



Realtime Log

Natural Formation Evaluation
Gamma Ray

Scale:

Company: Anadarko

1:240

Well: Brotemarkle 4N-13HZ

Measured Depth

Field: Weld County (Kerr-McGee)

County: Weld State: Colorado

Status: Surface Location: Other Services:

Final Print

Latitude: 40° 13' 7.604" N

Longitude: 104° 43' 46.819" W

API Number:

SEC: 13 TWP: 3N RNG: 66W

Directional
VSS

Permanent Datum (P.D.): Ground Level Elevation: 5024.00 ft.

Log Measured From: Rig Floor 5040.00 ft. Above P.D.

Depth Reference: Drillers Depth KB: Elevations: N/A
DF: 5040.00 ft.
GL: 5024.00 ft.

Interval Logged

Dates

Magnetic Field Reference

Top: 6700.0 ft. Date From: 14/Mar/14 Dip Angle: 66.83° Azi Reference North: True

Bottom: 11852.0 ft. Date To: 20/Mar/14 Total Mag to Reference

Spud Date: 14/Mar/14 Field Strength: 52572.0 nT North Correction: 8.60°

Borehole Record

Casing Record

Hole Size	From	To	Size	Weight	From	To
13.500 in.	Surface	1317.0 ft.	9.625 in.	36.00 lb/ft	Surface	1307.0 ft.
8.750 in.	1307.0 ft.	7651.0 ft.	7.000 in.	26.00 lb/ft	Surface	7649.0 ft.
6.125 in.	7649.0 ft.	11852.0 ft.				

Mud Record

Deviation Record

Type	From	To	Hole Size	Interval	Inc / Az (Start)	Inc / Az (End)
Fresh Water	Surface	6681.0 ft.	13.500 in.	1317.0 ft.	0.0° / 0.0°	0.3° / 44.5°
Water Based	6681.0 ft.	11852.0 ft.	8.750 in.	6344.0 ft.	0.4° / 55.5°	84.7° / 1.5°
			6.125 in.	4201.0 ft.	87.2° / 2.6°	88.9° / 1.7°
					/	/
					/	/
					/	/

Acquisition System

Software Version

Other

Advantage	2.20U4	Rig:	Xtreme 6	/ Xtreme Coil Drilling Corp
PAIS	6.4.1.34	Job No:	6066776	
		District / Unit:	RMD	/ D&E

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Log Run Summary

LWD Run No.	BHA Run No.	Bit Run No.	Bit Size (in.)	Bit Type	Bit Gauge Length (in.)	Assembly Type	Logged Interval		Bit Depth Interval		Date / Time		Circ. Time (hrs.)
							Top (ft.)	Bottom (ft.)	From (ft.)	To (ft.)	Start	End	
1	1	2	8.750	PDC	6.000	Steerable	6700.0	7007.0	1317.0	7007.0	14/Mar/2014 03:00	16/Mar/2014 01:30	29.4
2	2	3	8.750	PDC	3.600	Steerable	6969.0	7651.0	7007.0	7651.0	16/Mar/2014 03:00	17/Mar/2014 09:35	12.3
3	3	4	6.125	PDC	4.800	Steerable	7598.0	11852.0	7651.0	11852.0	18/Mar/2014 10:30	20/Mar/2014 09:40	26.1

Crew

Name	Arrive	Depart	Name	Arrive	Depart	Name	Arrive	Depart
	Wellsite	Wellsite		Wellsite	Wellsite		Wellsite	Wellsite
Matthew Delmore	14/Mar/2014	20/Mar/2014	David Campbell	14/Mar/2014	17/Mar/2014	Stephen Gray	17/Mar/2014	20/Mar/2014

Witness	
Name	LWD Run Number
David Cornett	1, 2, 3
Joe Wallum	1, 2, 3

Mud Properties Record												
Date / Time		LWD Run No.	Measured Depth (ft.)	Mud Type	Density (ppg)	Viscosity (cp)	pH	Fluid Loss (cc)	Oil / Water	Source	Total Chlorides (ppm)	K+ (%)
14/Mar/2014	12:00	1	2210.0	Fresh Water	8.5	27	8.0	0.0	0 / 99	Active Mud Pit	500	0.0
14/Mar/2014	22:00	1	3976.0	Fresh Water	8.6	27	8.2	0.0	0 / 98	Active Mud Pit	1100	0.0
15/Mar/2014	13:00	1	6681.0	Water Based	10.0	42	8.8	4.2	0 / 92	Active Mud Pit	1800	0.0
15/Mar/2014	21:00	1	7007.0	Water Based	10.0	41	9.1	4.4	0 / 91	Active Mud Pit	1900	0.0
16/Mar/2014	10:00	2	7007.0	Water Based	10.1	42	9.0	5.8	0 / 91	Active Mud Pit	2100	0.0
16/Mar/2014	21:00	2	7510.0	Water Based	10.1	43	9.3	5.5	0 / 91	Active Mud Pit	2300	0.0
18/Mar/2014	09:00	3	7651.0	Water Based	10.1	44	8.9	5.5	0 / 94	Active Mud Pit	2400	0.0
18/Mar/2014	21:30	3	7907.0	Water Based	9.2	42	9.5	5.0	0 / 95	Active Mud Pit	2300	0.0
19/Mar/2014	21:30	3	11852.0	Water Based	9.5	46	9.4	4.8	0 / 92	Active Mud Pit	2400	0.0

Mnemonics		
Curve	Description	Units
GRAX	Gamma Ray Apparent, 0.5 ft. Avg.	API
GRIX	Gamma Ray Data Density	points
GRSI	Gamma Ray Sliding Indicator	unitless
GRTX	Gamma Ray Time Since Drilled	min
ROPA	Rate of Penetration, 3.0 ft. Avg.	ft/hr
TCDX	Downhole Temperature	degF
TVD	True Vertical Depth	ft.
WOBA	Surface Weight on Bit, 1.0 ft. Avg.	klbs

Equipment and Service Data						
LWD Run No.	Tool	Serial Number	Measurement	Bit Offset (ft)	Max O.D. (in.)	Min I.D. (in.)
1	DIR	11814668	Directional	46.91	6.750	3.250
1	SRIG	12606959	Gamma	43.49	6.750	3.250
2	DIR	11814668	Directional	40.26	6.750	3.250
2	SRIG	12606959	Gamma	36.84	6.750	3.250
3	DIR	12592552	Directional	51.65	4.750	2.750
3	SRIG	10582603	Gamma	48.27	4.750	2.750

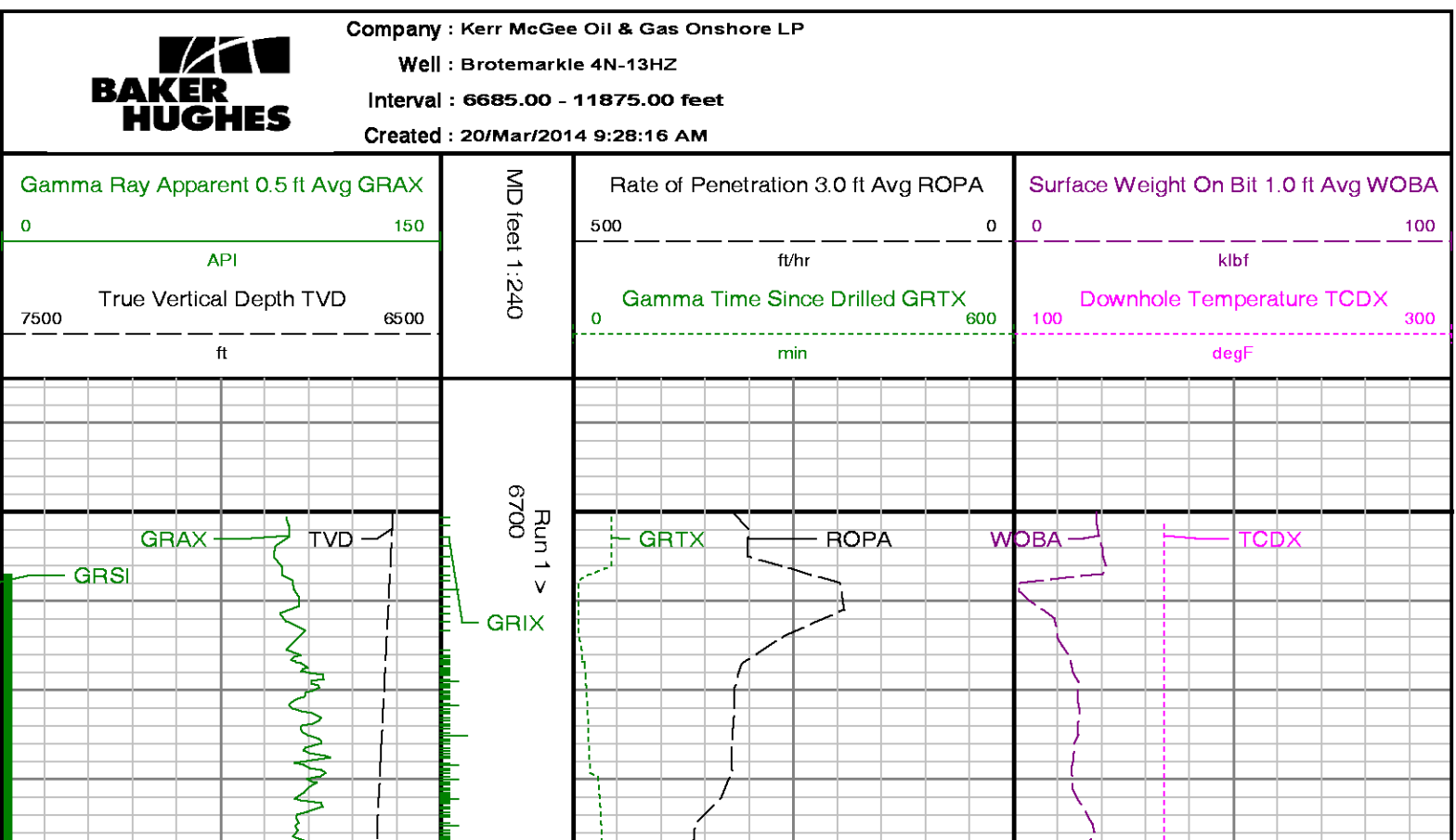
Service and Tool Mnemonics		
Mnemonic	Name	Description
DIR	Directional	Wellbore directional survey

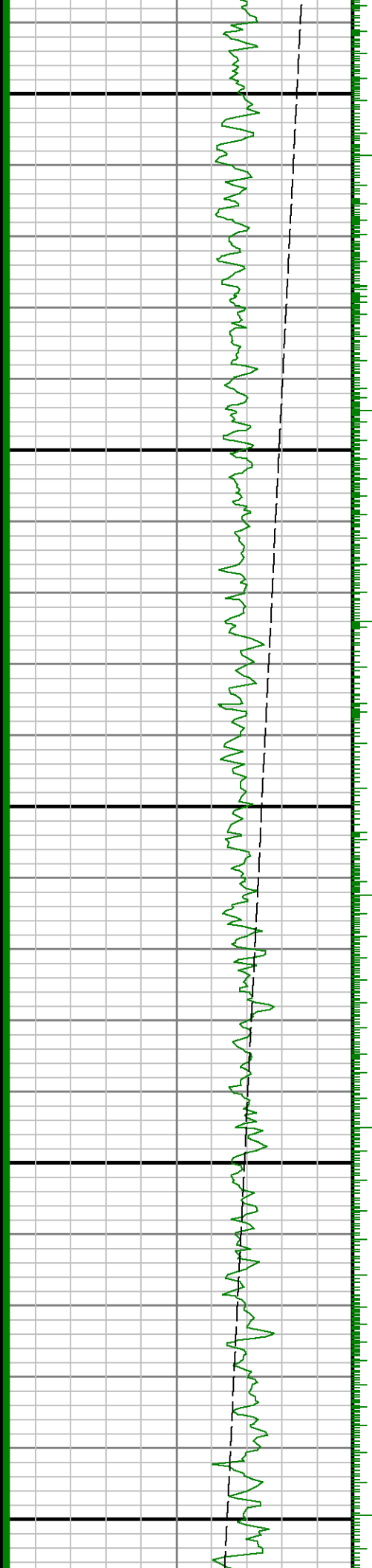
Comments

- 1.) Baker Hughes LWD run 1 utilized 6 3/4 inch NaviTrak Services (VSS, Directional) from 1317 to 6700 ft. MD (1316.99 to 6608.38 ft. TVD) and NaviGamma Services (VSS, Directional, Gamma Ray) from 6700 to 7007 ft. MD (6608.38 to 6912.02 ft. TVD) behind an 8 3/4 inch bit and steerable assembly.
- 2.) Baker Hughes LWD run 2 utilized 6 3/4 inch NaviGamma Services (VSS, Directional, Gamma Ray) from 7007 to 7651 ft. MD (6912.02 to 7247.24 ft. TVD) behind an 8 3/4 inch bit and steerable assembly.
- 3.) Baker Hughes LWD run 3 utilized 4 3/4 inch NaviGamma Services (VSS, Directional, Gamma Ray) from 7651 to 11852 ft. MD (7247.24 to 7261.41 ft. TVD) behind an 6 1/8 inch bit and steerable assembly.
- 4.) A sliding indicator is shown on the left edge of track 1 as a heavy line. This indicator has been depth-shifted to the gamma ray sensor offset to correspond with gamma ray data.
- 5.) Depth measurements obtained from a depth control system not supplied or operated by Baker Hughes. Due to the lack of control by Baker Hughes logging engineers, depth calibrations and measurements could not be independently verified.

Remarks

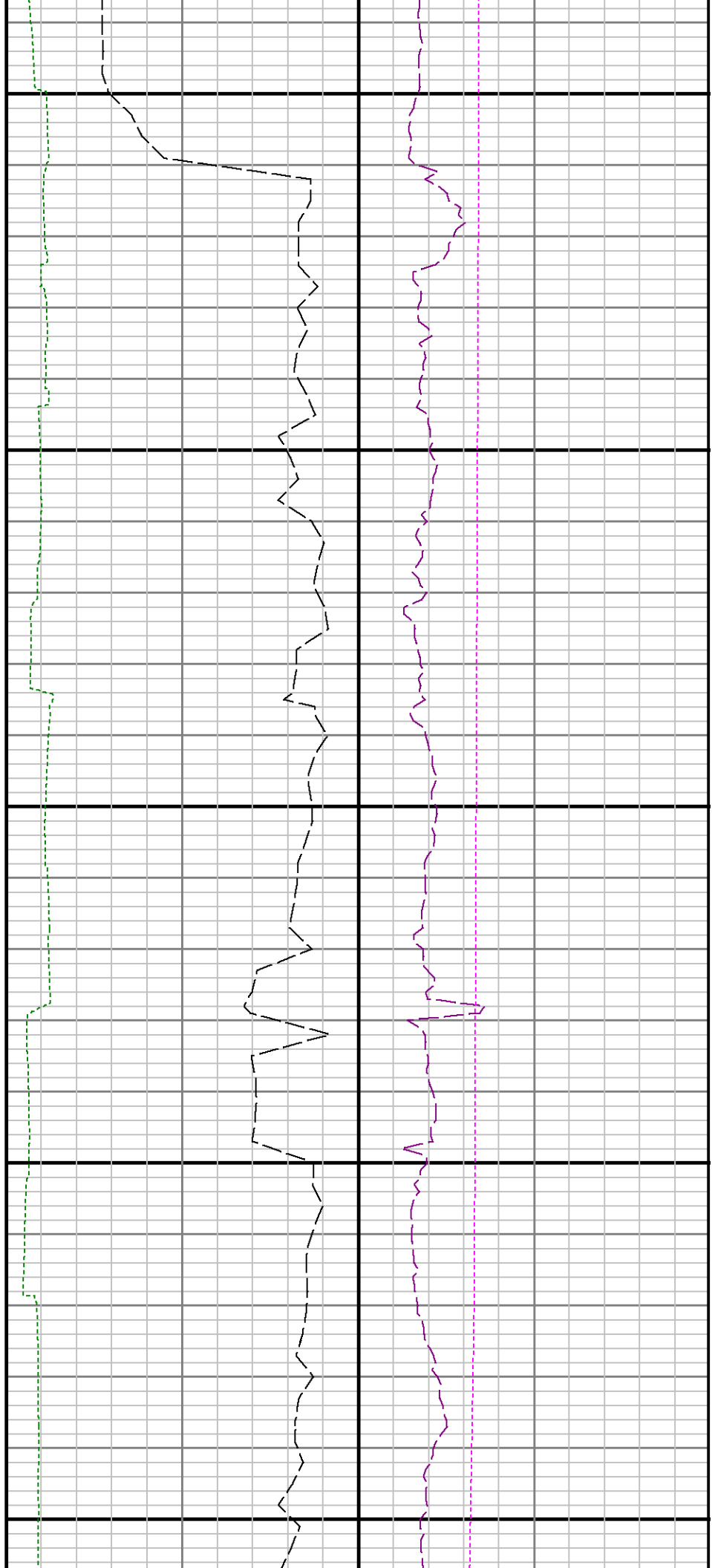
Number	Measured Depth (ft)	Hole Section (in.)	LWD Run No.	Remark
1	6980	8.750	1	The interval from 6964 to 7008 ft. MD (6870.48 to 6912.98 ft. TVD) was logged up to 19.4 hours after being drilled due to a trip out of the hole to pick up a new bha.
2	7630	8.750	2	The interval from 7612 to 7651 ft. MD (7244.55 to 7247.24 ft. TVD) was logged up to 40 hours after being drilled due to a trip out of the hole to lay down the curve assembly, run intermediate casing and cementing operations, and to pick up the lateral assembly.
3	11815	6.125	3	The interval from 11794 to 11852 ft. MD (7260.21 to 7261.41 ft. TVD) does not contain GRAX, GRIX or GRTX due to the bit to sensor offset.

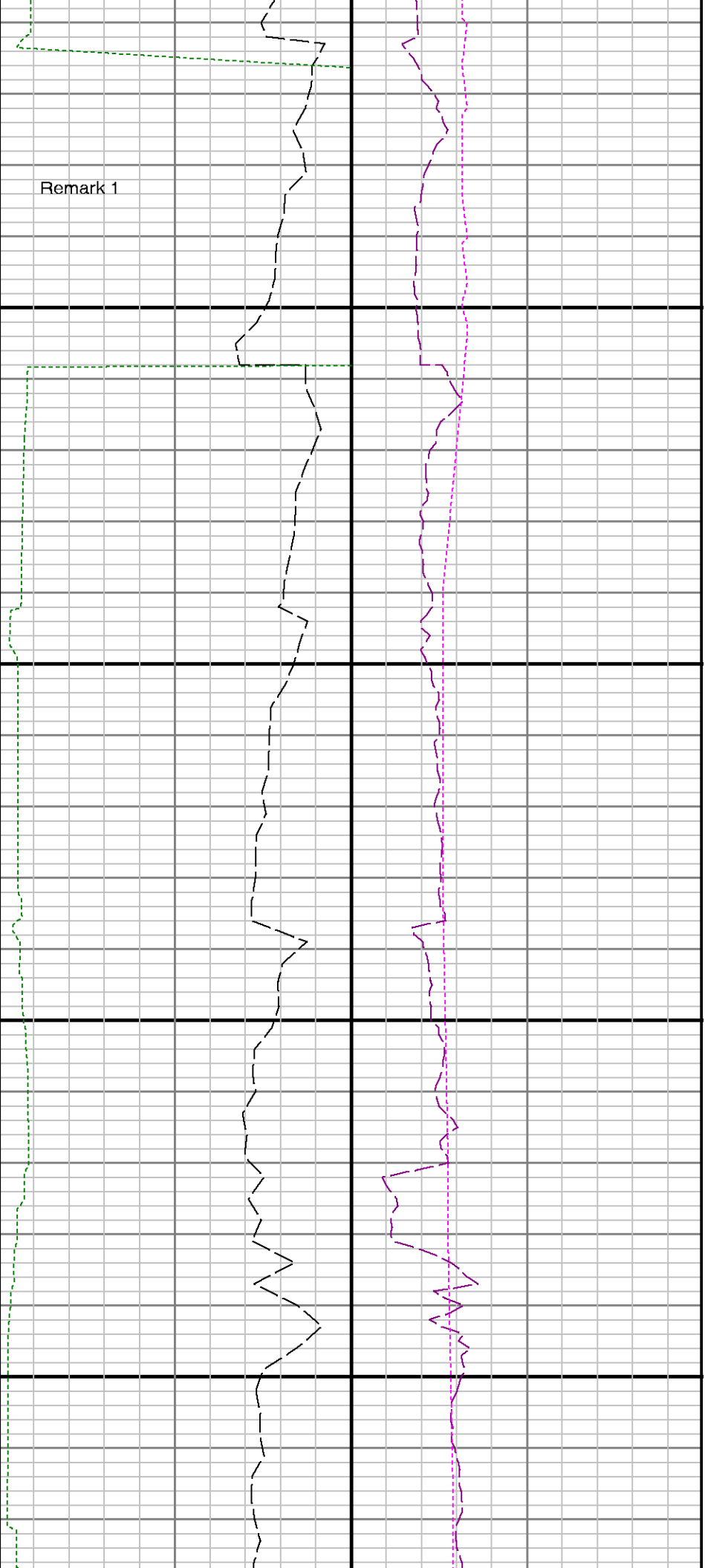




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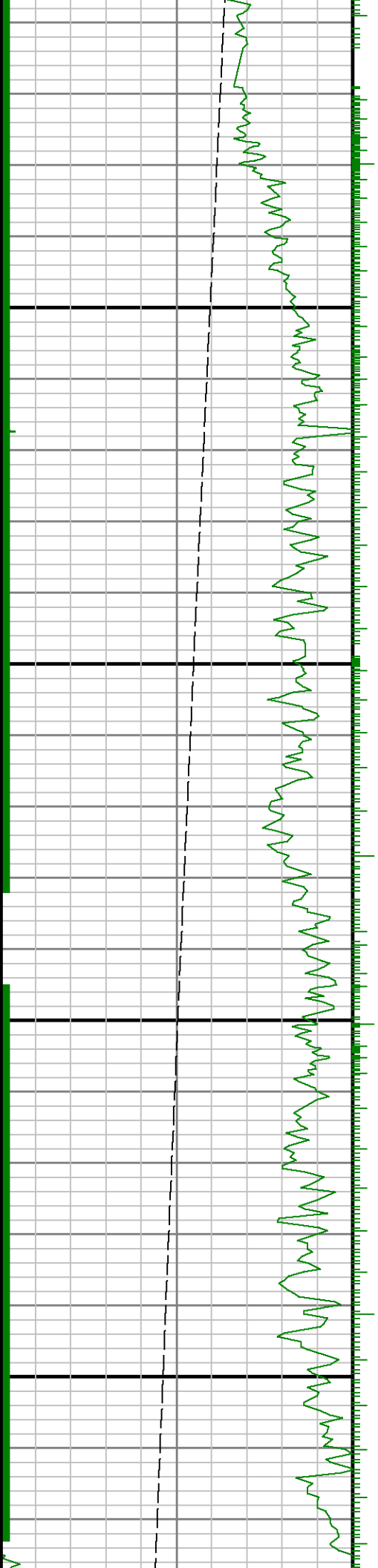
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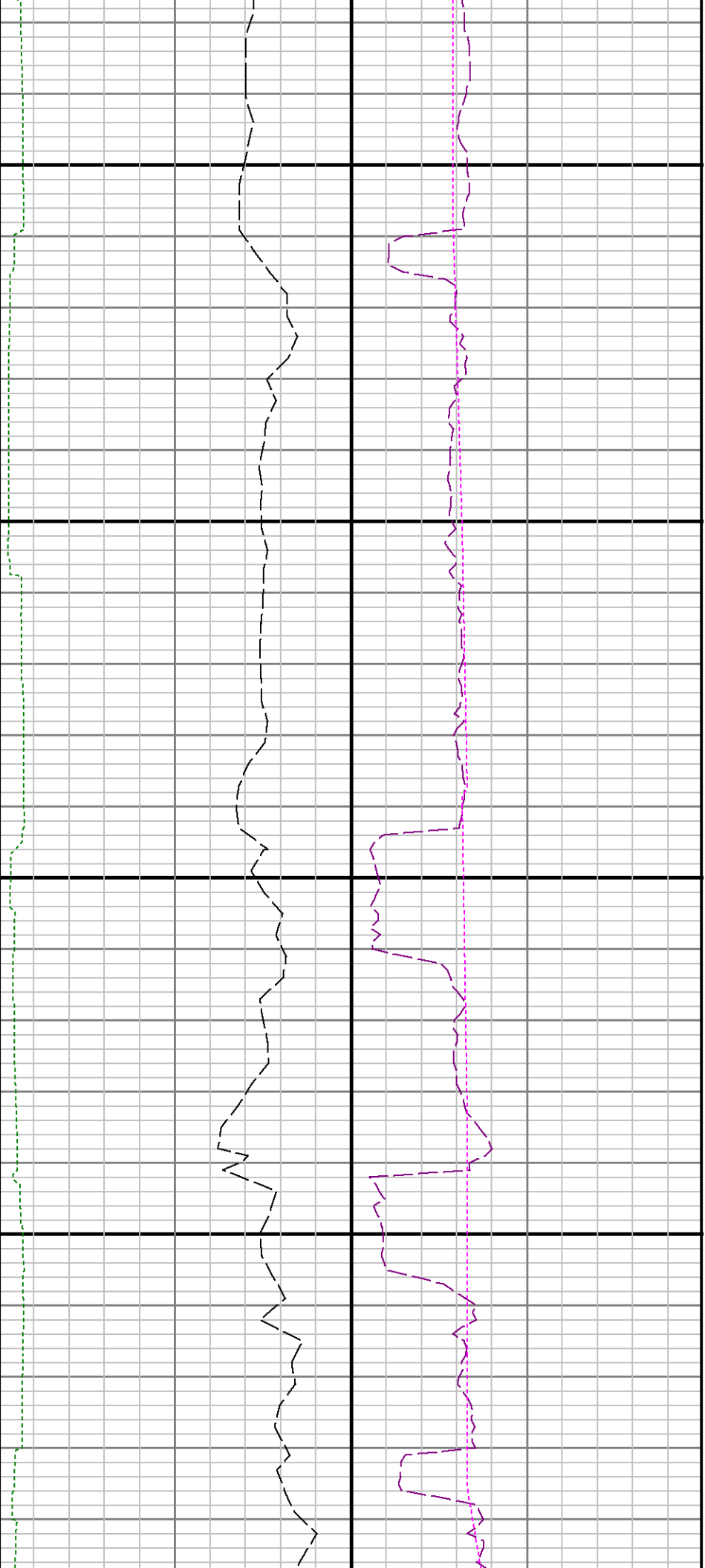




Run 1 < > Run 2
7000

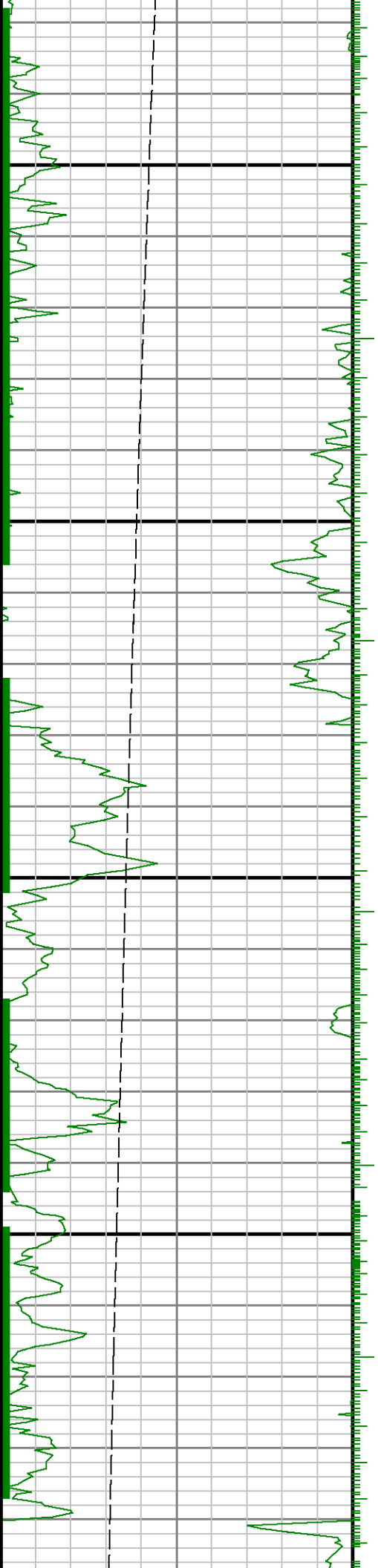
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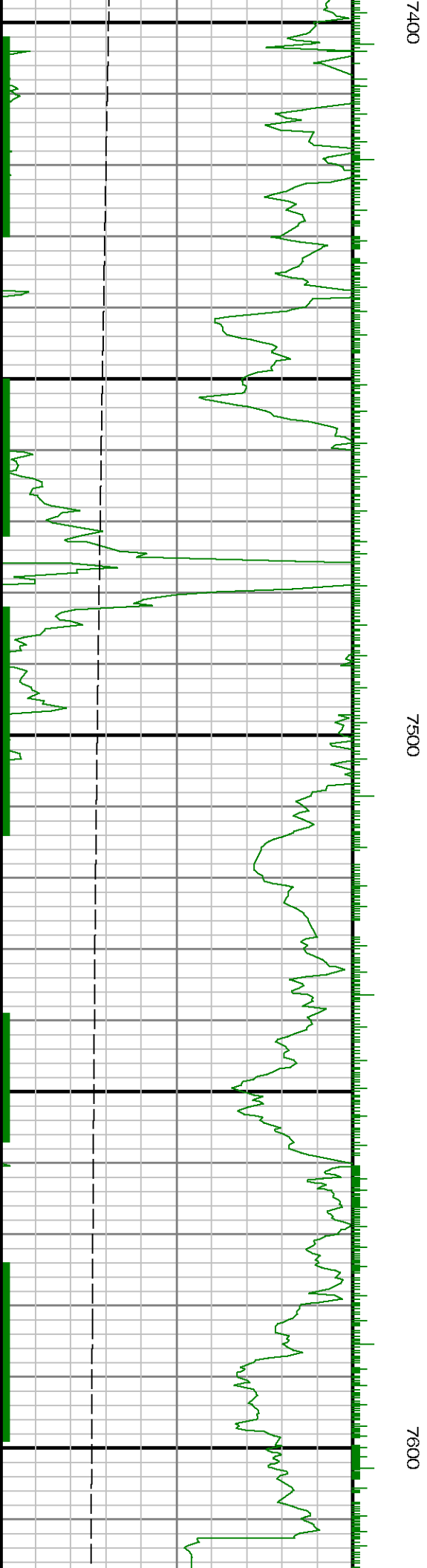
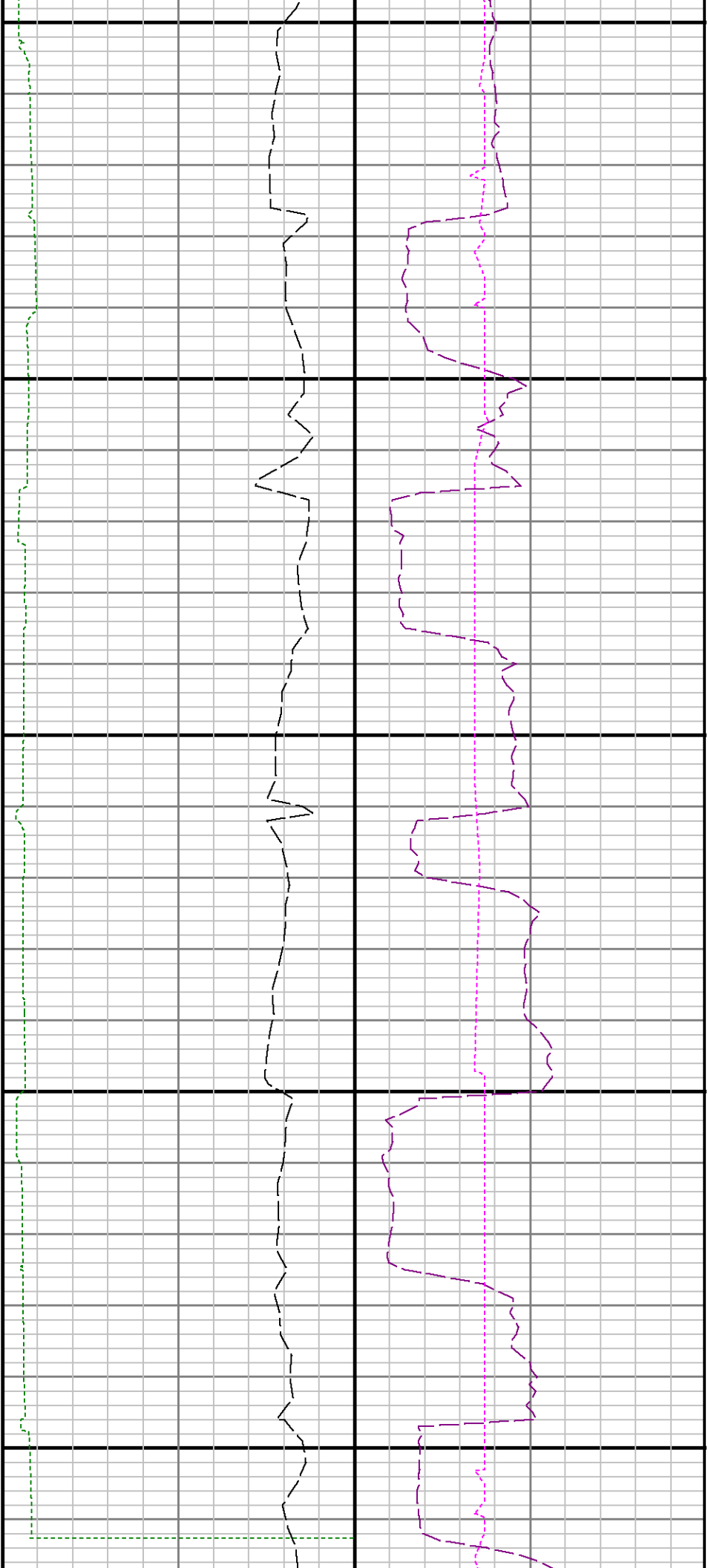


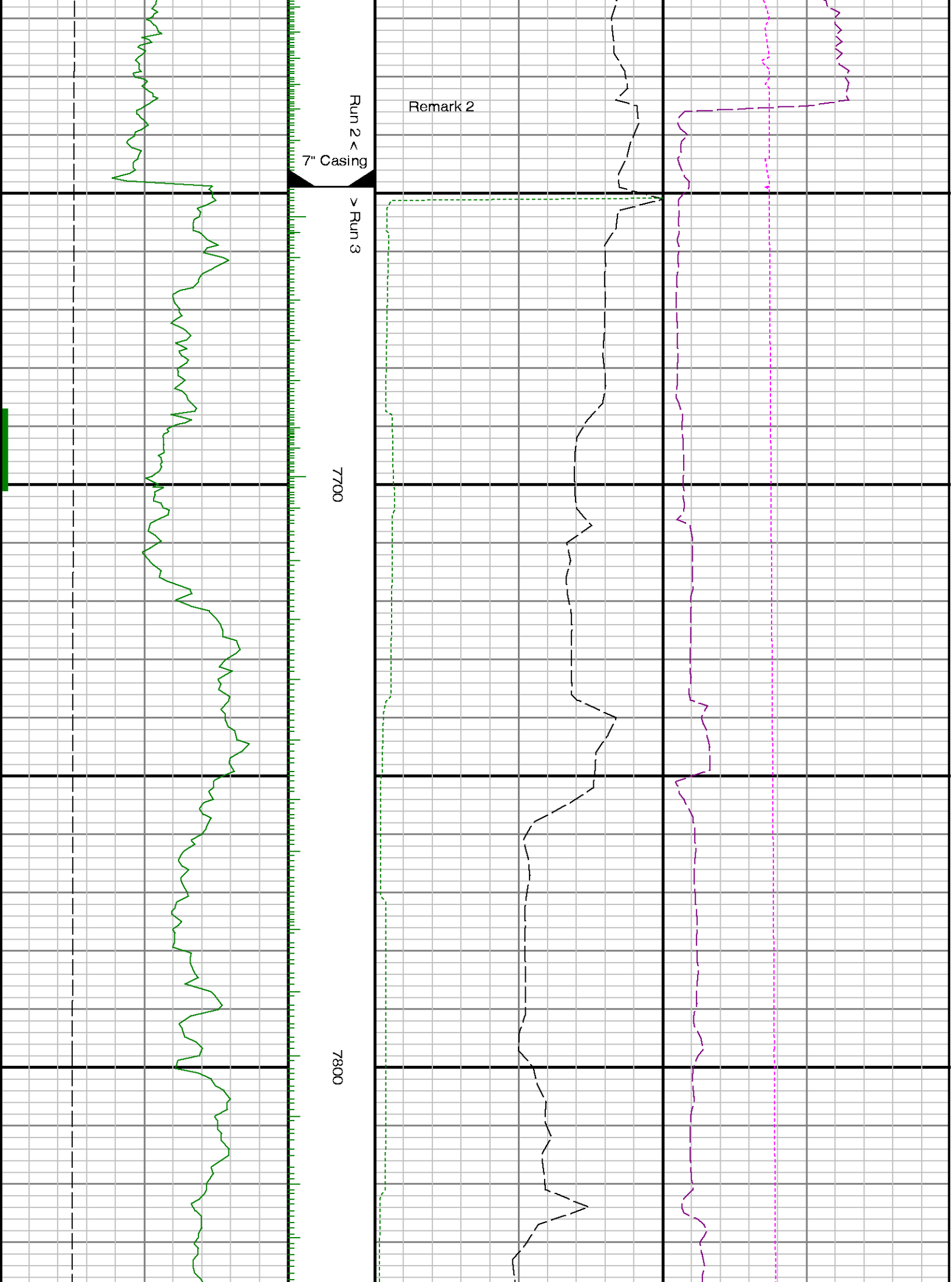


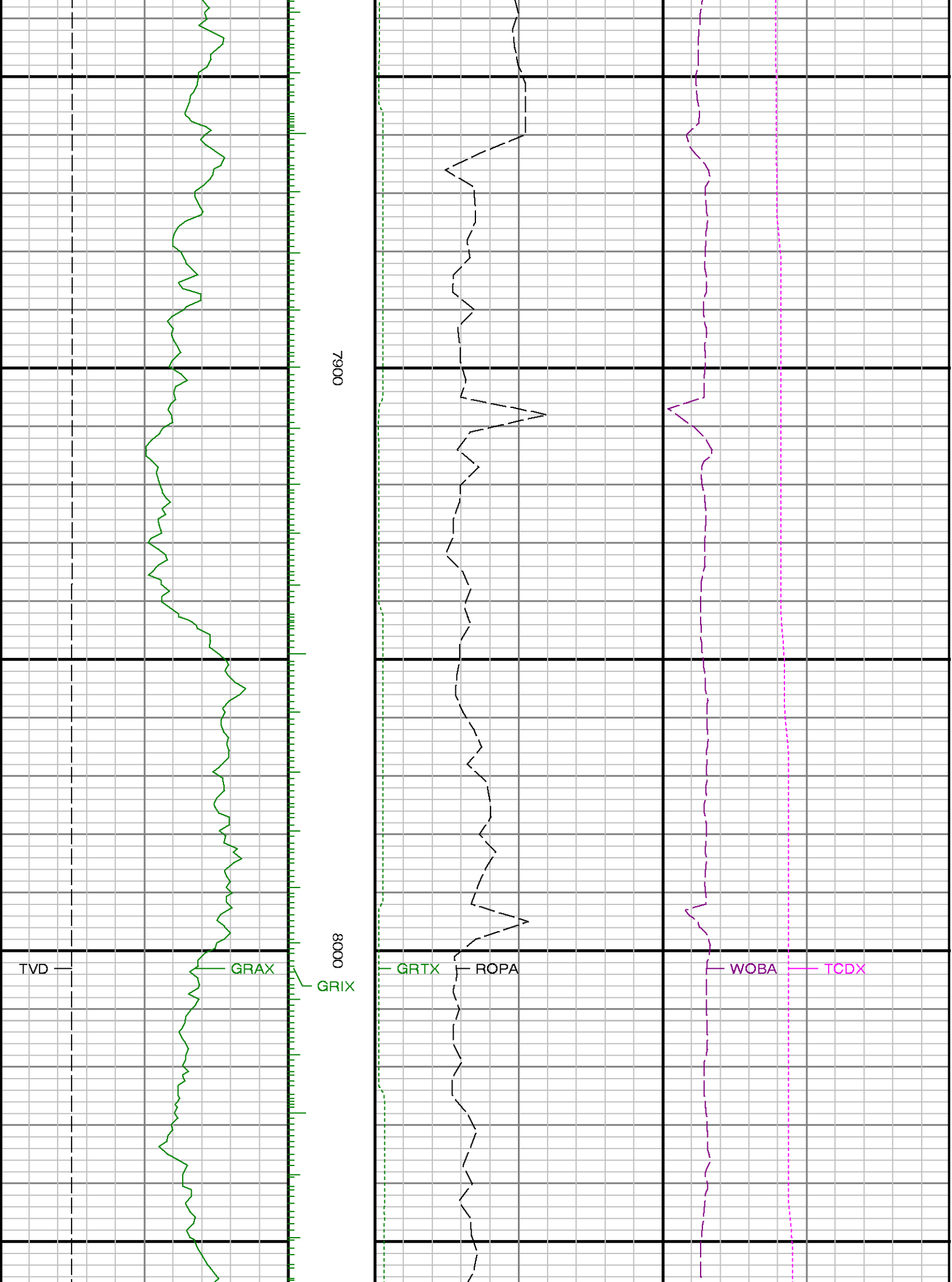
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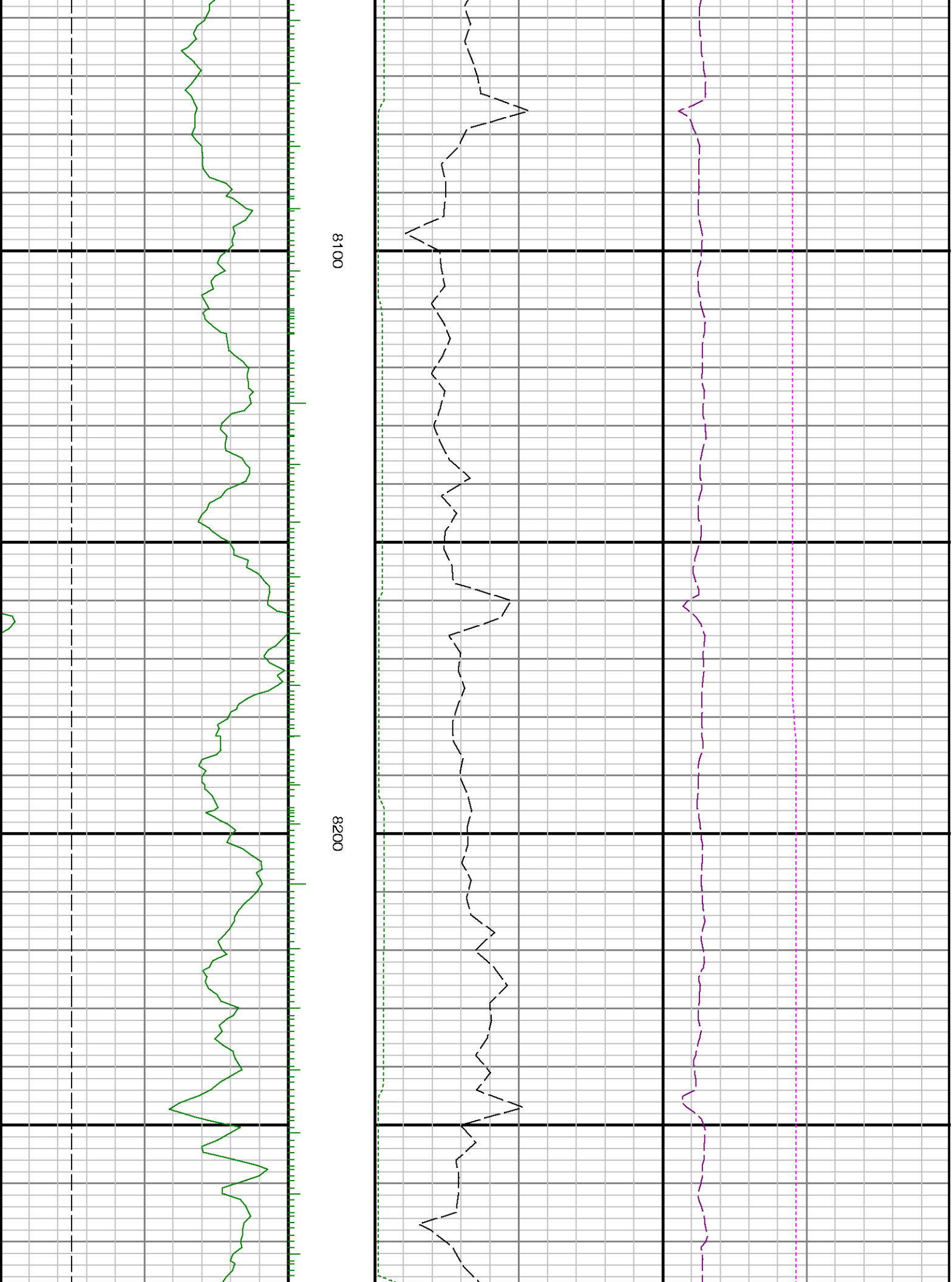
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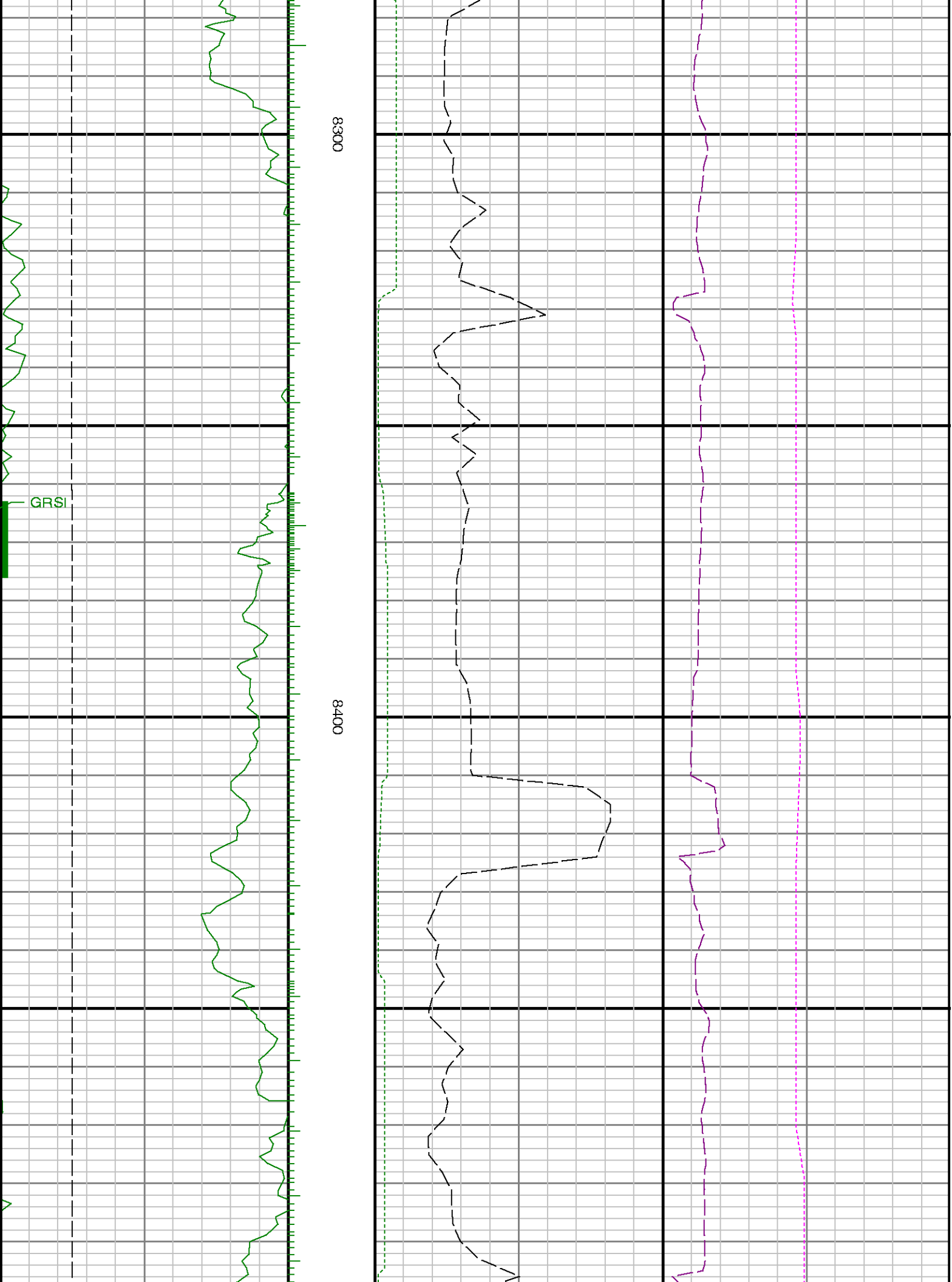


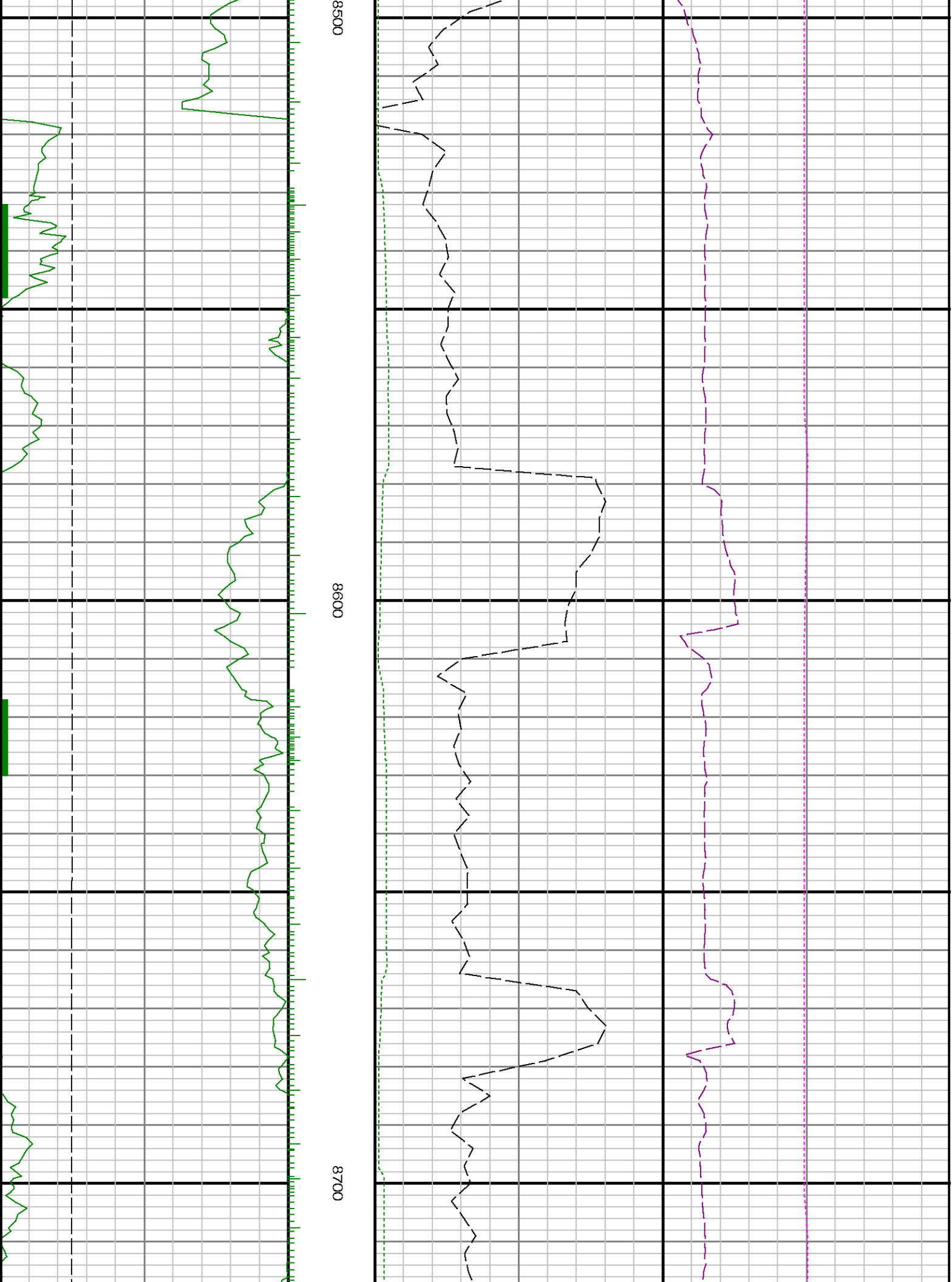


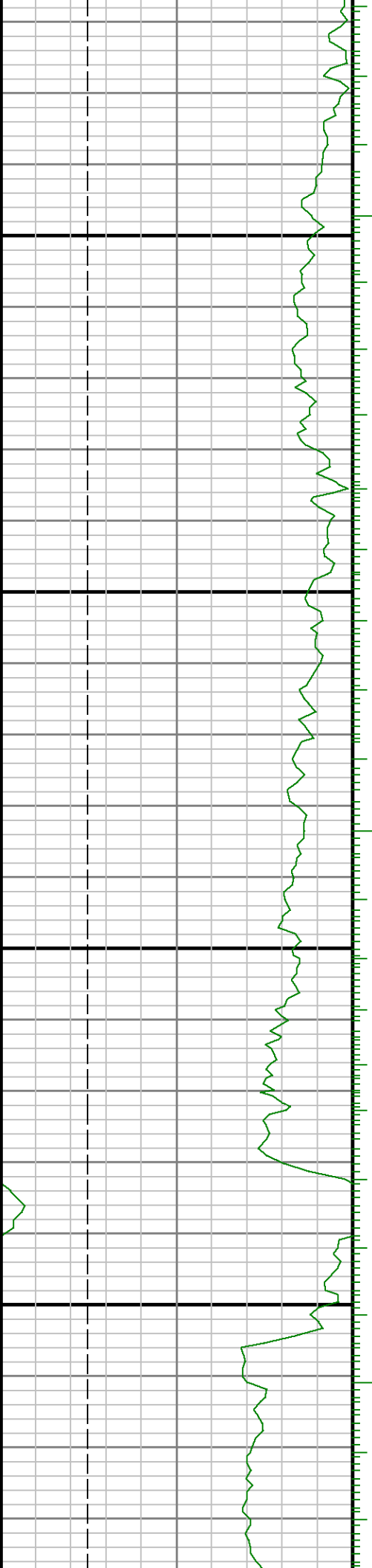






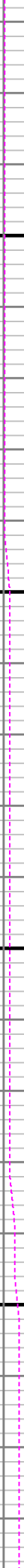
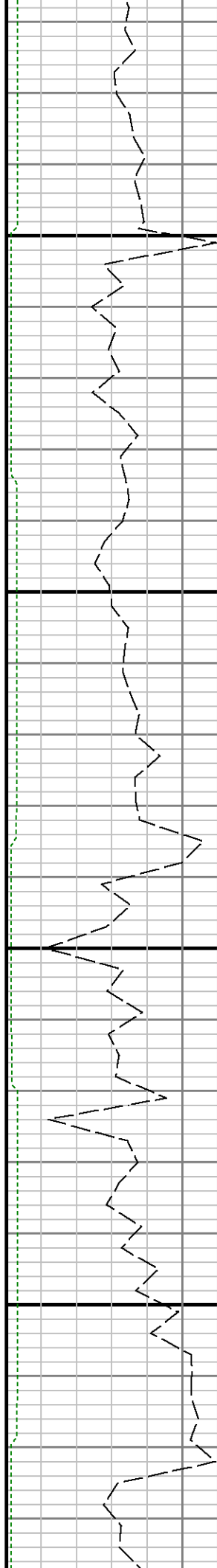


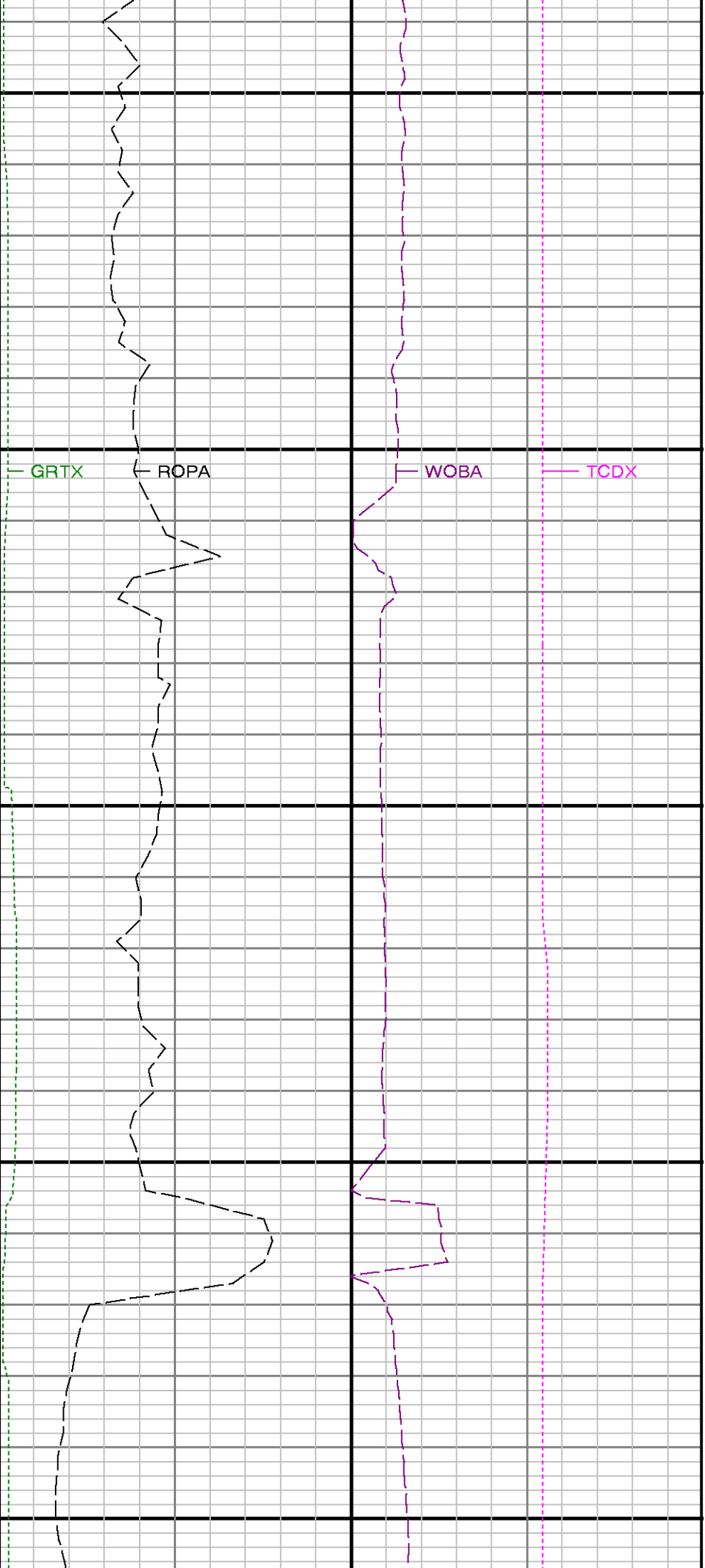
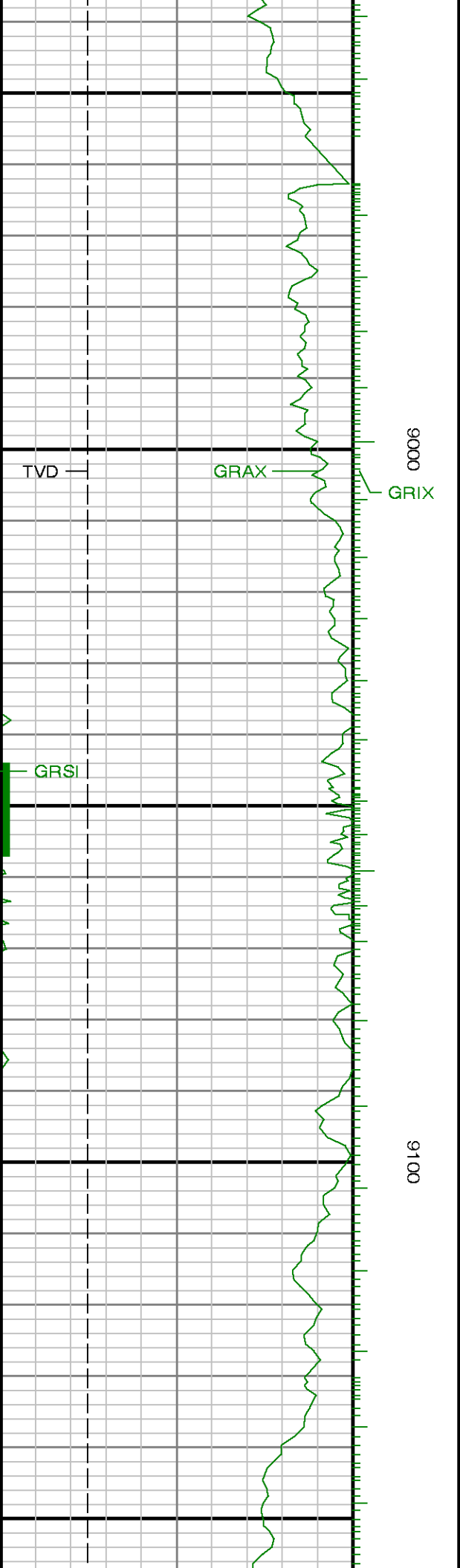


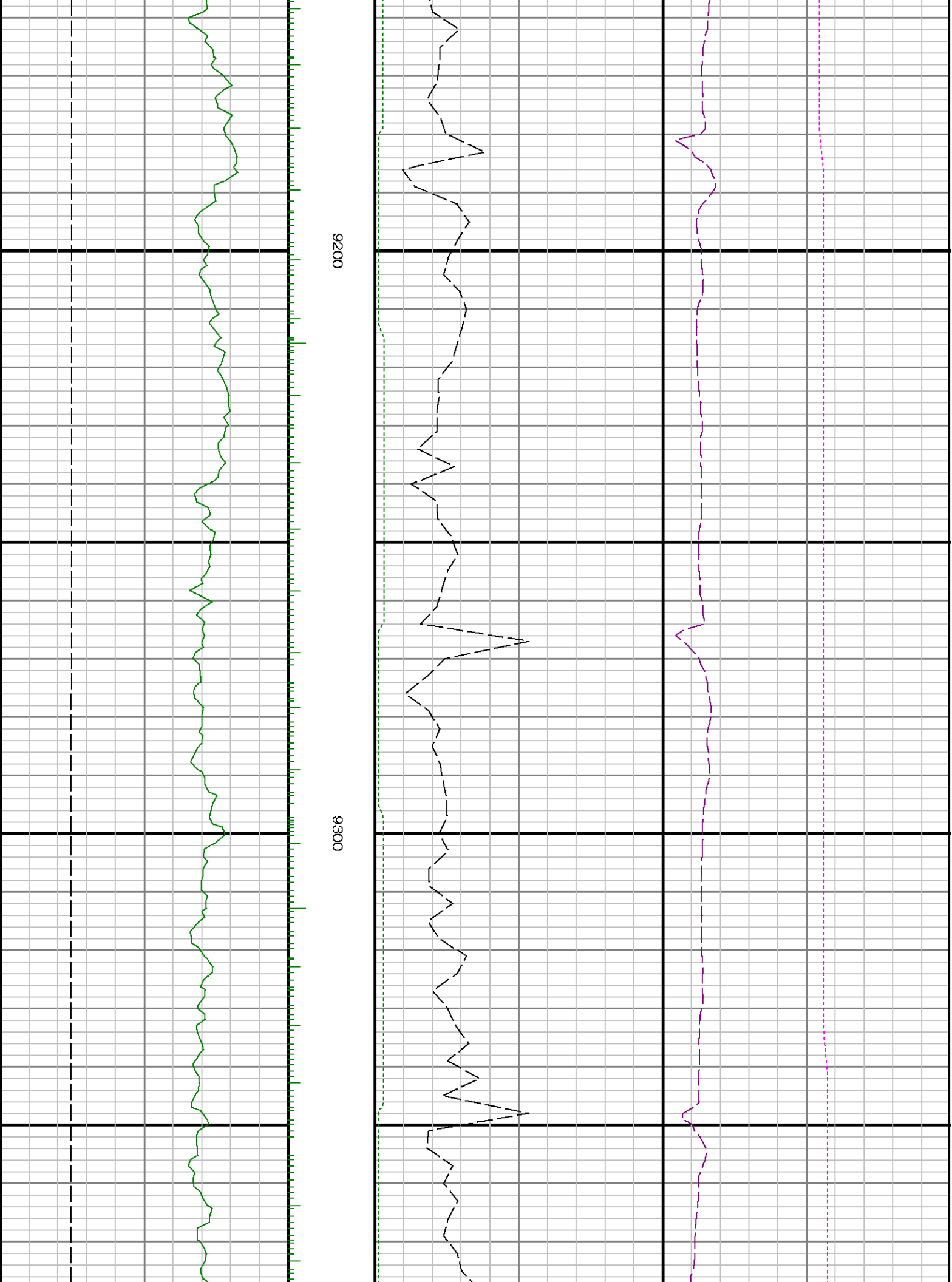


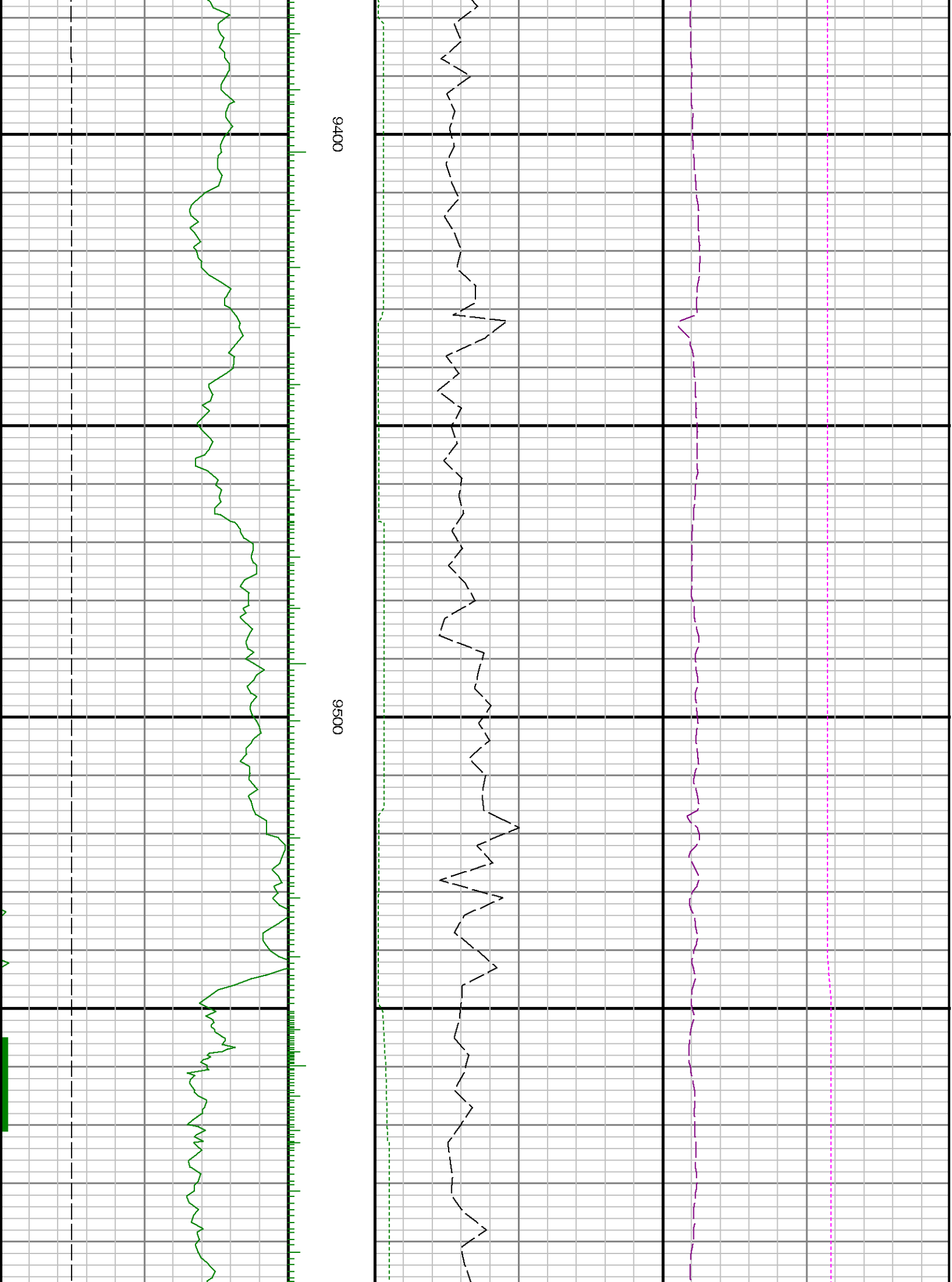
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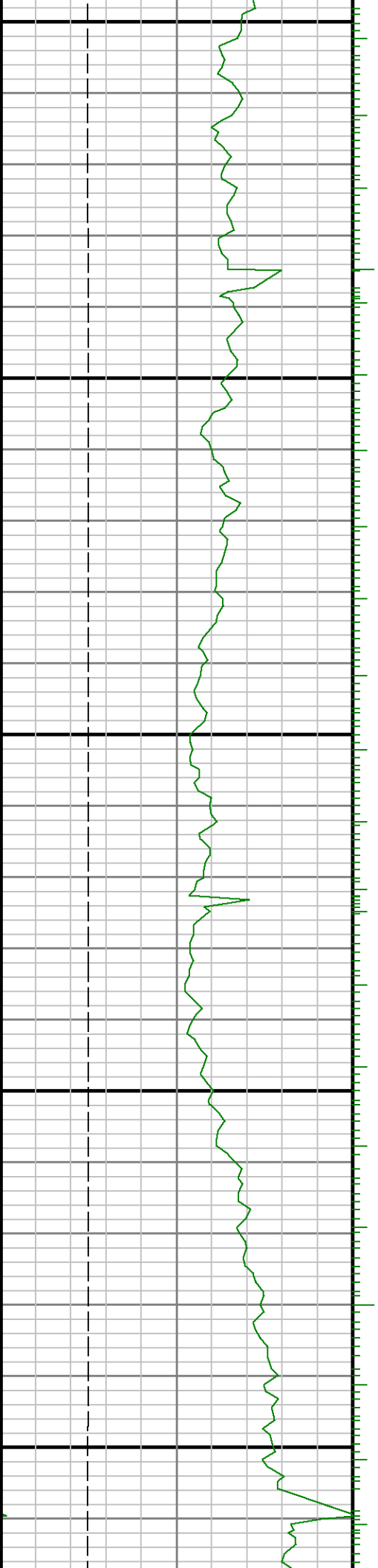
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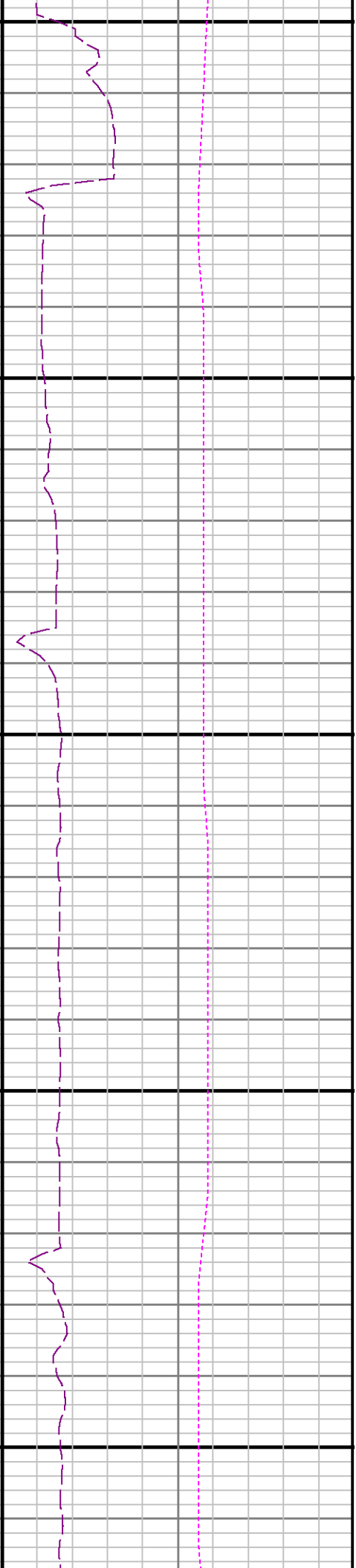
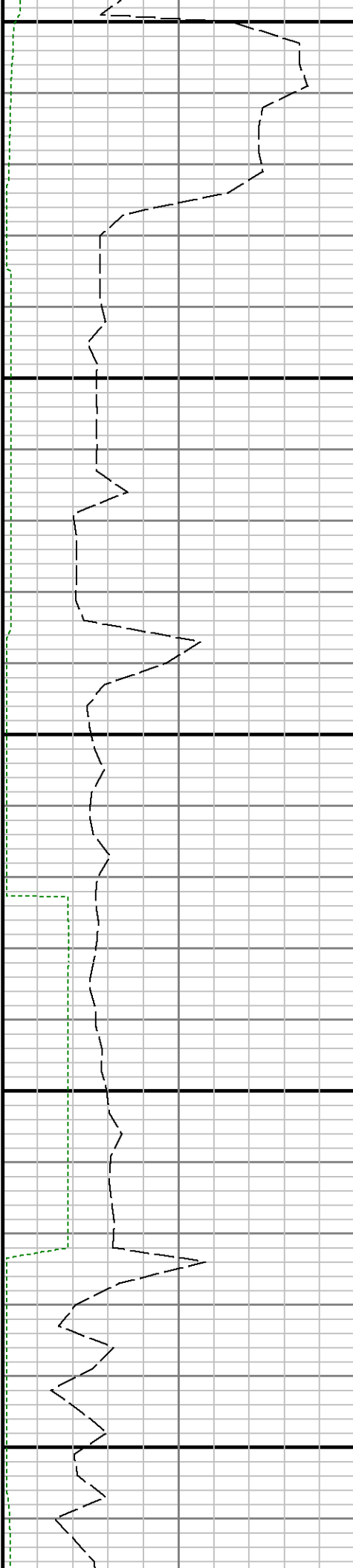


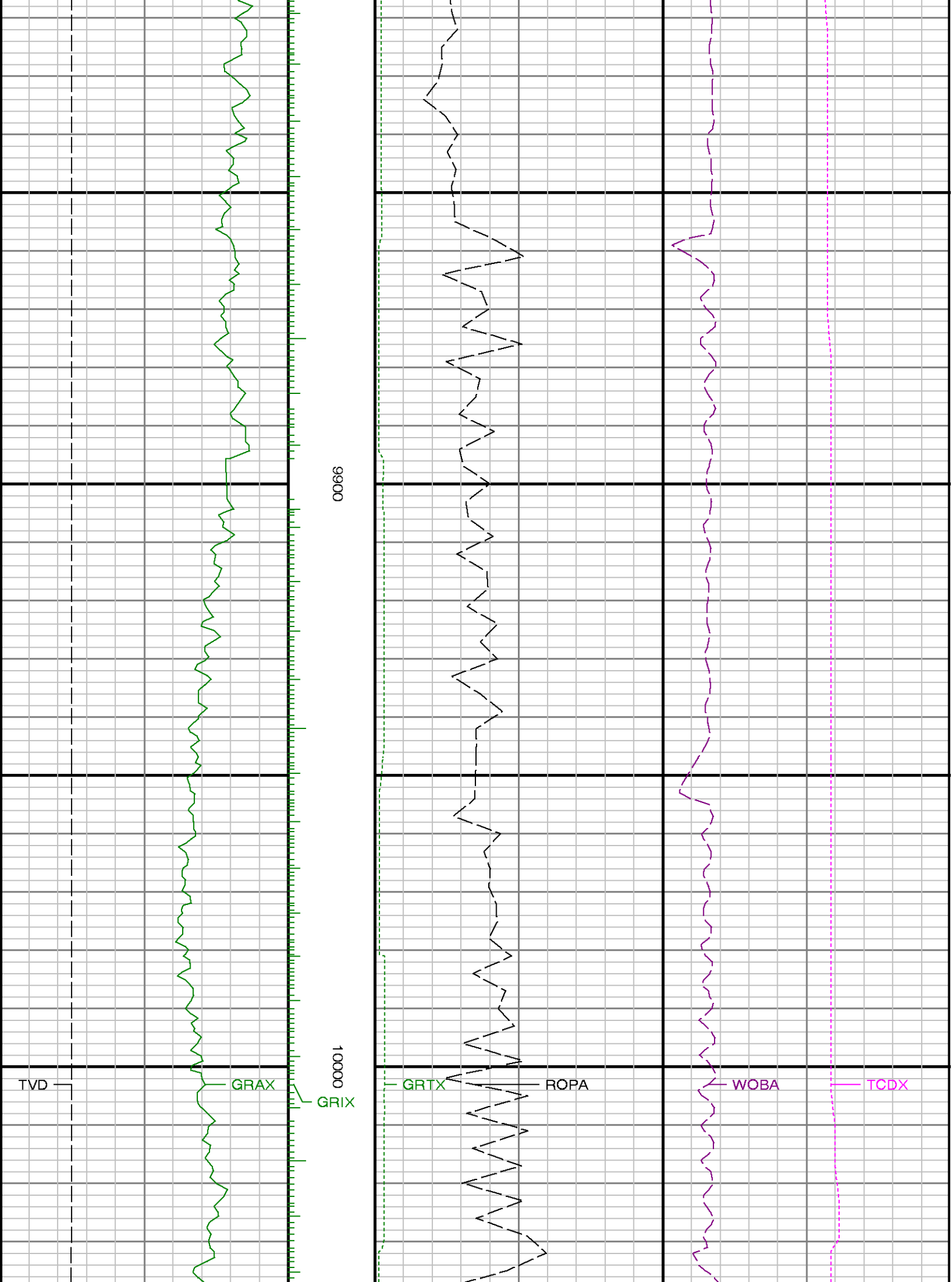


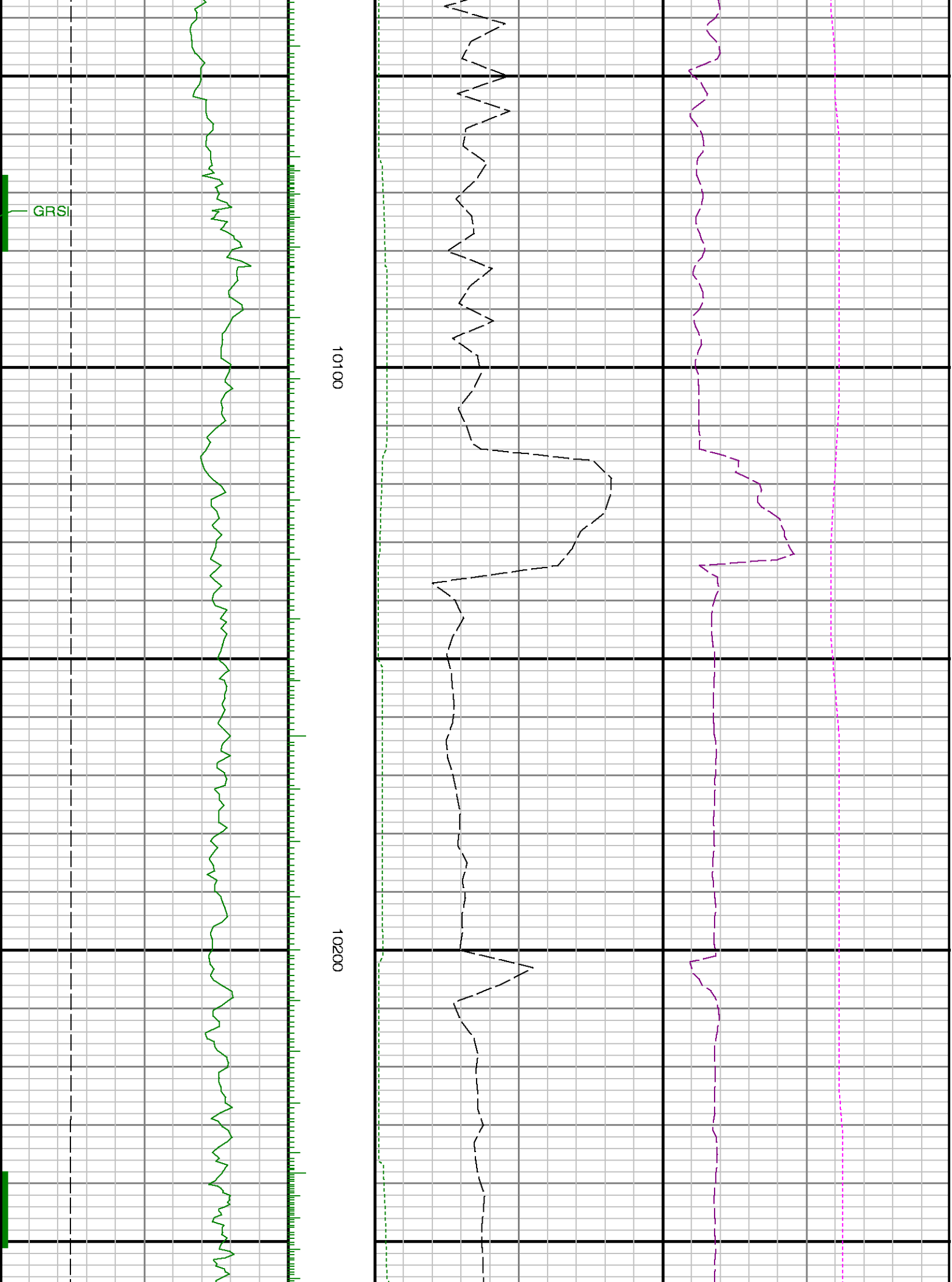
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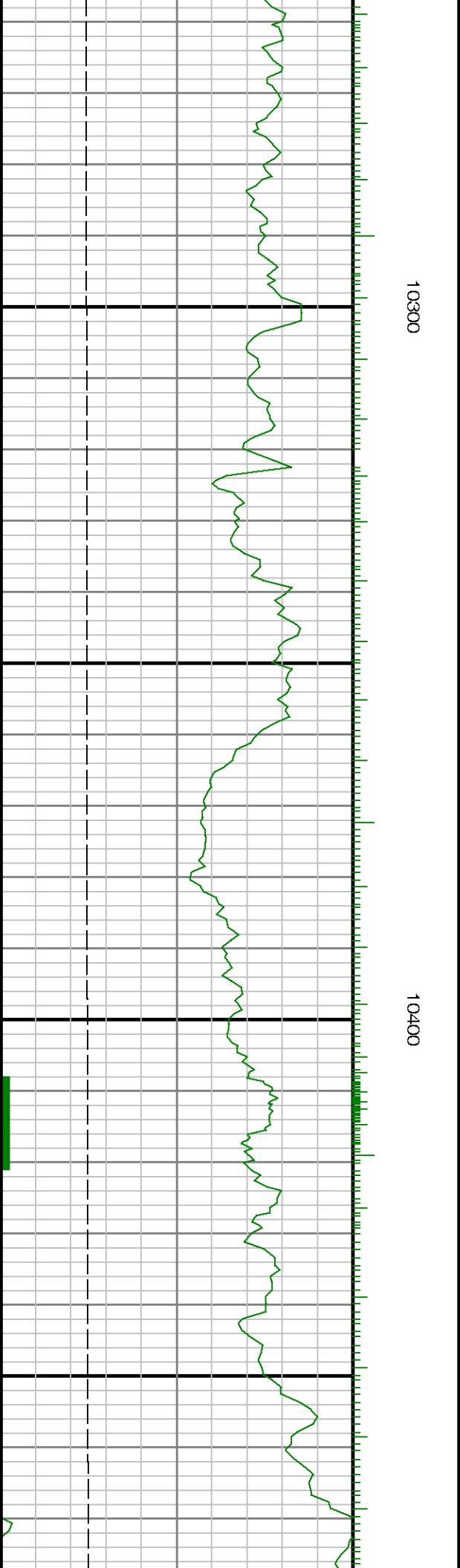
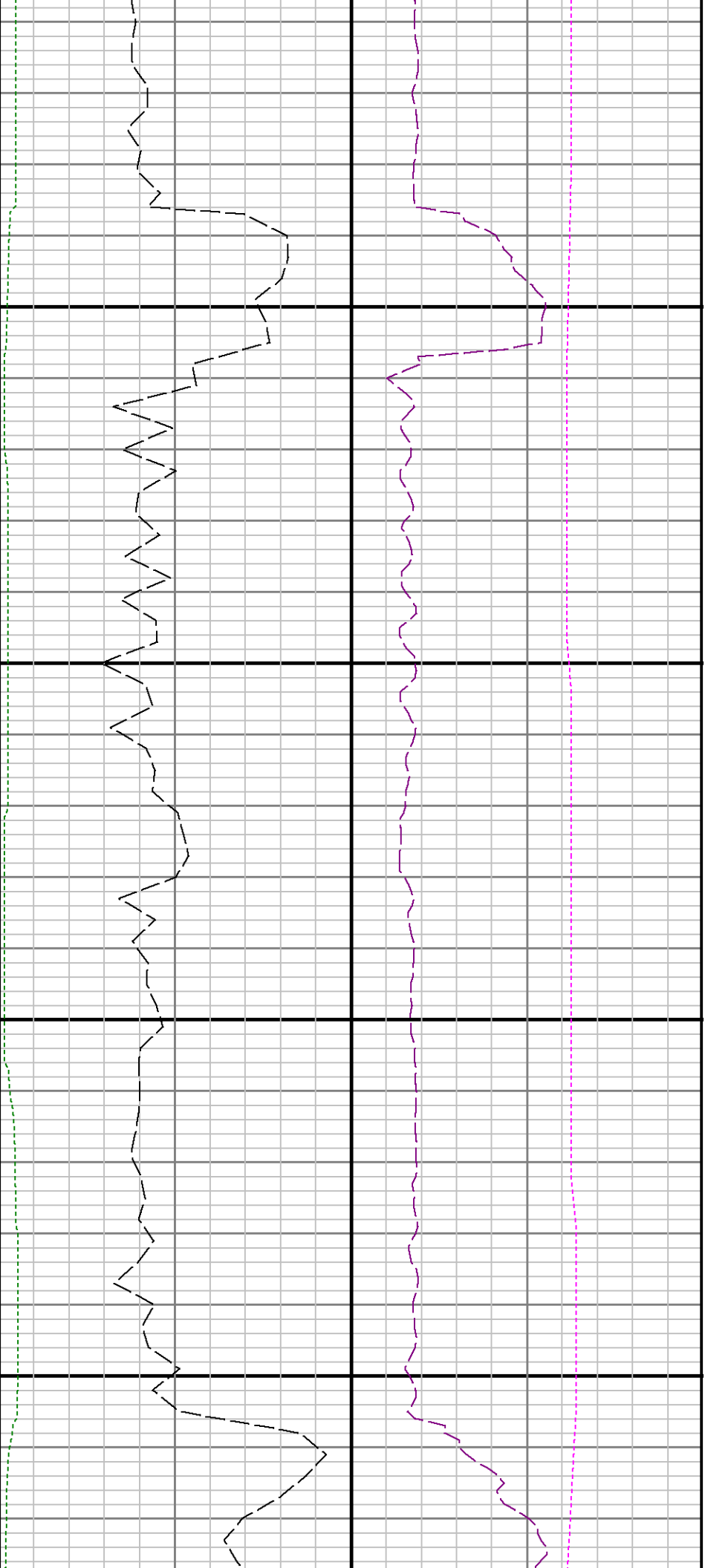
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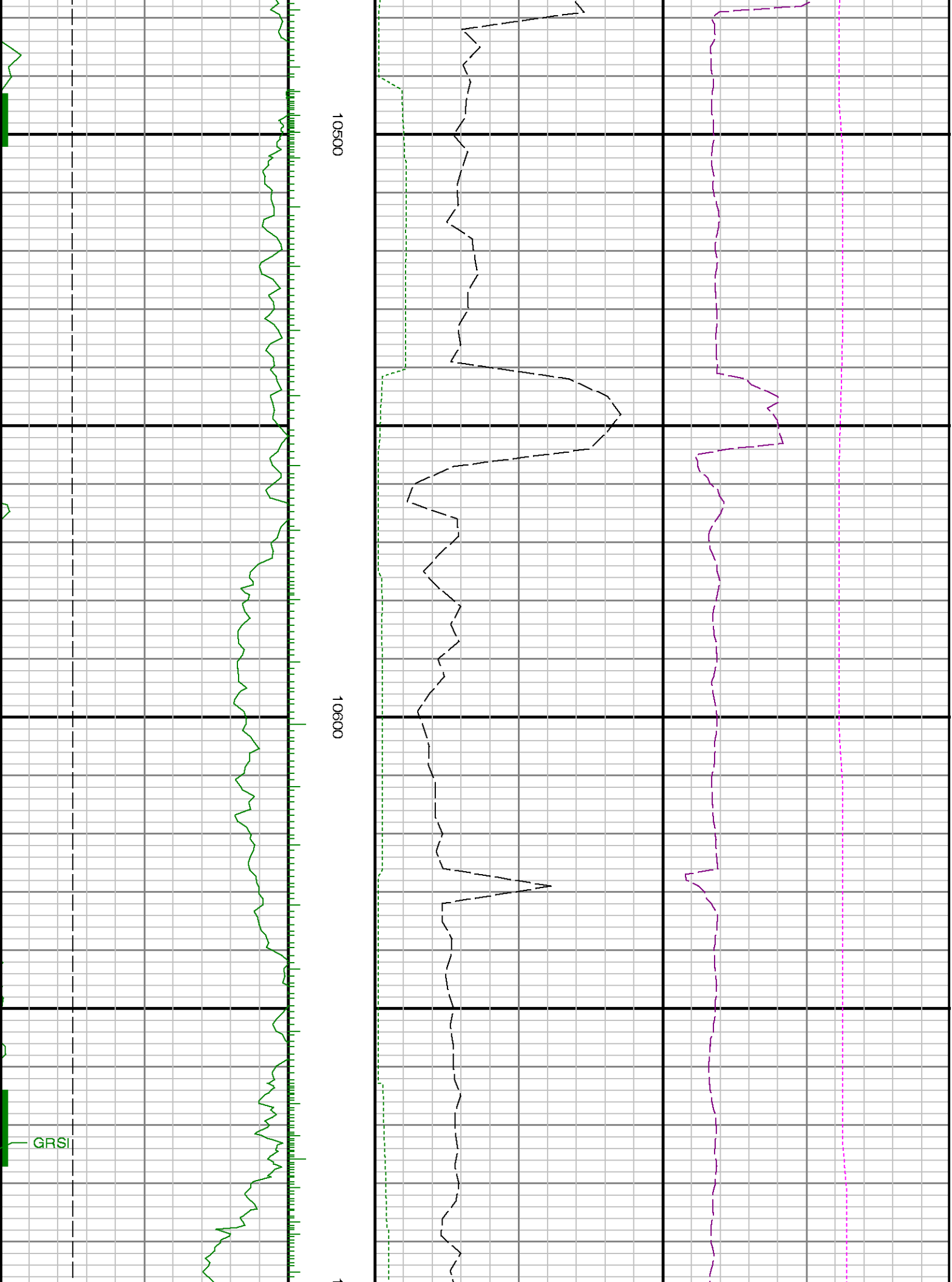
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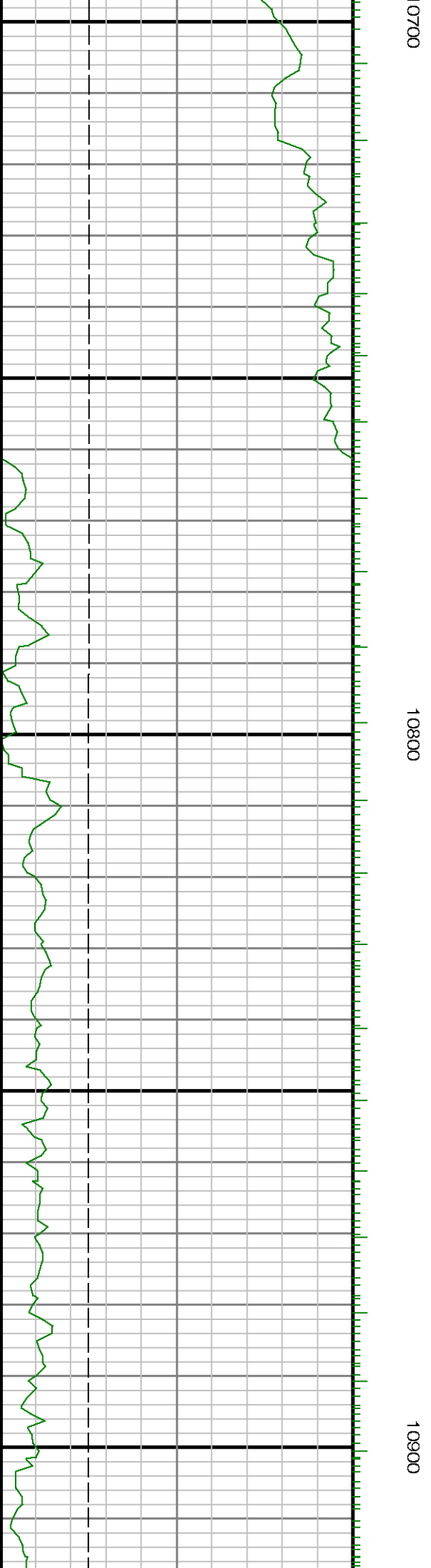


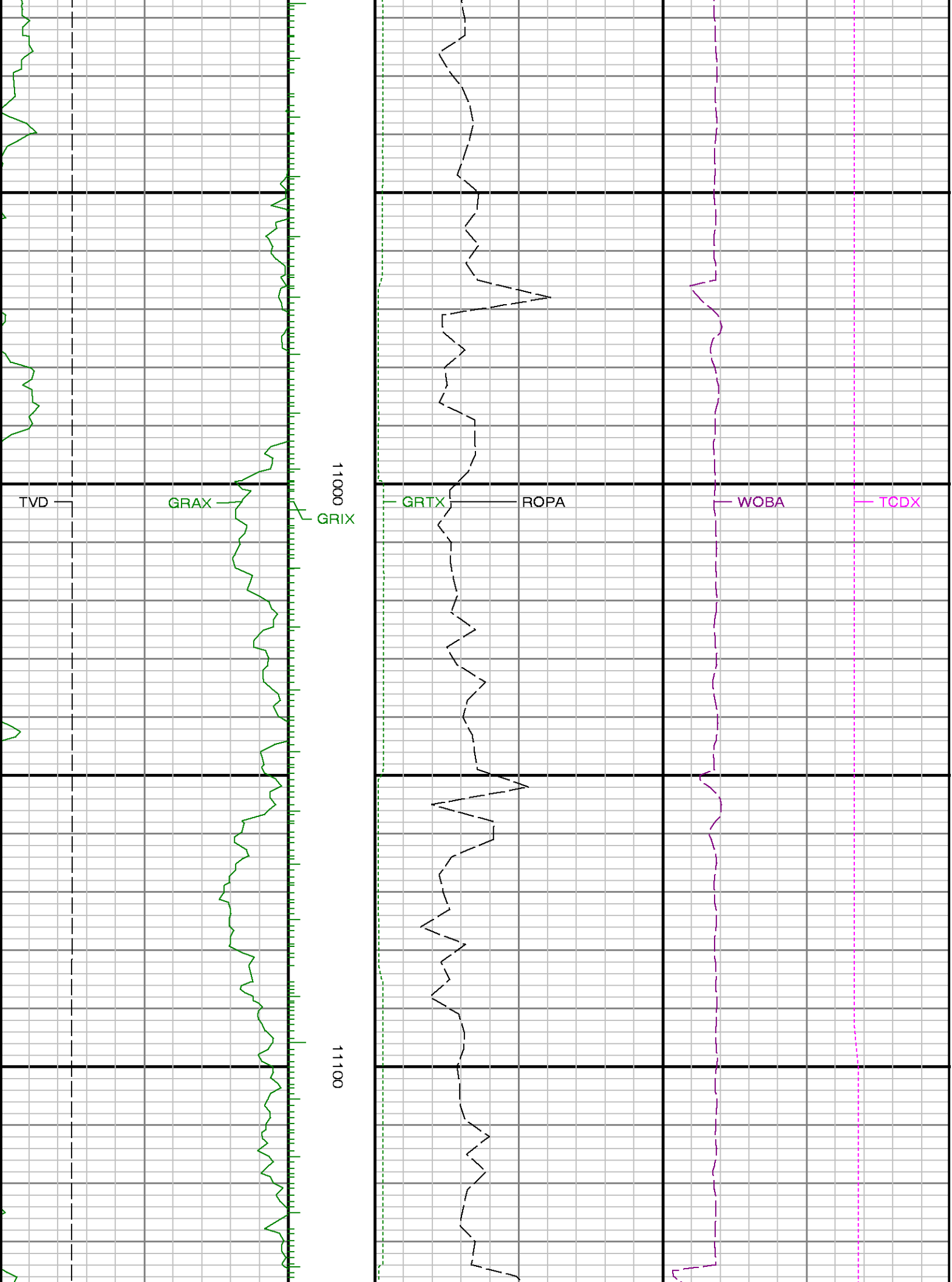


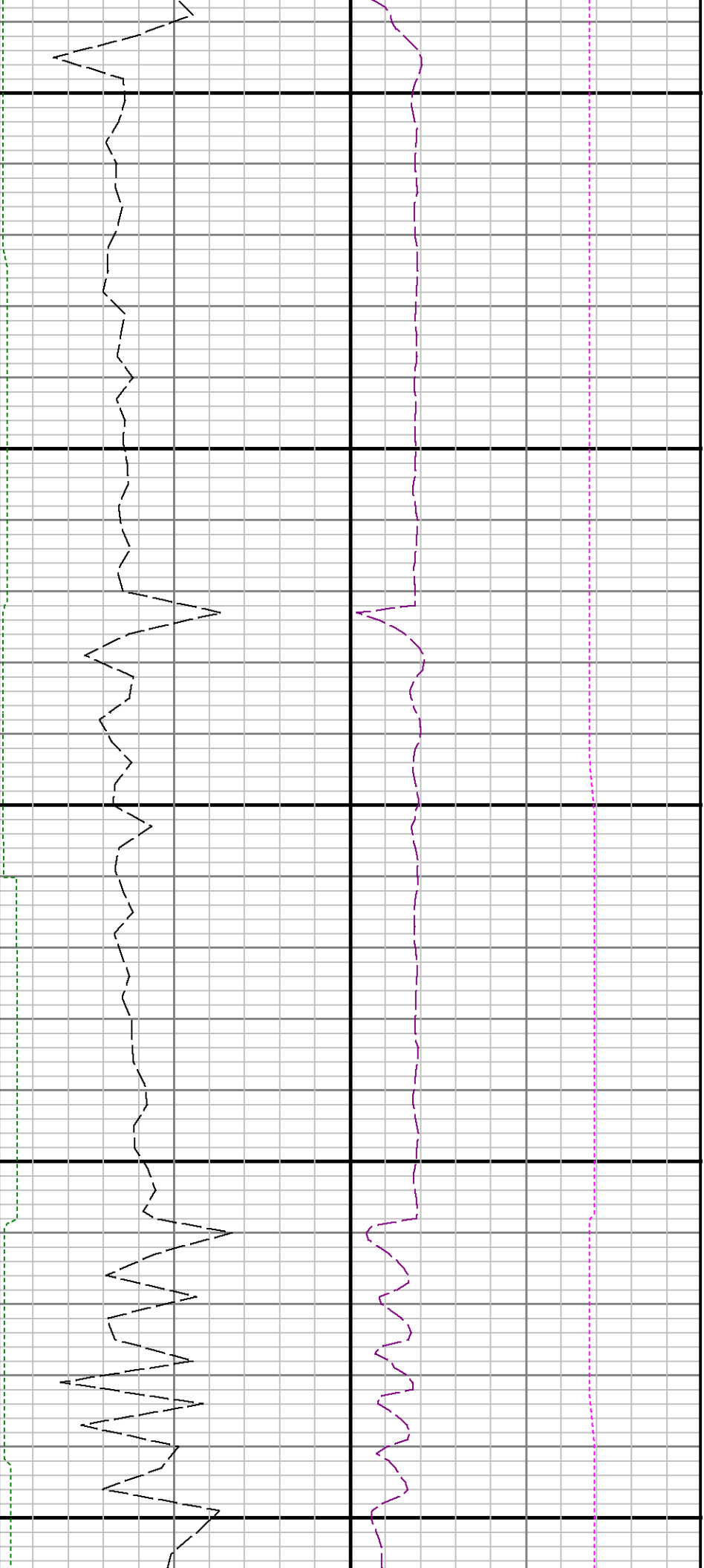












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