

LWD Composition Log										
<div><div><div><div>BAKER HUGHES</div></div></div><div><div></div></div></div>			Natural Formation Evaluation Gamma Ray Rotary Steerable							
Scale:			Company: Noble Energy							
1:240 MD			Well: Harper LD21-662							
Depth Reference:			Field: Weld County							
Driller's Depth			County:		Weld County		State: United States			
Status:			Surface Location:				Other Services:			
Final Print			Latitude:				Directional VSS			
API No: 0512343294			Longitude:							
Job ID: 8096754			SEC: 22		TWN: 9N		RGE: 58W			
Permanent Datum (P.D.): Ground Level			Elevation:		4777.00 ft		KB: N/A			
Log Measured From: Rig Floor			Above P.D.		30.00 ft		DF: 4807.00 ft			
			GL:		4777.00 ft					
Dates			Interval Logged			Magnetic Field Reference				
Date From: 2016-09-04			Top: (ft)		1900.00		Azi Reference North: Grid		Dip Angle: (deg)	
Date To: 2016-09-05			Bottom: (ft)		10701.00		Total Magnetic Field Strength: (nT)		52636	
Spud Date: 2016-09-03							Mag to Reference North Correction: (deg)		6.53E	
Borehole Record										
Casing Record										
Hole Size (in)			From (ft)		To (ft)		Size (in)		Weight (lb/ft)	
13.500			30.00		1948.00		9.625		36.00	
8.500			1948.00		10699.00					
Mud Record										
Deviation Record										
Type			From (ft)		To (ft)		Hole Size (in)		Interval (ft)	
Diesel-Oil Based Mud			1948.00		10699.00		8.500		8753.35	
Acquisition System										
Baker Hughes Cadence			Software Version				Other			
PlotStudio			G3.3 3.3.7410.1				Rig: H&P 517 Contractor: Noble Drilling District: RMA Unit: D&E			

1	ATC_MWD	12656414	Gamma (single)	2.17	12.17	7.000	3.250
1	ATC_MWD	12656414	Directional (mag)	12.24	22.24	7.000	3.250
2	ATC_SU	12142976	Near Bit Inclination	5.93	6.55	7.000	4.330
2	ATC_SU	12142976	Near Bit VSS	5.93	6.55	7.000	4.330
2	ATC_MWD	12473747	Gamma (single)	2.19	12.17	7.000	3.250
2	ATC_MWD	12473747	Directional (mag)	12.26	22.24	7.000	3.250

Service and Tool Mnemonics

Mnemonic	Name	Description
ATC_SU	ATC_SU	Auto Trak Curve Steering Unit
ATC_MWD	ATC_MWD	Auto Trak Curve MWD
ATC_LCPM	ATC_LCPM	Auto Trak Curve LCPM

Comments

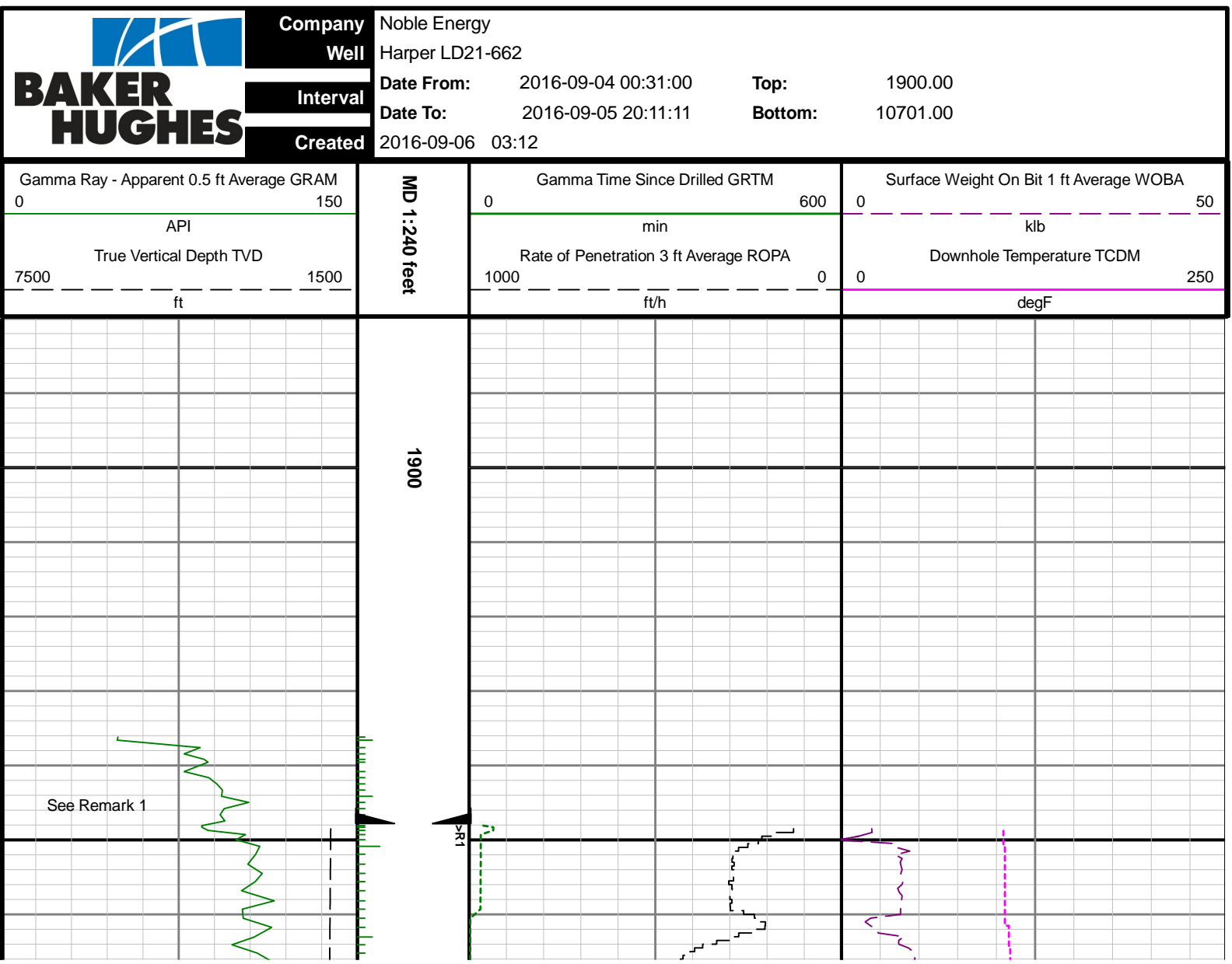
- 1 Baker Hughes Runs 1 and 2 utilized a 6.75 inch AutoTrak Curve Rotary Steerable assembly tool behind a 8.50 inch bit from 1949 to 10699 ft MD ( 1949 to 5721 ft TVD).
- 2 Small gaps in gamma data are due to tool power cycling off during downlink and not recording gamma ray data.
- 3 Depth measurements 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.

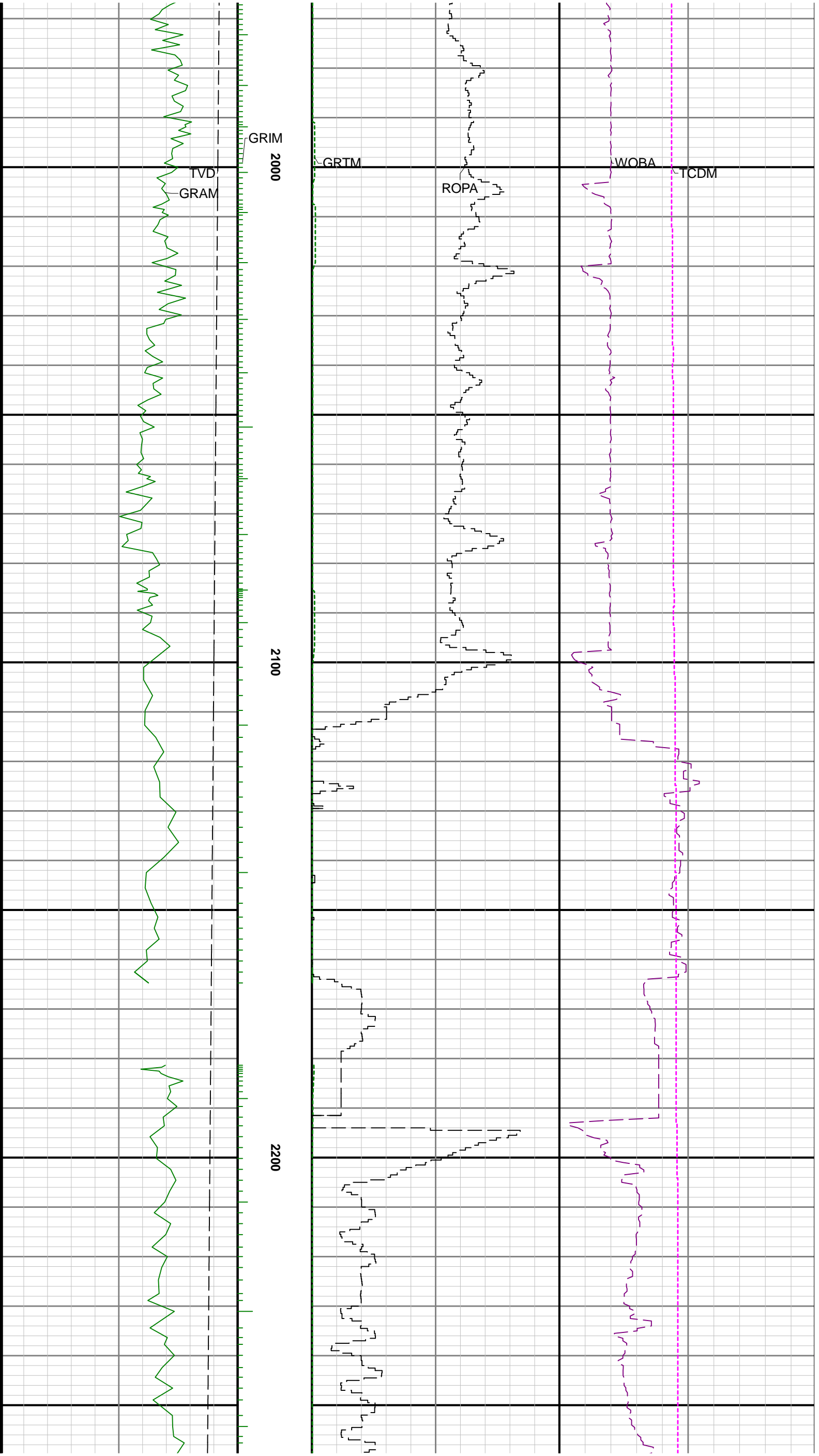
Remarks

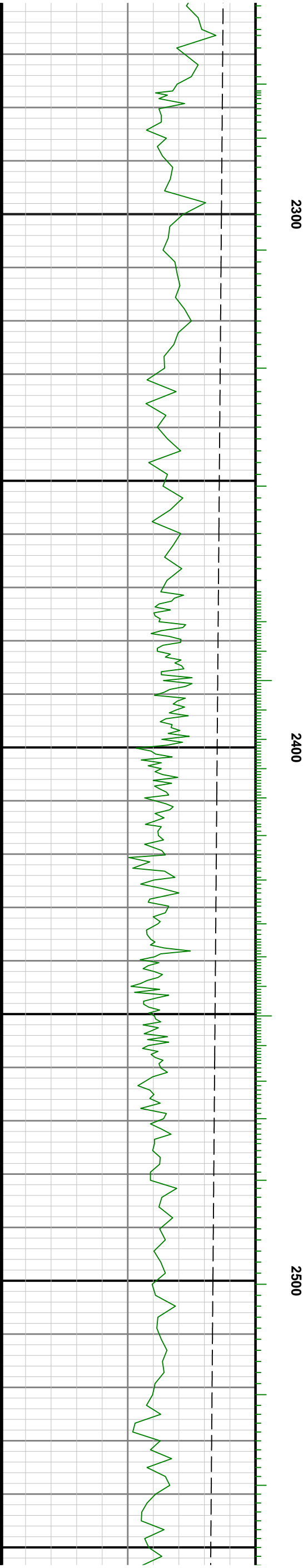
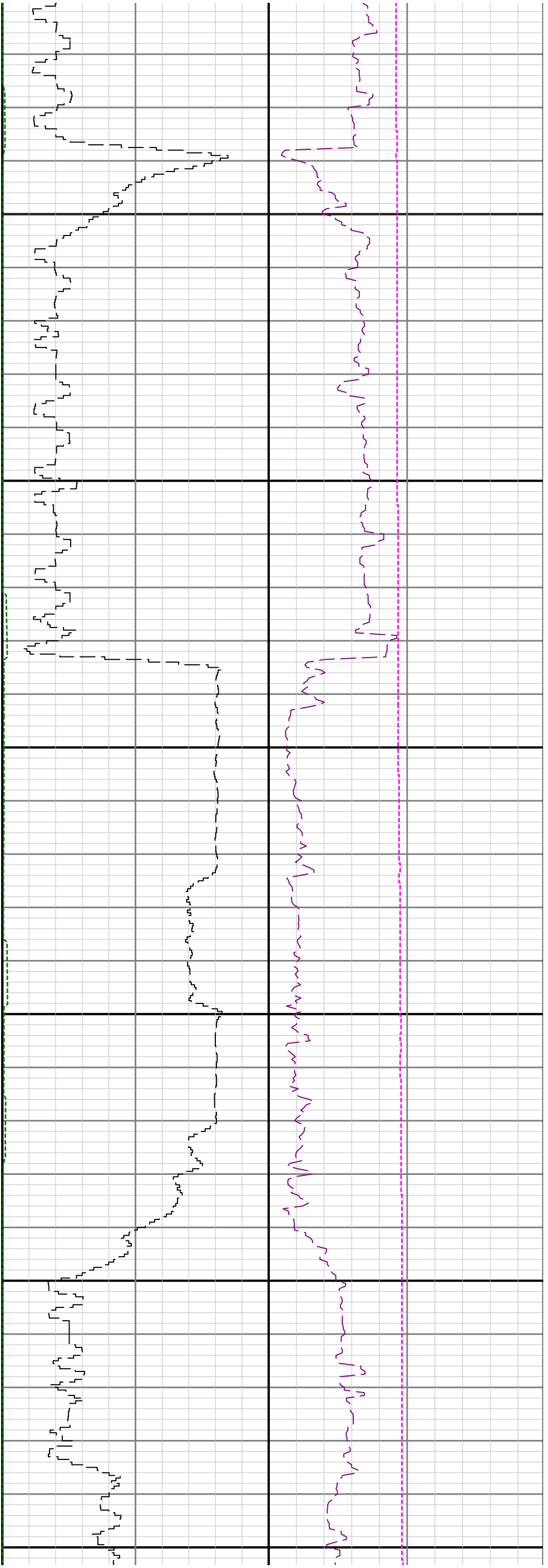
Number	Measured Depth (ft)	Hole Section (in)	Run No.	Remark
1	1945.00	8.500	1	The interval from 1937 to 1949 ft MD (1937 to 1949 ft TVD) has no ROPA, WOBA, and TCDM data due to the Gamma Ray sensor to bit offset.
2	7205.00	8.500	2	The interval from 7194 to 7206 ft MD (5751 to 5751ft TVD) was logged 9 hours after being drilled do to trip out of the hole to change out Autotrak Curve.
3	10690.00	8.500	2	The interval from 10687 to 10699 ft MD (5721 ft TVD) has no gamma data due to sensor to bit offset.

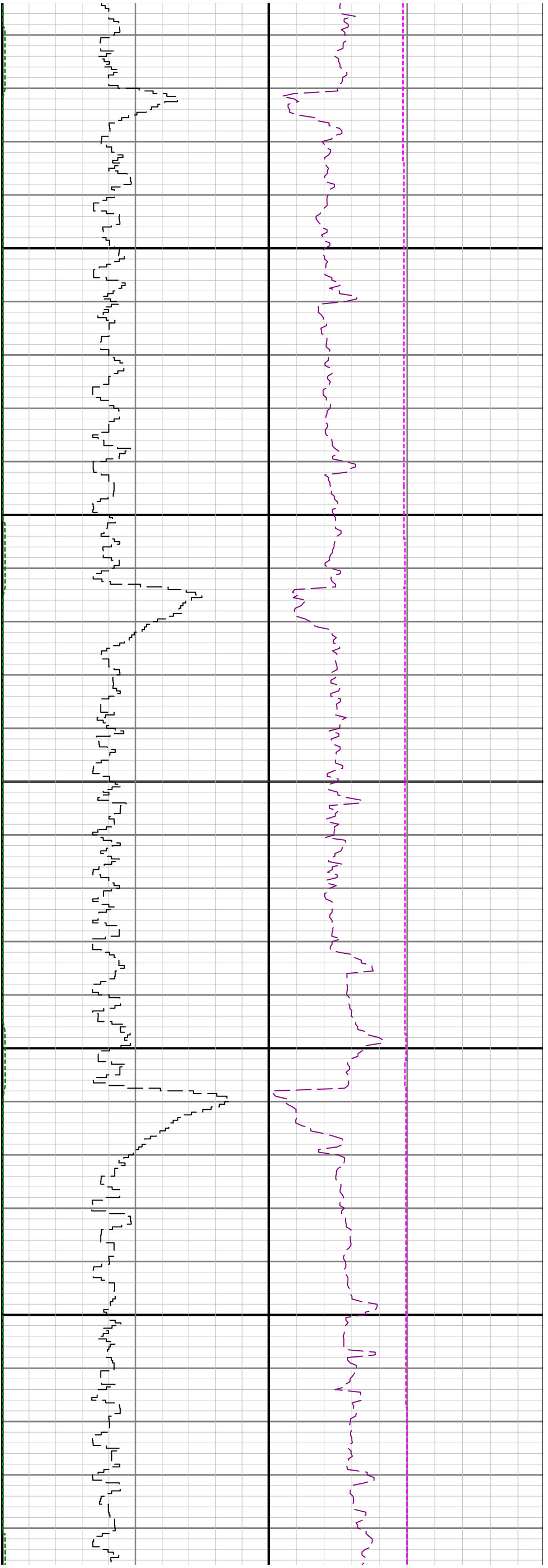
Curve Mnemonics

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





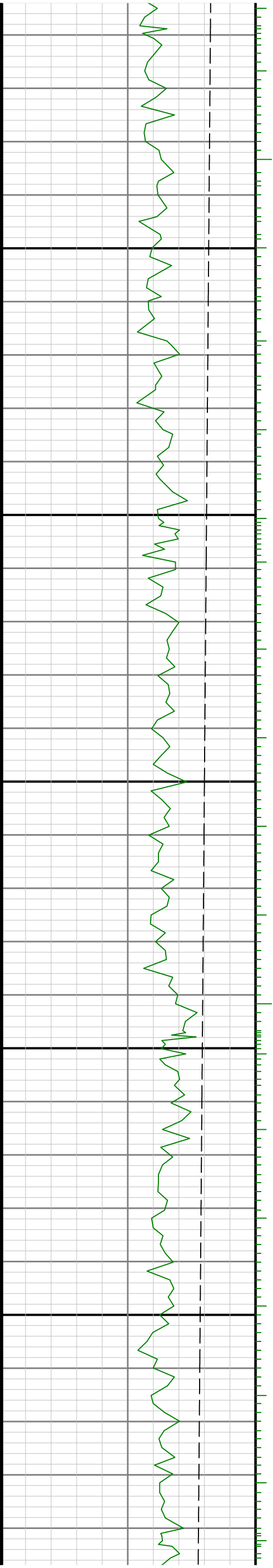


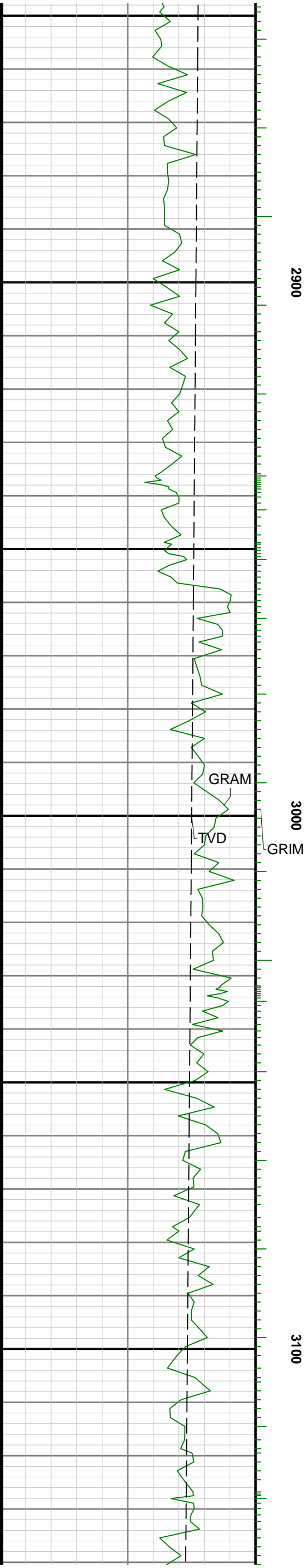
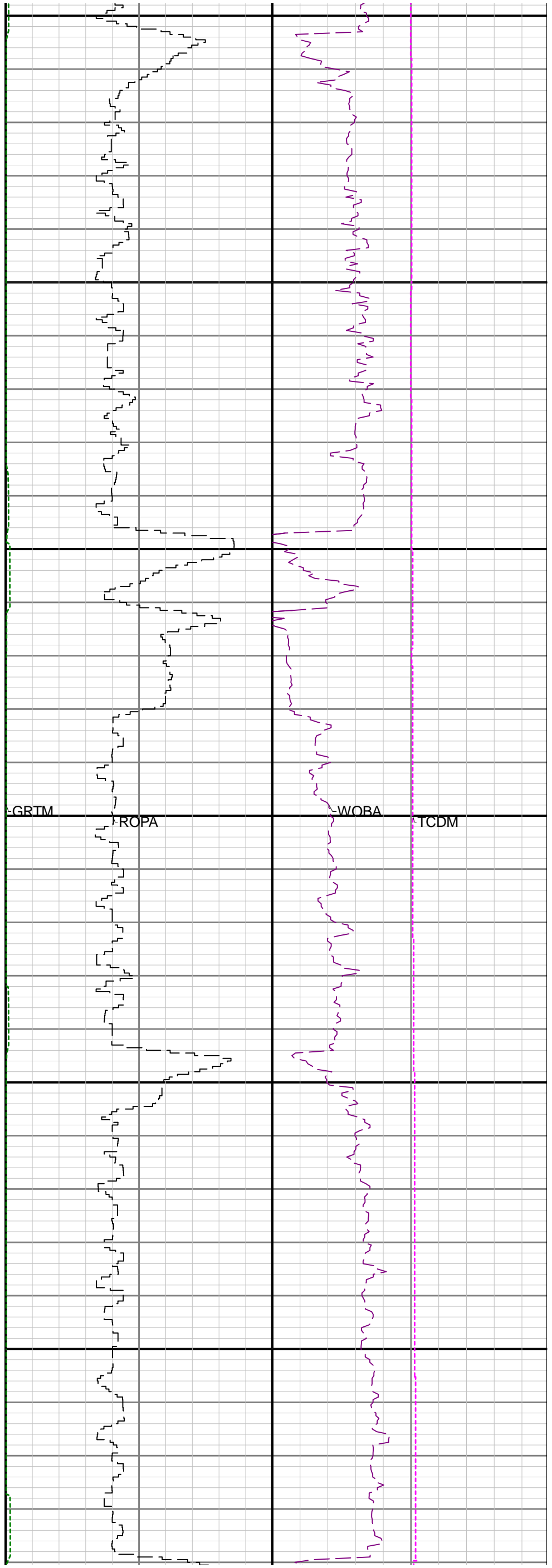


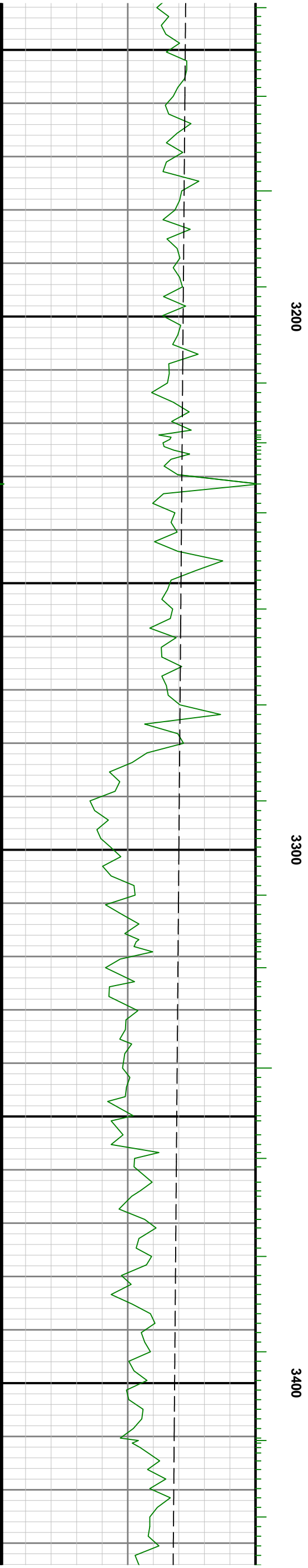
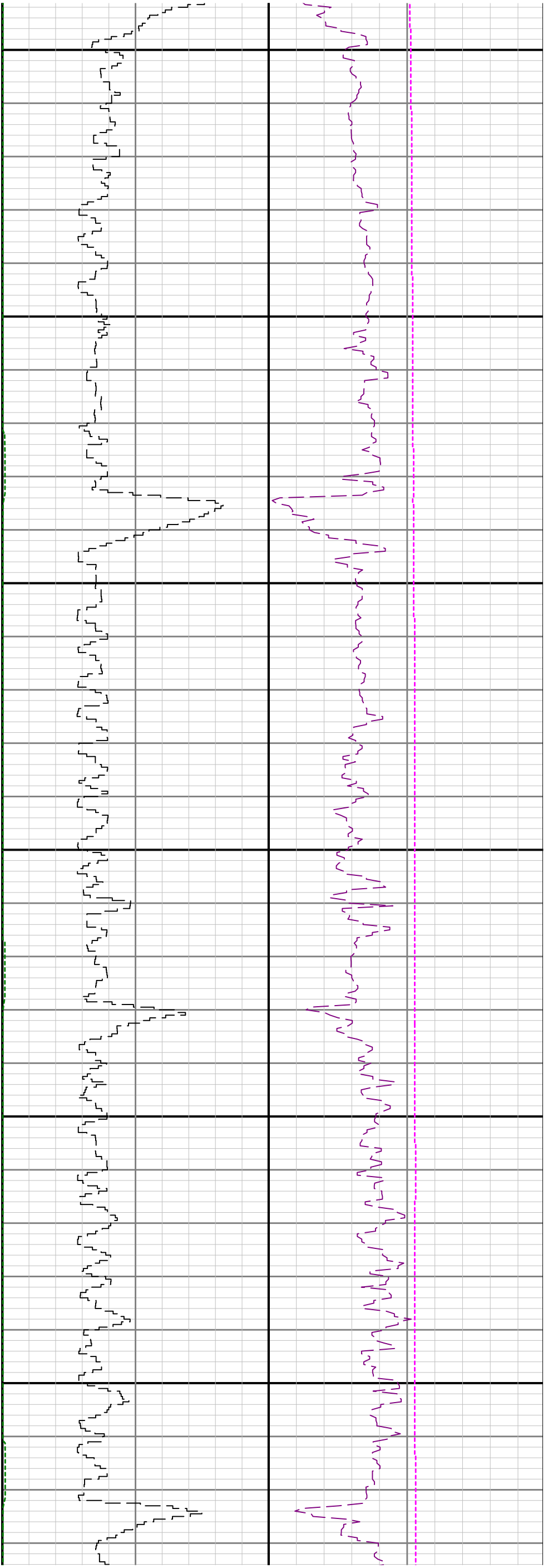
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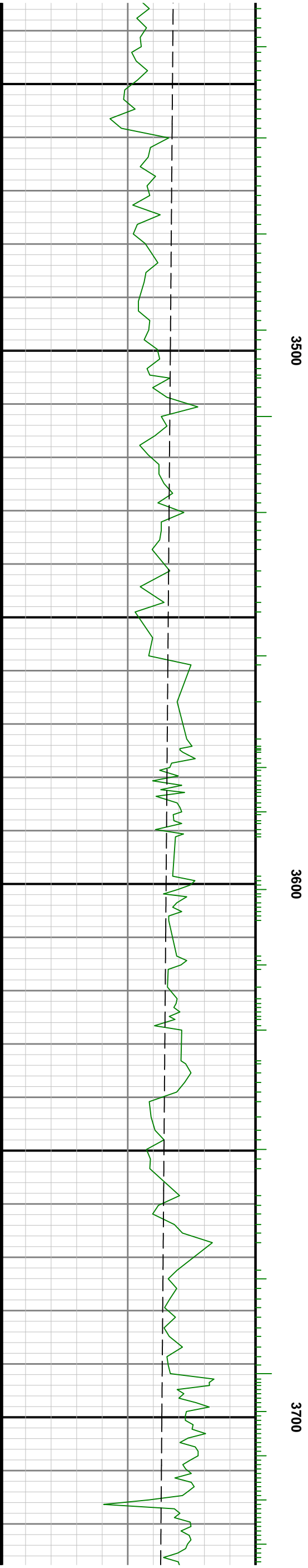
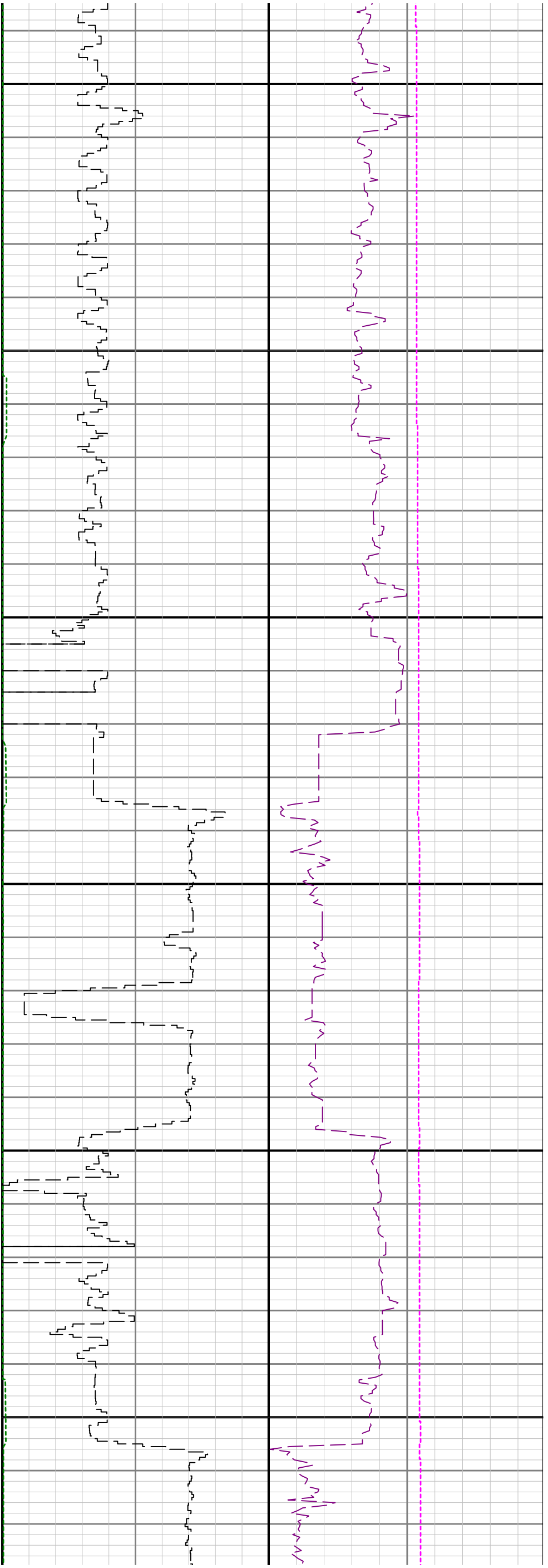
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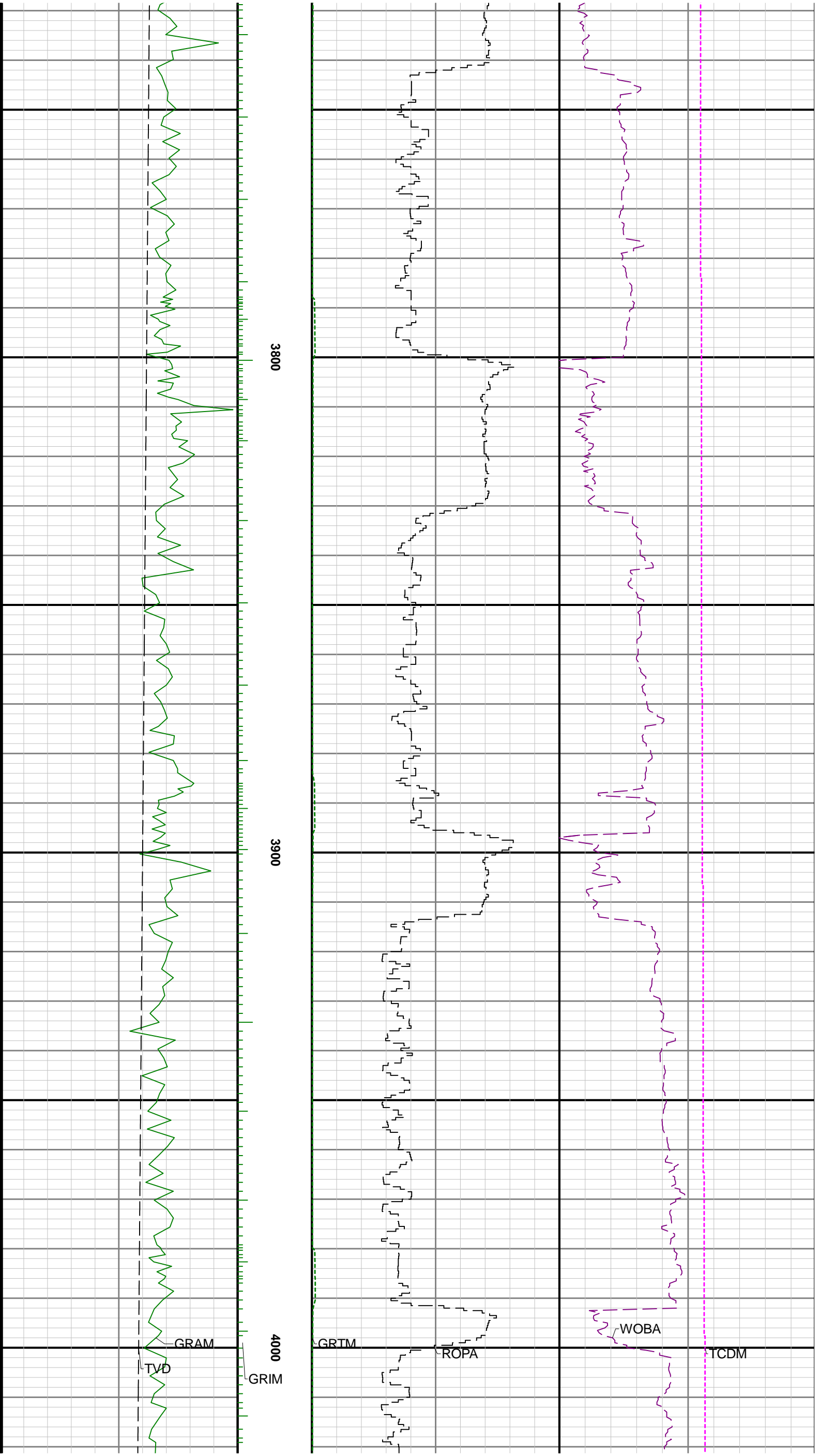


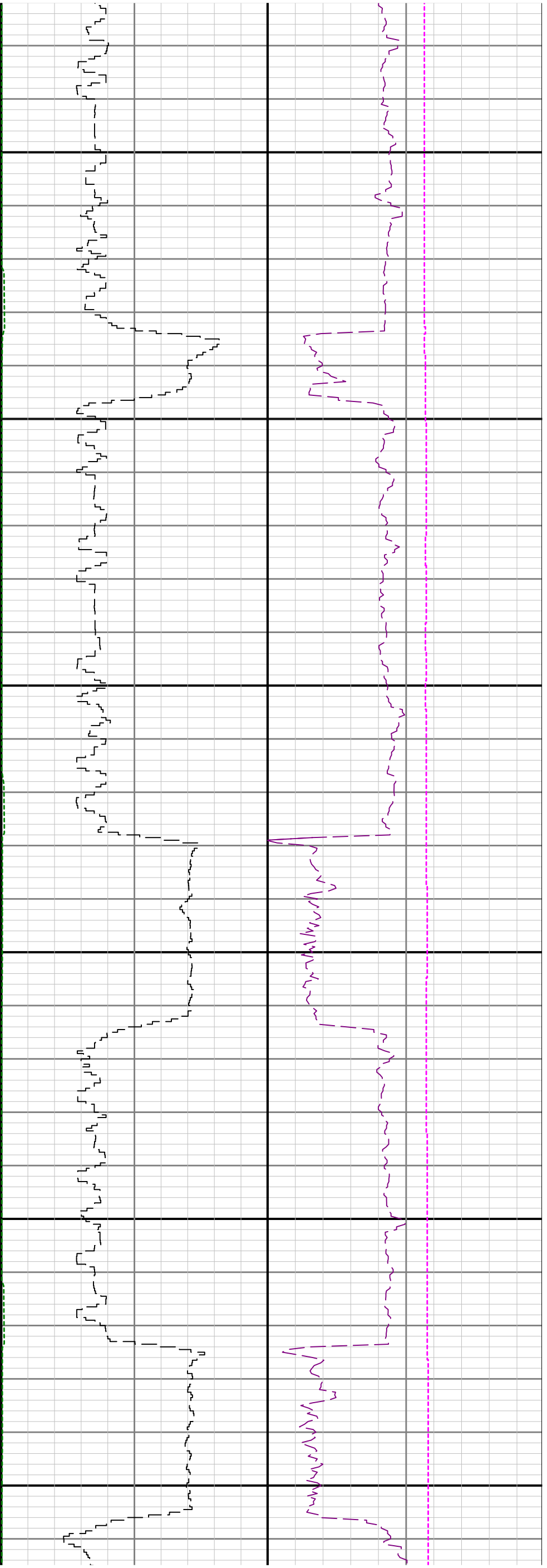








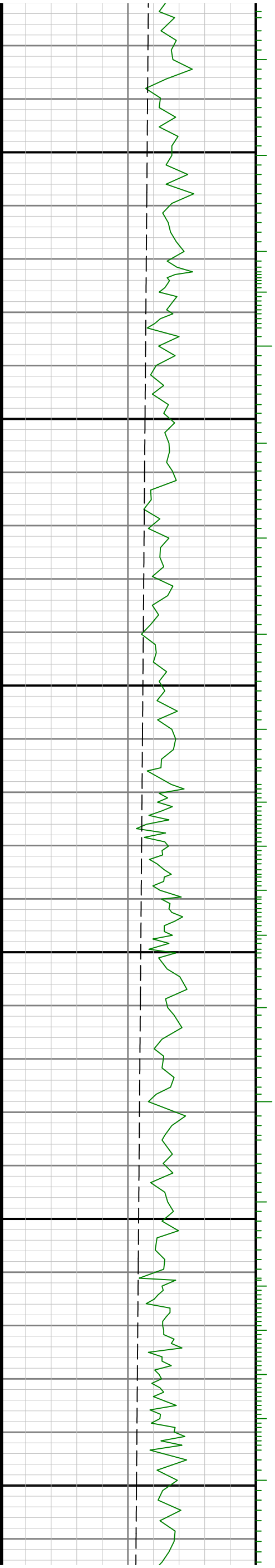


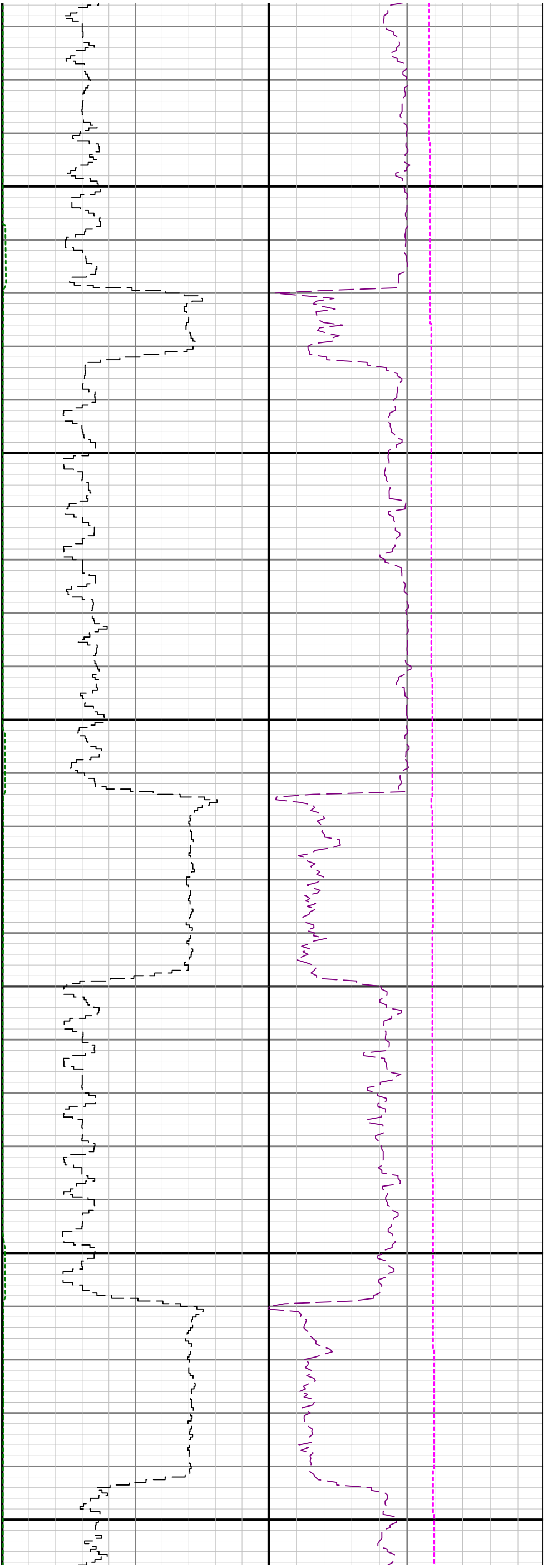


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4200

4300

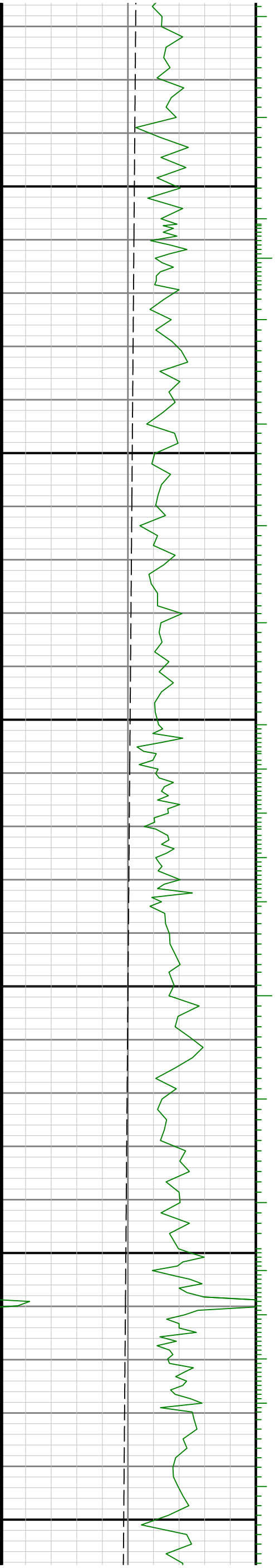


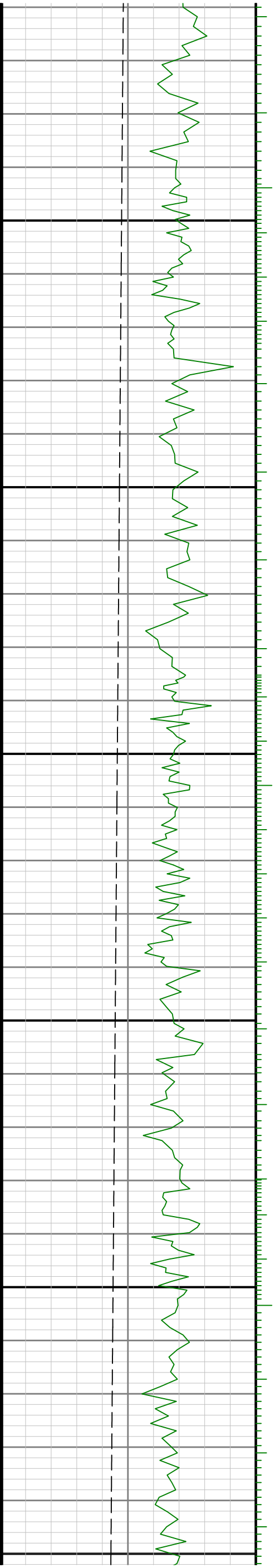
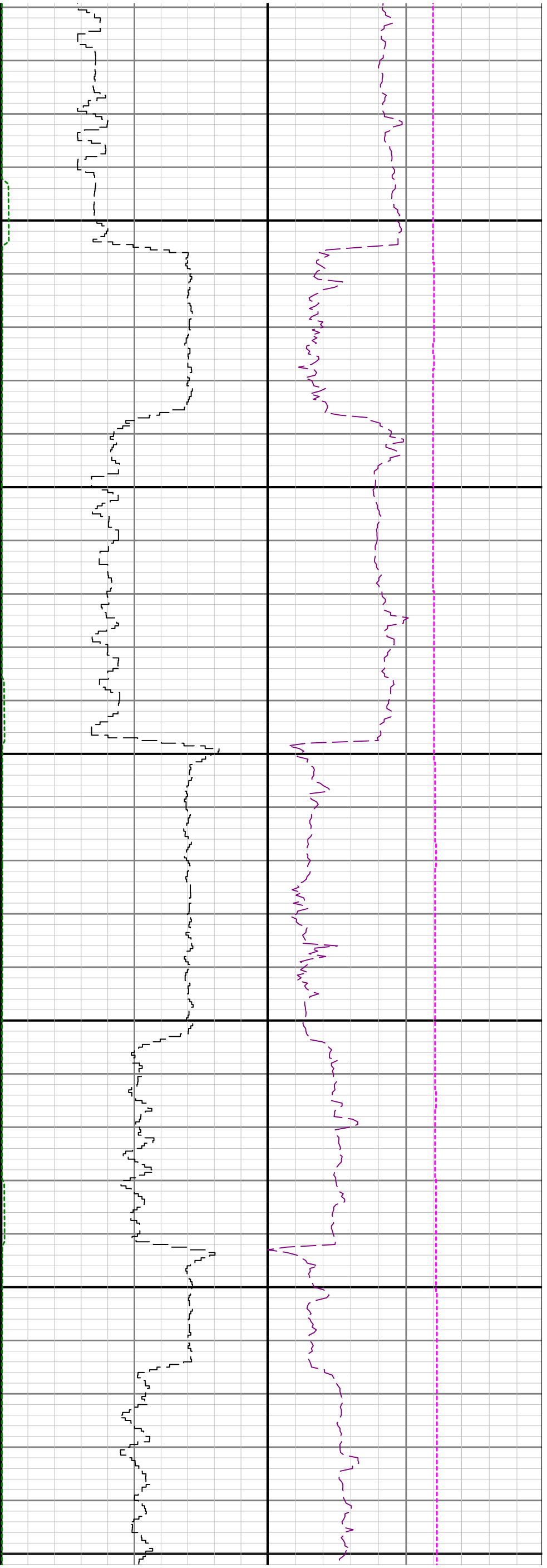


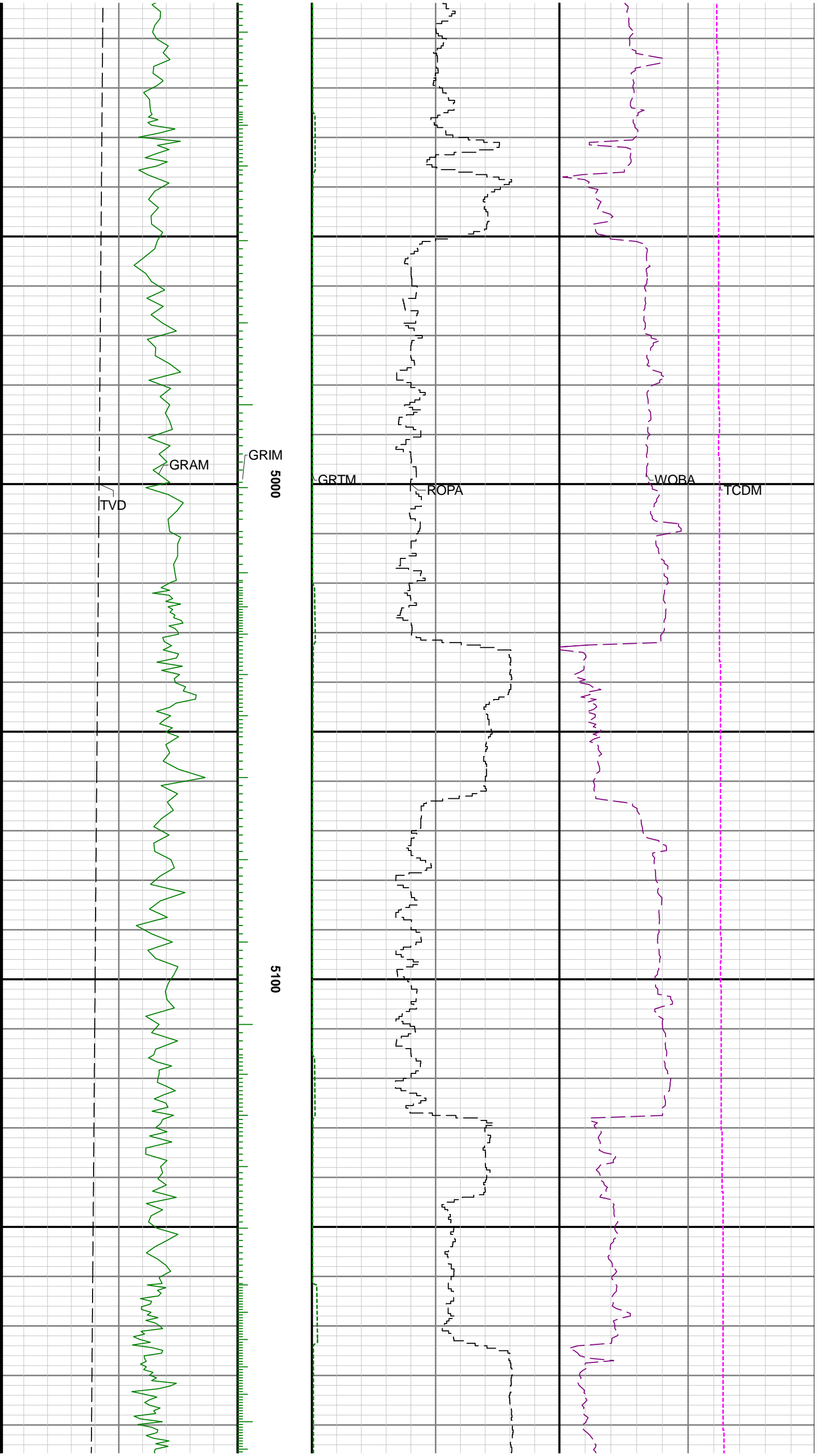
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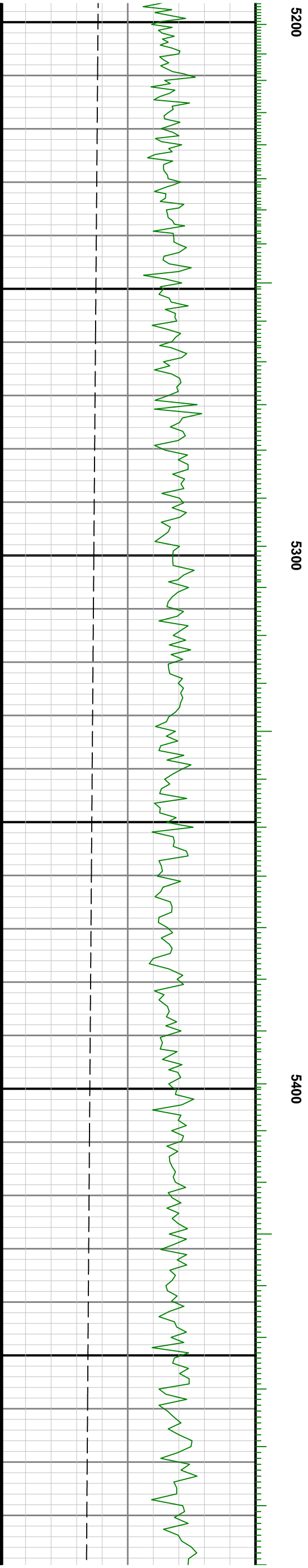
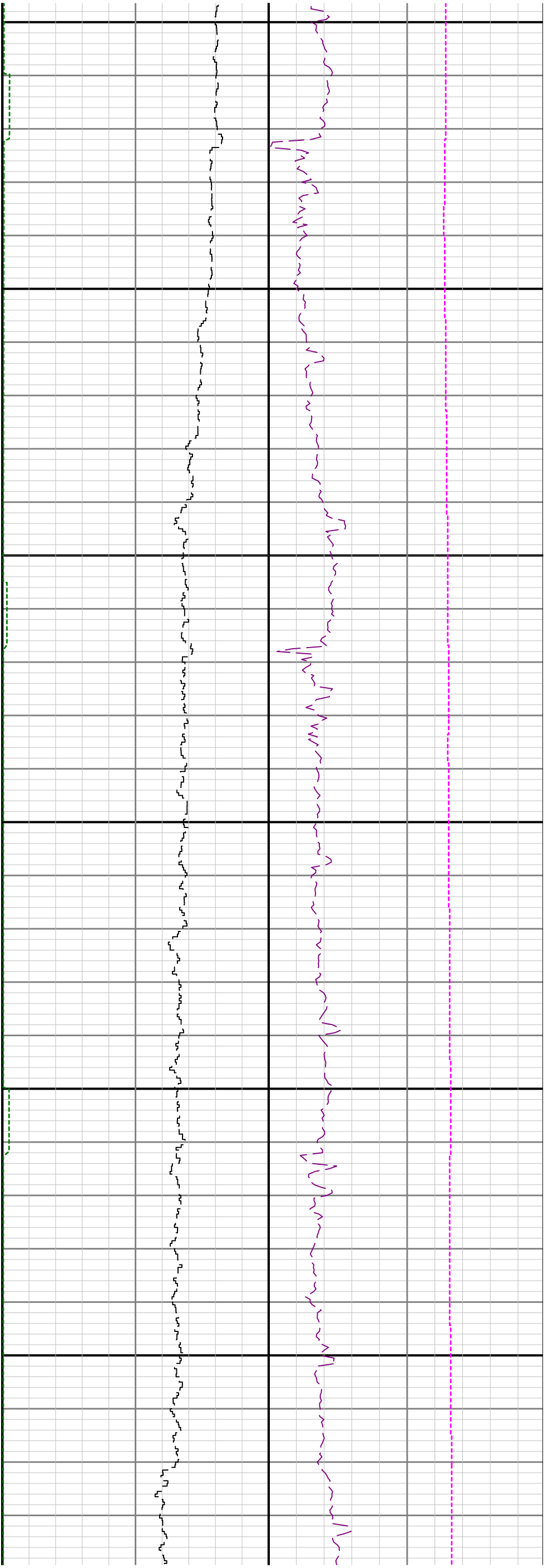
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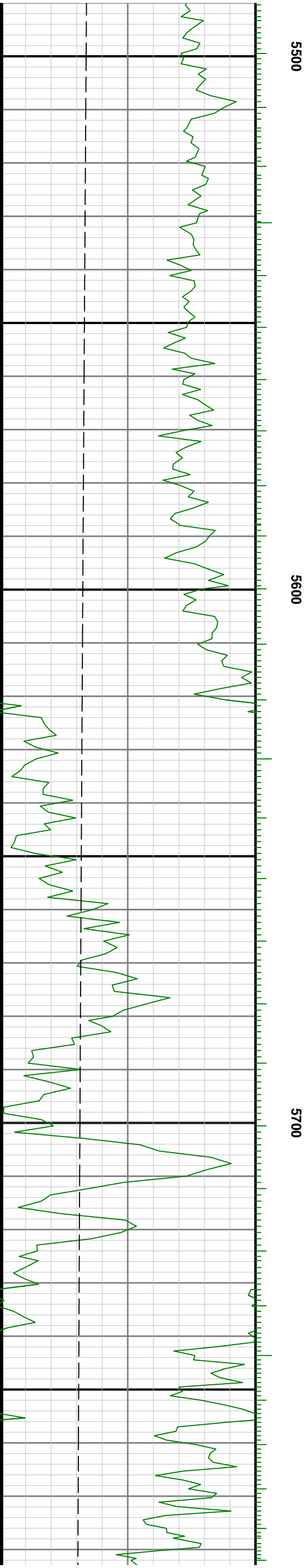
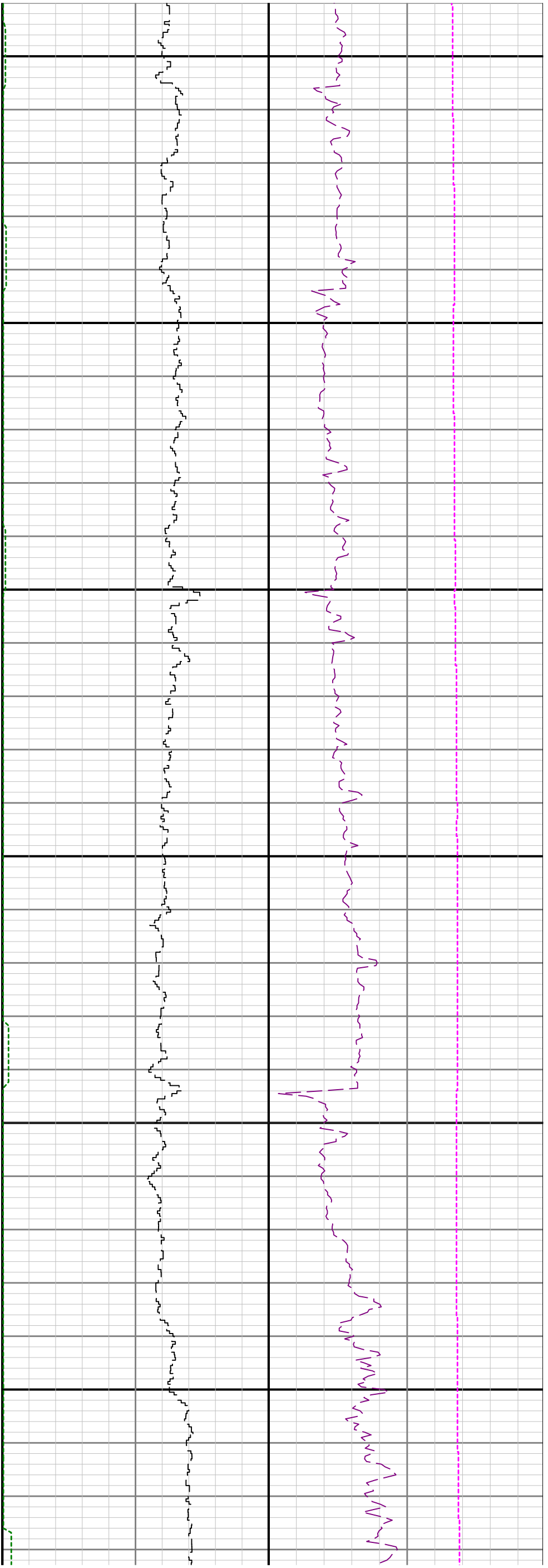
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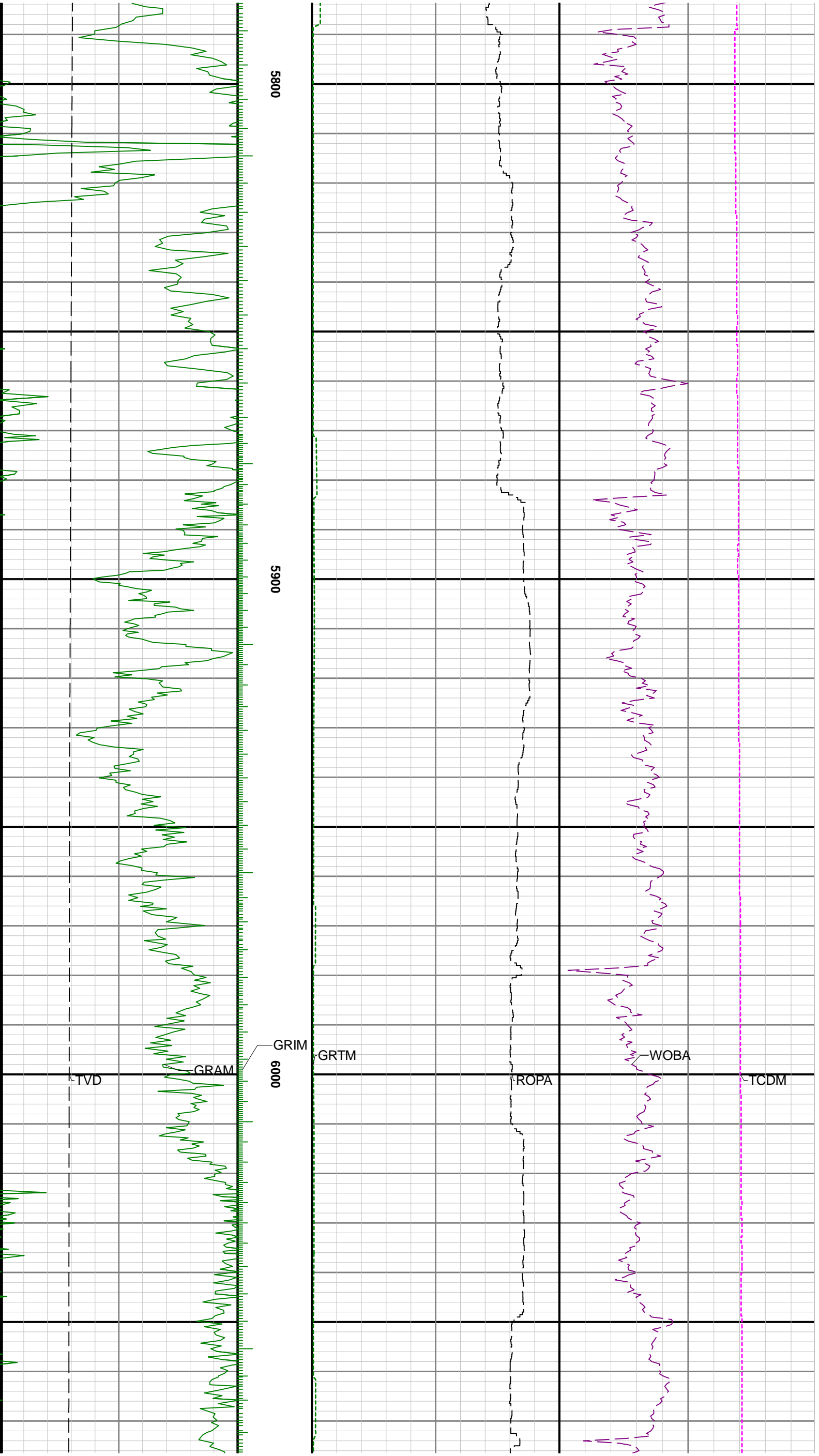




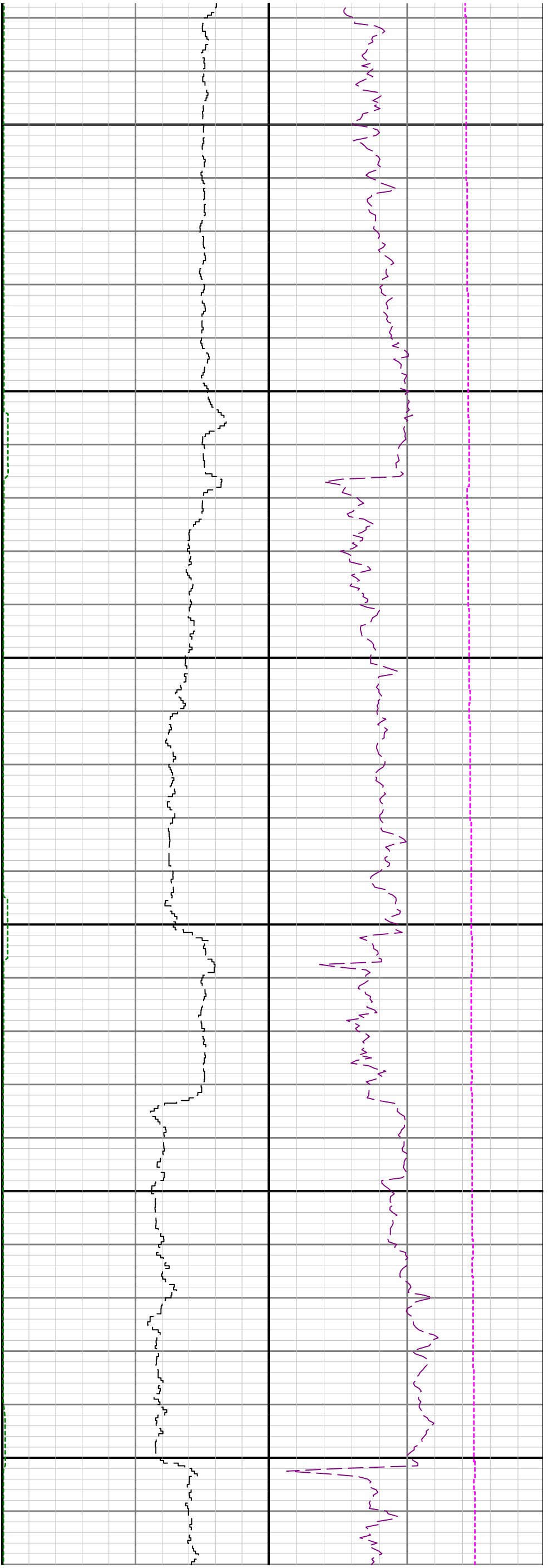












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