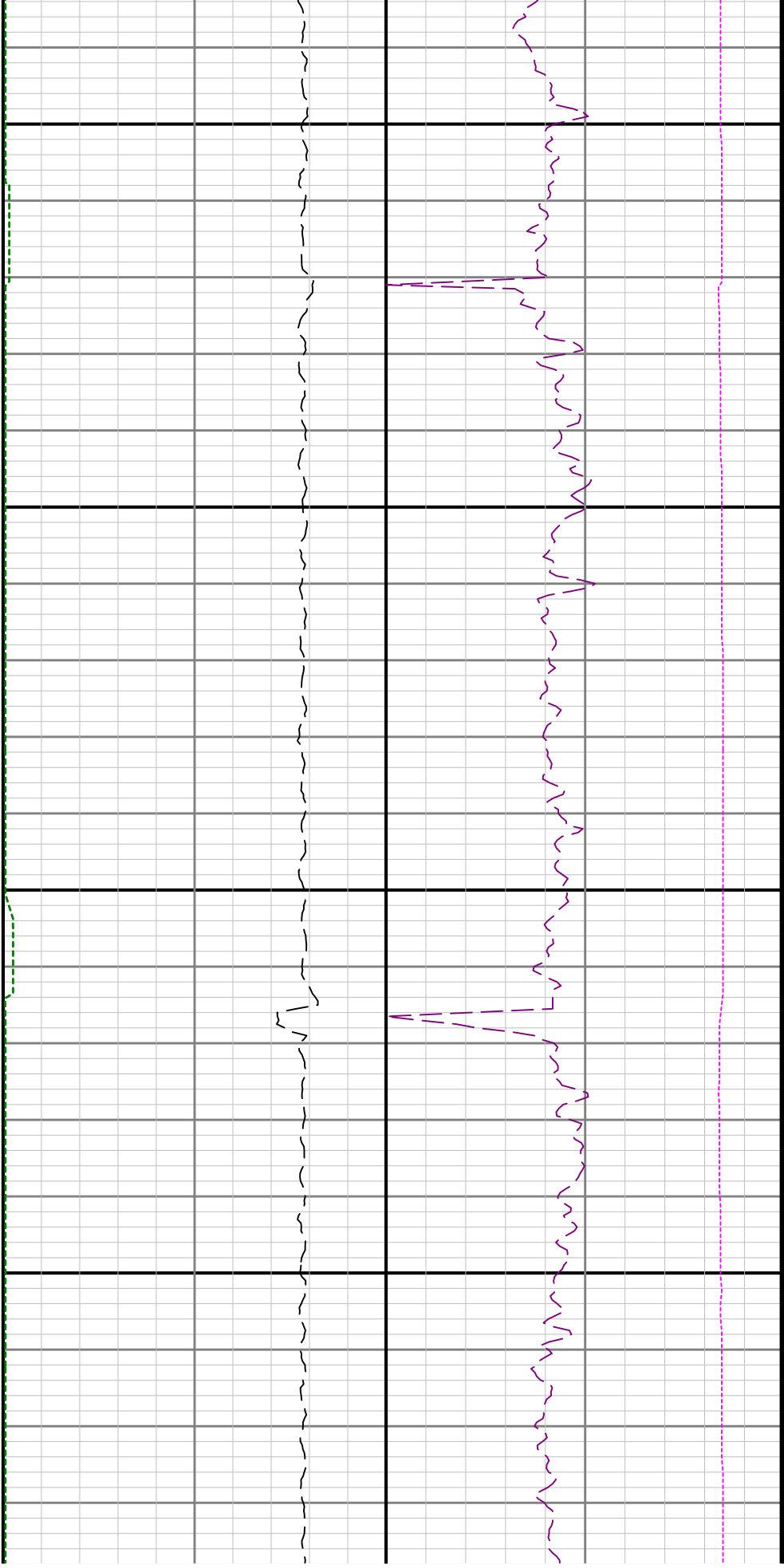




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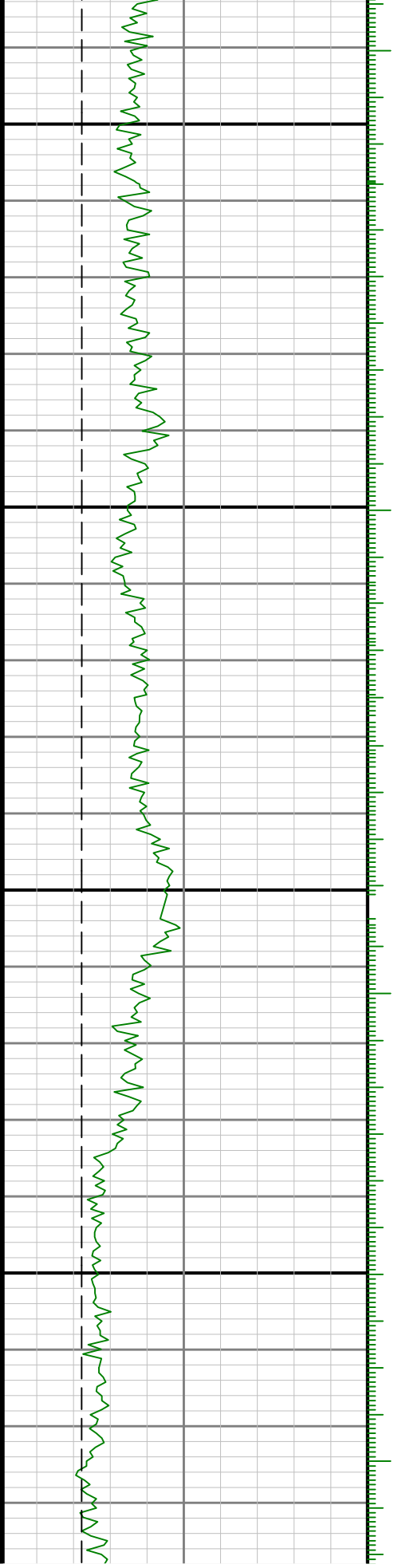
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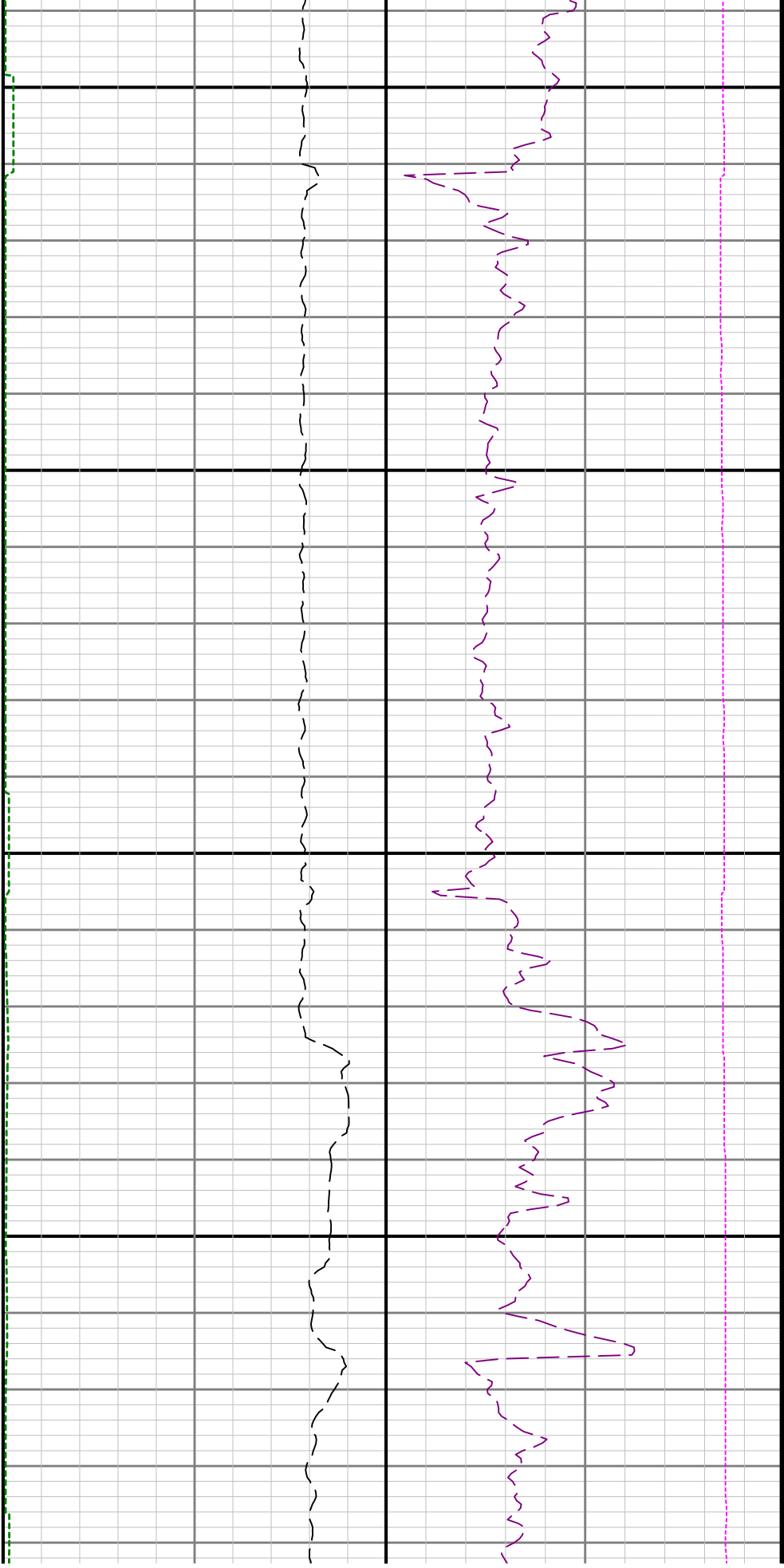




13600

13700





13800

13900

