



LWD MEMORY LOG

Gamma Ray

Scale: **1:240**

Measured Depth

Company: **Noble Energy**
Well: **Becker D17-715**
Field: **Wattenberg**
County: **Weld** Country: **United States**

Driller's Depth State: **Colorado**

Status: Surface Location: **40° 15' 07.852" N 104° 34' 12.173" W** Other Services:

Final Print

Latitude: Longitude: Directional

API No: **05-123-48855-00** Job ID: **110581714** SEC: **5** TWN: **3N** RGE: **64W**

Permanent Datum (P.D.): **Mean Sea Level** Elevation: **0.00 ft** Elev. KB: **N/A**
Log Measured From: **Rig Floor** Above P.D.: **4775.00 ft** Elev. DF: **4775.00 ft** Elev. GL: **4745.00 ft**

Dates Interval Magnetic Field Reference

From: **2020-10-21** Drilled (ft) Logged (ft) Azi Reference North: Grid Dip Angle: (deg) 66.61
To: **2020-10-23** Top: **1937.00** Top: **1937.00** Total Magnetic Field Strength: (nT) 51871
Spud: **2020-10-20** Bottom: **15100.00** Bottom: **15087.00** Mag to Reference North Correction: (deg) 7.33

Borehole Record

Casing Record

Hole Size (in)	From (ft)	To (ft)	Size (in)	Weight (lb/ft)	From (ft)	To (ft)
13.500	30.00	1937.00	9.625	36.00	30.00	1927.00
8.500	1937.00	15100.00				

Mud Record

Deviation Record

Type	From (ft)	To (ft)	Hole Size (in)	Interval (ft)	Inc Az (Start)	Inc Az (End)
Oil Based Mud	1937.00	15100.00	8.500	13163.00	0.21 286.38	90.25 179.31

Acquisition System

Software Version

Other

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

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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	1937.00	15087.00	1937.00	15100.00	2020-10-21 16:34	2020-10-23 08:55	38.74

Crew

Name	Arrive Wellsite	Depart Wellsite	Name	Arrive Wellsite	Depart Wellsite	Name	Arrive Wellsite	Depart Wellsite
John Moisan	2020-10-19	2020-10-24	Tien Bui	2020-10-19	2020-10-24			

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+ (%)
2020-10-19 17:13	1	1937.00	Oil Based Mud	9.2	10	N/A	20.0	79.5/20.5	Active Pit	27000	0.00
2020-10-23 14:14	1	9850.00	Oil Based Mud	9.6	10	N/A	17.4	78/22	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	14452345	Near Bit Inclination	5.93	6.81	7.000	4.330
1	AutoTrak Curve Steering Unit	14452345	Near Bit VSS	5.93	6.81	7.000	4.330
1	AutoTrak Curve MWD	14219781	Gamma (single)	2.75	12.98	7.000	3.250
1	AutoTrak Curve MWD	14219781	Directional (mag)	12.27	22.50	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

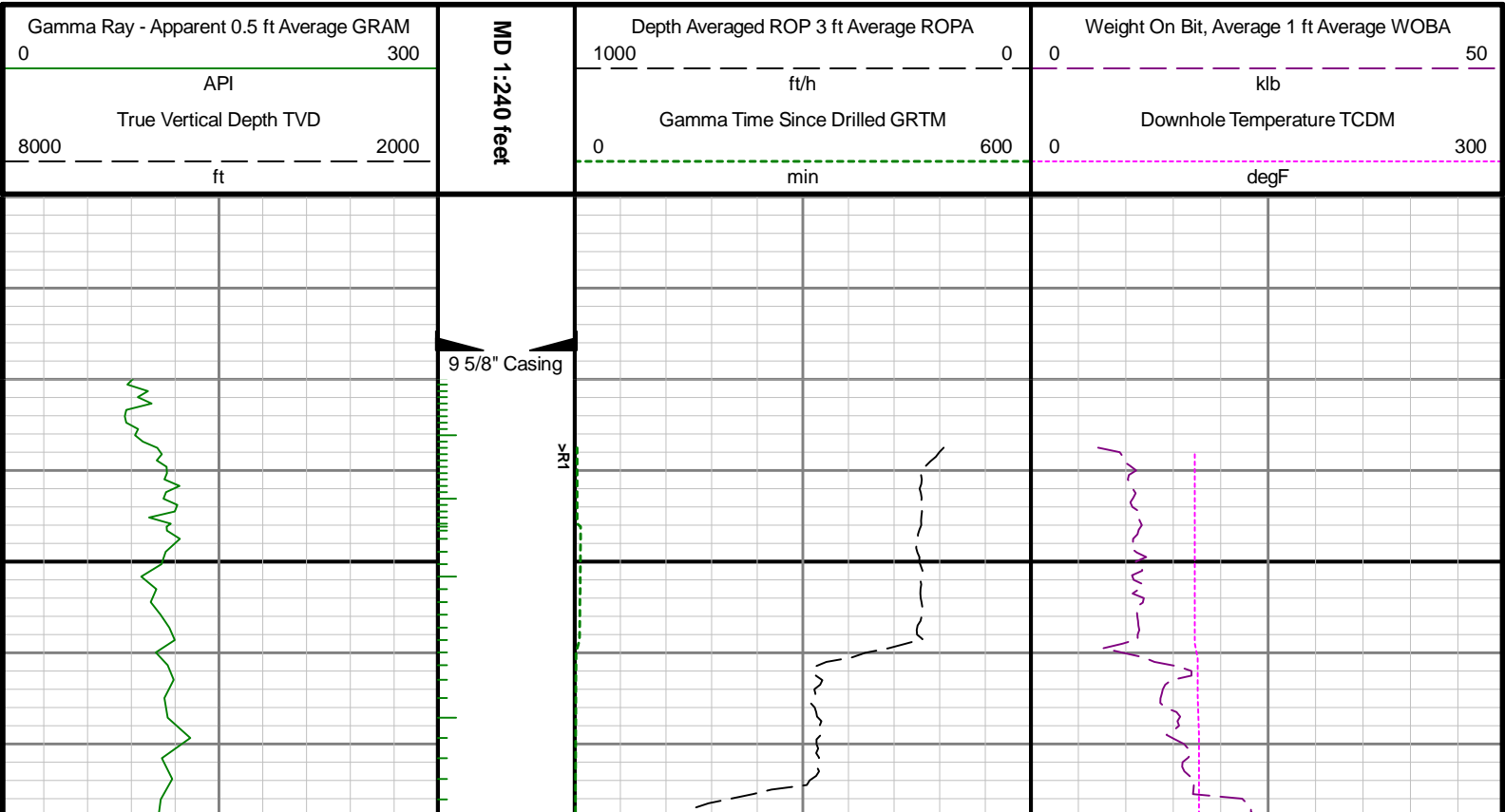
1	Depth measurements were obtained from a depth control system not supplied or operated by Baker Hughes. Due to lack of control by Baker Hughes logging engineers, depth calibrations and measurements could not be independently verified.
2	Baker Hughes LWD Run 1 utilized 6 ¾ inch NaviGamma service (Gamma Ray and Directional) behind a 8 1/2 inch bit and rotary steerable assembly from 1937 to 15100 feet MD (1937 to 6847 feet TVD).
3	The Gamma Ray Apparent (GRAM) data is presented 0 to 300 API, per the customer's request.
4	Several gaps appear in the log due to drilling ahead before the assembly had time to properly power on.

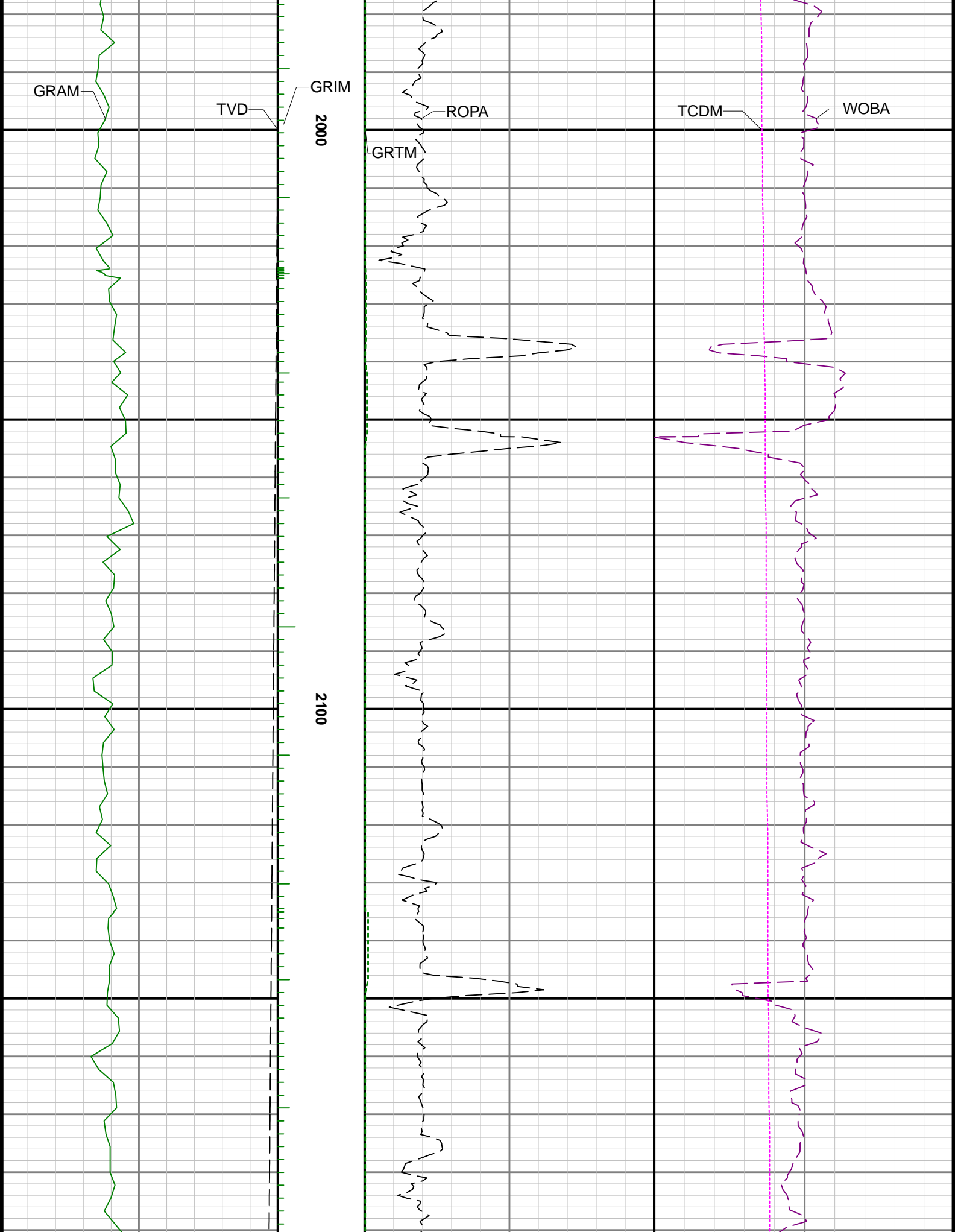
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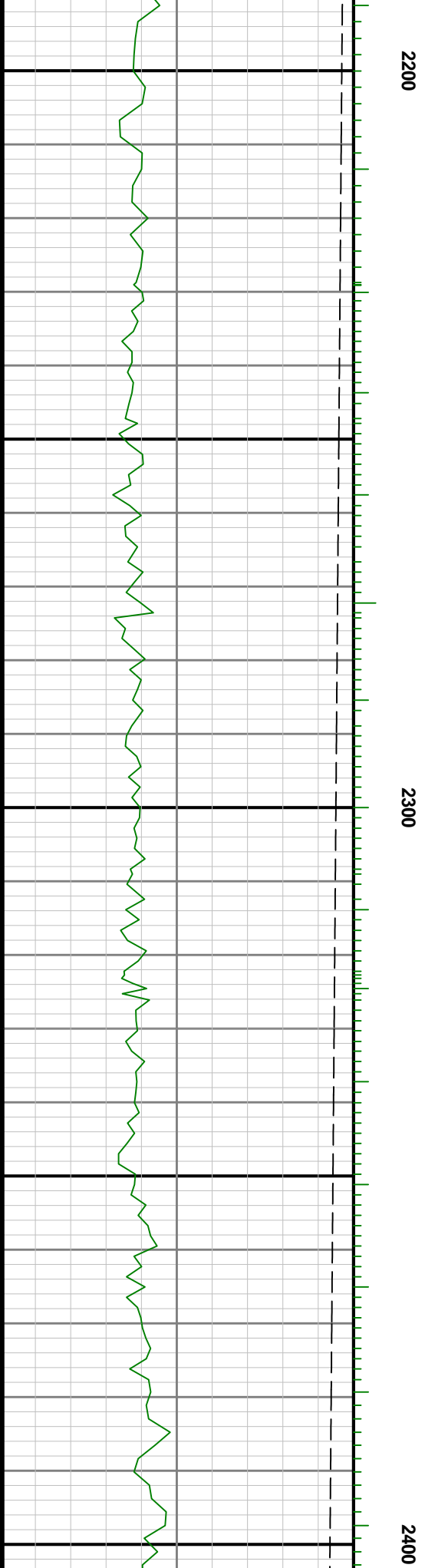
Number	Depth (ft)	Hole Section (in)	Run No.	Remark
1	15087.00	8.500	1	The interval from 15087 to 15100 feet MD (6847 feet TVD) was not logged due to sensor to bit offset at well TD.

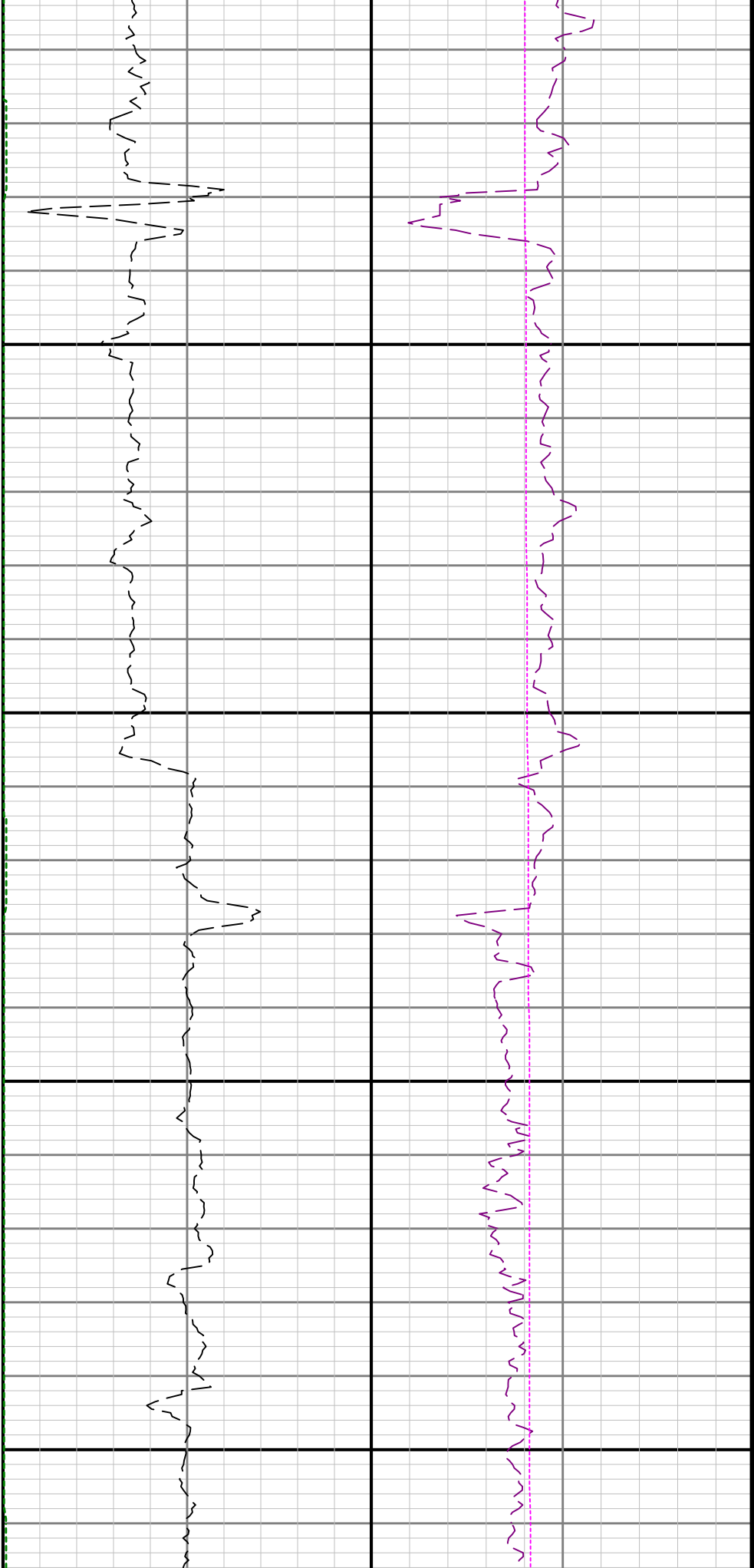
Curve Mnemonics

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



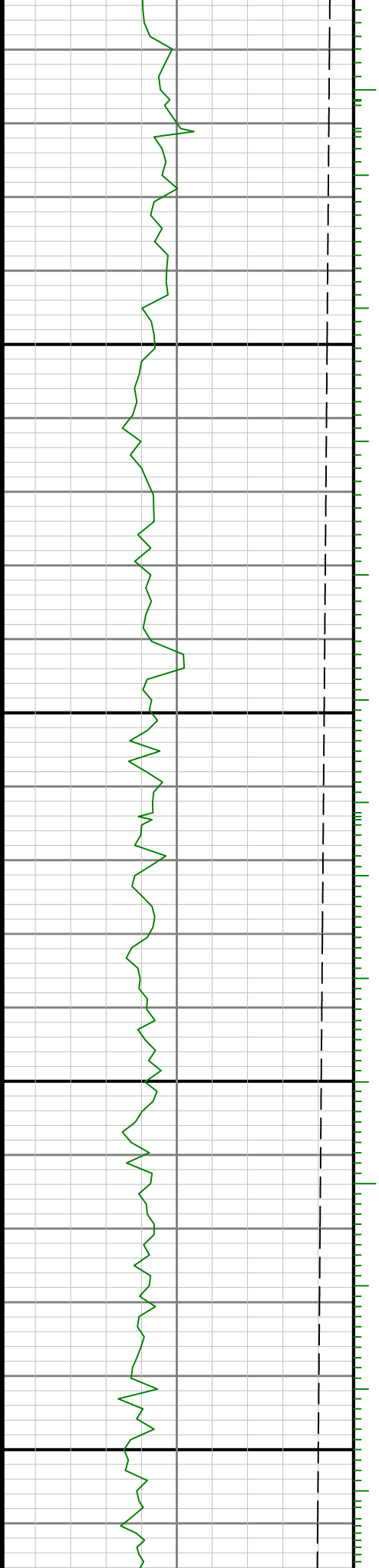


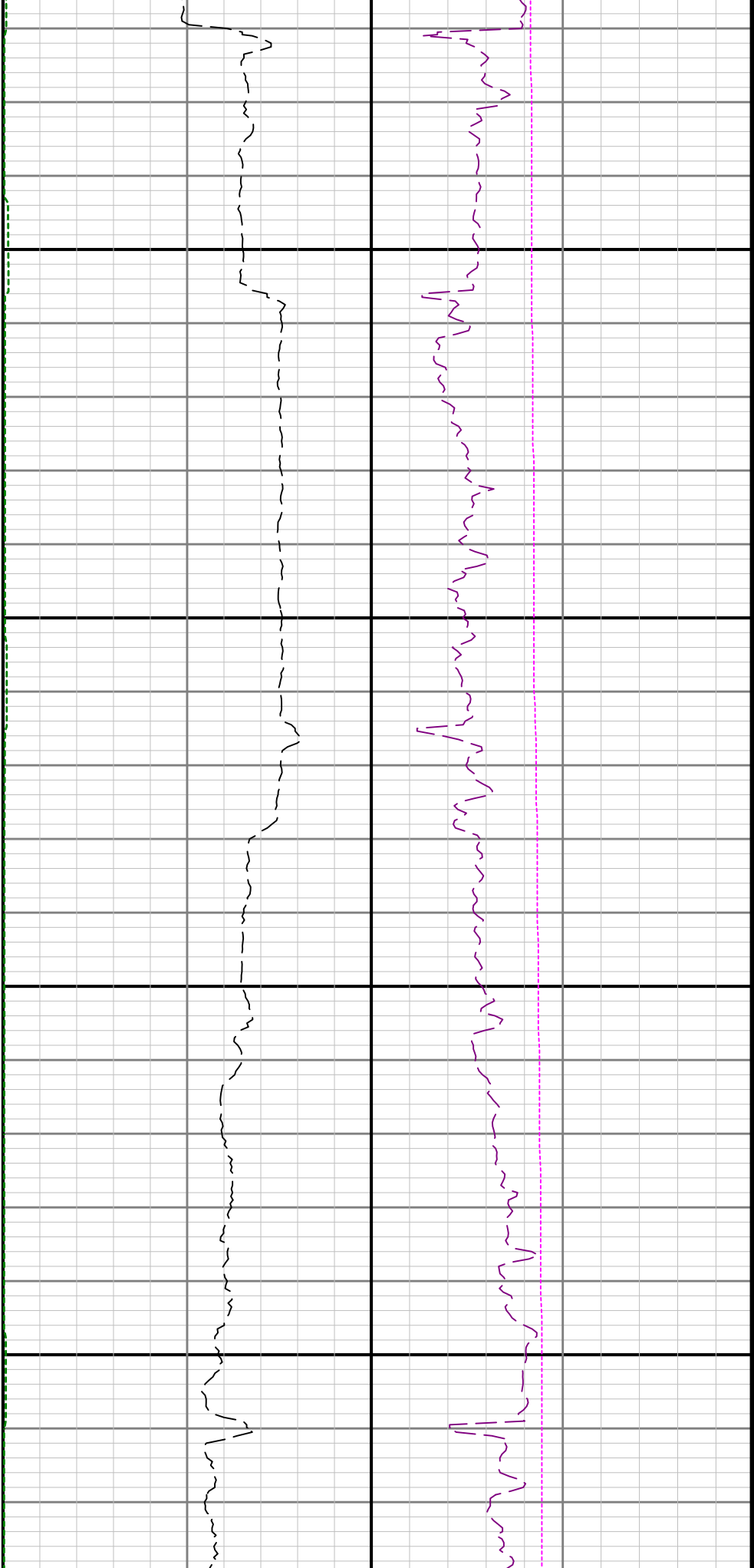




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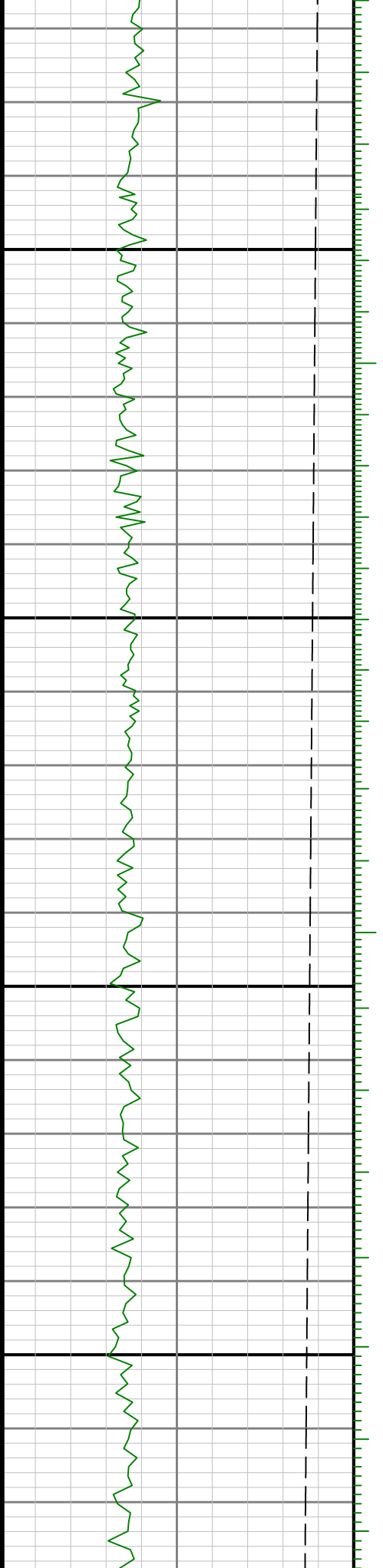
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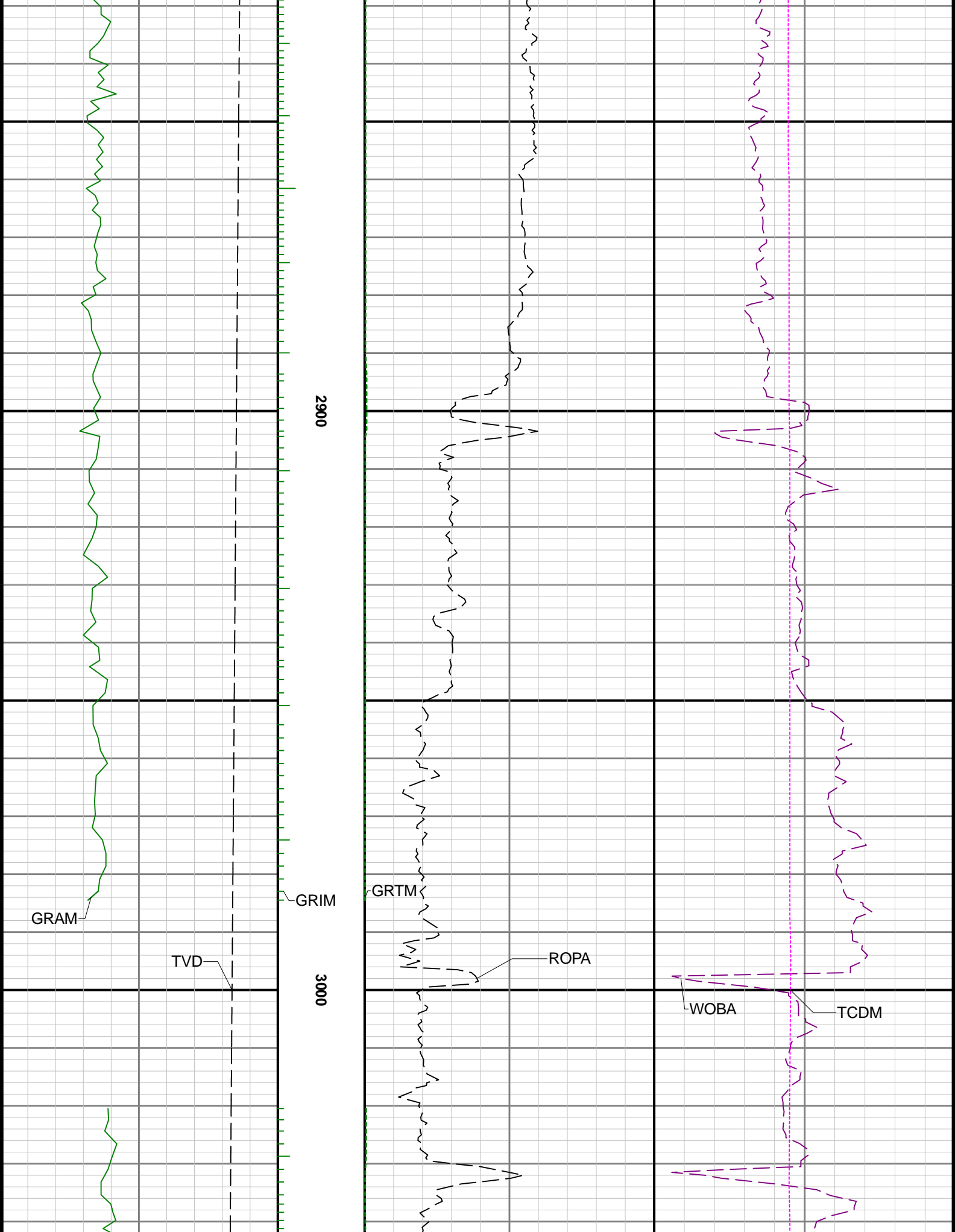


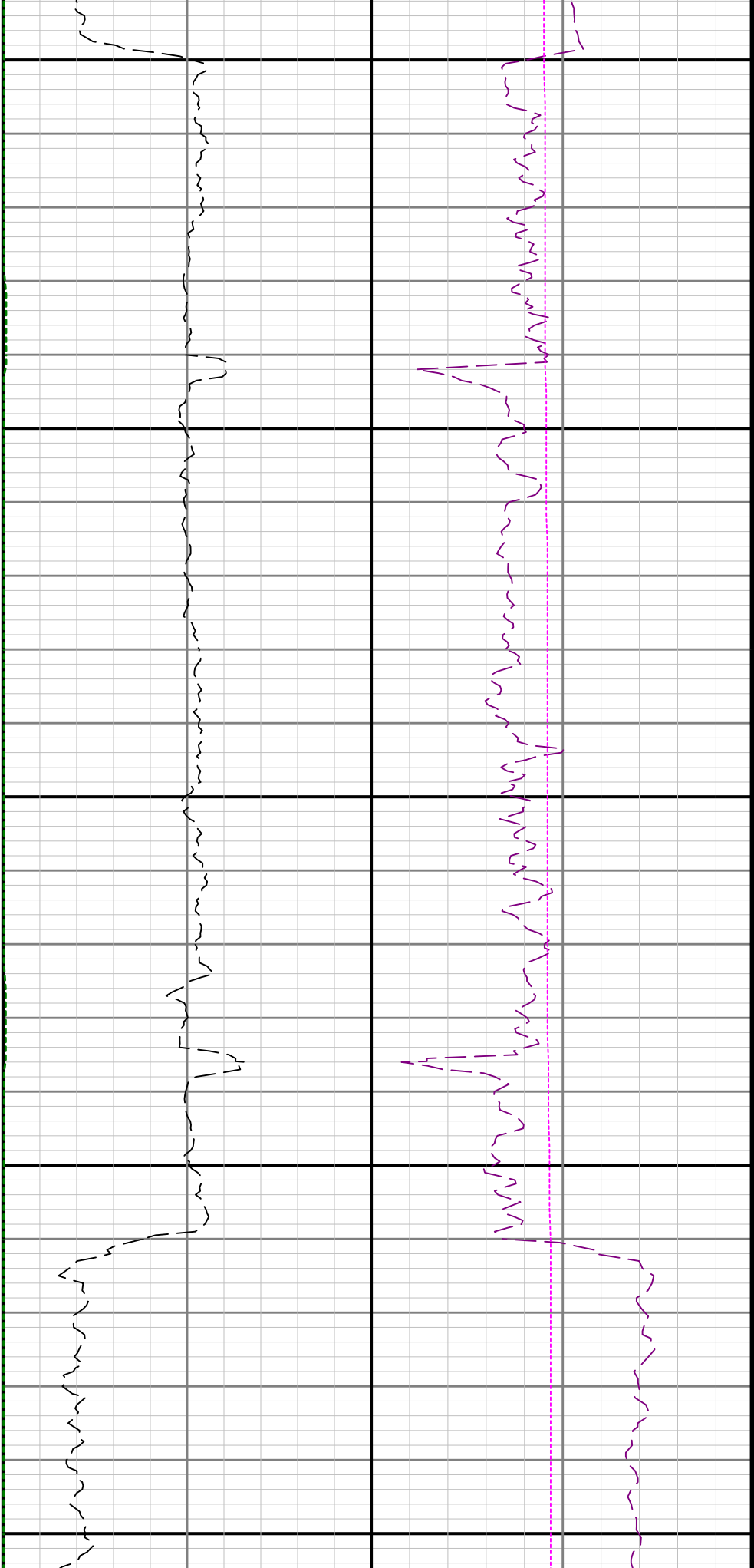


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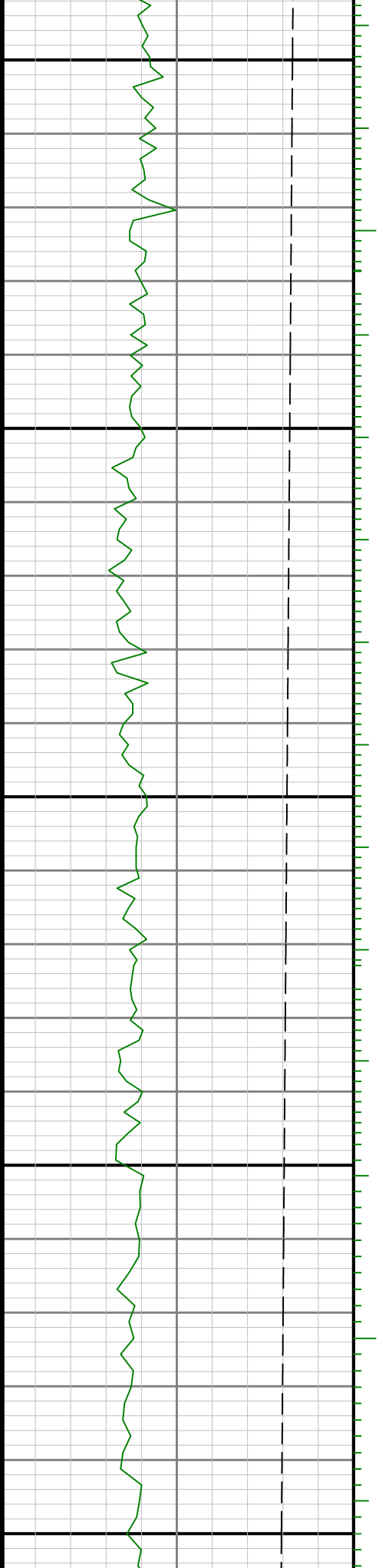


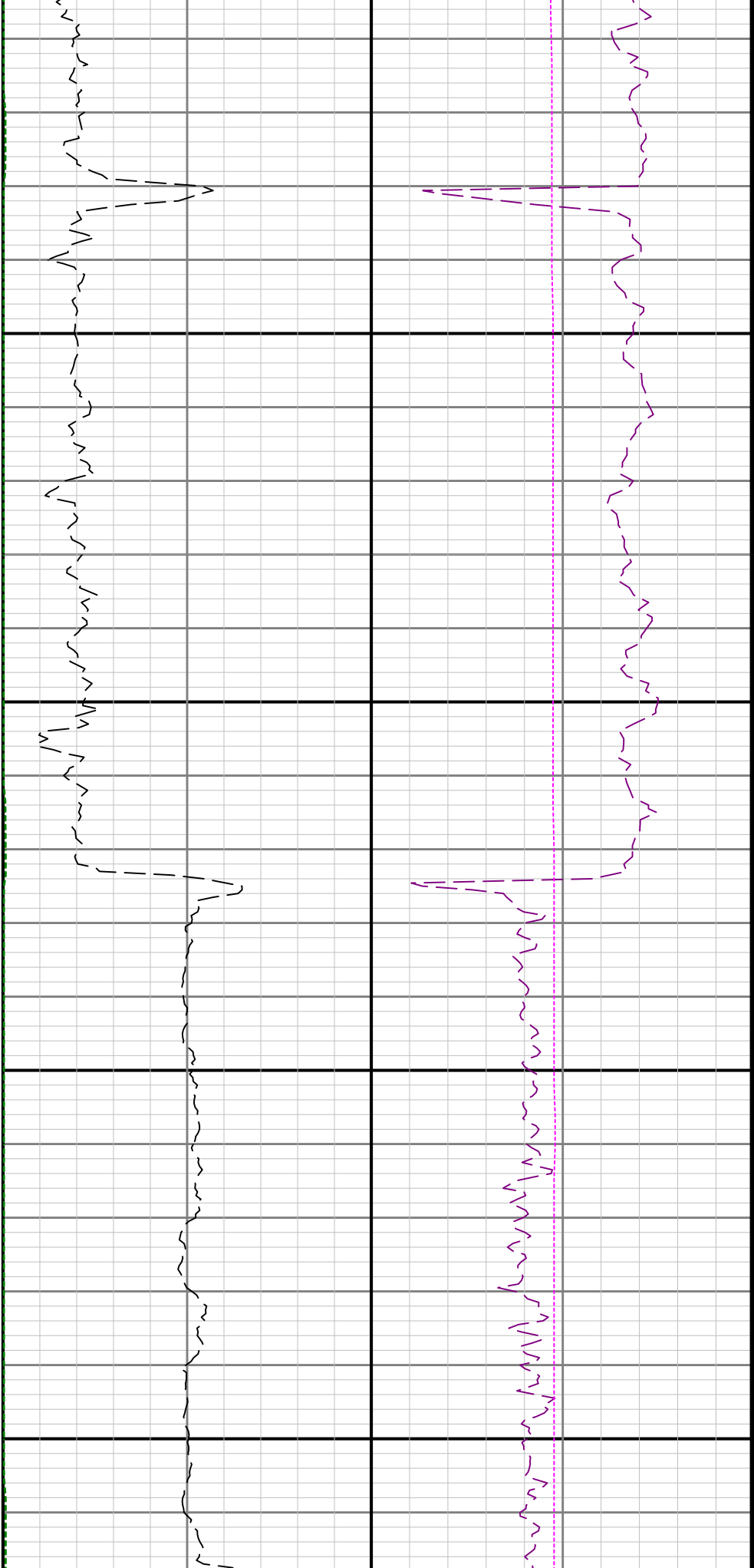




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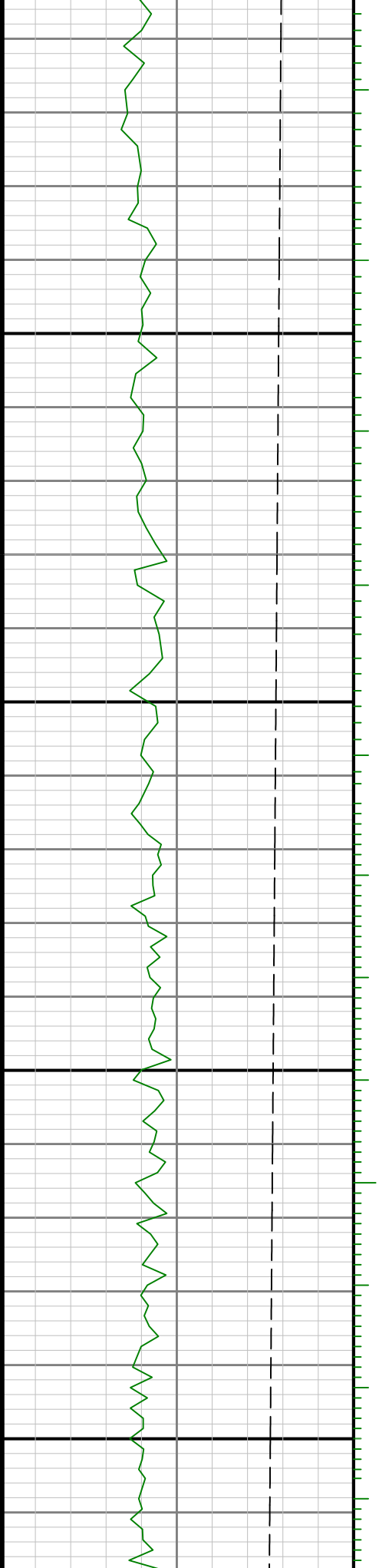
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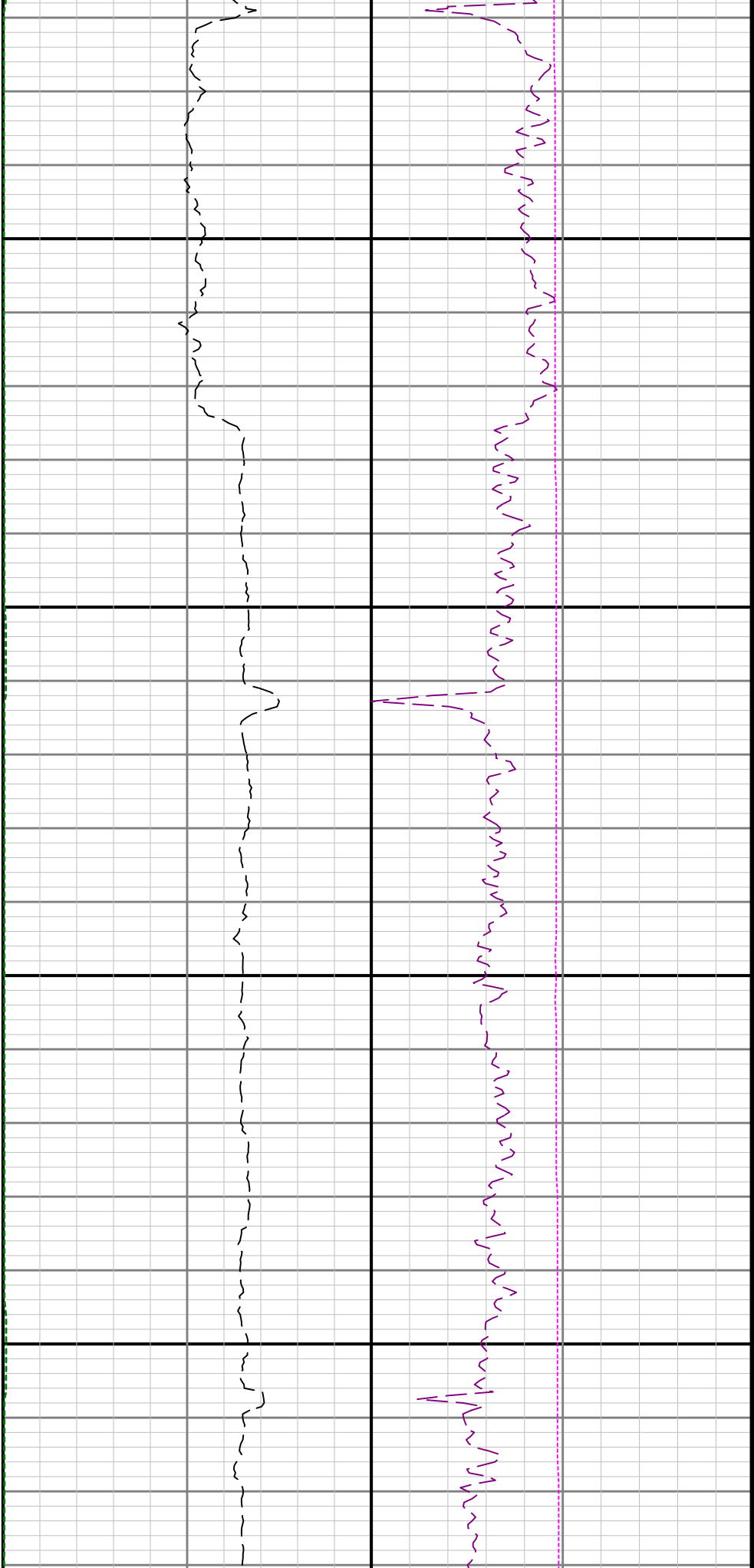




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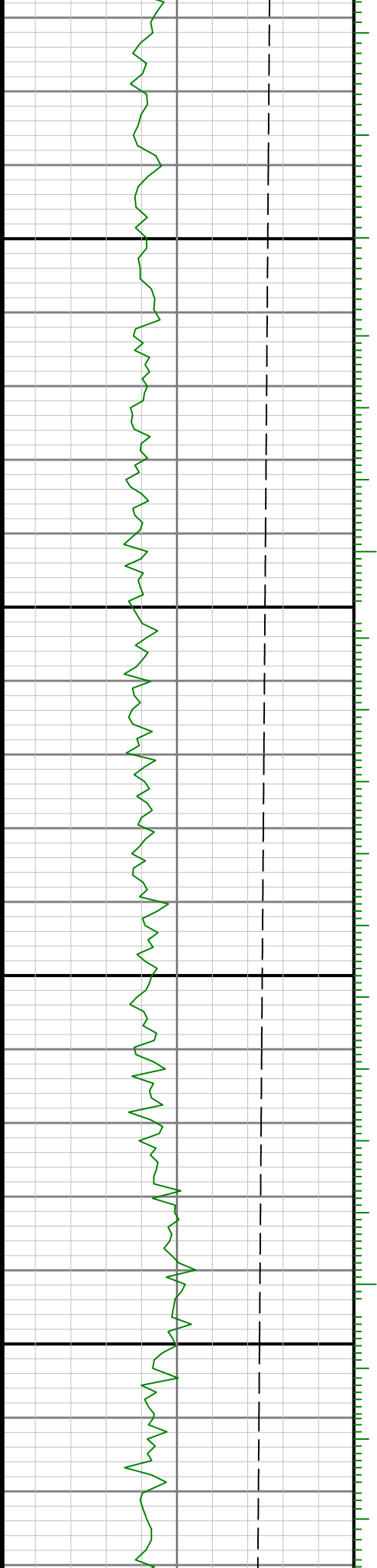
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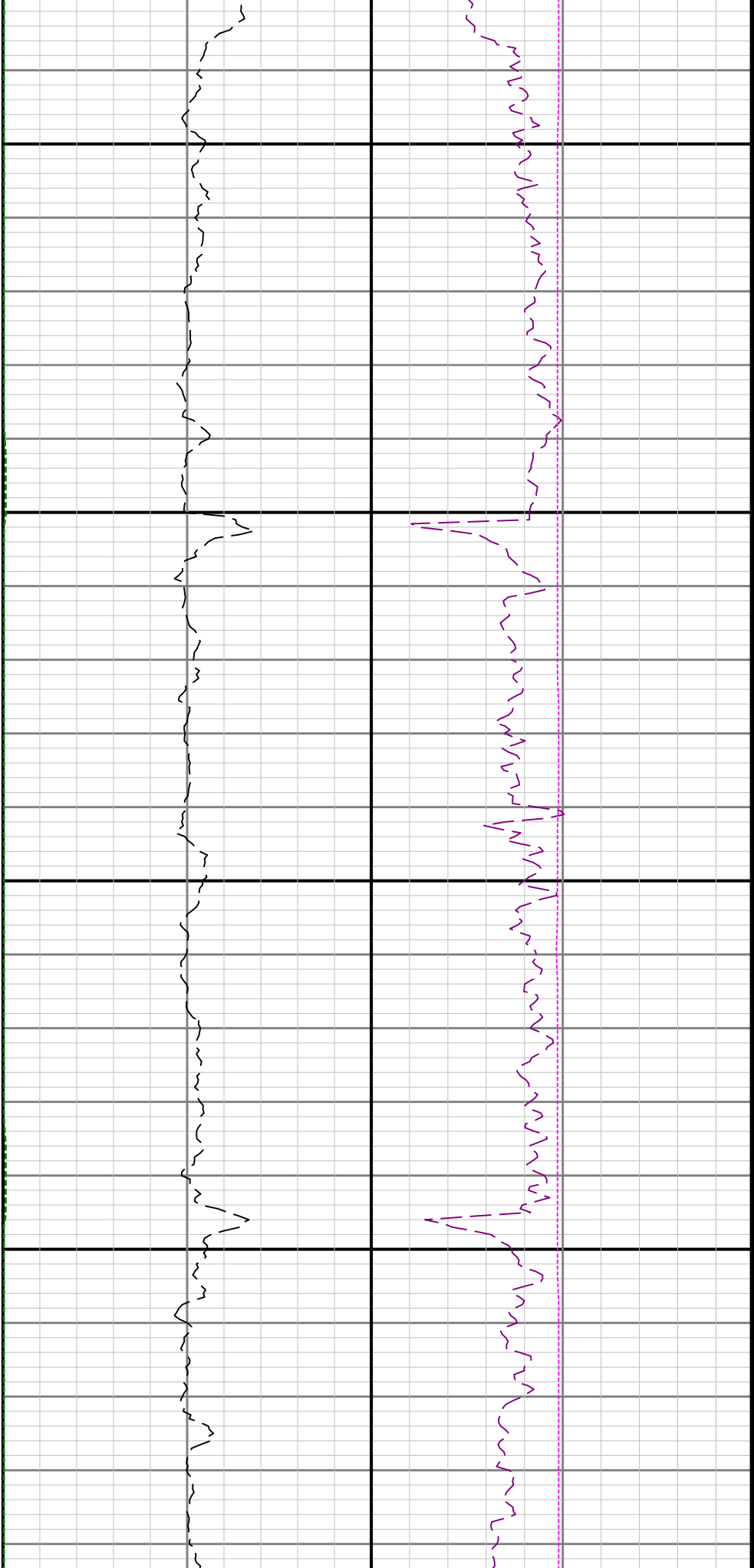




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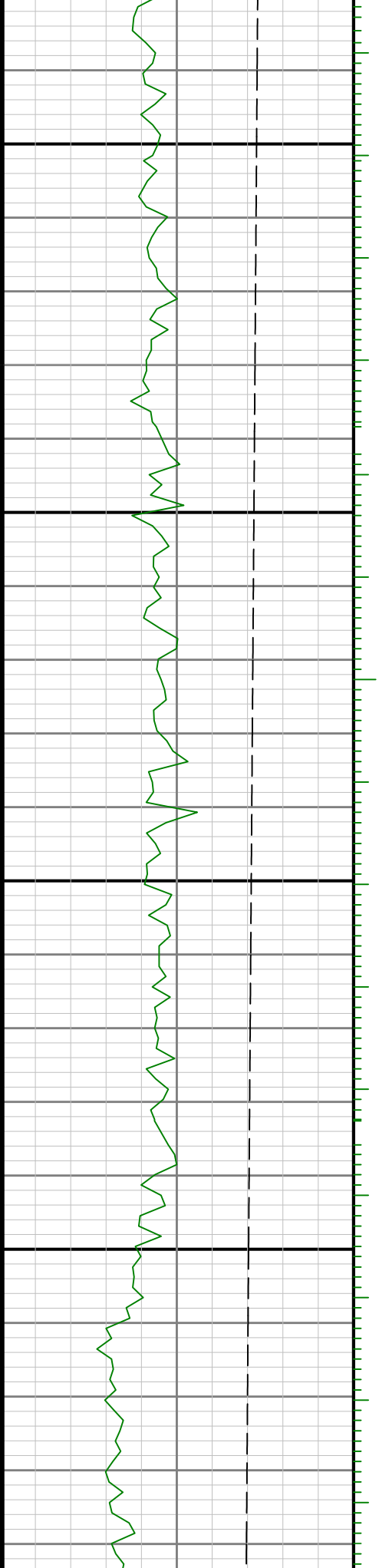
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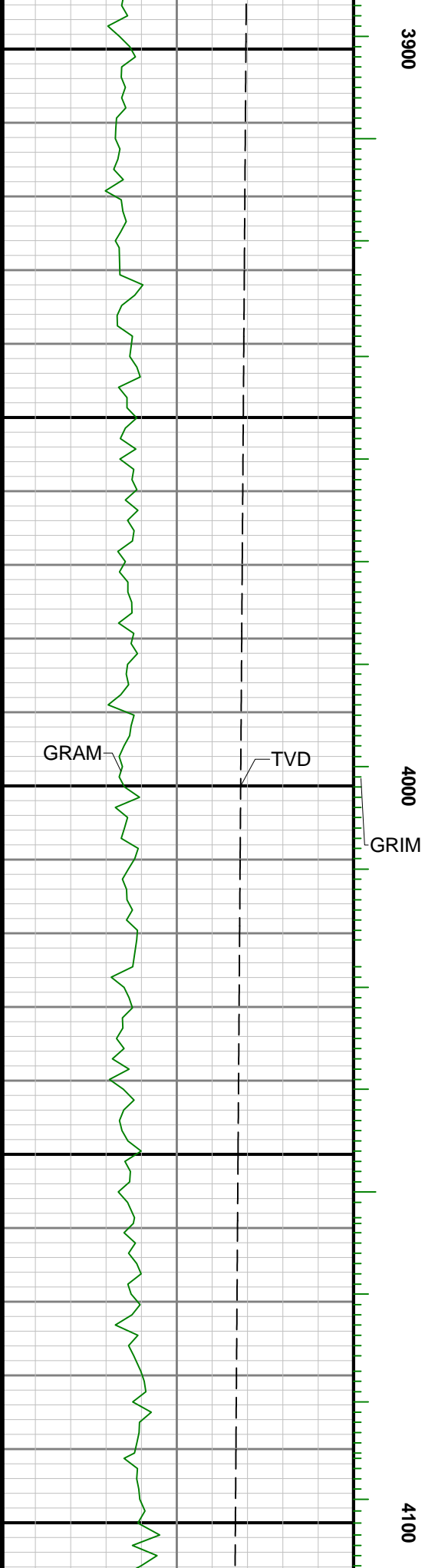
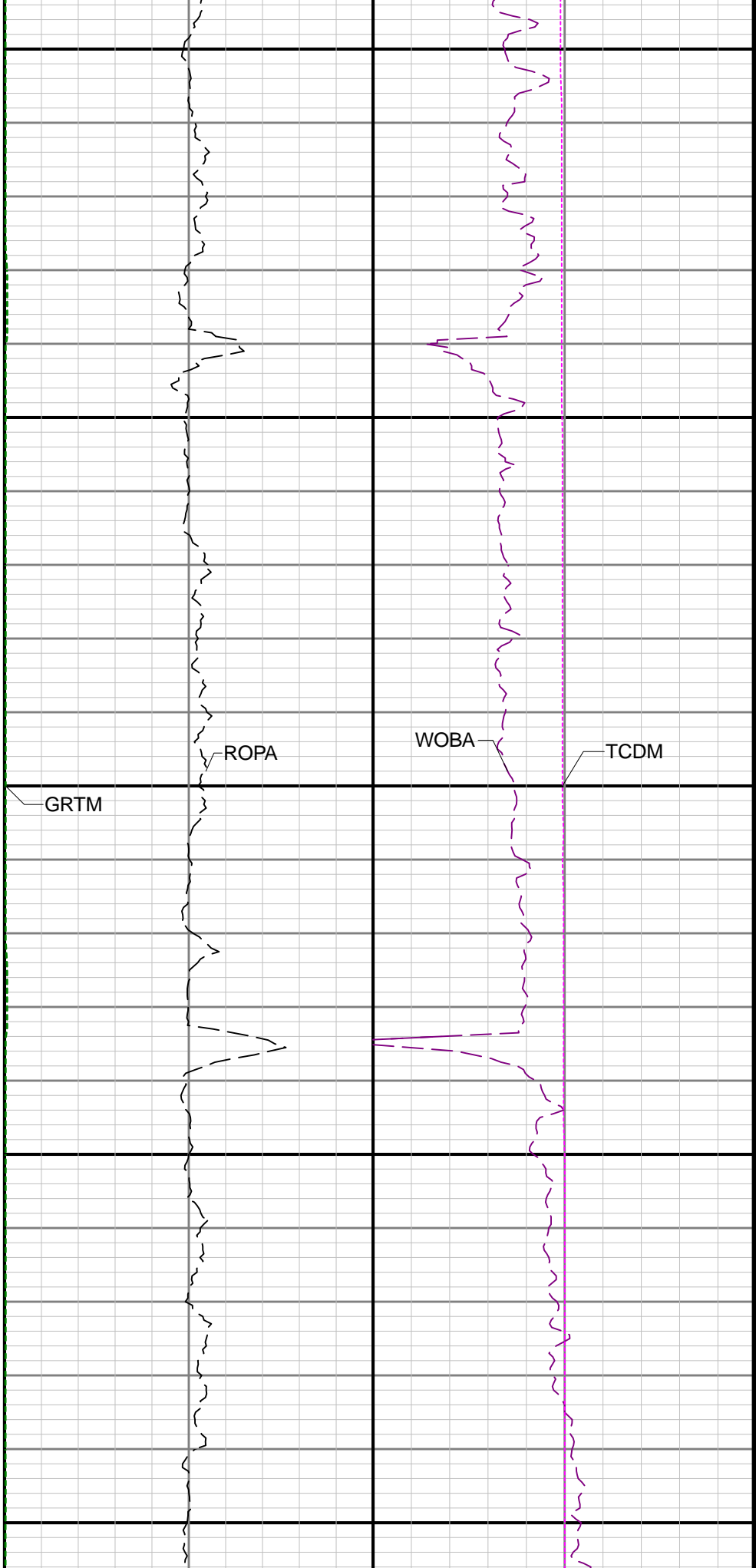


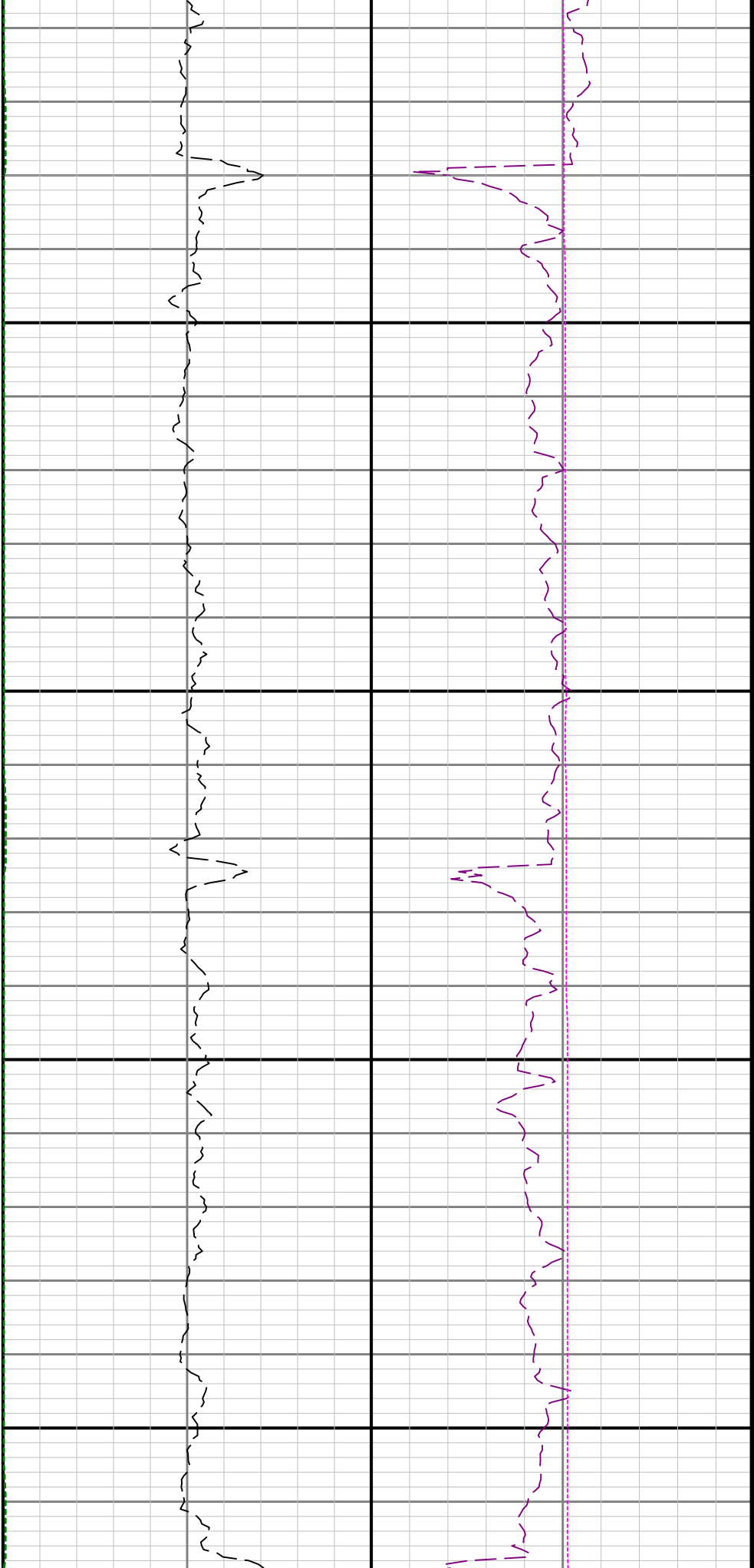


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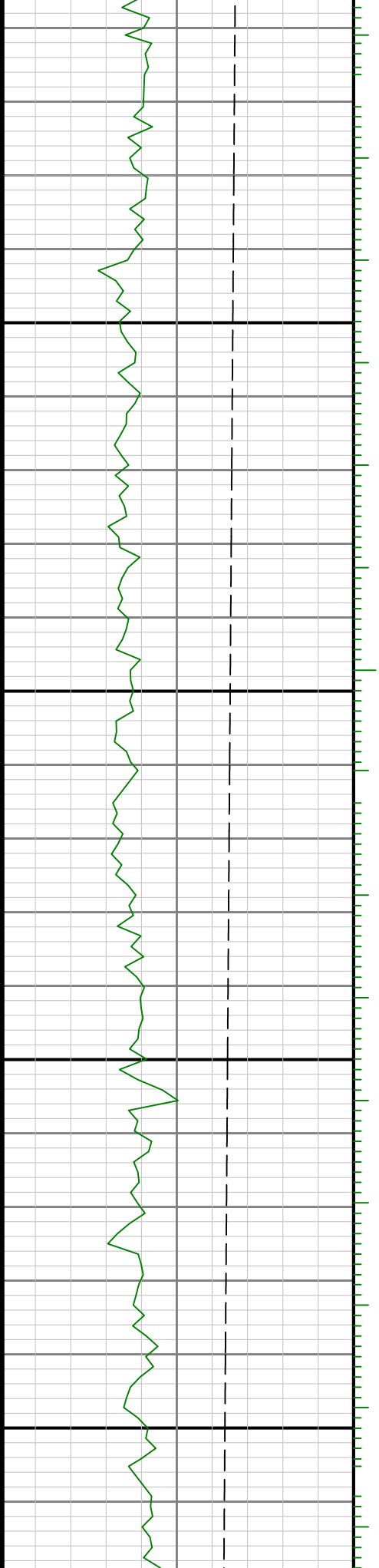


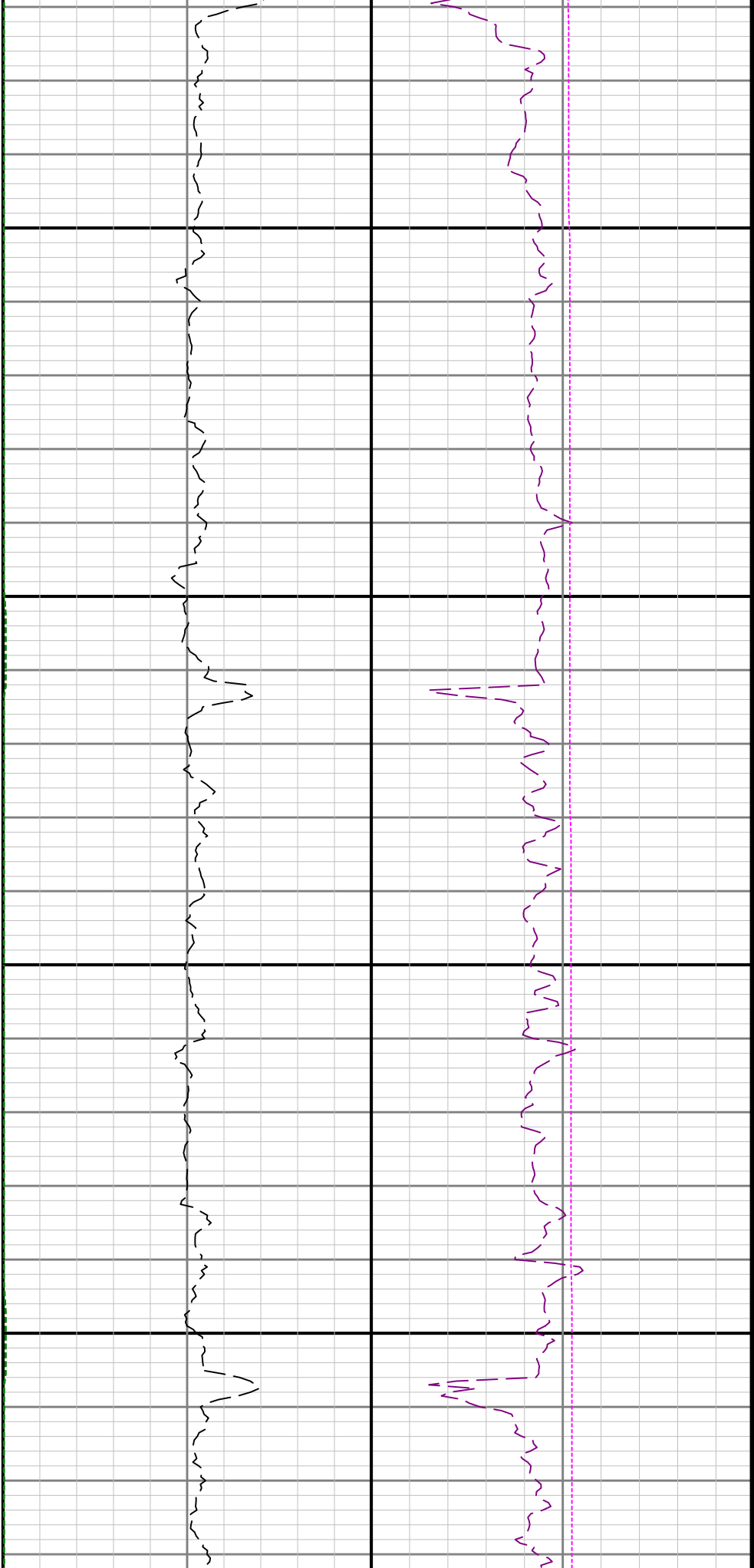




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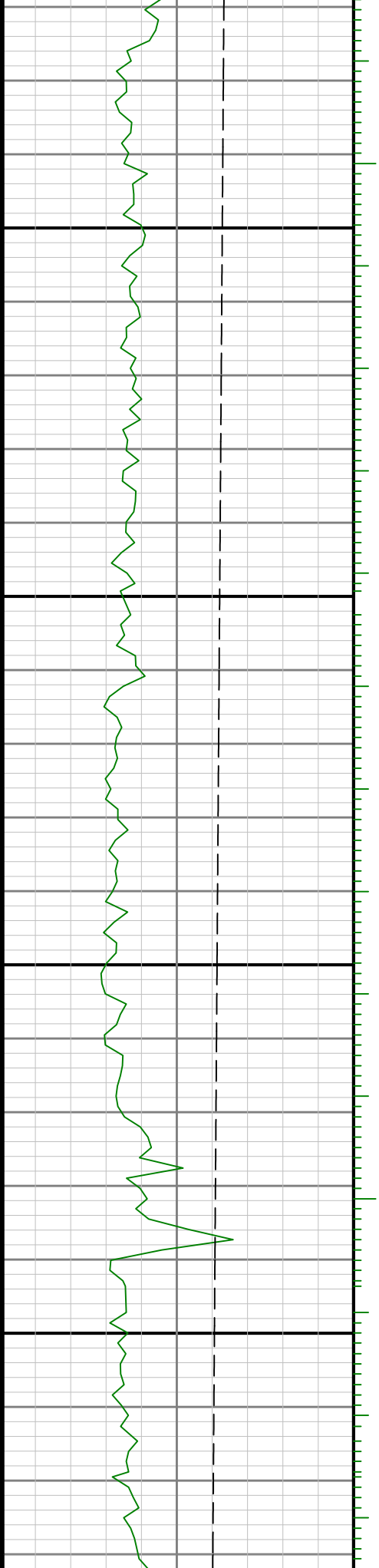
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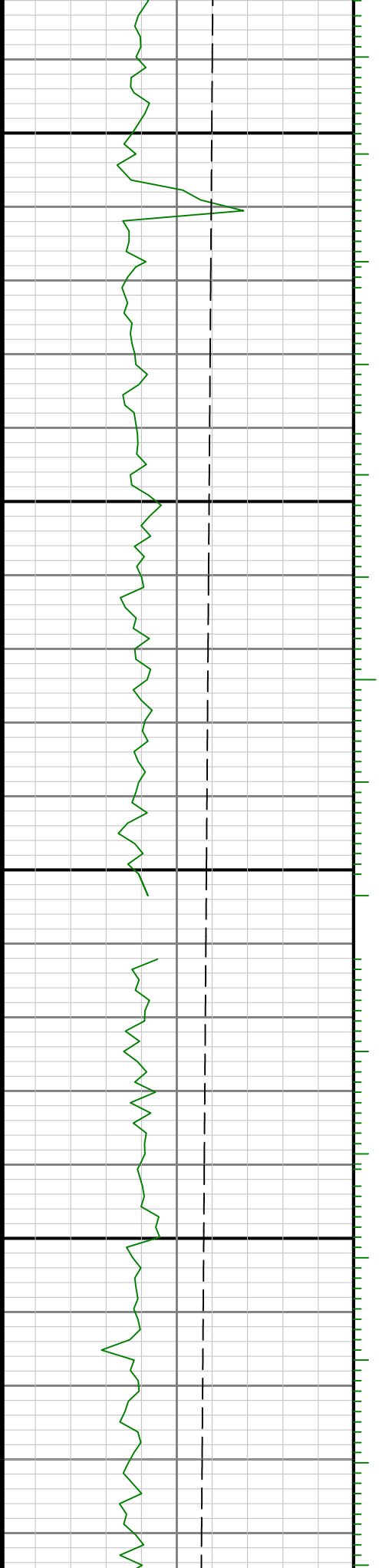
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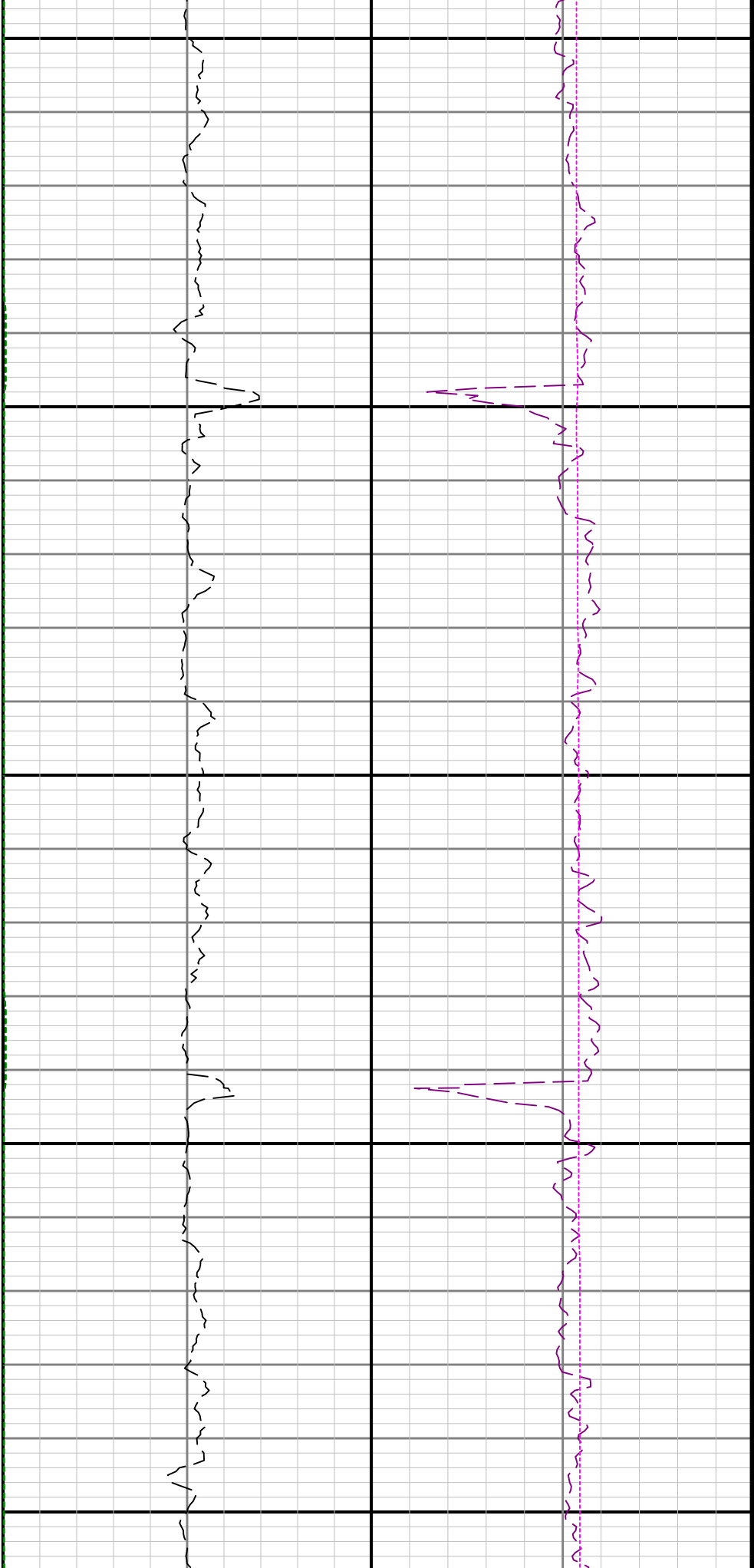




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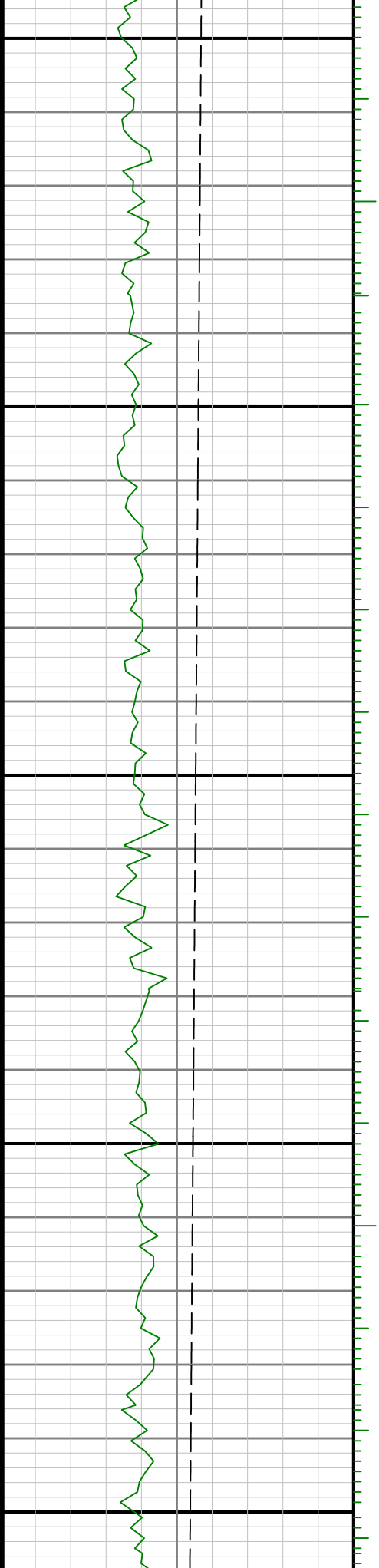
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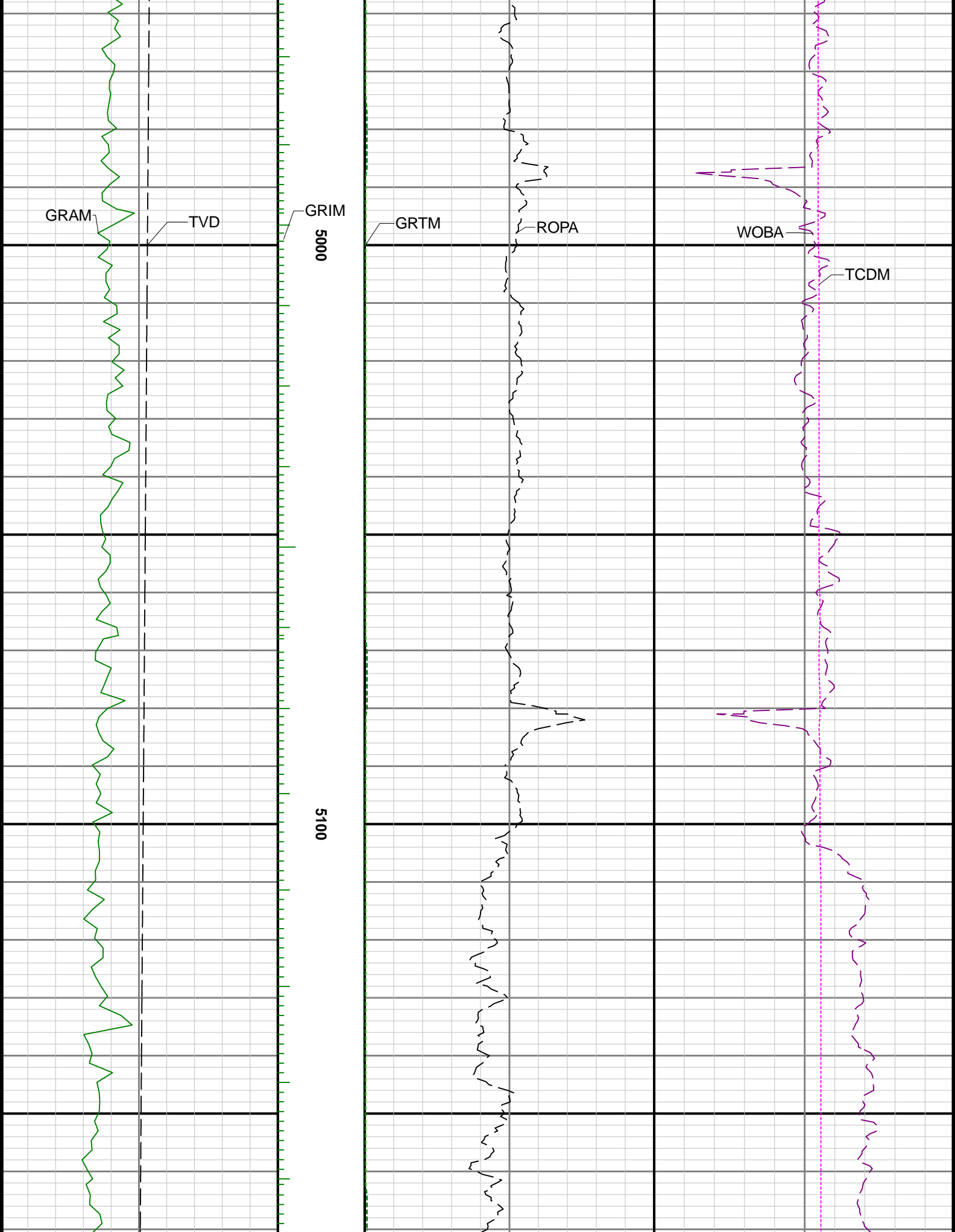


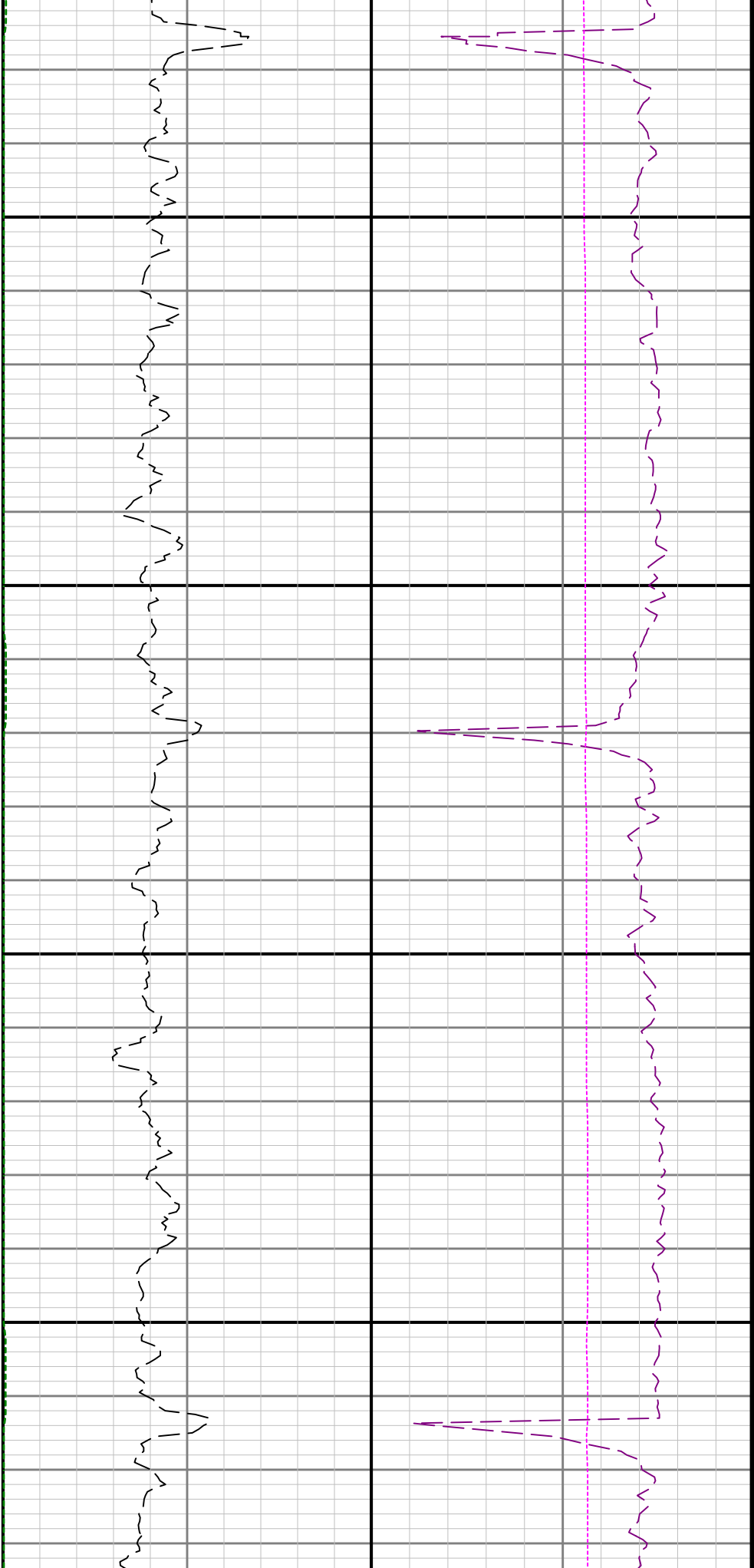


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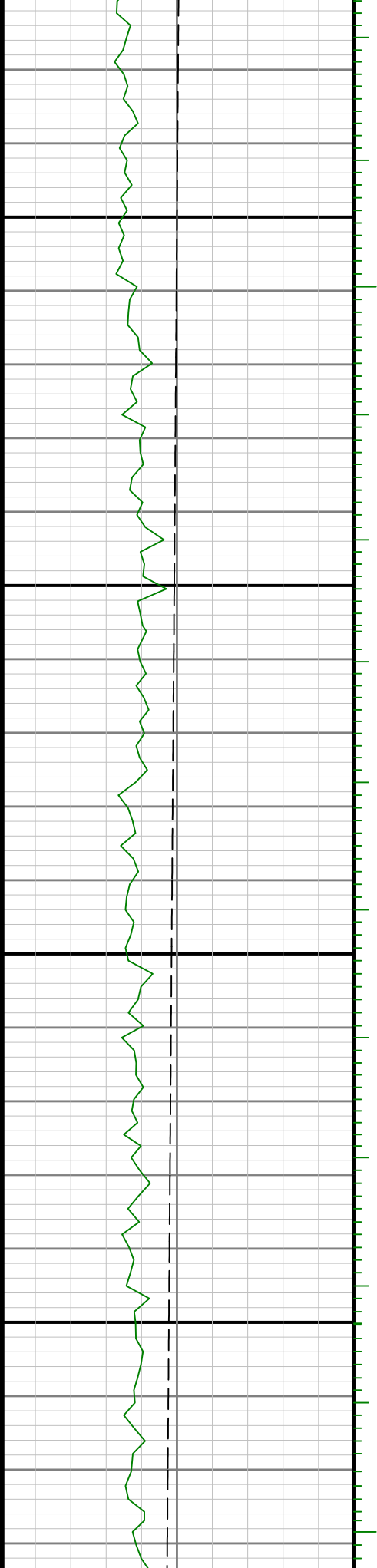


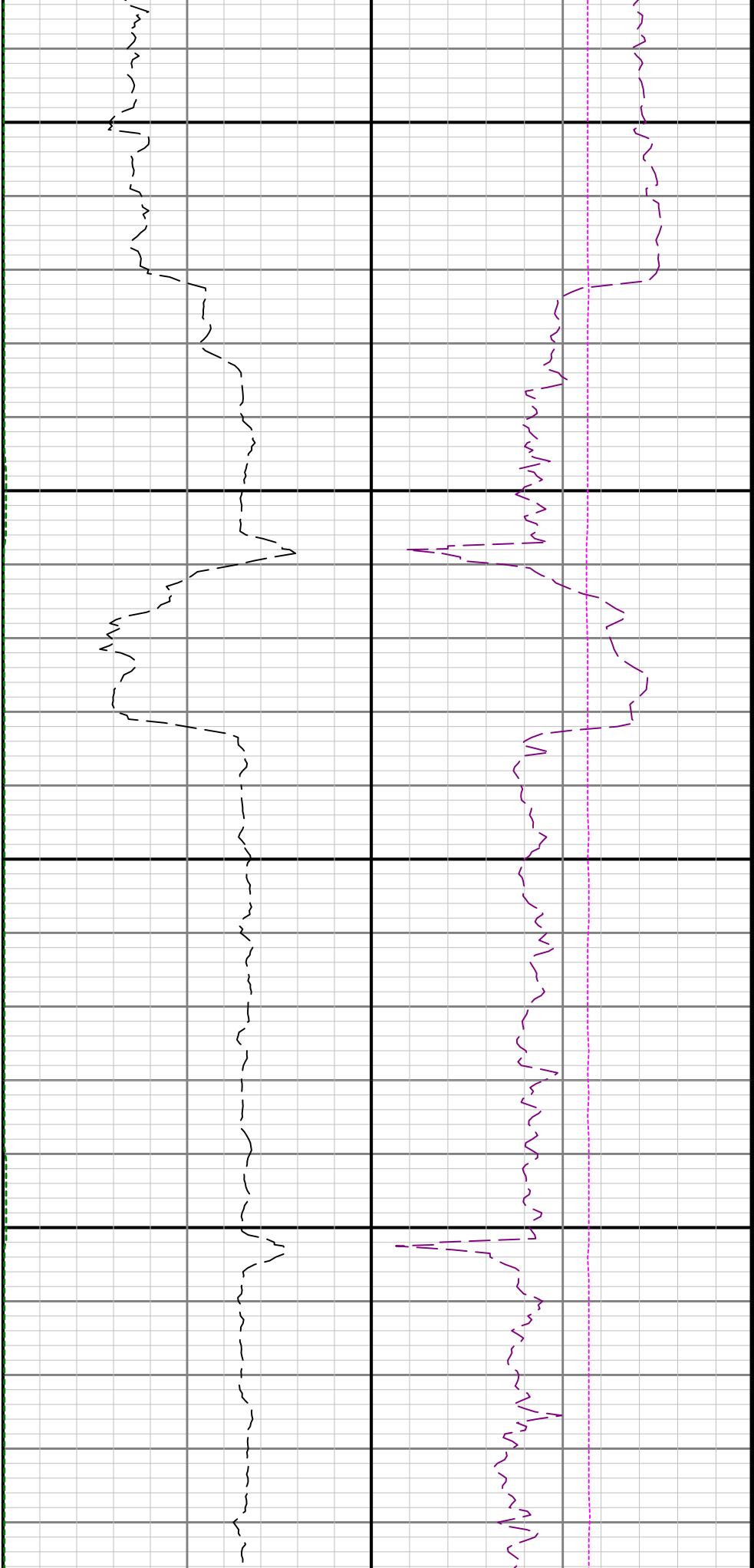




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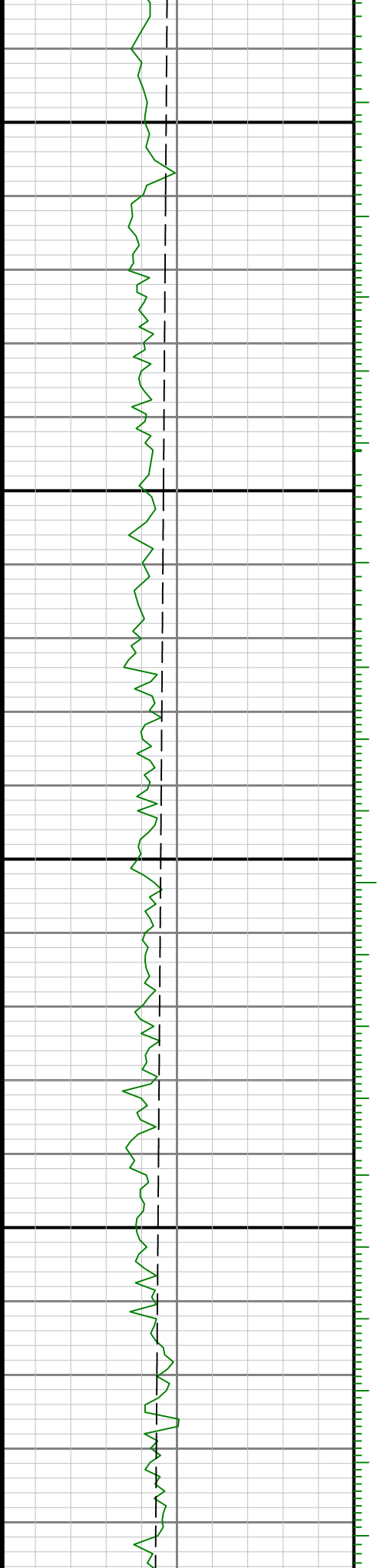
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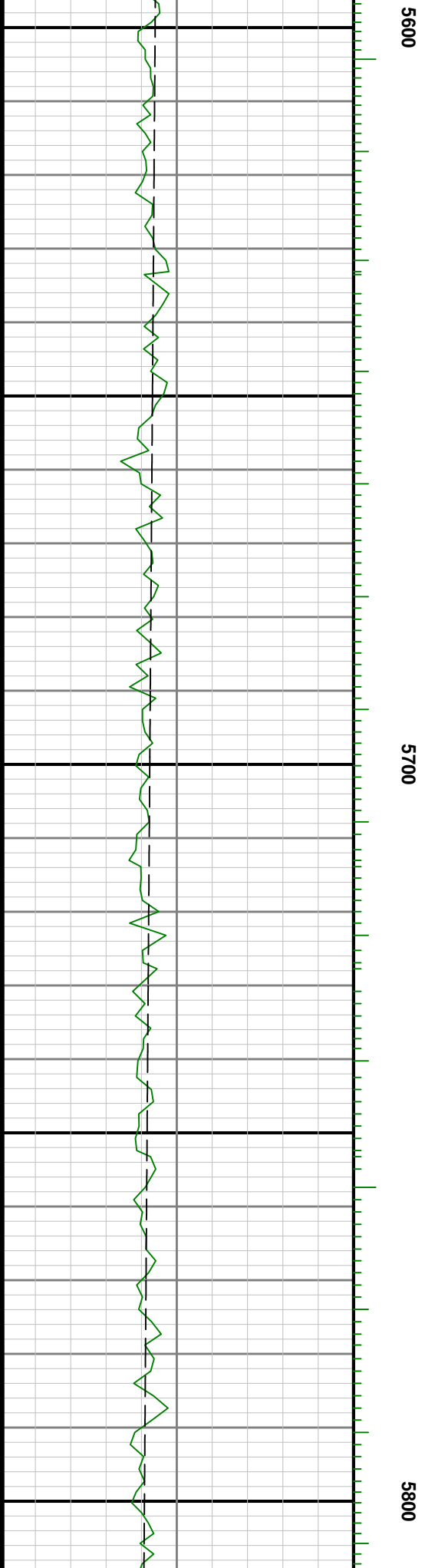
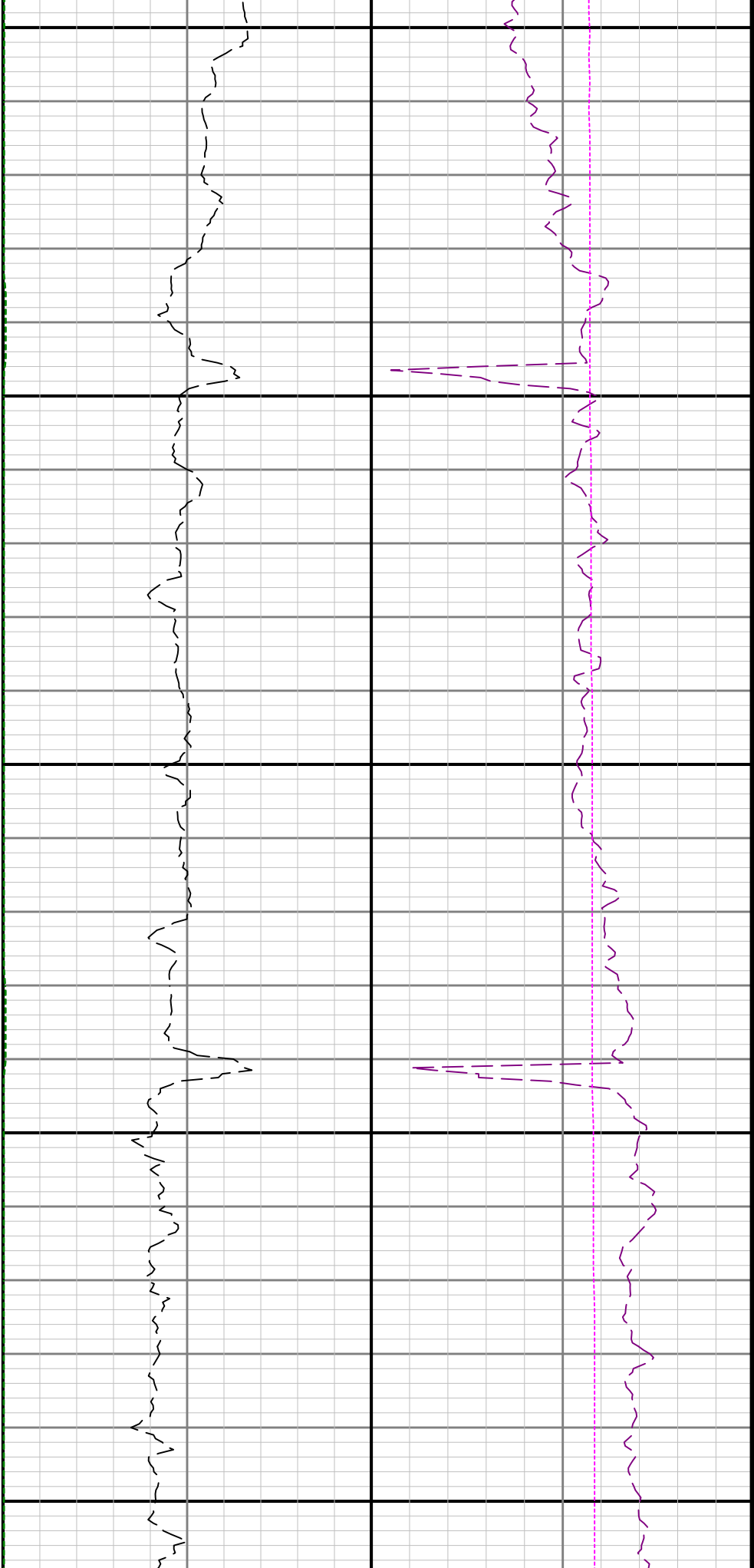


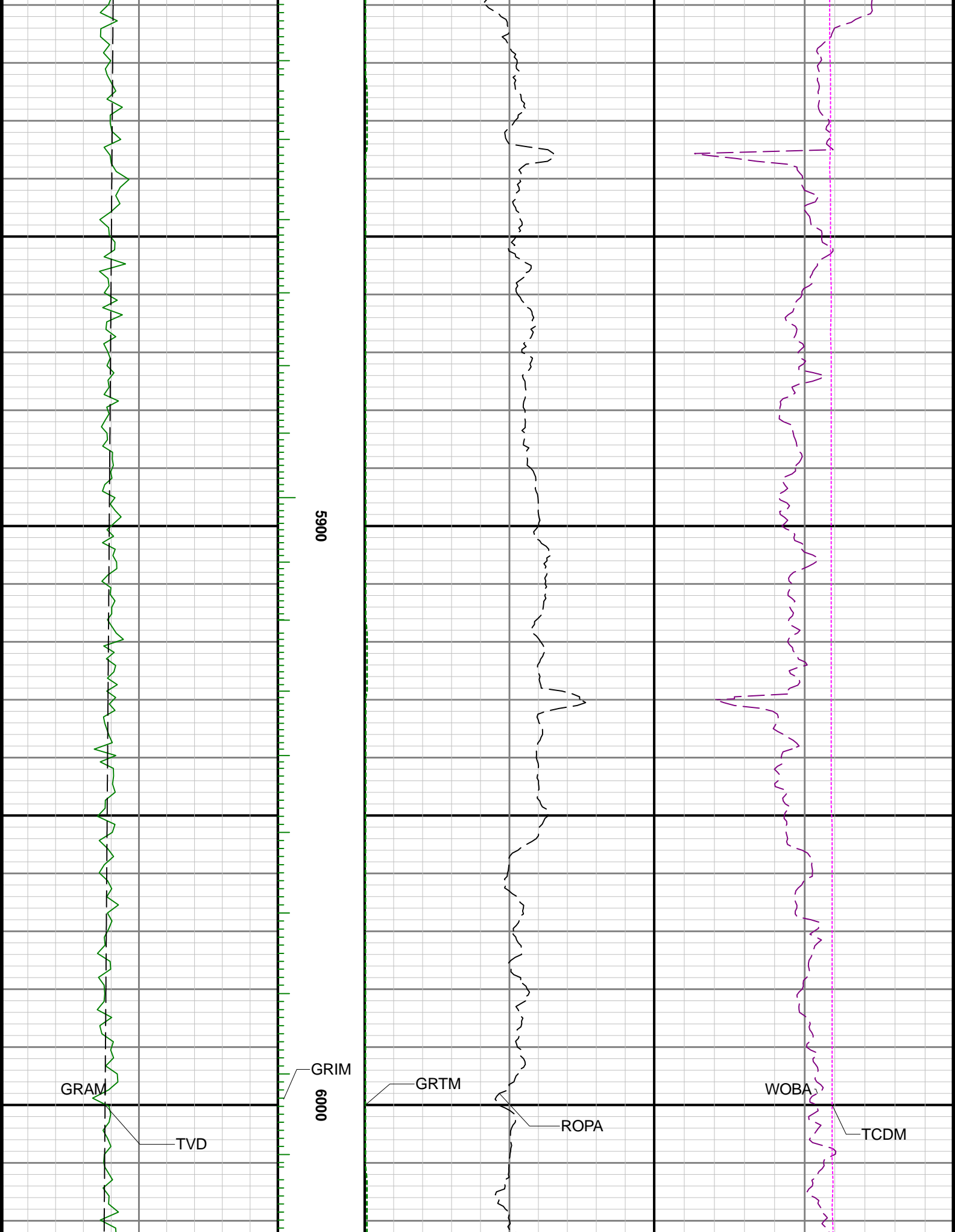


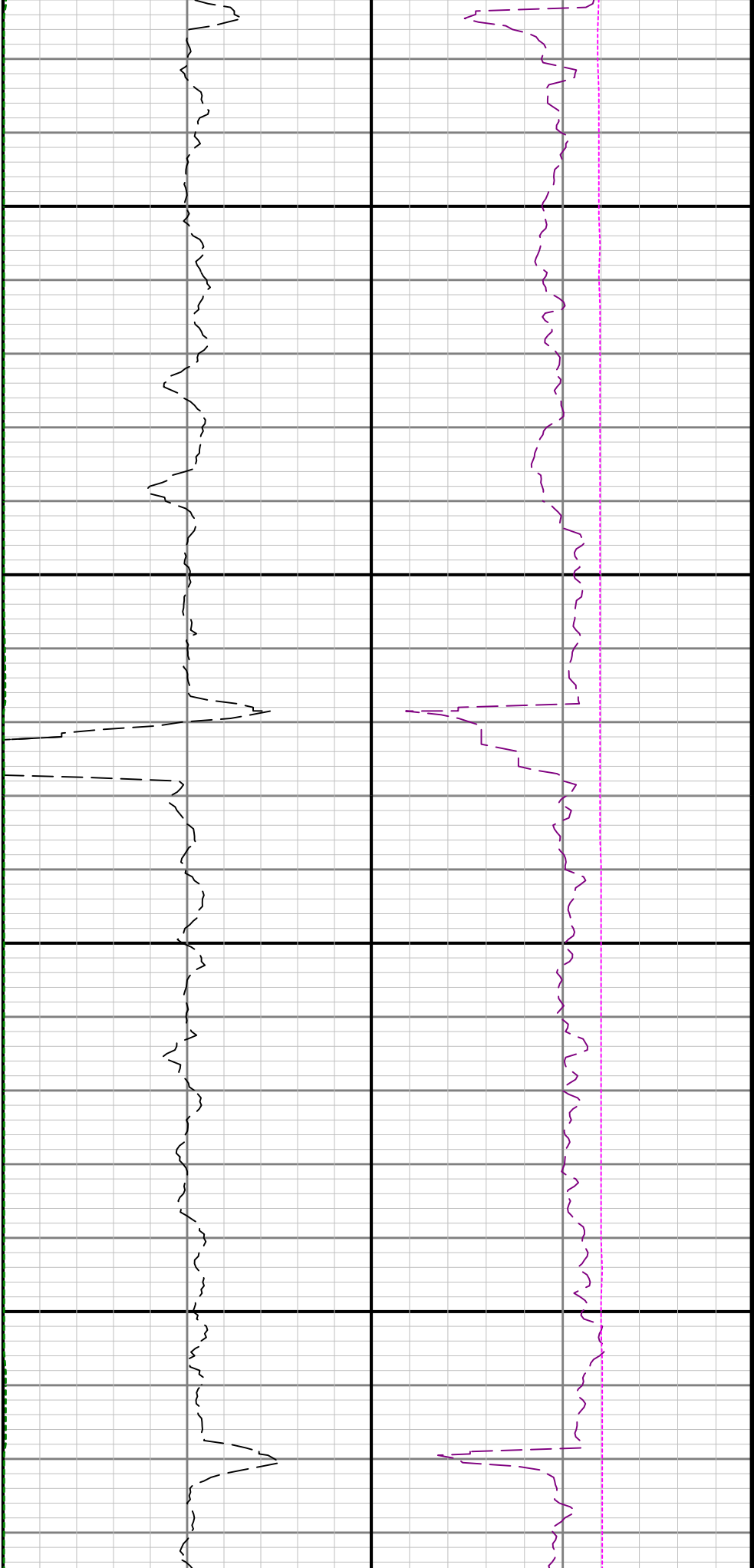
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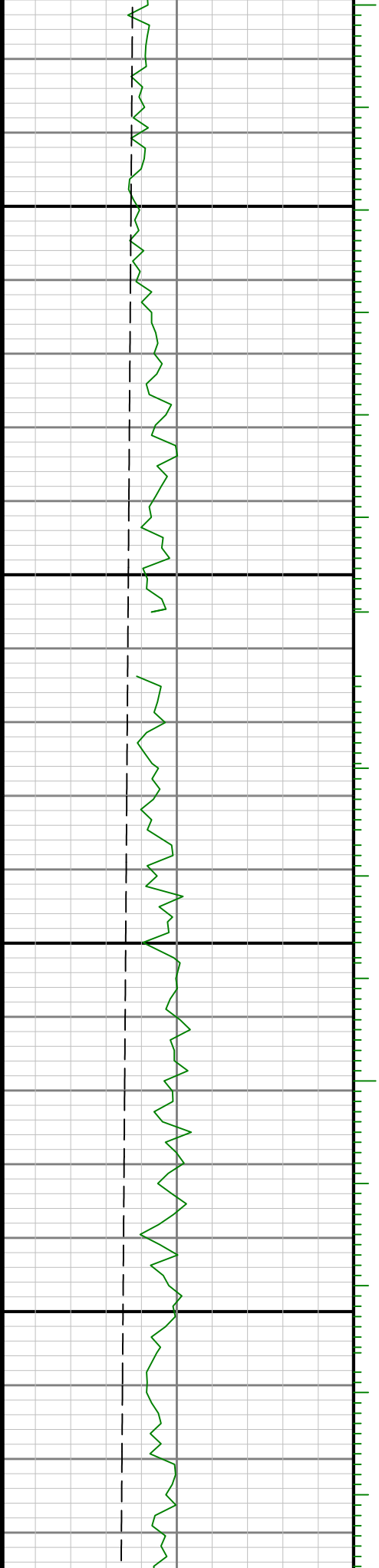


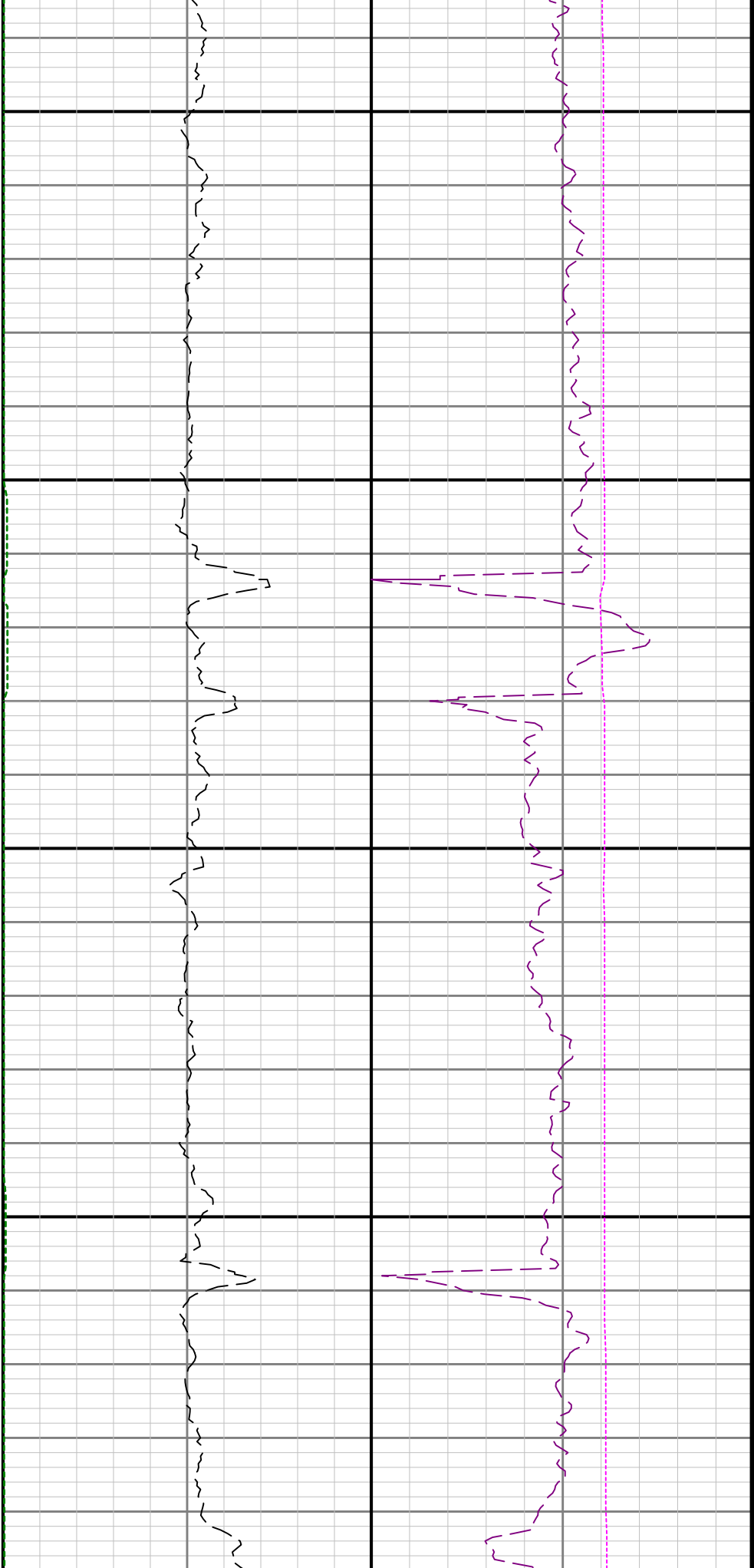




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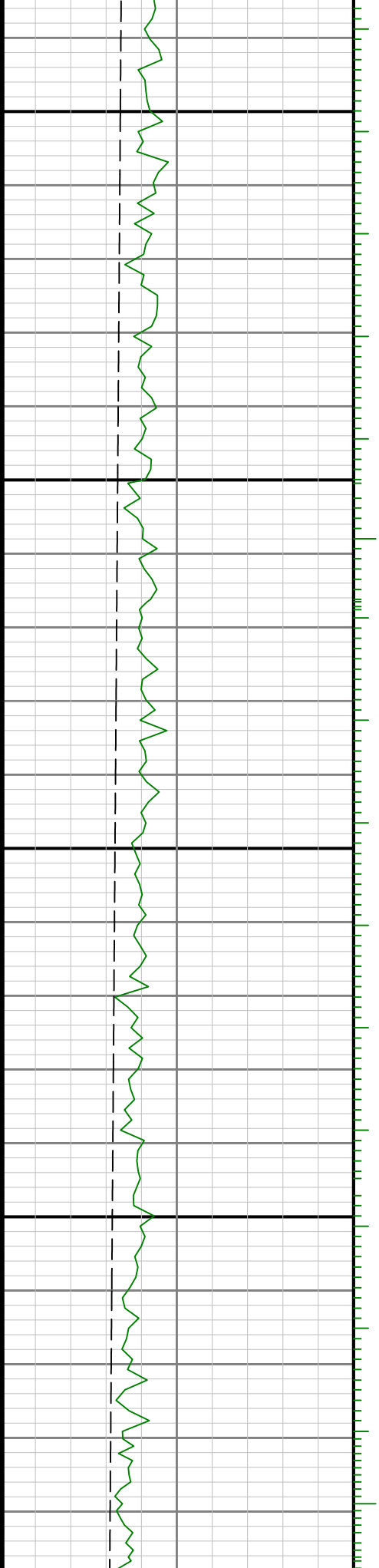
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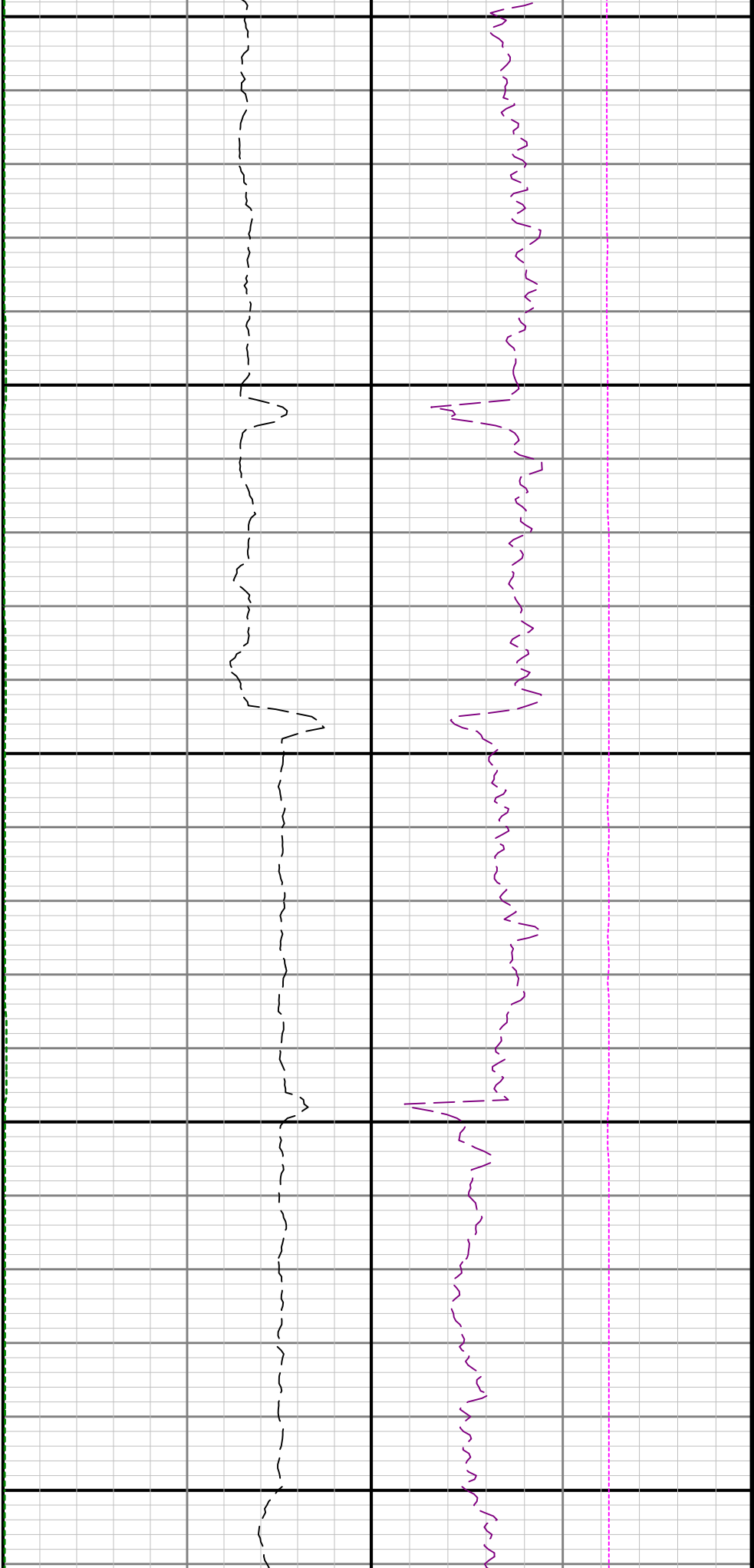




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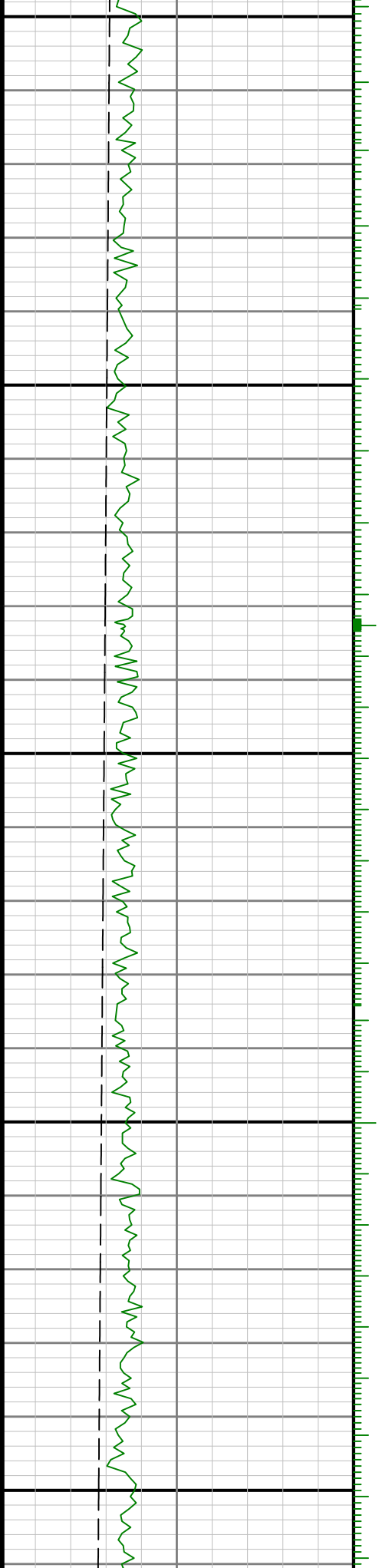
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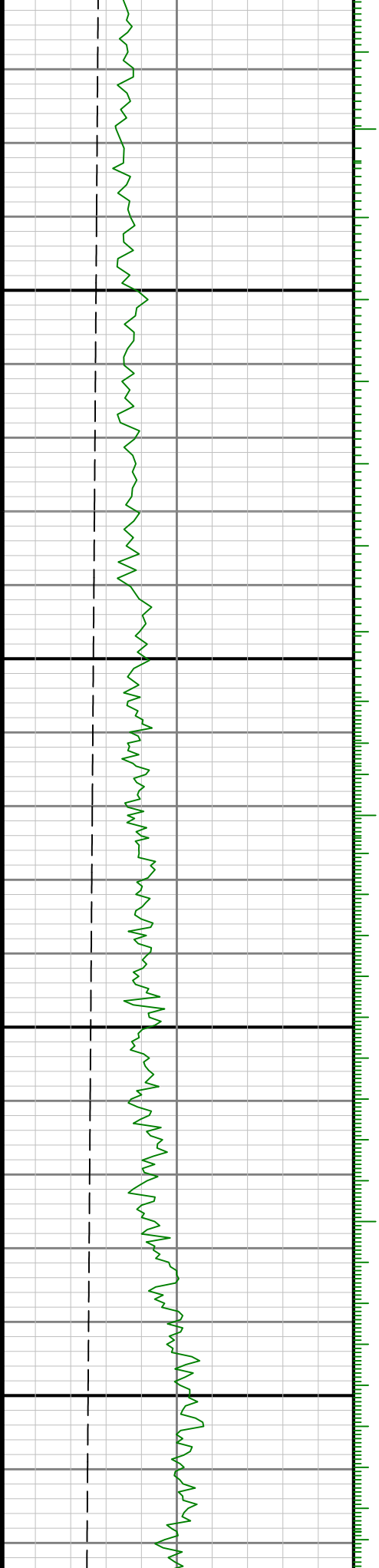




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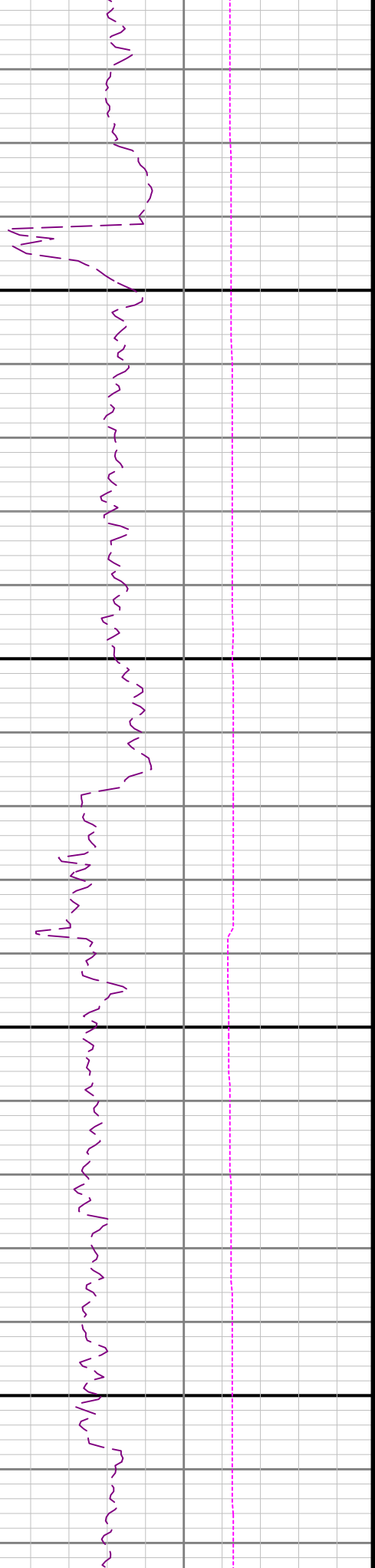
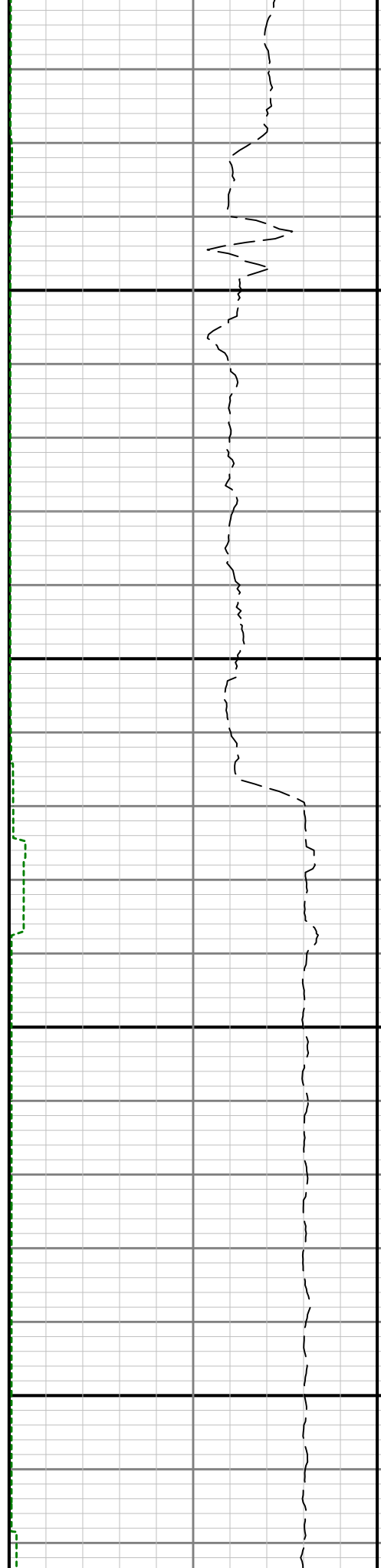
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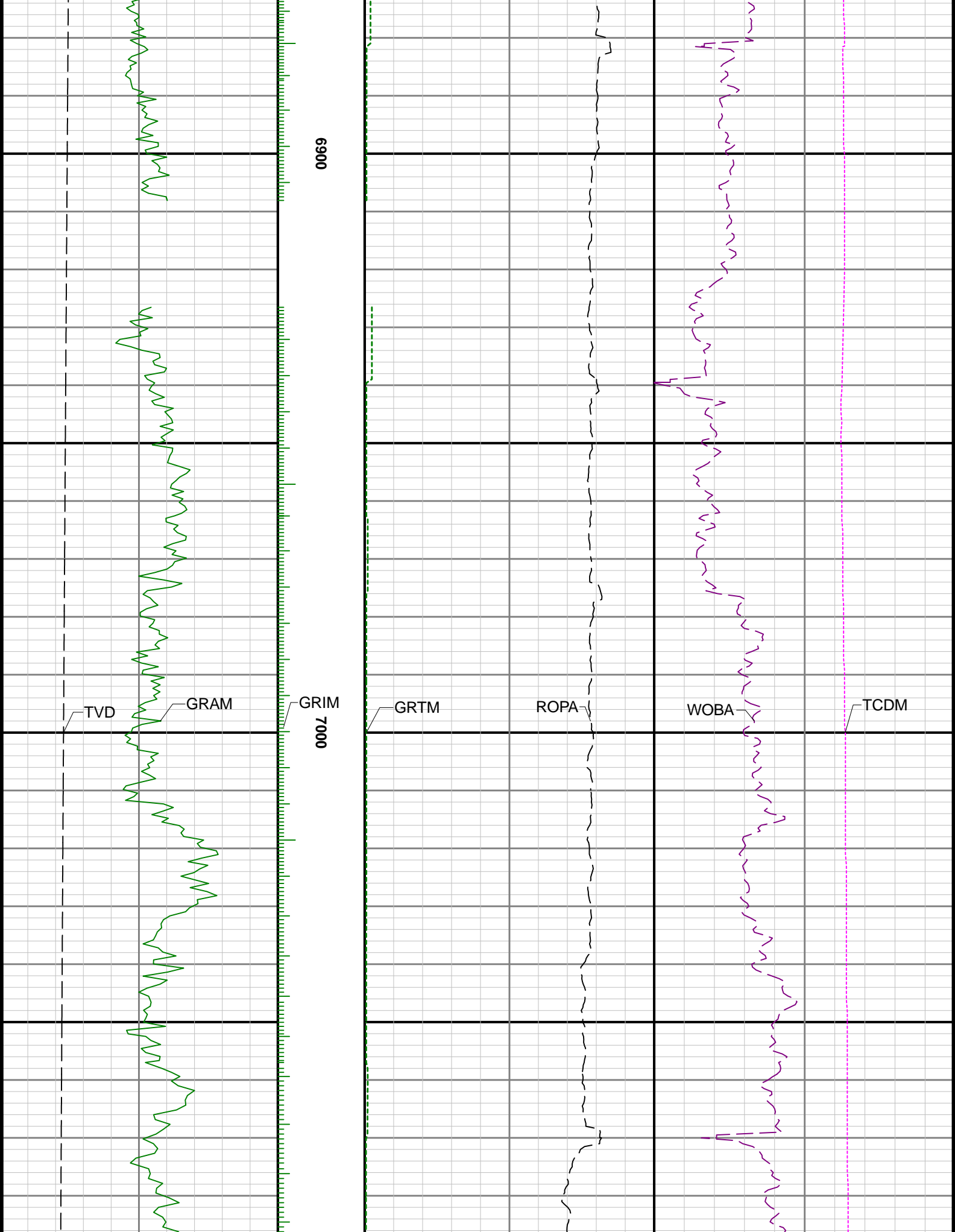




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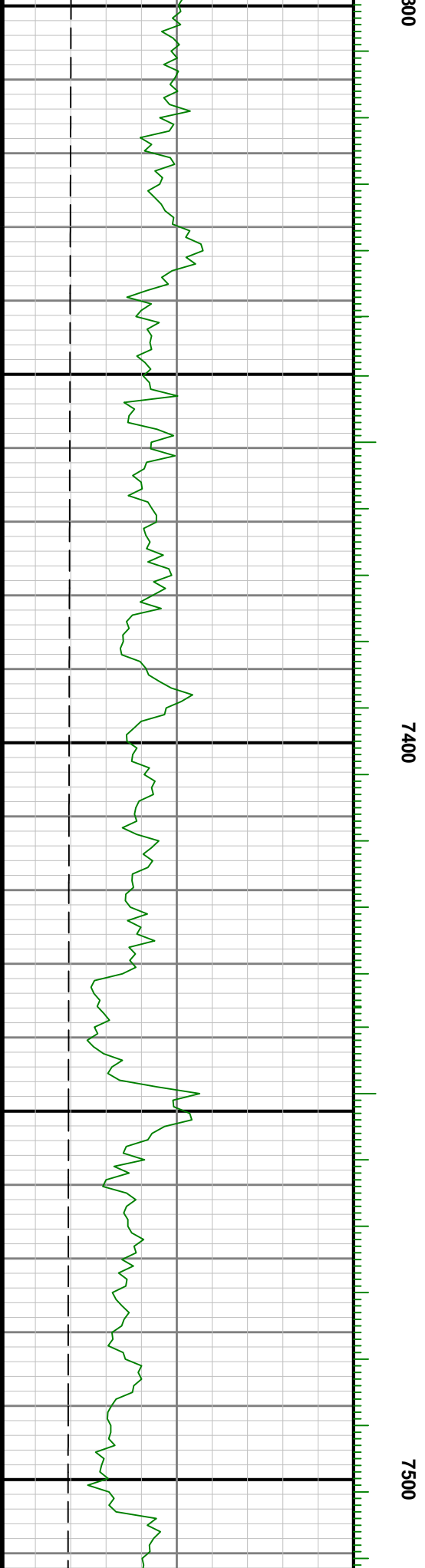


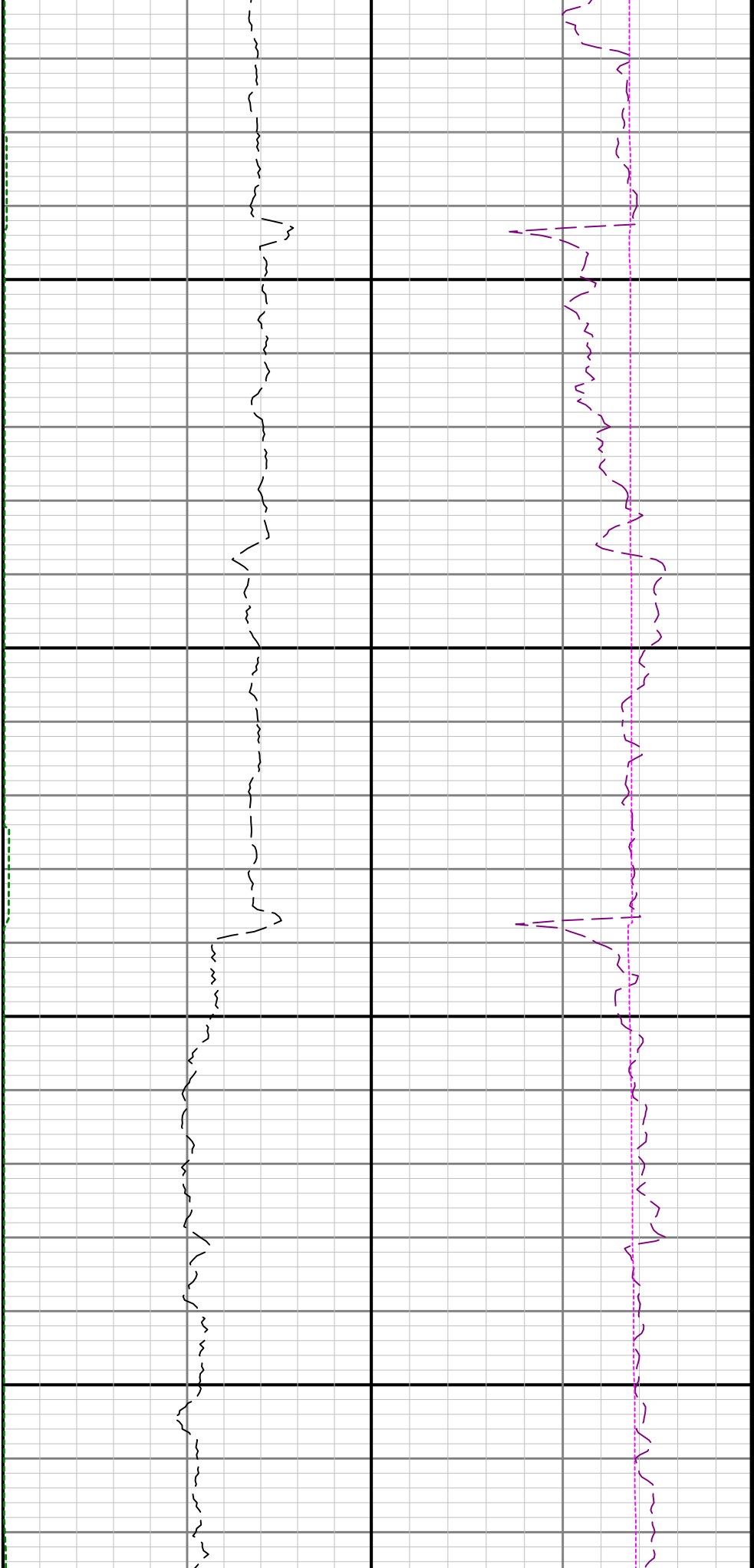


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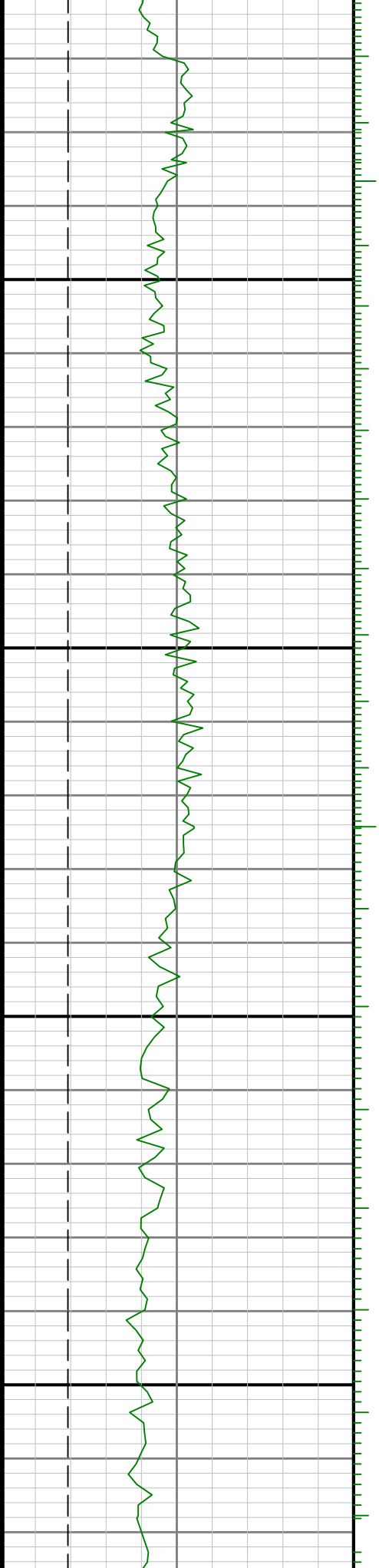
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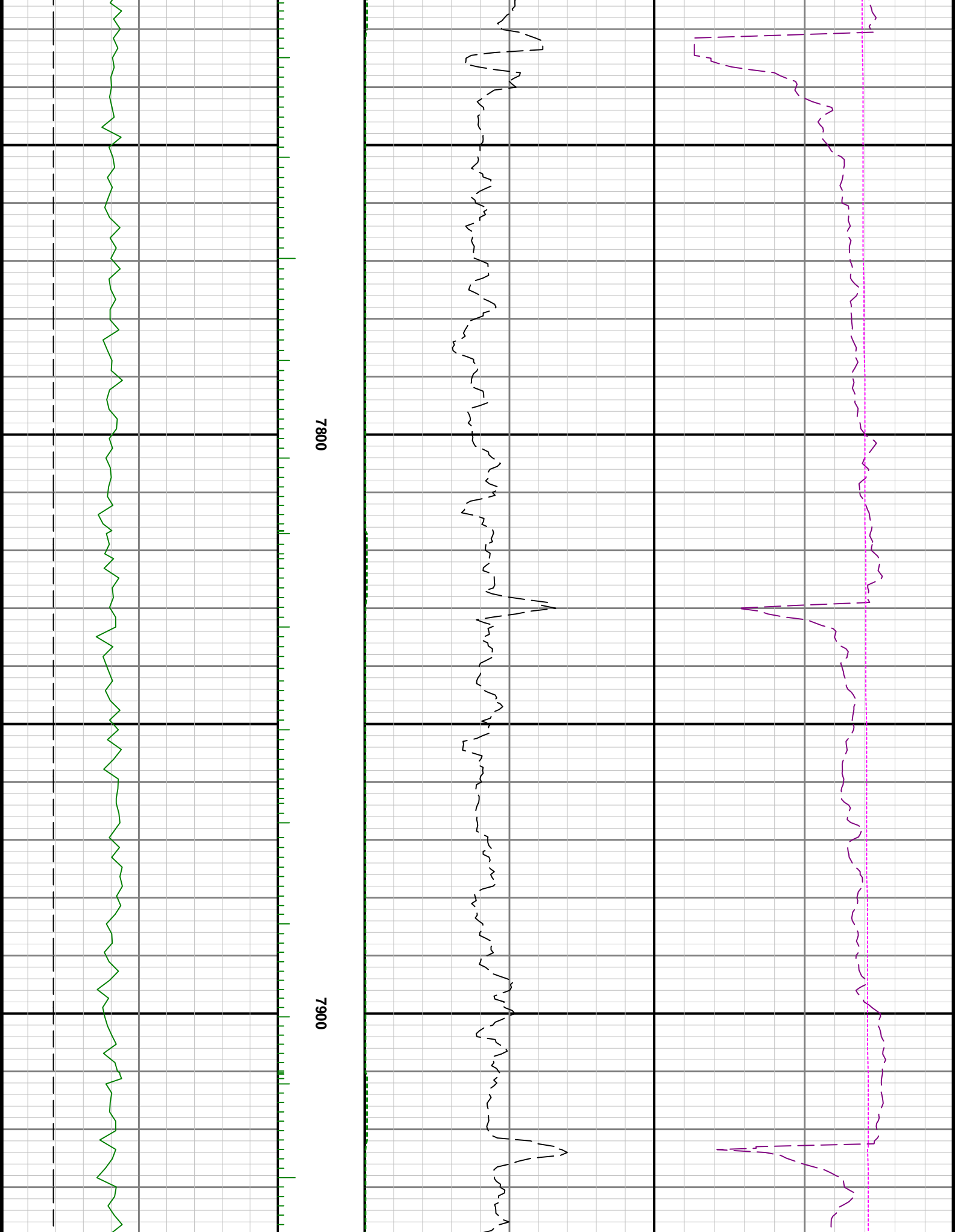


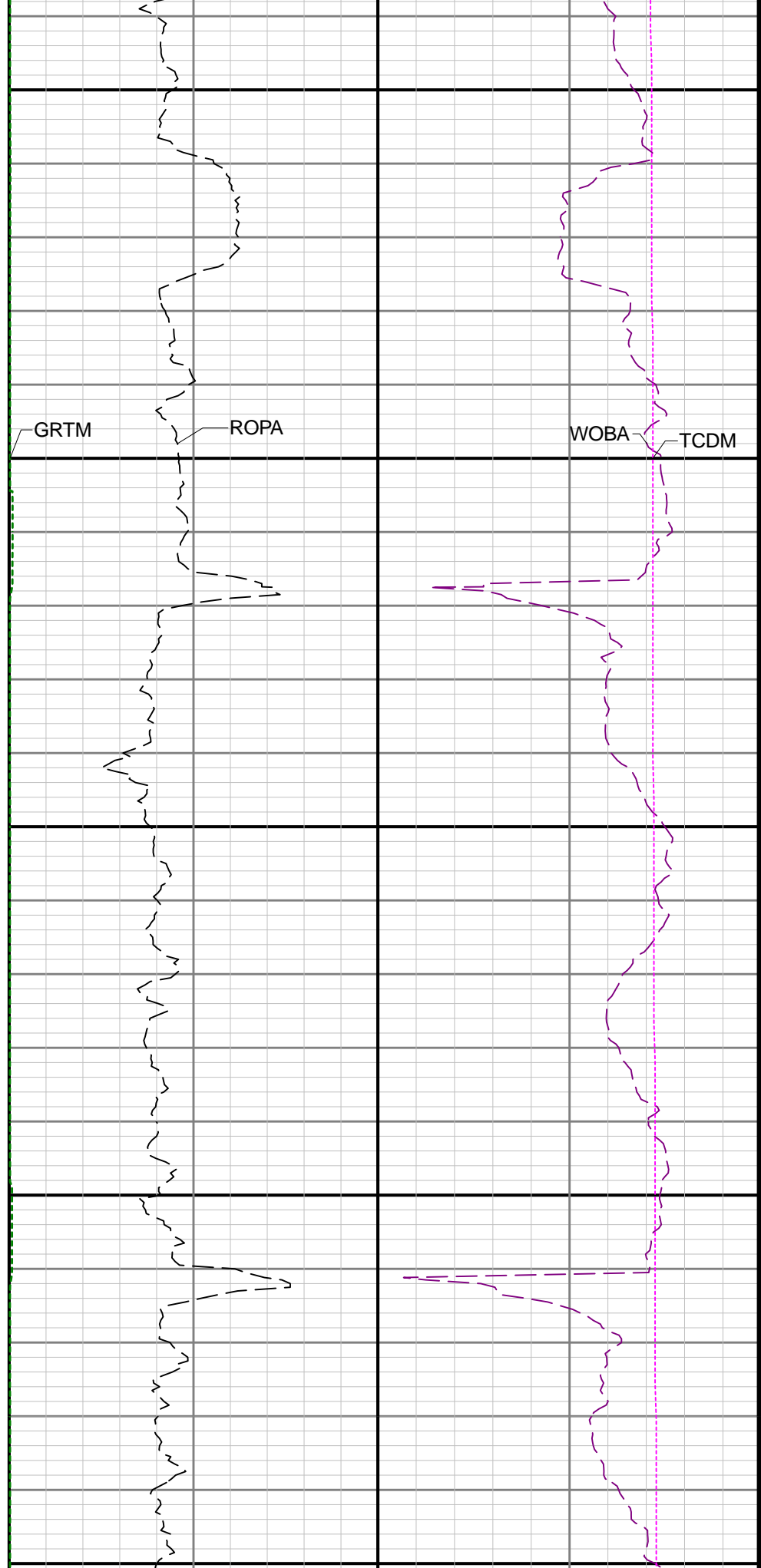
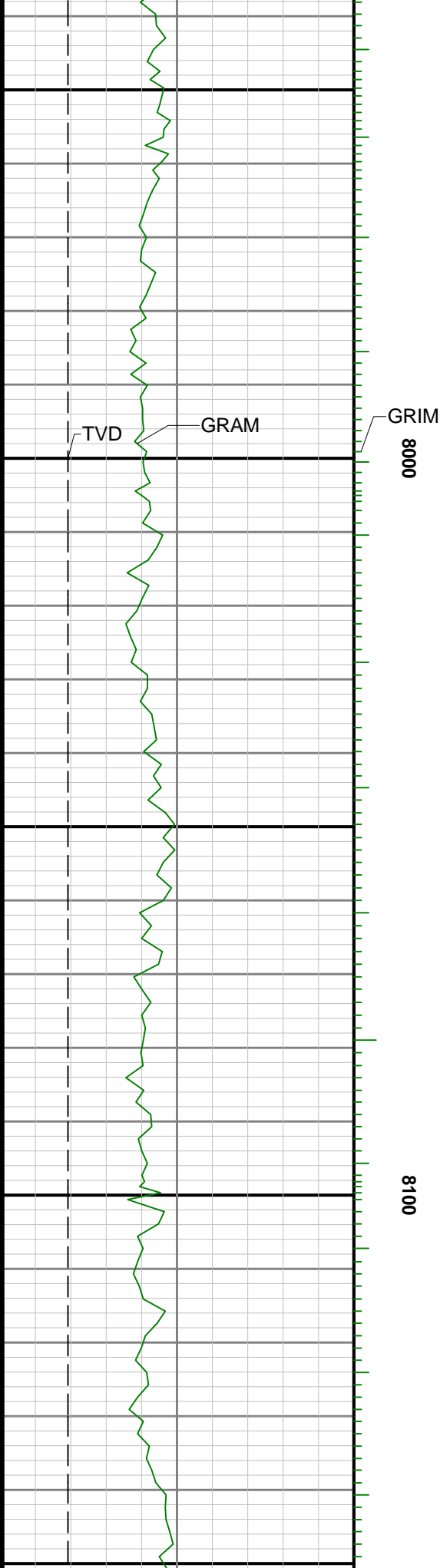


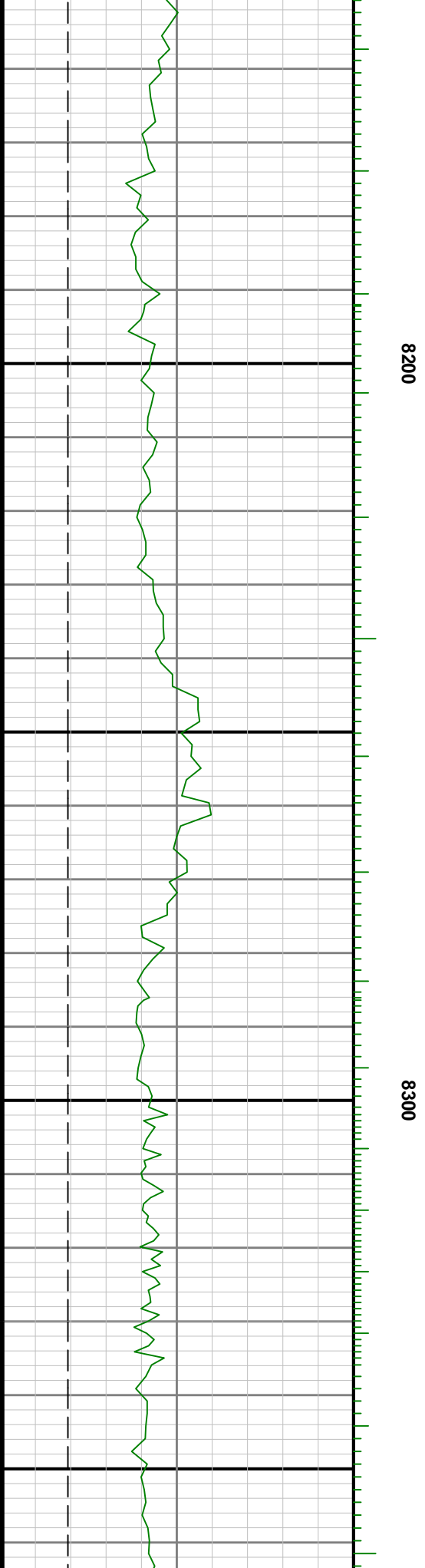
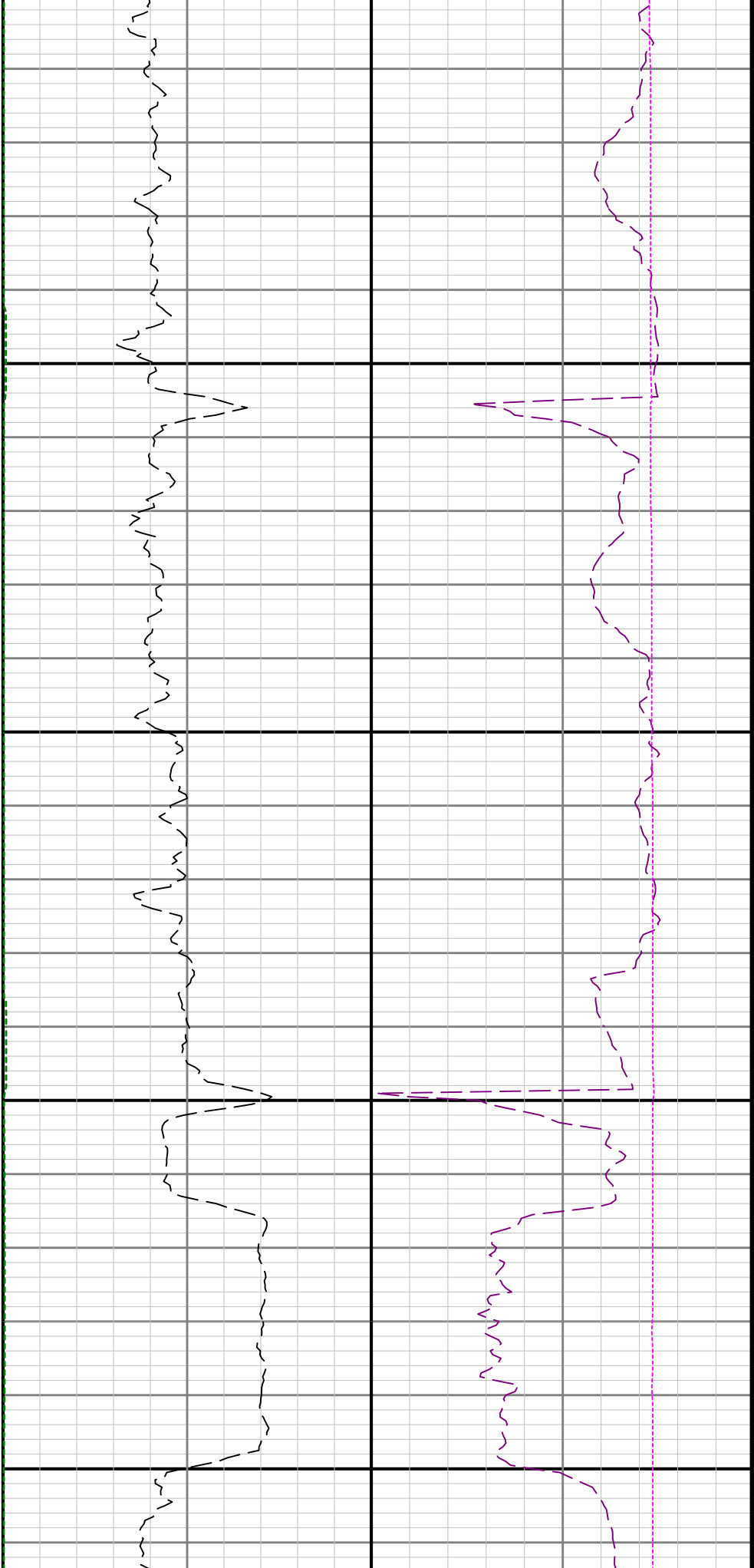
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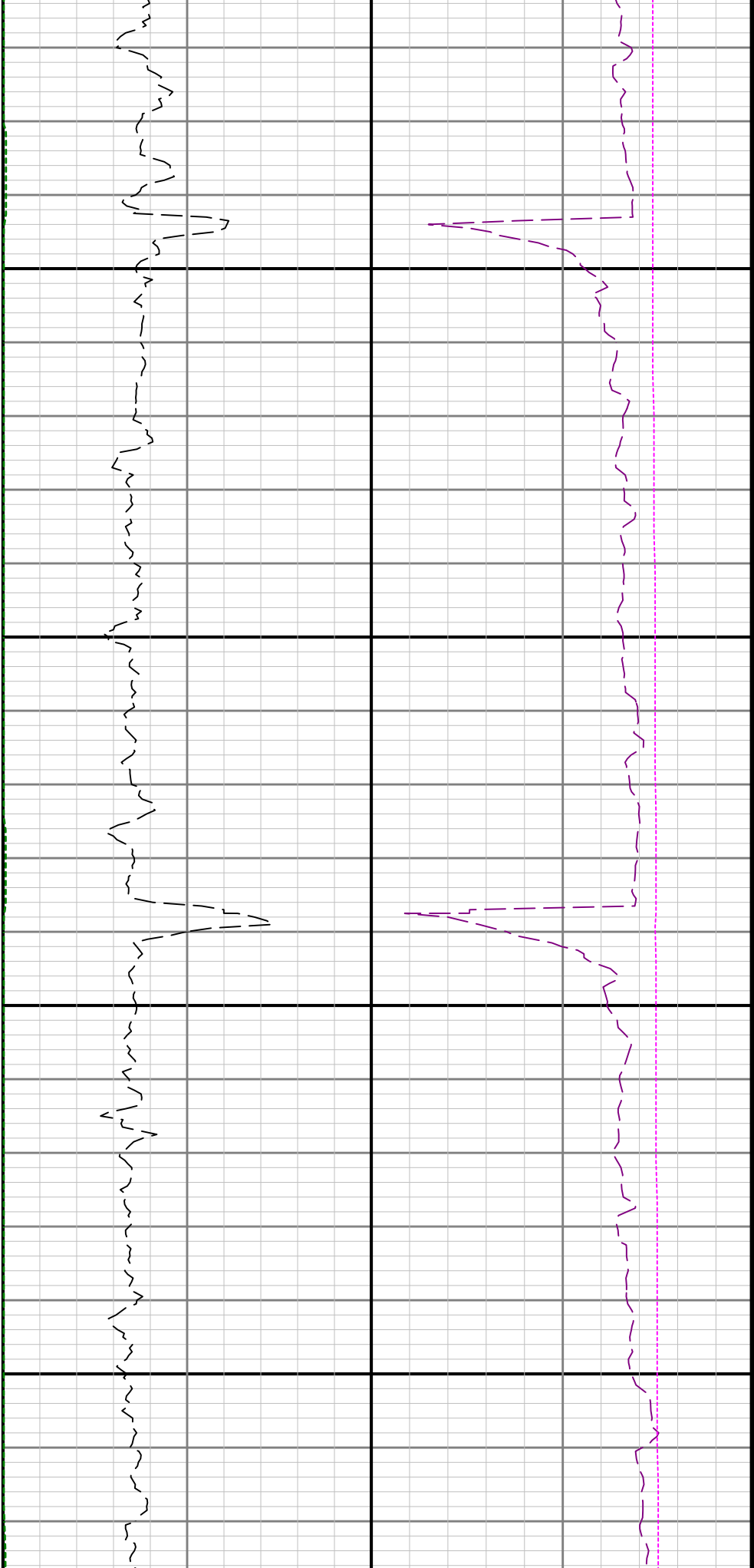
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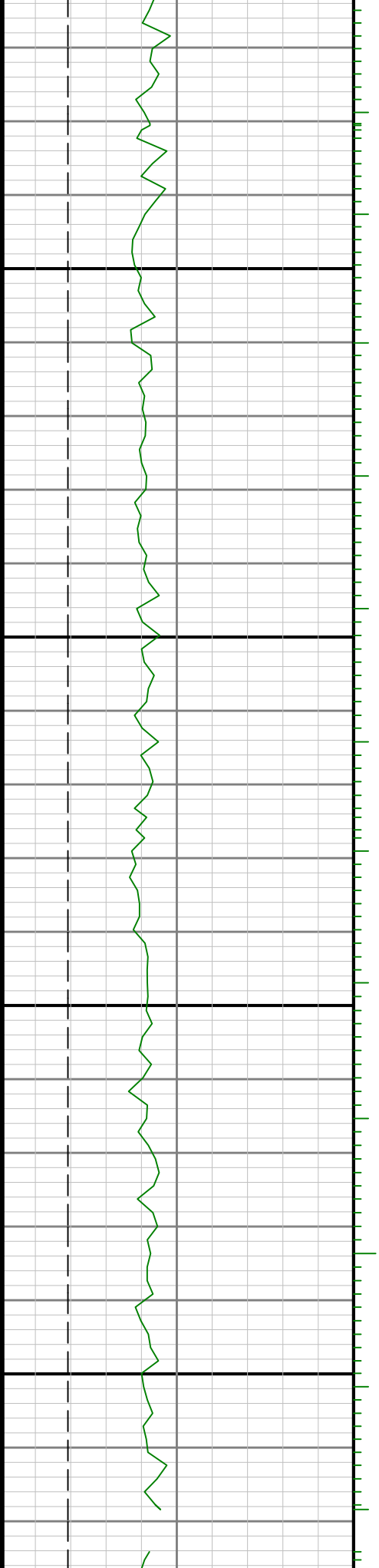


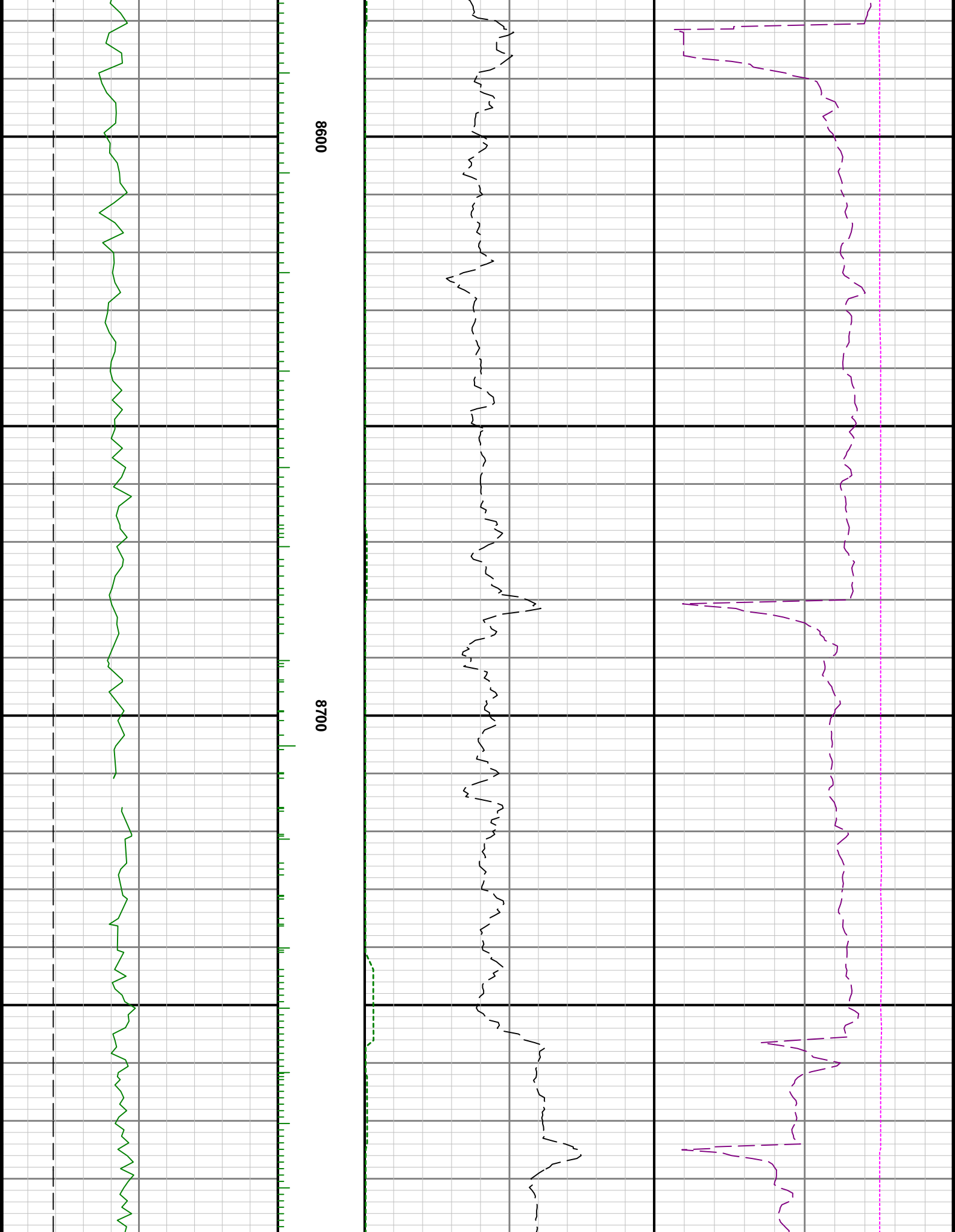


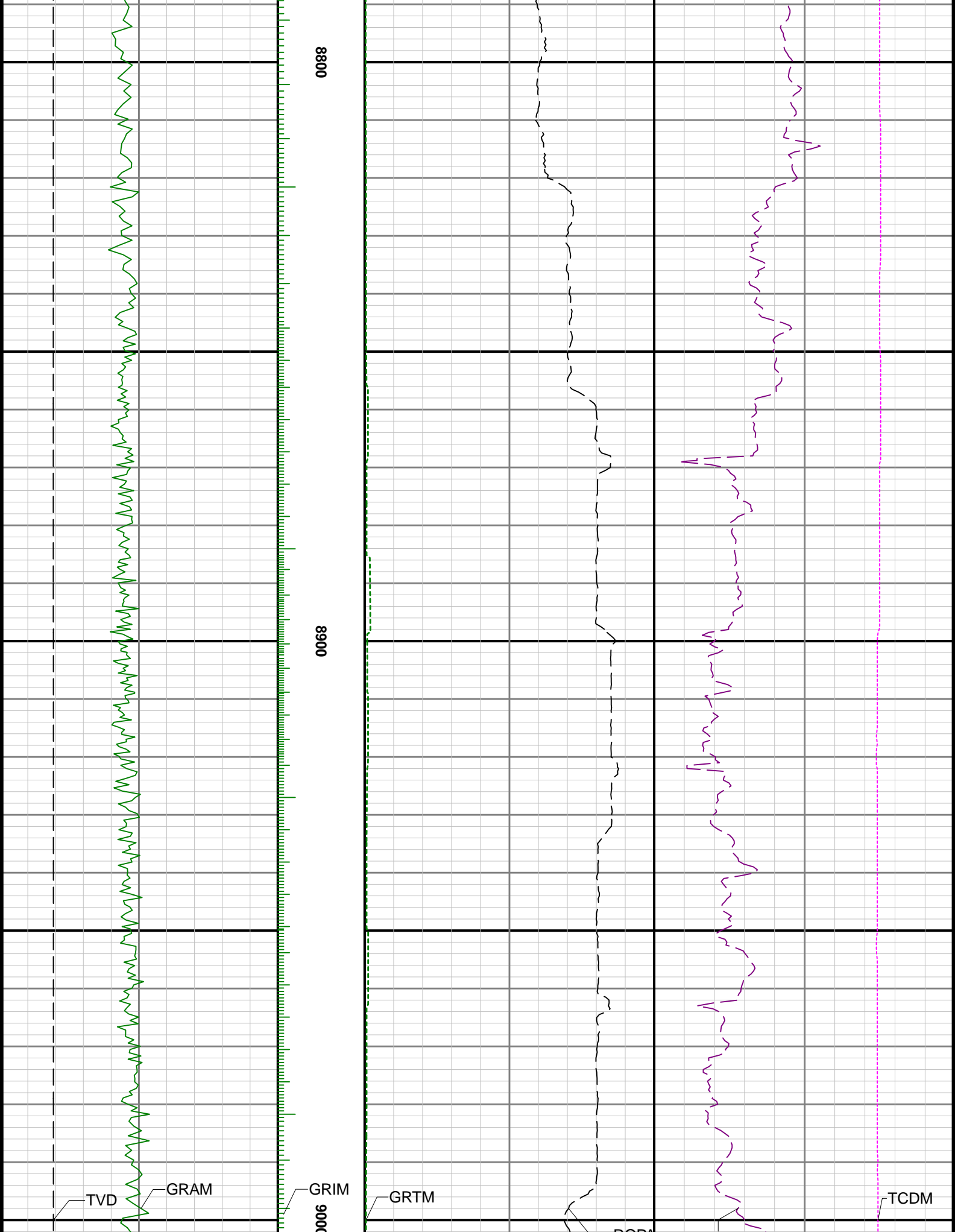


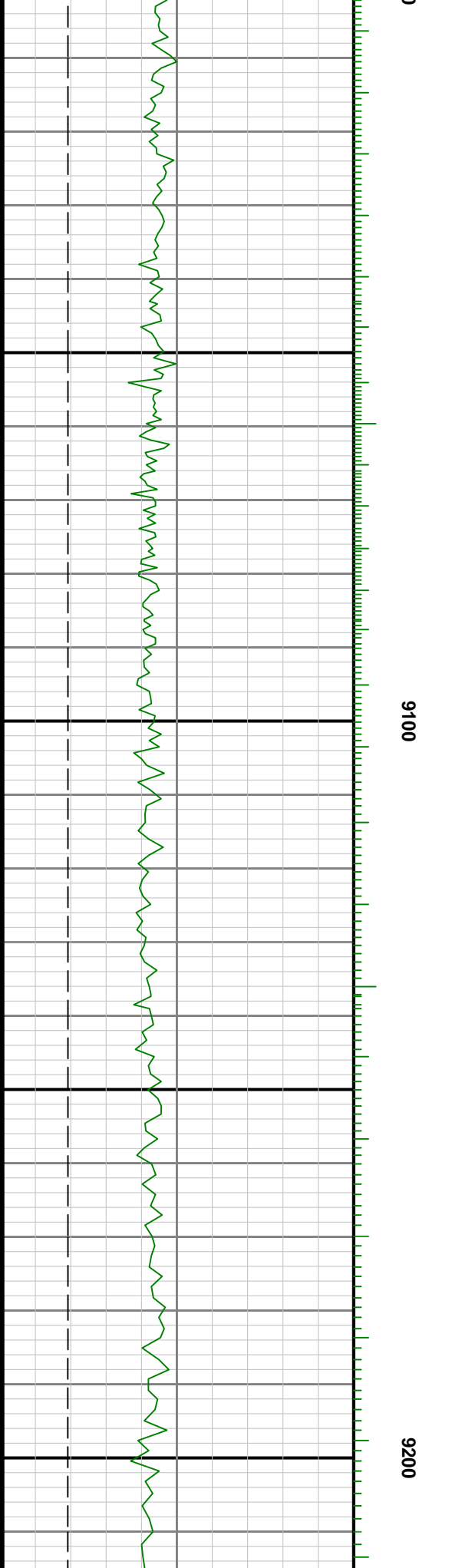
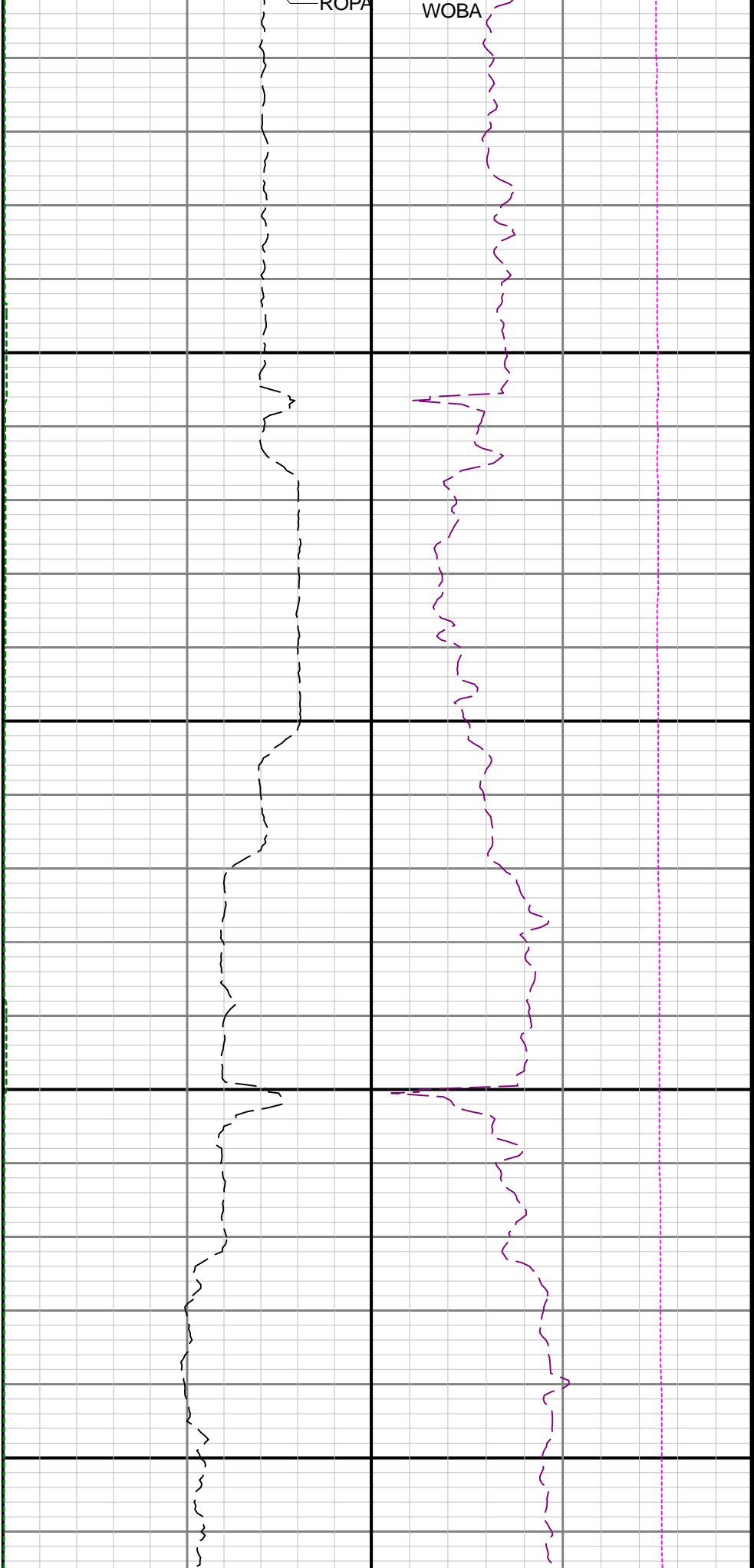
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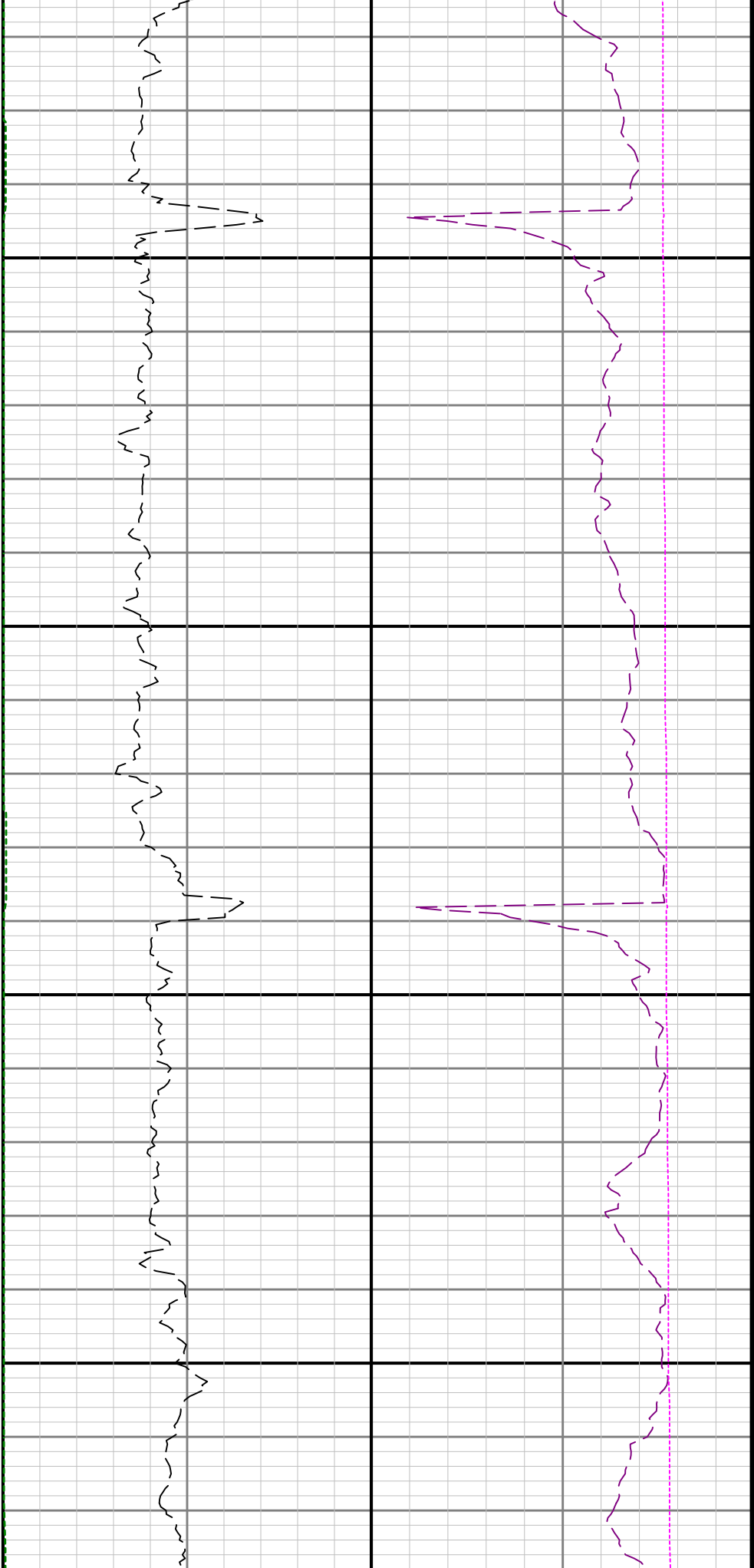
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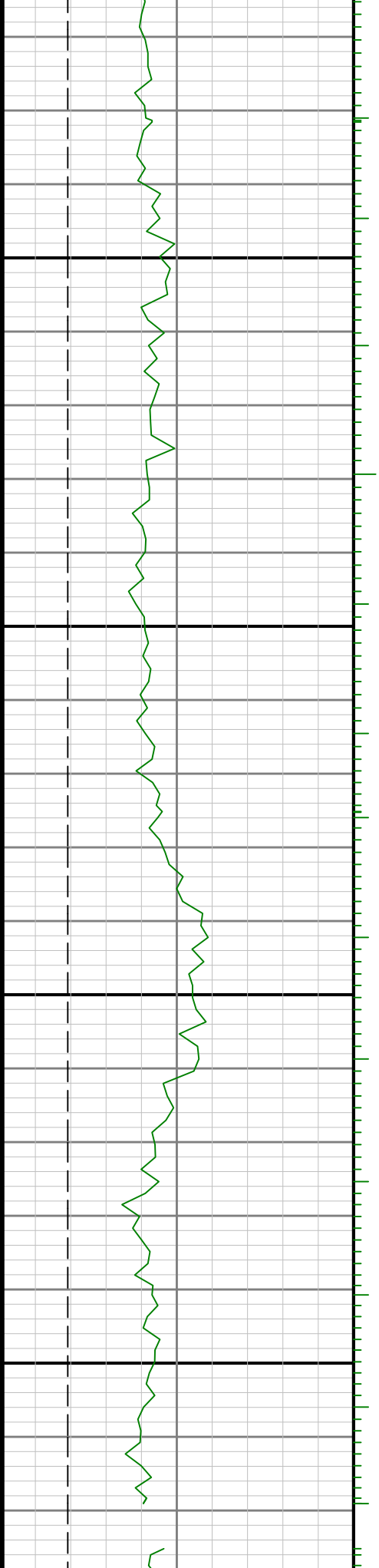


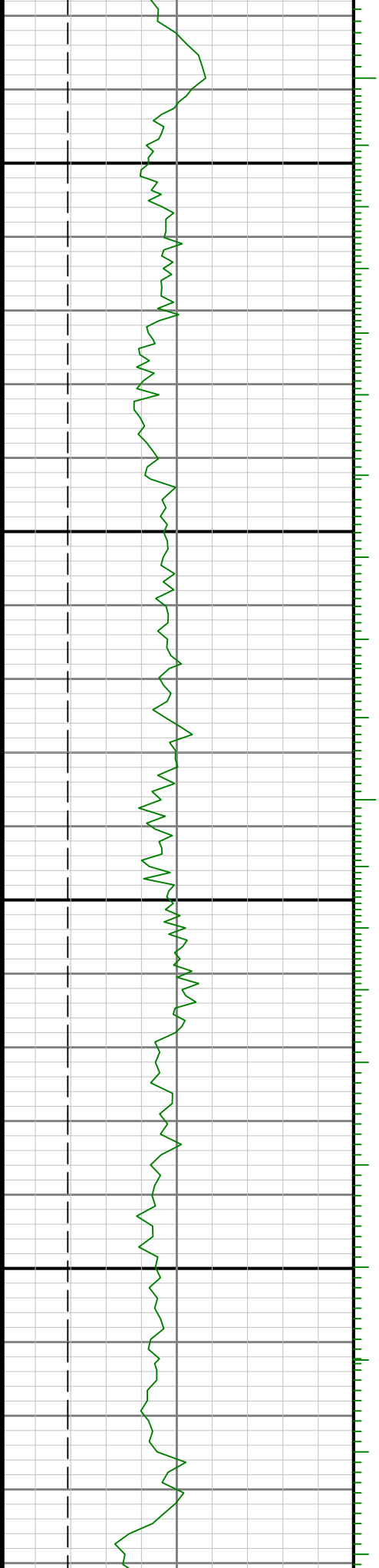




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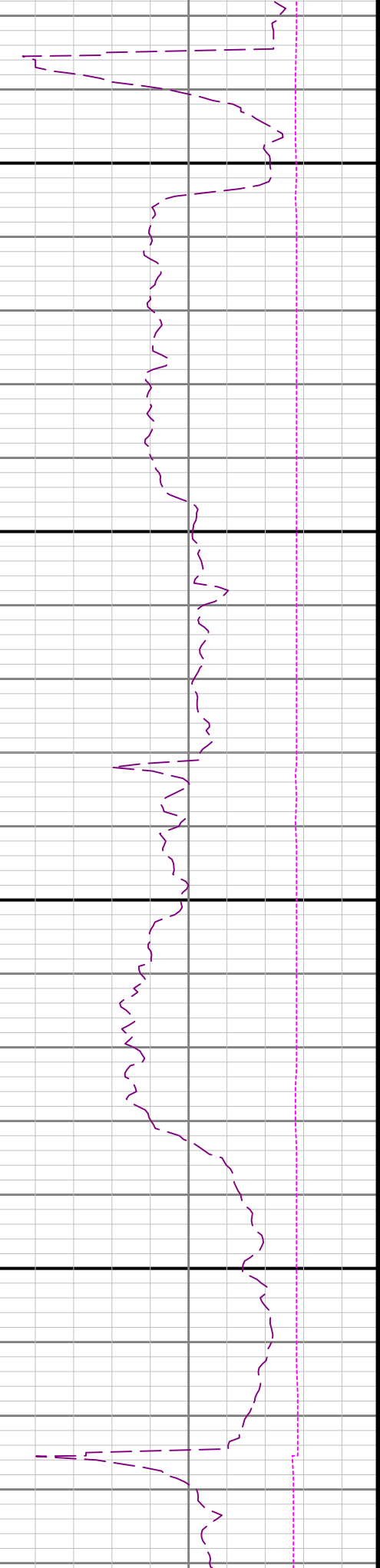
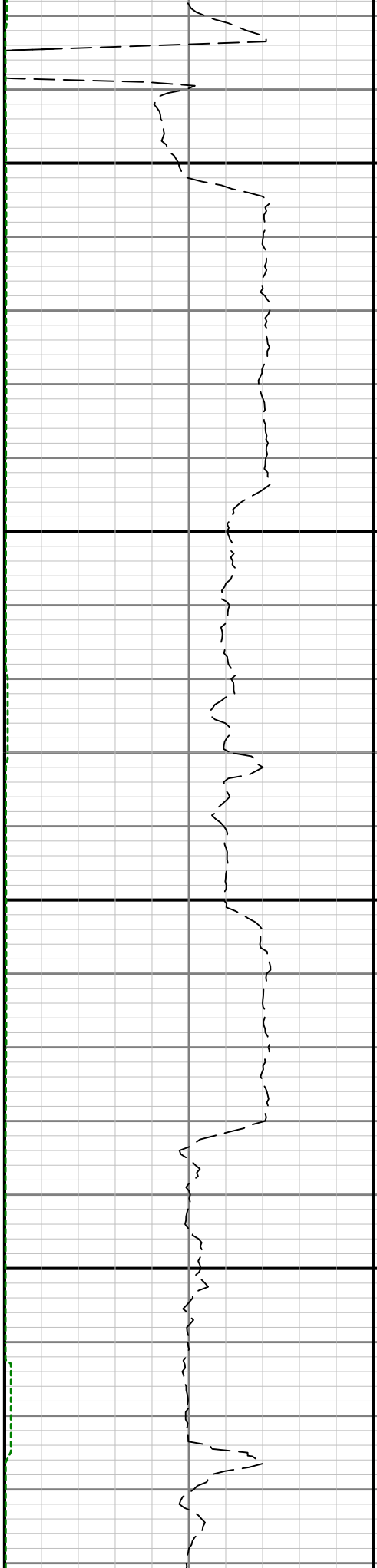
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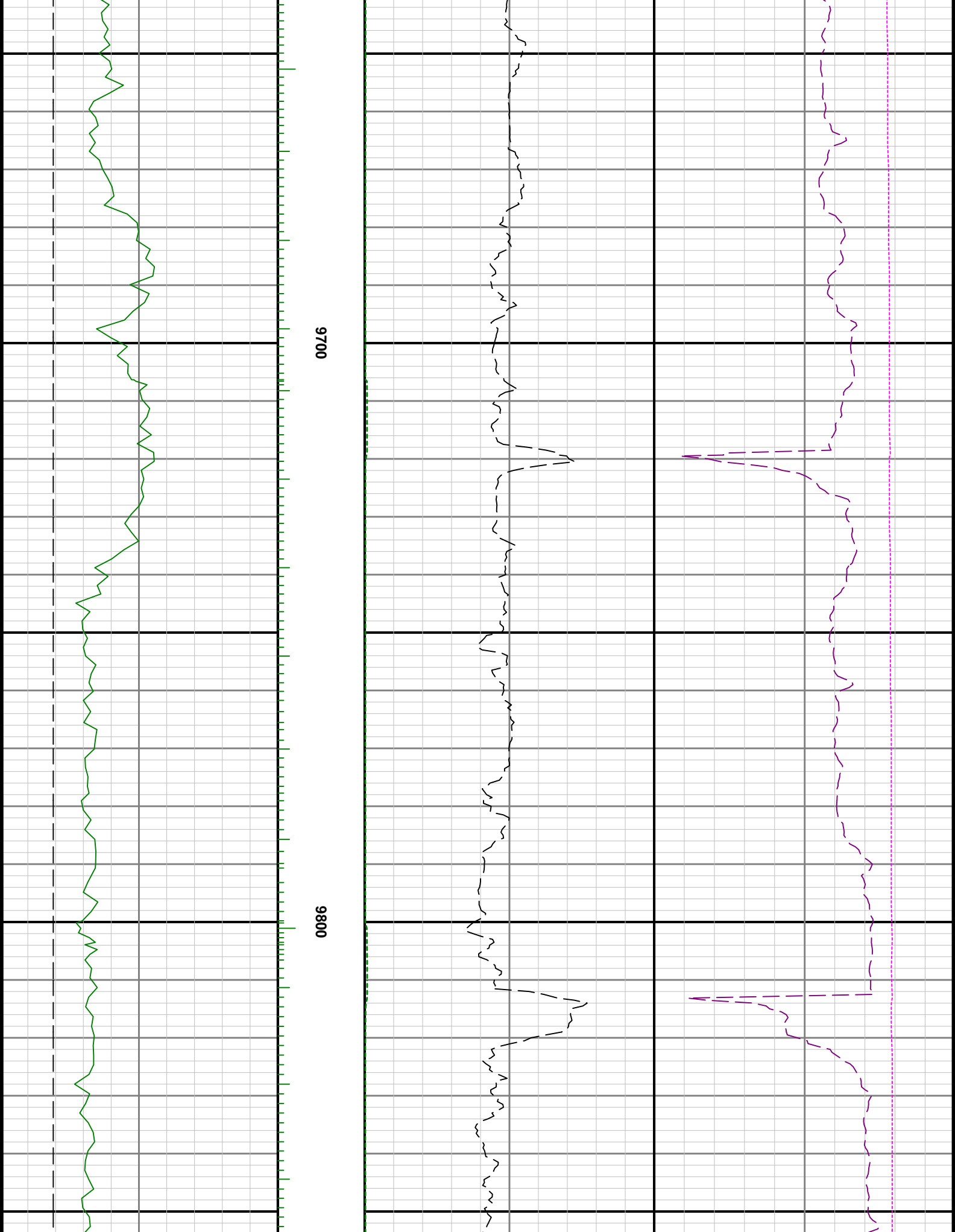


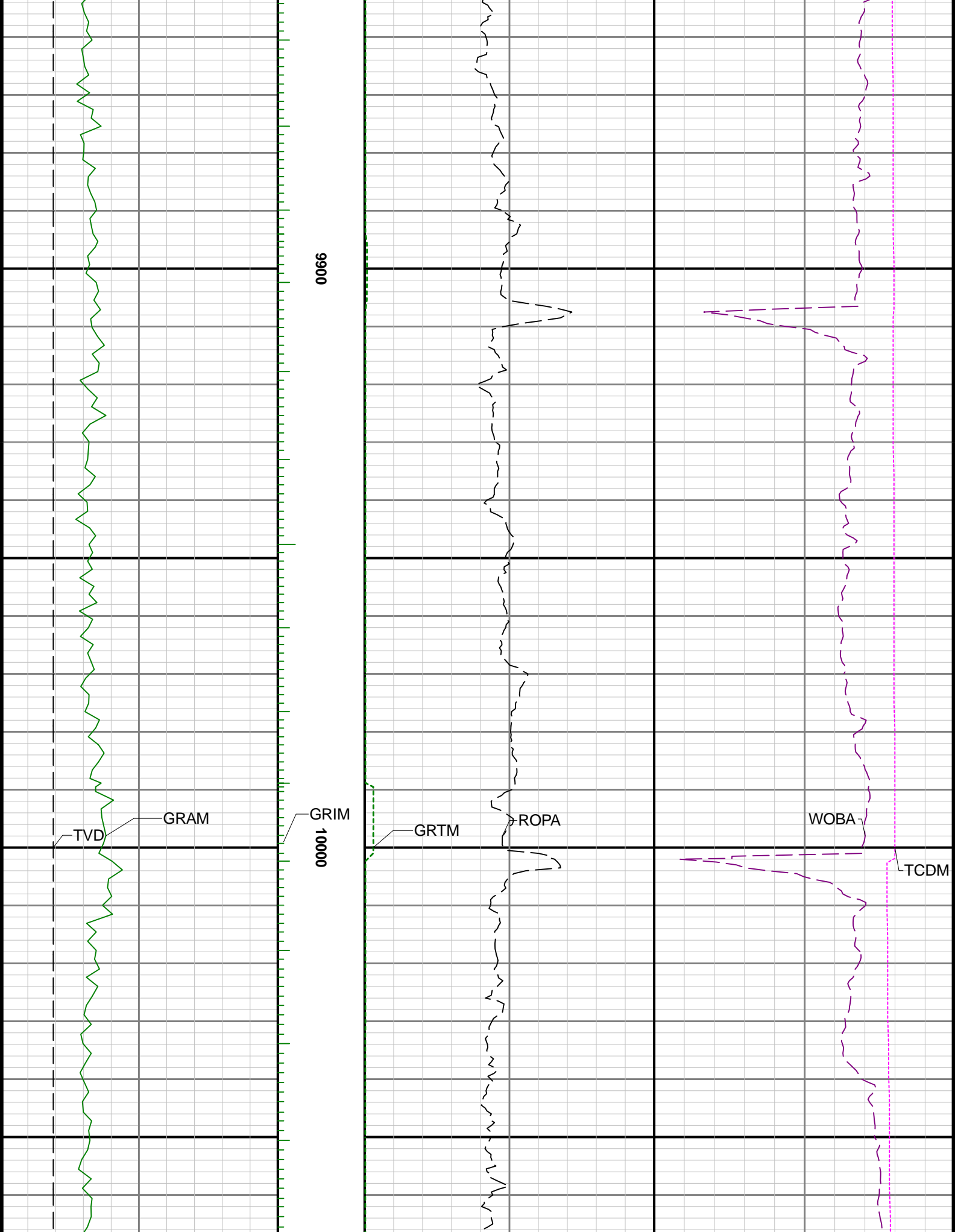


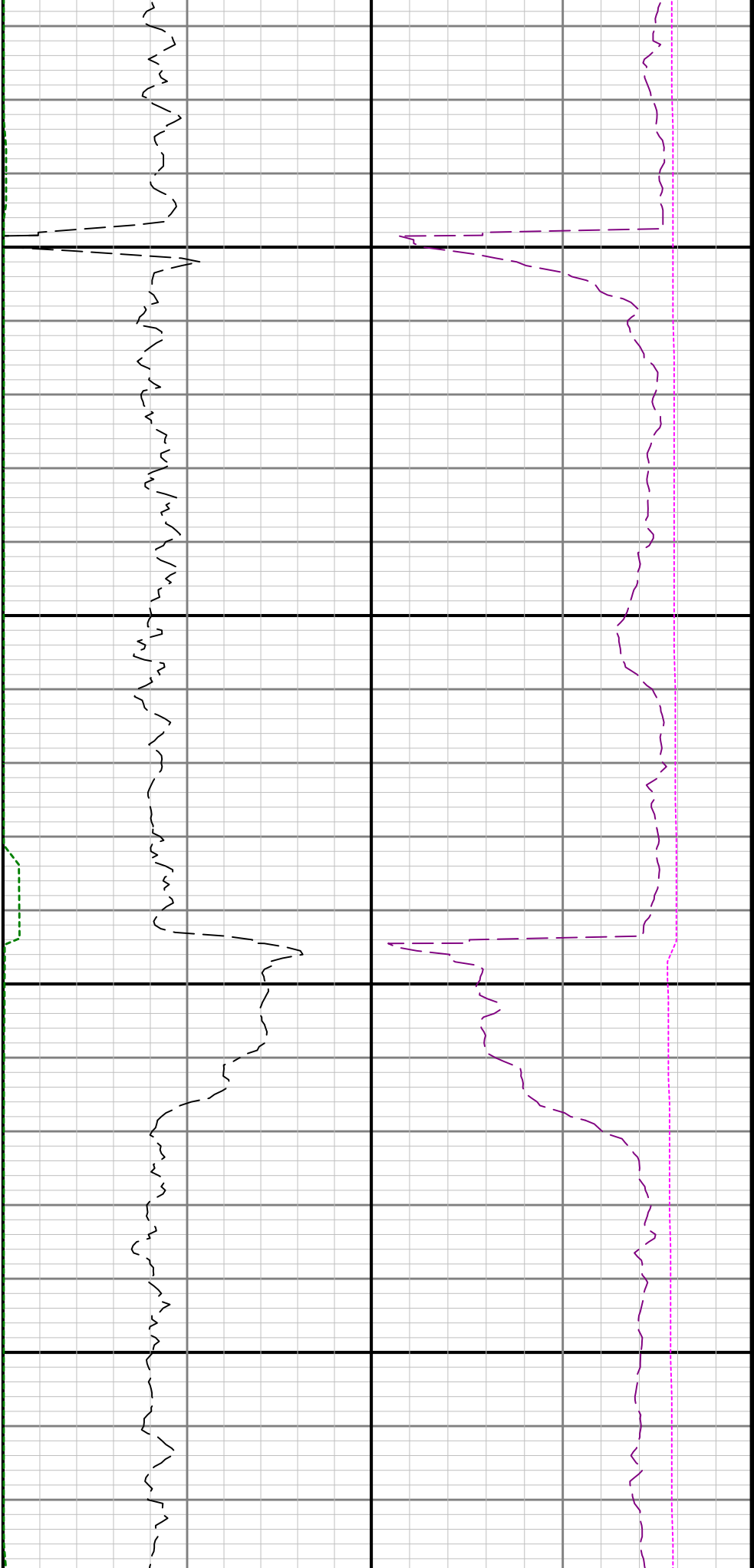
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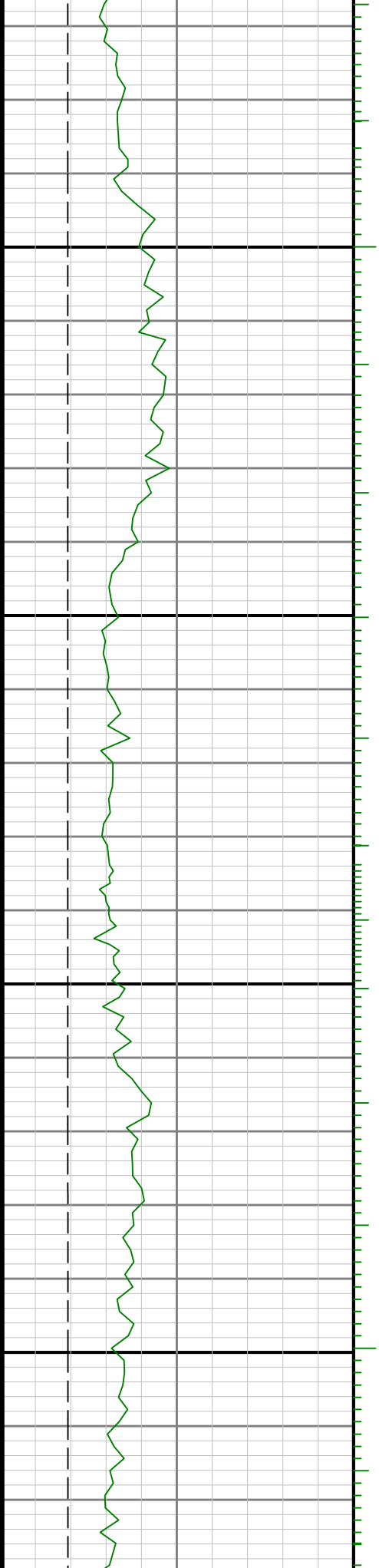


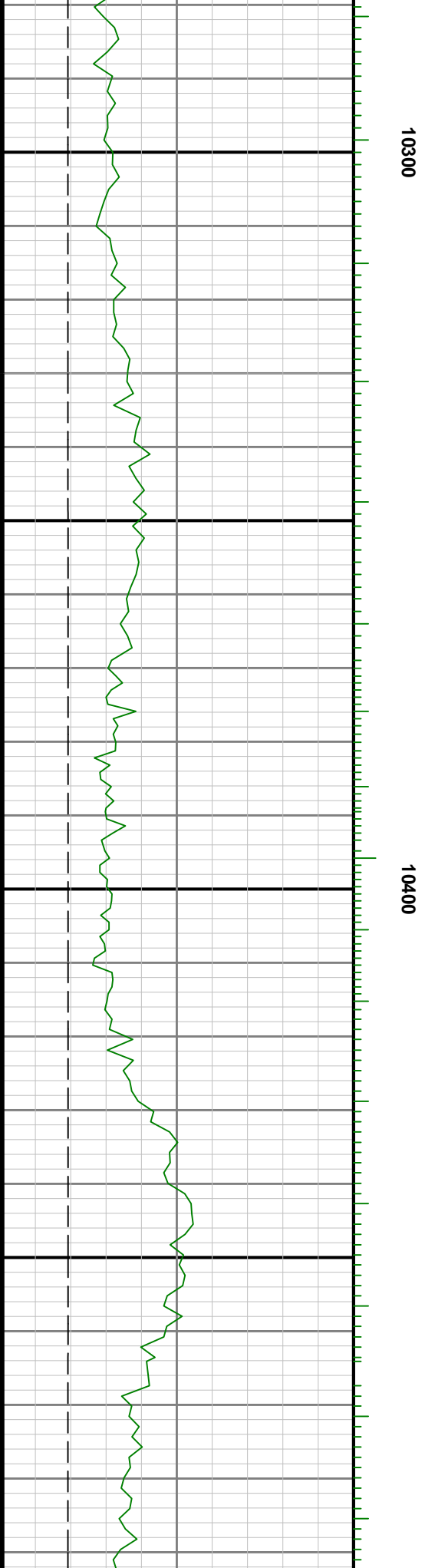
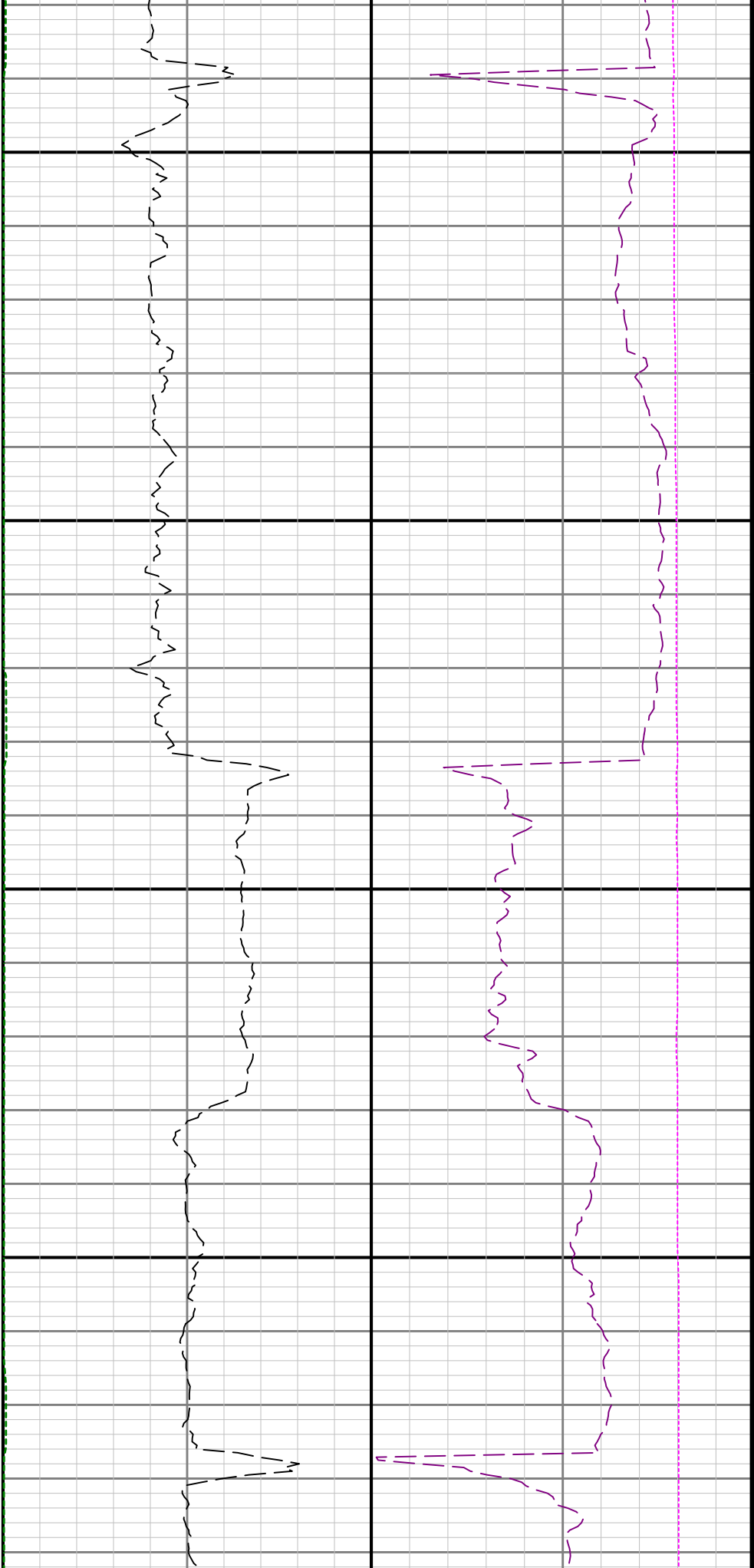


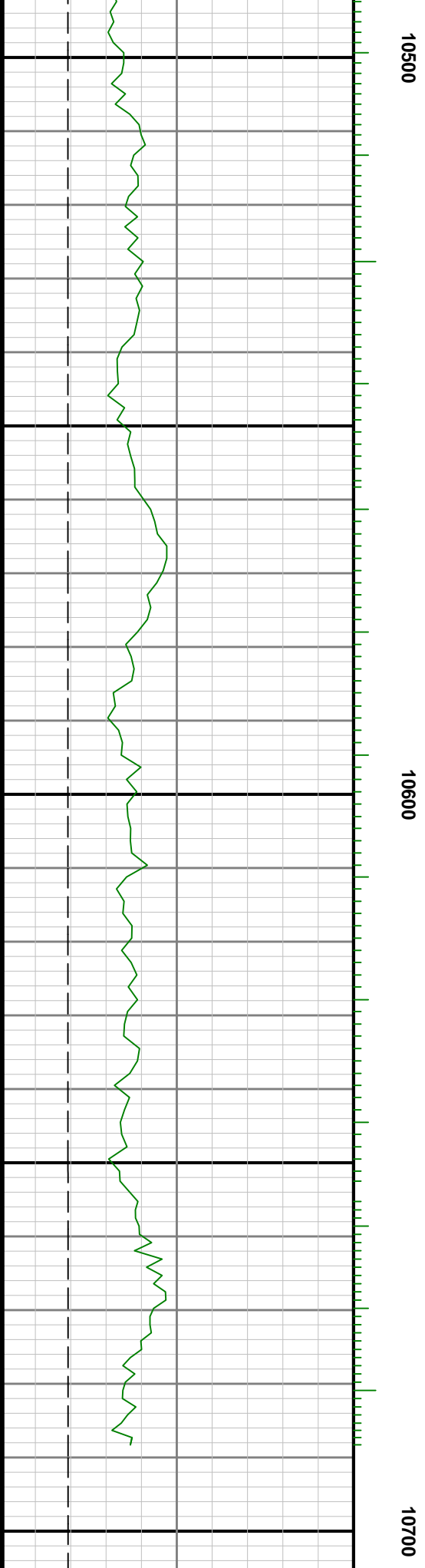
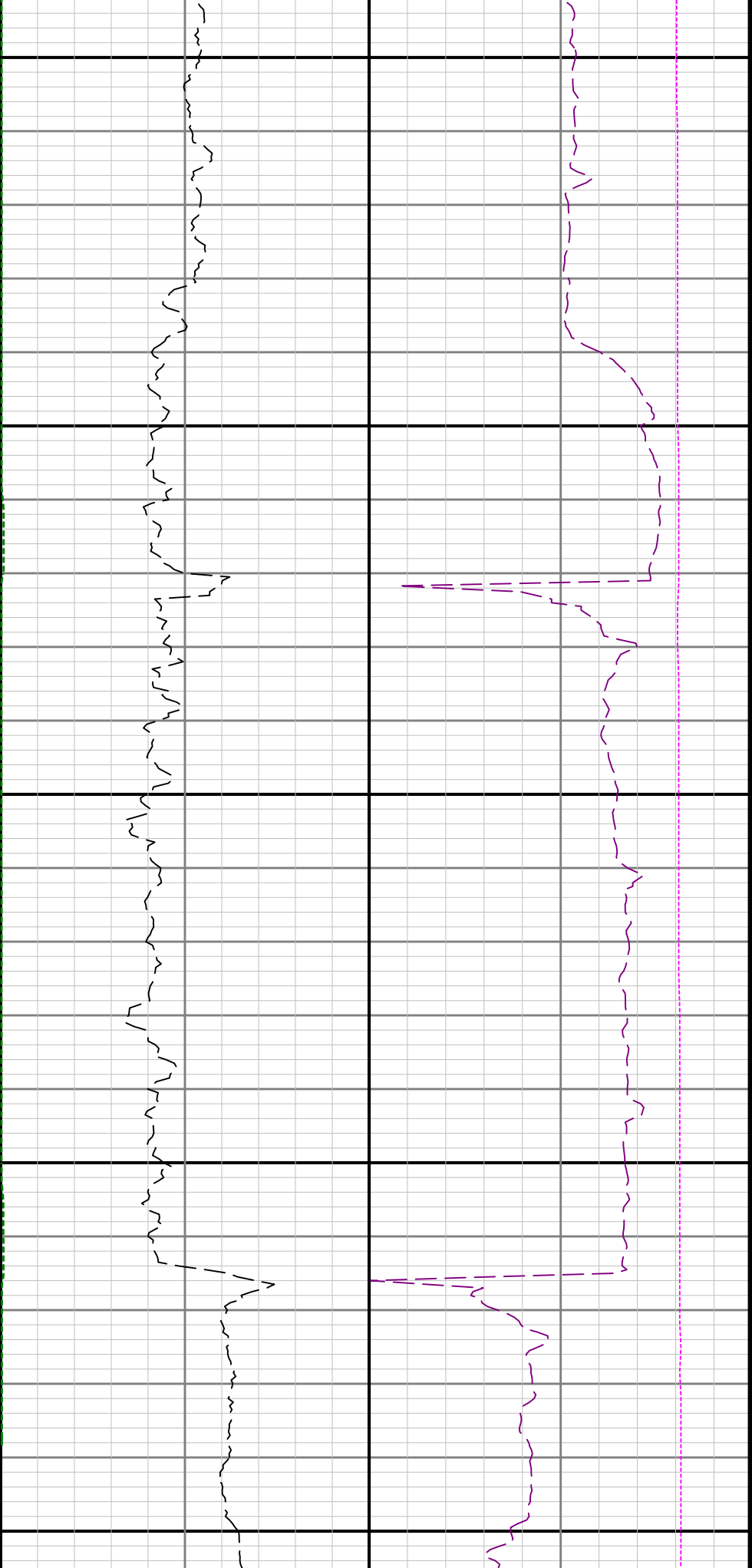


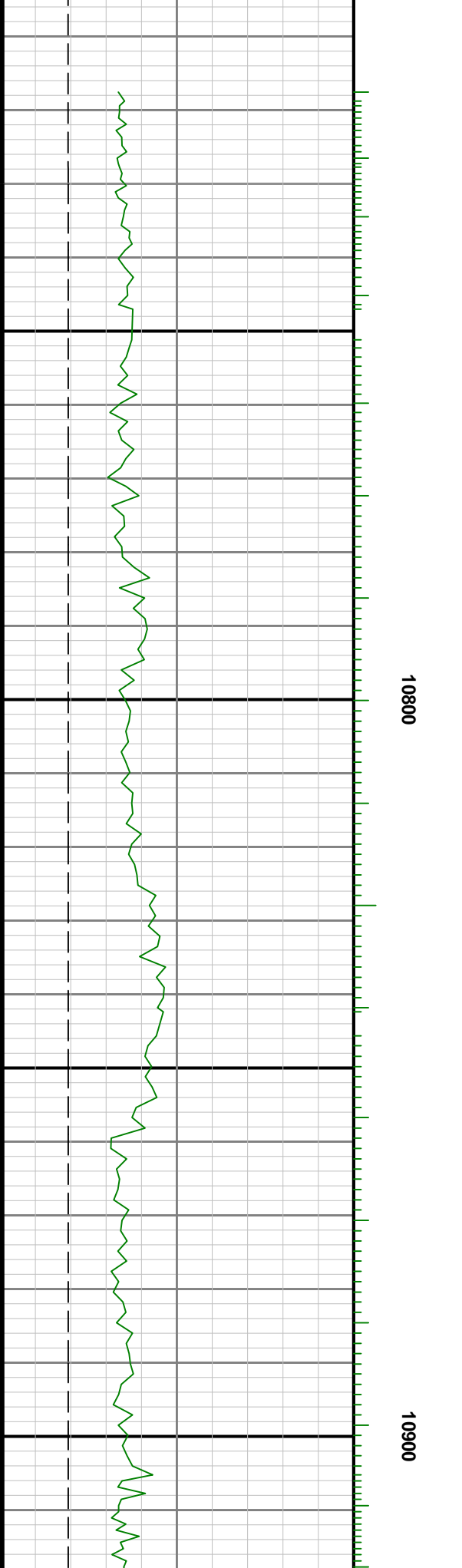
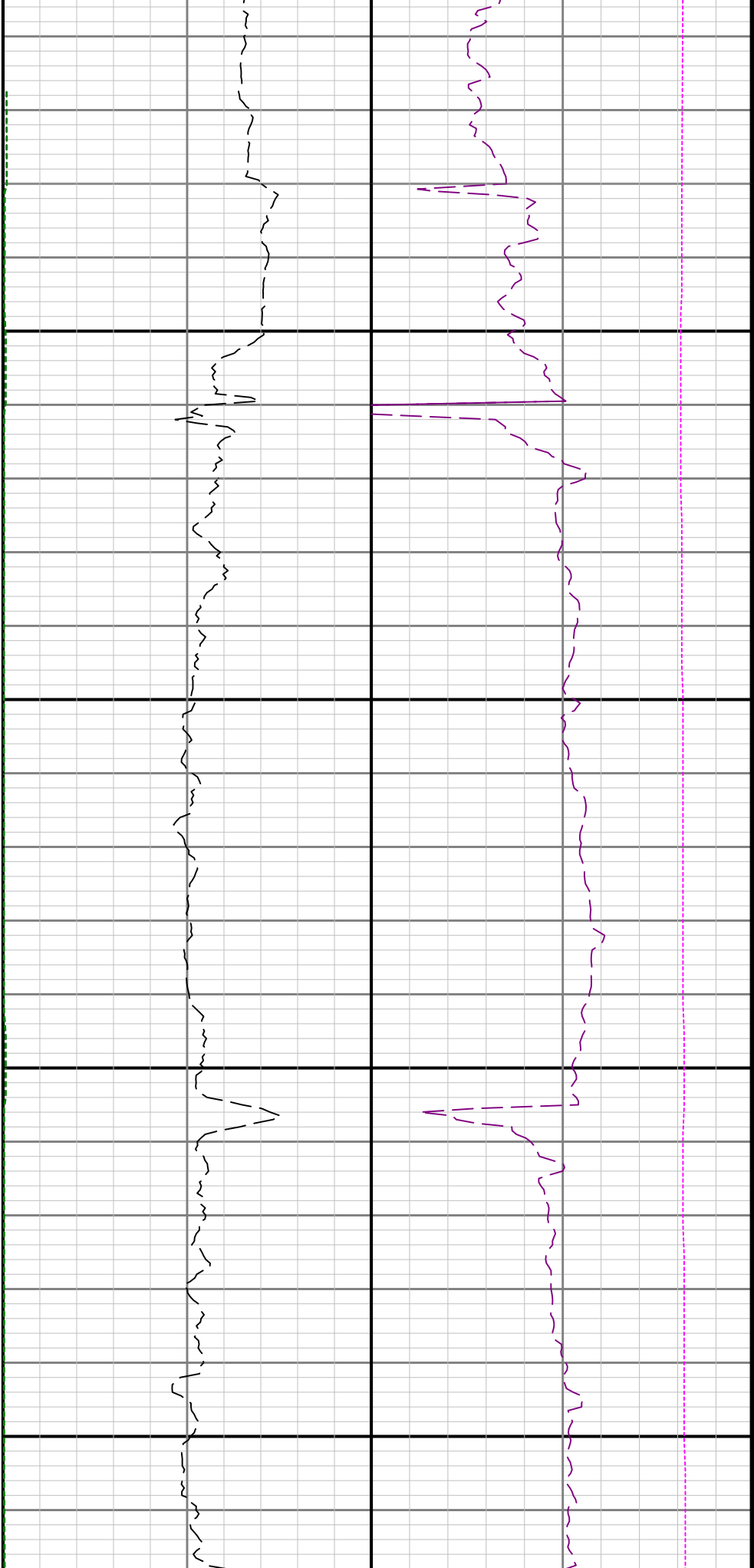
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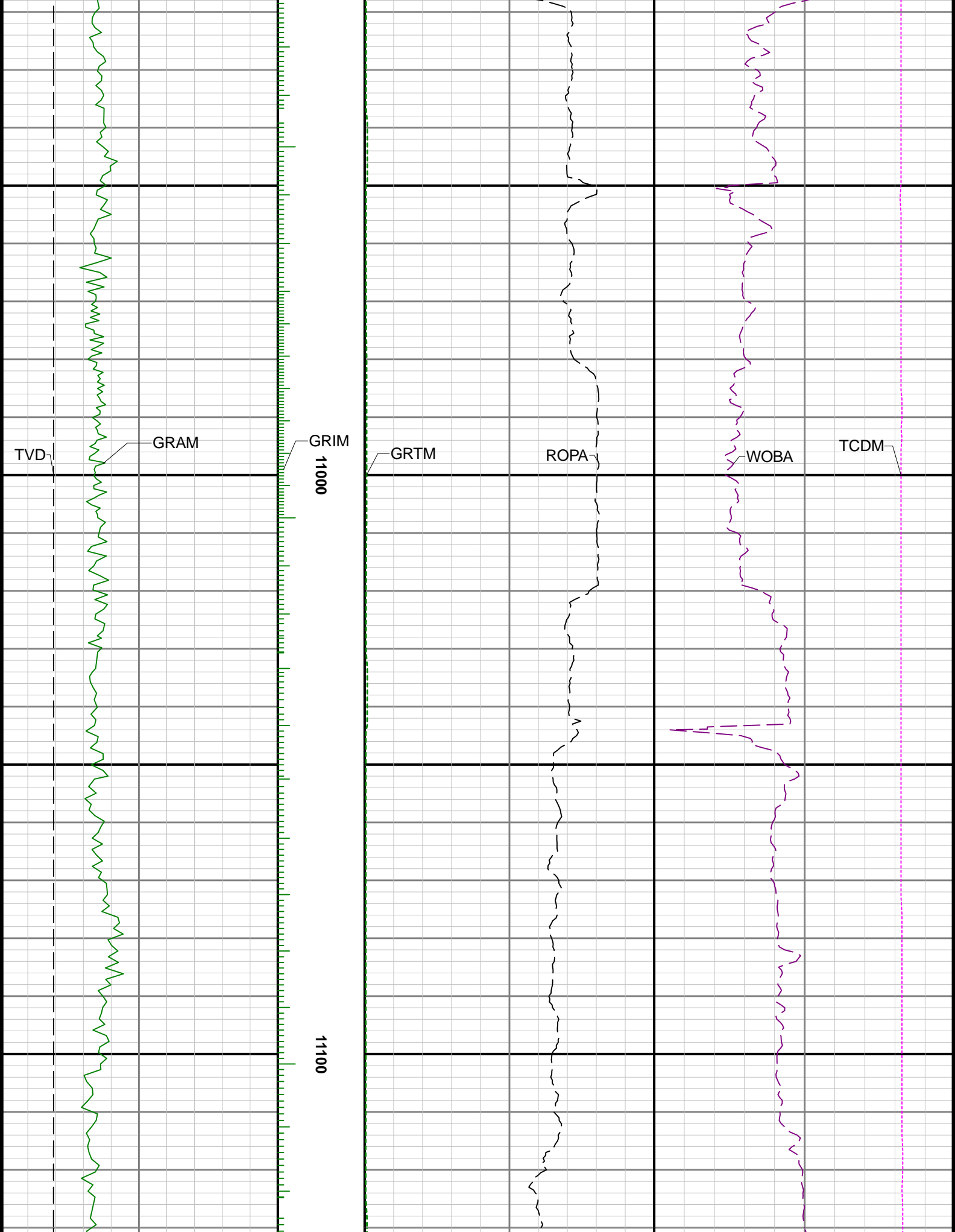
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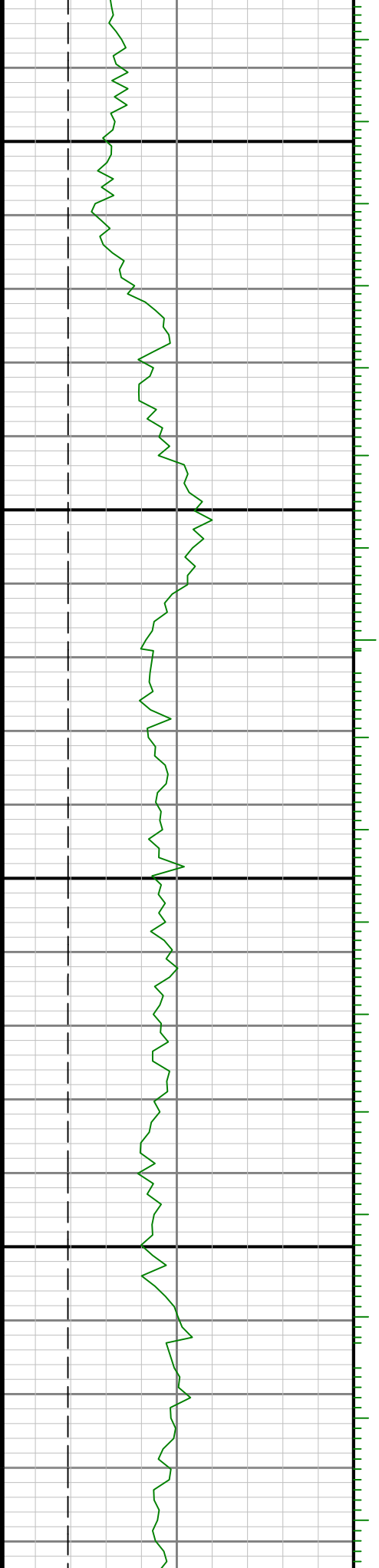


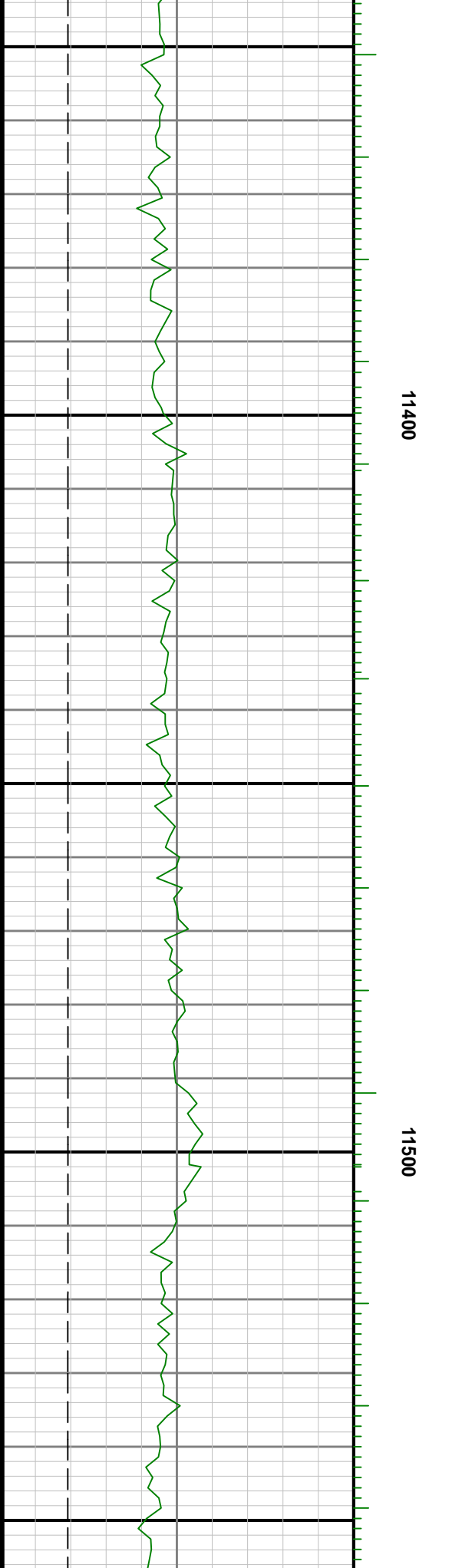


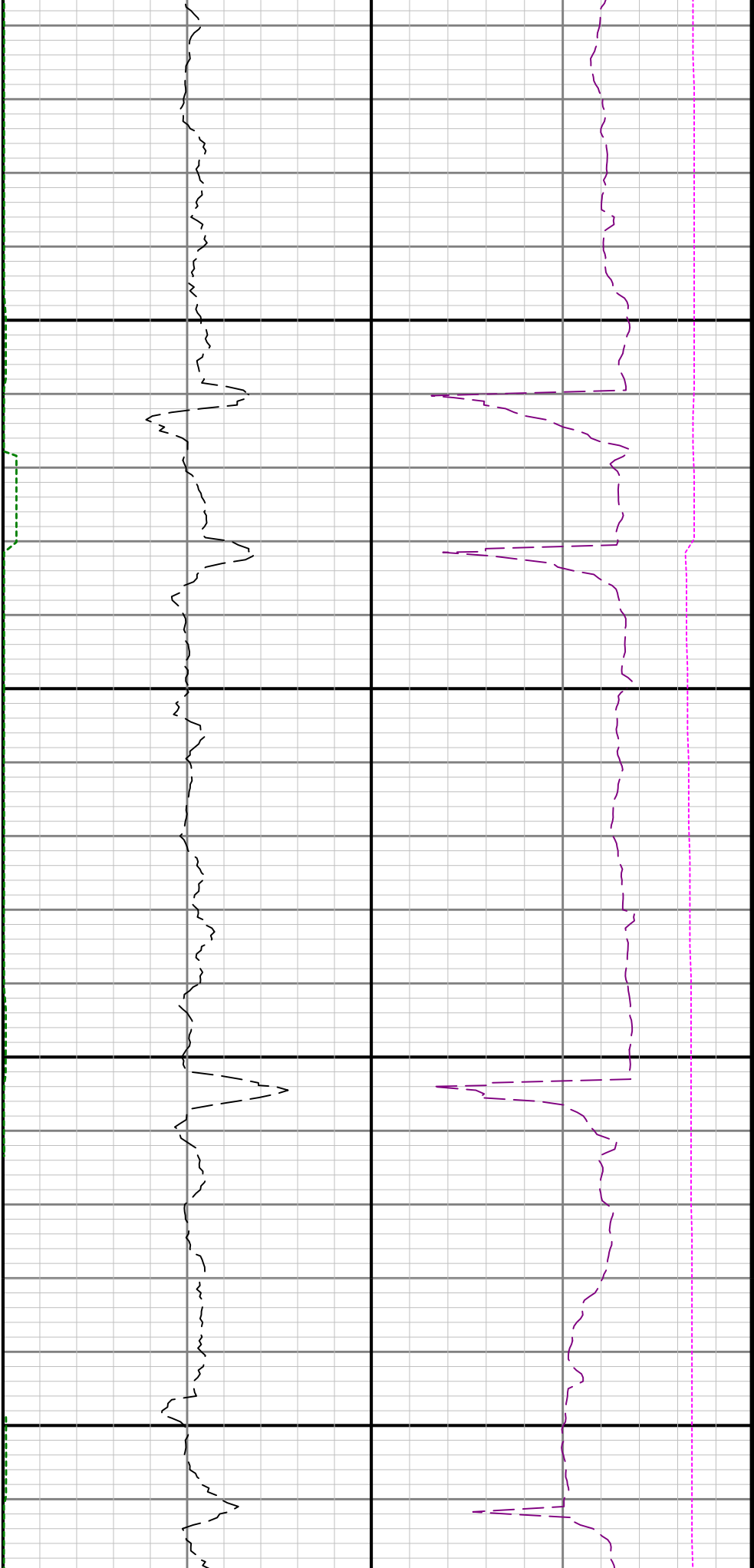


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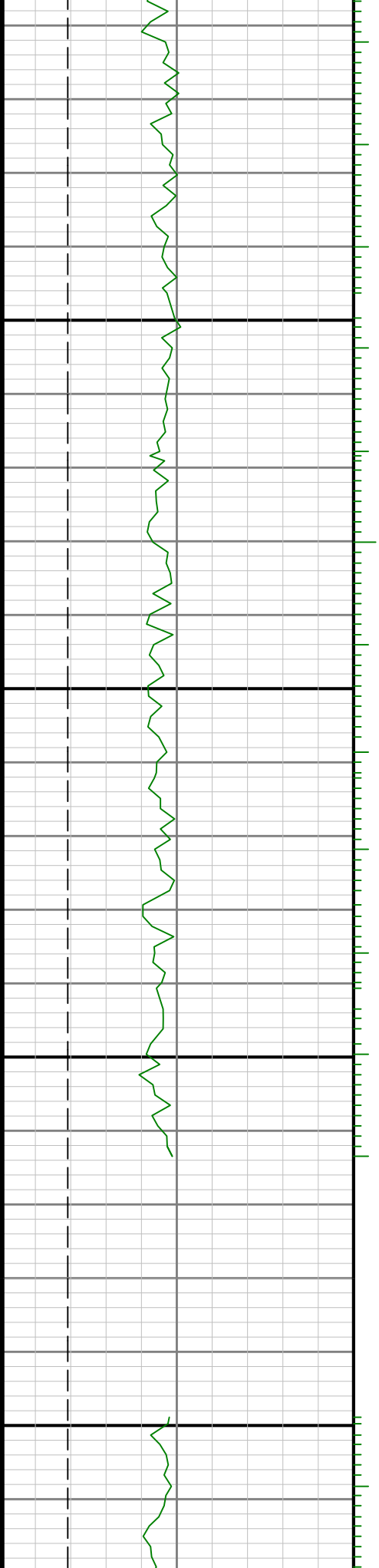


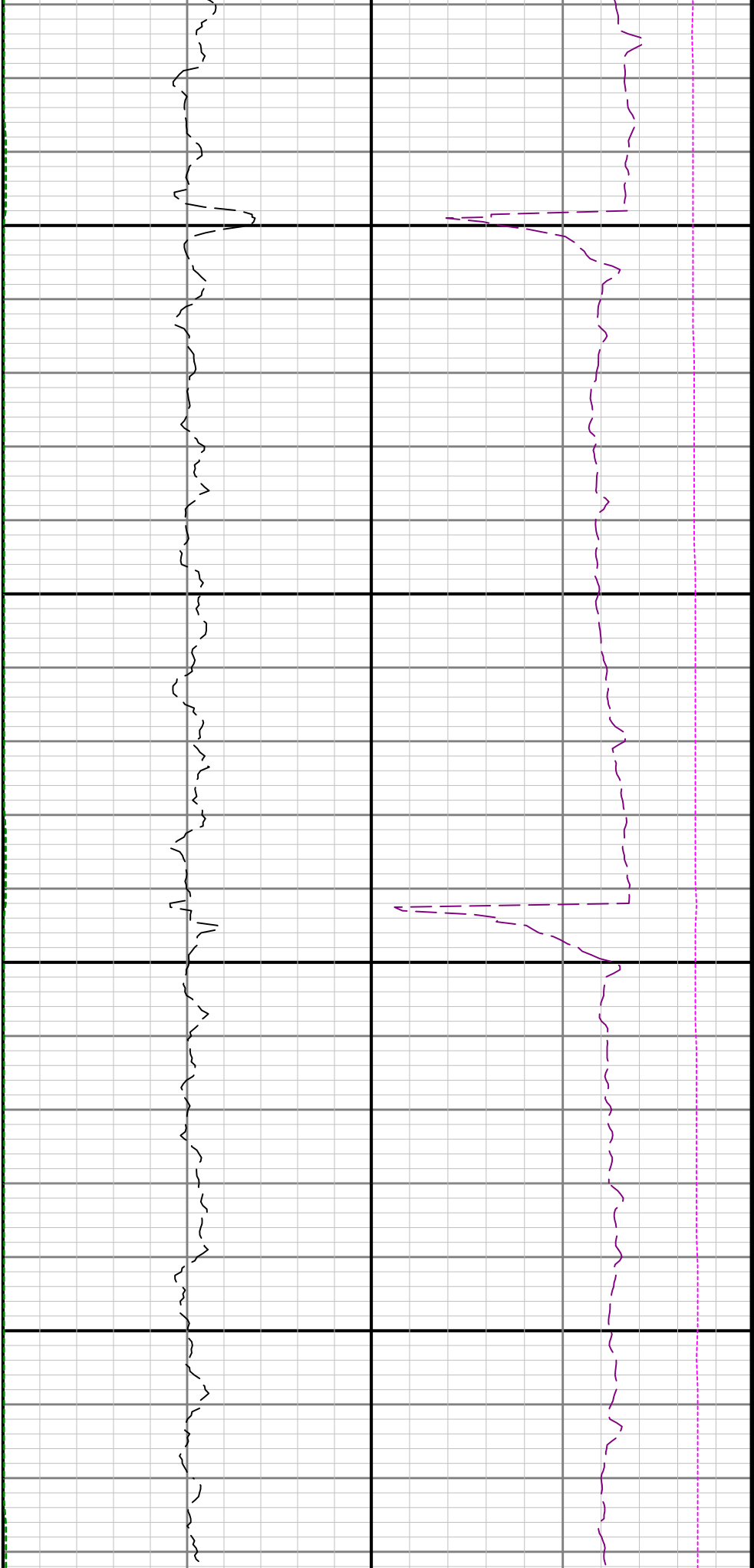




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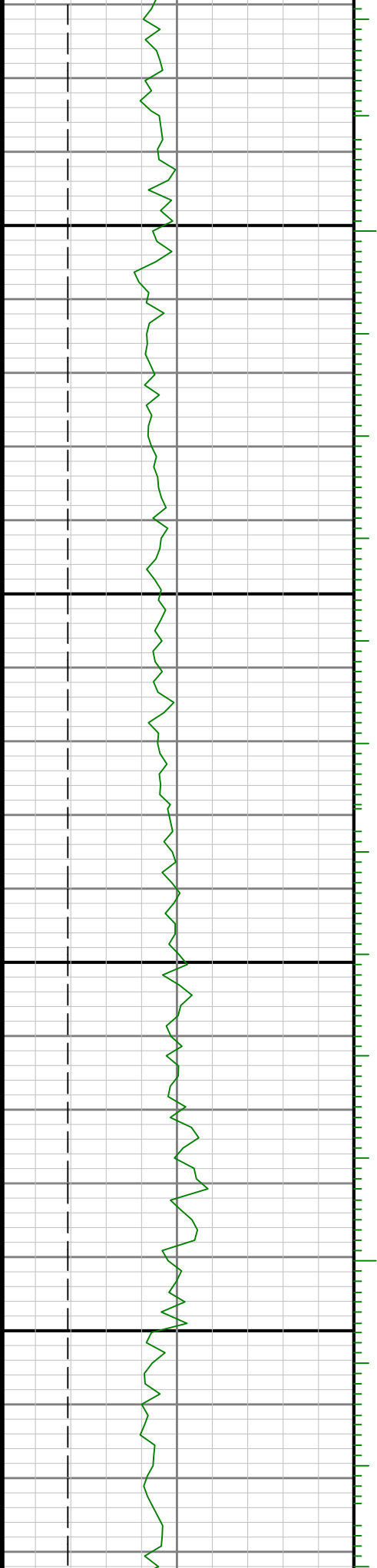
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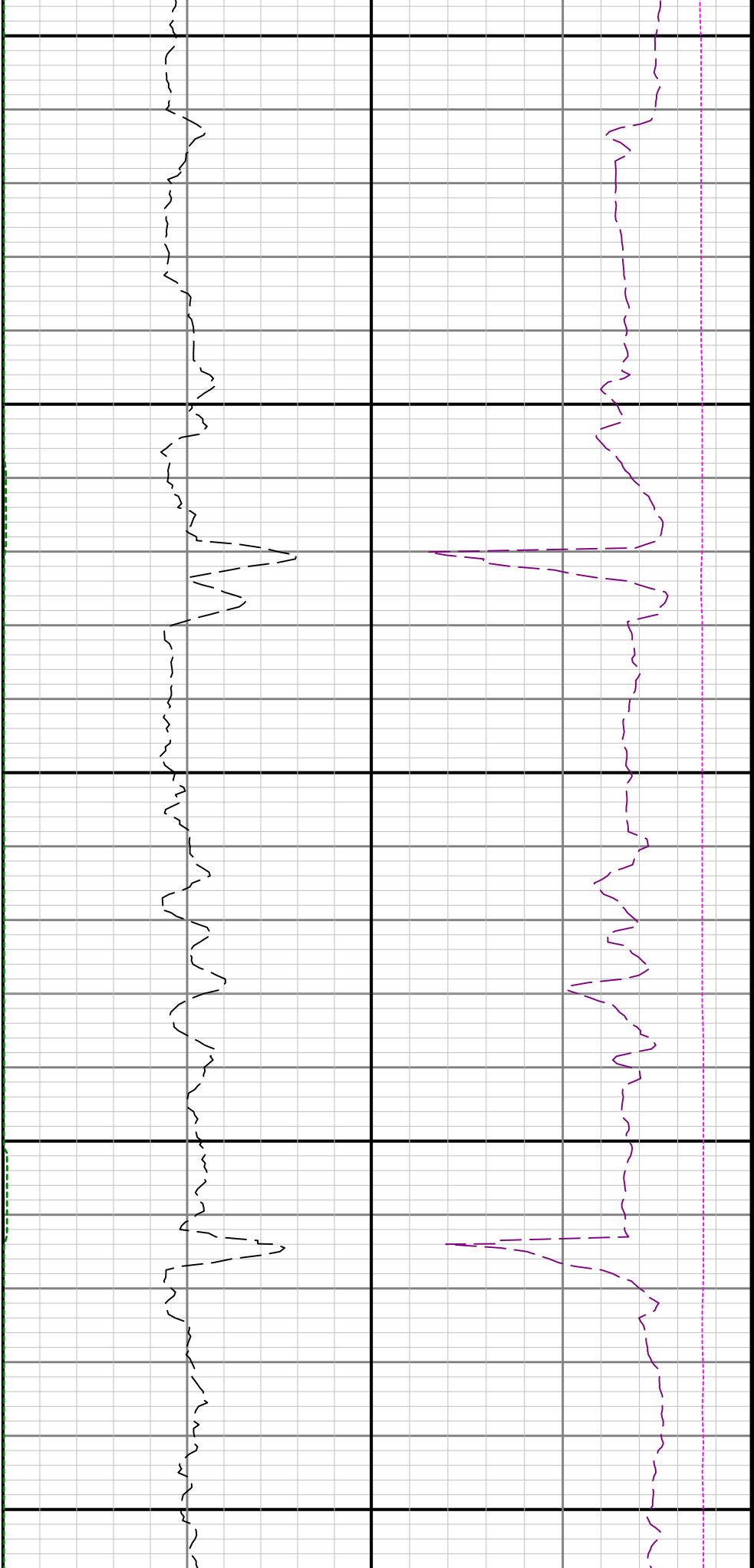


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11900



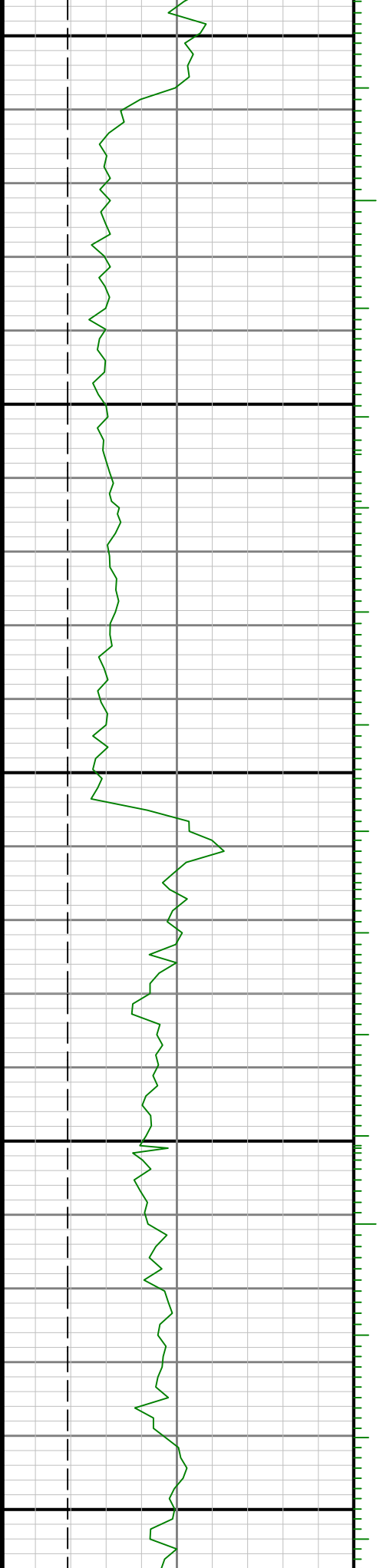




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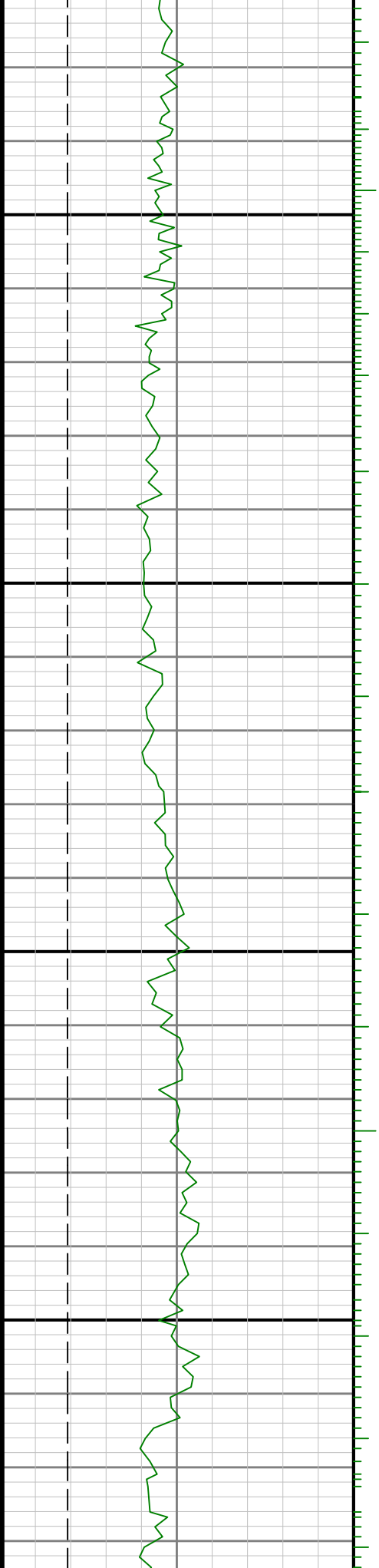
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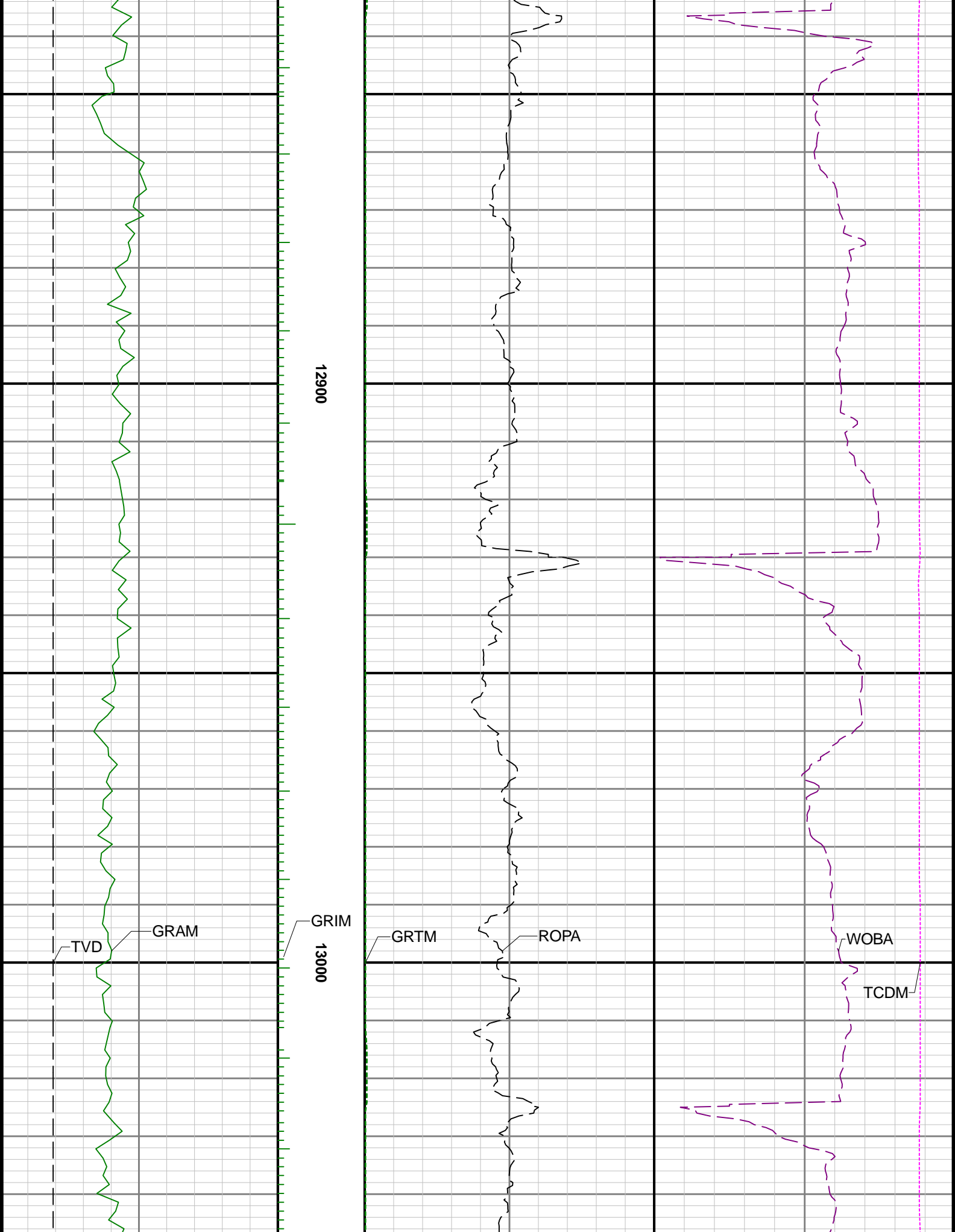
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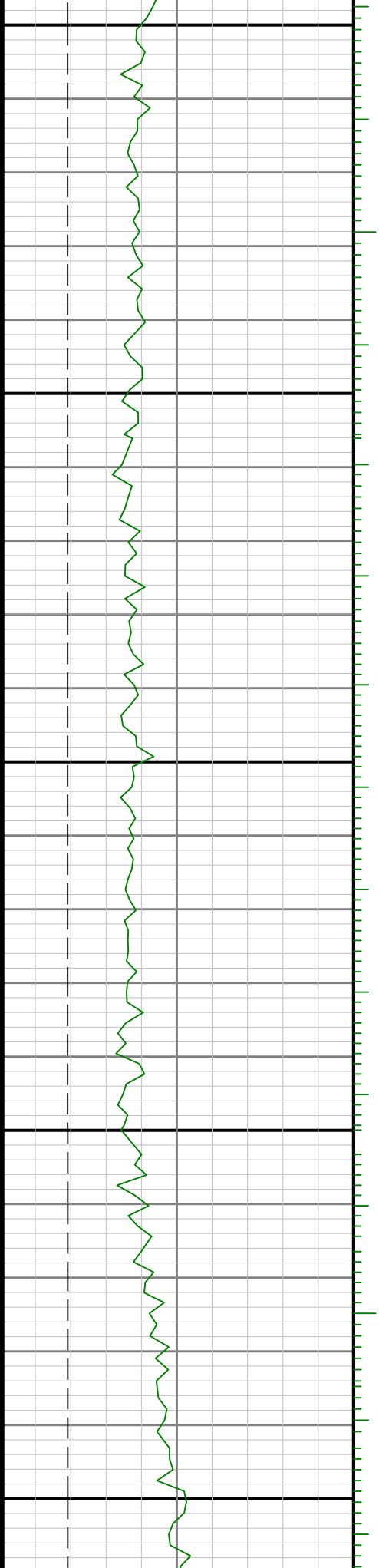


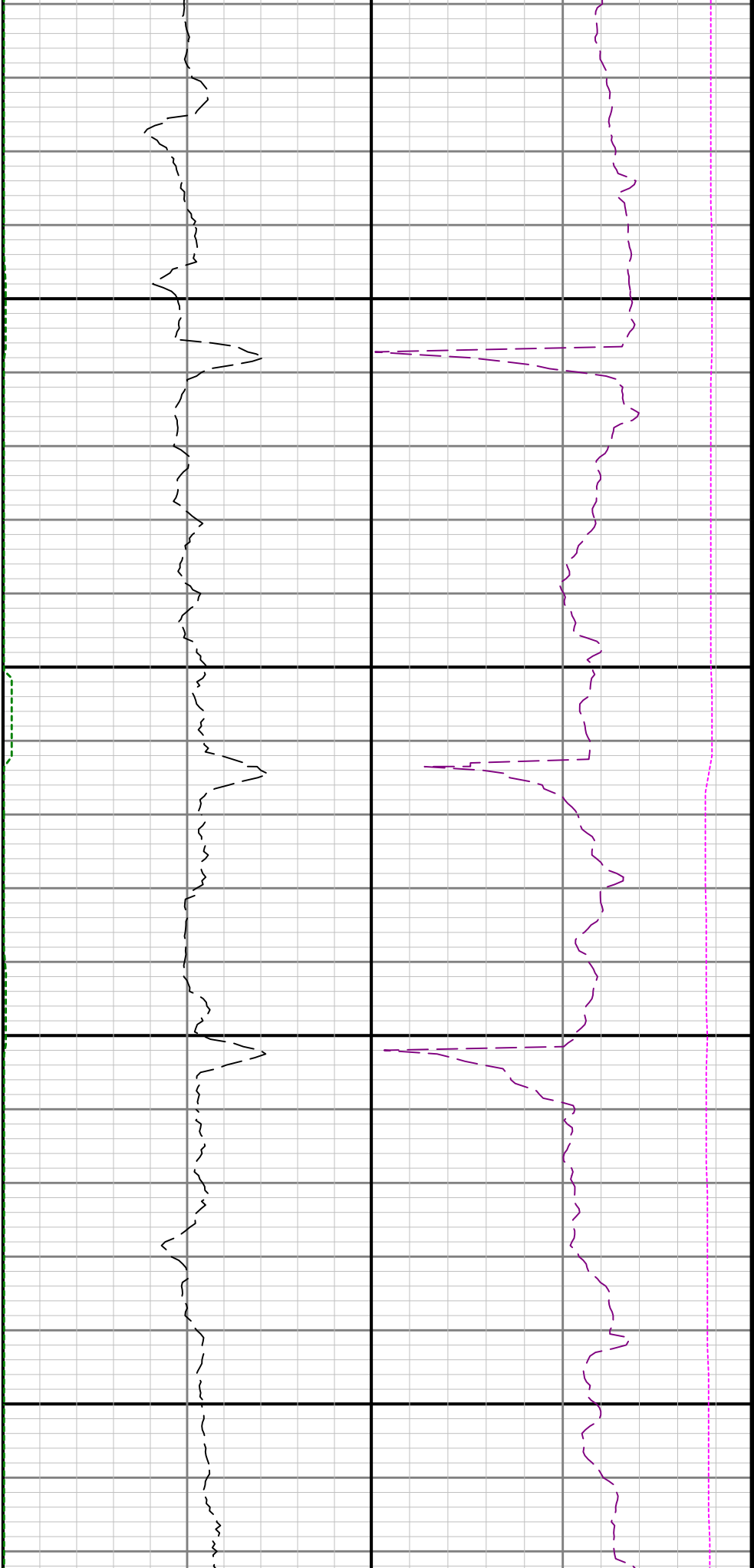




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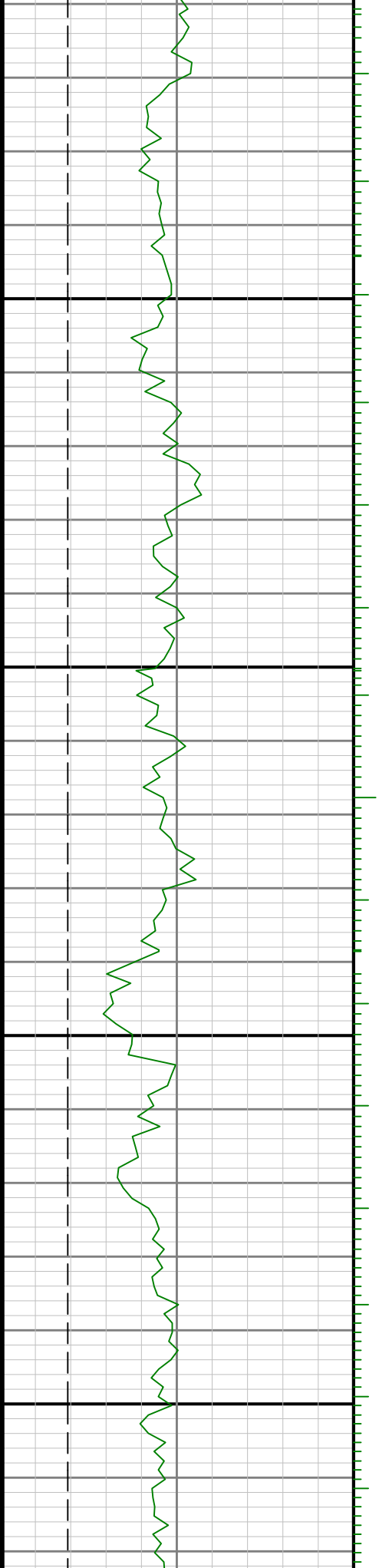
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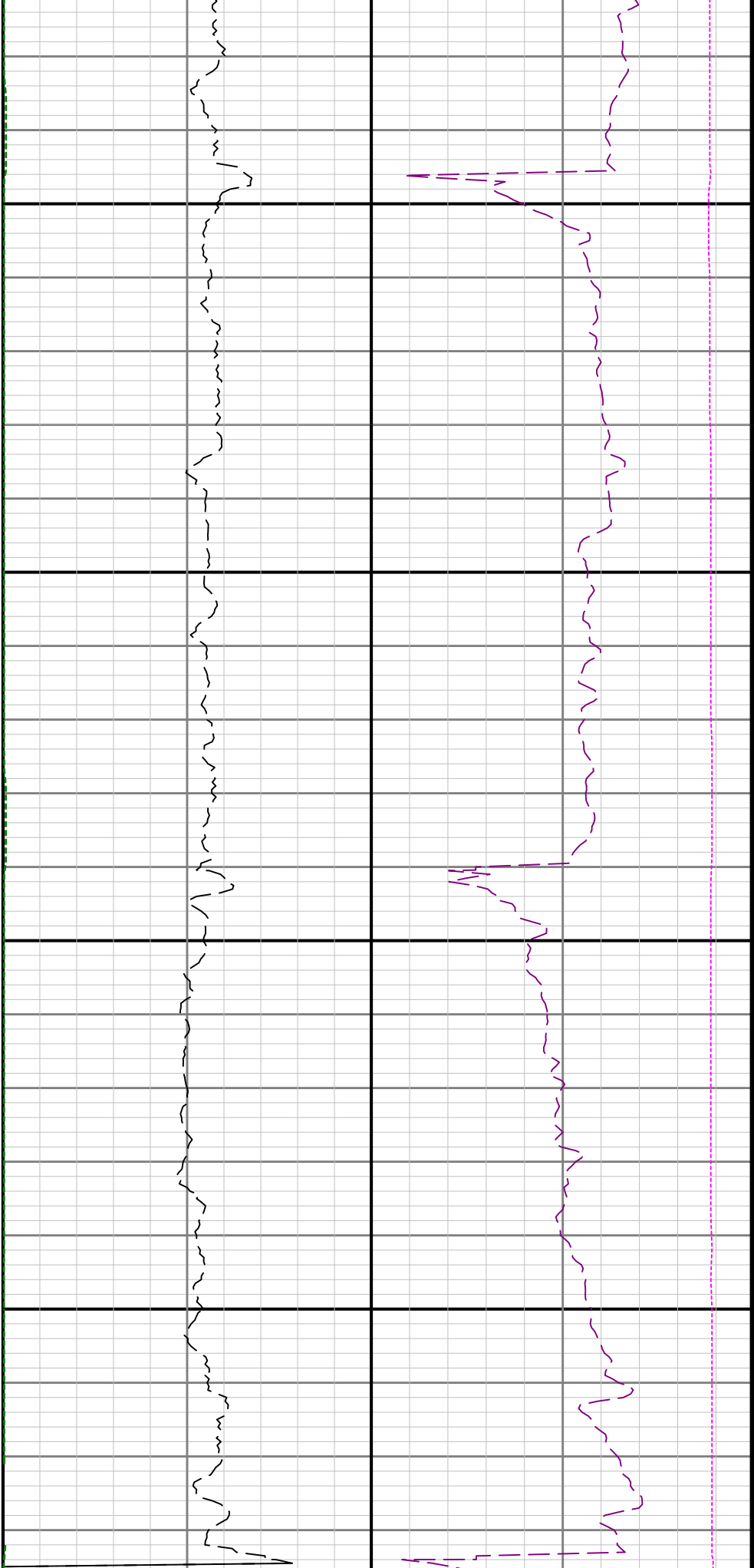




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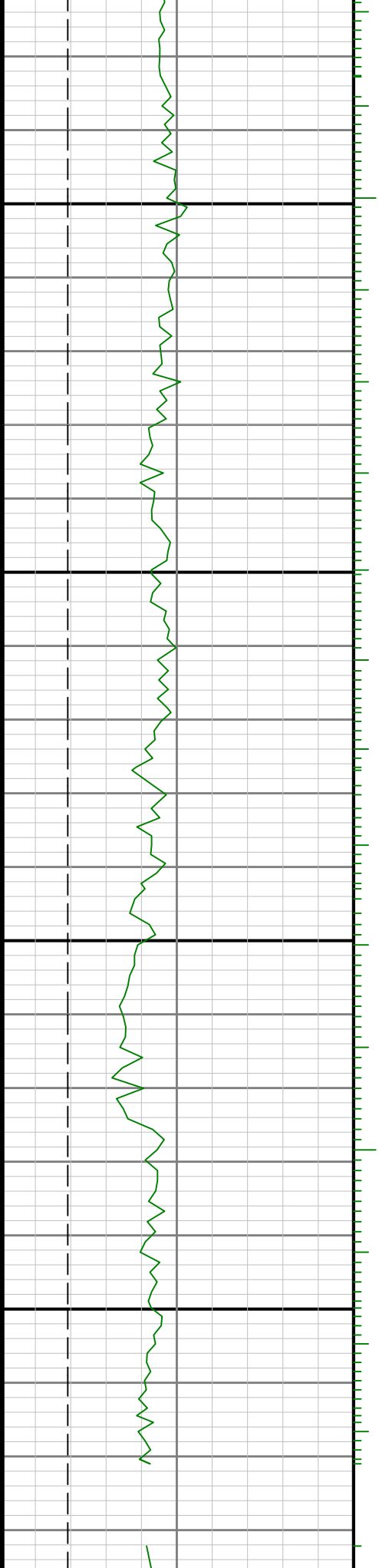
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13500

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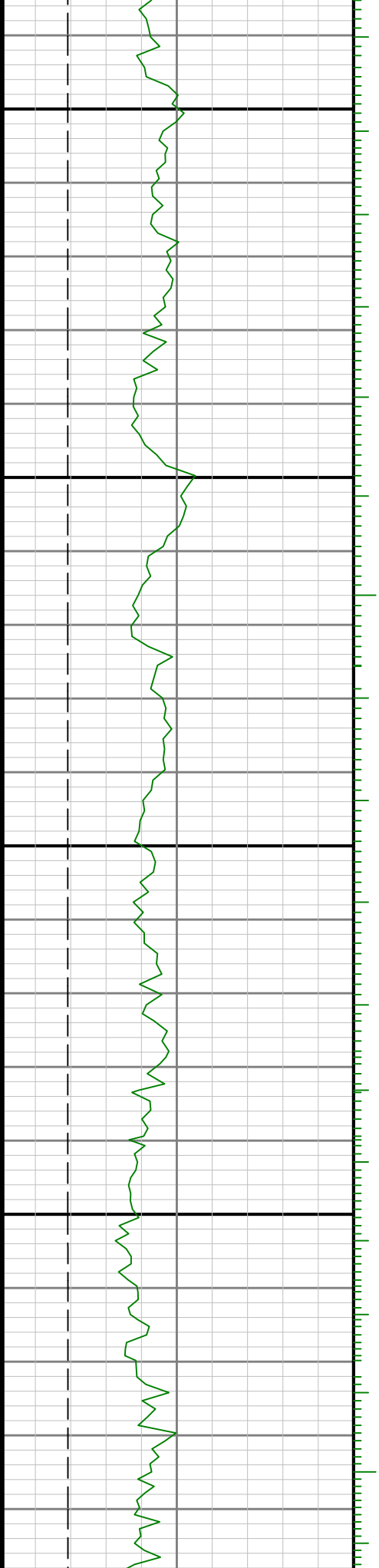


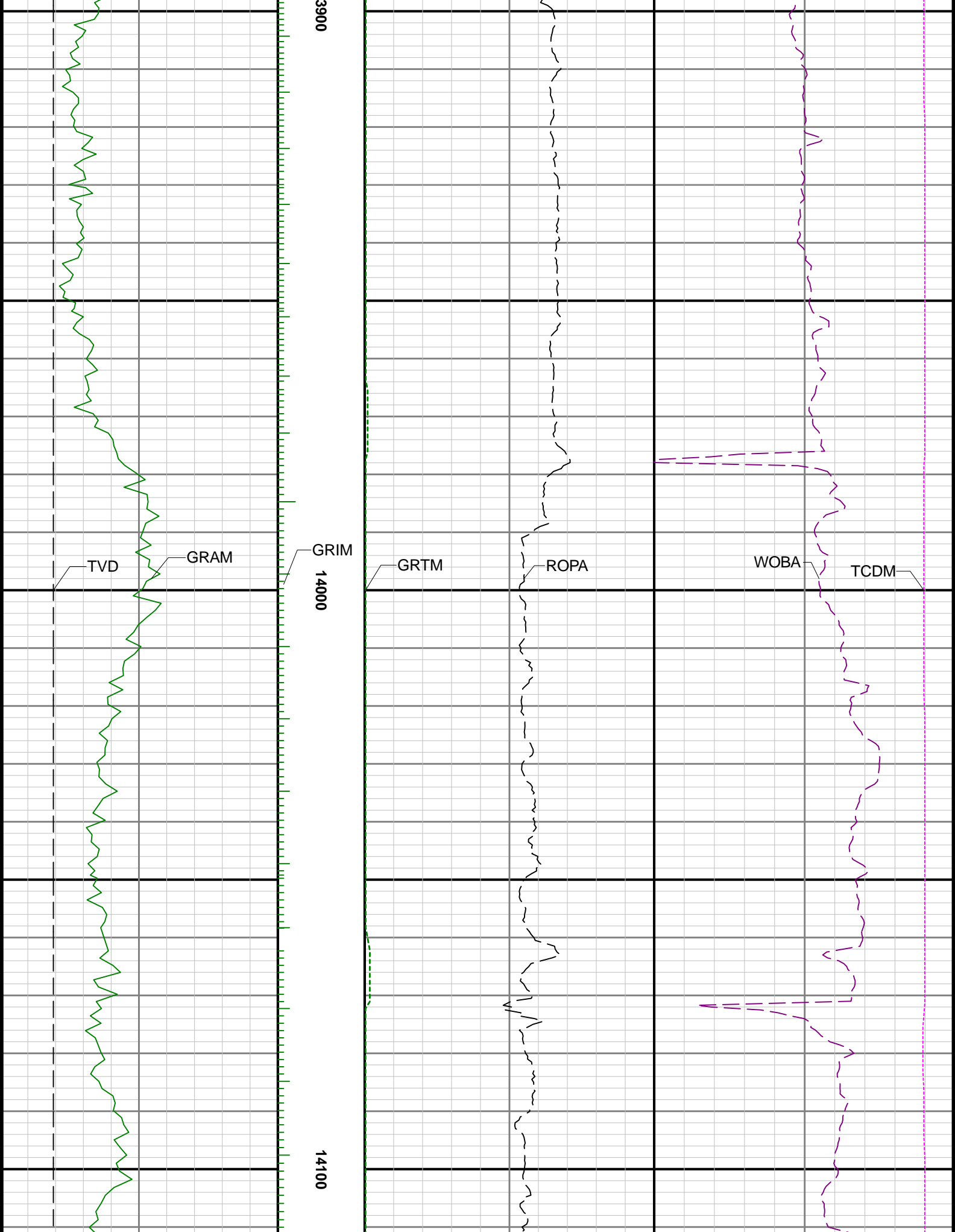


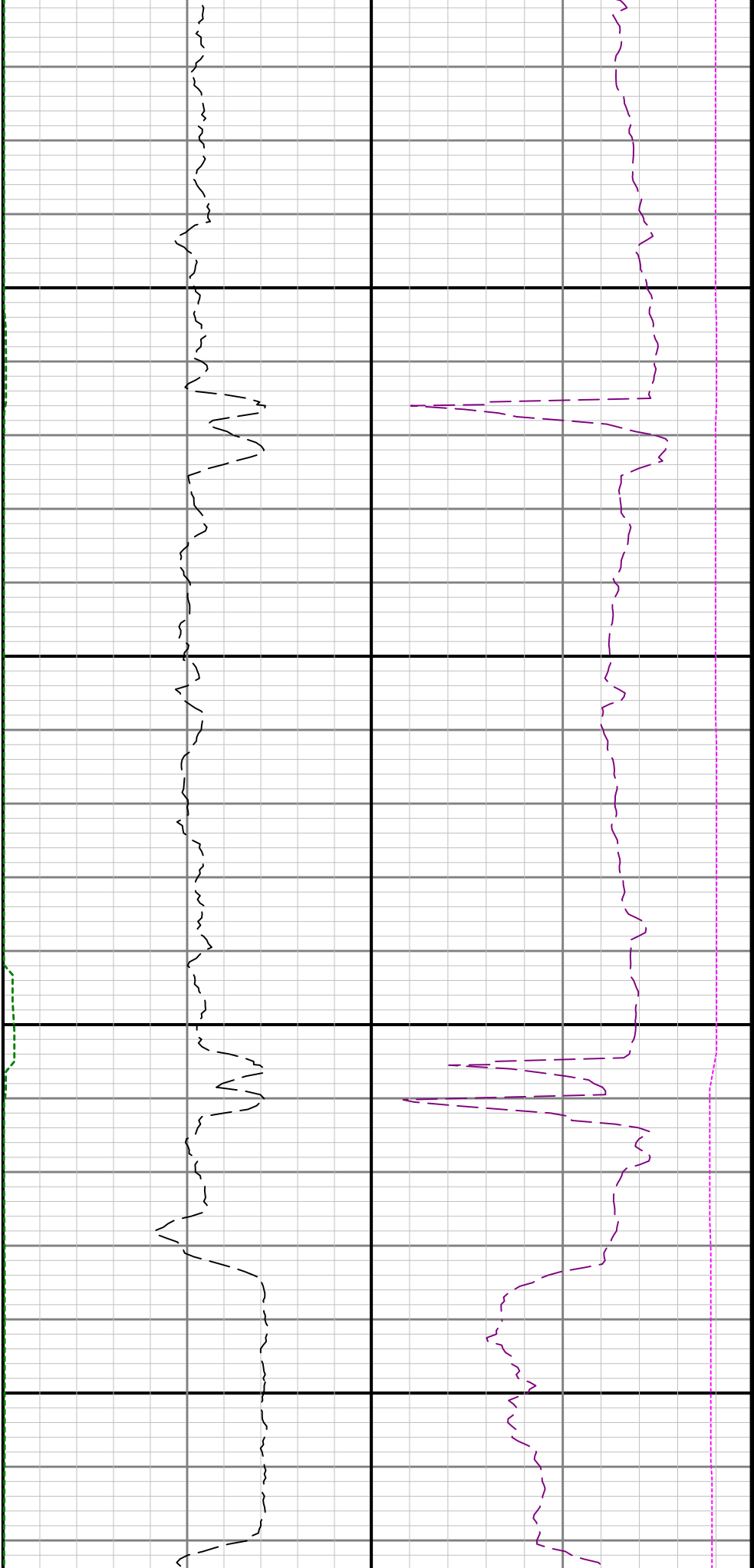
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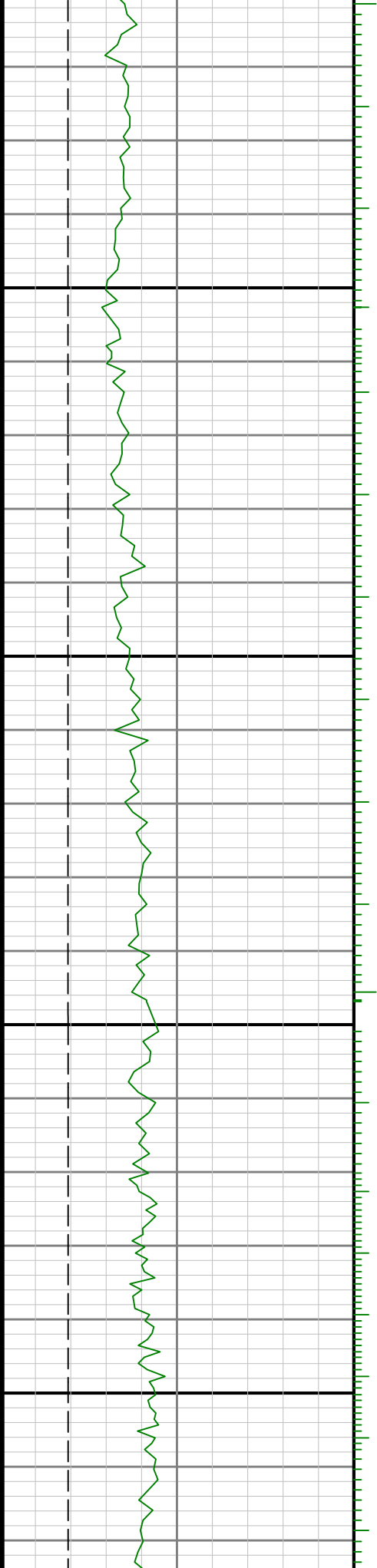


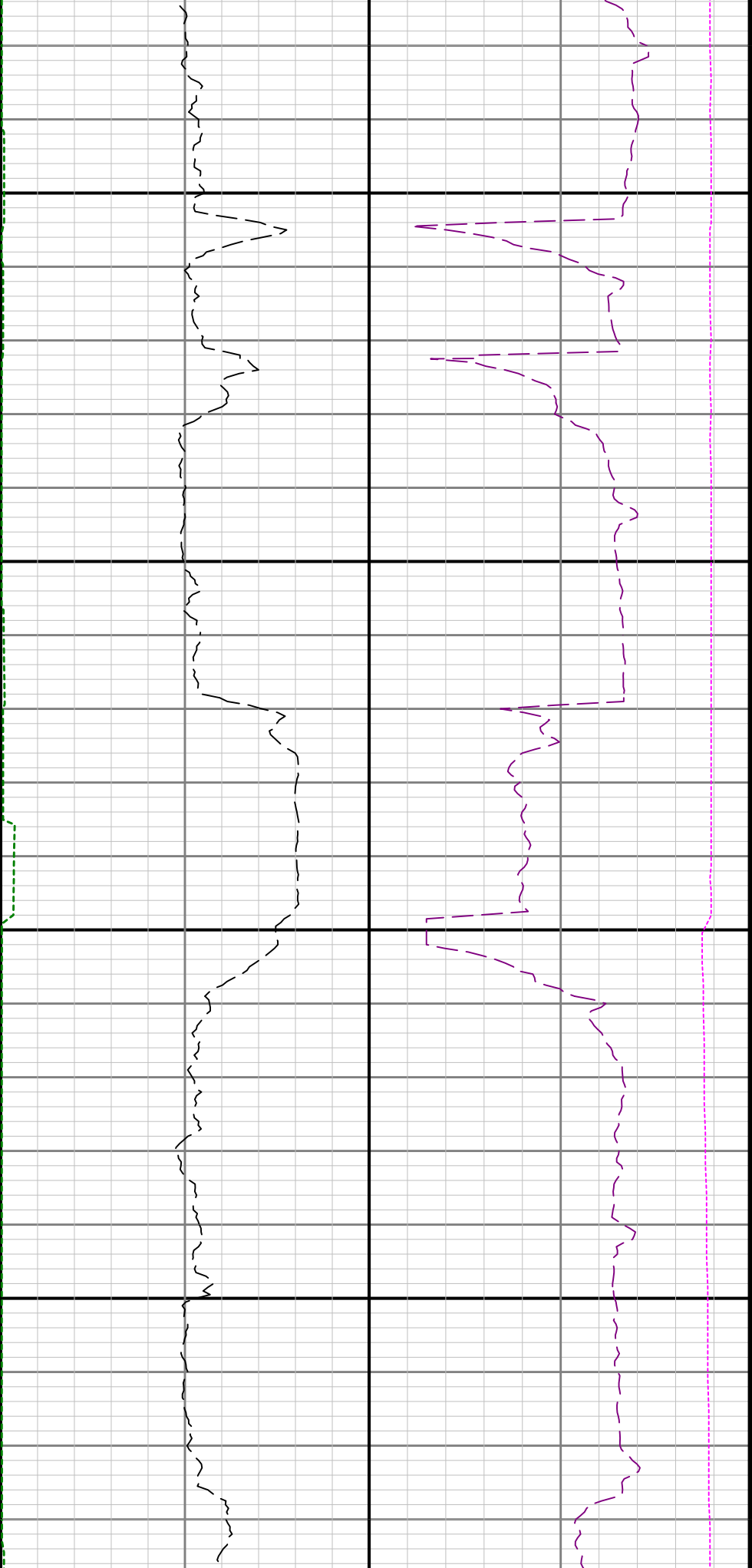




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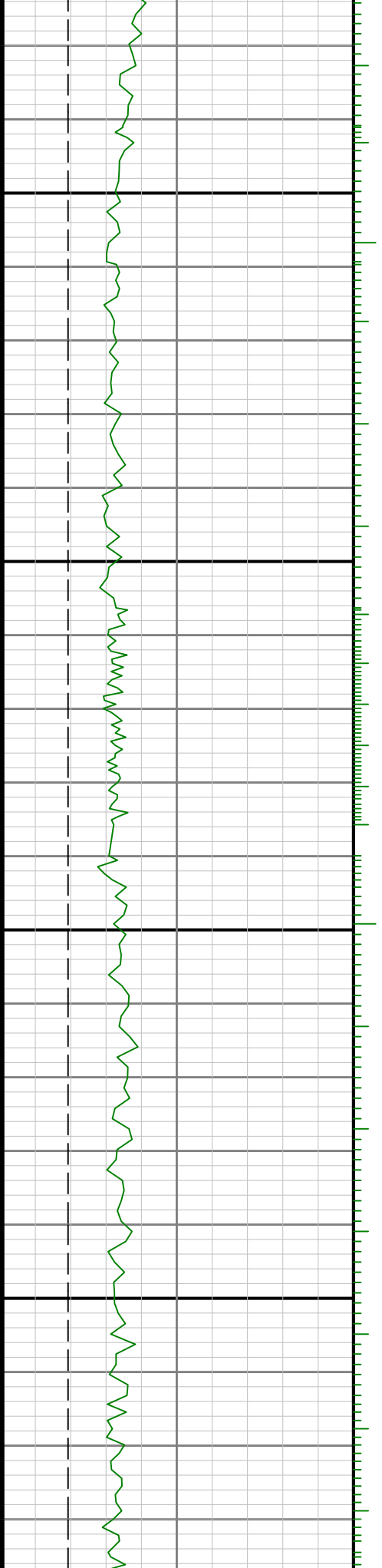
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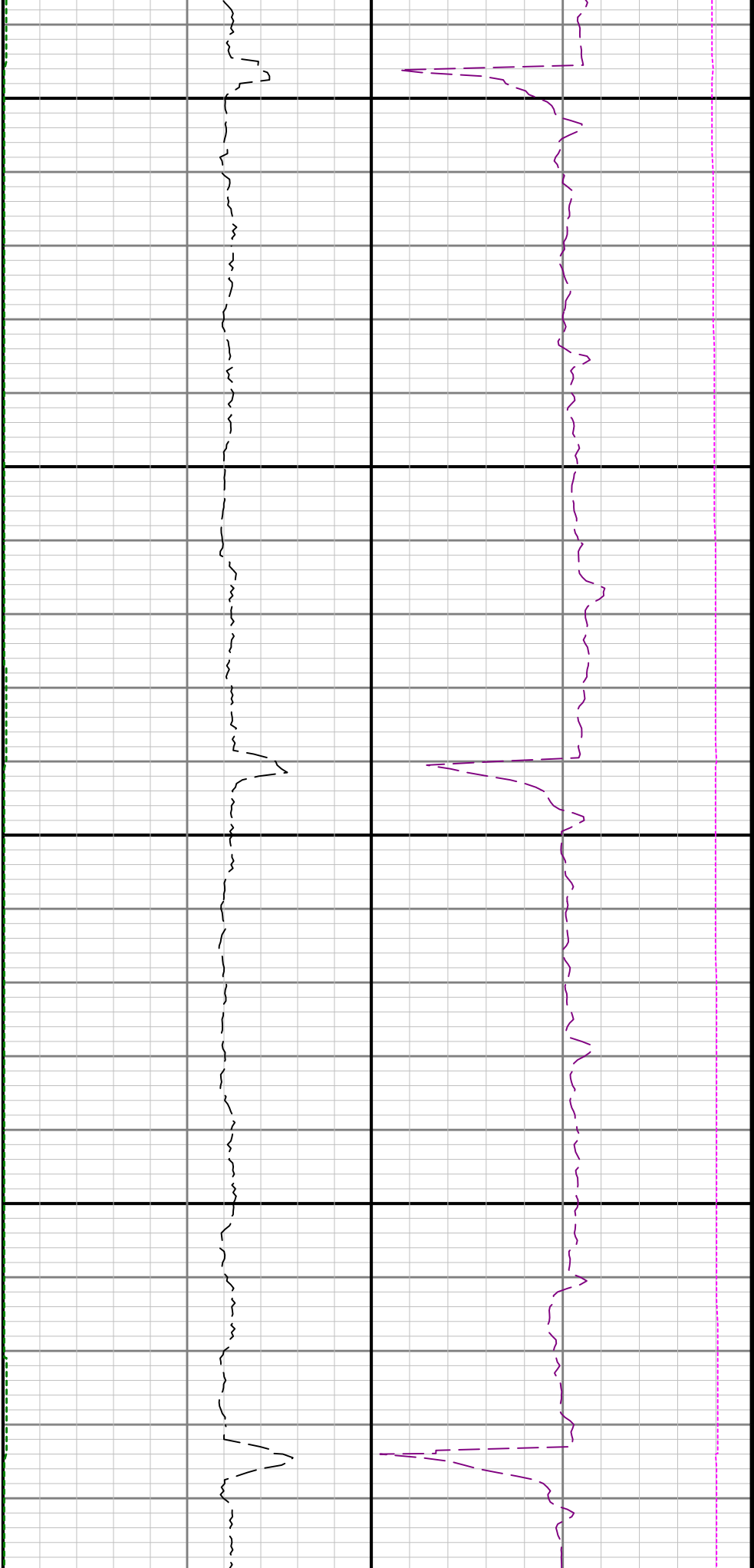




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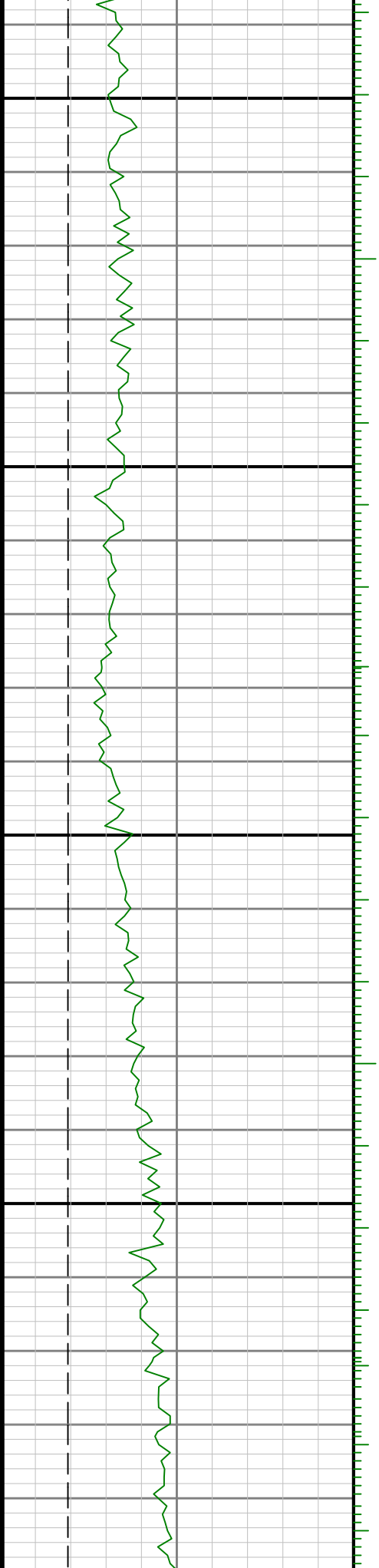
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14600

14700





14800

14900

