BAKER HUGHES

Memory/Realtime Log

Multiple Propagation Resistivity
Gamma Ray

Scale: 1:240 Measured Depth

Company: Kerr-McGee Oil & Gas Onshore LP

Well: Henrickson Federal 36C-18HZ

Field: Weld County (Kerr-McGee)

Region: RMD **Country:** United States

Status: **Final Print**

API Number: 051233767000

Surface Location:
Latitude: 40° 14' 13.175" N
Longitude: 104° 49' 20.784" W
Section7 TWN: 3N Range66E

Other Services:
2 Sector Gamma Ray
Directional
VSS

Permanent Datum (P.D.):	Ground Level	Elevation:	4810.00 ft.
Log Measured From:	Drill Floor	13.00 ft.	Above P.D.
Depth Reference:	Driller's Depth		

Elevations:
KB: N/A
DF: 4810.00 ft.
GL: 4797.00 ft.

Interval Logged		Dates		Magnetic Field Reference			
Top:	6736 ft.	Date From:	17/Sep/13	Dip Angle:	66.93 °	Azi Reference North:	True
Bottom:	14481 ft.	Date To:	22/Sep/13	Total		Mag to Reference	
		Spud Date:	14/Sep/13	Field Strength:	52663.0 nT	North Correction:	8.52 °

Borehole Record			Casing Record			
Hole Size	From	To	Size	Weight	From	To
13.500 in.	Surface	1047 ft.	9.625 in.	36.00 lb/ft	Surface	1027 ft.
8.750 in.	1047 ft.	7815 ft.	7.000 in.	26.00 lb/ft	Surface	7788 ft.
6.125 in.	7815 ft.	14528 ft.				

Mud Record			Deviation Record			
Type	From	To	Hole Size	Interval	Inc / Az (Start)	Inc / Az (End)
Water Based	1761 ft.	6931 ft.	13.500 in.	1047 ft.	0.3 ° / 289.2 °	0.2 ° / 257.9 °
Water Based - Fresh	6000 ft.	14377 ft.	8.750 in.	6768 ft.	0.5 ° / 223.5 °	89.7 ° / 183.7 °
			6.125 in.	6211 ft.	89.7 ° / 183.5 °	90.0 ° / 178.7 °
					/	/
					/	/
					/	/

Acquisition System	Software Version	Other	
Advantage	2.20U4	Rig: / Contractor:	Xtreme 20 / Xtreme Drilling
PATS	6.4.1.34	Job No:	5759125
		District: / Unit:	RMD / D&E

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 Top (ft.)	Logged Interval Bottom (ft.)	Bit Depth Interval From (ft.)	Bit Depth Interval To (ft.)	Date / Time Start	Date / Time End	Circ. Time (hrs.)
1	2	2	8.750	PDC	2.500	Steerable	6736	7763	1026	7816	17/Sep/2013 00:13	17/Sep/2013 17:38	43.9
2	2	2	6.125	PDC	2.500	Steerable	7788	8275	7817	8317	19/Sep/2013 08:06	19/Sep/2013 16:51	12.5
3	3	2	6.125	PDC	3.000	Steerable	8277	14481	8315	14528	20/Sep/2013 22:12	22/Sep/2013 06:53	42.1

Crew

Name	Arrive	Depart
David Campbell	Sept 14 2013 Wellsite	Sept 23 2013 Wellsite
Barry Combs	Sept 14 2013 Wellsite	Sept 22 2013 Wellsite
Adam Merha	Sept 14 2013 Wellsite	Sept 23 2013 Wellsite
Travis Wilcox	Sept 22 2013 Wellsite	Sept 23 2013 Wellsite
Greg Dore	Sept 14 2013 Wellsite	Sept 23 2013 Wellsite

Mud Properties Record

Date / Time	LWD Run No.	Measured Depth (ft.)	Mud Type	Density (sg)	Viscosity (cp)	pH	Fluid Loss (cc)	Oil / Water	Source	Total Chlorides (ppm)	K+ (%)
15/Sep/2013 20:46	1	1761	Water Based	8.3	27	8.0	10.0	0 / 99	Active Mud Pit	800	0.0
17/Sep/2013 02:23	1	6931	Water Based	8.3	28	8.0	10.0	0 / 99	Active Mud Pit	900	0.0
20/Sep/2013 06:43	3	6000	Water Based	9.3	40	8.0	4.0	4 / 91	Active Mud Pit	1000	0.0
20/Sep/2013 21:34	3	9931	Water Based	9.4	42	8.0	4.0	4 / 90	Active Mud Pit	1000	0.0
21/Sep/2013 15:22	3	12547	Water Based	9.5	40	8.0	4.6	4 / 89	Active Mud Pit	1000	0.0

Mnemonics

Curve	Description	Units
CACLM	Conductivity Attenuation - Corrected - 2MHz	mmho/m
GRAM	Gamma Ray Apparent, 0.5 ft. Avg.	API
GRAX	Gamma Ray Apparent, 0.5 ft. Avg.	API
GRIM	Gamma Ray Data Density	point
GRIX	Gamma Ray Data Density	point
RACHM	Resistivity Attenuation - Corrected - 2MHz	ohm.m
RACLM	Resistivity Attenuation - Corrected - 400kHz	ohm.m
ROPA	Rate of Penetration, 3.0 ft. Avg.	ft/hr
RPCLM	Resistivity Phase - Corrected - 400kHz	ohm.m
RPCHM	Resistivity Phase - Corrected - 2MHz	ohm.m
RPSIHM	Resistivity Sliding Indicator	untiless
RPTHM	Resistivity Time Since Drilled	min

Equipment and Service Data

LWD Run No.	Tool	Serial Number	Measurement	Bit Offset (m.)	Max O.D. (in.)	Min I.D. (in.)
1	DIR	12546347	Directional	56.28	6.750	0.000
1	SRIG	11732967	Gamma	52.91	6.750	0.000
2	CS	10211497	-	73.68	4.820	0.000
2	BCPM	12040066	Telemetry	62.58	5.050	0.000
2	STAB	11826084	-	59.57	5.280	0.000
2	OTK	12909192	Directional	55.03	5.040	2.569
2	OTK	12099192	Resistivity	49.06	5.040	2.569
2	APR	12909192	Resistivity	49.06	0.000	0.000
2	OTK	12909192	Gamma	41.87	5.040	2.569
2	OTK	12909192	Pressure	44.50	5.040	2.569
2	CS	10369034	-	37.73	5.020	0.000
3	CS	10392799	-	76.17	0.000	0.000
3	BCPM	12993880	Telemetry	64.07	0.000	0.000
3	STAB	12364042	-	60.86	0.000	0.000

3	OTK	12962598	Directional	56.34	4.843	2.569
3	OTK	12962598	Resistivity	50.37	4.843	2.569
3	APR	12962598	Resistivity	50.37	0.000	0.000
3	OTK	12962598	Gamma	43.18	4.843	2.569
3	OTK	12962598	Pressure	45.81	4.843	2.569
3	CS	10623947	-	37.73	0.000	0.000

Service and Tool Mnemonics

Mnemonic	Name	Description
APR	Resistivity	Azimuthal propagation resistivity, azimuthal propagation resistivity image
BCPM	BCPM	Mud pulse telemetry and downhole tool power module
DIR	Directional	Wellbore directional survey
OTK	OnTrak	Propagation resistivity, propagation conductivity, gamma ray, directional, annular pressure, system memory and VSS
SRIG	Inclination and Gamma	Probe based gamma ray and inclination module
STAB	Stabilizer	Stabilizer assembly
CS	Closure Sub	BHA power ring isolator allowing insertion of inert sub into electrically powered BHA

Comments

1.) 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.

2.) Baker Hughes run 1 utilized 6 3/4 inch NaviGamma services (Gamma Ray and Directional) behind an 8 3/4 inch bit and steerable assembly from 1047 to 7815 feet MD (1047 to 7228 feet TVD).

3.) Baker Hughes runs 2 and 3 utilized 4 3/4 inch OnTrak services (Multiple Propagation Resistivity, 2 Sector Azimuthal Gamma Ray, Gamma Ray, and Directional) behind a 6 1/8 inch bit and steerable assembly from 7815 to 14528 feet MD (7292 to 7304 feet TVD).

4.) The interval from 1047 to 6736 feet MD (1047 to 6631 feet TVD) was not logged due to directional only services being provided through the surface and vertical-hole sections for Baker Hughes run 1.

5.) A sliding indicator is shown on the right side of track 2 as a heavy line. This 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	6736	8.750	1	Begin logging due to directional only service provided thru vertical section.
2	7765	6.125	2	Gap in Data due to tool being in casing.
3	8268	6.125	3	The depth from 8268 ft to 8320 ft (7292 ft TVD to 7292 ft) was logged up to 18 hrs after tripping out for new mwd ontrak tool.
4	14486	6.125	3	No sensor data due to sensor to bit offset.

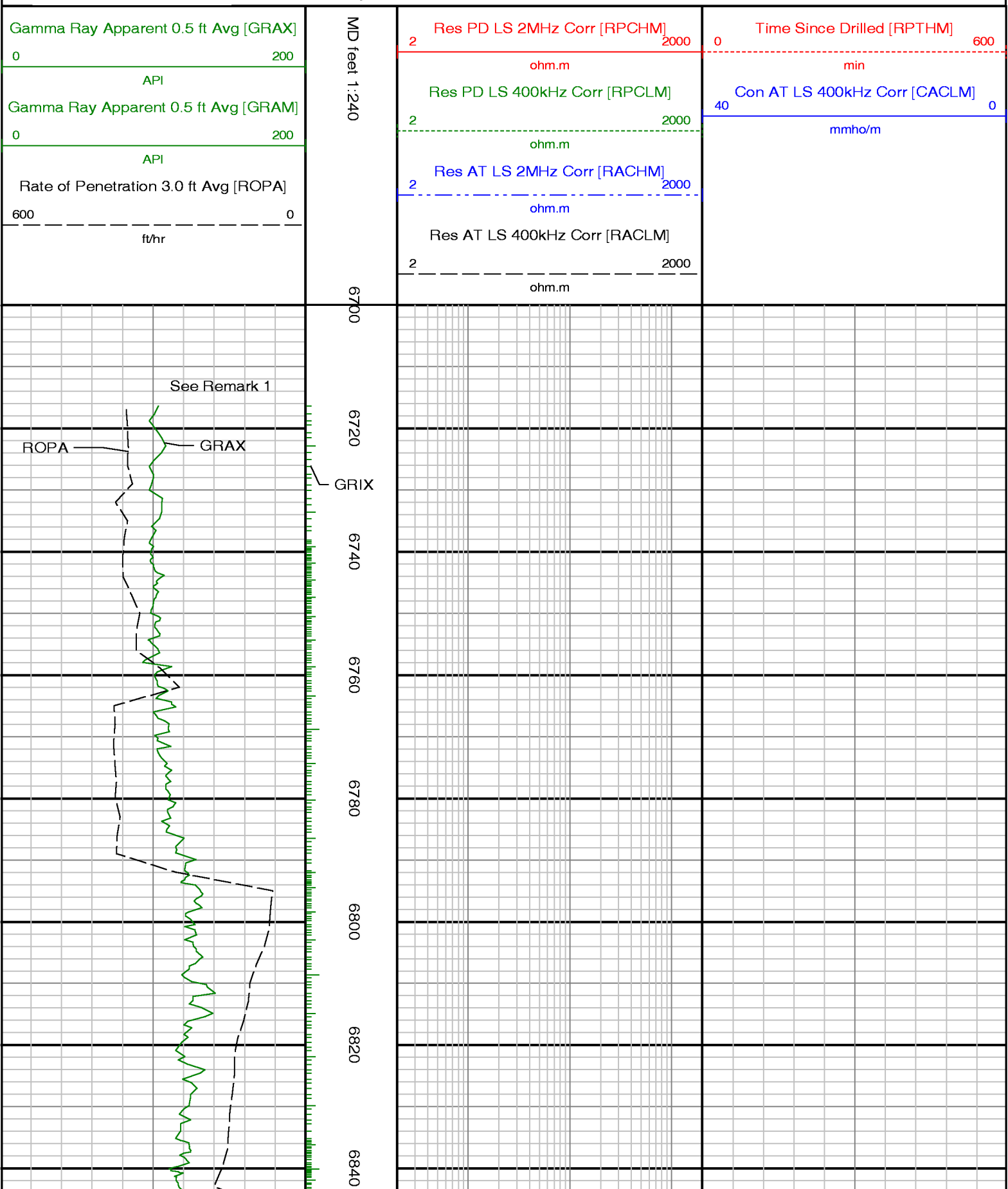
BAKER HUGHES

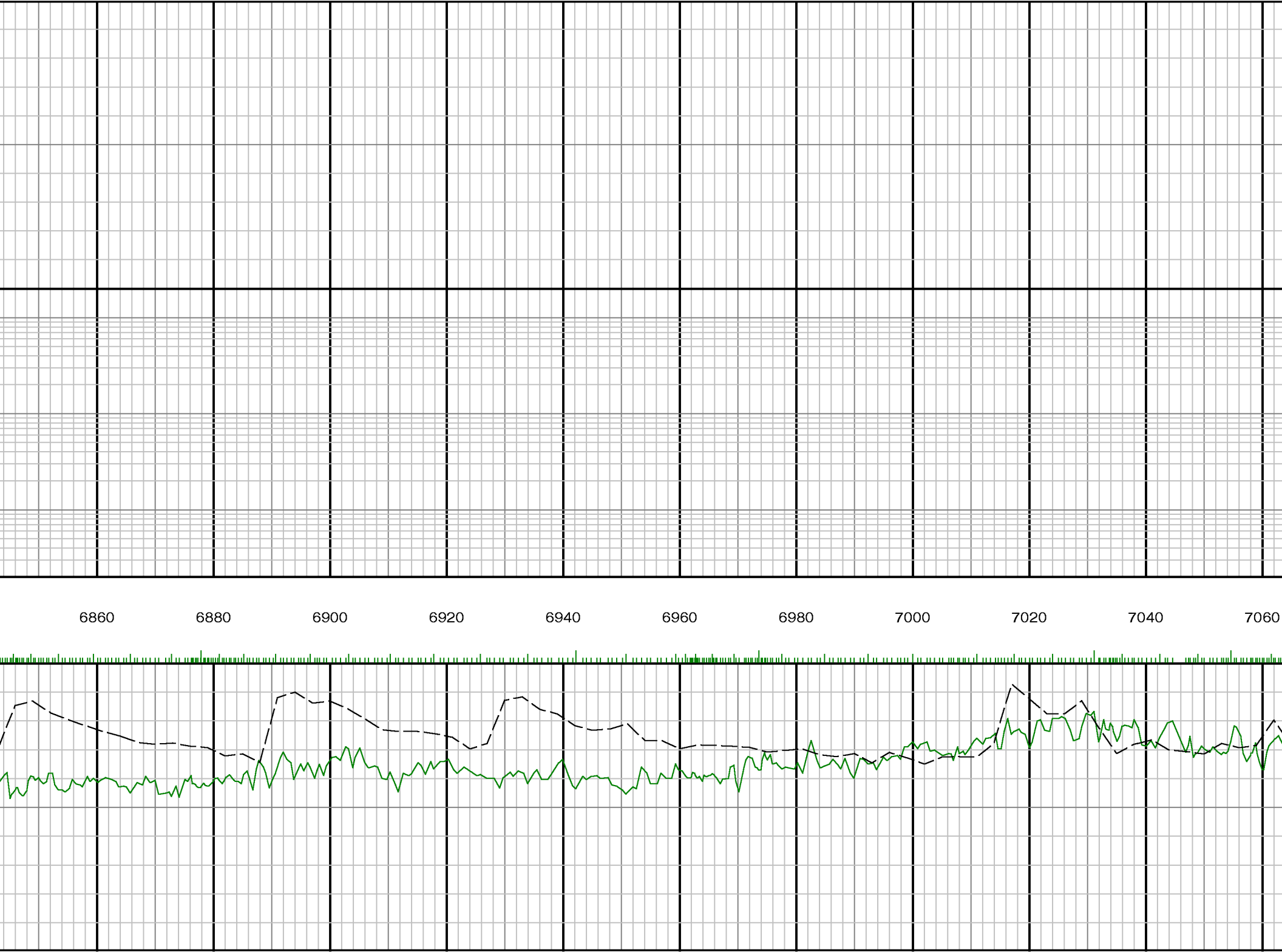
Company : Kerr-McGee Oil & Gas Onshore LP

Well : Henrickson Federal 36C-18HZ

Interval : 6700.00 - 14600.00 feet

Created : 21/Sep/2013 6:21:12 AM

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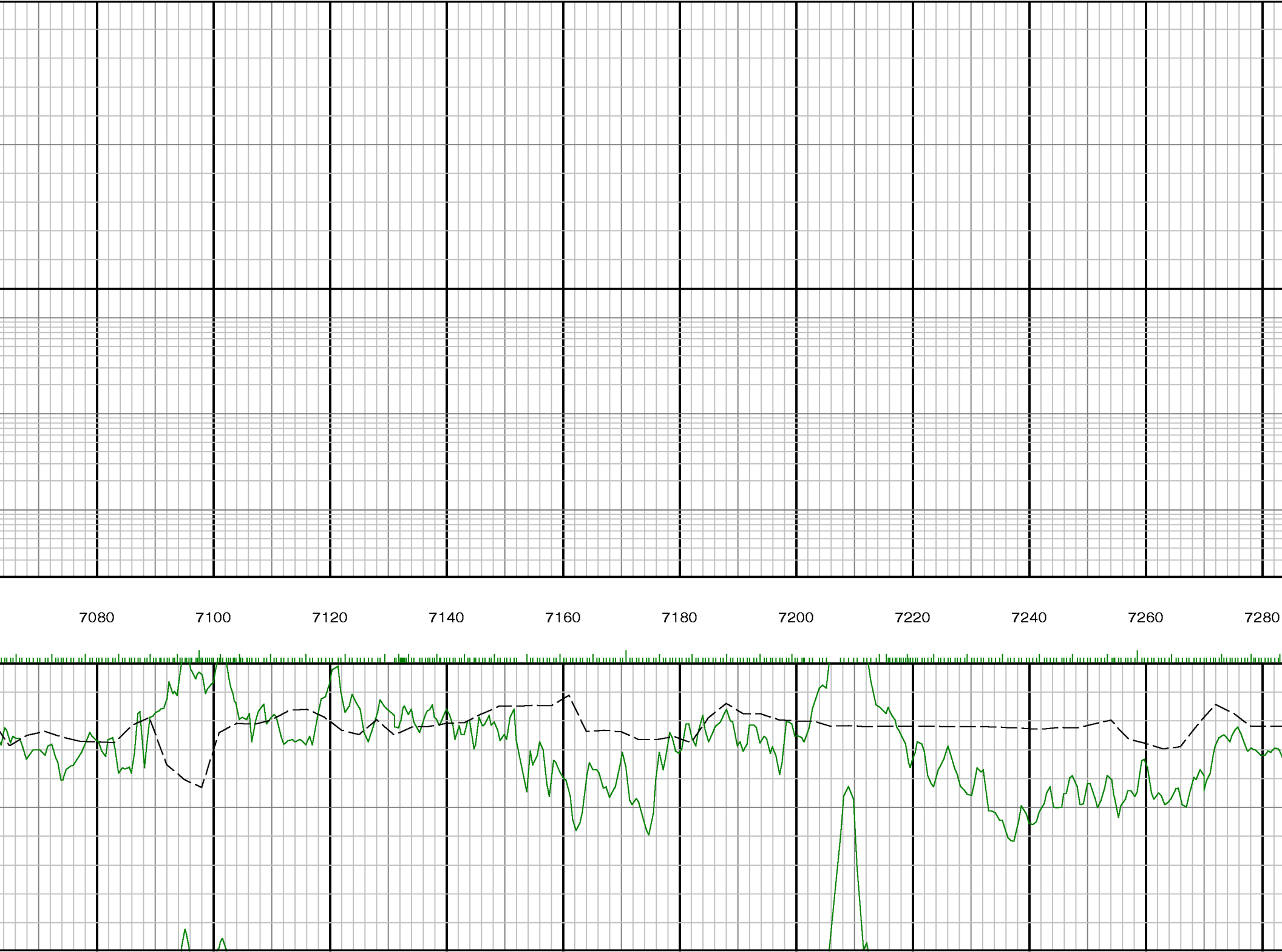
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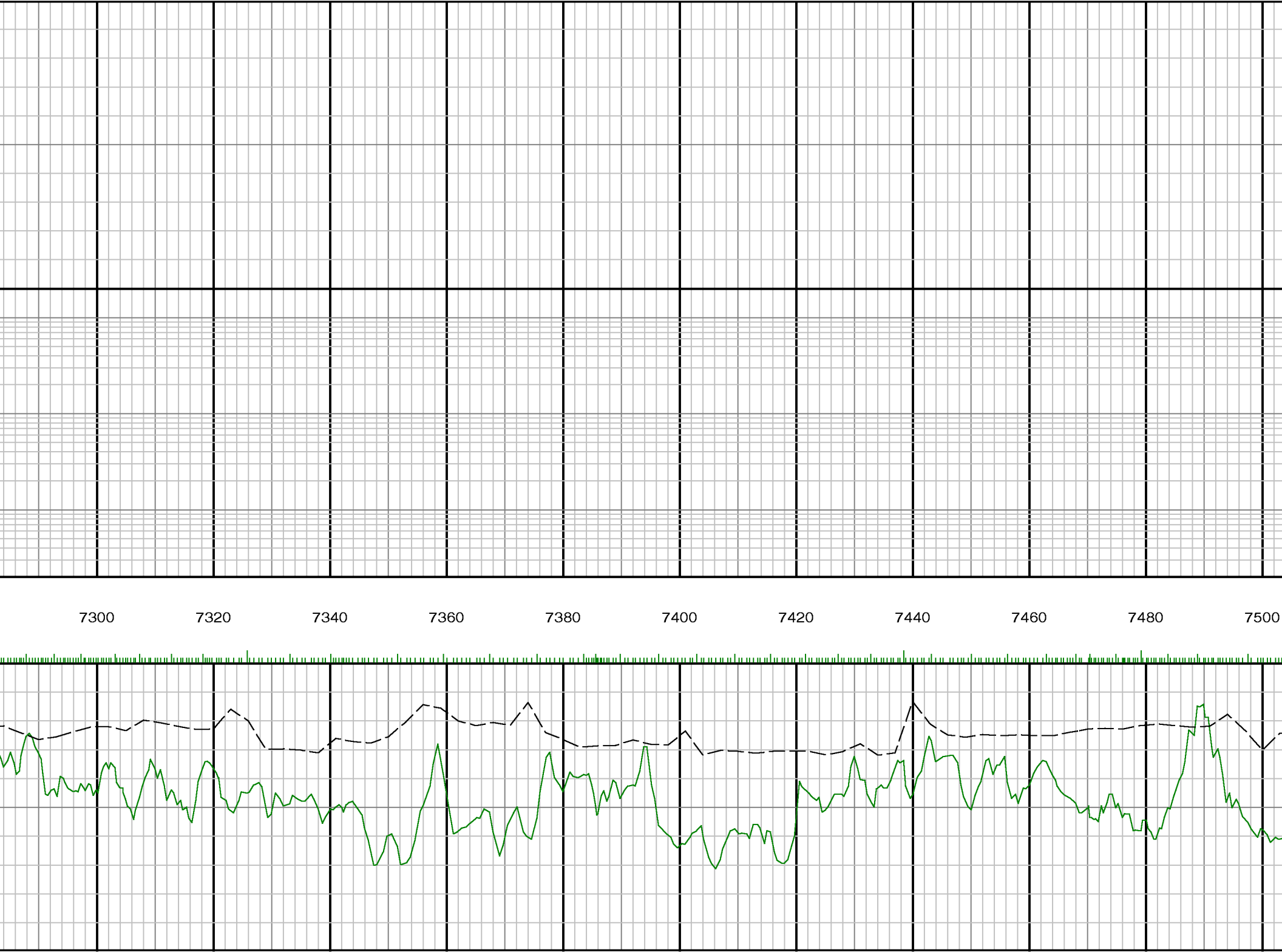
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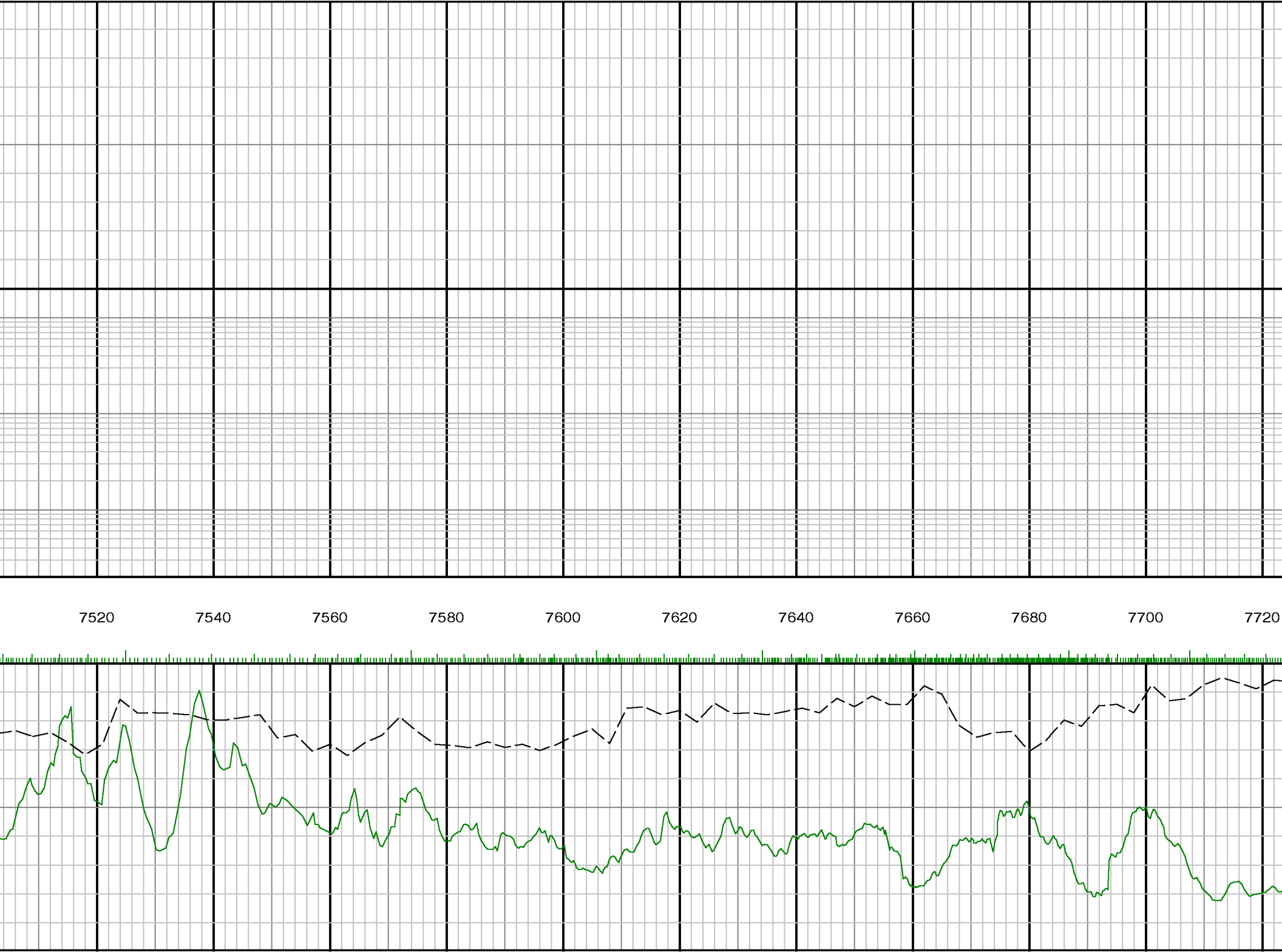
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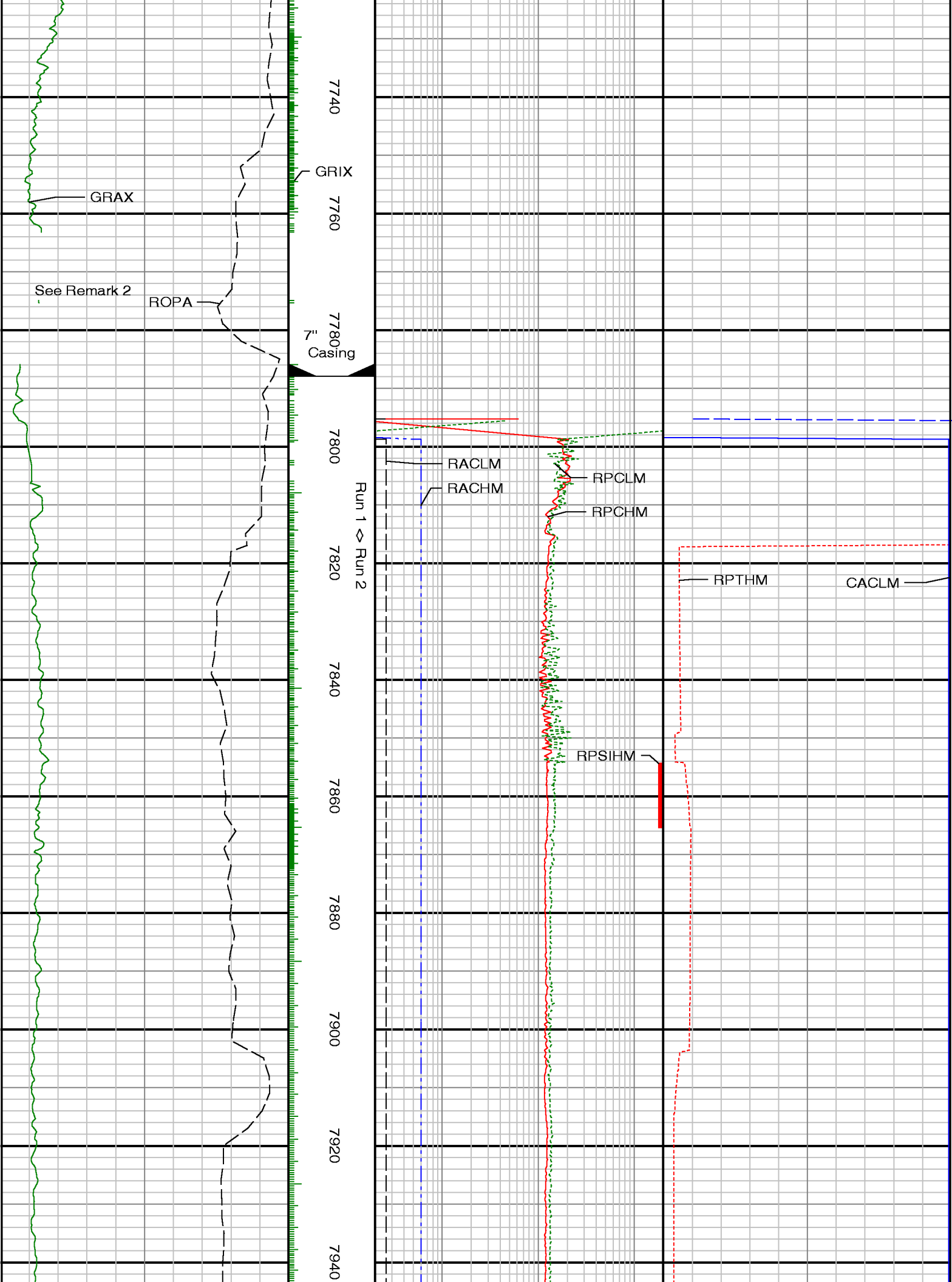
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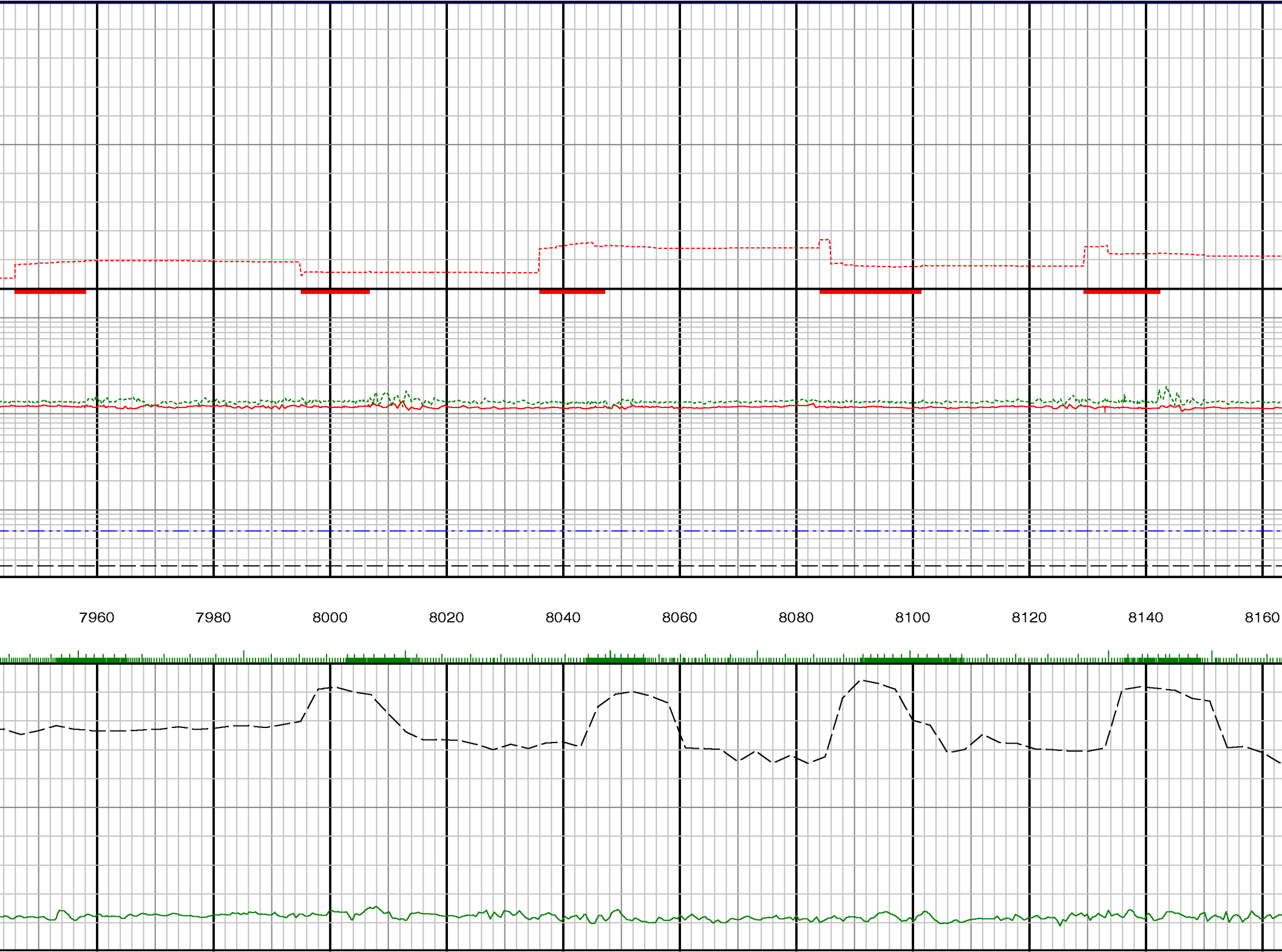
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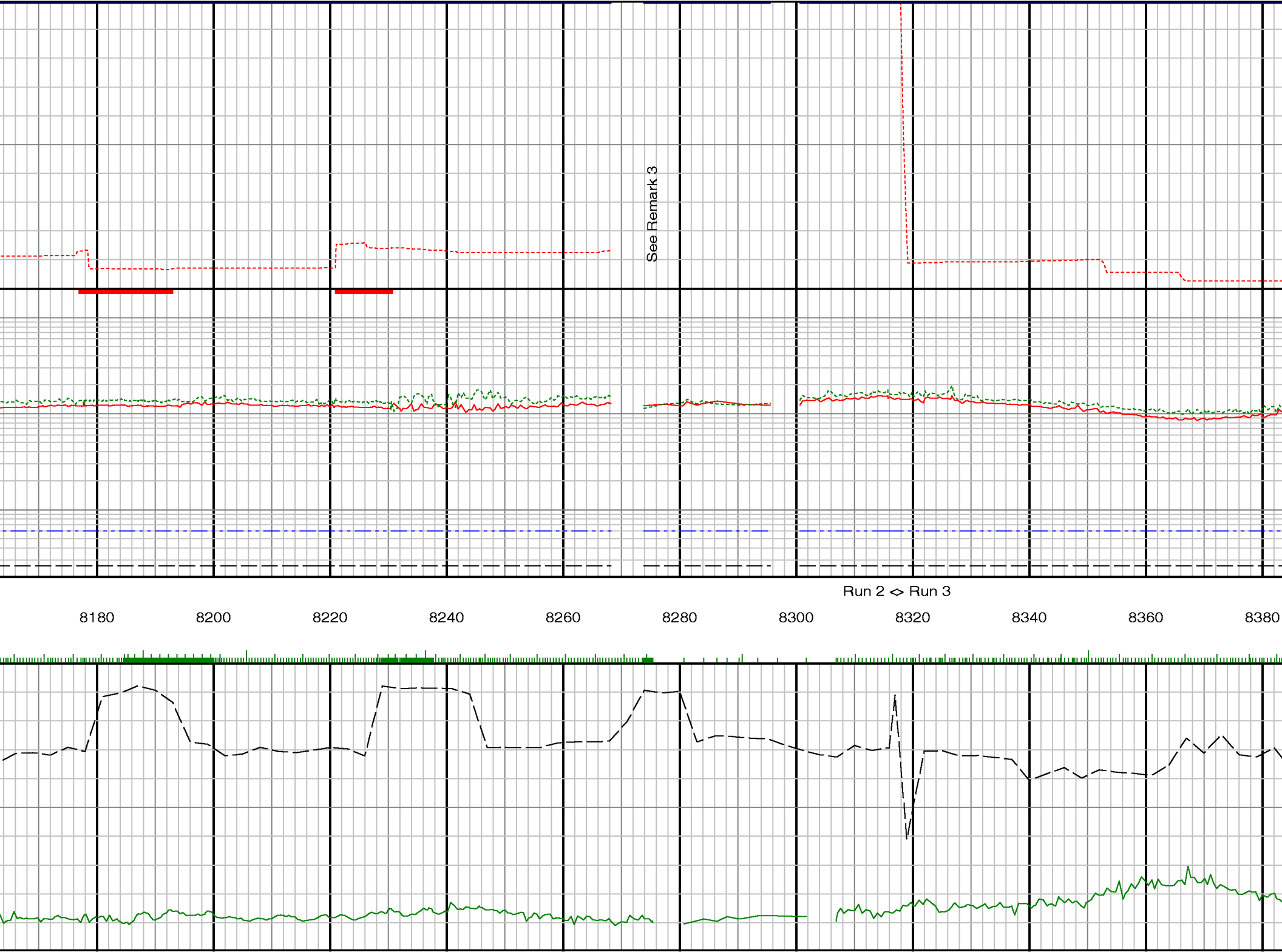
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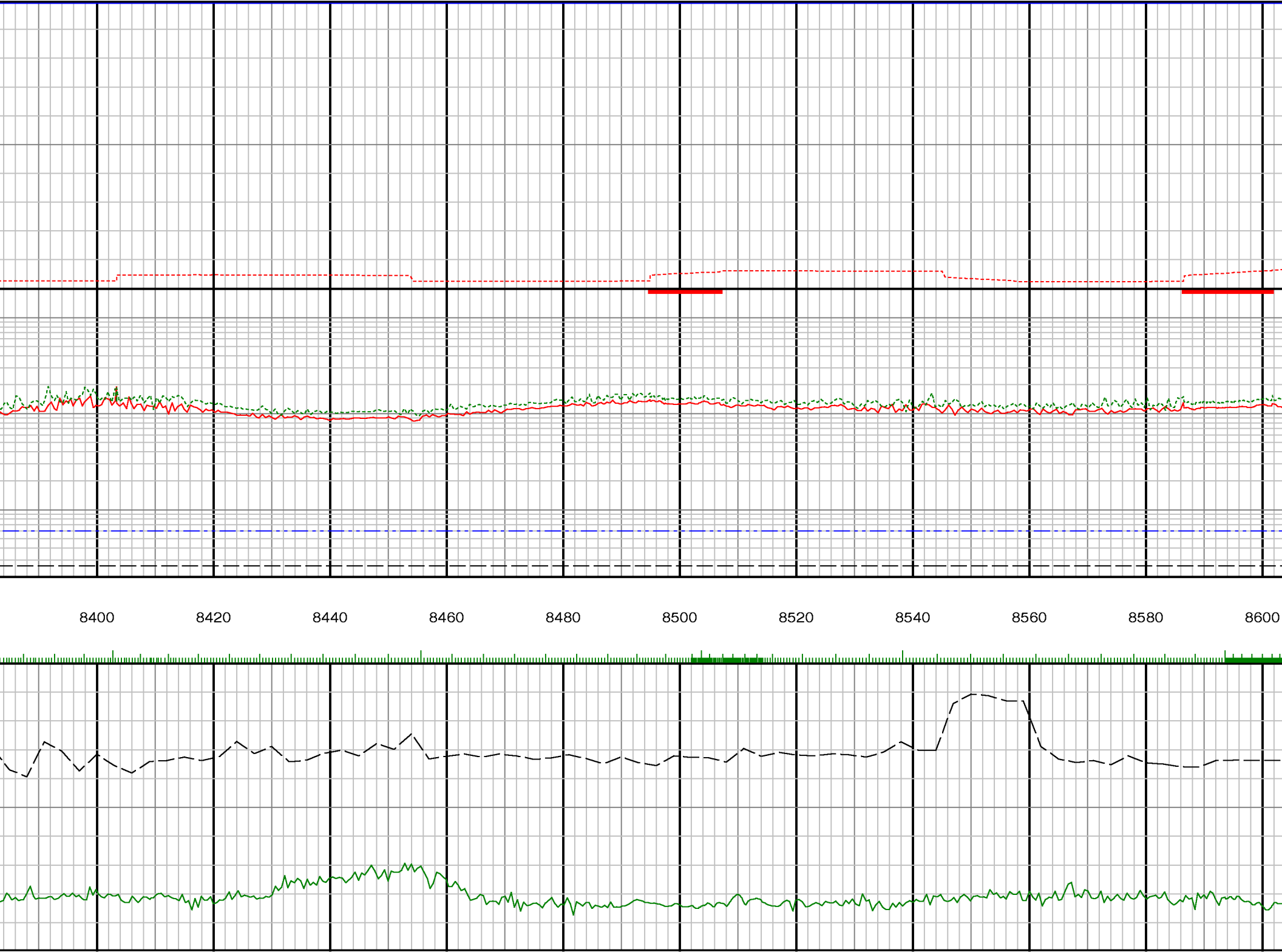
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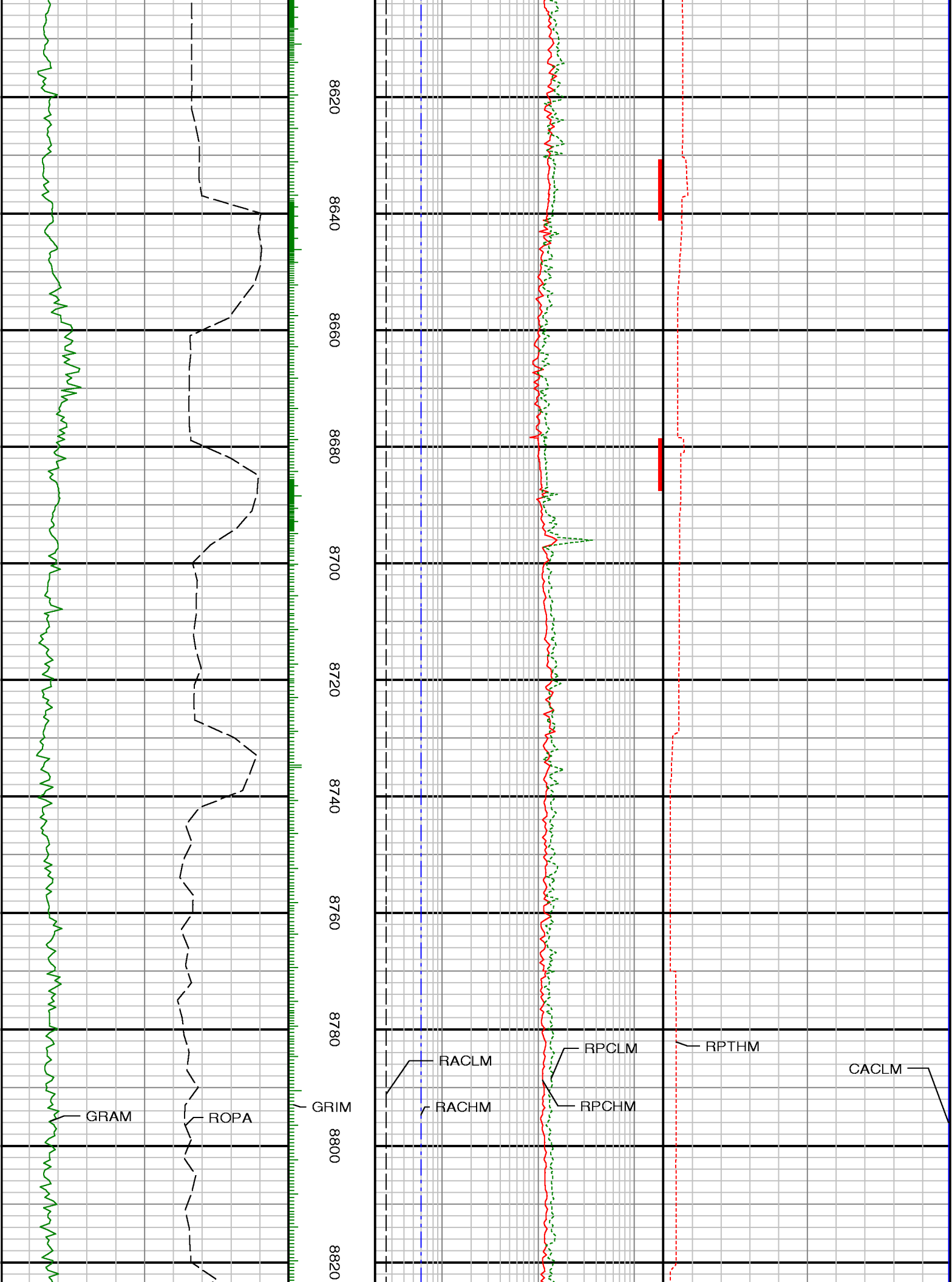
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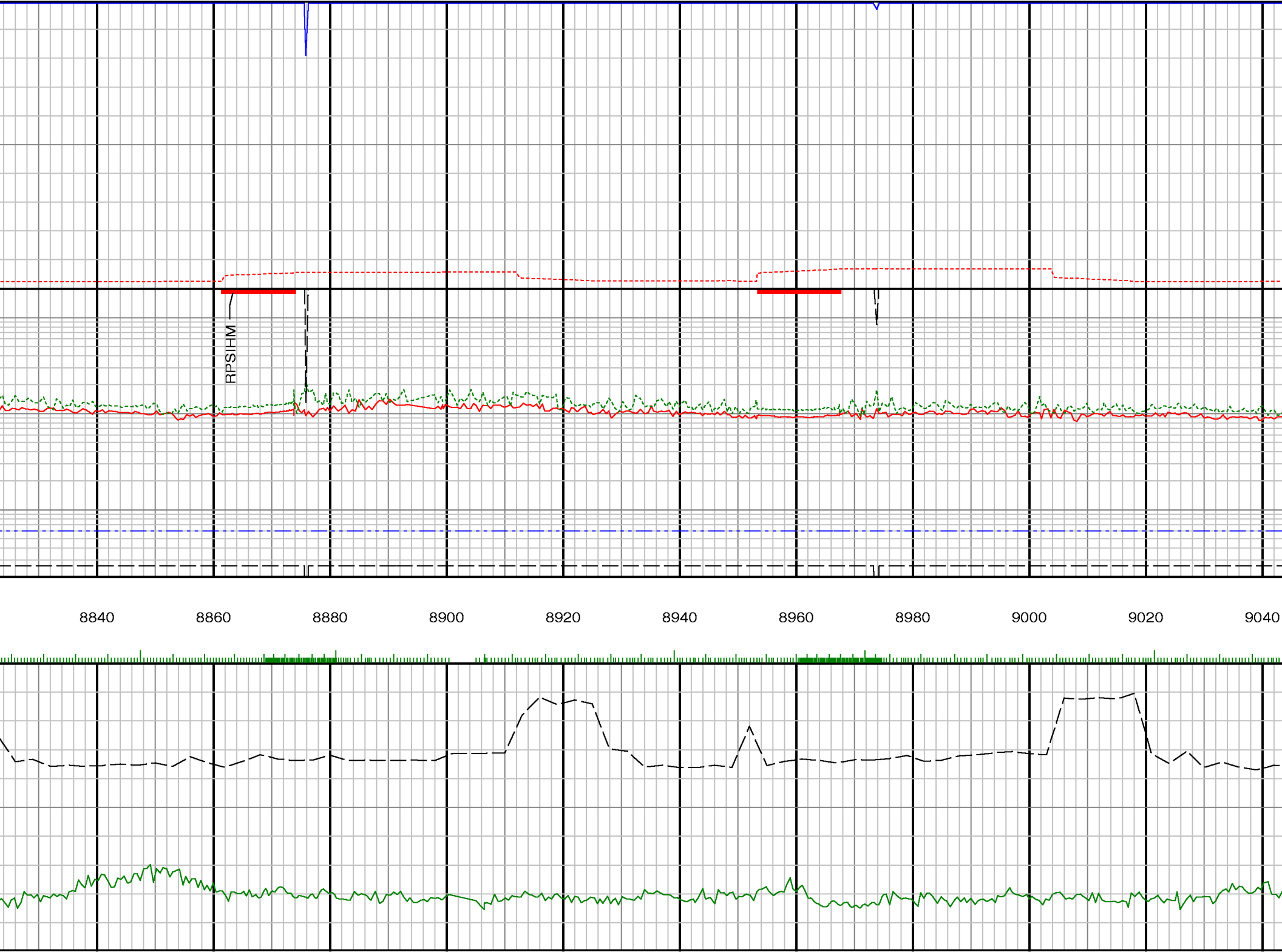
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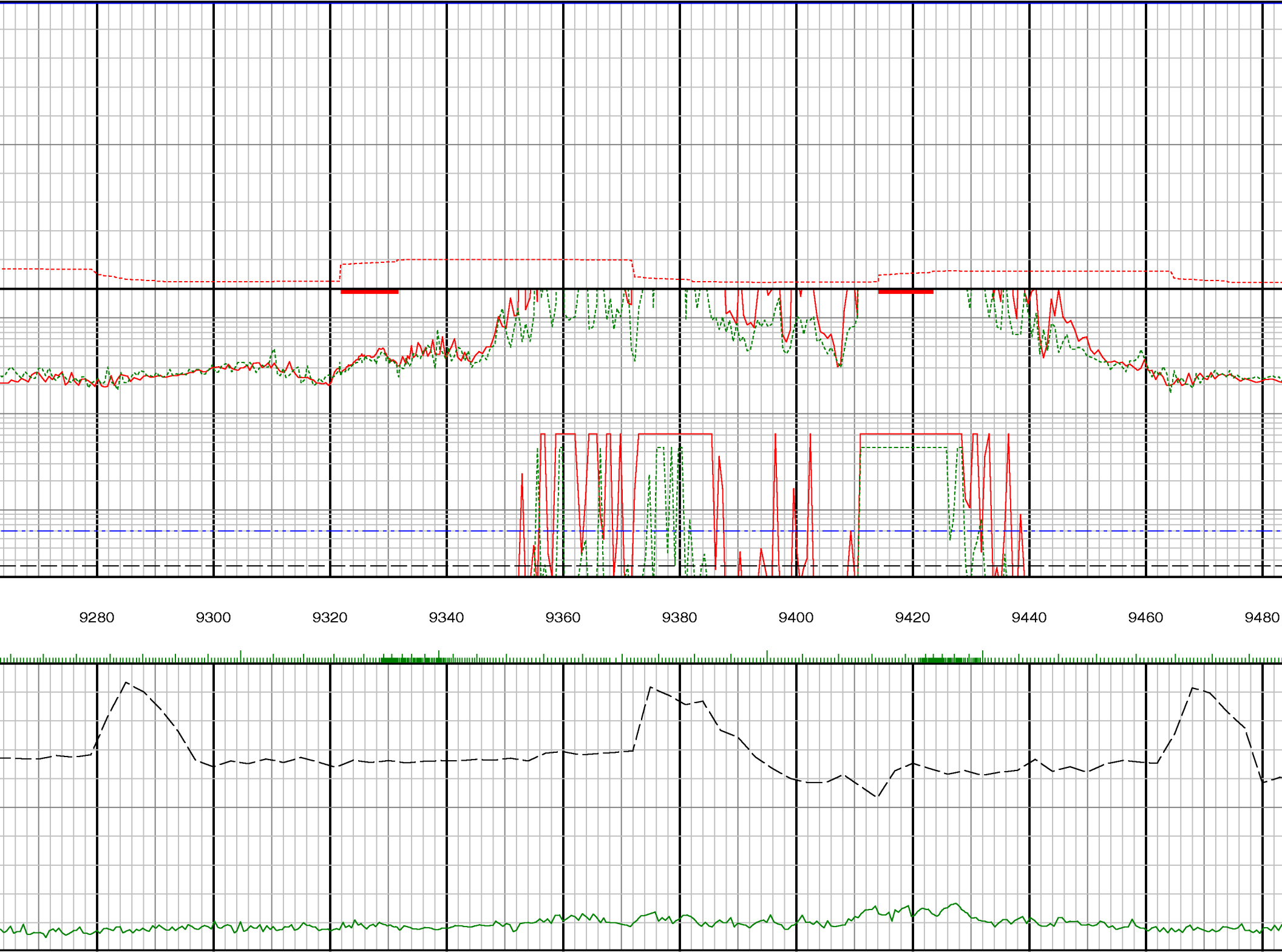
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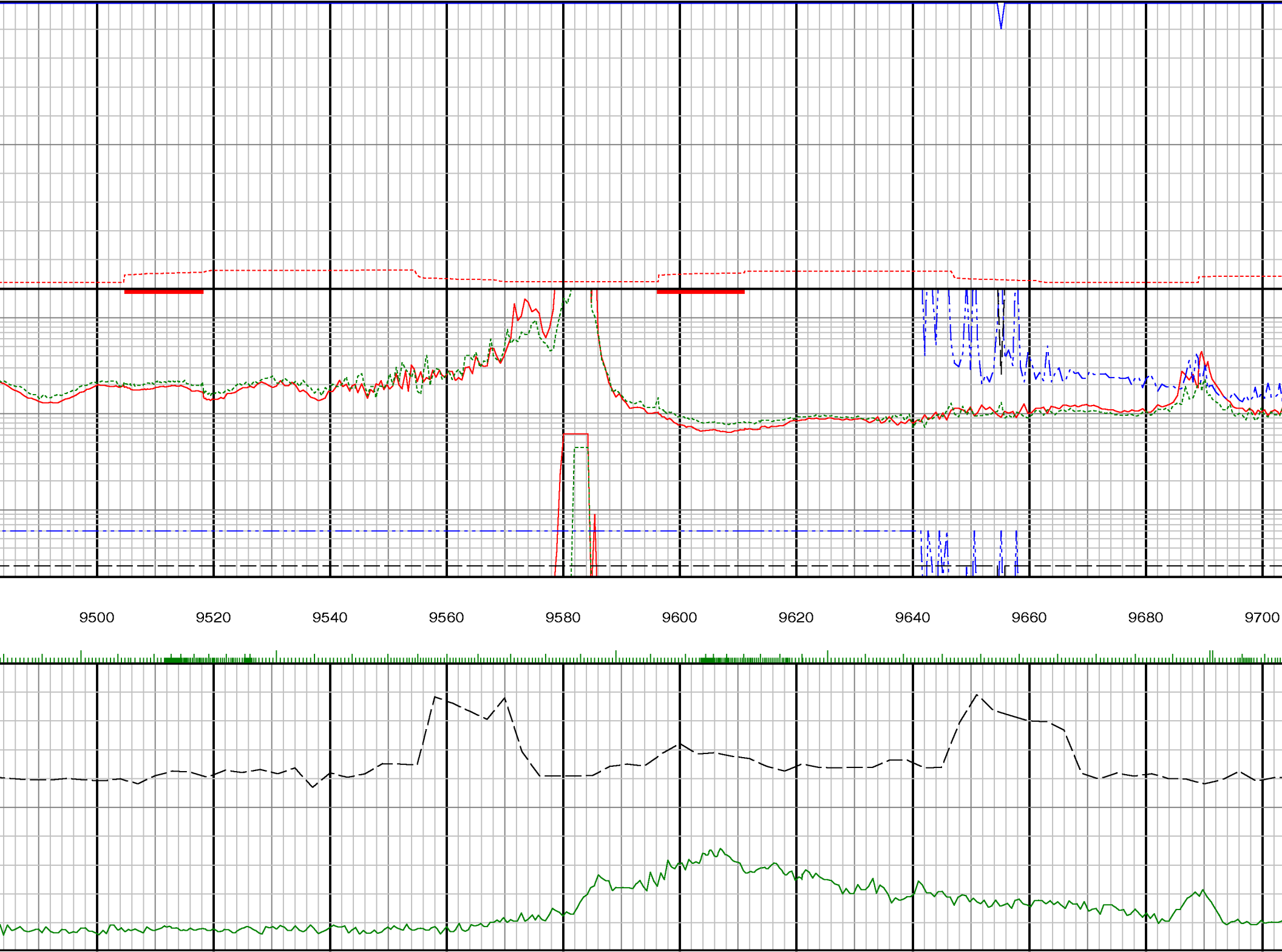
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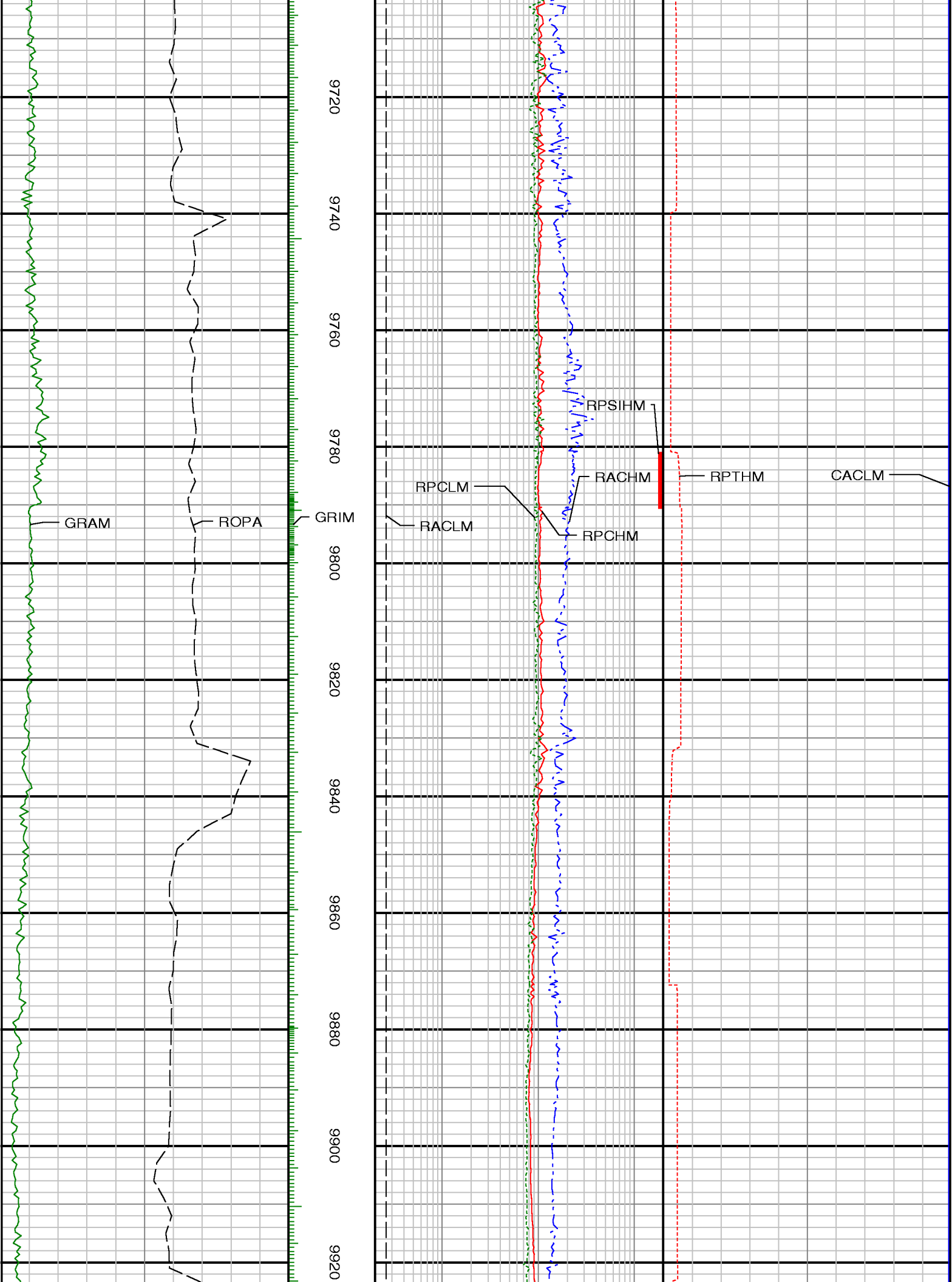
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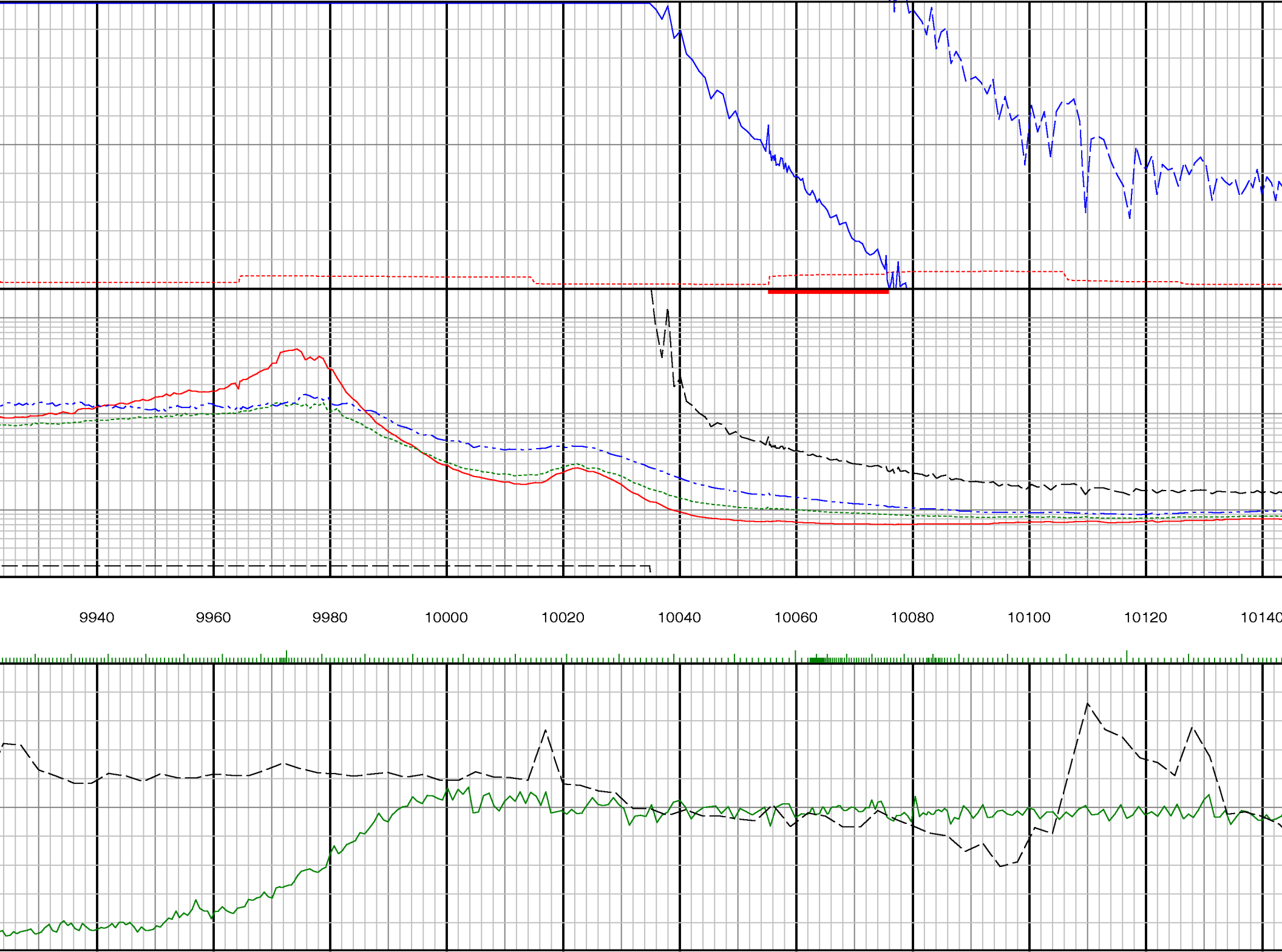
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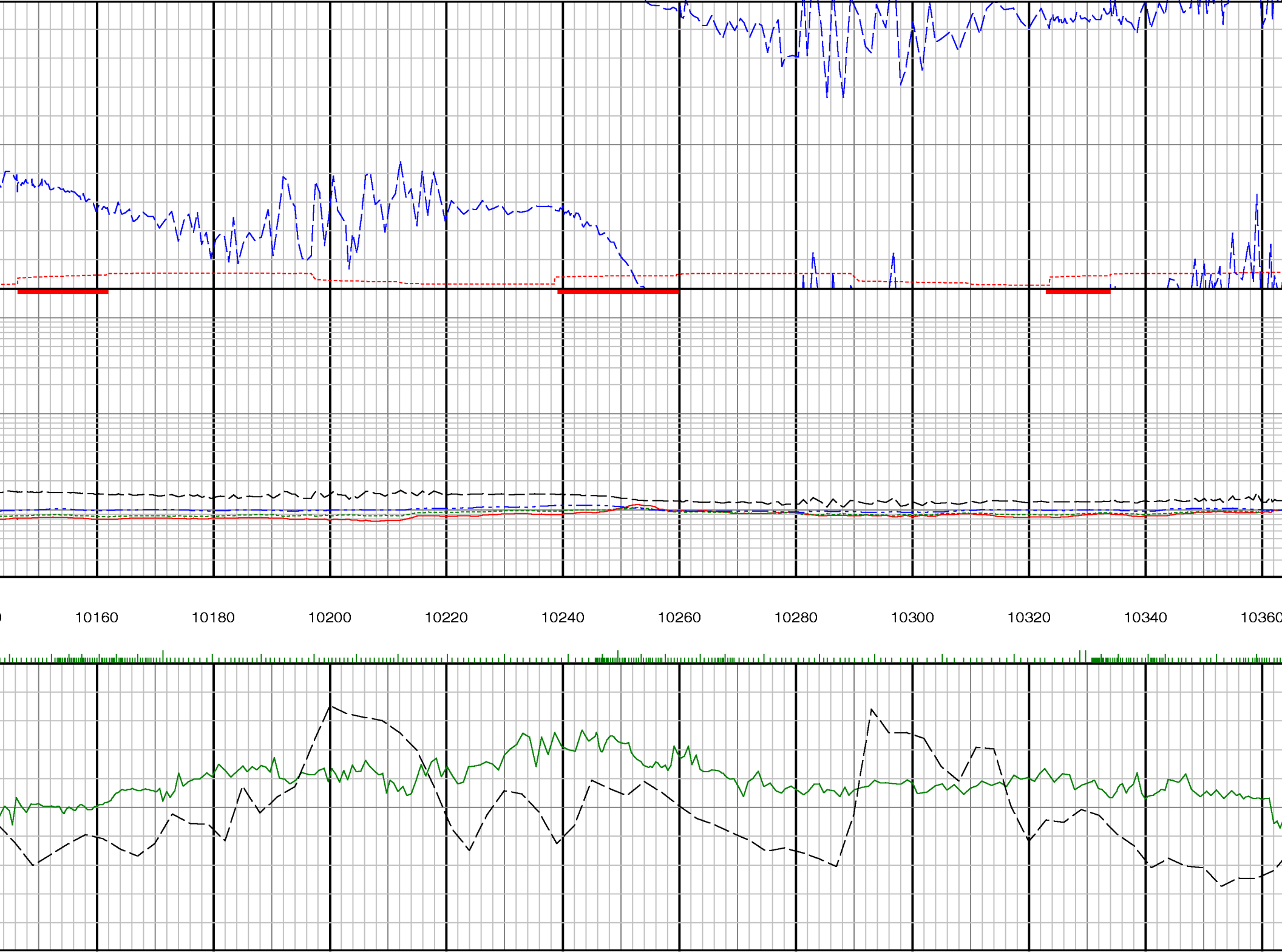
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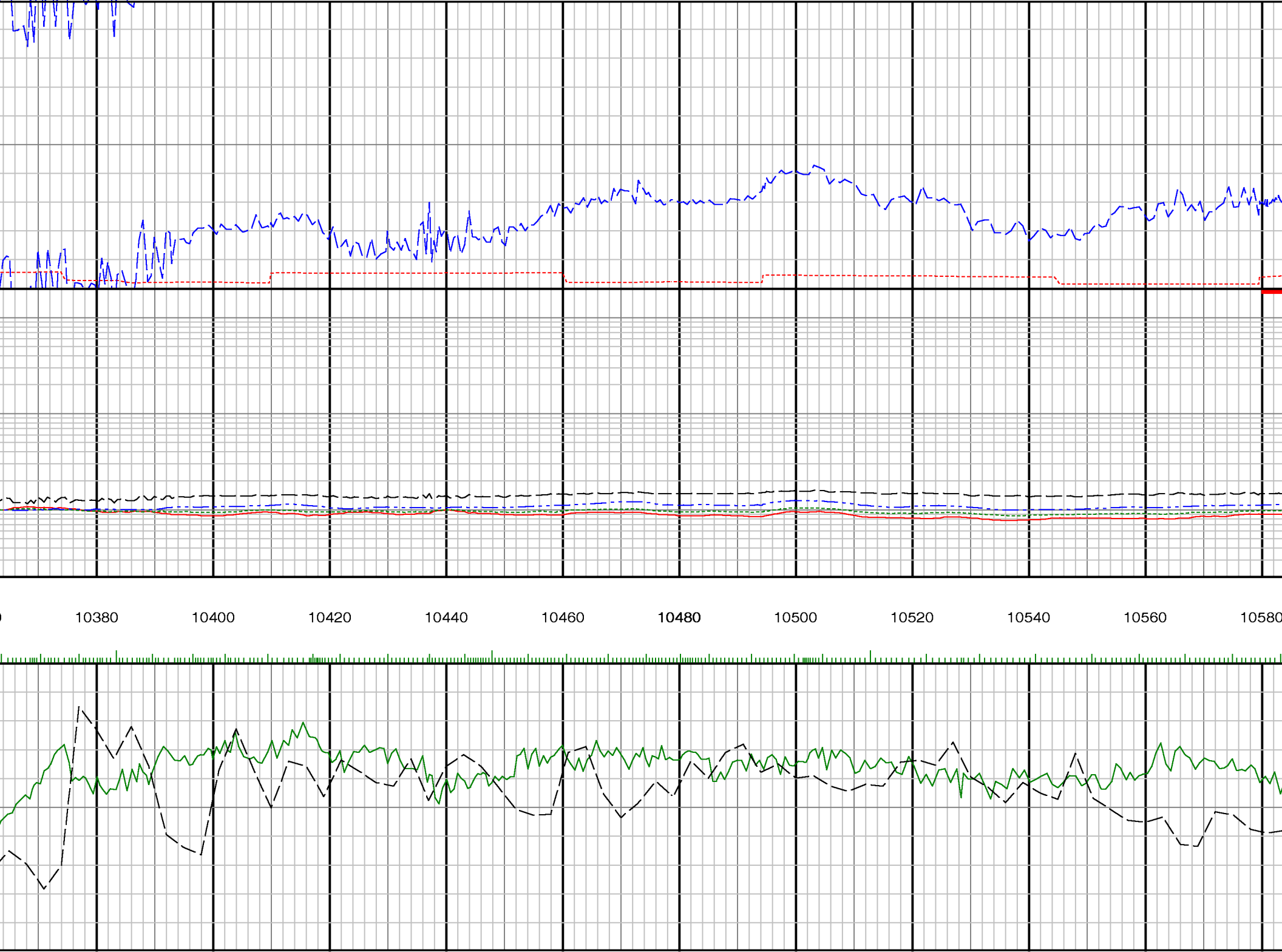
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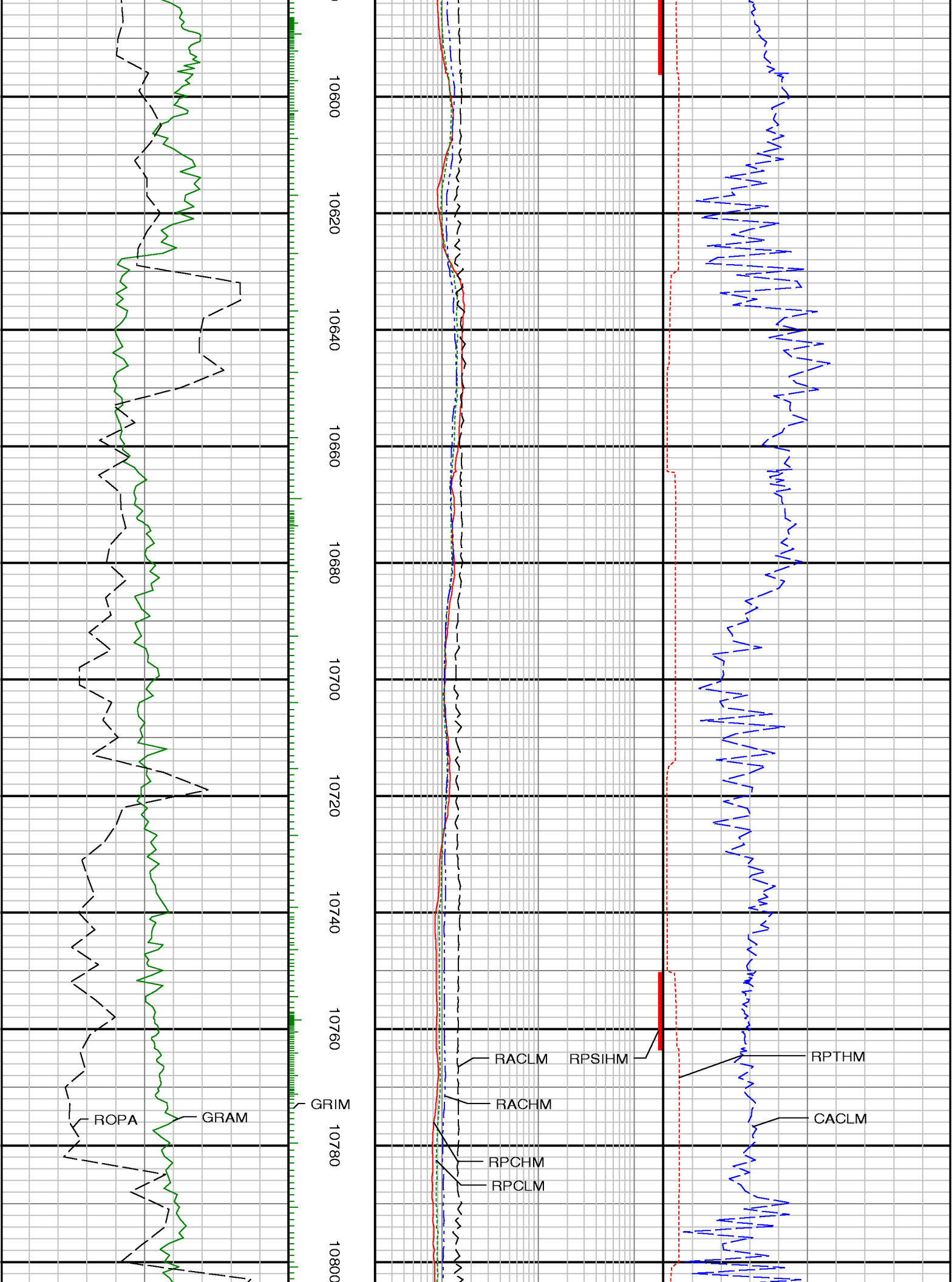
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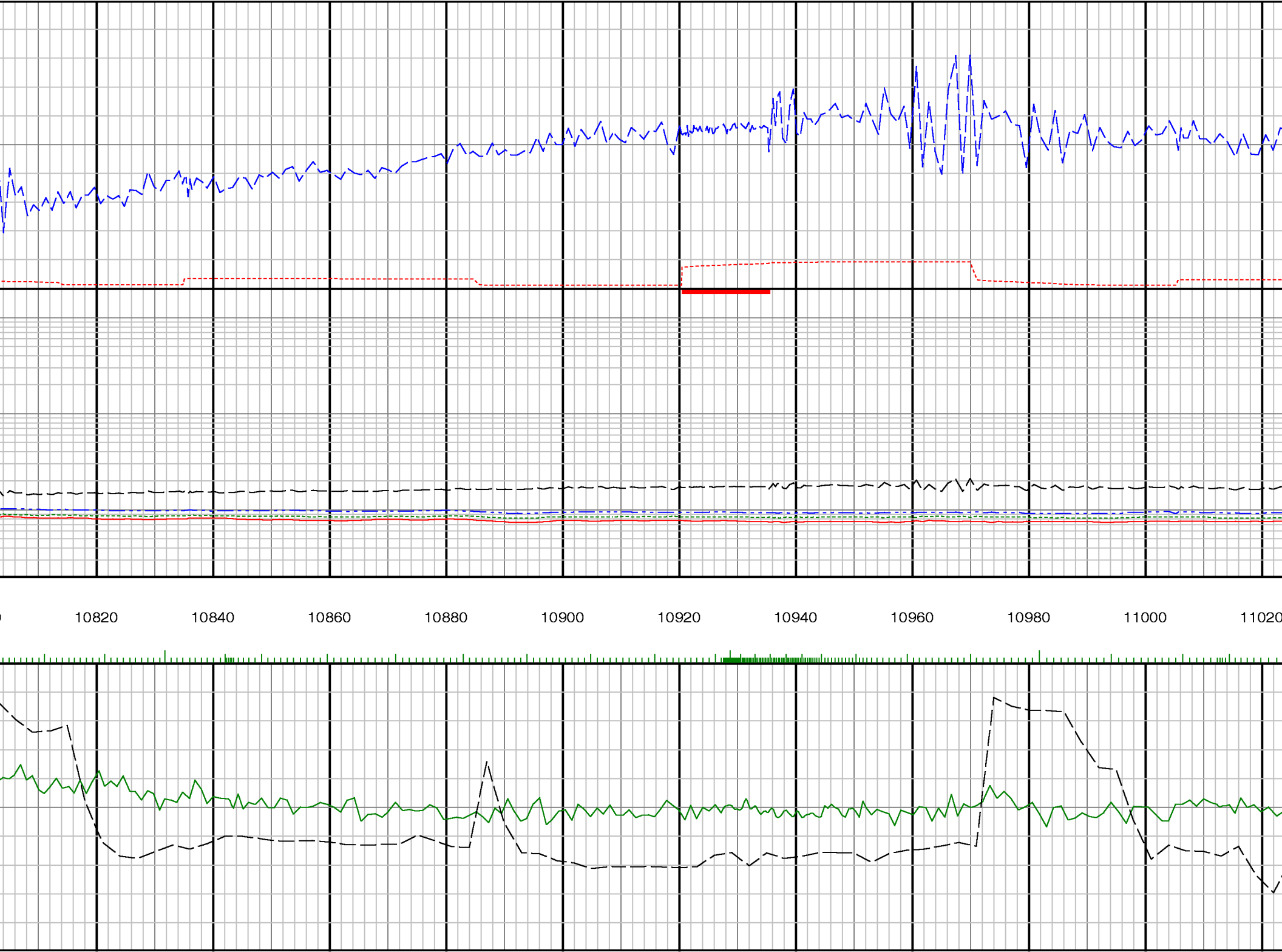
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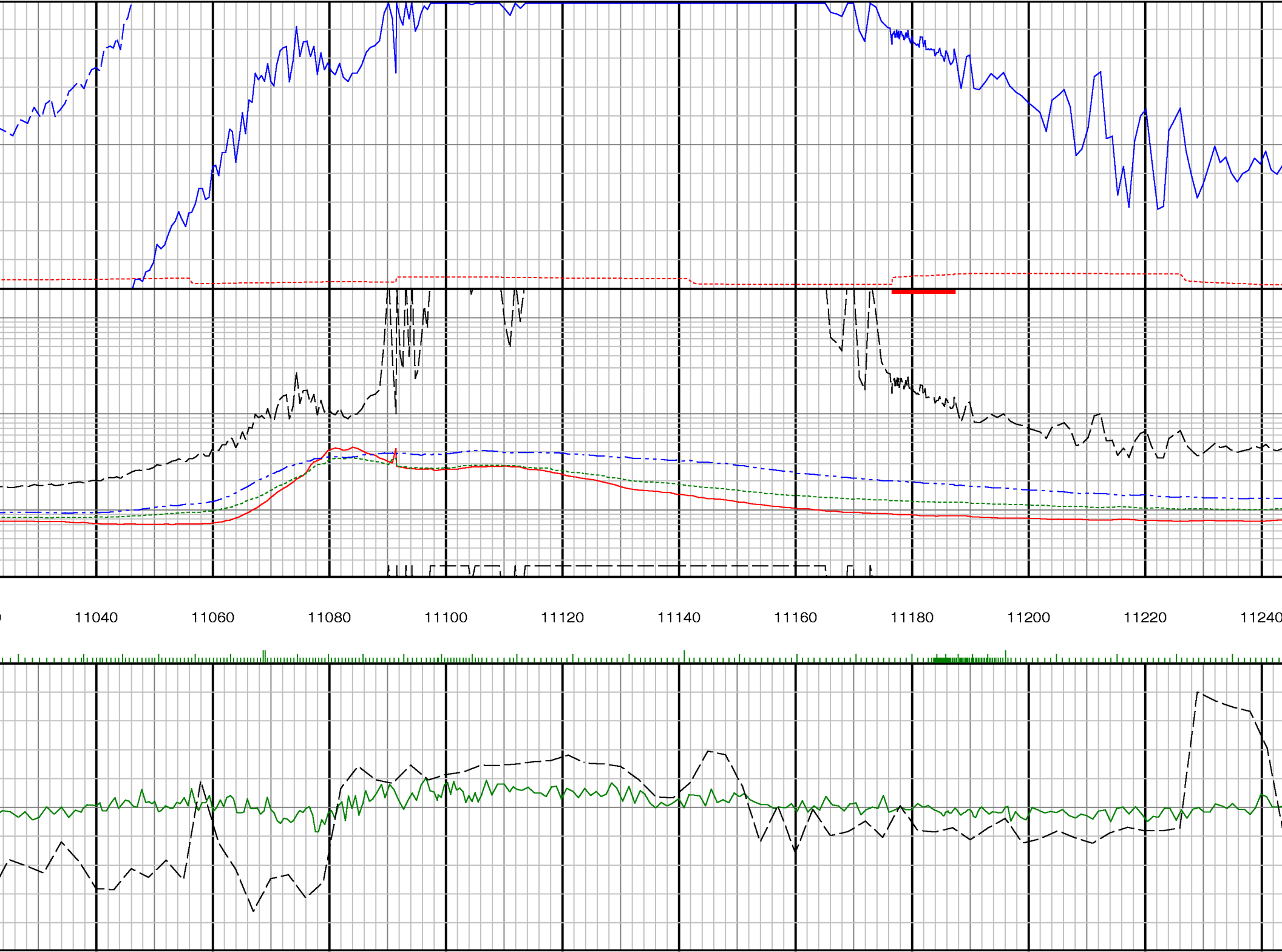
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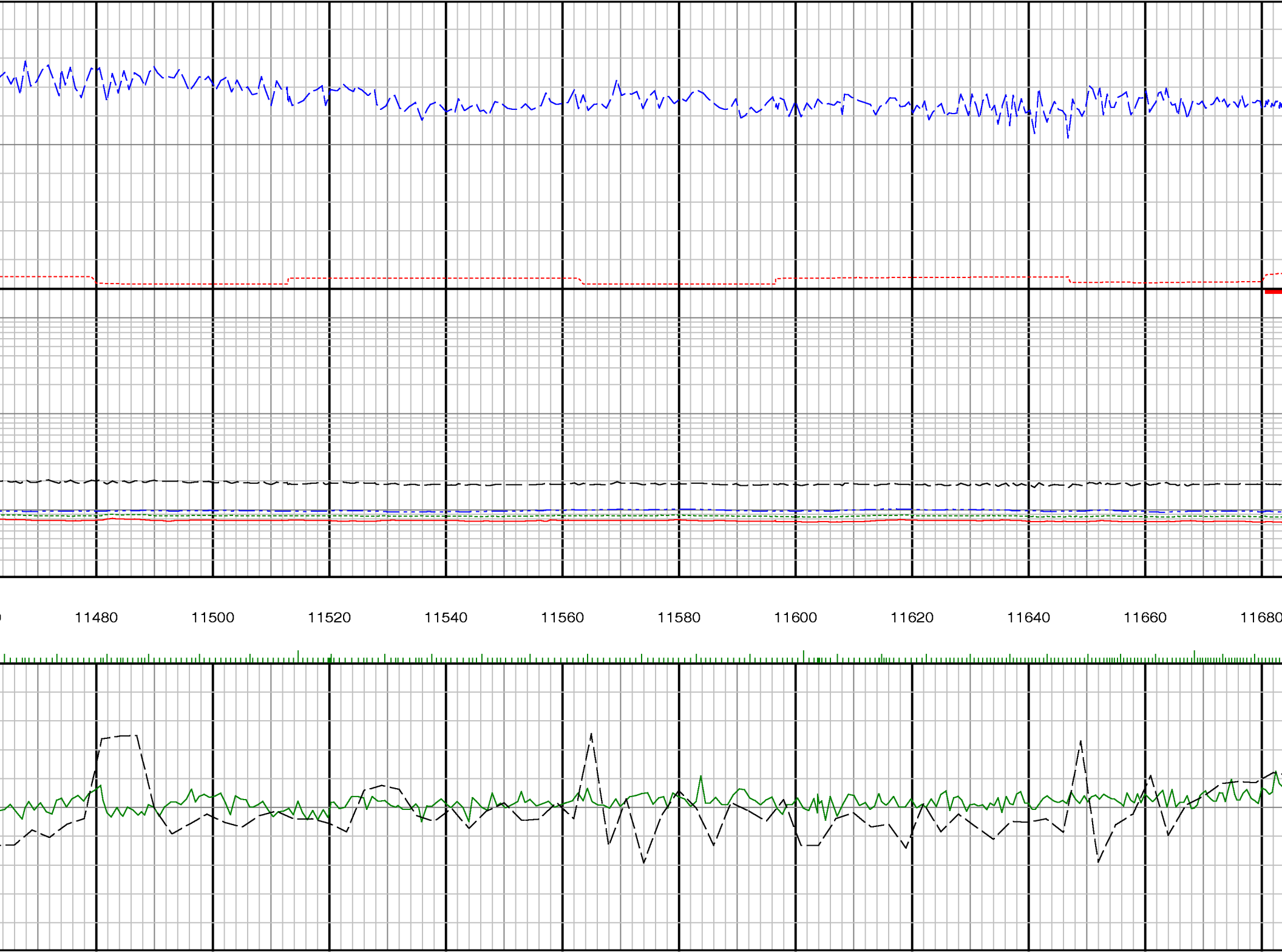
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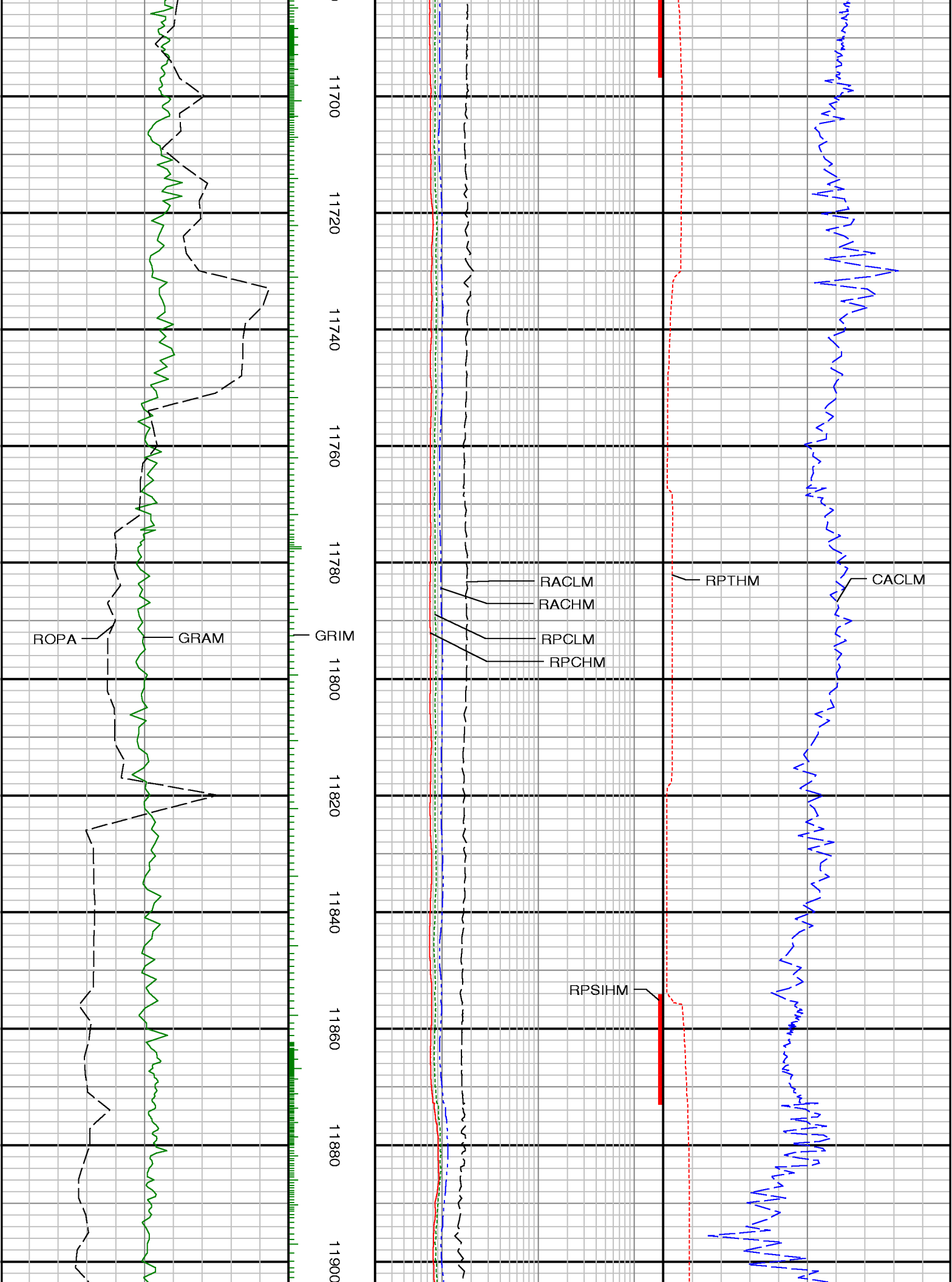
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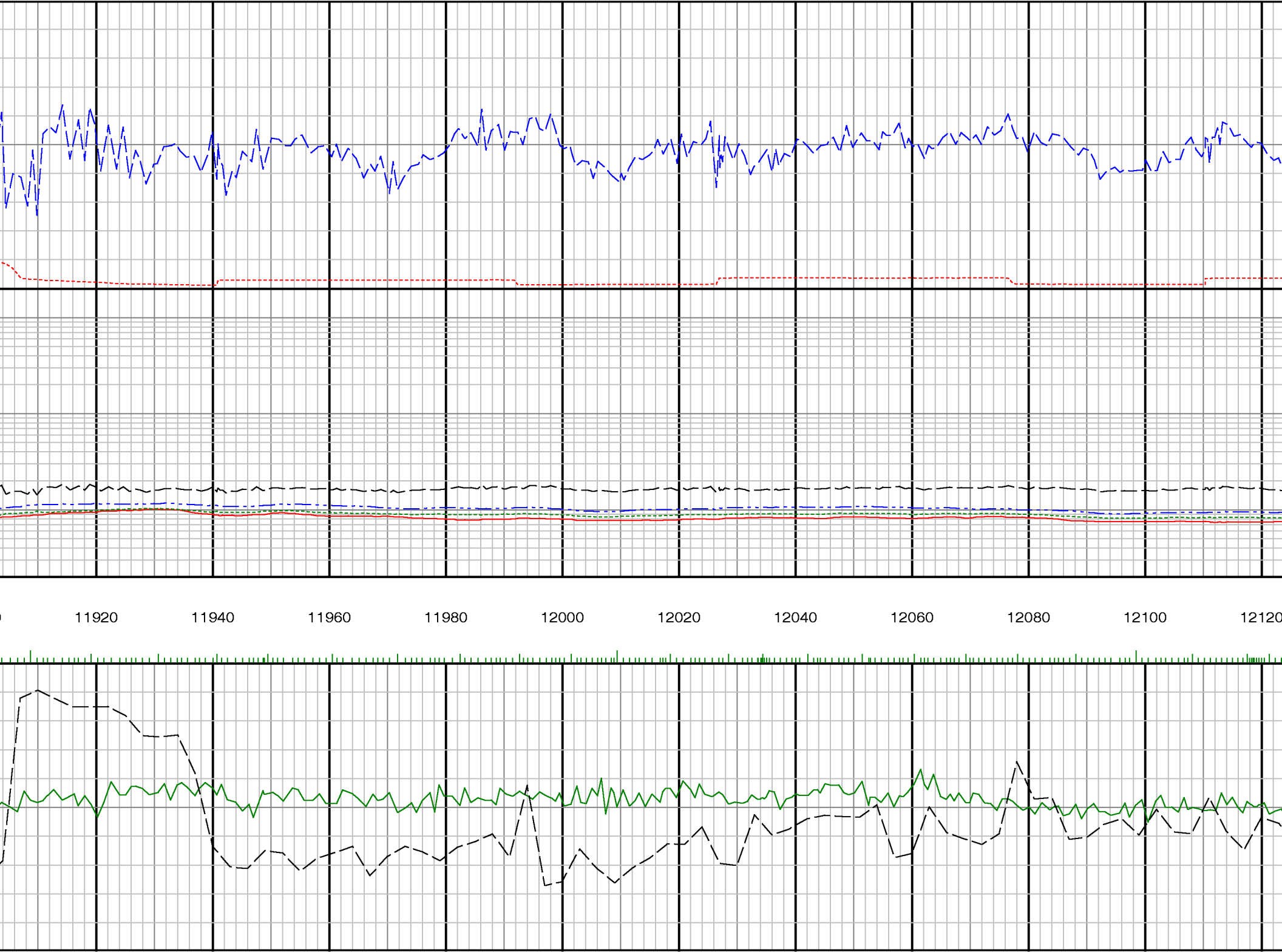
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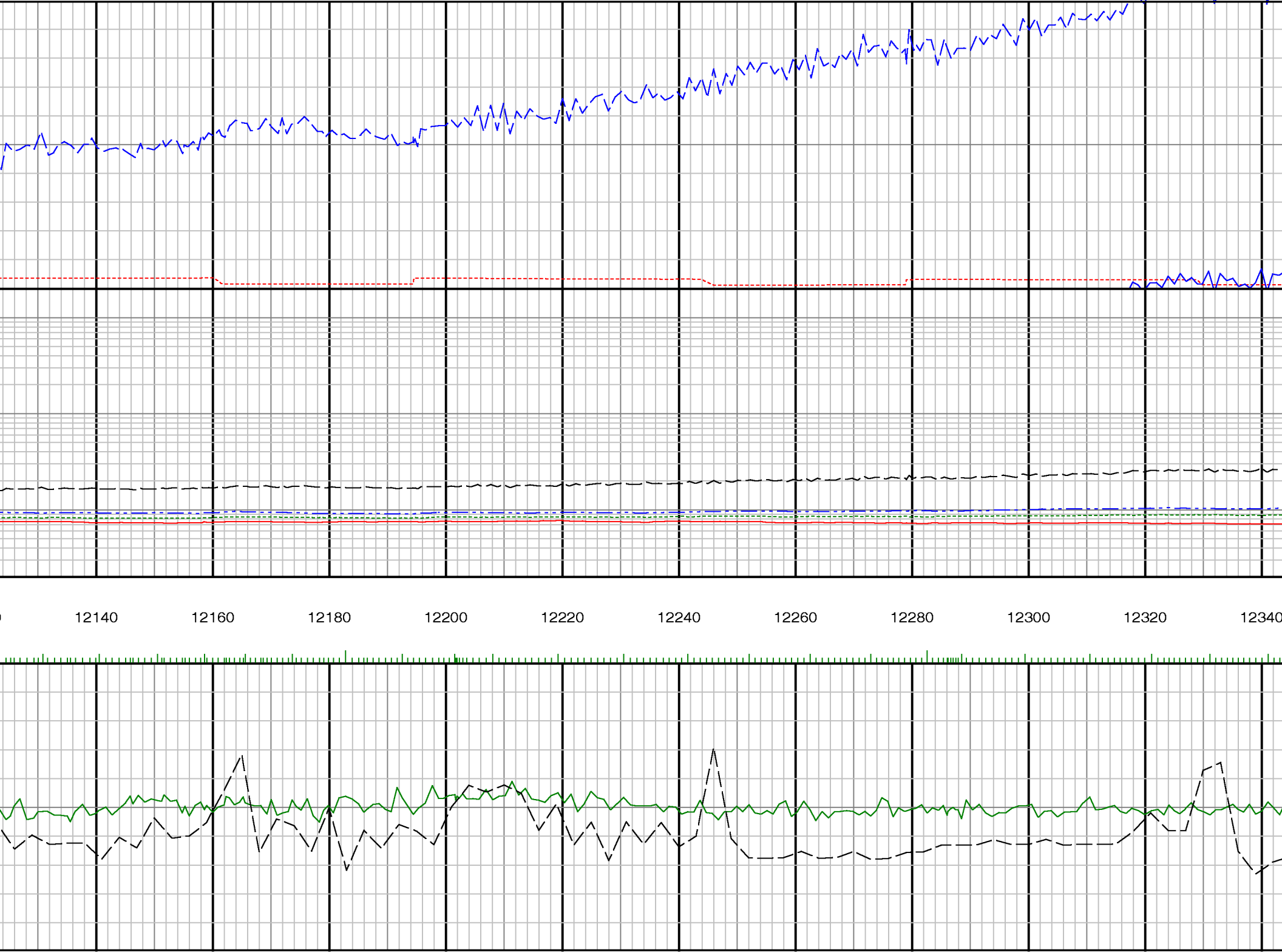
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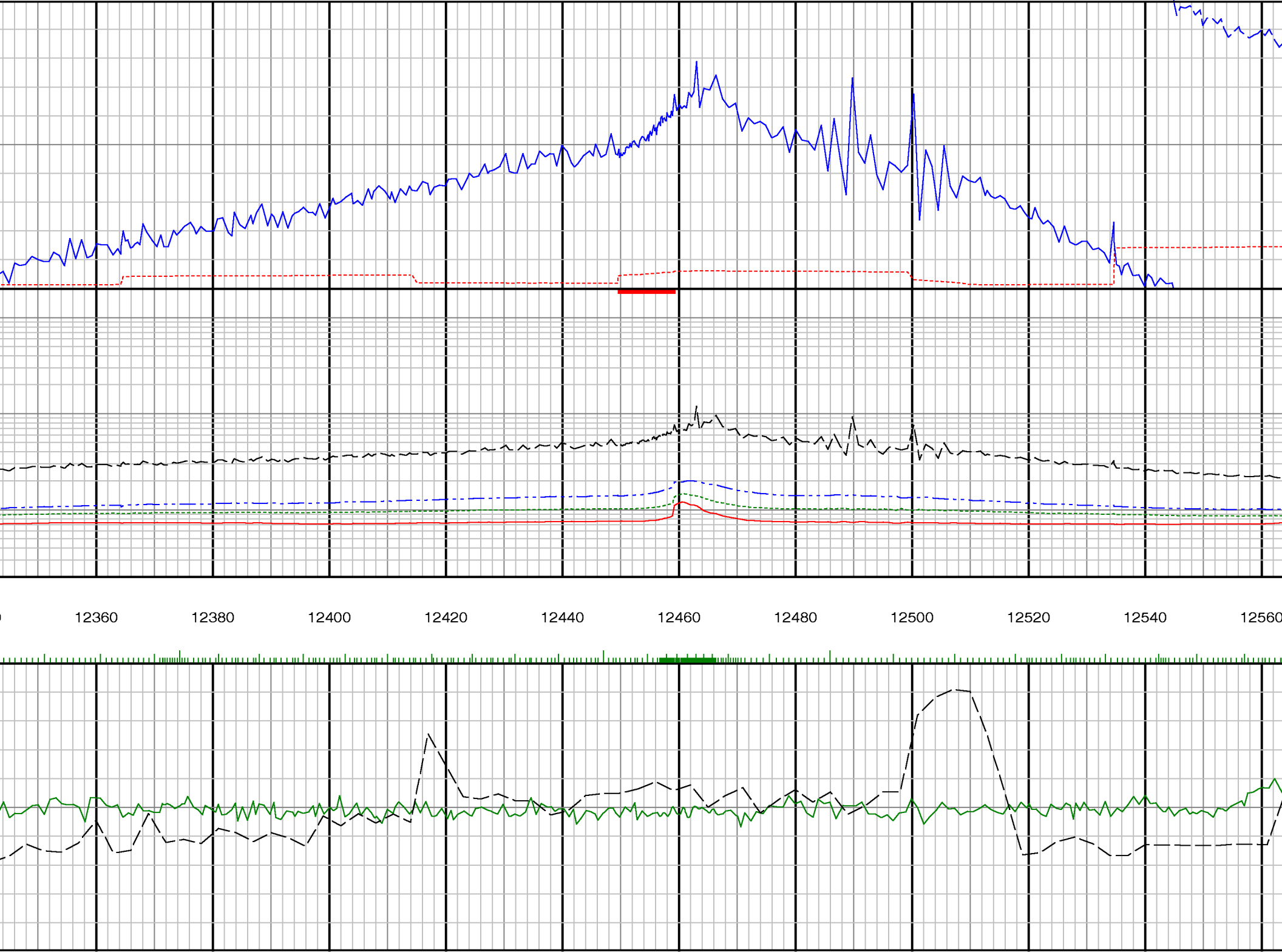
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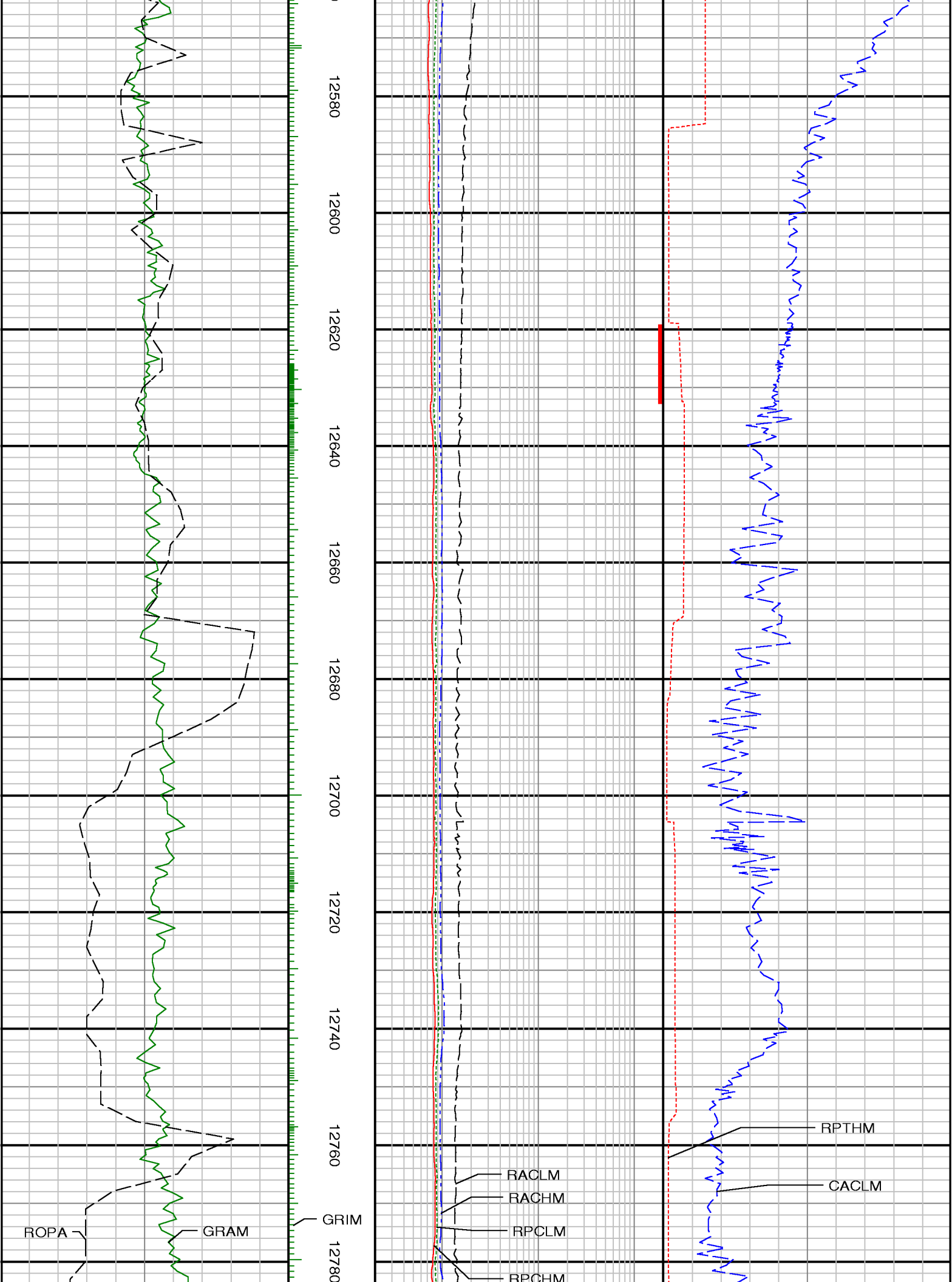
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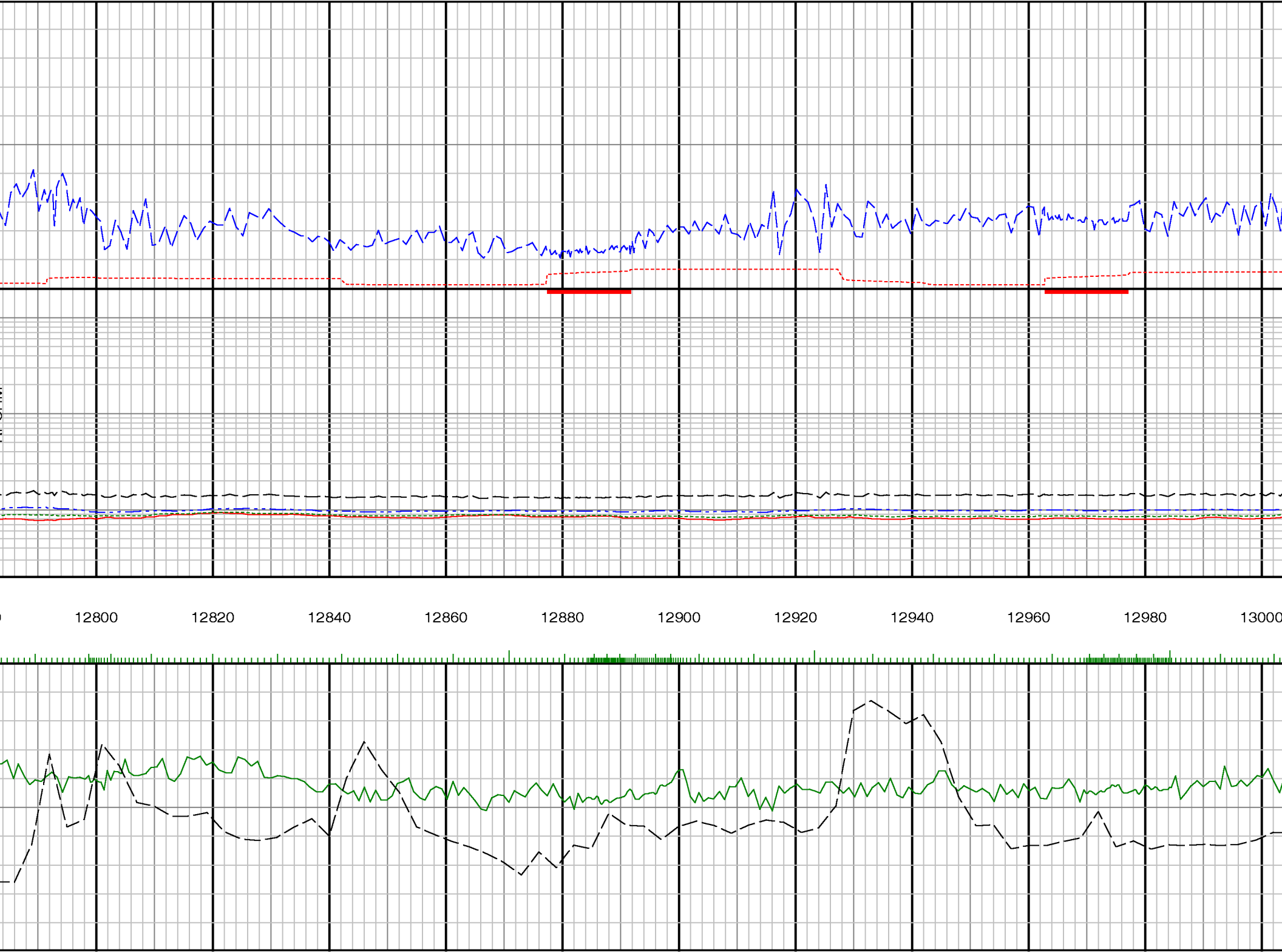
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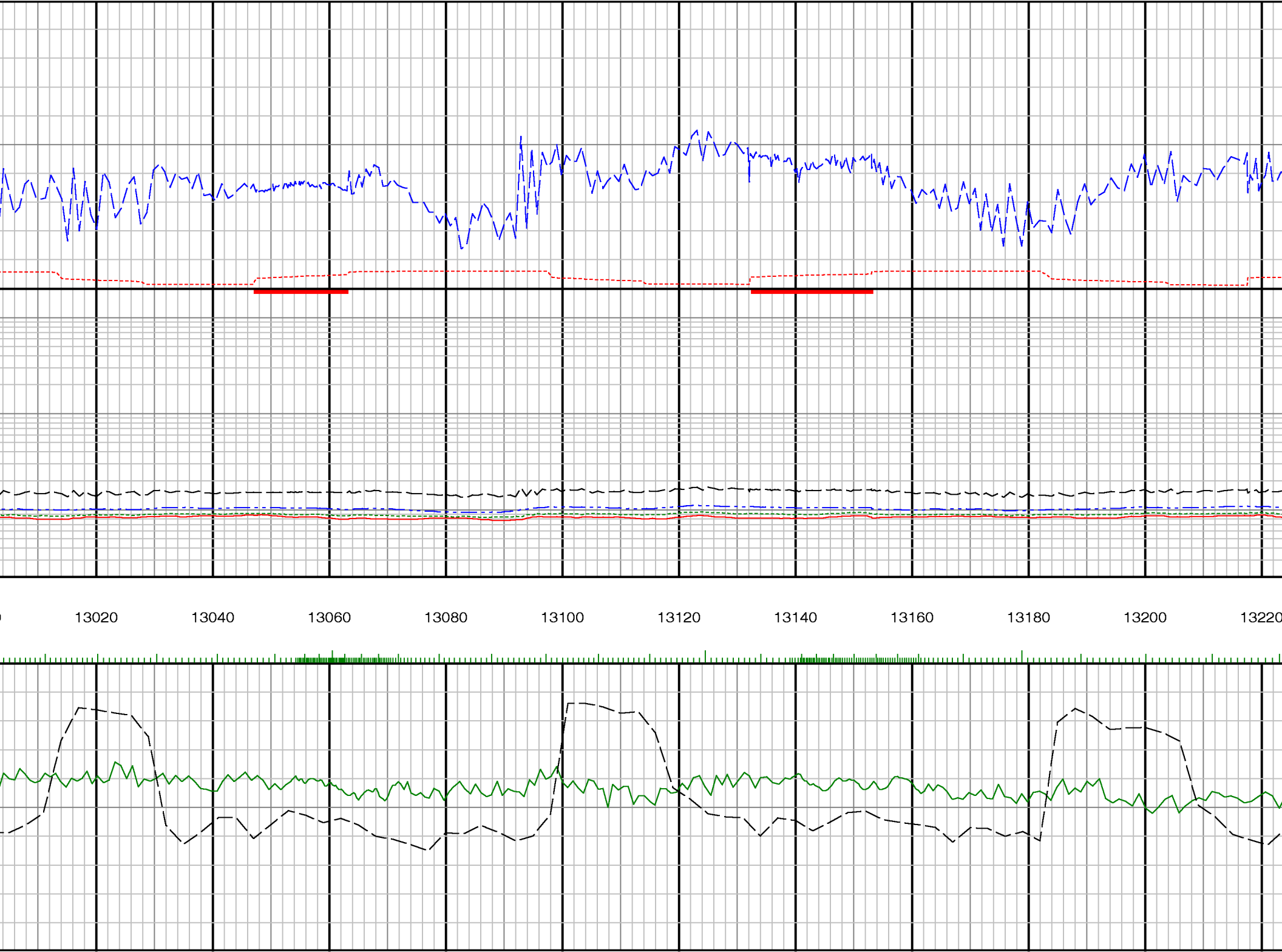
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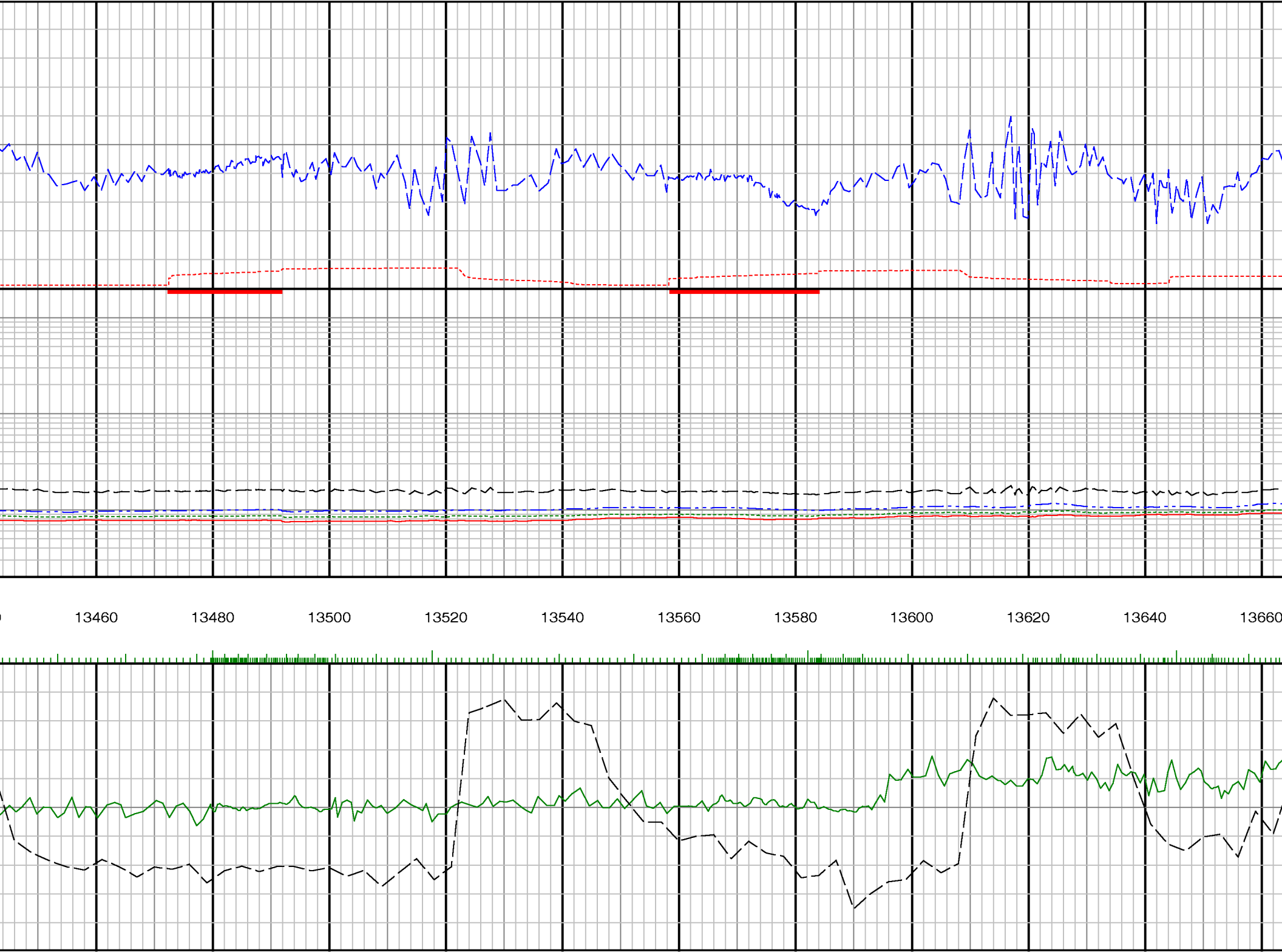
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13540
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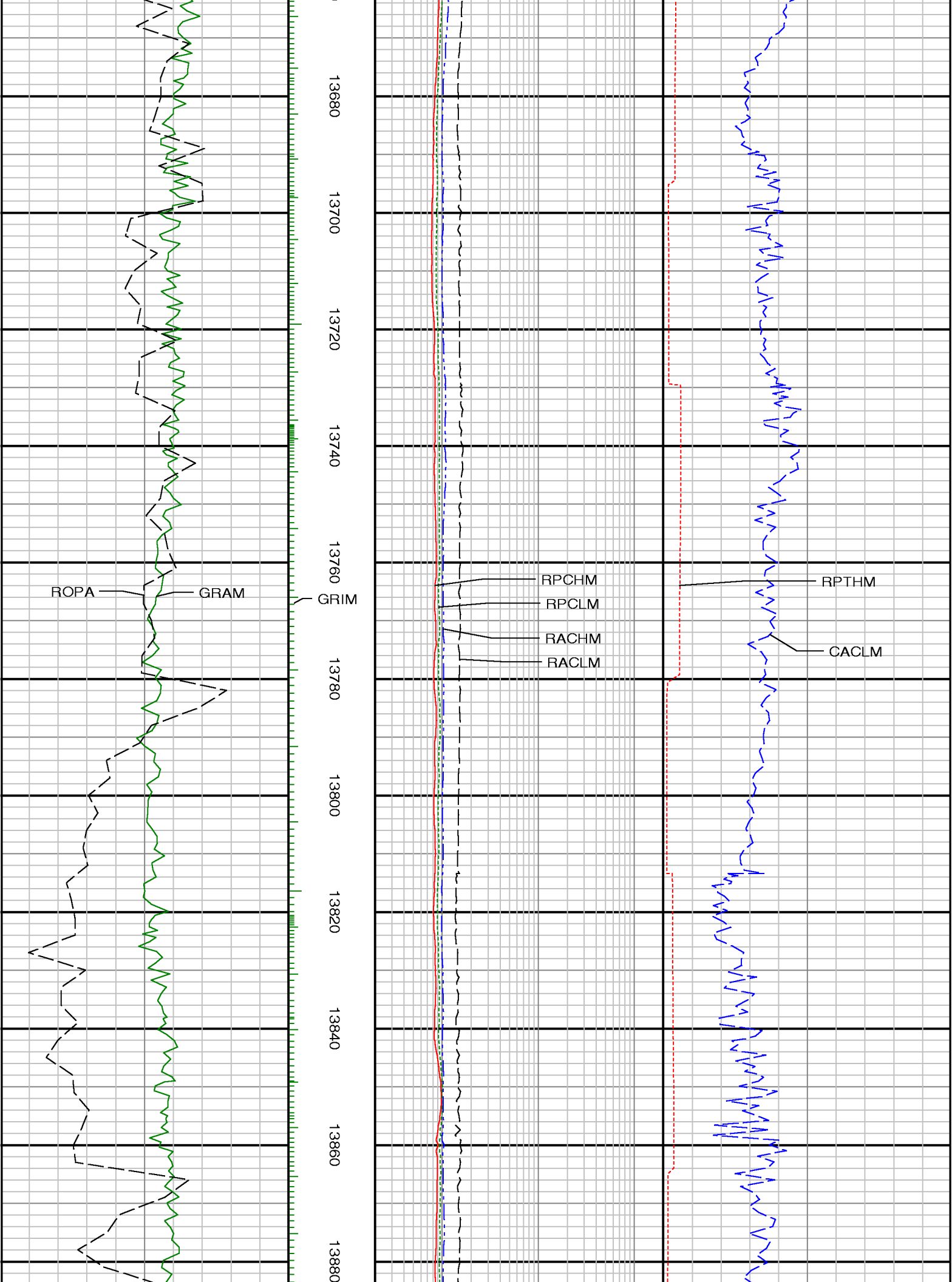
13680
13700
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13740
13760
13780
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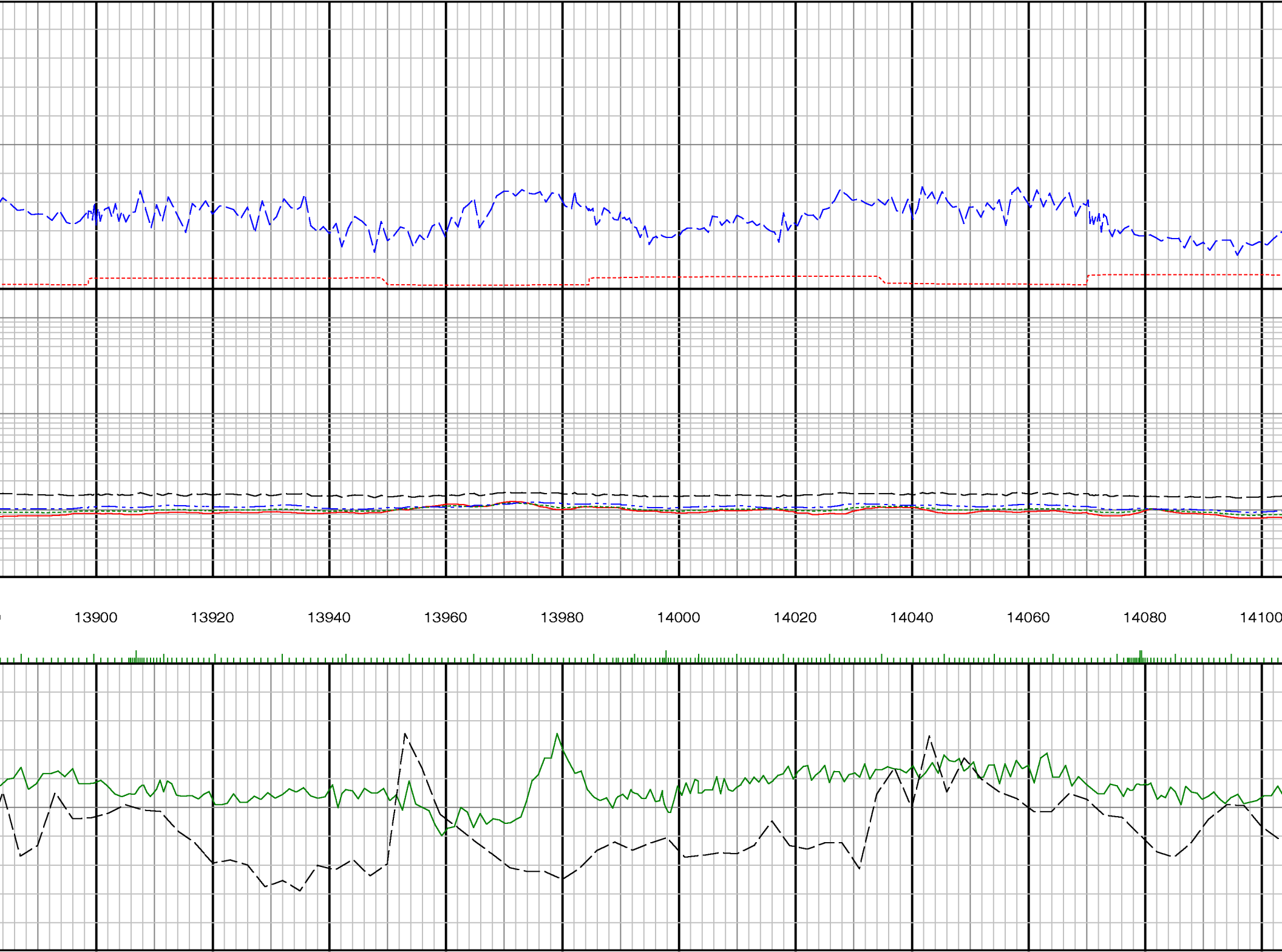
13860
13880
ROPA
GRAM
GRIM
RPCHM
RPCLM
RACHM
RACLM
RPTHM
CACLM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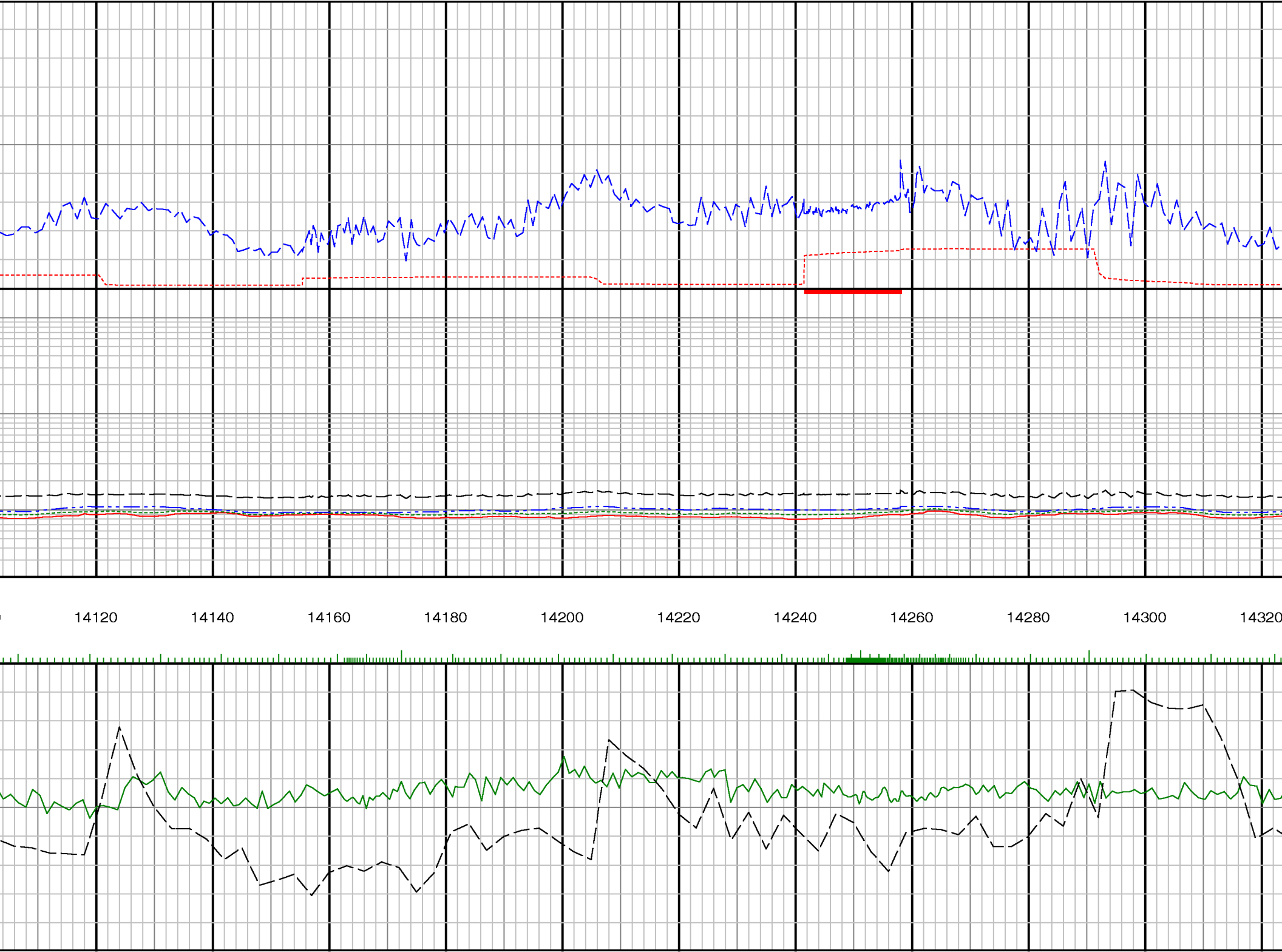
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14180
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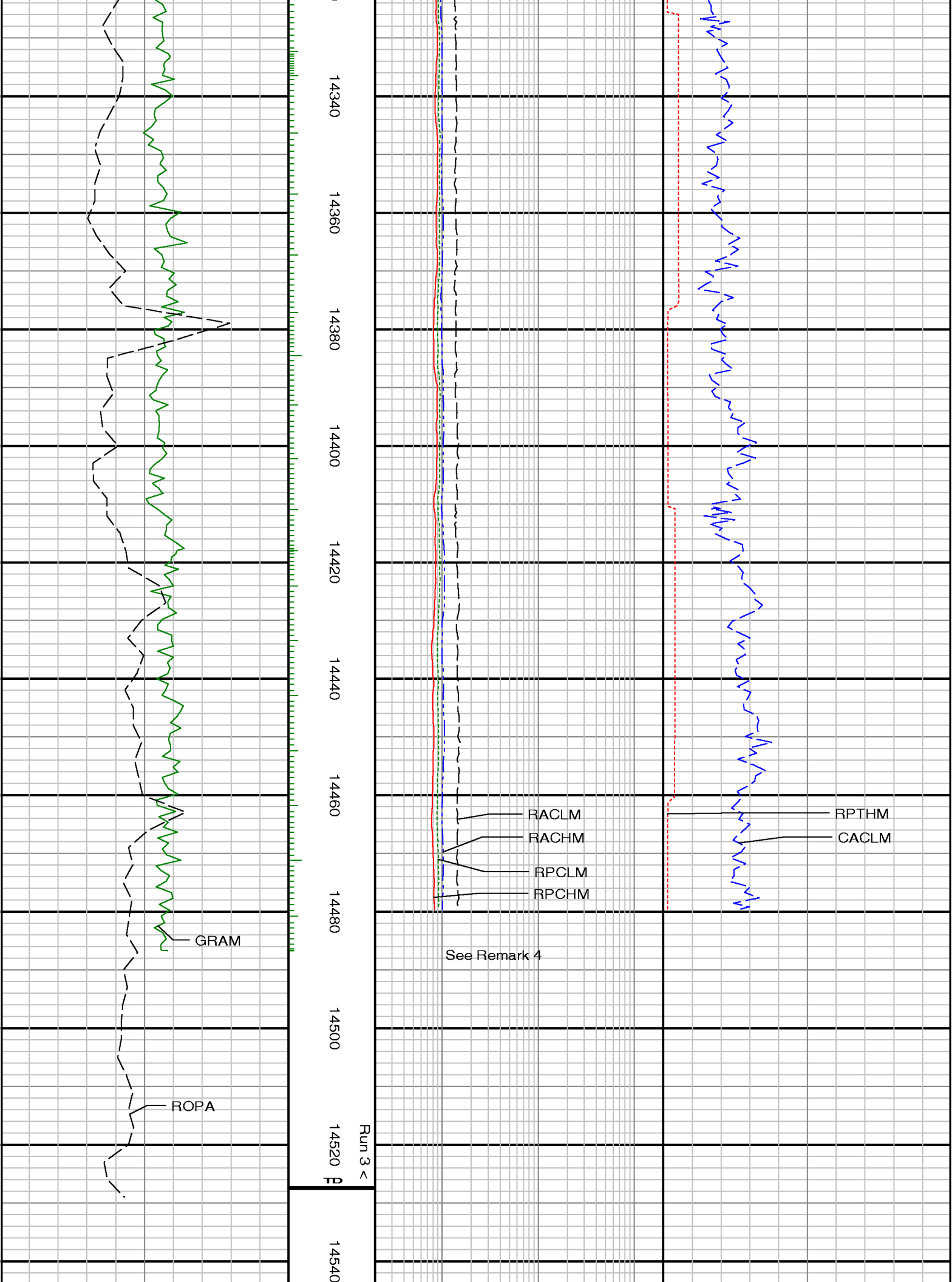
14220
14240
14260
14280
14300
14320


14340
14360
14380
14400
14420
14440
14460
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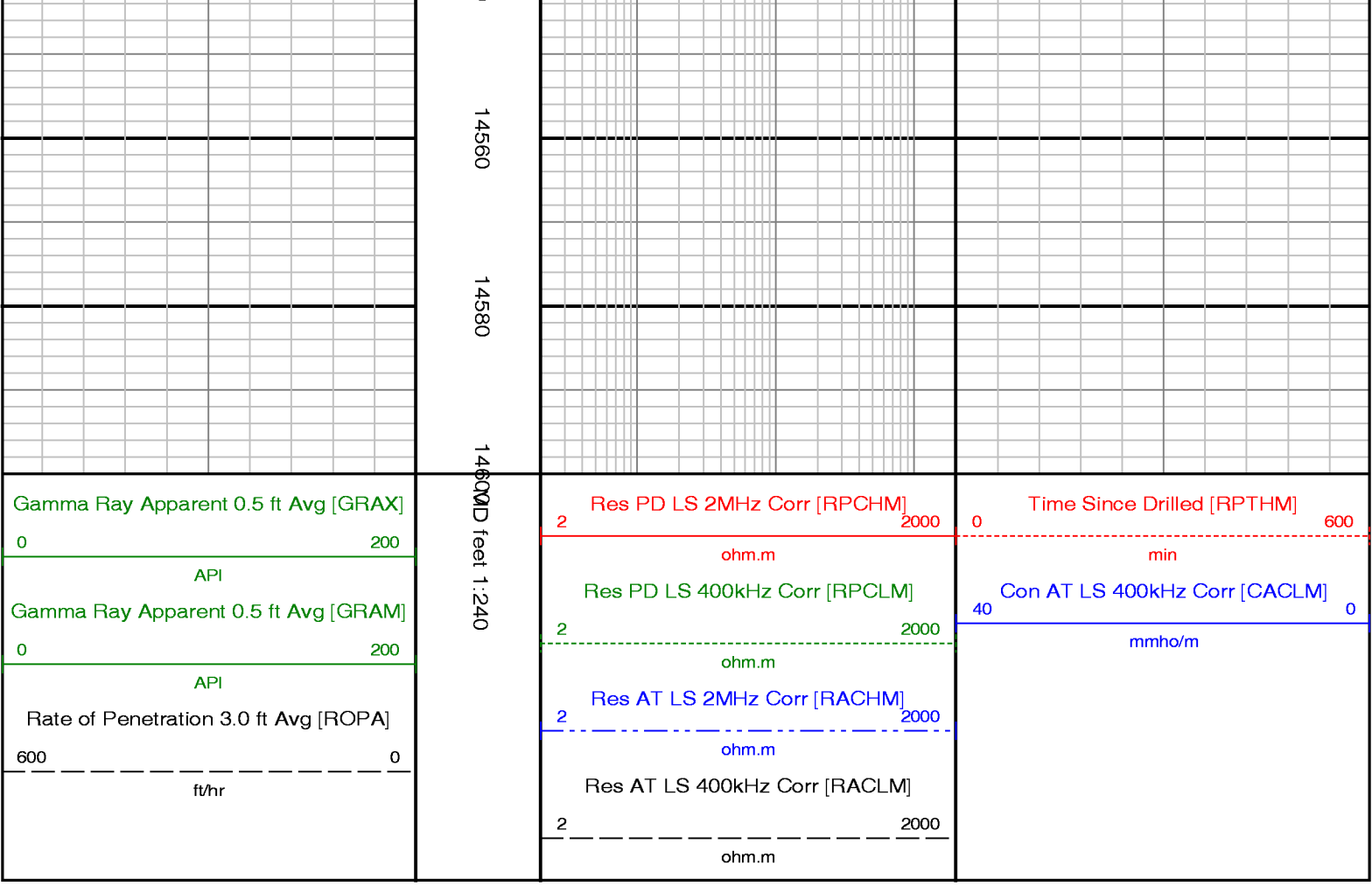
GRAM
ROPA
RACLM
RACHM
RPCLM
RPCHM
RPTHM
CACLM
See Remark 4
Run 3 <


14560
14580
14600
MD feet 1:240
Gamma Ray Apparent 0.5 ft Avg [GRAX]
0
200
API
Gamma Ray Apparent 0.5 ft Avg [GRAM]
0
200
API
Rate of Penetration 3.0 ft Avg [ROPA]
600
0
ft/hr
Res PD LS 2MHz Corr [RPCHM]
2
2000
ohm.m
Res PD LS 400kHz Corr [RPCLM]
2
2000
ohm.m
Res AT LS 2MHz Corr [RACHM]
2
2000
ohm.m
Res AT LS 400kHz Corr [RACLM]
2
2000
ohm.m
Time Since Drilled [RPTHM]
0
600
min
Con AT LS 400kHz Corr [CACLM]
40
0
mmho/m