MULTIPLE PROPAGATION RESISTIVITY
GAMMA RAY

BAKER HUGHES

INTEQ

MEMORY LOG

Company	Southern California Gas Company
Well	Standard Sesnon 4B ST1
Field	Aliso Canyon
County	Los Angeles
State	California
Country	United States

Well Location:
Surface Location:
Latitude: 34° 18' 53.236" N
Longitude: 118° 34' 18.564" W

API Number:			
037-30456	29	3N	16W

Other Services:
Directional
Annular Pressure
StarTrak Imaging

Log Measured From	Rig Floor	@	2910.5 ft.	Above Permanent Datum	Elev. KB N/A
Depth In	1578 ft.	MWD Start	16 Aug 2015	Permanent Datum	Elev. DF 22.5 ft.
Depth Out	10338 ft.	MWD End	17 Oct 2015	Mean Sea Level	Sea Bed/GL2888 ft.

BOREHOLE RECORD			CASING RECORD		
Hole Diameter	From	To	Casing Size	From	To
17.5 in.	0 ft.	1438 ft.	13.375 in.	Surface	1436 ft.
12.25 in.	1436 ft.	9267 ft.	9.625 in.	Surface	8887 ft.
8.5 in.	8892 ft.	9267 ft.	7 in.	8695 ft.	9270 ft.
6.125 in.	9270 ft.	10338 ft.			

Drilling Contractor: Ensign Drilling Rig: 587

1:240

MEASURED DEPTH FINAL PRINT

Company Representative: Kevin Katolas

Field Personnel: Kevin Miller, Rino Risi, Carlos Lopez, Tony Cheng Job#: 7398919

Bit Run Number	3	4	5	6	11	12
INTEQ Data						
Run Number	6	7	8	9	14	15
DHA Serial Number	12848622	12848622	11936813	11936813	12127020	12127020
Surface Gear Serial Number	S2K 11674673	S2K 11674673	S2K 11674673	S2K 11674673	S2K 11674673	S2K 11674673
Tool OD (in) / Type	8.25 OTK	8.25 OTK	8.25 OTK	8.25 OTK	4.75 OTK	4.75 OTK
Run Data						
Bit Diameter (in)	12.25	12.25	12.25	12.25	6.125	6.125
Measured Depth In (ft)	1578	5710	7085	8892	9270	9688
Measured Depth Out (ft)	5710	7085	8892	9267	9688	10338
Top of Interval Logged (ft)	1546	5678	7053	8860	9242	9660
Bottom of Interval Logged (ft)	5678	7053	8860	9235	9660	13010
Min/Max Inclination (deg)	1.6 - 5.0	1.9 - 5.1	5.1 - 64.8	64.8 - 80.1	73.6 - 84.6	82.4 - 84.8
Begin Log (hrs)	07:05	06:38	02:10	03:20	18:33	19:11
Begin Log (date)	28 Aug2015	04 Sep 2015	09 Sep 2015	16 Sep 2015	13 Oct 2015	15 Oct 2015
End Log (hrs)	13:08	14:32	09:25	04:45	05:45	03:34
End Log (date)	03 Sep 2015	08 Sep 2015	14 Sep 2015	18 Sep 2015	15 Oct 2015	17 Oct 2015
Mud Data @ Depth (ft)	5710	5710	7085	8941	9494	10338
Mud Type	Water Based	Water Based	Water Based	Water Based	Water Based	Water Based
Density From – To (ppg)	8.8 - 9.0	8.8 - 9.0	9.0 - 9.1	9.1 - 9.2	8.5 - 8.5	8.5 - 8.6
Mud Chlorides (ppm)	14500	14200	24300	19700	15000	16500
Oil/Water Ratio (%)	0/100	0/100	0/100	0/100	0/100	0/100

Max Circulating Temp (° F)	164	164	179	172	148	159		
Company Representative	K. Katolas	K. Katolas	K. Katolas	K. Katolas	K. Katolas	K. Katolas		
Field Engineer	T. Cheng	T. Cheng	T. Cheng	T. Cheng	C. Lopez	K. Miller		

Equipment Data								
INTEQ Run Number	6	7	8	9	14	15		
Modular Assembly Number	1	1	2	2	3	3		
Drill Collar S/N	12848622	12848622	11936813	11936813	12127020	12127020		
Master S/N	12848622	12848622	11936813	11936813	12127020	12127020		
Drill Collar Converter S/N	N/A	N/A	N/A	N/A	N/A	N/A		
Pressure Sub S/N	12848622	12848622	11936813	11936813	12127020	12127020		
Neutron Sub S/N	N/A	N/A	N/A	N/A	N/A	N/A		
Neutron Source S/N	N/A	N/A	N/A	N/A	N/A	N/A		
Density Sub S/N	N/A	N/A	N/A	N/A	N/A	N/A		
Density Source S/N	N/A	N/A	N/A	N/A	N/A	N/A		
Gamma Sub S/N	12848622	12848622	11936813	11936813	12127020	12127020		
Resistivity Detector S/N	N/A	N/A	N/A	N/A	N/A	N/A		
Resistivity Sub S/N	12848622	12848622	11936813	11936813	12127020	12127020		
Sensor Offsets to Bit (ft) / Acquisition Rates (sec)								
Bottom of INTEQ MWD (ft)	1.45	1.45	1.45	1.45	0.80	0.80		
Resistivity	31.74 / 10	31.74 / 10	31.98 / 10	31.98 / 10	35.09 / 10	35.09 / 10	/	/
Gamma Ray	26.36 / 10	26.36 / 10	26.60 / 10	26.60 / 10	27.90 / 10	27.90 / 10	/	/
Pressure	27.11 / 20	27.11 / 20	27.35 / 20	27.35 / 20	30.53 / 20	30.53 / 20	/	/
Density	N/A / N/A	N/A / N/A	N/A / N/A	N/A / N/A	N/A / N/A	N/A / N/A	/	/
Neutron	N/A / N/A	N/A / N/A	N/A / N/A	N/A / N/A	N/A / N/A	N/A / N/A	/	/
Directional	38.53 / 240	38.53 / 240	38.77 / 240	38.77 / 240	41.06 / 240	41.06 / 240	/	/
Temperature	AT BIT	AT BIT	AT BIT	AT BIT	AT BIT	AT BIT		
Other Tool Information								
Total INTEQ Length (ft)	62.00	62.00	63.12	63.12	66.77	66.77		
Assembly Type	AutoTrak	AutoTrak	AutoTrak	AutoTrak	AutoTrak	AutoTrak		
Stabilizer above Resistivity (ft)	12.10	12.10	12.10	12.10	11.20	11.20		
Stabilizer below Resistivity (ft)	10.03	10.03	10.03	10.03	20.32	20.32		
Run Circulating Time (hrs)	143.0	81.7	127.2	65.4	33.0	40.1		

Calibration Verification								
Post Run	N/A	6	7	N/A	8	9	N/A	14
Pre Run	6	7	N/A	8	9	N/A	14	15
Date	27 Aug 2015	03 Sep 2015	08 Sep 2015	08 Sep 2015	14 Sep 2015	19 Sep 2015	13 Oct 2015	15 Oct 2015
Time (hrs)	22:30	22:00	06:57	10:57	21:58	00:09	11:19	14:00
Resistivity Sub S/N	12848622	12848622	12848622	11936813	11936813	11936813	12127020	12127020
Phase Difference Delta (deg)	0.0150	0.0023	0.0627	0.0045	0.0397	0.0411	−0.0088	0.0059
Base Attenuation Delta (deg)	0.0022	0.0187	−0.0146	−0.0170	0.0266	0.0098	0.0301	0.0388
Average Temperature (° F)	67	100.25	113.97	90.13	110.76	102.62	91.07	96.17
Status	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
Gamma Sub S/N	12598076	12598076	12598076	11936813	11936813	11936813	12127020	12127020
Gamma Verifier S/N	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
*Verifier Field (cps)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
*Verifier Shop (cps)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Background Field (cps)	10.40 / 5.56	3.64 / 6.36	5.85 / 5.20	4.99 / 7.39	4.36 / 4.47	6.15 / 5.64	5.16 / 5.12	5.80 / 5.15
Background Shop (cps)	5.02 / 5.18	5.02 / 5.18	5.02 / 5.18	4.23 / 4.30	4.23 / 4.30	4.23 / 4.30	5.44 / 5.51	5.44 / 5.51
Status	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
Neutron Sub S/N	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Neutron Verifier S/N	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Near Shop (cps)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Near Field (cps)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Far Shop (cps)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Far Field (cps)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Status	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Density Sub S/N	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Density Verifier S/N	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
SS Shop (cps)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
SS Field (cps)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
LS Shop (cps)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
LS Field (cps)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Status	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Backgound counts have been subtracted from Gamma "Verifier Field (cps)" and "Verifier Shop (cps)"

Calibration Verification

Post Run	15							
Pre Run	N/A							
Date	17 Oct 2015							
Time (hrs)	18:26							
Resistivity Sub S/N	12127020							
Phase Difference Delta (deg)	0.0058							
Base Attenuation Delta (deg)	0.0107							
Average Temperature (° F)	98							
Status	PASS							
Gamma Sub S/N	12127020							
Gamma Verifier S/N	N/A							
*Verifier Field (cps)	N/A							
*Verifier Shop (cps)	N/A							
Background Field (cps)	6.40 / 6.05							
Background Shop (cps)	5.44 / 5.51							
Status	PASS							
Neutron Sub S/N	N/A							
Neutron Verifier S/N	N/A							
Near Shop (cps)	N/A							
Near Field (cps)	N/A							
Far Shop (cps)	N/A							
Far Field (cps)	N/A							
Status	N/A							
Density Sub S/N	N/A							
Density Verifier S/N	N/A							
SS Shop (cps)	N/A							
SS Field (cps)	N/A							
LS Shop (cps)	N/A							
LS Field (cps)	N/A							
Status	N/A							

*Backgound counts have been subtracted from Gamma "Verifier Field (cps)" and "Verifier Shop (cps)"

Enviromental Parameters

Date & Time	Run No.	Bit Depth (ft)	Rm @ BHCT (ohmm) / (° F)	Mud Weight (ppg)	K (%)	Rmf @ BHCT (ohmm) / (° F)
27 Aug 2015 07:35	6	1438	0.56 / N/A	8.9	N/A	N/A / N/A
28 Aug 2015 13:43	6	1755	0.28 / N/A	8.9	N/A	N/A / N/A
30 Aug 2015 03:57	6	2970	0.29 / 142	8.9	N/A	N/A / 142
02 Sep 2015 12:31	6	5144	0.28 / 160	9.0	N/A	N/A / 160
08 Sep 2015 14:30	7	7085	0.28 / 164	9.1	N/A	N/A / 164

08 Sep 2015 14:30	7	7083	0.28	/	164	9.1	N/A	N/A	/ 164
14 Sep 2015 09:00	8	8892	0.58	/	167	9.1	N/A	N/A	/ 167
18 Sep 2015 04:40	9	9267	0.65	/	172	9.2	N/A	N/A	/ 172
15 Oct 2015 06:00	14	9688	0.17	/	147	8.5	N/A	N/A	/ 147
16 Oct 2015 14:20	15	10055	0.20	/	158	8.6	N/A	N/A	/ 158

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MNEMONICS:

GRAFM > Gamma Ray APPARENT, API 0.5 ft. avg.

GRIM > Gamma Ray Data Density, unitless

ROP_AVG > Rate of Penetration, ft/hr 3.0 ft. avg.

RPCHM > Resistivity (PD) (LS) 2MHz-Compensated Borehole Corrected, ohm.m

RPCLM > Resistivity (PD) (LS) 400kHz Compensated Borehole Corrected ohm.m

RACHM > Resistivity (AT) (LS) 2MHz Compensated Borehole Corrected, ohm.m

RACLM > Resistivity (AT) (LS) 400kHz Compensated Borehole Corrected, ohm.m

TVD > True Vertical Depth, ft

RPTHM > Time Since Drilled, min

TCDM > Downhole Temperature, deg F

COMMENTS:

1. Baker Hughes INTEQ Runs 6 thru 9 utilized 8 1/4 inch OnTrak (Multiple Propagation Resistivity, Annular Pressure, Gamma Ray, and Directional) tool behind a 9 1/2 inch RCLS (Rotary Closed Loop System) and a 12 1/4 inch Kymara bit from 1578 ft to 9267 ft MD (1577 ft to 8540 ft TVD).

2. Baker Hughes INTEQ Runs 15 thru 16 utilized 4 3/4 inch OnTrak (Multiple Propagation Resistivity, Annular Pressure, Gamma Ray, and Directional) tool behind a 4 3/4 inch RCLS (Rotary Closed Loop System) and a 6 1/8 inch Kymara bit from 1578 ft to 9267 ft MD (1577 ft to 8540 ft TVD).

3. Depth measurements were obtained from a depth control system (Totco) not supplied or operated by Baker Hughes INTEQ. Due to the lack of control by Baker Hughes INTEQ logging engineers, depth calibrations and measures could not be independently verified and the unverified depths, as supplied to INTEQ, are being used to present logging data.

4. Well Standard Sesnon 4B ST1 was Sidetracked in open hole from Standard Sesnon 4B at approximately 8870 ft MD.

REMARKS:

1. Drillers Casing Depth : 1436 feet MD (1436 feet TVD).
   Loggers Casing Depth : Not logged due to the inability to circulate inside casing with the Schlumberger reamer.
2. The interval from 5678 ft to 5715 ft MD (5662 ft to 5699 ft TVD) was logged 17.5 hours after being drilled due to a trip for a bit.
3. The interval from 6763 ft to 6797 ft MD (6743 ft to 6777 ft TVD) was logged 7 hours after being drilled due to Rig problems.
4. The interval from 7053 ft to 7085 ft MD (7033 ft to 7066 ft TVD) was logged 11.5 hours after being drilled due to a trip for a tool failure.
5. The interval from 8860 ft to 8892 ft MD (8433 ft to 8445 ft TVD) was logged 42 hours after being drilled due to a trip for a bit.
6. Drillers Liner Depth : 9270 feet MD (8568 feet TVD).
   Loggers Liner Depth : 9275 feet MD (8569 feet TVD).
7. The interval from 9653 ft to 9688 ft MD (8626 ft to 8628 ft TVD) was logged 13 hours after being drilled due to a trip for a bit.
8. The interval from 10310 to 10338 feet MD (8704 to 8708 feet TVD) was not logged due to the sensor to bit offset at TD.

Company : Southern California Gas Company
Well : Standard Sesnon 4B
Interval : 1418.56 - 10338.41 feet UP
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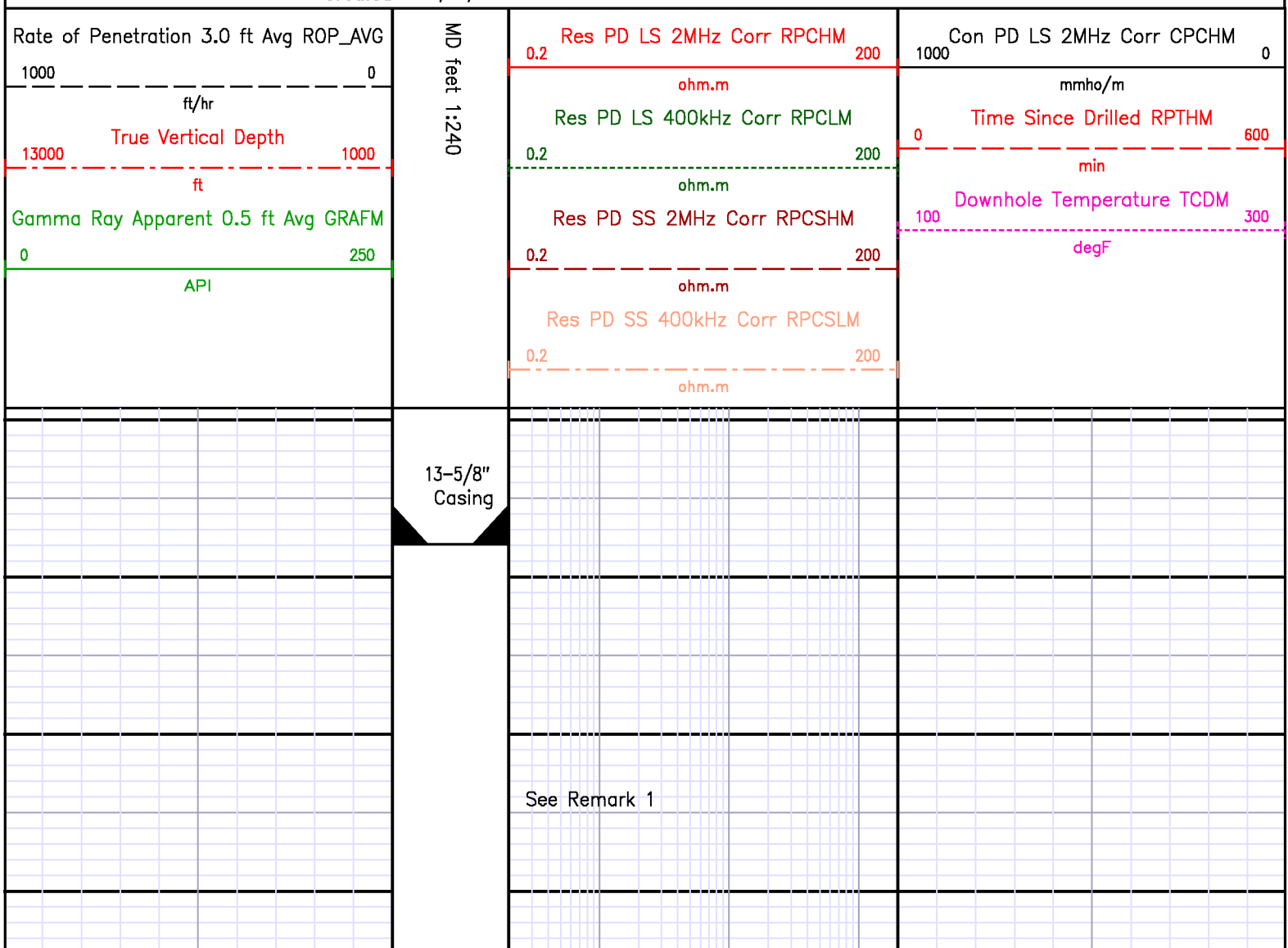

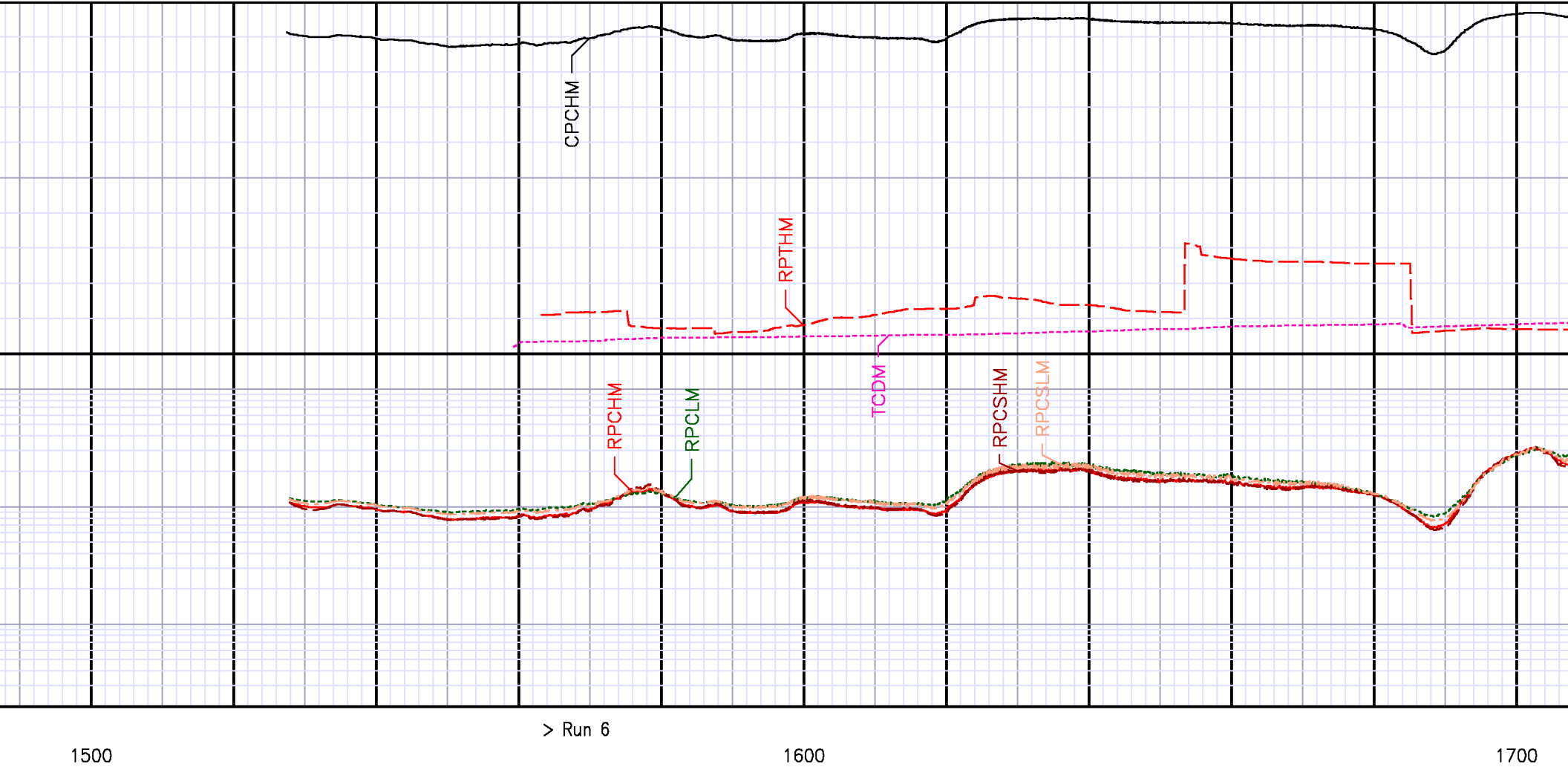
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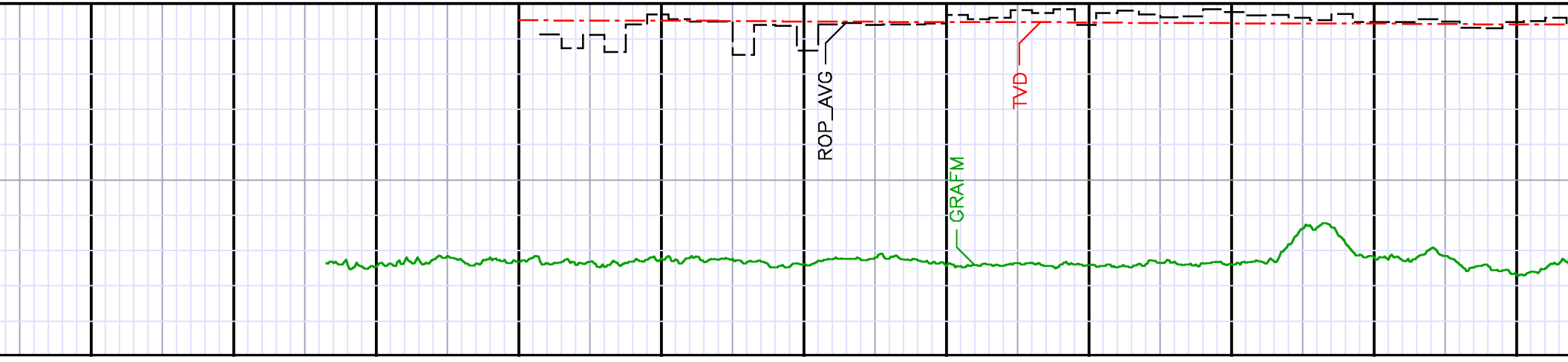
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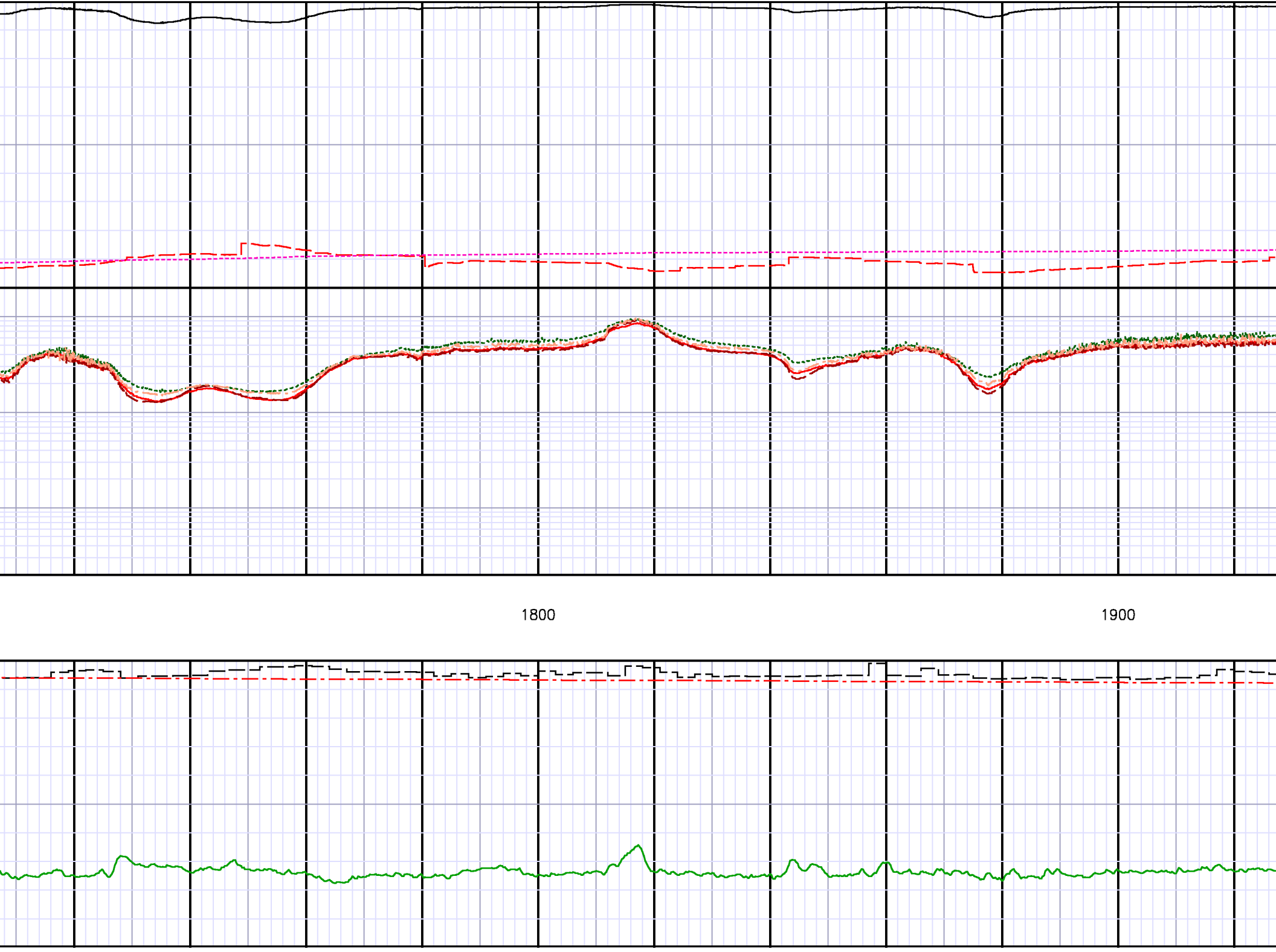
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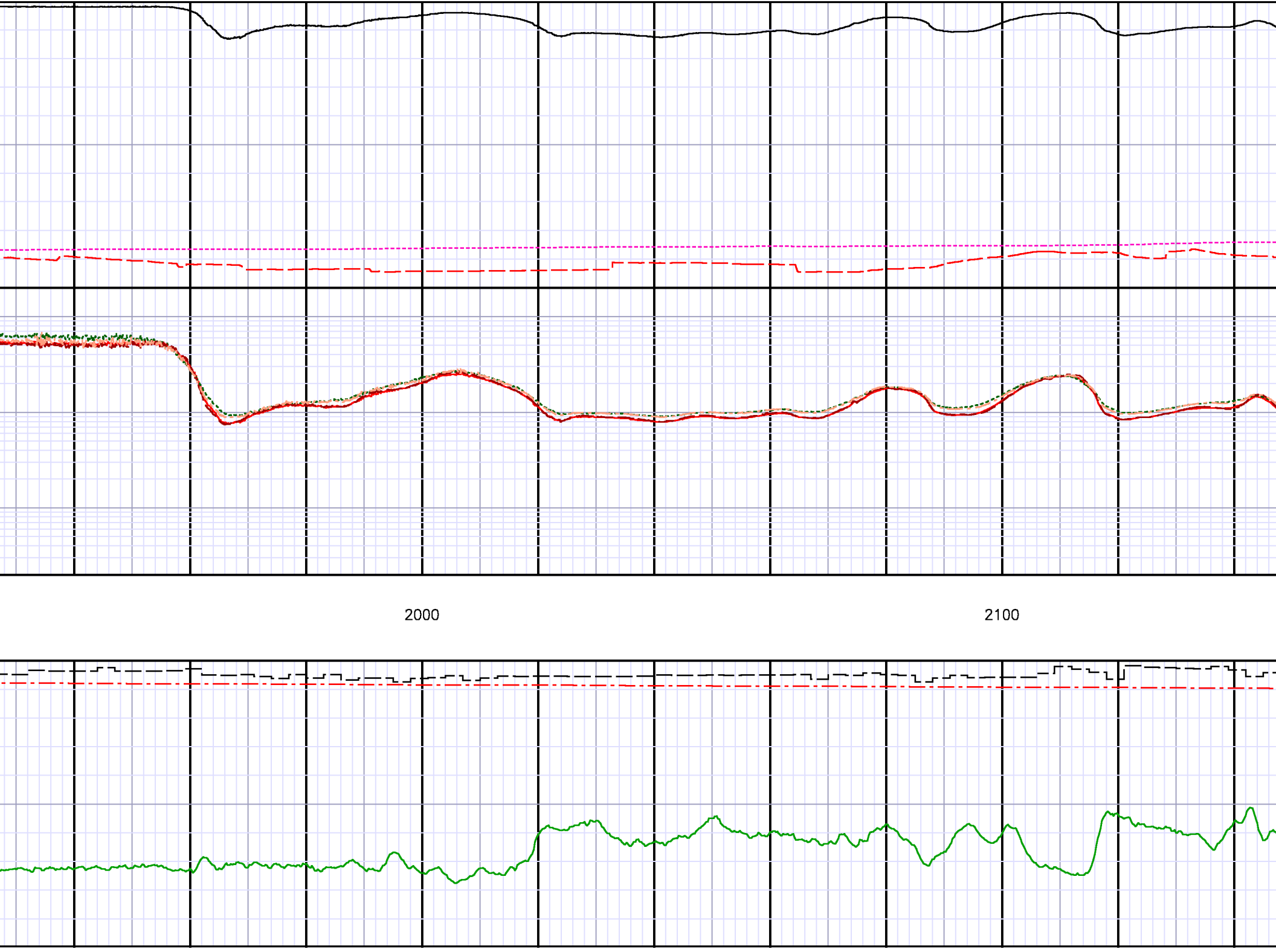
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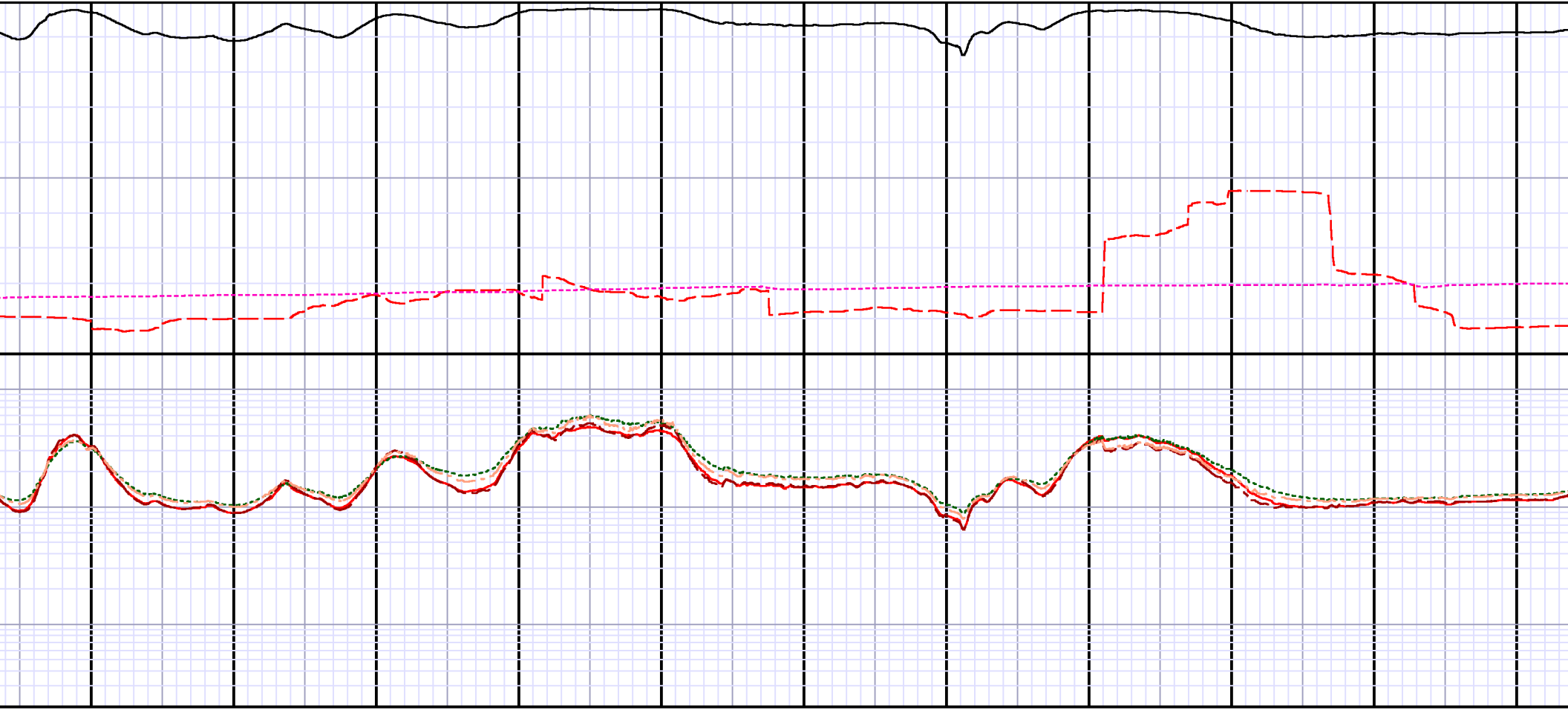

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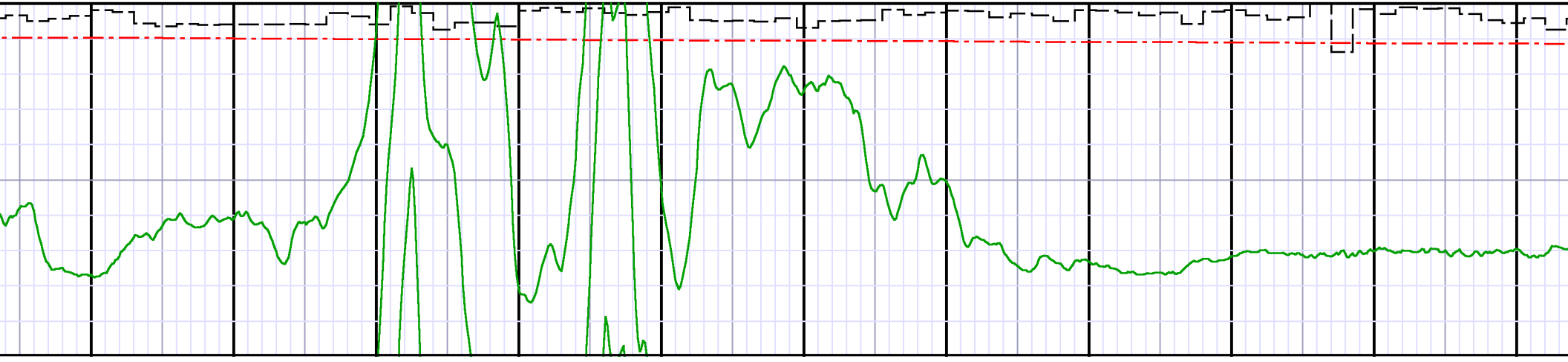

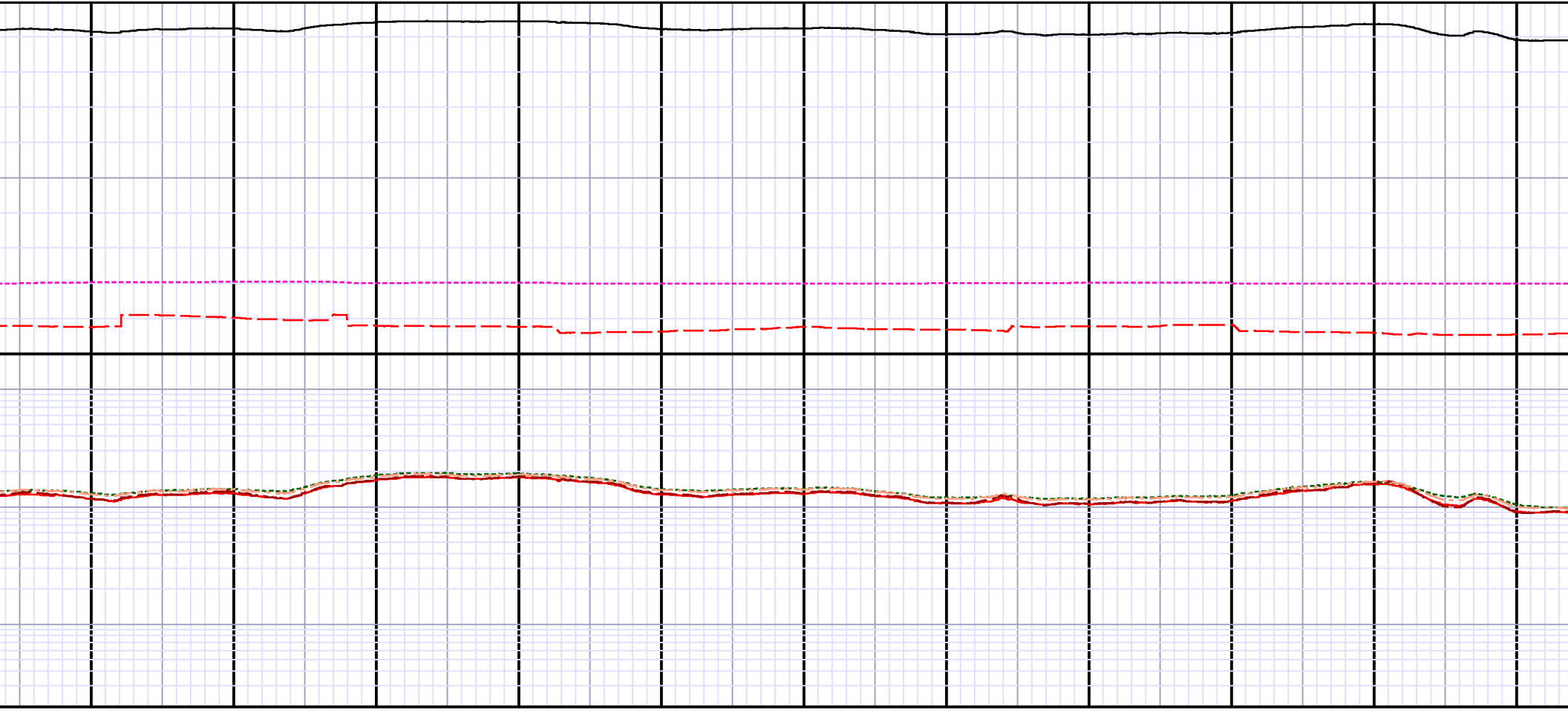

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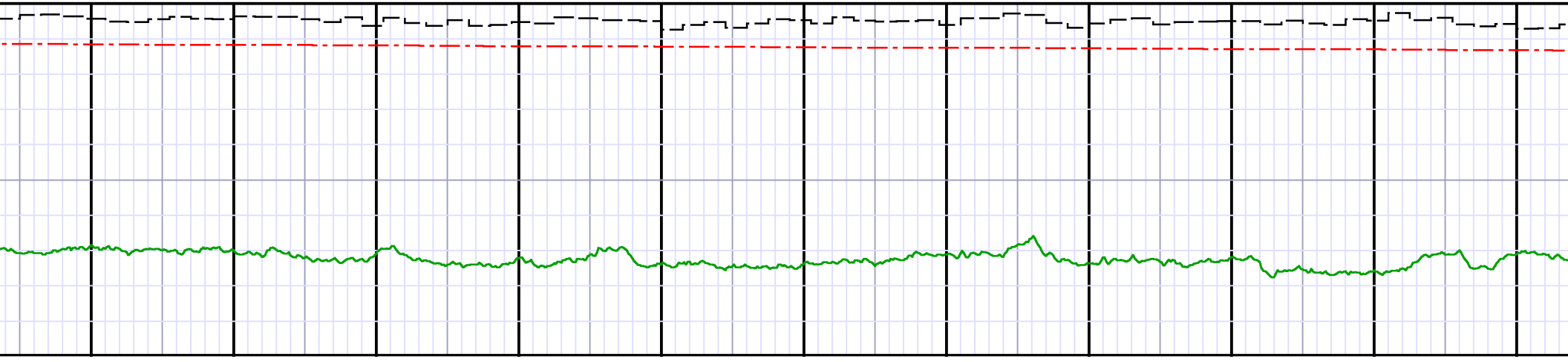

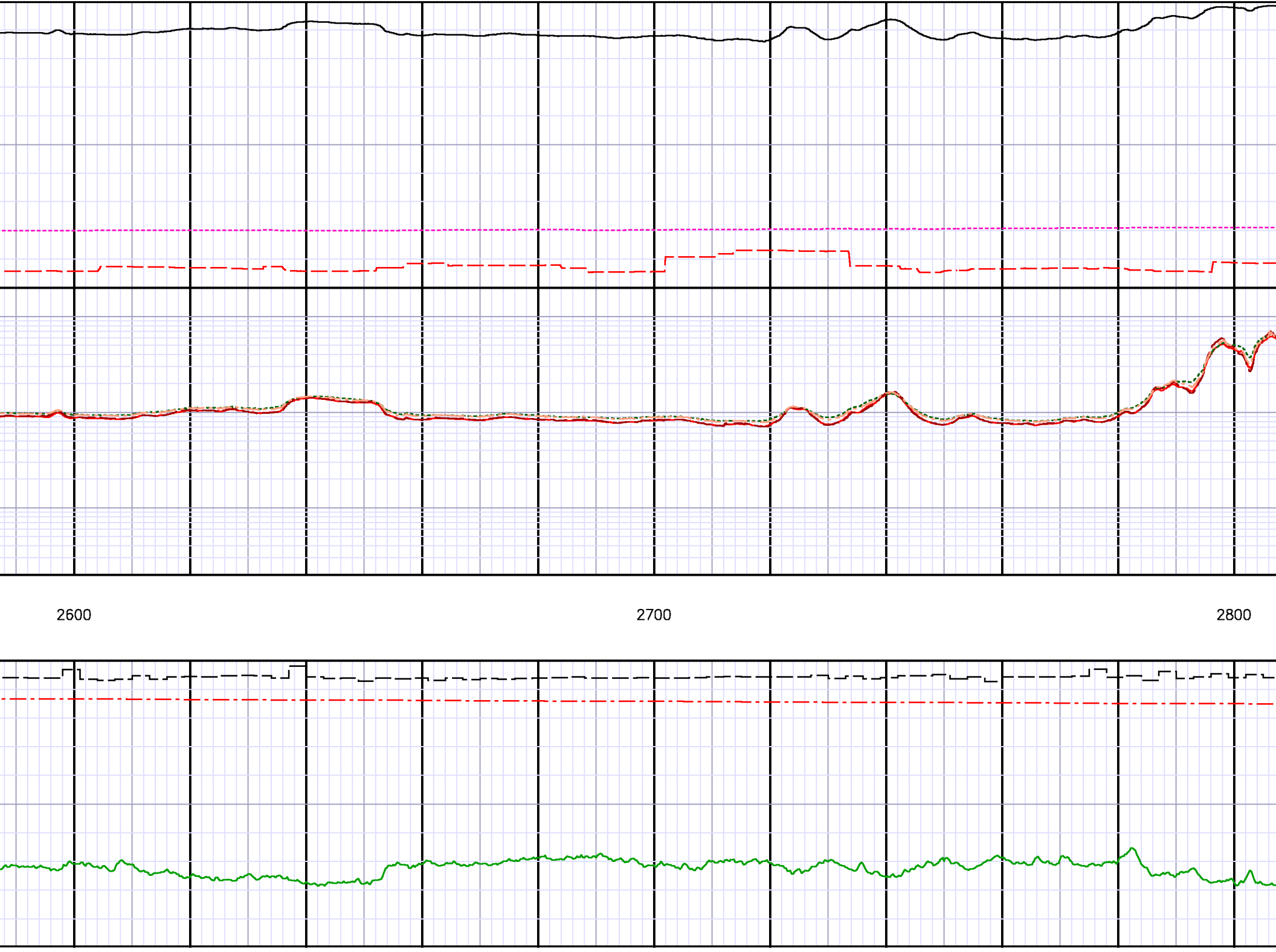
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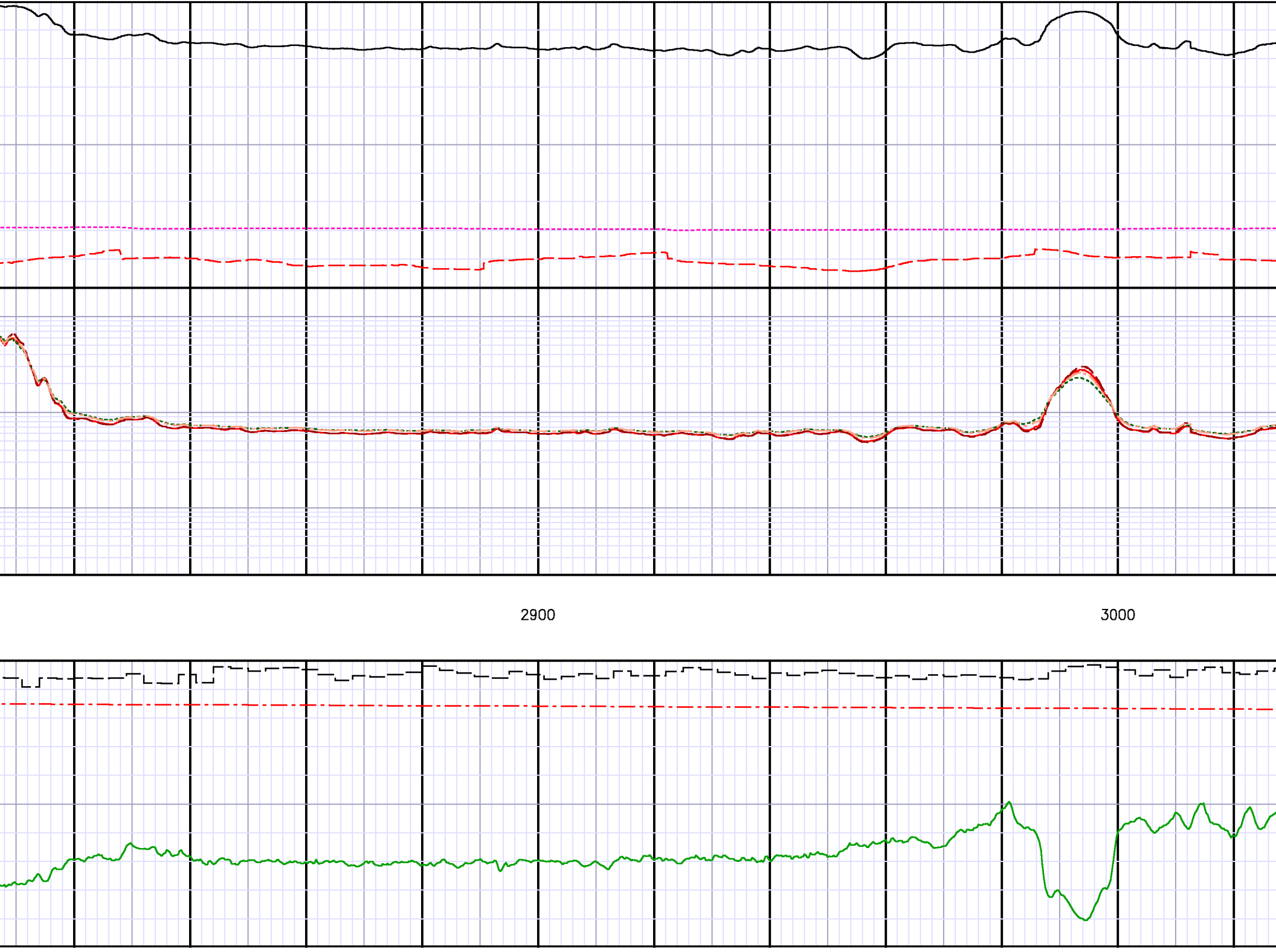
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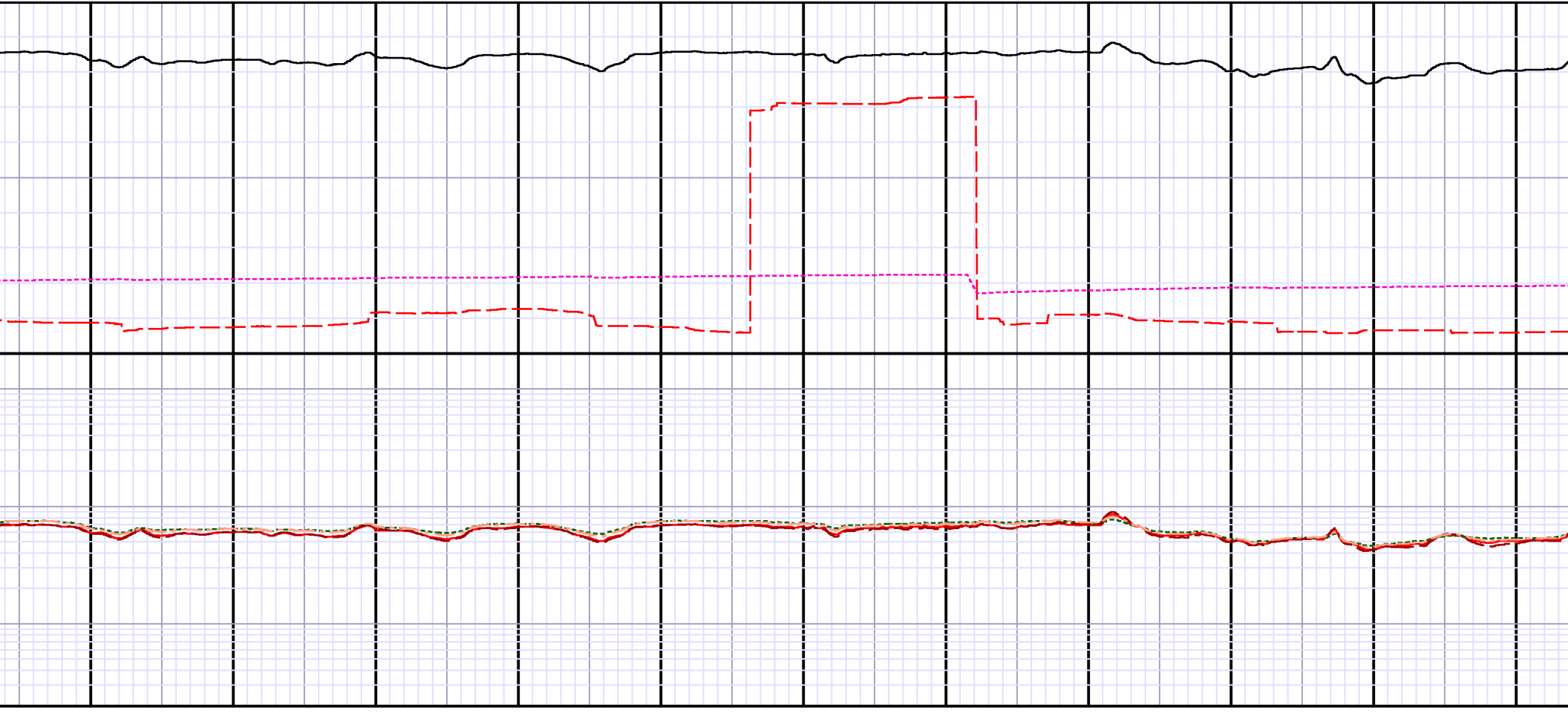

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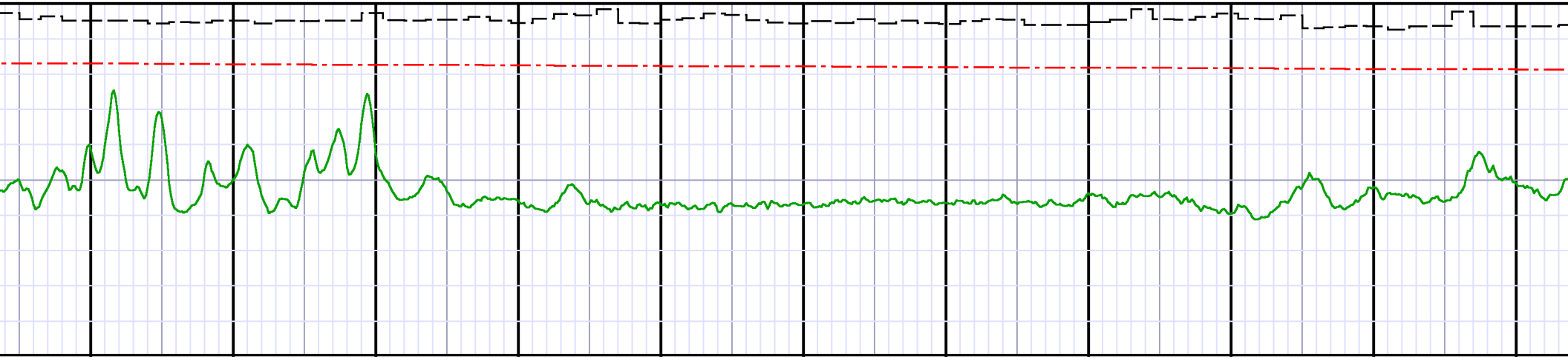

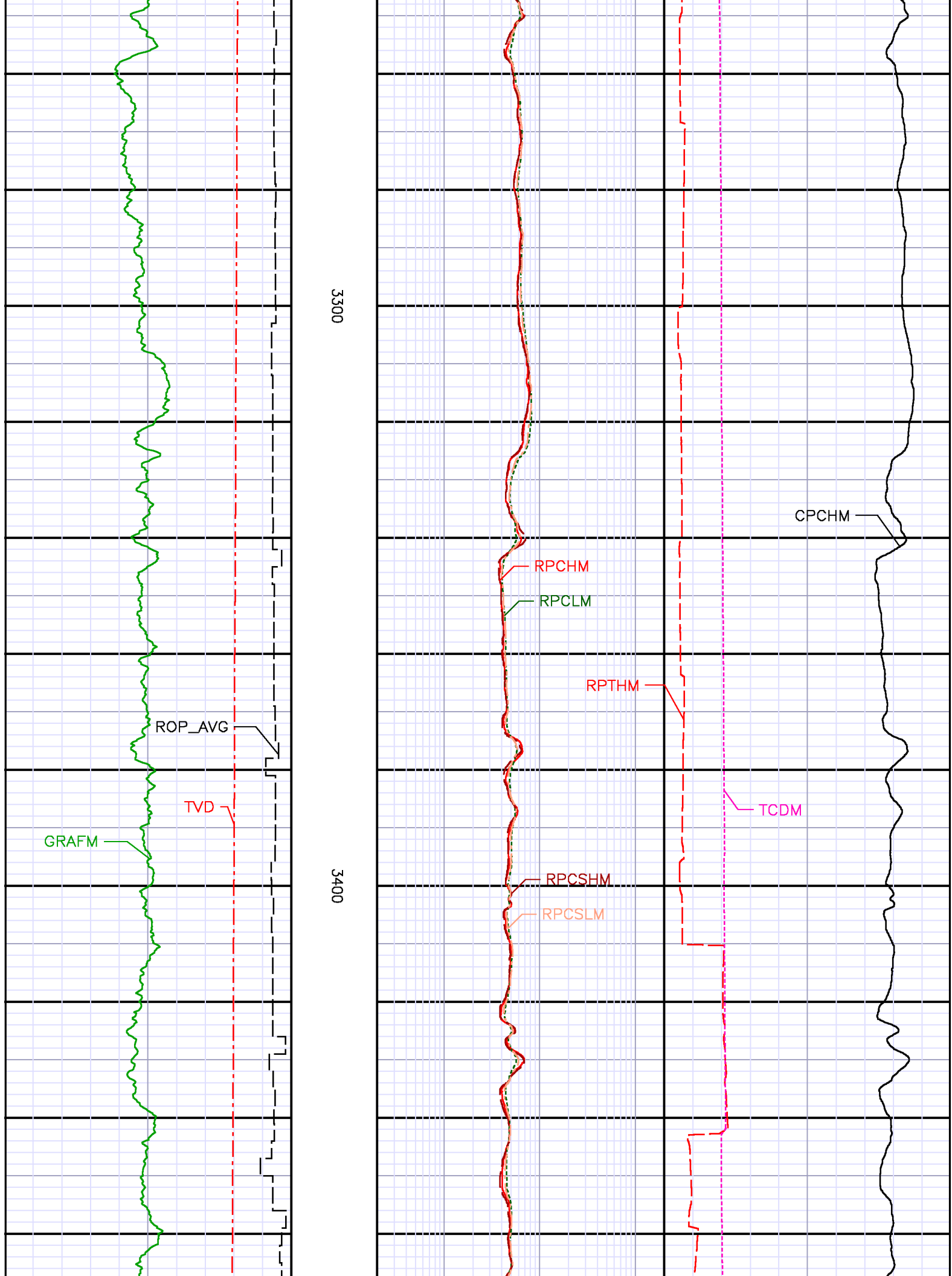
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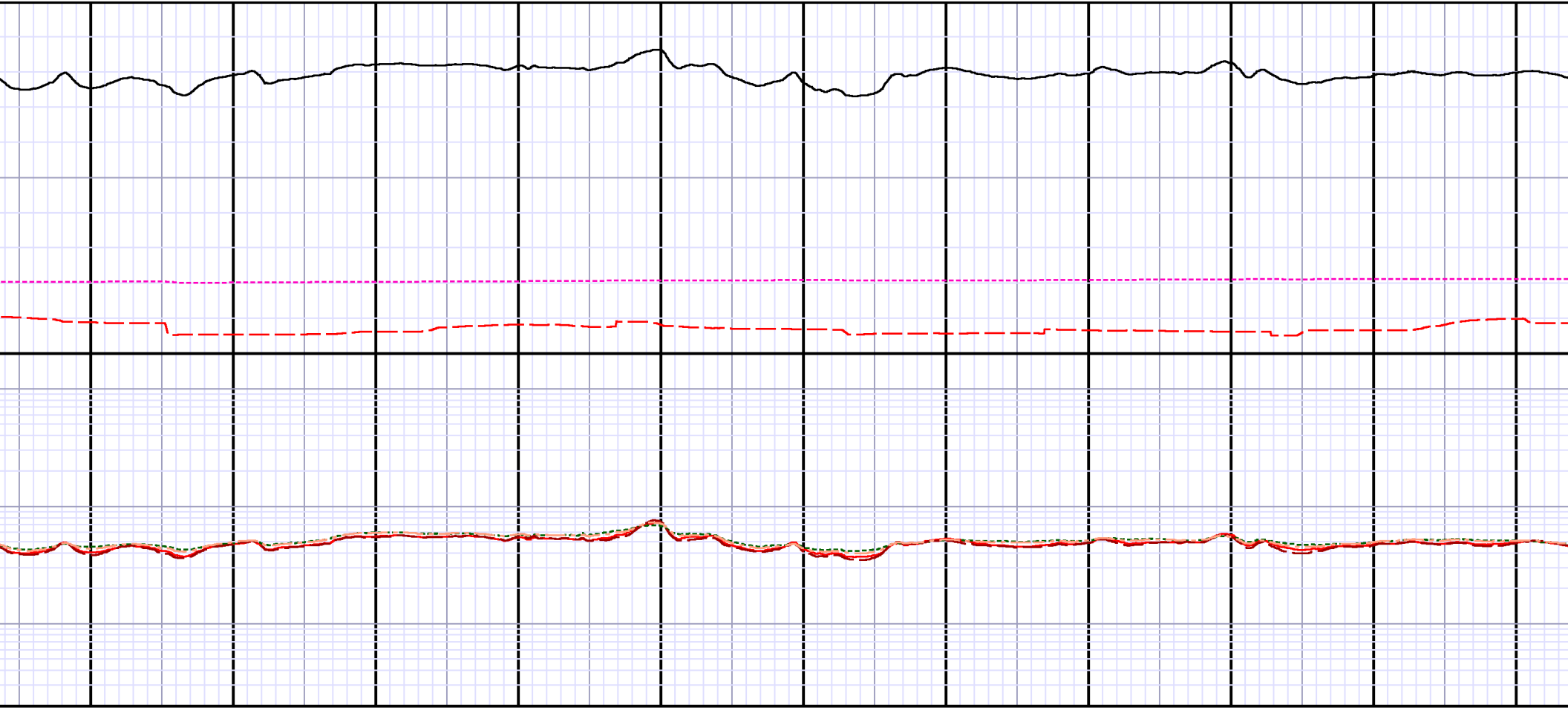

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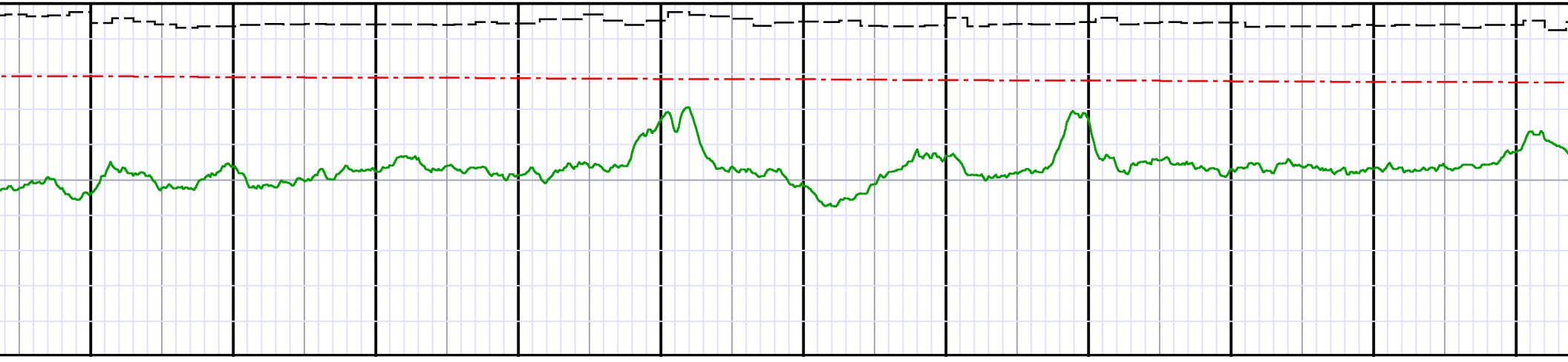

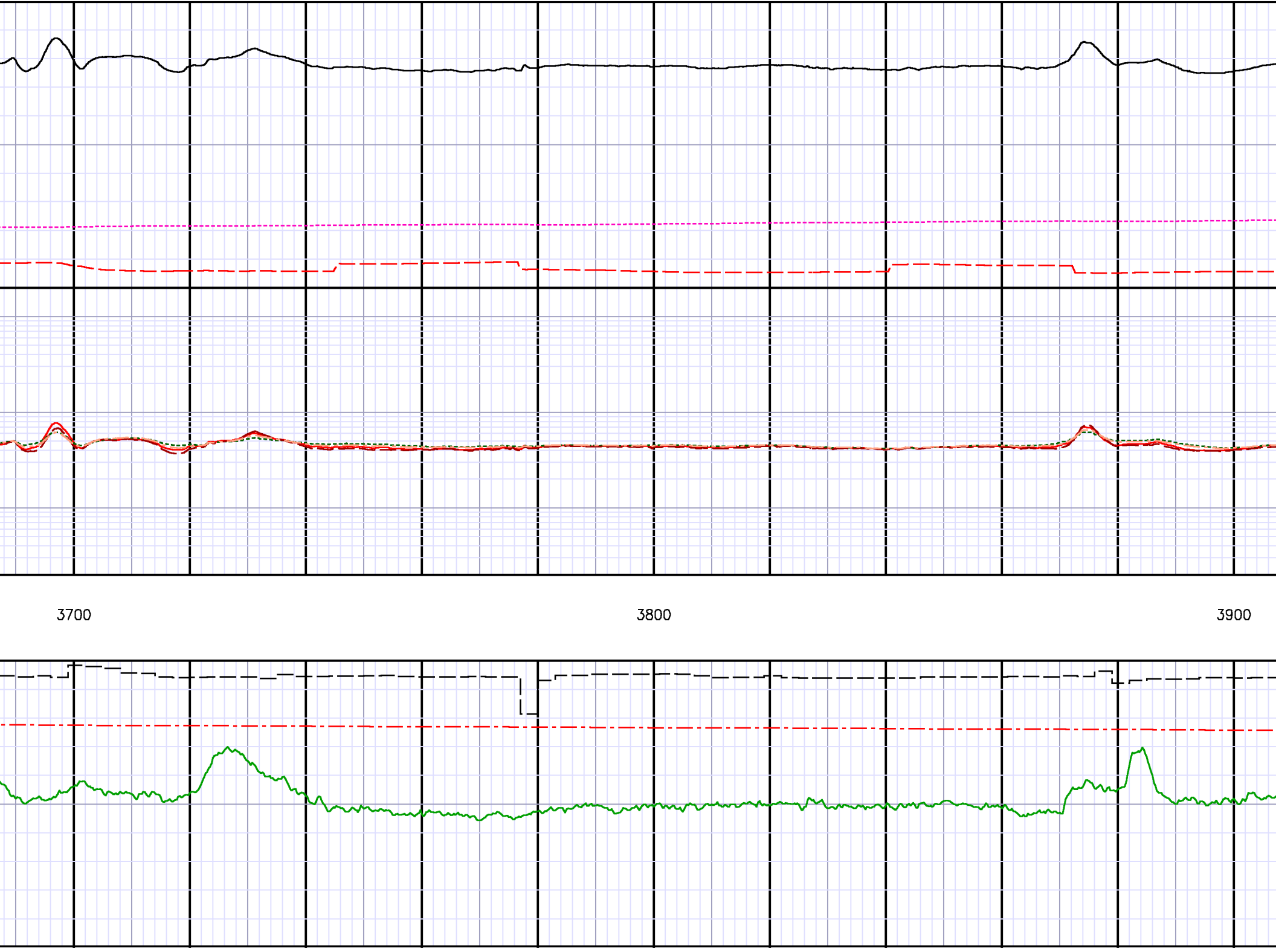
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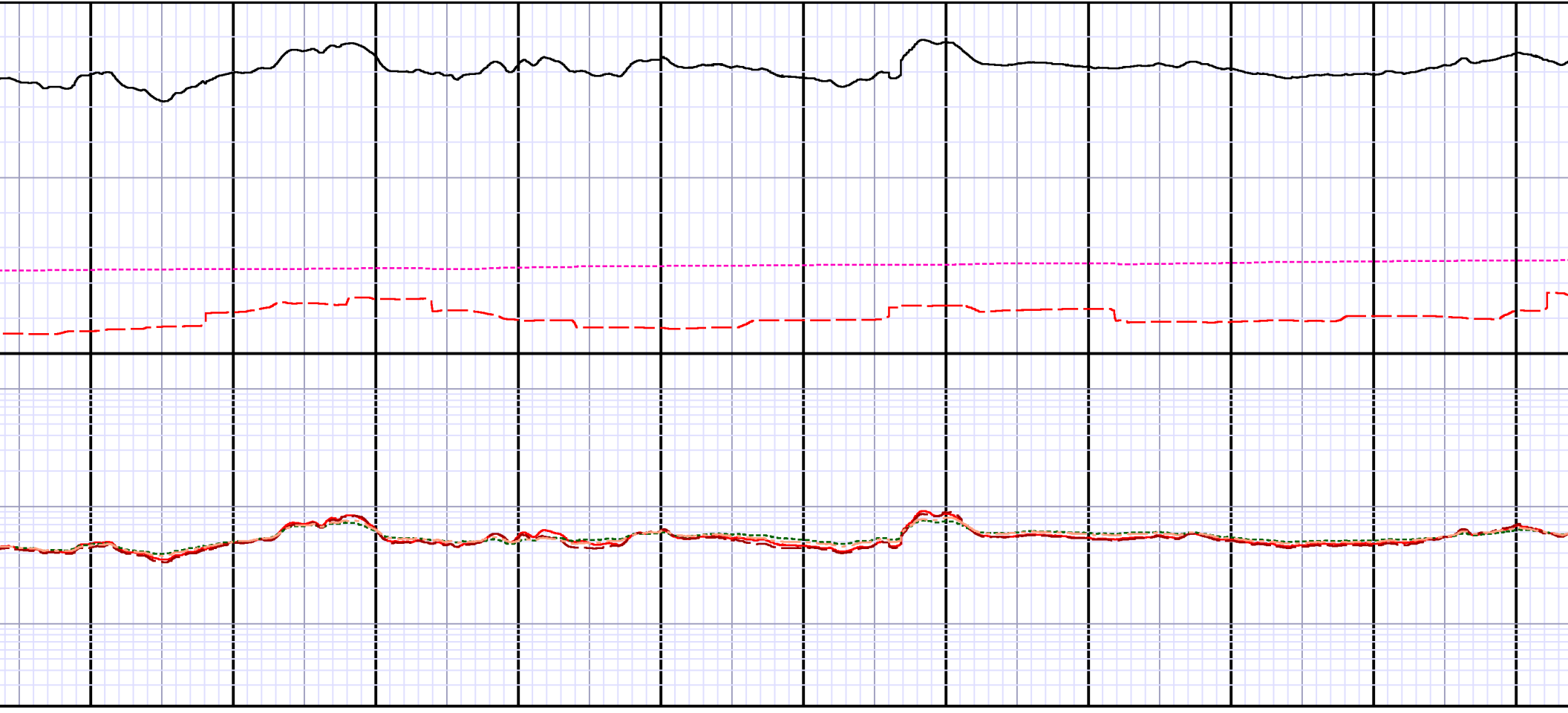

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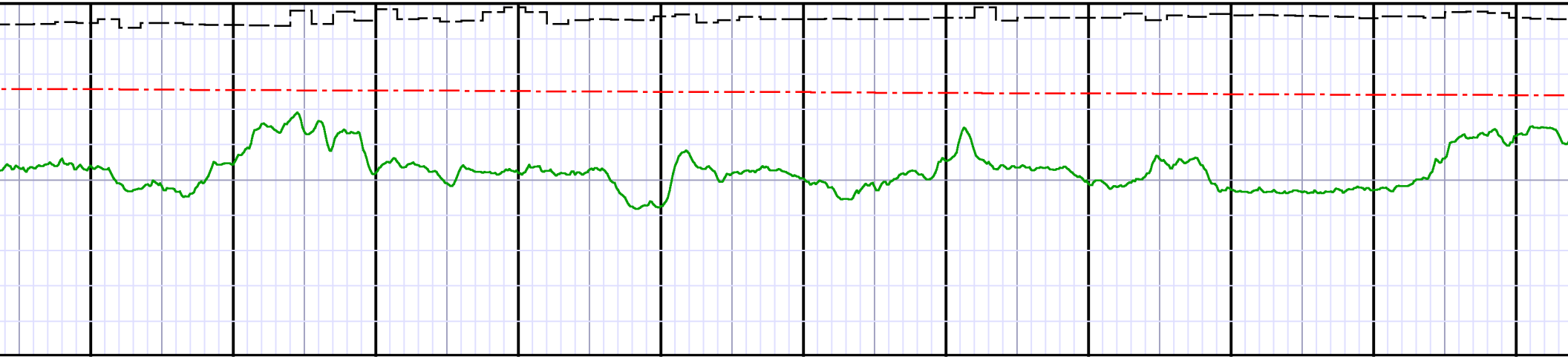

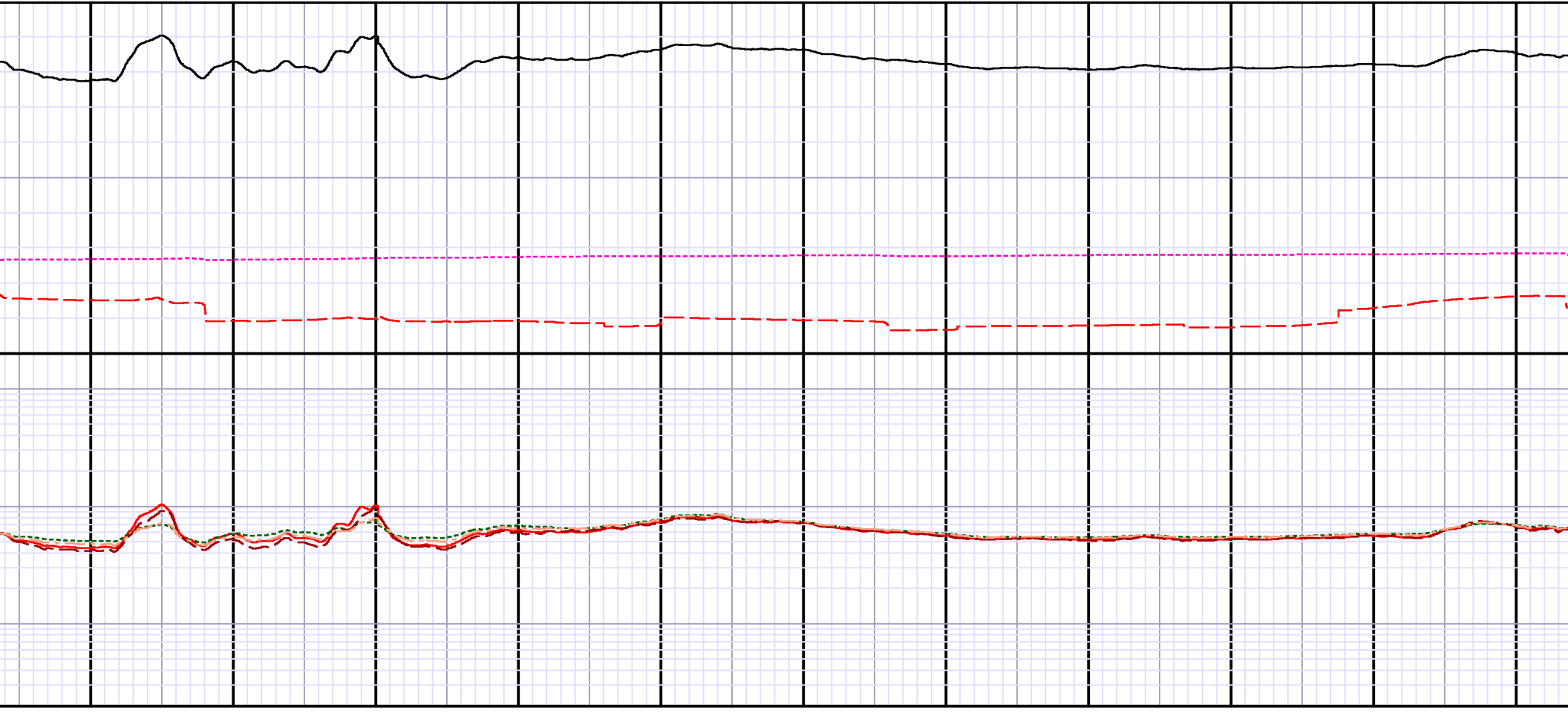

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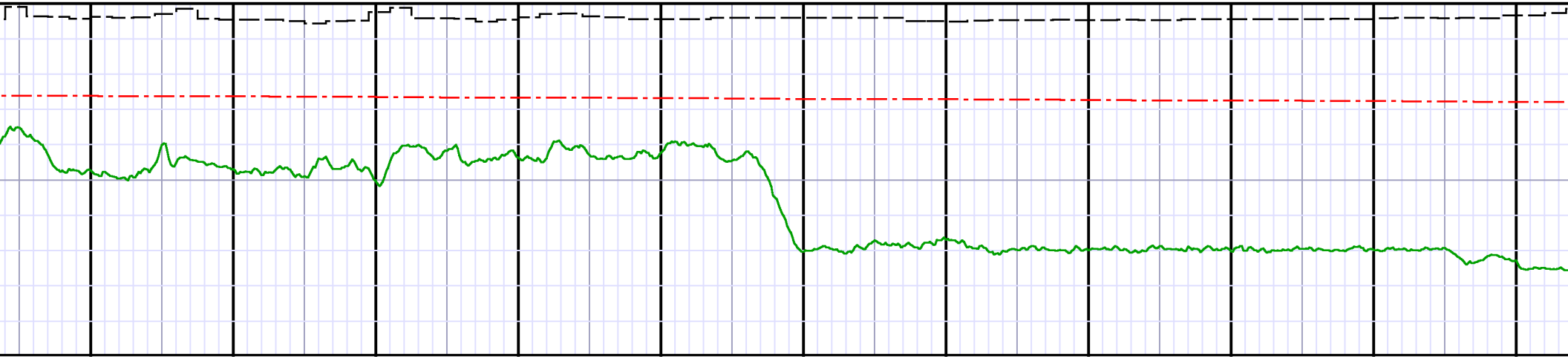
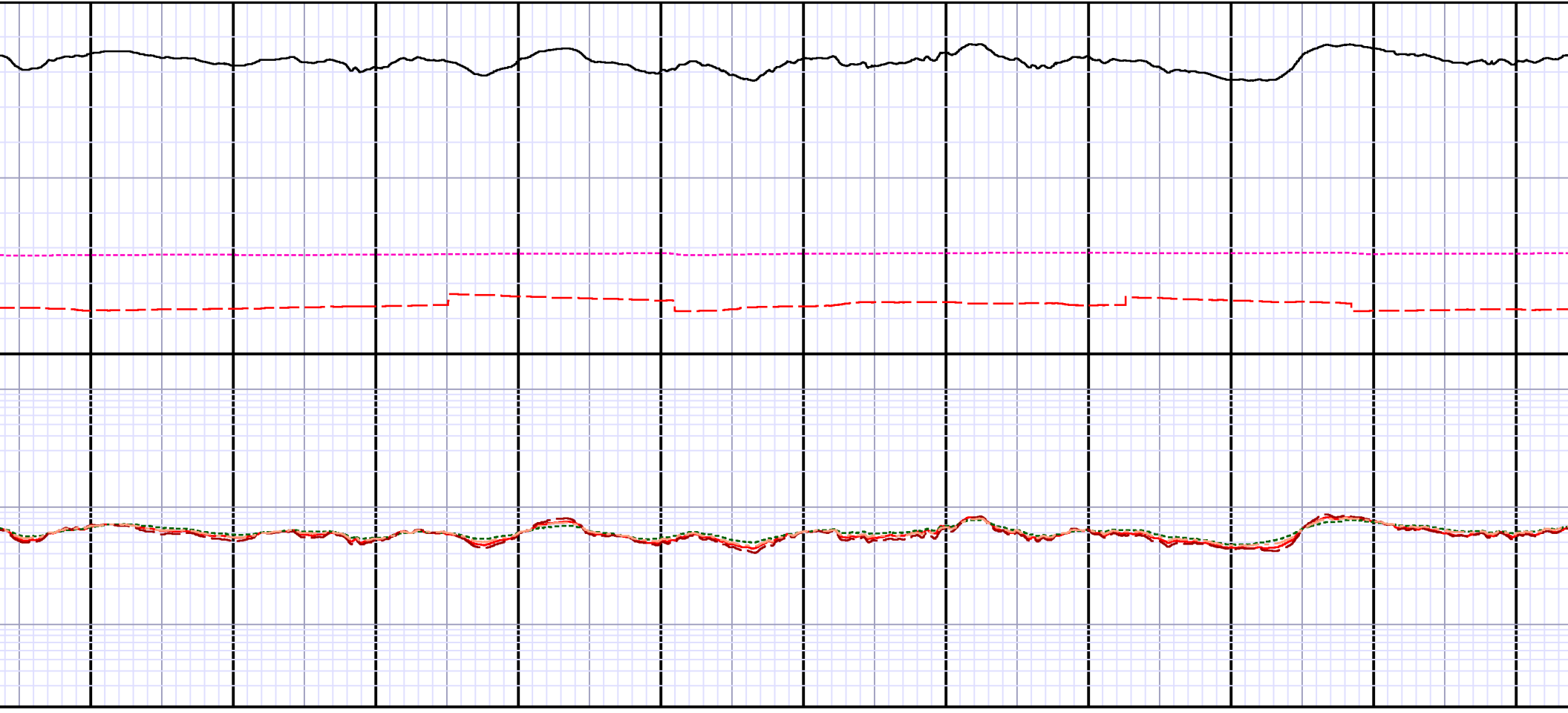
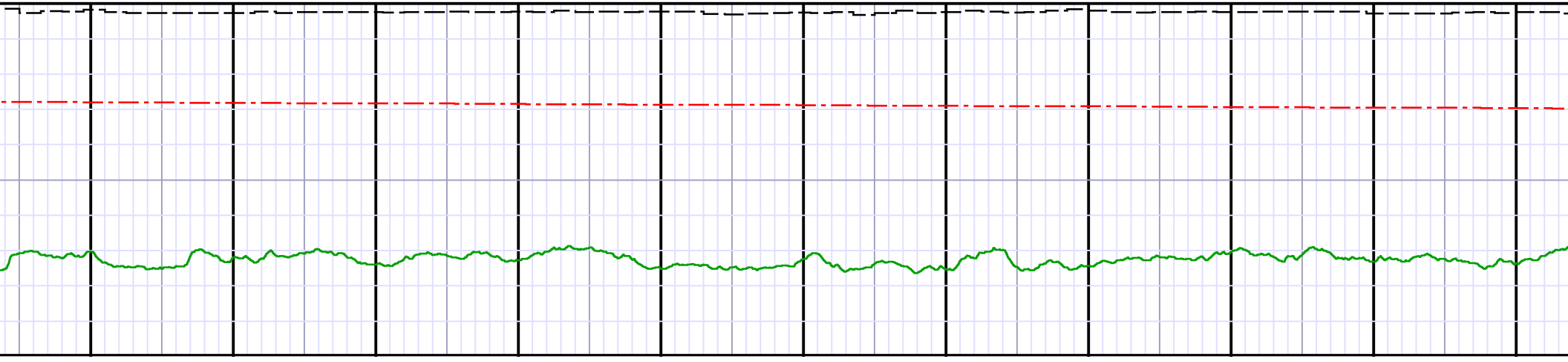
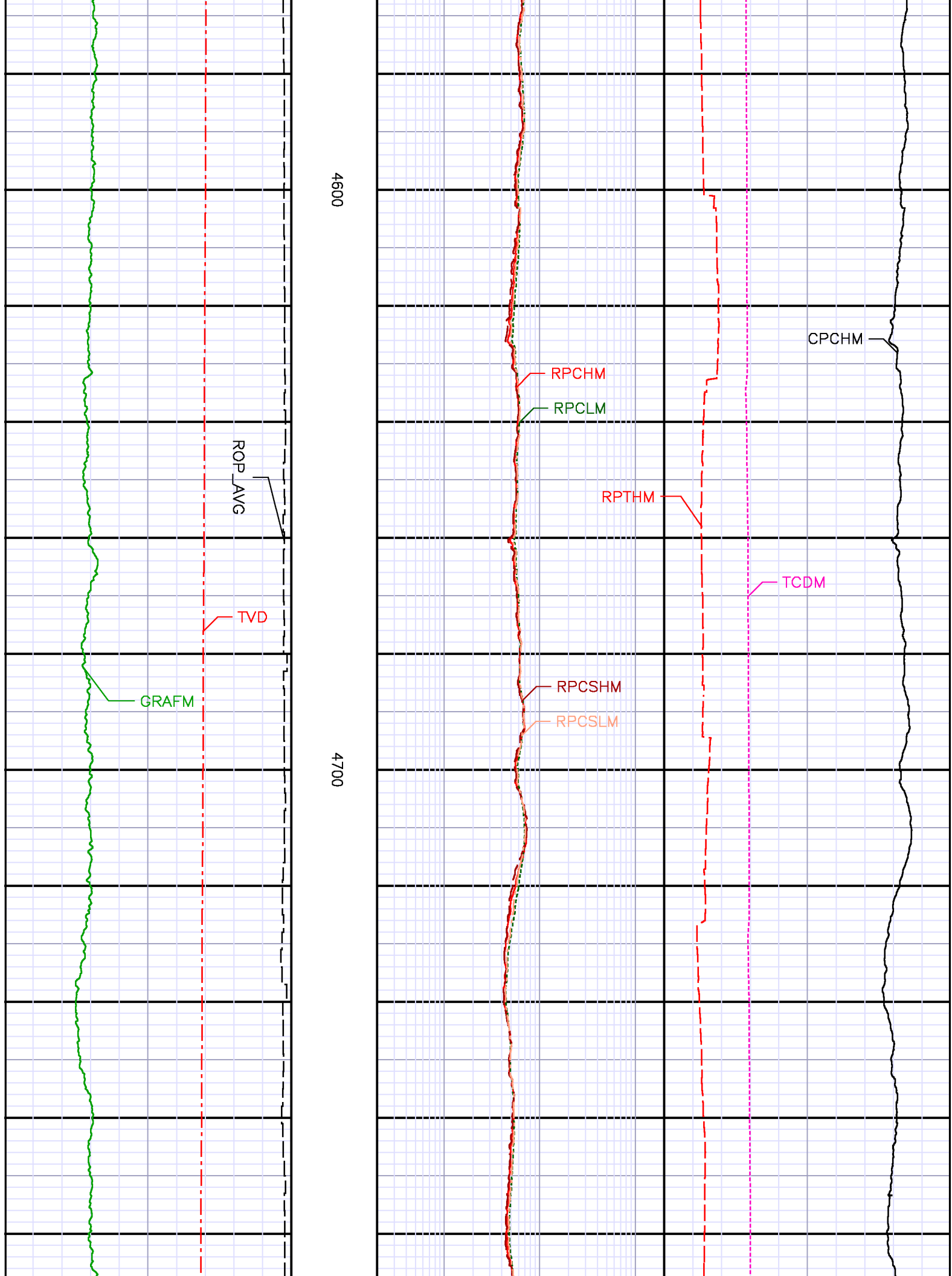
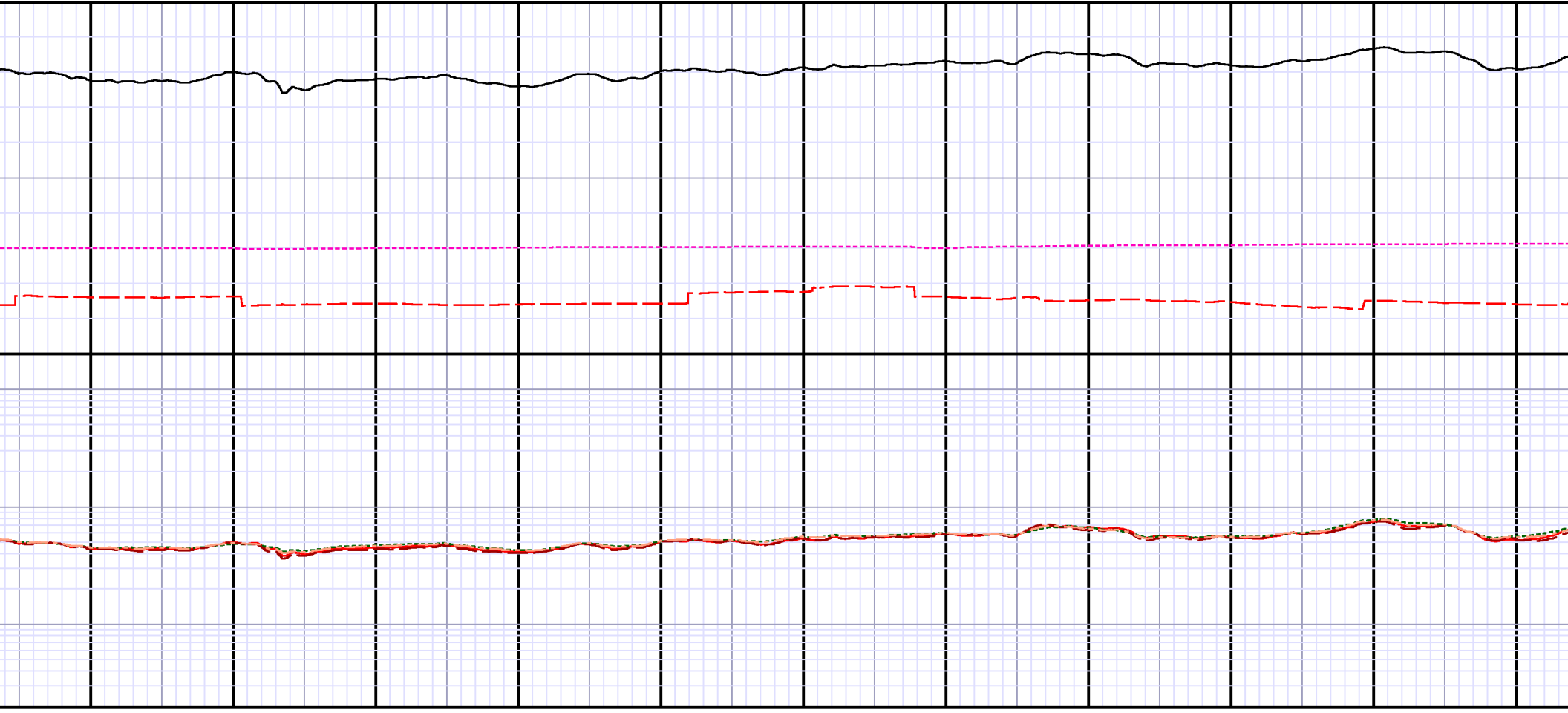




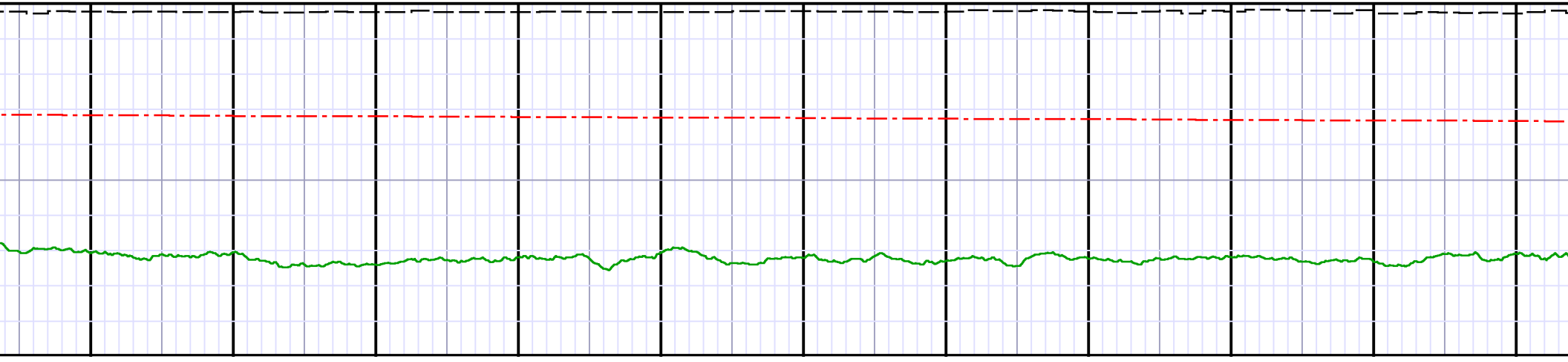
4400 4500

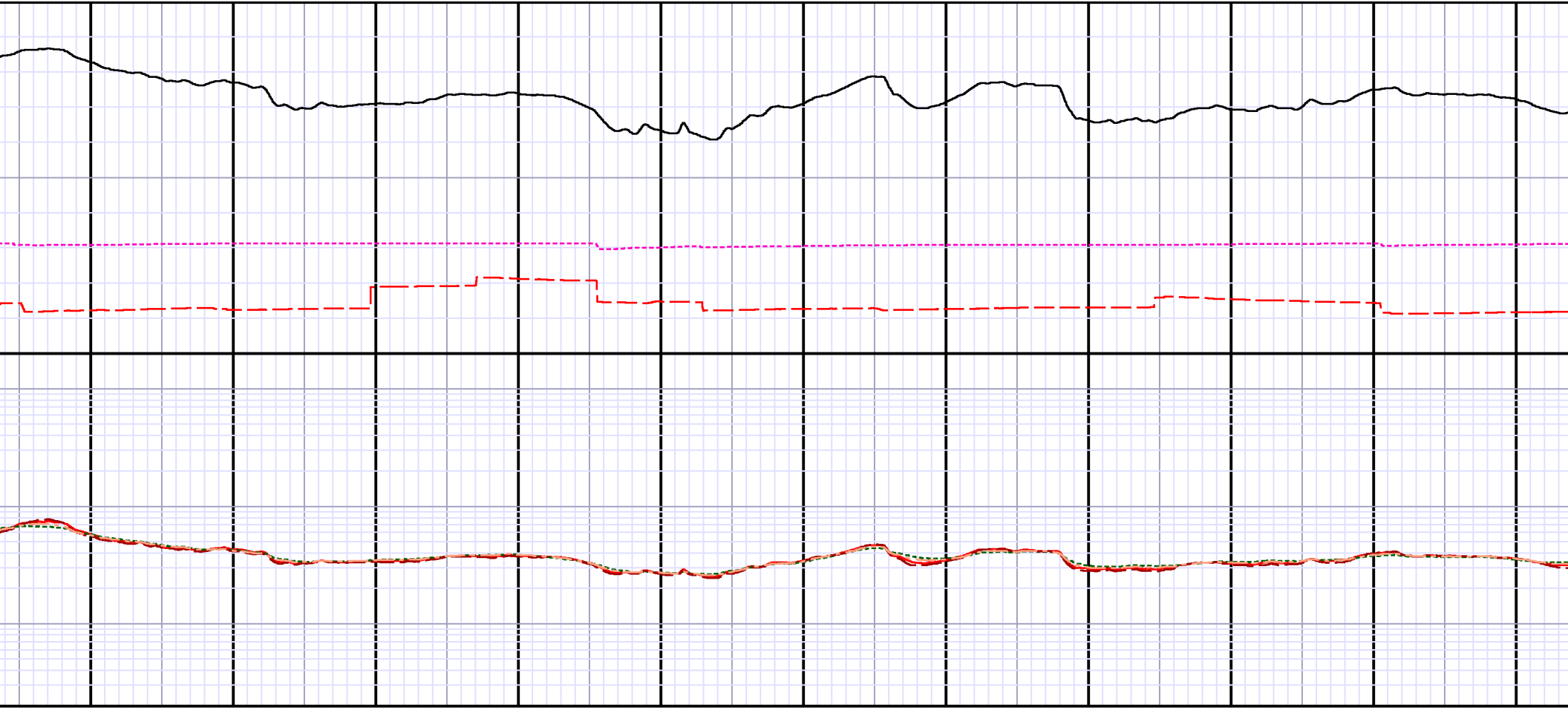



4600
4700
ROP_AVG
TVD
GRAFM
RPCHM
RPCLM
RPTHM
RPCSHM
RPCSLM
CPCHM
TCDM



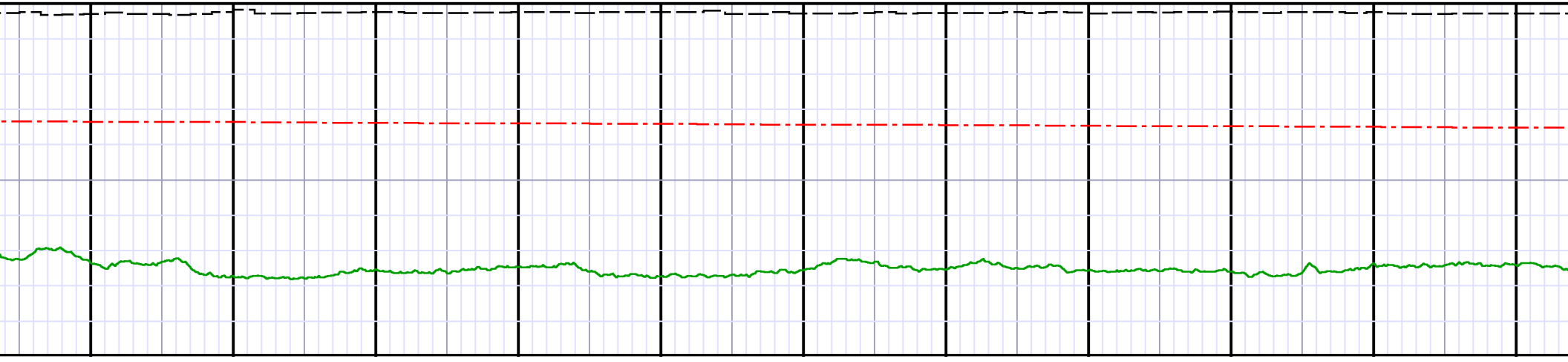
4800 4900 5000

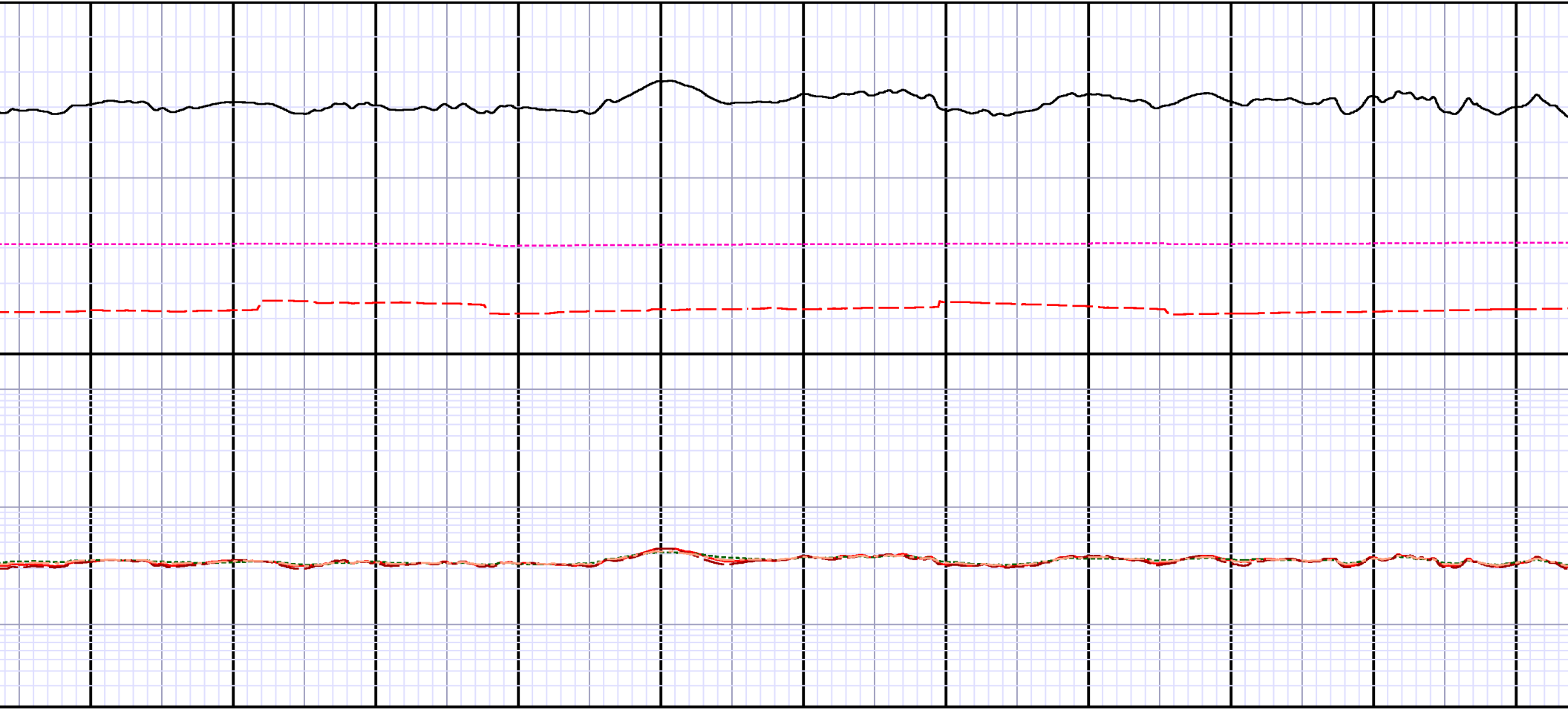




5100

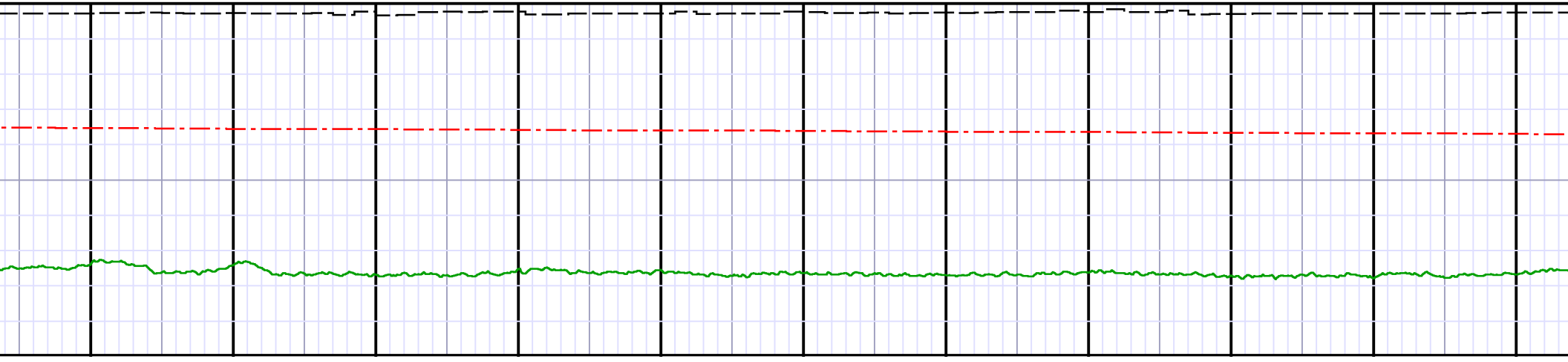
5200



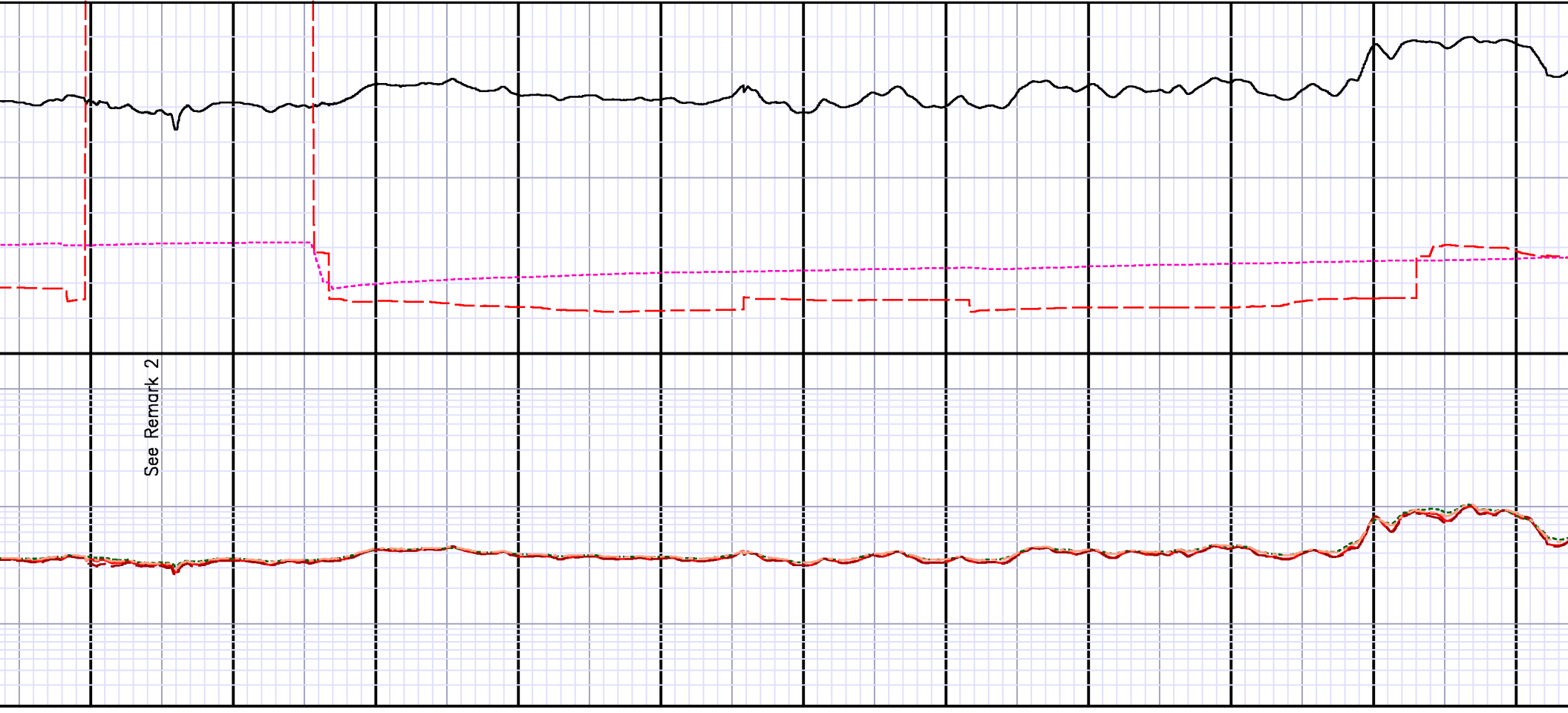


5300

5400



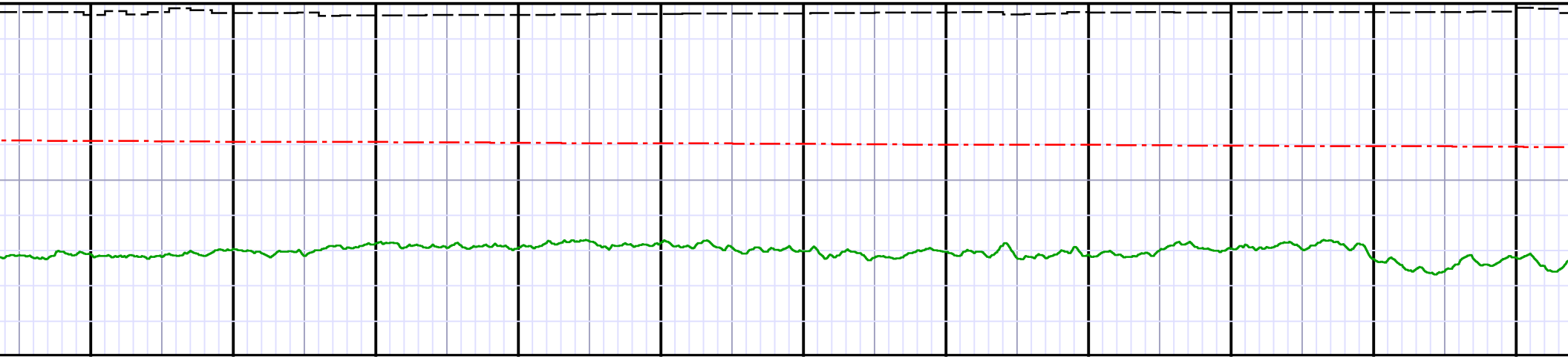
5500
5600



Run 6 <> Run 7

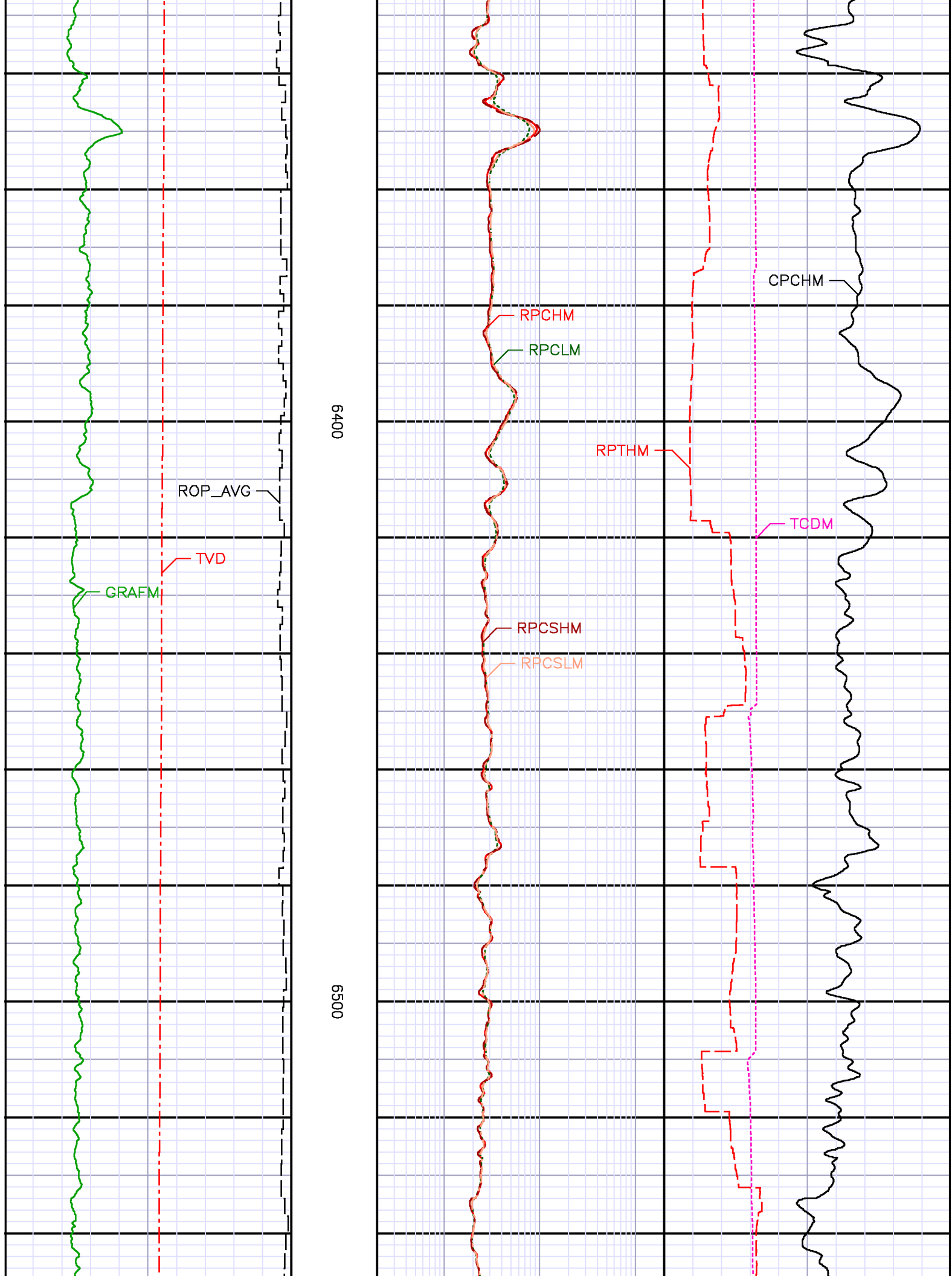
5700

5800

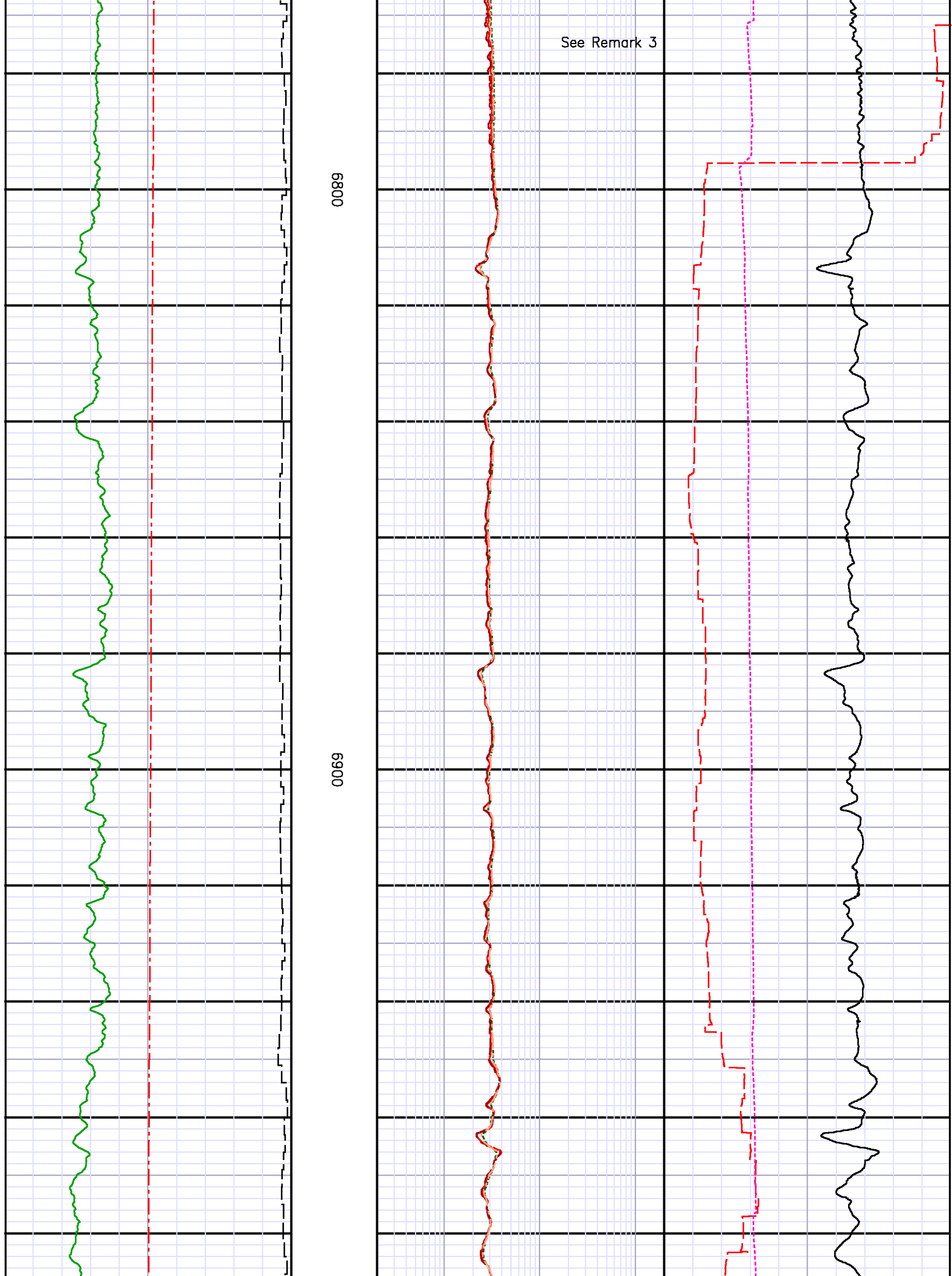


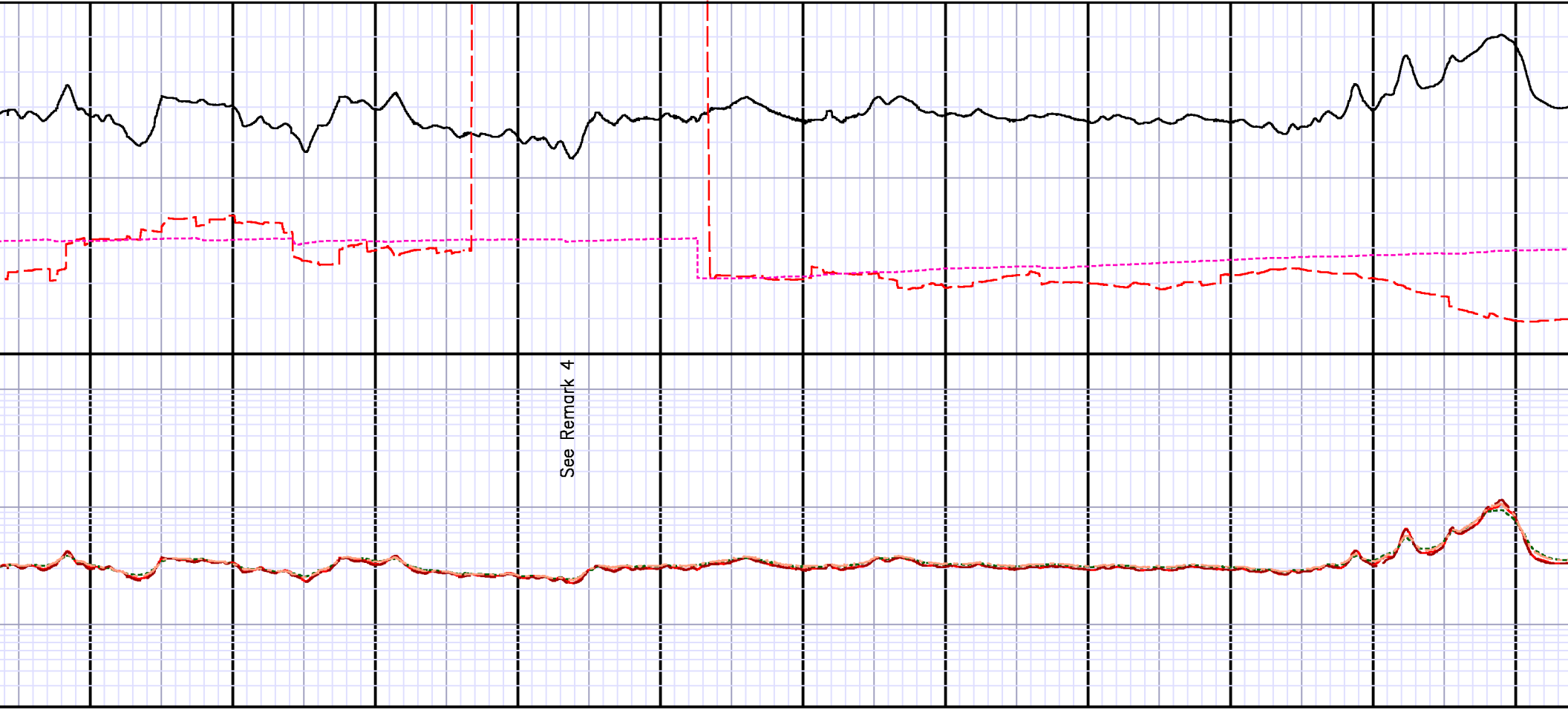
5900
6000
6100

6200
6300


ROP_AVG
TVD
GRAFM
6400
6500
RPCHM
RPCLM
RPCSHM
RPCSLM
RPTHM
TCDM
CPCHM

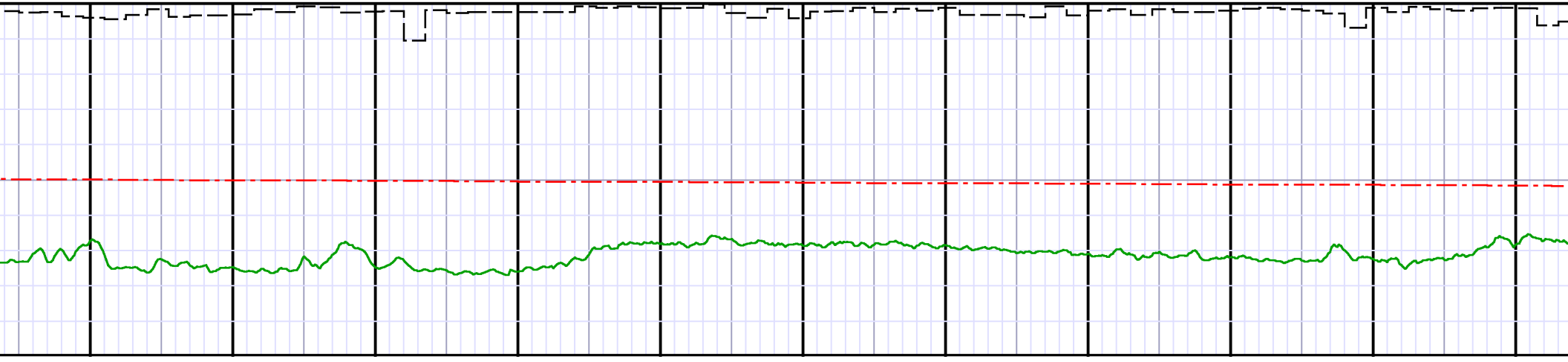
6600
6700

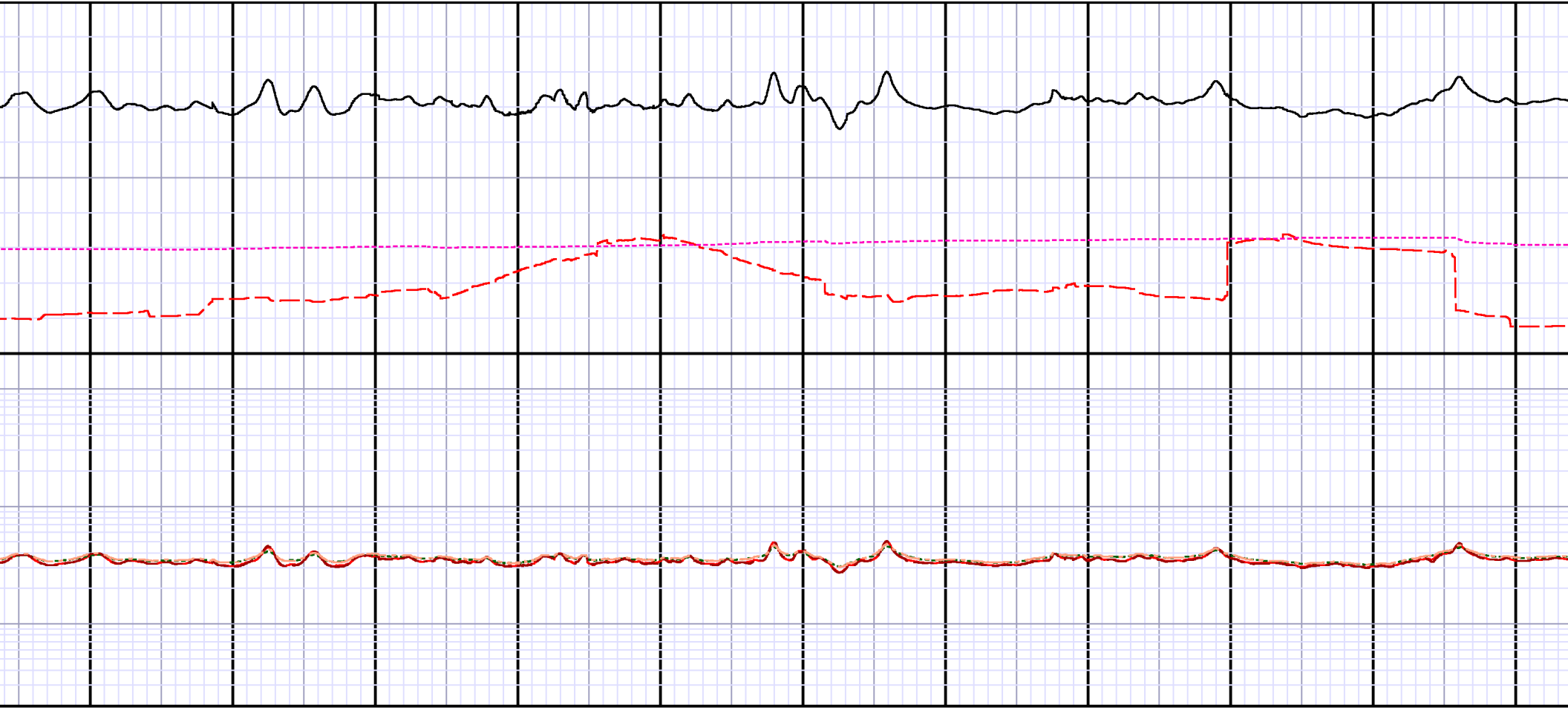

See Remark 3
6800
6900



Run 7 <> Run 8

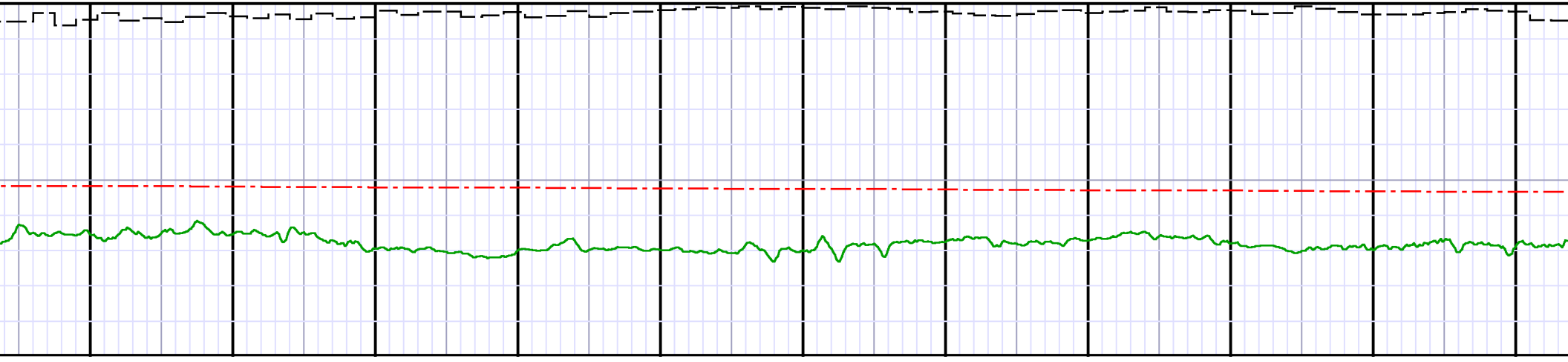
7000 7100 7200

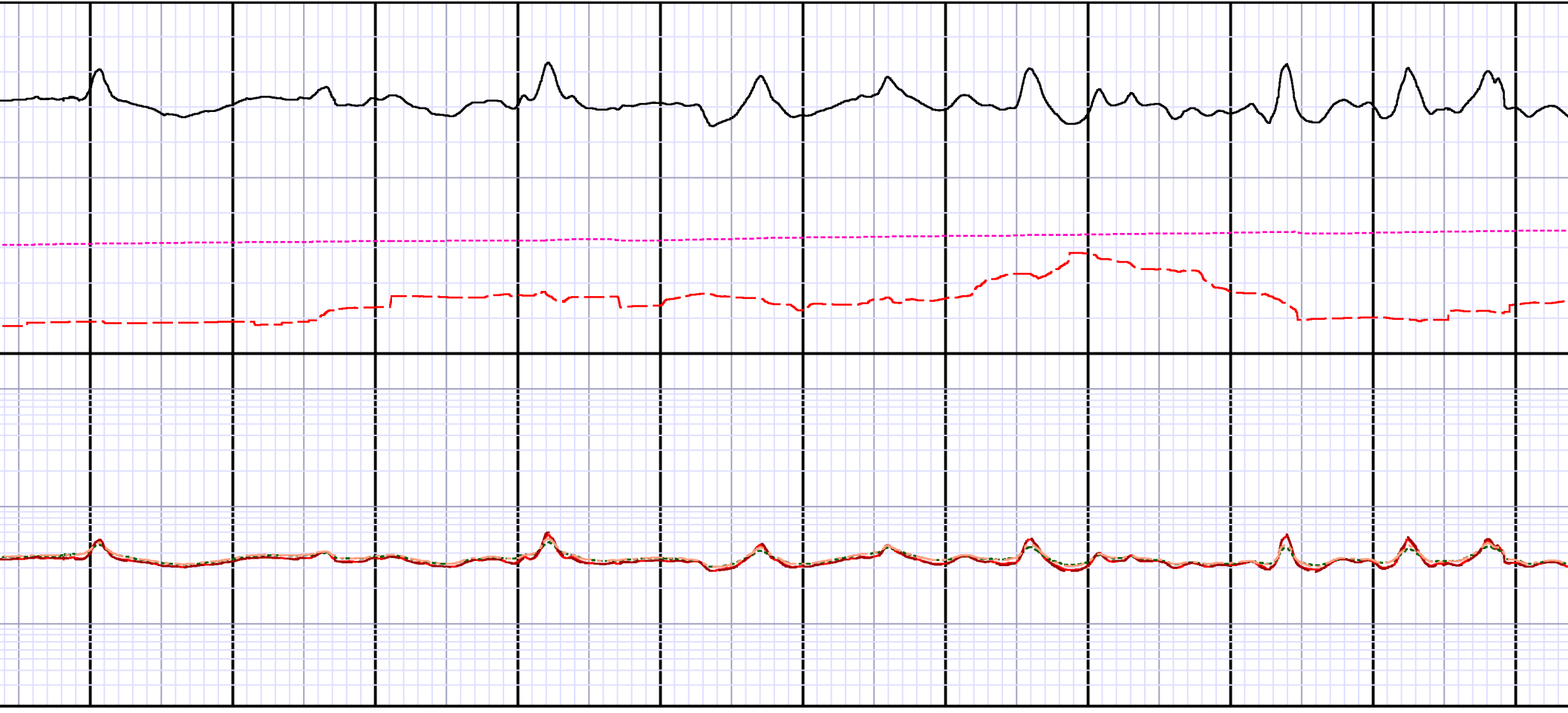




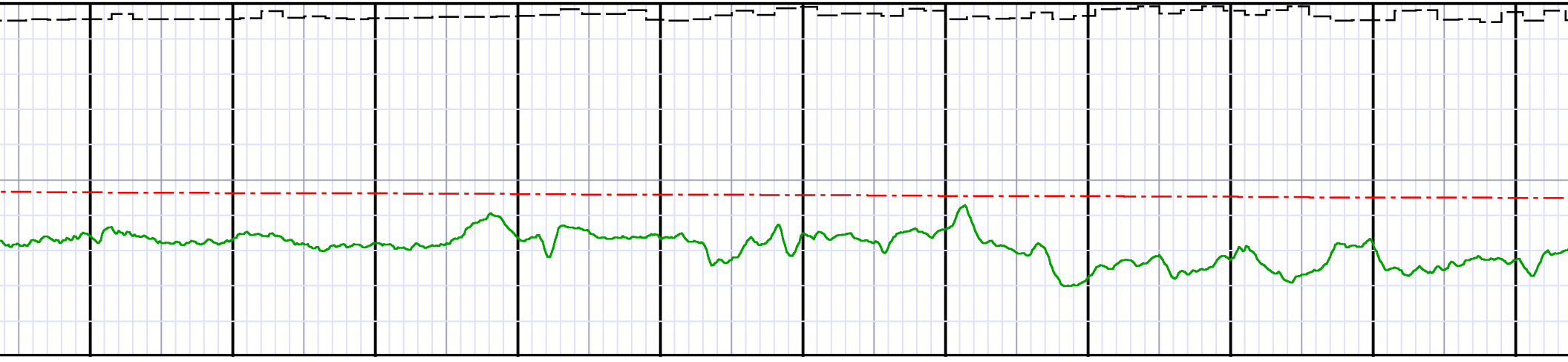
7300

7400



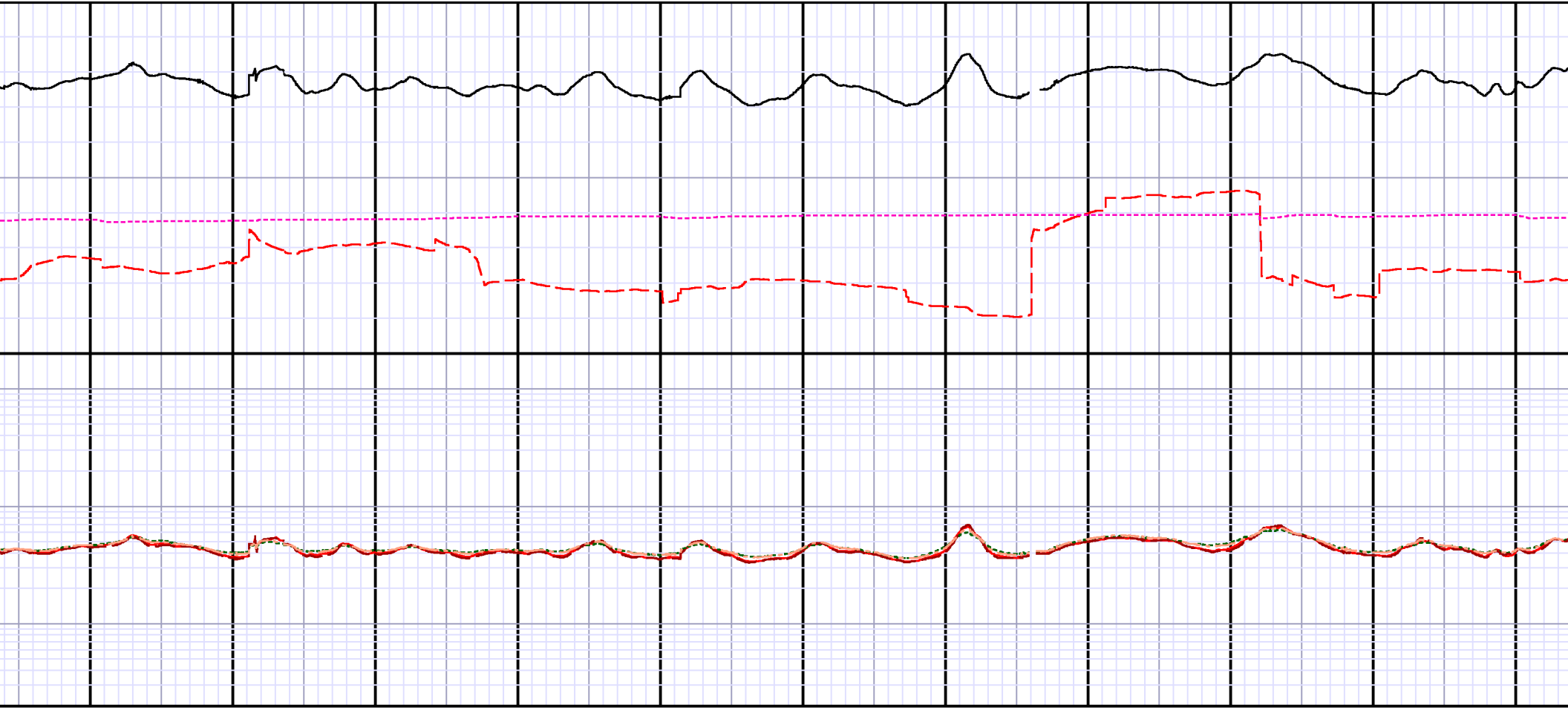


7500 7600

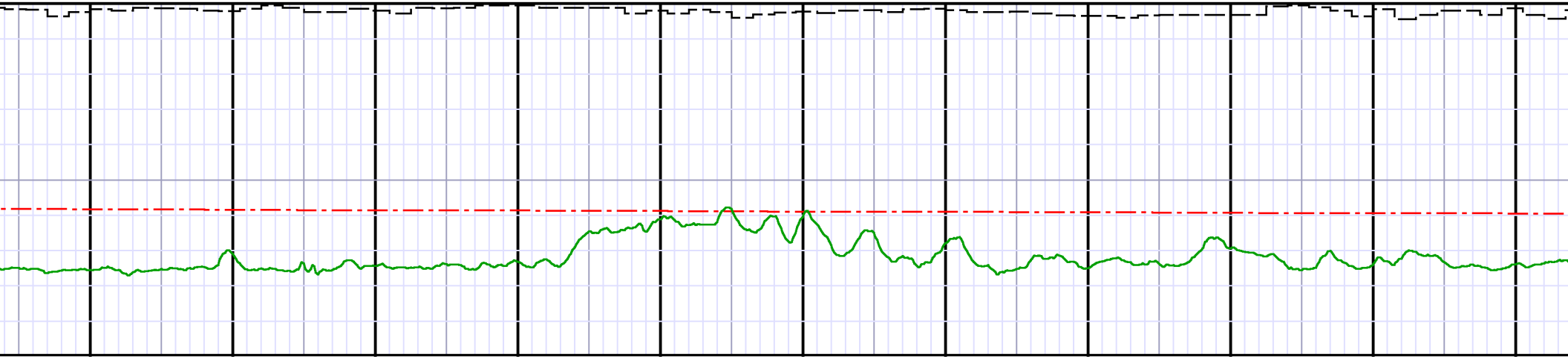


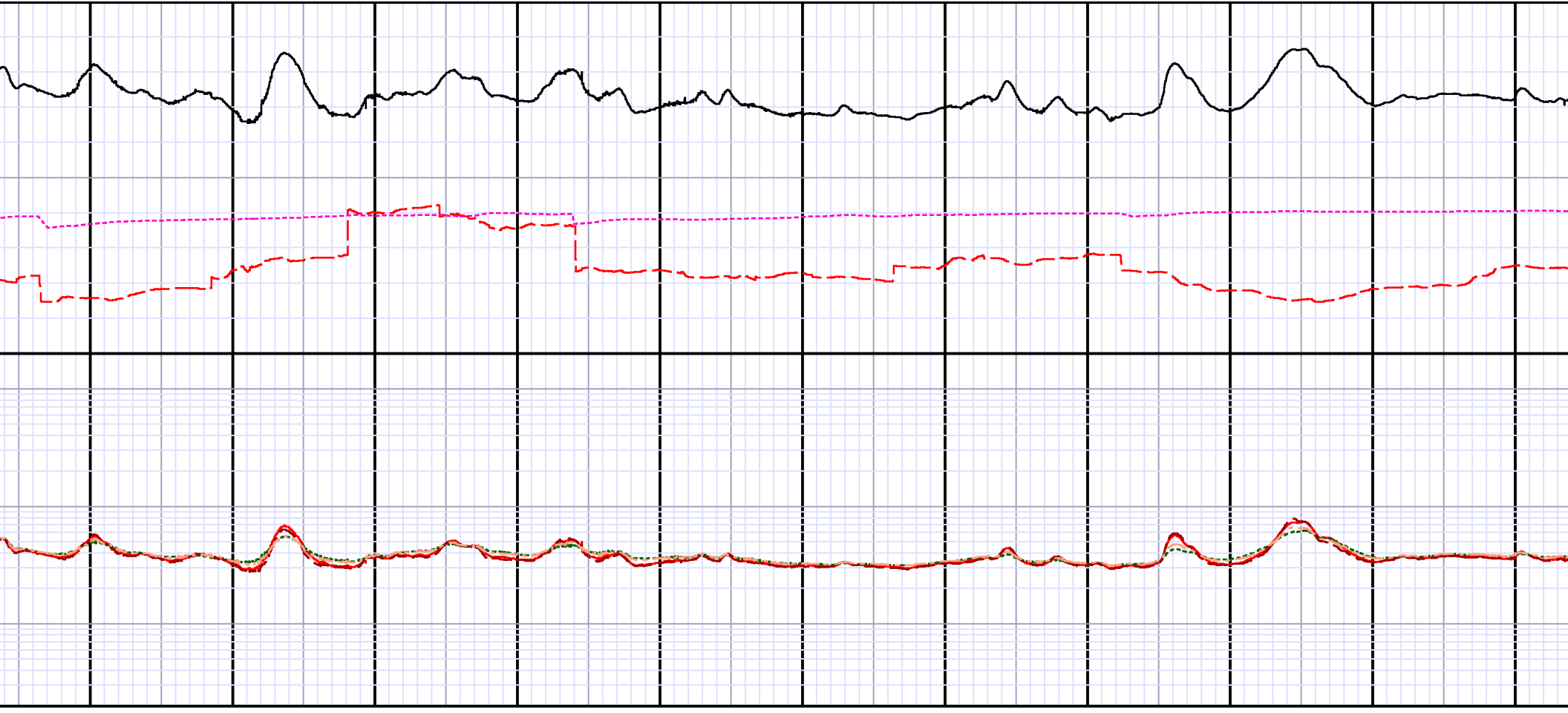
7700
7800

7900
8000



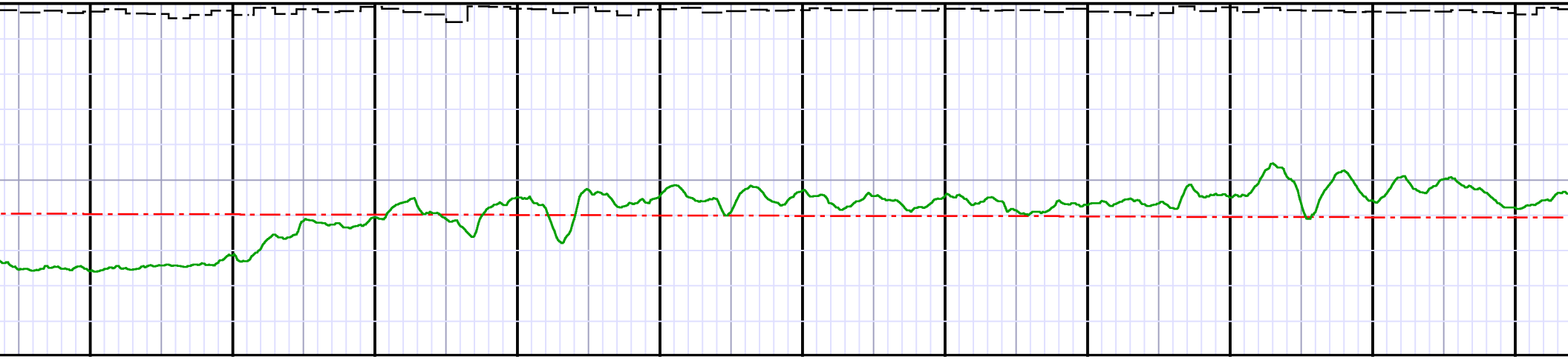
8100 8200 8300





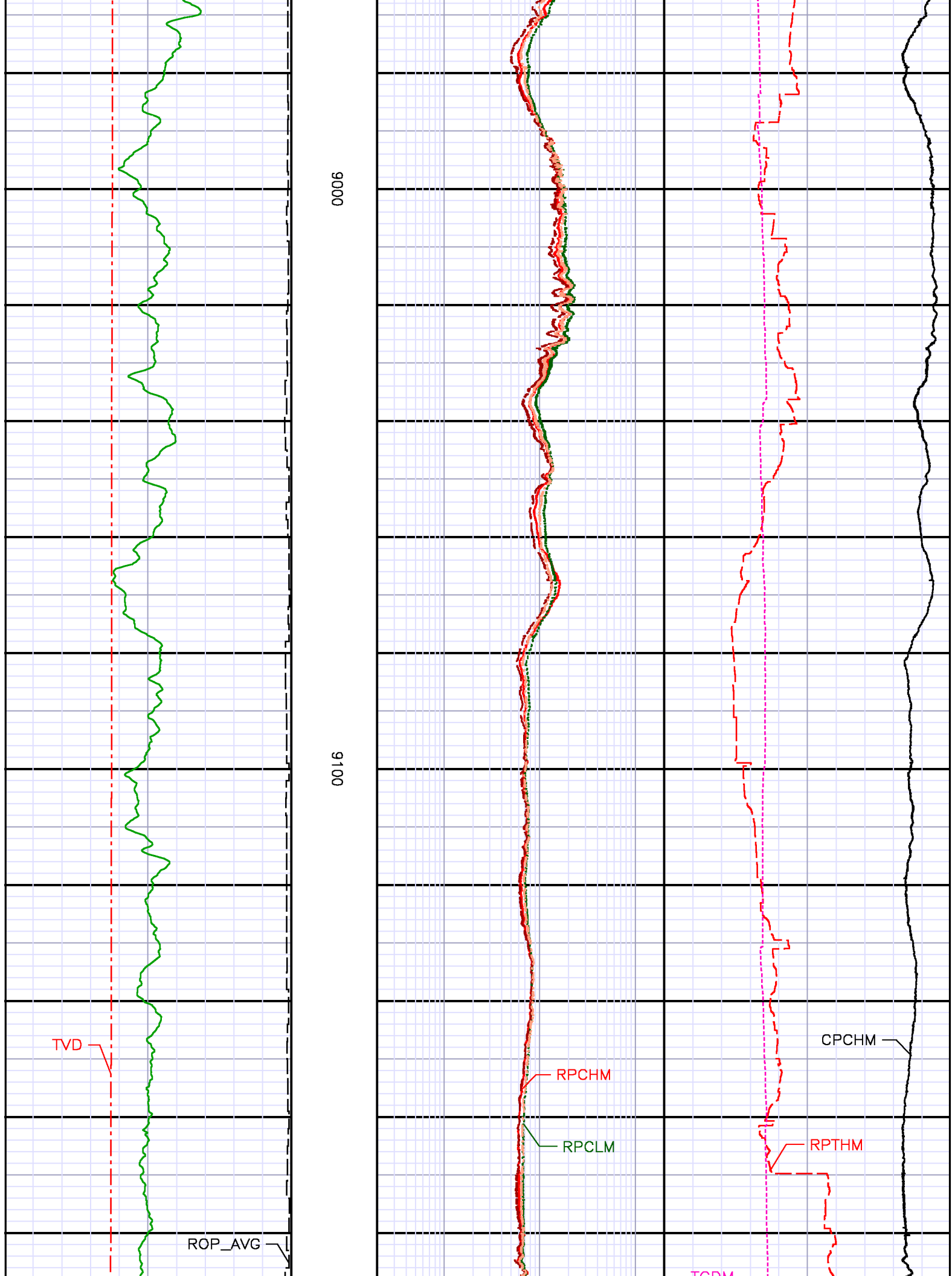
8400

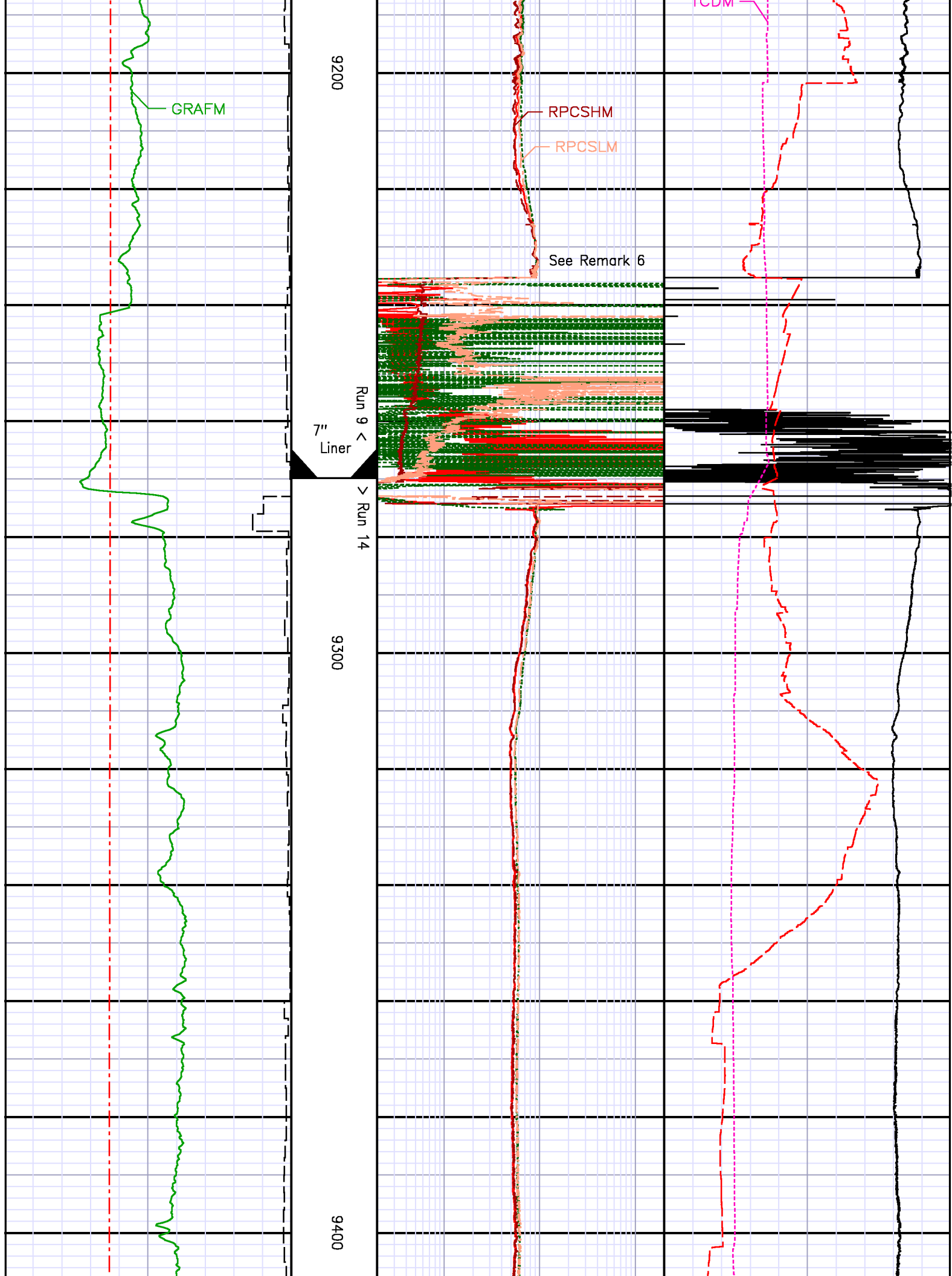
8500



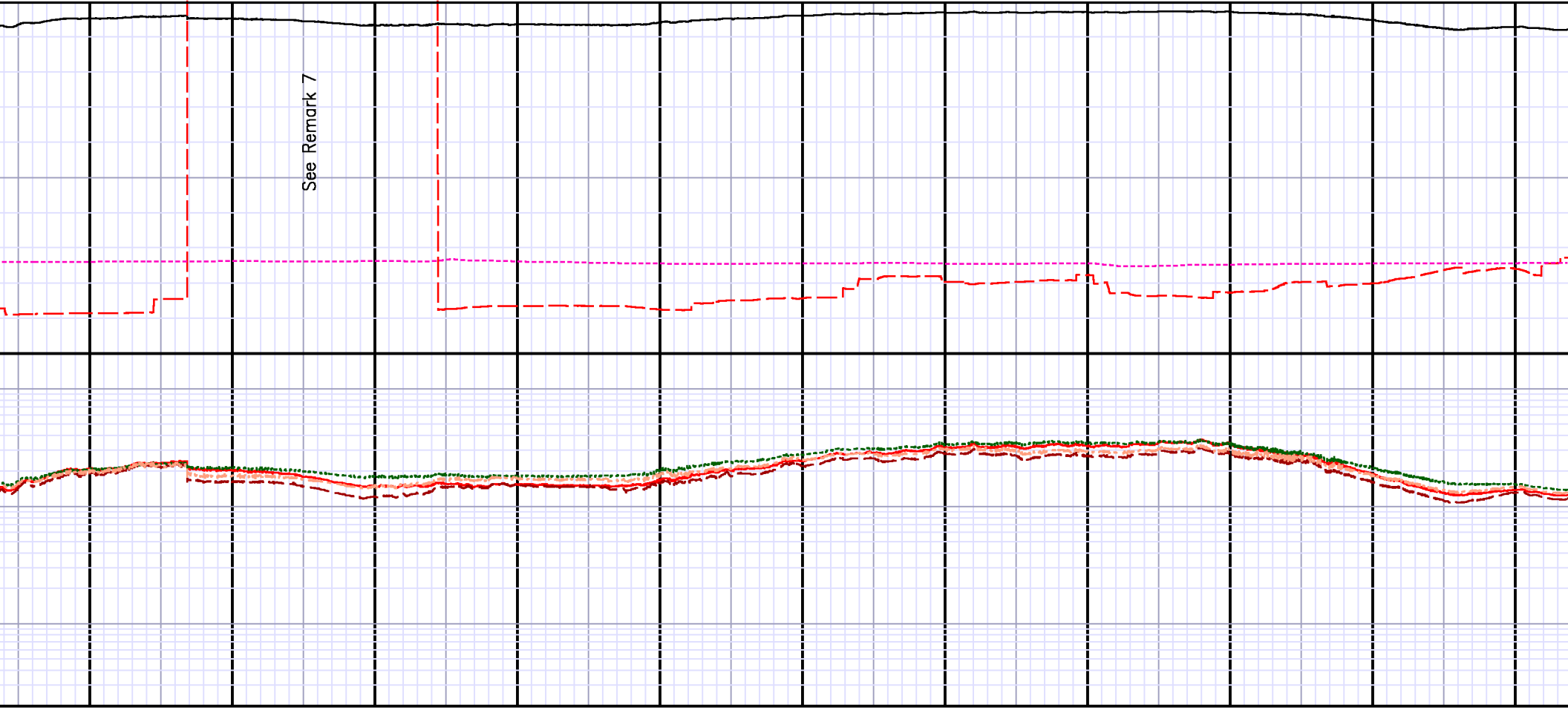
8600
8700

8800
Run 8 <> Run 9
8900
See Remark 5


9000
9100
TVD
ROP_AVG
RPCHM
RPCLM
CPCHM
RPTHM


GRAFM
9200
RPCSHM
RPCSLM
TCDM
See Remark 6
Run 9 <
7"
Liner
> Run 14
9300
9400

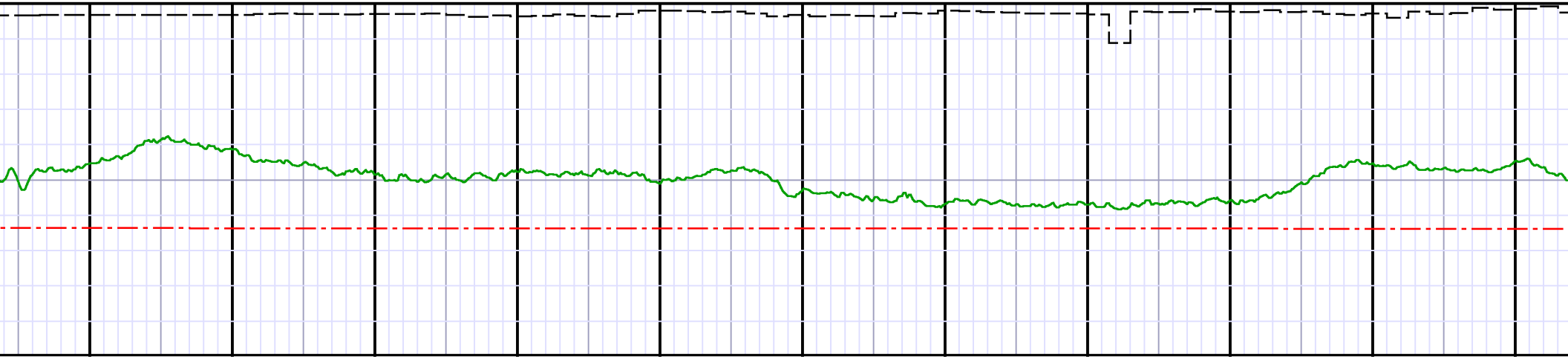
9500
9600



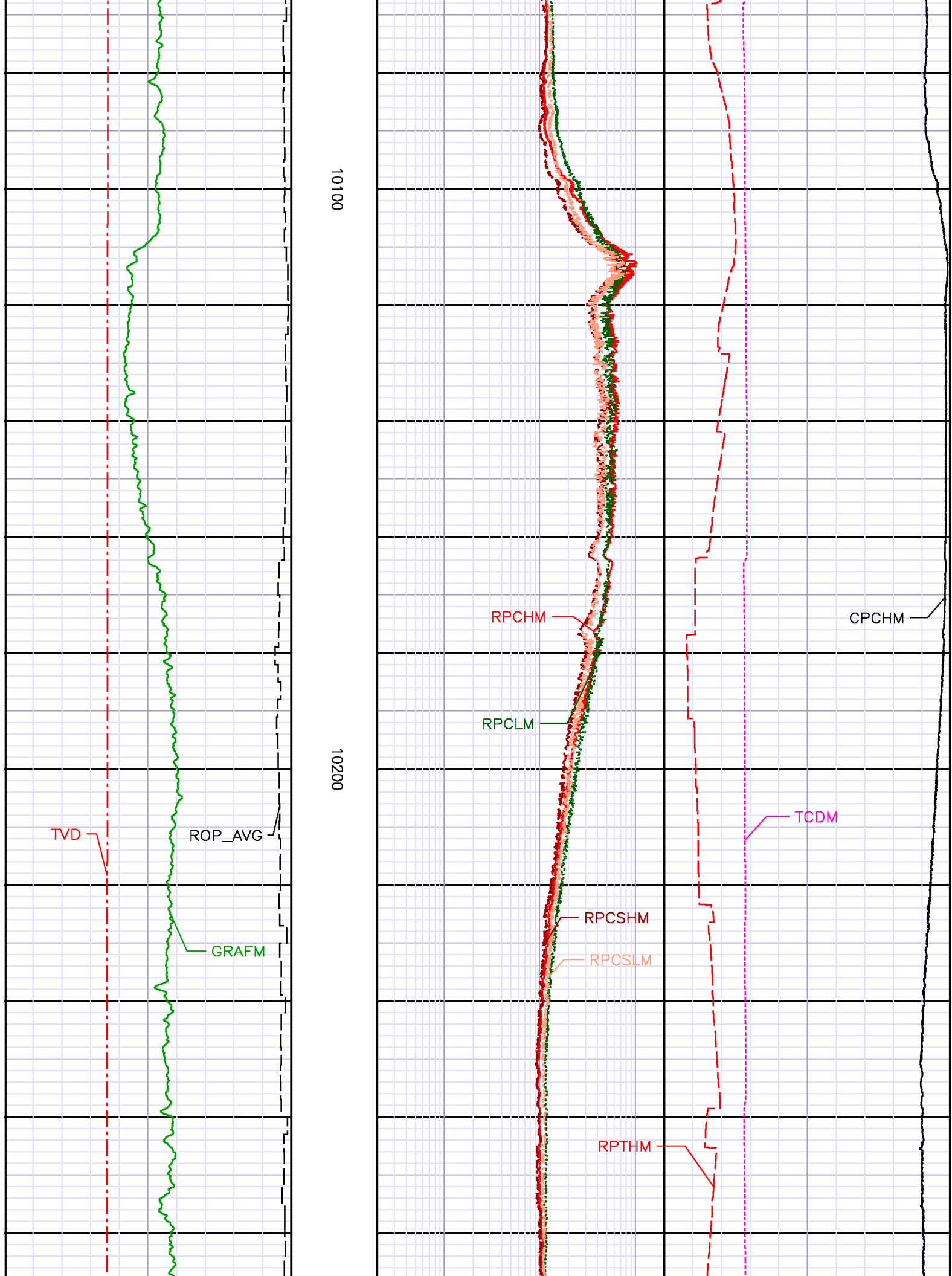
Run 14 < > Run 15

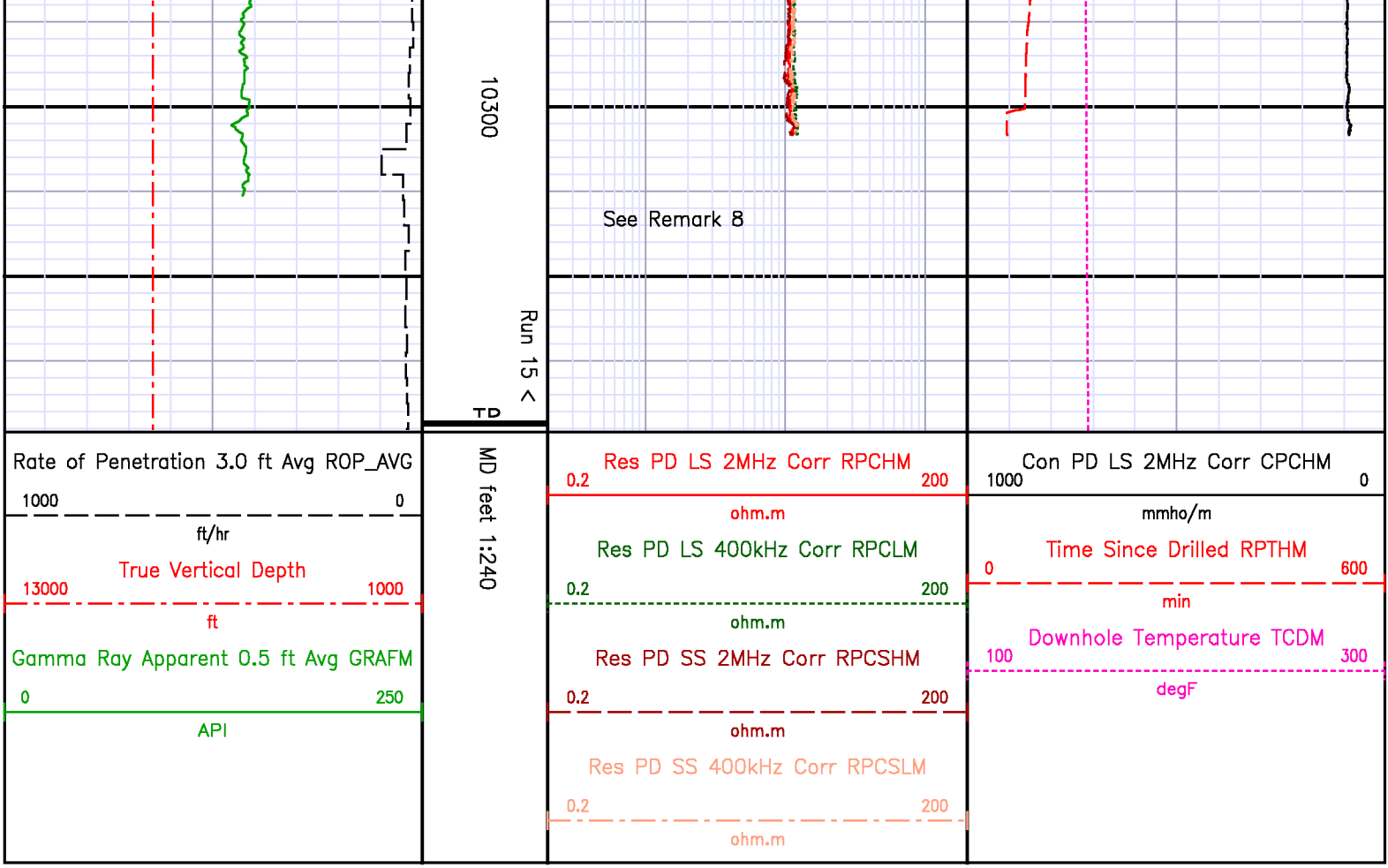
9700

9800



9900
10000


10100
10200
TVD
ROP_AVG
GRAFM
RPCHM
RPCLM
RPCSHM
RPCSLM
RPTHM
TCDM
CPCHM


10300
Run 15 <
See Remark 8
Rate of Penetration 3.0 ft Avg ROP_AVG
1000
0
ft/hr
True Vertical Depth
13000
1000
ft
Gamma Ray Apparent 0.5 ft Avg GRAFM
0
250
API
MD feet 1:240
Res PD LS 2MHz Corr RPCHM
0.2
200
ohm.m
Res PD LS 400kHz Corr RPCLM
0.2
200
ohm.m
Res PD SS 2MHz Corr RPCSHM
0.2
200
ohm.m
Res PD SS 400kHz Corr RPCSLM
0.2
200
ohm.m
Con PD LS 2MHz Corr CPCHM
1000
0
mmho/m
Time Since Drilled RPTHM
0
600
min
Downhole Temperature TCDM
100
300
degF