

<div><div><div>BAKER HUGHES</div></div><div><div>Gamma Ray</div></div></div>	MEMORY LOG			
Scale:	Company: Noble Energy			
Depth Reference:	Well: ANNI LD29-755			
	Field: Weld County			
	County:	Weld County	State:	Colorado
Status:	Driller's Depth		Surface Location:	
Final Print	Latitude:		040° 43' 49.116" N	
	Longitude:		103° 53' 33.180" W	
API No:	05-123-43288-00		Directional	
Job ID:	8173263		SEC: 20	TWN: 9N RGE: 68W
Permanent Datum (P.D.):		Mean Sea Level	Elevation:	0.00 ft
Log Measured From:		Rig Floor	Above P.D.	4897.00 ft
			KB:	N/A
			DF:	4897.00 ft
			GL:	4867.00 ft
Interval Logged				Magnetic Field Reference
Date From:	2016-10-22	Top: (ft)	1913.00	Azi Reference North: Grid Dip Angle: (deg)
Date To:	2016-10-24	Bottom: (ft)	11146.00	Total Magnetic Field Strength: (nT)
Spud Date:	2016-10-21	Mag to Reference North Correction: (deg)		
Borehole Record				Casing Record
Hole Size (in)	From (ft)	To (ft)	Size (in)	Weight (lb/ft)
	13.500	0.00	9.625	36.00
	8.500	1925.00		0.00
		11146.00		1915.00
Mud Record				Deviation Record
Type	From (ft)	To (ft)	Hole Size (in)	Interval (ft)
Oil Based Mud	1925.00	11146.00	8.500	9221.00
				0.37 193.73
				90.28 176.97
Acquisition System				Other
Baker Hughes Cadence	Software Version	PlotStudio	3.3.7410.1	RG: H&P 517
				Contractor: Helmerich & Payne Drilling Co
				Unit: D&E
				Distict: RMD

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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	2.00	AutoTrak Curve	1913.00	11133.00	1925.00	11146.00	2016-10-22 09:43	2016-10-24 06:41	42.09
Crew												
Name			Arrive Wellsite	Depart Wellsite	Name		Arrive Wellsite	Depart Wellsite	Name		Arrive Wellsite	Depart Wellsite
Alex Osborne			2016-10-21	2016-10-25	Scott Sims		2016-10-21	2016-10-25				

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+ (%)
2016-10-22 08:00	1	1925.00	Oil Based Mud	9.4	56	N/A	20.4	72/18	Active Pit	22500	0.00
2016-10-22 20:00	1	4009.00	Oil Based Mud	9.2	43	N/A	18.4	73/17	Active Pit	24000	0.00
2016-10-23 08:00	1	6415.00	Oil Based Mud	9.1	42	N/A	20.0	73/27	Active Pit	25000	0.00
2016-10-23 20:00	1	9095.00	Oil Based Mud	9.2	41	N/A	17.6	75/15	Active Pit	22500	0.00
2016-10-24 08:00	1	11146.00	Oil Based Mud	9.3	41	N/A	21.6	75/15	Active Pit	22500	0.00

Equipment and Service Data							
Run No.	Tool	Serial Number	Measurement		Sensor Offset (ft)	Bit Offset (ft)	Max O.D. (in)
1	ATC_SU	12575814	Near Bit Inclination		5.93	6.73	7.000
1	ATC_SU	12575814	Near Bit VSS		5.93	6.73	7.000
1	ATC_MWD	12127451	Gamma (single)		2.20	12.35	7.000
1	ATC_MWD	12127451	Directional (mag)		12.27	22.42	7.000

Comments


- 1
- 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.
- 2
- Baker Hughes LWD Run 1 utilized 6 3/4 inch NaviGamma Services (Gamma Ray and Directional) behind an 8 1/2 inch bit and rotary steerable assembly from 1925 to 11146 ft MD (1925 to 5913 ft TVD).

Remarks

Number	Measured Depth (ft)	Hole Section (in)	Run No.	Remark
1	1913.00	8.500	1	Gamma Ray logging operations began at 1913 feet MD (1913 feet TVD)
2	11133.00	8.500	1	The interval from 11133 to 11146 feet MD (5913 feet TVD) was not logged due to sensor offset at well TD.

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



Company

Well

Interval

Created

Noble Energy

ANNI LD29-755

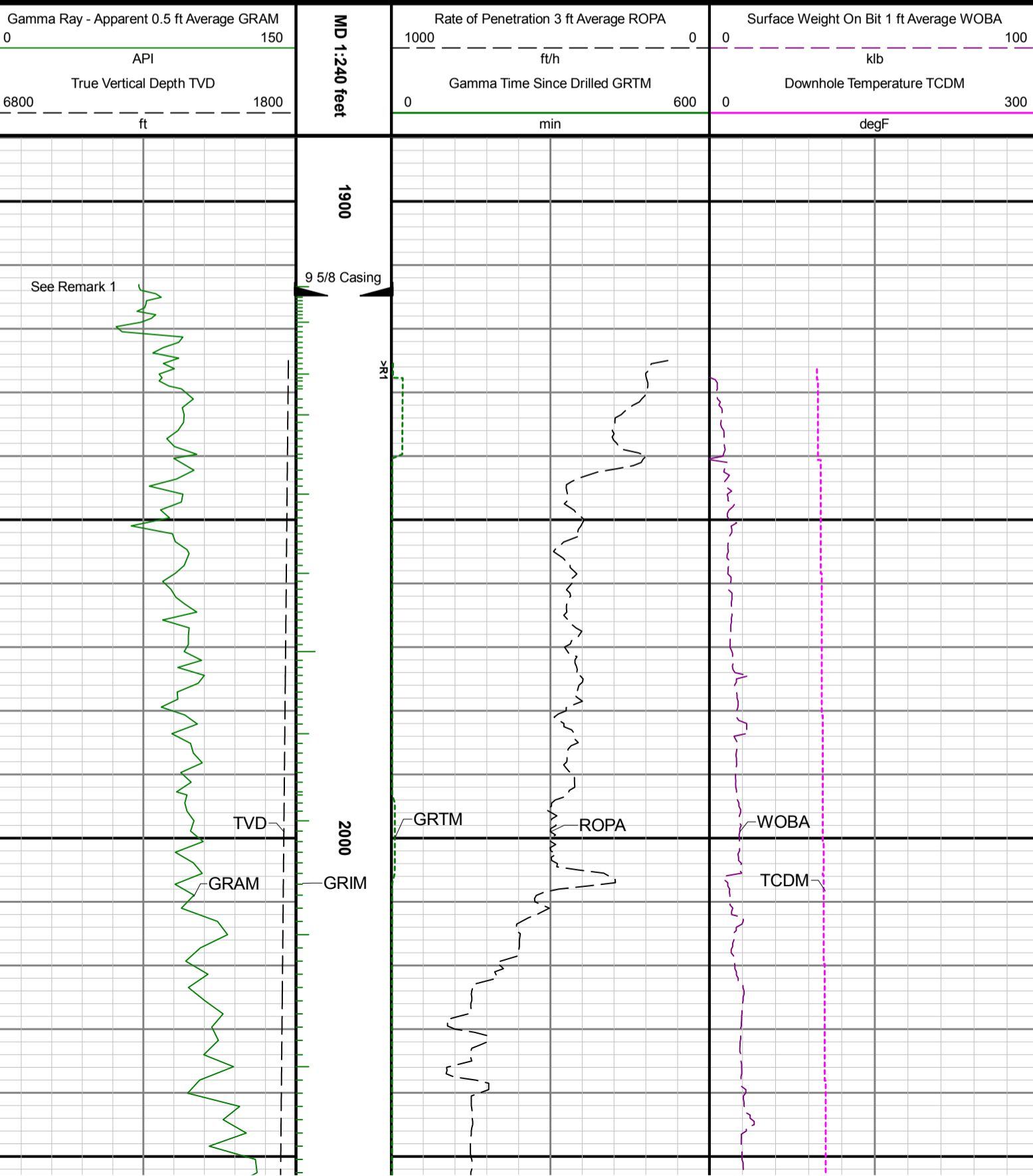
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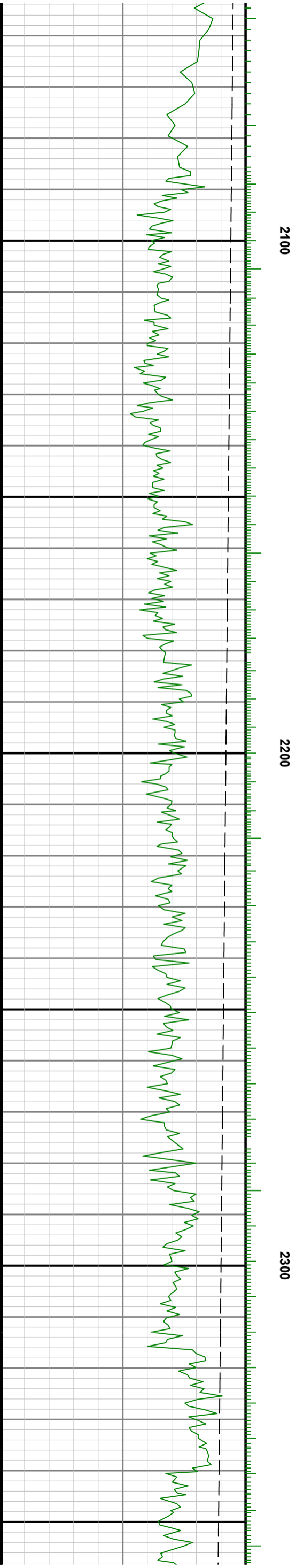
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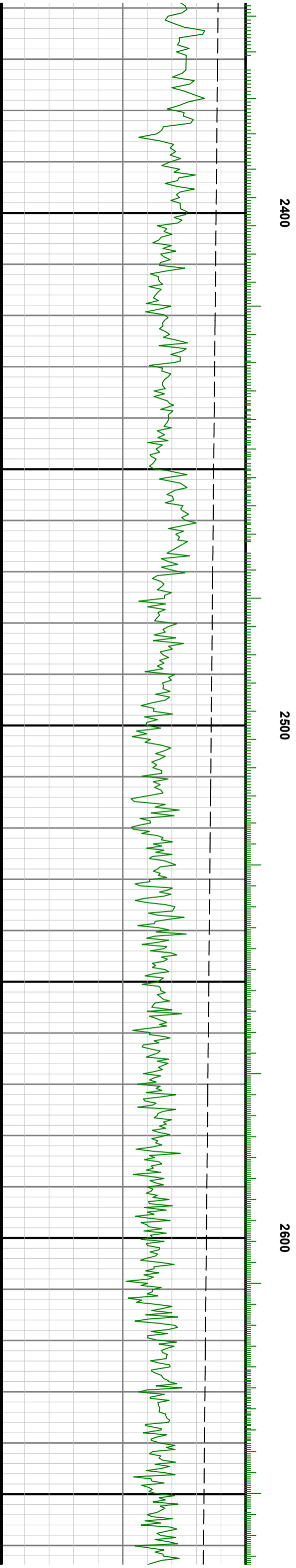
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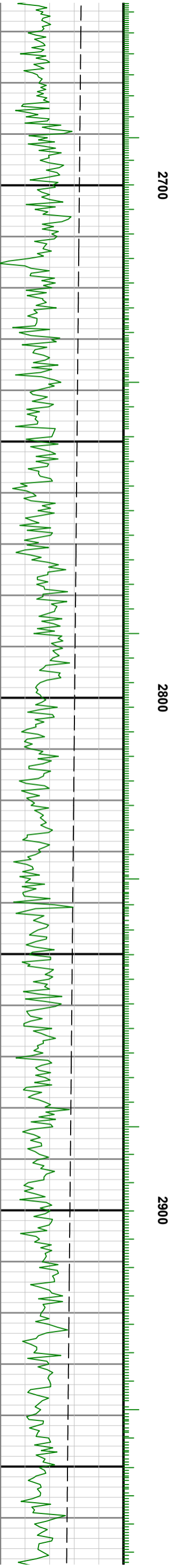
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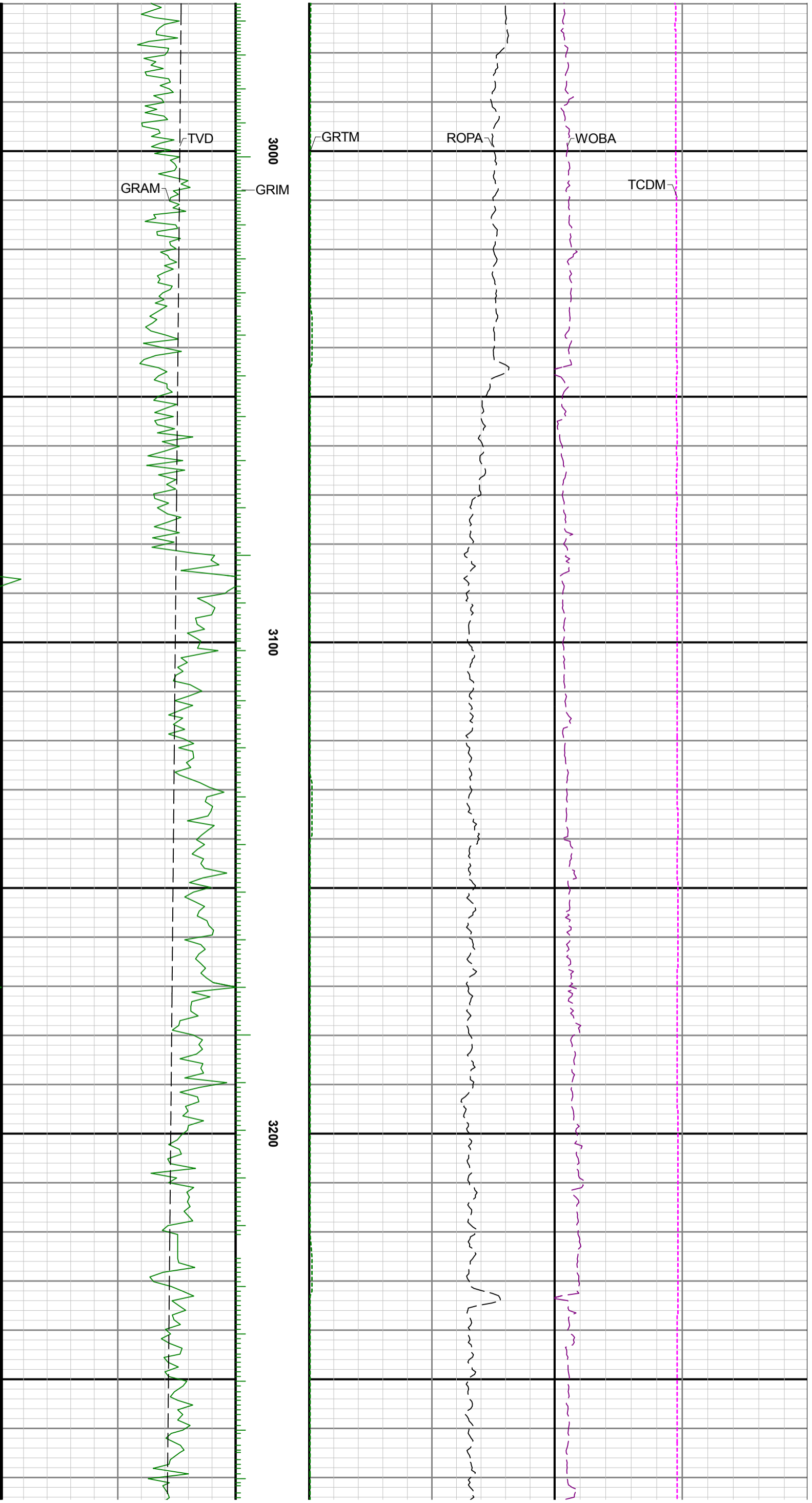
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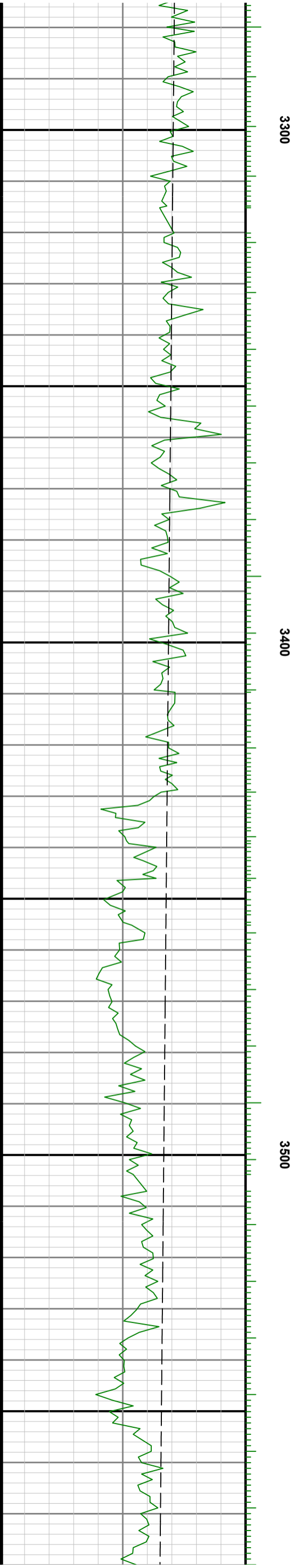
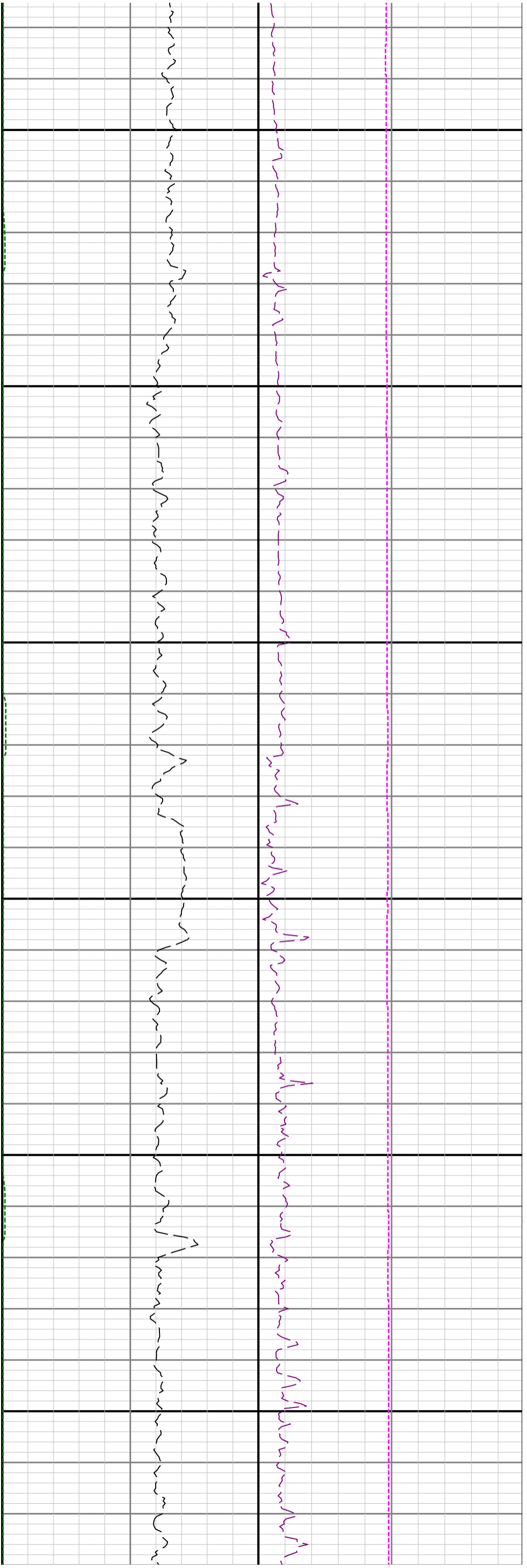


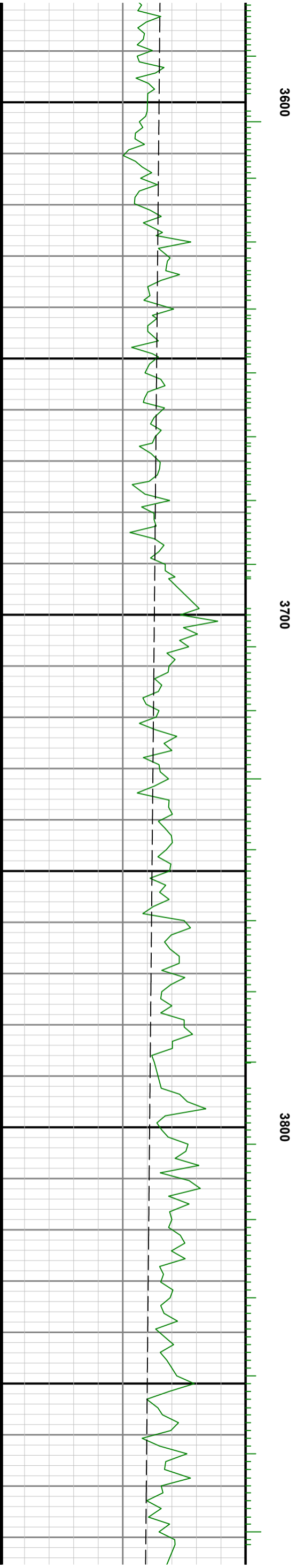
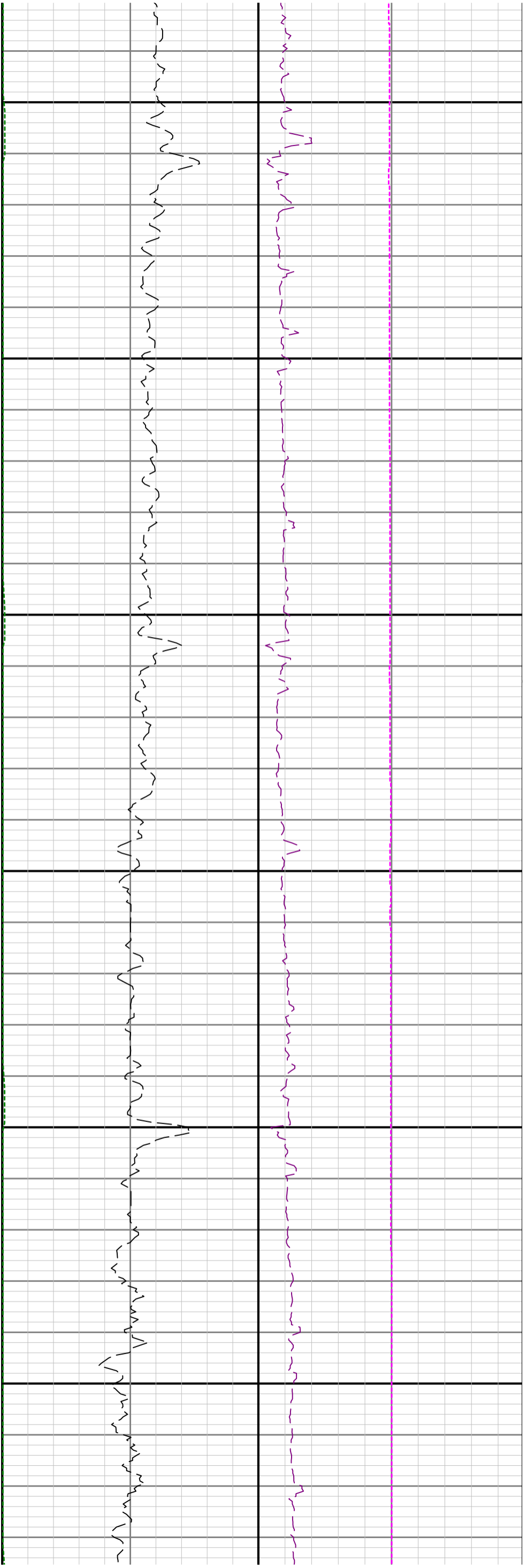


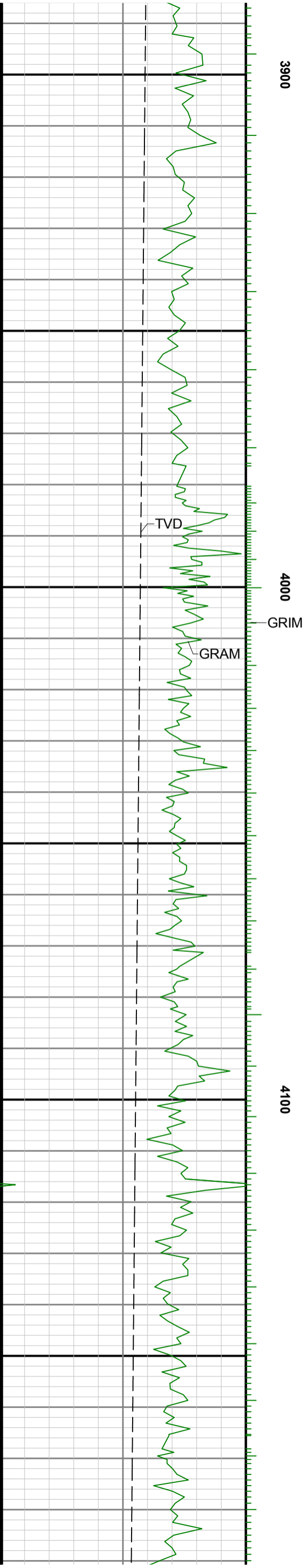
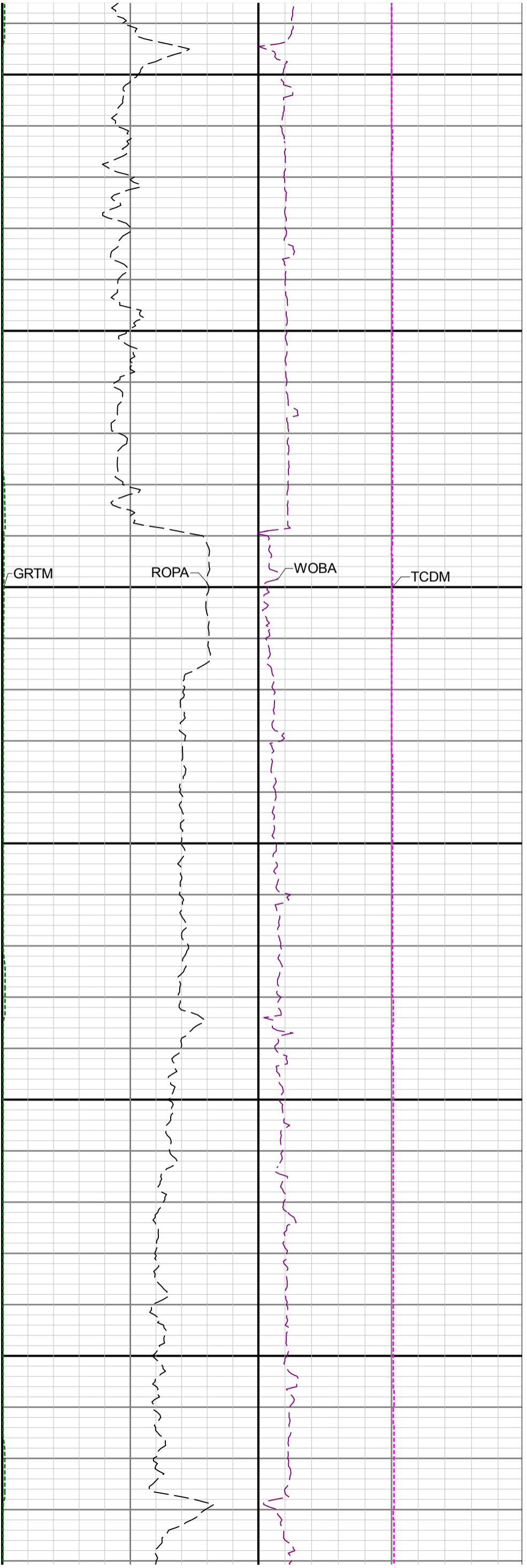


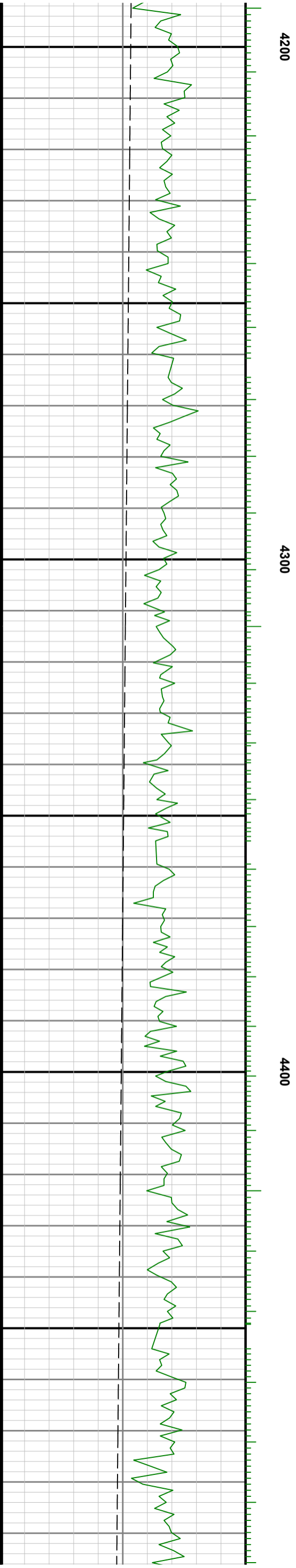
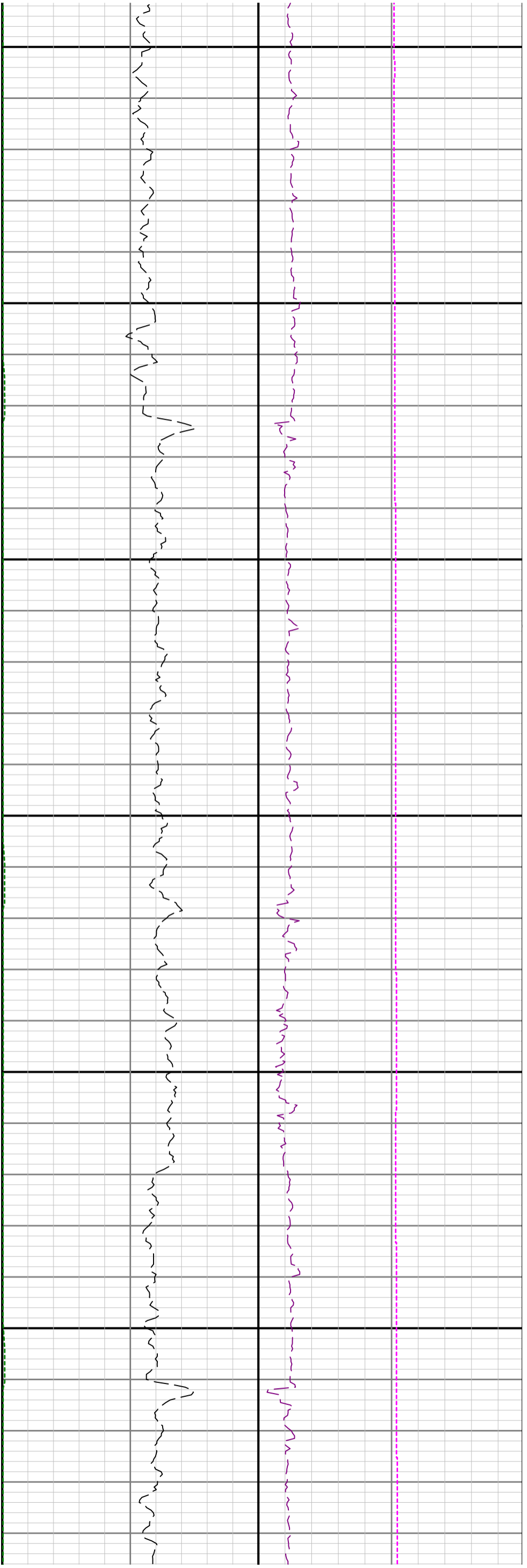


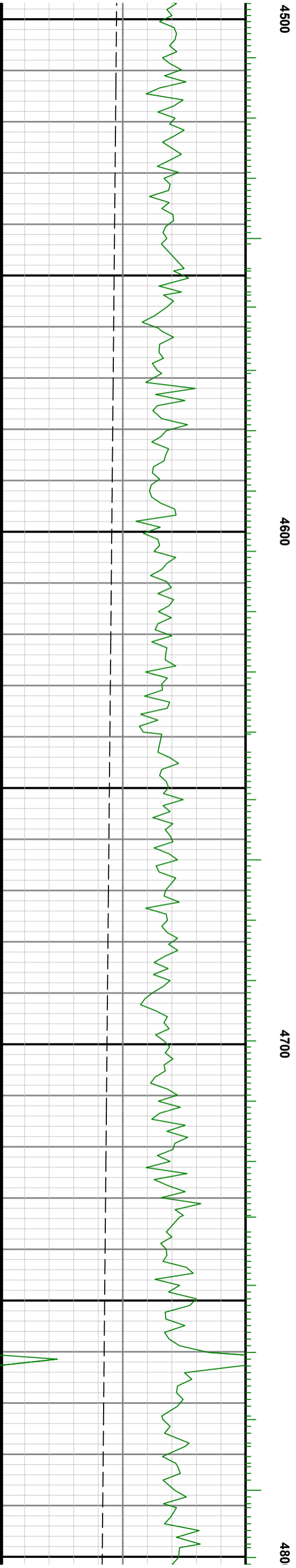
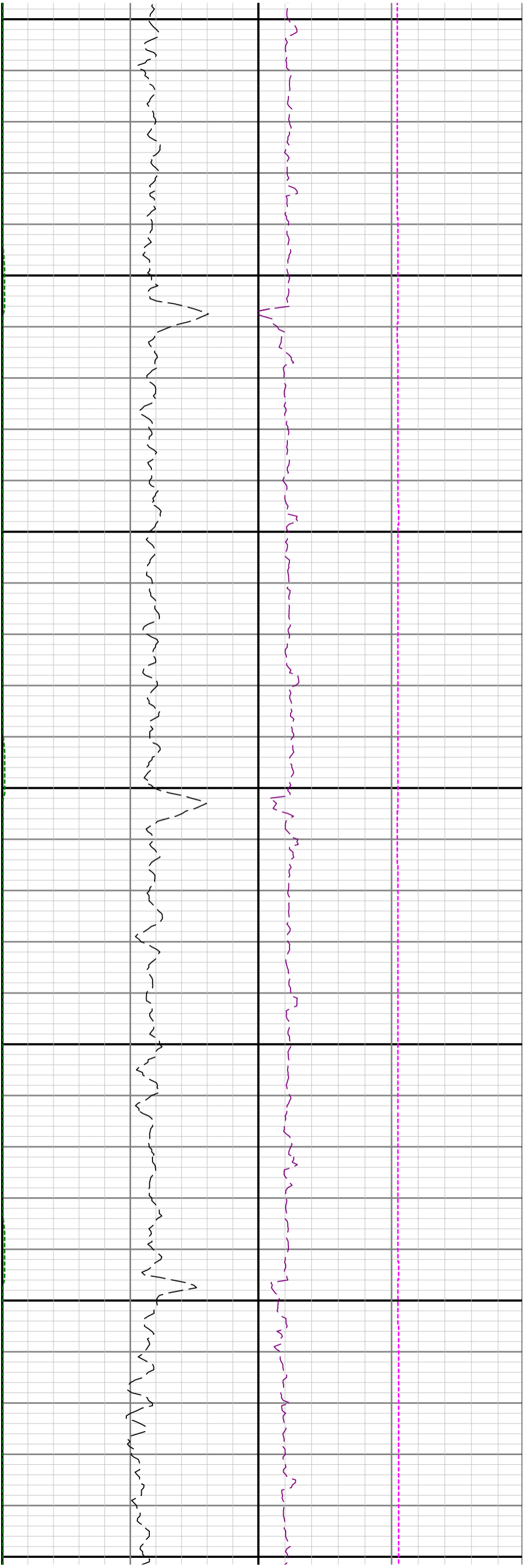


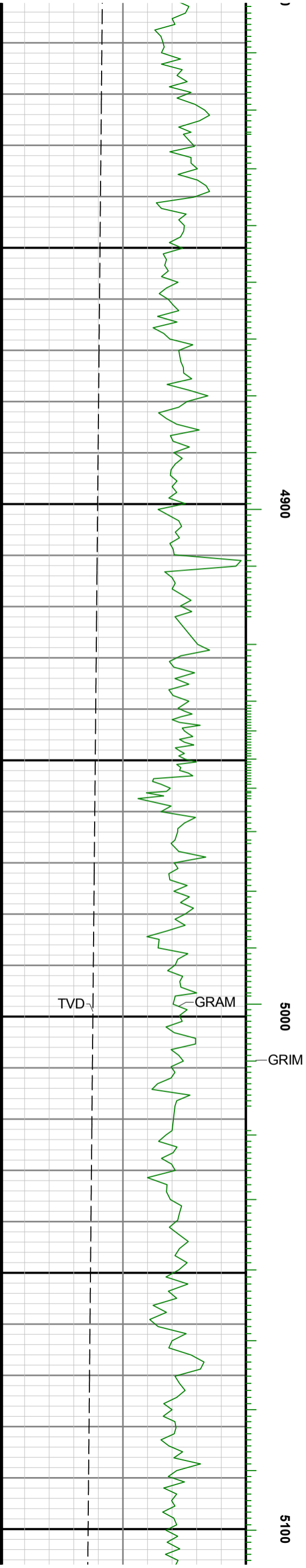
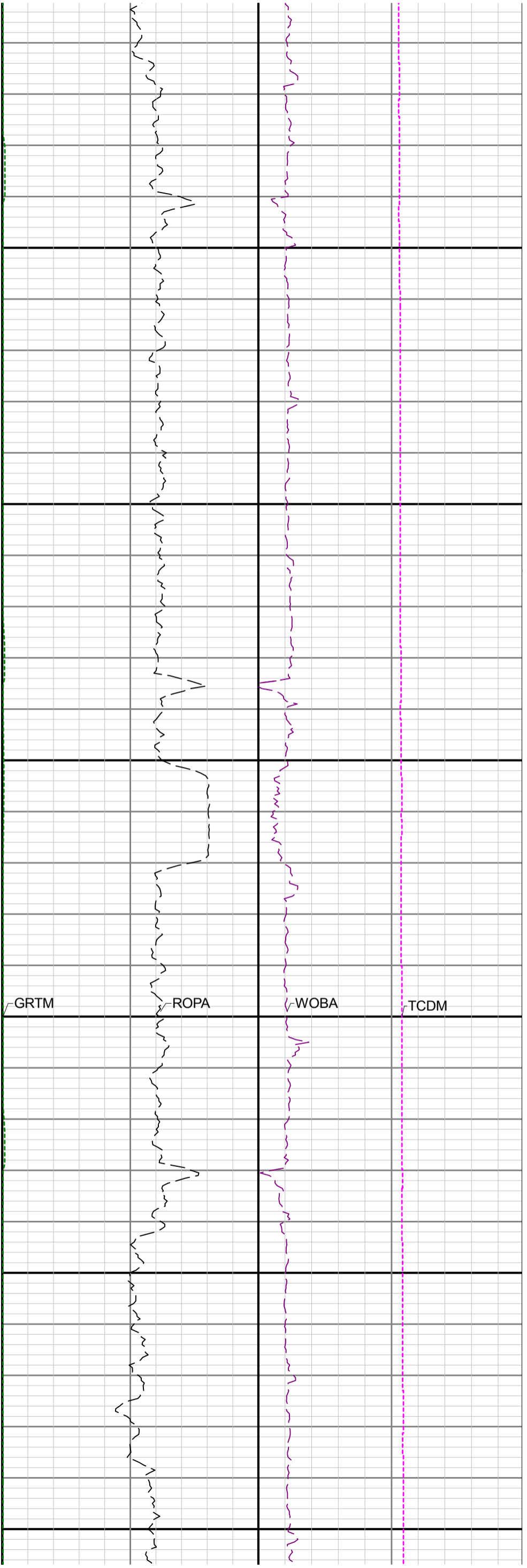


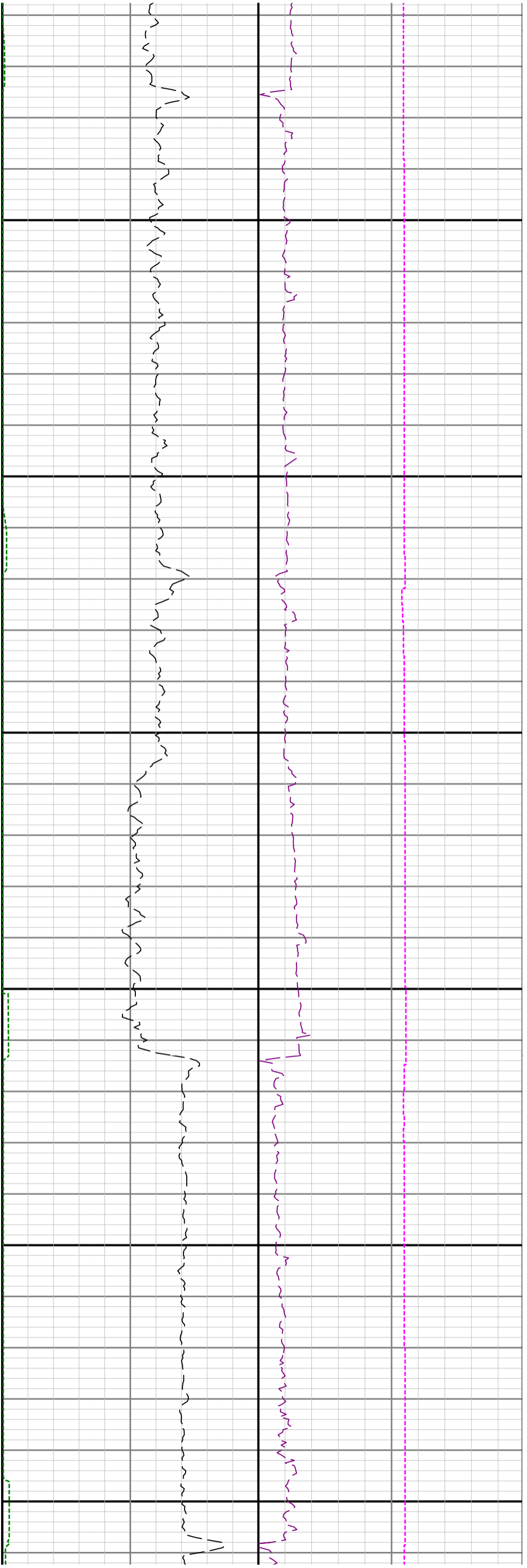












5200

5300

5400

