



LWD MEMORY LOG

Gamma Ray  
Azimuthal Gamma Ray

Scale:		Company: Bonanza Creek Oil Company			
1:240 MD		Well: State Antelope T44-2-14XRLNB			
Depth Reference:		Field: Weld County			
Driller's Depth		County: Weld		Country: United States	
Status:		State: Colorado			
Final Print		Surface Location:		Other Services:	
API No: 05-123-44483-00		Latitude: 040° 25' 18.117" N		Directional	
Job ID: 1093332003		Longitude: 104° 17' 00.572" W			
Permanent Datum (P.D.): Mean Sea Level		Elevation: 0.00 ft		Elev. KB: N/A	
Log Measured From: Rig Floor		Above P.D. 4653.00 ft		Elev. DF: 4653.00 ft	
				Elev. GL: 4636.00 ft	
Dates		Interval Drilled		Magnetic Field Reference	
Date From: 2018-07-29		Top: (ft) 17.00		Azi Reference North: True	
Date To: 2018-08-25		Bottom: (ft) 16870.00		Total Magnetic Field Strength: (nT)	
Spud Date: 2018-07-29				Mag to Reference North Correction: (deg)	

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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	13.500	PDC	4.00	Steerable	0.00	0.00	17.00	1635.00	2018-07-29 15:01	2018-07-30 01:15	6.89
2	2	8.500	PDC	4.00	AutoTrak Curve	5000.00	10816.00	1635.00	10829.00	2018-08-19 23:35	2018-08-22 11:10	42.81
3	3	8.500	PDC	4.00	AutoTrak Curve	10816.00	10821.00	10829.00	10834.00	2018-08-22 13:50	2018-08-23 01:45	2.54
4	4	8.500	PDC	4.00	AutoTrak Curve	10821.00	16857.00	10834.00	16870.00	2018-08-23 04:10	2018-08-25 12:00	45.04

Crew

Name	Arrive Wellsite	Depart Wellsite	Name	Arrive Wellsite	Depart Wellsite	Name	Arrive Wellsite	Depart Wellsite
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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+ (%)
2018-07-29 08:50	1	17.00	Water Based Mud	8.4	1	8	0.0	0/98.5	Active Pit	350	0.00
2018-08-19 21:00	2	1635.00	Diesel-Oil Based Mud	8.9	7	N/A	0.0	77/14	Active Pit	31000	0.00
2018-08-20 17:00	2	5570.00	Diesel-Oil Based Mud	9.0	8	N/A	0.0	76.5/14	Active Pit	30000	0.00
2018-08-22 14:15	3	10829.00	Diesel-Oil Based Mud	9.4	11	N/A	0.0	73/15.5	Active Pit	30000	0.00
2018-08-23 05:15	4	10834.00	Diesel-Oil Based Mud	9.5	10	N/A	0.0	72/16	Active Pit	30000	0.00
2018-08-23 16:00	4	12080.00	Diesel-Oil Based Mud	9.5	11	N/A	0.0	72/16	Active Pit	31000	0.00
2018-08-24 06:00	4	13949.00	Diesel-Oil Based Mud	9.7	14	N/A	0.0	70/18	Active Pit	31000	0.00
2018-08-24 17:00	4	15810.00	Diesel-Oil Based Mud	9.5	10	N/A	0.0	71/17	Active Pit	31000	0.00
2018-08-25 06:00	4	16870.00	Diesel-Oil Based Mud	9.5	14	N/A	0.0	72/16	Active Pit	31000	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	10341483	VSS	14.98	50.96	8.000	0.000
1	NaviTrak	10341483	Directional (mag)	14.98	50.96	8.000	0.000
2	ATC_SU	14178992	Near Bit Inclination	5.93	6.93	7.000	4.330
2	ATC_SU	14178992	Near Bit VSS	5.93	6.93	7.000	4.330
2	ATC_MWD	14452425	Gamma (single)	2.73	13.10	7.000	3.250
2	ATC_MWD	14452425	Directional (mag)	12.27	22.64	7.000	3.250
3	ATC_SU	14473393	Near Bit VSS	5.93	6.93	7.000	4.330
3	ATC_SU	14473393	Near Bit Inclination	5.93	6.93	7.000	4.330
3	ATC_MWD	14305965	Gamma (single)	2.72	13.10	7.000	3.250
3	ATC_MWD	14305965	Directional (mag)	12.27	22.65	7.000	3.250
4	ATC_SU	14178990	Near Bit VSS	5.93	6.93	7.000	4.330
4	ATC_SU	14178990	Near Bit Inclination	5.93	6.93	7.000	4.330
4	ATC_MWD	13012733	Gamma (single)	2.76	13.10	7.000	3.250
4	ATC_MWD	13012733	Directional (mag)	12.28	22.62	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

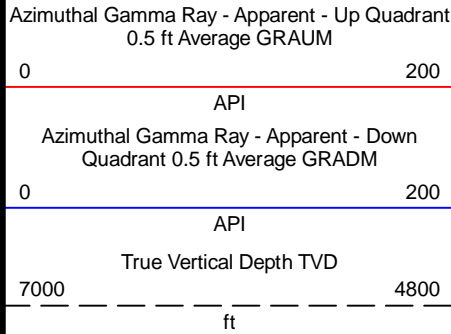
Comments

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 1635 feet MD (17 to 1622 feet TVD).
3	Baker Hughes LWD Runs 2 through 4 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 1635 to 16870 feet MD (1622 to 6188 feet TVD).
4	The Gamma Ray Apparent (GRAM) data is presented from 0 to 200 API, per customer's request.

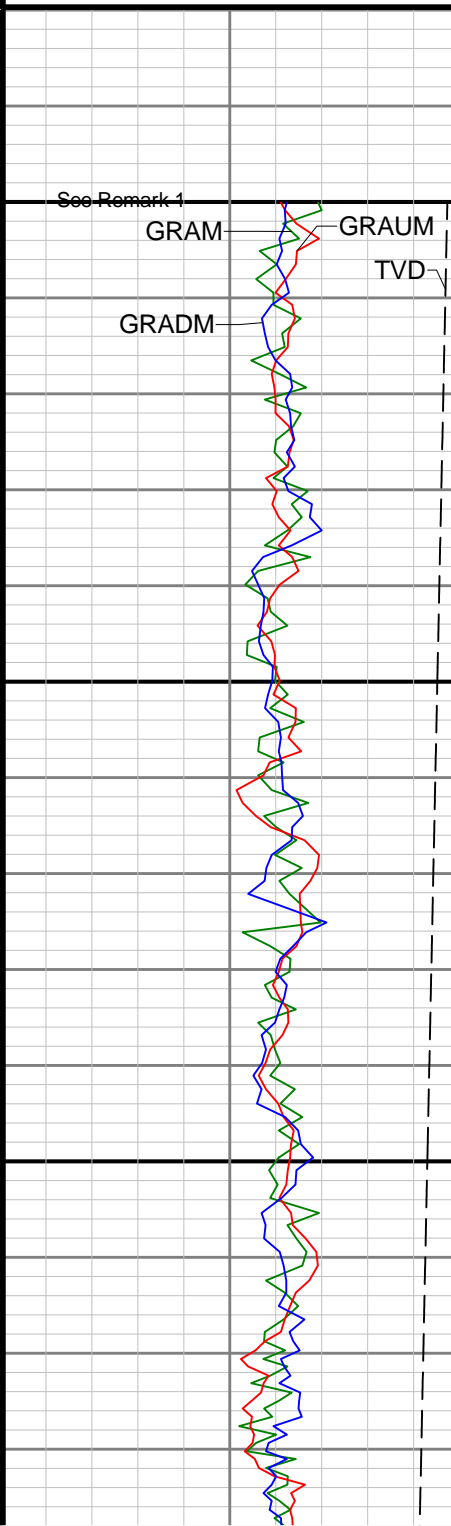
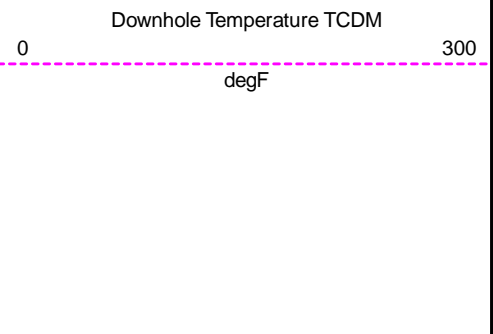
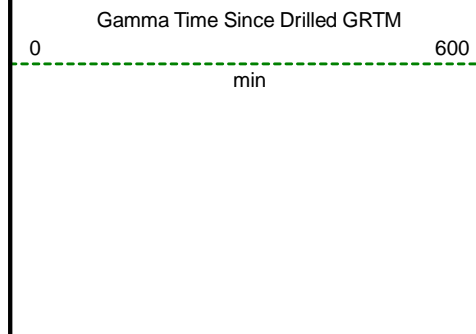
Remarks

Number	Measured Depth (ft)	Hole Section (in)	Run No.	Remark
1	5000.00	8.500	2	The Gamma Ray Apparent (GRAM) log starts at 5000 feet, per customer's request.
2	10816.00	8.500	2	The GRTM curve exceeds the 600 min scale in the interval from 10816 to 10834 feet MD (6184 TVD) because it was not logged for up to 31 hours after two trips out of hole to change BHA.
3	16857.00	8.500	4	The interval from 16857 to 16870 feet MD (6188 feet TVD) was not logged due to sensor to bit offset at well TD.

Gamma Ray - Apparent 0.5 ft Average GRAM	MD 1:2	Depth Averaged ROP 3 ft Average ROPA	Weight On Bit, Average 1 ft Average WOBA
0 200		1000 _ _ _ _ _ 0	0 _ _ _ _ _ 100
API		ft/h	klb

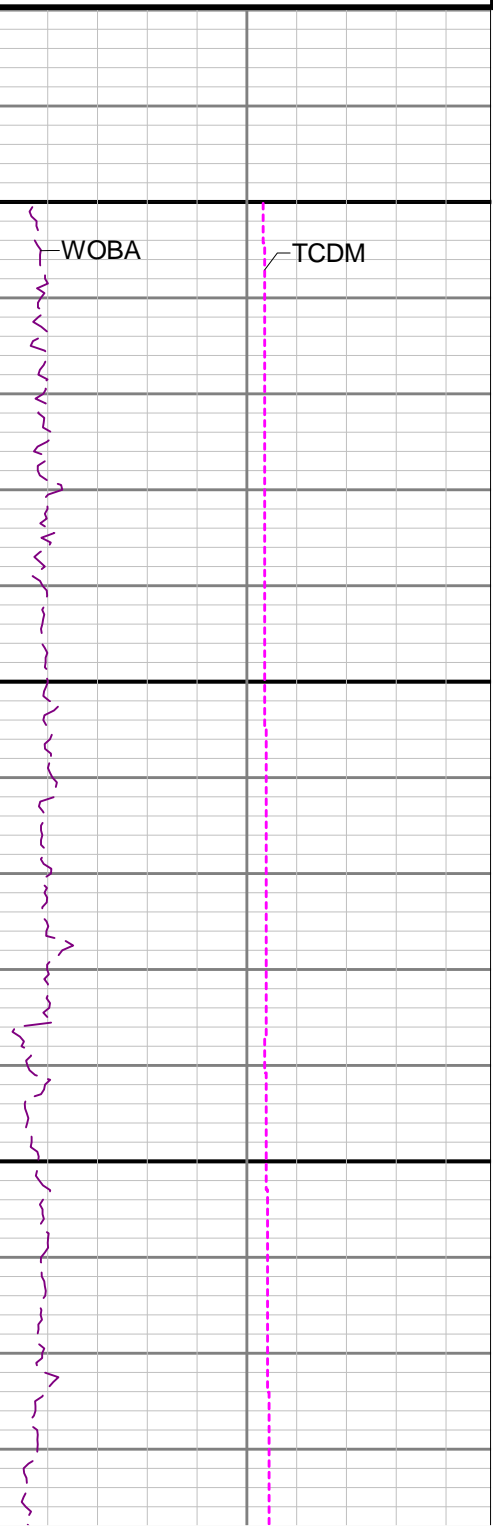
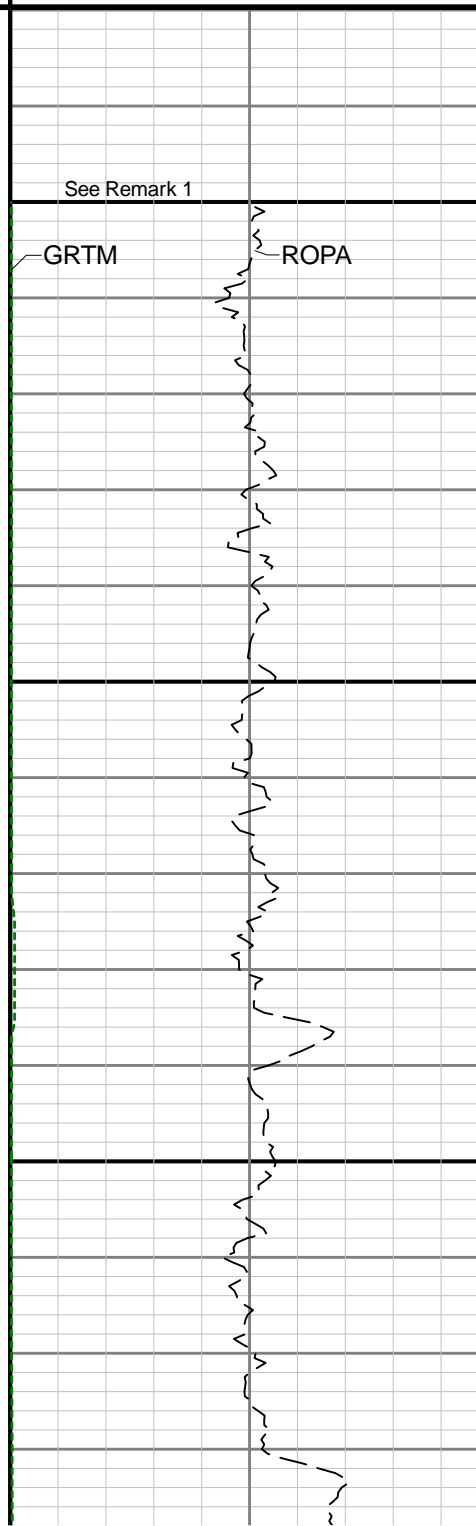


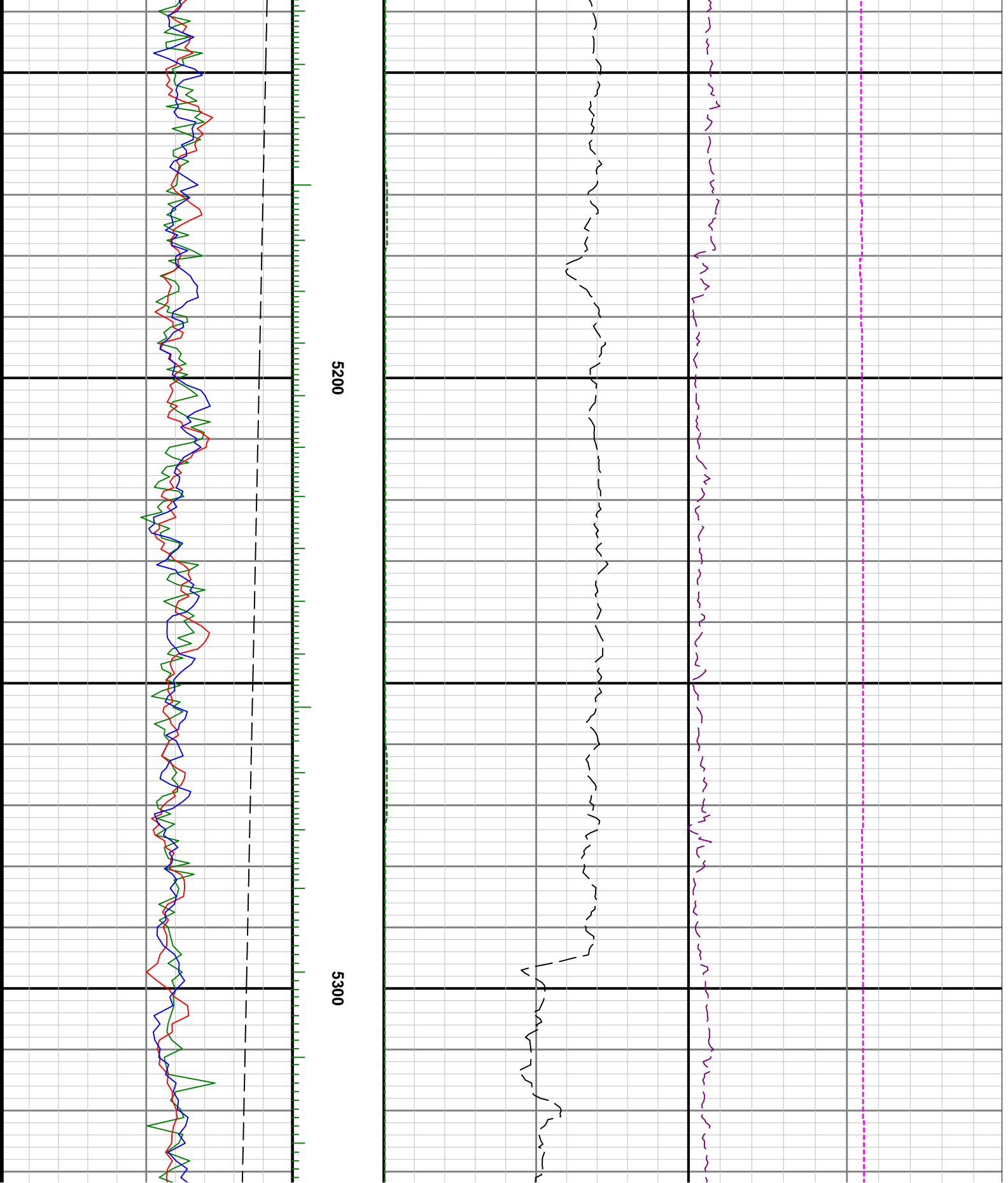
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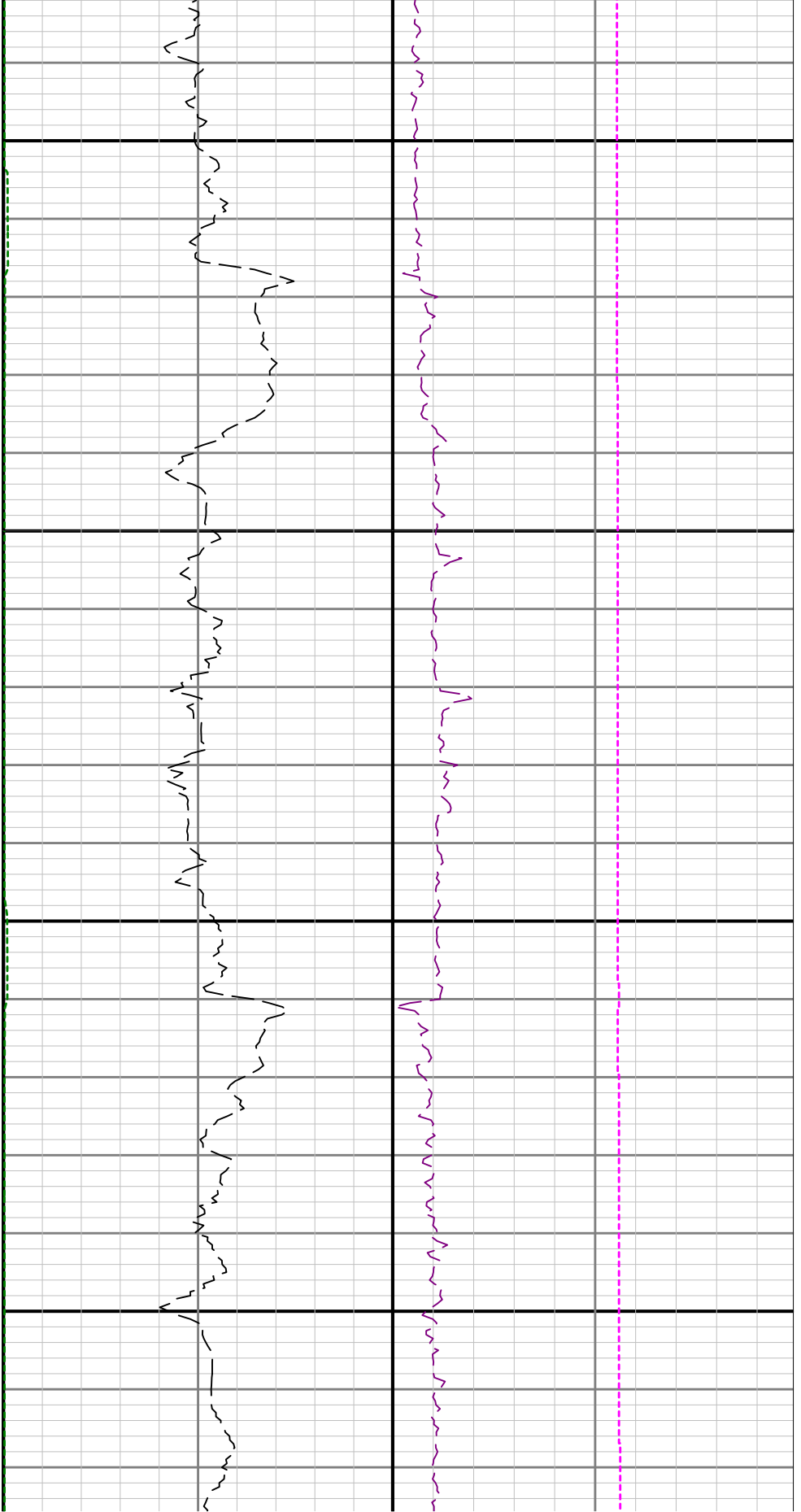


5000

5100

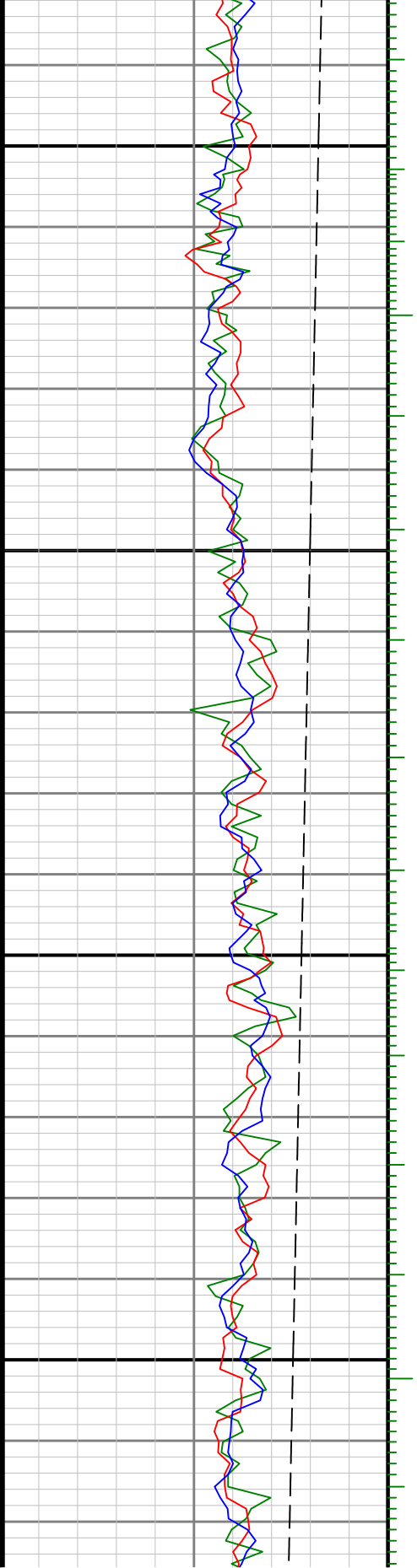


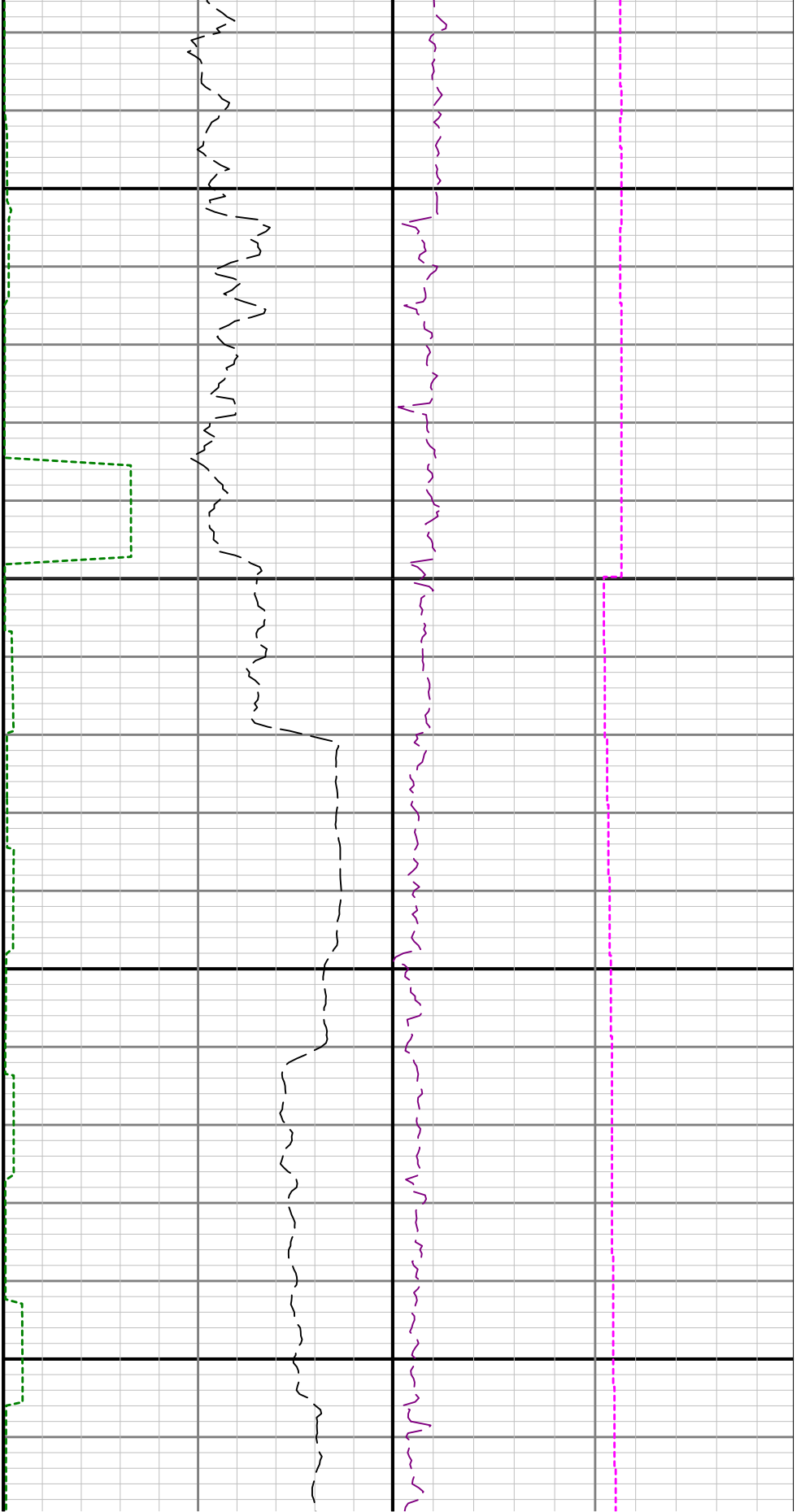




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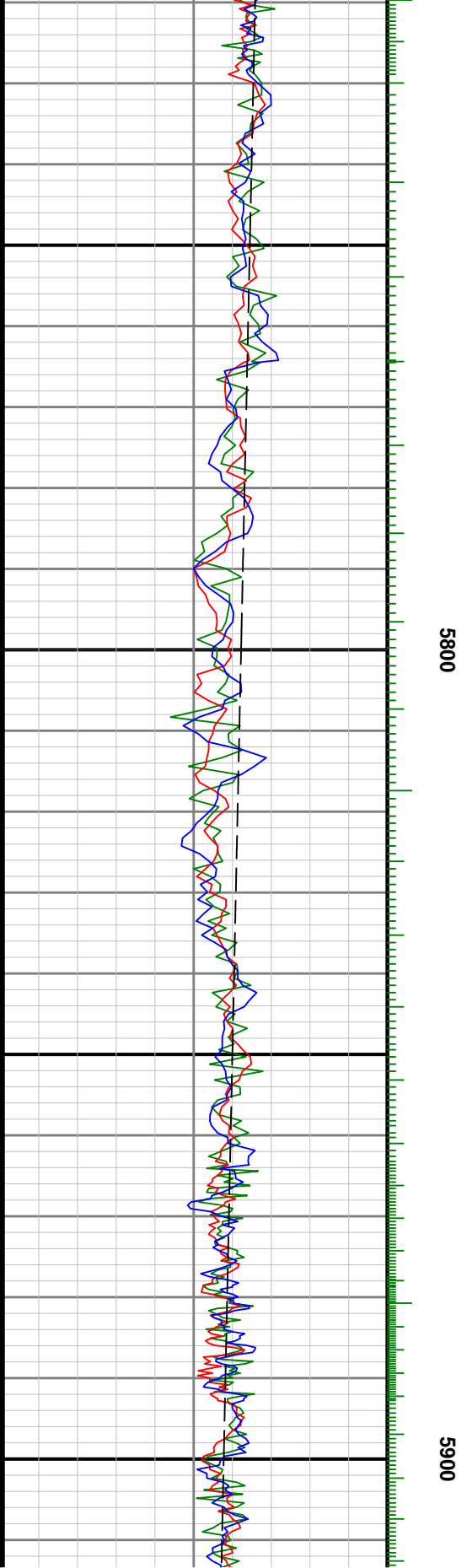
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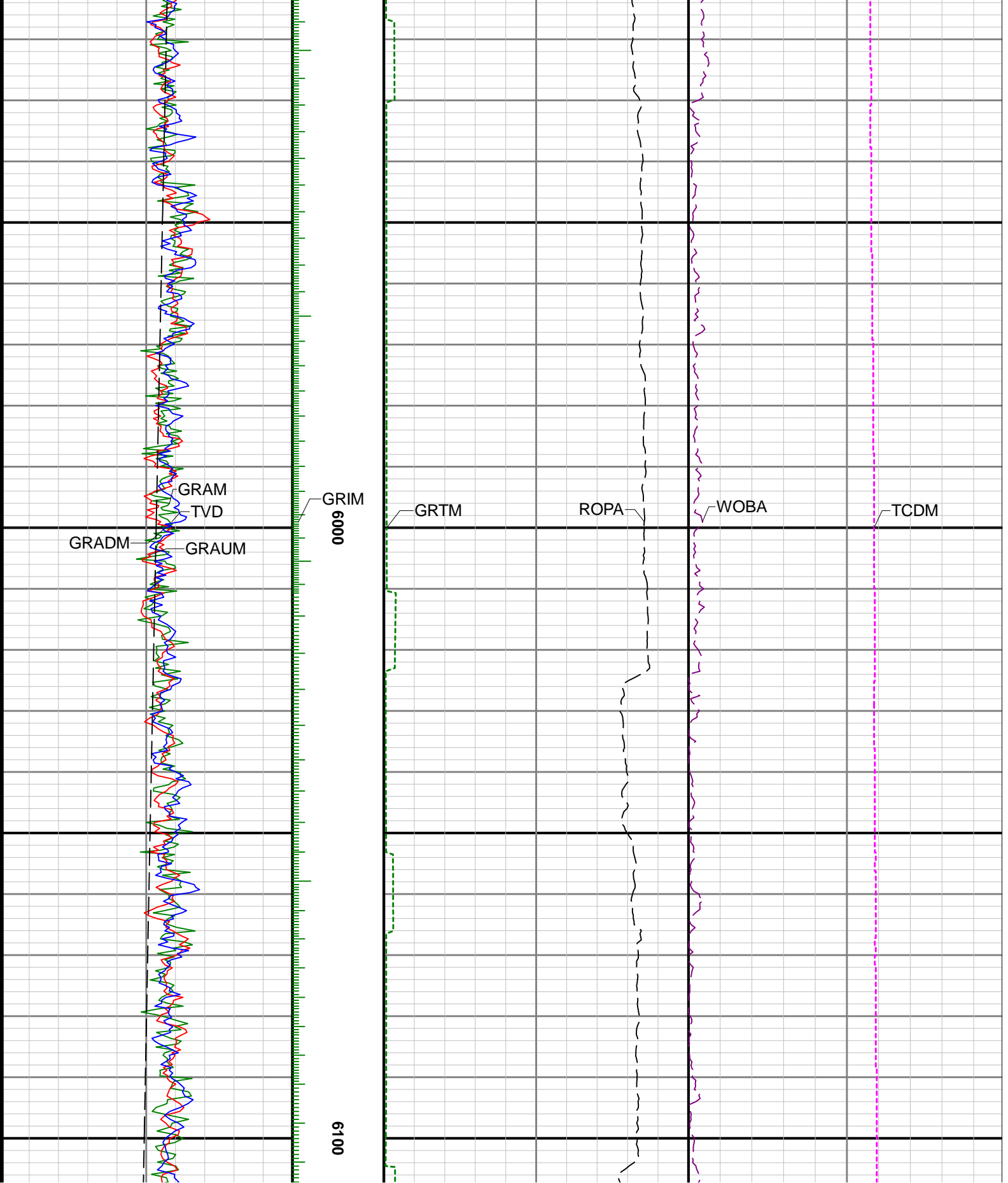




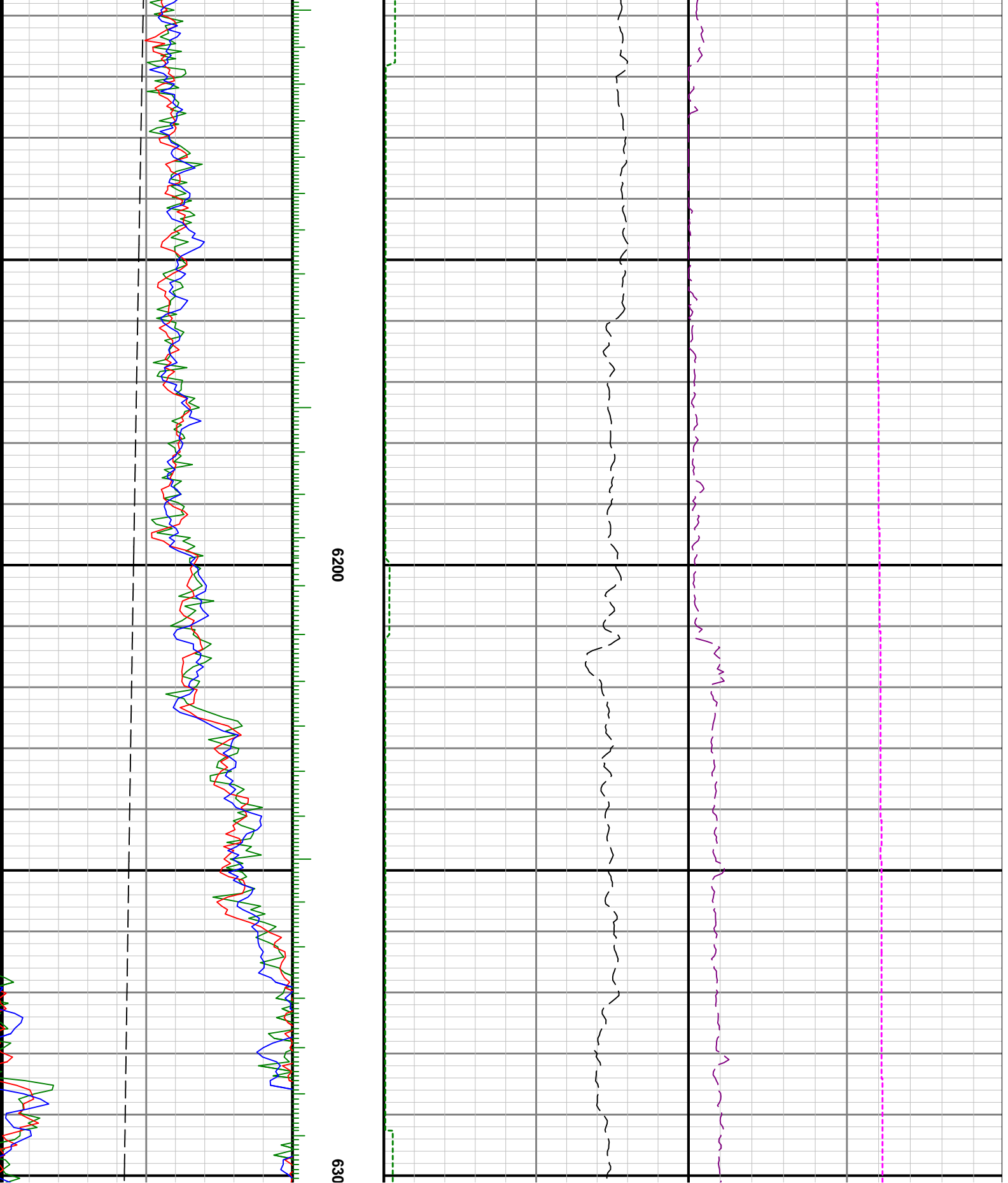
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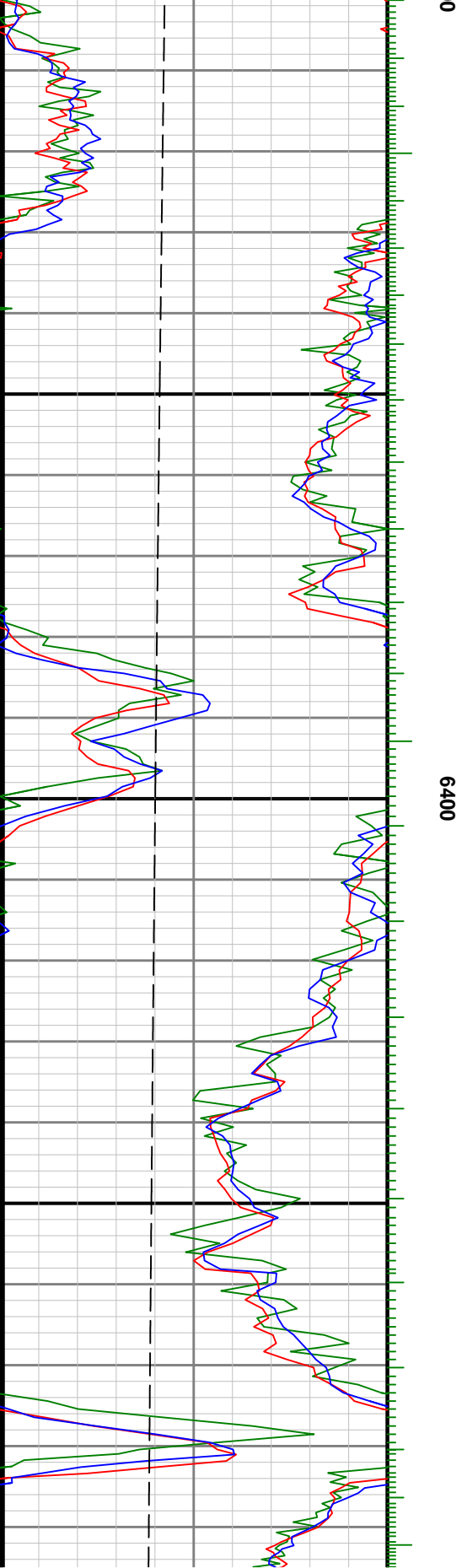
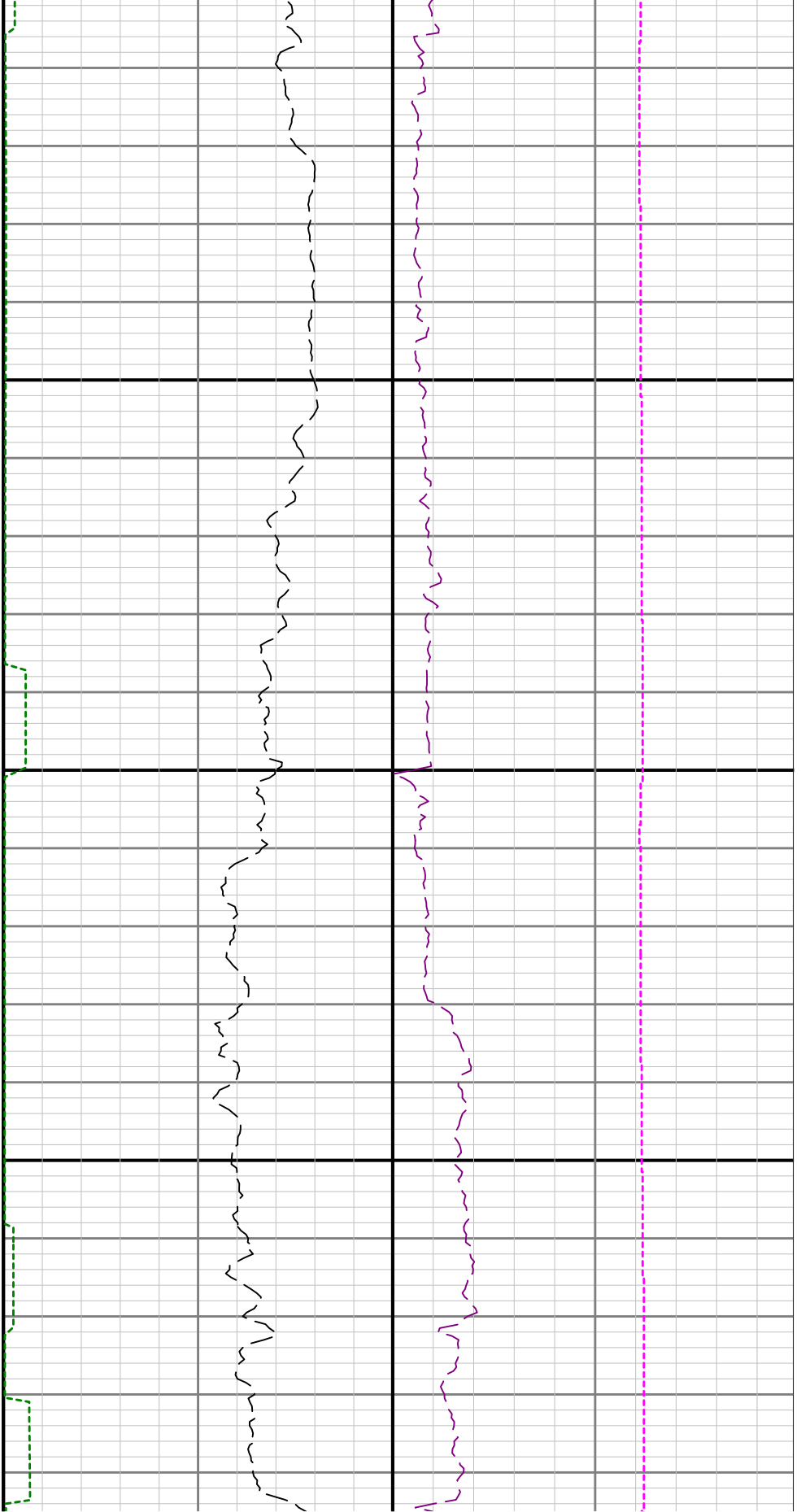
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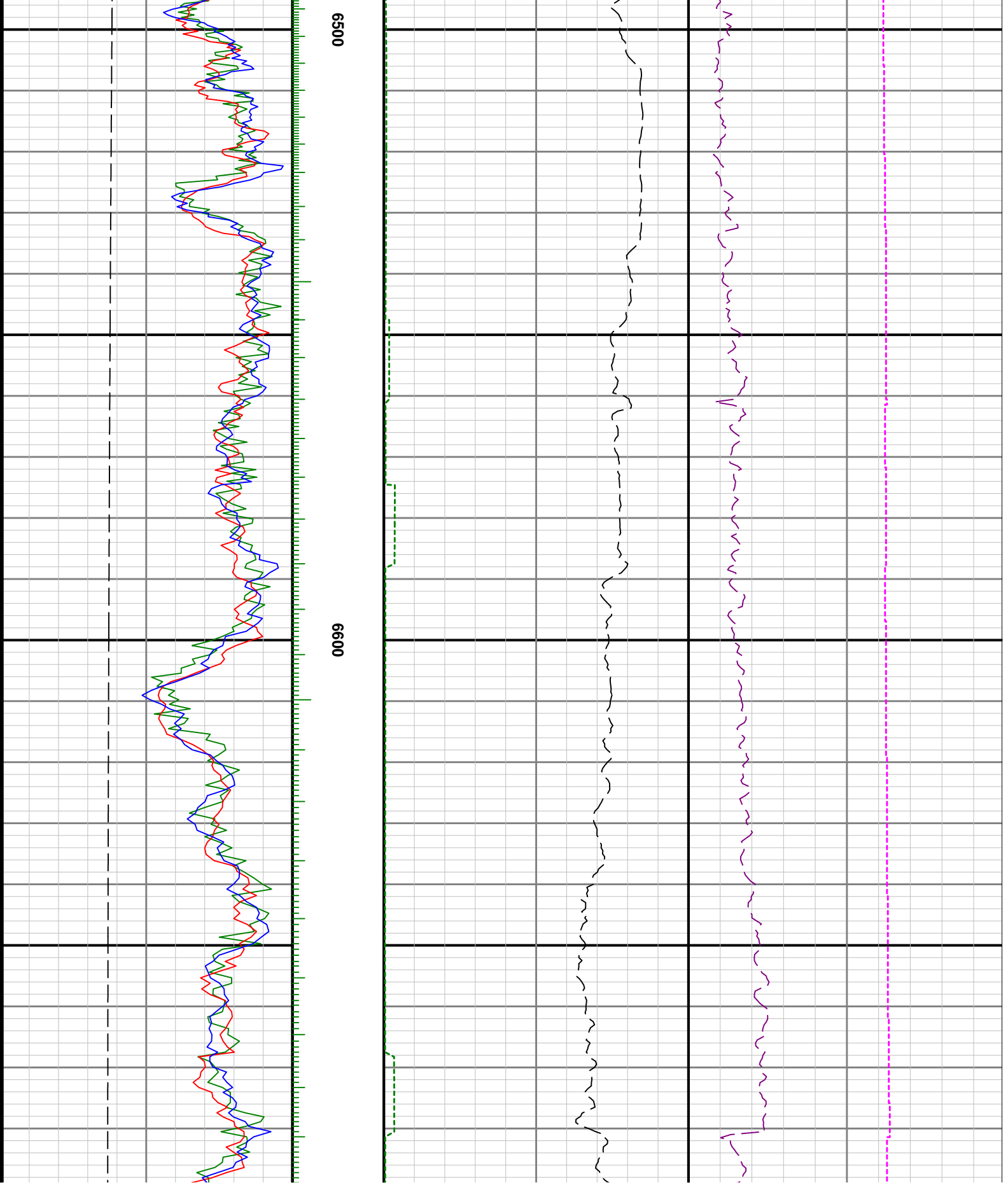


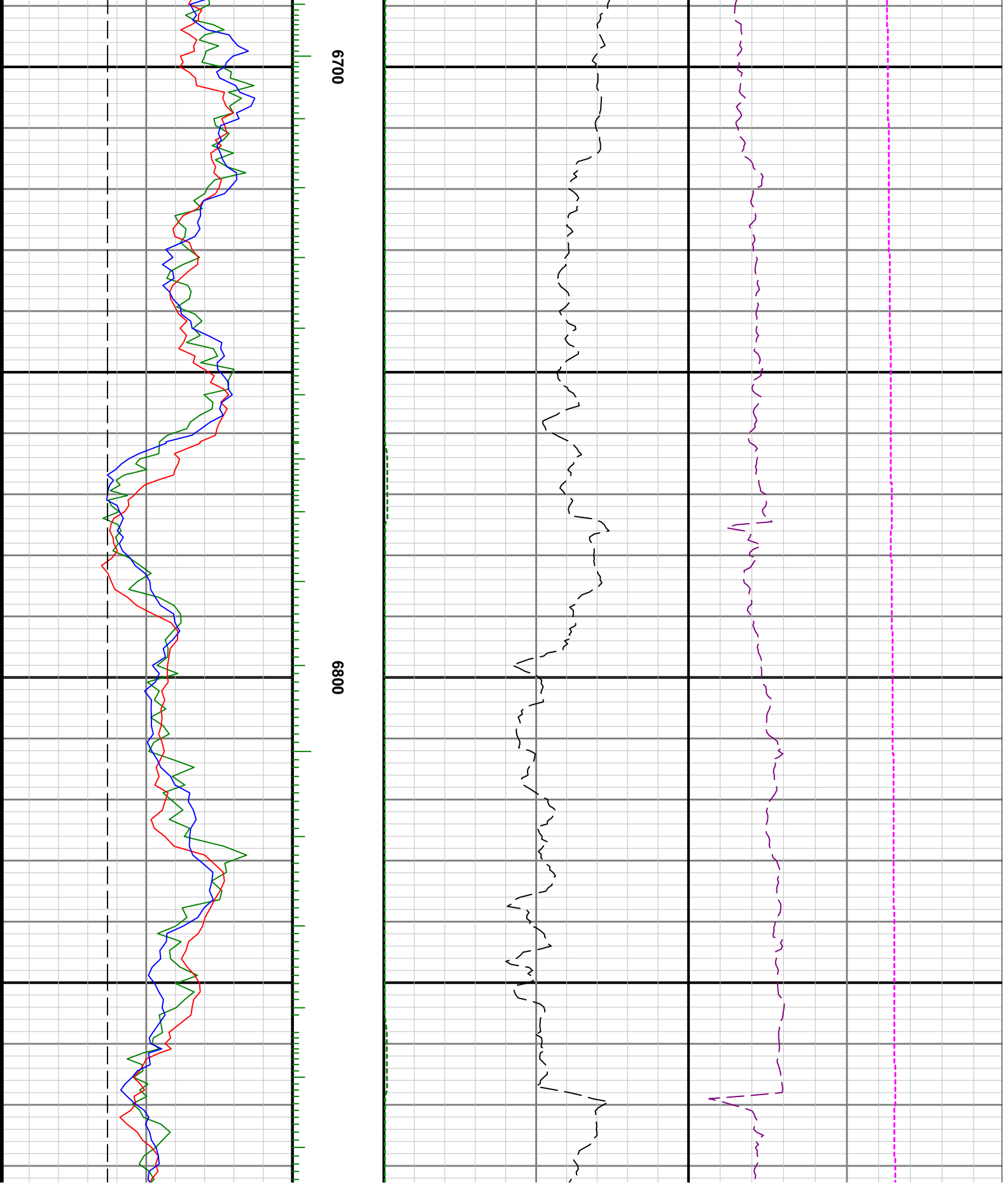


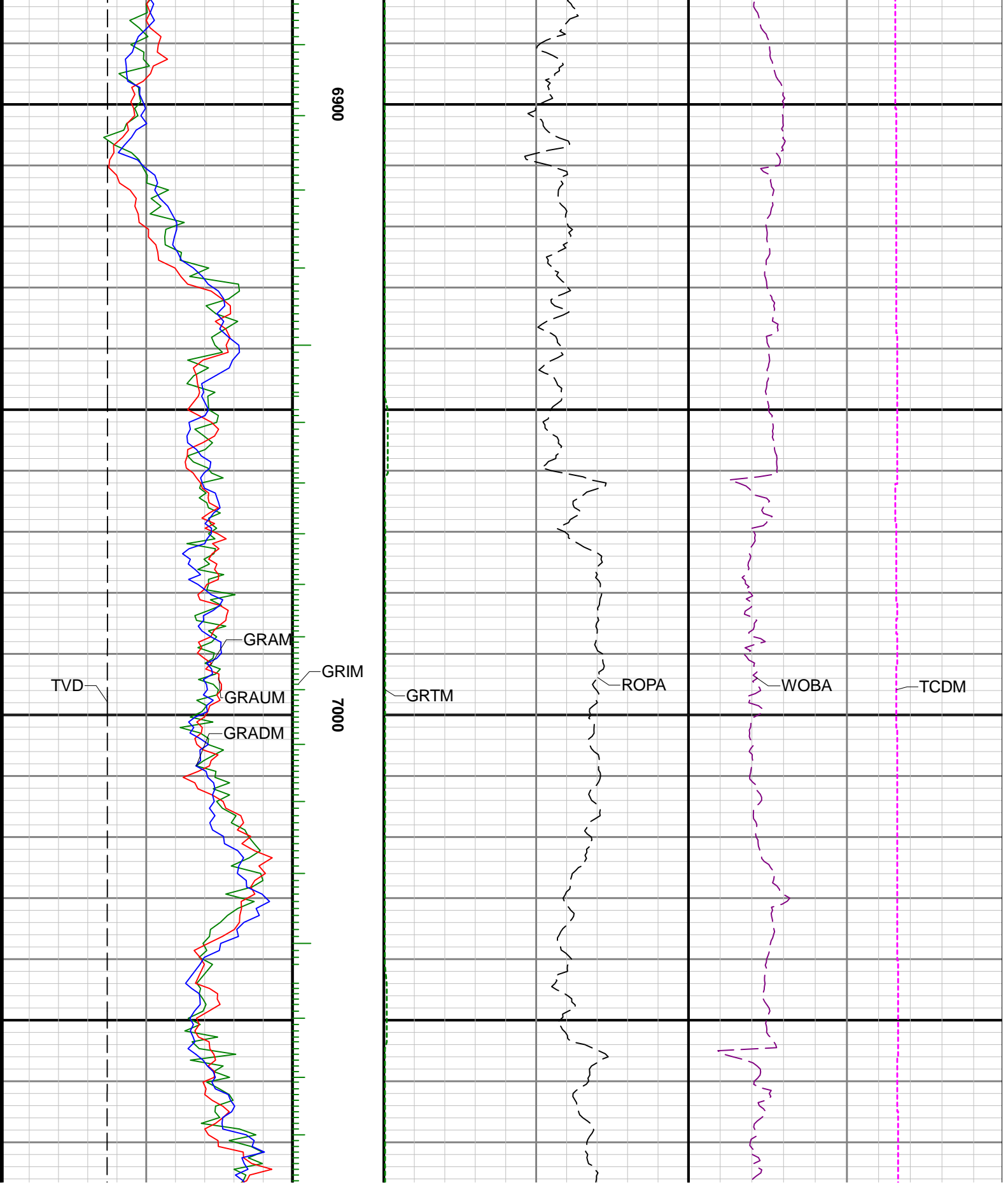


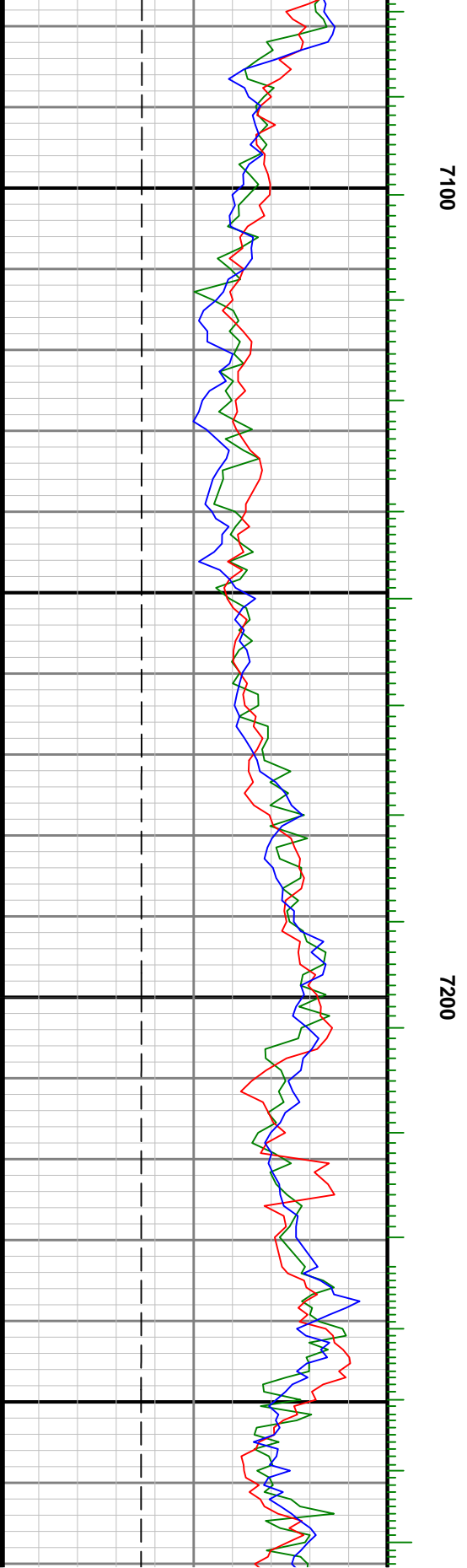
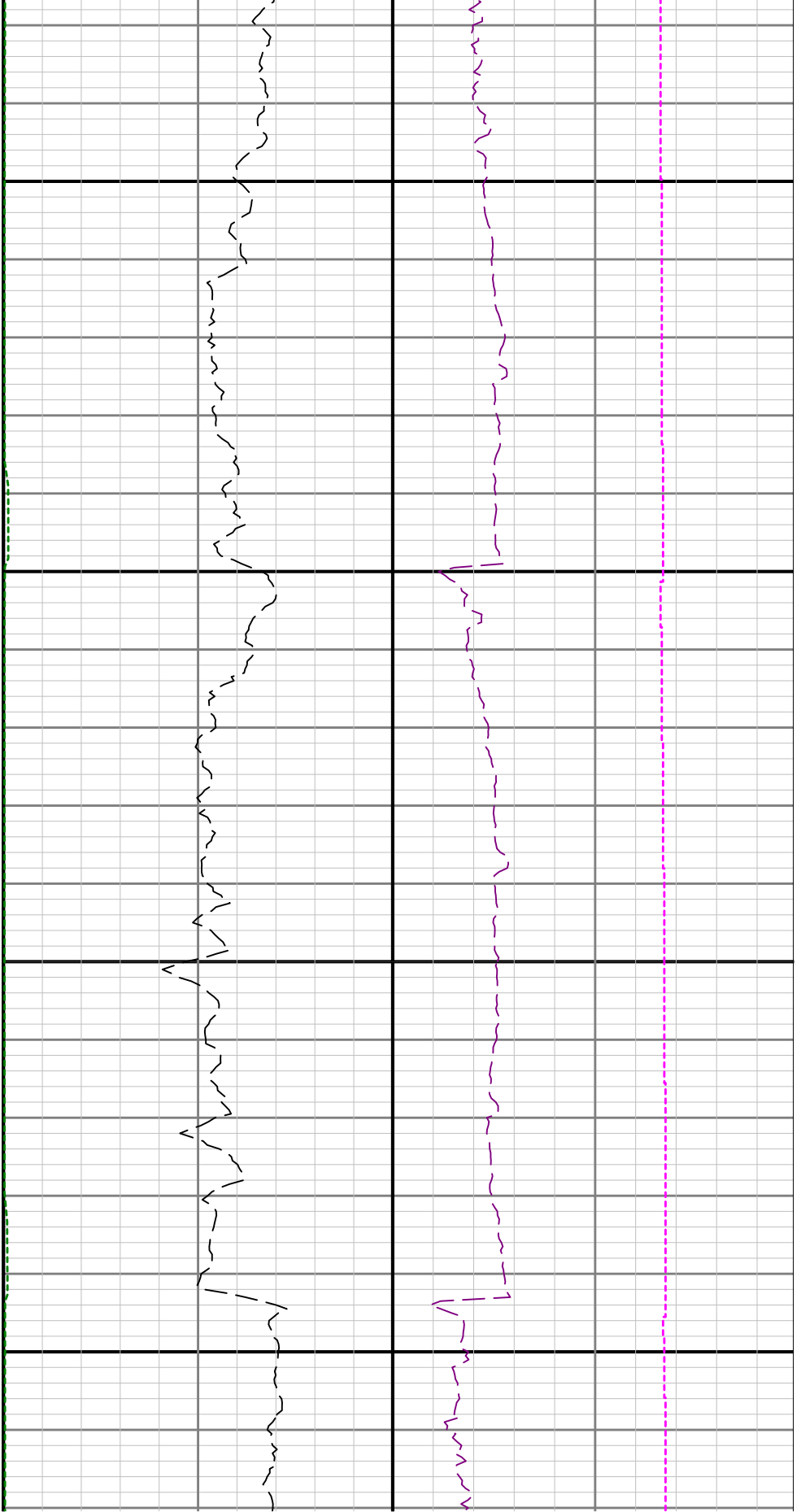


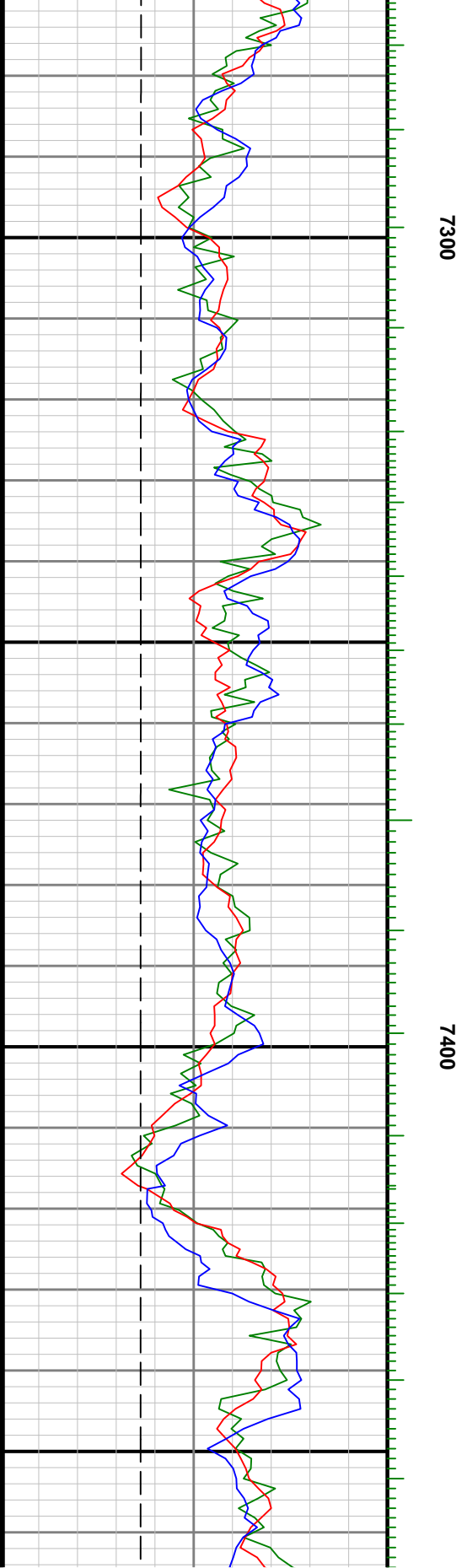
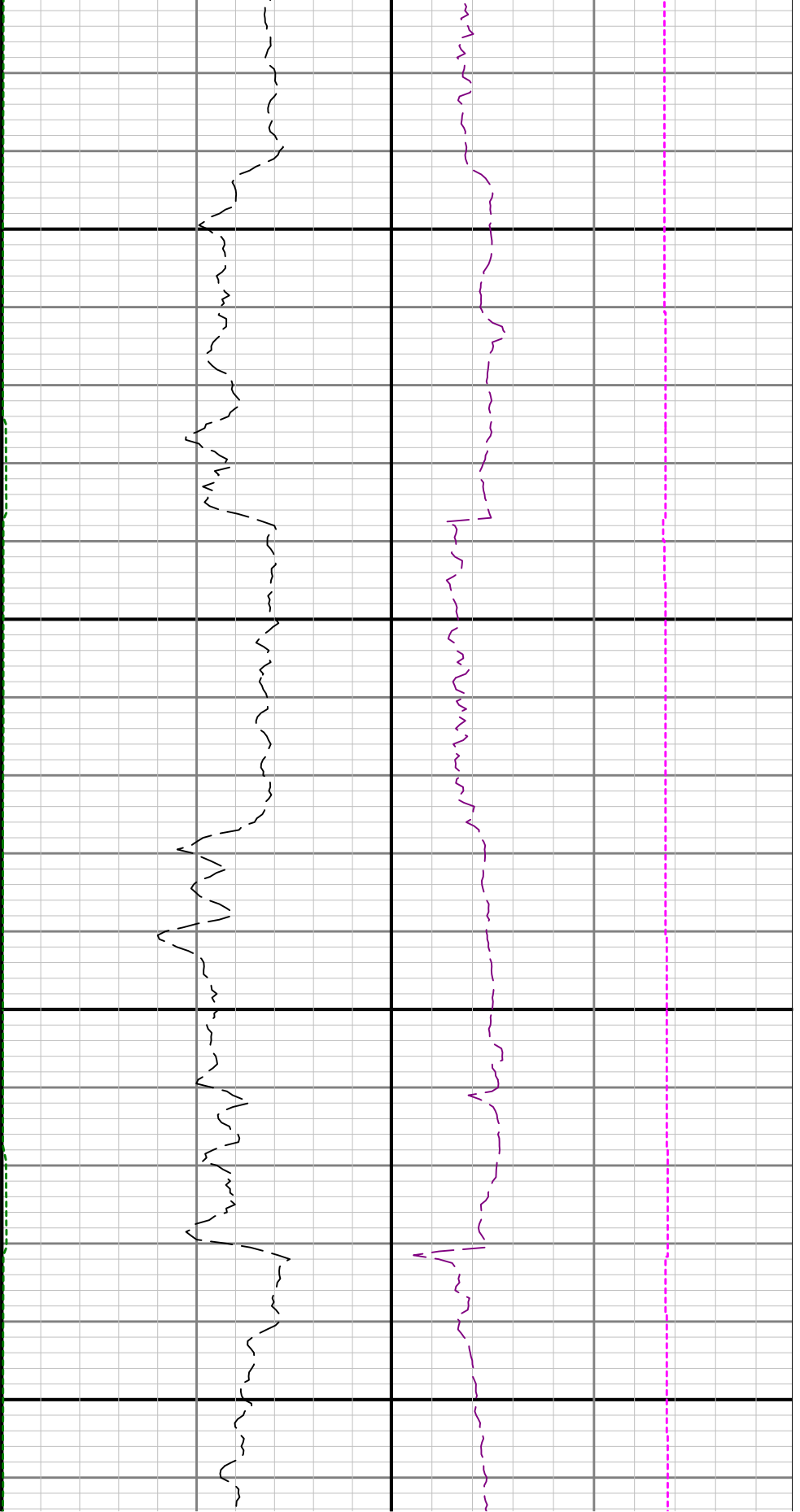


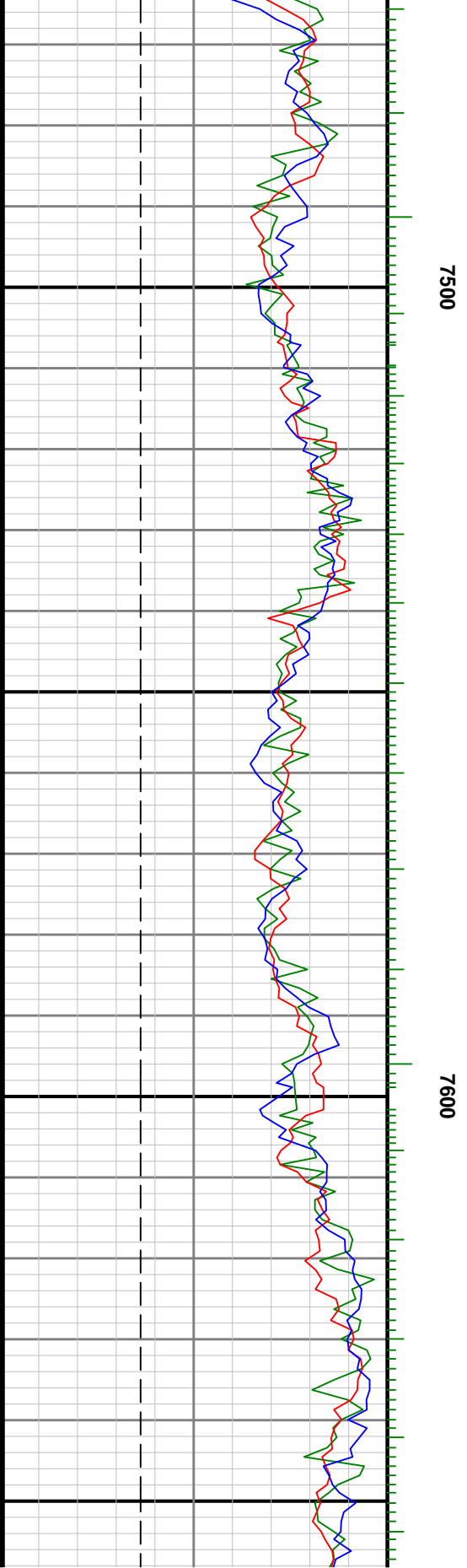
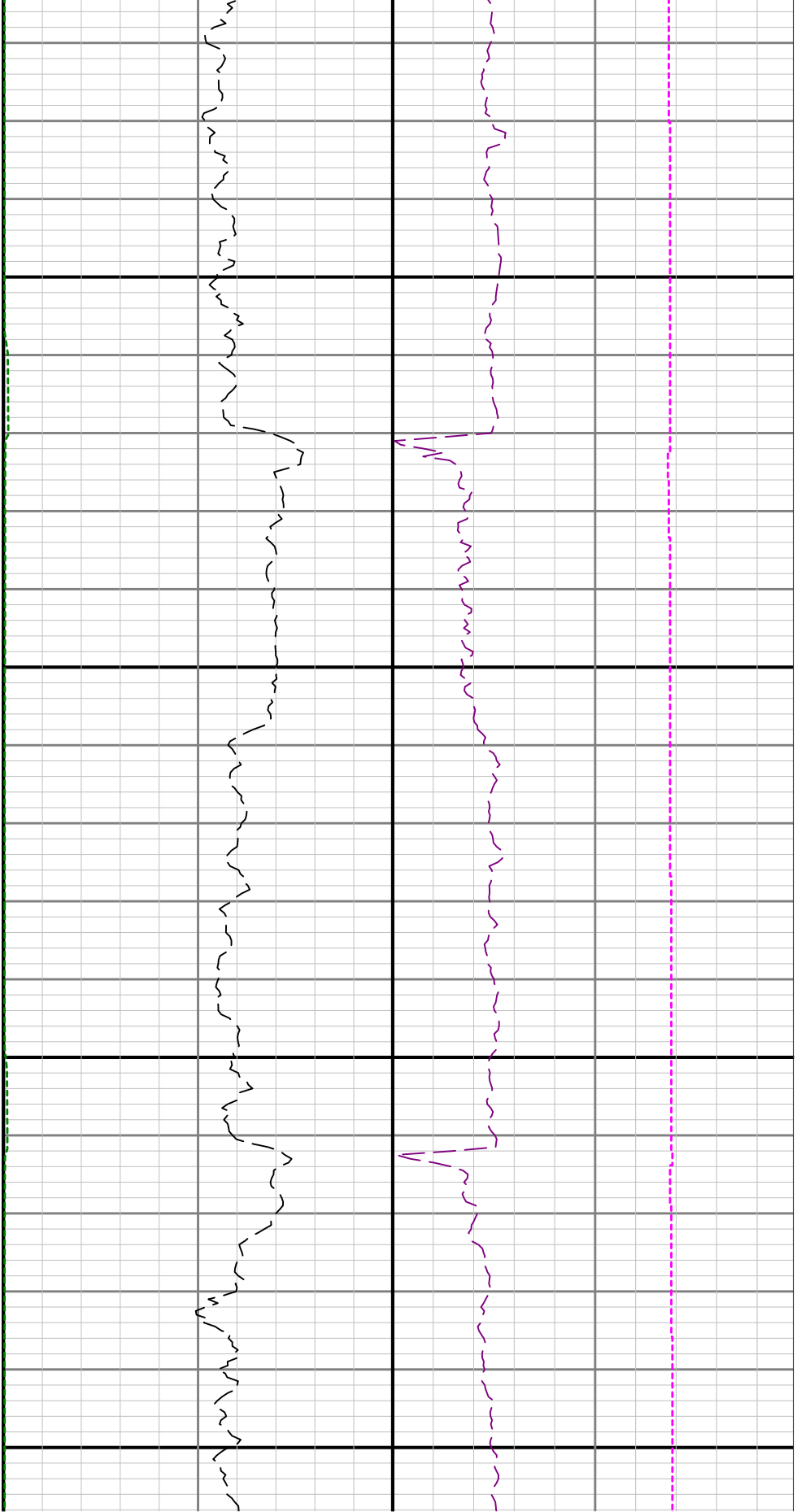




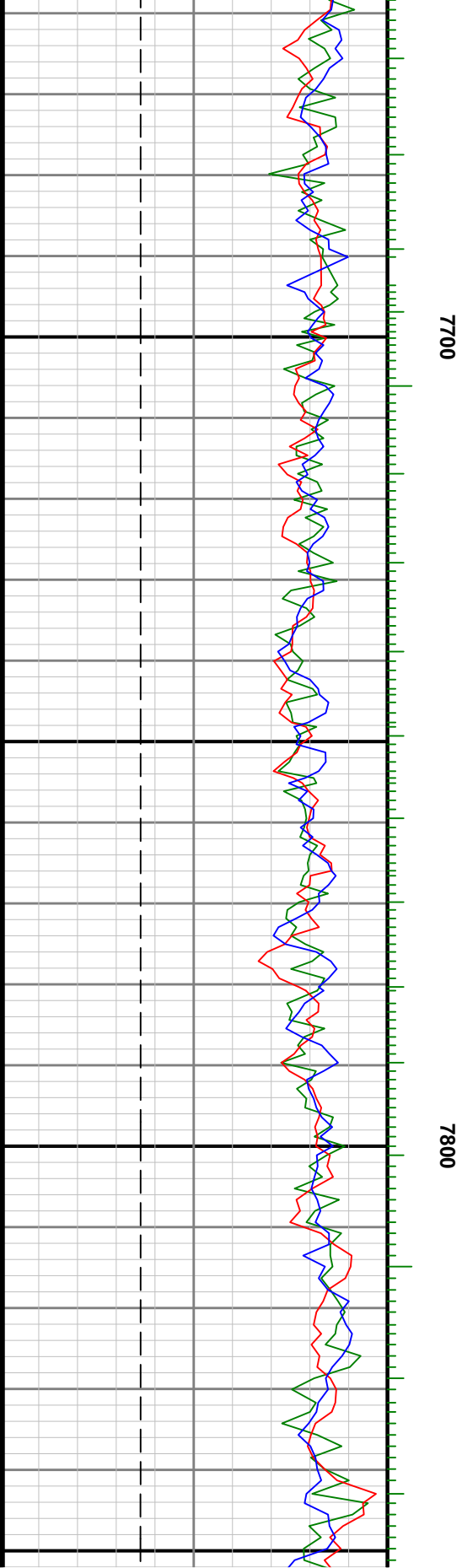
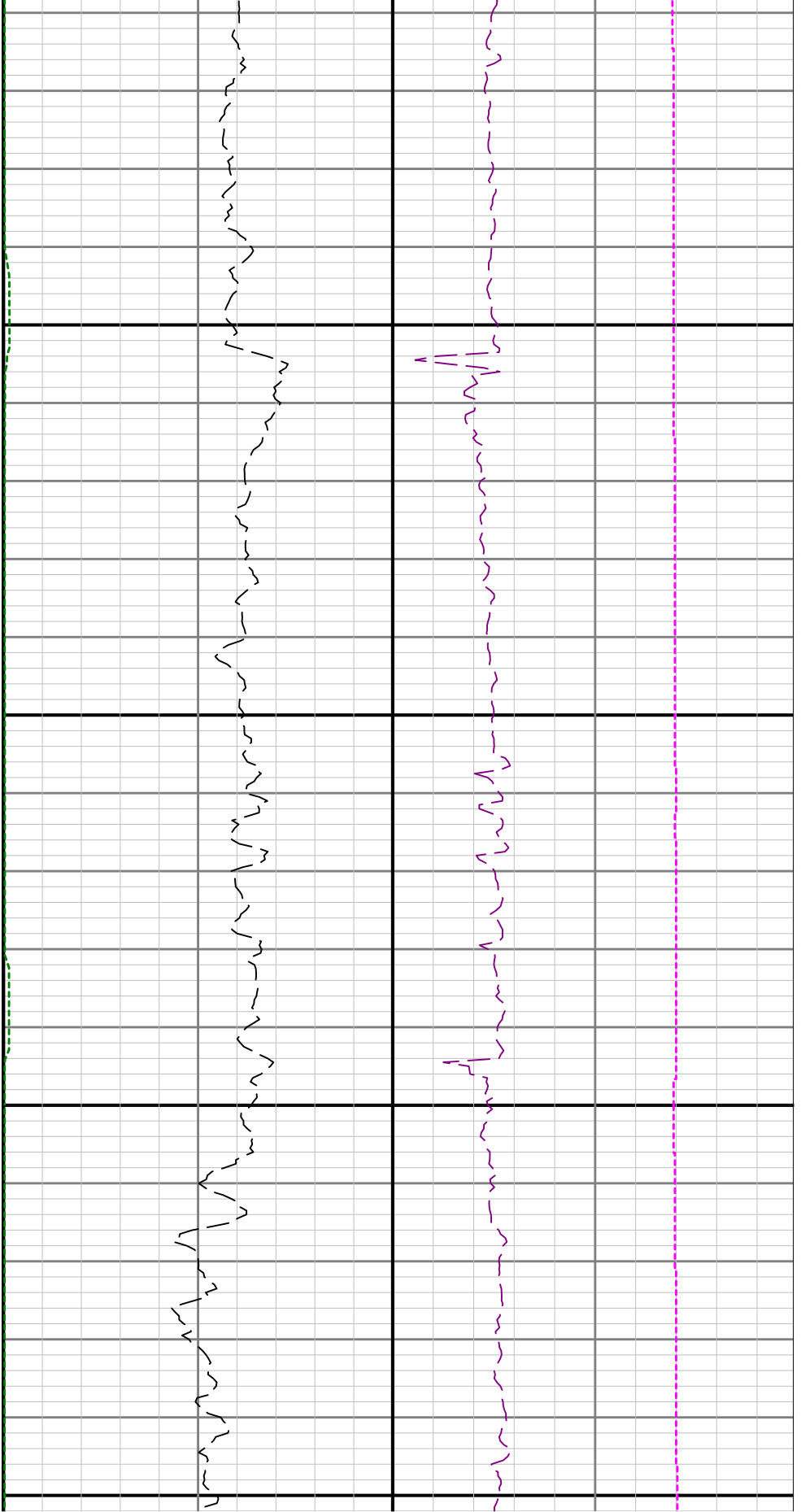


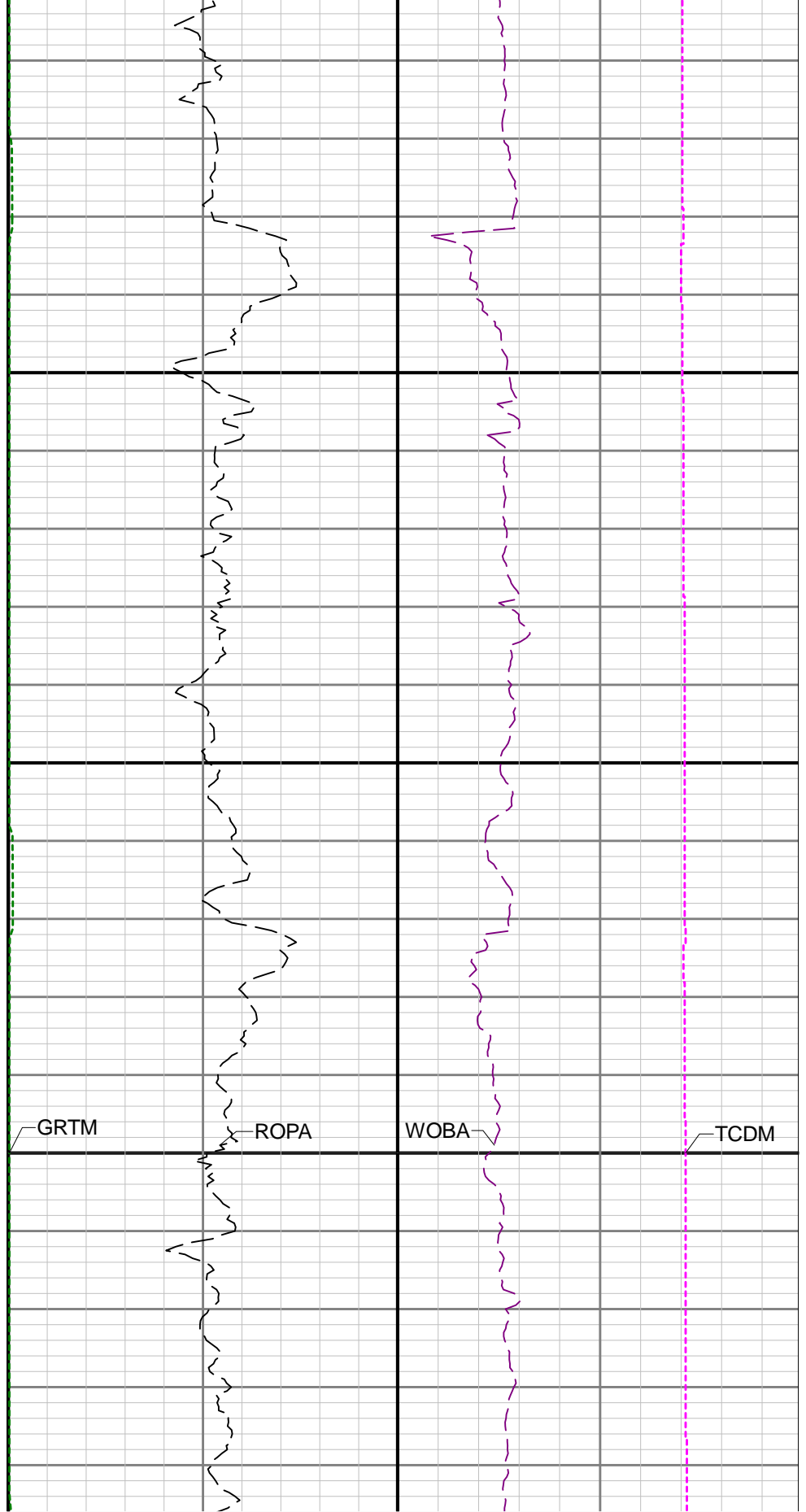
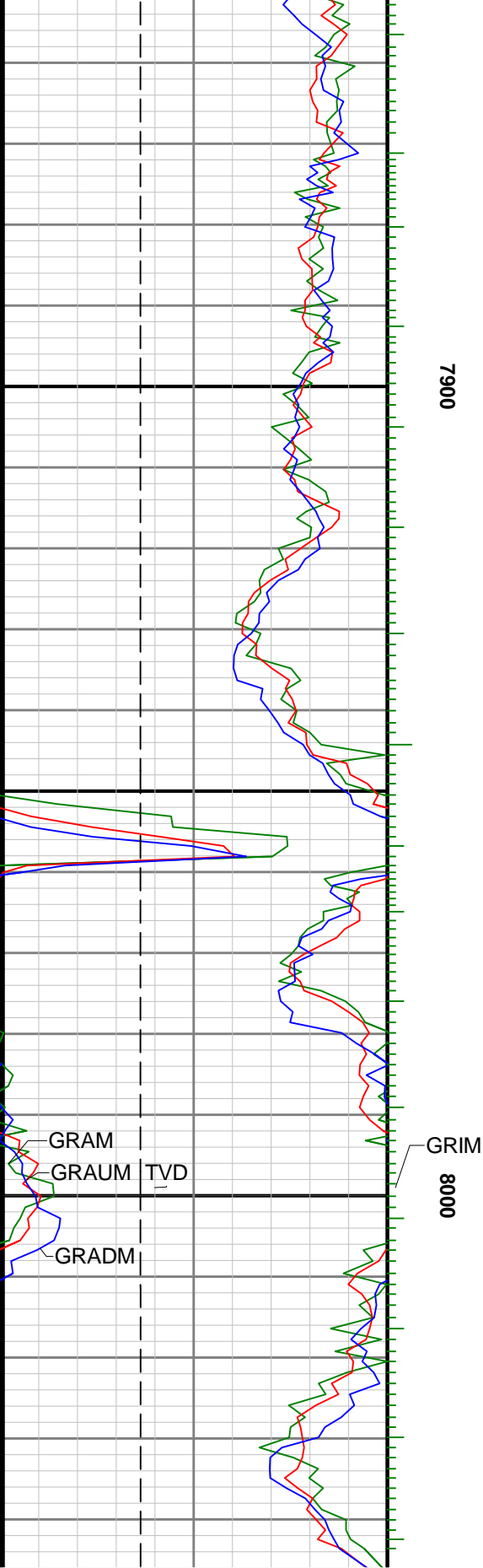


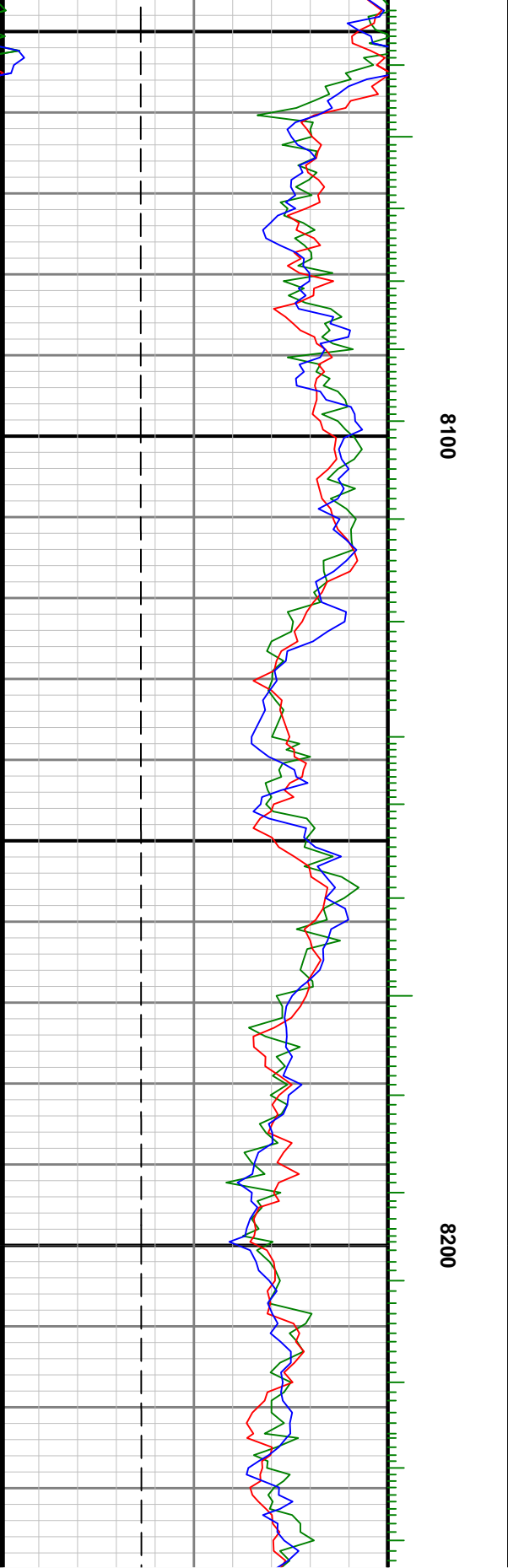
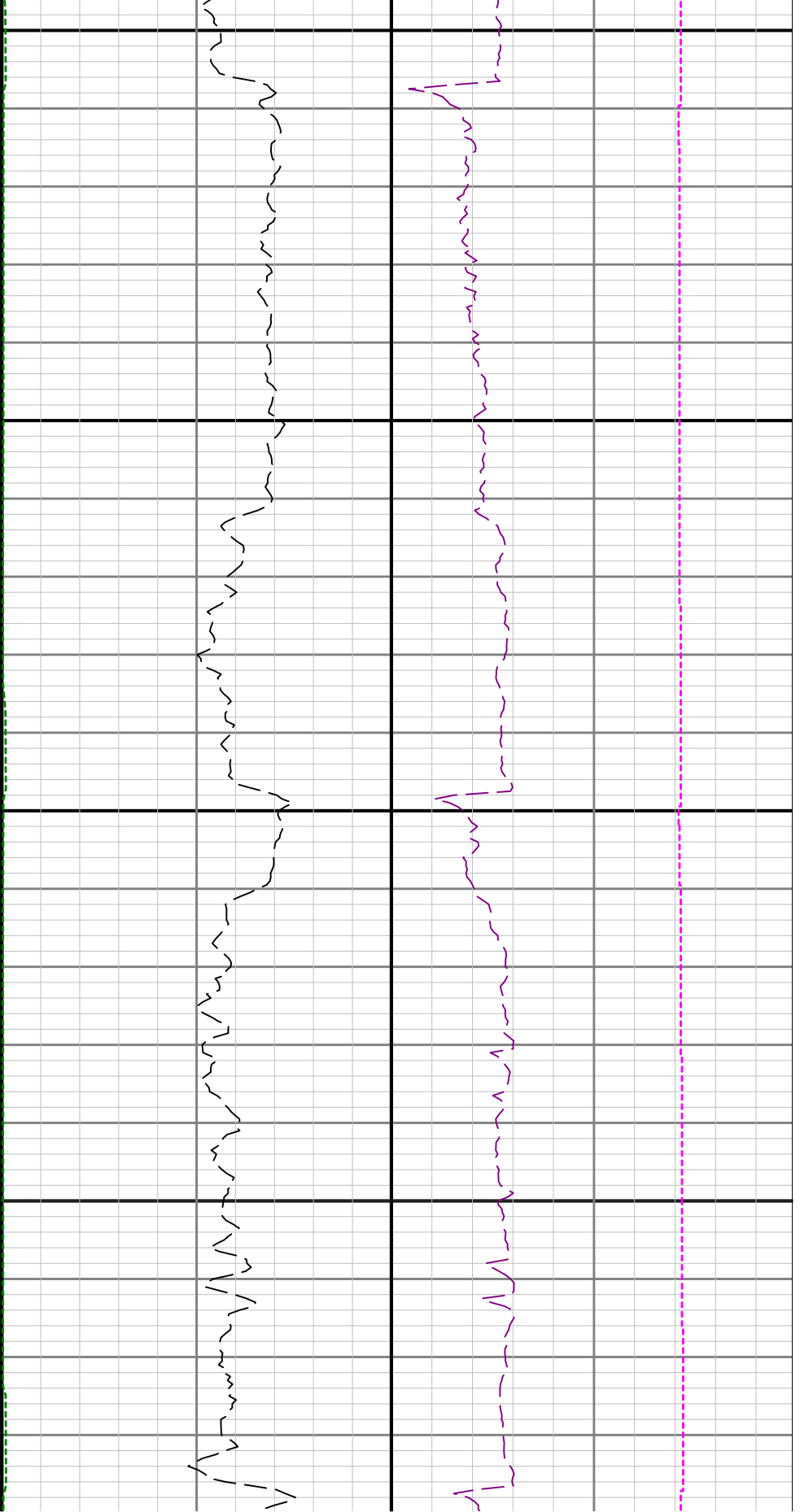


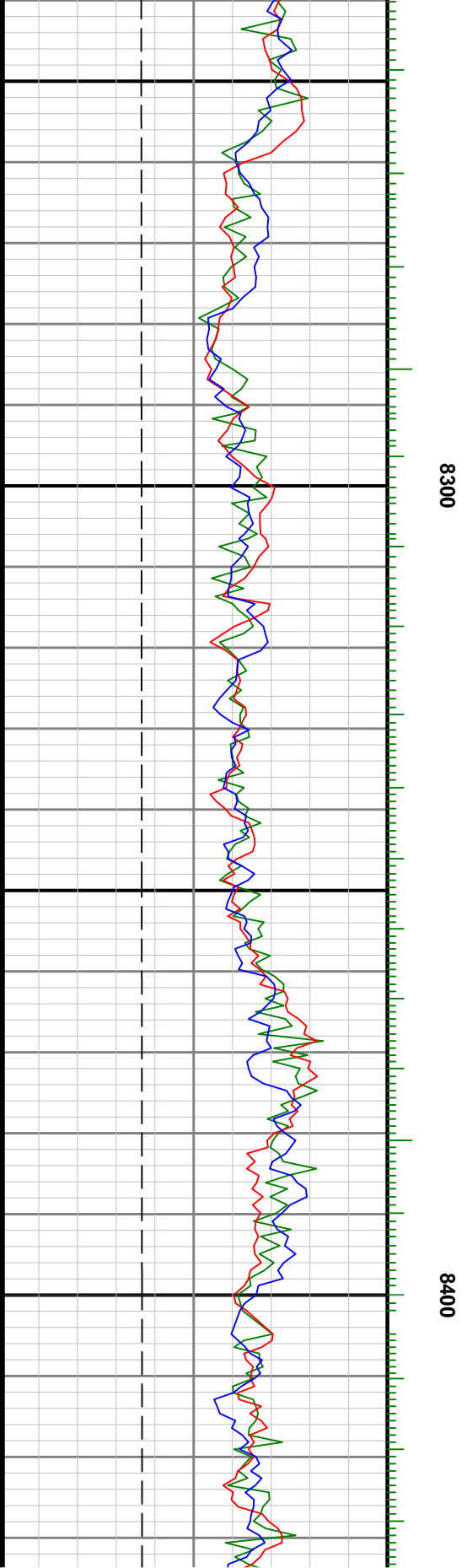
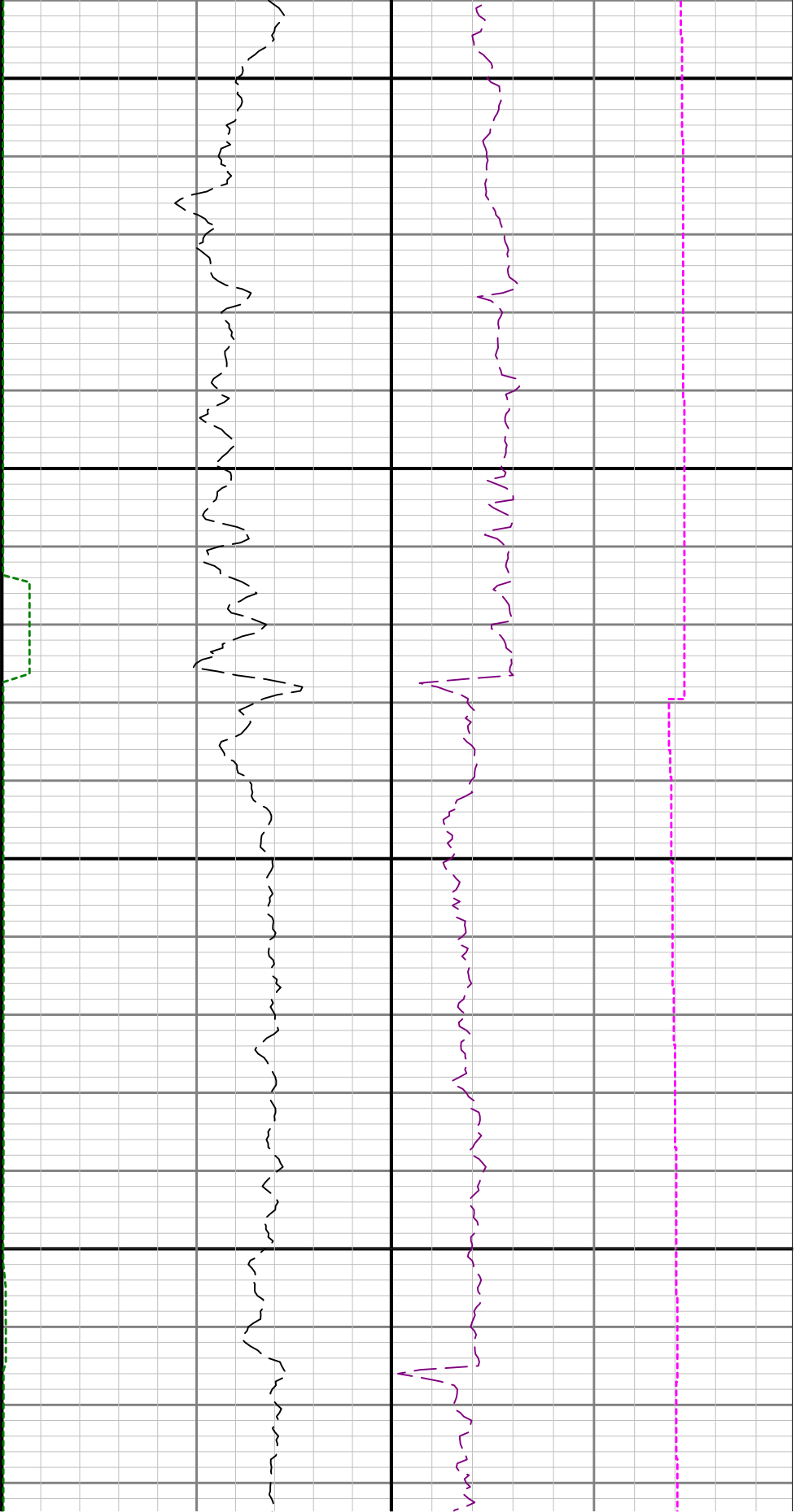


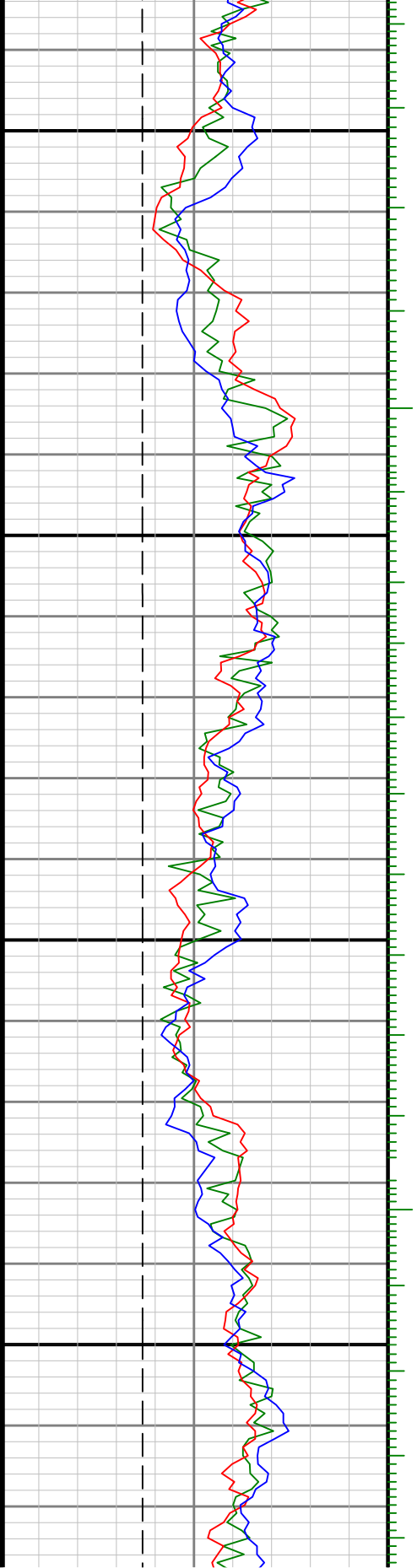






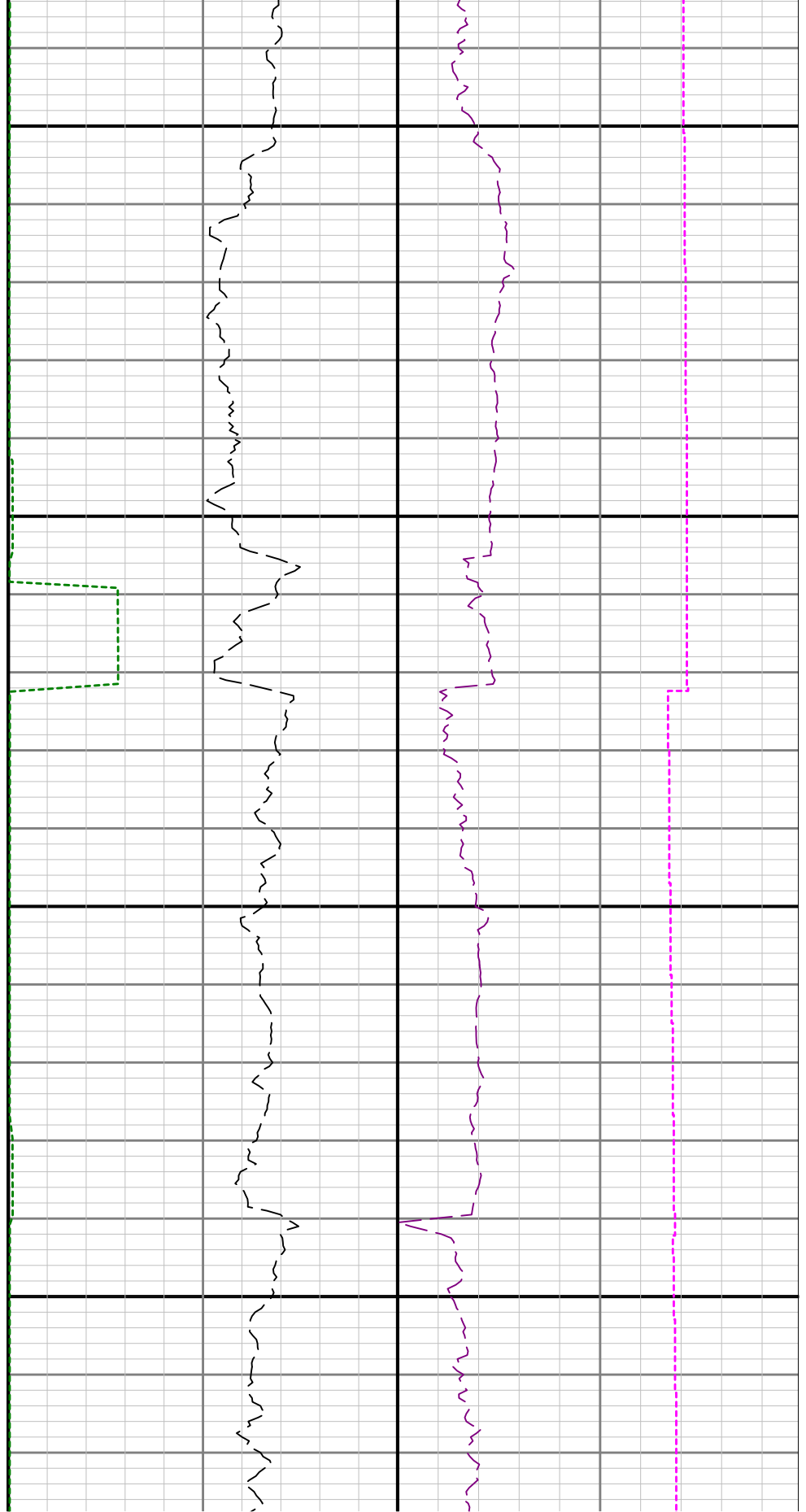


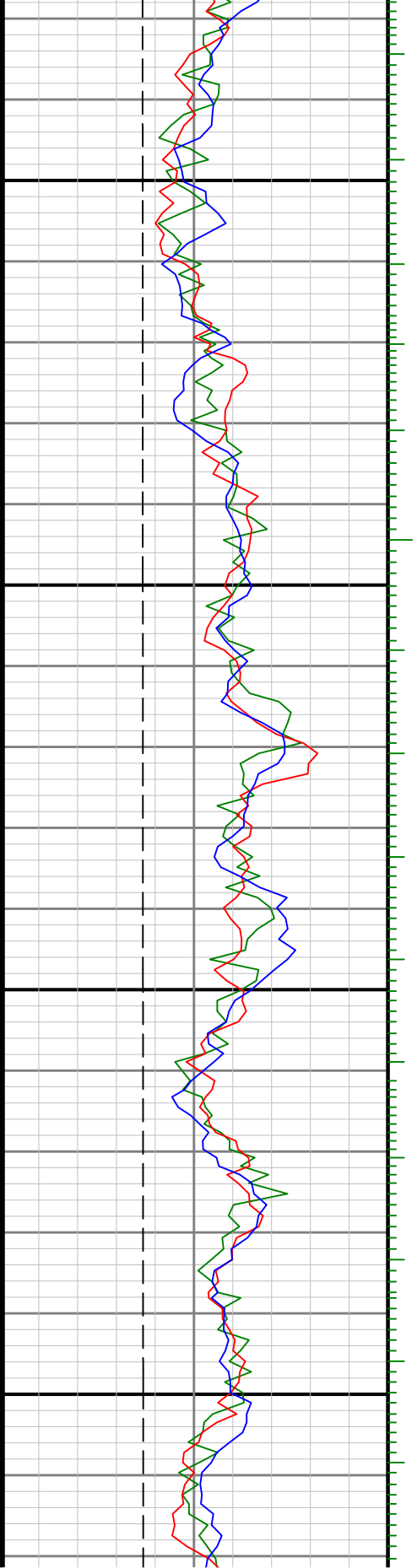




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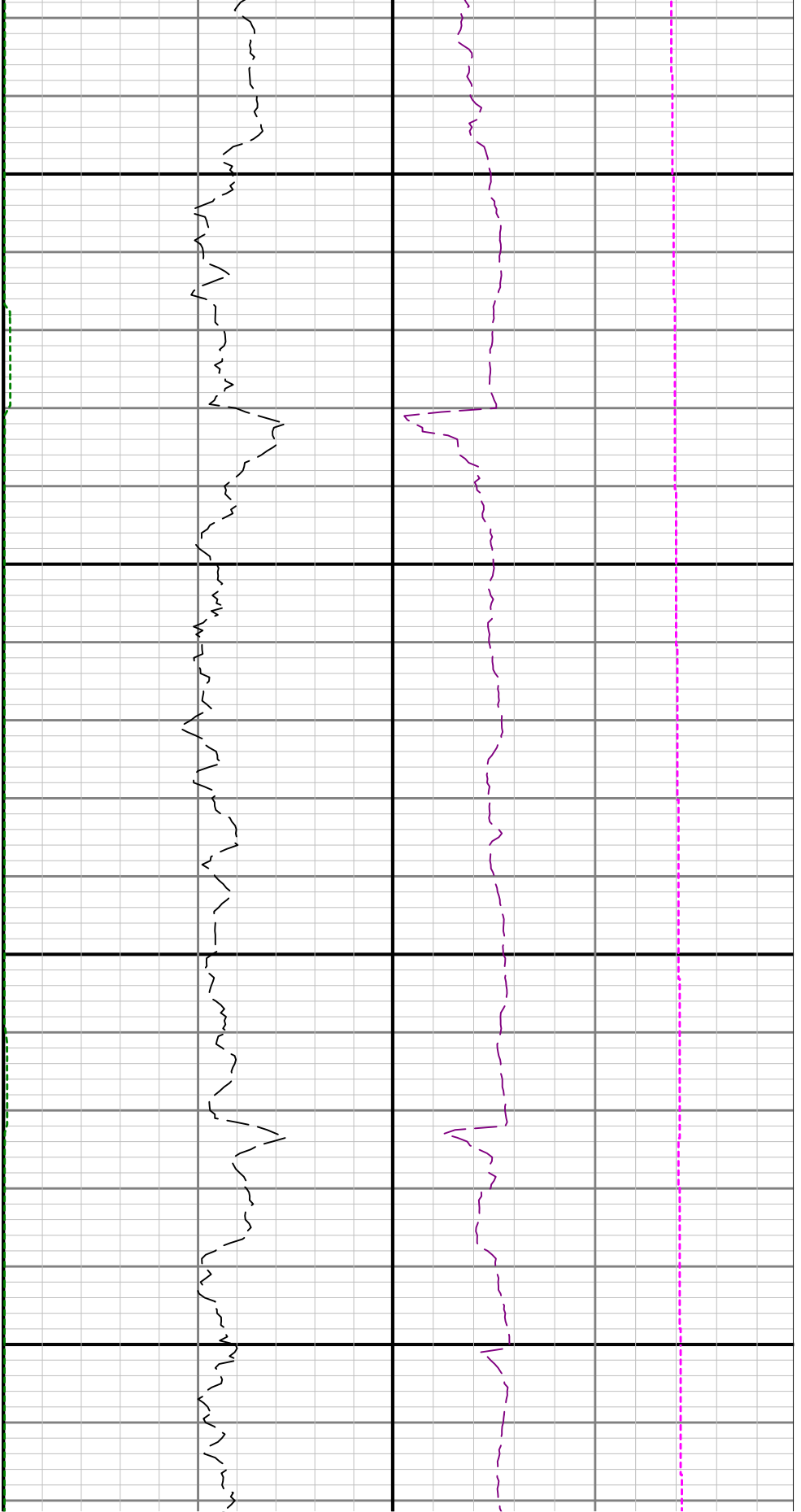
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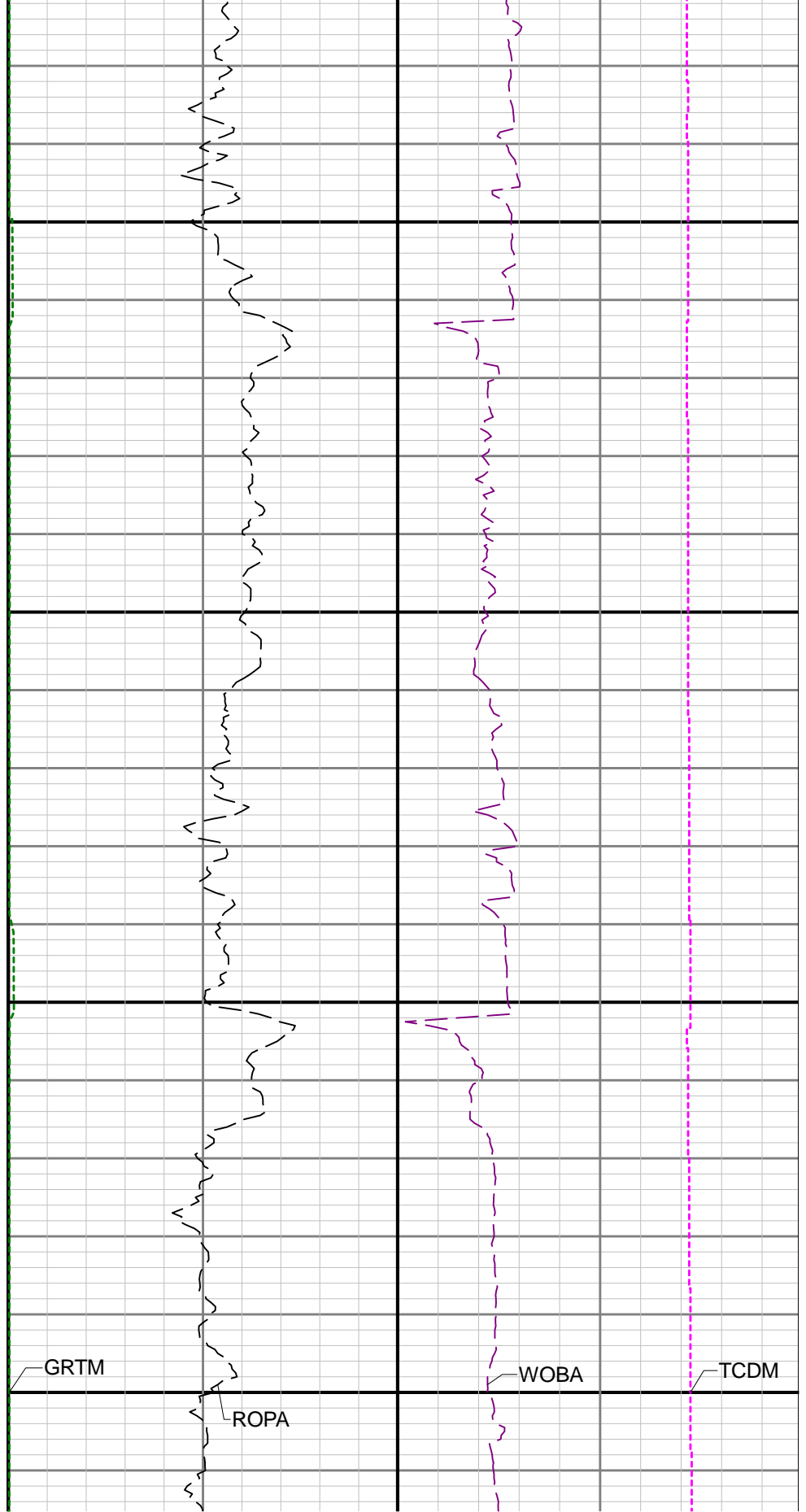
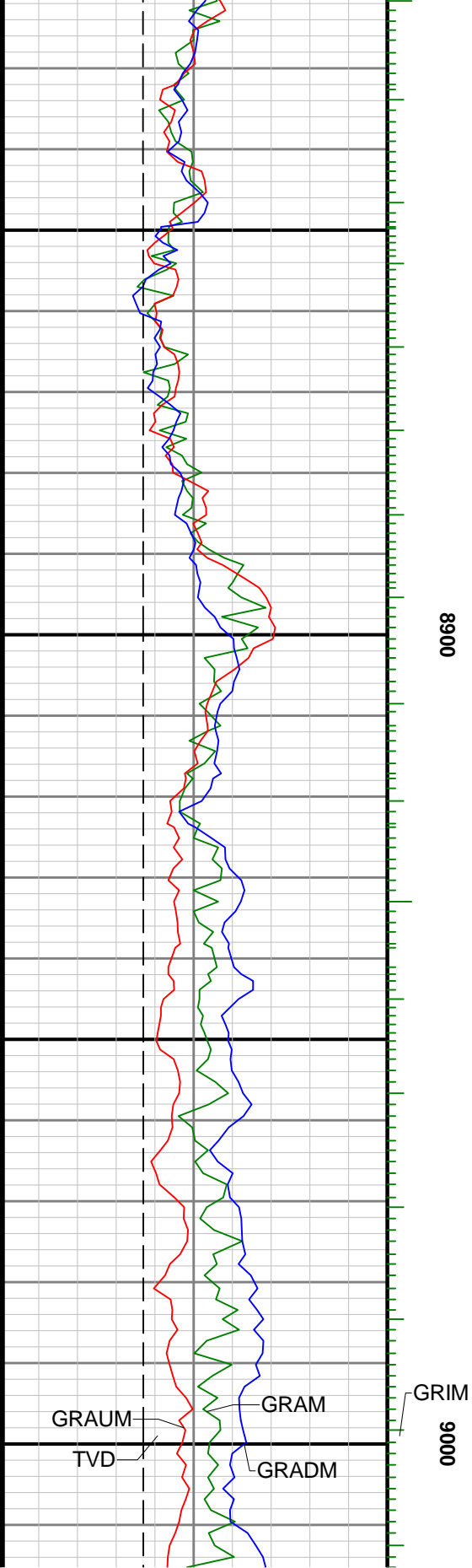


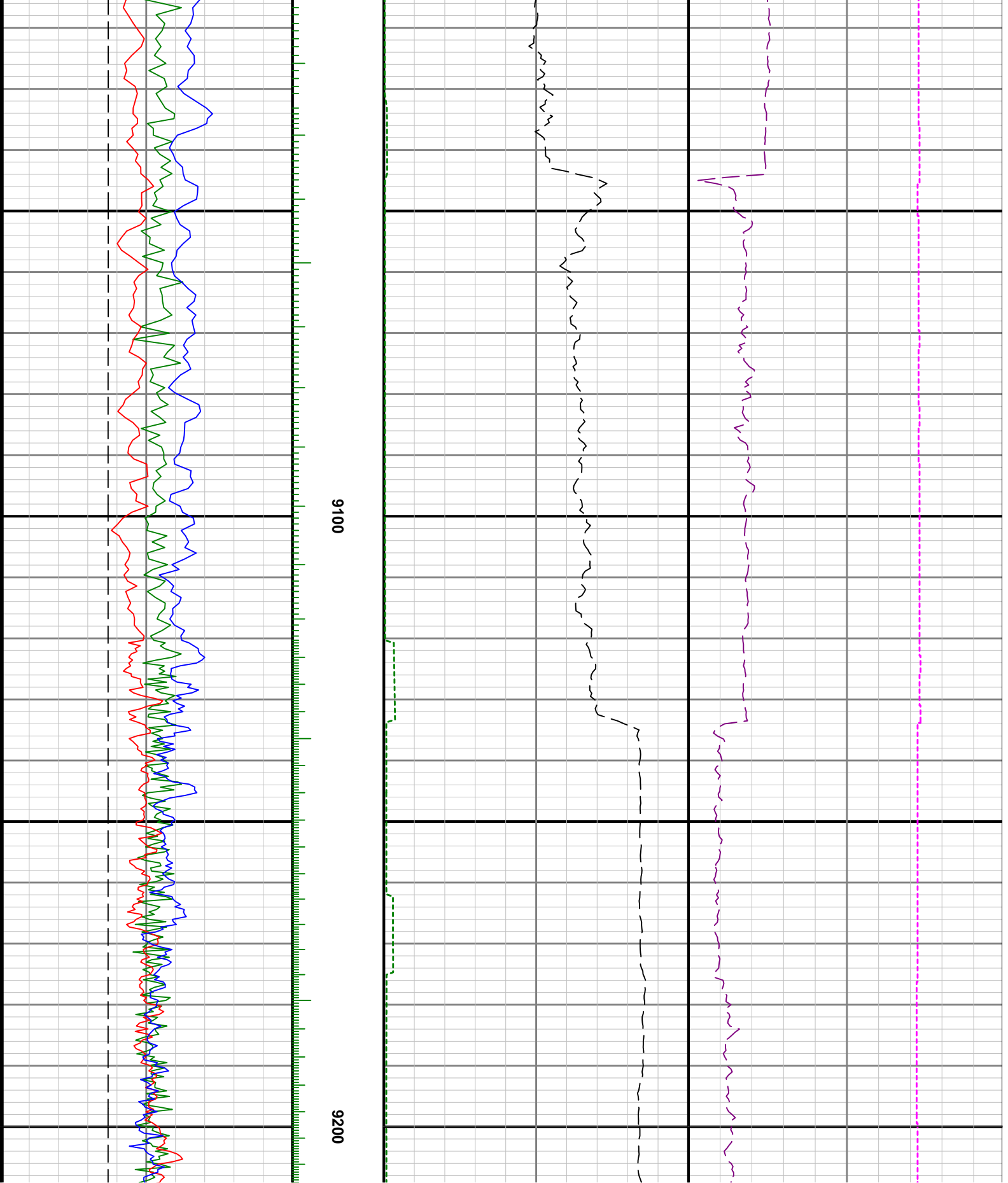


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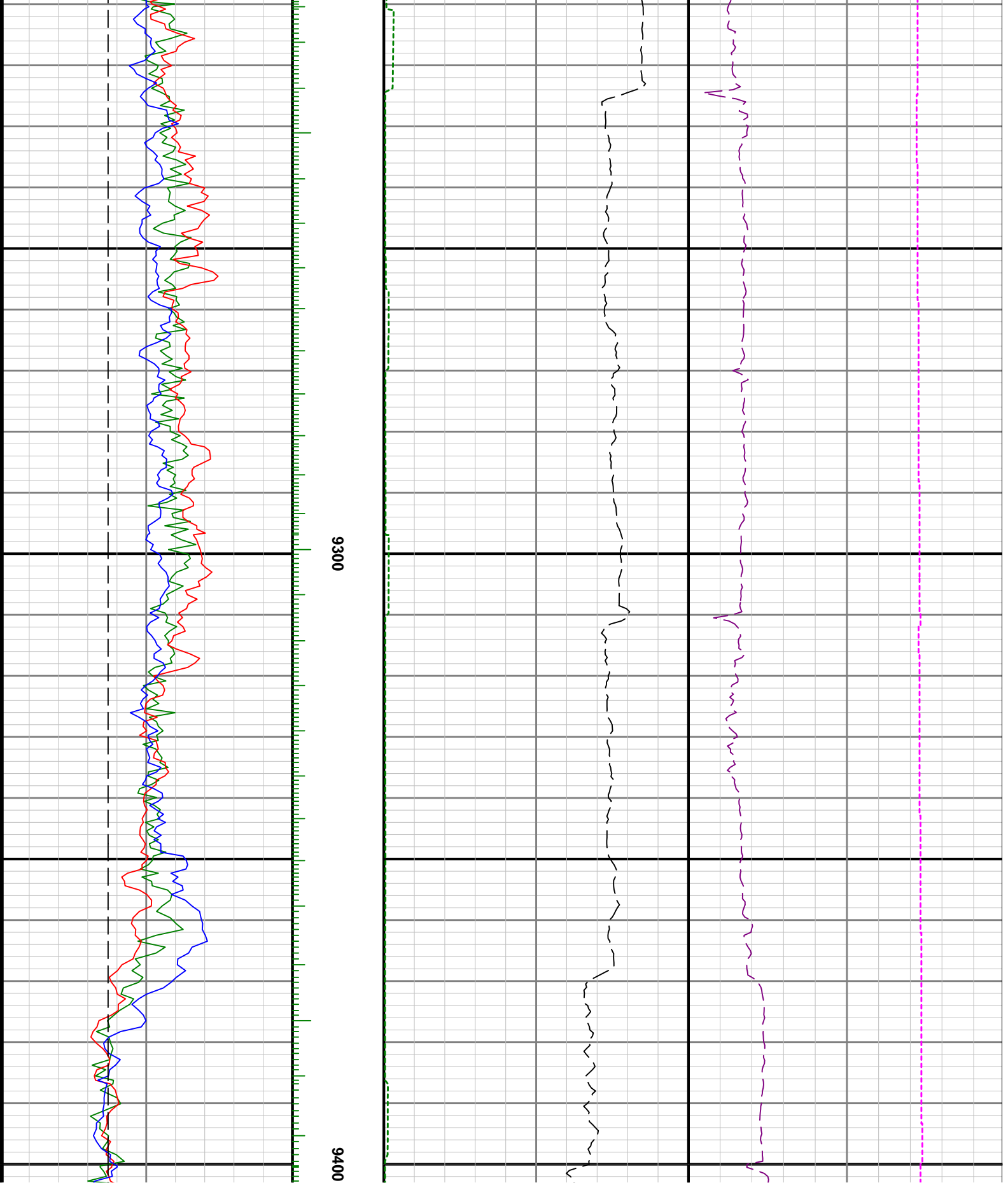
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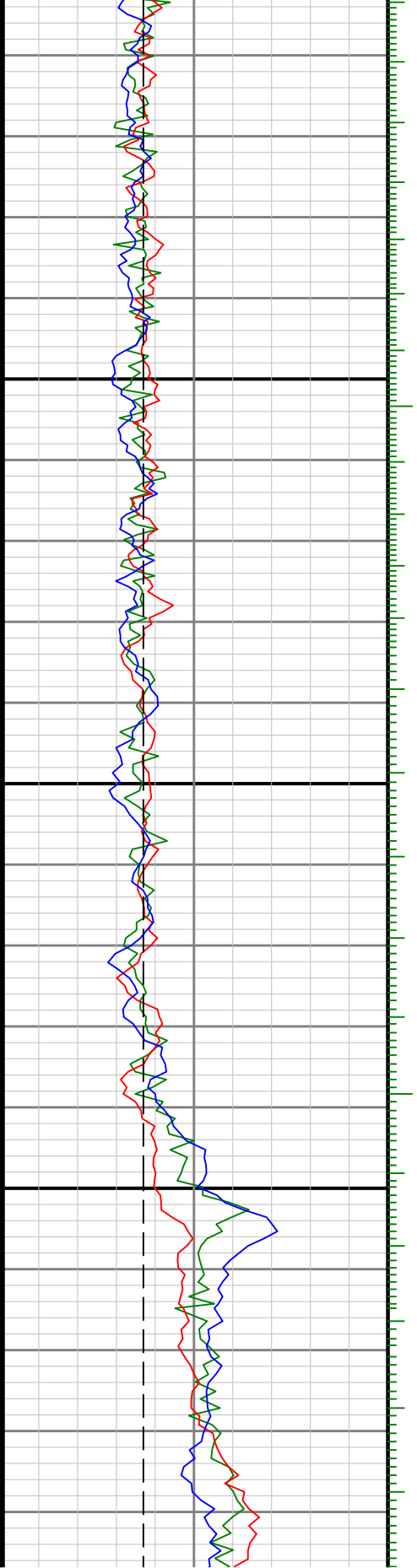




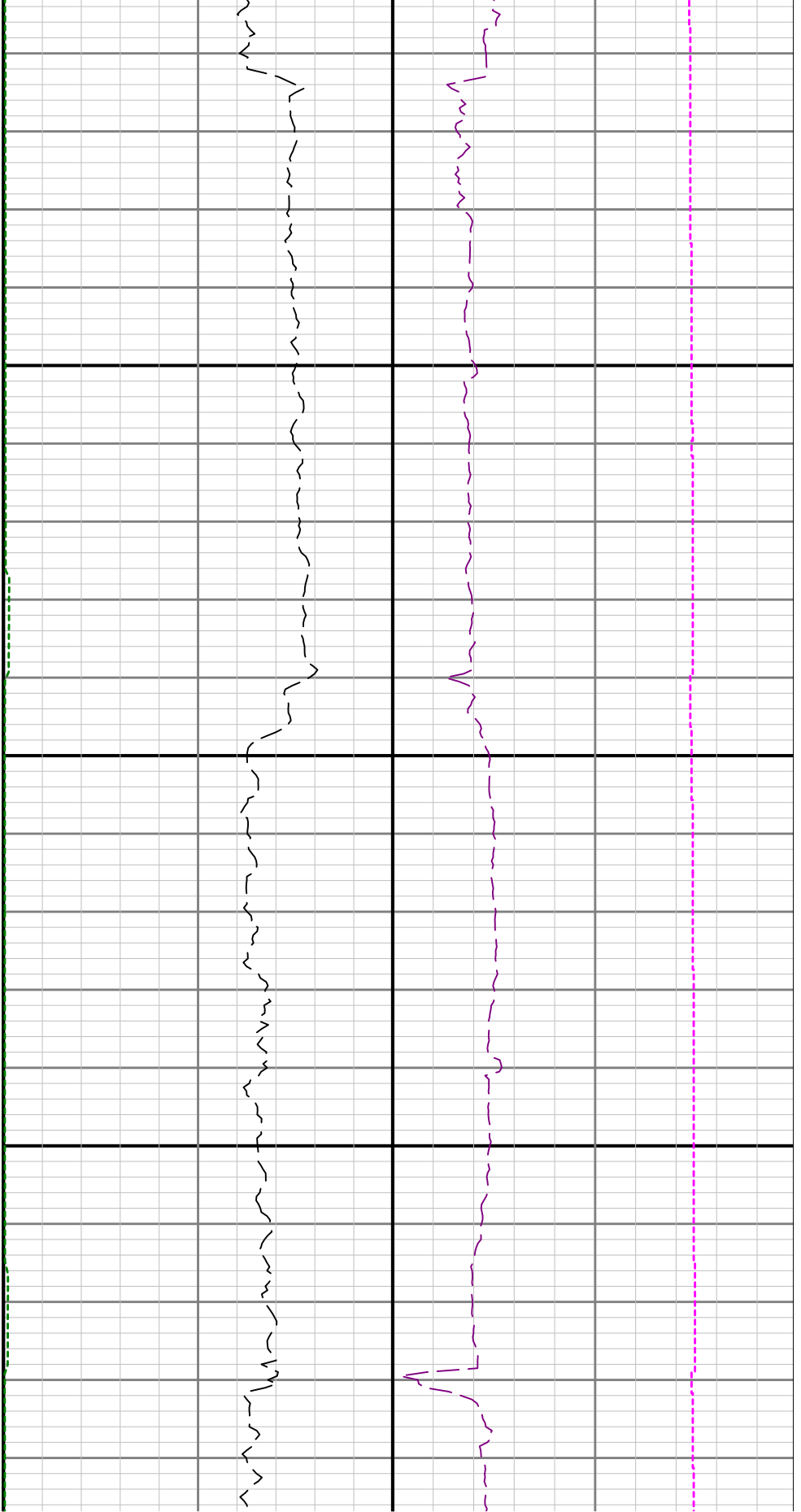


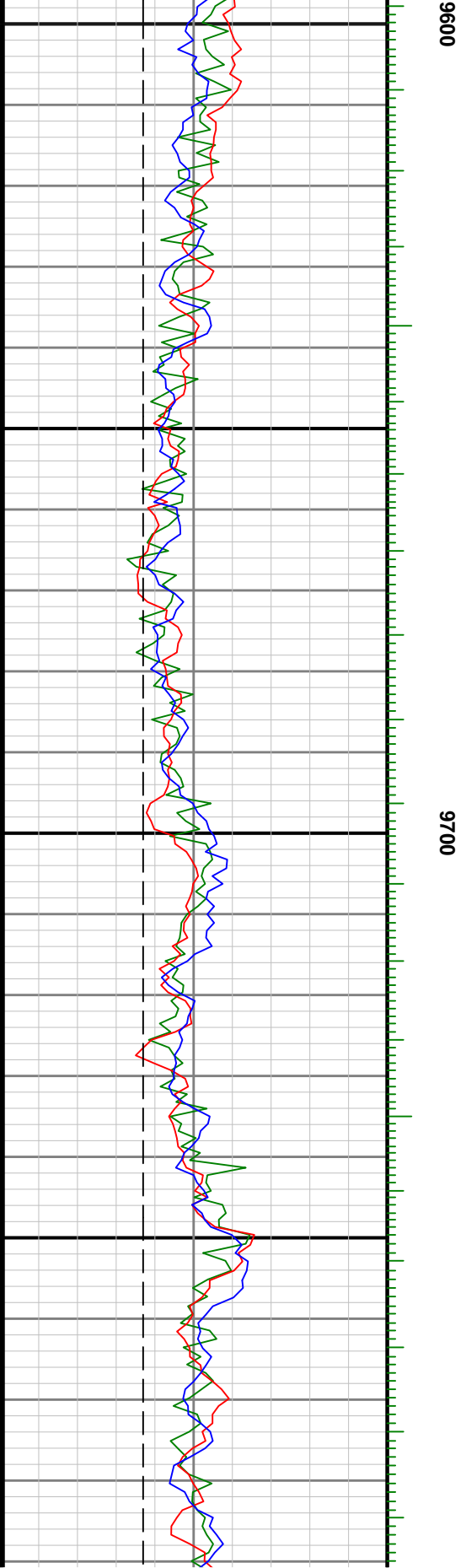
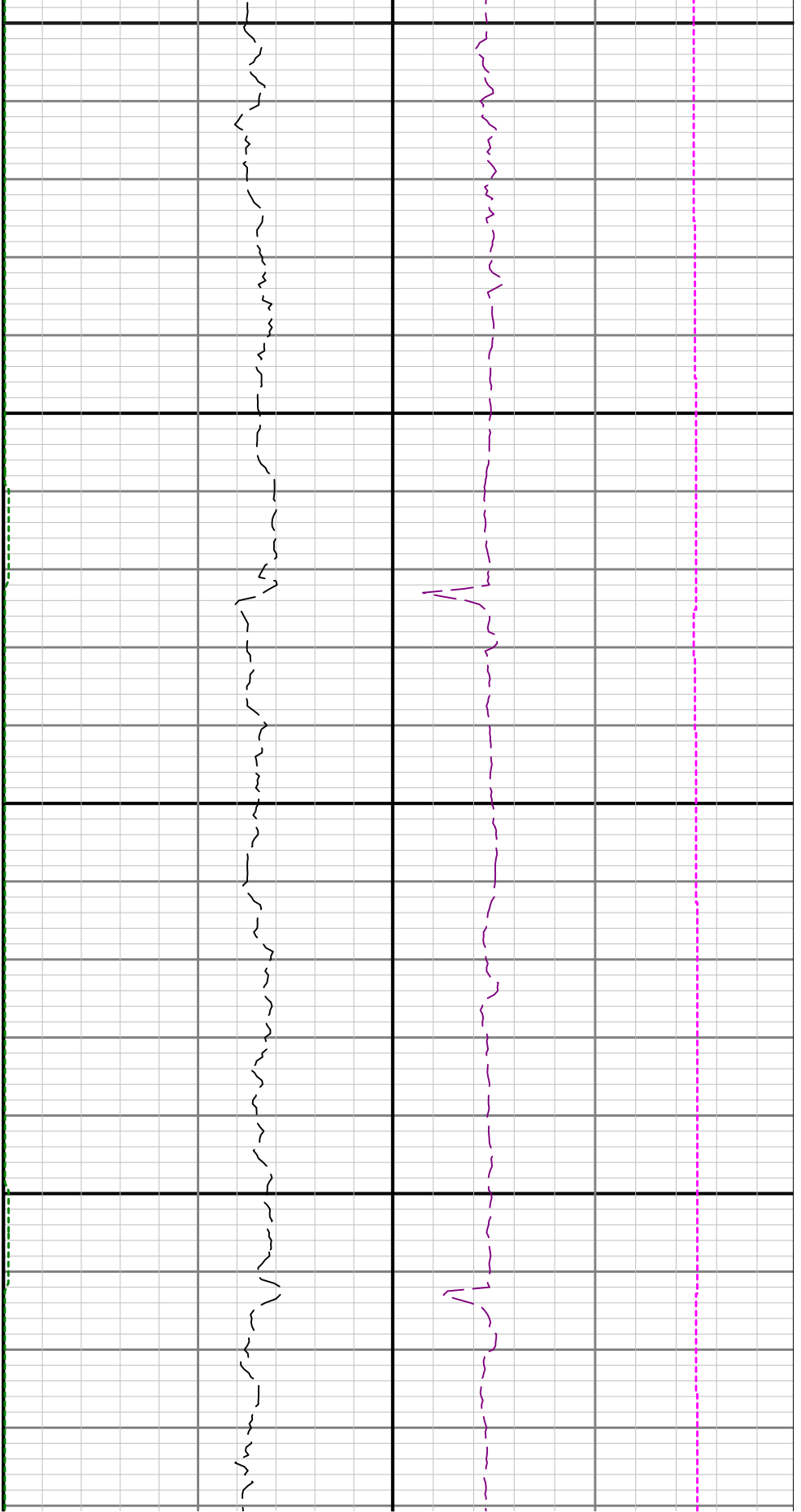


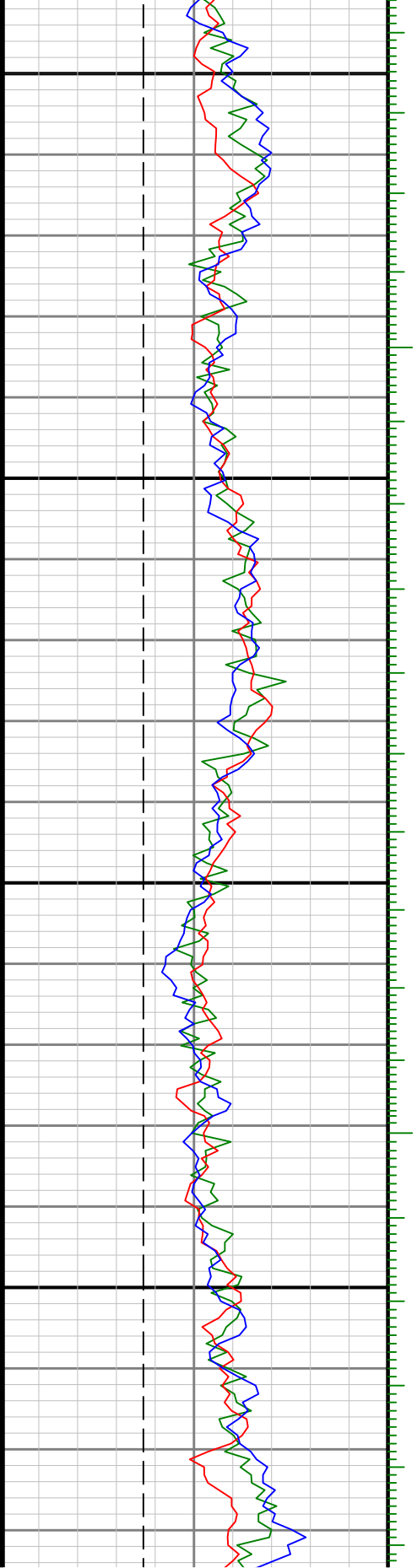




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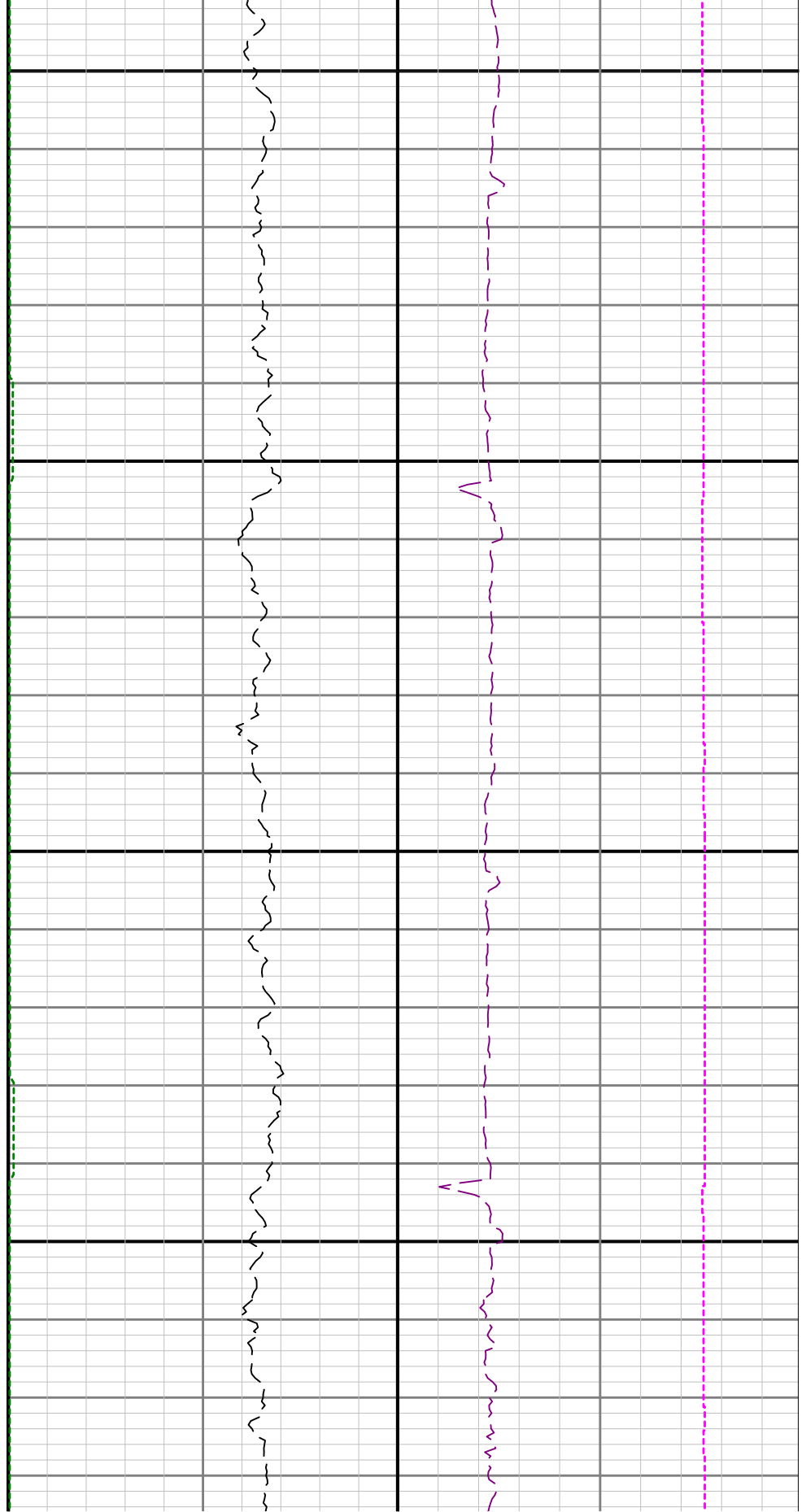


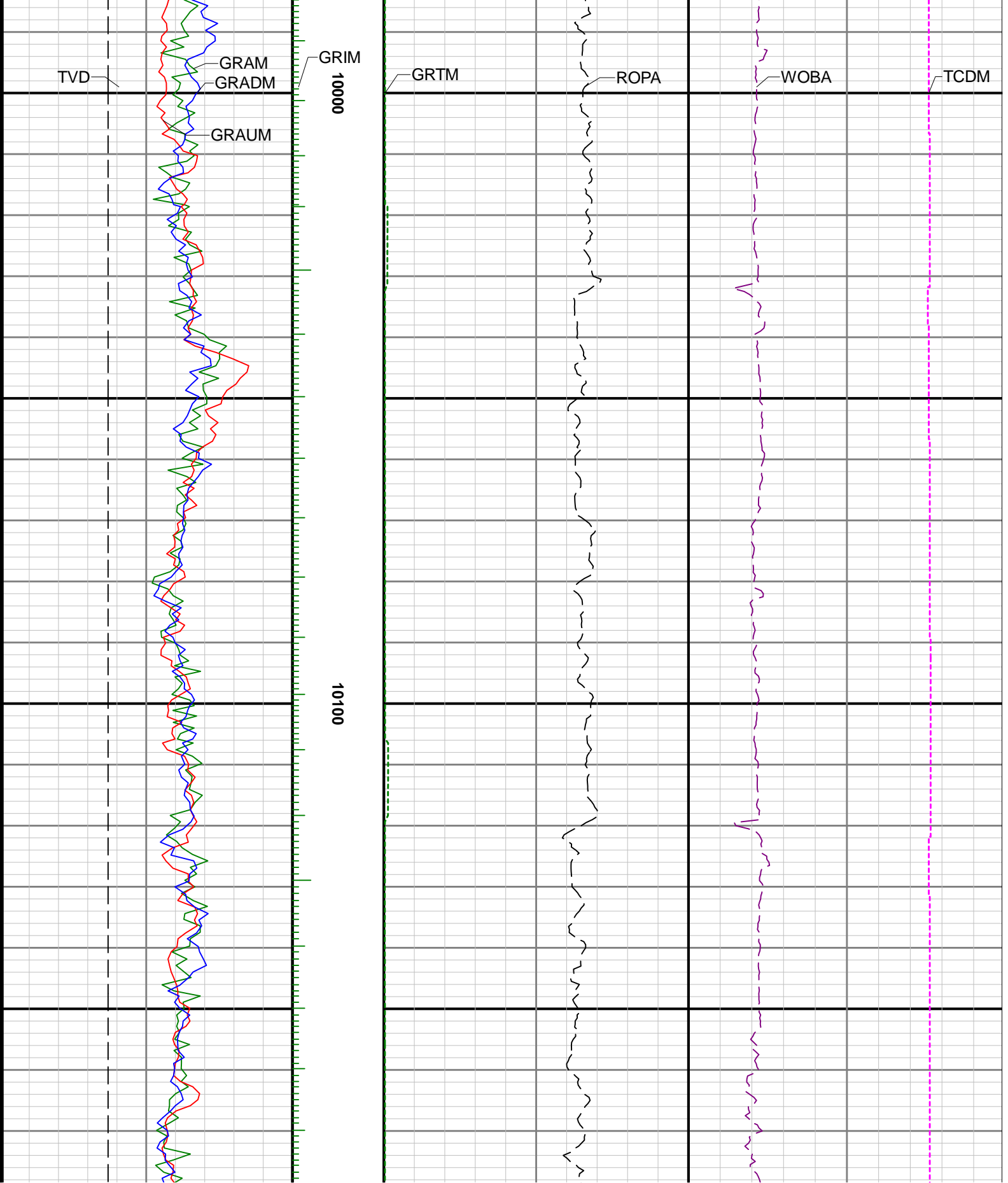


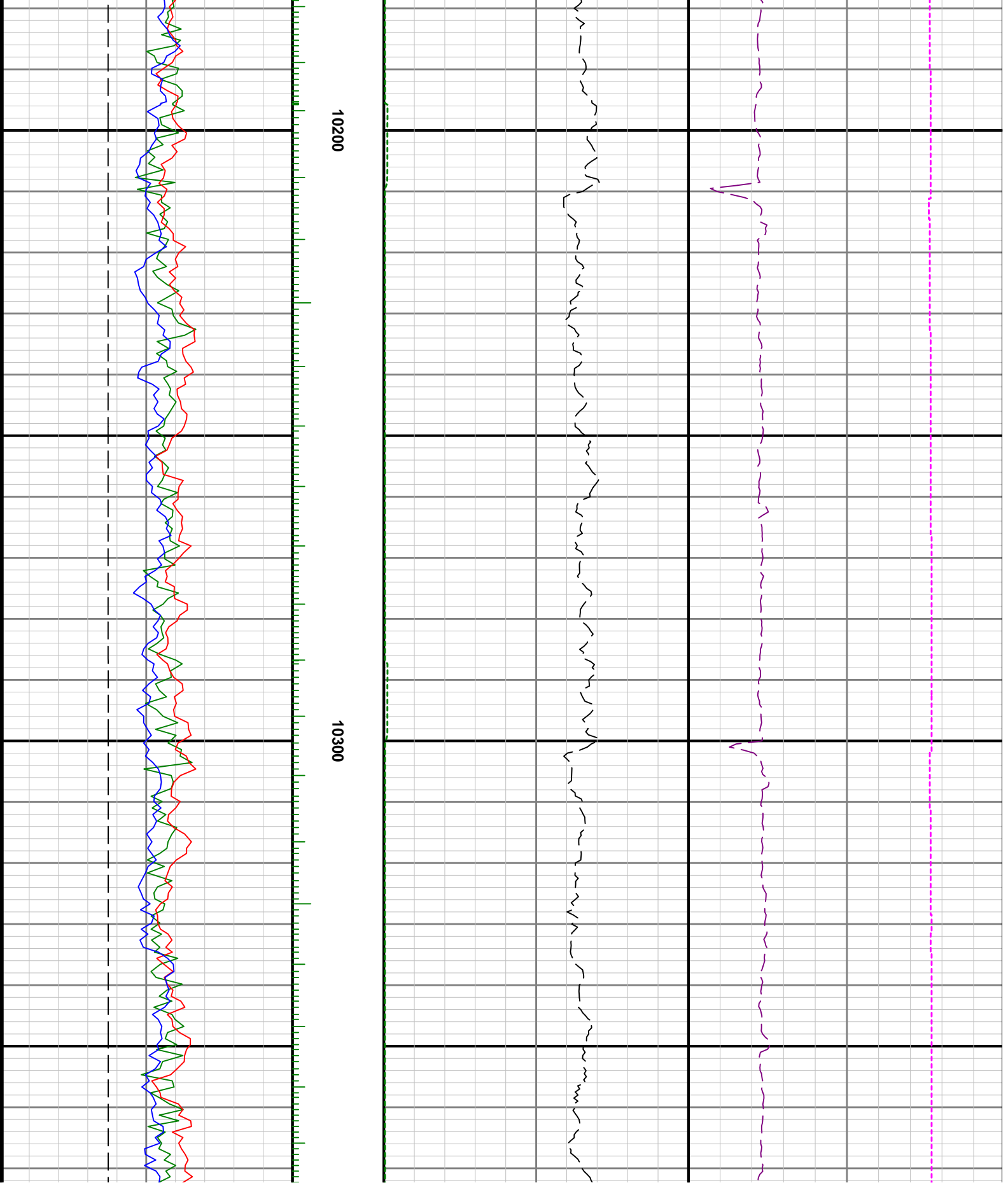


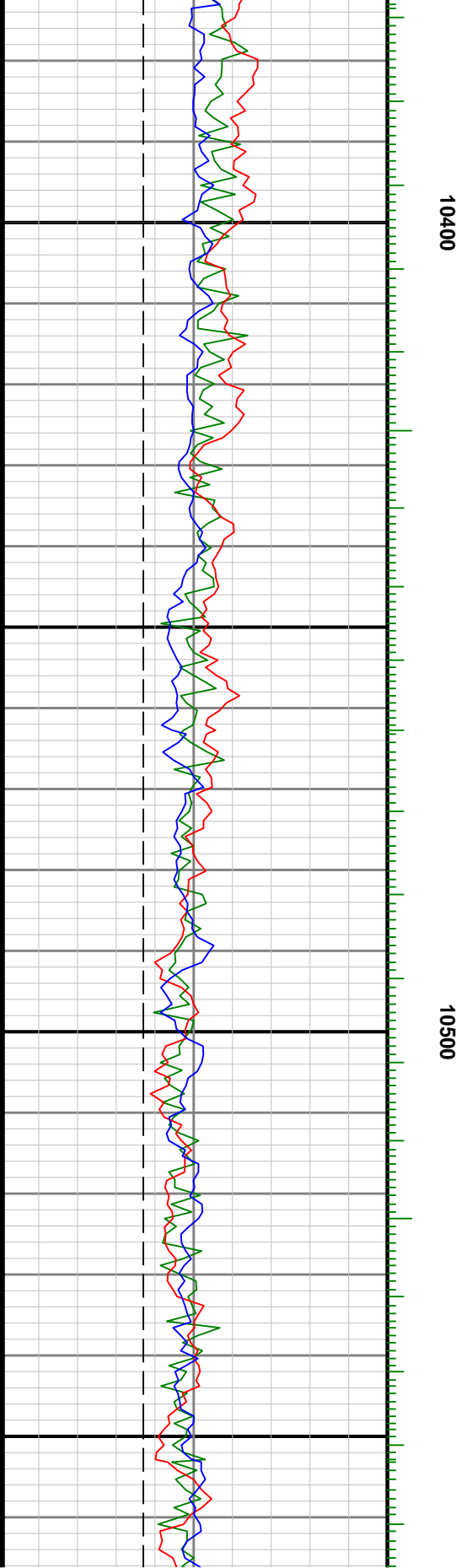
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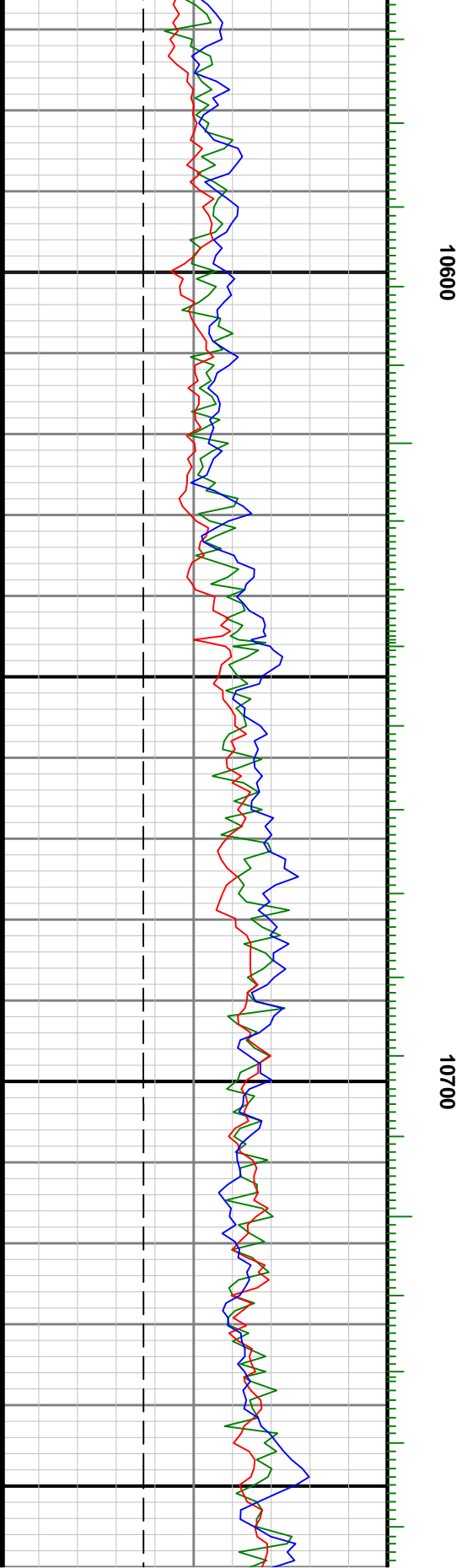
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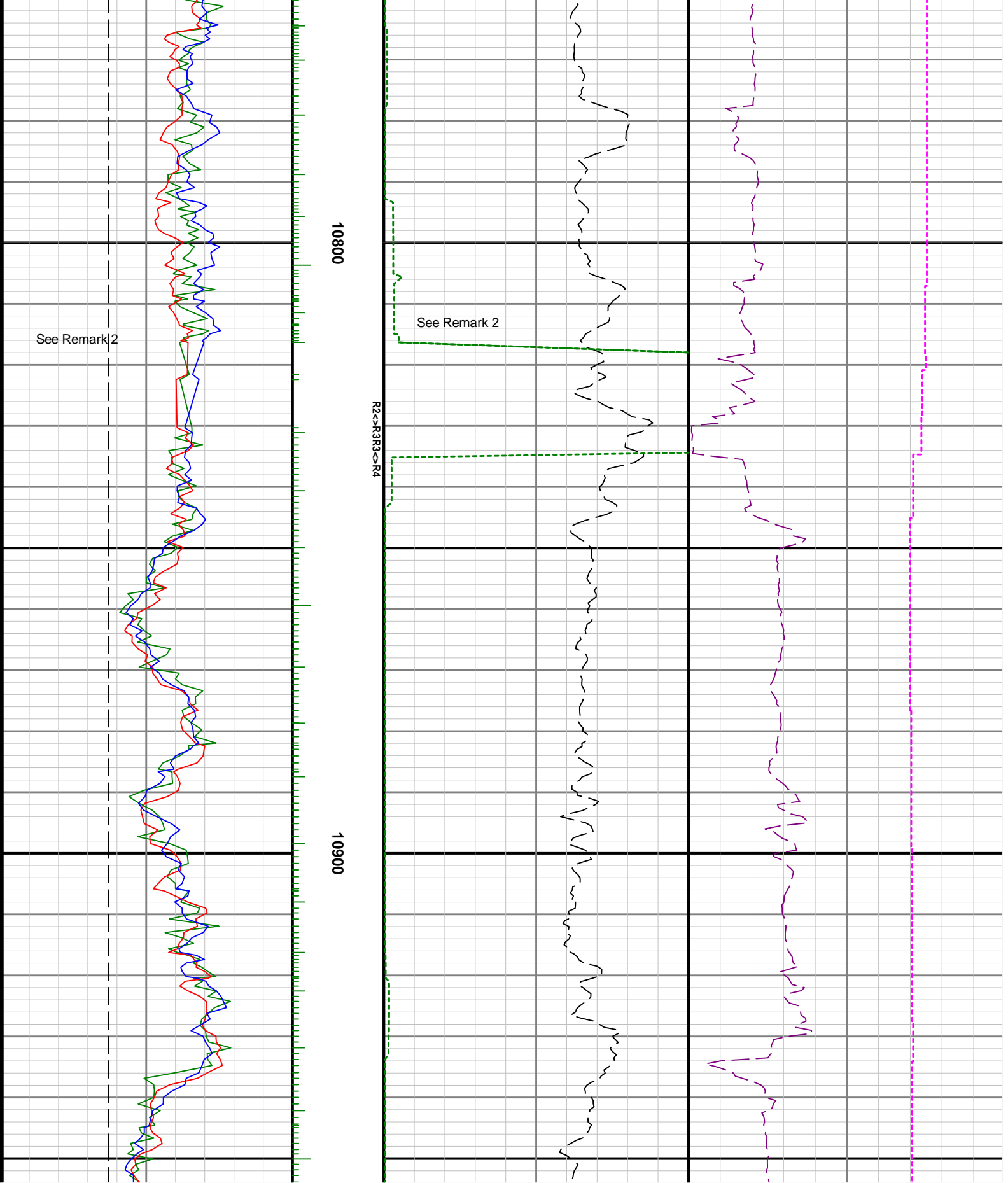


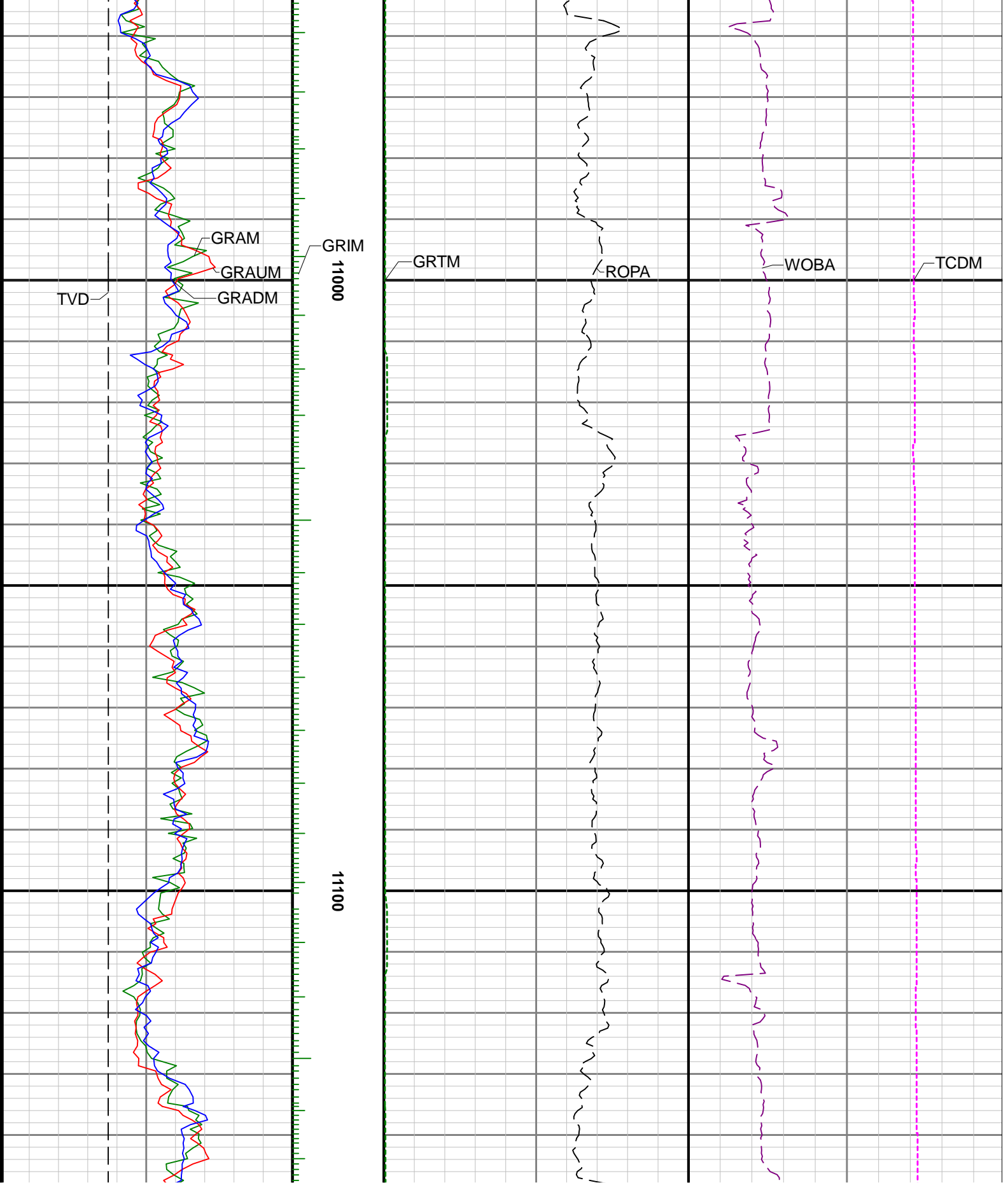


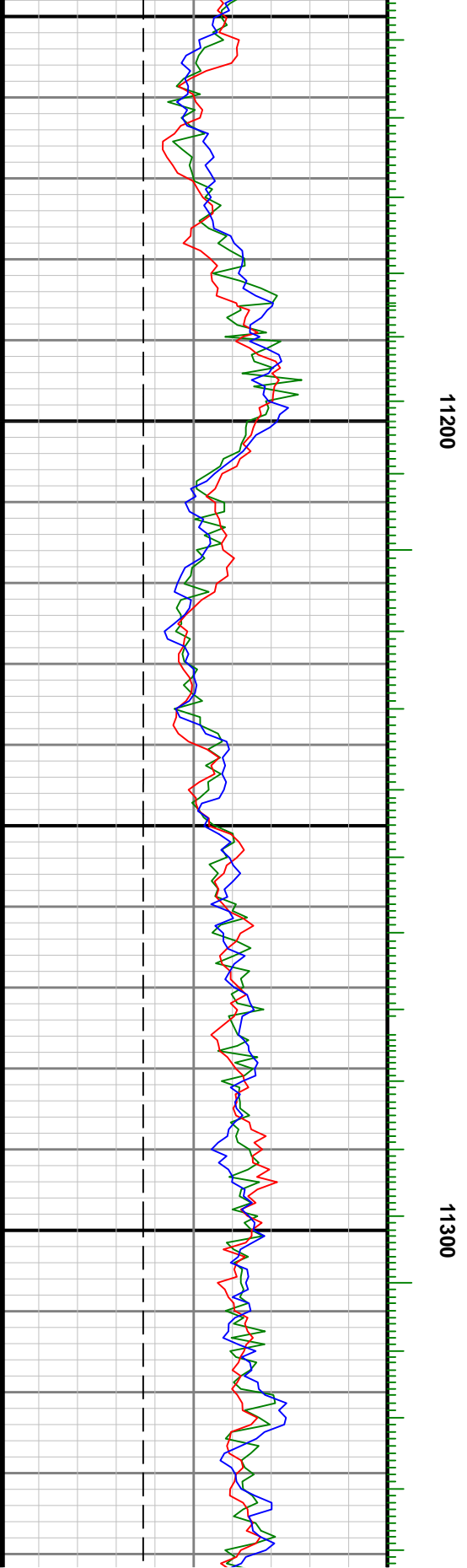
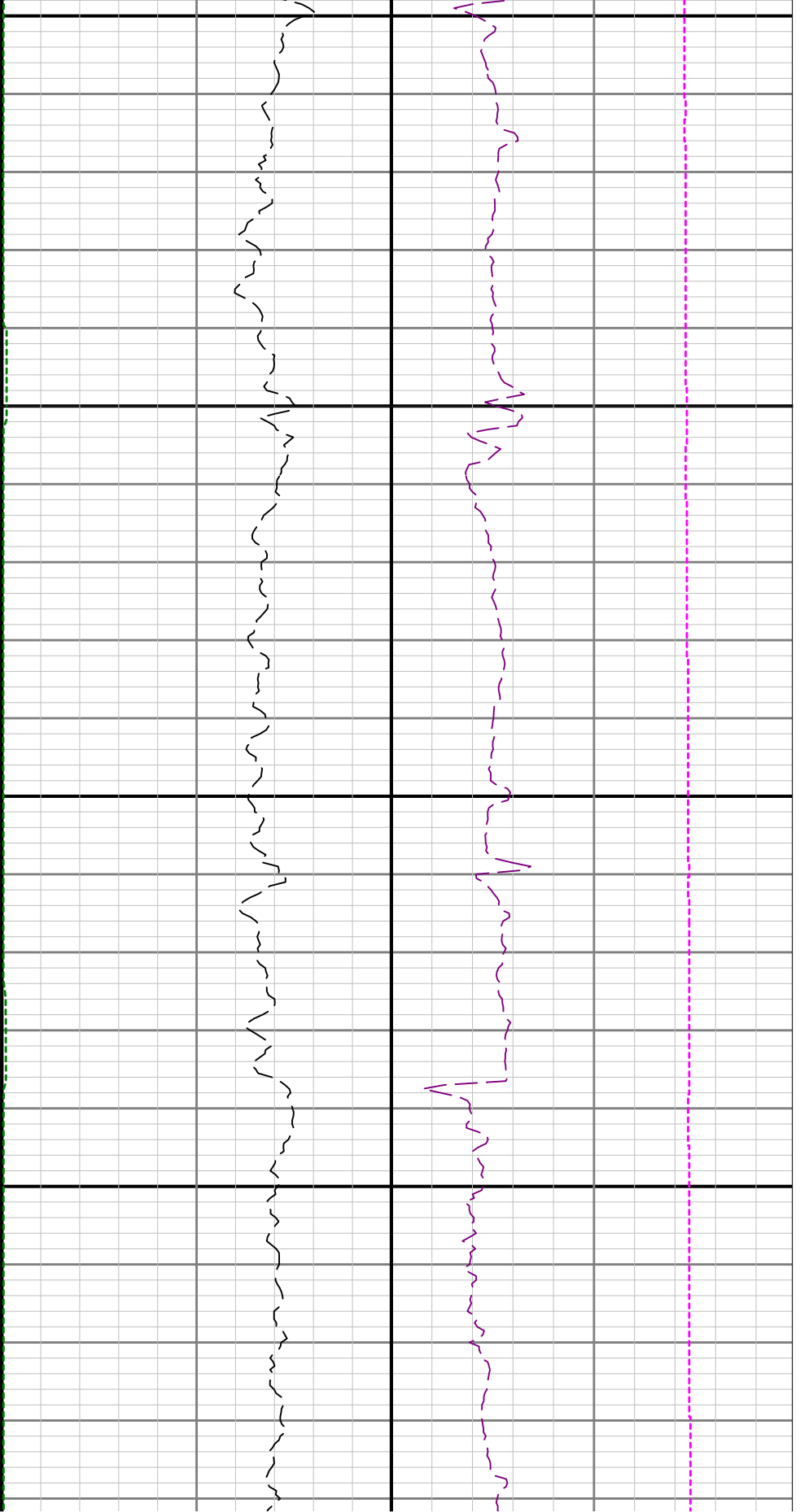


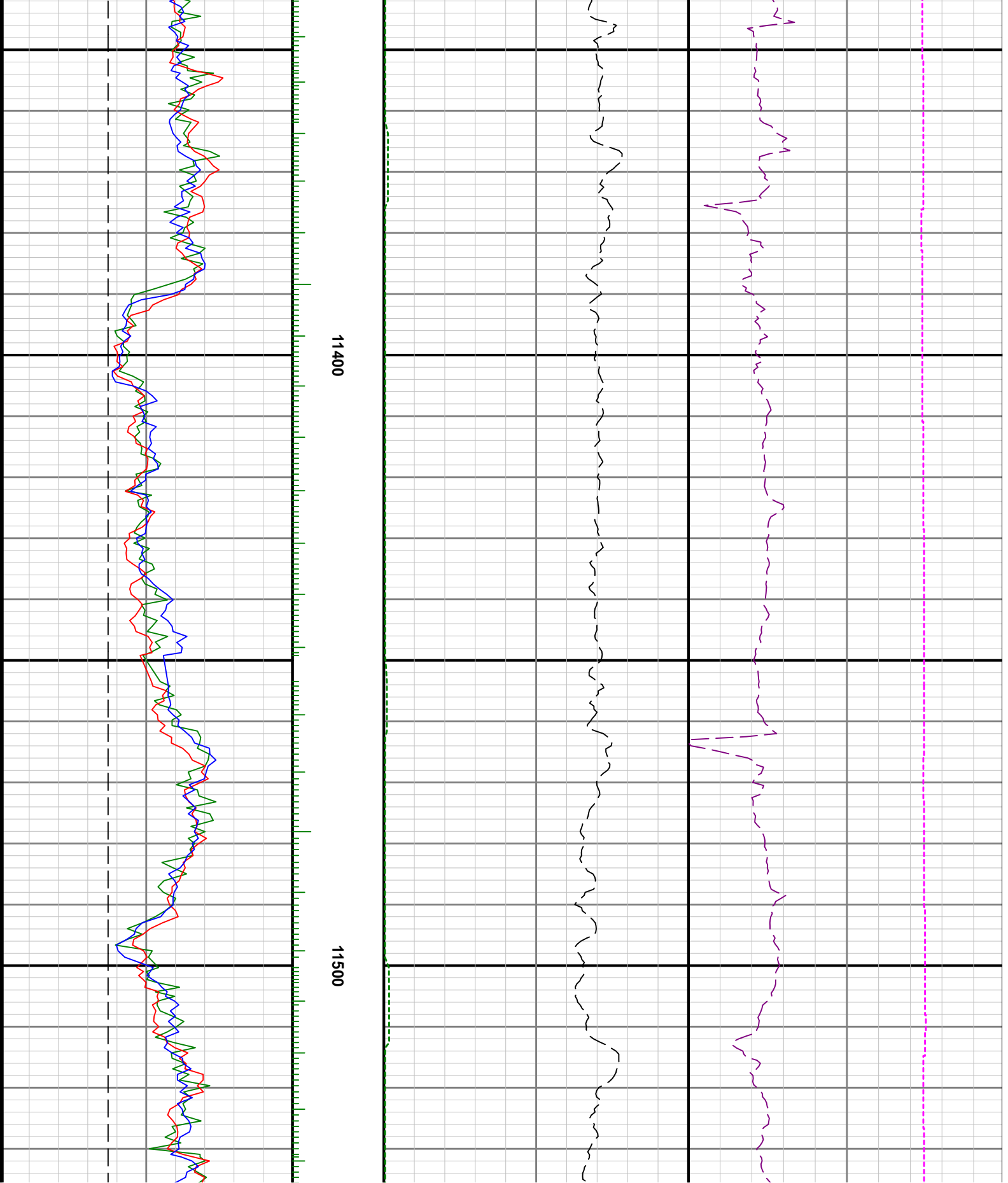


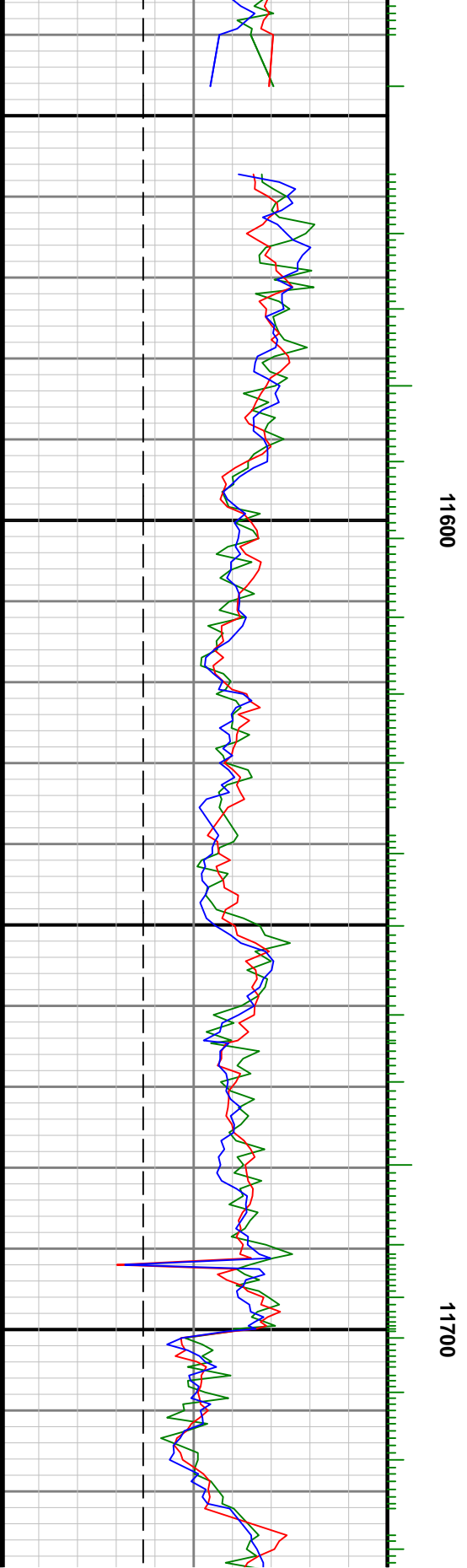
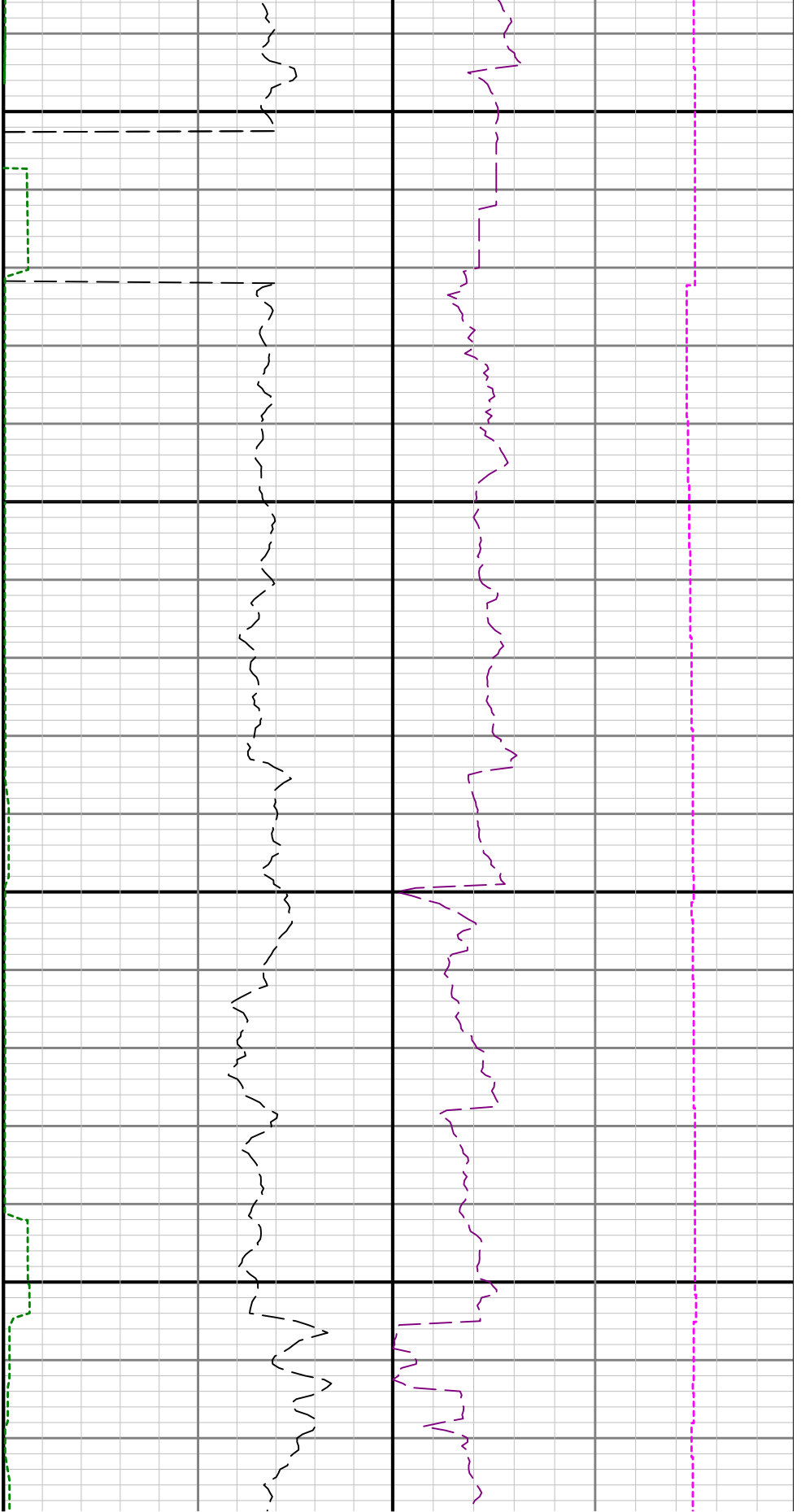


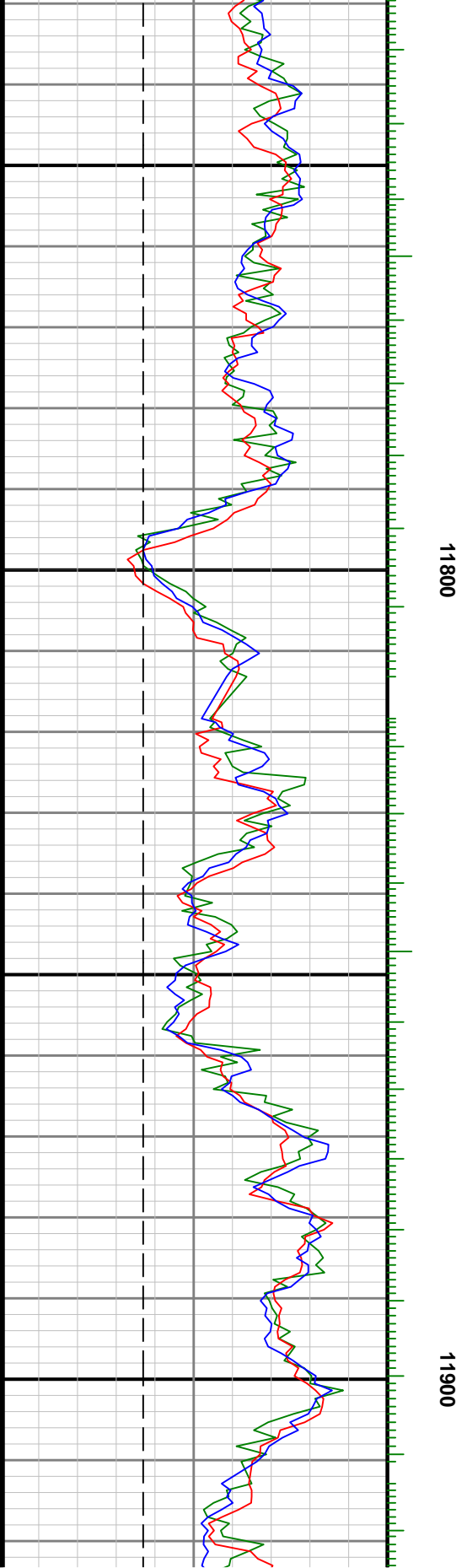


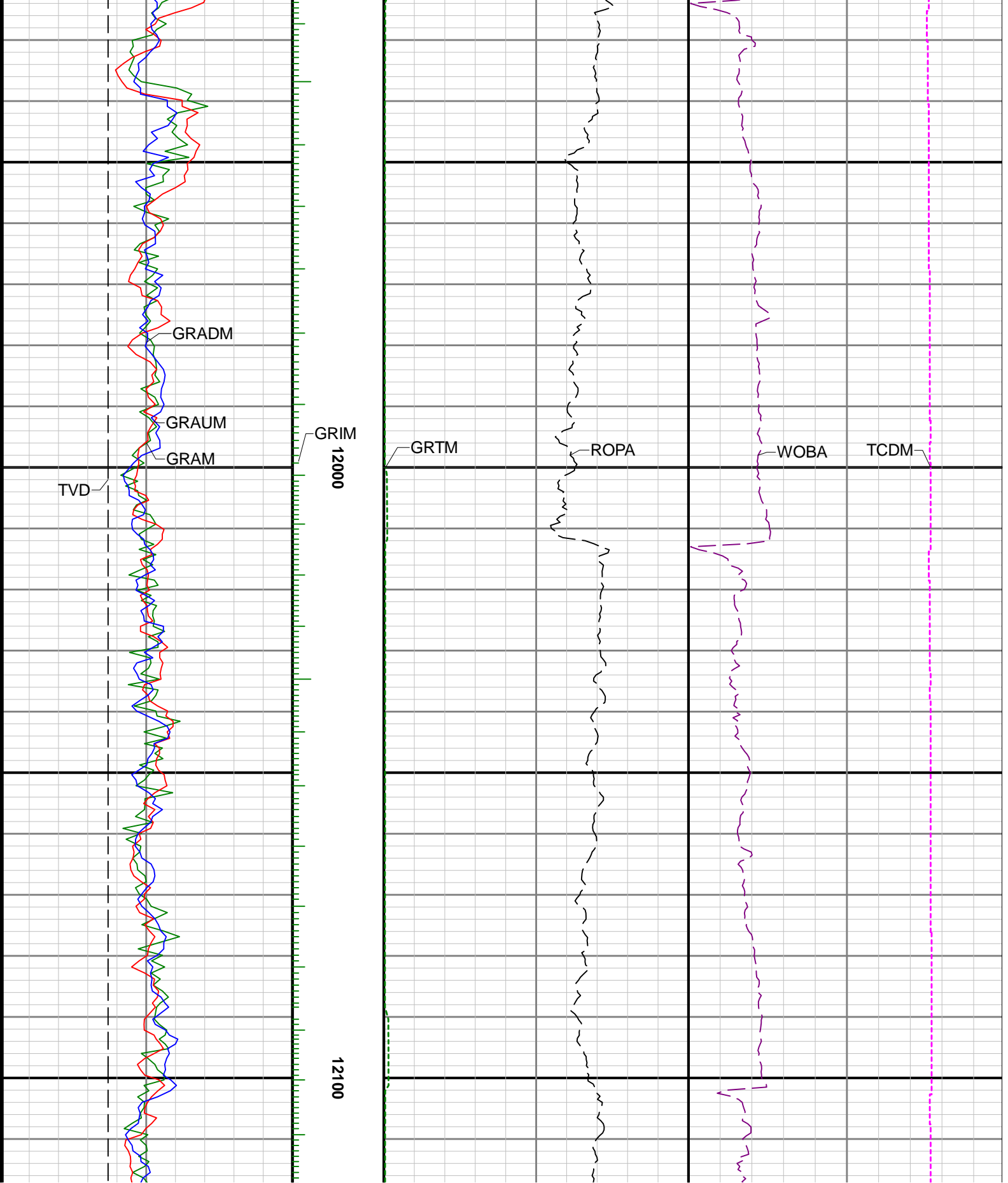


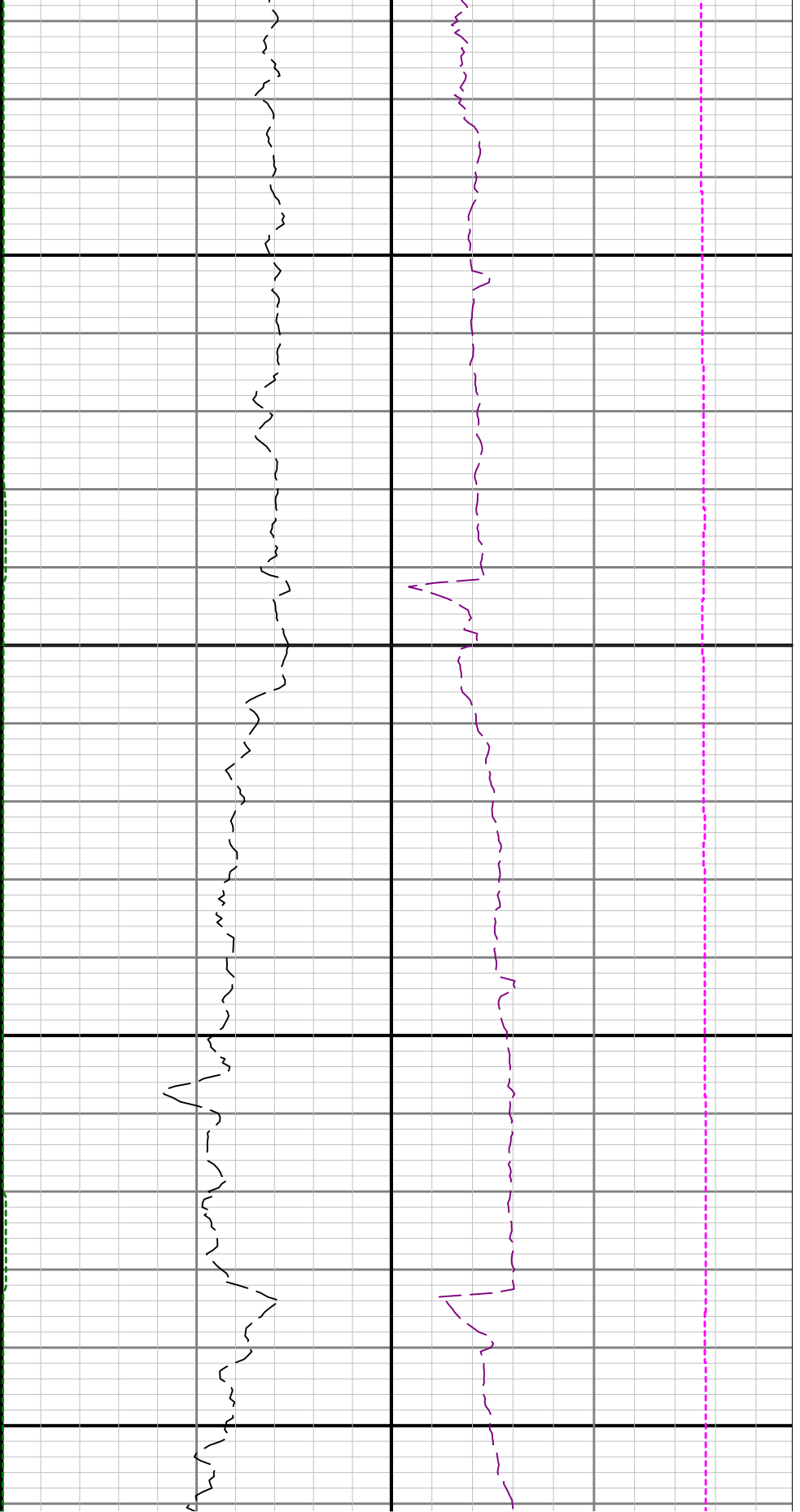






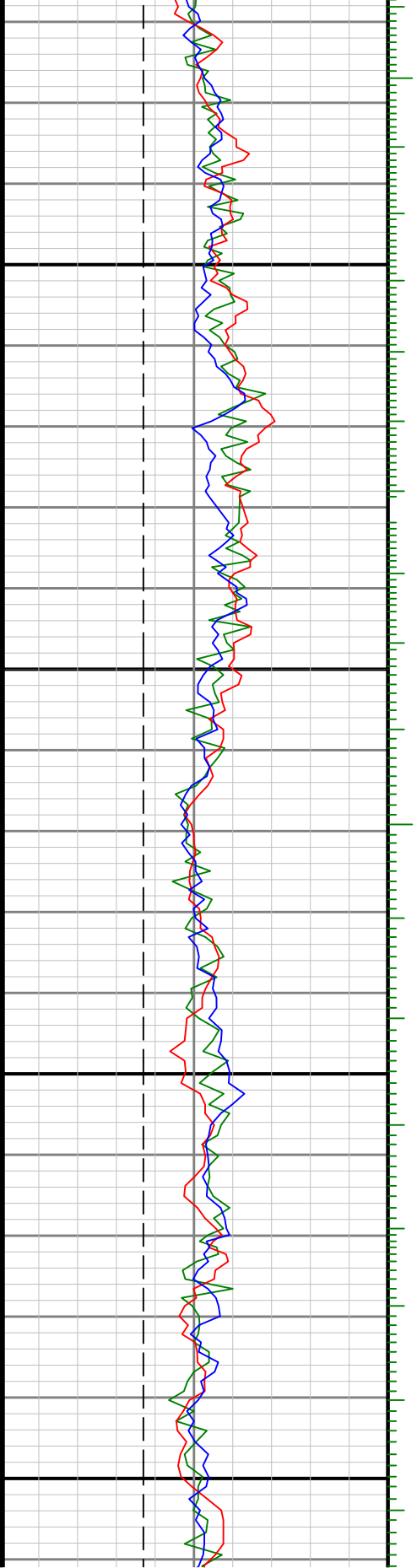




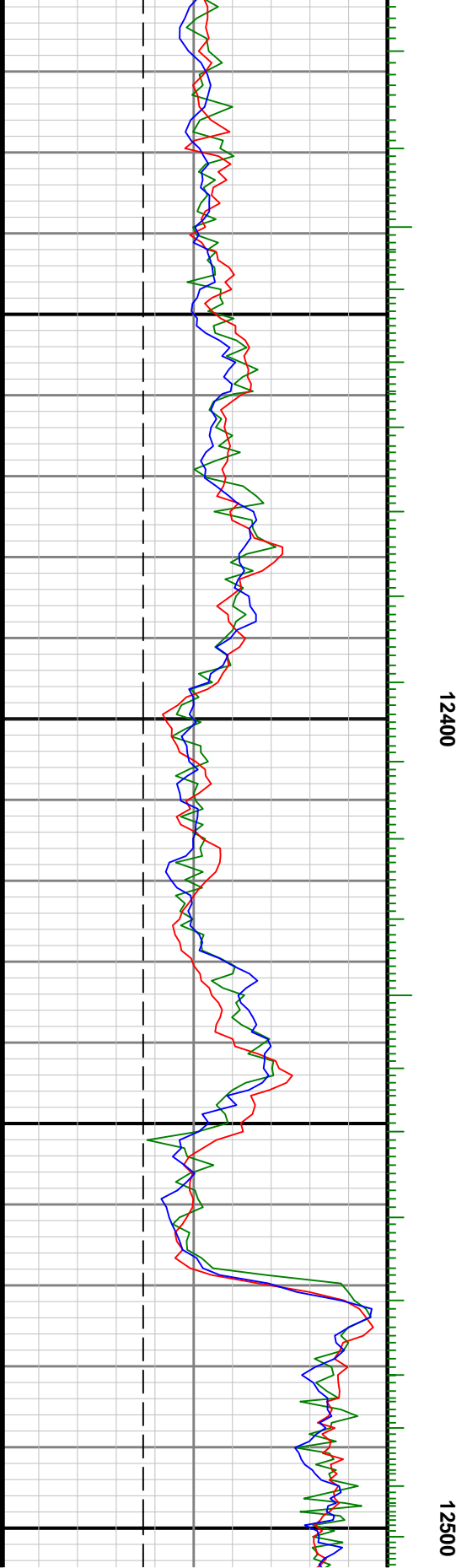
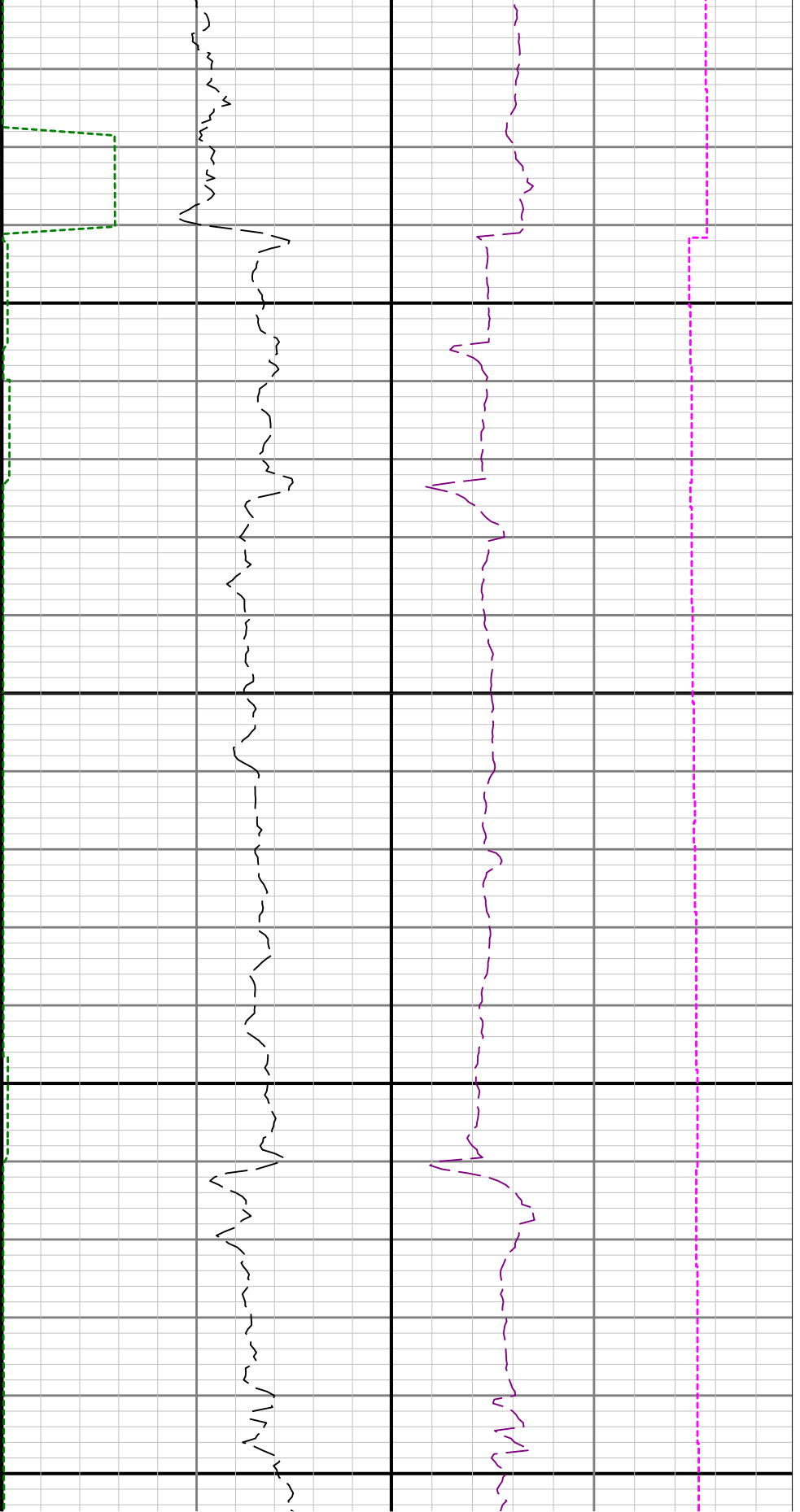


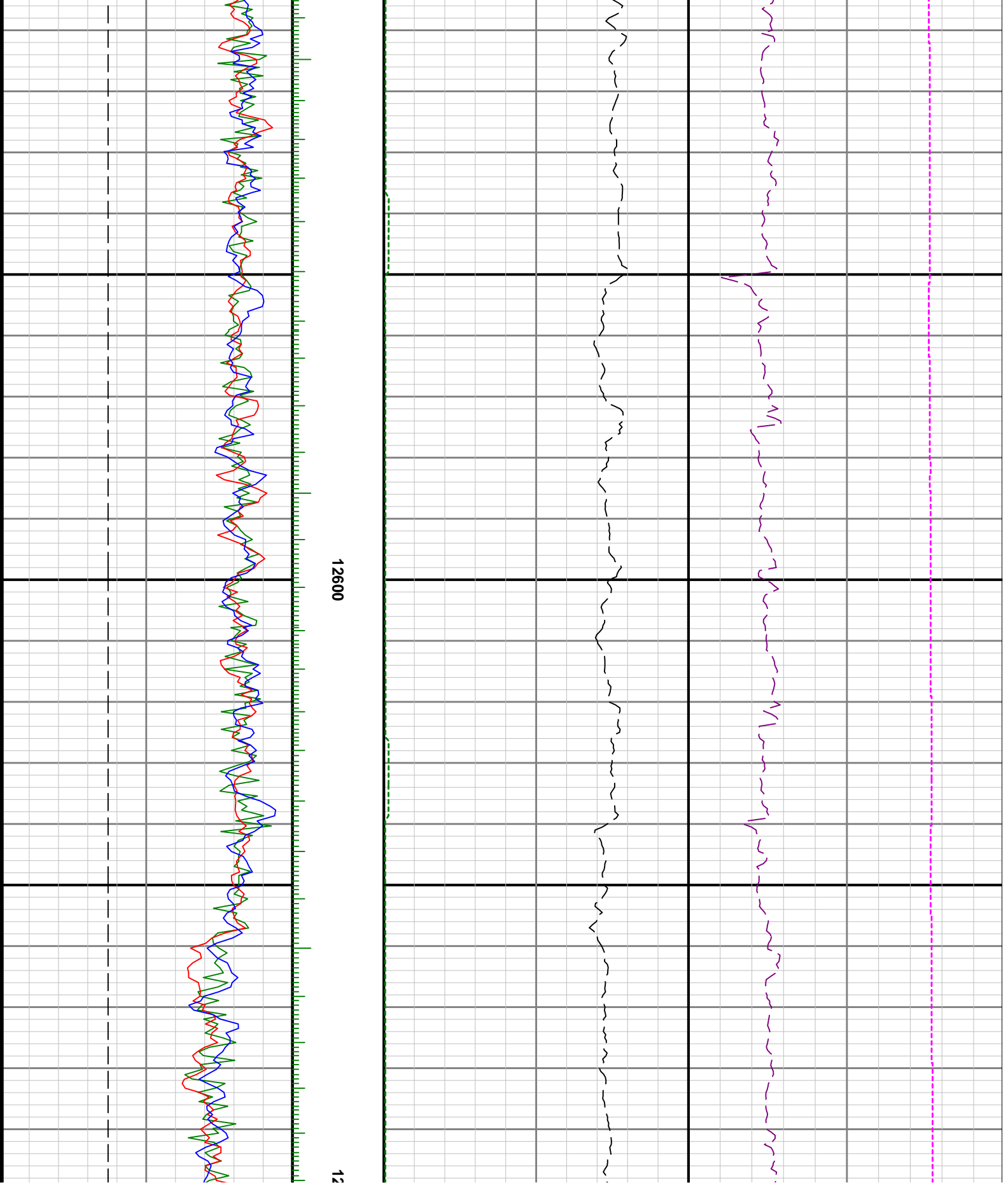
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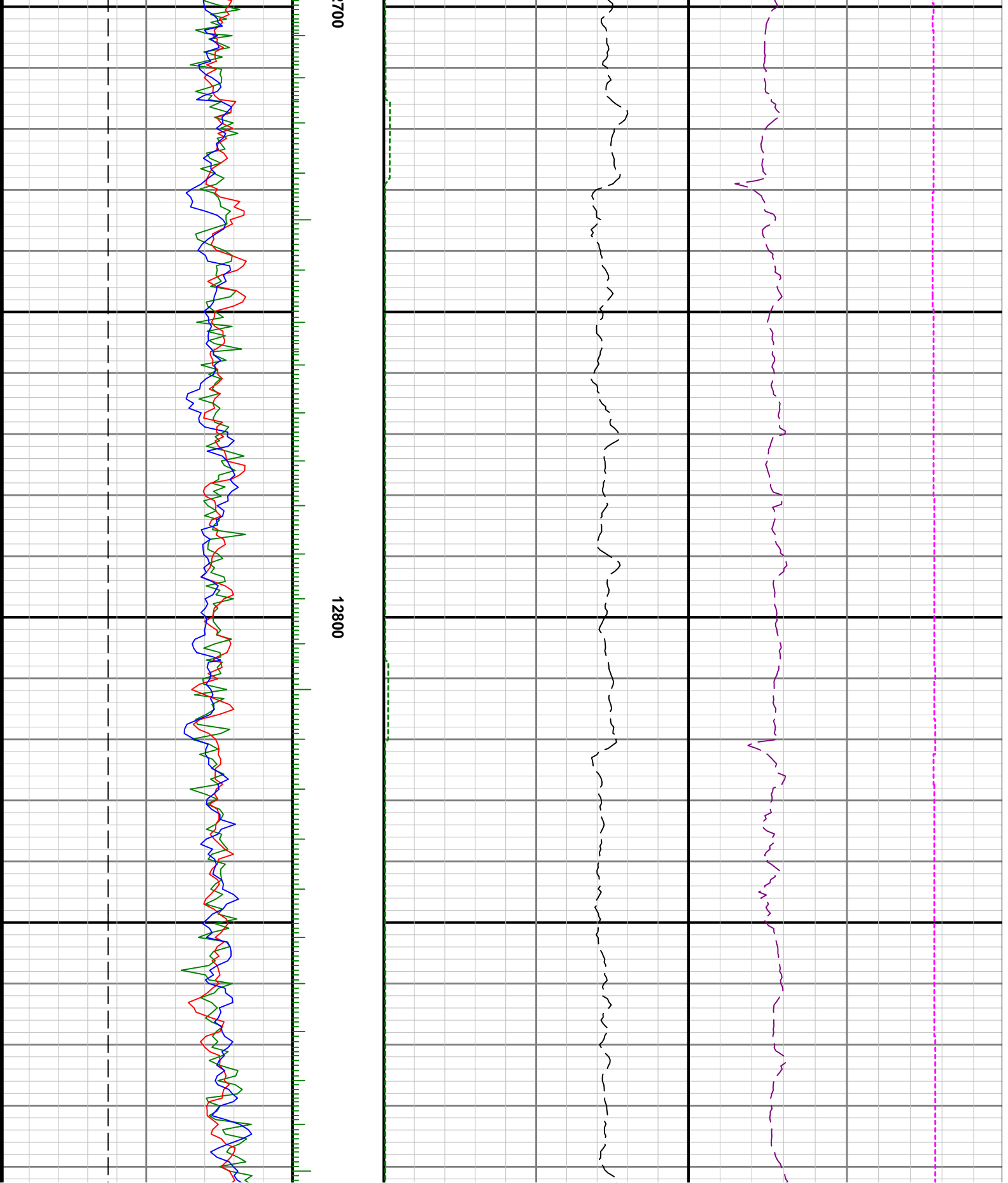
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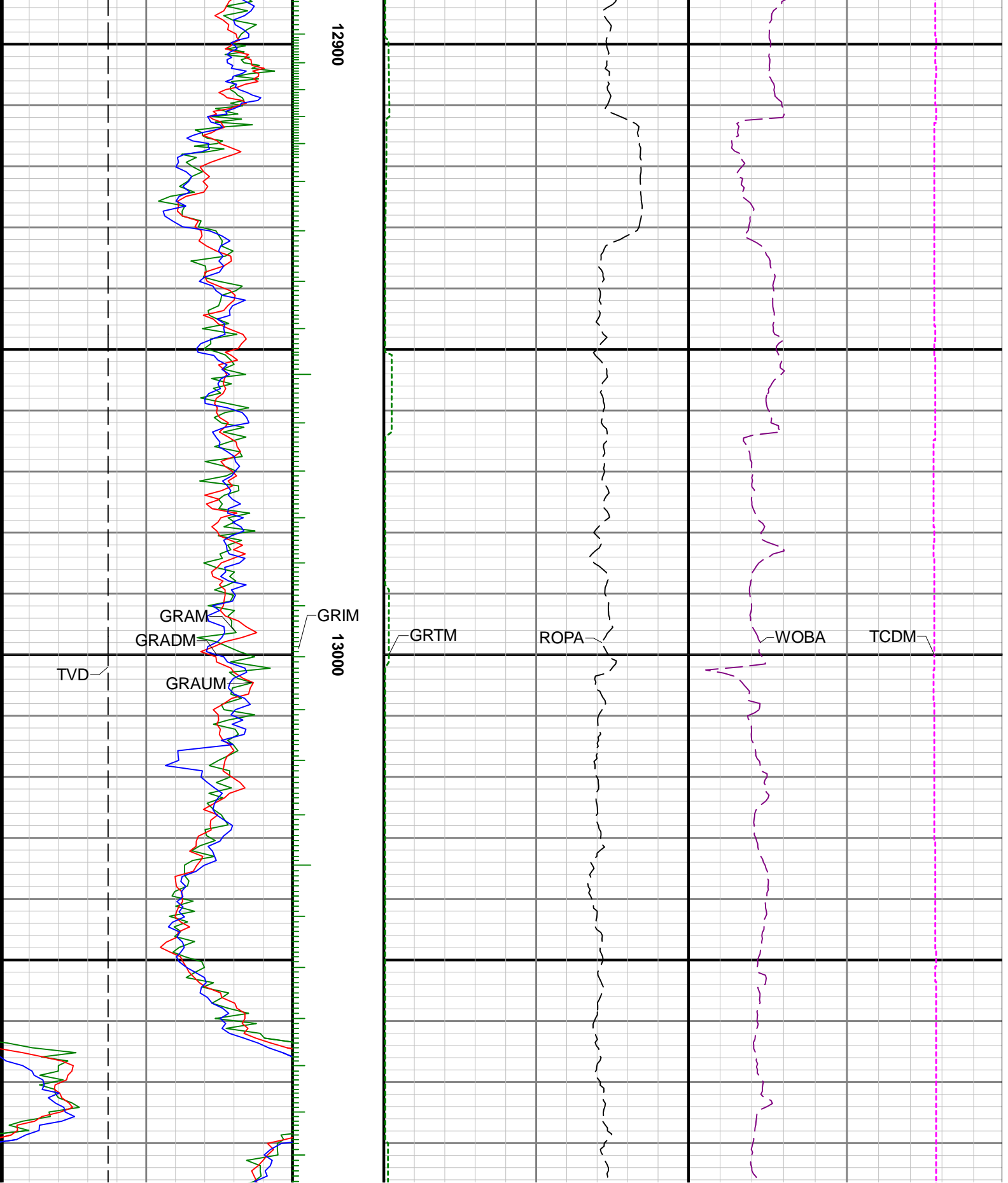


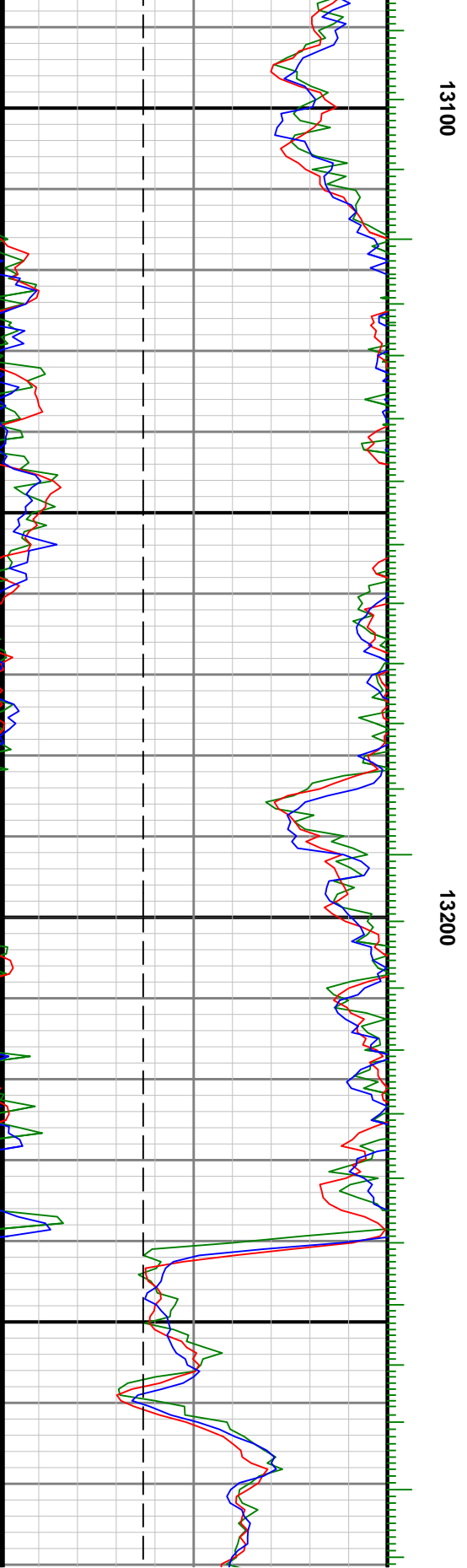
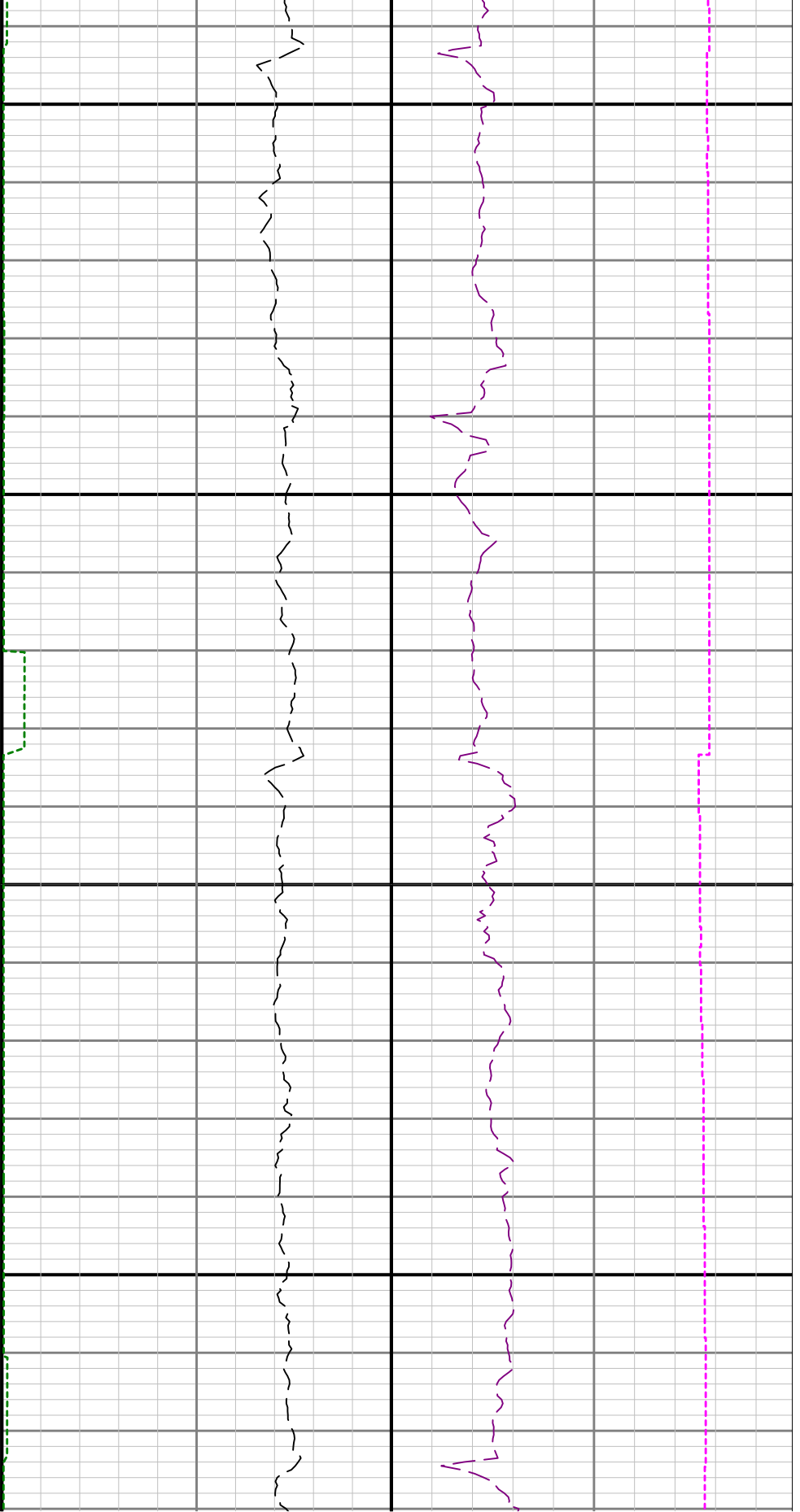


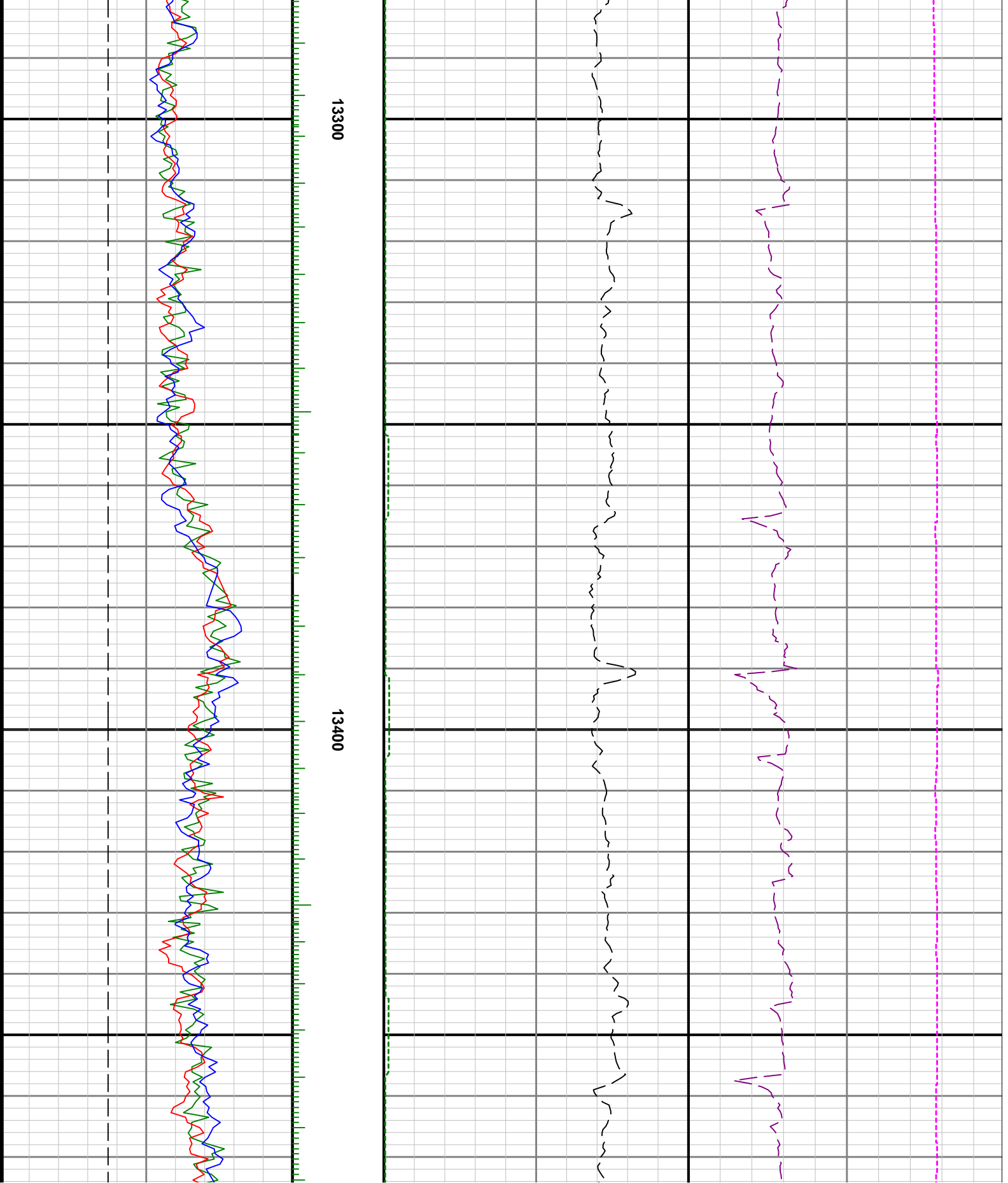


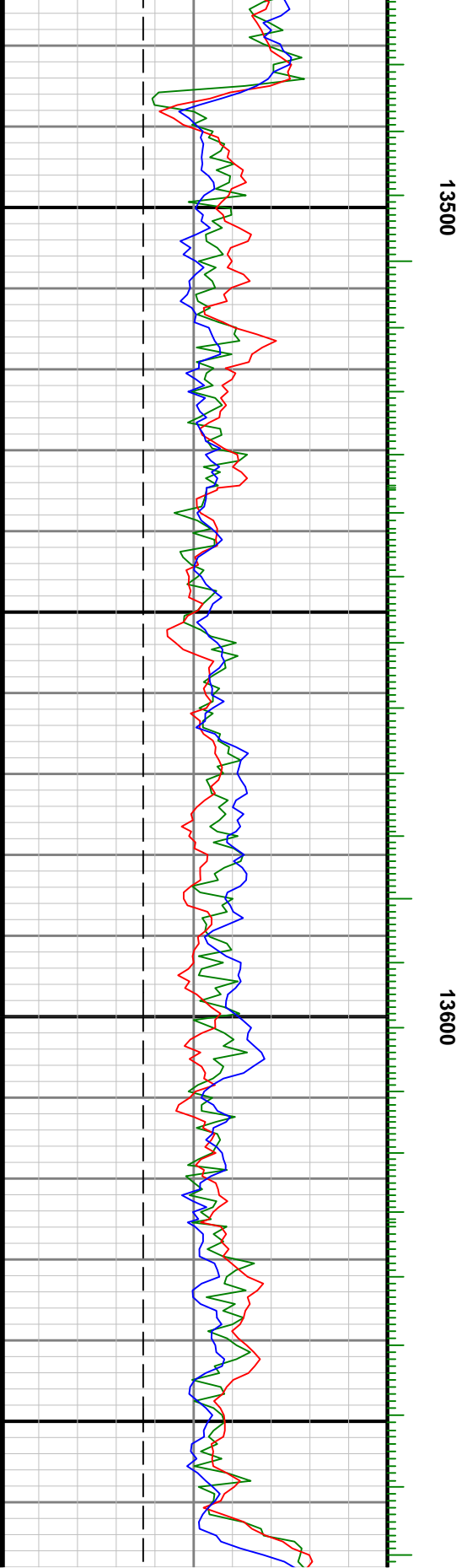
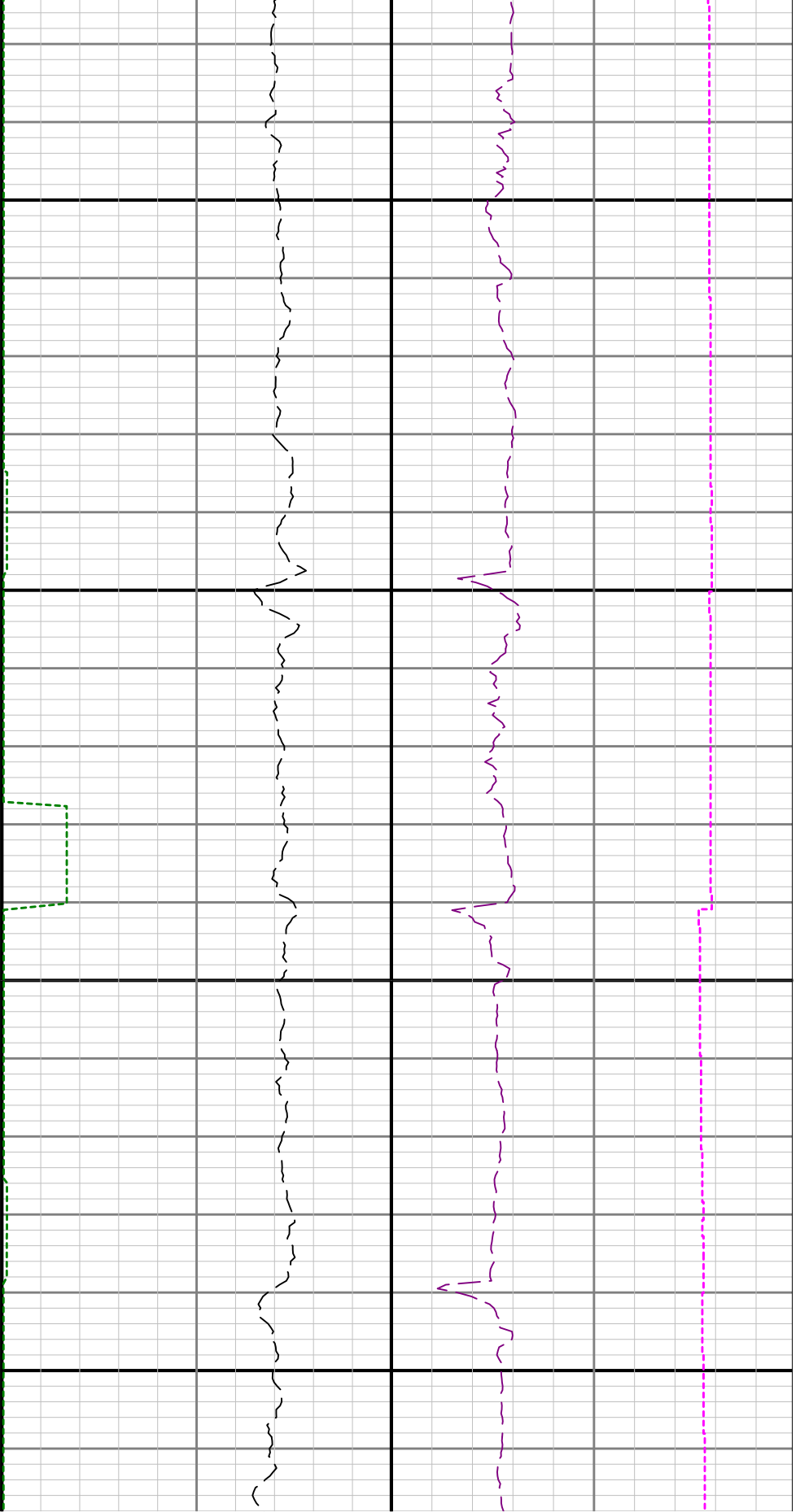


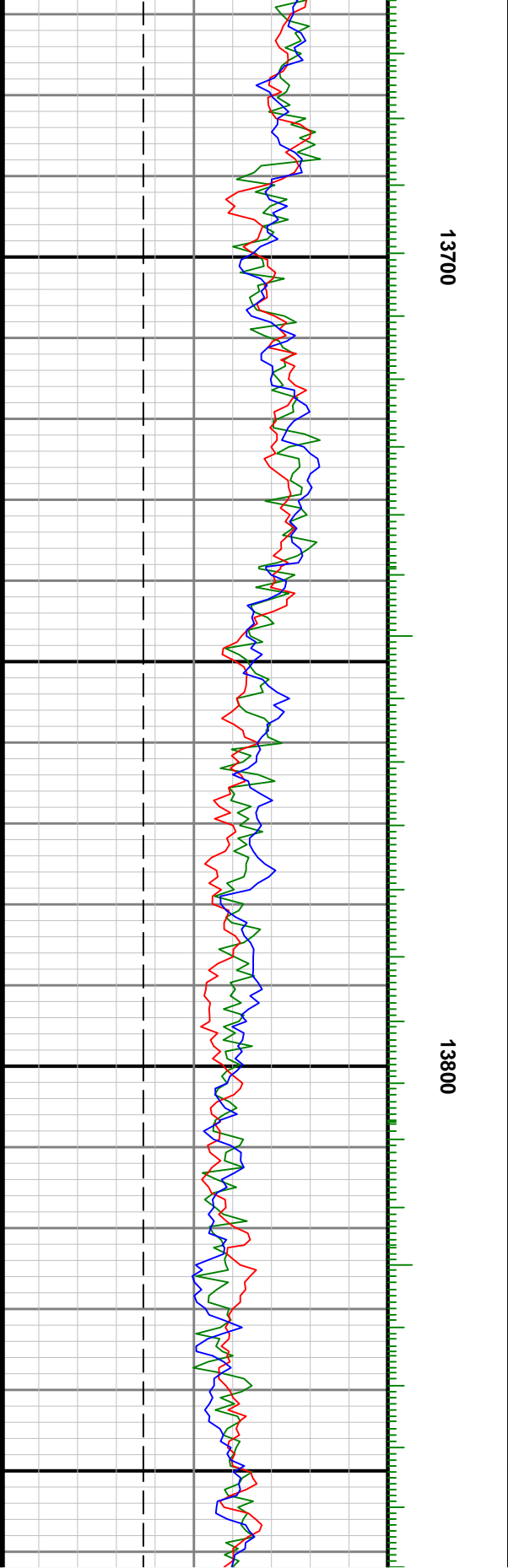
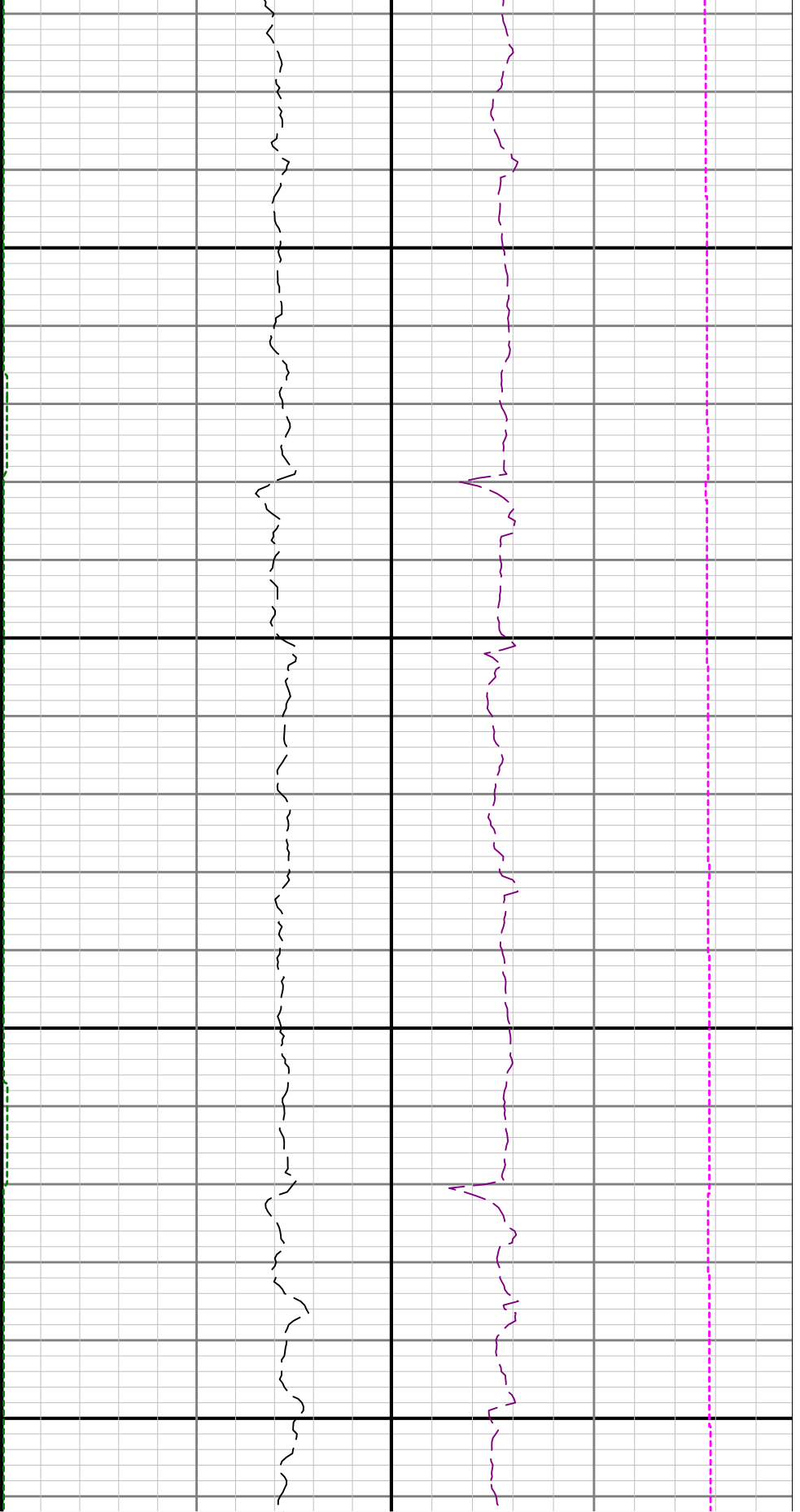




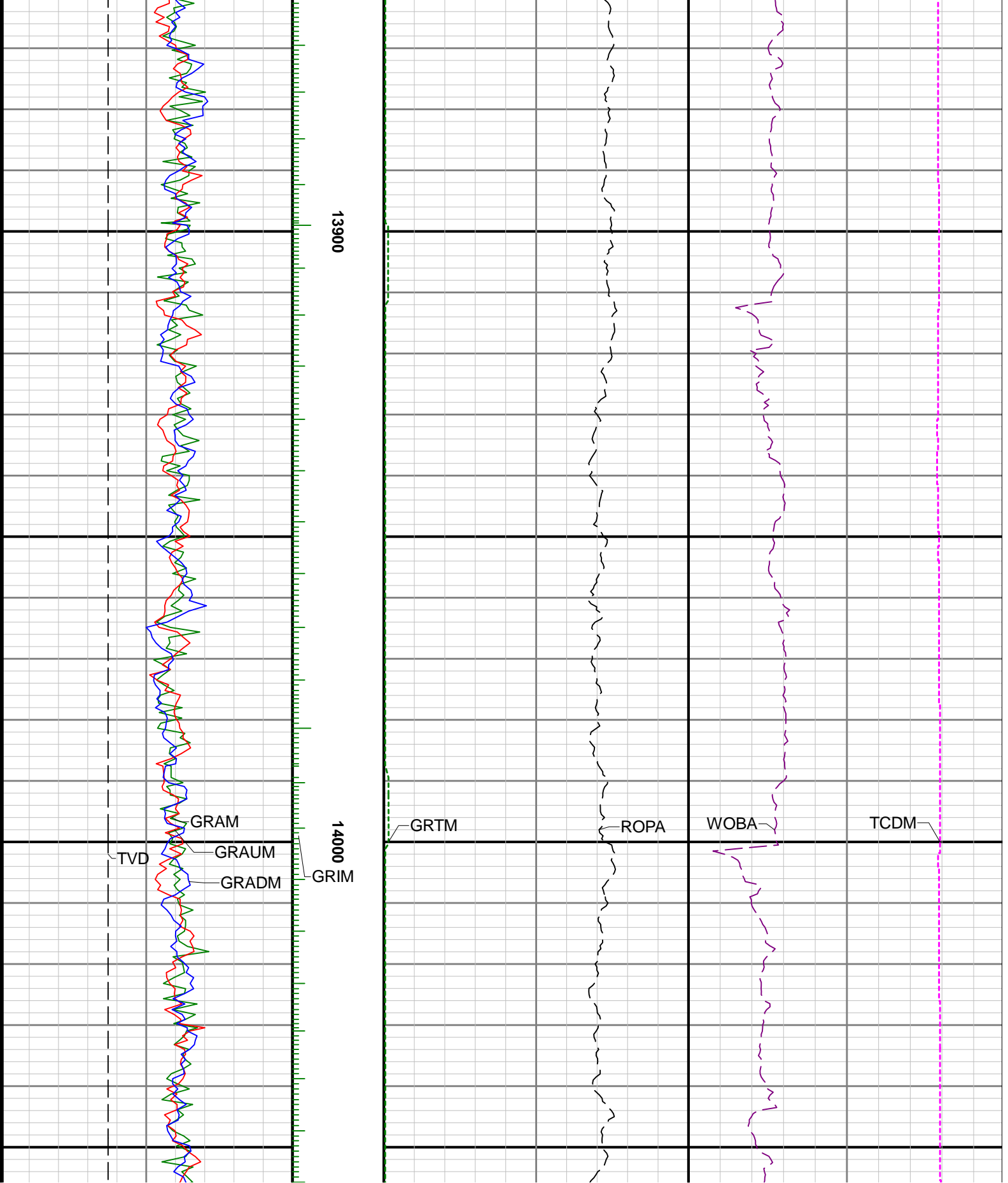


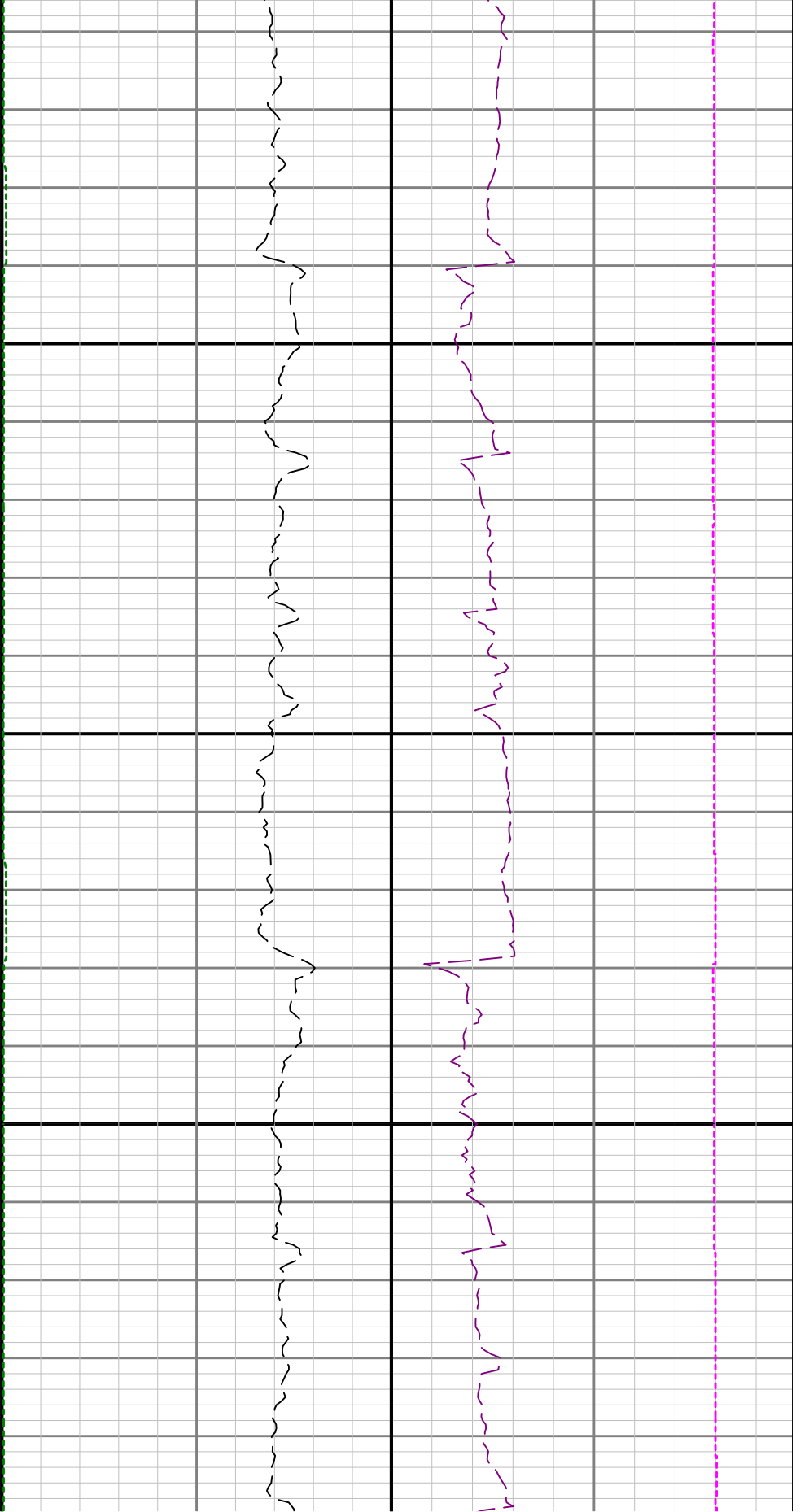






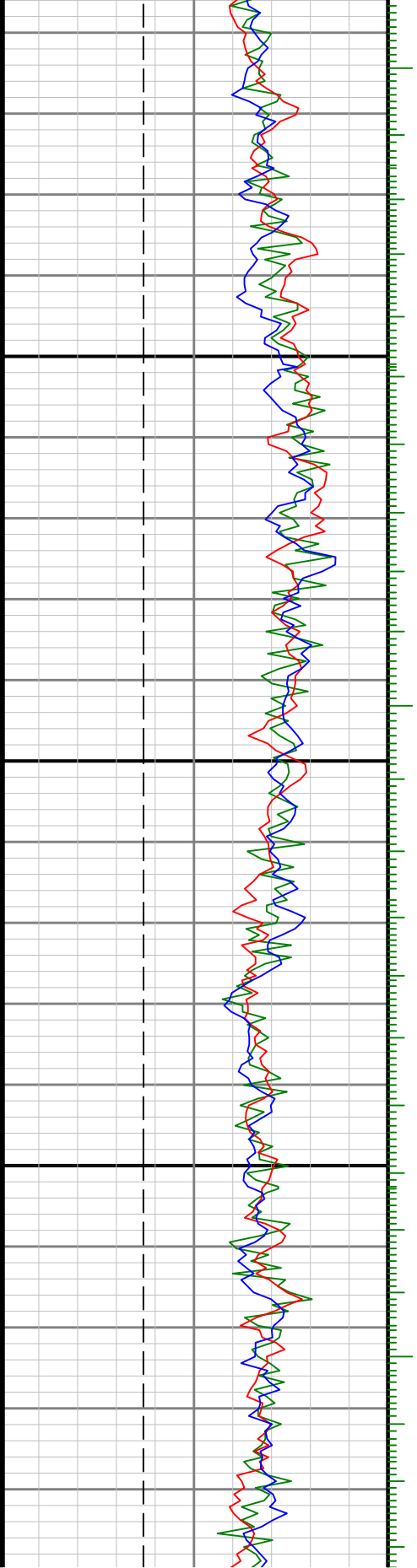


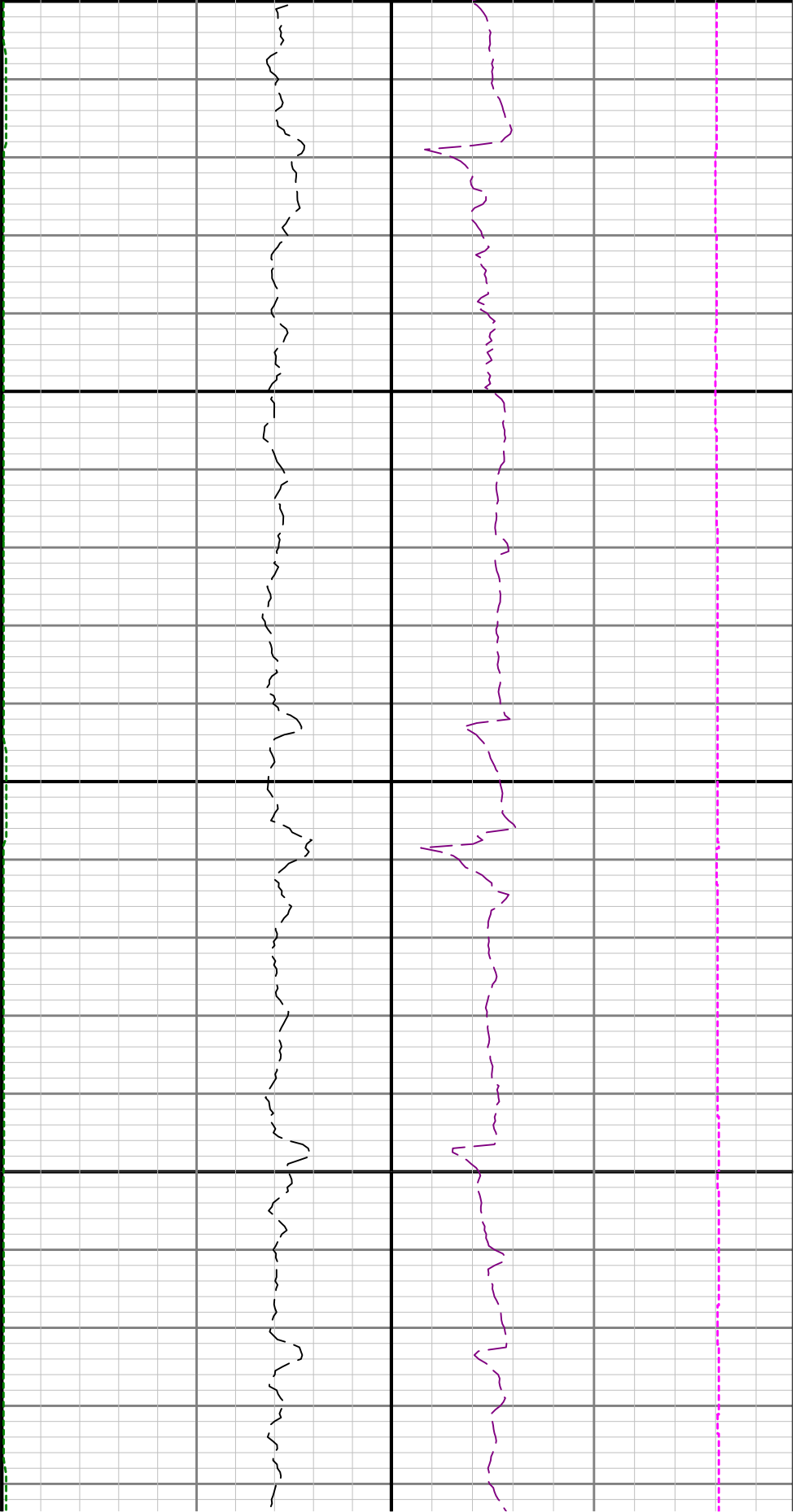




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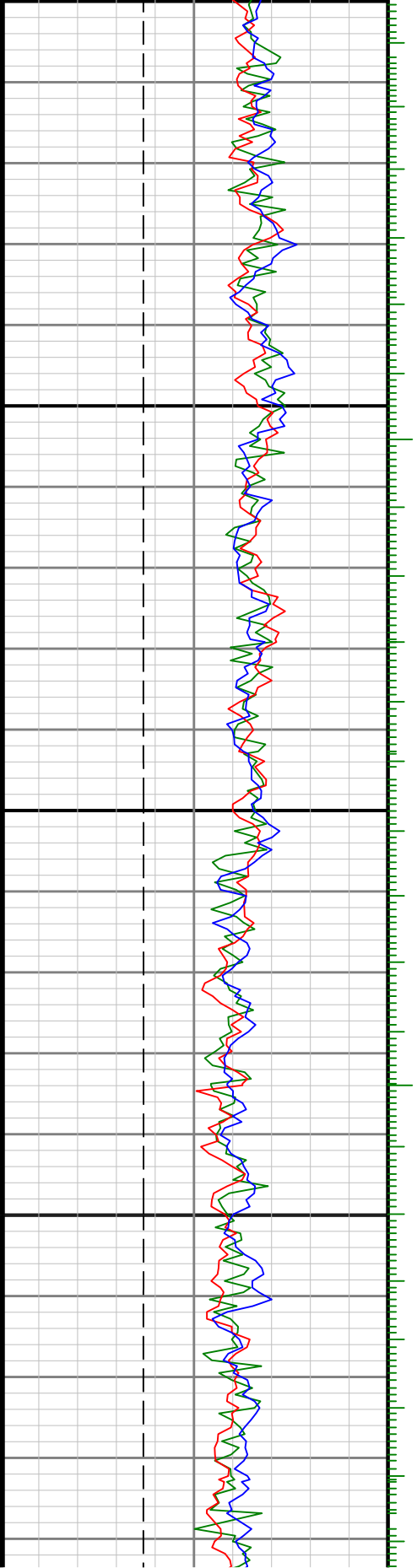
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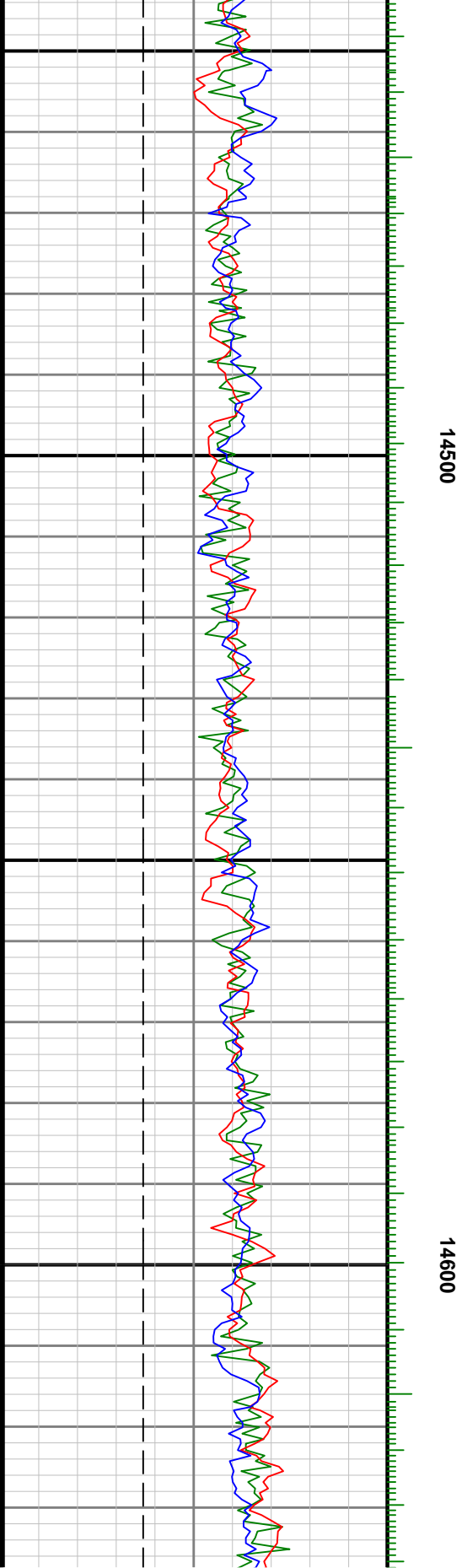
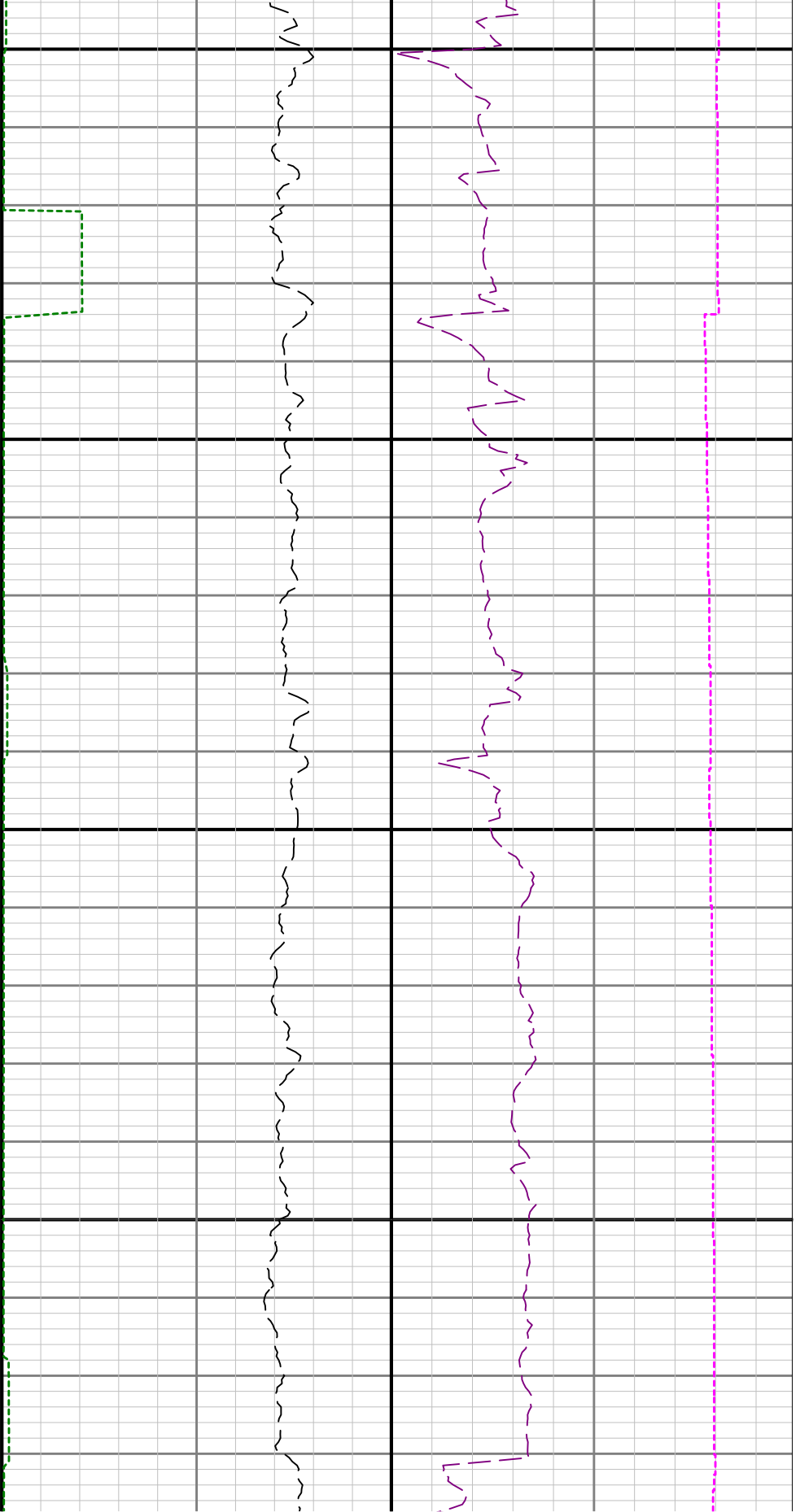


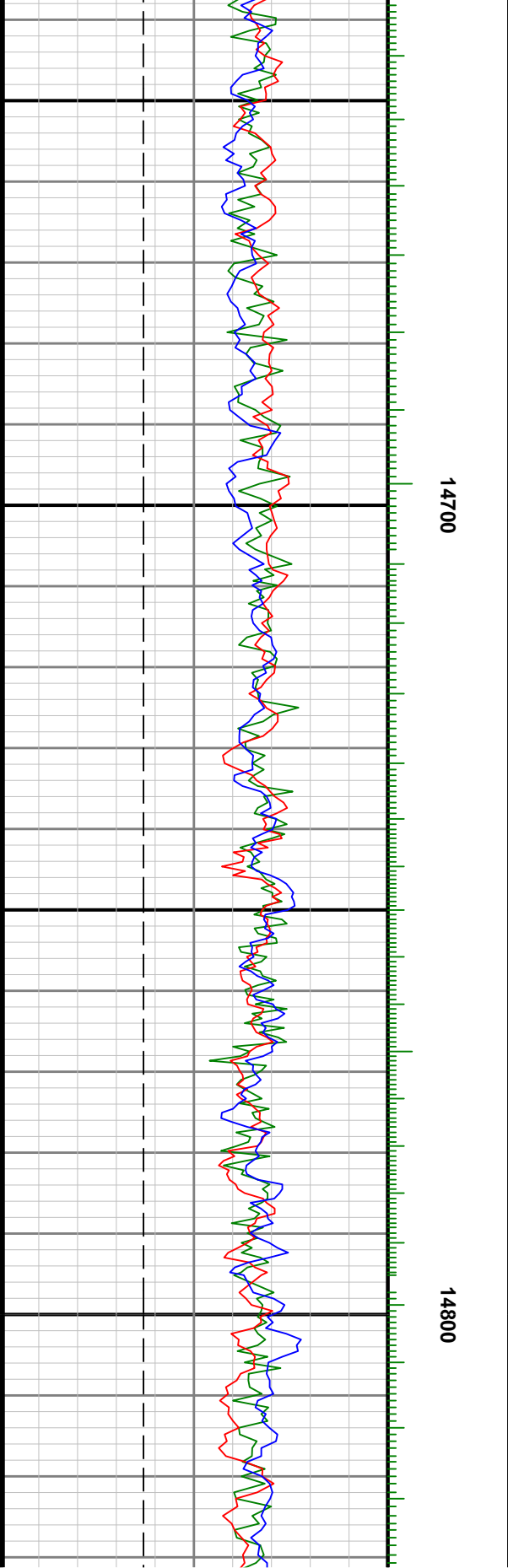


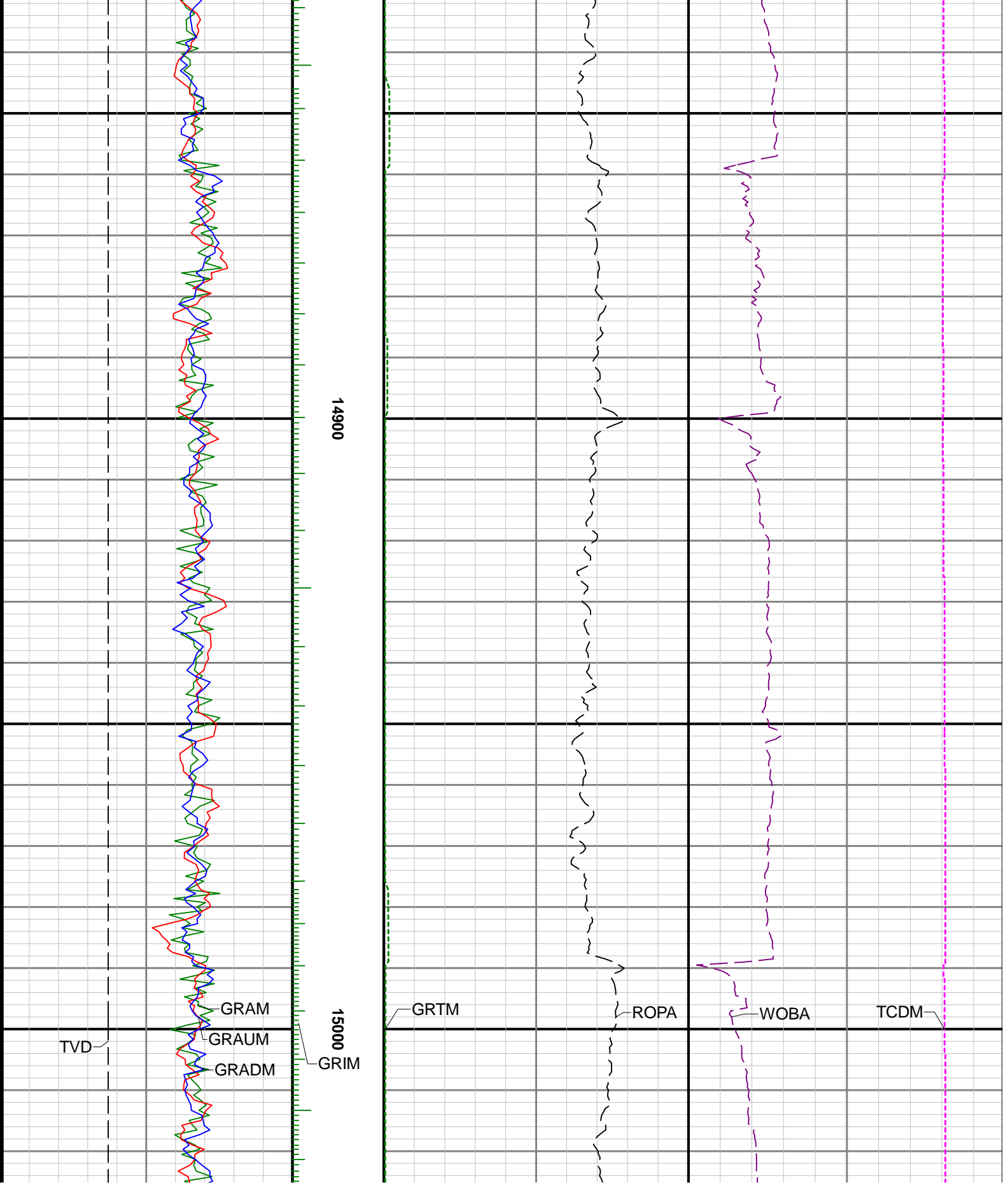
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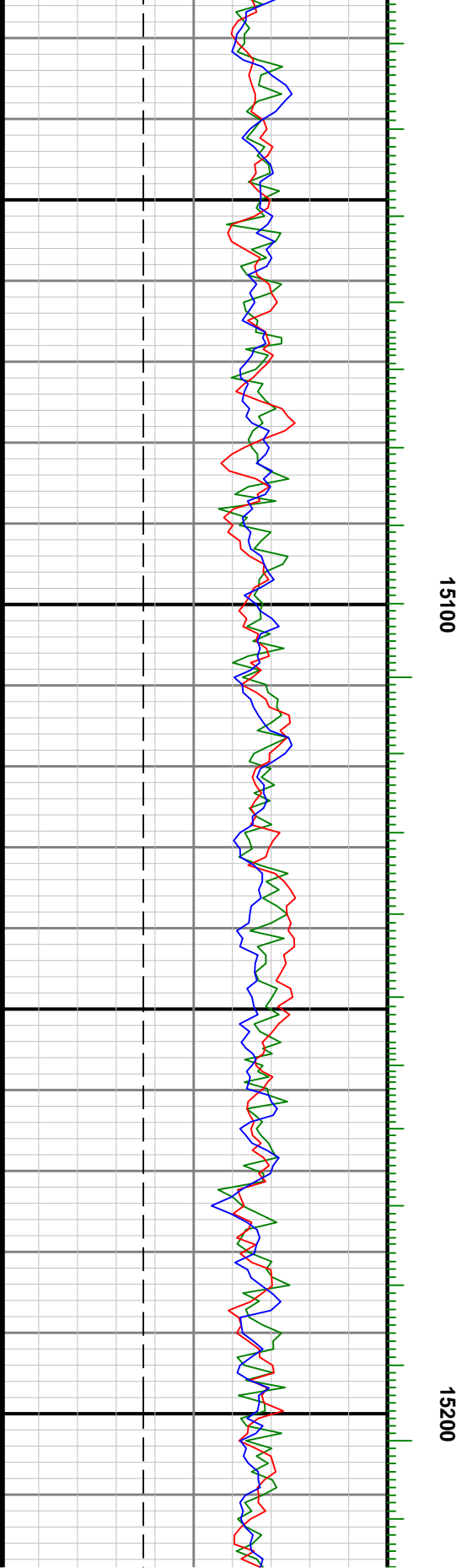
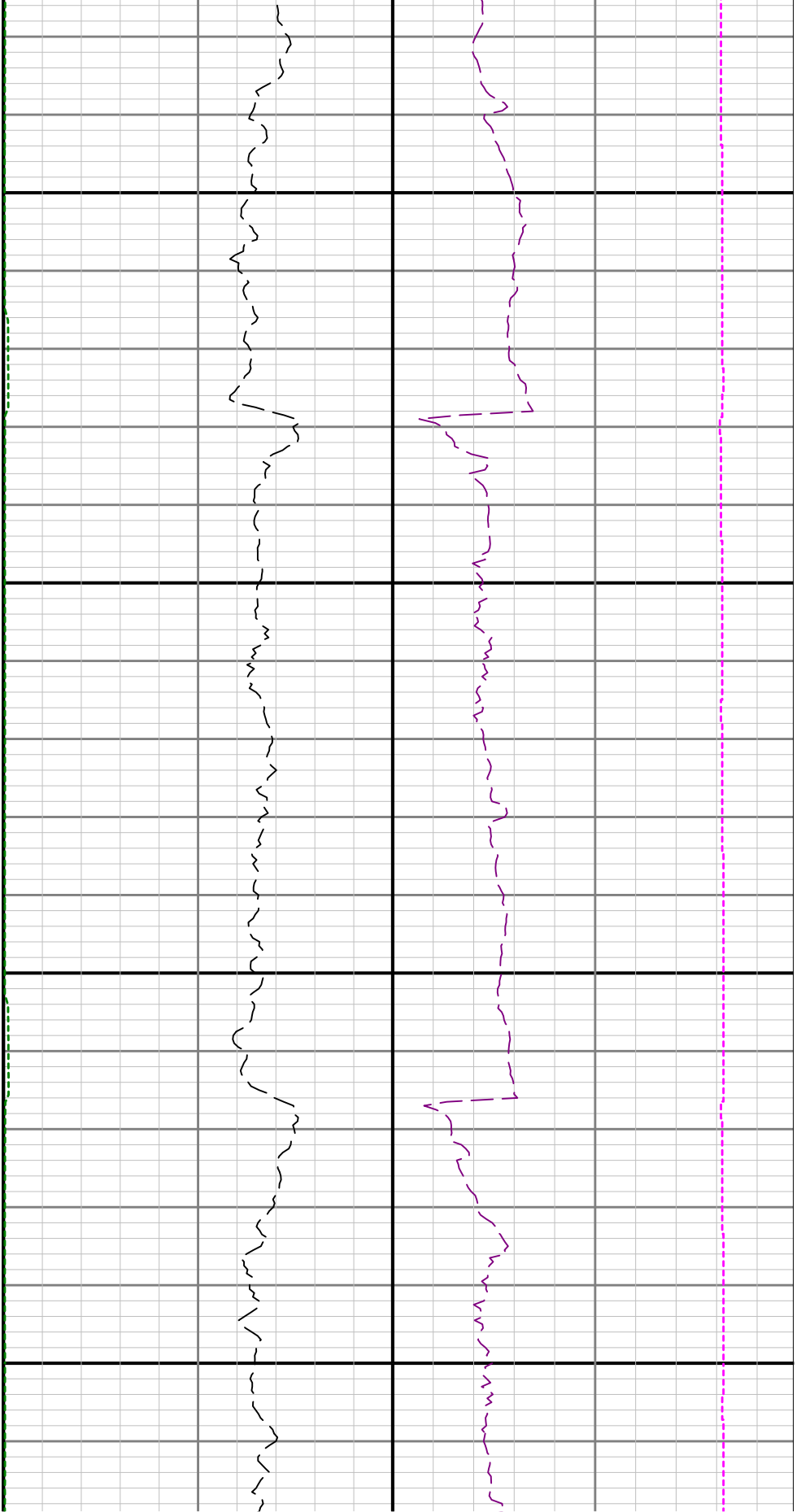
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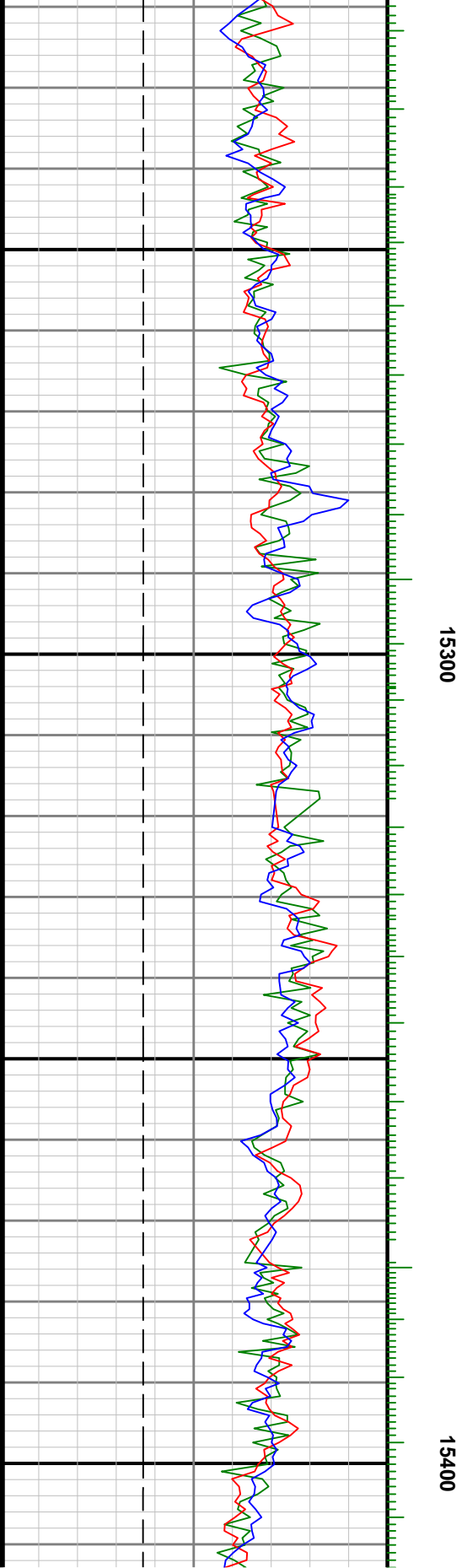
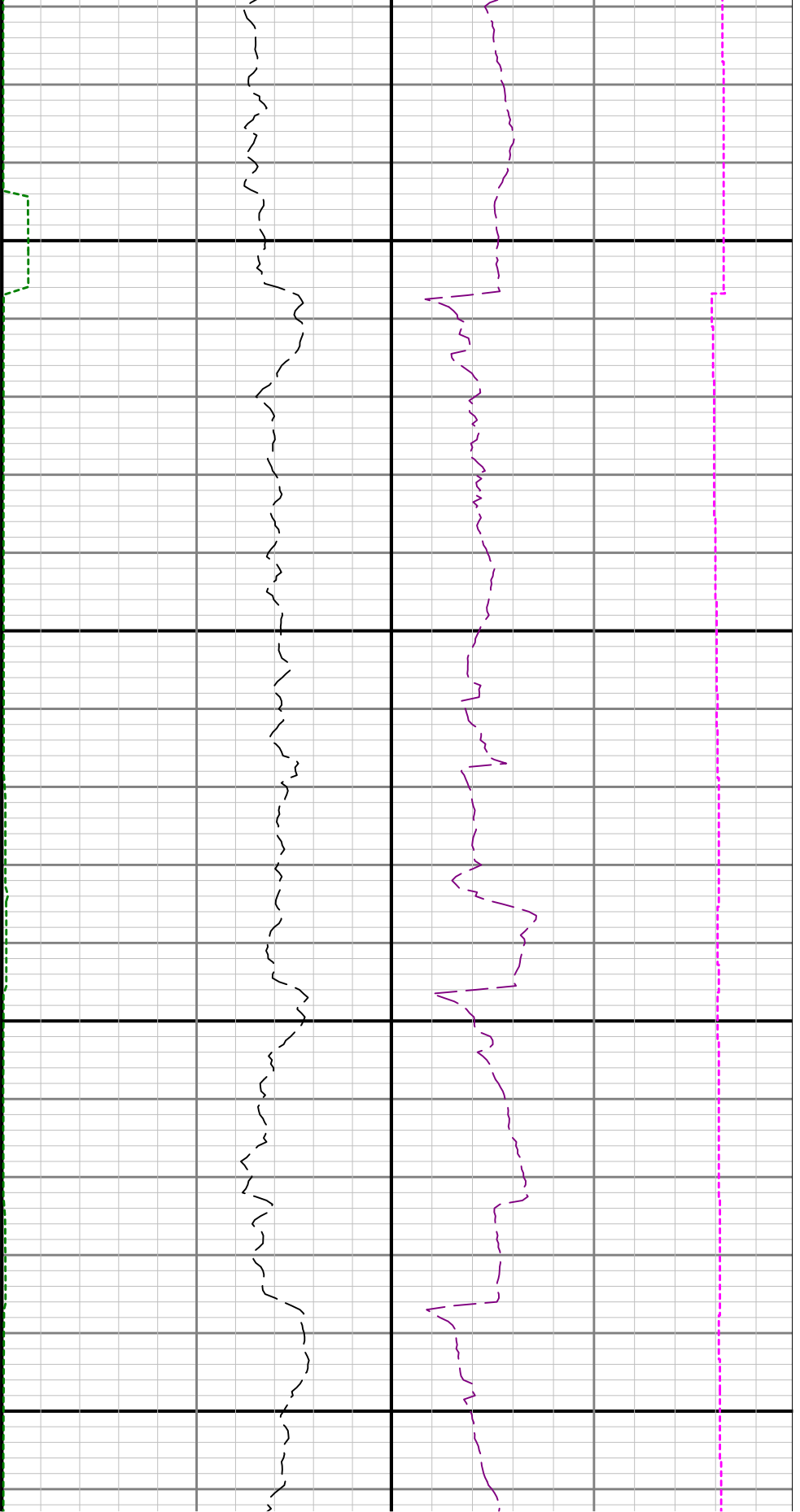




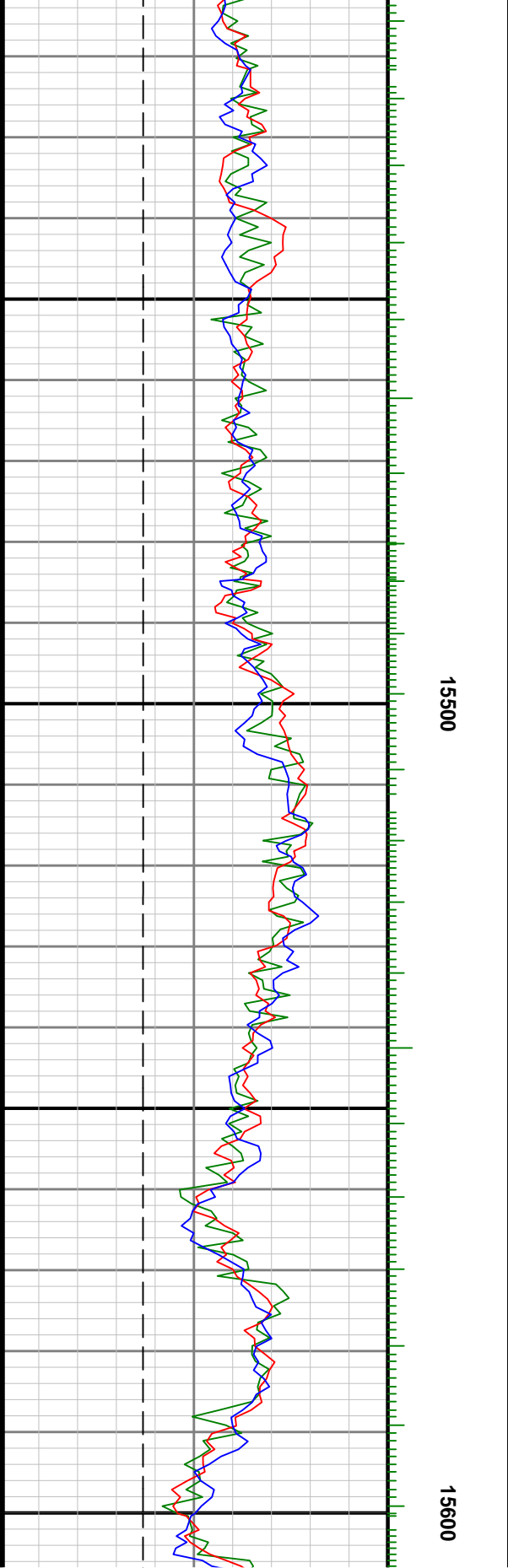
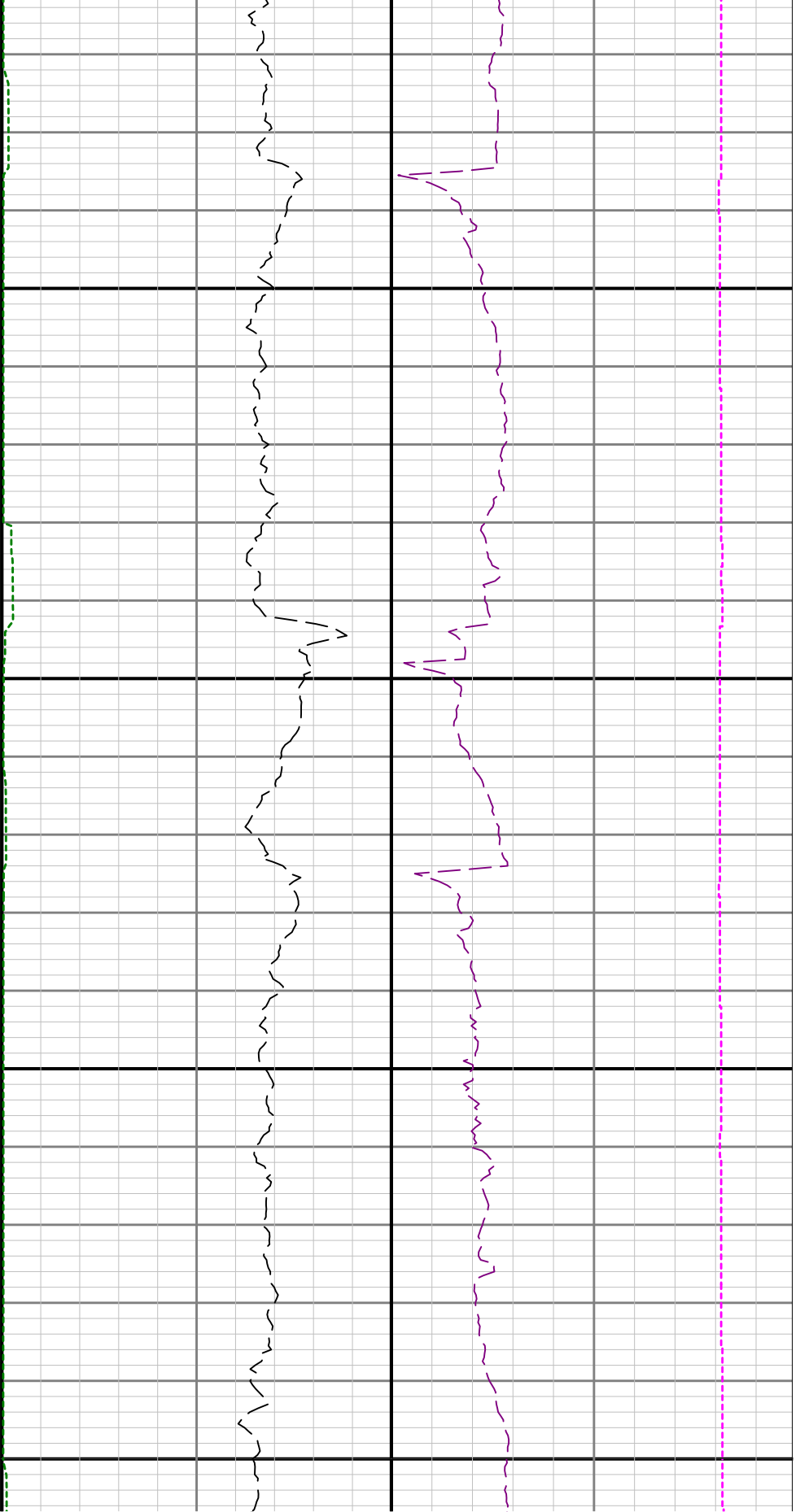


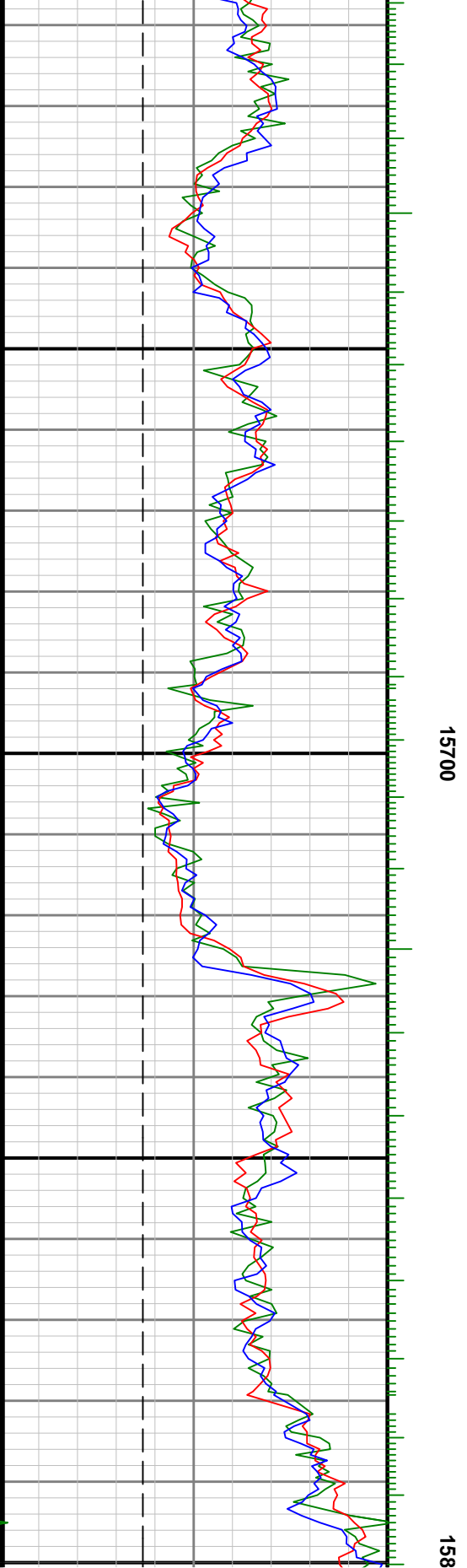
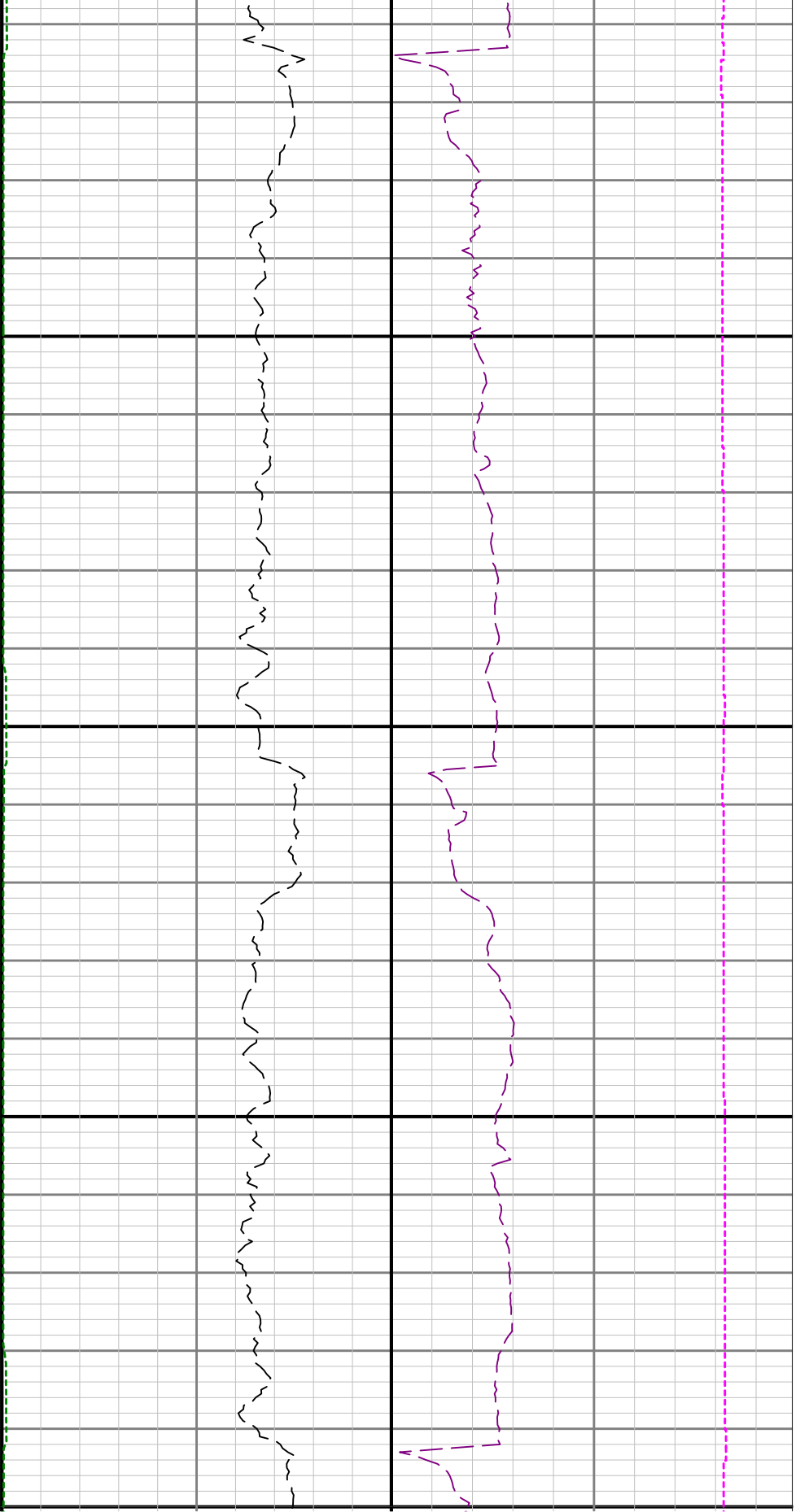


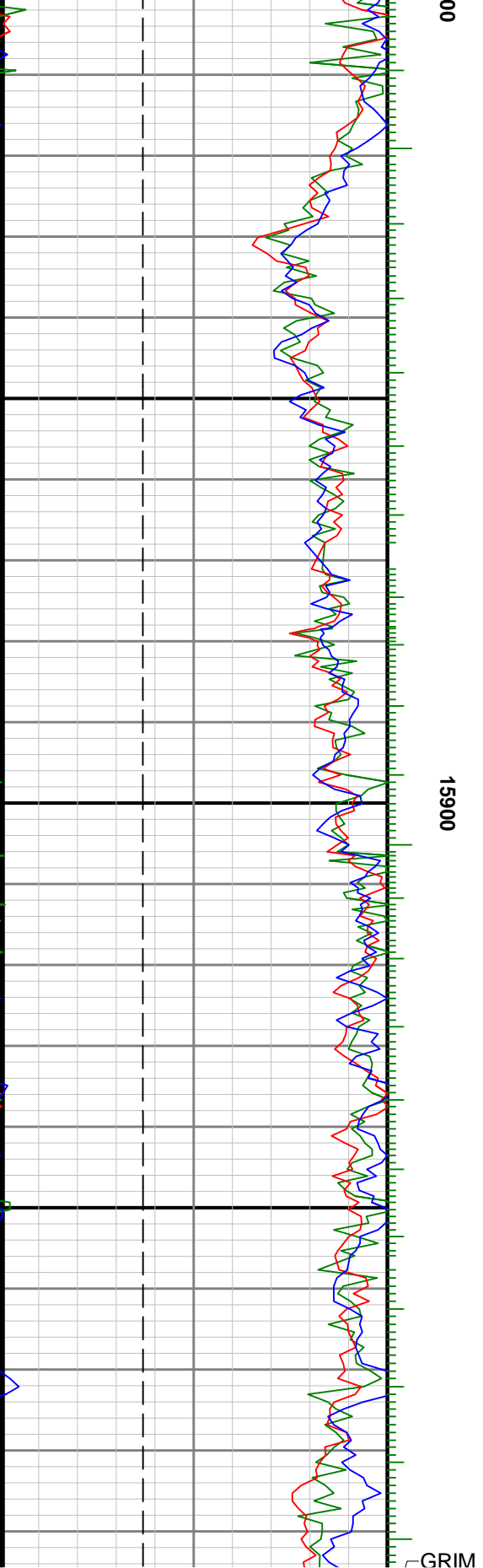
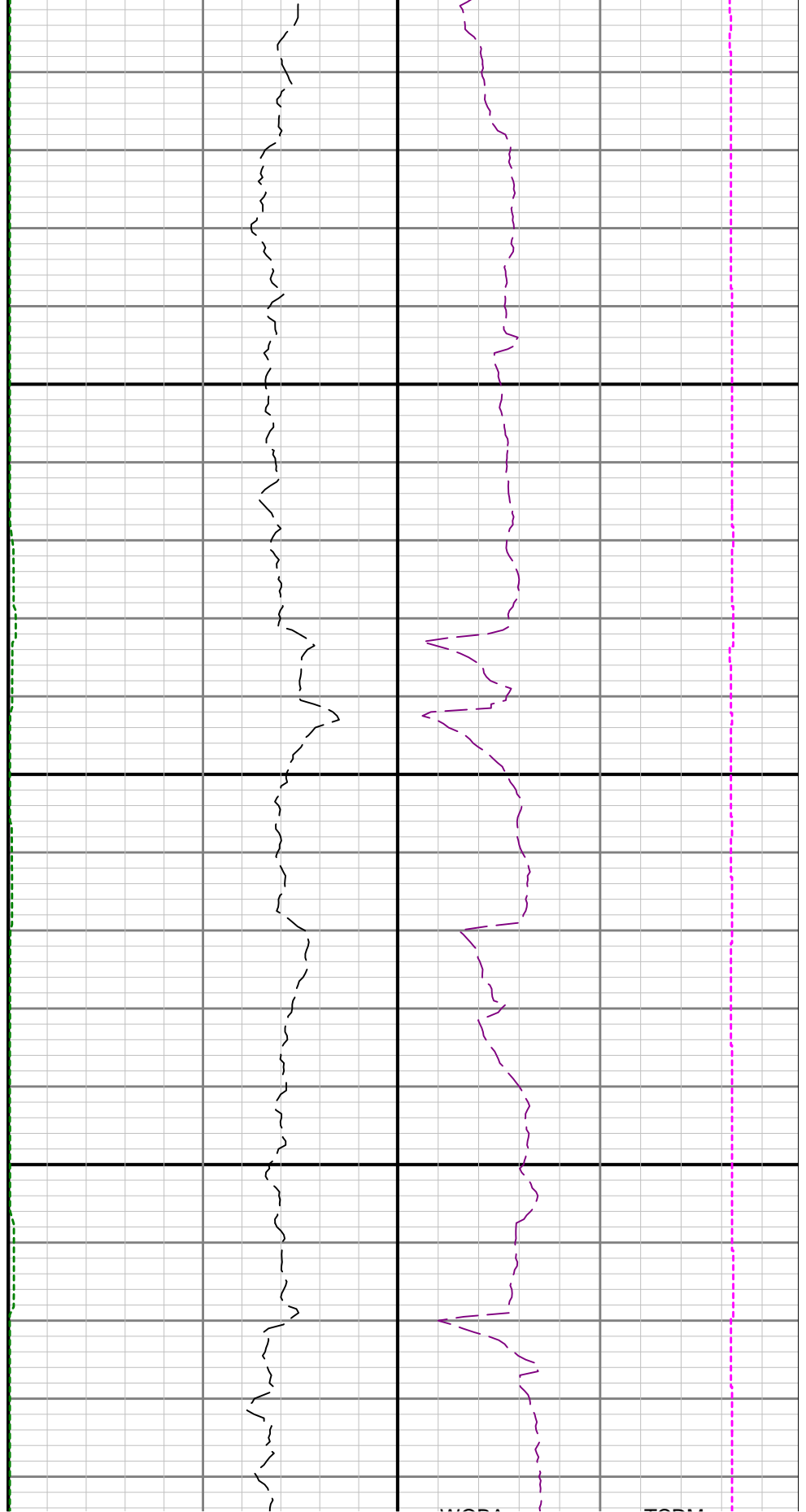


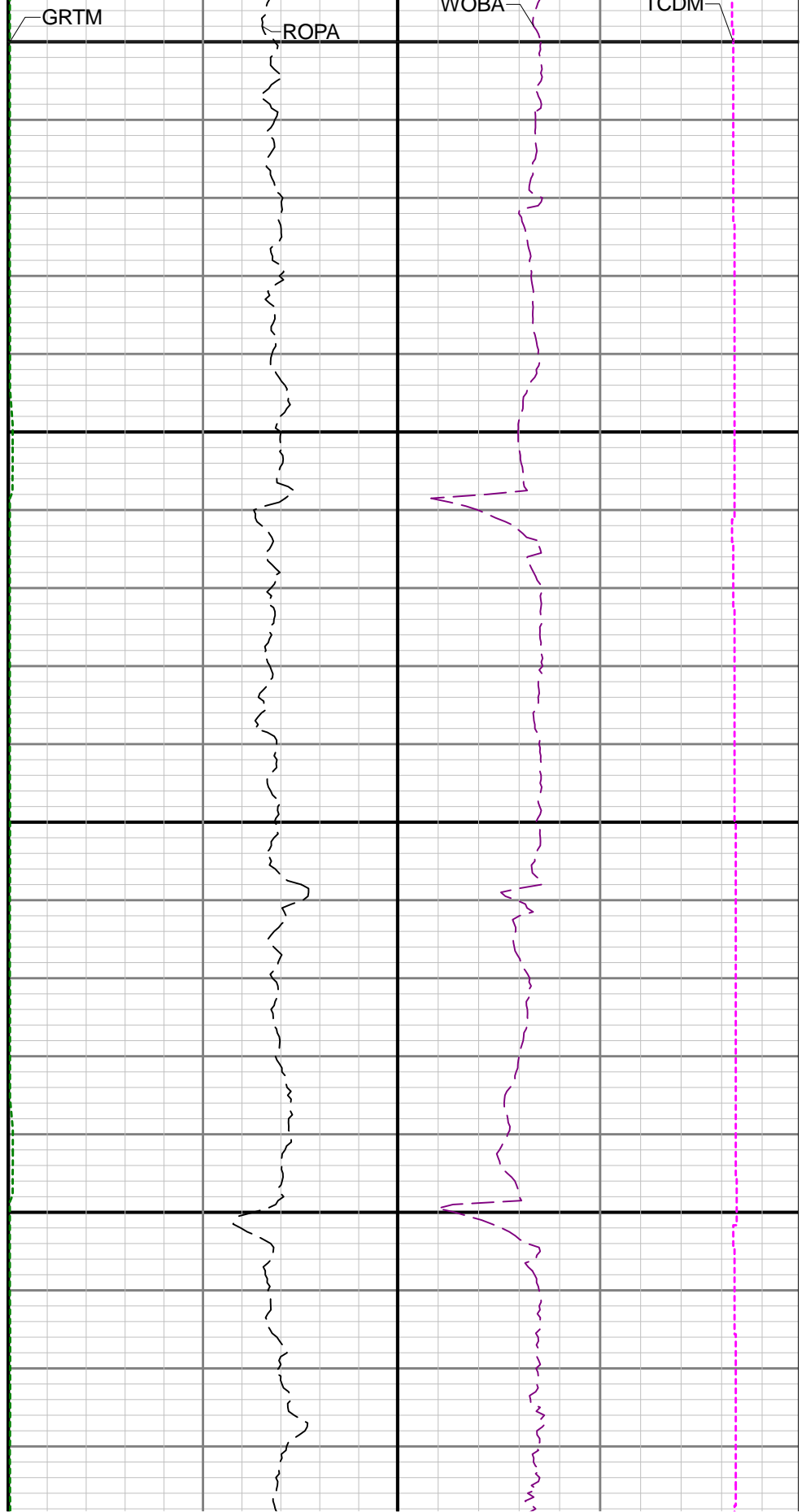
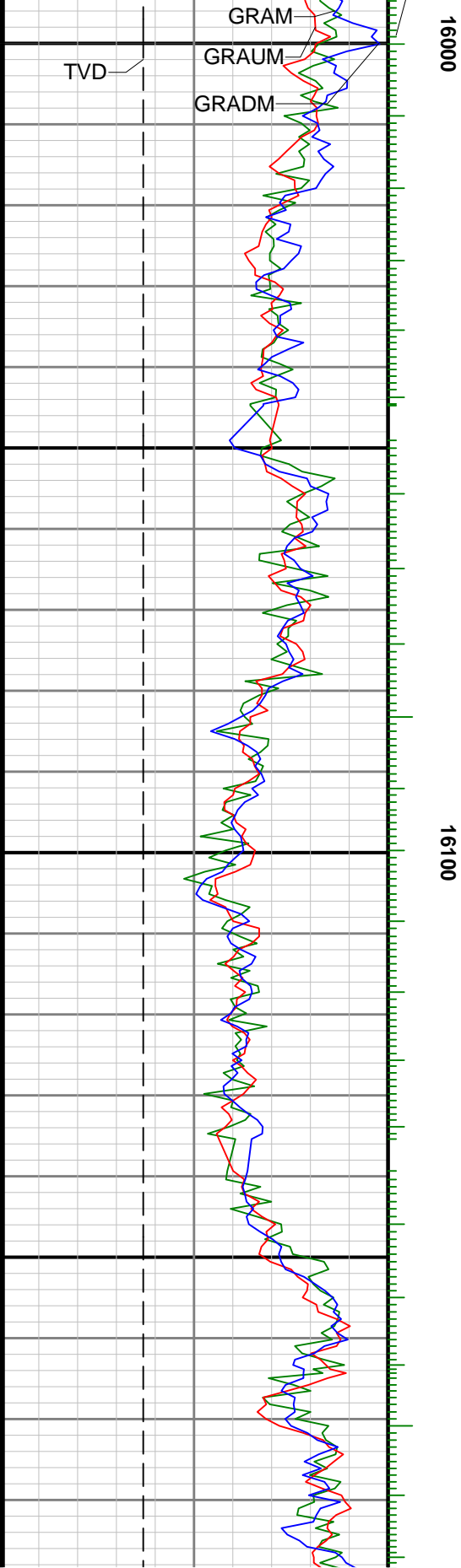


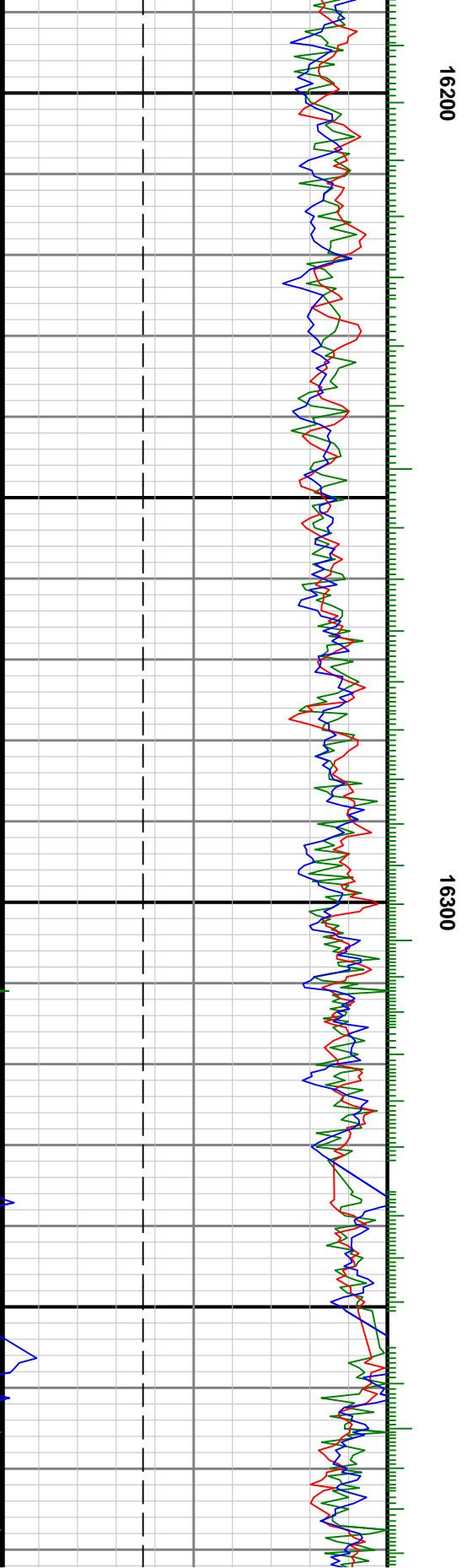
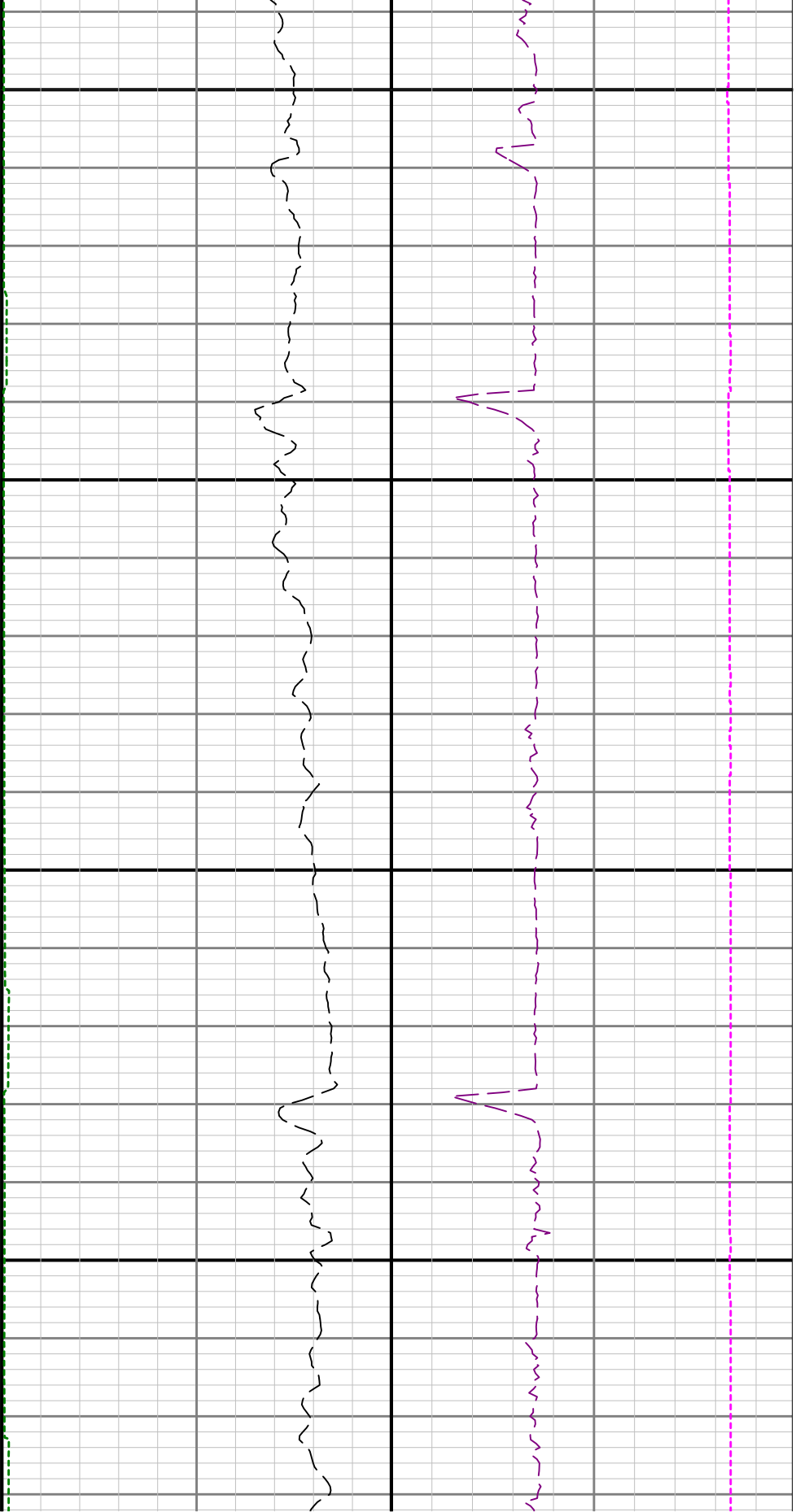


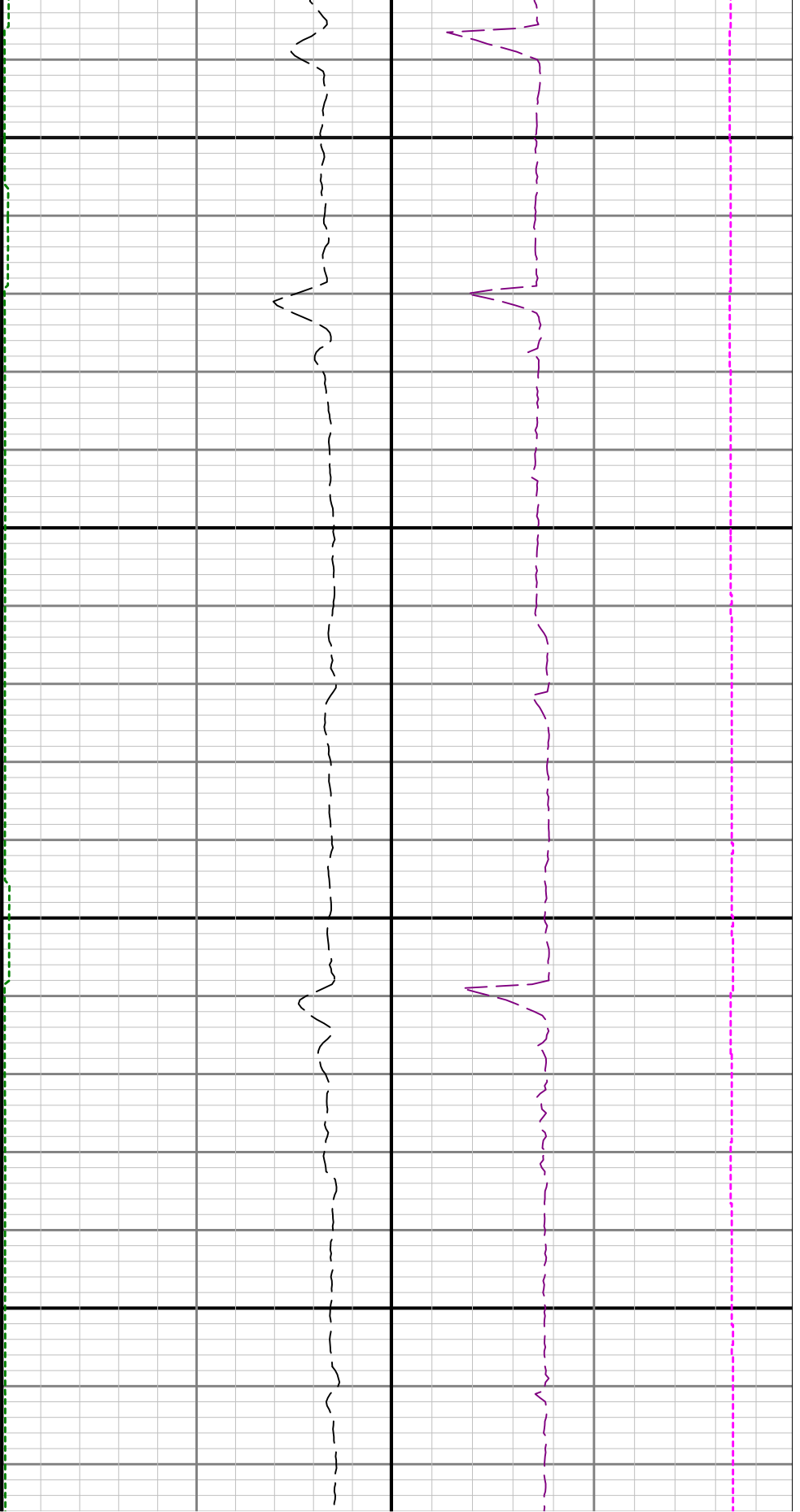






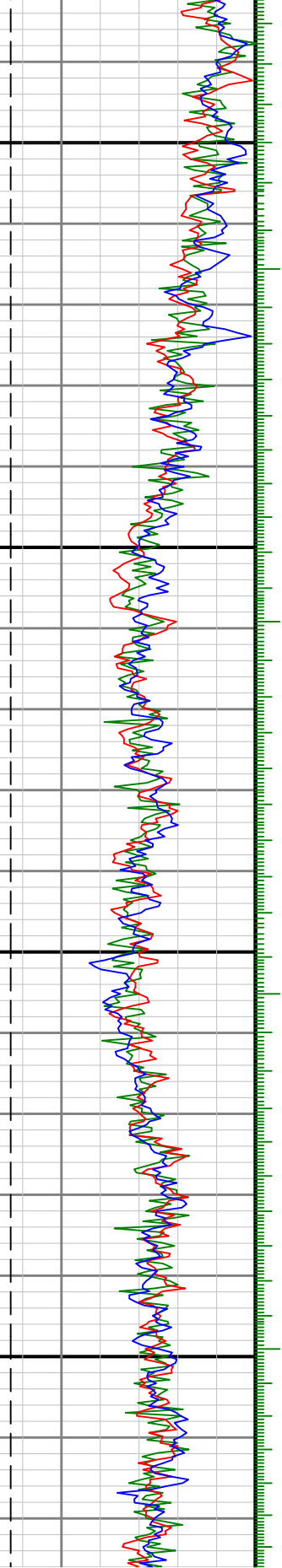


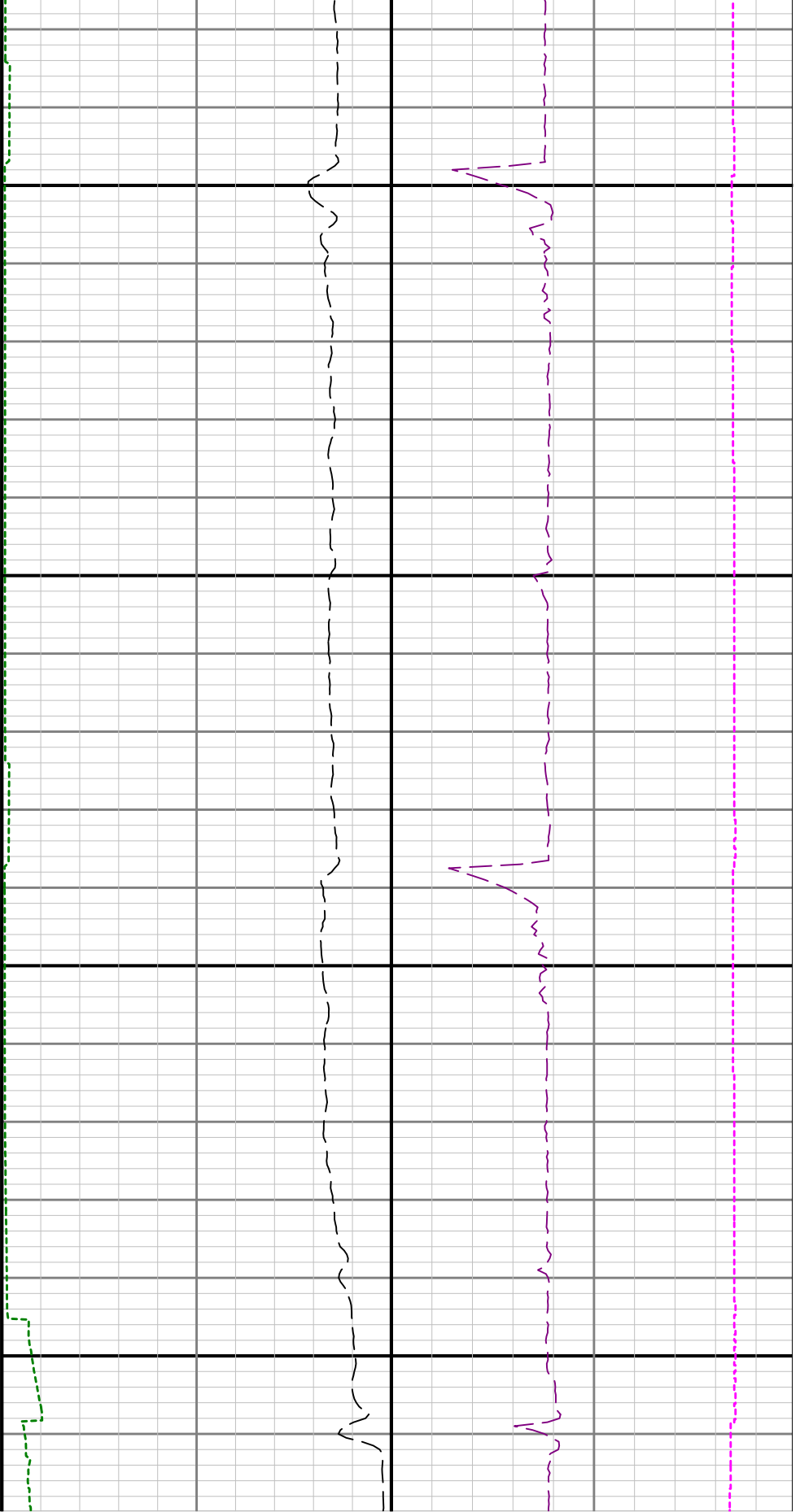




16400

16500





16600

16700

