



LWD MEMORY LOG

Gamma Ray

LWD MEMORY LOG									
<div>BAKER HUGHES a GE company</div> <div></div>				Gamma Ray					
Scale:		Company: Noble Energy							
True Vertical Depth		1:240		Well:		Wells Ranch State AA32-783			
				Field:		Weld County			
				County:		Weld		Country: United States	
Depth Reference:		Driller's Depth		State:		Colorado			
Status:		Final Print		Surface Location:			Other Services:		
API No:		05-123-50174-00		Latitude:			40° 26' 05.604" N		
Job ID:		110096565		Longitude:			104° 28' 03.684" W		
Permanent Datum (P.D.):		Mean Sea Level		Elevation:			0.00 ft		
Log Measured From:		Rig Floor		Above P.D.:			4703.00 ft		
Dates		Interval		Magnetic Field Reference					
F from: 2019-11-14		Drilled (ft)		Logged (ft)		Azi Reference North:		Grid Dip Angle: (deg)	
To: 2019-11-15		Top: 1964.00		Top: 1964.00		Total Magnetic Field Strength: (nT)		52089	
Spud: 2019-11-5		Bottom: 16936.00		Bottom: 16923.00		Mag to Reference North Correction: (deg)		7.11	
Borehole Record									
Casing Record									
Hole Size (in)		From (ft)		To (ft)		Size (in)		Weight (lb/ft)	
13.500		30.00		1964.00		9.625		36.00	
8.500		1964.00		16936.00					
Mud Record									
Deviation Record									
Type		From (ft)		To (ft)		Hole Size (in)		Interval (ft)	
Oil Based Mud		1964.00		16936.00		8.500		14972.00	
Acquisition System									
Cadence		RT 5.4				Rig: H&P 517			
Pilot Studio		5.4.8632.4				Contractor: Heimerich & Payne Drilling Co			
						District: RMD 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	Bottom	From	To	Start Logging	End Logging	
						(ft)	(ft)	(ft)	(ft)			
1	1	8.500	PDC	3.00	AutoTrak Curve	1964.00	16923.00	1964.00	16936.00	2019-11-12 00:35	2019-11-14 02:50	47.88

Crew

Name	Arrive Wellsite	Depart Wellsite	Name	Arrive Wellsite	Depart Wellsite	Name	Arrive Wellsite	Depart Wellsite
Andrew Hays	2019-11-11	2019-11-14						

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+ (%)
2019-11-12 03:00	1	2645.00	Oil Based Mud	9.0	8	N/A	18.2	71.5/18	Active Pit	26239	0.00
2019-11-12 15:00	1	6600.00	Oil Based Mud	9.3	11	N/A	18.0	70/18.5	Active Pit	27211	0.00
2019-11-13 15:00	1	13740.00	Oil Based Mud	9.5	12	N/A	18.0	69/19	Active Pit	26239	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	12653420	Near Bit VSS	5.93	6.73	7.000	4.330
1	AutoTrak Curve Steering Unit	12653420	Near Bit Inclination	5.93	6.73	7.000	4.330
1	AutoTrak Curve MWD	14146739	Gamma (single)	2.20	12.32	7.000	3.250
1	AutoTrak Curve MWD	14146739	Directional (mag)	12.27	22.39	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

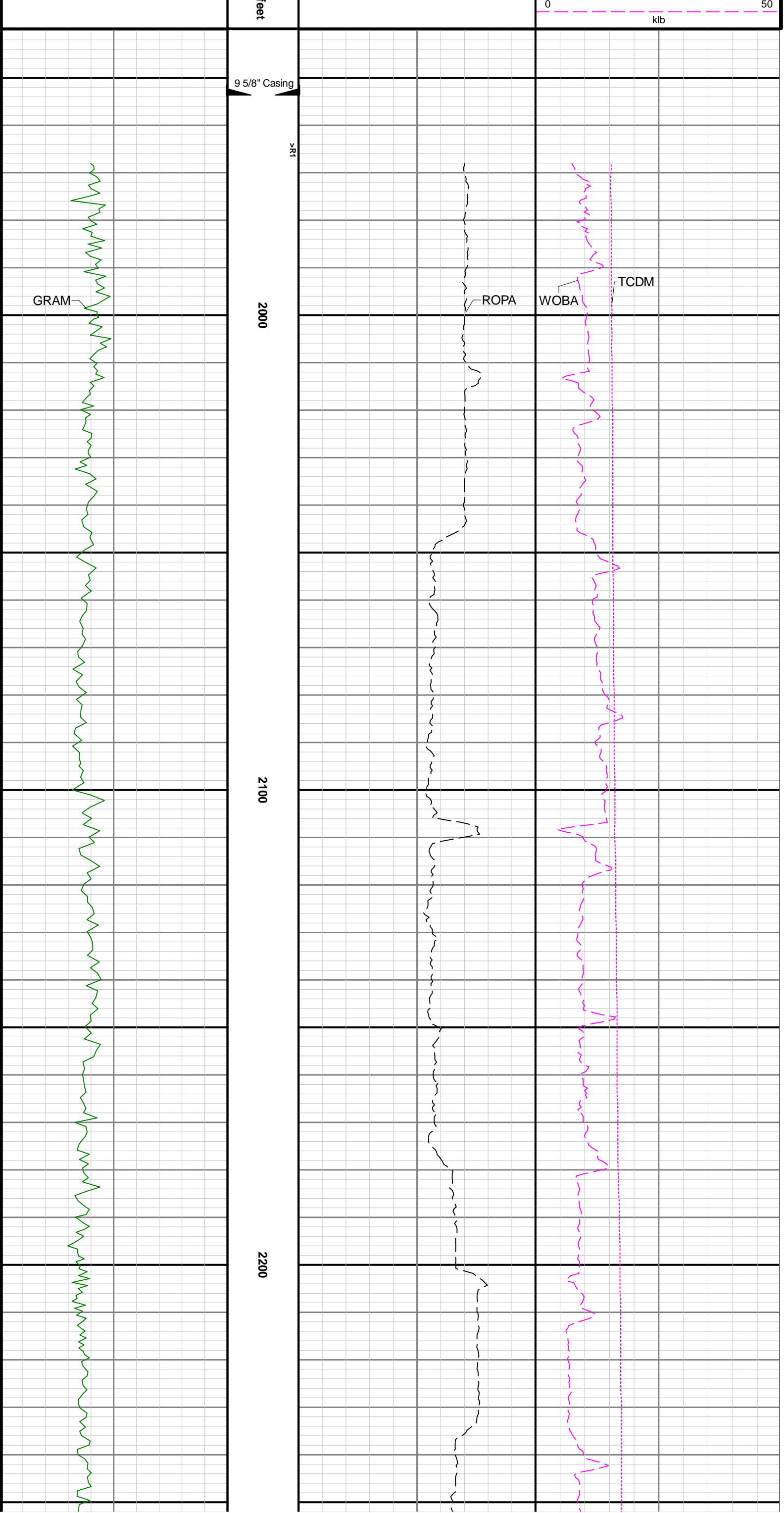
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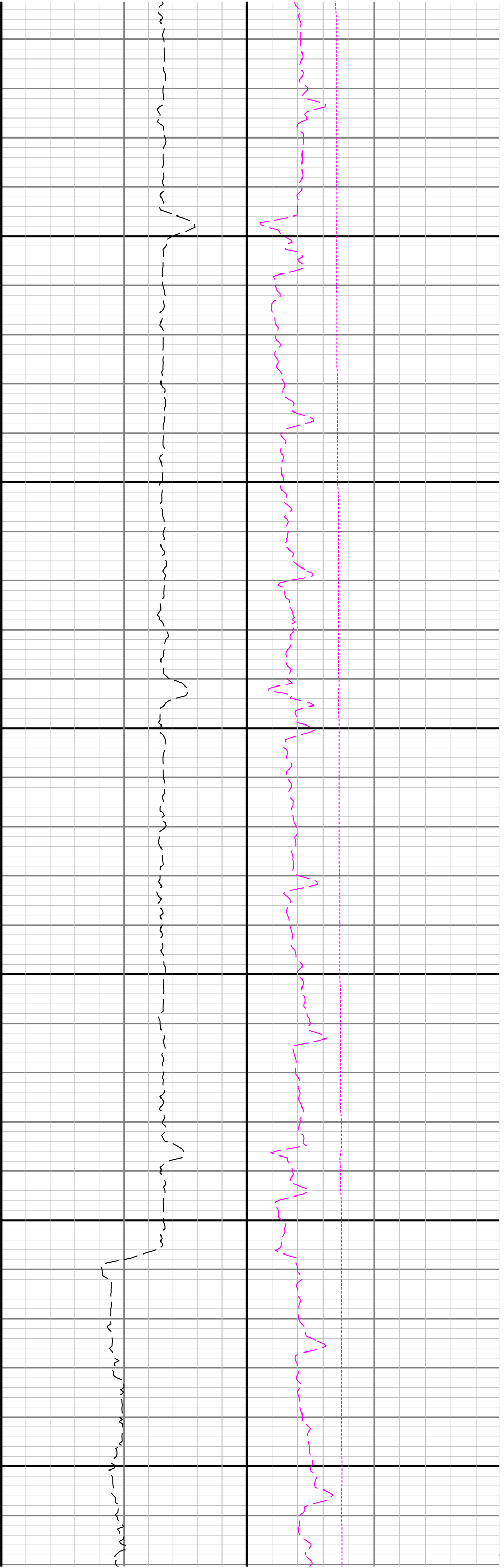
- 1 Depth measurements were obtained from a depth control system not supplied or operated by Baker Hughes. Due to the lack of control by Baker Hughes, depth
calibrations and measurements could not be independently verified.
- 2 Baker Hughes LWD run 1 utilized a 6.75 inch NaviGamma service (Directional and Gamma Ray) behind a 8.5 inch bit and rotary steerable assembly from 1945 to
16936 feet MD (1945 to 6618 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 an internal communication issue with the MWD tool.

Remarks

Number	Depth (ft)	Hole Section (in)	Run No.	Remark
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Gamma Ray - Apparent 0.5 ft Average GRAM 0 300	TVD 1:240 ft	Depth Averaged ROP 3 ft Average ROPA 1000 0	Downhole Temperature TCDM 0 300
API		ft/h	degF
		Weight On Bit, Average 1 ft Average WOBA 0 50	

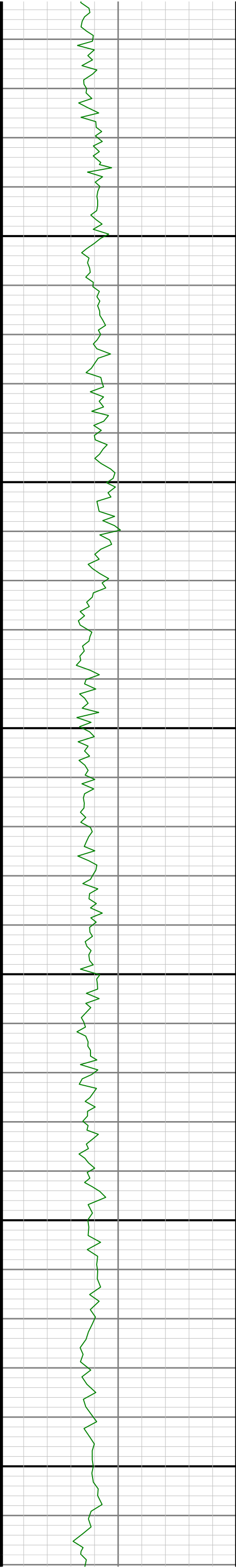


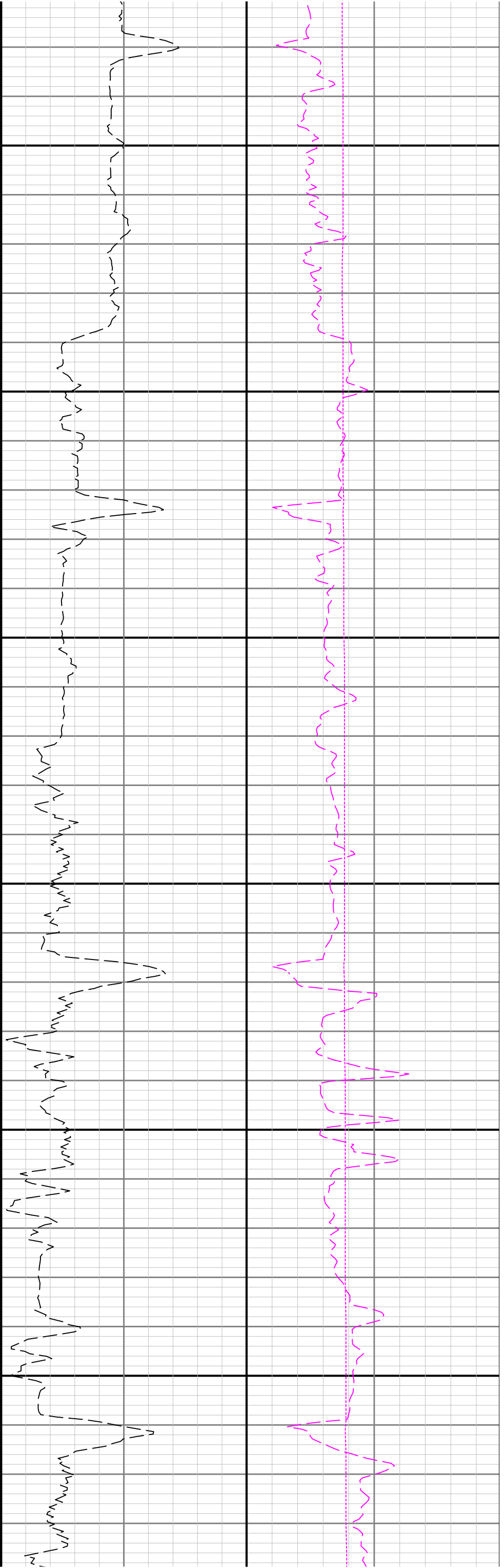


2300

2400

2500

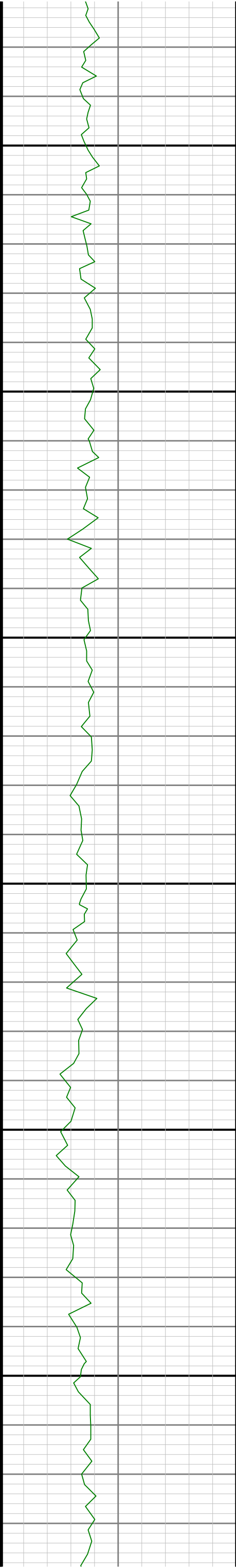


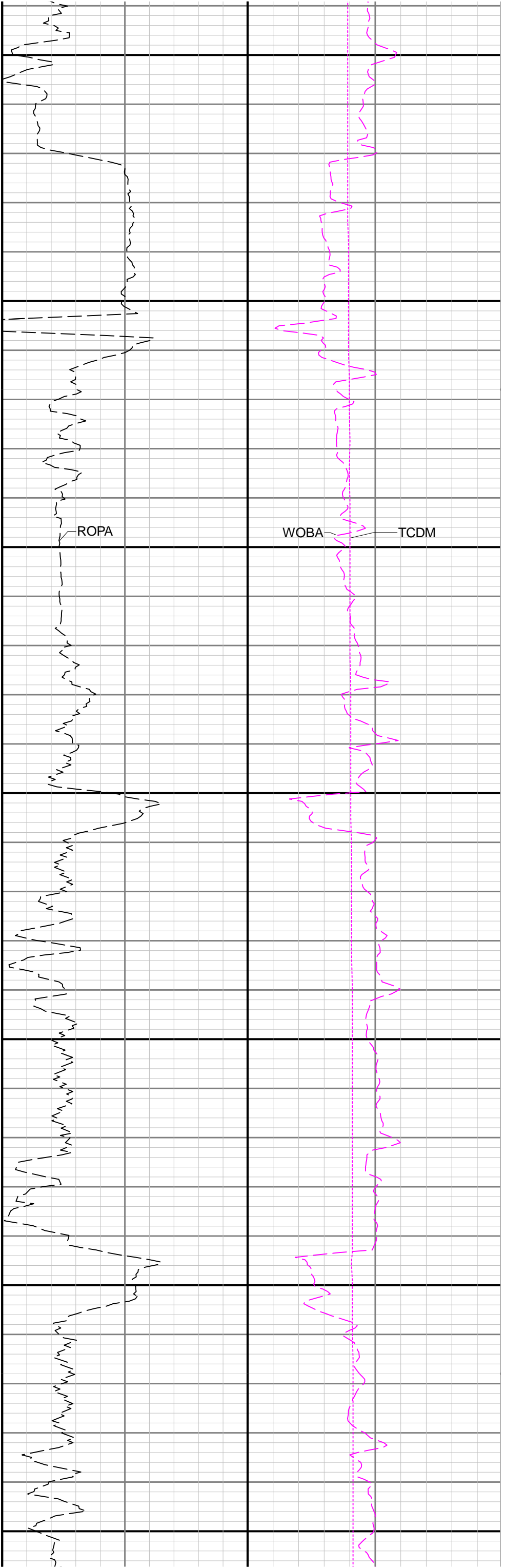


2600

2700

2800





2900

3000

3100

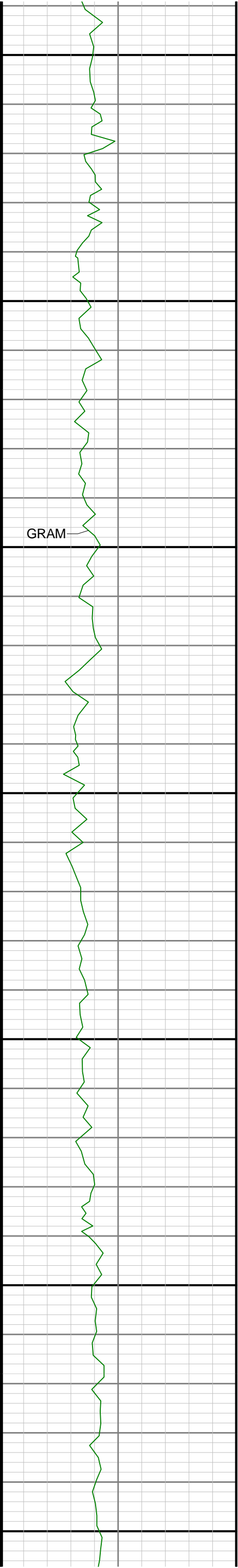
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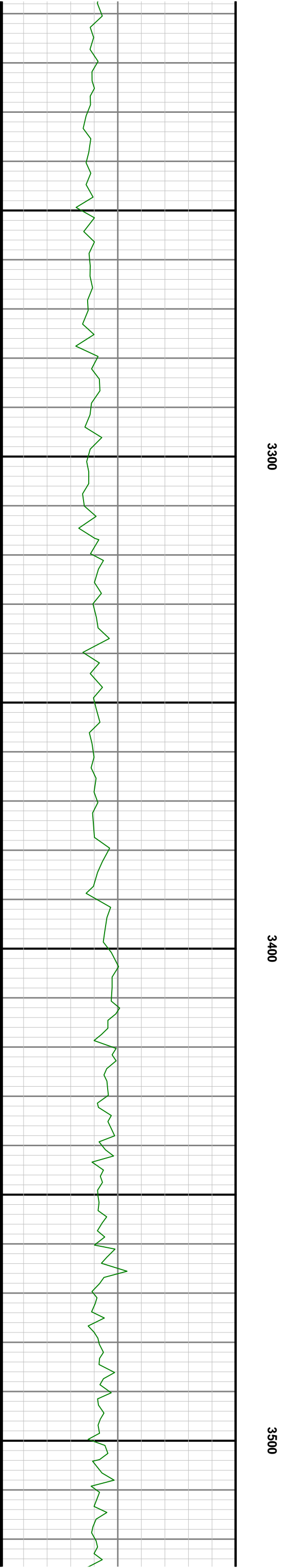
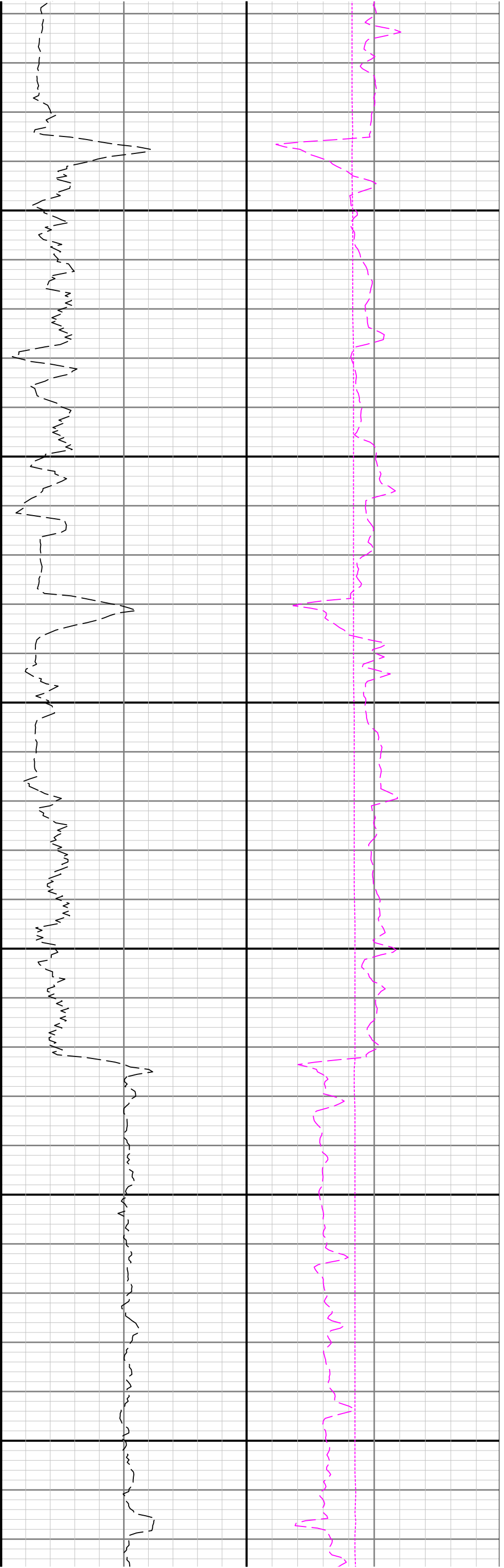
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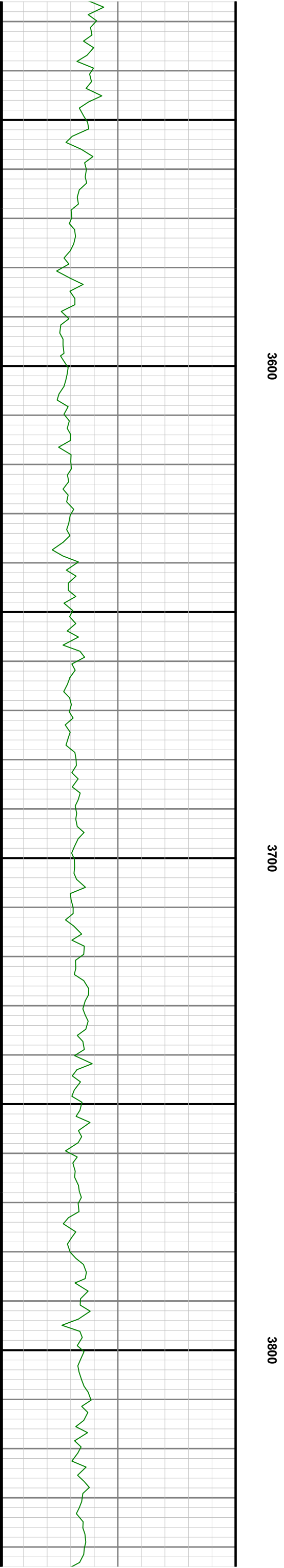
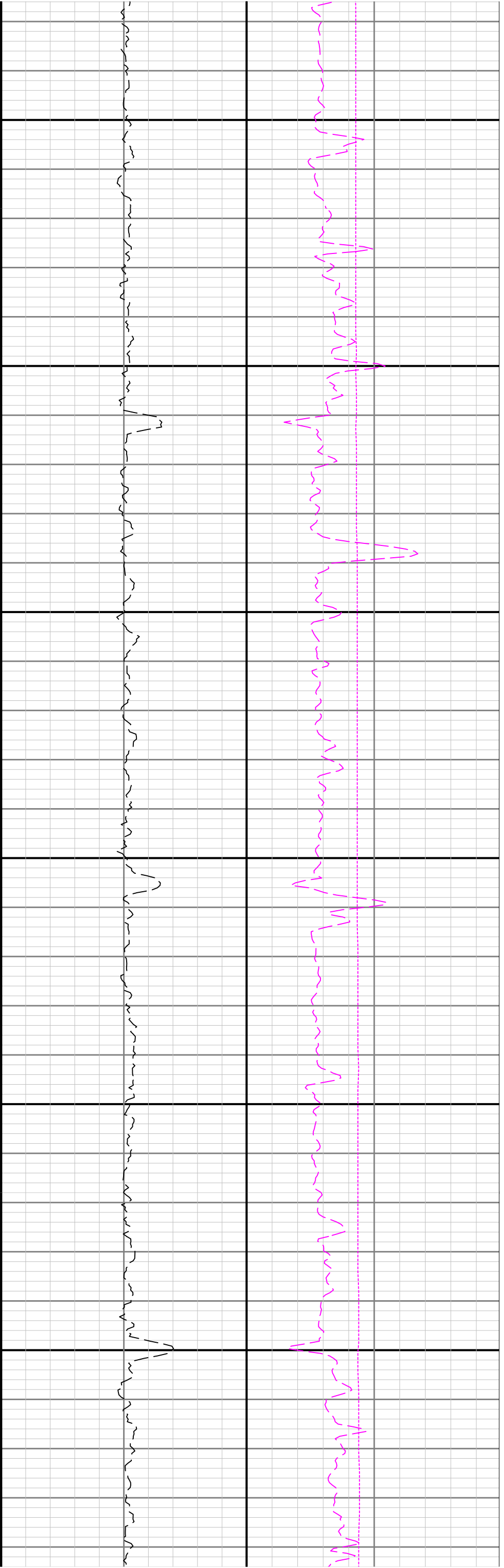
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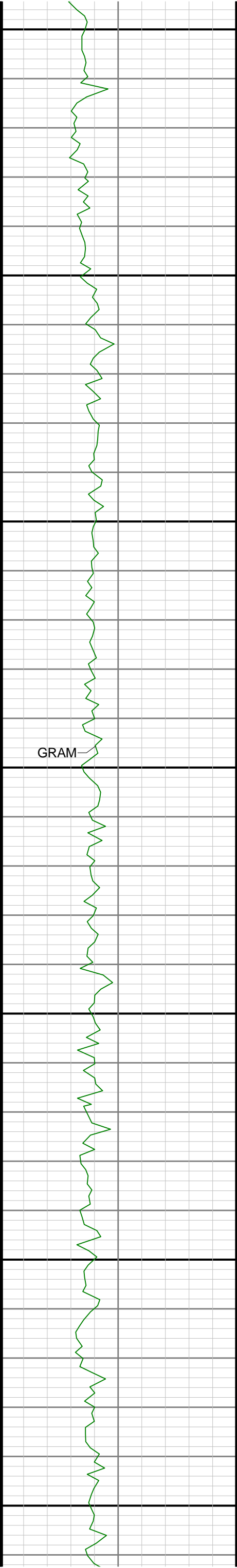
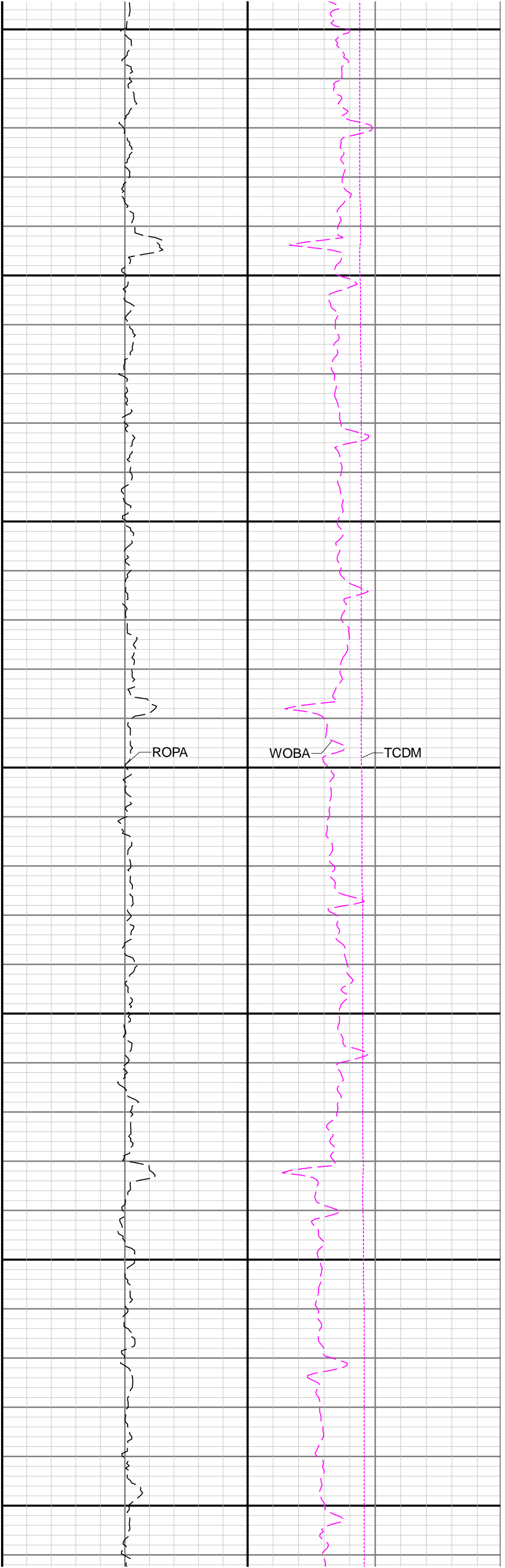
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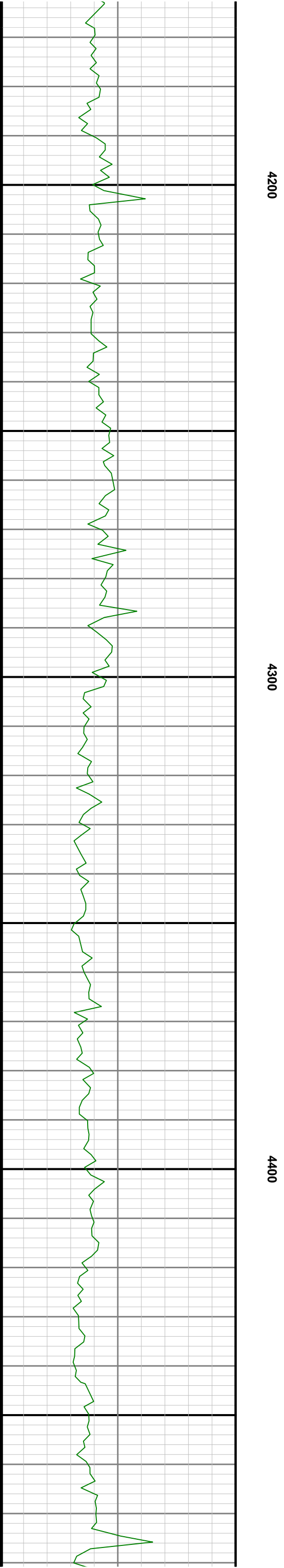
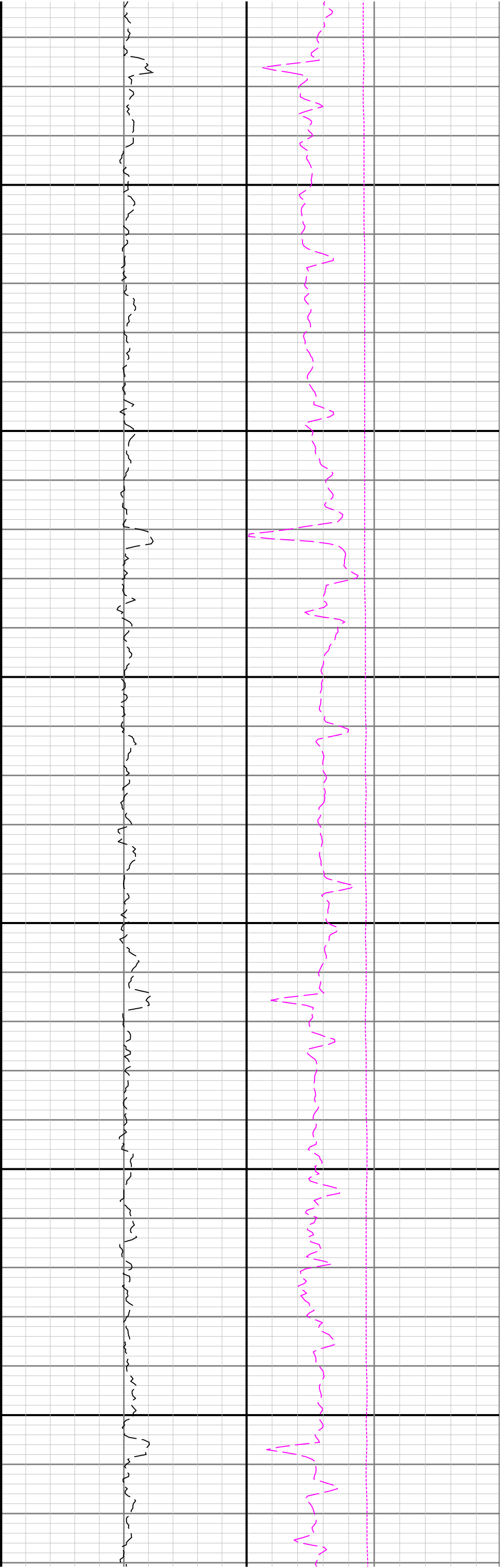
GRAM

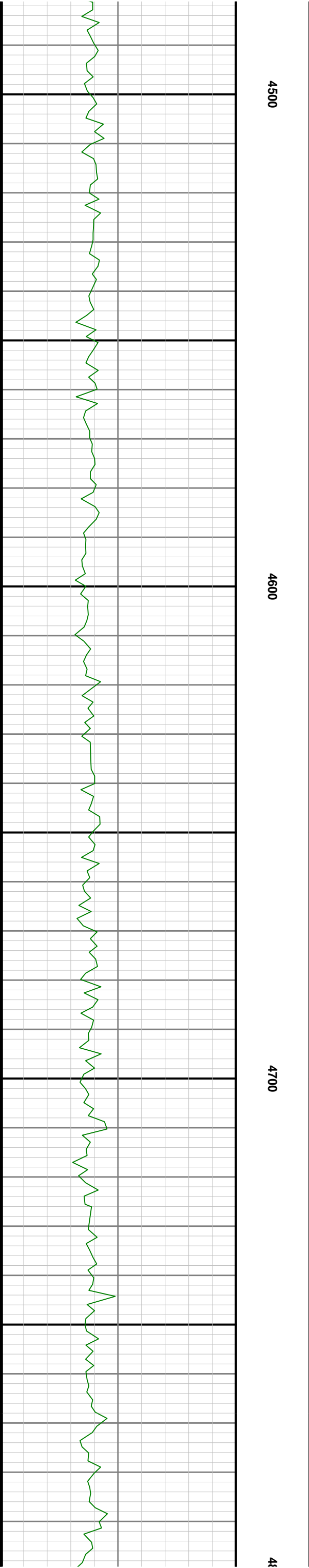
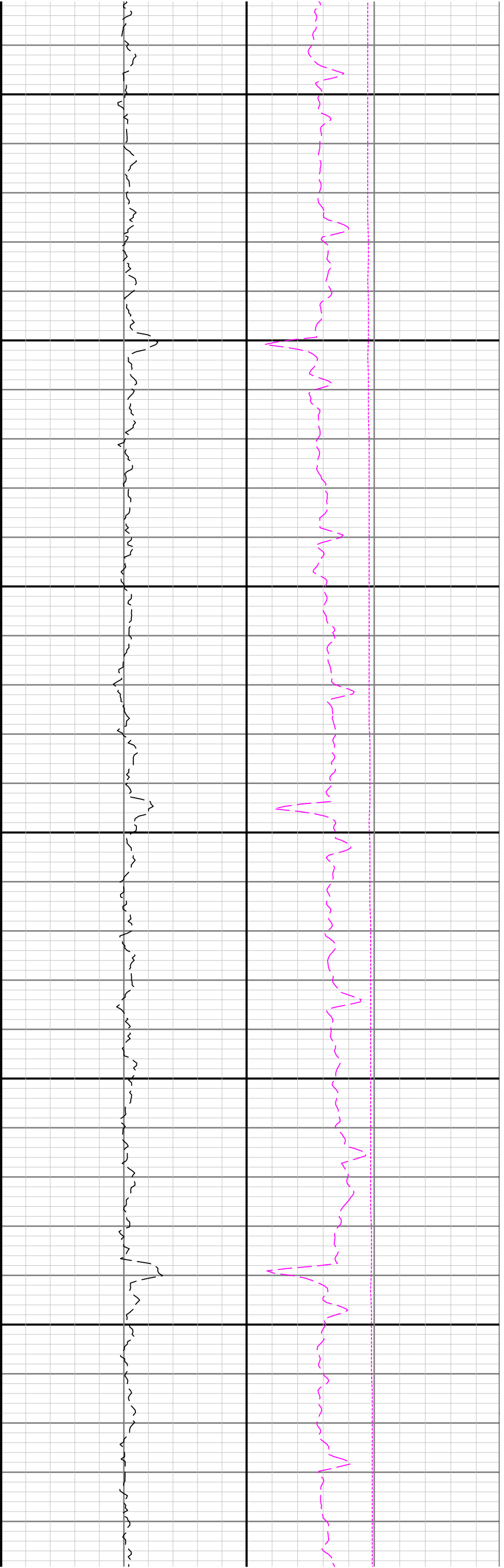


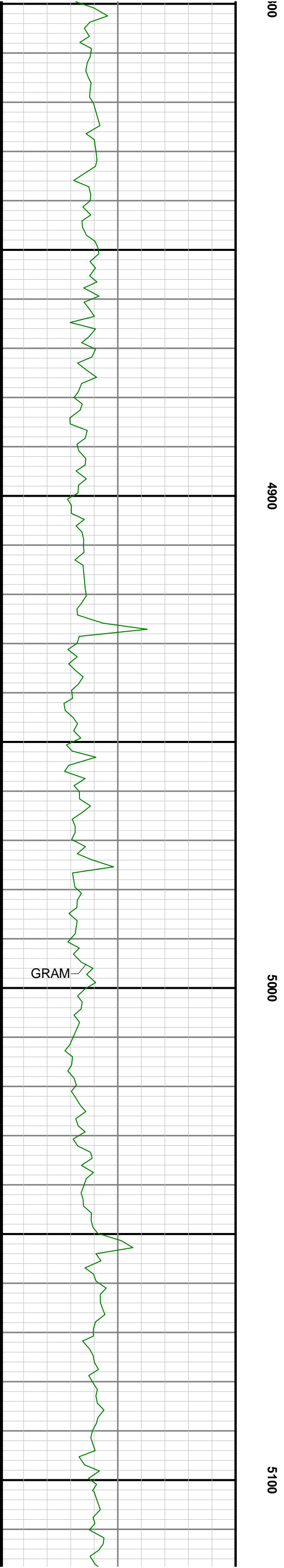
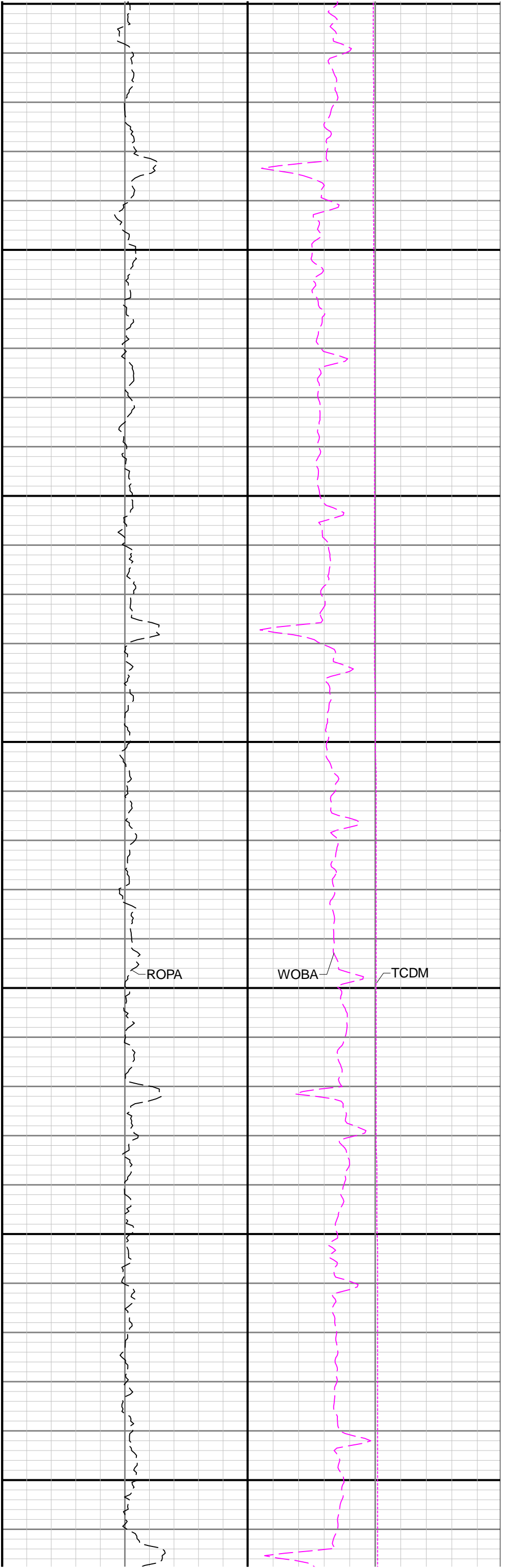


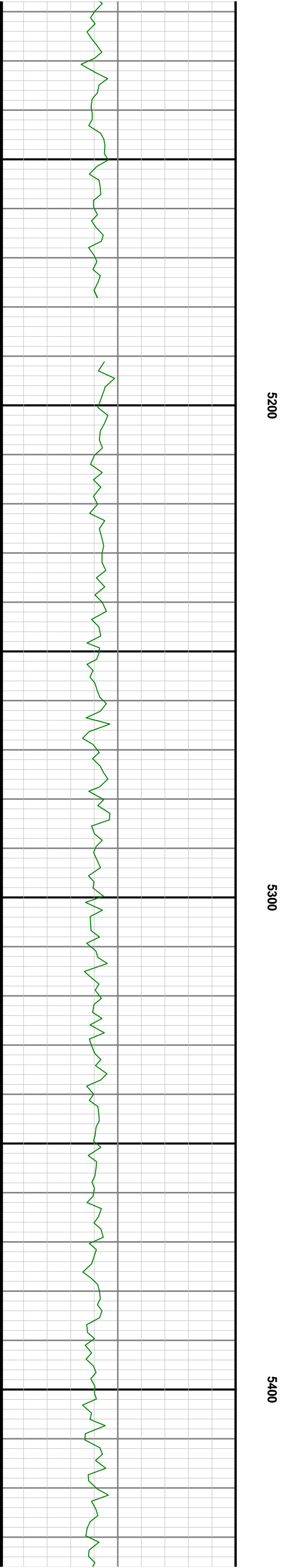
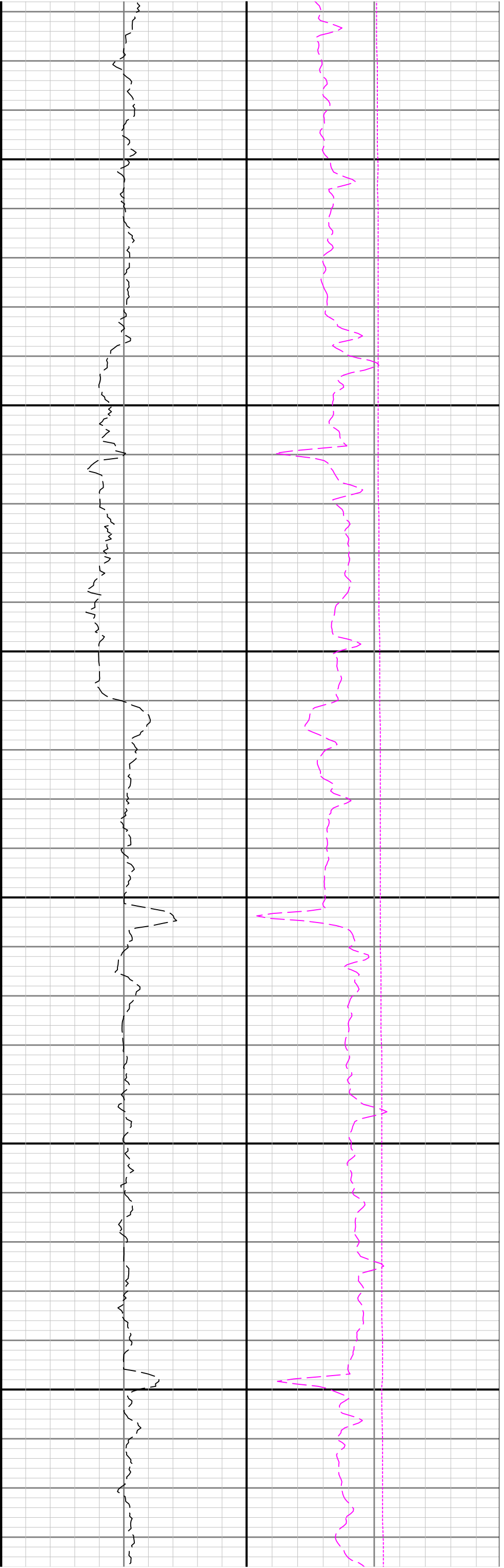


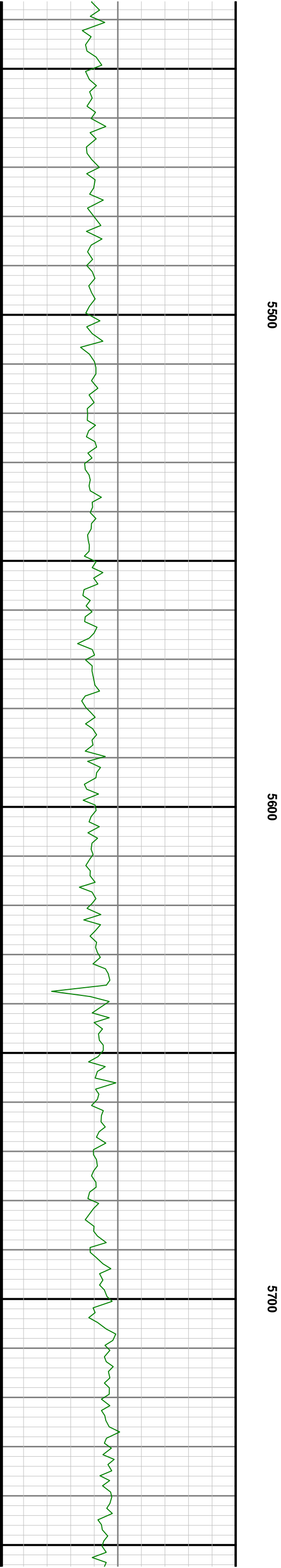
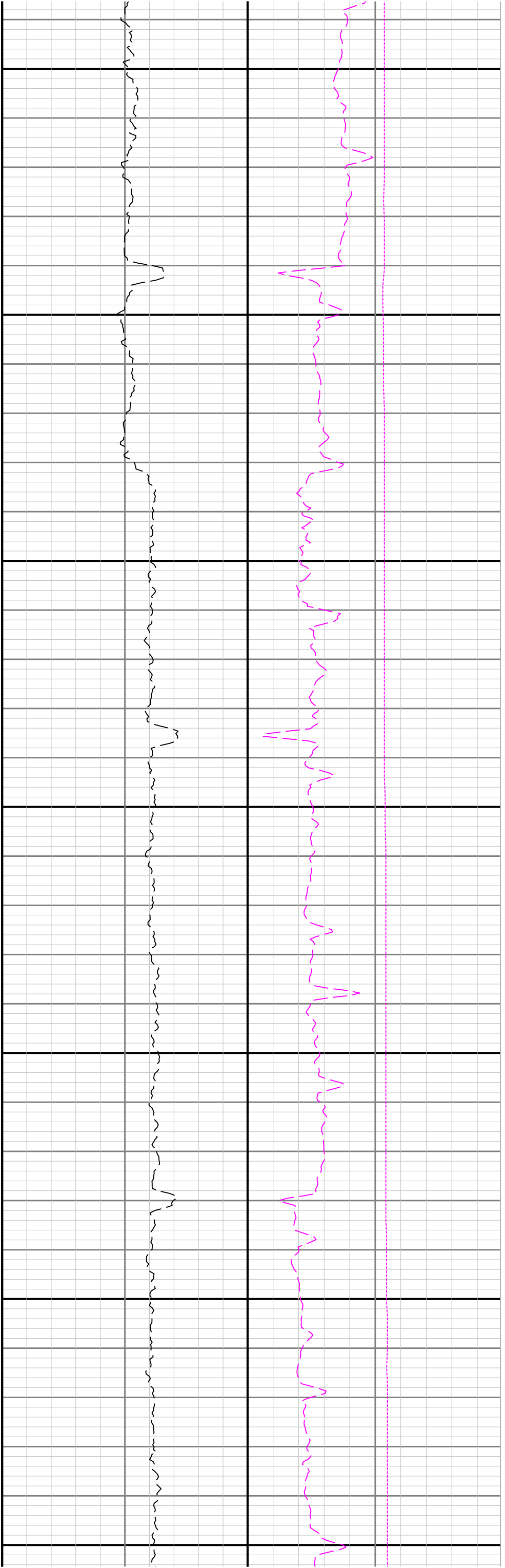


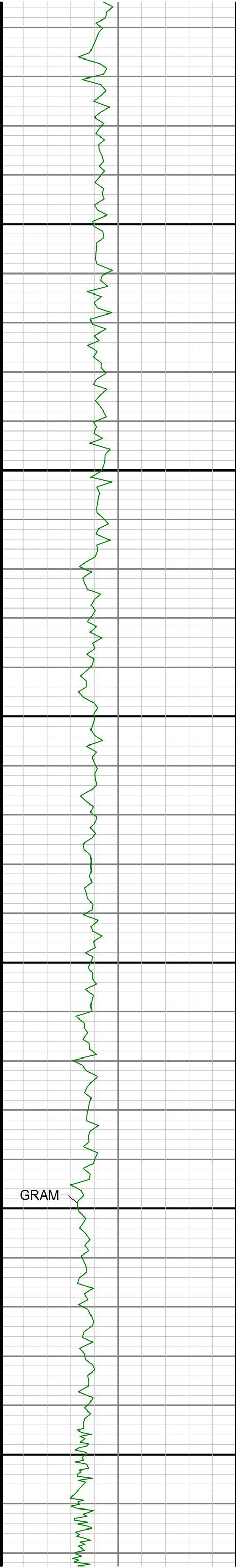








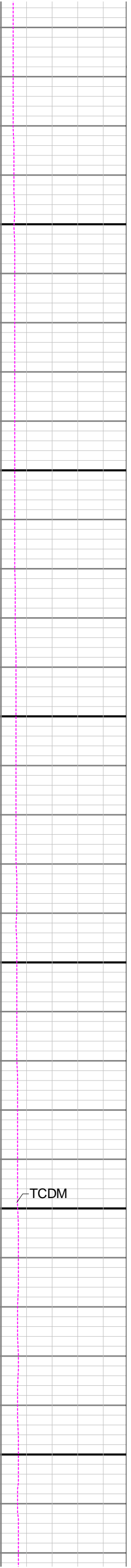
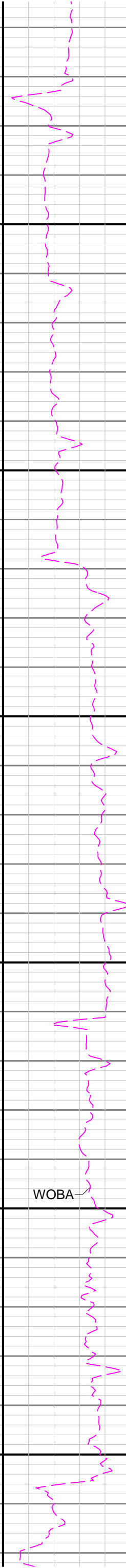
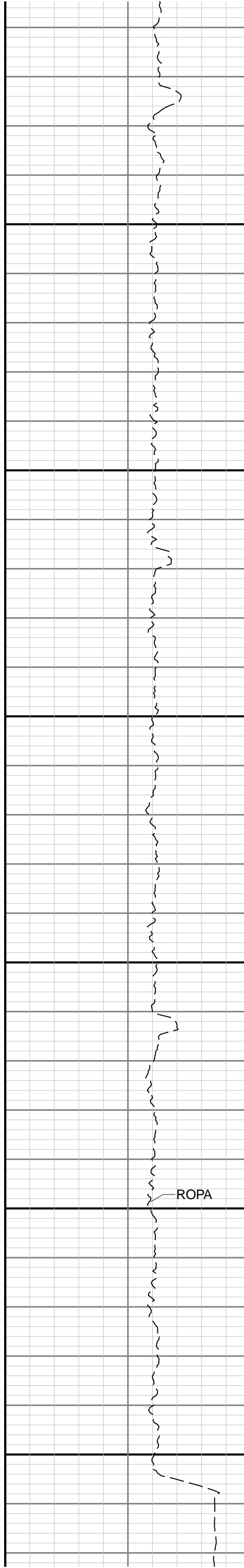


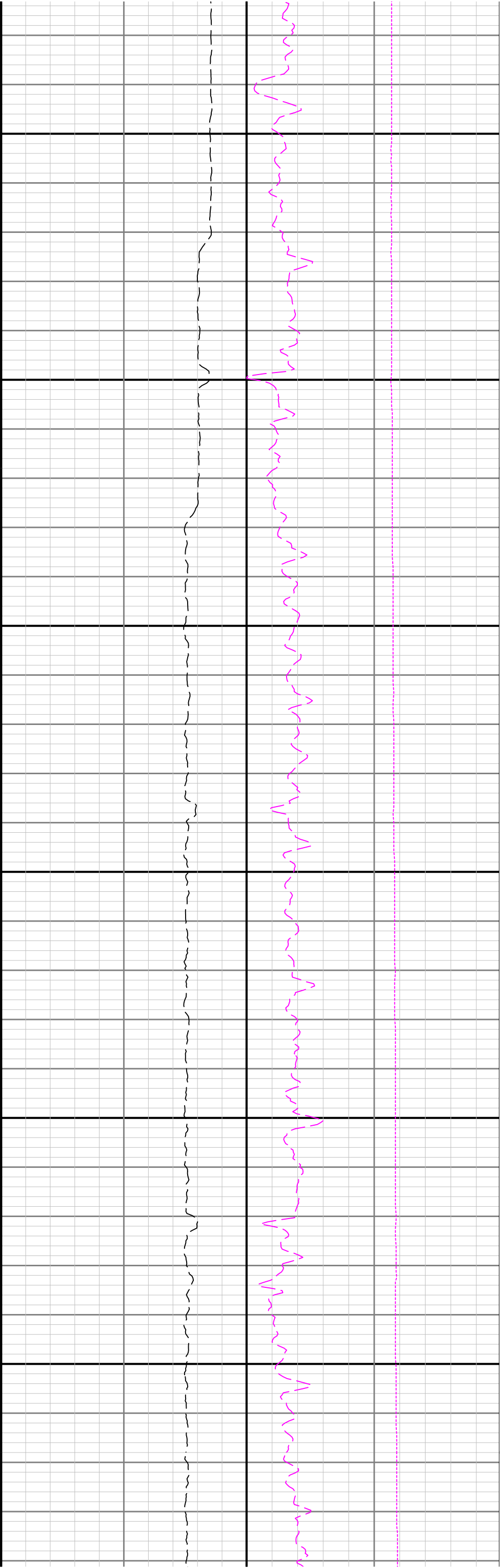


5800

5900

6000





6100

6200

6300

