



**BAKER
HUGHES**

LWD REALTIME LOG

Gamma Ray

Scale: Company: Great Western

1:240 MD Well: Raindance FD 20-282HC

Depth Reference: Field: Wattenberg

Driller's Depth County: Weld Country: United States

State: Colorado

Status: Surface Location: Other Services:

Final Print Latitude: 040° 27' 46.570" N

Longitude: 104° 55' 38.651" W

API No: 05-123-44991-00

Job ID: 8666853 SEC: 30 TWN: 6N RGE: 67W

Permanent Datum (P.D.): Ground Level Elevation: 4789.00 ft Elev. KB: N/A

Log Measured From: Rig Floor Above P.D. 20.00 ft Elev. DF: 4809.00 ft

Dates Interval Logged Magnetic Field Reference

Date From: 2017-07-22 Top: (ft) 1585.00 Azi Reference North: True Dip Angle: (deg) 66.89

Date To: 2017-07-25 Bottom: (ft) 12681.70 Total Magnetic Field Strength: (nT) 52413

Spud Date: 2017-07-22 May to Reference North Correction: (deg) 8.46 E

Borehole Record

Casing Record

Hole Size (in)	From (ft)	To (ft)	Size (in)	Weight (lb/ft)	From (ft)	To (ft)
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13.500	20.00	1585.00	9.625	36.00	20.00	1575.00
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8.500	1585.00	12681.00				
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Mud Record

Deviation Record

Type	From (ft)	To (ft)	Hole Size (in)	Interval (ft)	Inc Az (Start)	Inc Az (End)
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Diesel-Oil Based Mud	1585.00	12681.00	8.500	11096.00	1.64 42.84	89.57 85.71
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Acquisition System Software Version Other

Baker Hughes Cadence

RT4.1

Plot Studio 4.1.7763.3

Rig: Precision 460

Contractor: Precision Drilling

District: RMA

Unit: D&E

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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	8.500	PDC	3.00	AutoTrak Curve	1572.00	5563.00	1585.00	5576.00	2017-07-22 23:53	2017-07-23 16:43	14.36
2	2	8.500	PDC	3.00	AutoTrak Curve	5563.00	12668.00	5576.00	12681.00	2017-07-24 02:48	2017-07-25 18:32	36.00

Crew

Name		Arrive Wellsite	Depart Wellsite	Name		Arrive Wellsite	Depart Wellsite	Name		Arrive Wellsite	Depart Wellsite
Doug Rusco		2017-07-22	2017-07-25	Emi Iyalla		2017-07-22	2017-07-24	Andrew Clancy		2017-07-24	2017-07-25

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+ (%)
2017-07-22 19:15		1	1585.00	Diesel-Oil Based Mud	10.2	33	0	0.0	74/26	Flow Line	35000	0.00
2017-07-24 01:40		2	5576.00	Diesel-Oil Based Mud	10.2	31	0	0.0	73/27	Flow Line	32000	0.00
2017-07-25 02:41		2	8615.00	Diesel-Oil Based Mud	10.0	29	0	0.0	73/27	Flow Line	29000	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		12232313	Near Bit VSS	5.93	6.73	7.000	4.330
1	ATC_SU		12232313	Near Bit Inclination	5.93	6.73	7.000	4.330
1	ATC_MWD		12694813	Gamma (single)	2.74	12.90	7.000	3.250
1	ATC_MWD		12694813	Directional (mag)	12.26	22.42	7.000	3.250
2	ATC_MWD		12653420	Gamma (single)	11.55	12.35	7.000	3.250
2	ATC_MWD		12653420	Directional (mag)	21.62	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

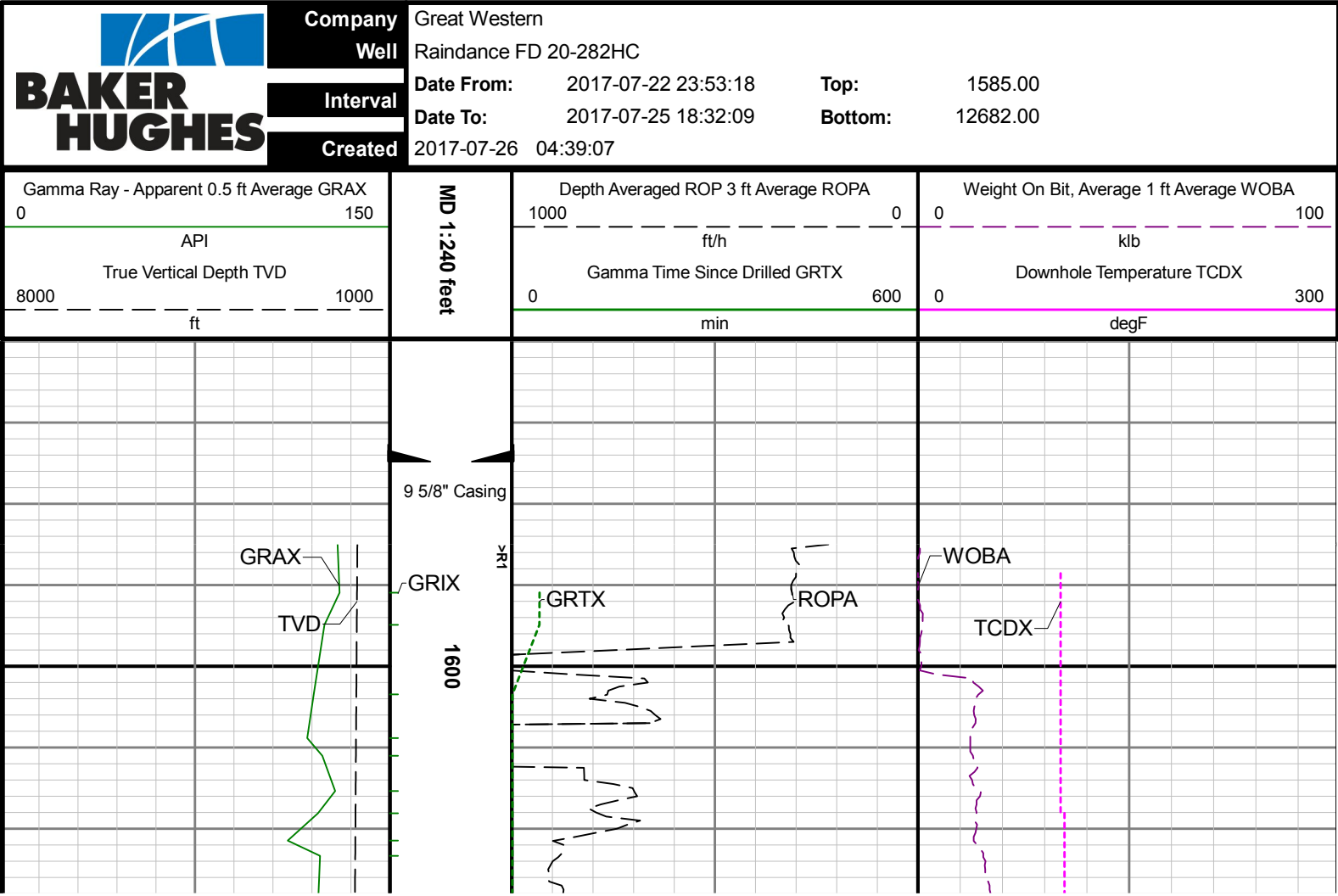
1	Depth measurements were obtained from a depth control system not supplied or operated by Baker Hughes. Due to lack of control by Baker Hughes logging engineers, depth calibrations and measurements could not be independently verified.
2	Baker Hughes LWD Runs 1 and 2 utilized 6 ¾ inch Navigamma service (Gamma Ray and Directional) behind an 8 1/2 inch bit and rotary steerable assembly from 1585 to 12681 feet MD (1584 to 7193 feet TVD).
3	Gaps in Gamma Ray data are present throughout the log due to downlinking while drilling ahead.

Remarks

	Measured	Hold	Run	
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Number	Measured Depth (ft)	Hole Section (in)	Run No.	Remark
1	5564.00	8.500	2	The interval from 5564 to 5580 feet MD (5291 to 5305 feet TVD) was logged up to 9.25 hours after being drilled due to a trip out of hole to change out BHA.
2	12681.00	8.500	2	The interval from 12688 to 12681 feet MD (7193 feet TVD) was not logged due to sensor to bit offset at well TD.

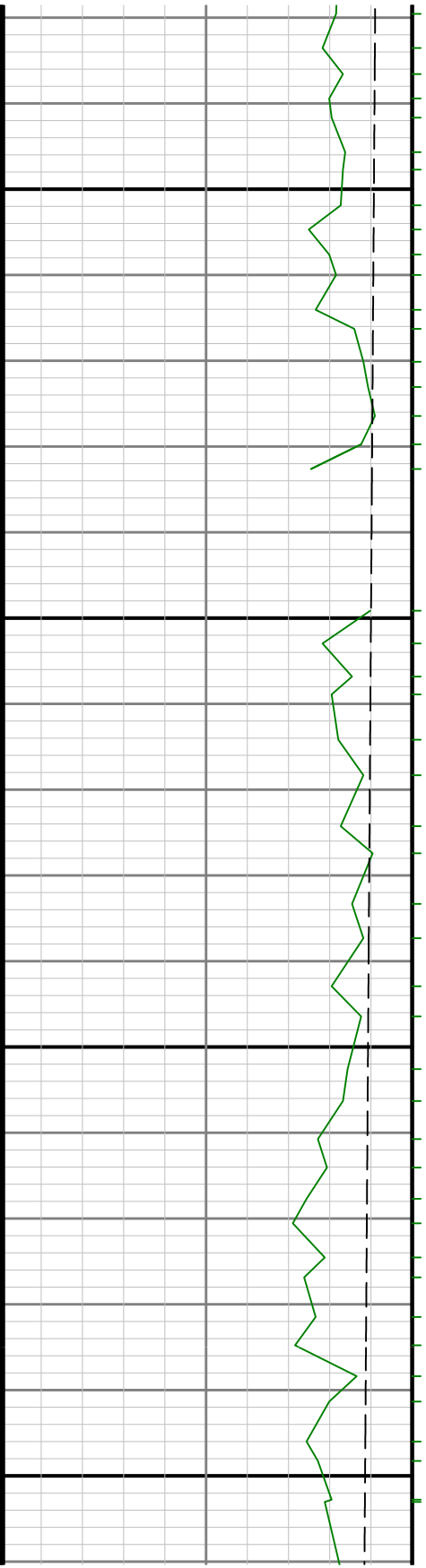
Curve Mnemonics		
Presented Curves	Description	Units
TCDX	Downhole Temperature	degF
ROPA	Depth Averaged ROP 3 ft Average	ft/h
TVD	True Vertical Depth	ft
WOBA	Weight On Bit, Average 1 ft Average	klb
GRAX	OnTrak - Gamma Ray - Apparent - Real-Time 0.5 ft Average	API
GRIX	OnTrak - Gamma Ray - Data Point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

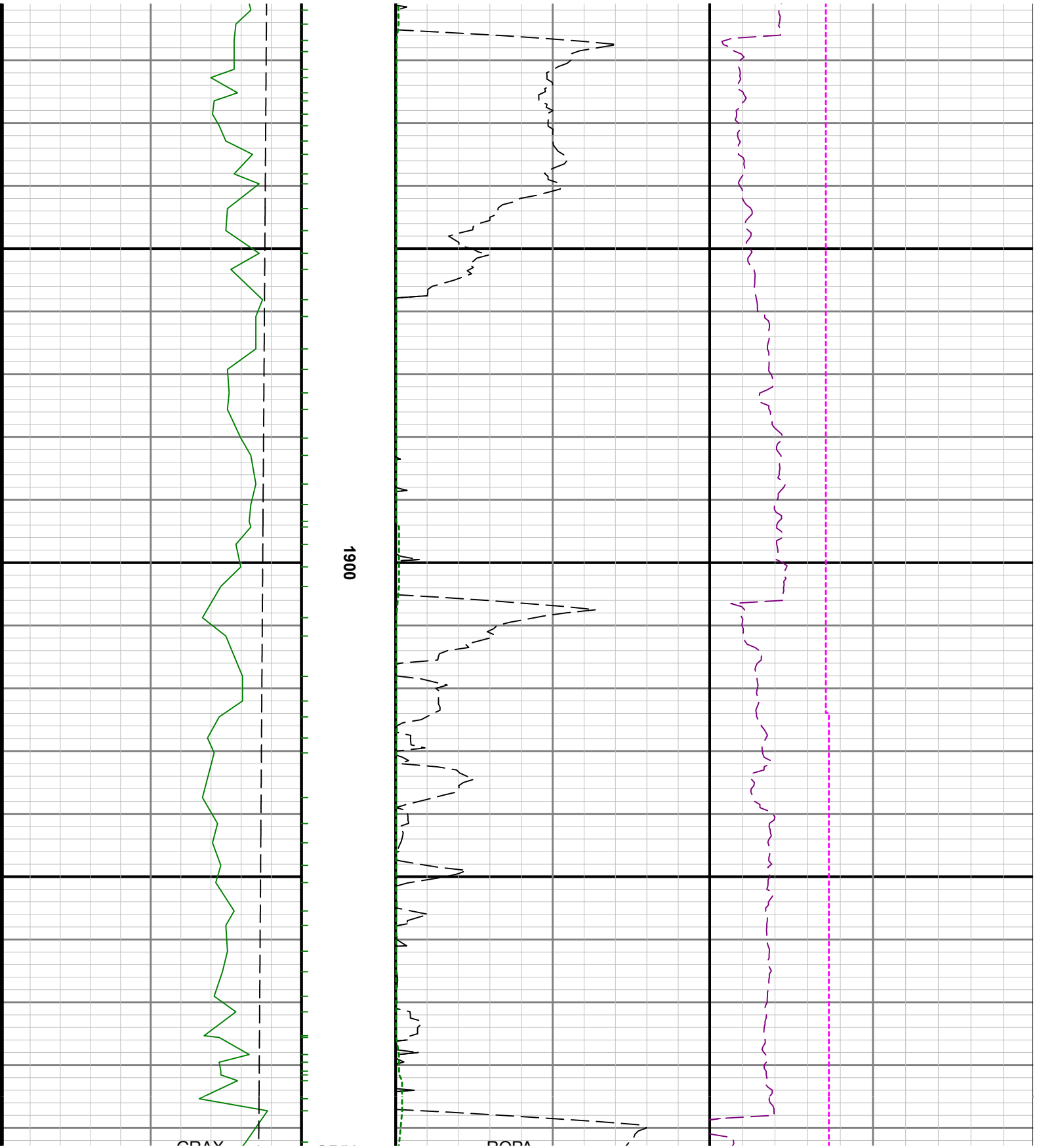


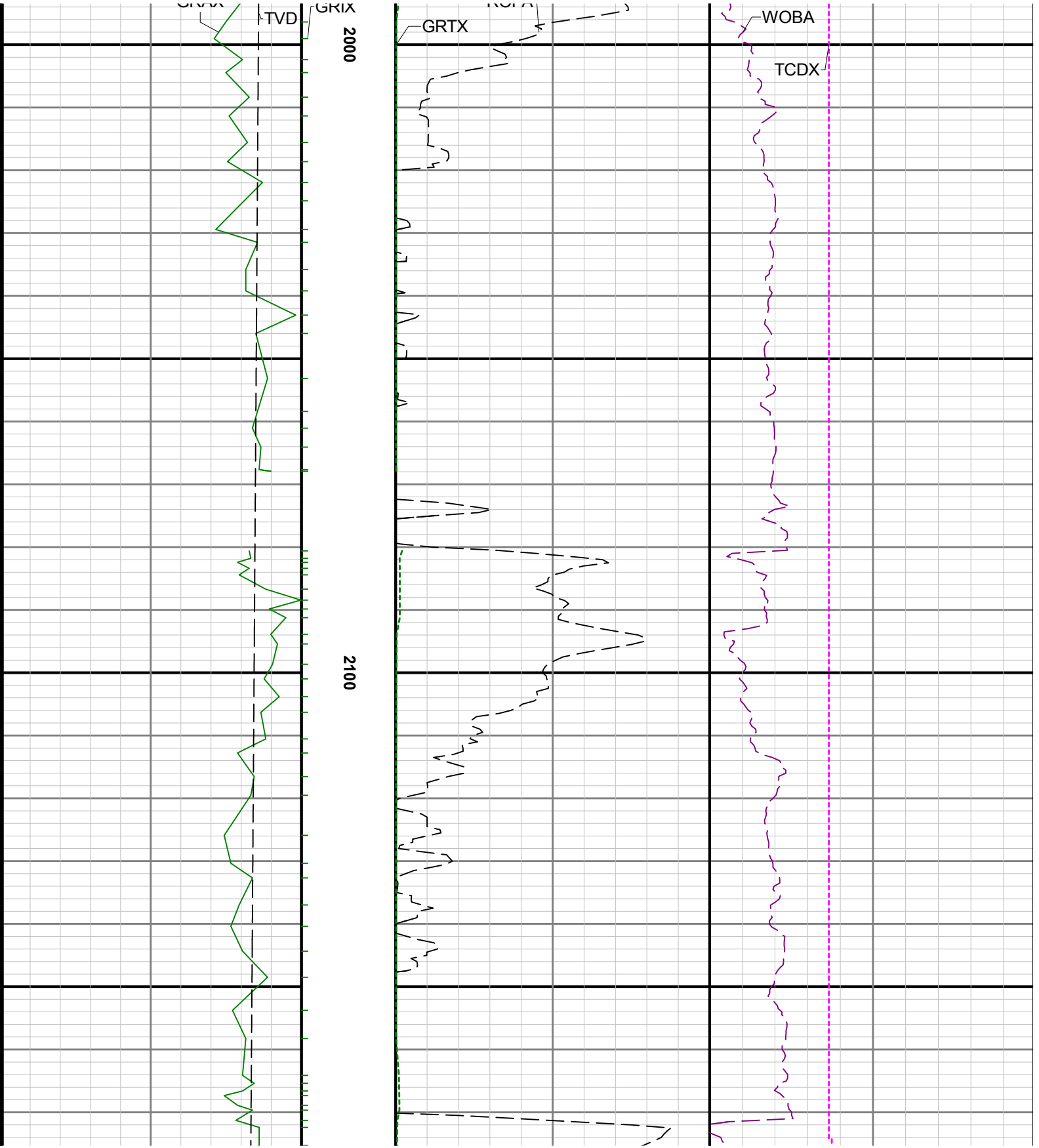


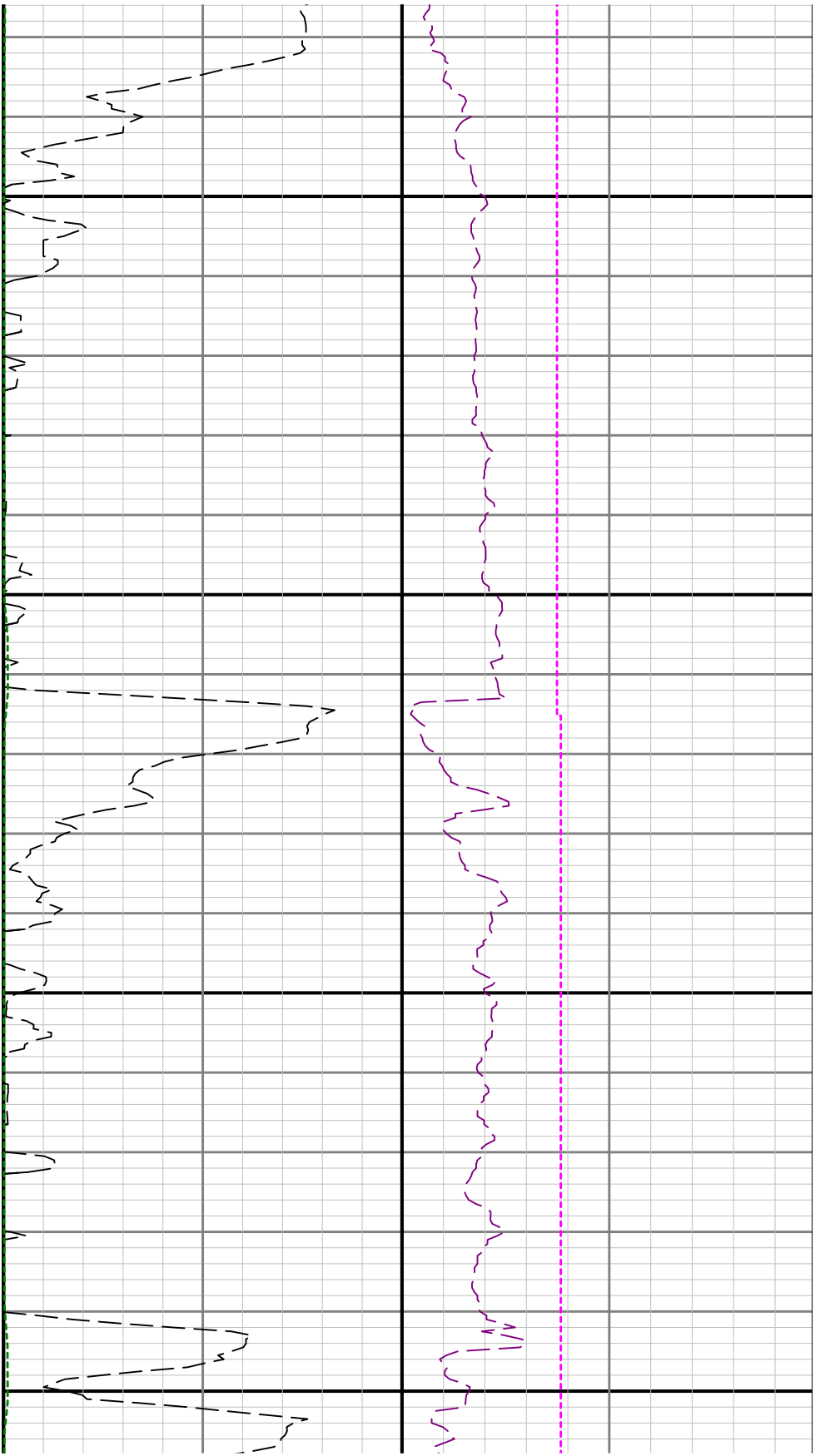
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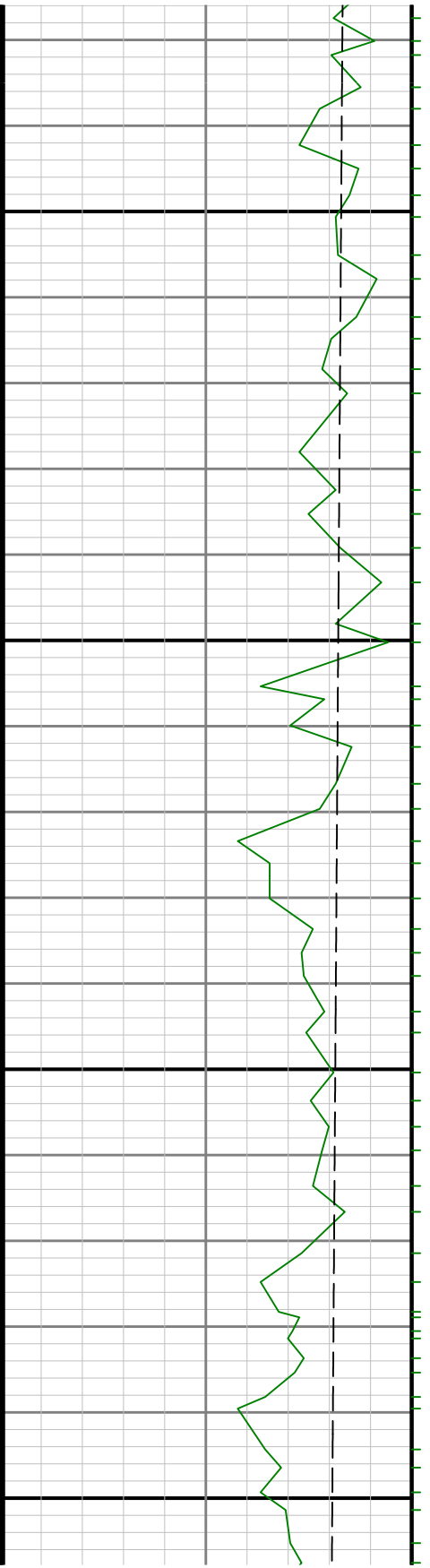


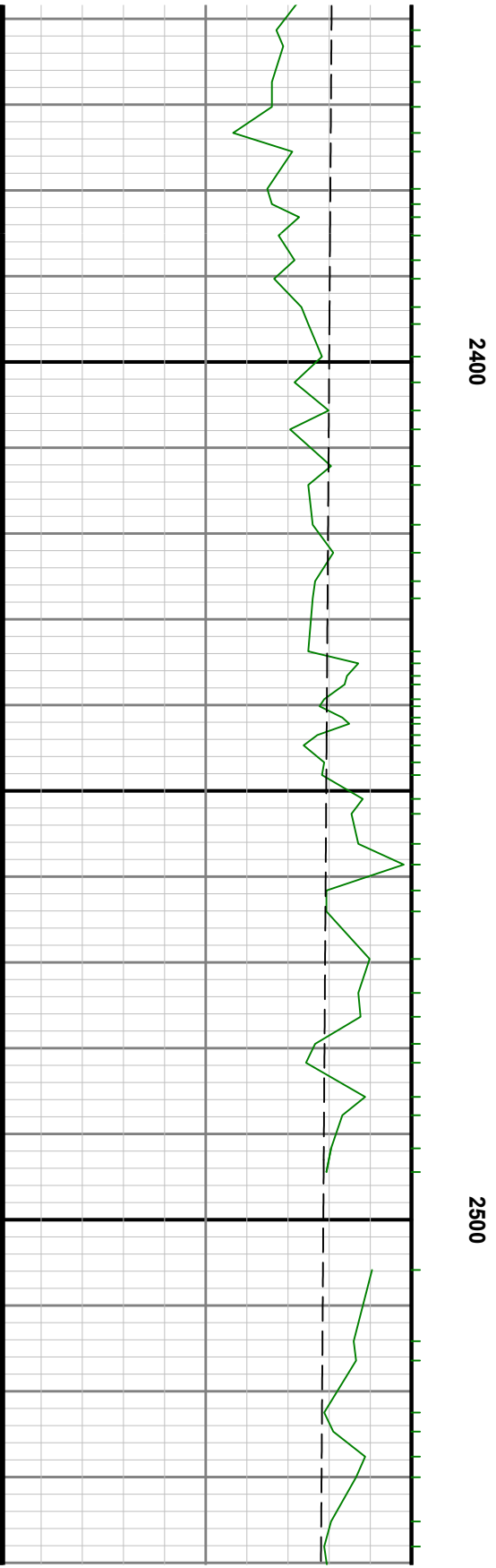
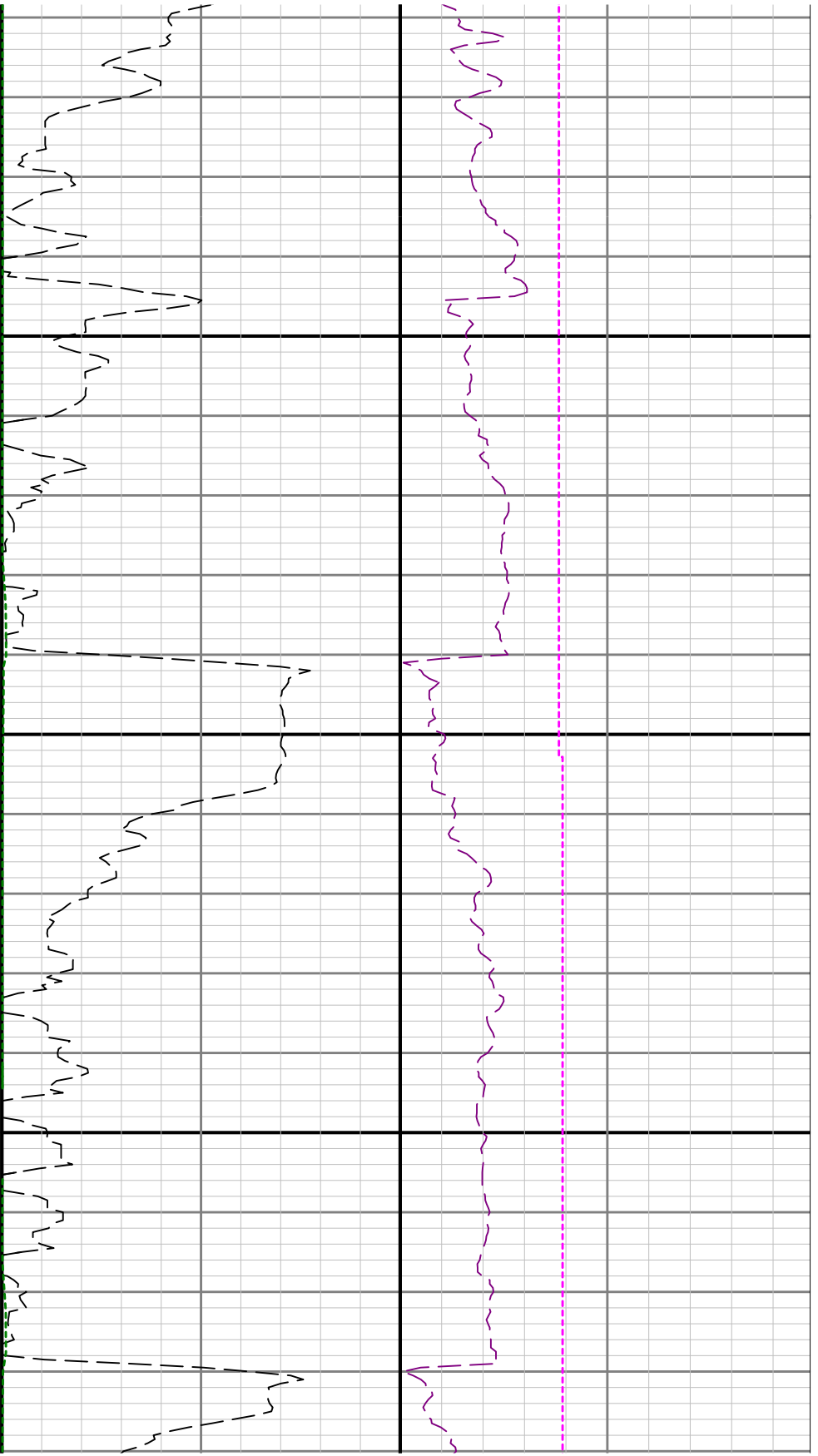


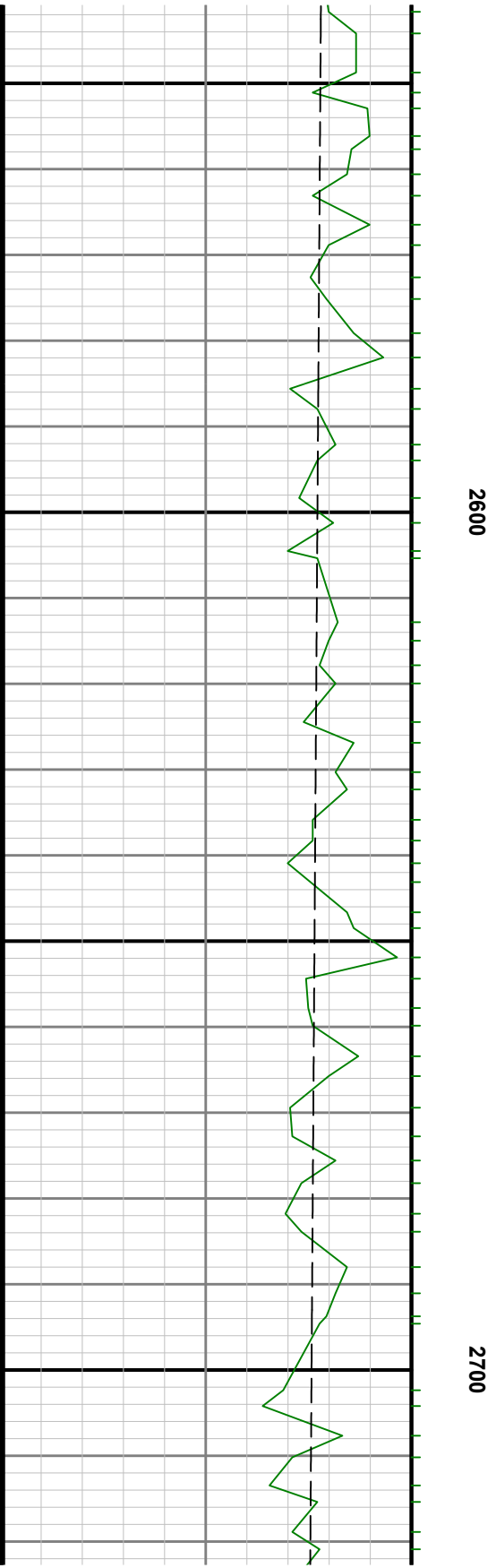
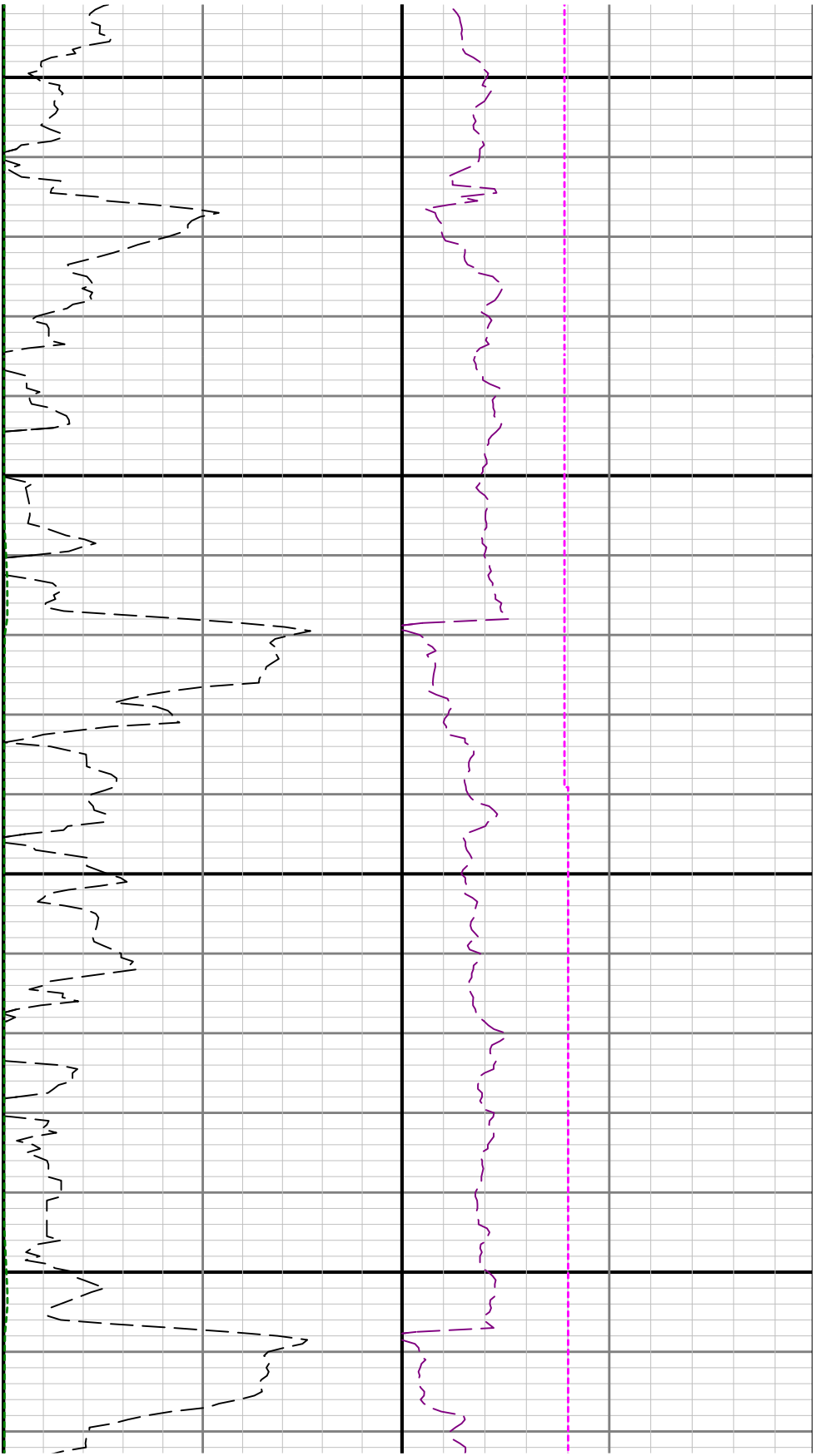


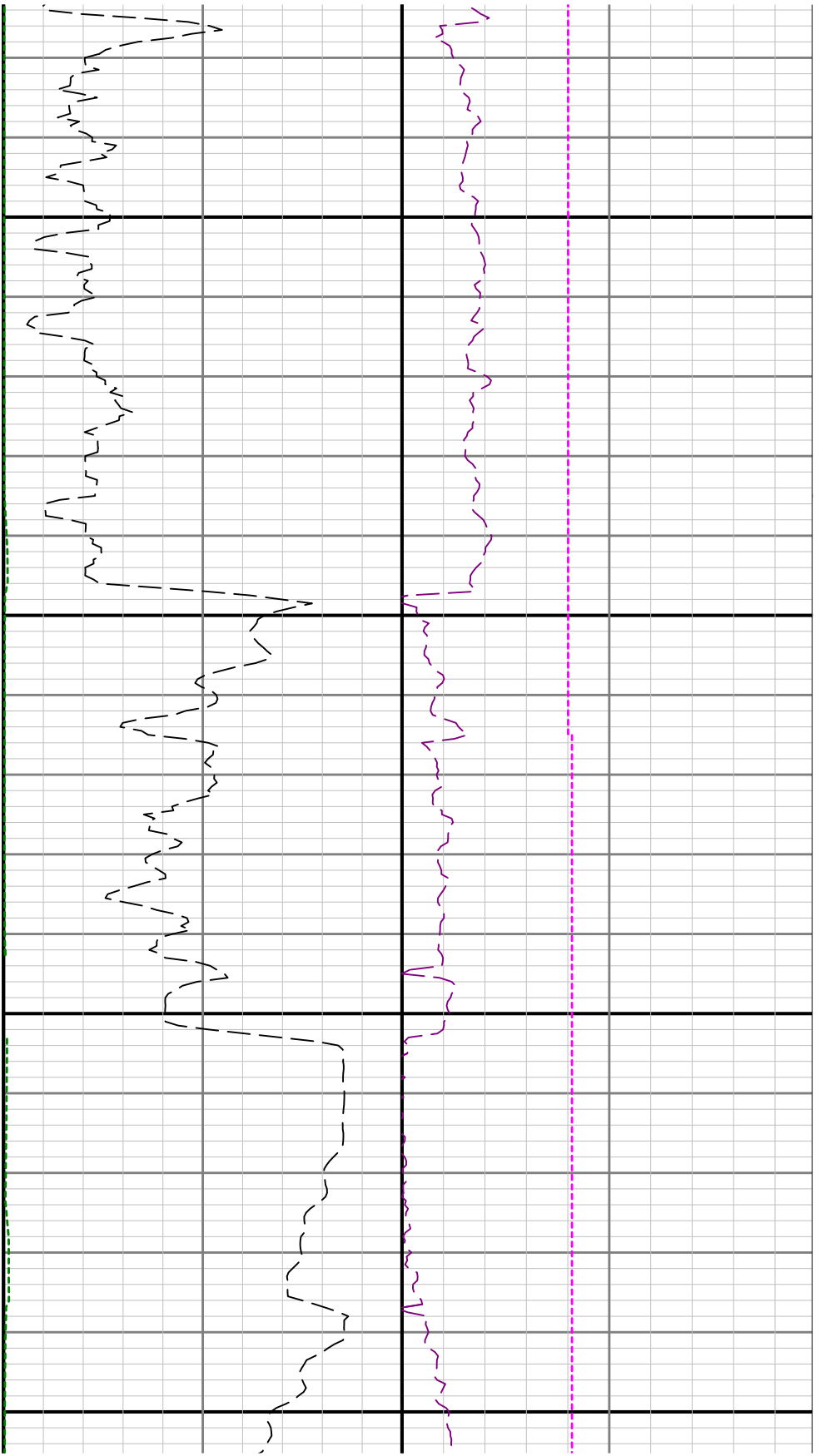
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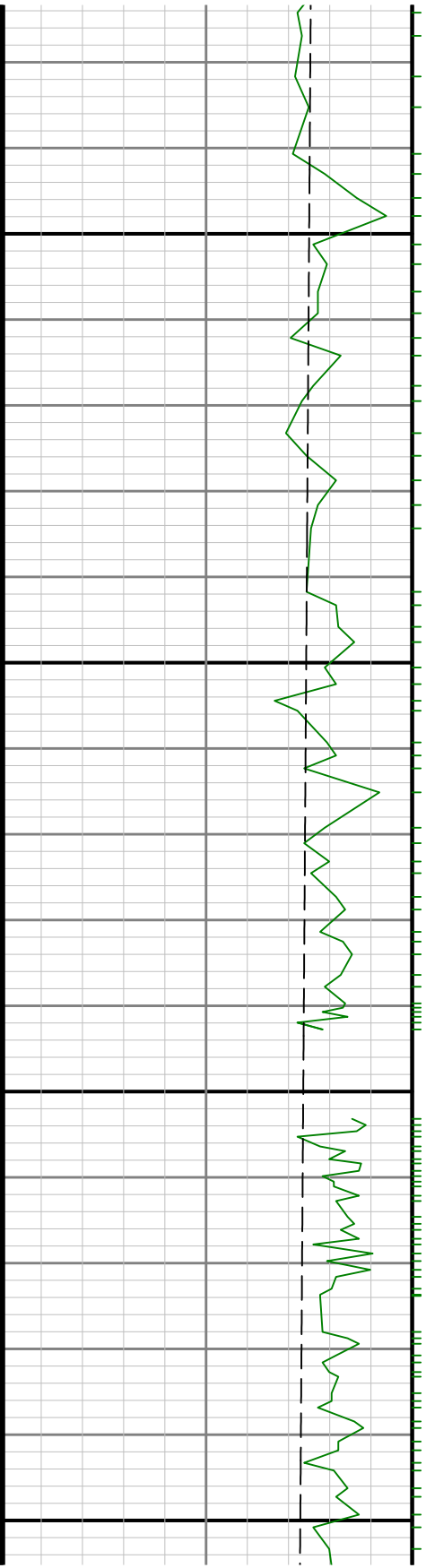


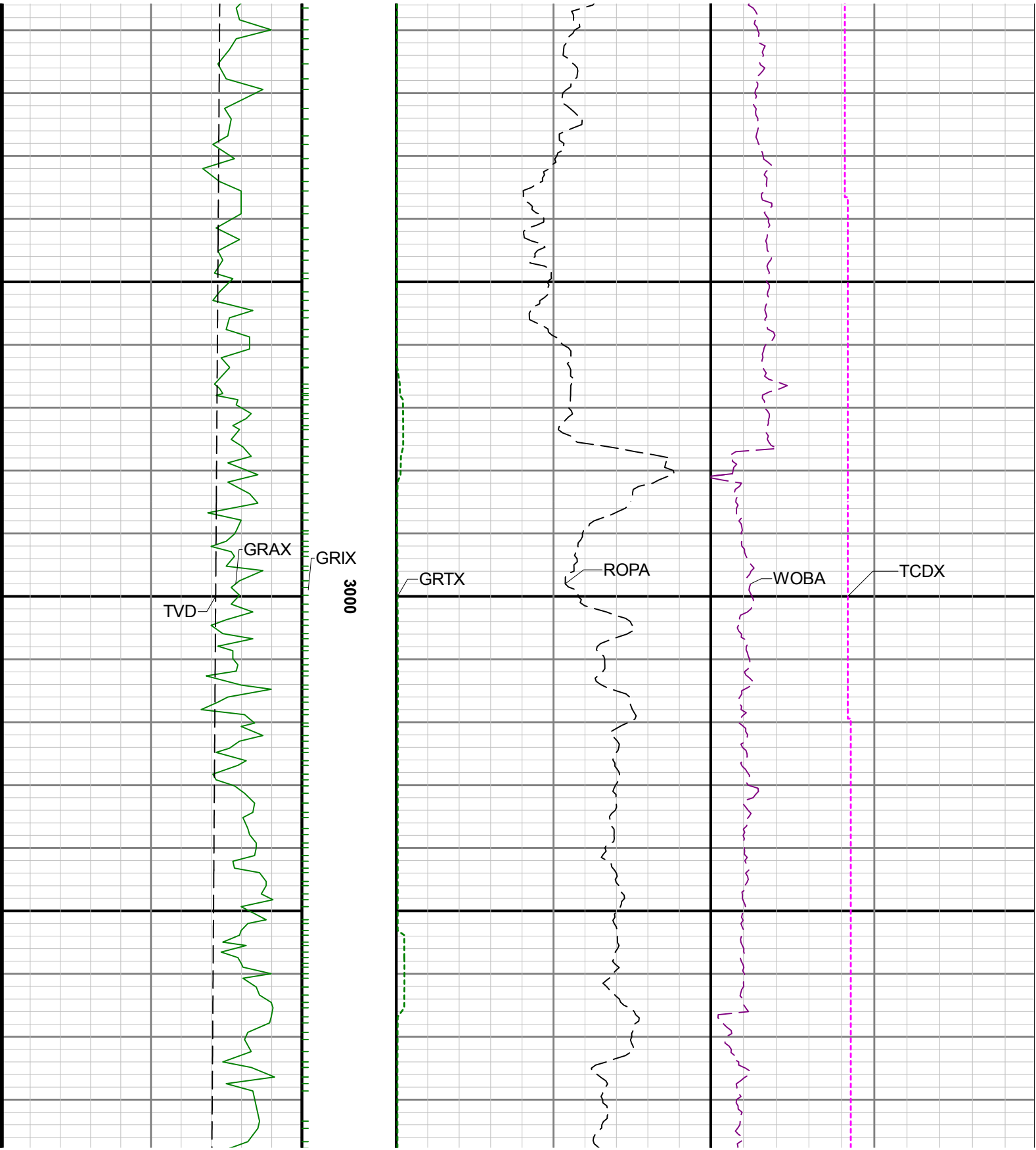


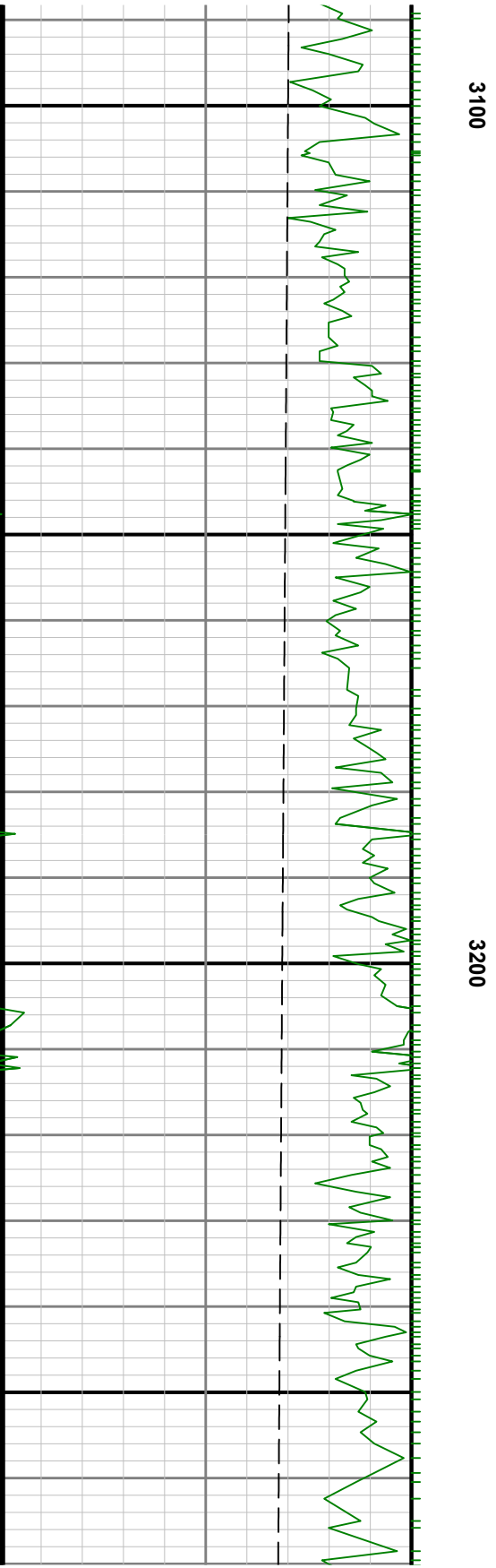


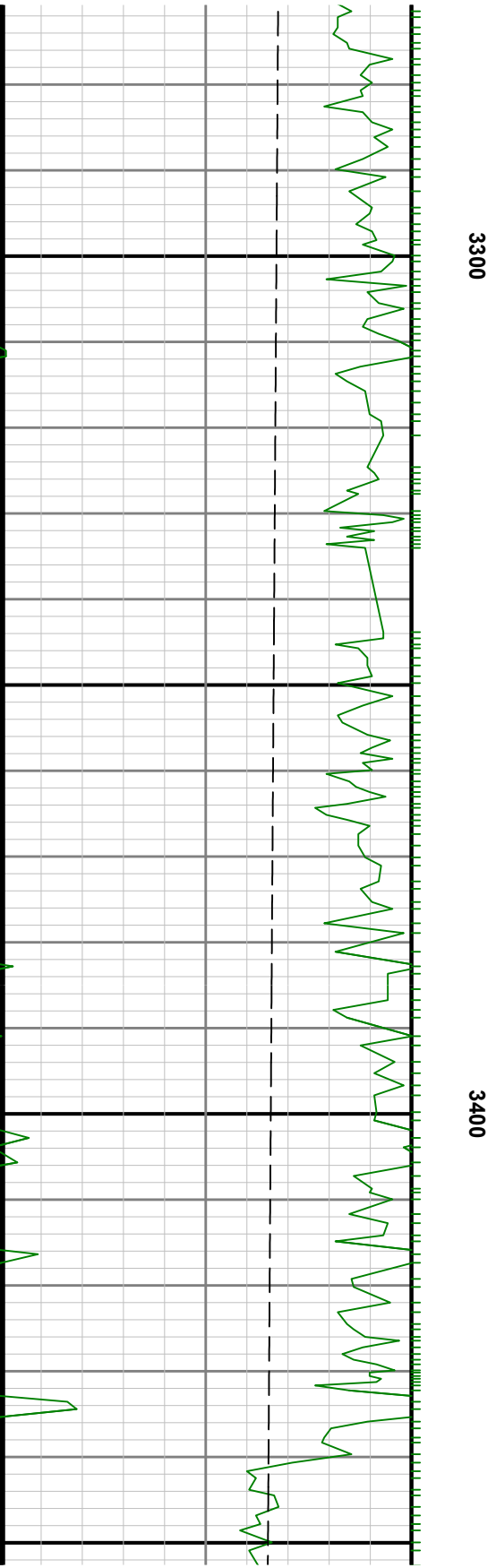
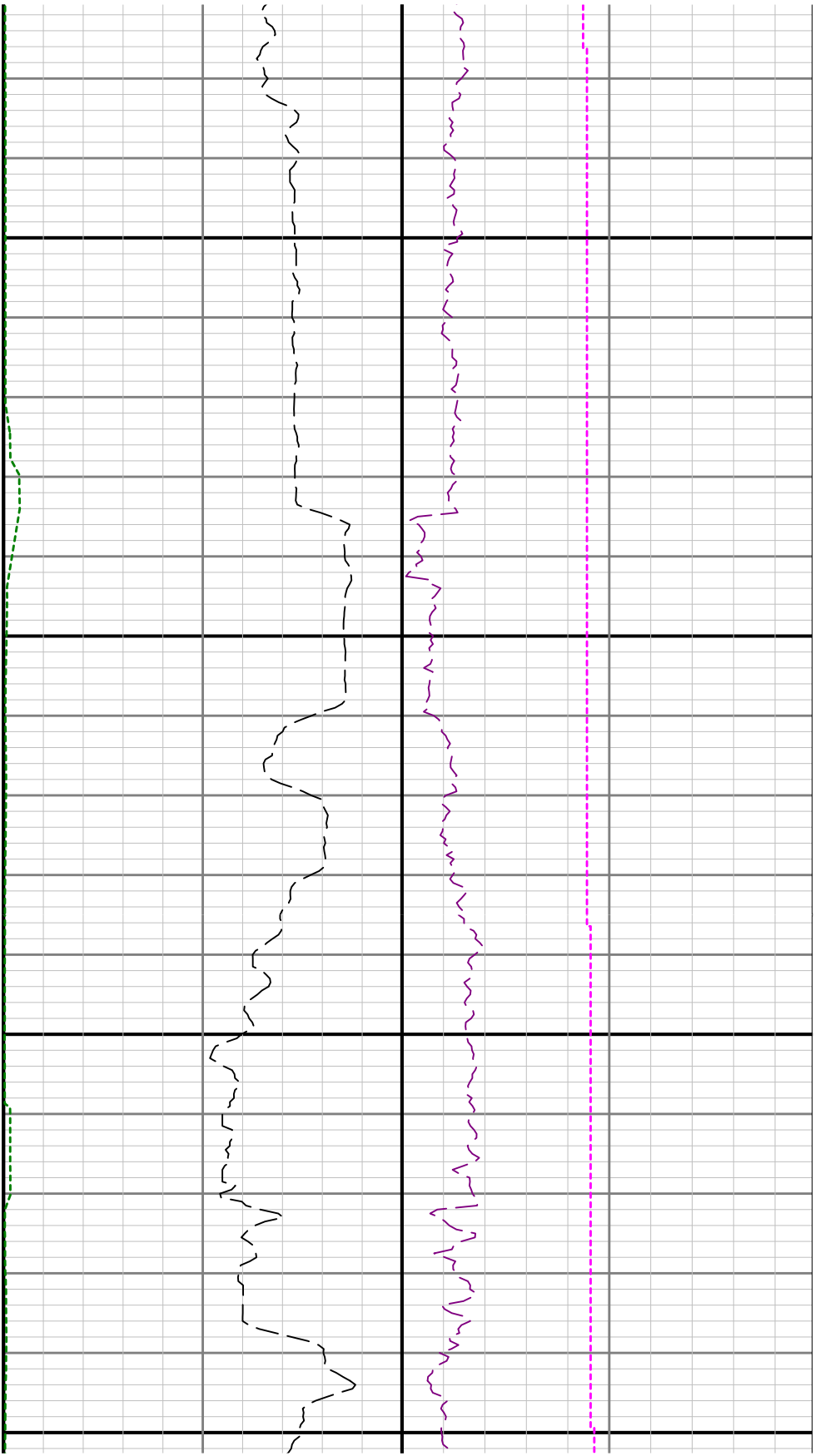
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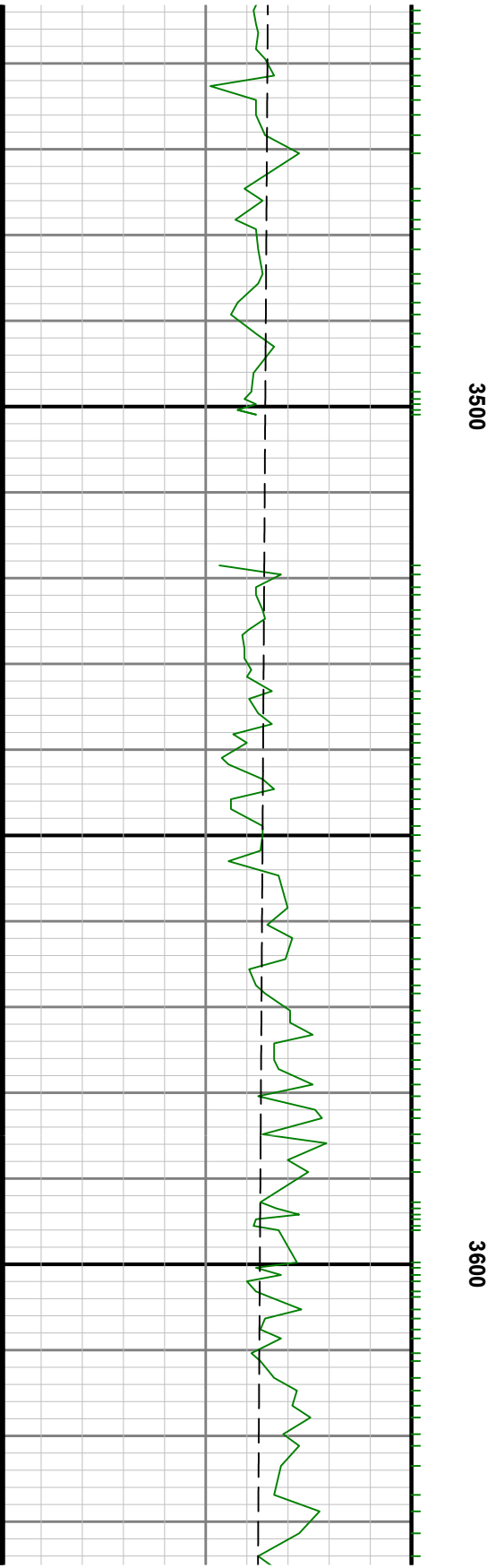
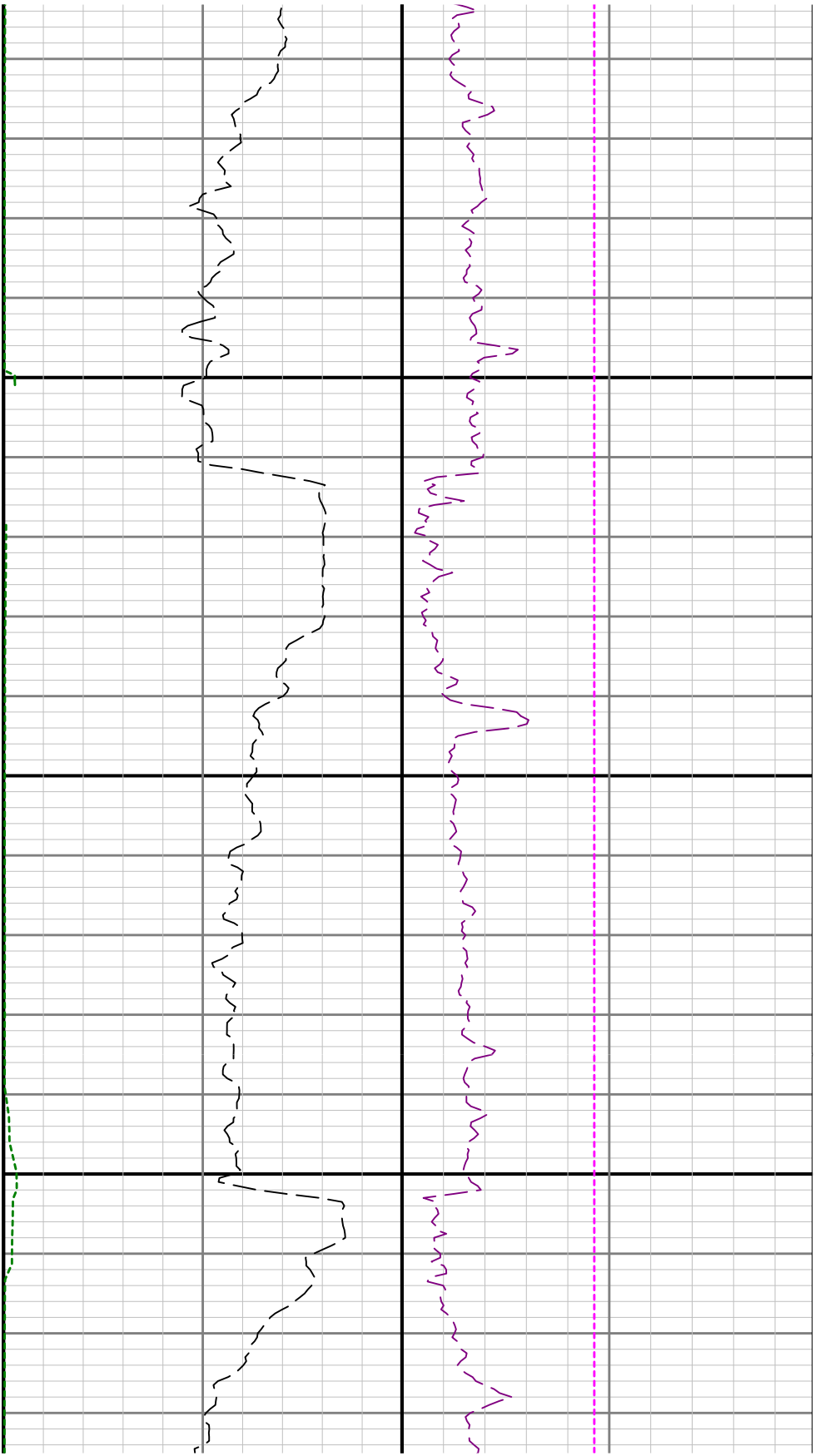
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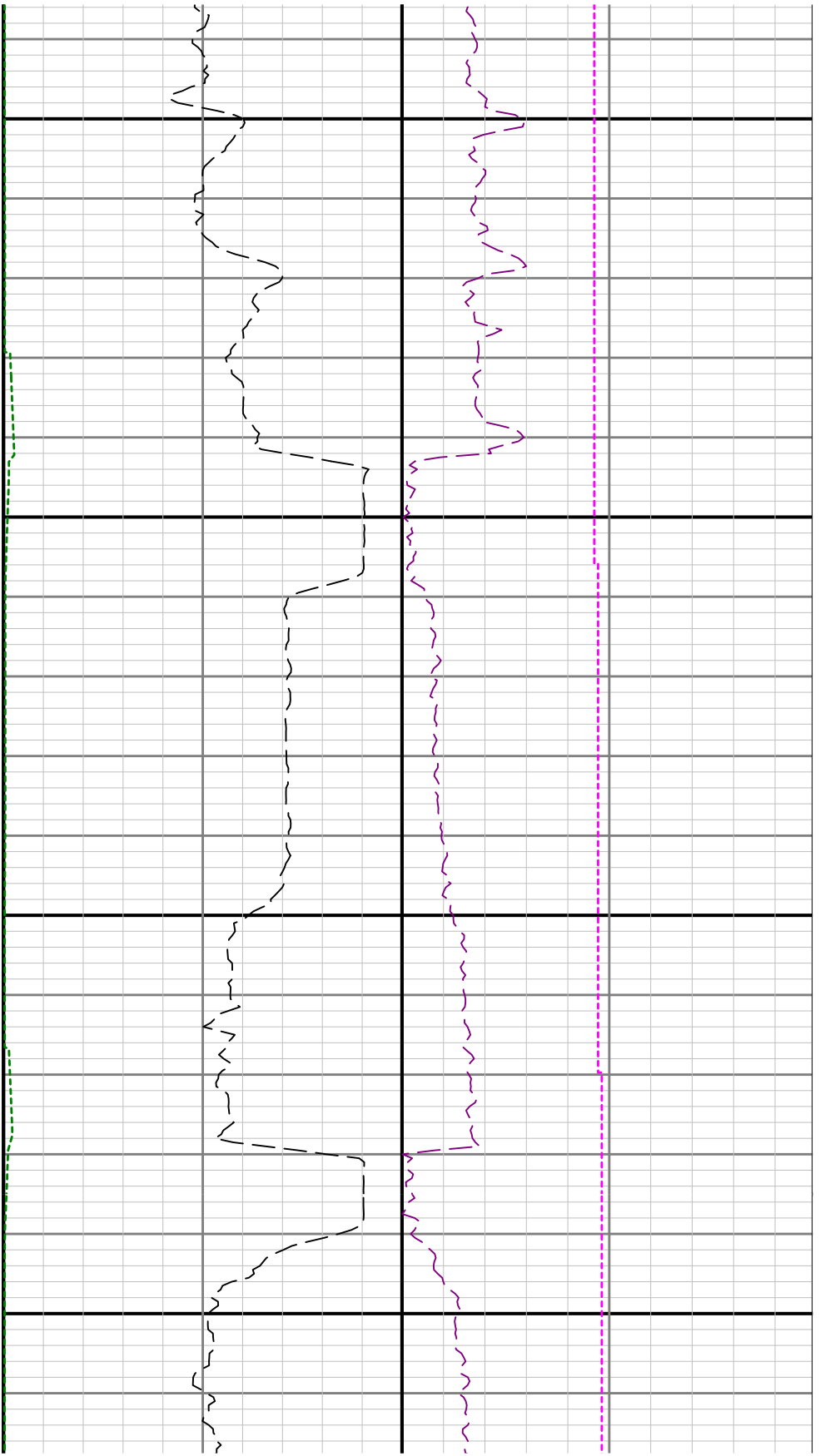






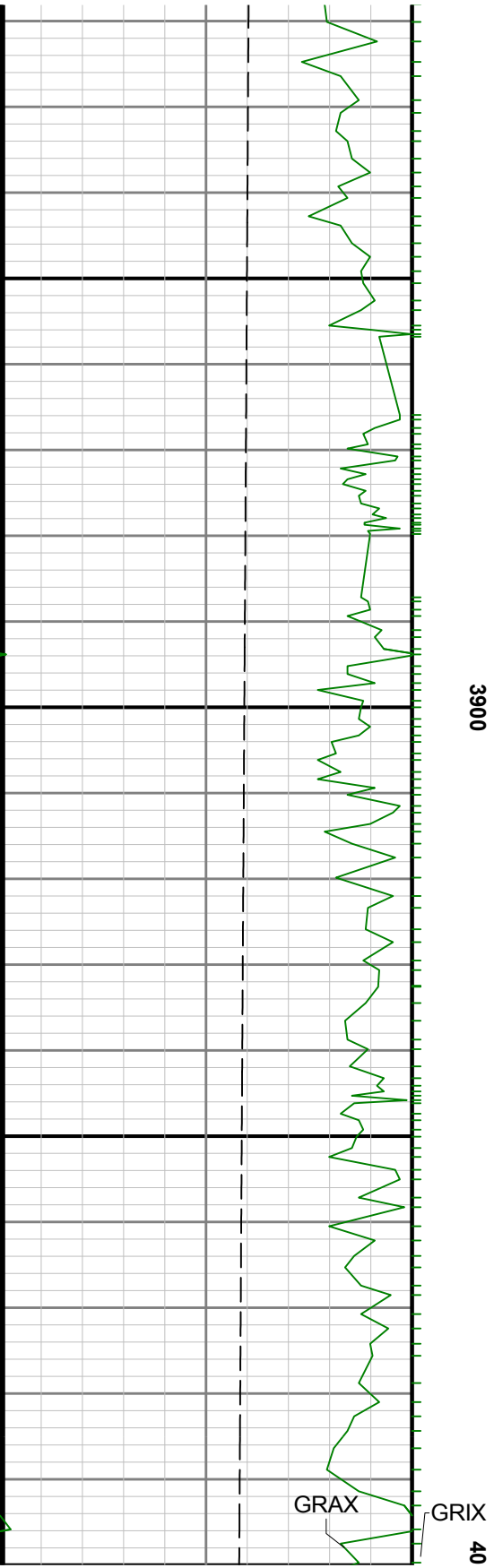






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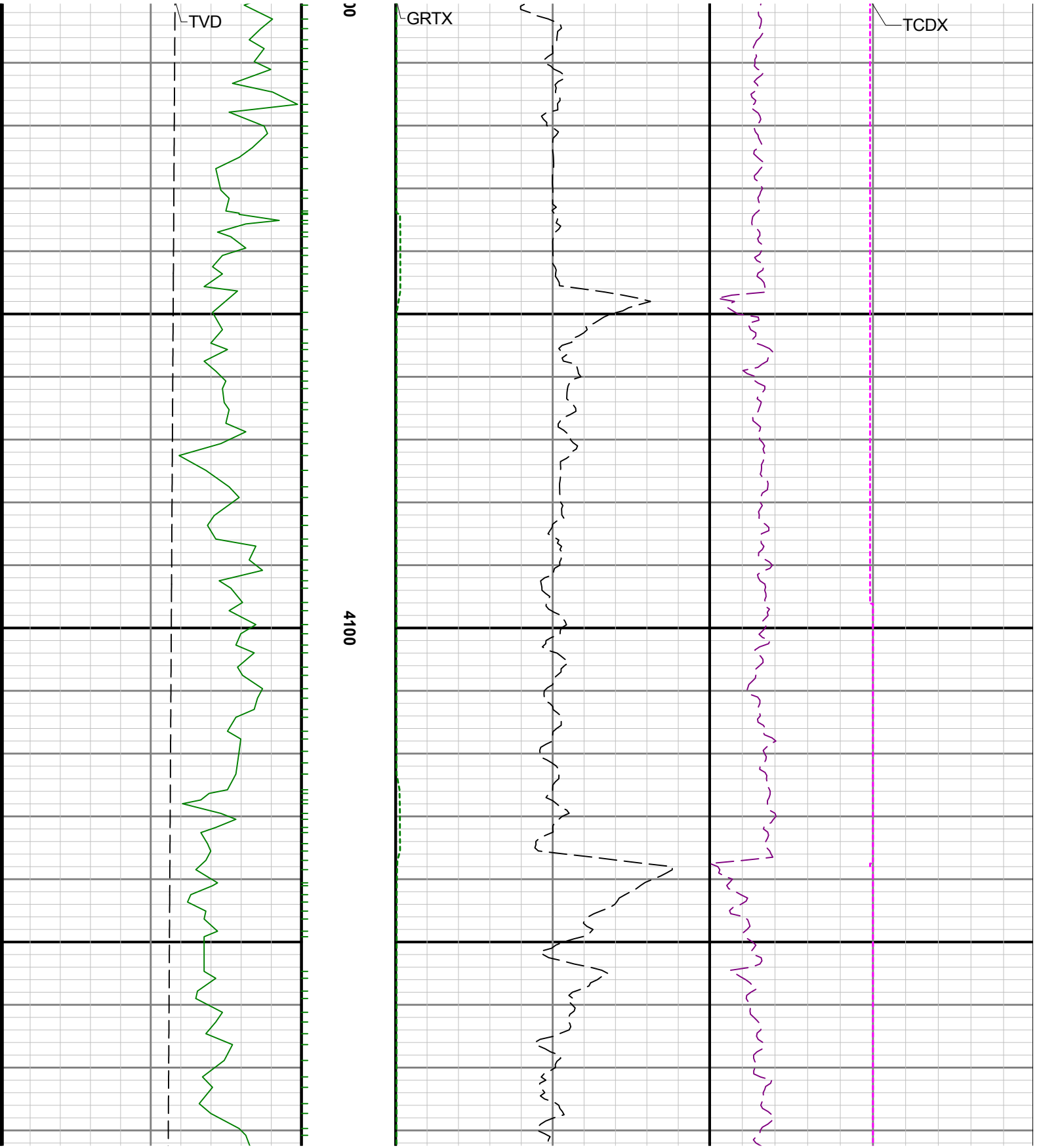
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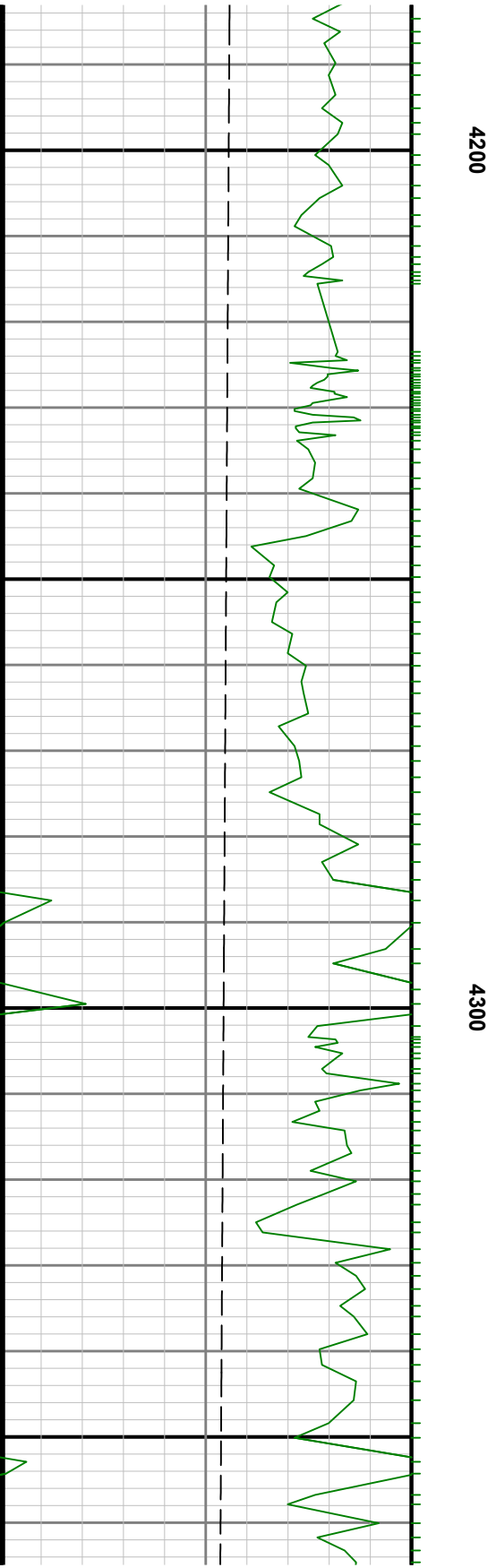
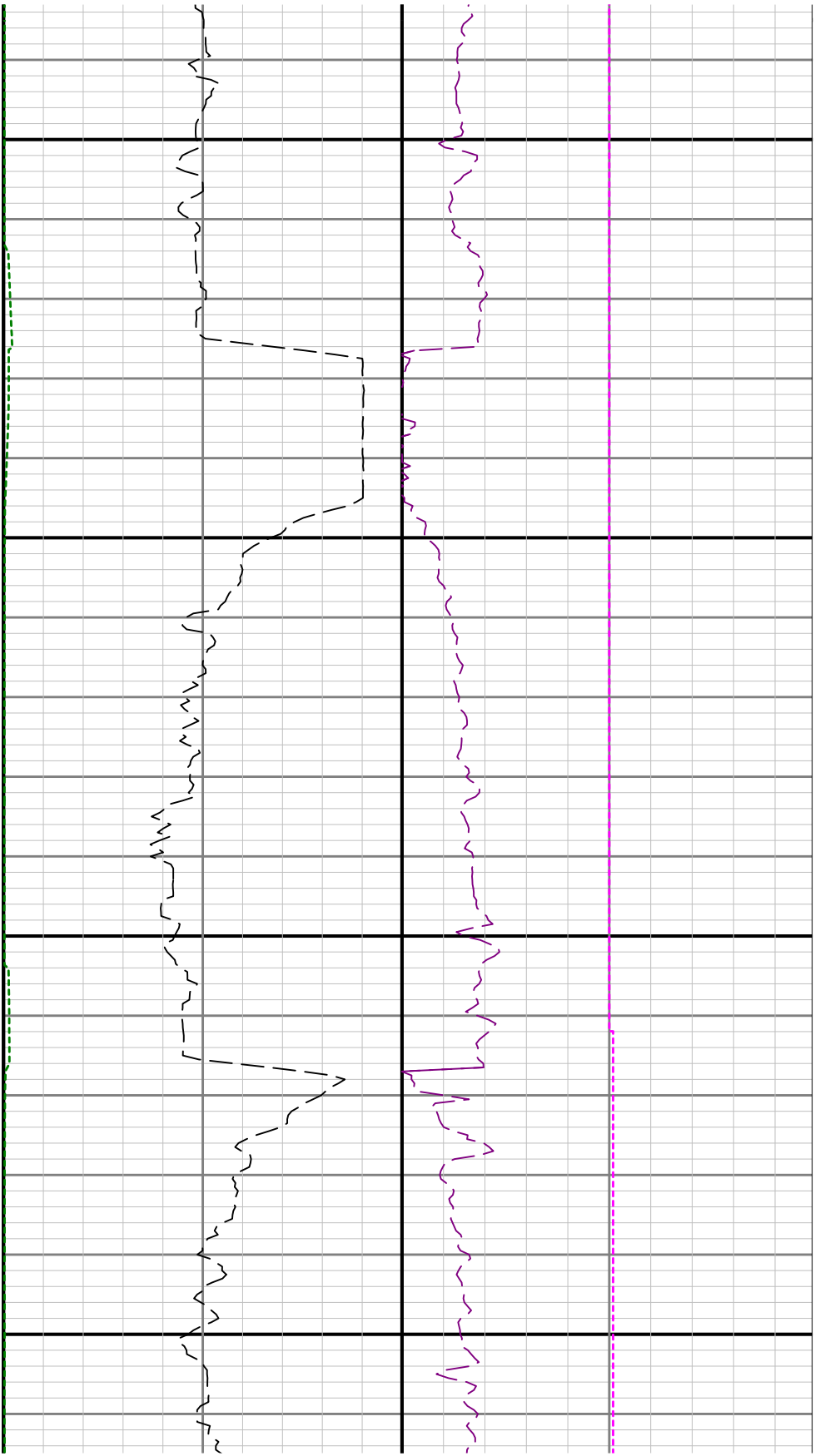
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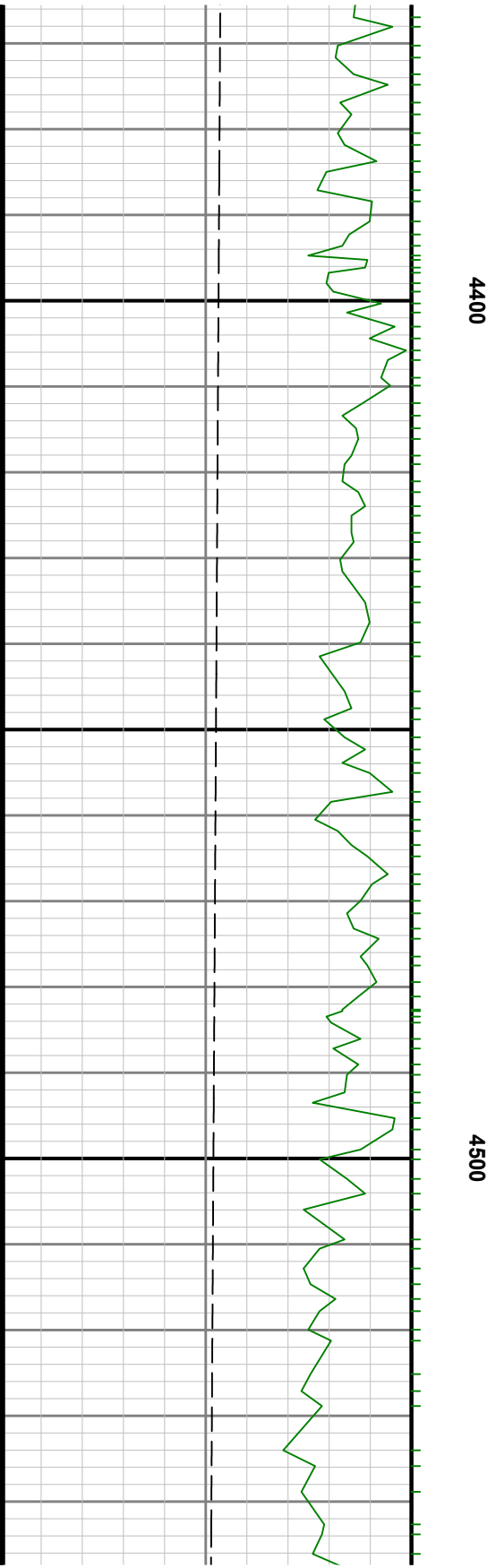
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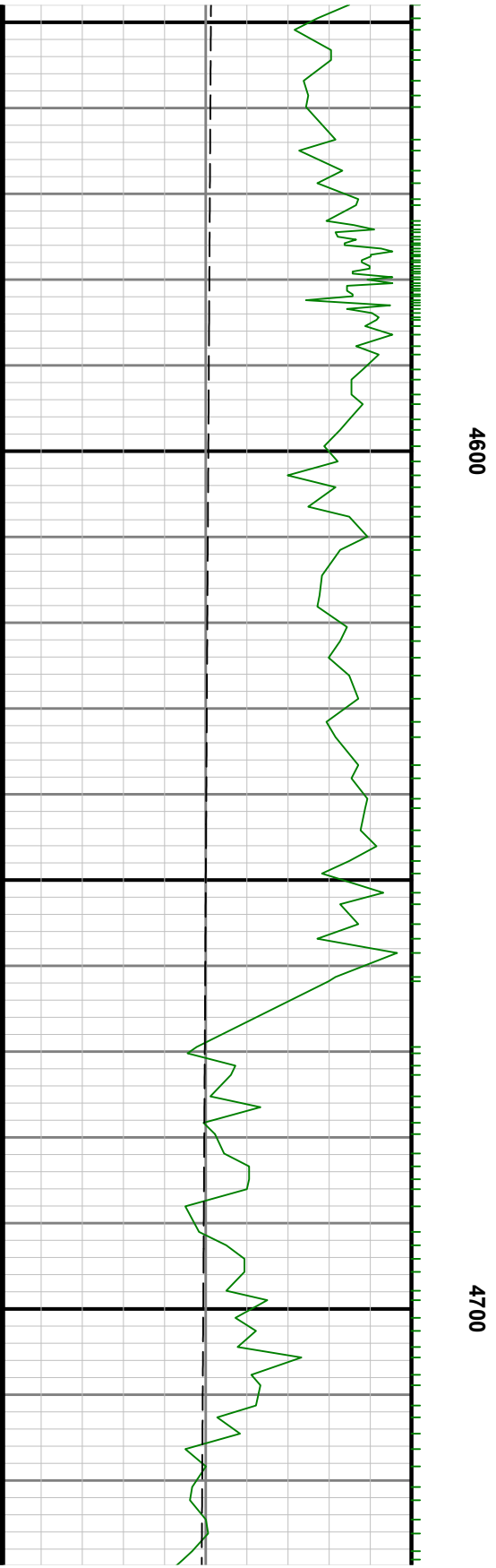
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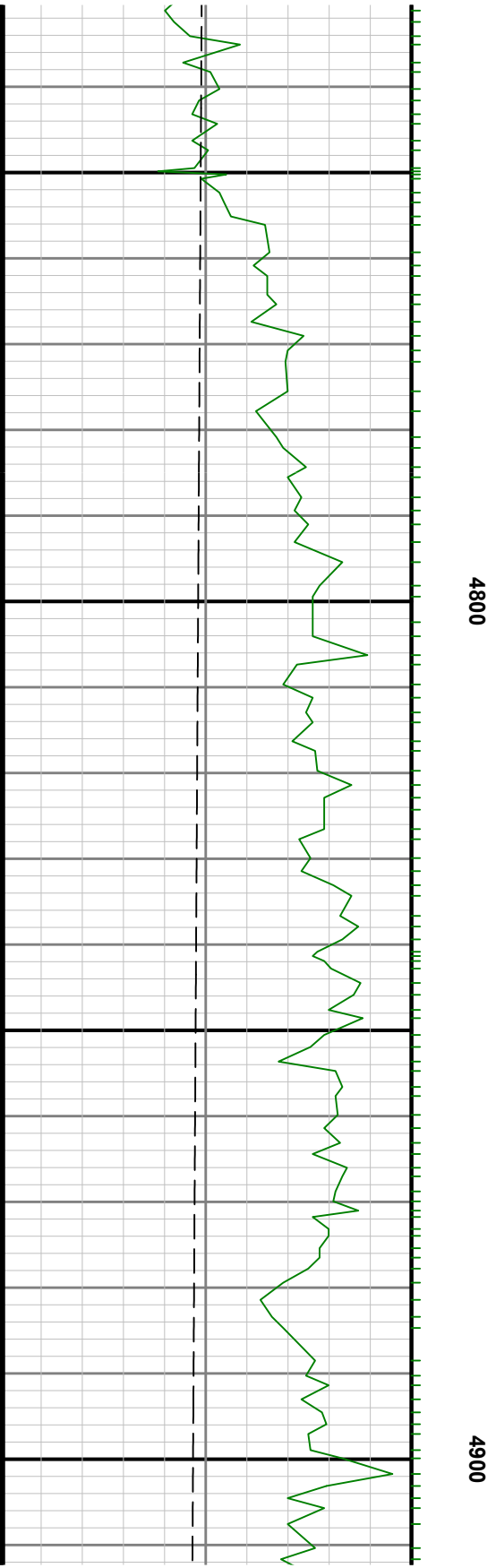
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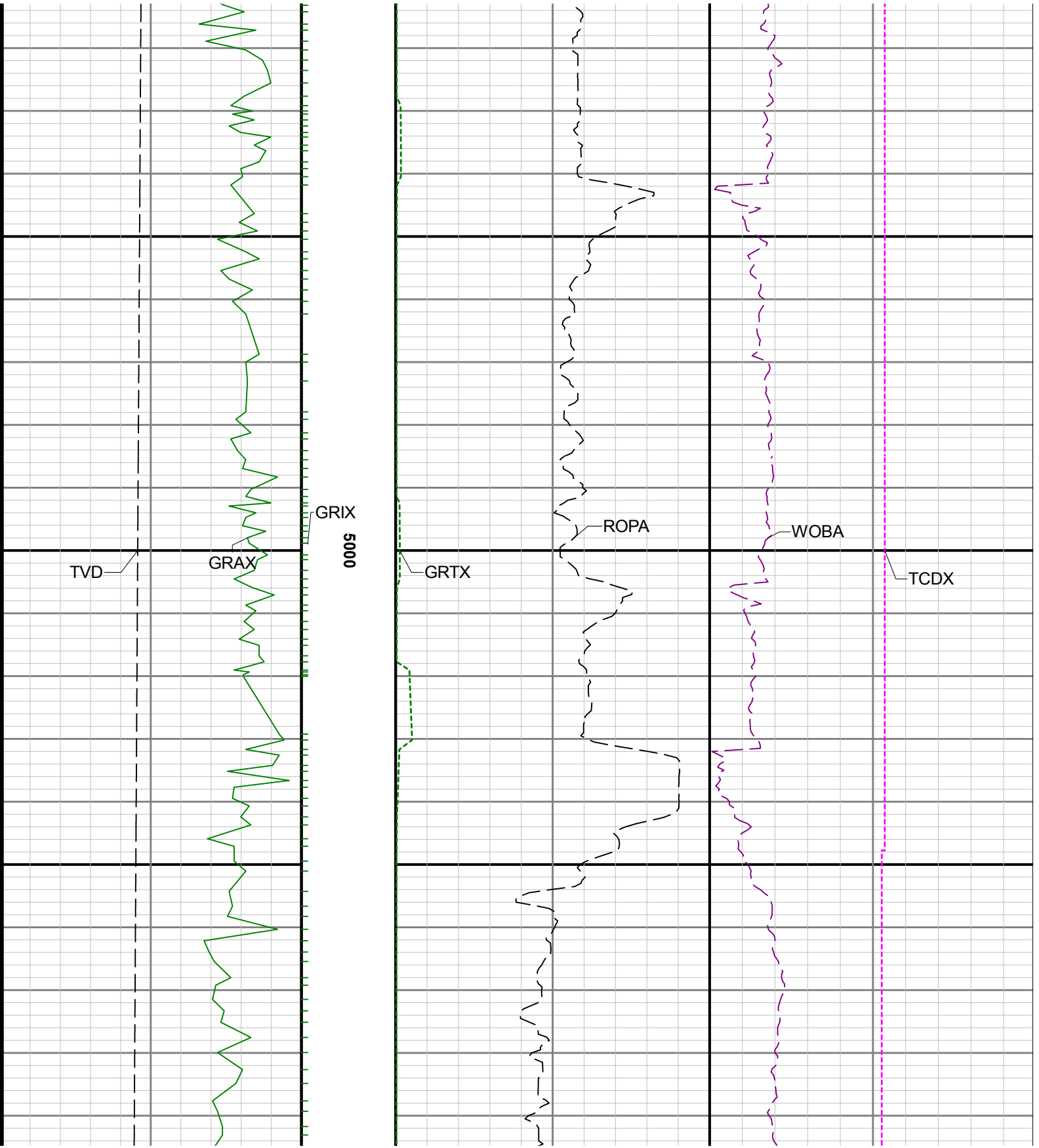


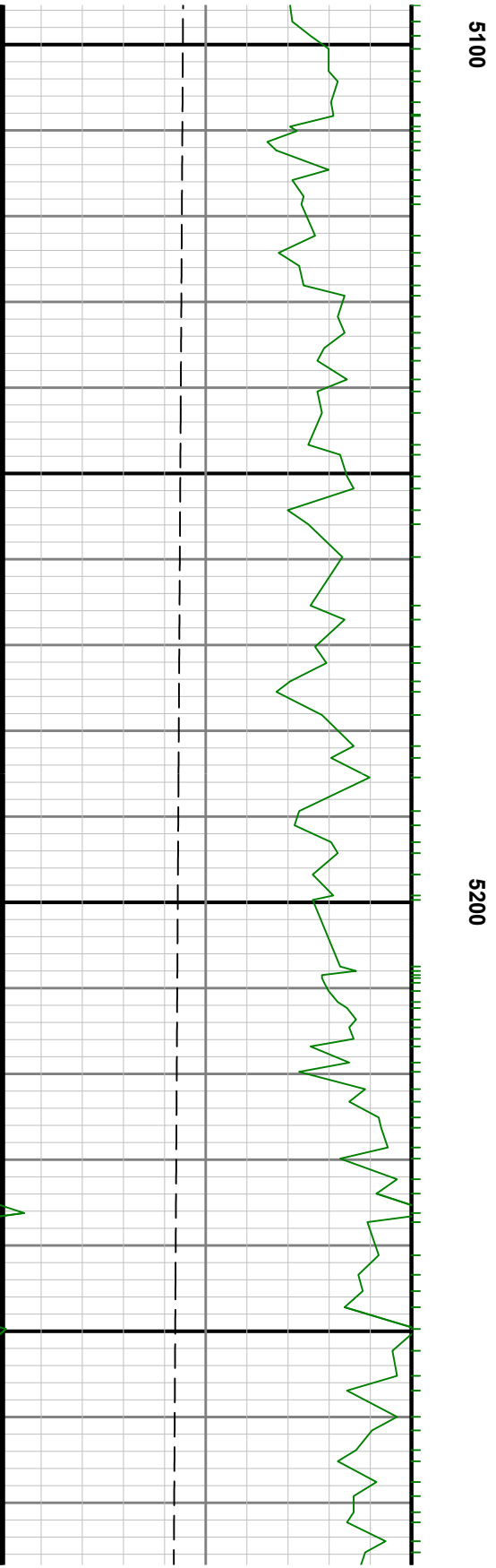
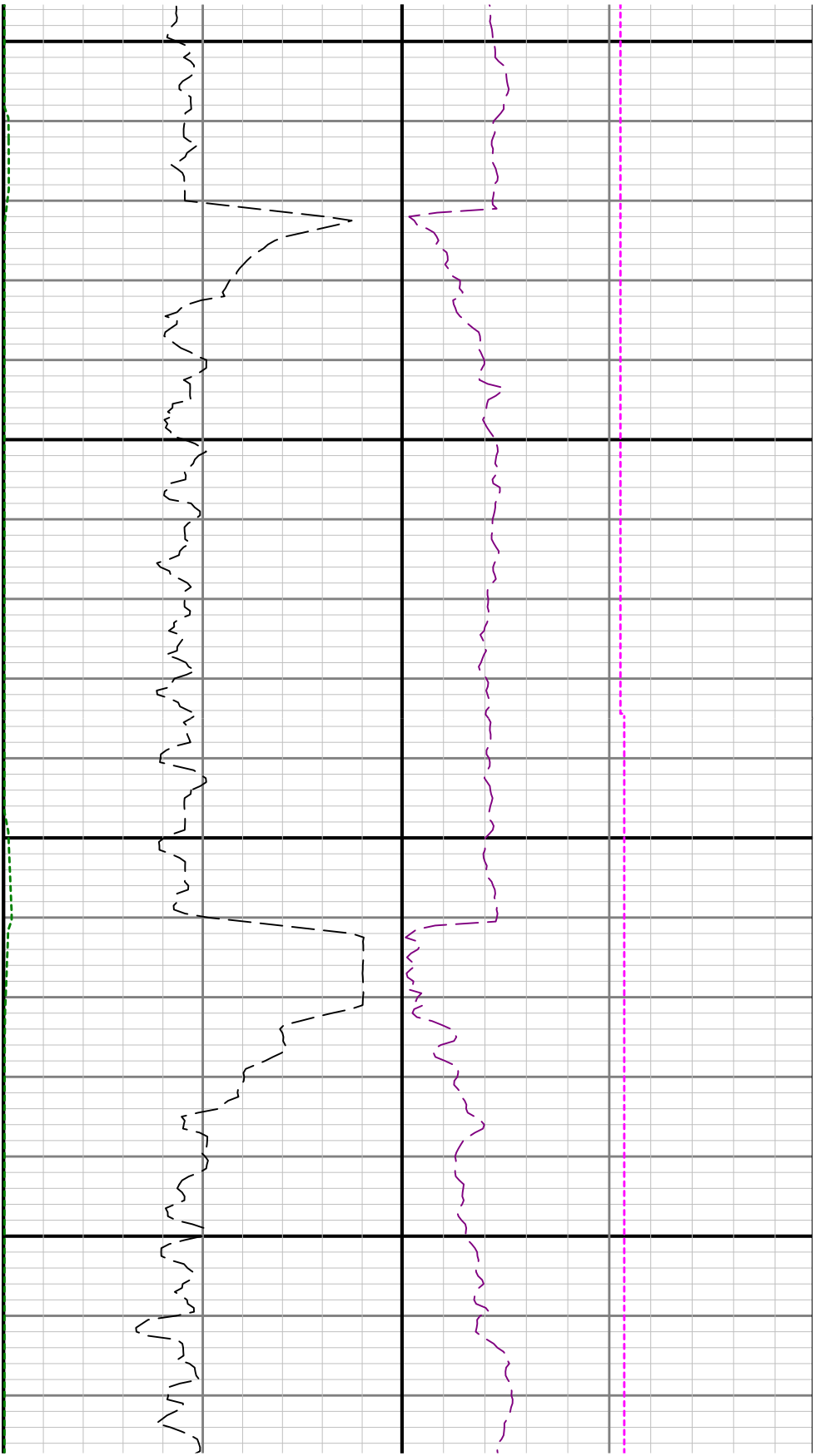


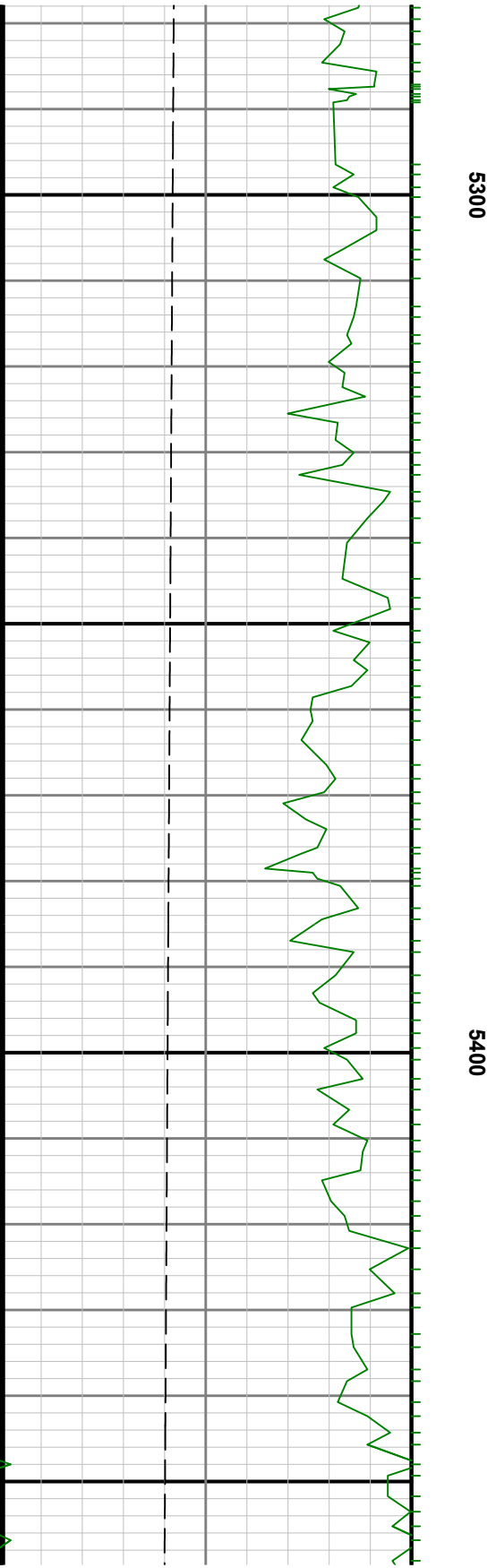
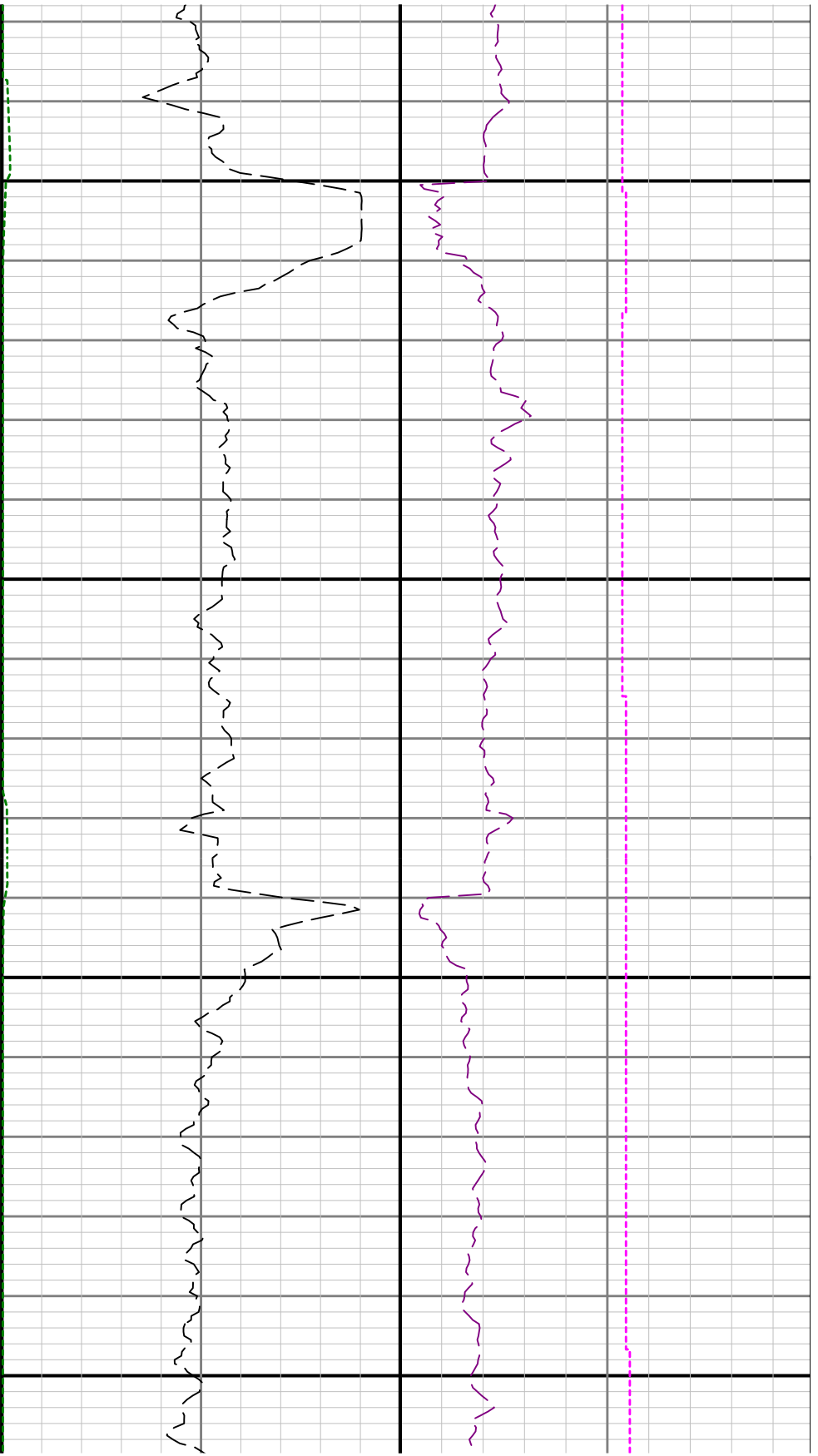


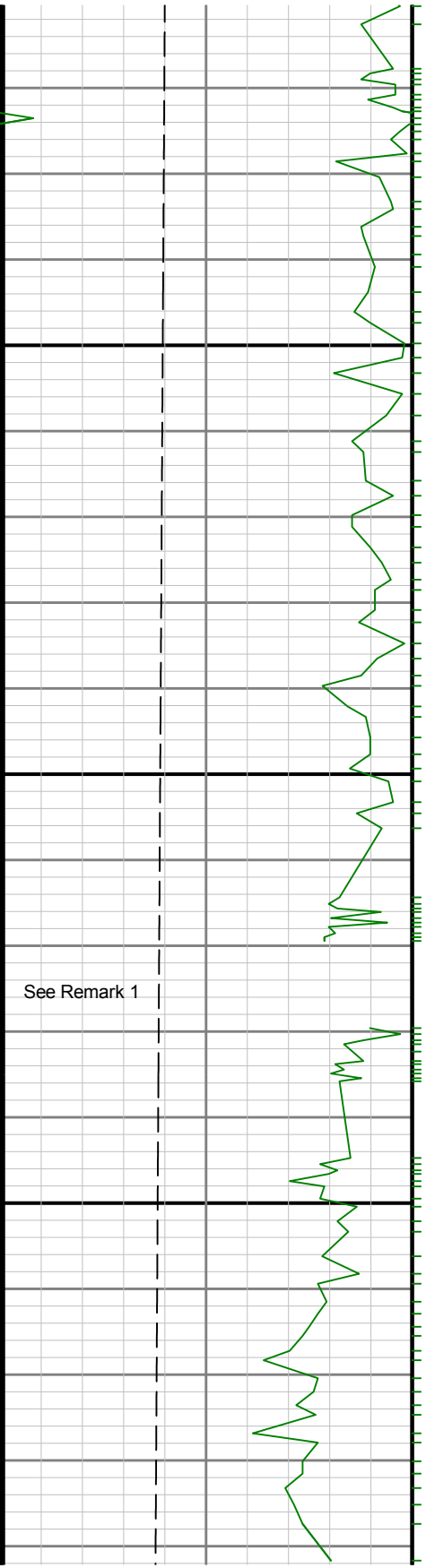






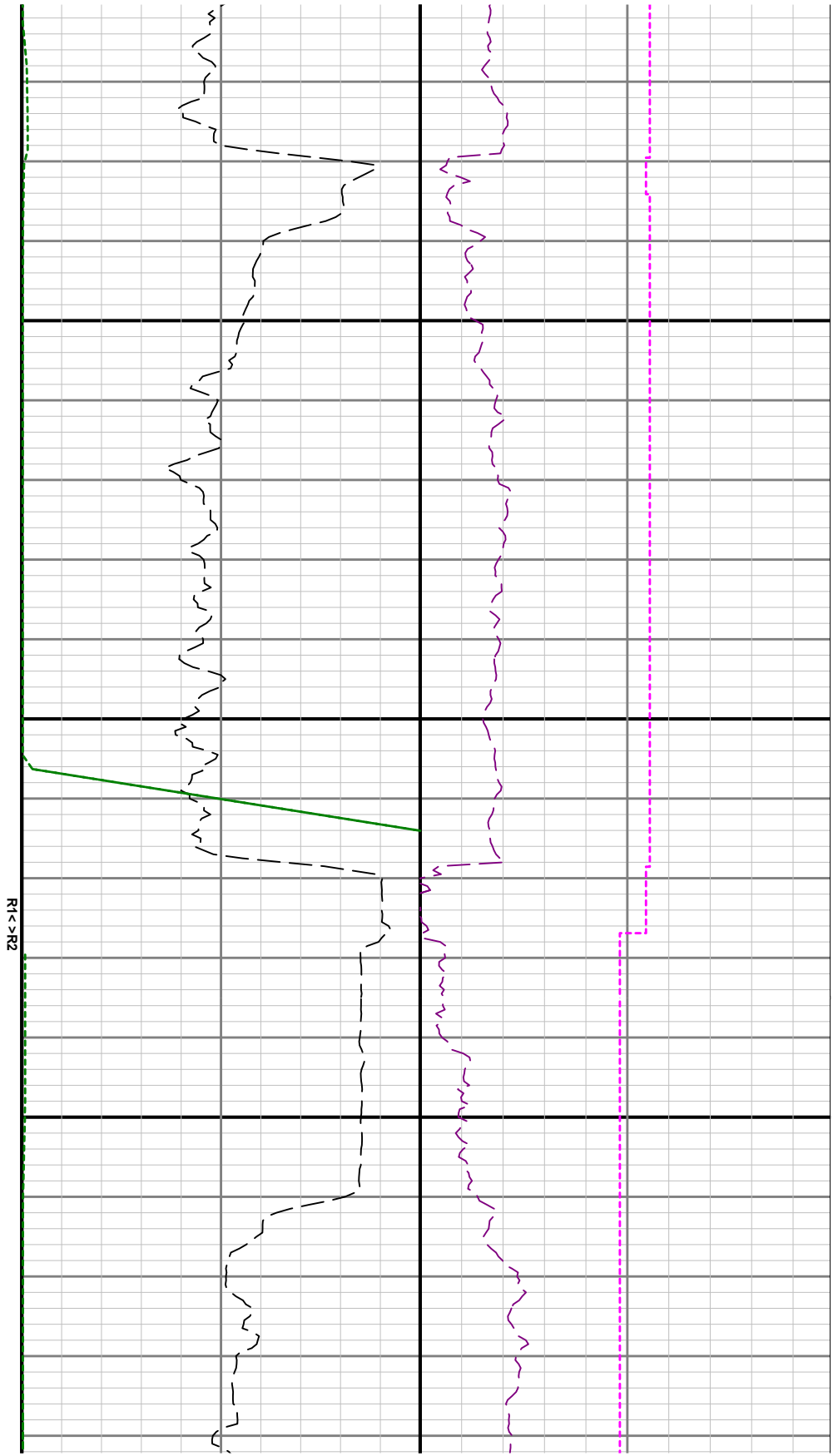


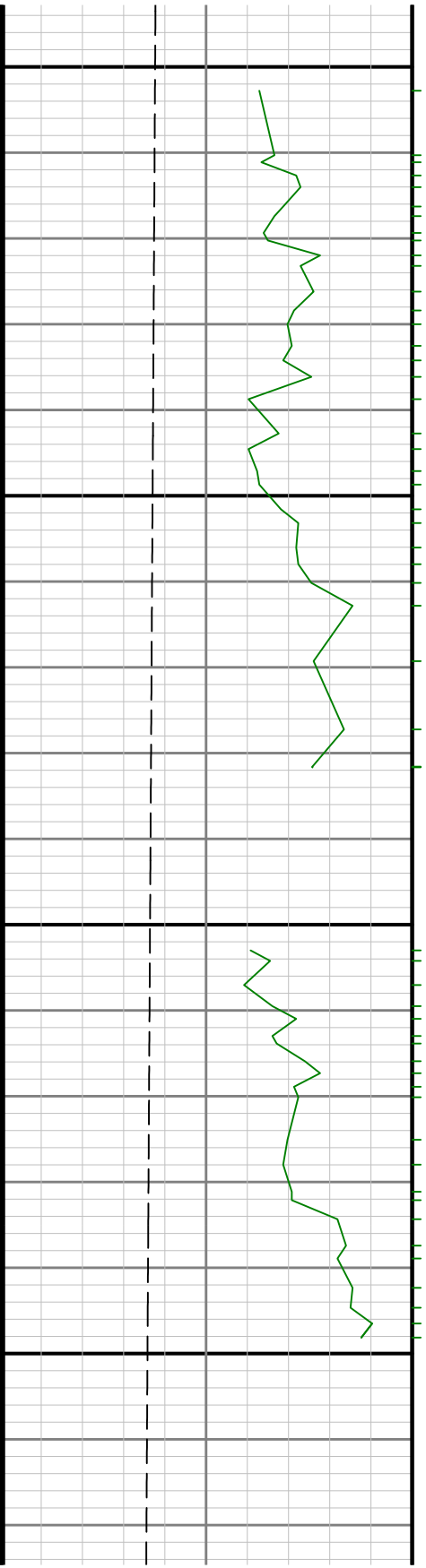




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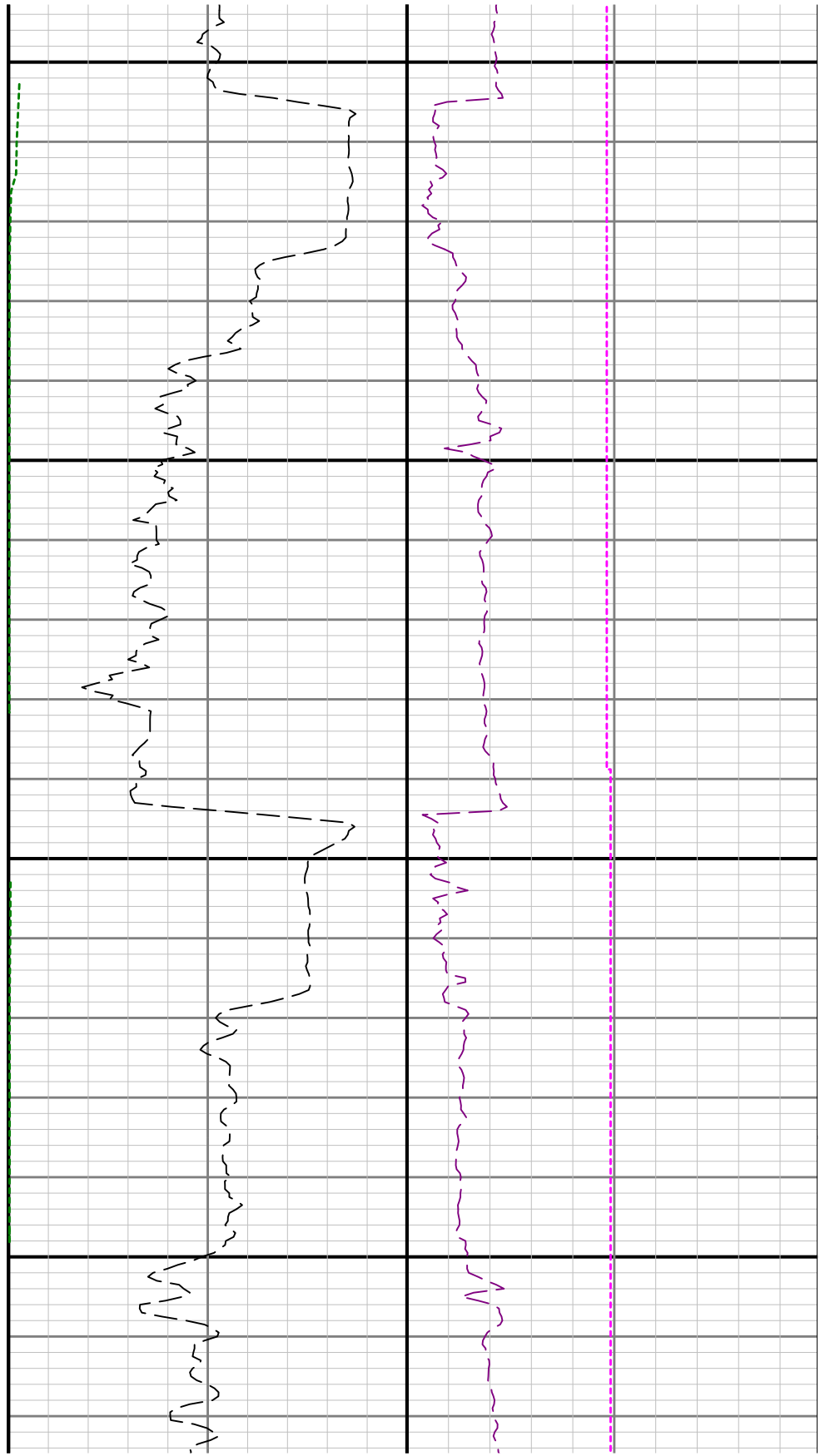
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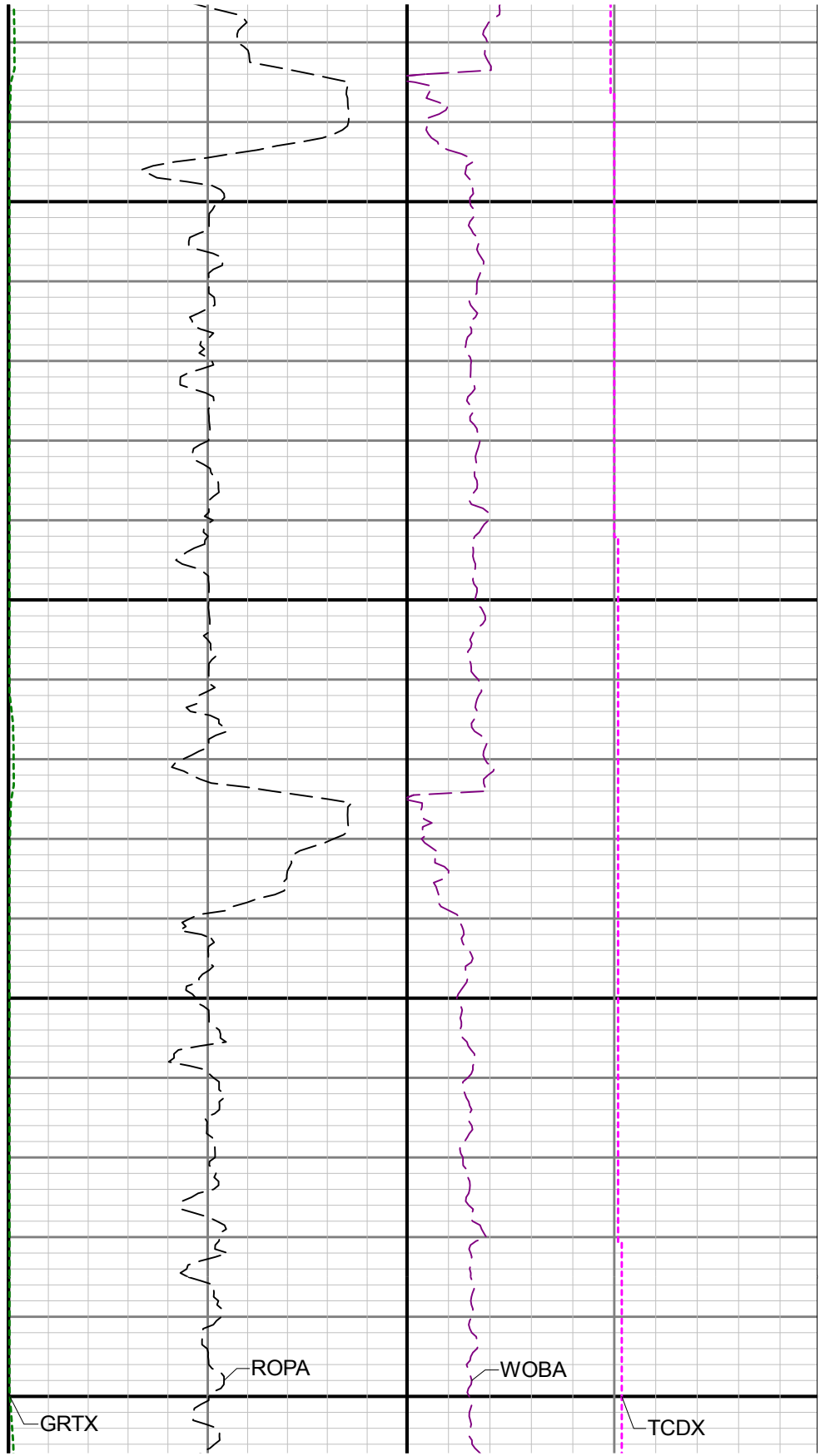
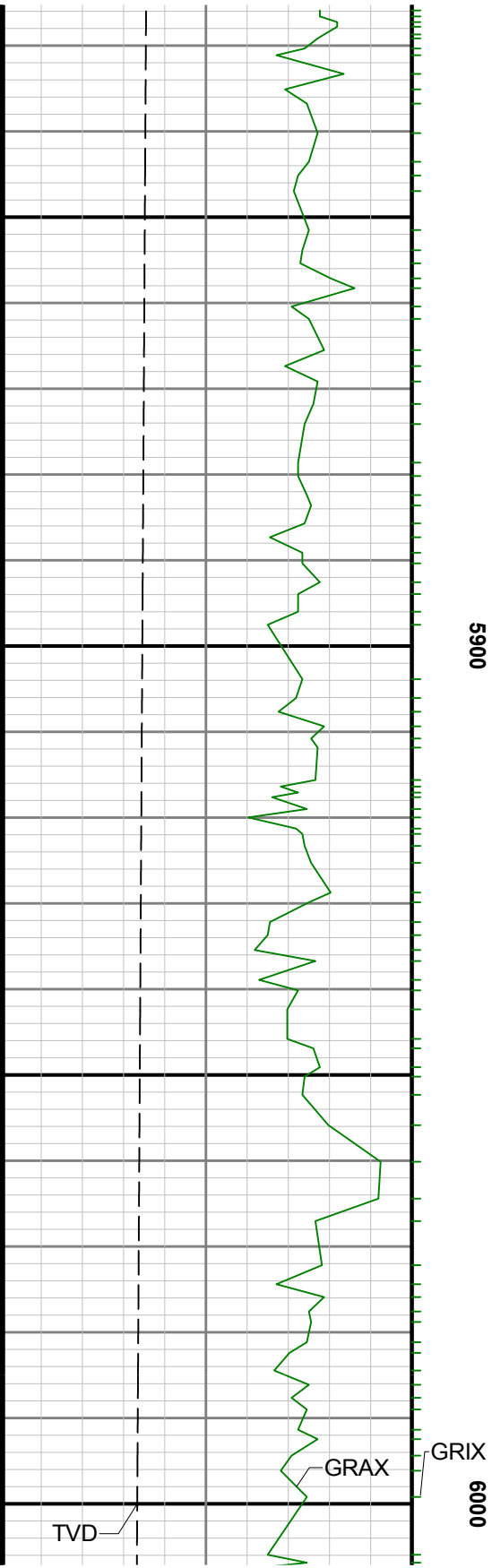


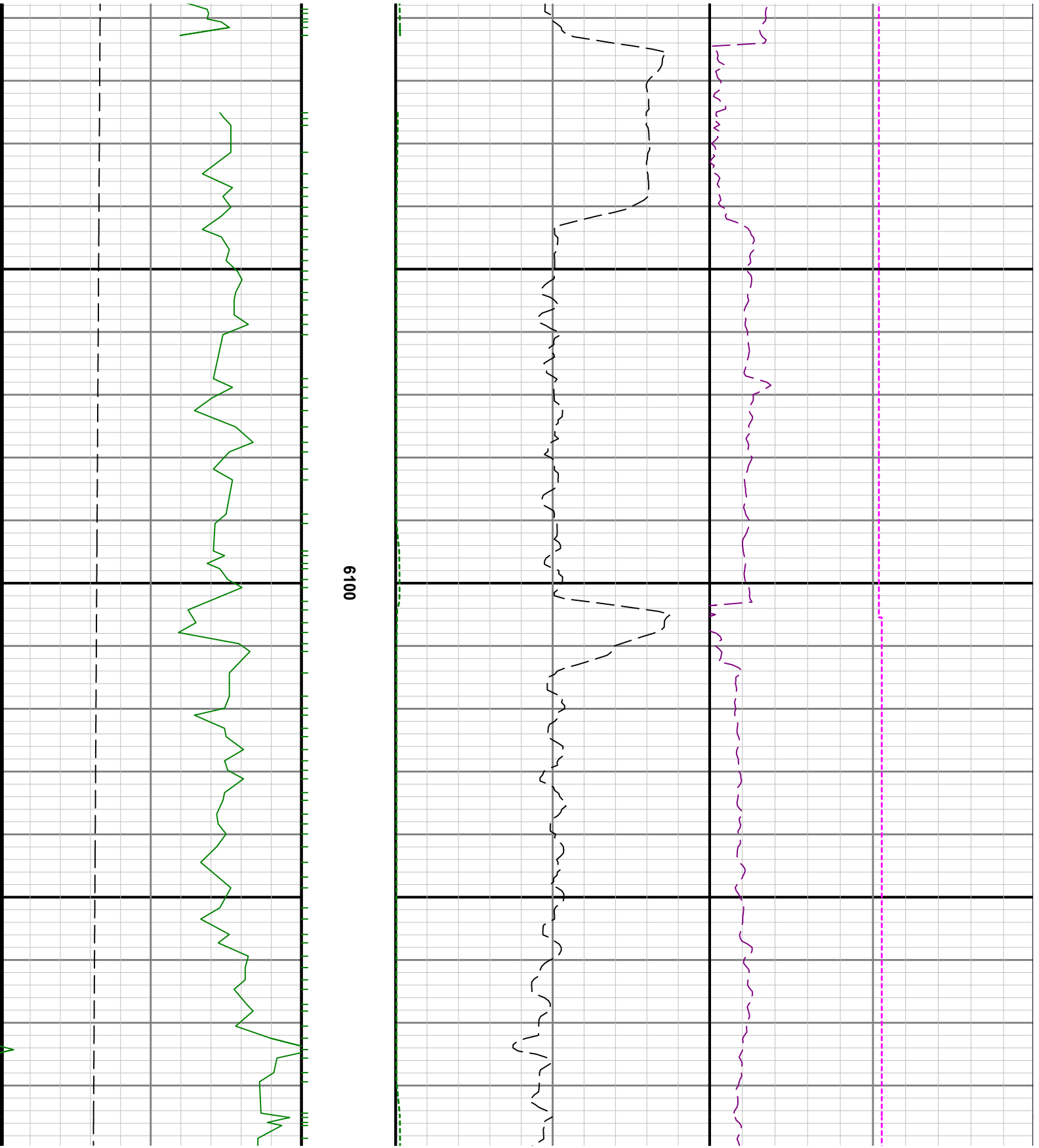


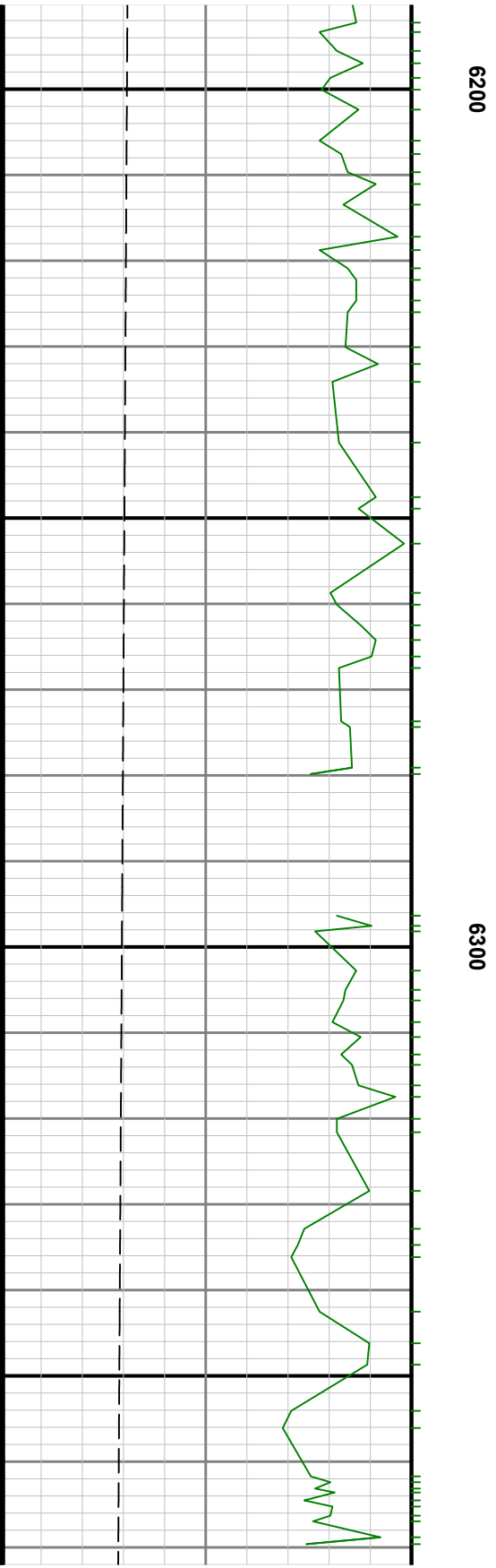
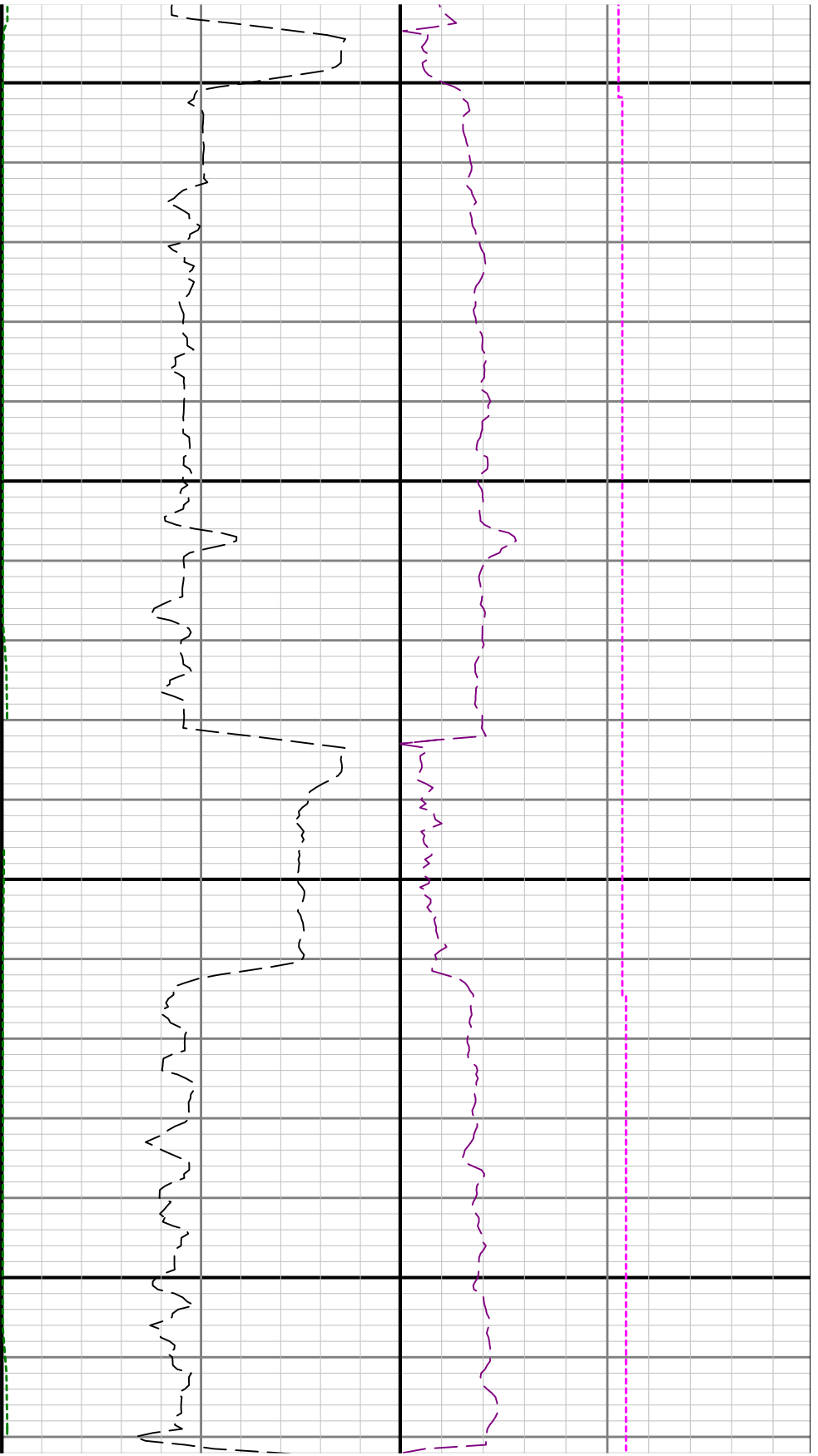
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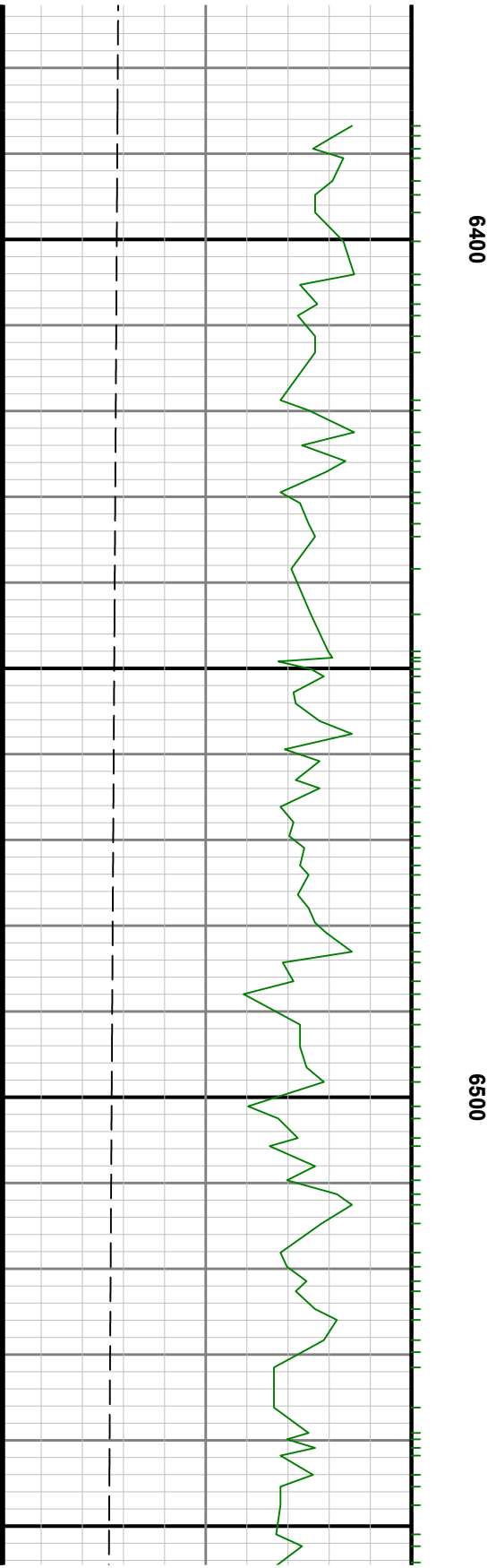
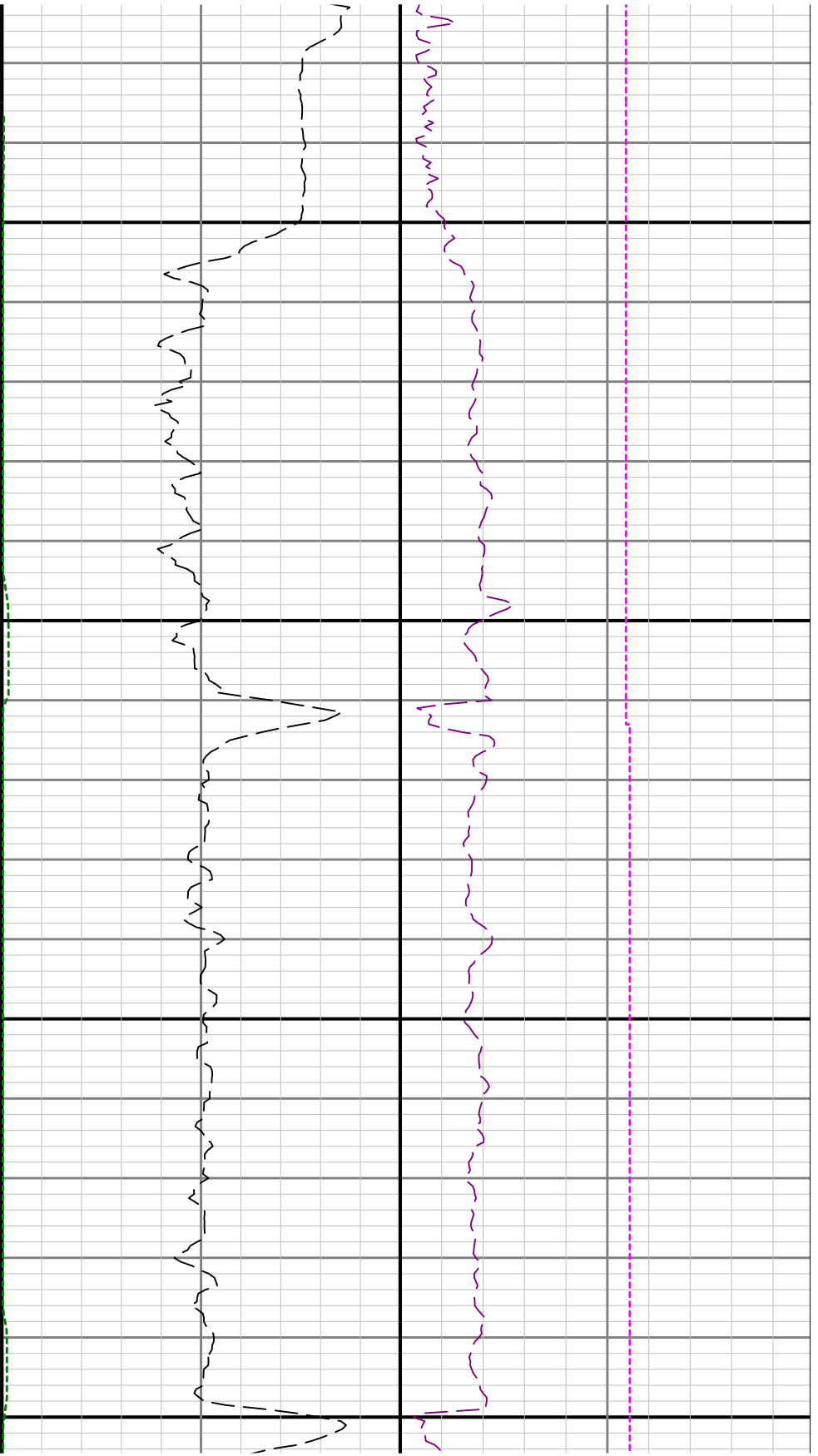
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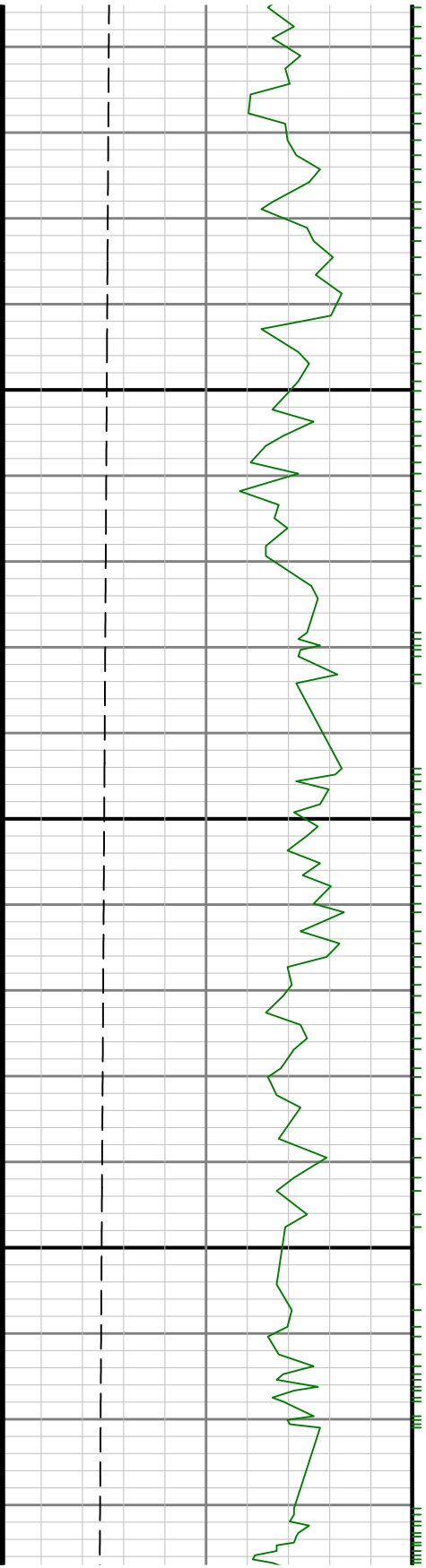






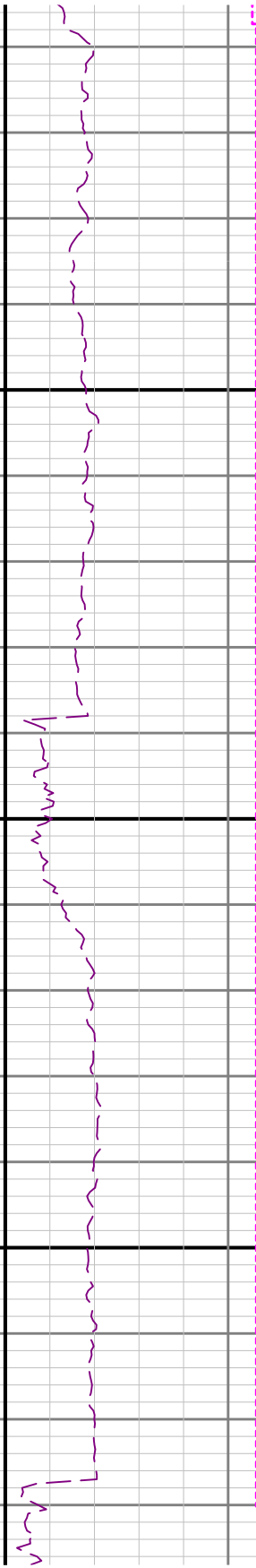
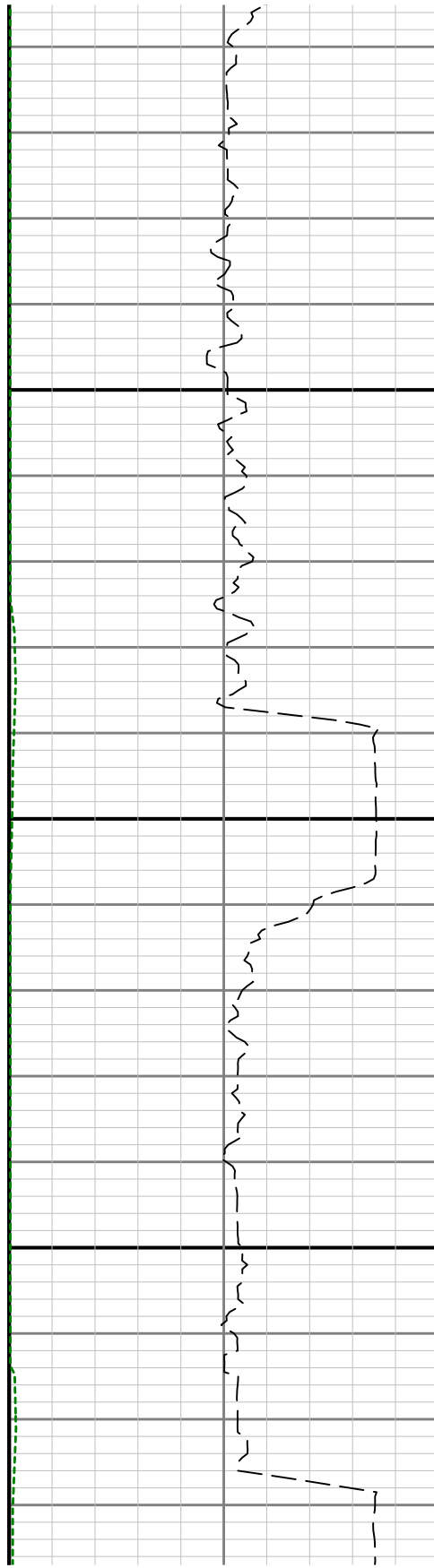


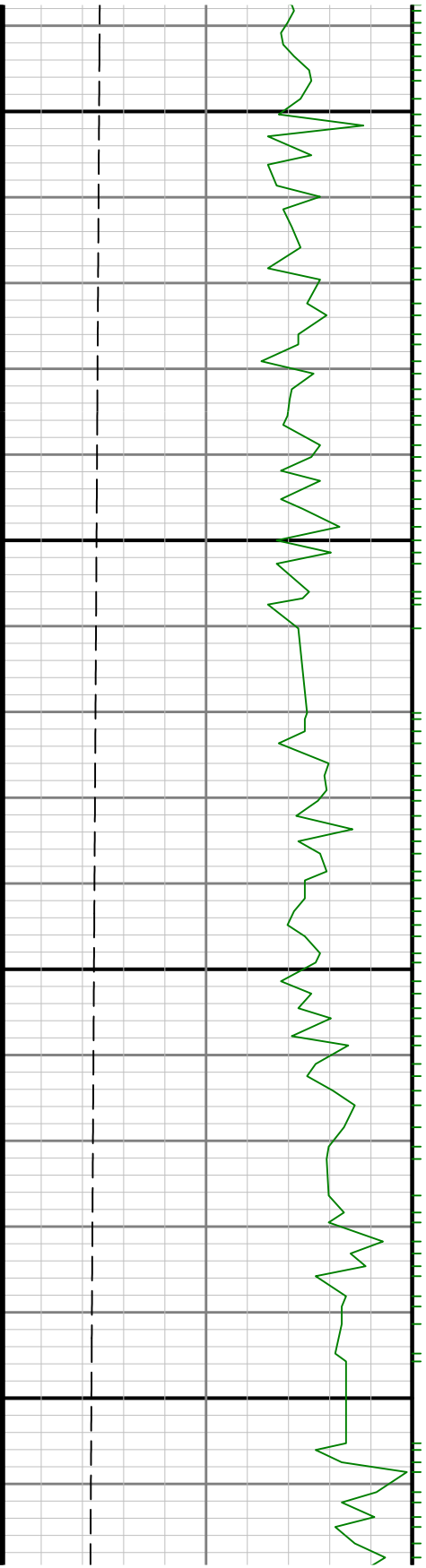




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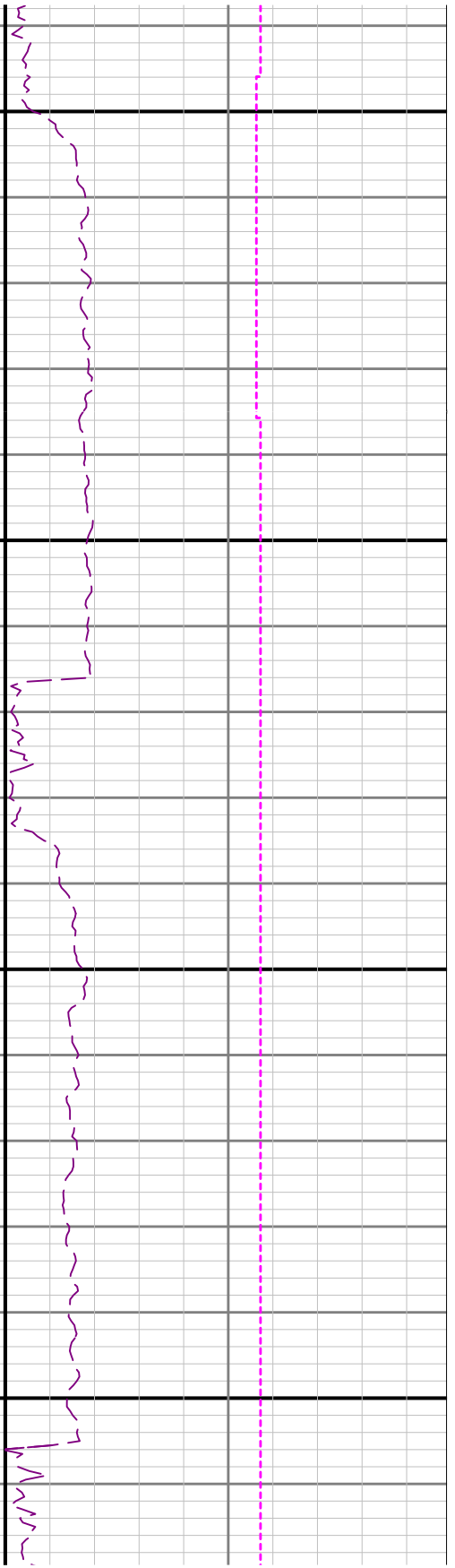
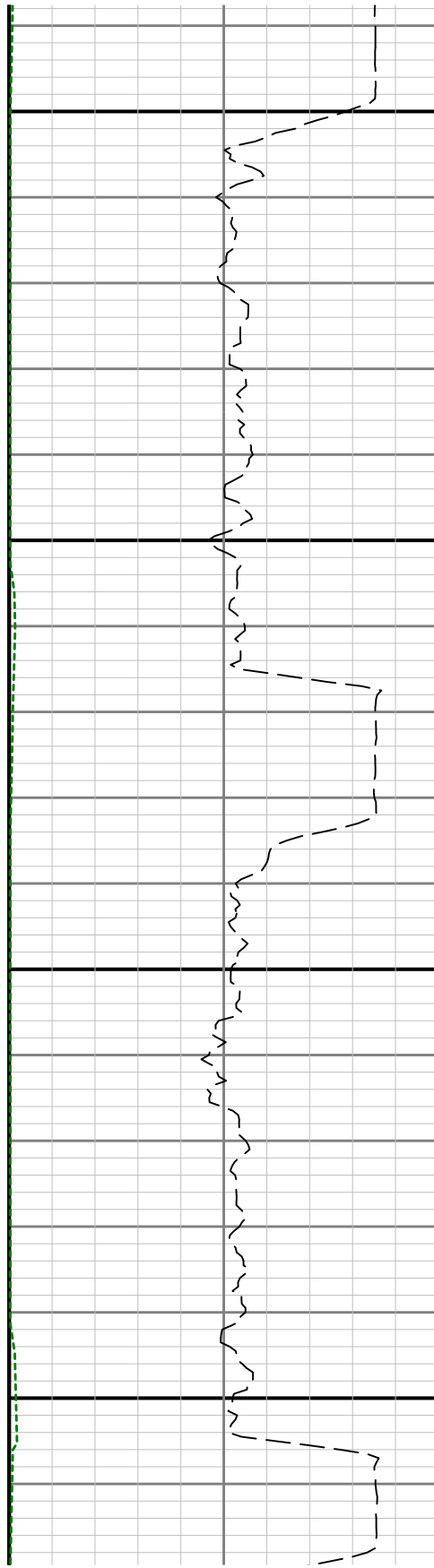
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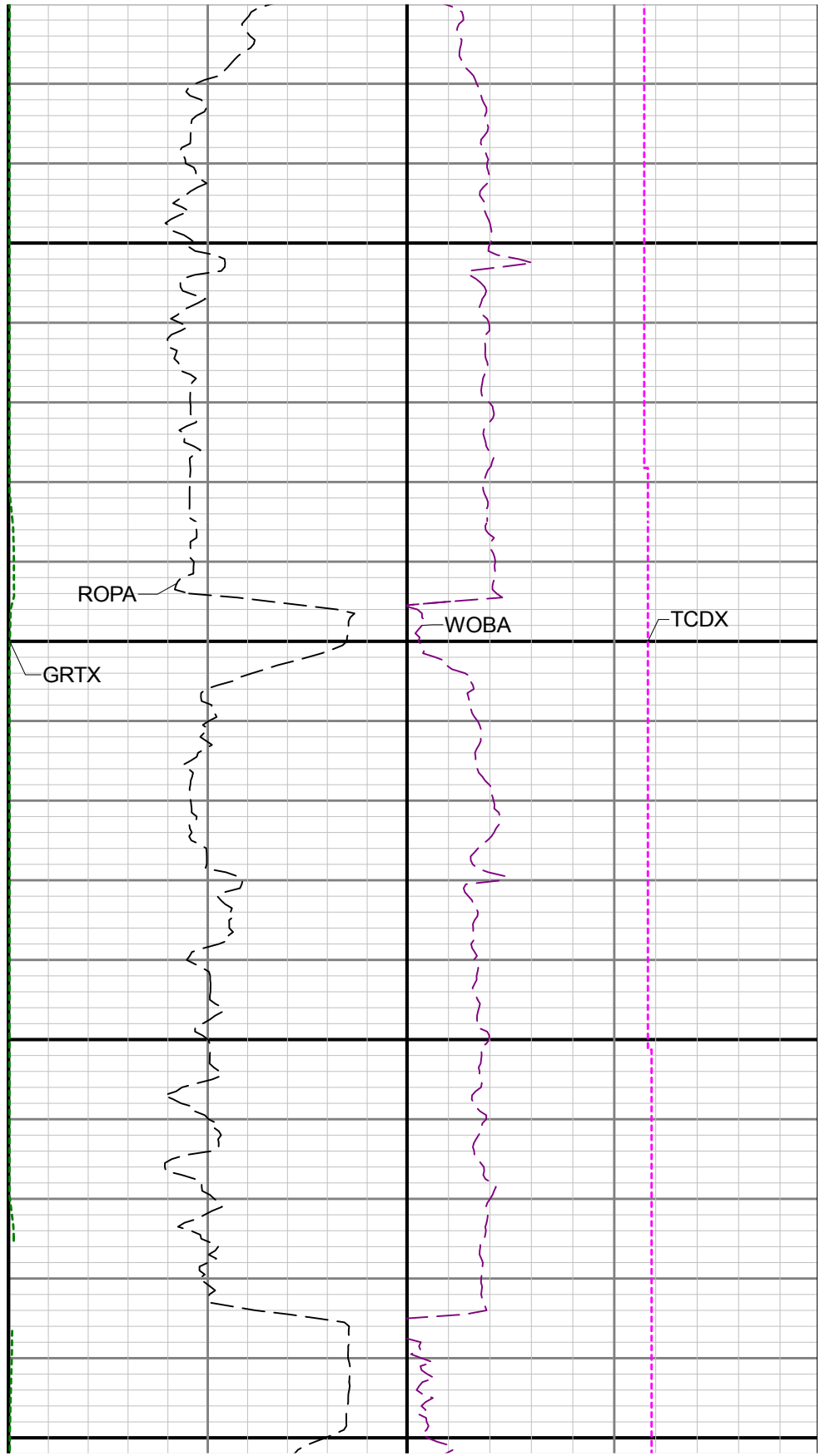
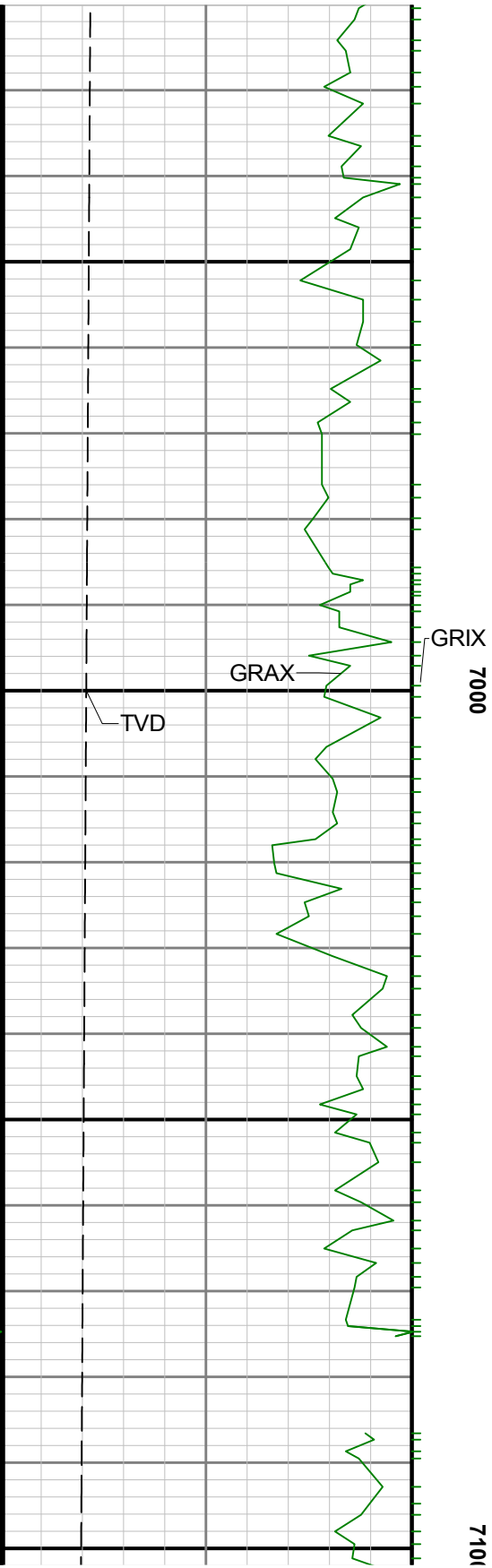


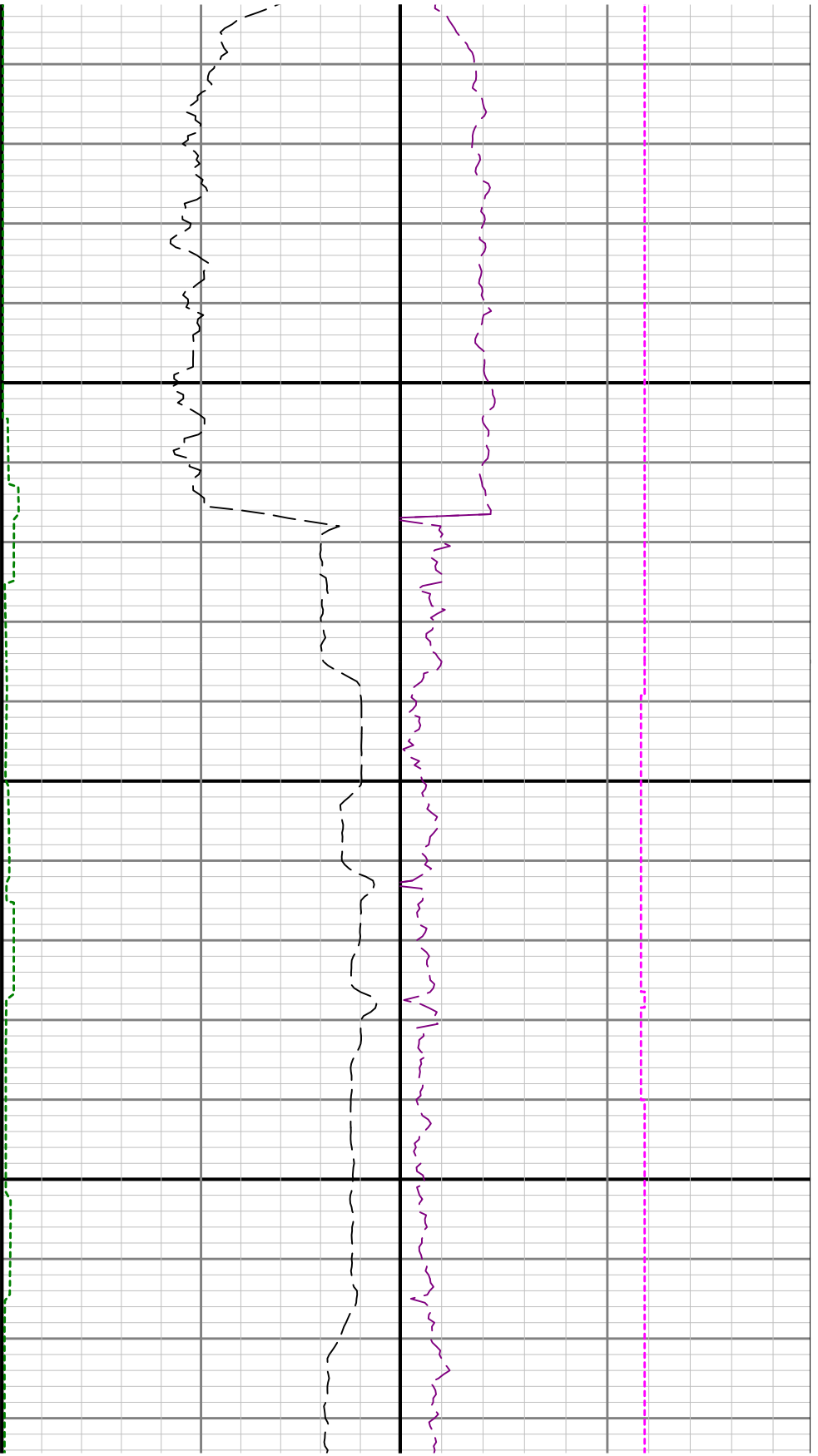


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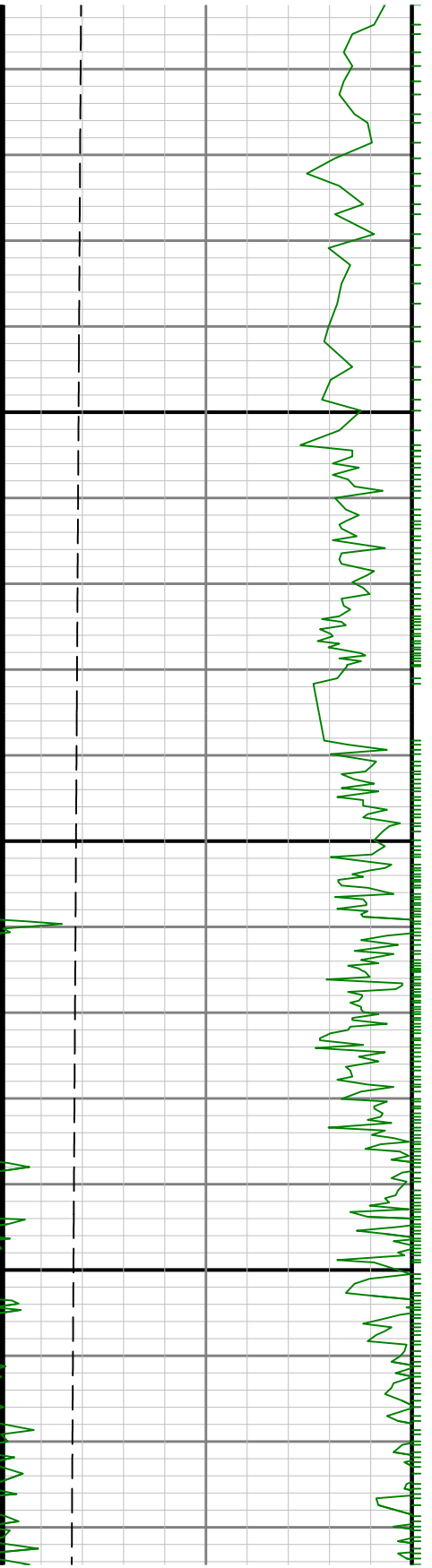
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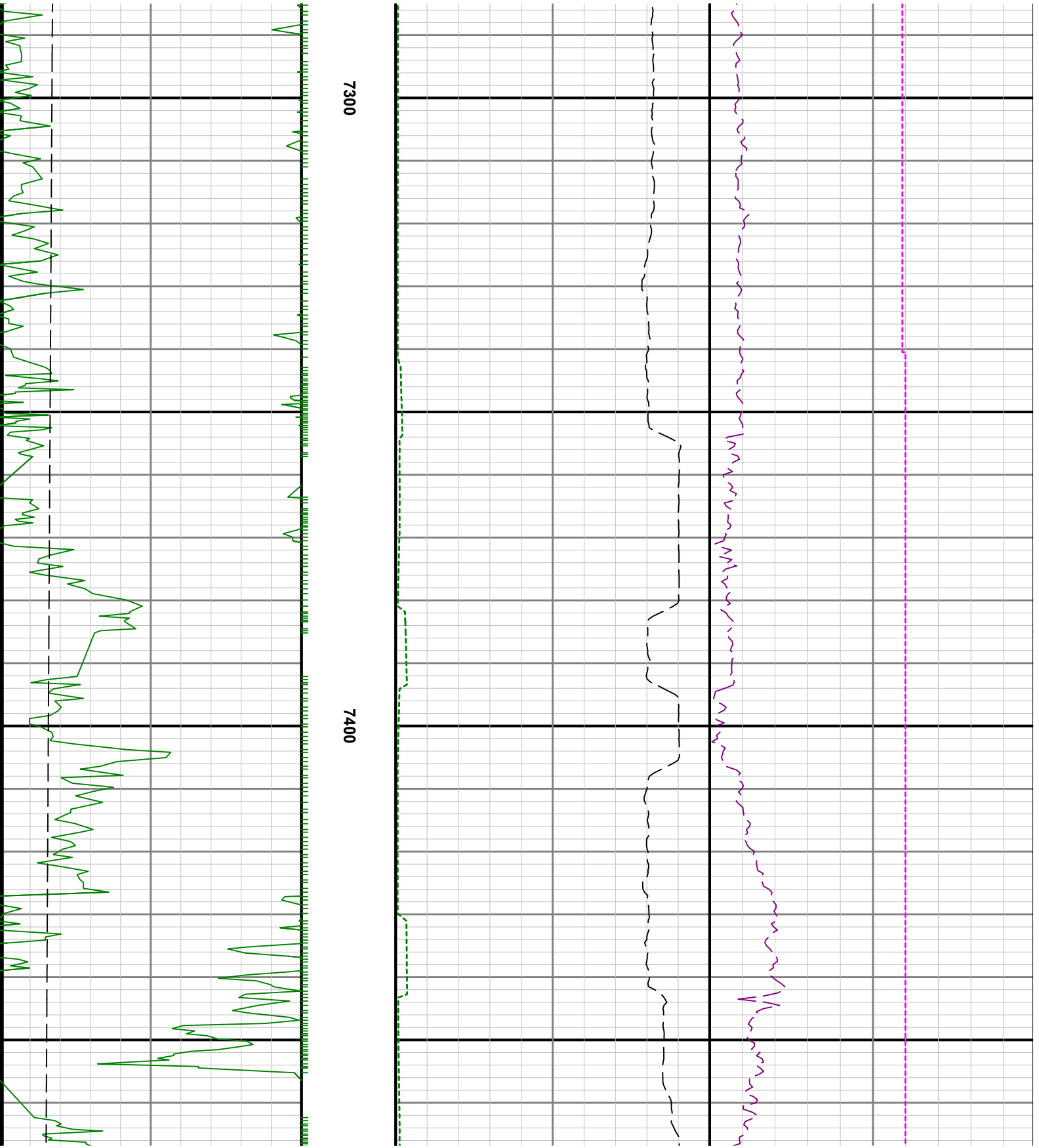


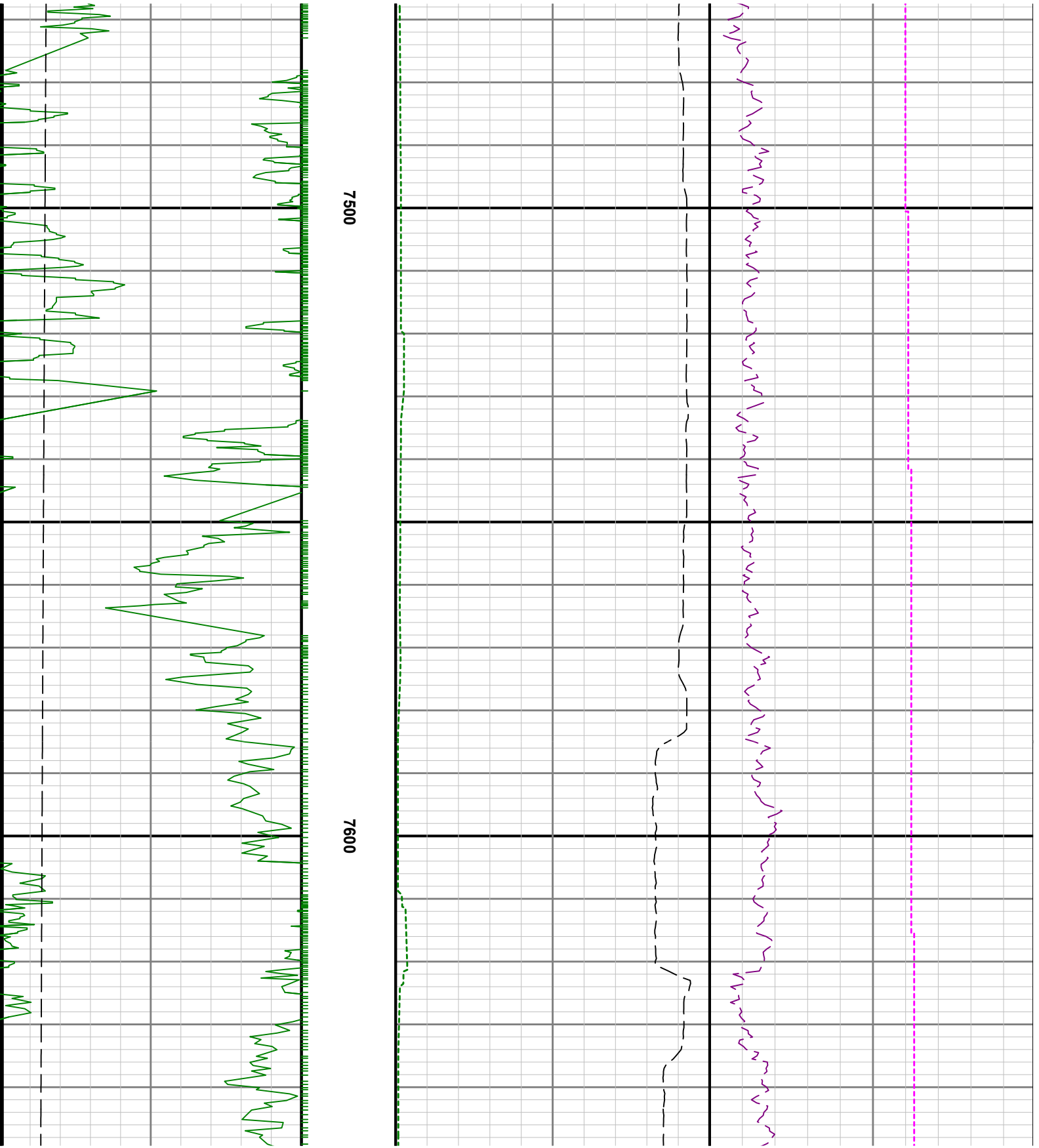


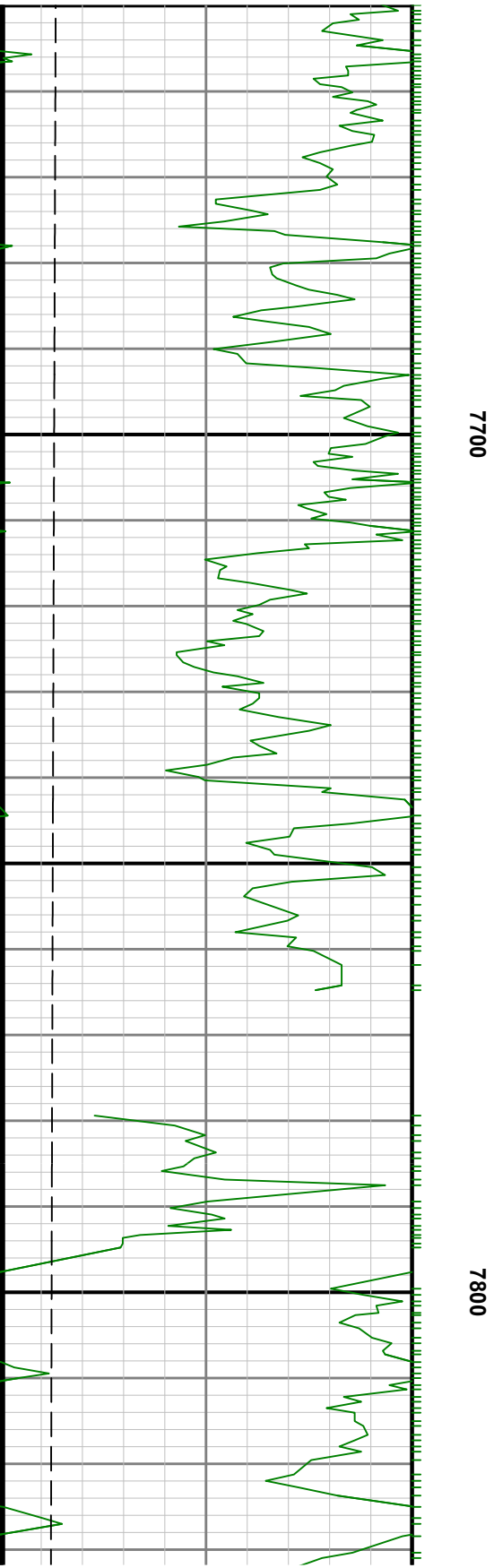
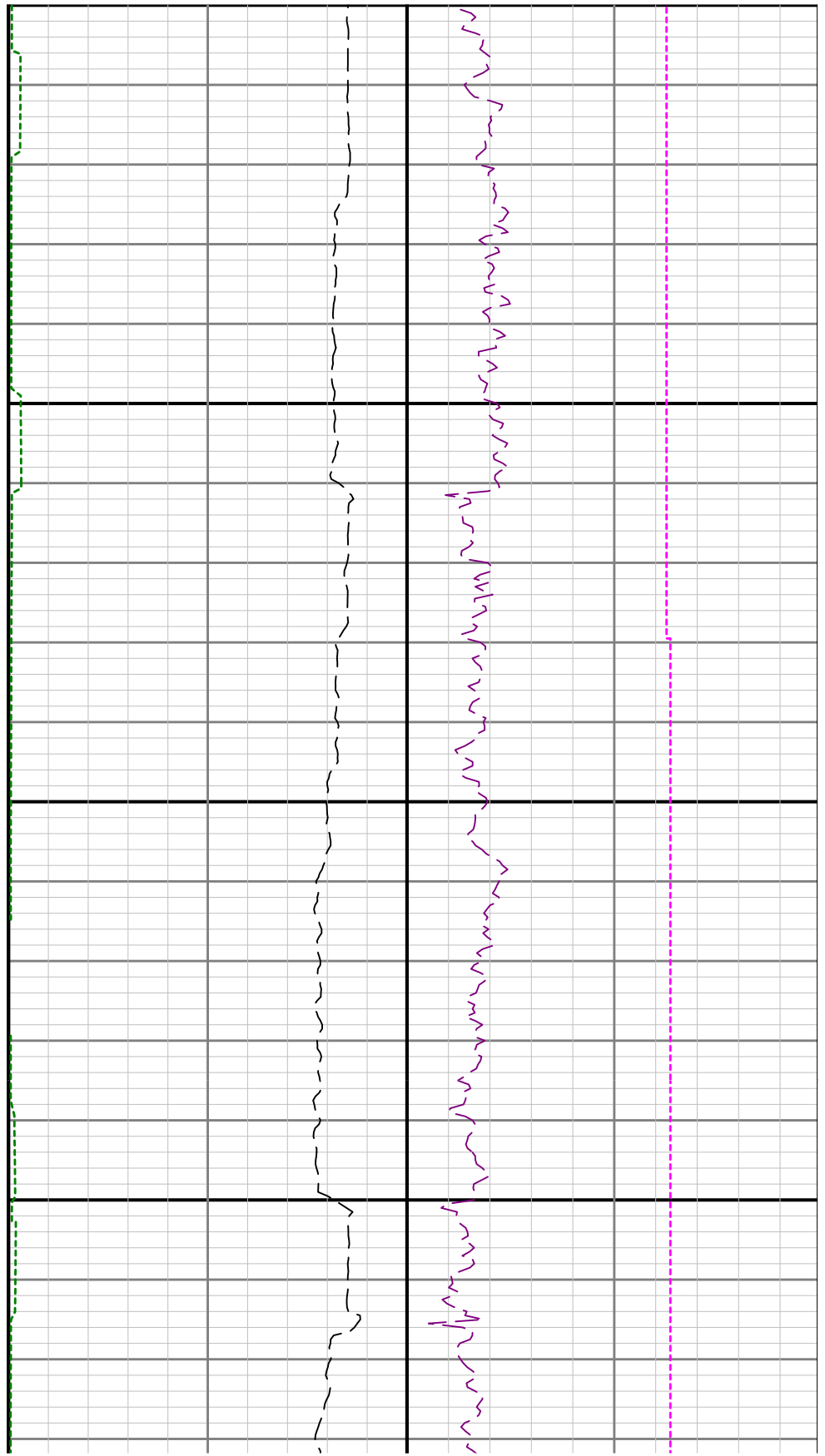


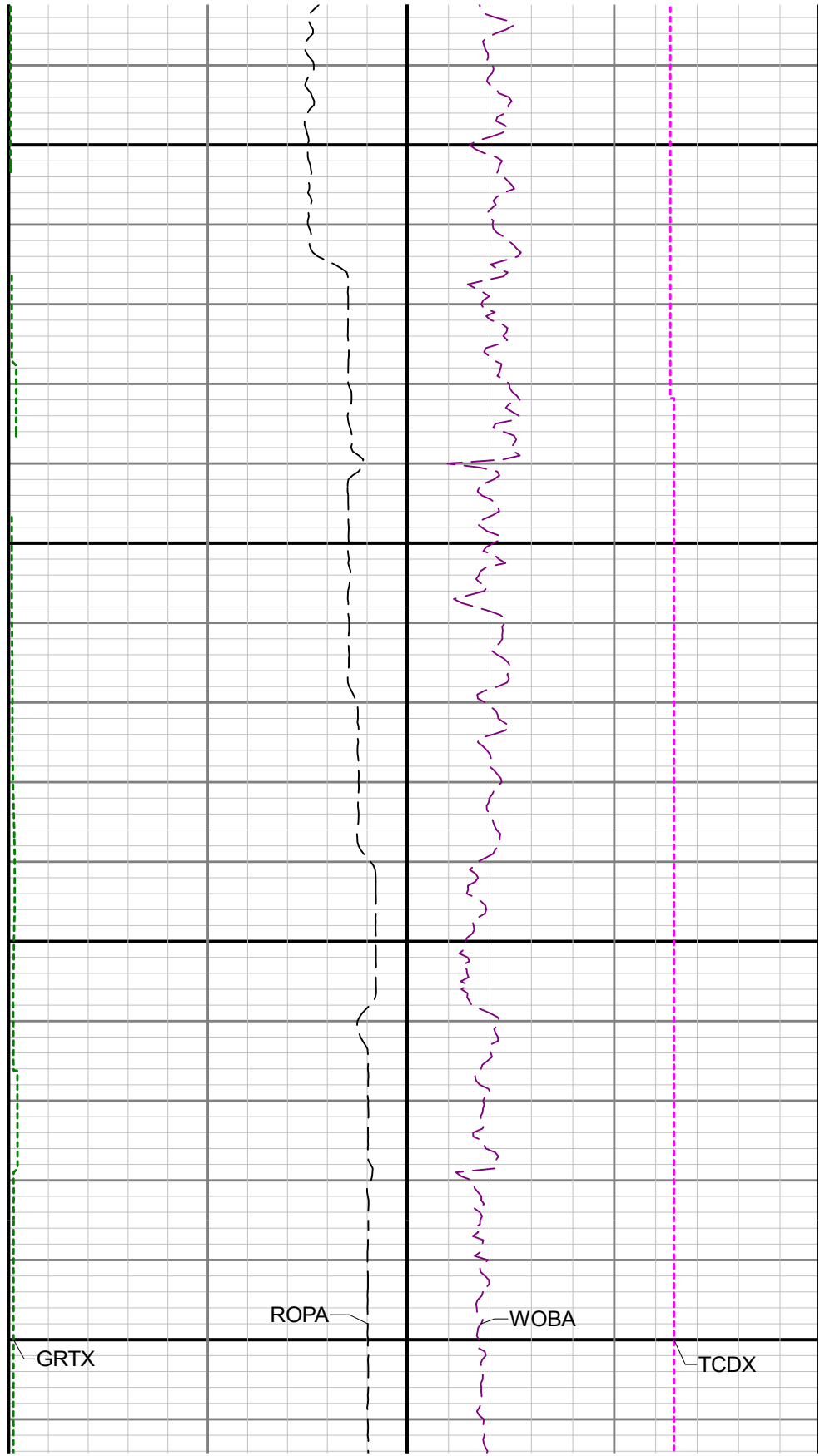
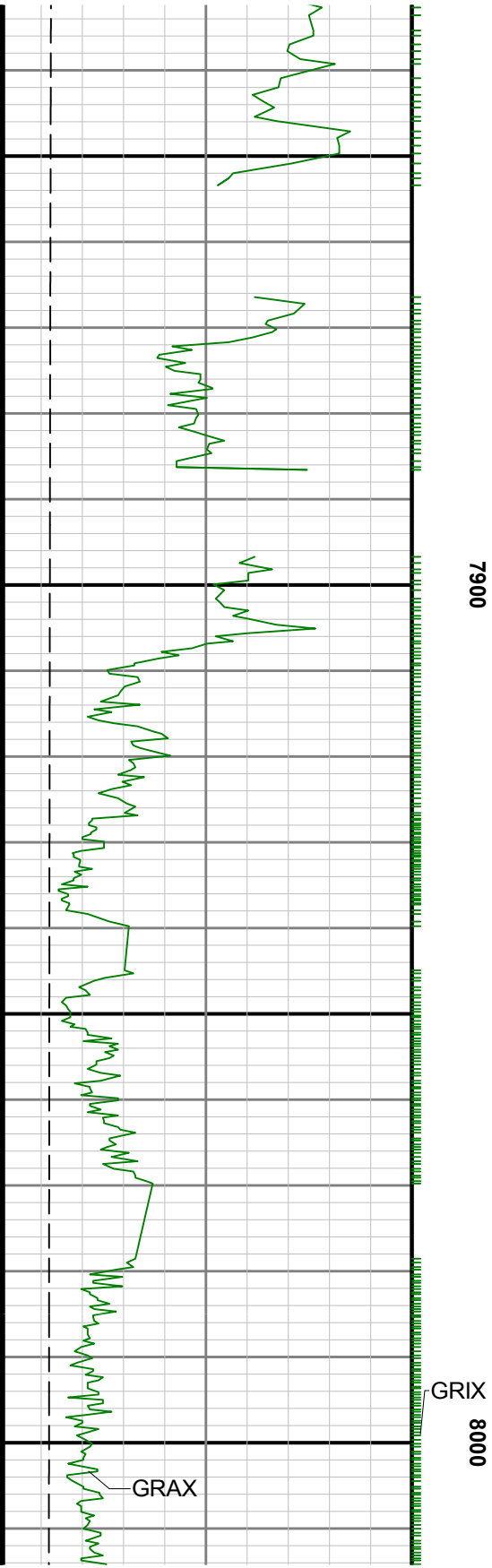
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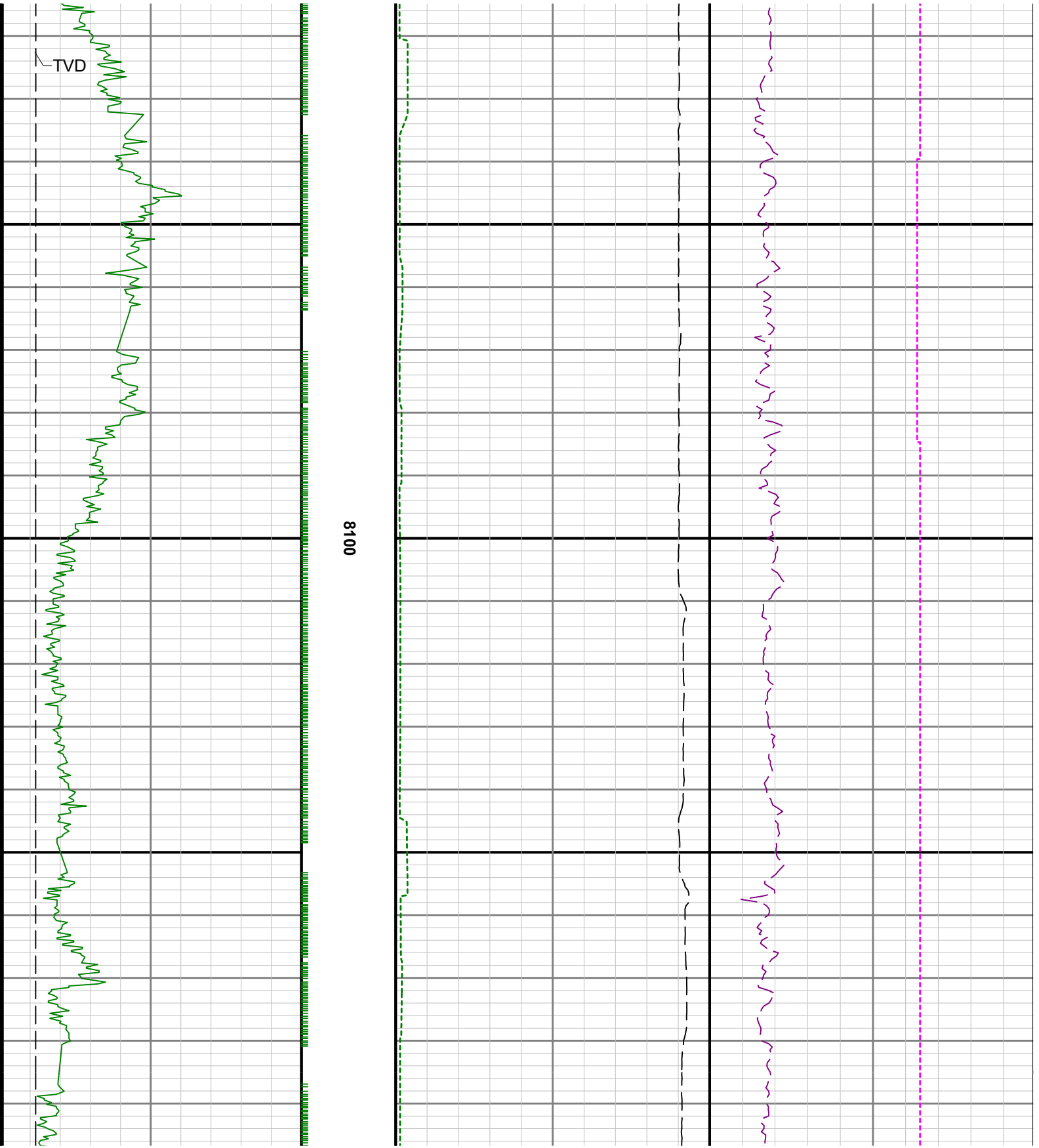


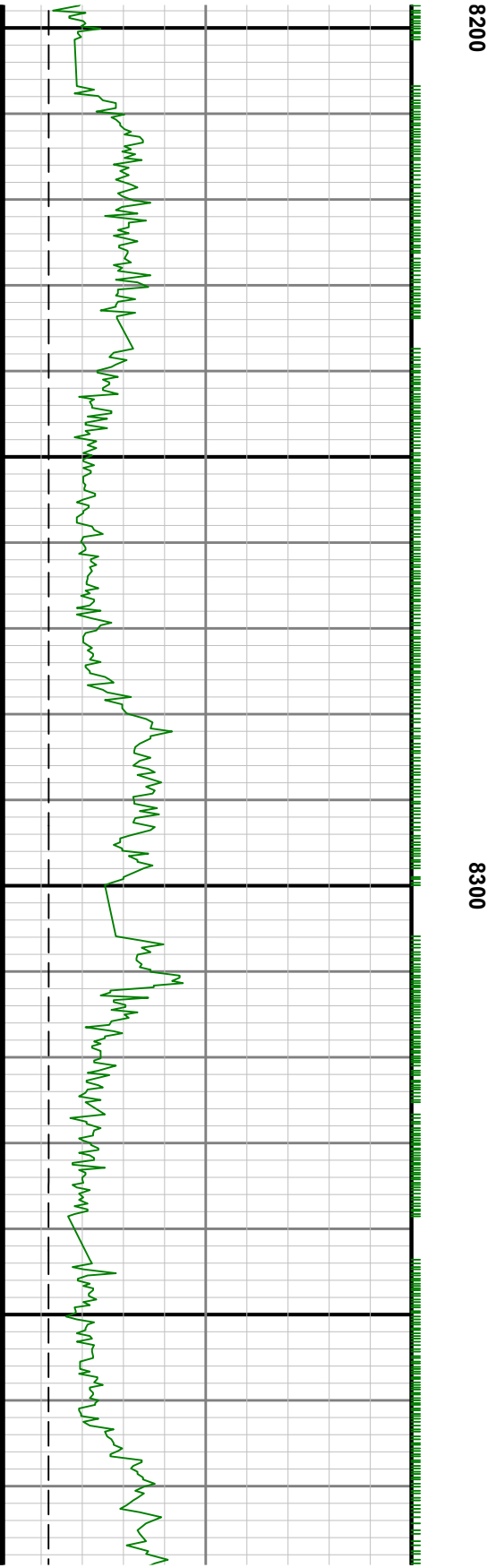








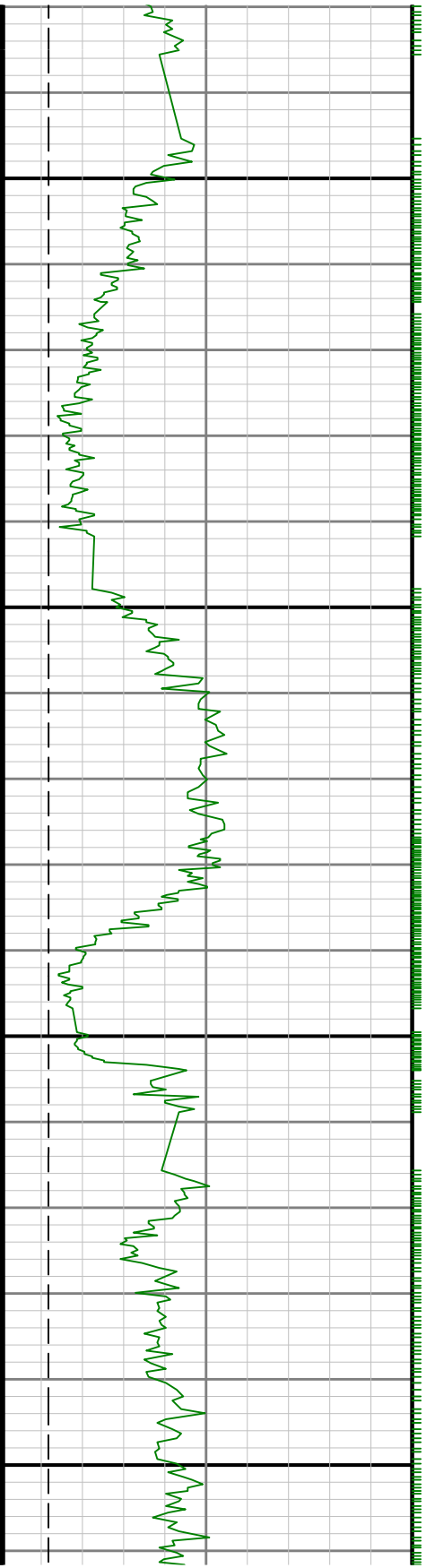


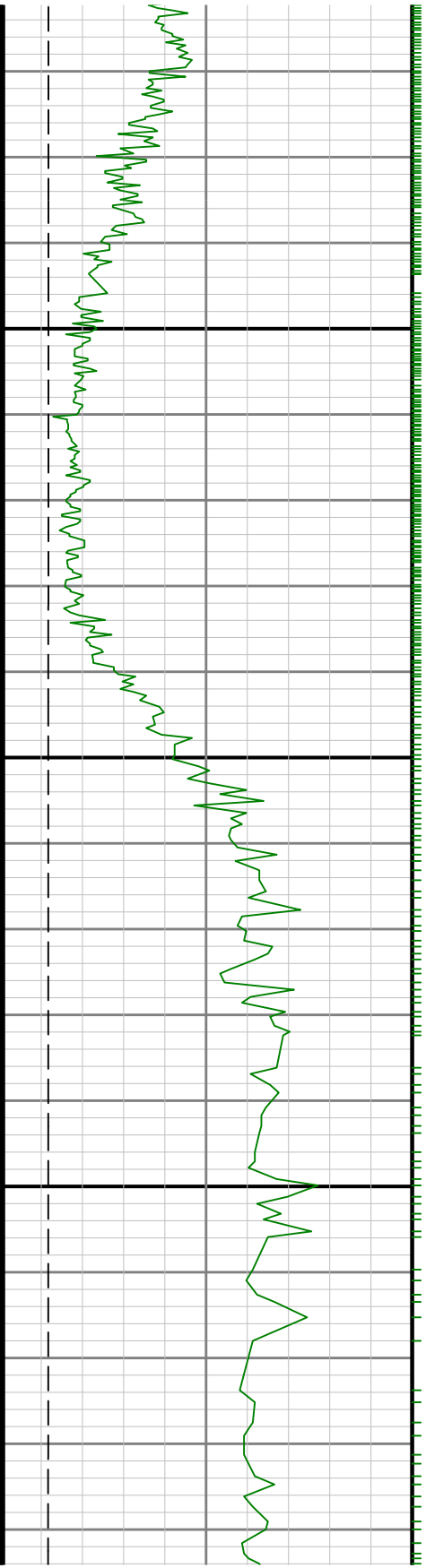




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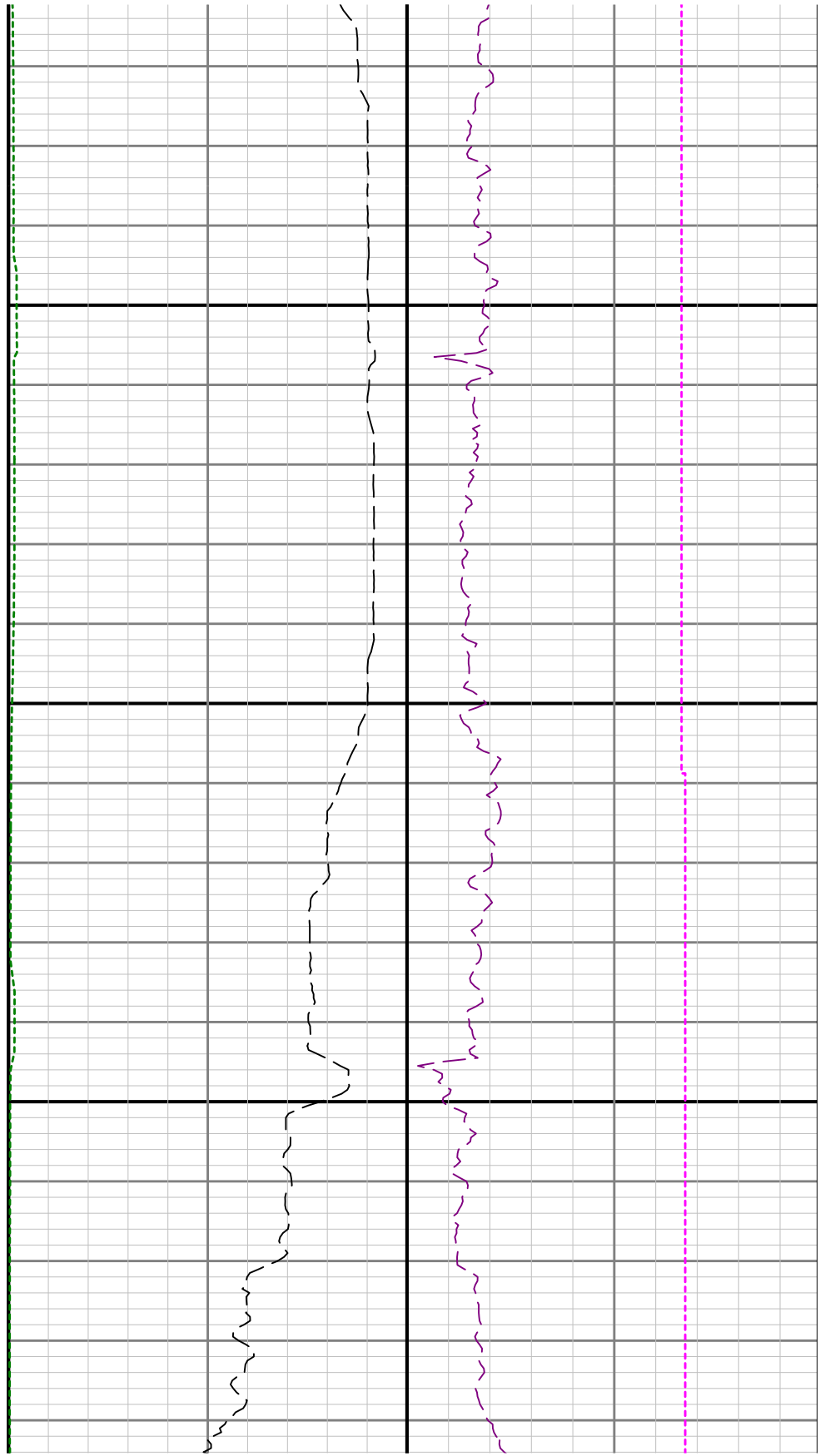
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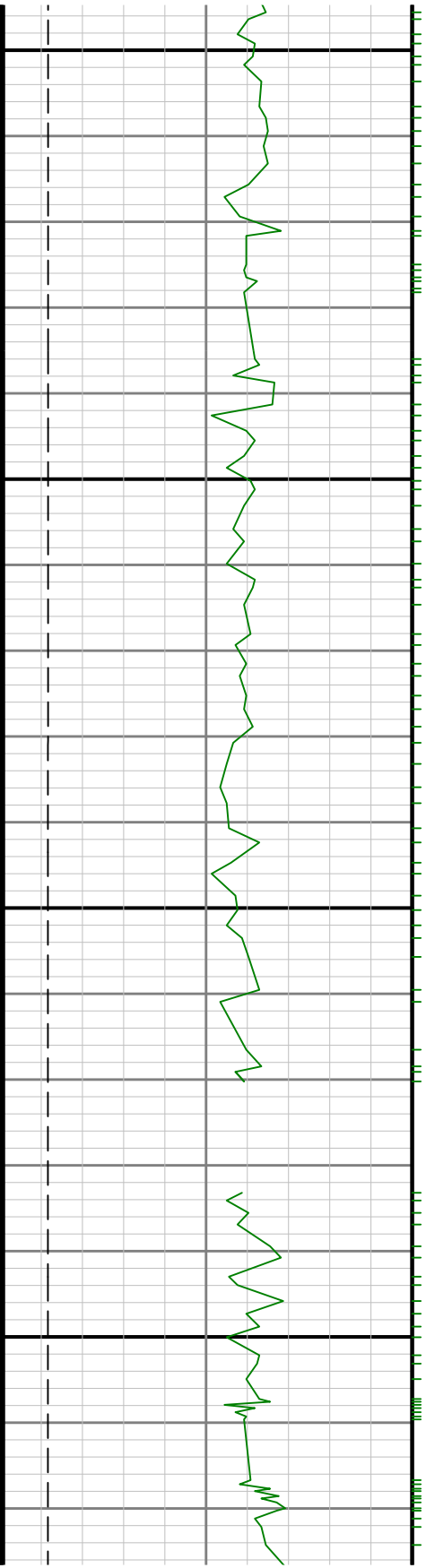




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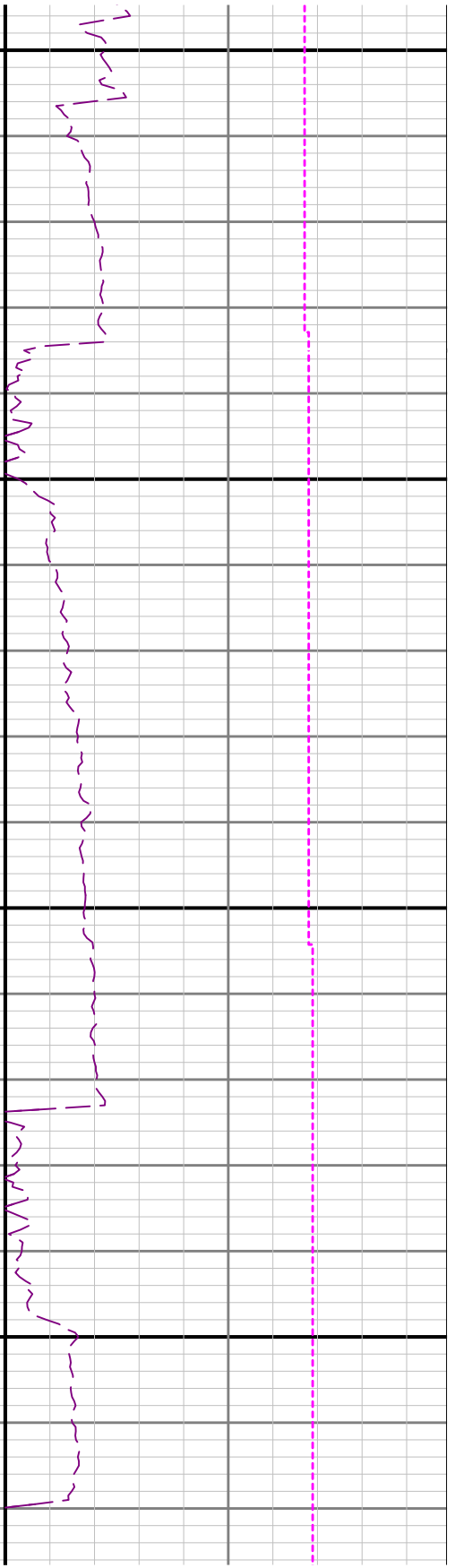
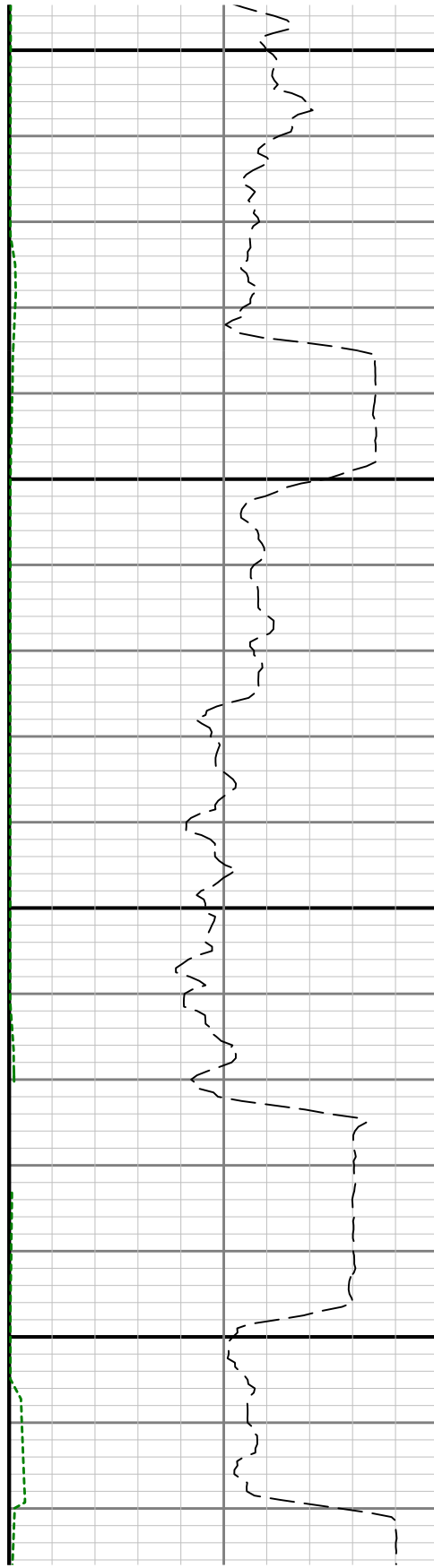
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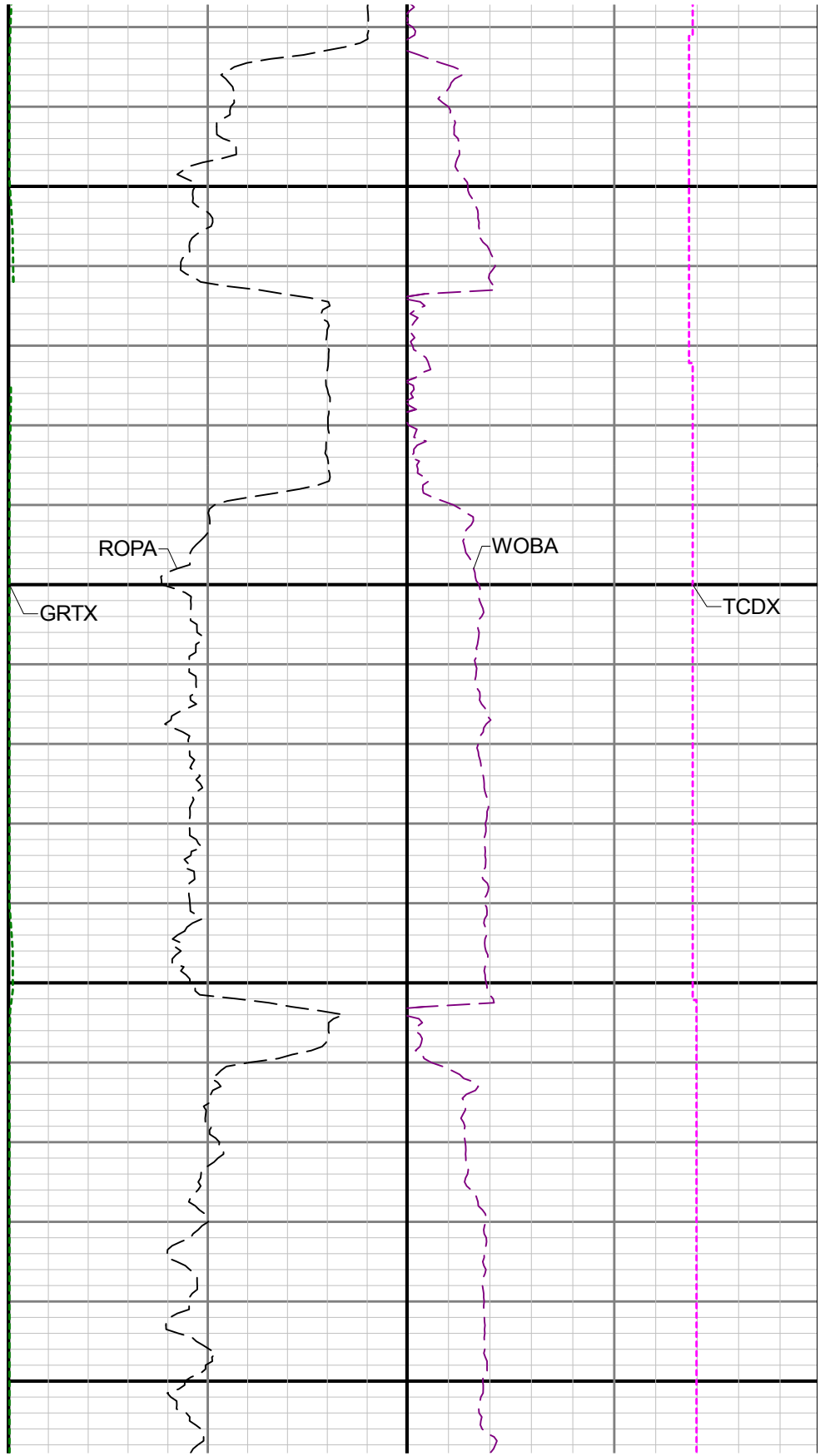
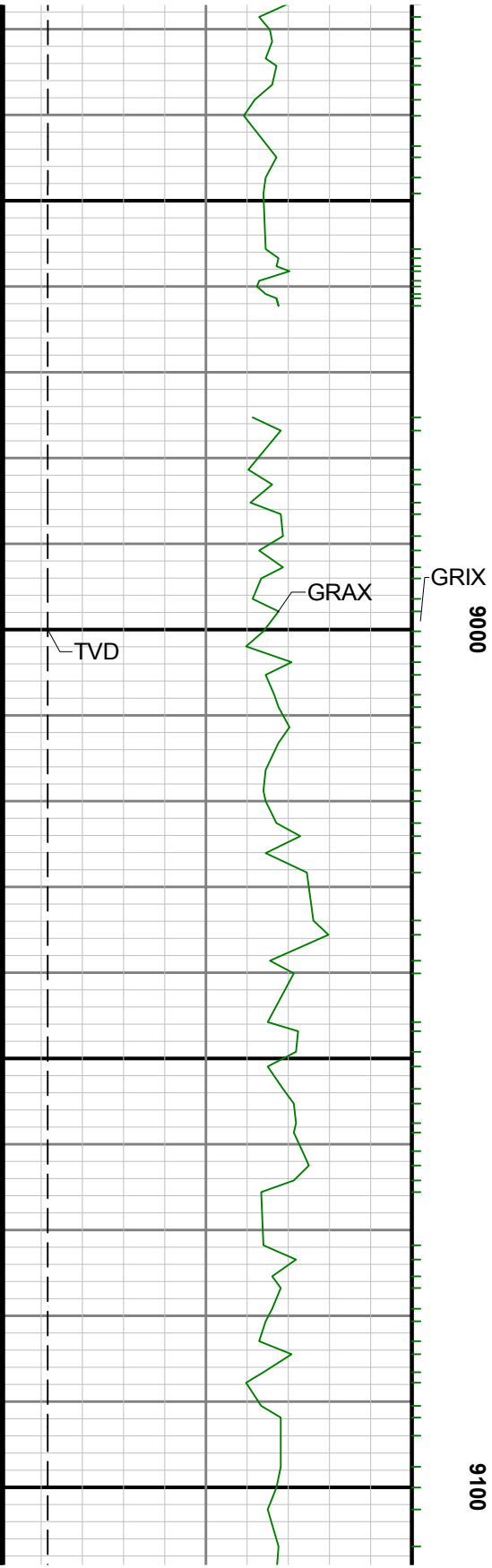


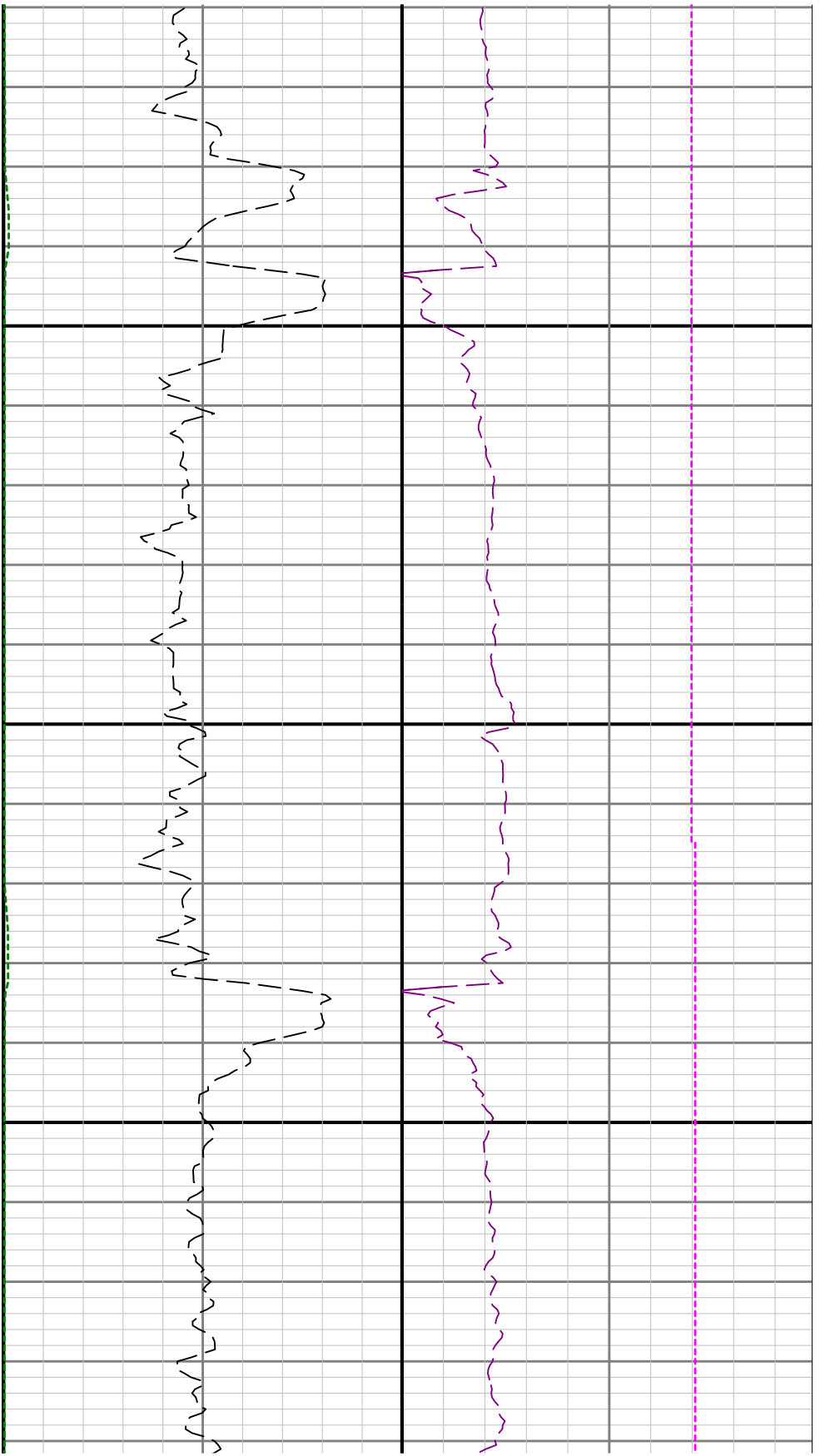


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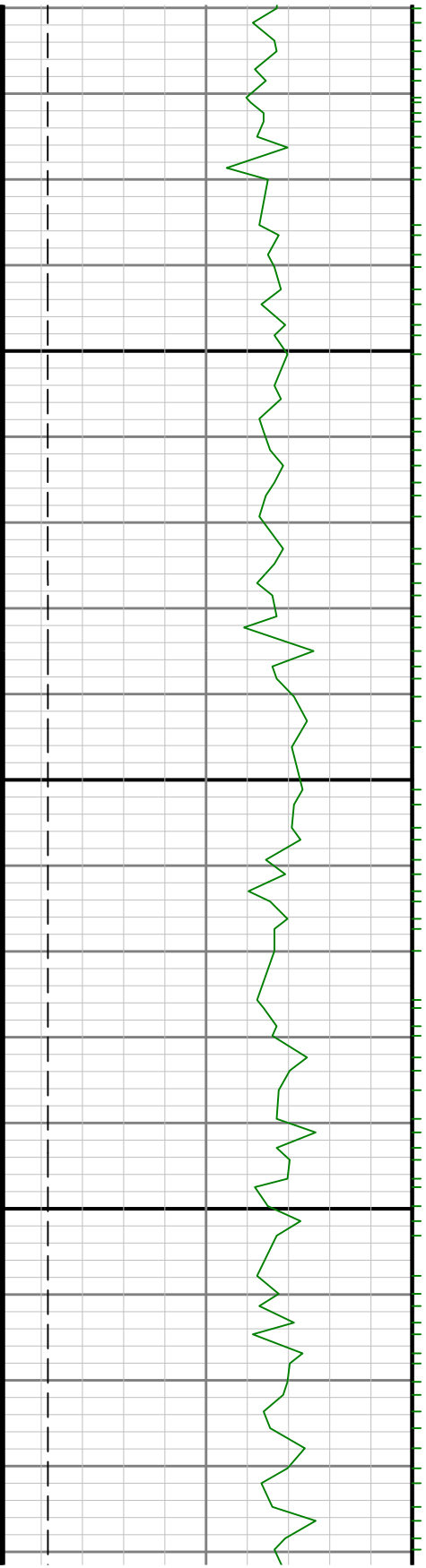
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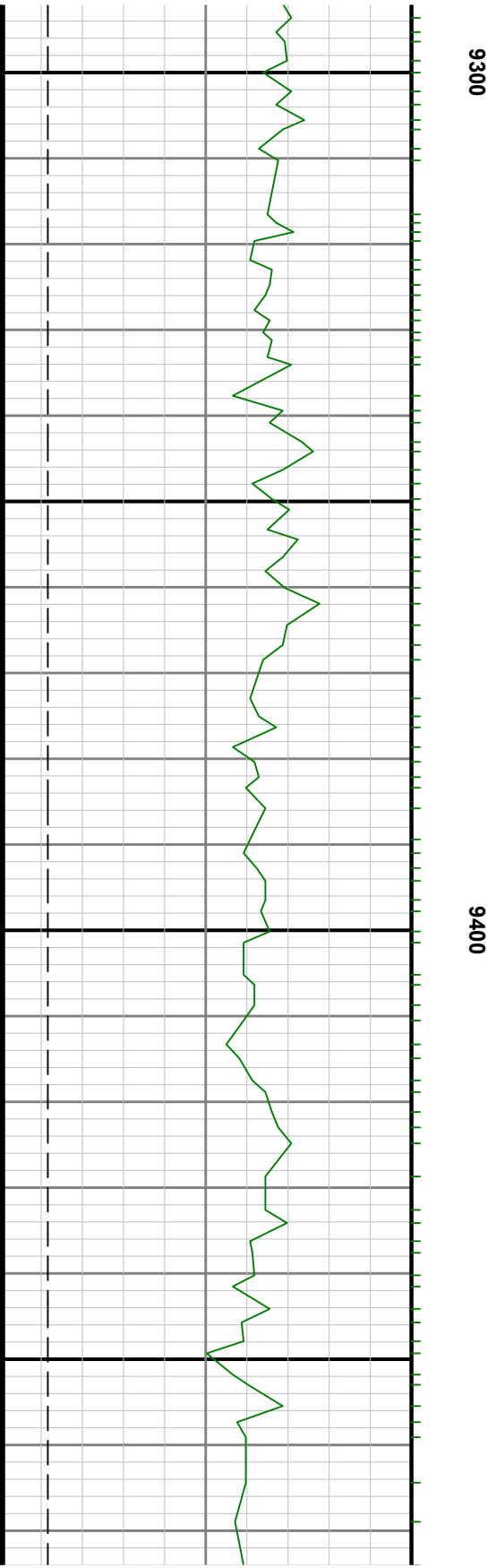
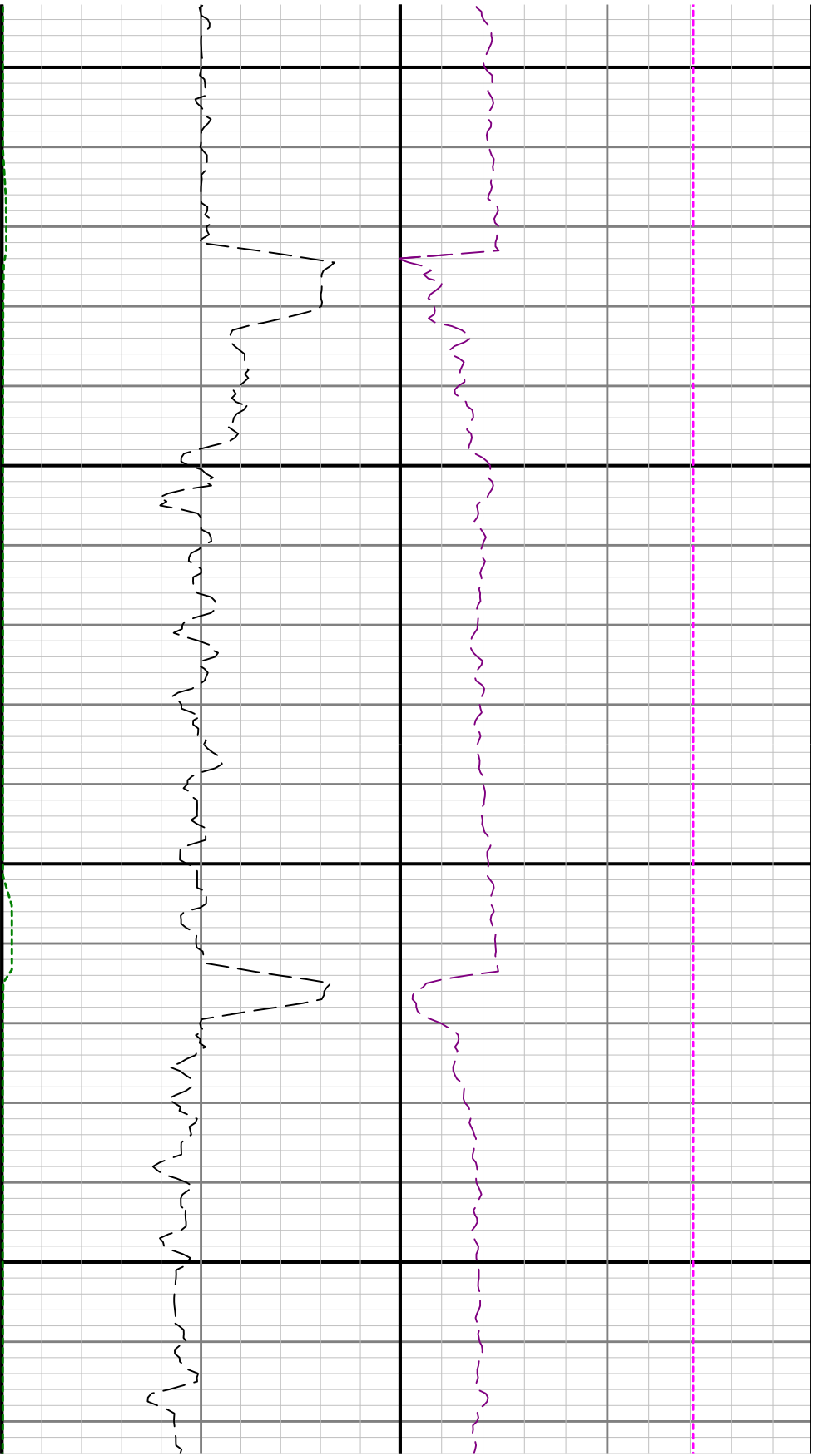


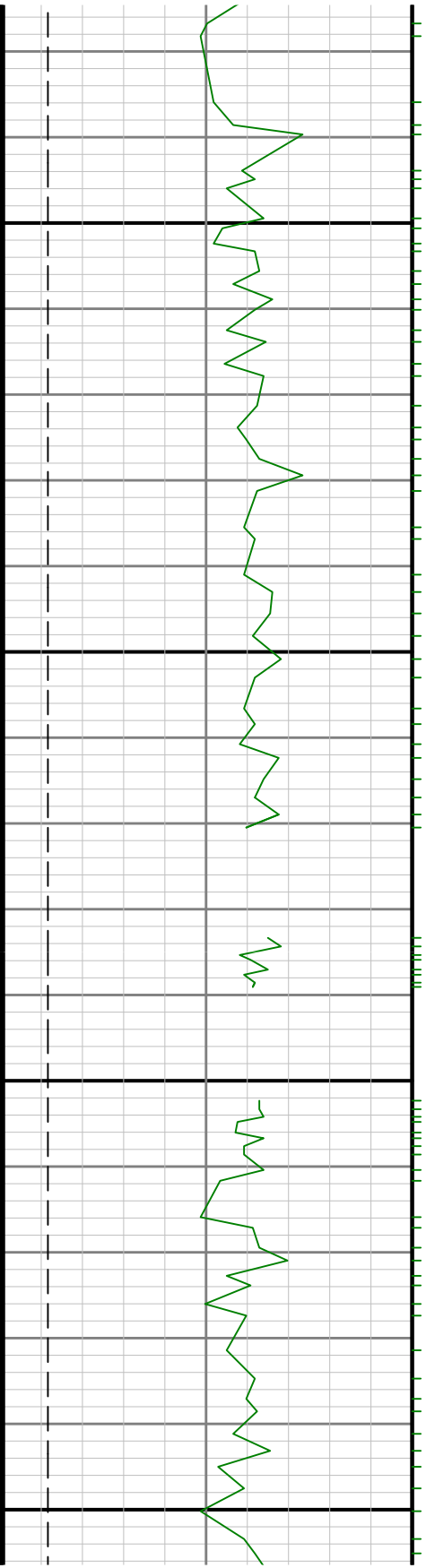




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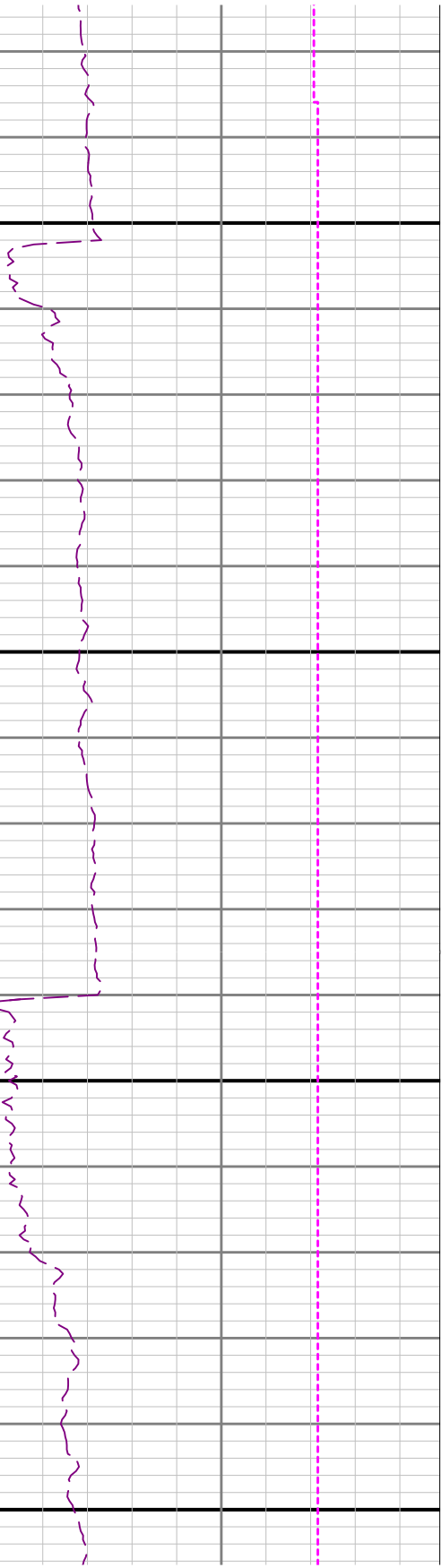


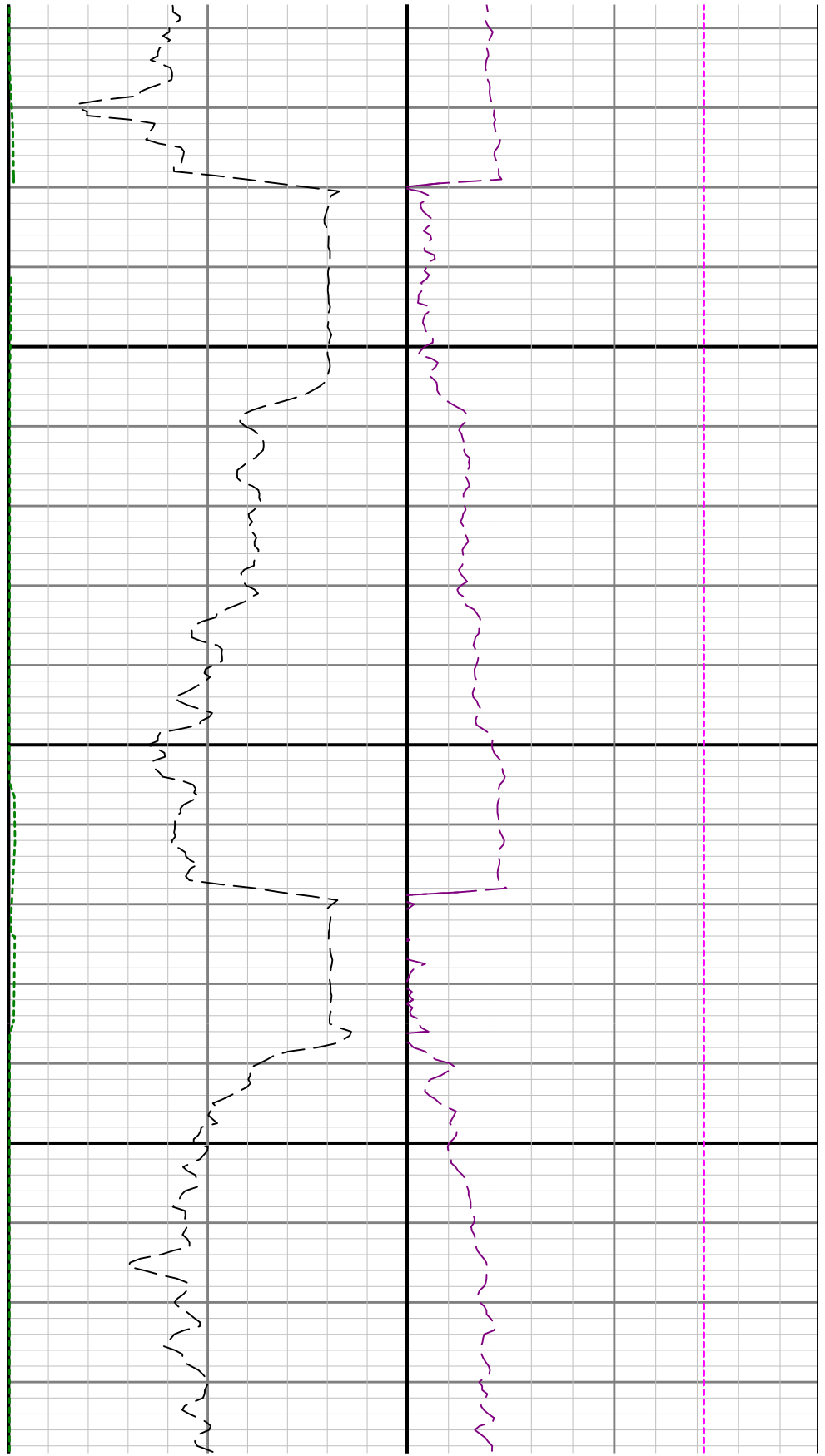
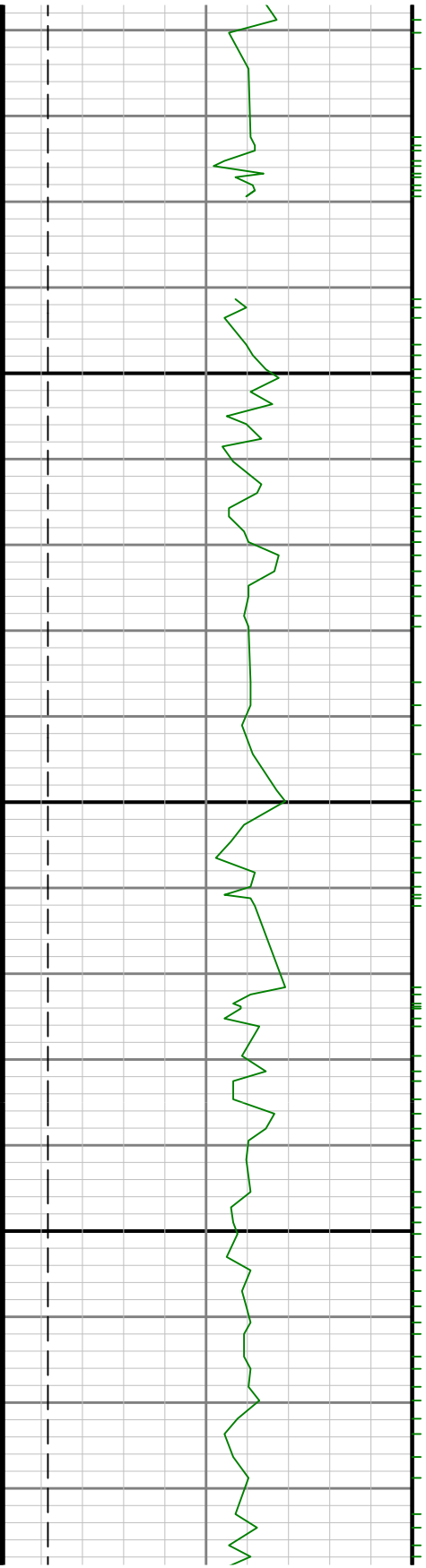


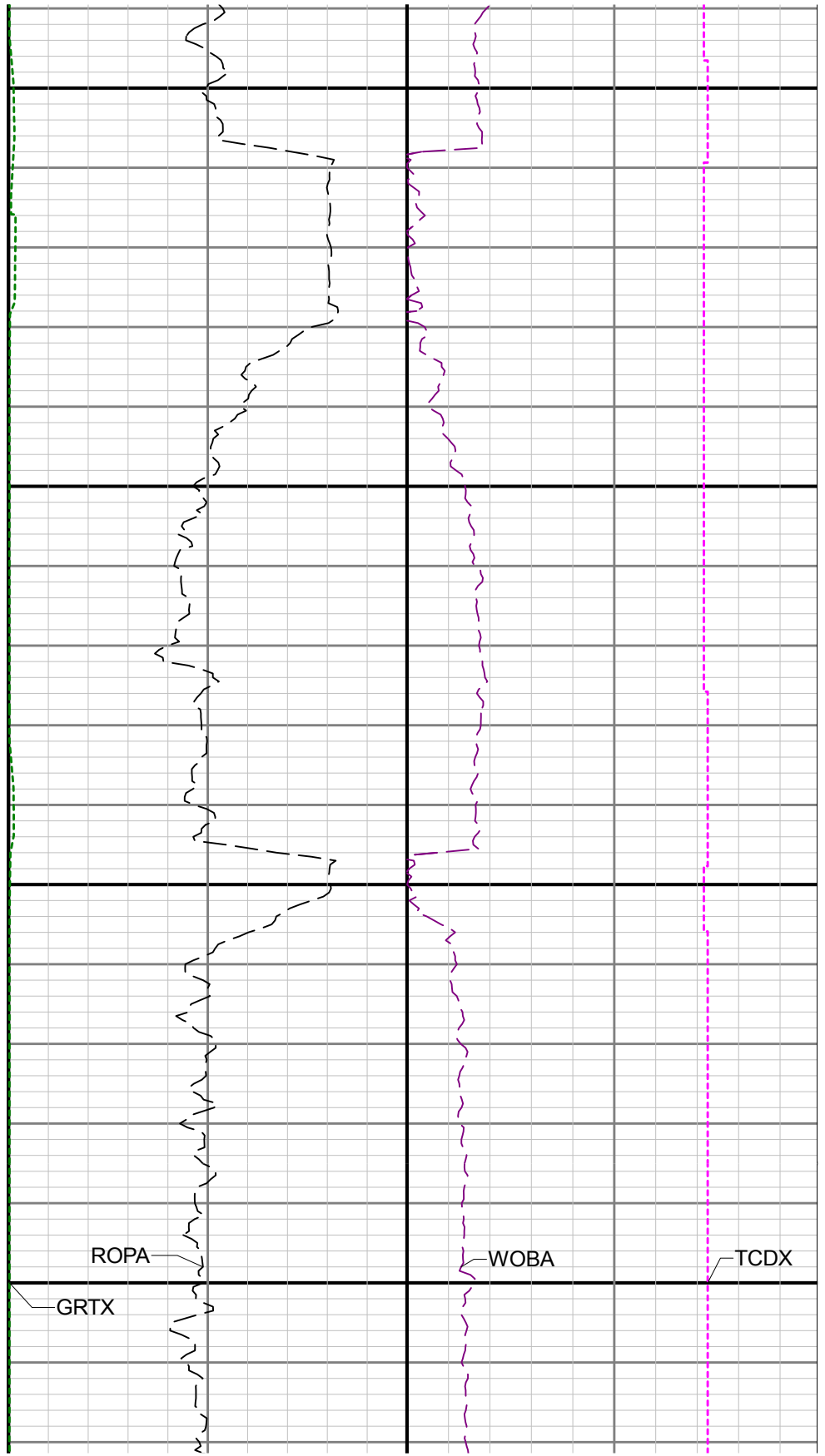
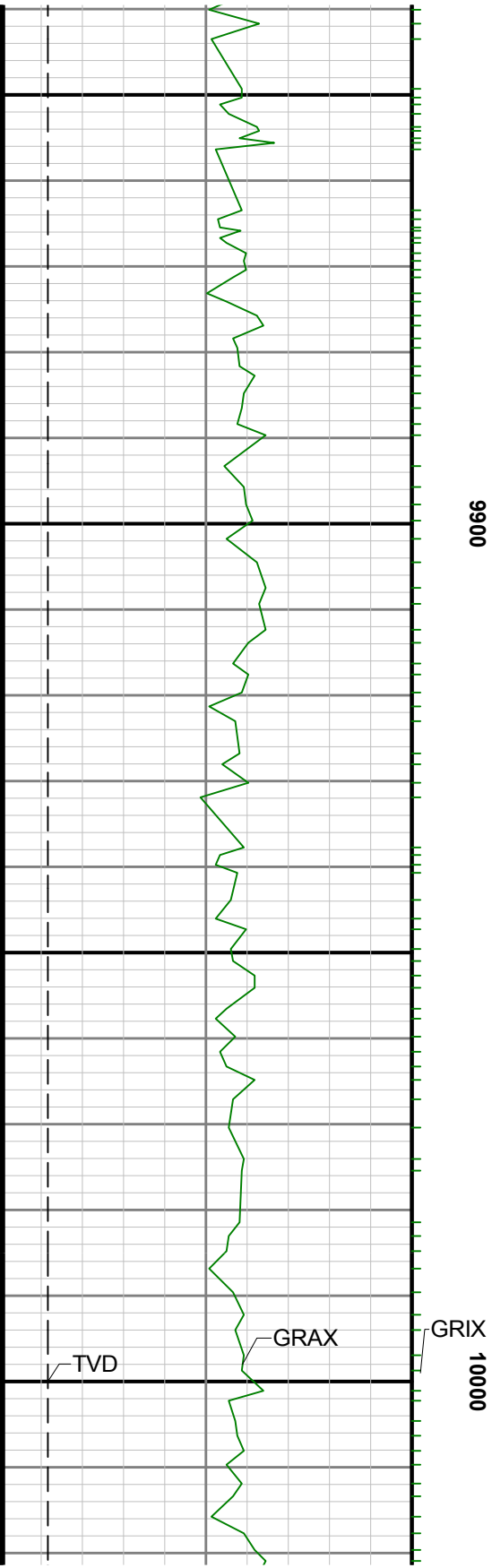


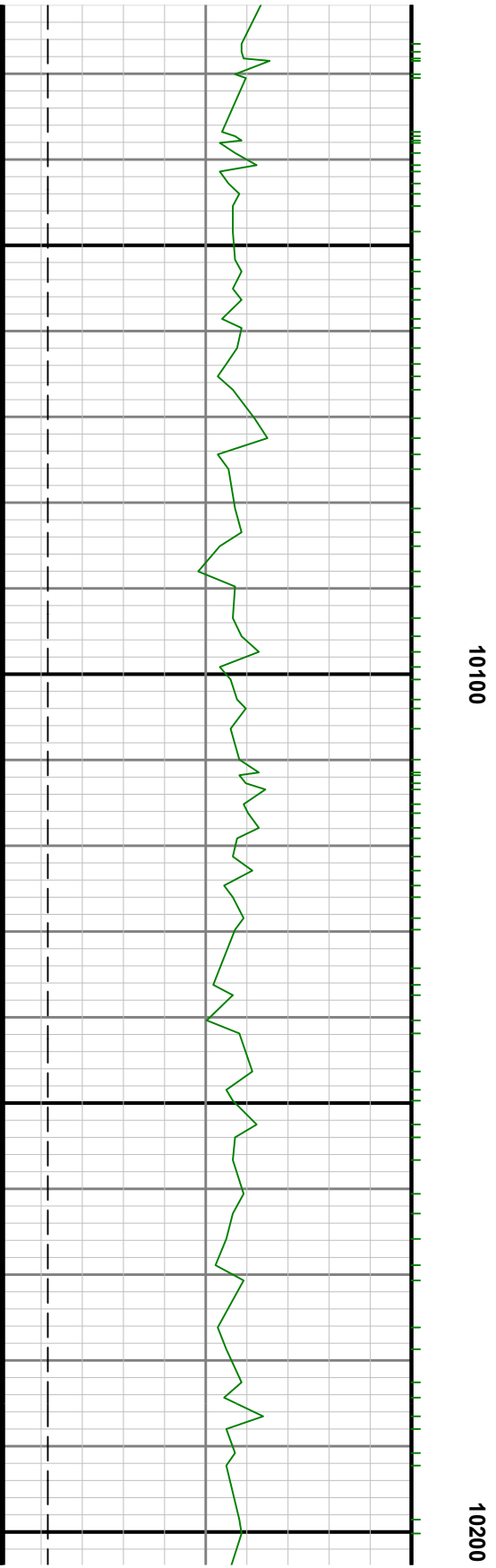
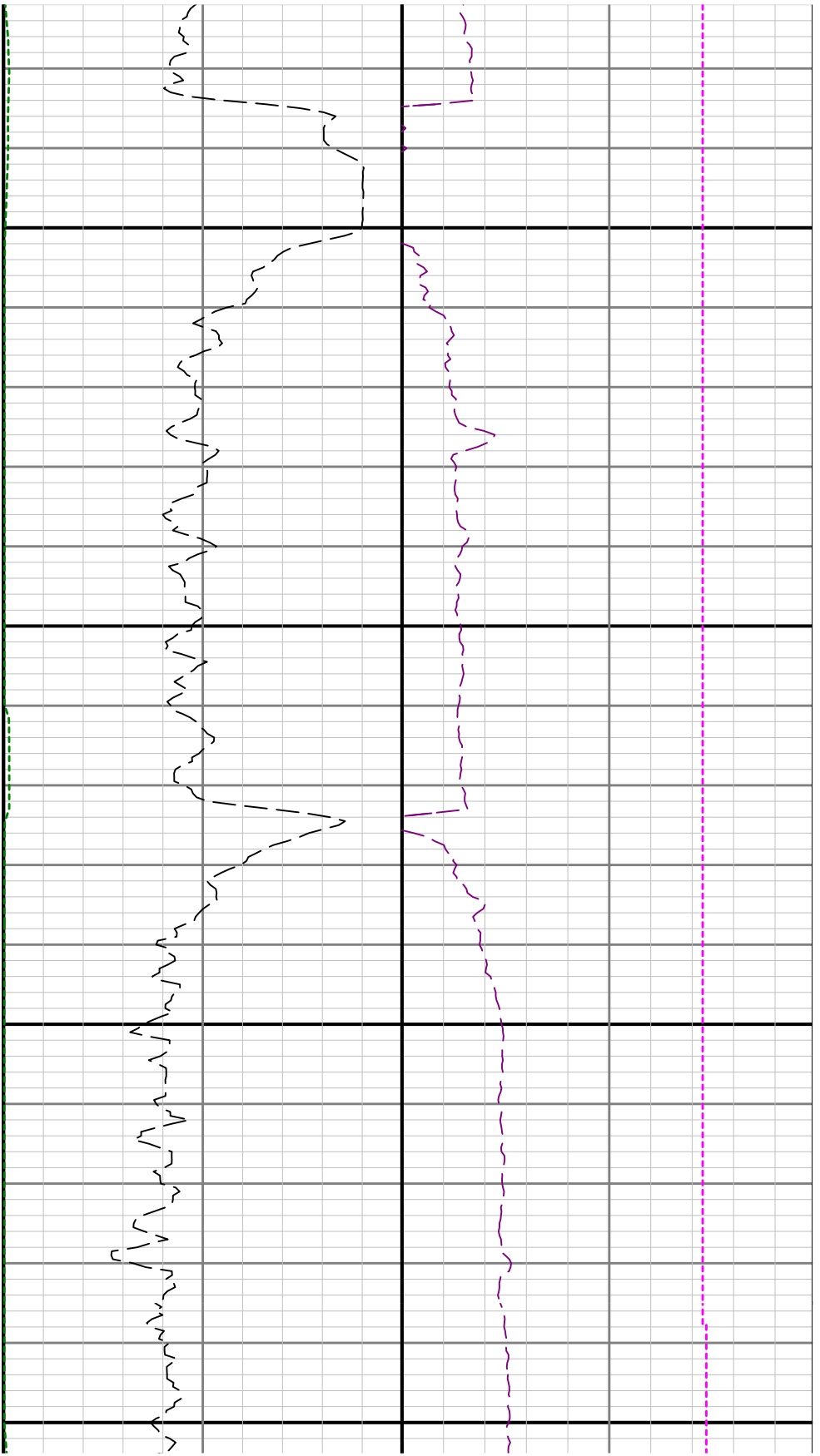
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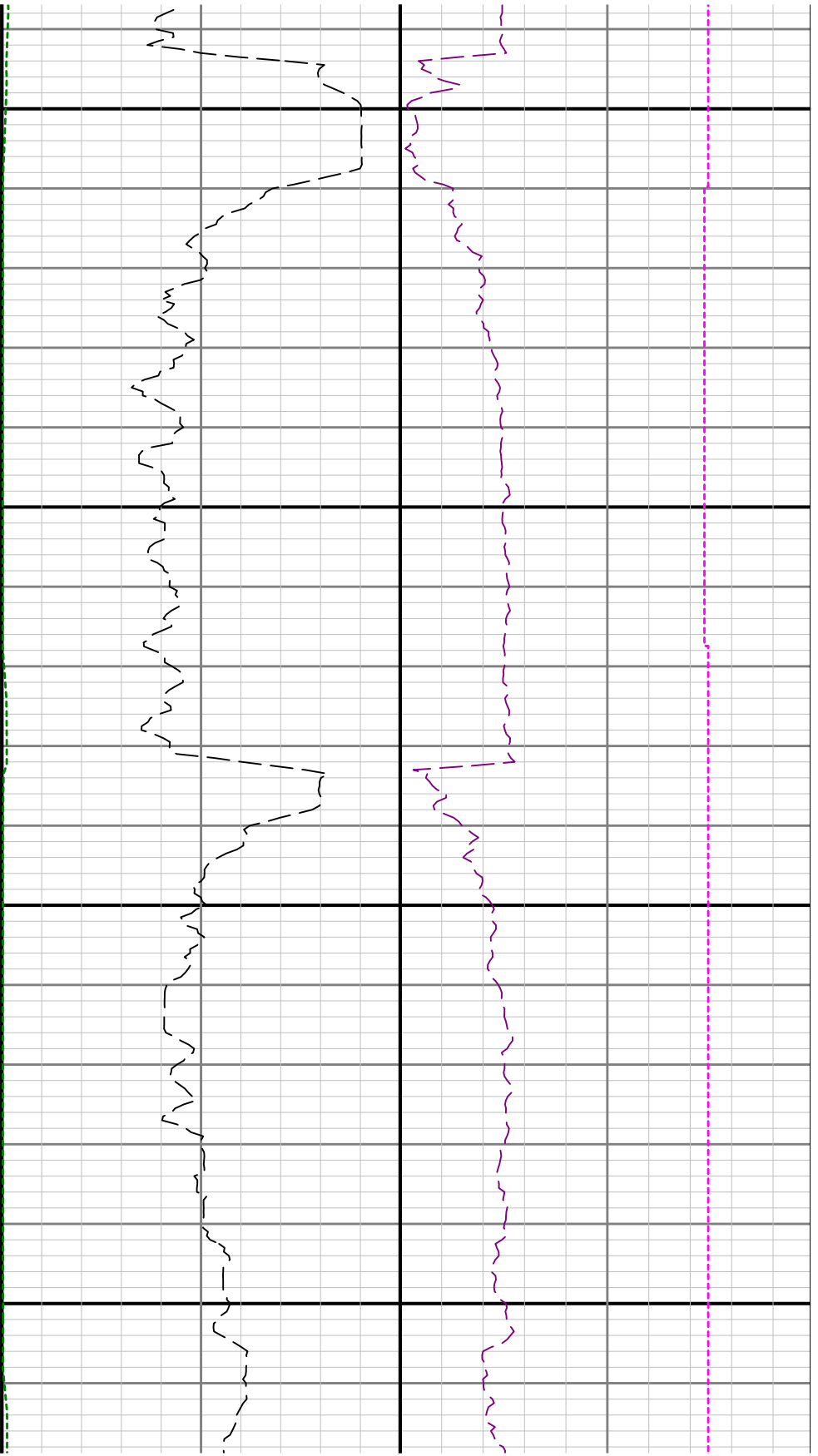






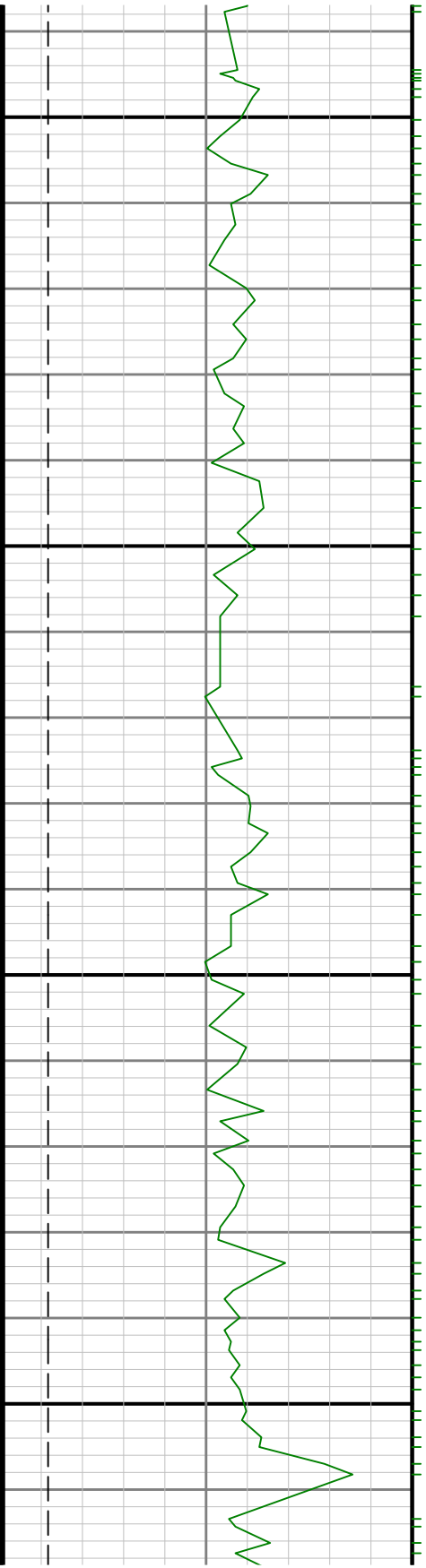


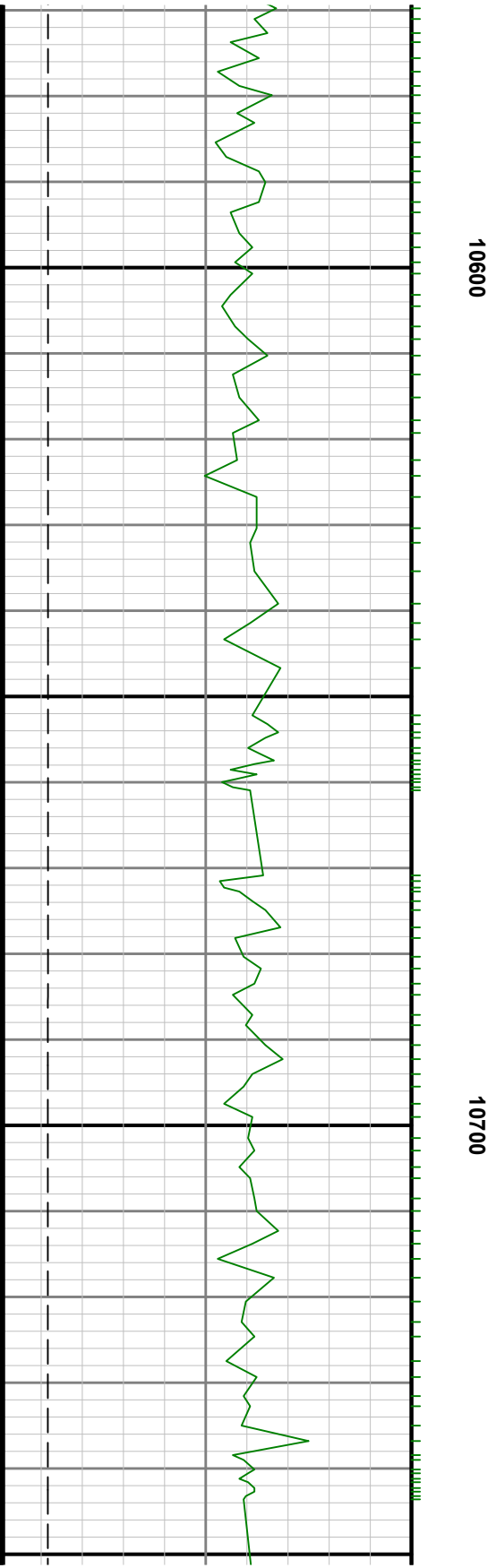


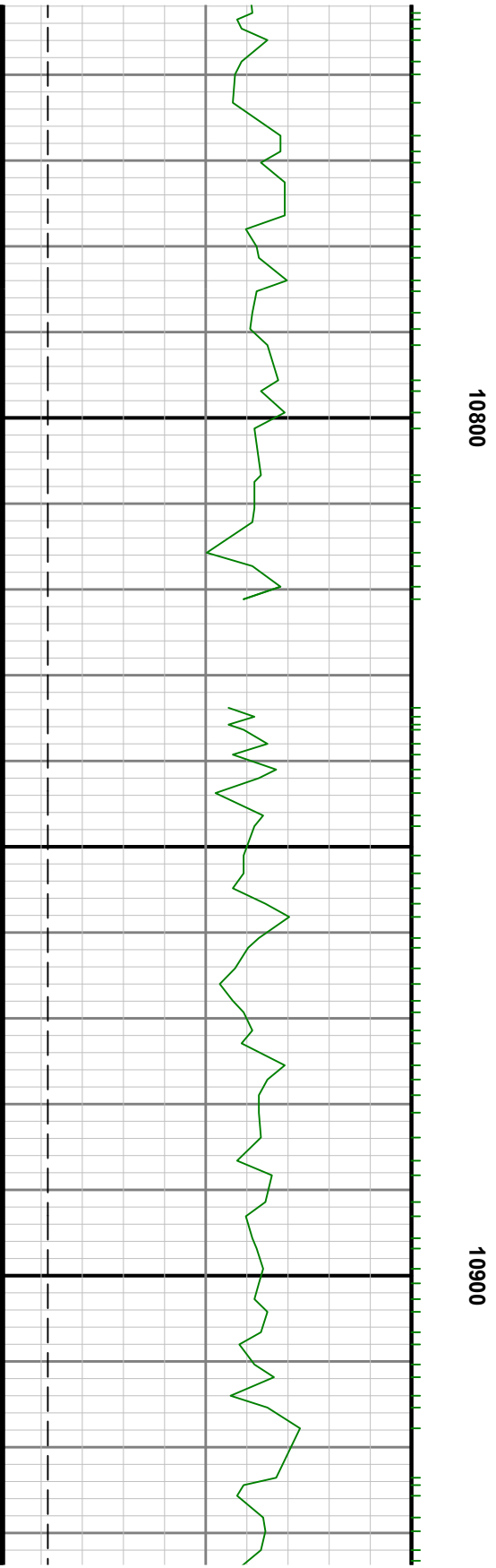
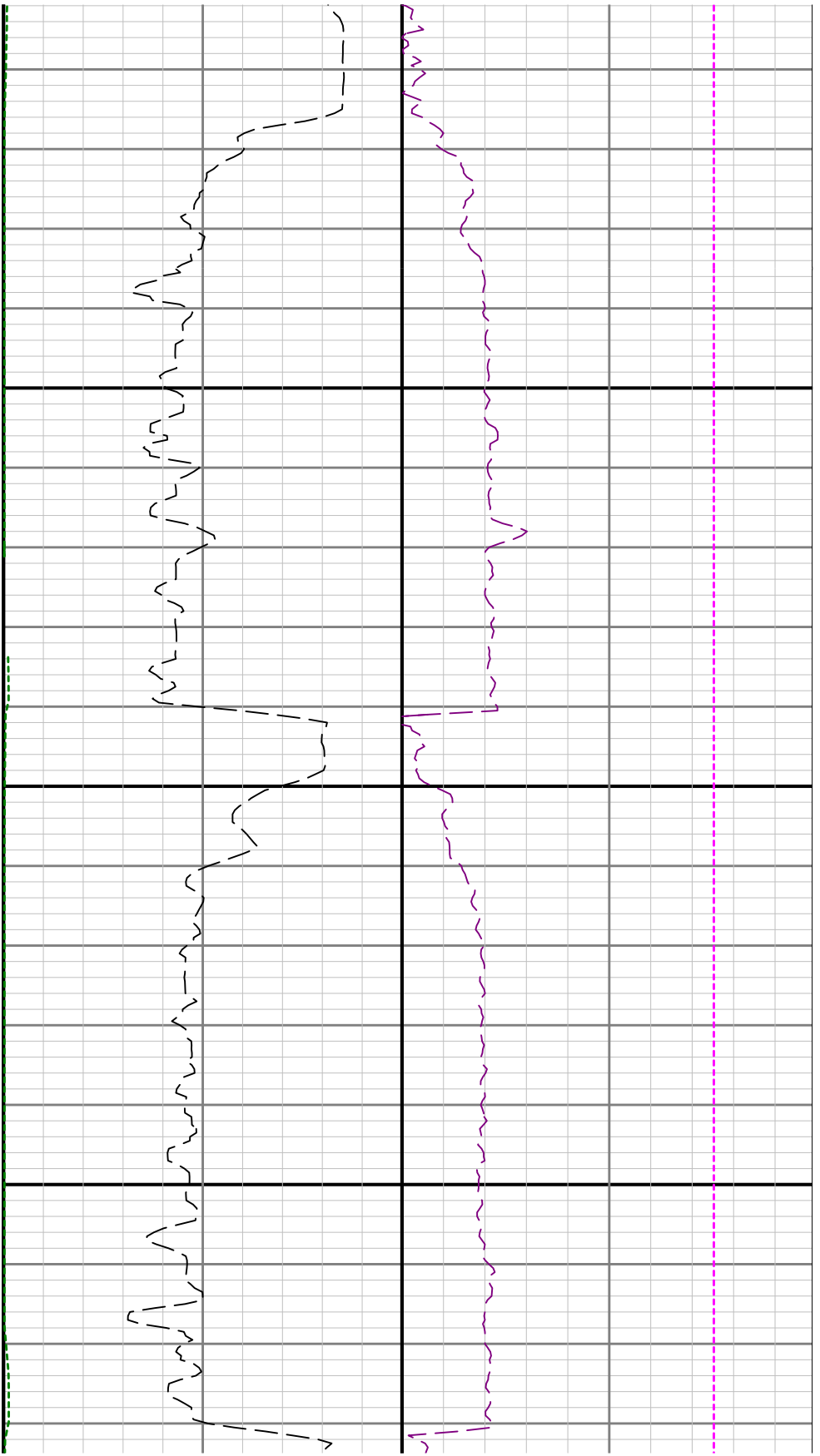


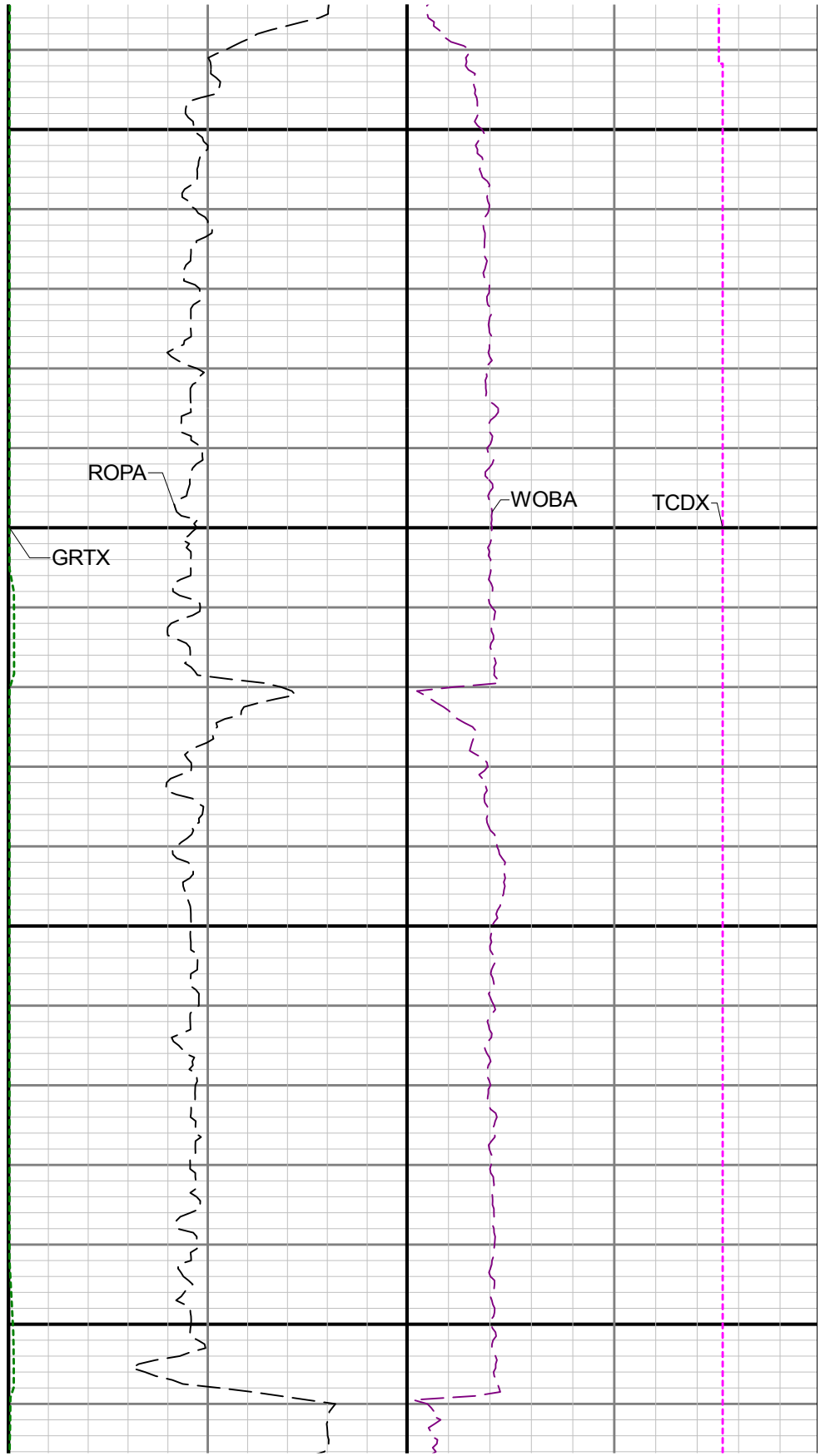
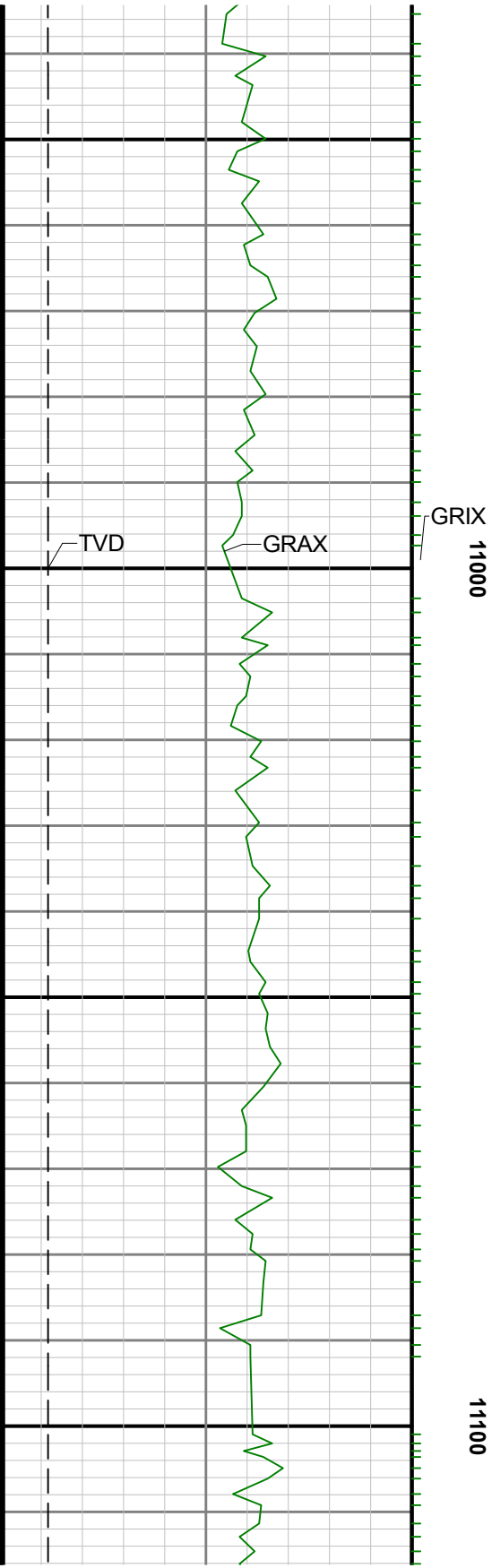
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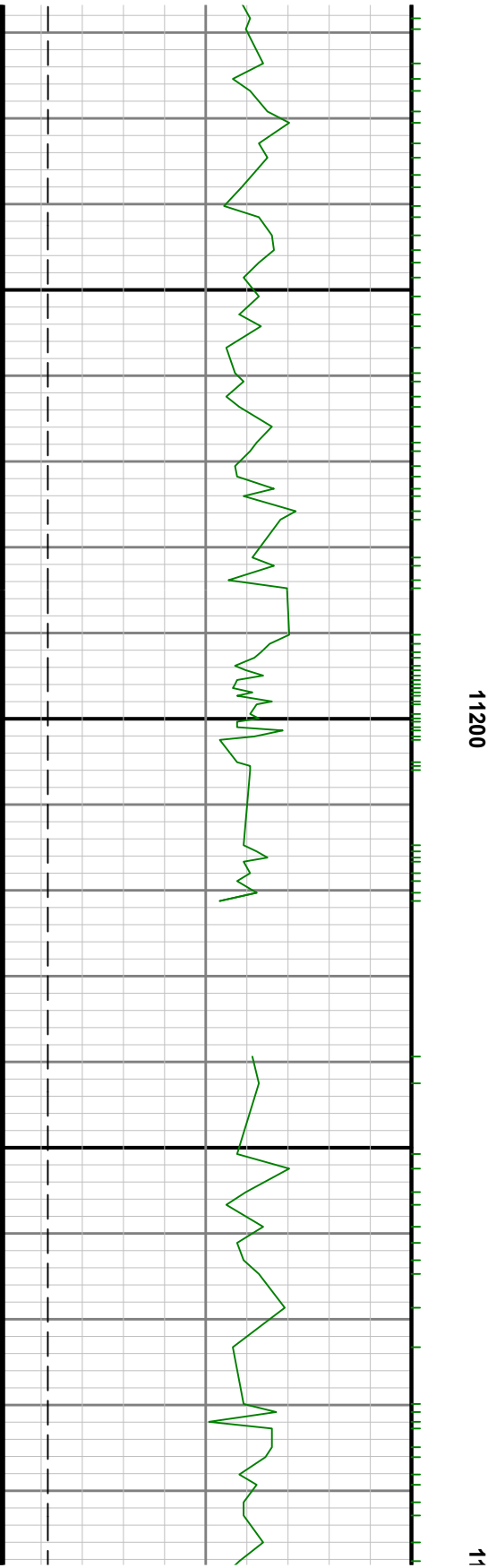
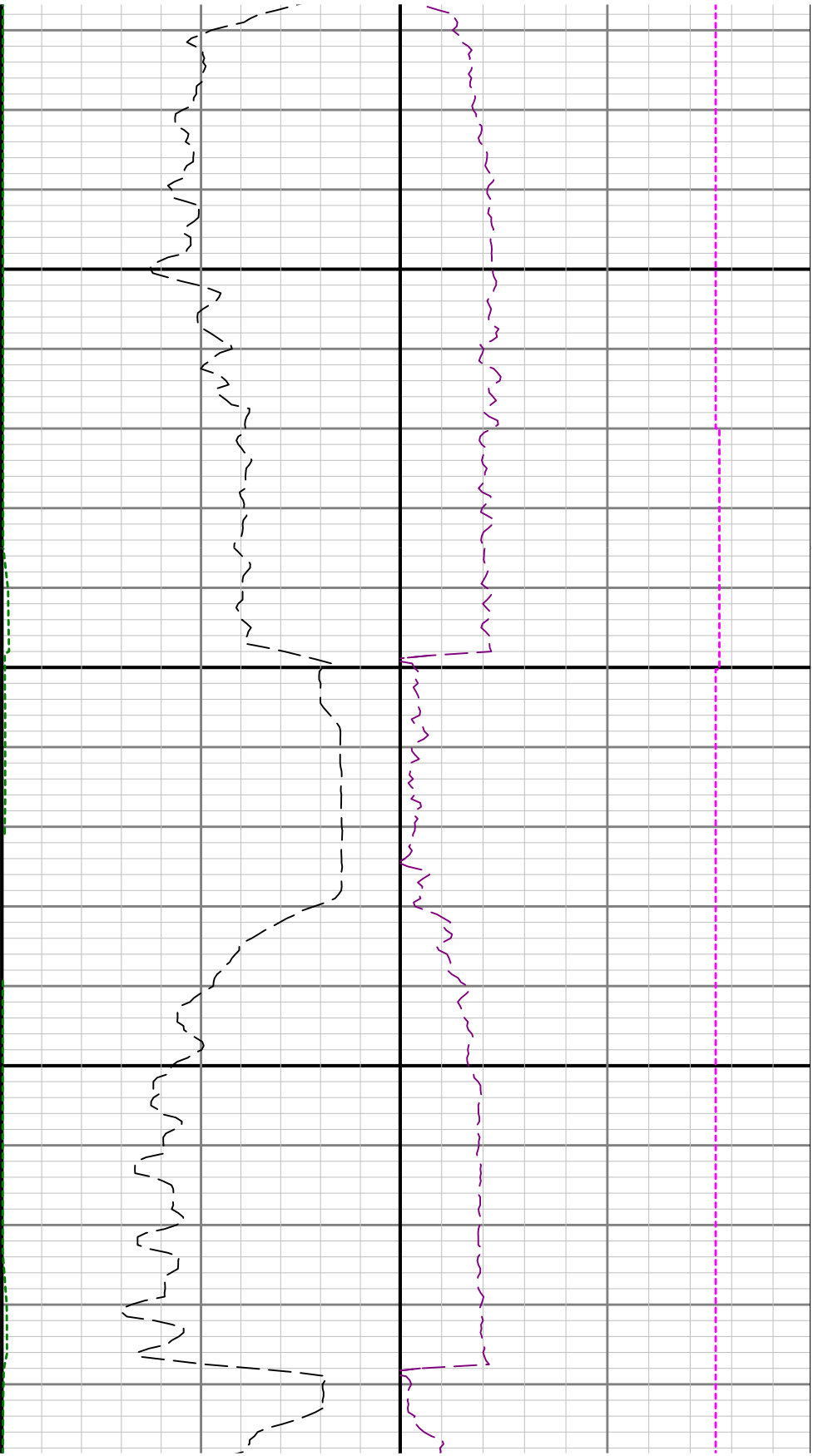
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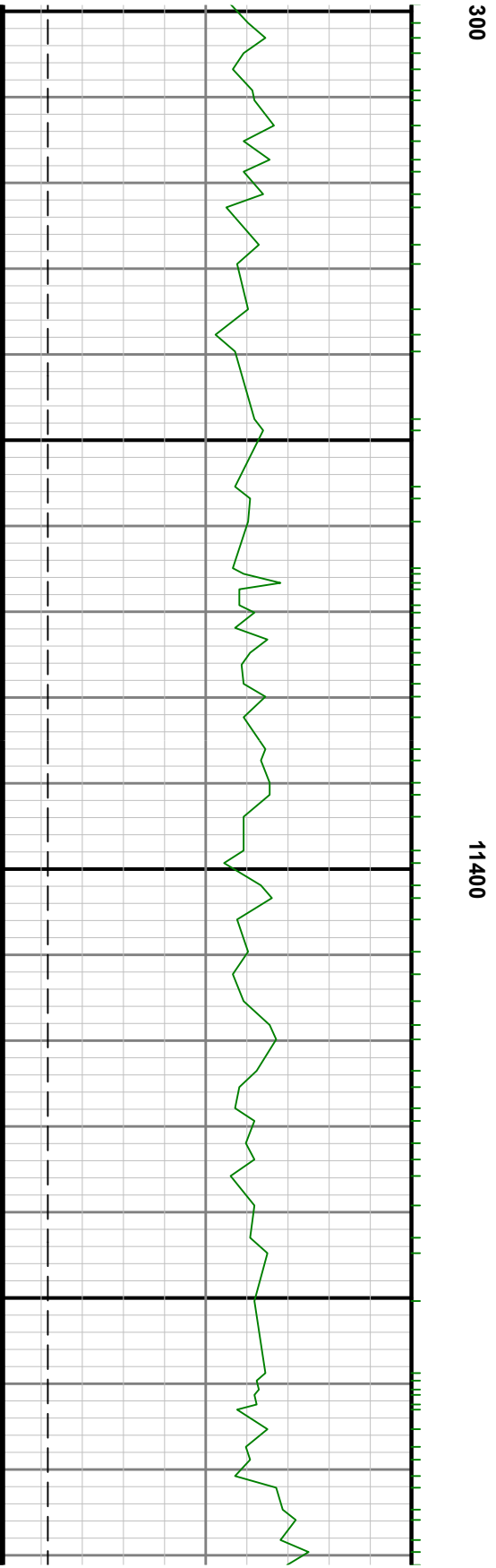
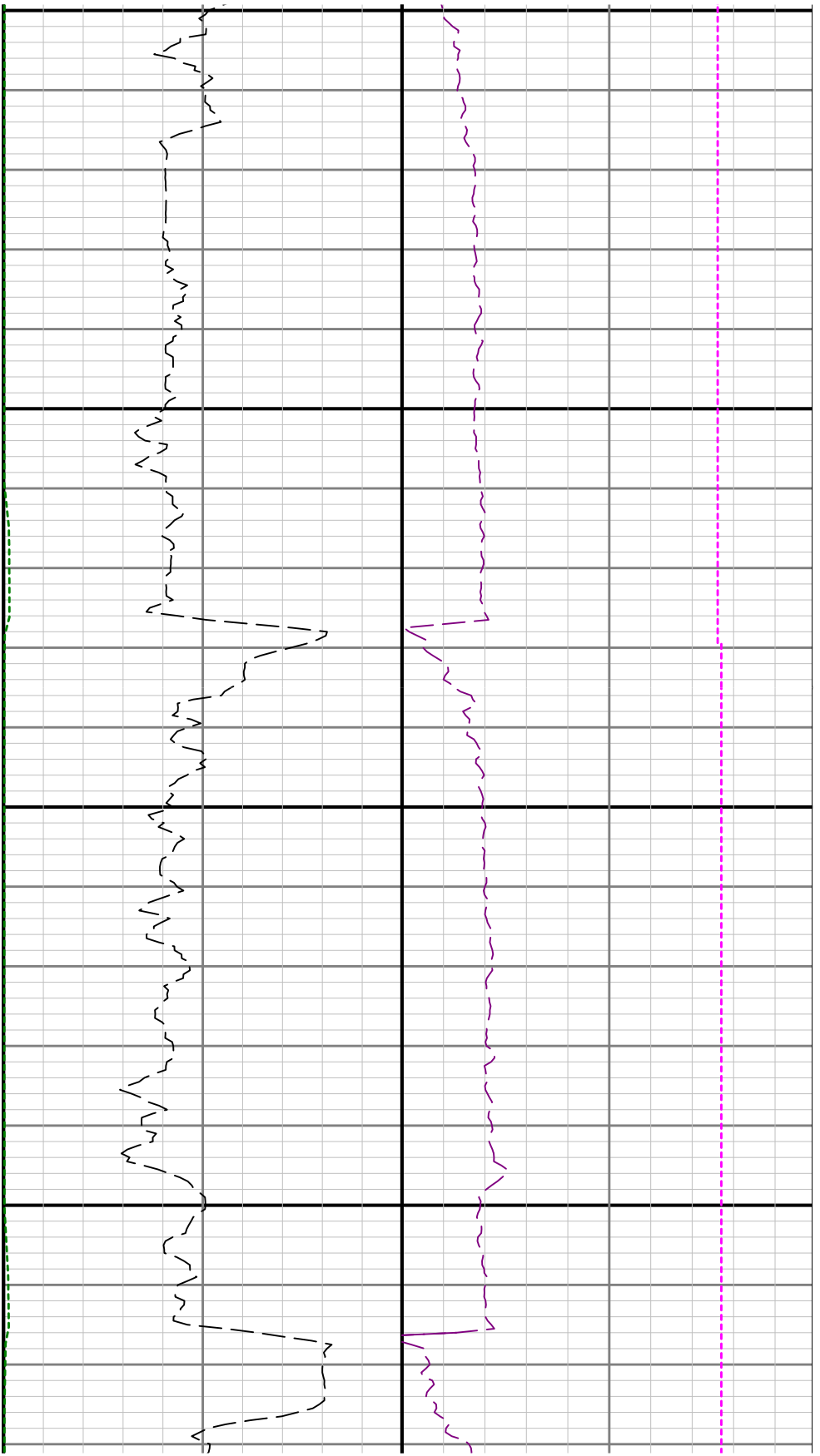


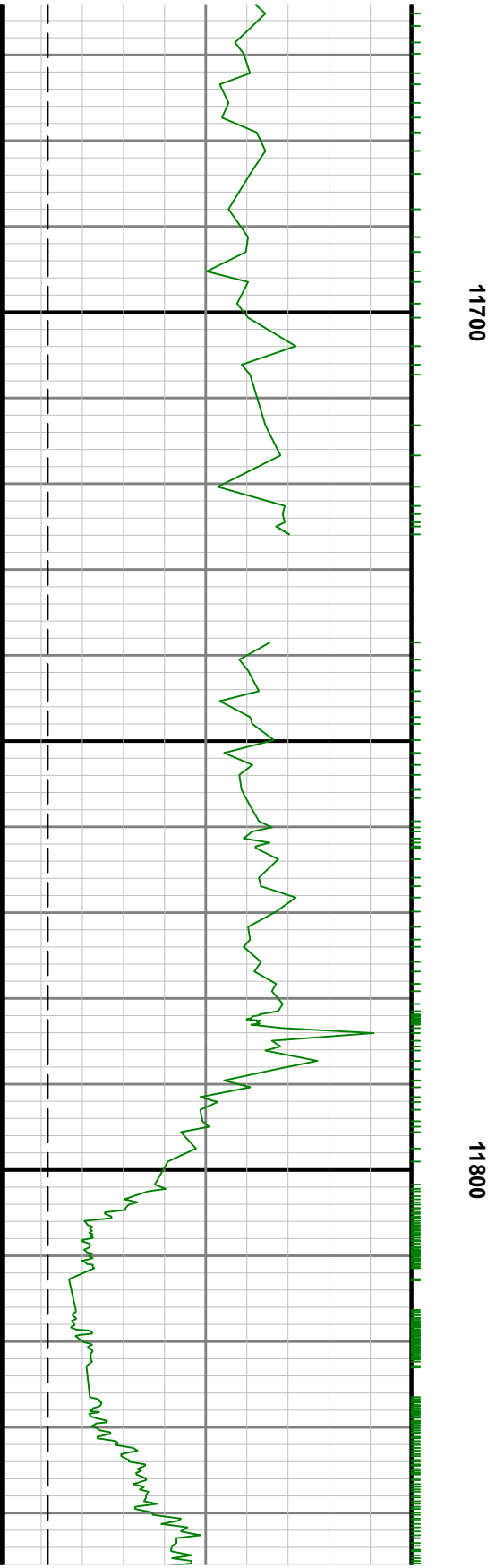
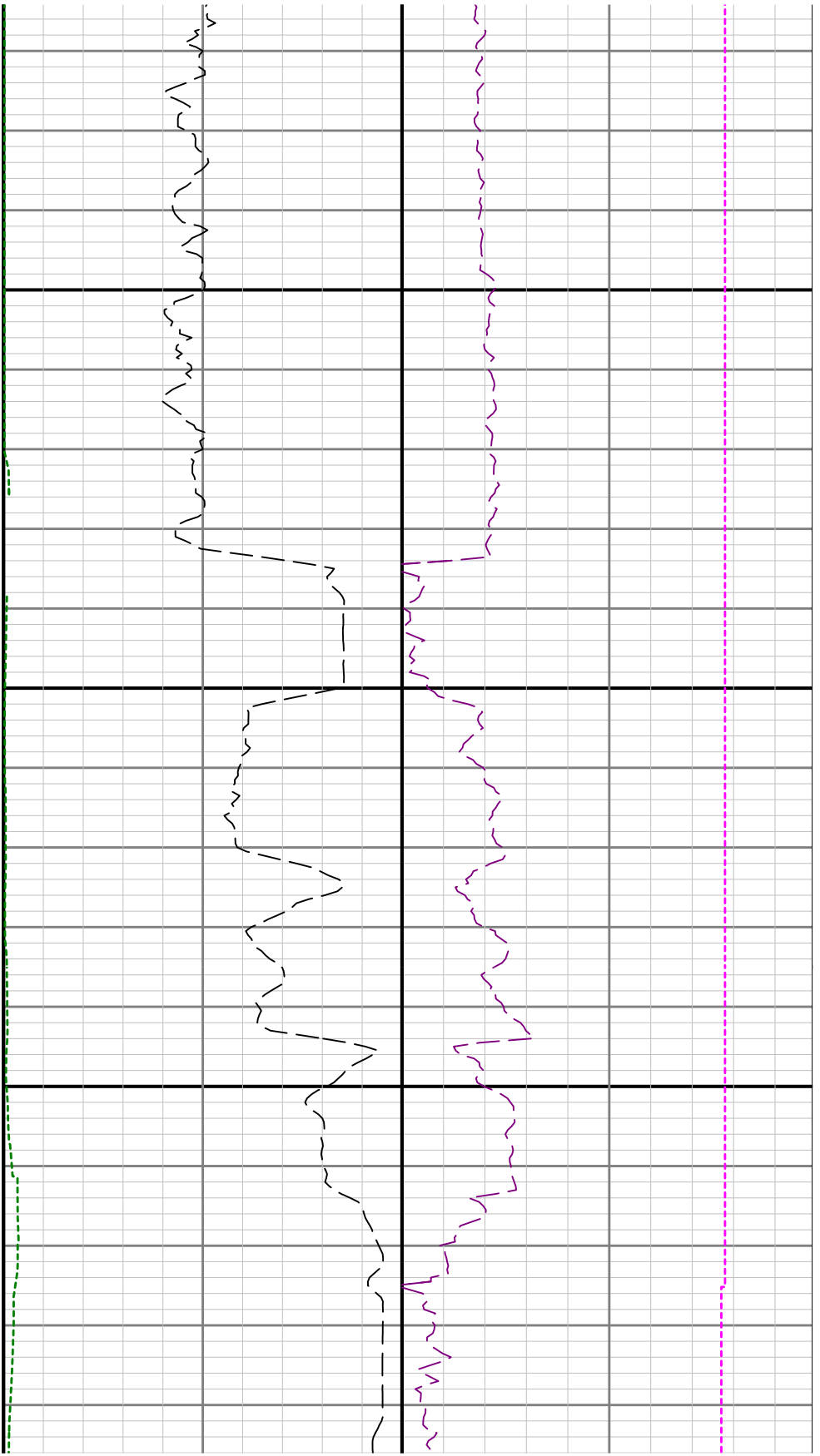


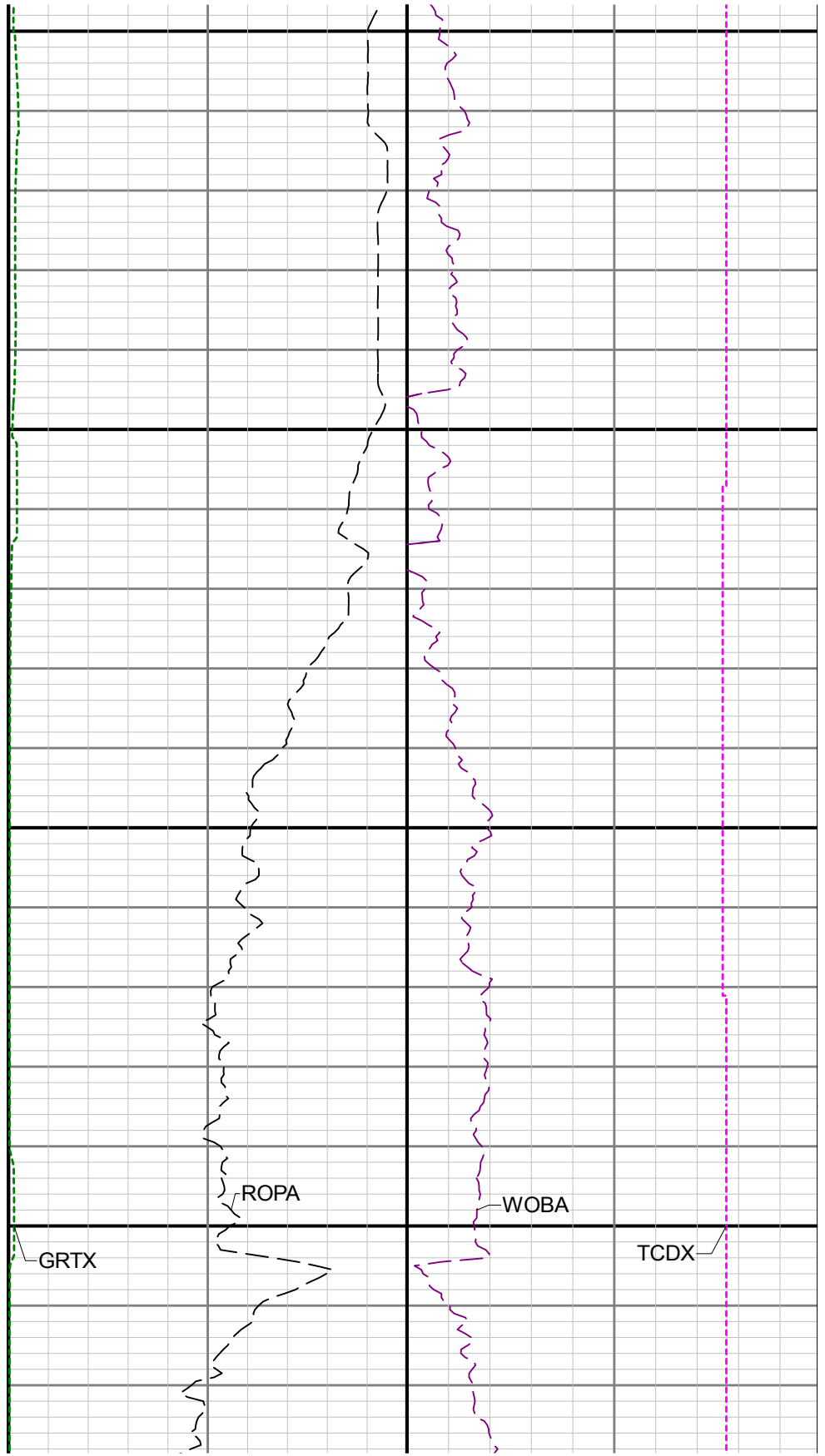
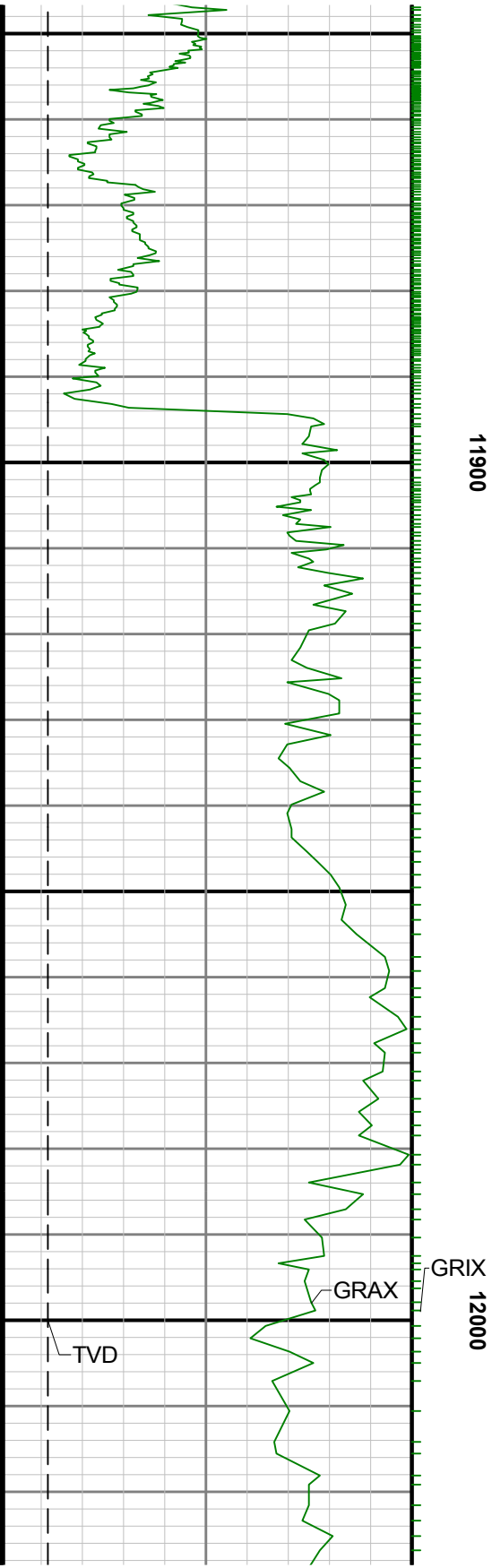


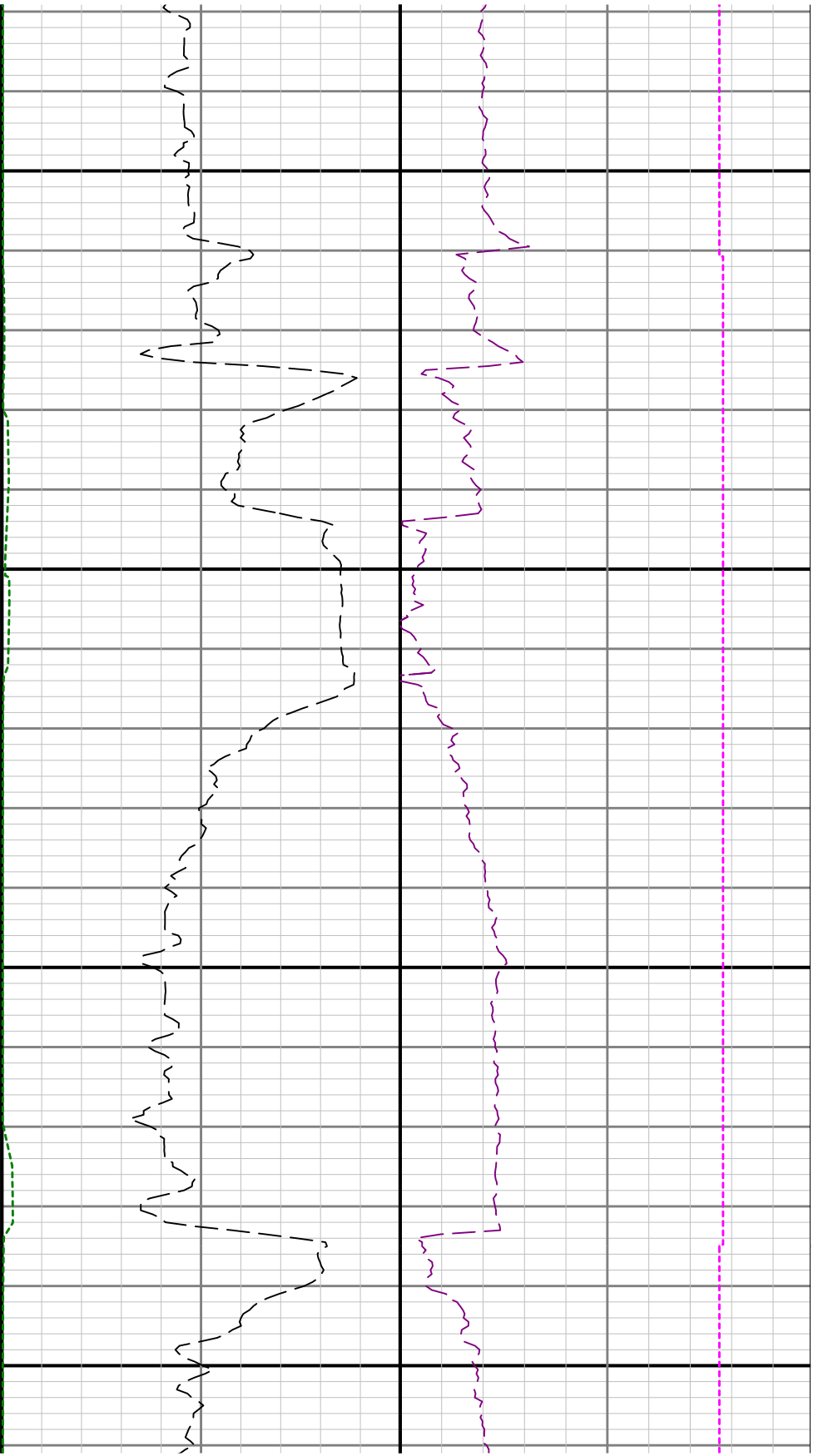






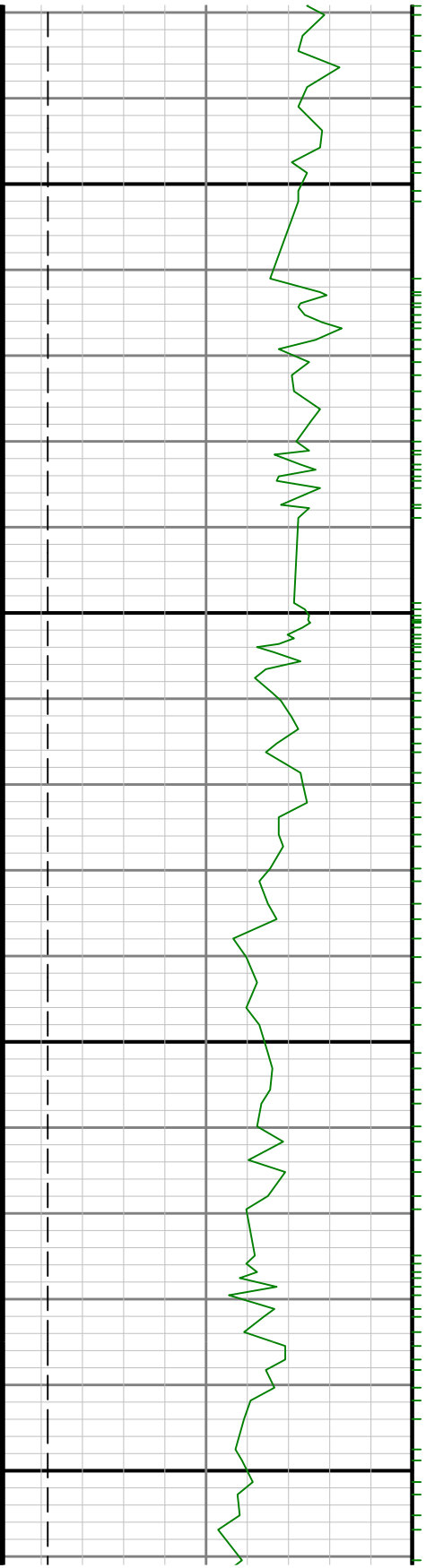






12100

12200





12300

