



Memory and Realtime Log

Natural Formation Evaluation
Multiple Propagation Resistivity
Gamma Ray

Scale:	Company: Anadarko
1:240	Well: UNDERHILL 27N-17HZ
Measured Depth	Field: WELD COUNTY (KERR MCGEE)
	Region: Rocky Mountains Country: United States

Status:	Field Print	Surface Location:	Other Services:
API Number:	051233691500	Latitude: 40° 2' 46.000" N Longitude: 104° 54' 30.971" W	Directional
Permanent Datum (P.D.):	Ground Level	Elevation: 5113.00 ft.	Elevations: N/A
Log Measured From:	Rig Floor	15.00 ft.	Above P.D.
Depth Reference:	Driller's Depth		KB: 5119.00 ft. DF: 5103.00 ft. GL:

Interval Logged	Dates	Magnetic Field Reference
Top: 7062.0 ft.	Date From: 03/Aug/2013	Dip Angle: 66.50°
Bottom: 12158.0 ft.	Date To: 05/Aug/2013	Azi Reference North: True
	Spud Date: 29/Jul/2013	Field Strength: 52930.0 nT North Correction: 8.51°

Borehole Record			Casing Record		
Hole Size	From	To	Size	Weight	From To
8.750 in.	953.0 ft.	8119.0 ft.	9.625 in.	36.00 lb/ft	Surface 943.0 ft.
6.125 in.	8119.0 ft.	12201.0 ft.	7.000 in.	26.00 lb/ft	Surface 8110.0 ft.

Mud Record			Deviation Record		
Type	From	To	Hole Size	Interval	Inc / Az (Start) Inc / Az (End)
Water Based	Surface	8119.0 ft.	8.750 in.	90.0 ft.	1.8° / 52.5° 0.1° / 295.6°
LSND	8119.0 ft.	12201.0 ft.	8.750 in.	45.0 ft.	0.1° / 295.6° 87.3° / 1.1°
			6.125 in.	90.0 ft.	87.3° / 1.1° 91.9° / 359.3°
					/
					/
					/

Acquisition System		Software Version		Other	
Advantage	2.20U4	Rig / Contractor:	Xtreme 24	/ Xtreme Coil Drilling	
PATS	6.4.1.34	Job No:	5589936	/ D & E	
		District / Unit:	RMD		

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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	Bottom	From	To	Start		End		
							(ft.)	(ft.)	(ft.)	(ft.)					
1	1	1	8.750	PDC	2.000	Steerable	7062.0	8072.0	953.0	8119.0	29/Jul/2013 07:32		31/Jul/2013 22:50		35
2	2	2	6.125	PDC	6.000	Steerable	8072.0	12158.0	8119.0	12201.0	03/Aug/2013 17:30		06/Aug/2013 20:15		43.9

Crew

Name	Arrive	Depart	Name	Arrive	Depart	Name	Arrive	Depart
	Wellsite	Wellsite		Wellsite	Wellsite		Wellsite	Wellsite
Austin Small	30/Jul/2013	07/Aug/2013	Osagie Otoikhine	29/Jul/2013	07/Aug/2013			

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+ (%)
30/Jul/2013	18:00	1	3764.0	Drill Water	8.5	2	8.0	N/A	0/98.5	Active	1500	N/A
31/Jul/2013	06:00	1	6060.0	Drill Water	8.6	2	8.0	N/A	0/97.8	Active	1500	N/A
31/Jul/2013	1800	1	7751.0	LSND	10.0	14	7.7	N/A	0/91.5	Active	2000	N/A
03/Aug/2013	18:00	2	8119.0	LSND	10.0	14	8.5	N/A	0.0/91.4	Flowline	1000	N/A
04/Aug/2013	18:00	2	9370.0	LSND	9.6	9	8.5	N/A	0.0/93.0	Flowline	1600	N/A

Mud Resistivity Record				Surface				Downhole			
Date / Time		LWD Run No.	Measured Depth (ft.)	Surface Temp (deg F)	Rm (ohm.m)	Rmf (ohm.m)	Rmc (ohm.m)	BHCT (deg F)	Rm @ BHCT (ohm.m)	Rmf @ BHCT (ohm.m)	Rmc @ BHCT (ohm.m)
29/Jul/2013	07:56	1	900.0	70	1.50	1.50	1.50	100	1.07	1.07	1.07
30/Jul/2013	13:02	1	2613.0	72	0.82	0.82	0.82	115	0.53	0.53	0.53
31/Jul/2013	09:49	1	6885.0	69	0.88	0.88	0.88	167	0.38	0.38	0.38
03/Aug/2013	11:12	2	6885.0	69	0.88	0.88	0.88	167	0.38	0.38	0.38
04/Aug/2013	02:32	2	8198.0	70	0.29	0.29	0.29	193	0.11	0.11	0.11
04/Aug/2013	08:32	2	8653.0	80	1.18	1.18	1.18	195	0.50	0.50	0.50
04/Aug/2013	18:43	2	9467.0	73	1.28	1.28	1.28	210	0.46	0.46	0.46
05/Aug/2013	13:09	2	11324.0	72	1.24	1.24	1.24	225	0.41	0.41	0.41

Mnemonics		
Curve	Description	Units
ROPA	Rate of Penetration, 3.0 ft. Avg.	ft/hr
GRAM	Gamma Ray Apparent, 0.5 ft. Avg.	API
GRIM	Gamma Ray Data Density	points
RACLM	Resistivity (AT) (LS) 400kHz – Compensated Borehole Corrected	ohm.m
RACHM	Resistivity (AT) (LS) 2MHz – Compensated Borehole Corrected	ohm.m
RPCLM	Resistivity (PD) (LS) 400kHz – Compensated Borehole Corrected	ohm.m
RPCHM	Resistivity (PD) (LS) 2MHz – Compensated Borehole Corrected	ohm.m
CACHM	Conductivity (AT) (LS) 2MHz – Compensated Borehole Corrected	mho/m
RPTHM	Time Since Drilled [RPCHM]	mins
RPSHIM	Resistivity Slide Indicator	unitless

Equipment and Service Data						
LWD Run No.	Tool	Serial Number	Measurement	Bit Offset (ft.)	Max O.D. (in.)	Min I.D. (in.)
1	CS	12447875	-	72.90	7.030	2.165
1	BCPM	12000489	Telemetry	62.53	7.030	2.165
1	OTK	12129153	Directional	57.61	7.031	2.165
1	OTK	12129153	Resistivity	51.80	7.031	2.165
1	OTK	12129153	Gamma	47.77	7.031	2.165

1	OTK	12129153	Pressure	46.88	7.031	2.165
1	CS	12128324	-	43.29	7.030	2.165
2	CS	12114979	-	74.15	5.000	2.060
2	BCPM	12114979	Telemetry	63.60	5.000	2.060
2	STAB	12401251	-	60.34	5.625	2.060
2	OTK	11790138	Directional	55.72	4.843	2.569
2	OTK	11790138	Resistivity	49.75	4.843	2.569
2	OTK	11790138	Gamma	42.56	4.843	2.569
2	OTK	11790138	Pressure	45.19	4.843	2.569
2	CS	12018734	-	38.04	5.000	2.060

Service and Tool Mnemonics

Mnemonic	Name	Description
BCPM	BCPM	Mud pulse telemetry and downhole tool power module
OTK	OnTrak	Propagation resistivity, propagation conductivity, gamma ray, directional, annular pressure, system memory and VSS
STAB	Stabilizer	Stabilizer assembly
CS	Closure Sub	BHA power ring isolator allowing insertion of inert sub into electrically powered BHA

Comments

- (1) Baker Hughes INTEQ run 1 utilized 6 3/4 Ontrak services (Multiple Propagation Resistivity, Gamma Ray and Directional) behind a 8 3/4 inch bit and steerable assembly from 935 to 7727 feet MD (935 to 7675 feet TVD).
- (2) Baker Hughes INTEQ run 2 utilized 4 3/4 Ontrak services (Multiple Propagation Resistivity, Gamma Ray and Directional) behind a 6 1/8 inch bit and steerable assembly from 8120 to 12201 feet MD (7648 to 7494 feet TVD).
- (3) A sliding indicator is shown on the right edge of track 2 as a heavy line. The indicator has been depth-shifted to the resistivity sensor offset to correspond with resistivity data acquired while sliding.

Remarks

Number	Measured Depth (ft.)	Hole Section (in.)	LWD Run No.	Remark
1	7062	8.750	1	The interval from surface to 7062 feet MD (6980 feet TVD) was not logged since logging services began with the start of drilling with the curve assembly for run 1.
2	8096	8.750	1	Erratic Resistivity Values from 8073 to 8099 feet MD (7648 to 7648 feet TVD) due to casing shoe.
3	8119	8.750	1	The interval from 8072 to 8119 feet MD (7647 feet to 7648 feet TVD) was logged up to 35 hours after being drilled due to trip out of the hole for casing and cementing operations.
4	12158	6.125	2	The interval from 12158 to 12201 feet MD (7495 feet to 7494 feet TVD) was not logged due to bit sensor offset at TD.



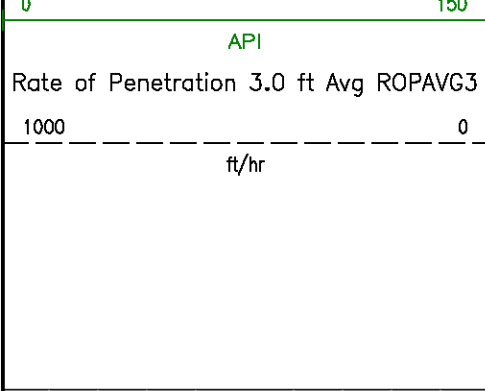
Company : Anadarko

Well : UNDERHILL 27N-17HZ

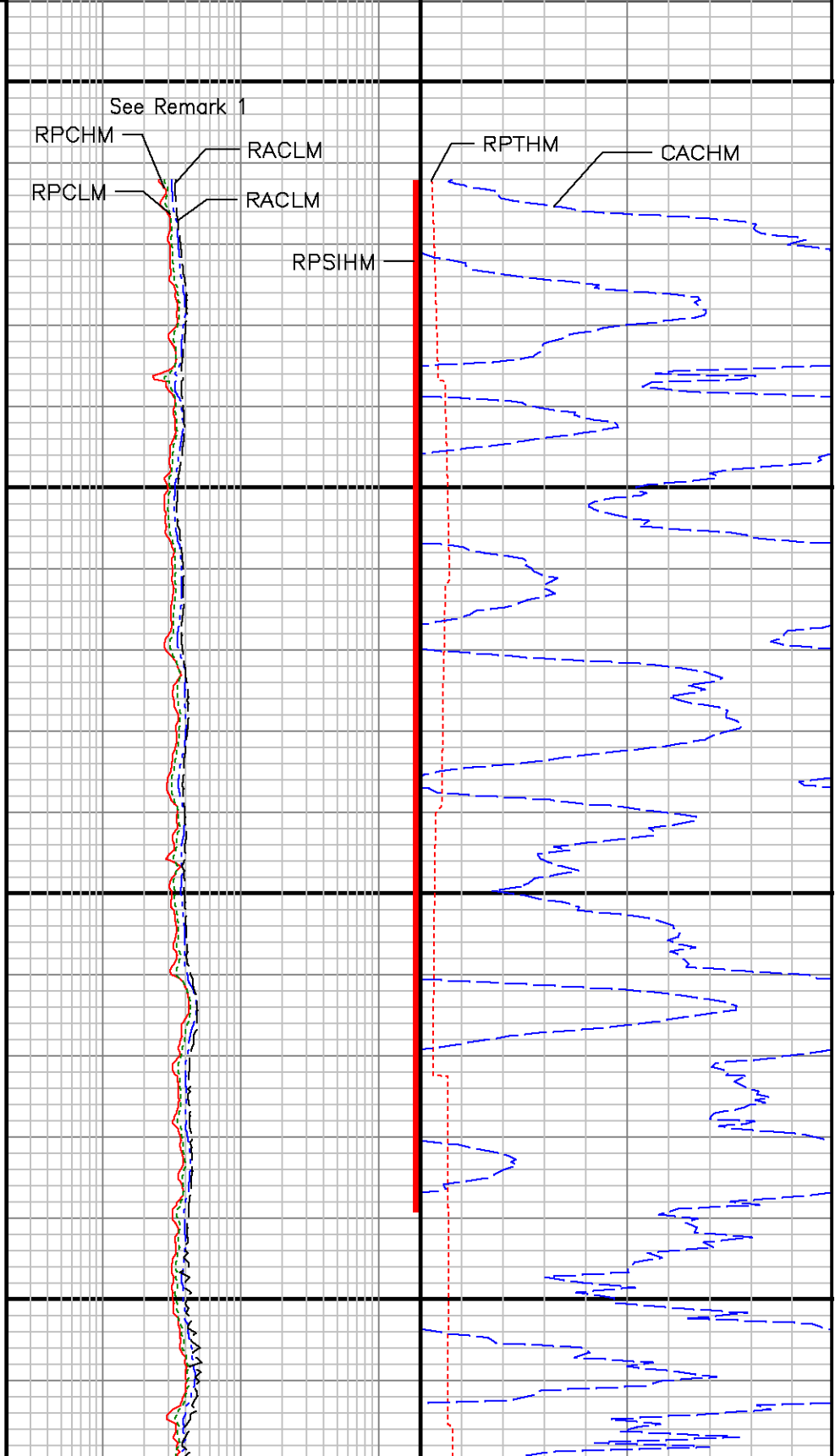
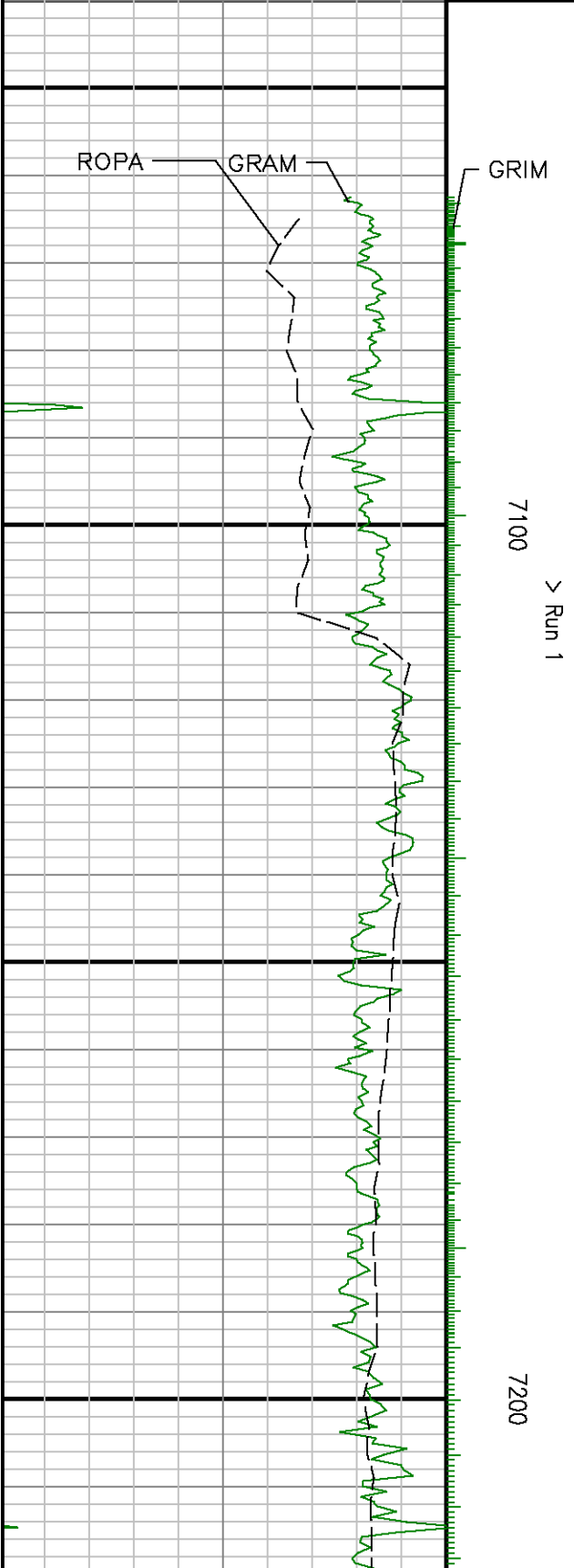
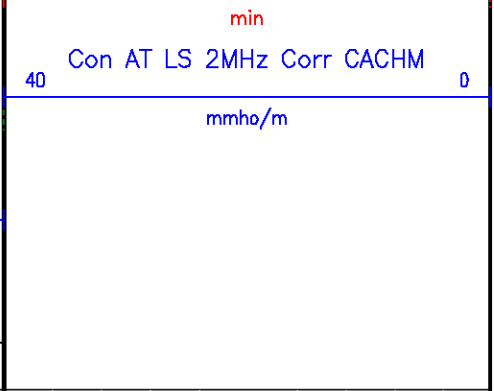
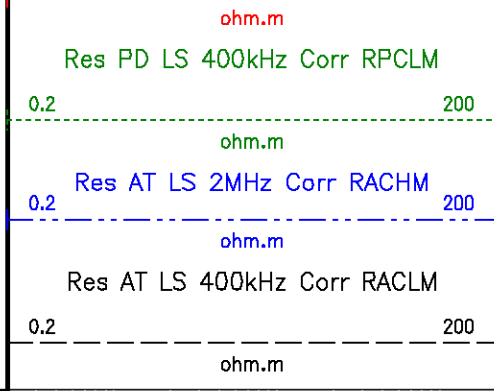
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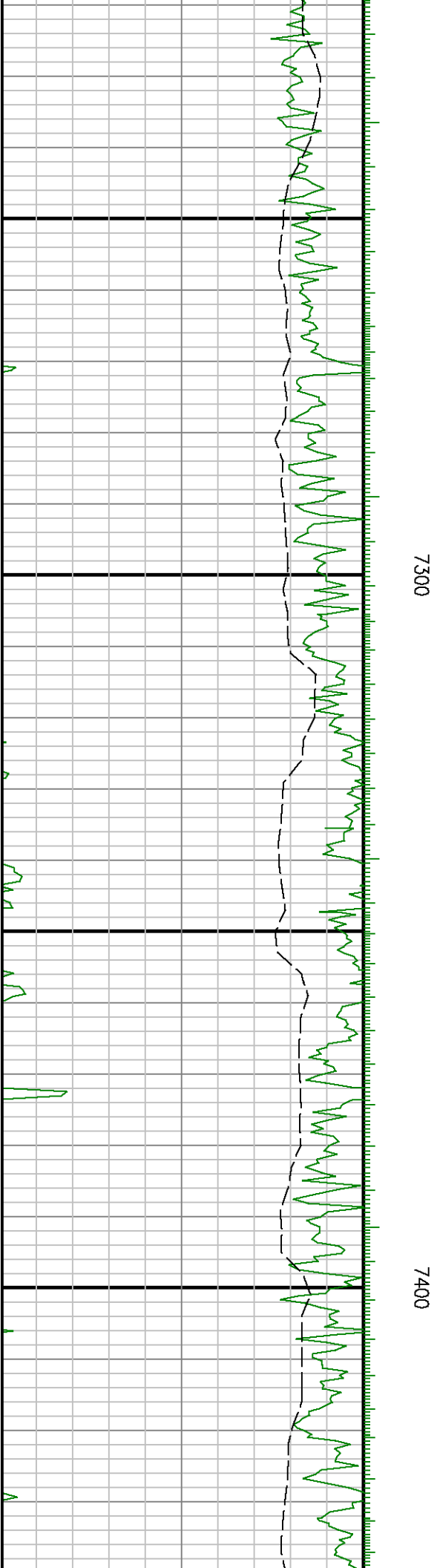
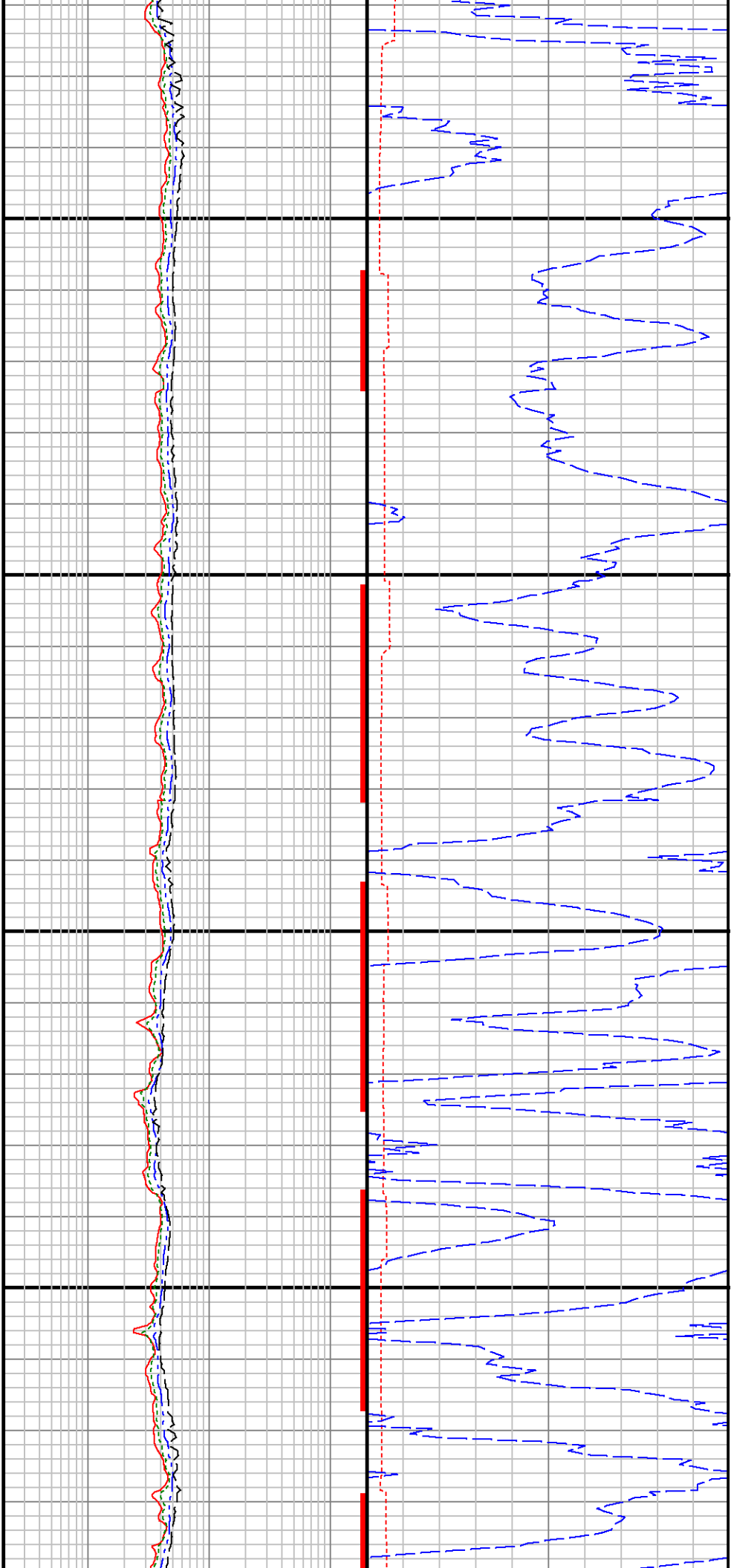
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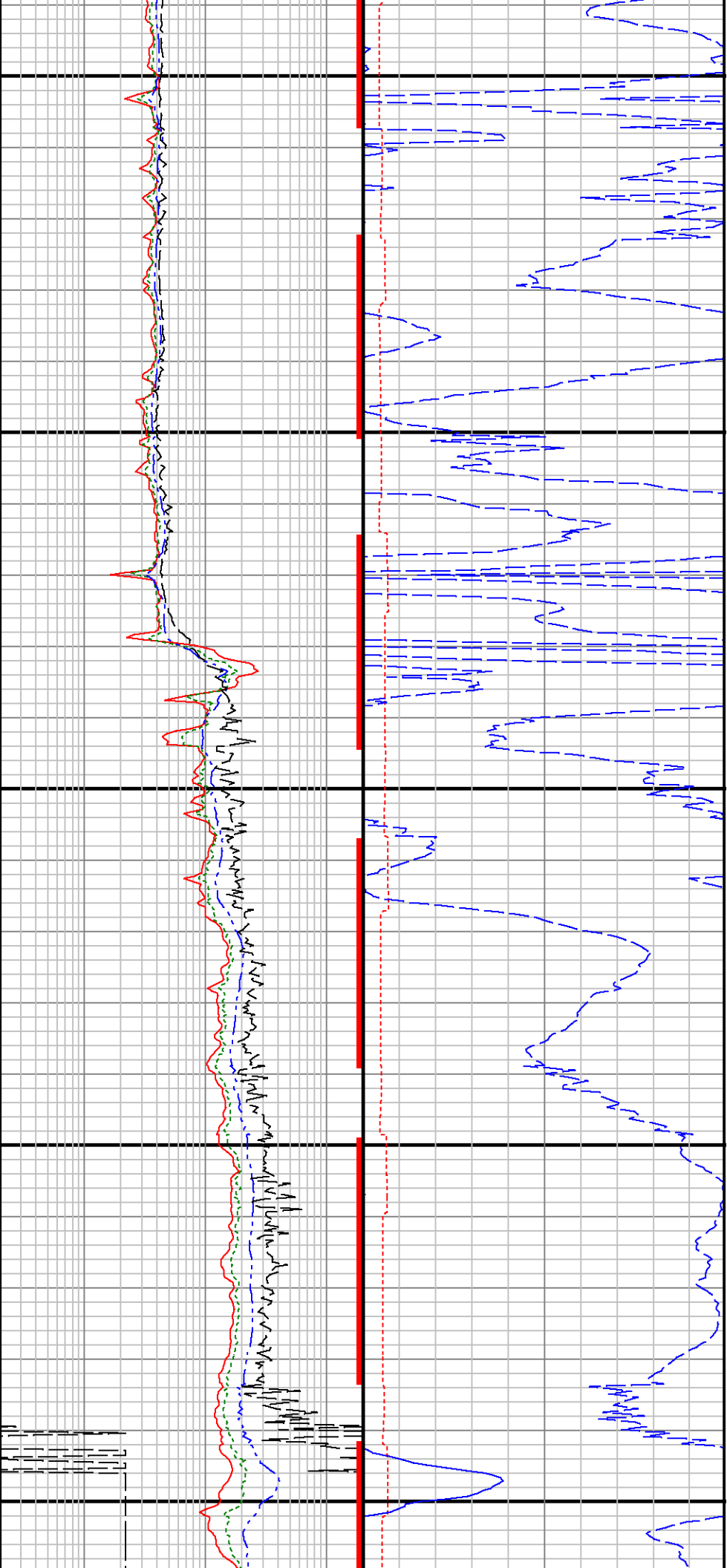
Gamma Ray Apparent 0.5 ft Avg GRAM	MD Feet	Res PD LS 2MHz Corr RPCHM	Time Since Drilled RPTHM
0.2	200	0	600



Set 1:240

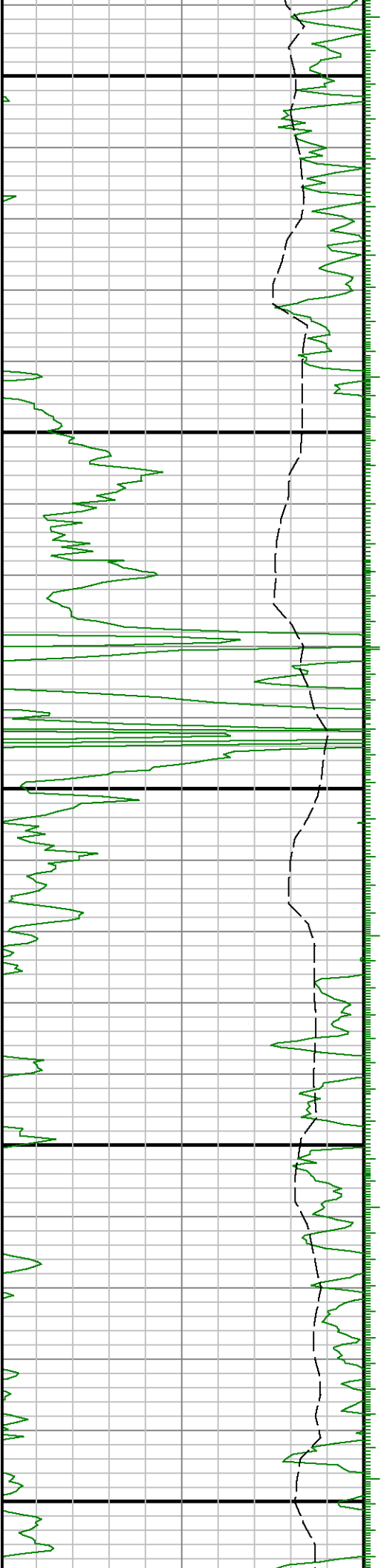


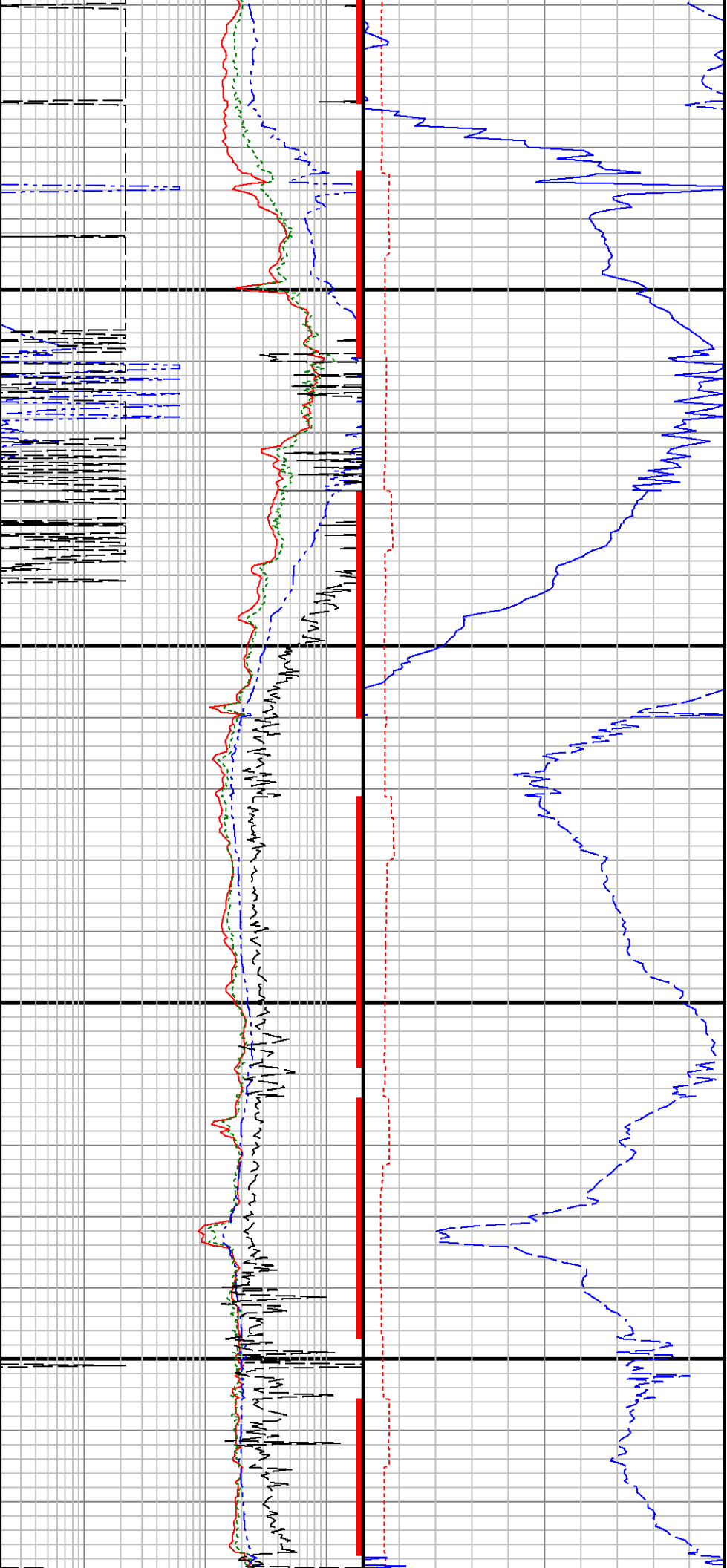




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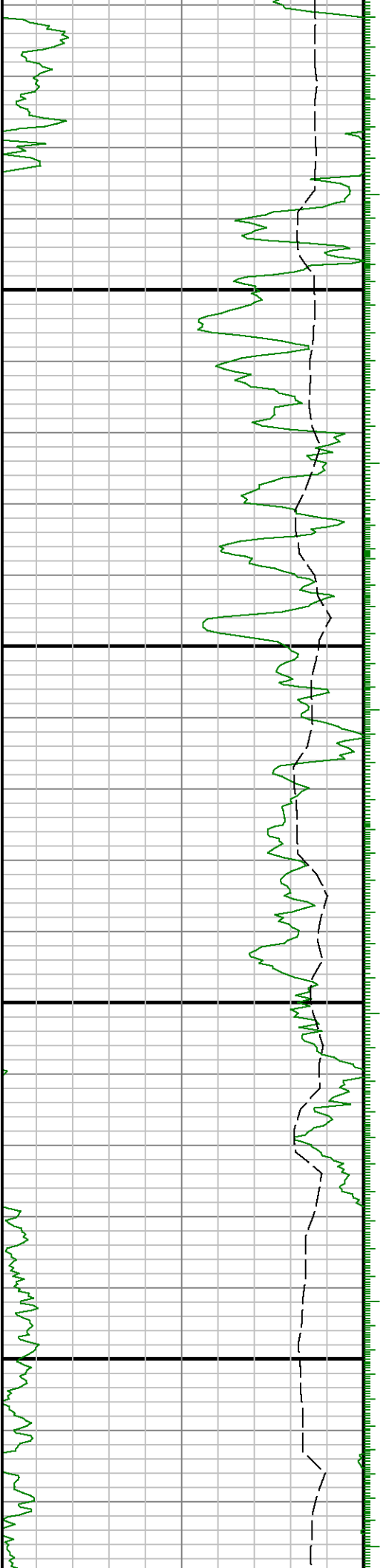
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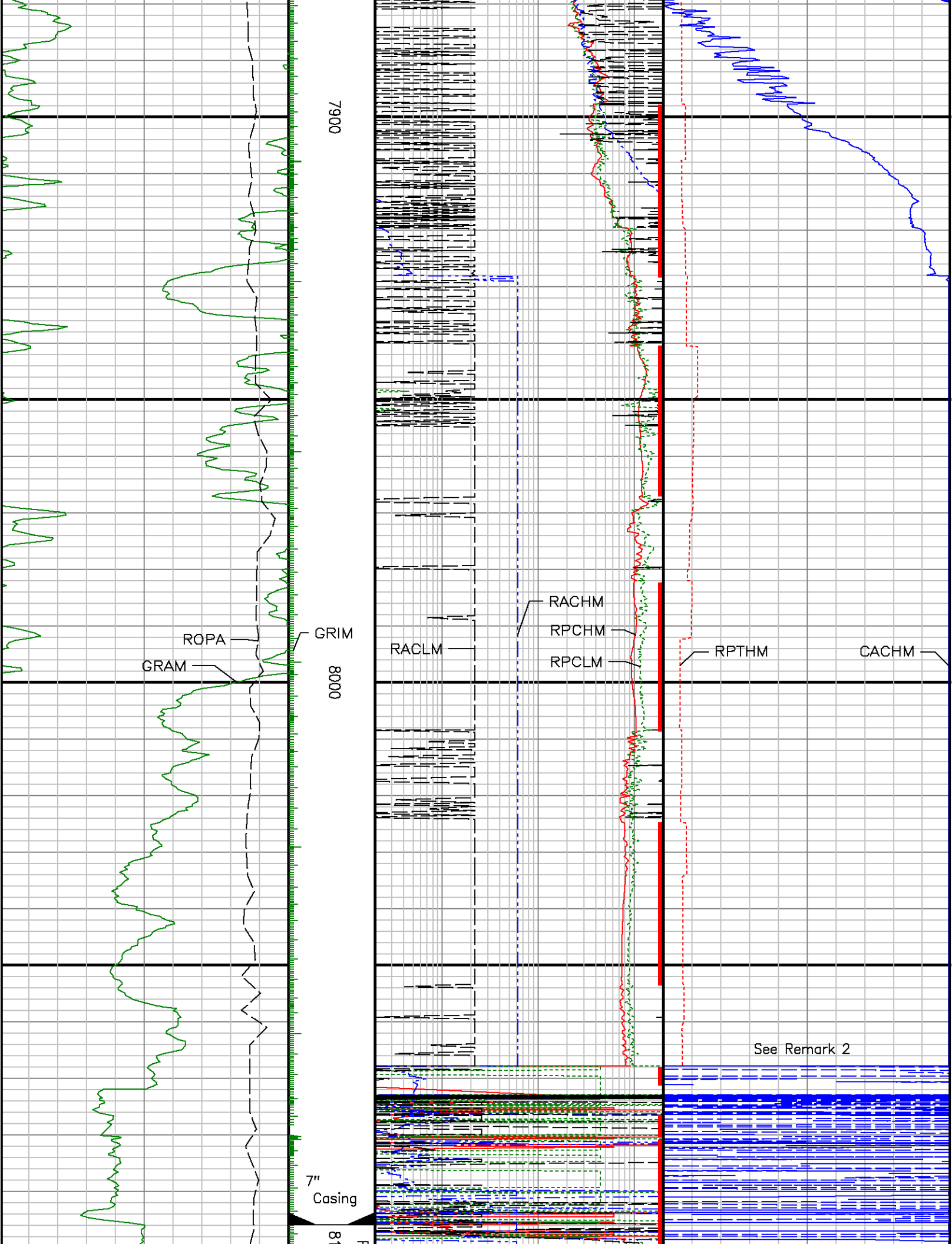




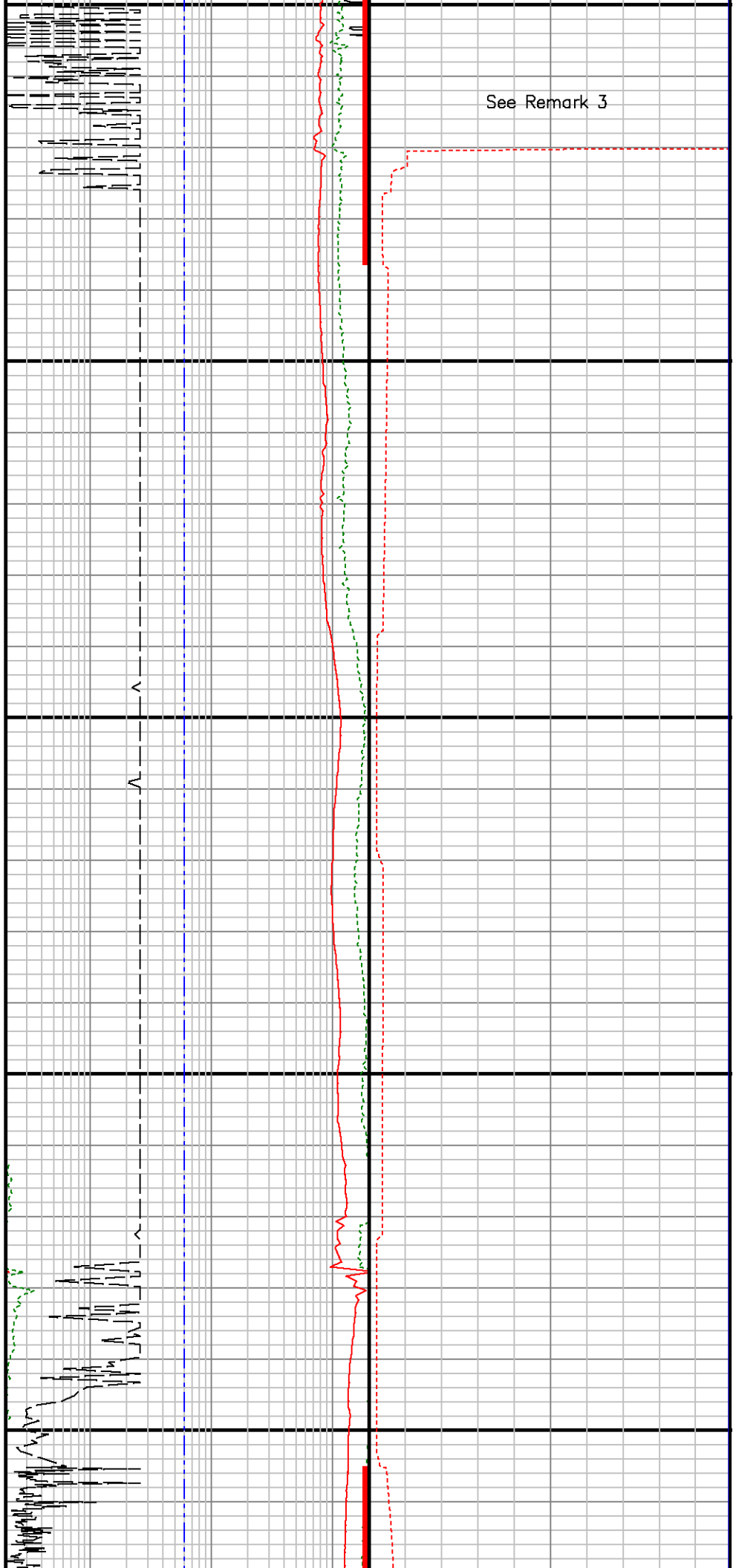
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See Remark 3

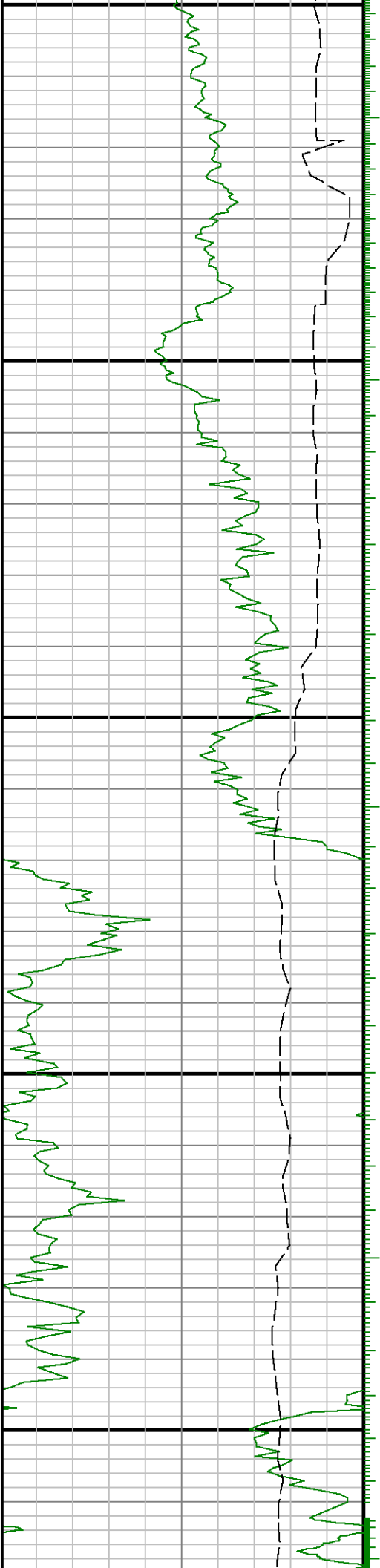


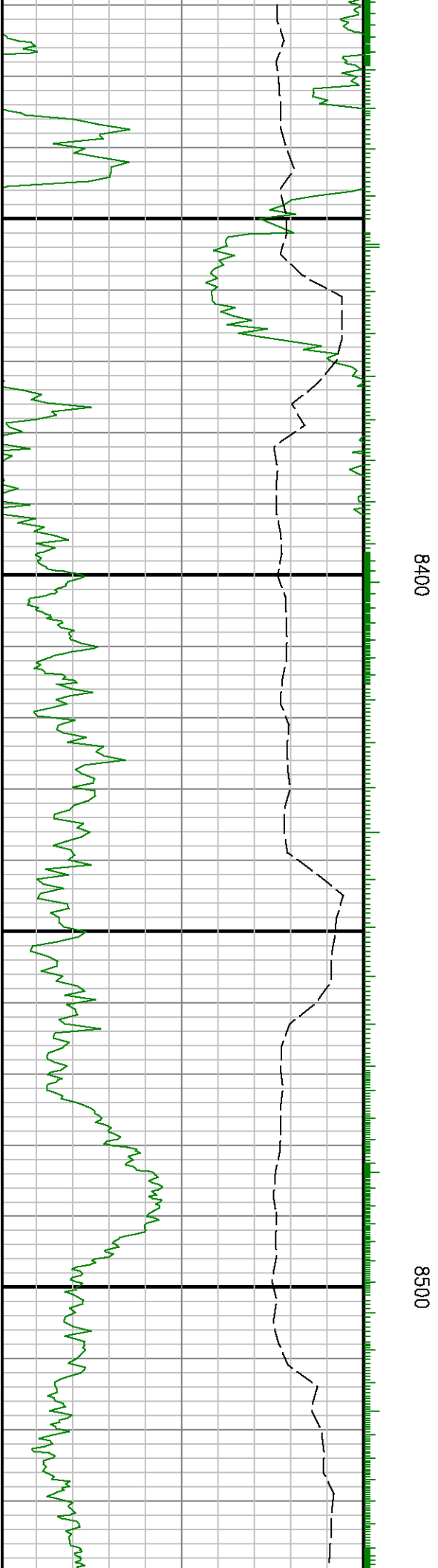
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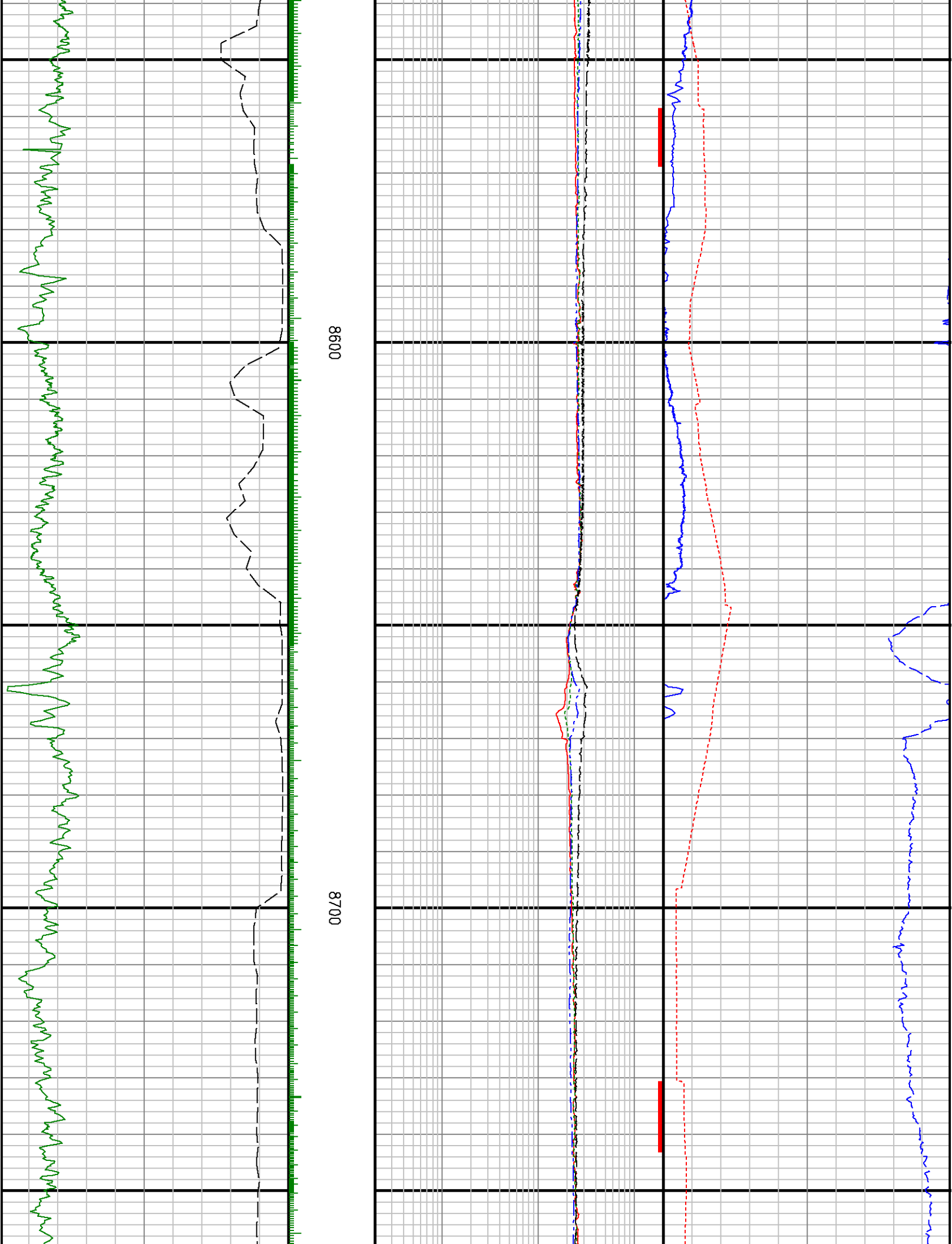
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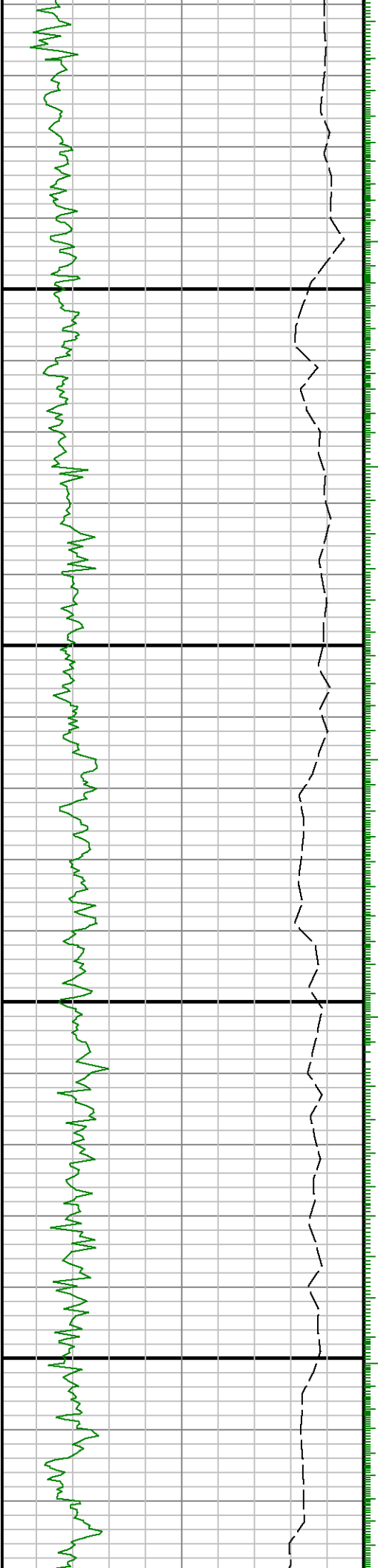
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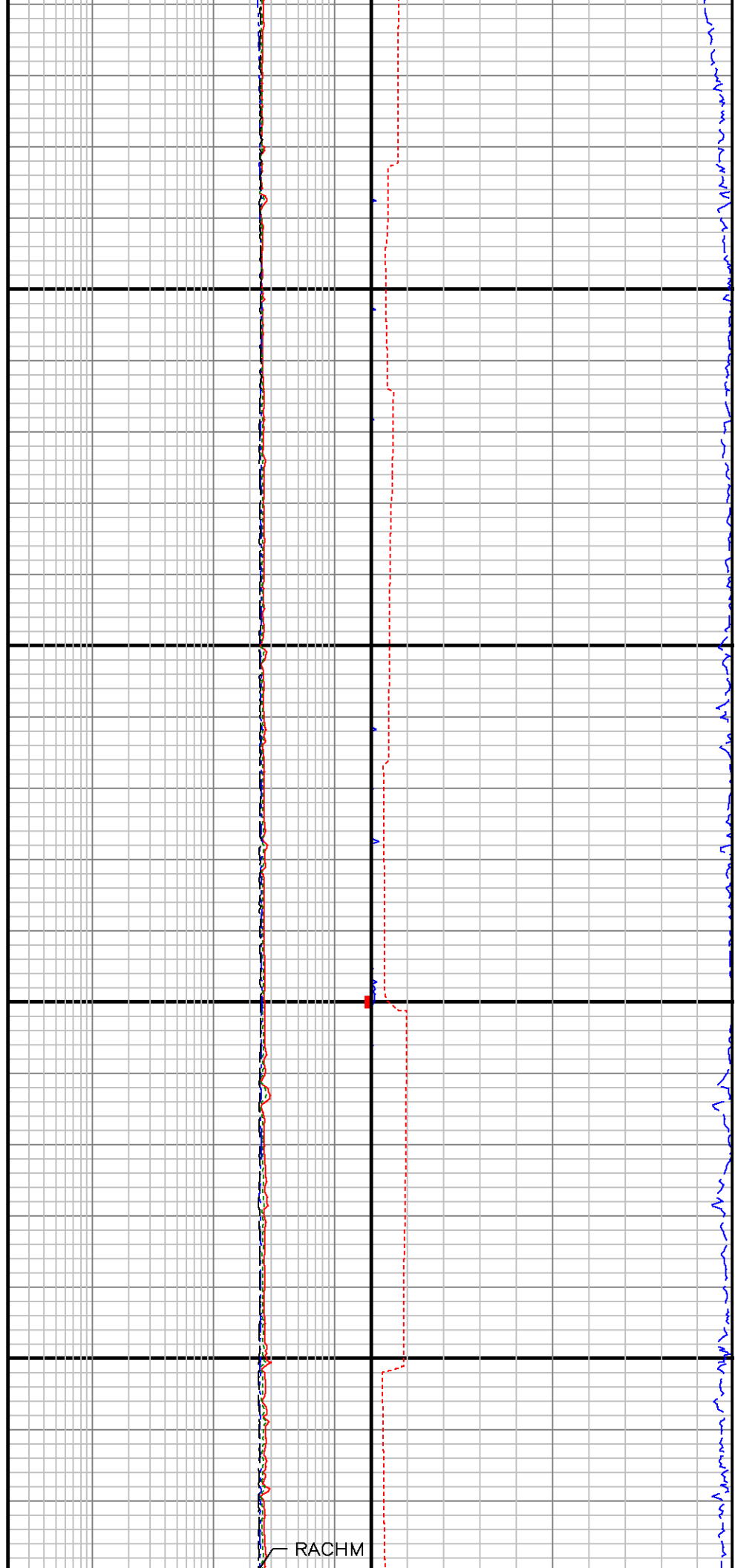




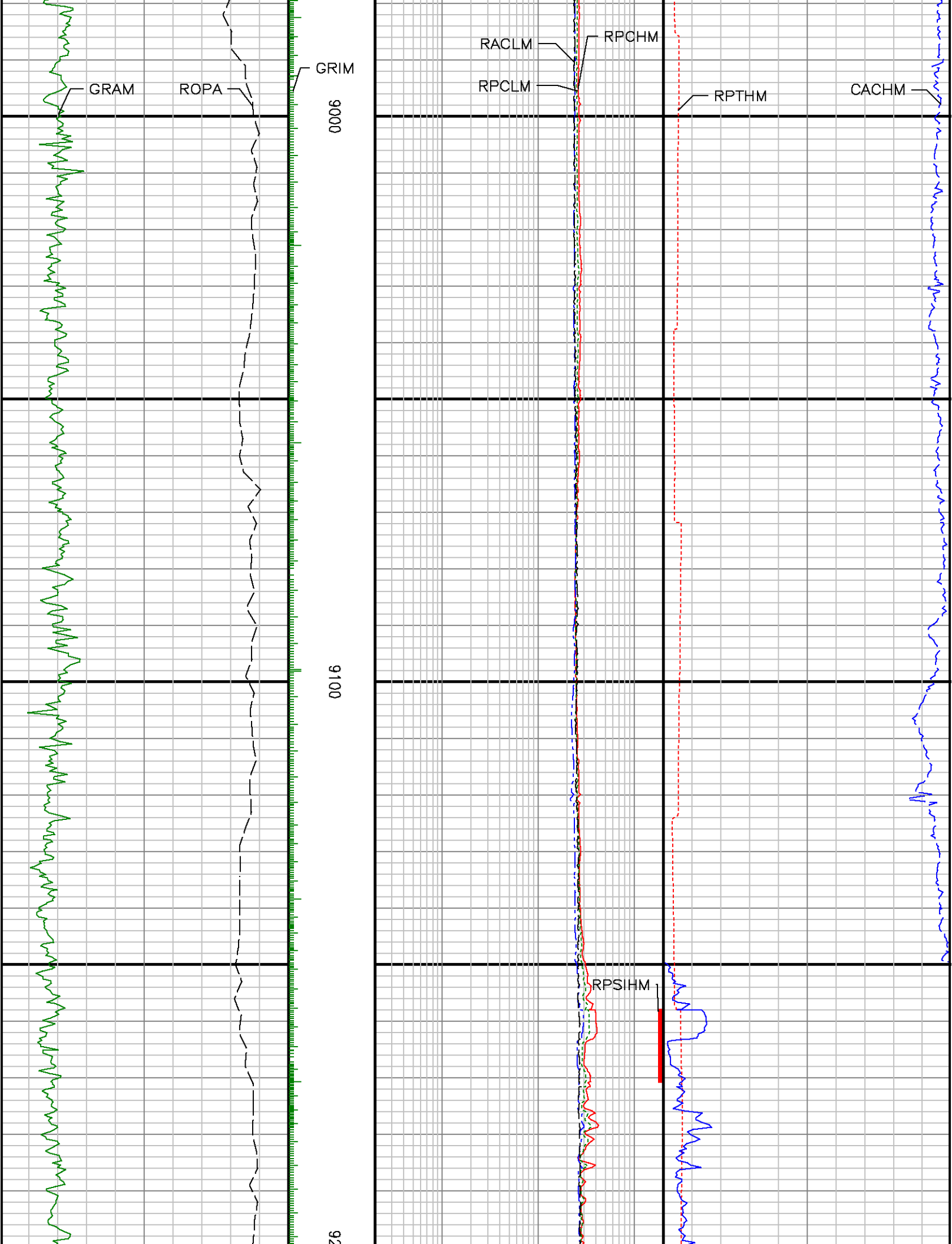


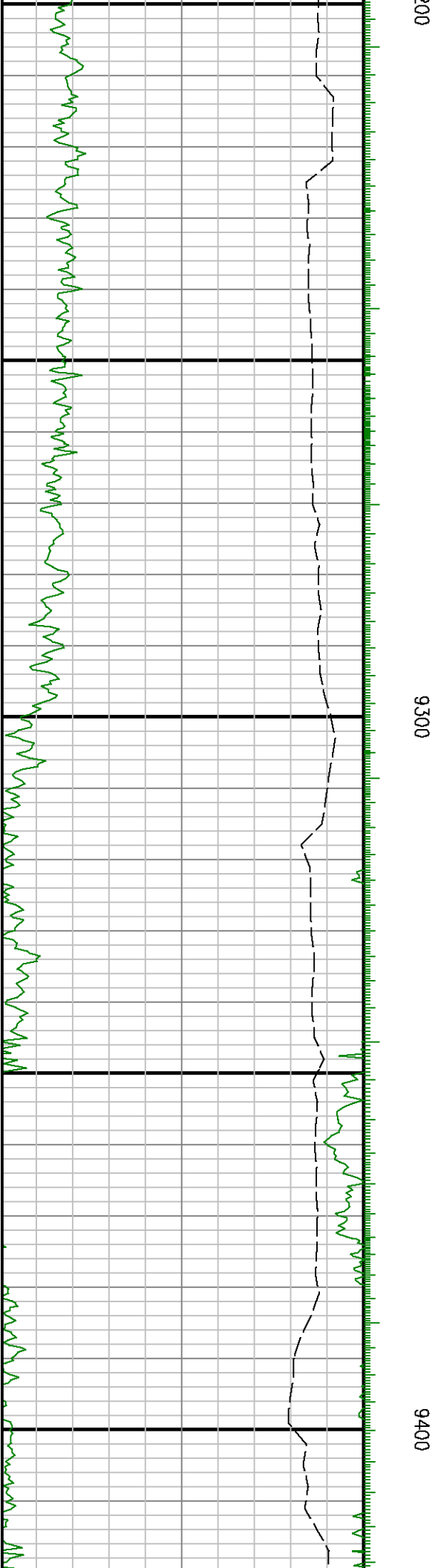
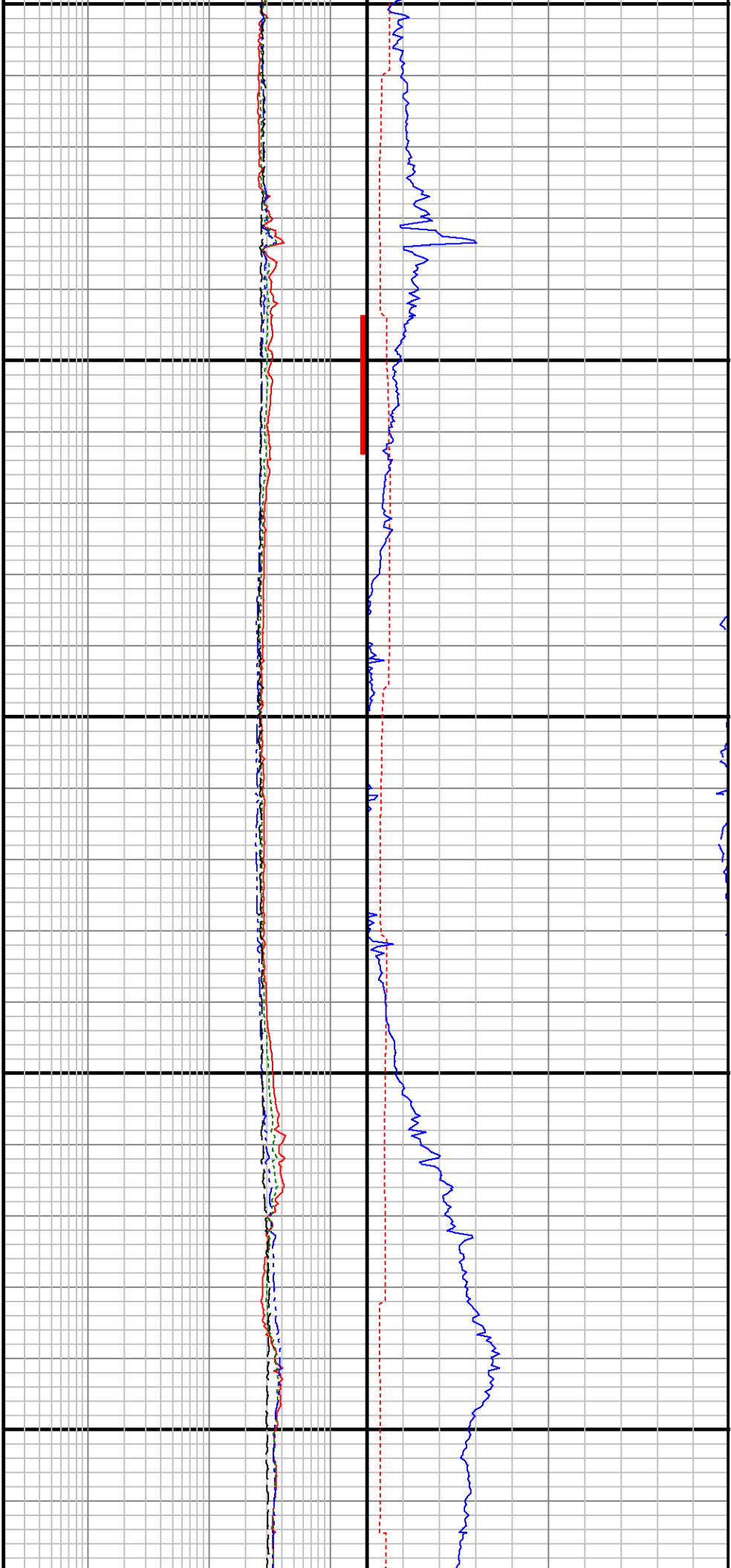
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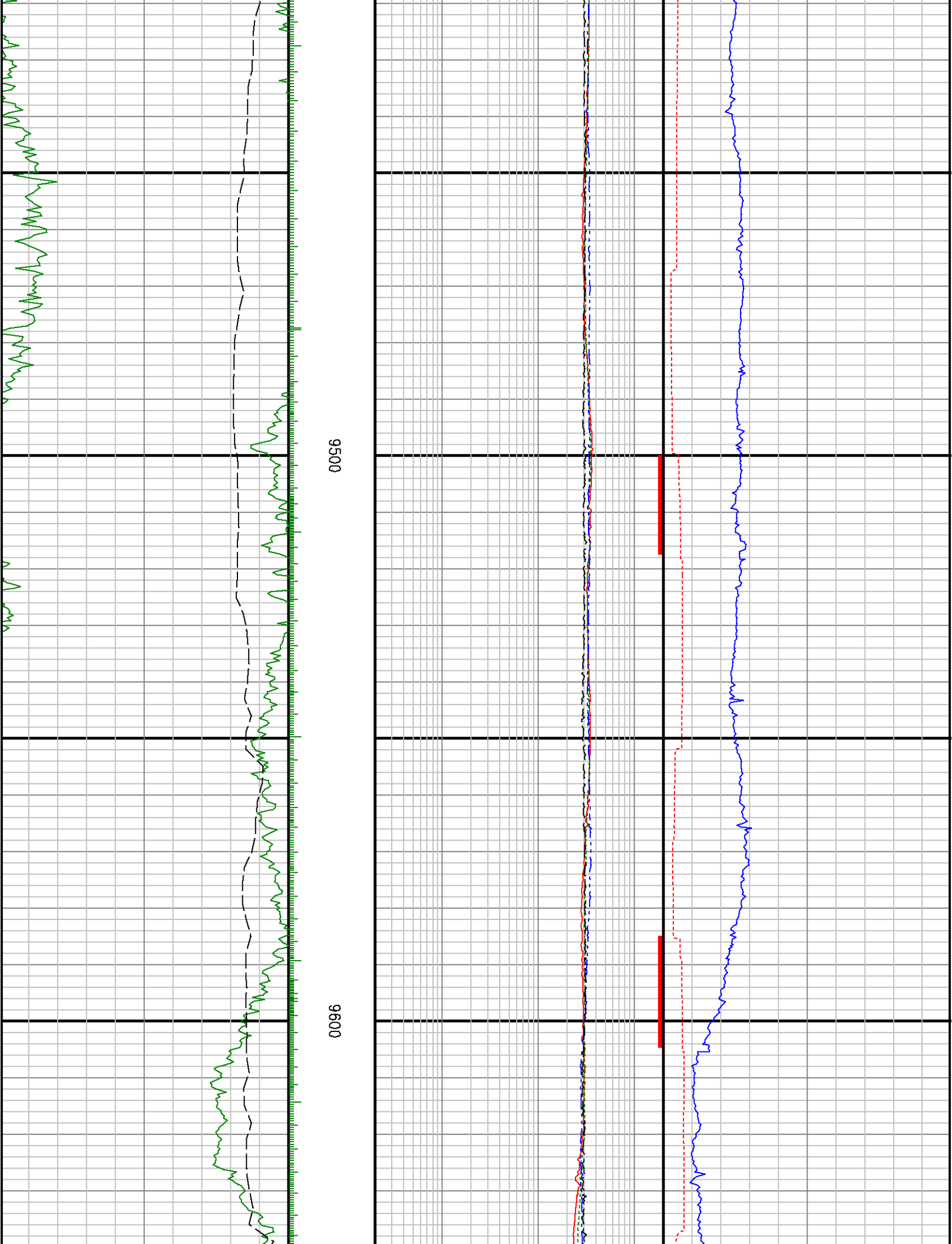
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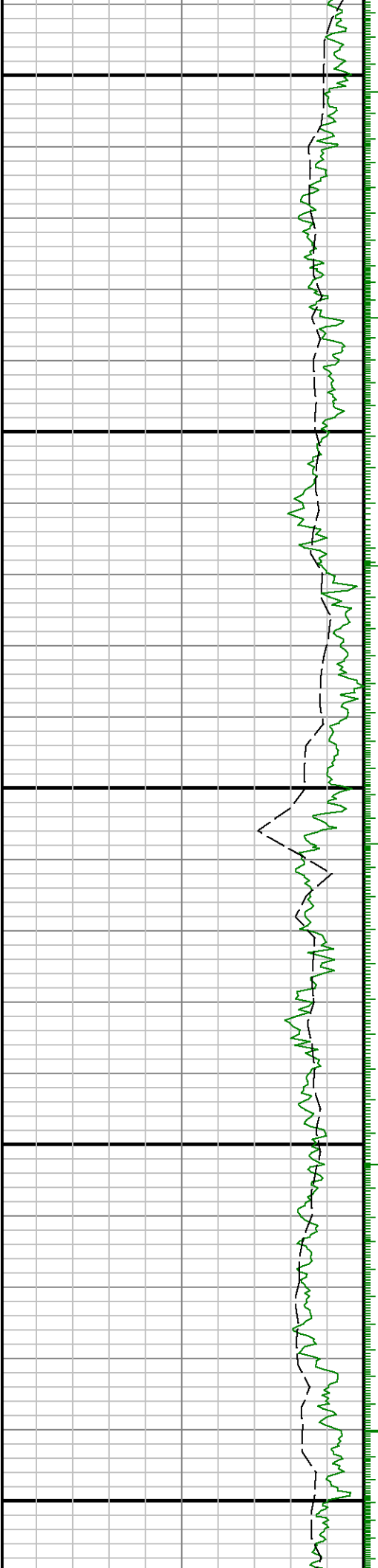


RACHM



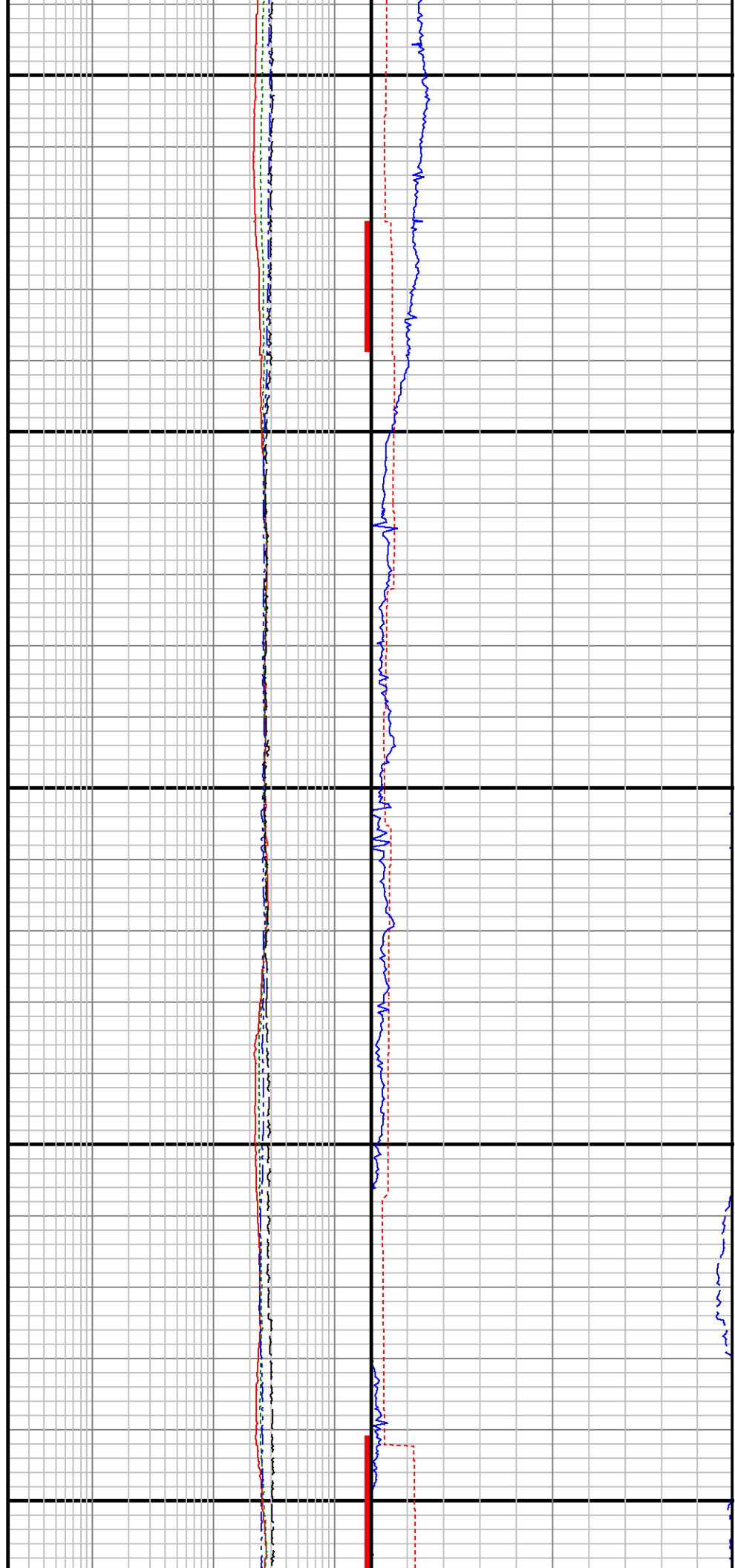


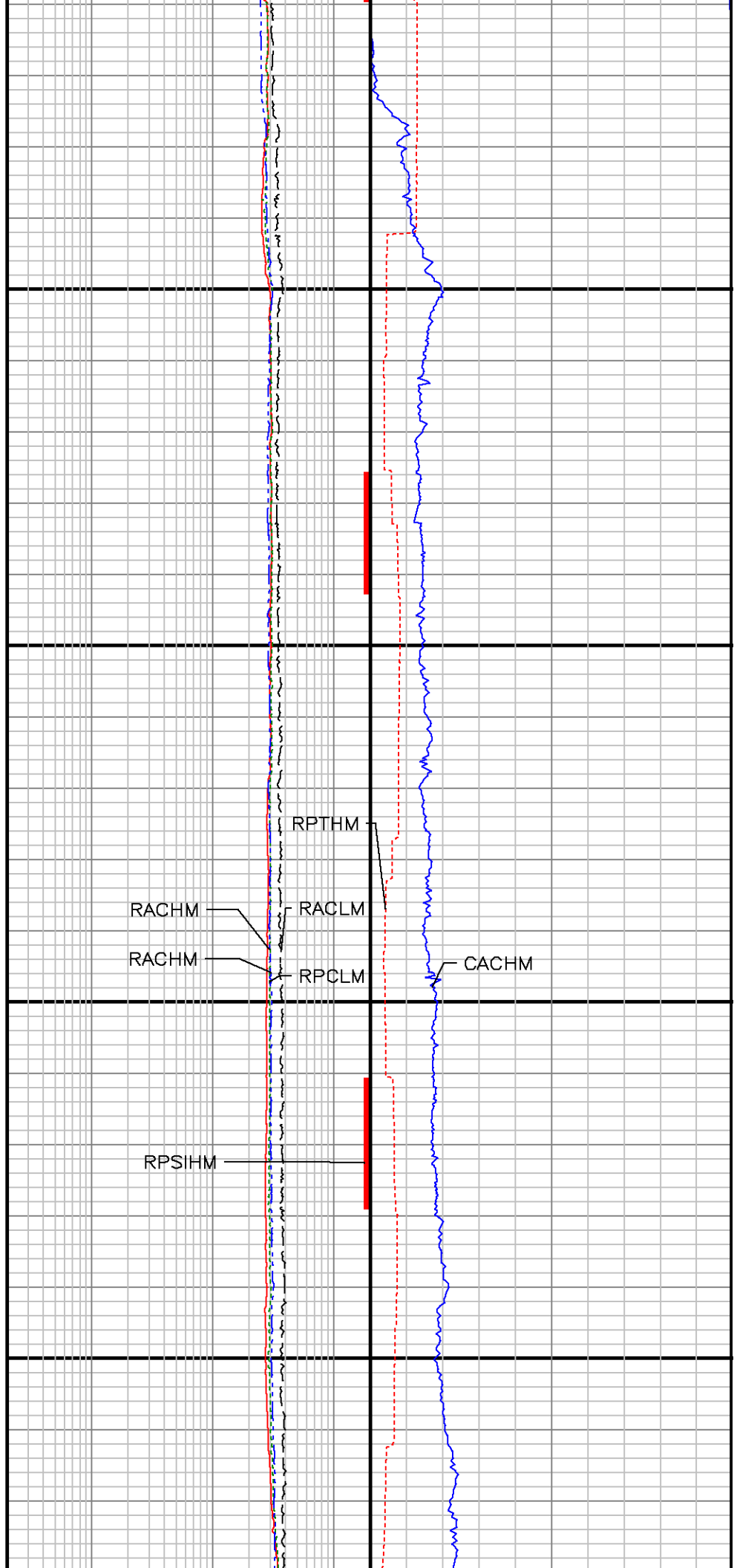
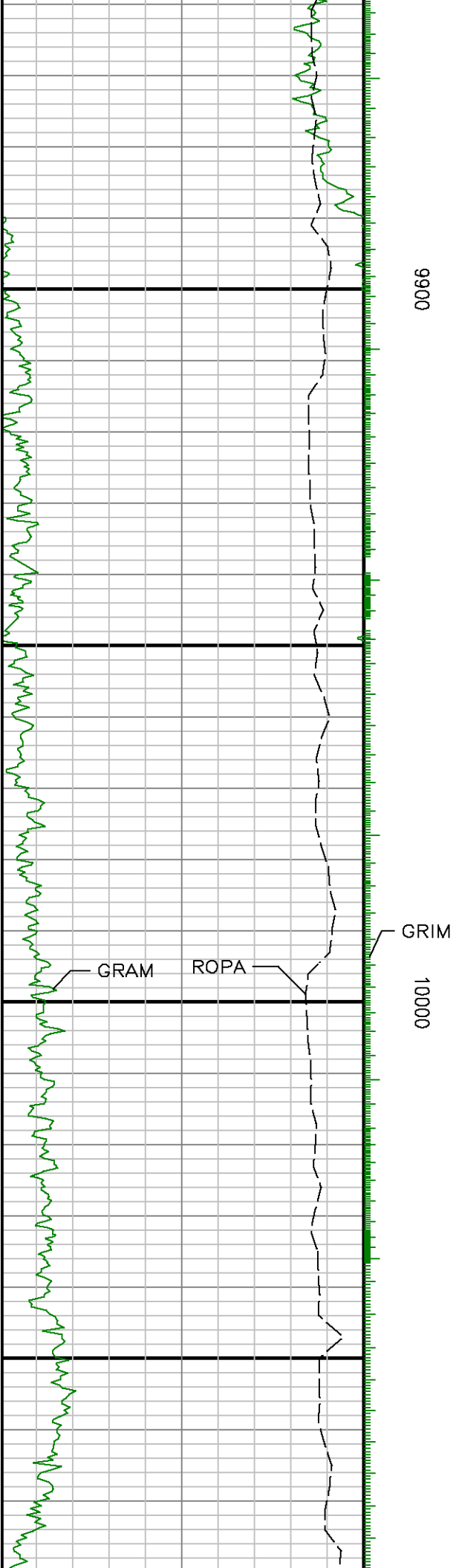


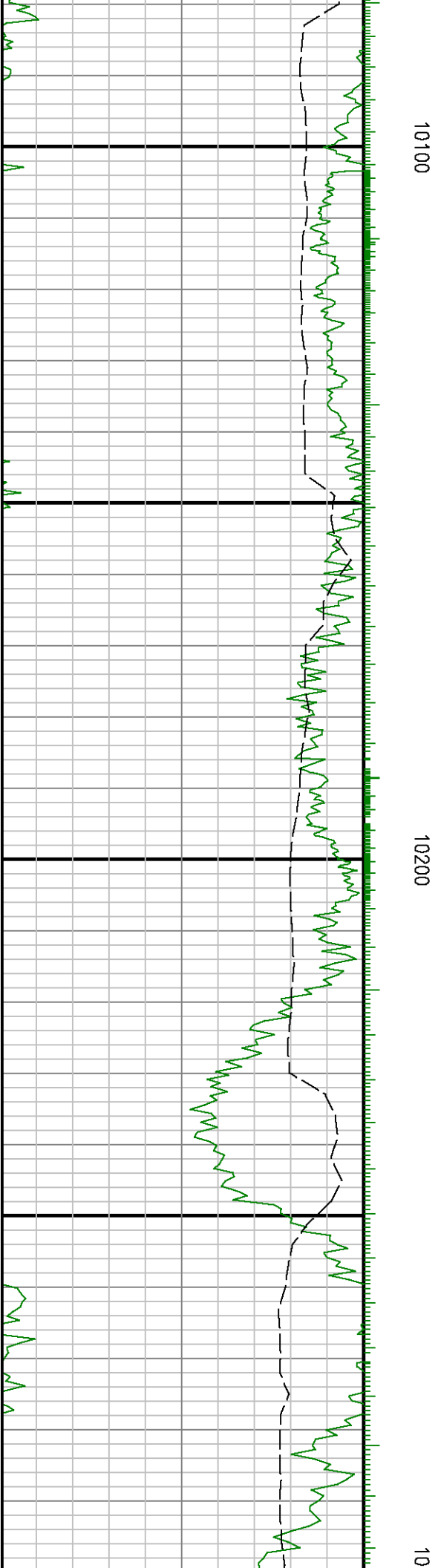


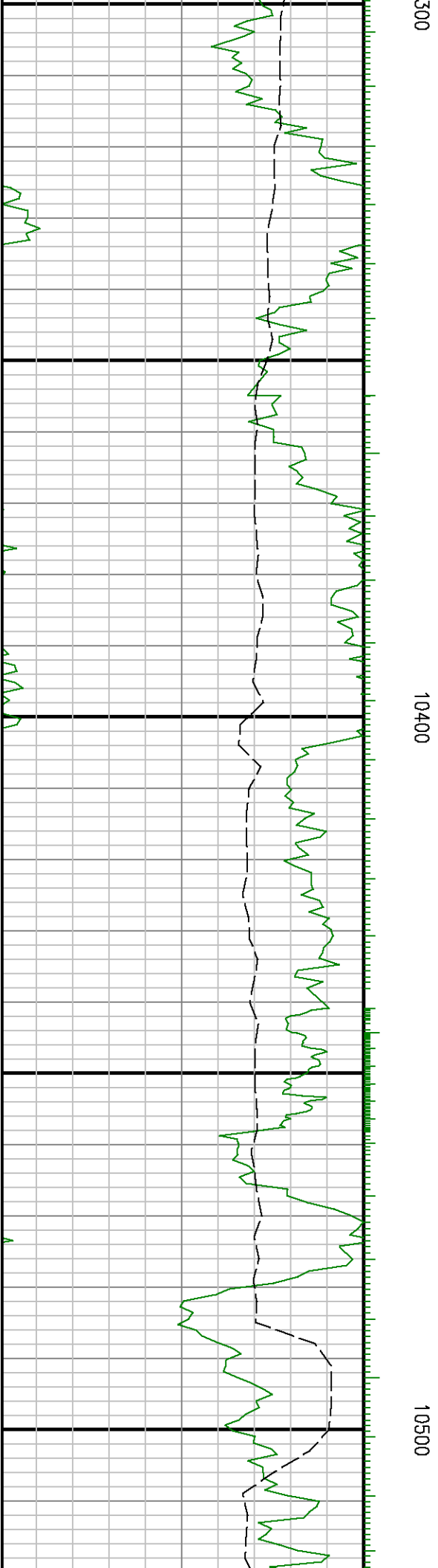
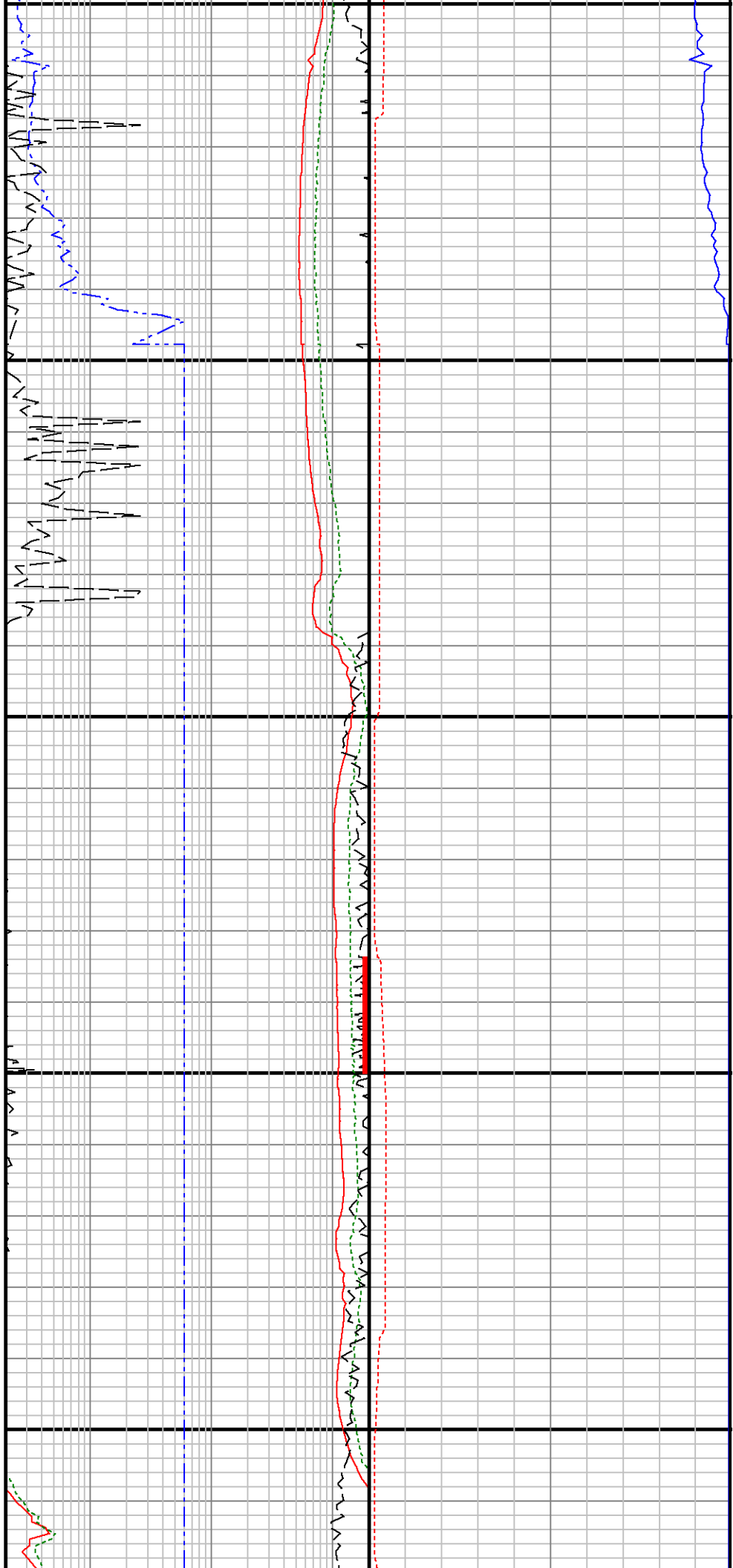
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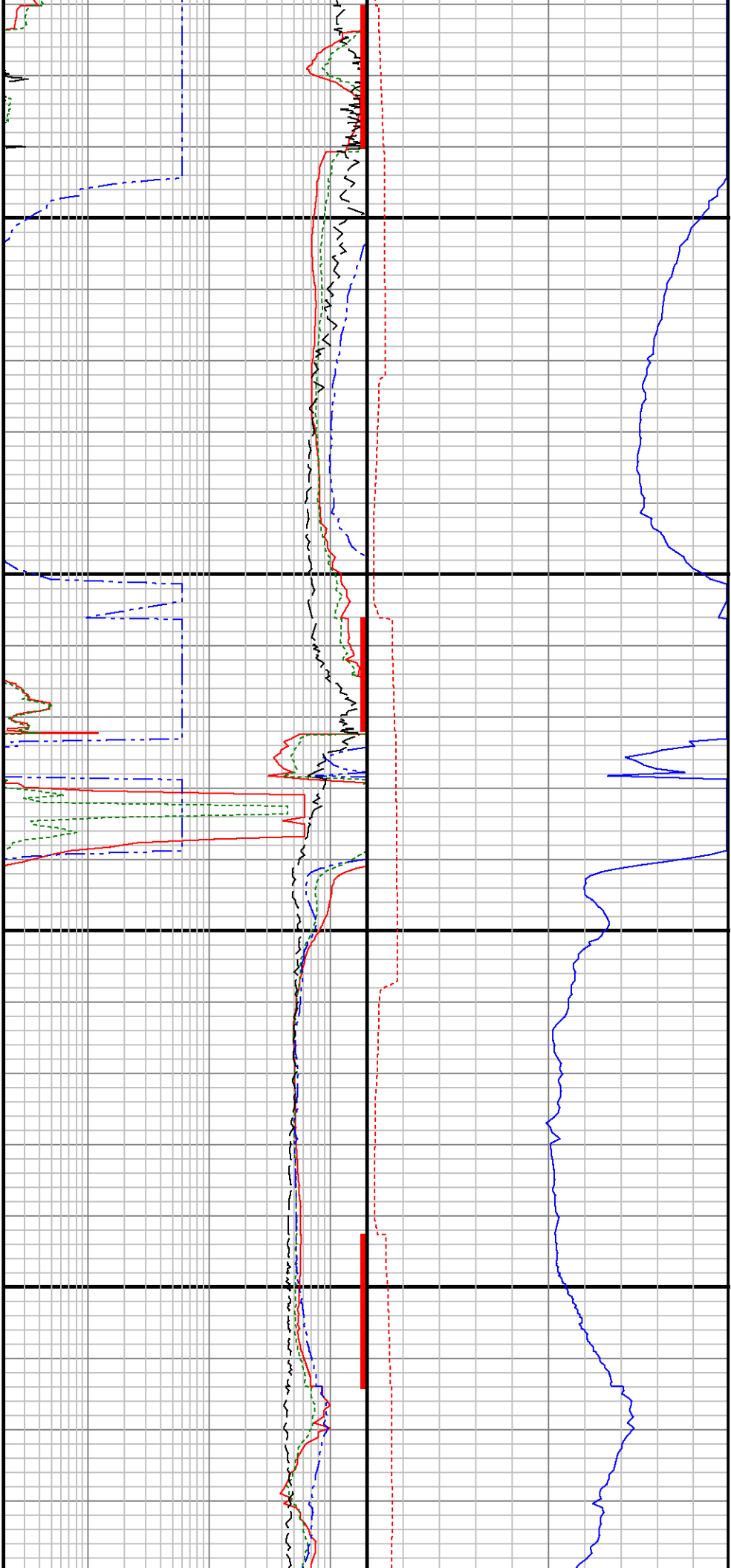
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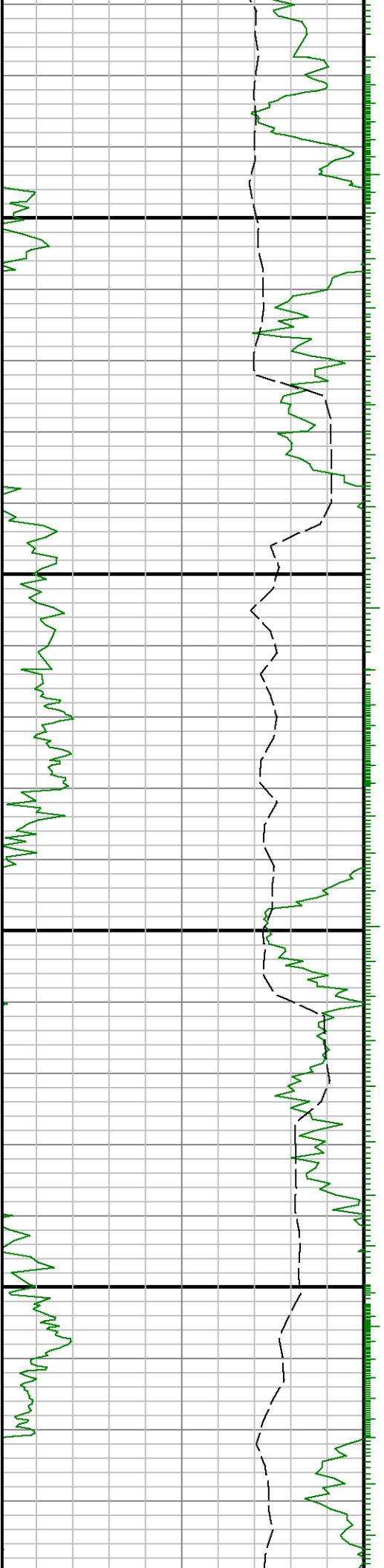


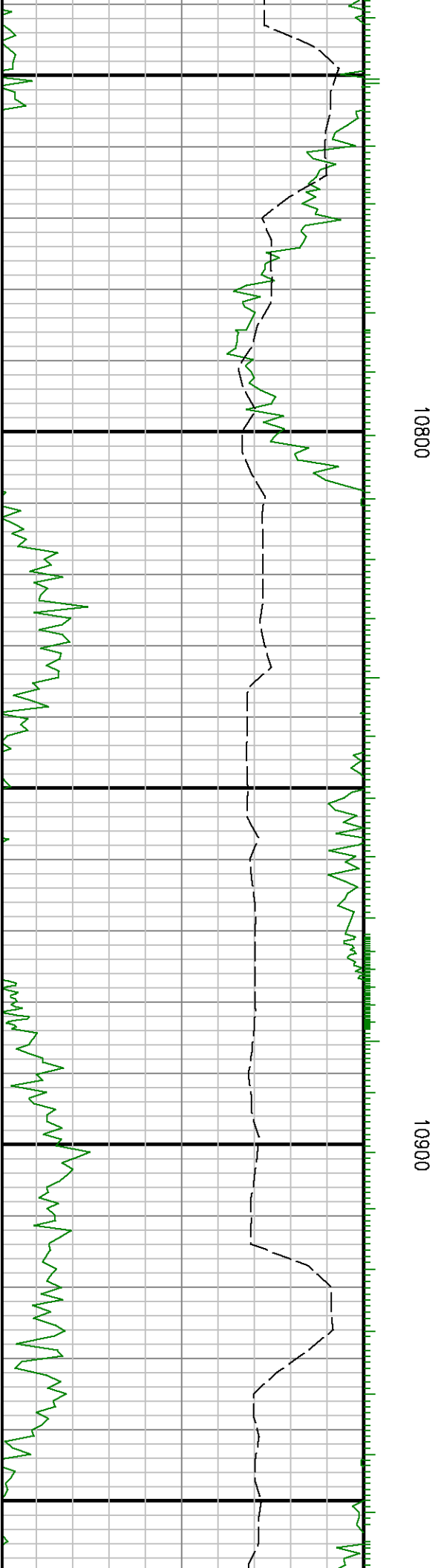
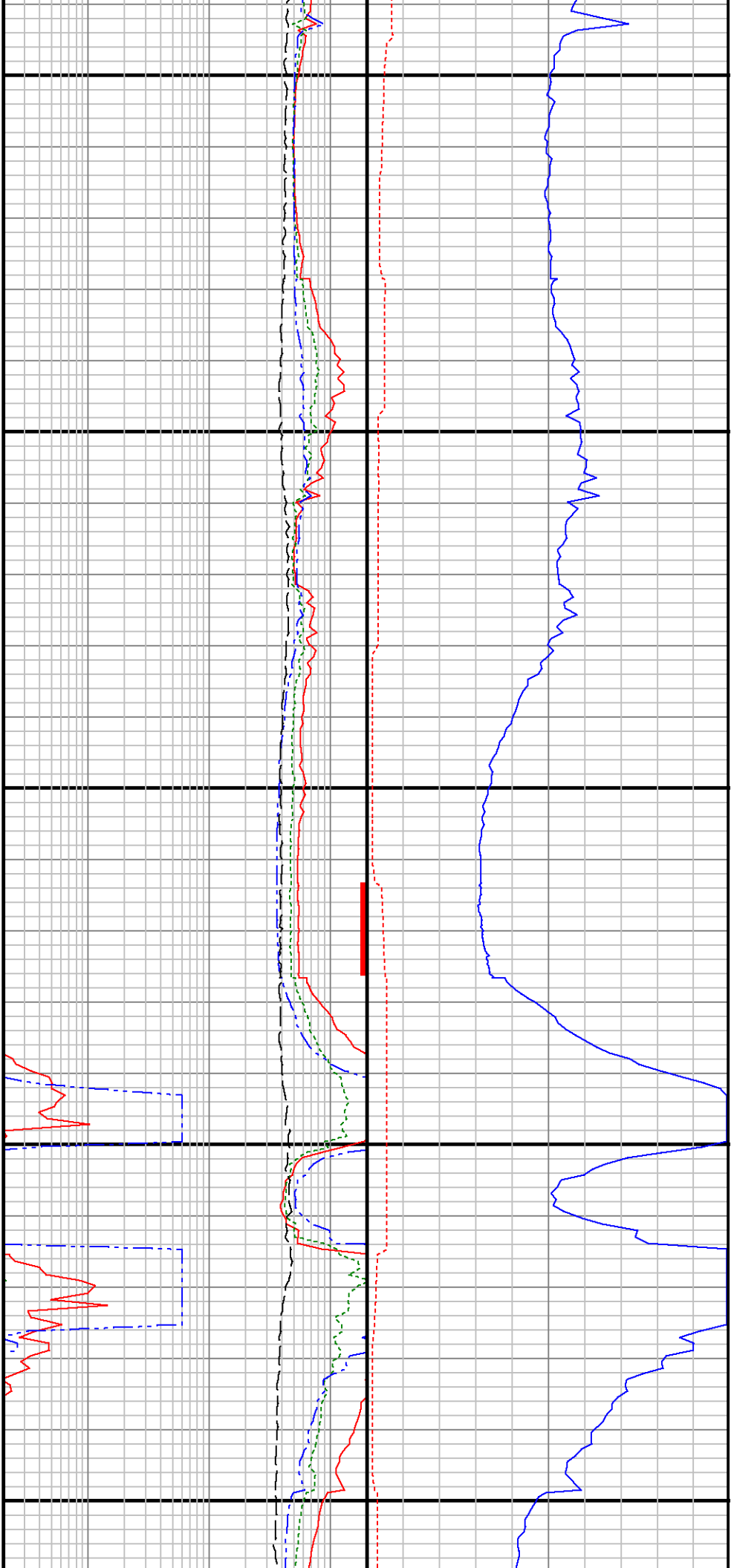


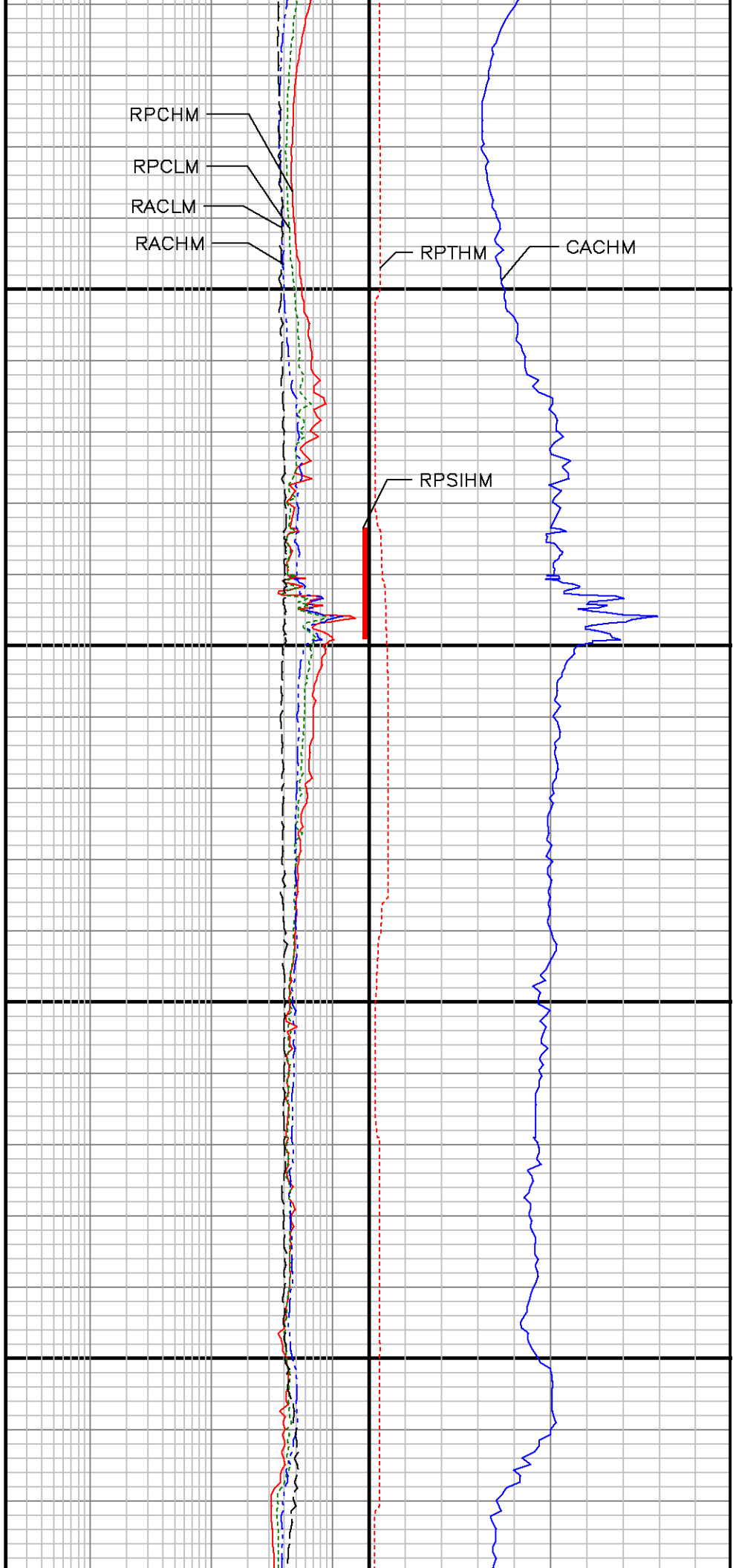
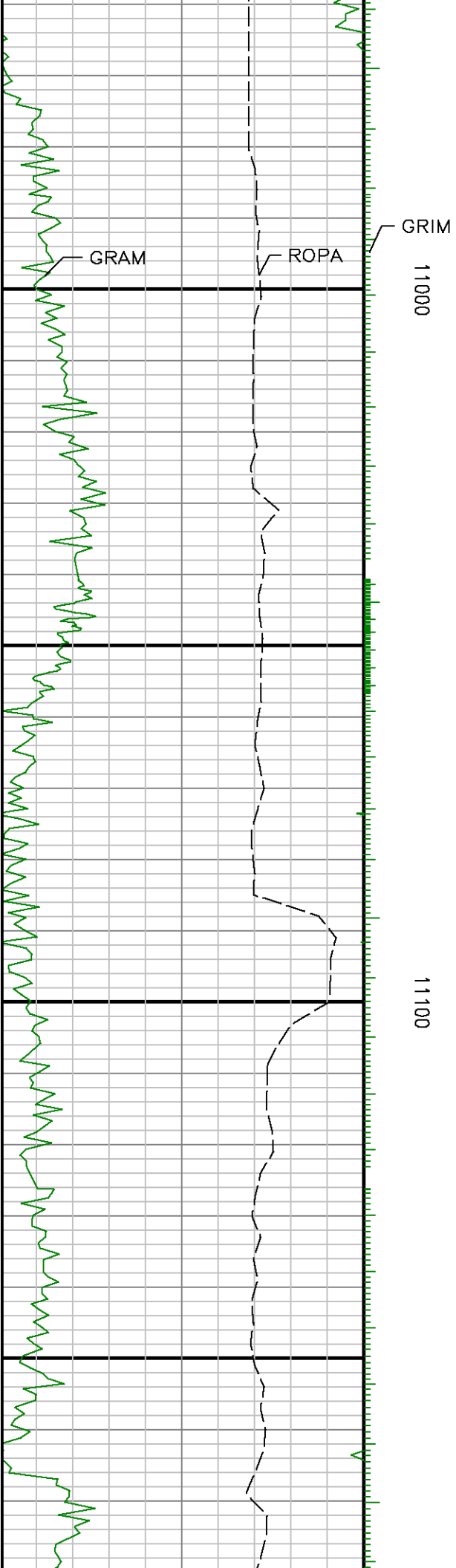


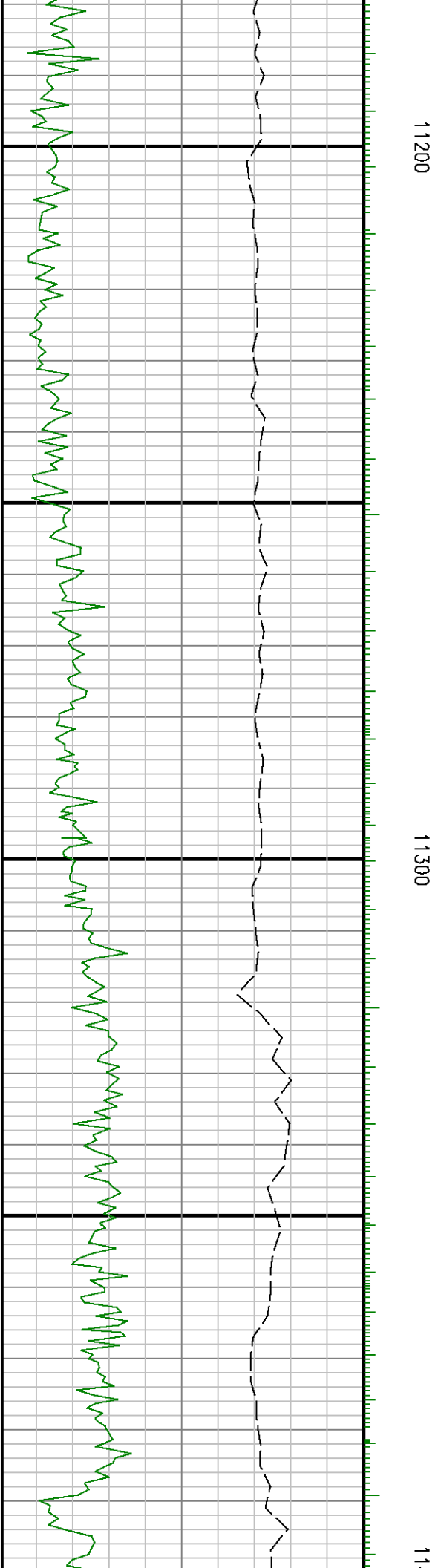
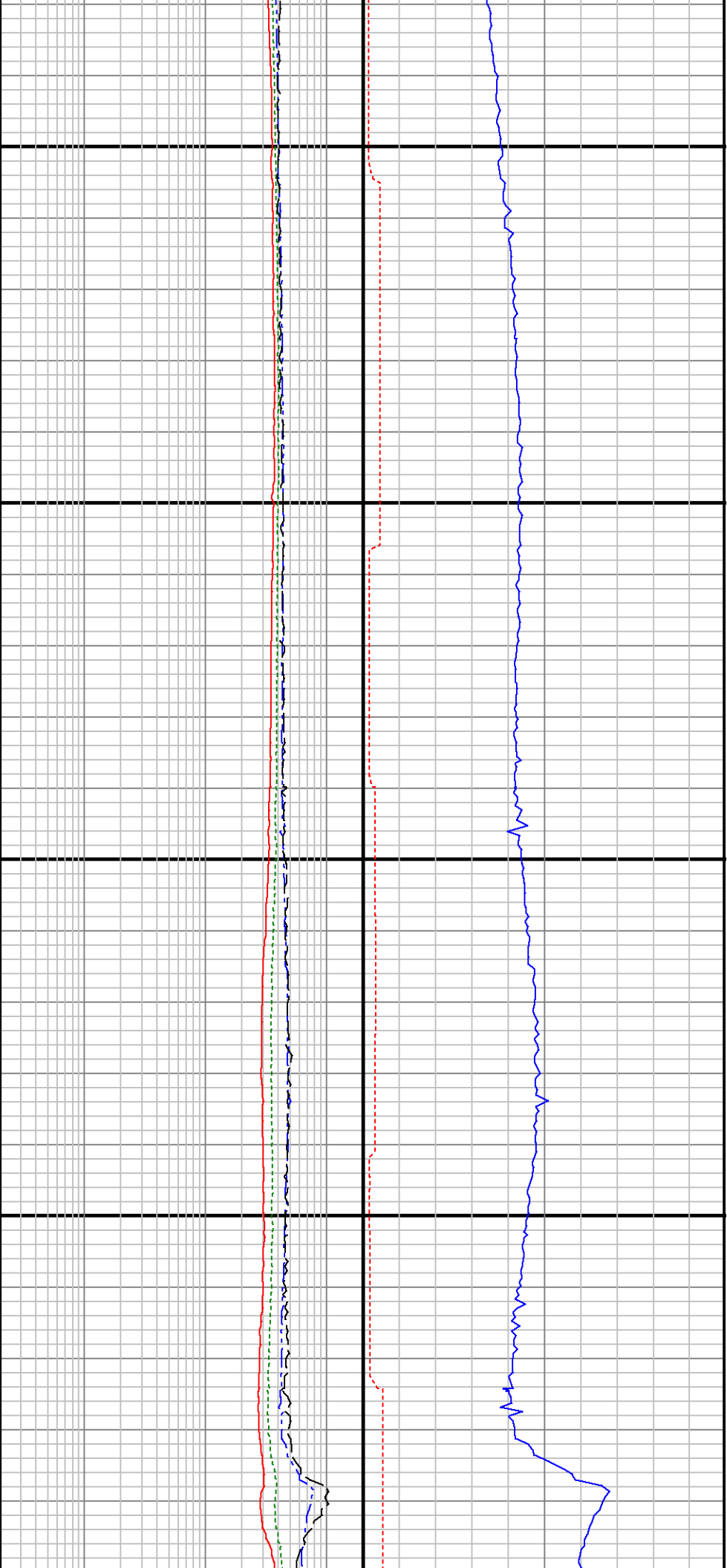
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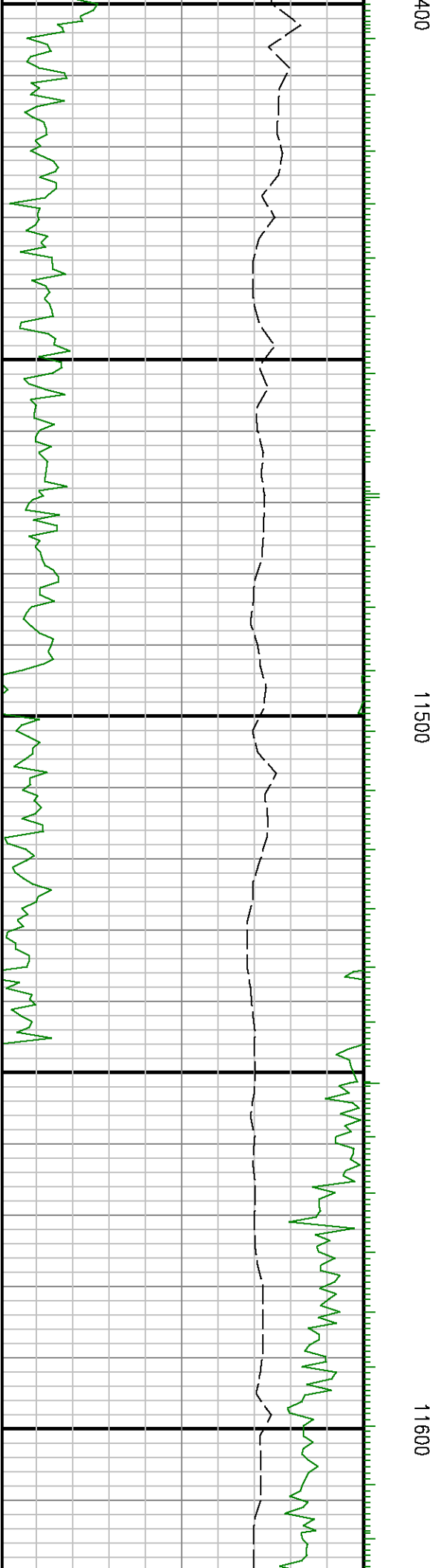
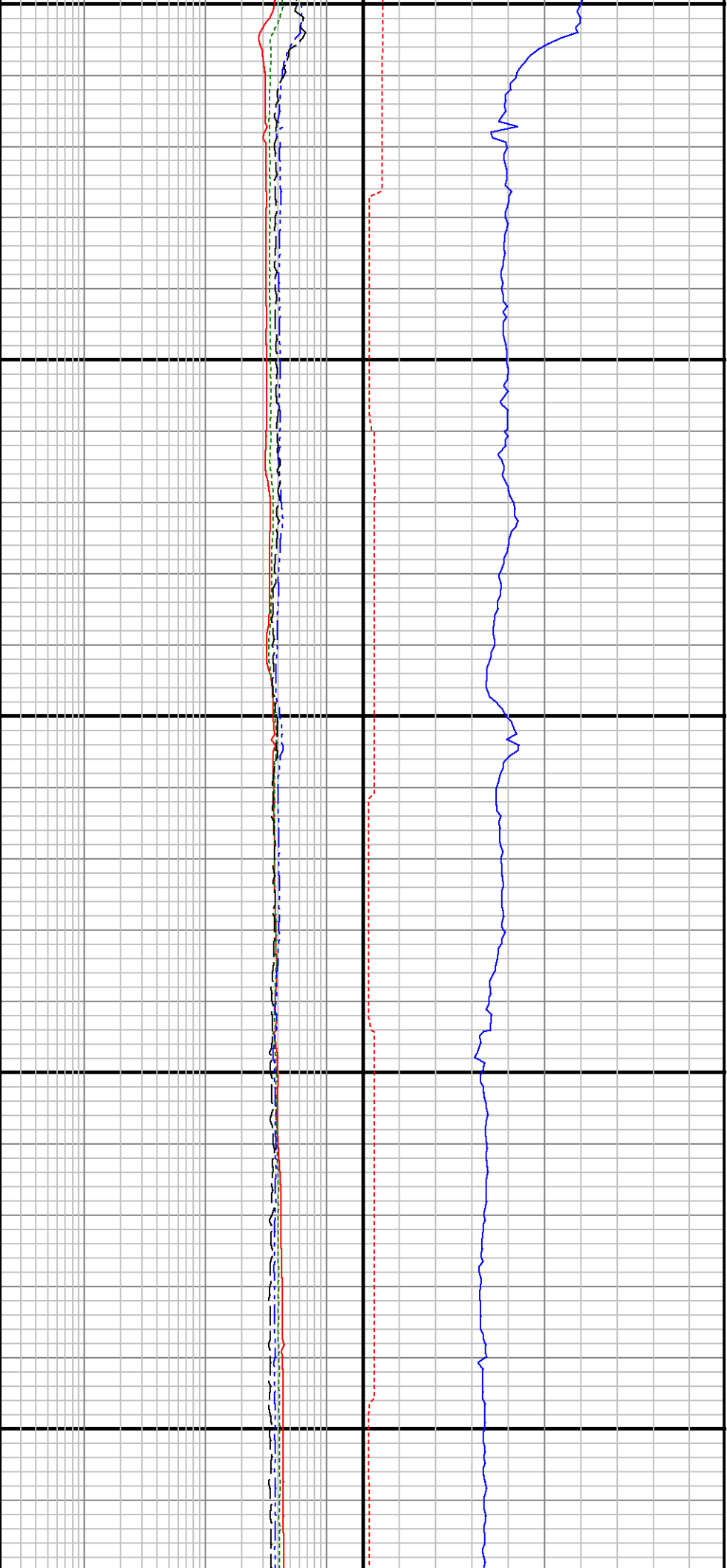
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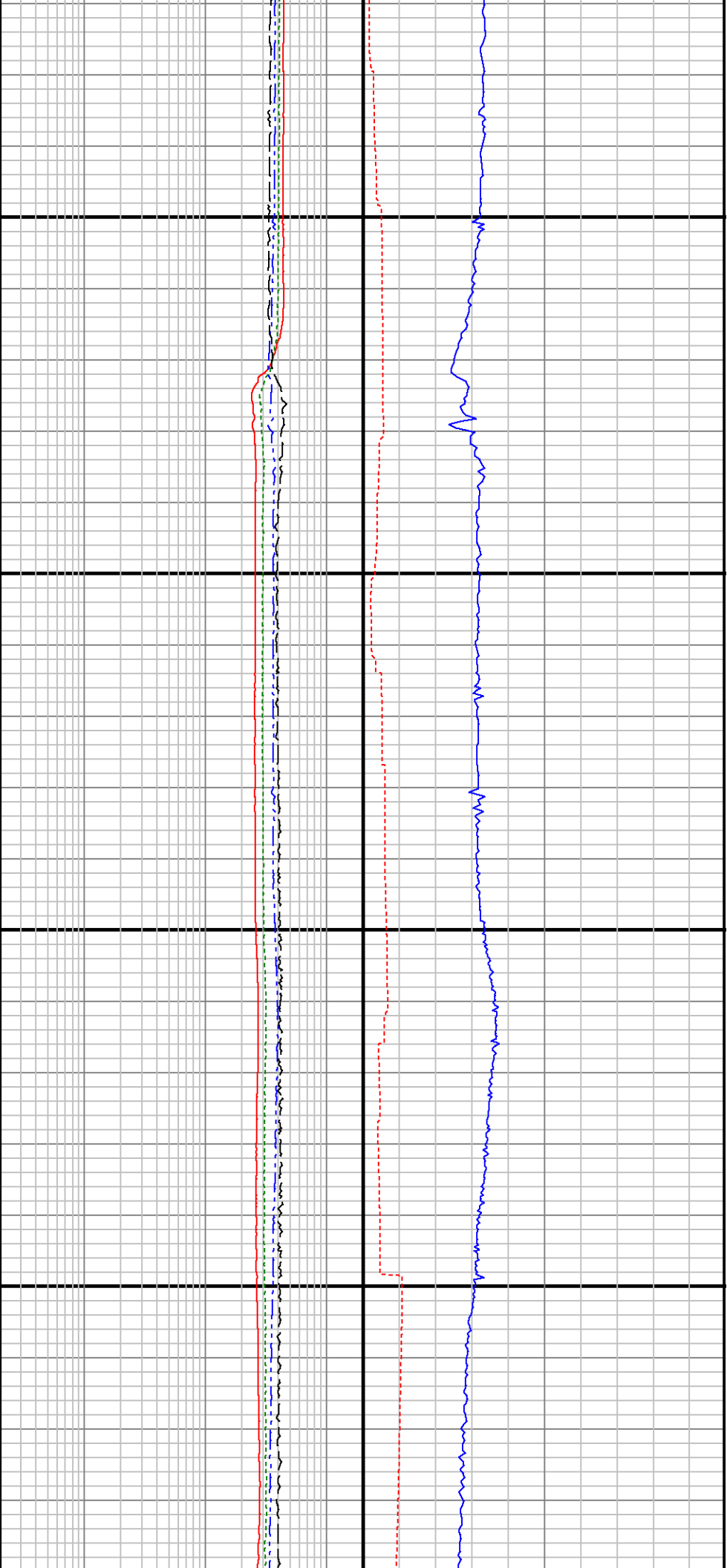






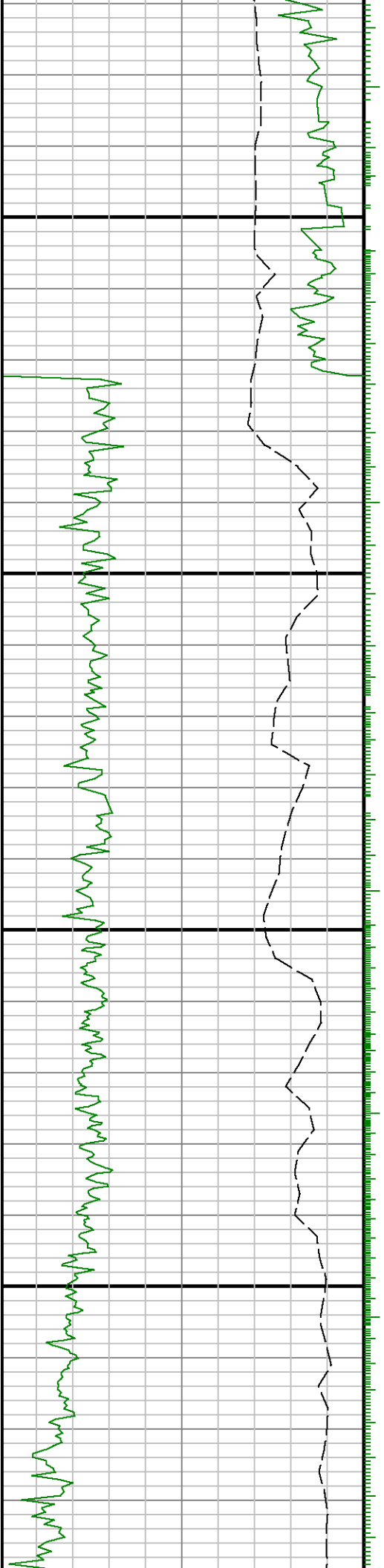


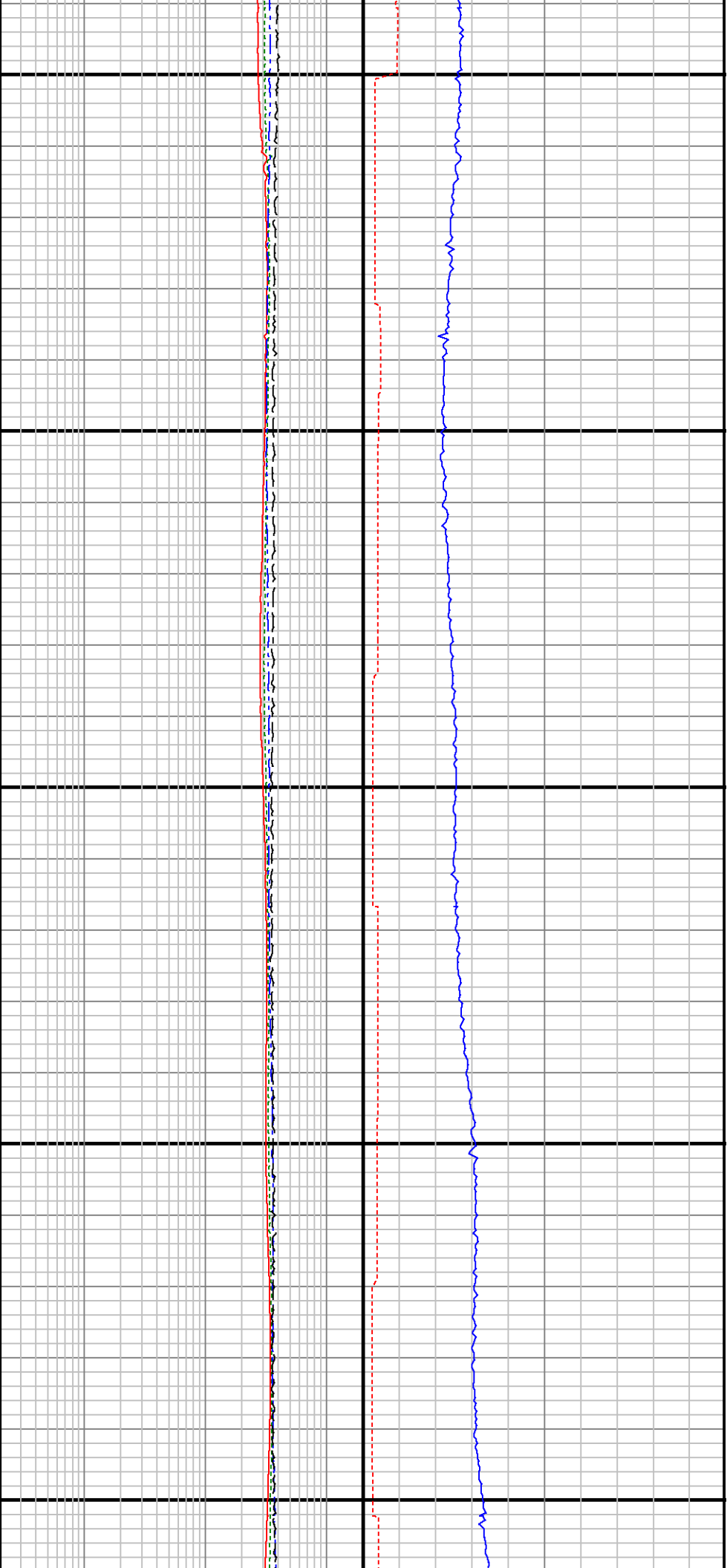




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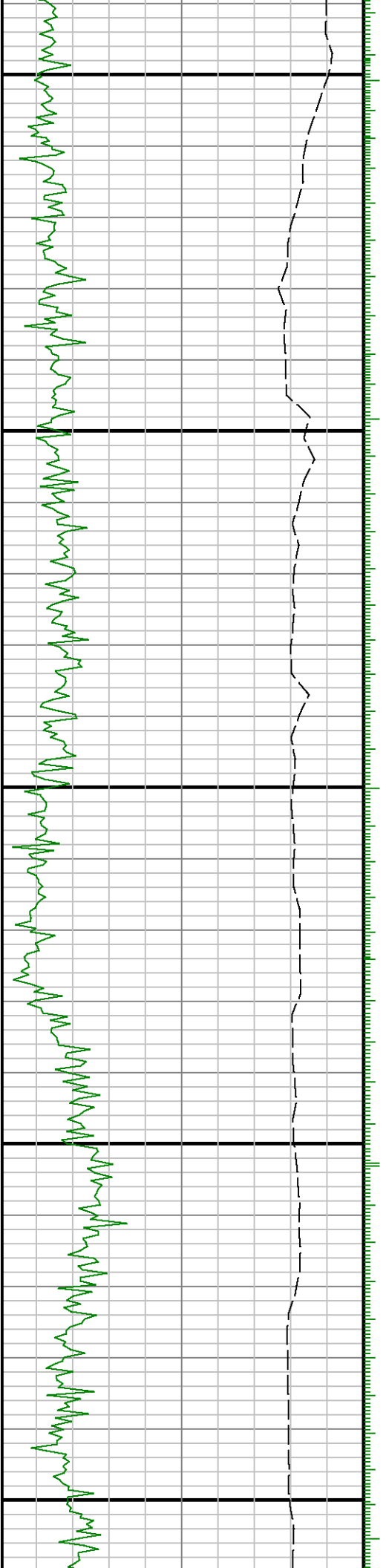
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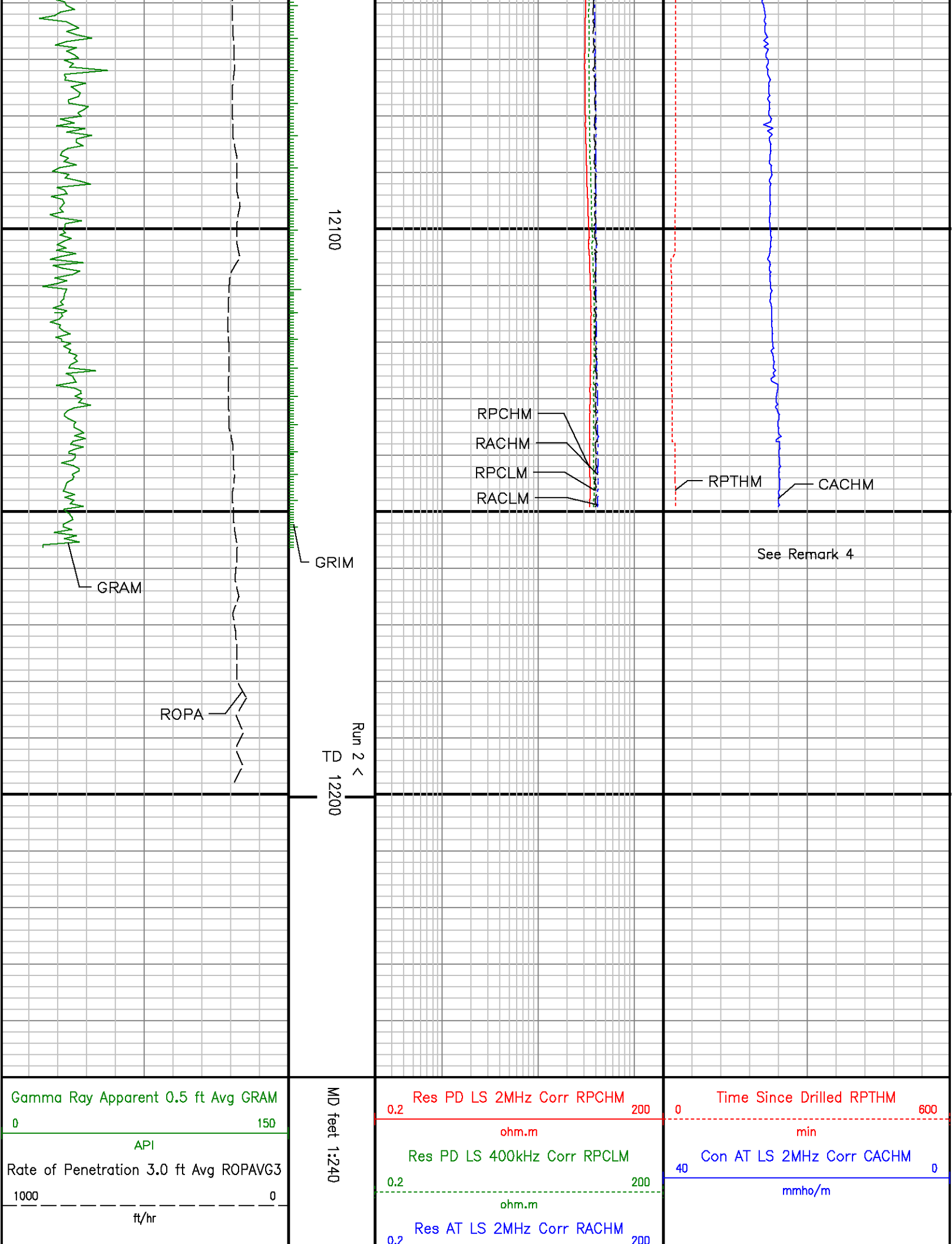




11900

12000





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