



Gamma Ray

LWD MEMORY LOG

Scale: Company: Noble Energy

1:240 Well: Gutteresen YY06-756

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° 11' 26.861" N Longitude: 104° 28' 51.578" W Directional

API No: 05-123-48641-00 SEC: 30 TWN: 3N RGE: 63W

Job ID: 110462621

Permanent Datum (P.D.): Mean Sea Level Elevation: 0.00 ft Elev. KB: N/A

Log Measured From: Rig Floor Above P.D.: 4820.00 ft Elev. DF: 4820.00 ft Elev. GL: 4790.00 ft

Dates Interval Magnetic Field Reference

From: 2020-07-15	Drilled (ft)	Logged (ft)	Azi Reference North:	Grid	Dip Angle: (deg)	66.57
To: 2020-07-17	Top: 1943.00	Top: 1943.00	Total Magnetic Field Strength: (nT)			52003
Spud: 2020-07-12	Bottom: 17289.50	Bottom: 17277.00	Mag to Reference North Correction: (deg)			7.26

Borehole Record Casing Record

Hole Size (in)	From (ft)	To (ft)	Size (in)	Weight (lb/ft)	From (ft)	To (ft)
13.500	30.00	1943.00	9.625	36.00	30.00	1933.00
8.500	1943.00	17290.00				

Mud Record Deviation Record

Type	From (ft)	To (ft)	Hole Size (in)	Interval (ft)	Inc Az (Start)	Inc Az (End)
Oil Based Mud	1943.00	17290.00	8.500	15347.00	0.47 345.43	91.63 180.82

Acquisition System Software Version Other

Cadence	RT 5.7	Rig: H&P 517
DeliverableGen	5.7.8878.1	Contractor: Helmerich & Payne Drilling Co
		District: RMA Unit: D&E

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Log Run Summary

Run No	Bit Run No.	Bit Size (in)	Bit Type	Bit Gauge Length (in)	Assembly Type	Logged Interval		Bit Depth Interval		Date / Time		Circ. Hours (h)
						Top (ft)	Bottom (ft)	From (ft)	To (ft)	Start Logging	End Logging	
1	1	8.500	PDC	3.00	AutoTrak Curve	1930.05	2187.05	1943.00	2200.00	2020-07-13 00:09	2020-07-13 01:05	3.01
2	2	8.500	PDC	3.00	AutoTrak Curve	2187.05	5972.08	2200.00	5985.03	2020-07-13 06:47	2020-07-13 17:31	9.44
3	3	8.500	PDC	3.00	AutoTrak Curve	5971.05	17276.55	5984.00	17289.50	2020-07-13 17:42	2020-07-15 21:00	37.65

Crew

Name	Arrive Wellsite	Depart Wellsite	Name	Arrive Wellsite	Depart Wellsite	Name	Arrive Wellsite	Depart Wellsite
Tien Bui	2020-07-12	2020-07-16						

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+ (%)
2020-07-12 14:24	1	1943.00	Oil Based Mud	9.2	14	N/A	20.0	68/20	Active Pit	26500	0.00
2020-07-13 05:30	2	2200.00	Oil Based Mud	9.2	14	N/A	20.0	68/20	Active Pit	27000	0.00
2020-07-13 22:13	3	5985.00	Oil Based Mud	9.3	11	N/A	18.2	69.2/21.2	Active Pit	30000	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	15092344	Near Bit VSS	5.93	6.78	7.000	4.330
1	AutoTrak Curve Steering Unit	15092344	Near Bit Inclination	5.93	6.78	7.000	4.330
1	AutoTrak Curve MWD	1421820	Gamma (single)	2.74	12.95	7.000	3.250
1	AutoTrak Curve MWD	1421820	Directional (mag)	12.27	22.48	7.000	3.250

2	AutoTrak Curve Steering Unit	14514942	Near Bit Inclination	5.93	6.78	7.000	4.330
2	AutoTrak Curve Steering Unit	14514942	Near Bit VSS	5.93	6.78	7.000	4.330
2	AutoTrak Curve MWD	12398178	Gamma (single)	2.74	12.95	7.000	3.250
2	AutoTrak Curve MWD	12398178	Directional (mag)	12.27	22.48	7.000	3.250
3	AutoTrak Curve Steering Unit	15068338	Near Bit VSS	5.93	6.78	7.000	4.330
3	AutoTrak Curve Steering Unit	15068338	Near Bit Inclination	5.93	6.78	7.000	4.330
3	AutoTrak Curve MWD	14334277	Gamma (single)	2.74	12.95	7.000	3.250
3	AutoTrak Curve MWD	14334277	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

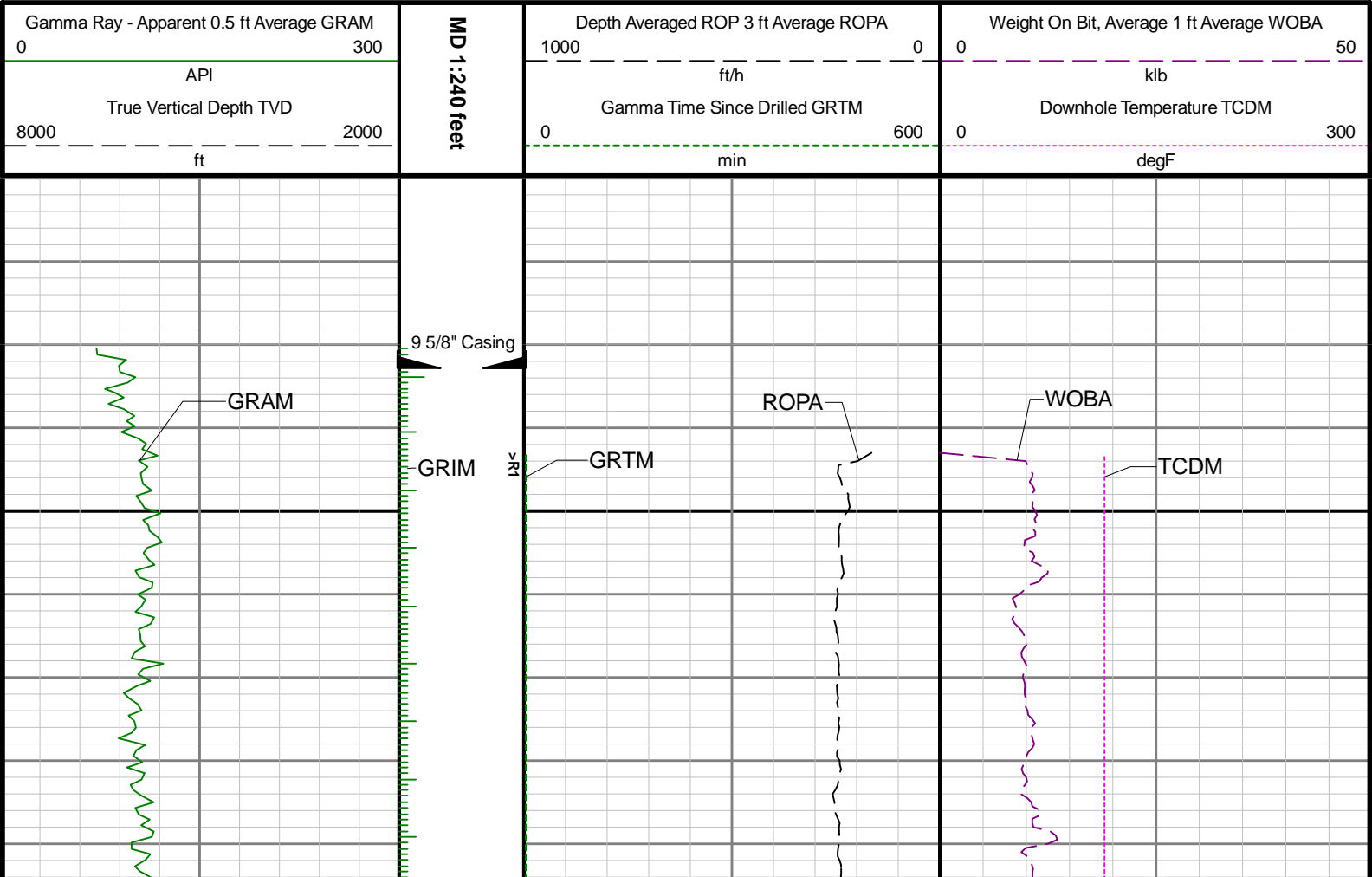
1	Depth measurements were obtained from a depth control system not supplied or operated by Baker Hughes. Due to lack of control by Baker Hughes logging engineers, depth calibrations and measurements could not be independently verified.
2	Baker Hughes runs 1 through 3 utilized 6.75 inch ATC services (Directional and Gamma Ray) behind an 8.5 inch PDC bit and rotary steerable assembly from 1943 to 17290 feet MD (1942 to 6613 feet TVD).
3	Baker Hughes LWD Run 1 to Run 3 utilized 6 ¾ inch NaviGamma service (Gamma Ray and Directional) behind an 8 1/2 inch bit and rotary steerable assembly from 1943 to 17290 feet MD (1943 to 6614 feet TVD).

Remarks

Number	Depth (ft)	Hole Section (in)	Run No.	Remark
1	2185.00	8.500	2	The interval from 2185 to 2199 feet MD (2198 to 2198 feet TVD) was logged up to 6.07 hours later due to a trip out of hole to change BHA.
2	5838.00	8.500	2	The interval from 5838 to 5897 feet MD (5814 to 5872 feet TVD) has gaps in Gamma Ray data due to losing connection with the third party Pason depth tracking system.
3	5972.00	8.500	3	The interval from 5972 to 5984 feet MD (5956 to 5956 feet TVD) was logged up to 6.52 hours later due to a trip out of hole to change BHA.
4	17277.00	8.500	3	The interval from 17277 to 17290 feet MD (6614 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





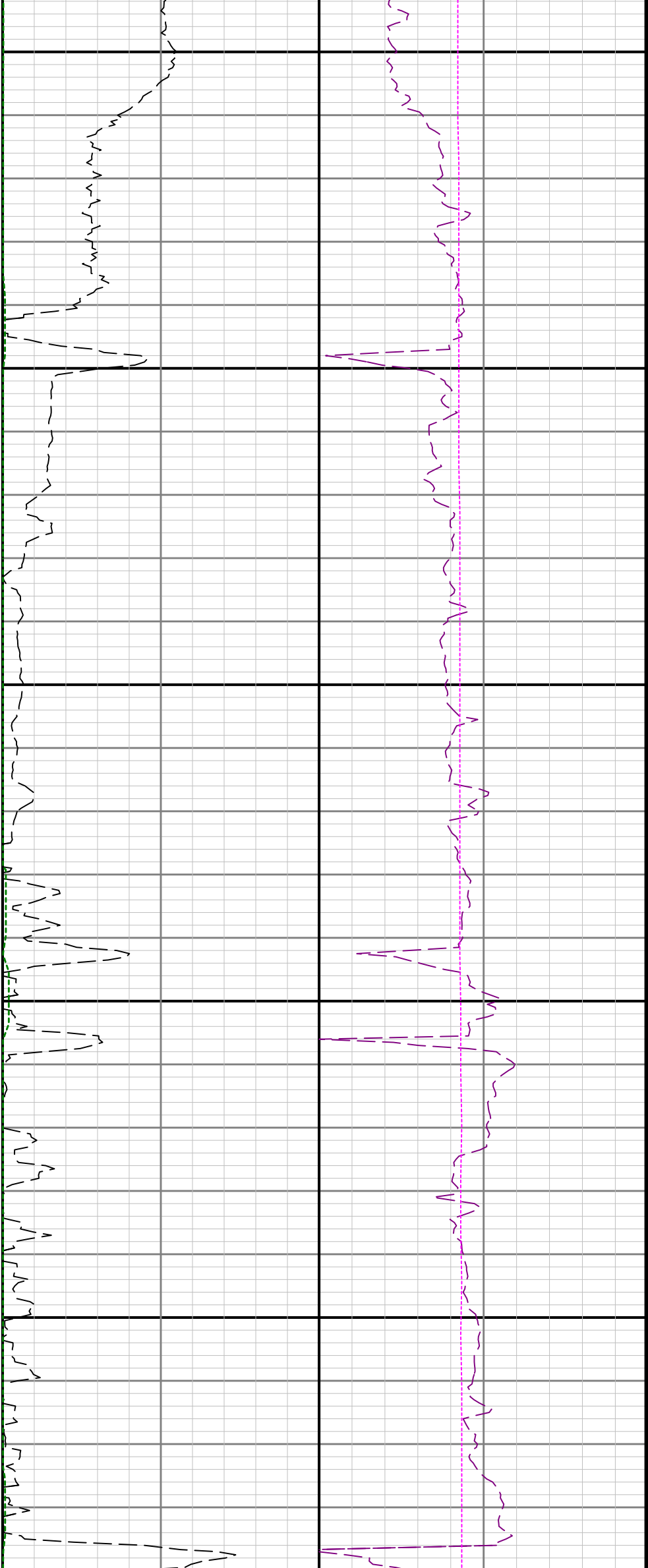
R1 < R2

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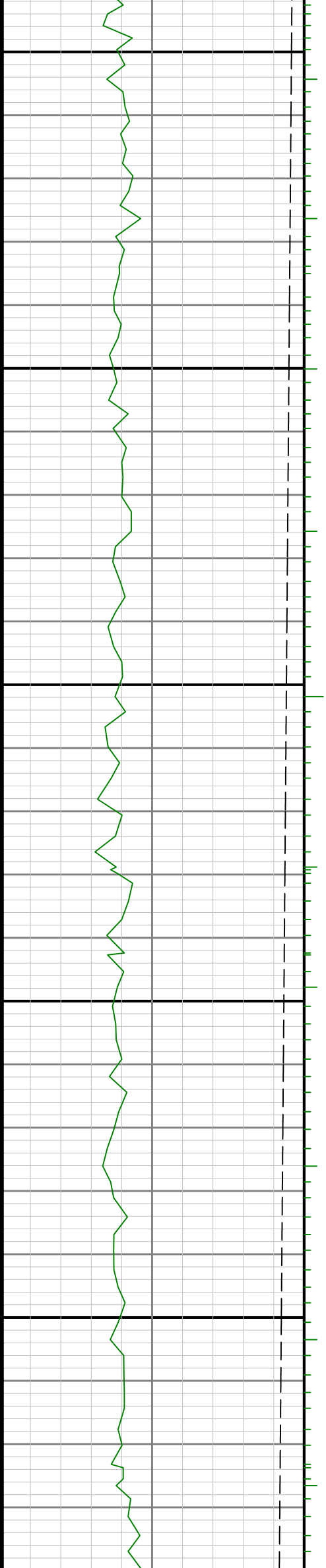
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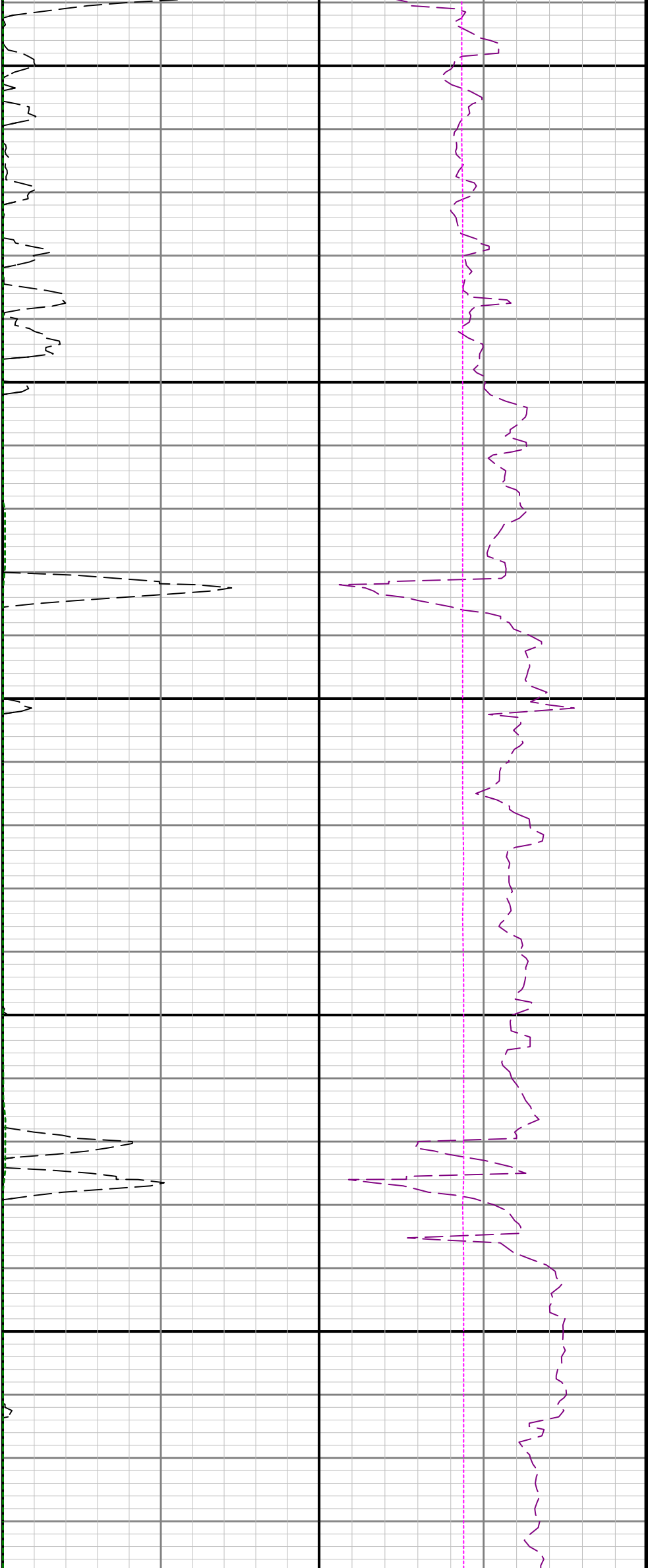
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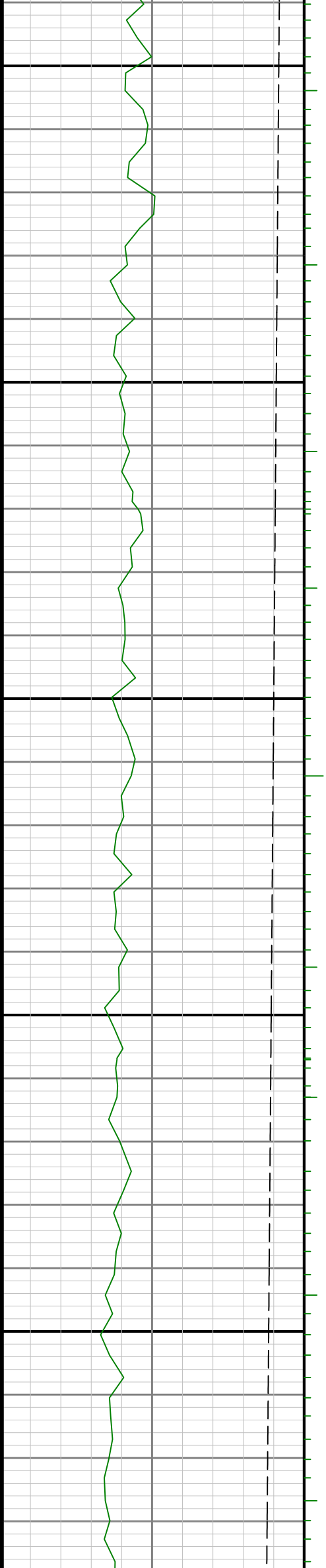


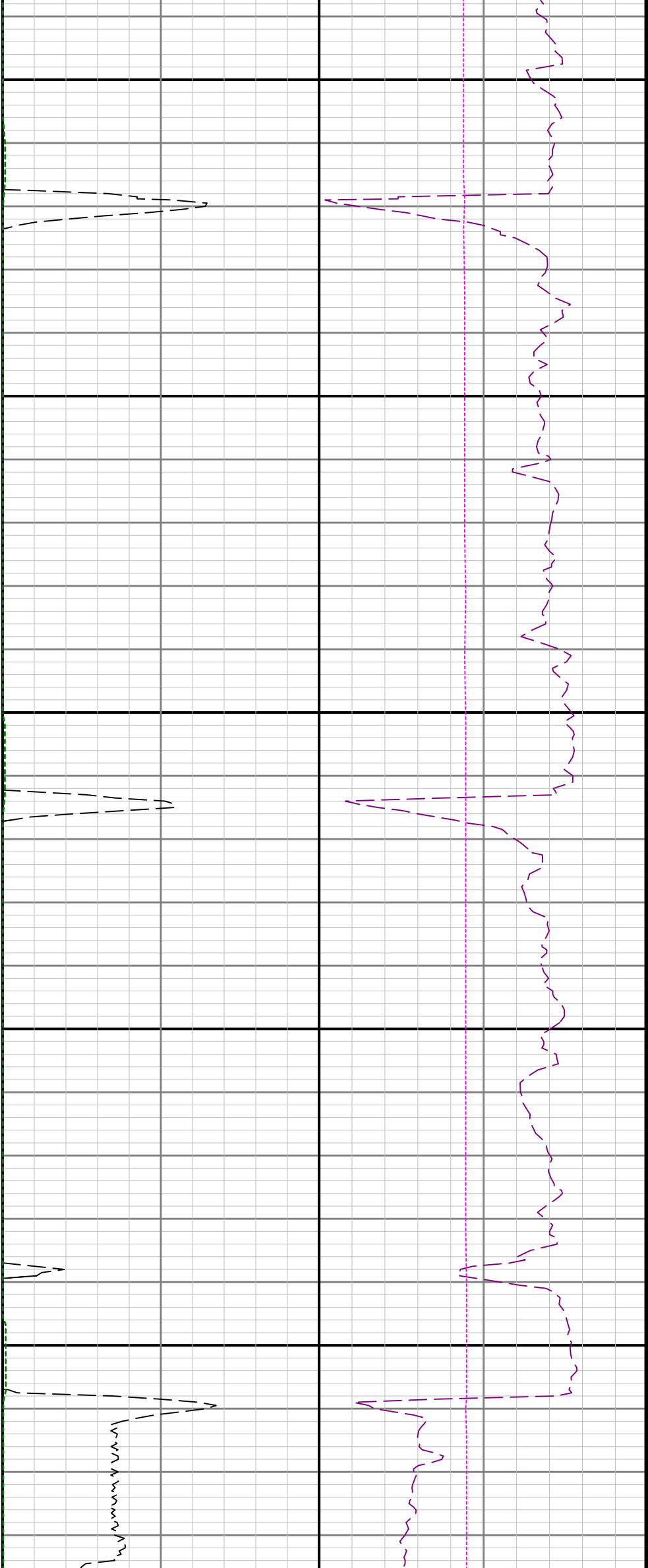


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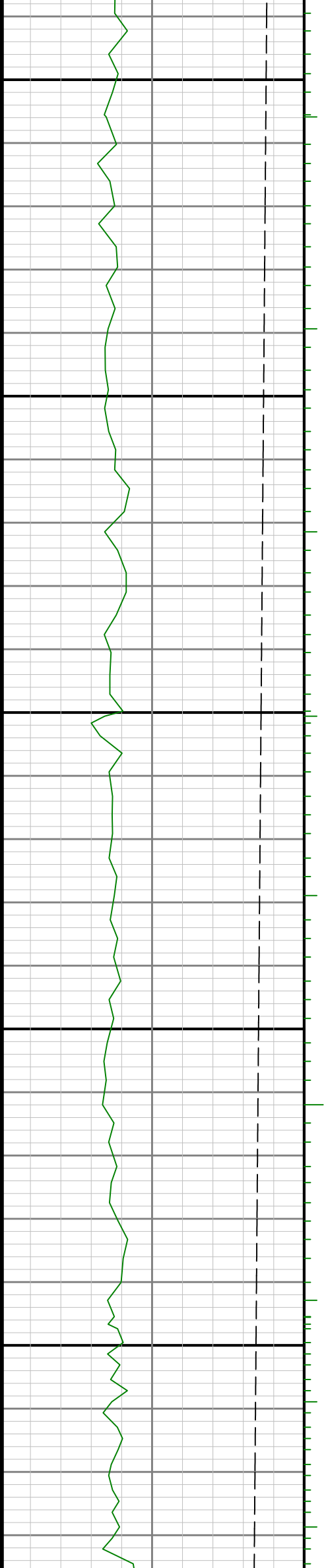
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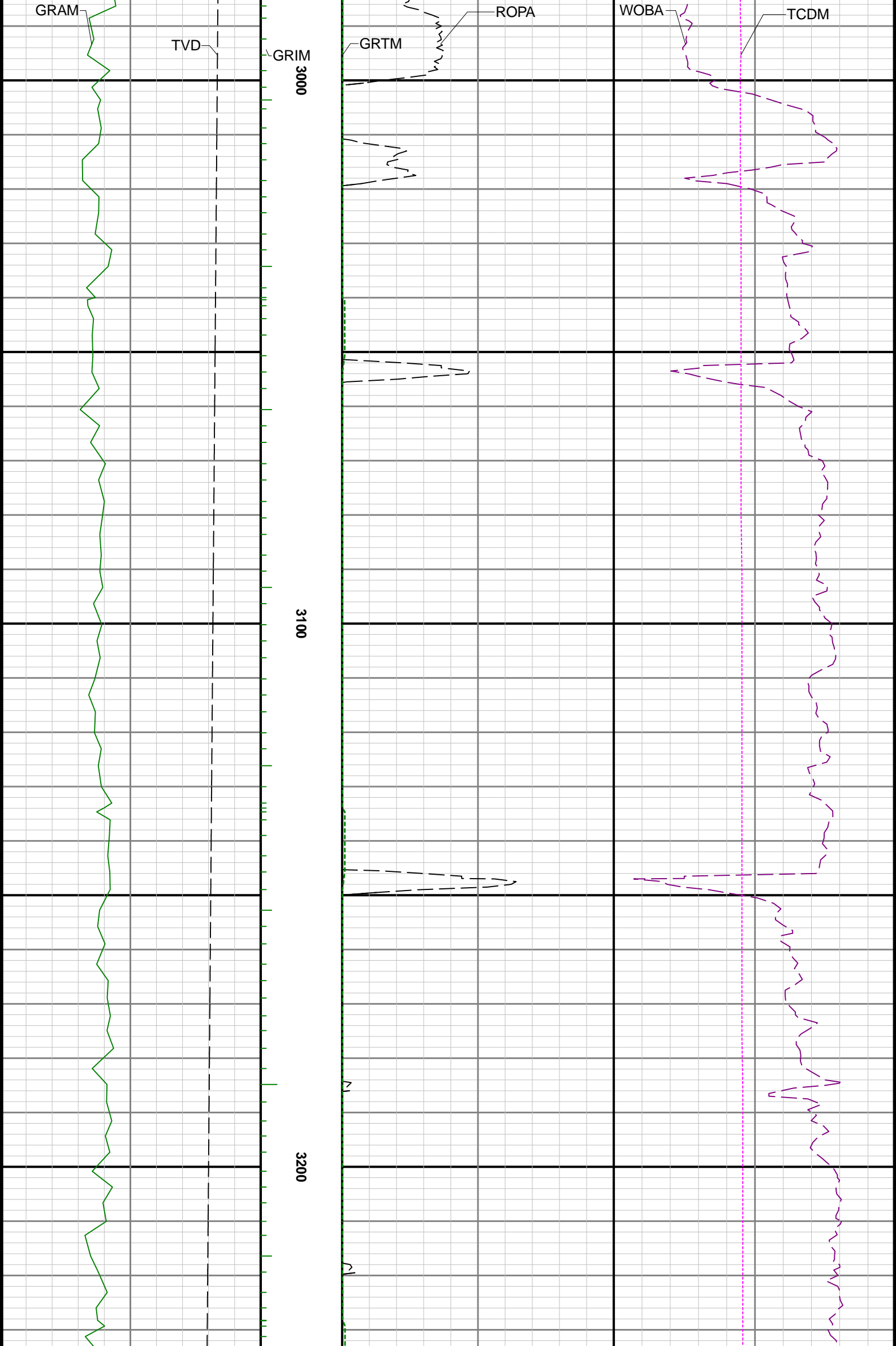


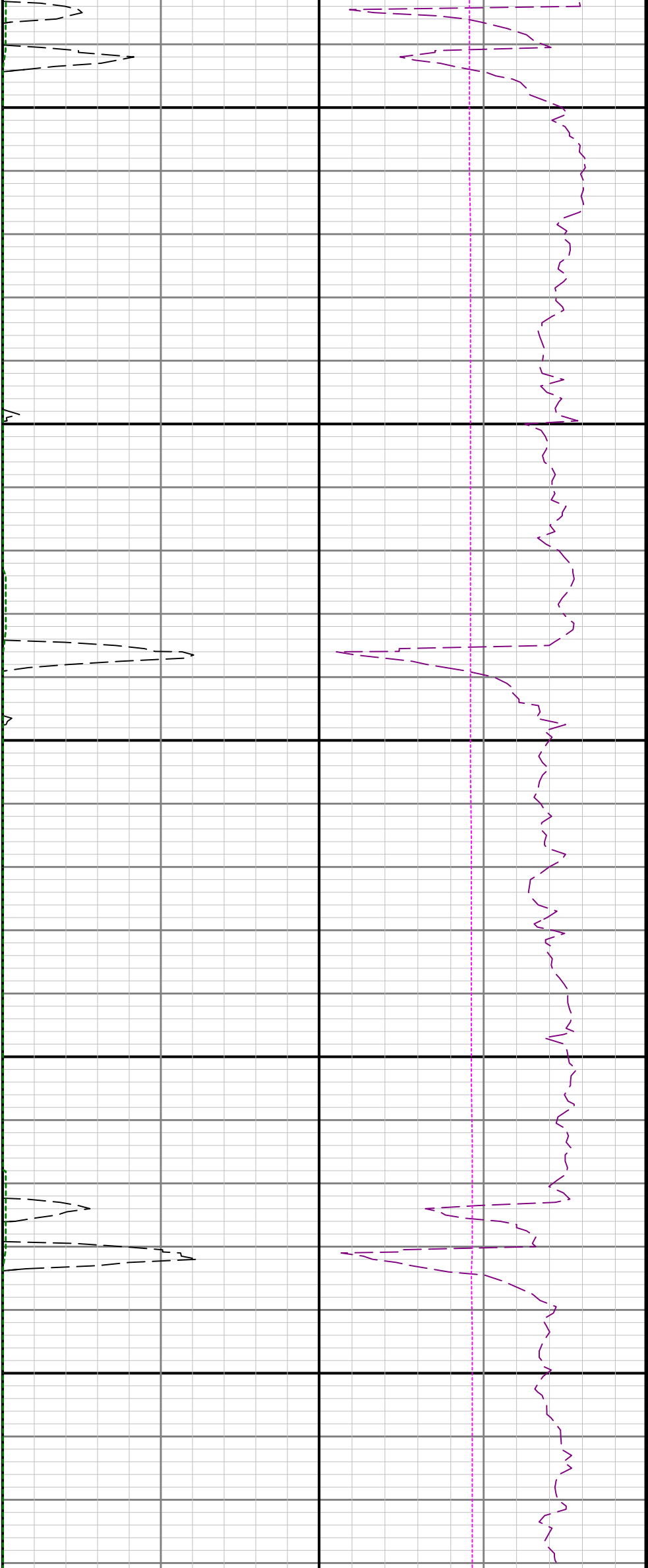


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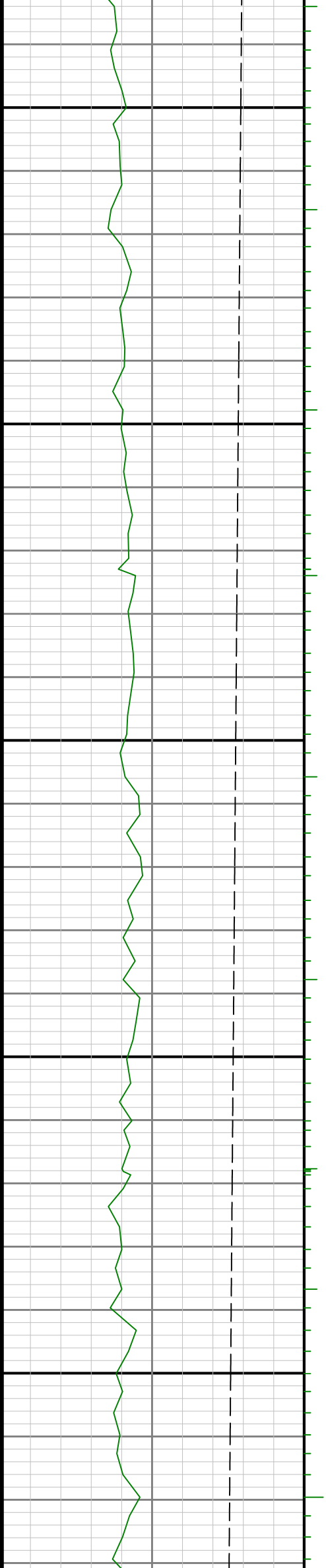


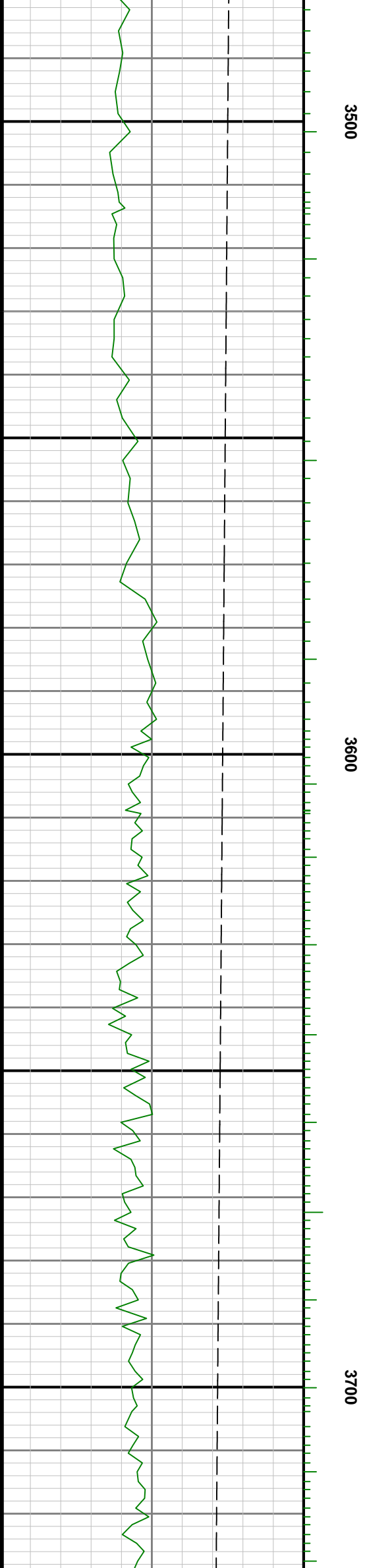
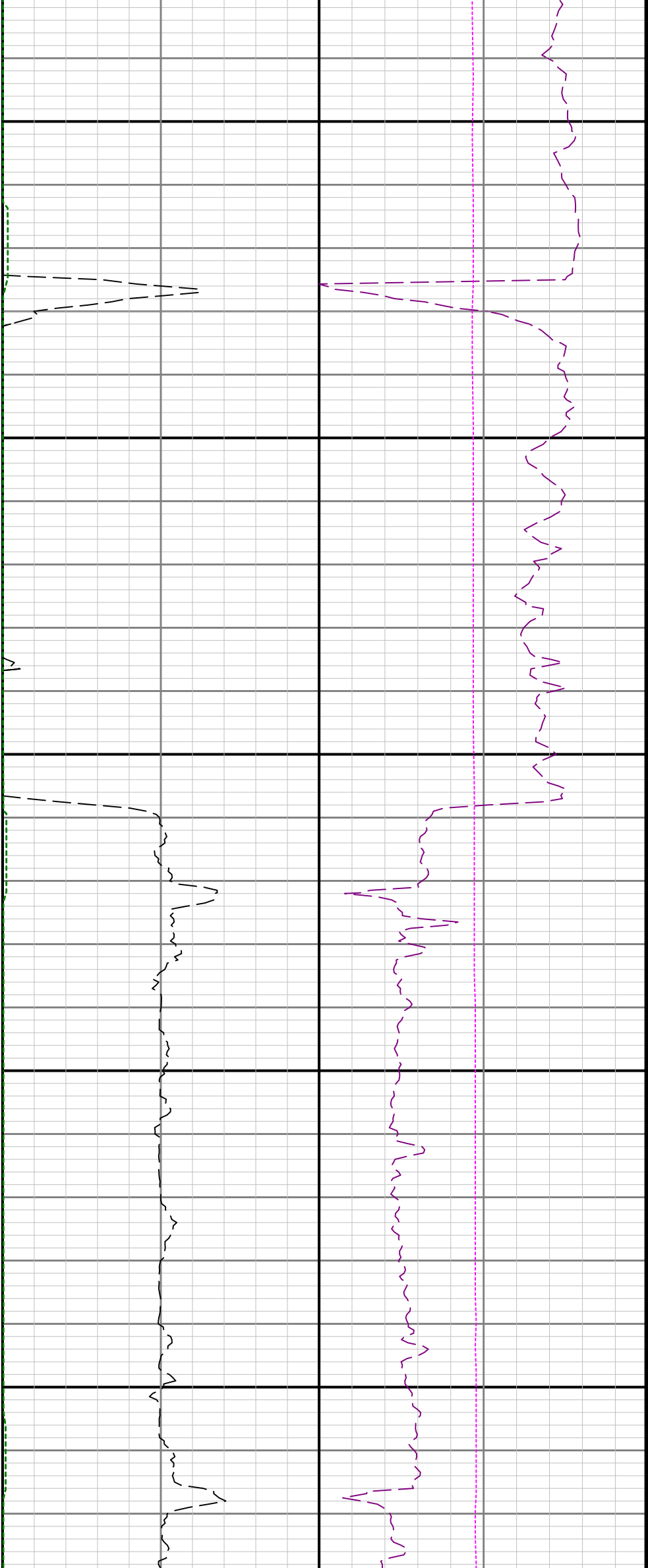


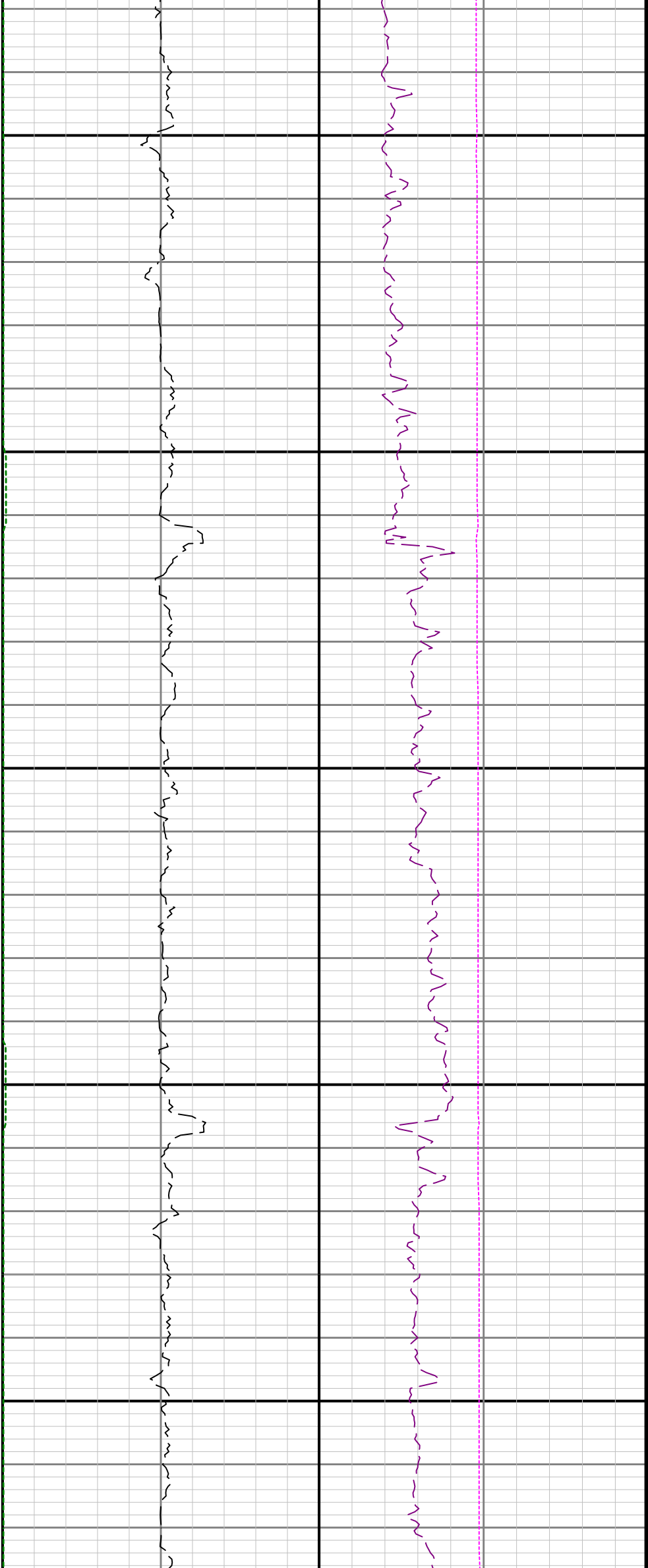


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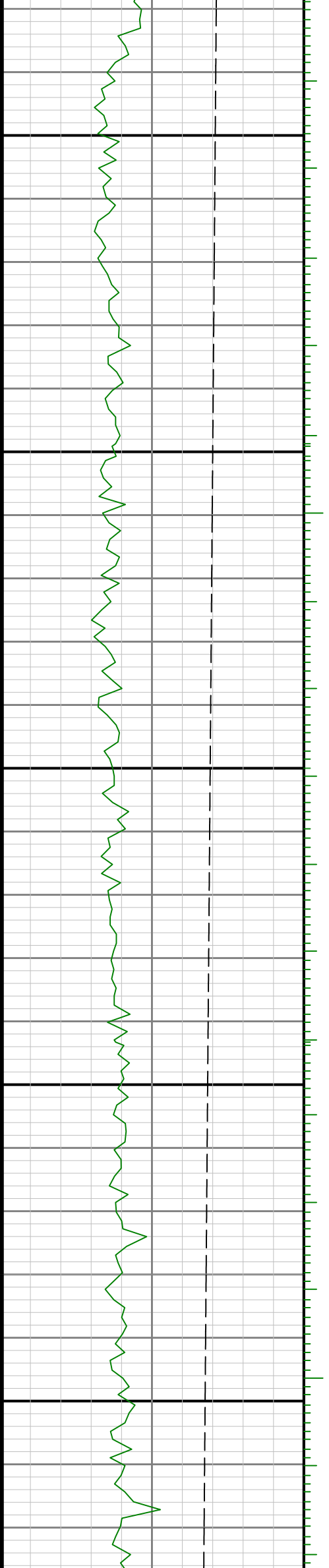


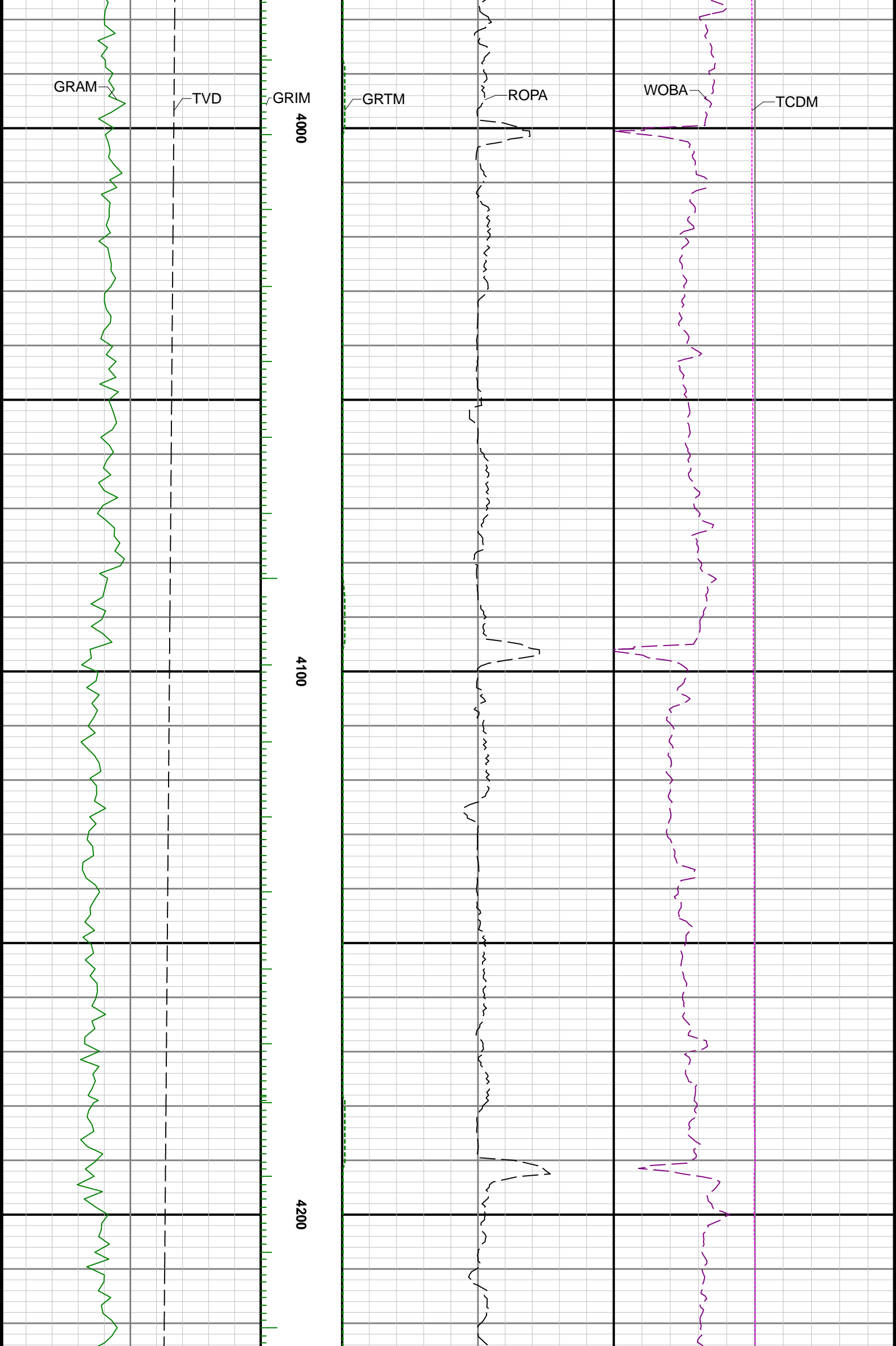


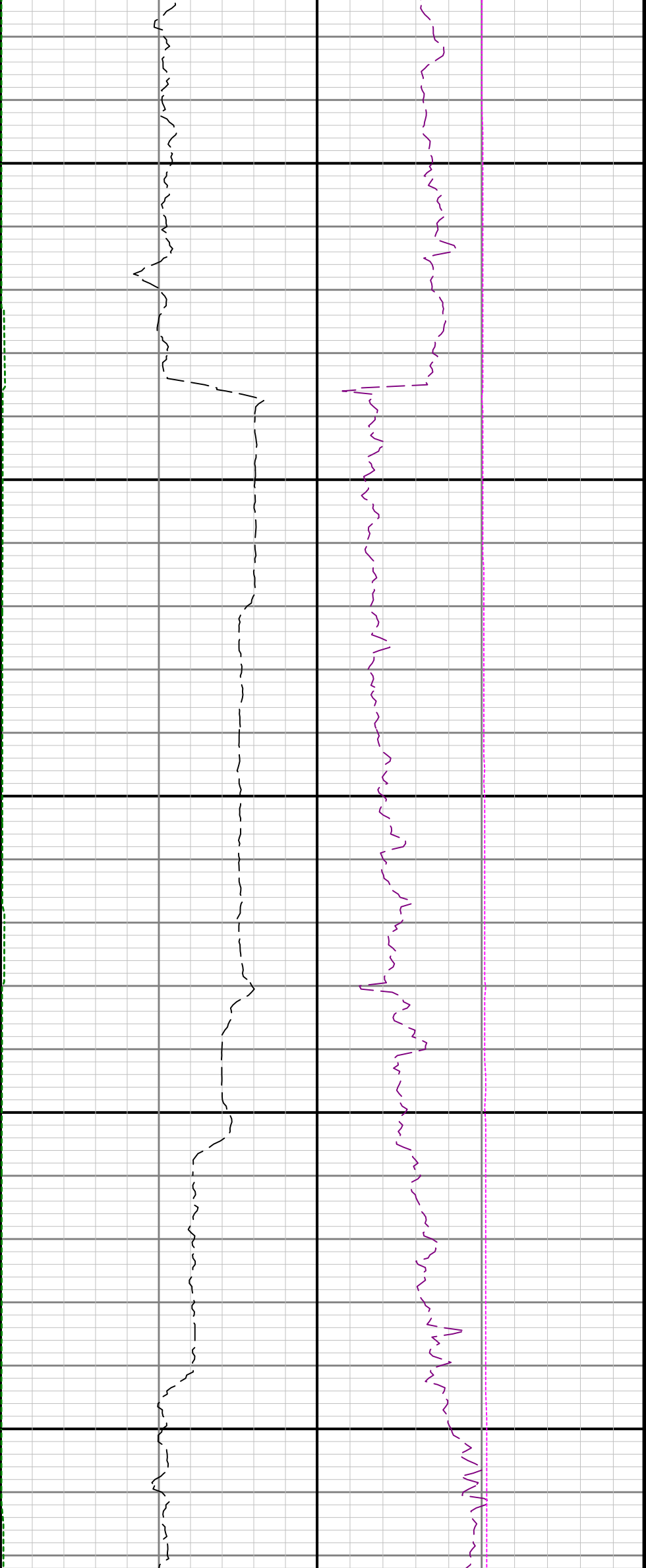


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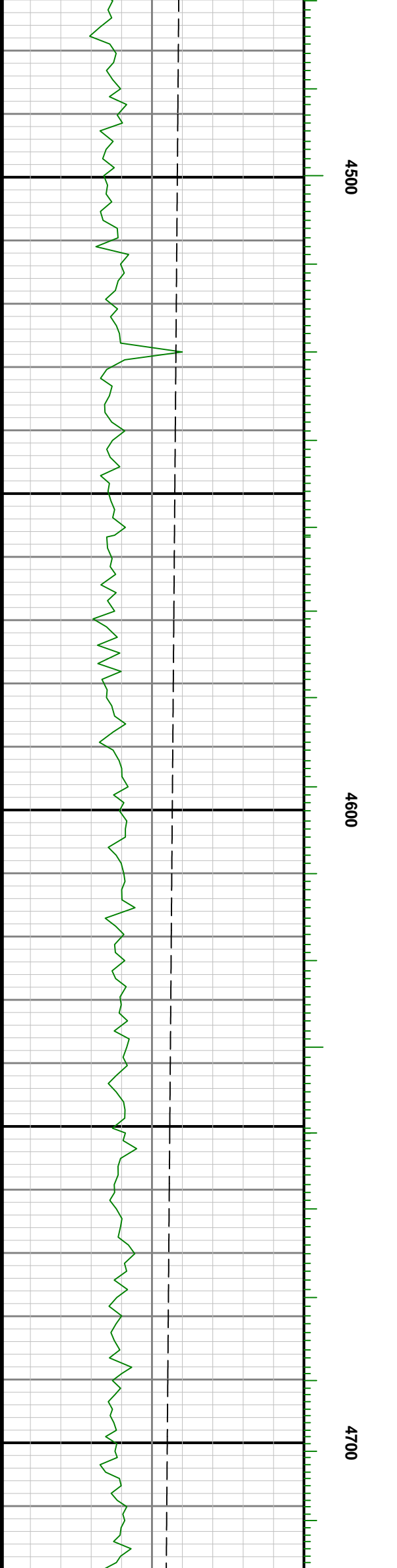
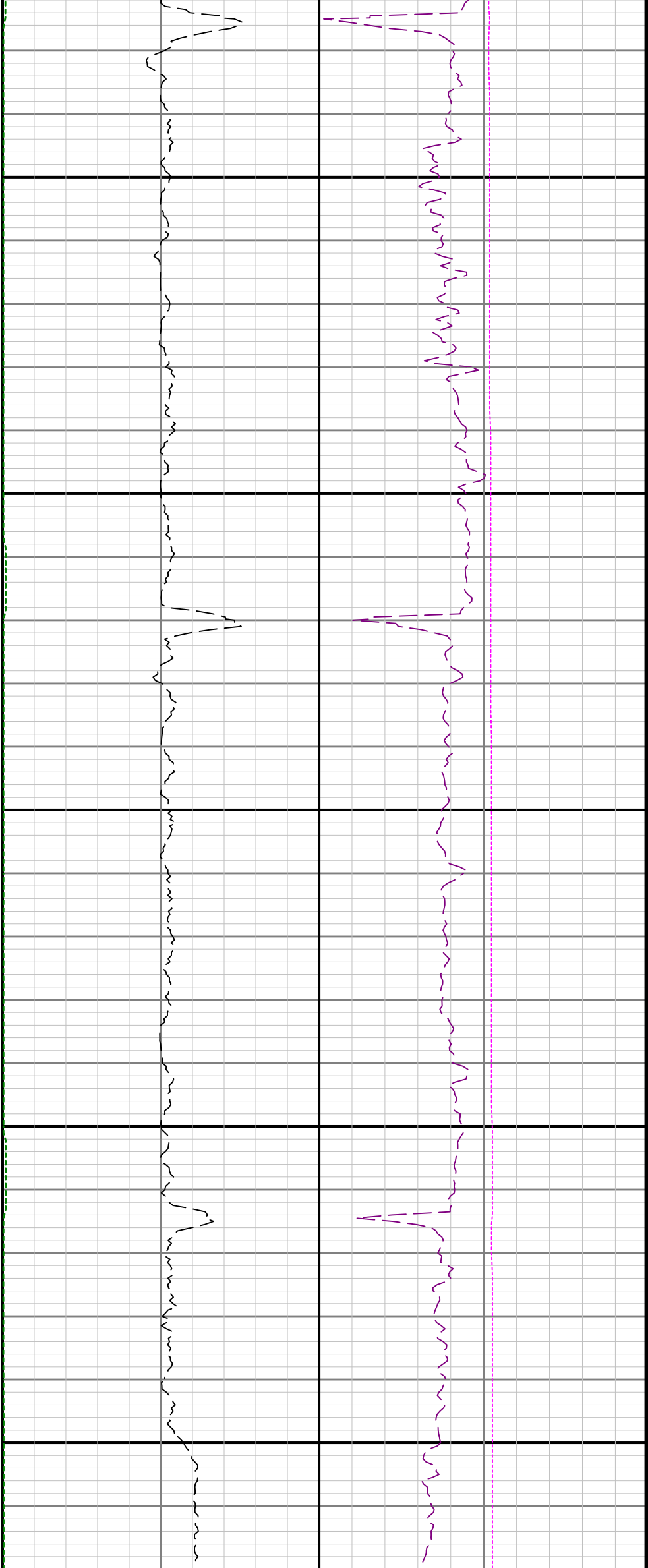


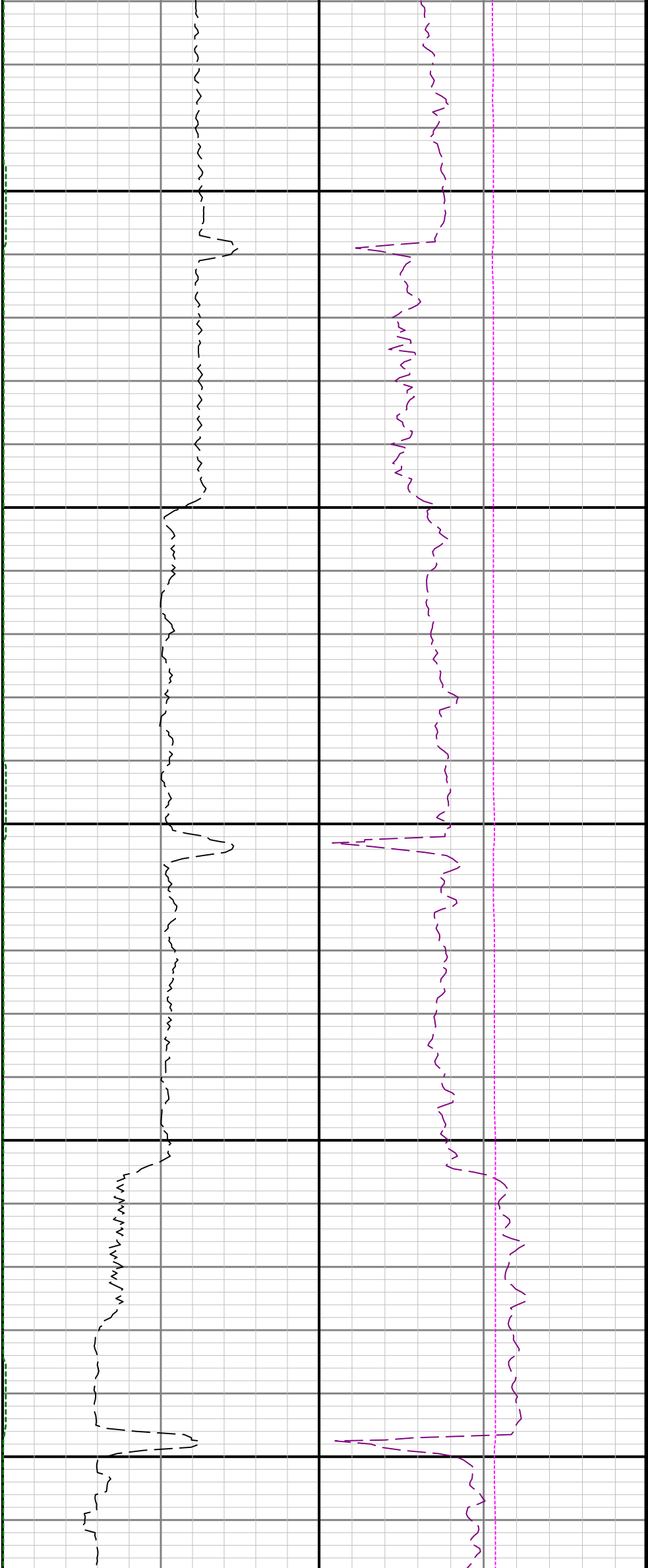




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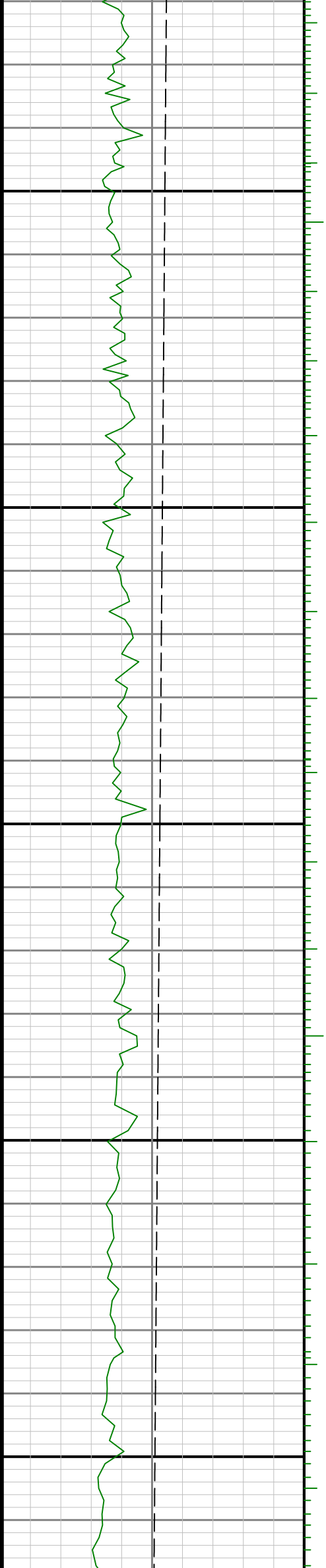
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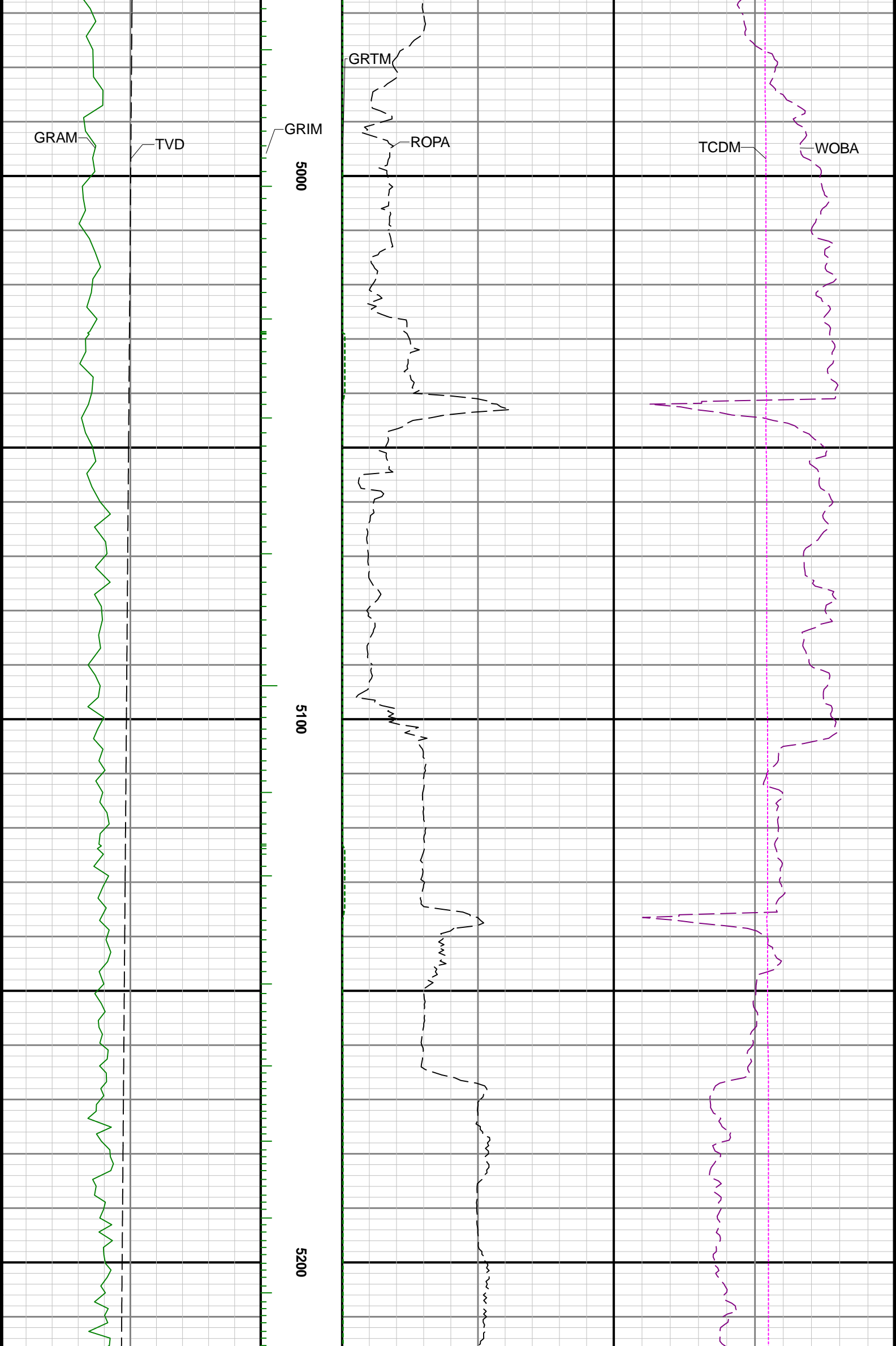


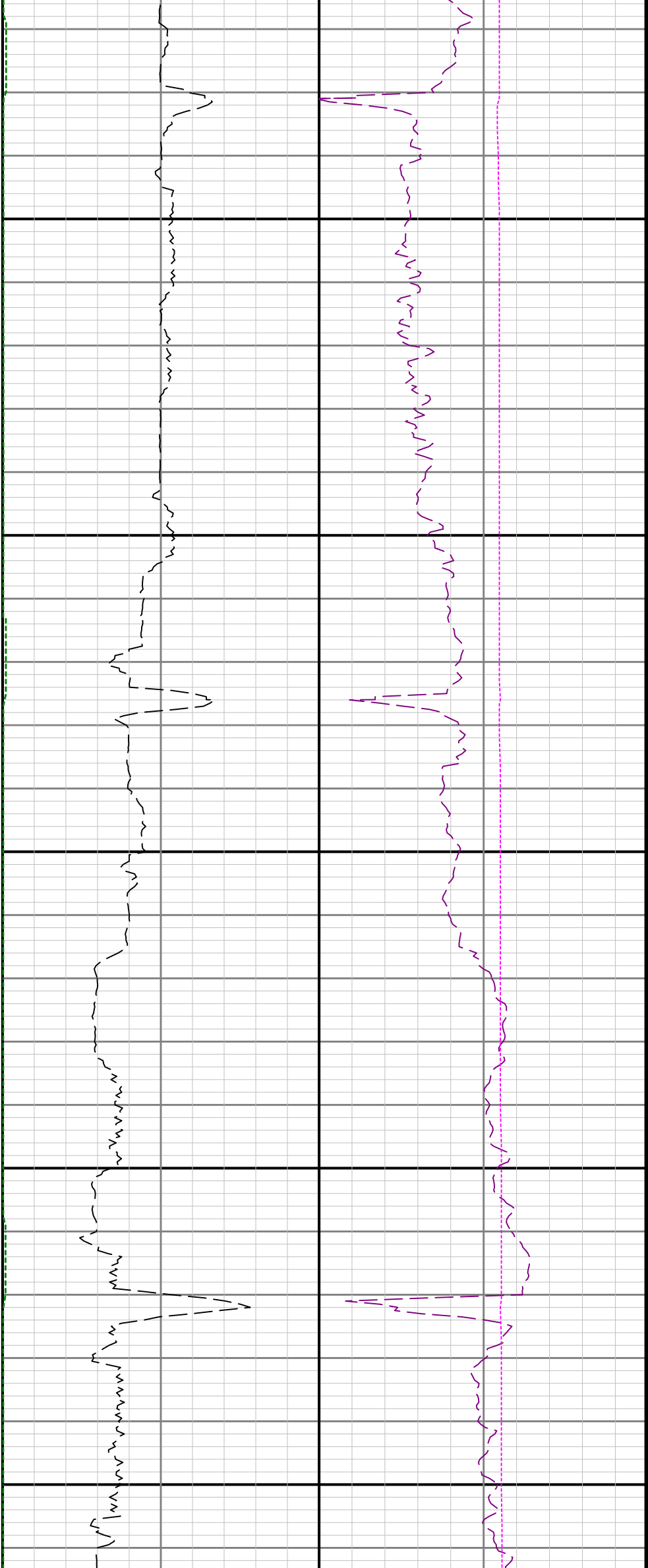


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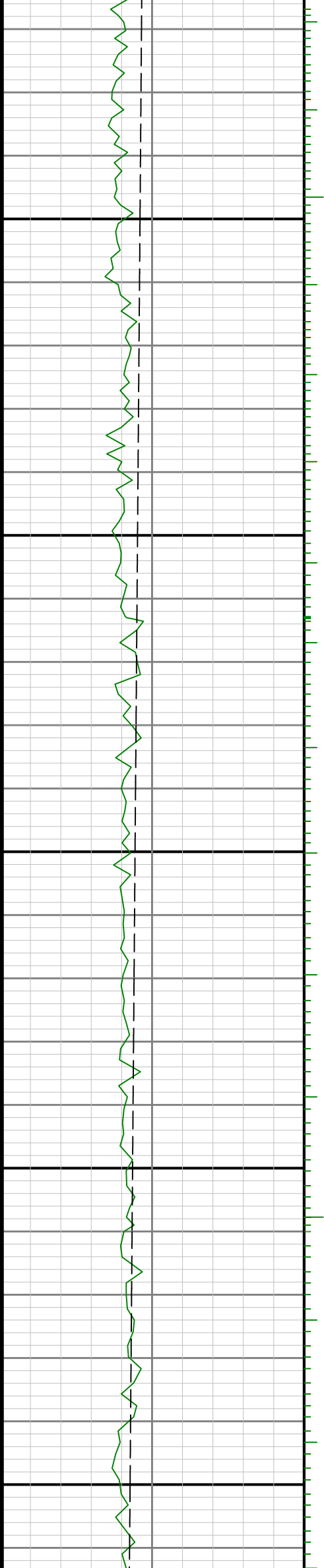


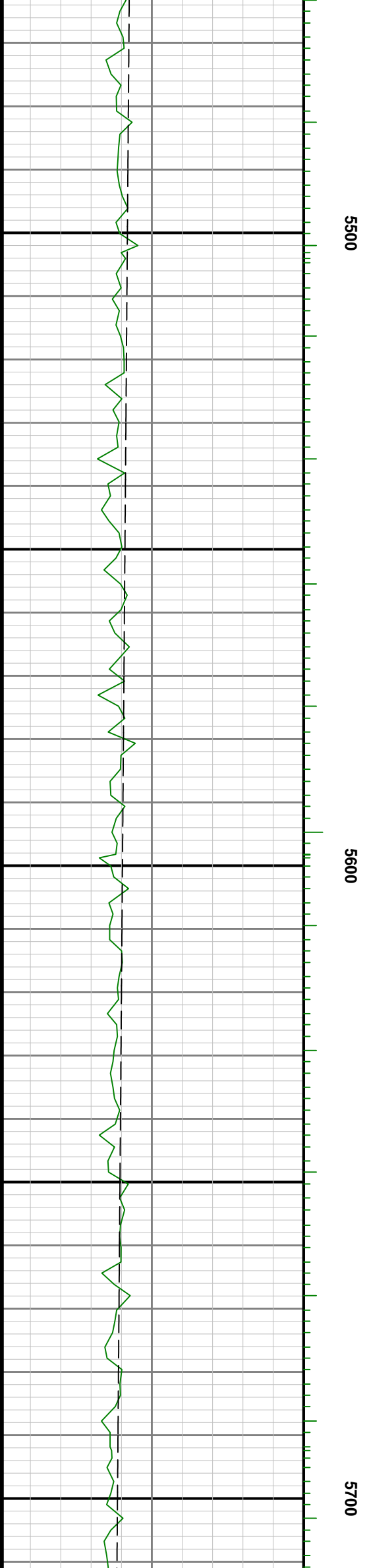
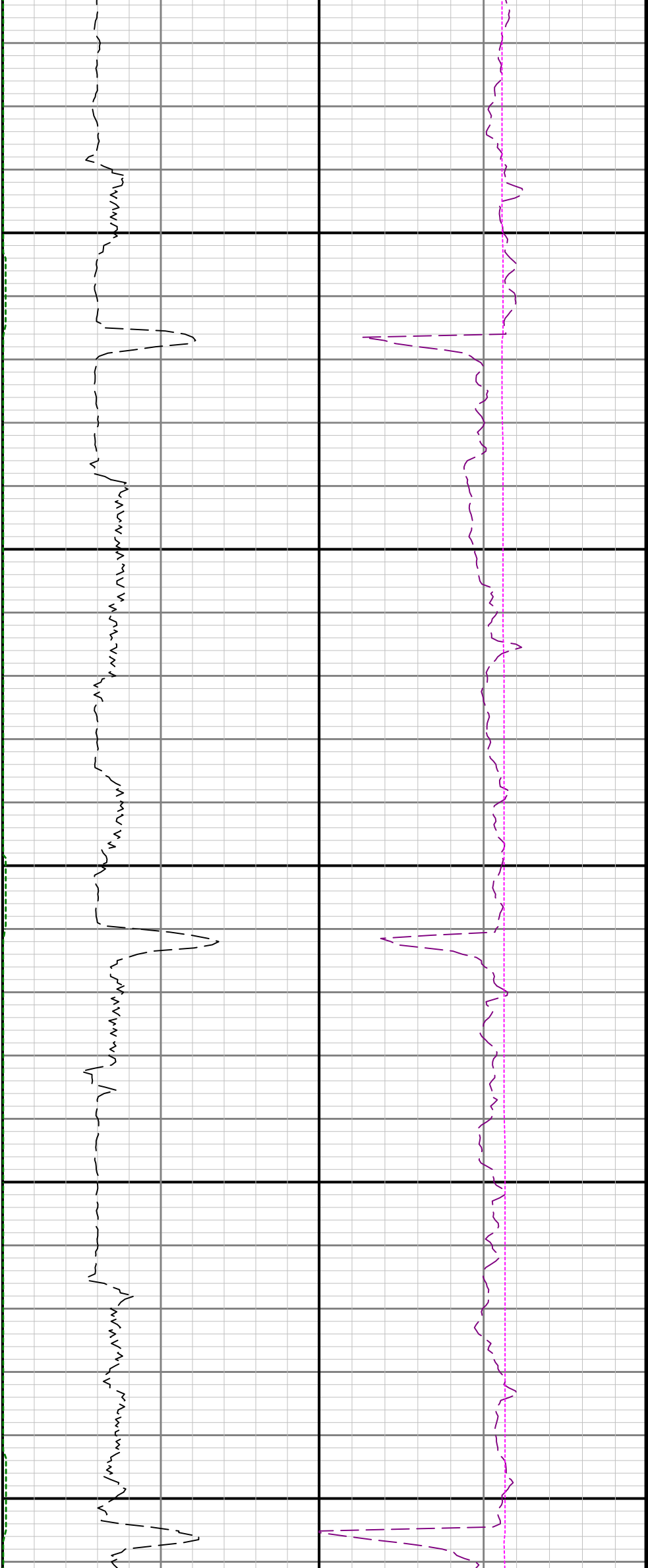


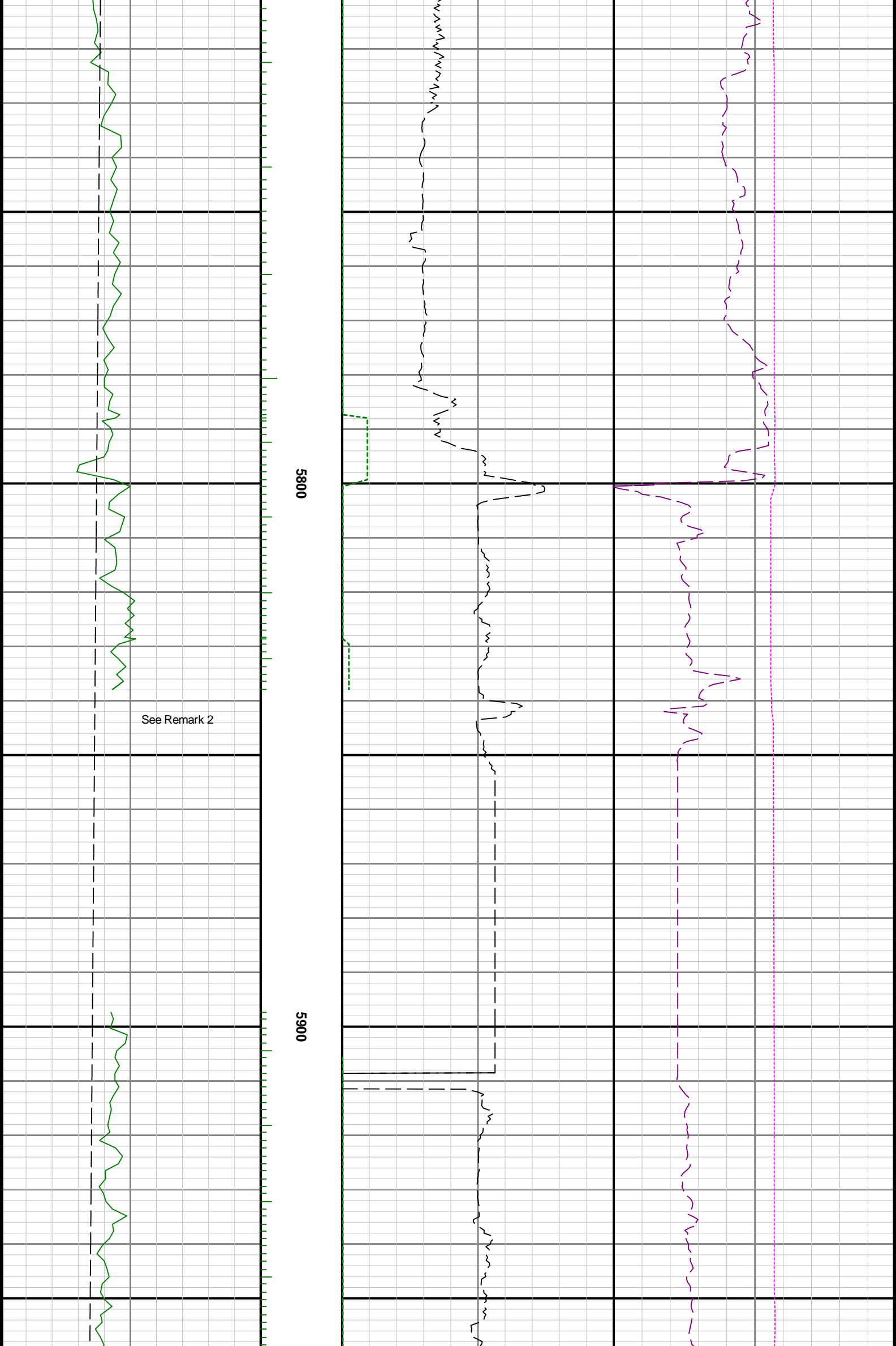


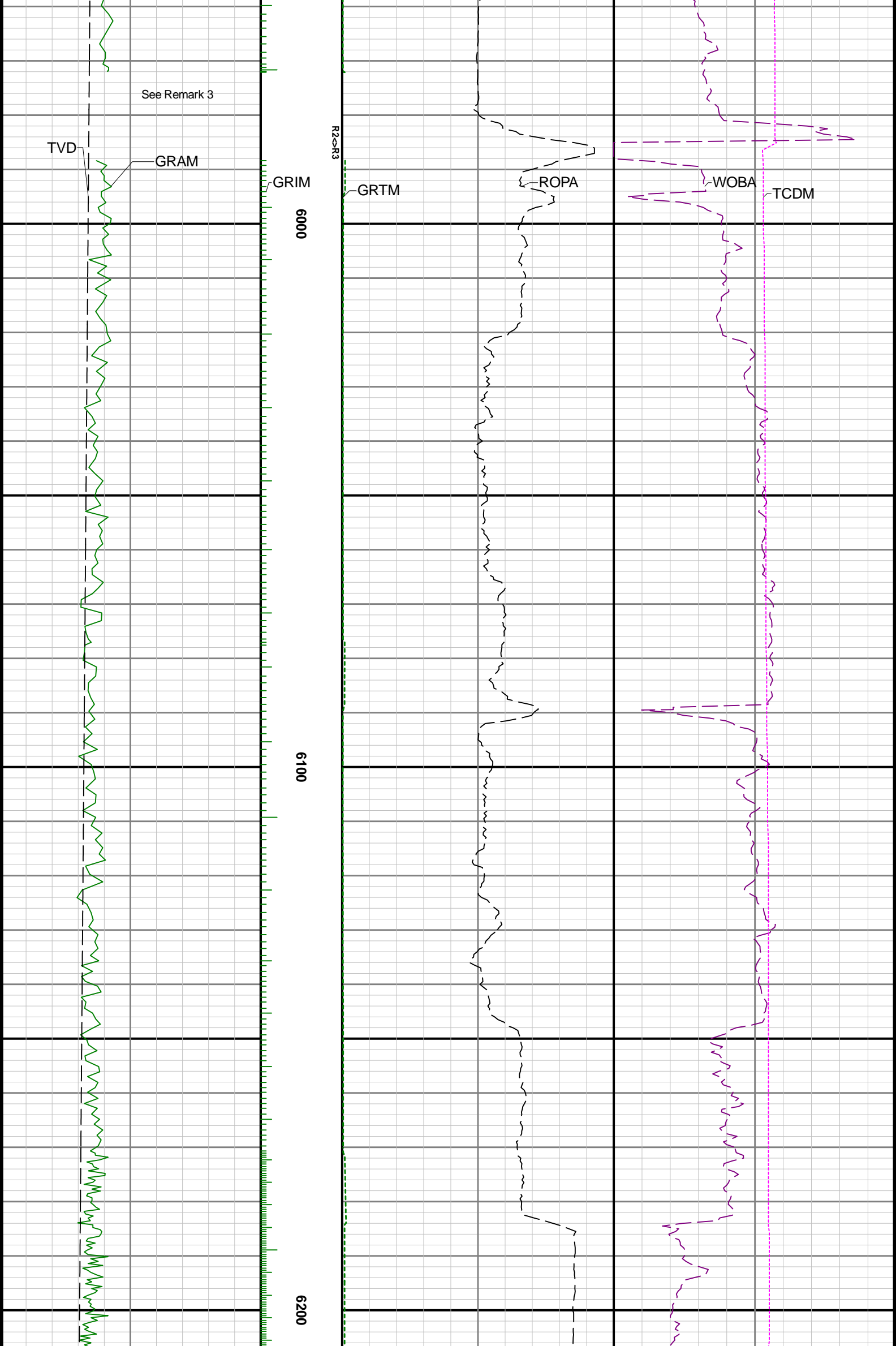
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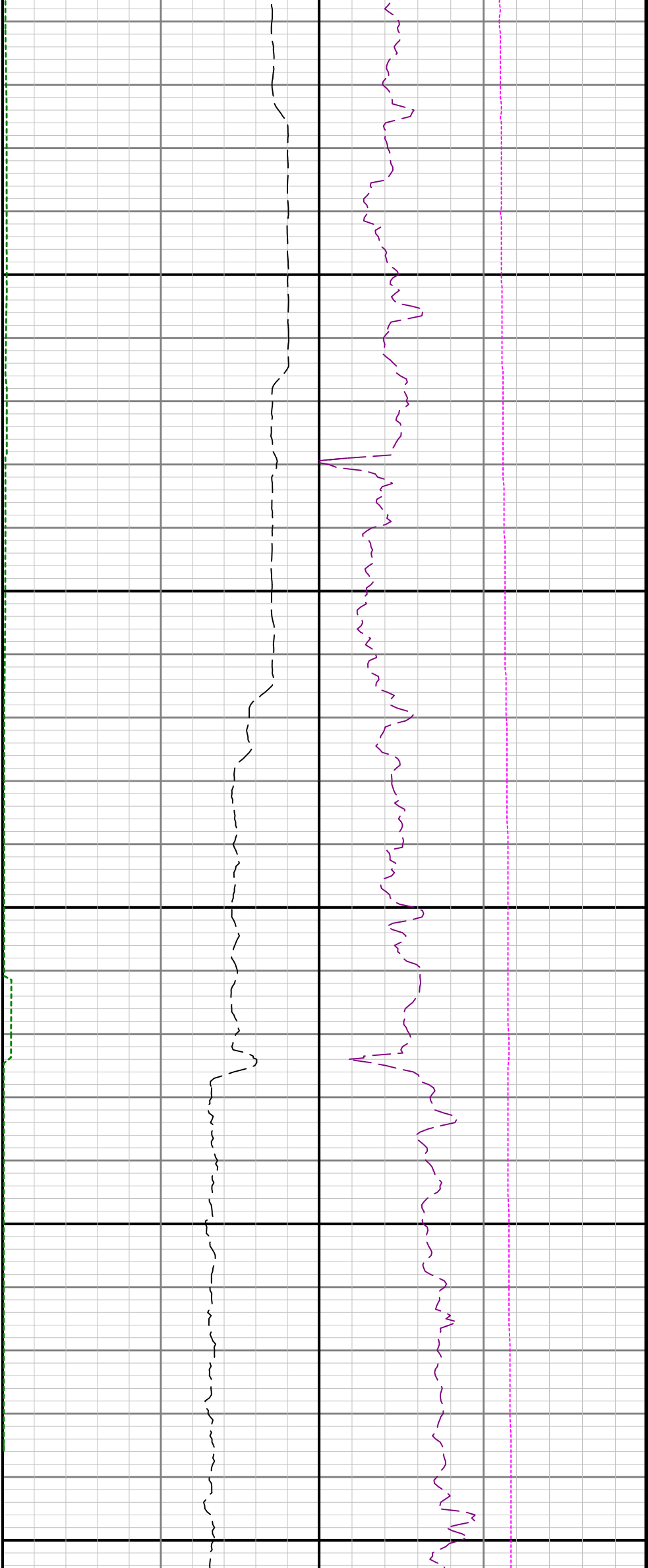
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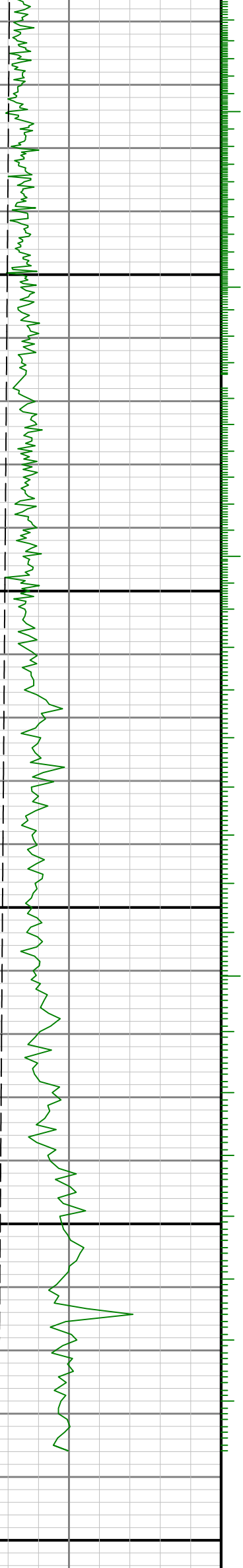


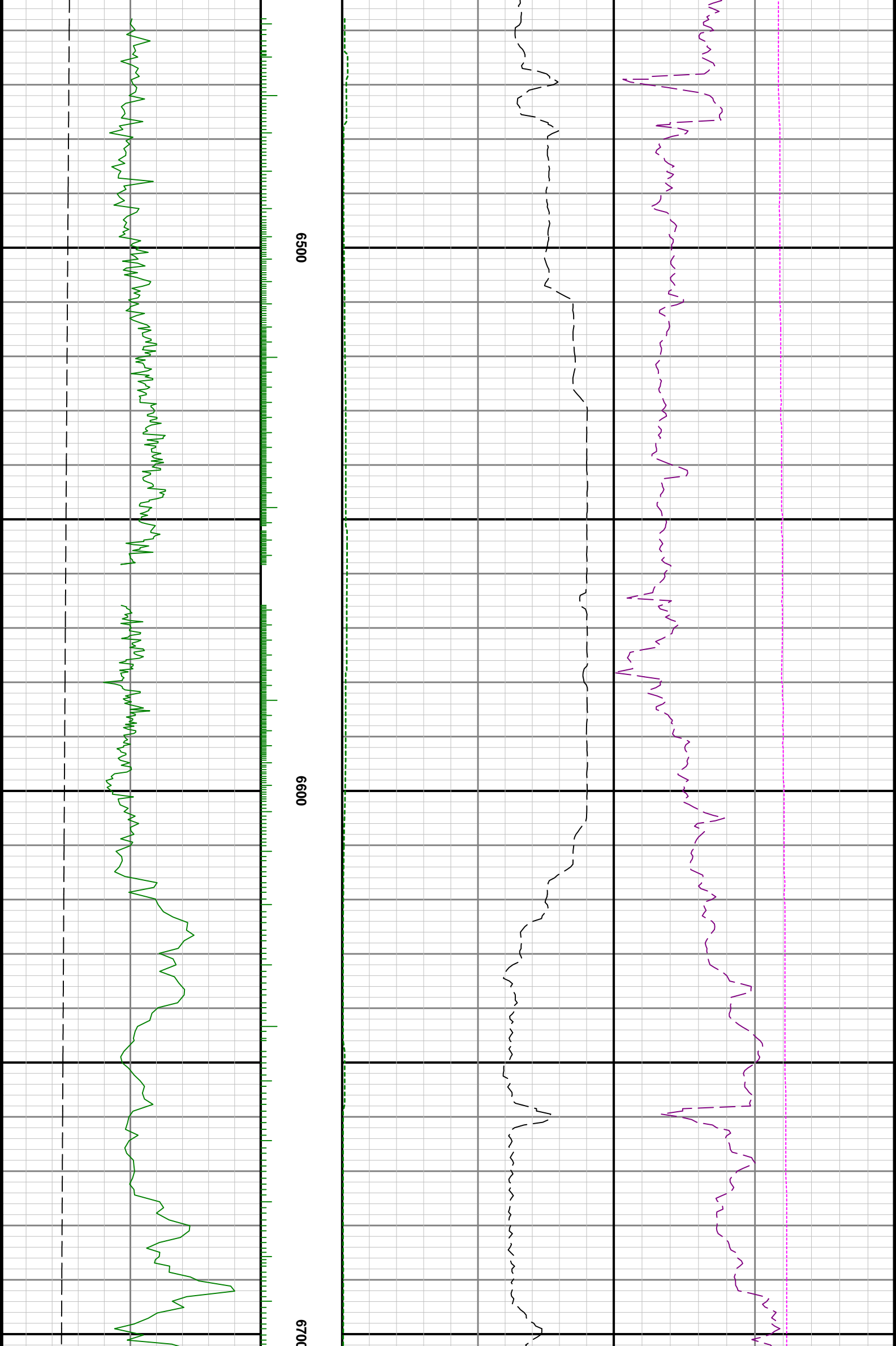


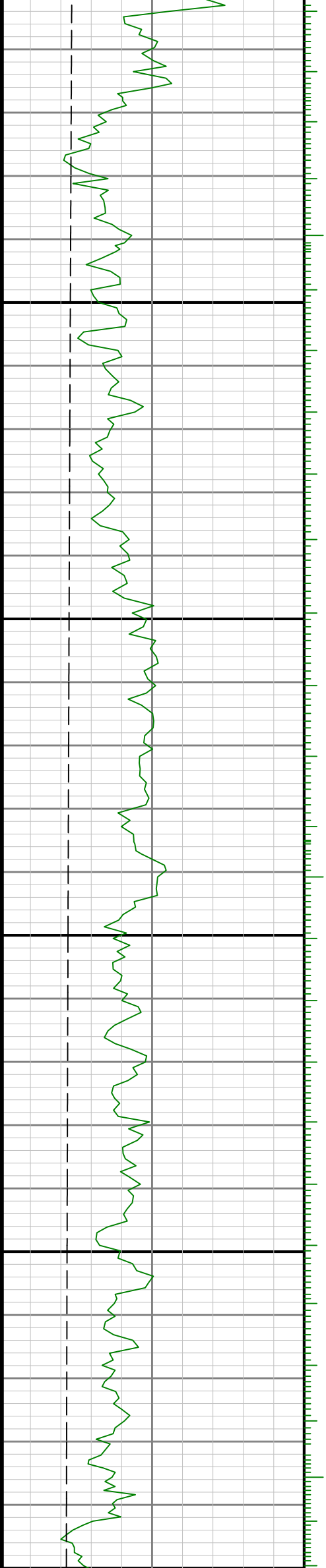


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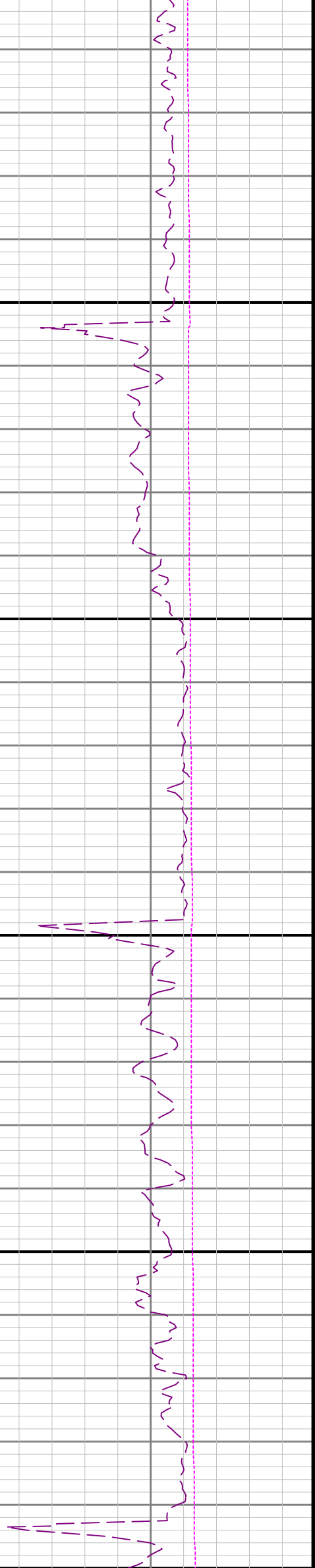
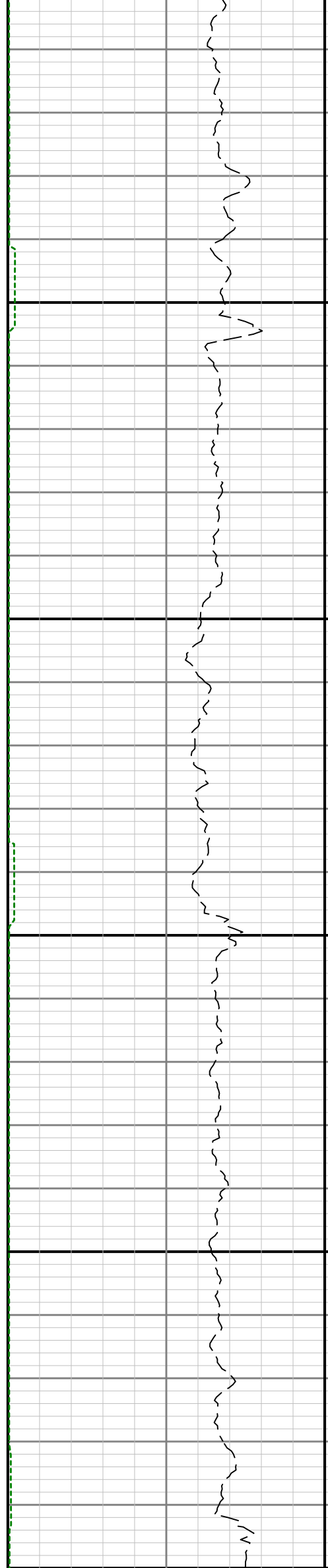


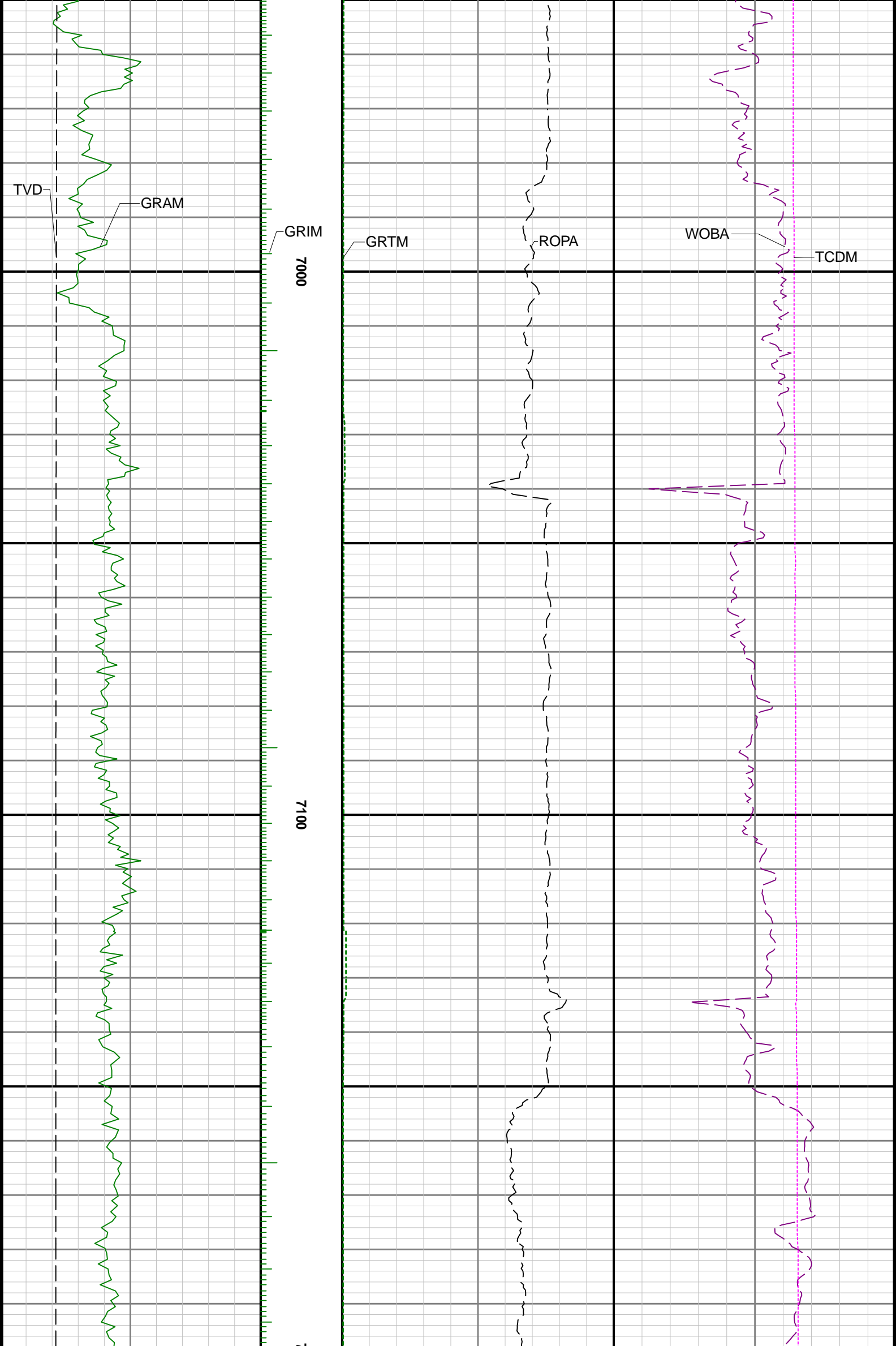


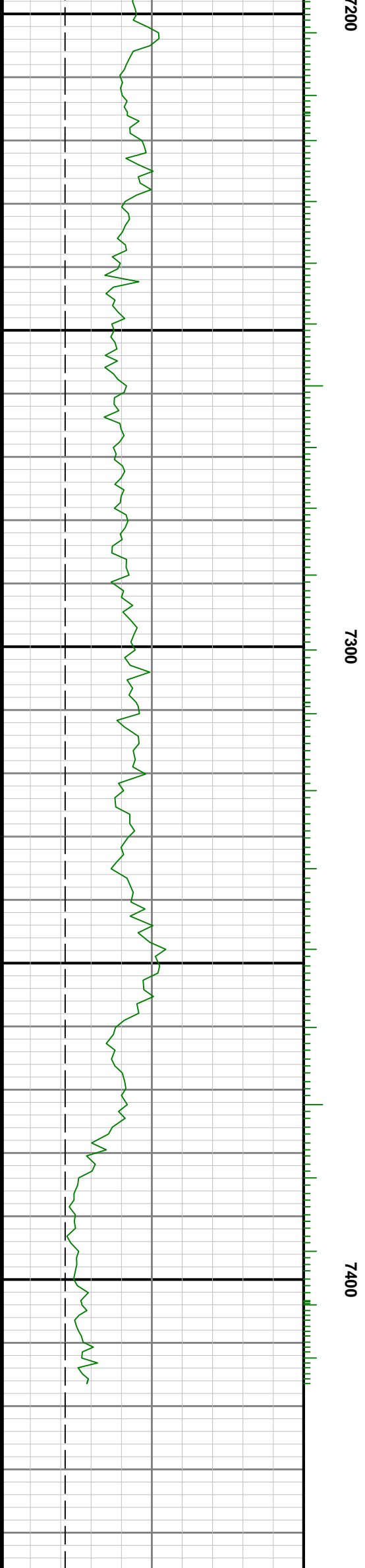


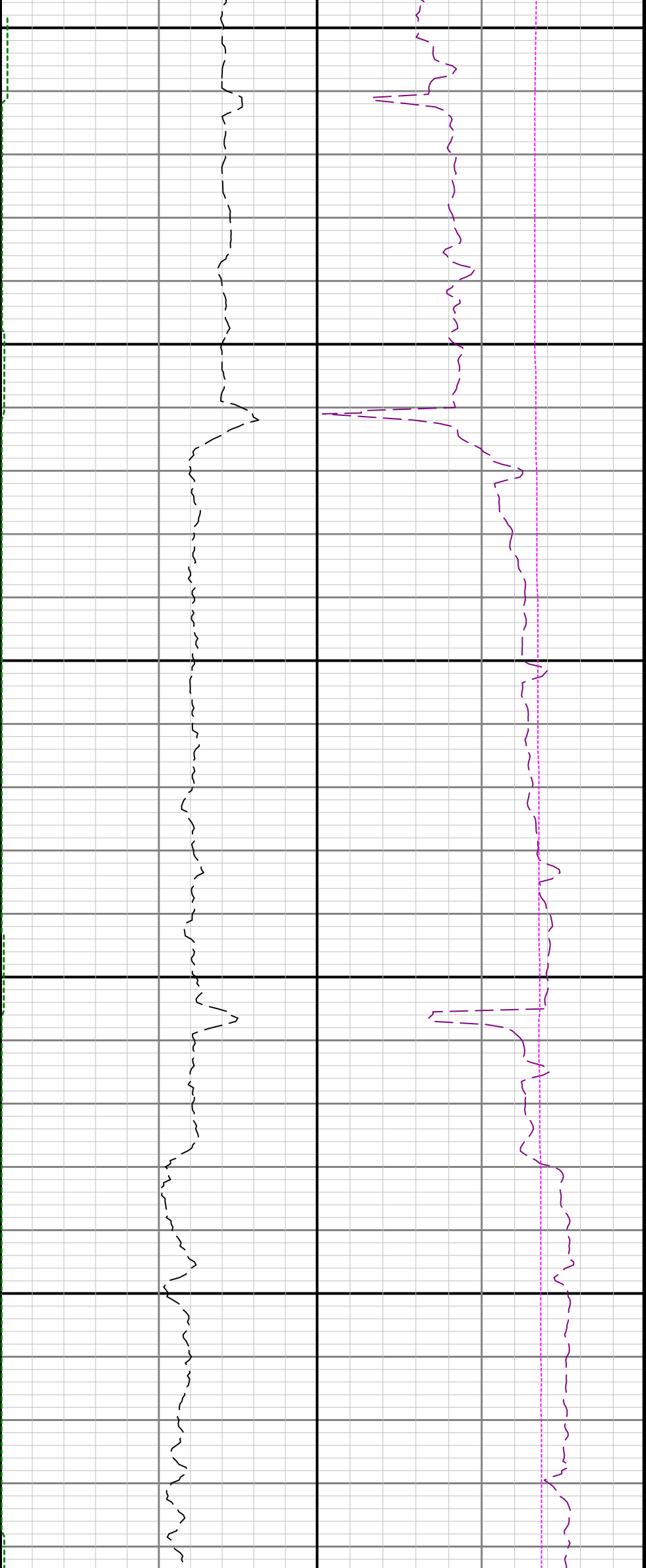
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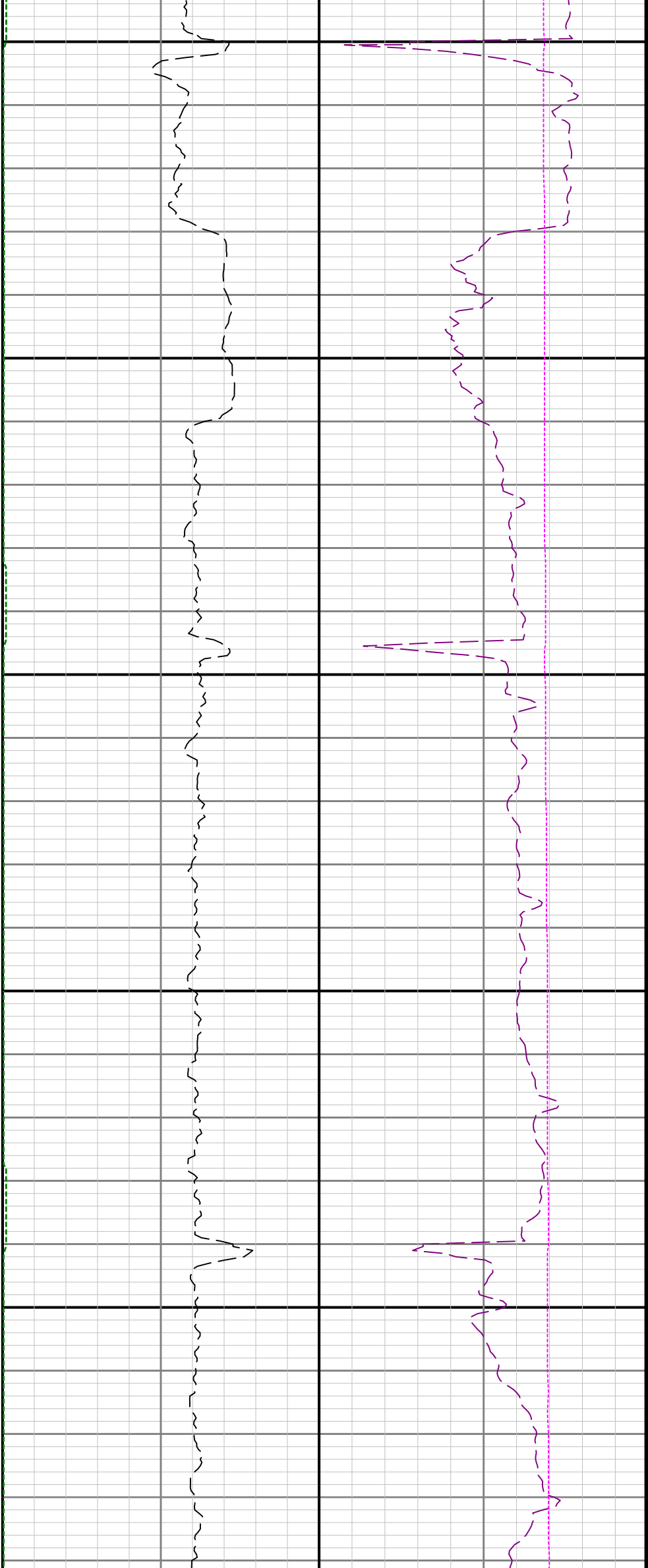






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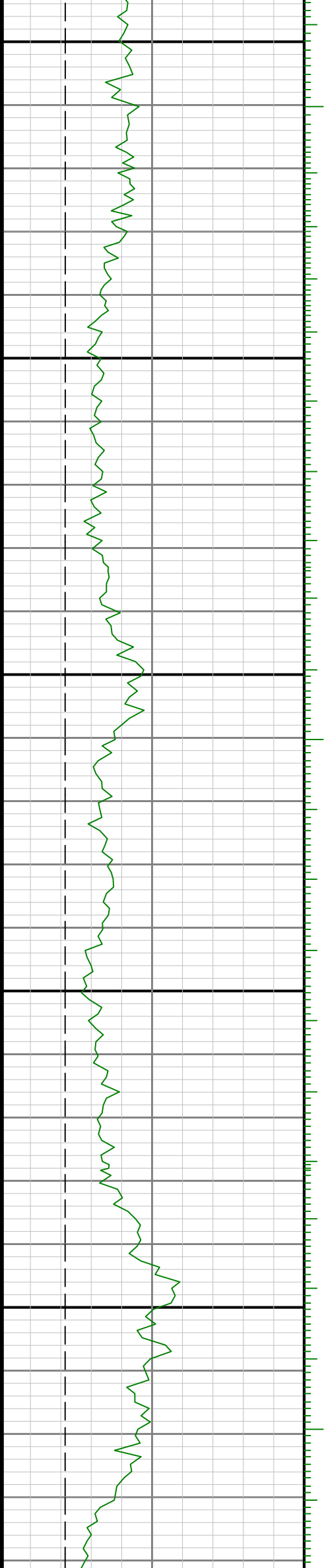
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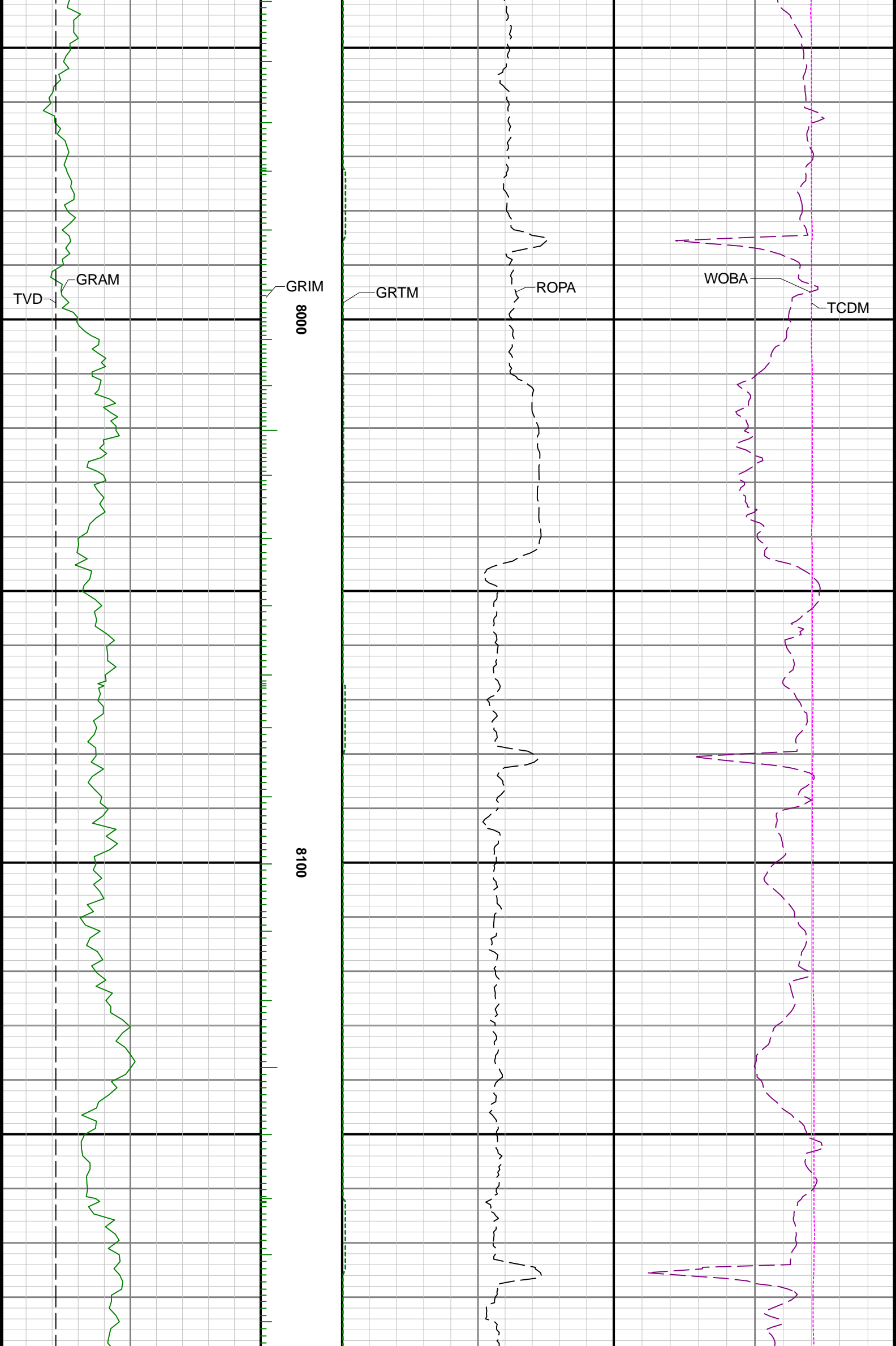


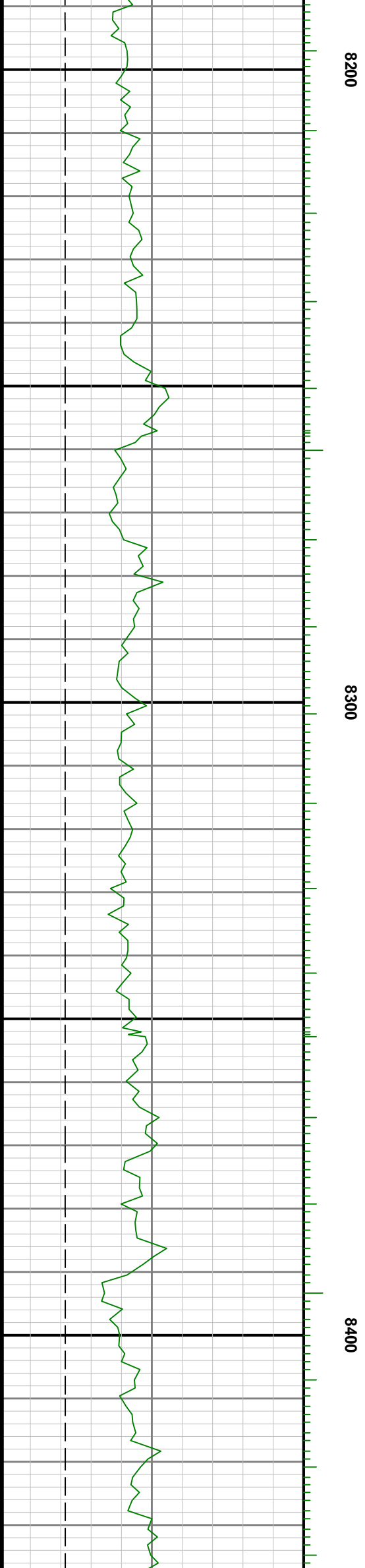
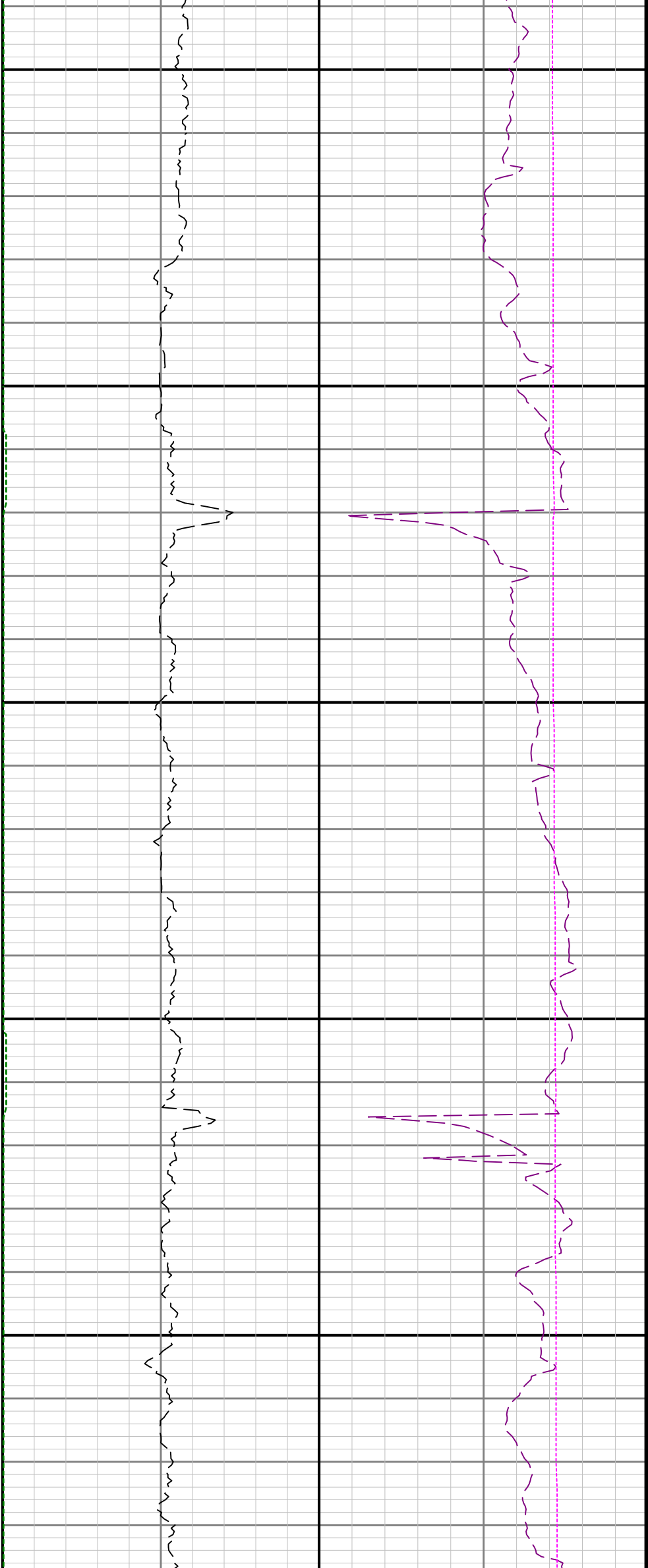
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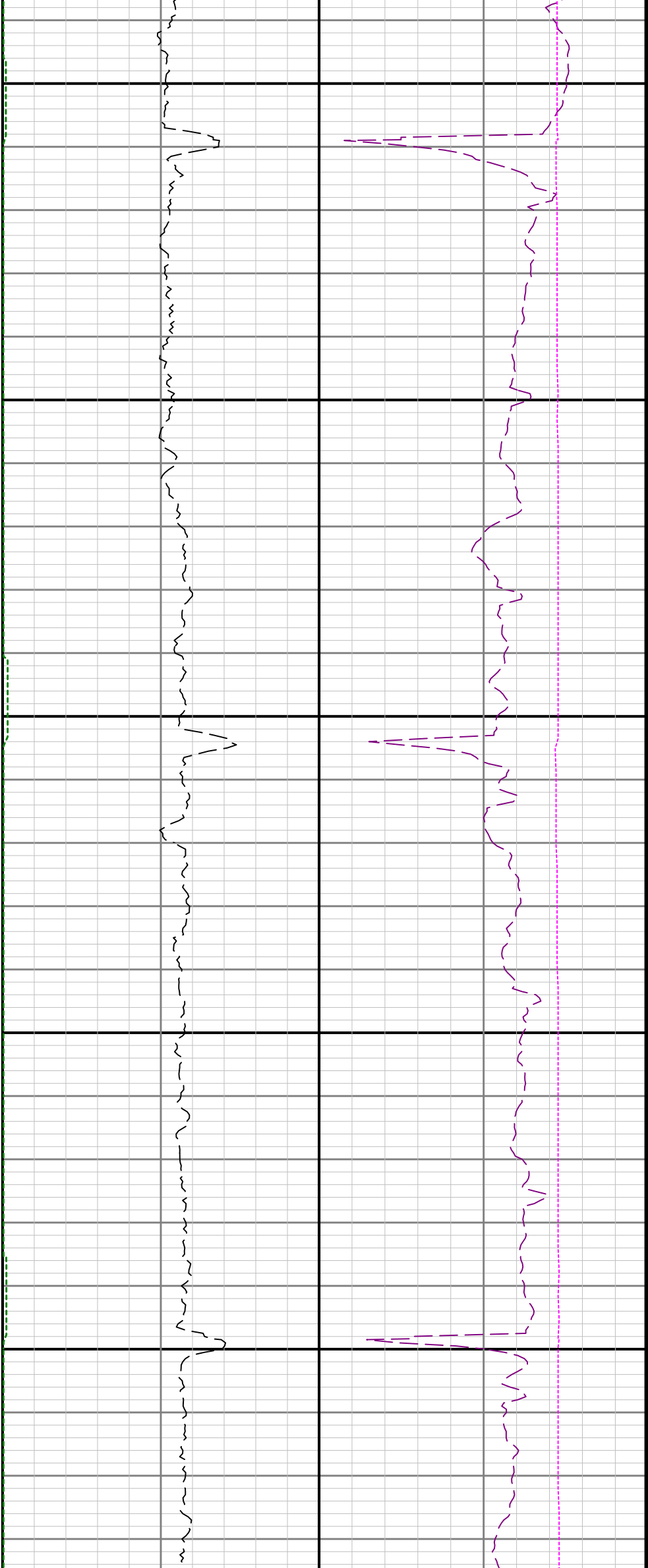
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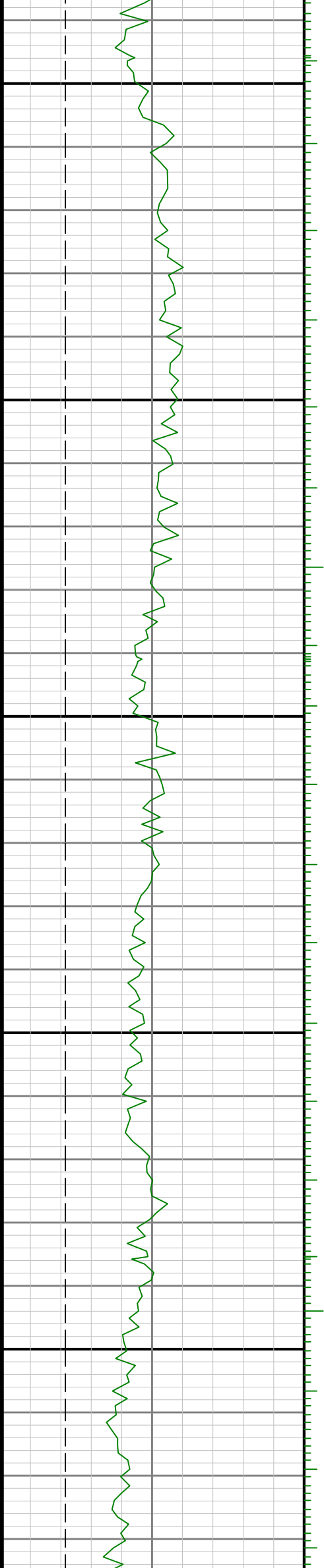


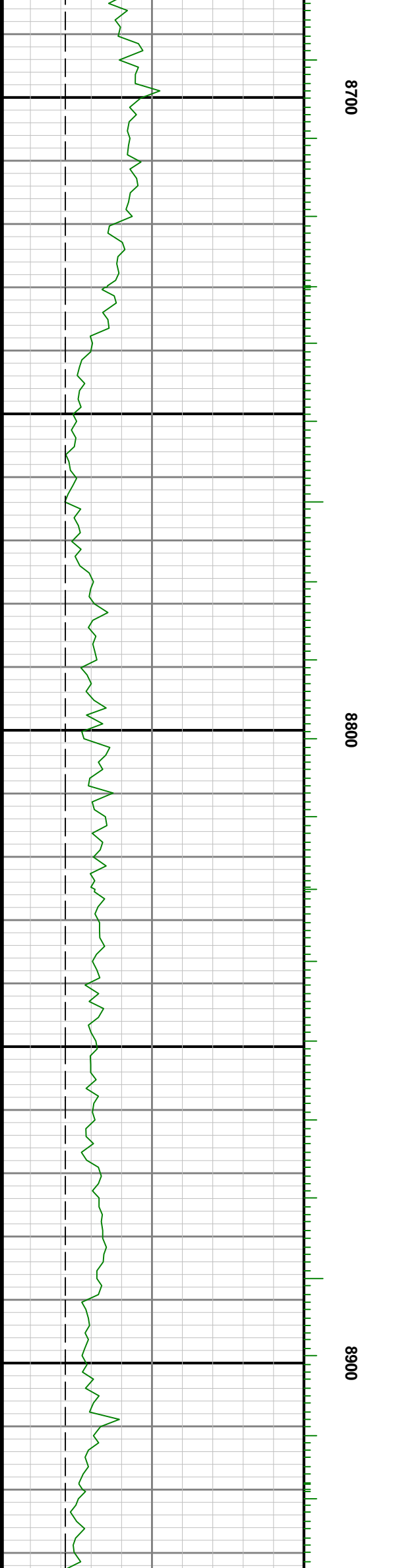
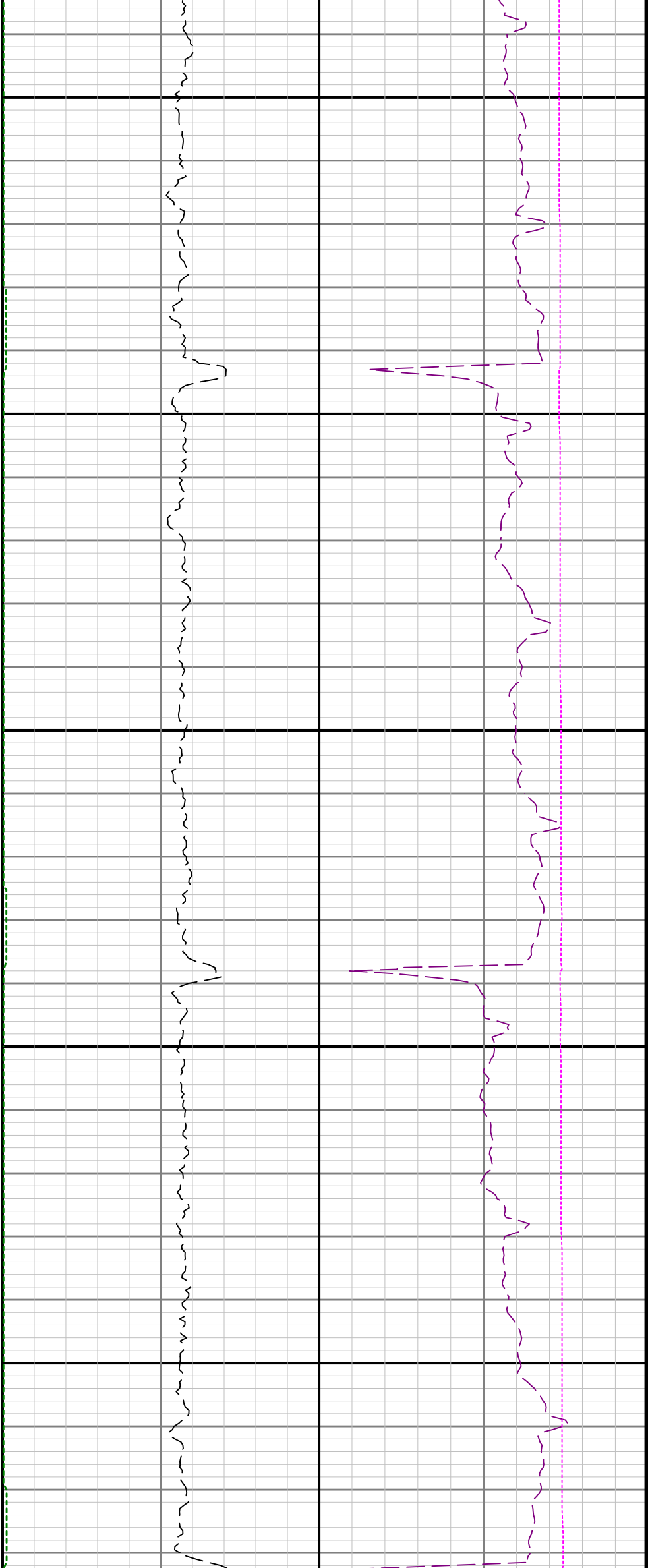


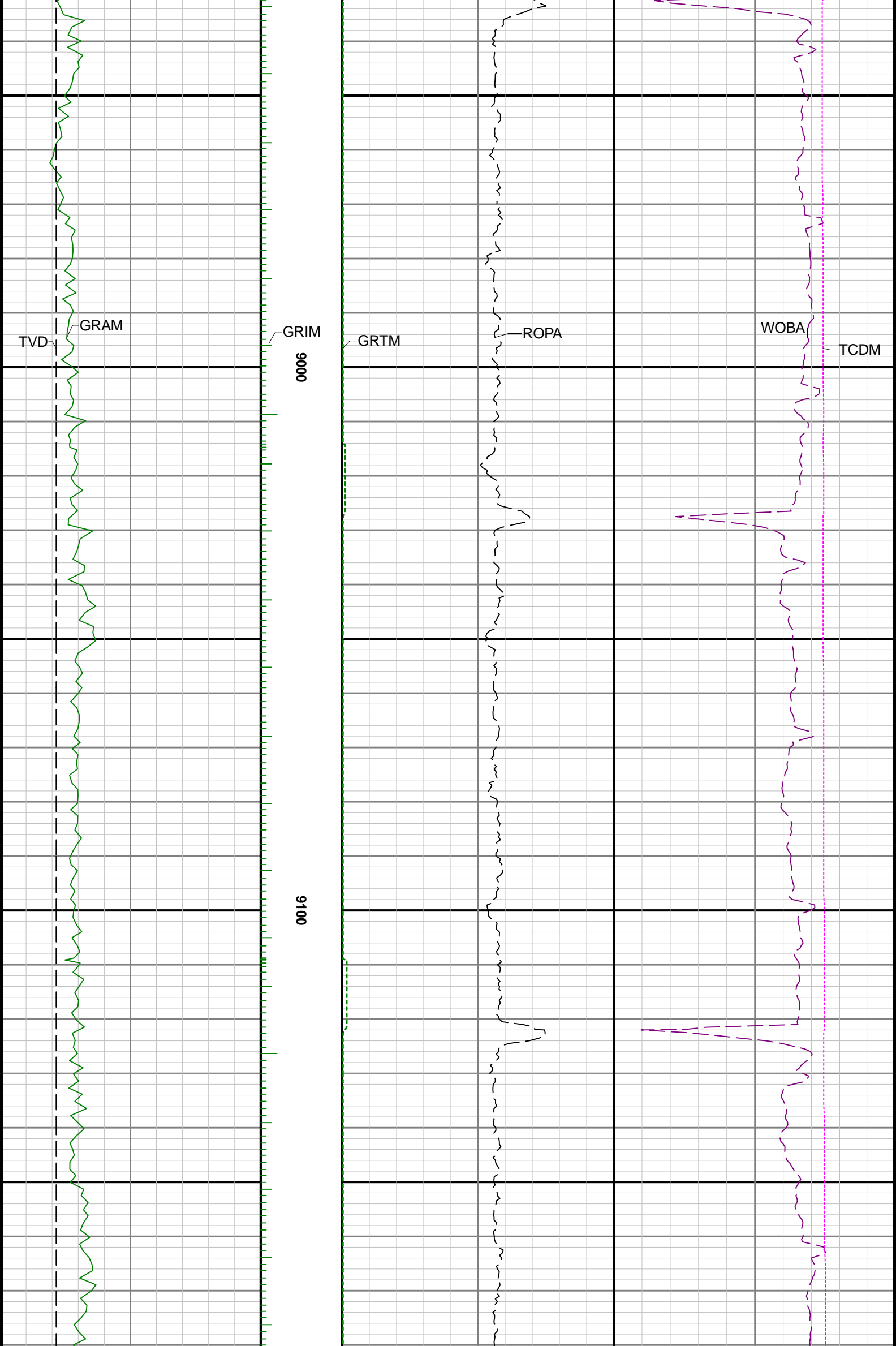


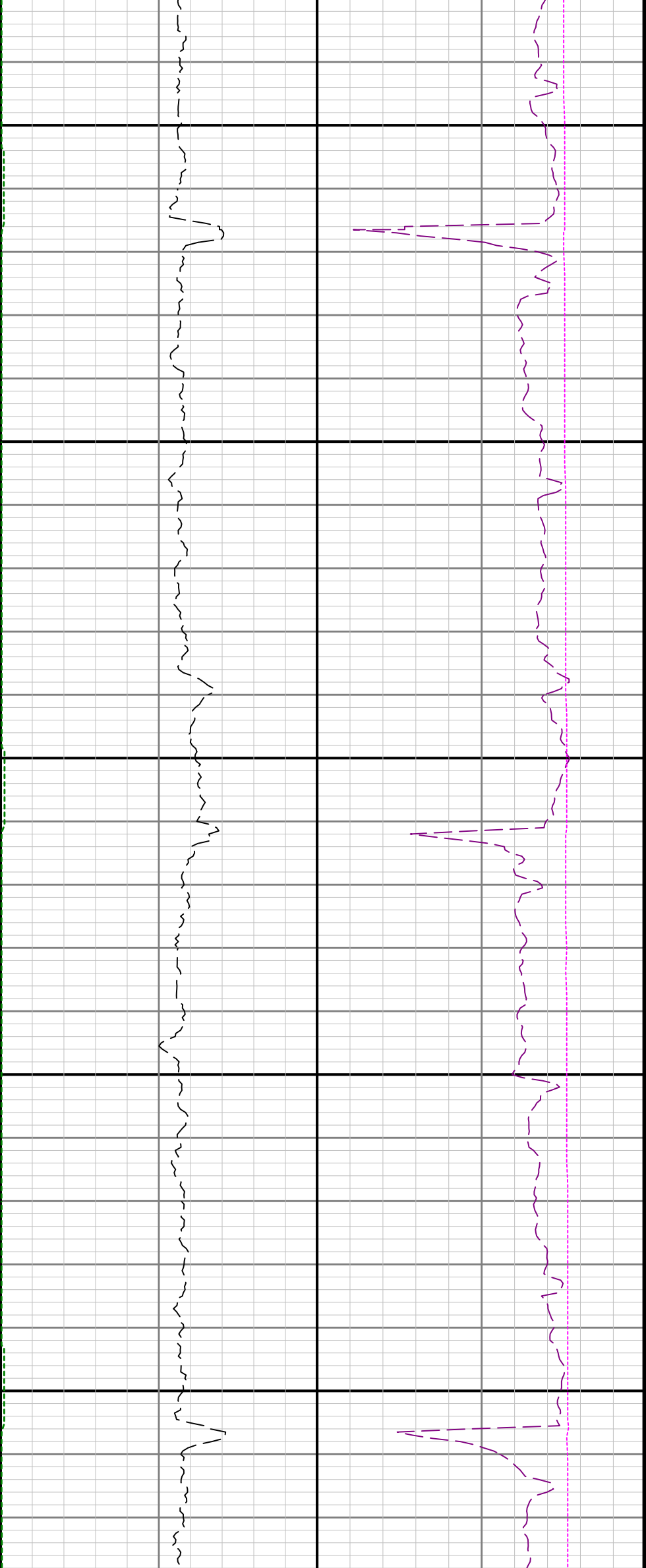
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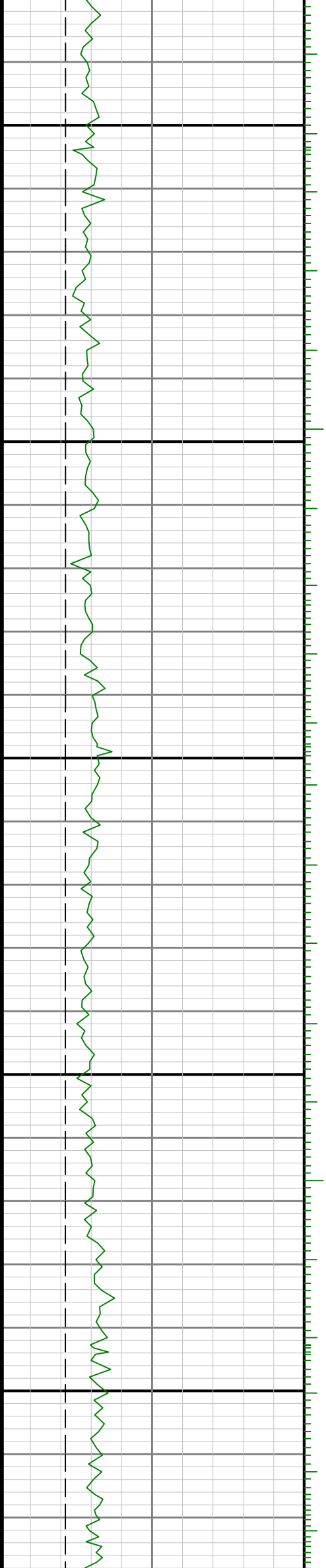


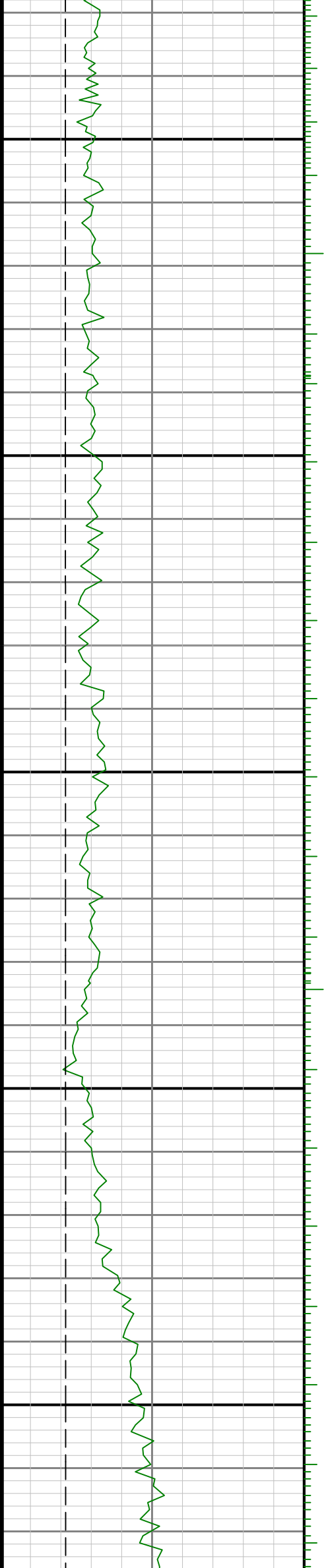


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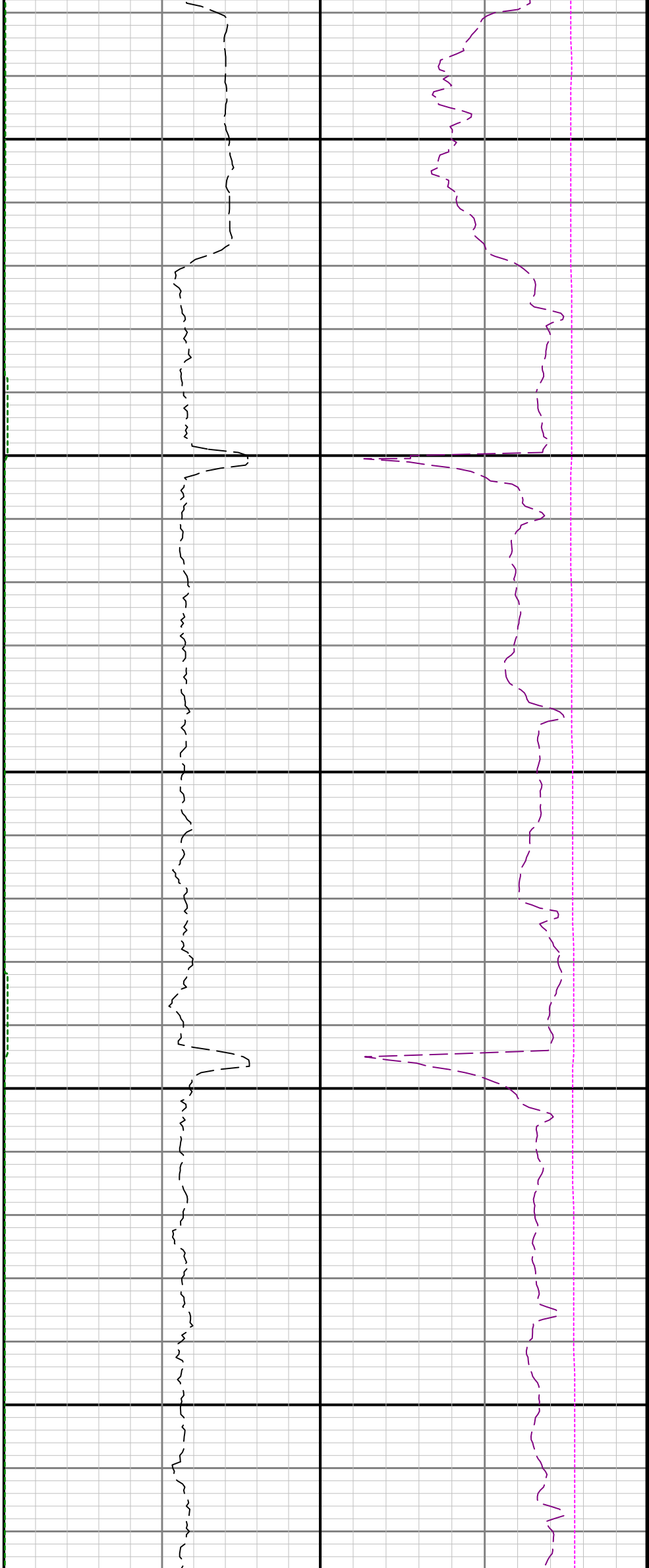
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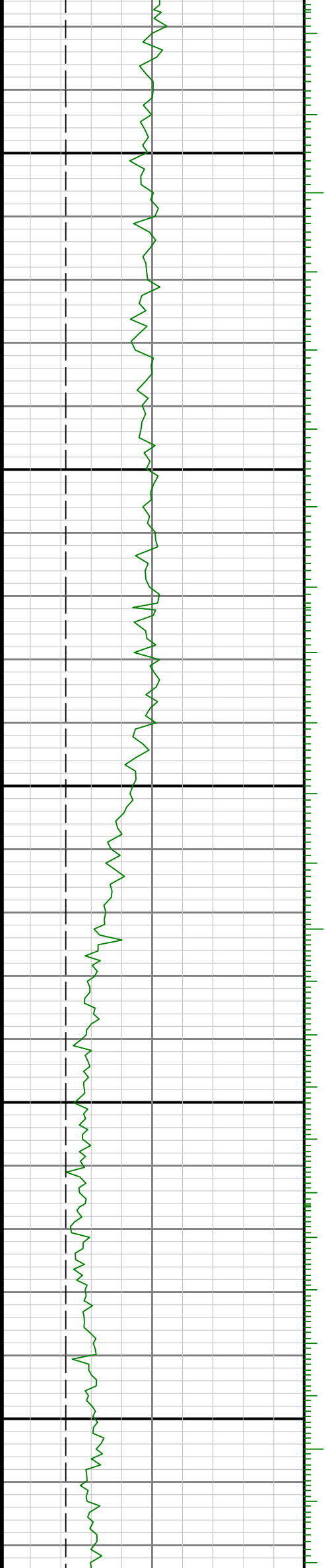




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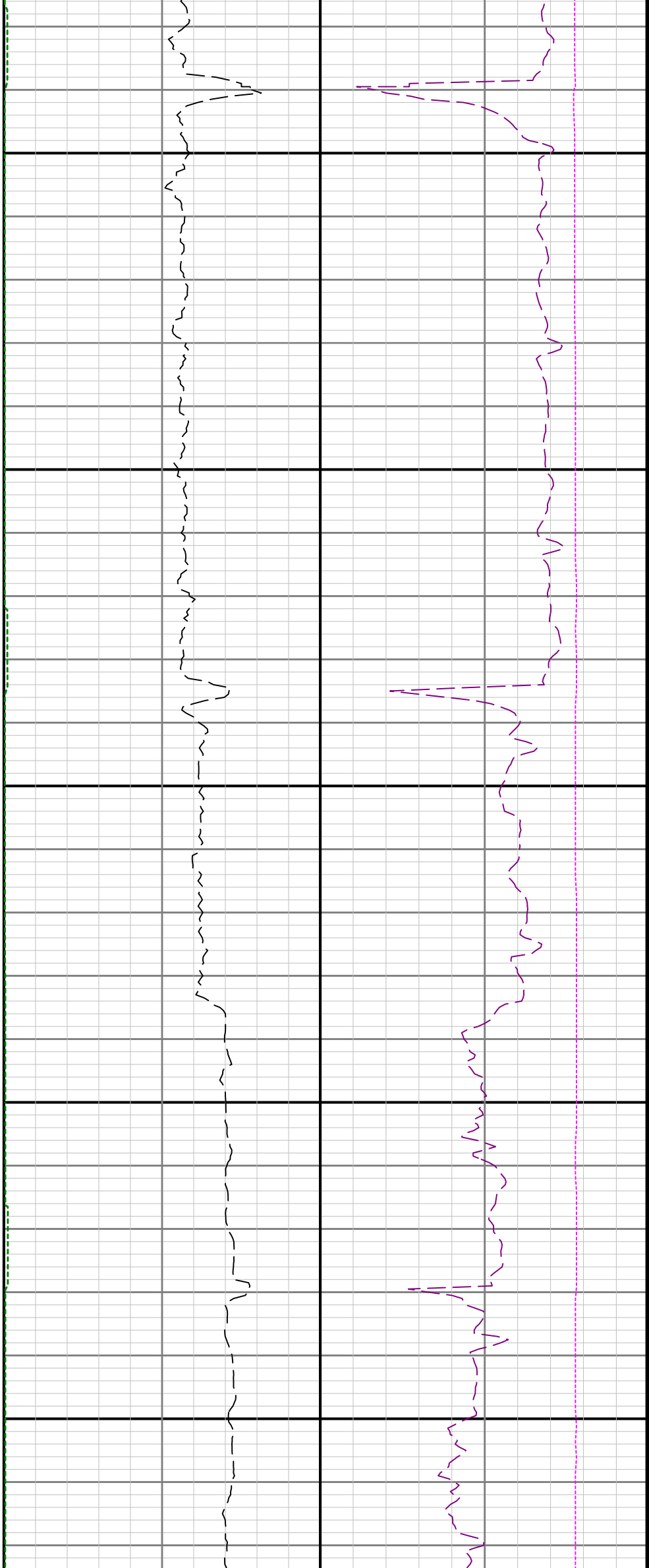


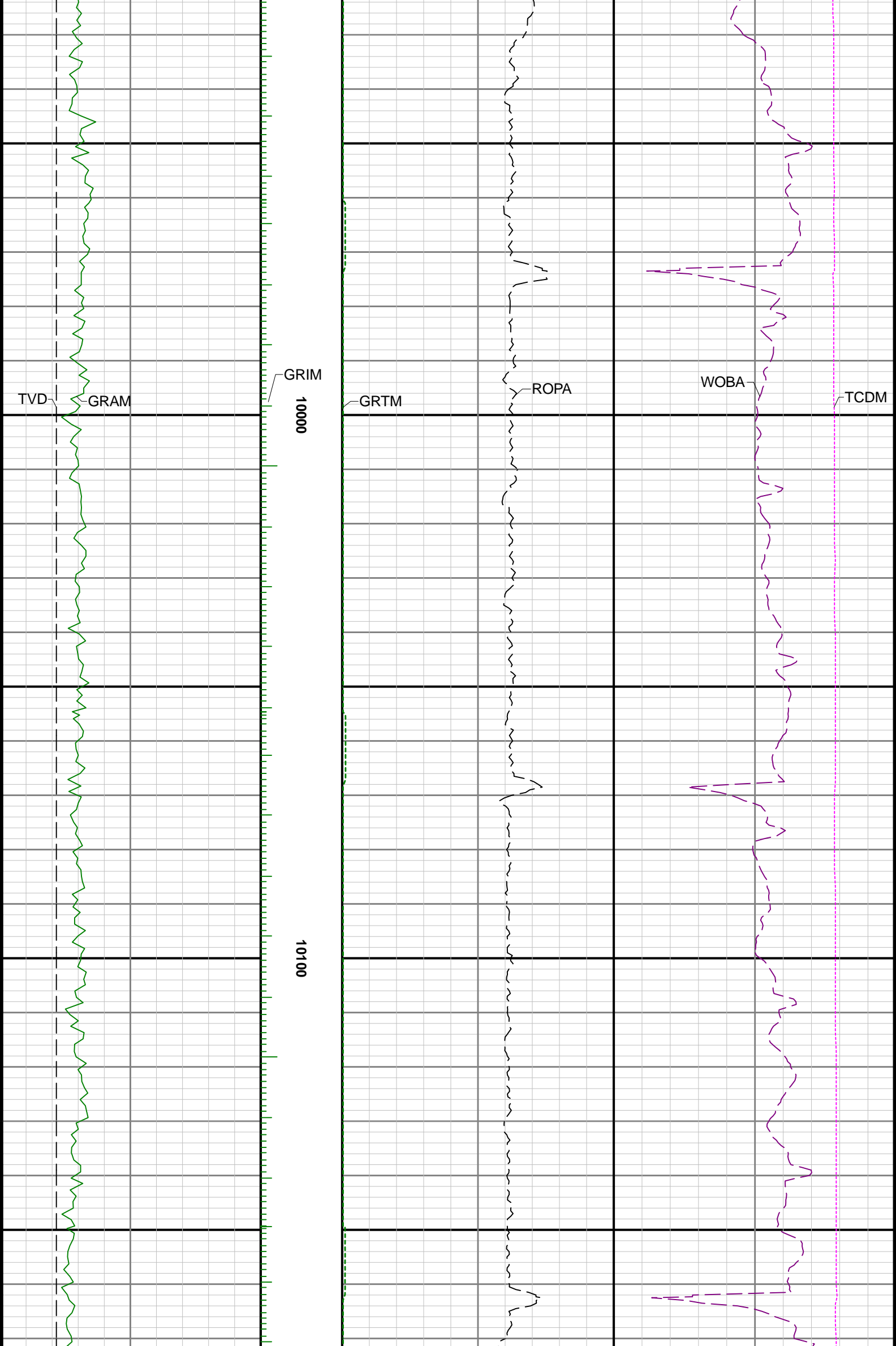


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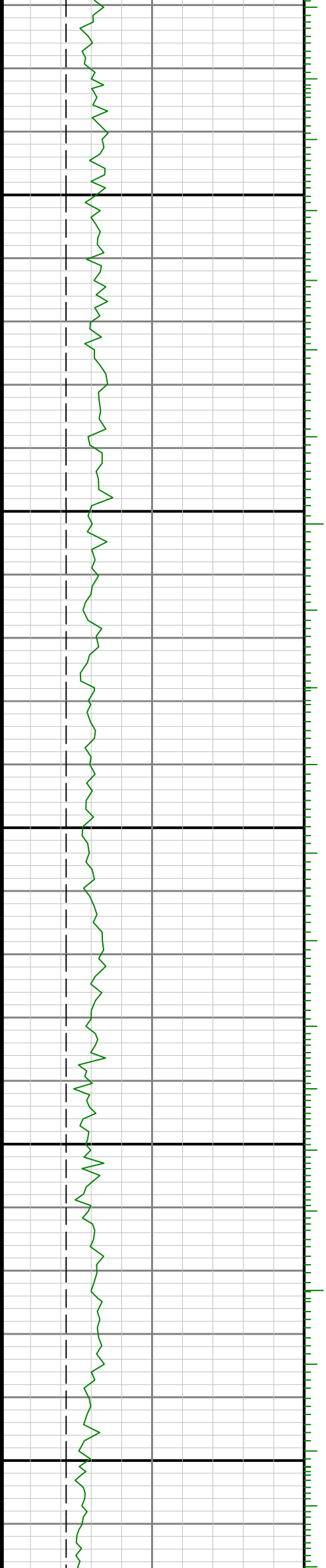






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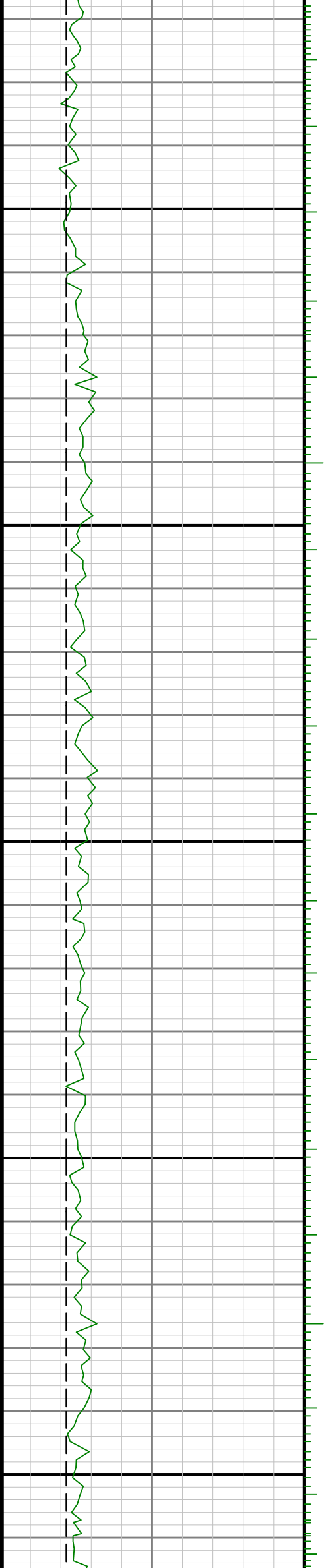


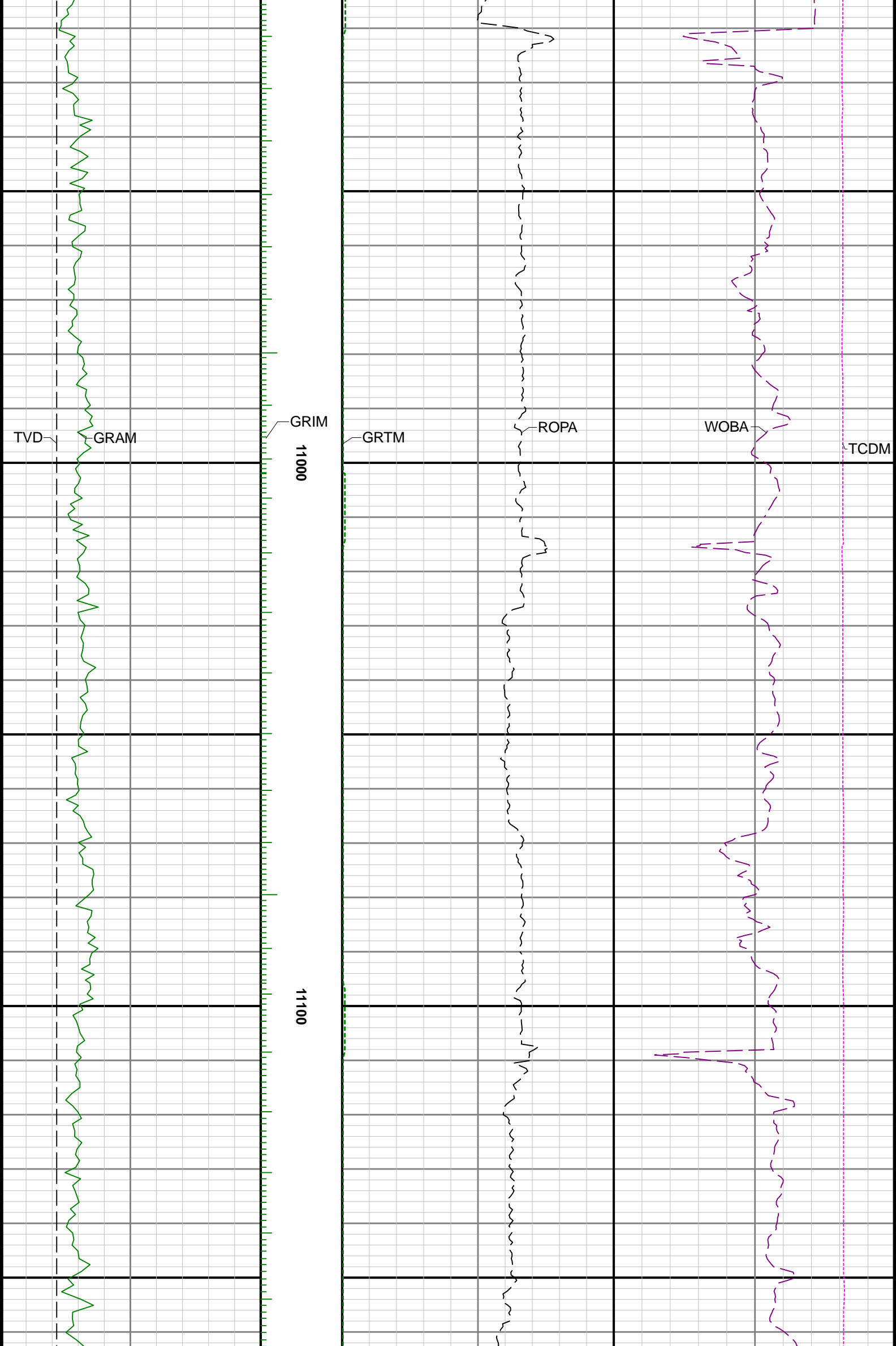


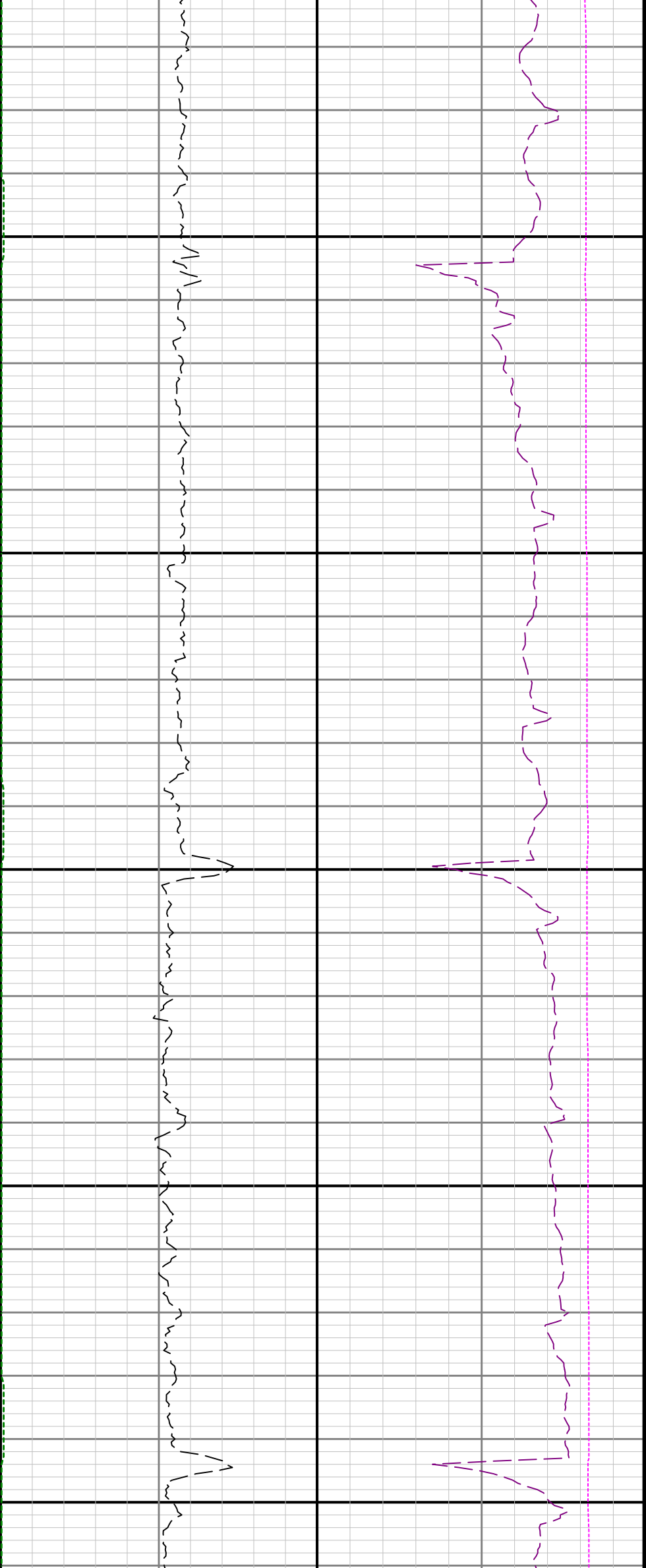
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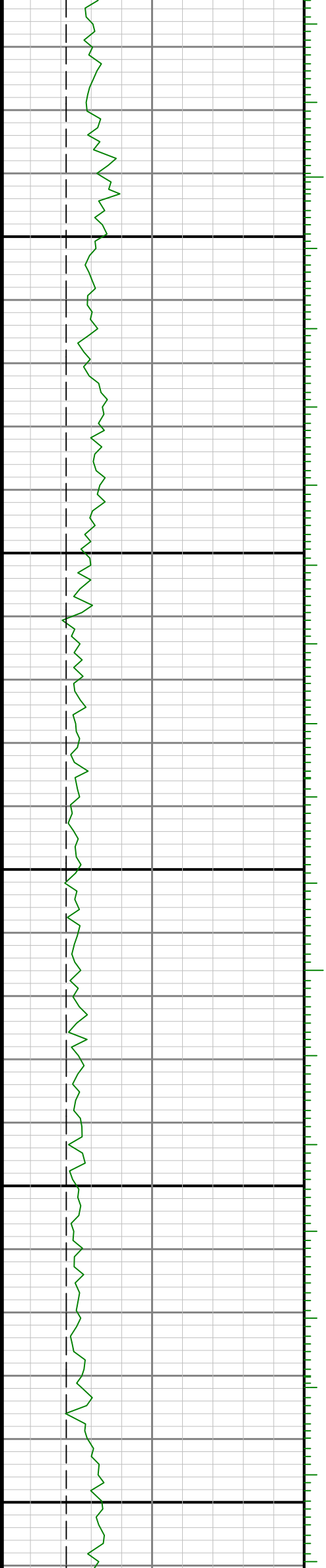


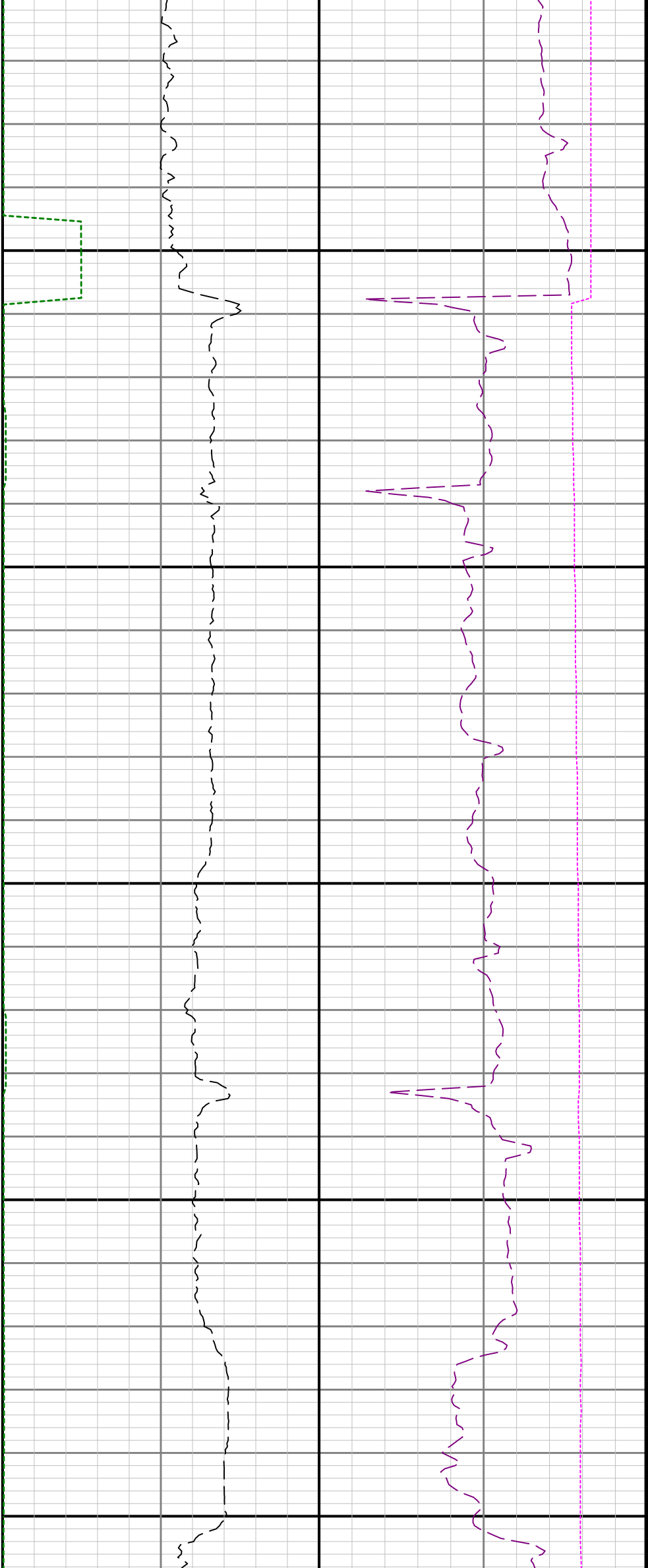


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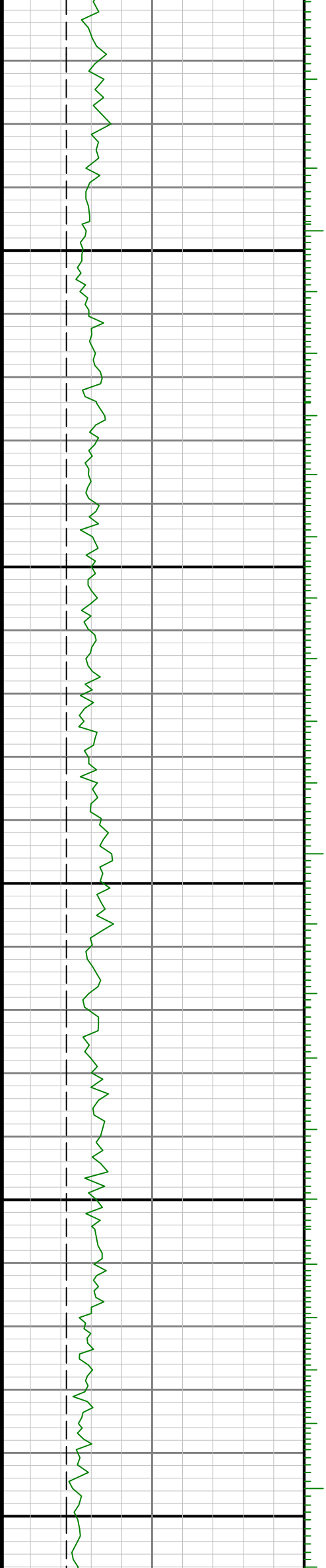
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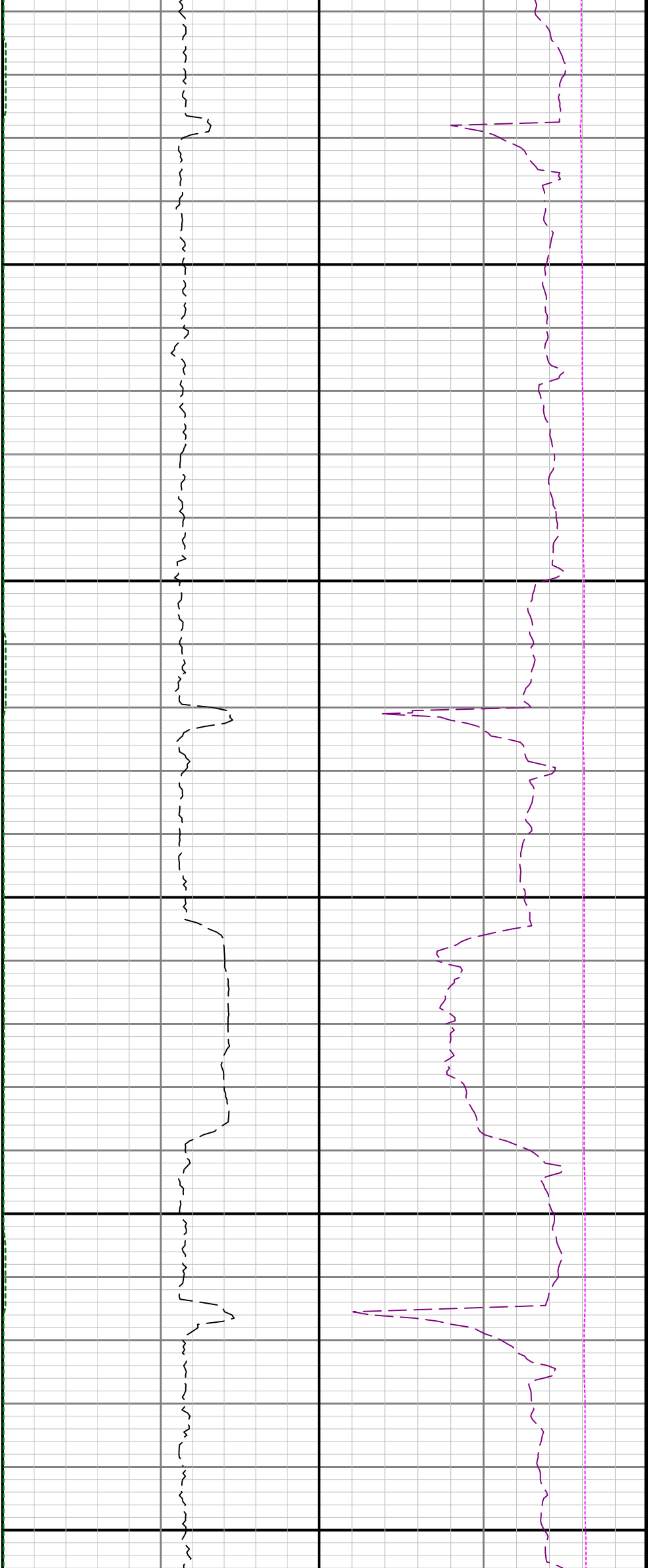




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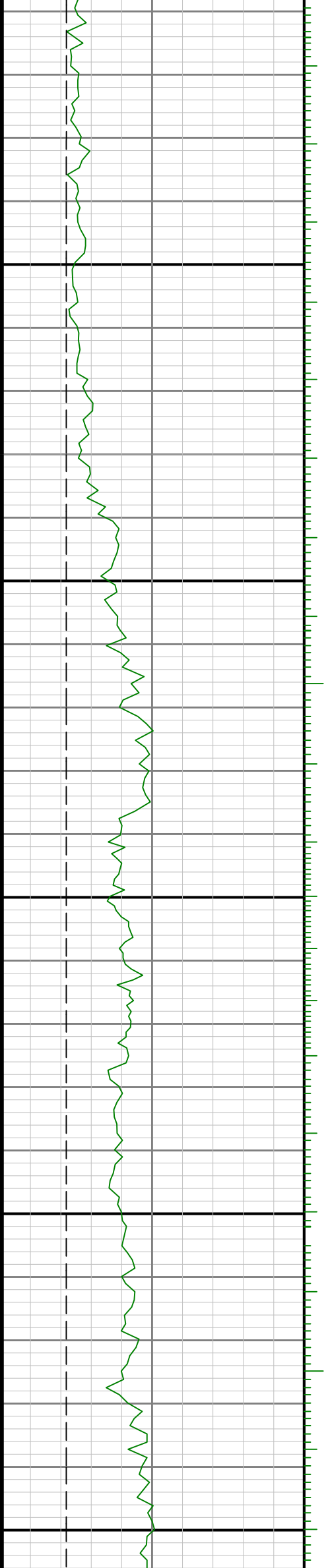


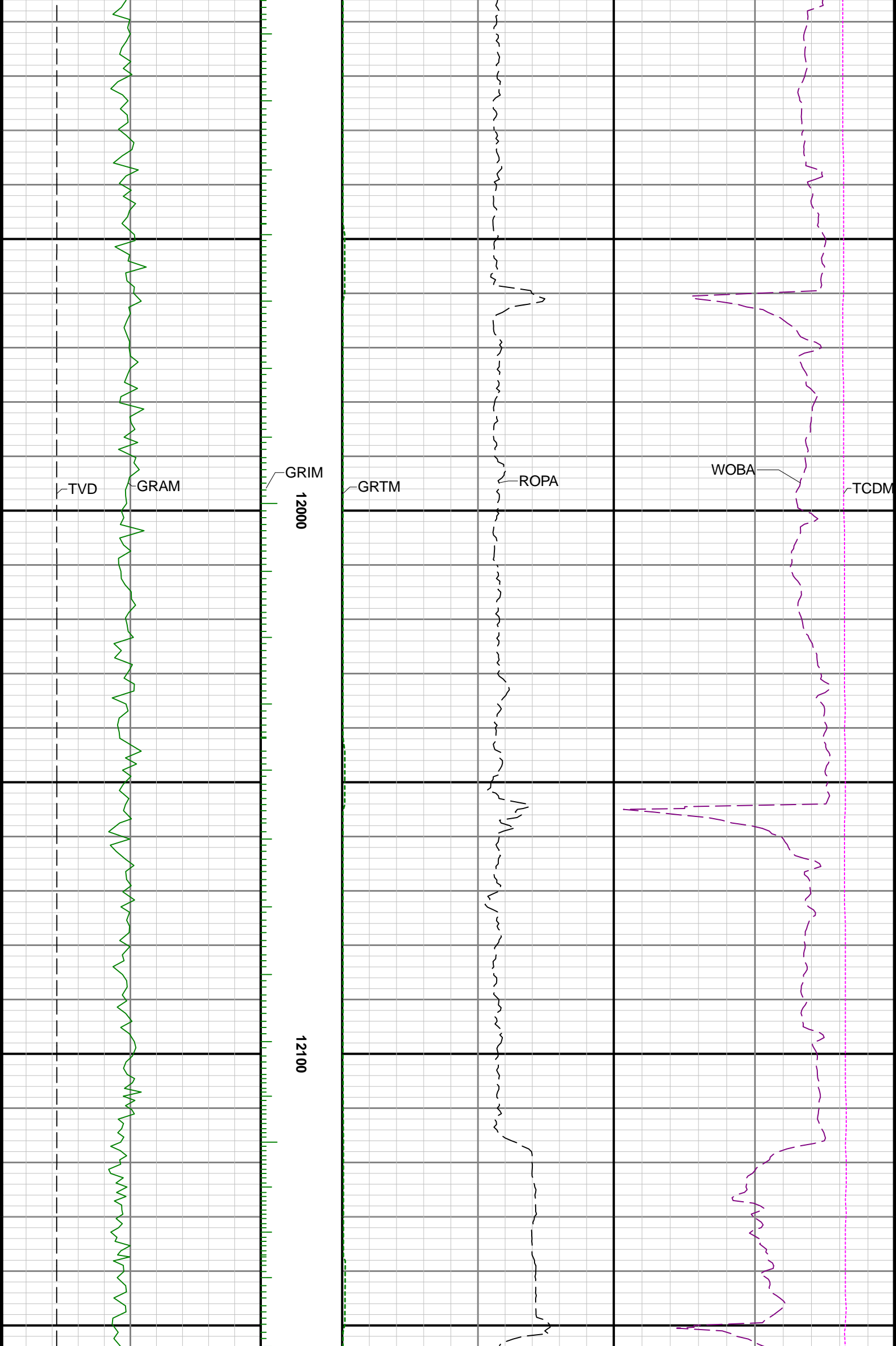


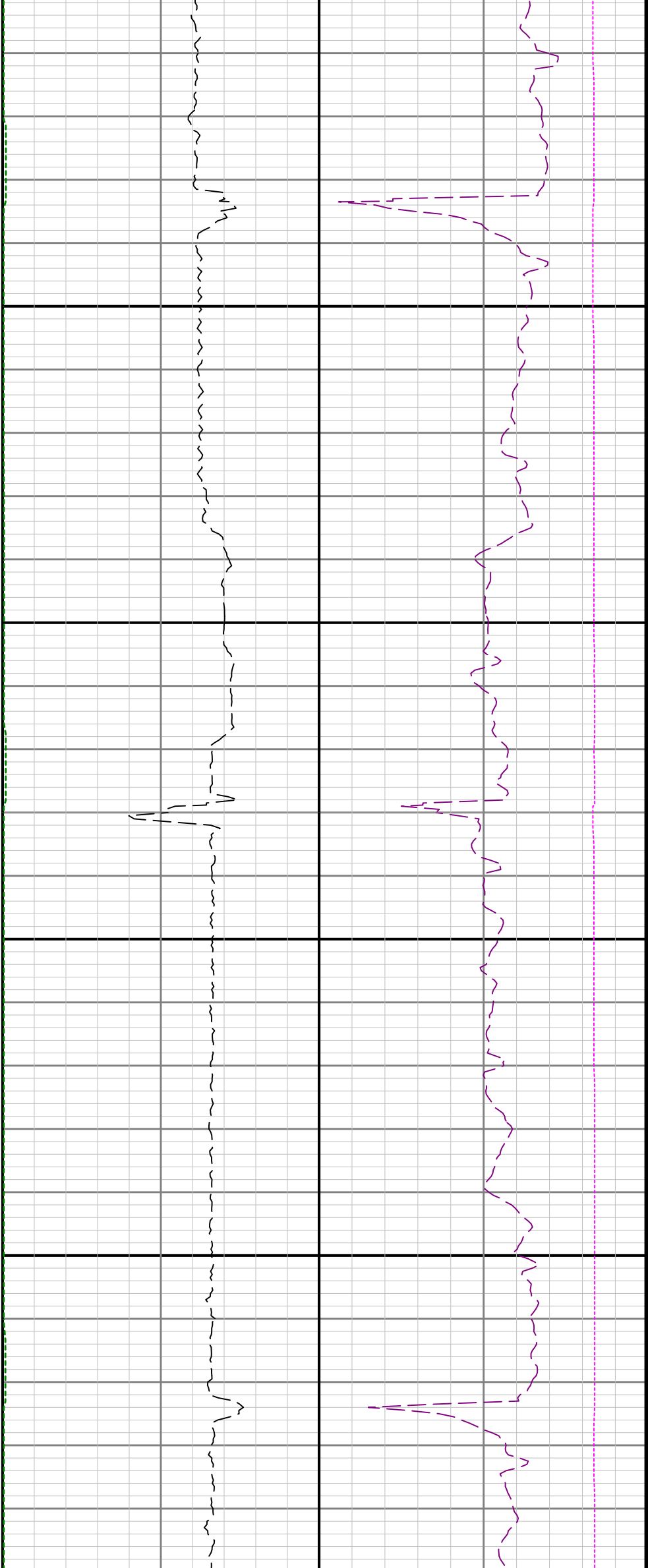
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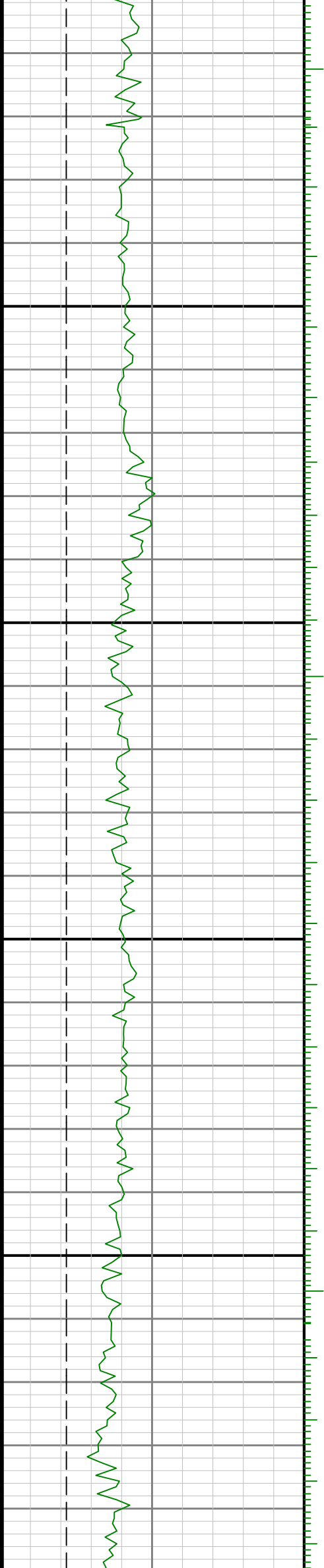


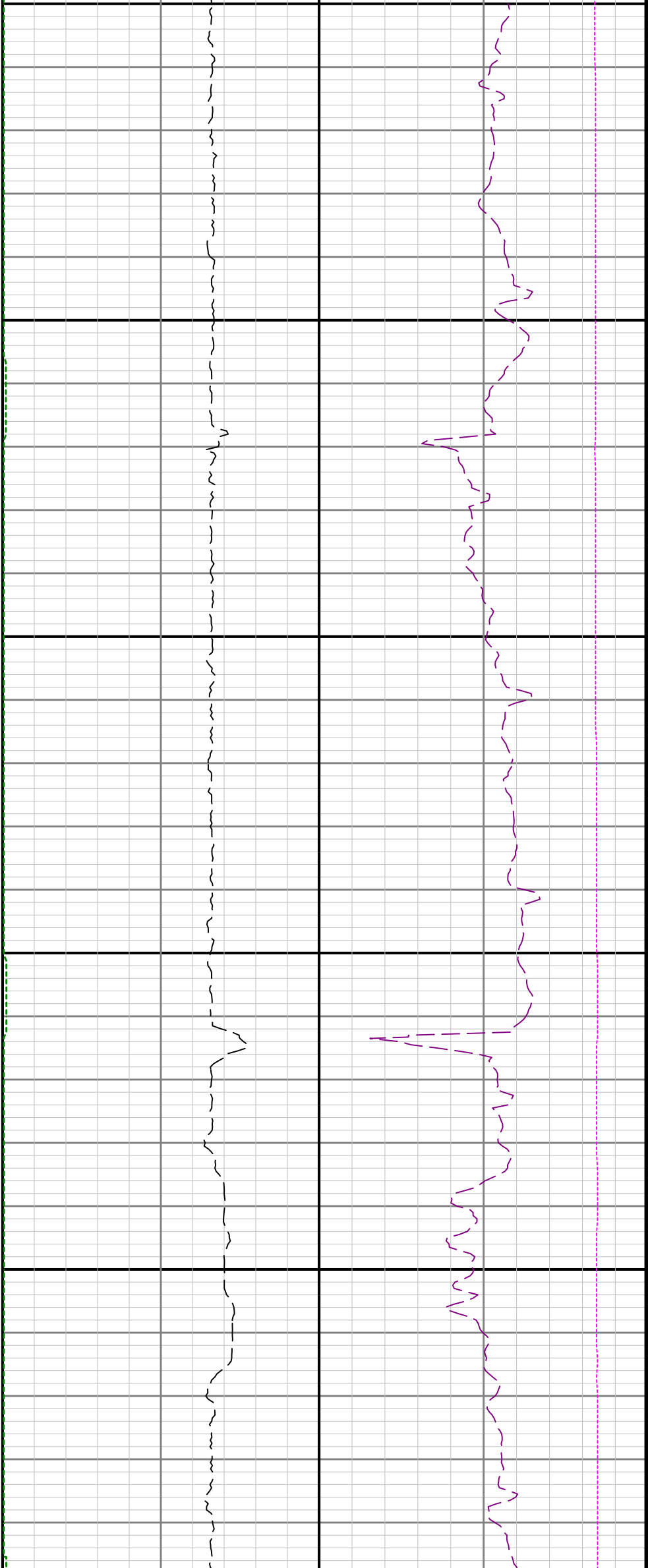


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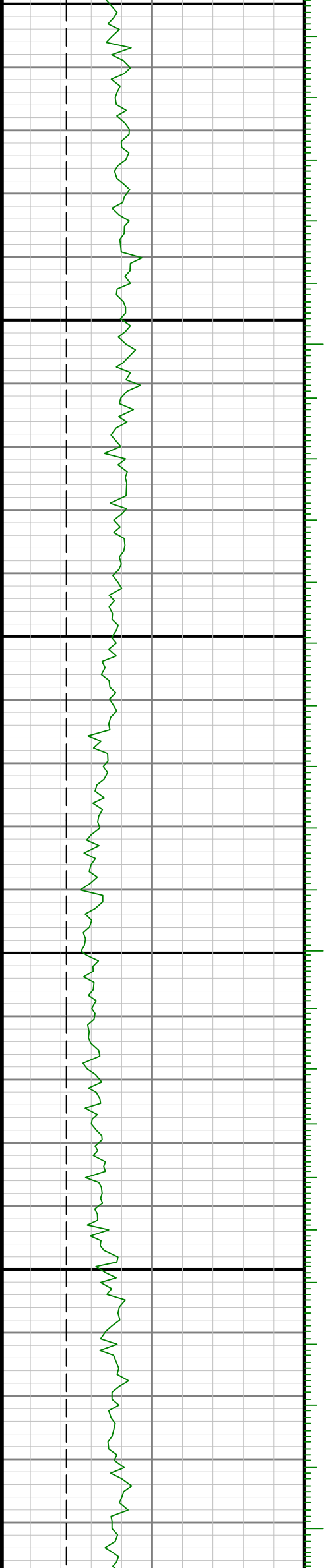
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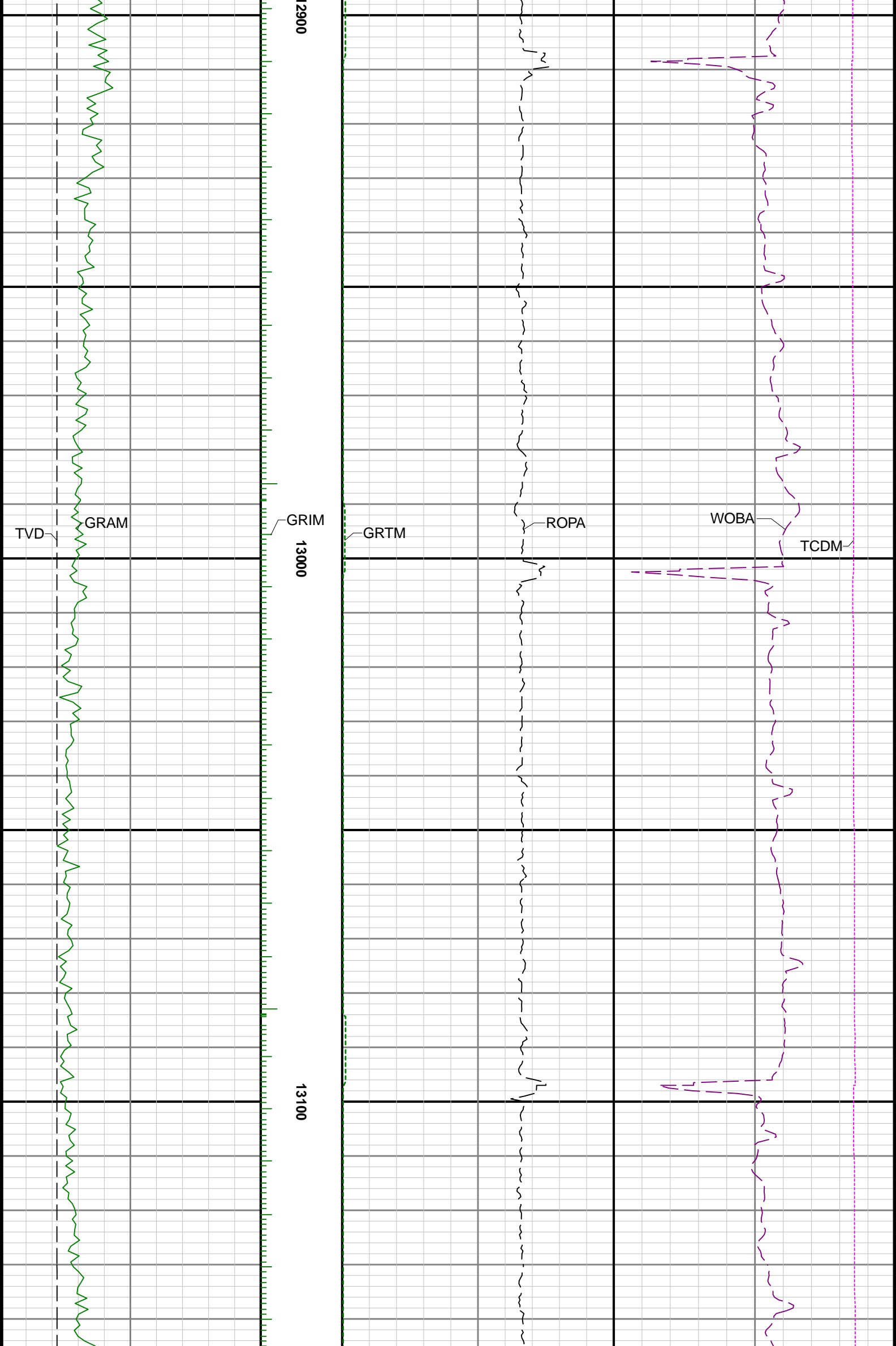


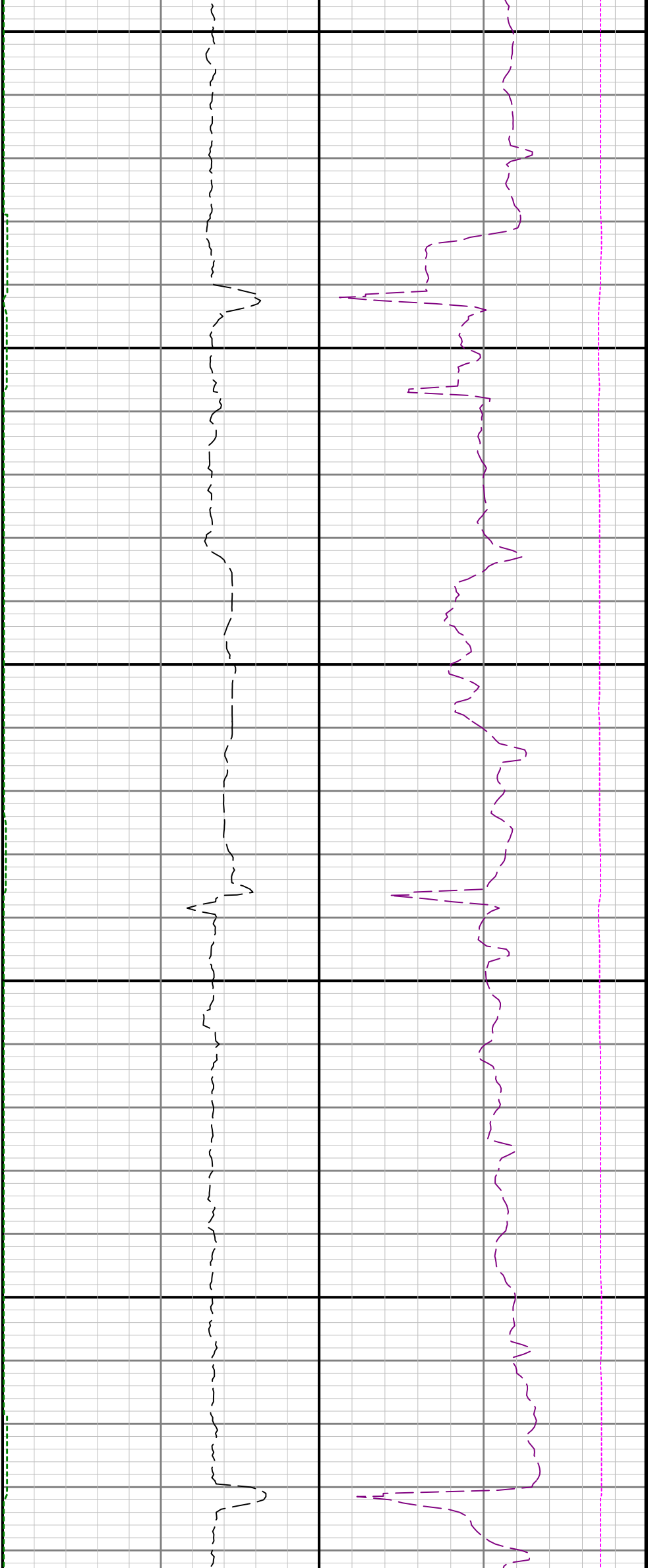


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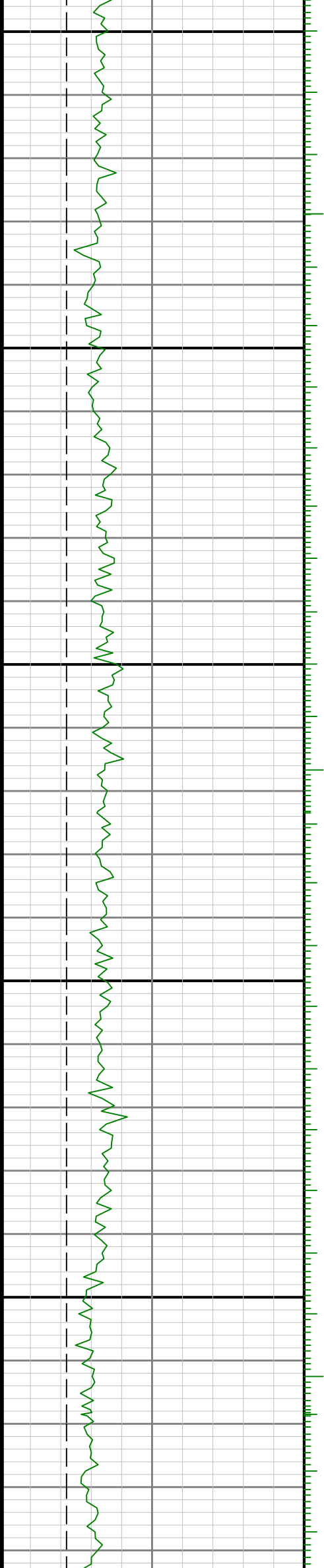


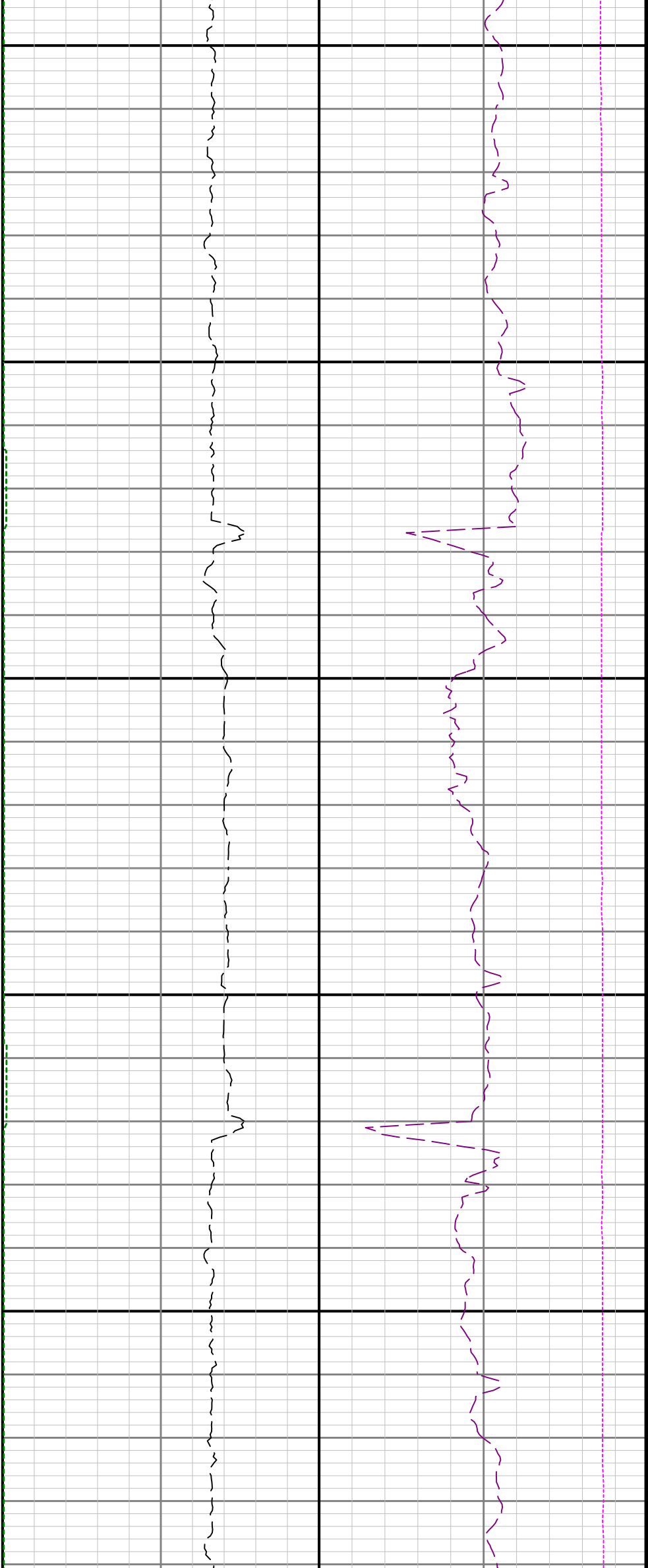




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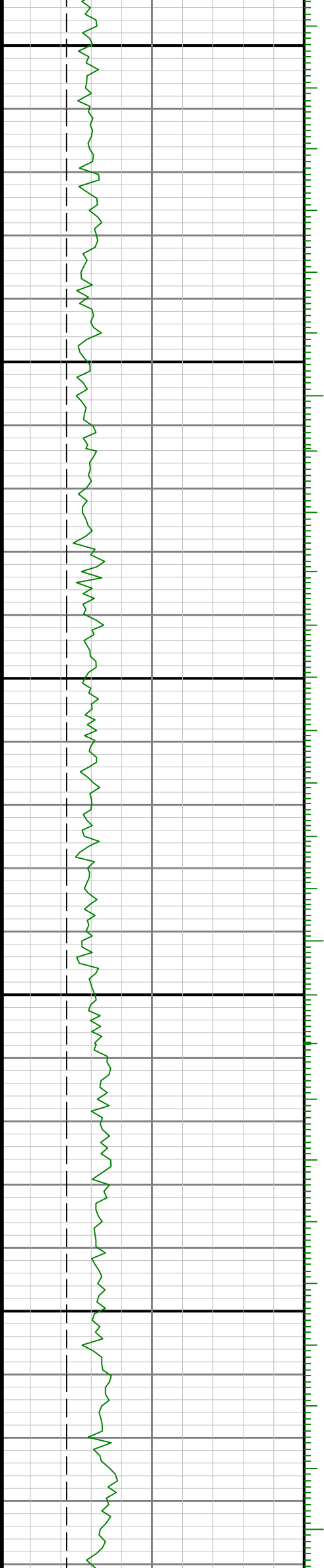


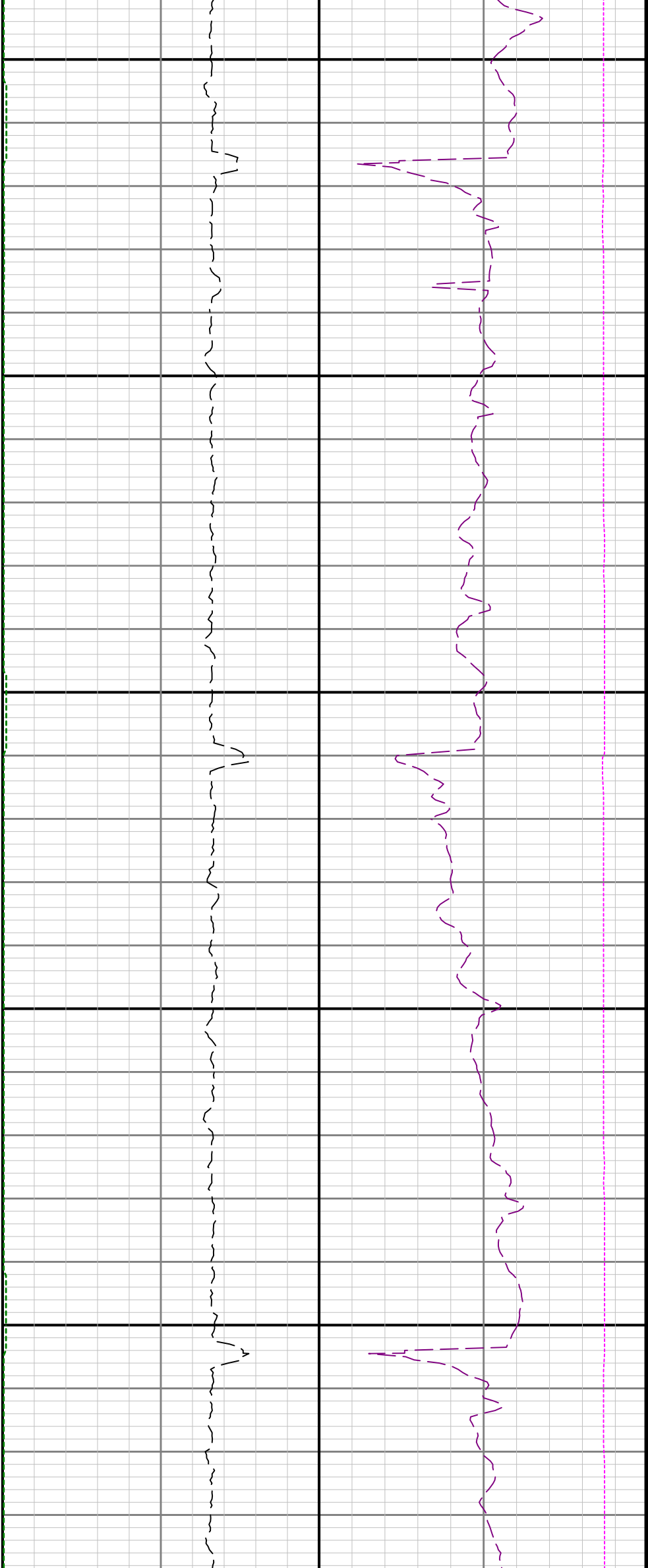


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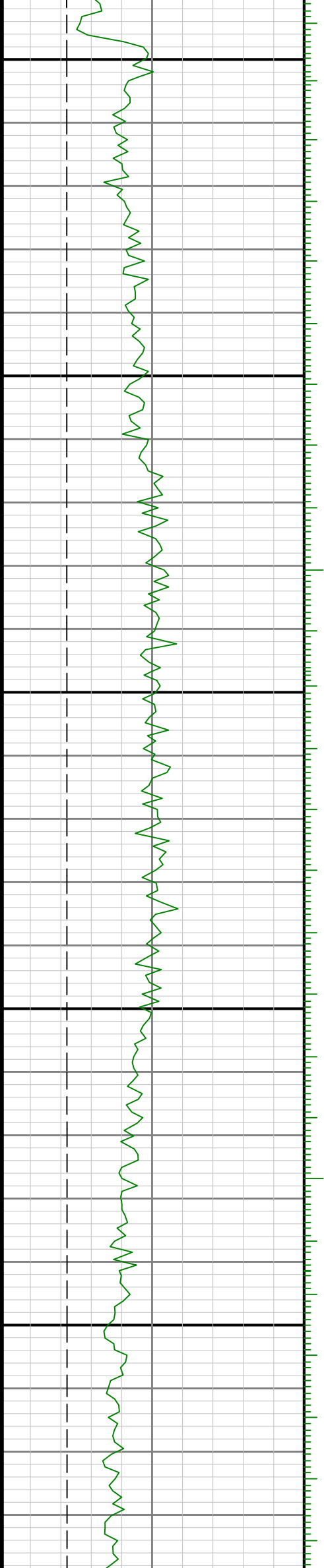
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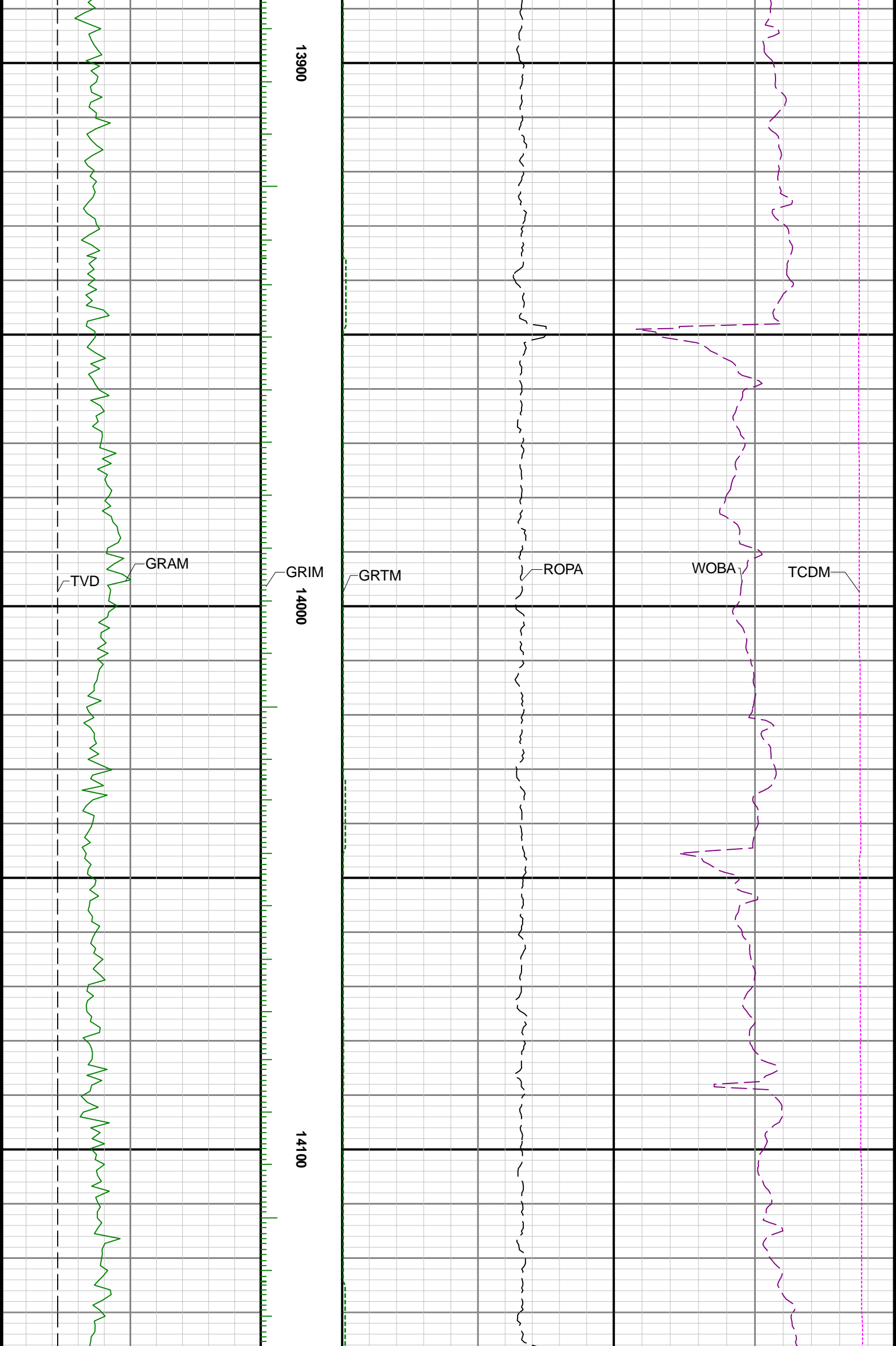


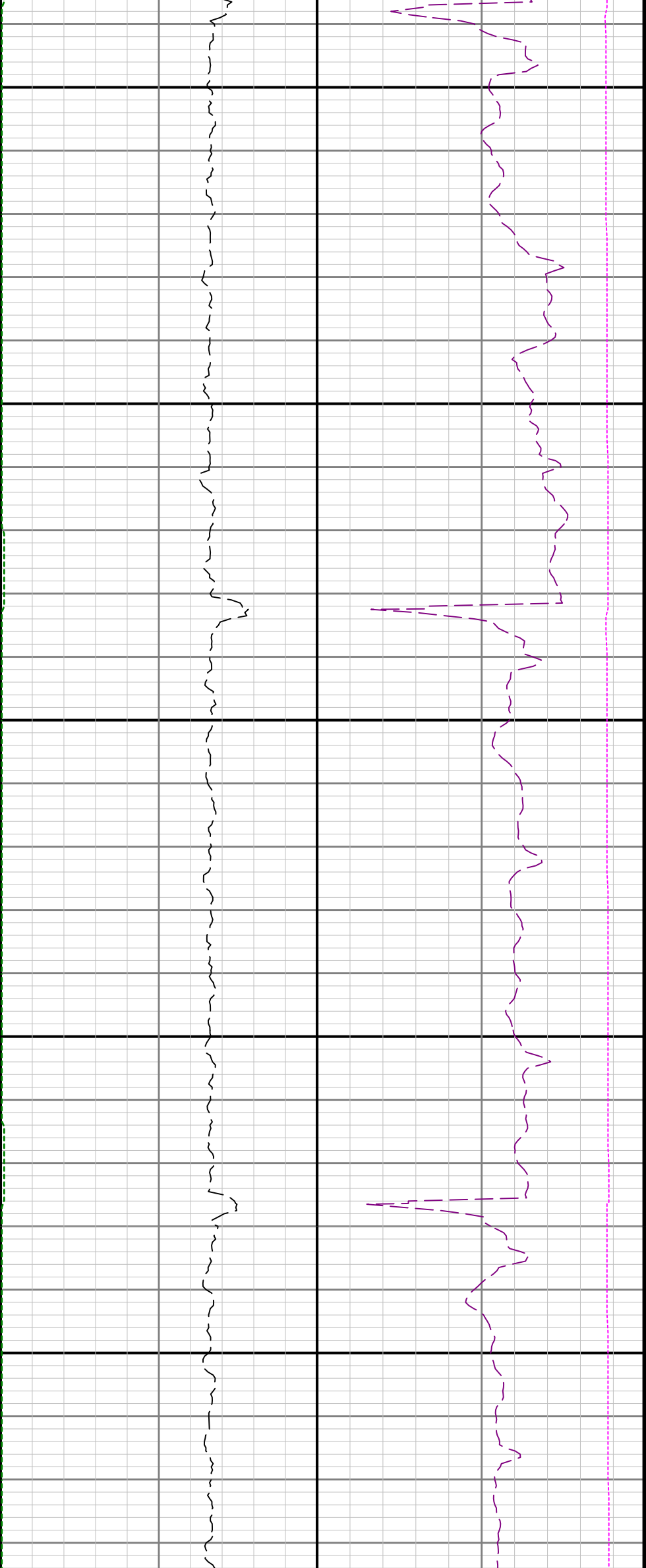


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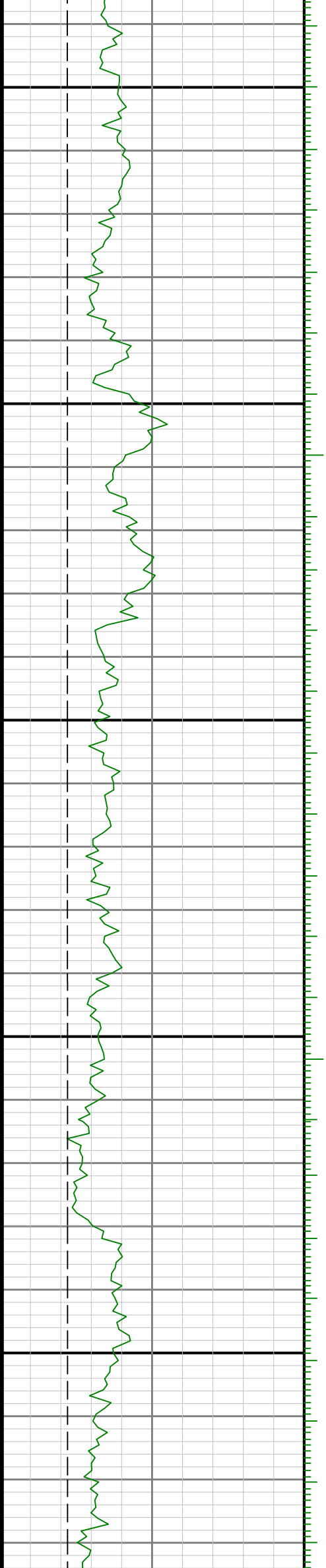


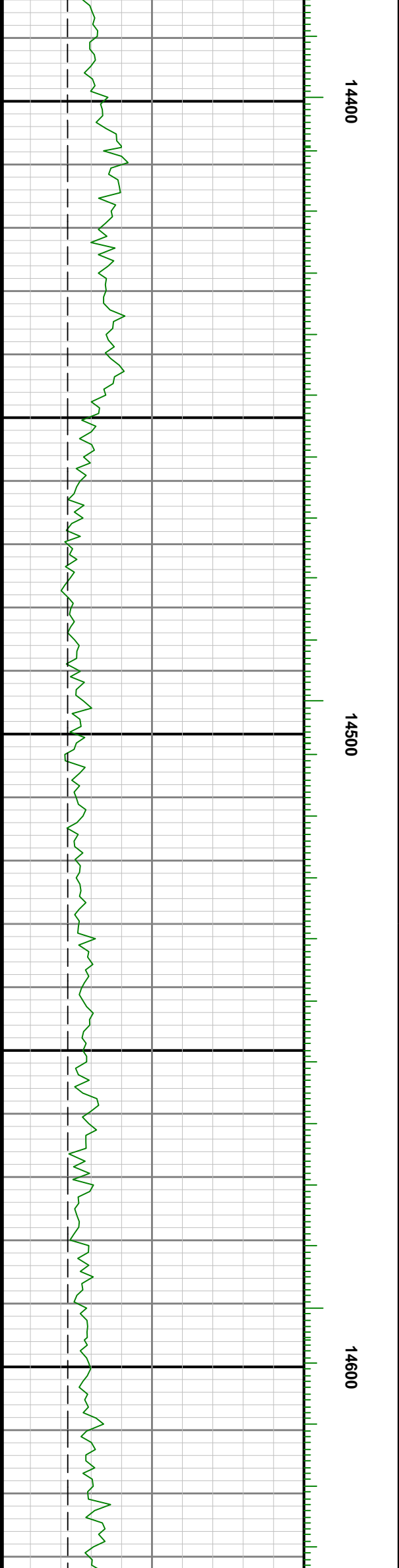
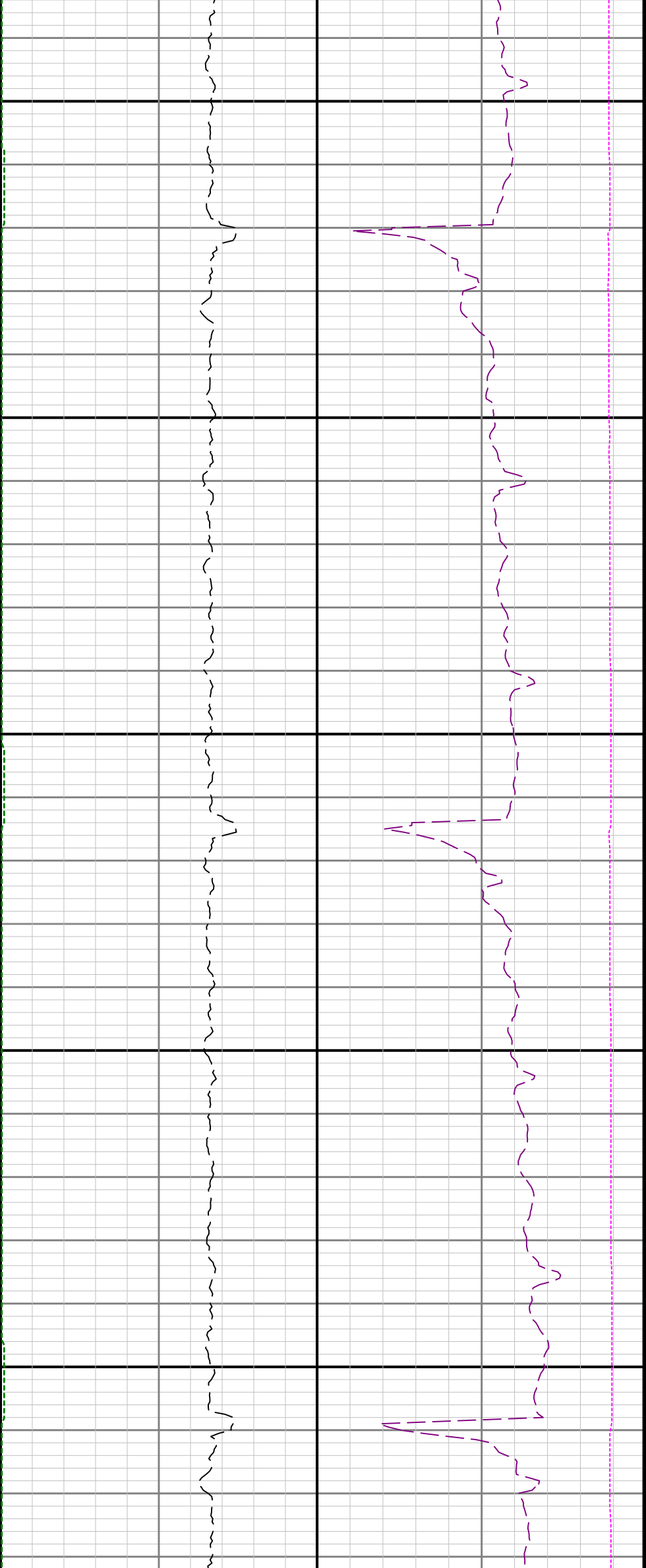


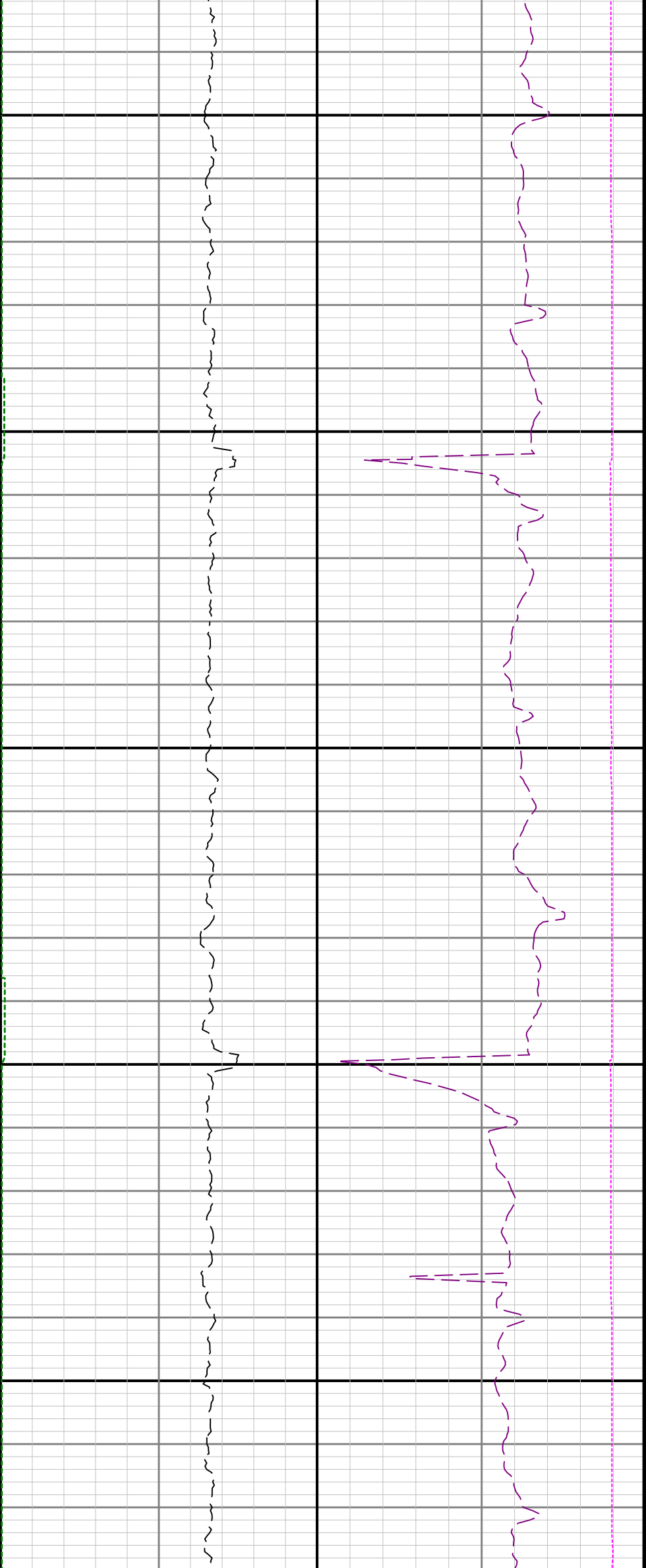


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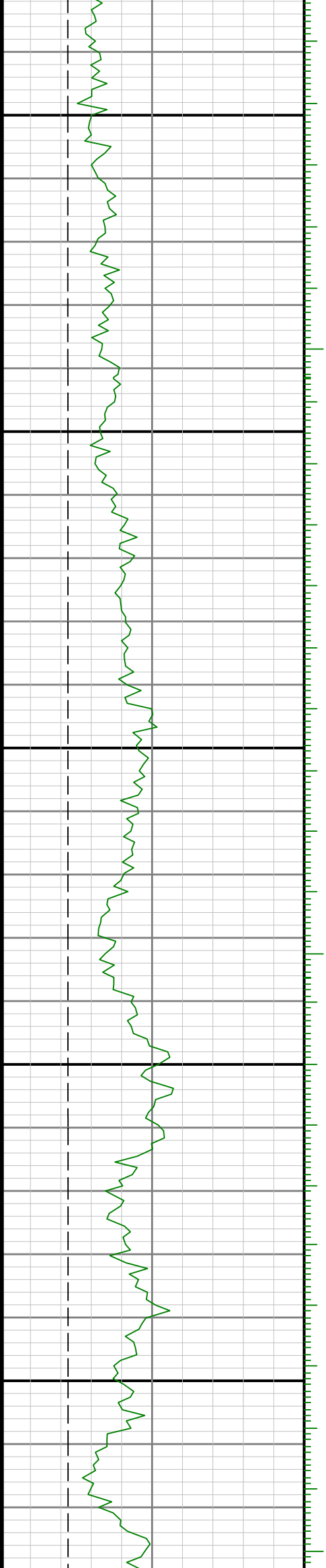


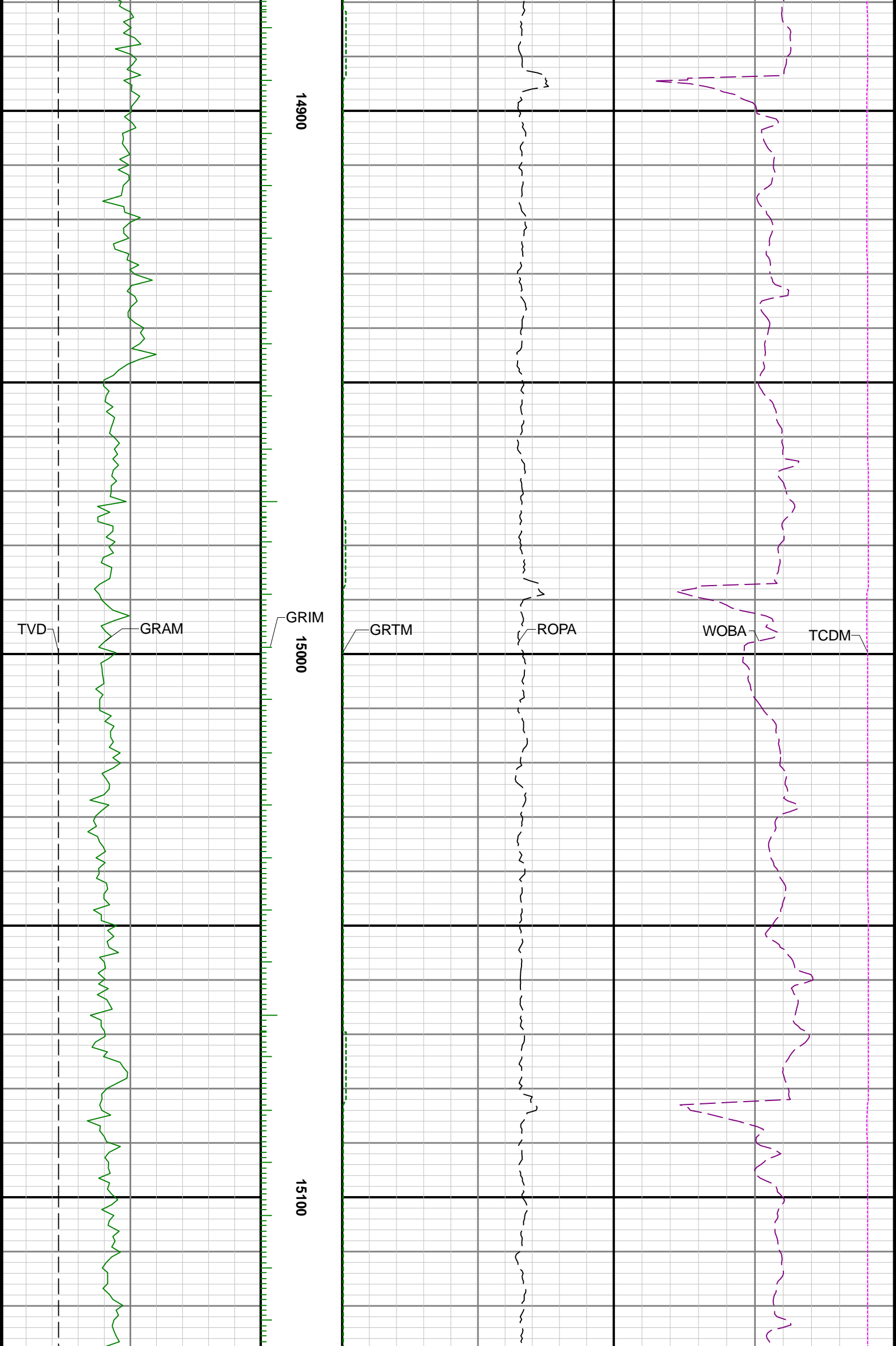




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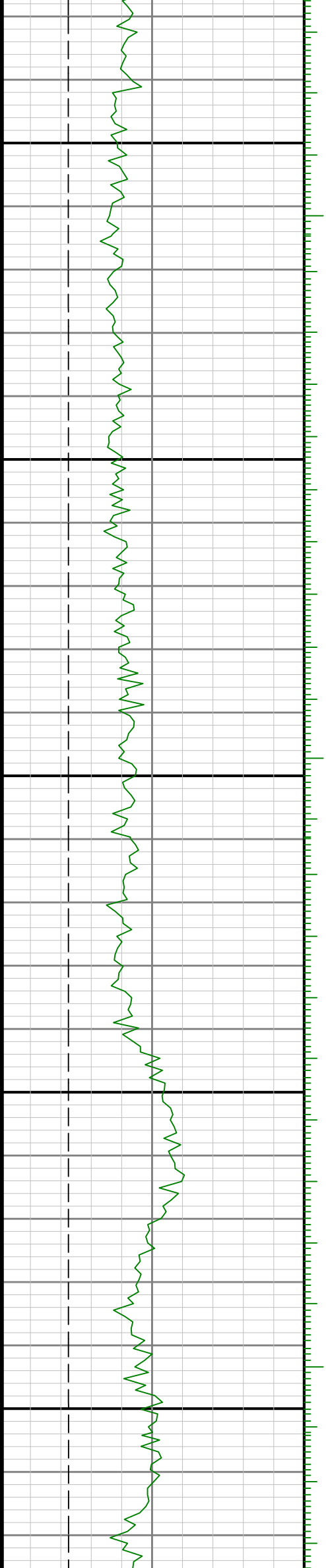


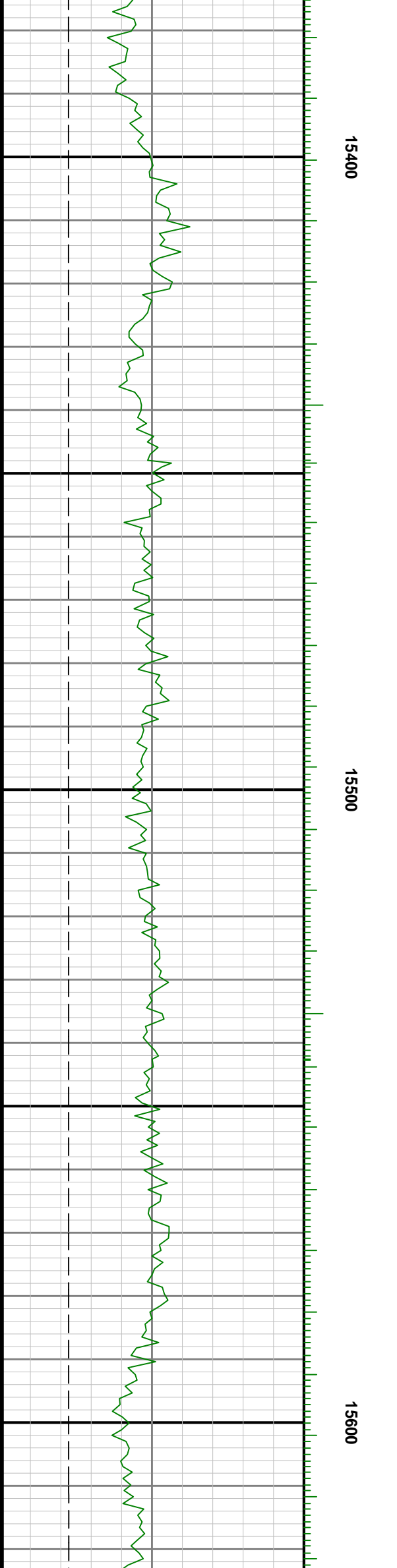
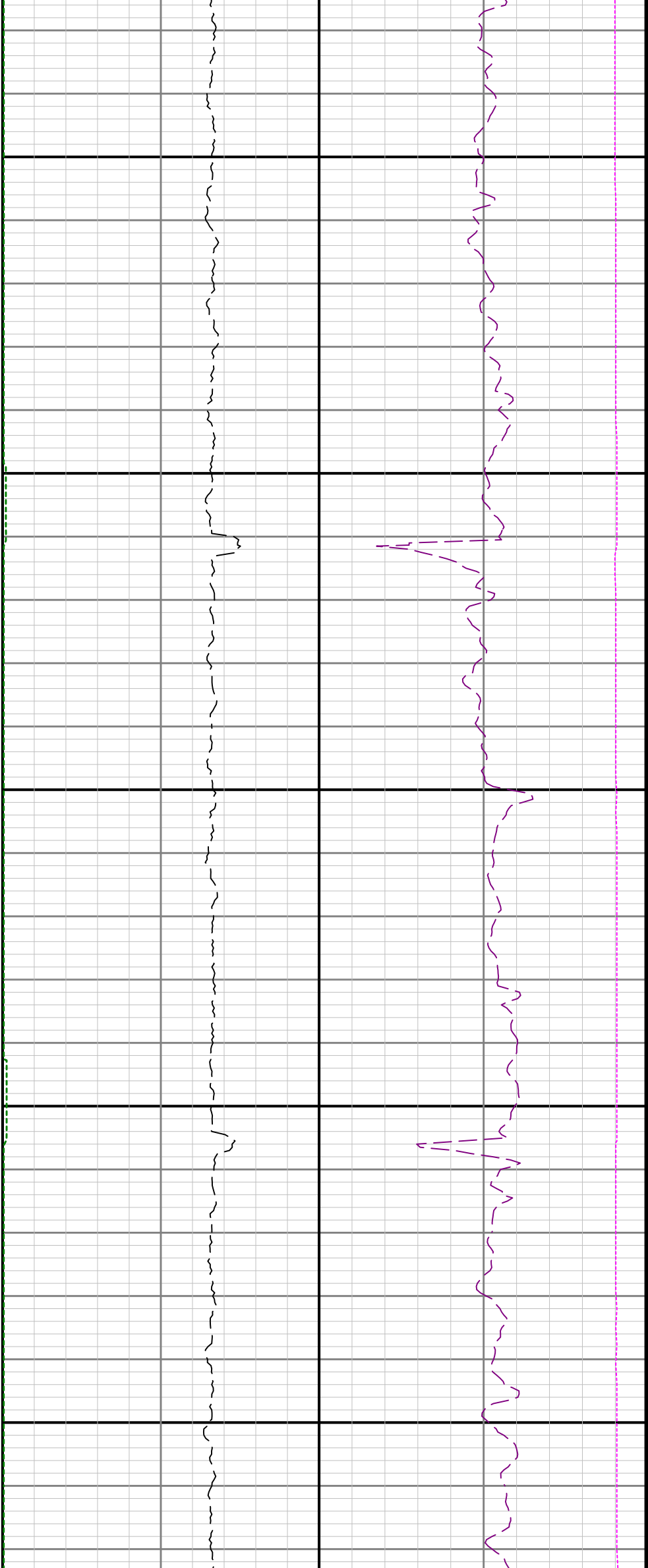


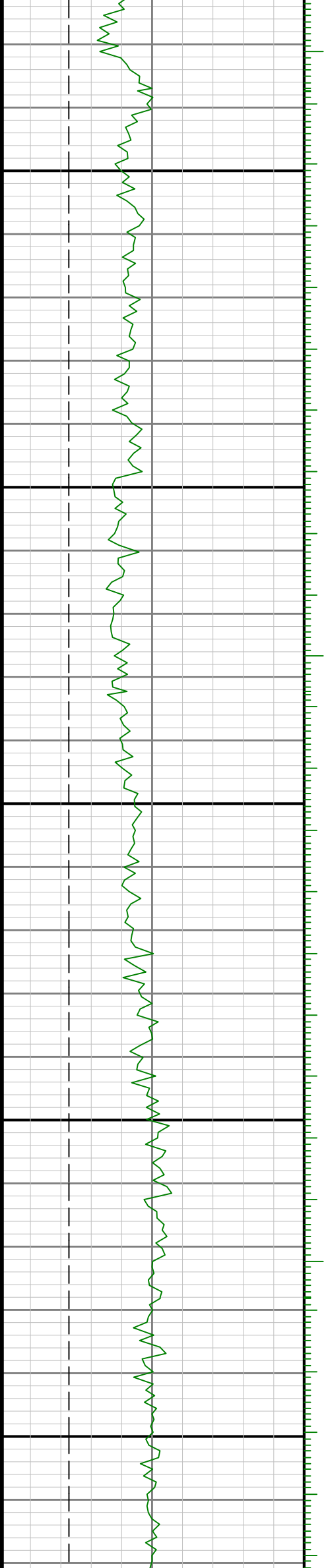
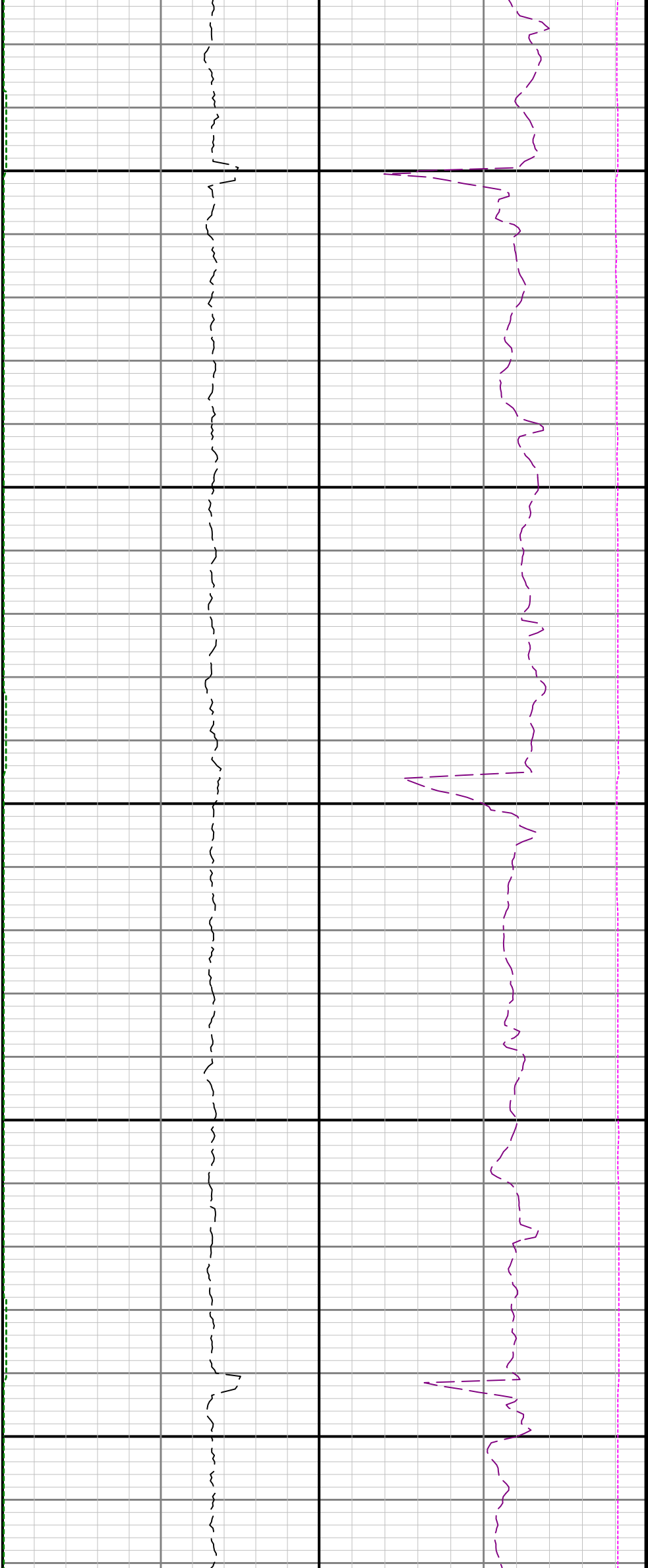


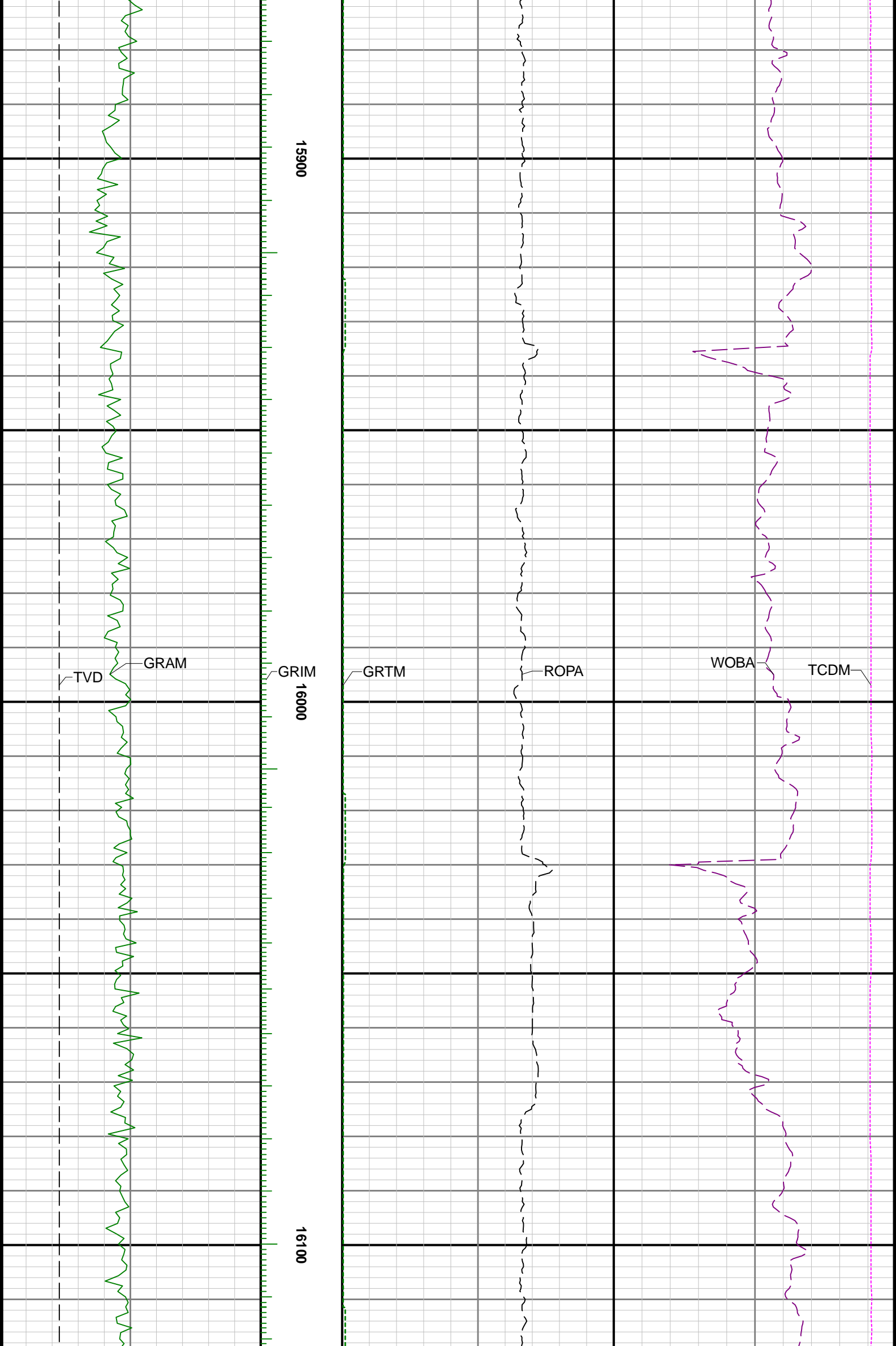
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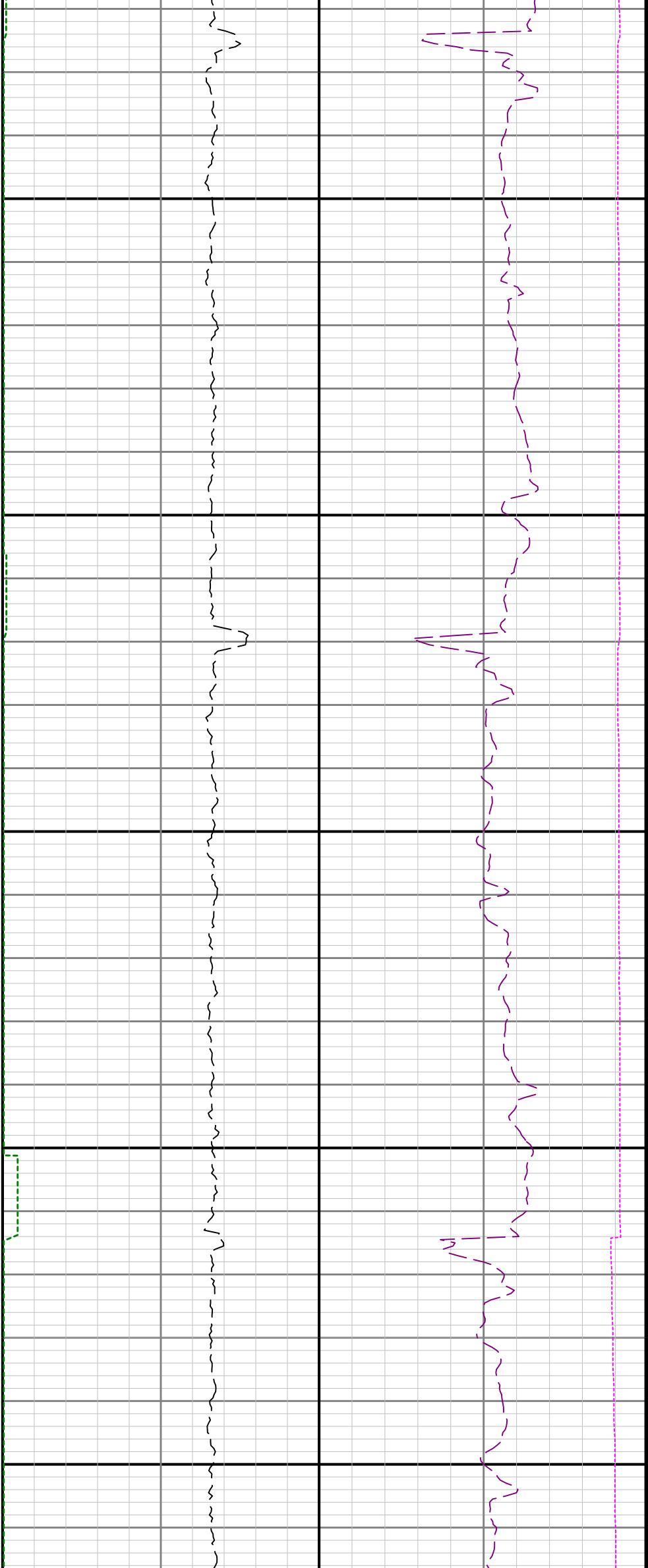
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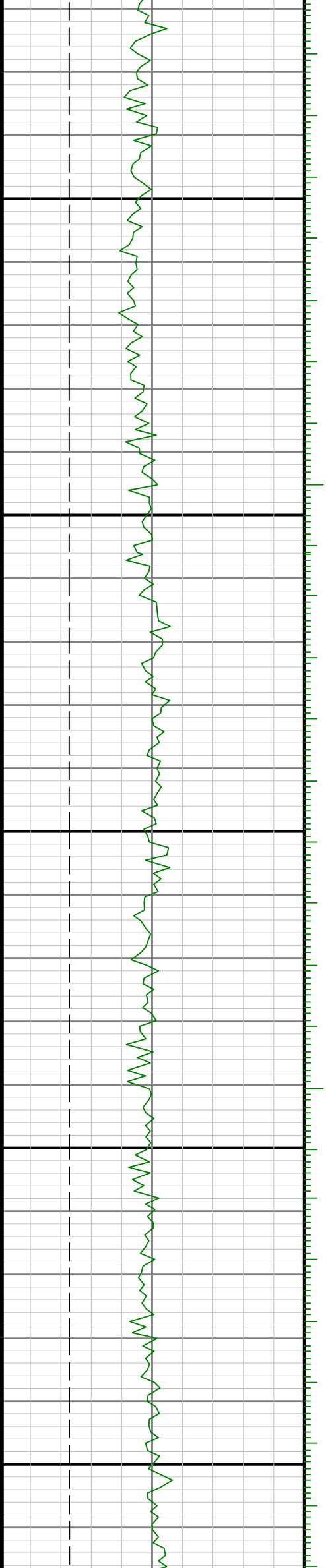


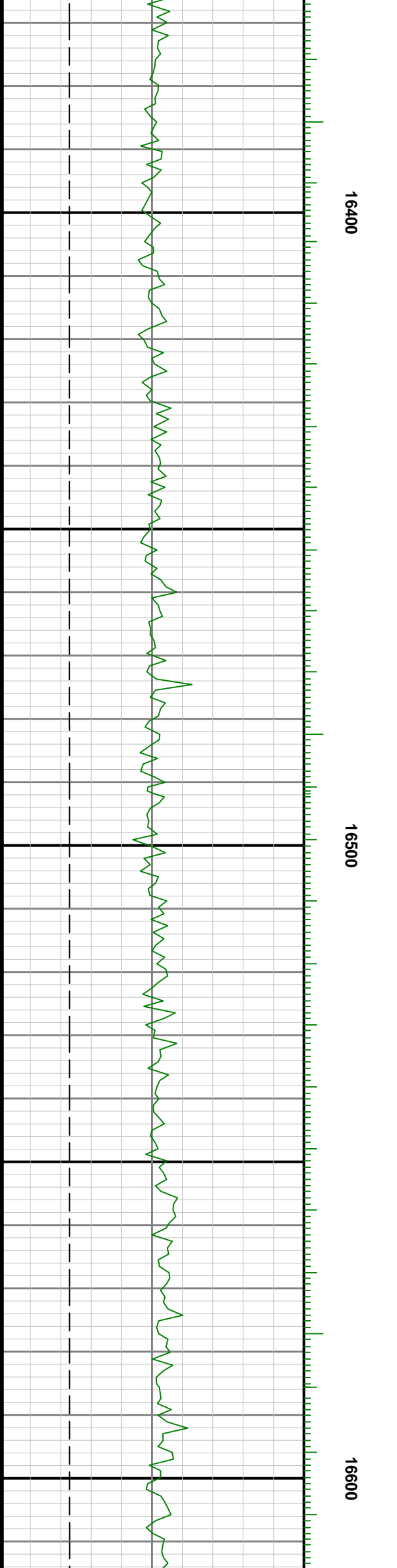
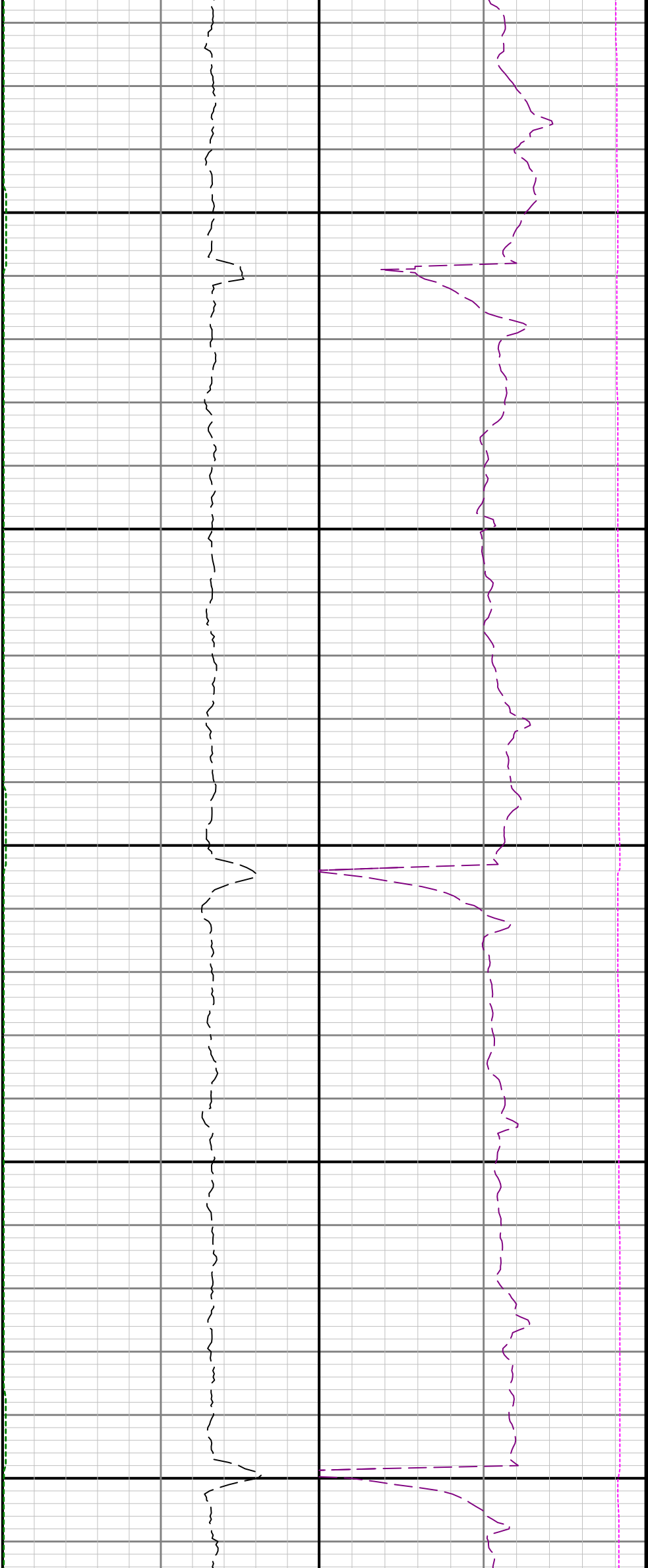


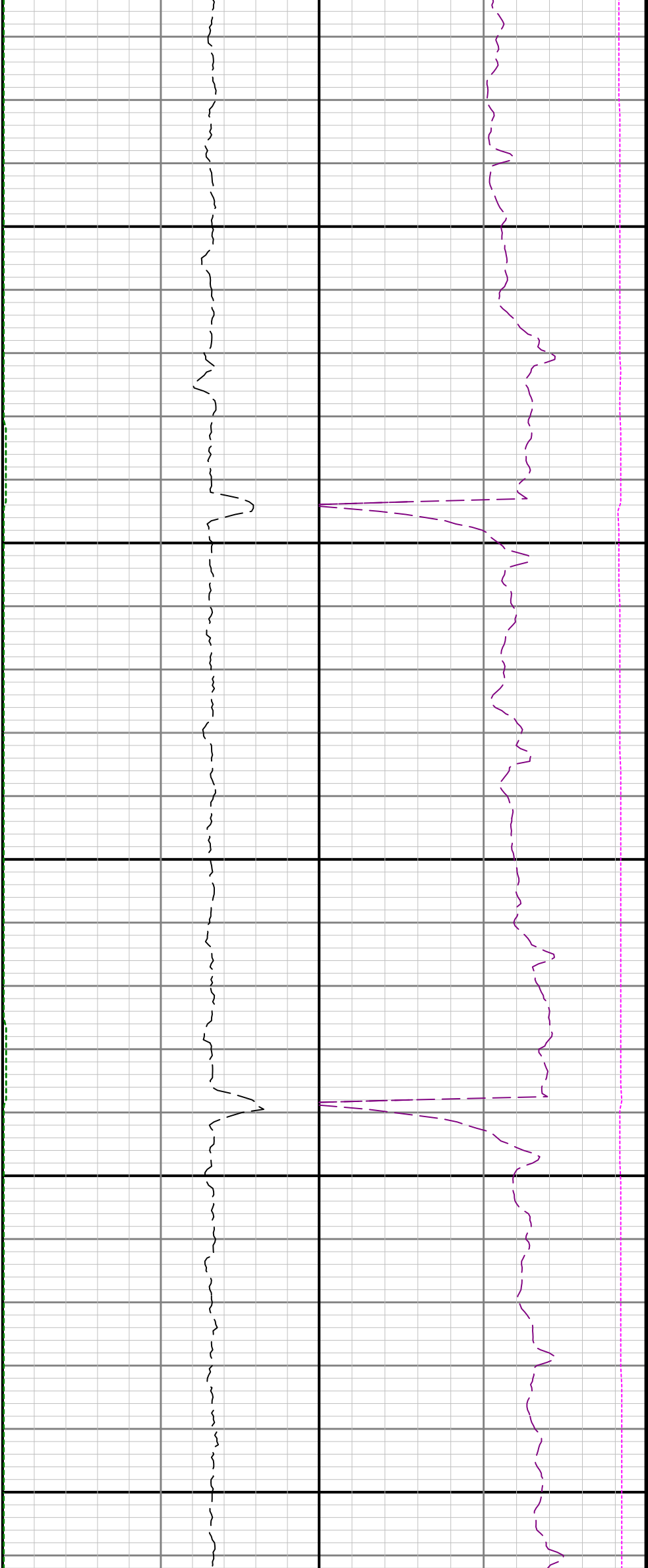


16200

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