Country	: USA
Field	: Wattenburg
Location	: Lat: 40° 42' 59.33" North Long: 103° 52' 20.32" West
Well	: Greyson LD28-753
Company	: Noble Energy Inc.
Rig	: H&P 343

HALLIBURTON | Sperry Drilling

EWR Electromagnetic Wave Resistivity
PCG Pressure Case Gamma Ray

Company : **Noble Energy Inc.**
Rig : **H&P 343**
Well : **Greyson LD28-753**
Field : **Wattenburg**
Country : **USA**
API Number : **05-123-41586**

LOCATION
Latitude : **40° 42' 59.33" North**
Longitude : **103° 52' 20.32" West**
UTM Easting = **3,451,193.411 ft**
UTM Northing = **1,508,001.906 ft**

Other Services
Directional Drilling

Permanent Datum : **Ground Level** Elevation : **4853.00 ft**
Log Measured From : **Drill Floor** **24.00 ft** Above Permanent Datum
Drilling Measured From : **Drill Floor**

MD LOG

Elev. KB **N/A**
DF **4877.00 ft**
GL **4853.00 ft**
WD **N/A**

Depth Logged : **1,135.00 ft** To **6,290.00 ft**
Date Logged : **29-Jul-15** To **01-Aug-15**
Total Depth MD : **6,290.00 ft** TVD: **5,824.15 ft**
Spud Date : **29-Jul-15**

Unit No. : **11610115**
Plot Type : **Final**
Plot Date : **03-Aug-15**
Job No. : **CA-XX-0902594951**

Run No.	Borehole Record (MD) Size	From	To	Casing Record (MD) Size	Weight	From	To
2	8.750 in	1,135.00 ft	6,145.00 ft	9.625 in	36.60 lbpf	SURFACE	1,124.00 ft
3	8.750 in	6,145.00 ft	6,290.00 ft				

WELL INFORMATION

MWD Run Number	100	200			
Date run completed	01-Aug-15	01-Aug-15			
Rig Bit Number	2	3			
Bit Size (in)	8.750	8.750			
Tool Nominal OD (in)	6.750	6.750			
Log Start Depth (MD, ft)	1,135.00	6,145.00			
Log End Depth (MD, ft)	6,145.00	6,290.00			
Drill or Wipe	Drill	Drill			
Drill/Wipe Start Date and Time	30-Jul-15 23:00	01-Aug-15 05:00			
Drill/Wipe End Date and Time	31-Jul-15 22:45	01-Aug-15 10:45			
Min Inc (deg) @ Depth (MD, ft)	0.14 @ 1,223.00	0.14 @ 1,223.00			
Max Inc (deg) @ Depth (MD, ft)	61.84 @ 6,012.00	84.60 @ 6,226.00			
Bit TFA(in2) / Bit Type	0.98 / PDC	0.98 / PDC			
Flow Rate (gpm)	596.14	560.00			
Max AV (fpm) / CV (fpm) @ MWD	N/A / N/A	N/A / N/A			
Fluid Type	Native/Spud Mud	Native/Spud Mud			
Density (ppg) / Viscosity (spqt)	10.65 / 40.00	10.60 / 29.00			
Filtrate CL (ppm)	400.00	400.00			
pH / Fluid Loss (mptm)	9.70 / 7	11.00 / 14			
PV (cP) / YP (lhf2)	12 / 12.00	3 / 3.00			
% Solids / % Sand	4.7 / 0.25	4.7 / .1			
% Oil / Oil:Water Ratio	N/A / N/A	N/A / N/A			
Rm @ Measured Temp (degF)	N/A @ N/A	N/A @ N/A			
Rmf @ Measured Temp (degF)	N/A @ N/A	N/A @ N/A			
Rmc @ Measured Temp (degF)	N/A @ N/A	N/A @ N/A			

Max Tool Temp (degF) / Source	175.21 / PCM	175.21 / PCM			
Rm @ Max Tool Temp (degF)	N/A @ 175.21	N/A @ 175.21			
Lead MWD Engineer	Brian Neu	Brian Neu			
Customer Representative	JW Irwin	JW Irwin			

SENSOR INFORMATION

Downhole Processor Information

Tool Type	HCIM	HCIM			
Software Version	88.58	88.58			
Sub Serial Number					
Insert Serial Number					
Date and Time Initialized	30-Jul-15 15:30	30-Jul-15 15:30			
Date and Time Read	01-Aug-15 15:08	29-Jul-15 23:44			
ECMB SW Version	N/A	N/A			

Directional Sensor Information

Tool Type	PCDC	PCDC			
Distance From Bit (ft)	65.00	64.00			
Software Version	6.21	6.21			
Sub Serial Number	11303511	11303511			
Sonde Serial Number	11478016	11478016			
Sensor ID Number	N/A	N/A			
Toolface Offset (deg)	41.80	172.80			

Gamma Ray Sensor Information

Tool Type	PCG	PCG			
Distance From Bit (ft)	58.24	57.27			
Recorded Sample Period (sec)	10	10			
Software Version	8.15	8.15			
Sub Serial Number	11303511	11303511			
Insert/Sonde Serial Number	12037418	12037418			

Resistivity Sensor Information

Tool Type	EWR-P4	EWR-P4			
Distance From Bit (ft)	81.29	81.29			
Recorded Sample Period (sec)	4	4			
Software Version	1.50	1.50			
Sub Serial Number	10505932	10505932			
Receiver Insert Serial Number	215271	215271			
Transmitter Insert Serial Number	11254798	11254798			
Receiver Orientation	Down	Down			

REMARKS

1. All depths are calibrated to the driller's pipe tally and are measured bit depths, measured from the drill floor.

2. No depth corrections have been made for pipe stretch or compression.

3. Critical annular velocities have been calculated using the "Power Law" model for water based fluids and the "Bingham Plastic" model for syntheic and oil based fluids.

4. All data presented is recorded (memory) data unless otherwise stated.
ROPA is realtime data

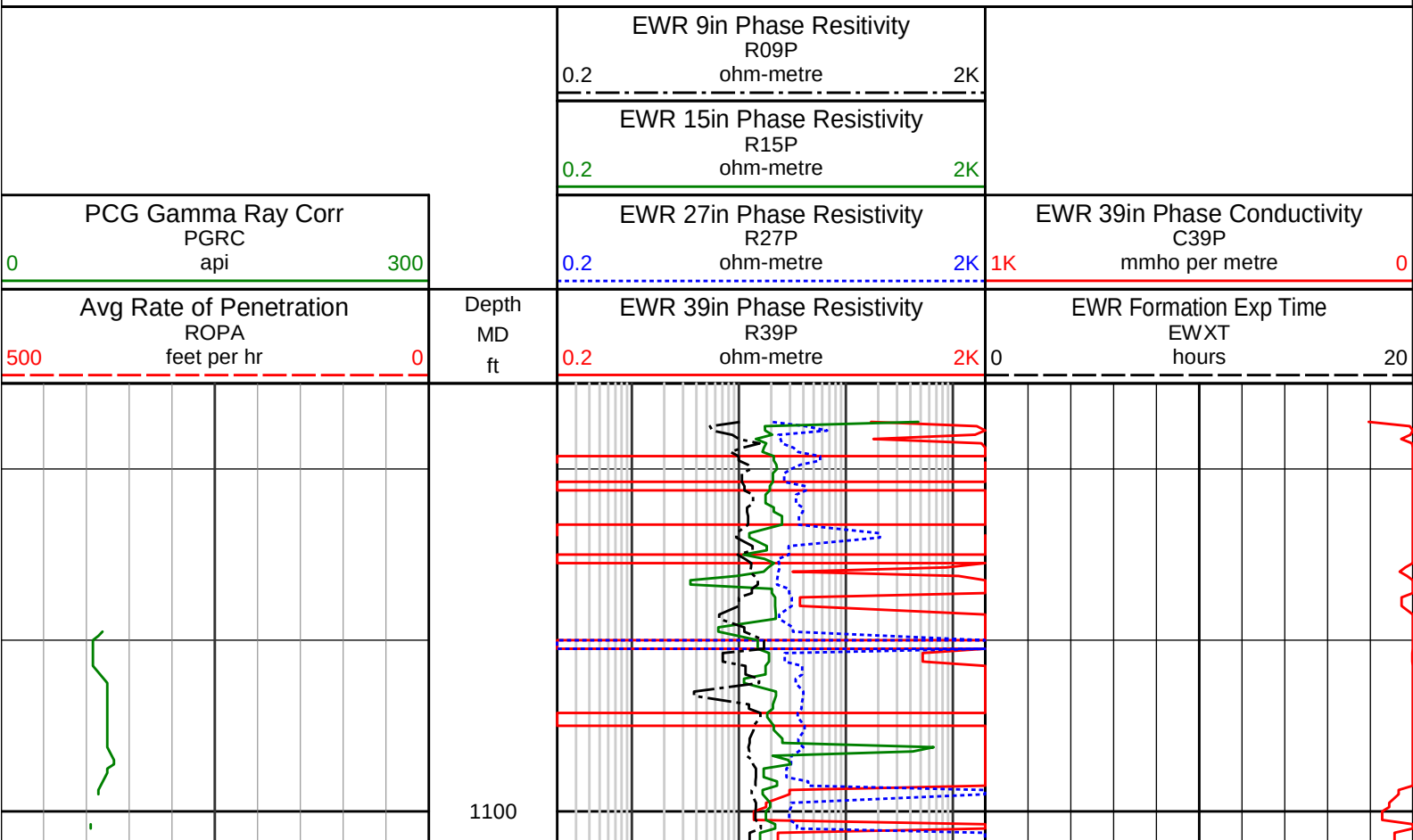
5. The following smoothing parameters have been applied to the data:

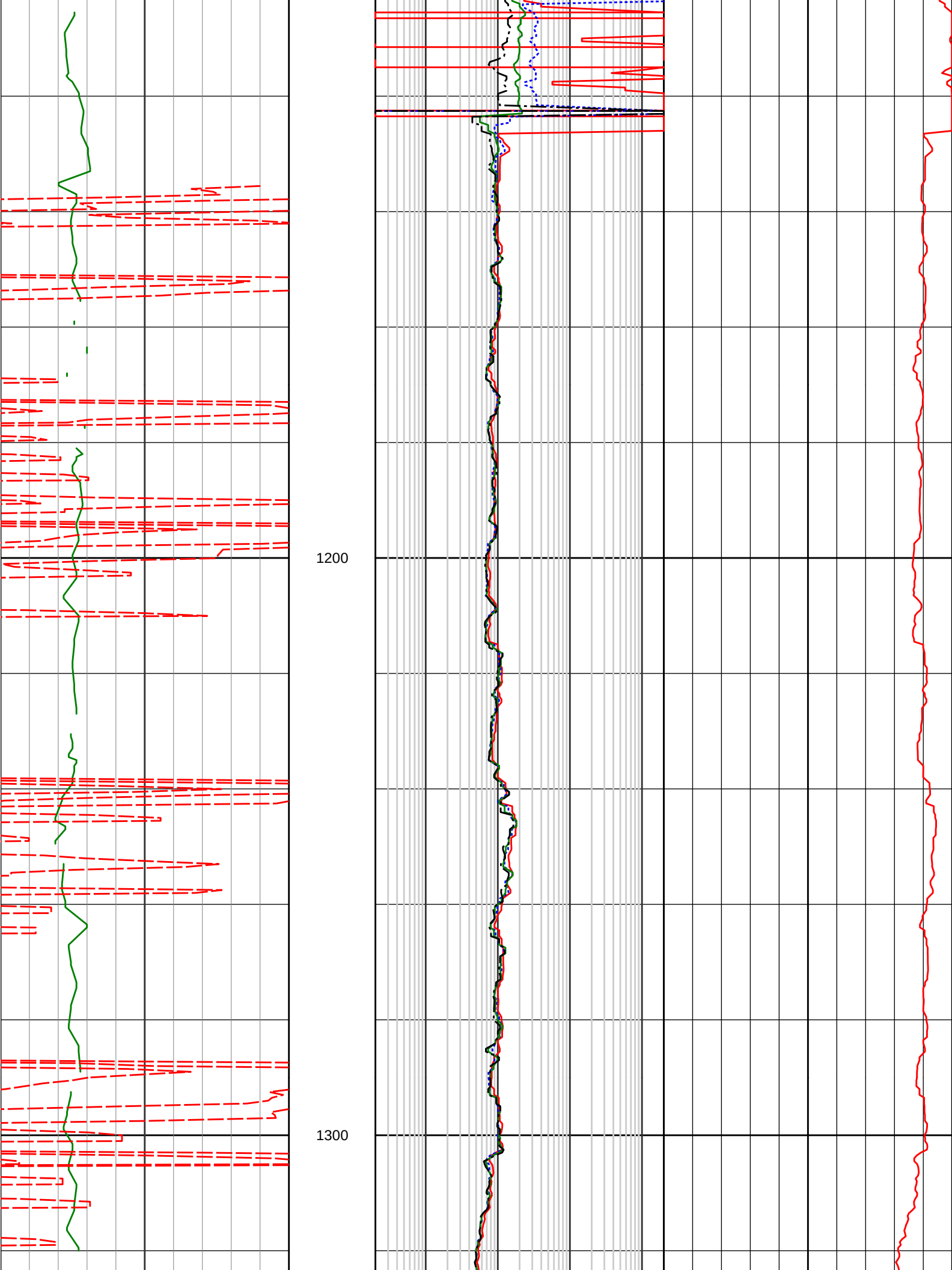
5. The following smoothing parameters have been applied to the data:
   ROPA: 0.5 ft interval, 1.2 ft coercion distance, 3 ft gap fill
   RXXP: 0.5 ft interval, 0.6 ft coercion distance, 3 ft gap fill
   C39P: 0.5 ft interval, 0.6 ft coercion distance, 3 ft gap fill
   EWXT: 0.5 ft interval, 0.6 ft coercion distance, 3 ft gap fill
   PGRC: 0.5 ft interval, 0.6 ft coercion distance, 3 ft gap fill

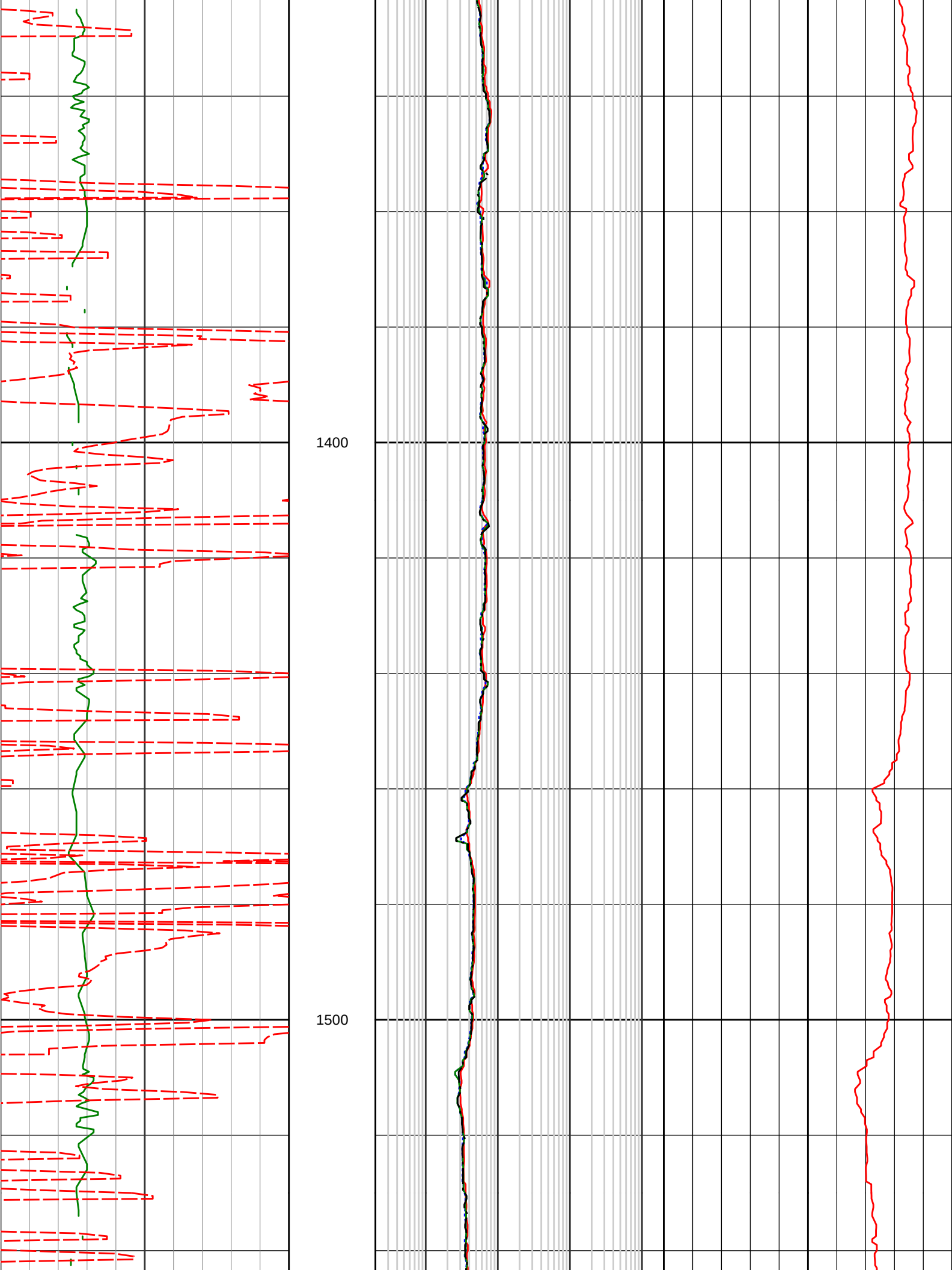
6. Insite Version 8.0.2

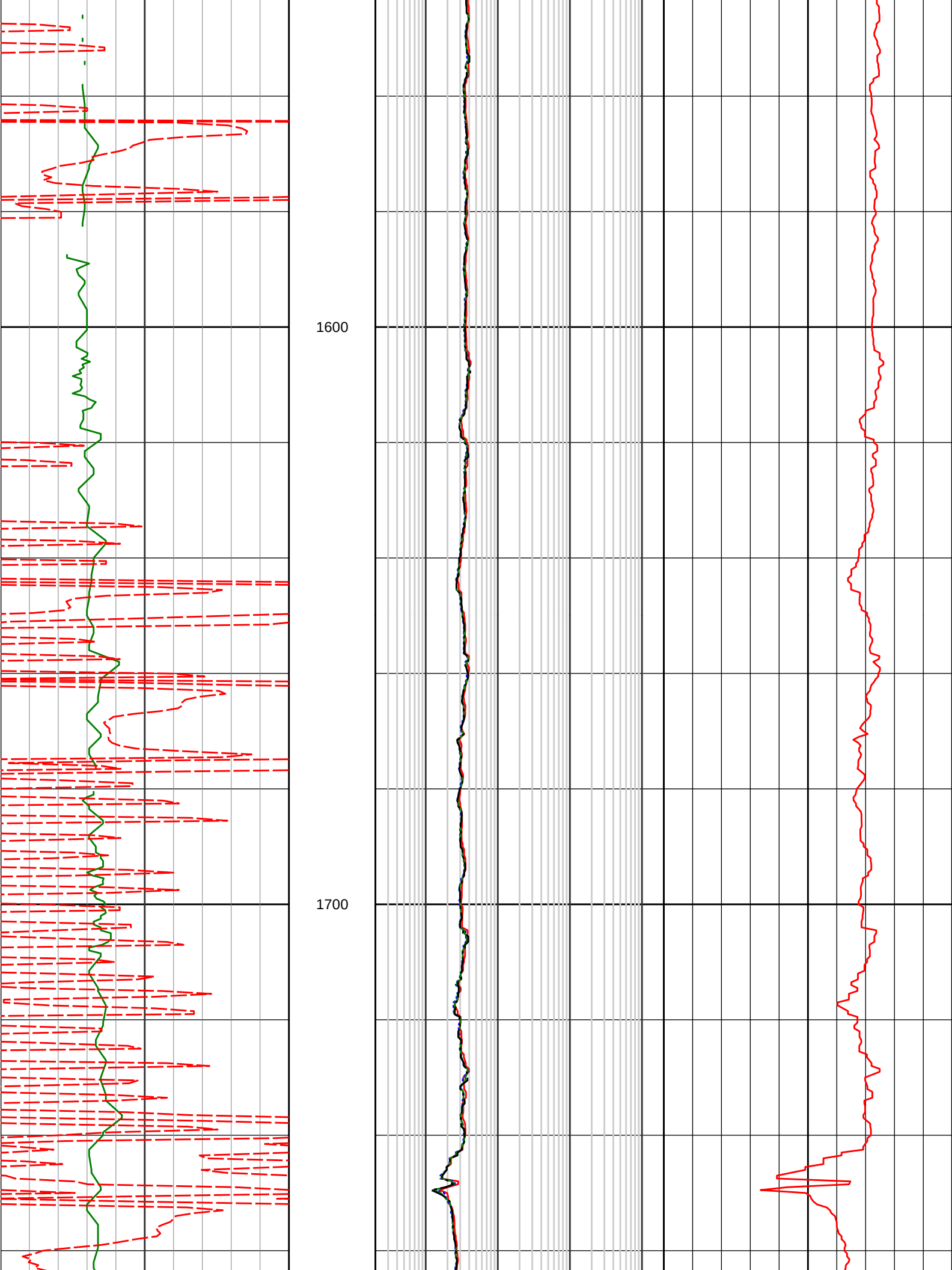
WARRANTY

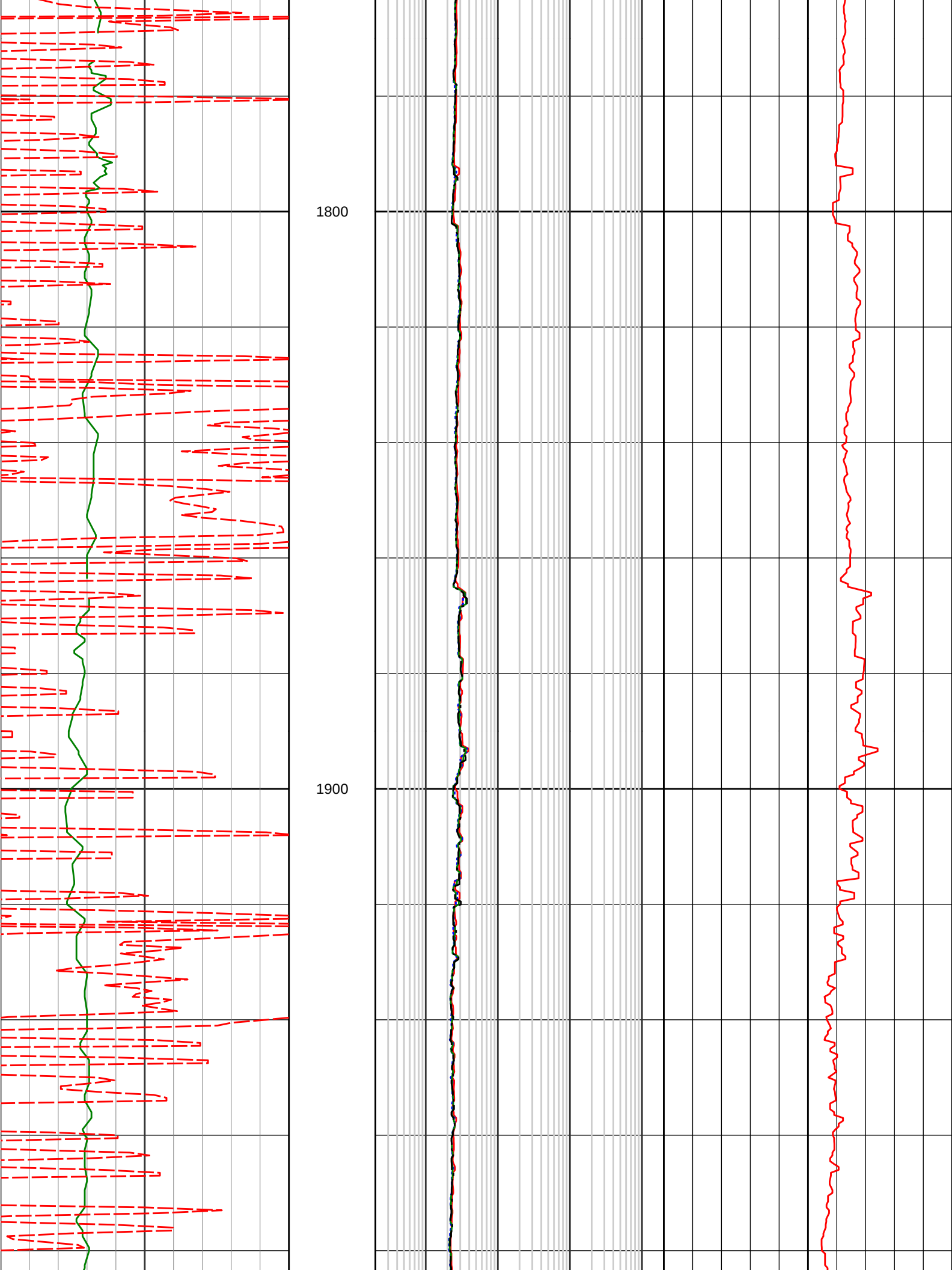
MD Detail 1:240 Scale

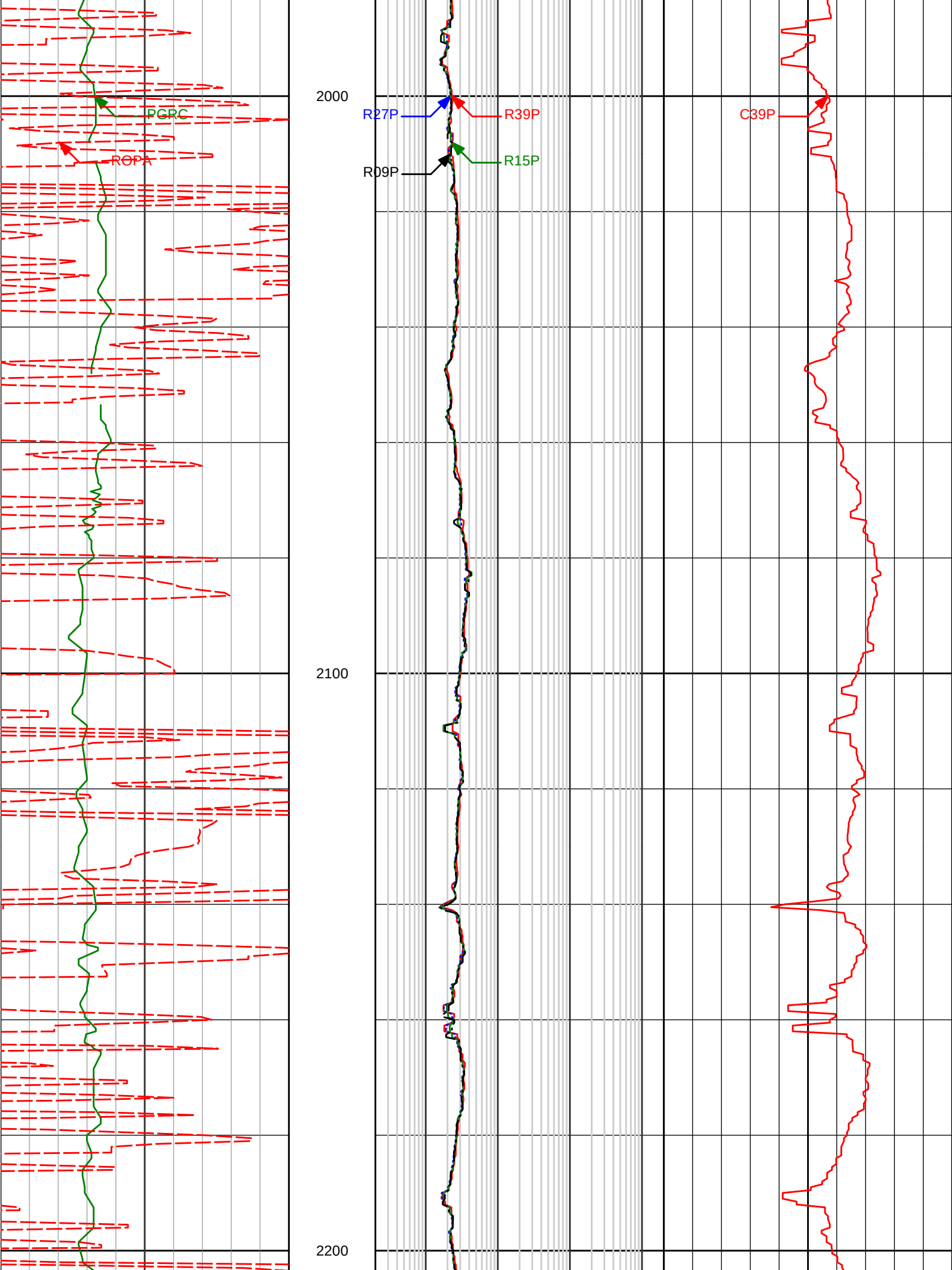


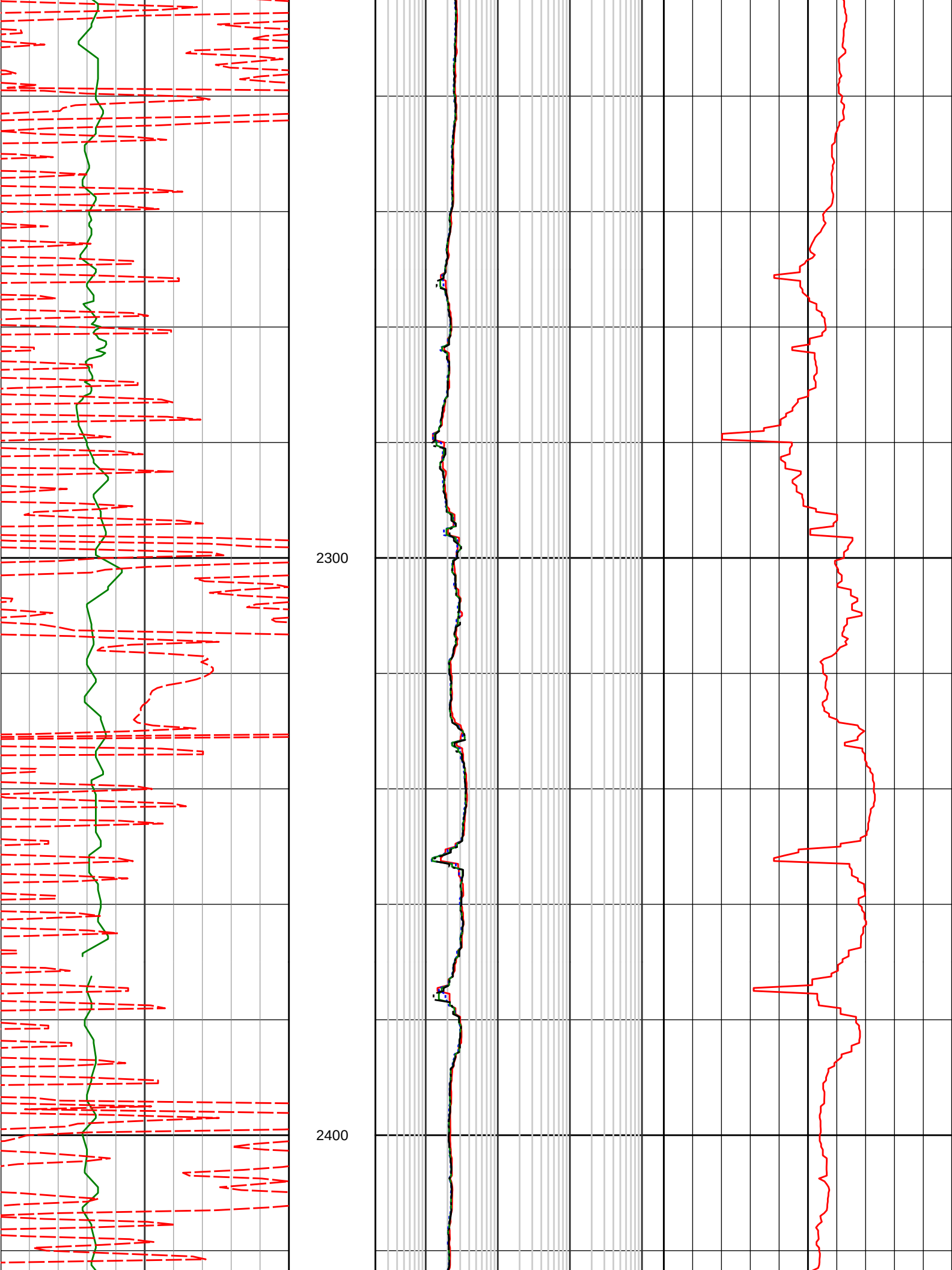

1200
1300

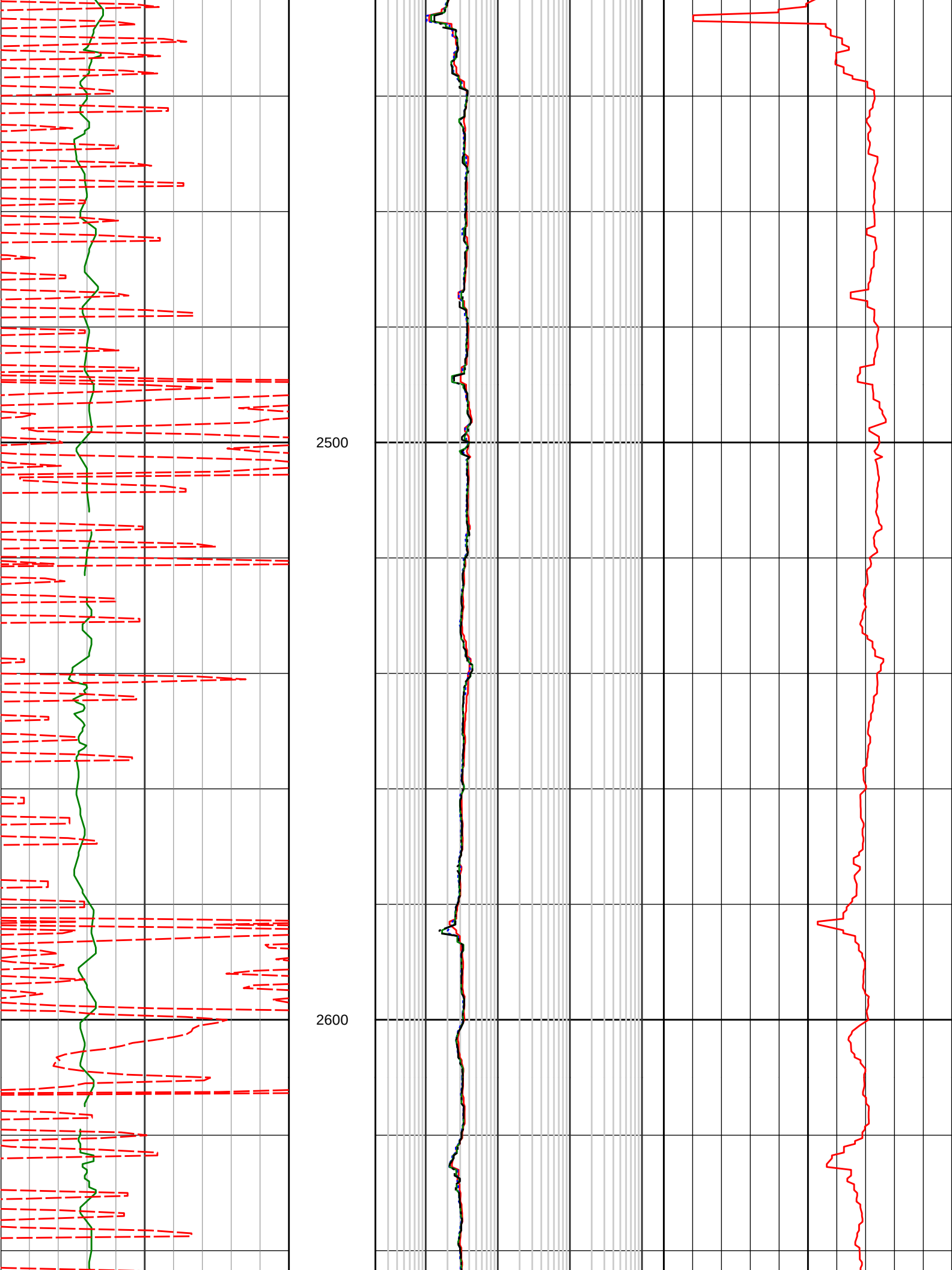

1400
1500

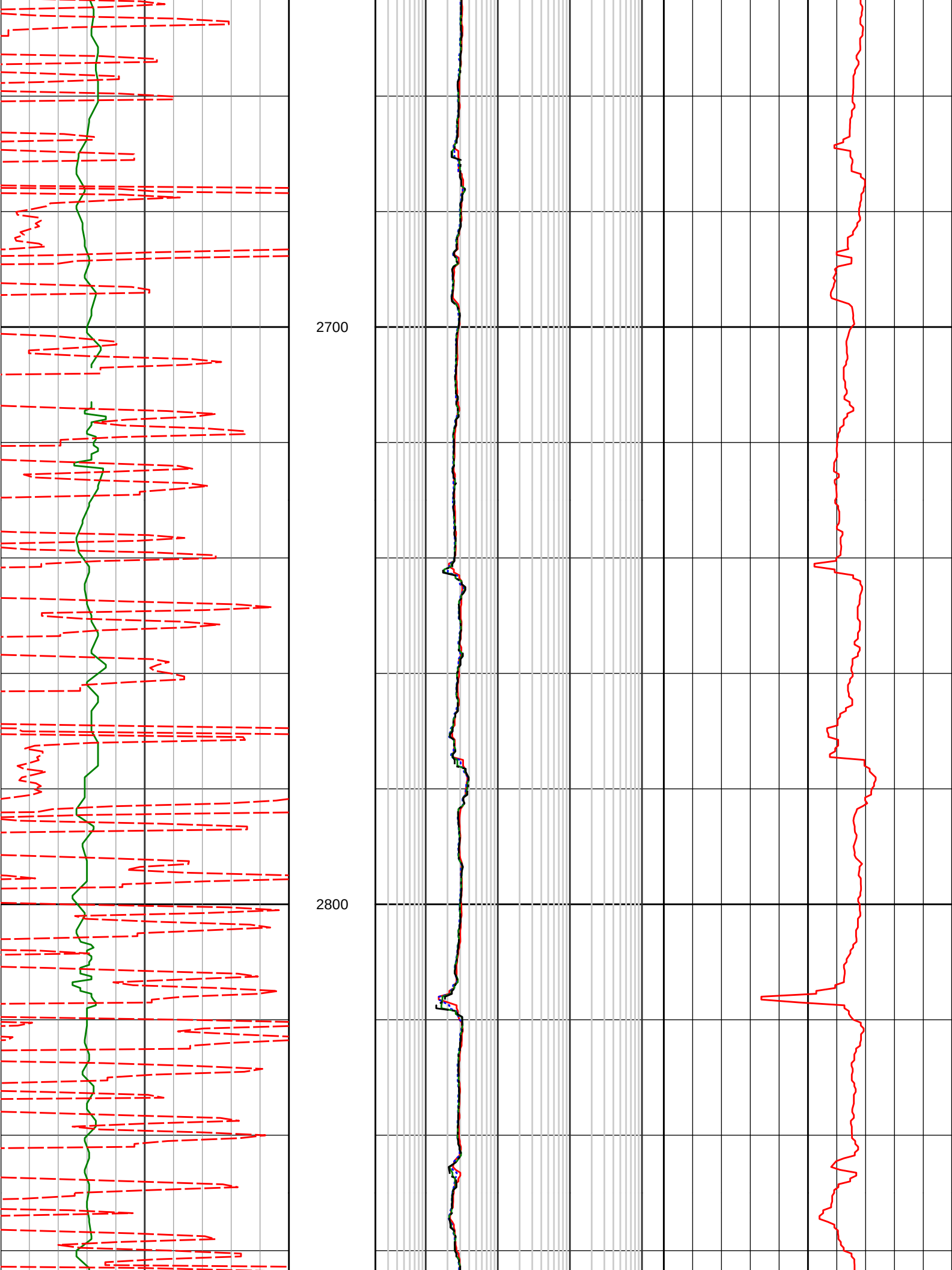

1600
1700

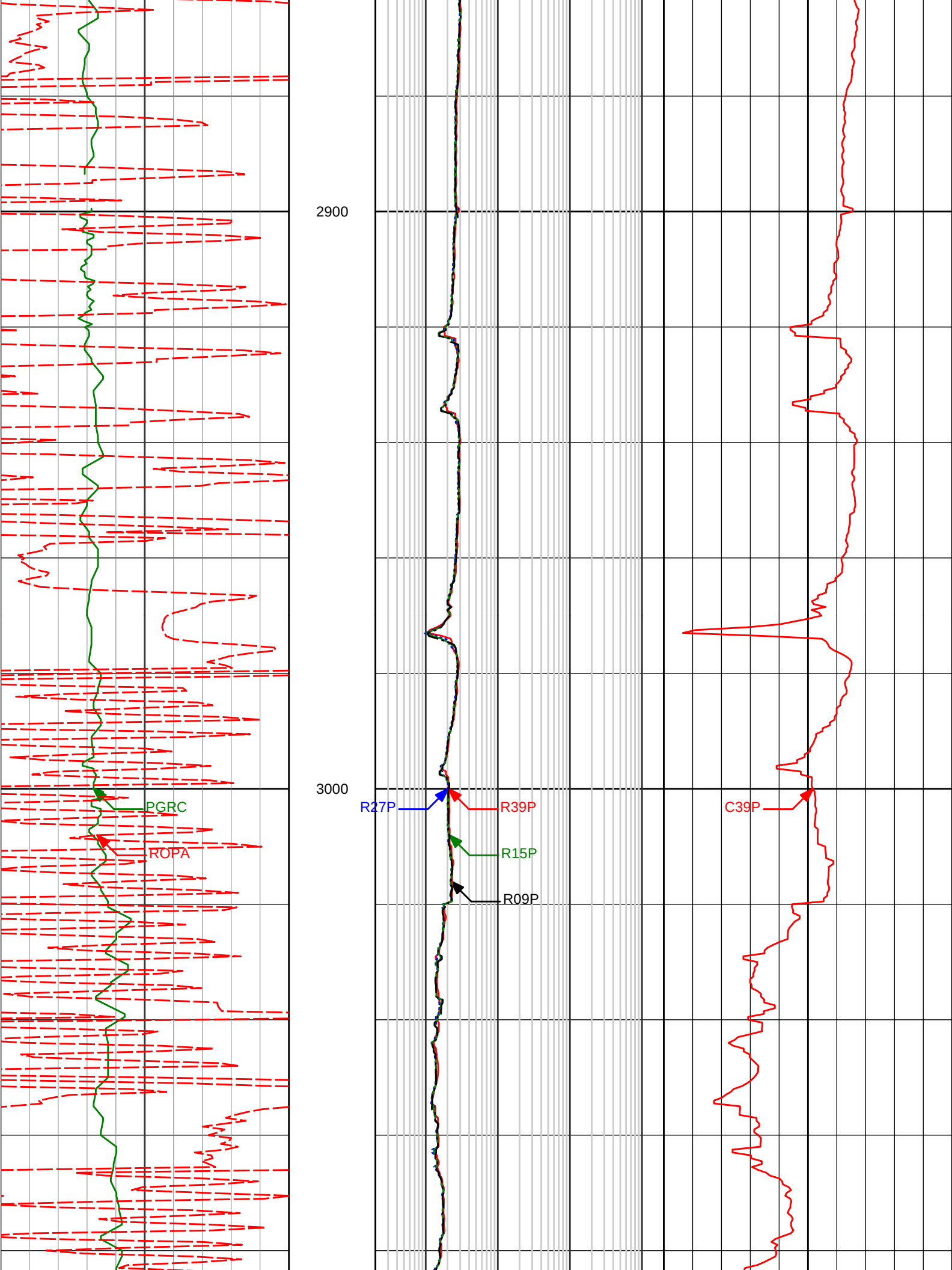

1800
1900

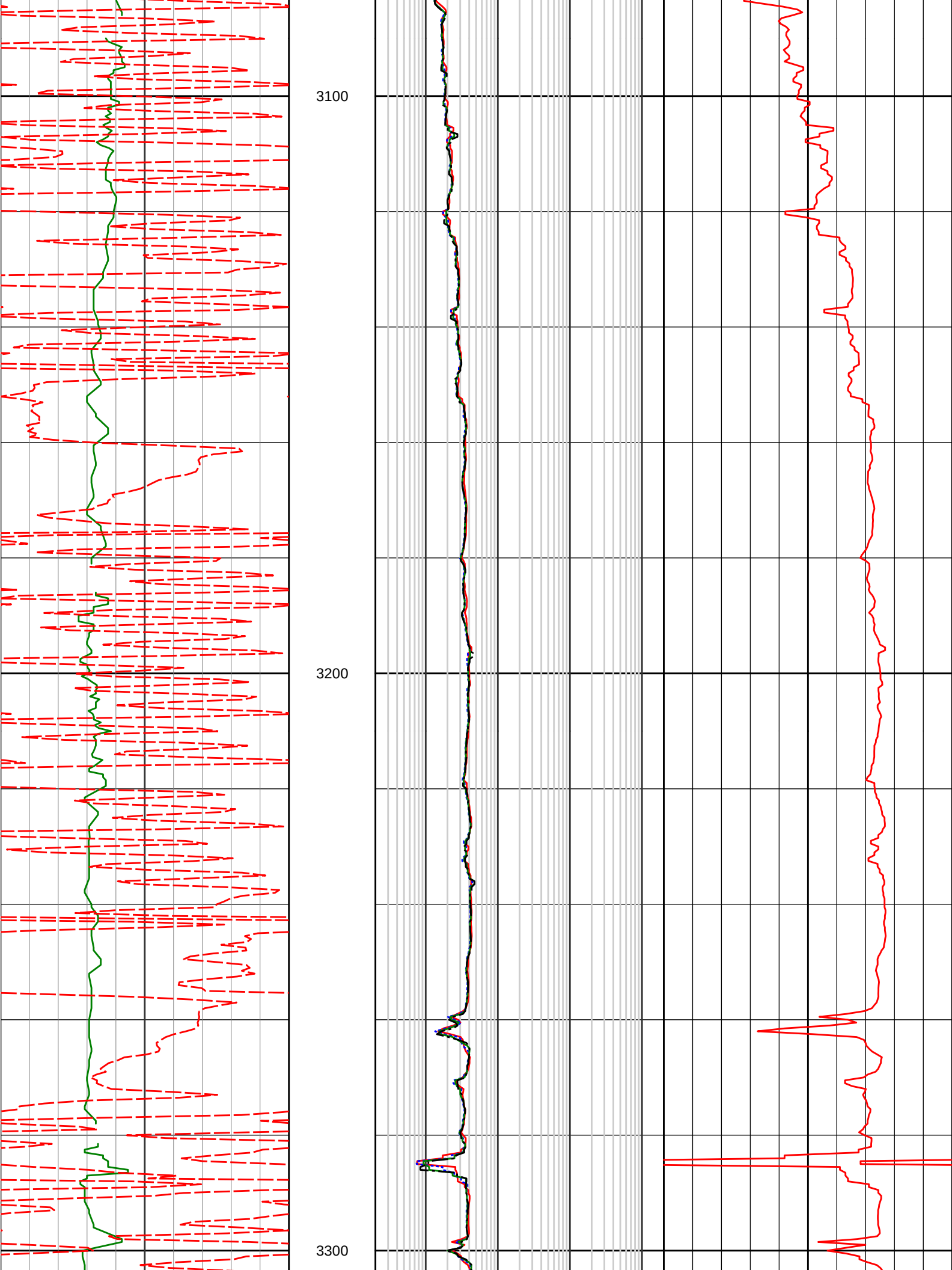

2000
2100
2200
PGRC
ROPA
R27P
R39P
R09P
R15P
C39P

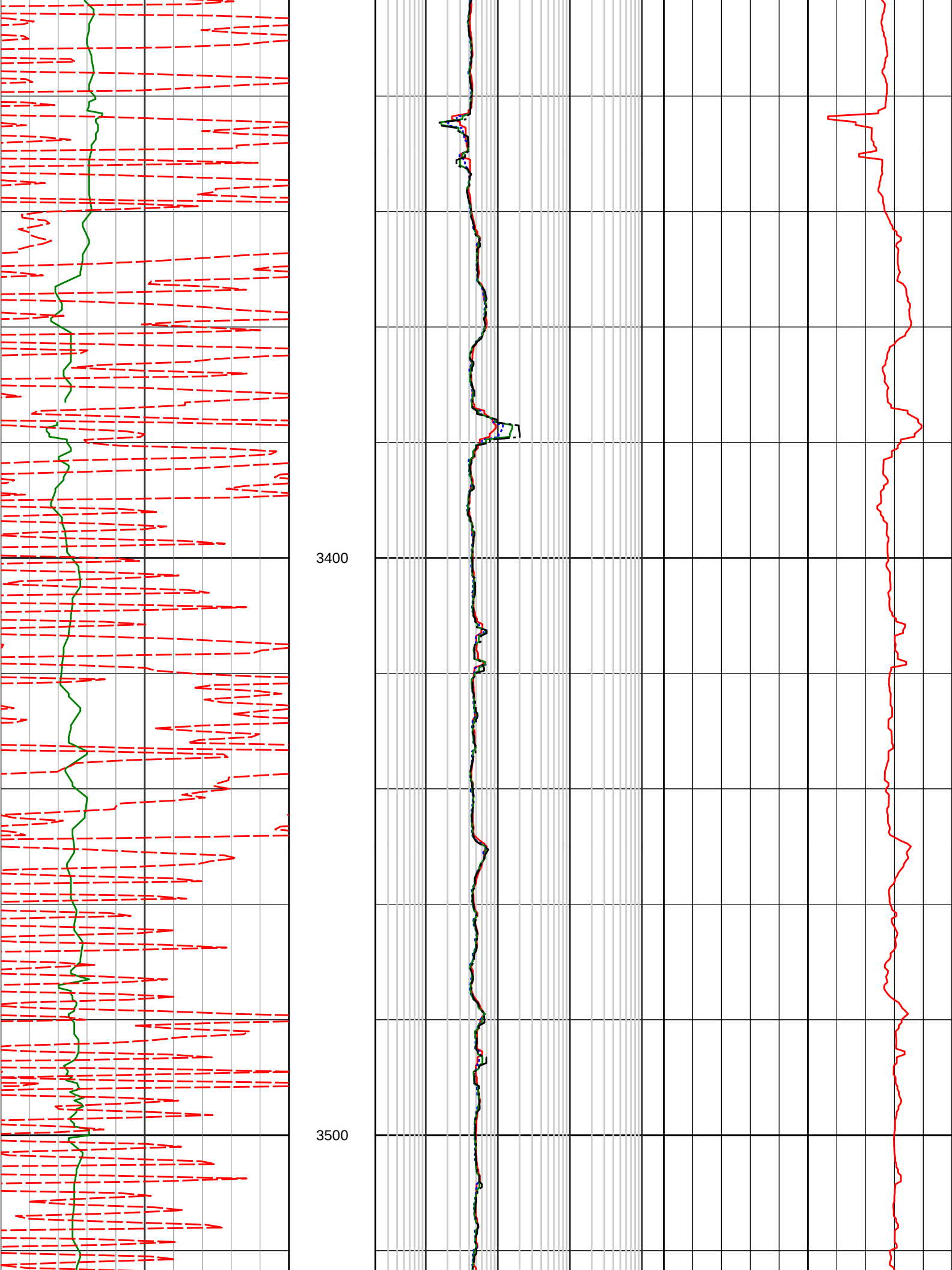

2300
2400

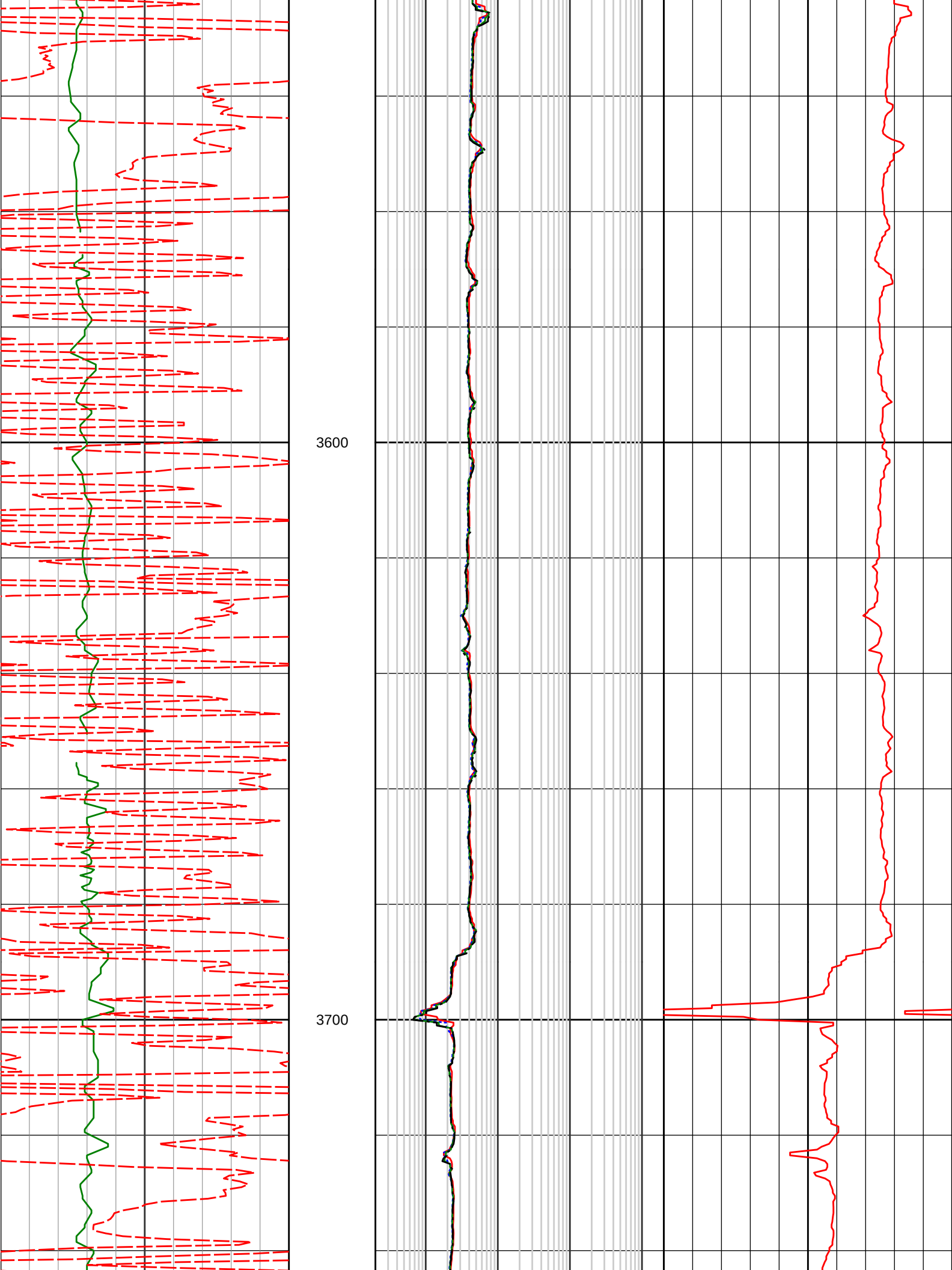

2500
2600

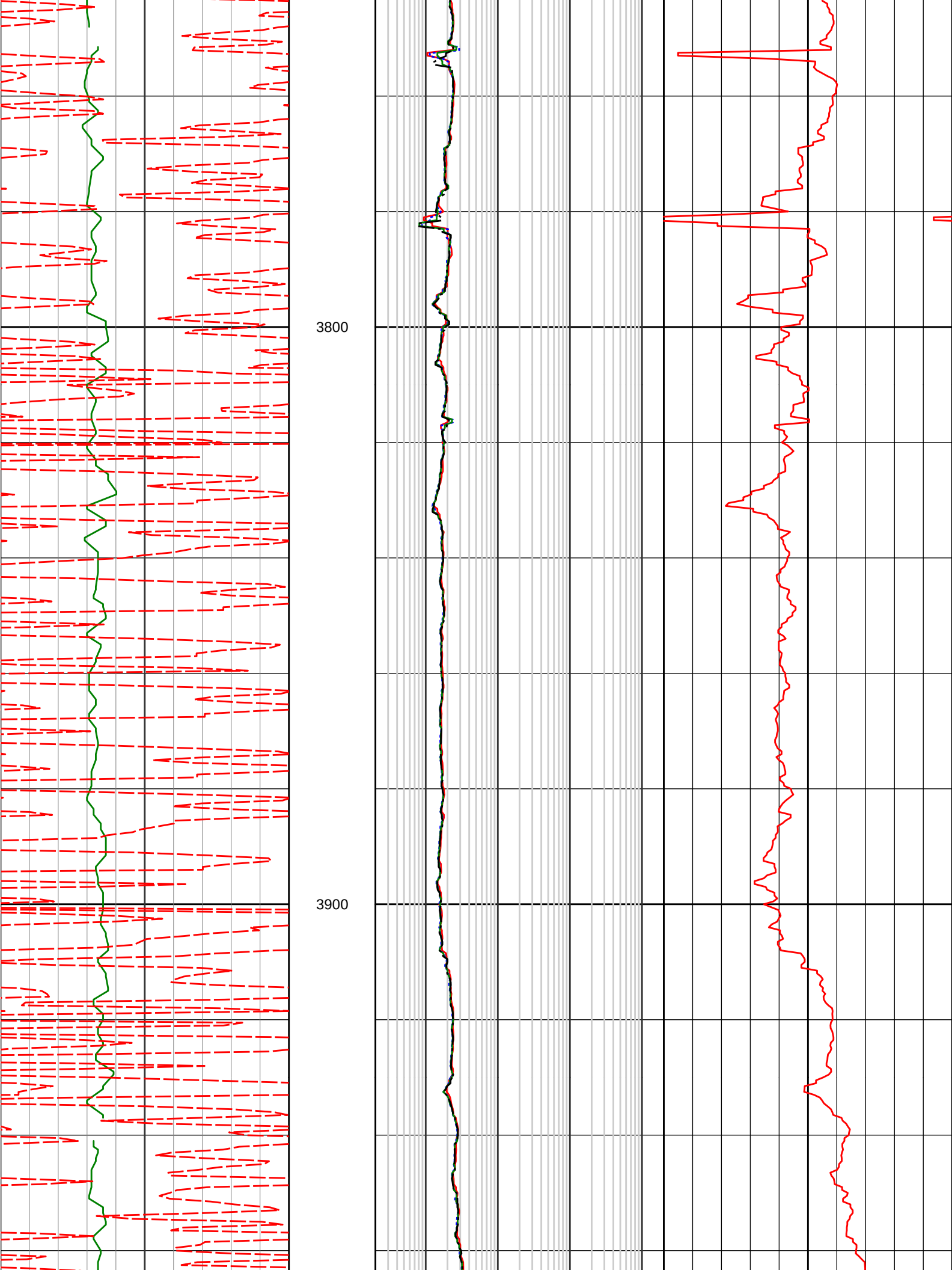

2700
2800

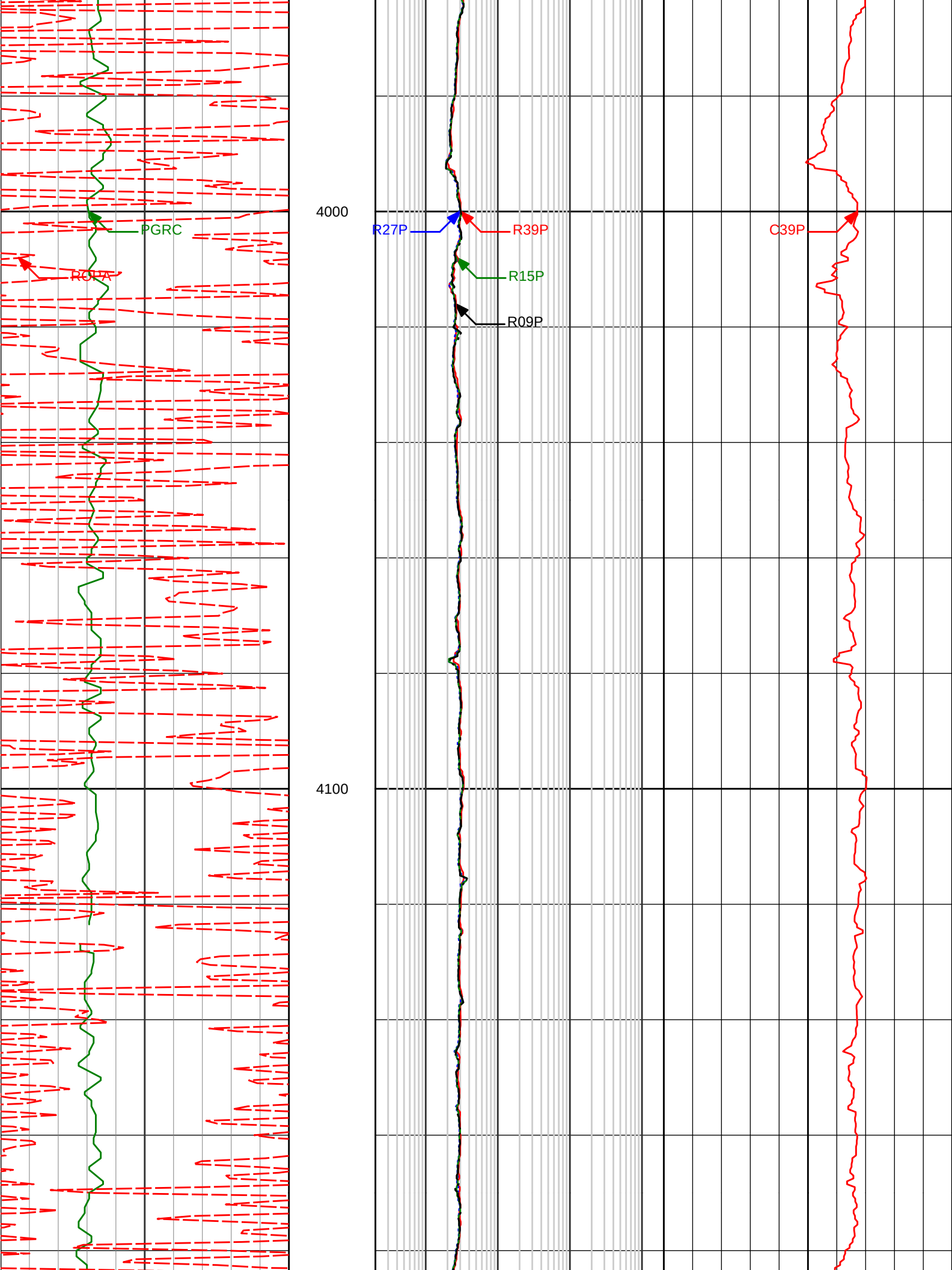

2900
3000
PGRC
ROPA
R27P
R39P
R15P
R09P
C39P

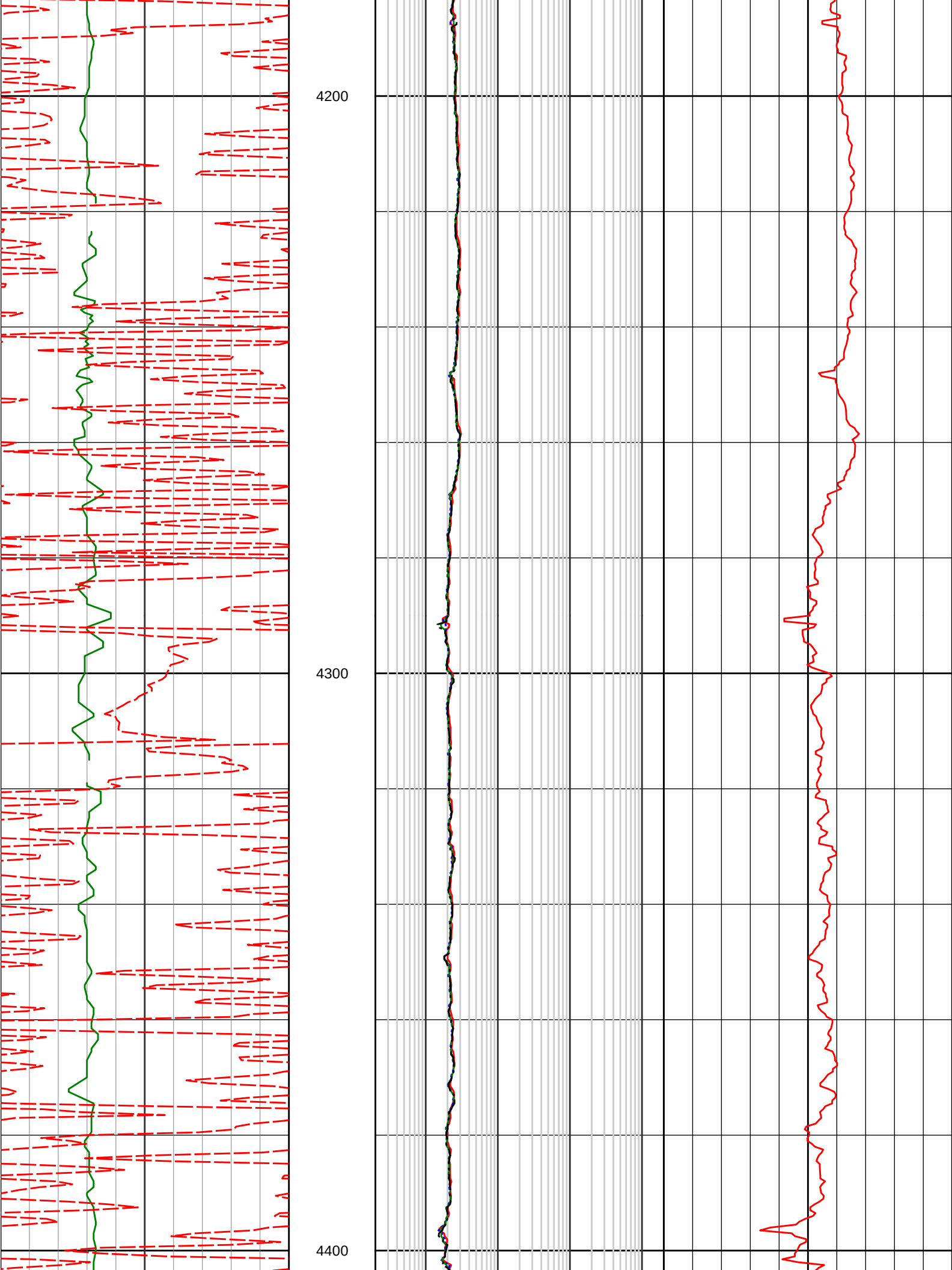

3100
3200
3300

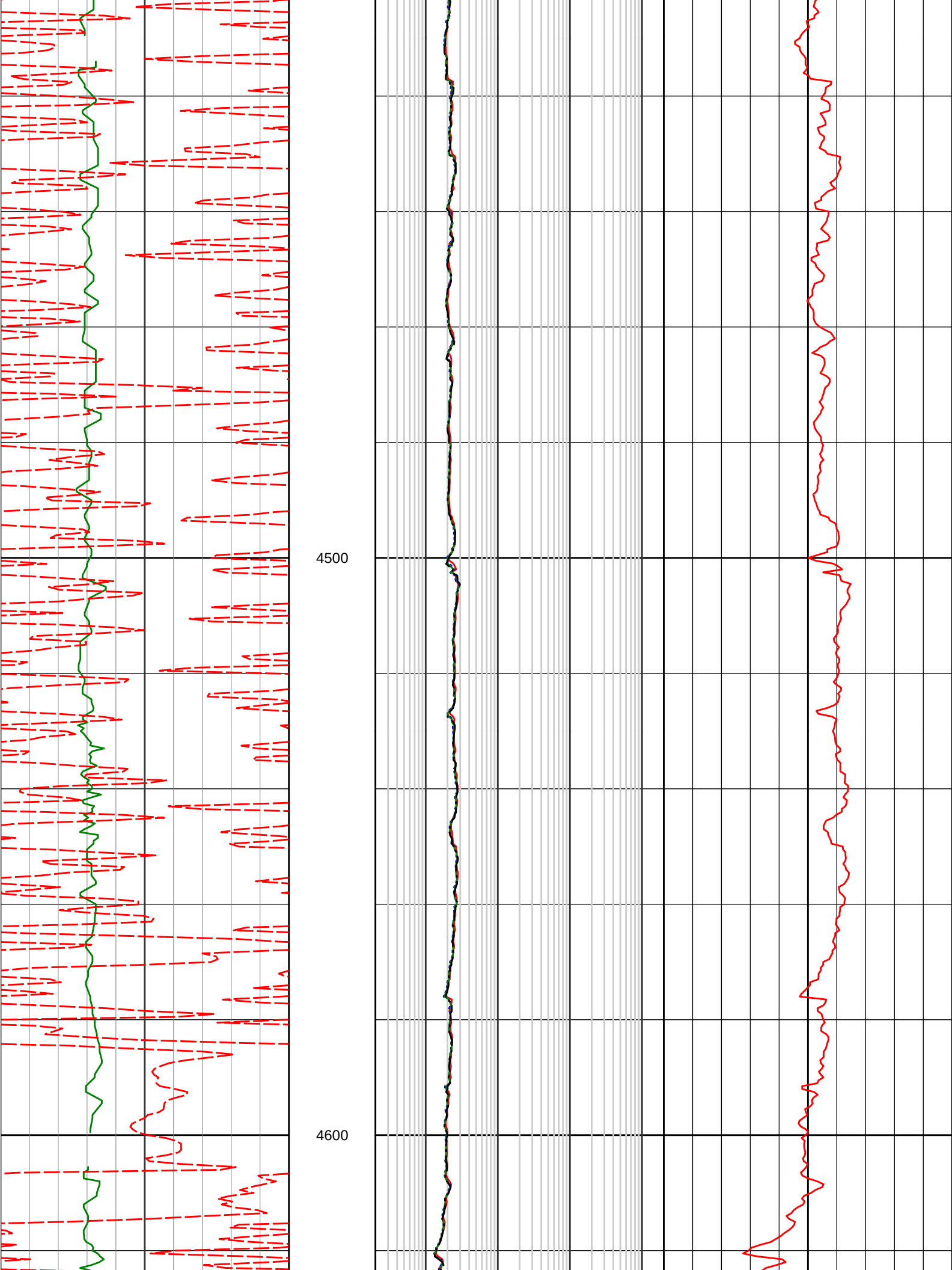

3400
3500

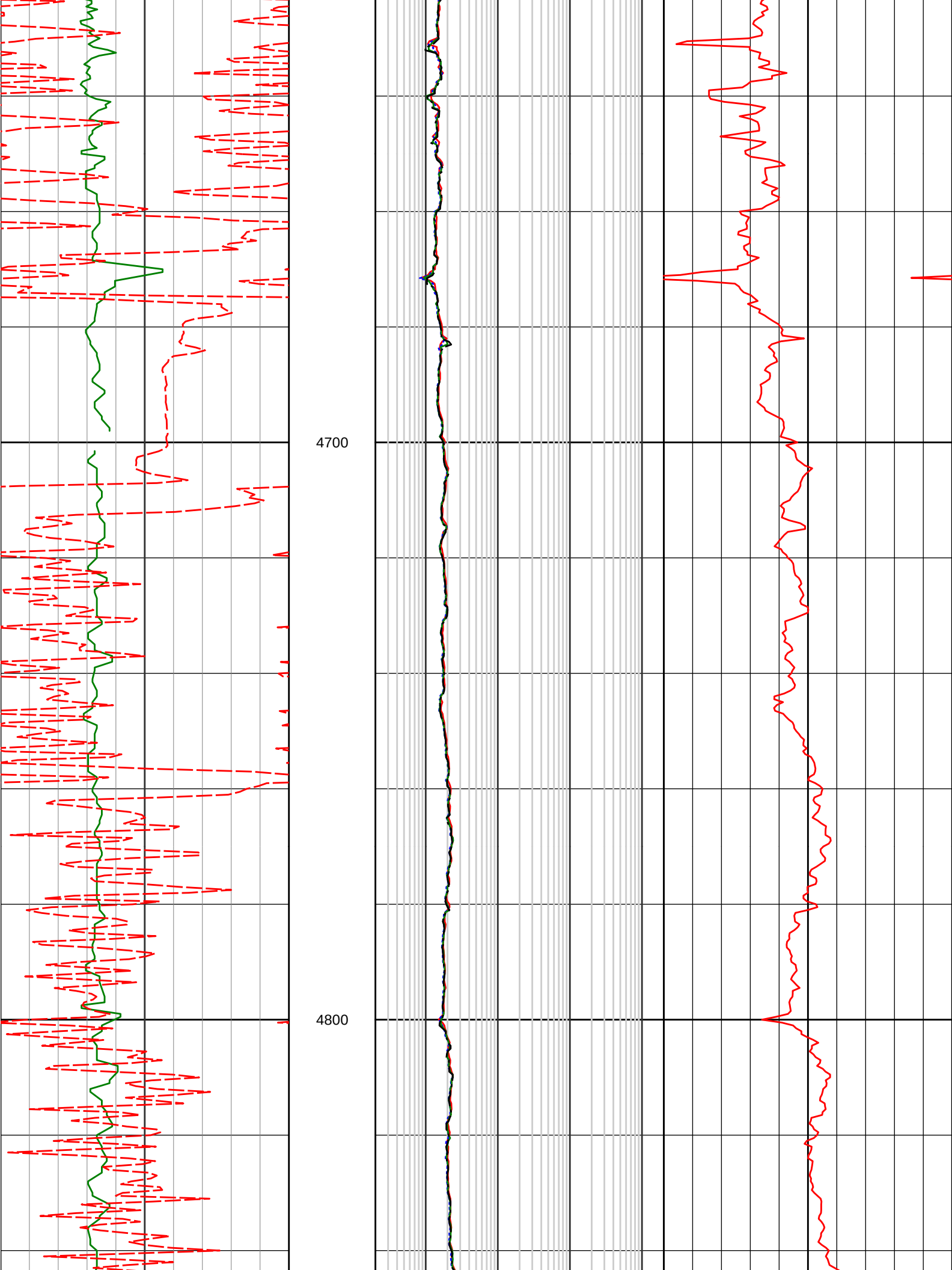

3600
3700

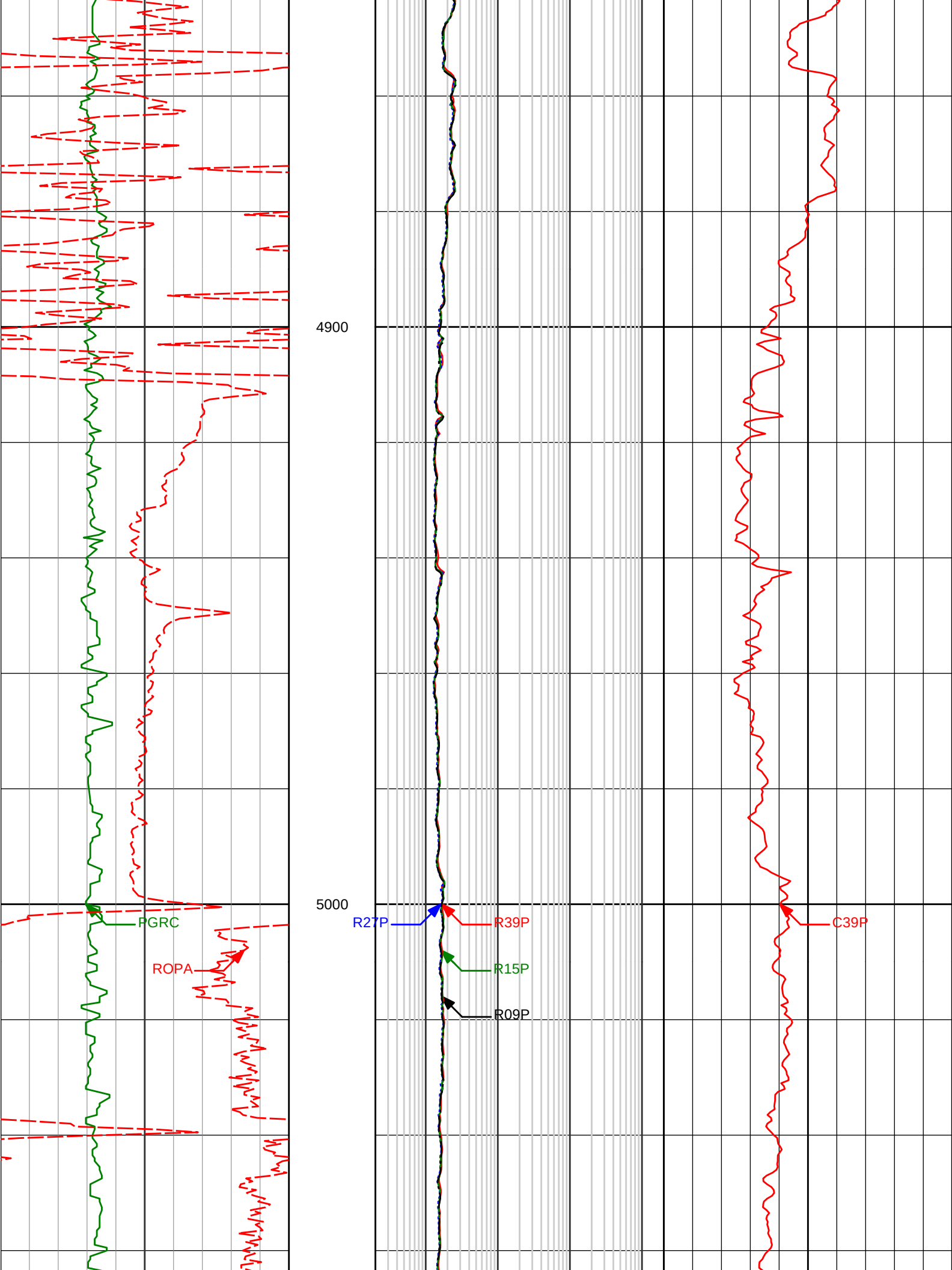

3800
3900

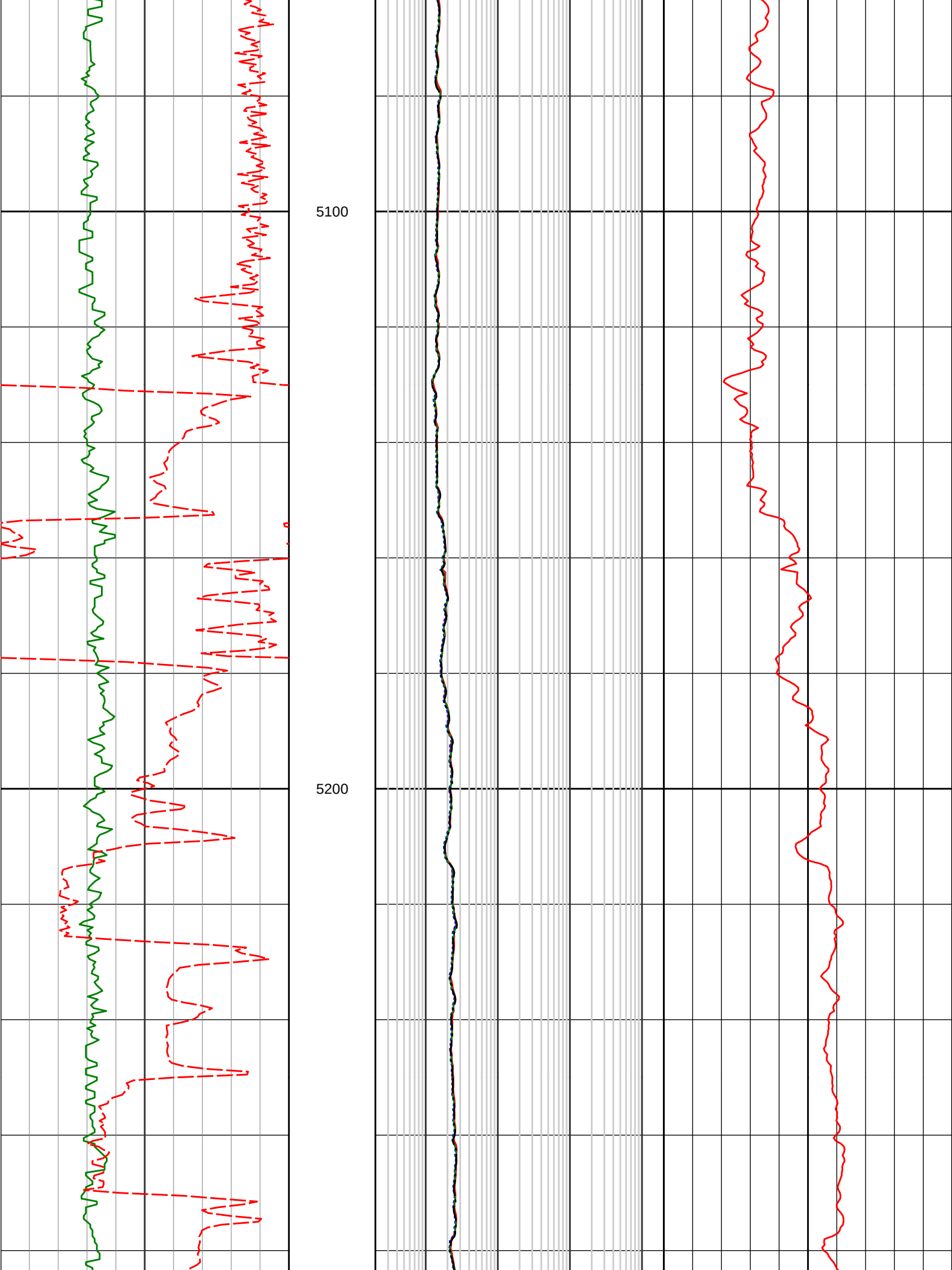

4000
4100
PGRC
R01A
R27P
R39P
R15P
R09P
C39P

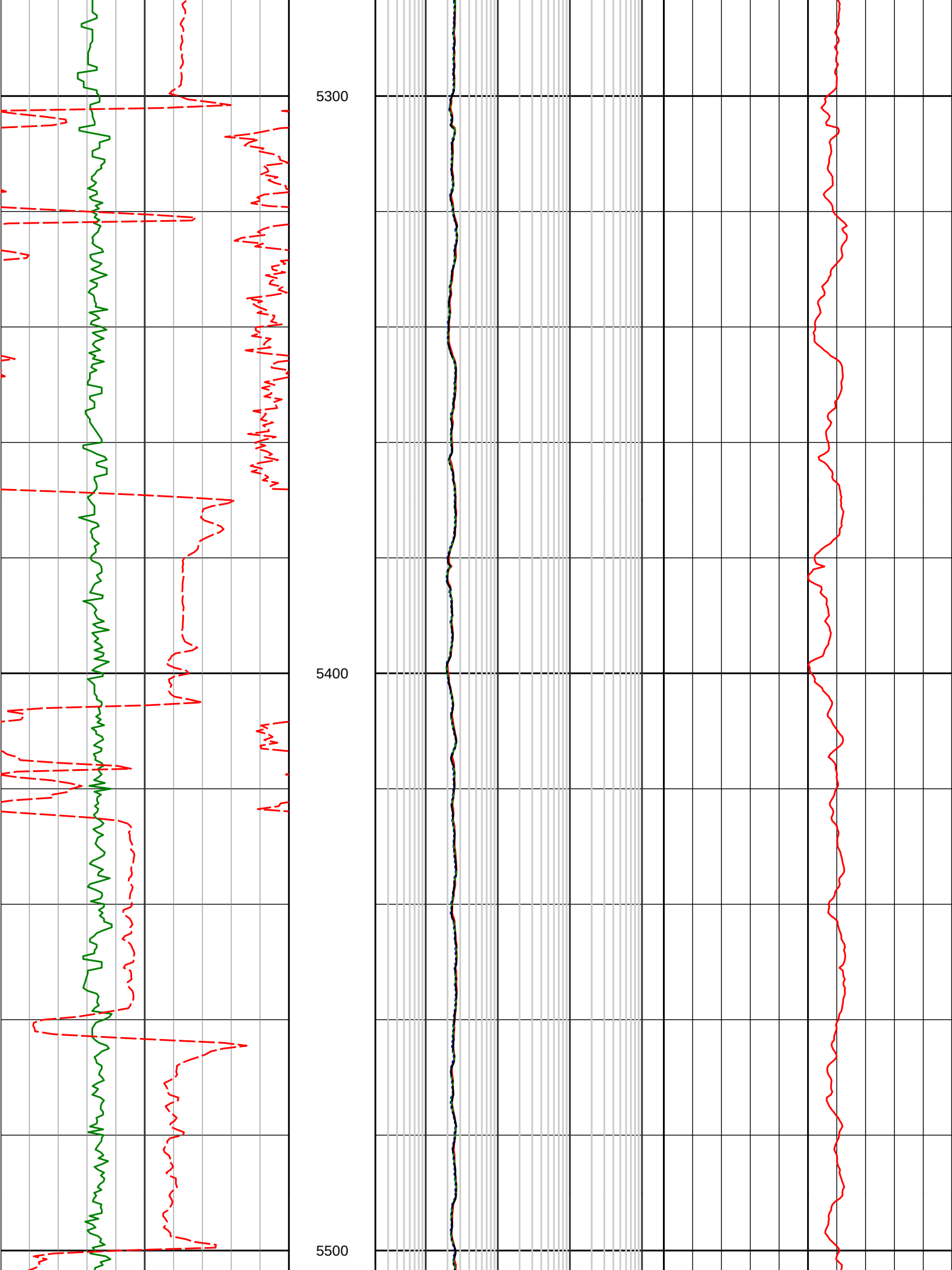

4200
4300
4400

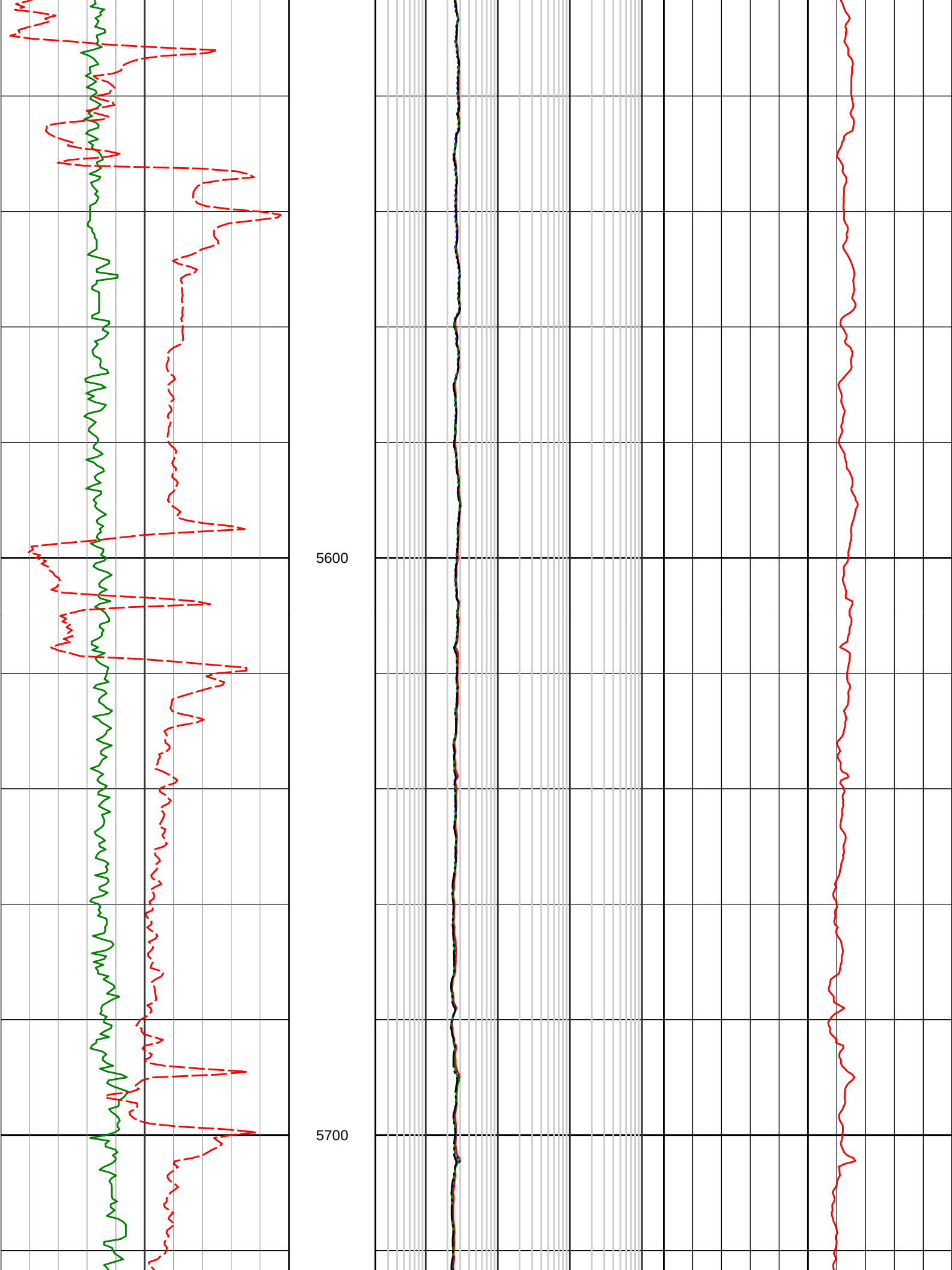

4500
4600

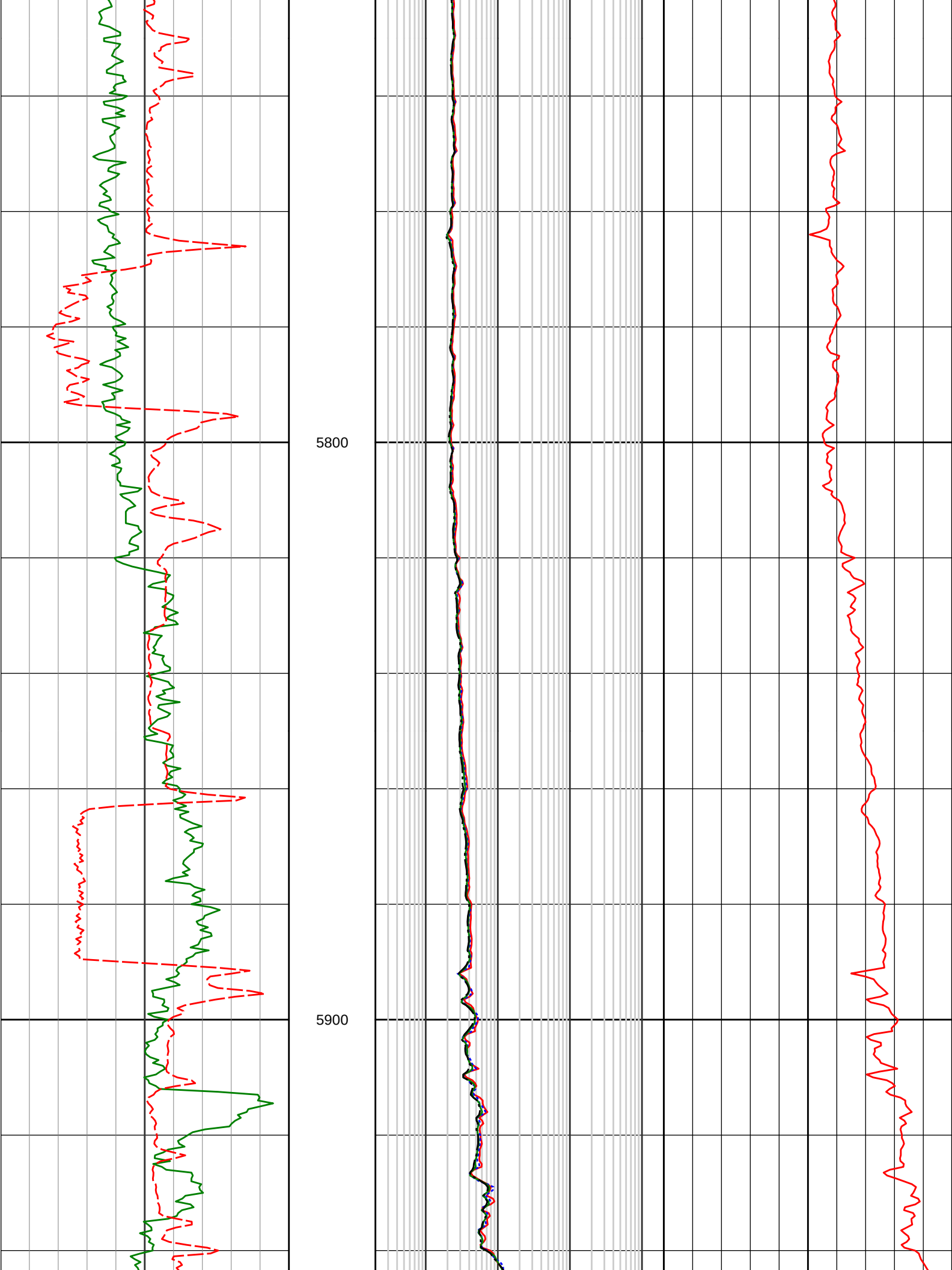

4700
4800

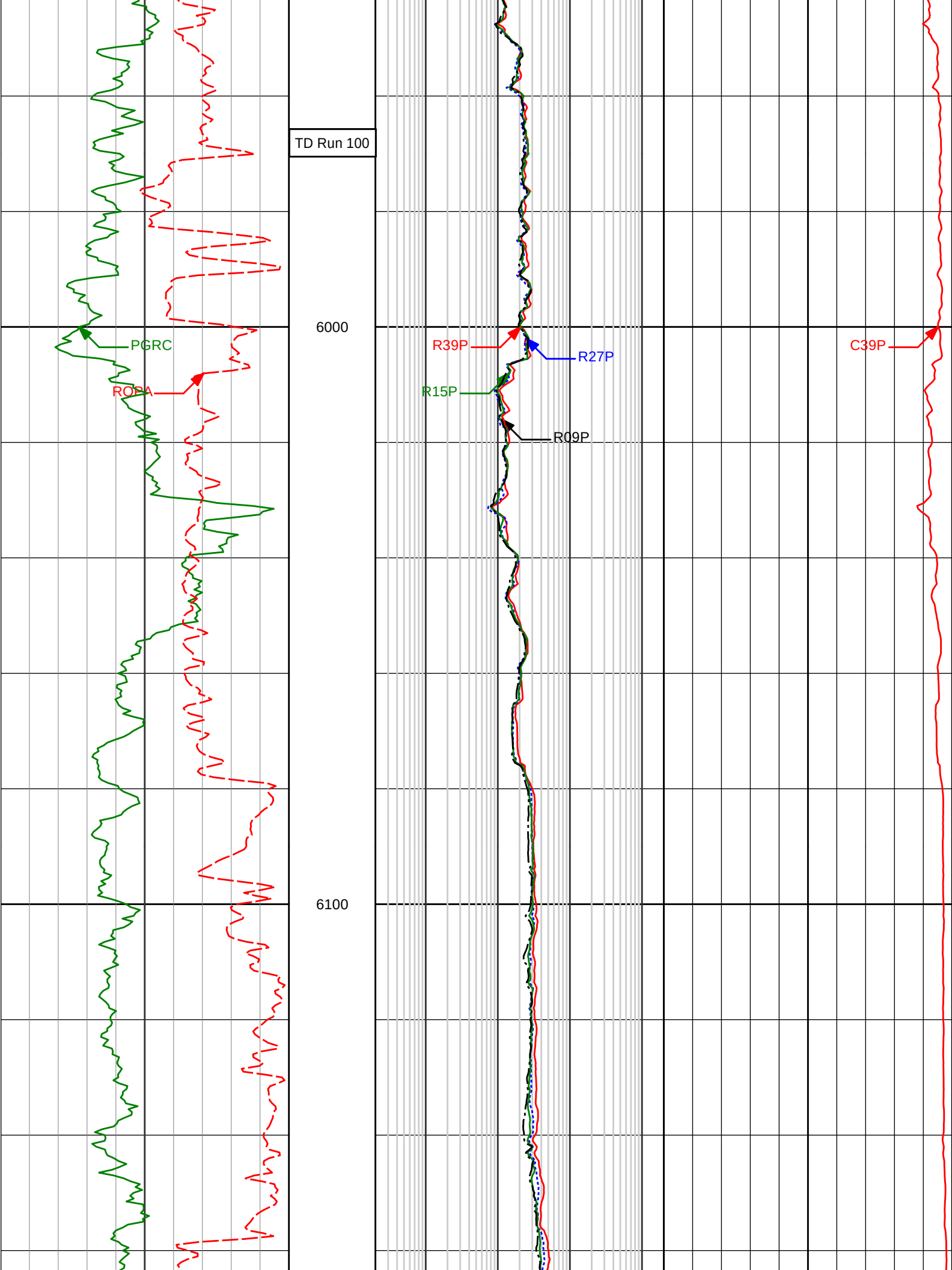

4900
5000
PGRC
ROPA
R27P
R39P
R15P
R09P
C39P

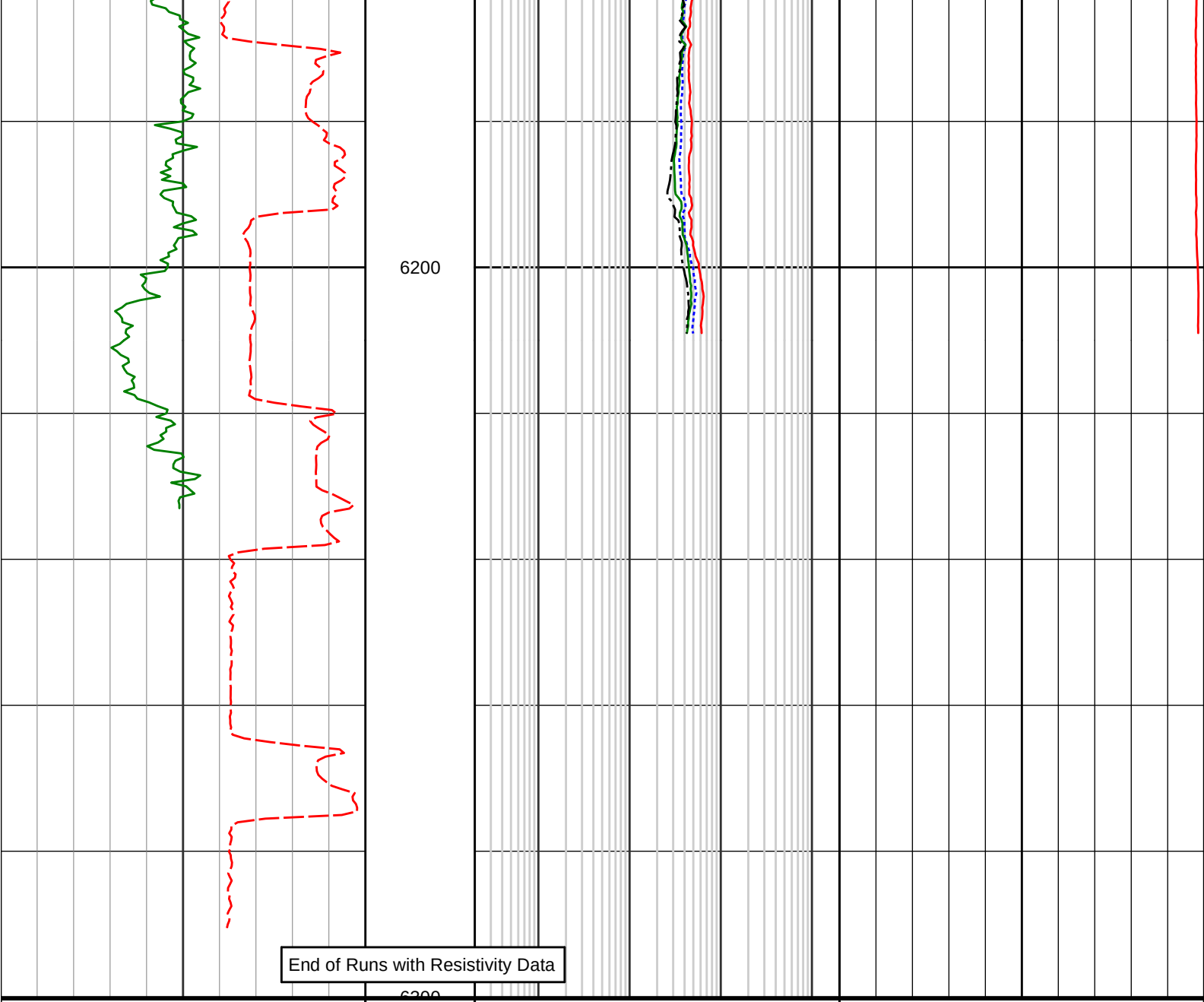

5100
5200


5300
5400
5500


5600
5700


5800
5900


TD Run 100
6000
6100
PGRC
ROPA
R39P
R27P
R15P
R09P
C39P



Avg Rate of Penetration	Depth	EWR 39in Phase Resistivity	EWR Formation Exp Time
ROPA	MD	R39P	EWXT
500 feet per hr 0	ft	0.2 ohm-metre 2K	0 hours 20
PCG Gamma Ray Corr		**EWR 27in Phase Resistivity**	**EWR 39in Phase Conductivity**
PGRC		R27P	C39P
0 api 300		0.2 ohm-metre 2K	1K mmho per metre 0
		EWR 15in Phase Resistivity	
		R15P	
		0.2 ohm-metre 2K	
		EWR 9in Phase Resitivity	
		R09P	
		0.2 ohm-metre 2K	

HALLIBURTON

DIRECTIONAL SURVEY REPORT

Noble Energy Inc.
Greyson LD28-753
Wattenburg
Weld Colorado
USA

CA-XX-0902594951

Measured Depth (feet)	Inclination (degrees)	Direction (degrees)	Vertical Depth (feet)	Latitude (feet)	Departure (feet)	Vertical Section (feet)	Dogleg (deg/100ft)
0.00	0.00	0.00	0.00	0.00 N	0.00 E	0.00	TIE-IN
39.00	0.20	282.17	39.00	0.01 N	0.07 W	0.01	0.52
102.00	0.29	252.81	102.00	0.01 S	0.33 W	-0.05	0.24
193.00	0.51	331.37	193.00	0.28 N	0.74 W	0.18	0.59
284.00	0.50	327.41	283.99	0.98 N	1.15 W	0.81	0.04
375.00	0.58	348.27	374.99	1.77 N	1.46 W	1.55	0.23
466.00	0.21	313.08	465.99	2.33 N	1.68 W	2.08	0.46
557.00	0.20	243.13	556.99	2.38 N	1.94 W	2.09	0.26
648.00	0.51	209.64	647.99	1.95 N	2.28 W	1.62	0.40
739.00	0.16	209.98	738.98	1.49 N	2.55 W	1.12	0.38
830.00	0.44	171.79	829.98	1.03 N	2.56 W	0.67	0.36
921.00	0.44	181.38	920.98	0.34 N	2.52 W	-0.01	0.08
1012.00	0.51	172.90	1011.98	0.41 S	2.48 W	-0.75	0.11
1103.00	0.53	184.59	1102.97	1.23 S	2.46 W	-1.55	0.12
1121.00	0.45	175.48	1120.97	1.38 S	2.47 W	-1.71	0.60
1223.00	0.14	185.86	1222.97	1.91 S	2.45 W	-2.22	0.31
1315.00	0.34	165.61	1314.97	2.28 S	2.39 W	-2.59	0.24
1407.00	2.09	170.57	1406.95	4.20 S	2.05 W	-4.45	1.90
1500.00	4.42	159.39	1499.79	9.24 S	0.50 W	-9.22	2.59
1592.00	6.19	151.06	1591.39	16.90 S	3.14 E	-16.31	2.08
1686.00	7.39	142.99	1684.73	26.16 S	9.23 E	-24.64	1.63
1778.00	9.55	144.99	1775.73	37.13 S	17.18 E	-34.43	2.36
1871.00	10.13	145.62	1867.36	50.20 S	26.22 E	-46.13	0.63
1964.00	9.86	144.95	1958.95	63.46 S	35.40 E	-58.01	0.32
2055.00	9.05	143.99	2048.71	75.63 S	44.09 E	-68.87	0.90
2147.00	9.62	150.85	2139.50	88.20 S	52.09 E	-80.22	1.36
2239.00	9.13	152.52	2230.27	101.39 S	59.20 E	-92.32	0.61
2331.00	10.26	151.21	2320.95	115.05 S	66.52 E	-104.84	1.25
2424.00	10.45	147.51	2412.44	129.42 S	75.03 E	-117.91	0.75
2517.00	10.74	146.54	2503.85	143.76 S	84.34 E	-130.84	0.37
2610.00	9.82	147.09	2595.36	157.65 S	93.43 E	-143.35	0.99
2703.00	9.68	148.60	2687.01	170.99 S	101.81 E	-155.41	0.31
2797.00	9.43	148.42	2779.71	184.29 S	109.97 E	-167.48	0.28
2889.00	9.20	146.54	2870.50	196.85 S	117.97 E	-178.81	0.42
2984.00	9.50	156.00	2964.24	210.34 S	125.34 E	-191.17	1.65
3079.00	8.03	153.68	3058.13	223.45 S	131.47 E	-203.32	1.58
3174.00	8.91	151.60	3152.09	235.87 S	137.91 E	-214.74	0.97
3268.00	11.01	151.73	3244.67	250.18 S	145.63 E	-227.85	2.23
3363.00	10.73	149.16	3337.97	265.75 S	154.45 E	-242.07	0.59
3457.00	11.29	150.10	3430.24	281.24 S	163.53 E	-256.17	0.63
3552.00	10.80	150.05	3523.48	297.01 S	172.61 E	-270.55	0.51
3647.00	11.02	148.66	3616.76	312.48 S	181.77 E	-284.61	0.36
3742.00	10.55	158.78	3710.09	328.34 S	189.64 E	-299.24	2.05
3836.00	10.44	158.08	3802.52	344.27 S	195.94 E	-314.15	0.18
3930.00	9.89	155.94	3895.04	359.54 S	202.41 E	-328.40	0.71
4025.00	9.43	154.47	3988.69	374.02 S	209.09 E	-341.82	0.55
4119.00	8.91	153.69	4081.49	387.50 S	215.64 E	-354.28	0.57
4214.00	8.40	155.97	4175.41	400.44 S	221.73 E	-366.26	0.64
4309.00	9.76	153.85	4269.22	414.01 S	228.10 E	-378.83	1.47
4403.00	9.37	154.07	4361.91	428.04 S	234.96 E	-391.79	0.42
4498.00	8.15	158.03	4455.80	441.24 S	240.86 E	-404.05	1.43
4592.00	7.30	166.03	4548.95	453.22 S	244.80 E	-415.38	1.45
4687.00	9.08	153.80	4642.98	465.81 S	249.56 E	-427.19	2.61
4782.00	9.13	150.07	4736.79	479.06 S	256.63 E	-439.35	0.62
4876.00	8.14	152.20	4829.72	491.41 S	263.46 E	-450.65	1.10
4971.00	17.94	125.18	4922.23	505.84 S	278.61 E	-462.87	11.89
5066.00	19.85	113.26	5012.14	520.64 S	305.39 E	-473.86	4.52
5160.00	21.81	108.46	5100.00	532.48 S	336.62 E	-481.30	2.77
5255.00	24.07	95.06	5187.54	539.78 S	372.69 E	-483.59	5.98
5349.00	25.64	83.77	5272.88	539.26 S	412.03 E	-477.68	5.31
5444.00	27.93	73.20	5357.73	530.59 S	453.79 E	-463.37	5.55
5539.00	31.74	62.16	5440.19	512.47 S	497.23 E	-439.46	7.03
5633.00	39.51	51.04	5516.62	482.04 S	542.46 E	-403.11	10.73
5728.00	43.77	32.78	5587.86	435.21 S	583.92 E	-351.05	13.49
5823.00	46.14	22.27	5655.18	375.80 S	614.74 E	-287.97	8.19
5917.00	55.03	17.57	5714.83	307.57 S	639.27 E	-217.02	10.21

6012.00	61.84	11.04	5764.57	229.21 S	659.07 E	-136.68	9.25
6106.00	74.56	3.68	5799.45	142.87 S	669.98 E	-49.67	15.35
6201.00	82.49	0.05	5818.33	49.90 S	672.96 E	42.83	9.15
6226.00	84.60	359.62	5821.14	25.06 S	672.89 E	67.42	8.61

CALCULATION BASED ON MINIMUM CURVATURE METHOD

SURVEY COORDINATES RELATIVE TO WELL SYSTEM REFERENCE POINT
TVD VALUES GIVEN RELATIVE TO DRILLING MEASUREMENT POINT

VERTICAL SECTION RELATIVE TO WELL HEAD
VERTICAL SECTION IS COMPUTED ALONG A DIRECTION OF 7.88 DEGREES (GRID)
A TOTAL CORRECTION OF 6.97 DEG FROM MAGNETIC NORTH TO GRID NORTH HAS BEEN APPLIED

HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.
HORIZONTAL DISPLACEMENT(CLOSURE) AT 6226.00 FEET
IS 673.36 FEET ALONG 92.13 DEGREES (GRID)

Date Printed:03 August 2015