



Realtime Log

Natural Formation Evaluation  
Gamma Ray

Scale:

Company: Anadarko

Well: Howard 28C-21HZ

Field: Weld County (Kerr McGee)

County: Weld State: Colorado

Status:

Final Print

Surface Location:

Latitude: 40° 1' 48.331" N

Longitude: 104° 53' 58.412" W

Other Services:

Directional  
VSS

API Number:  
05-123-36809-00

SEC: 21 TWP: 1N RNG: 67W

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

Log Measured From: Rig Floor 5041.00 ft. Above P.D.

Depth Reference: Drillers Depth KB: Elevations: N/A  
DF: 5041.00 ft.  
GL: 5024.00 ft.

Interval Logged

Dates

Magnetic Field Reference

Top: 7137.0 ft. Date From: 09/Nov/13 Dip Angle: 66.64° Azi Reference North: True

Bottom: 12217.0 ft. Date To: 18/Nov/13 Total Mag to Reference

Spud Date: 10/Nov/13 Field Strength: 52651.9 nT North Correction: 8.62°

Borehole Record

Casing Record

Hole Size	From	To	Size	Weight	From	To
13.500 in.	Surface	942.0 ft.	9.625 in.	36.00 lb/ft	Surface	927.0 ft.
8.750 in.	927.0 ft.	8240.0 ft.	7.000 in.	26.00 lb/ft	Surface	8229.0 ft.
6.125 in.	8229.0 ft.	12217.0 ft.				

Mud Record

Deviation Record

Type	From	To	Hole Size	Interval	Inc / Az (Start)	Inc / Az (End)
Water Based Mud	Surface	12217.0 ft.	13.500 in.	942.0 ft.	0.0° / 0.0°	1.6° / 289.7°
			8.750 in.	7313.0 ft.	1.6° / 290.2°	89.0° / 0.5°
			6.125 in.	3989.1 ft.	88.3° / 0.5°	90.7° / 359.6°
					/	/
					/	/
					/	/

Acquisition System Software Version

Other

Advantage	2.20U4	Rig:	Xtreme 6	/ Xtreme Coil Drilling
PAIS	6.4.1.34	Job No:	5583955	
		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 Core	0.600	Steerable	7137.0	8196.7	942.0	8240.0	09/Nov/2013 22:57	09/Nov/2013 22:57	65.4
2	2	3	6.125	PDC Core	0.500	Steerable	8197.5	10392.5	8240.0	10446.0	13/Nov/2013 12:18	13/Nov/2013 12:18	24.2
3	3	4	6.125	PDC Core	0.500	Steerable	N/A	N/A	N/A	N/A	17/Nov/2013 12:07	17/Nov/2013 12:07	0
4	4	5	6.125	PDC Core	0.500	Steerable	10392.9	12165.9	10446.0	12217.0	18/Nov/2013 16:11	18/Nov/2013 16:11	19.3

Crew

Name	Arrive	Depart	Name	Arrive	Depart	Name	Arrive	Depart
	Wellsite	Wellsite		Wellsite	Wellsite		Wellsite	Wellsite
Matthew Delmore	09/Nov/2013	21/Nov/2013	Stephen Gray	09/Nov/2013	21/Nov/2013			

Mud Properties Record

Date / Time		LWD Run No.	Measured Depth (ft.)	Mud Type	Density (ppg)	Viscosity (sec/qt)	pH	Fluid Loss (cc)	Oil / Water	Source	Total Chlorides (ppm)	K+ (%)
10/Nov/2013	15:30	1	927.0	Water Based Mud	8.6	28	8.5	NC	0 / 98	Active Mud Pit	900	N/A
11/Nov/2013	19:00	1	5049.0	Water Based Mud	8.6	29	8.5	NC	0 / 99	Active Mud Pit	900	N/A
12/Nov/2013	19:00	1	7498.0	Water Based Mud	10.0	40	9.0	NC	0 / 92	Active Mud Pit	800	N/A
13/Nov/2013	18:00	1	8240.0	Water Based Mud	11.0	45	9.0	NC	0 / 90	Active Mud Pit	800	N/A
14/Nov/2013	18:00	2	8240.0	Water Based Mud	11.6	46	9.0	NC	0 / 85	Active Mud Pit	800	N/A
15/Nov/2013	15:00	2	8240.0	Water Based Mud	11.7	45	9.1	NC	0 / 84	Active Mud Pit	800	N/A
16/Nov/2013	19:00	2	8840.0	Water Based Mud	9.2	40	8.8	NC	0 / 96	Active Mud Pit	300	N/A
17/Nov/2013	18:30	2	10446.0	Water Based Mud	9.2	45	8.8	NC	2 / 93	Active Mud Pit	300	N/A
18/Nov/2013	21:30	2	10446.0	Water Based Mud	10.0	43	8.8	NC	3 / 90	Active Mud Pit	300	N/A
19/Nov/2013	19:00	4	11660.0	Water Based Mud	10.7	41	9.0	3.6	3 / 86	Active Mud Pit	400	N/A

Mnemonics

Curve	Description	Units
GRAX	Gamma Ray Apparent, 0.5 ft. Avg.	API
GRIX	Gamma Ray Density	points
GRSI	Gamma Ray Slide 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

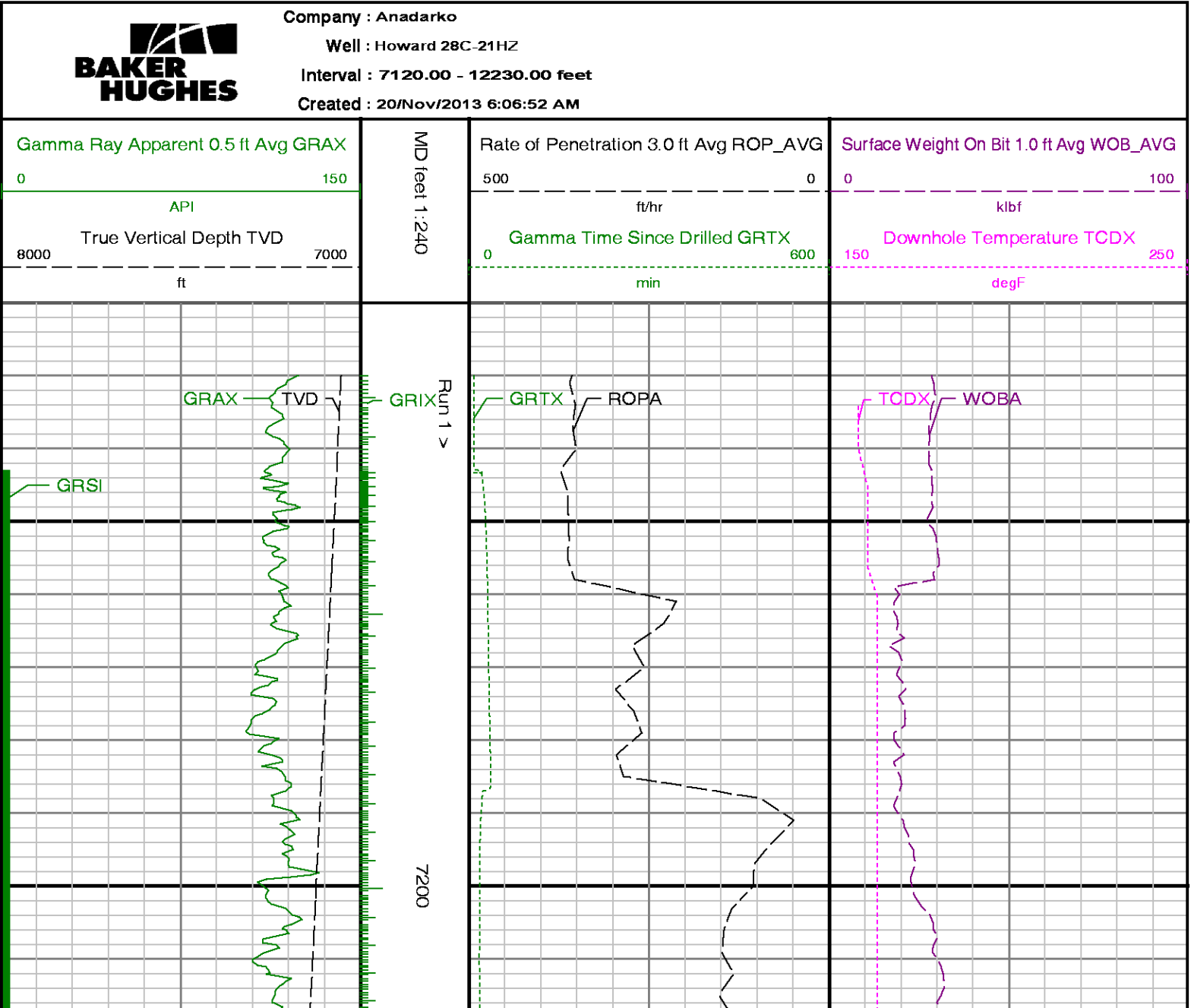
Equipment and Service Data

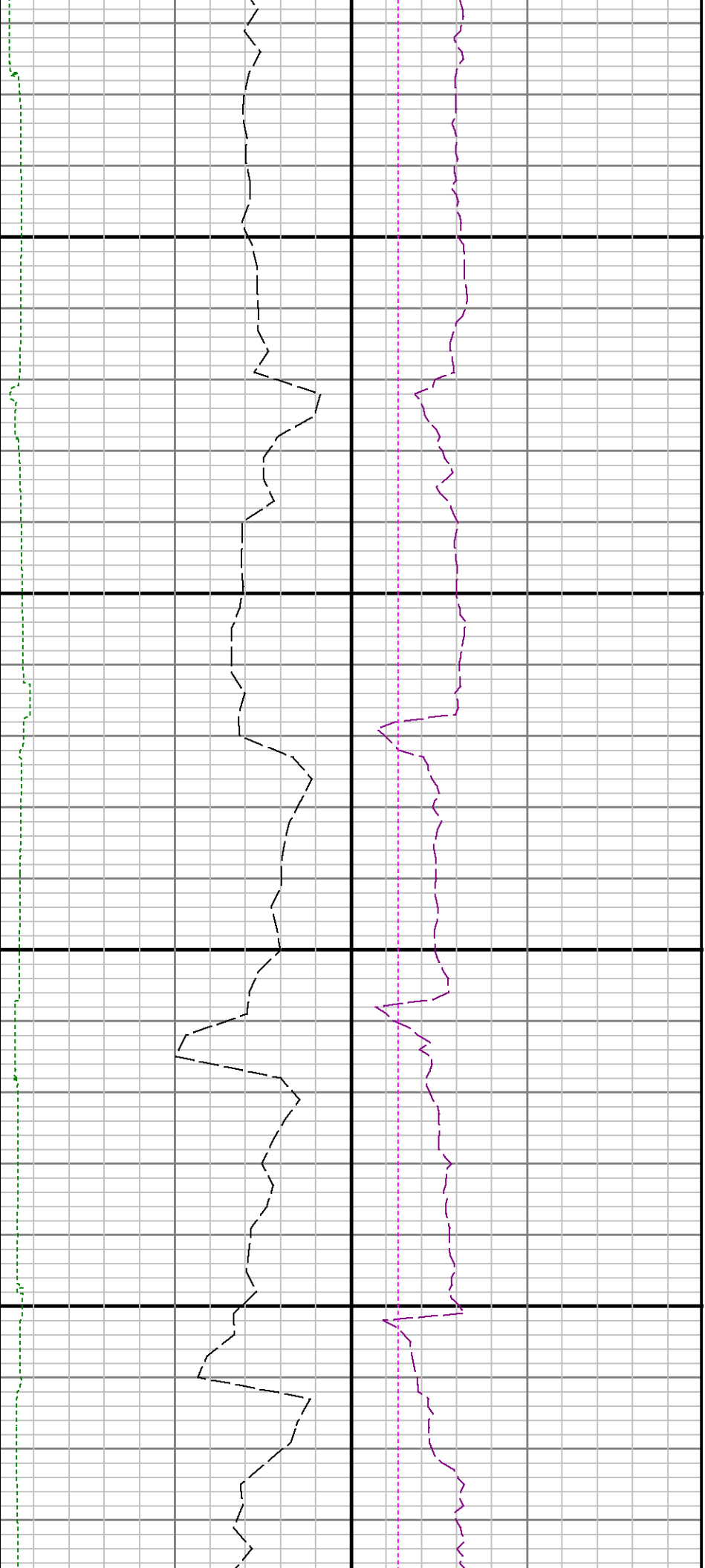
LWD Run No.	Tool	Serial Number	Measurement	Bit Offset (ft.)	Max O.D. (in.)	Min I.D. (in.)
1	DIR	11688045	Directional	46.90	6.750	3.250
1	SRIG	12578109	Gamma	43.53	6.750	3.250
2	DIR	12373467	Directional	55.58	4.750	2.750
2	SRIG	12605969	Gamma	52.20	4.750	2.750
3	DIR	12566686	Directional	57.20	4.750	2.750
3	SRIG	12354931	Gamma	53.82	4.750	2.750
4	DIR	10170879	Directional	54.01	4.750	2.750
4	SRIG	12600748	Gamma	50.63	4.750	2.750

Service and Tool Mnemonics

Mnemonic	Name	Description
DIR	Directional	Wellbore directional survey
SRIG	Inclination and Gamma	Probe based gamma ray and inclination module

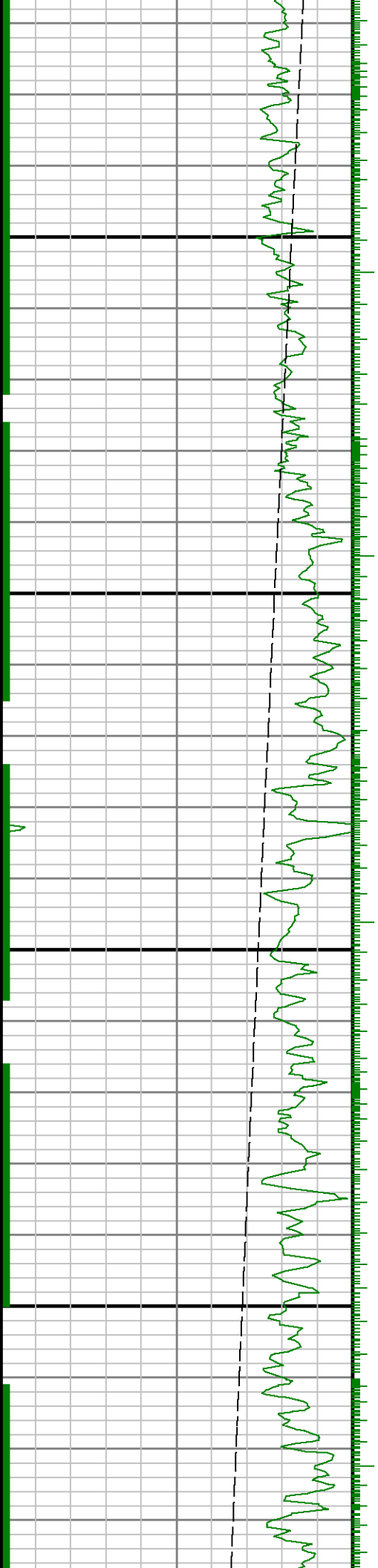
- 1.) Baker Hughes LWD run 1 utilized 6 3/4 inch NaviTrak Services (VSS, Directional) from 899 to 7137 ft. MD (898.32 to 7060.12 ft. TVD) and NaviGamma Services (VSS, Directional, Gamma Ray) behind an 8 3/4 inch bit and steerable assembly from 7137 to 8240 ft. MD (7060.12 to 7726.74 ft. TVD).
- 2.) Baker Hughes LWD run 2 utilized 4 3/4 inch NaviGamma Services (VSS, Directional, Gamma Ray) behind an 6 1/8 inch bit and steerable assembly from 8240 to 10446 ft. MD (7726.74 to 7690.29 ft. TVD).
- 3.) Baker Hughes LWD run 3 utilized NaviGamma Services (VSS, Directional, Gamma Ray) behind an 6 1/8 inch bit and steerable assembly. No footage was drilled or logged with this tool.
- 4.) Baker Hughes LWD run 4 utilized 4 3/4 inch NaviGamma Services (VSS, Directional, Gamma Ray) behind an 6 1/8 inch bit and steerable assembly from 10446 to 12217 ft. MD (7690.29 to 7678.27 ft. TVD).
- 5.) A sliding indicator is shown to the left of track 1 as a heavy green line. The indicator has been depth-shifted to the gamma sensor offset to correspond with data acquired while sliding.
- 6.) Depth measurements were obtained from a depth tracking system not supplied or operated by Baker Hughes. Due to the lack of control by Baker Hughes LWD logging engineers, depth calibrations and measurements could not be independently verified and the unverified depths as supplied to Baker Hughes are being used to present logging data.

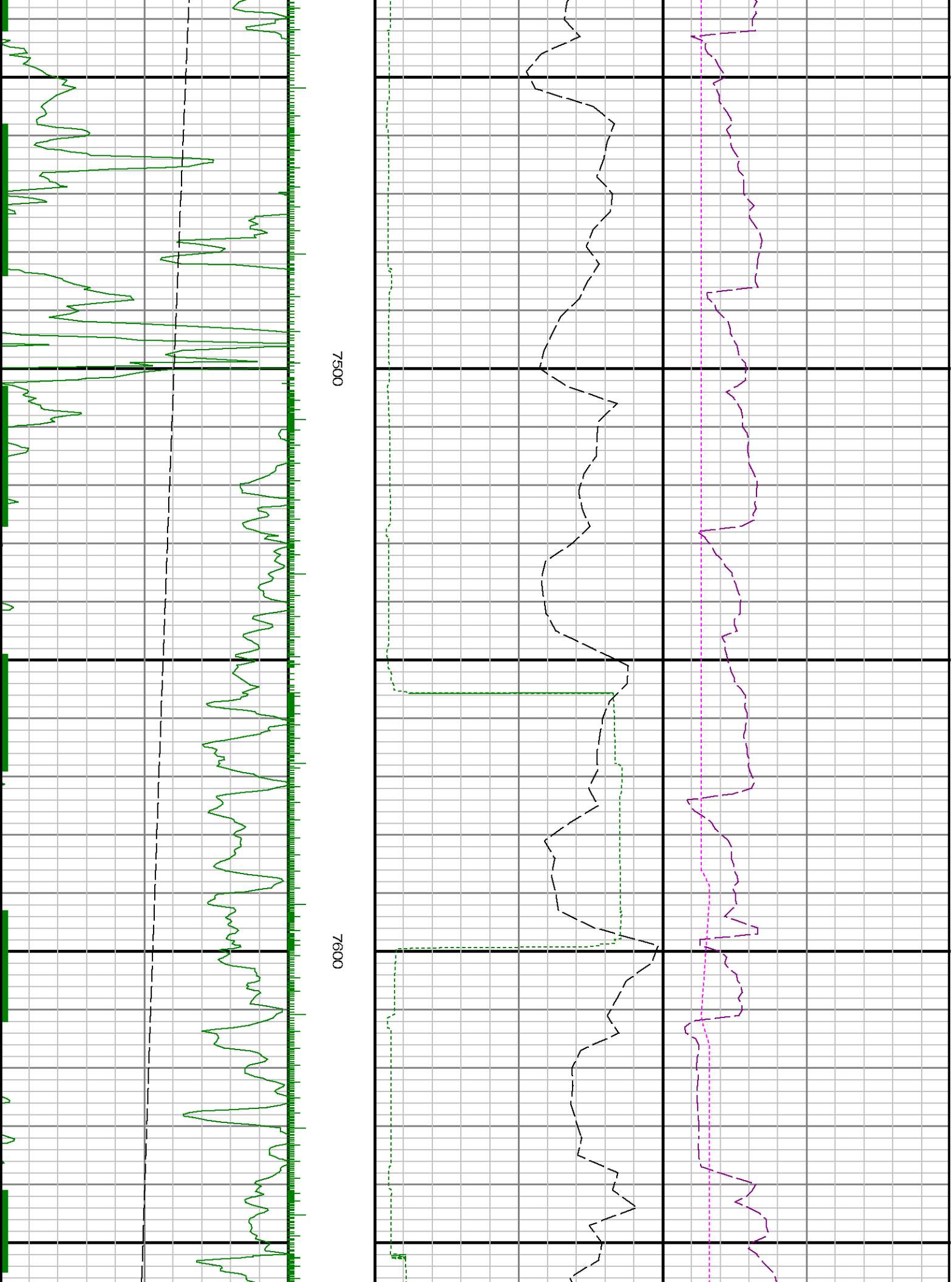


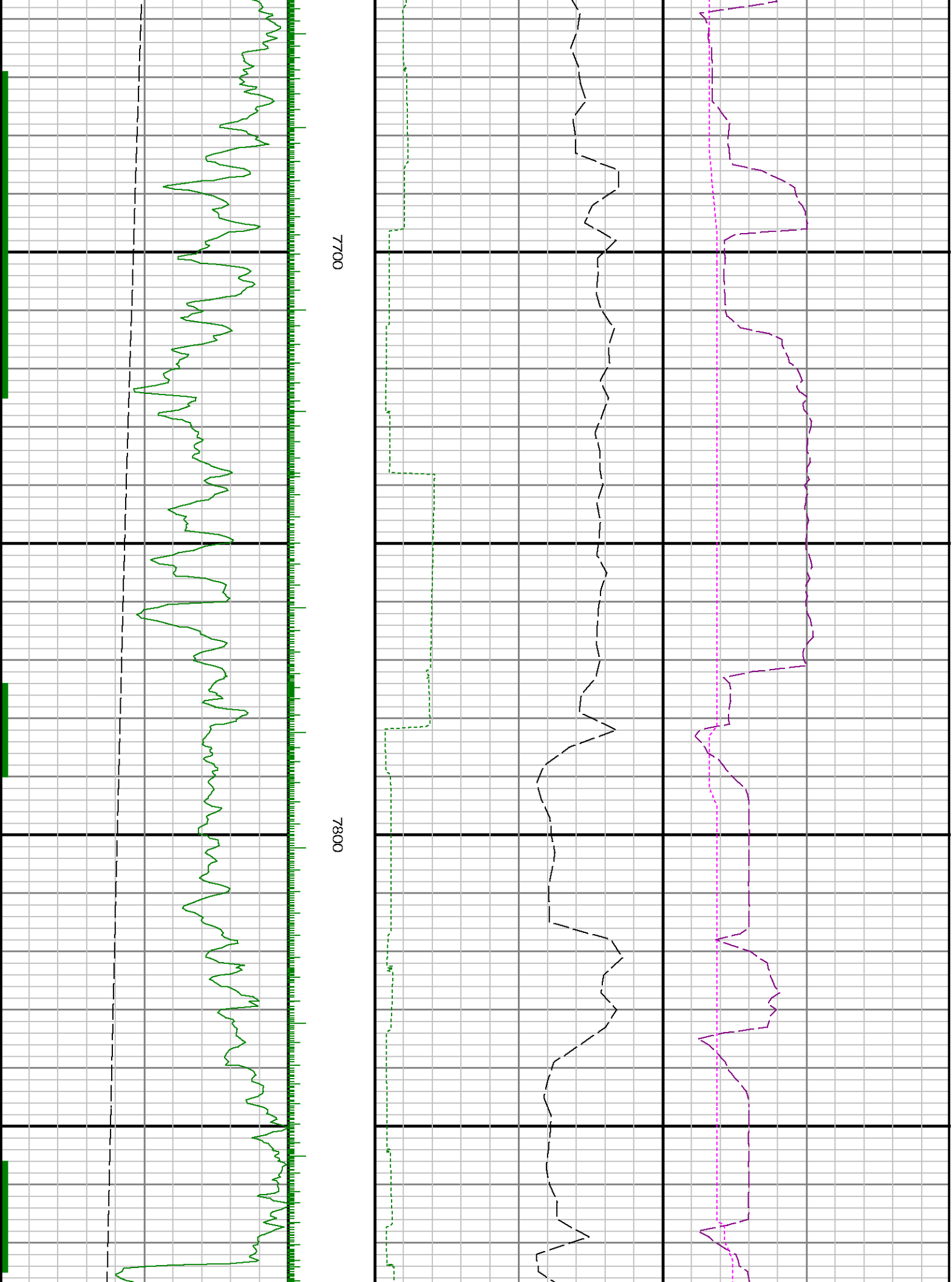


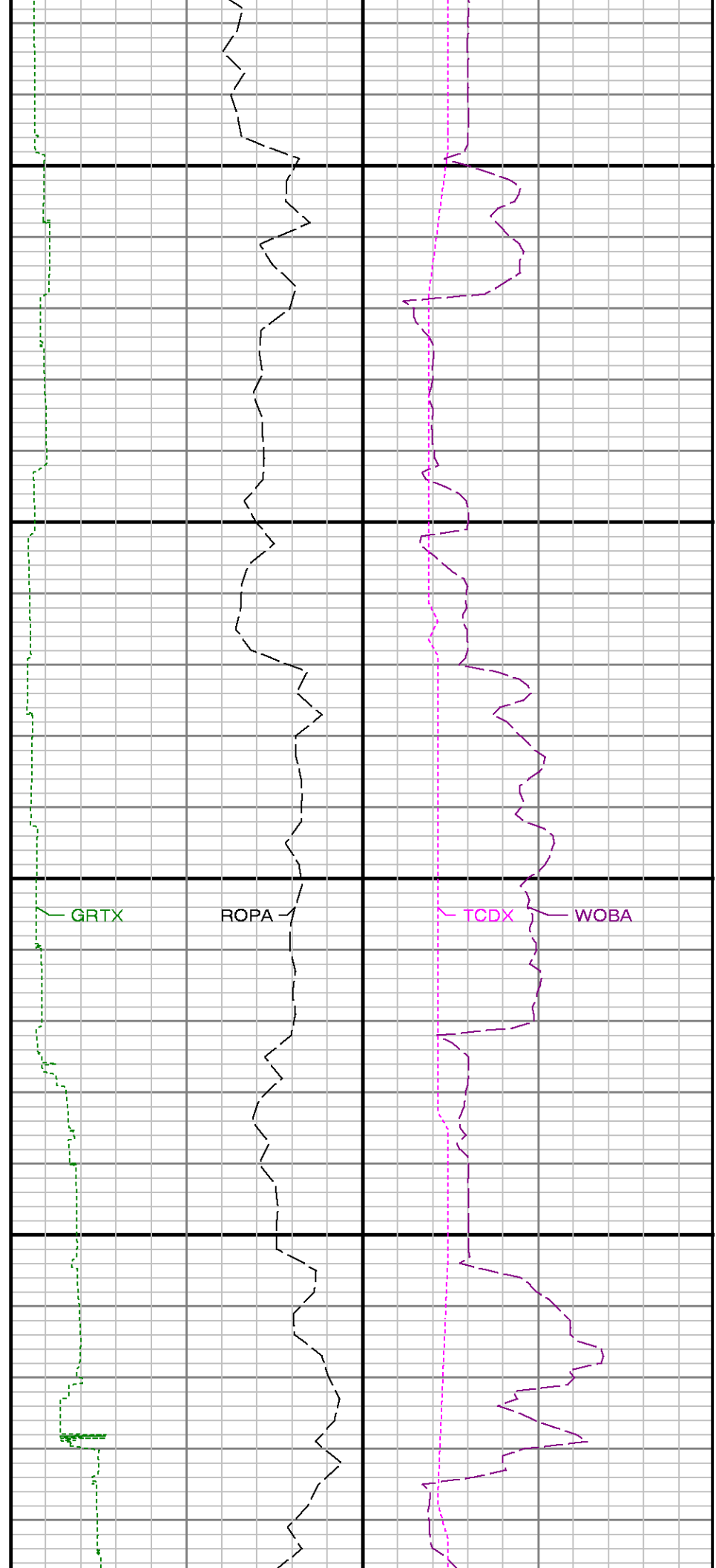
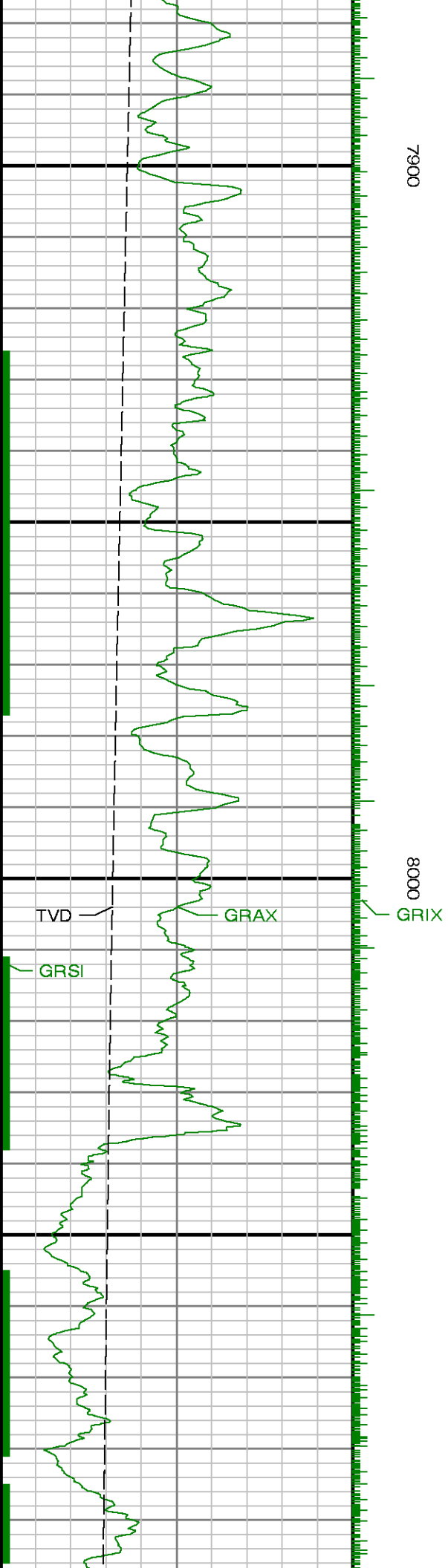
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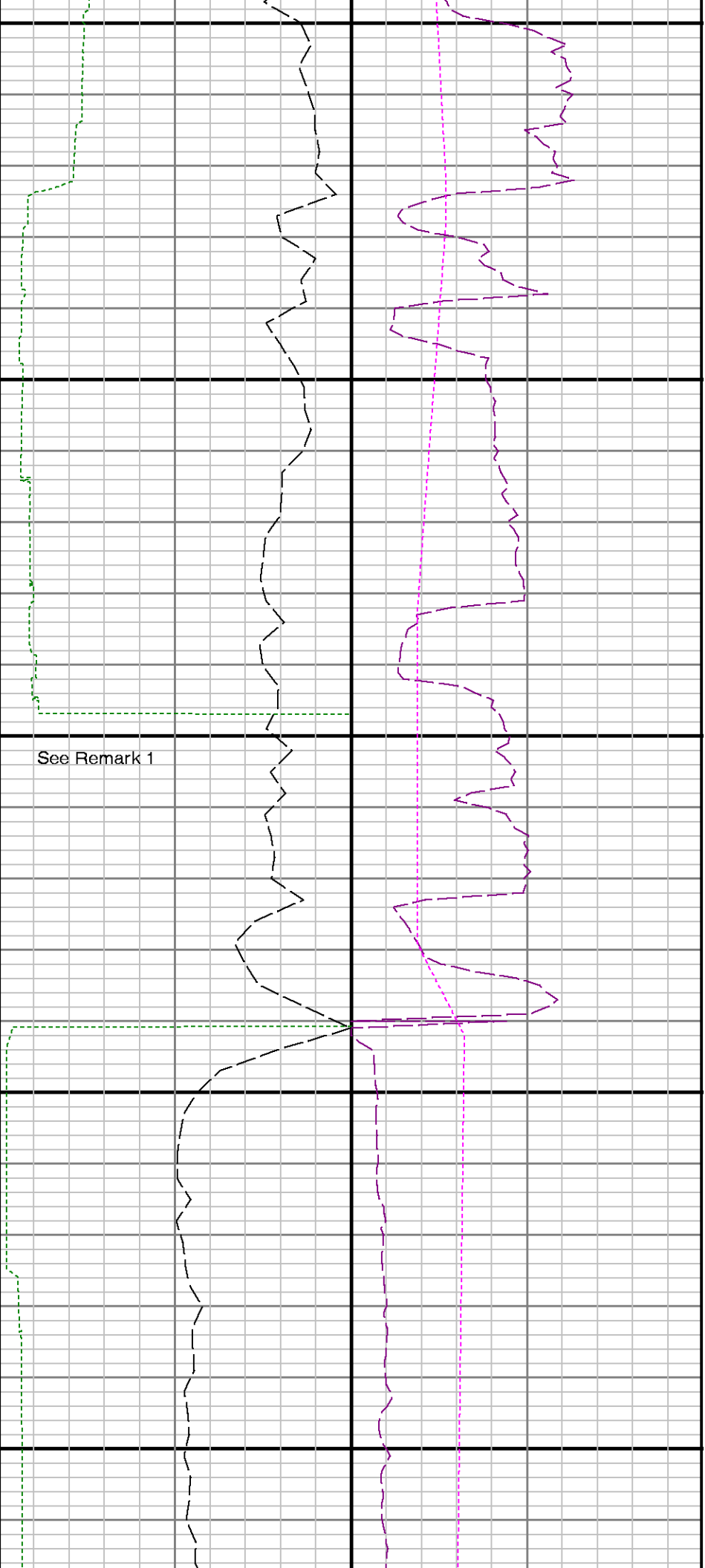
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See Remark 1

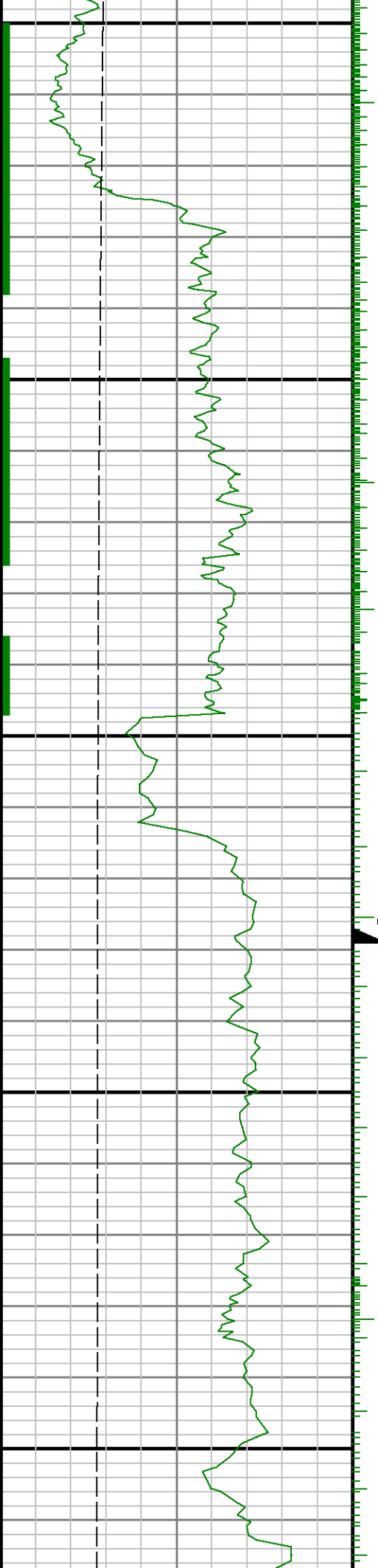
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8200

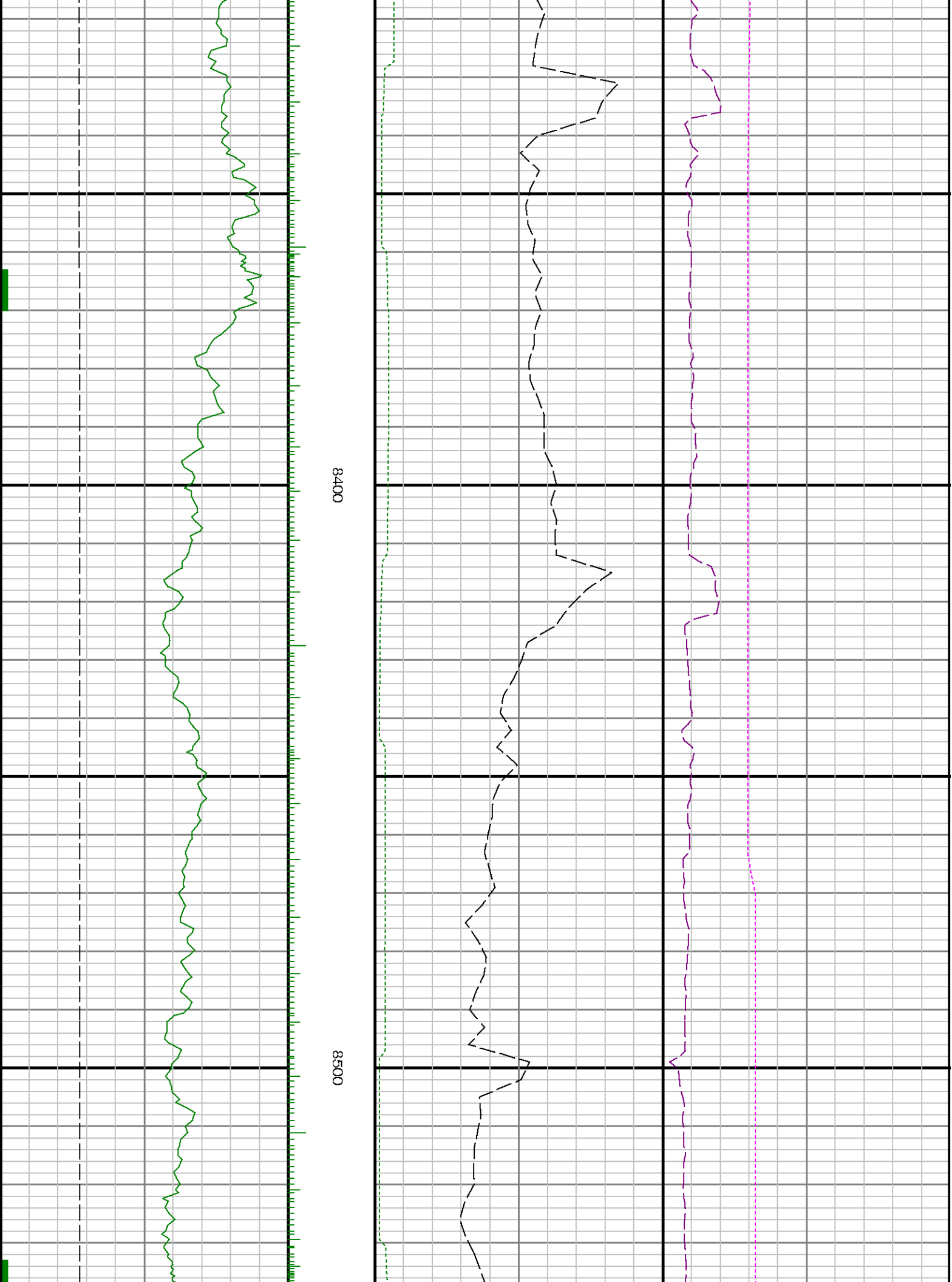
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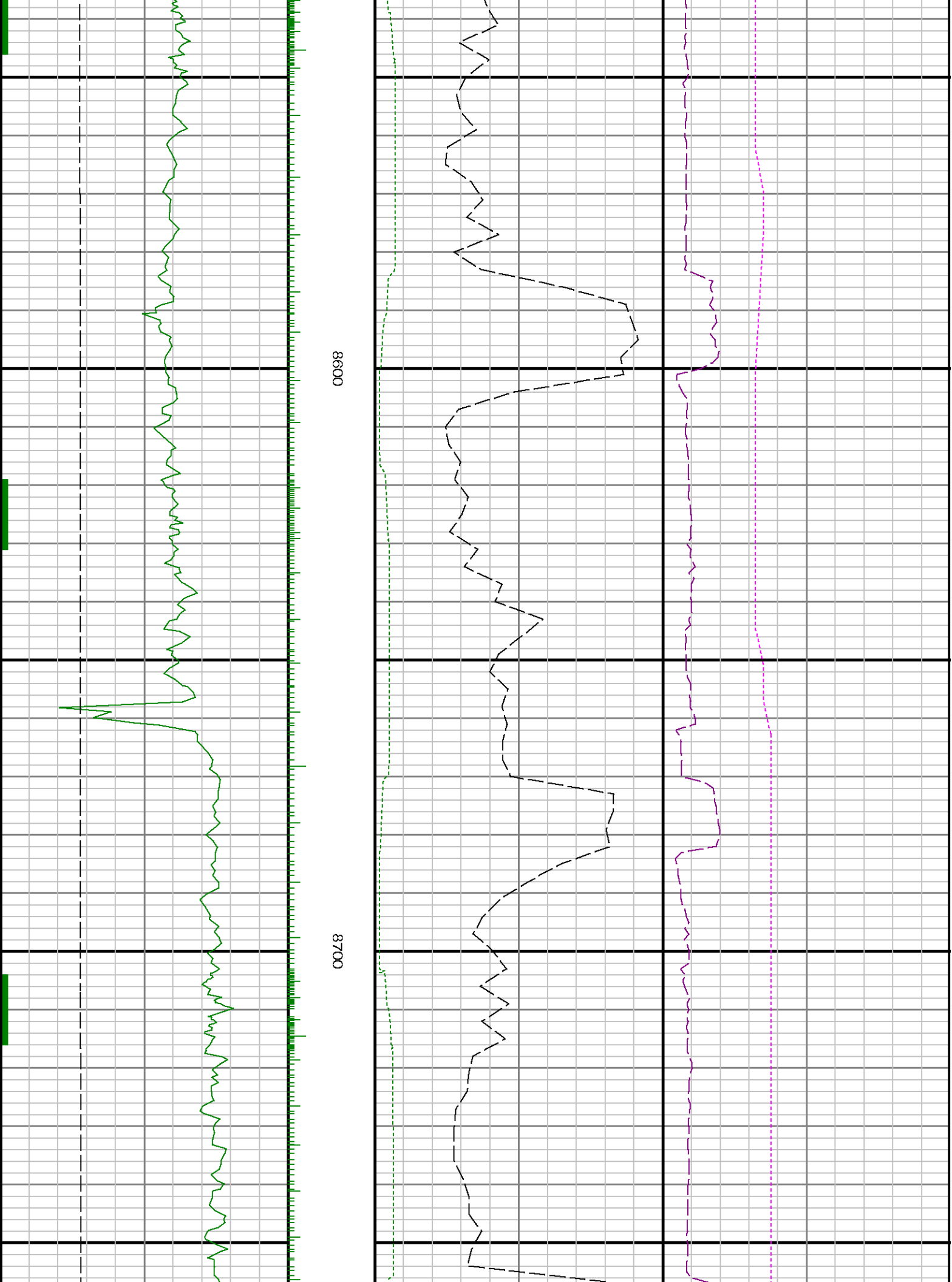
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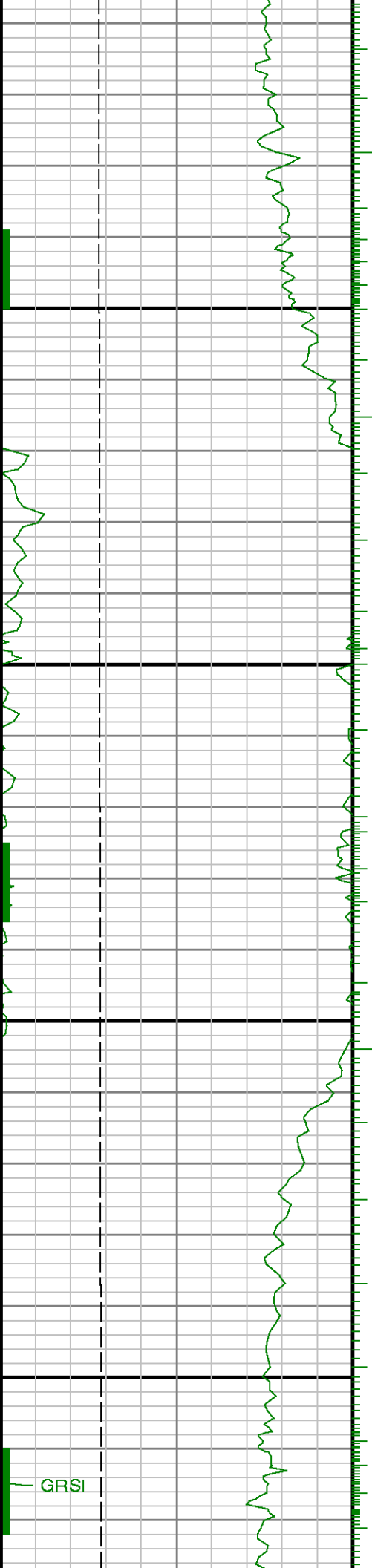
Run 1 < > Run 2







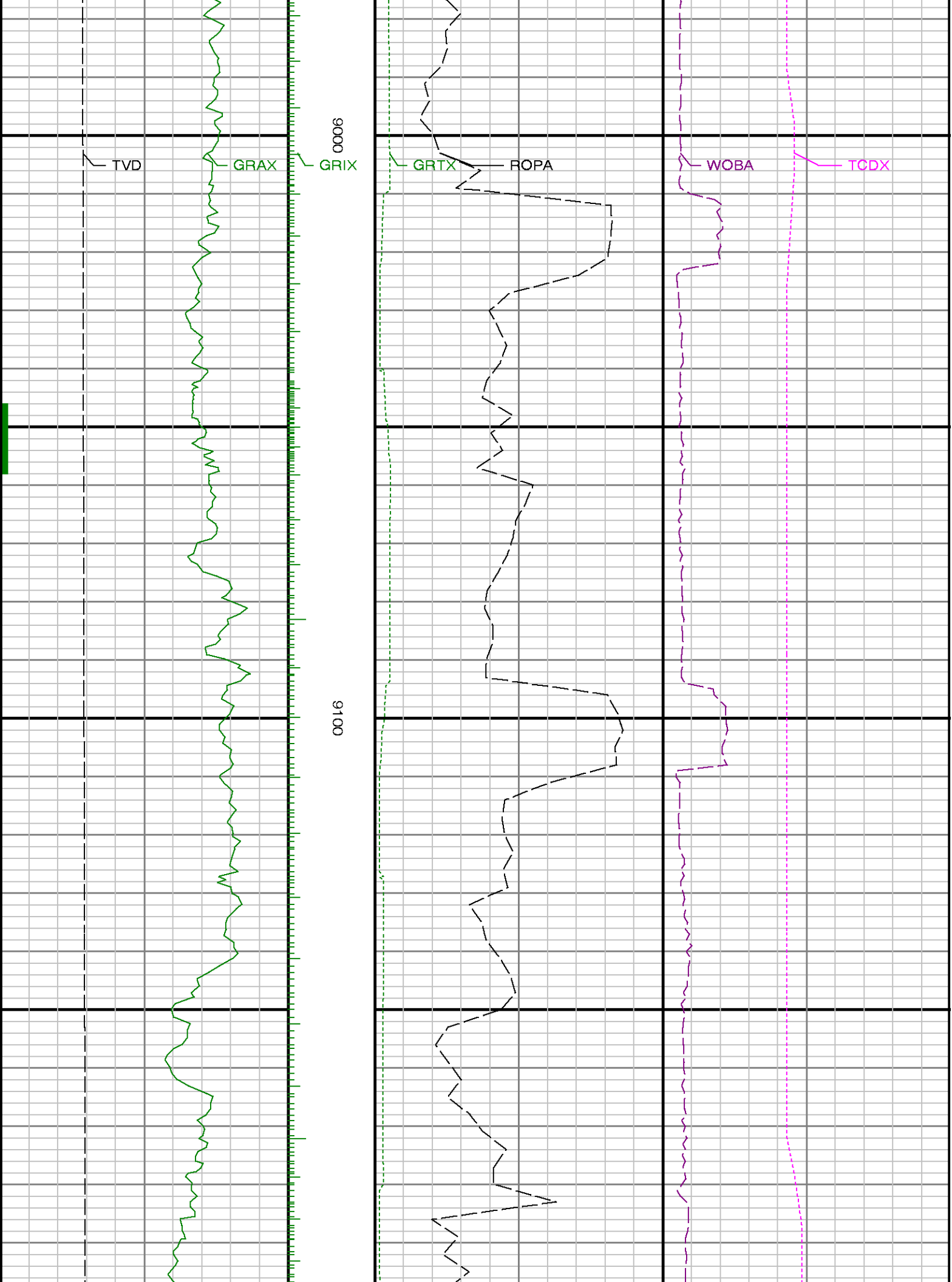


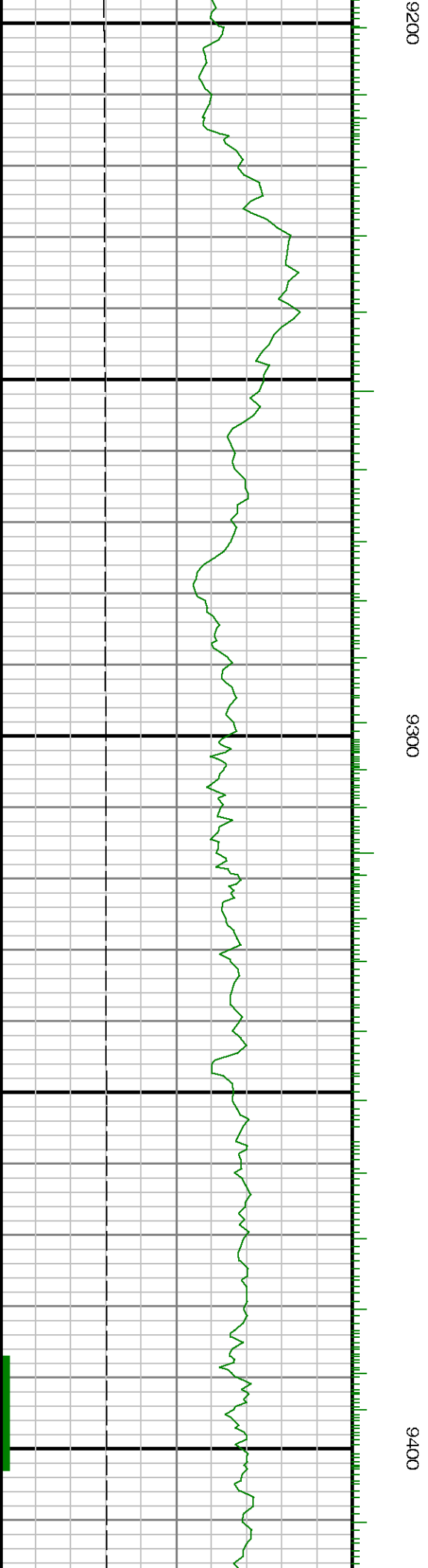


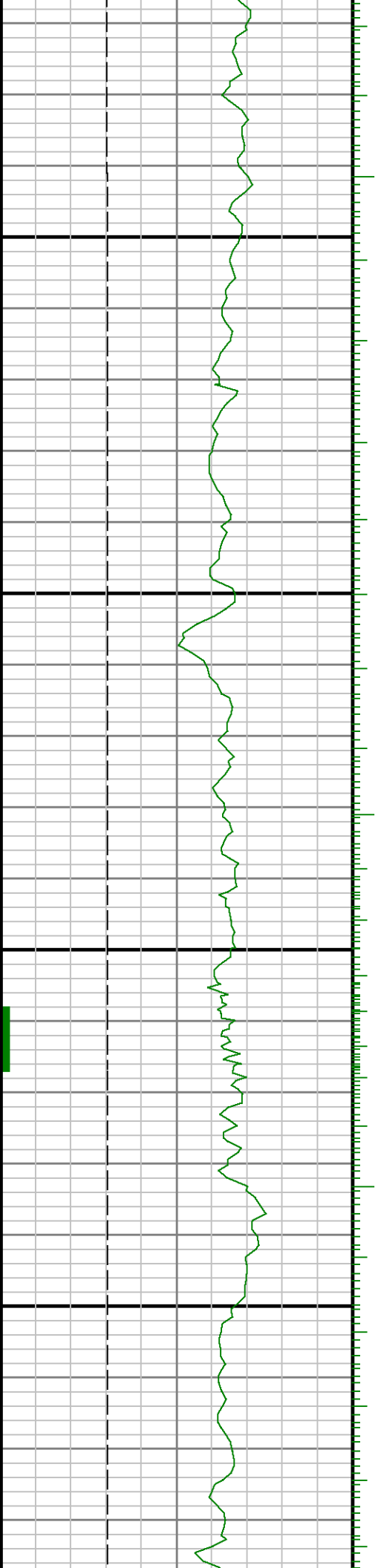
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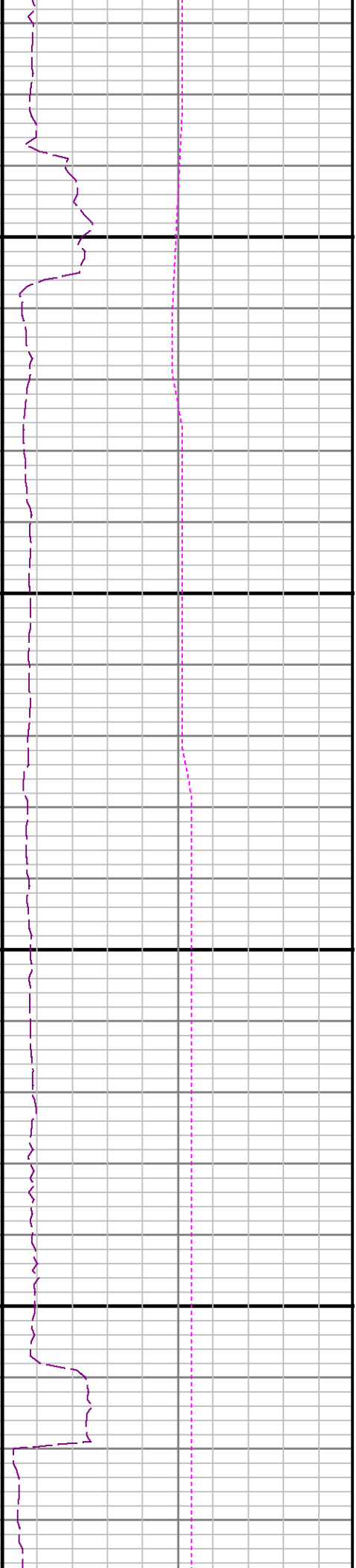


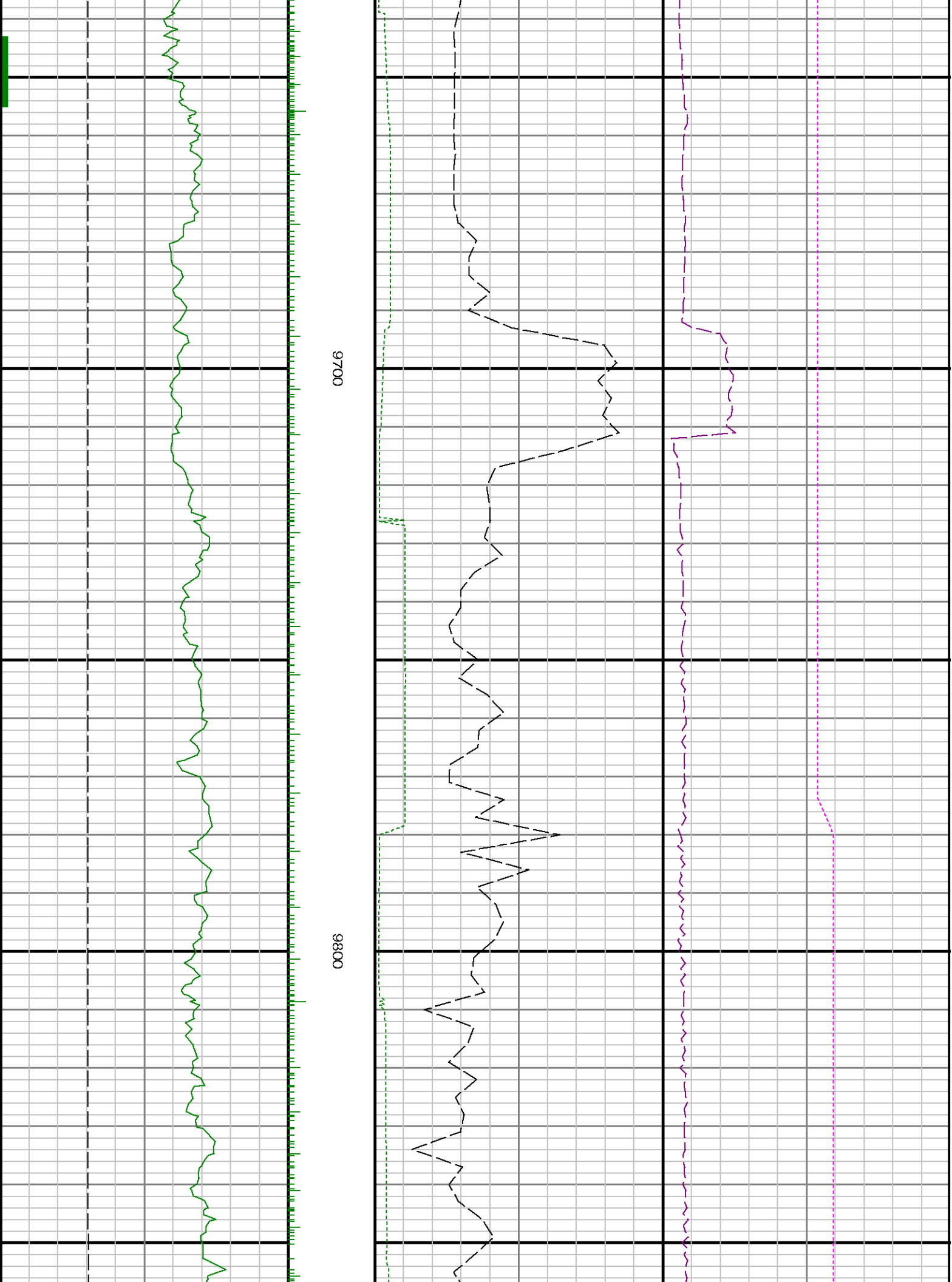


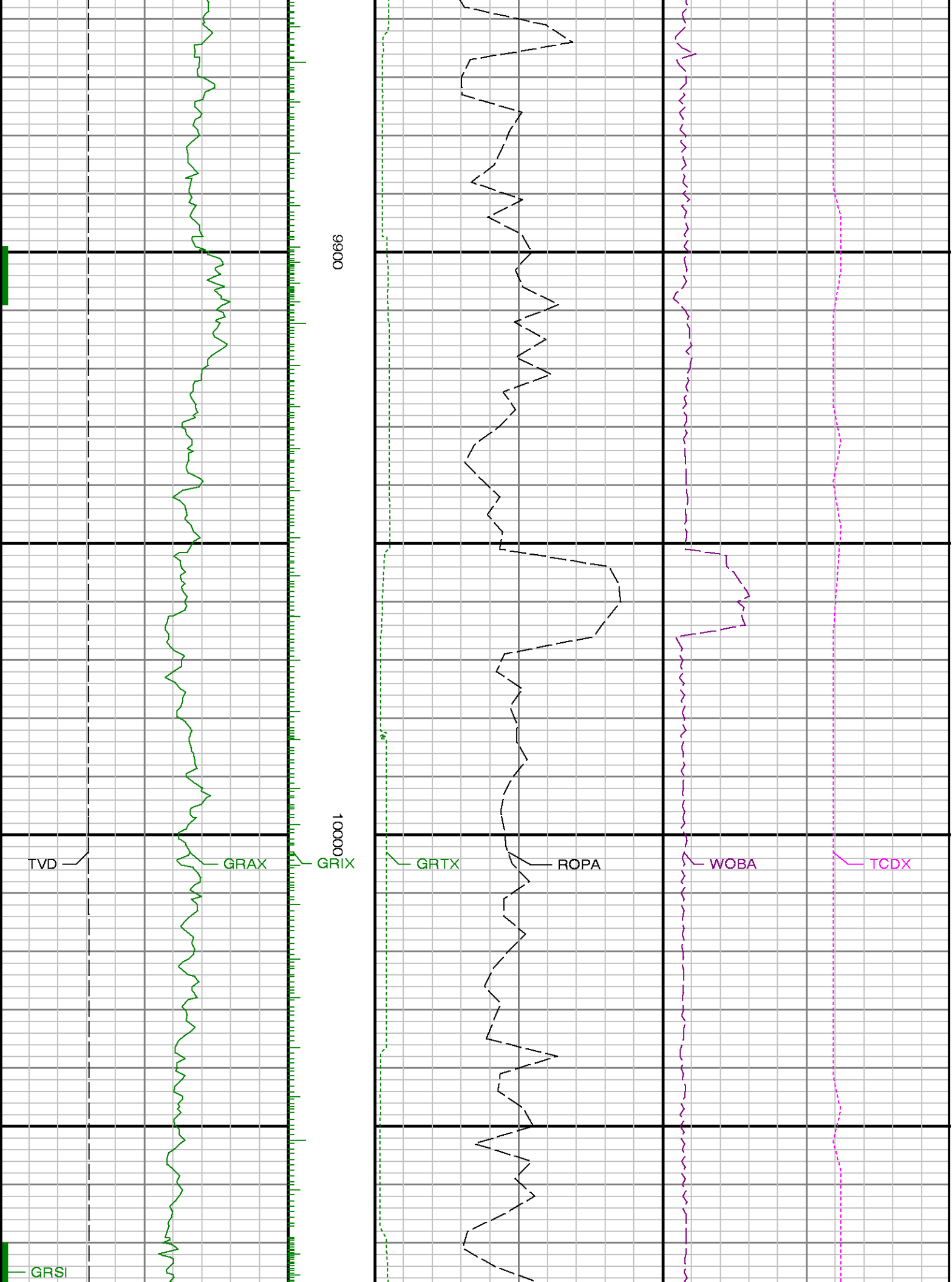


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9600





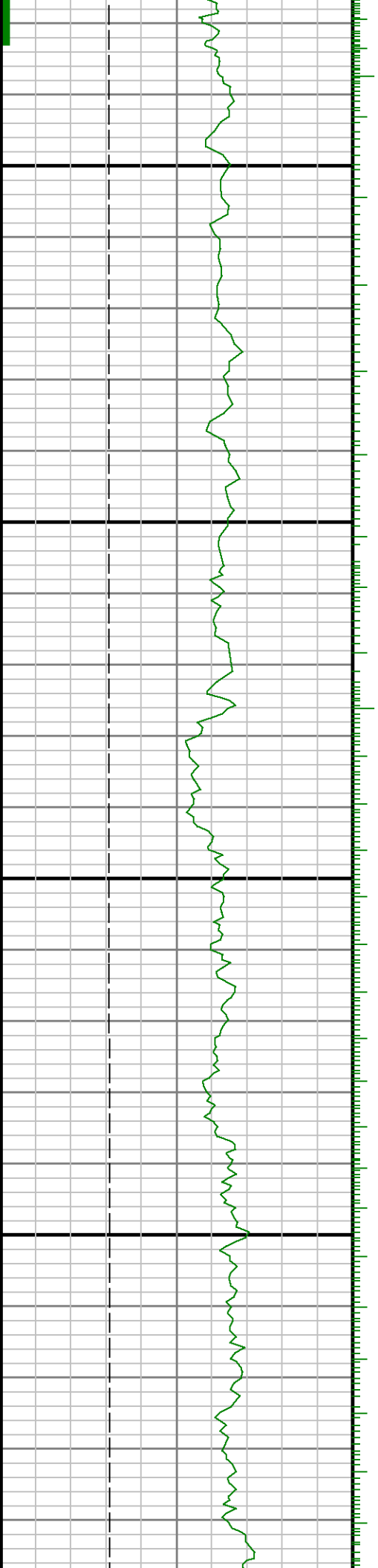


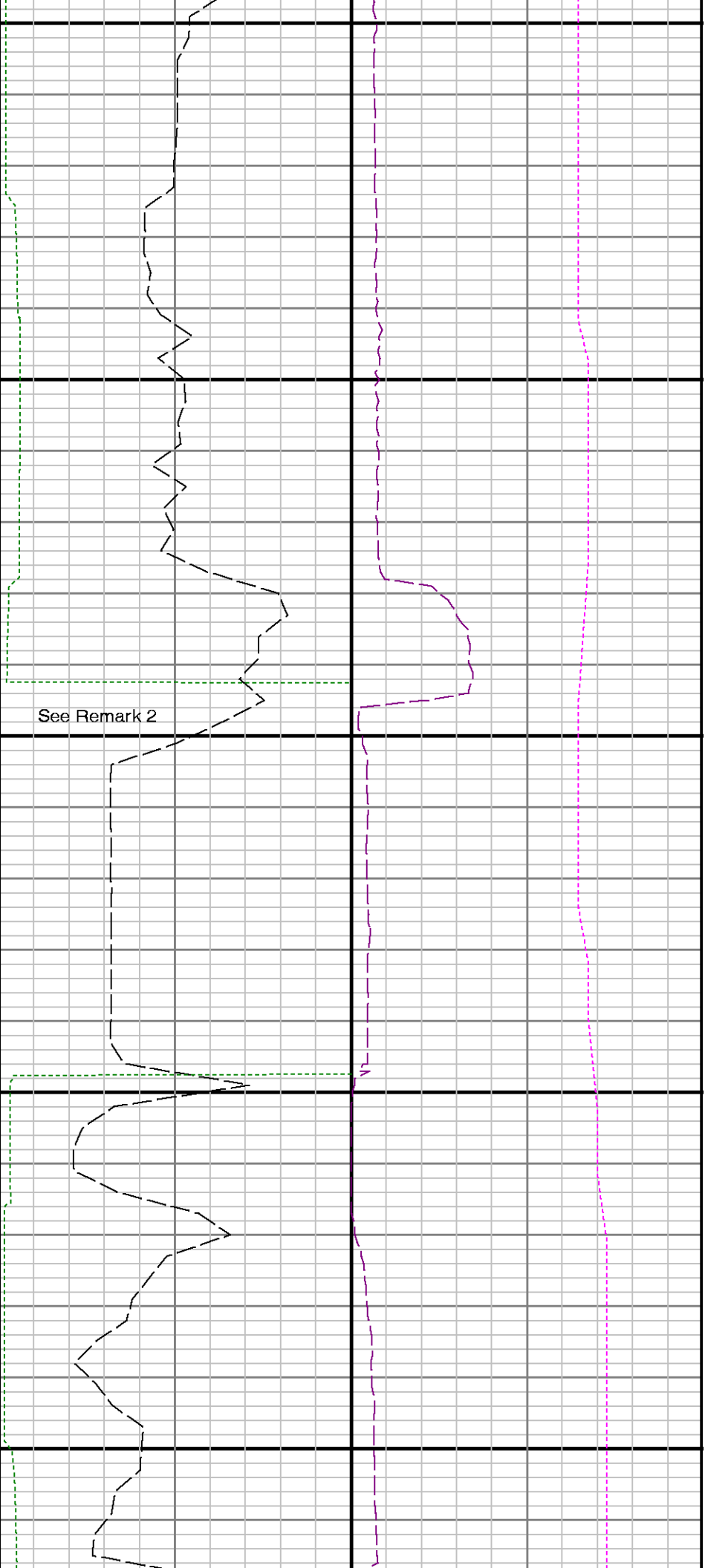




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10200





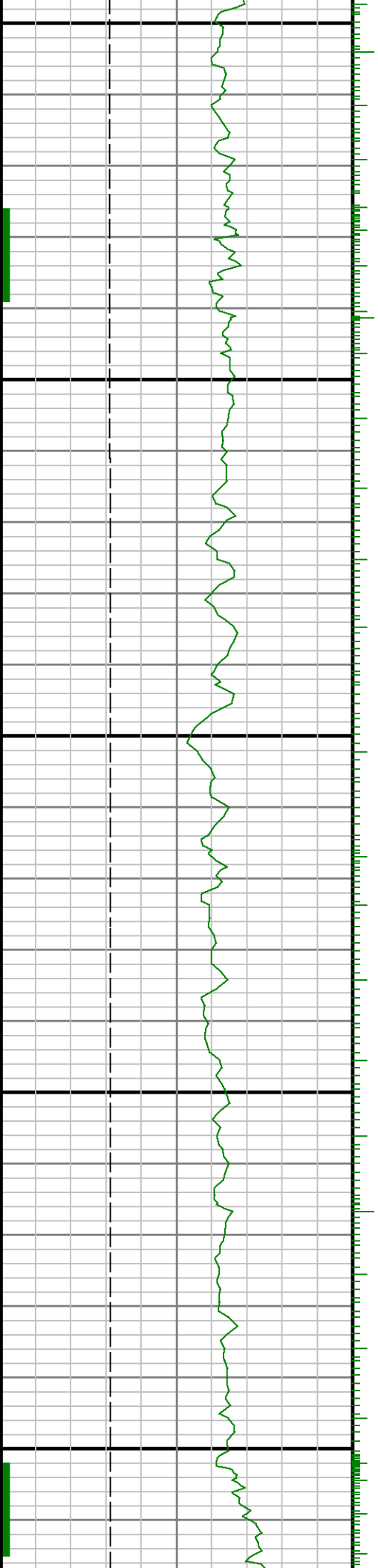
See Remark 2

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Run 2 < > Run 4

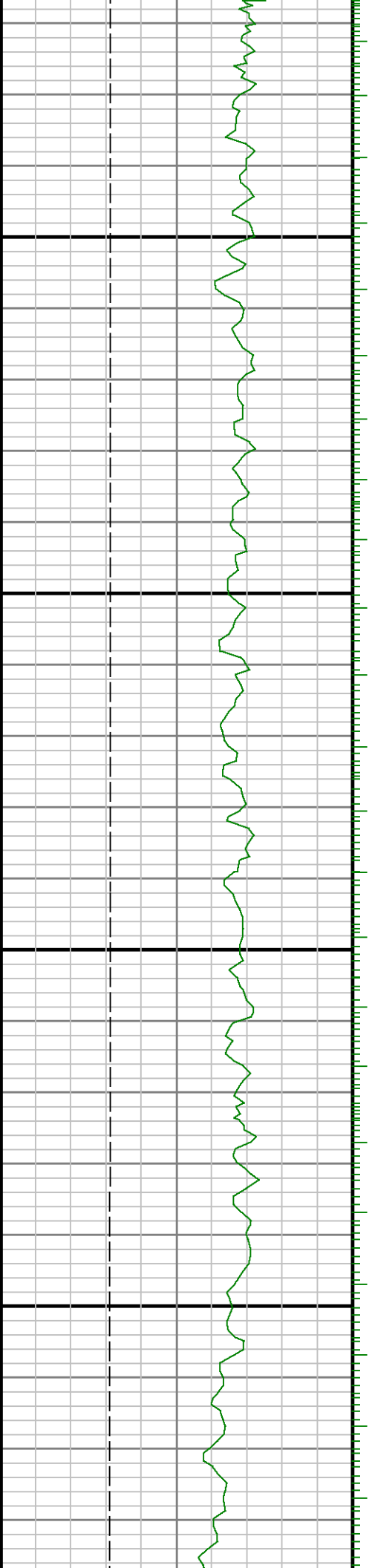
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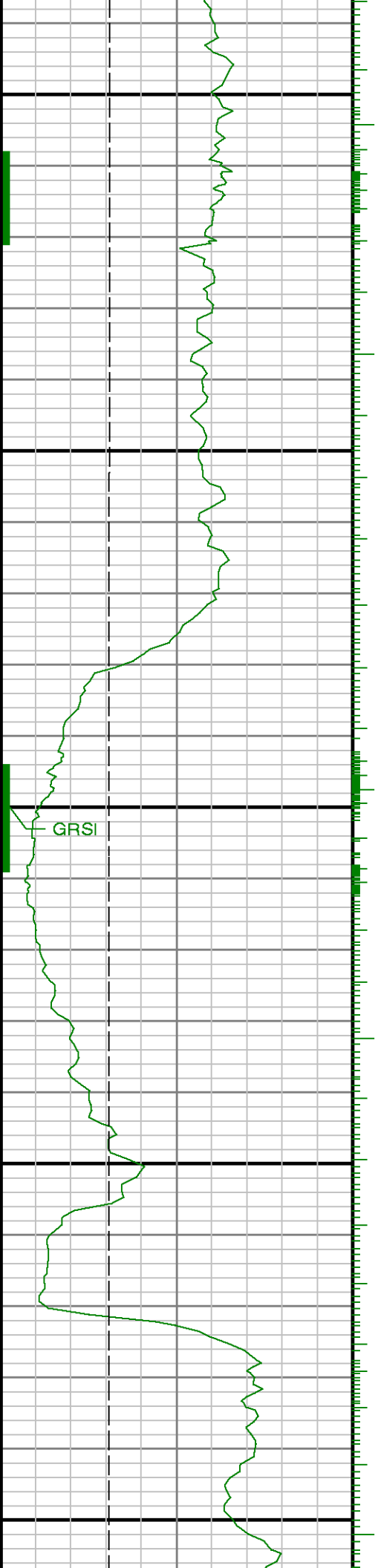




10600

10700





10800

10900



