



LWD MEMORY LOG

Gamma Ray
Azimuthal Gamma Ray

Scale:		Company: Bonanza Creek Oil Company											
1:240 MD		Well: North Platte 21-24-28HNC											
Depth Reference:		Field: Weld County											
Driller's Depth		County: Weld State: Colorado Country: United States											
Status:	Surface Location:										Other Services:		
Final Print		Latitude: 040° 22' 53.918" N Longitude: 104° 26' 42.914" W										Directional	
API No:	05-123-47009-00	SEC: 21 TWN: 5N RGE: 63W											
Job ID:	1093388065												
Permantent Datum (P.D.):		Mean Sea Level		Elevation:		0.00 ft		Elev. KB:		N/A			
Log Measured From:		Rig Floor		Above P.D.		4570.00 ft		Elev. DF:		4570.00 ft			
								Elev. GL:		4553.00 ft			
Dates		Interval Drilled						Magnetic Field Reference					
Date From: 2018-09-07		Top: (ft) 17.00		Azi Reference North: True		Dip Angle: (deg) 66.84							
Date To: 2018-09-11		Bottom: (ft) 11657.00		Total Magnetic Field Strength: (nT)		52332							
Spud Date: 2018-09-04				Mag to Reference North Correction: (deg)		8.08							
Borehole Record						Casing Record							
Hole Size (in)	From (ft)	To (ft)	Size (in)	Weight (lb/ft)	From (ft)	To (ft)							
13.500	17.00	1612.00	9.625	36.00	17.00	1601.00							
8.500	1612.00	11657.00											
Mud Record							Deviation Record						
Type	From (ft)	To (ft)	Hole Size (in)	Interval (ft)	Inc Az (Start)	Inc Az (End)							
Water Based Mud	17.00	1612.00	13.500	1595.00	0.17 7.92	0.25 241.38							
Diesel-Oil Based Mud	1612.00	11657.00	8.500	10045.00	0.25 241.38	89.97 178.89							
Acquisition System							Software Version						
Baker Hughes Cadence	RT 4.2		Xtreme 19				Other						
Pilot Studio	4.2.8155.1		Rig: Contractor: District:		RMA		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
						Top	Bottom	From	To	Start Logging	End Logging	
						(ft)	(ft)	(ft)	(ft)			
1	1	13.500	PDC	4.00	Rotary	0.00	0.00	17.00	1612.00	N/A	N/A	5.84
2	1	8.500	PDC	4.00	Rotary Steerable	5000.00	11643.00	1612.00	11657.00	2018-09-09 17:25	2018-09-11 08:06	50.60

Crew

Name	Arrive Wellsite	Depart Wellsite	Name	Arrive Wellsite	Depart Wellsite	Name	Arrive Wellsite	Depart Wellsite
Steve Buechly	2018-09-03	2018-09-11						

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+ (%)
2018-09-03 20:06	1	135.00	Water Based Mud	8.4	1	8	0.0	0/99	Active Pit	400	0.00
2018-09-08 21:00	2	1612.00	Diesel-Oil Based Mud	9.1	6	N/A	0.0	79/10.5	Active Pit	14000	0.00
2018-09-09 20:00	2	5870.00	Diesel-Oil Based Mud	8.8	7	N/A	0.0	78/12.5	Active Pit	14000	0.00
2018-09-10 20:00	2	9370.71	Diesel-Oil Based Mud	9.5	9	N/A	0.0	76/12.5	Active Pit	12000	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	NaviTrak	13225711	Directional (mag)	16.02	52.03	8.000	0.000
1	NaviTrak	13225711	VSS	16.02	52.03	8.000	0.000
2	ATC_SU	12252538	Near Bit Inclination	5.93	6.93	7.000	4.330
2	ATC_SU	12252538	Near Bit VSS	5.93	6.93	7.000	4.330
2	ATC_MWD	14313851	Gamma (single)	2.23	12.55	7.000	3.250
2	ATC_MWD	14313851	Directional (mag)	12.27	22.59	7.000	3.250

Service and Tool Mnemonics

Mnemonic	Name	Description
NTK	NaviTrak	Probe Based Directional Module, NaviTrak Platform
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

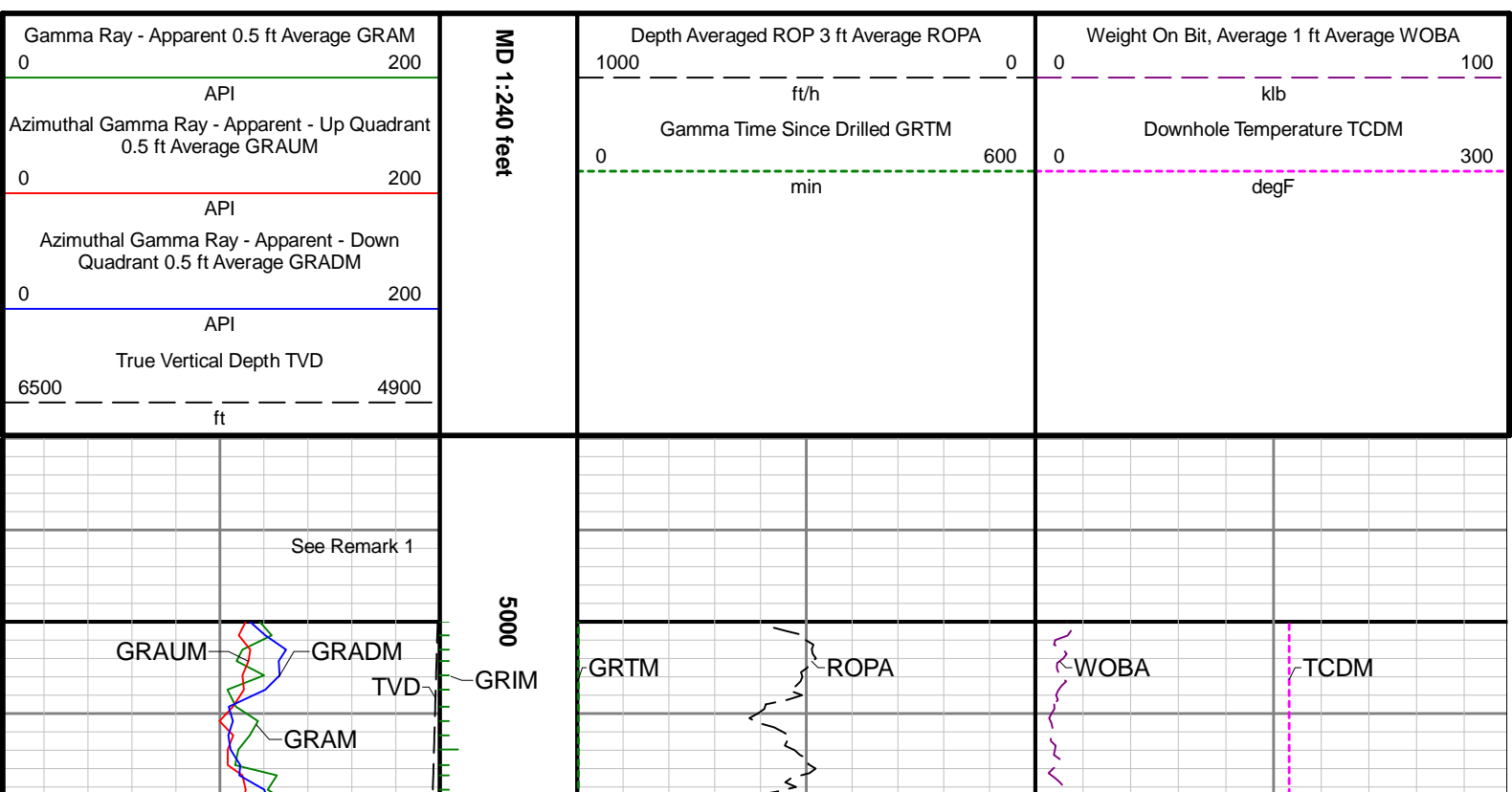
- 1 Depth measurements were obtained from a depth control system not supplied or operated by Baker Hughes. Due to the lack of control by Baker Hughes, depth calibrations and measurements could not be independently verified.
- 2 Baker Hughes LWD Run 1 used the 8 inch NaviTrak service (Directional) behind a 13 1/2 inch bit and steerable assembly to drill from 17 to 1612 feet MD (17 to 1612 feet TVD).
- 3 Baker Hughes LWD Run 2 used the 6 3/4 inch NaviGamma service (Gamma Ray, Azimuthal Gamma Ray and Directional) behind an 8 1/2 inch bit and rotary steerable assembly to drill from 1612 to 11657 feet MD (1612 to 6391 feet TVD).
- 4 The Gamma Ray Apparent (GRAM) data is presented from 0 to 200 API, per customer's request.

Remarks

Number	Measured Depth (ft)	Hole Section (in)	Run No.	Remark
1	5090.00	8.500	2	The Gamma Ray Apparent (GRAM) log starts at 5000 feet, per customer's request.
2	11650.00	8.500	2	The interval from 11644 to 11657 feet MD (6391 feet TVD) was not logged due to sensor to bit offset at well TD.

Curve Mnemonics

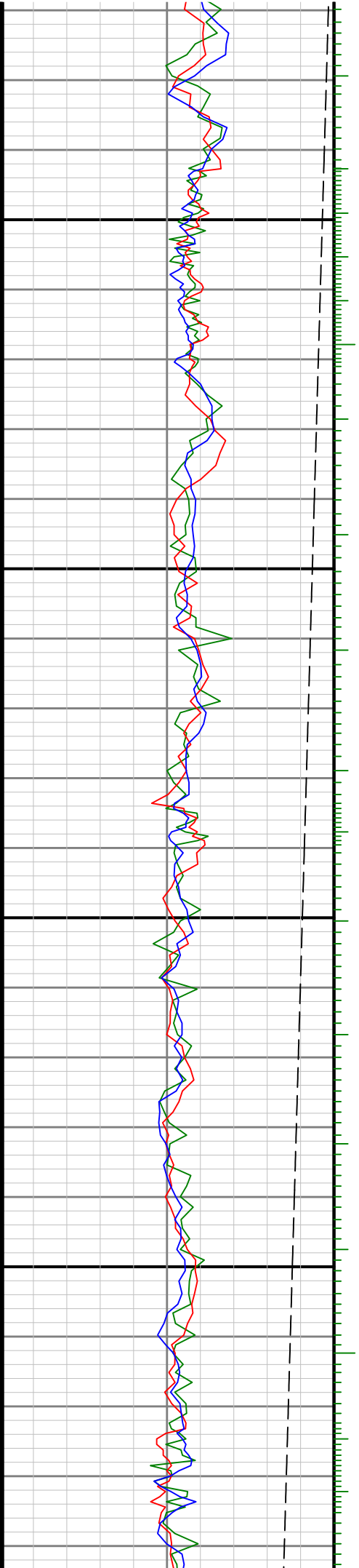
Presented Curves	Description	Units
ROPA	Depth Averaged ROP 3 ft Average	ft/h
TVD	True Vertical Depth	ft
WOBA	Weight On Bit, Average 1 ft Average	klb
GRAM	Gamma Ray - Apparent - Memory 0.5 ft Average	API
GRIM	Gamma Ray - Data Point Indicator - Memory	unitless
GRTM	Gamma Ray - Time Since Drilled - Memory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

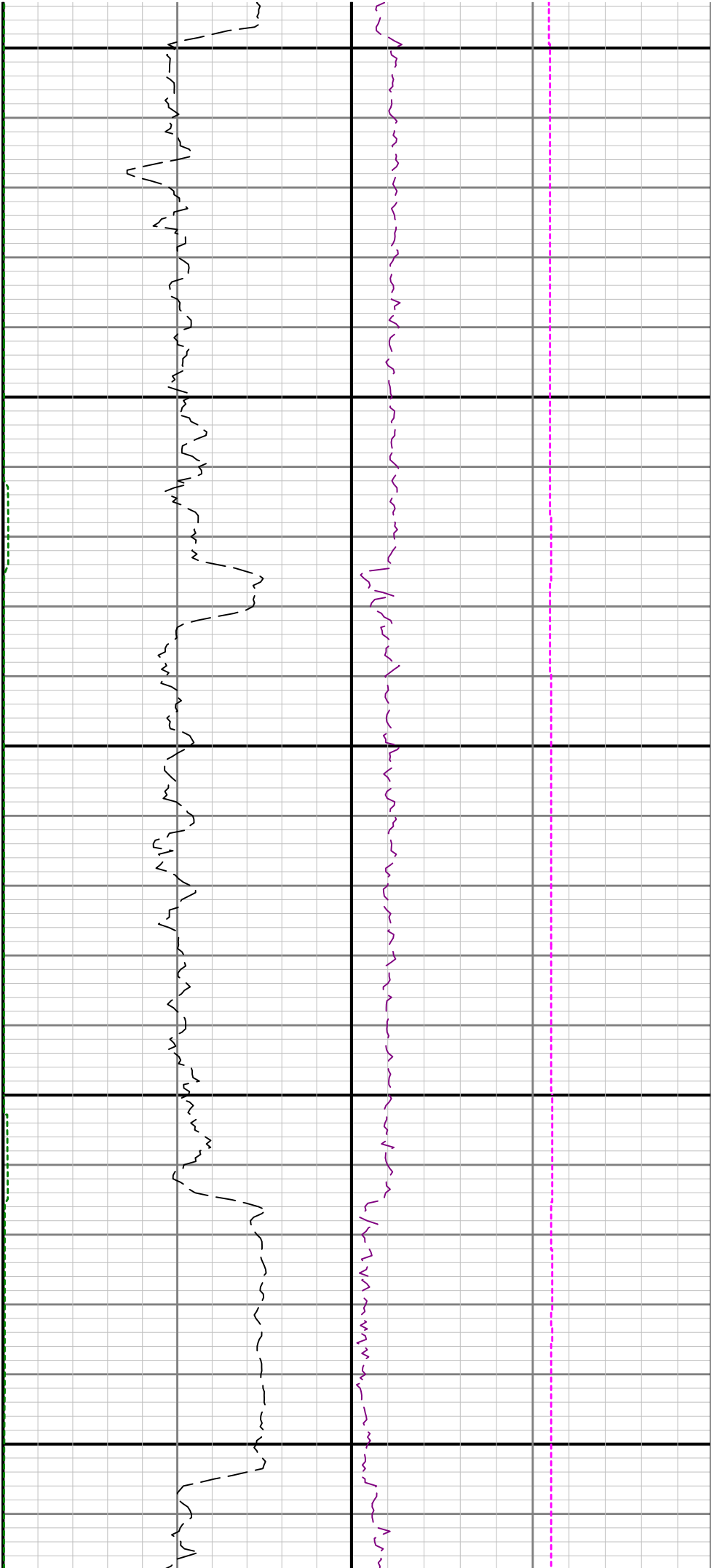




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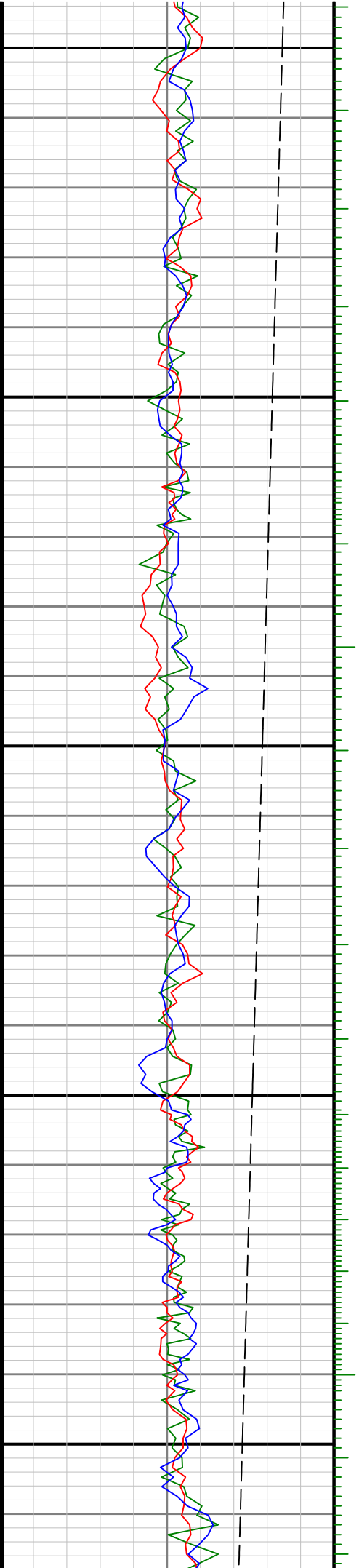
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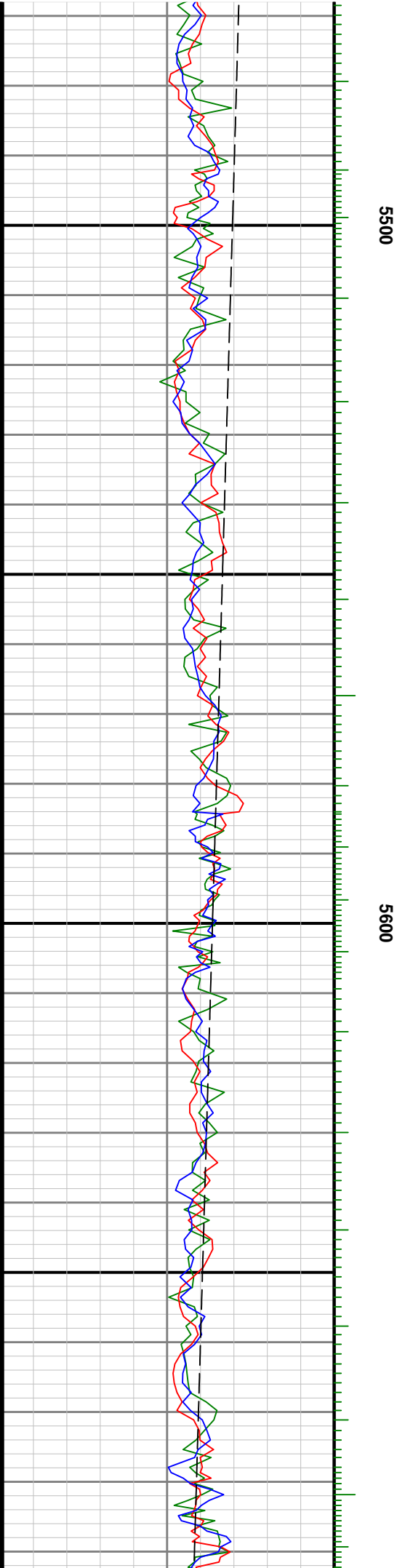
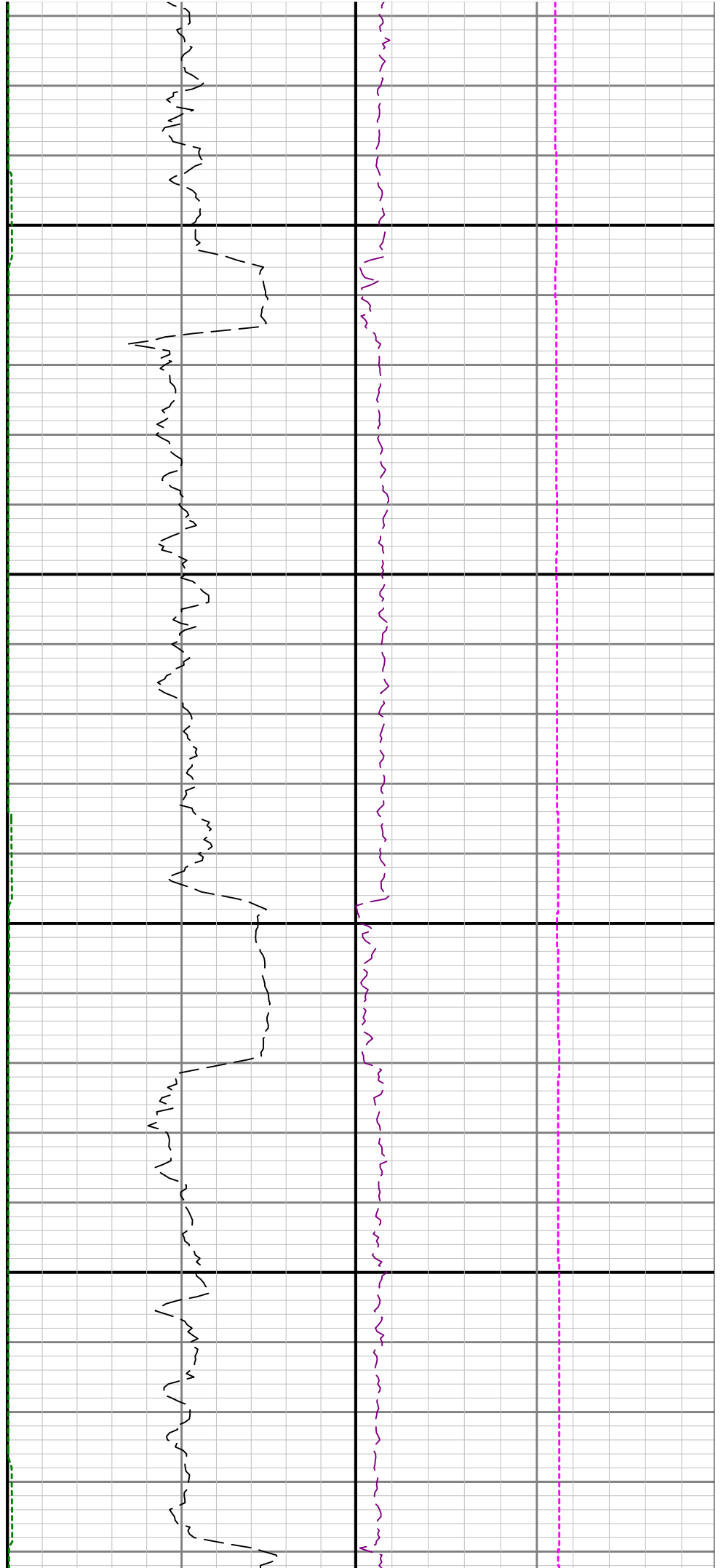


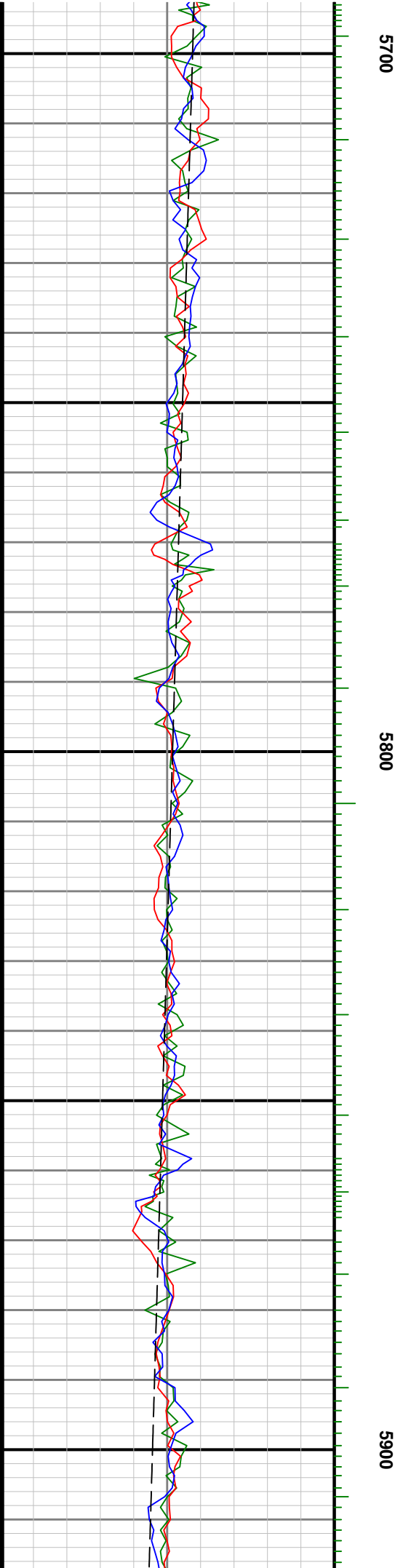
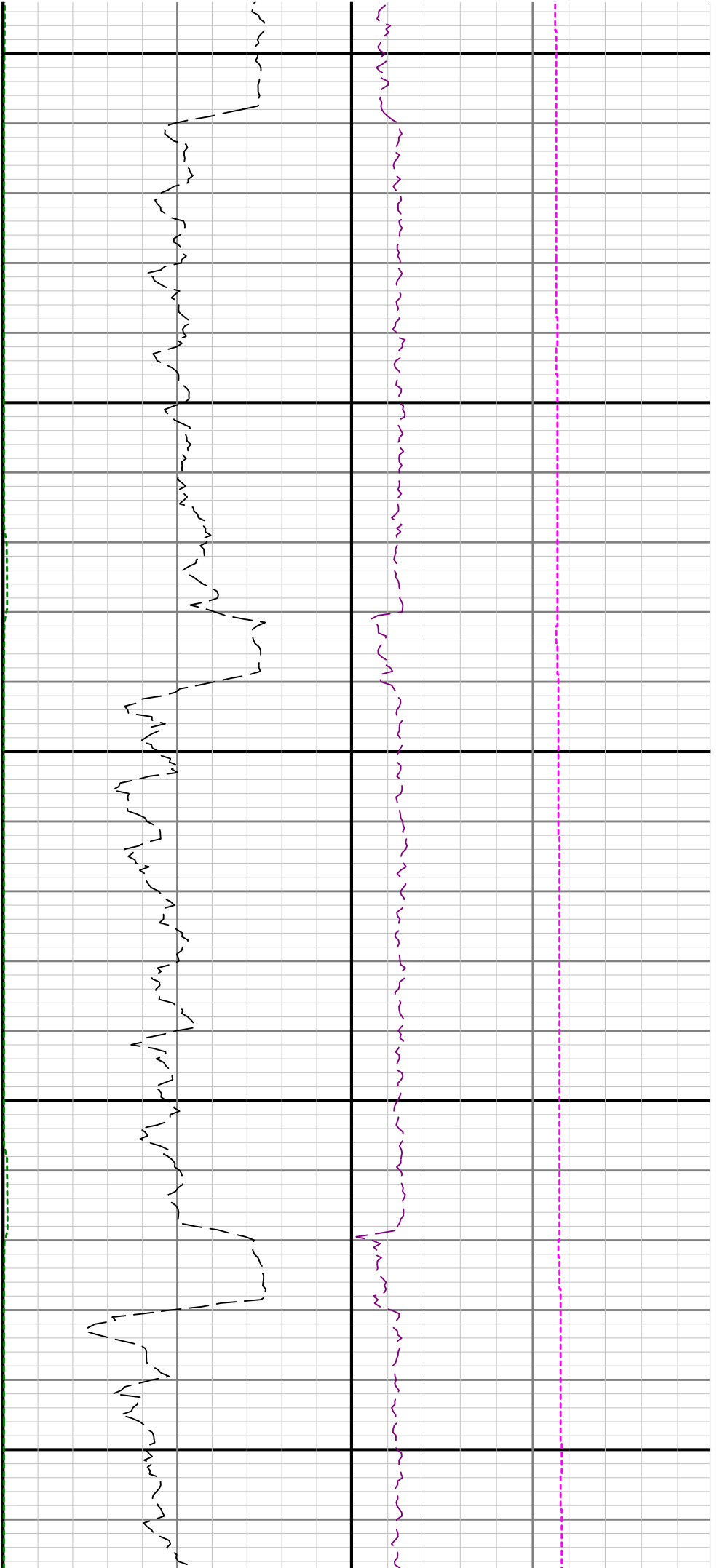


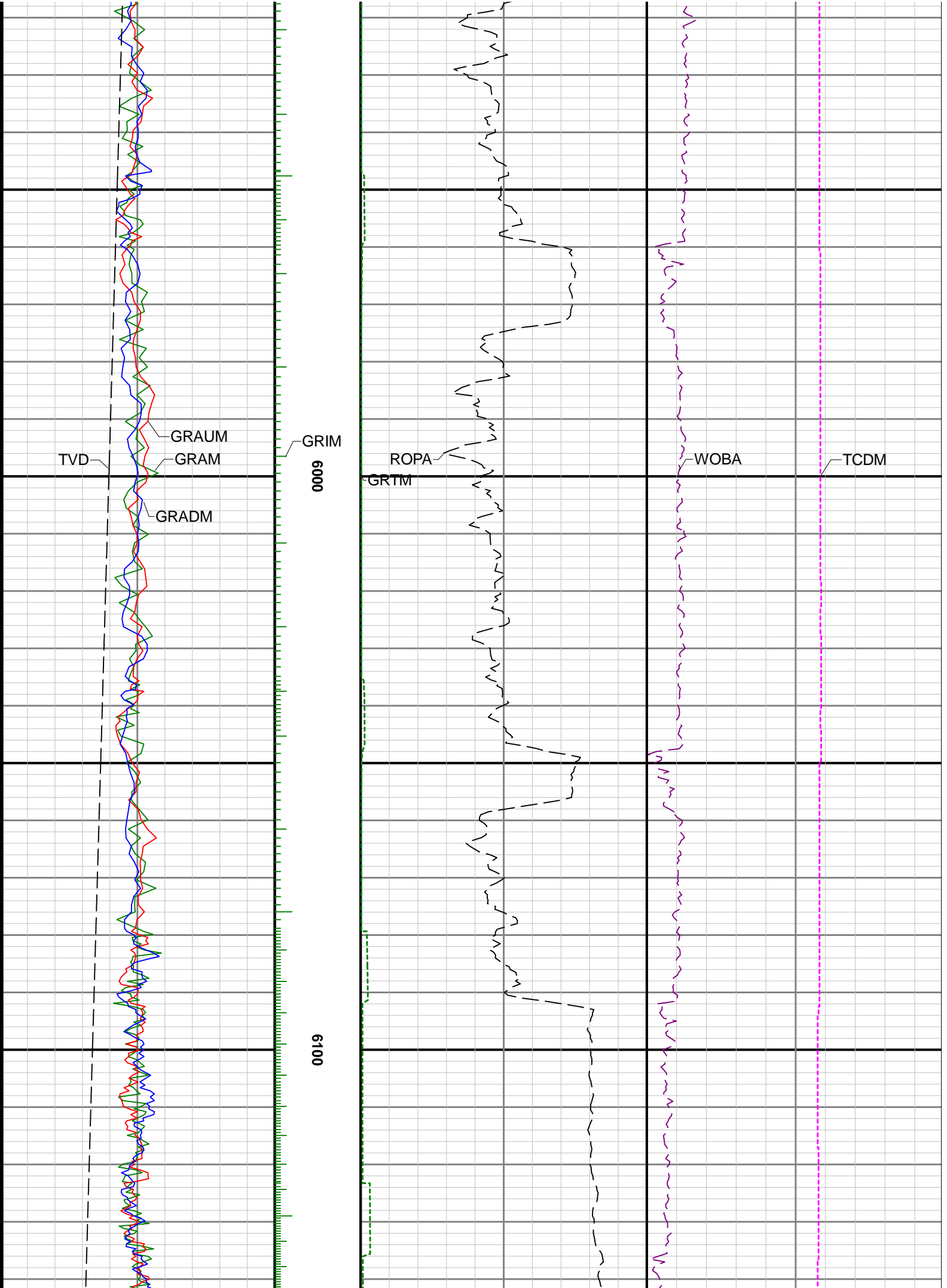
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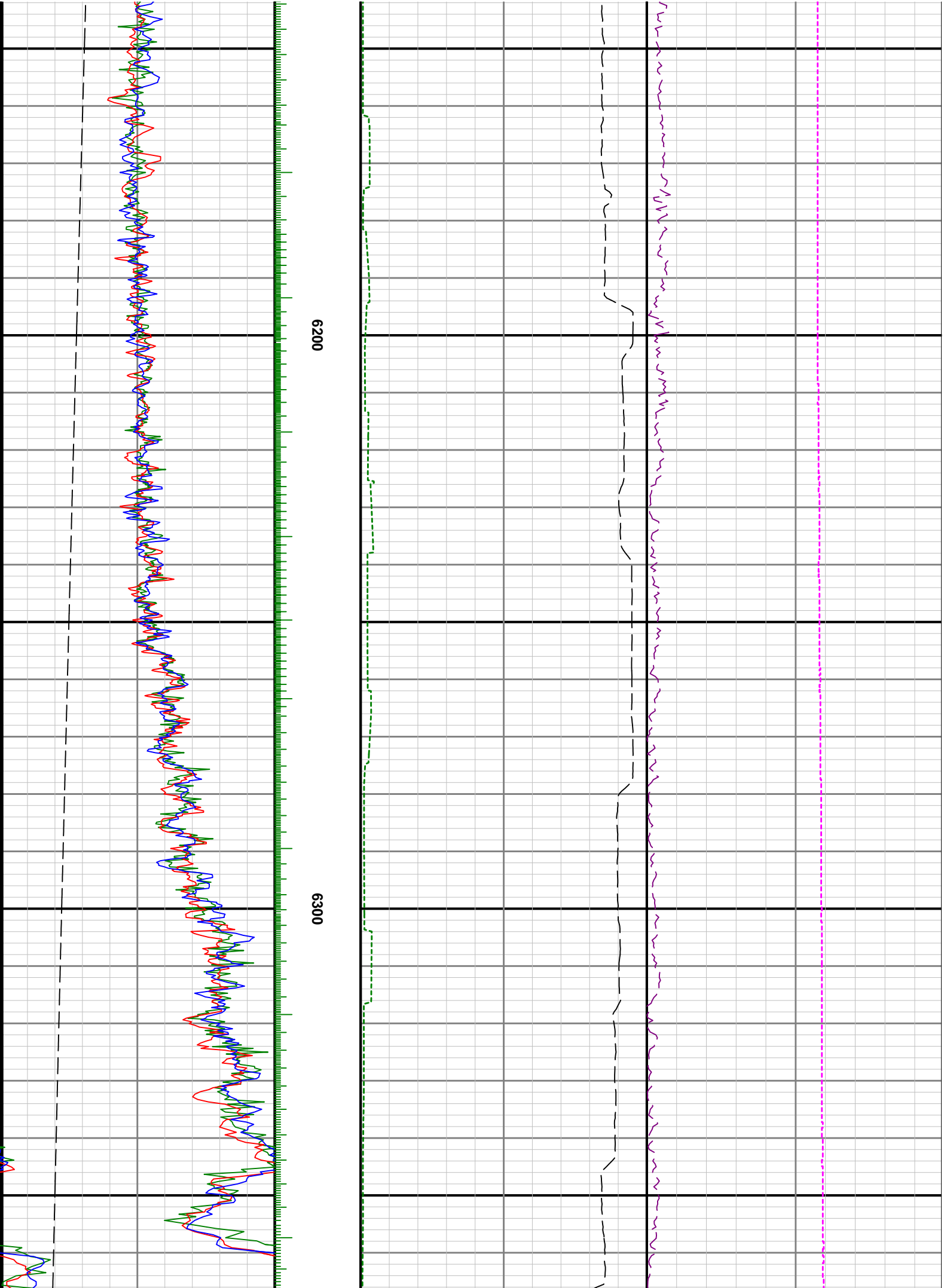
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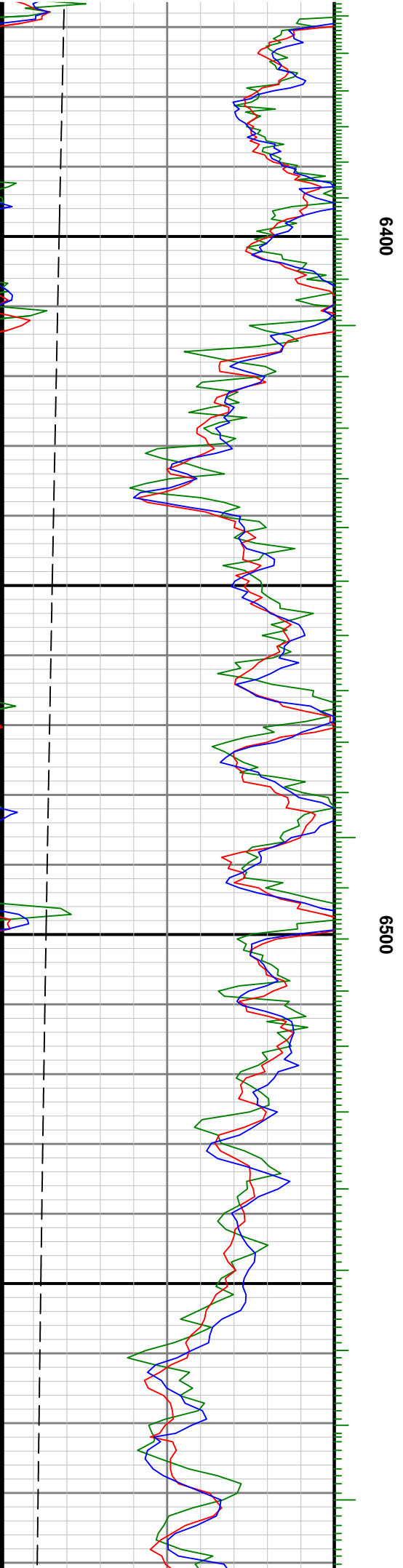
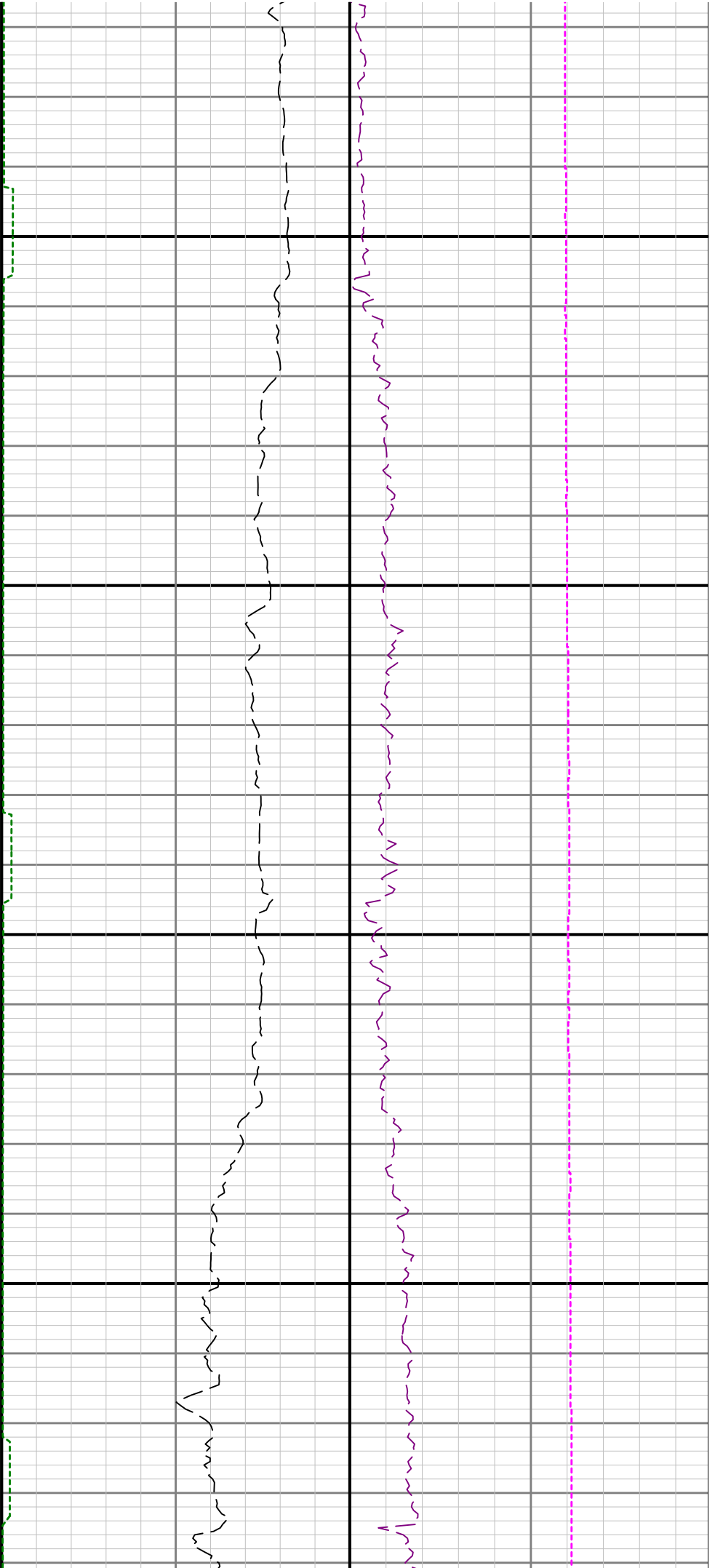


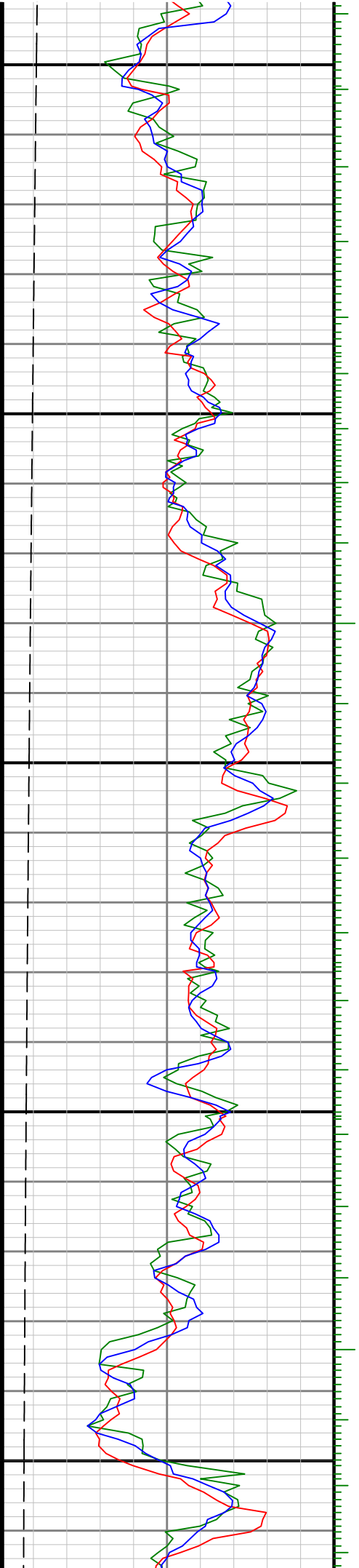








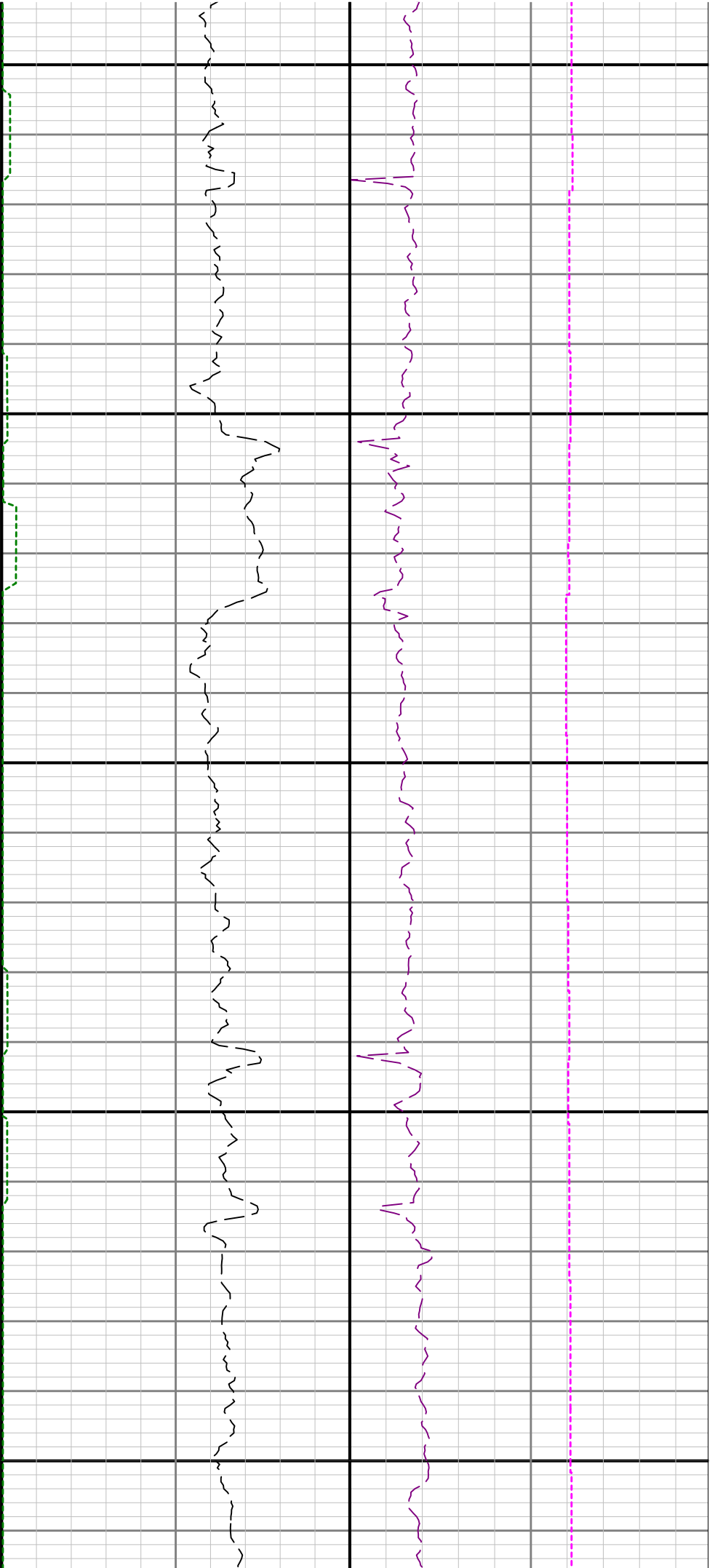


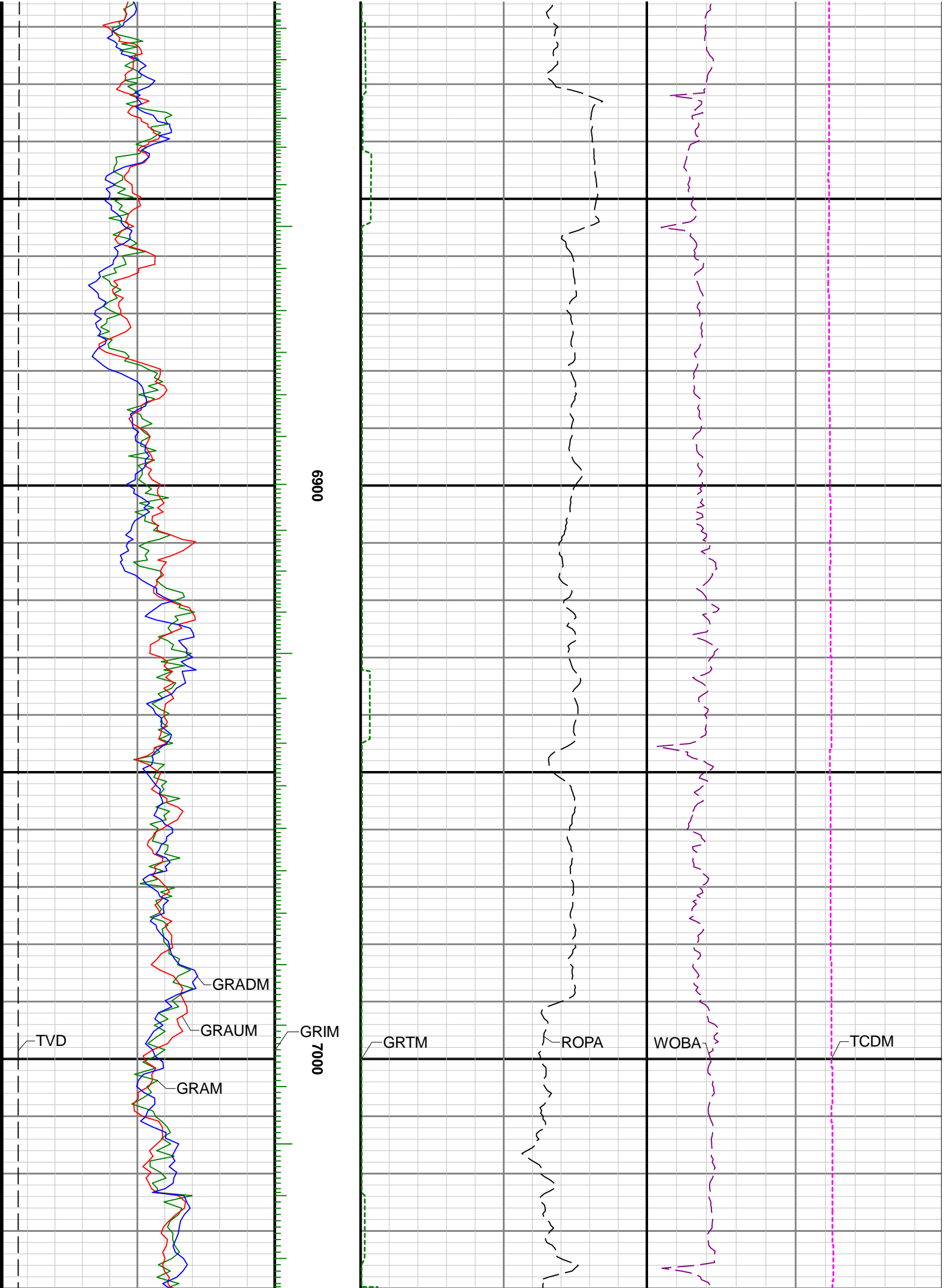


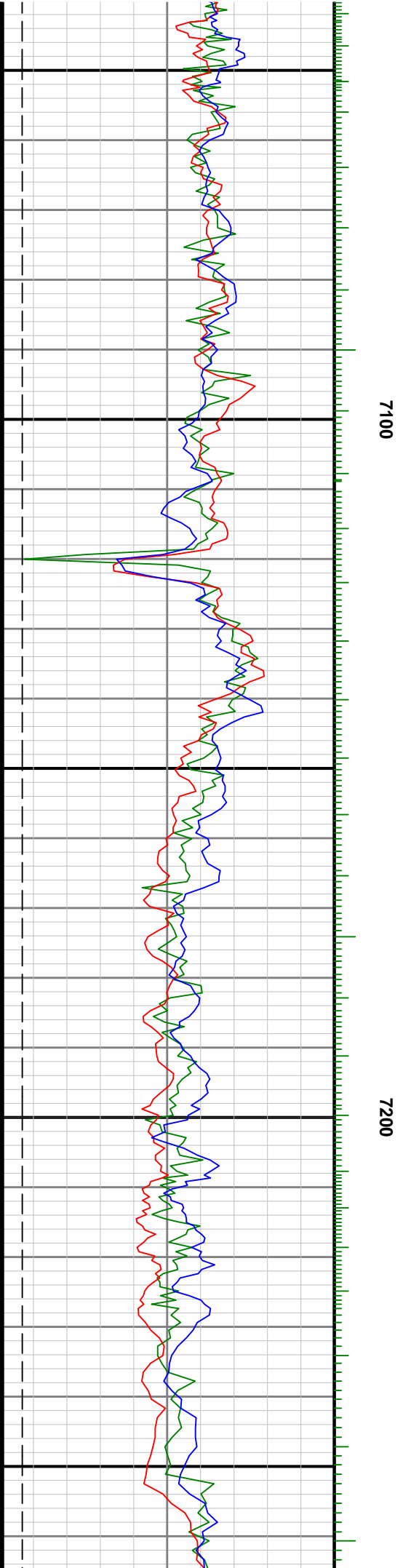
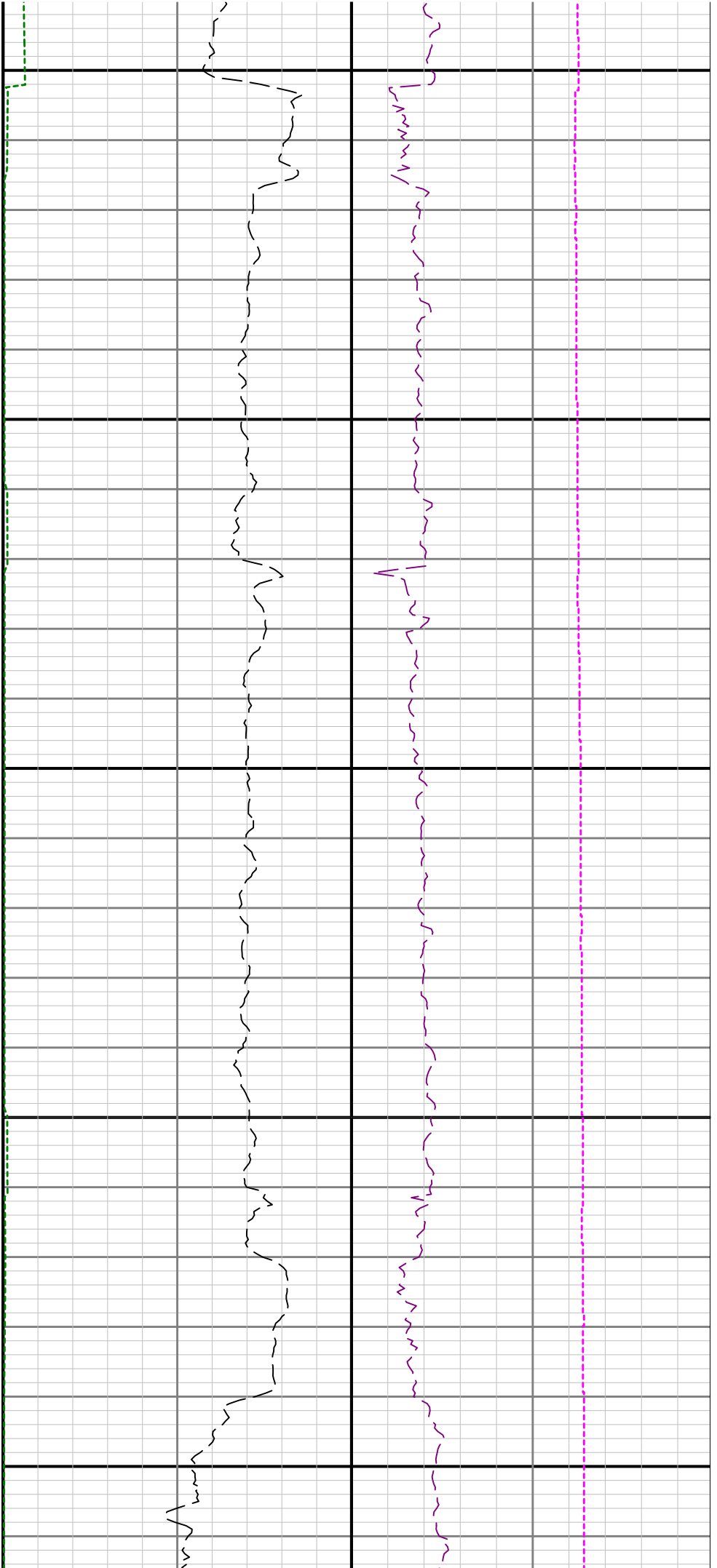
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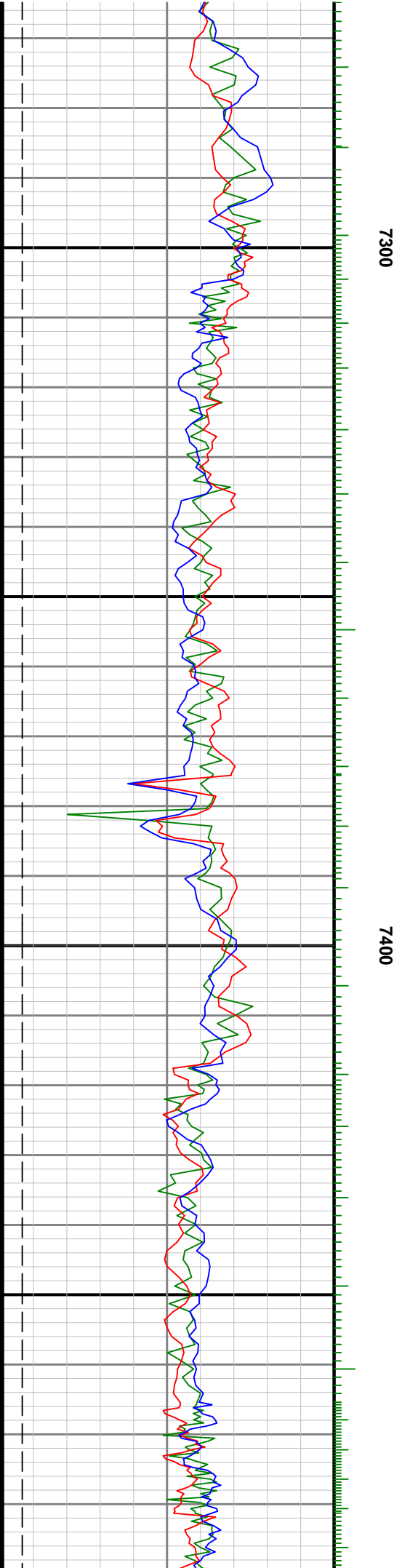
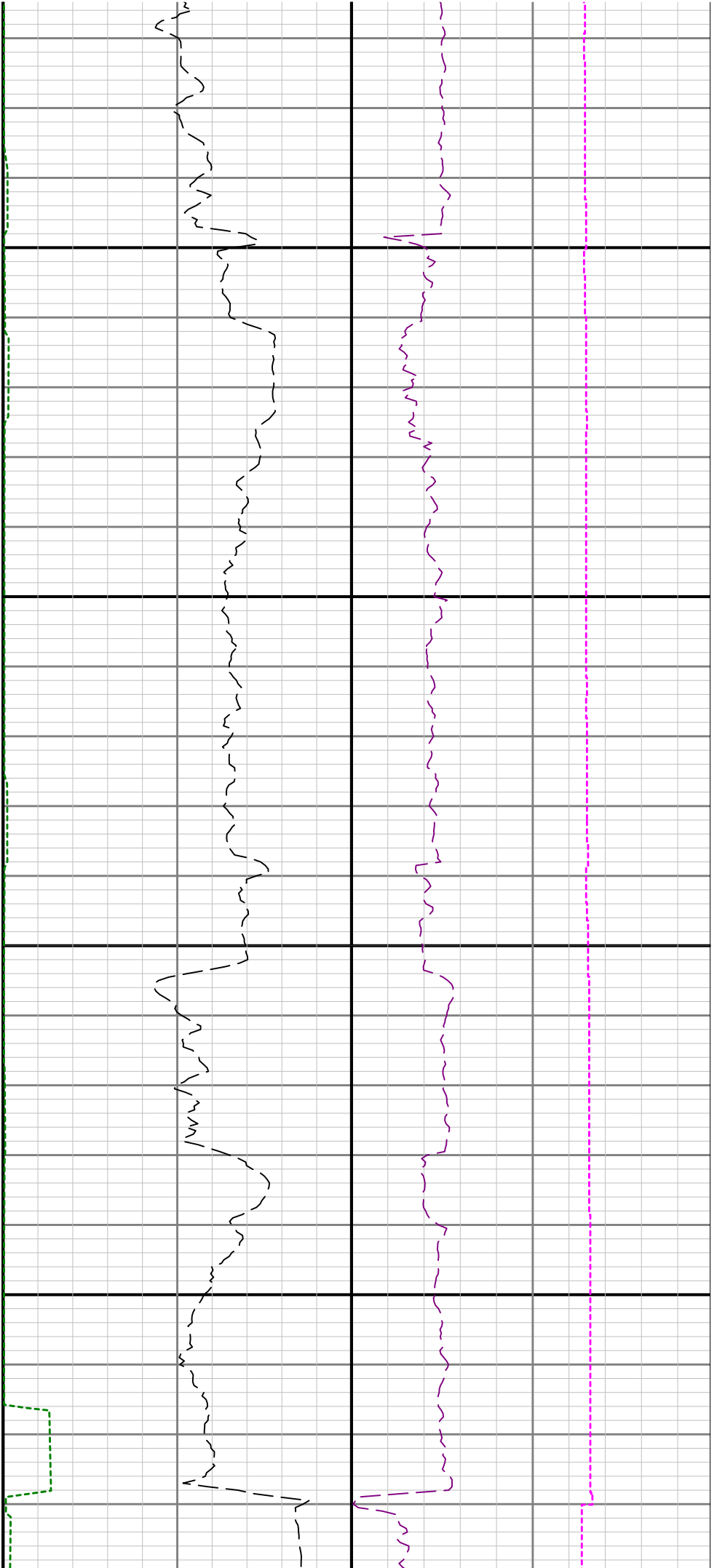
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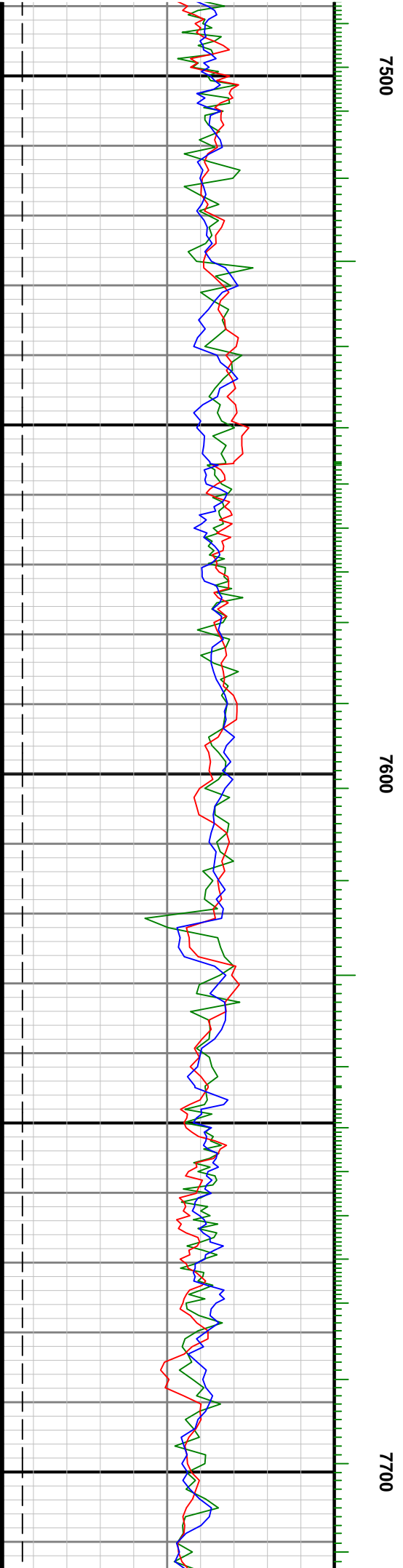
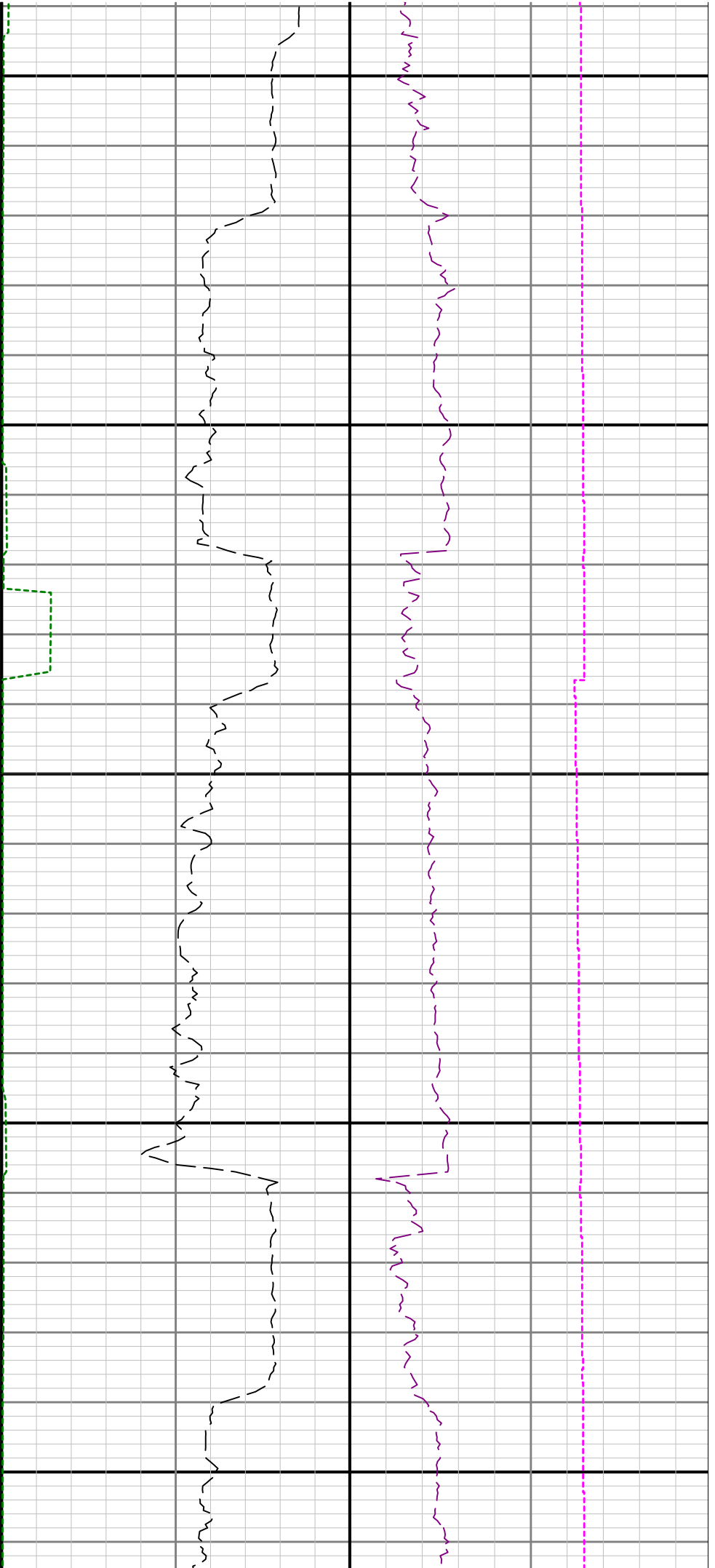
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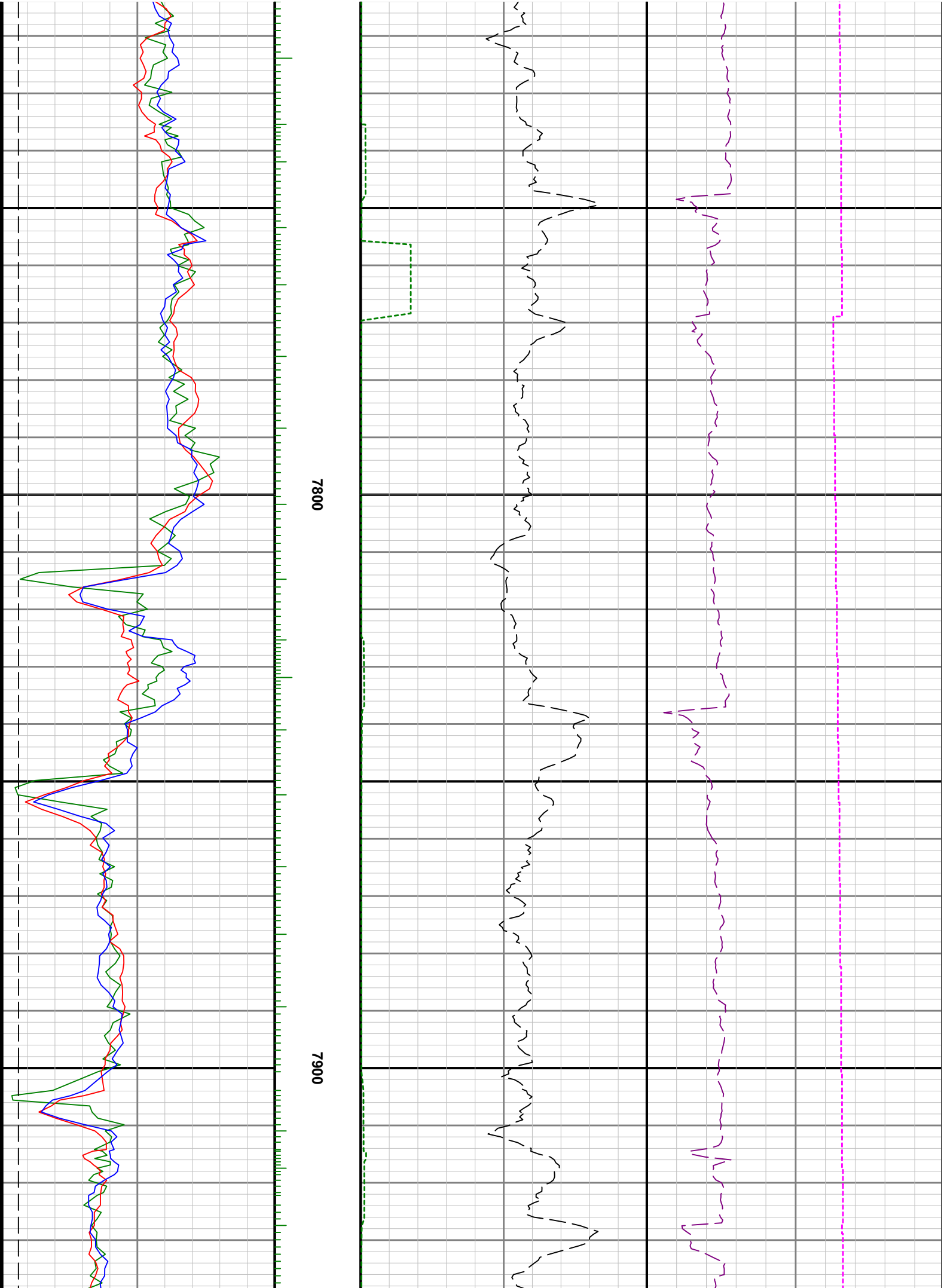


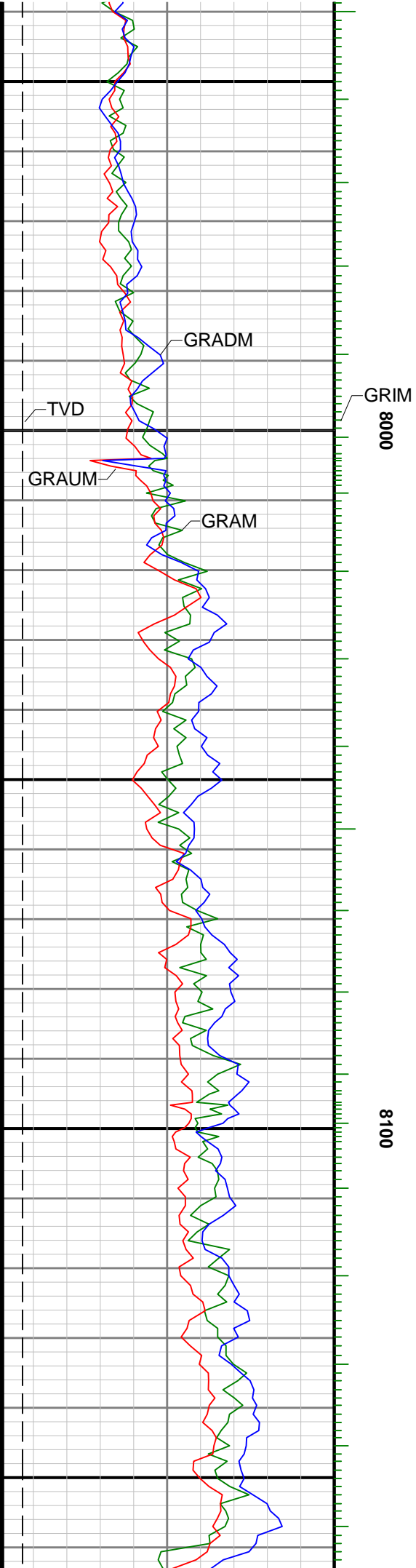


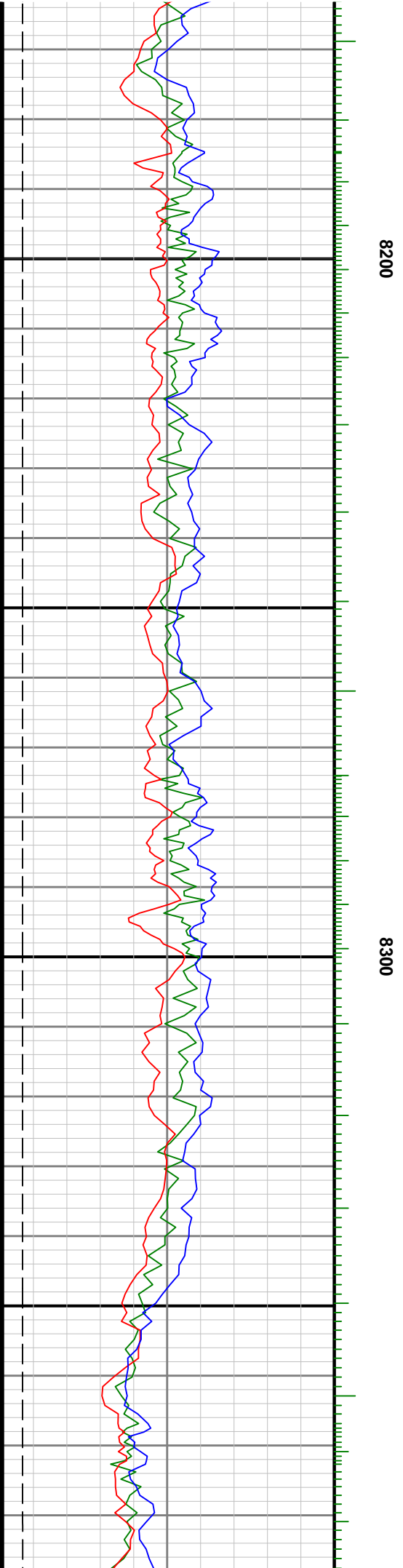
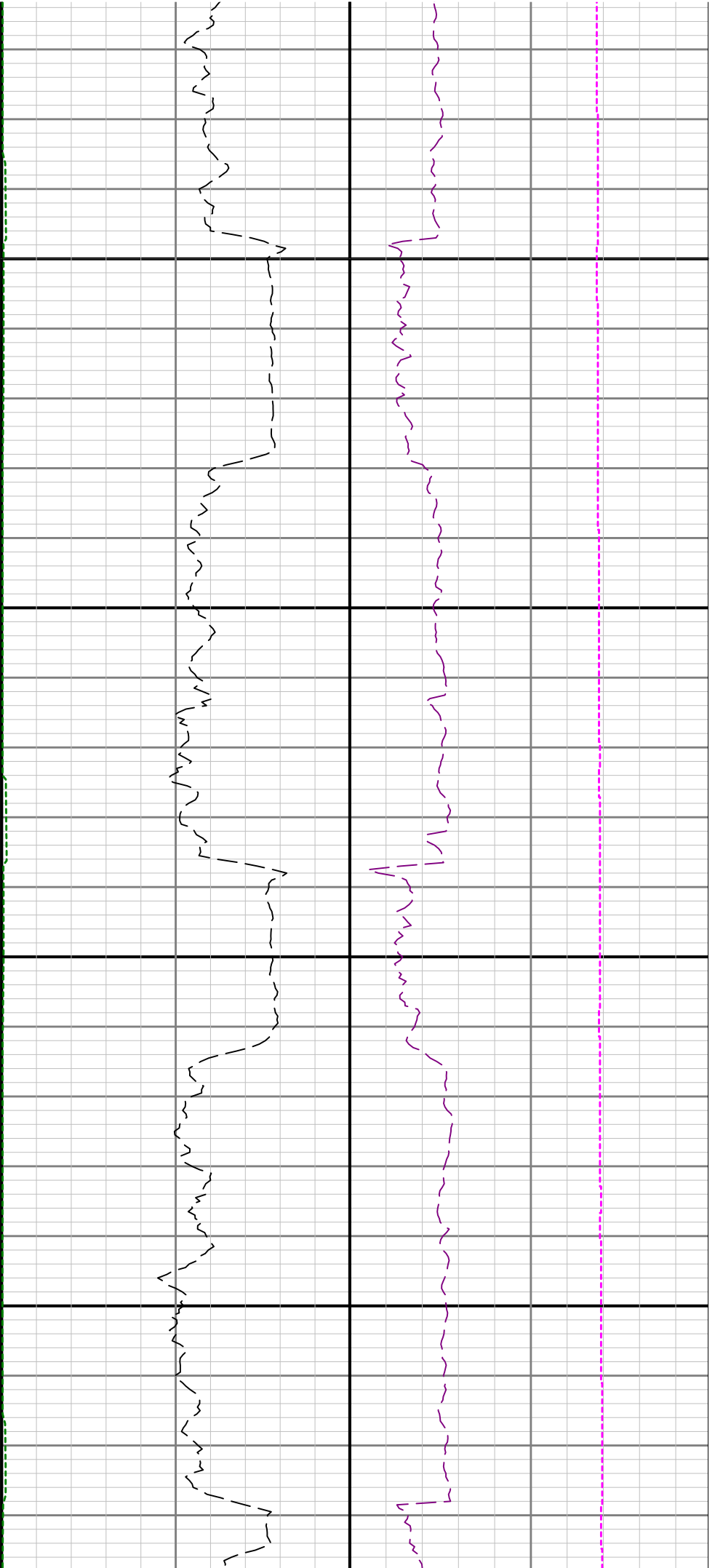


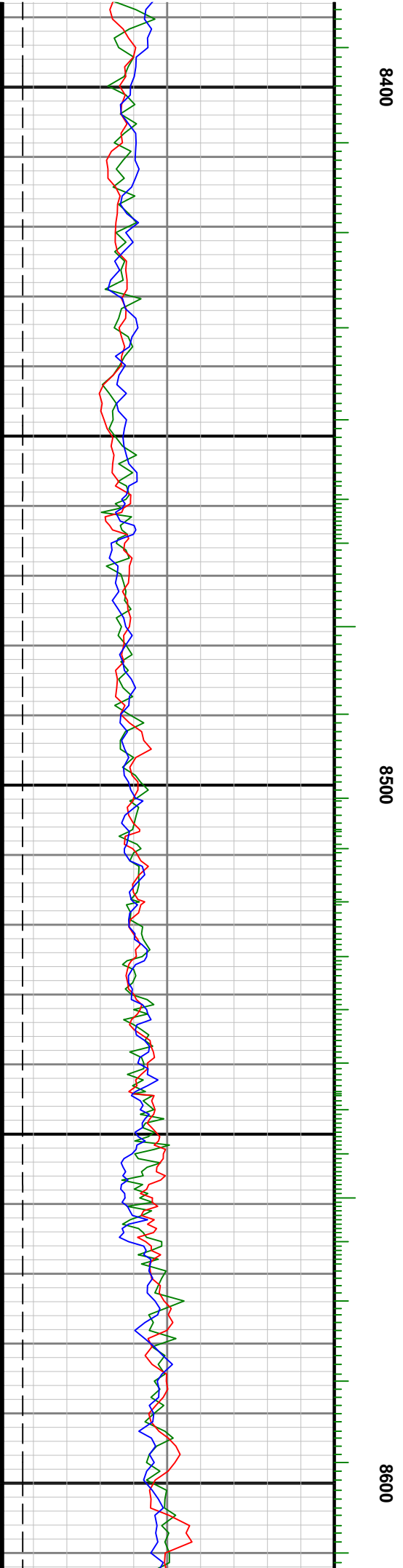
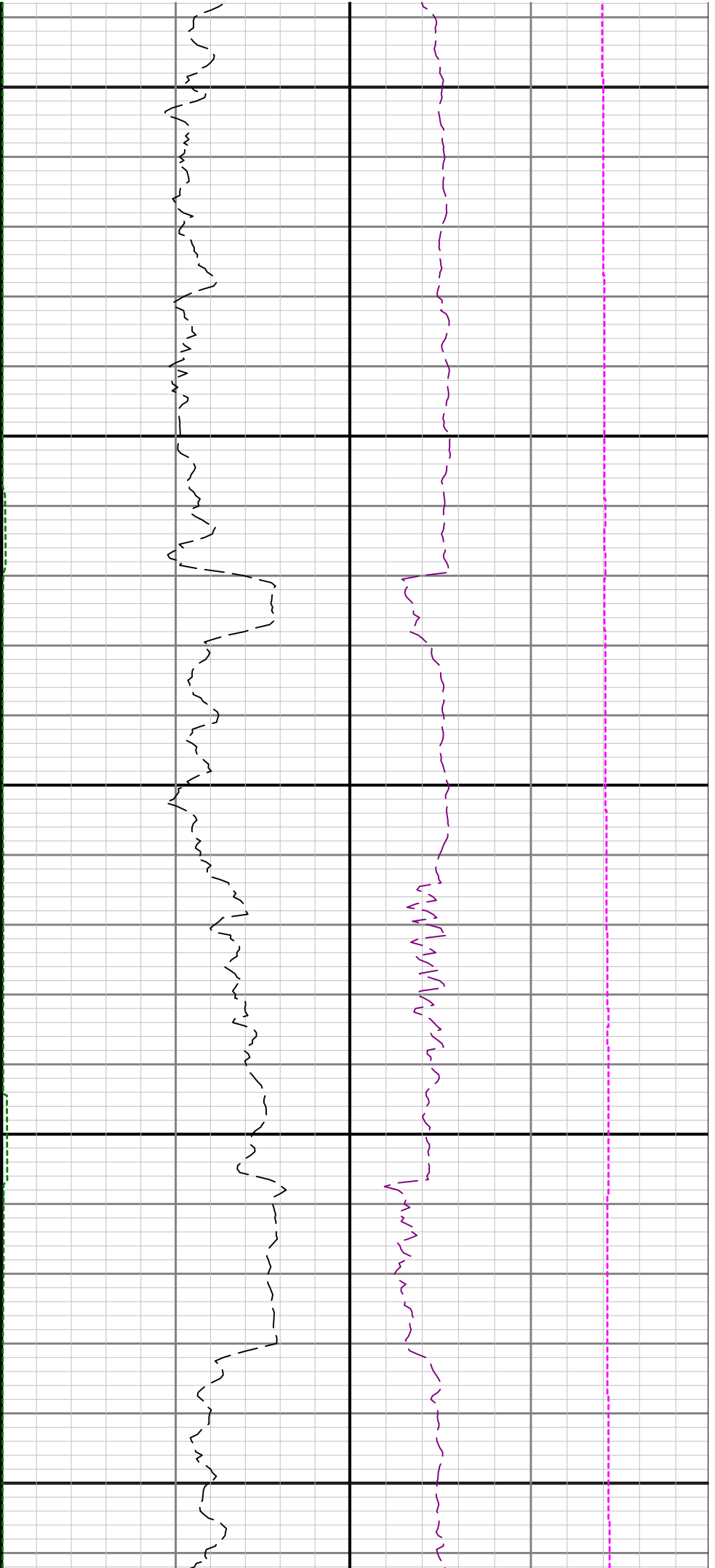


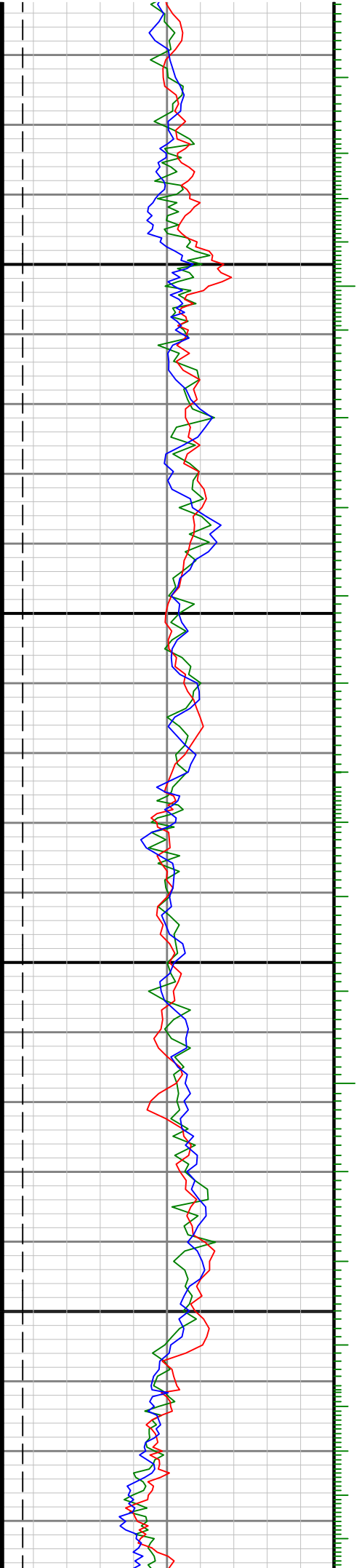






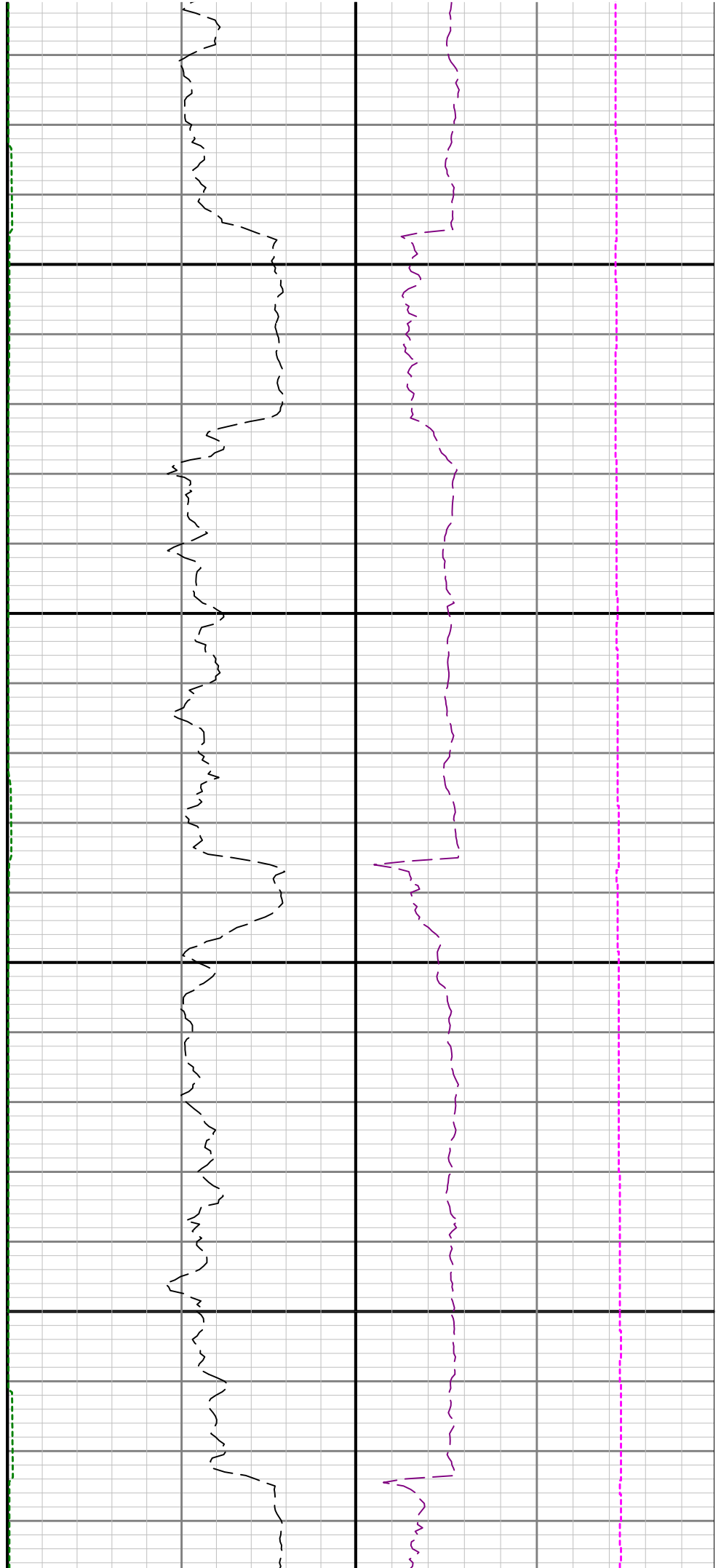


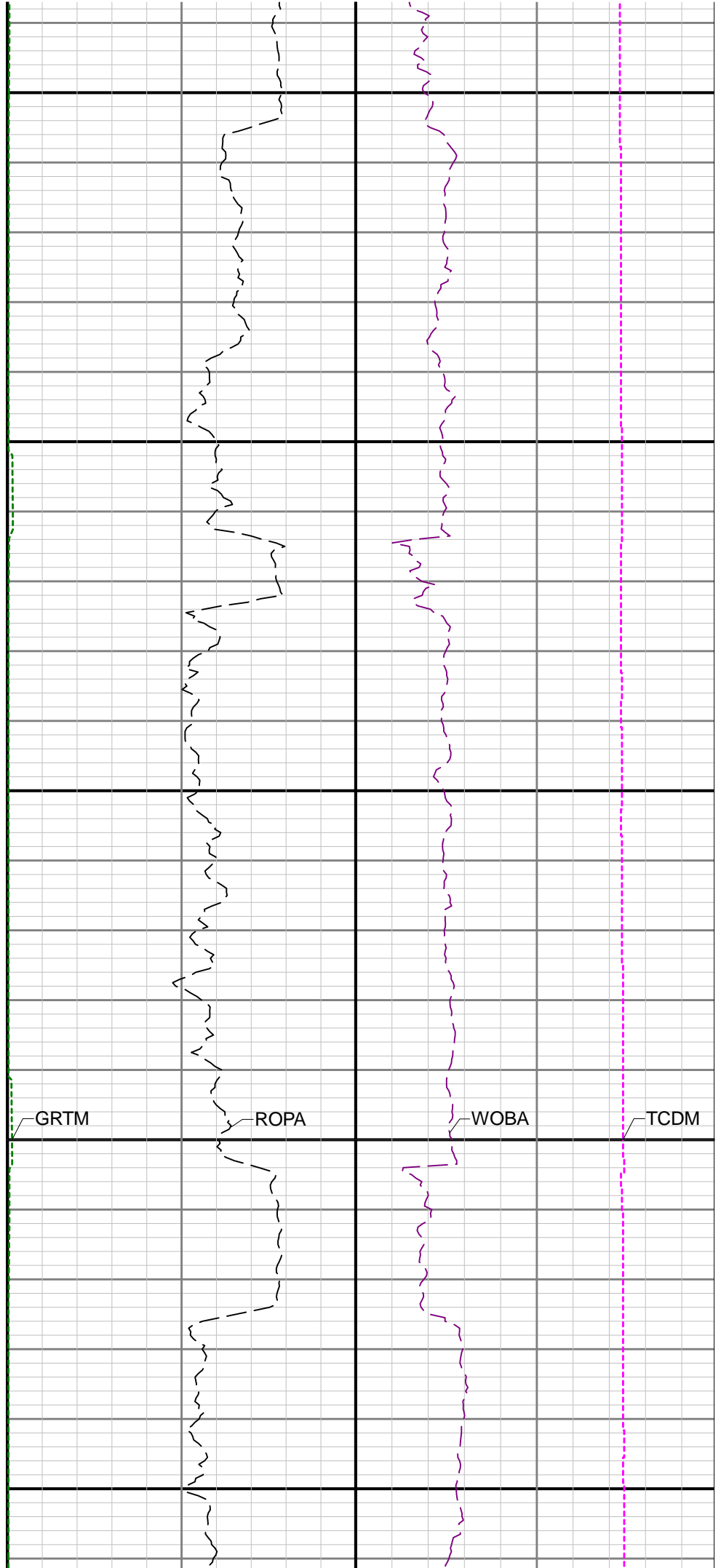
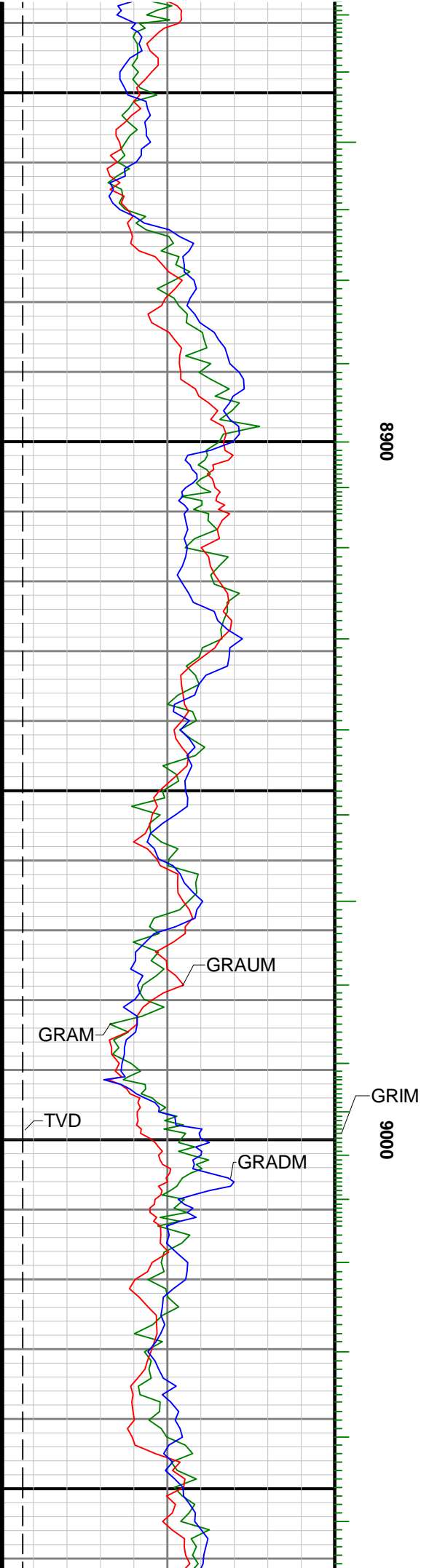


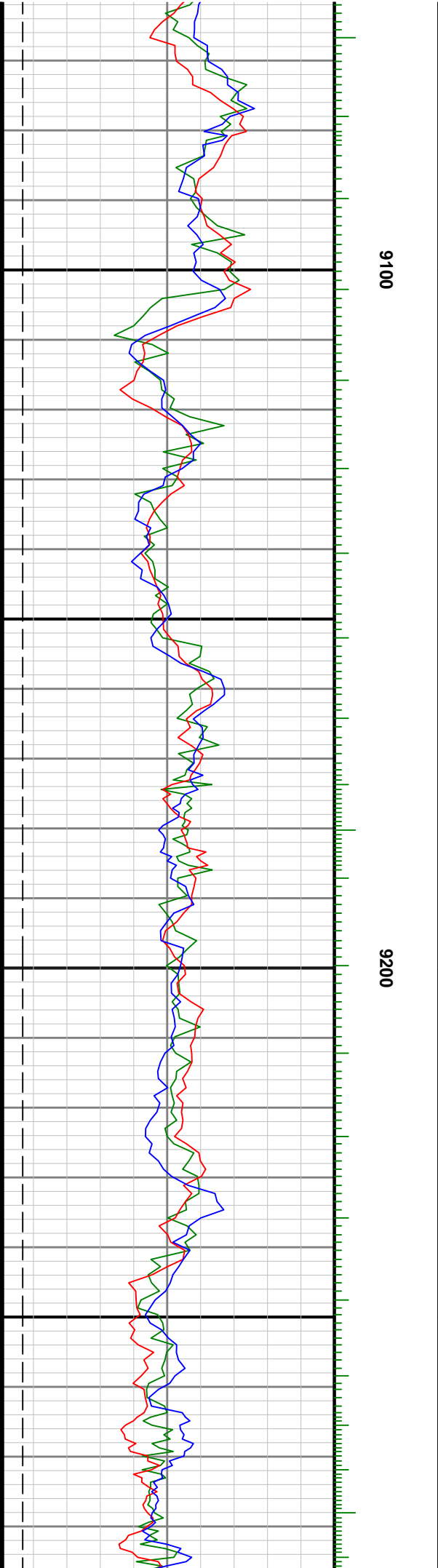


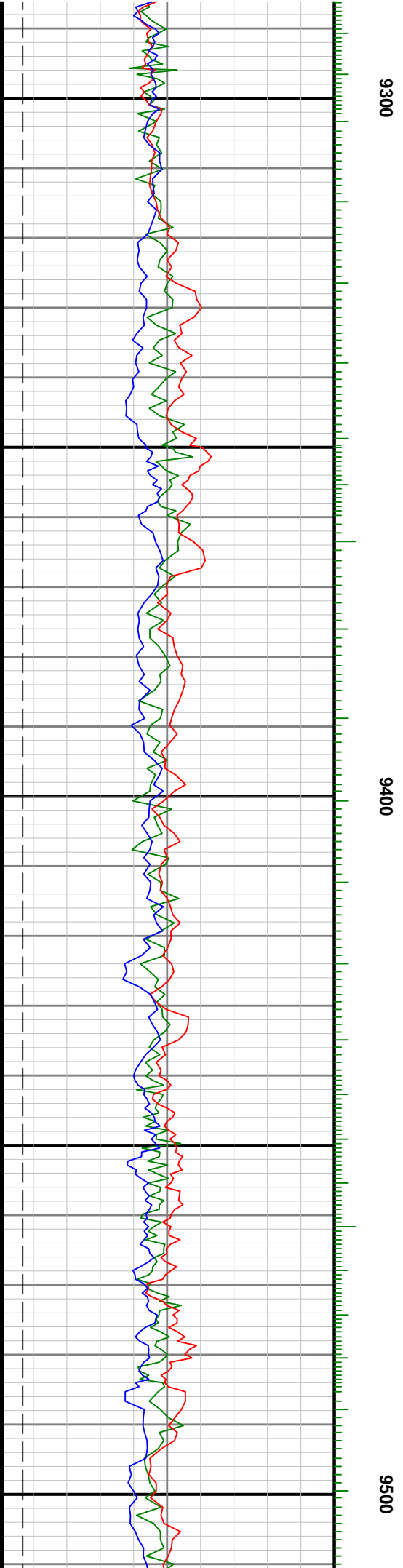
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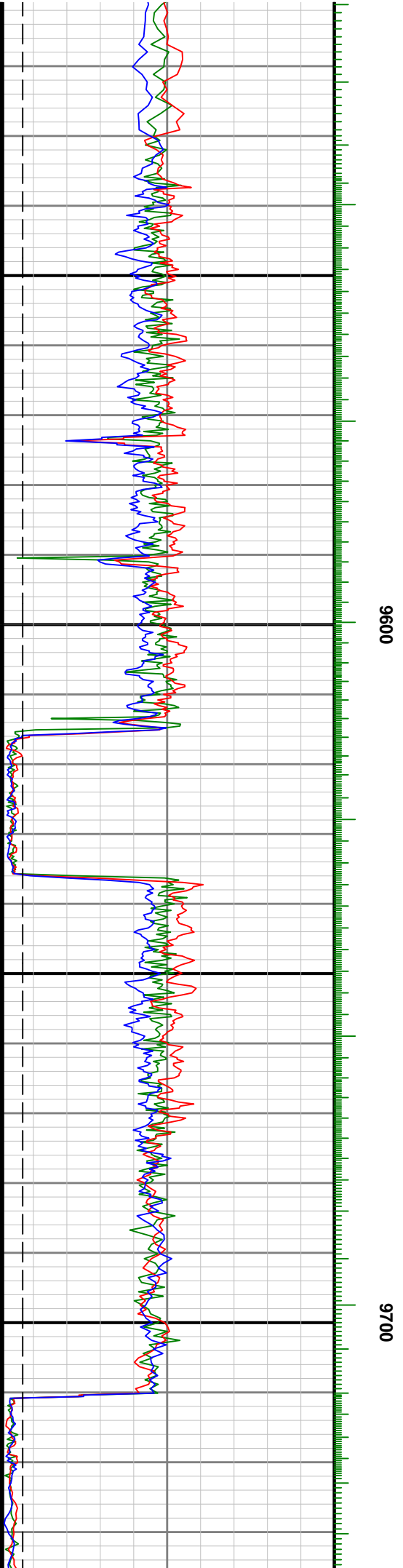
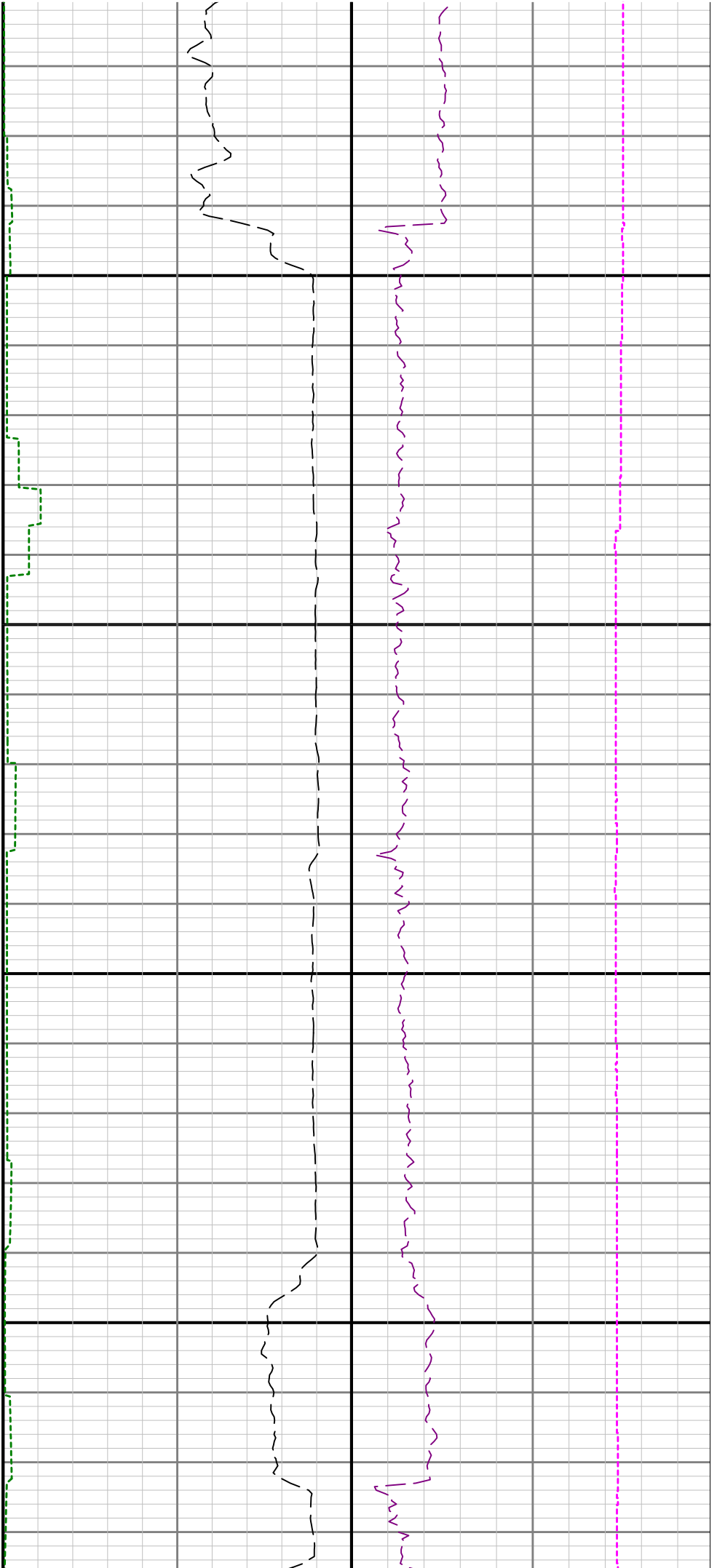
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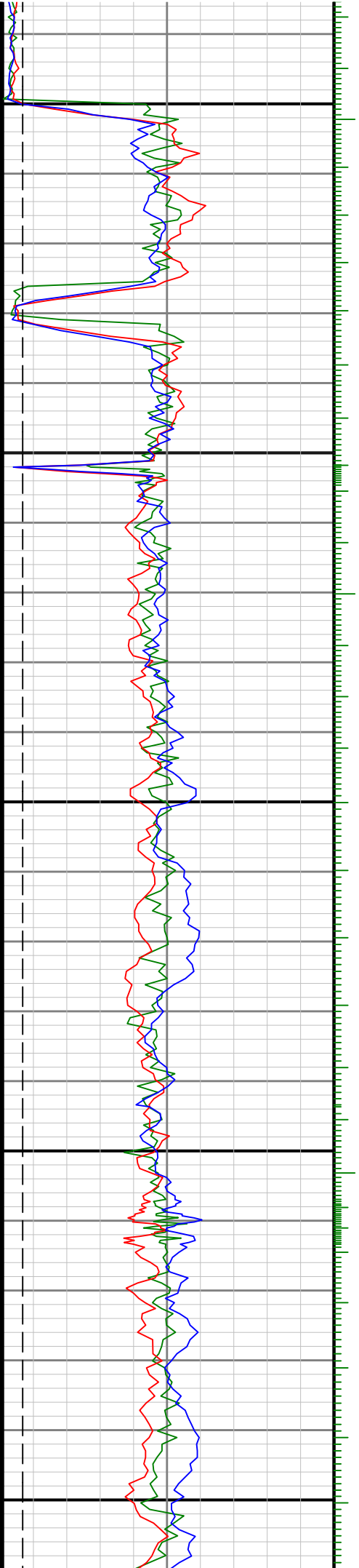












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