


LWD MEMORY LOG									
<div><div><div>BAKER HUGHES</div><div>a GE company</div></div><div></div></div>			Gamma Ray						
Scale:	Company: Noble Energy								
Measured Depth	1:240	Well: Guttersen D29-738							
		Field: Wattenberg							
Depth Reference:		County:	Weld	Country: United States					
Driller's Depth		State:	Colorado						
Status:	Final Print		Surface Location:		Other Services:				
API No:	05-123-48045-00	Latitude:		040° 11' 49.452" N					
Job ID:	109539062	Longitude:		104° 34' 33.384" W					
Permanent Datum (P.D.):	Mean Sea Level	SEC:		29	TWN:	3N	RGE:	64W	Directional
	Log Measured From:	Rig Floor	Elevation:		Above P.D.		0.00 ft		Elev. KB: 4812.00 ft
							4812.00 ft		Elev. DF: 4782.00 ft
Dates			Interval Drilled			Magnetic Field Reference			
Date From:	2019-01-06	Top: (ft)	1969.00	Azi Reference North:		Grid	Dip Angle: (deg)		66.68
Date To:	2019-01-10	Bottom: (ft)	17760.00	Total Magnetic Field Strength: (nT)					52084
Spud Date:	2019-01-05			Mag to Reference North Correction: (deg)					7.49
Borehole Record			Casing Record						
Hole Size (in)	From (ft)	To (ft)	Size (in)	Weight (lb/ft)	From (ft)	To (ft)			
13.500	30.00	1969.00	9.625	36.00	30.00	1959.00			
8.500	1969.00	17760.00							
Mud Record			Deviation Record						
Type	From (ft)	To (ft)	Hole Size (in)	Interval (ft)	Inc Az (Start)	Inc Az (End)			
Oil Based Mud	1969.00	17760.00	8.500	15791.00	0.65 307.15	90.09 2.85			
Acquisition System			Software Version			Other			
Baker Hughes Cadence	RT 5.0		Rig:		H&P 517				
Plot Studio	5.0.8260.3		Contractor:		Helmerich & Payne Drilling Co				
			District:		RMA		Unit:		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	Rotary Steerable	1969.00	17747.00	1969.00	17760.00	2019-01-07 22:09	2019-01-09 08:26	53.15

Crew								
Name	Arrive Wellsite	Depart Wellsite	Name	Arrive Wellsite	Depart Wellsite	Name	Arrive Wellsite	Depart Wellsite
Andrew Hays	2019-01-06	2019-01-10						

Mud Properties Record											
Date / Time	Run No.	Measured Depth (ft)	Mud Type	Density (ppg)	Viscosity (cP)	pH	Fluid Loss (cm3)	Oil / Water	Source	Total Chlorides (ppm)	K+ (%)
2019-01-06 15:00	1	1969.00	Oil Based Mud	8.5	10	N/A	N/A	80.2/19.8	Active Pit	26500	0.00
2019-01-07 04:00	1	3642.00	Oil Based Mud	10.0	10	N/A	N/A	80.2/19.8	Active Pit	28500	0.00
2019-01-08 04:00	1	10279.00	Oil Based Mud	12.0	12	N/A	N/A	81.8/18.2	Active Pit	27500	0.00
2019-01-09 04:00	1	16680.00	Oil Based Mud	13.0	13	N/A	N/A	83.7/16.3	Active Pit	23500	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	14645503	Near Bit VSS	5.93	6.73	7.000	4.330
1	AutoTrak Curve Steering Unit	14645503	Near Bit Inclination	5.93	6.73	7.000	4.330
1	AutoTrak Curve MWD	11993844	Gamma (single)	2.77	12.90	7.000	3.250
1	AutoTrak Curve MWD	11993844	Directional (mag)	12.27	22.40	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 the lack of control by Baker Hughes, depth calibrations and measurements could not be independently verified.
- 2
- Baker Hughes LWD run 1 utilized a 6.75 inch NaviGamma service (Directional and Gamma Ray) behind a 8.5 inch bit and rotary steerable assembly from 1969 to 17760 feet MD (1969 to 6893 feet TVD).
- 3
- The Gamma Ray Apparent (GRAM) data is presented 0 to 300 API, per the customer's request.

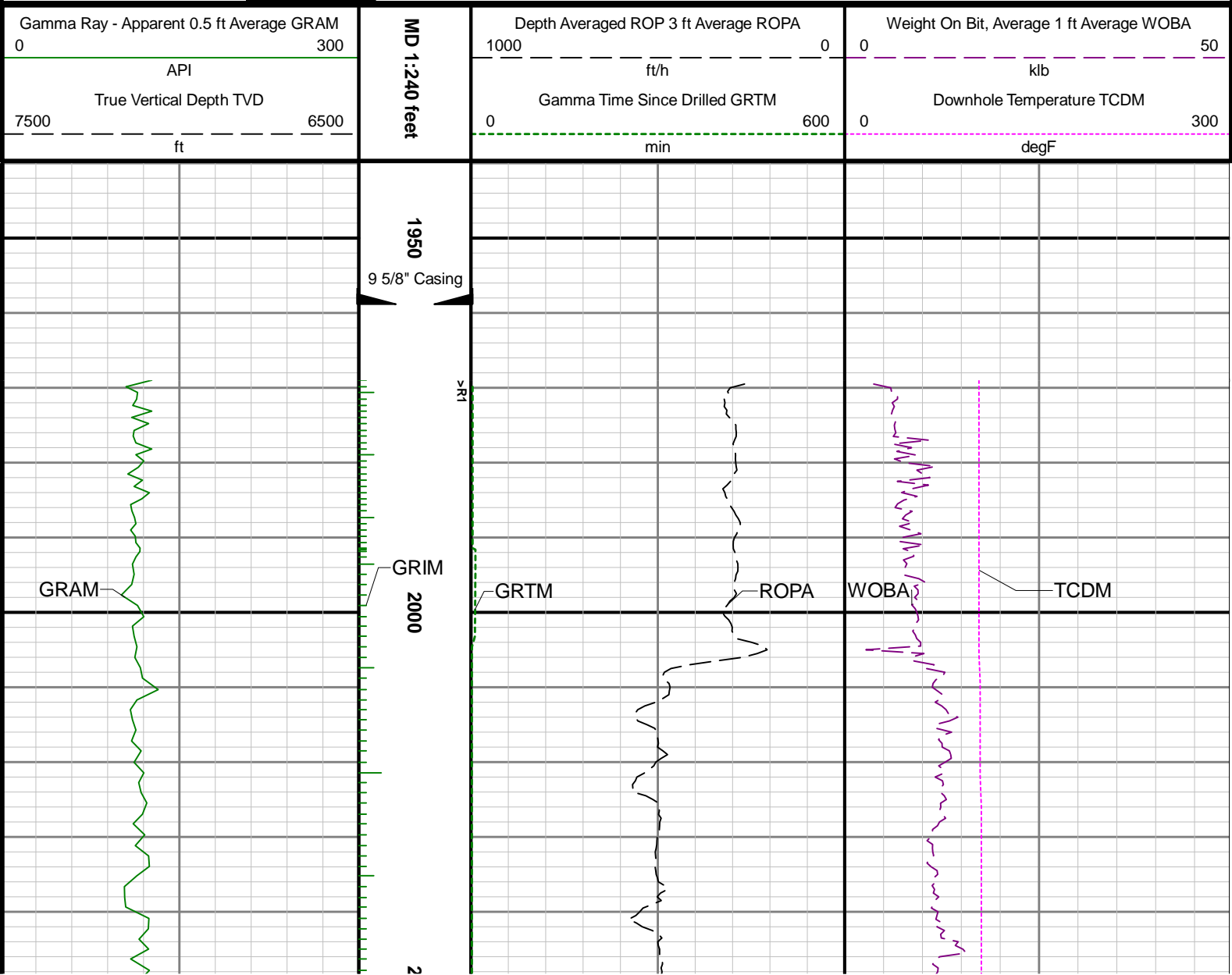
Remarks

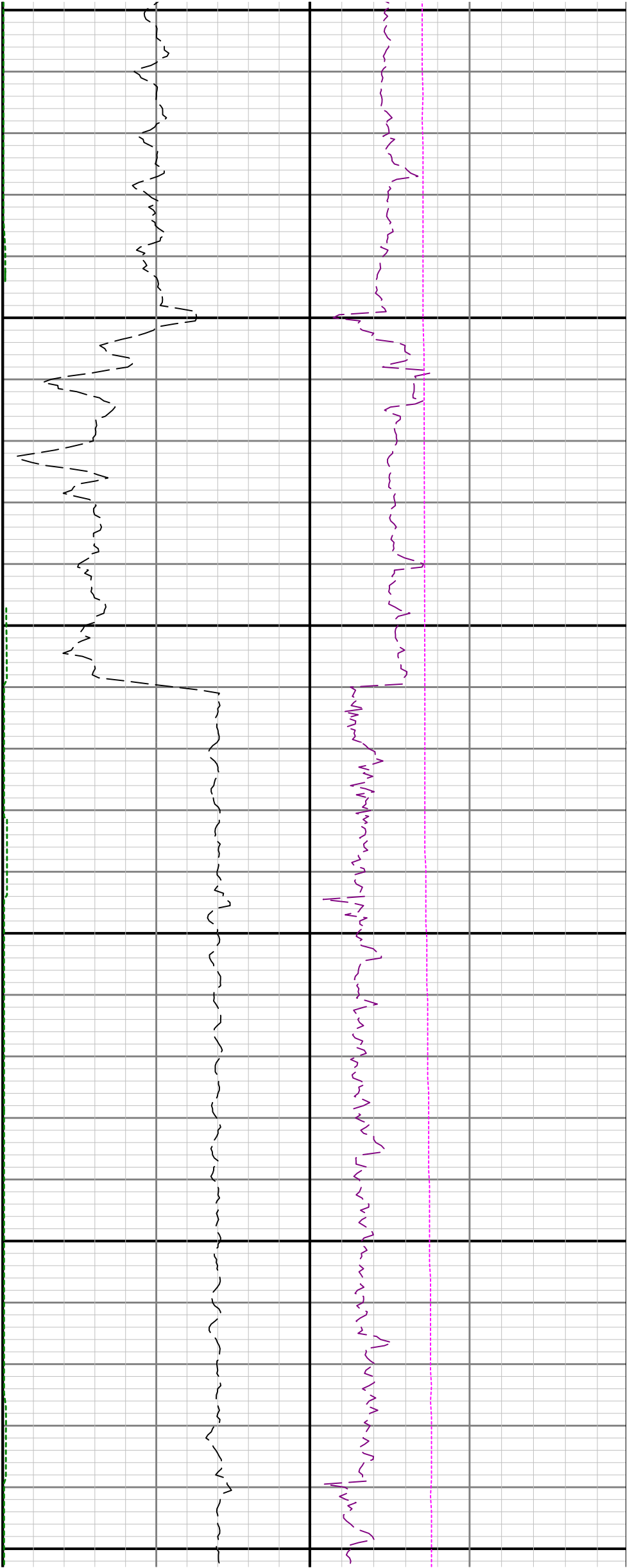
Number	Measured Depth (ft)	Hole Section (in)	Run No.	Remark
1	2094.00	8.500	1	The interval from 2094 to 2147 feet MD (2094 to 2147 feet TVD) was not logged after being drilled due to the tool failing to power back on after a downlink.
2	2668.00	8.500	1	The interval from 2668 to 2700 feet MD (2665 to 2696 feet TVD) was not logged after being drilled due to the tool failing to power back on after a downlink.
3	2968.00	8.500	1	The interval from 2968 to 3003 feet MD (2956 to 2990 feet TVD) was not logged after being drilled due to the tool failing to power back on after a downlink.
4	7604.00	8.500	1	The interval from 7604 to 7656 feet MD (6921 feet TVD) was not logged after being drilled due to the tool failing to power back on after a downlink.
5	17760.00	8.500	1	The interval from 17747 to 17760 feet MD (6893 feet TVD) was not logged after being drilled due to sensor to bit offset at well TD.

Curve Mnemonics

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

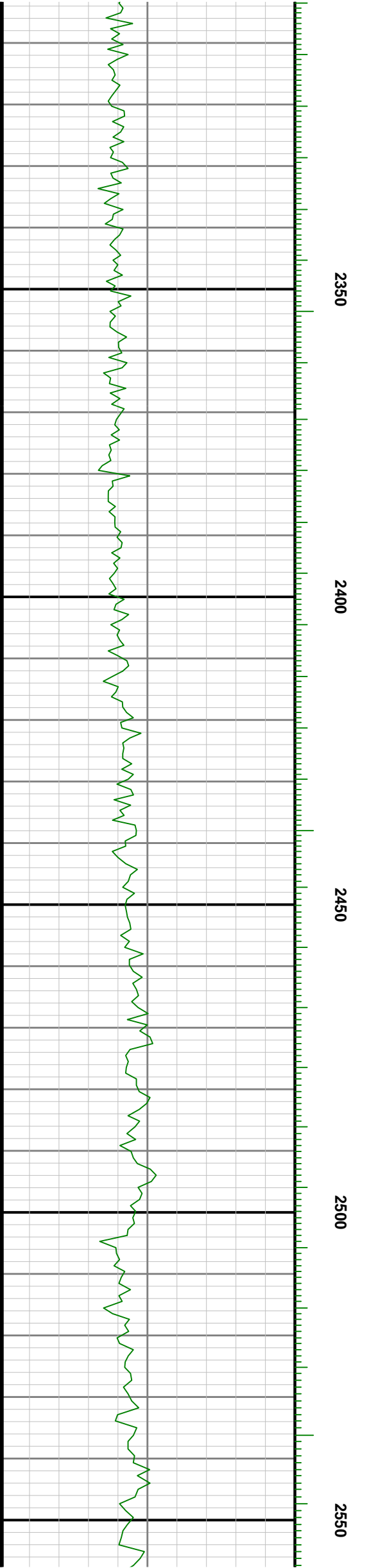
<div><div><div>BAKER HUGHES</div><div>a GE company</div></div><div></div></div>	Company	Noble Energy	
	Well	Guttersen D29-738	
	Interval	Date From:	2019-01-06 20:51
		Date To:	2019-01-10 01:27
	Created	2019-01-10 07:13:27	
		Top:	1969.00 ft
		Bottom:	17760.00 ft

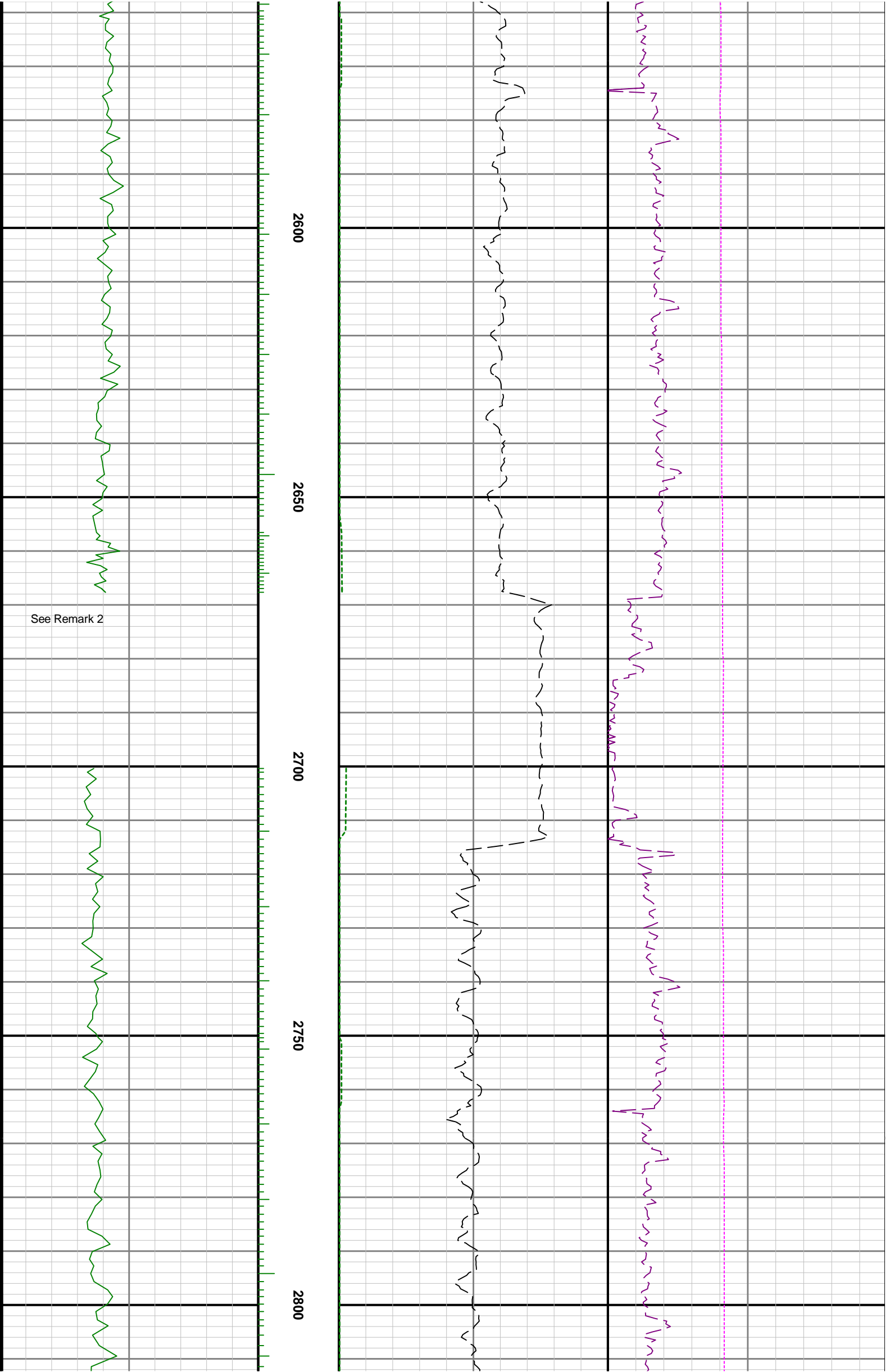


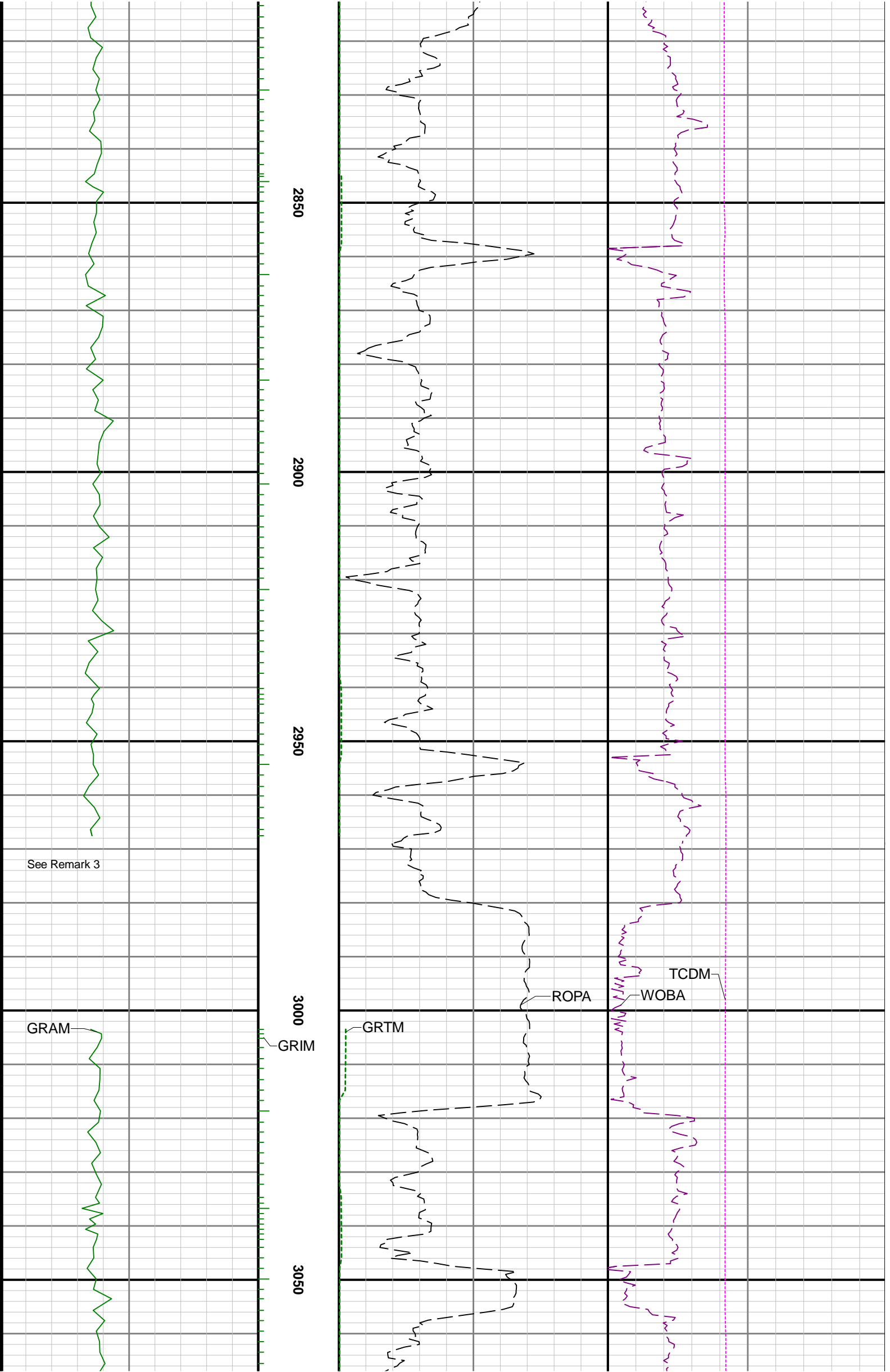


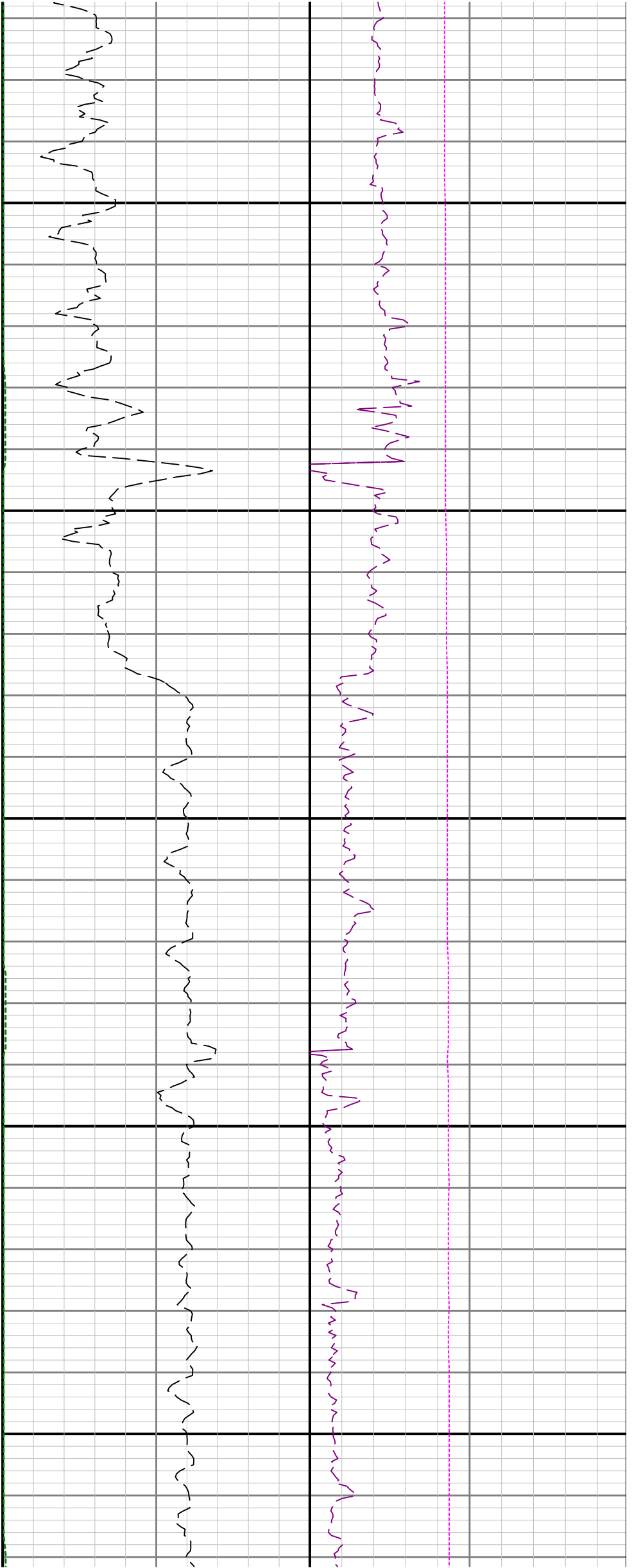
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See Remark 1









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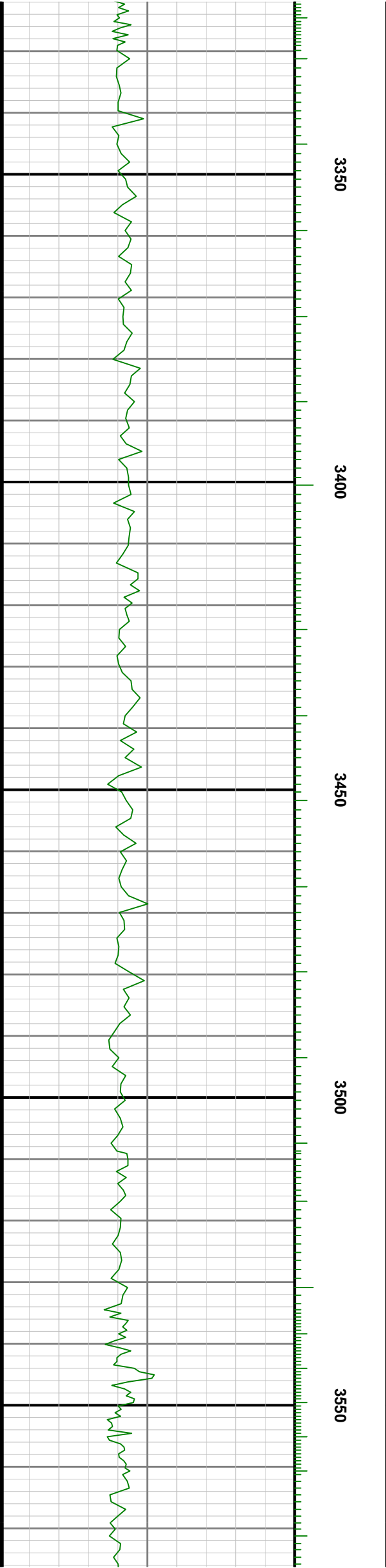
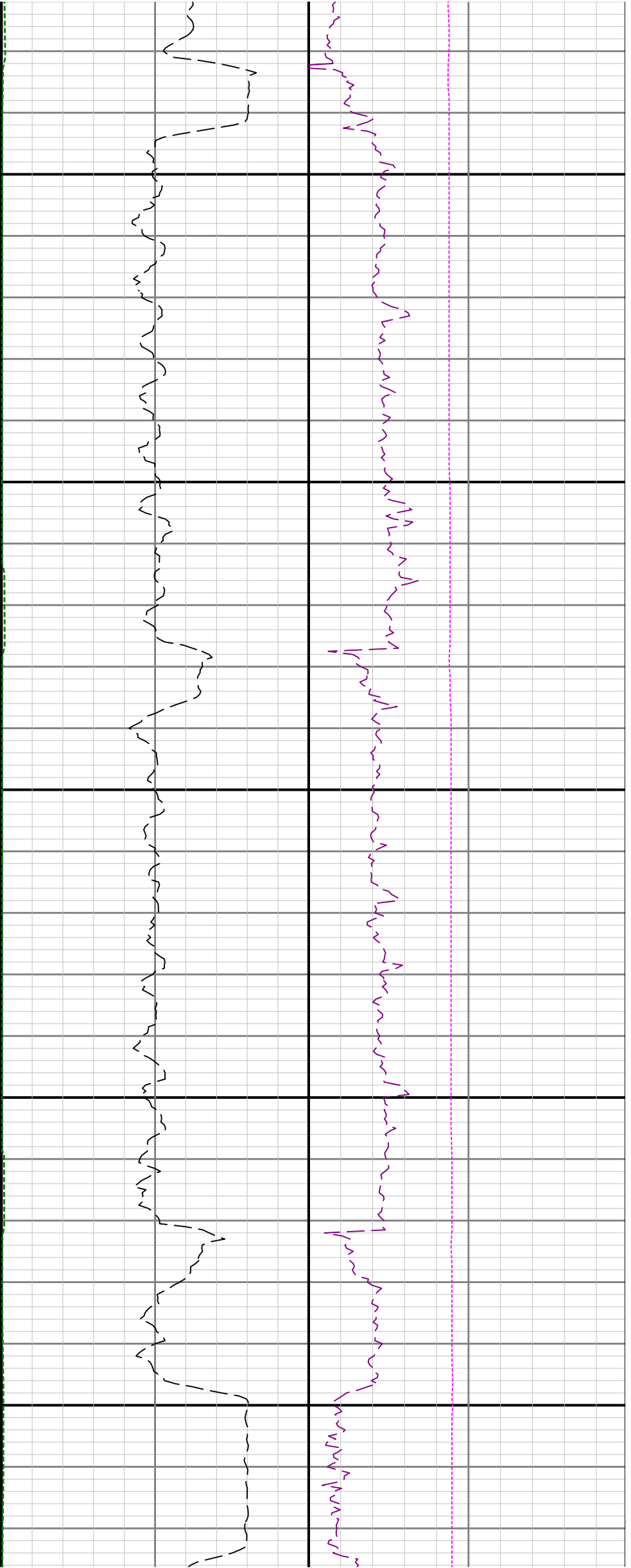
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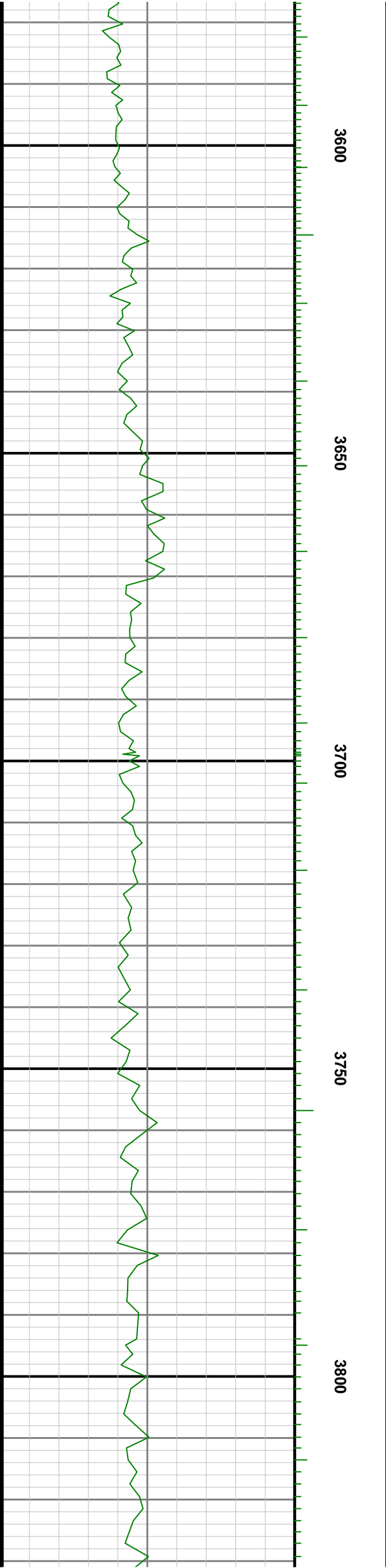
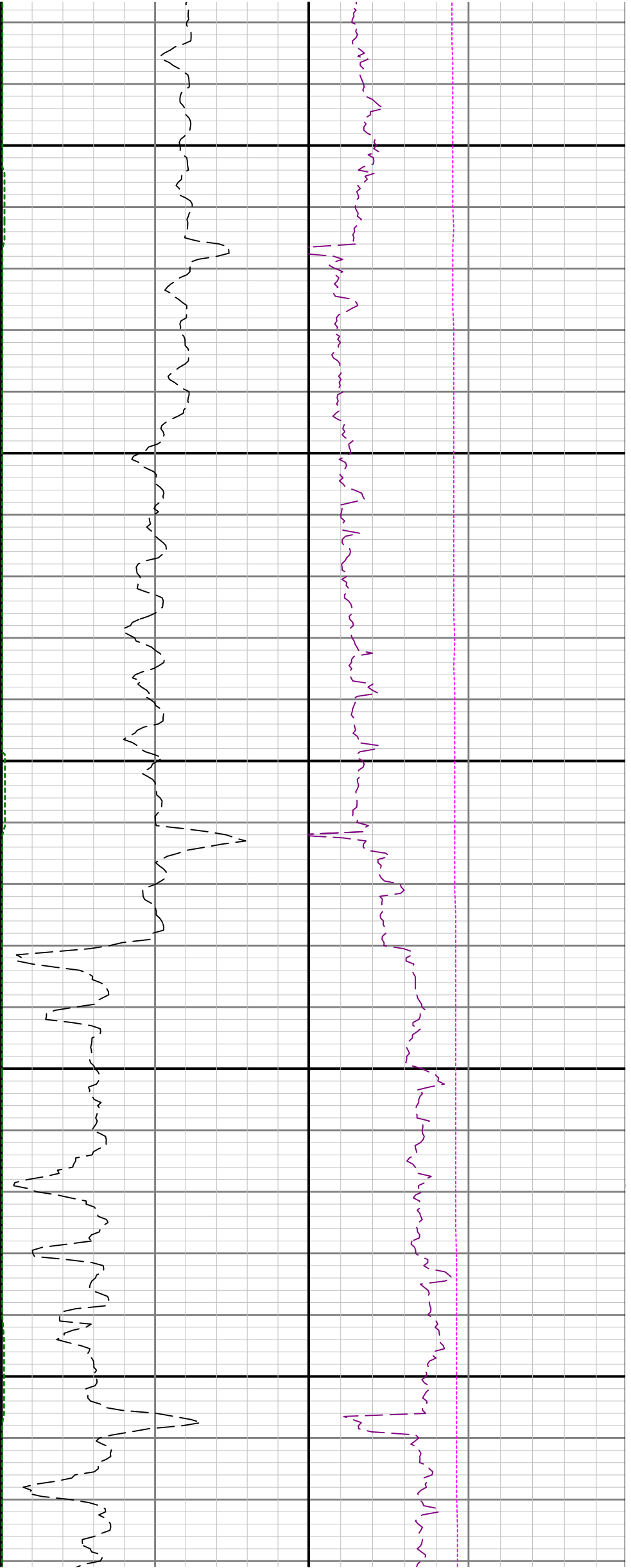
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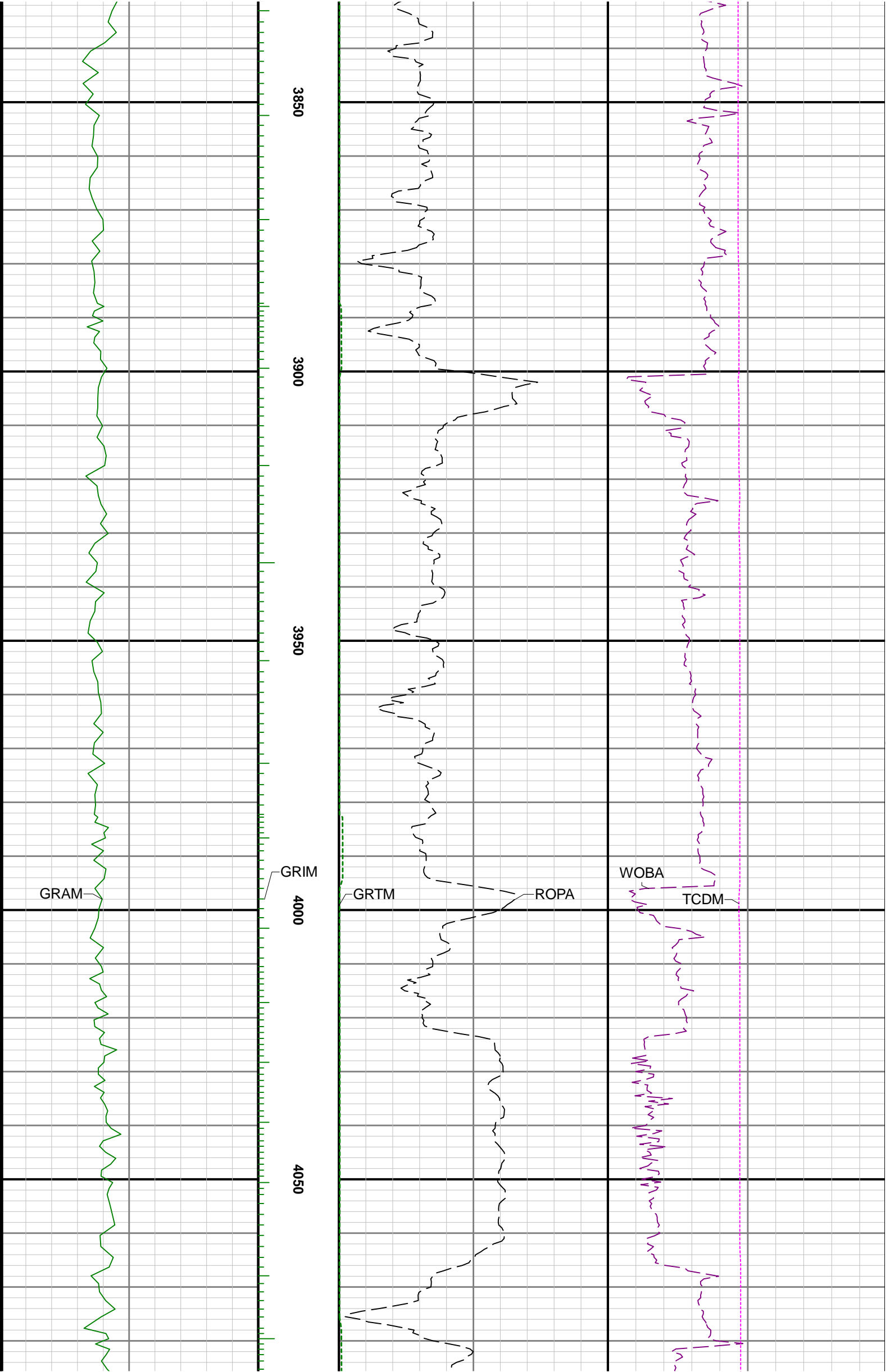
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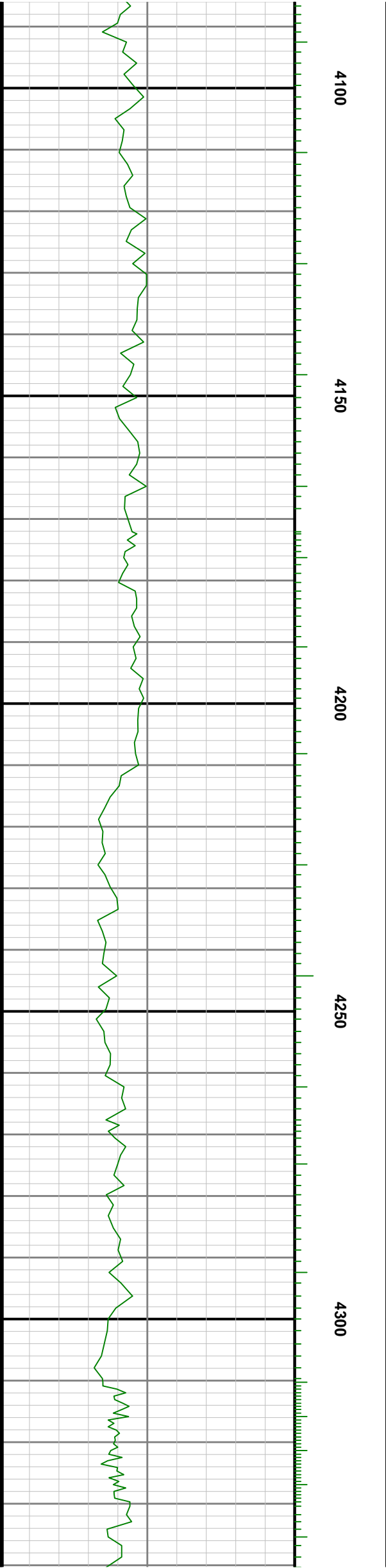
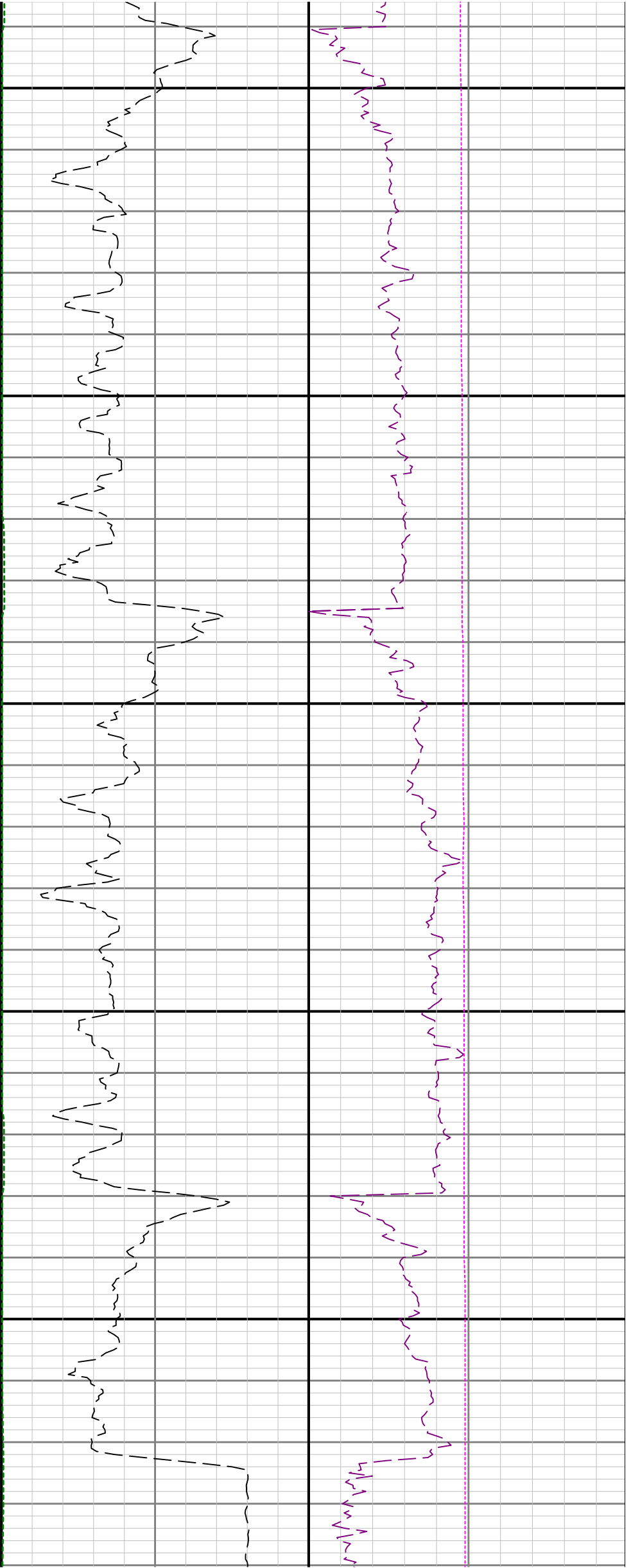
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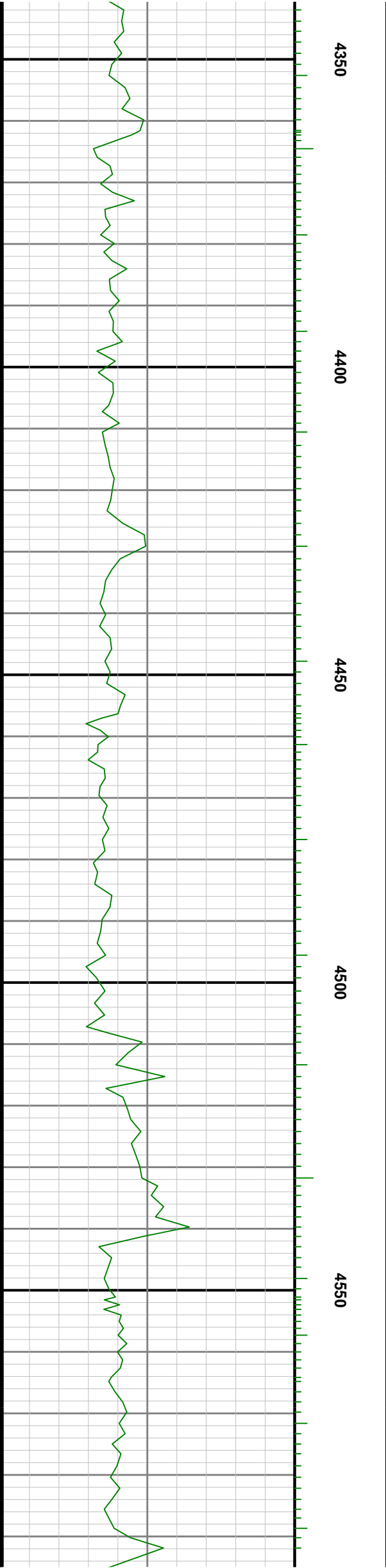
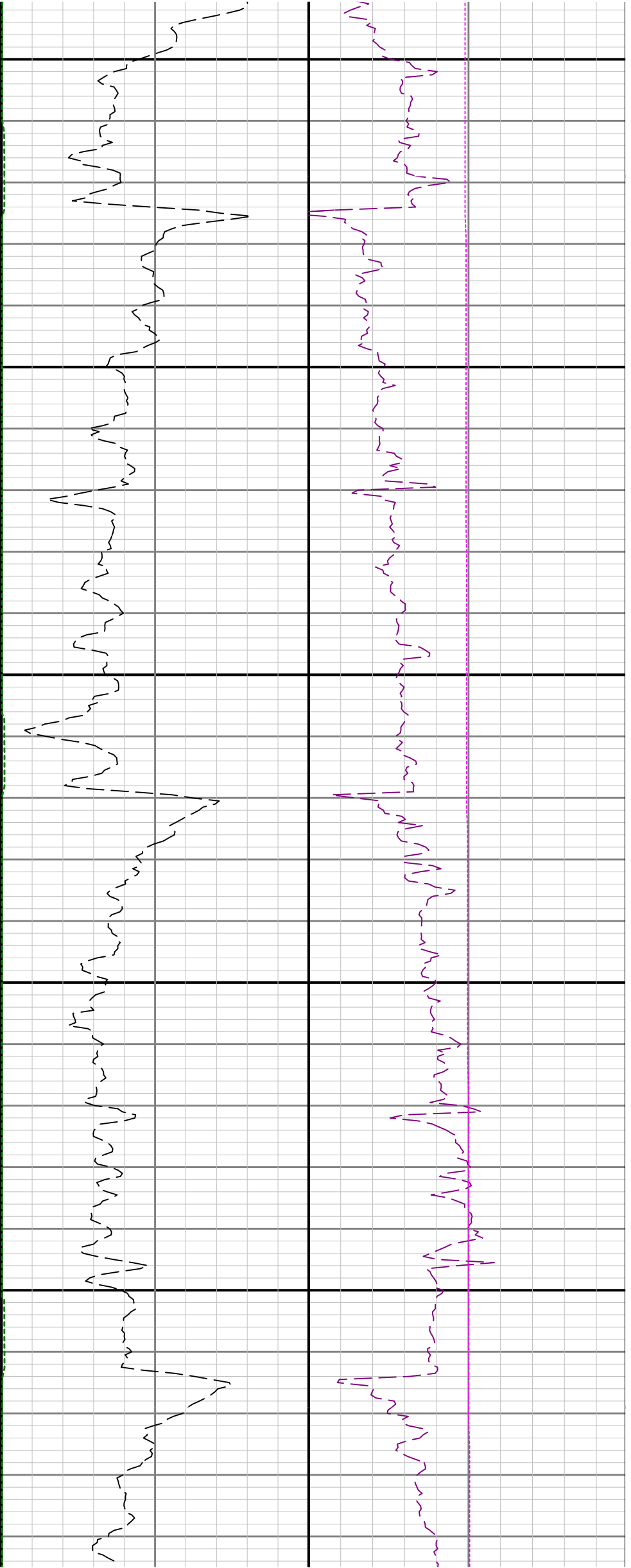


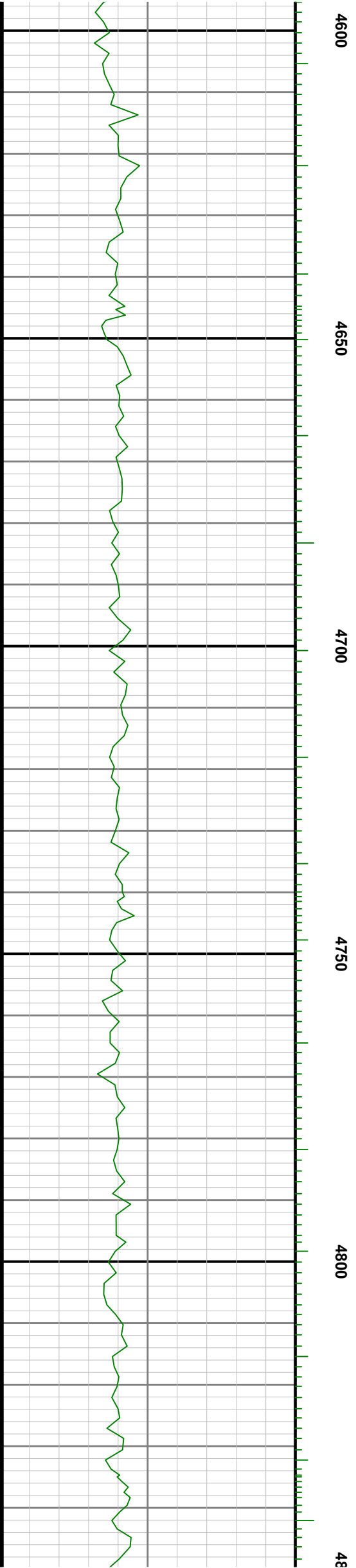
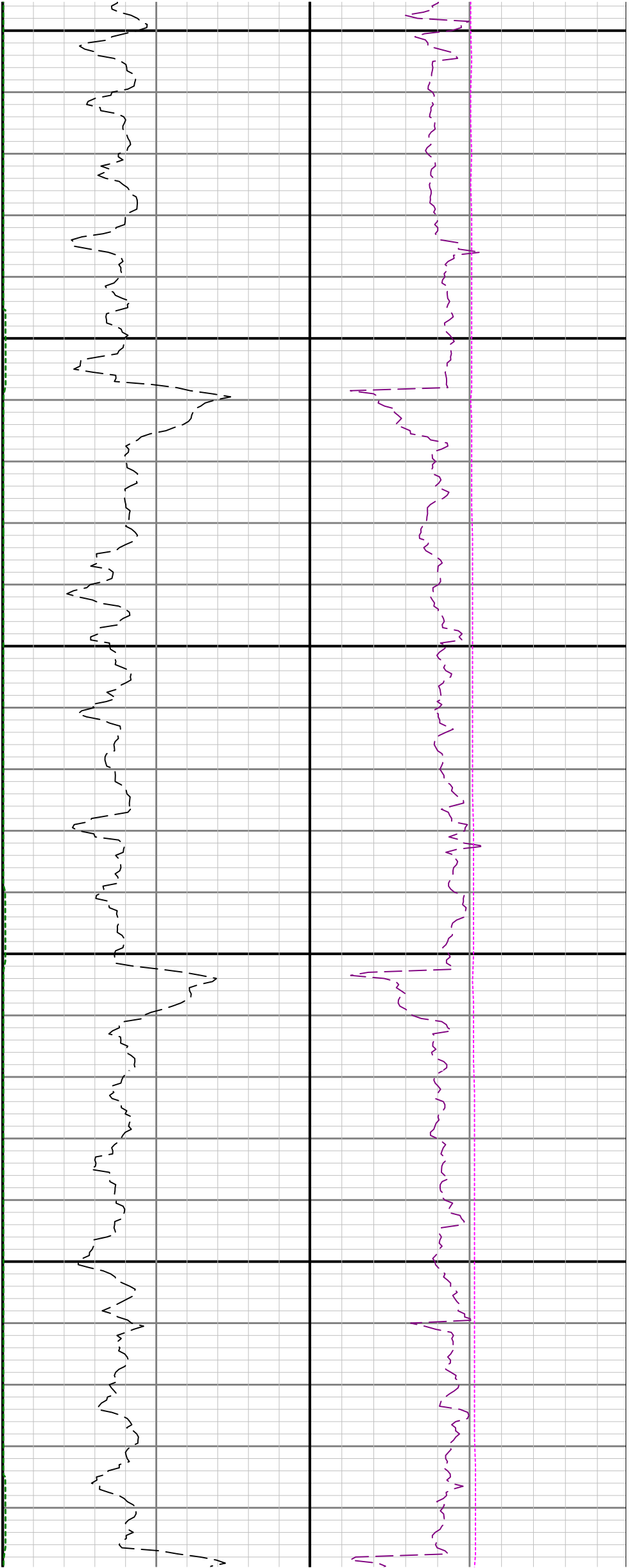


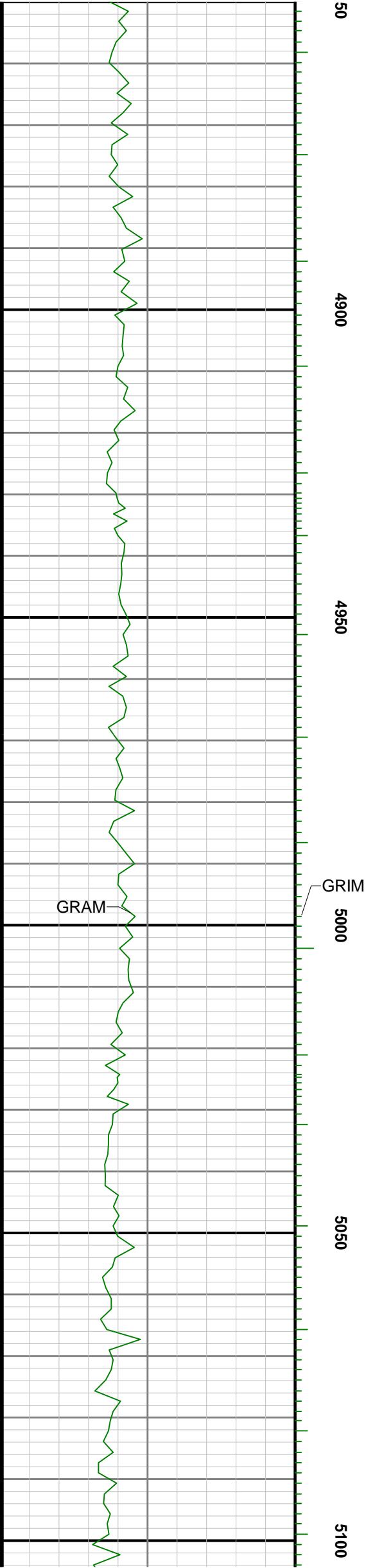
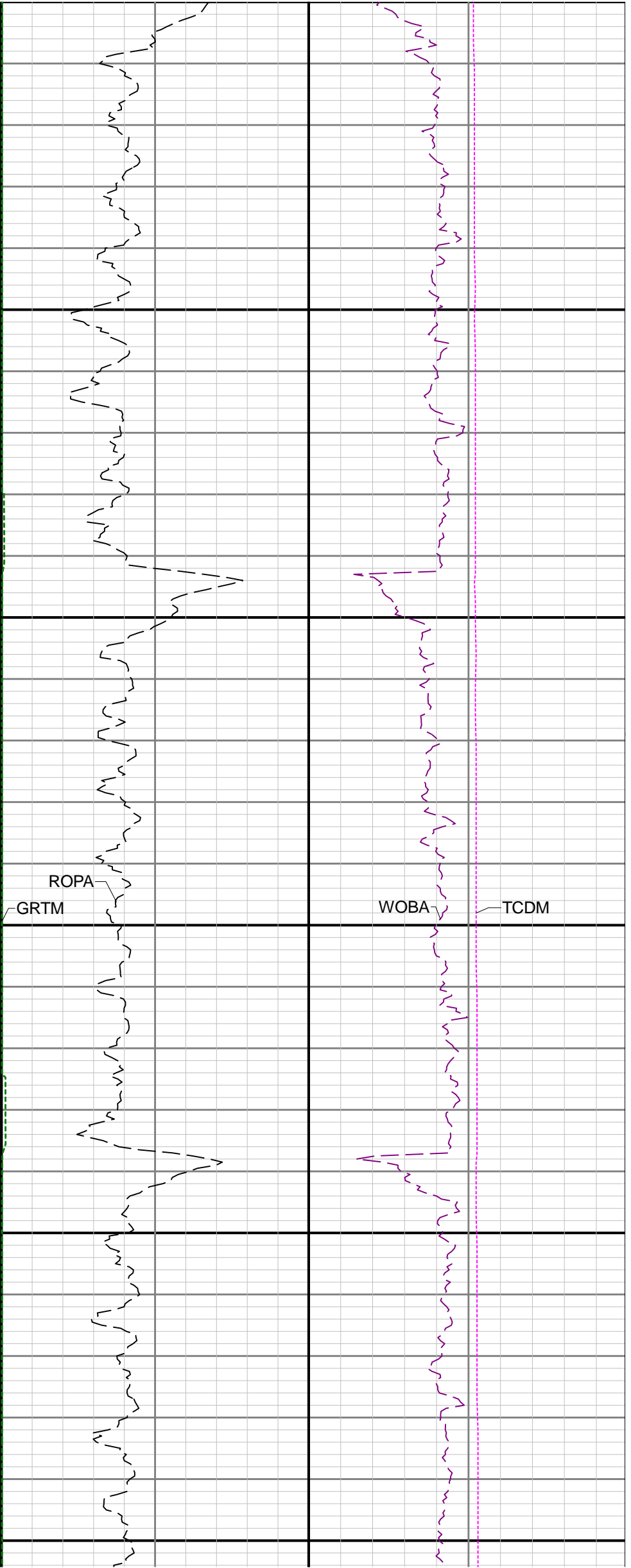


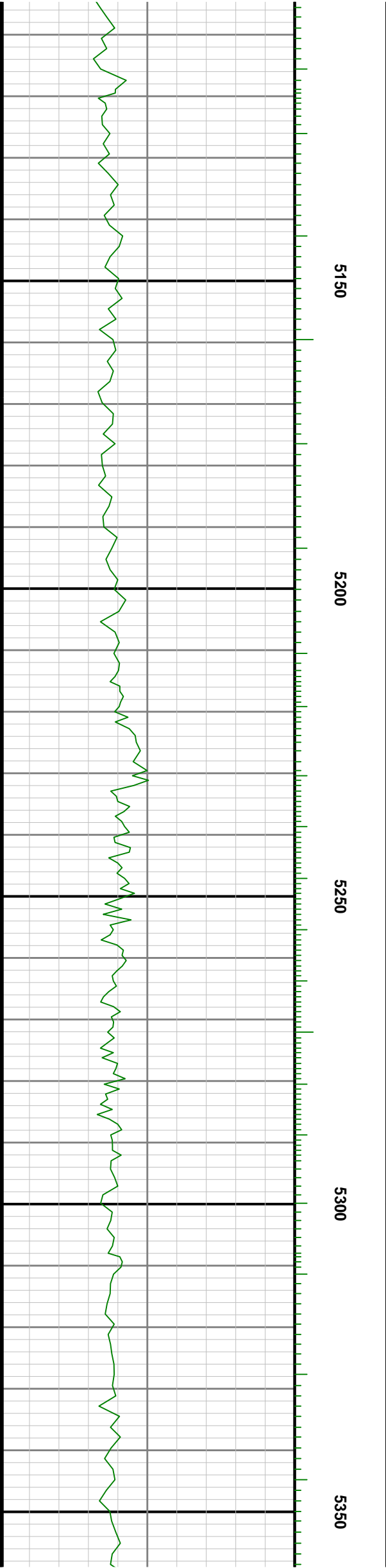
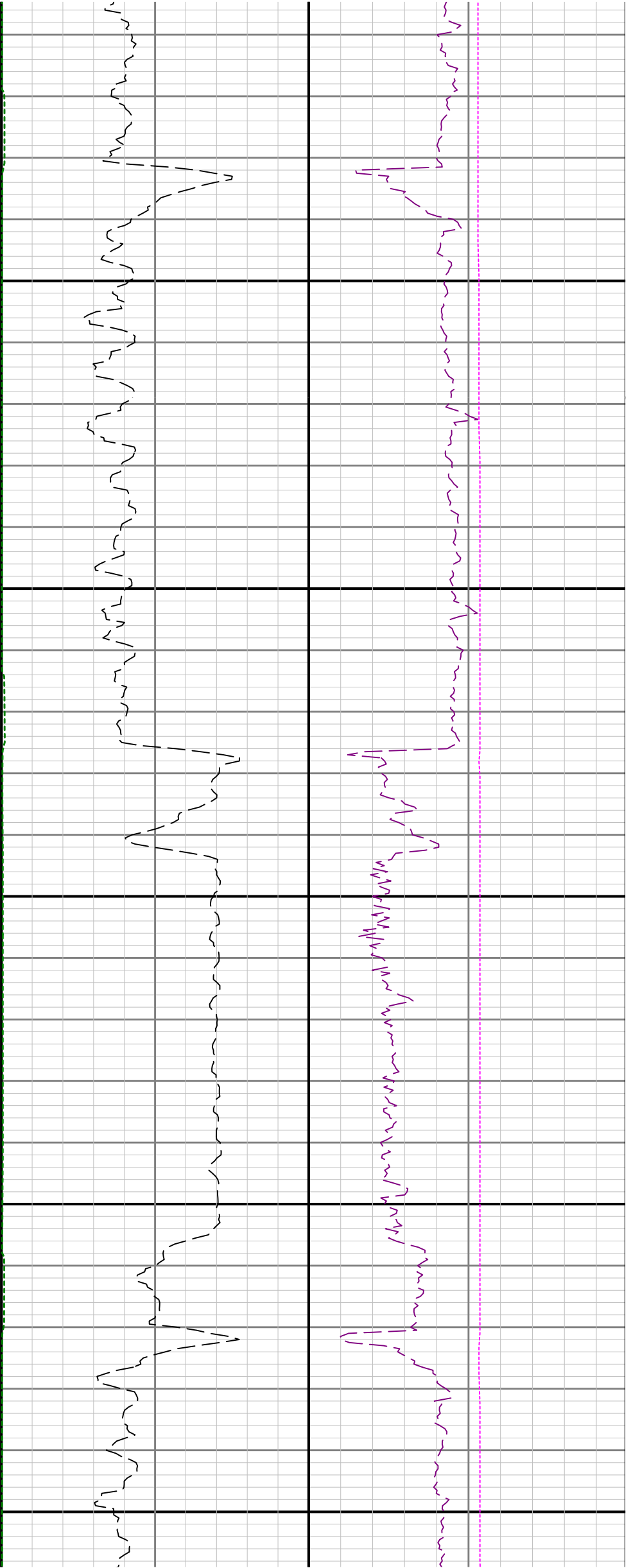


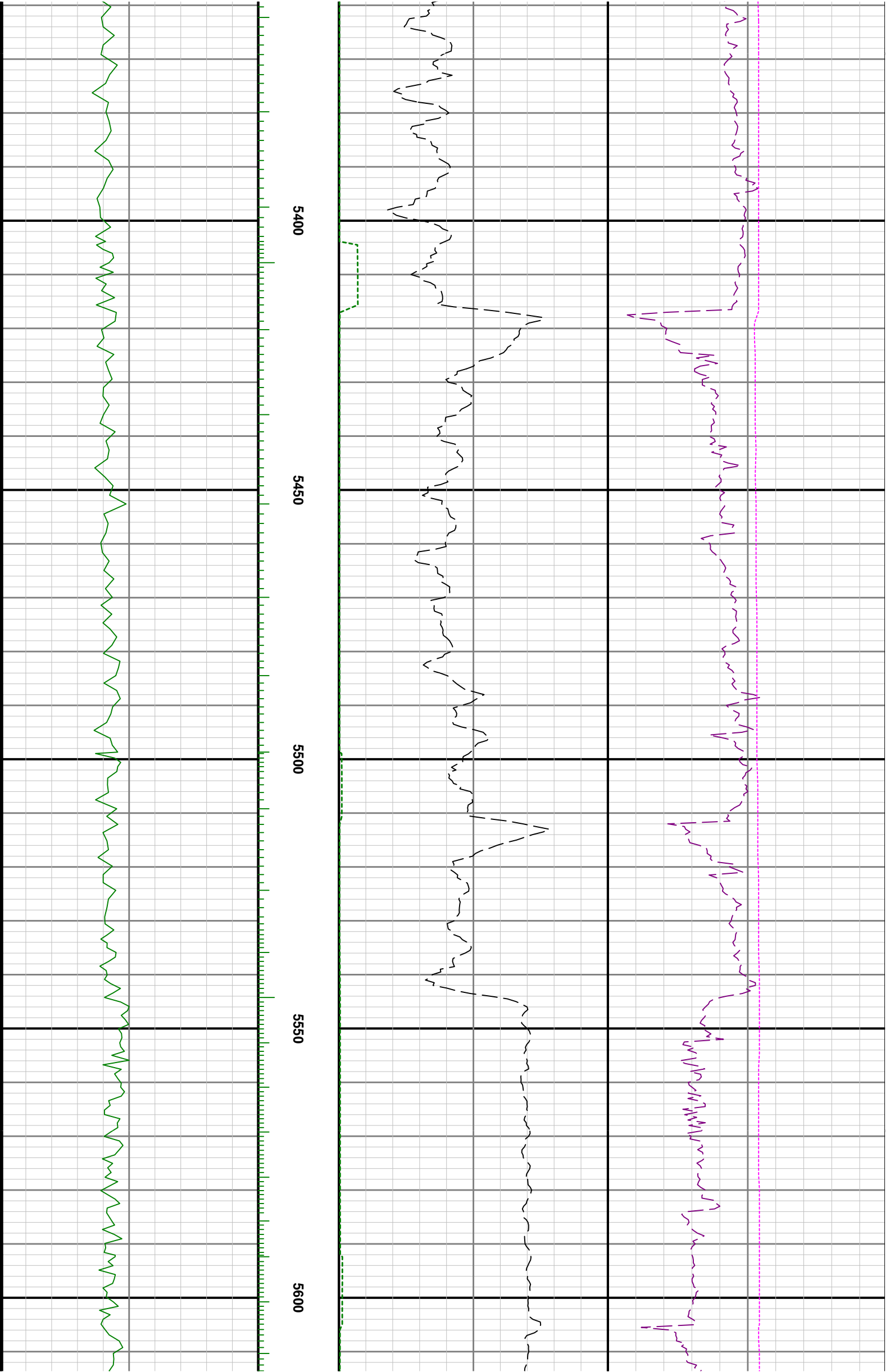


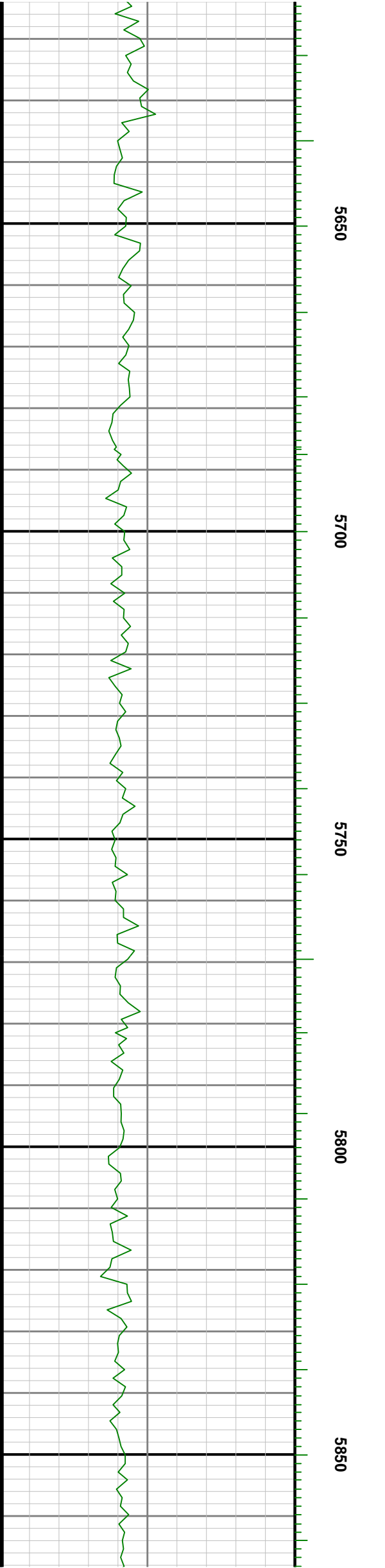
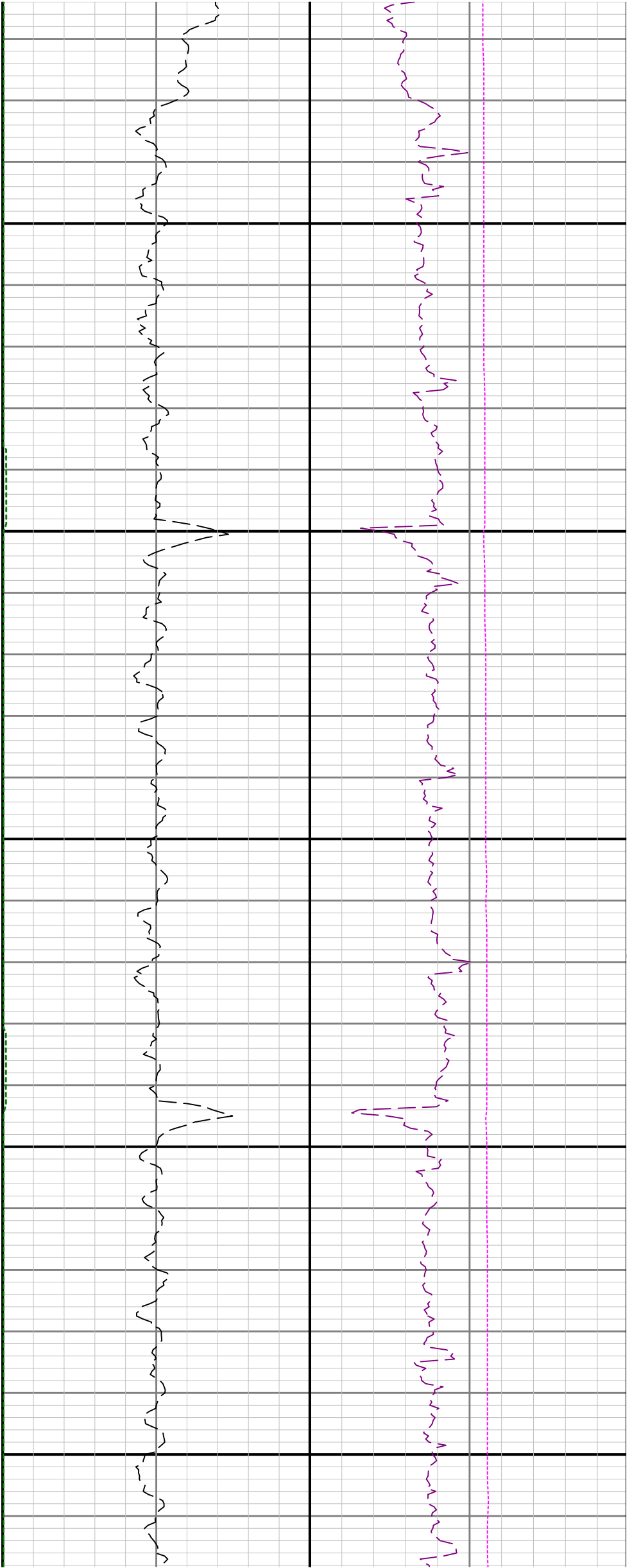


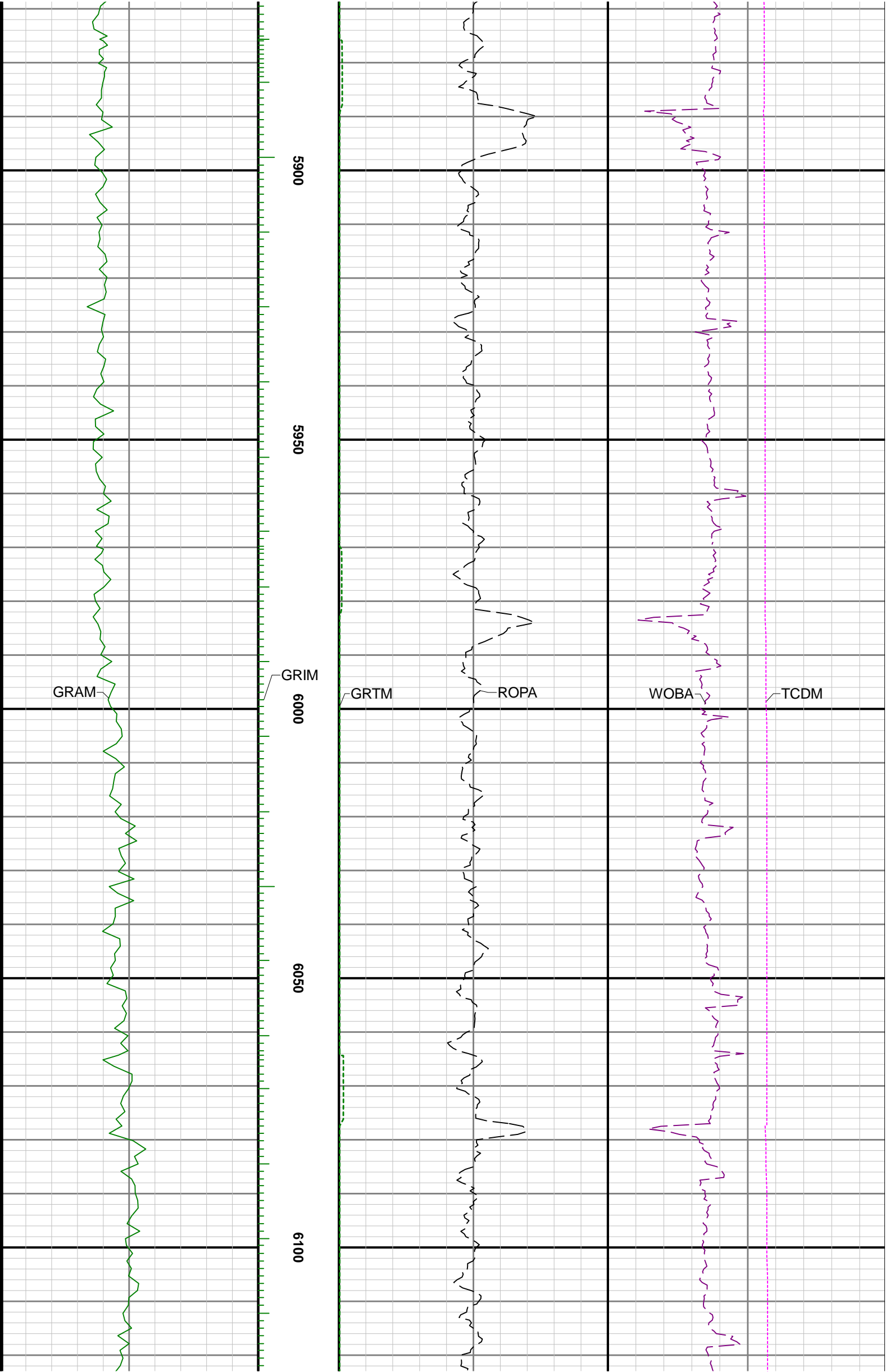


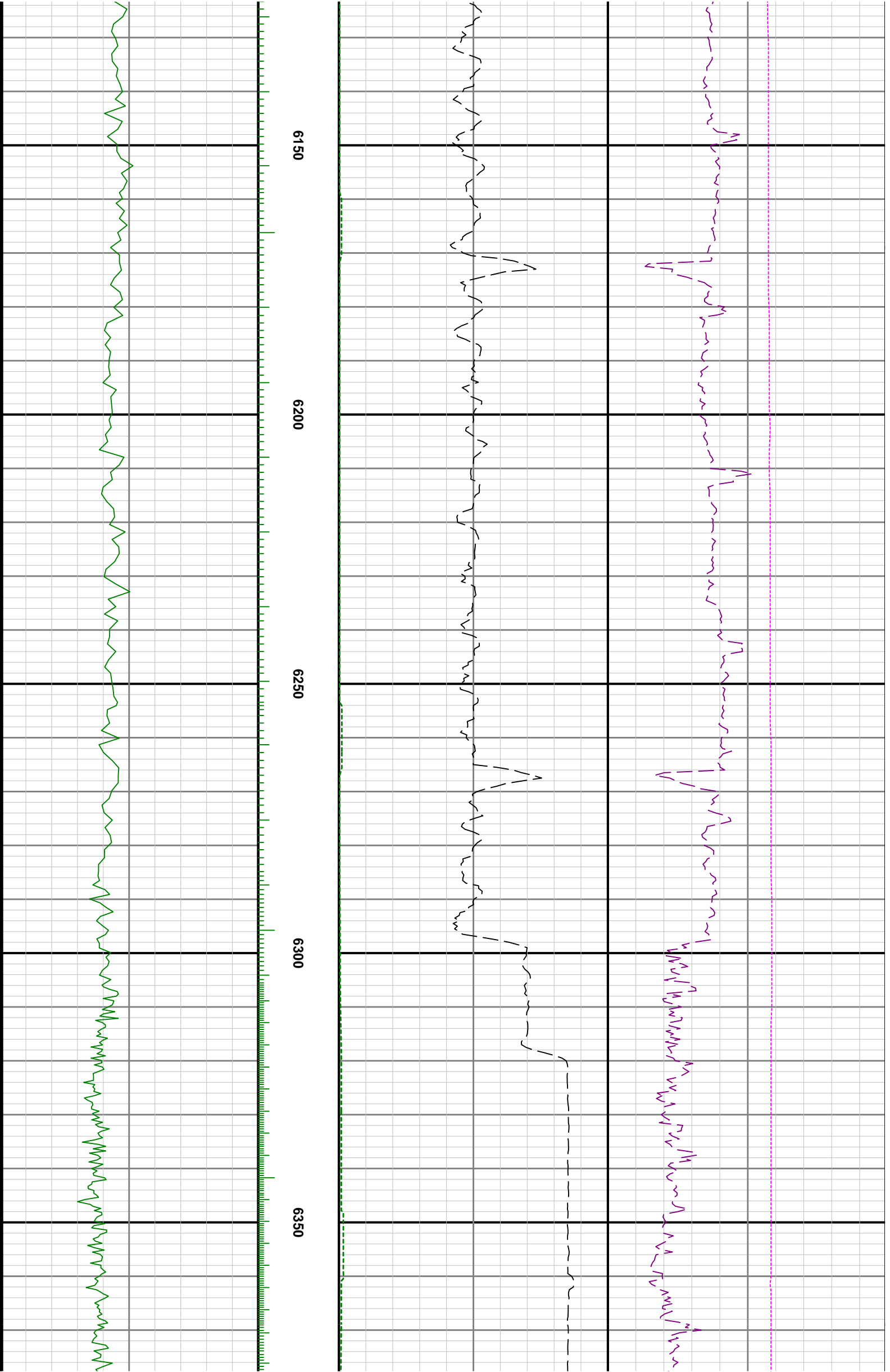


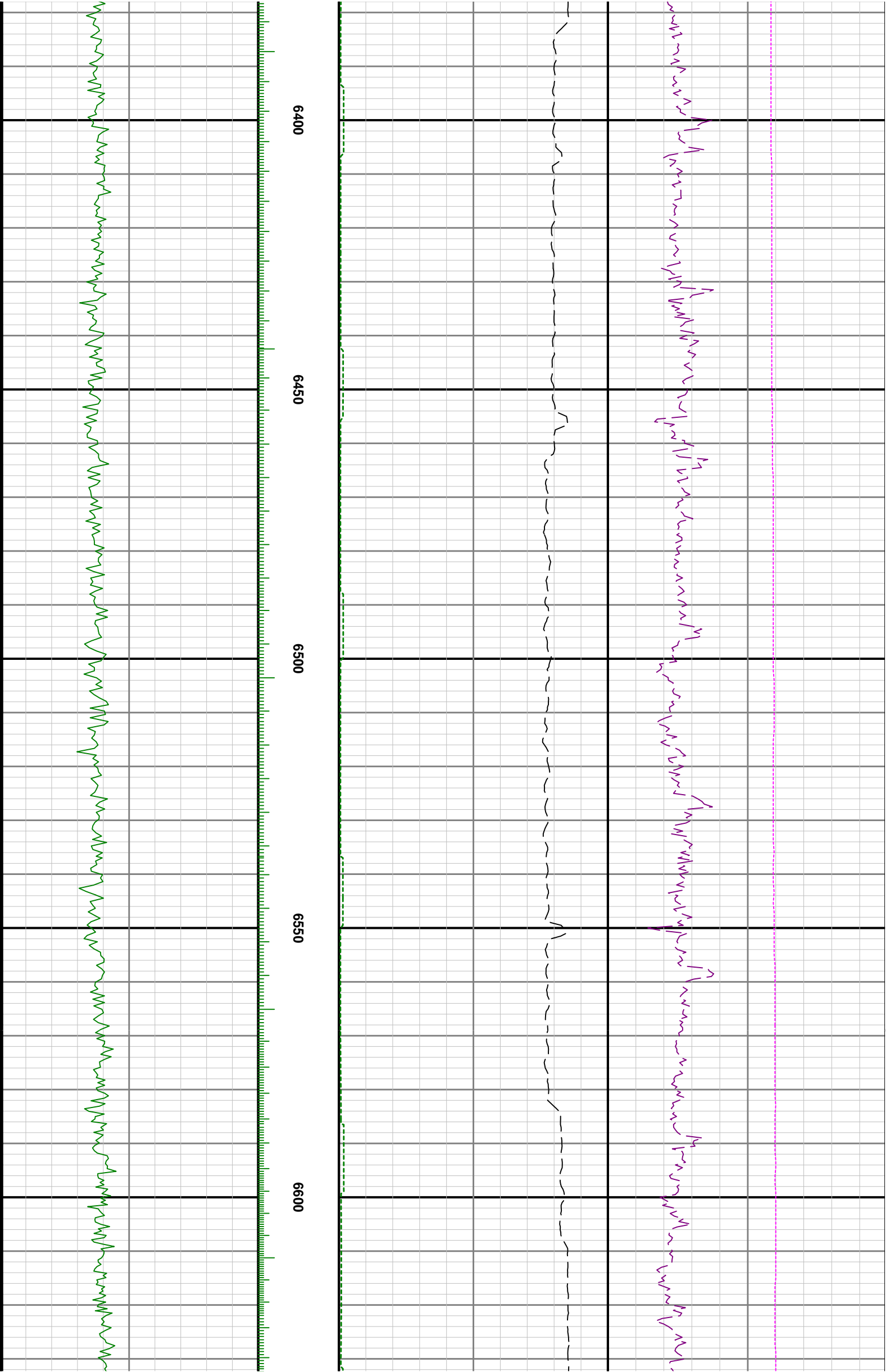


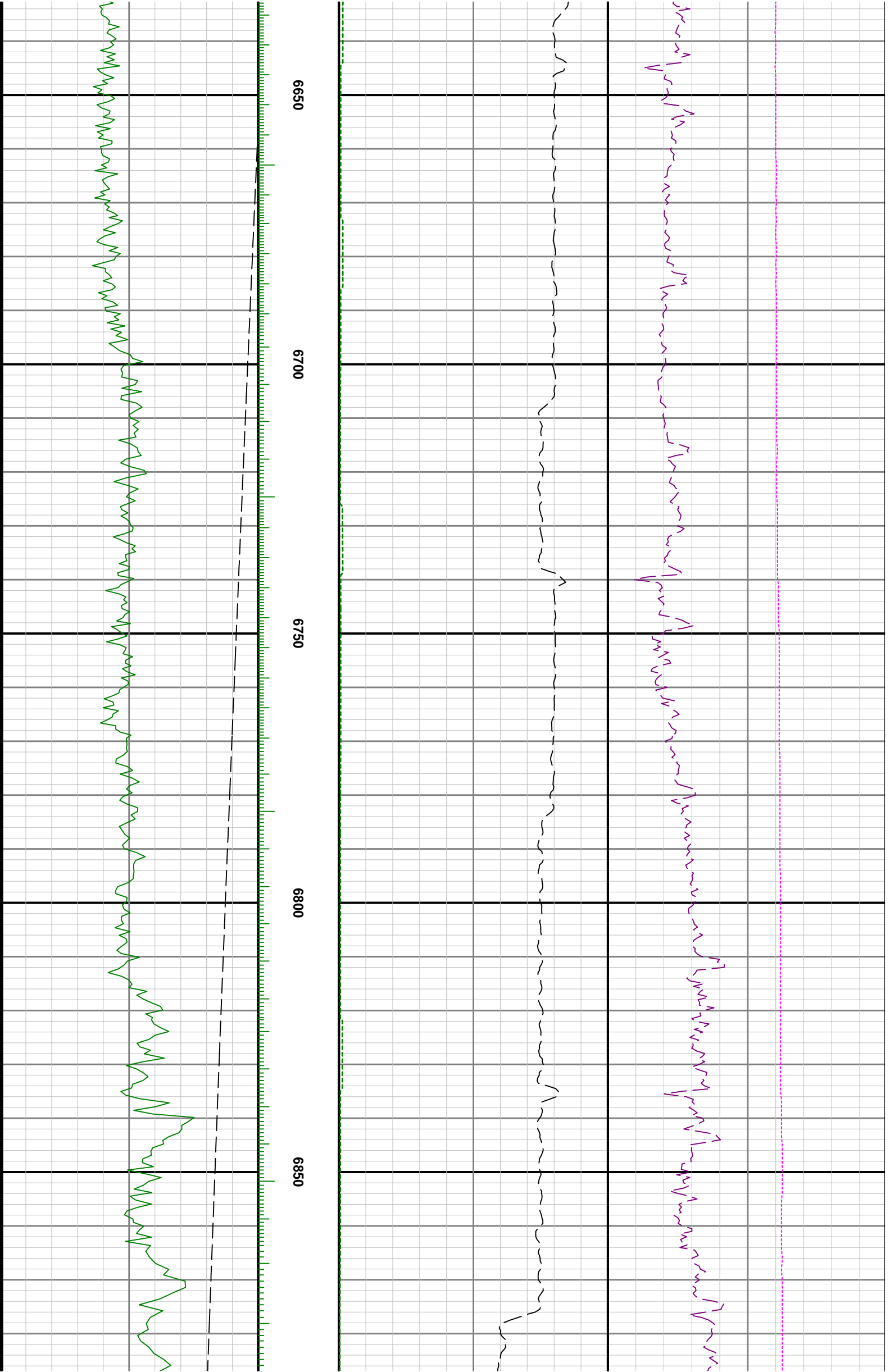


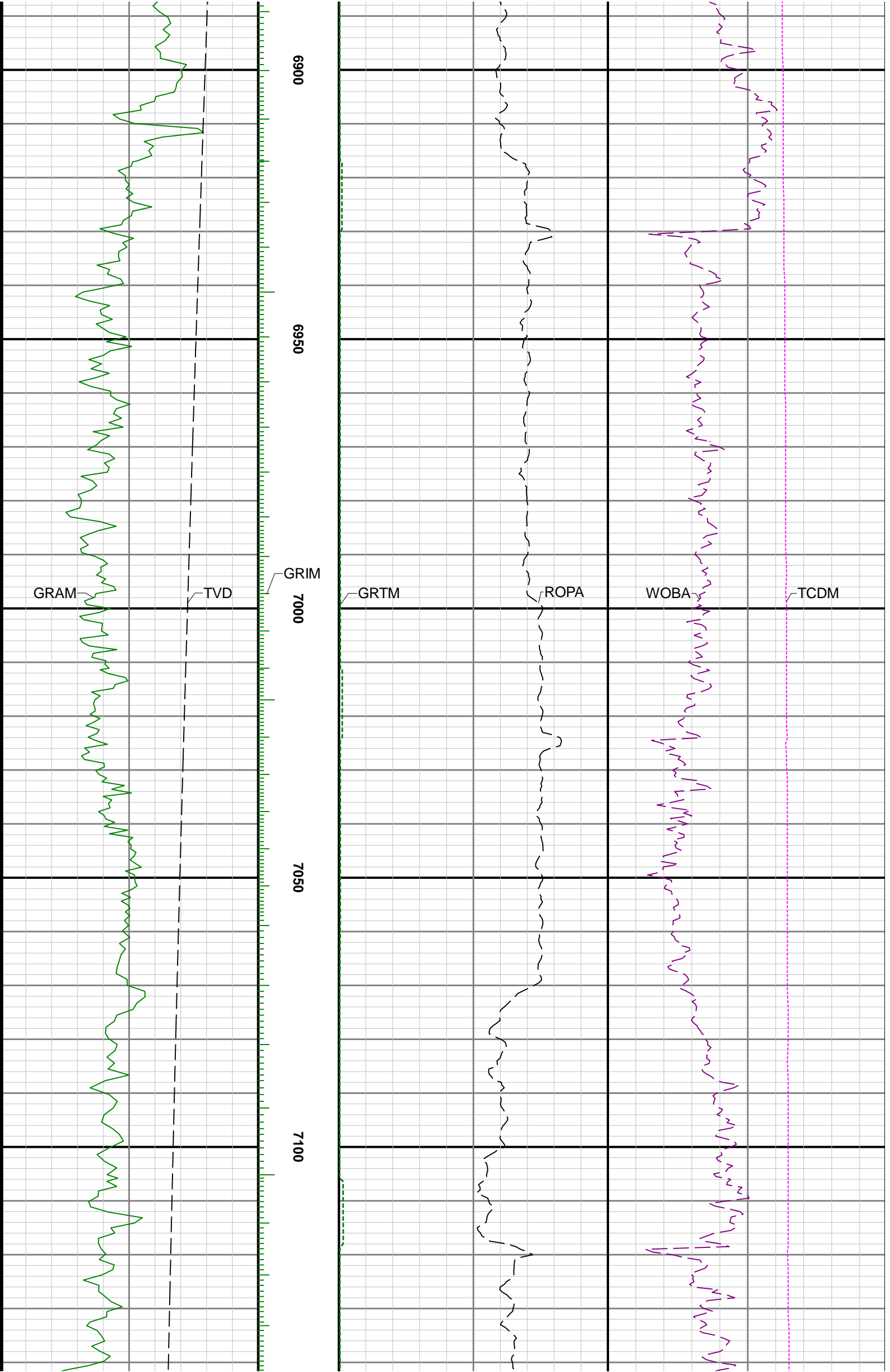


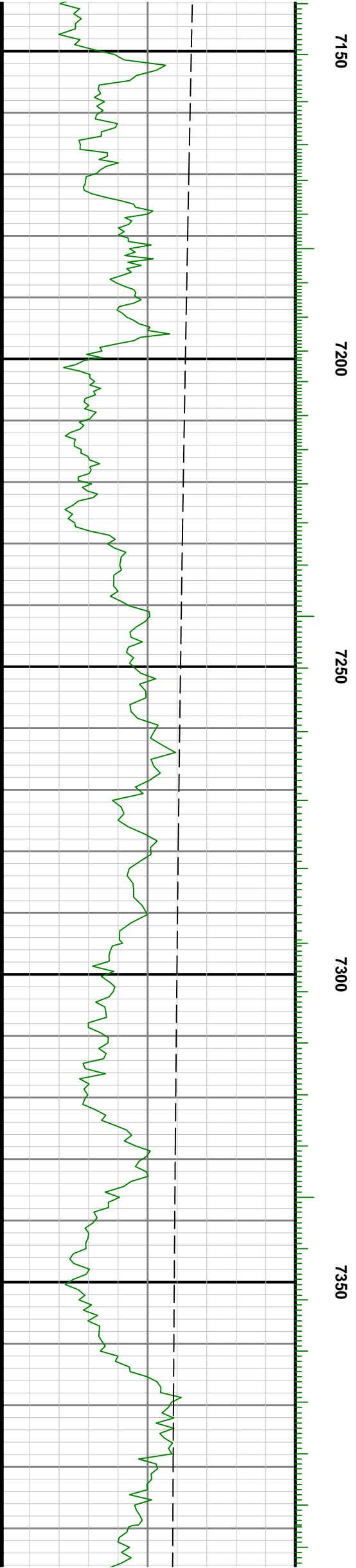
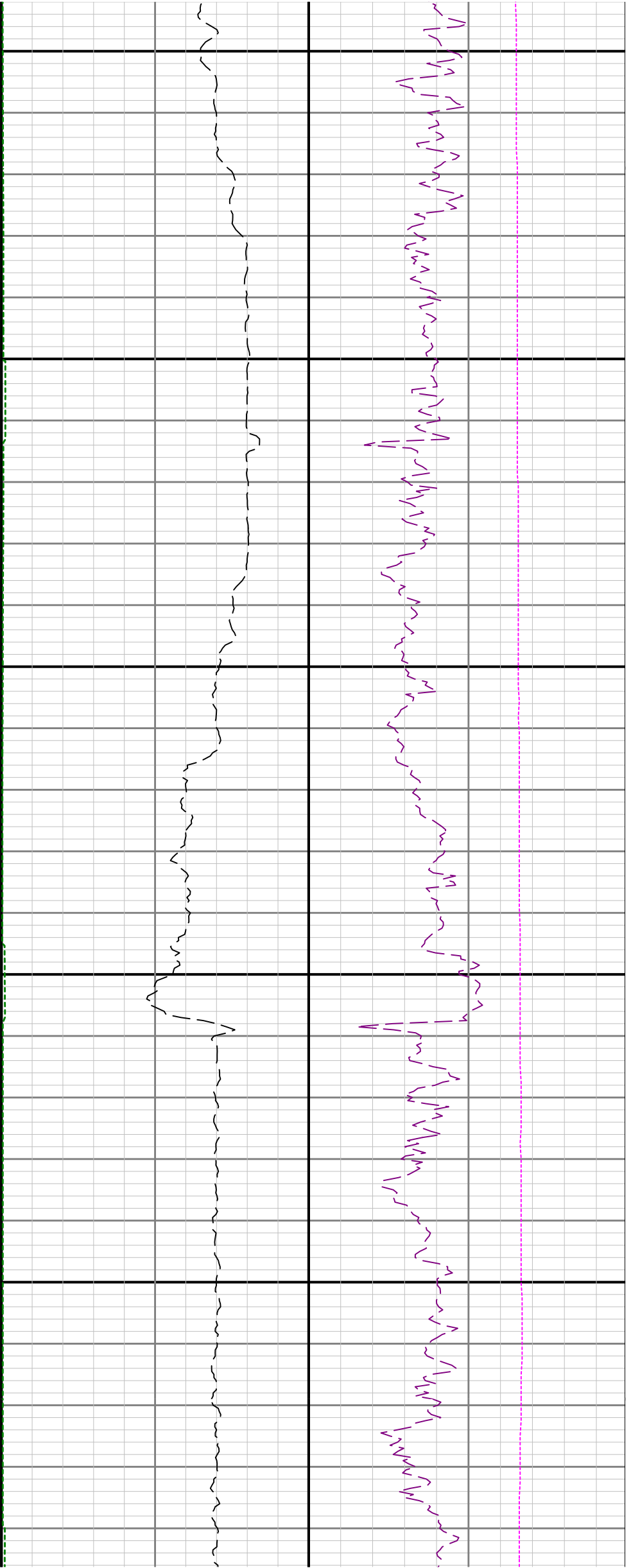


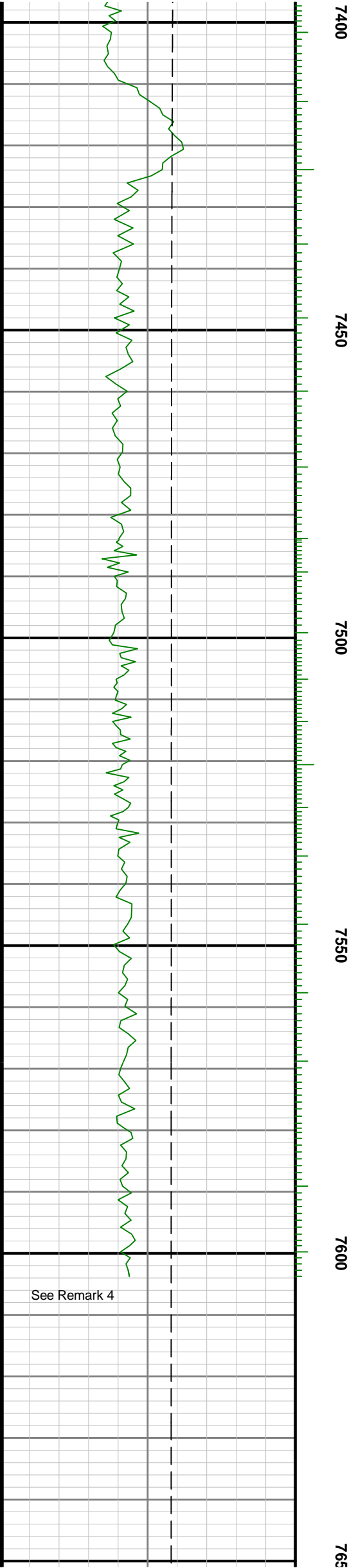
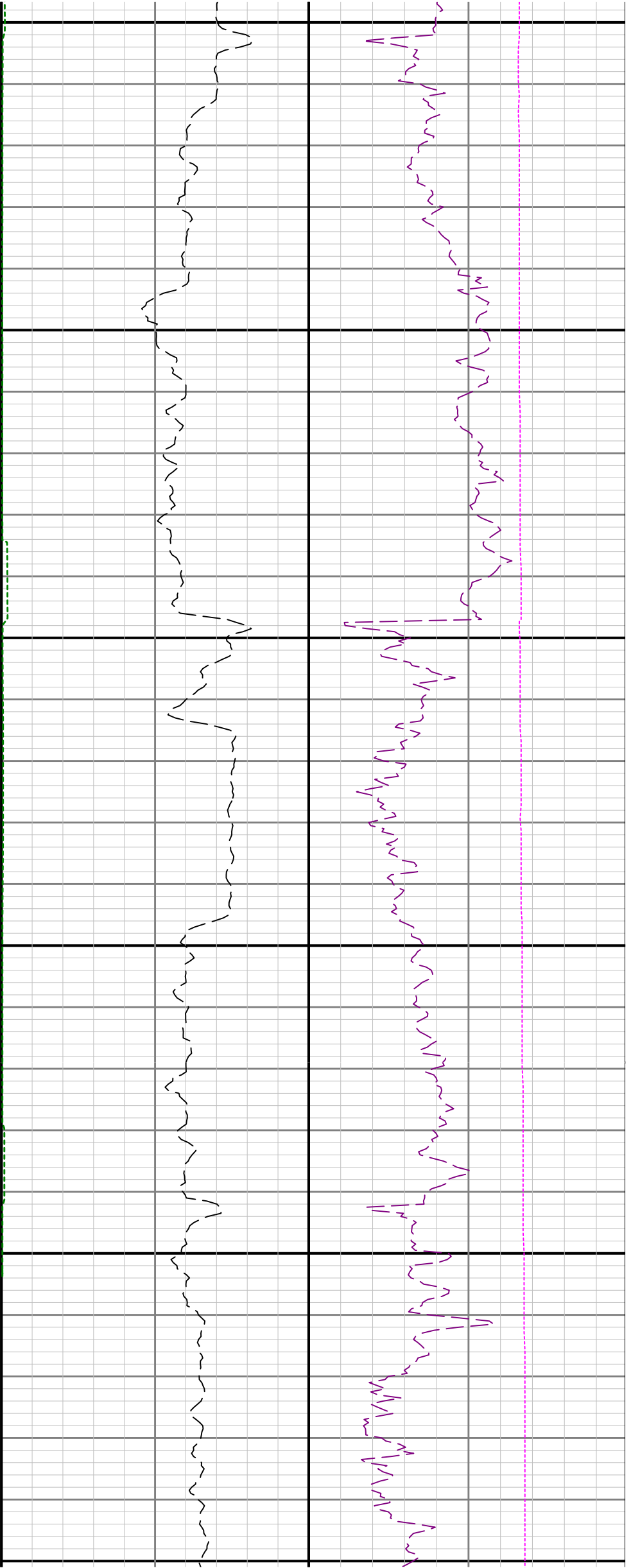




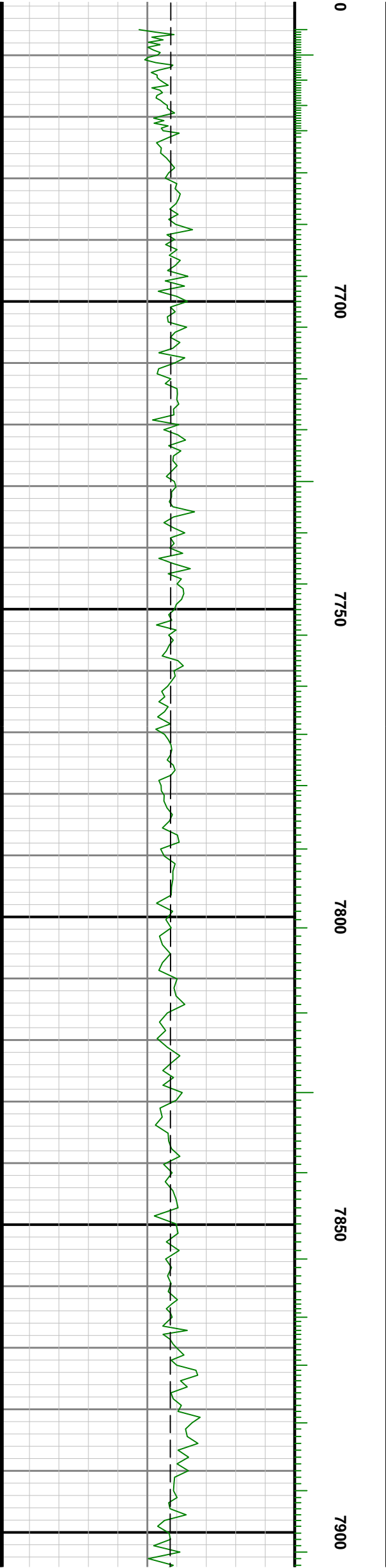
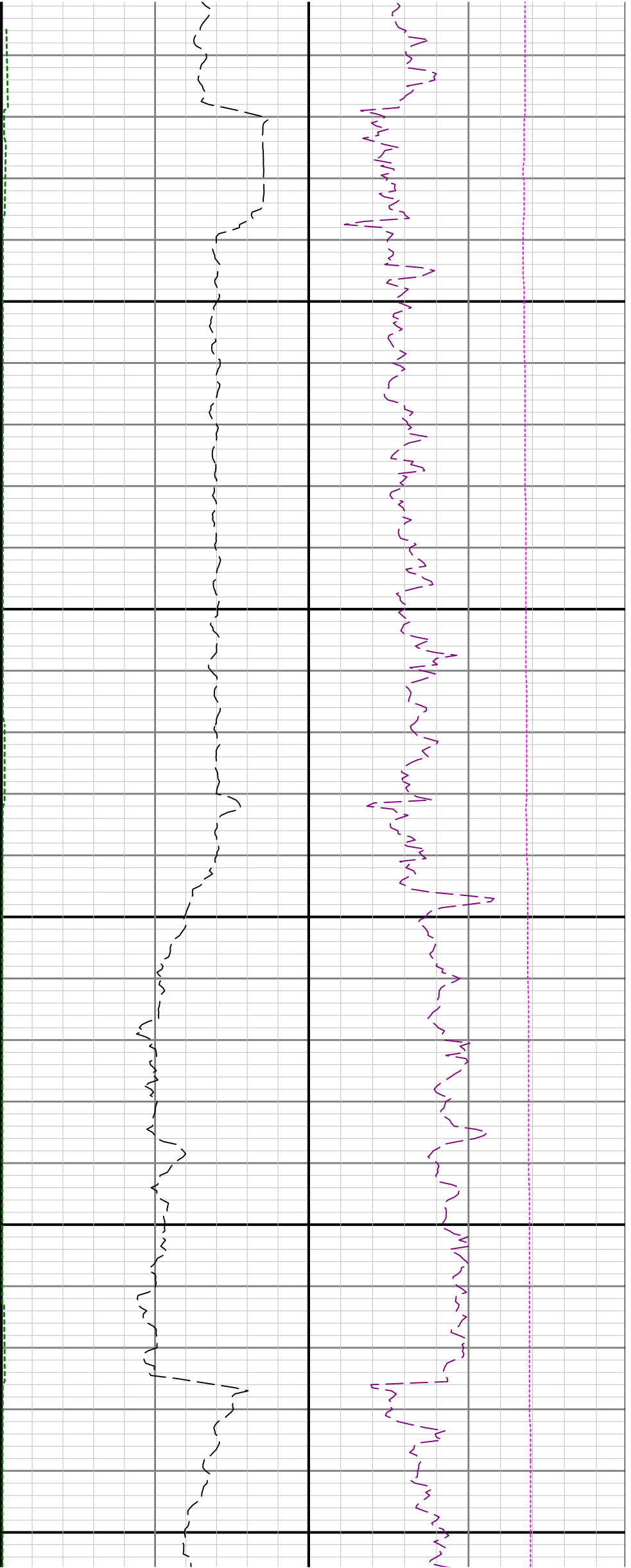


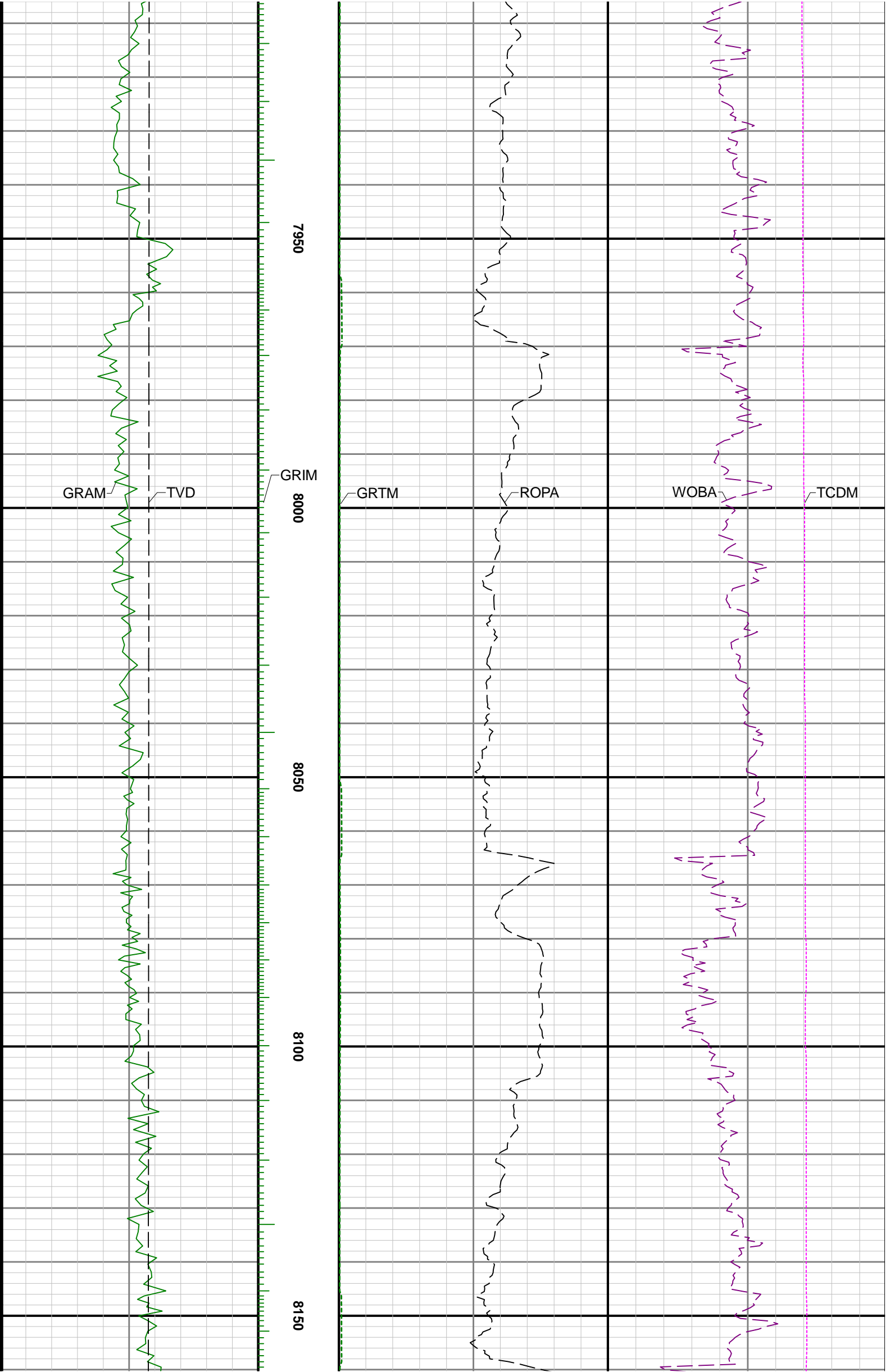


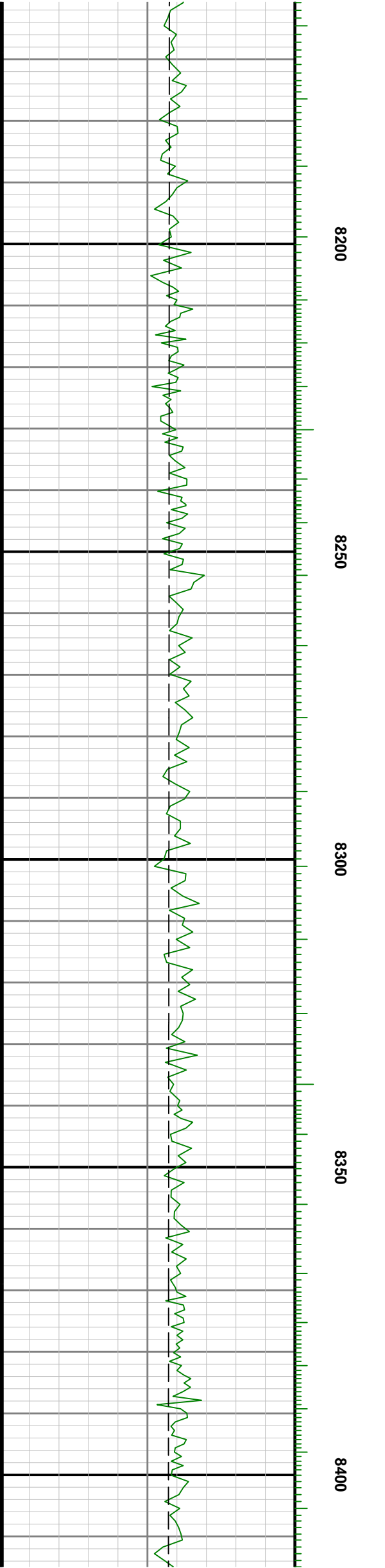
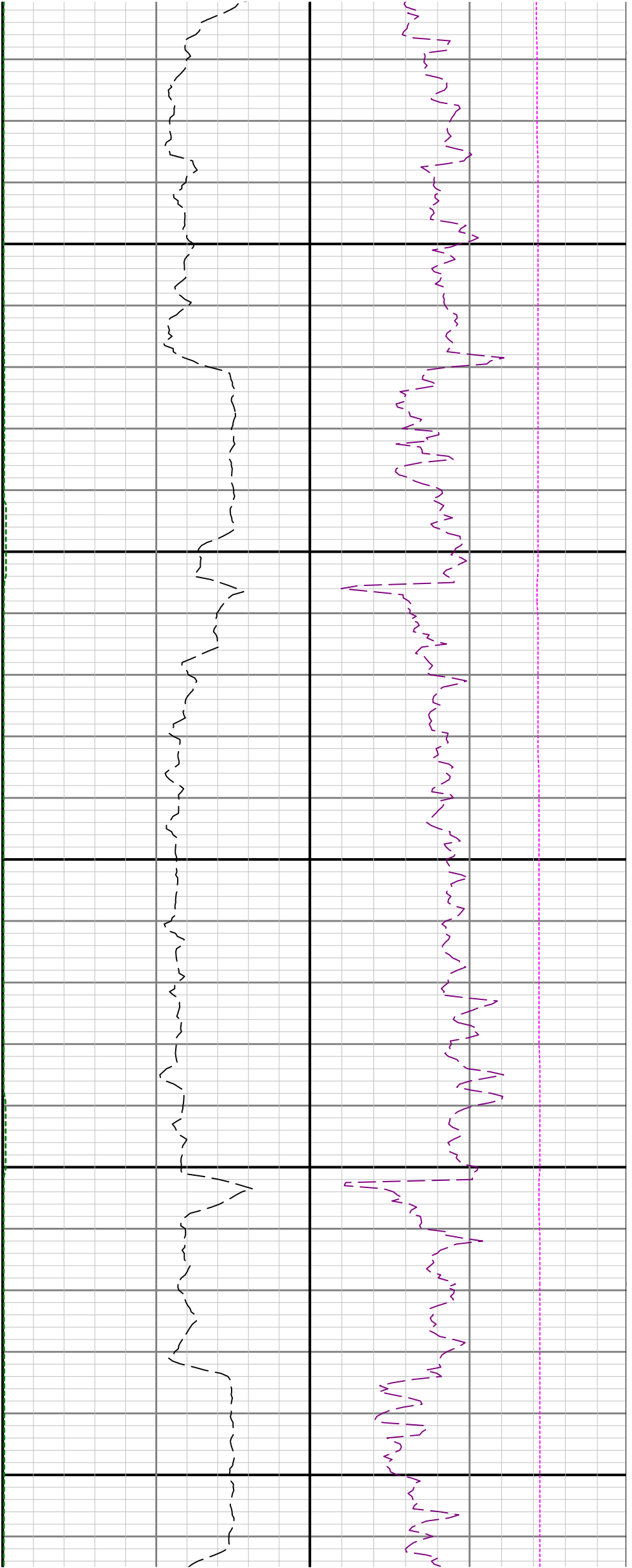


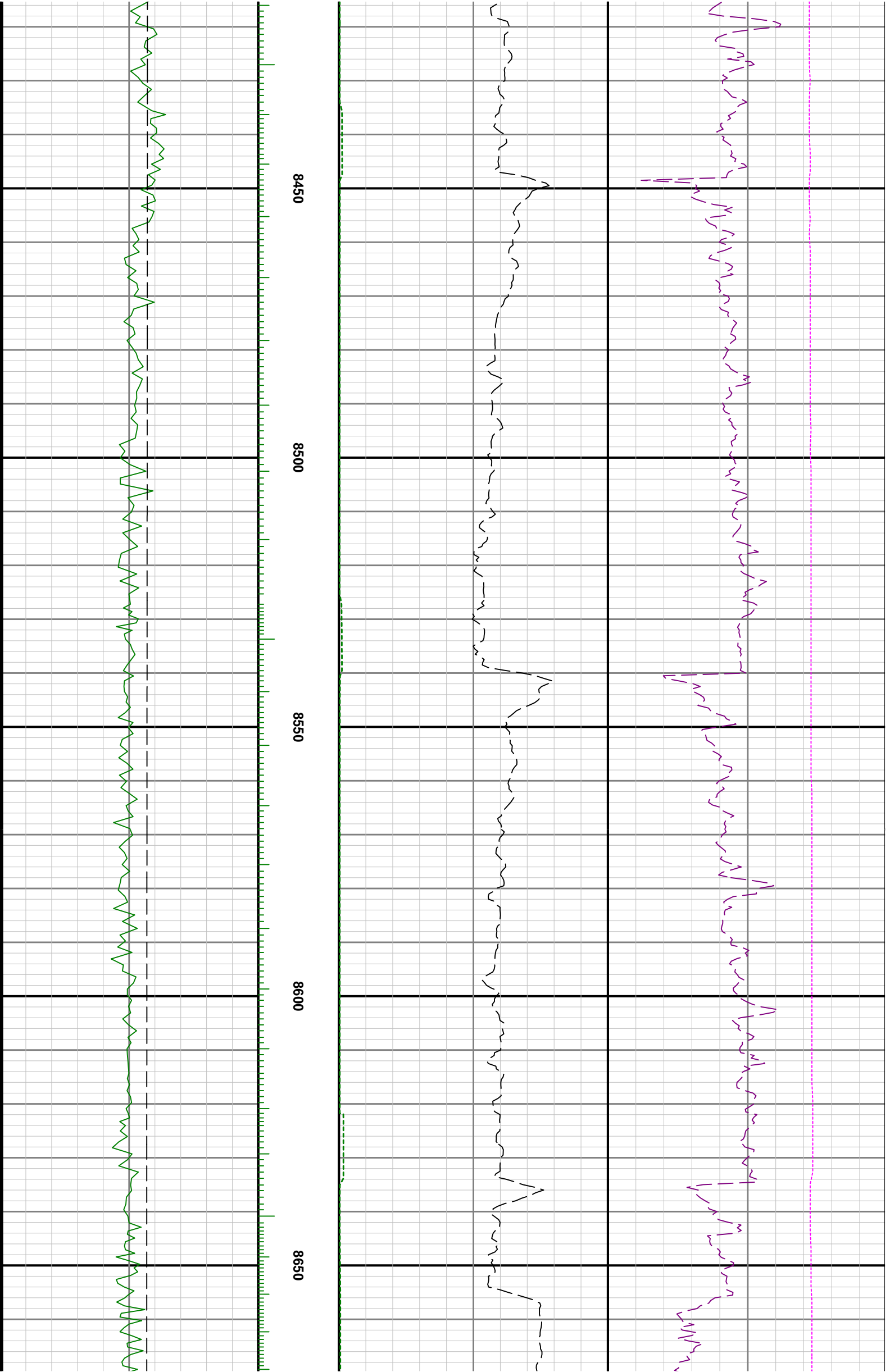


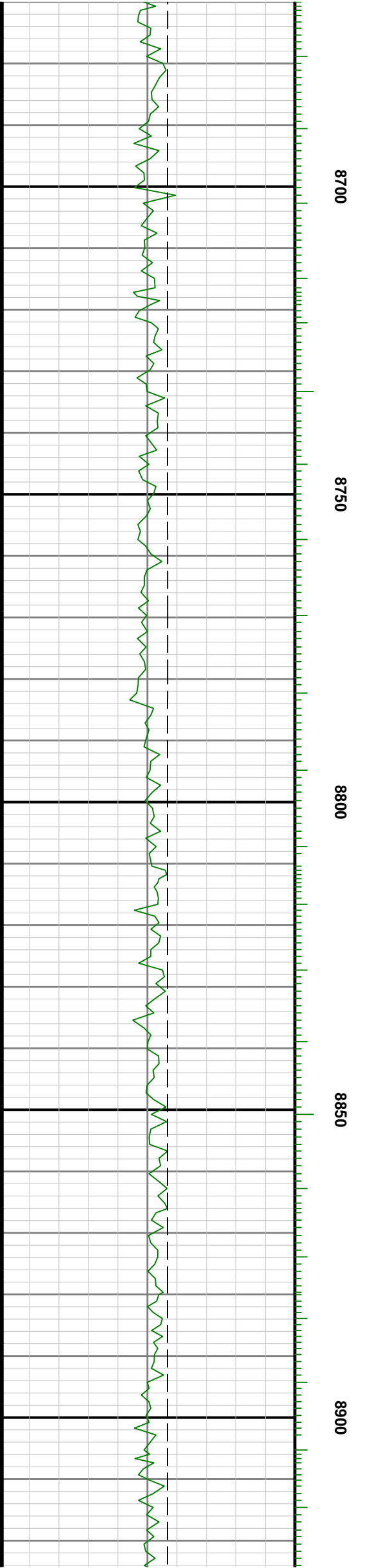
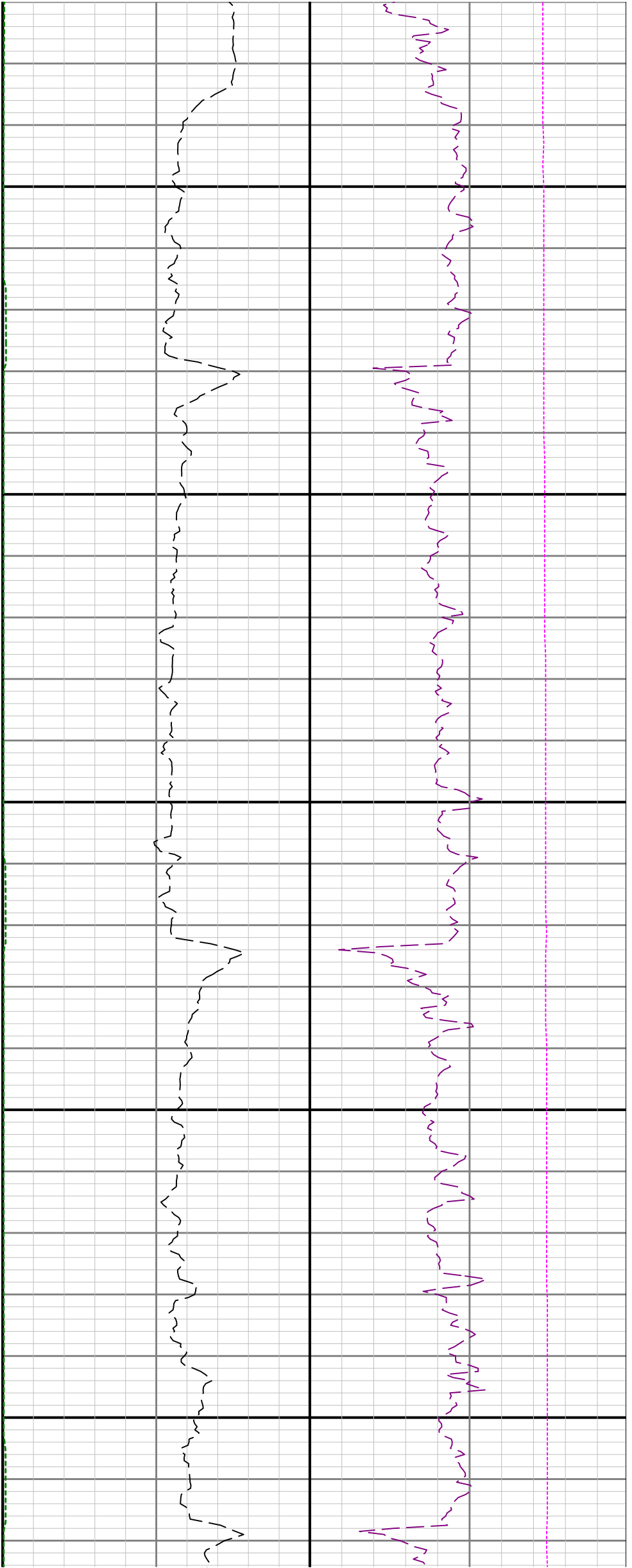
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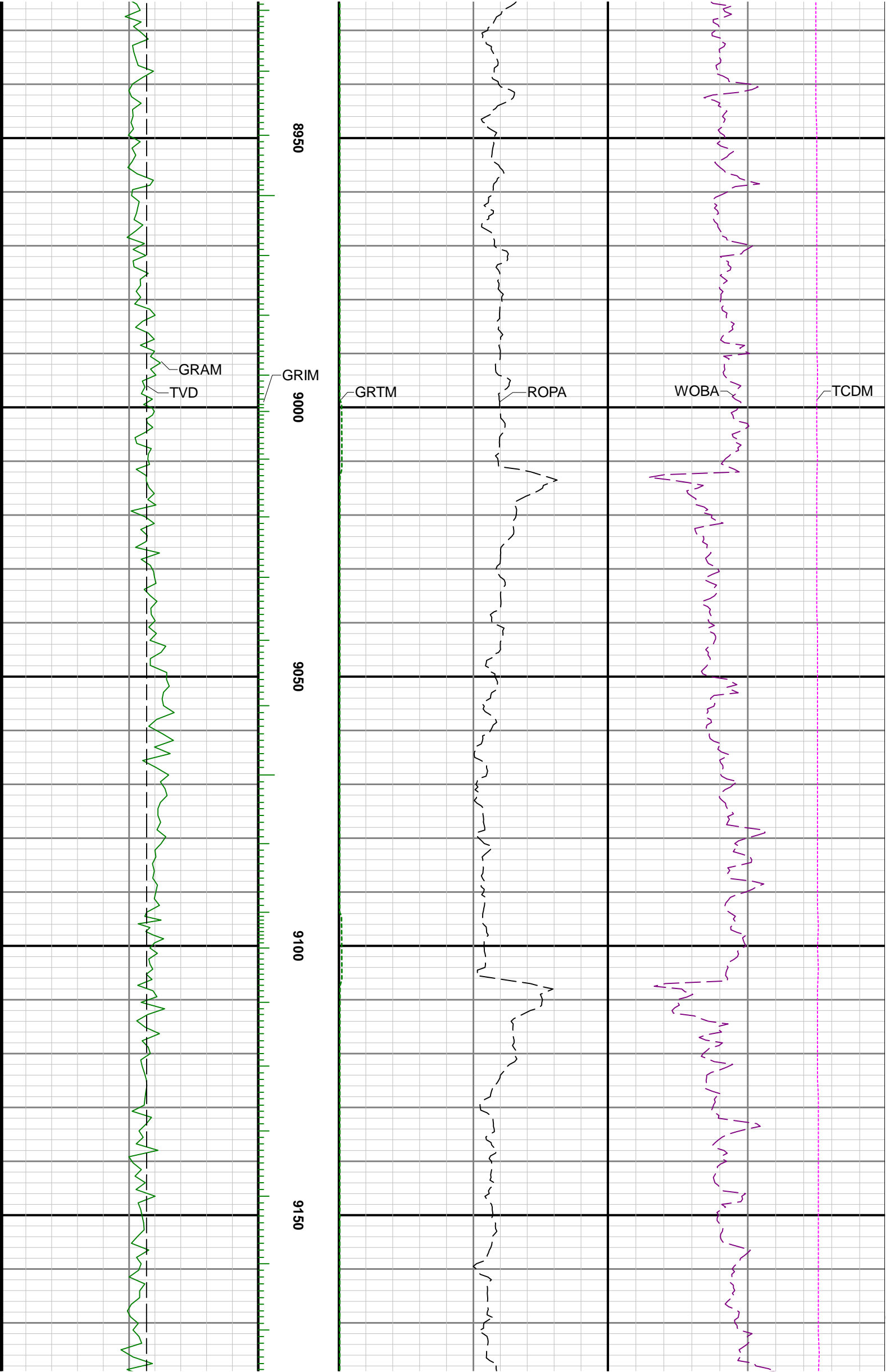


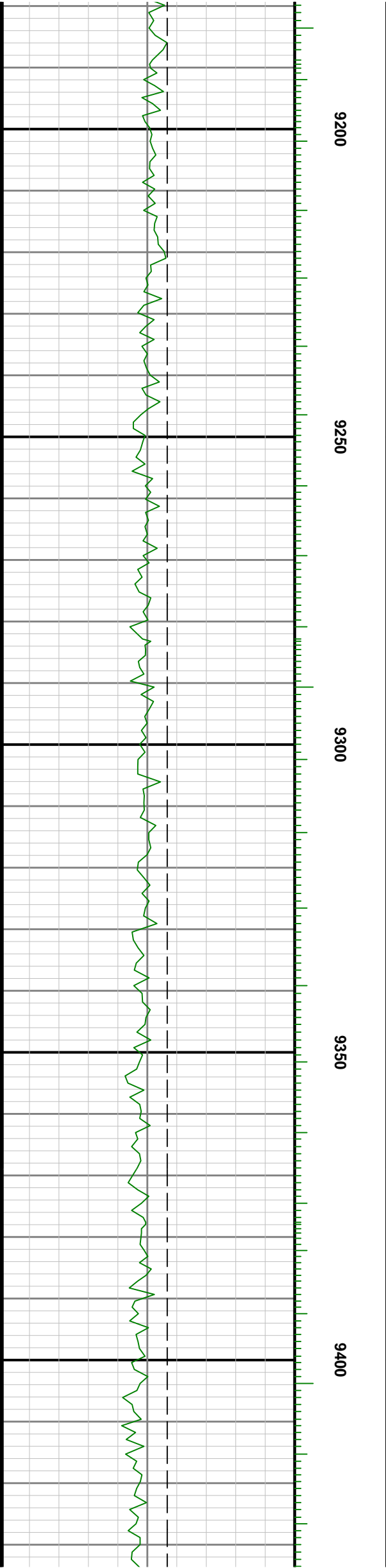
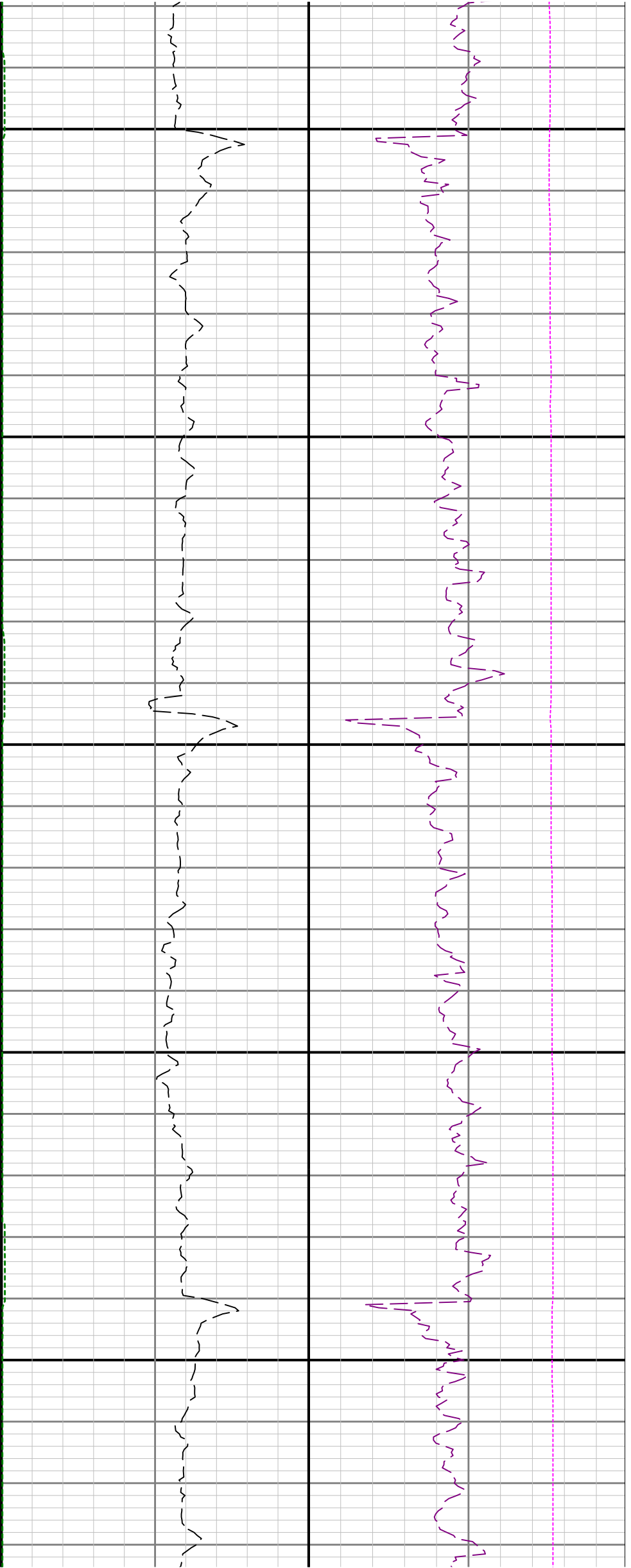


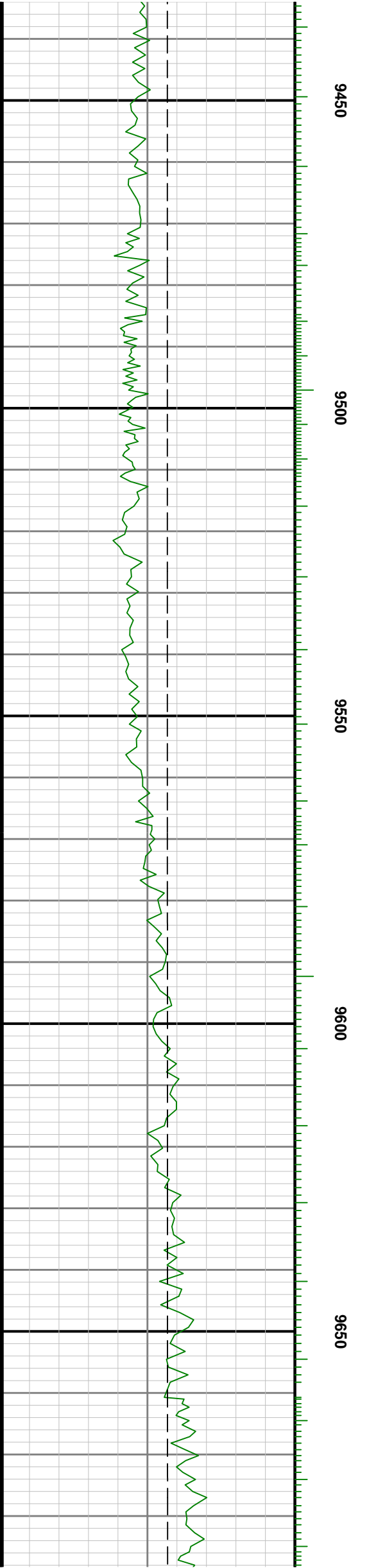
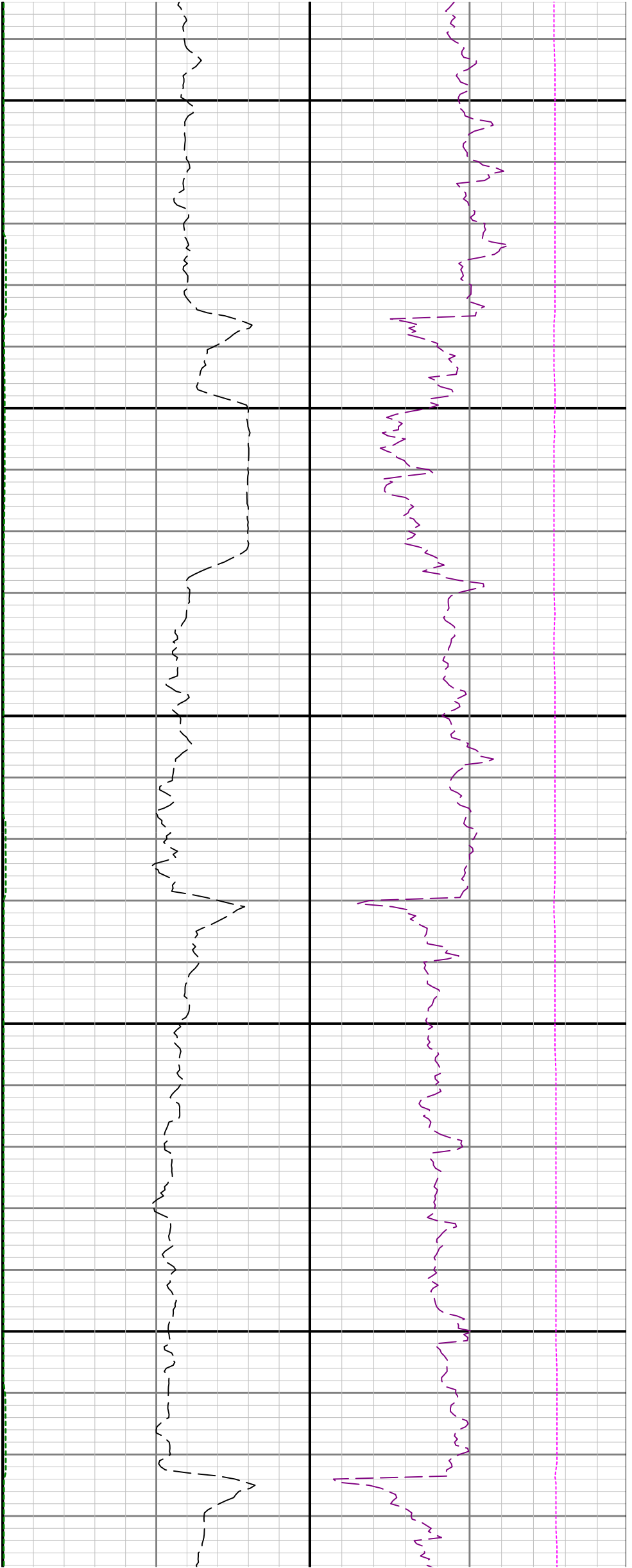


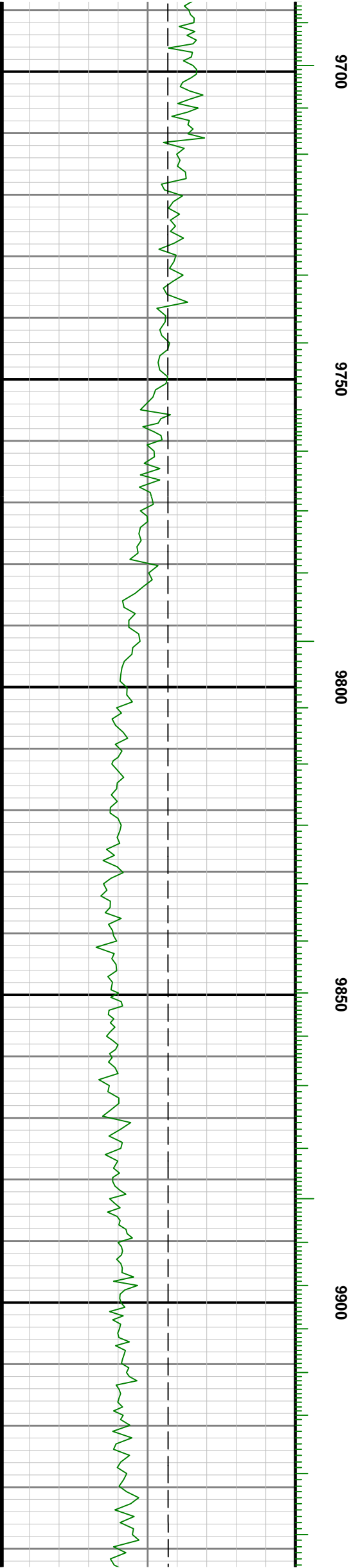
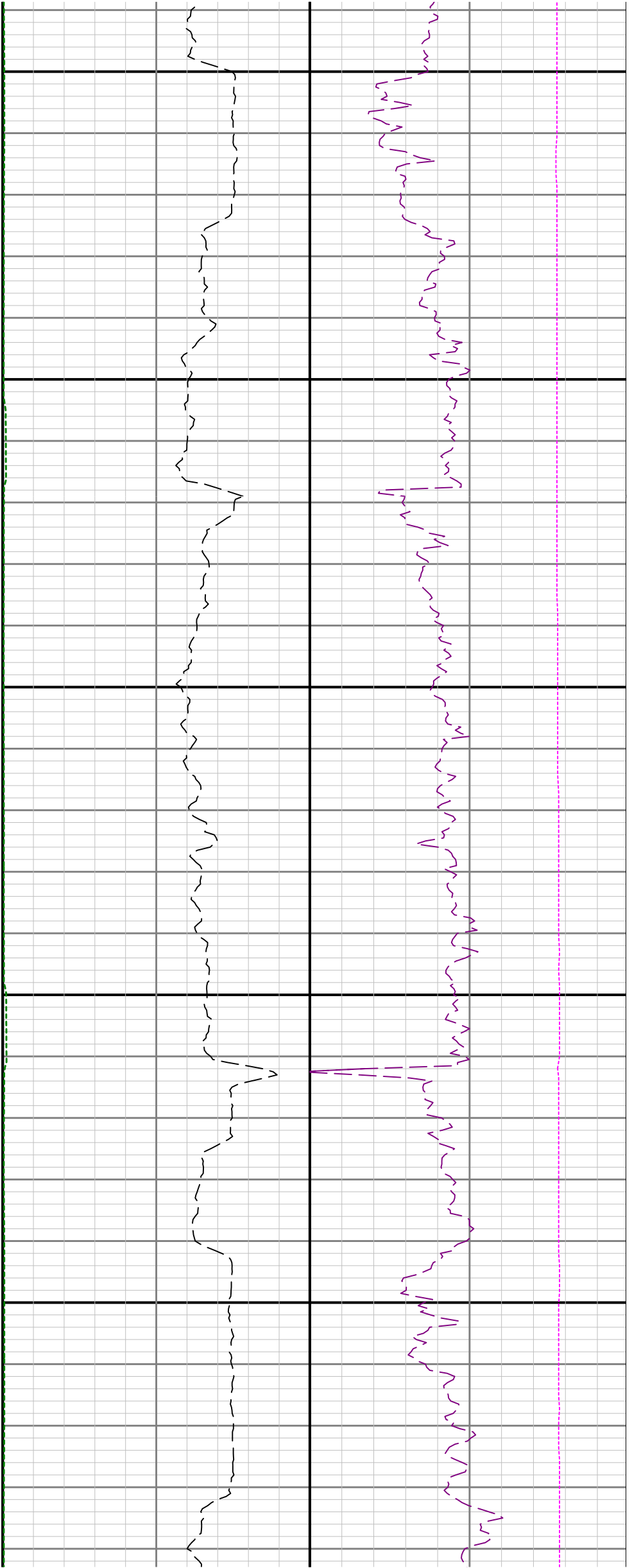


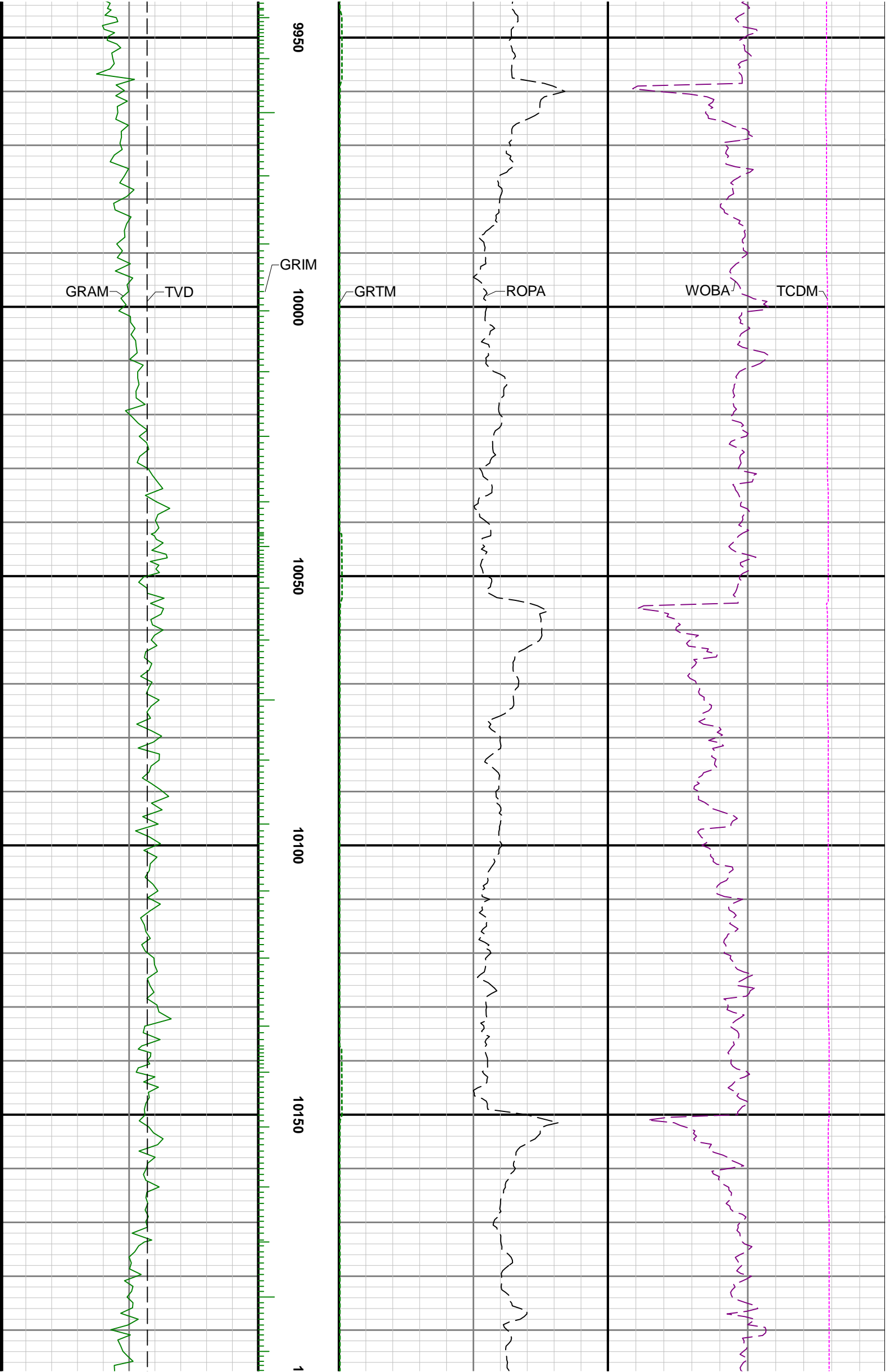


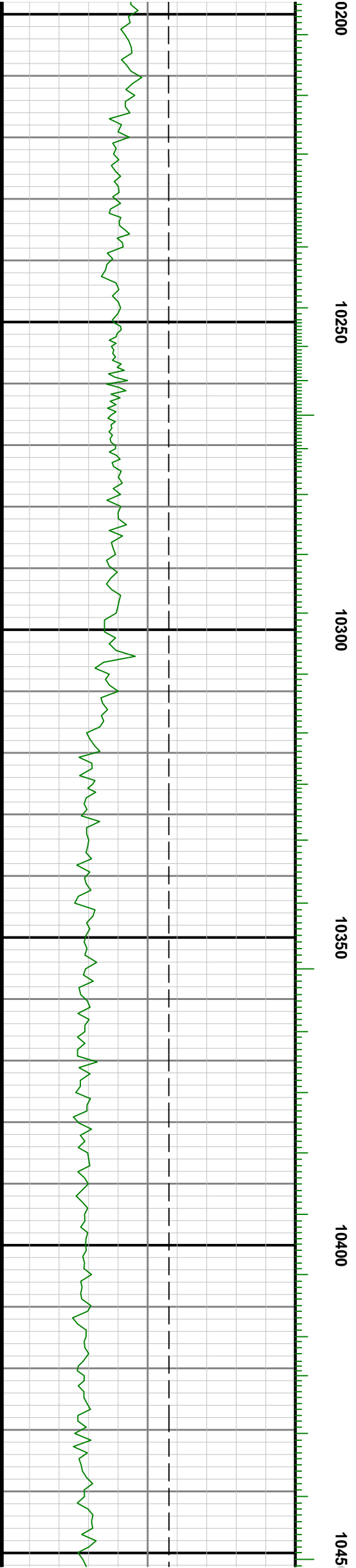


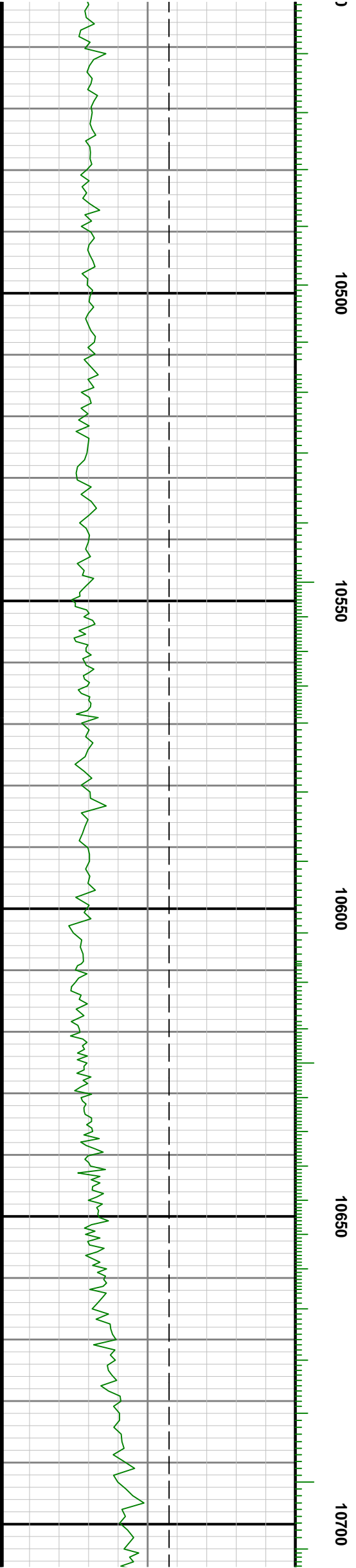
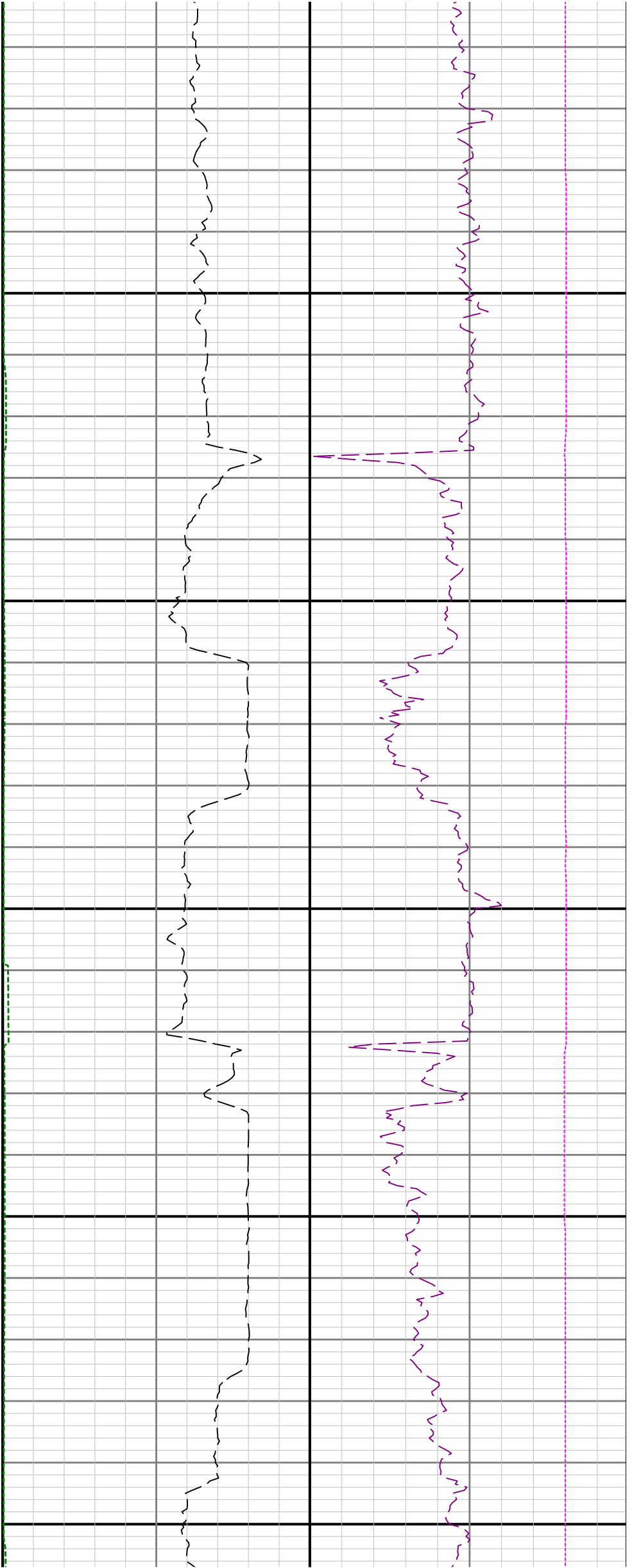


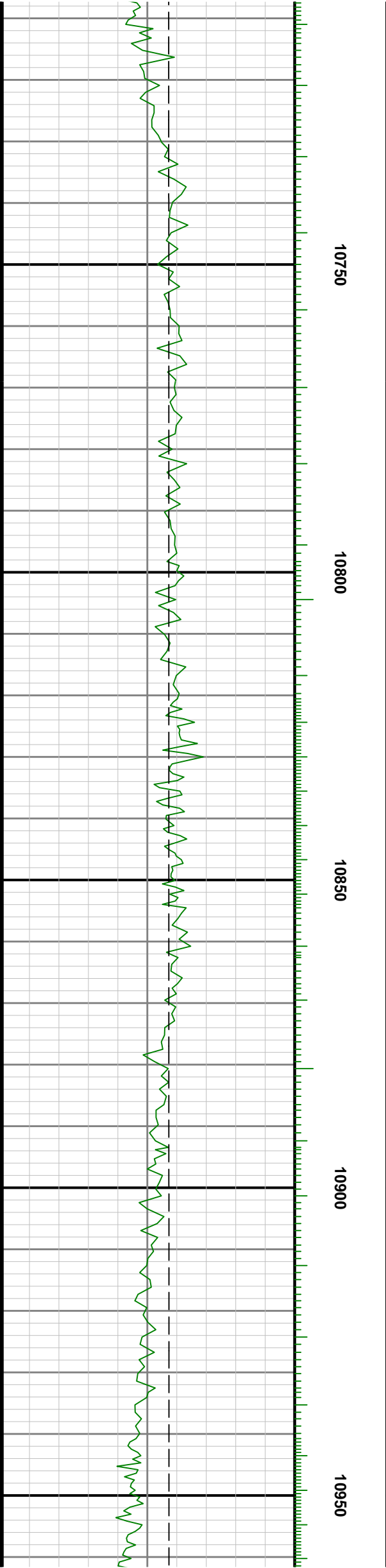
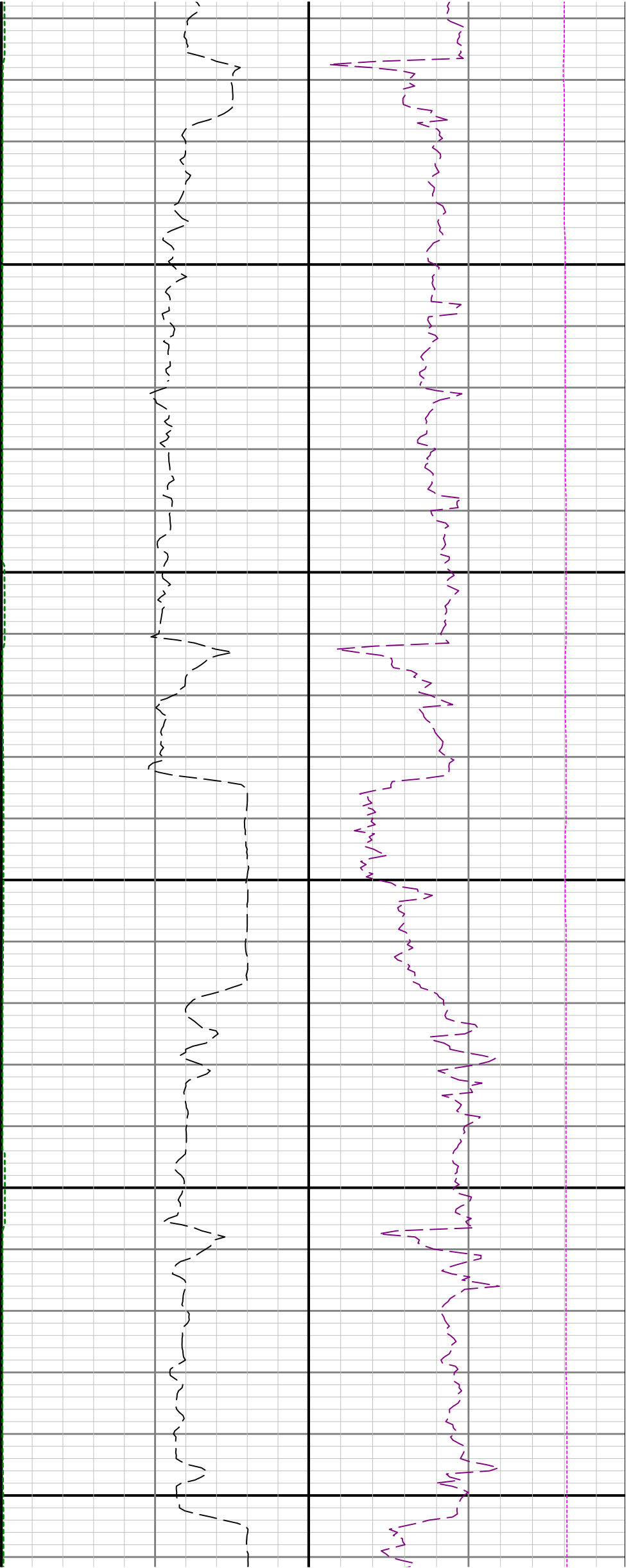


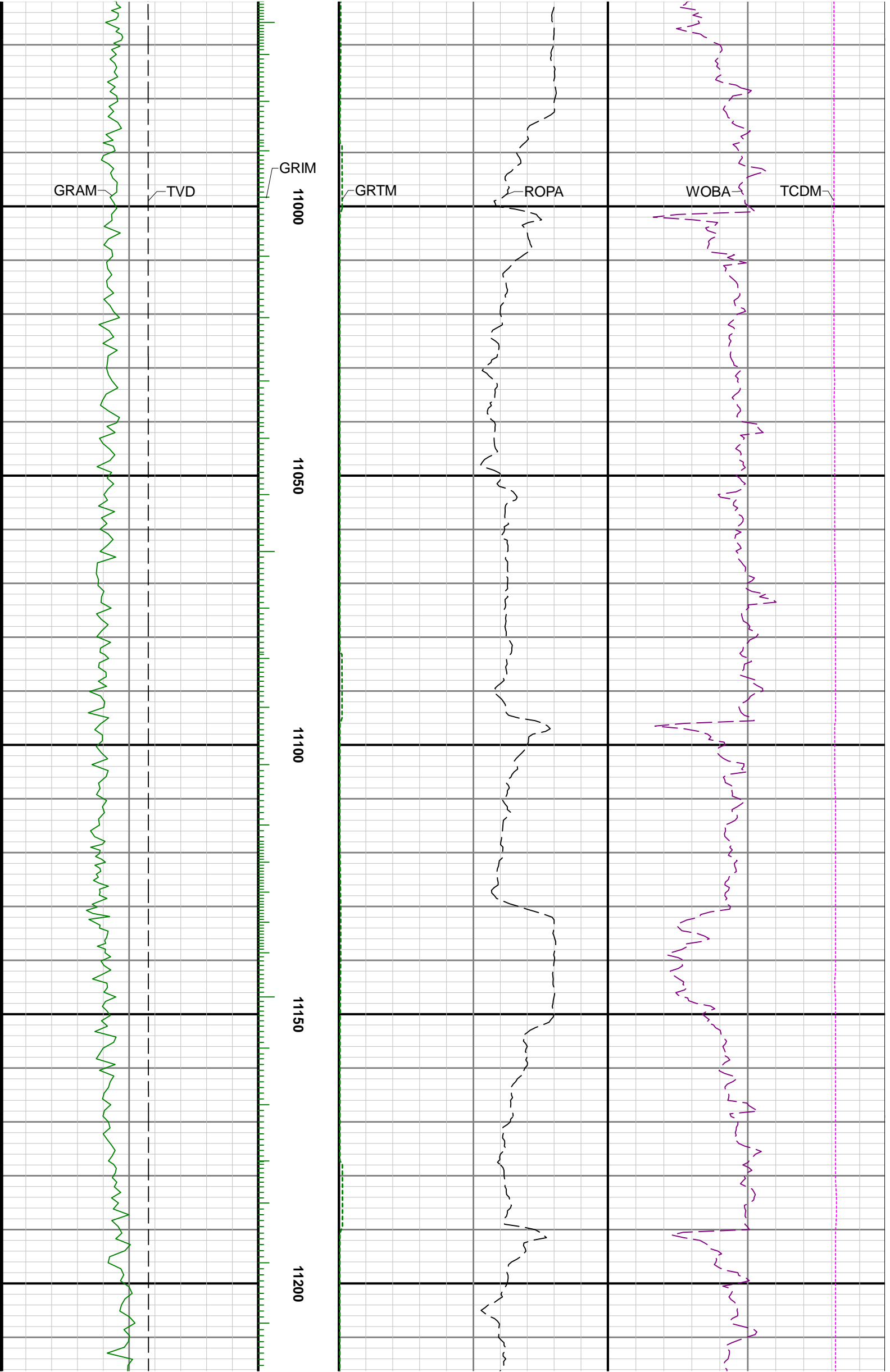


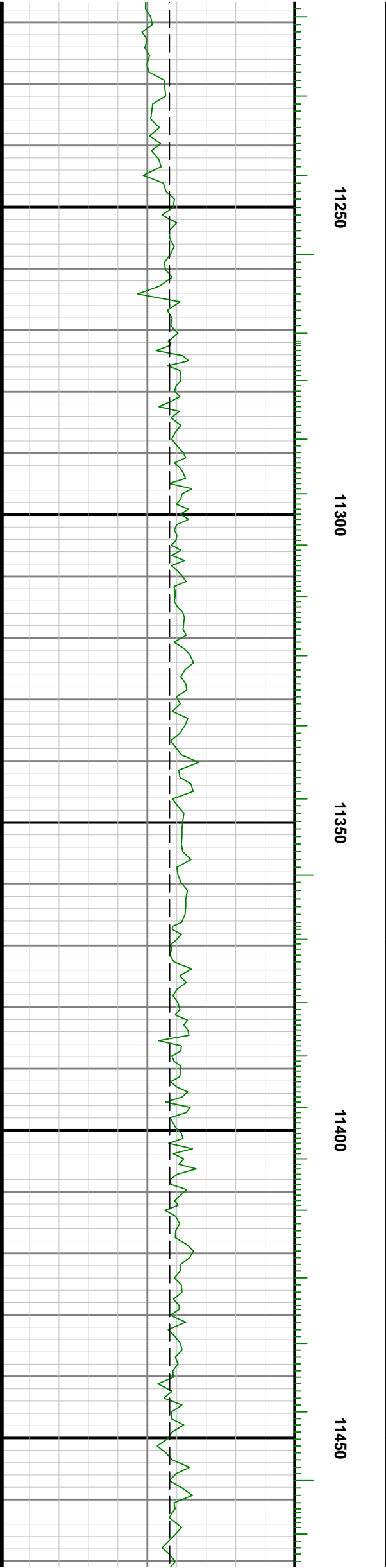
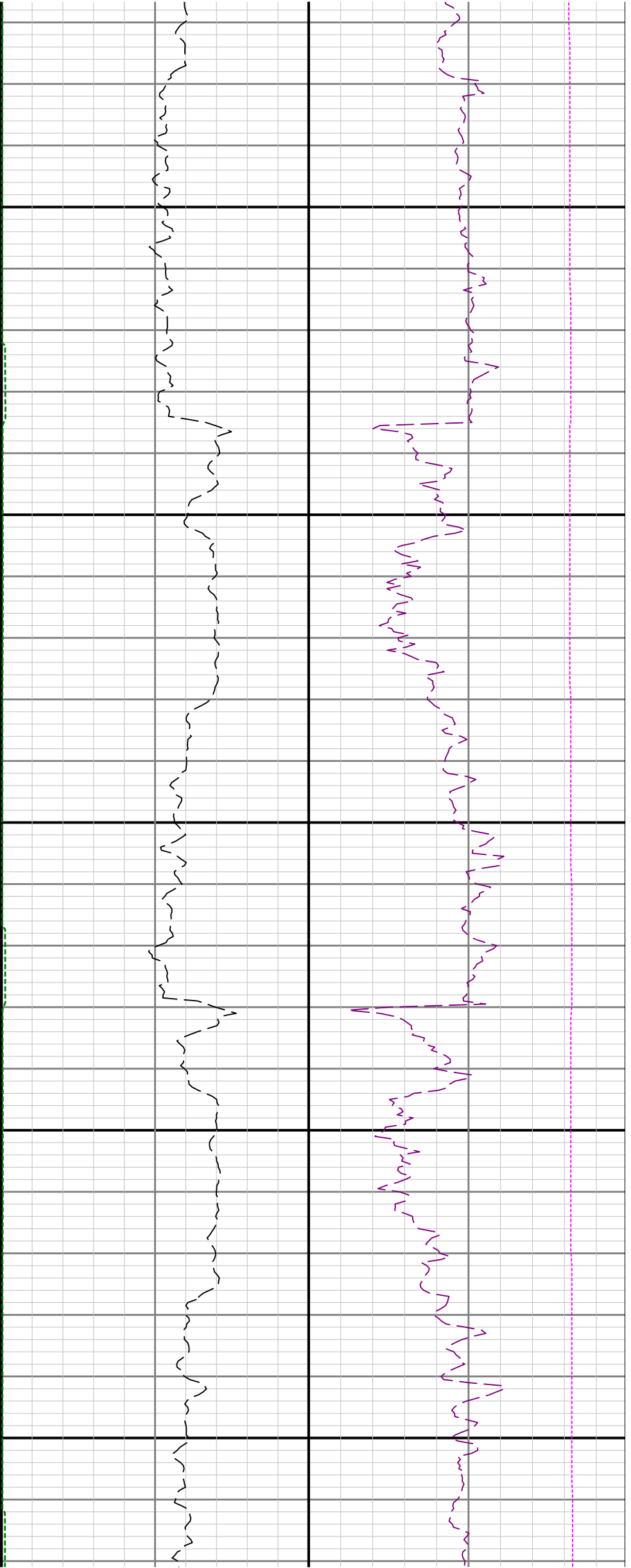


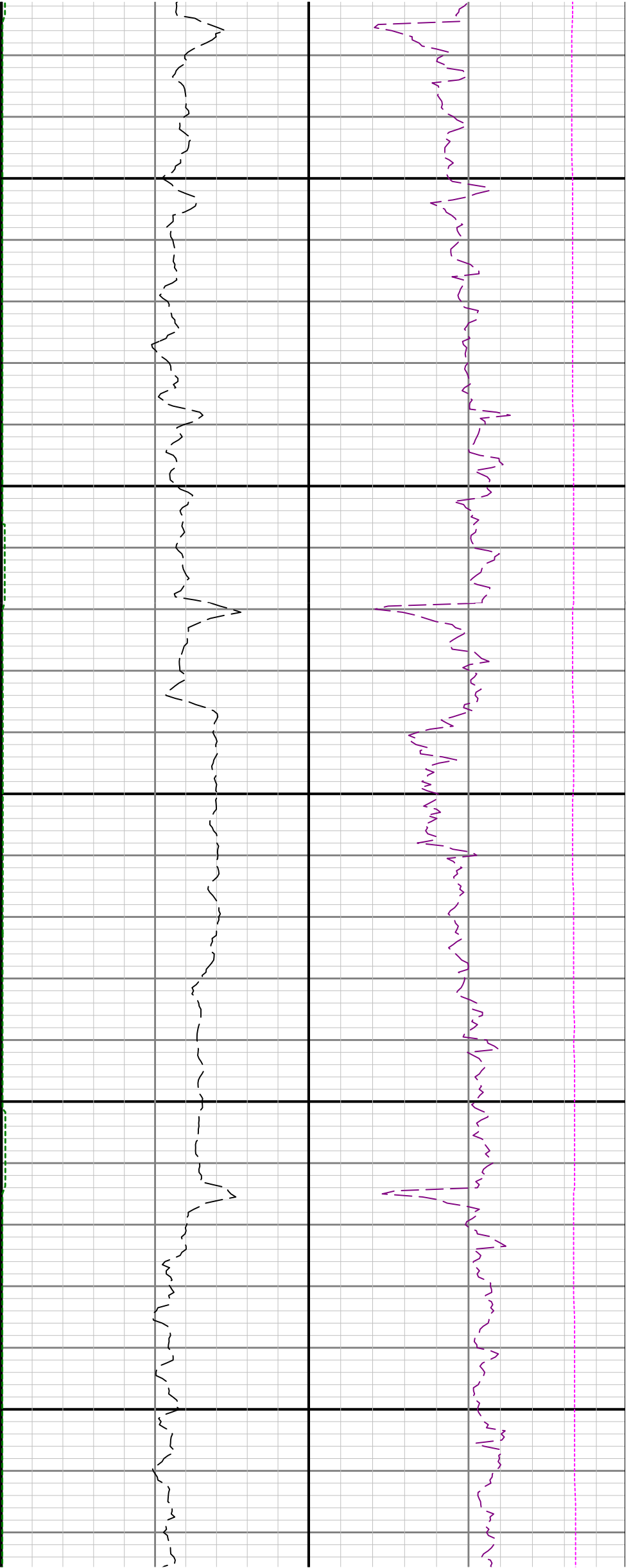












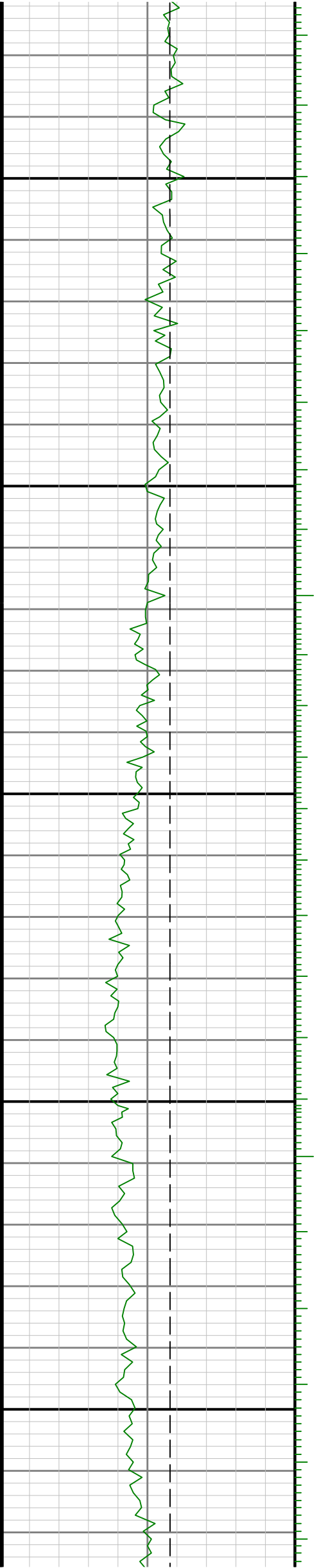
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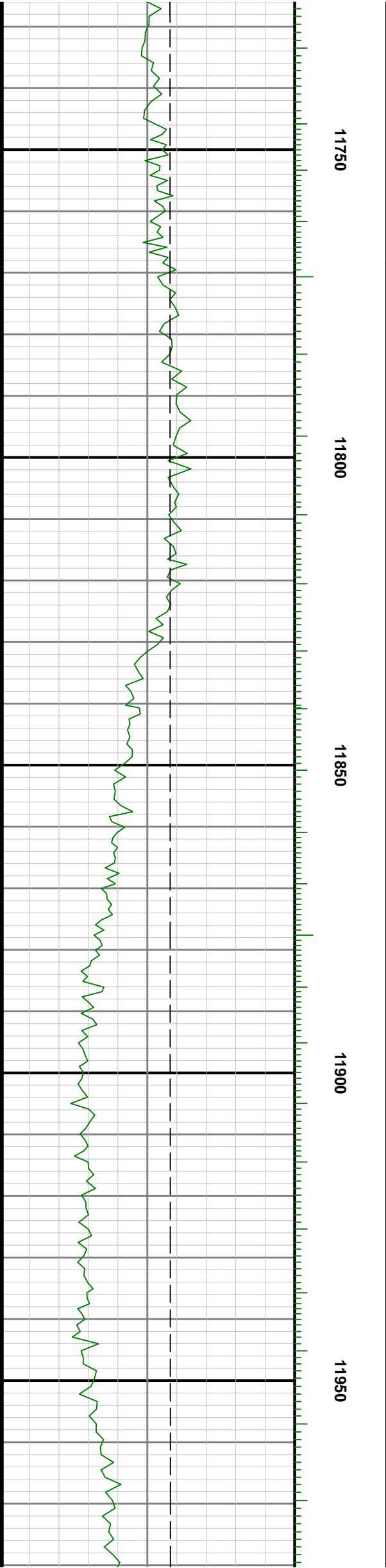
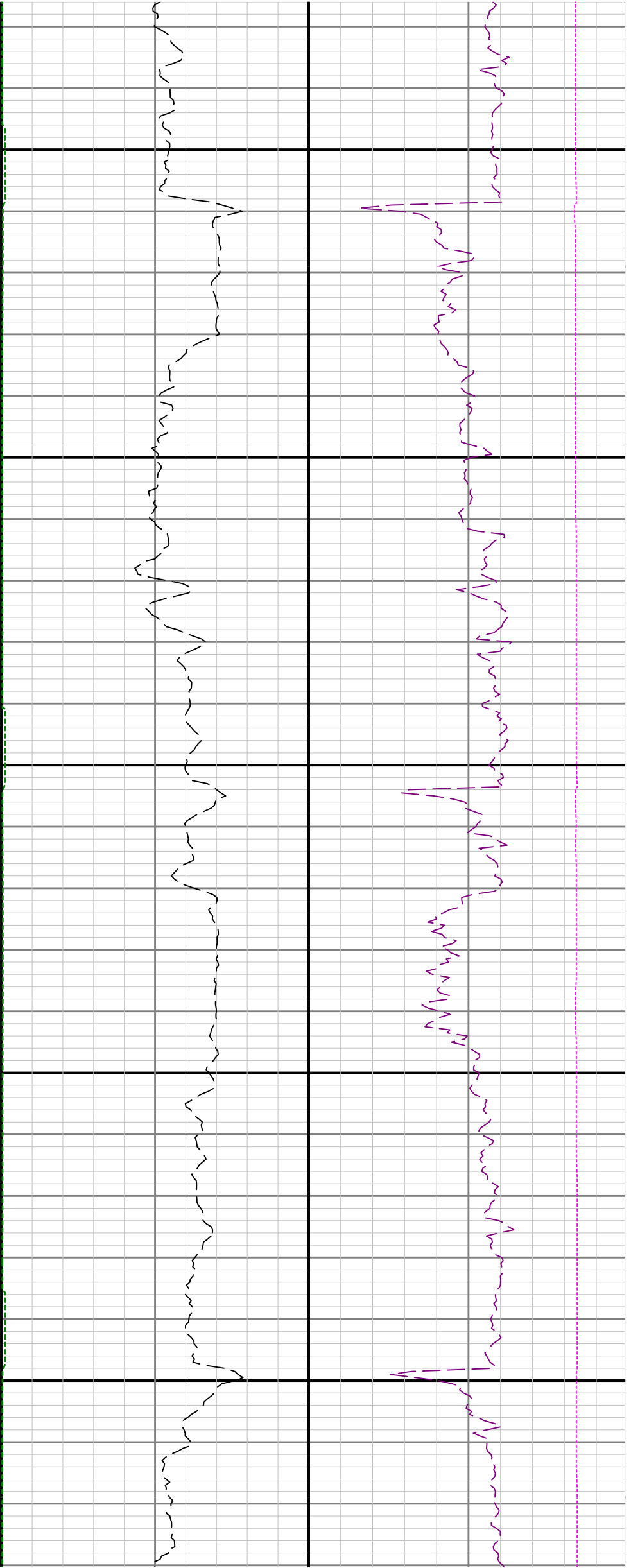
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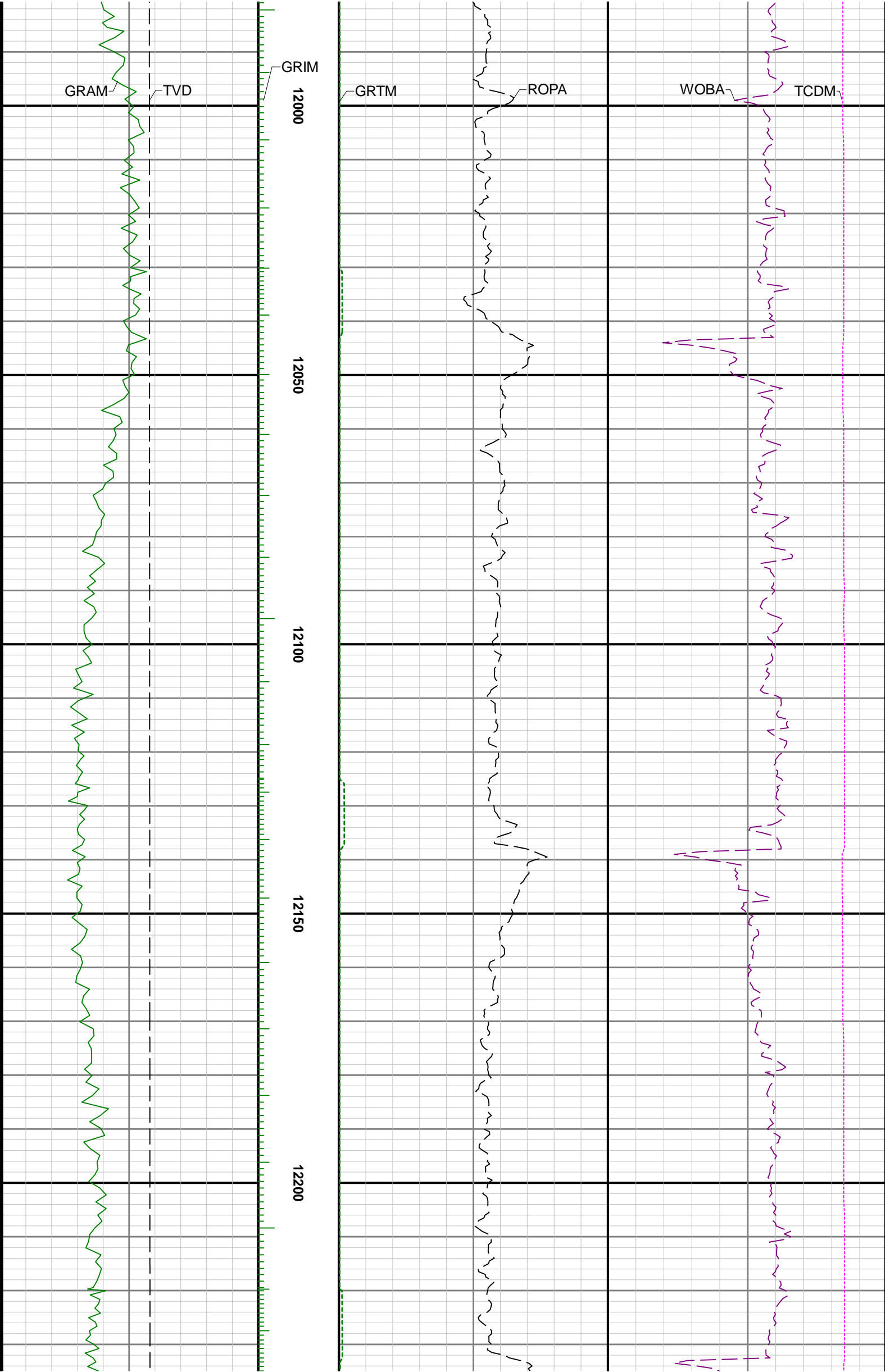
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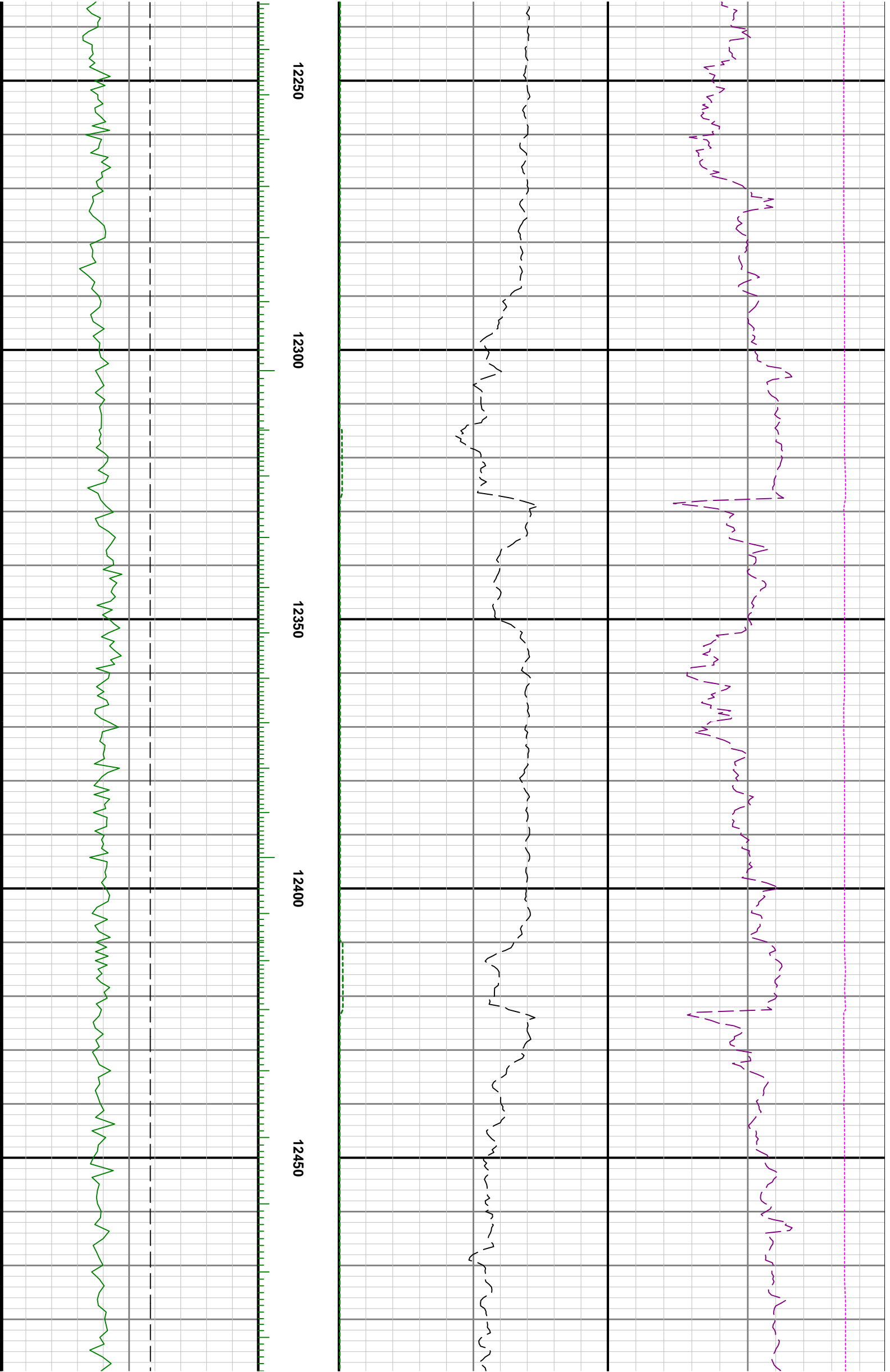
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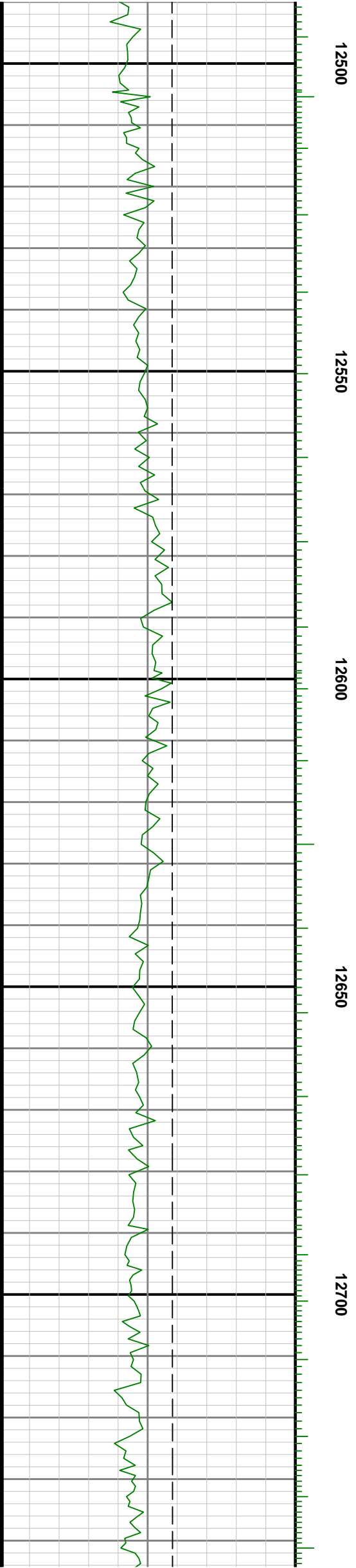
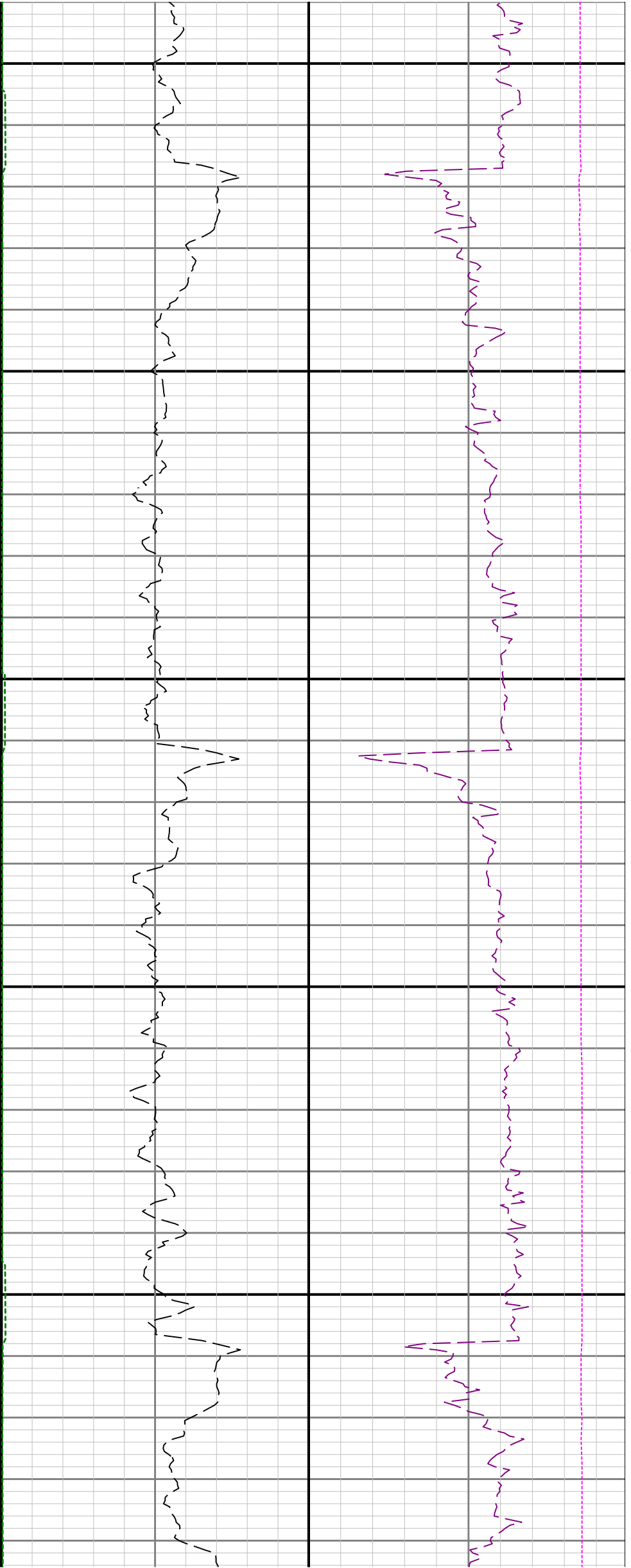
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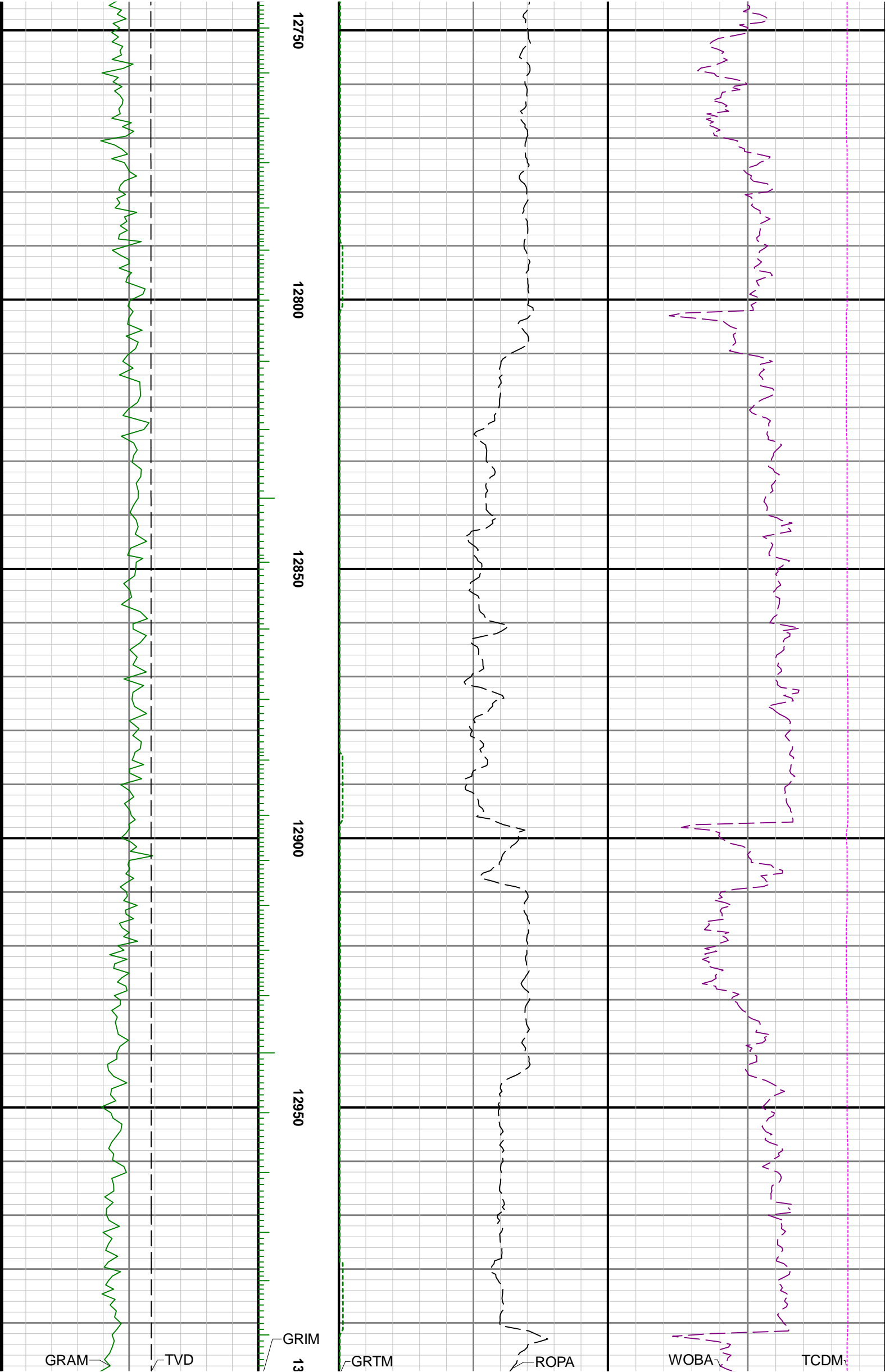


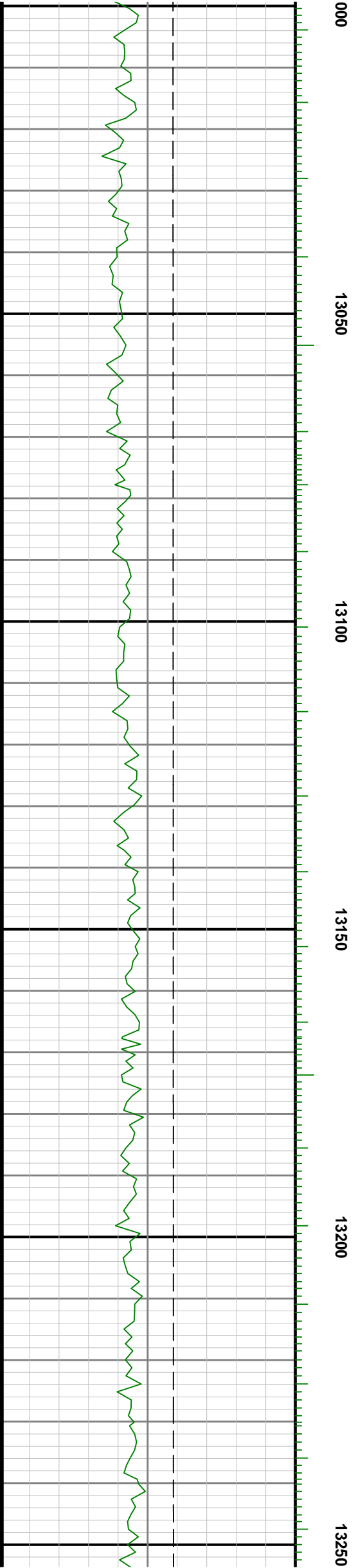
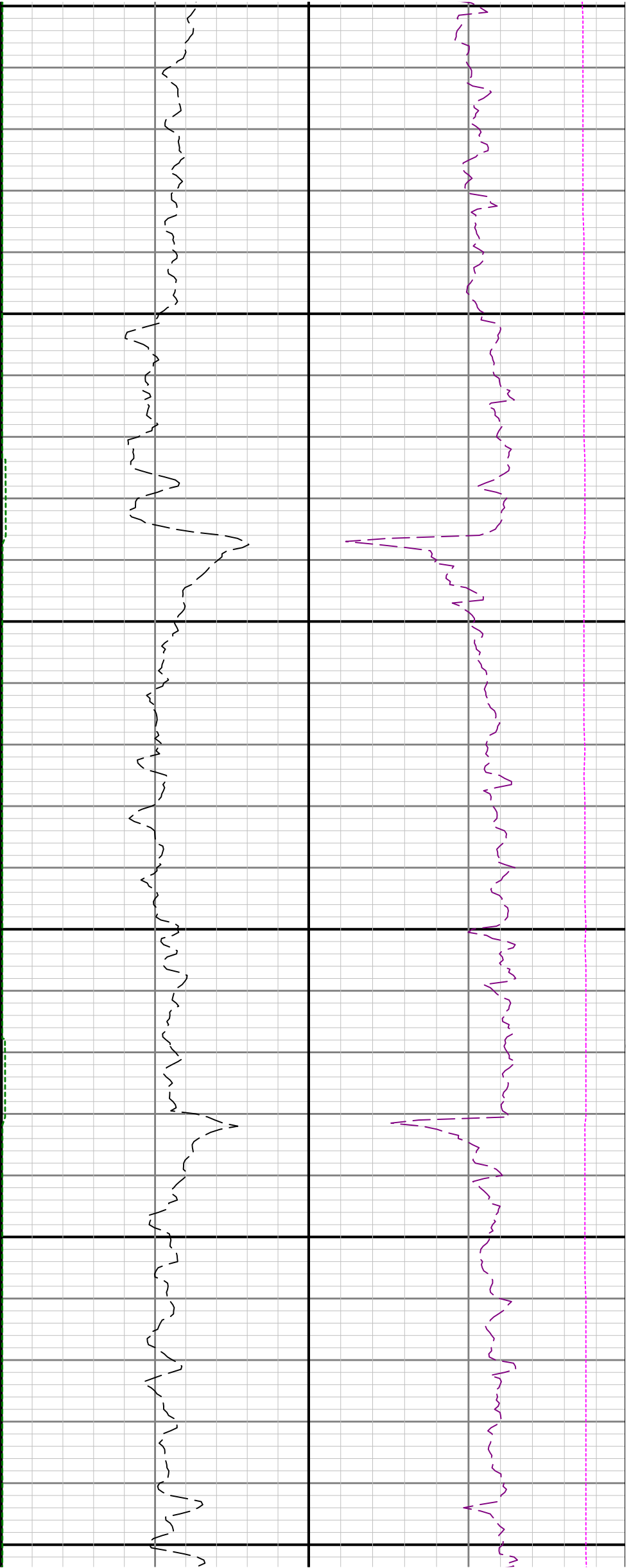


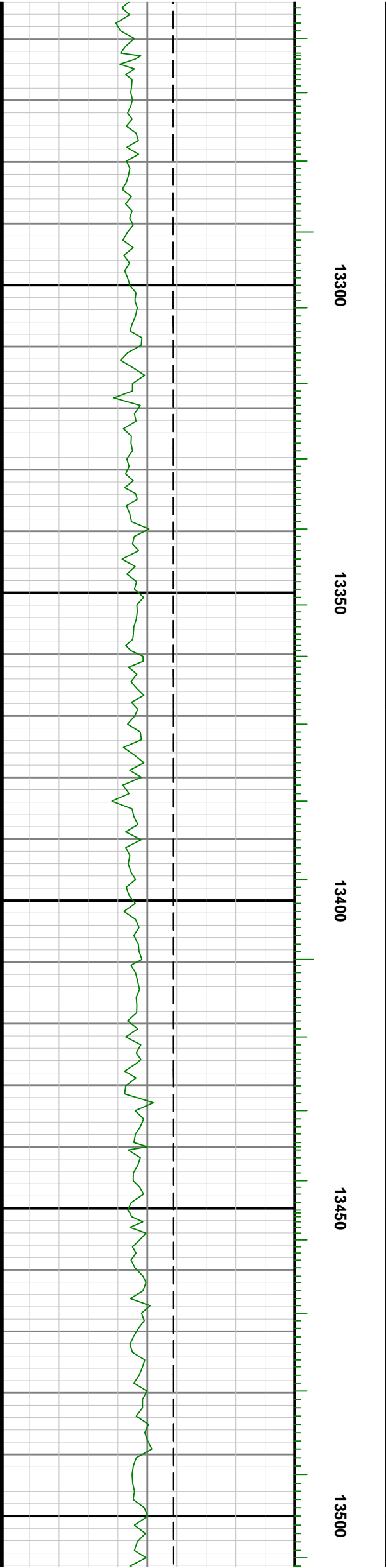
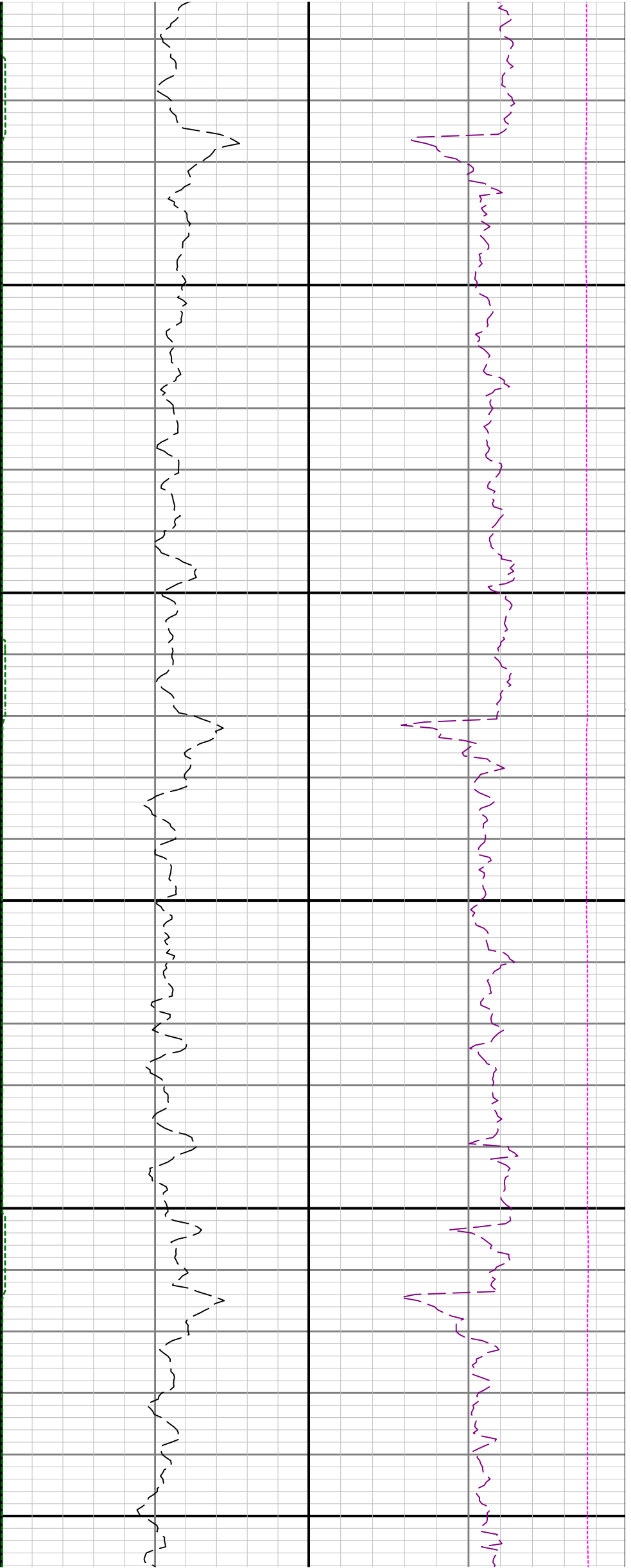


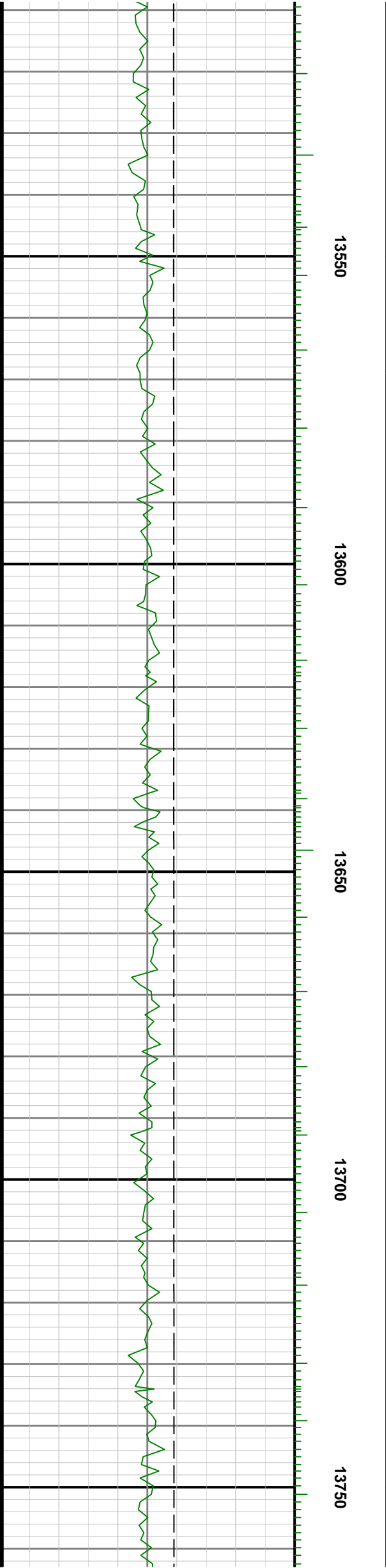
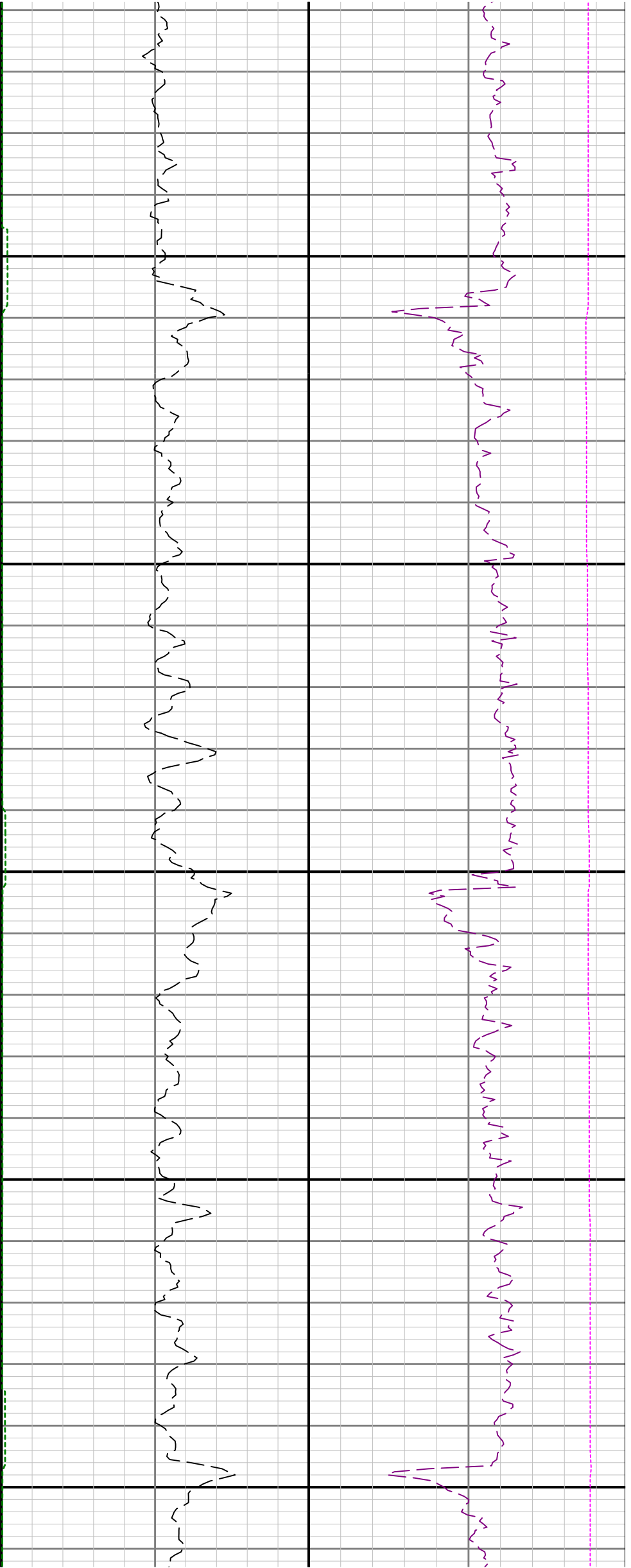


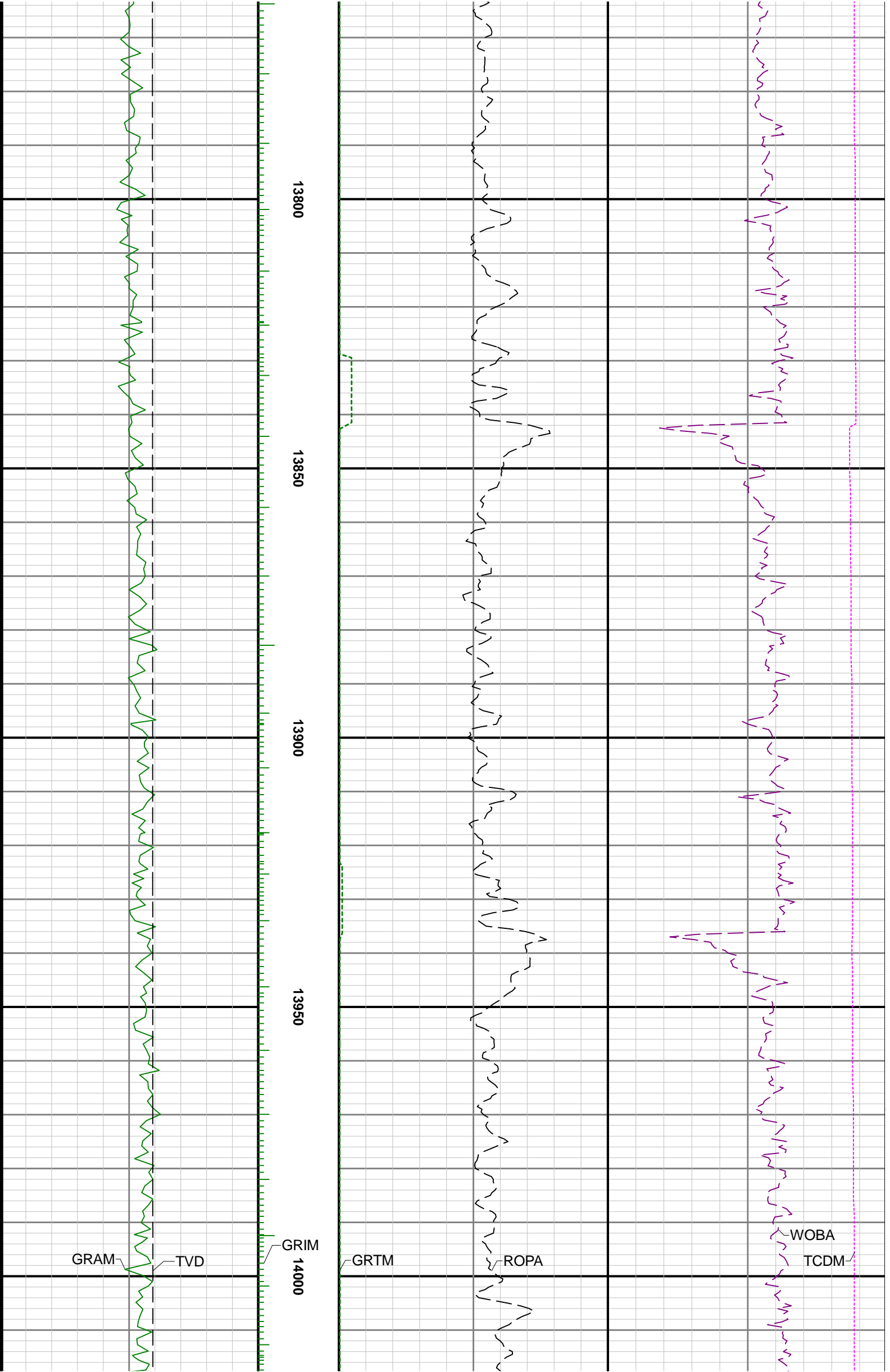


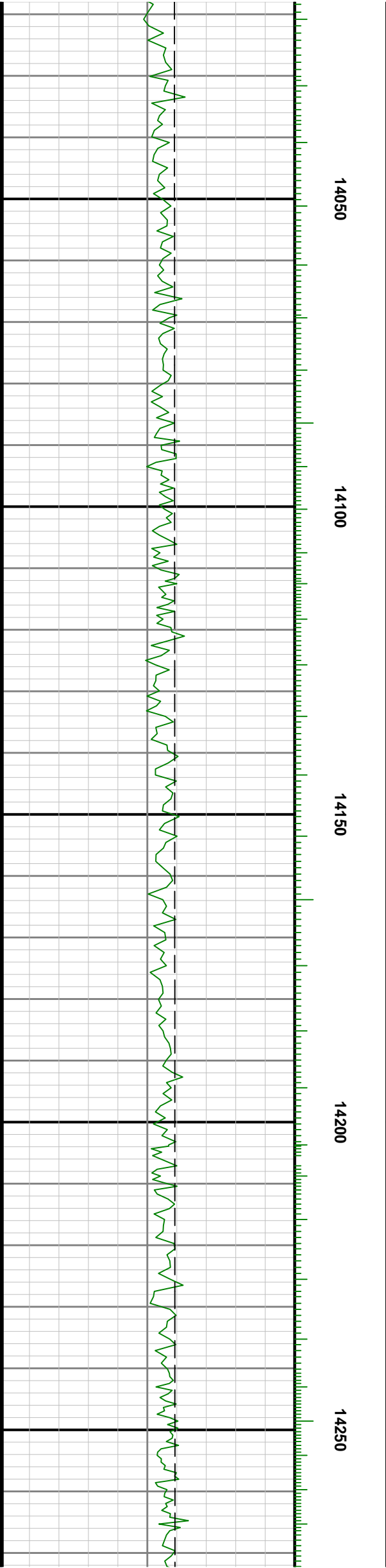
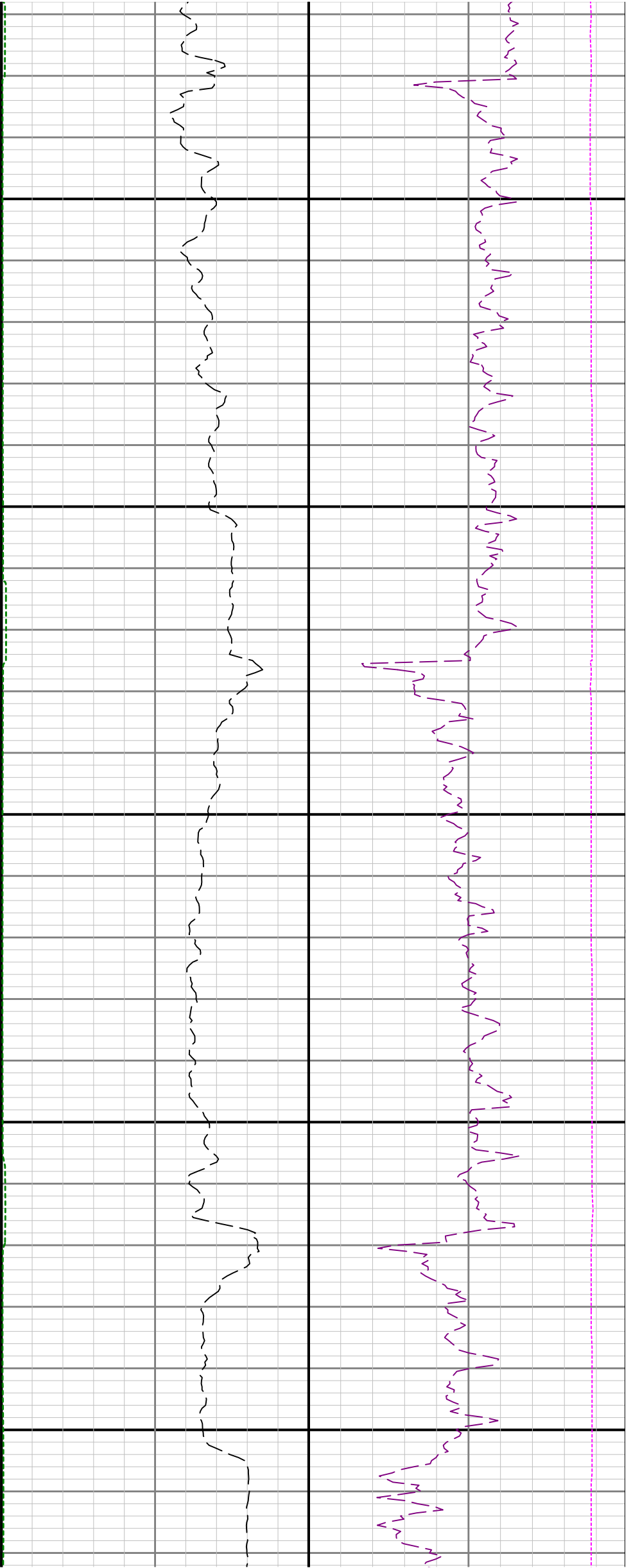


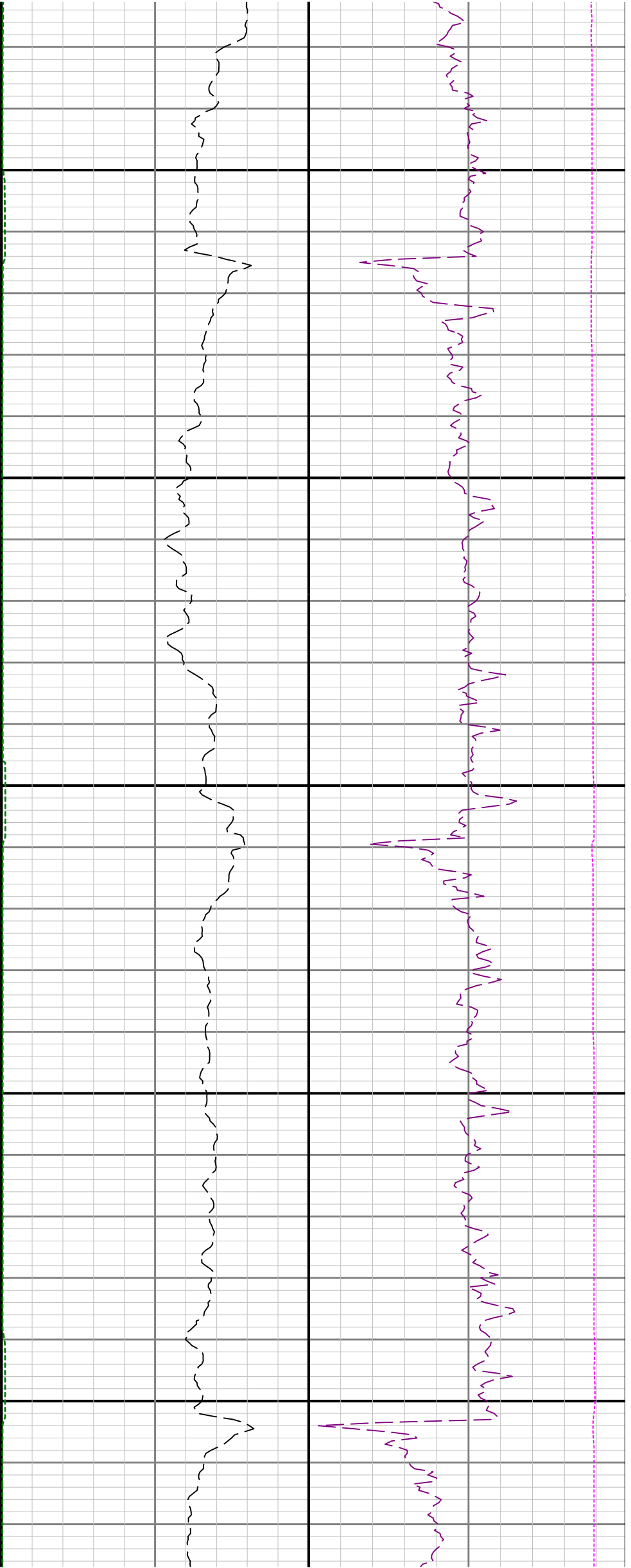












14300

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