

Baker Hughes										LWD MEMORY LOG									
<div> <div>Scale:</div> <div>1:240</div> <div>Measured Depth</div> </div>										Gamma Ray									
<div> <div>Company: Noble Energy</div> <div>Well: Gutteresen D09-755</div> <div>Field: Wattenberg</div> </div>																			
<div> <div>Depth Reference:</div> <div>Driller's Depth</div> </div>										<div> <div>County: Weld</div> <div>State: Colorado</div> <div>Country: United States</div> </div>									
<div> <div>Status:</div> <div>Final Print</div> </div>										<div> <div>Surface Location:</div> <div>Latitude: 40° 15' 46.883" N</div> <div>Longitude: 104° 33' 35.456" W</div> <div>Other Services:</div> </div>									
<div> <div>API No: 05-123-48951-00</div> <div>Job ID: 110661658</div> </div>										<div> <div>SEC: 33</div> <div>TWN: 4N</div> <div>RGE: 64W</div> </div>									
<div> <div>Permanent Datum (P.D.): Mean Sea Level</div> <div>Log Measured From: Rig Floor</div> </div>										<div> <div>Elevation: 0.00 ft</div> <div>Above P.D.: 4754.00 ft</div> <div>Elev. KB: N/A</div> <div>Elev. DF: 4754.00 ft</div> <div>Elev. GL: 4724.00 ft</div> </div>									
<div> <div>Dates</div> <div> <div>From: 2020-12-09</div> <div>To: 2020-12-12</div> <div>Spud: 2020-11-25</div> </div> </div>										<div> <div>Interval</div> <div> <div>Drilled (ft)</div> <div>Top: 1939.00</div> <div>Bottom: 17362.00</div> </div> </div>									
<div> <div>Borehole Record</div> <div> <div>Hole Size (in)</div> <div>13.500</div> <div>8.500</div> </div> </div>										<div> <div>Magnetic Field Reference</div> <div> <div>Azi Reference North: 66.61</div> <div>Total Magnetic Field Strength: (nT) 51871</div> <div>Mag to Reference North Correction: (deg) 7.33</div> </div> </div>									
<div> <div>Casing Record</div> <div> <div>Hole Size (in)</div> <div>13.500</div> <div>8.500</div> </div> </div>										<div> <div>From (ft)</div> <div>30.00</div> <div>1939.00</div> </div>									
<div> <div>Deviation Record</div> <div> <div>Size (in)</div> <div>9.625</div> </div> </div>										<div> <div>Weight (lb/ft)</div> <div>36.00</div> </div>									
<div> <div>Mud Record</div> <div> <div>Type</div> <div>Oil Based Mud</div> </div> </div>										<div> <div>From (ft)</div> <div>1939.00</div> </div>									
<div> <div>Acquisition System</div> <div> <div>Software Version</div> <div>RT 5.7</div> </div> </div>										<div> <div>To (ft)</div> <div>17362.00</div> </div>									
<div> <div>Deliverable</div> <div>5.7.8878.1</div> </div>										<div> <div>Hole Size (in)</div> <div>8.500</div> </div>									
<div> <div>Interval</div> <div>15423.00</div> </div>										<div> <div>Interval (ft)</div> <div>1.81</div> </div>									
<div> <div>Inc   Az (Start)</div> <div>233.02</div> </div>										<div> <div>Inc   Az (End)</div> <div>89.97</div> </div>									
<div> <div>Other</div> <div>Unit: D&amp;E</div> </div>										<div> <div>175.39</div> </div>									

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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
						Top (ft)	Bottom (ft)	From (ft)	To (ft)	Start Logging	End Logging	
1	1	8.500	PDC	3.00	AutoTrak Curve	1939.00	14230.00	1939.00	14243.00	2020-12-09 13:44	2020-12-11 04:18	35.53
2	2	8.500	PDC	3.00	AutoTrak Curve	14230.00	17349.00	14243.00	17362.00	2020-12-11 18:11	2020-12-12 04:02	12.87

### Crew

Name	Arrive Wellsite	Depart Wellsite	Name	Arrive Wellsite	Depart Wellsite	Name	Arrive Wellsite	Depart Wellsite
Tien Bui	2020-12-08	2020-12-12						

### Mud Properties Record

Date / Time	Run No.	Depth (ft)	Mud Type	Density (ppg)	Viscosity (cP)	pH	Fluid Loss (cm3)	Oil / Water	Source	Total Chlorides (ppm)	K+ (%)
2020-12-08 17:20	1	1939.00	Oil Based Mud	9.3	10	N/A	19.5	79.4/20.6	Active Pit	27000	0.00
2020-12-11 09:40	1	13500.00	Oil Based Mud	9.6	14	N/A	17.4	79.3/20.7	Active Pit	26500	0.00
2020-12-11 12:09	2	14243.00	Oil Based Mud	9.6	14	N/A	17.4	79.3/20.7	Active Pit	27000	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	AutoTrak Curve Steering Unit	14856336	Near Bit Inclination	5.93	6.79	7.000	4.330
1	AutoTrak Curve Steering Unit	14856336	Near Bit VSS	5.93	6.79	7.000	4.330
1	AutoTrak Curve MWD	12316739	Gamma (single)	2.75	12.96	7.000	3.250
1	AutoTrak Curve MWD	12316739	Directional (mag)	12.27	22.48	7.000	3.250
2	AutoTrak Curve Steering Unit	14381506	Near Bit Inclination	5.93	6.79	7.000	4.330
2	AutoTrak Curve Steering Unit	14381506	Near Bit VSS	5.93	6.79	7.000	4.330

	AutoTrak Curve Steering Unit	14381899	Near Bit VSS	5.95	6.79	7.000	4.350
2	AutoTrak Curve MWD	14381899	Gamma (single)	2.75	12.96	7.000	3.250
2	AutoTrak Curve MWD	14381899	Directional (mag)	12.27	22.48	7.000	3.250

Service and Tool Mnemonics

Mnemonic	Name	Description
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

Depth measurements were 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 6 ¾ inch NaviGamma service (Gamma Ray and Directional) behind a 8 1/2 inch bit and rotary steerable assembly from 1939 to 17362 feet MD (1939 to 6751 feet TVD).
- 3

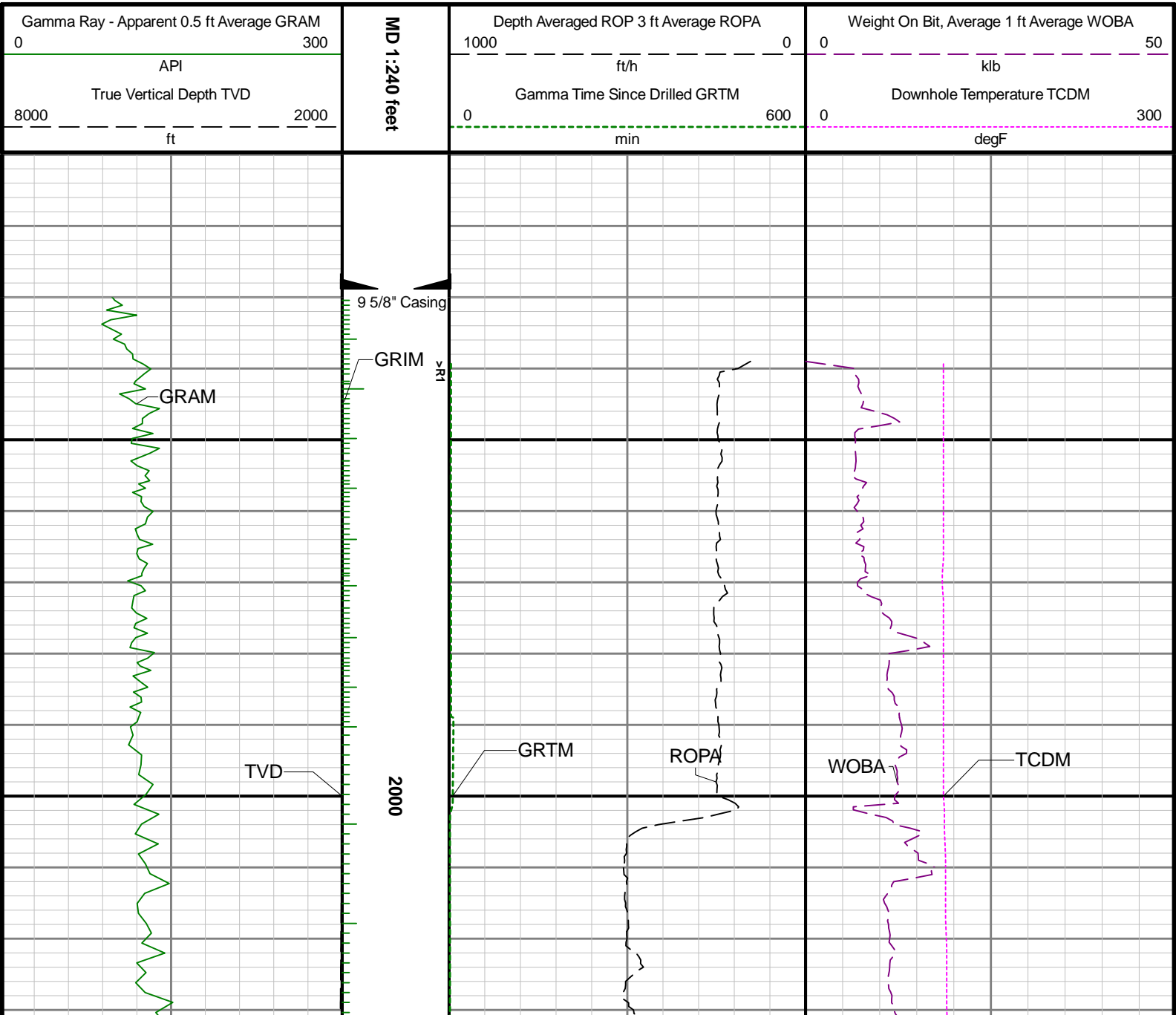
The Gamma Ray Apparent (GRAM) data is presented 0 to 300 API, per the customer's request.

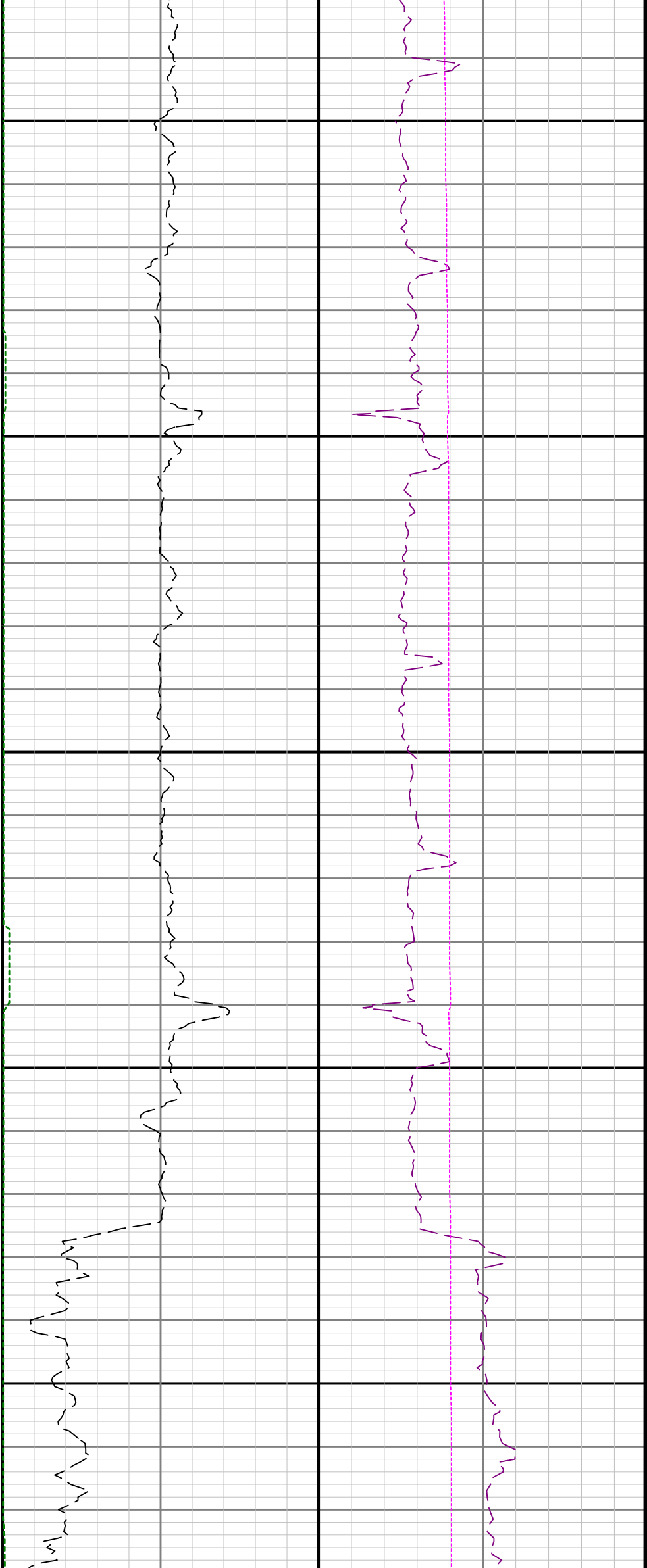
Remarks

Number	Depth (ft)	Hole Section (in)	Run No.	Remark
1	14230.00	8.500	2	The interval from to 14198 to 14243 feet MD (6738 feet TVD) was missing and logged up to 14 hours after being drilled due to a trip out of hole to change out BHA.
2	17349.00	8.500	2	The interval from 17349 to 17362 feet MD (6751 feet TVD) was not logged due to sensor to bit offset at well TD.

Curve Mnemonics

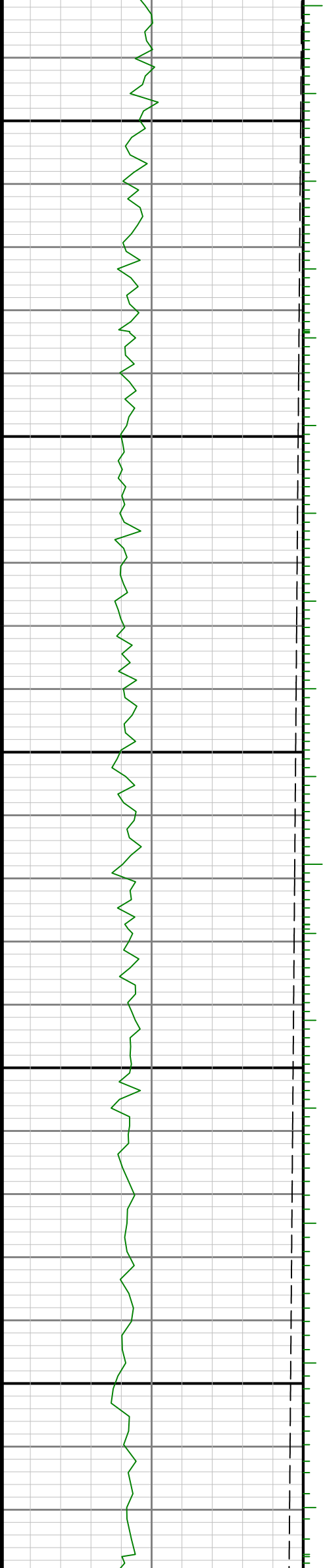
Presented Curves	Description	Units
ROPA	Depth Averaged ROP 3 ft Average	ft/h
TVD	TVD	ft
WOBA	Weight On Bit 1 ft Average	klb
GRAM	Gamma Ray - Apparent - Memory 0.5 ft Average	API
GRIM	Gamma Ray - Data Point Indicator - Memory	unitless
GRTM	Gamma Ray - Time Since Drilled - Memory	min
TCDM	Directional Real-Time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

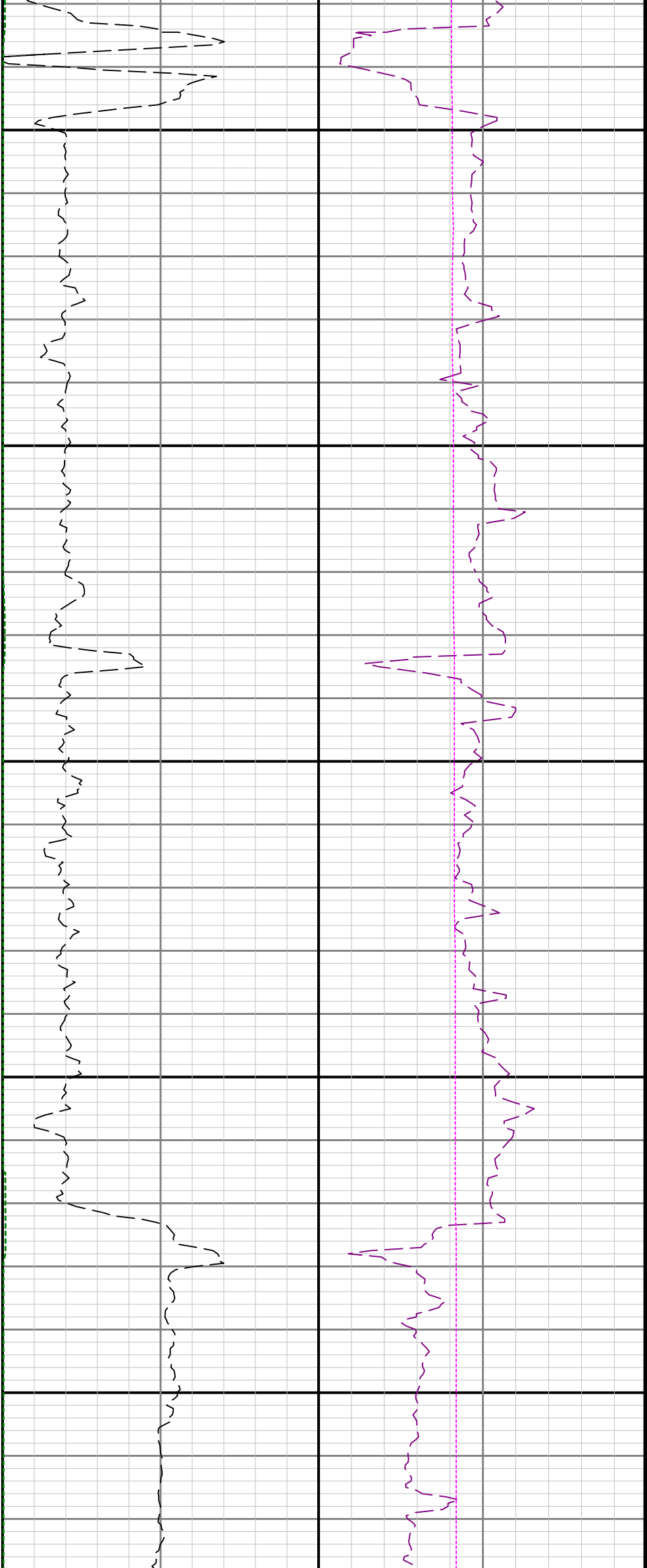




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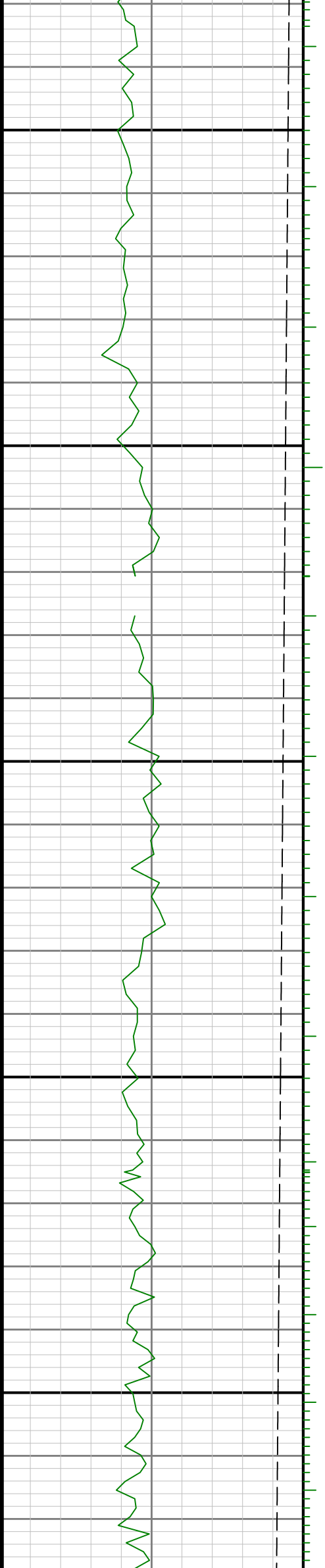


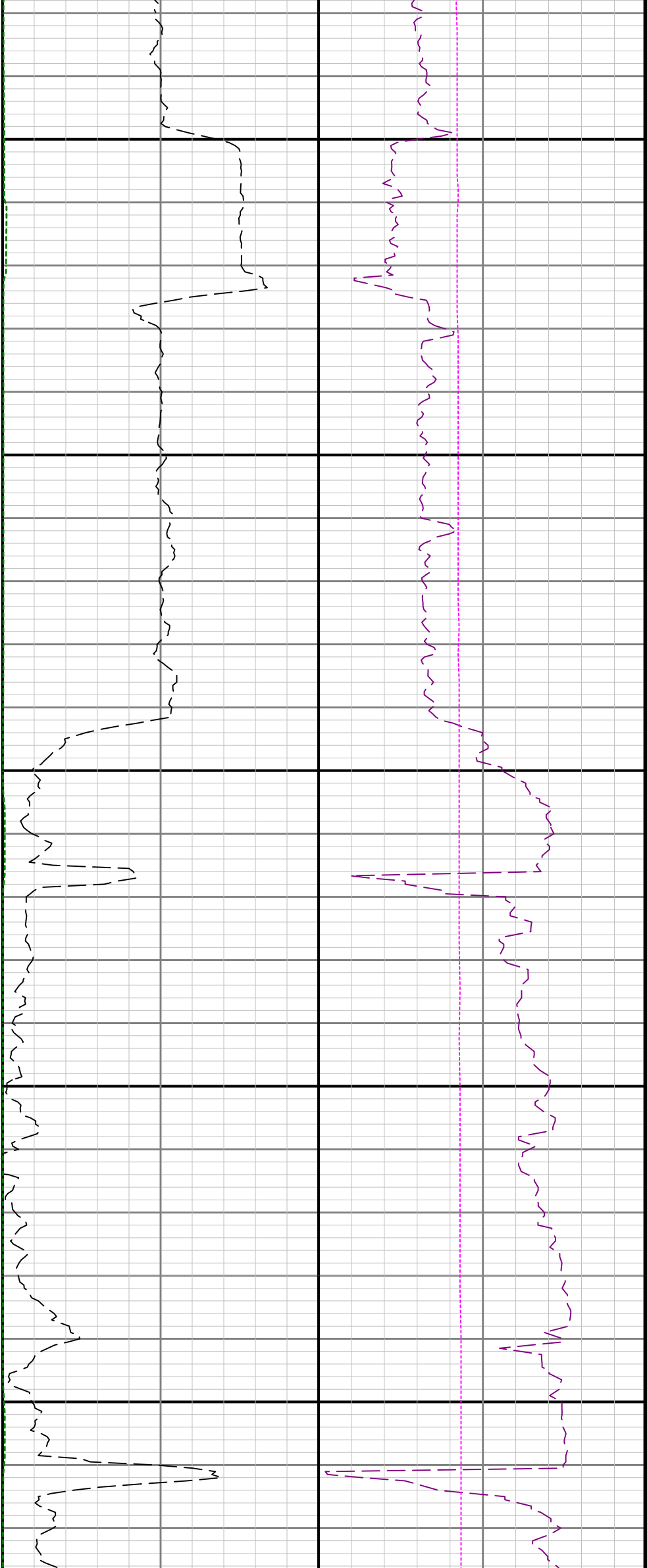


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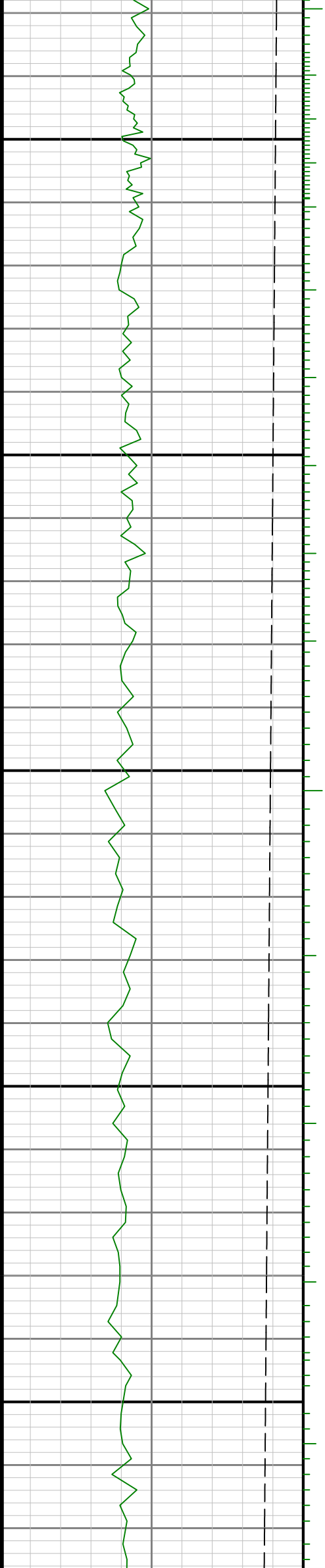
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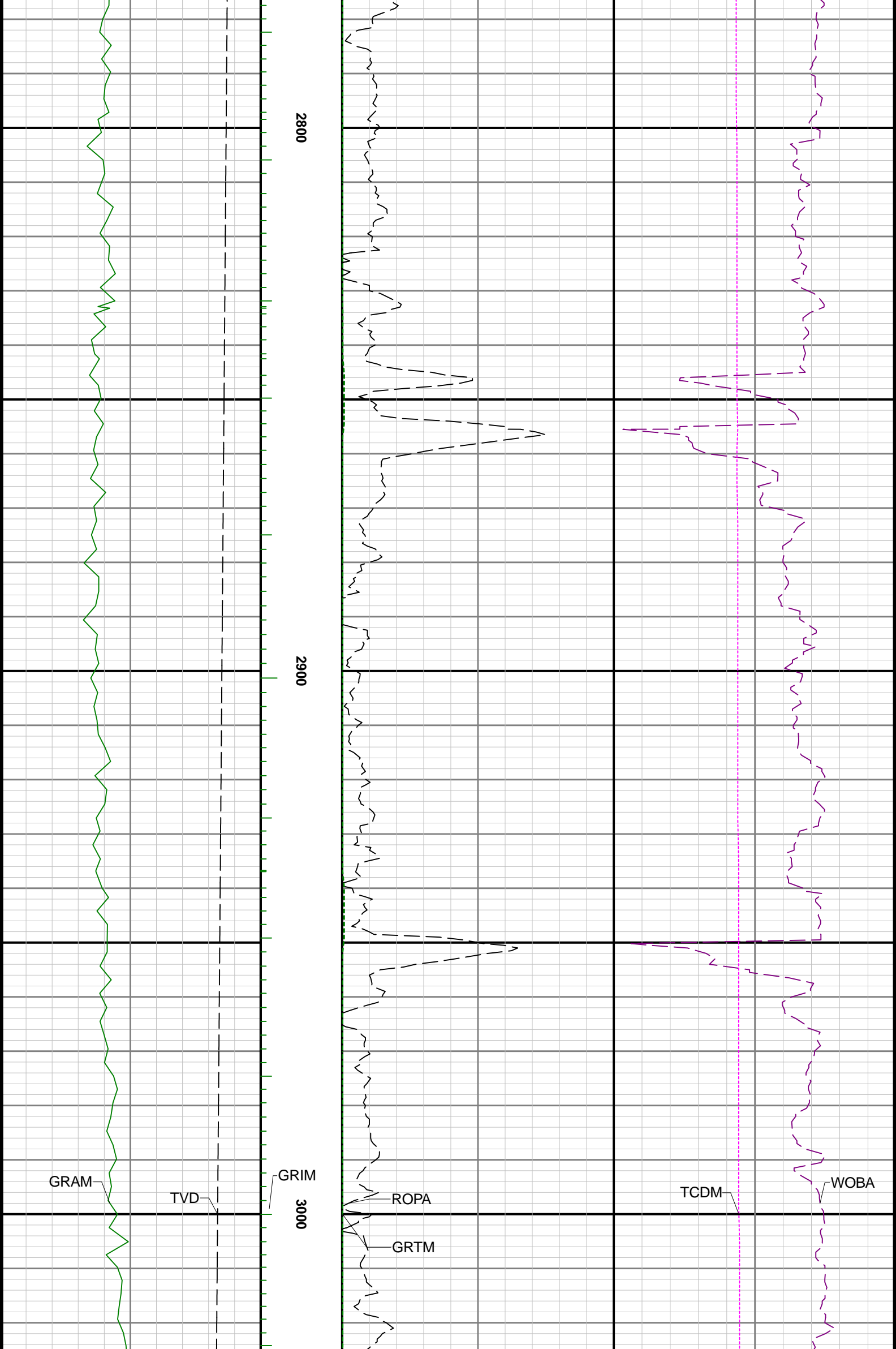


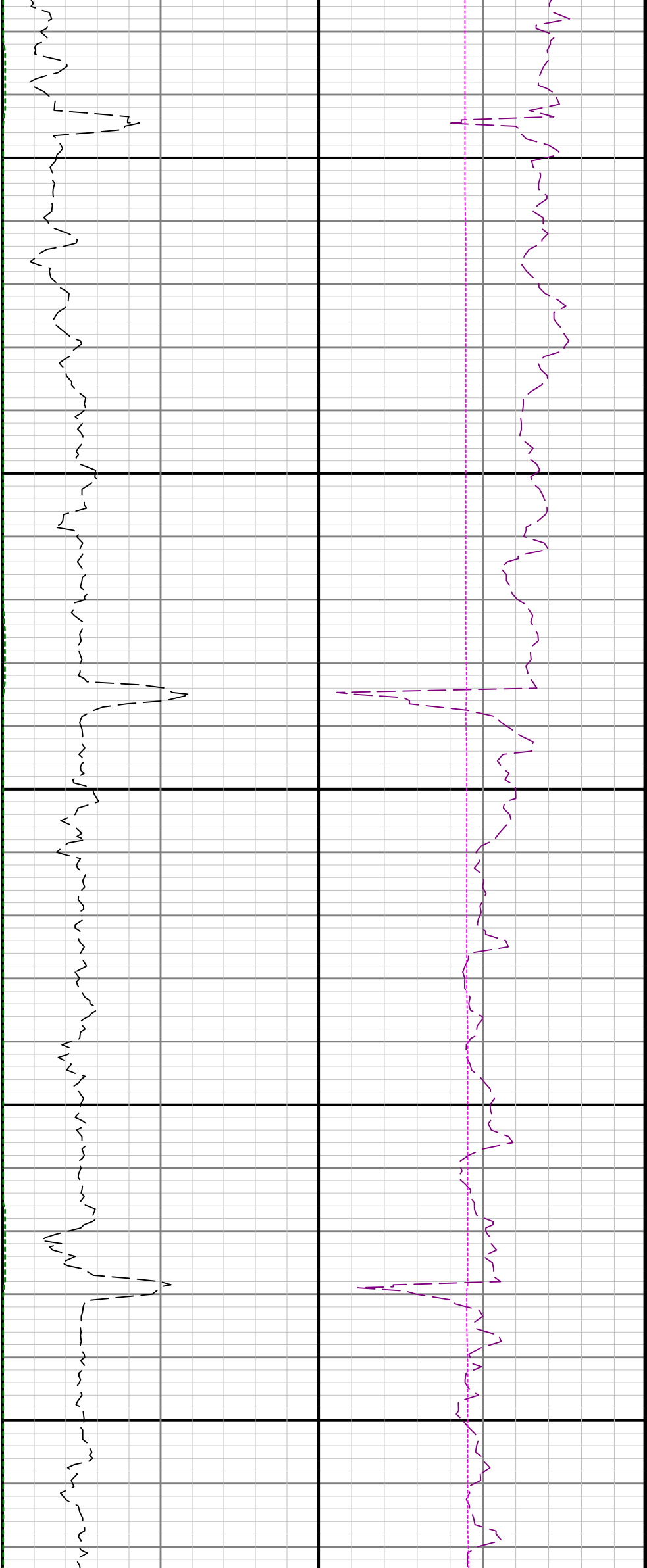


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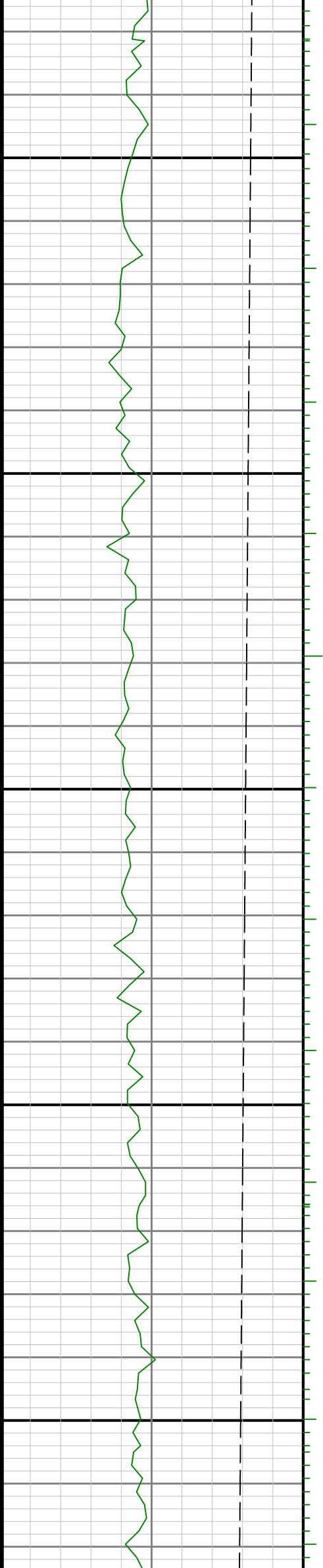


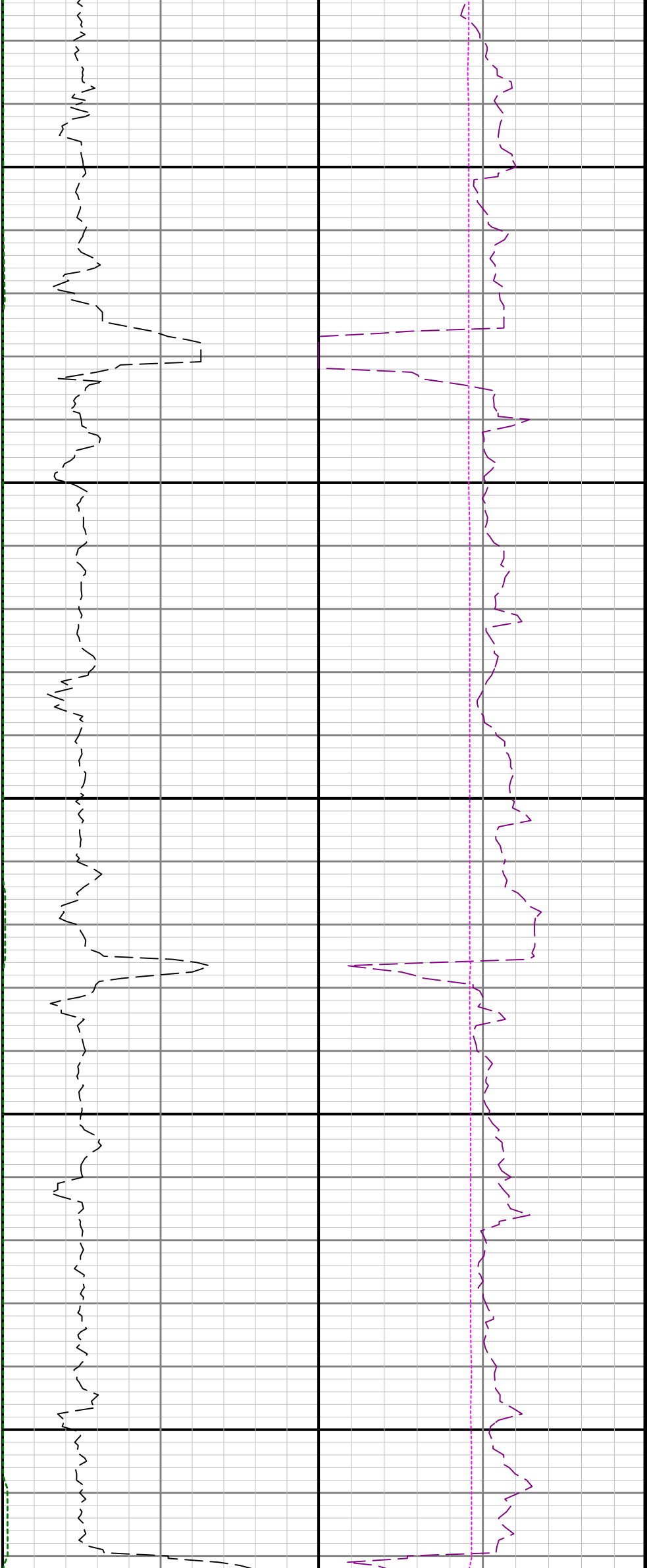




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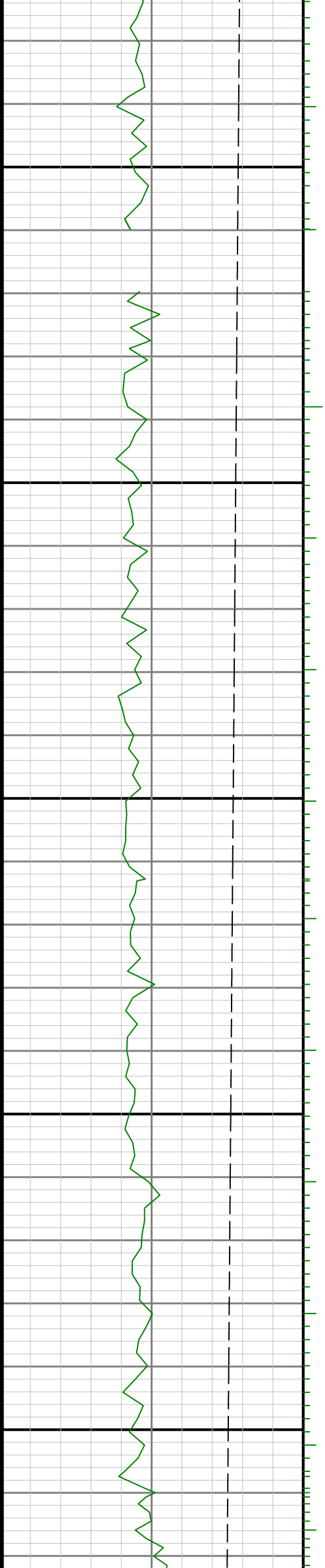




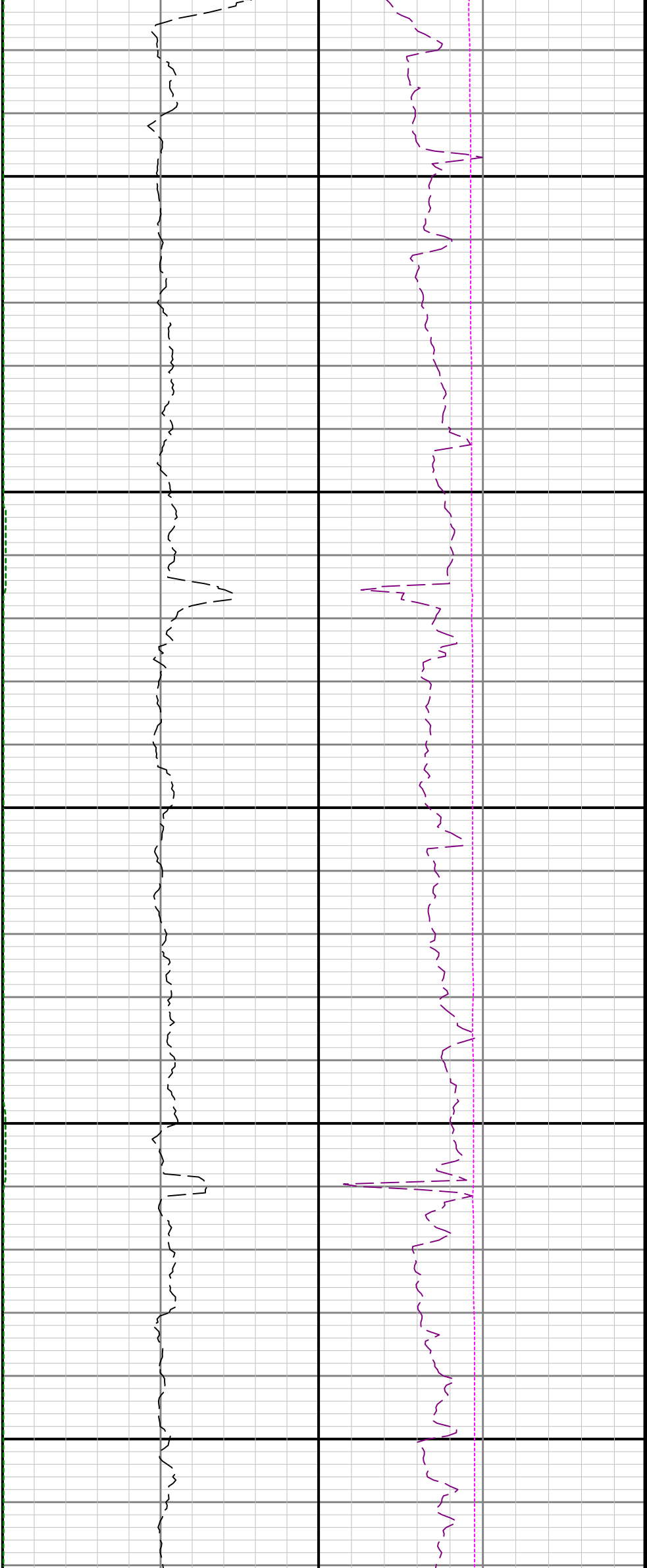
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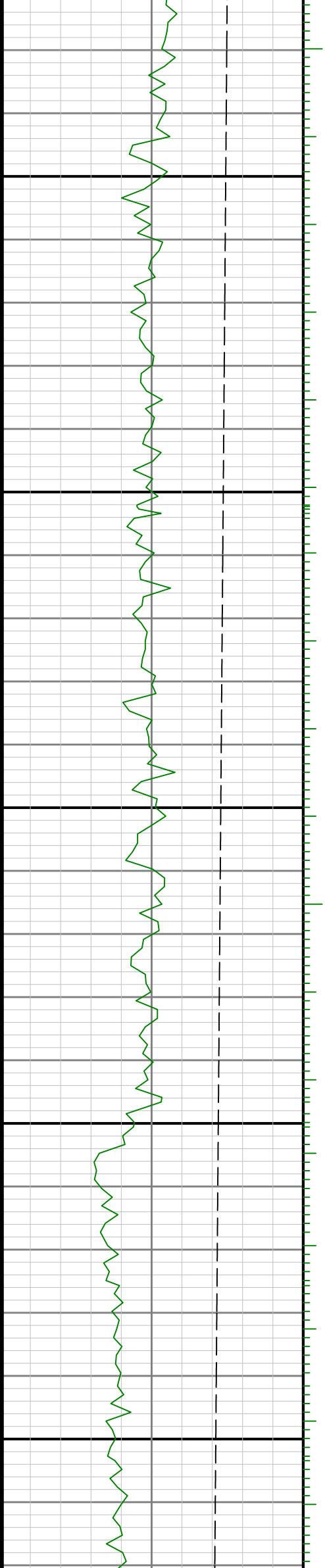


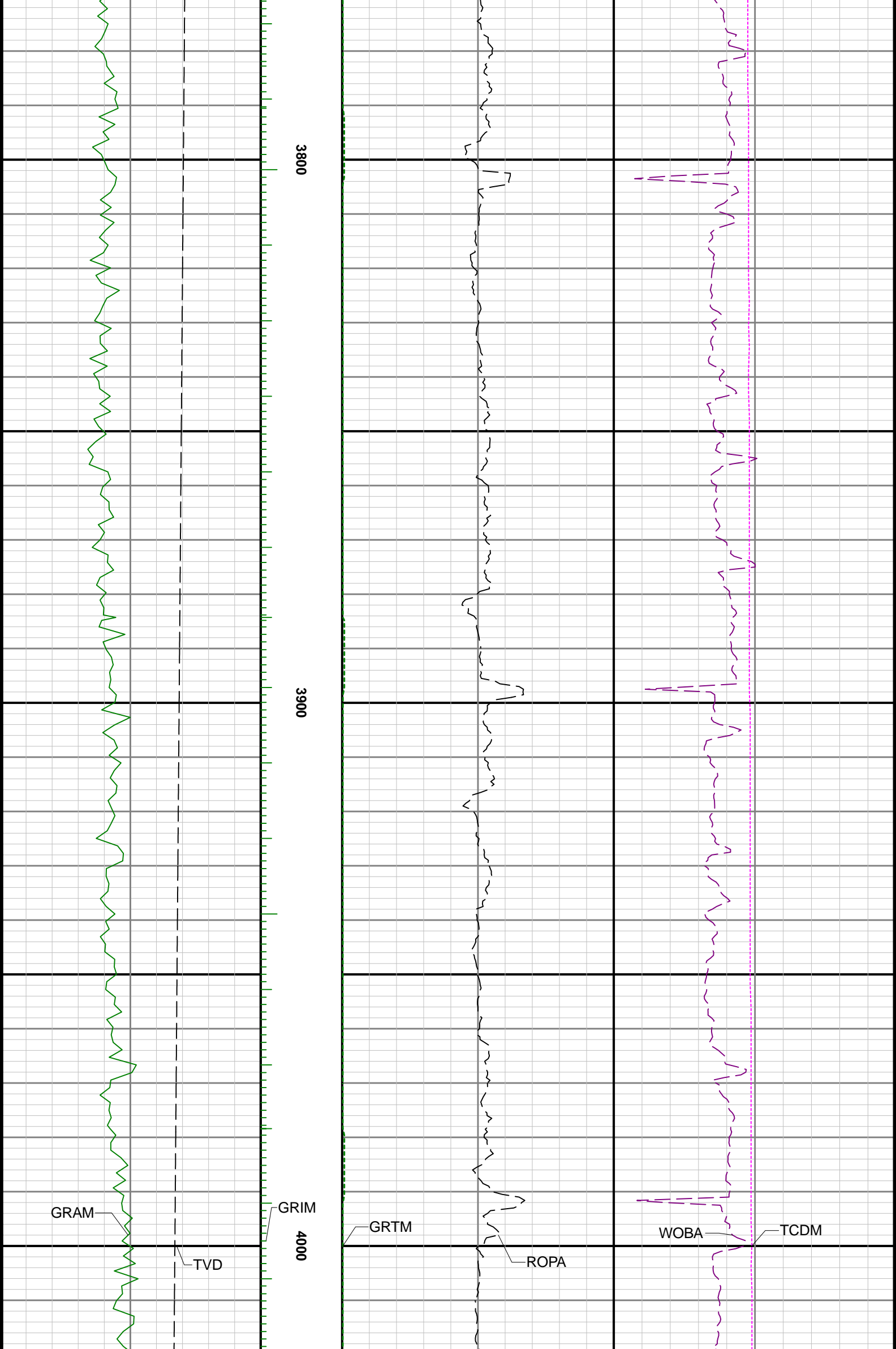


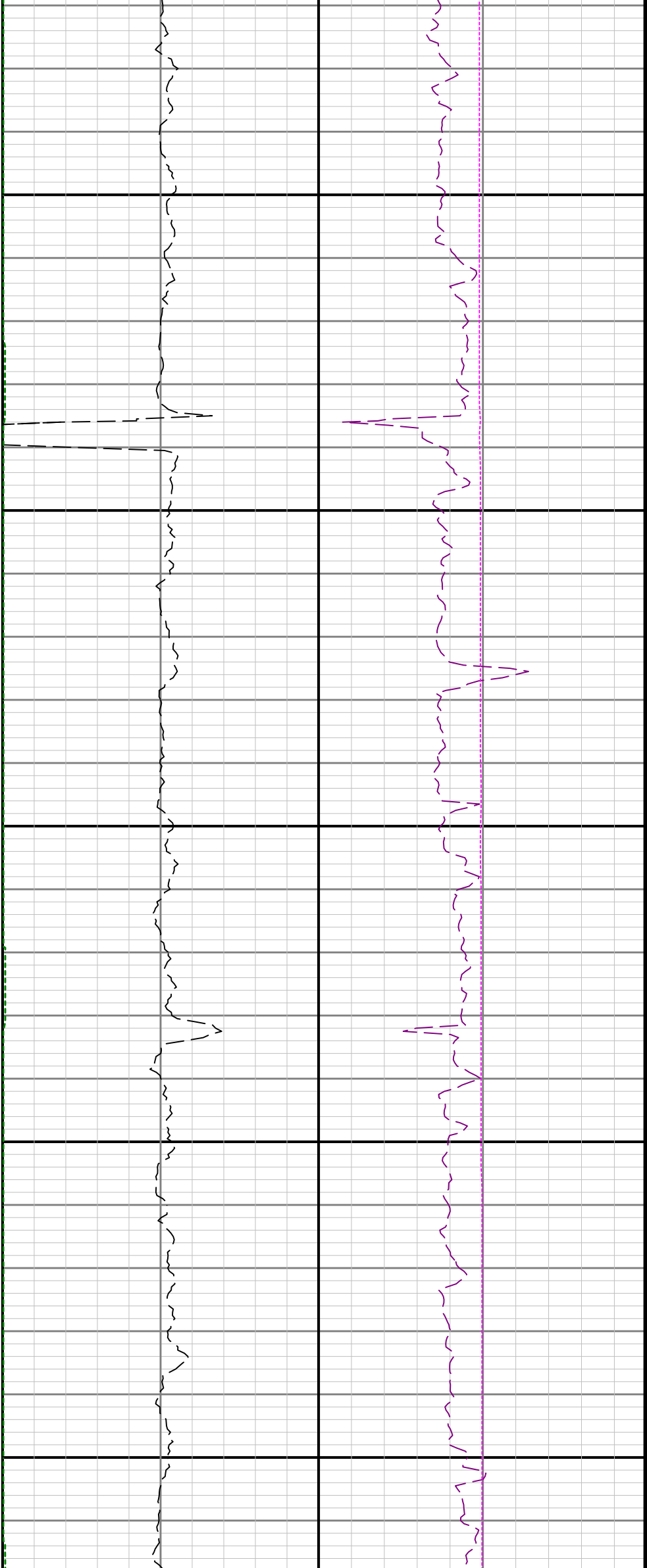


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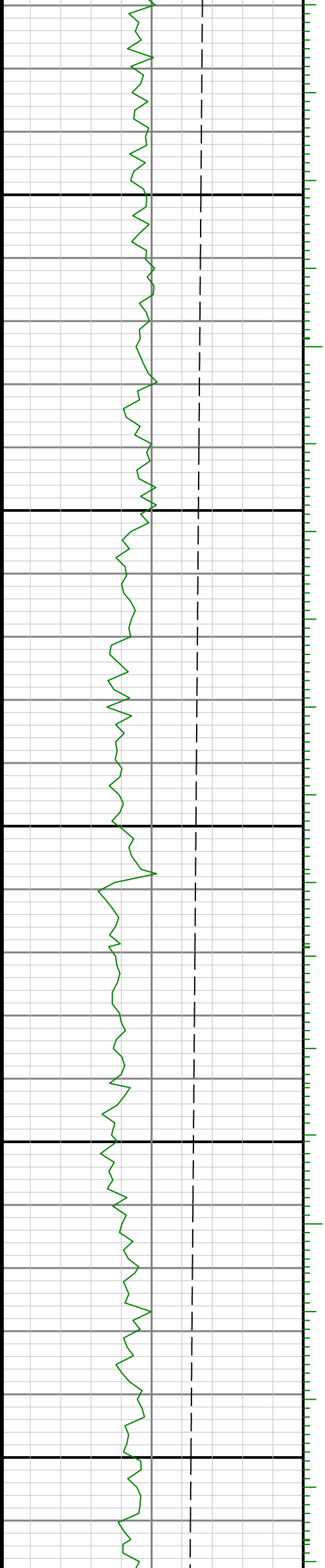


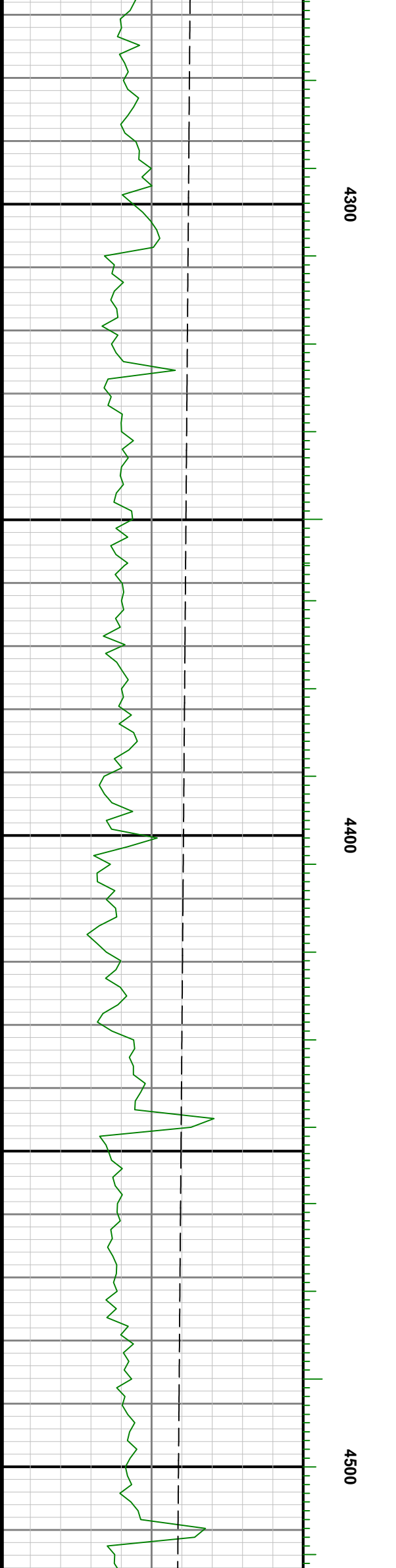
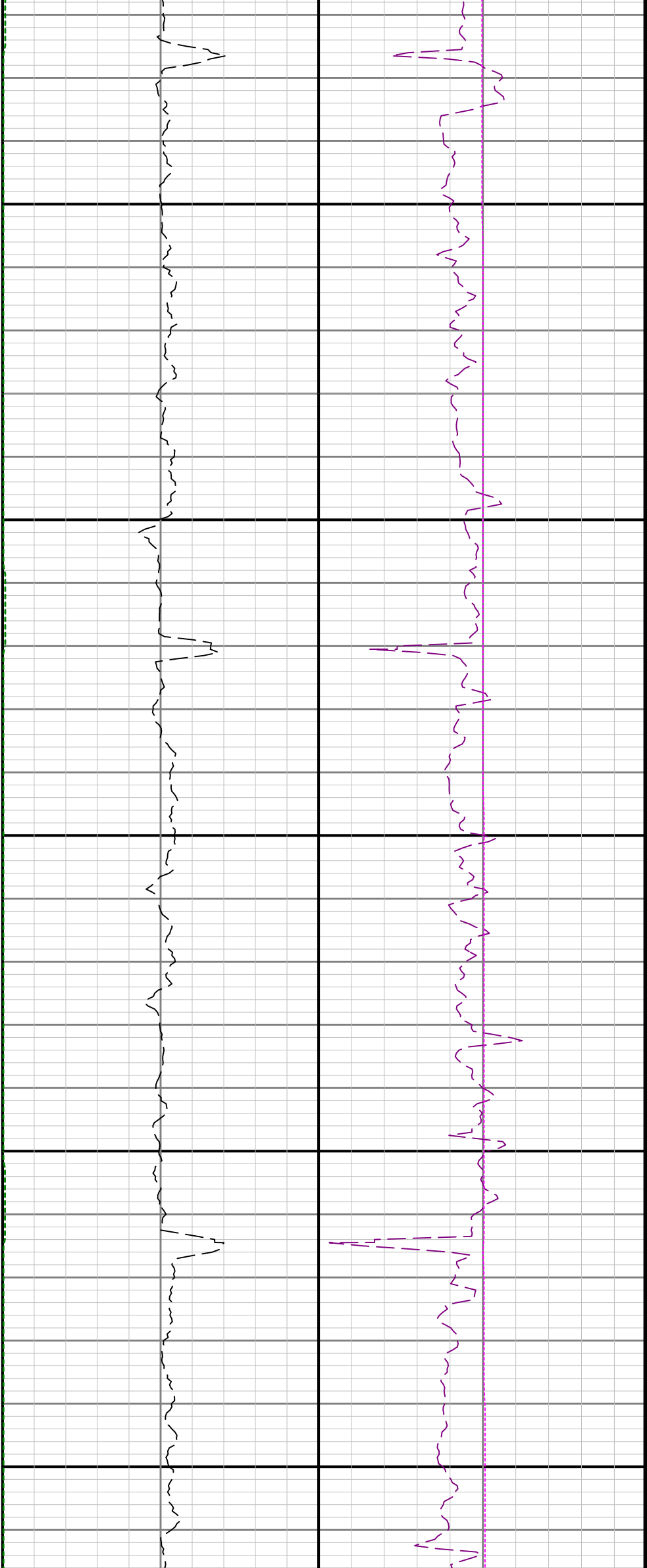


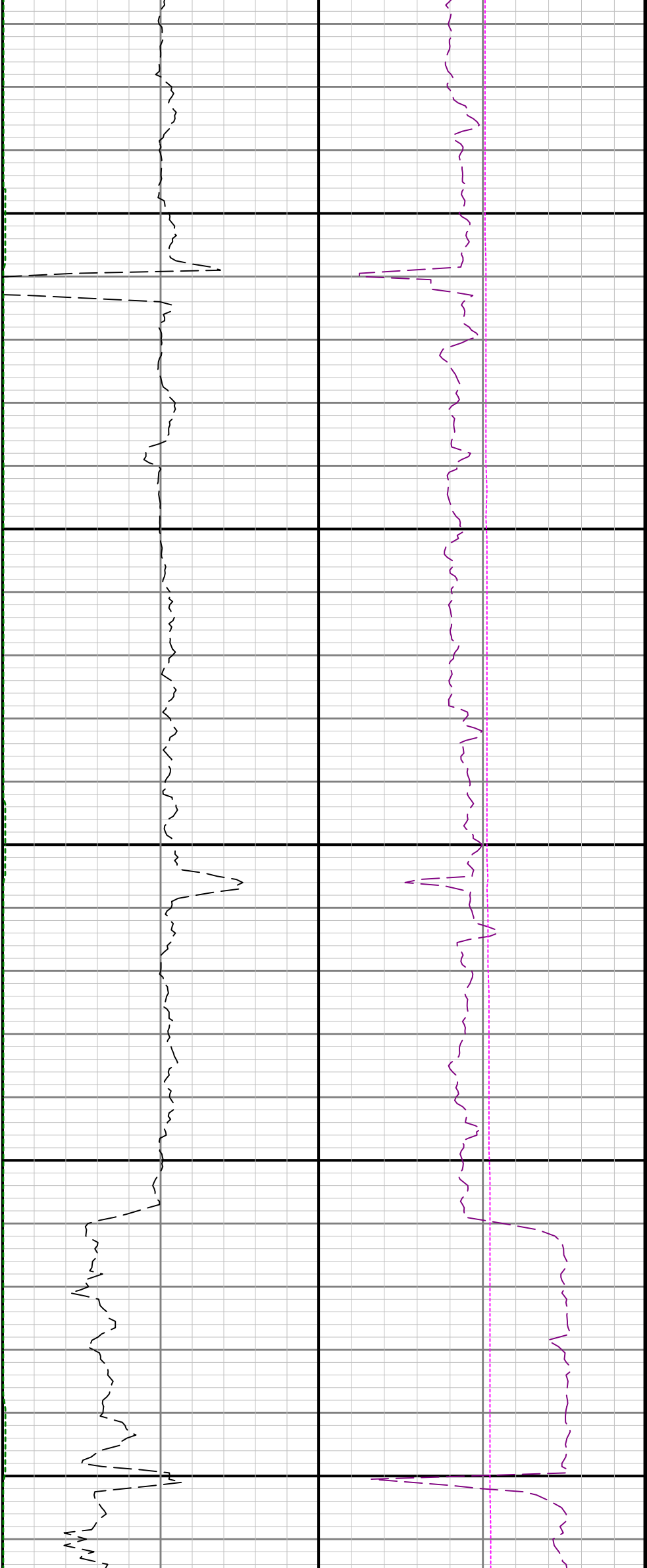


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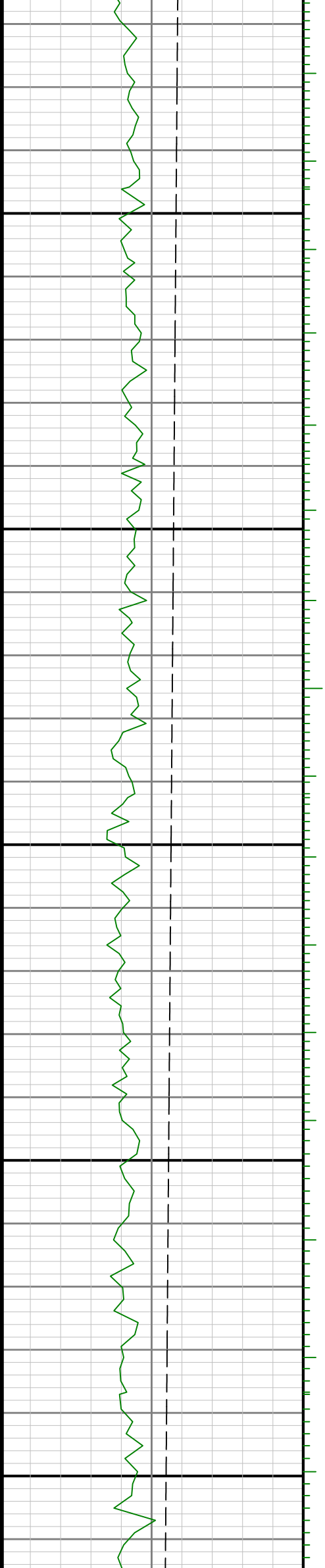


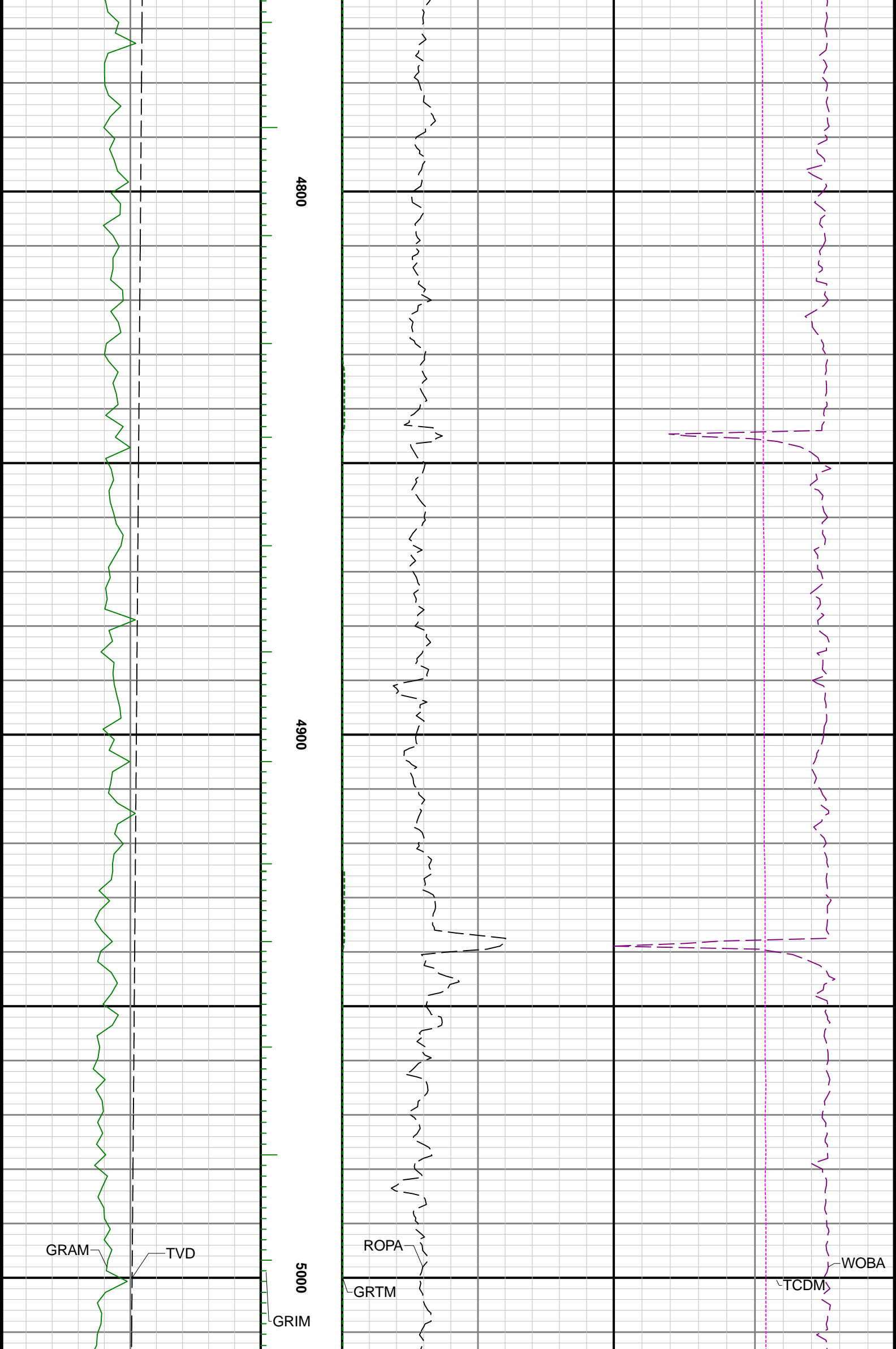


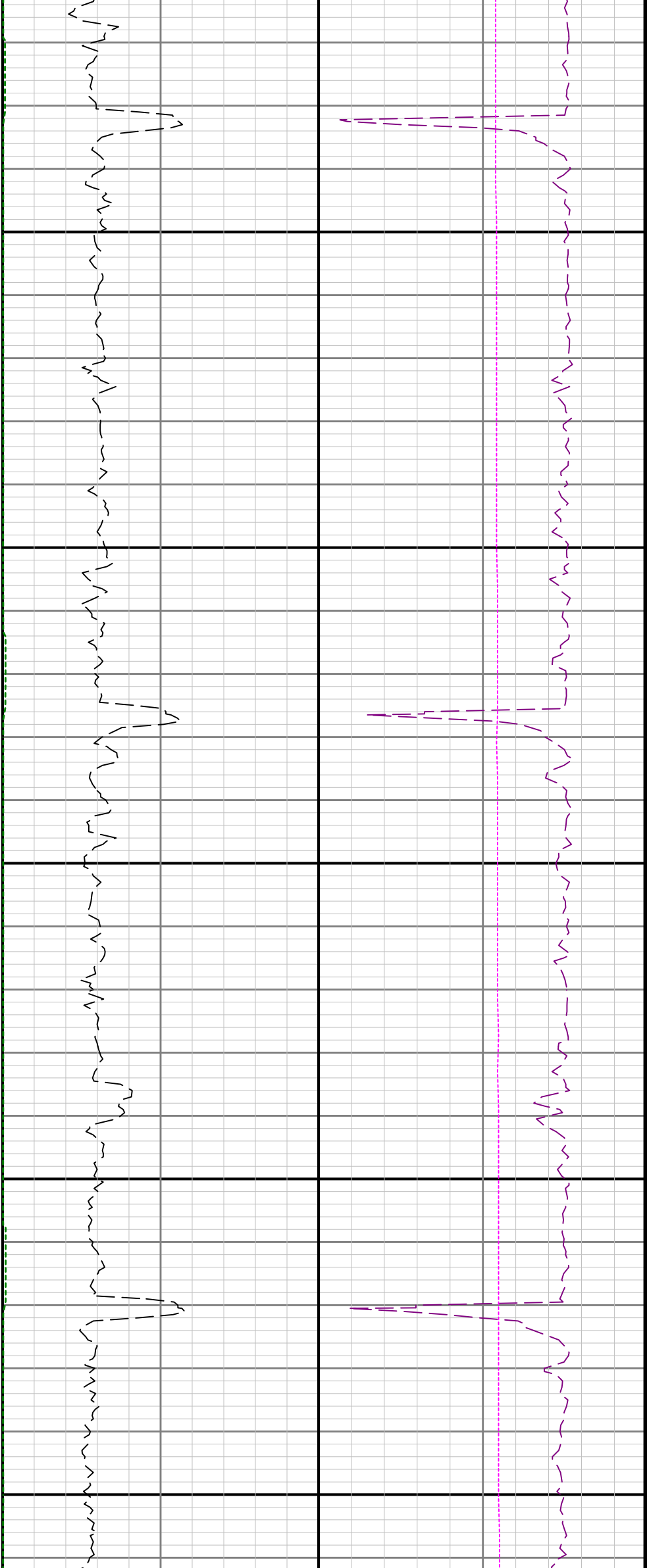


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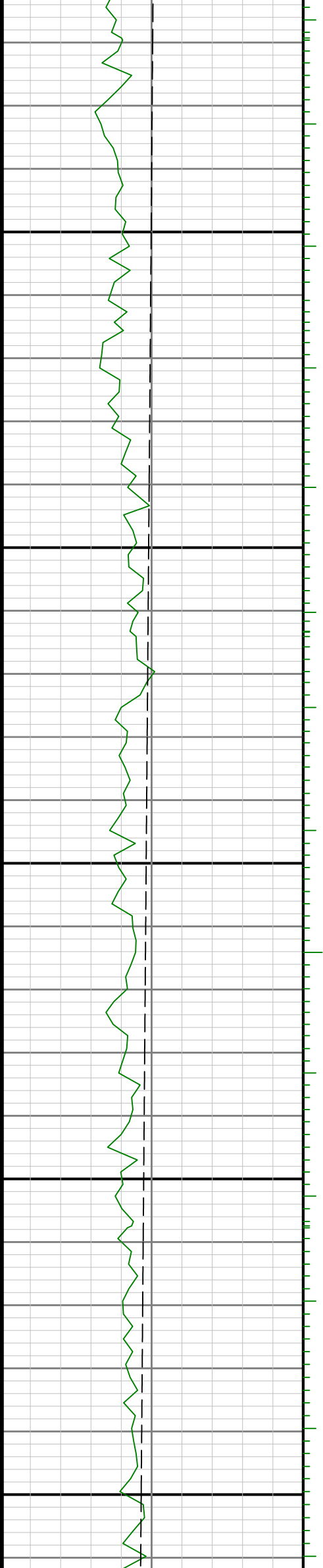


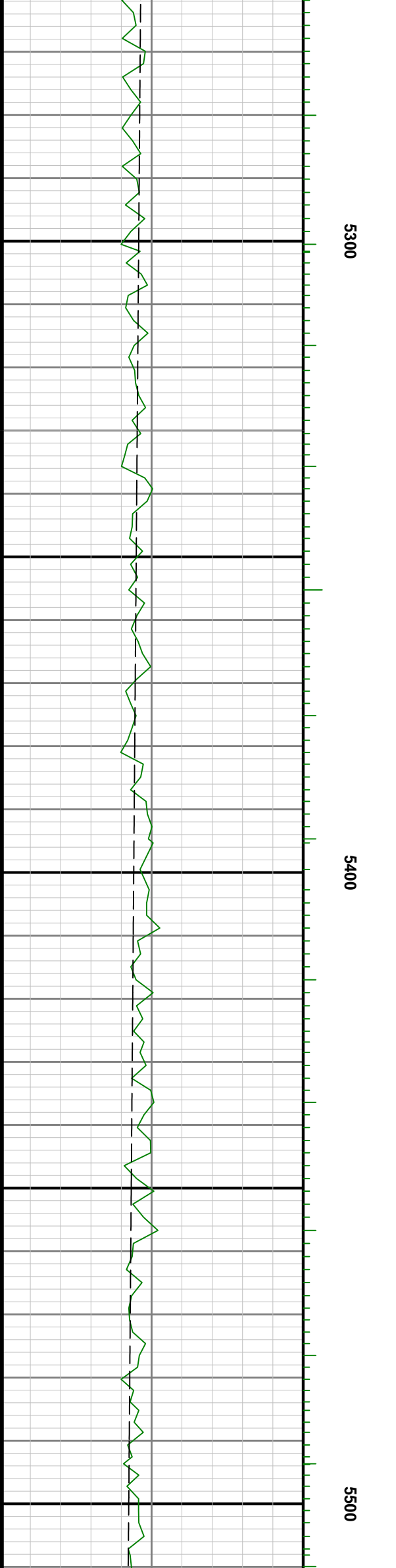
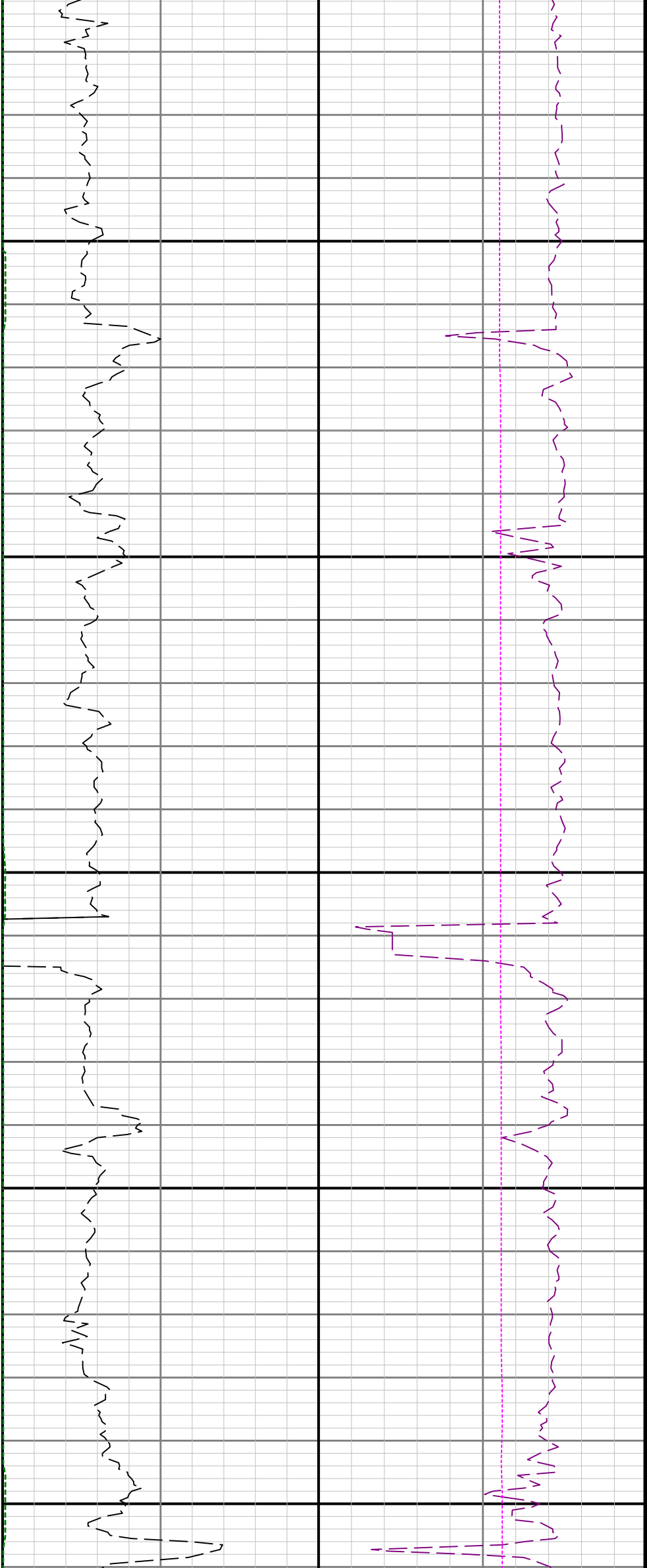




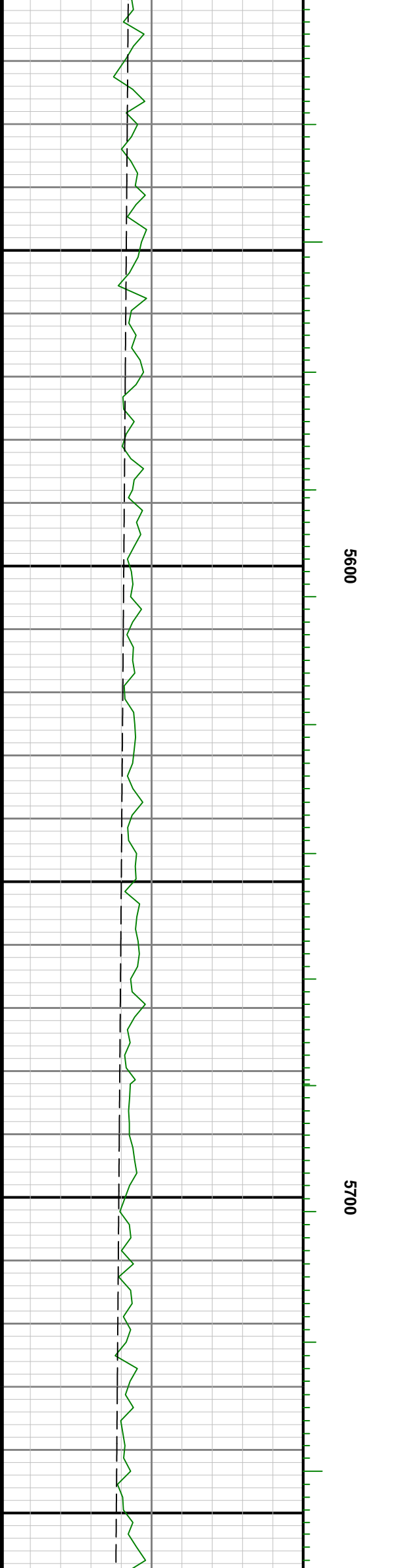
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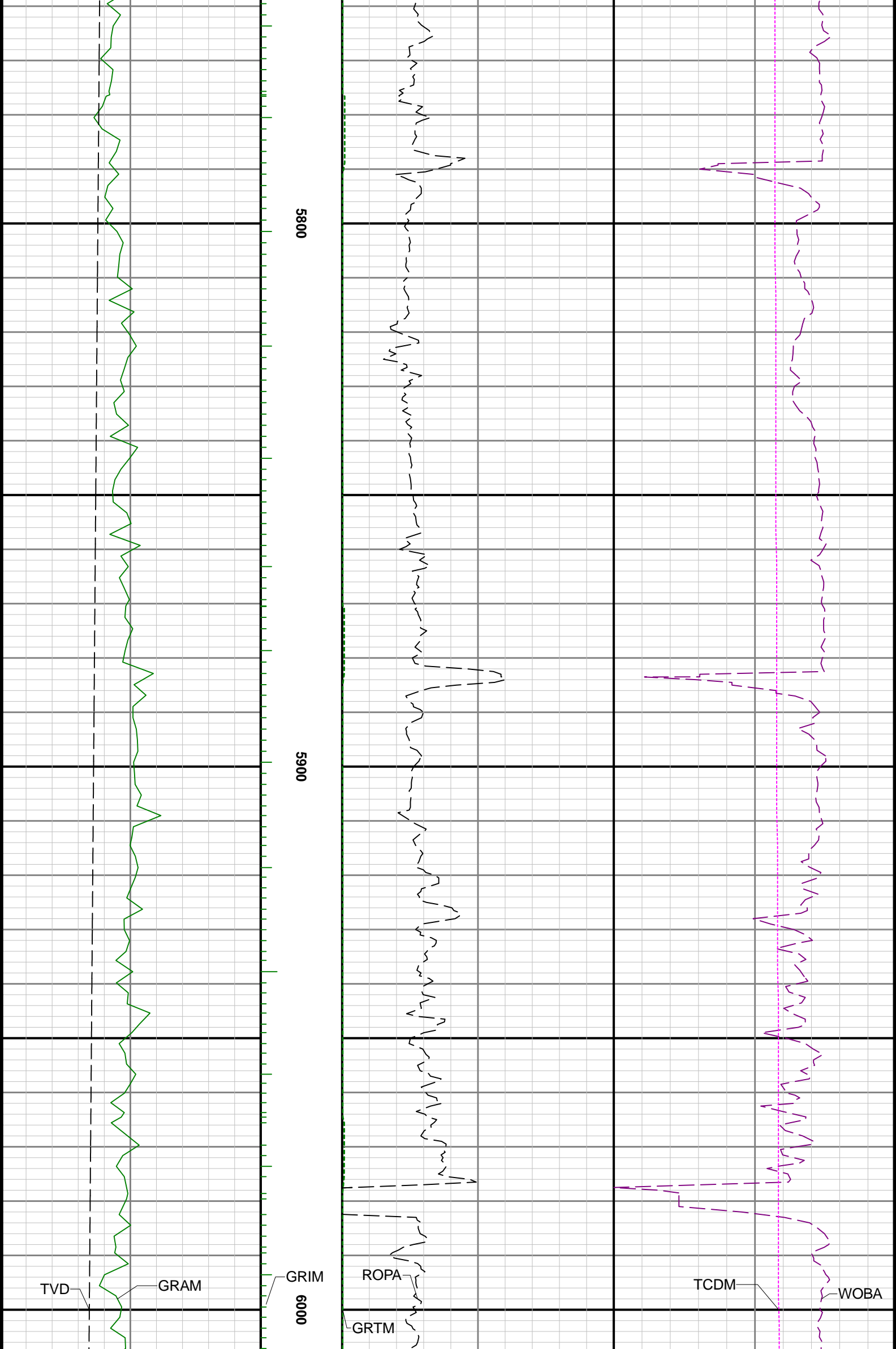
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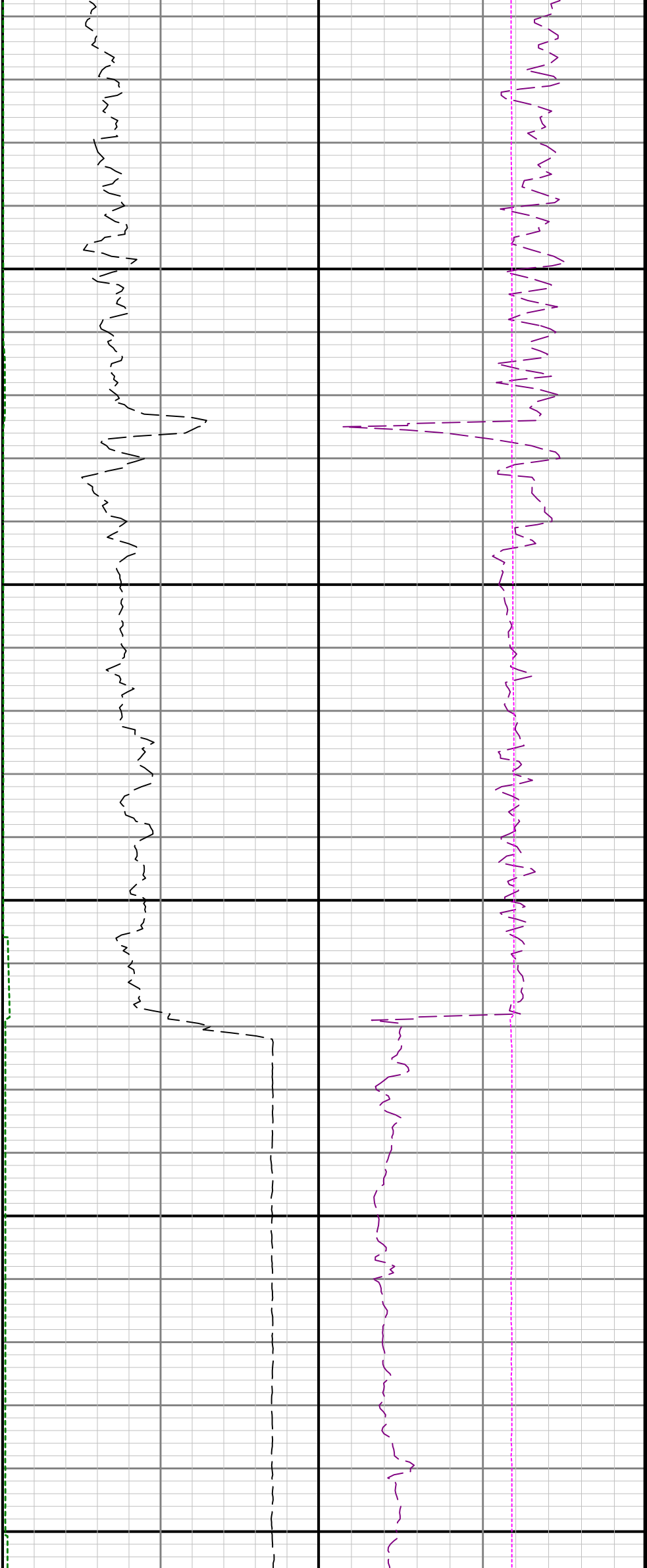






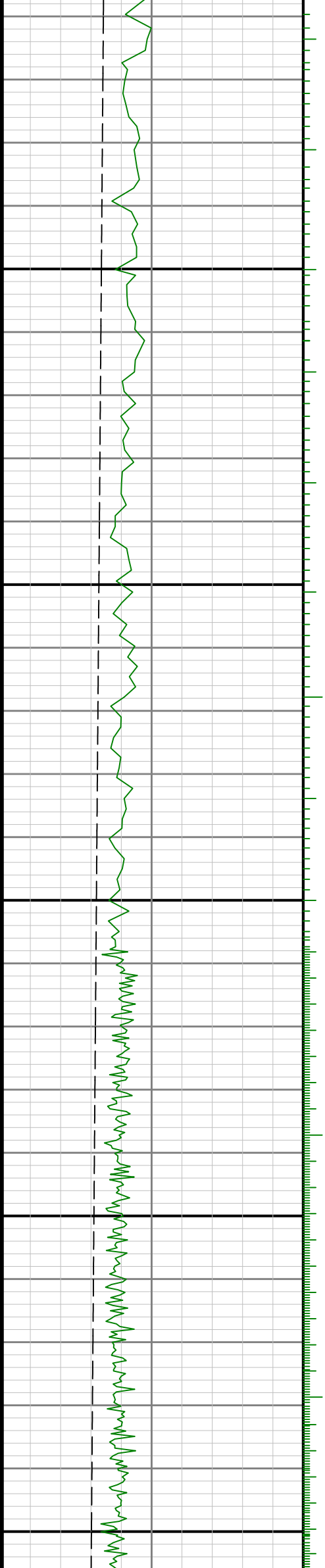


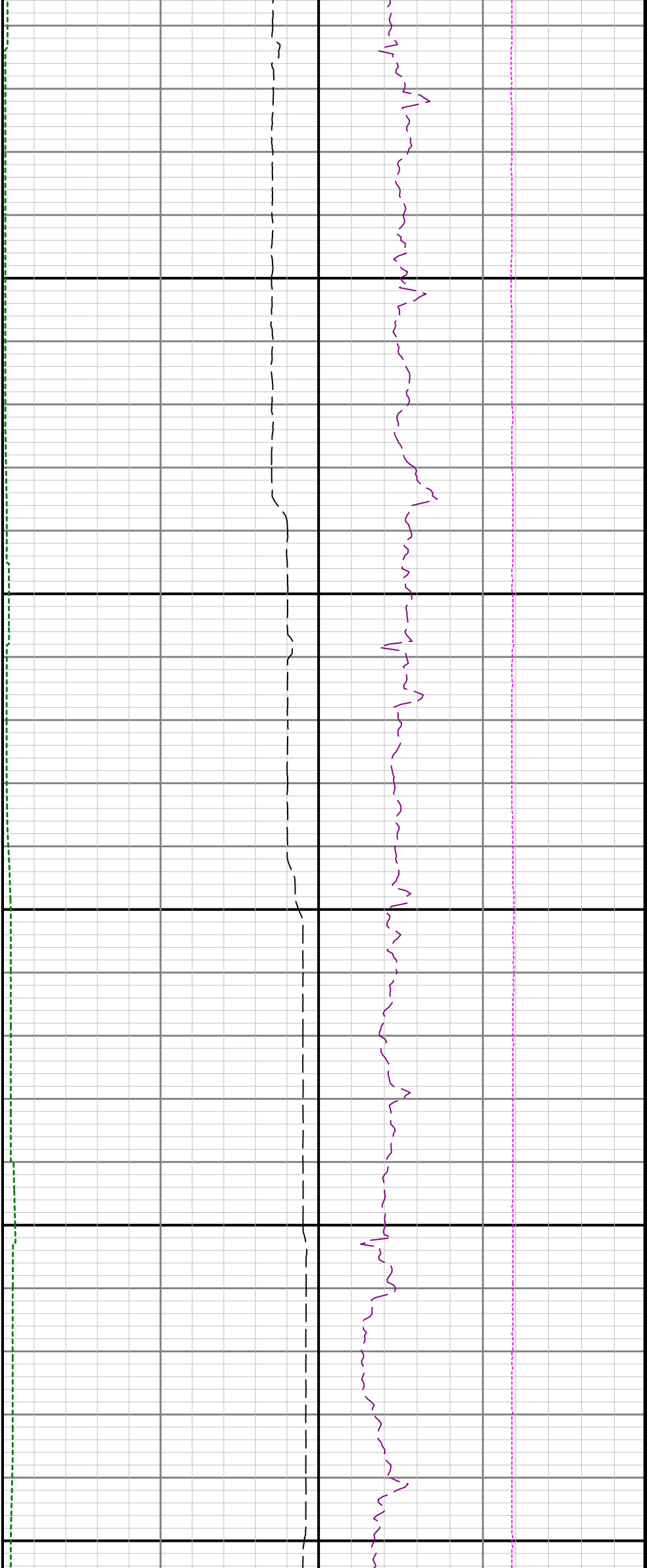




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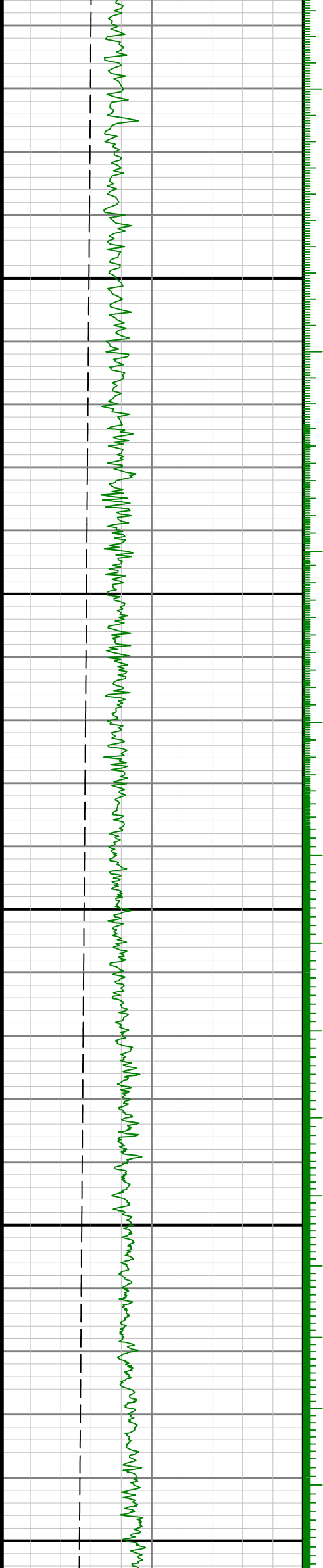


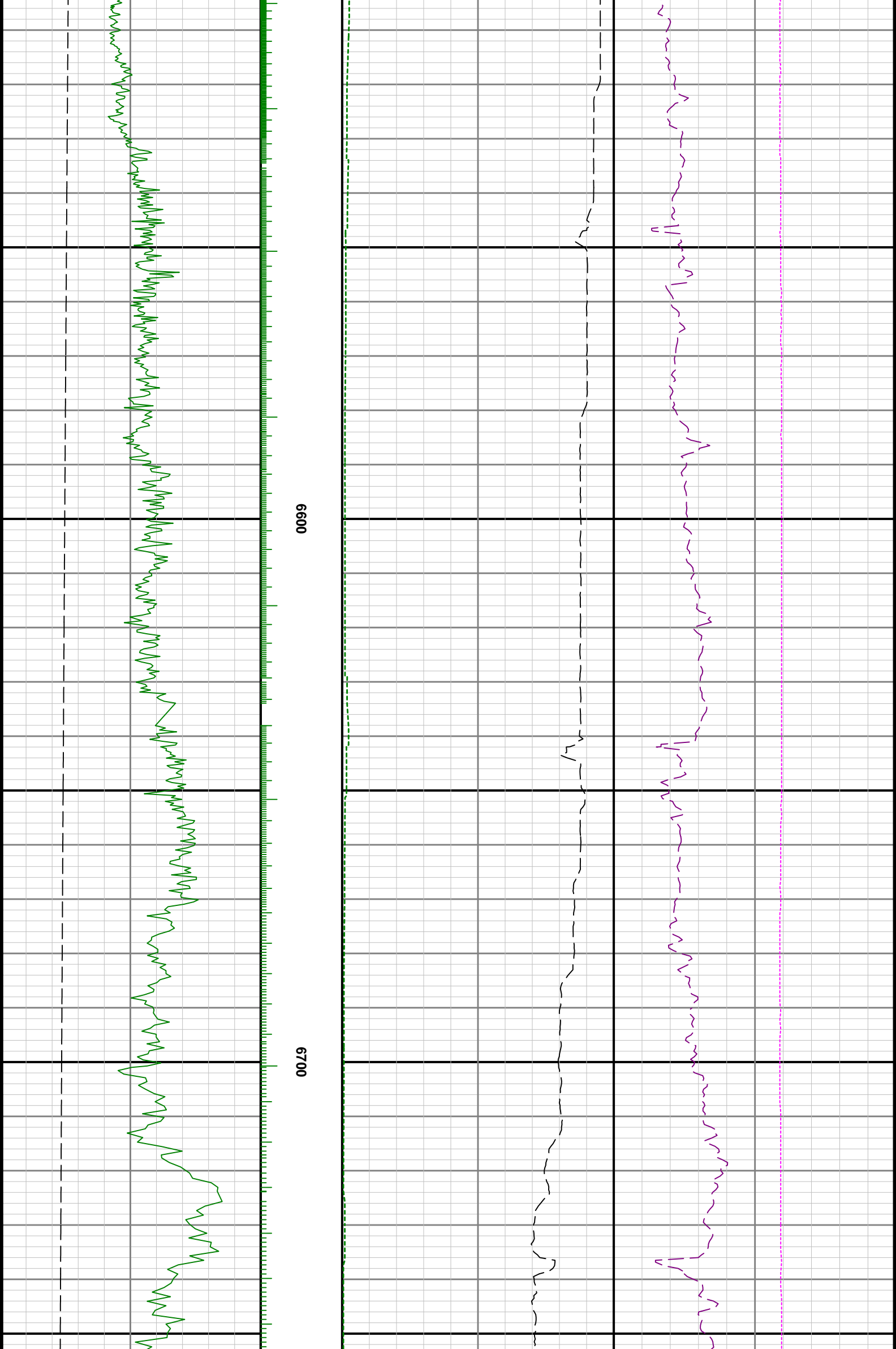


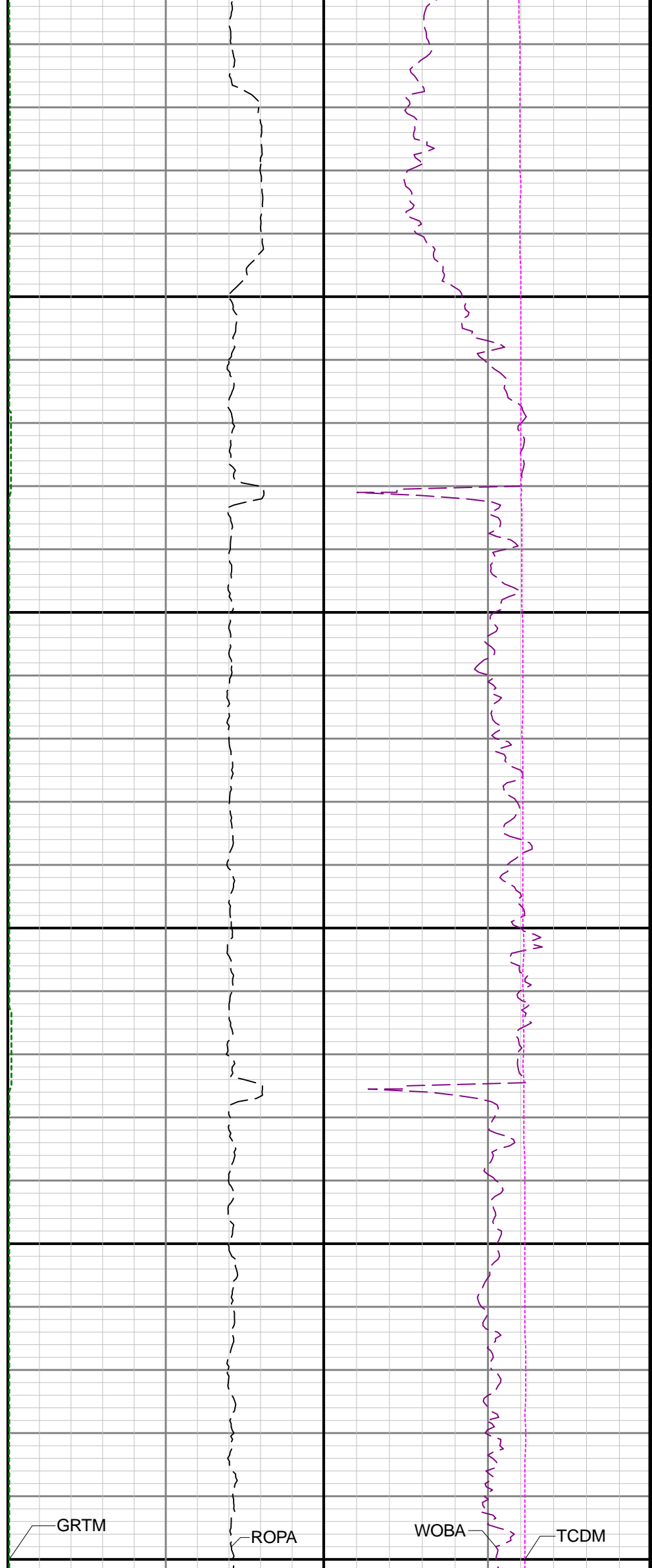
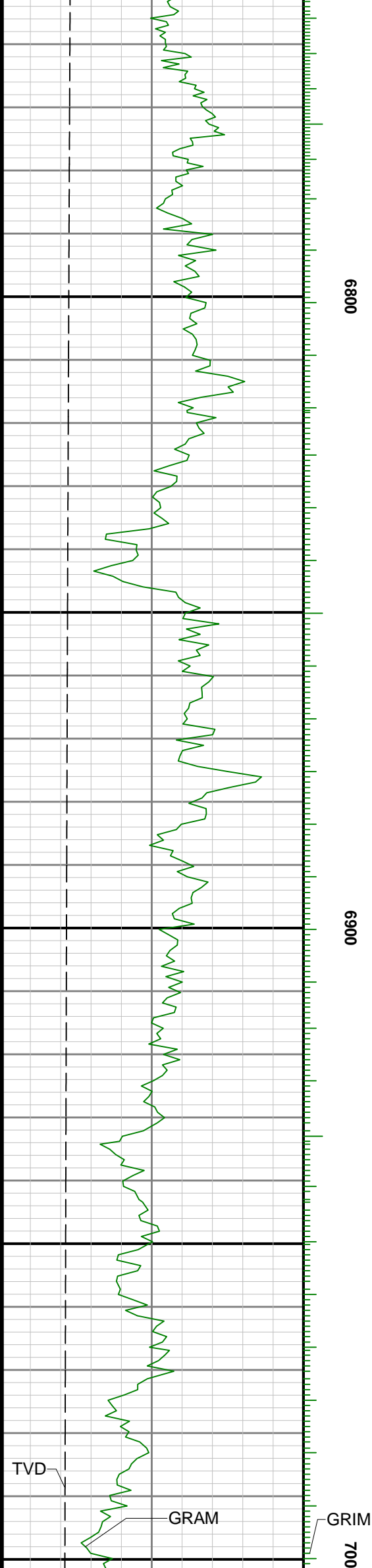
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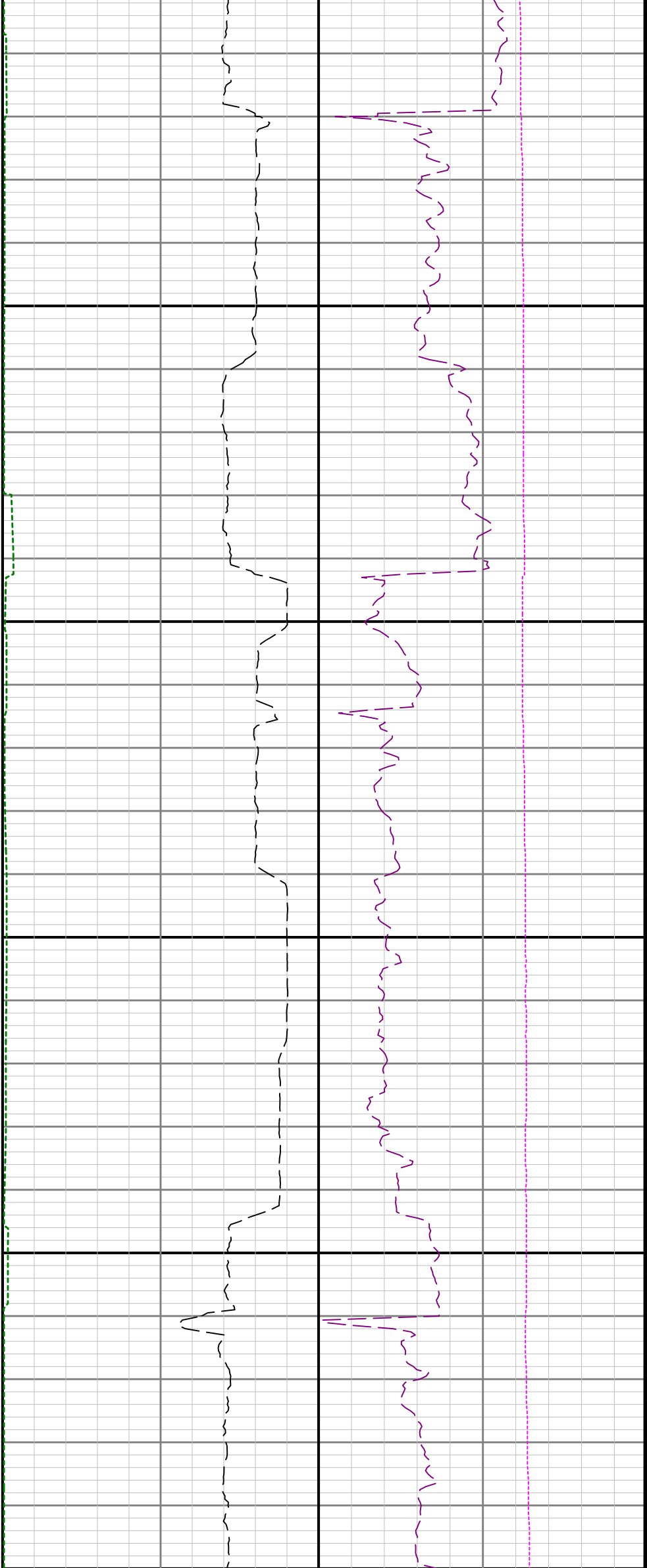
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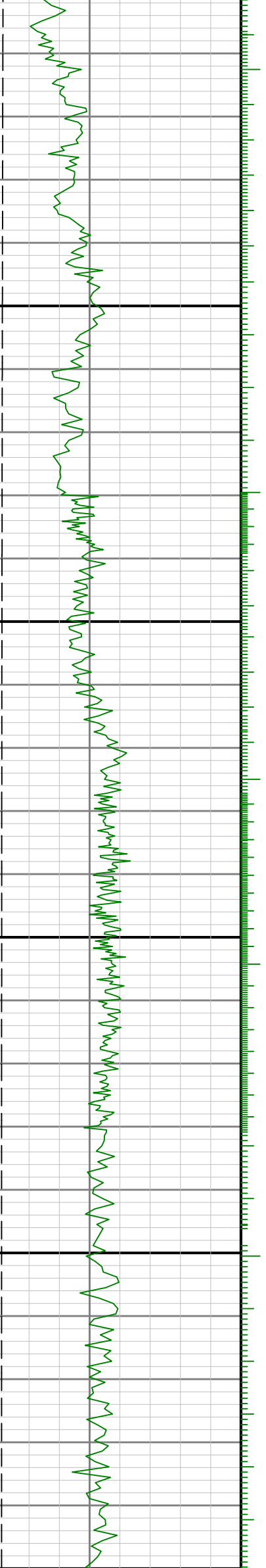


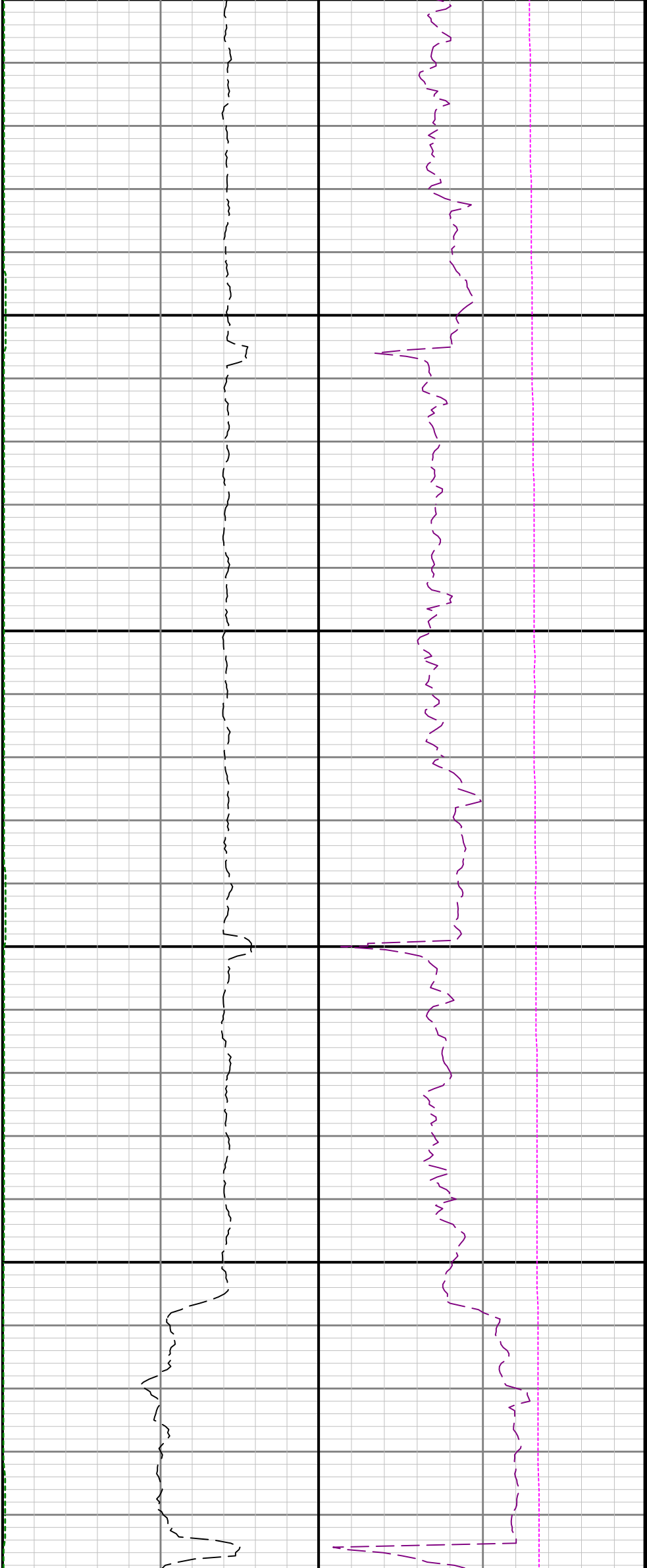


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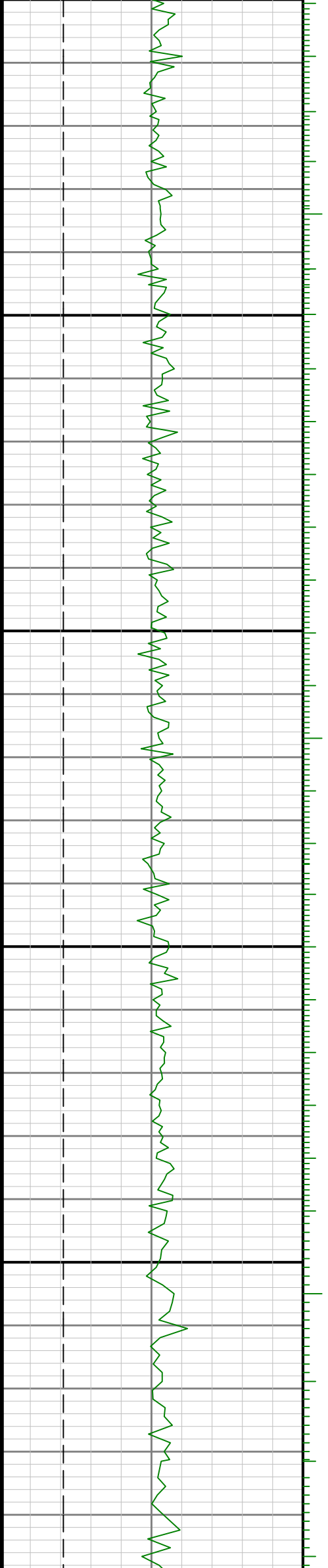




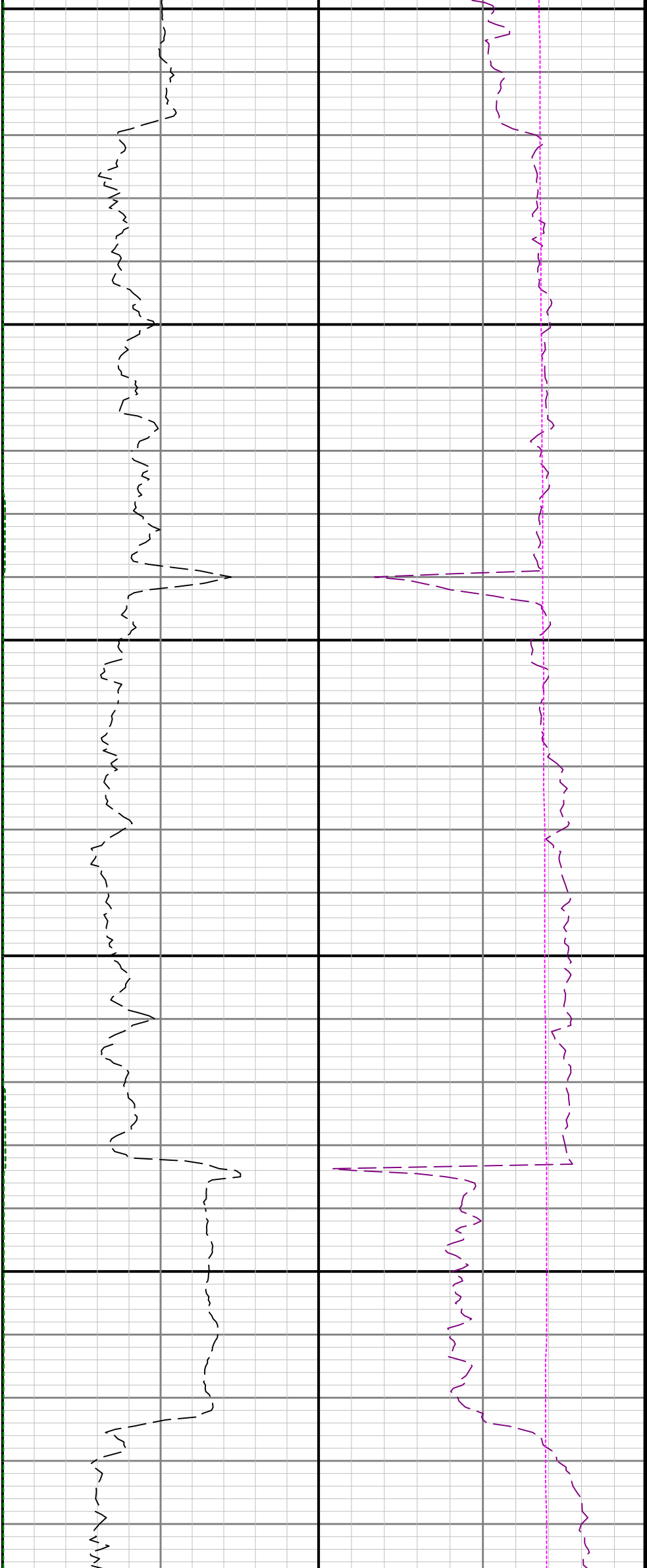
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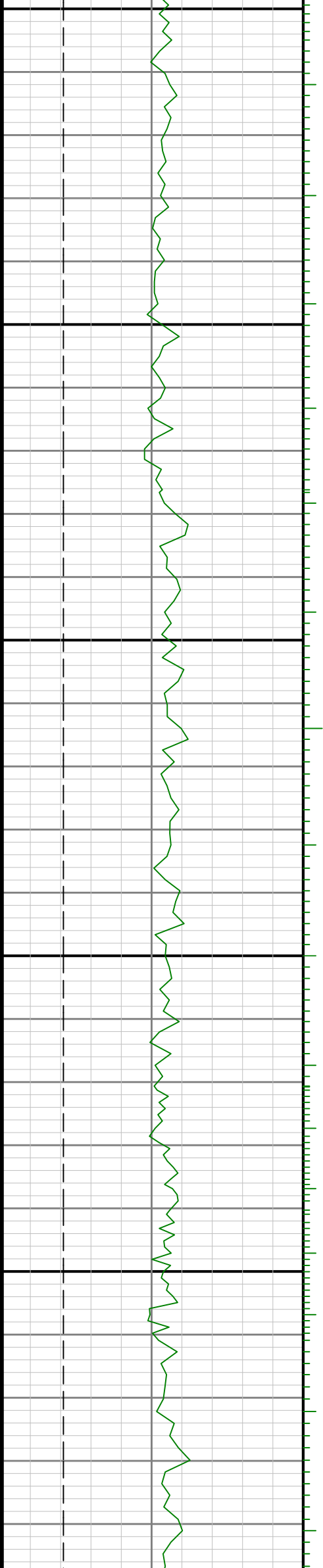


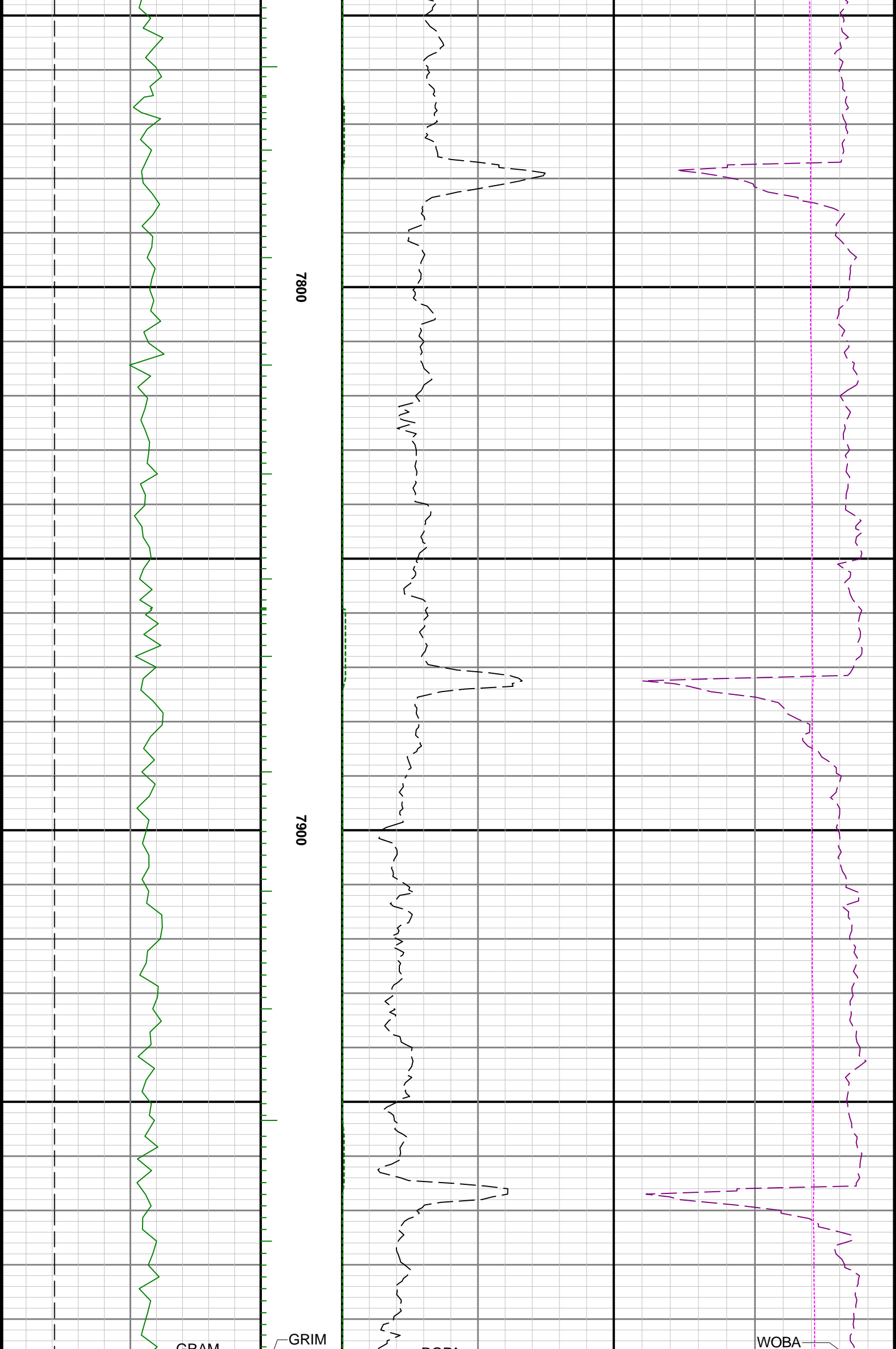


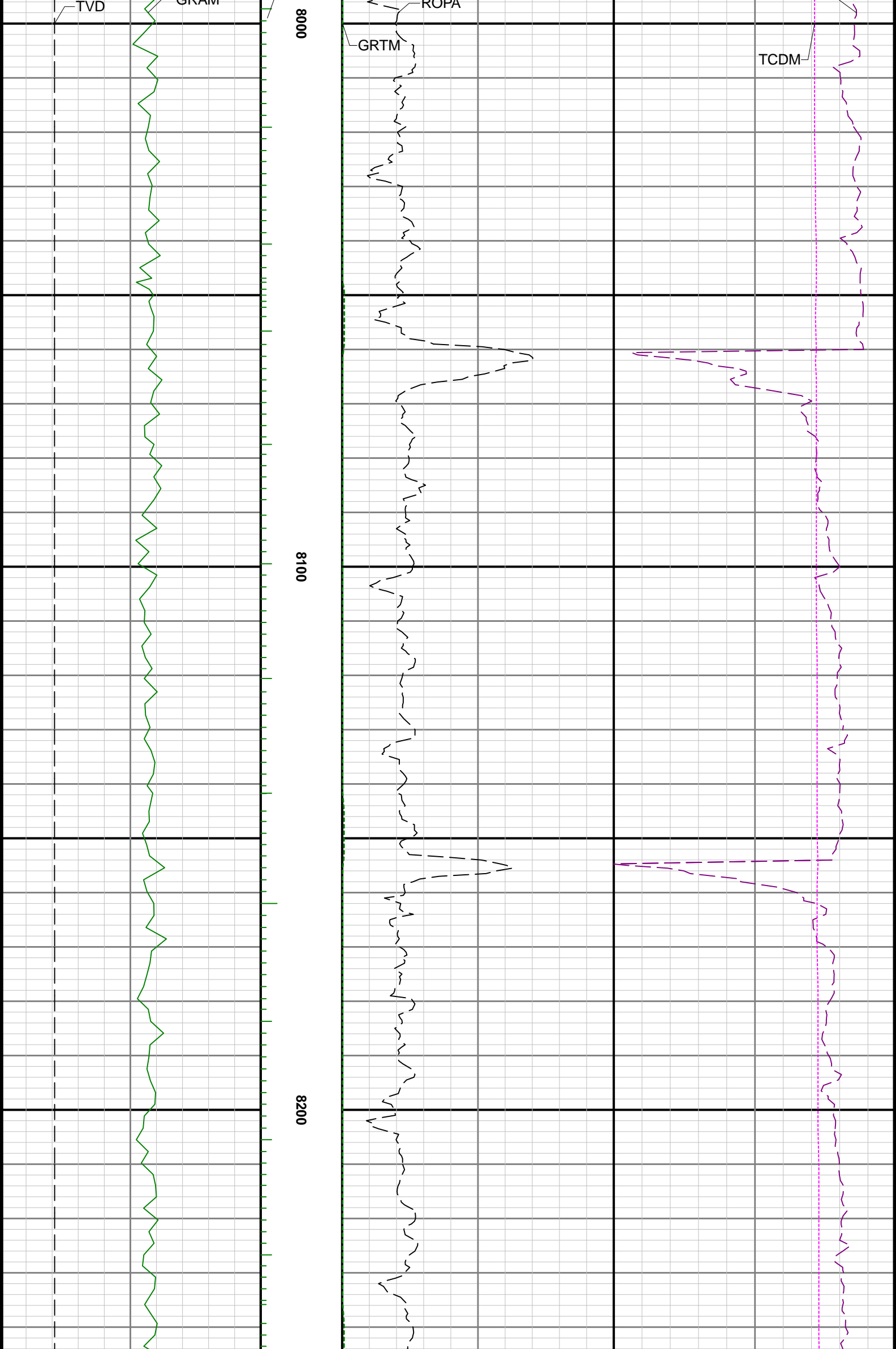
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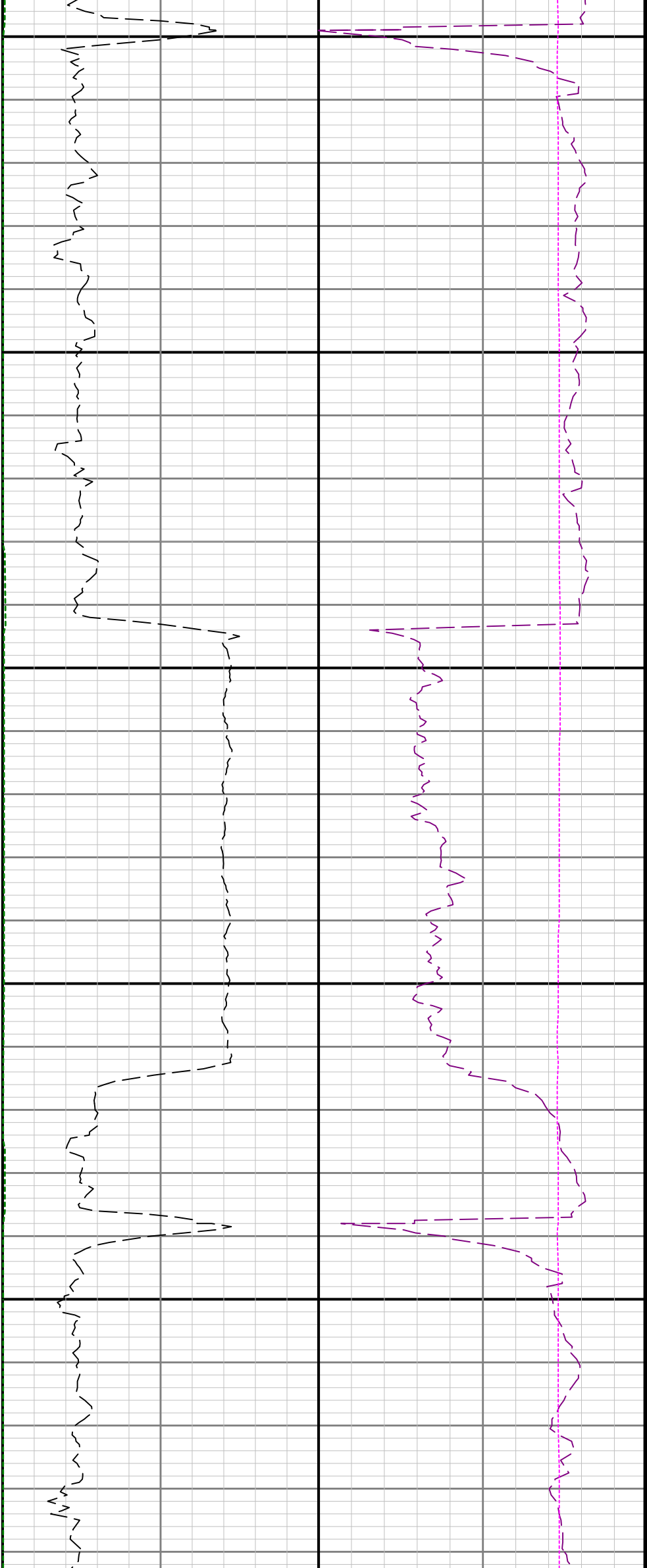
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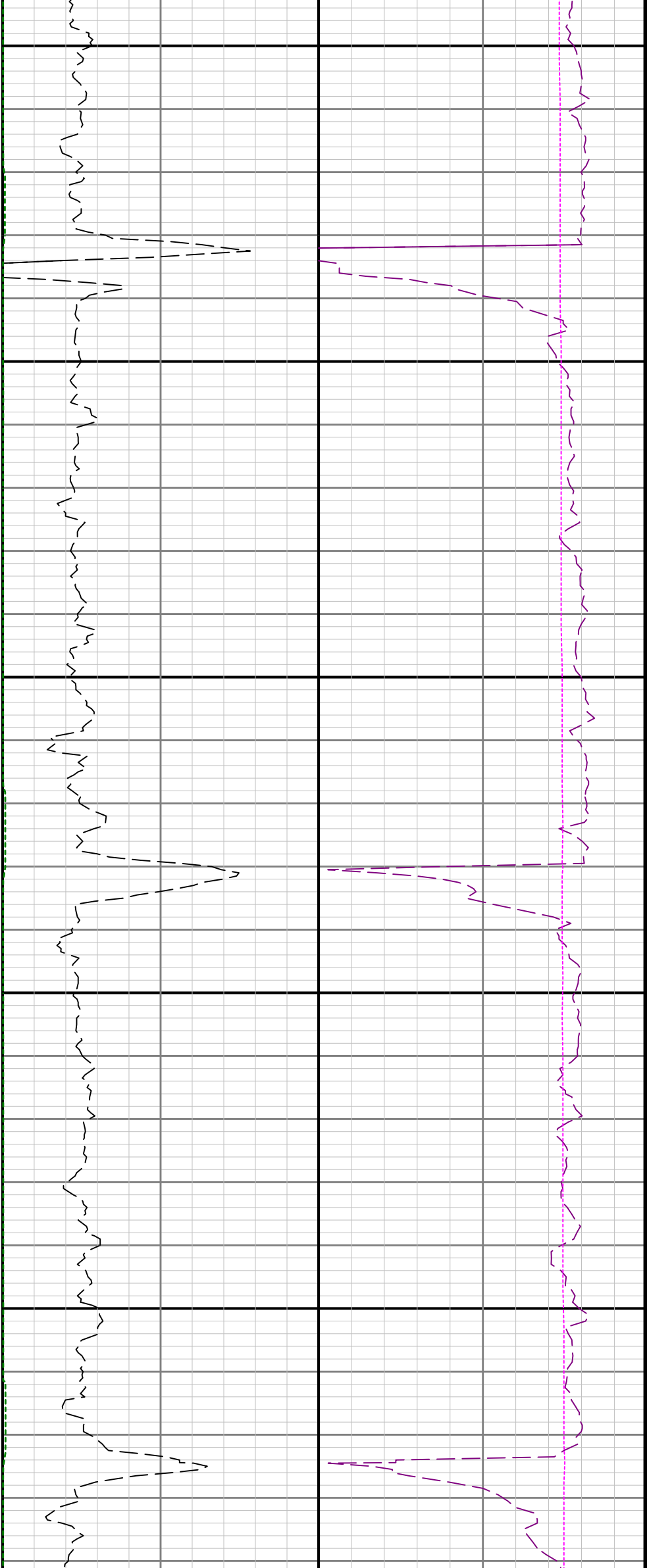






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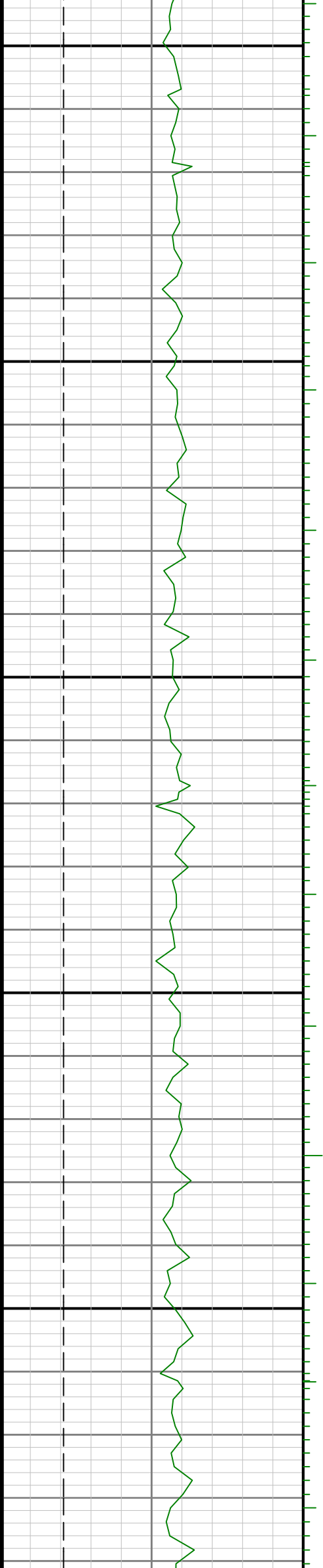
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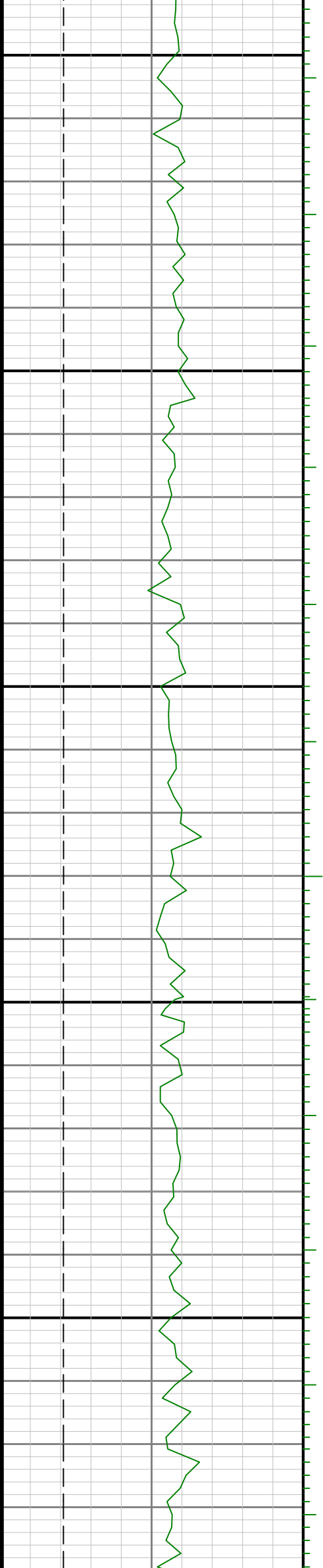


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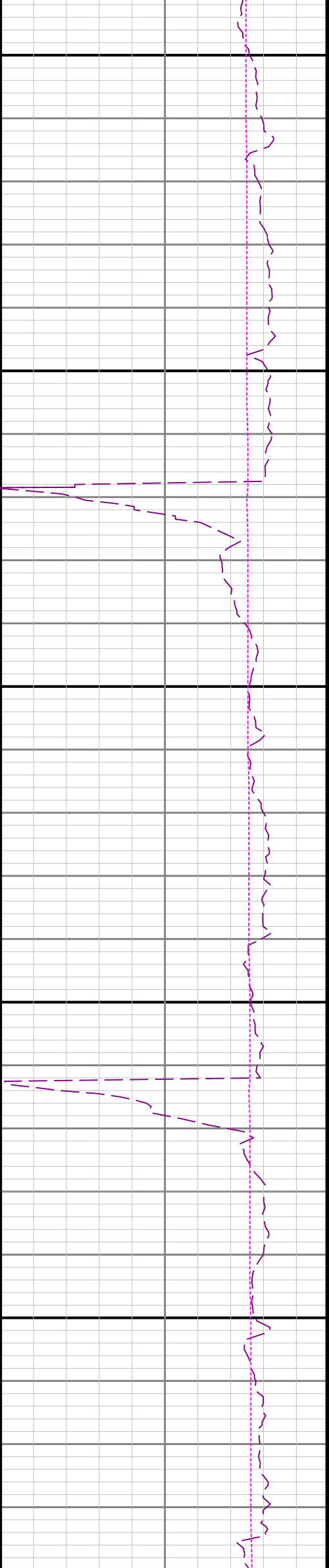
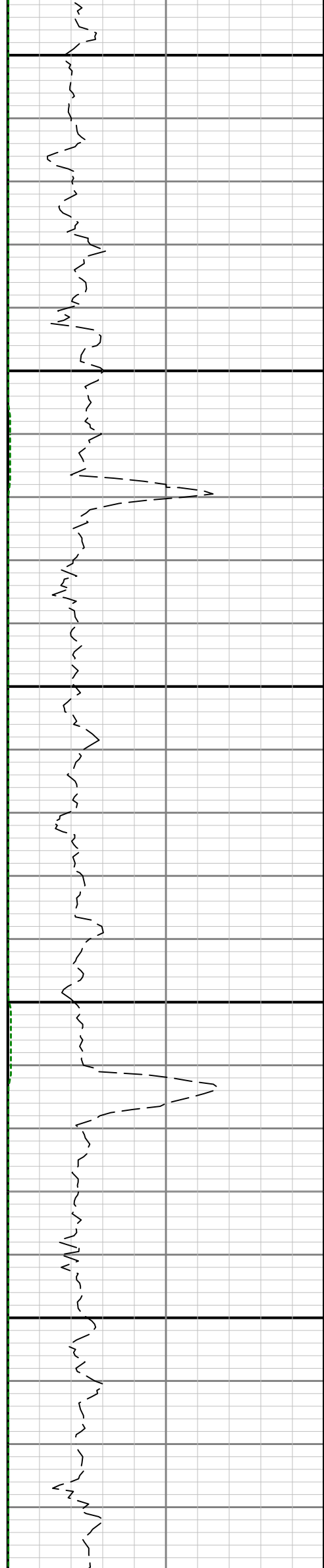
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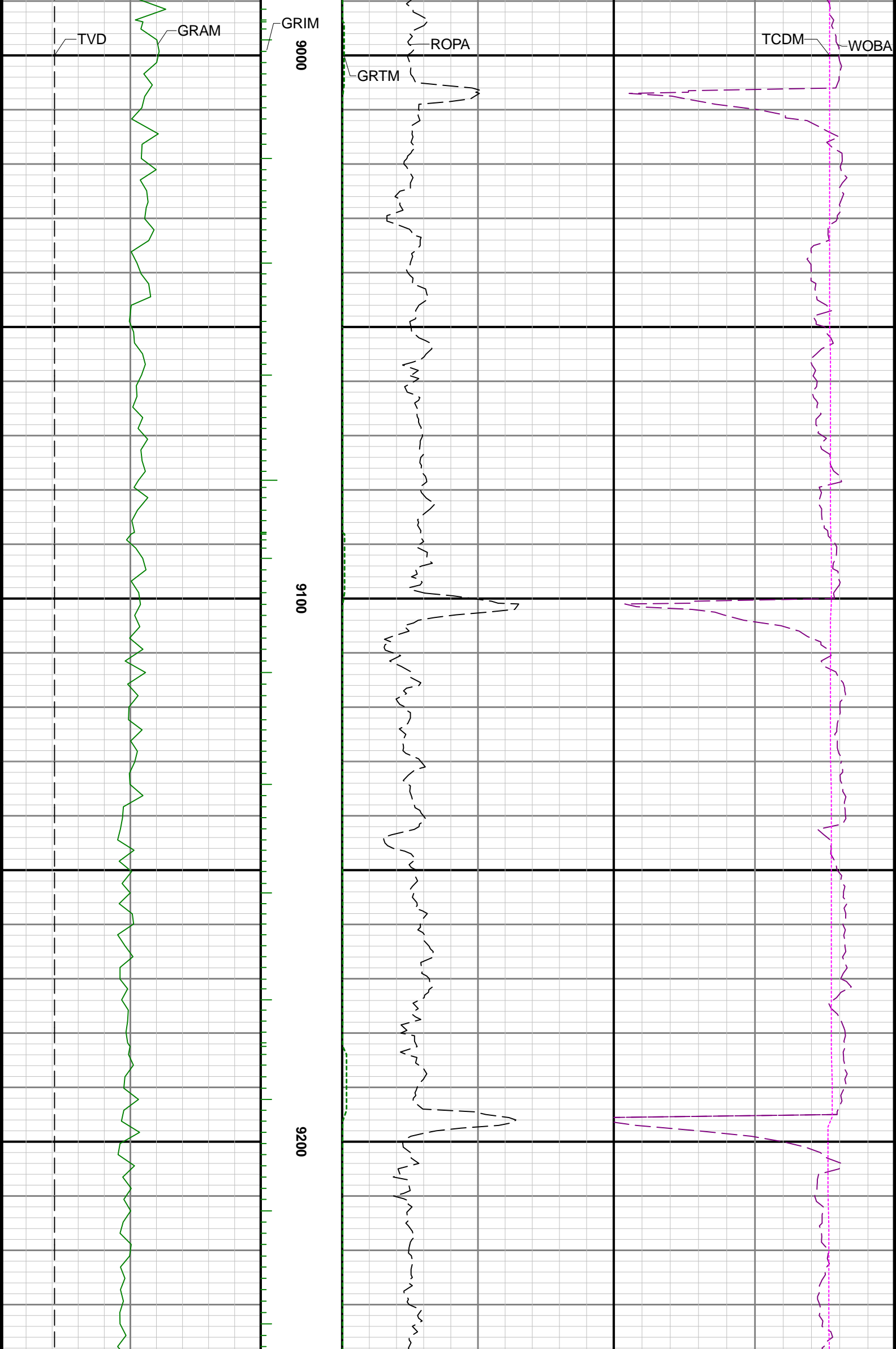


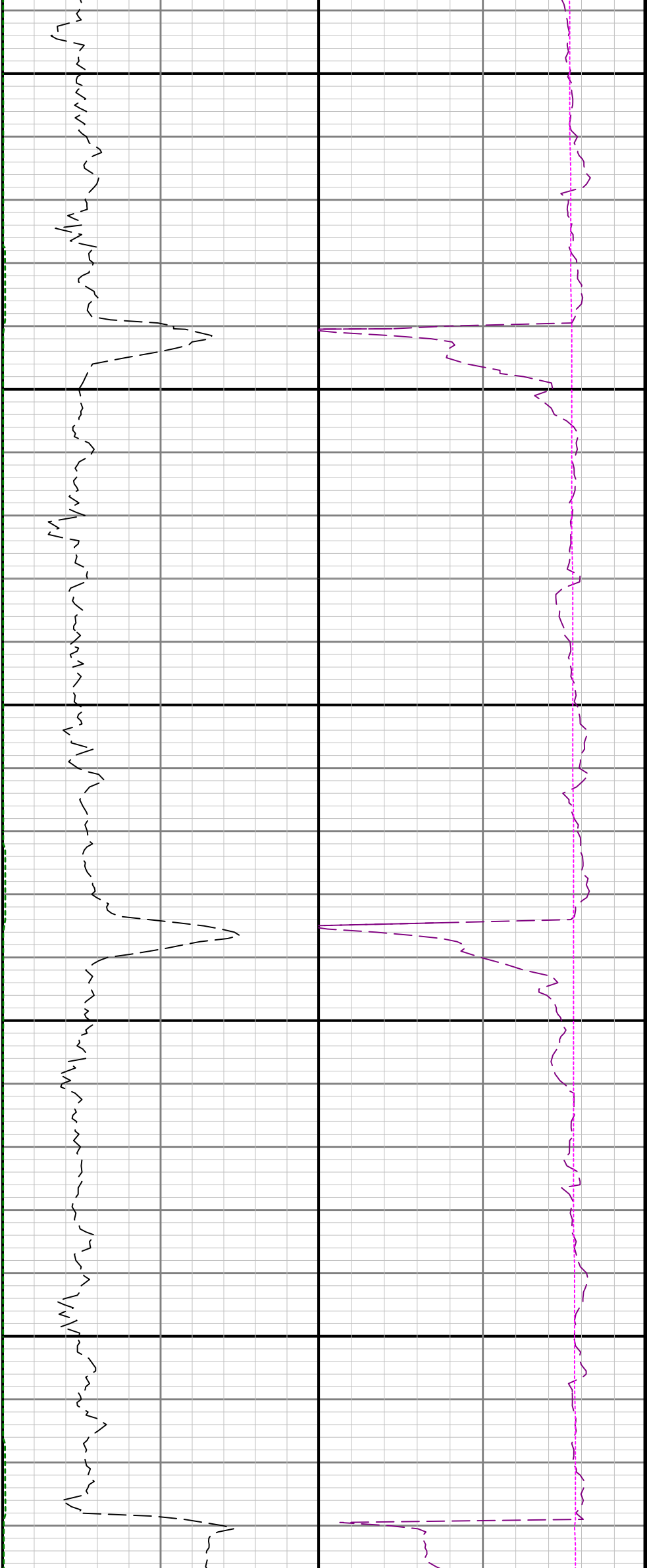


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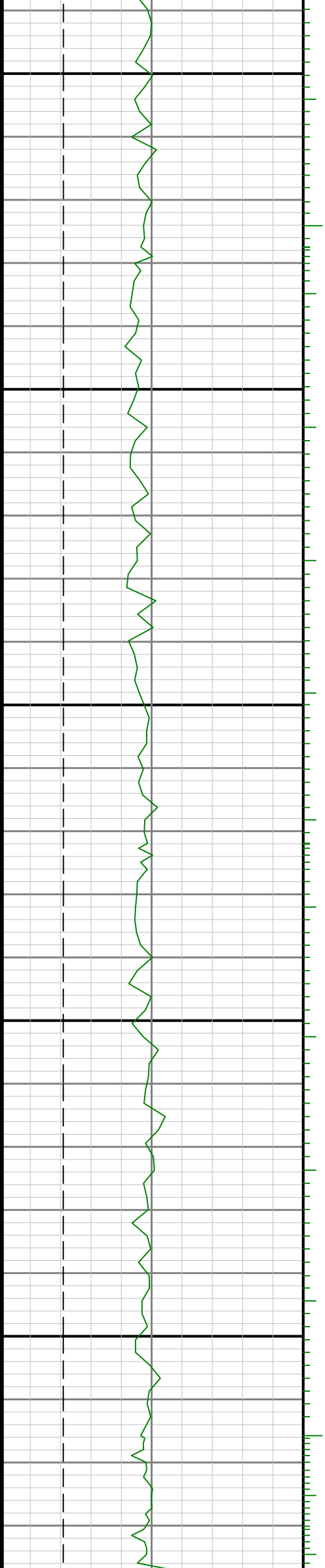




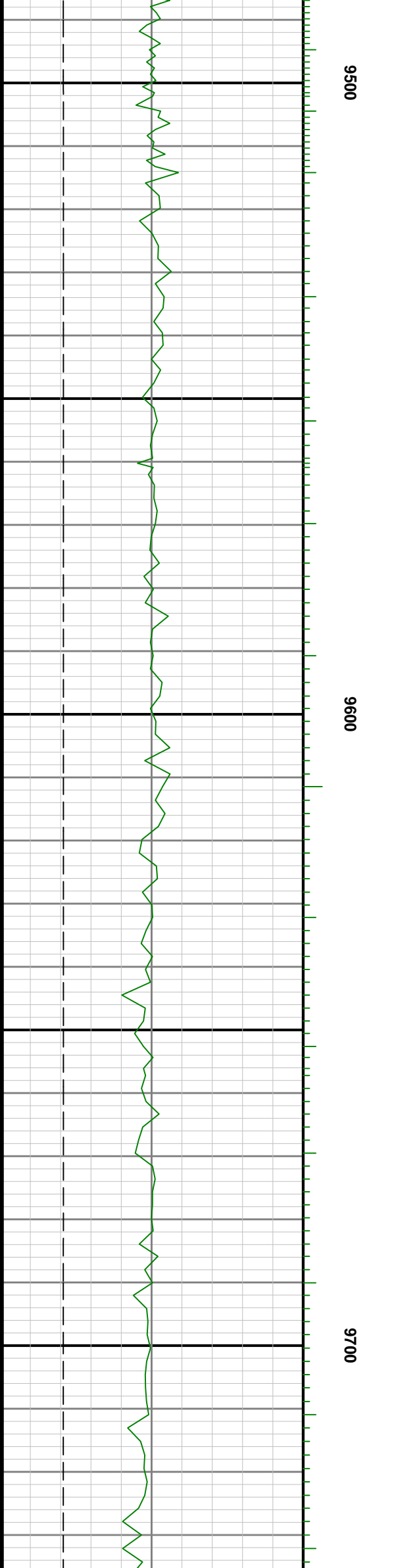


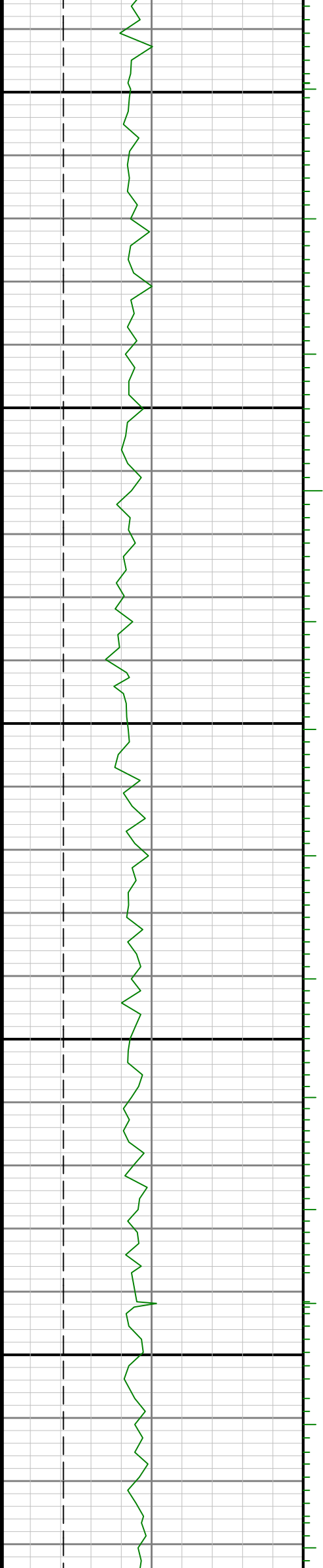
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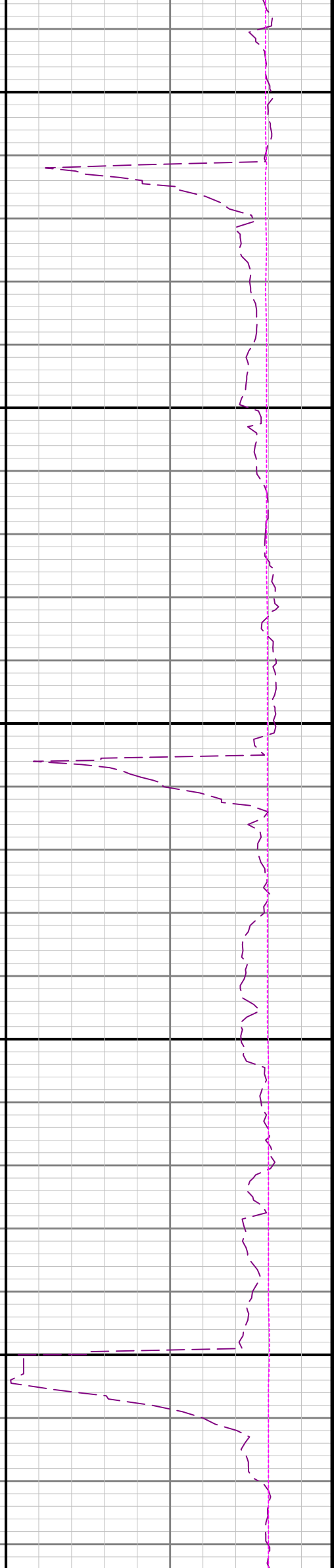
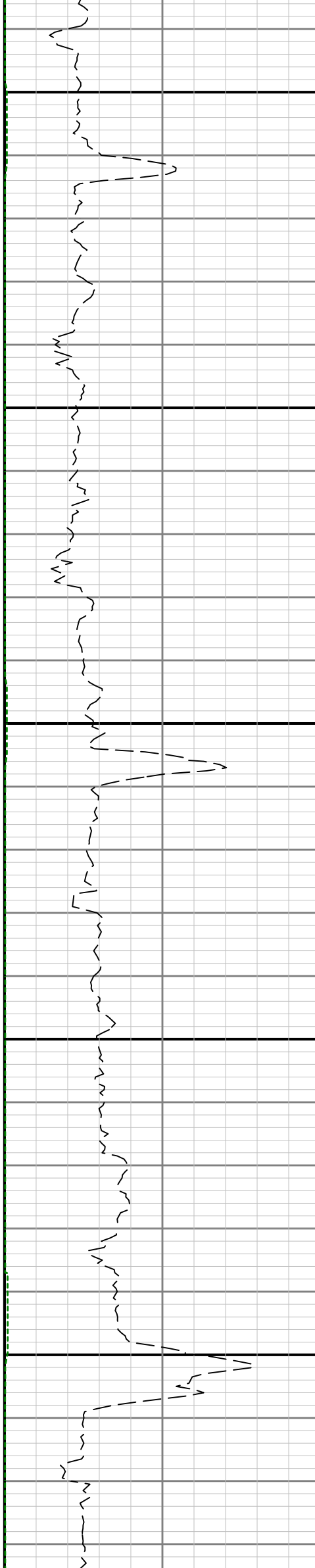


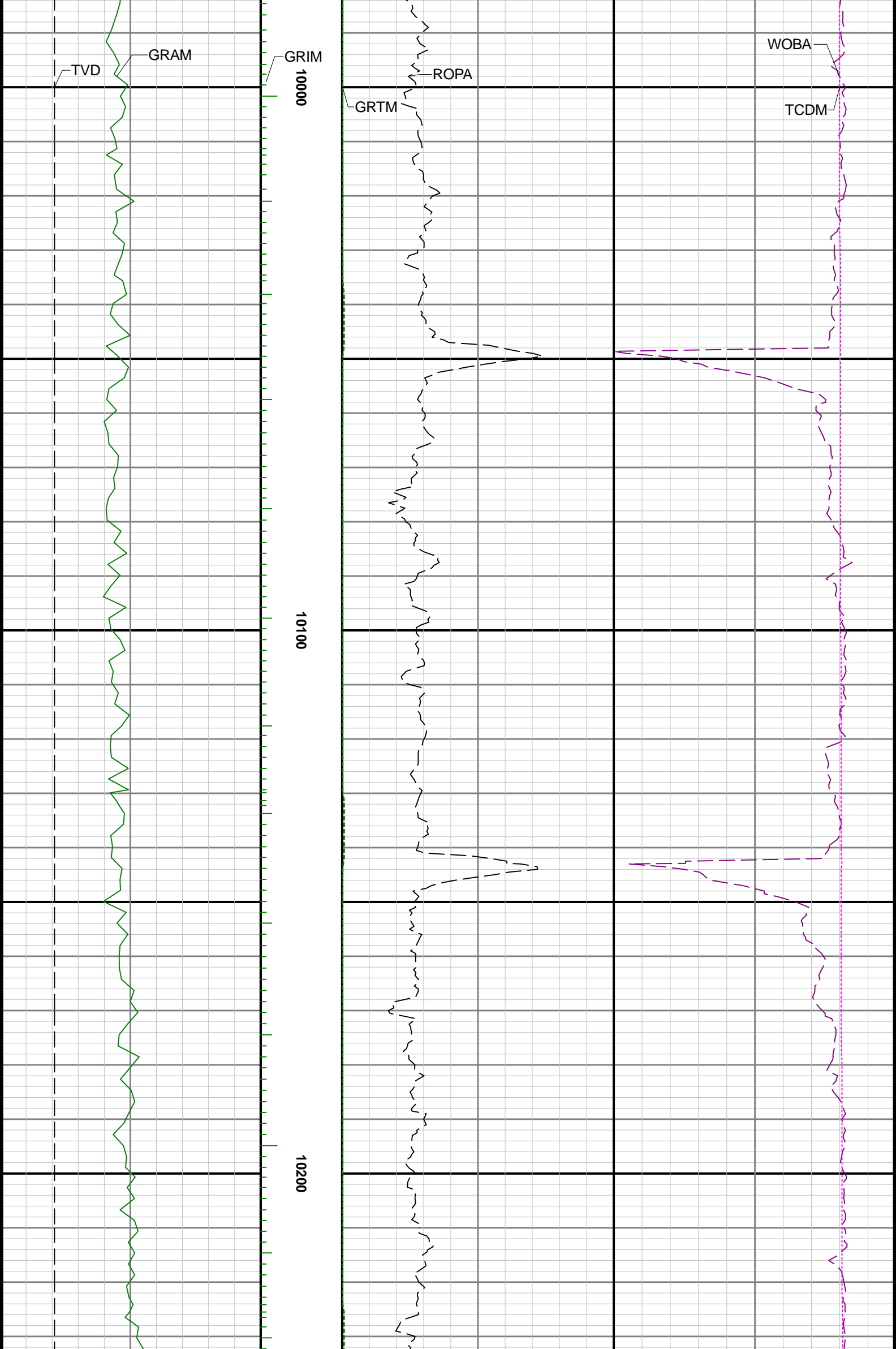




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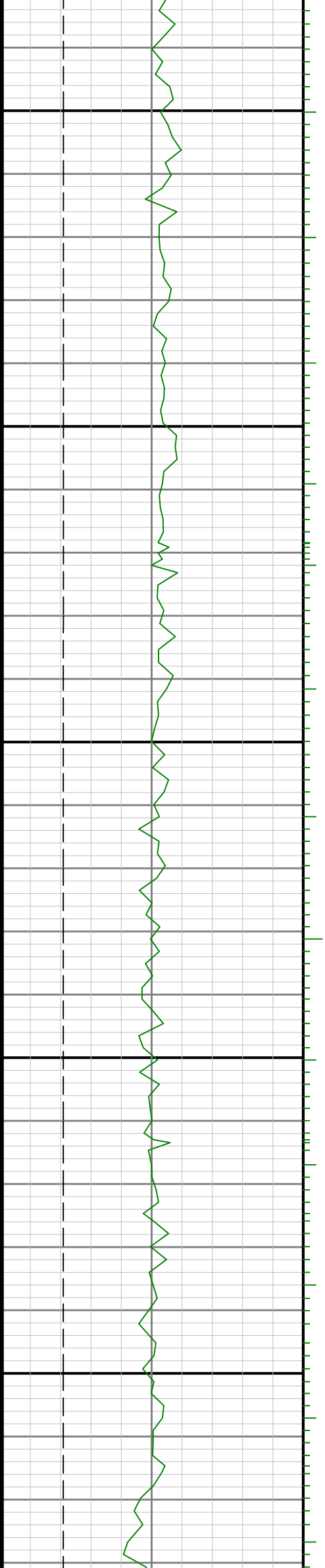


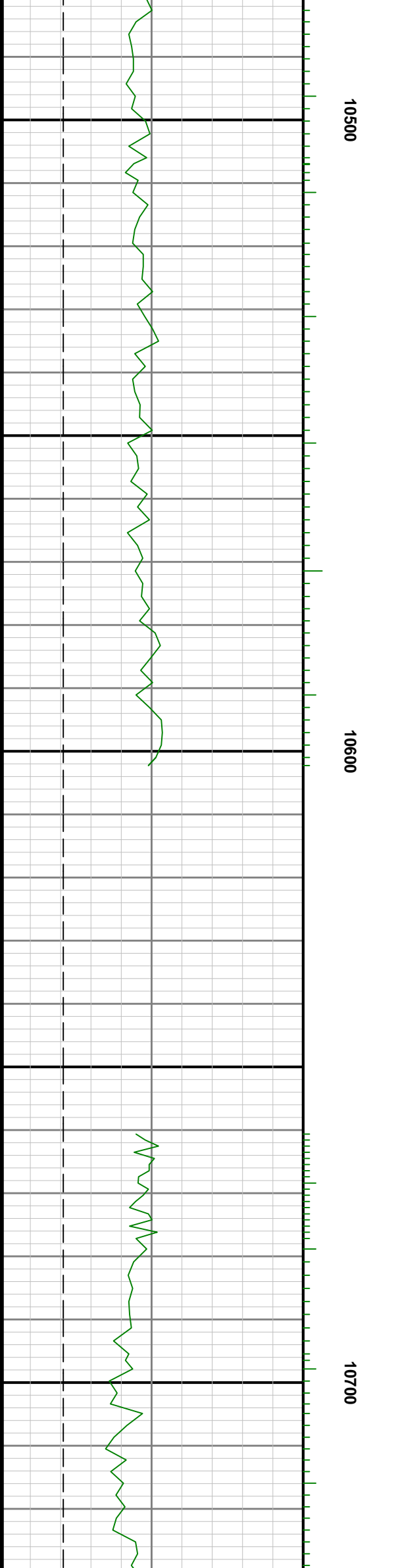
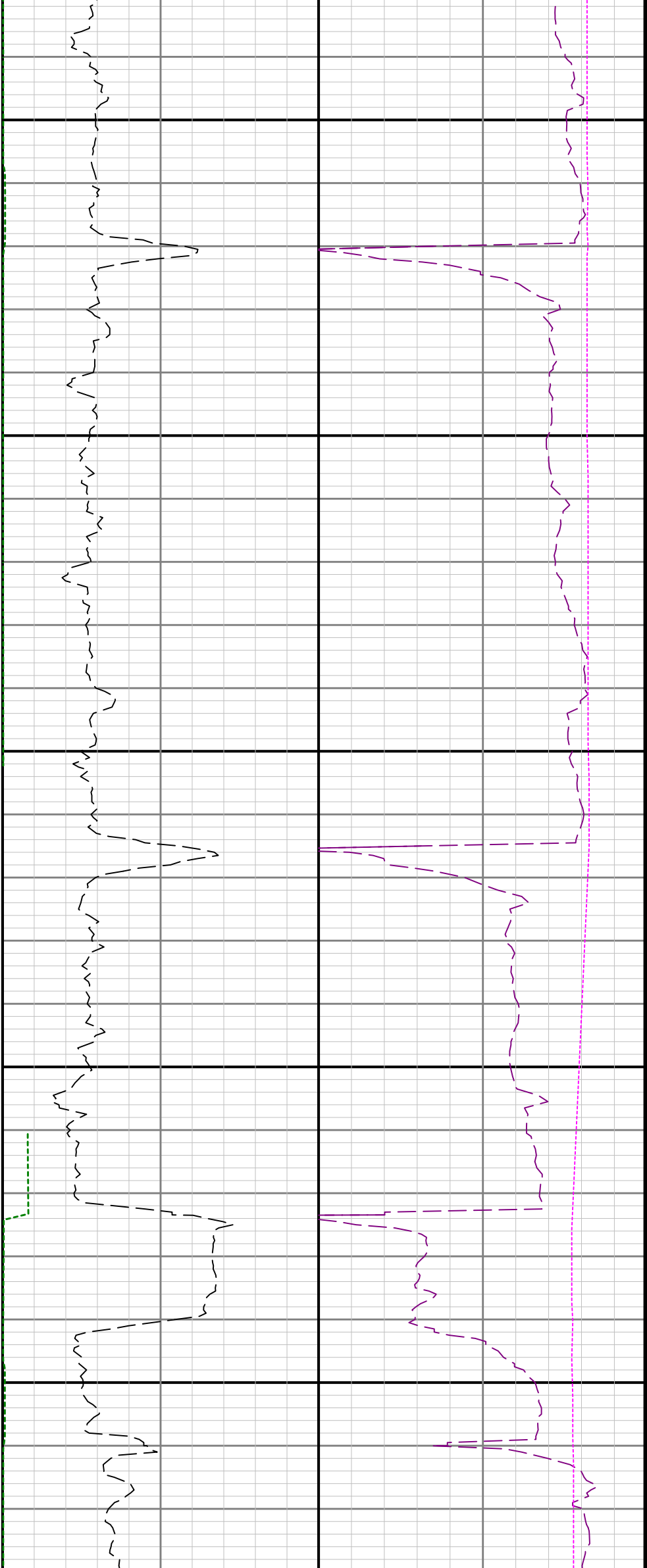


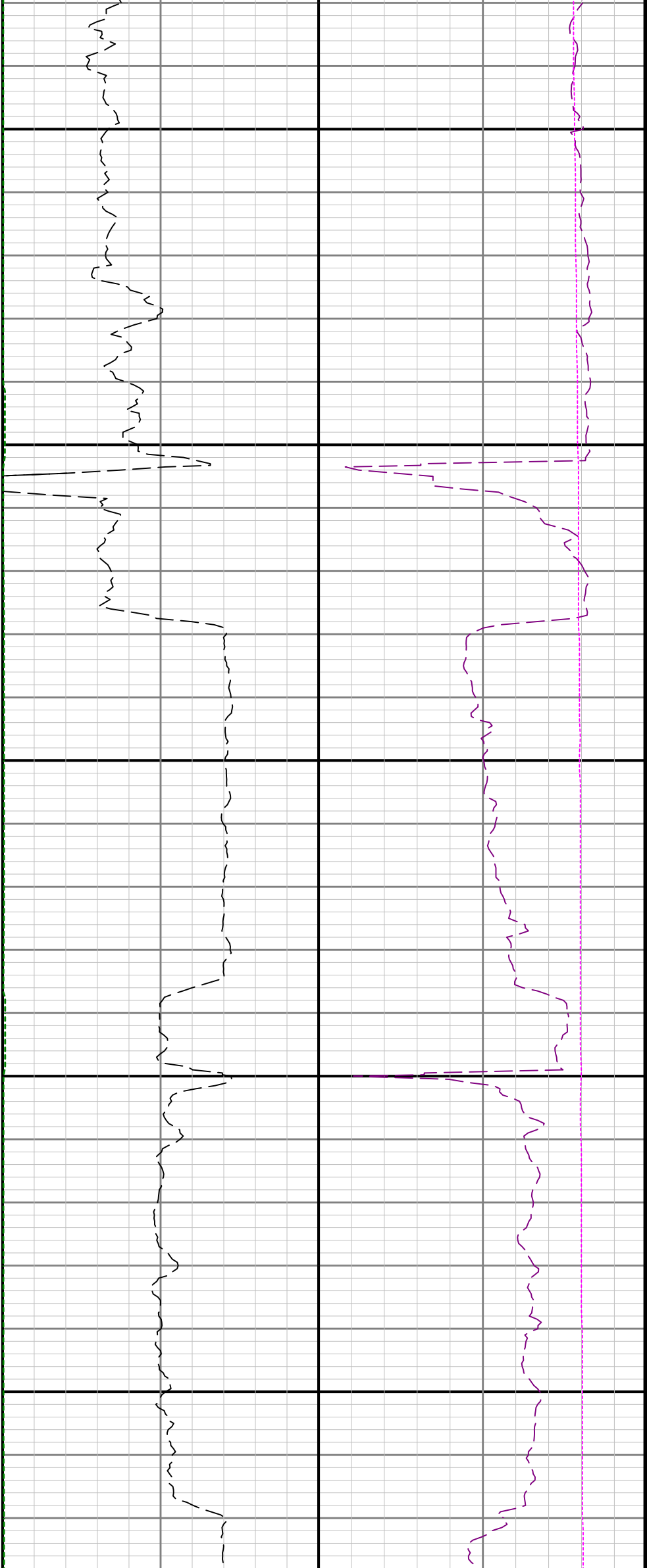


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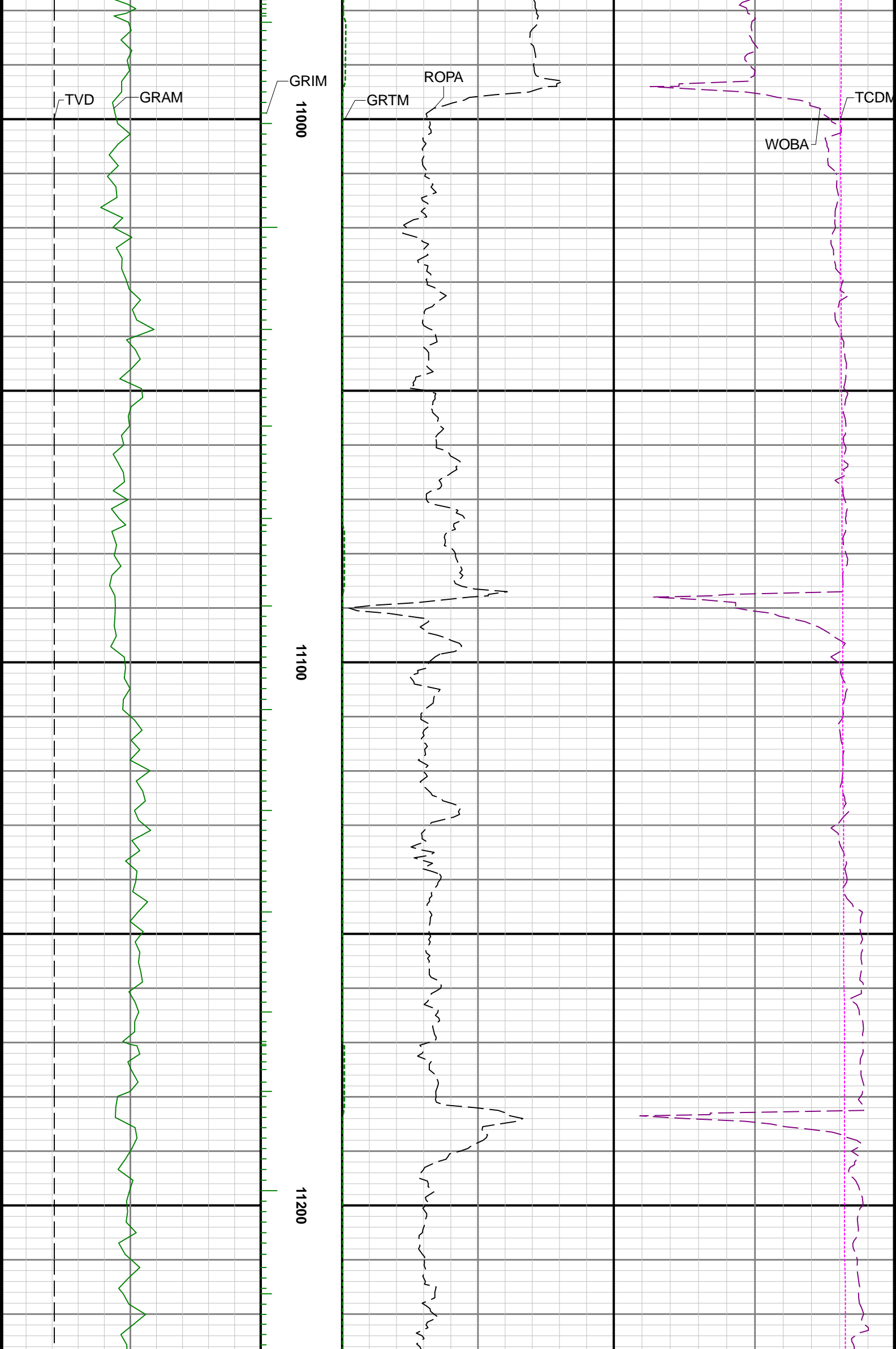


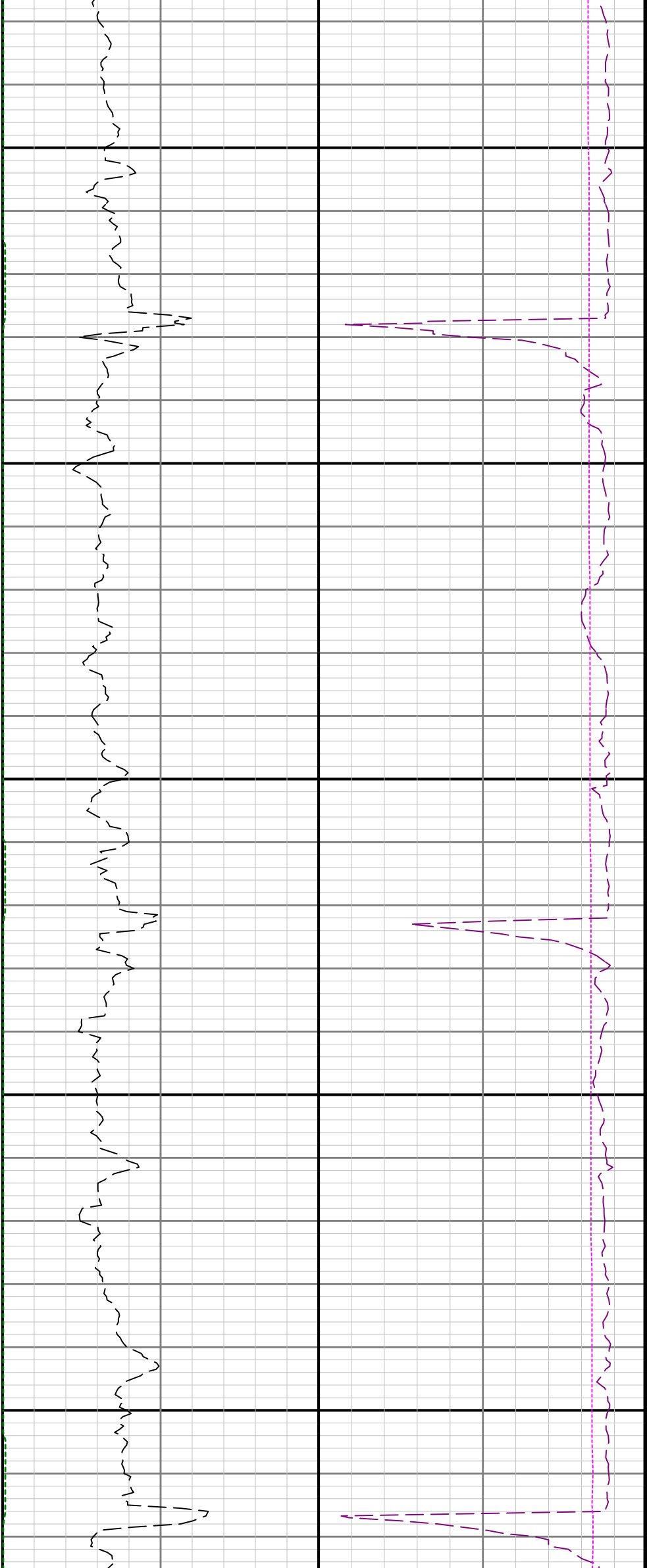




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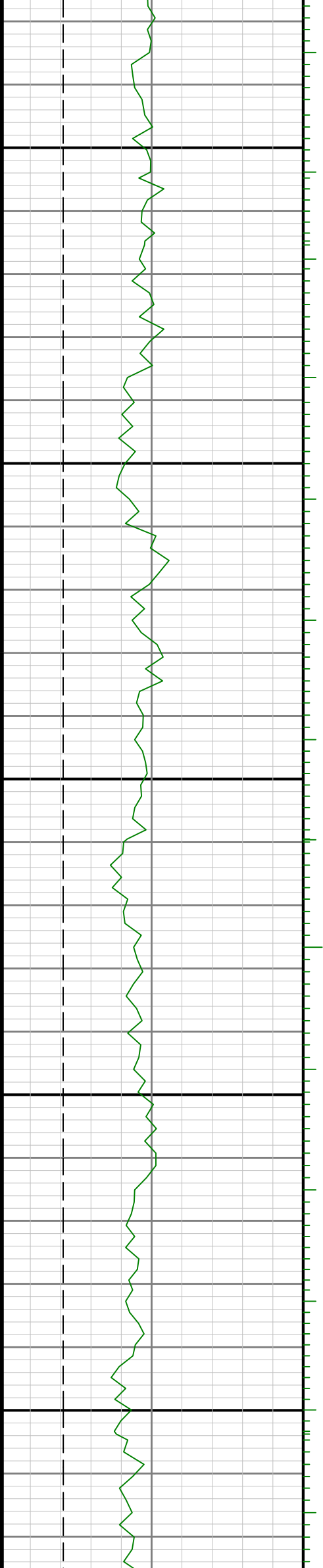
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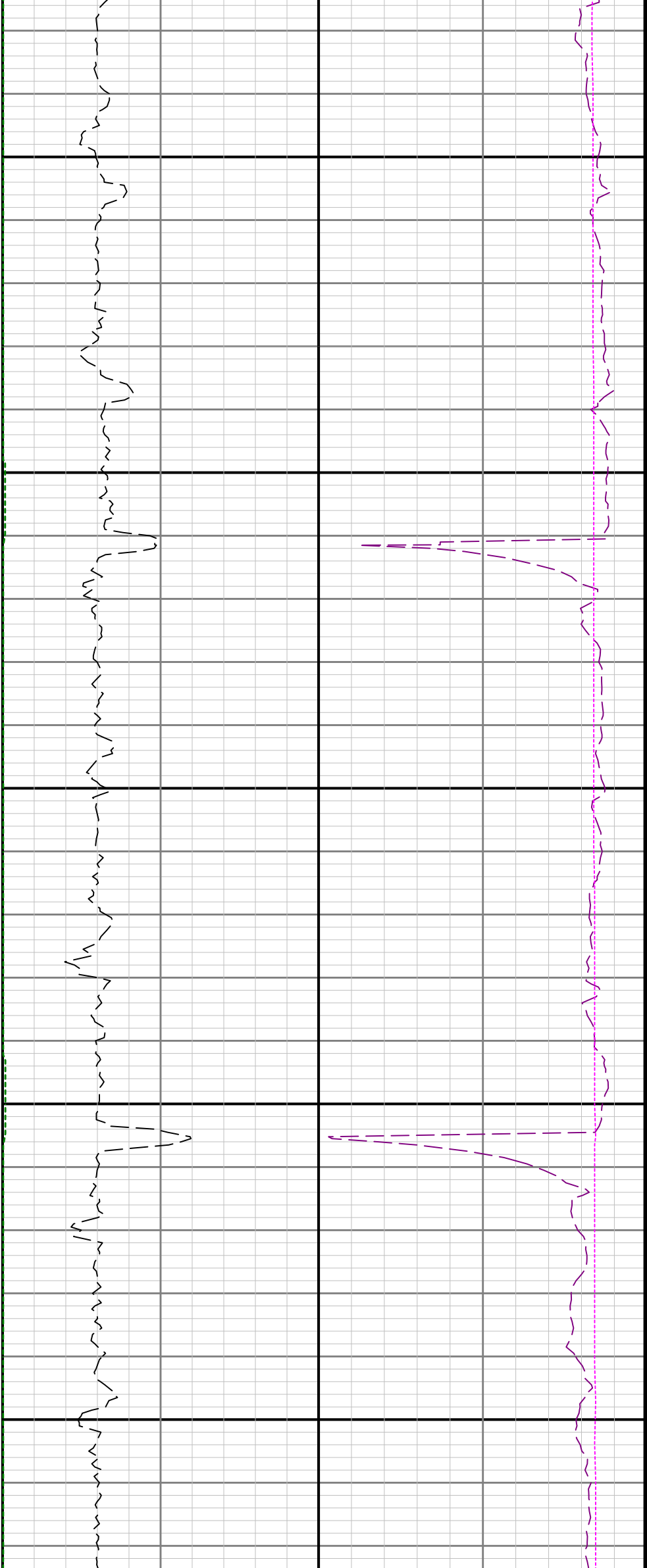


11300

11400



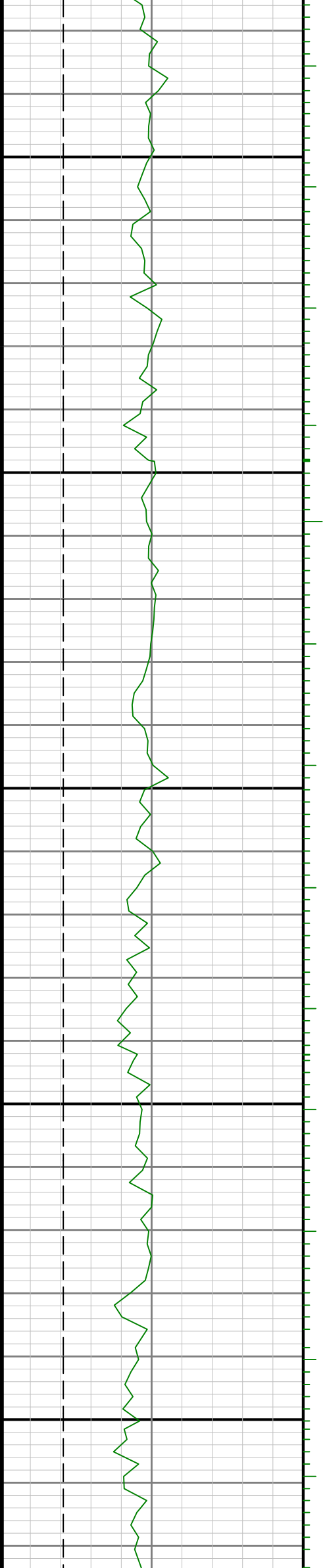


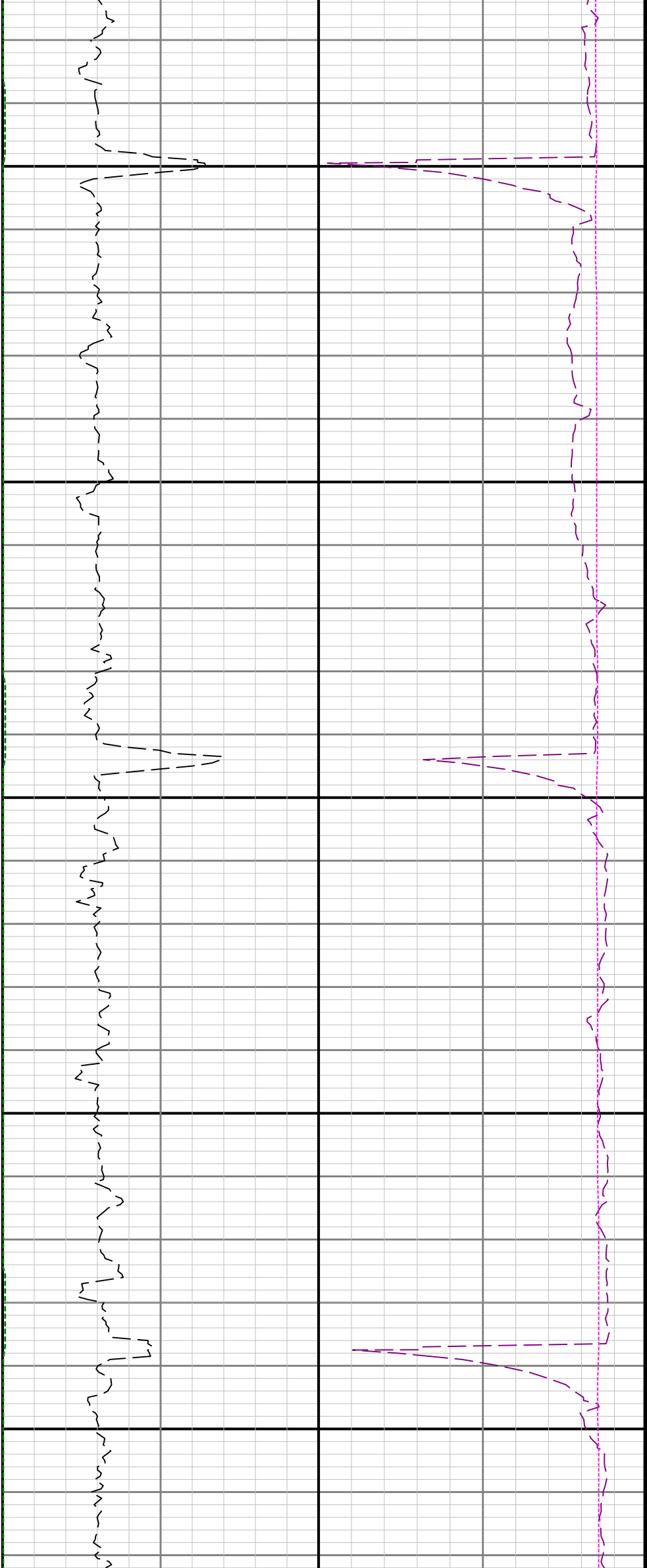


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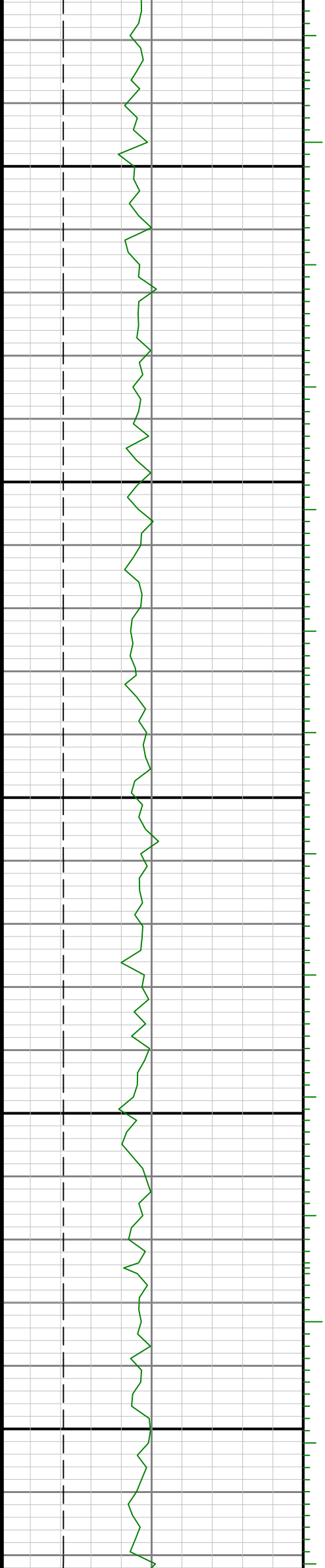
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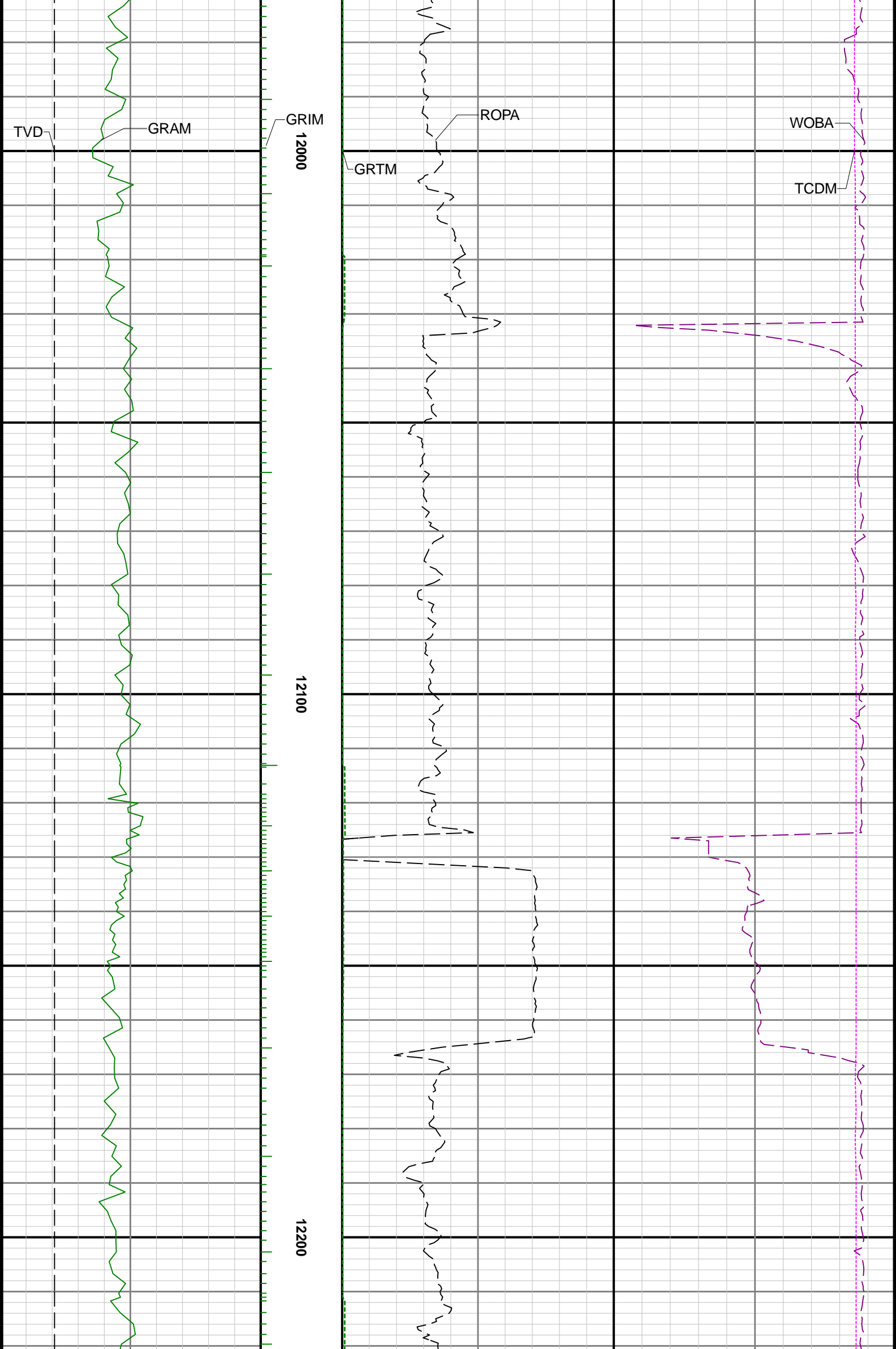


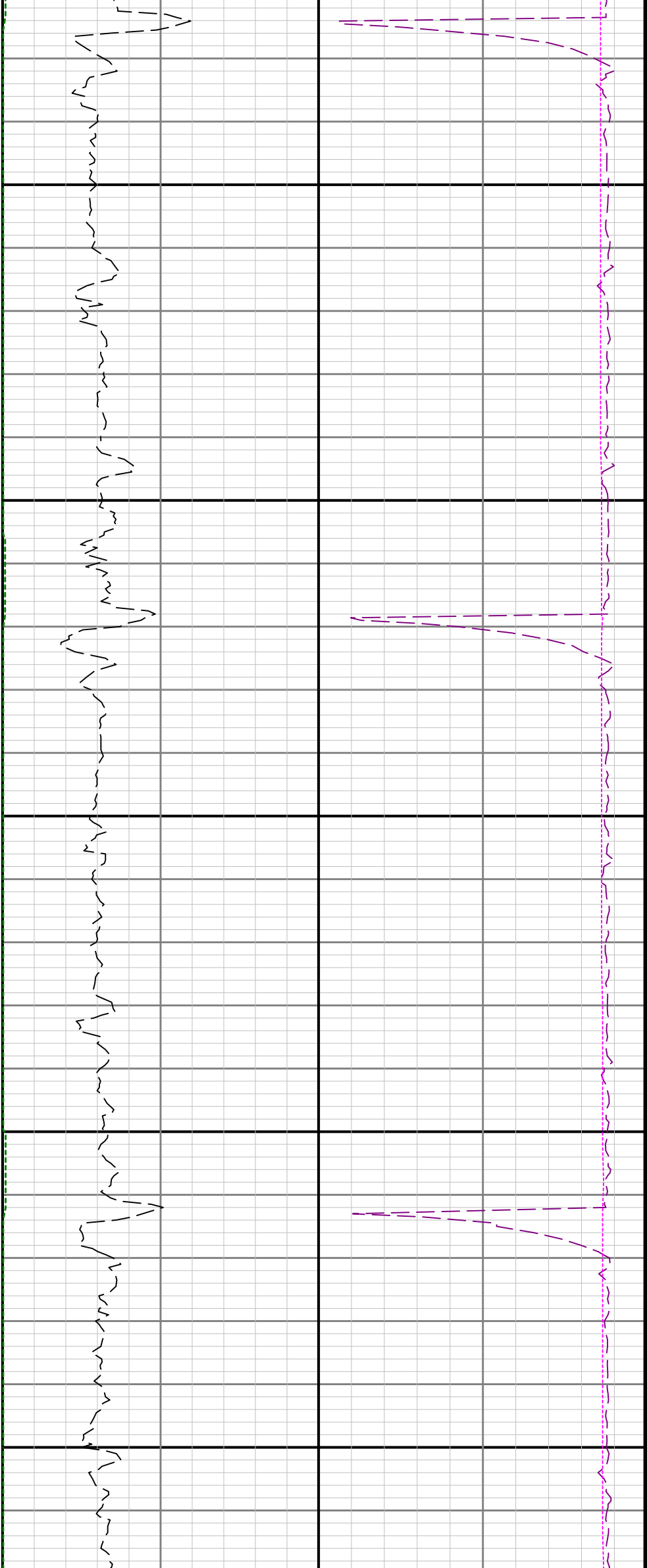


11800

11900

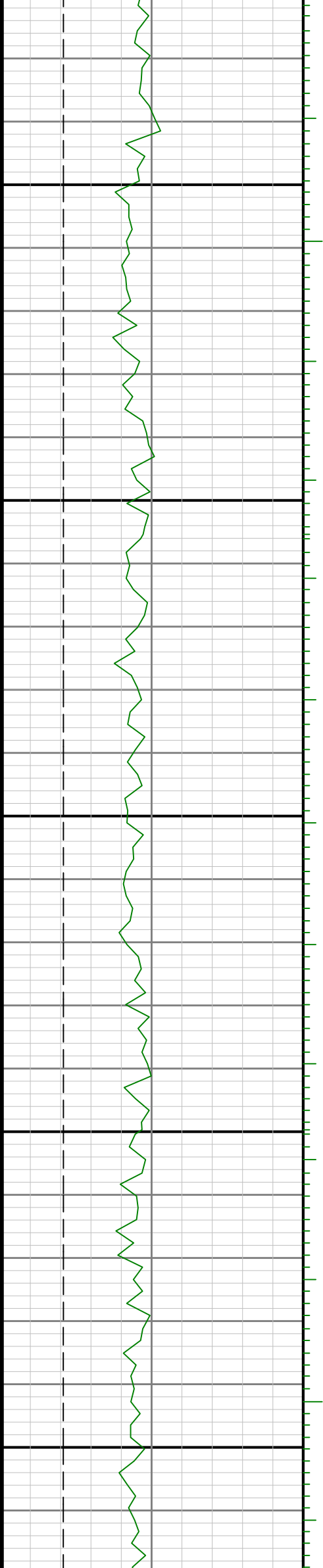


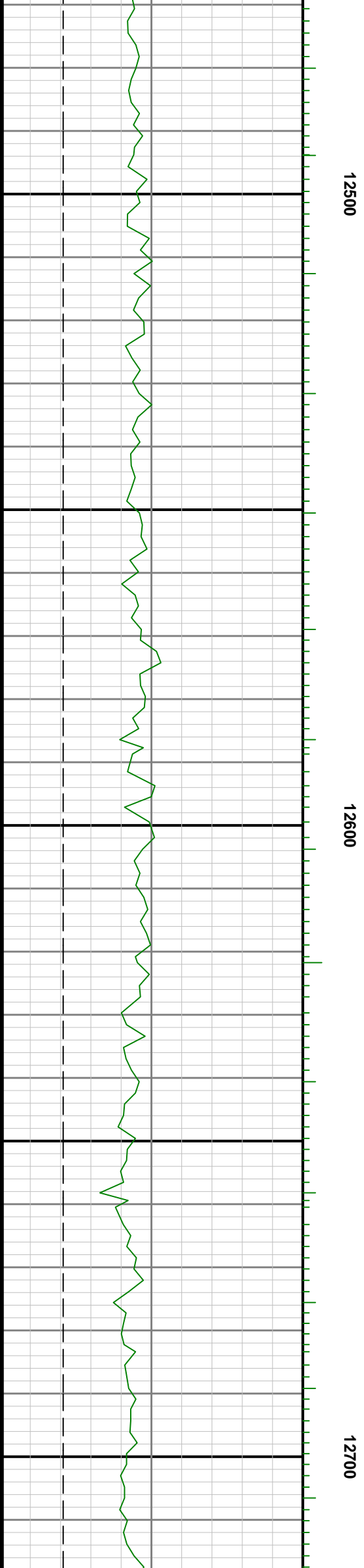
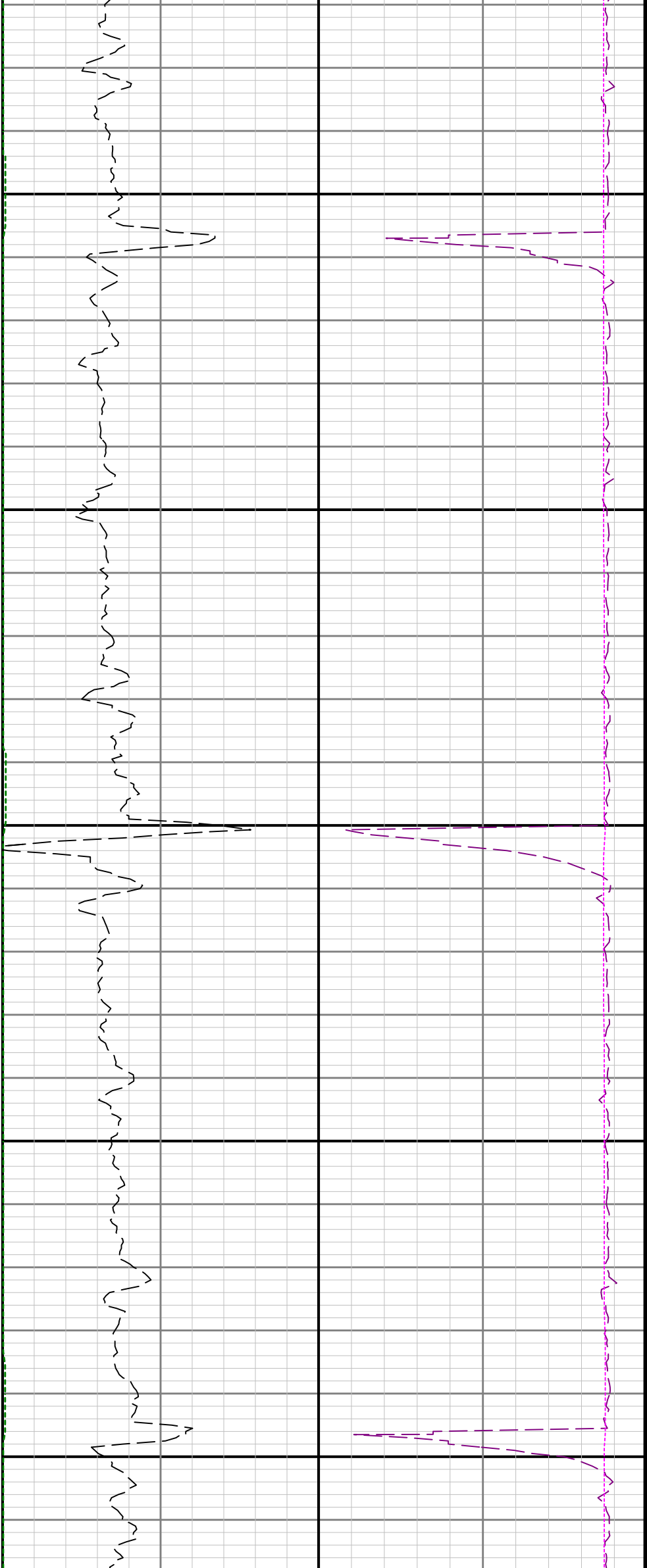


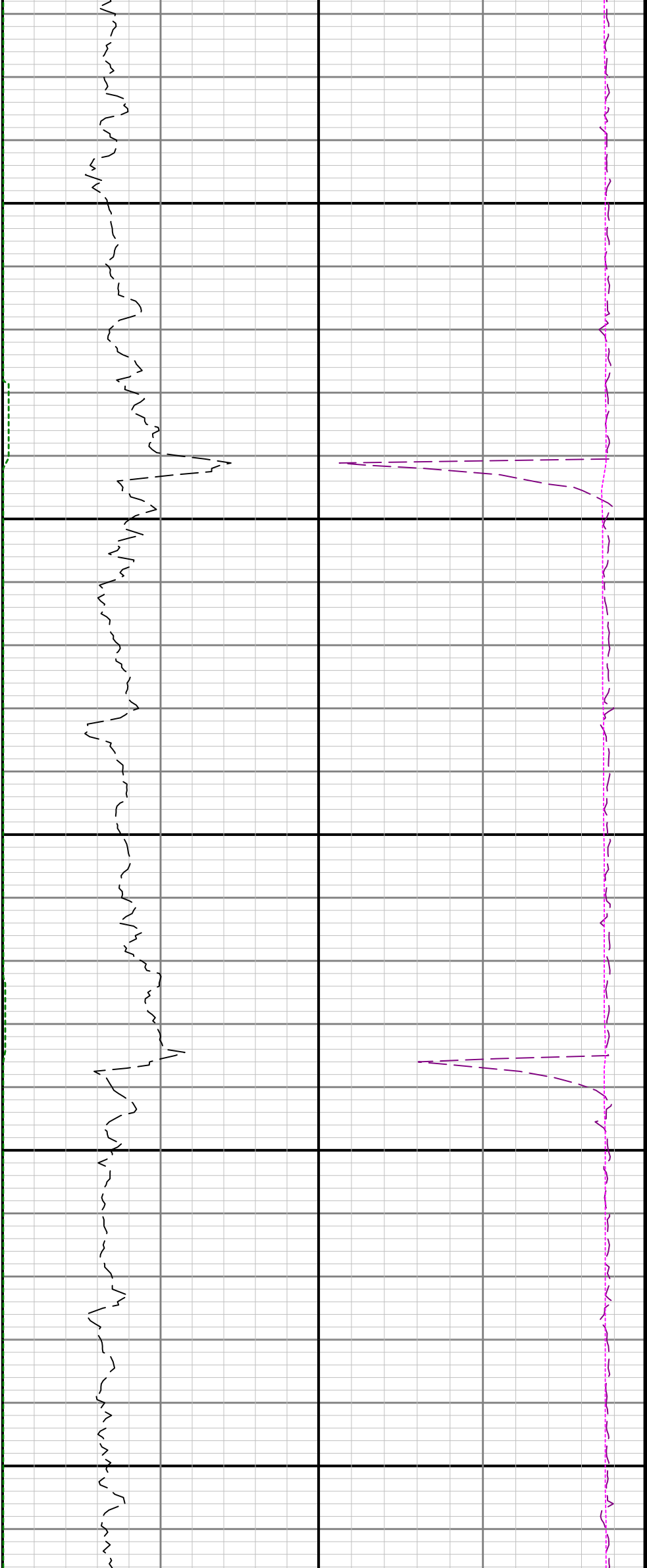


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12400

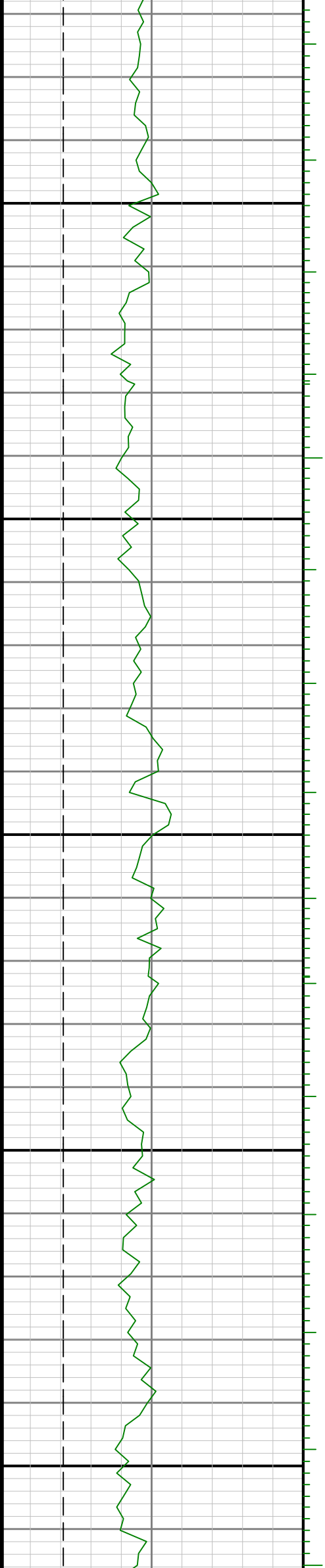


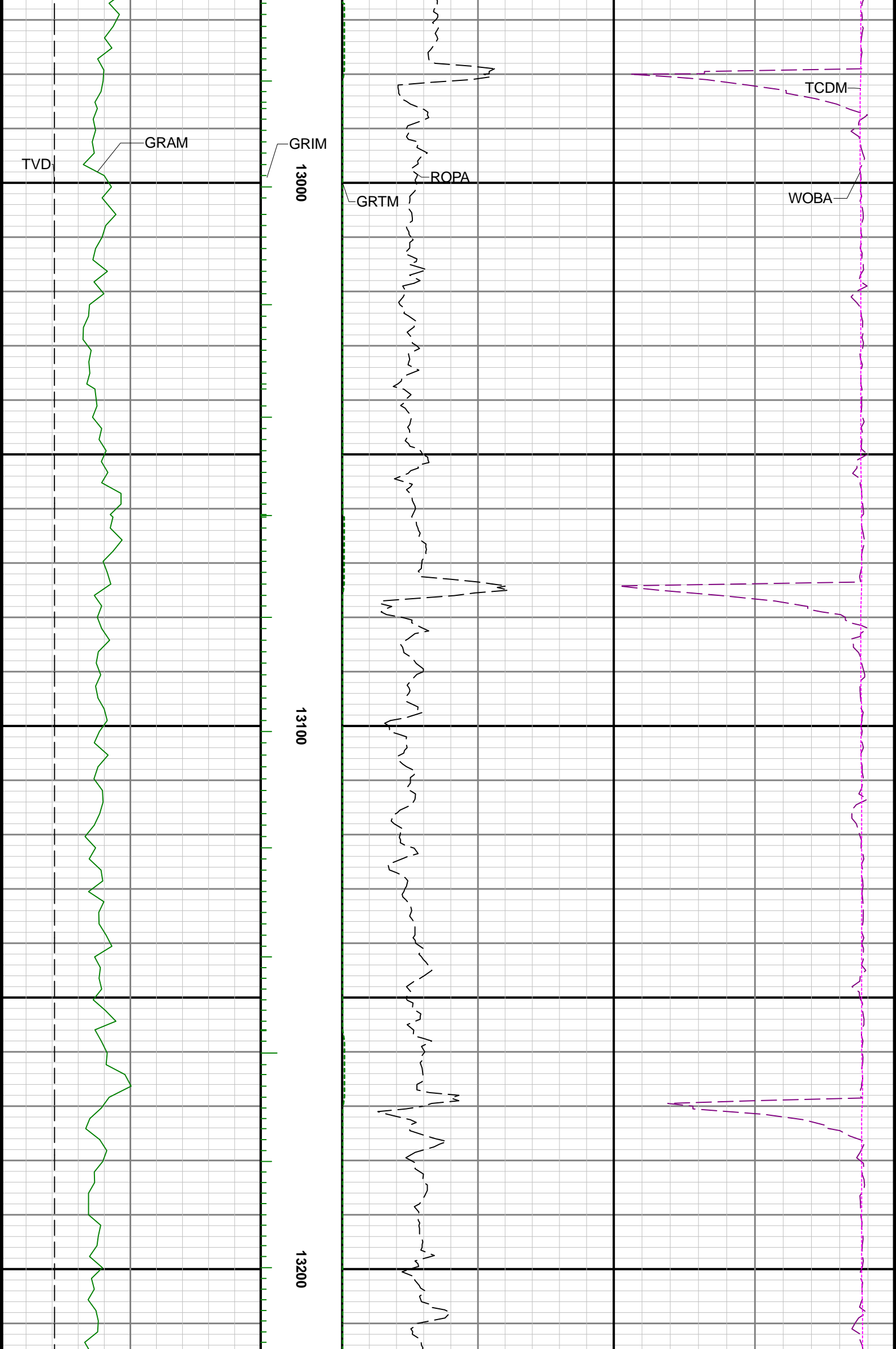


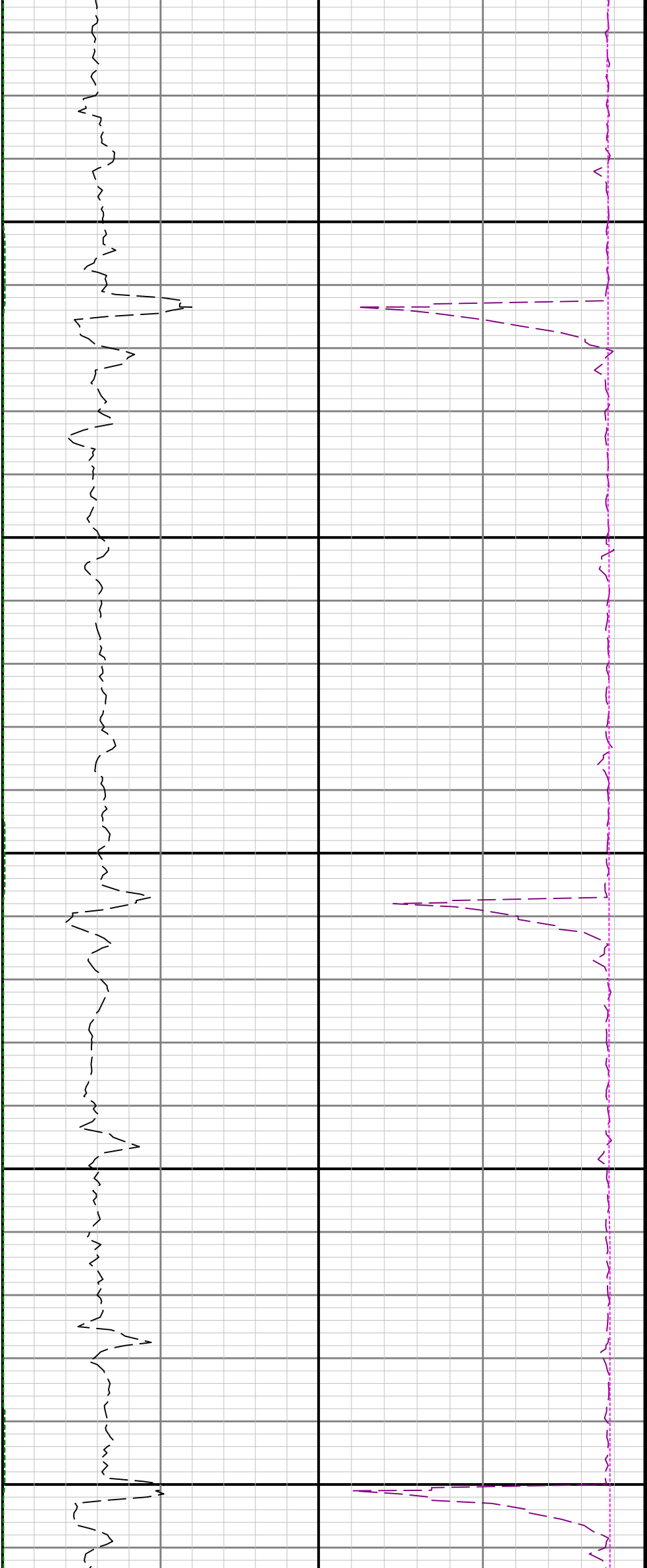


12800

12900

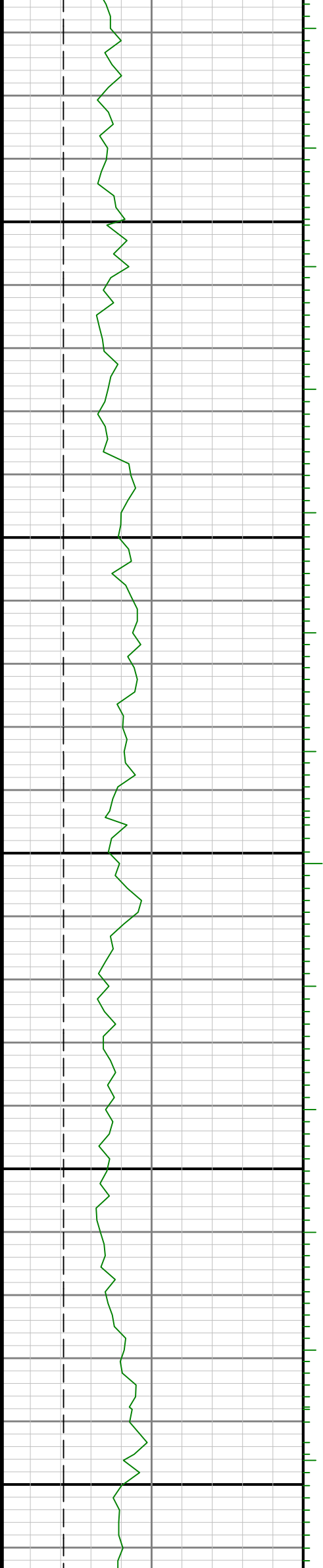




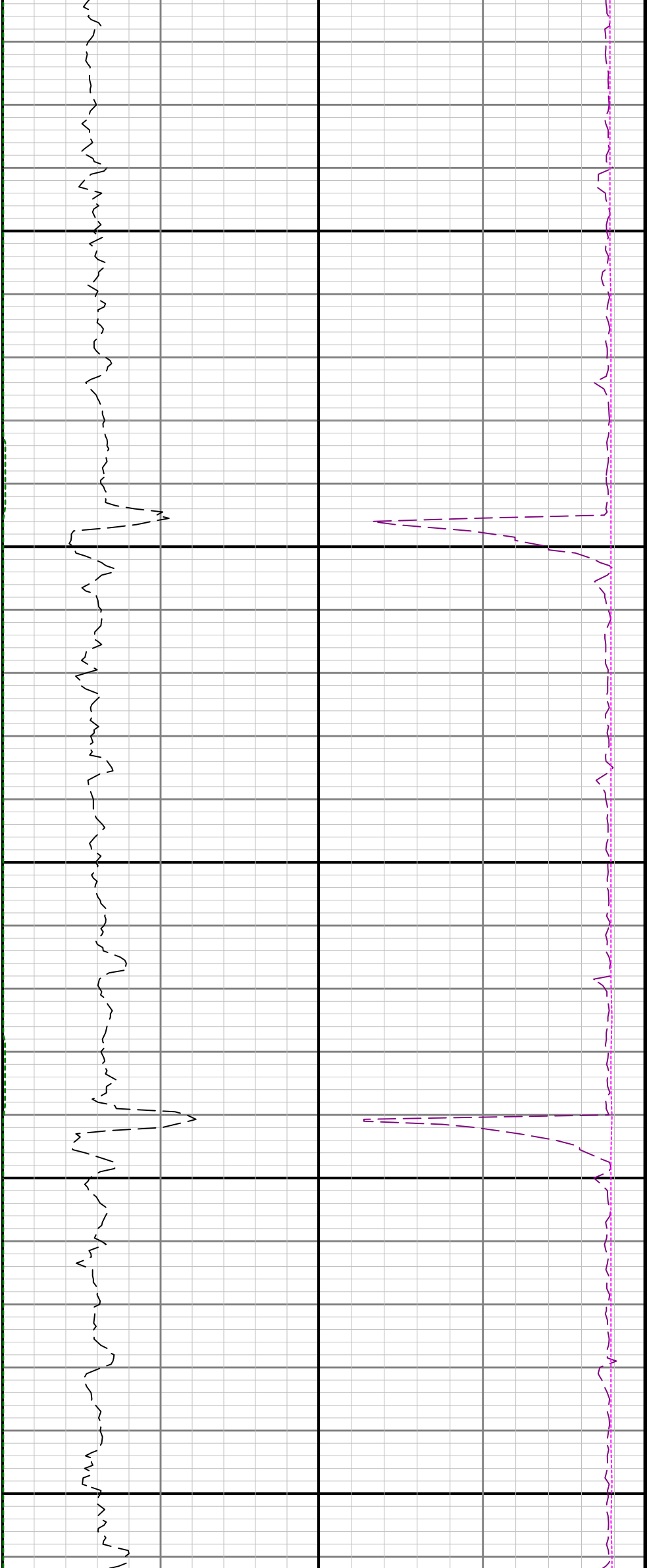


13300

13400



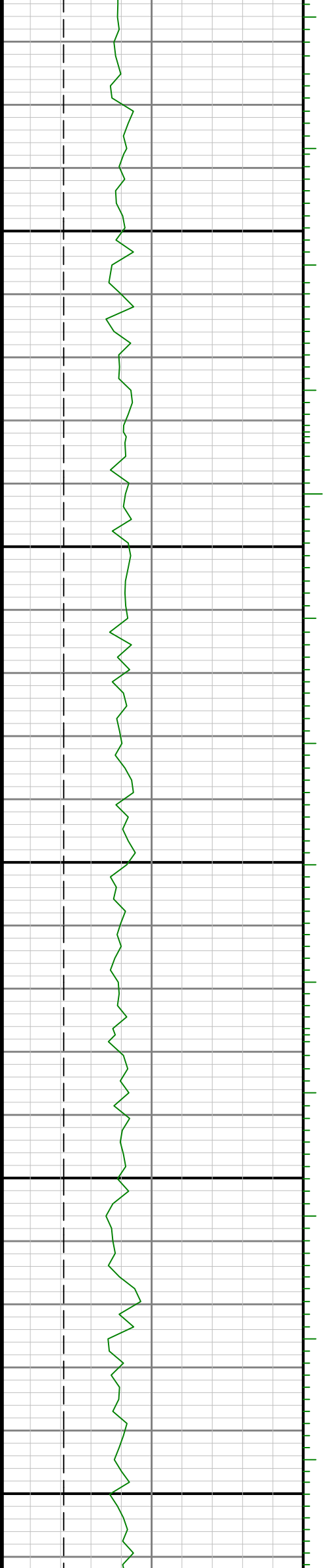




13500

13600

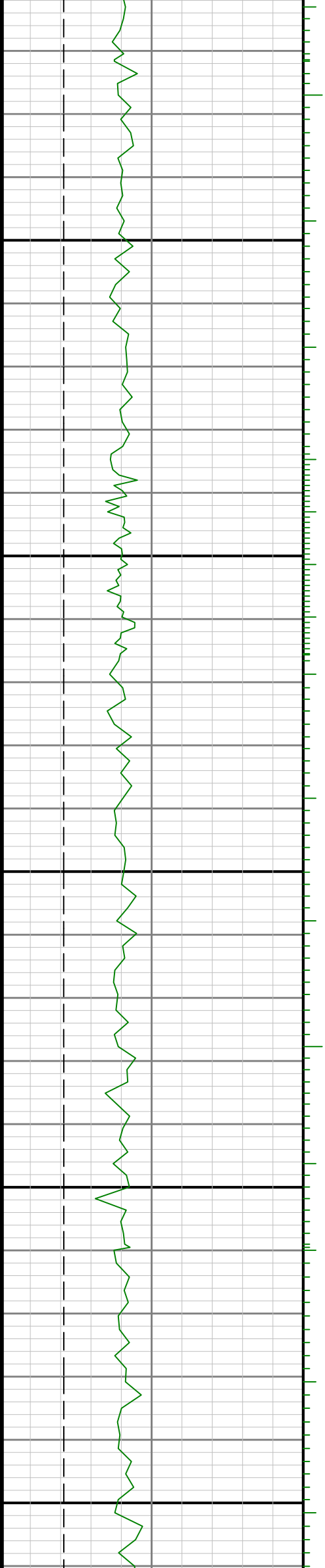
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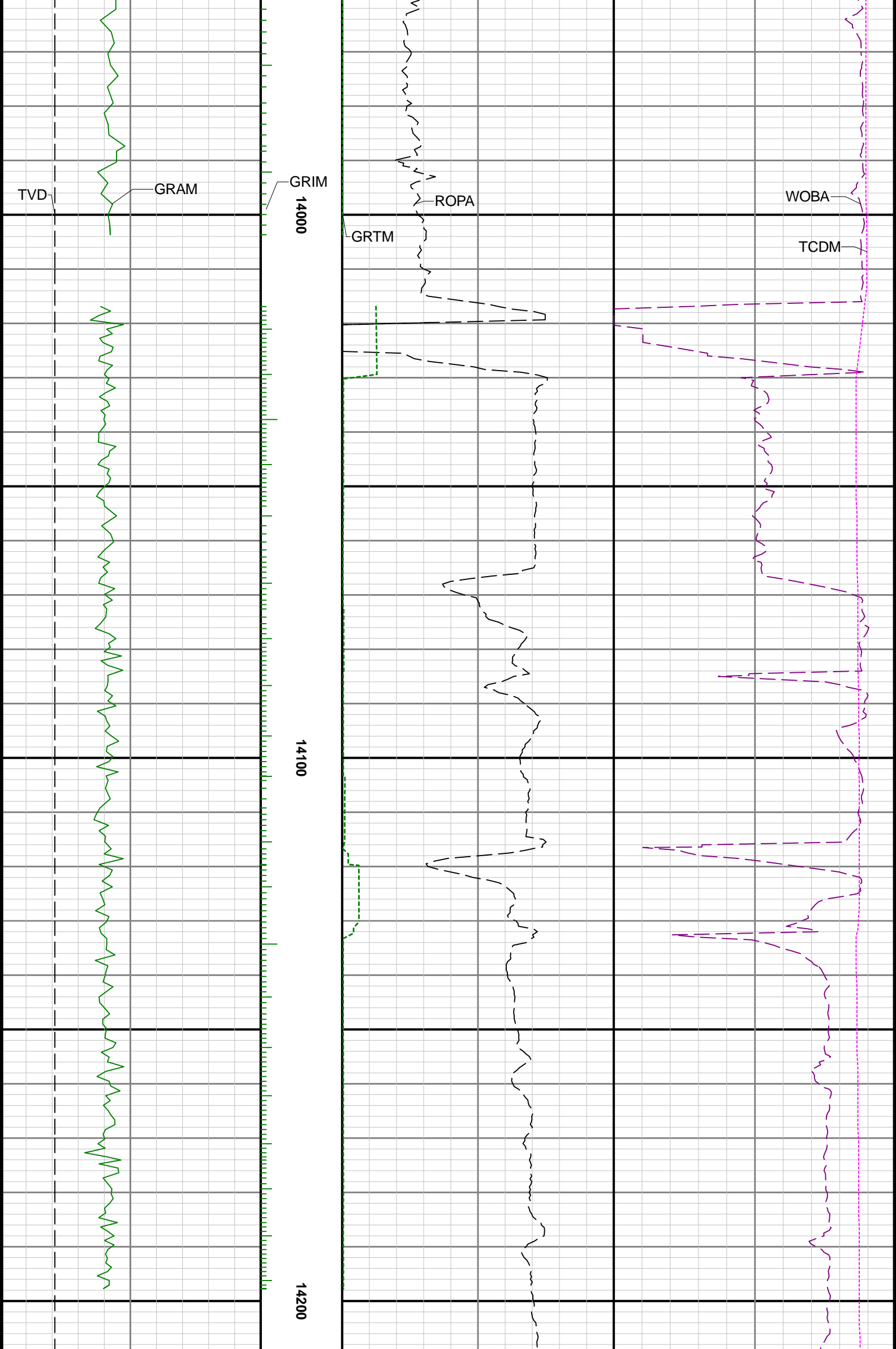




13800

13900



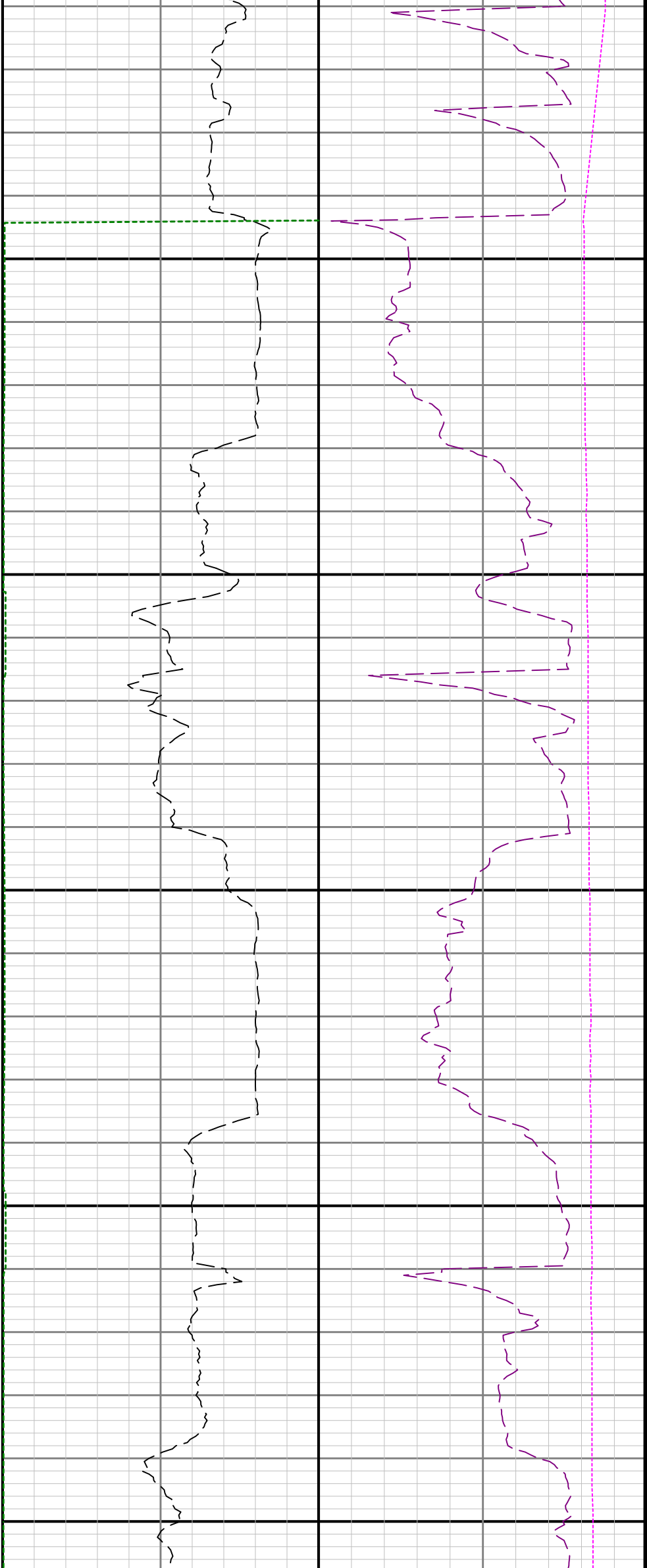
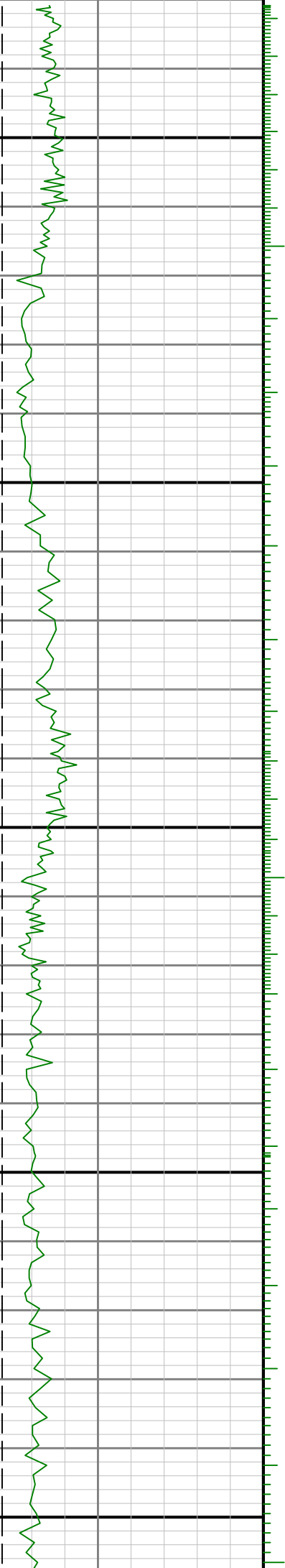


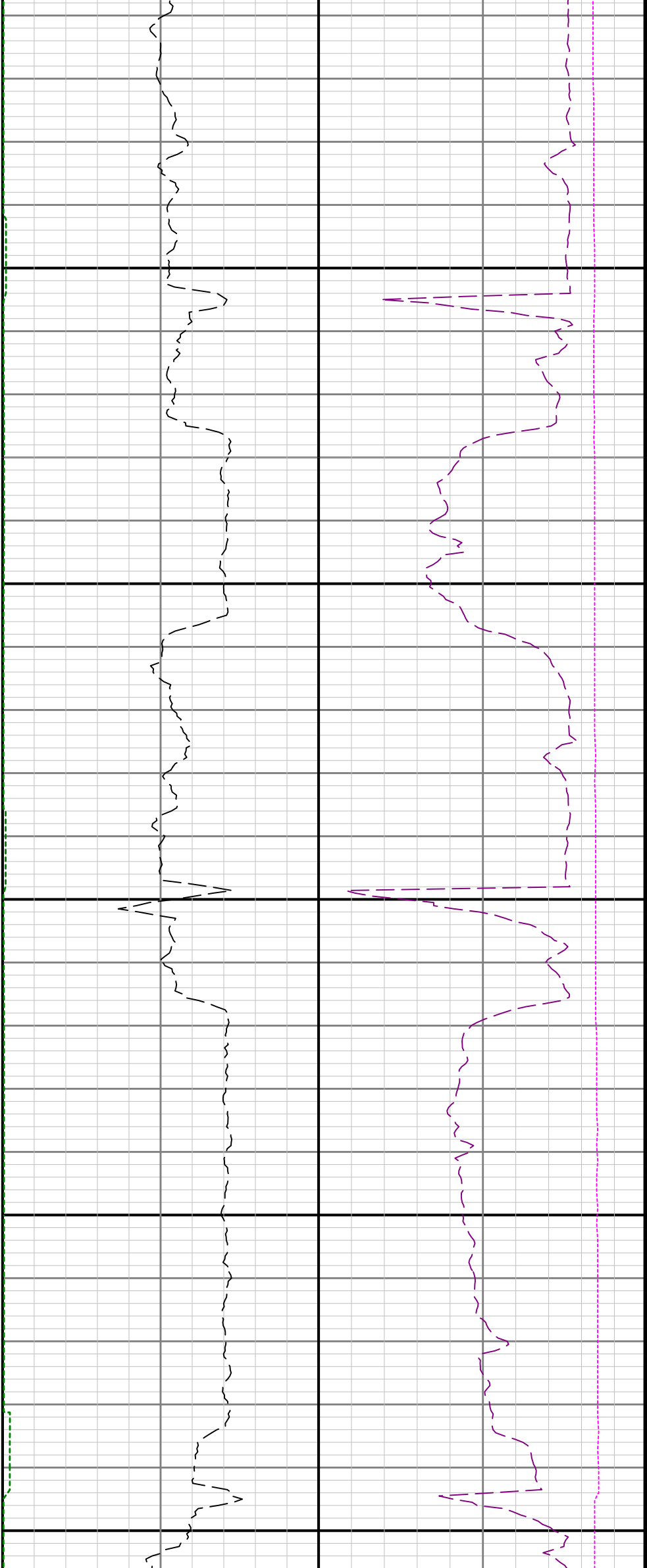
See Remark 1

R1 ⇄ R2

14300

14400

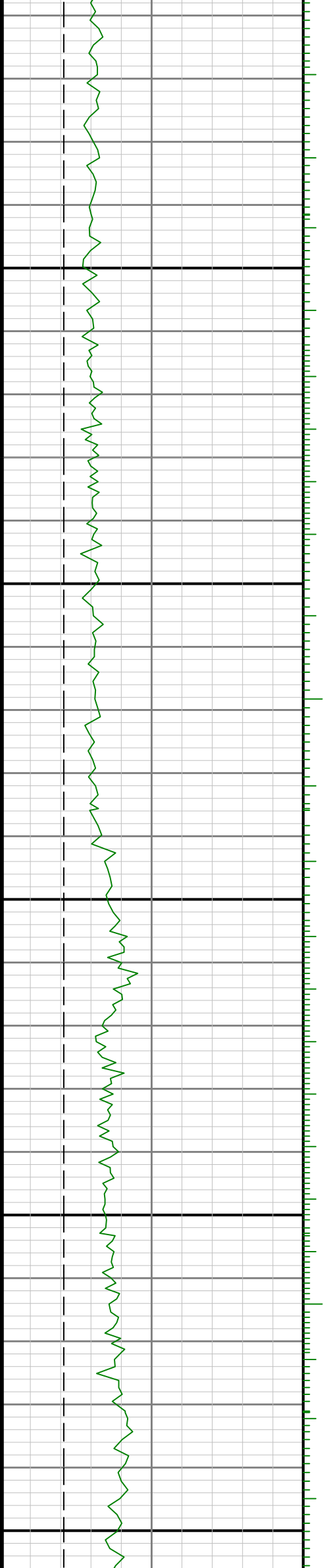


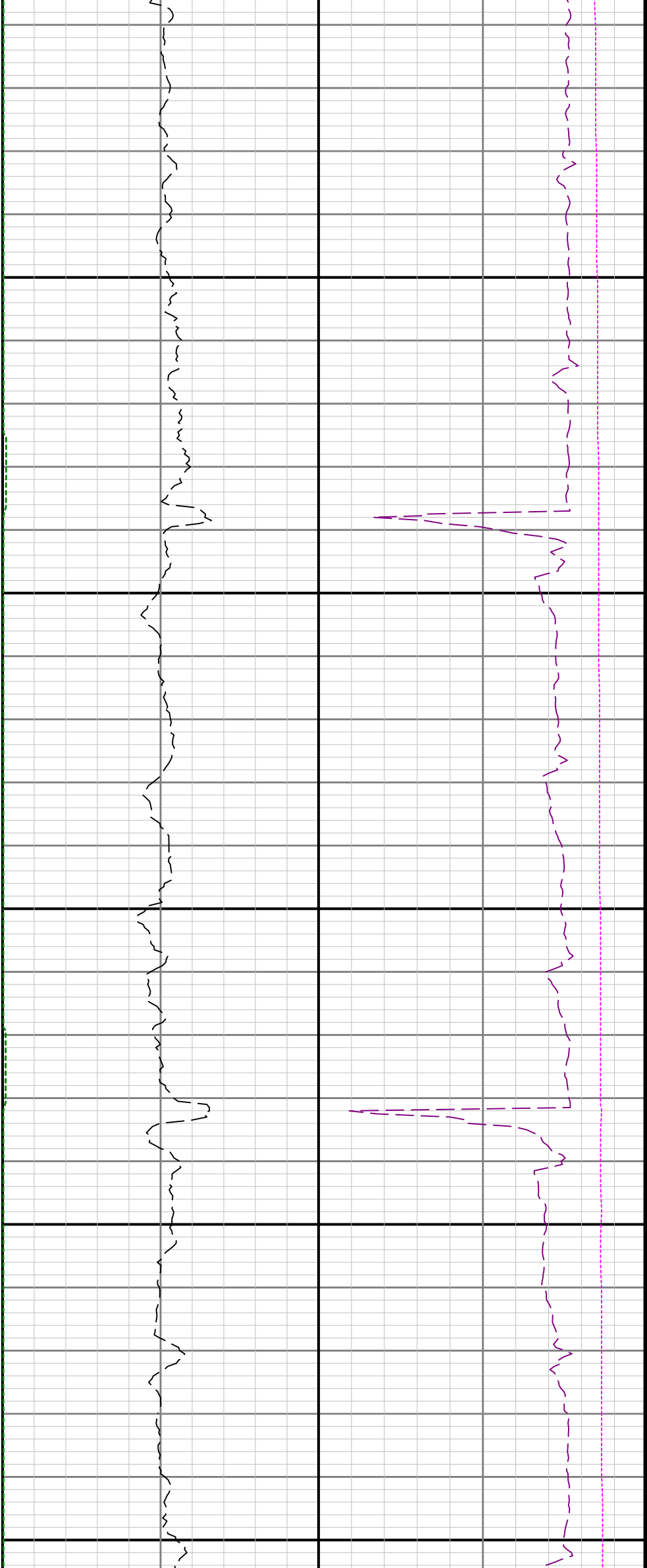


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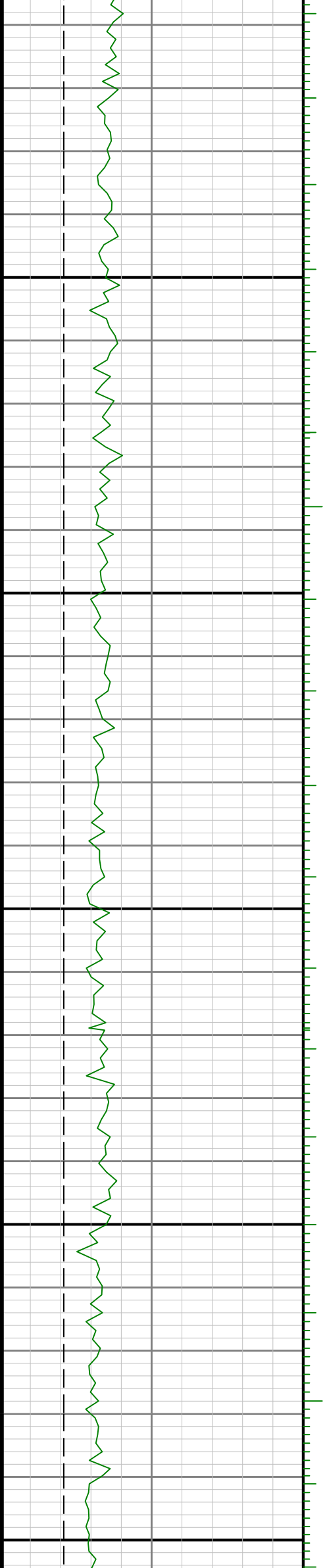
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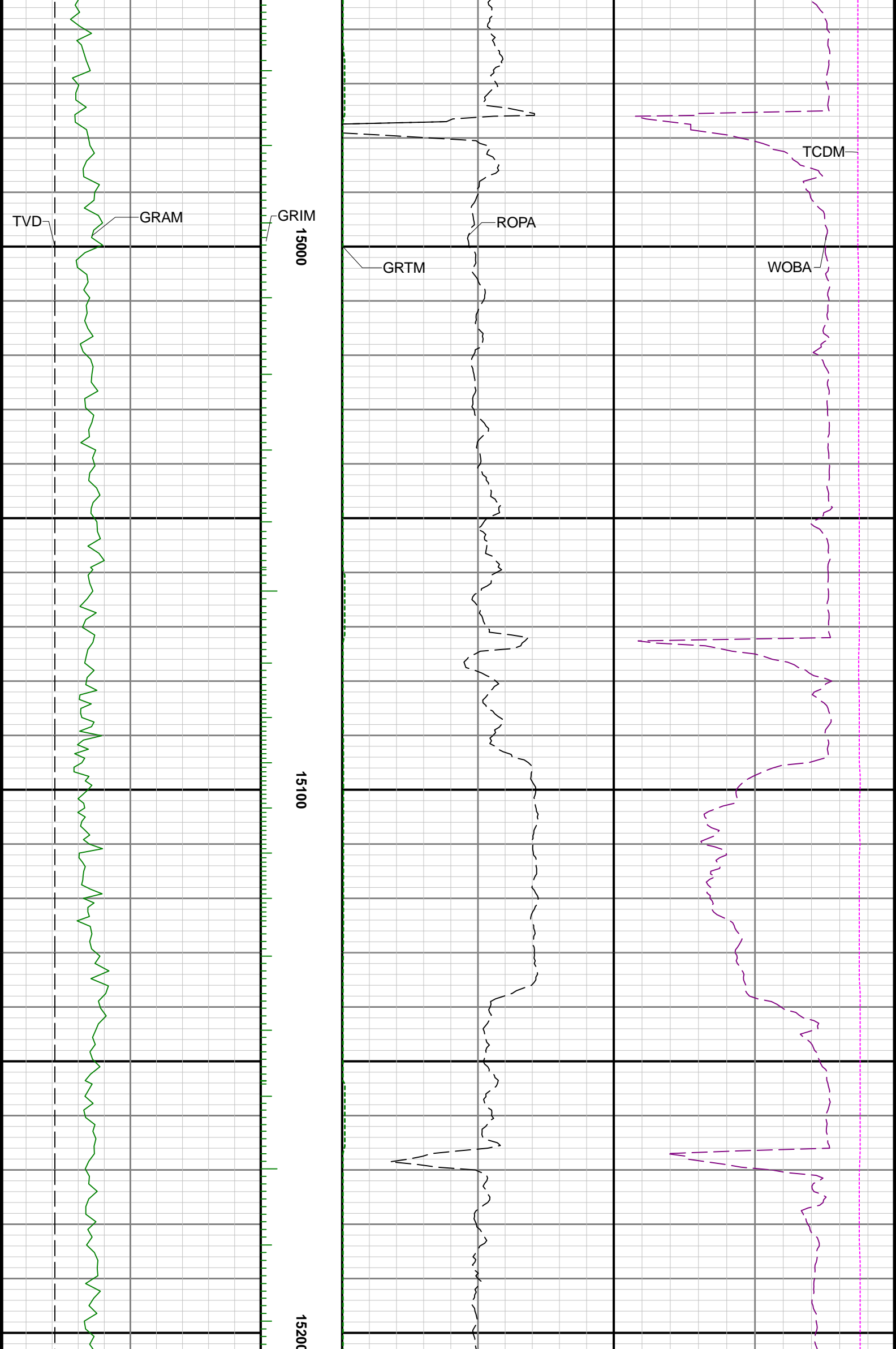


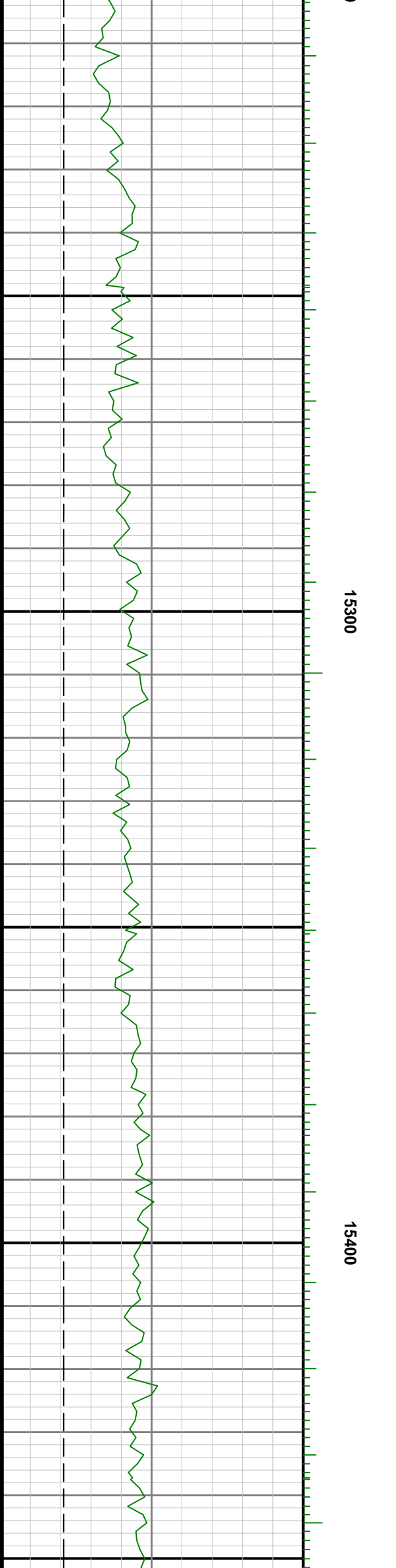
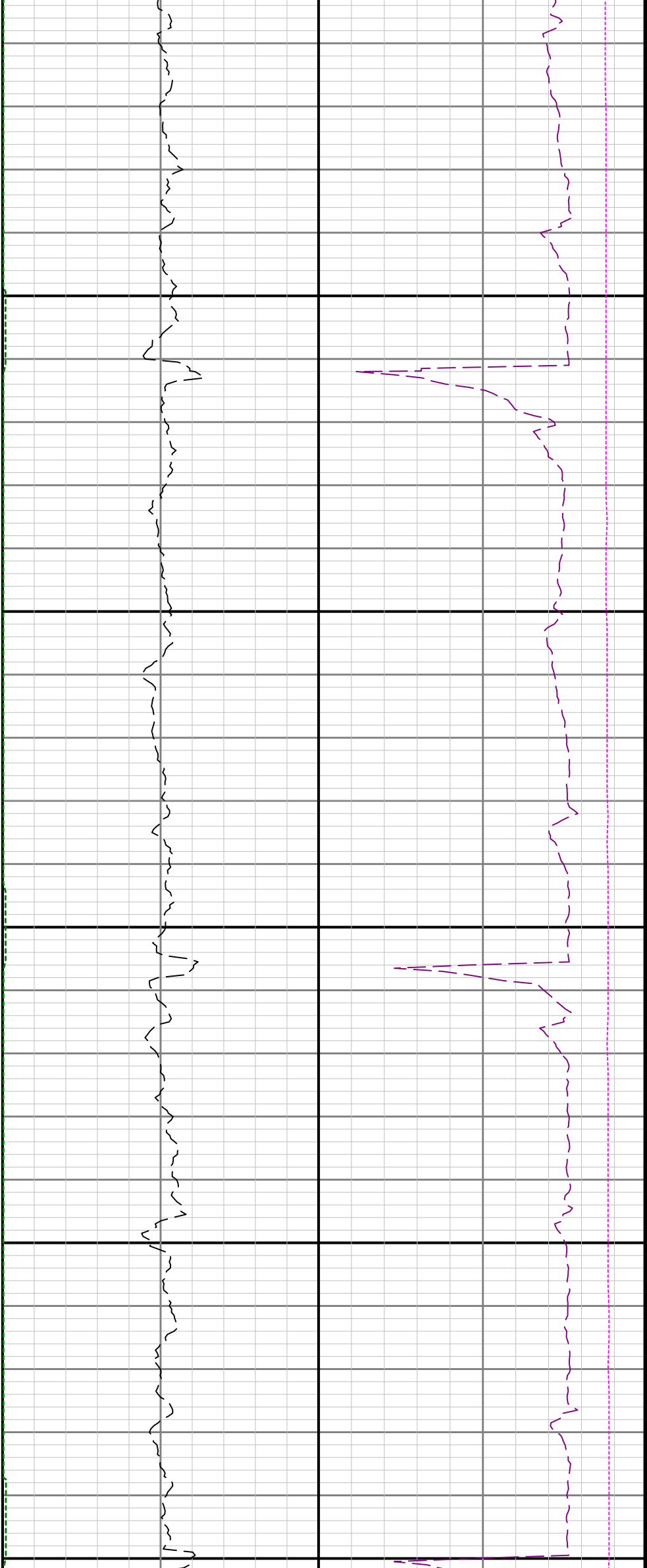


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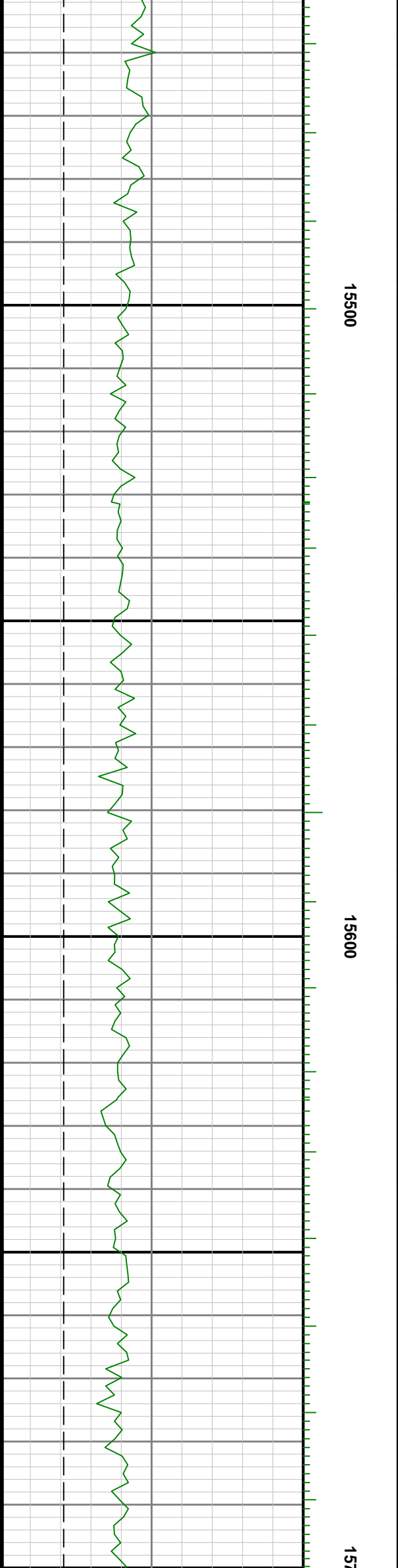
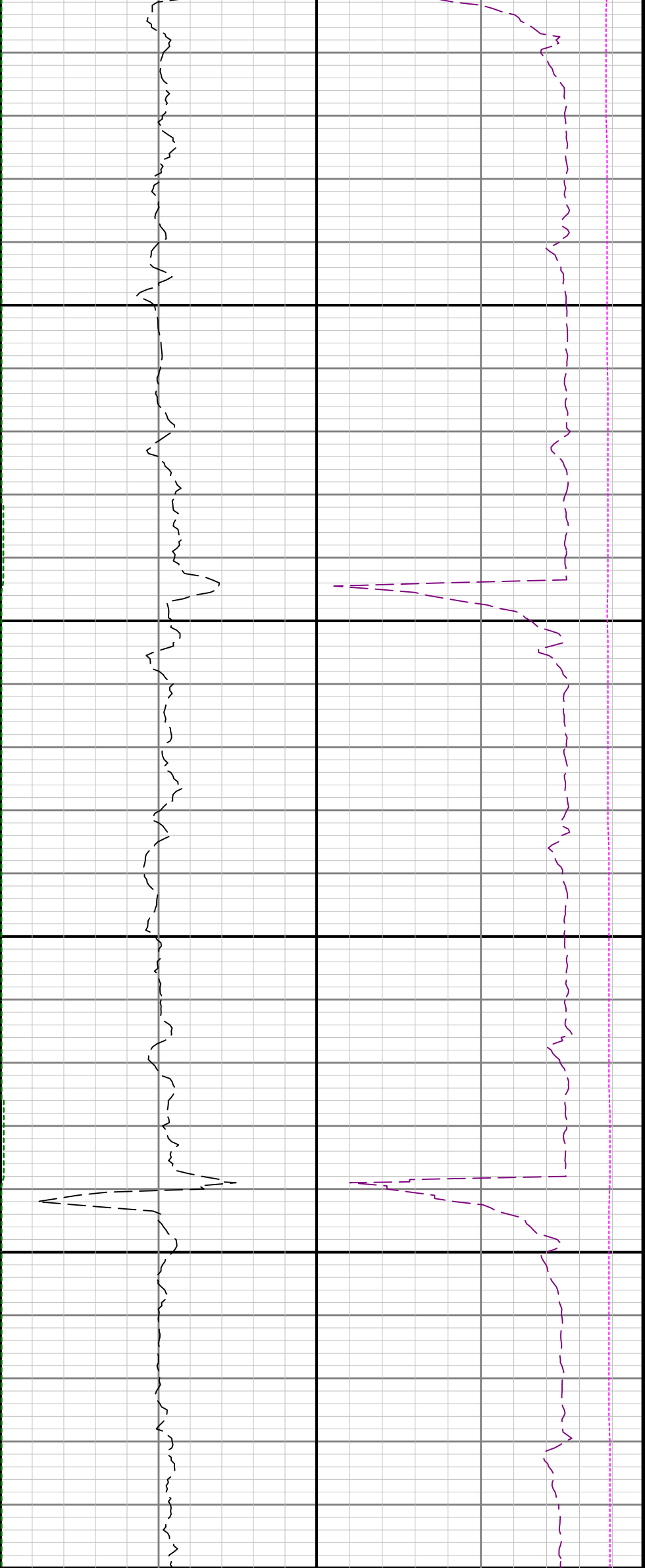
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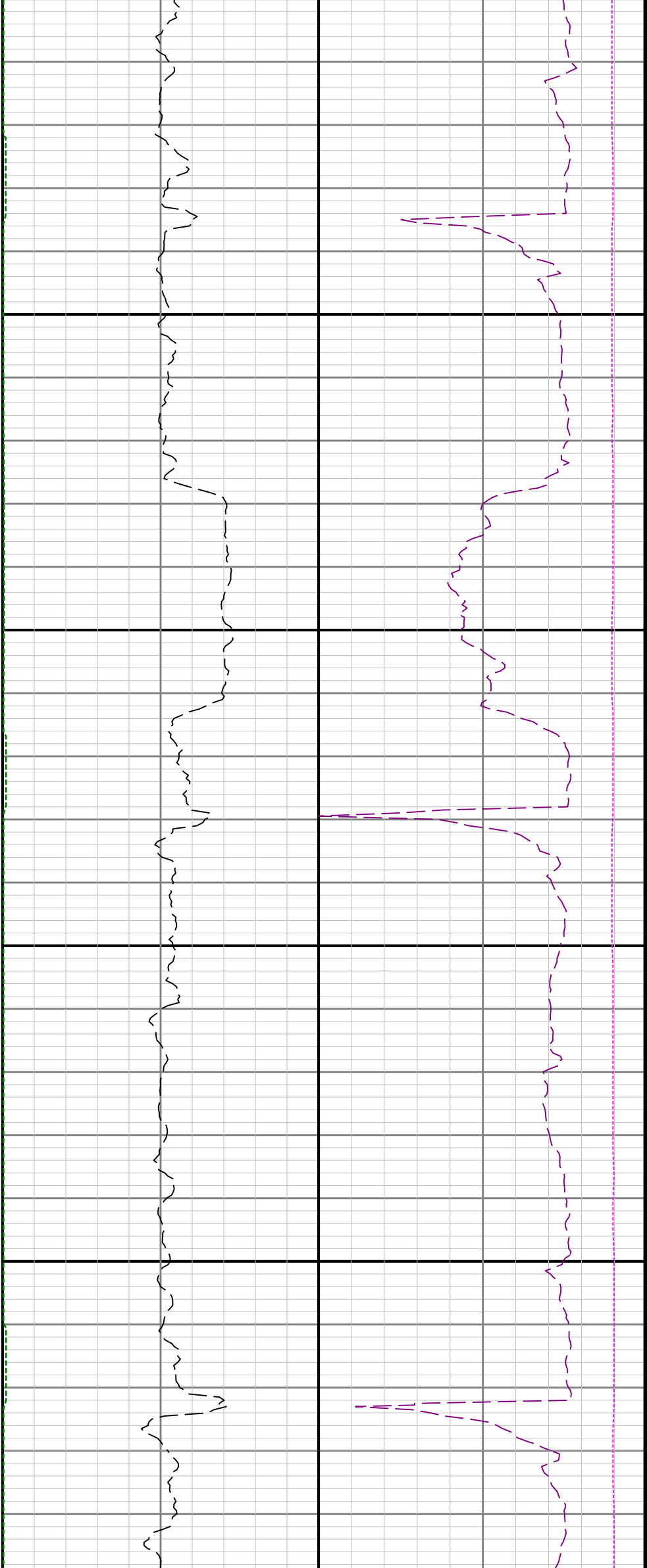








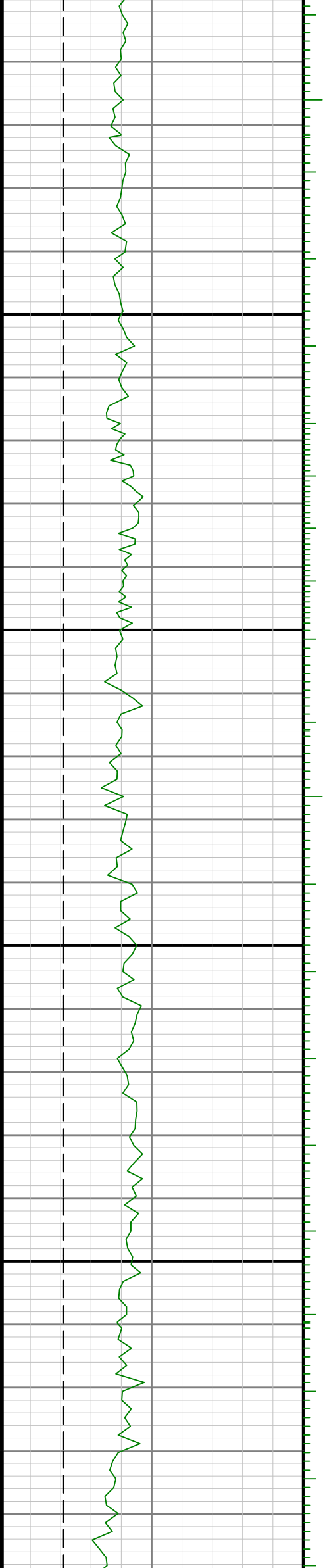


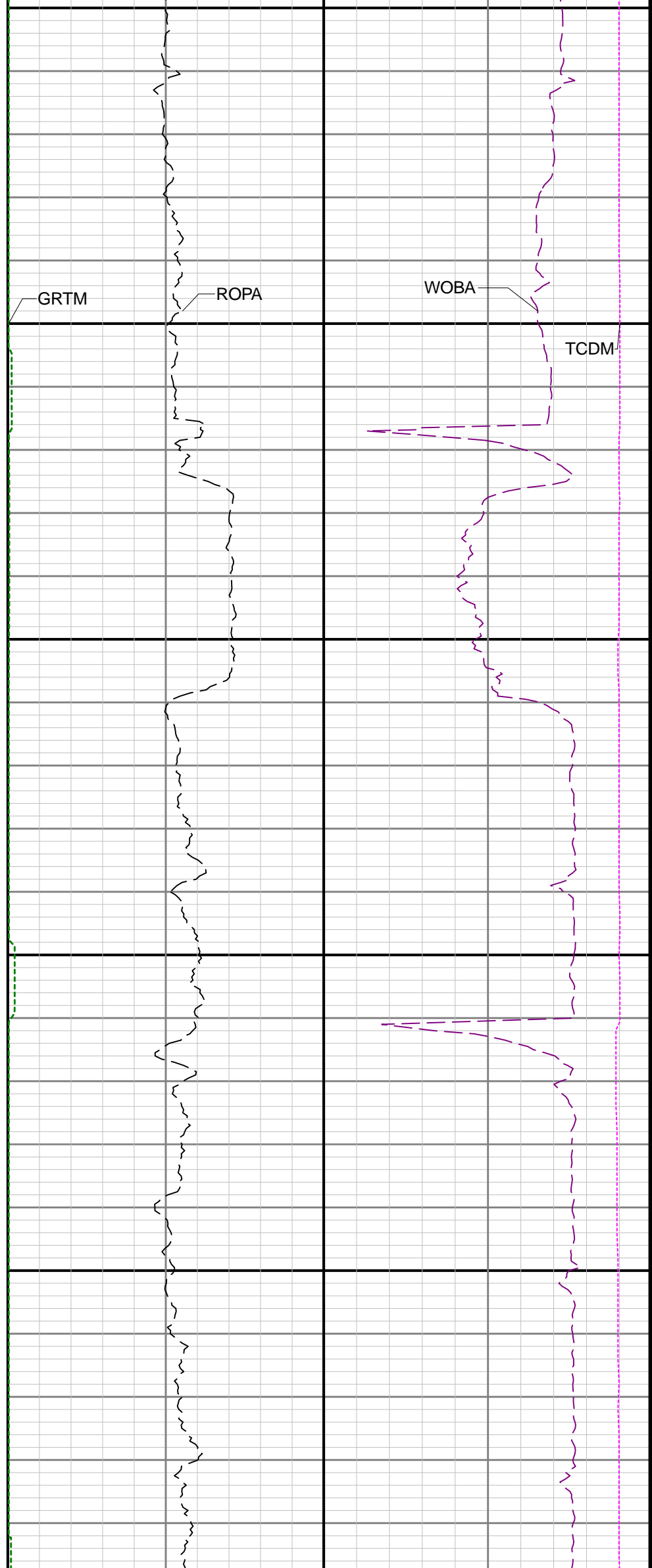
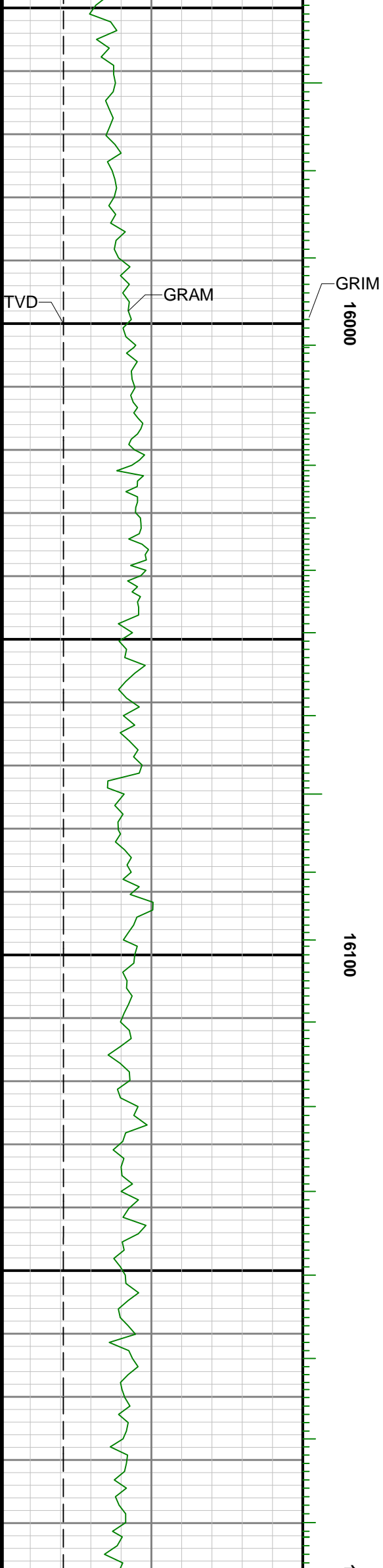


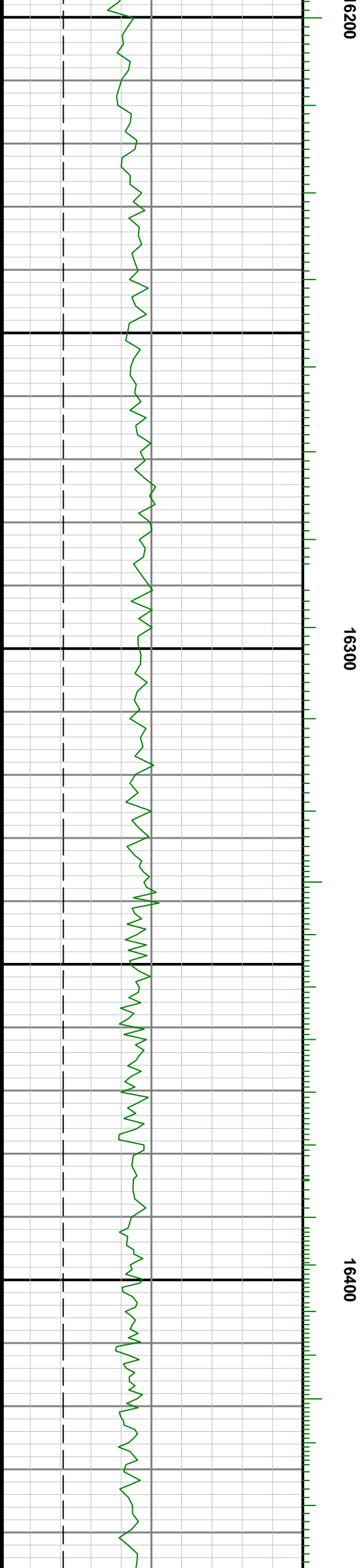
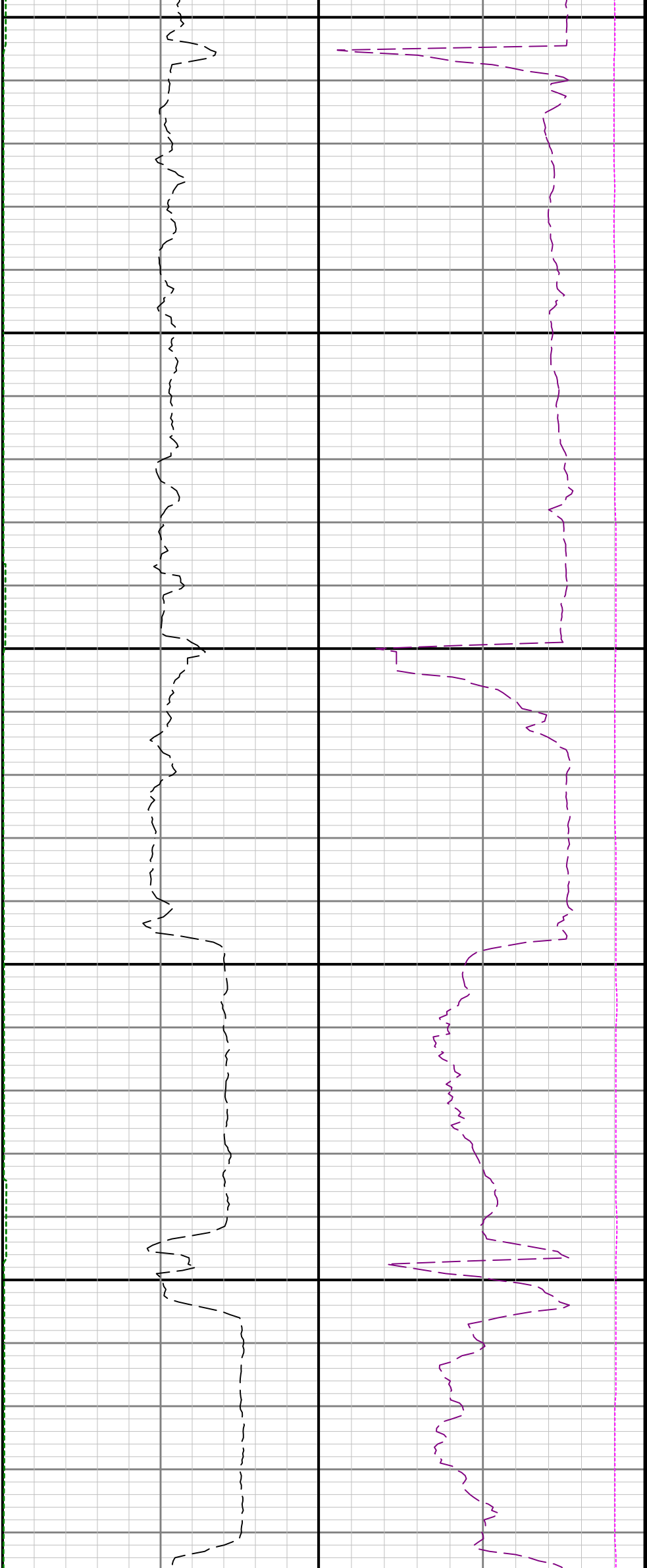
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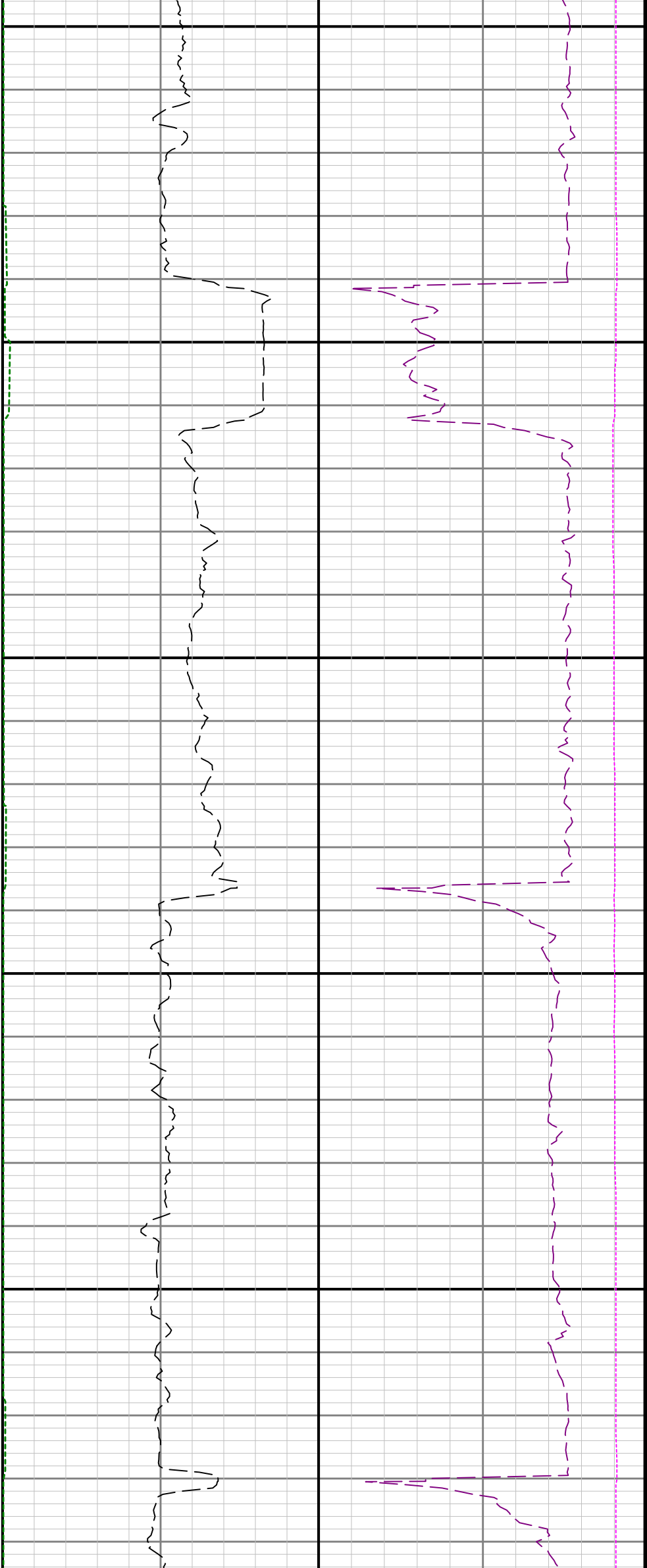
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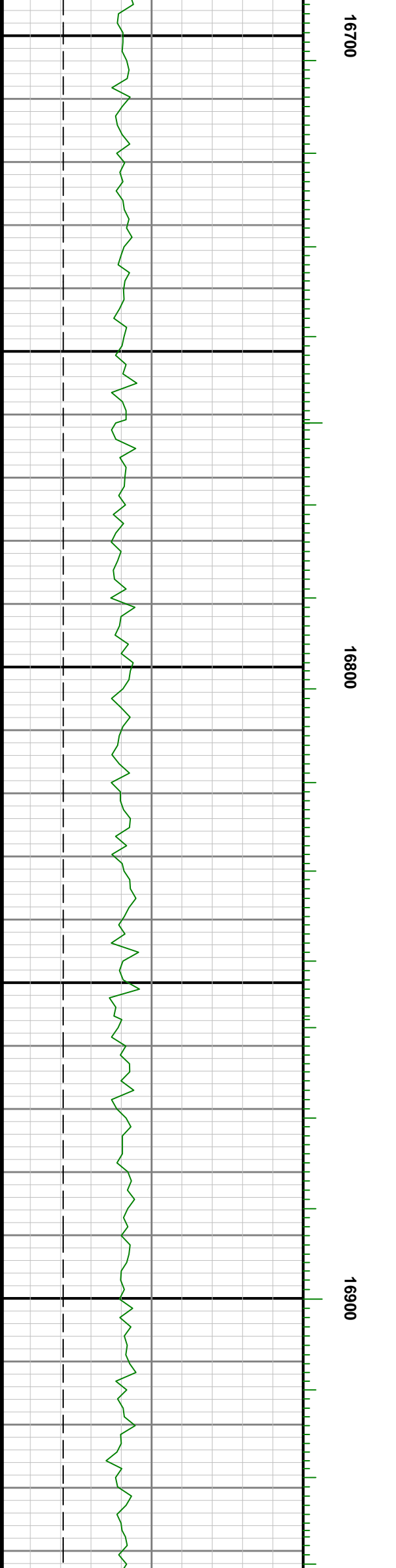


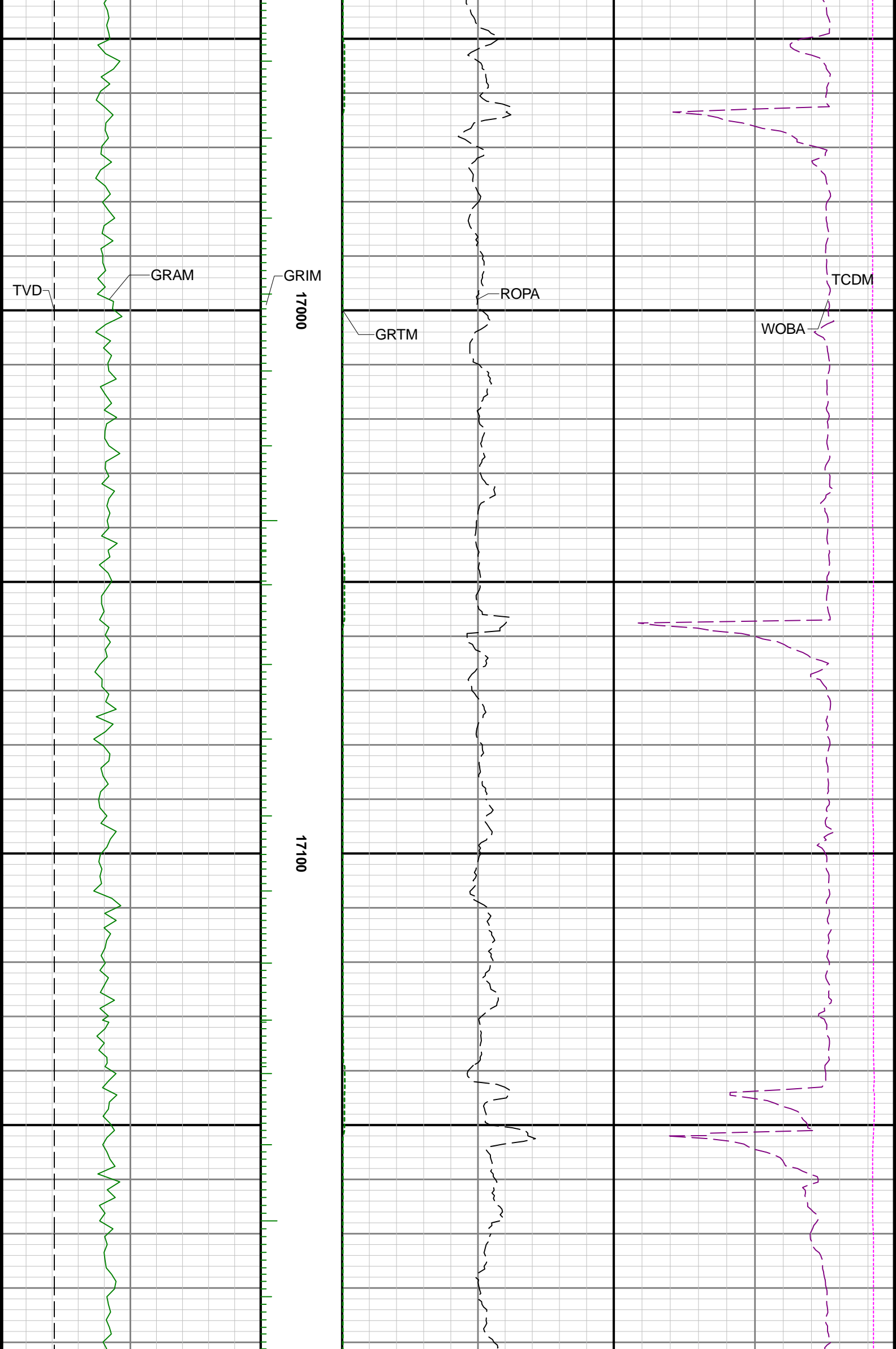


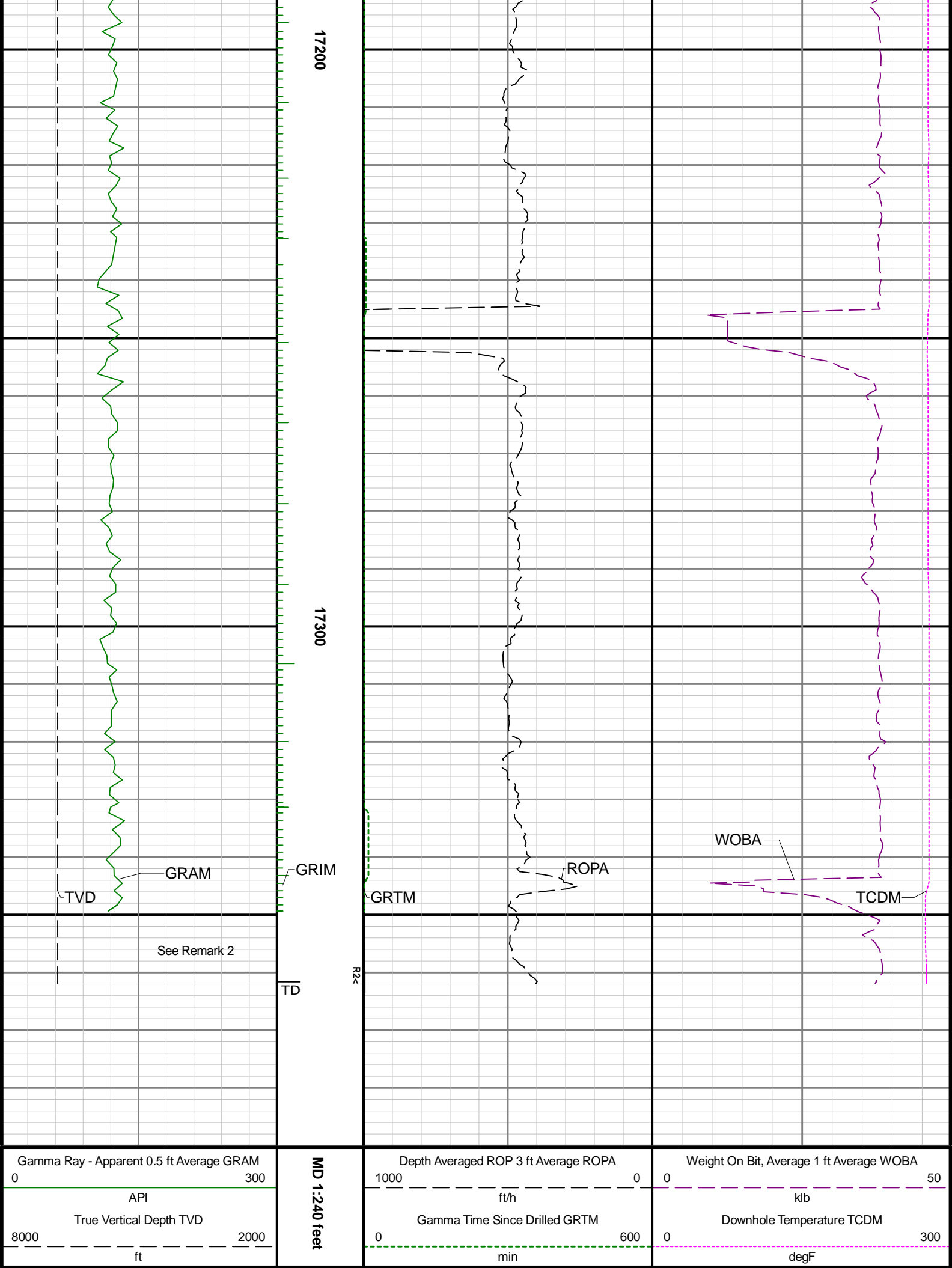


16500

16600







17200

17300

MID 1:240 feet