



PCDC - Pressure Case Directional
PCGK - Pressure Case Gamma
SLIM PHASE 4
DDSr-DGR - Drillstring Dynamics

[illegible]

WELL INFORMATION

MWD Run Number	100	200	300		
Date run completed	24-Mar-15	25-Mar-15	30-Mar-15		
Rig Bit Number	0100	0200	0300		
Bit Size (in)	8.750	8.750	6.125		
Tool Nominal OD (in)	6.750	6.750	4.750		
Log Start Depth (MD, ft)	1,680.00	5,247.00	5,320.00		
Log End Depth (MD, ft)	5,247.00	5,320.00	9,525.00		
Drill or Wipe	Drill	Drill	Drill		
Drill/Wipe Start Date and Time	23-Mar-15 12:00	25-Mar-15 00:00	26-Mar-15 08:10		
Drill/Wipe End Date and Time	24-Mar-15 12:13	25-Mar-15 03:10	27-Mar-15 20:39		
Min Inc (deg) @ Depth (MD, ft)	0.00 @ 0.00	80.88 @ 5,277.00	86.66 @ 5,338.00		
Max Inc (deg) @ Depth (MD, ft)	68.60 @ 5,190.00	89.43 @ 5,320.00	92.78 @ 5,618.00		
Bit TFA(in2) / Bit Type	1.49 / PDC	0.92 / PDC	1.24 / PDC		
Flow Rate (gpm)	600.00	520.00	320.00		
Max AV (fpm) / CV (fpm) @ MWD	N/A / N/A	N/A / N/A	N/A / N/A		
Fluid Type	Native/Spud Mud	Native/Spud Mud	Native/Spud Mud		
Density (ppg) / Viscosity (spqt)	8.70 / 29.00	9.00 / 29.00	9.10 / 40.00		
Filtrate CL (ppm)	4,000.00	4,000.00	3,600.00		
pH / Fluid Loss (mptm)	7.60 / 0	7.60 / 0	9.90 / 6		
PV (cP) / YP (lbf2)	1 / 2.00	1 / 2.00	14 / 13.00		
% Solids / % Sand	2 / 0.05	2 / 0.05	5.50 / 0.18		
% Oil / Oil:Water Ratio	N/A / N/A	N/A / N/A	N/A / N/A		
Rm @ Measured Temp (degF)	N/A @ N/A	N/A @ N/A	N/A @ N/A		
Rmf @ Measured Temp (degF)	N/A @ N/A	N/A @ N/A	N/A @ N/A		
Rmc @ Measured Temp (degF)	N/A @ N/A	N/A @ N/A	N/A @ N/A		
Max Tool Temp (degF) @ Depth (MD, ft)	112.15 / N/A	125.15 / N/A	128.05 / N/A		

Max Tool Temp (degF) / Source	148.47 / HCIM	135.45 / PCM	169.65 / HCIM		
Rm @ Max Tool Temp (degF)	N/A @ N/A	N/A @ N/A	N/A @ N/A		
Lead MWD Engineer	Matt Busche	Matt Busche	Matt Busche		
Customer Representative	Frank Kinney	Frank Kinney	Frank Kinney		

SENSOR INFORMATION

Downhole Processor Information

Tool Type	HCIM	PCM	HCIM		
Software Version	88.58	5.93	88.58		
Sub Serial Number	123	11341341	11753543		
Insert Serial Number	123	11400840	11753543		
Date and Time Initialized	23-Mar-15 05:17	24-Mar-15 15:54	26-Mar-15 01:21		
Date and Time Read	24-Mar-15 18:37	25-Mar-15 10:42	30-Mar-15 12:43		
ECMB SW Version	N/A	N/A	N/A		

Directional Sensor Information

Tool Type	PCDC	PCDC	PCDC		
Distance From Bit (ft)	55.50	41.44	46.16		
Software Version	6.21	6.21	6.33		
Sub Serial Number	11654492	11341341	11122415		
Sonde Serial Number	11638621	11902169	10859934		
Sensor ID Number	N/A	N/A	N/A		
Toolface Offset (deg)	28.13	177.87	231.84		

Gamma Ray Sensor Information

Tool Type	PCG	PCG	DGR		
Distance From Bit (ft)	64.55	46.39	71.65		
Recorded Sample Period (sec)	10	10	12		
Software Version	8.15	8.15	N/A		
Sub Serial Number	10825583	11341341	12531030		
Insert/Sonde Serial Number	11579811	11293376	268167		

Resistivity Sensor Information

Tool Type	EWR-P4		Slim P4		
Distance From Bit (ft)	37.69		64.66		
Recorded Sample Period (sec)	8		12		
Software Version	1.50		5.55		
Sub Serial Number	10505858		11274400		
Receiver Insert Serial Number	11075061		11281792		
Transmitter Insert Serial Number	11254779		230979		
Receiver Orientation	Down		Up		

DDSr-DGR Sensor Information

Tool Type			DDSr-DGR		
Distance From Bit (ft)			0.00		
Recorded Sample Period (sec)			12		
Software Version			10.88		
Sub Serial Number			268167		
Insert Serial Number			11205043		
Sensor ID Number			6095		

DDSr-HCIM Sensor Information

Tool Type	DDSr-HCIM				
Distance From Bit (ft)	0.00				

Distance From Bit (ft)	0.00				
Recorded Sample Period (sec)	12				
Software Version	20.88				
Sub Serial Number					
Insert Serial Number	11713278				
Sensor ID Number	8982				

REMARKS

1. Depths are measured depths, referenced to Driller's pipe tally, and measured from the rig floor.
2. No depth corrections have been made for pipe stretch or compression.
3. All data presented is recorded unless otherwise specified.
4. The following smoothing parameters have been applied to the data:

PGRC (Corrected Gamma Ray):

Interval Resolution: 0.5 ft

Interval Distance: 0.6 ft

Gap Fill: 3.0 ft

DGRCC (Corrected Dual Gamma Ray):

Interval Resolution: 0.5 ft

Interval Distance: 0.6 ft

Gap Fill: 3.0 ft

ROPA (Average Rate of Penetration):

Interval Resolution: 0.5 ft

Interval Distance: 1.2 ft

Gap Fill: 3.0 ft

R09-39 PC (Corrected Phase Resistivity):

Interval Resolution: 0.5 ft

Interval Distance: 0.6 ft

Gap Fill: 3.0 ft

R09-39 AC (Corrected Attenuated Resistivity):

Interval Resolution: 0.5 ft

Interval Distance: 0.6 ft

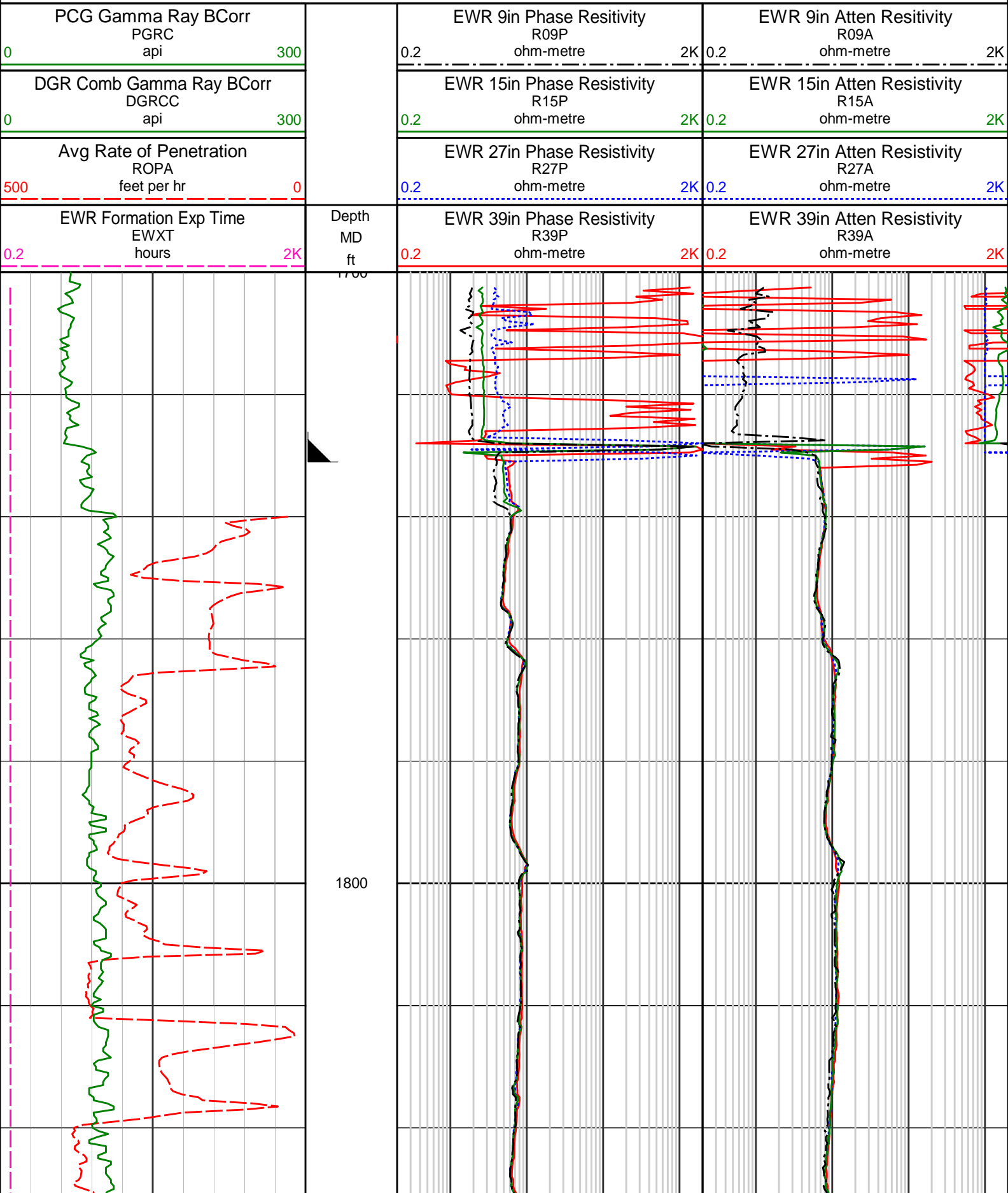
Gap Fill: 3.0 ft

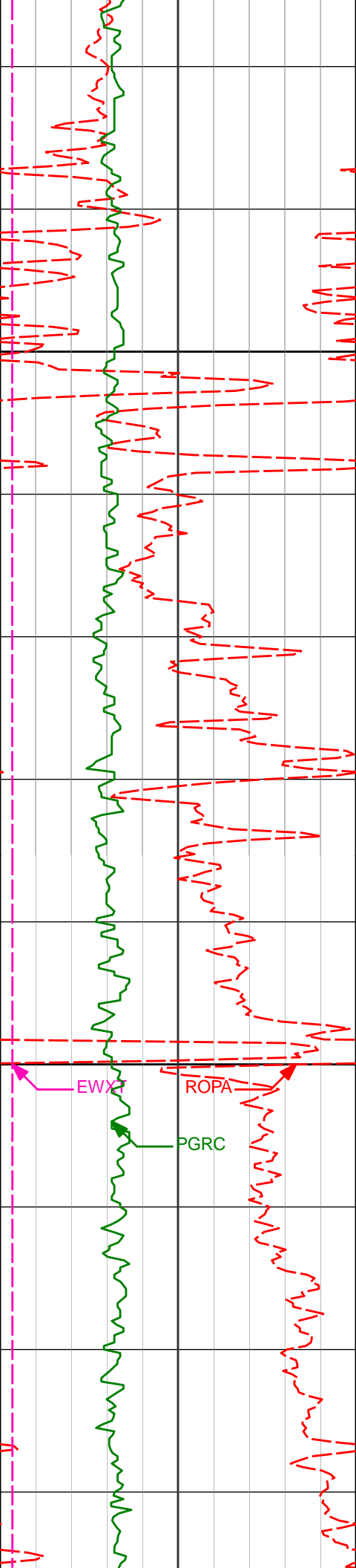
Insite Version 8.1.1

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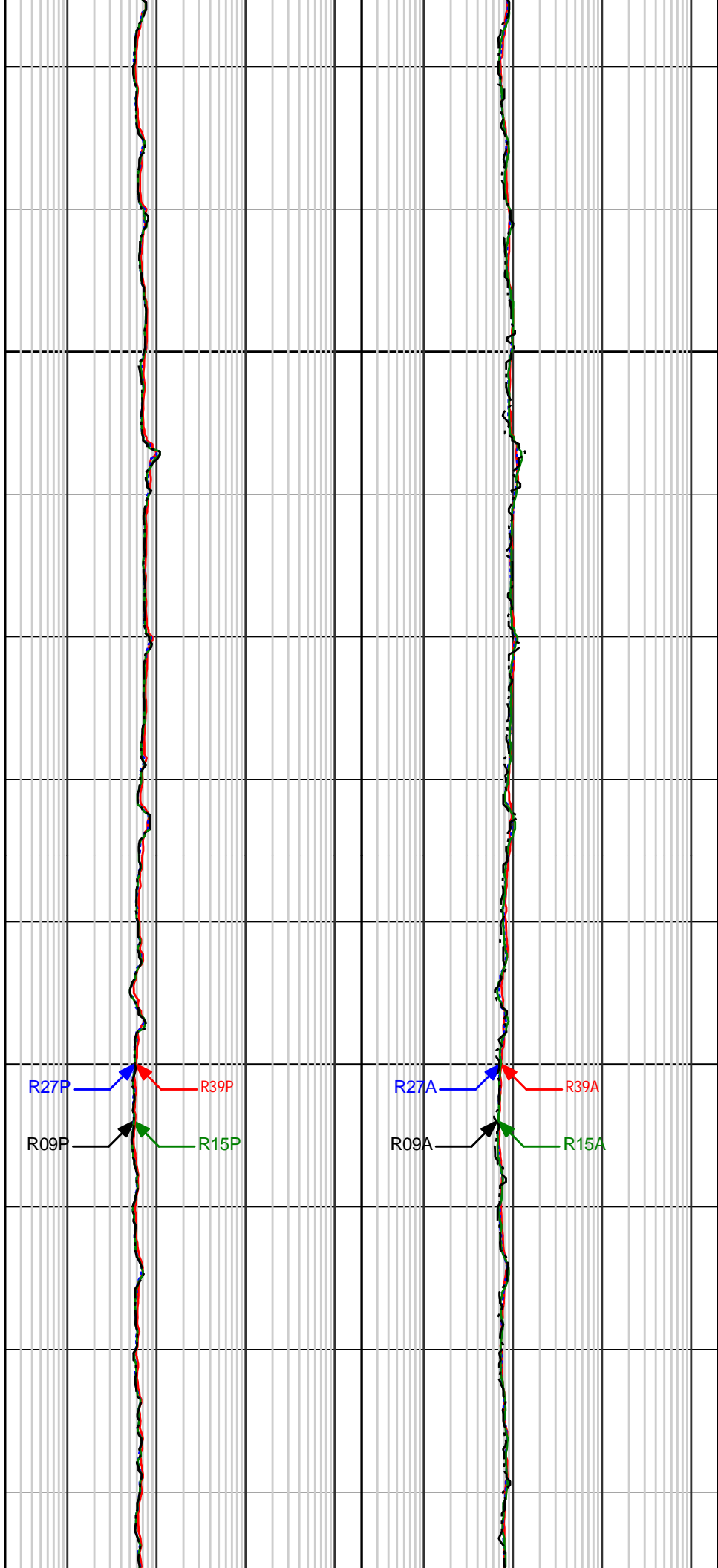
MD Detail 1:240





1900

2000

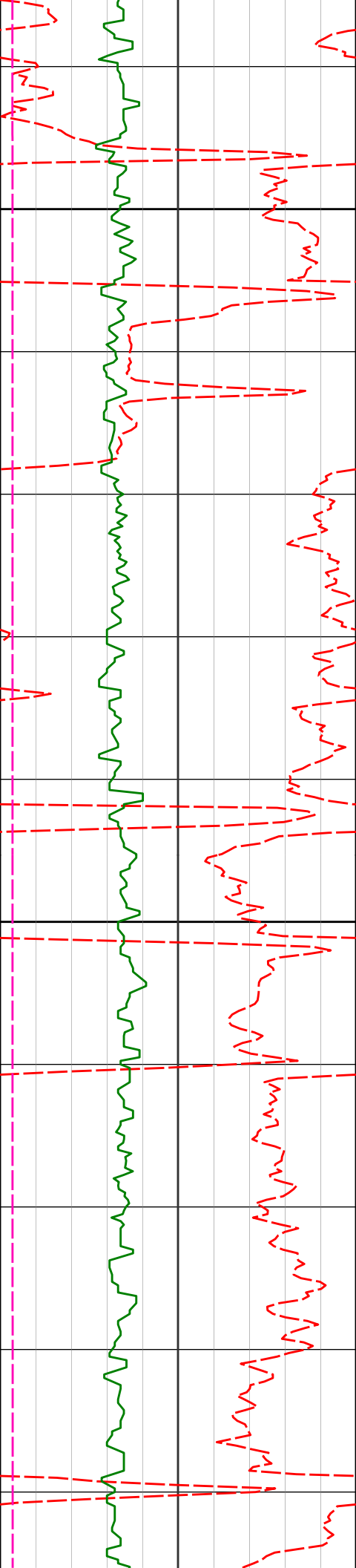


R27A

R39A

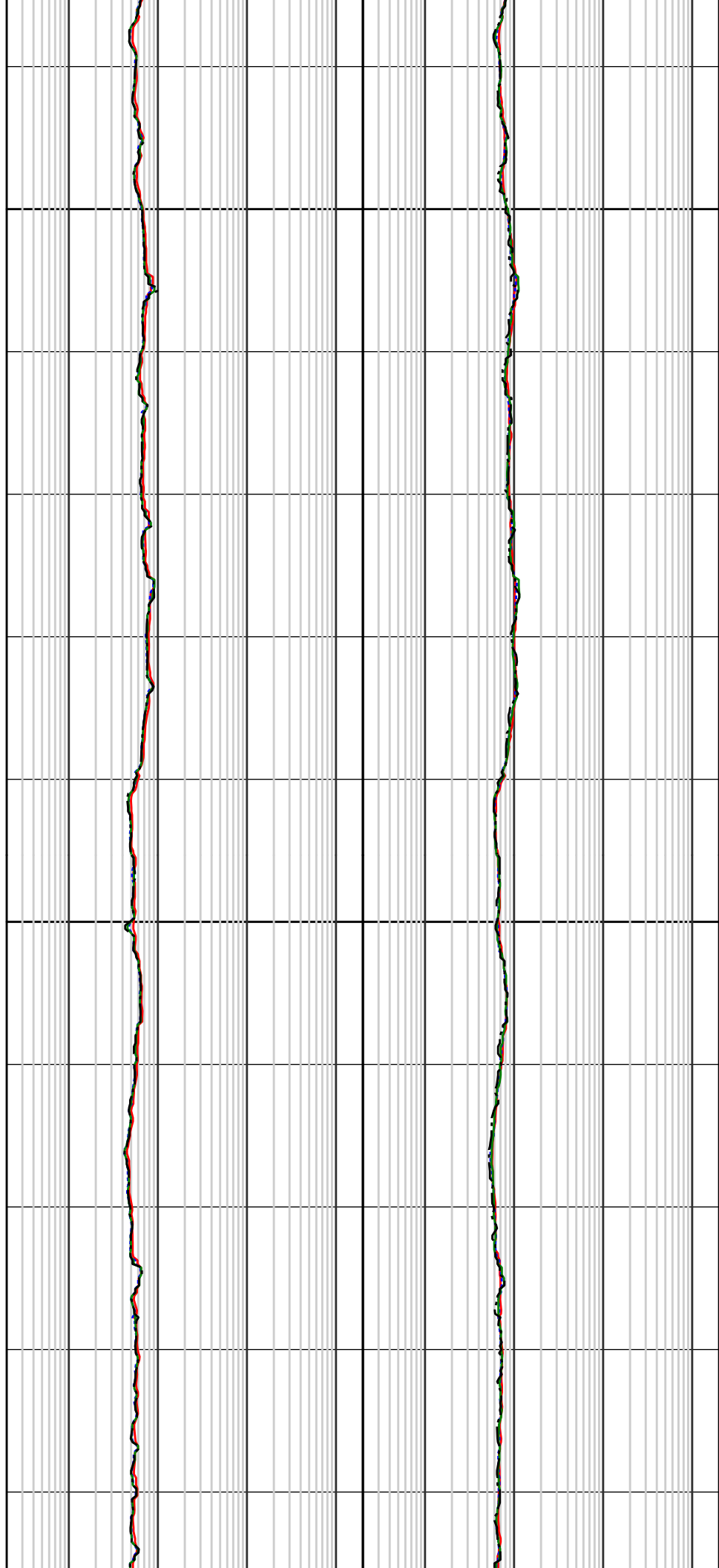
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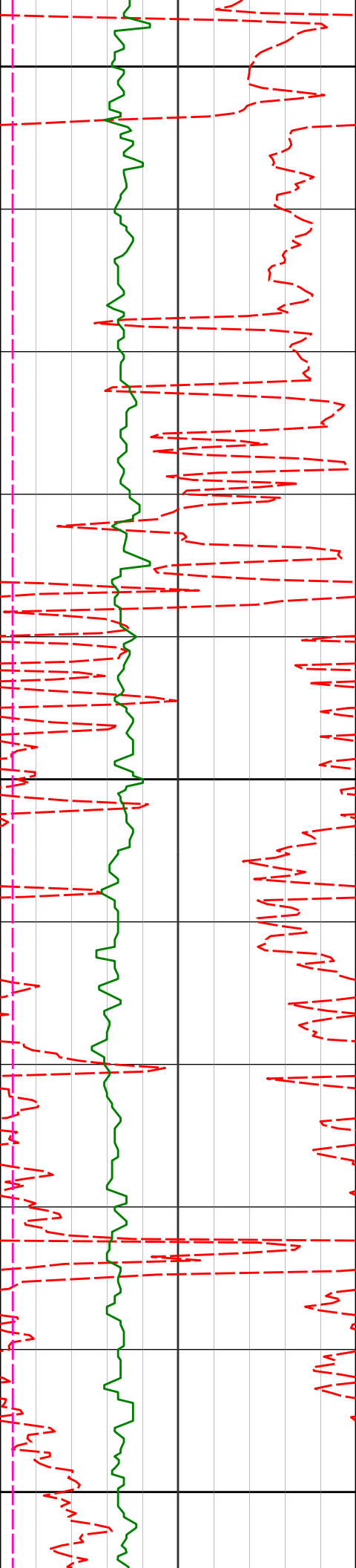
R09A



2100

2200

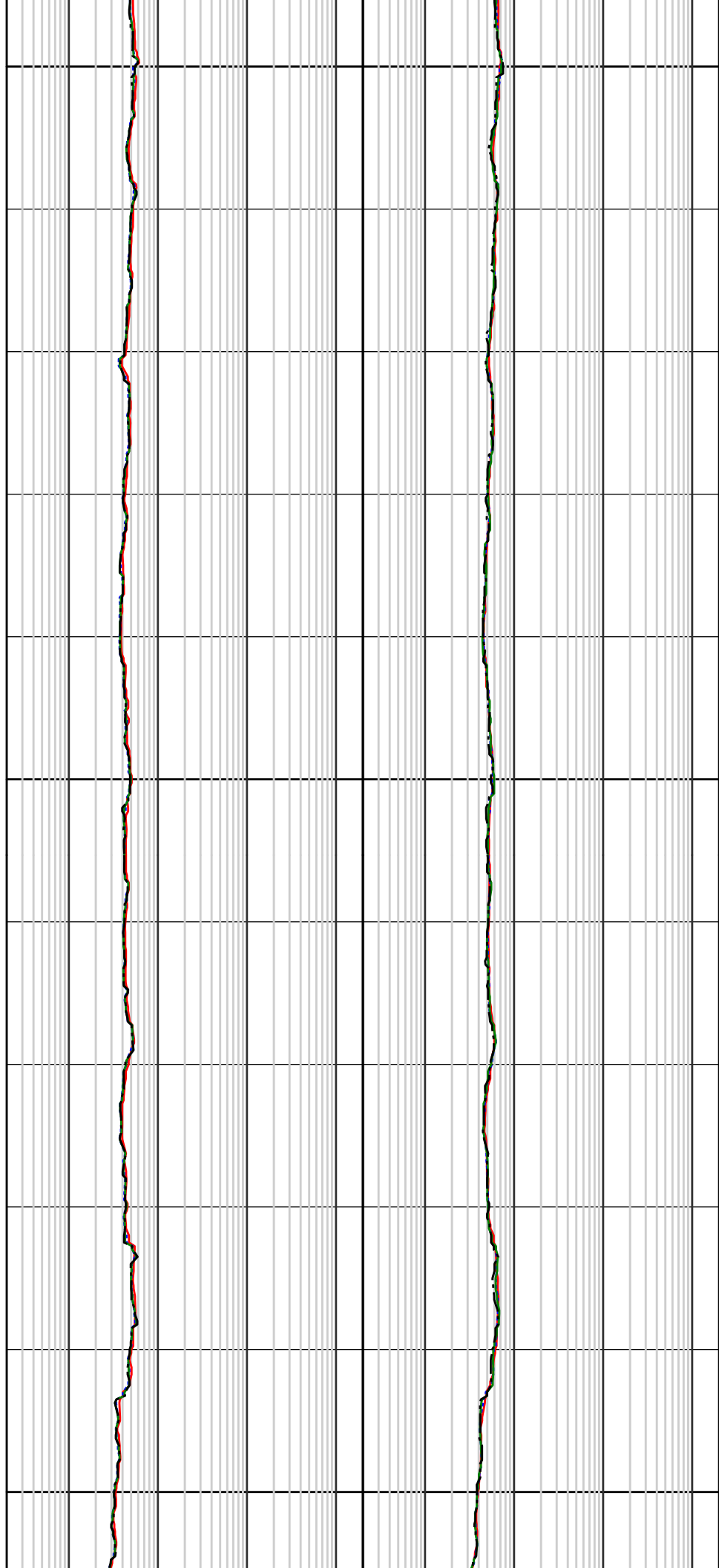


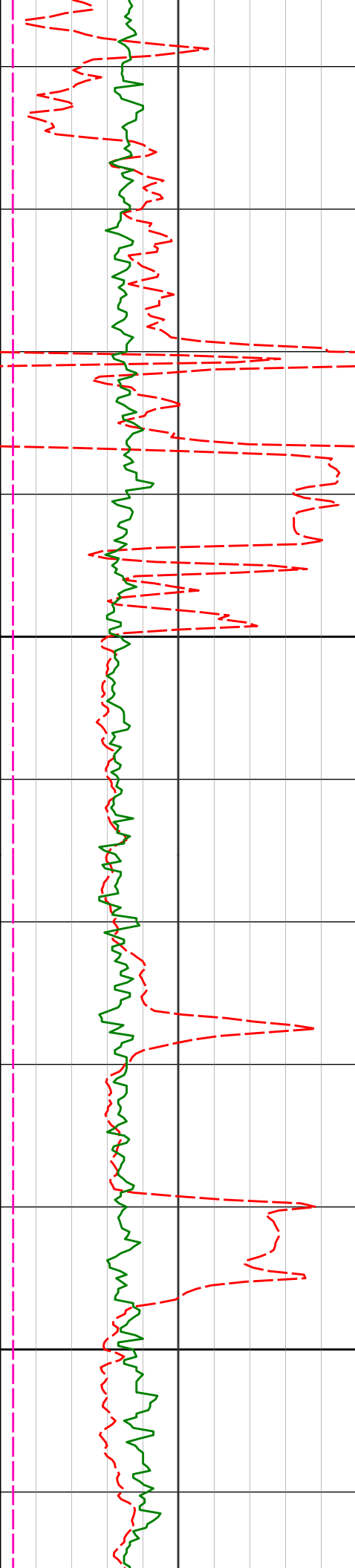


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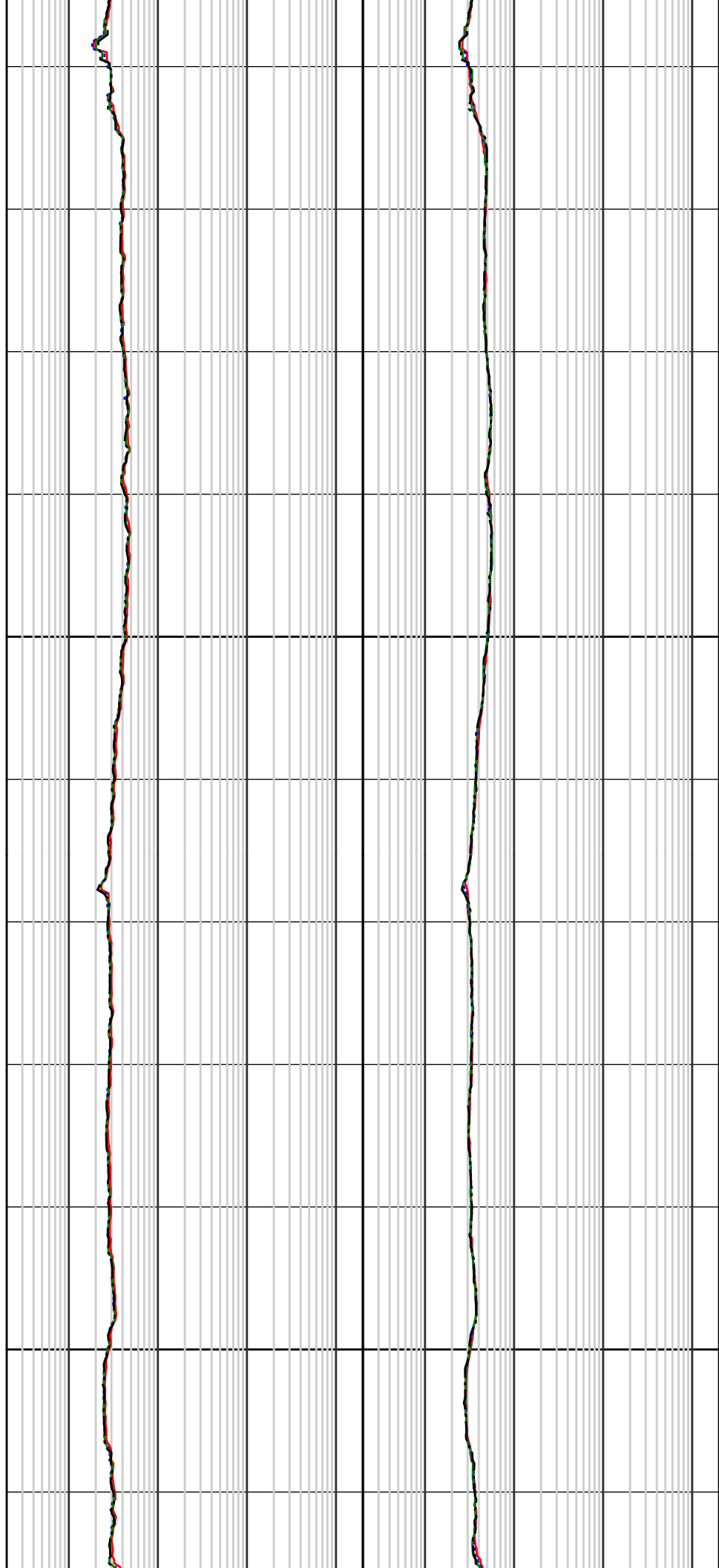
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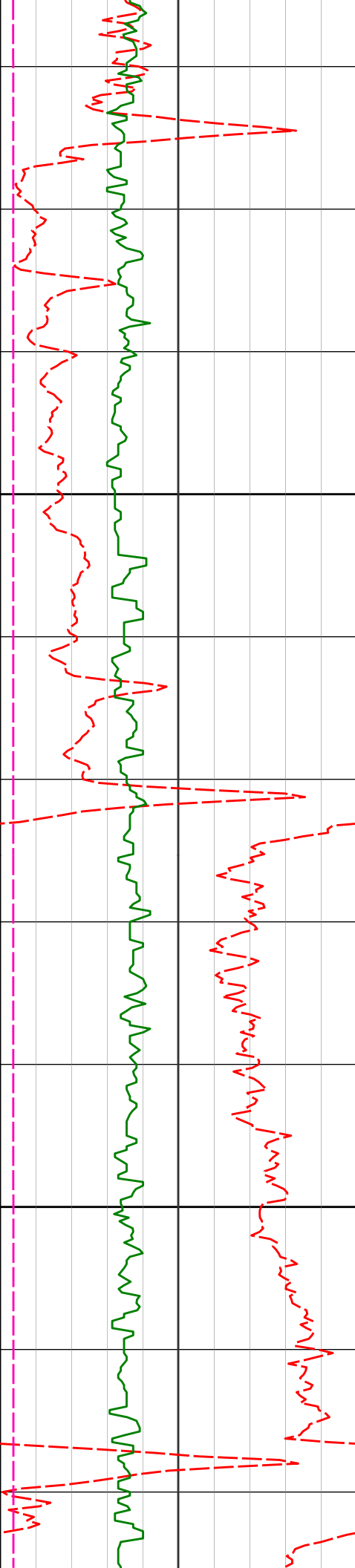




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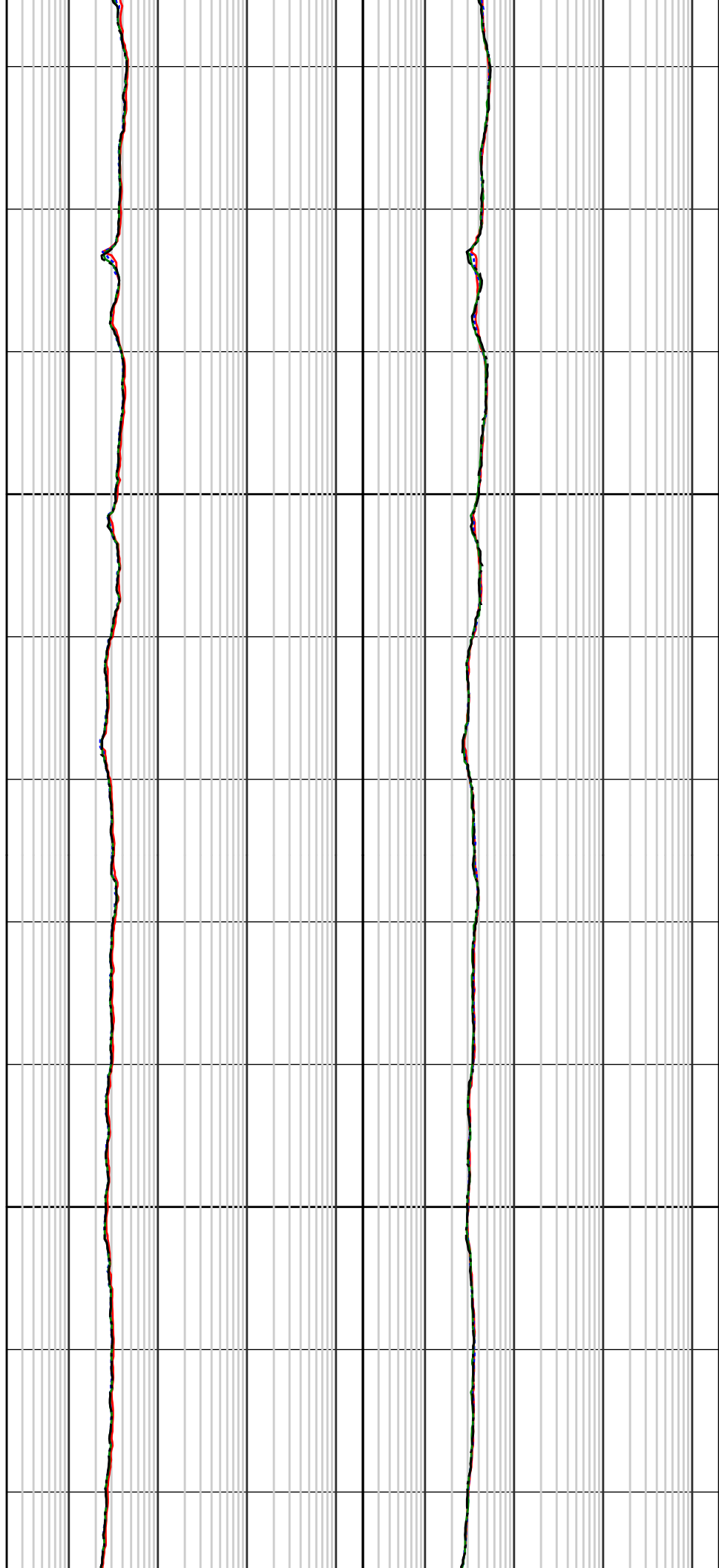
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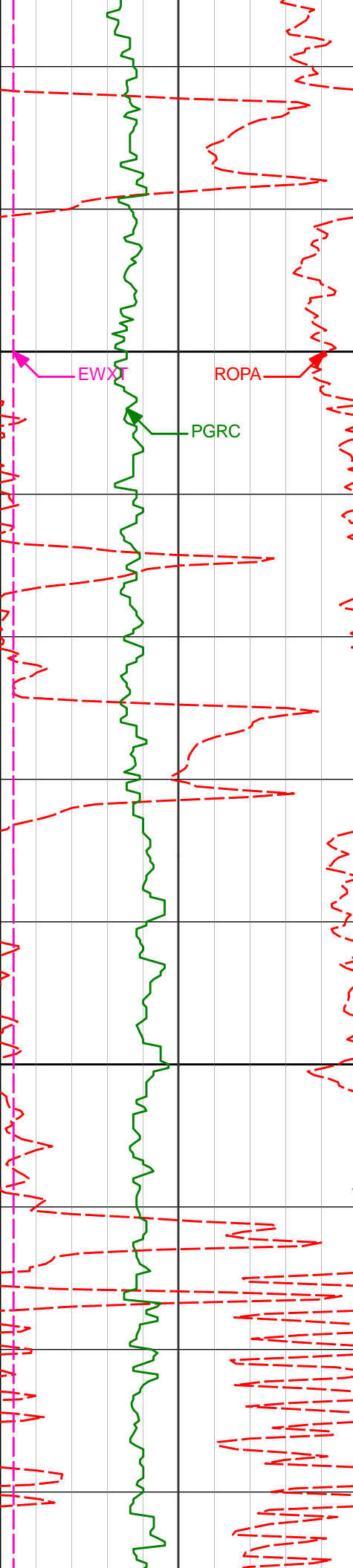




2800

2900





3000

R27P

R39P

R09P

R15P

ROPA

PGRC

EWT

3100

R27A

R39A

R09A

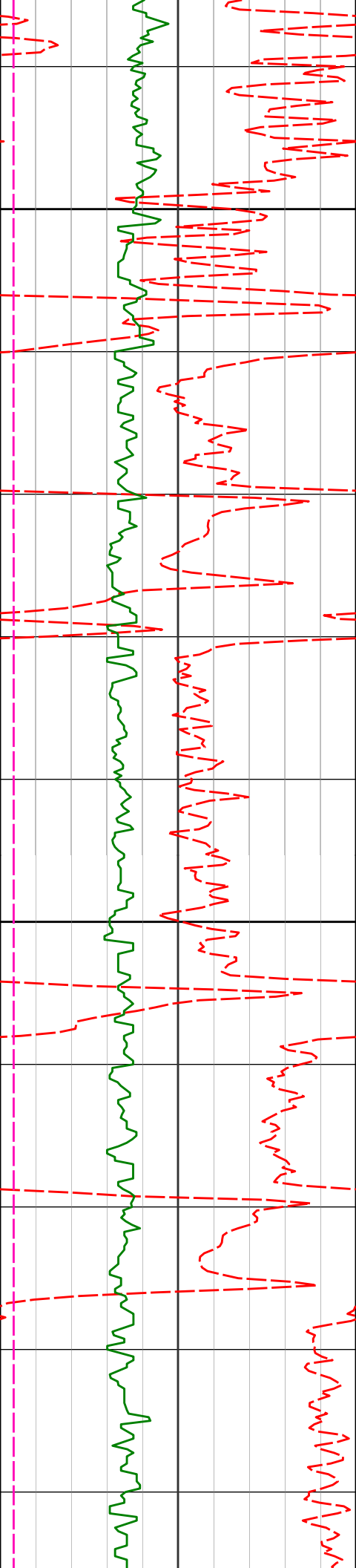
R15A

R27A

R39A

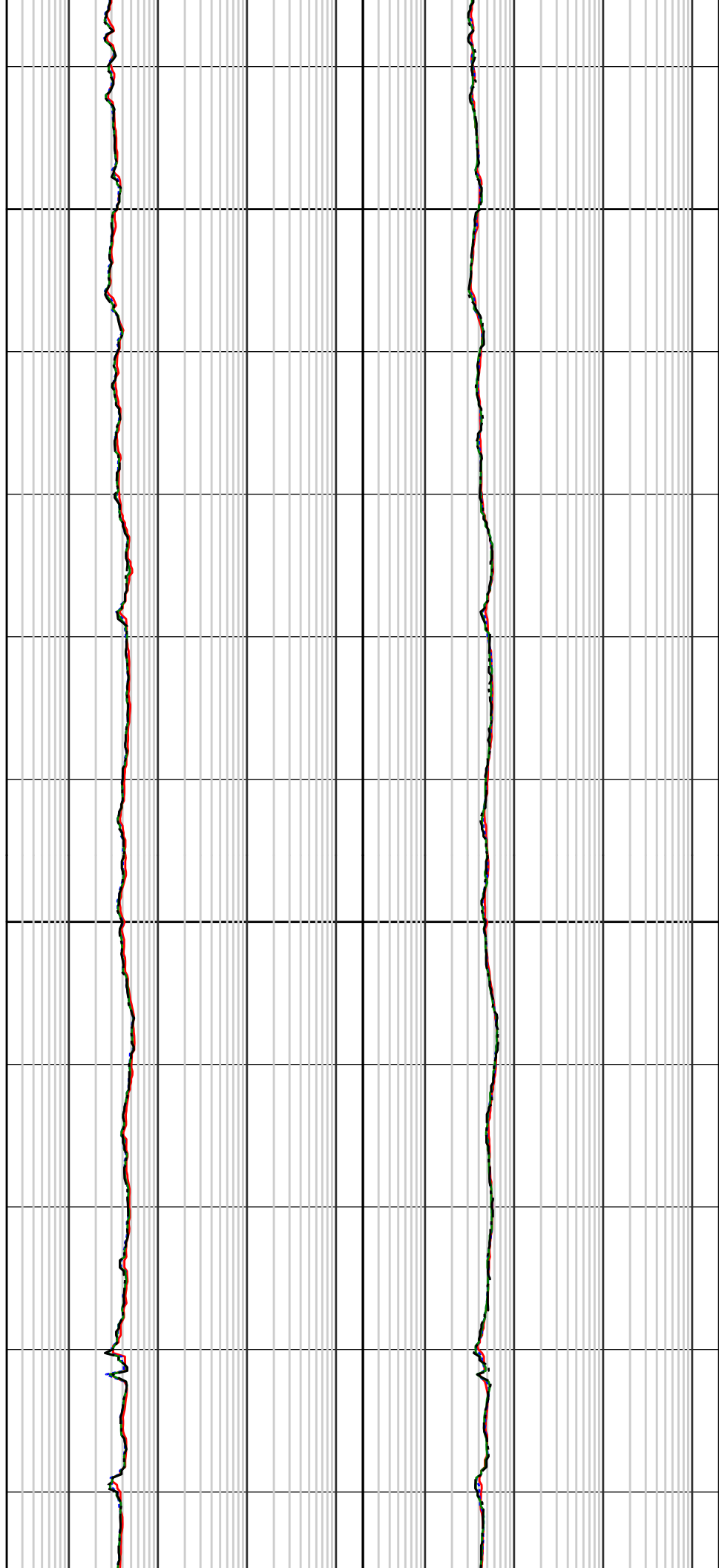
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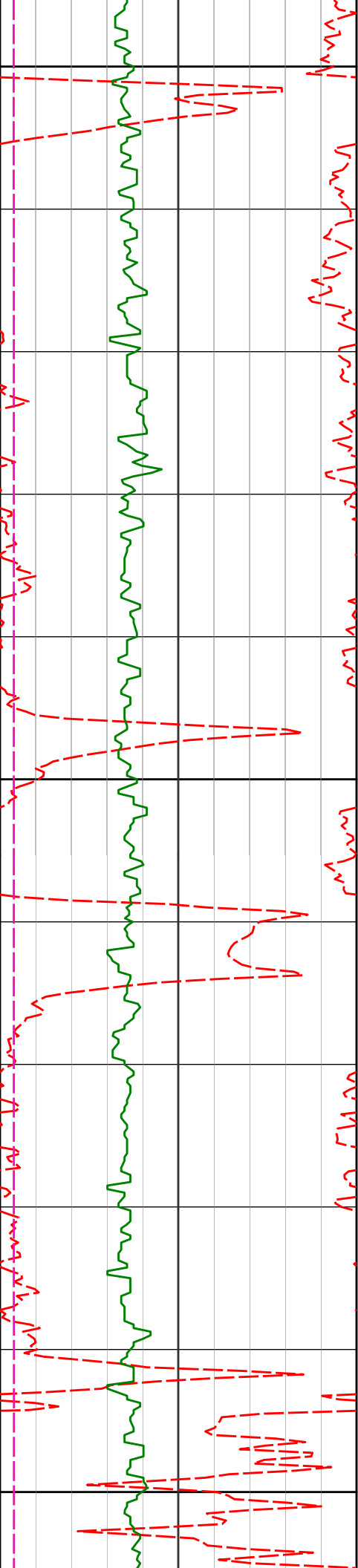
R15A



3200

3300

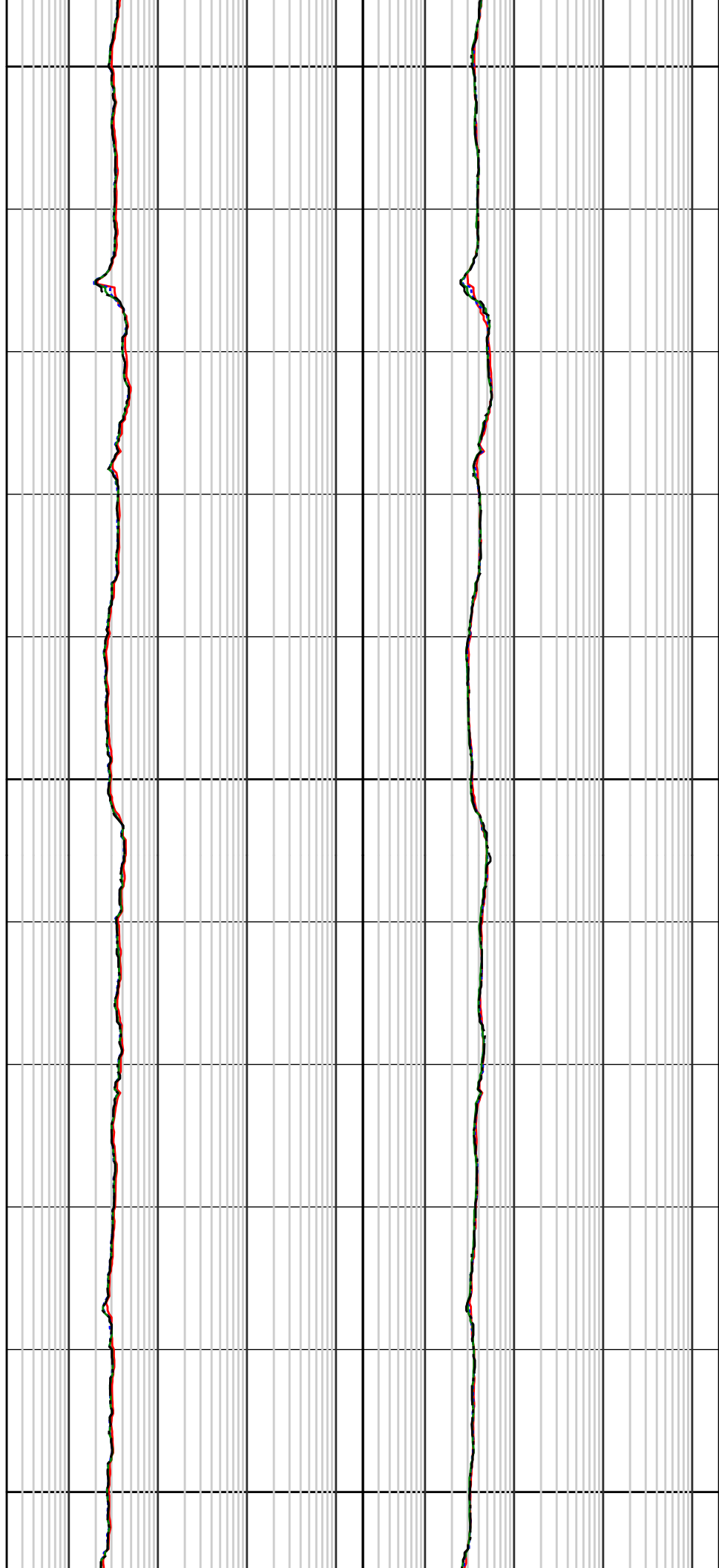


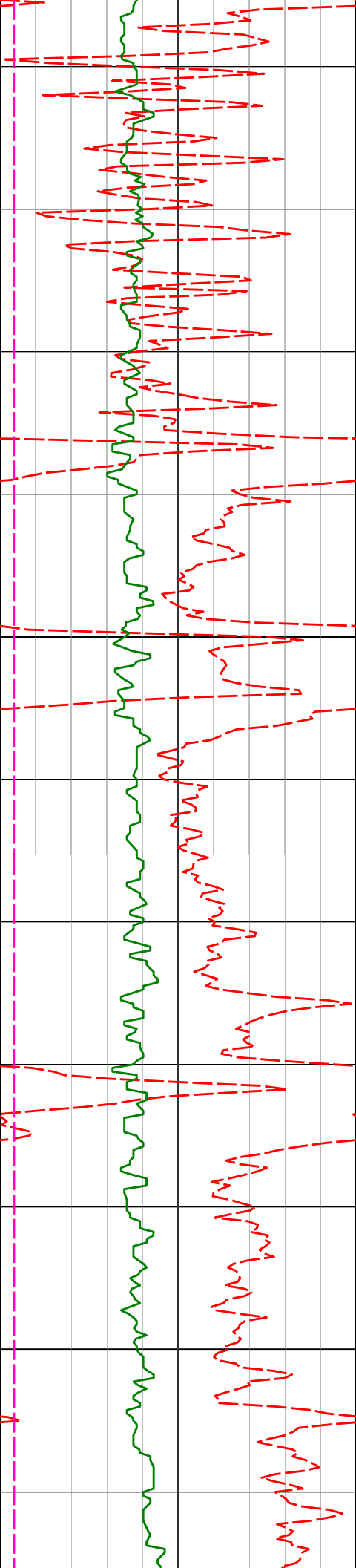


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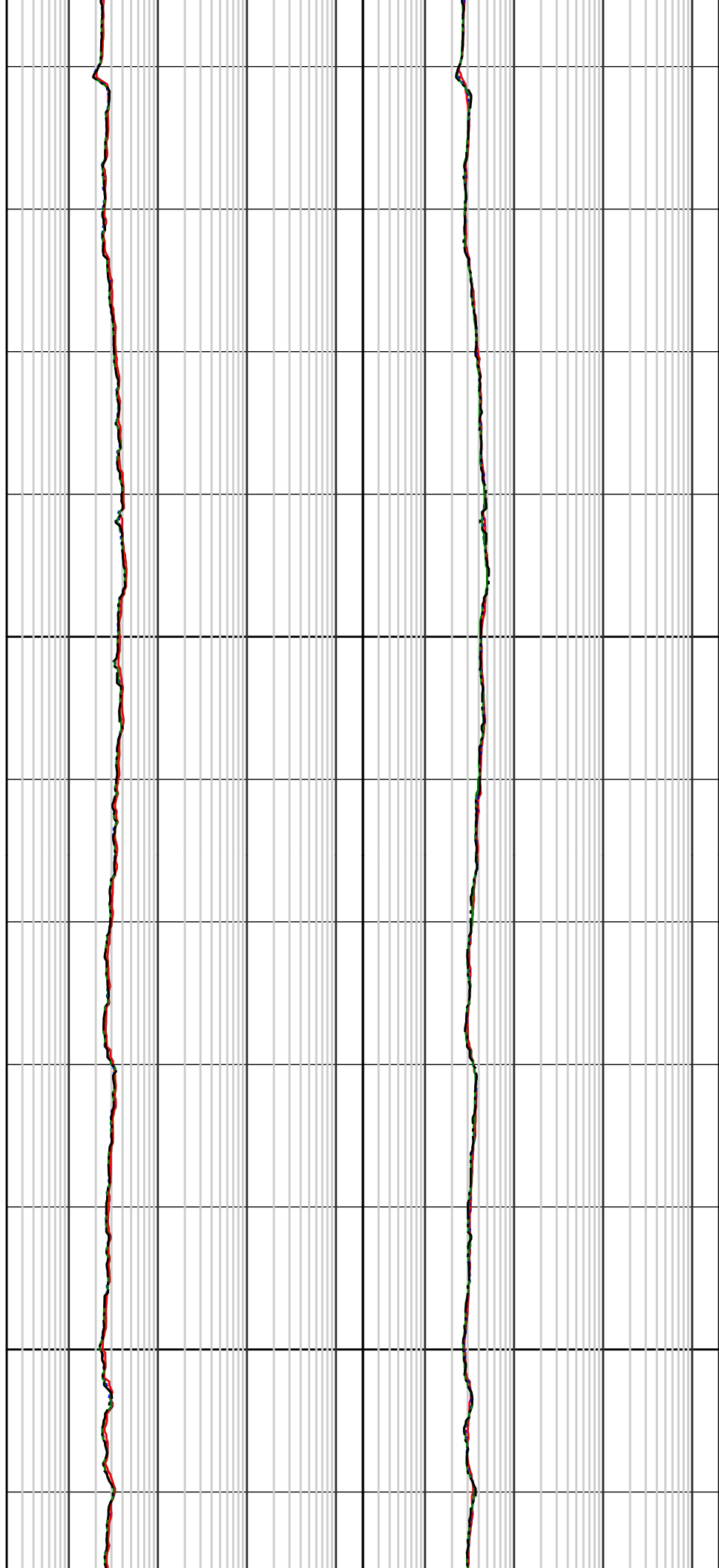
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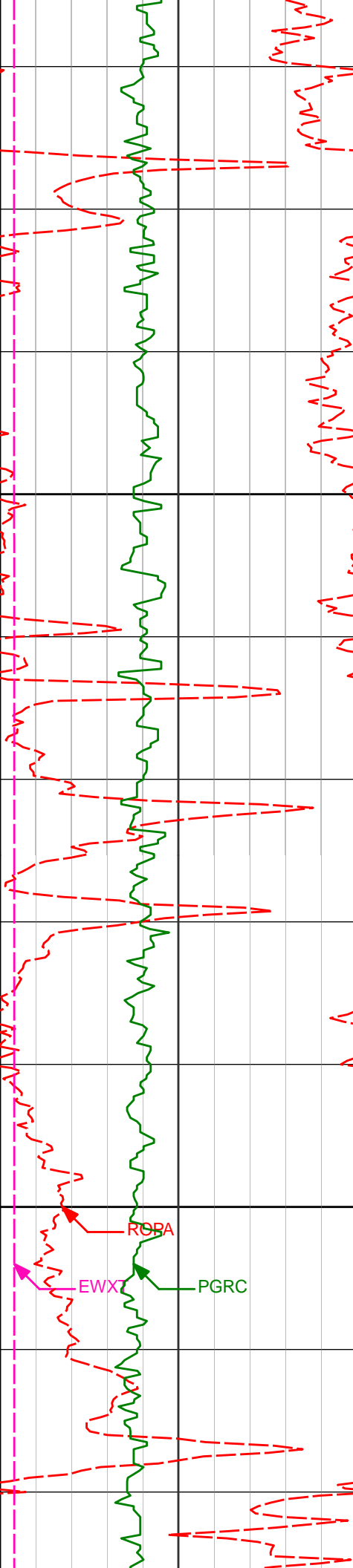




3700

3800





3900

4000

R27P

R09P

R39P

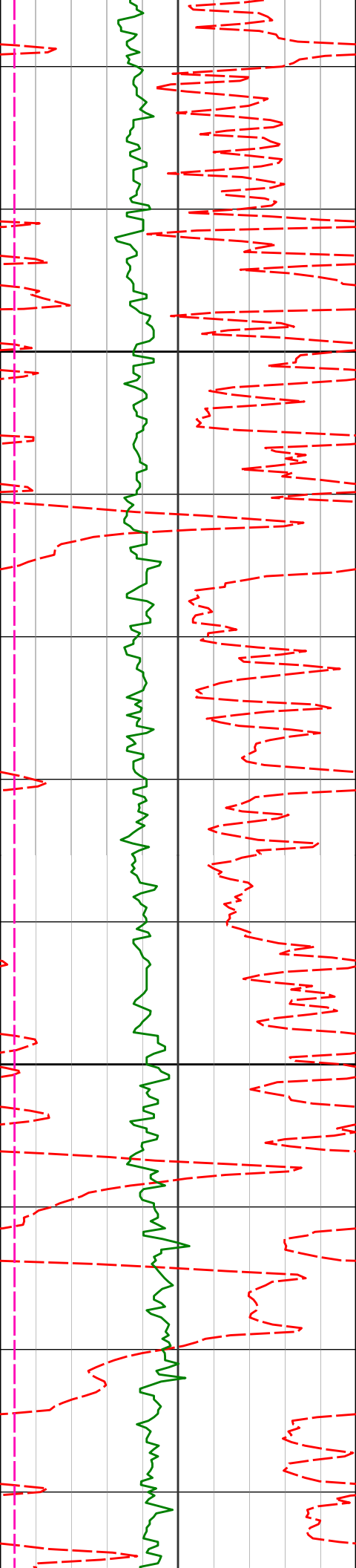
R15P

R27A

R09A

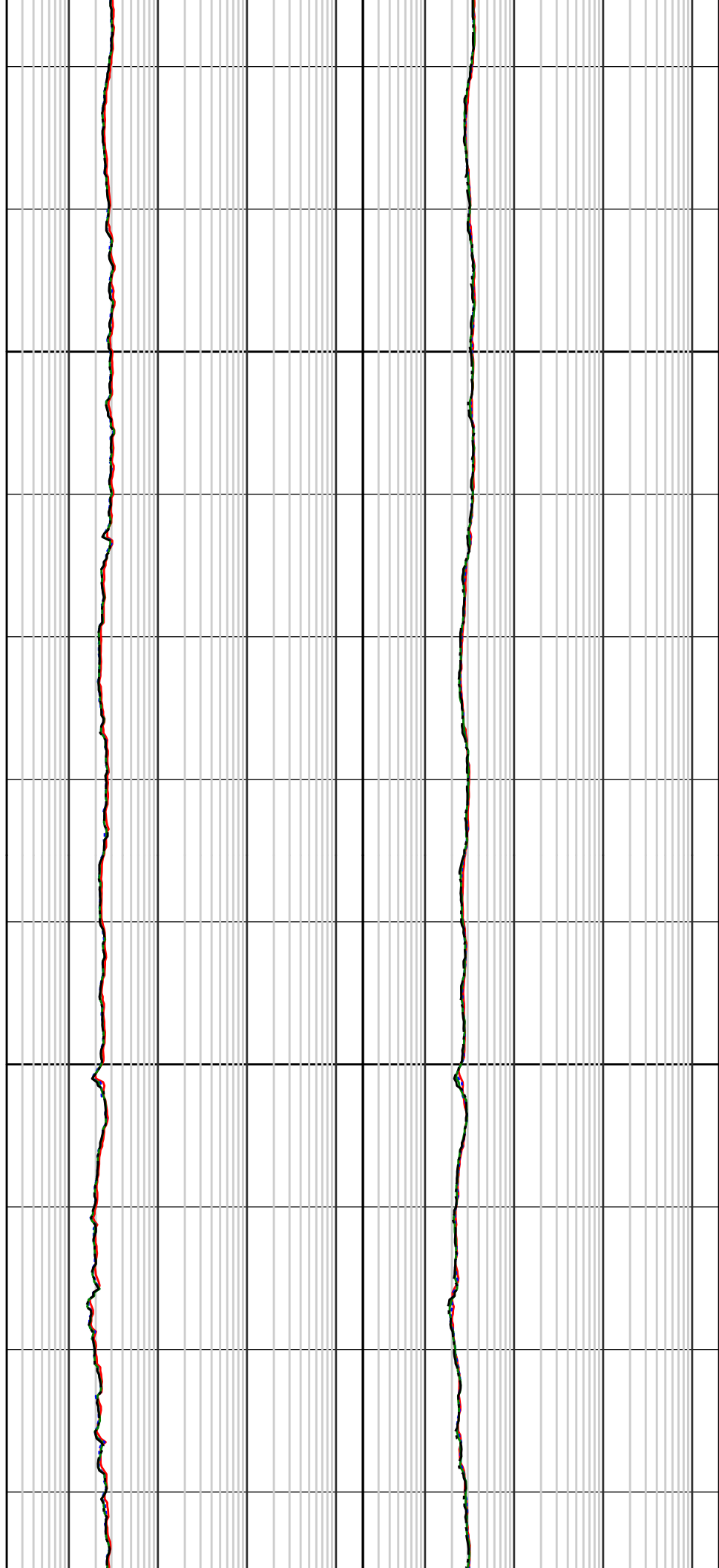
R39A

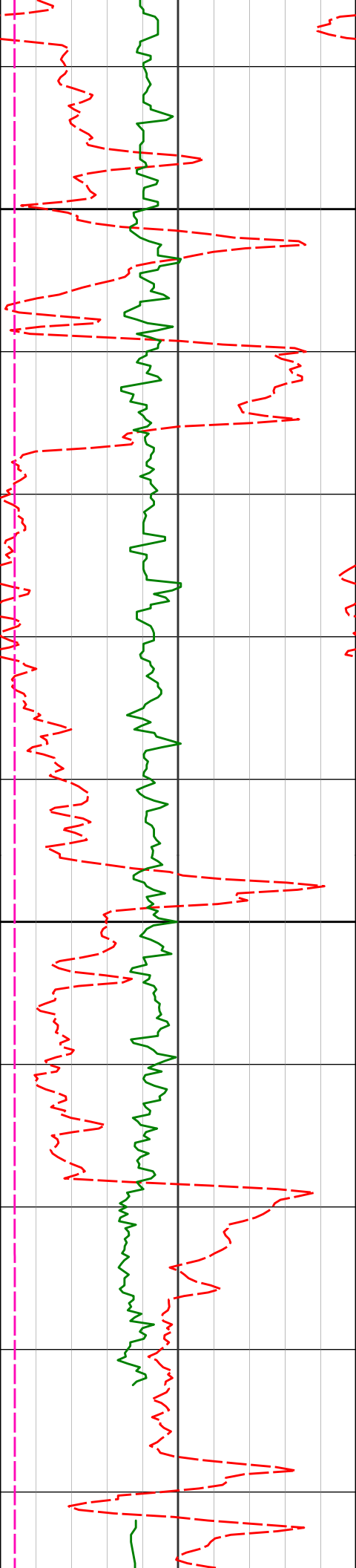
R15A



4100

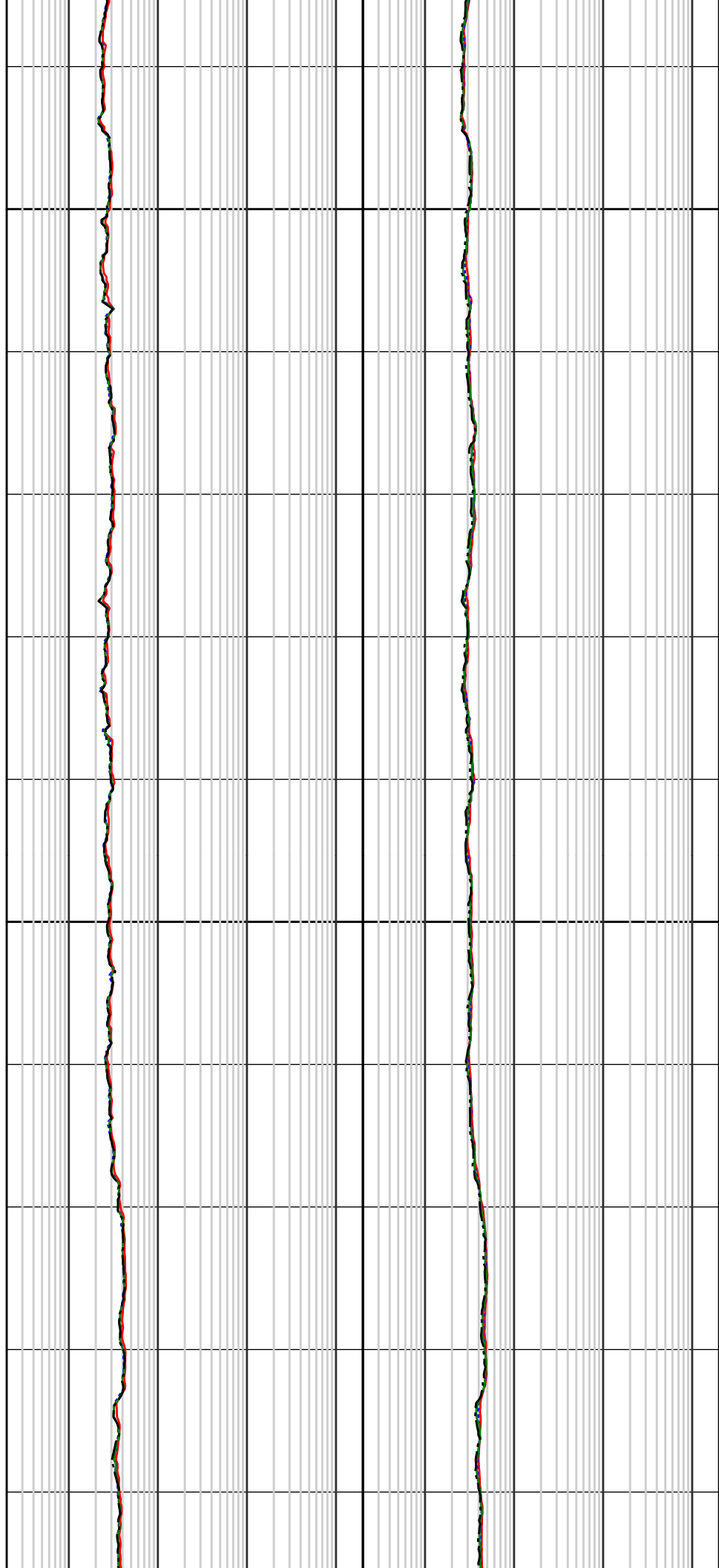
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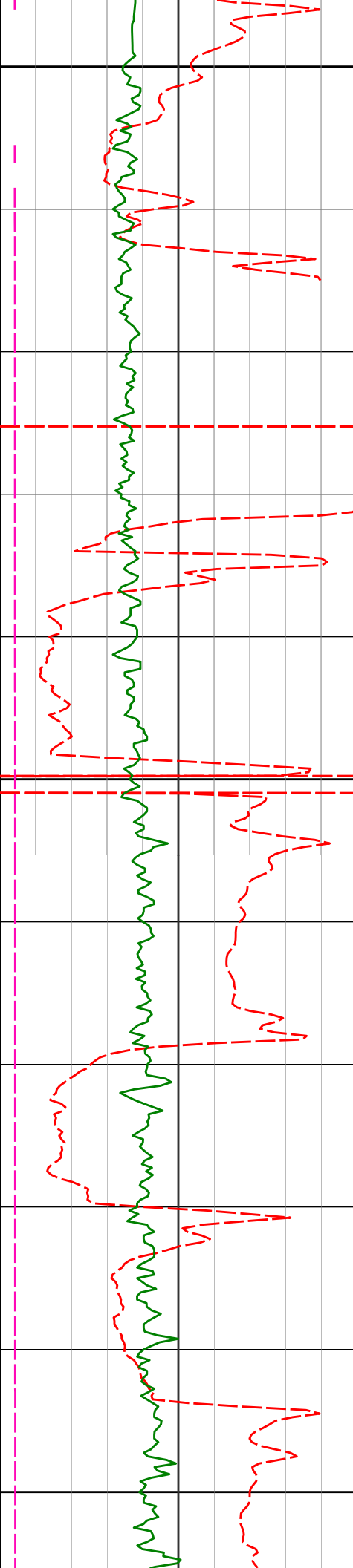




4300

4400





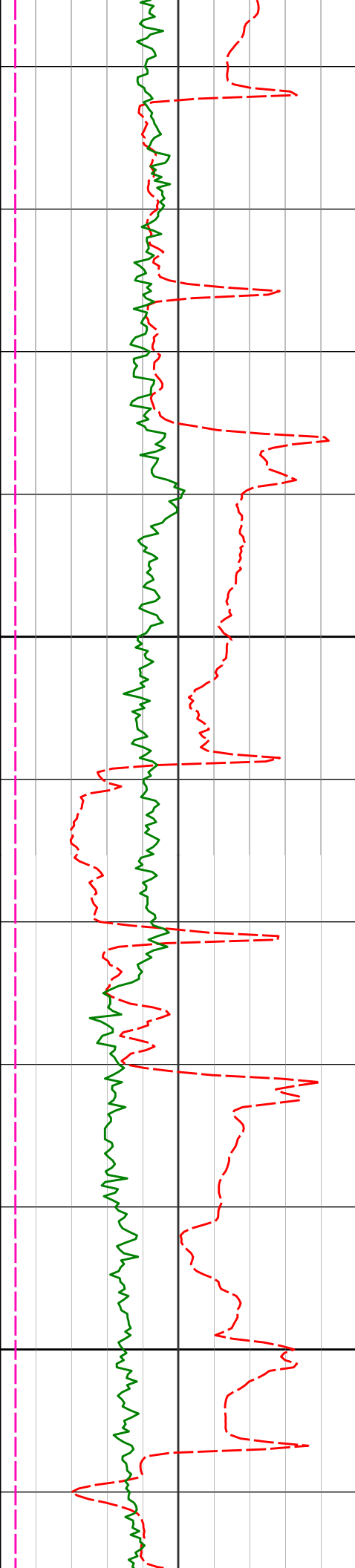
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4600

4700

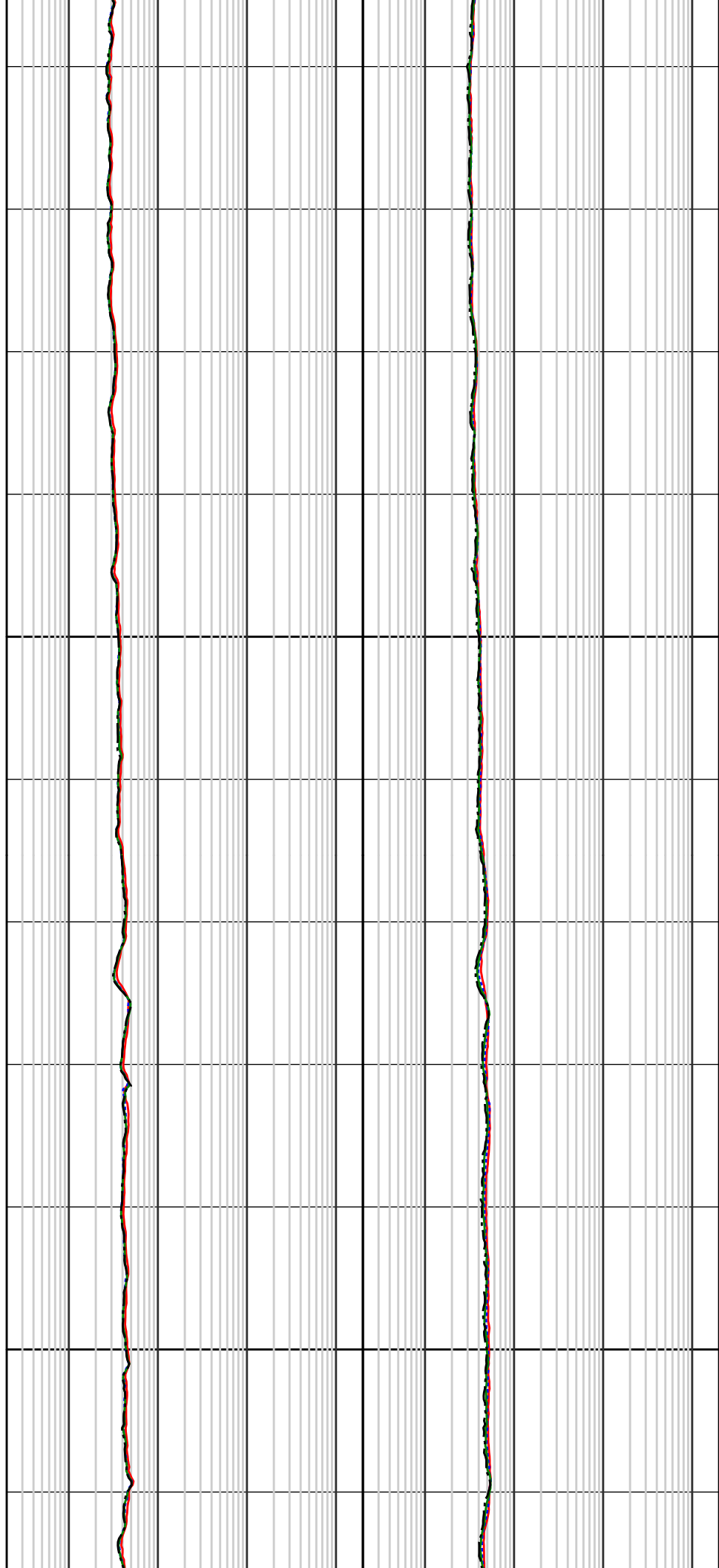
WITS depth tracking lost due to Pason freeze

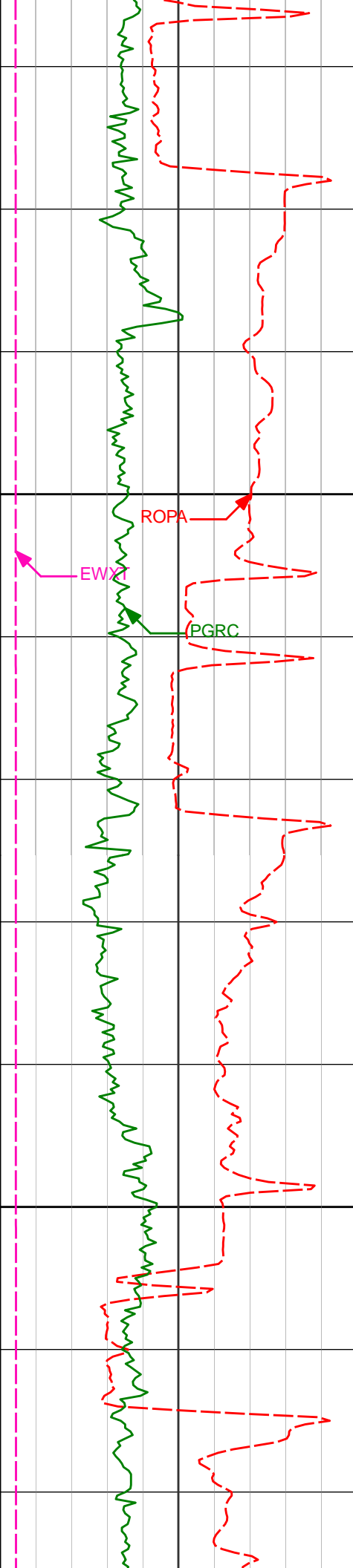




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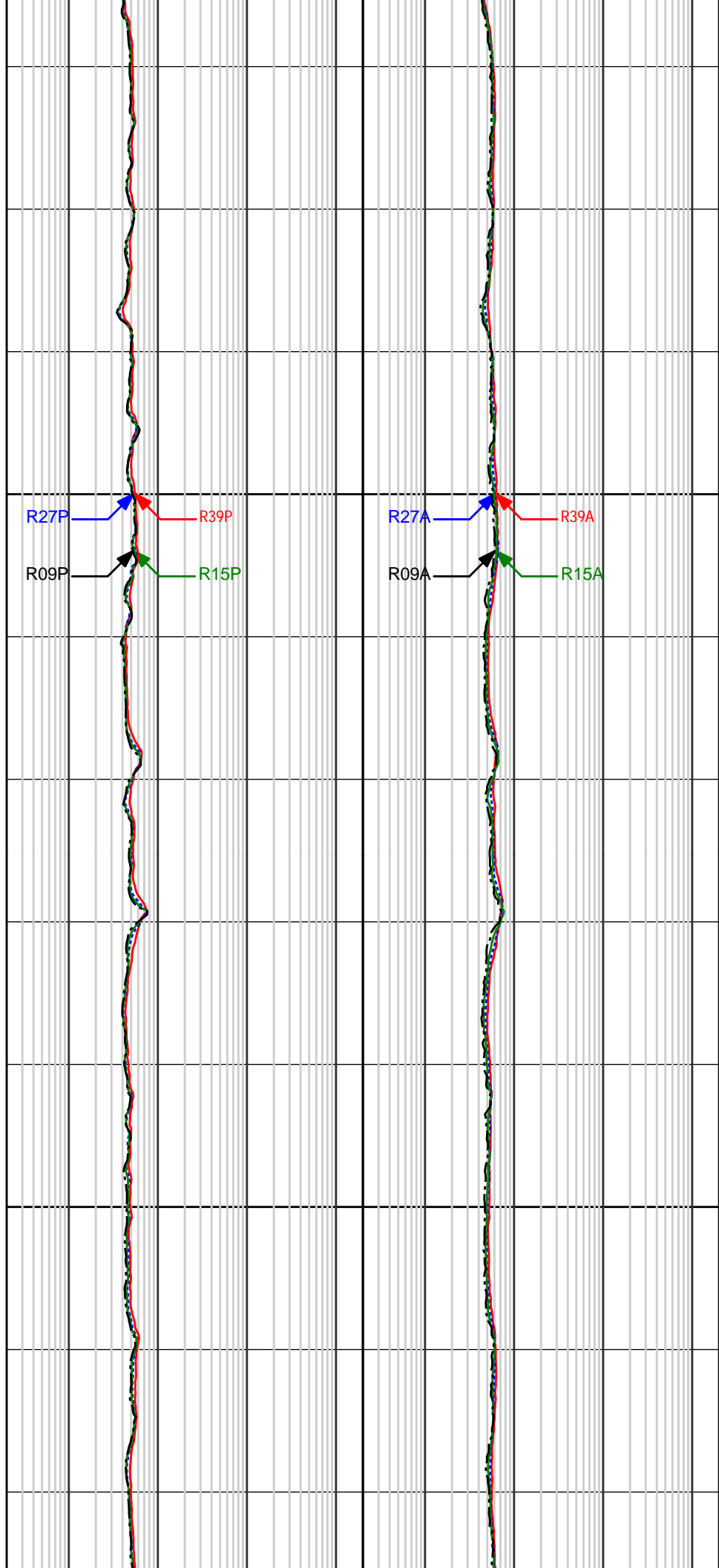
4900



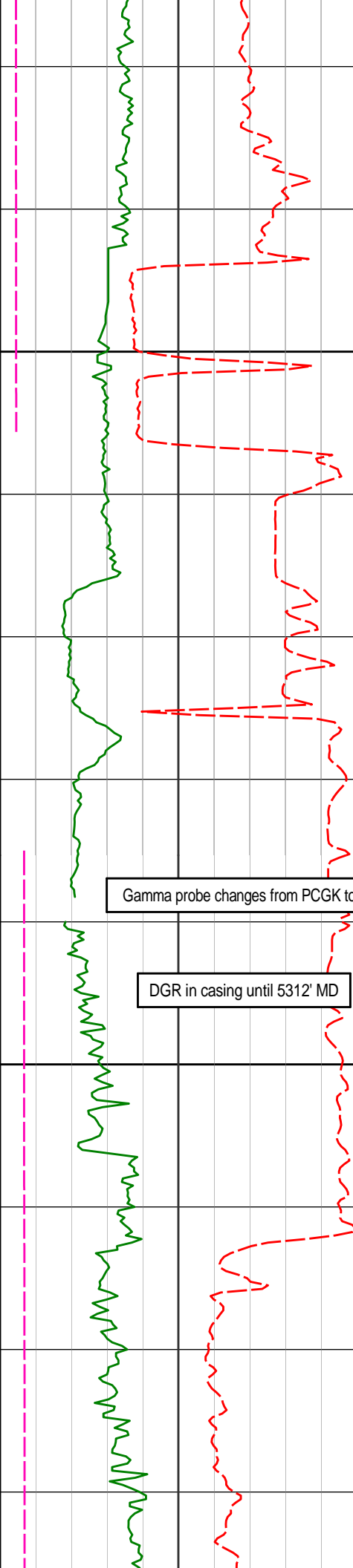


5000

5100



R27A (blue solid line)
R39A (red solid line)
R09A (black solid line)
R15A (green solid line)

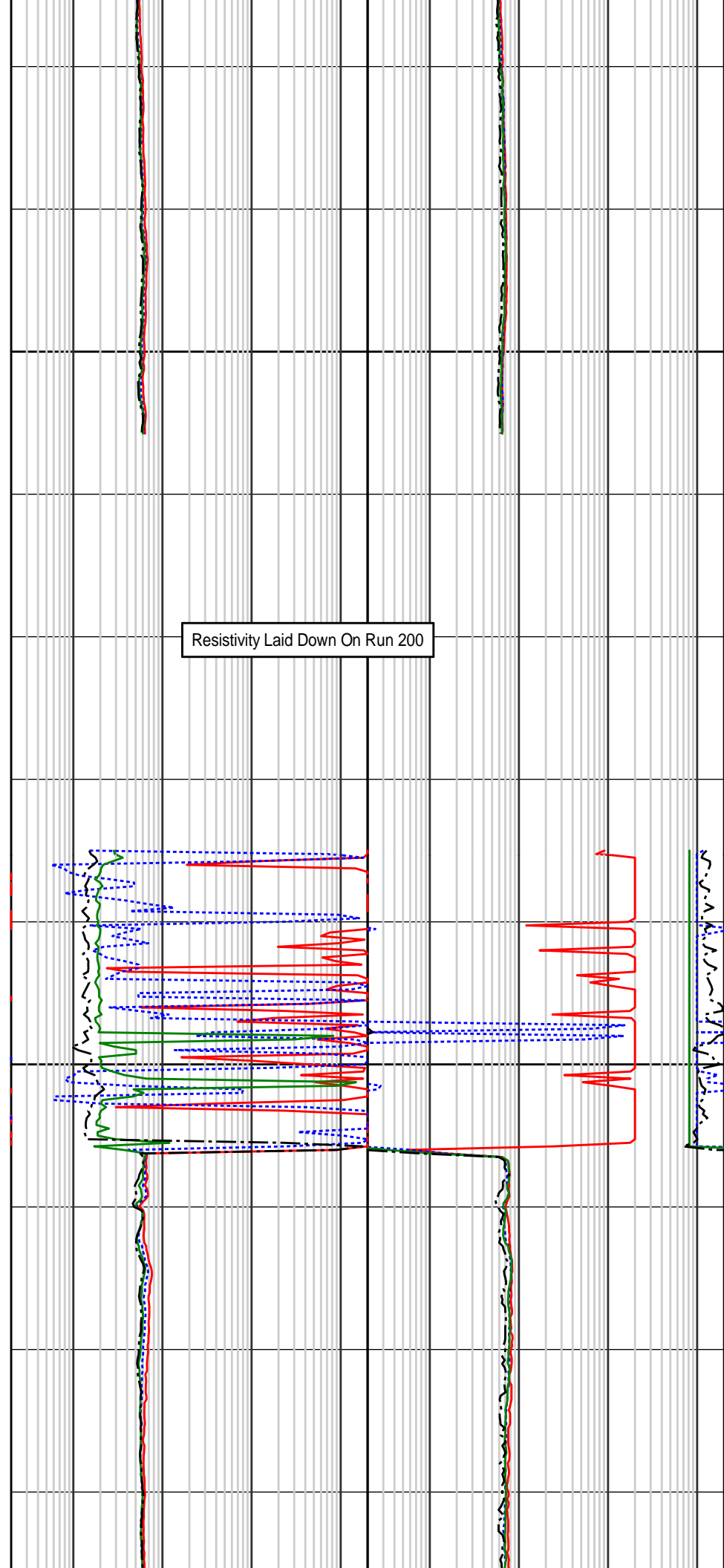


5200

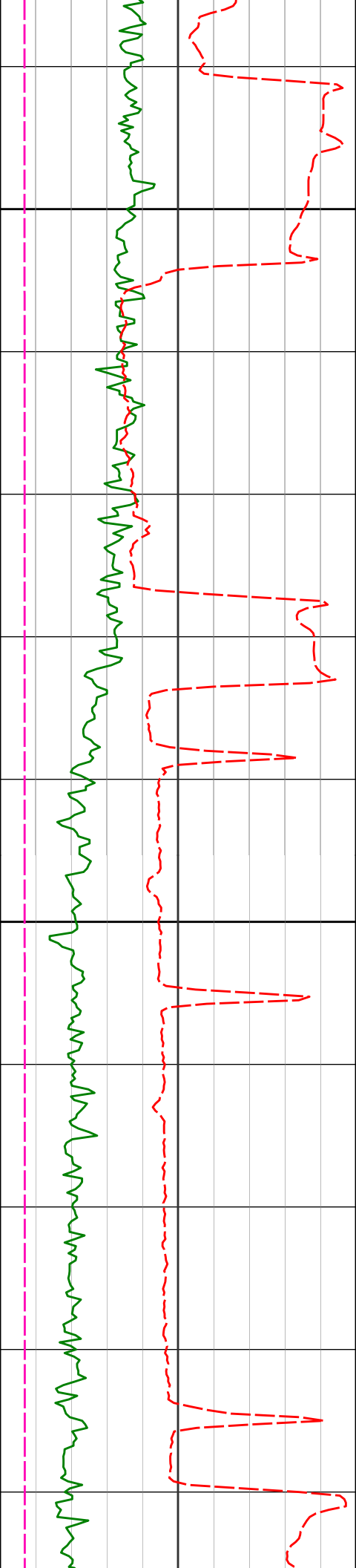
Gamma probe changes from PCGK to DGR

DGR in casing until 5312' MD

5300

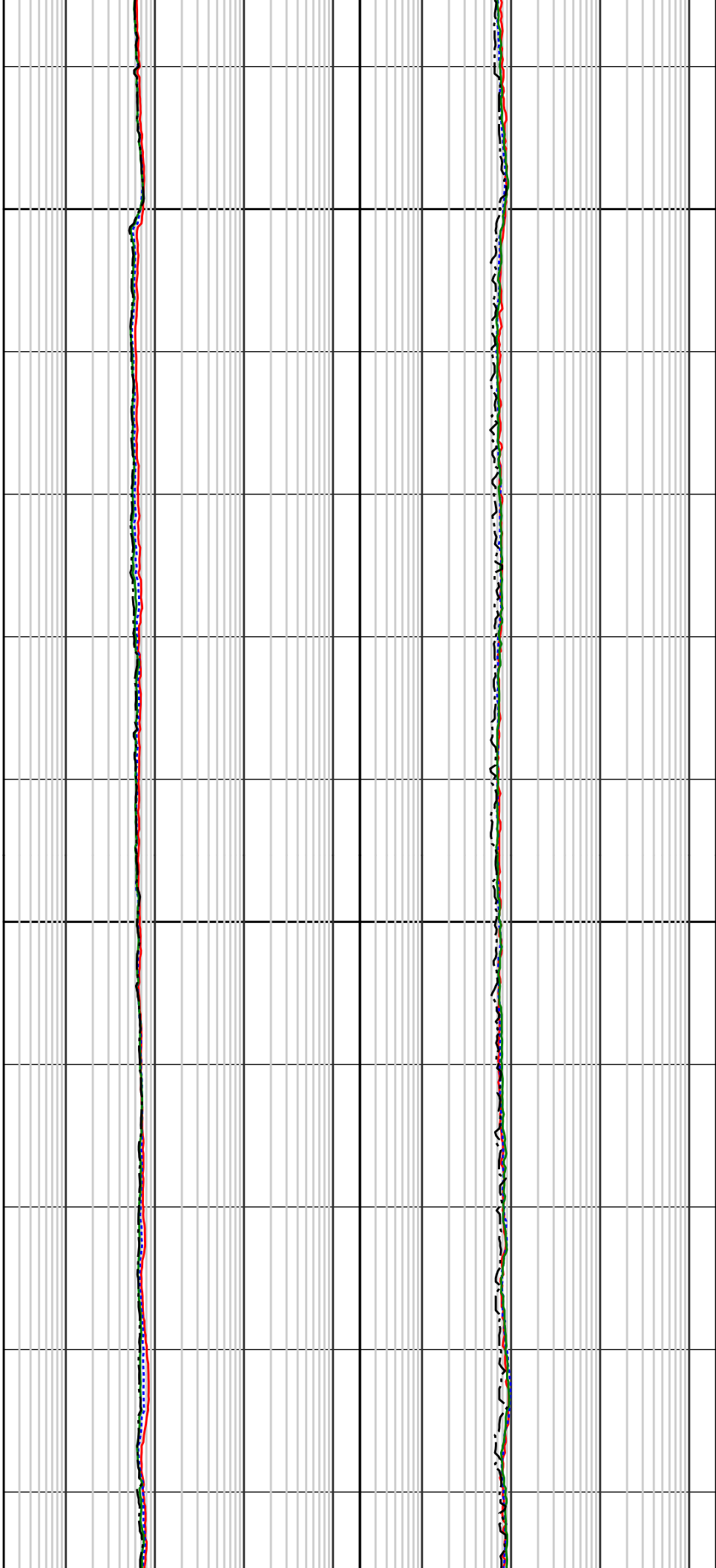


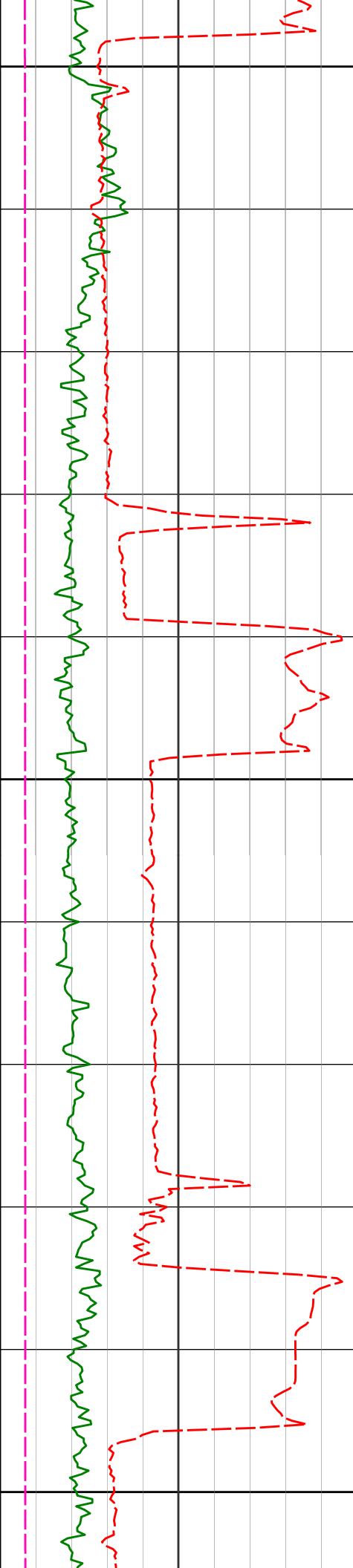
Resistivity Laid Down On Run 200



5400

5500

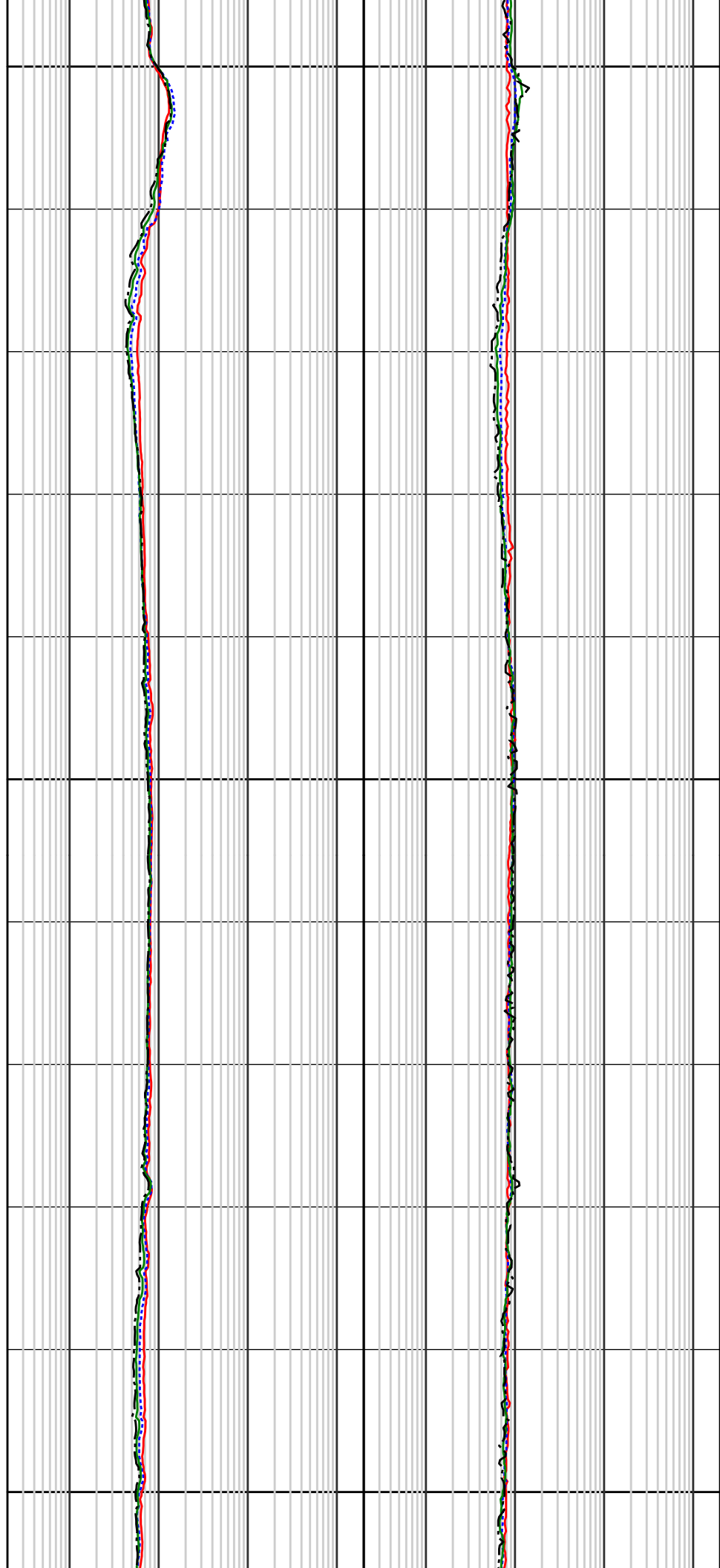


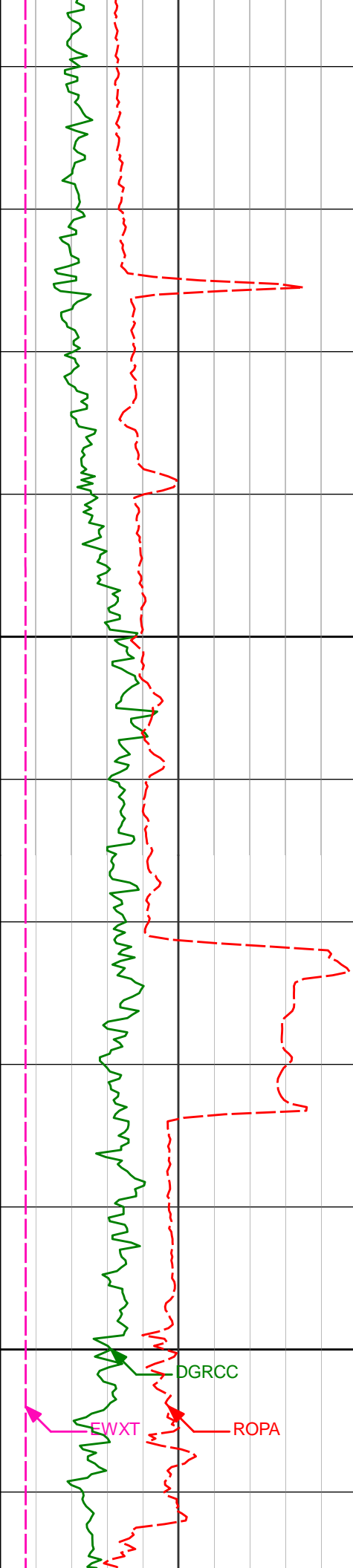


5600

5700

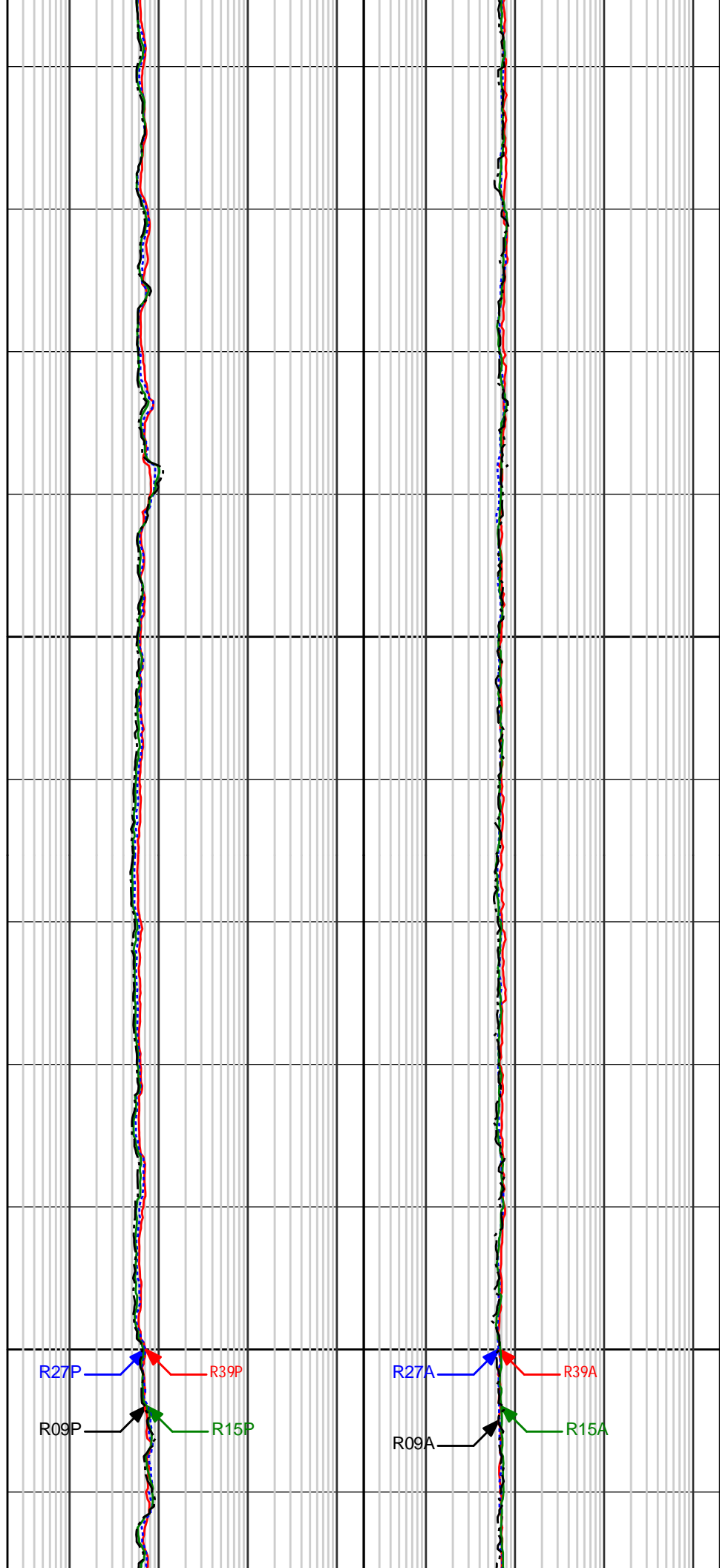
5800





5900

6000

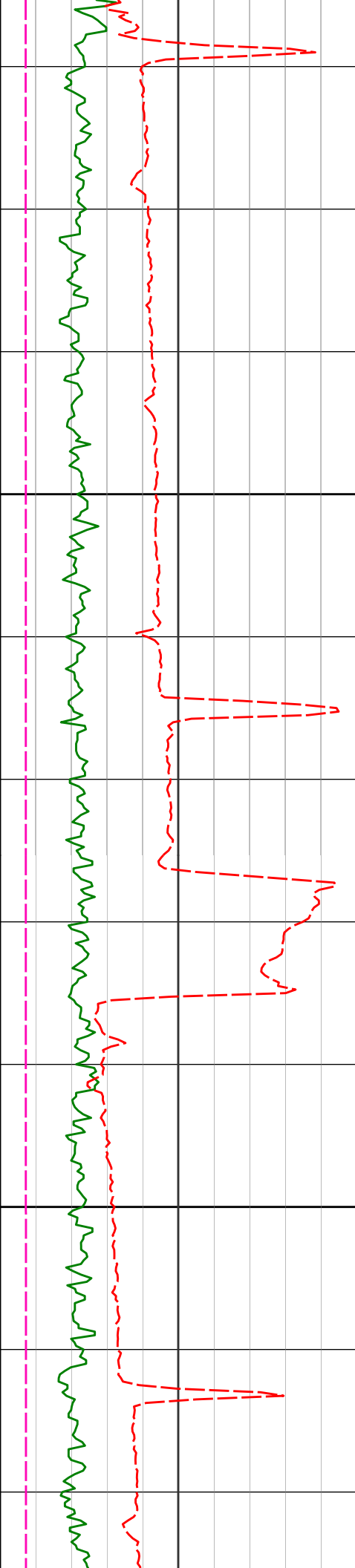


R27A

R39A

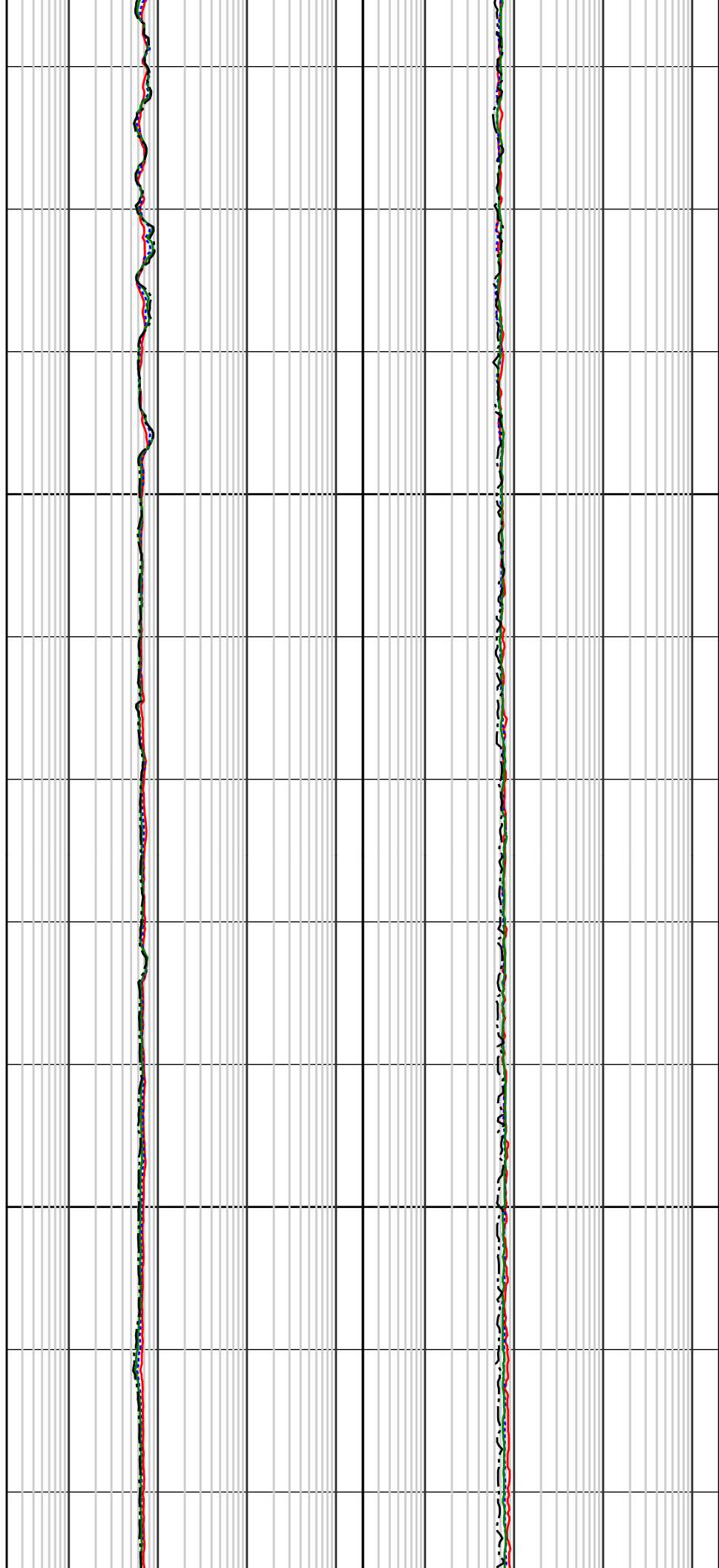
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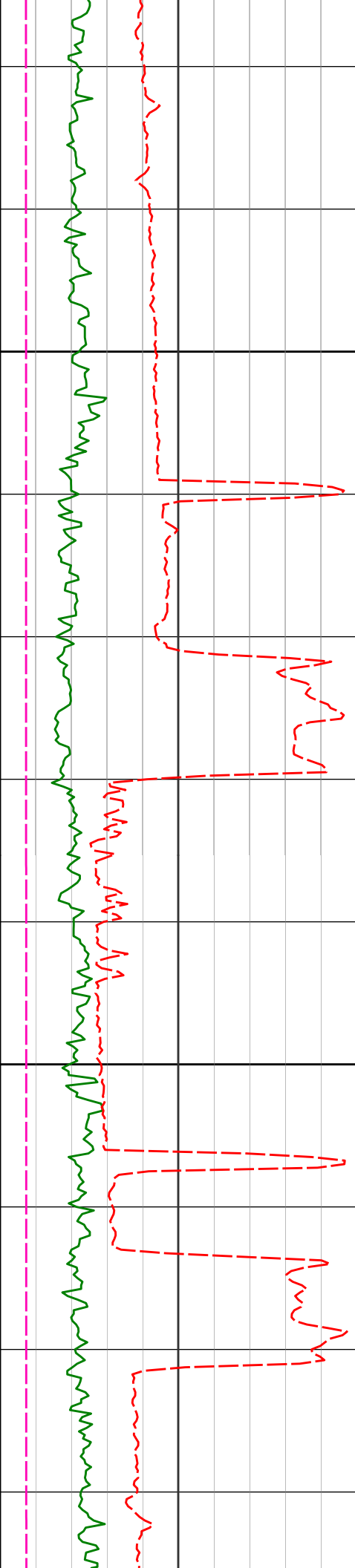
R15A



6100

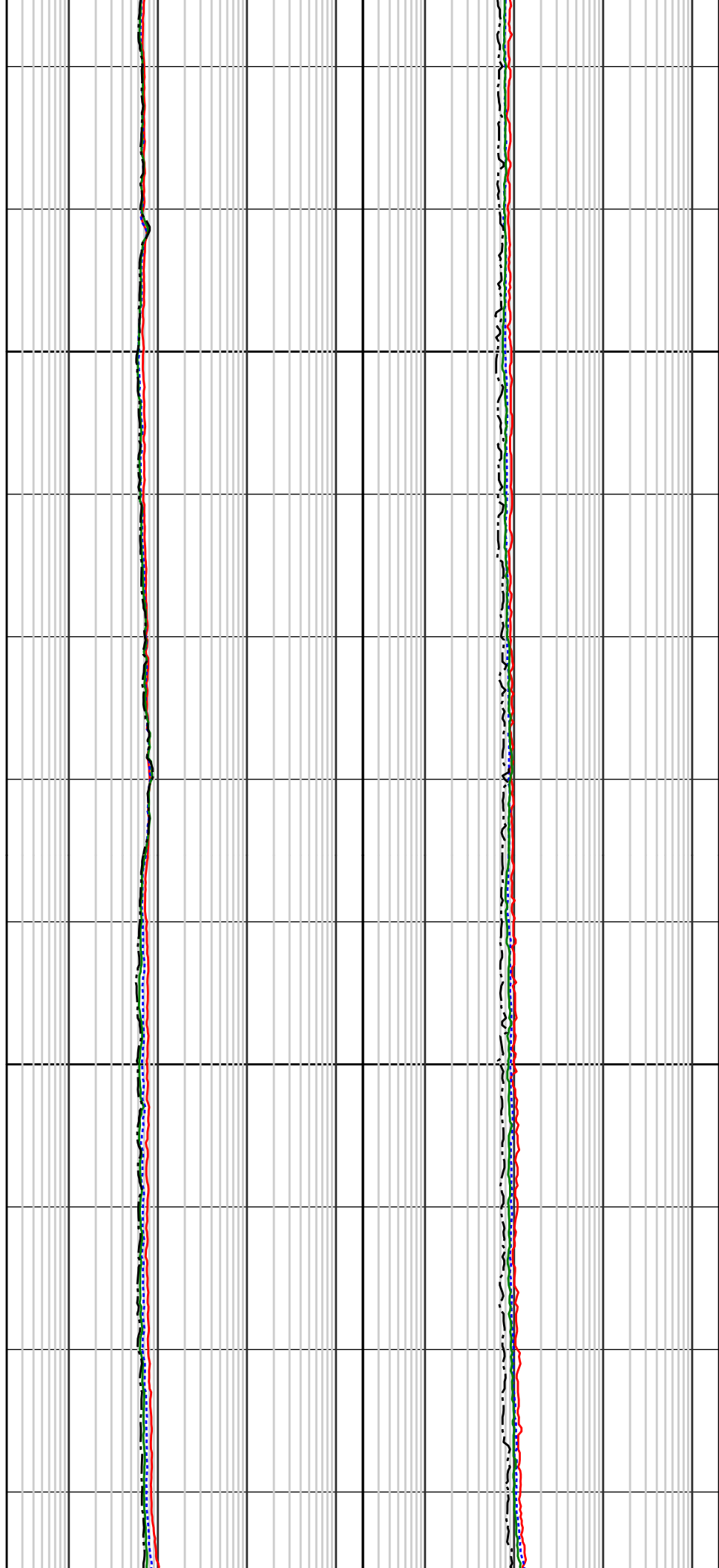
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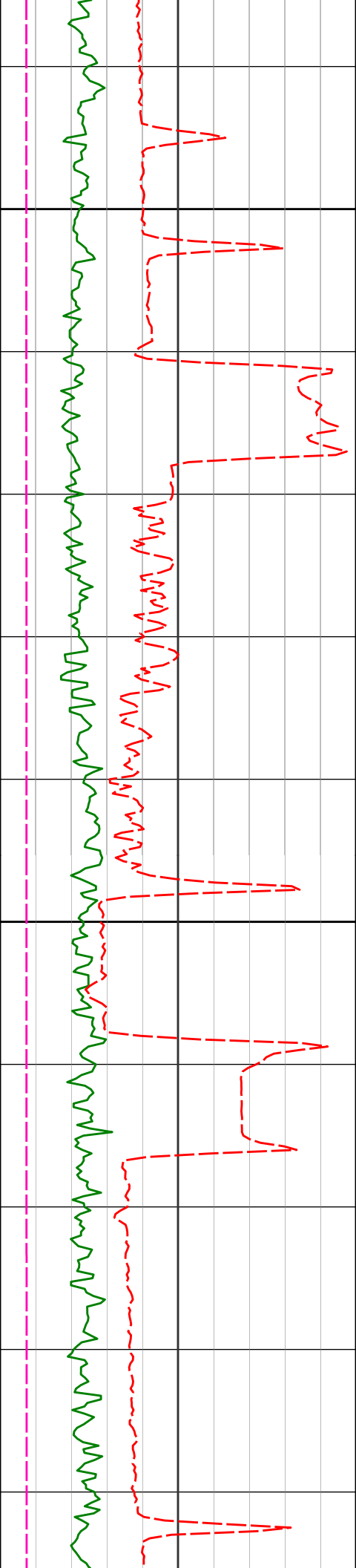




6300

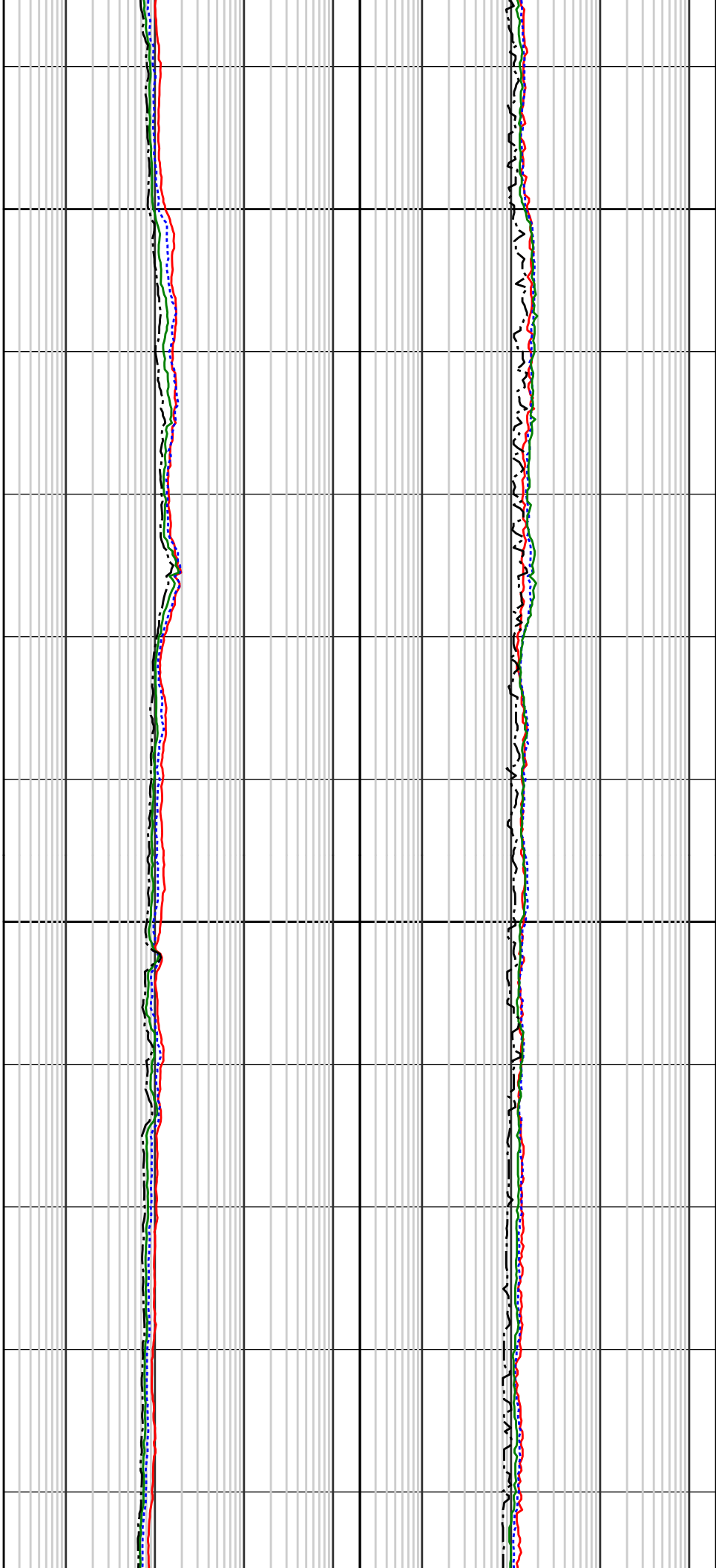
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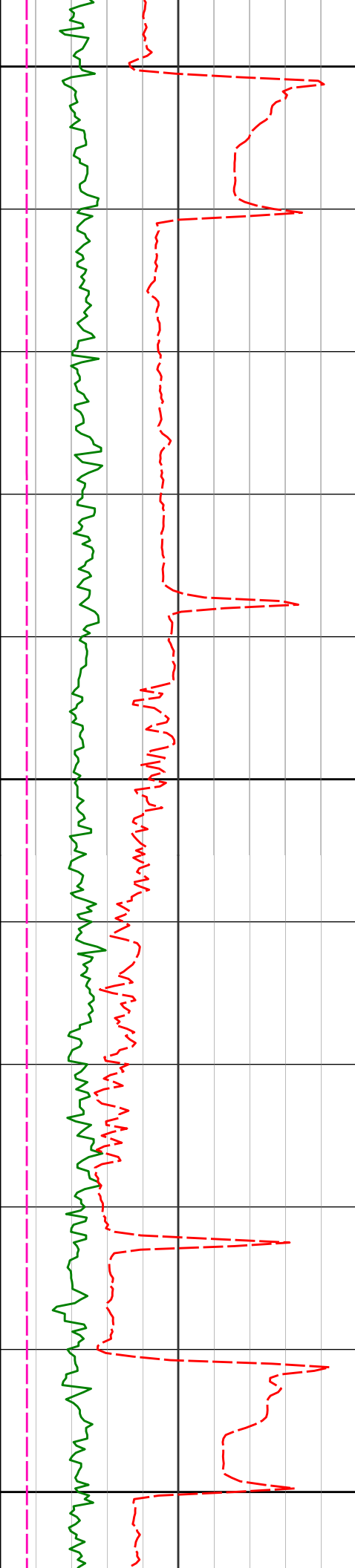




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6600

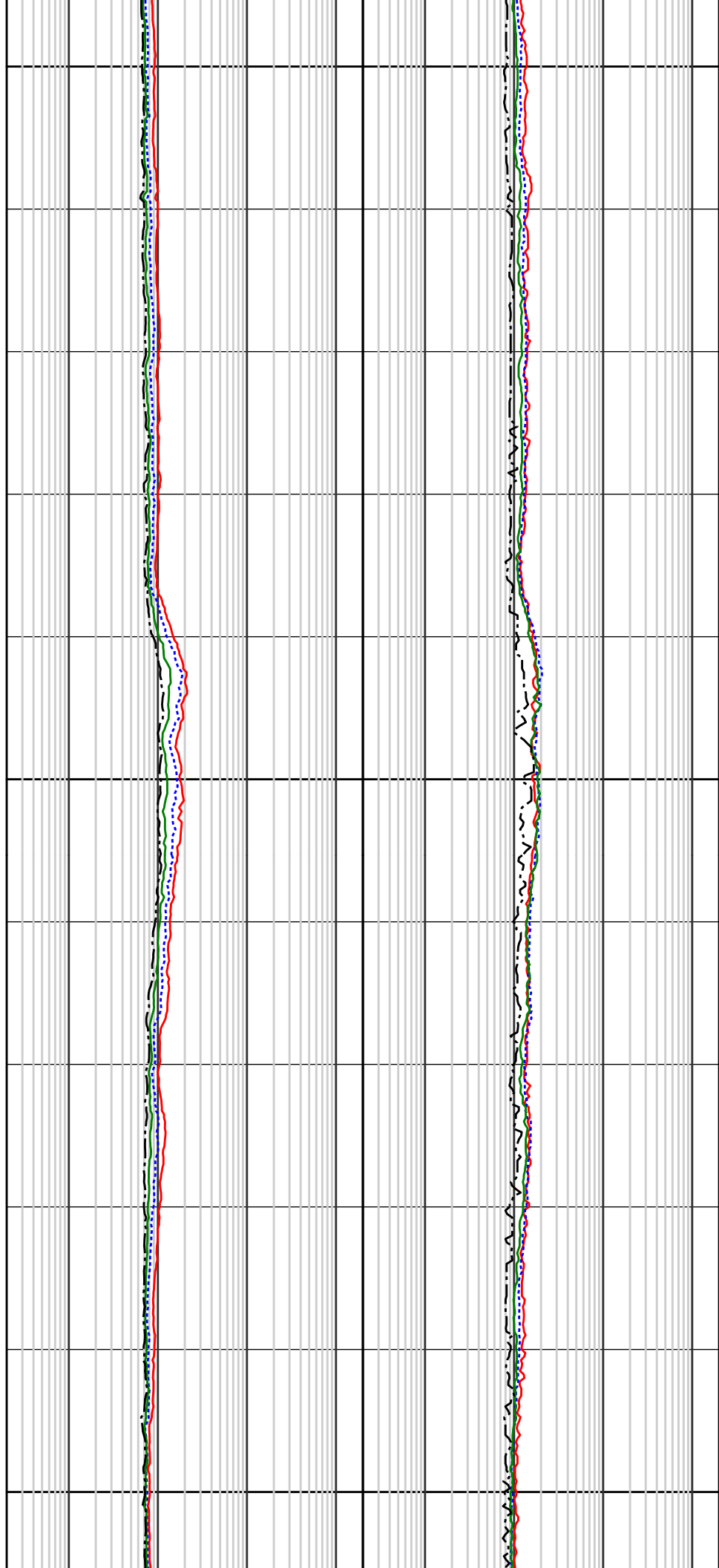


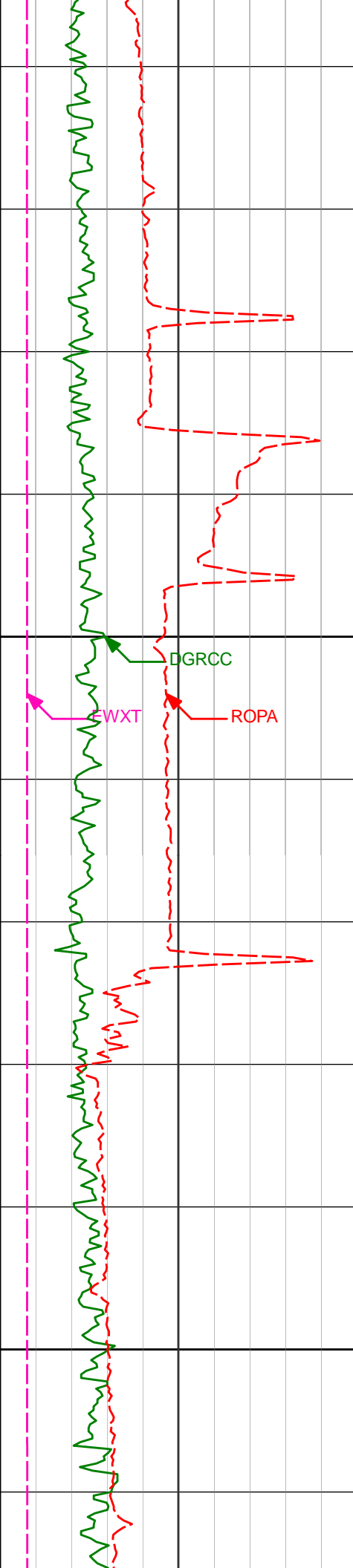


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6800

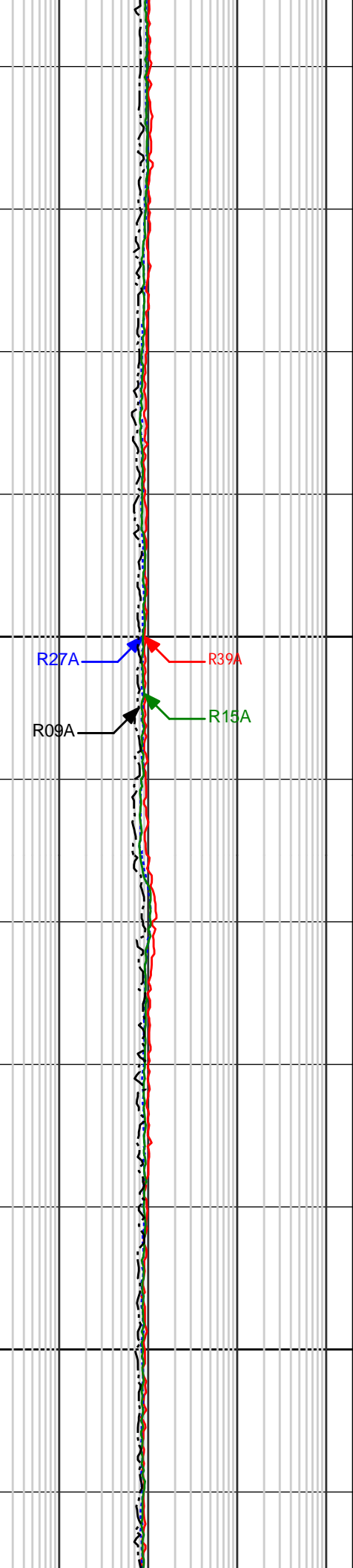
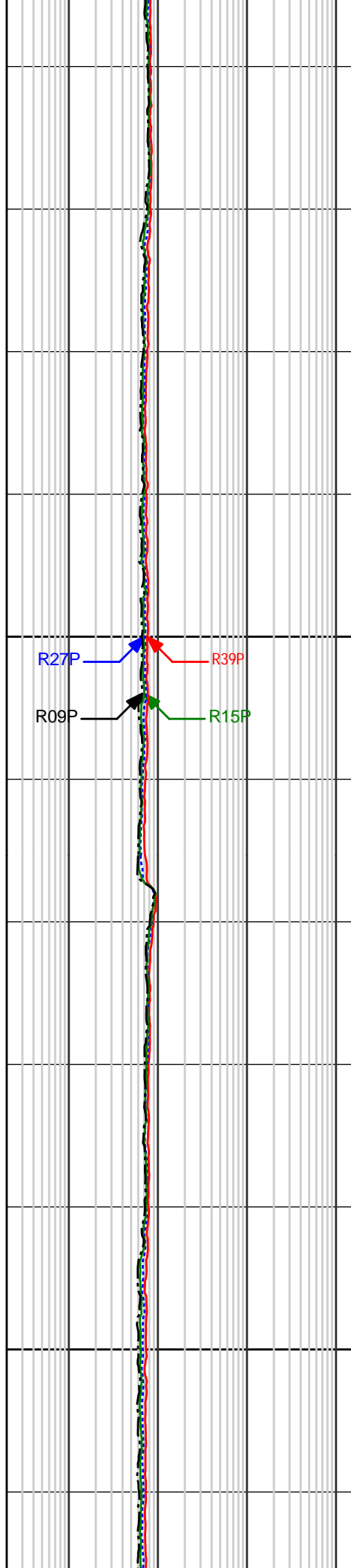
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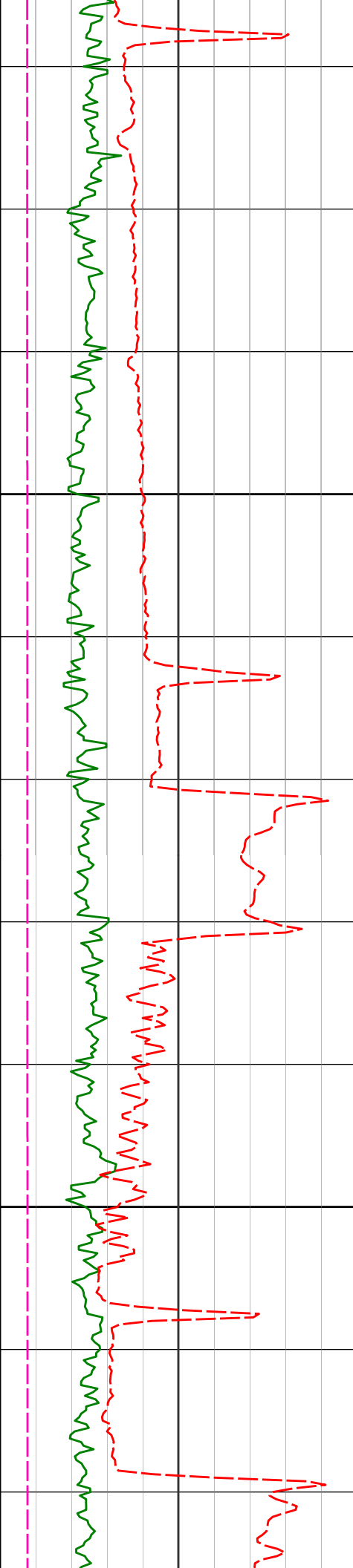




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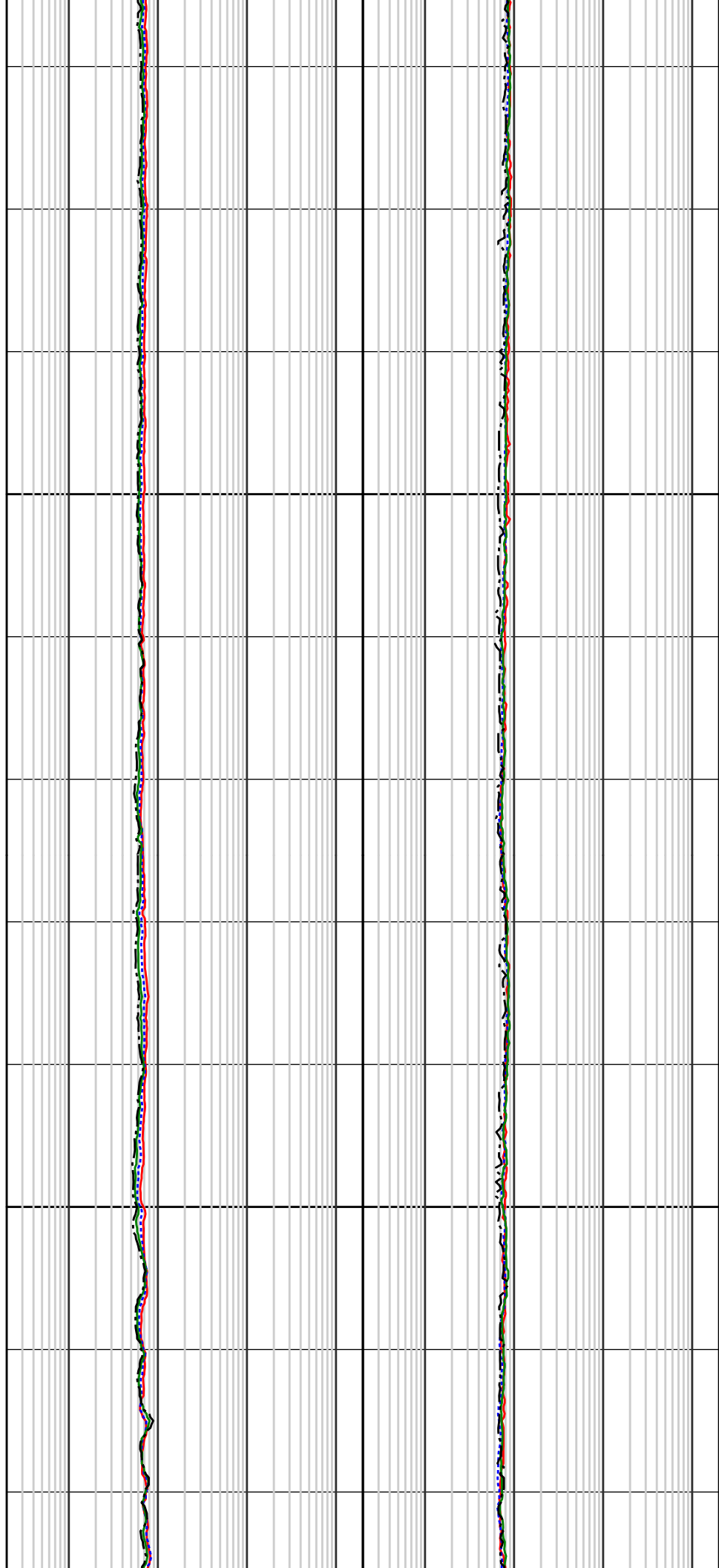
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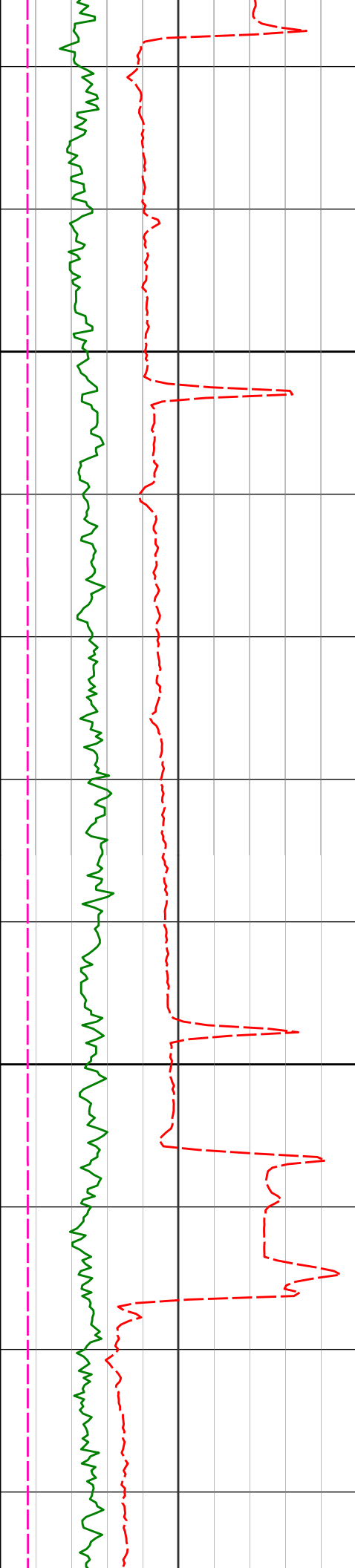




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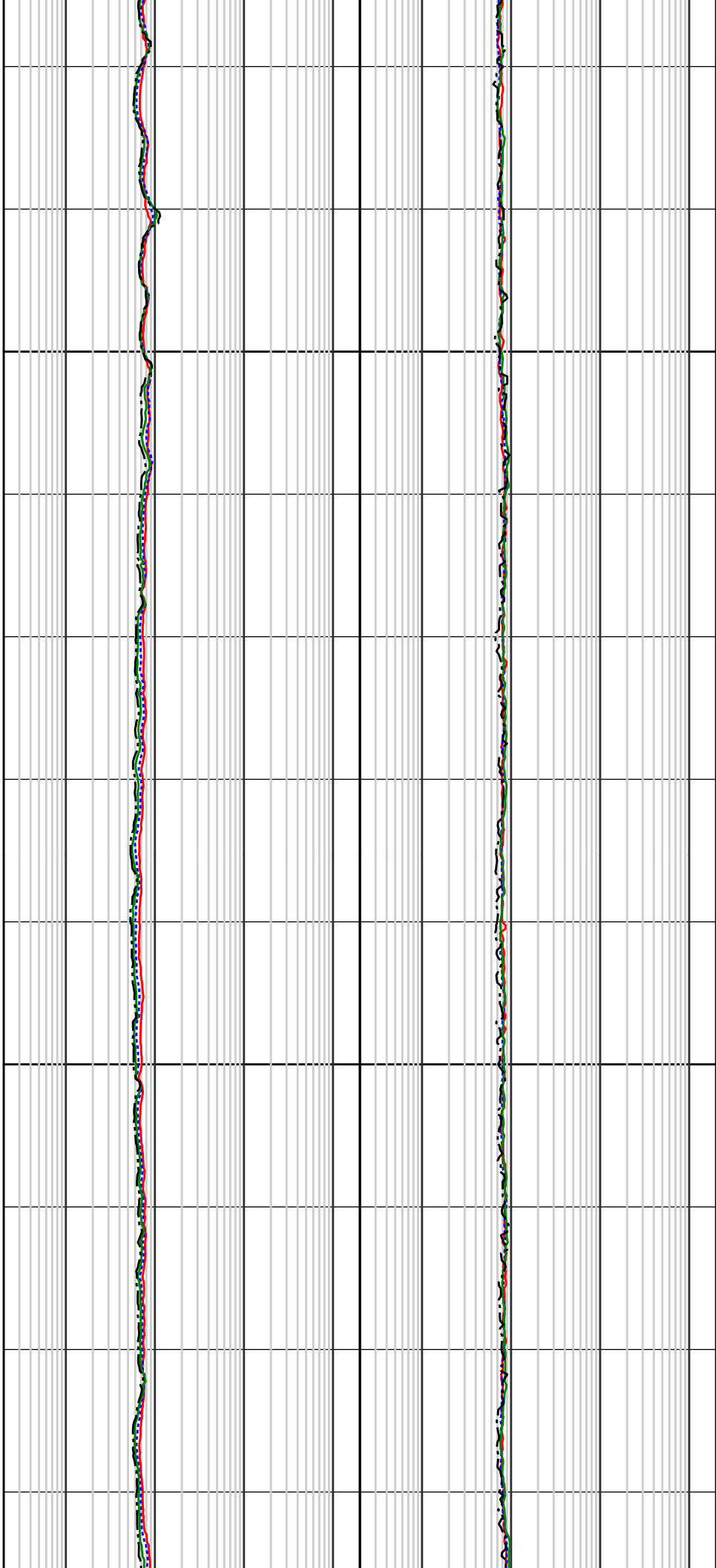
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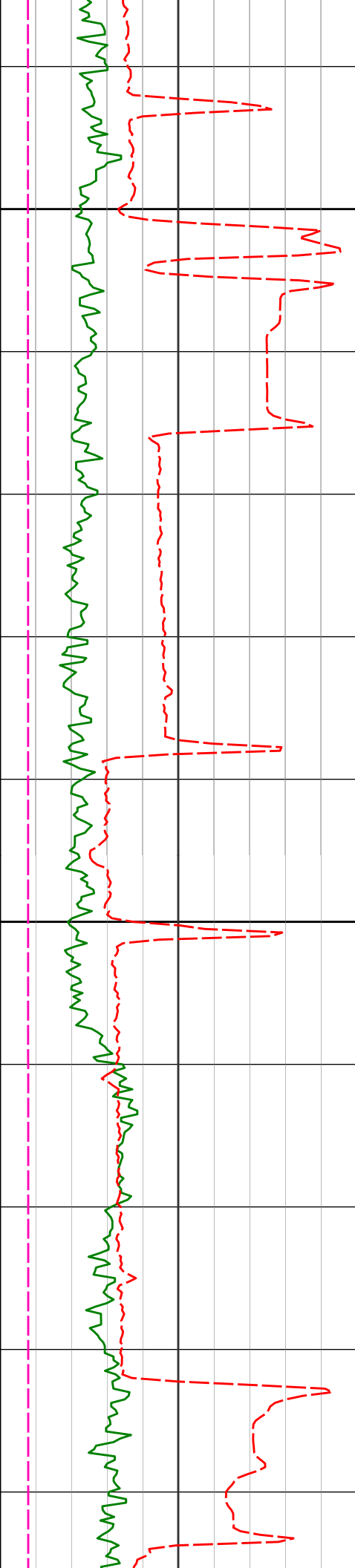




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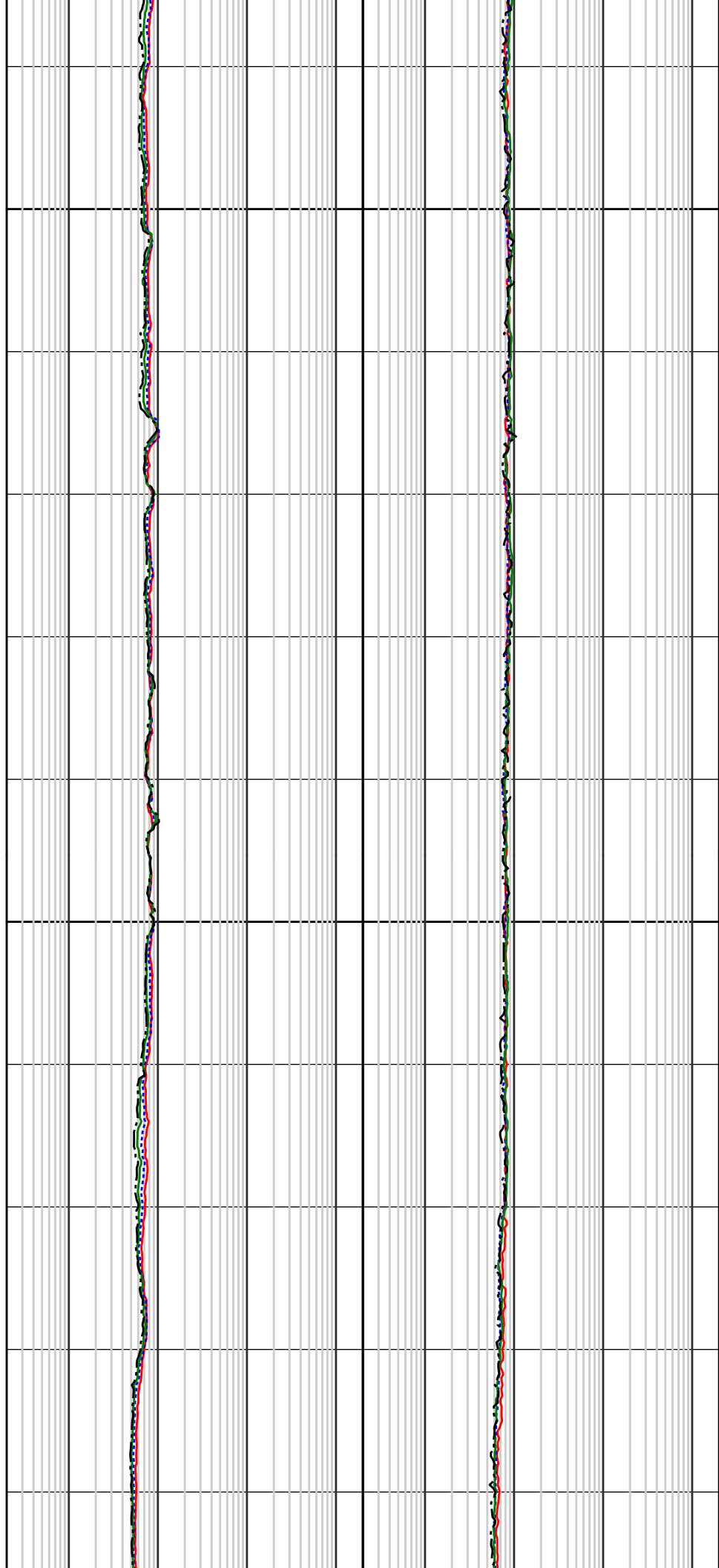
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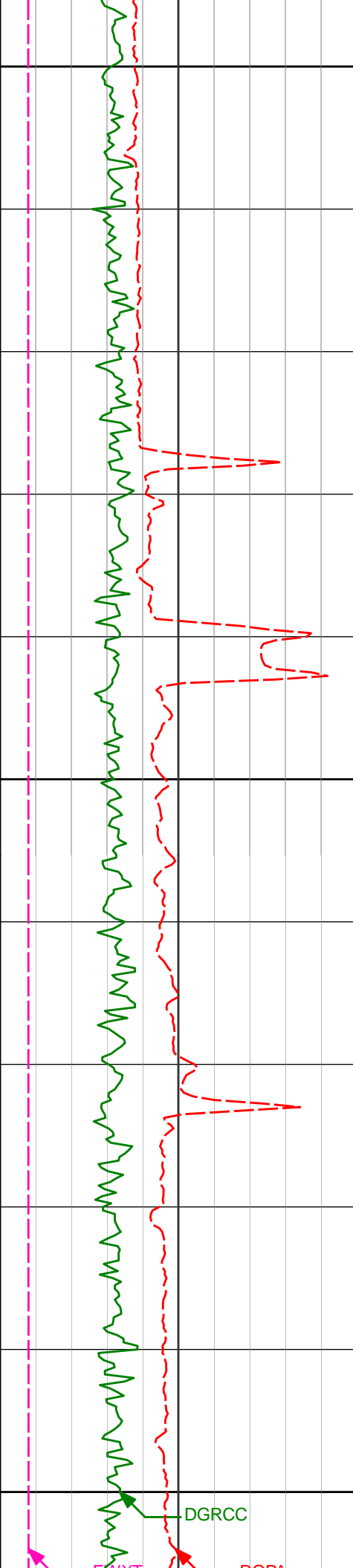




7600

7700

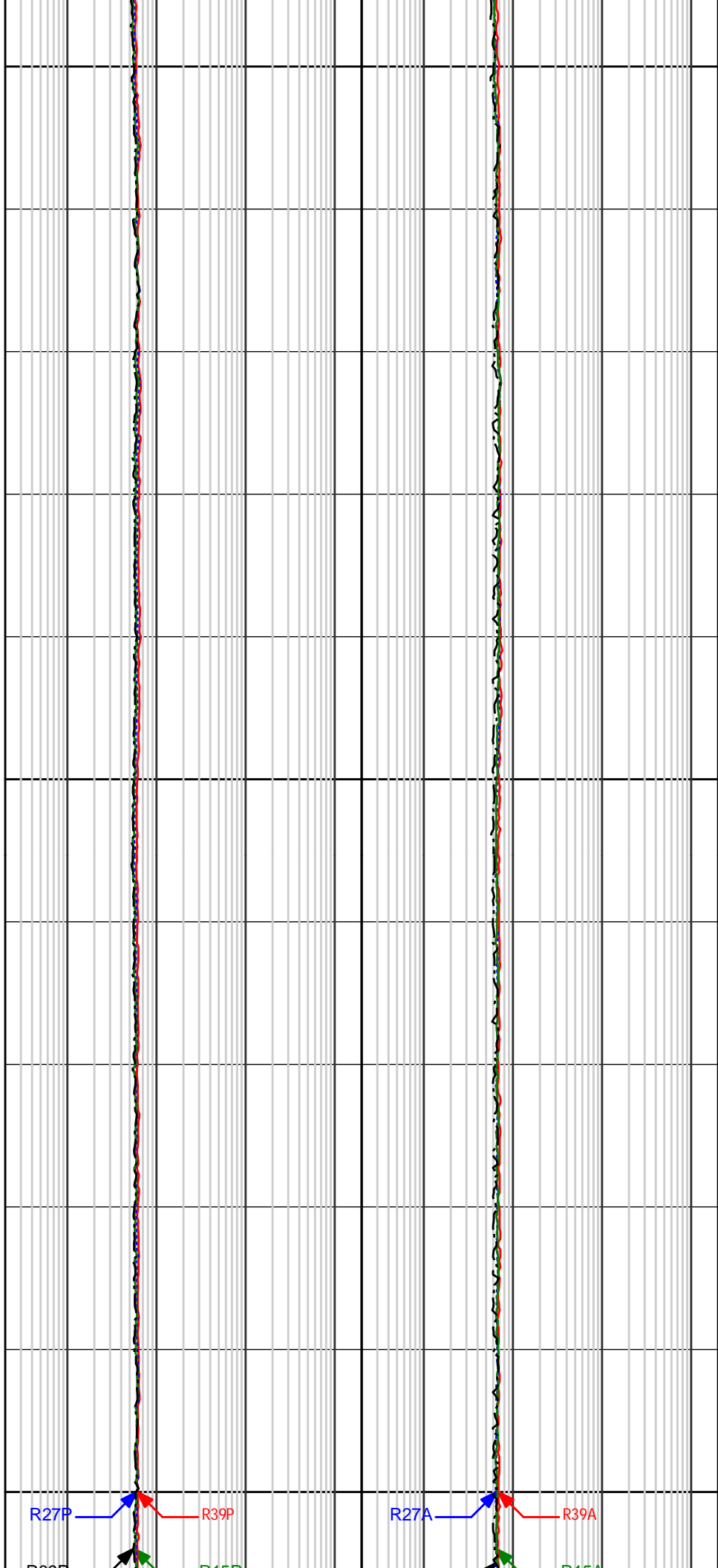




7800

7900

8000



R27P

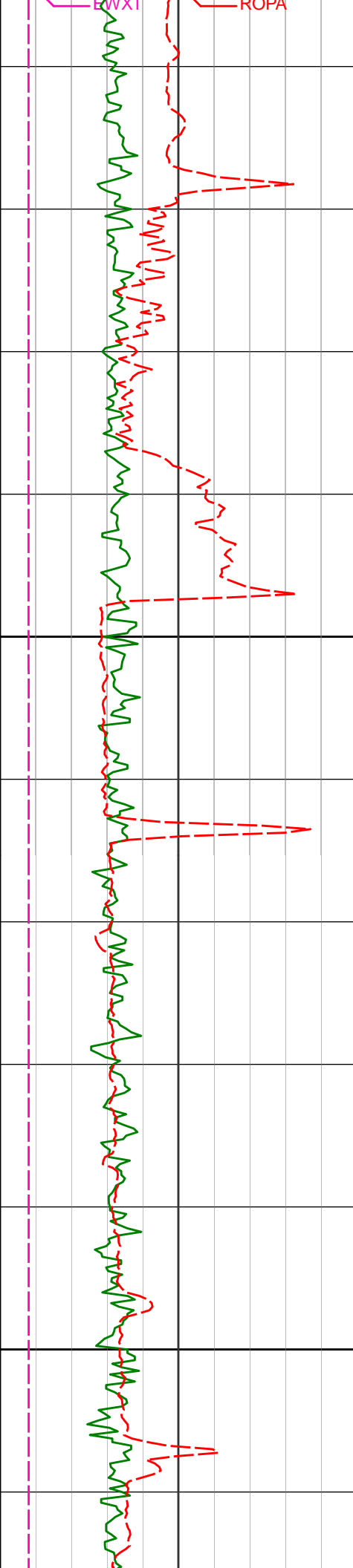
R39P

R27A

R39A

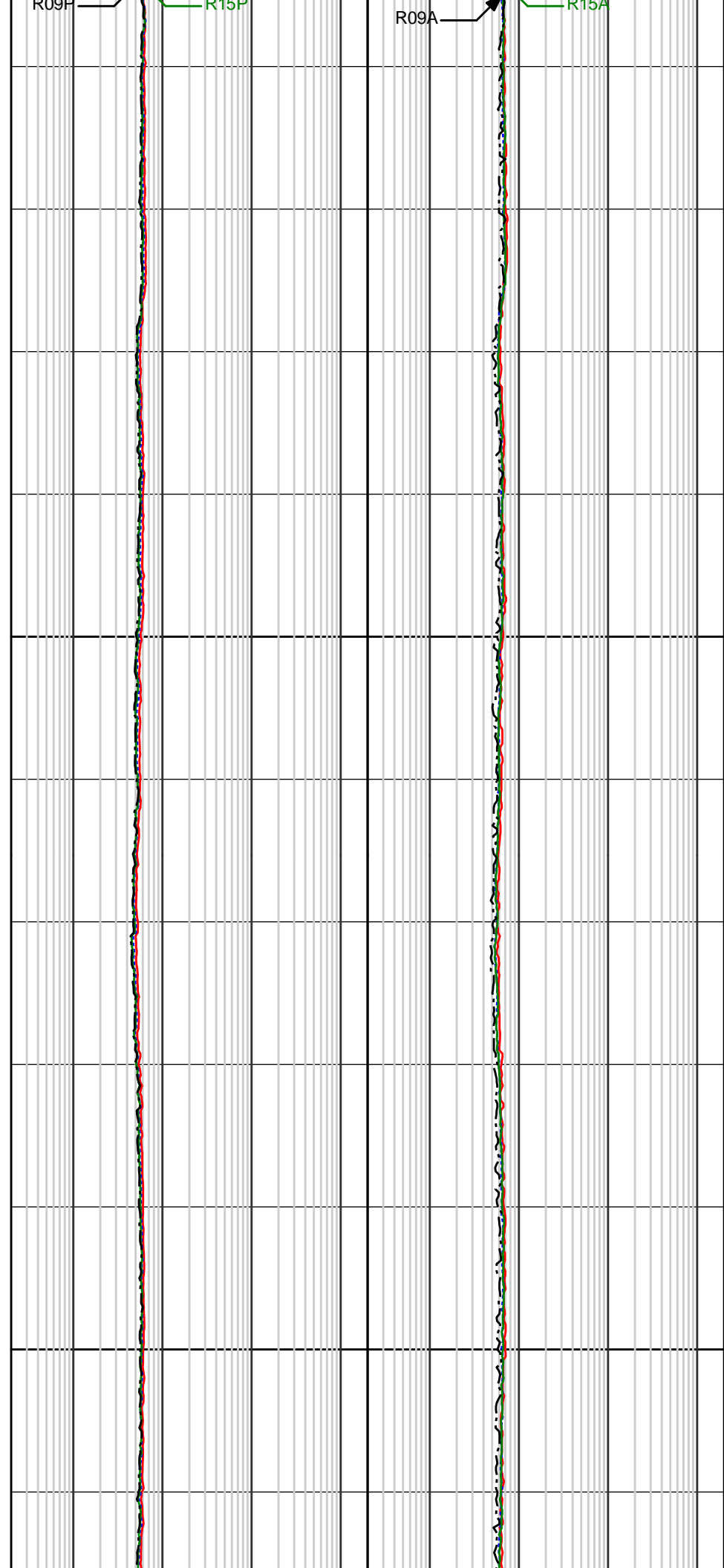
DGRCC

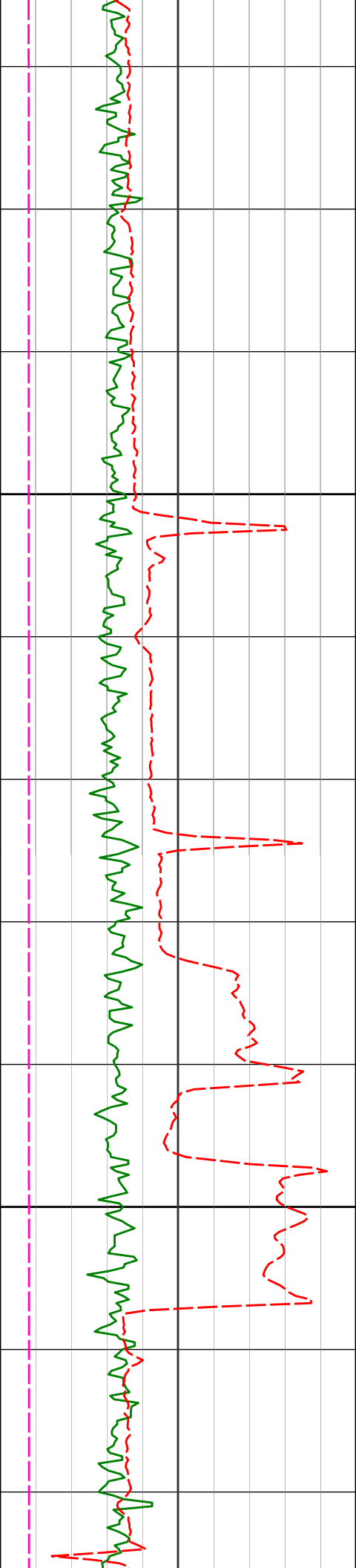
DGRCC



8100

8200

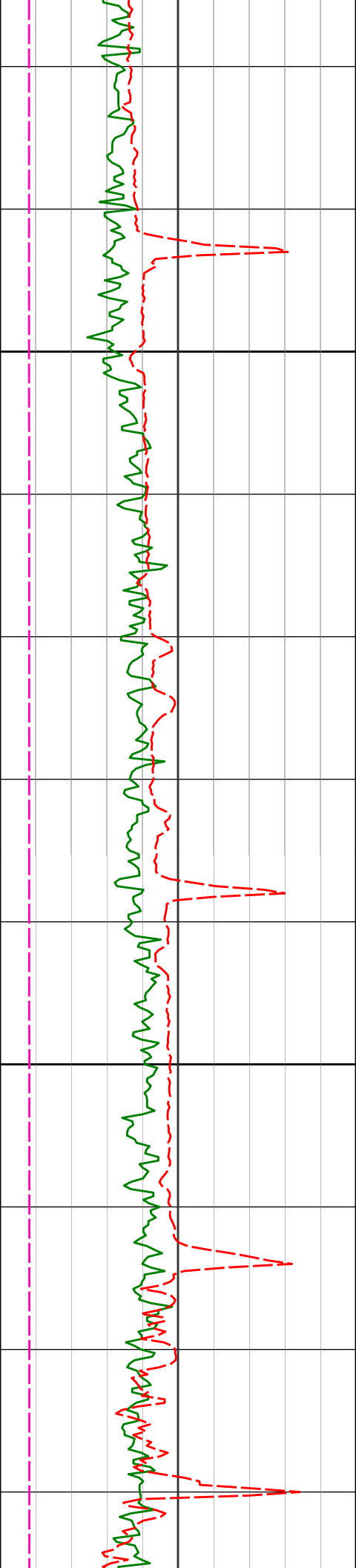




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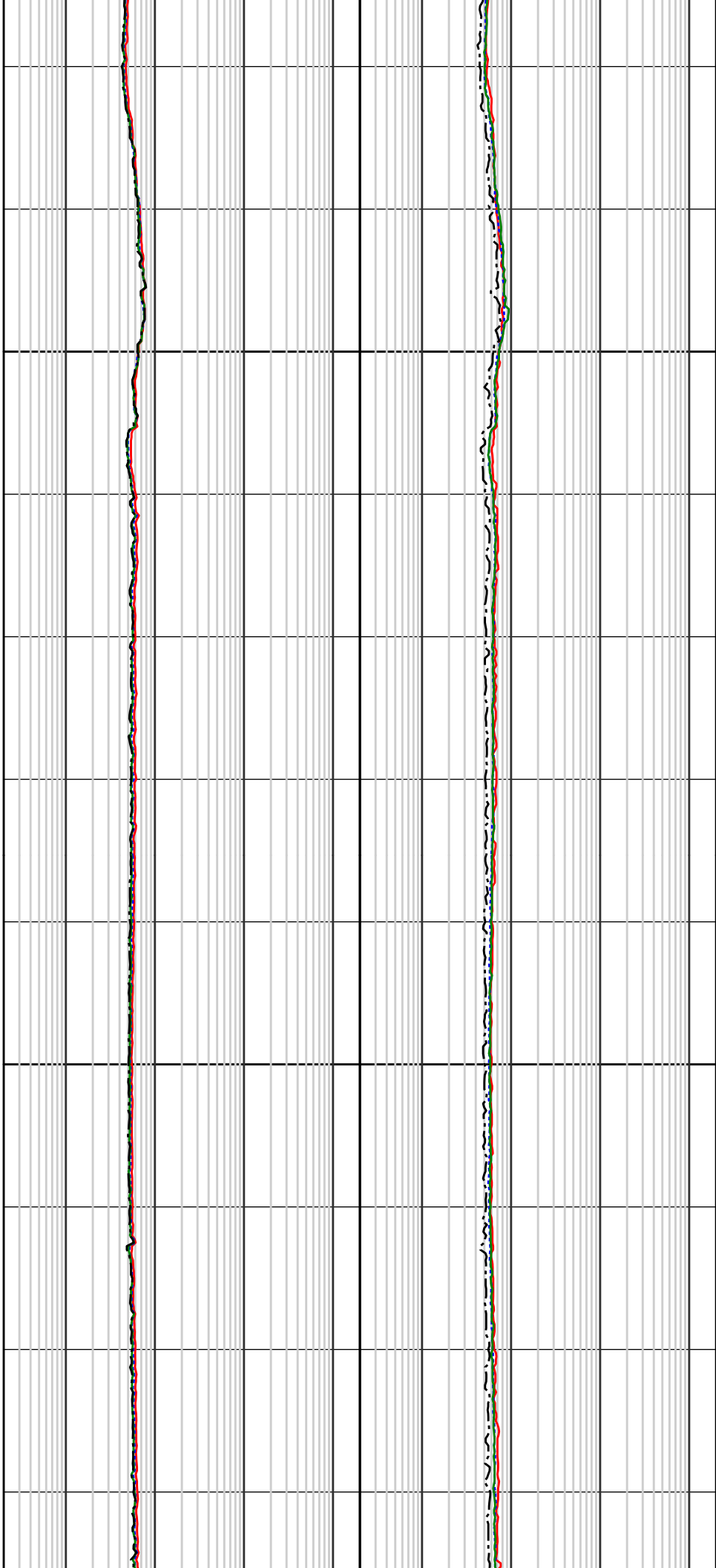
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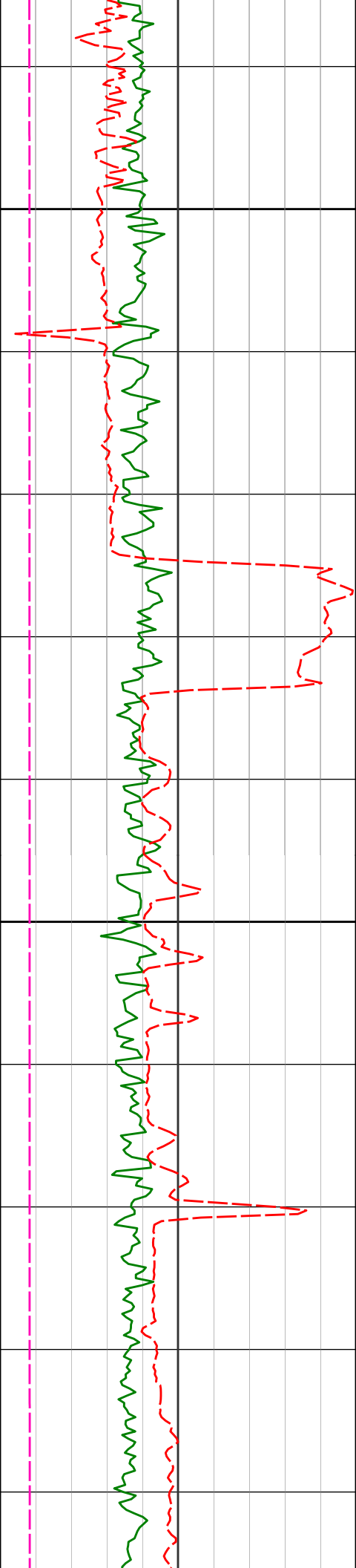




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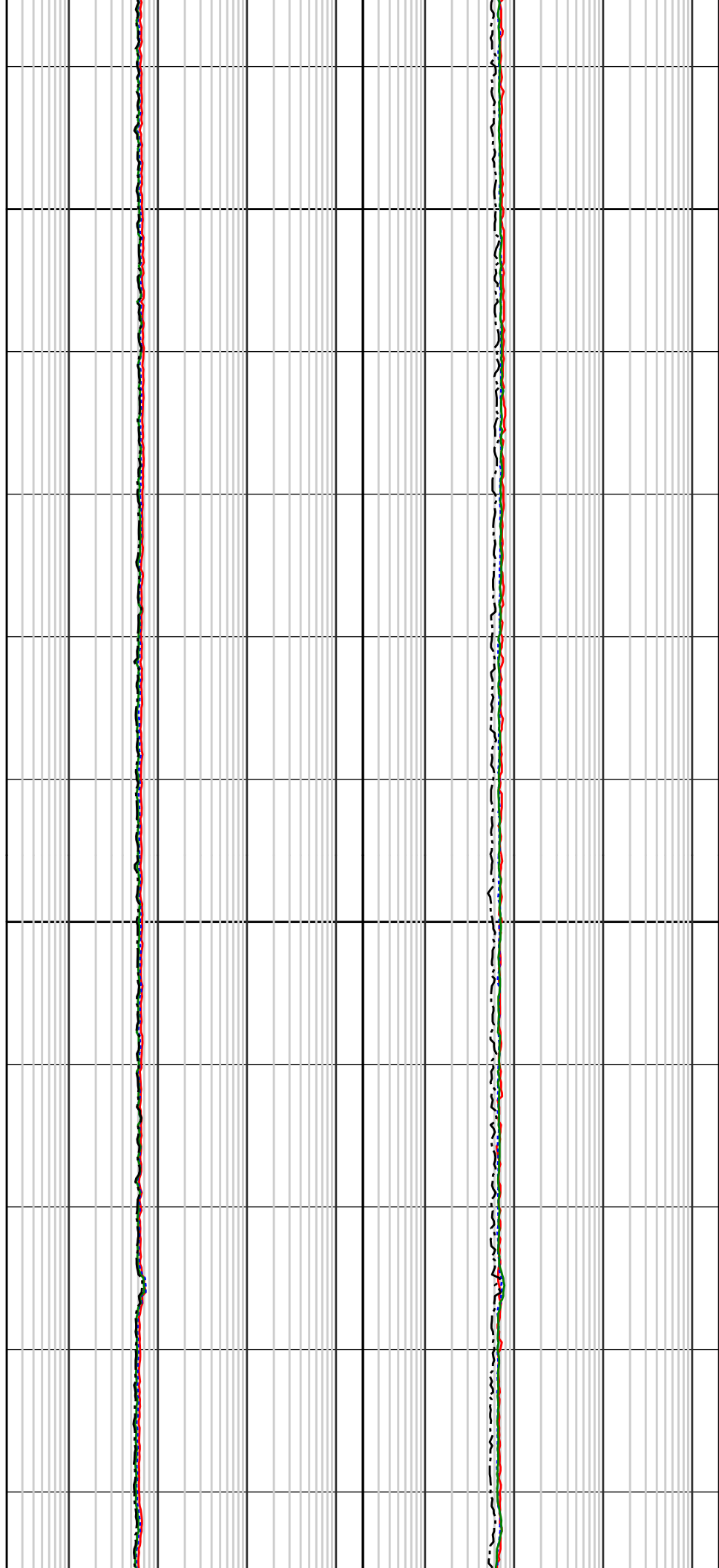
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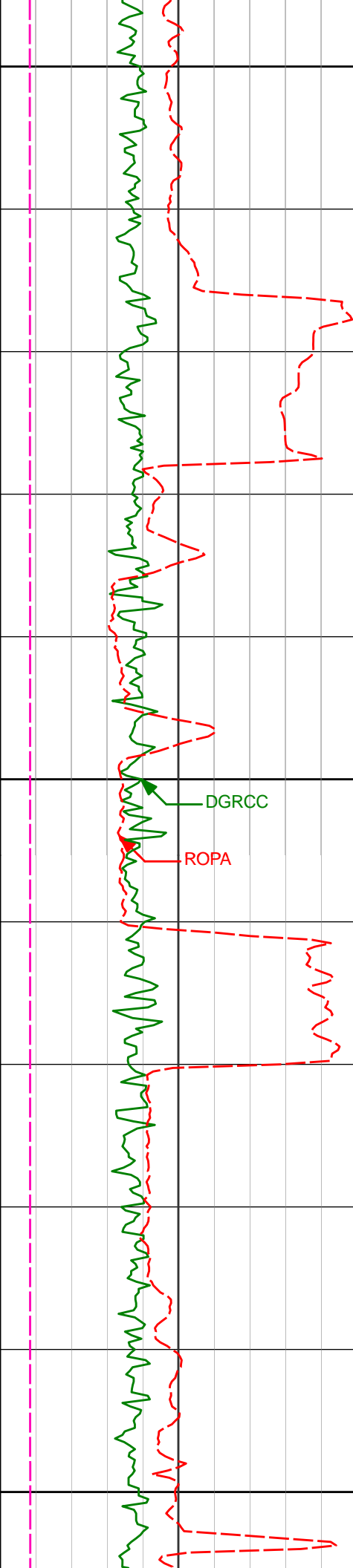




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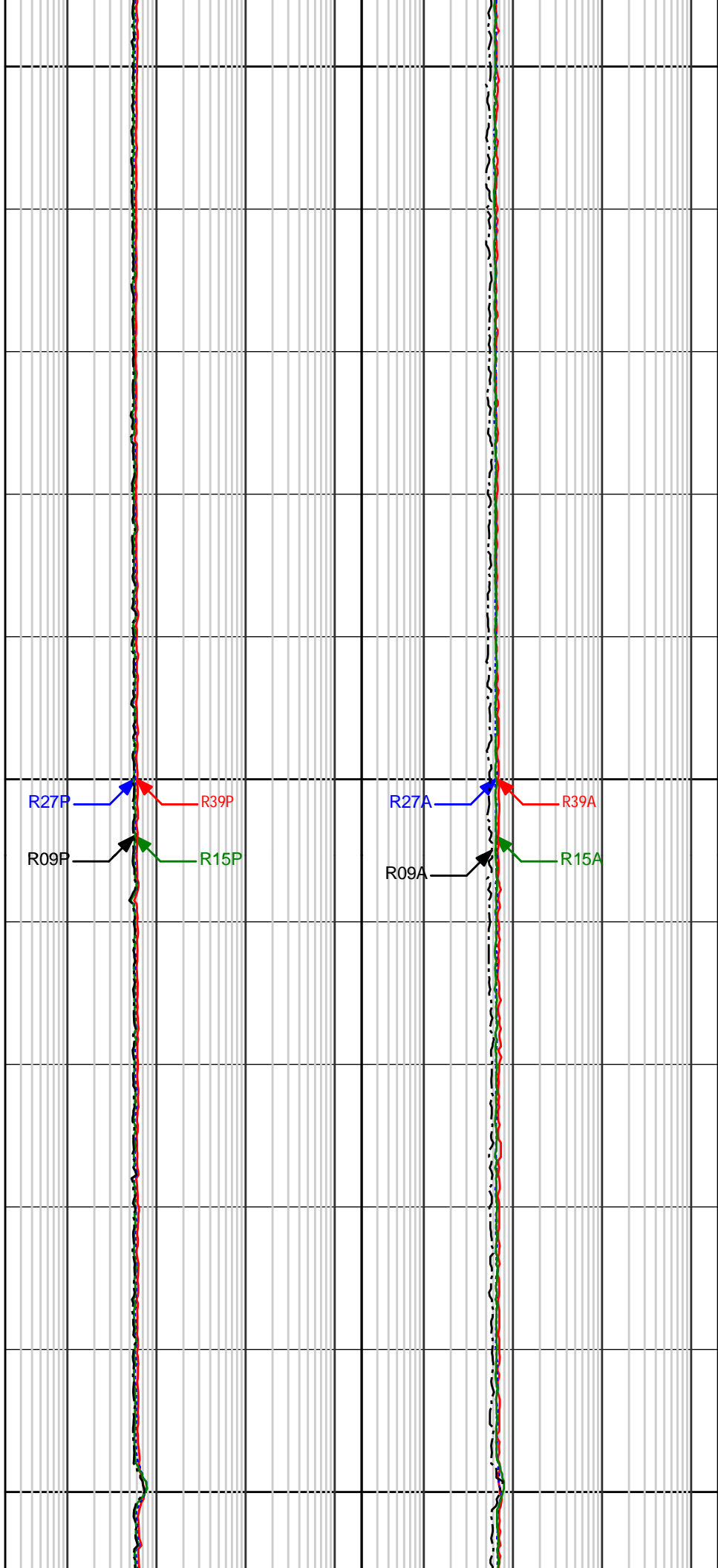




8900

9000

9100



R27P

R09P

R39P

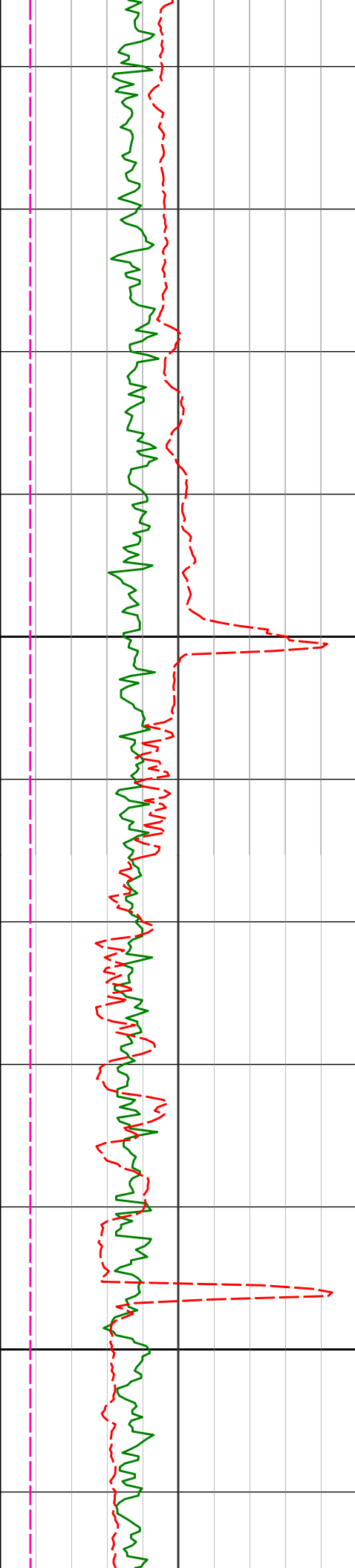
R15P

R27A

R09A

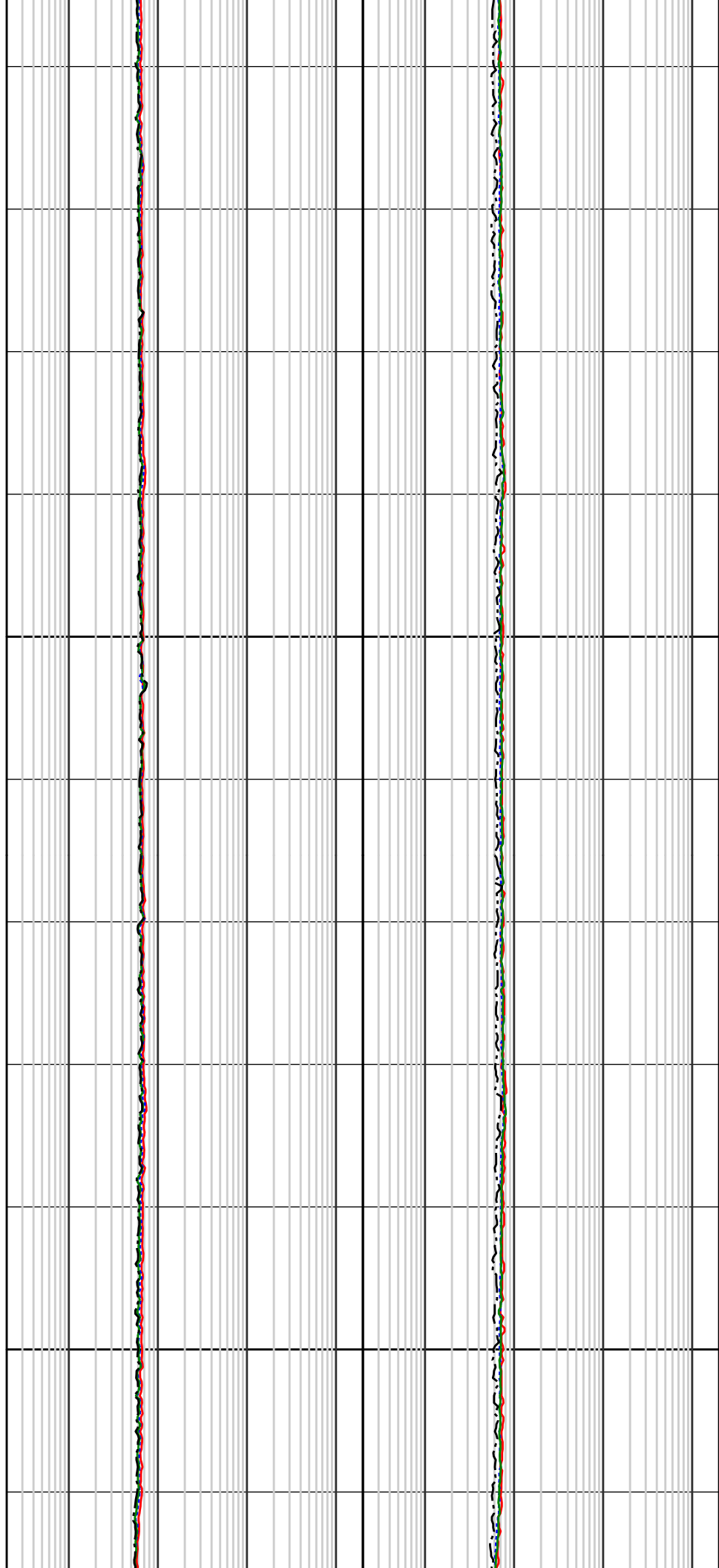
R39A

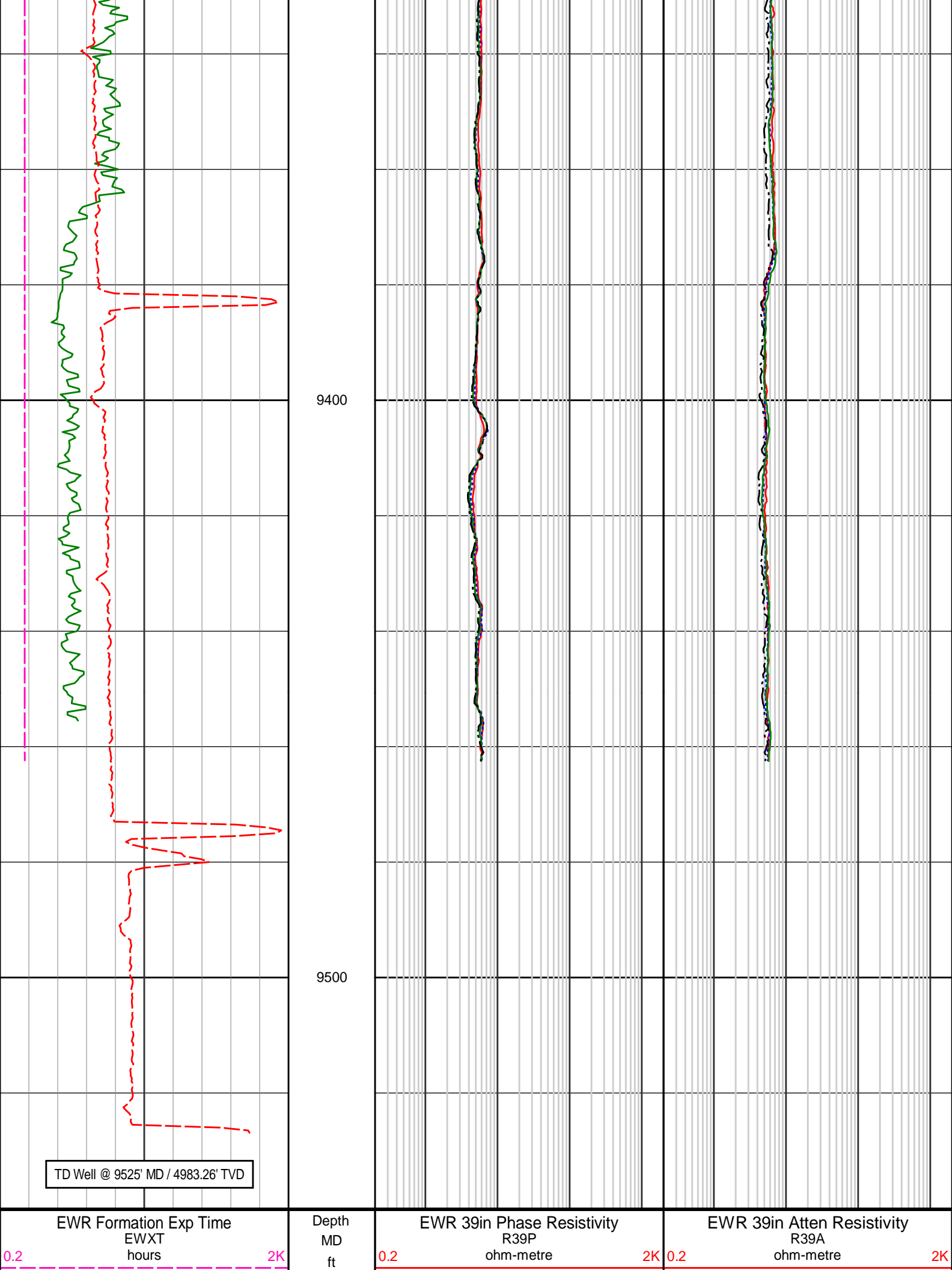
R15A



9200

9300





EWR Formation Exp Time
EWXT
hours

Depth
MD
ft

EWR 39in Phase Resistivity
R39P
ohm-metre

EWR 39in Atten Resistivity
R39A
ohm-metre

<div> <div> <div>Avg Rate of Penetration</div> <div>ROPA</div> <div>feet per hr</div> <div>500</div> <div>0</div> </div> </div>		<div> <div>EWR 27in Phase Resistivity</div> <div>R27P</div> <div>ohm-metre</div> <div>0.2</div> <div>2K</div> </div>	<div> <div>EWR 27in Atten Resistivity</div> <div>R27A</div> <div>ohm-metre</div> <div>0.2</div> <div>2K</div> </div>
		<div> <div>EWR 15in Phase Resistivity</div> <div>R15P</div> <div>ohm-metre</div> <div>0.2</div> <div>2K</div> </div>	<div> <div>EWR 15in Atten Resistivity</div> <div>R15A</div> <div>ohm-metre</div> <div>0.2</div> <div>2K</div> </div>
		<div> <div>EWR 9in Phase Resitivity</div> <div>R09P</div> <div>ohm-metre</div> <div>0.2</div> <div>2K</div> </div>	<div> <div>EWR 9in Atten Resitivity</div> <div>R09A</div> <div>ohm-metre</div> <div>0.2</div> <div>2K</div> </div>
<div> <div>DGR Comb Gamma Ray BCorr</div> <div>DGRCC</div> <div>api</div> <div>0</div> <div>300</div> </div>			
<div> <div>PCG Gamma Ray BCorr</div> <div>PGRCC</div> <div>api</div> <div>0</div> <div>300</div> </div>			

HALLIBURTON

DIRECTIONAL SURVEY REPORT

Anadarko Petroleum Corp
Griswold 29-11HZ
Wattenberg
Weld Colorado
USA
CA-XX-0902109867

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
119.00	0.50	11.80	119.00	0.51 N	0.11 E	0.51	0.42
209.00	0.60	53.30	208.99	1.17 N	0.56 E	1.17	0.45
295.00	0.30	19.10	294.99	1.66 N	1.00 E	1.66	0.45
382.00	0.60	194.20	381.99	1.43 N	0.96 E	1.43	1.03
472.00	2.00	203.20	471.97	0.47 S	0.23 E	-0.47	1.57
566.00	3.80	211.10	565.84	4.65 S	2.03 W	-4.65	1.96
661.00	5.40	214.30	660.53	11.03 S	6.17 W	-11.04	1.71
757.00	7.30	220.40	755.94	19.41 S	12.67 W	-19.42	2.10
852.00	8.40	215.50	850.05	29.66 S	20.61 W	-29.66	1.35
948.00	9.80	212.70	944.84	42.24 S	29.10 W	-42.25	1.53
1043.00	9.80	206.50	1038.46	56.28 S	37.08 W	-56.29	1.11
1139.00	10.20	207.30	1133.00	71.15 S	44.62 W	-71.16	0.44
1233.00	9.40	209.20	1225.63	85.24 S	52.18 W	-85.26	0.92
1327.00	9.20	203.70	1318.39	98.83 S	58.95 W	-98.85	0.97
1423.00	8.40	211.70	1413.26	111.82 S	65.72 W	-111.84	1.52
1519.00	8.80	207.20	1508.19	124.32 S	72.76 W	-124.34	0.82
1613.00	8.70	208.60	1601.09	136.95 S	79.45 W	-136.98	0.25
1695.00	8.20	209.50	1682.20	147.49 S	85.30 W	-147.52	0.63
1756.00	9.13	214.05	1742.51	155.28 S	90.15 W	-155.32	1.89
1849.00	12.59	219.62	1833.83	169.21 S	100.75 W	-169.25	3.88
1942.00	13.50	220.38	1924.43	185.29 S	114.24 W	-185.33	1.00
2036.00	13.88	220.12	2015.76	202.27 S	128.62 W	-202.31	0.41
2130.00	13.08	215.60	2107.17	219.54 S	142.07 W	-219.59	1.41
2223.00	10.31	207.18	2198.24	235.50 S	152.00 W	-235.56	3.49
2317.00	8.88	208.14	2290.92	249.38 S	159.27 W	-249.44	1.53
2410.00	8.52	209.10	2382.85	261.73 S	166.01 W	-261.79	0.42
2504.00	7.92	207.72	2475.88	273.55 S	172.40 W	-273.61	0.67
2597.00	8.58	218.26	2567.93	284.67 S	179.68 W	-284.73	1.77
2691.00	9.30	224.08	2660.78	295.63 S	189.31 W	-295.70	1.23
2784.00	9.13	225.72	2752.58	306.18 S	199.82 W	-306.25	0.34
2878.00	8.64	225.62	2845.46	316.33 S	210.20 W	-316.40	0.52
2971.00	8.80	221.71	2937.38	326.52 S	219.93 W	-326.60	0.66
3065.00	10.42	218.36	3030.06	338.56 S	229.99 W	-338.64	1.82
3158.00	9.60	219.55	3121.64	351.13 S	240.15 W	-351.22	0.91
3252.00	10.28	217.41	3214.23	363.84 S	250.23 W	-363.93	0.82
3345.00	11.55	209.09	3305.55	378.57 S	259.80 W	-378.66	2.17
3435.00	11.76	204.40	3393.70	394.79 S	267.97 W	-394.89	1.08
3525.00	10.34	211.42	3482.03	410.04 S	275.97 W	-410.14	2.17
3615.00	9.15	215.20	3570.73	422.78 S	284.31 W	-422.88	1.50
3705.00	8.94	211.62	3659.62	434.58 S	292.10 W	-434.68	0.67
3795.00	7.66	211.78	3748.67	445.64 S	298.92 W	-445.74	1.42
3885.00	6.23	213.27	3838.01	454.82 S	304.76 W	-454.93	1.60
3976.00	4.91	214.47	3928.58	462.16 S	309.68 W	-462.27	1.46
4066.00	4.09	211.70	4018.30	468.07 S	313.54 W	-468.17	0.94

4156.00	3.30	210.38	4108.11	473.03 S	316.54 W	-473.14	0.88
4246.00	1.66	238.48	4198.03	475.95 S	318.96 W	-476.06	2.22
4335.00	0.93	261.41	4287.00	476.73 S	320.77 W	-476.84	0.99
4425.00	0.55	303.88	4377.00	476.60 S	321.85 W	-476.71	0.71
4470.00	6.54	22.65	4421.90	474.11 S	321.05 W	-474.22	14.35
4515.00	13.05	25.39	4466.22	467.15 S	317.88 W	-467.26	14.50
4605.00	20.47	23.29	4552.33	443.48 S	307.28 W	-443.59	8.27
4695.00	26.06	19.73	4634.99	410.39 S	294.38 W	-410.49	6.40
4785.00	32.49	12.21	4713.48	368.10 S	282.57 W	-368.19	8.22
4875.00	40.39	10.82	4785.83	315.75 S	271.97 W	-315.84	8.83
4965.00	47.91	6.92	4850.37	253.85 S	262.46 W	-253.94	8.88
5055.00	55.48	3.11	4906.13	183.56 S	256.41 W	-183.65	9.04
5145.00	63.57	2.70	4951.73	106.16 S	252.50 W	-106.25	9.00
5190.00	68.60	2.20	4969.97	65.07 S	250.74 W	-65.16	11.22
5236.00	72.84	2.43	4985.16	21.70 S	248.99 W	-21.79	9.23
5277.00	80.88	1.07	4994.47	18.18 N	247.78 W	18.09	19.87
5338.00	86.66	0.43	5001.09	78.78 N	246.99 W	78.70	9.53
5431.00	89.32	1.20	5004.35	171.71 N	245.66 W	171.62	2.98
5525.00	90.80	1.19	5004.25	265.69 N	243.70 W	265.60	1.57
5618.00	92.78	0.36	5001.34	358.63 N	242.44 W	358.54	2.31
5712.00	92.78	0.56	4996.78	452.51 N	241.69 W	452.43	0.21
5805.00	91.24	359.96	4993.52	545.45 N	241.27 W	545.37	1.78
5899.00	92.29	0.38	4990.63	639.40 N	240.99 W	639.32	1.20
5992.00	89.81	359.28	4988.92	732.38 N	241.26 W	732.30	2.92
6086.00	90.74	359.18	4988.47	826.37 N	242.53 W	826.28	1.00
6180.00	89.57	358.55	4988.22	920.35 N	244.39 W	920.26	1.41
6273.00	90.74	359.24	4987.97	1013.33 N	246.18 W	1013.24	1.46
6367.00	90.06	359.40	4987.31	1107.32 N	247.30 W	1107.23	0.74
6457.00	90.00	359.52	4987.26	1197.32 N	248.15 W	1197.23	0.15
6547.00	90.56	358.68	4986.82	1287.30 N	249.56 W	1287.21	1.12
6637.00	91.23	358.61	4985.42	1377.27 N	251.69 W	1377.18	0.75
6727.00	89.75	357.95	4984.65	1467.22 N	254.39 W	1467.13	1.80
6817.00	90.74	358.07	4984.26	1557.16 N	257.51 W	1557.07	1.11
6907.00	90.56	358.74	4983.24	1647.12 N	260.02 W	1647.03	0.77
6997.00	89.38	359.12	4983.29	1737.10 N	261.70 W	1737.01	1.38
7087.00	90.06	358.80	4983.73	1827.09 N	263.33 W	1826.99	0.84
7177.00	90.74	358.43	4983.10	1917.06 N	265.51 W	1916.96	0.86
7267.00	90.00	358.35	4982.52	2007.02 N	268.04 W	2006.93	0.83
7357.00	89.07	357.73	4983.25	2096.96 N	271.11 W	2096.87	1.24
7447.00	88.70	356.80	4985.00	2186.84 N	275.41 W	2186.75	1.11
7537.00	89.63	358.32	4986.31	2276.75 N	279.24 W	2276.65	1.98
7627.00	90.25	359.69	4986.41	2366.73 N	280.80 W	2366.63	1.67
7717.00	90.56	359.12	4985.77	2456.72 N	281.74 W	2456.62	0.72
7807.00	90.25	0.83	4985.14	2546.72 N	281.78 W	2546.62	1.93
7897.00	89.94	1.25	4984.99	2636.70 N	280.14 W	2636.60	0.58
7986.00	89.57	0.74	4985.37	2725.69 N	278.60 W	2725.59	0.71
8076.00	89.63	0.90	4986.00	2815.68 N	277.31 W	2815.58	0.19
8166.00	89.51	0.82	4986.67	2905.66 N	275.96 W	2905.57	0.16
8257.00	89.32	0.83	4987.60	2996.65 N	274.65 W	2996.55	0.21
8346.00	88.58	0.42	4989.23	3085.63 N	273.68 W	3085.53	0.95
8437.00	90.49	0.49	4989.97	3176.62 N	272.96 W	3176.52	2.10
8528.00	89.81	0.11	4989.73	3267.62 N	272.48 W	3267.52	0.86
8618.00	89.44	0.48	4990.32	3357.61 N	272.02 W	3357.52	0.58
8708.00	89.01	0.46	4991.54	3447.60 N	271.28 W	3447.51	0.48
8798.00	89.44	1.04	4992.75	3537.58 N	270.10 W	3537.49	0.80
8888.00	89.20	0.84	4993.82	3627.57 N	268.62 W	3627.47	0.35
8978.00	90.74	1.02	4993.87	3717.55 N	267.16 W	3717.46	1.73
9068.00	91.98	0.82	4991.73	3807.51 N	265.72 W	3807.42	1.39
9158.00	91.24	0.69	4989.20	3897.47 N	264.53 W	3897.38	0.83
9248.00	90.74	0.23	4987.65	3987.45 N	263.81 W	3987.36	0.75
9338.00	90.37	0.36	4986.77	4077.45 N	263.35 W	4077.35	0.44
9428.00	91.05	0.49	4985.66	4167.44 N	262.68 W	4167.34	0.77
9477.00	91.54	0.48	4984.55	4216.42 N	262.26 W	4216.33	1.00
9525.00	91.54	0.48	4983.26	4264.40 N	261.86 W	4264.31	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 DIRECTION OF 0.02 DEGREES (TRUE)
A TOTAL CORRECTION OF 8.26 DEG FROM MAGNETIC NORTH TO TRUE NORTH HAS BEEN APPLIED**

HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.
HORIZONTAL DISPLACEMENT(CLOSURE) AT 9525.00 FEET
IS 4272.44 FEET ALONG 356.49 DEGREES (TRUE)

Survey Data is tied on to Gyro Data.

Surveys have been IFR Corrected

Date Printed:06 April 2015