



WELL INFORMATION					
MWD Run Number	100				
Date run completed	31-May-15				
Rig Bit Number	2				
Bit Size (in)	8.750				
Tool Nominal OD (in)	6.750				
Log Start Depth (MD, ft)	652.00				
Log End Depth (MD, ft)	7,066.00				
Drill or Wipe	Drill				
Drill/Wipe Start Date and Time	30-May-15 00:50				
Drill/Wipe End Date and Time	31-May-15 05:45				
Min Inc (deg) @ Depth (MD, ft)	0.14 @ 5,819.00				
Max Inc (deg) @ Depth (MD, ft)	77.89 @ 7,014.00				
Bit TFA(in2) / Bit Type	0.91 / PDC				
Flow Rate (gpm)	593.37				
Max AV (fpm) / CV (fpm) @ MWD	N/A / N/A				
Fluid Type	Fresh Water Gel				
Density (ppg) / Viscosity (spqt)	10.00 / 37.00				
Filtrate CL (ppm)	1,100.00				
pH / Fluid Loss (mptm)	8.00 / 0				
PV (cP) / YP (lbf2)	11 / 10.00				
% Solids / % Sand	10.2 / .3				
% Oil / Oil:Water Ratio	N/A / N/A				
Rm @ Measured Temp (degF)	N/A @ N/A				
Rmf @ Measured Temp (degF)	N/A @ N/A				
Rmc @ Measured Temp (degF)	N/A @ N/A				
Max Tool Temp (degF) / C	172.72 / 100.00				

Max Tool Temp (degF) / Source	179.70 / HCIM				
Rm @ Max Tool Temp (degF)	N/A @ 179.70				
Lead MWD Engineer	Paul Kock				
Customer Representative	Justin Fields				

SENSOR INFORMATION

Downhole Processor Information

Tool Type	HCIM				
Software Version	88.58				
Sub Serial Number					
Insert Serial Number					
Date and Time Initialized	29-May-15 21:19				
Date and Time Read	31-May-15 12:20				
ECMB SW Version	N/A				

Directional Sensor Information

Tool Type	PCDC				
Distance From Bit (ft)	52.00				
Software Version	6.33				
Sub Serial Number	11341324				
Sonde Serial Number	11638623				
Sensor ID Number	N/A				
Toolface Offset (deg)	95.70				

Gamma Ray Sensor Information

Tool Type	PCG				
Distance From Bit (ft)	40.19				
Recorded Sample Period (sec)	10				
Software Version	8.15				
Sub Serial Number	11341324				
Insert/Sonde Serial Number	12071280				

Resistivity Sensor Information

Tool Type	EWR-P4				
Distance From Bit (ft)	68.58				
Recorded Sample Period (sec)	4				
Software Version	1.50				
Sub Serial Number	11179699				
Receiver Insert Serial Number	11172698				
Transmitter Insert Serial Number	250683				
Receiver Orientation	Down				

Pulser Controller Sensor Information

Tool Type	PCM				
Software Version	5.93				
PIC Software Version	1.70				
Sub/HOC Serial Number	11341324				
Insert/Probe/Module SN	11400838				
Battery Serial Number	N/A				
Valve Insert SN	N/A				
DC Insert Serial Number	N/A				
Choke Size (32nd)	N/A				
Driver Current (amps)	N/A				
Driver SMI Current (amps)	N/A				

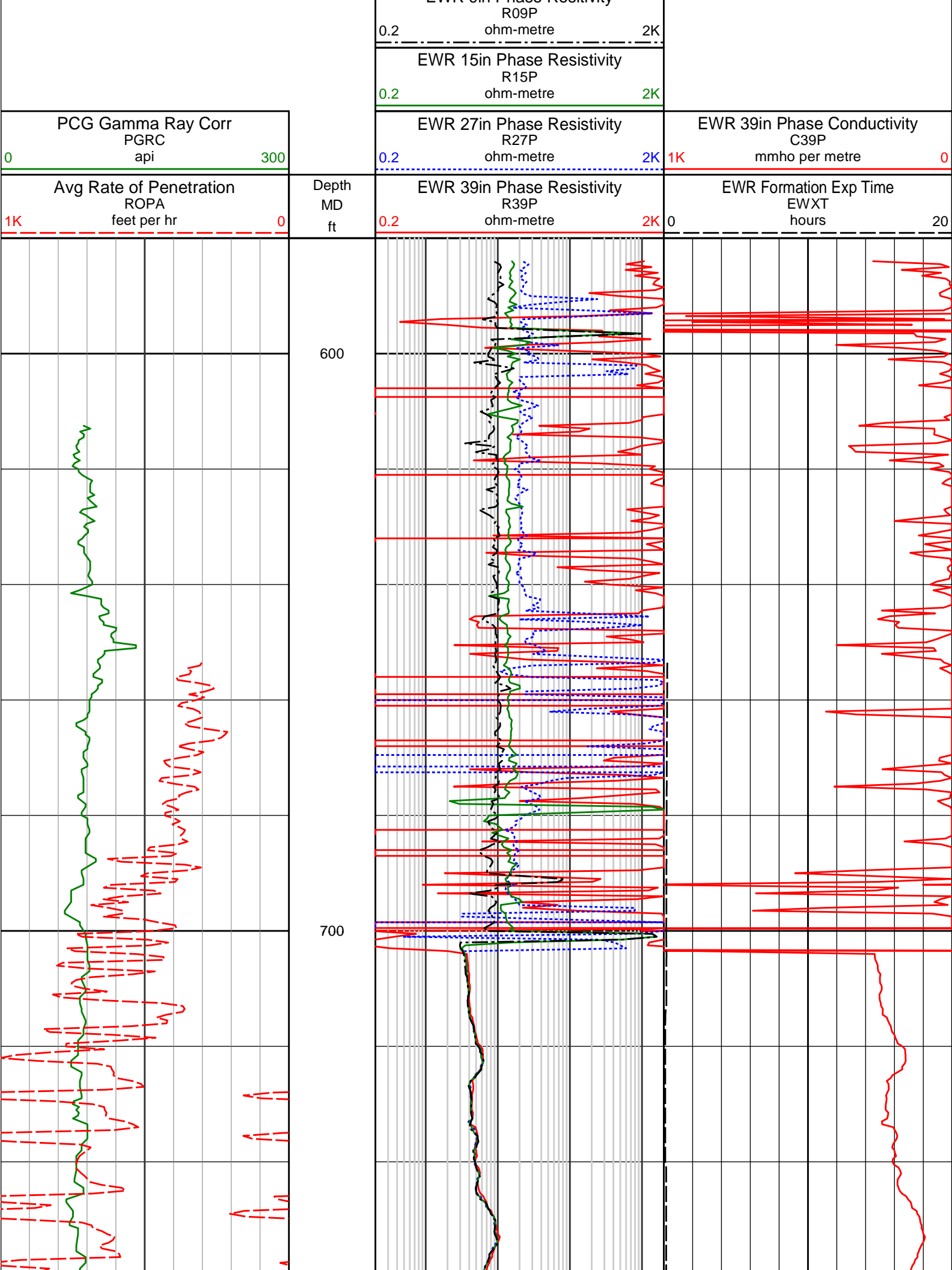
Boot Strap Version	4,146.00				
DDSr-HCIM Sensor Information					
Tool Type	DDSr-HCIM				
Distance From Bit (ft)	0.00				
Recorded Sample Period (sec)	4				
Software Version	20.88				
Sub Serial Number					
Insert Serial Number	11739922				
Sensor ID Number	8863				

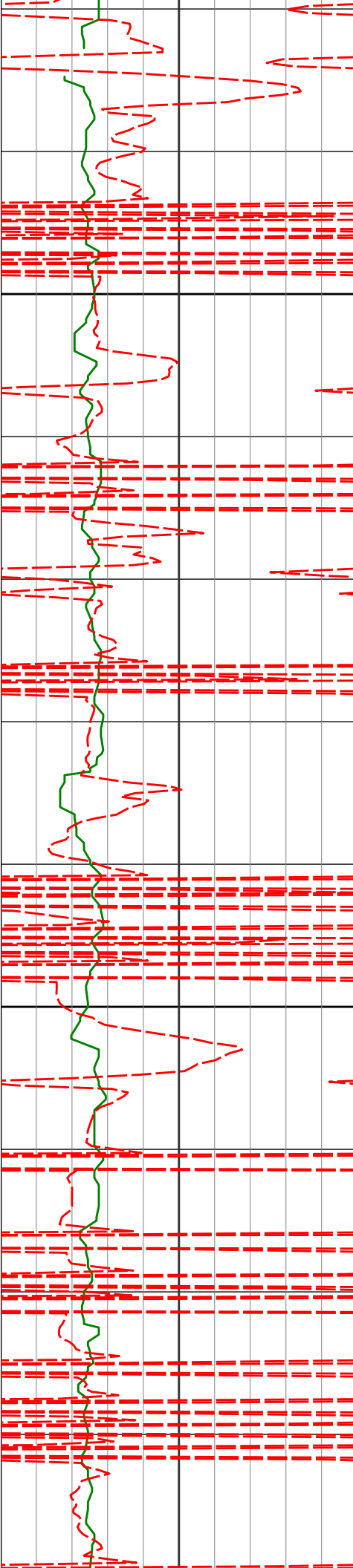
REMARKS
<p>1. All depths are calibrated to the driller's pipe tally and are measured bit depths, measured from the drill floor.</p> <p>2. No depth corrections have been made for pipe stretch or compression.</p> <p>3. Critical annular velocities have been calculated using the "Power Law" model for water based fluids and the "Bingham Plastic" model for syntheic and oil based fluids.</p> <p>4. All data presented is recorded (memory) data unless otherwise stated. ROPA is realtime data</p> <p>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</p> <p>6. Insi te Version 8.1.1</p>

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MD Detail 1:240 Scale

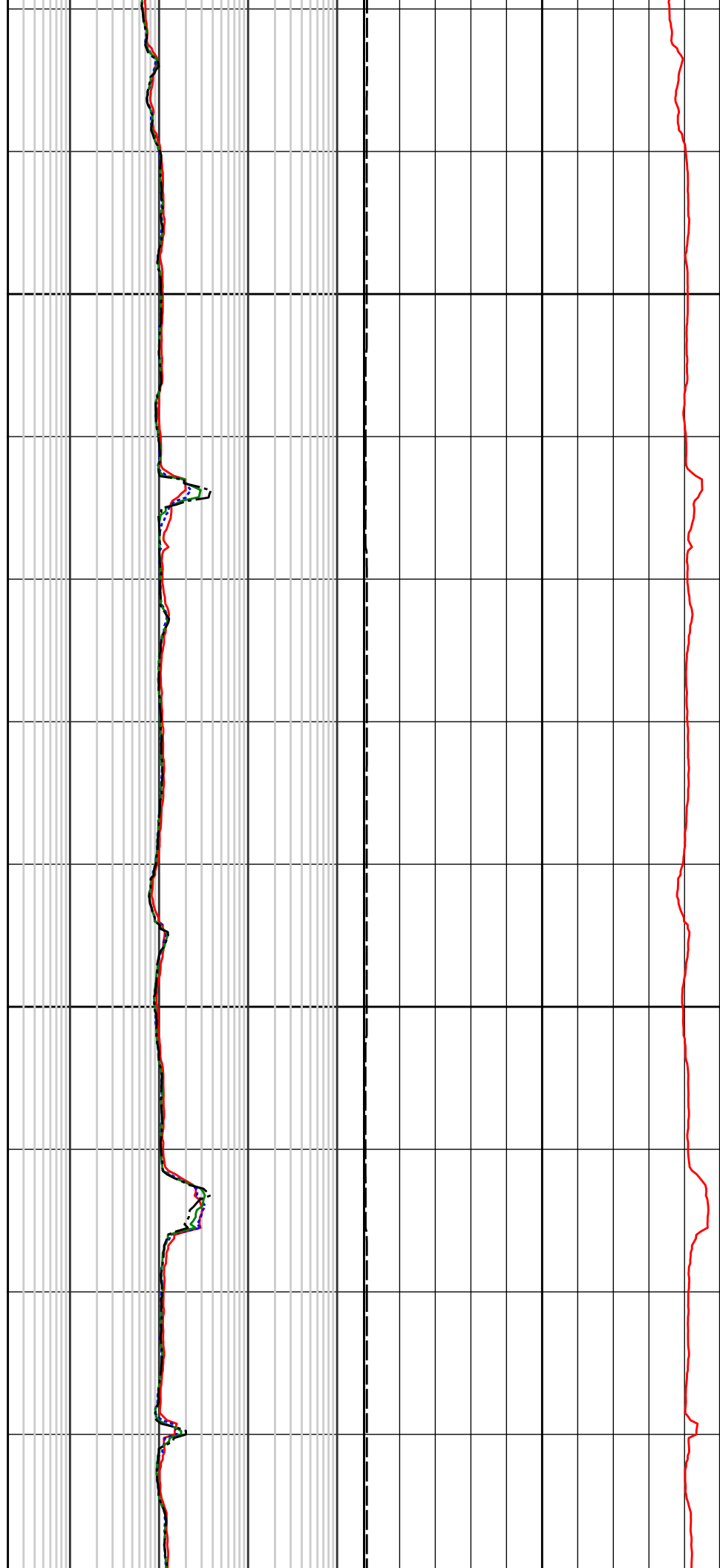
EWR 9in Phase Resitivity

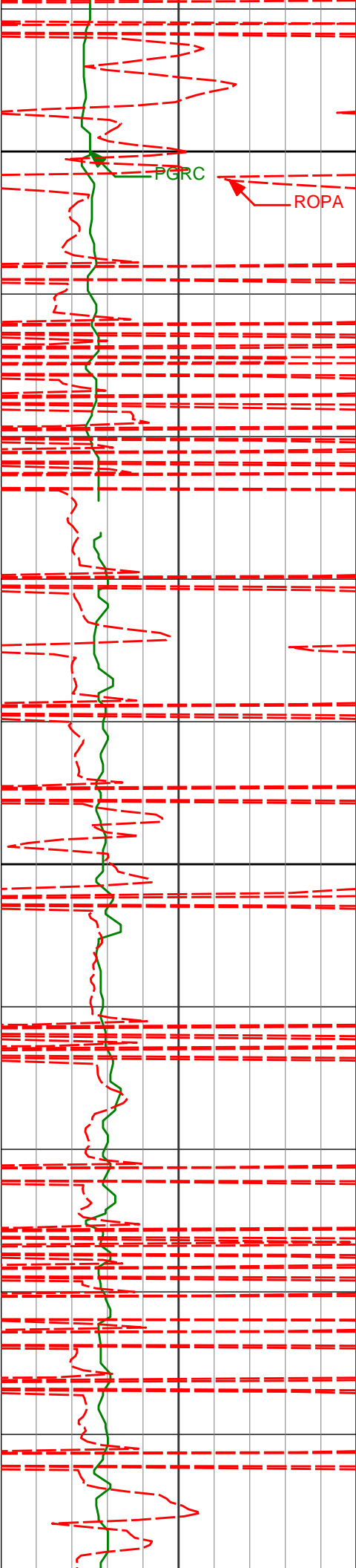




800

900





1000

R27P

R89P

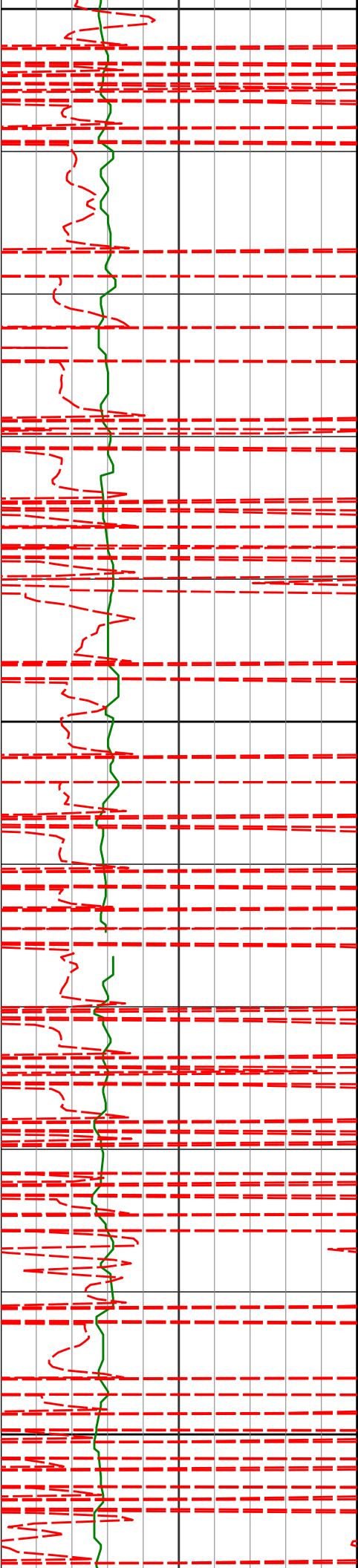
EWXT

C39P

R09P

R15P

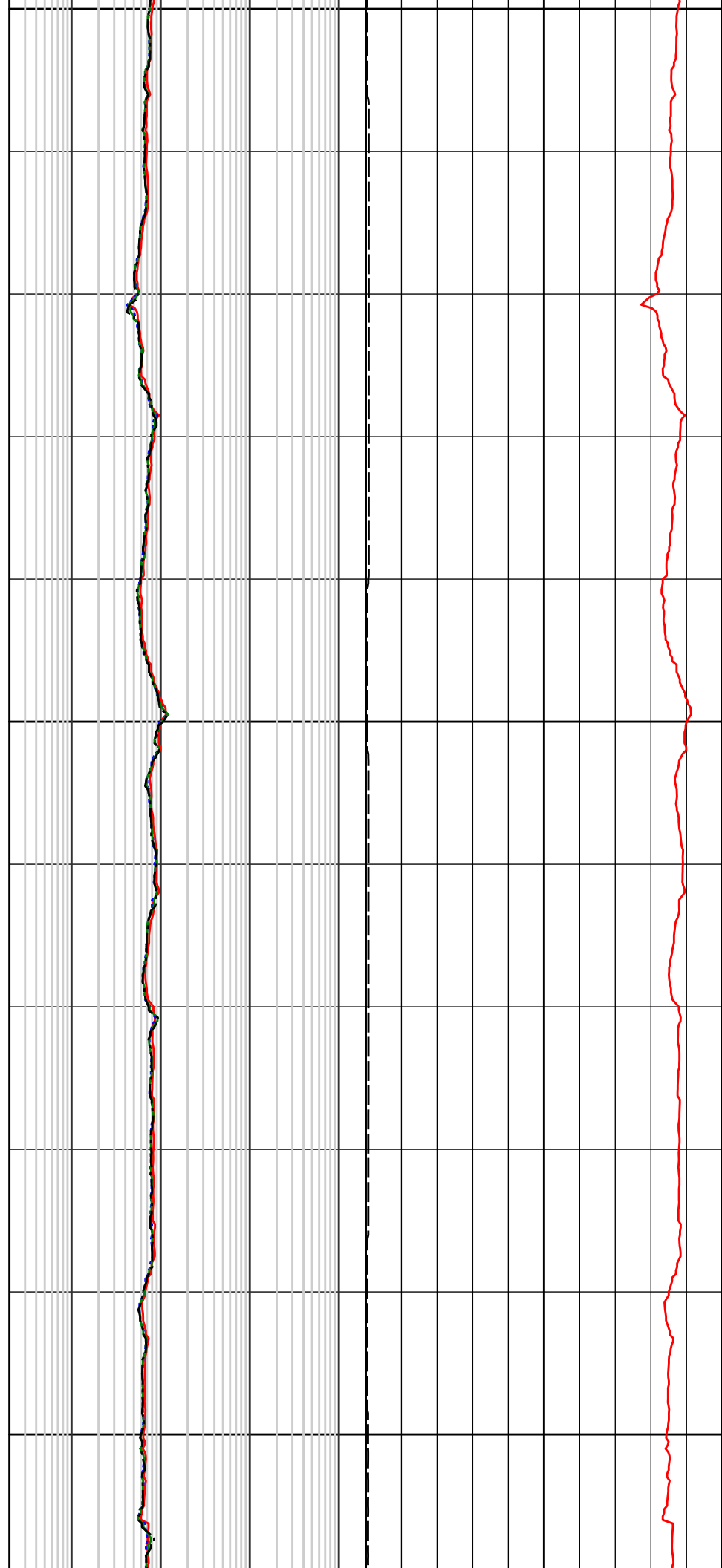
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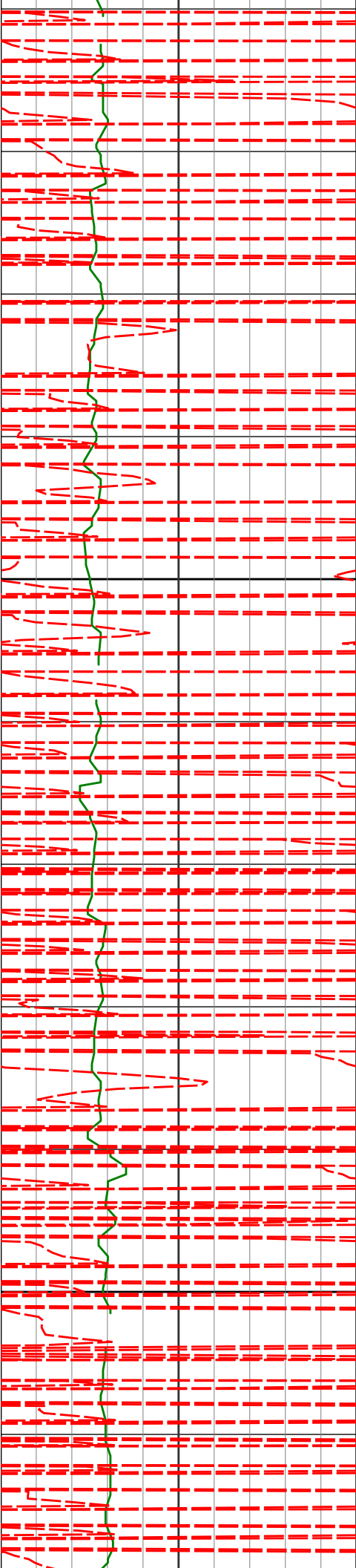


1200

1300

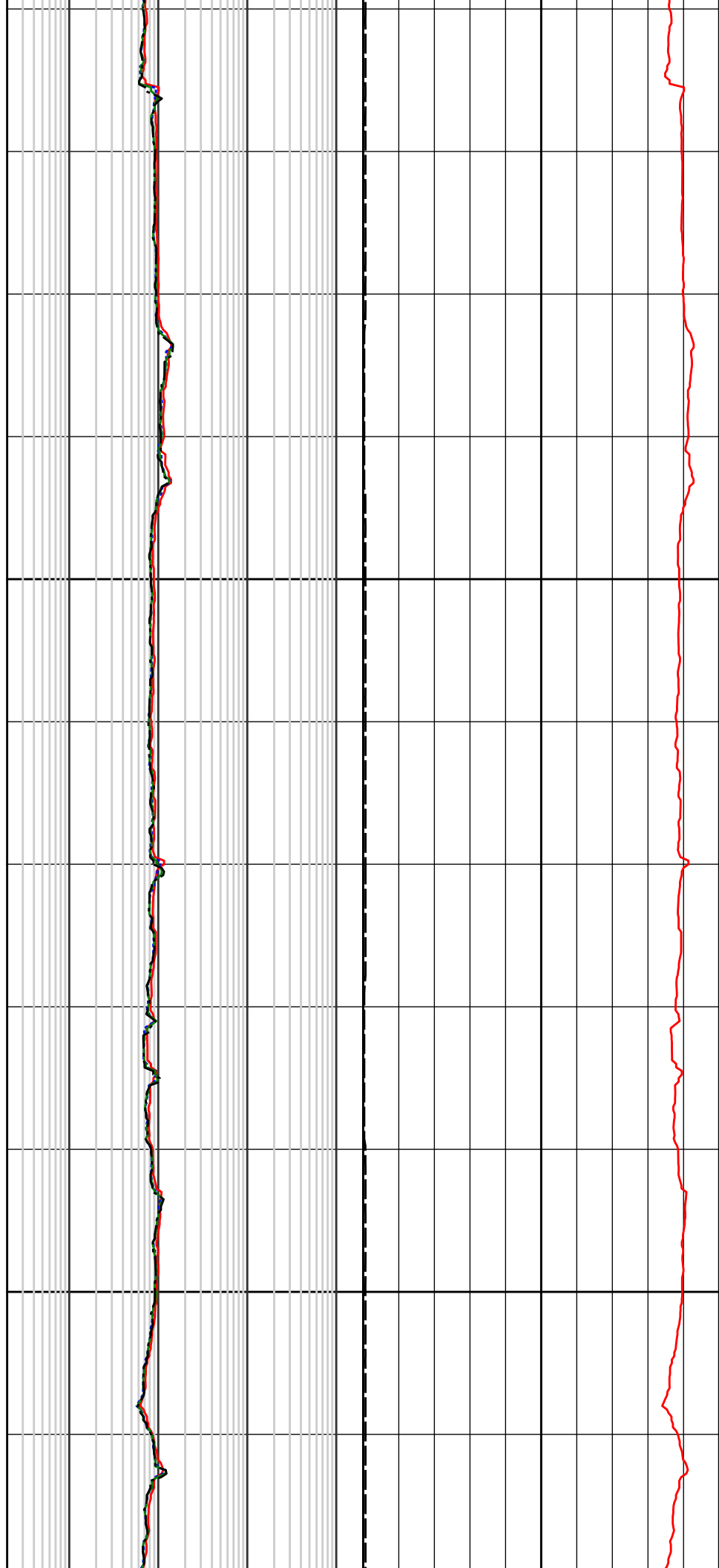
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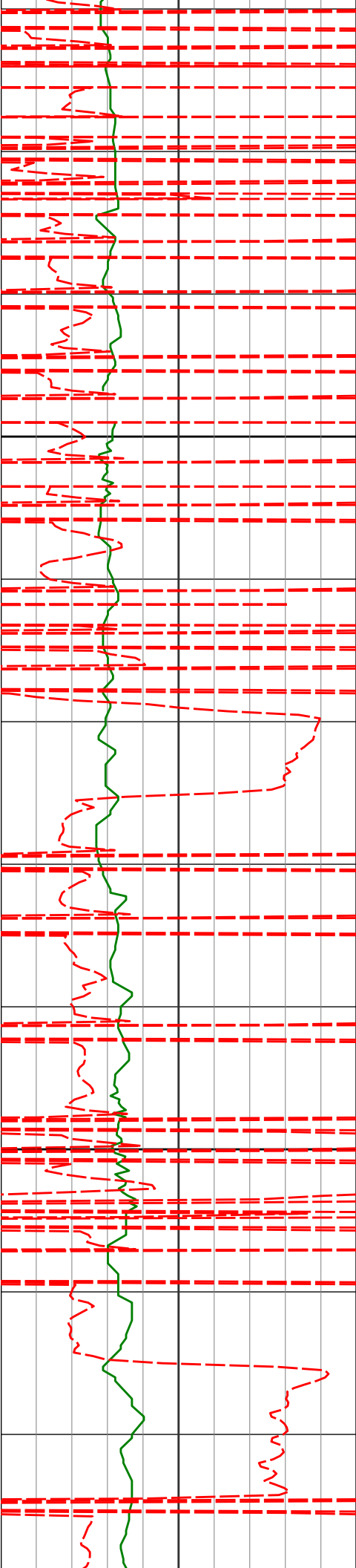




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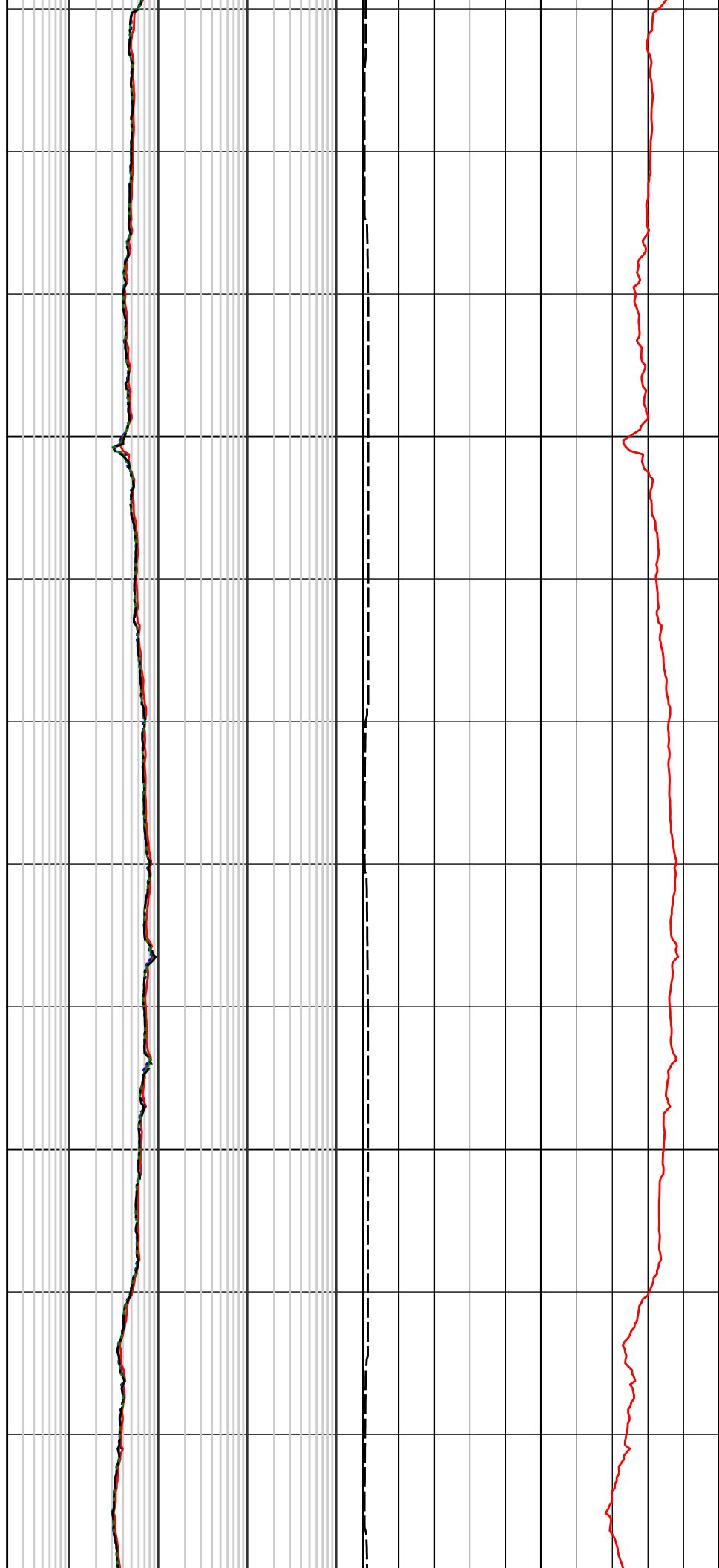
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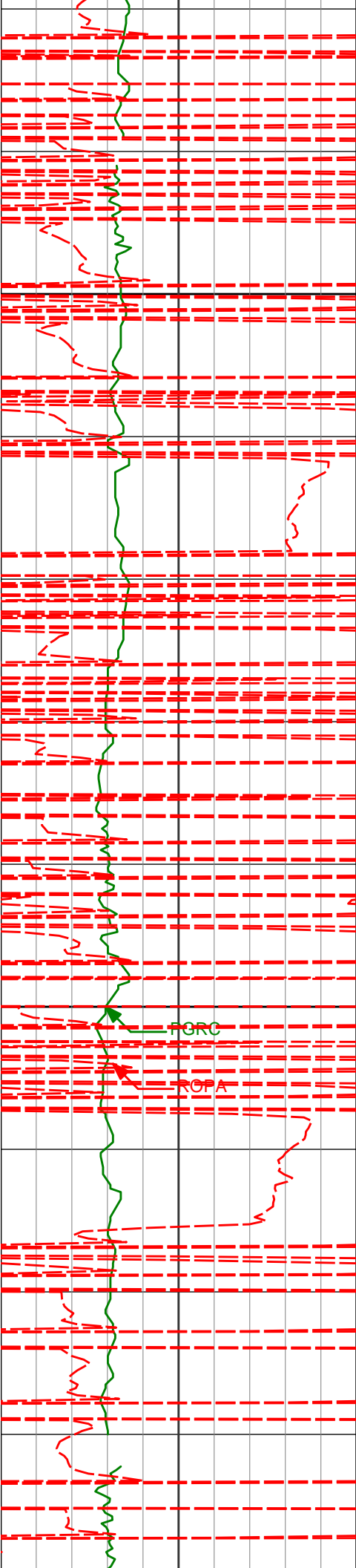




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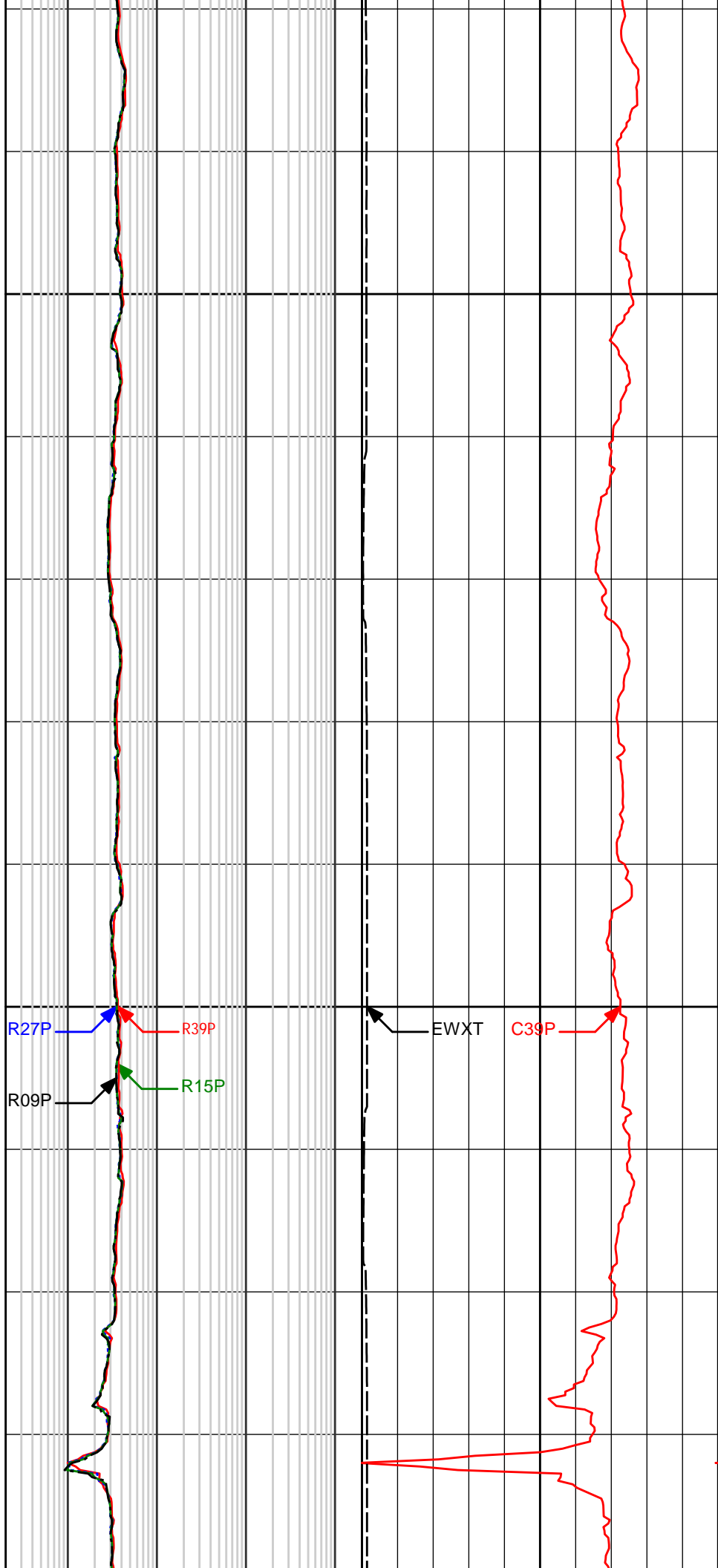
1800





1900

2000



R27P

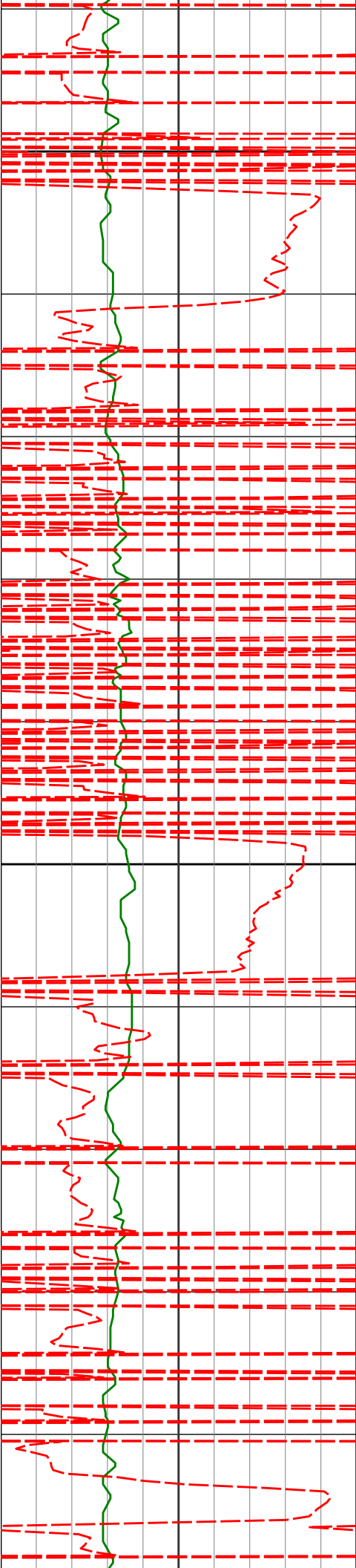
R39P

EWXT

C39P

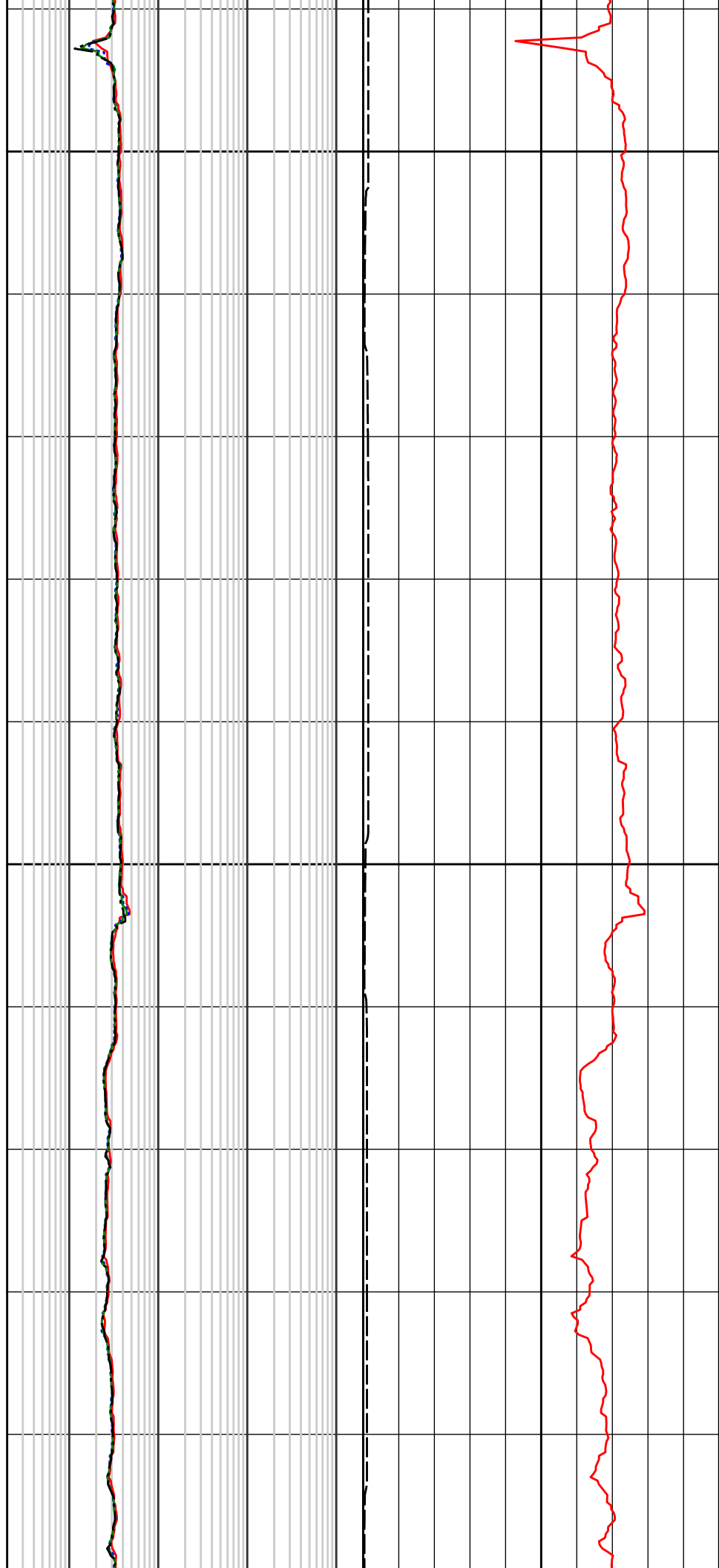
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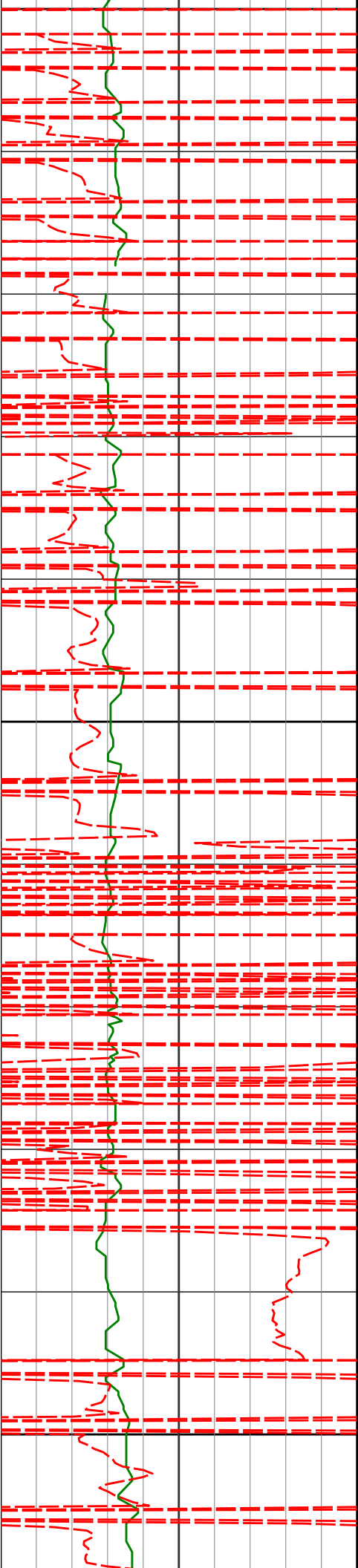
R15P



2100

2200

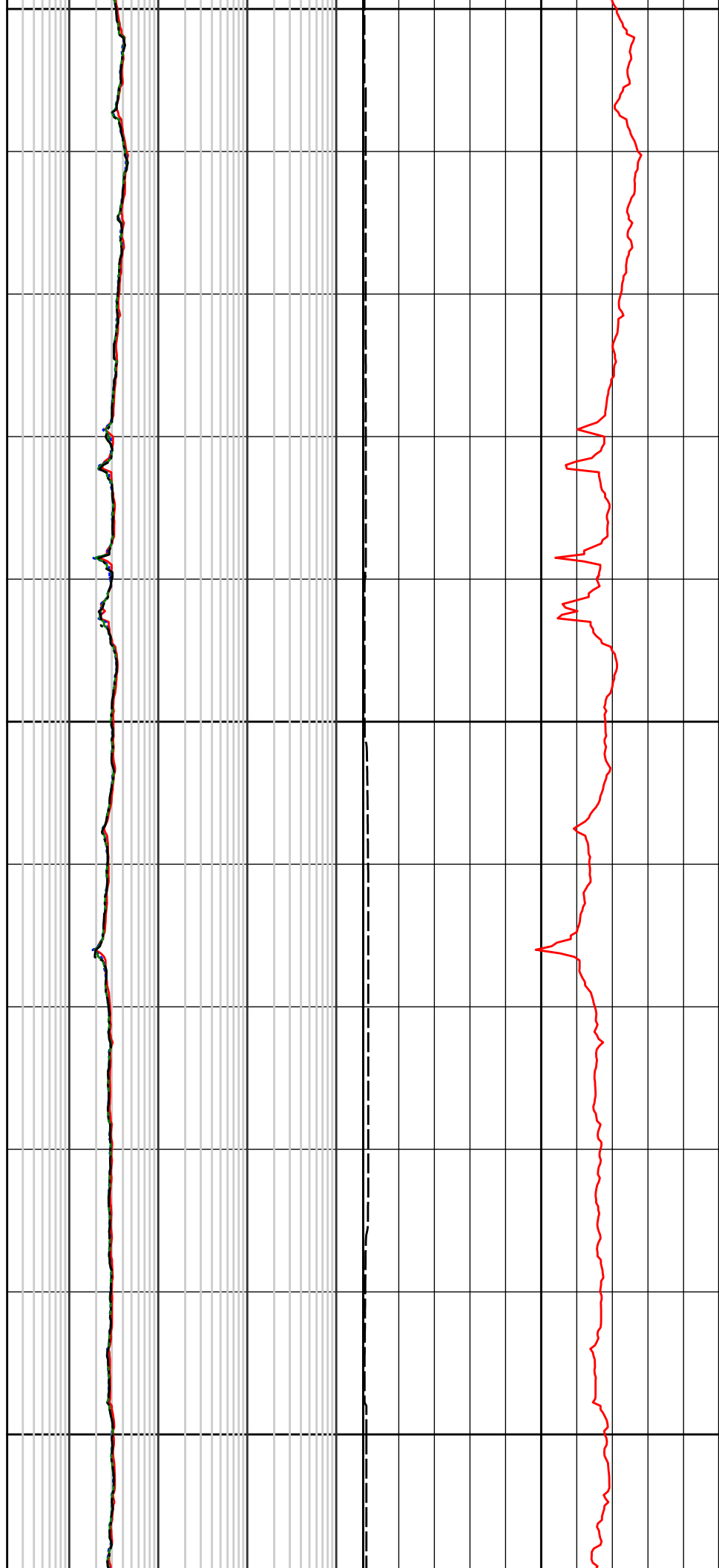


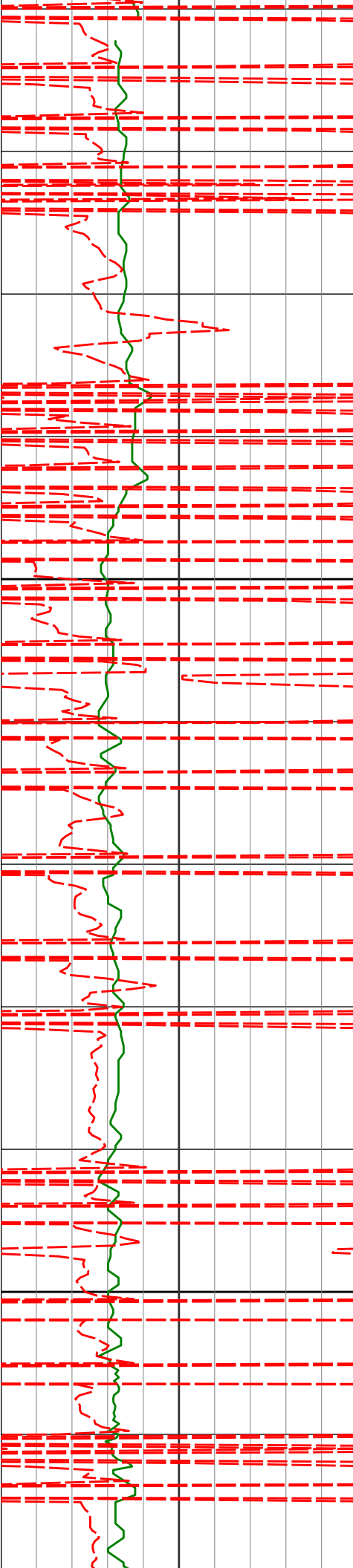


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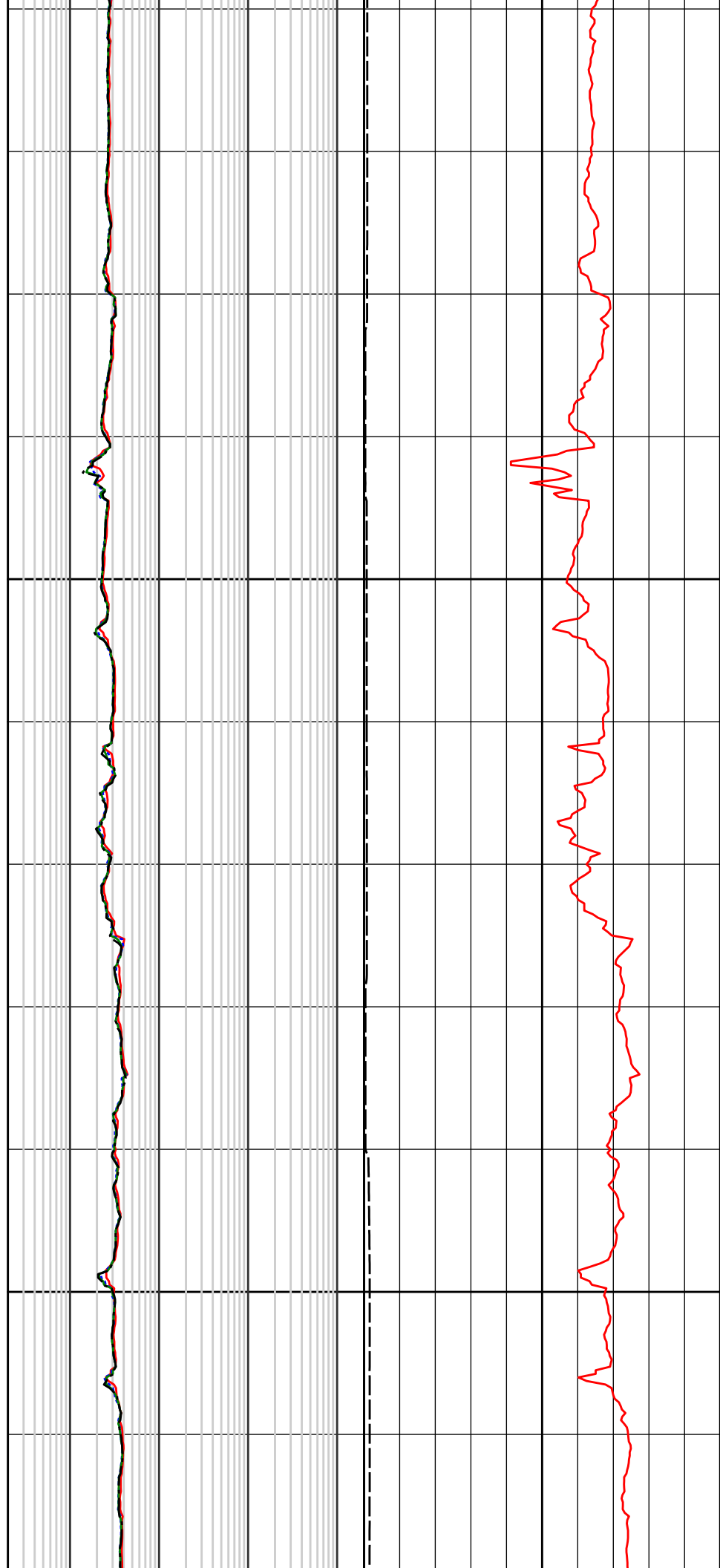
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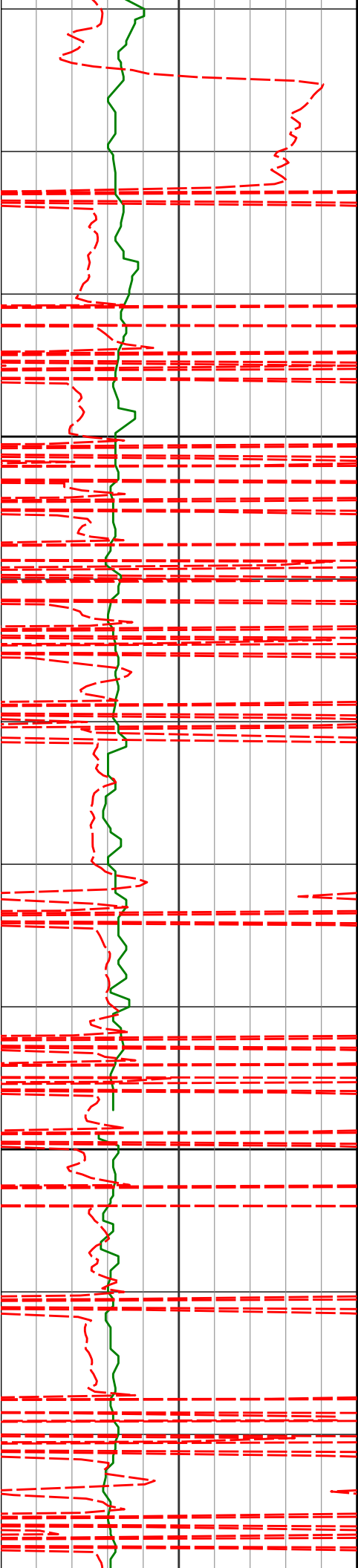




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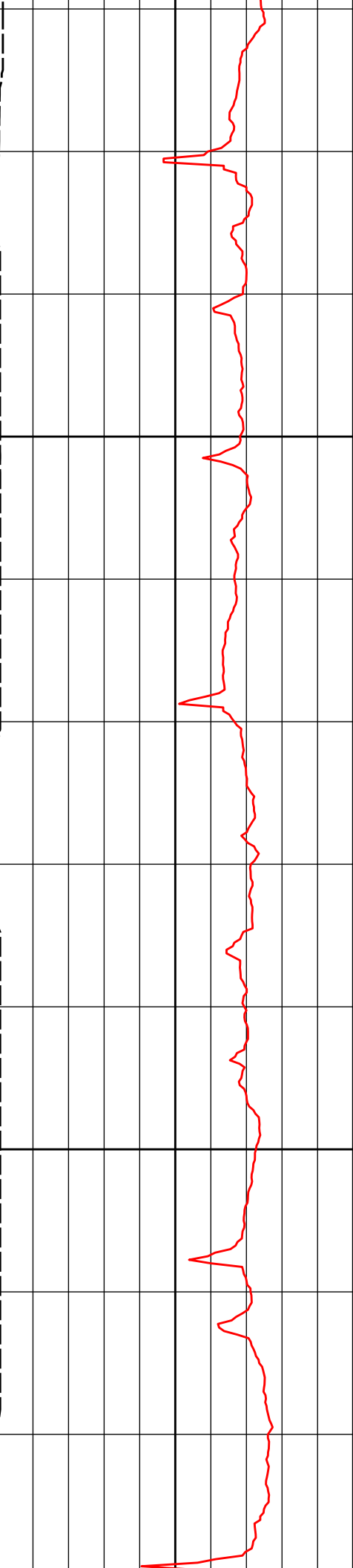
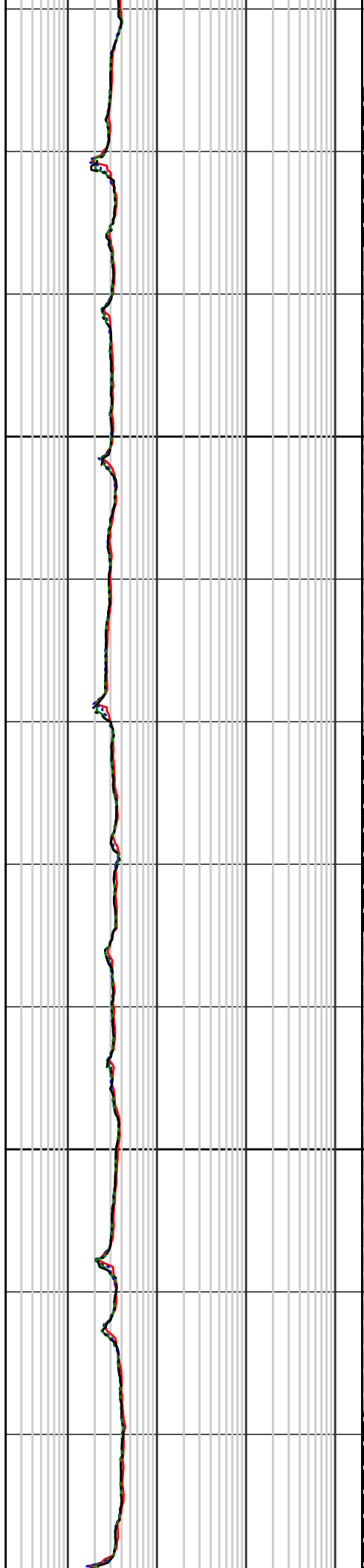
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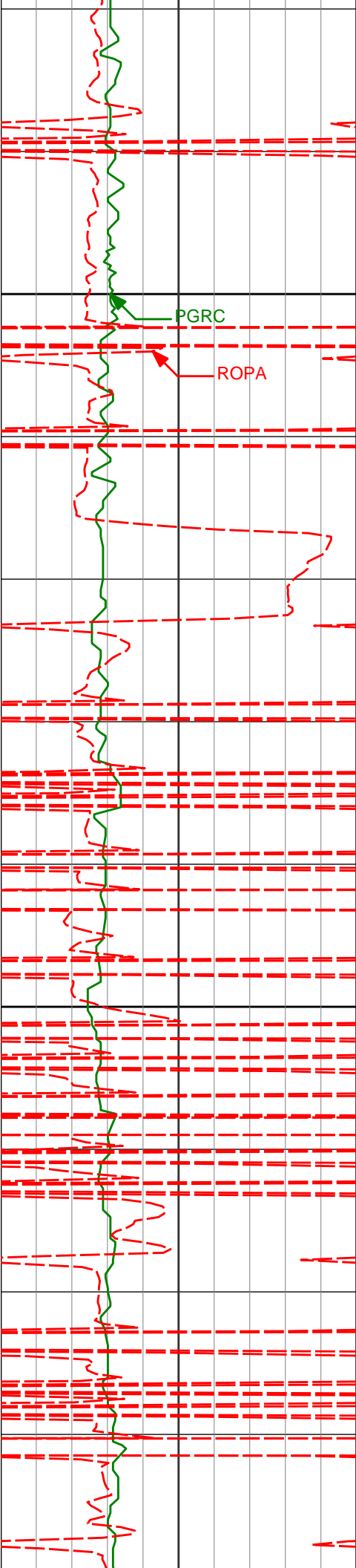




2800

2900





3000

R27P

R39P

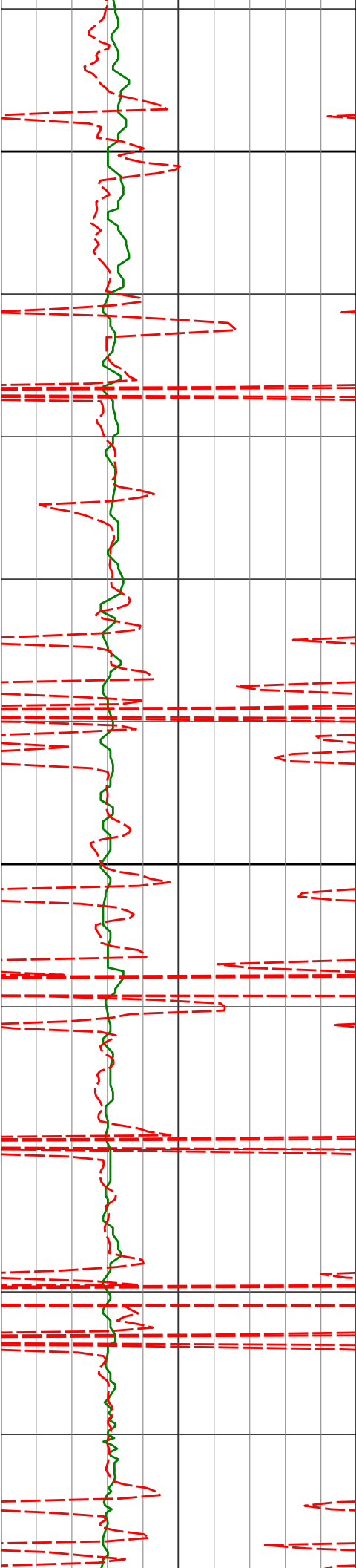
EWXT

C39P

R09P

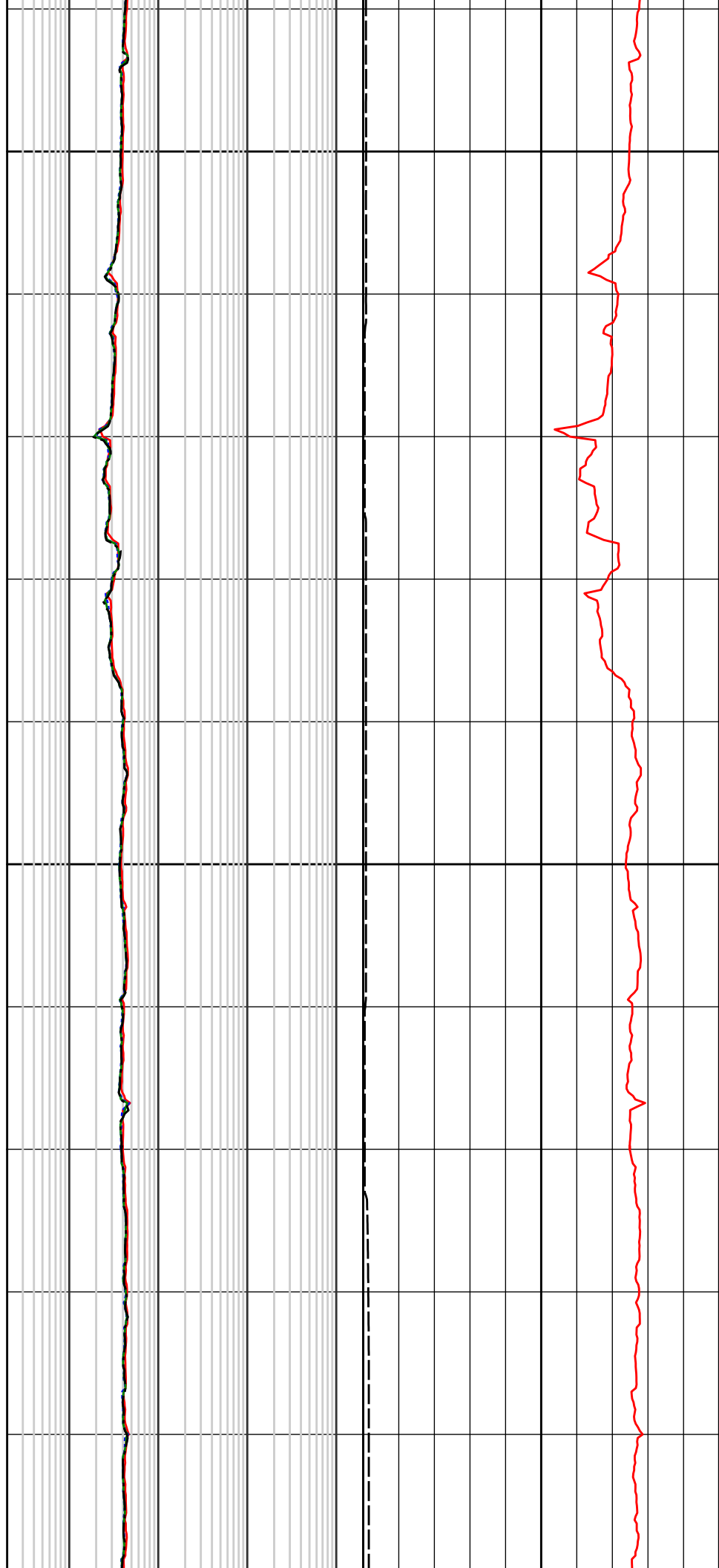
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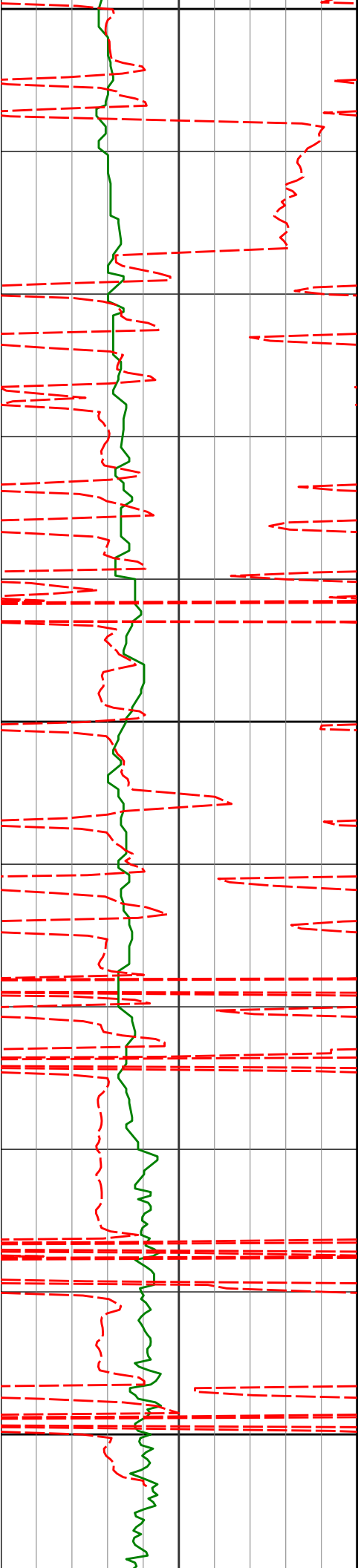
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3200

3300

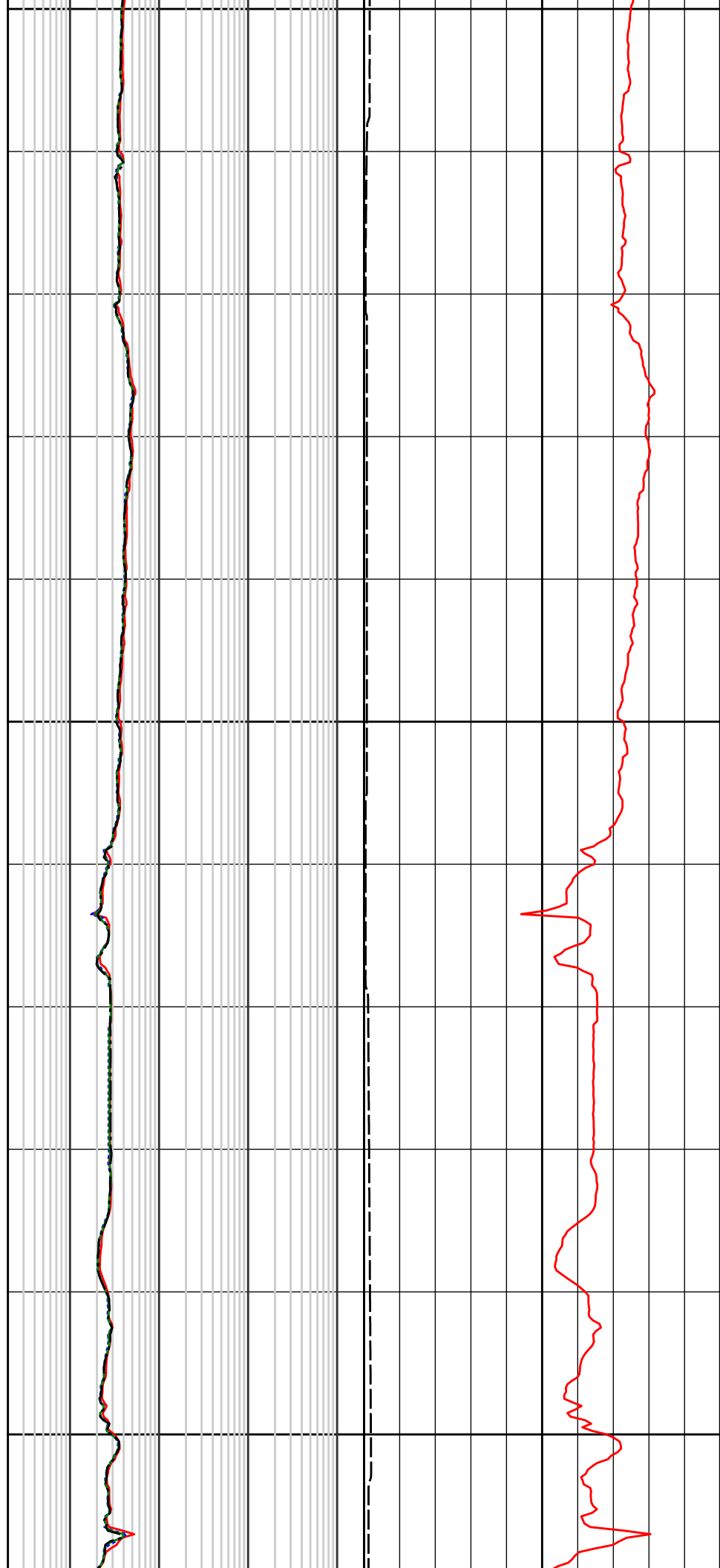


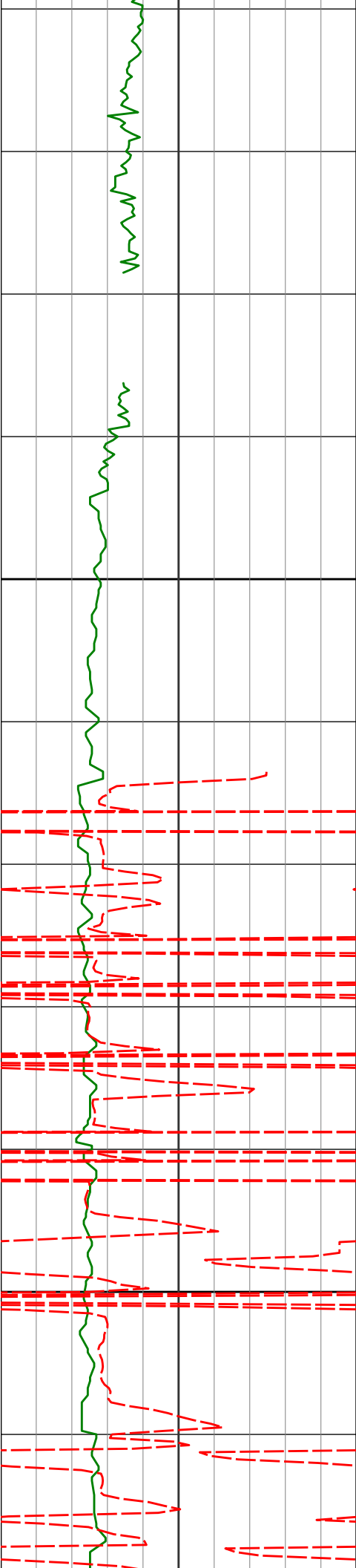


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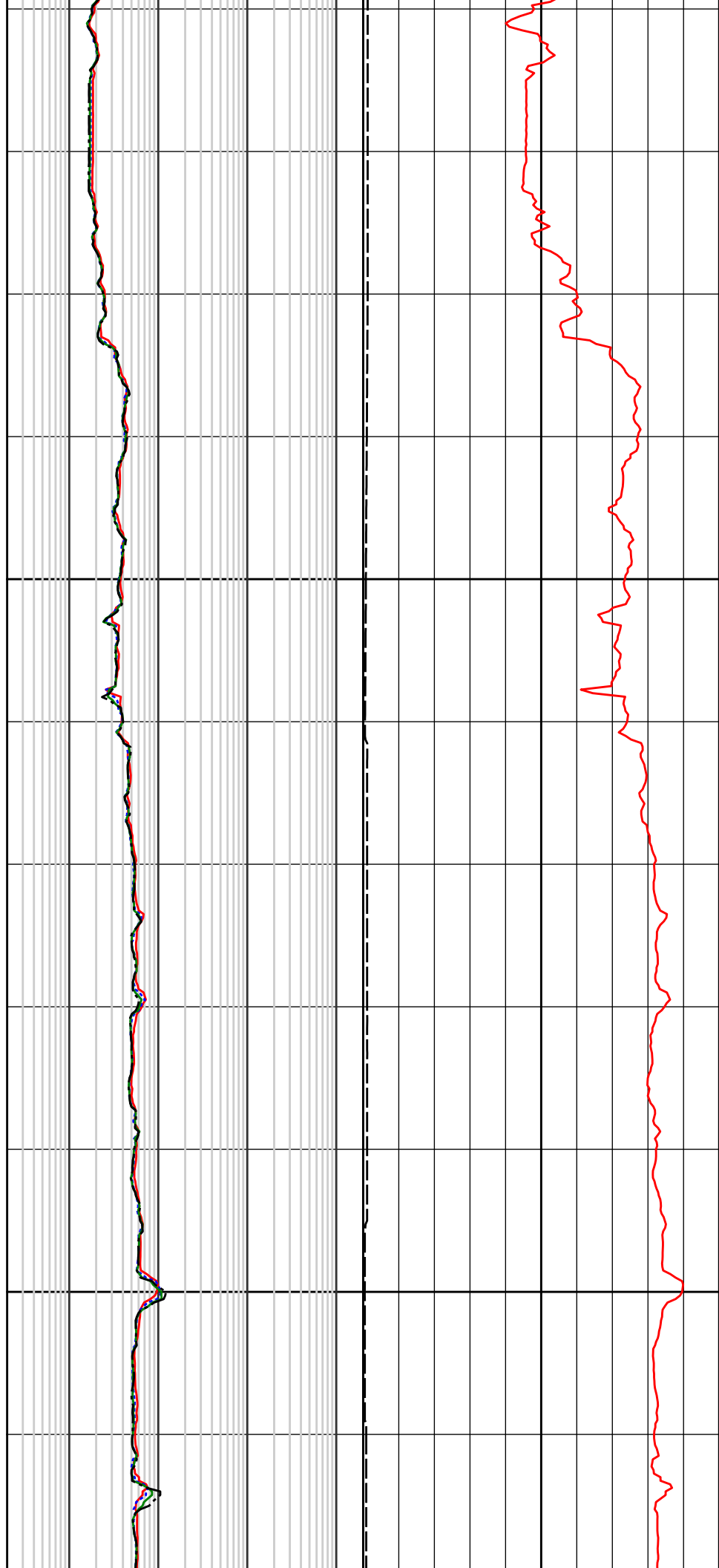
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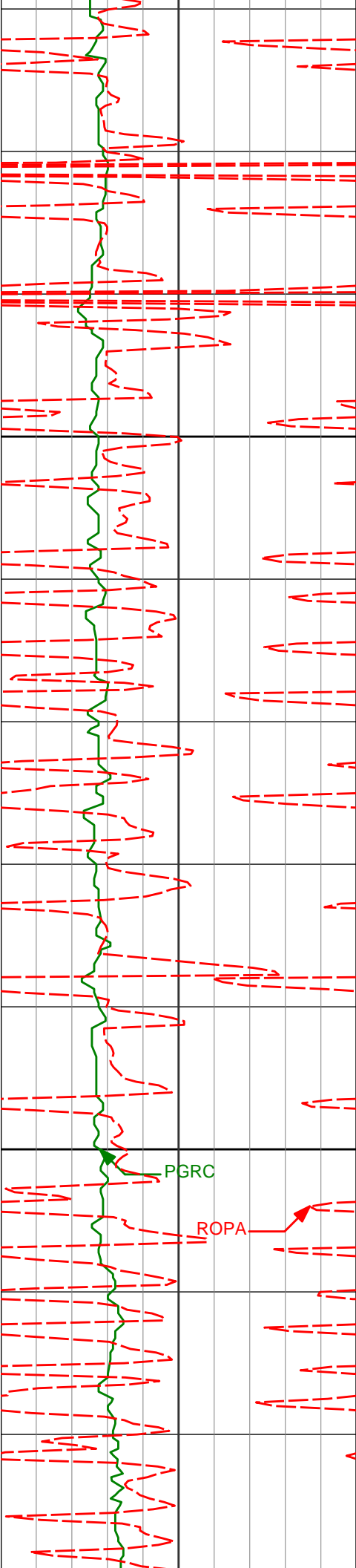




3700

3800





3900

4000

PGRC

ROPA

R27P

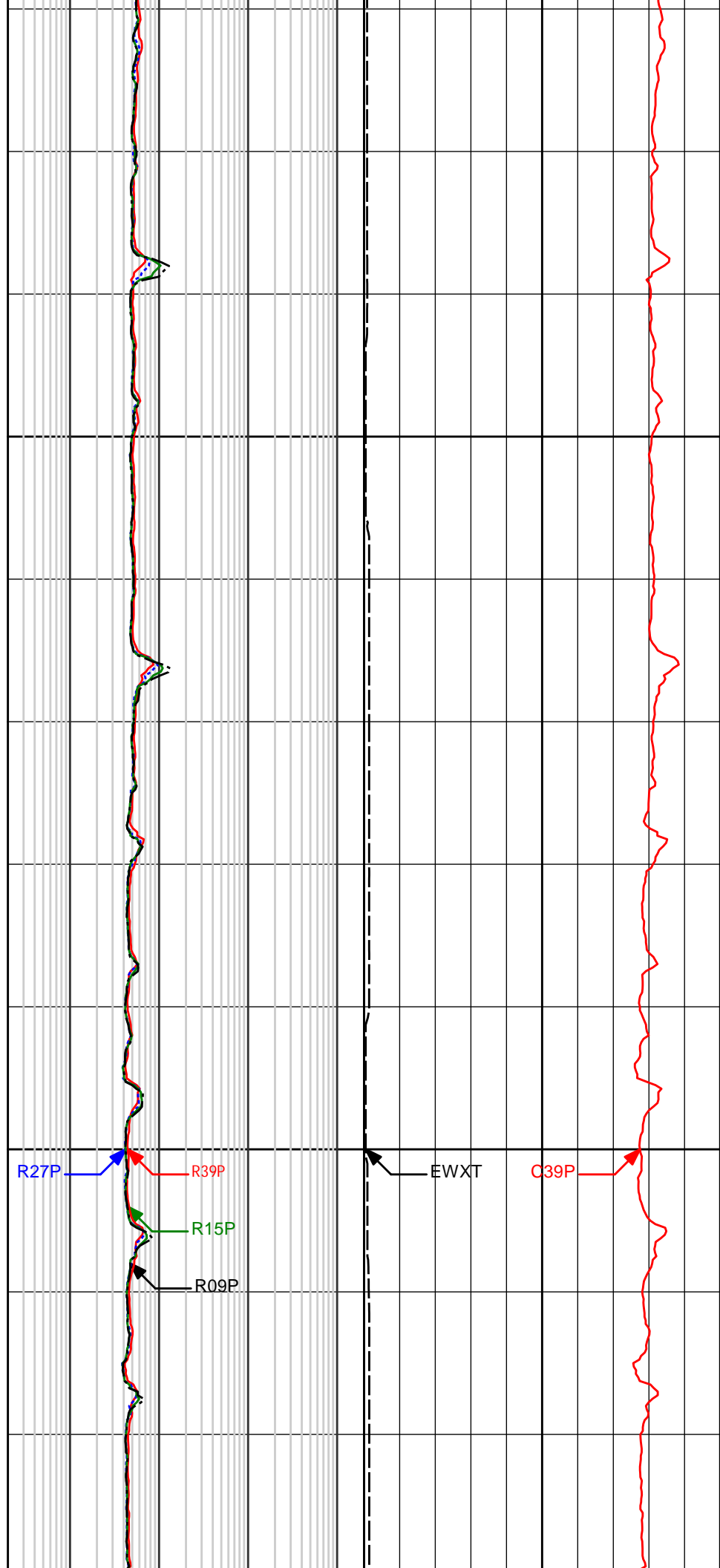
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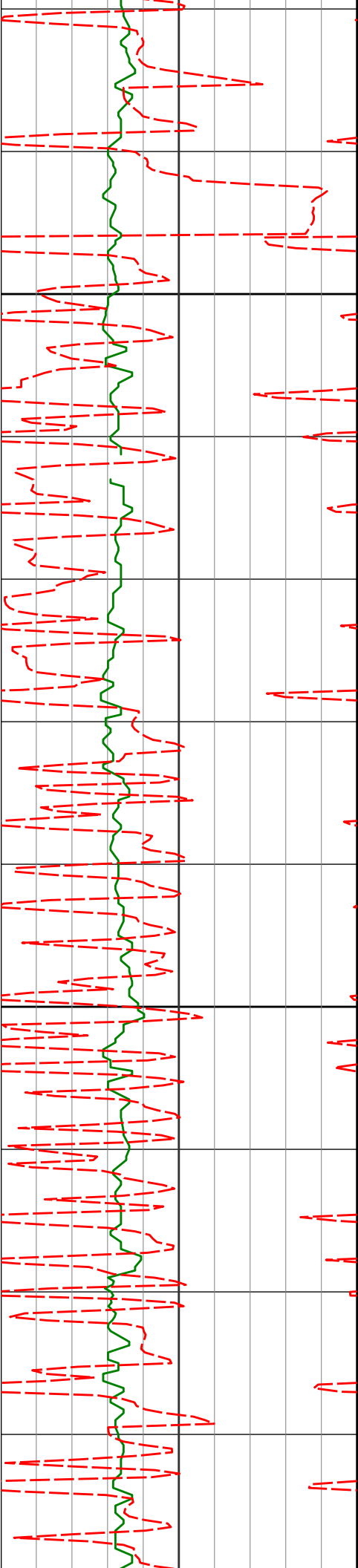
R15P

R09P

EWXT

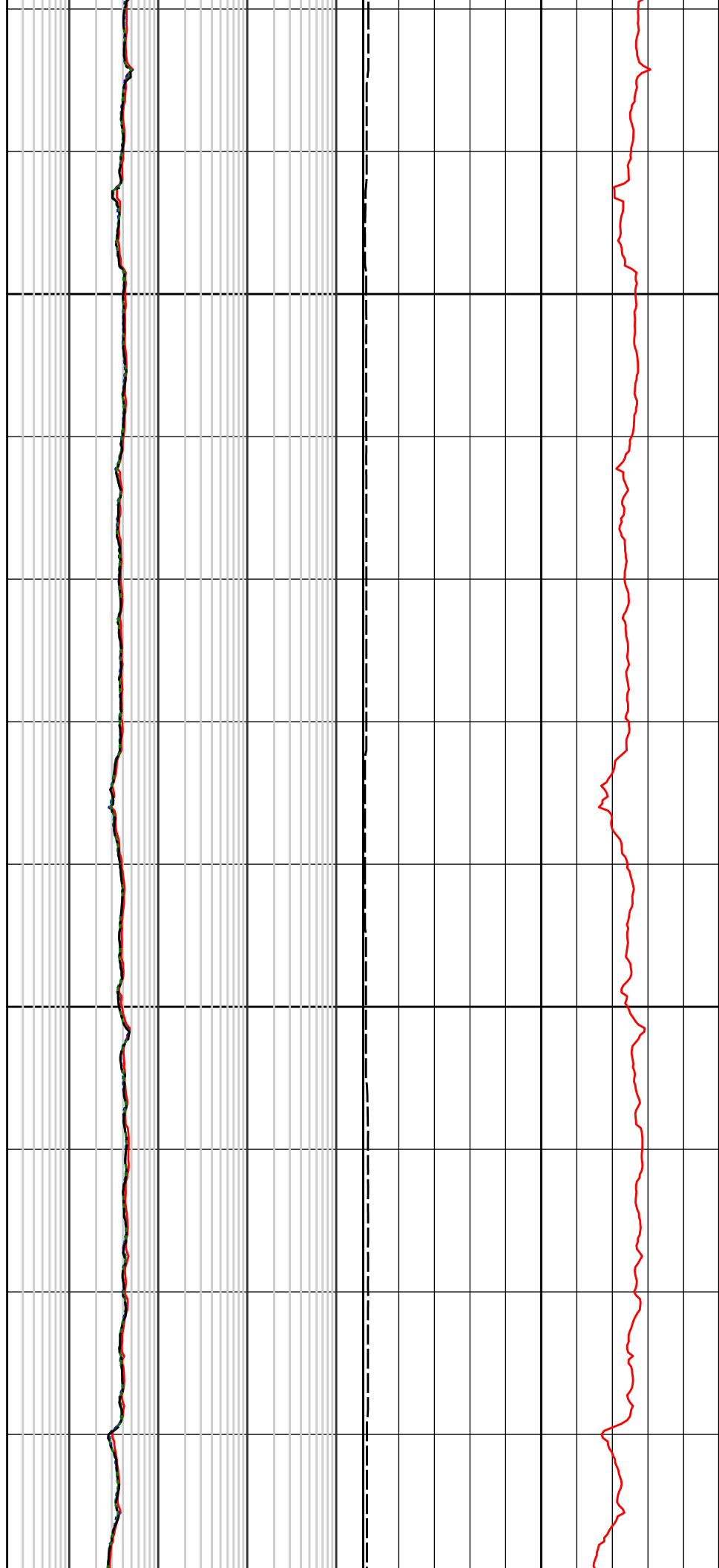
C39P

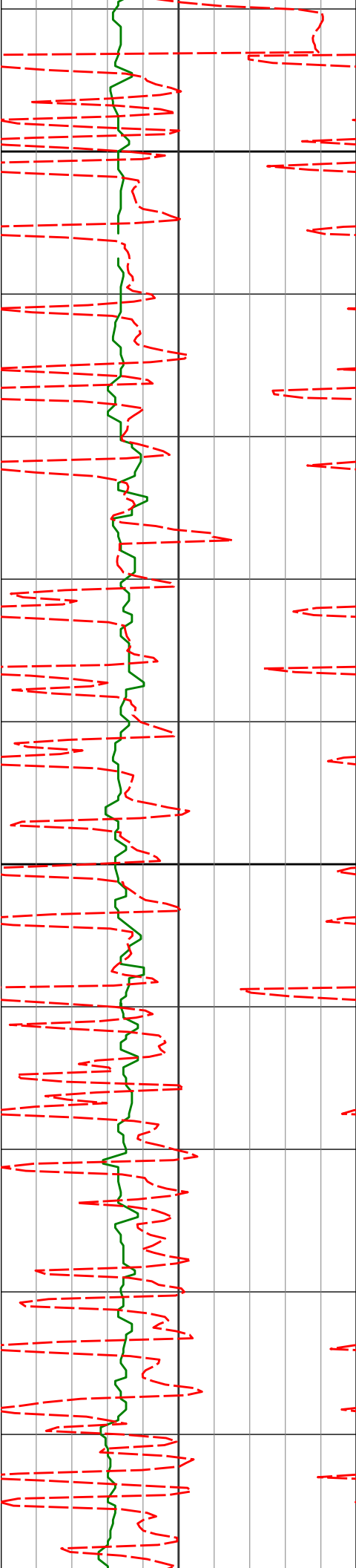




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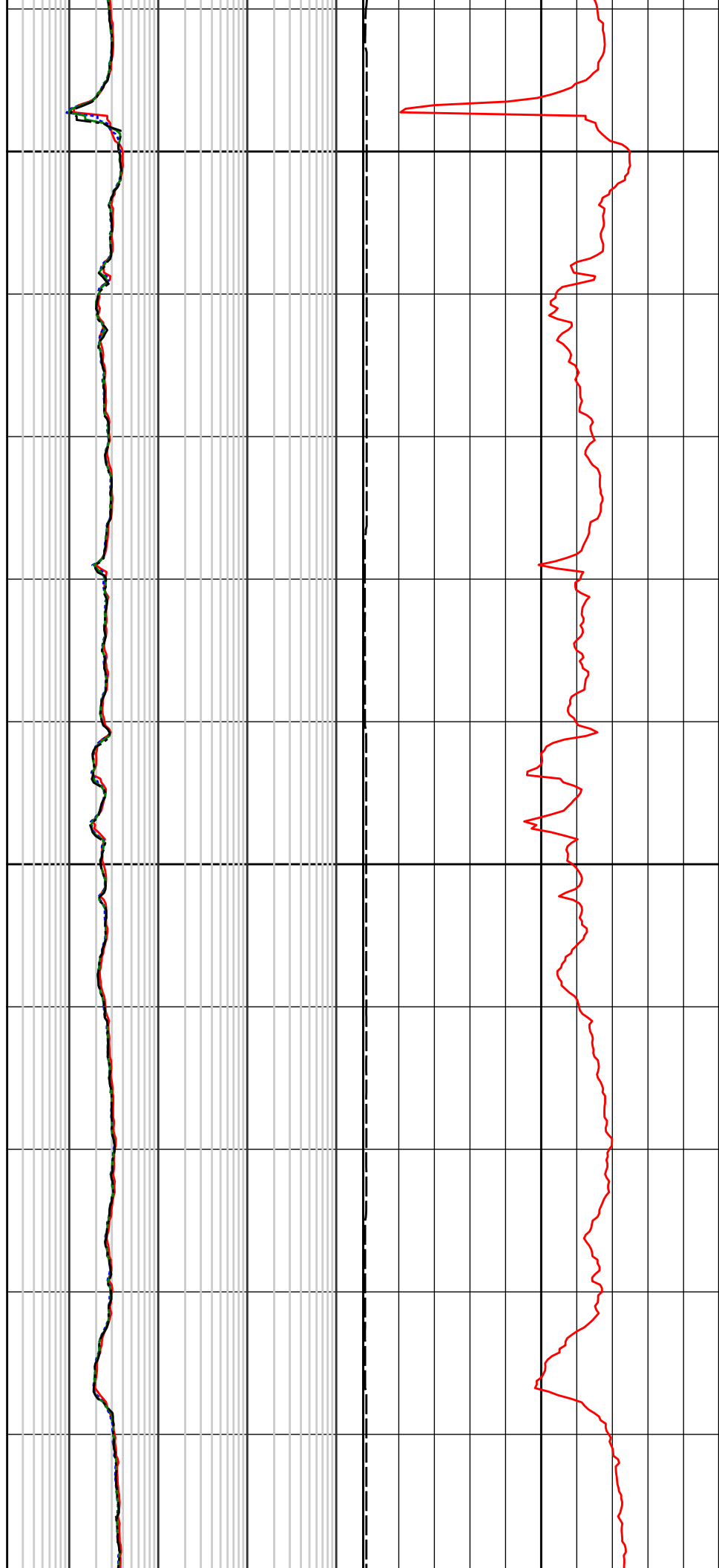
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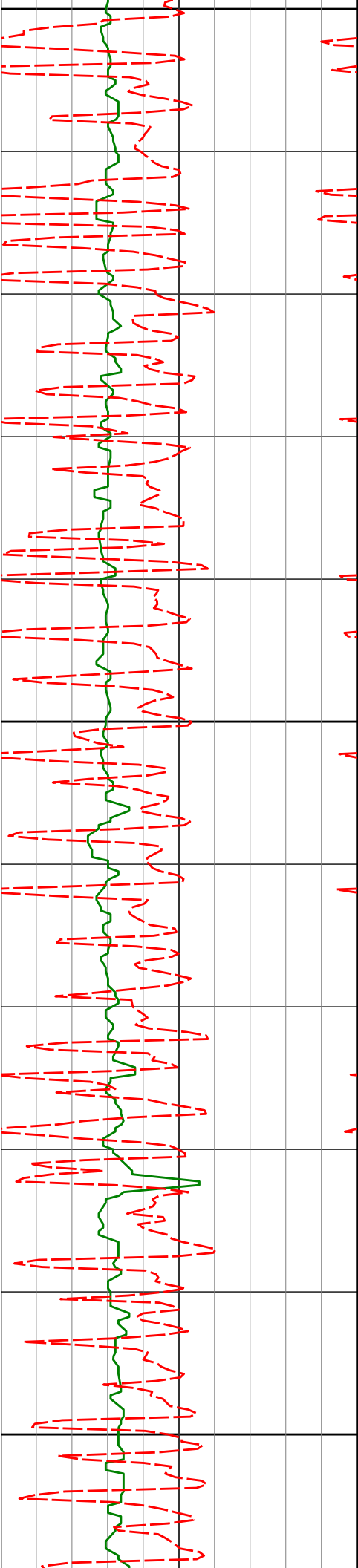




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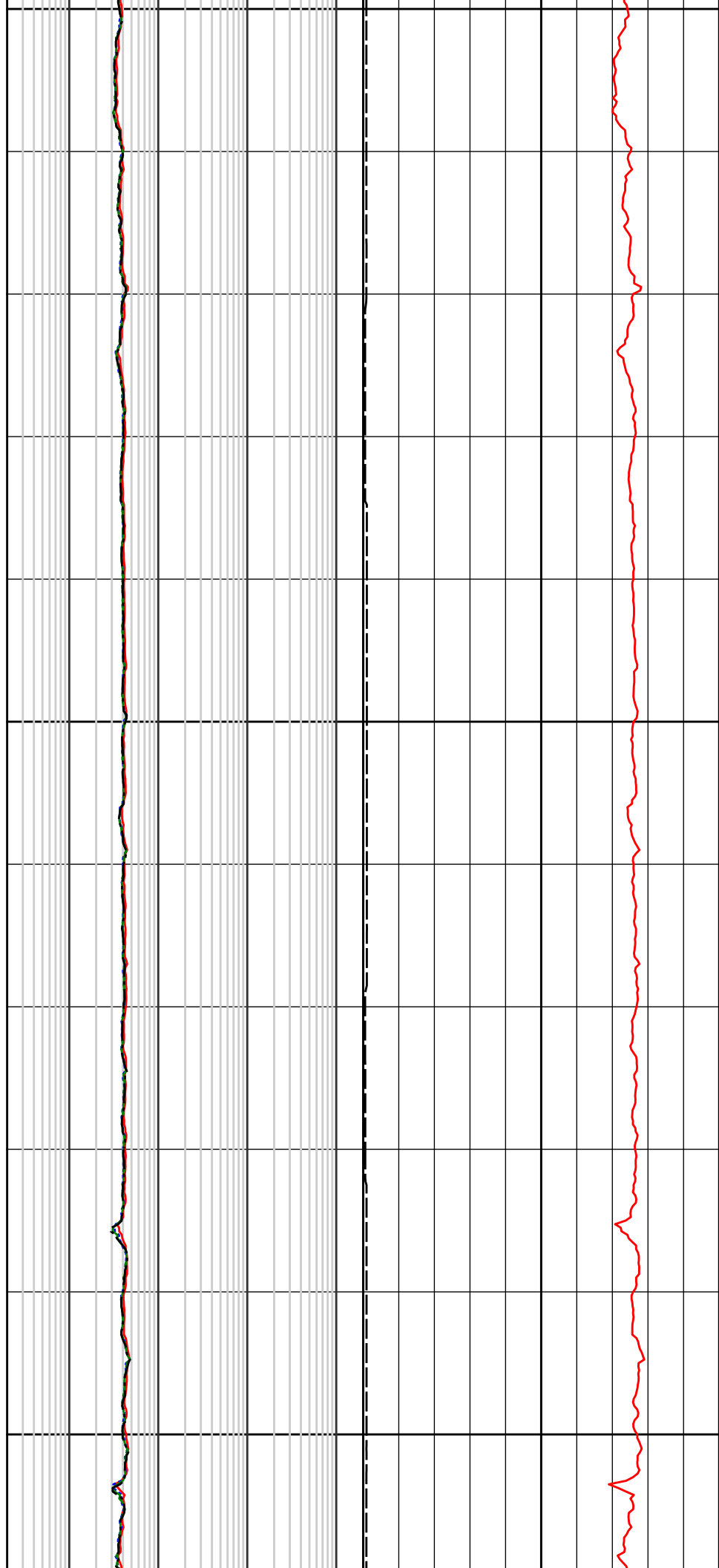


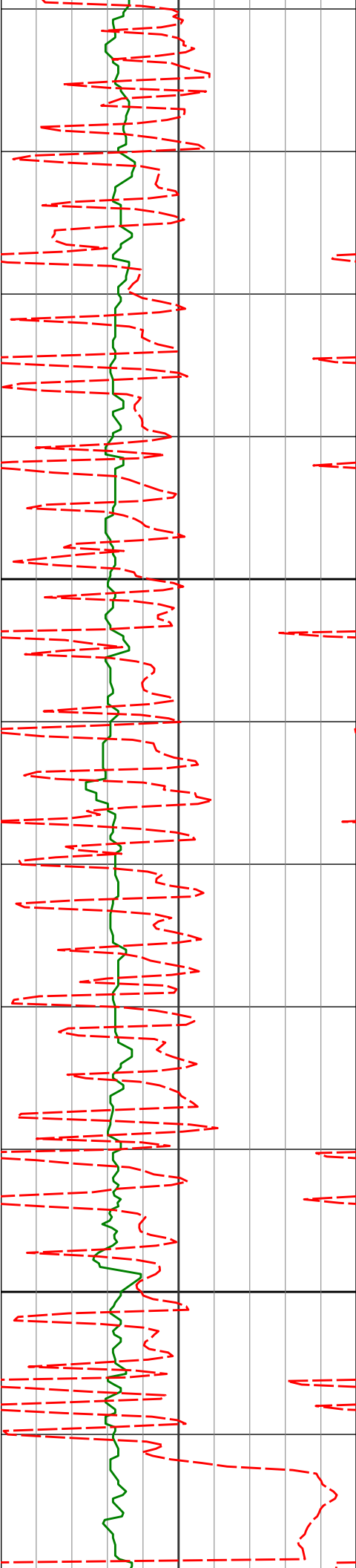


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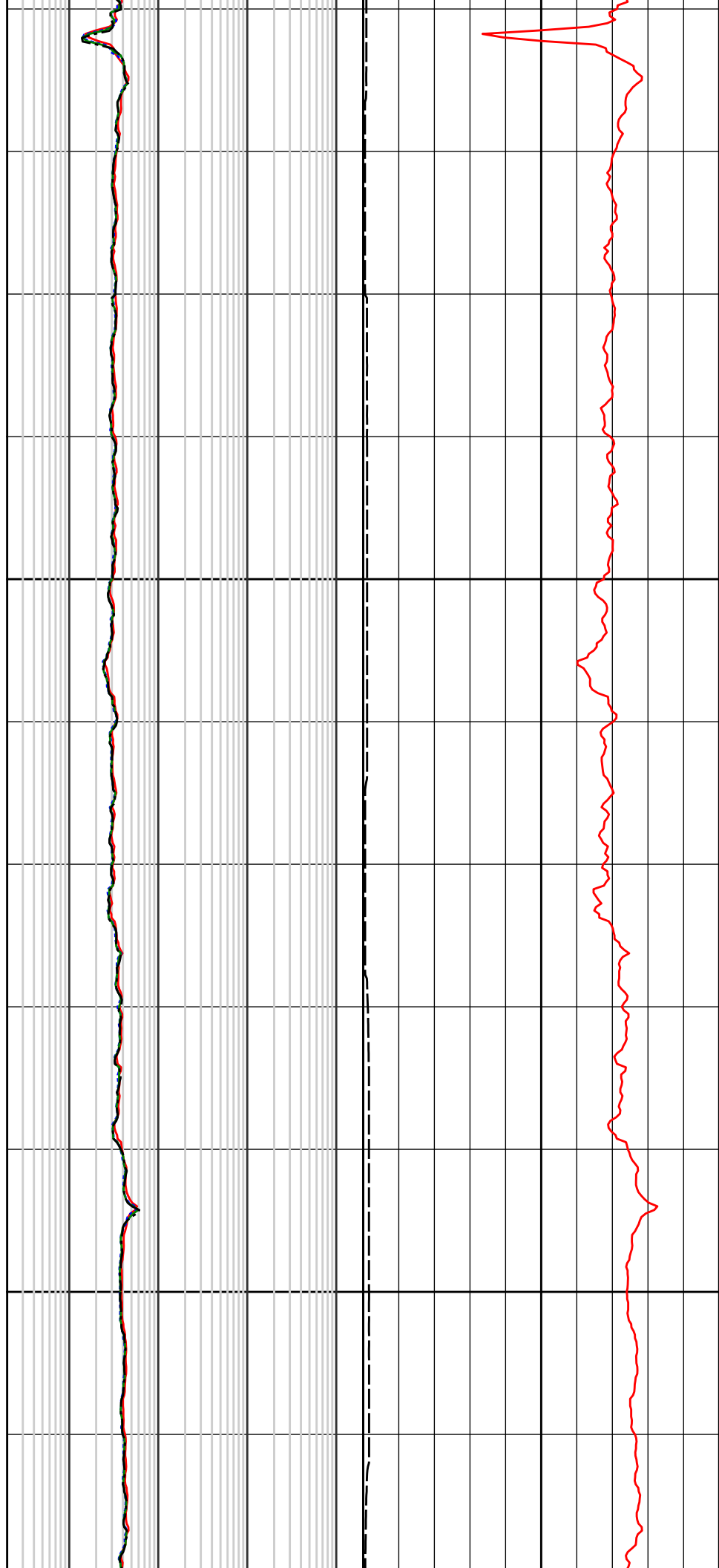
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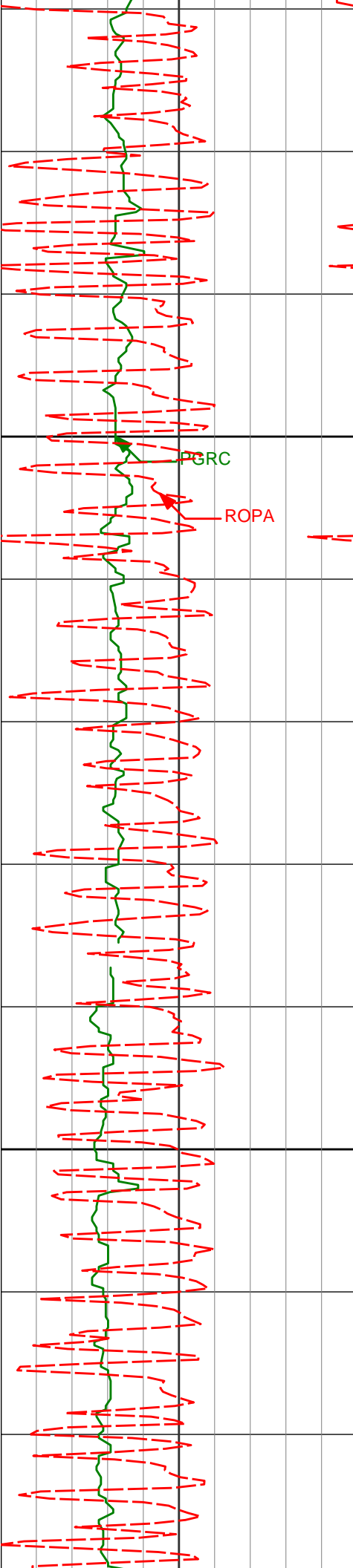




4800

4900





5000

R27P

R39P

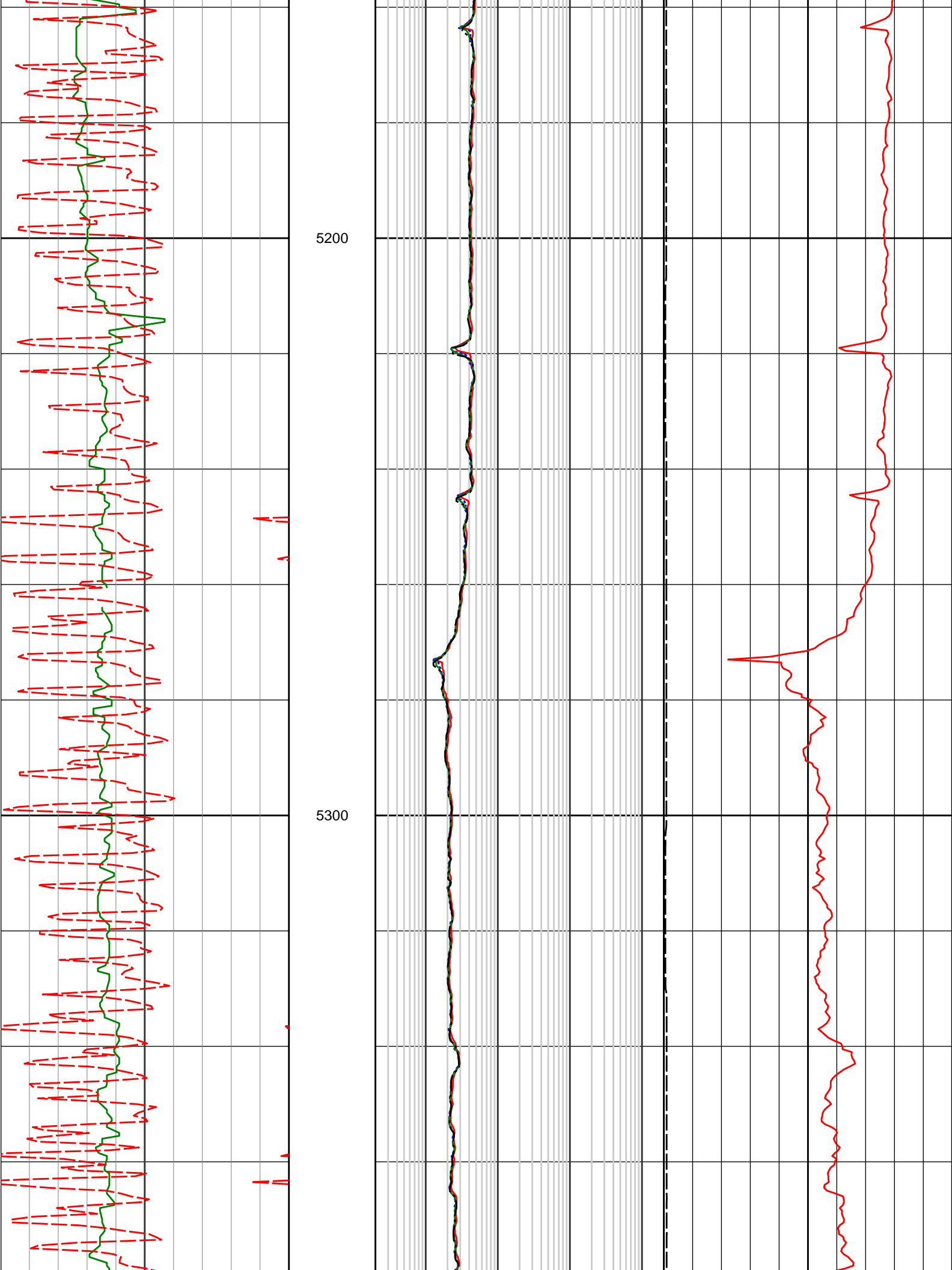
EWXT

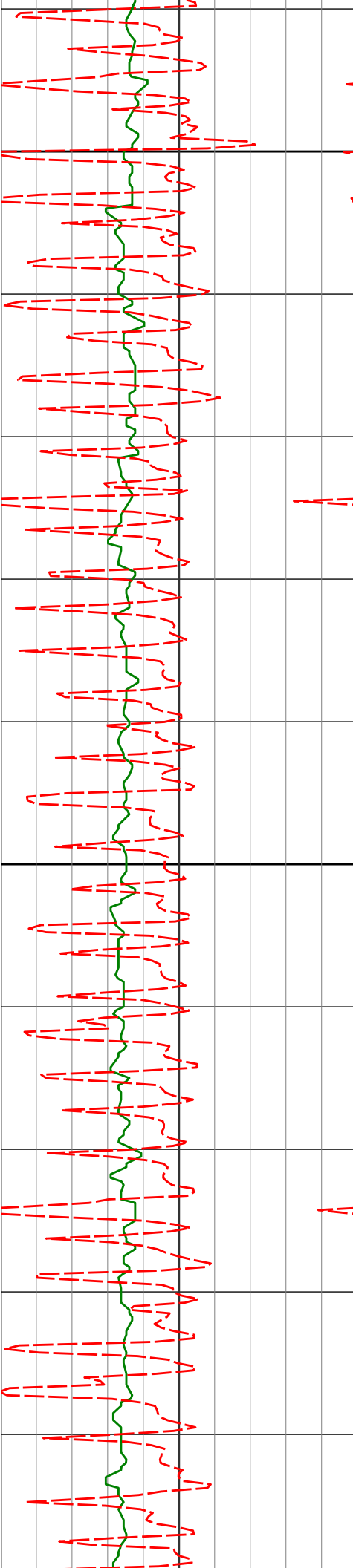
C39P

R15P

R09P

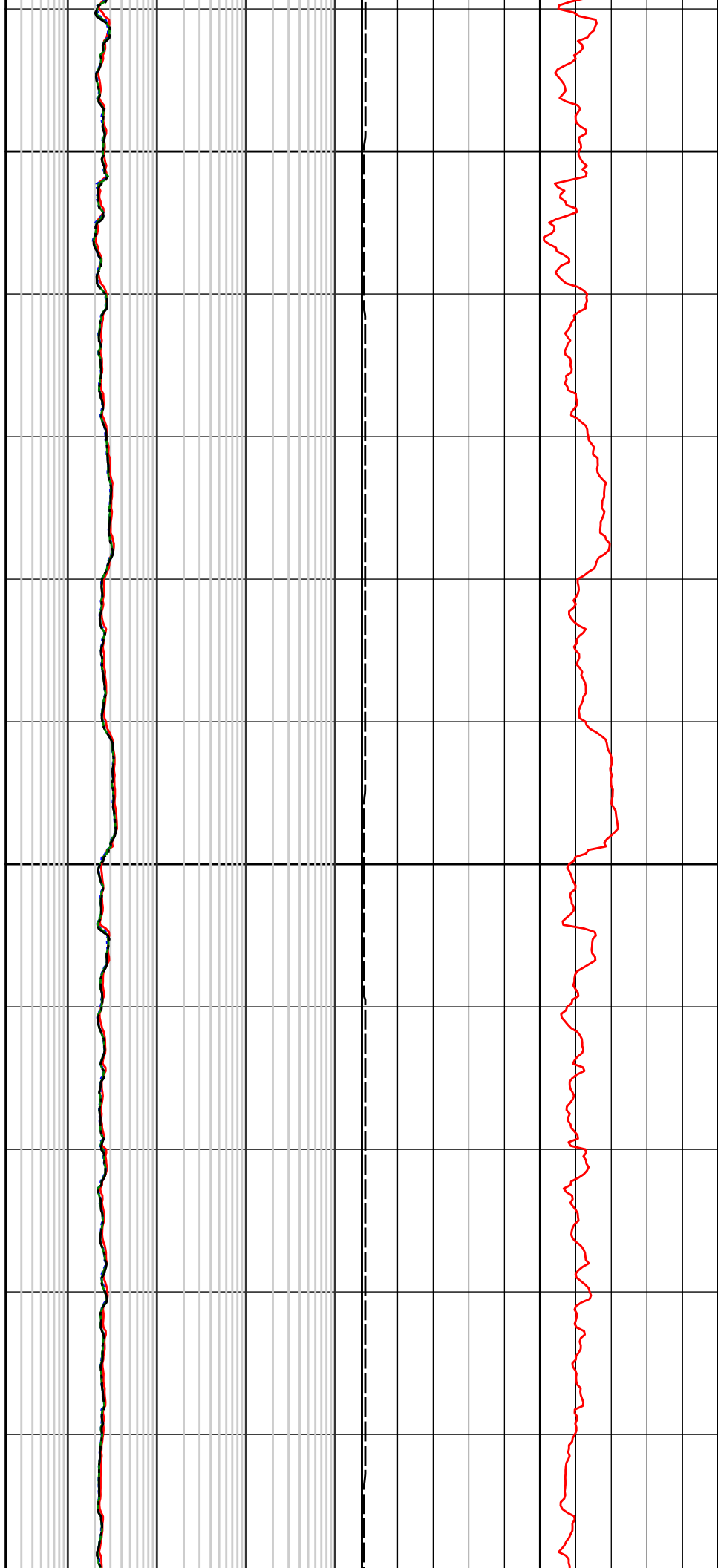
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5400

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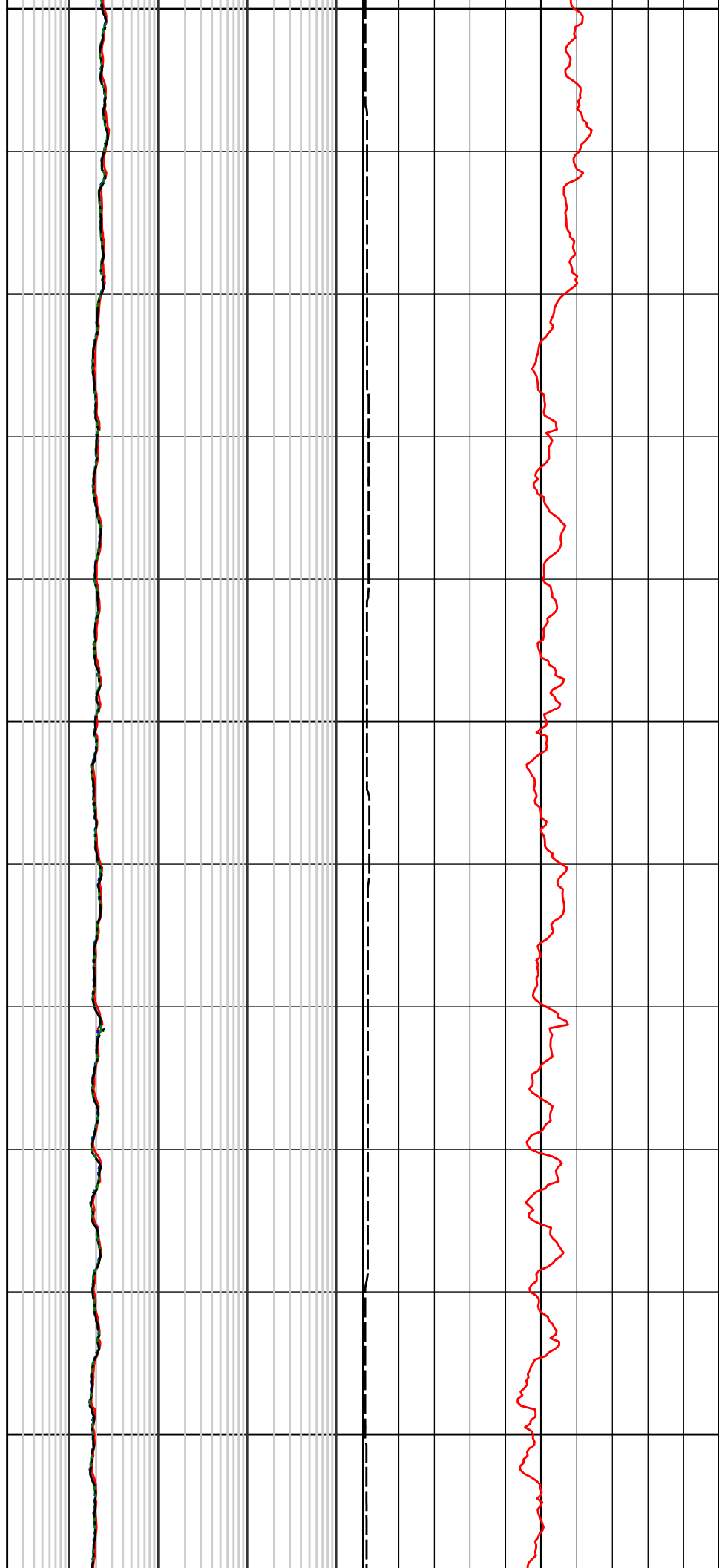


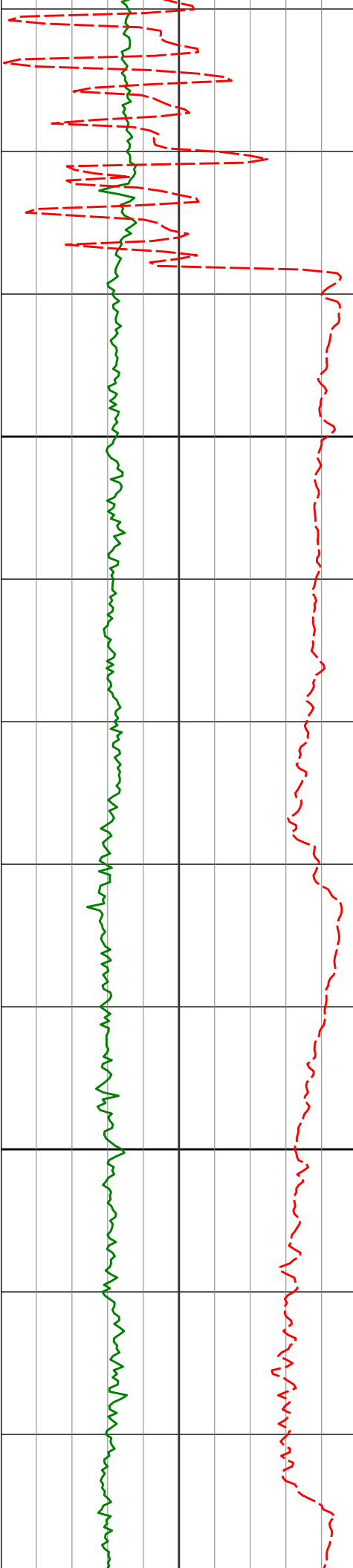


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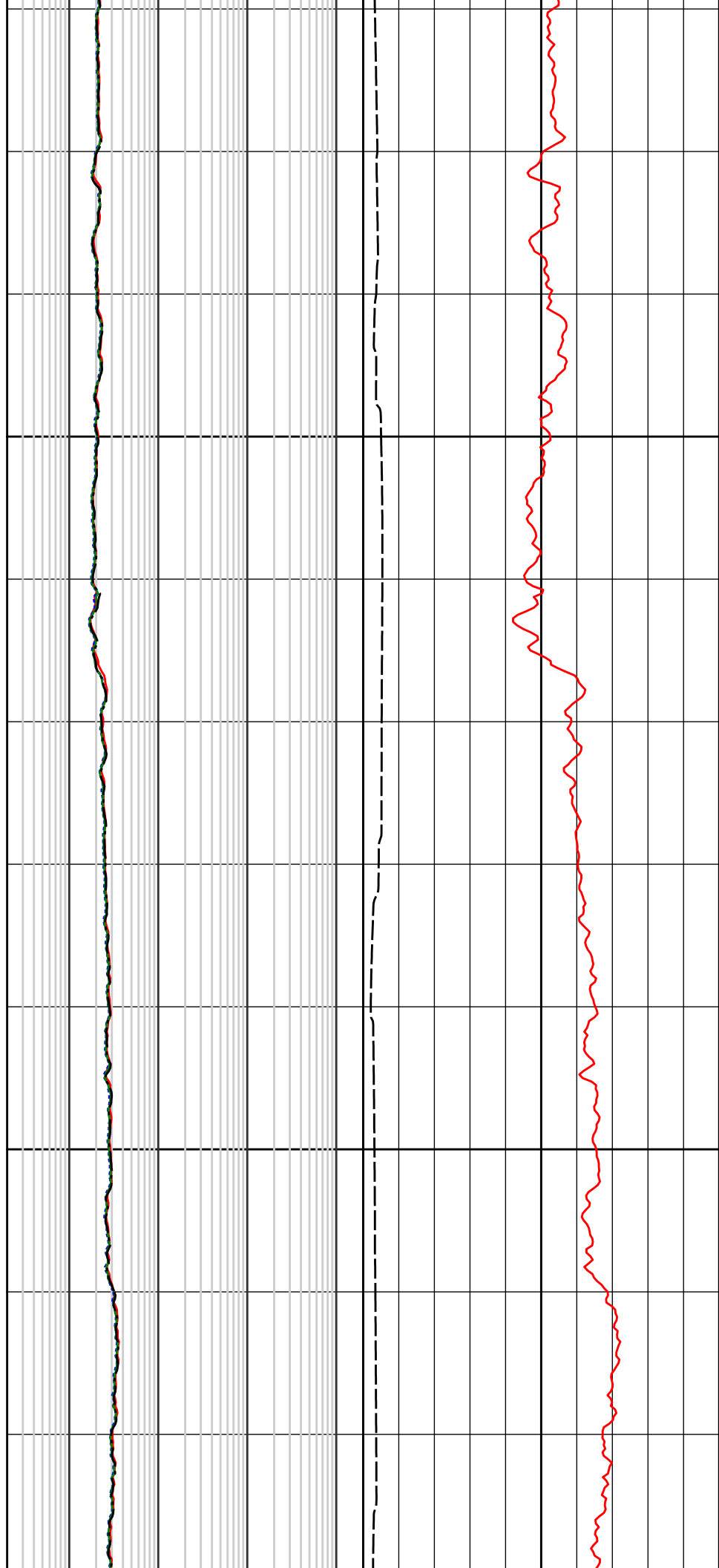
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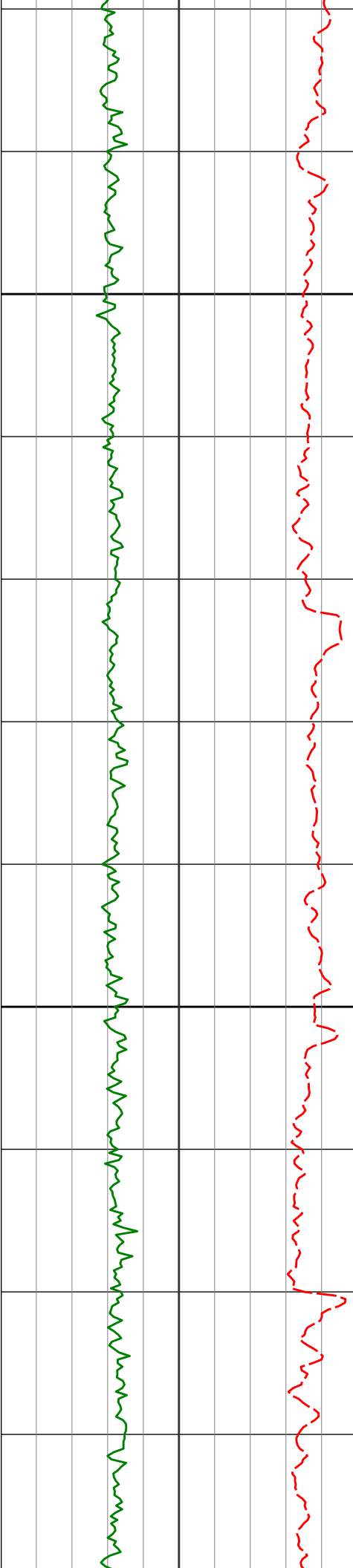




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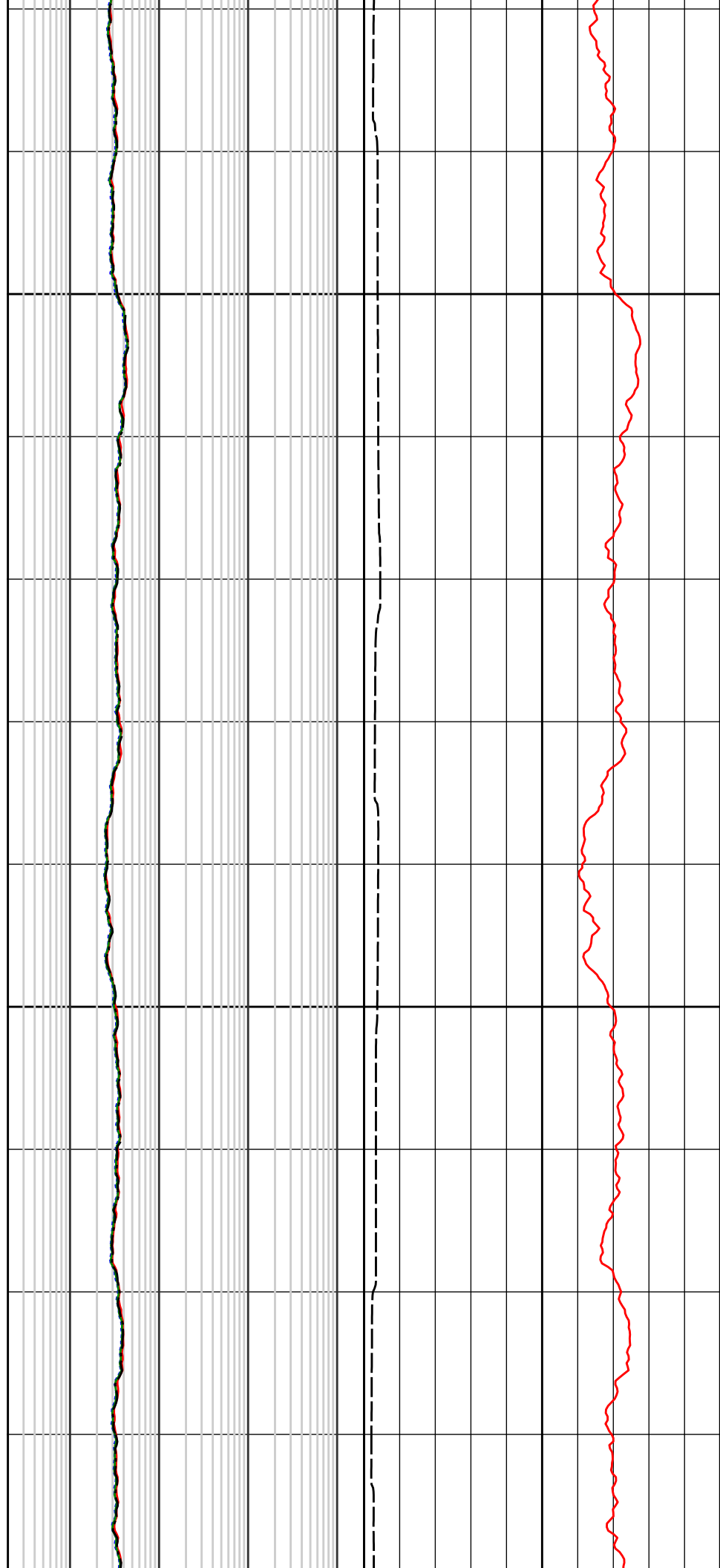
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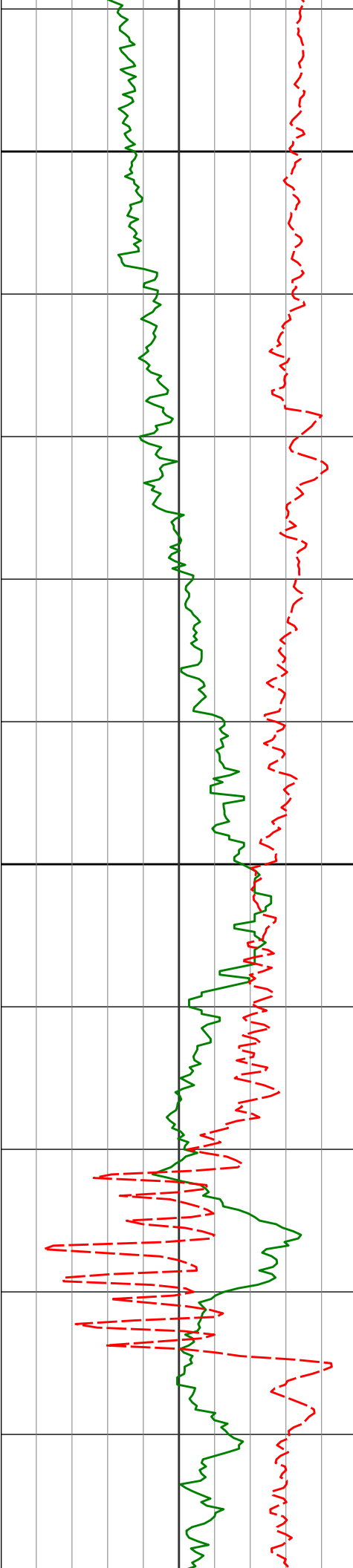




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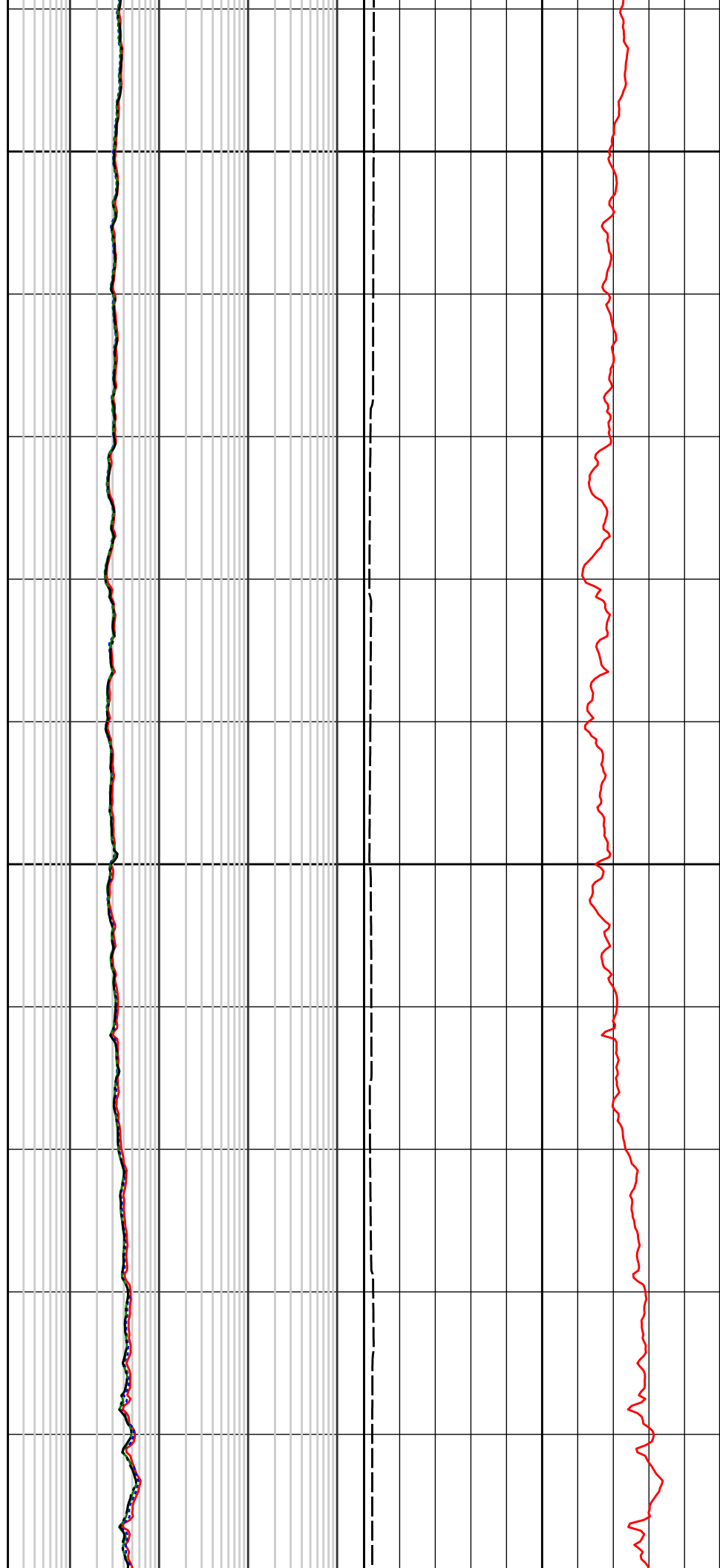
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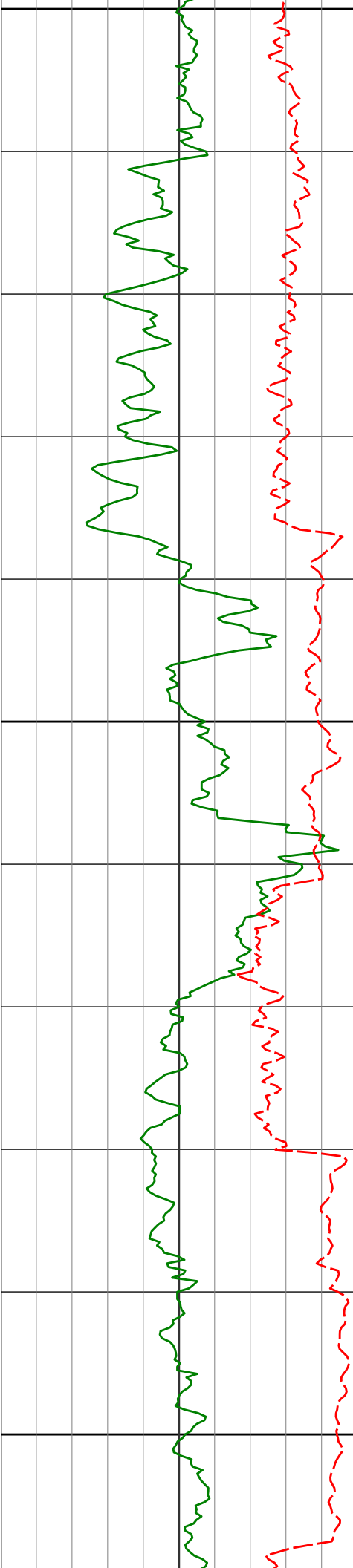




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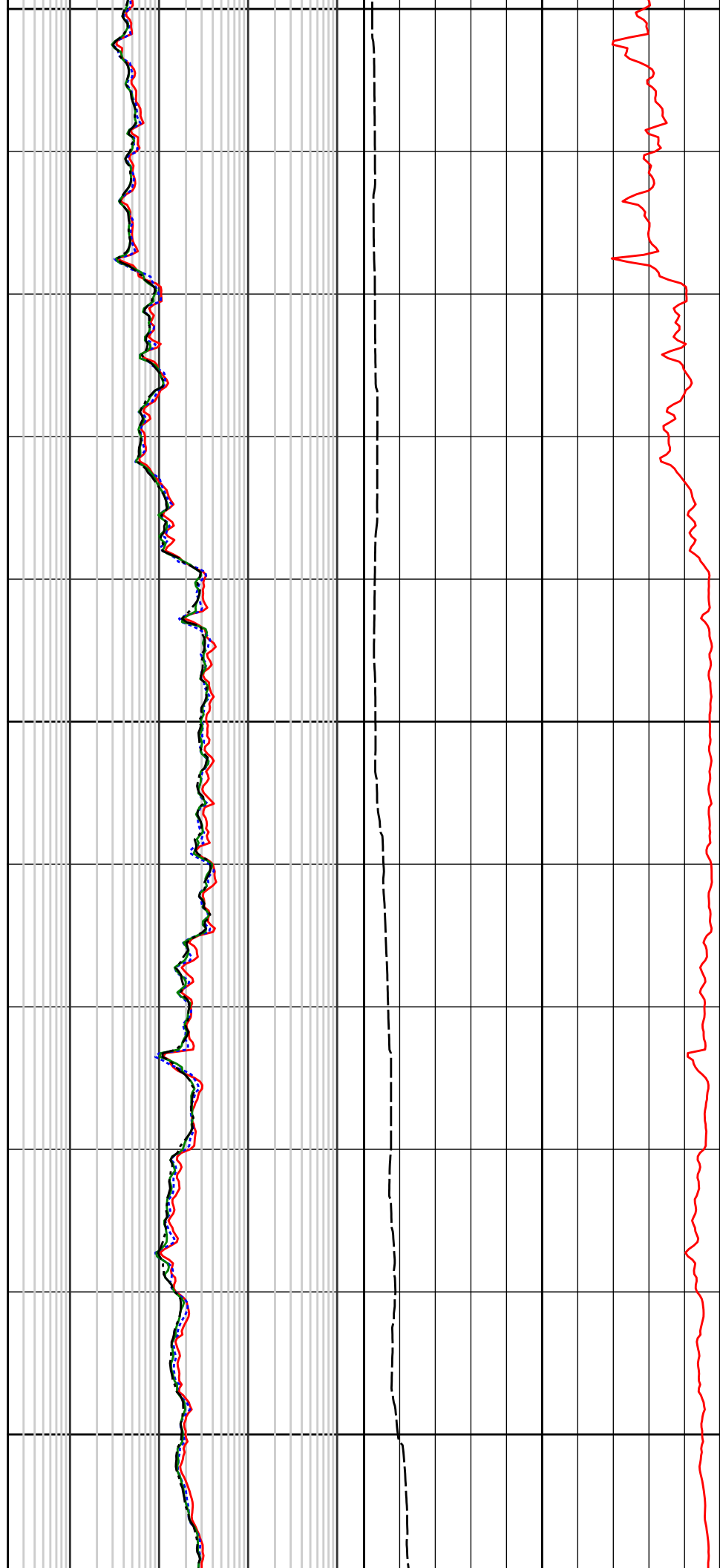


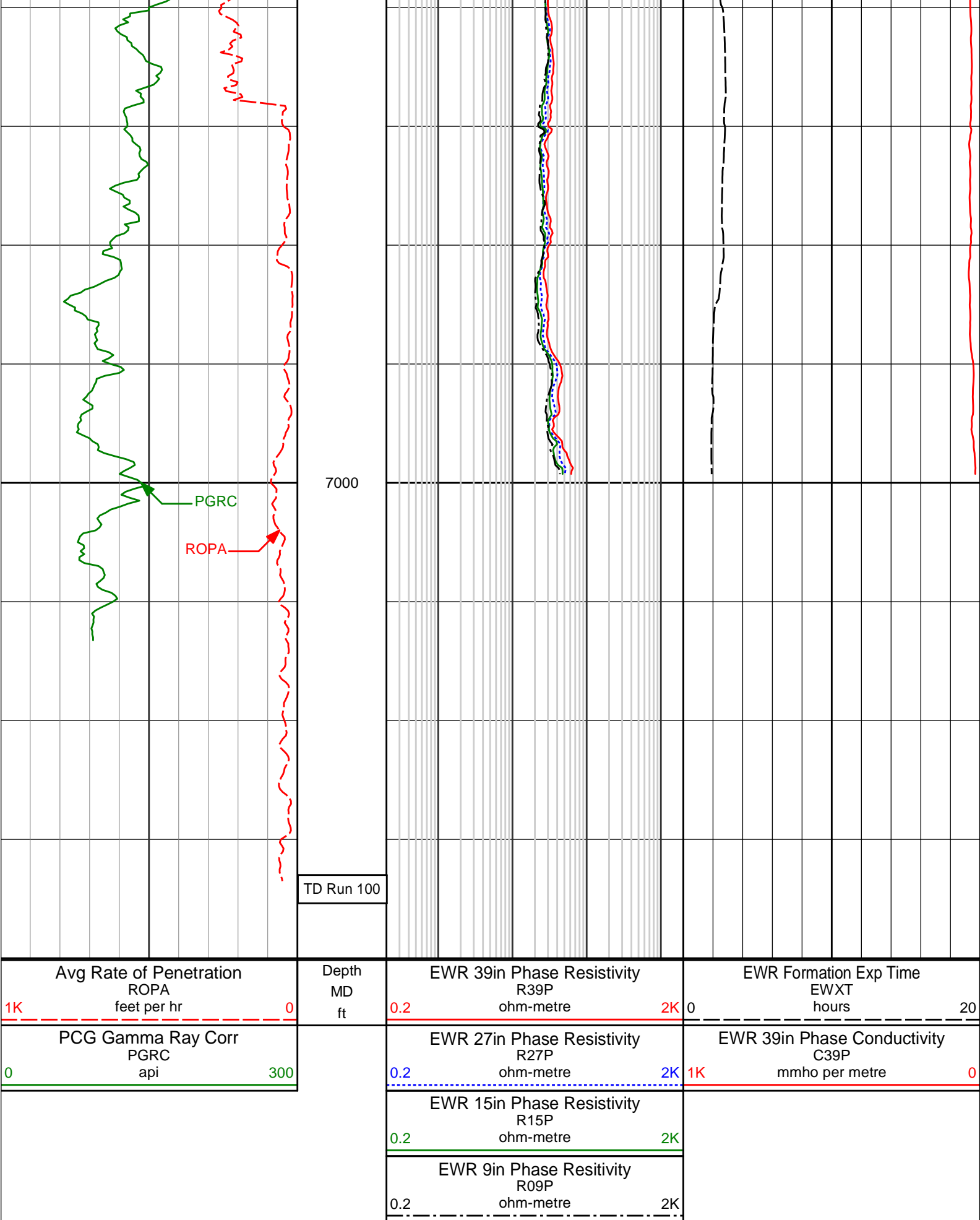


6700

6800

6900





DIRECTIONAL SURVEY REPORT

Noble Energy
Wells Ranch AA11-667
Wattenberg
Weld Colorado
USA
CA-XX-0902306869

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
250.00	0.41	312.00	250.00	0.60 N	0.66 W	0.70	0.16
500.00	0.82	312.00	499.98	2.39 N	2.66 W	2.80	0.16
664.00	1.06	312.00	663.96	4.20 N	4.66 W	4.90	0.15
759.00	0.97	315.95	758.95	5.36 N	5.88 W	6.19	0.13
854.00	1.30	312.20	853.93	6.66 N	7.23 W	7.61	0.35
1043.00	1.43	313.23	1042.87	9.72 N	10.54 W	11.10	0.07
1138.00	1.59	310.38	1137.84	11.38 N	12.40 W	13.06	0.18
1229.00	1.42	307.99	1228.81	12.89 N	14.25 W	14.99	0.20
1321.00	1.57	304.37	1320.78	14.31 N	16.19 W	17.02	0.20
1412.00	1.67	311.23	1411.74	15.89 N	18.22 W	19.13	0.24
1595.00	1.87	314.03	1594.65	19.72 N	22.37 W	23.51	0.12
1687.00	1.77	304.99	1686.61	21.58 N	24.62 W	25.86	0.33
1778.00	2.08	341.40	1777.56	23.95 N	26.29 W	27.67	1.36
1870.00	2.22	47.72	1869.51	26.73 N	25.51 W	27.06	2.56
1961.00	3.84	43.56	1960.38	30.12 N	22.11 W	23.86	1.79
2053.00	5.97	45.07	2052.04	35.73 N	16.60 W	18.70	2.32
2144.00	7.23	43.56	2142.43	43.22 N	9.30 W	11.86	1.40
2236.00	8.78	40.53	2233.53	52.75 N	0.75 W	3.89	1.74
2327.00	8.64	36.16	2323.48	63.55 N	7.80 E	-3.99	0.74
2419.00	8.04	33.53	2414.51	74.49 N	15.43 E	-10.95	0.77
2510.00	9.12	35.26	2504.49	85.68 N	23.10 E	-17.95	1.22
2602.00	8.39	28.87	2595.42	97.51 N	30.55 E	-24.68	1.32
2694.00	8.35	26.13	2686.44	109.39 N	36.74 E	-30.15	0.44
2786.00	9.37	34.45	2777.35	121.57 N	43.92 E	-36.59	1.78
2881.00	9.19	26.74	2871.11	134.73 N	51.71 E	-43.58	1.32
2976.00	9.16	23.65	2964.89	148.43 N	58.16 E	-49.20	0.52
3070.00	10.27	28.17	3057.54	162.67 N	65.12 E	-55.30	1.43
3165.00	10.21	26.51	3151.03	177.67 N	72.87 E	-62.14	0.32
3260.00	9.59	23.53	3244.61	192.46 N	79.79 E	-68.17	0.85
3355.00	9.16	20.67	3338.35	206.79 N	85.62 E	-73.13	0.67
3449.00	8.56	36.27	3431.24	219.43 N	92.40 E	-79.14	2.63
3544.00	7.22	37.40	3525.34	229.88 N	100.21 E	-86.32	1.42
3639.00	8.95	39.09	3619.39	240.35 N	108.49 E	-93.96	1.84
3733.00	9.95	38.15	3712.11	252.41 N	118.12 E	-102.85	1.08
3828.00	10.46	38.73	3805.61	265.60 N	128.59 E	-112.51	0.55
3923.00	10.98	37.81	3898.95	279.48 N	139.53 E	-122.61	0.58
4018.00	11.81	32.51	3992.08	294.83 N	150.30 E	-132.45	1.41
4112.00	10.04	32.52	4084.37	309.85 N	159.88 E	-141.11	1.89
4302.00	8.31	29.57	4271.93	335.76 N	175.56 E	-155.21	0.94
4397.00	7.10	28.66	4366.07	346.88 N	181.76 E	-160.74	1.28
4492.00	6.27	29.09	4460.43	356.57 N	187.10 E	-165.50	0.88
4587.00	6.24	27.74	4554.86	365.67 N	192.03 E	-169.87	0.16
4681.00	5.77	27.32	4648.35	374.39 N	196.57 E	-173.89	0.50
4776.00	4.91	25.89	4742.93	382.29 N	200.54 E	-177.37	0.91
4871.00	3.72	21.87	4837.66	388.80 N	203.46 E	-179.90	1.29
4966.00	1.13	18.82	4932.57	392.55 N	204.91 E	-181.13	2.72
5061.00	0.60	358.18	5027.56	393.93 N	205.20 E	-181.33	0.64
5156.00	0.79	37.26	5122.55	394.95 N	205.57 E	-181.65	0.52
5250.00	0.81	71.37	5216.54	395.67 N	206.60 E	-182.62	0.50
5345.00	0.96	53.00	5311.53	396.37 N	207.87 E	-183.86	0.34
5440.00	0.83	66.01	5406.52	397.13 N	209.14 E	-185.08	0.25
5535.00	1.25	61.90	5501.51	397.90 N	210.69 E	-186.58	0.44
5629.00	1.07	57.87	5595.49	398.85 N	212.33 E	-188.16	0.21
5819.00	0.14	11.87	5785.47	400.01 N	213.88 E	-189.63	0.51
5914.00	0.95	289.42	5880.47	400.39 N	213.16 E	-188.89	0.99
6009.00	1.95	265.28	5975.44	400.51 N	210.81 E	-186.54	1.21
6104.00	5.19	274.76	6070.24	400.74 N	204.92 E	-180.65	3.45
6198.00	10.48	274.04	6163.23	401.69 N	192.15 E	-167.84	5.62

6198.00	10.48	274.01	6163.33	401.69 N	192.13 E	-167.84	3.63
6293.00	18.59	276.69	6255.22	404.06 N	168.45 E	-144.04	8.56
6388.00	26.14	273.46	6343.01	407.09 N	132.46 E	-107.94	8.05
6483.00	35.09	270.46	6424.69	408.57 N	84.16 E	-59.64	9.55
6578.00	46.93	271.19	6496.24	409.51 N	21.94 E	2.53	12.47
6672.00	53.92	271.77	6556.09	411.40 N	50.44 W	74.90	7.45
6767.00	60.43	269.94	6607.56	412.54 N	130.22 W	154.60	7.04
6862.00	65.79	267.34	6650.52	410.49 N	214.88 W	238.98	6.15
6957.00	72.26	268.05	6684.52	406.93 N	303.46 W	327.20	6.84
7014.00	77.89	268.34	6699.20	405.20 N	358.49 W	382.02	9.90

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 273.42 DEGREES (GRID)
A TOTAL CORRECTION OF 7.65 DEG FROM MAGNETIC NORTH TO GRID NORTH HAS BEEN APPLIED**

**HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.
HORIZONTAL DISPLACEMENT(CLOSURE) AT 7014.00 FEET
IS 541.02 FEET ALONG 318.50 DEGREES (GRID)**