



BAKER  
HUGHES

LWD MEMORY LOG

Gamma Ray

Scale:

Company: Ward Petroleum Corporation

1:240 MD

Well: Ritchey #26-1-19HC

Depth Reference:

Field: Weld County

Driller's Depth

Country: Weld Country: United States

State: Colorado

Status:

Final Print

Surface Location:  
Latitude: 40° 46' 44" N  
Longitude: 106° 41' 06" W

Other Services:

API No: 05-123-44745-0000

Job ID: 8628324

SEC: 26 TOWN: 1N RGE: 66W

Permanent Datum (P.D.): Ground Level  
Log Measured From: Rig Floor

Elevation: 5154.00 ft  
Above P.D. 20.00 ft  
Elev. KB: 5174.00 ft  
Elev. DF: 5154.00 ft  
Elev. GL:

Dates

Interval Logged

Magnetic Field Reference

Date From: 2017-06-29 Top: (ft) 1496.00  
Date To: 2017-07-02 Bottom: (ft) 12586.00  
Spud Date: 2017-06-26

Azi Reference North: True  
Total Magnetic Field Strength: (nT) 52228  
Mag to Reference North Correction: (deg) 8.35 E

Borehole Record

Casing Record

Hole Size (in)	From (ft)	To (ft)	Size (in)	Weight (lb/ft)	From (ft)	To (ft)
13.500	20.00	1496.00	13.500	37.00	20.00	1486.00
8.500	1496.00	12586.00				

Mud Record

Deviation Record

Type	From (ft)	To (ft)	Hole Size (in)	Interval (ft)	Inc   Az (Start)	Inc   Az (End)
Oil Based Mud	20.00	12586.00	8.500	11090.00	0.00   78.10	89.69   177.53

Acquisition System

Software Version

Other

Baker Hughes Cadence  
Plot Studio

RT4.1  
4.1.7763.3

Rig: PD 460  
Contractor: Precision Drilling  
District: RMA  
Unit: US Land

"These interpretations and analyses ("Interpretations") are opinions provided by Baker Hughes Oilfield Operations, Inc ("Baker Hughes"), based upon industry practice, empirical relationships, assumptions and measurements, (many of which may be provided by the customer). The Interpretations are not infallible and may be subject to different opinions. Vjwu."Dcmgt"Jwi jgu"fqgu"pqv"ycttcpv"vjgkt"ceewtce{"."eqttgevpvguu."qt"eqorngvgpguu."qt"vjcv"vjg"ewuvqogtøu"cpflqt"cp{" vjktf"rctv{øu"tgnkcpeg"qp"uwej"Kpvgtrtgvcvkqpu"yknn"ceeqornkuj"cp{"rctvkewnct"tguwnvu0"Vjg"ewuvqogt"cuuwogu"hwnn" responsibility for the use of the Interpretations and for decisions based thereon and the customer agrees to release, defend and indemnify Baker Hughes, its parent, subsidiaries and affiliated or related entities, and subcontractors, together with its and their officers, directors, employees, agents and invitees against, any and all claims, losses, damages, or expenses sustained by the customer or any third party arising out of reliance upon or use of the Interpretations, without regard to the cause(s) thereof, including without limitation any form of negligence on the part of Baker Hughes. Unless other contract terms have been agreed to by the parties, each party's liabilities and qdnkicvkqpu"ujcnn"dg"iqxgtpgf"d{"Dcmgt"Jwi jgu"Kpeqtrqtctvgføu"Yqtnfykfg"Vgtou"cpf"Eqpfkvkqpu0\$""

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	1486.00	9500.00	1496.00	9513.00	2017-06-30 00:55	2017-07-01 13:28	33.91
2	2	8.500	PDC	3.00	AutoTrak Curve	9500.00	12573.00	9513.00	12586.00	2017-07-01 23:27	2017-07-02 13:17	14.12

Crew

Name		Arrive Wellsite	Depart Wellsite	Name		Arrive Wellsite	Depart Wellsite	Name		Arrive Wellsite	Depart Wellsite
Andrew Clancy		2017-06-28	2017-07-02	Doug Rusco		2017-06-28	2017-07-02				

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+ (%)
2017-06-30 06:49		1	3066.00	Oil Based Mud	10.0	18	0	0.0	76/24	Active Pit	29000	0.00
2017-07-01 06:44		1	8250.00	Oil Based Mud	9.9	16	0	0.0	77/23	Active Pit	26000	0.00
2017-07-02 06:12		2	11199.00	Oil Based Mud	10.2	20	0	0.0	76/24	Active Pit	35000	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	ATC_SU	12911316	Near Bit VSS	5.93	6.73	7.000	4.330
1	ATC_SU	12911316	Near Bit Inclination	5.93	6.73	7.000	4.330
1	ATC_MWD	12141334	Gamma (single)	2.75	12.90	7.000	3.250
1	ATC_MWD	12141334	Directional (mag)	12.27	22.42	7.000	3.250
2	ATC_SU	12512032	Near Bit Inclination	5.93	6.73	7.000	4.330
2	ATC_SU	12512032	Near Bit VSS	5.93	6.73	7.000	4.330
2	ATC_MWD	12473747	Gamma (single)	2.20	12.35	7.000	3.250
2	ATC_MWD	12473747	Directional (mag)	12.27	22.42	7.000	3.250

Service and Tool Mnemonics

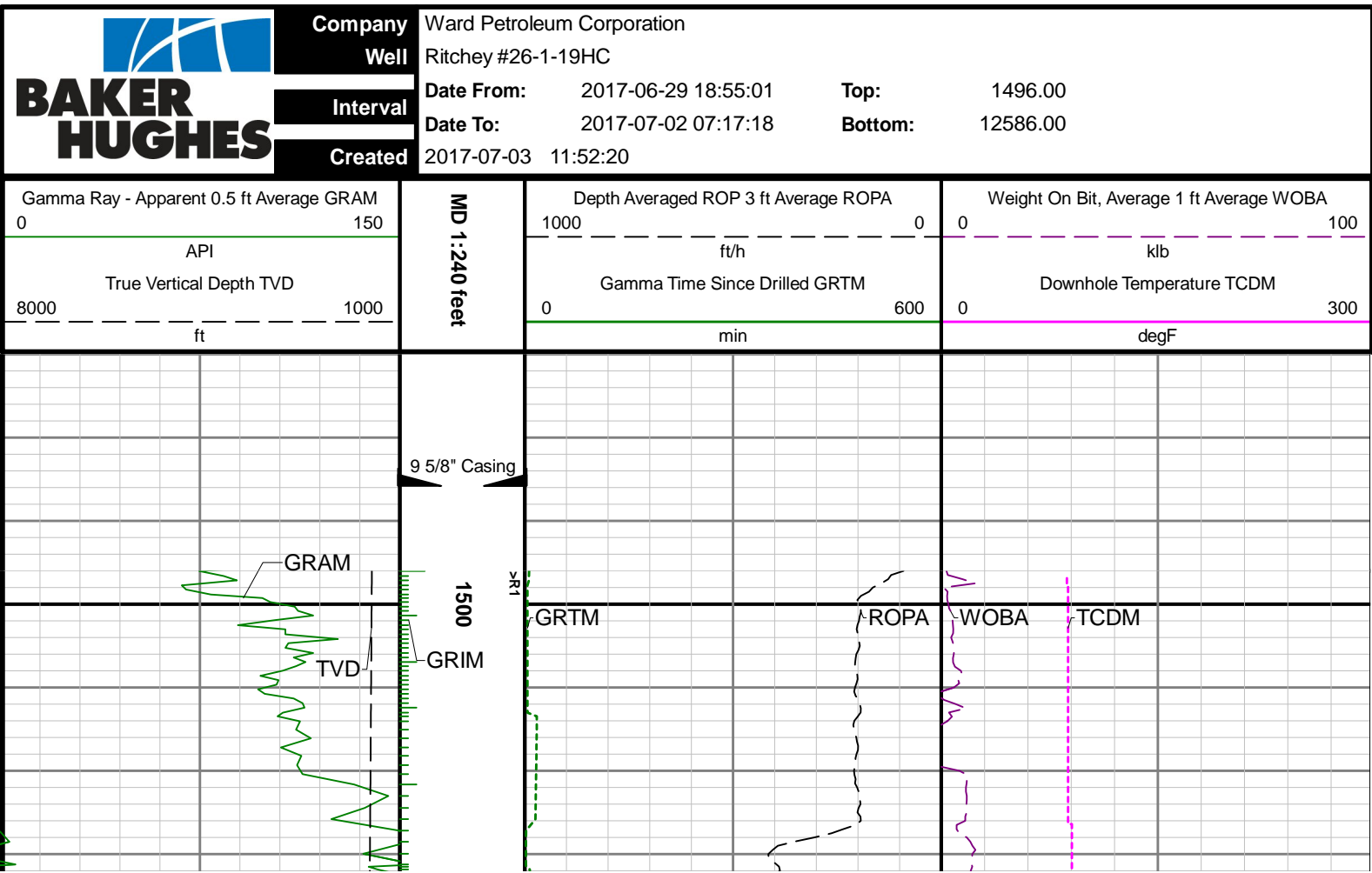
Mnemonic	Name	Description
ATC_SU	ATC_SU	Auto Trak Curve Steering Unit
ATC_MWD	ATC_MWD	Auto Trak Curve MWD
ATC_LCPM	ATC_LCPM	Auto Trak Curve LCPM

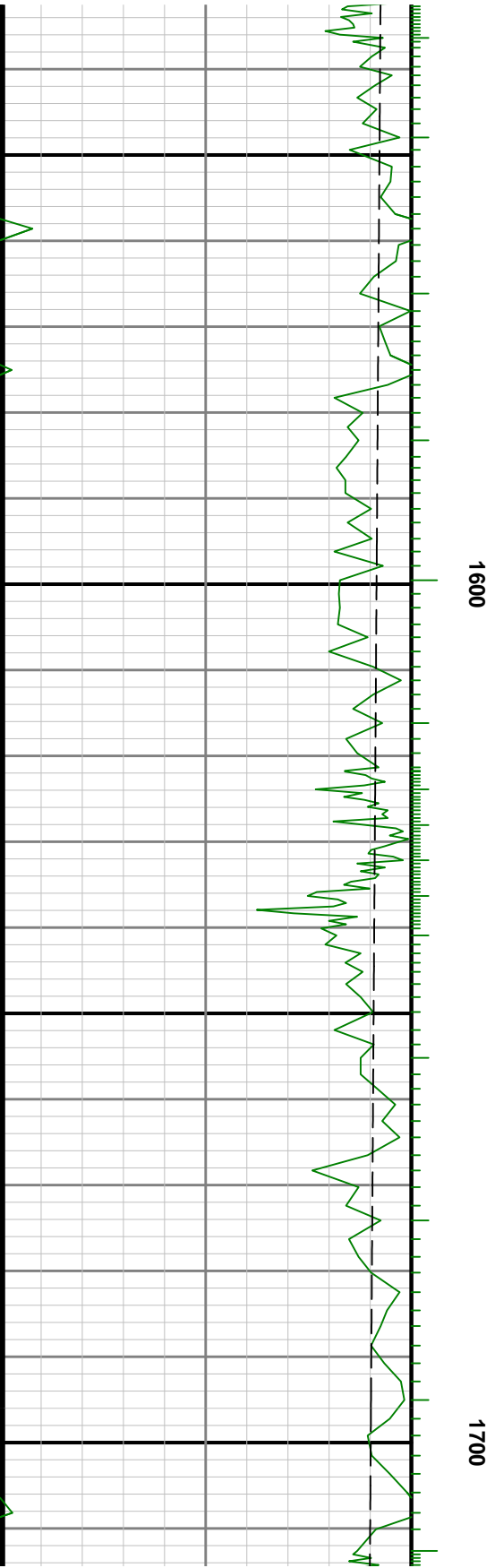
Comments

1	Depth measurements were 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	Corrosion rate of 0.0001 in/yr was determined from a coupon run from 1496 to 12586 feet MD (1496 to 7714 feet TVD).
3	Gaps in Gamma Ray data are present throughout the log due to downlinking while drilling ahead.

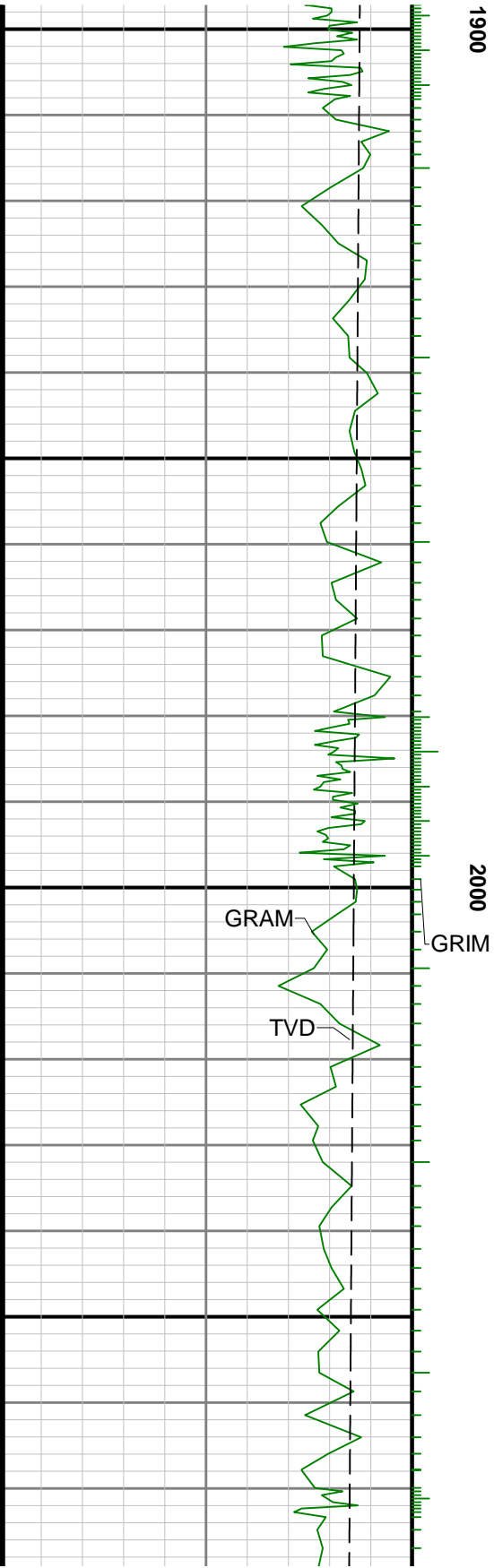
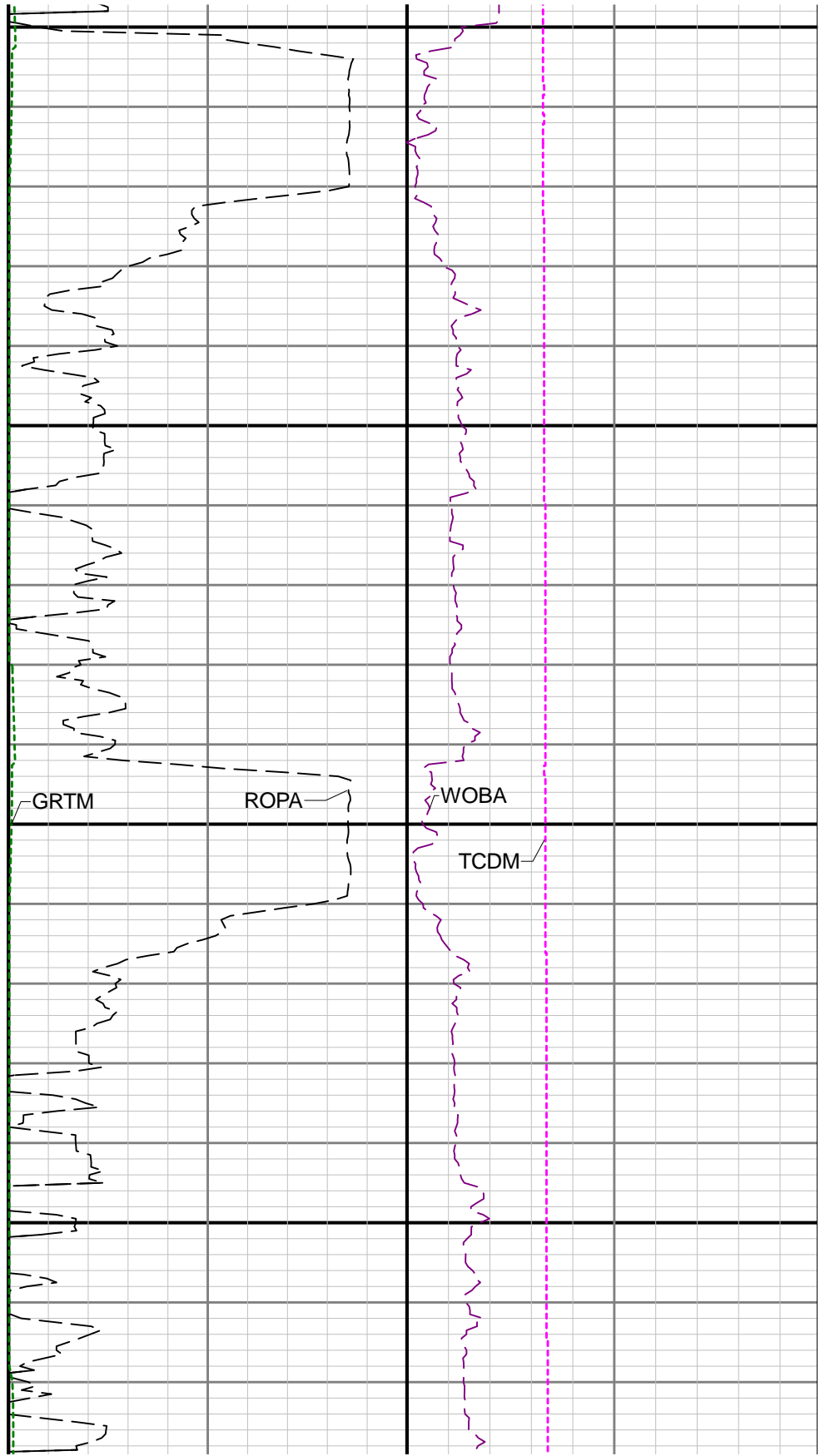
Remarks				
Number	Measured Depth (ft)	Hole Section (in)	Run No.	Remark
1	9501.00	8.500	2	The interval from 9501 to 9513 feet MD (7718 feet TVD) was logged up to 10.9 hours after being drilled due to a trip out of hole to change out BHA.
2	12586.00	8.500	2	The interval from 12573 to 12586 feet MD (7714 feet TVD) was not logged due to sensor to bit offset at well TD.

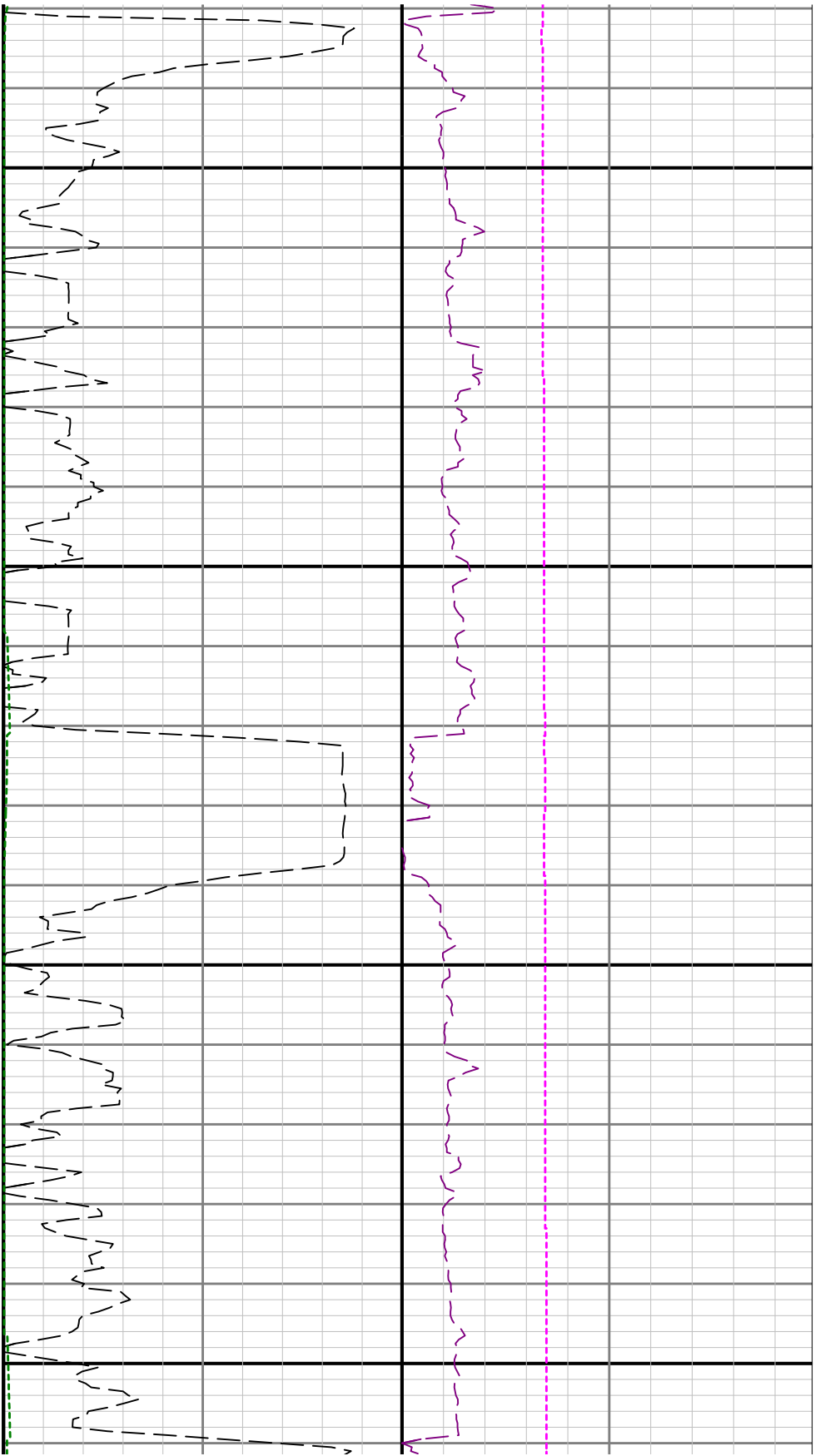
Curve Mnemonics		
Presented Curves	Description	Units
ROPA	Depth Averaged ROP 3 ft Average	ft/h
TVD	True Vertical Depth	ft
WOBA	Weight On Bit, Average 1 ft Average	klb
GRAM	OnTrak - Gamma Ray - Apparent - Memory 0.5 ft Average	API
GRIM	OnTrak - Gamma Ray - Data Point Indicator - Memory	unitless
GRTM	OnTrak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





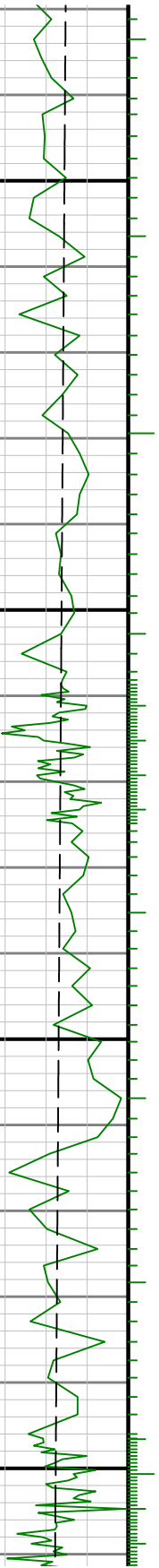






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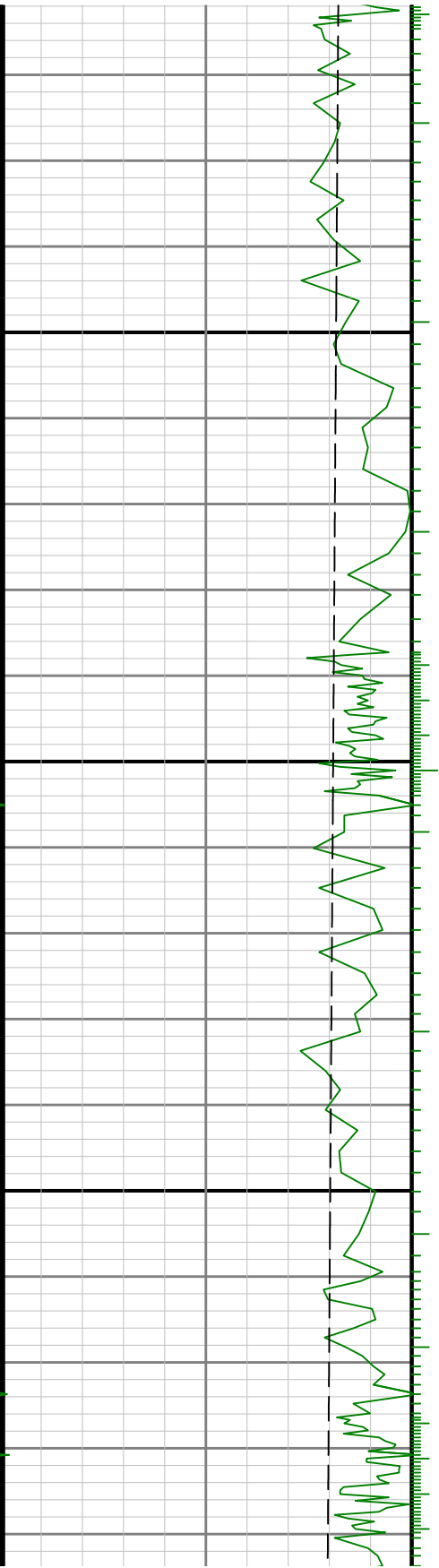
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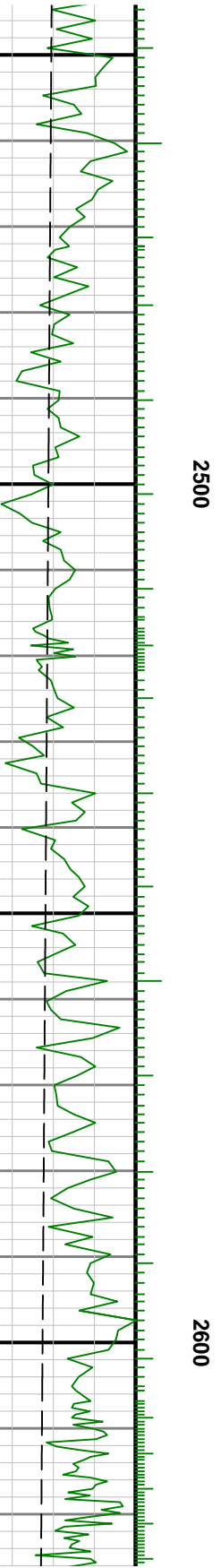


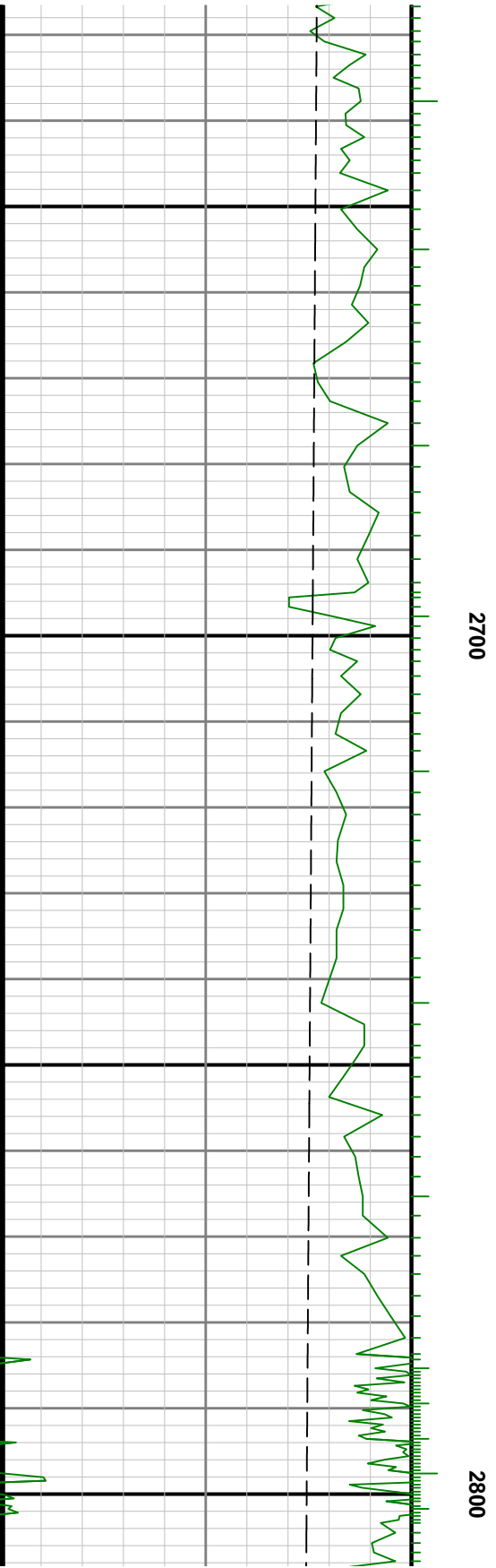
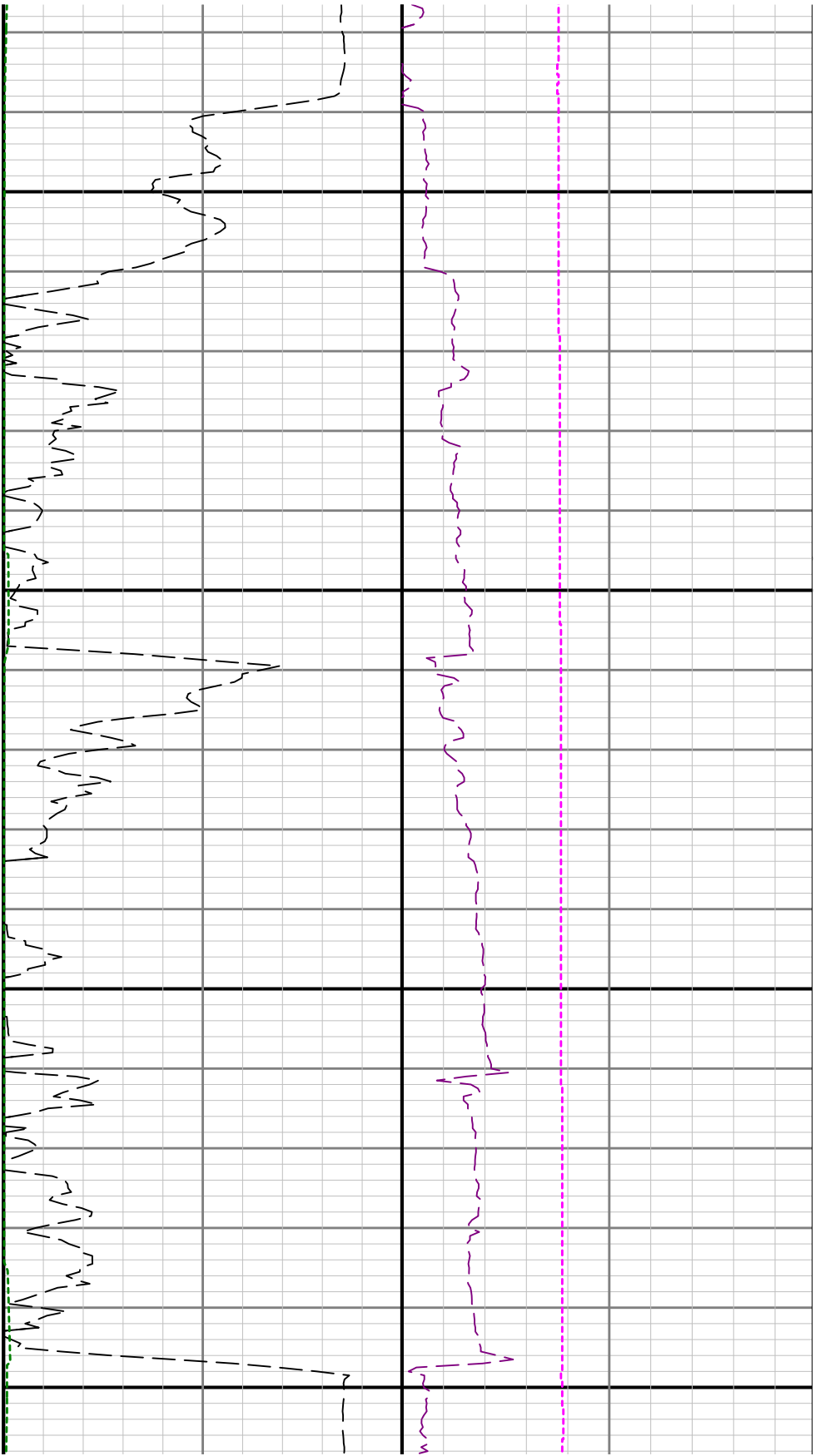
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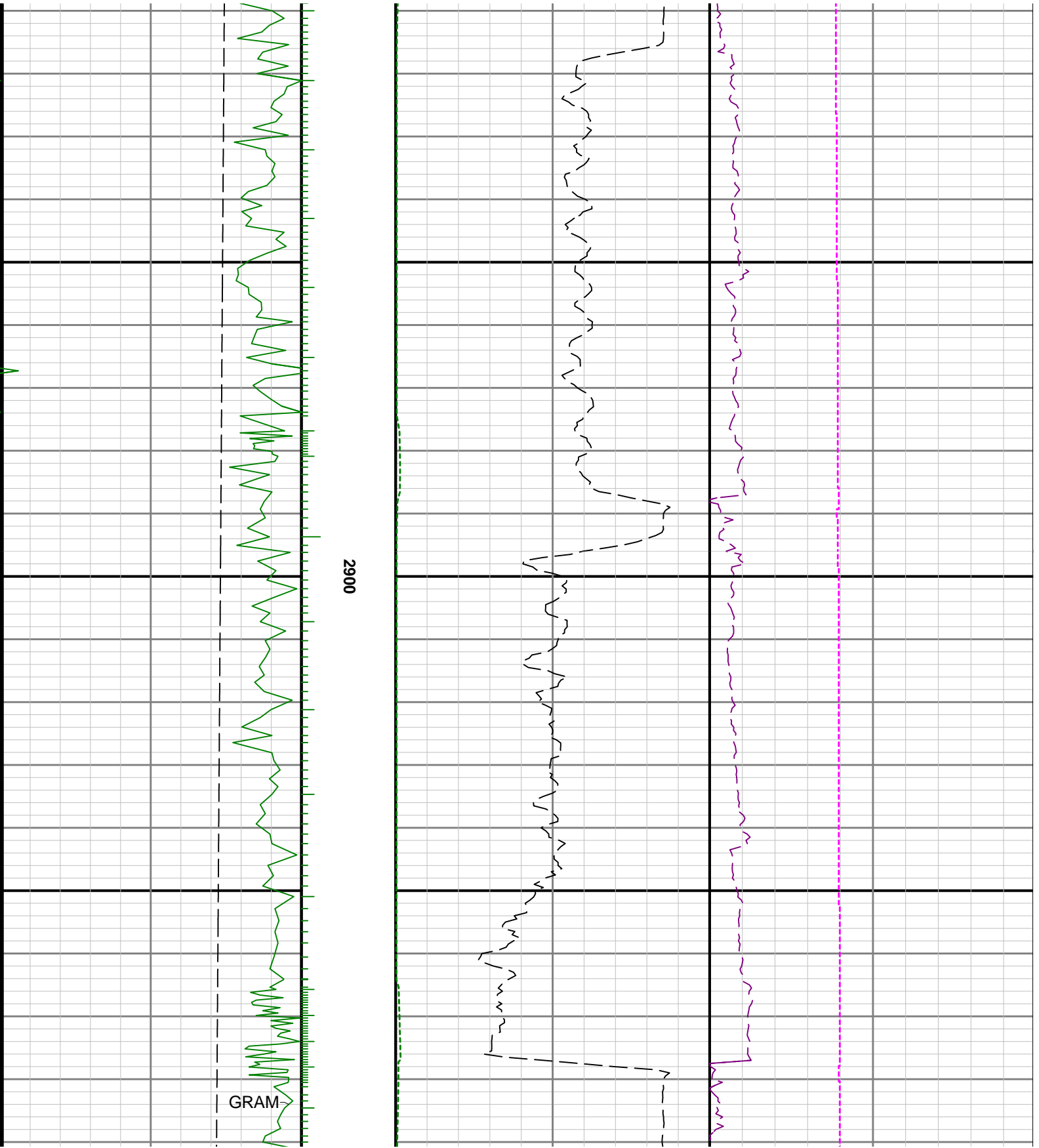
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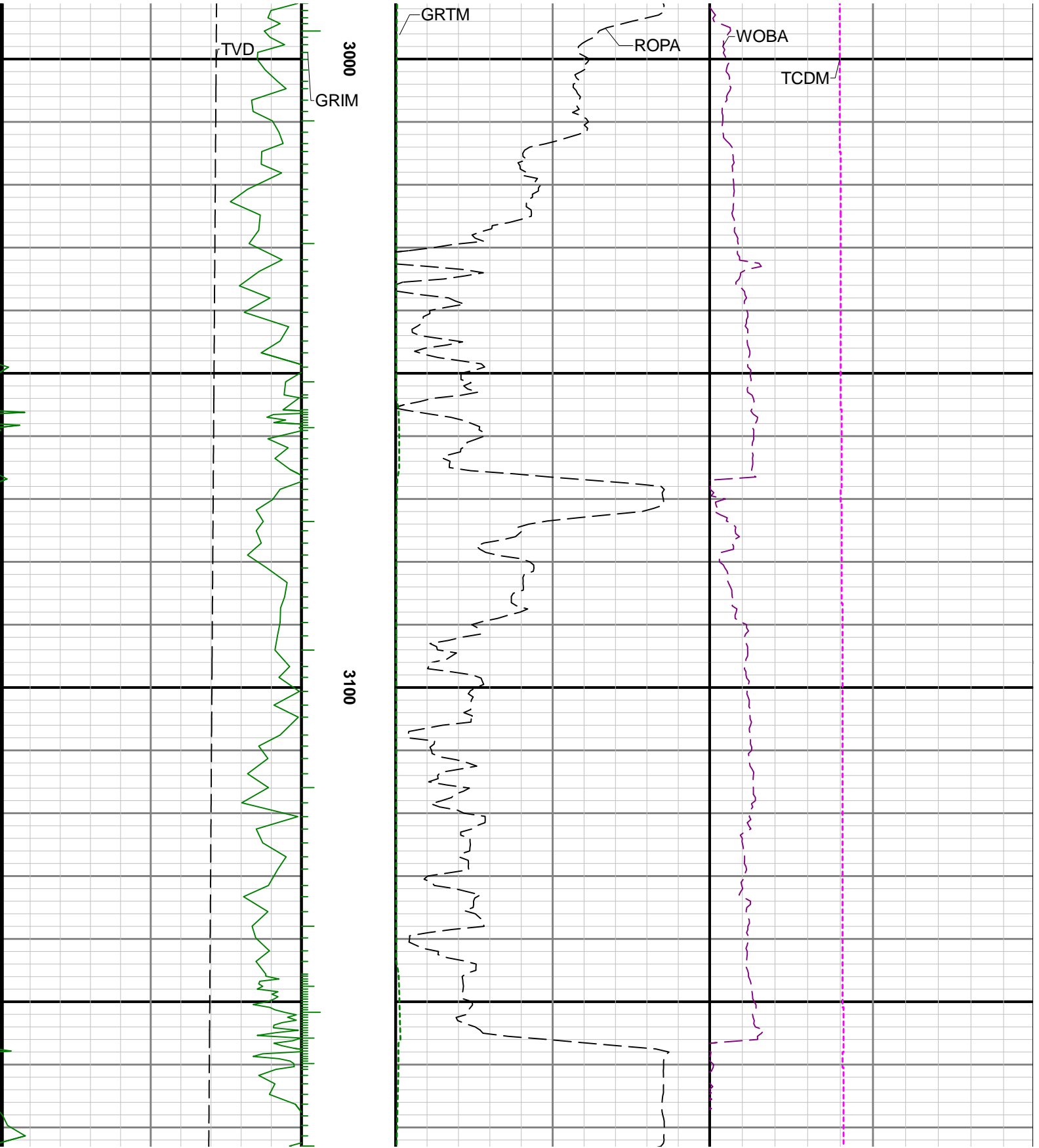


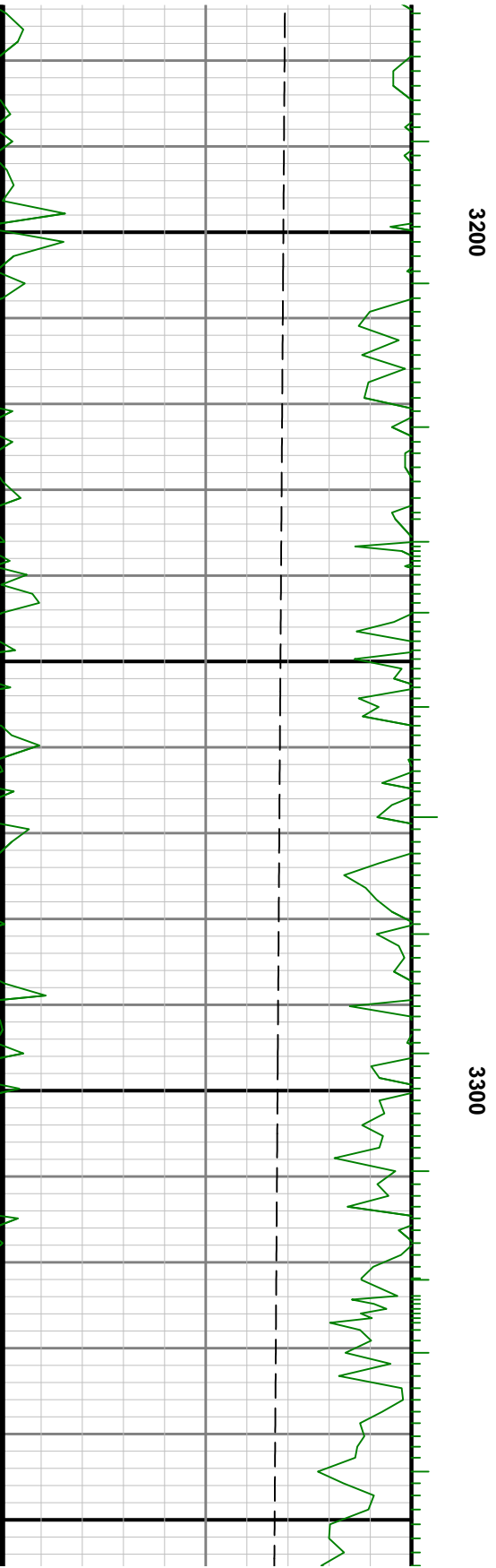


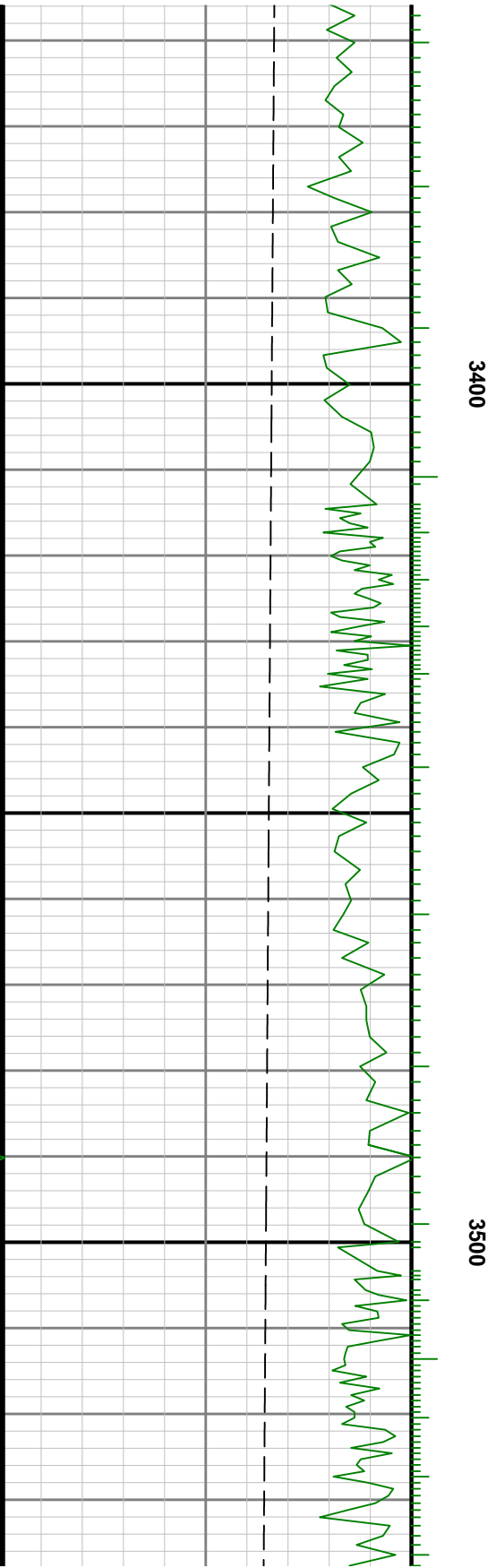
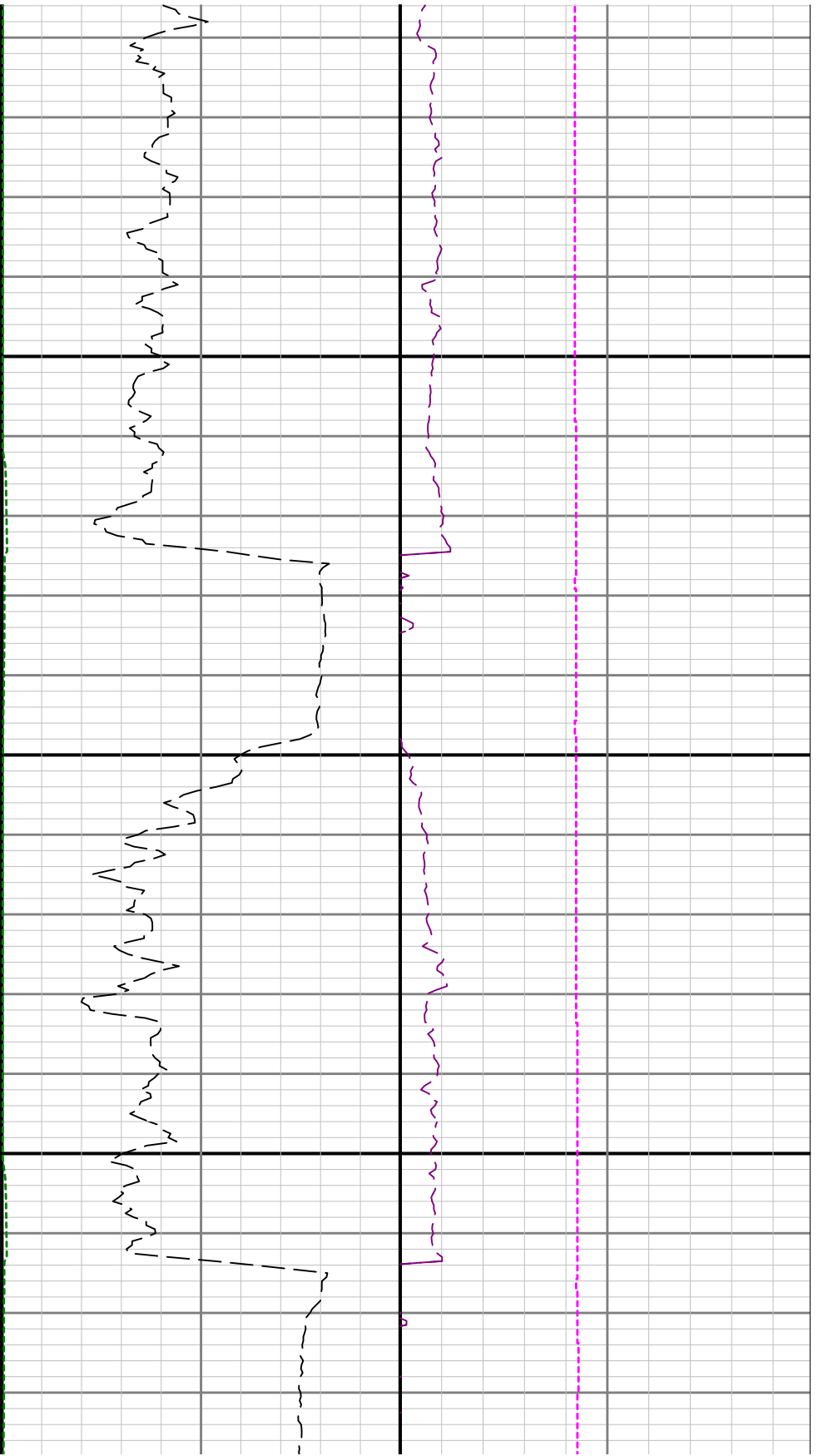


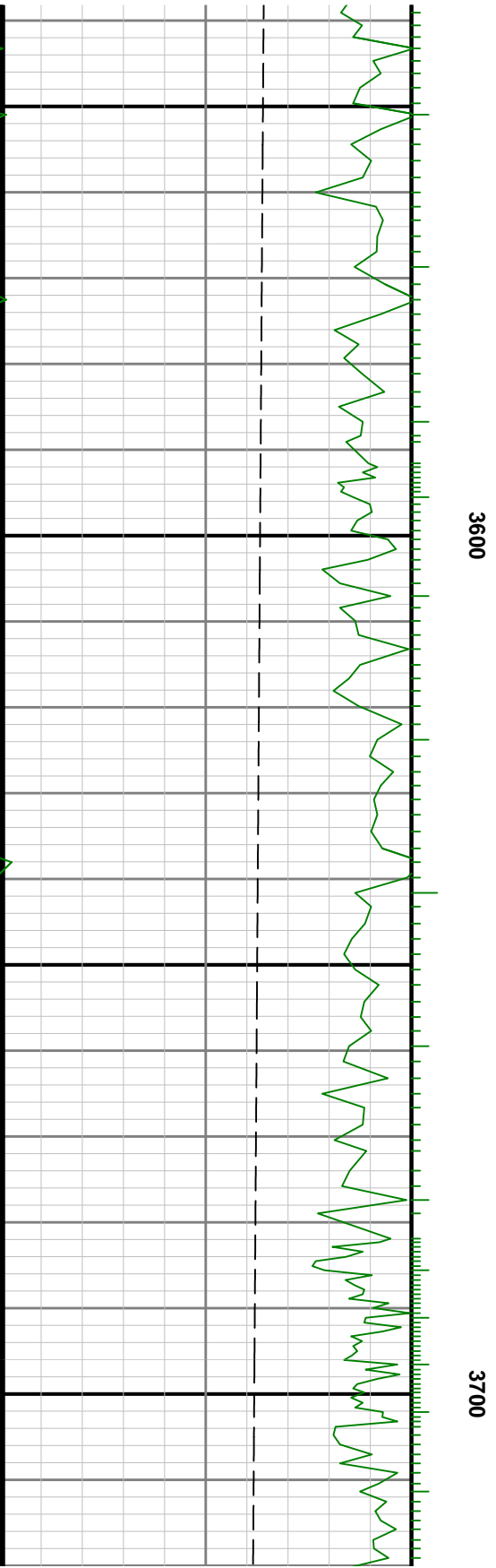
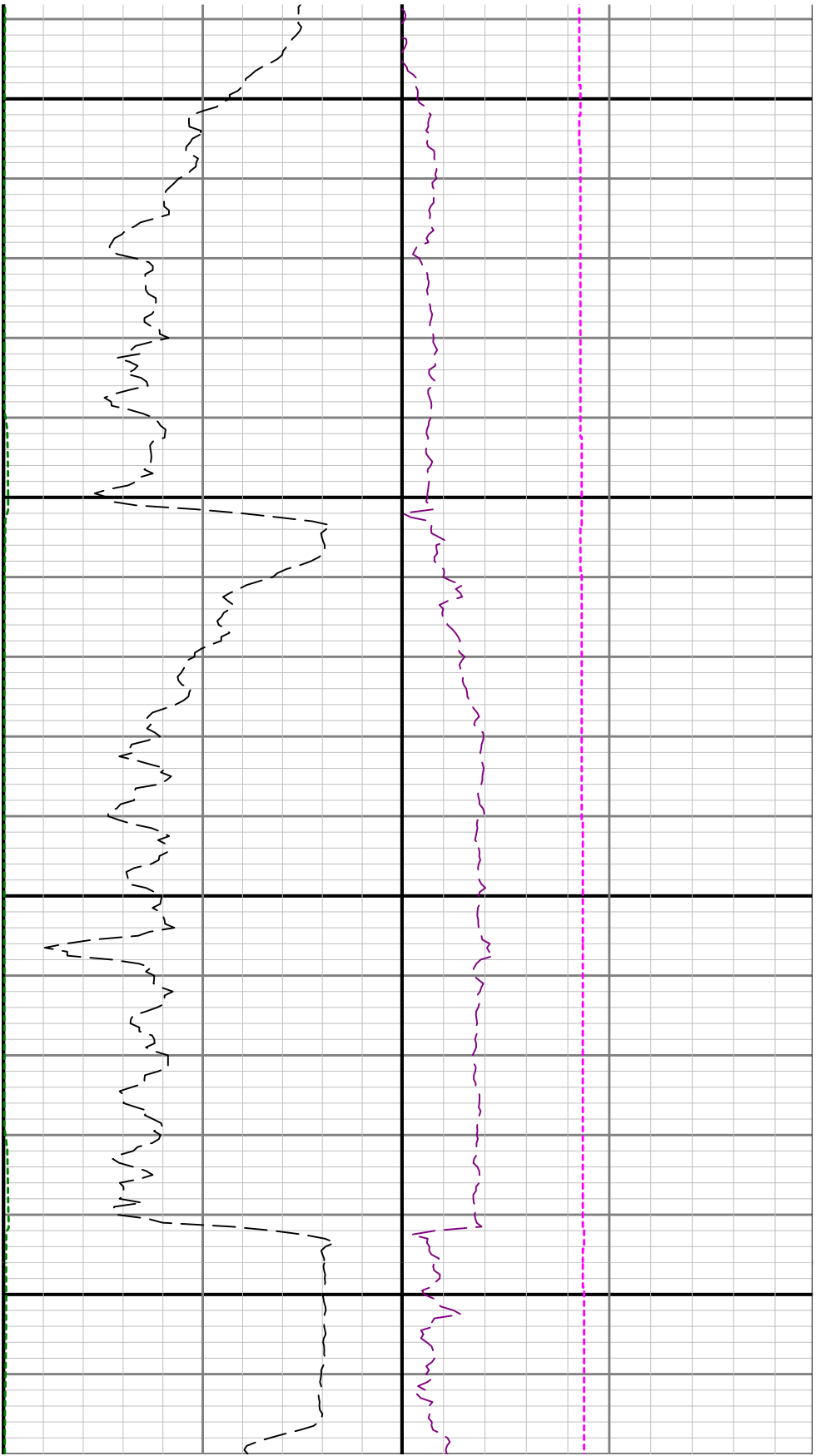


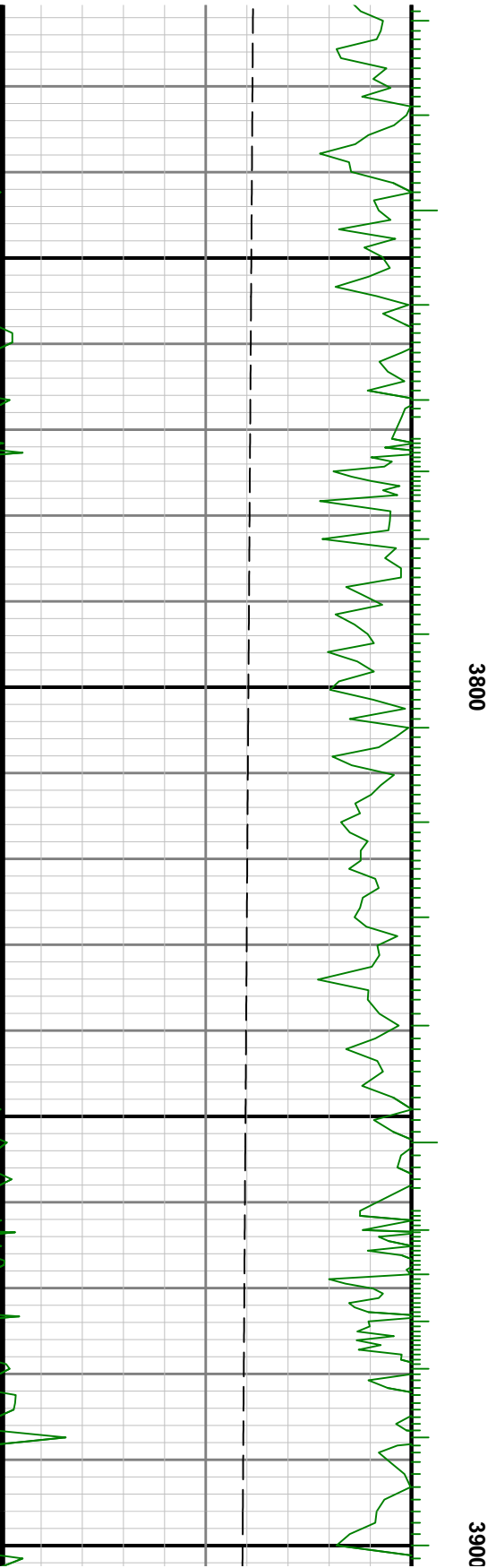
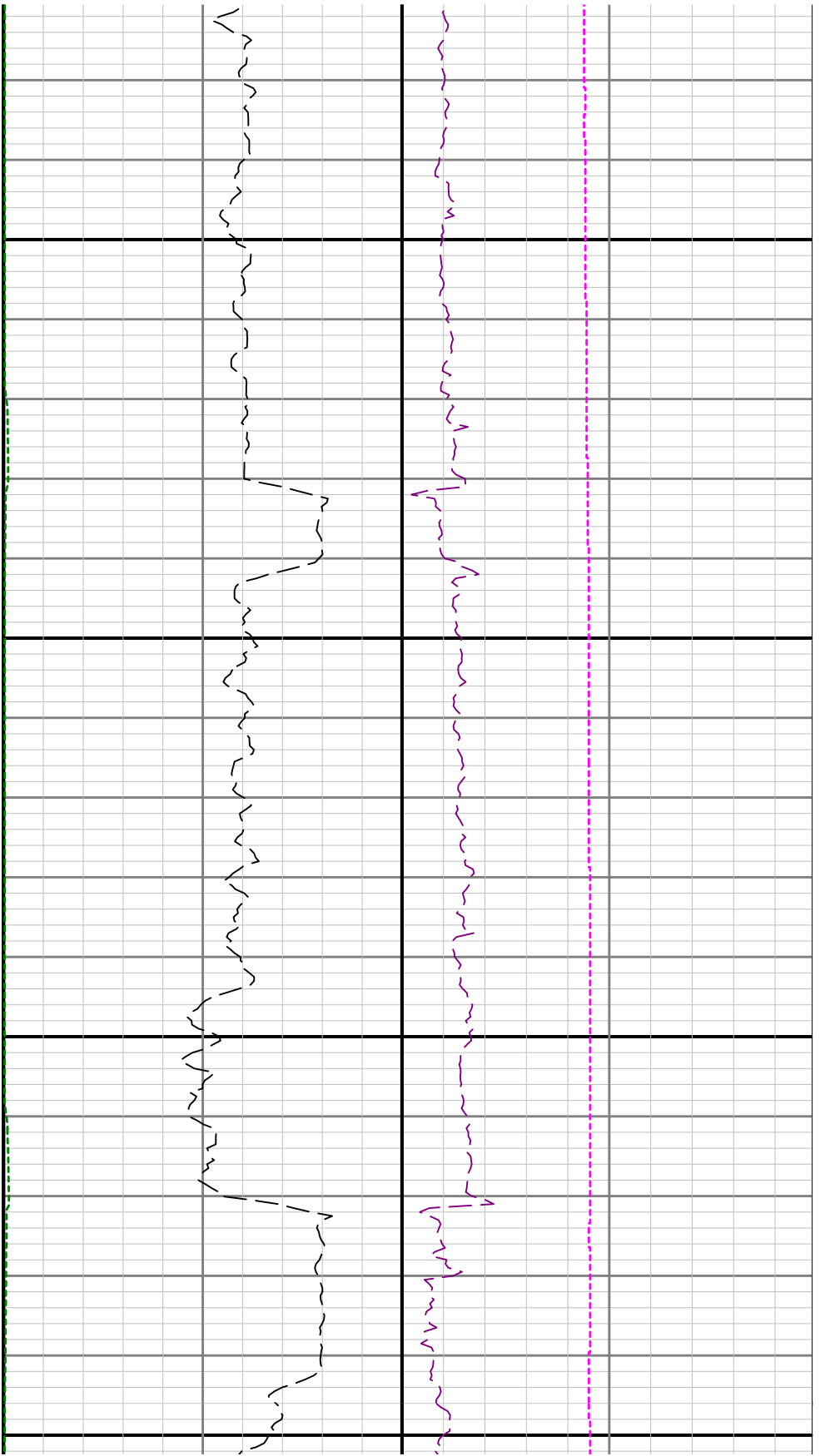




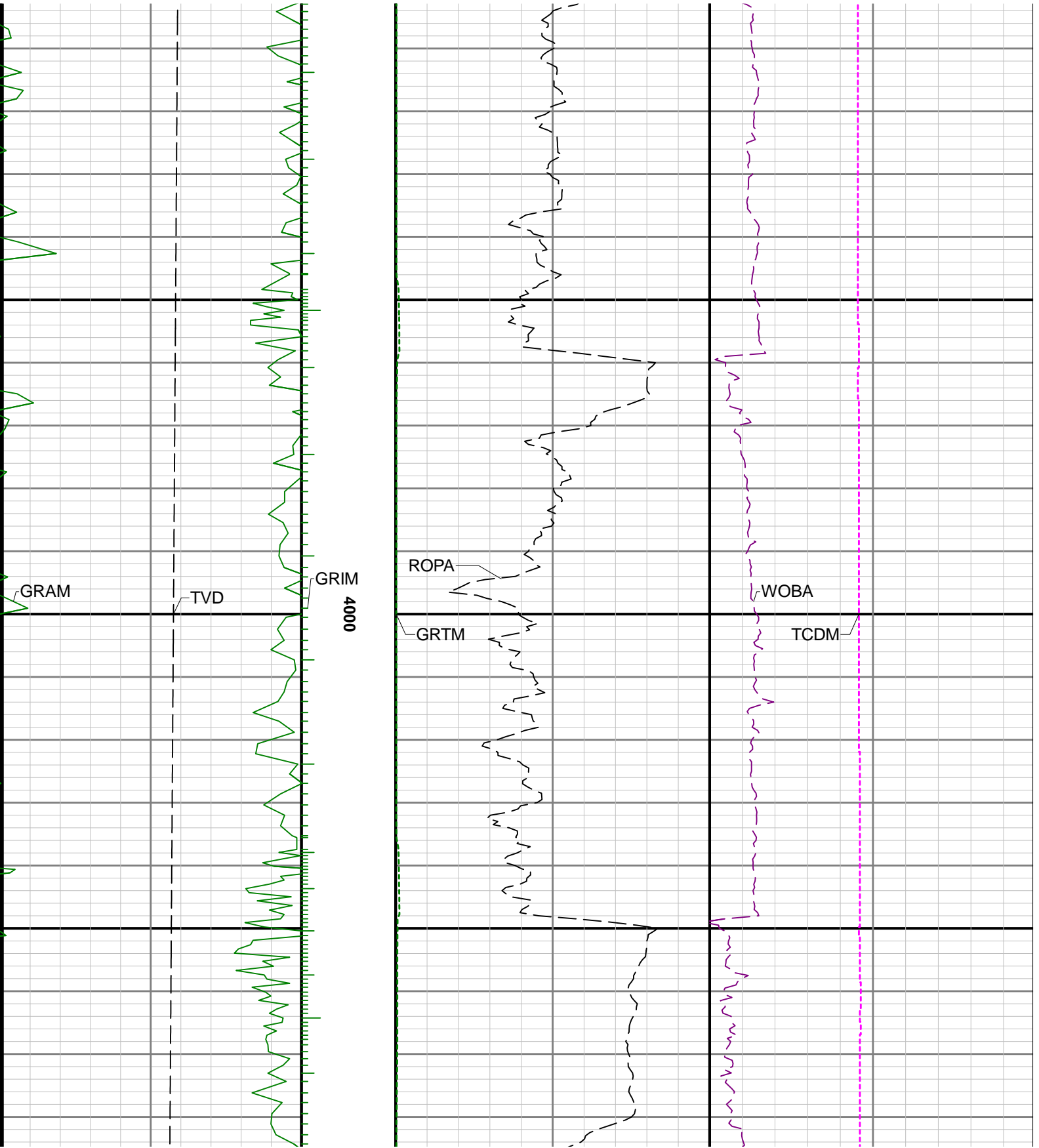


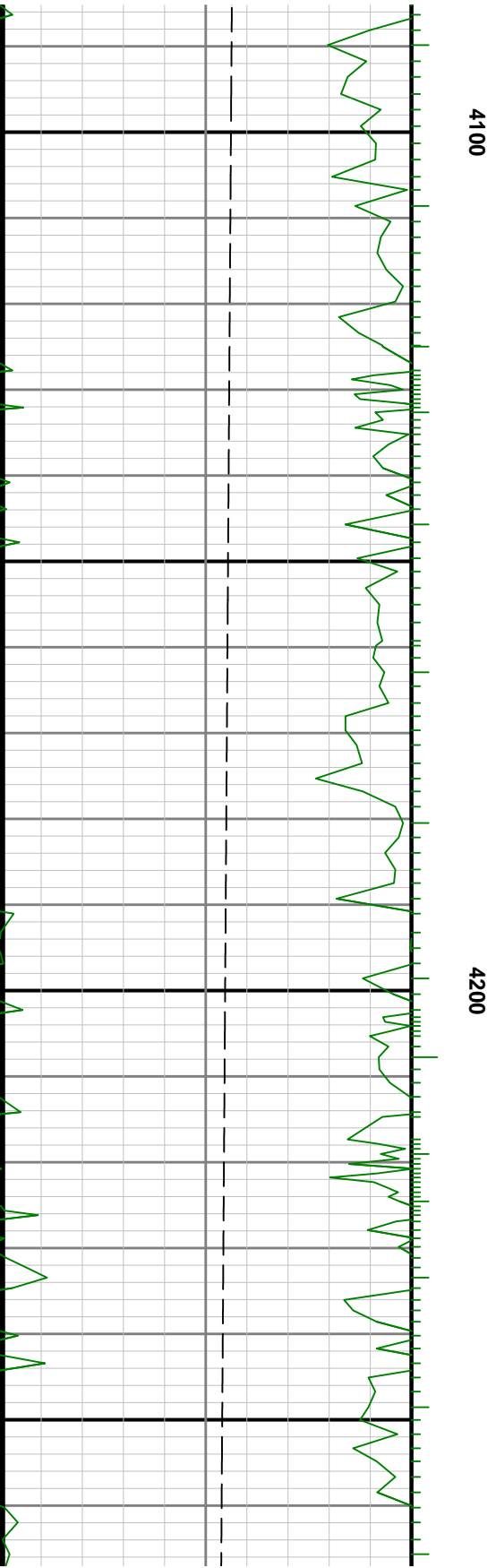
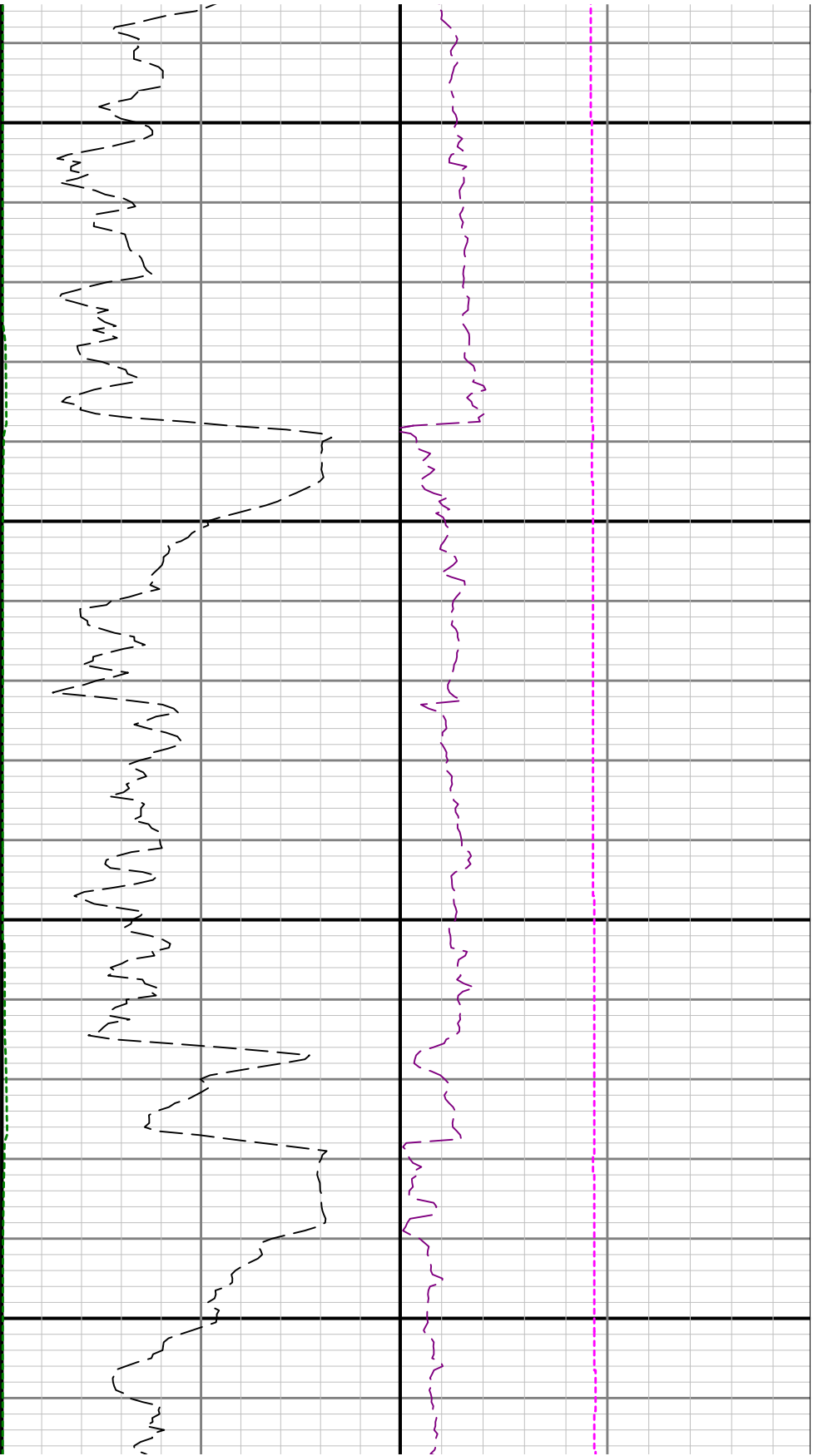


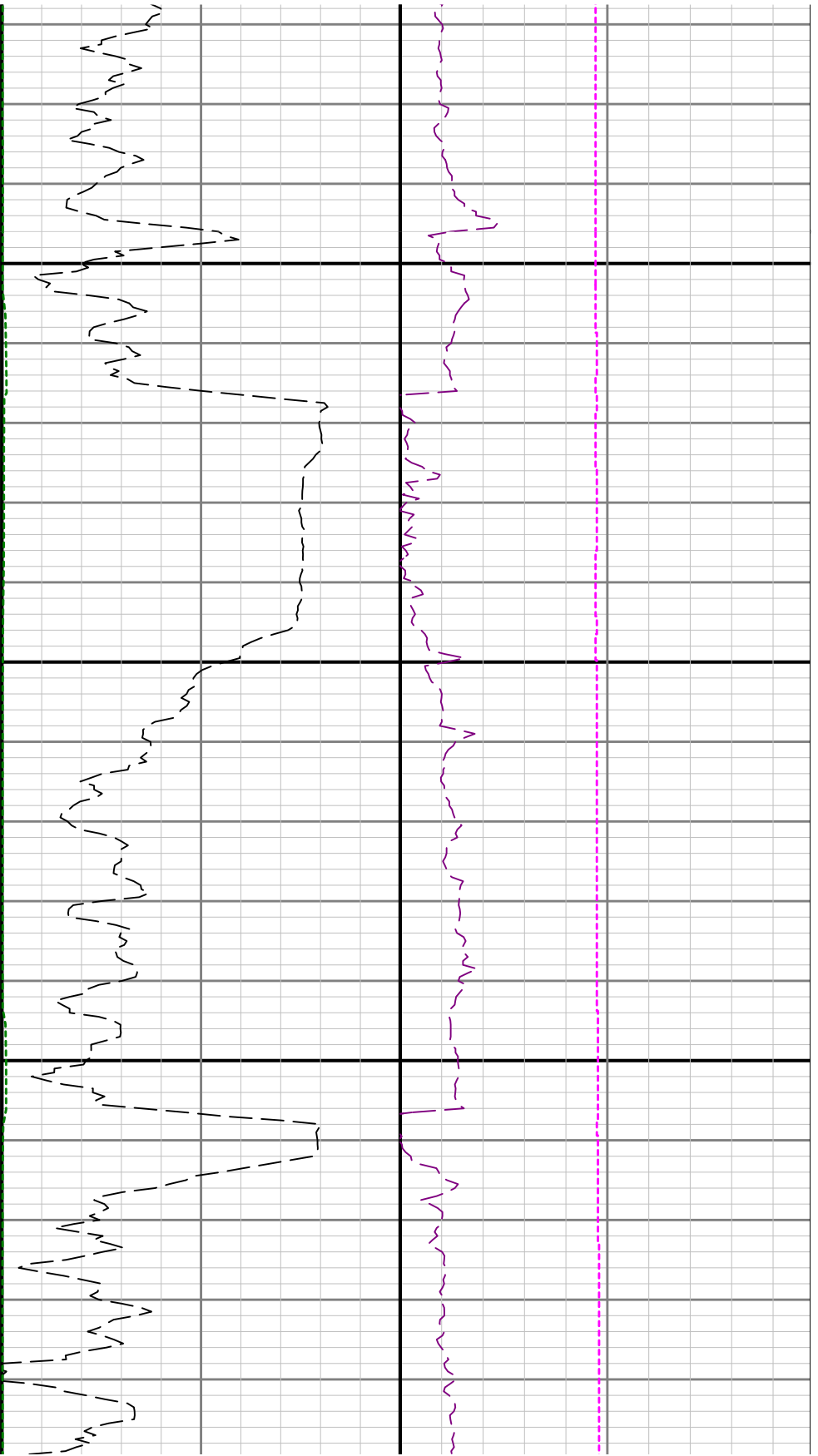






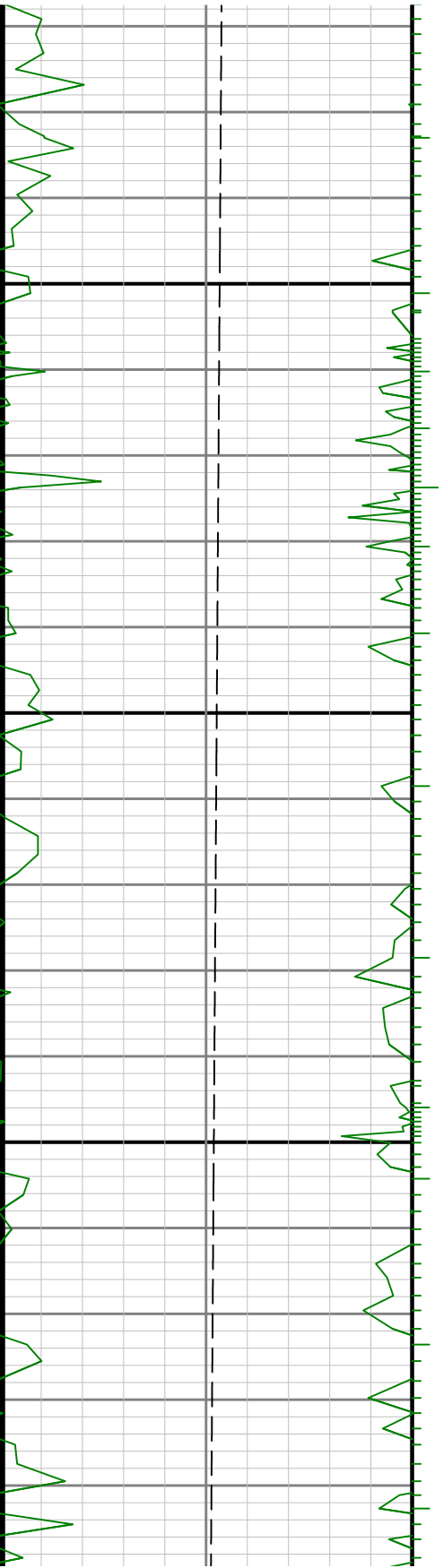


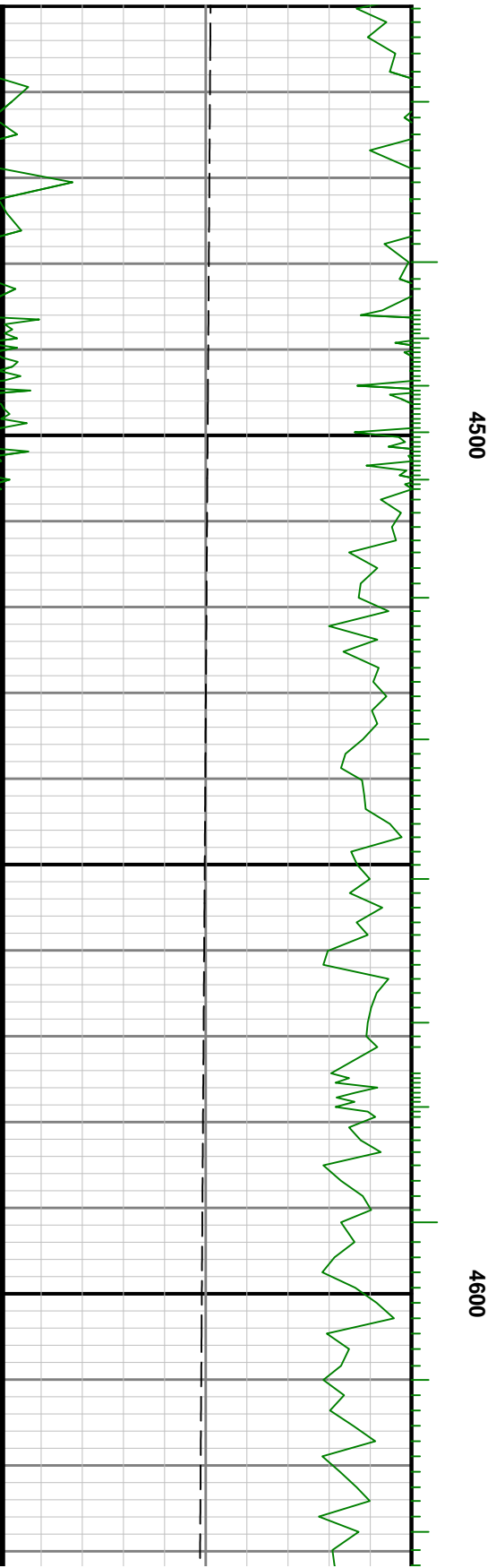
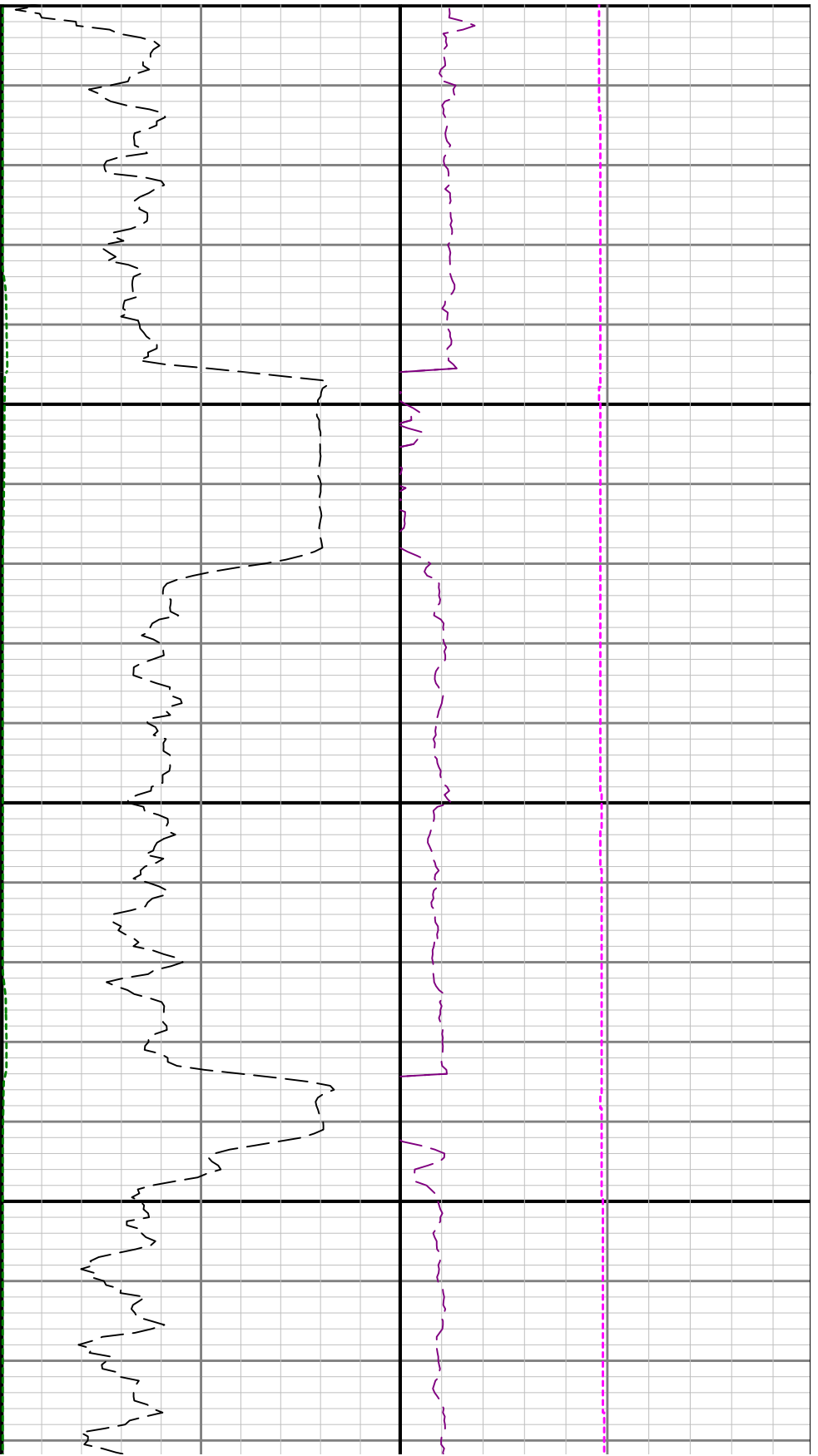


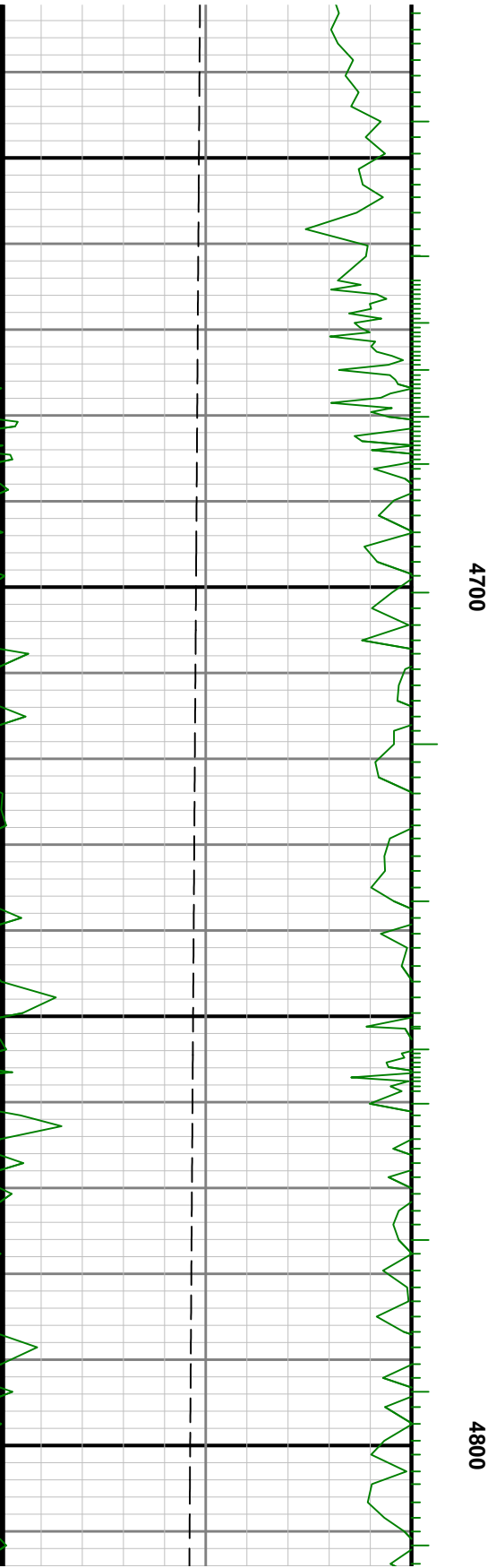
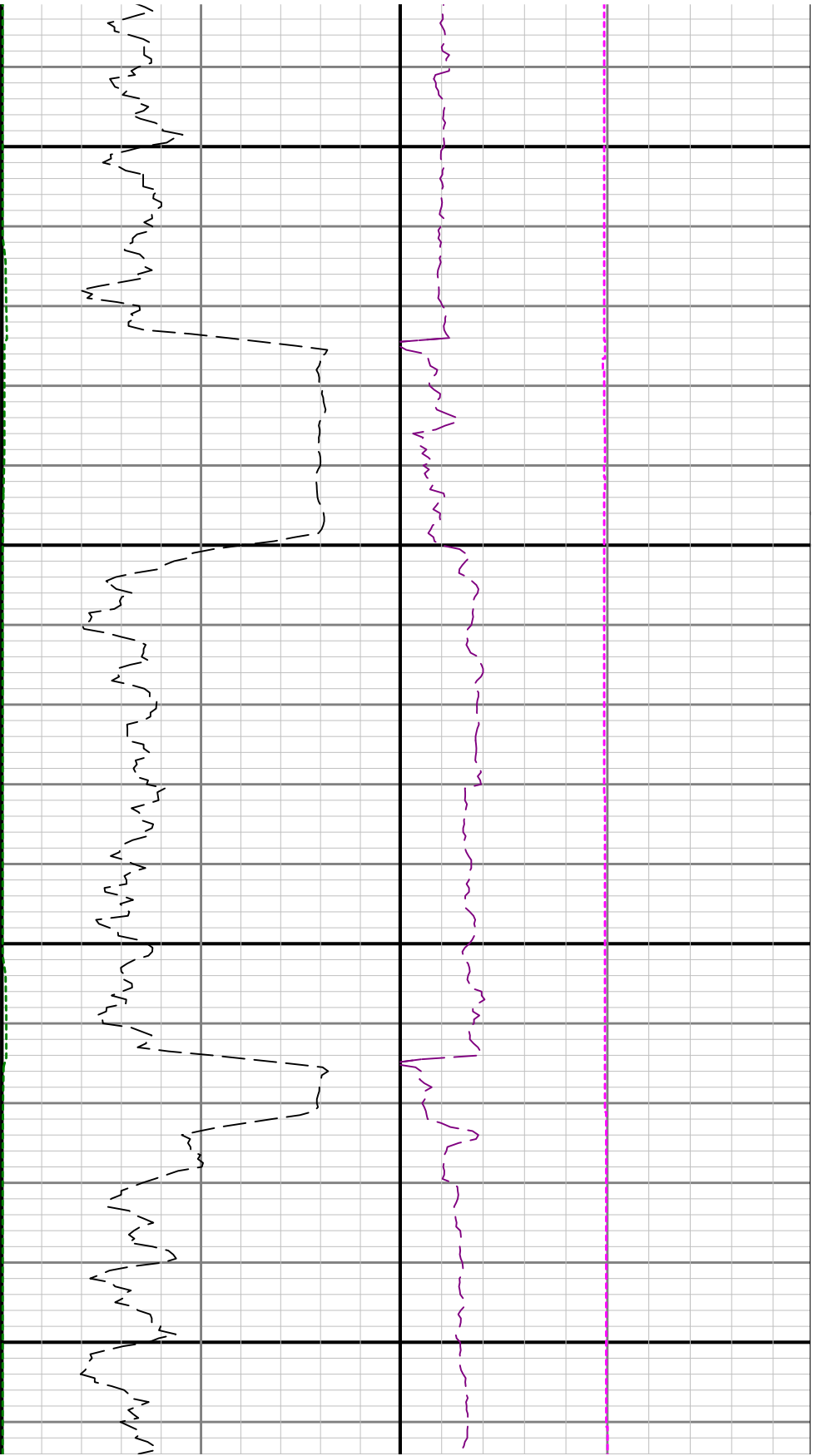


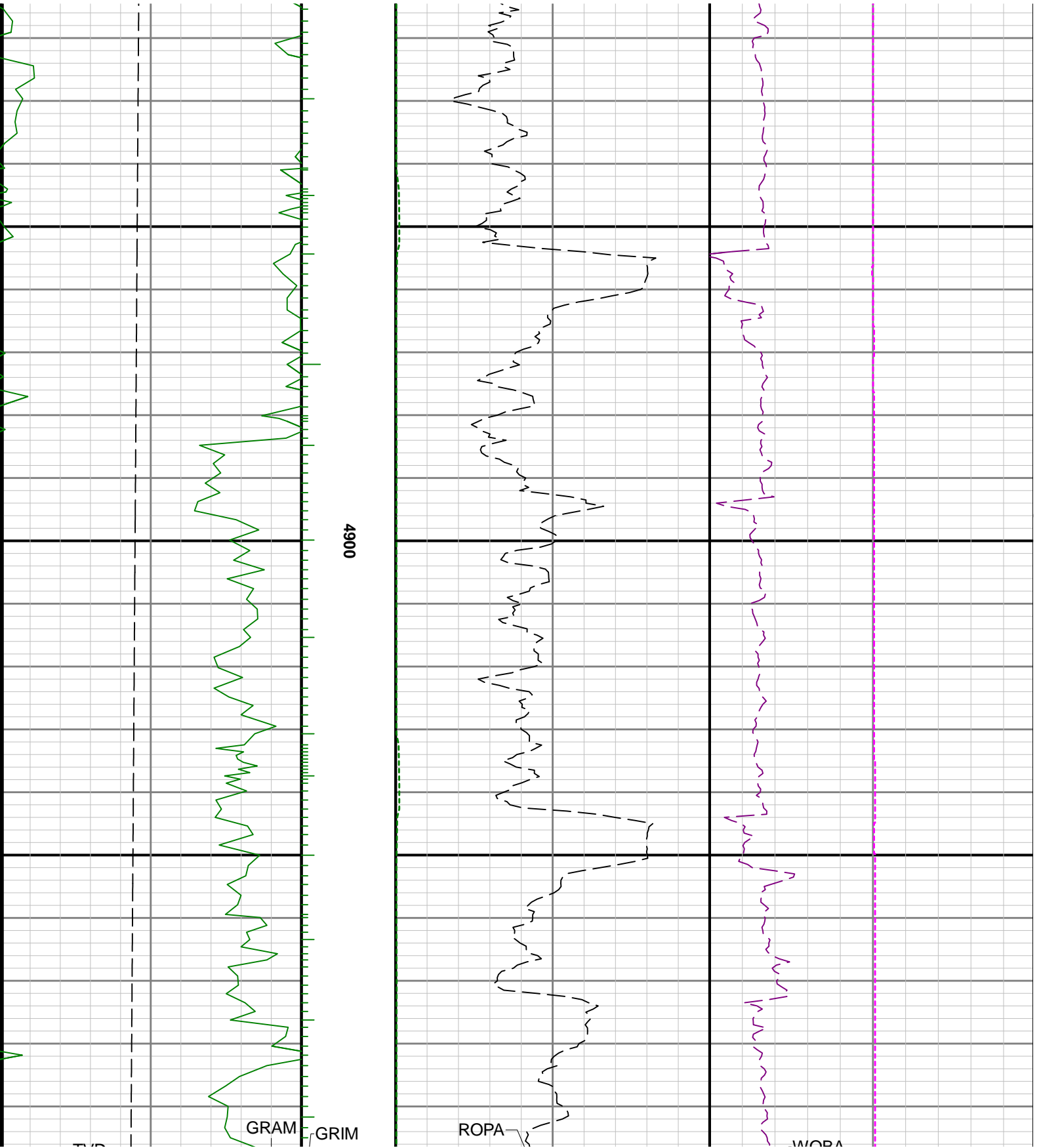
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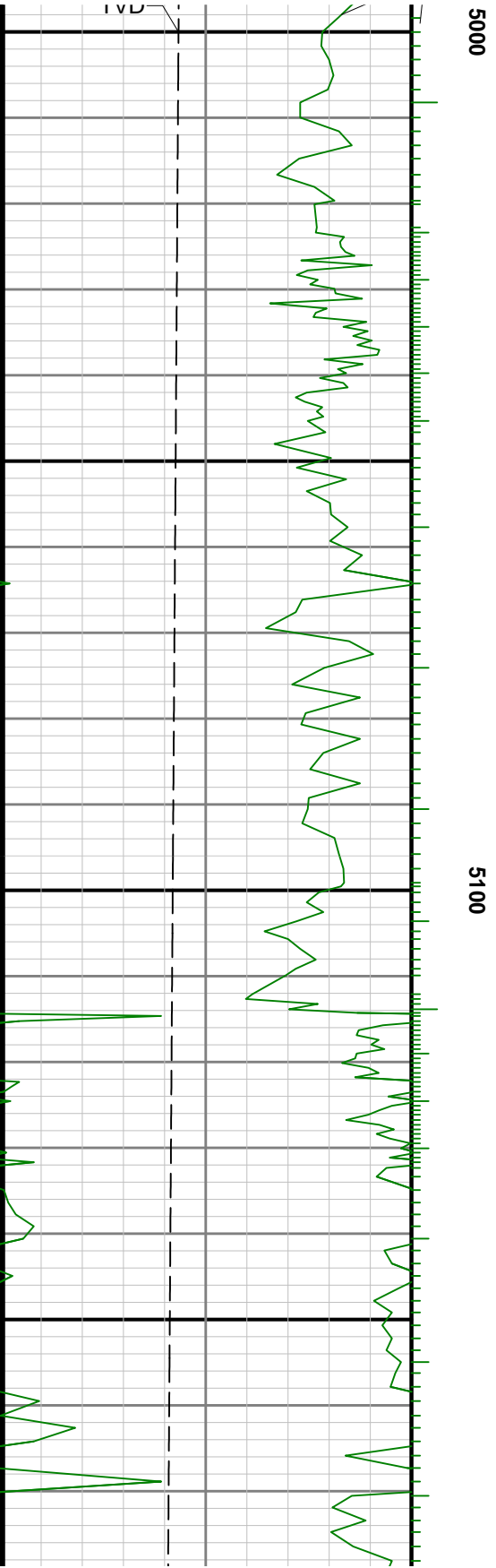
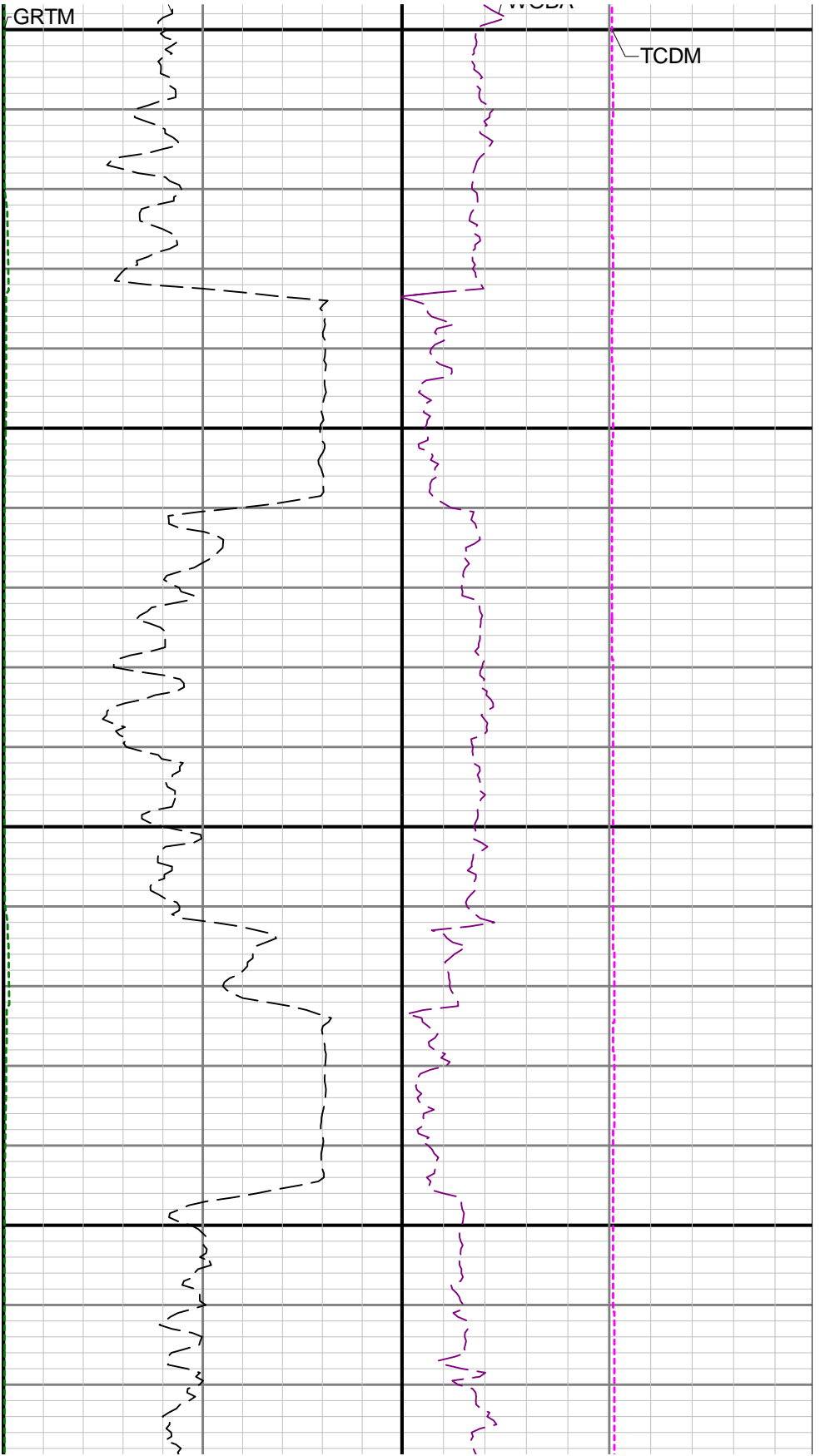
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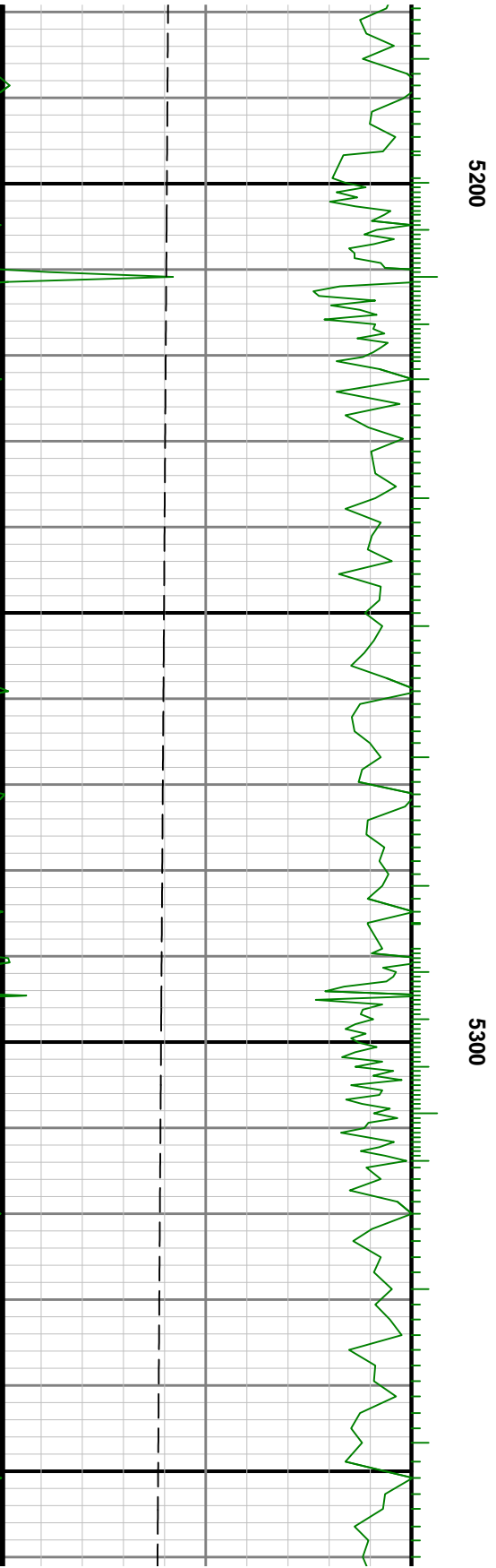
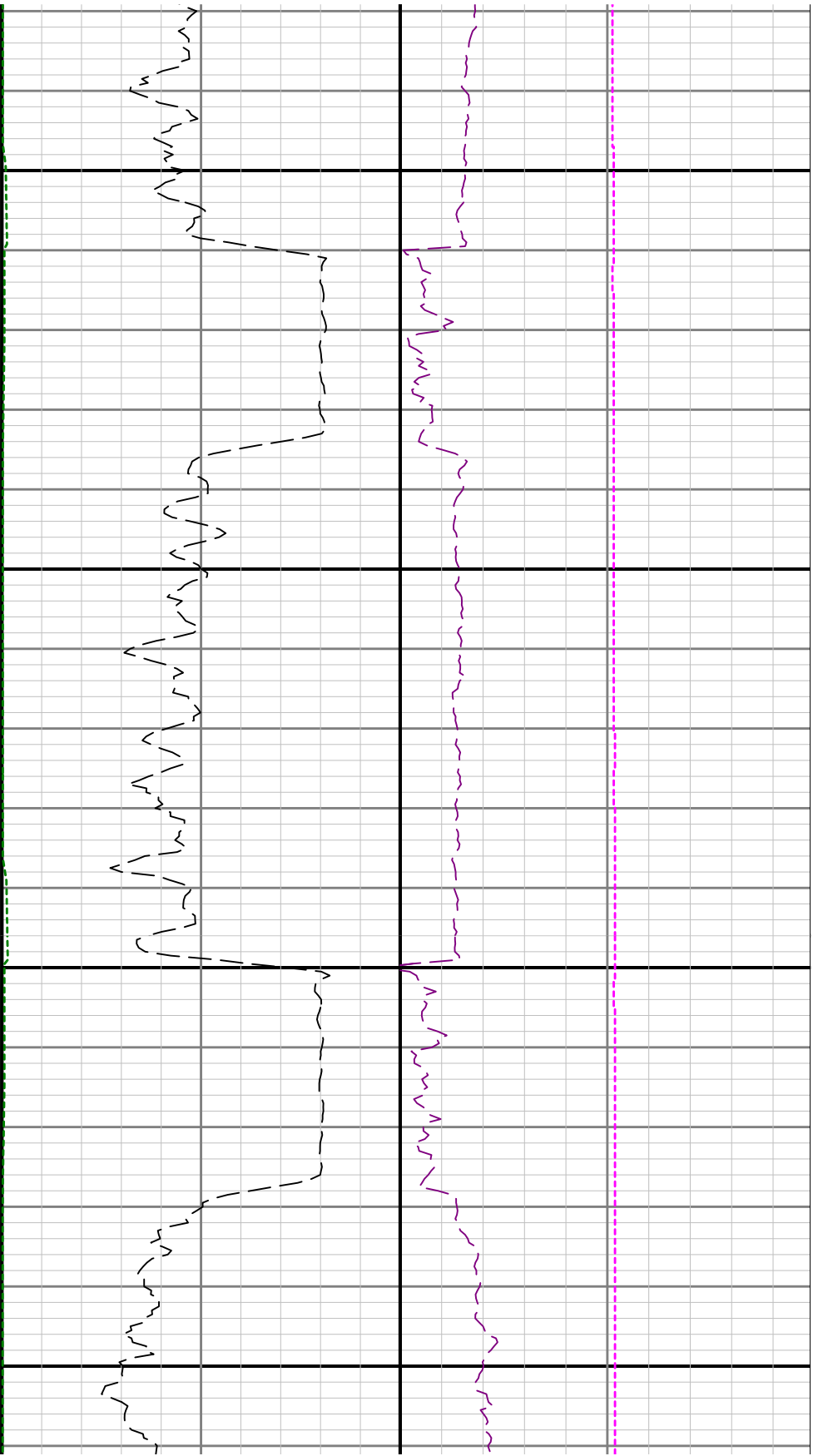




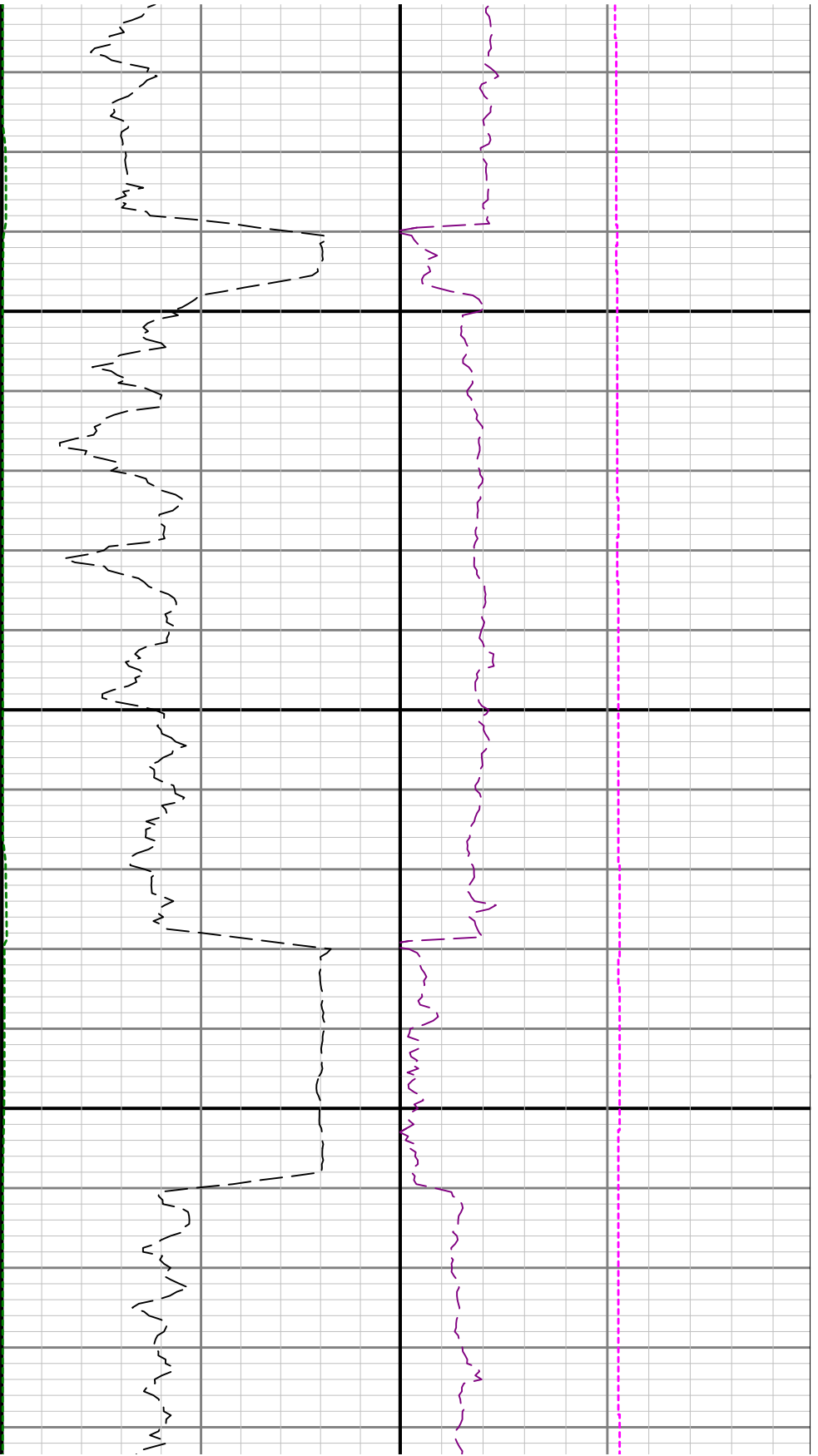






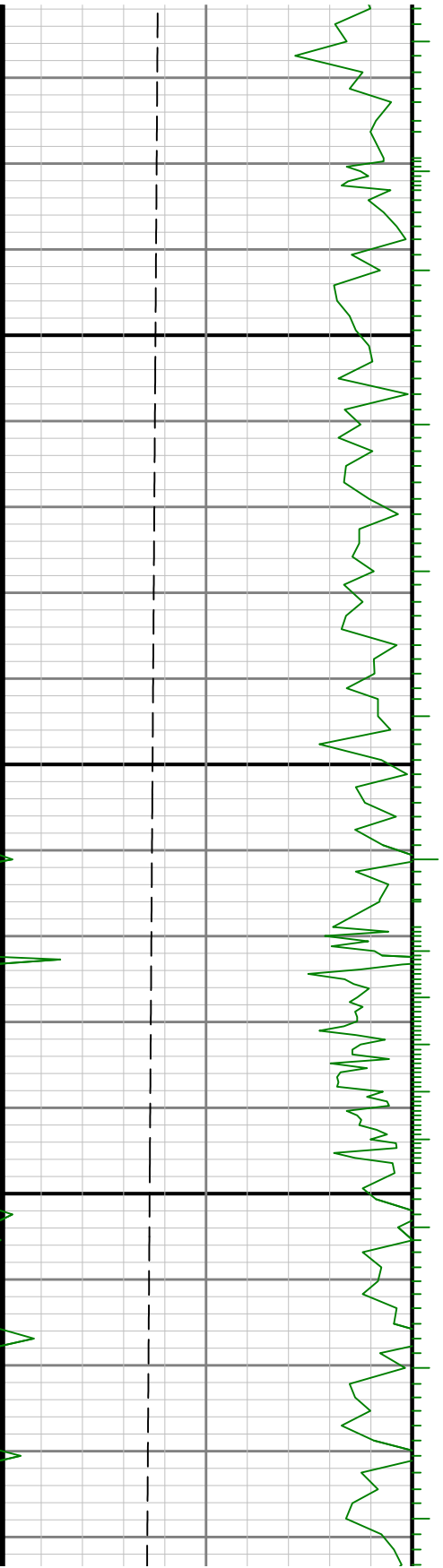


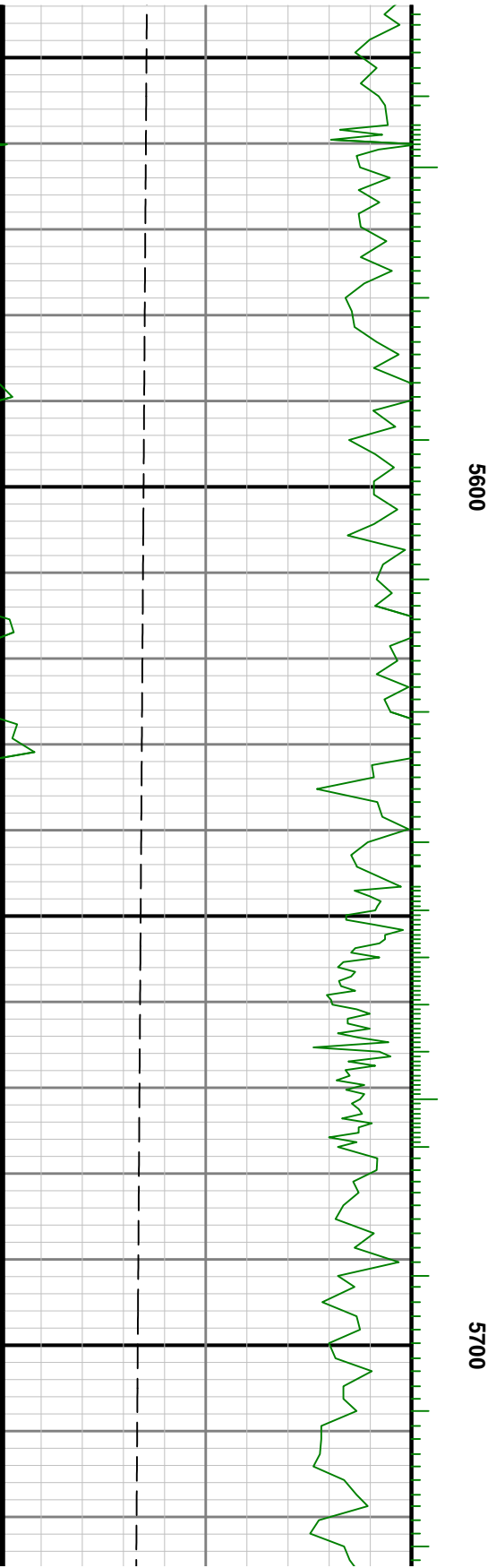
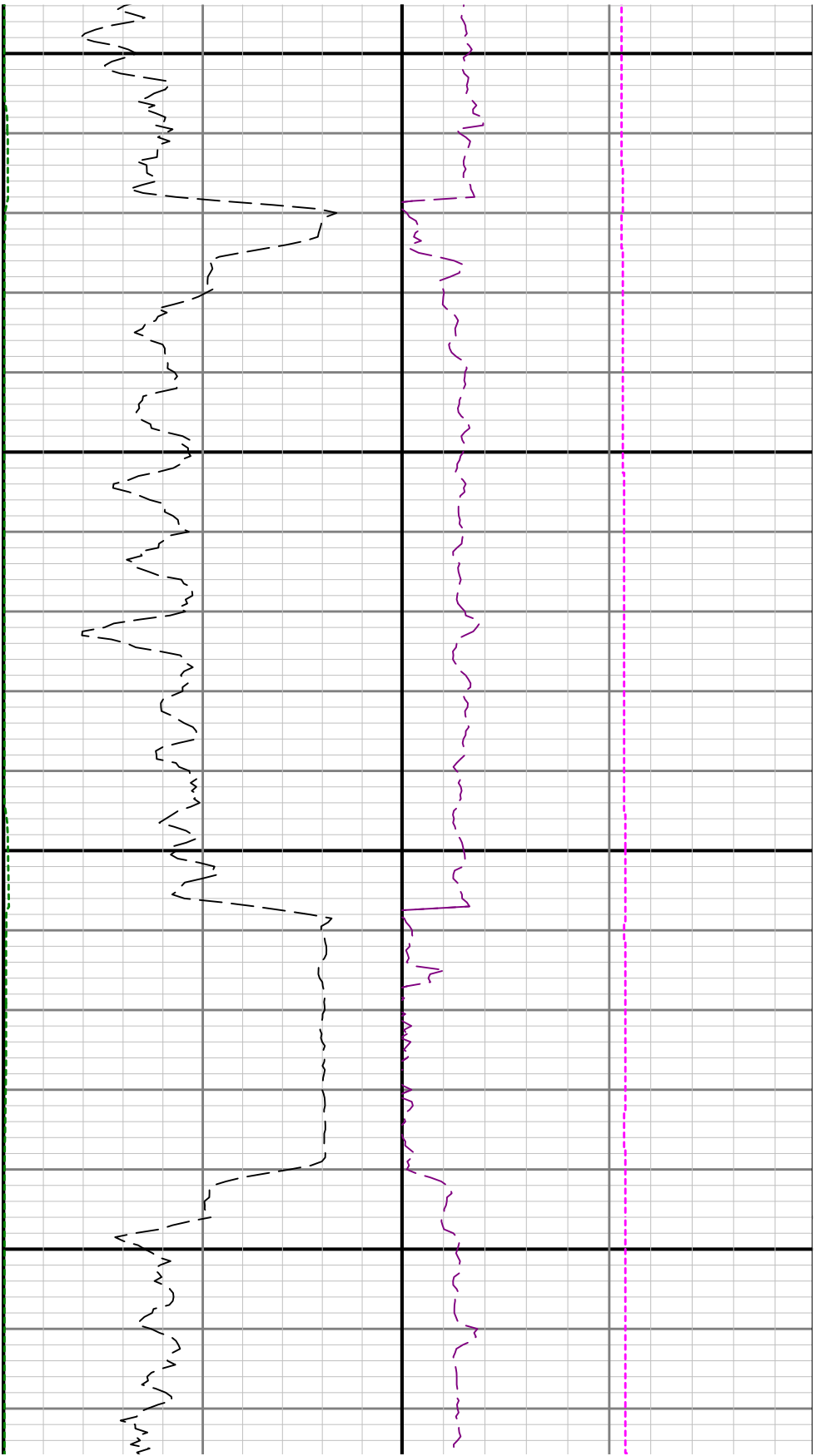


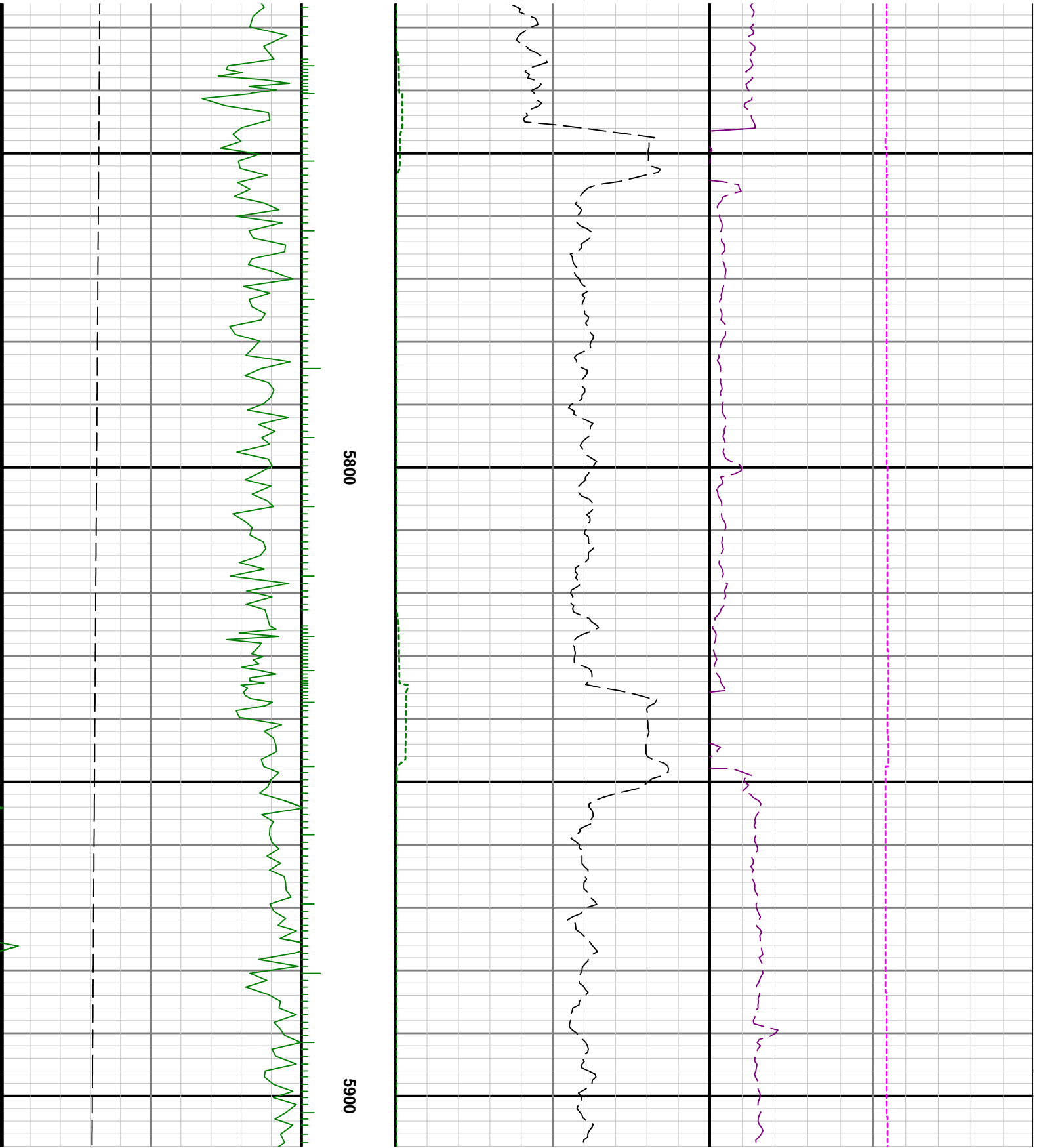


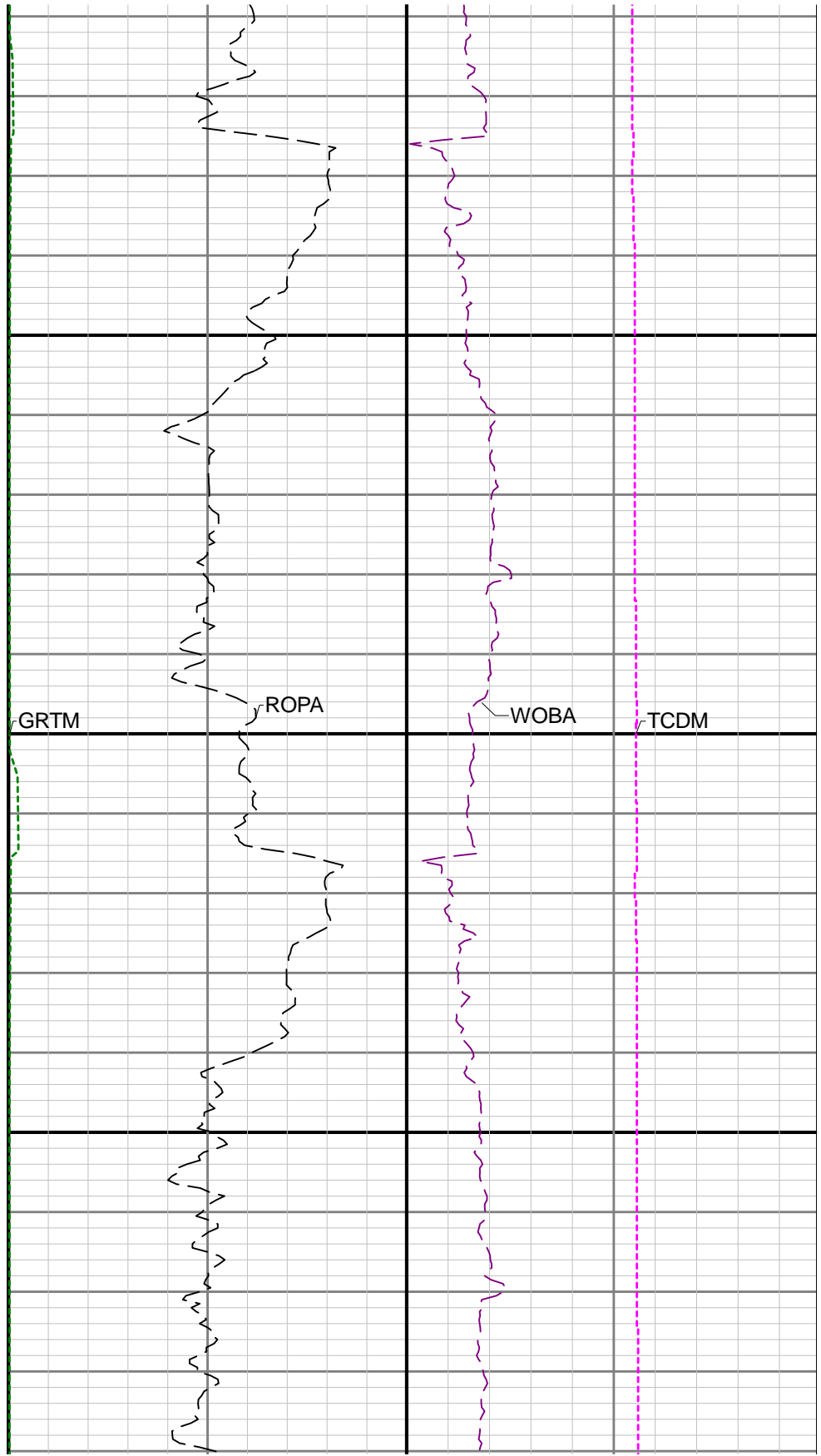
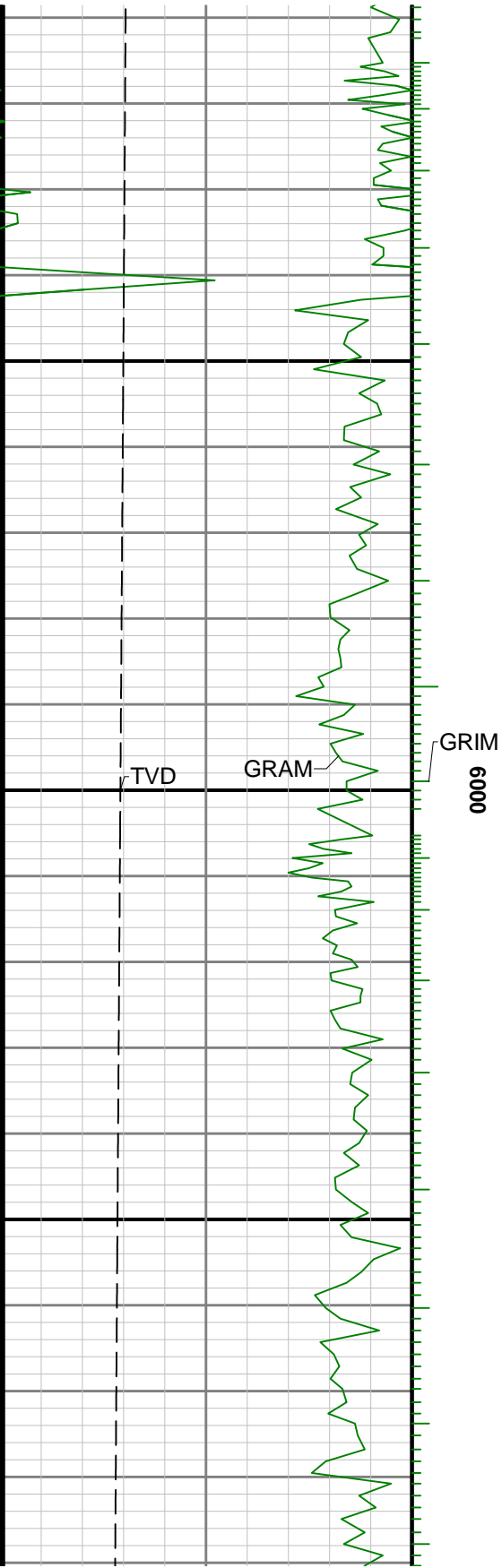
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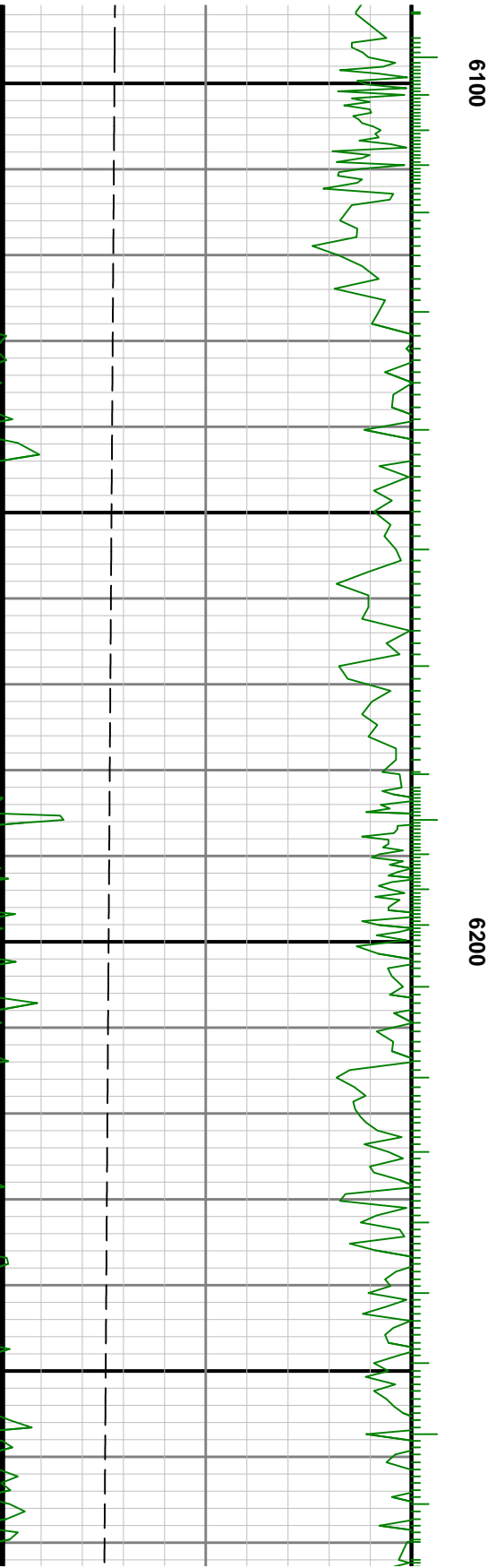
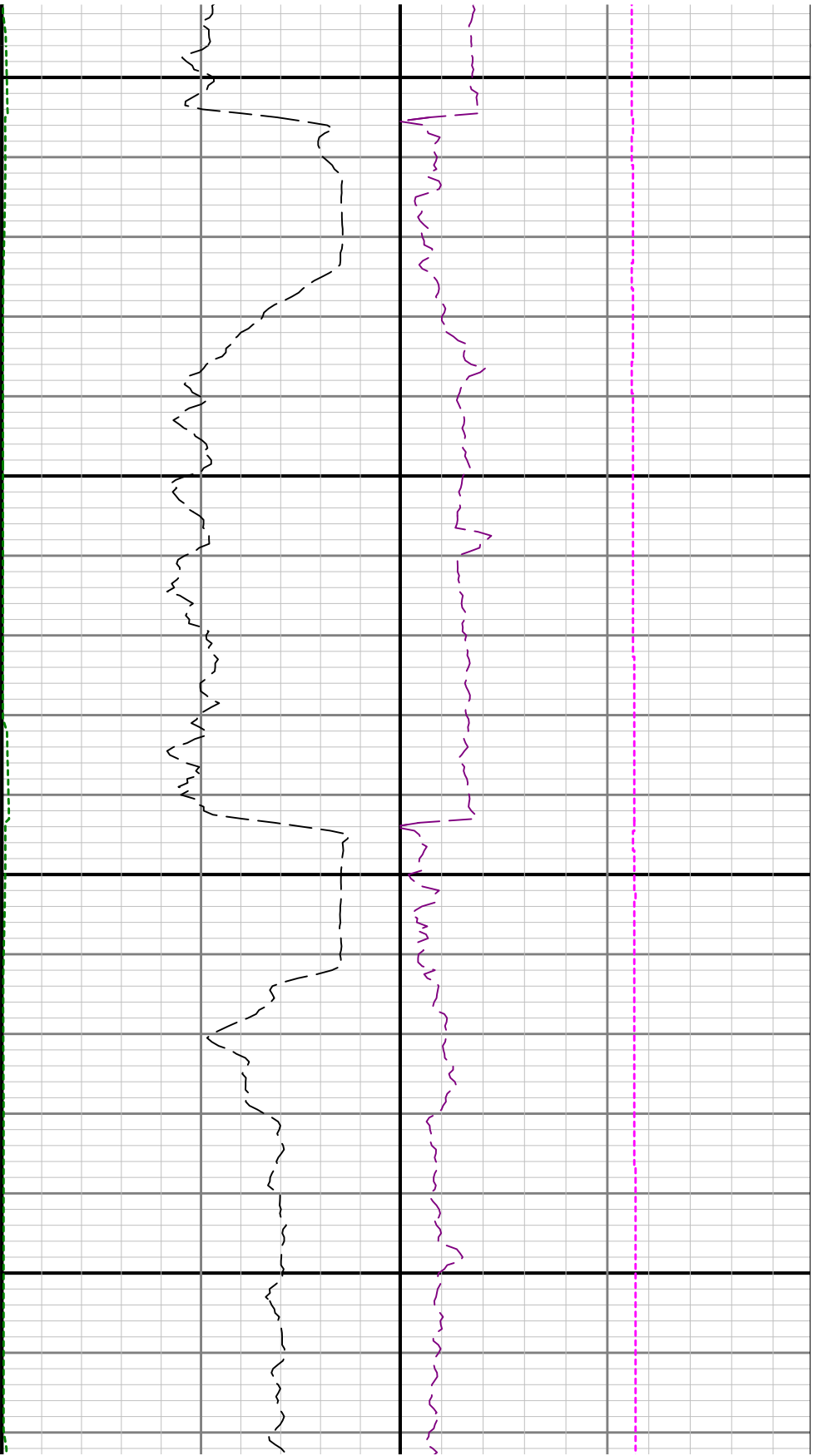
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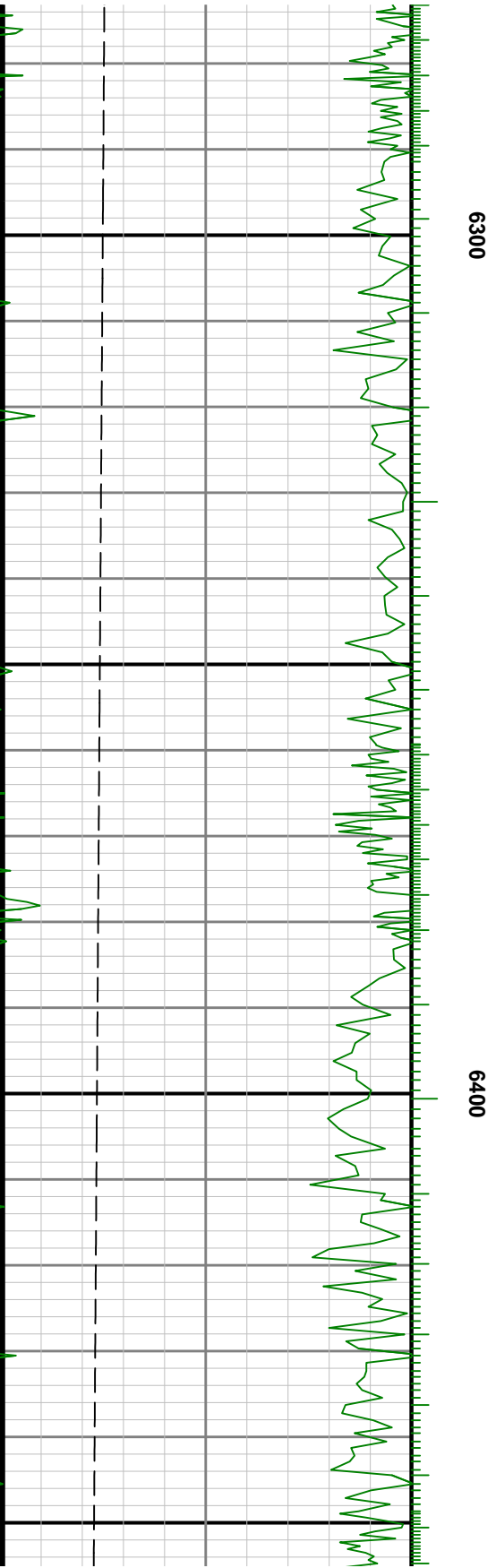
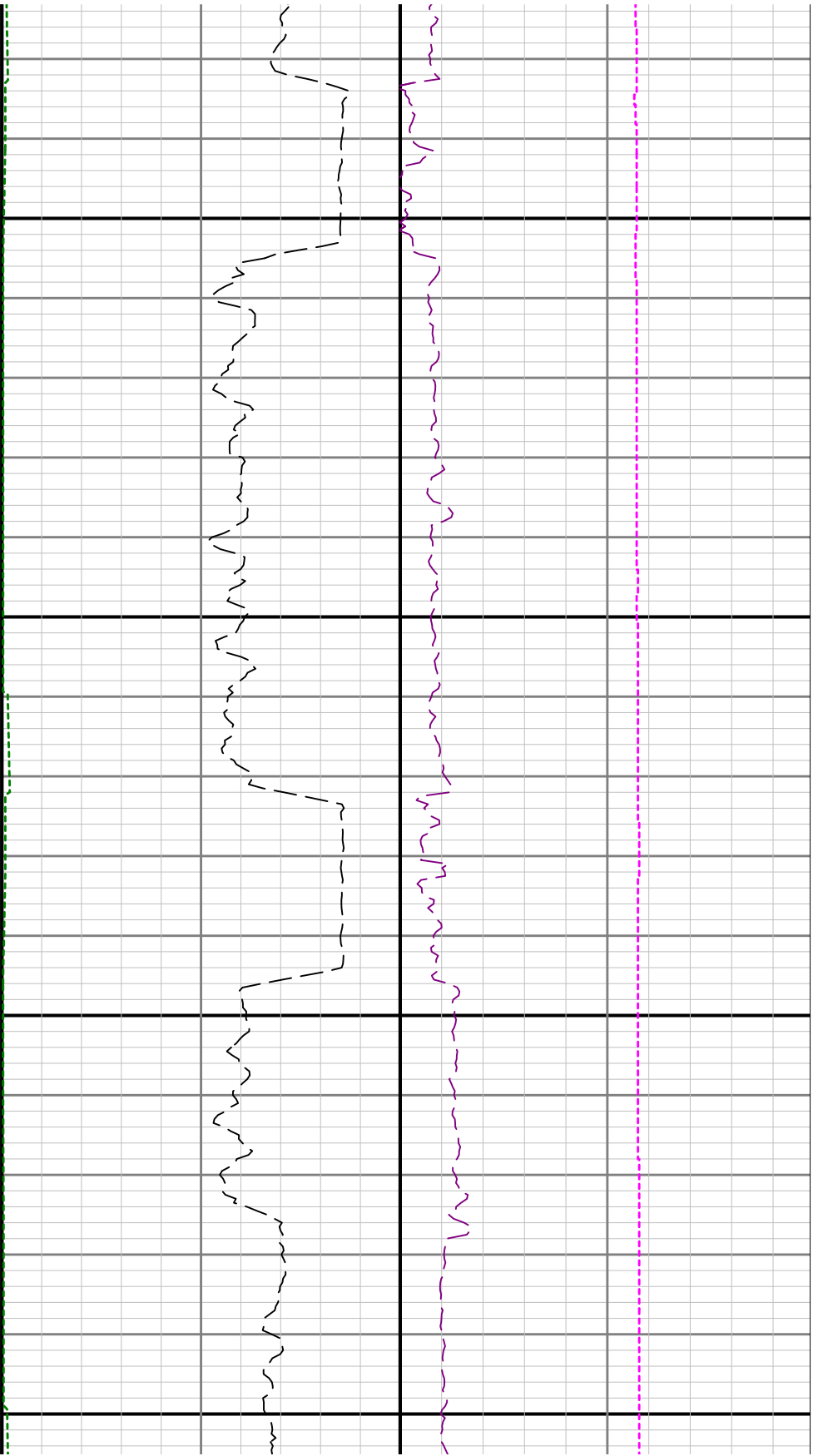


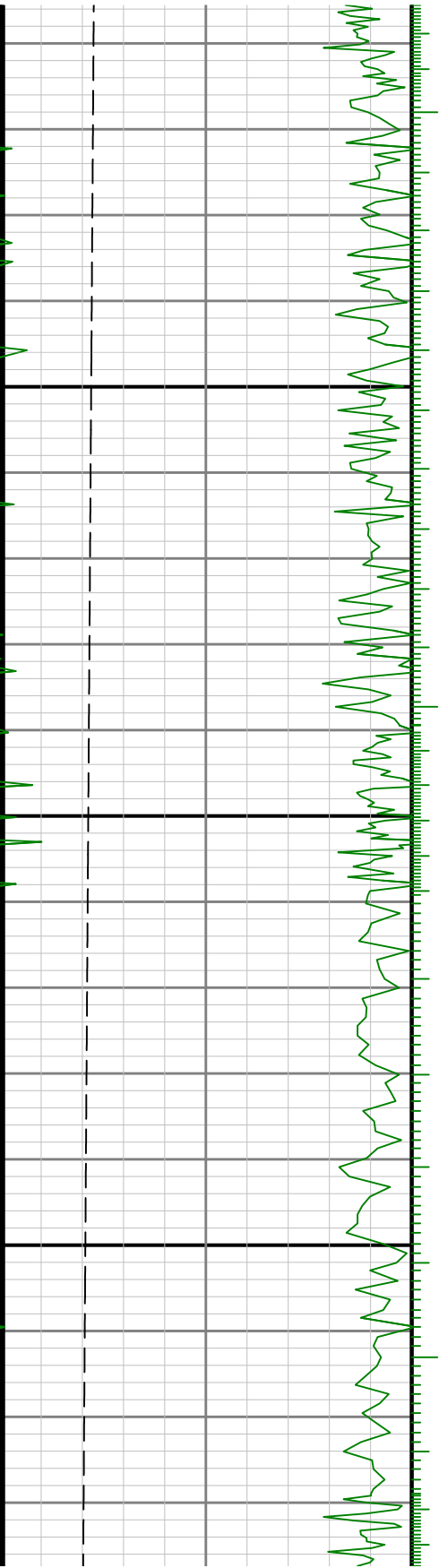






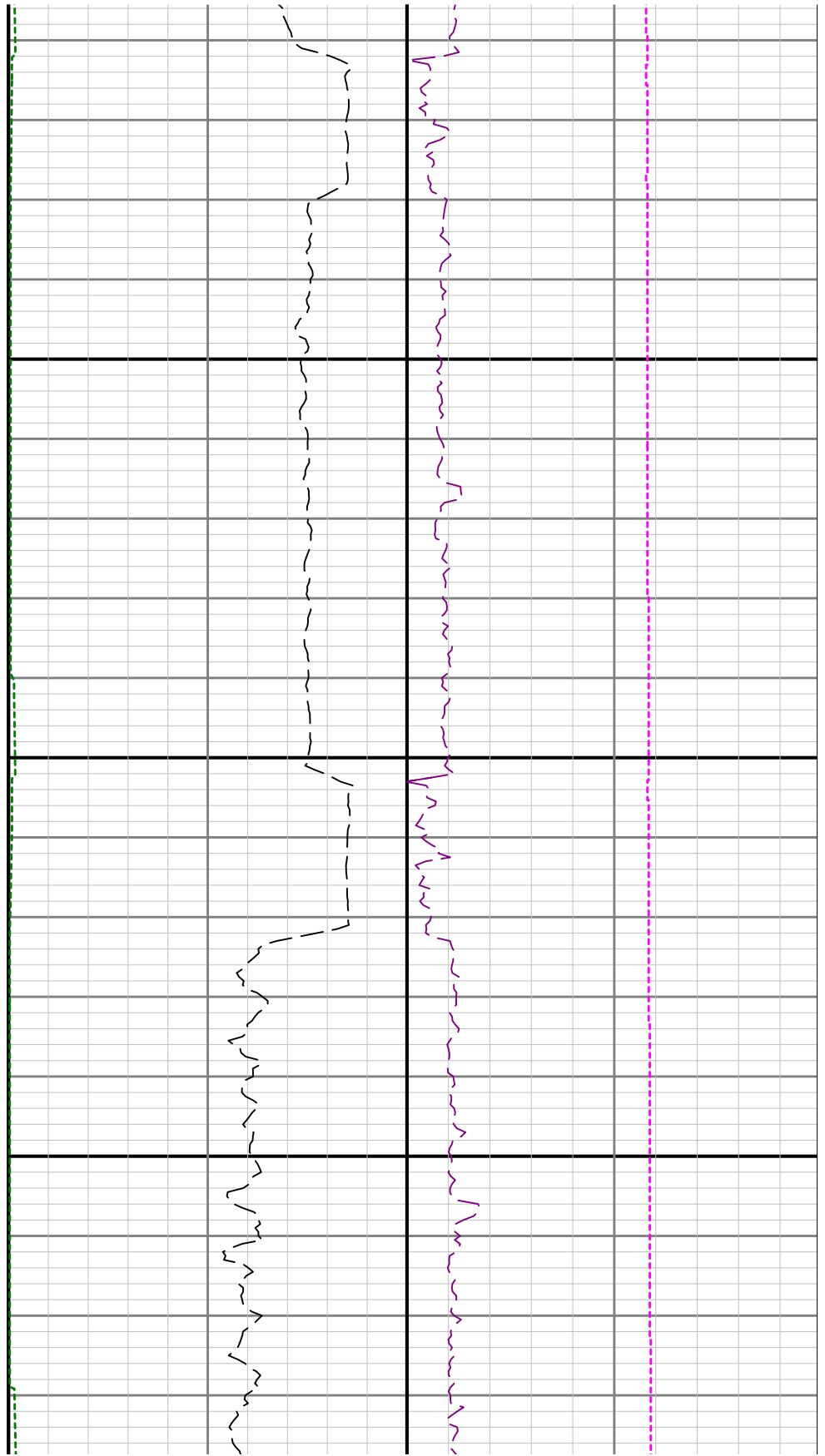


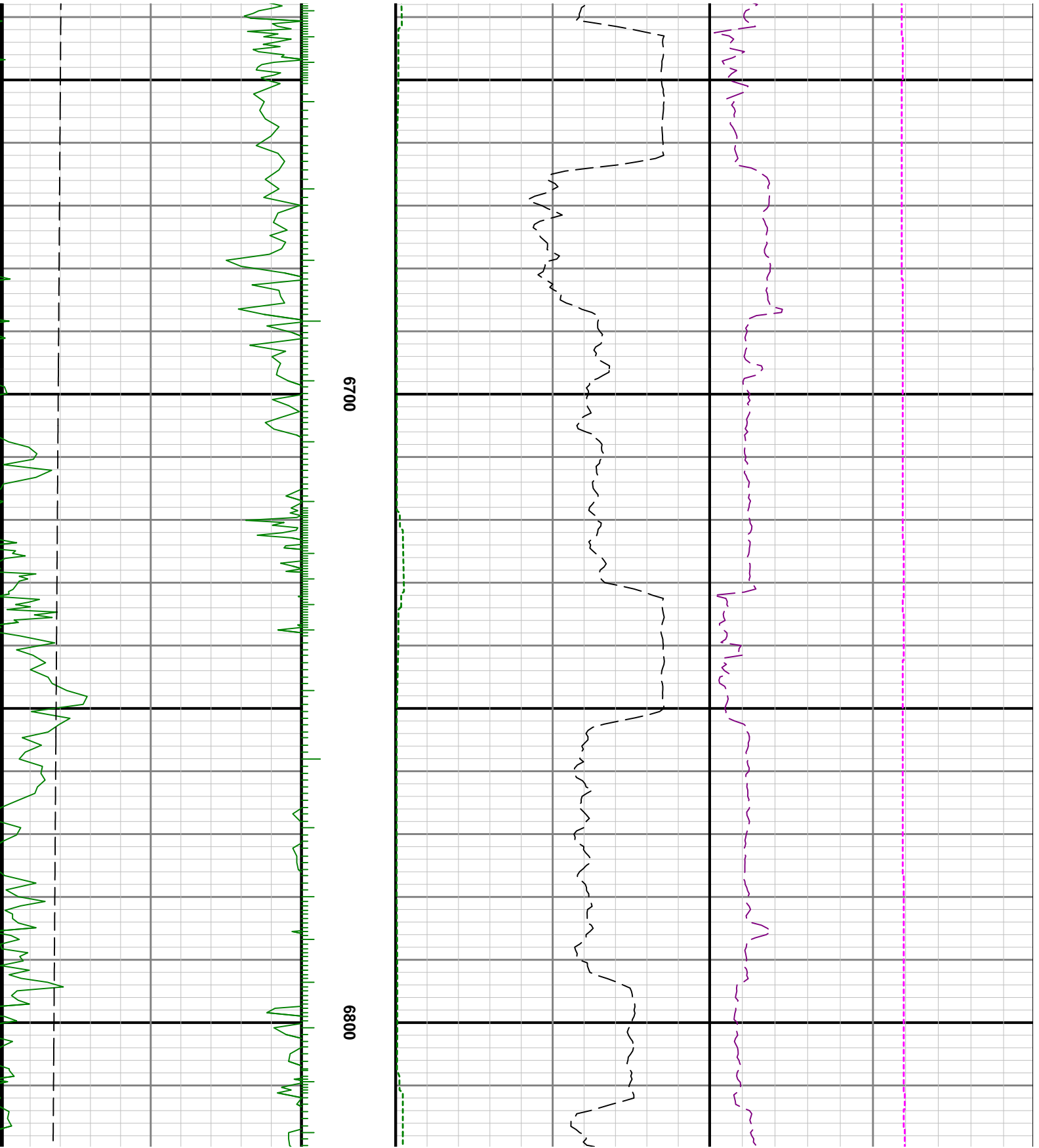




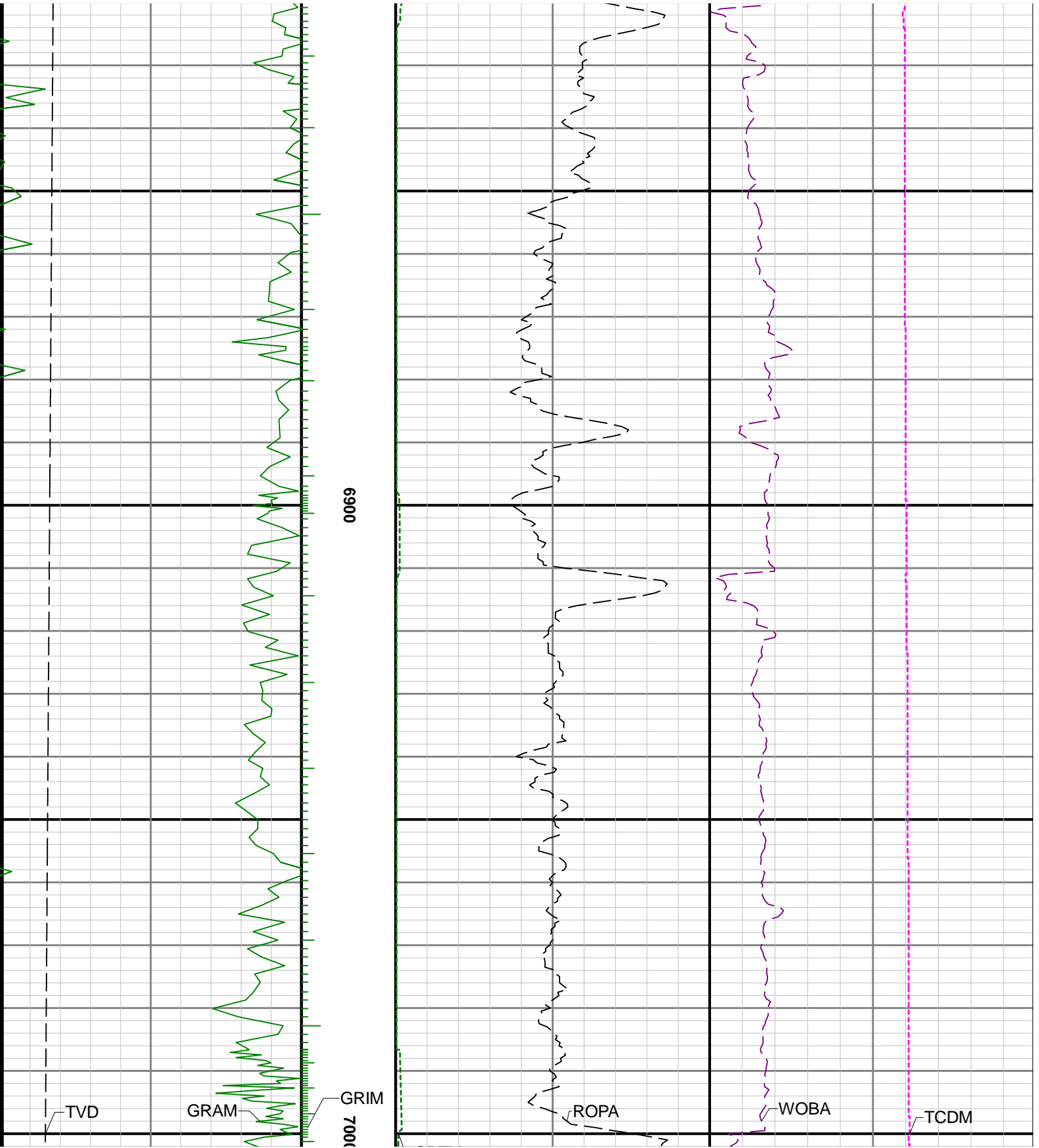
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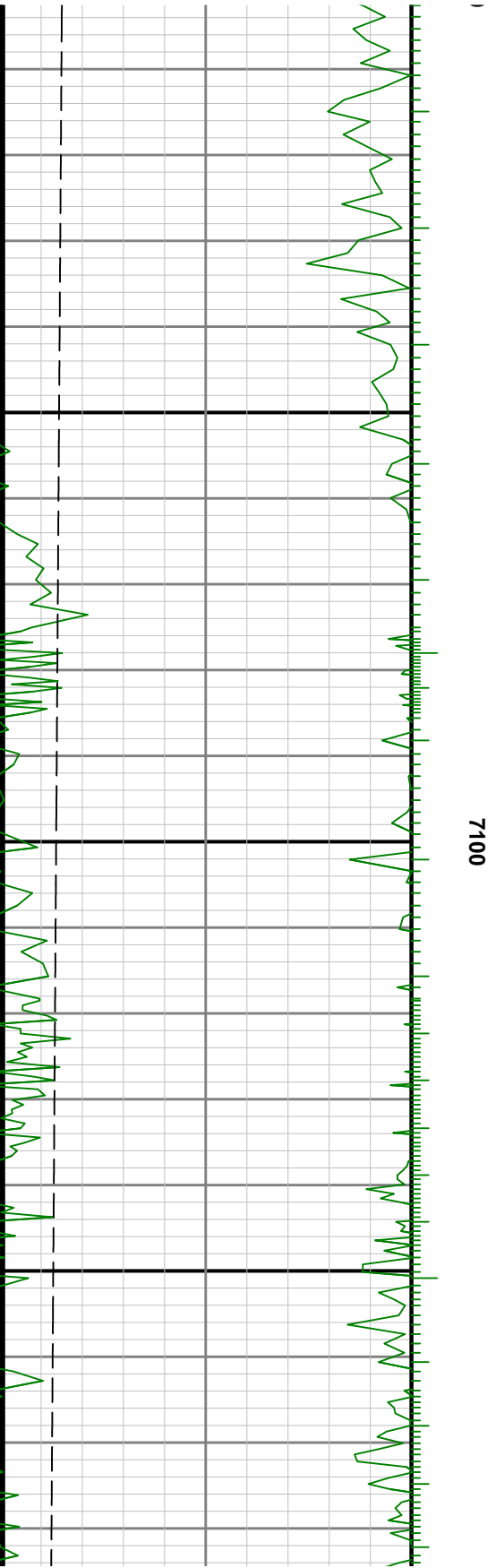
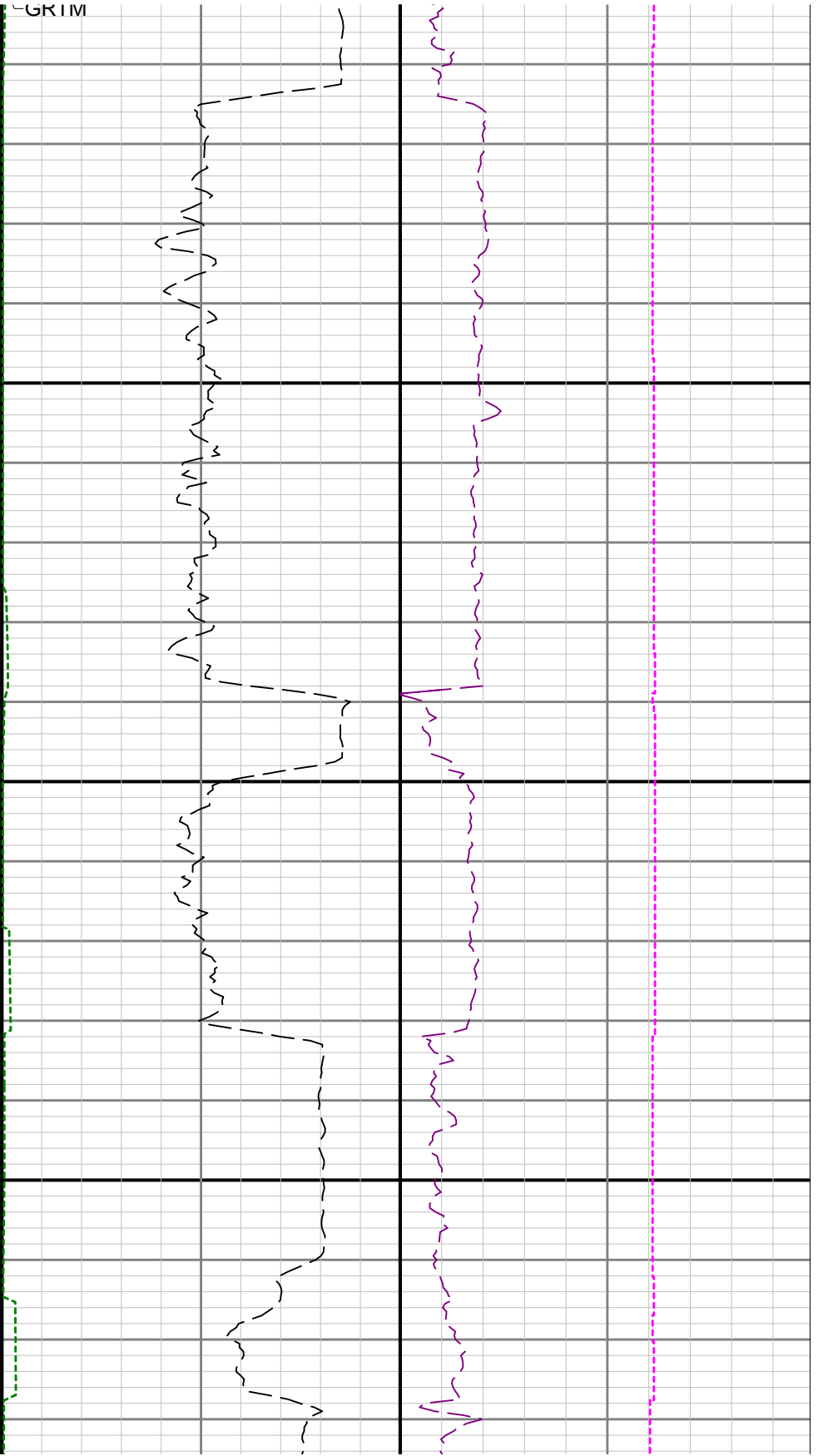
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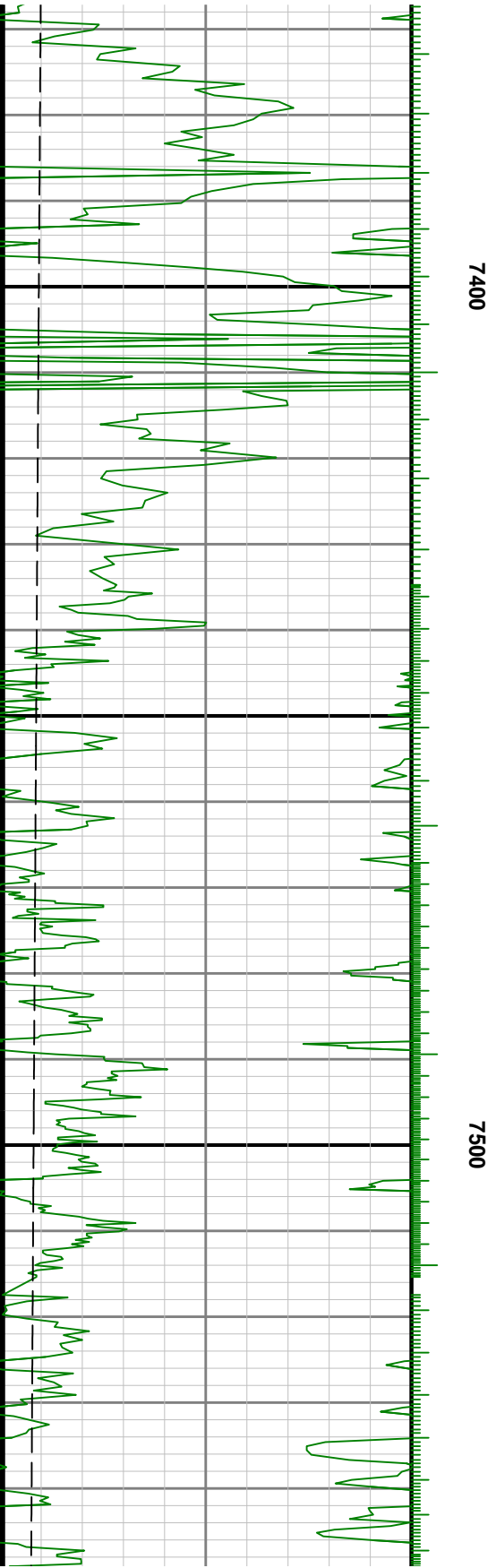


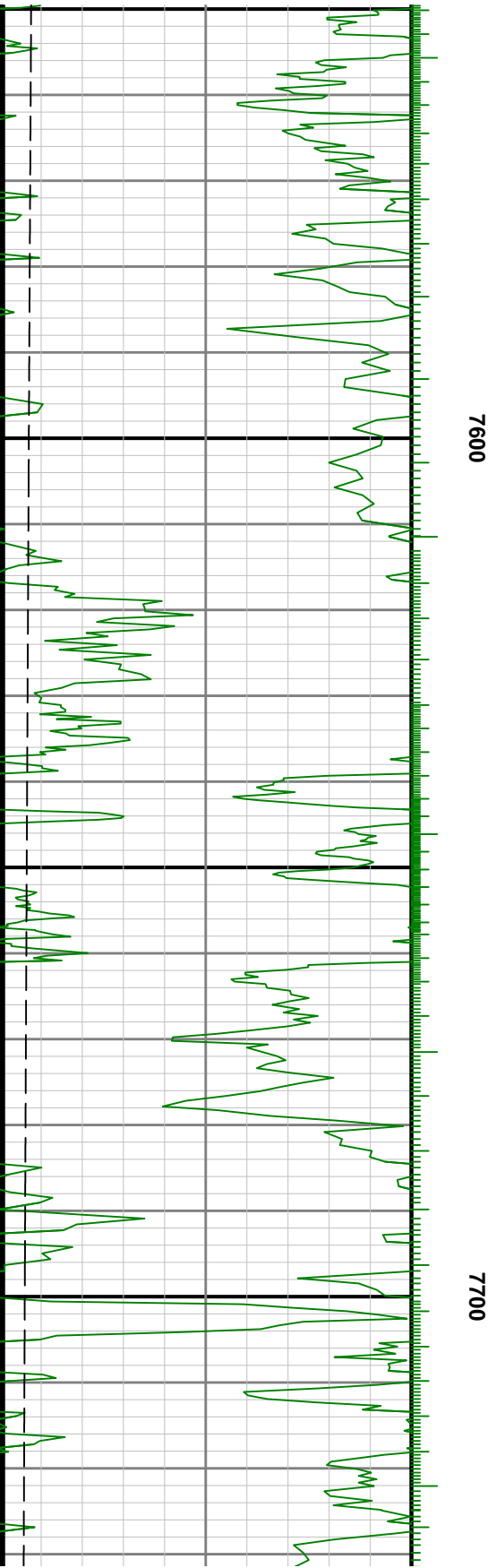
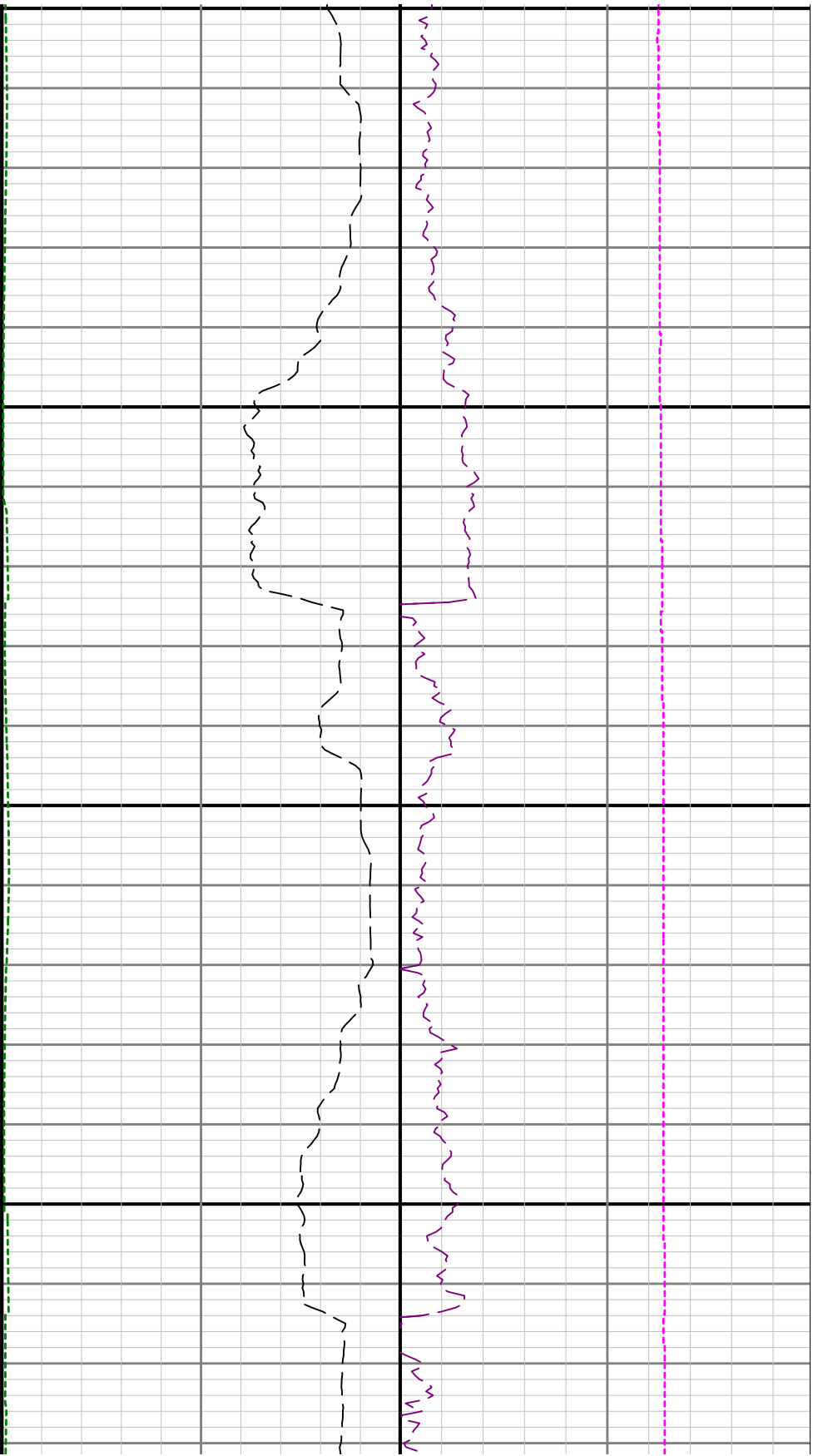


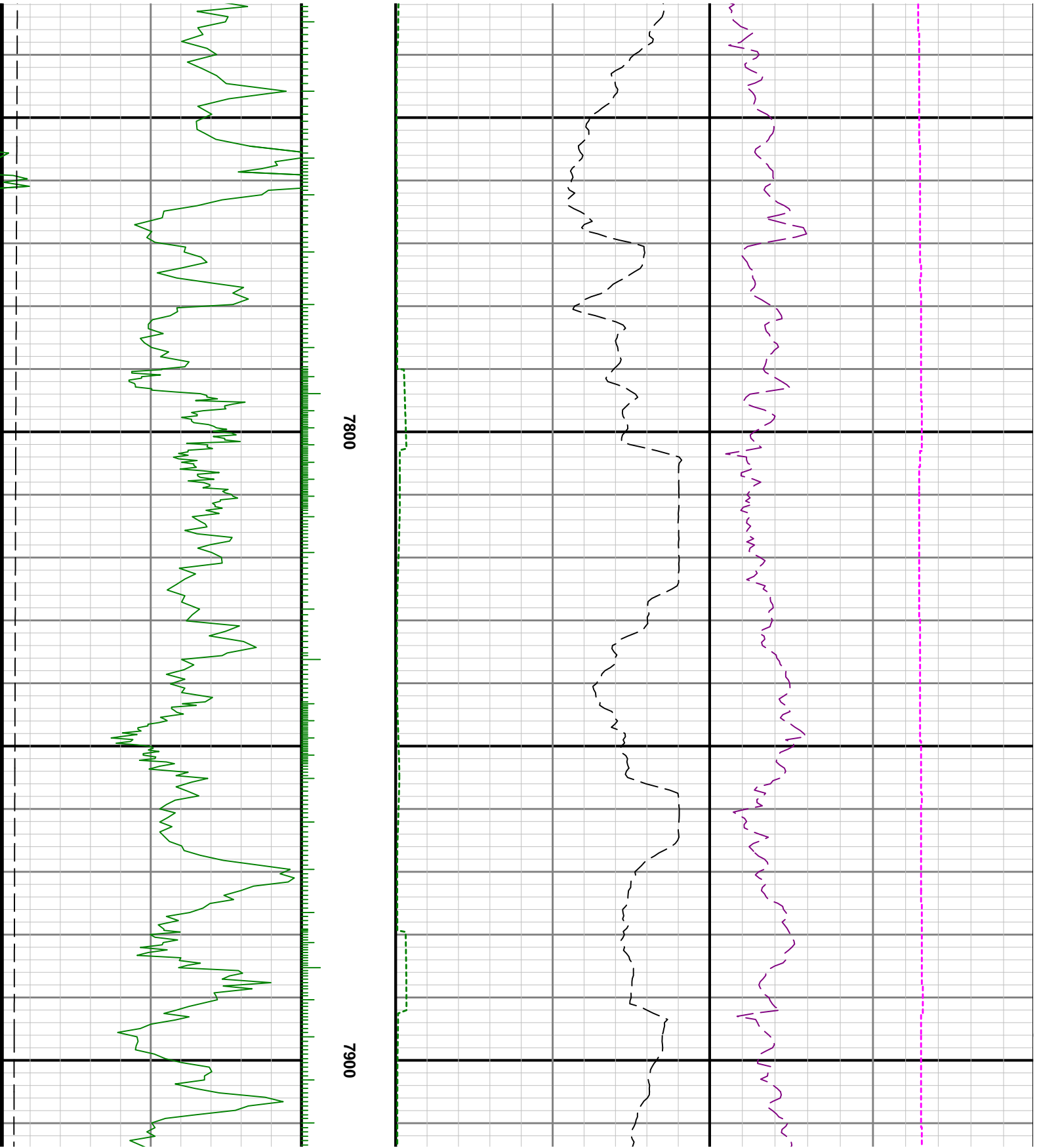


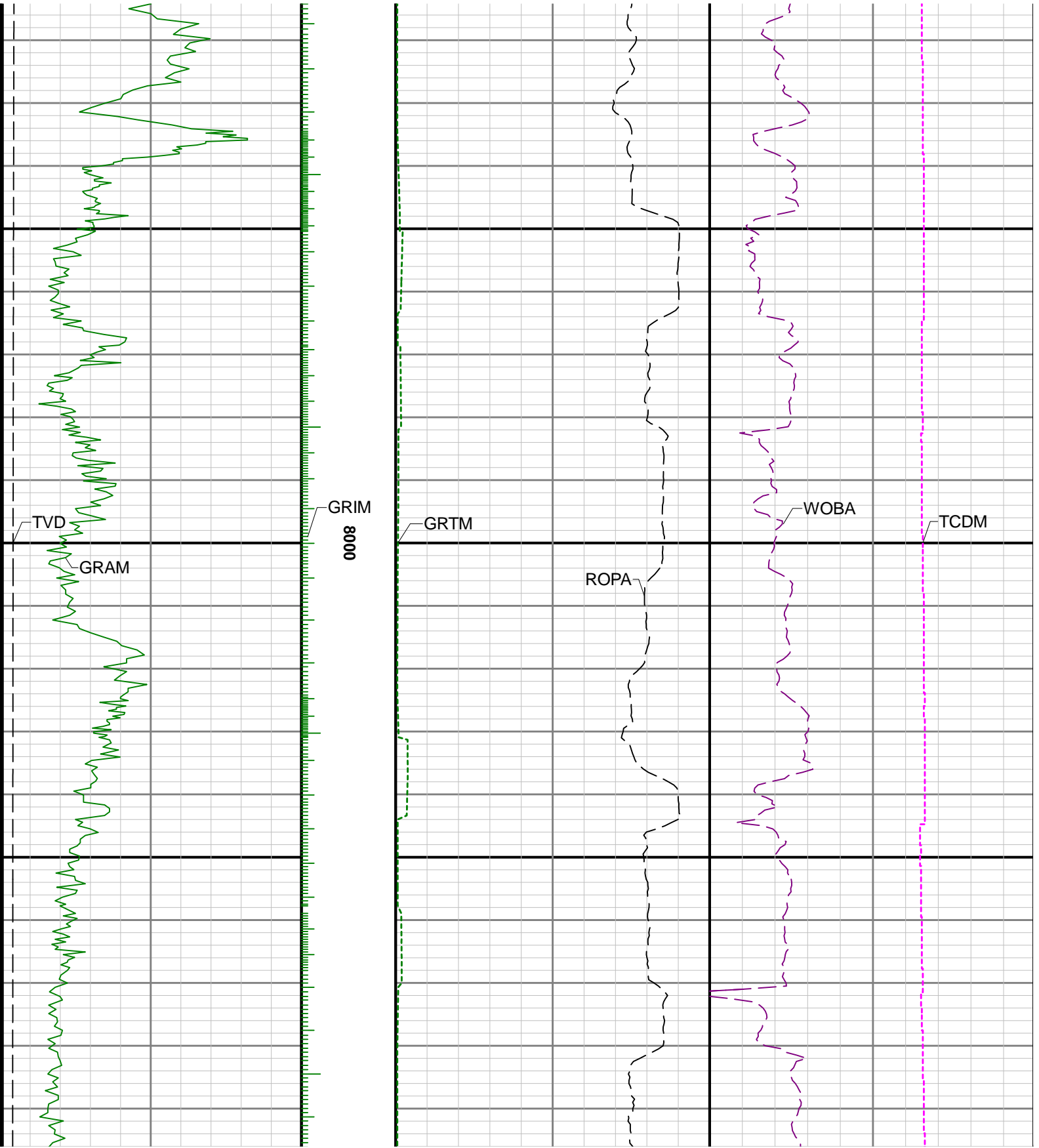


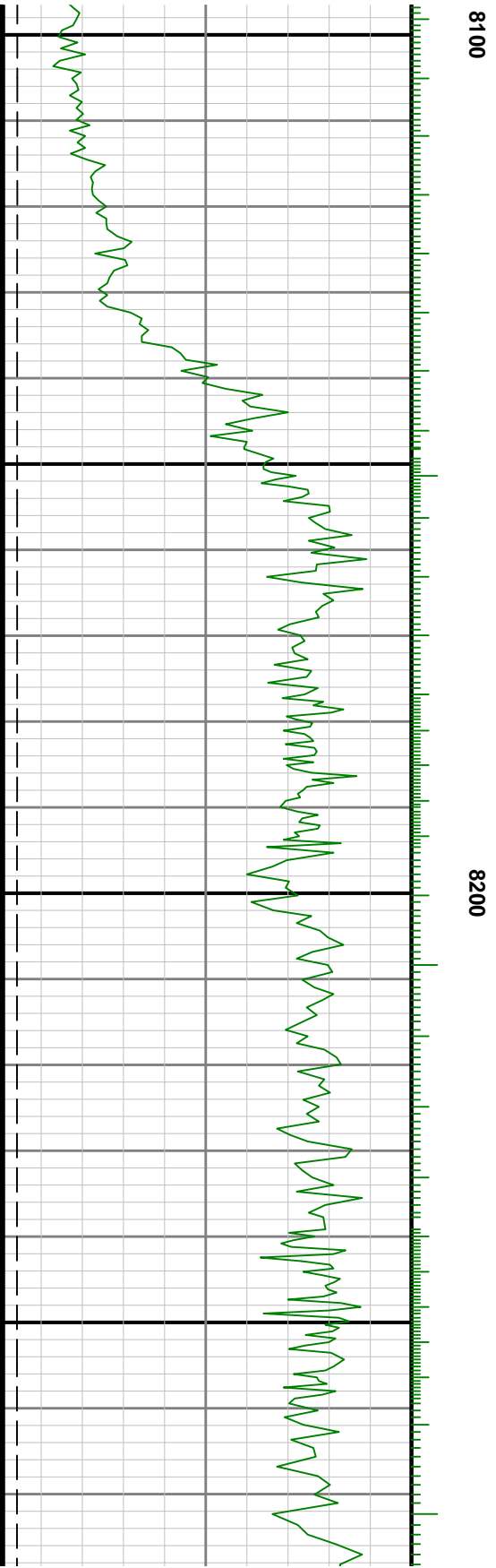
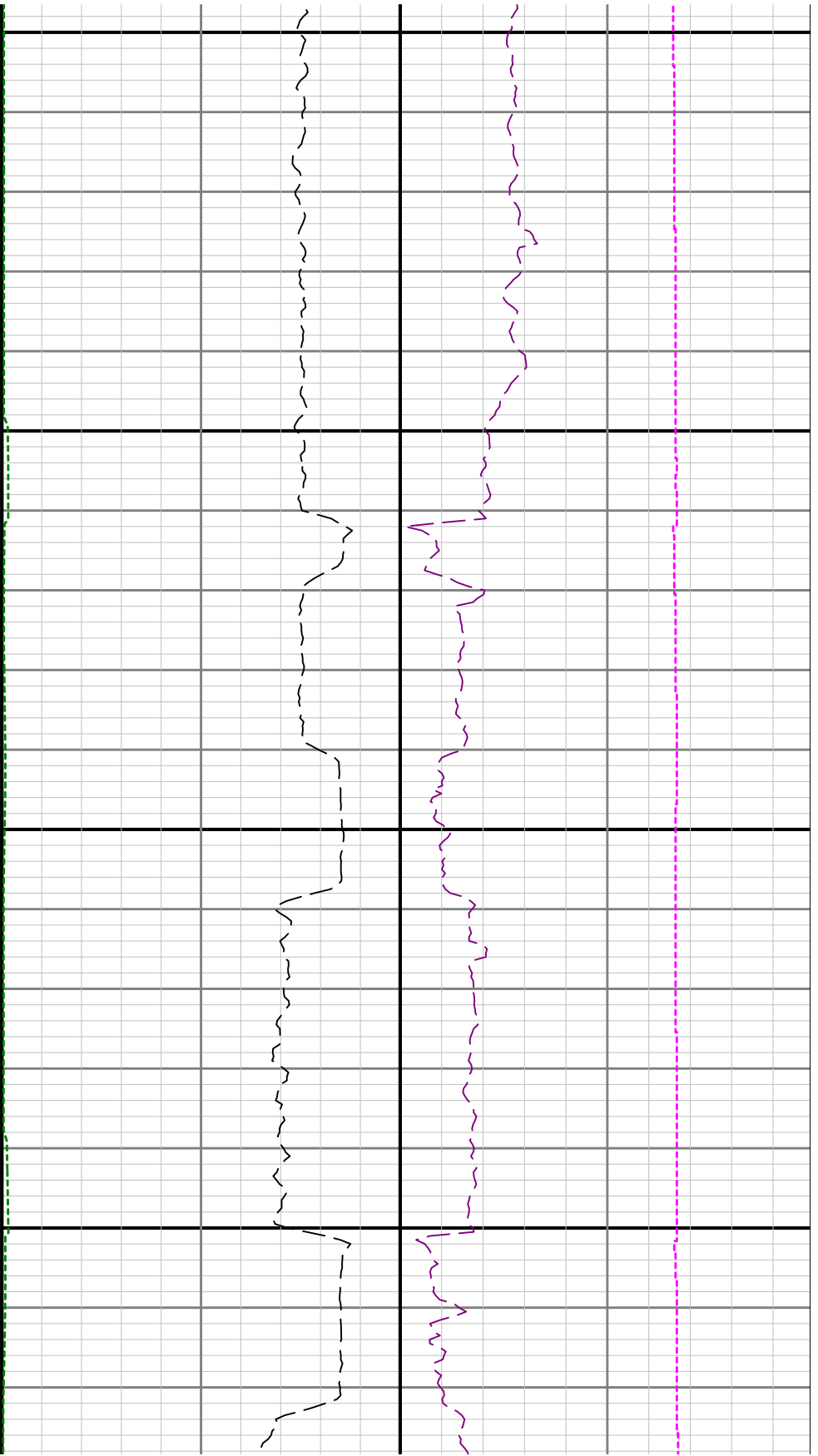




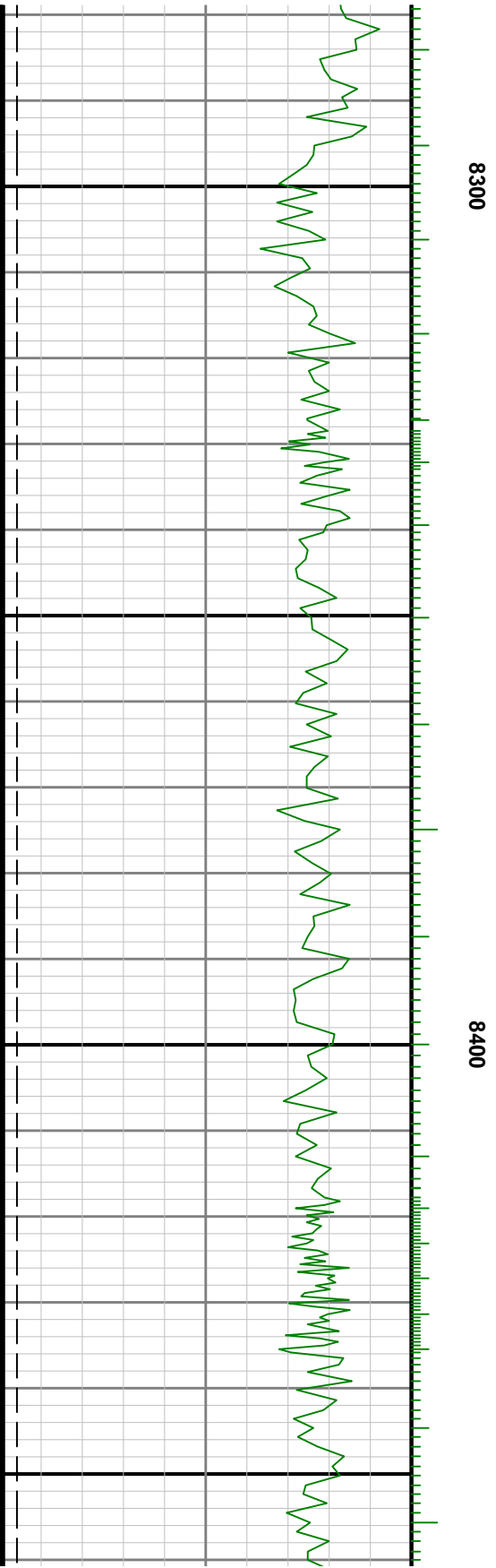


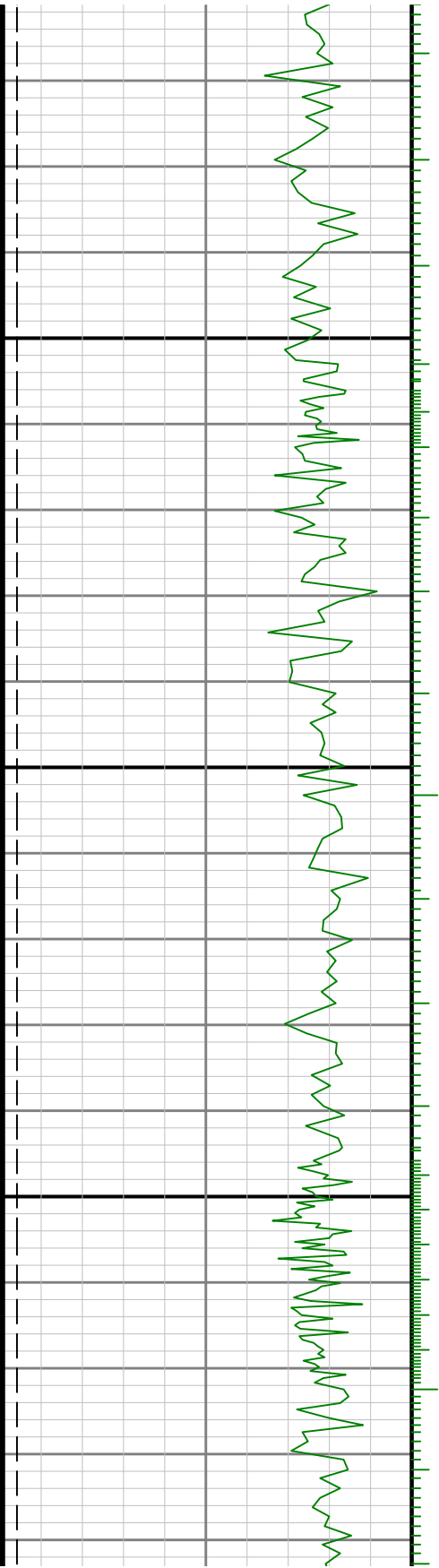






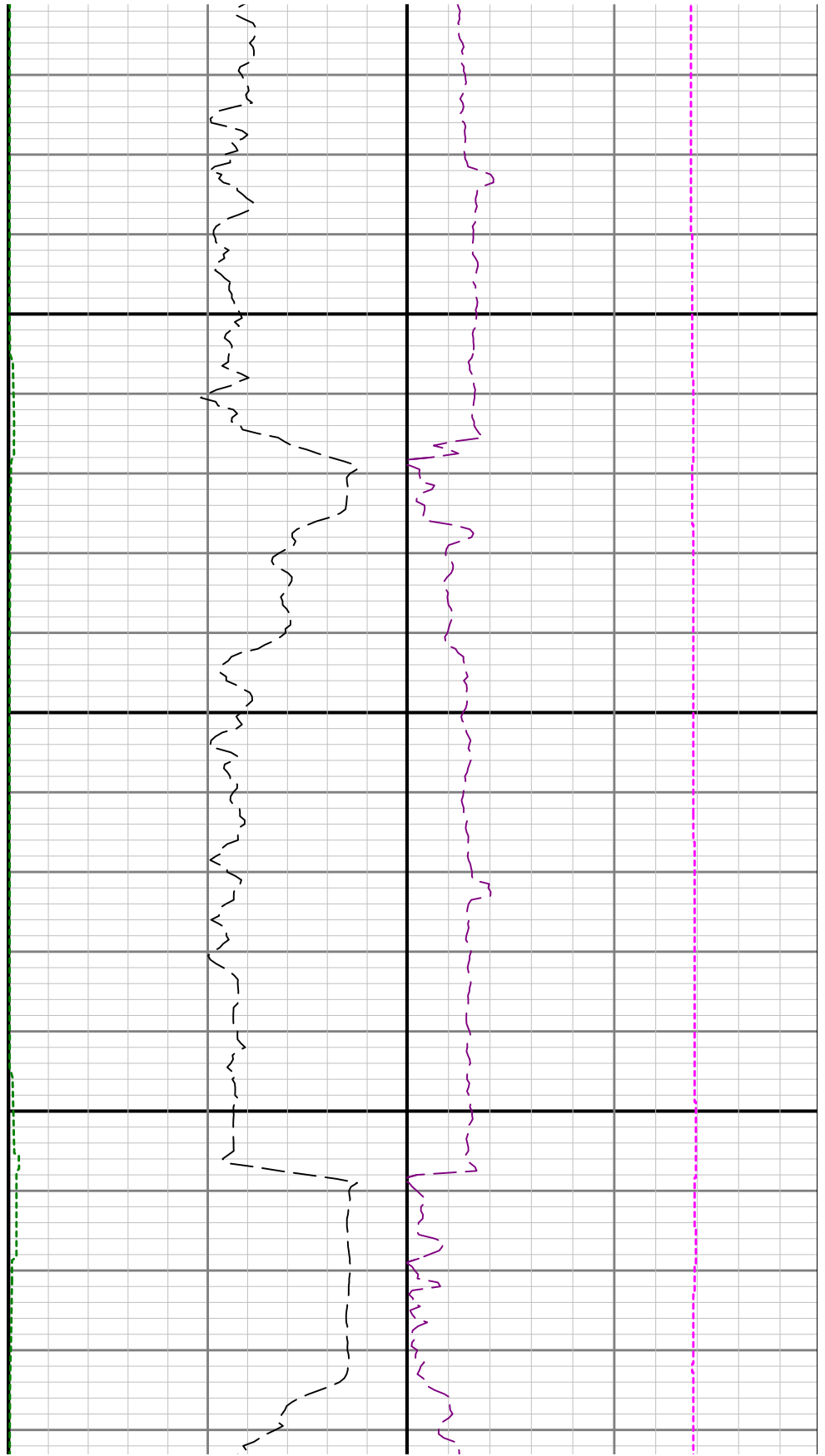


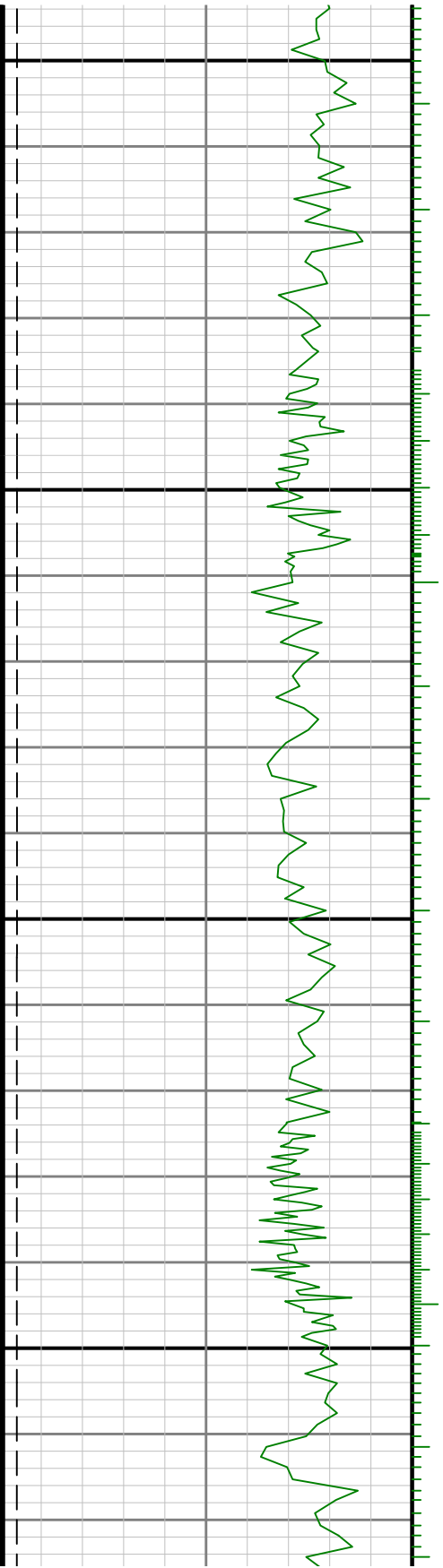




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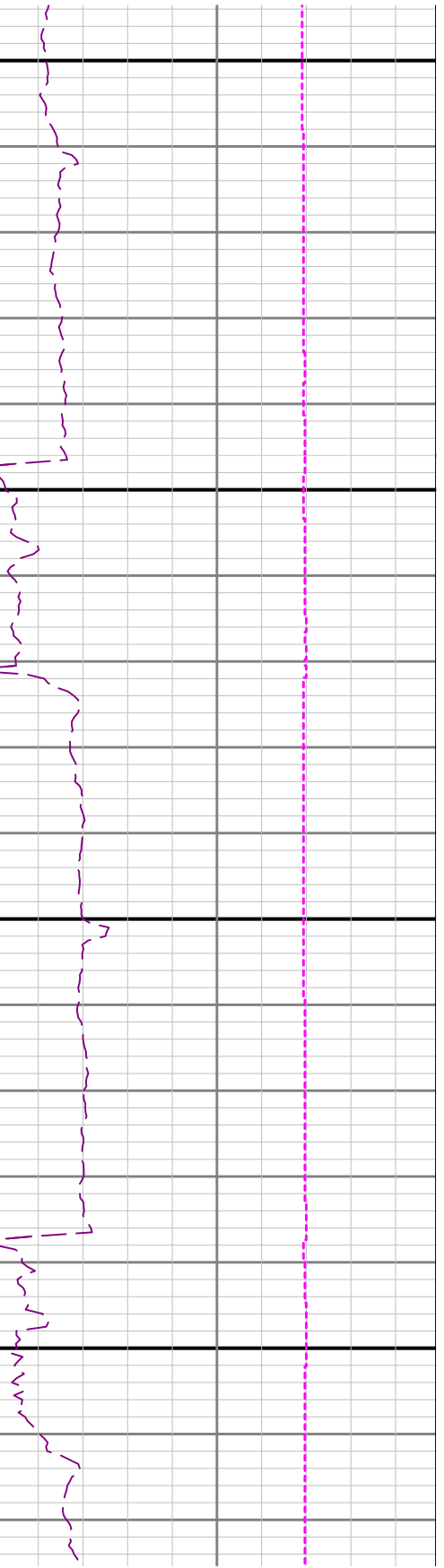
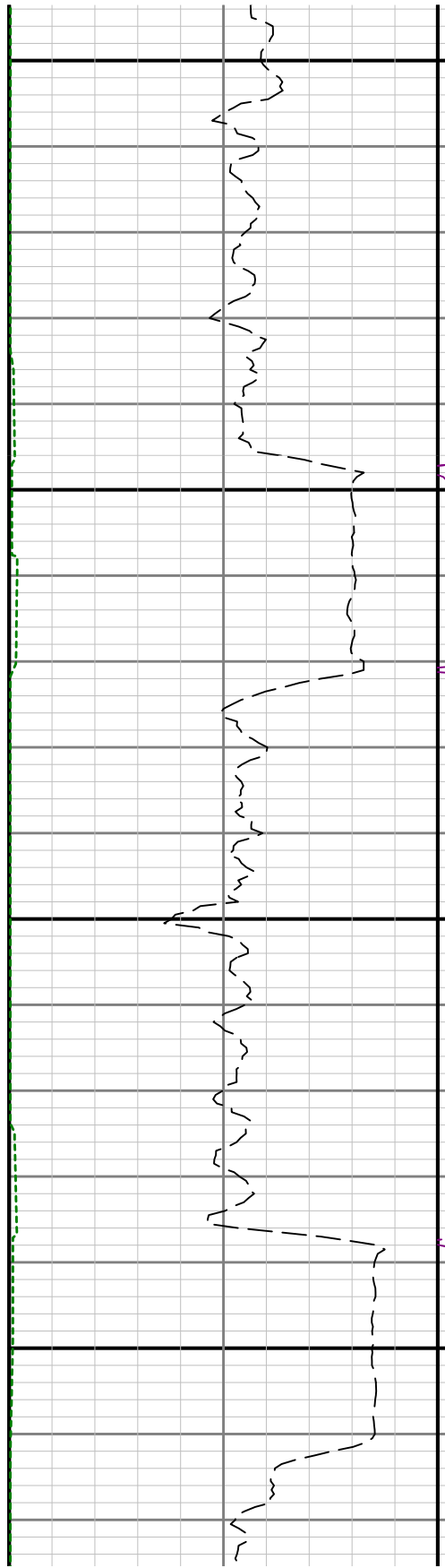
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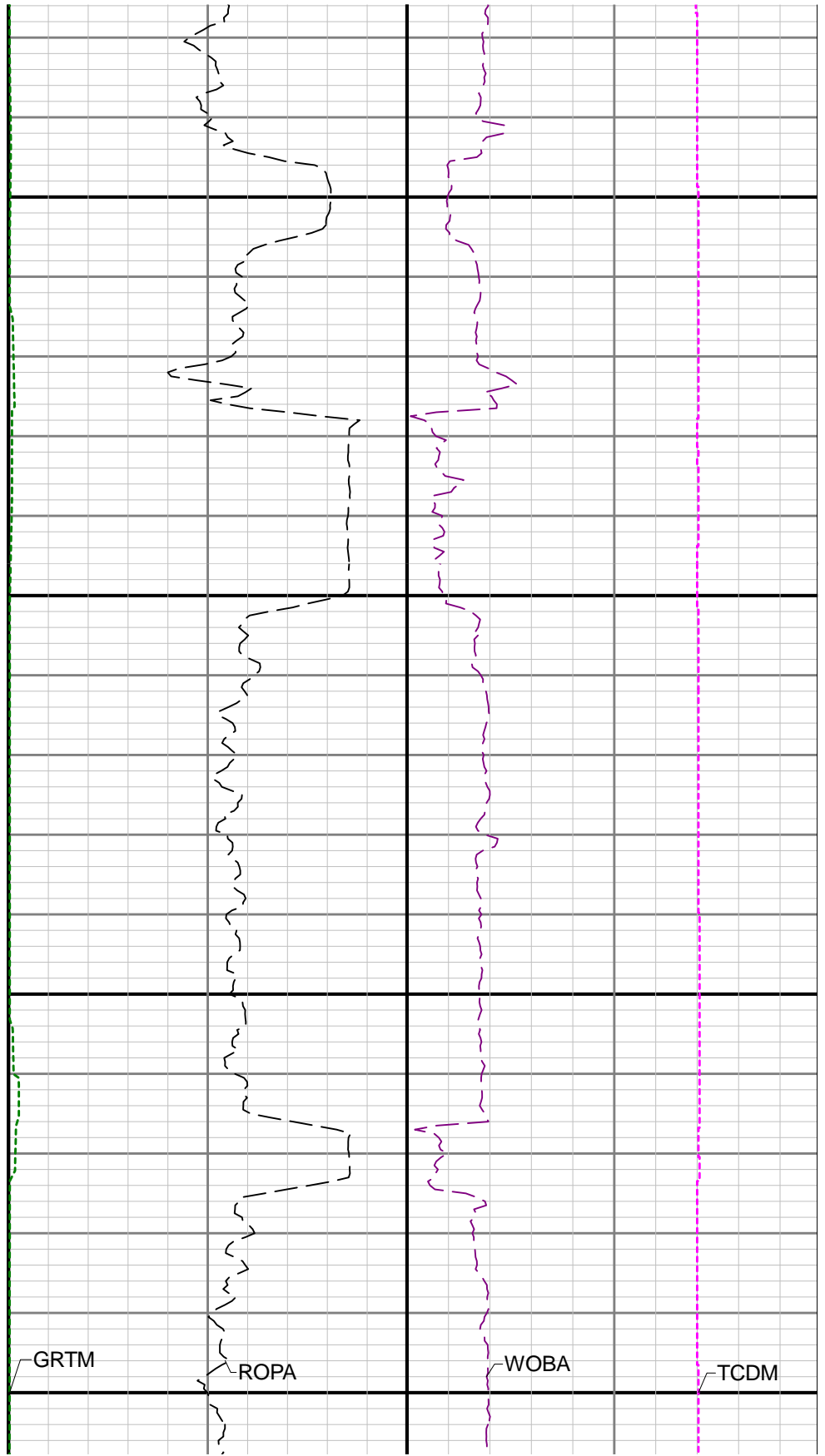
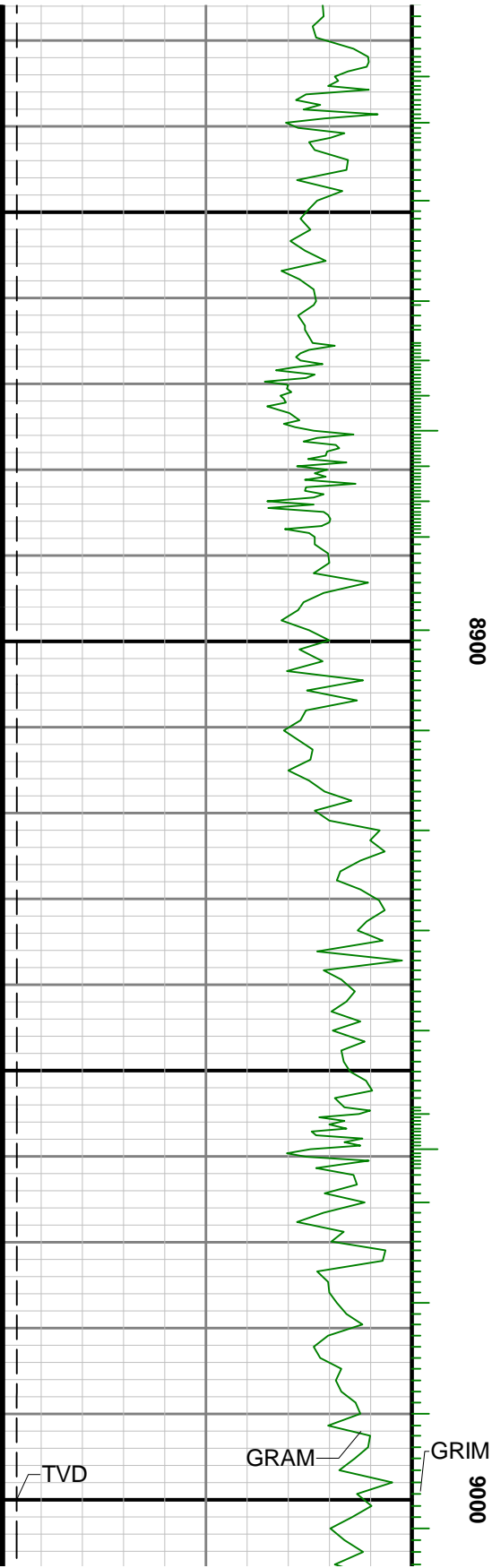


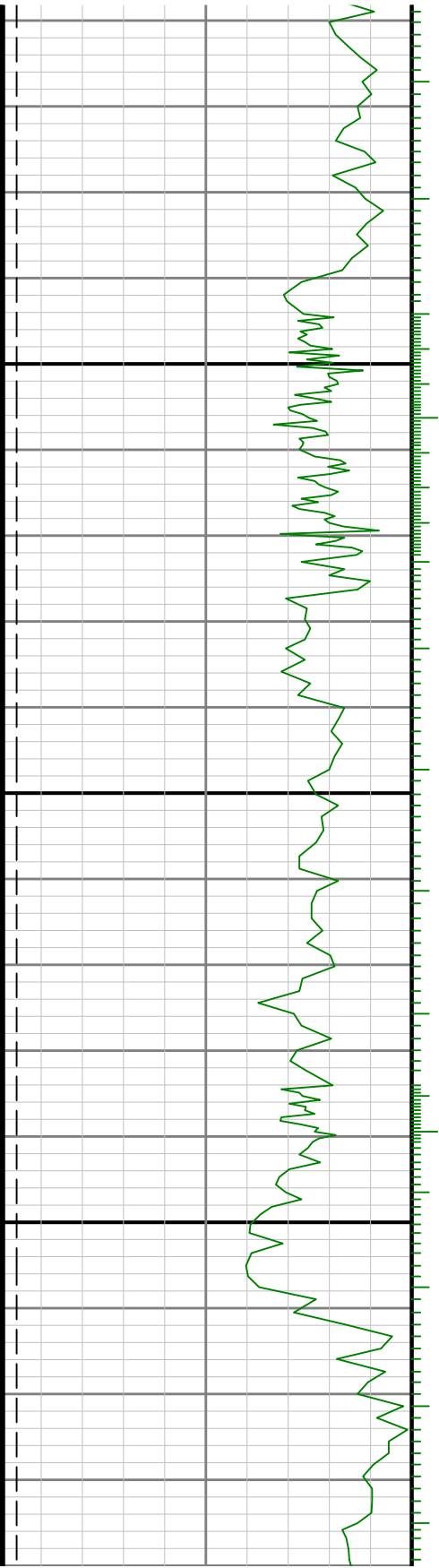


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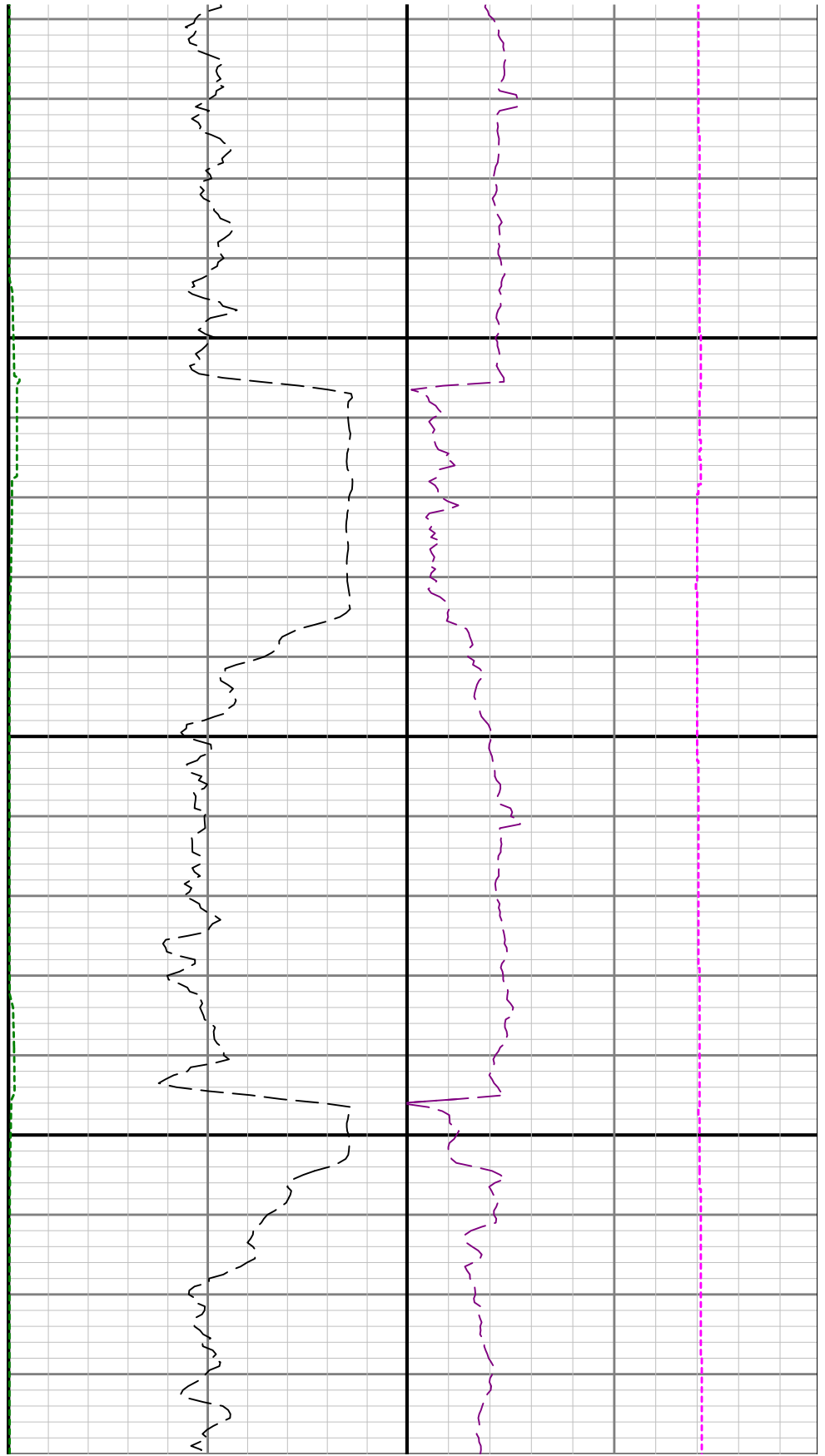
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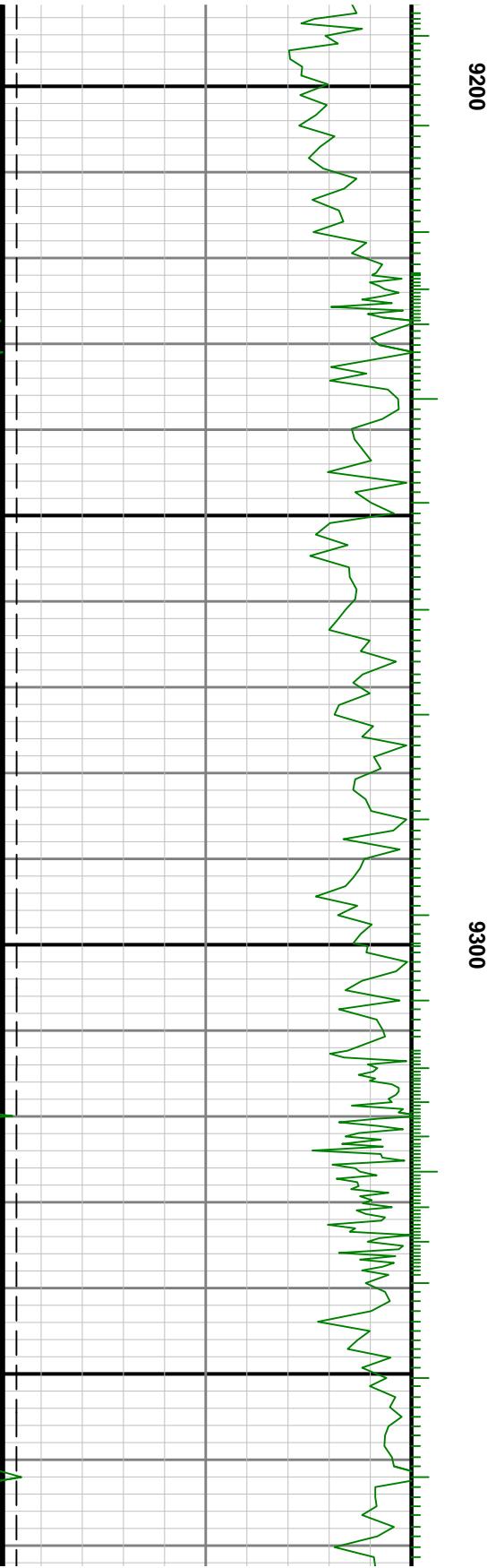
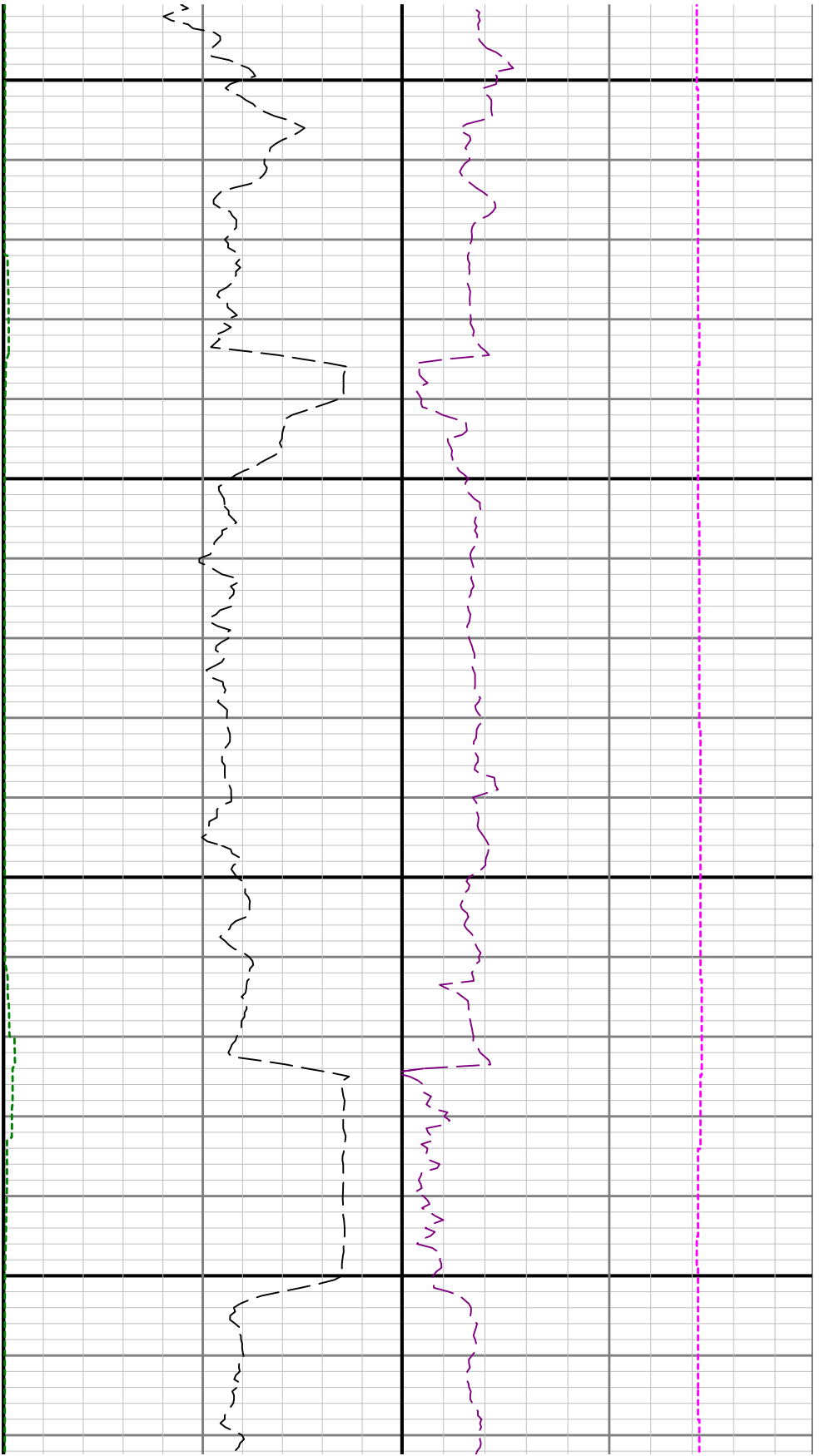


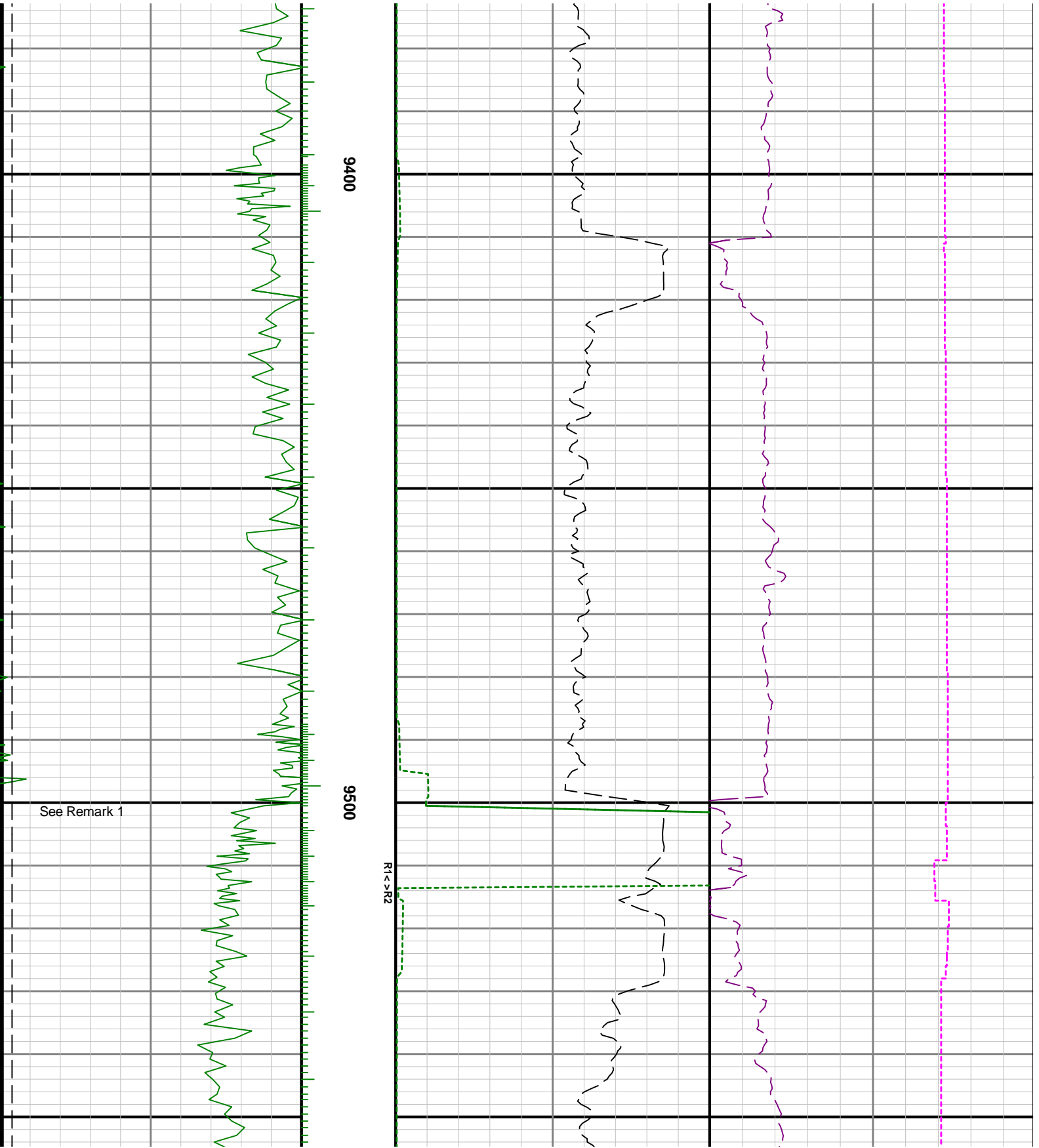


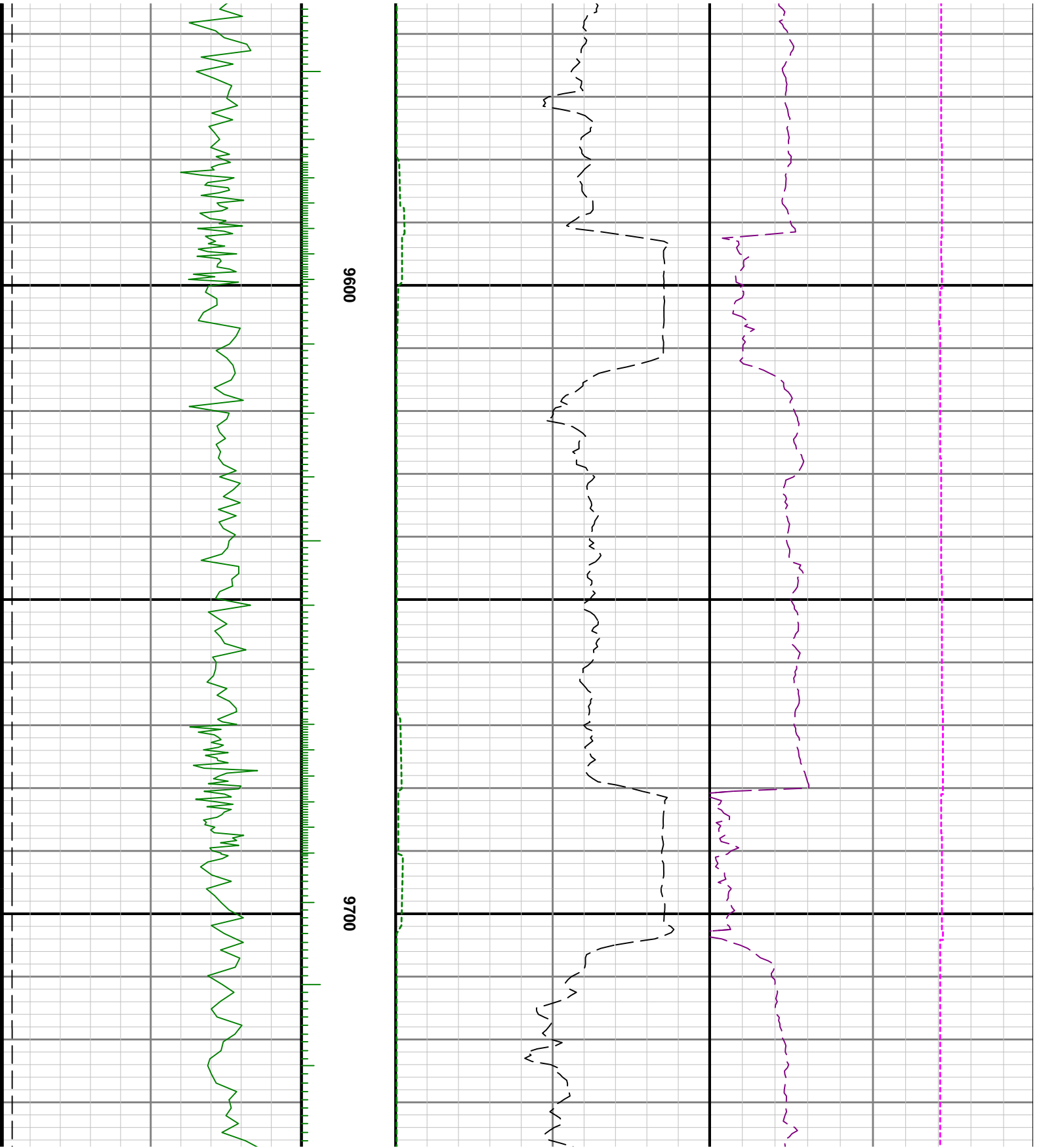


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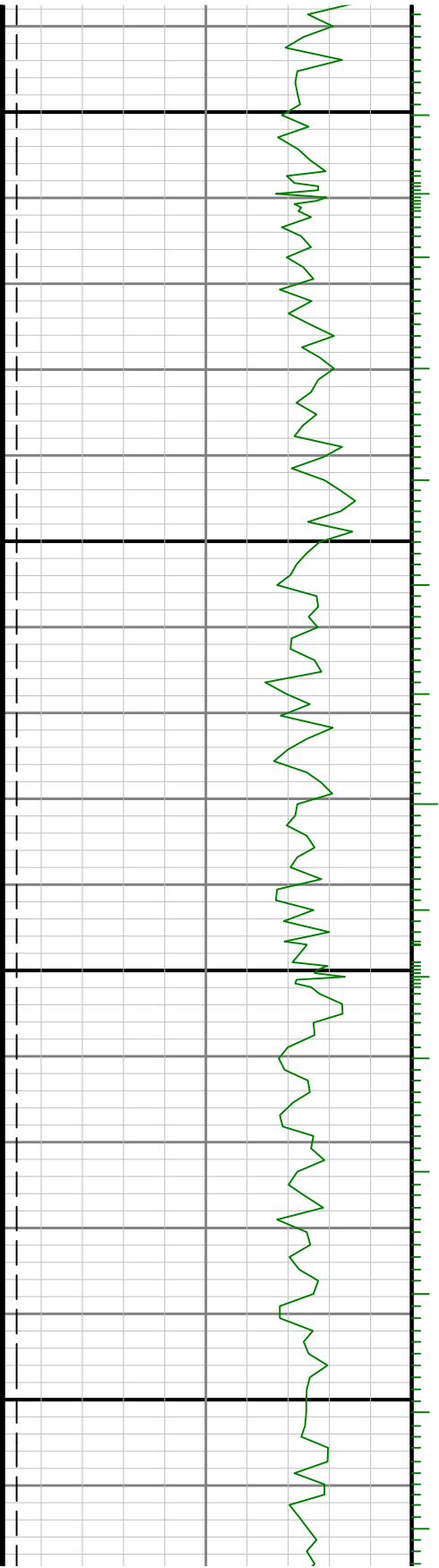






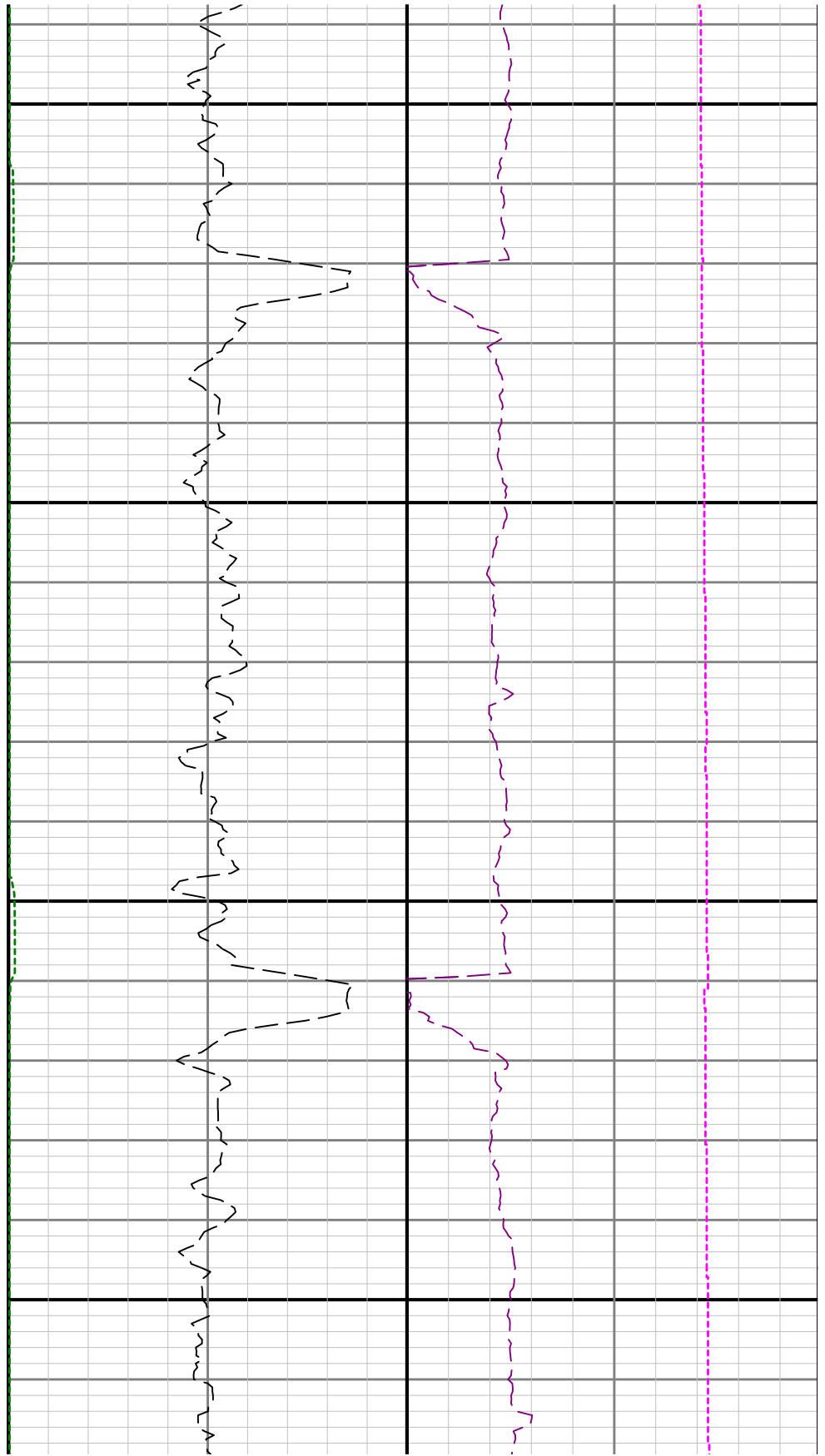


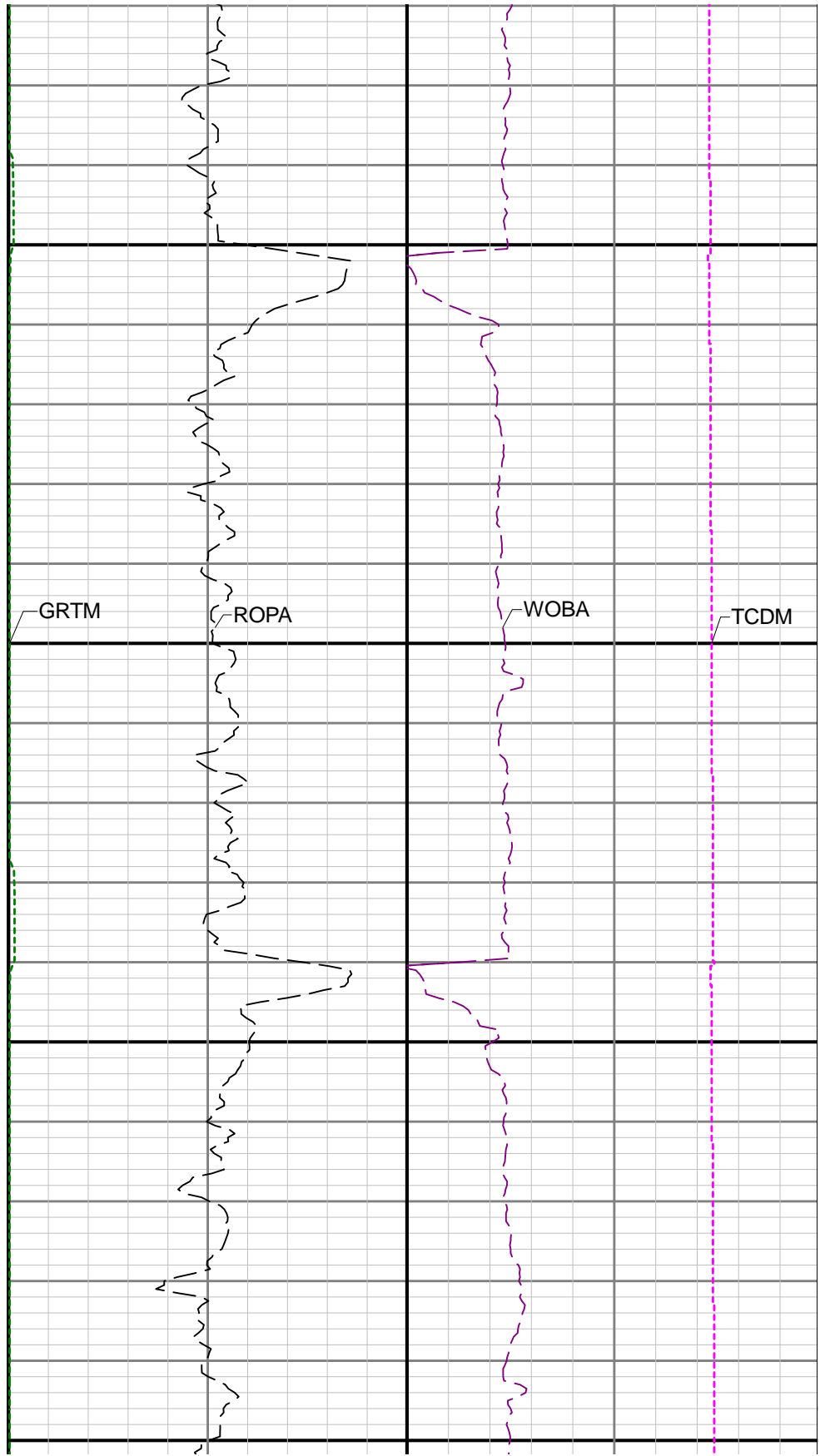
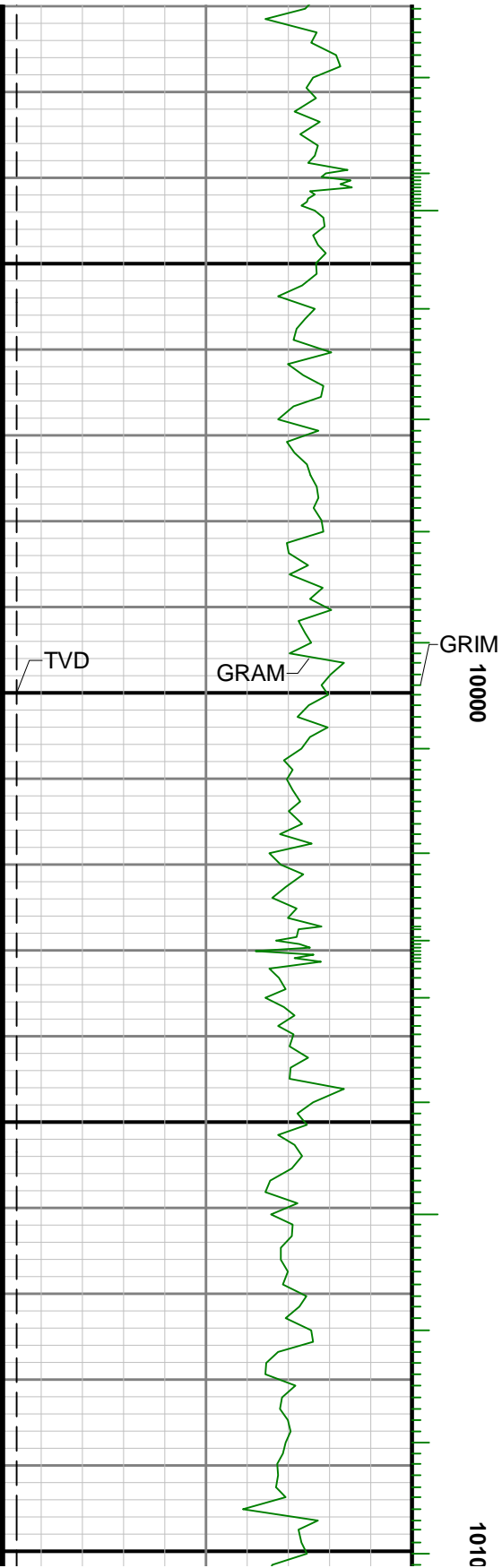


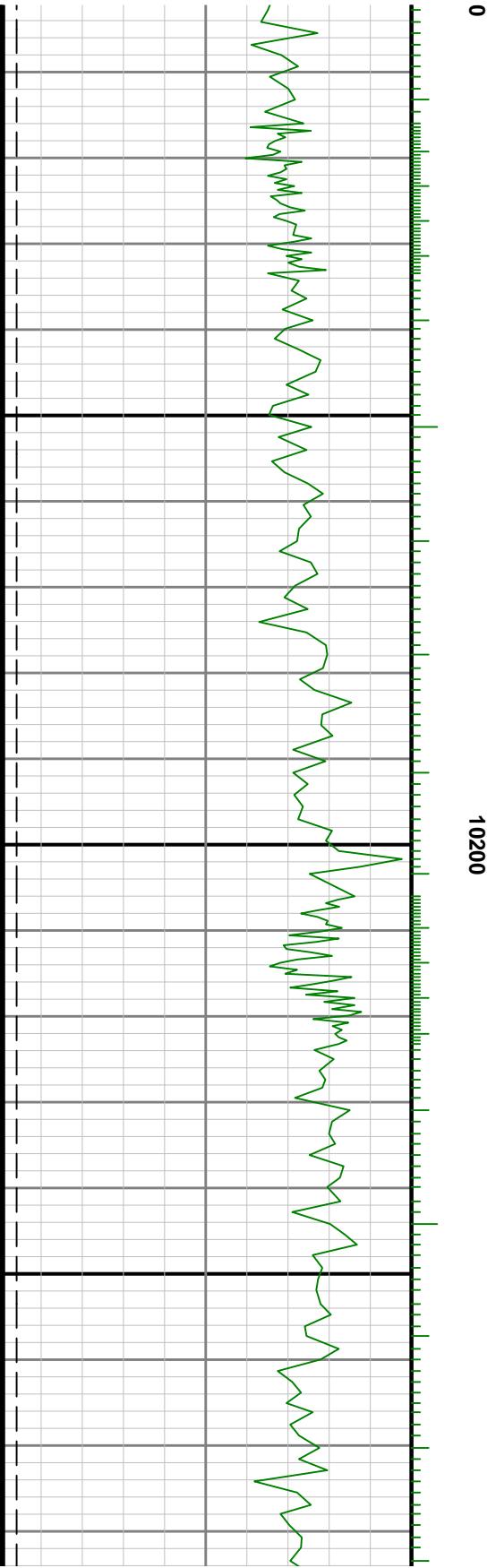
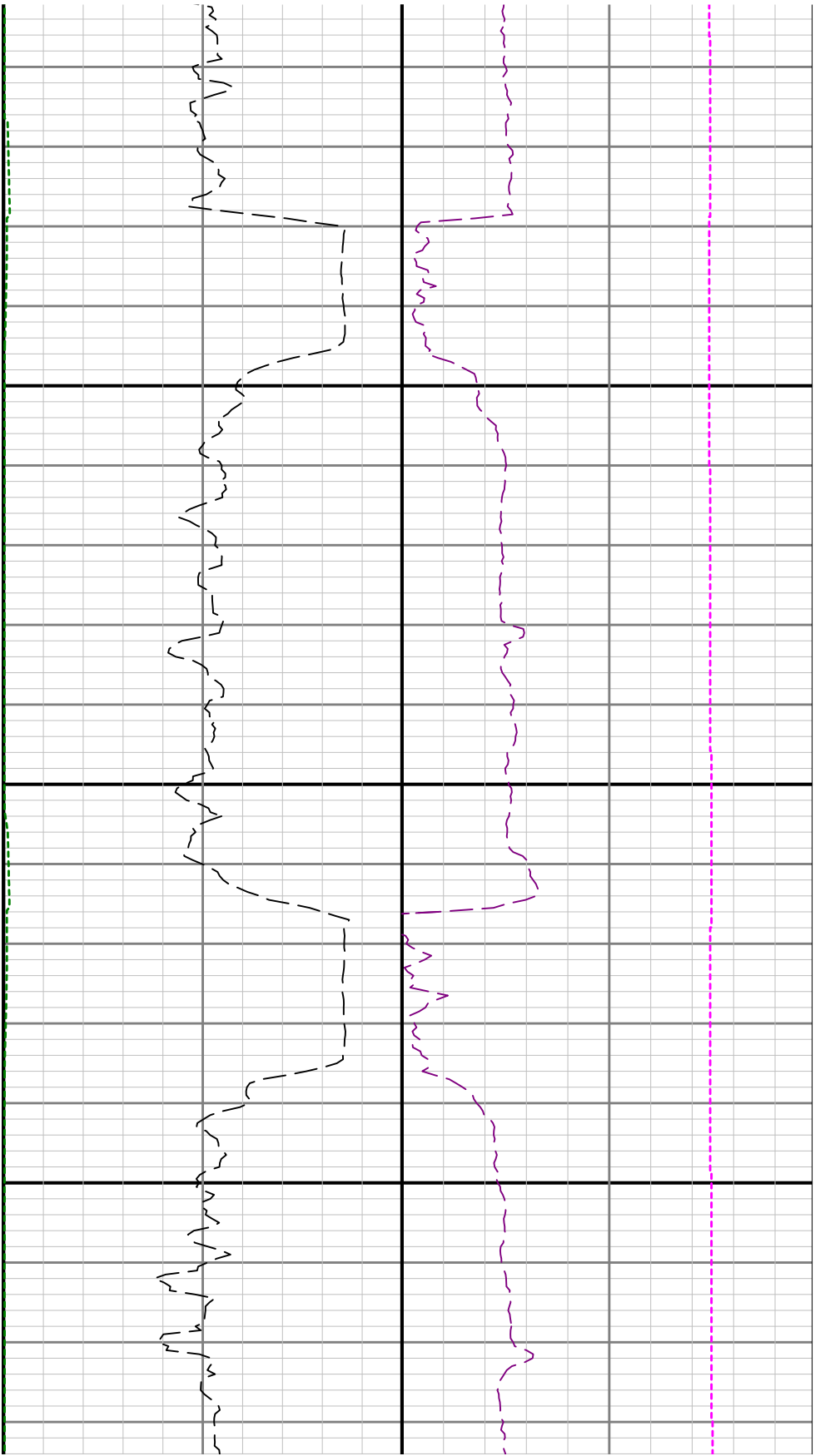


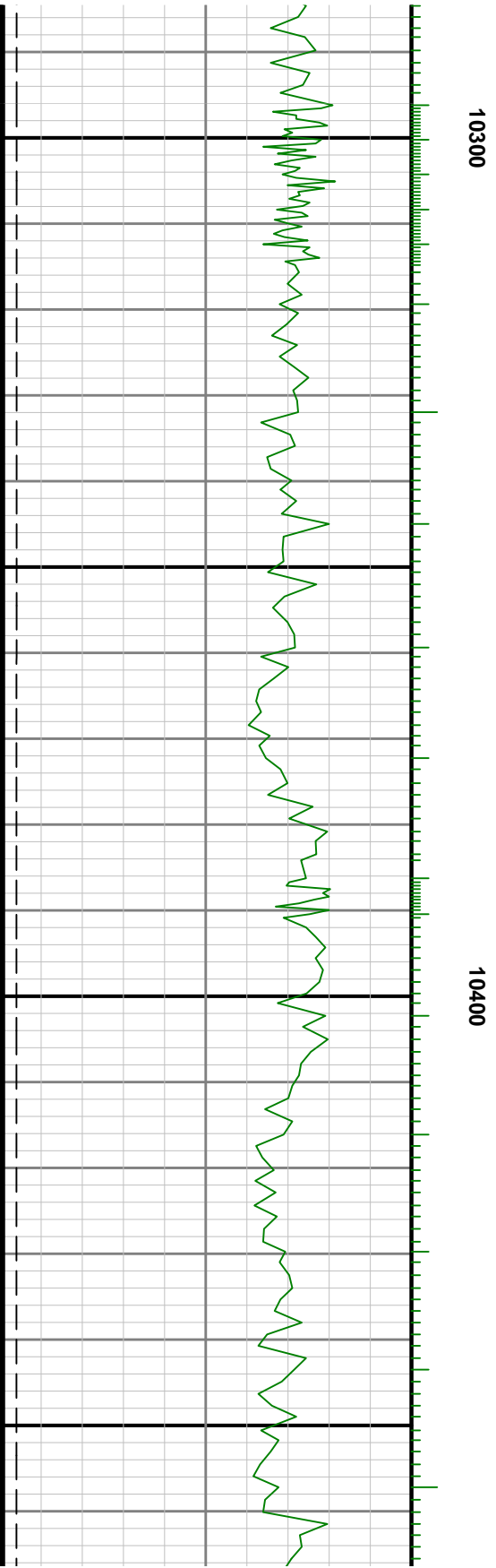
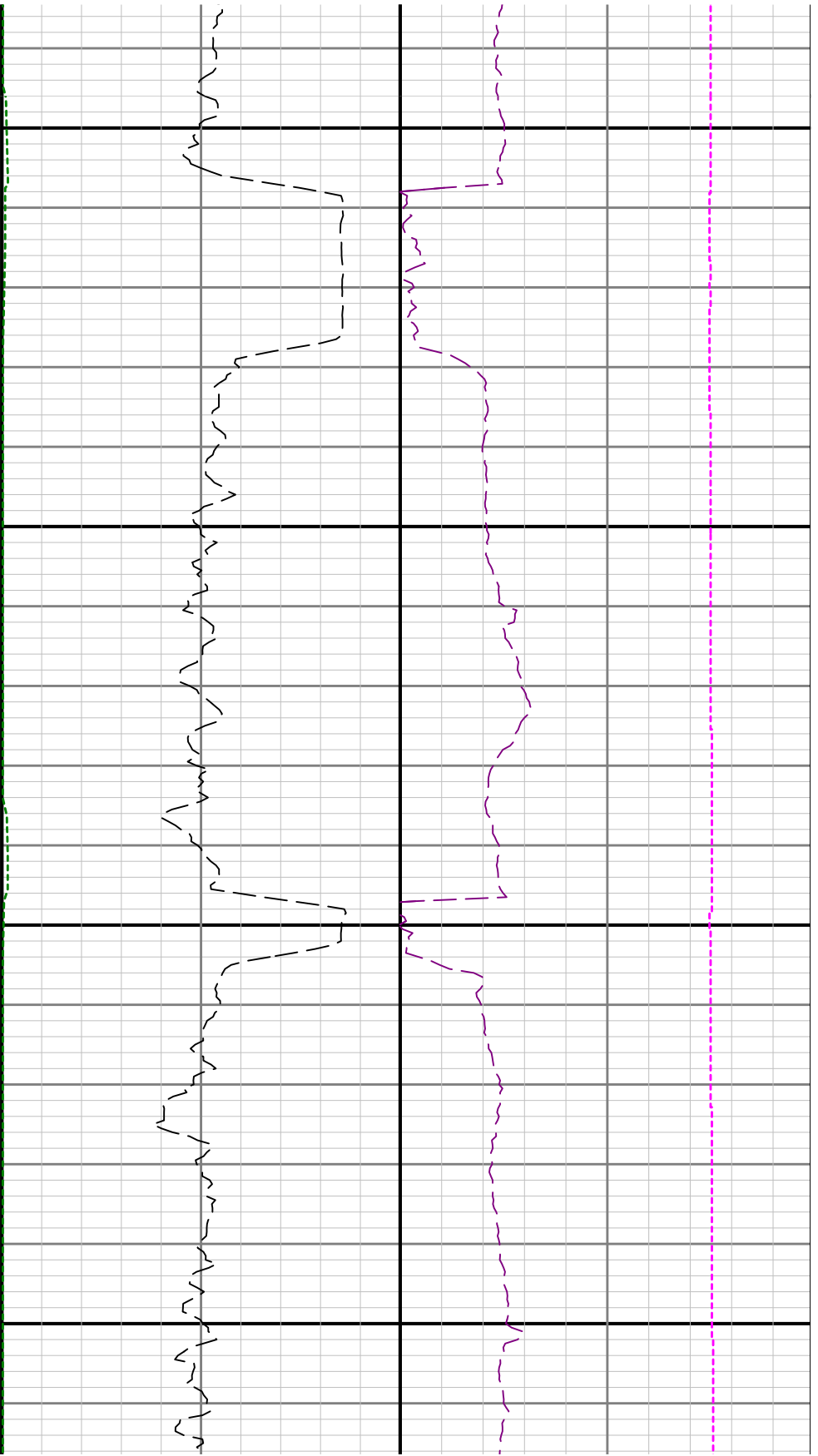
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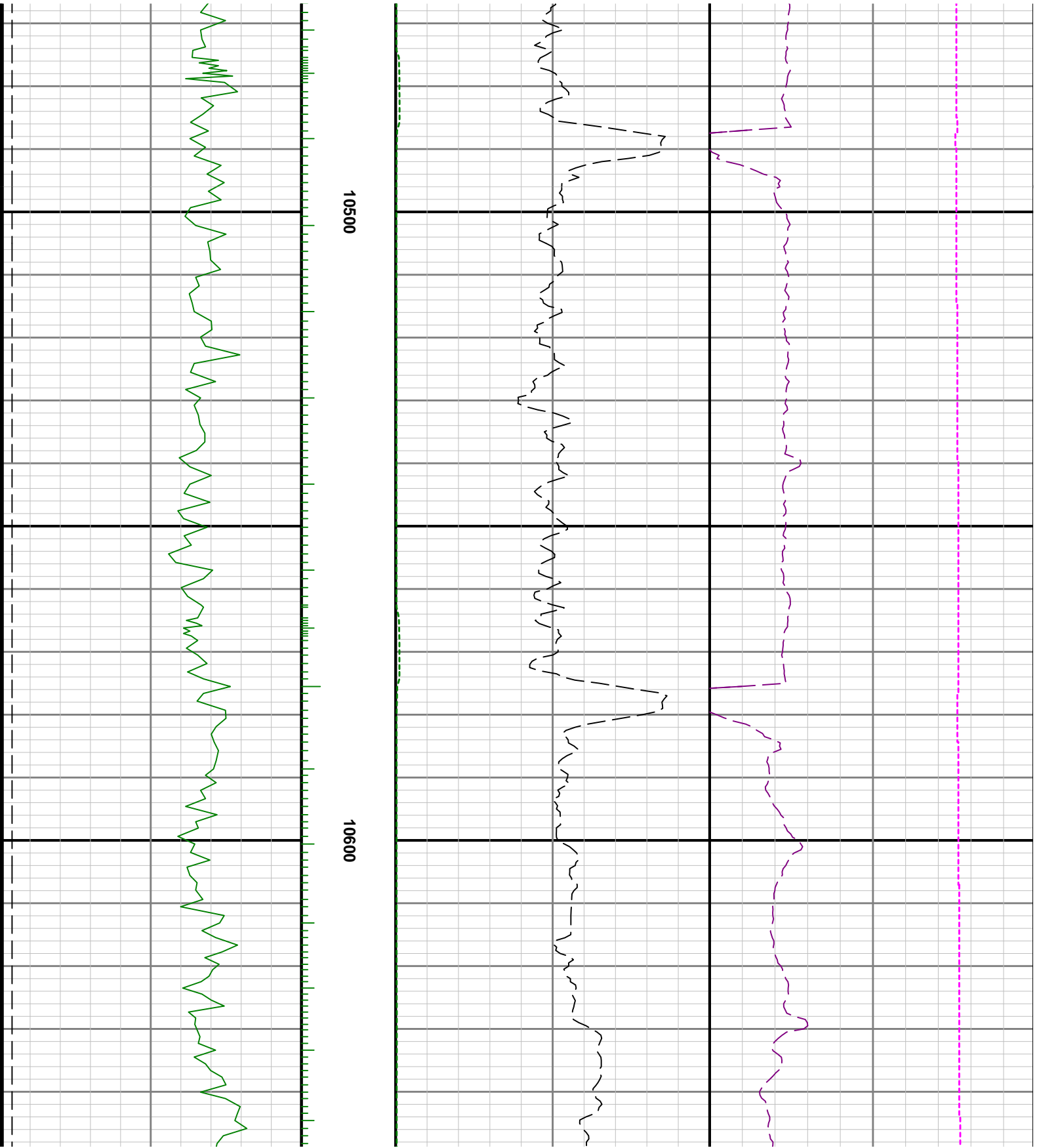
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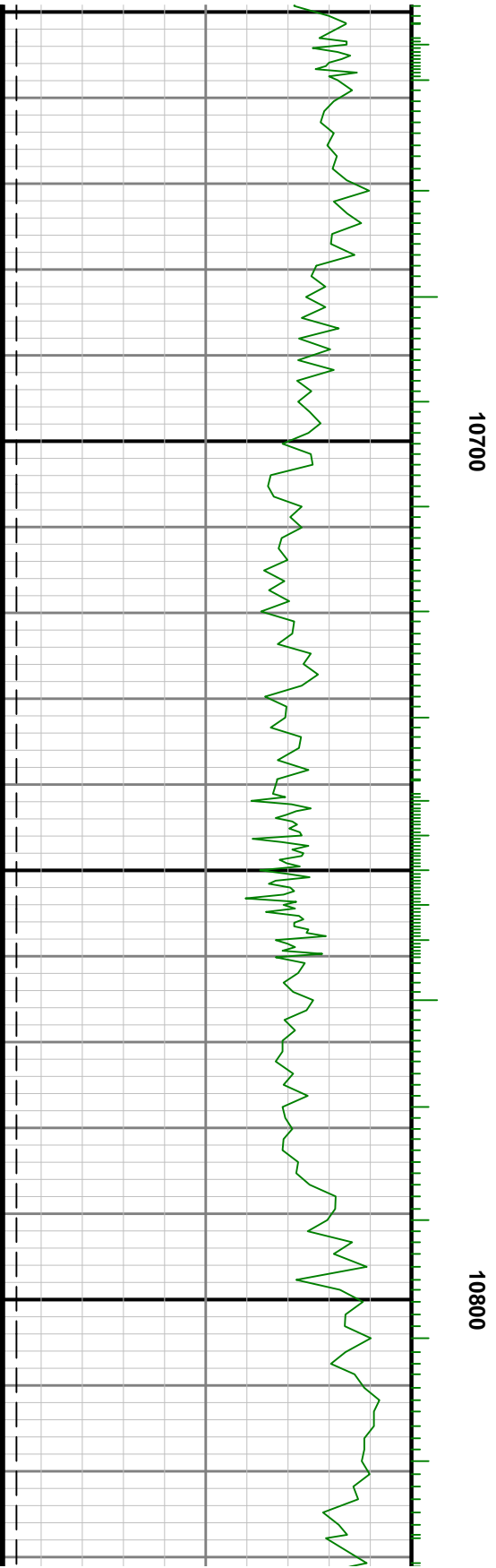


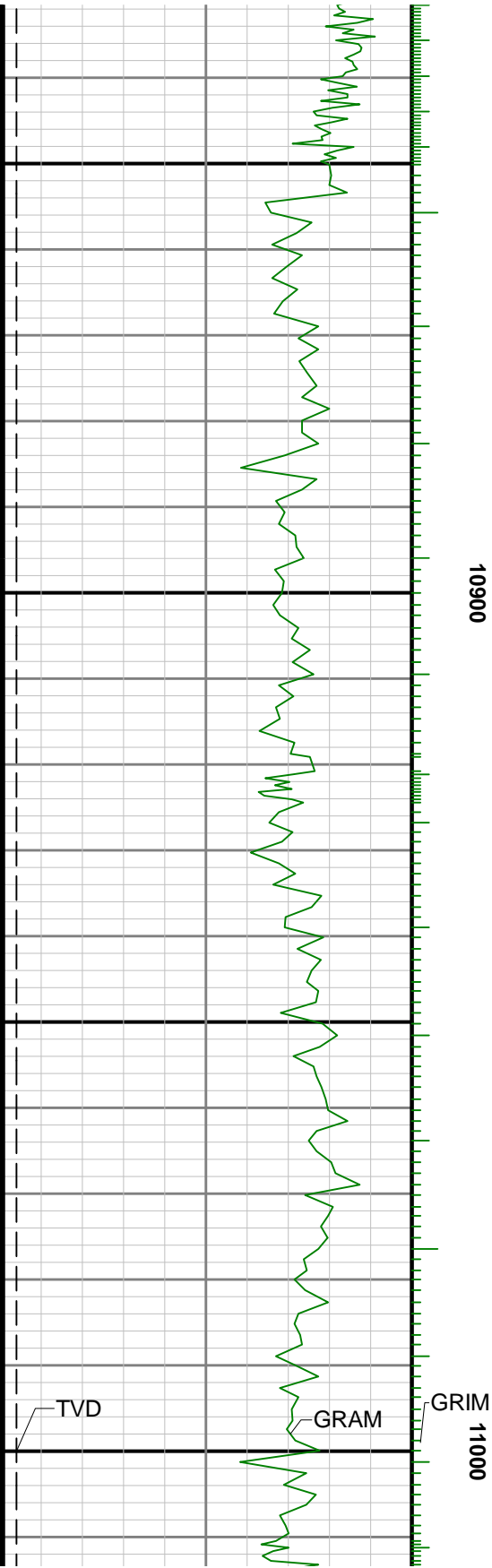


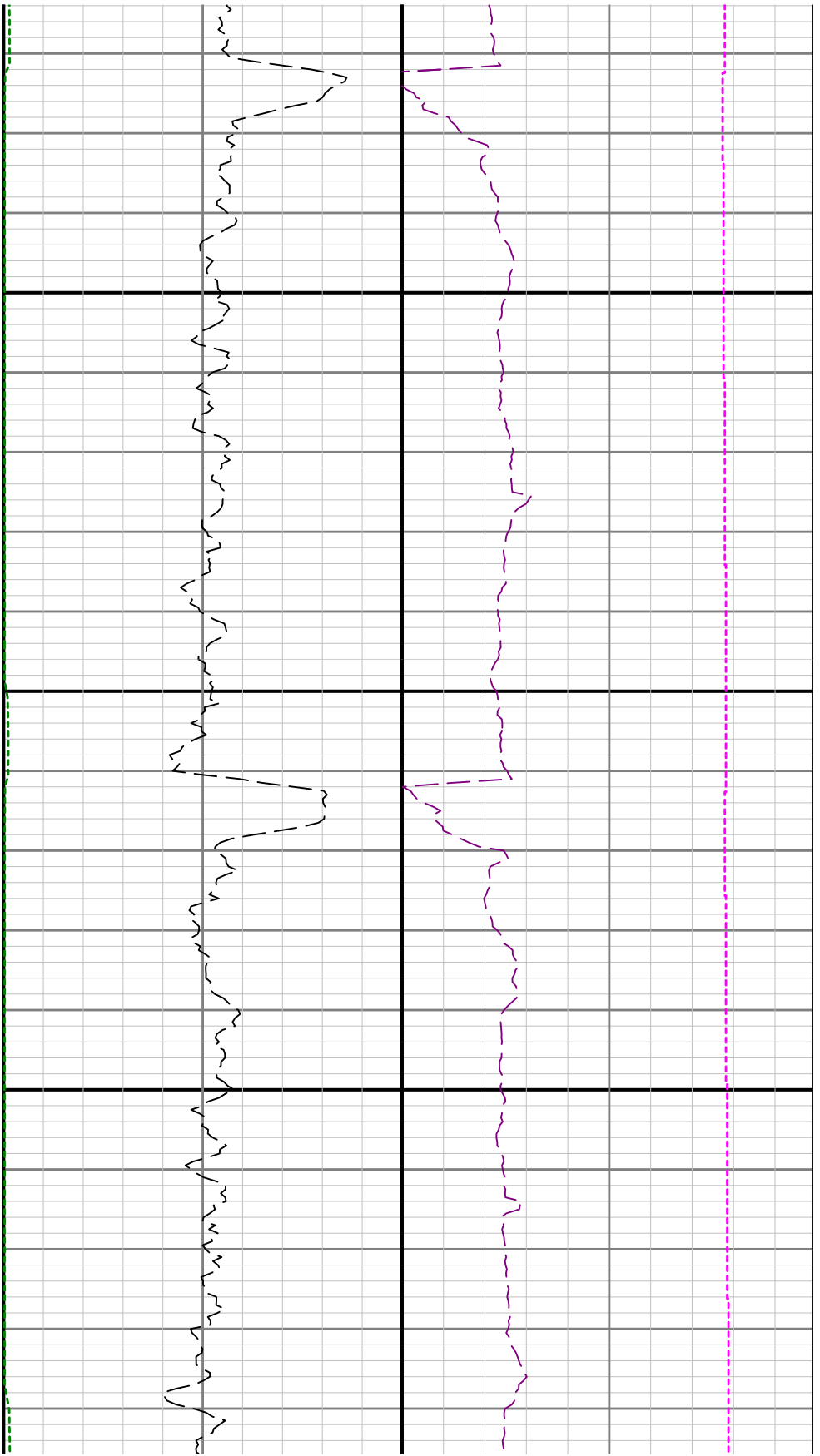












11100

