sperry-sun DRILLING SERVICES
A Halliburton Company

1 : 200

INSITE

MWD

EWR Electromagnetic Wave Resistivity
DGR Dual Gamma Ray

Country : **Australia**
Field : **Exploration**
Location : **Lat: 38° 48' 50.381" South**
Long: 141° 50' 39.579" East
Well : **Hill-1**
Company : **Santos SBU**
Rig : **Ocean Epoch**

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Well : **Hill-1**
Field : **Exploration**
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DOE Number :

LOCATION
Latitude : **Lat: 38° 48' 50.381" South**
Longitude : **Long: 141° 50' 39.579" East**
UTM Easting = 573,303.40 m
UTM Northing = 5,703,525.73 m

Other Services

Permanent Datum : **LAT**
Log Measured From : **Drill Floor** **22.40 m** Above Permanent Datum
Drilling Measured From : **Drill Floor**
Elevation : **0.00 m**

MD LOG

Elev. KB
DF **22.40 m**
GL
WD **215.00 m**

Depth Logged : **777.00 m** To **2,575.00 m**
Date Logged : **08-Dec-03** To **20-Dec-03**
Total Depth MD : **2,575.00 m** TVD : **2,574.85 m**
Spud Date : **08-Dec-03**

Unit No. : **LT-1087** Job No. : **AU-FE-0002774266**
Plot Type : **Final**
Plot Date : **21-Jan-04**

Run No.	Borehole Record (MD) Size	From	To
100	311.000 mm	777.00 m	1,810.00 m
200	216.000 mm	1,810.00 m	2,575.00 m

Run No.	Borehole Record (MD) Size	From	To

Casing Record (MD) Size	Weight	From	To
340.000 mm	101.00 kgpm	215.00 m	769.00 m
244.000 mm	70.00 kgpm	215.00 m	1,801.00 m

WELL INFORMATION

MWD Run Number	100	200																											
Date run completed	16-Dec-03	20-Dec-03																											
Rig Bit Number	100	200																											
Bit Size (mm)	311	216																											
Tool Nominal OD (mm)	203	171																											
Log Start Depth (MD, m)	777.00	1,810.00																											
Log End Depth (MD, m)	1,810.00	2,575.00																											
Drill or Wipe	Drilling	Drilling																											
Drill/Wipe Start Date and Time	15-Dec-03 06:00	18-Dec-03 19:06																											
Drill/Wipe End Date and Time	16-Dec-03 13:10	20-Dec-03 01:34																											
Min Inc (deg) @ Depth (MD, m)	0.12 @ 787.46	0.12 @ 2,266.83																											
Max Inc (deg) @ Depth (MD, m)	1.04 @ 1,569.90	0.88 @ 1,830.94																											
Bit TFA(in2) / Bit Type	0.65 / HC-605	0.55 / DSX104-HGN																											
Flow Rate (gpm)	860	650																											
Max AV (mpm) / CV (mpm) @ MWD	82.2 / 127.4	49.9 / 141.7																											
Fluid Type	KCl/PHPA	KCl/PHPA																											
Density (sg) / Viscosity (spl)	1.1 / 42.3	1.1 / 74.0																											
Filtrate CL (ppm)	37000	42000																											
pH / Fluid Loss (cptm)	8.8 / 7.0	9.5 / 0.25																											
PV (cp) / YP (pa)	16 / 11.5	23 / 16.7																											
% Solids / % Sand	6 / 0.6	9.5 / 0.25																											
% Oil / Oil:Water Ratio	N/A / N/A:100	N/A / N/A:100																											
Rm @ Measured Temp (degC)	0.11 @ 18.00	0.08 @ 18.00																											
Rmf @ Measured Temp (degC)	0.10 @ 18.00	0.06 @ 18.00																											
Rmc @ Measured Temp (degC)	0.12 @ 18.00	0.12 @ 18.00																											
Max Tool Temp (degC) / Source	52.00 / EWR P4	70.00 / EWR-P4																											
Rm @ Max Tool Temp (degC)	0.06 @ 52.00	0.03 @ 70.00																											
Lead MWD Engineer	T.Oborne	T.Oborne																											
Customer Representative	G.Howard	G.Howard																											

SENSOR INFORMATION

Downhole Processor Information

Tool Type	HCIM	HCIM			
Software Version	66.37	66.37			
Sub Serial Number	198839	197931			
Insert Serial Number	170439	191774			
Logging String Serial Number	DM90033559XHGR8	DM90033562XHGR6			
Date and Time Initialized	14-Dec-03 18:30	18-Dec-03 12:37			
Date and Time Read	16-Dec-03 21:59	20-Dec-03 18:34			

Directional Sensor Information

Tool Type	DM	DM			
Distance From Bit (m)	16.02	11.06			
Software Version	3.15	3.15			
Sub Serial Number	N/A	N/A			
Sonde Serial Number	103286	185534			
Sensor ID Number	N/A	N/A			
Survey String Serial Number	DM90026201F8	N/A			
Toolface Offset (deg)	N/A	N/A			

Gamma Ray Sensor Information

Tool Type	DGR	DGR			
Distance From Bit (m)	12.49	7.51			
Recorded Sample Period (sec)	12	12			
Software Version	N/A	N/A			
Sub Serial Number	196051	078523			
Insert/Sonde Serial Number	188554	016131			

Resistivity Sensor Information

Tool Type	EWR-P4	EWR-P4			
Distance From Bit (m)	9.46	4.47			
Recorded Sample Period (sec)	12	12			
Software Version	1.38	1.38			
Sub Serial Number	96508	134751			
Receiver Insert Serial Number	77242	130937			
Transmitter Insert Serial Number	135158	123469			
Receiver Orientation	Down	Down			

REMARKS

1. All depths are bit depths and referenced to the drillers pipe tally.

2. AV/CV is calculated at the MWD collar using the Power Law for water based muds and the Binghams Plastic Law for oil based muds.

3. Curve mnemonics are :

SGRC - Smoothed Gamma Ray Combined, api
SEXP - Smoothed Extra Shallow Phase-Shift Derived Resistivity, ohm-m
SESP - Smoothed Shallow Phase-Shift Derived Resistivity, ohm-m
SEMP - Smoothed Medium Phase-Shift Derived Resistivity, ohm-m
SEDP - Smoothed Deep Phase-Shift Derived Resistivity, ohm-m
SROP - Smoothed Rate of Penetration, m/hr
SFXE - Smoothed Formation Exposure Time, hr
STEM - Smoothed EWR-P4 Temperature, Deg C

4. Mud system changed from sea water and Hi-Vis sweeps to KCl/PHPA at 1435.0 mMDRT.

WARRANTY

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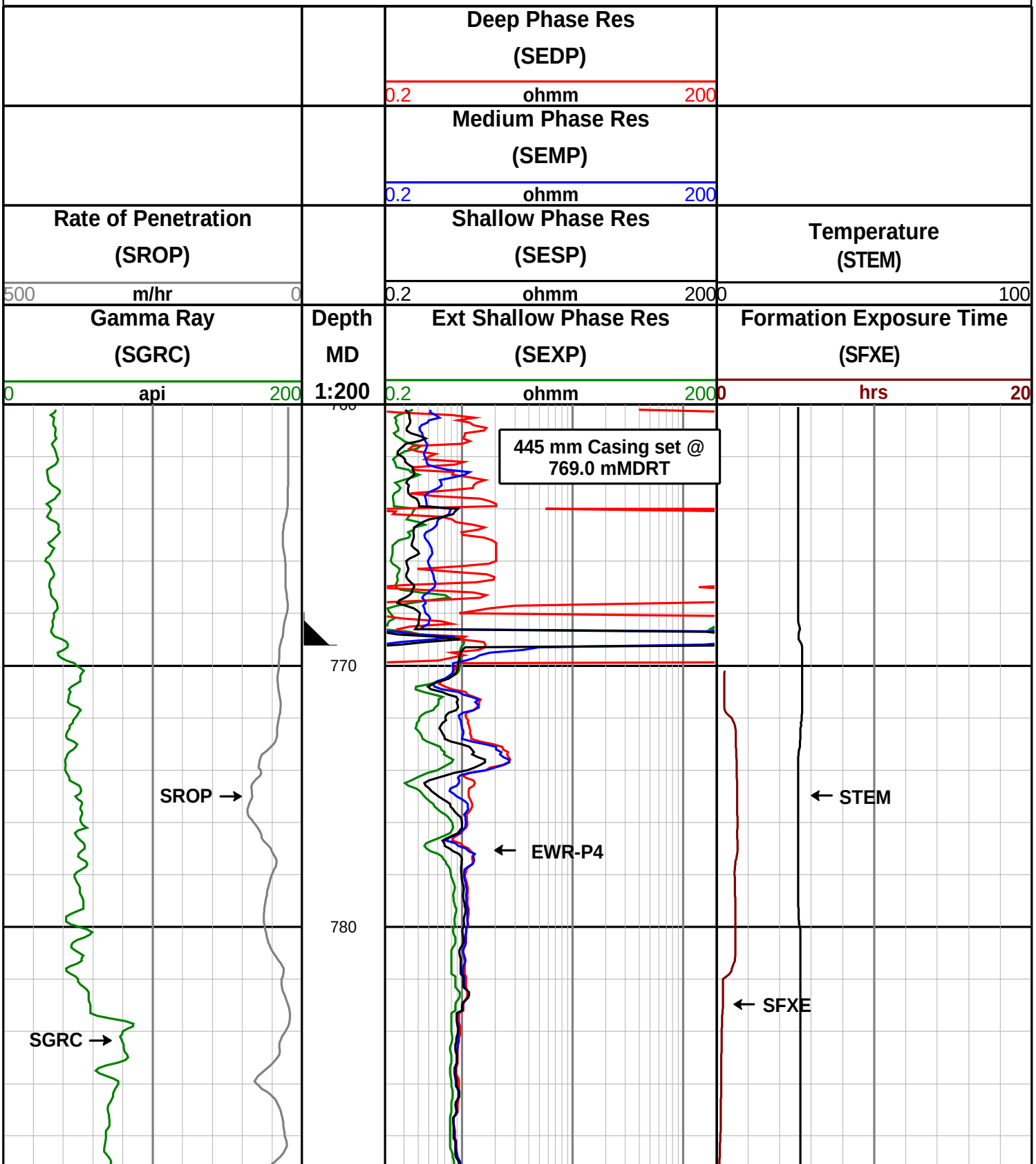

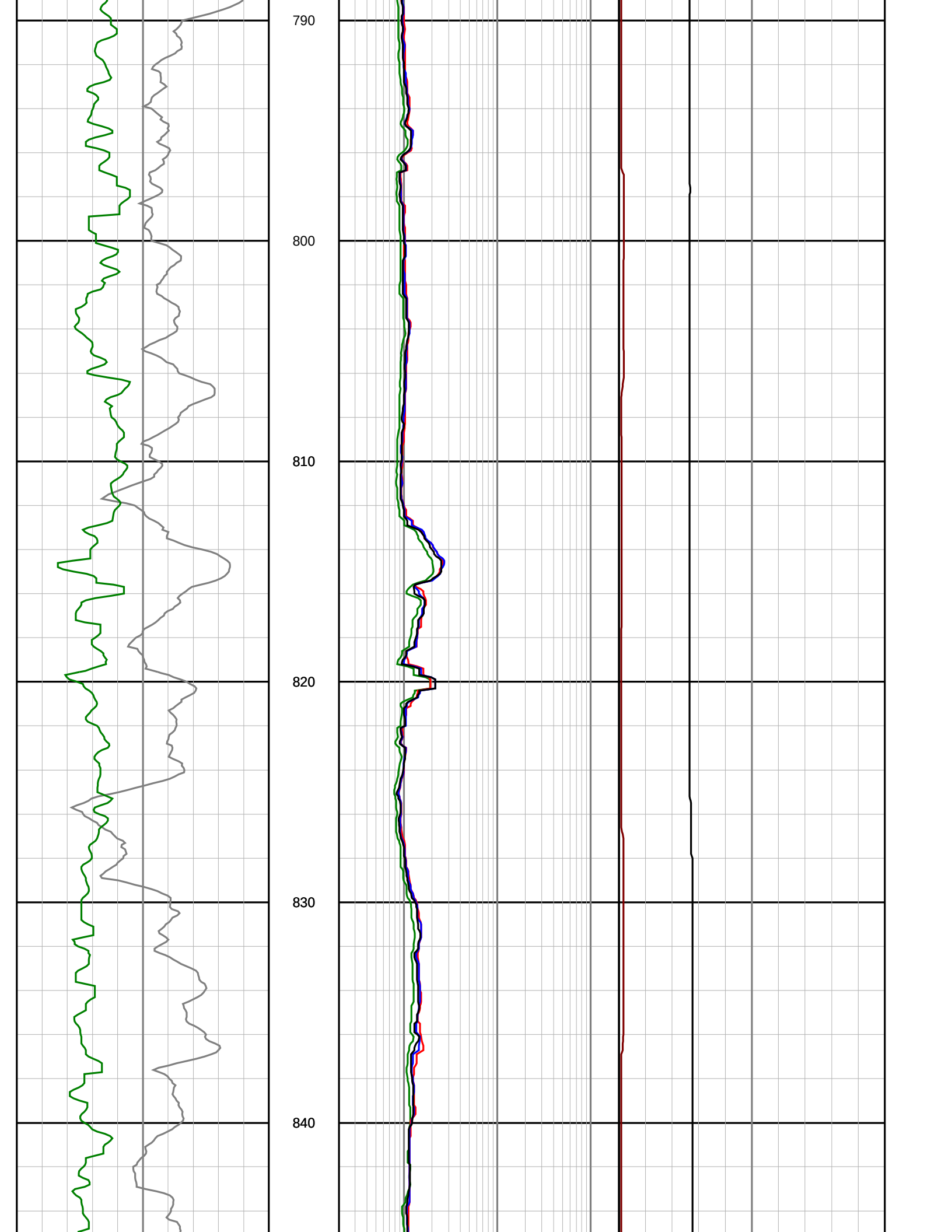
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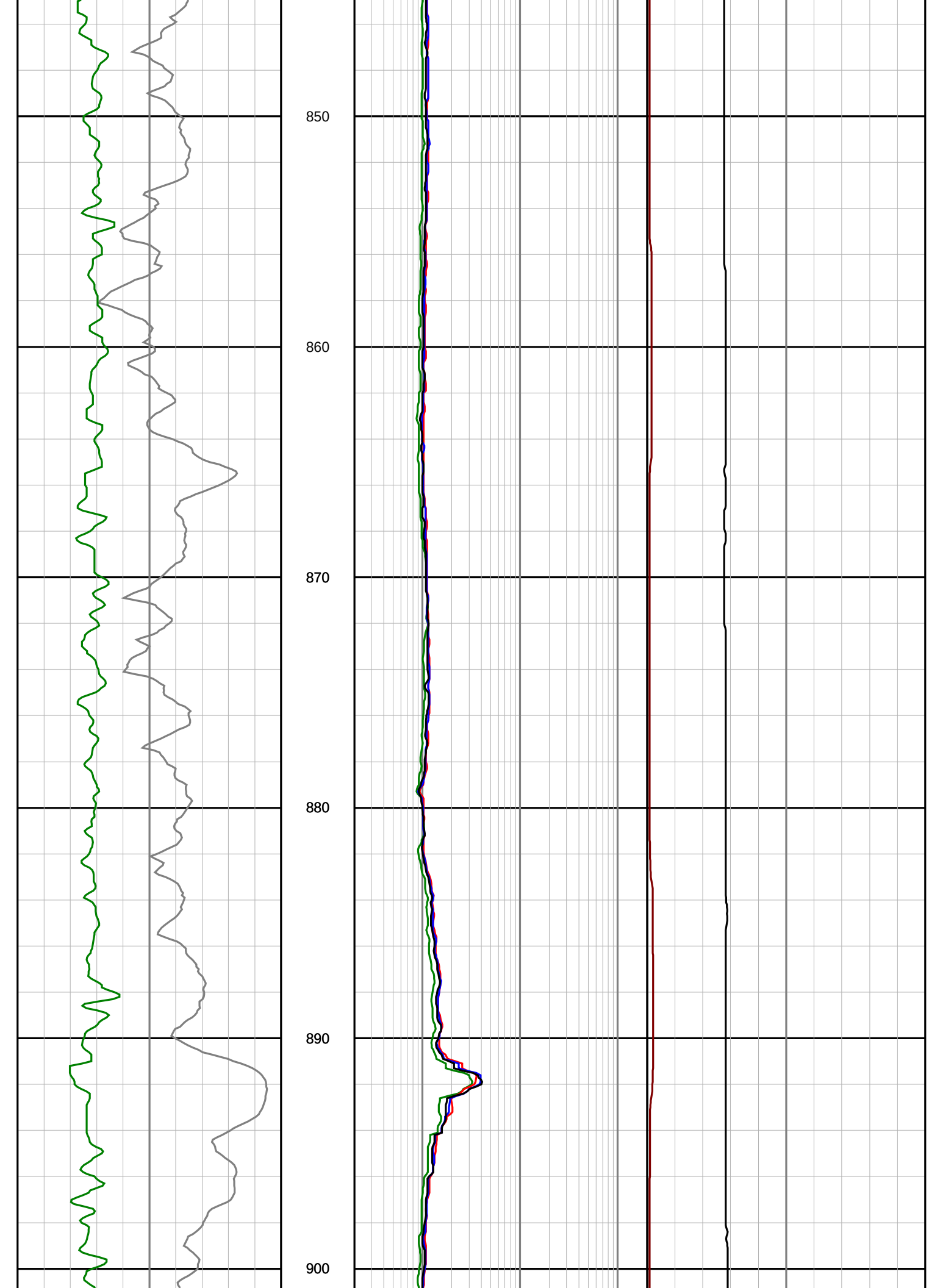
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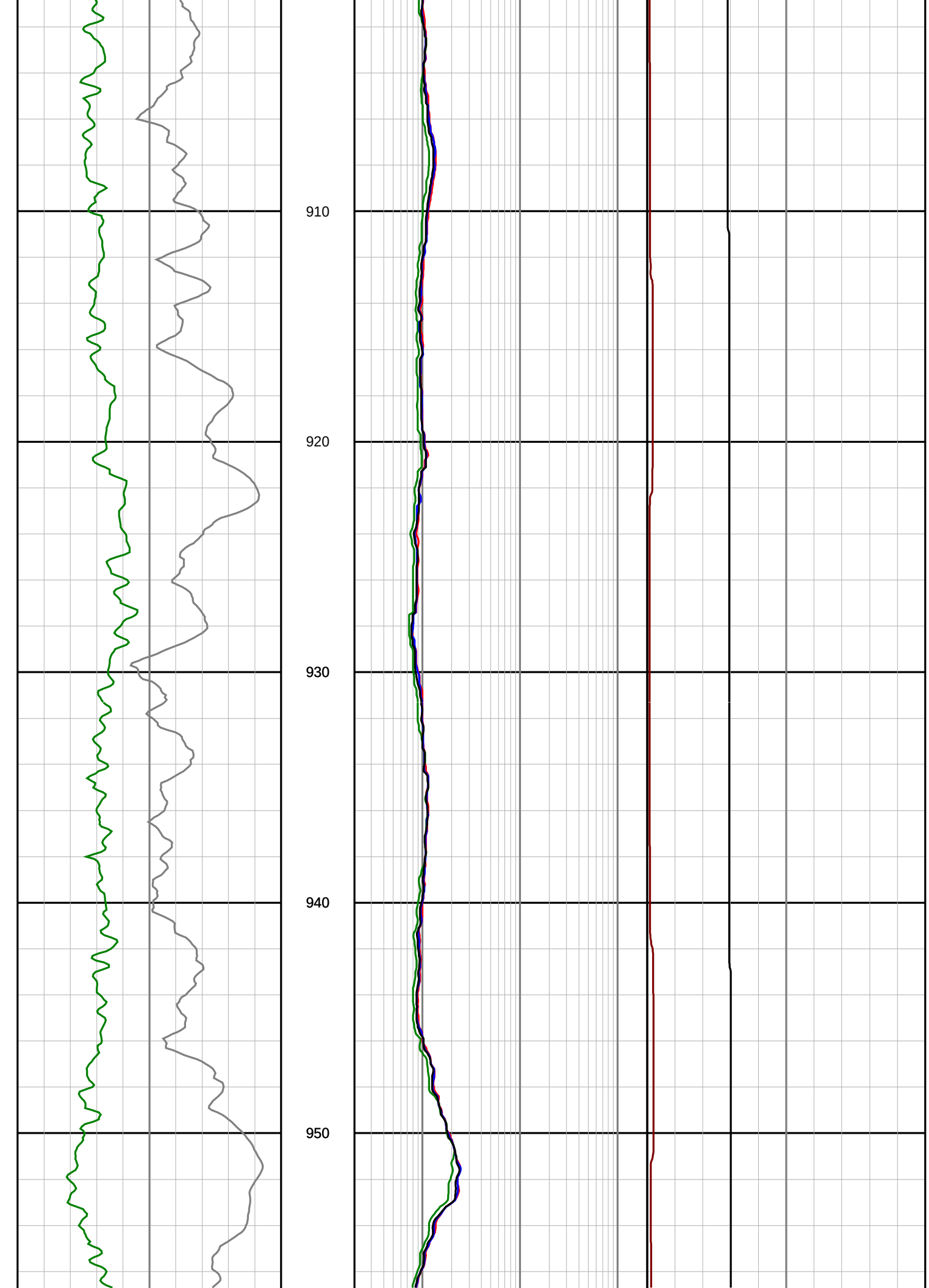
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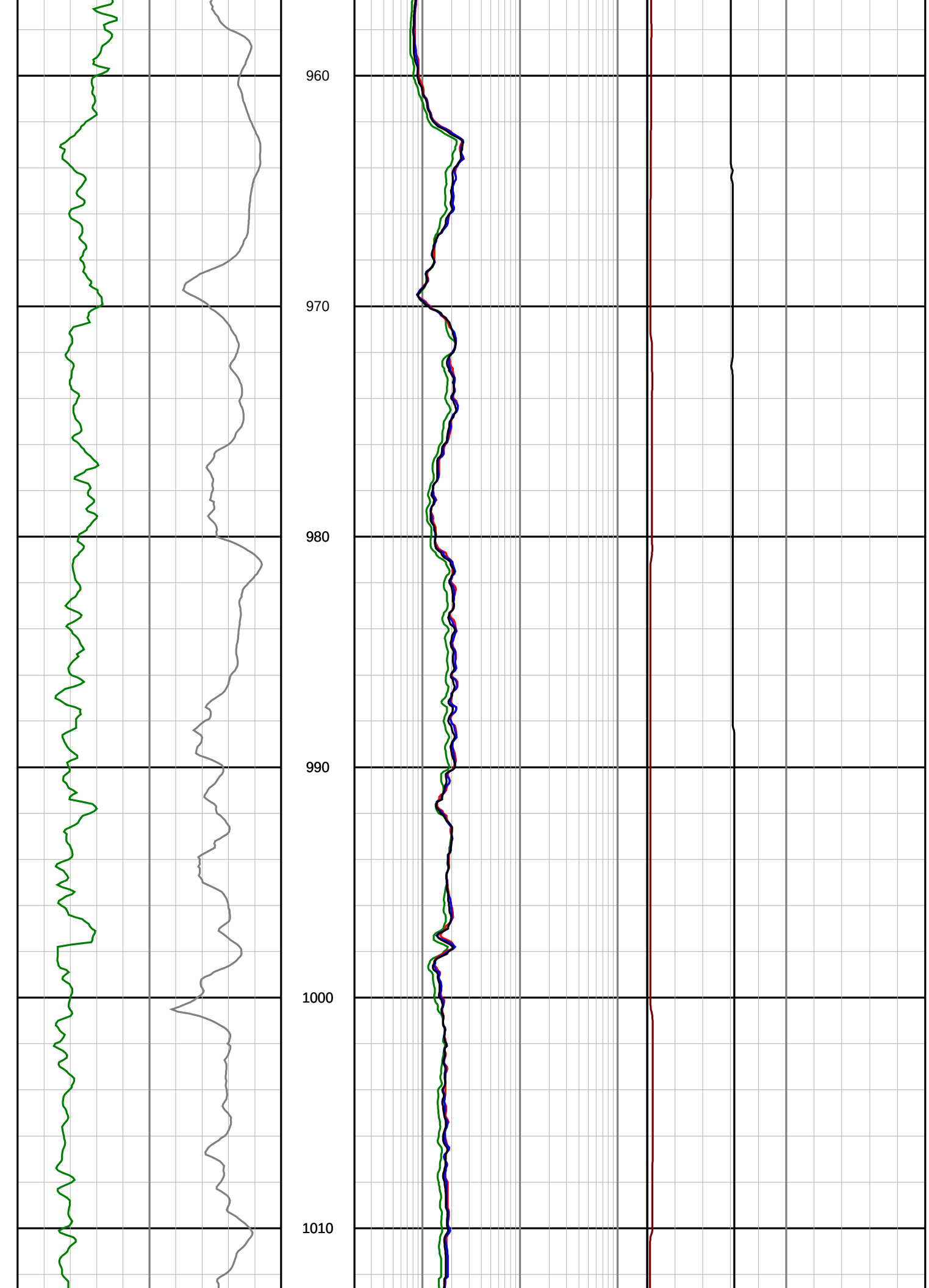
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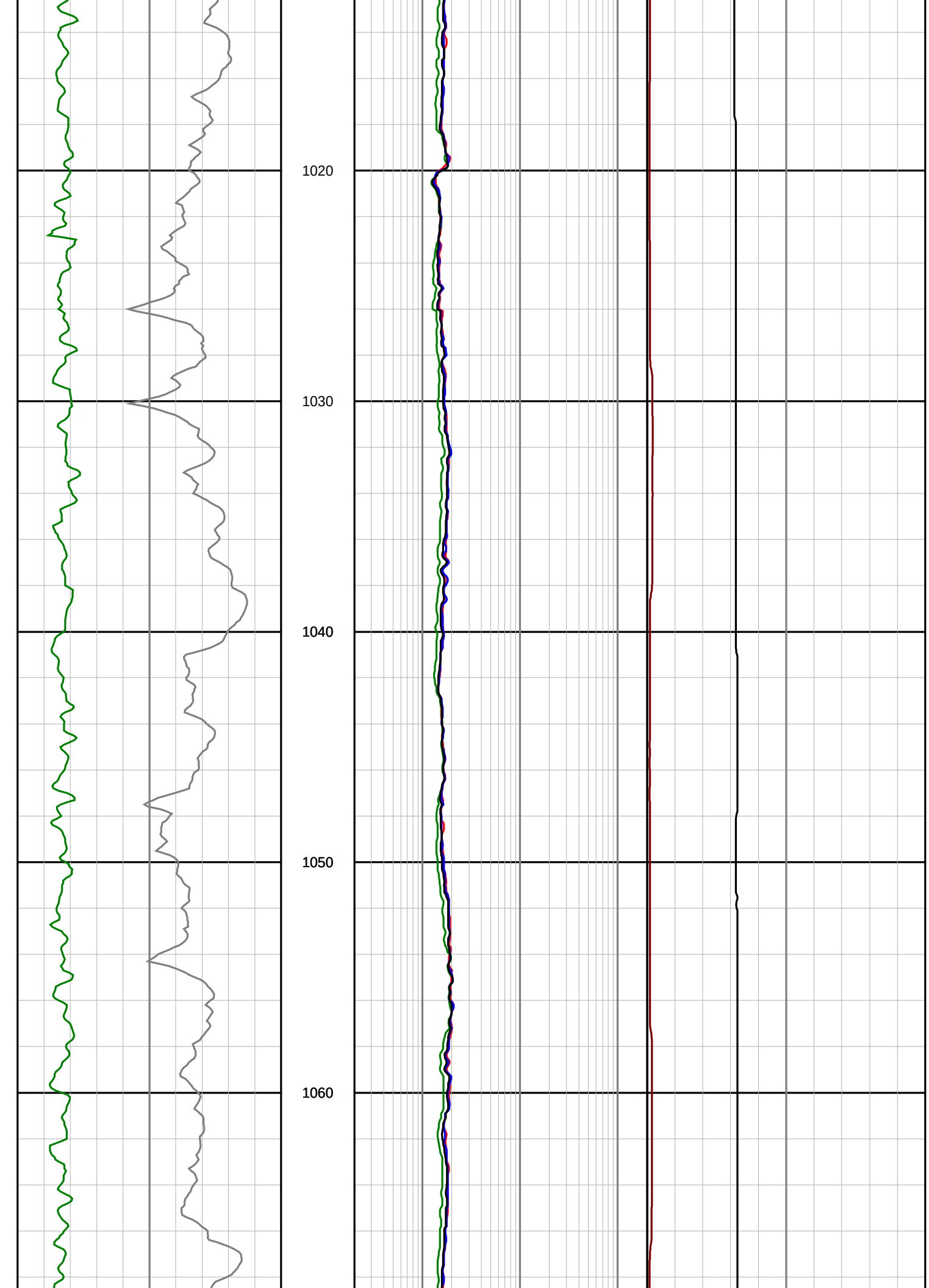
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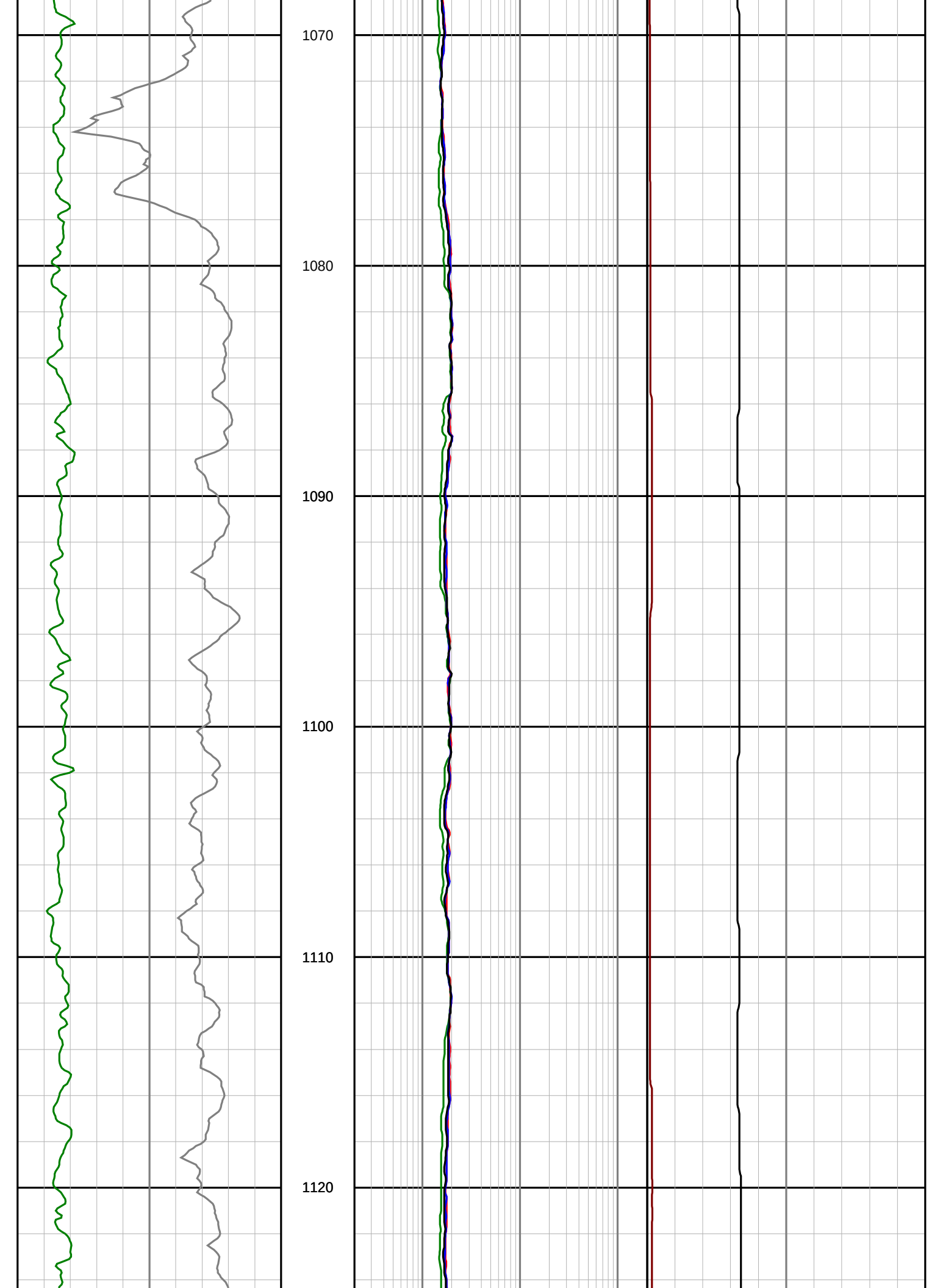
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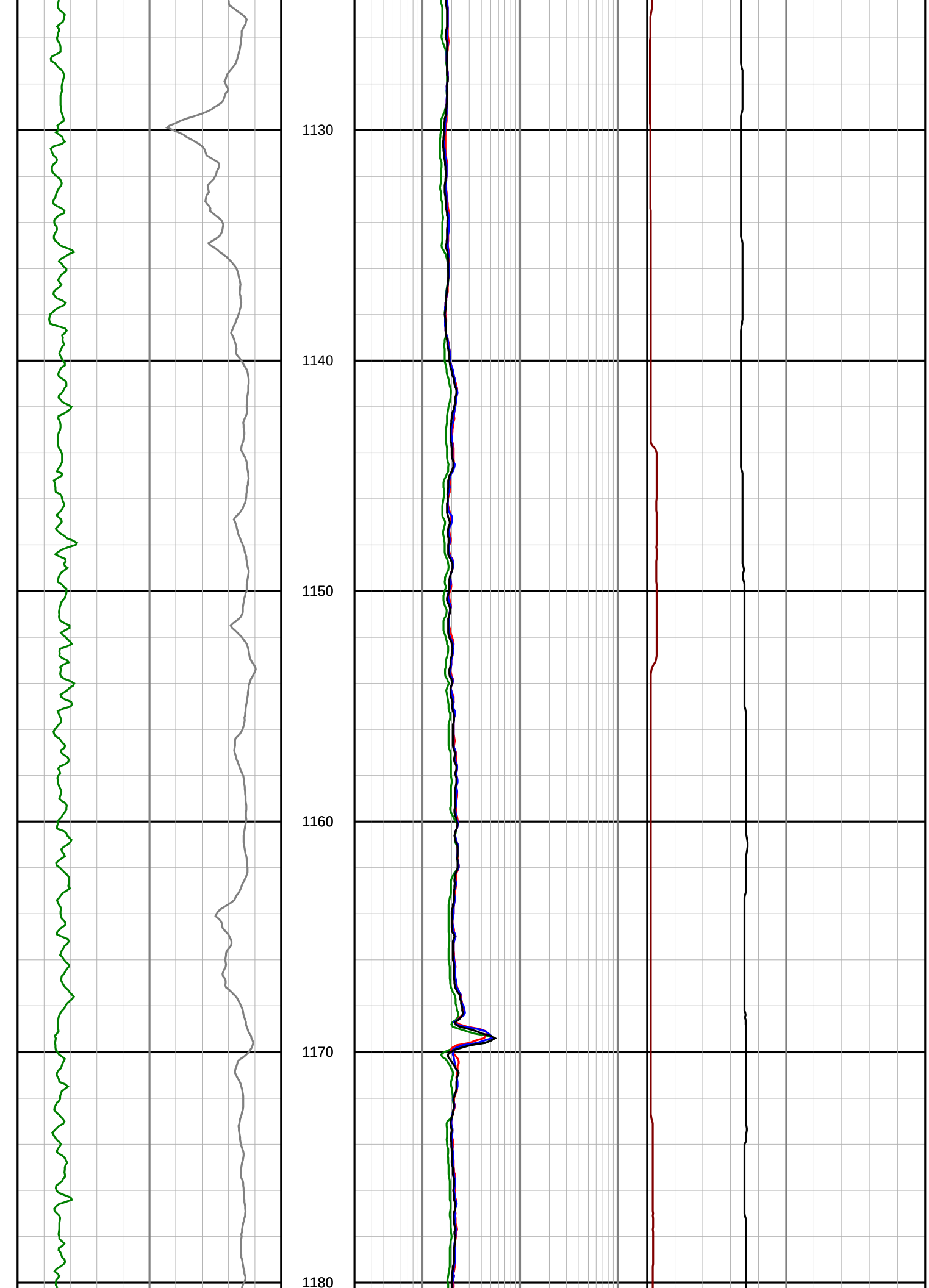
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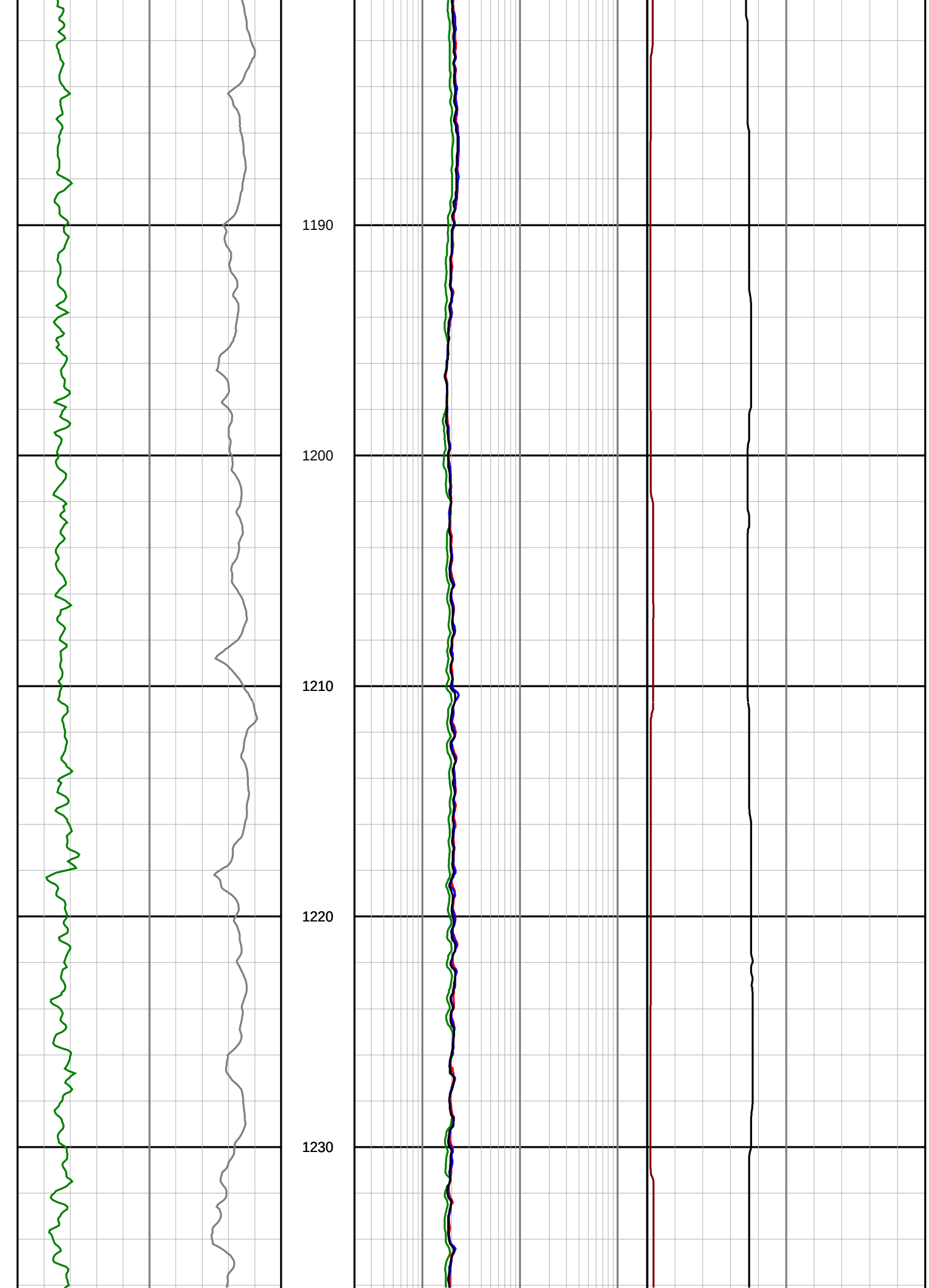
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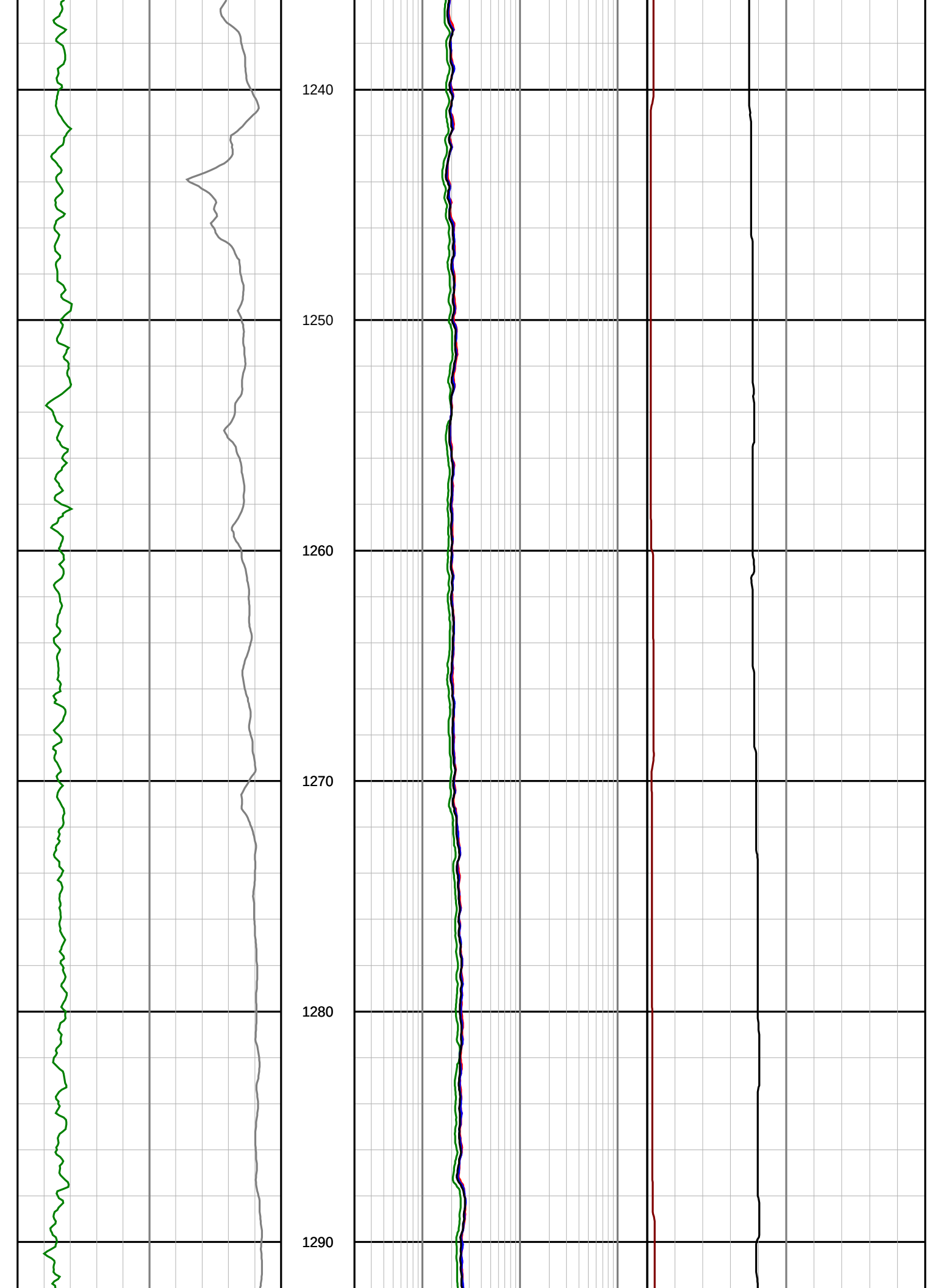
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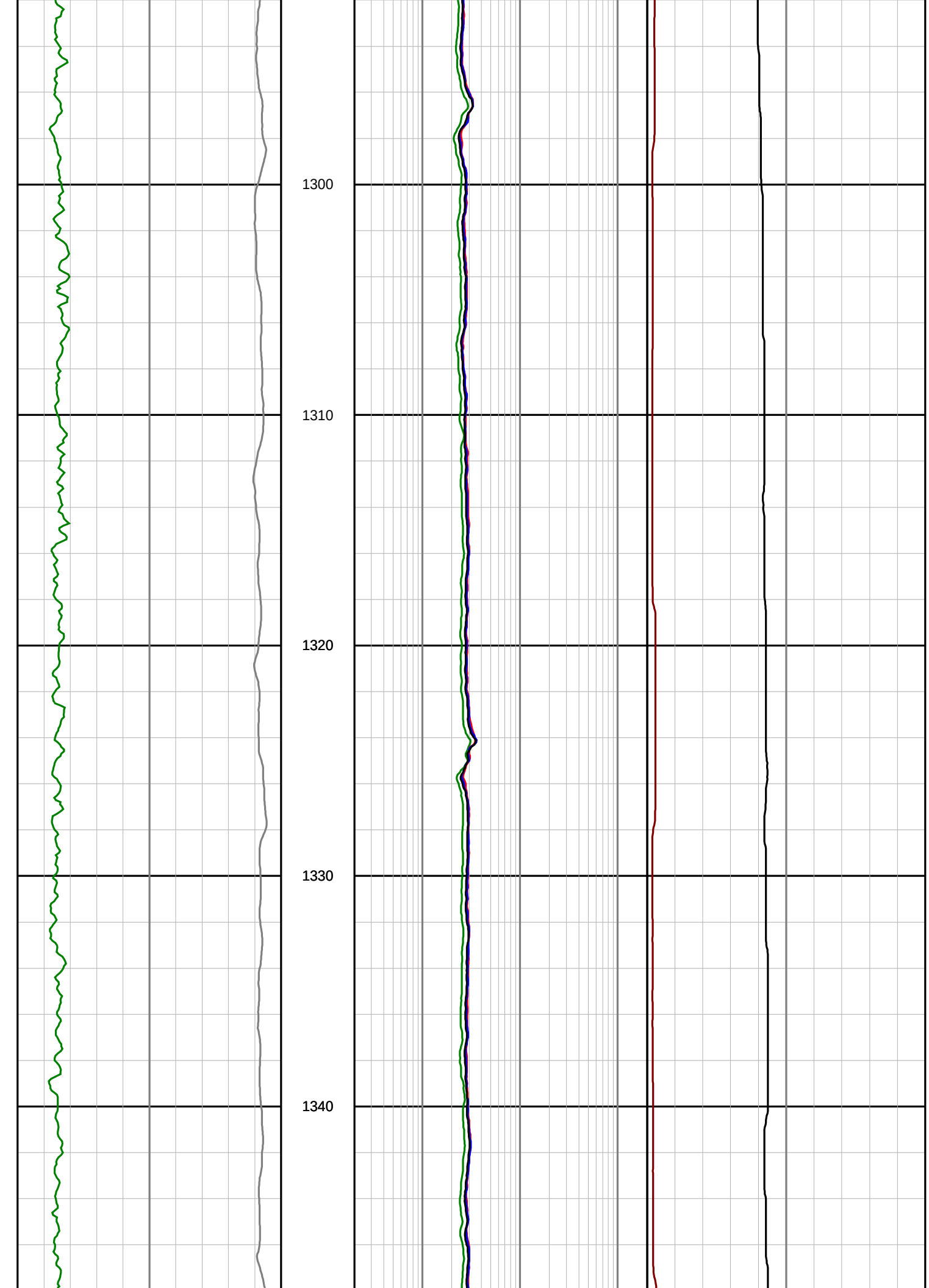
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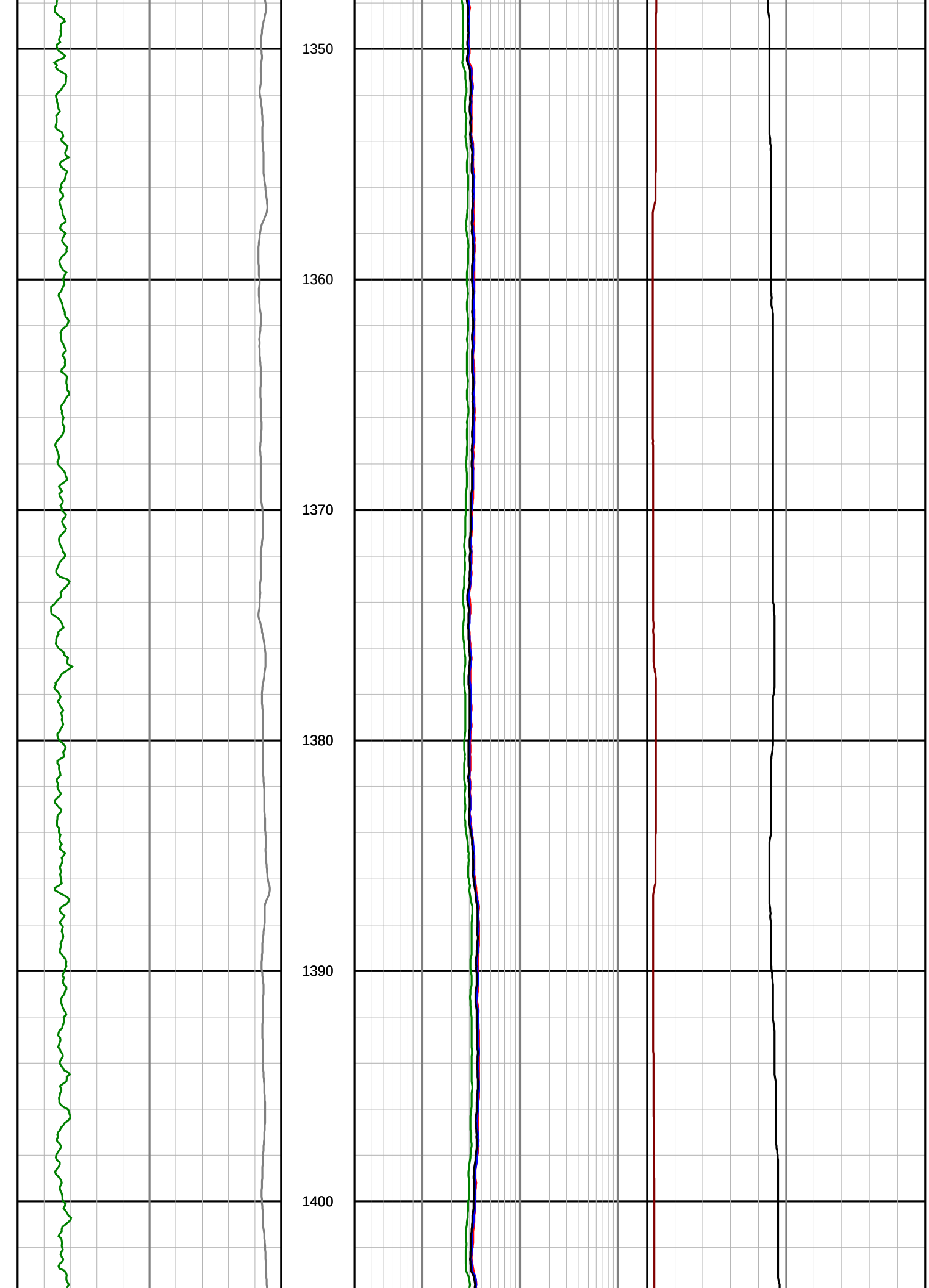
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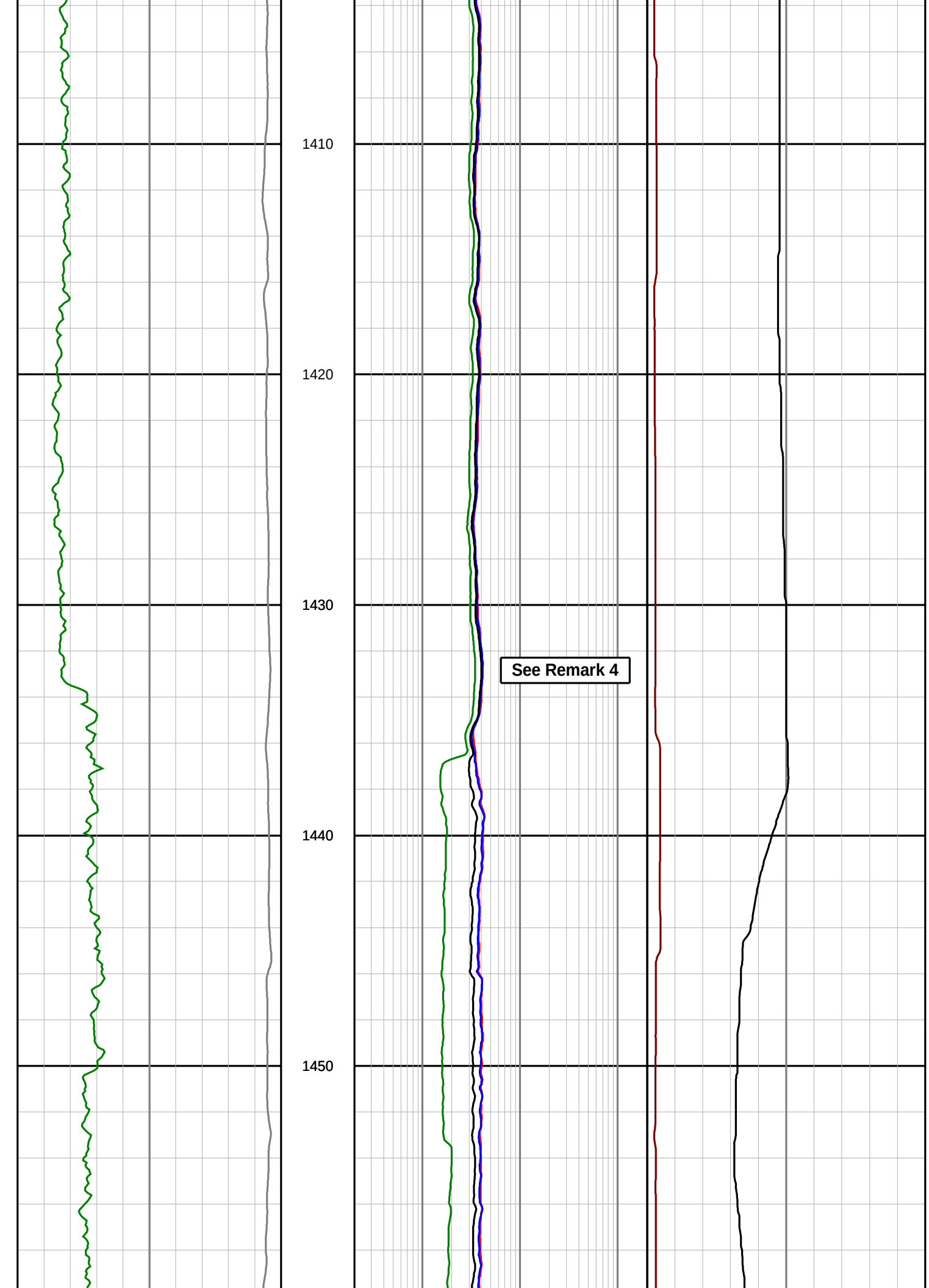
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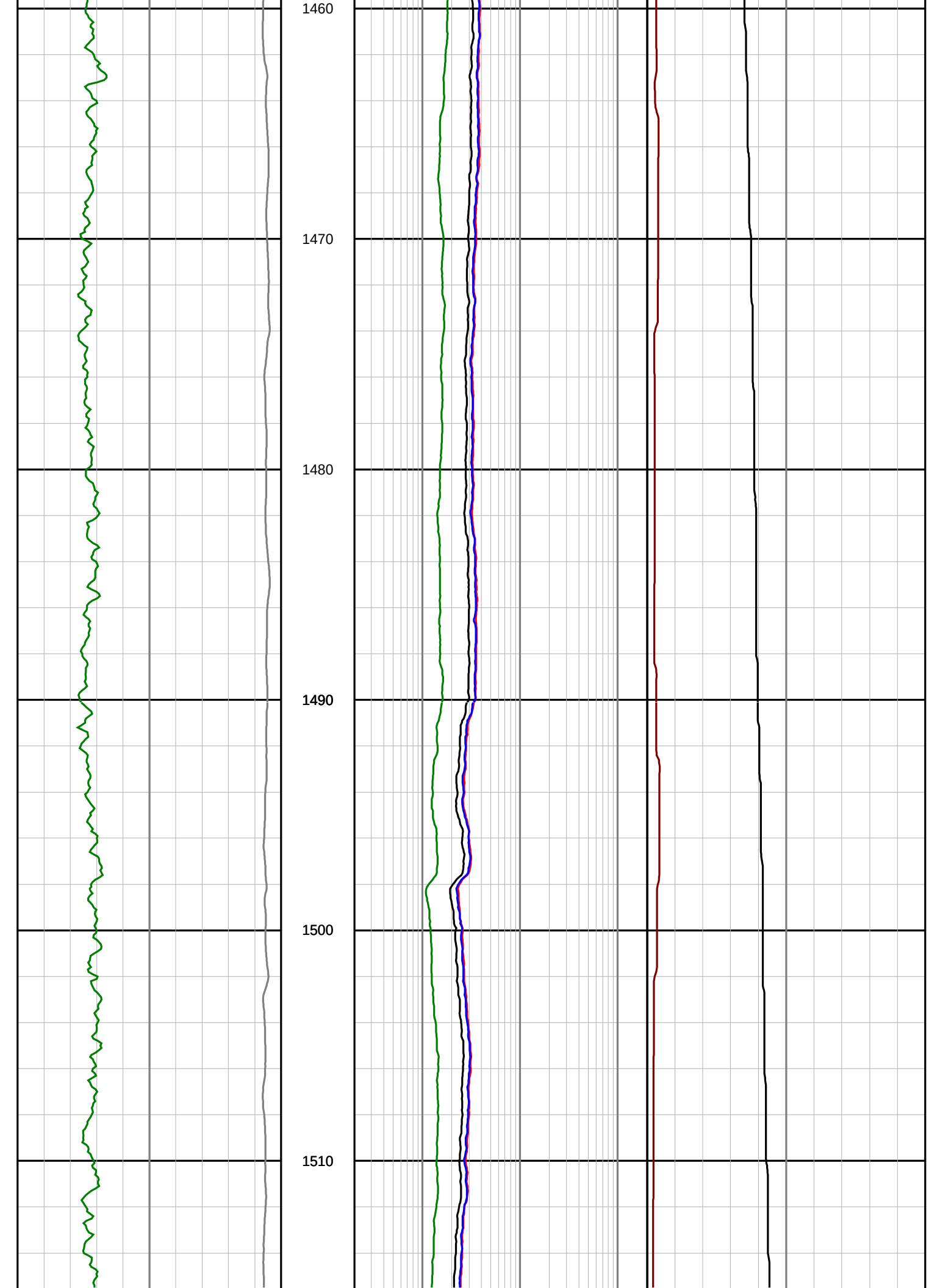
See Remark 4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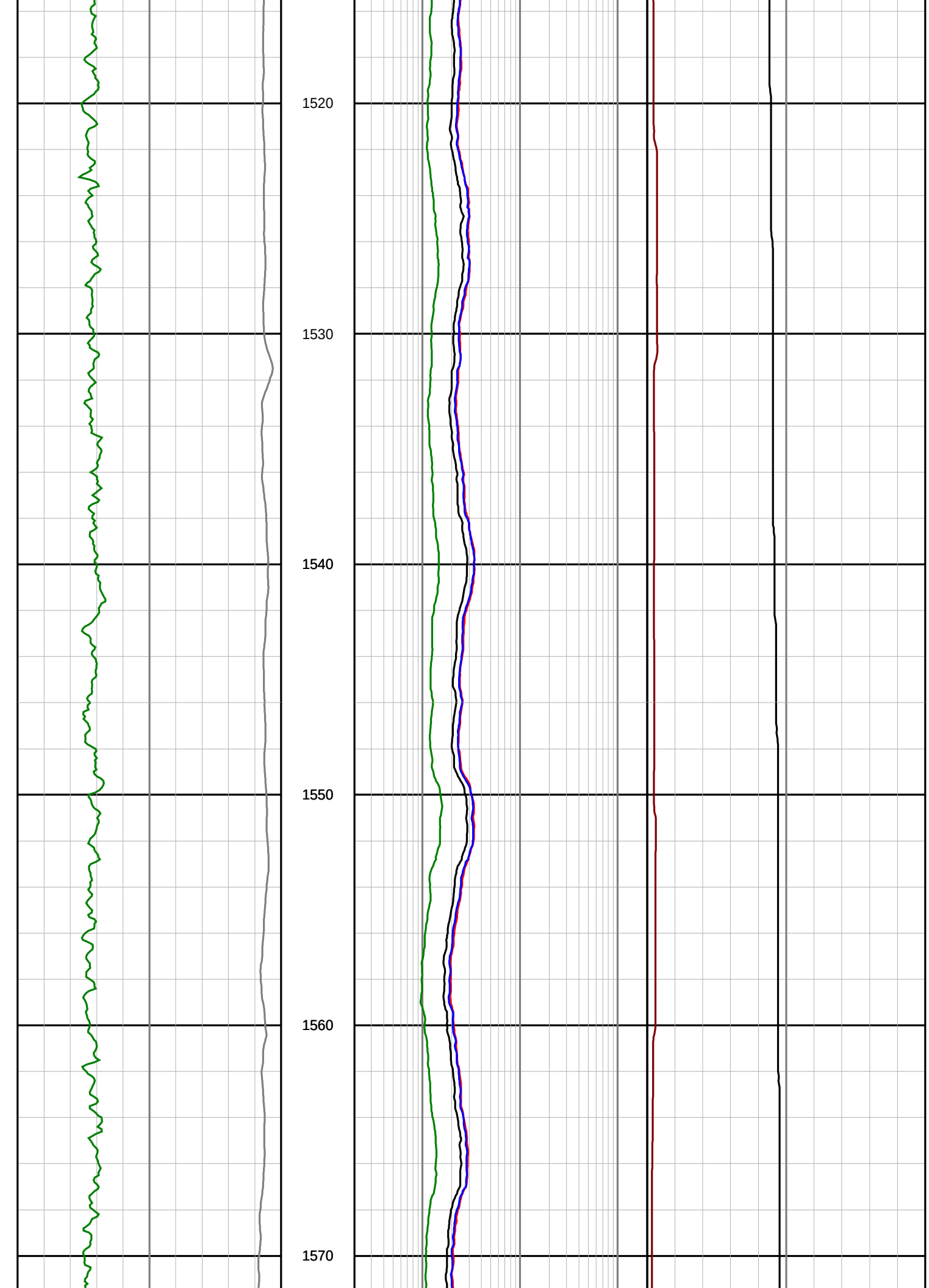
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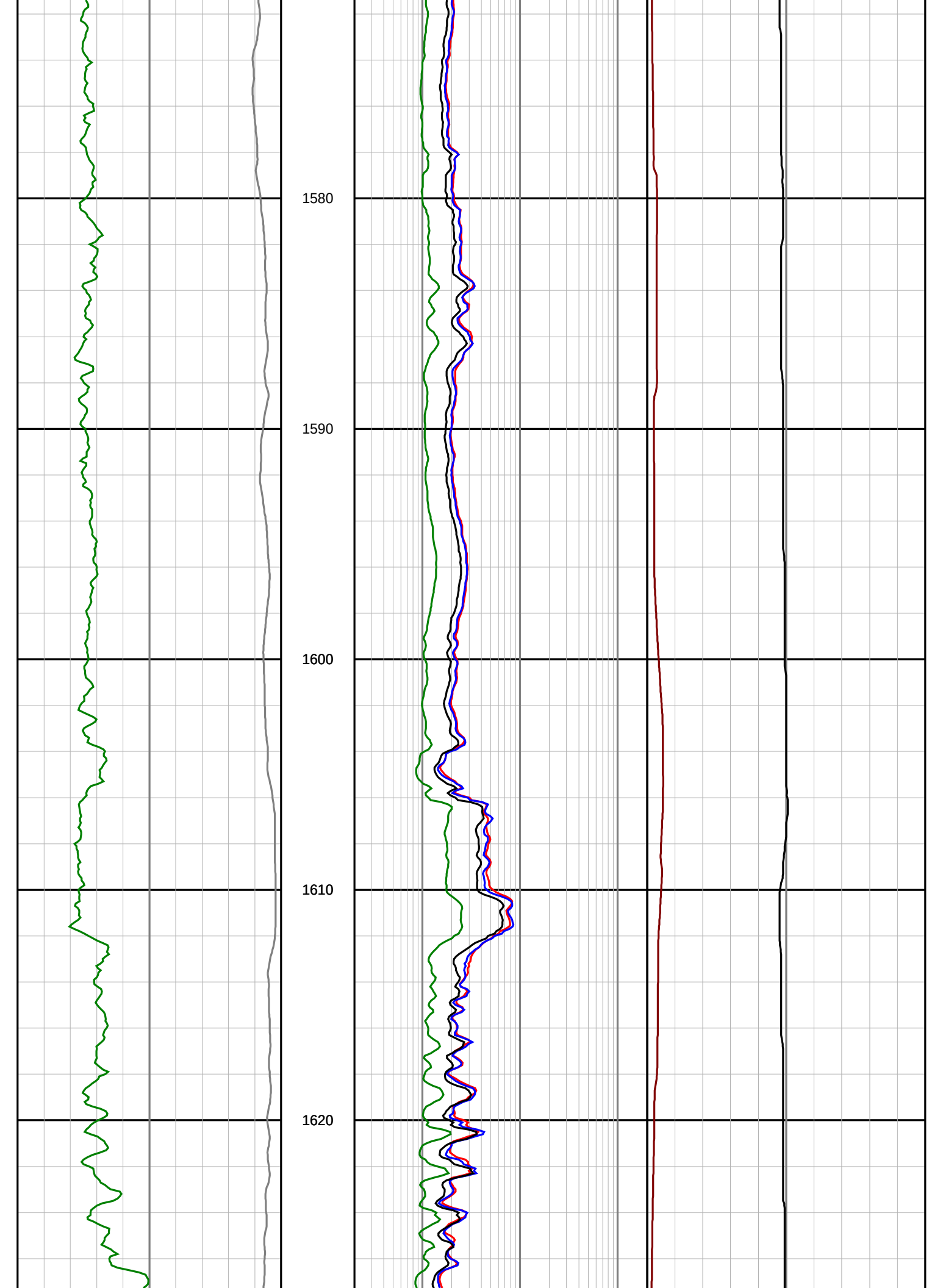
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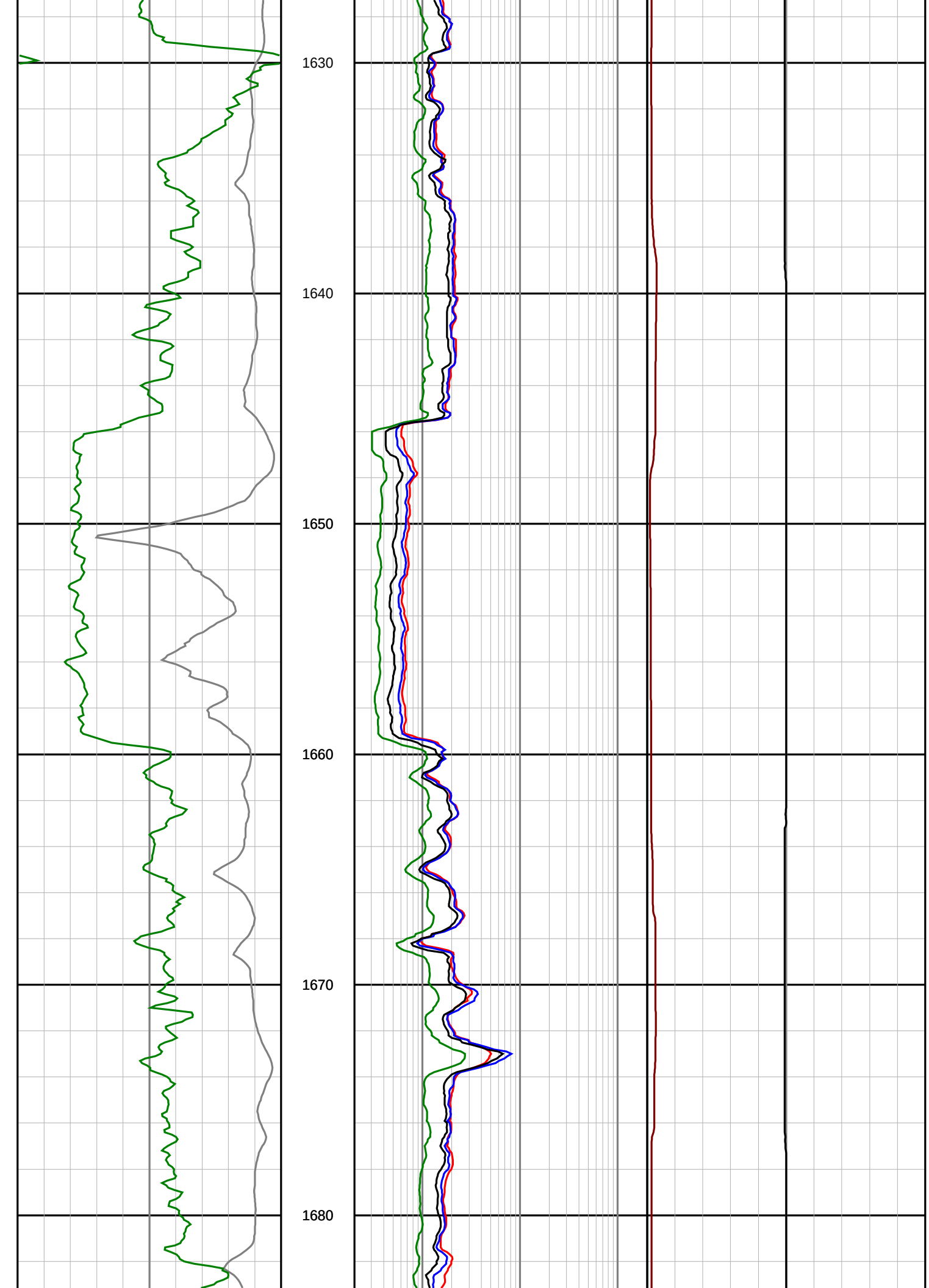
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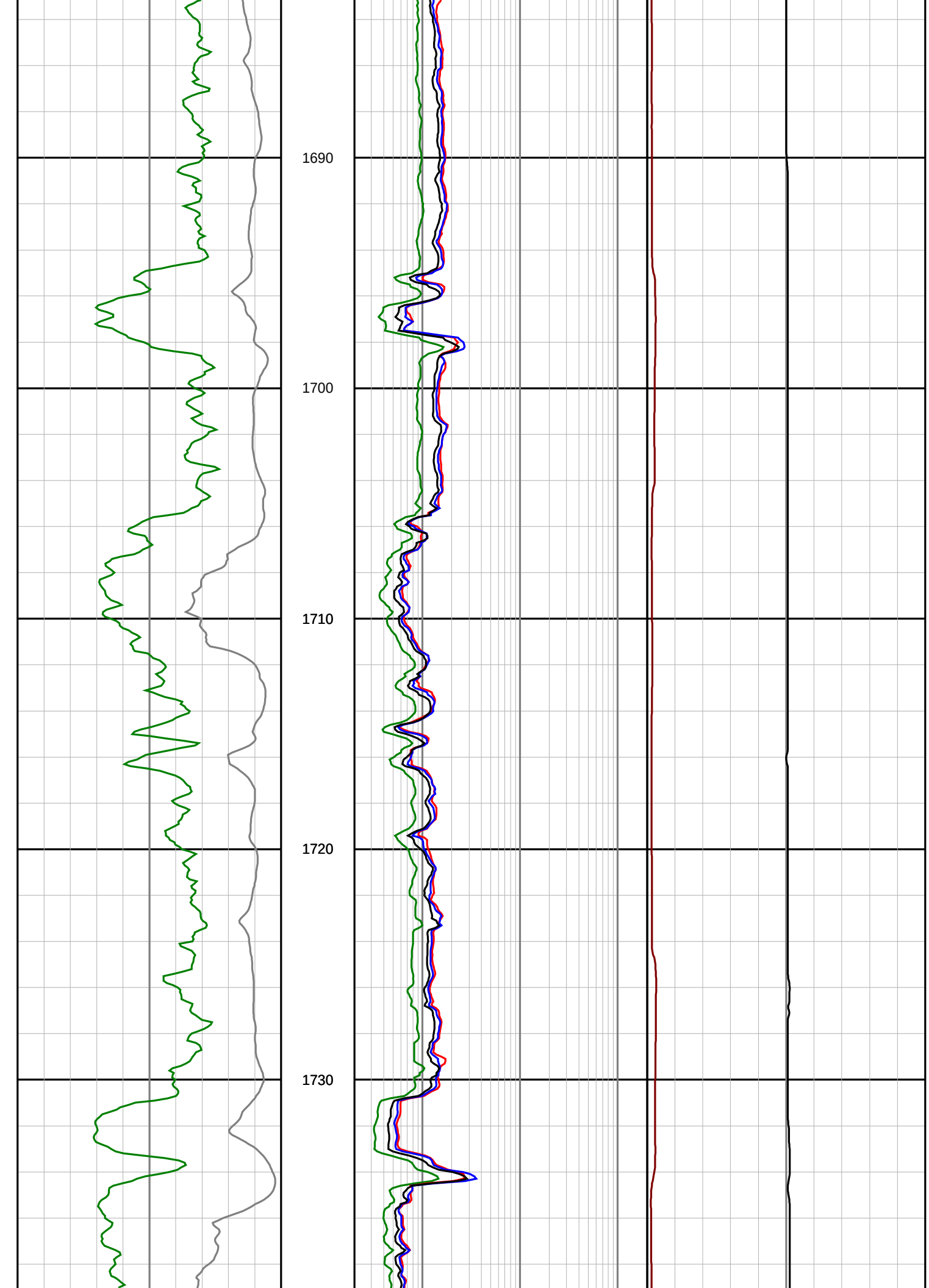
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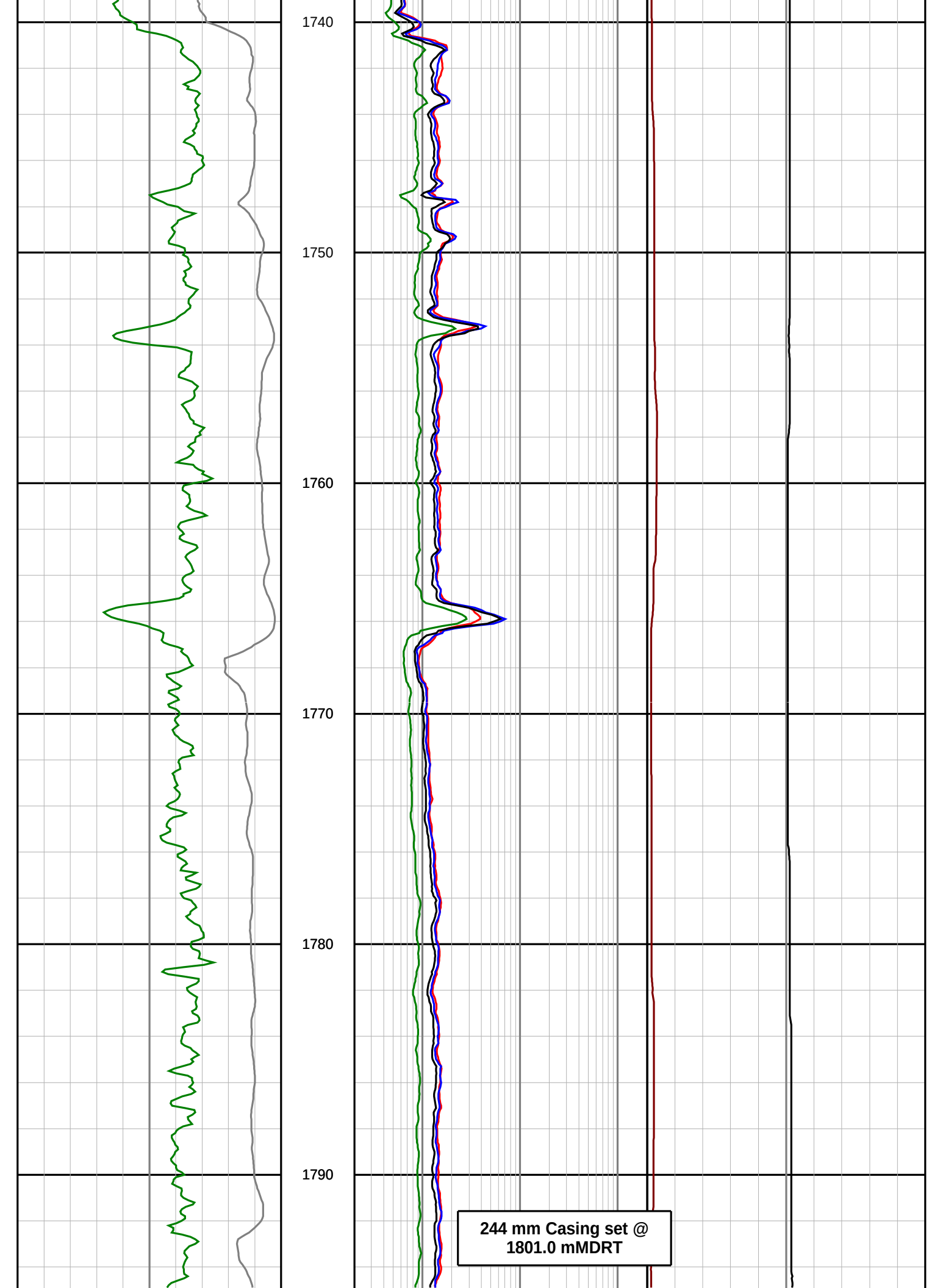
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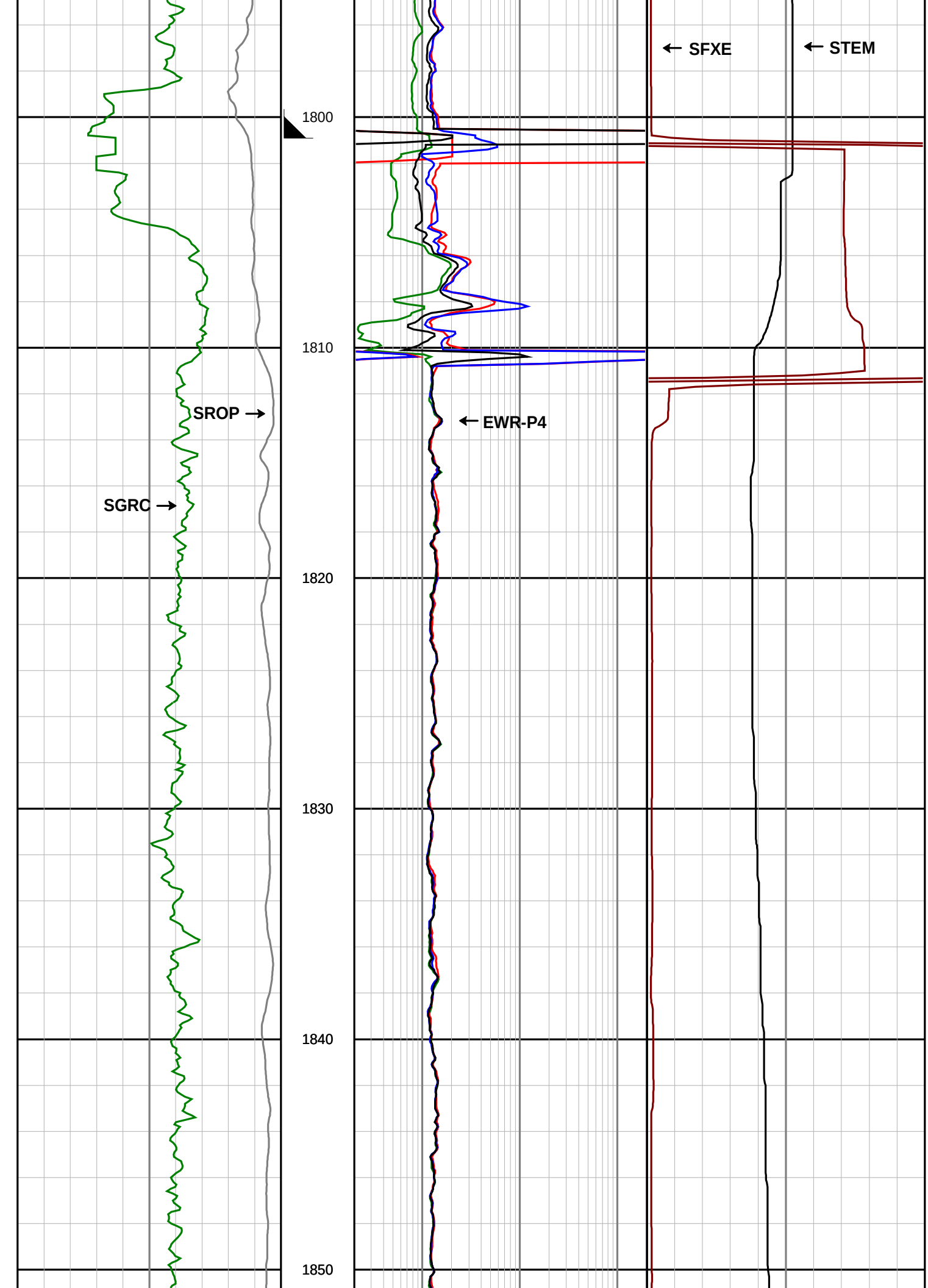
244 mm Casing set @
1801.0 mMDRT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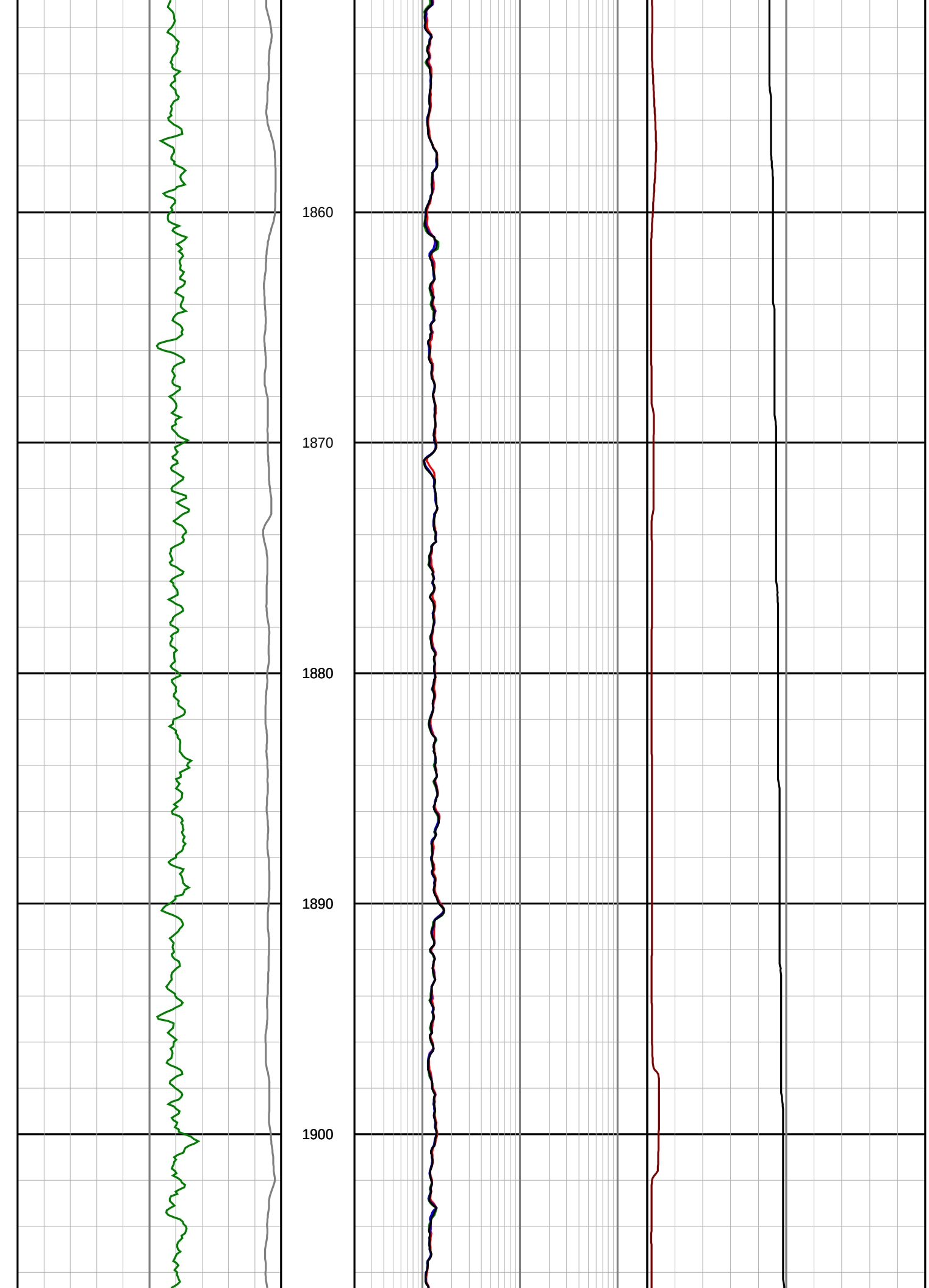
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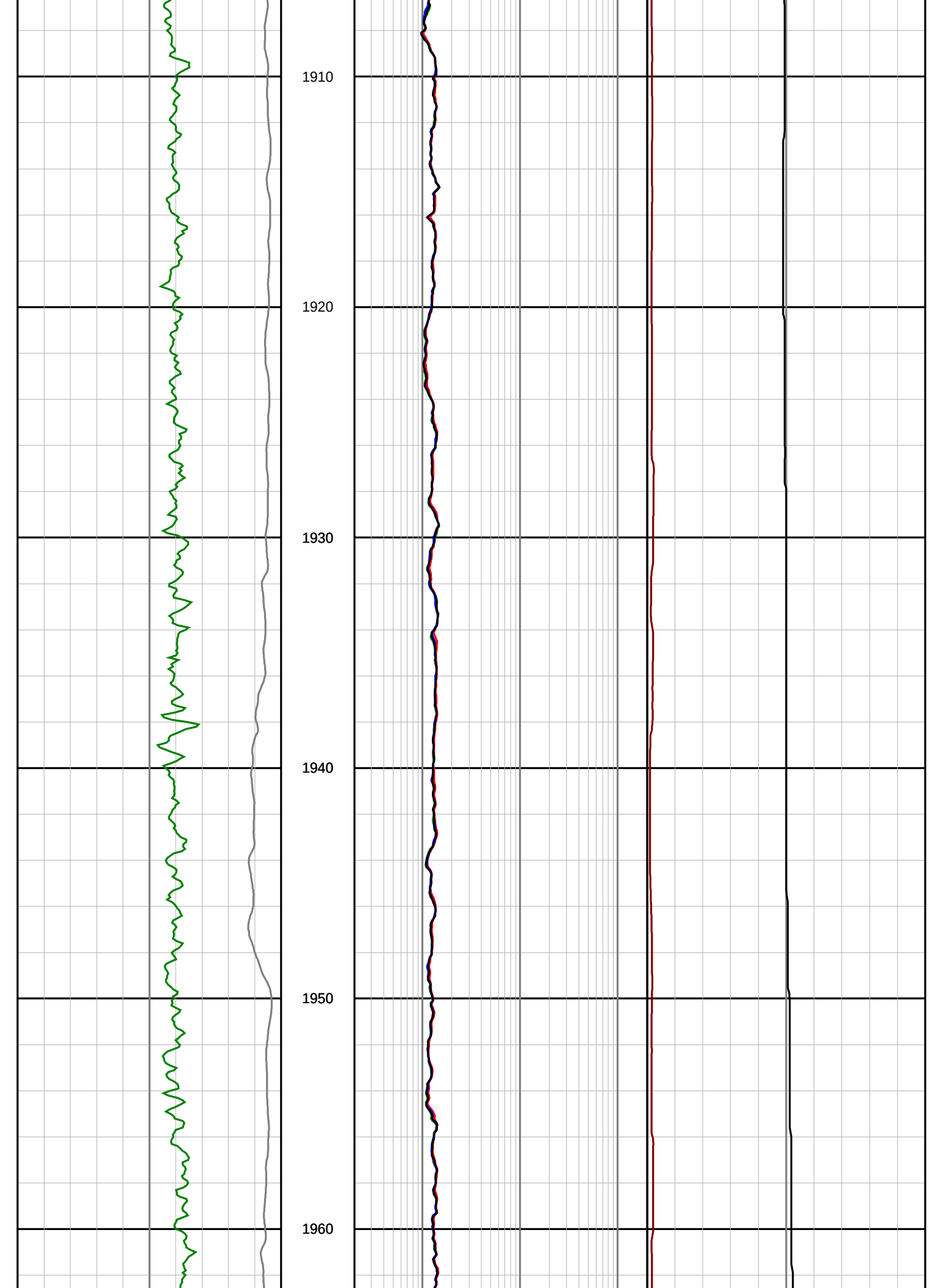
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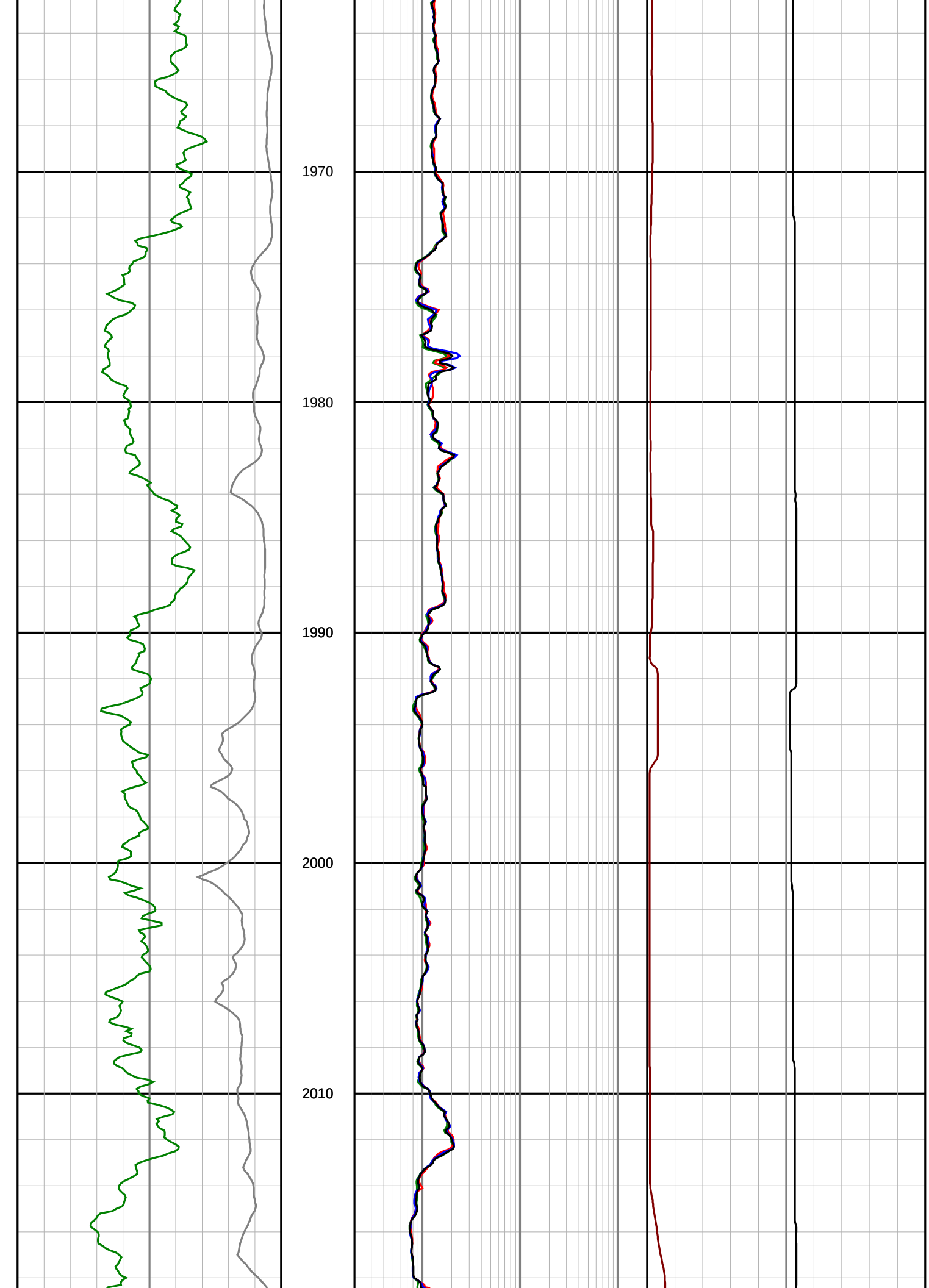
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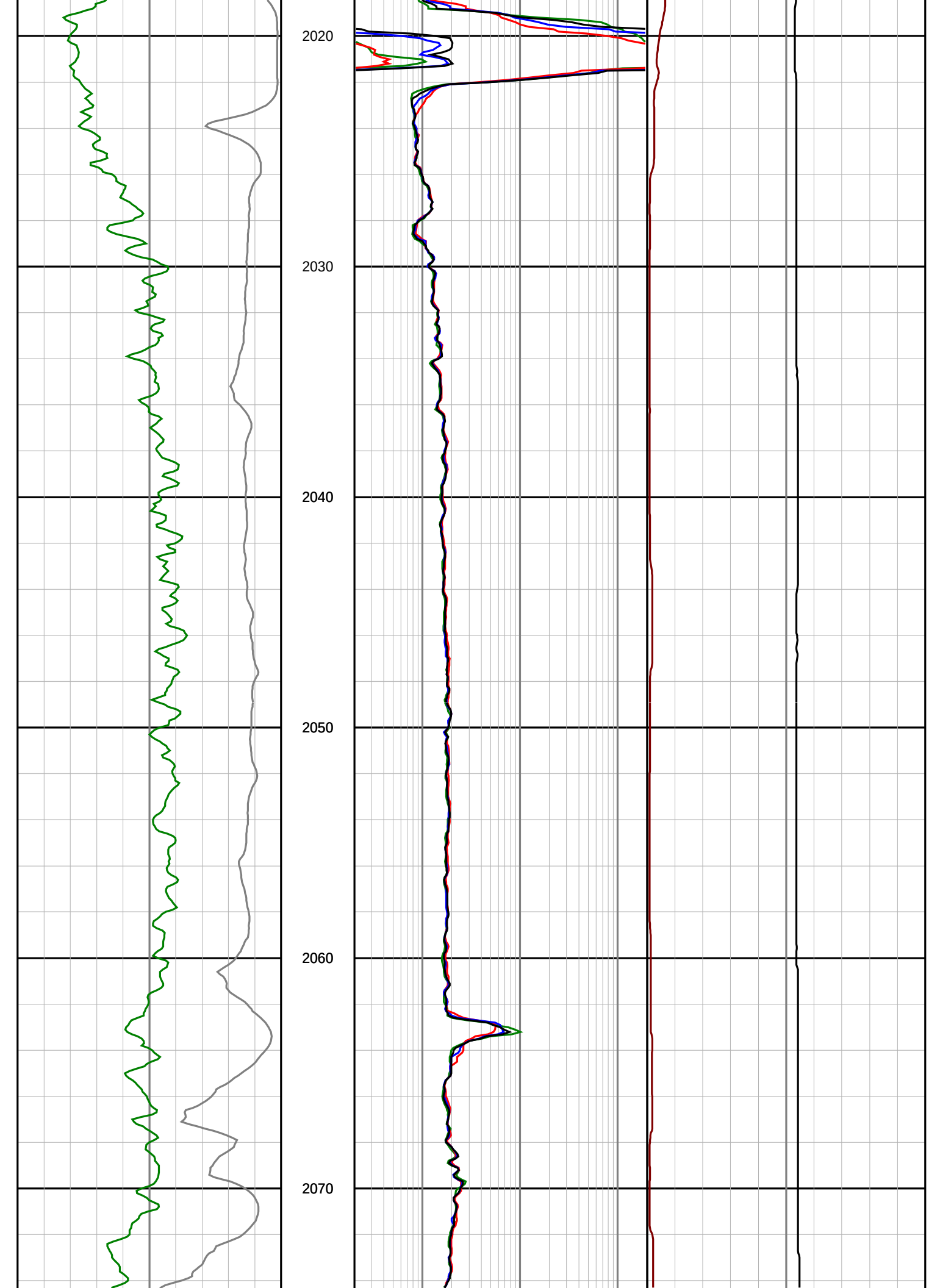
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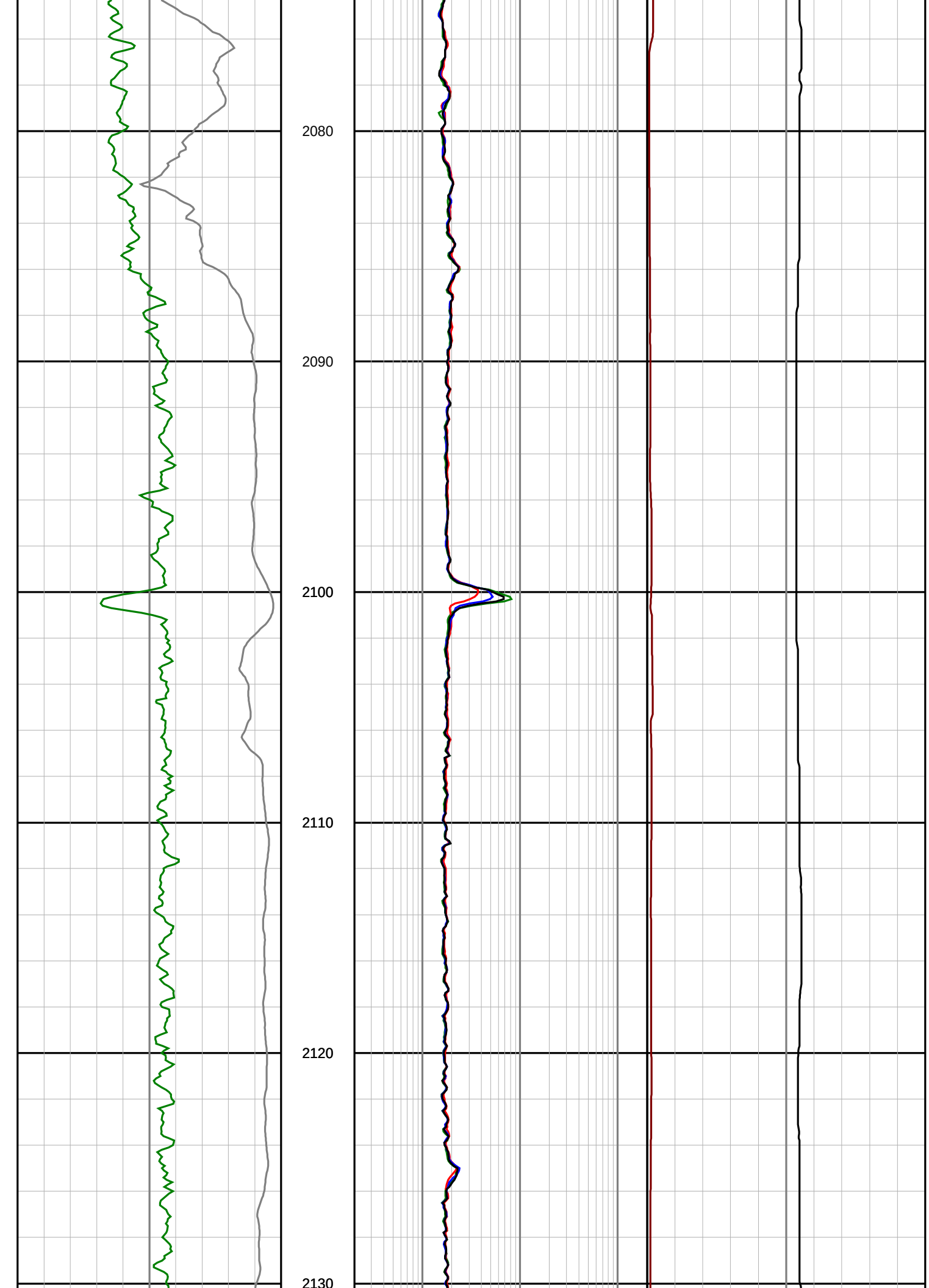
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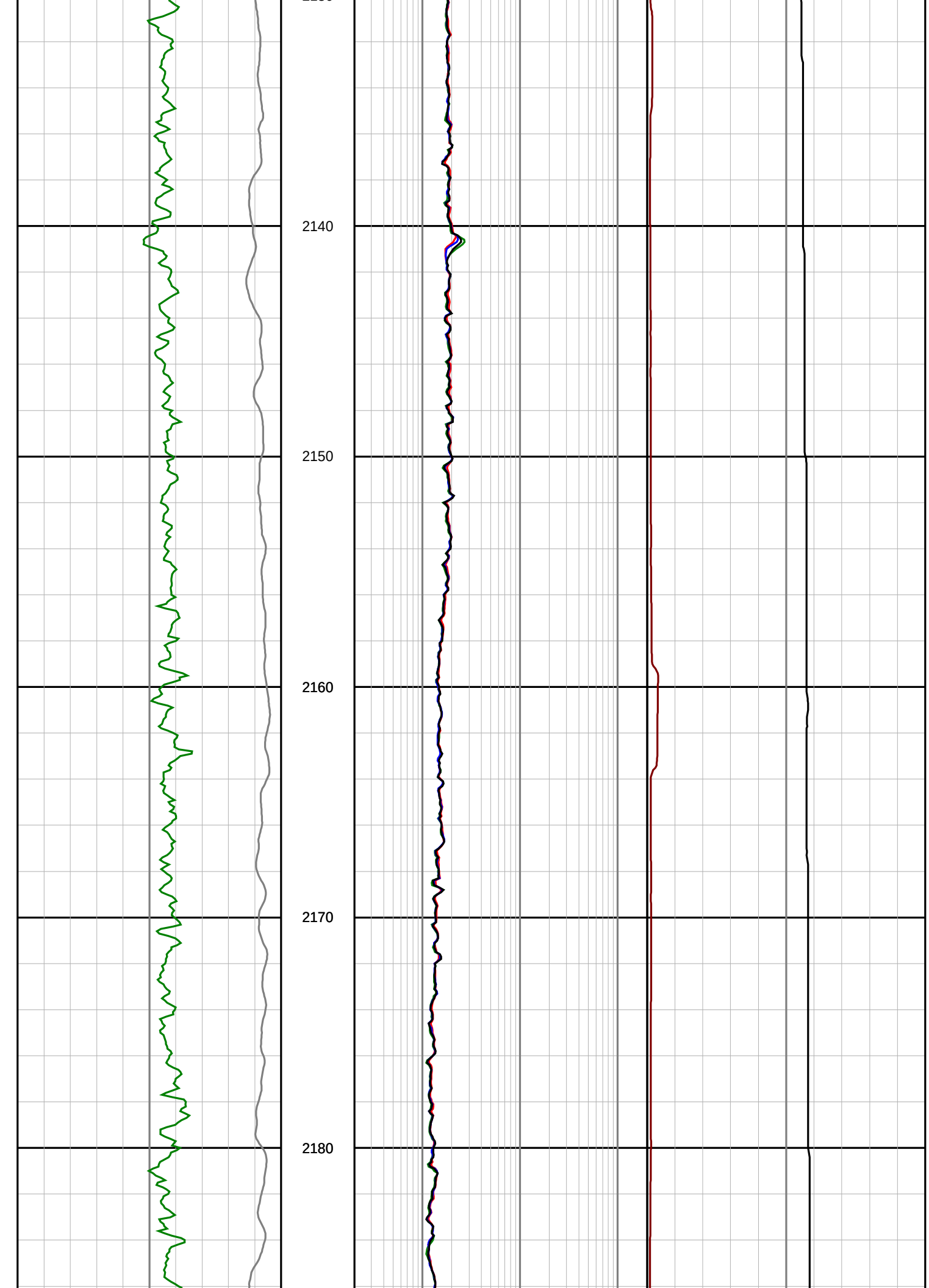
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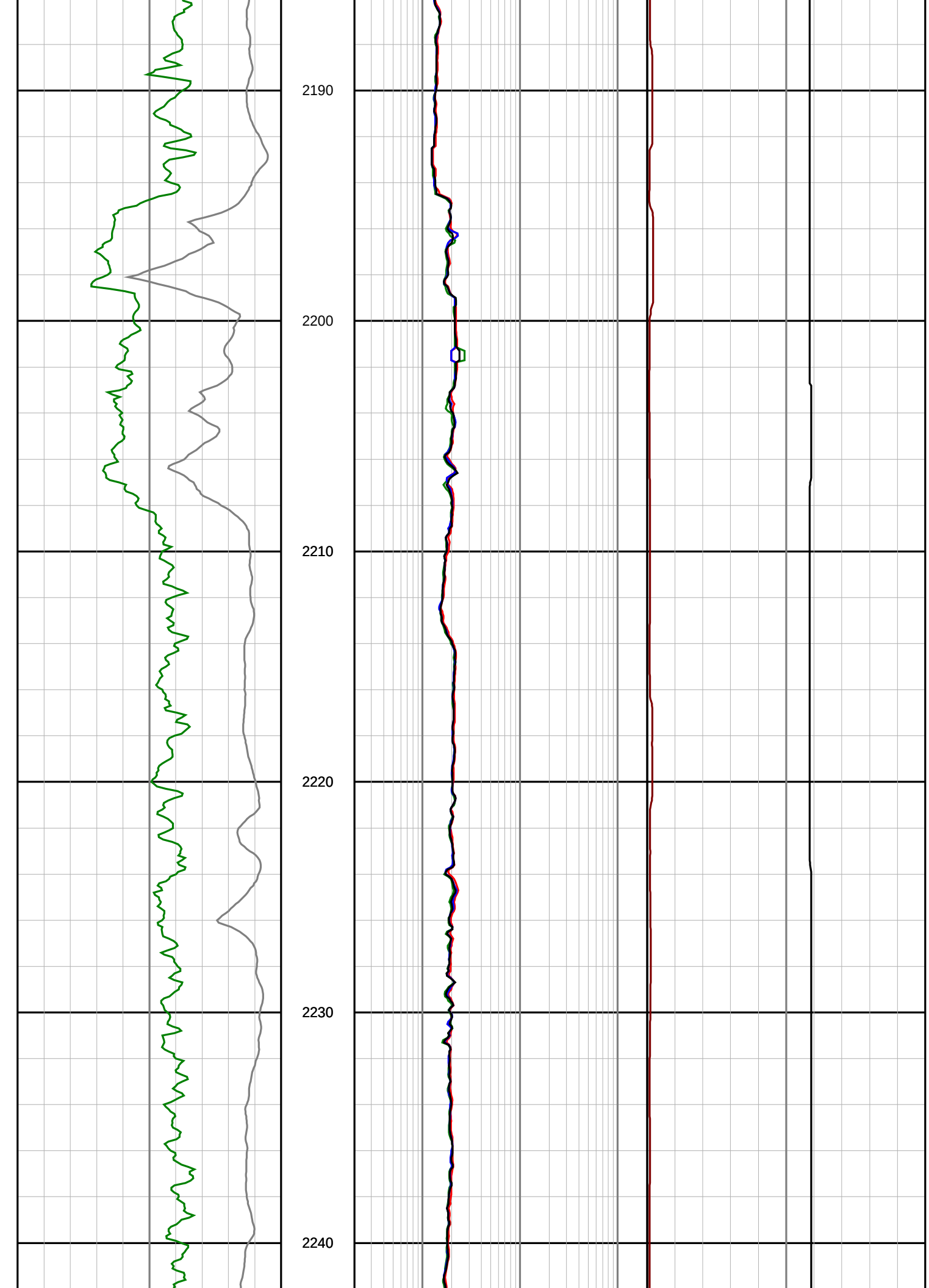
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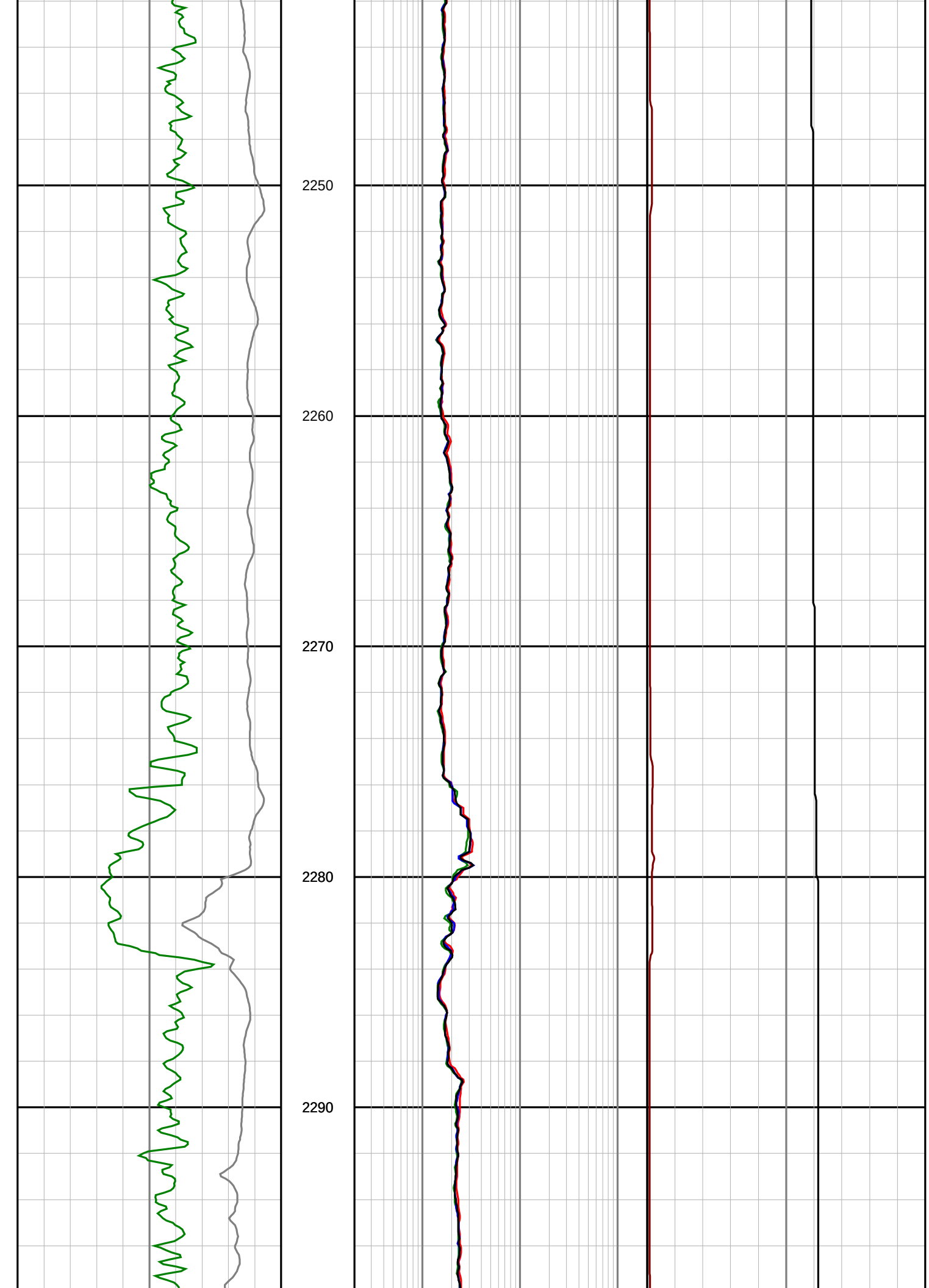
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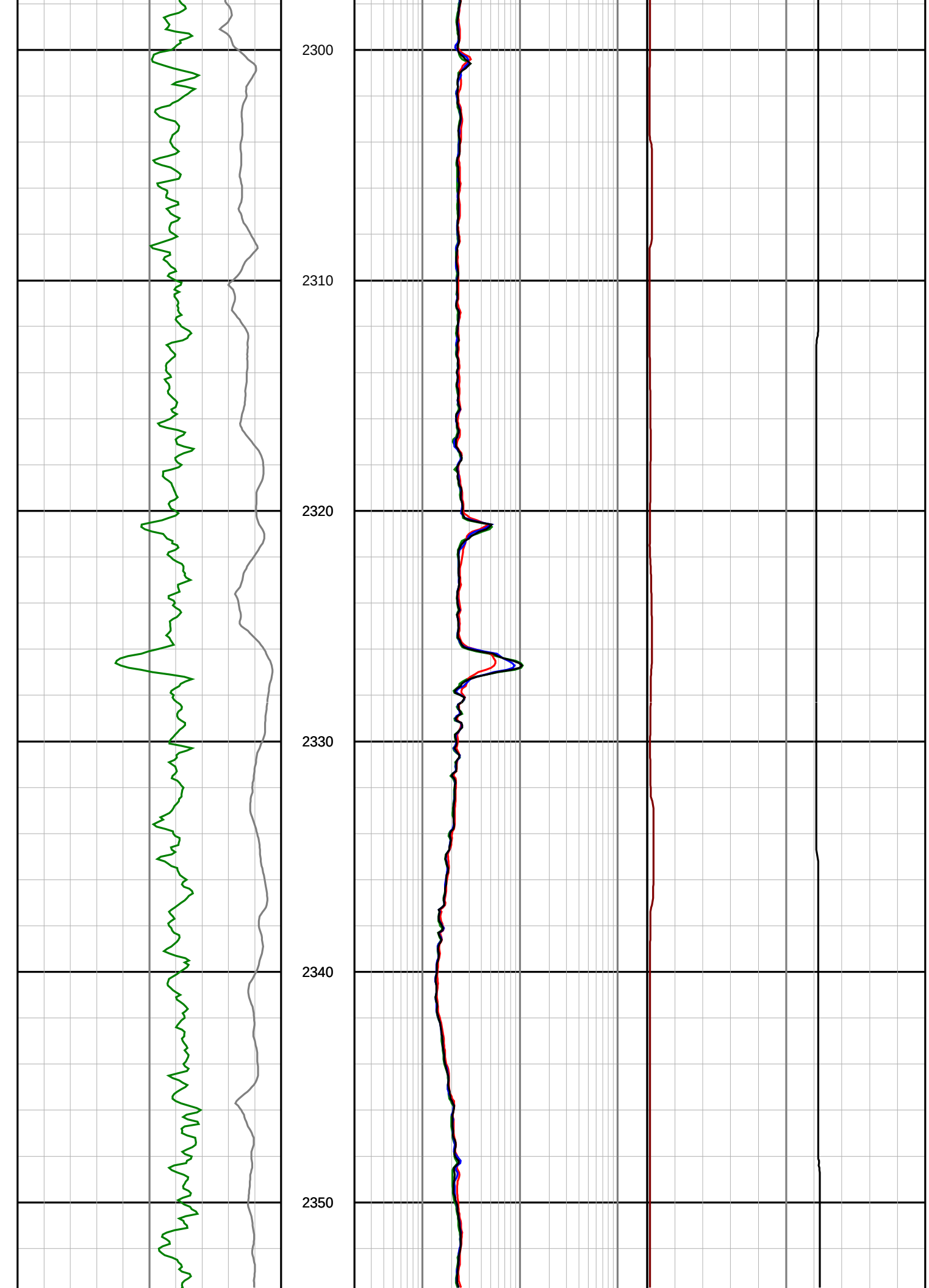
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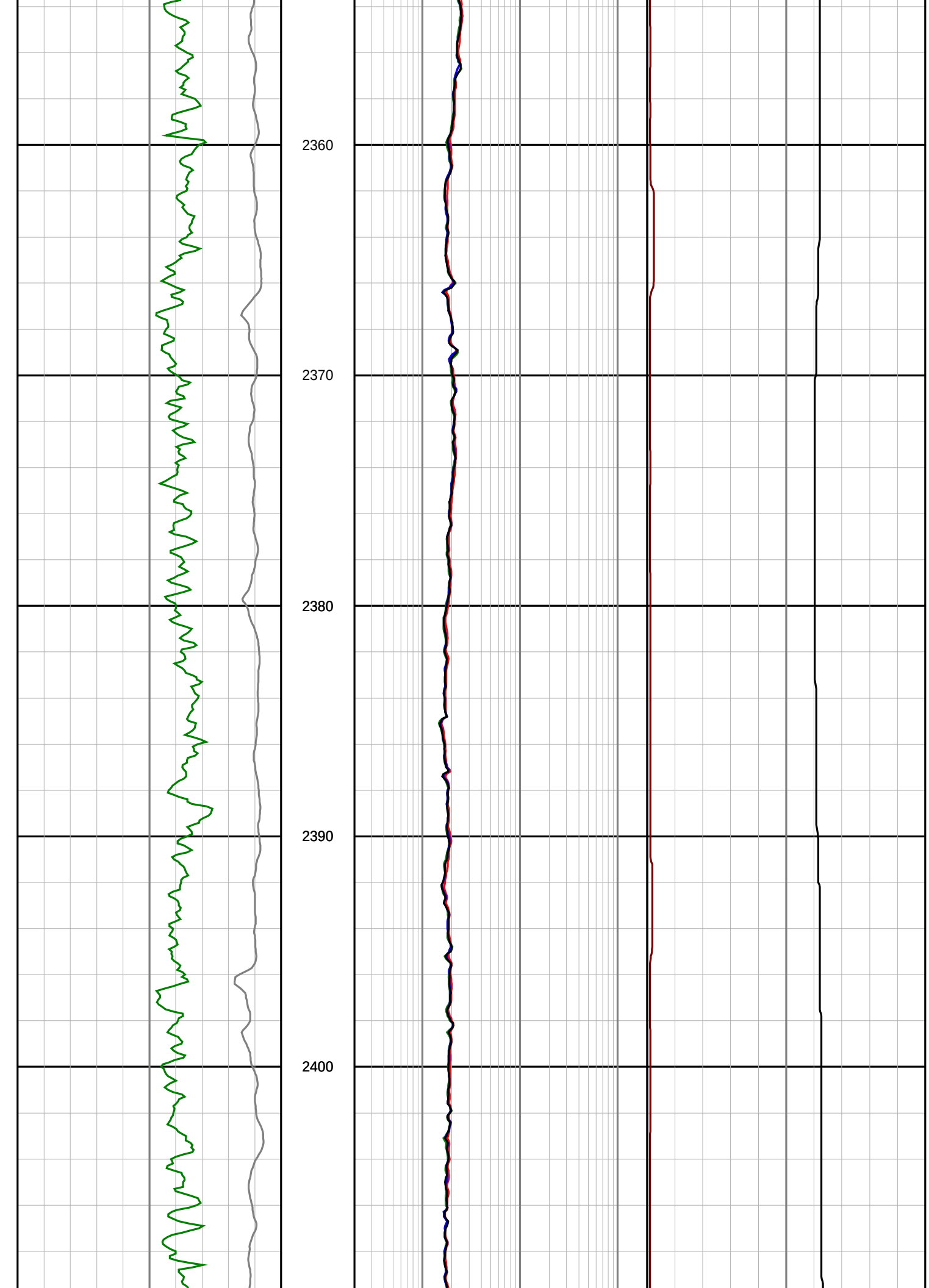
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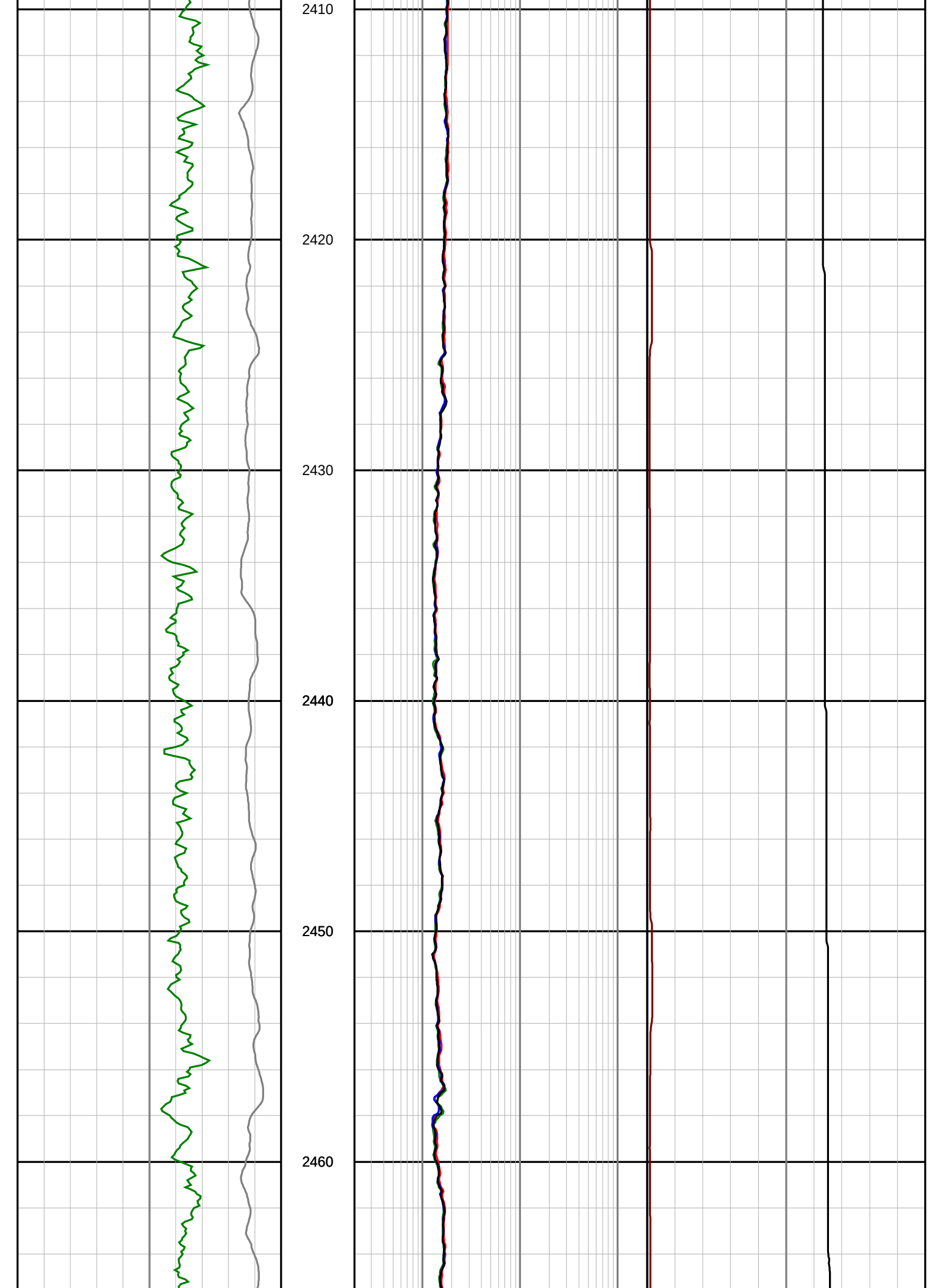
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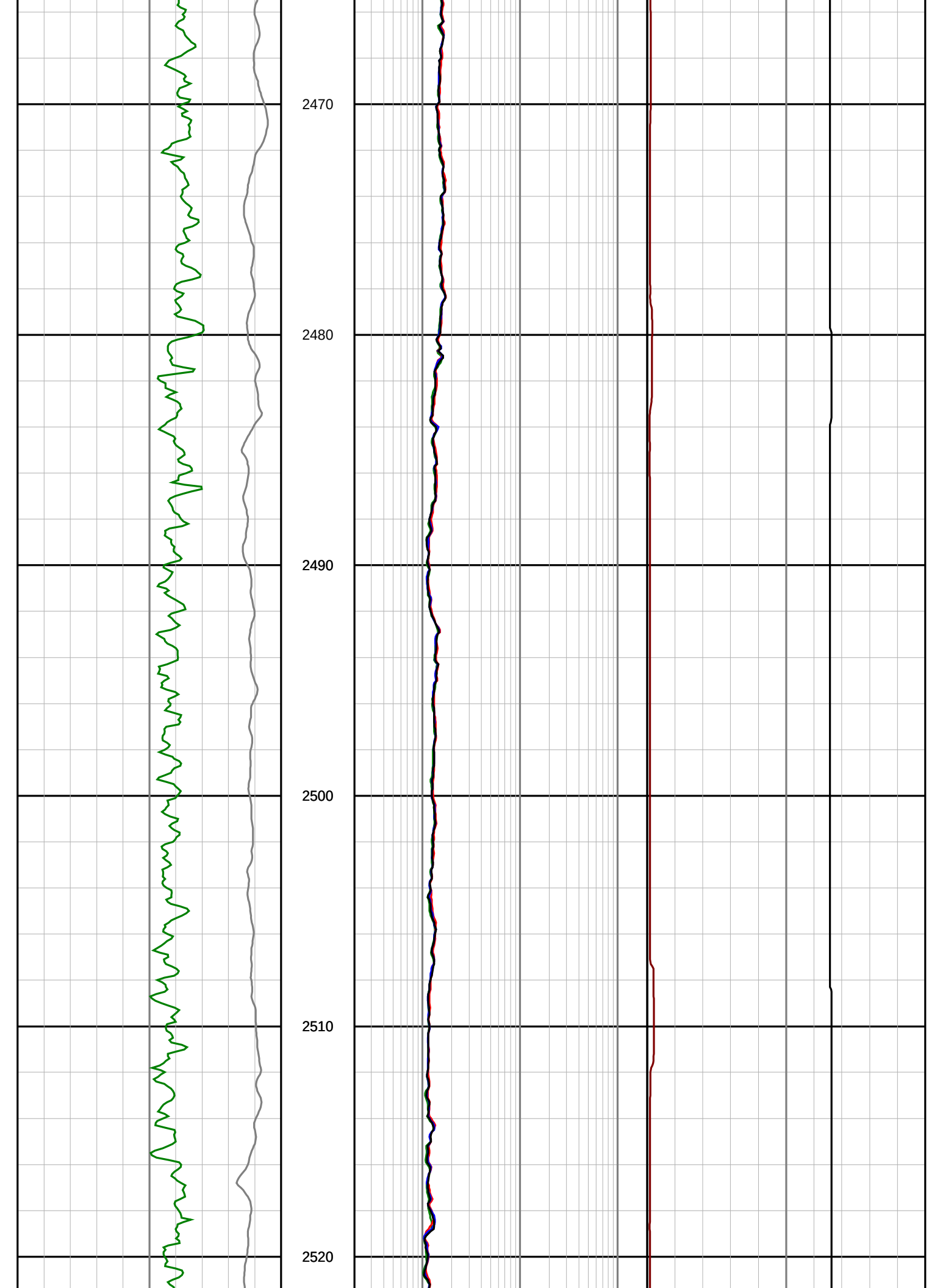
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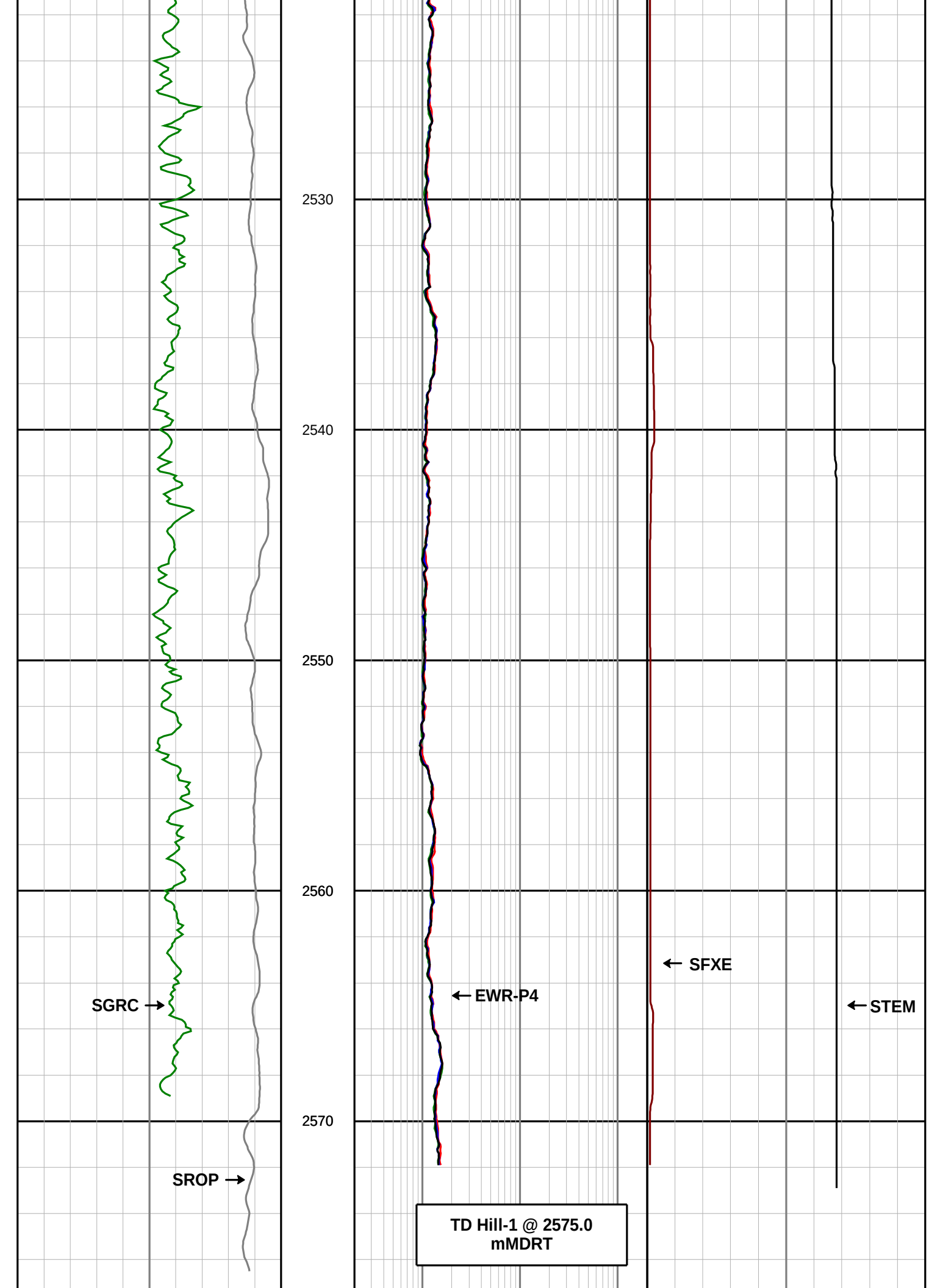
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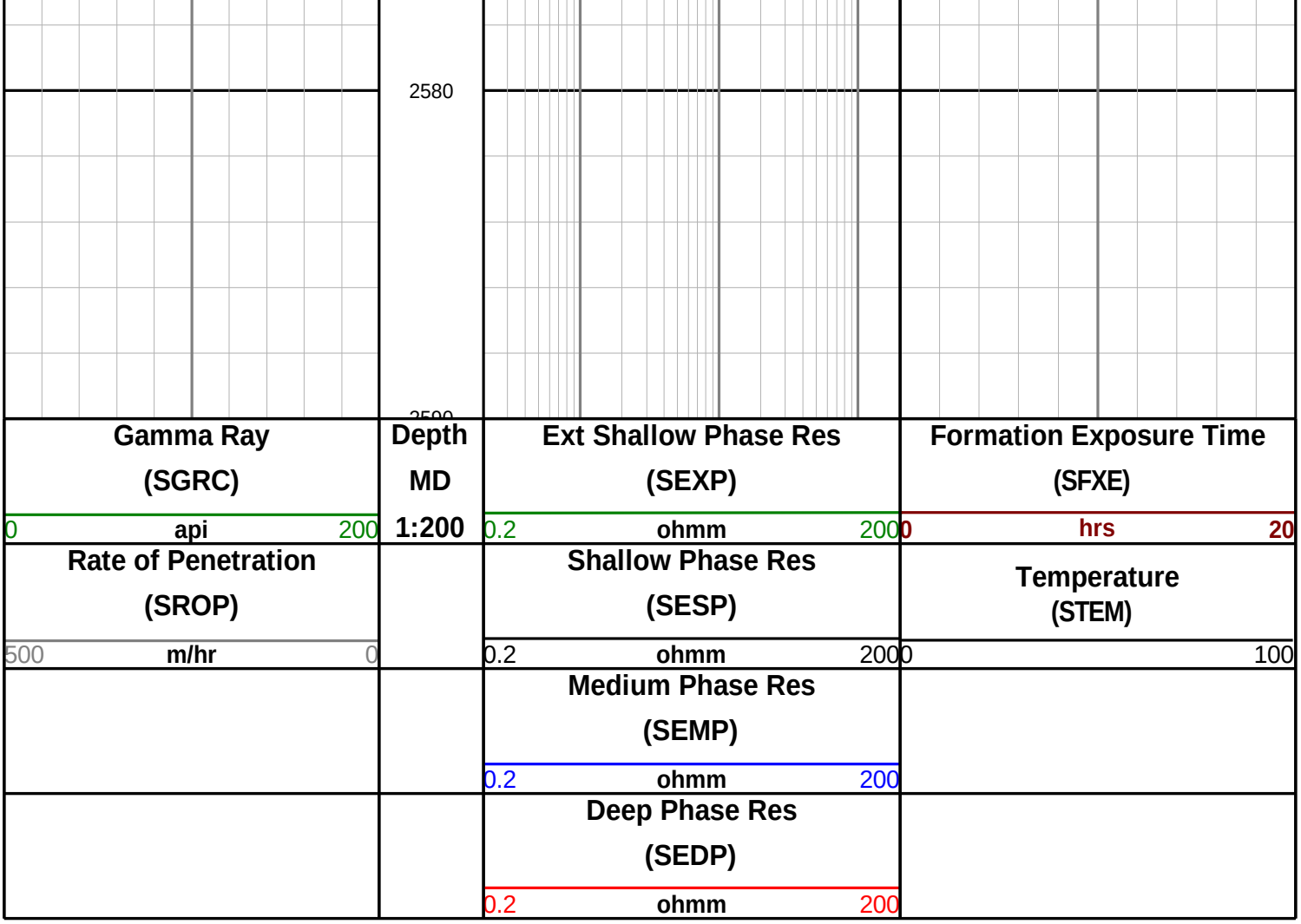
SGRC
SROP
EWR-P4
SFXE
STEM
TD Hill-1 @ 2575.0
mMDRT



DIRECTIONAL SURVEY REPORT

Santos SBU
Hill-1
Exploration
Victoria
Australia
AU-FE-0002774266
Final survey projected toTD

Measured Depth (metres)	*Inclination (degrees)*	*Direction (degrees)*	*Vertical Depth (metres)*	*Latitude (metres)*	*Departure (metres)*	*Vertical Section (metres)*	*Dogleg (deg/30m)*
215.000	0.00	0.00	215.000	0.000 N	0.000 E	0.000	TIE-IN
256.000	1.00	0.00	256.000	0.001 N	0.003 E	0.002	0.01
771.000	0.50	0.00	771.000	0.225 N	0.536 E	0.347	0.01
787.460	0.12	67.24	787.460	0.238 N	0.568 E	0.368	0.01
843.000	0.22	48.21	842.999	0.333 N	0.704 E	0.493	0.06
904.440	0.31	35.64	904.439	0.547 N	0.889 E	0.745	0.05
929.630	0.40	38.33	929.628	0.670 N	0.982 E	0.887	0.11
1017.400	0.87	38.98	1017.393	1.424 N	1.588 E	1.765	0.16
1045.490	0.84	22.92	1045.479	1.778 N	1.802 E	2.160	0.26
1075.660	0.81	9.37	1075.646	2.190 N	1.922 E	2.589	0.19

HALLIBURTON

Hill-1

Measured Depth (metres)	Inclination (degrees)	Direction (degrees)	Vertical Depth (metres)	Latitude (metres)	Departure (metres)	Vertical Section (metres)	Dogleg (deg/30m)
1107.140	0.72	9.97	1107.124	2.604 N	1.992 E	3.007	0.08
1162.240	0.83	10.31	1162.219	3.336 N	2.123 E	3.749	0.06
1191.380	0.96	20.31	1191.355	3.773 N	2.246 E	4.203	0.21
1222.780	0.96	24.23	1222.751	4.261 N	2.446 E	4.725	0.06
1248.550	0.97	35.16	1248.517	4.636 N	2.660 E	5.141	0.21
1280.630	0.93	40.57	1280.593	5.055 N	2.985 E	5.625	0.09
1309.300	0.84	37.96	1309.259	5.397 N	3.265 E	6.025	0.10
1339.100	0.93	39.70	1339.056	5.754 N	3.553 E	6.441	0.09
1394.960	0.89	36.10	1394.909	6.452 N	4.097 E	7.249	0.04
1455.710	0.92	32.58	1455.651	7.244 N	4.638 E	8.148	0.03
1483.050	1.02	32.83	1482.987	7.634 N	4.888 E	8.587	0.11
1510.370	1.03	29.55	1510.303	8.051 N	5.141 E	9.053	0.06
1538.700	1.01	27.64	1538.628	8.494 N	5.382 E	9.541	0.04
1569.900	1.04	13.43	1569.823	9.013 N	5.576 E	10.091	0.24
1627.360	1.04	9.82	1627.274	10.030 N	5.785 E	11.129	0.03
1655.580	0.87	5.35	1655.490	10.496 N	5.848 E	11.596	0.19
1685.810	0.94	10.68	1685.716	10.969 N	5.916 E	12.072	0.11
1712.120	0.96	9.64	1712.023	11.399 N	5.993 E	12.507	0.03
1745.900	0.99	6.48	1745.798	11.968 N	6.073 E	13.079	0.06
1772.730	0.77	353.39	1772.625	12.379 N	6.079 E	13.479	0.33
1791.400	0.69	348.35	1791.293	12.615 N	6.041 E	13.699	0.17
1830.940	0.88	326.25	1830.829	13.101 N	5.824 E	14.118	0.27
1856.750	0.78	329.33	1856.637	13.418 N	5.624 E	14.378	0.12
1918.200	0.81	316.68	1918.081	14.094 N	5.113 E	14.911	0.09
1944.220	0.66	306.66	1944.099	14.316 N	4.867 E	15.067	0.22
1973.450	0.62	331.70	1973.327	14.556 N	4.657 E	15.249	0.29
2002.660	0.61	346.23	2002.535	14.846 N	4.546 E	15.504	0.16
2031.420	0.65	345.22	2031.294	15.153 N	4.467 E	15.783	0.04
2059.750	0.63	337.25	2059.622	15.453 N	4.366 E	16.049	0.10
2089.980	0.79	349.72	2089.849	15.811 N	4.264 E	16.373	0.21
2122.030	0.73	341.38	2121.897	16.220 N	4.160 E	16.744	0.12
2151.020	0.47	3.16	2150.885	16.513 N	4.108 E	17.016	0.35
2179.660	0.45	356.67	2179.524	16.741 N	4.108 E	17.238	0.06
2206.860	0.38	7.86	2206.724	16.936 N	4.114 E	17.428	0.12
2237.900	0.14	43.04	2237.763	17.064 N	4.153 E	17.562	0.27
2266.830	0.12	51.65	2266.693	17.109 N	4.201 E	17.617	0.02
2323.770	0.31	195.67	2323.633	16.996 N	4.207 E	17.509	0.22
2352.550	0.50	187.16	2352.412	16.796 N	4.170 E	17.306	0.20
2382.660	0.57	188.78	2382.521	16.519 N	4.131 E	17.028	0.07
2412.010	0.59	186.72	2411.869	16.226 N	4.091 E	16.734	0.03
2440.800	0.65	189.72	2440.658	15.918 N	4.046 E	16.424	0.08
2470.120	0.64	190.52	2469.976	15.592 N	3.988 E	16.093	0.01
2498.180	0.66	197.21	2498.034	15.281 N	3.911 E	15.773	0.08
2524.200	0.70	194.84	2524.052	14.983 N	3.825 E	15.463	0.06
2553.310	0.86	204.43	2553.160	14.611 N	3.689 E	15.070	0.21
2575.000	0.86	204.43	2574.847	14.315 N	3.555 E	14.750	0.00

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 CLOSURE OF 13.95 DEGREES (GRID)
A TOTAL CORRECTION OF 11.01 DEG FROM MAGNETIC NORTH TO GRID NORTH HAS BEEN APPLIED

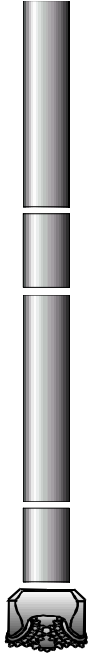
HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.
HORIZONTAL DISPLACEMENT(CLOSURE) AT 2575.000 METRES
IS 14.750 METRES ALONG 13.95 DEGREES (GRID)

MWD RUN 100 - BHA

	Component Length (m)	Cumulative Length (m)
		257.71
HWDP	113.330	
		144.38
Cross Over Sub	1.100	
		143.28
Drill Collar	9.510	
		133.77
Cross Over Sub	8.190	
		125.58
Drill Collar	27.610	
		97.97
Drilling Jars	9.770	
		88.20
Drill Collar	65.760	
		22.44
3-Point String Reamer	2.010	
		12.490

MWD RUN 100 - MWD

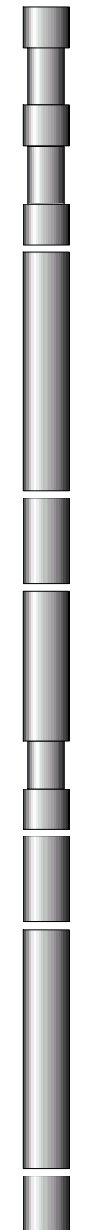
	Sensor Measure Point Distance To Bit (m)
Sub	
Directional	
Processor	
Gamma Ray	



	Component Length (m)	Cumulative Length (m)
MWD	12.920	20.43
Cross Over Sub	2.010	7.51
Drill Collar	2.970	5.50
Bit Sub	2.150	2.53
PDC	.380	0.38

	Sensor Measure Point Distance To Bit (m)
Resistivity	9.460

MWD RUN 200 - BHA

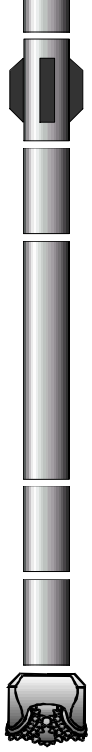


	Component Length (m)	Cumulative Length (m)
HWDP	113.340	280.43
Drill collar	28.080	167.09
Cross Over Sub	.360	139.01
Drilling Jars	9.630	138.65
Cross Over Sub	.820	129.02
Spiral Drill collar	111.520	128.20
Cross Over Sub	.360	16.68

MWD RUN 200 - MWD

	Sensor Measure Point Distance To Bit (m)
Sub	
Processor	
Gamma Ray	7.514

3-Point String Reamer	1.420	16.32	
Cross Over Sub	.590	14.90	
MWD	12.000	14.31	
Cross Over Sub	.500	2.31	
Bit Sub	1.580	1.81	
PDC	.230	0.23	



Resistivity	4.470