



WELL INFORMATION					
MWD Run Number	100	200	300		
Date run completed	23-Mar-15	26-Mar-15	31-Mar-15		
Rig Bit Number	0100	0200	0300		
Bit Size (in)	13.500	8.750	6.125		
Tool Nominal OD (in)	6.750	6.750	4.750		
Log Start Depth (MD, ft)	106.00	1,840.00	6,230.00		
Log End Depth (MD, ft)	1,840.00	6,231.00	13,825.00		
Drill or Wipe	Drill	Drill	Drill		
Drill/Wipe Start Date and Time	23-Mar-15 06:00	24-Mar-15 22:50	27-Mar-15 10:43		
Drill/Wipe End Date and Time	23-Mar-15 14:30	26-Mar-15 02:20	30-Mar-15 16:24		
Min Inc (deg) @ Depth (MD, ft)	0.52 @ 267.00	0.62 @ 5,033.00	87.21 @ 10,277.00		
Max Inc (deg) @ Depth (MD, ft)	6.19 @ 1,185.00	86.89 @ 6,183.00	92.58 @ 9,909.00		
Bit TFA(in2) / Bit Type	0.90 / PDC	0.66 / PDC	0.65 / PDC		
Flow Rate (gpm)	681.55	486.46	263.86		
Max AV (fpm) / CV (fpm) @ MWD	NA / NA	NA / NA	NA / NA		
Fluid Type	Native/Spud Mud	Polymer	Polymer		
Density (ppg) / Viscosity (spqt)	8.60 / 31.00	9.80 / 32.00	10.60 / 43.00		
Filtrate CL (ppm)	1,500.00	1,800.00	2,300.00		
pH / Fluid Loss (mptm)	8.30 / 0	10.60 / 0	8.80 / 5		
PV (cP) / YP (lbf/2)	4 / 2.00	2 / 3.00	13 / 13.00		
% Solids / % Sand	5.7 / .50	5 / .1	12.2 / 0.05		
% Oil / Oil:Water Ratio	NA / NA	NA / NA	NA / NA		
Rm @ Measured Temp (degF)	NA @ NA	NA @ NA	NA @ NA		
Rmf @ Measured Temp (degF)	NA @ NA	NA @ NA	NA @ NA		
Rmc @ Measured Temp (degF)	NA @ NA	NA @ NA	NA @ NA		
Max Tool Temp (in F) / S	115.70 / PDM	170.70 / PDM	231.10 / PDM		

Max Tool Temp (degF) / Source	117.73 / PCM	172.78 / PCM	231.42 / PCM		
Rm @ Max Tool Temp (degF)	NA @ 117.73	NA @ 172.78	NA @ 231.42		
Lead MWD Engineer	Scott Trowbridge	Scott Trowbridge	Scott Trowbridge		
Customer Representative	Jamie Wilkerson	Tyson Renton	Tyson Renton		

SENSOR INFORMATION

Downhole Processor Information

Tool Type	PCM	PCM	PCM		
Software Version	5.93	5.93	5.93		
Sub Serial Number	11404261	11404261	12396733		
Insert Serial Number	11619996	11620319	11619996		
Date and Time Initialized	22-Mar-15 20:05	24-Mar-15 02:05	26-Mar-15 20:50		
Date and Time Read	23-Mar-15 17:53	26-Mar-15 13:23	31-Mar-15 19:11		
ECMB SW Version	N/A	N/A	N/A		

Directional Sensor Information

Tool Type	PCDC	PCDC	PCDC		
Distance From Bit (ft)	56.69	45.48	45.20		
Software Version	6.33	6.21	6.33		
Sub Serial Number	11404261	11404261	12396733		
Sonde Serial Number	11638564	11638470	11638564		
Sensor ID Number	N/A	N/A	N/A		
Toolface Offset (deg)	140.87	295.71	196.12		

Gamma Ray Sensor Information

Tool Type		PCG	PCG		
Distance From Bit (ft)		50.43	39.50		
Recorded Sample Period (sec)		10	10		
Software Version		8.15	8.15		
Sub Serial Number		11404261	12396733		
Insert/Sonde Serial Number		11680921	11120599		

REMARKS

1. All depths are measured depths, referenced to the Driller's pipe tally and are measured from the Drill Floor, unless otherwise specified.

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

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

4. All data is stored data unless otherwise specified.

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

PCG Gamma Ray BCorr (PGRC)
Interval Resolution: .5
Interval Distance: .6
Gap Fill: 3

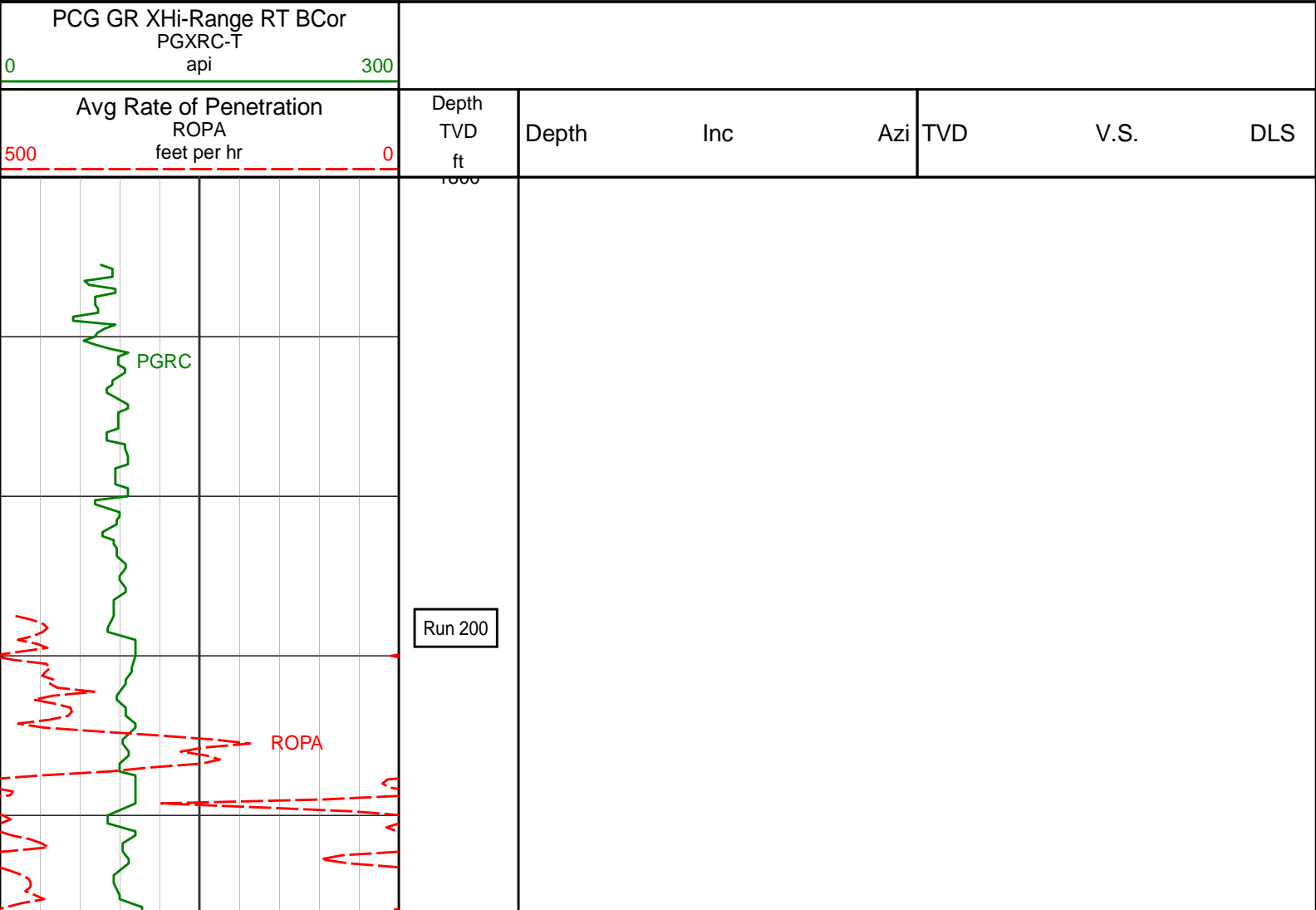
Average Rate of Penetration (ROPA)
Interval Resolution: .5
Interval Distance: 1.2
Gap Fill: 3

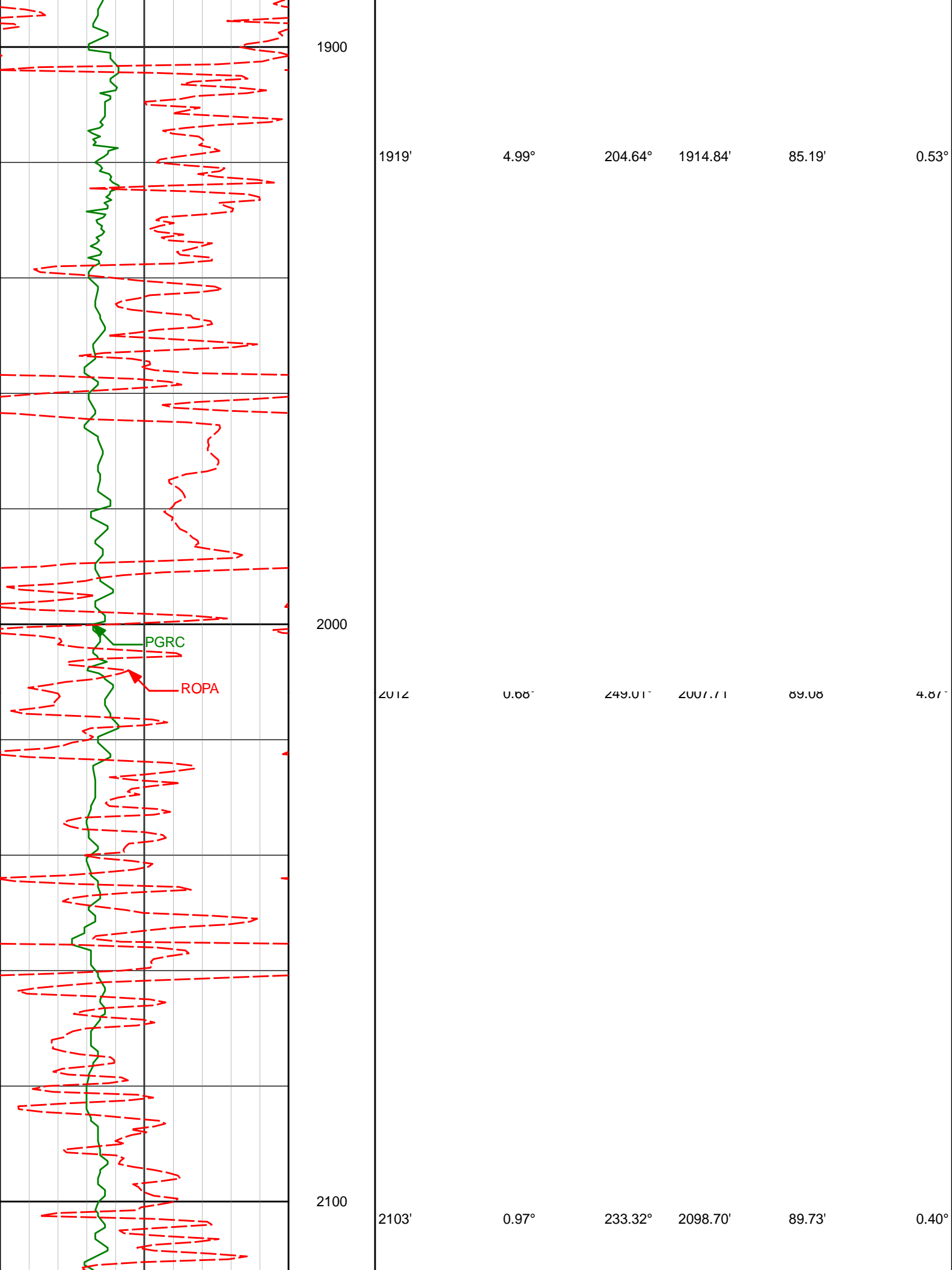
WARRANTY

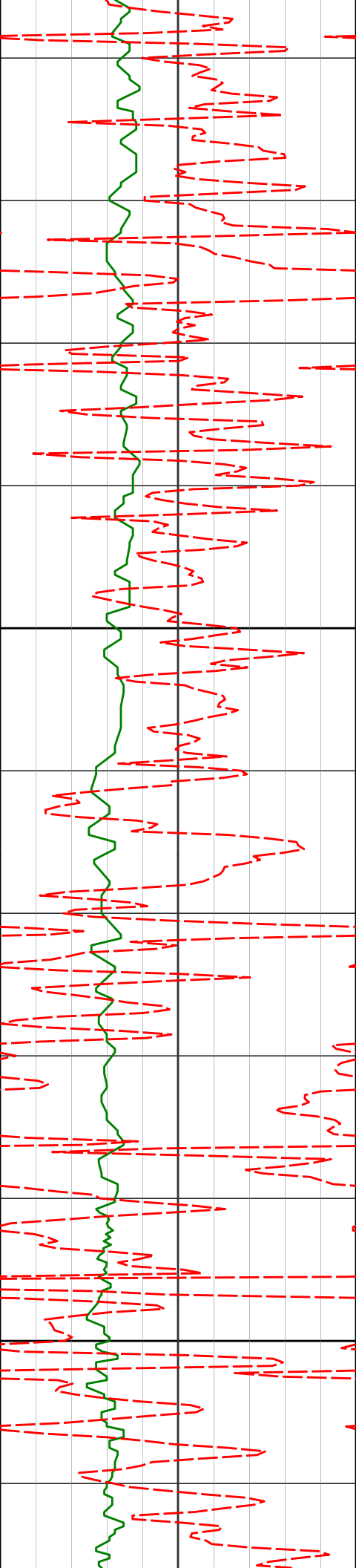
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HALLIBURTON
Sperry Drilling Services

MD Main Log 1:240







2200

2300

2194'

1.01°

252.99°

2189.69'

90.43'

0.37°

2286'

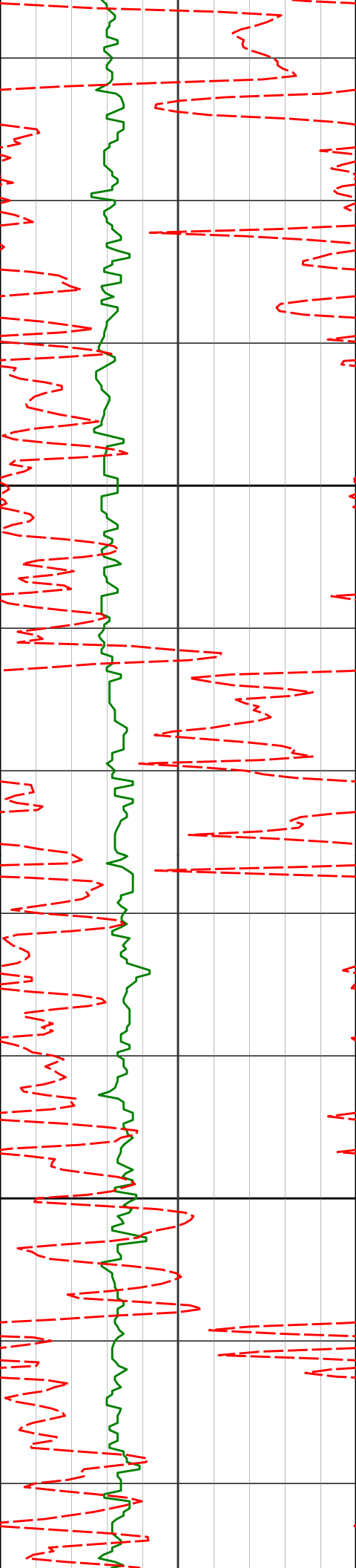
0.83°

253.41°

2281.67'

90.87'

0.20°



2400

2469'

1.33°

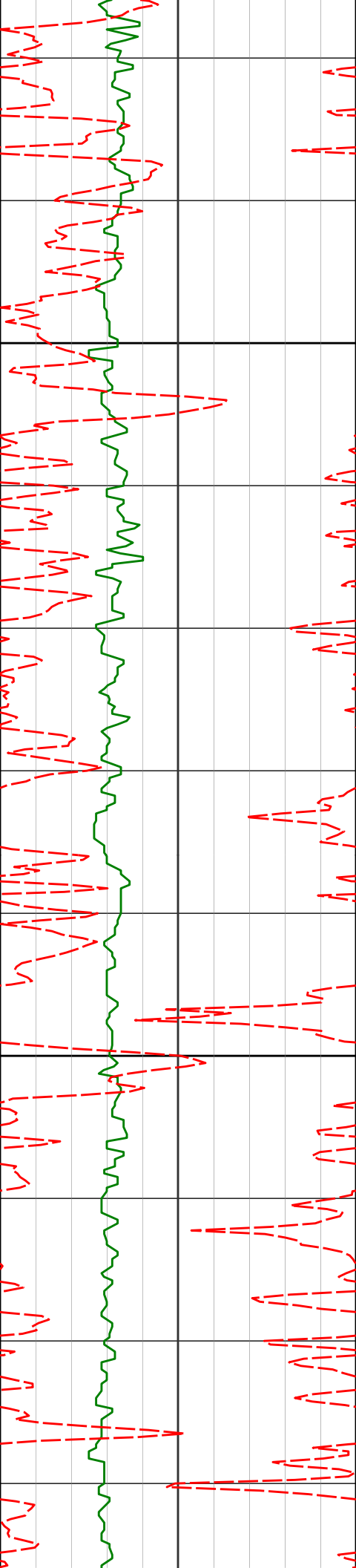
47.08°

2464.66'

89.80'

1.15°

2500



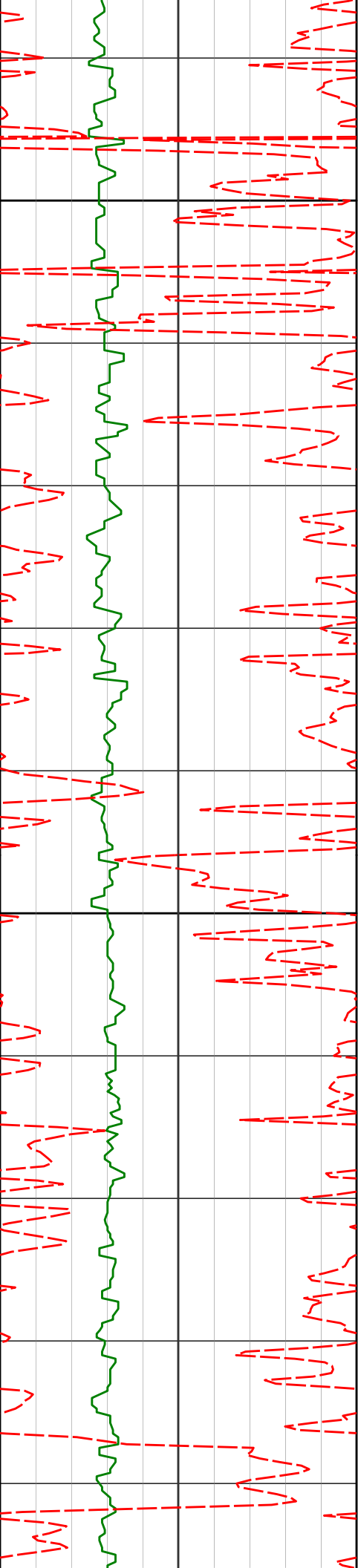
2600

2700

2561'	1.10°	36.91°	2556.64'	88.36'	0.34°
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2652'	0.98°	30.20°	2647.63'	86.98'	0.19°
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2744'	0.96°	35.16°	2739.61'	85.67'	0.09°
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2800

2836'

1.21°

35.27°

2831.60'

84.24'

0.27°

2900

2927'

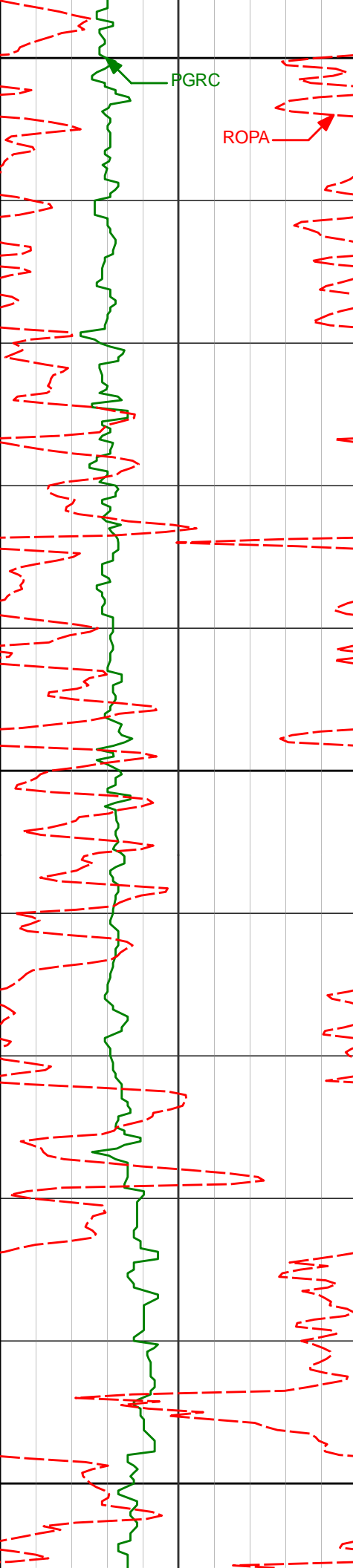
1.35°

41.18°

2922.57'

82.65'

0.21°



3000

PGRC

ROPA

3019'

1.41°

341.07°

3014.55'

80.76'

1.50°

3100

3110'

1.74°

342.23°

3105.52'

78.39'

0.36°

3200

3201'

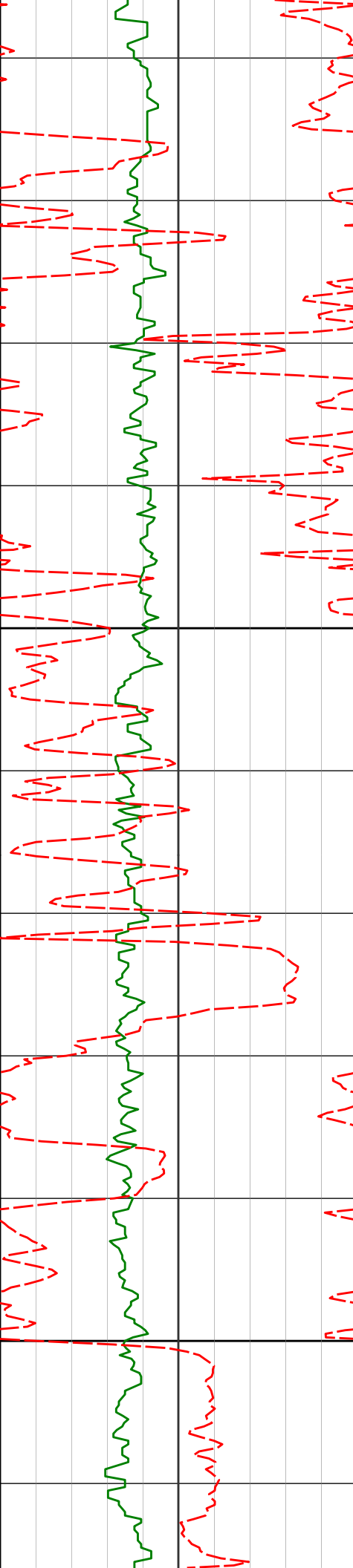
1.47°

7.20°

3196.48'

75.92'

0.82°



3300

3400

3292'

1.31°

25.38°

3287.45'

73.82'

0.51°

3384'

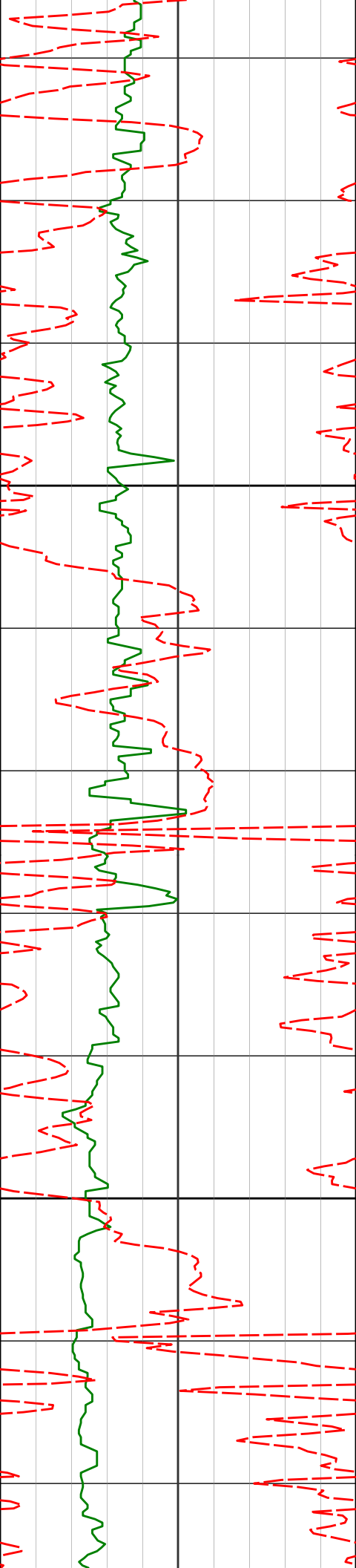
1.07°

356.25°

3379.44'

72.01'

0.70°



3500

3600

3476'

1.08°

7.08°

3471.42'

70.29'

0.22°

3568'

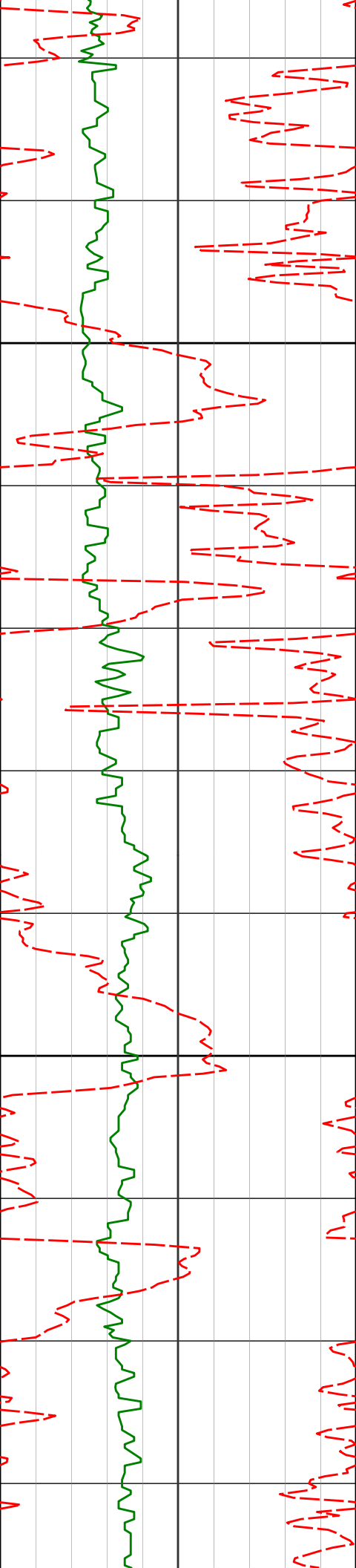
1.09°

10.21°

3563.40'

68.57'

0.07°



3700

3800

3659'

1.07°

15.82°

3654.39'

66.90'

0.12°

3751'

1.30°

13.10°

3746.37'

65.05'

0.26°

3842'

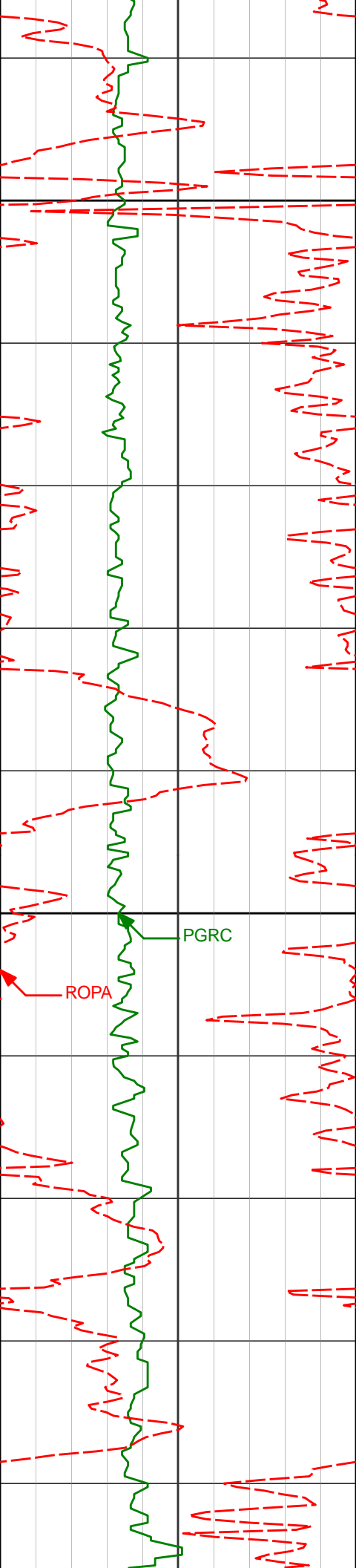
1.03°

24.98°

3837.35'

63.30'

0.40°



3900

3934'

1.00°

20.76°

3929.33'

61.80'

0.09°

4000

PGRC

ROPA

4025'

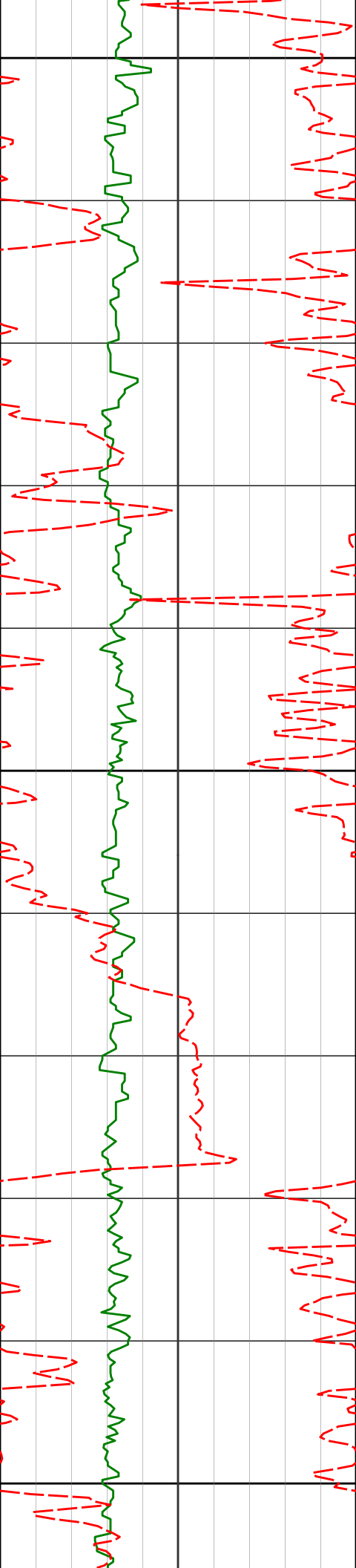
1.17°

28.19°

4020.32'

60.24'

0.24°



4100

4116'

1.07°

337.50°

4111.30'

58.63'

1.06°

4200

4208'

0.81°

322.21°

4203.29'

57.33'

0.39°

4300

4299'

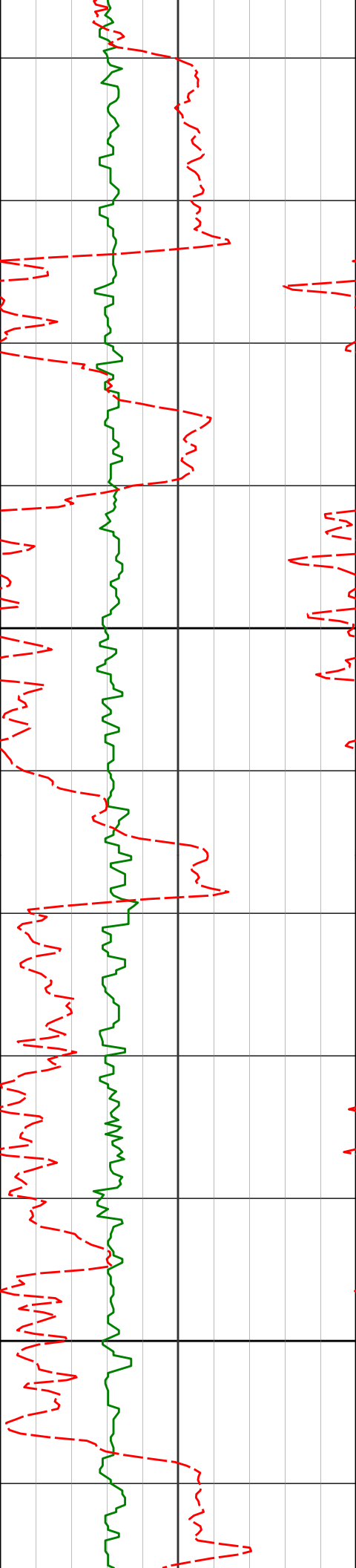
0.88°

313.16°

4294.28'

56.34'

0.17°



4400

4500

4391'

0.94°

279.41°

4386.27'

55.74'

0.58°

4482'

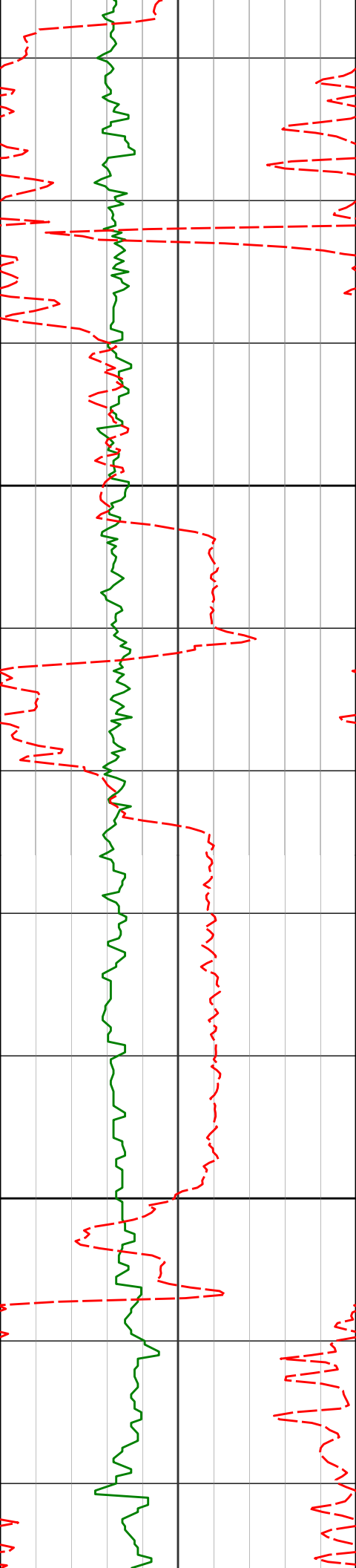
0.63°

258.45°

4477.26'

55.72'

0.46°



4600

4700

4574'

1.52°

228.76°

4569.24'

56.64'

1.11°

4665'

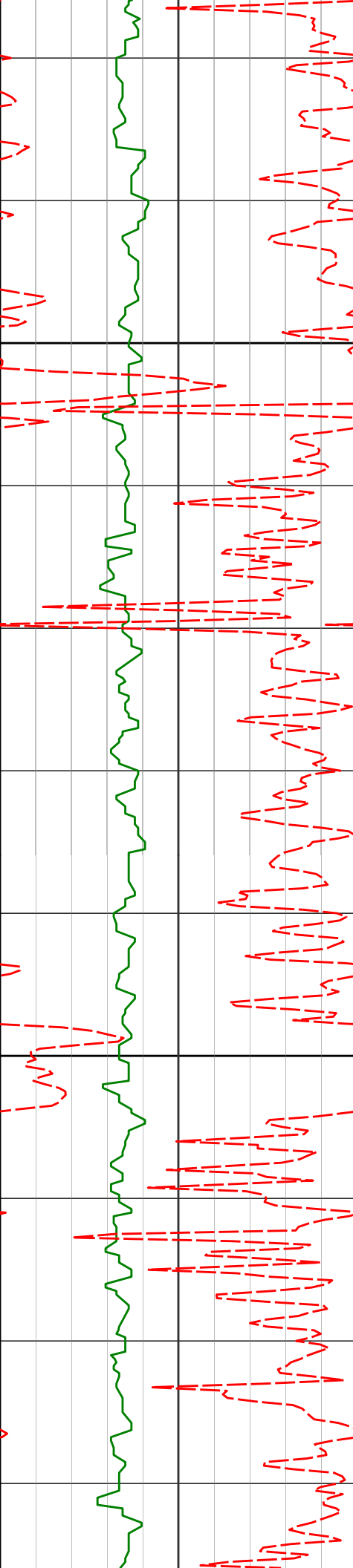
1.83°

238.82°

4660.21'

58.19'

0.47°



4800

4900

4757'

1.80°

220.90°

4752.16'

60.05'

0.62°

4850'

1.01°

214.58°

4845.13'

61.84'

0.86°

4942'

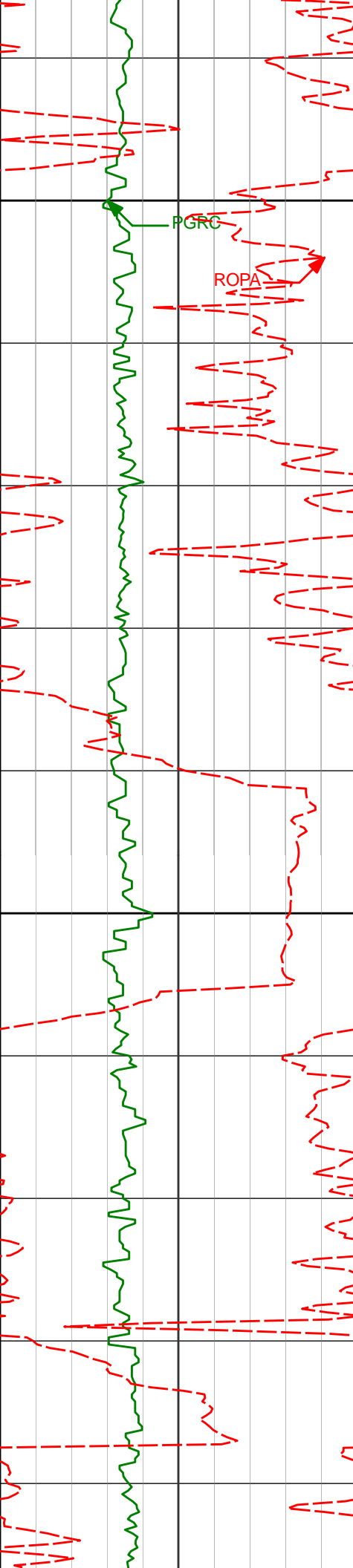
1.00°

197.13°

4937.12'

63.27'

0.33°



5000

PGRC

ROPA

5033'

0.62°

199.65°

5028.11'

64.50'

0.42°

5100

5125'

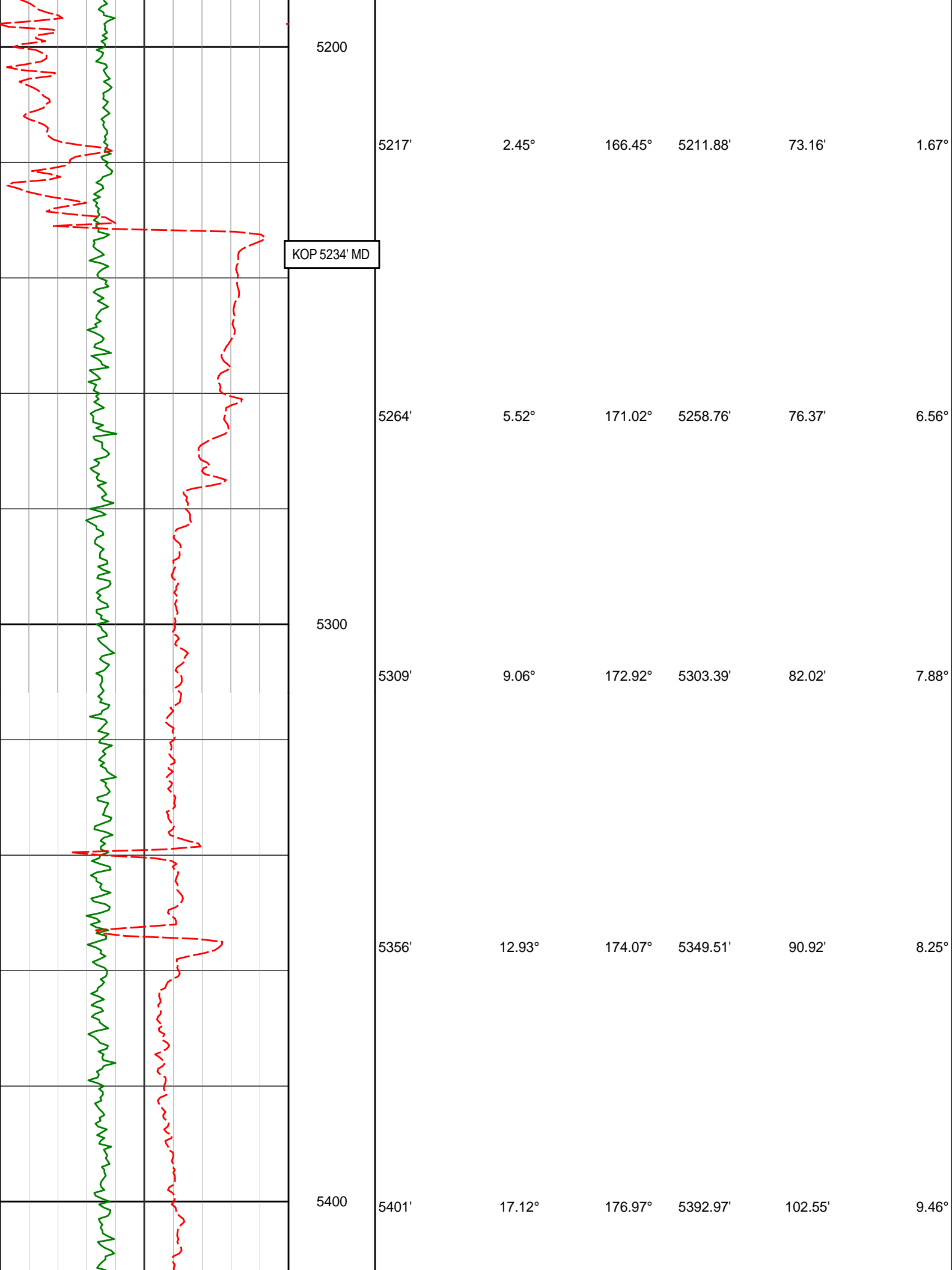
3.98°

169.79°

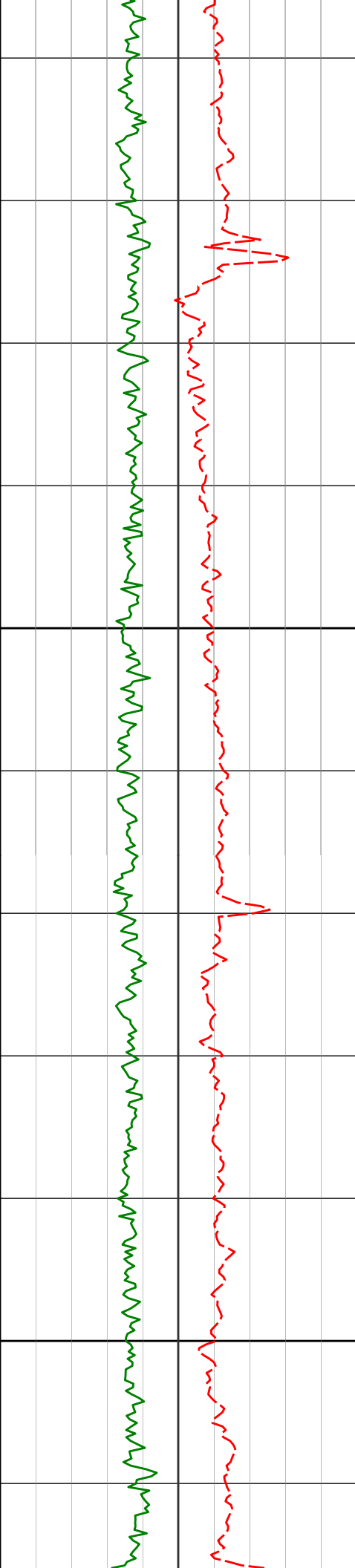
5120.02'

68.11'

3.76°



KOP 5234' MD



5500

5600

5448'

20.99°

174.93°

5437.38'

117.84'

8.35°

5493'

25.16°

176.82°

5478.77'

135.42'

9.41°

5540'

29.25°

179.75°

5520.57'

156.89'

9.15°

5584'

33.76°

180.04°

5558.07'

179.88'

10.26°

5631'

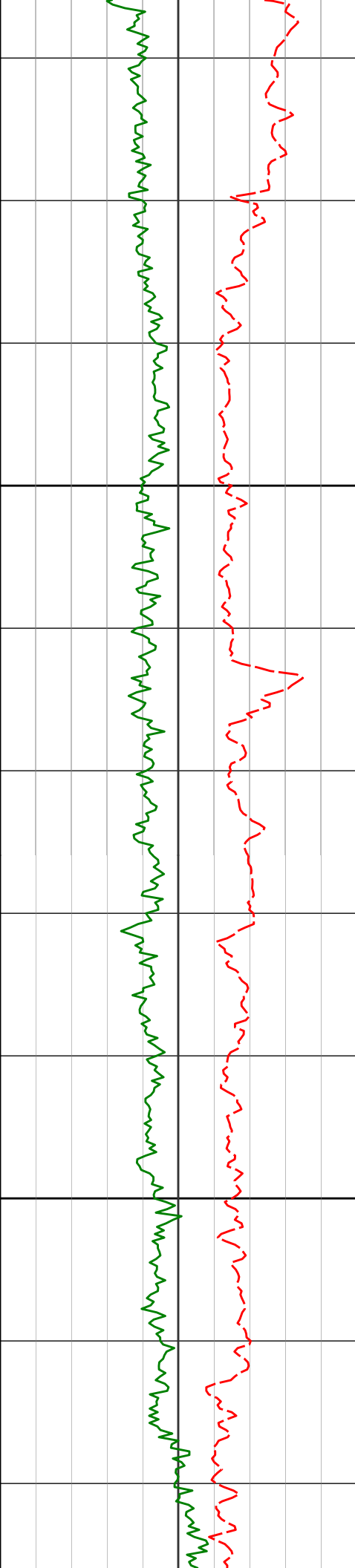
38.24°

180.57°

5596.09'

207.49'

9.55°



5700

5800

5679'

43.16°

179.48°

5632.47'

238.78'

10.36°

5726'

48.19°

179.97°

5665.30'

272.39'

10.73°

5775'

52.97°

180.76°

5696.40'

310.24'

9.83°

5822'

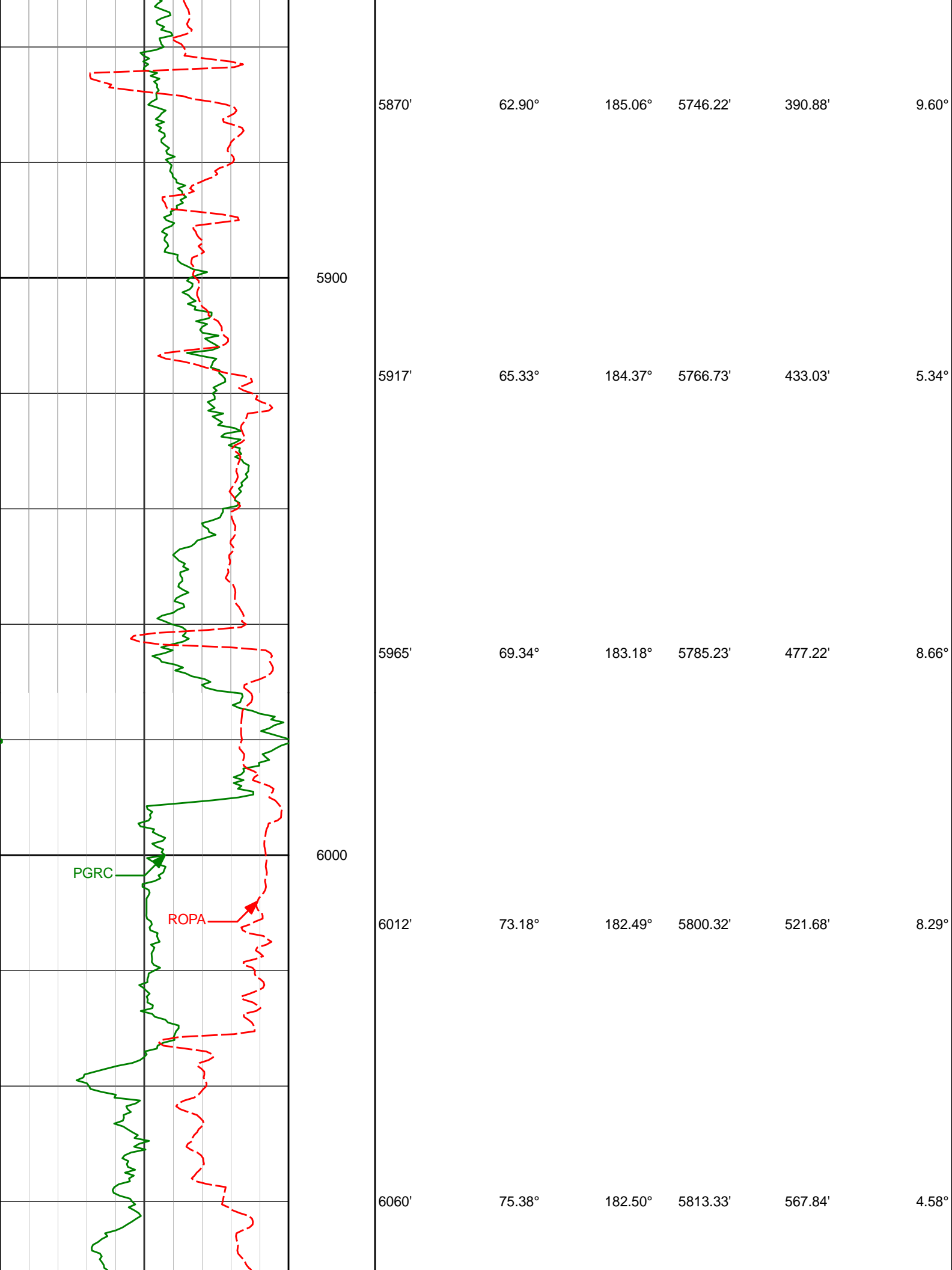
58.68°

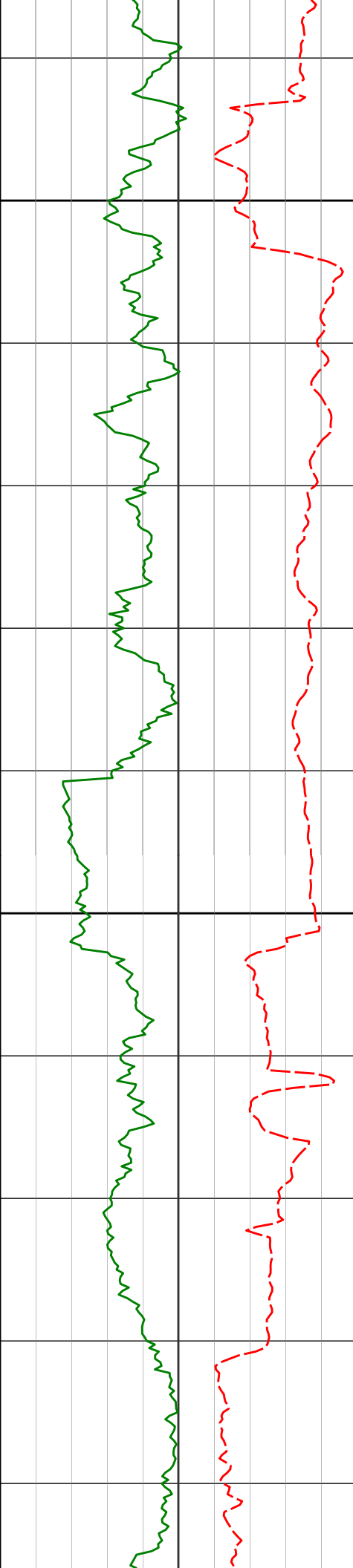
182.94°

5722.79'

349.08'

12.74°





6100

6107'

77.44°

182.79°

5824.37'

613.48'

4.42°

6155'

82.81°

181.10°

5832.60'

660.73'

11.71°

6183'

86.89°

180.40°

5835.11'

688.61'

14.78°

6200

Casing Shoe @ 6297' MD



R300

6265'

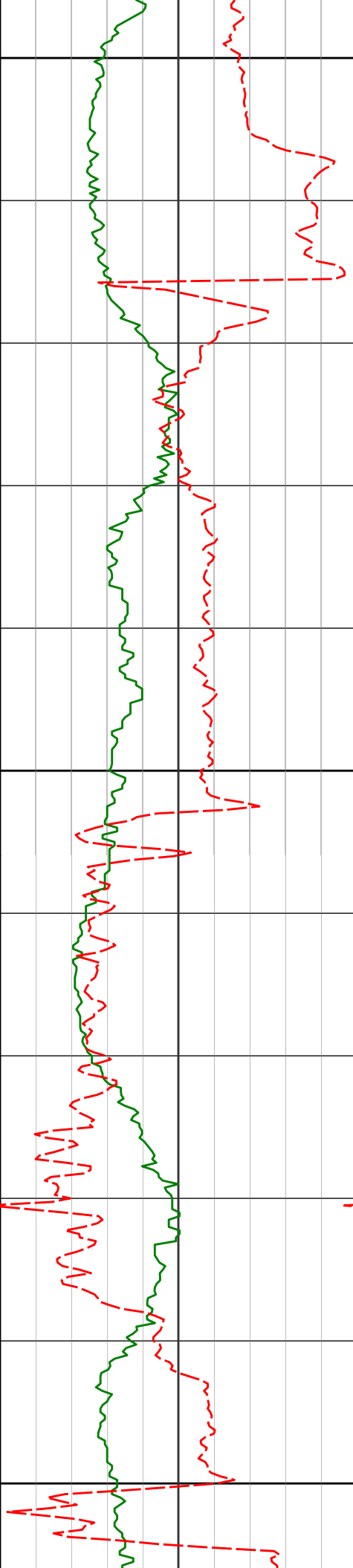
88.21°

180.30°

5838.62'

770.54'

1.61°



6300

6359'

92.10°

179.37°

5838.36'

864.51'

4.25°

6400

6454'

92.16°

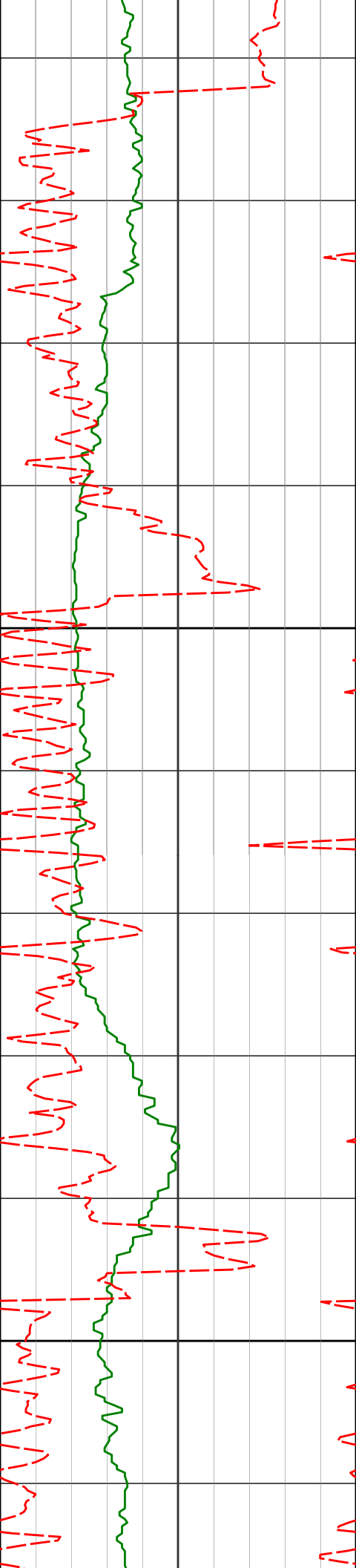
179.69°

5834.83'

959.44'

0.34°

6500



6548'

90.77°

180.57°

5832.43'

1053.41'

1.75°

6600

6643'

91.00°

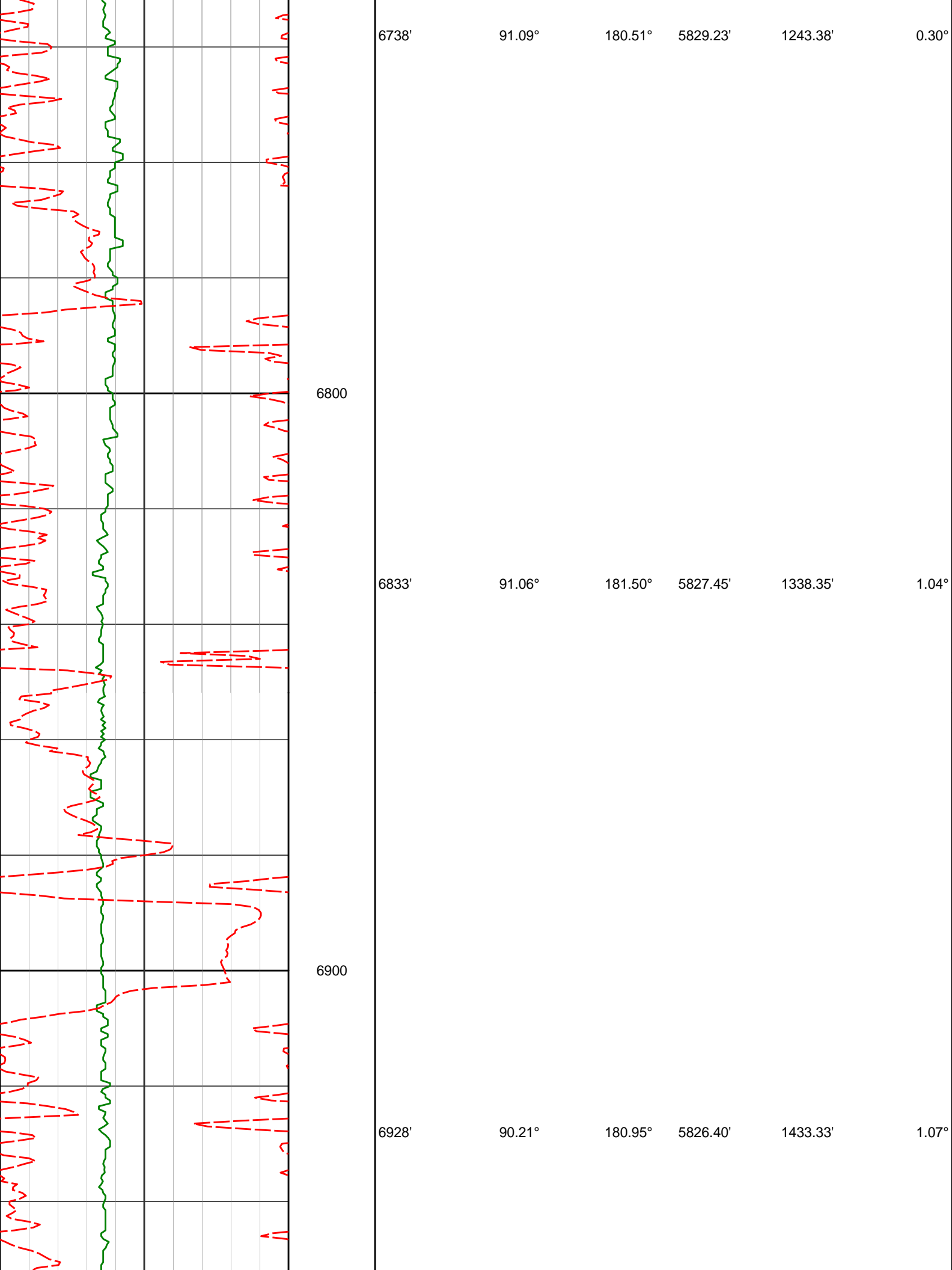
180.24°

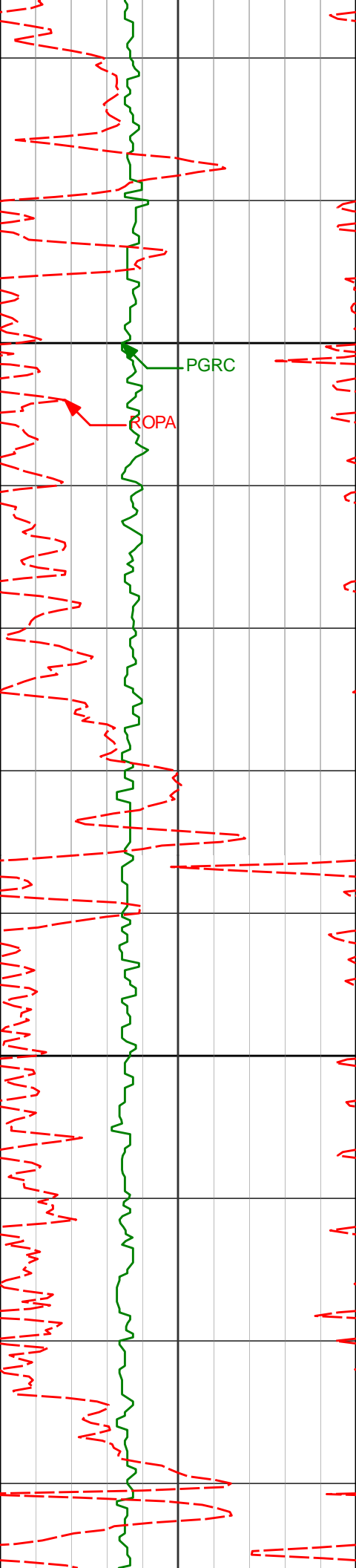
5830.96'

1148.40'

0.42°

6700





7000

7023'

89.75°

181.51°

5826.43'

1528.31'

0.76°

7100

7118'

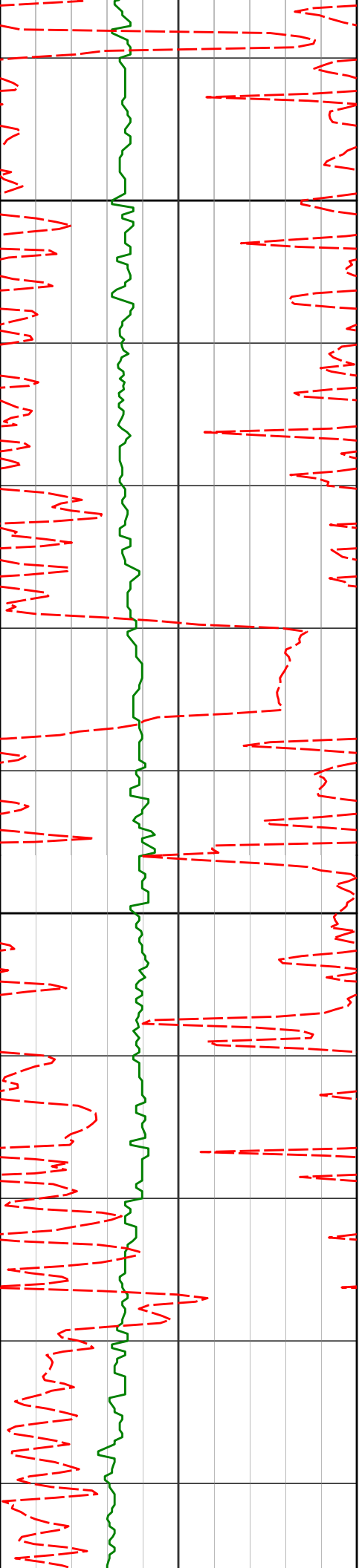
89.40°

181.35°

5827.13'

1623.29'

0.41°



7200

7213'

89.19°

181.08°

5828.30'

1718.27'

0.36°

7300

7308'

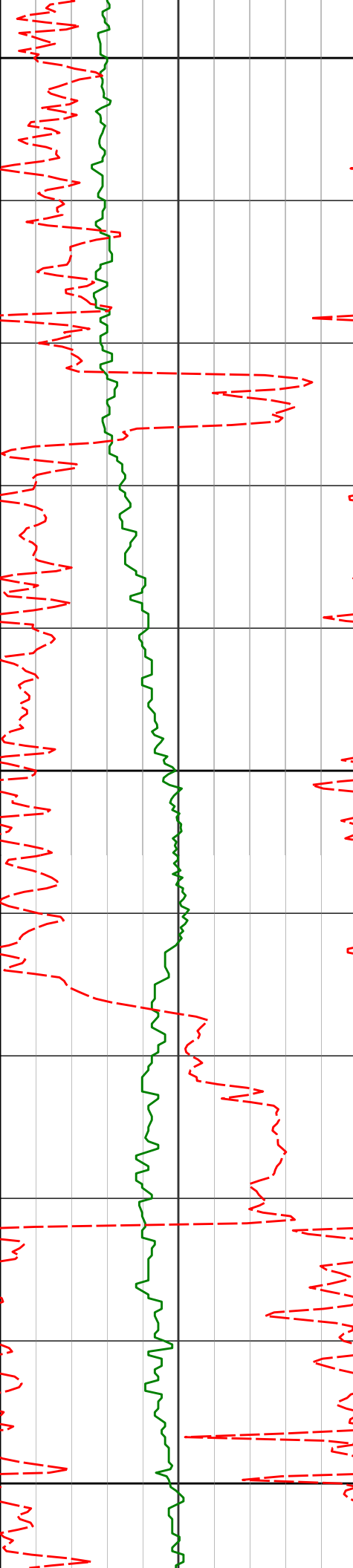
89.88°

179.73°

5829.07'

1813.26'

1.60°



7400

7403'

89.75°

180.50°

5829.38'

1908.26'

0.82°

7500

7498'

89.55°

179.71°

5829.96'

2003.26'

0.86°

7600

7593'

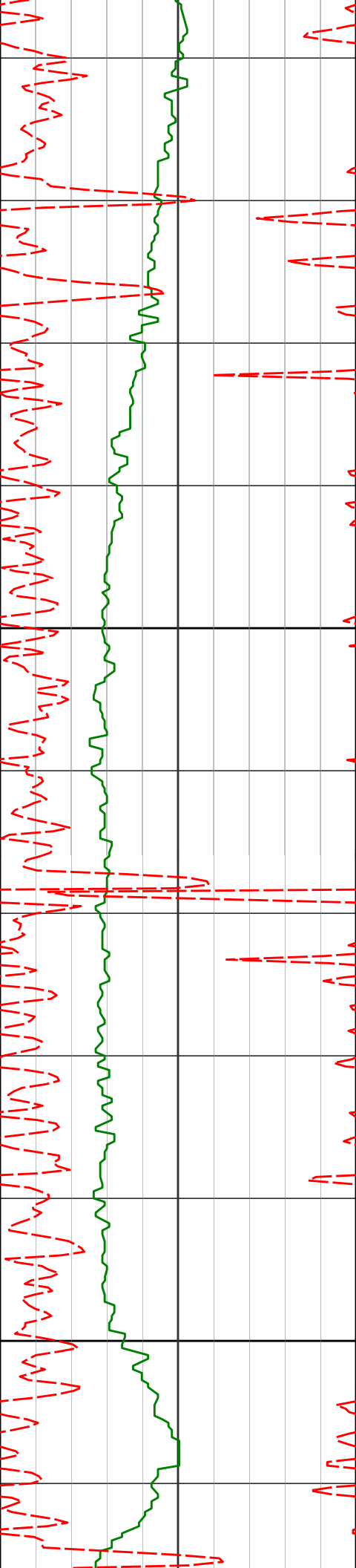
91.10°

180.24°

5829.42'

2098.25'

1.72°



7687'

7700

7782'

7800

90.67°

178.38°

5827.97'

2192.23'

2.03°

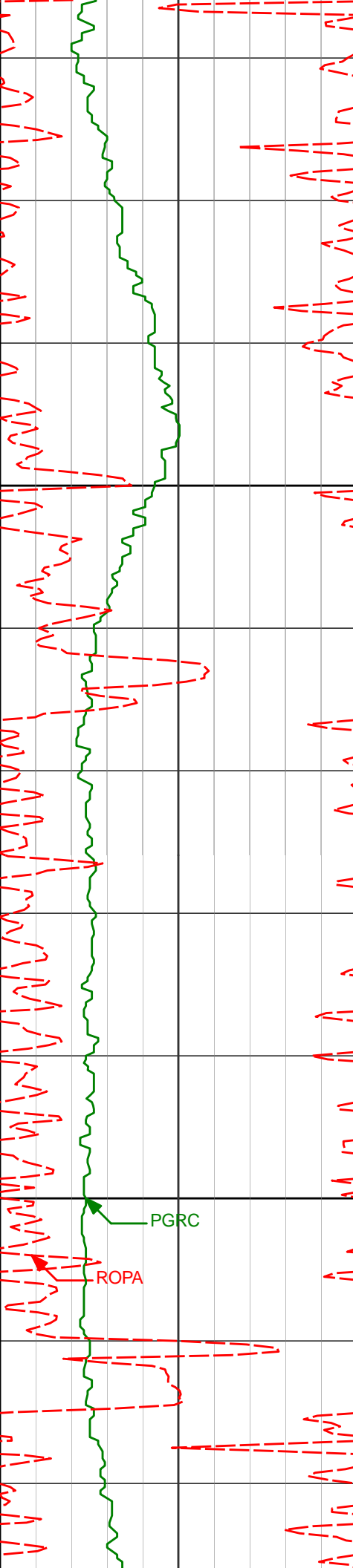
90.83°

179.35°

5826.73'

2287.19'

1.03°



7877' 90.27° 178.20° 5825.81' 2382.15' 1.35°

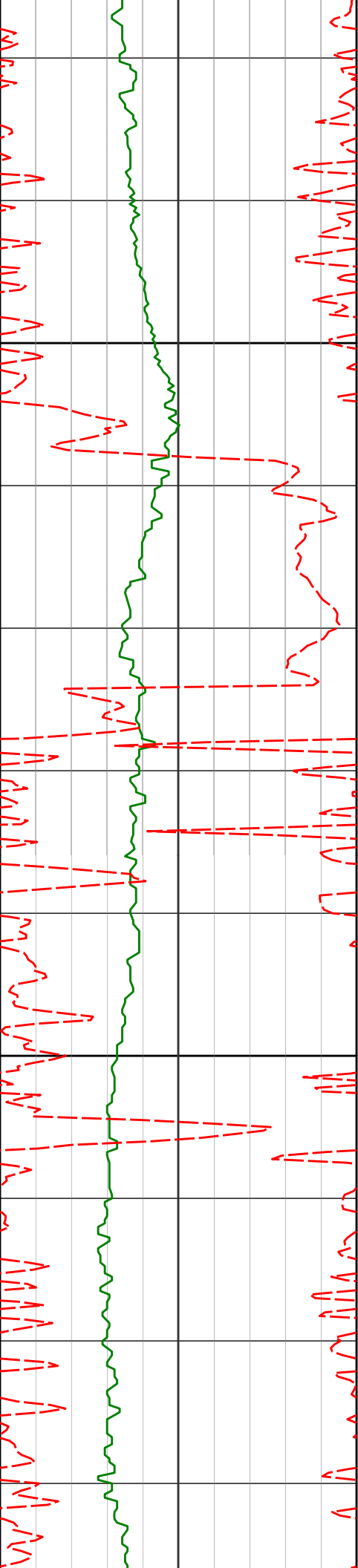
7900

7972' 89.99° 177.92° 5825.60' 2477.09' 0.42°

8000

PGRC

ROPA



8100

8200

8067'

89.70°

178.22°

5825.86'

2572.02'

0.44°

8161'

90.67°

178.67°

5825.55'

2665.97'

1.14°

8255'

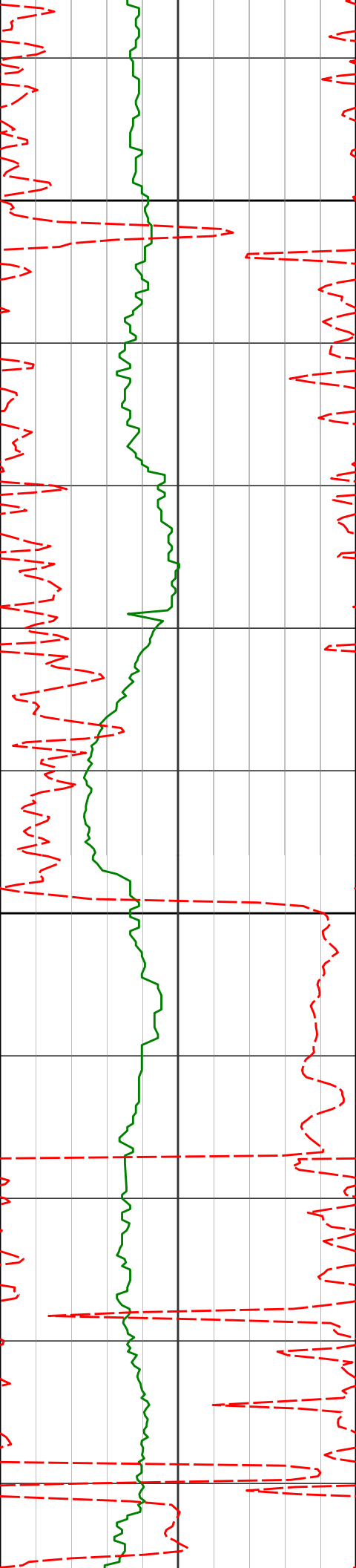
90.78°

178.40°

5824.36'

2759.92'

0.31°



8300

8350'

90.19°

177.68°

5823.56'

2854.85'

0.98°

8400

8445'

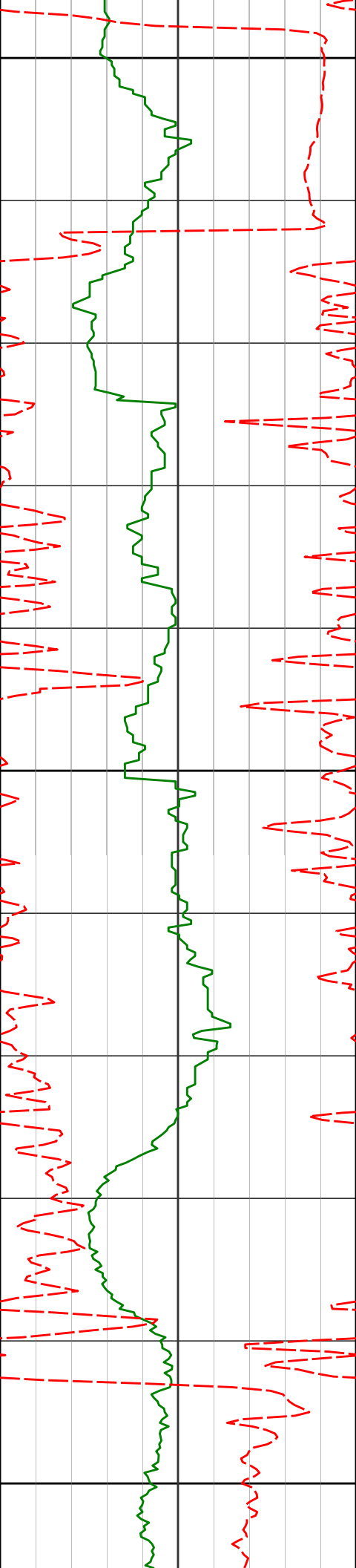
91.41°

178.84°

5822.23'

2949.78'

1.77°



8500

8536'

90.07°

181.89°

5821.06'

3040.76'

3.66°

8600

8628'

89.84°

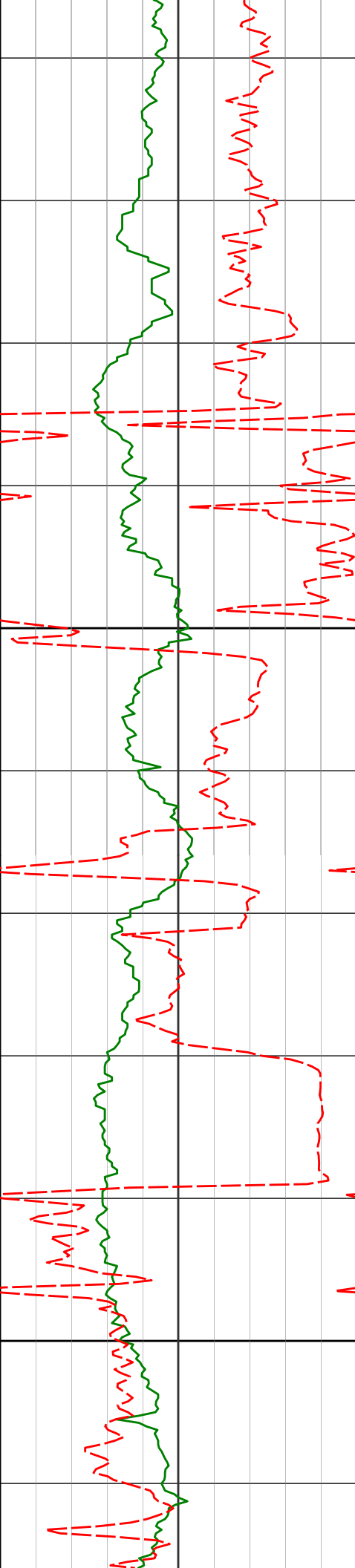
181.84°

5821.13'

3132.72'

0.26°

8700



8800

8900

8719'

89.72°

181.81°

5821.48'

3223.69'

0.14°

8811'

89.14°

180.86°

5822.39'

3315.66'

1.21°

8901'

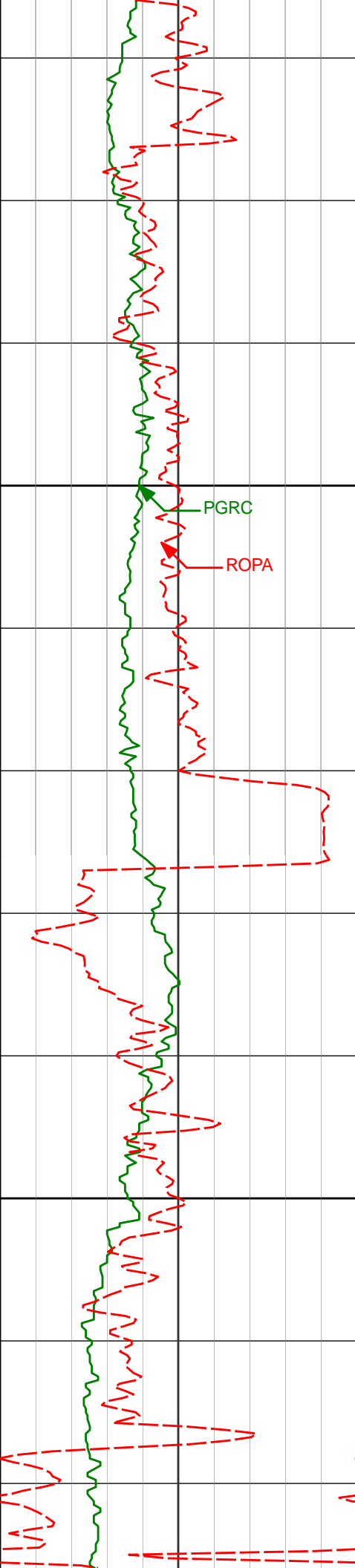
91.46°

181.13°

5821.92'

3405.65'

2.60°



9000

PGRC

ROPA

9100

8993'

91.57°

180.92°

5819.49'

3497.61'

0.26°

9083'

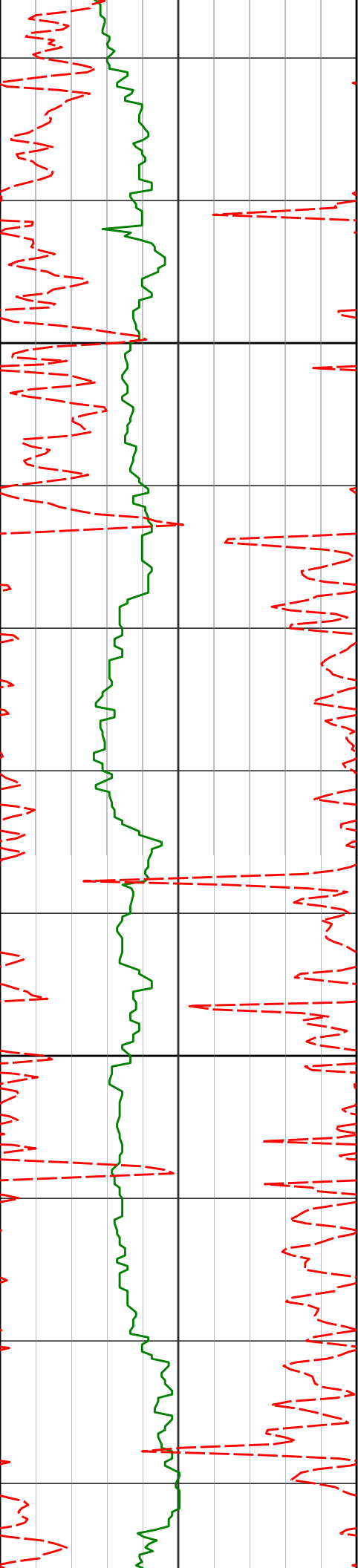
90.40°

181.09°

5817.94'

3587.58'

1.31°



9200

9300

9176'

90.30°

180.47°

5817.37'

3680.58'

0.68°

9267'

90.03°

180.61°

5817.11'

3771.57'

0.33°

9359'

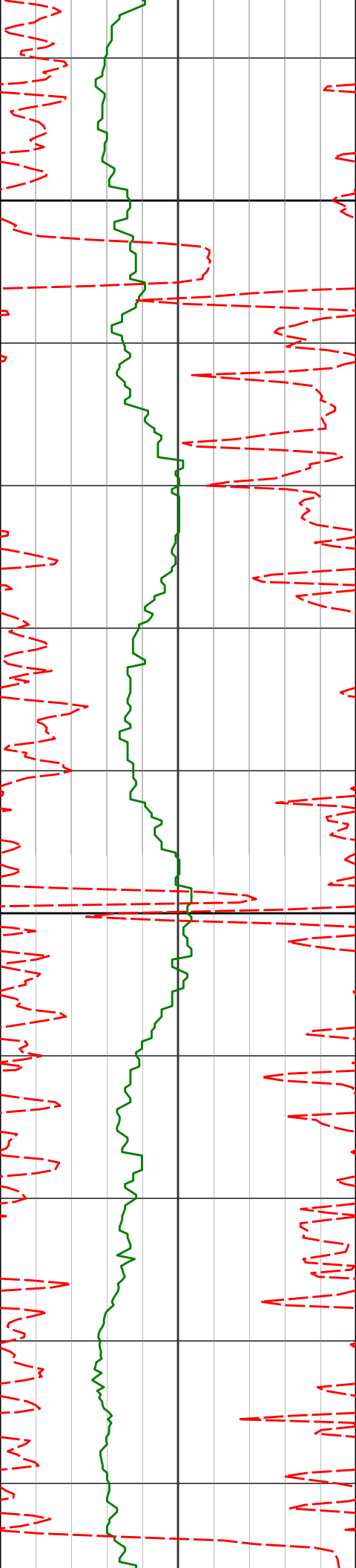
89.80°

180.44°

5817.25'

3863.57'

0.31°



9400

9451'

89.20°

180.19°

5818.05'

3955.57'

0.71°

9500

9543'

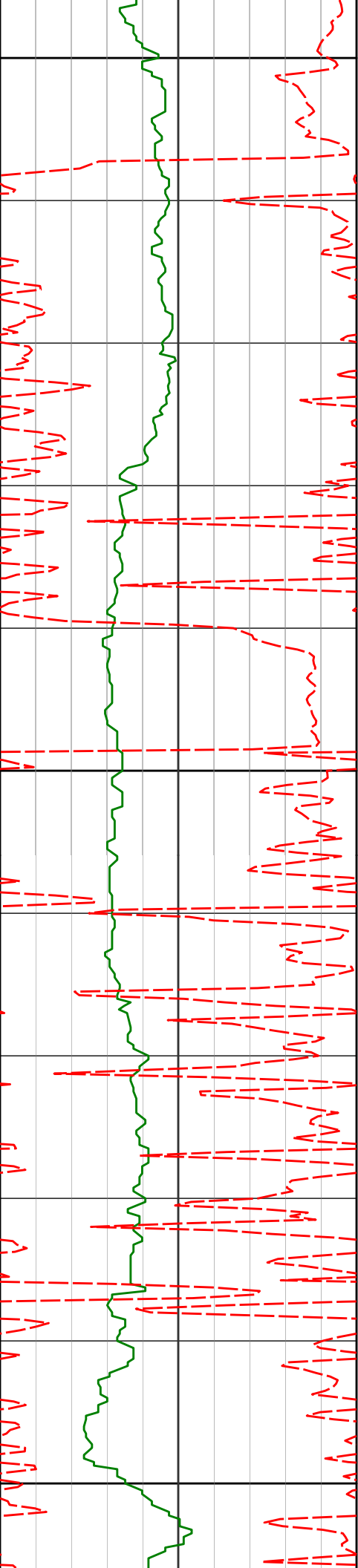
88.79°

179.66°

5819.67'

4047.55'

0.73°



9600

9634'

89.22°

179.51°

5821.25'

4138.53'

0.50°

9700

9727'

91.10°

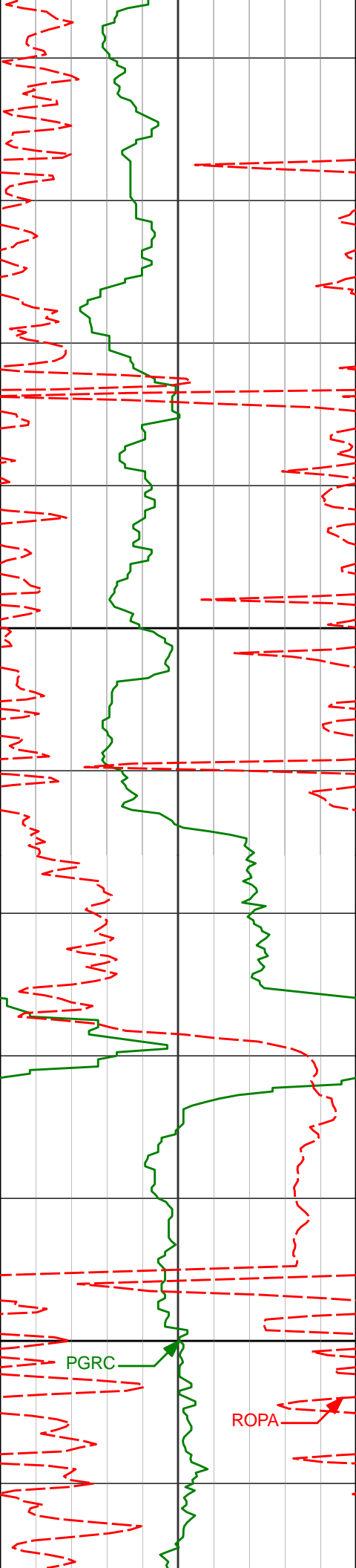
180.57°

5820.99'

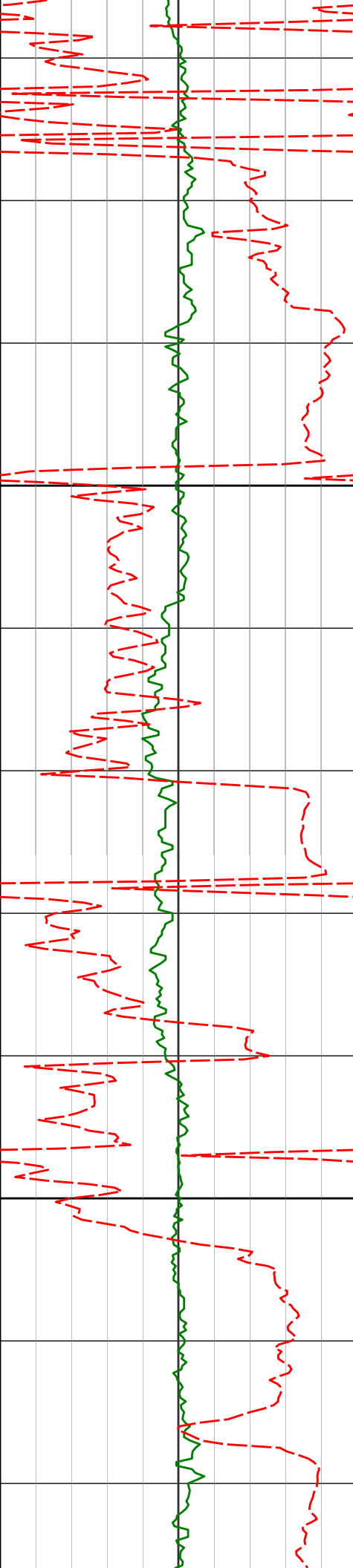
4231.53'

2.32°

9800



9817'	91.71°	180.51°	5818.78'	4321.50'	0.68°
9900					
9909'	92.58°	180.40°	5815.34'	4413.43'	0.95°
10000					
10002'	91.75°	182.04°	5811.82'	4506.35'	1.98°



10094'

10100

10094'

90.69°

182.04°

5809.86'

4598.28'

1.15°

10185'

10200

10185'

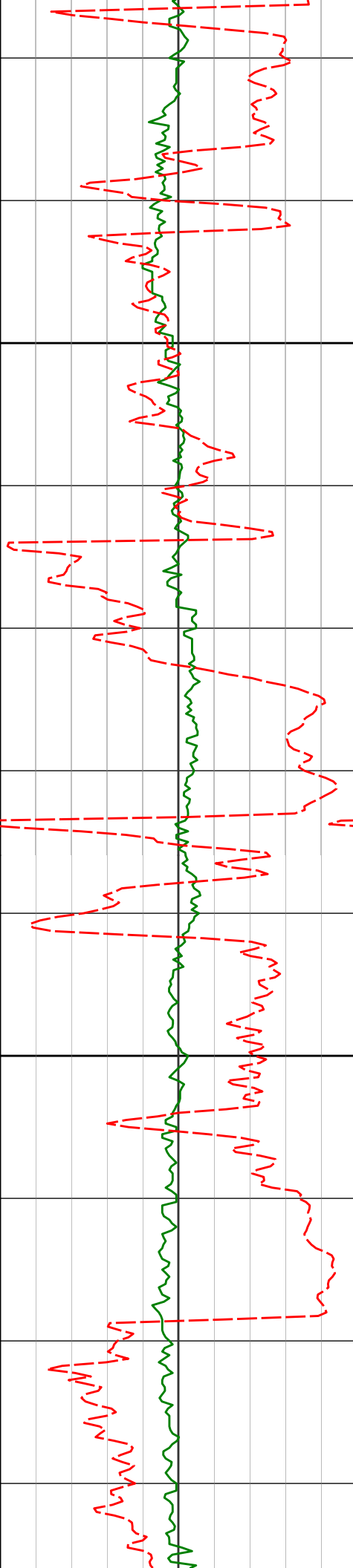
89.94°

181.15°

5809.36'

4689.25'

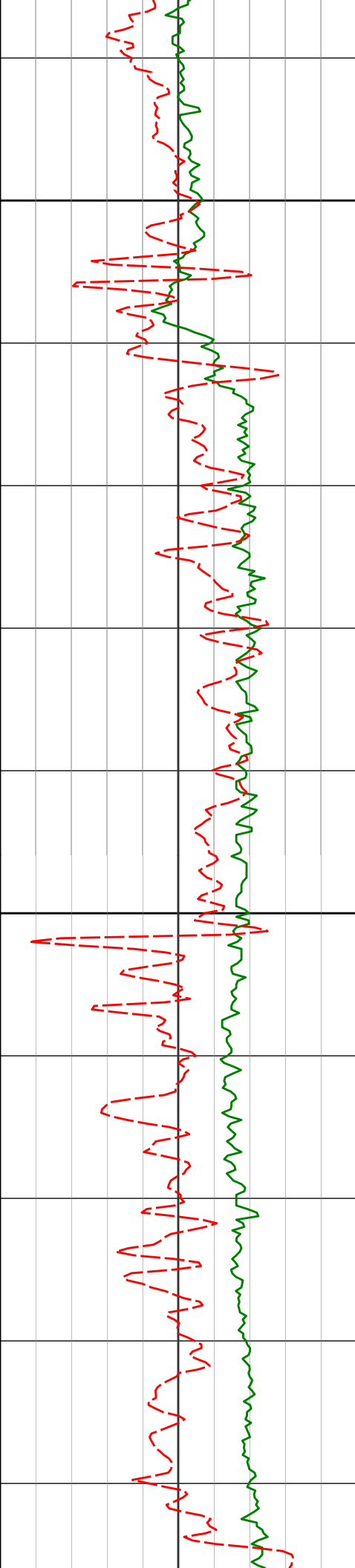
1.28°



10300

10400

10277'	87.21°	181.05°	5811.65'	4781.20'	2.97°
10370'	87.66°	179.94°	5815.81'	4874.11'	1.29°
10461'	89.82°	179.88°	5817.81'	4965.08'	2.37°



10500

10553'

89.93°

179.25°

5818.02'

5057.07'

0.70°

10600

10645'

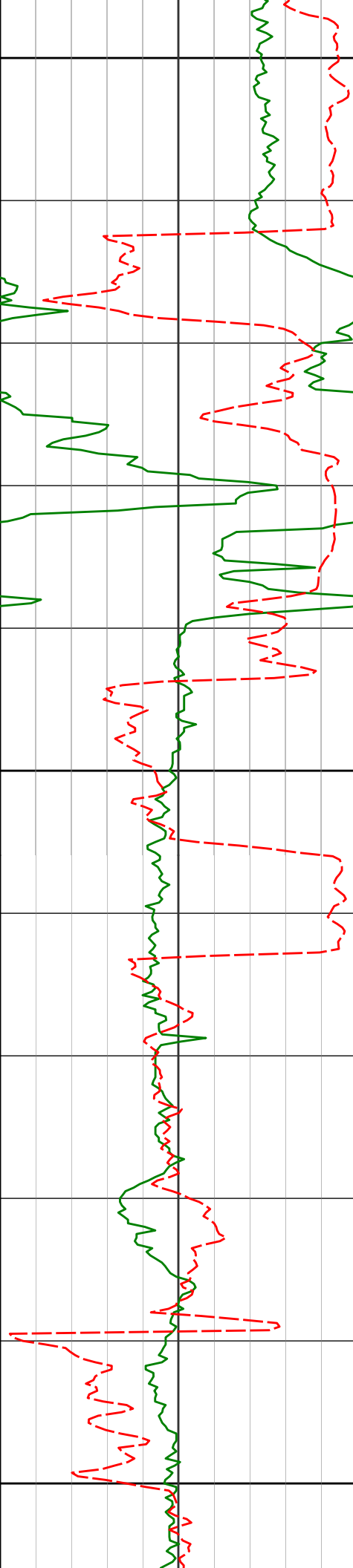
90.31°

178.76°

5817.82'

5149.05'

0.67°



10700

10737'

90.13°

182.11°

5817.47'

5241.03'

3.65°

10800

10828'

89.79°

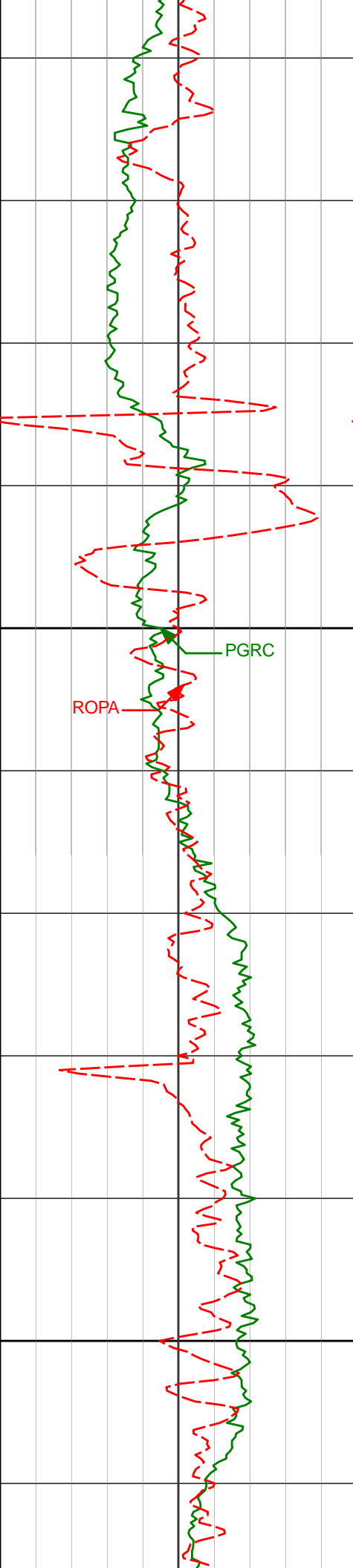
180.32°

5817.53'

5332.02'

2.00°

10900



11000

11100

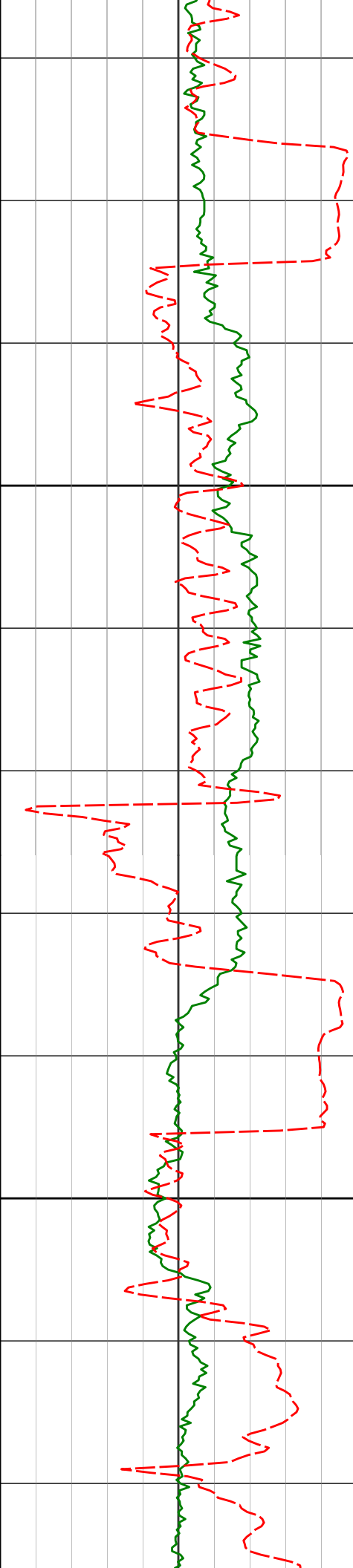
PGRC

ROPA

10920'	89.99°	179.77°	5817.71'	5424.02'	0.64°
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11011'	90.42°	179.66°	5817.38'	5515.01'	0.49°
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11103'	90.60°	178.89°	5816.56'	5606.99'	0.86°
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11200

11300

11194'

89.99°

180.07°

5816.10'

5697.98'

1.46°

11286'

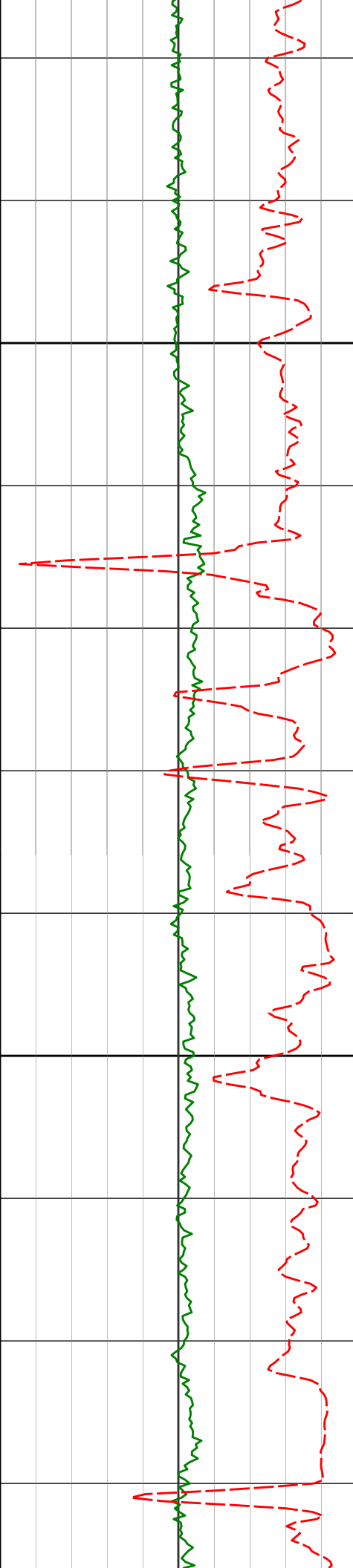
88.01°

181.72°

5817.70'

5789.96'

2.80°



11400

11500

11378'

87.96°

181.84°

5820.94'

5881.86'

0.14°

11469'

88.21°

181.86°

5823.98'

5972.78'

0.28°

11562'

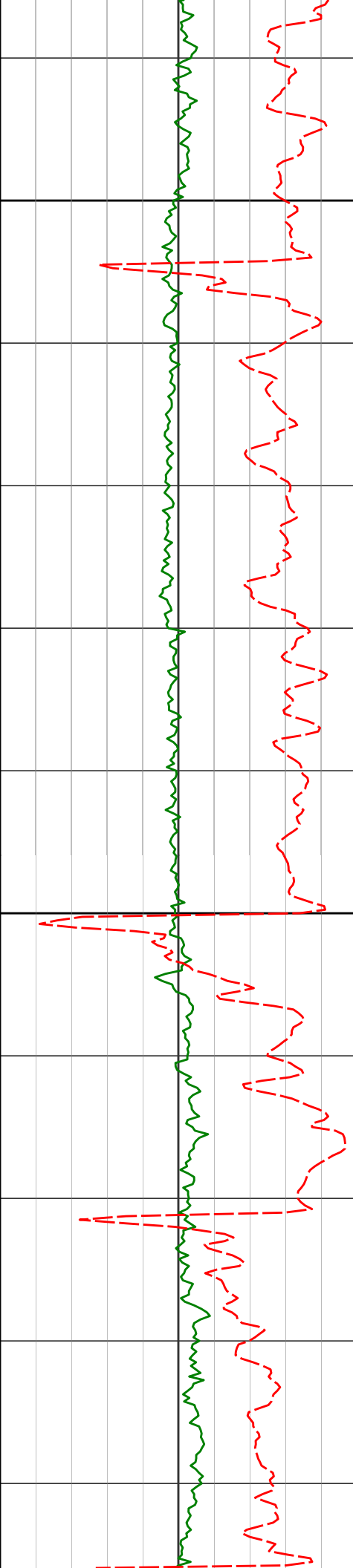
89.32°

181.57°

5825.98'

6065.72'

1.23°



11600

11653'

89.76°

181.46°

5826.71'

6156.70'

0.50°

11700

11744'

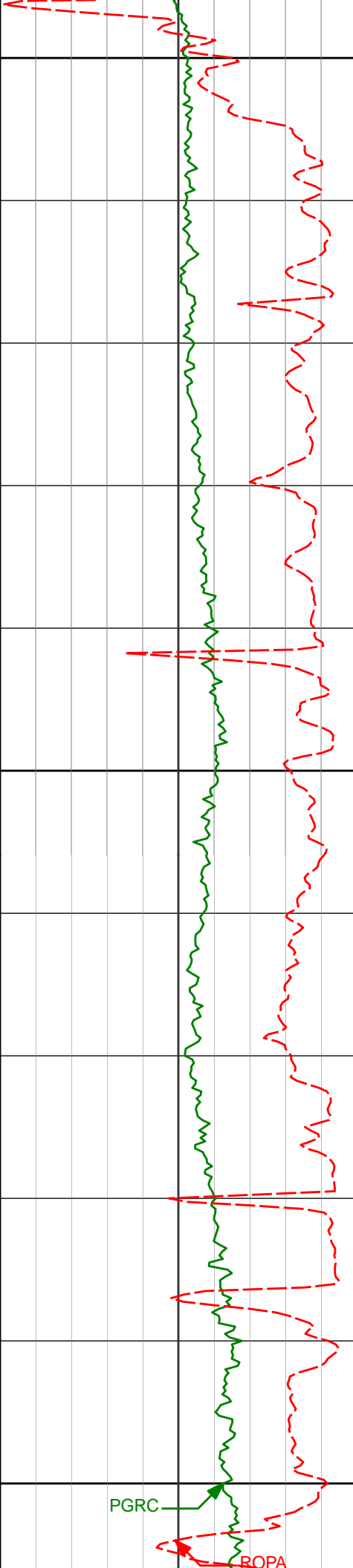
90.20°

180.01°

5826.74'

6247.69'

1.67°



11800

11836'

90.42°

179.56°

5826.25'

6339.68'

0.54°

11900

11927'

90.87°

179.76°

5825.22'

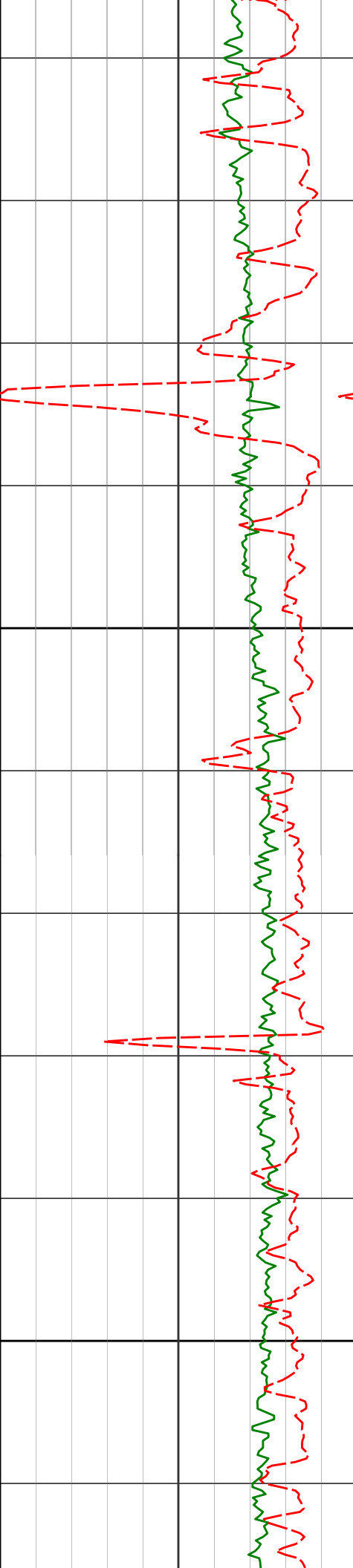
6430.67'

0.54°

12000

PGRC

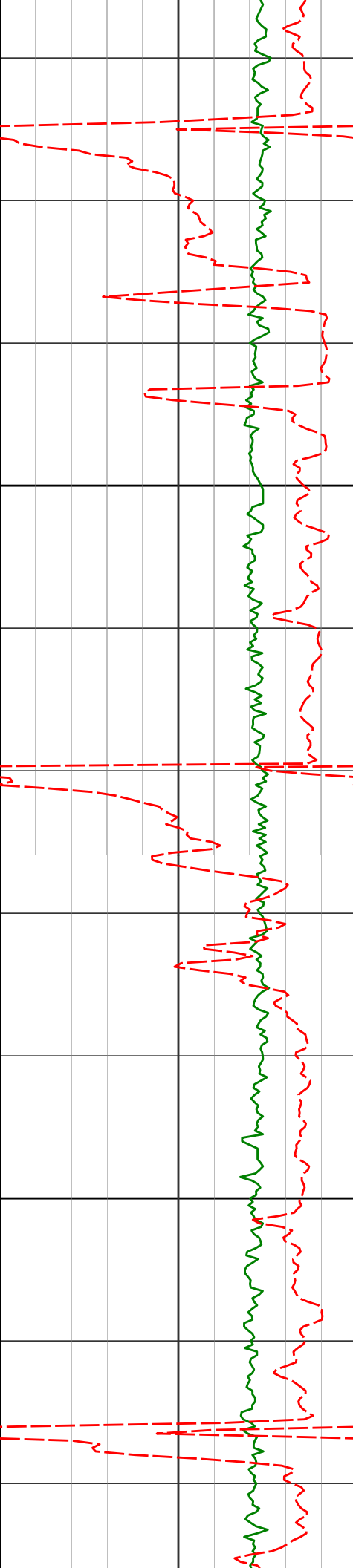
ROPA



12100

12200

12019'	90.49°	179.29°	5824.13'	6522.66'	0.66°
12110'	90.74°	179.40°	5823.15'	6613.64'	0.30°
12202'	90.83°	179.04°	5821.89'	6705.62'	0.40°



12300

12400

12294'

89.81°

179.65°

5821.38'

6797.61'

1.29°

12386'

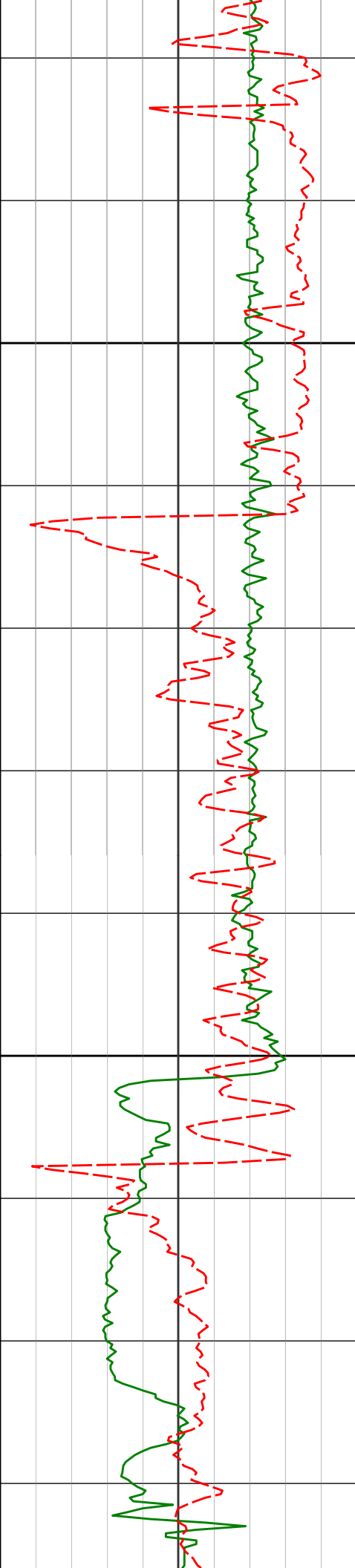
89.97°

179.32°

5821.56'

6889.60'

0.40°



12500

12600

12477'

89.52°

180.25°

5821.96'

6980.60'

1.14°

12568'

89.67°

180.10°

5822.60'

7071.59'

0.23°

12660'

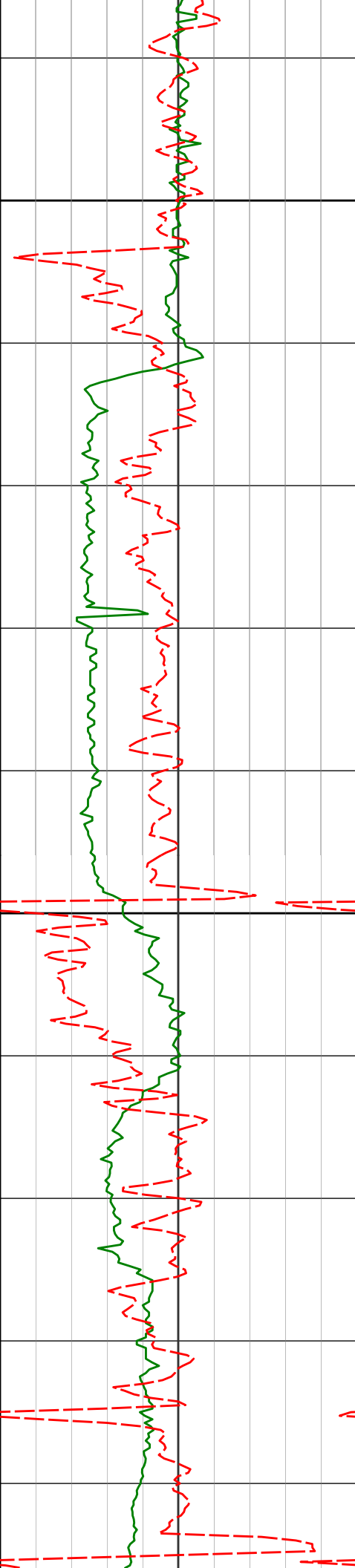
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179.75°

5822.77'

7163.59'

0.63°



12700

12751'

90.23°

179.01°

5822.48'

7254.58'

0.82°

12800

12842'

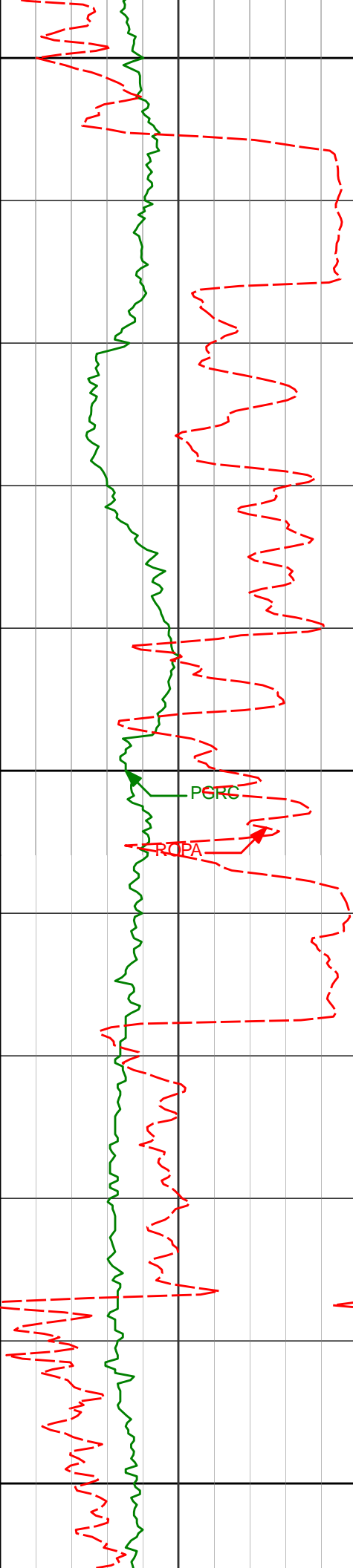
91.08°

178.74°

5821.44'

7345.55'

0.98°



12900

12934'

91.79°

180.35°

5819.14'

7437.51'

1.91°

13000

PCRC

ROPA

13026'

91.57°

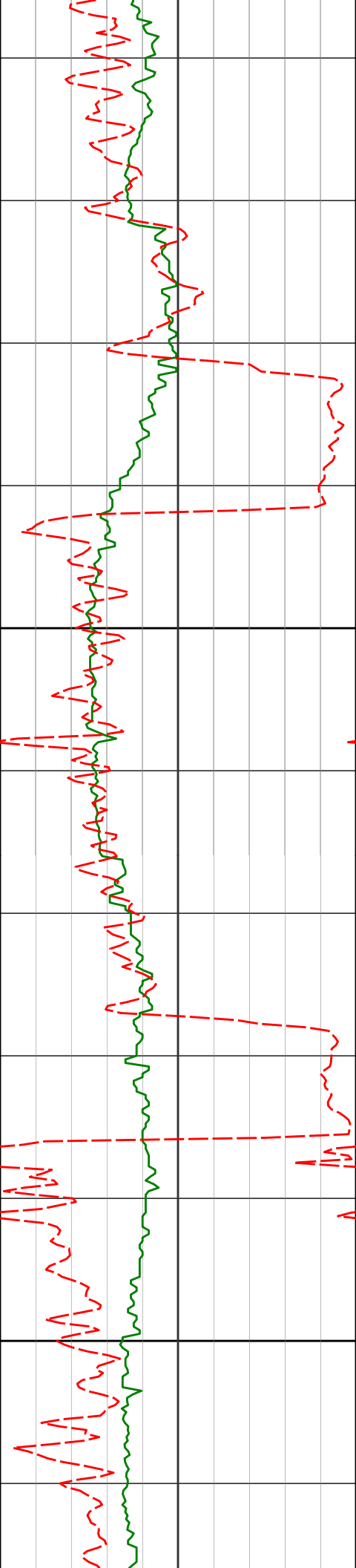
181.05°

5816.44'

7529.47'

0.80°

13100



13200

13300

13118'

91.35°

180.64°

5814.09'

7621.43'

0.51°

13209'

90.84°

181.68°

5812.35'

7712.40'

1.27°

13301'

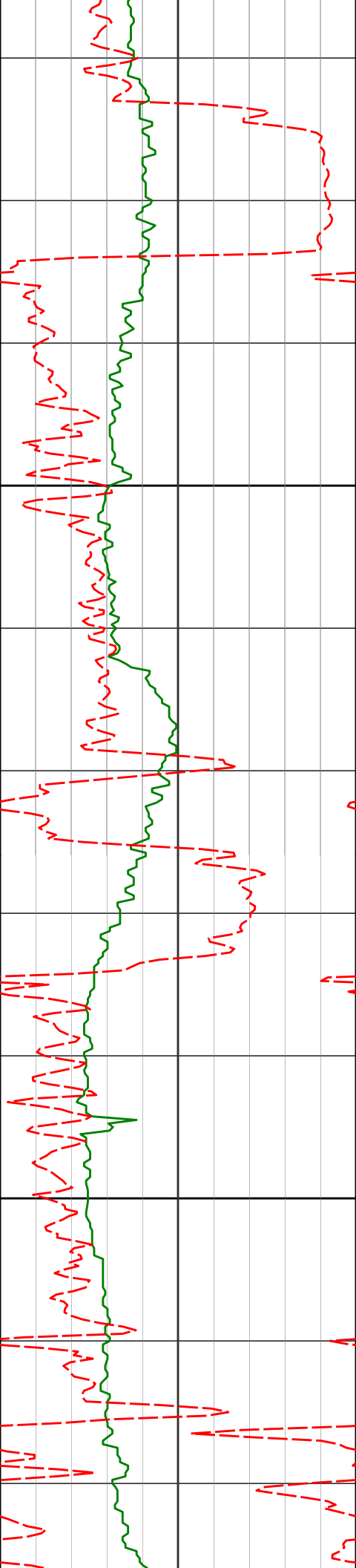
89.92°

181.63°

5811.74'

7804.37'

1.00°



13400

13500

13392'

88.49°

182.36°

5813.01'

7895.31'

1.76°

13484'

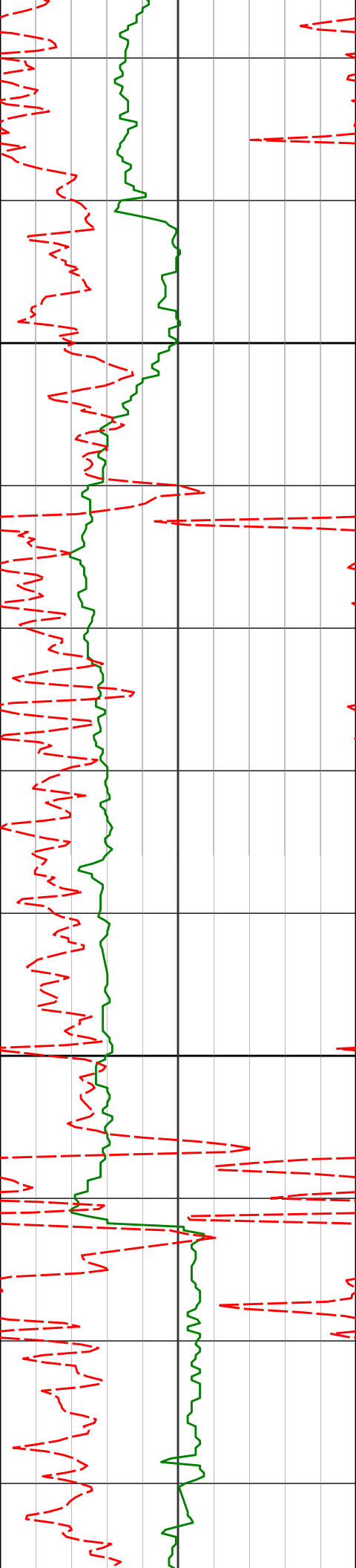
88.74°

182.38°

5815.23'

7987.22'

0.27°



13600

13700

13575'

88.56°

181.37°

5817.38'

8078.16'

1.13°

13666'

88.26°

180.74°

5819.90'

8169.11'

0.77°

13758'

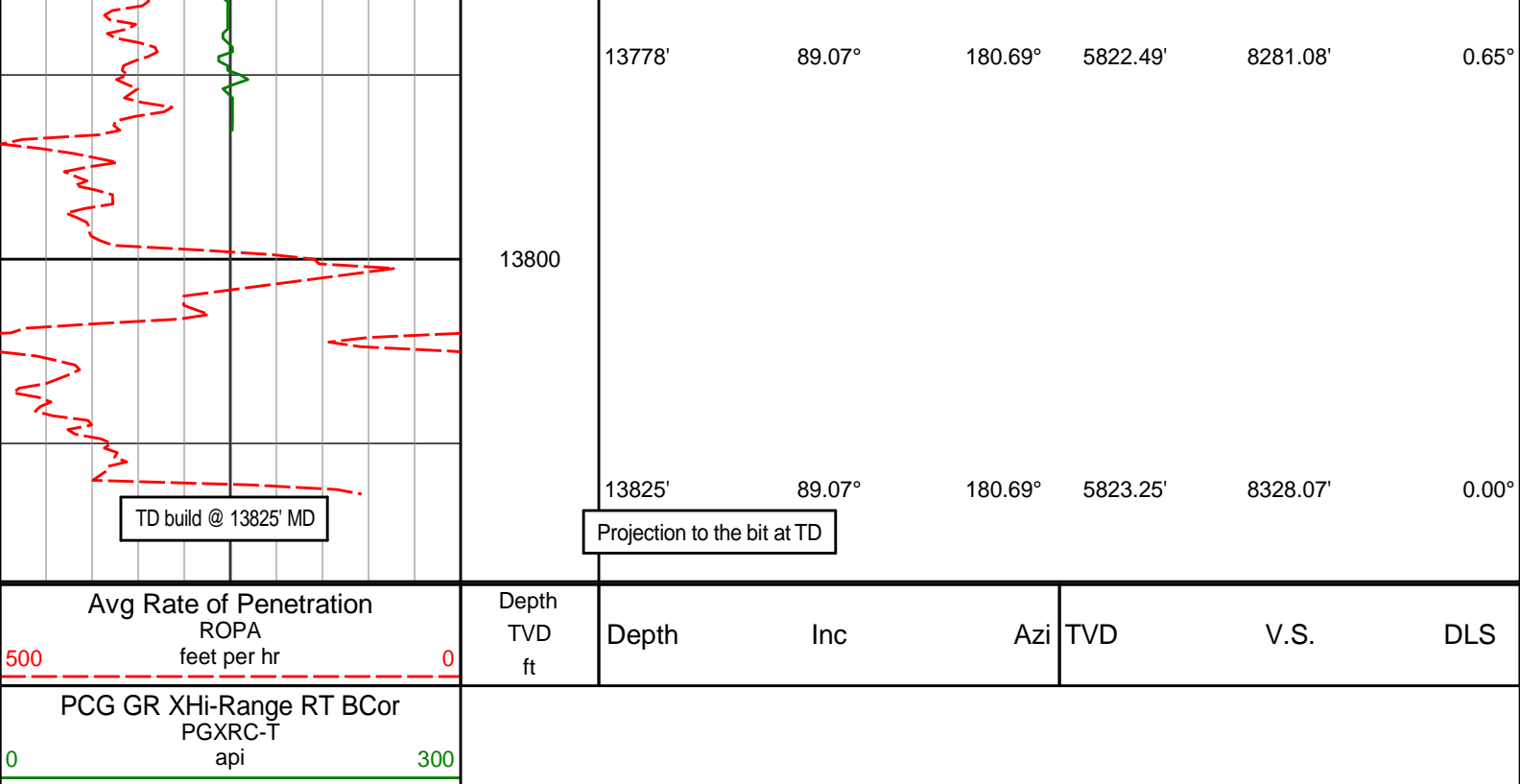
88.95°

180.64°

5822.14'

8261.08'

0.76°



HALLIBURTON

DIRECTIONAL SURVEY REPORT

Whiting Oil and Gas
Razor 11H-1415A
Redtail
Weld Colorado
USA
CA-XX-0902160032
Surveys are Sag, IFR and MS corrected

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
174.00	0.89	61.00	173.99	0.66 N	1.18 E	-0.66	0.51
267.00	0.52	58.28	266.99	1.23 N	2.17 E	-1.24	0.40
450.00	0.76	54.88	449.97	2.36 N	3.87 E	-2.38	0.13
542.00	0.67	55.38	541.97	3.02 N	4.81 E	-3.04	0.10
634.00	0.83	167.34	633.96	2.67 N	5.40 E	-2.69	1.35
726.00	1.68	123.49	725.94	1.28 N	6.67 E	-1.31	1.33
910.00	4.49	136.96	909.66	5.47 S	13.84 E	5.42	1.57
1094.00	5.69	157.78	1092.95	19.18 S	22.21 E	19.10	1.19
1185.00	6.19	157.01	1183.46	27.88 S	25.83 E	27.78	0.56
1277.00	6.03	157.20	1274.93	36.90 S	29.64 E	36.78	0.18
1369.00	6.05	162.66	1366.42	45.98 S	32.96 E	45.85	0.62
1460.00	4.66	172.22	1457.03	54.22 S	34.88 E	54.09	1.81
1551.00	3.22	190.94	1547.81	60.39 S	34.90 E	60.26	2.10
1643.00	3.77	198.46	1639.64	65.80 S	33.45 E	65.67	0.78
1733.00	4.13	200.30	1729.43	71.64 S	31.39 E	71.52	0.42
1781.00	4.33	200.67	1777.30	74.96 S	30.15 E	74.84	0.42
1919.00	4.99	204.64	1914.84	85.29 S	25.81 E	85.19	0.53
2012.00	0.68	249.01	2007.71	89.17 S	23.61 E	89.08	4.87
2103.00	0.97	233.32	2098.70	89.82 S	22.49 E	89.73	0.40
2194.00	1.01	252.99	2189.69	90.52 S	21.10 E	90.43	0.37
2286.00	0.83	253.41	2281.67	90.94 S	19.69 E	90.87	0.20
2469.00	1.33	47.08	2464.66	89.87 S	19.97 E	89.80	1.15
2561.00	1.10	36.91	2556.64	88.44 S	21.28 E	88.36	0.34
2652.00	0.98	30.20	2647.63	87.07 S	22.20 E	86.98	0.19
2744.00	0.96	35.16	2739.61	85.76 S	23.04 E	85.67	0.09

2836.00	1.21	35.27	2831.60	84.34 S	24.04 E	84.24	0.27
2927.00	1.35	41.18	2922.57	82.75 S	25.31 E	82.65	0.21
3019.00	1.41	341.07	3014.55	80.86 S	25.65 E	80.76	1.50
3110.00	1.74	342.23	3105.52	78.48 S	24.87 E	78.39	0.36
3201.00	1.47	7.20	3196.48	76.01 S	24.59 E	75.92	0.82
3292.00	1.31	25.38	3287.45	73.91 S	25.18 E	73.82	0.51
3384.00	1.07	356.25	3379.44	72.11 S	25.58 E	72.01	0.70
3476.00	1.08	7.08	3471.42	70.39 S	25.63 E	70.29	0.22
3568.00	1.09	10.21	3563.40	68.67 S	25.89 E	68.57	0.07
3659.00	1.07	15.82	3654.39	67.00 S	26.28 E	66.90	0.12
3751.00	1.30	13.10	3746.37	65.15 S	26.75 E	65.05	0.26
3842.00	1.03	24.98	3837.35	63.41 S	27.33 E	63.30	0.40
3934.00	1.00	20.76	3929.33	61.91 S	27.96 E	61.80	0.09
4025.00	1.17	28.19	4020.32	60.35 S	28.68 E	60.24	0.24
4116.00	1.07	337.50	4111.30	58.74 S	28.79 E	58.63	1.06
4208.00	0.81	322.21	4203.29	57.43 S	28.07 E	57.33	0.39
4299.00	0.88	313.16	4294.28	56.45 S	27.16 E	56.34	0.17
4391.00	0.94	279.41	4386.27	55.84 S	25.90 E	55.74	0.58
4482.00	0.63	258.45	4477.26	55.82 S	24.68 E	55.72	0.46
4574.00	1.52	228.76	4569.24	56.73 S	23.26 E	56.64	1.11
4665.00	1.83	238.82	4660.21	58.27 S	21.11 E	58.19	0.47
4757.00	1.80	220.90	4752.16	60.13 S	18.91 E	60.05	0.62
4850.00	1.01	214.58	4845.13	61.90 S	17.49 E	61.84	0.86
4942.00	1.00	197.13	4937.12	63.34 S	16.79 E	63.27	0.33
5033.00	0.62	199.65	5028.11	64.56 S	16.39 E	64.50	0.42
5125.00	3.98	169.79	5120.02	68.17 S	16.79 E	68.11	3.76
5217.00	2.45	166.45	5211.88	73.23 S	17.82 E	73.16	1.67
5264.00	5.52	171.02	5258.76	76.44 S	18.41 E	76.37	6.56
5309.00	9.06	172.92	5303.39	82.09 S	19.18 E	82.02	7.88
5356.00	12.93	174.07	5349.51	91.00 S	20.18 E	90.92	8.25
5401.00	17.12	176.97	5392.97	102.63 S	21.05 E	102.55	9.46
5448.00	20.99	174.93	5437.38	117.93 S	22.16 E	117.84	8.35
5493.00	25.16	176.82	5478.77	135.51 S	23.40 E	135.42	9.41
5540.00	29.25	179.75	5520.57	156.98 S	24.01 E	156.89	9.15
5584.00	33.76	180.04	5558.07	179.97 S	24.05 E	179.88	10.26
5631.00	38.24	180.57	5596.09	207.59 S	23.89 E	207.49	9.55
5679.00	43.16	179.48	5632.47	238.88 S	23.89 E	238.78	10.36
5726.00	48.19	179.97	5665.30	272.49 S	24.05 E	272.39	10.73
5775.00	52.97	180.76	5696.40	310.33 S	23.80 E	310.24	9.83
5822.00	58.68	182.94	5722.79	349.17 S	22.52 E	349.08	12.74
5870.00	62.90	185.06	5746.22	390.95 S	19.58 E	390.88	9.60
5917.00	65.33	184.37	5766.73	433.09 S	16.11 E	433.03	5.34
5965.00	69.34	183.18	5785.23	477.28 S	13.20 E	477.22	8.66
6012.00	73.18	182.49	5800.32	521.72 S	11.00 E	521.68	8.29
6060.00	75.38	182.50	5813.33	567.88 S	8.99 E	567.84	4.58
6107.00	77.44	182.79	5824.37	613.52 S	6.88 E	613.48	4.42
6155.00	82.81	181.10	5832.60	660.76 S	5.28 E	660.73	11.71
6183.00	86.89	180.40	5835.11	688.64 S	4.92 E	688.61	14.78
6265.00	88.21	180.30	5838.62	770.56 S	4.42 E	770.54	1.61
6359.00	92.10	179.37	5838.36	864.54 S	4.69 E	864.51	4.25
6454.00	92.16	179.69	5834.83	959.47 S	5.47 E	959.44	0.34
6548.00	90.77	180.57	5832.43	1053.44 S	5.26 E	1053.41	1.75
6643.00	91.00	180.24	5830.96	1148.42 S	4.58 E	1148.40	0.42
6738.00	91.09	180.51	5829.23	1243.40 S	3.96 E	1243.38	0.30
6833.00	91.06	181.50	5827.45	1338.37 S	2.30 E	1338.35	1.04
6928.00	90.21	180.95	5826.40	1433.34 S	0.27 E	1433.33	1.07
7023.00	89.75	181.51	5826.43	1528.32 S	1.77 W	1528.31	0.76
7118.00	89.40	181.35	5827.13	1623.29 S	4.14 W	1623.29	0.41
7213.00	89.19	181.08	5828.30	1718.26 S	6.16 W	1718.27	0.36
7308.00	89.88	179.73	5829.07	1813.25 S	6.83 W	1813.26	1.60
7403.00	89.75	180.50	5829.38	1908.25 S	7.02 W	1908.26	0.82
7498.00	89.55	179.71	5829.96	2003.25 S	7.19 W	2003.26	0.86
7593.00	91.10	180.24	5829.42	2098.24 S	7.15 W	2098.25	1.72
7687.00	90.67	178.38	5827.97	2192.22 S	6.02 W	2192.23	2.03
7782.00	90.83	179.35	5826.73	2287.19 S	4.14 W	2287.19	1.03
7877.00	90.27	178.20	5825.81	2382.16 S	2.11 W	2382.15	1.35
7972.00	89.99	177.92	5825.60	2477.11 S	1.11 E	2477.09	0.42
8067.00	89.70	178.22	5825.86	2572.05 S	4.31 E	2572.02	0.44
8161.00	90.67	178.67	5825.55	2666.02 S	6.86 E	2665.97	1.14
8255.00	90.78	178.40	5824.36	2759.98 S	9.26 E	2759.92	0.31
8350.00	90.19	177.68	5823.56	2854.92 S	12.51 E	2854.85	0.98
8445.00	91.41	178.84	5822.23	2949.86 S	15.40 E	2949.78	1.77
8536.00	90.07	181.89	5821.06	3040.84 S	14.82 E	3040.76	3.66
8628.00	89.84	181.84	5821.13	3132.79 S	11.82 E	3132.72	0.26
8719.00	89.79	181.91	5821.19	3223.74 S	8.88 E	3223.68	2.14

8719.00	89.72	181.81	5821.48	3223.74 S	8.92 E	3223.69	0.14
8811.00	89.14	180.86	5822.39	3315.71 S	6.78 E	3315.66	1.21
8901.00	91.46	181.13	5821.92	3405.69 S	5.22 E	3405.65	2.60
8993.00	91.57	180.92	5819.49	3497.65 S	3.57 E	3497.61	0.26
9083.00	90.40	181.09	5817.94	3587.62 S	1.99 E	3587.58	1.31
9176.00	90.30	180.47	5817.37	3680.61 S	0.73 E	3680.58	0.68
9267.00	90.03	180.61	5817.11	3771.60 S	0.13 W	3771.57	0.33
9359.00	89.80	180.44	5817.25	3863.60 S	0.97 W	3863.57	0.31
9451.00	89.20	180.19	5818.05	3955.59 S	1.48 W	3955.57	0.71
9543.00	88.79	179.66	5819.67	4047.58 S	1.36 W	4047.55	0.73
9634.00	89.22	179.51	5821.25	4138.56 S	0.70 W	4138.53	0.50
9727.00	91.10	180.57	5820.99	4231.55 S	0.76 W	4231.53	2.32
9817.00	91.71	180.51	5818.78	4321.52 S	1.61 W	4321.50	0.68
9909.00	92.58	180.40	5815.34	4413.45 S	2.34 W	4413.43	0.95
10002.00	91.75	182.04	5811.82	4506.36 S	4.32 W	4506.35	1.98
10094.00	90.69	182.04	5809.86	4598.28 S	7.59 W	4598.28	1.15
10185.00	89.94	181.15	5809.36	4689.24 S	10.13 W	4689.25	1.28
10277.00	87.21	181.05	5811.65	4781.19 S	11.89 W	4781.20	2.97
10370.00	87.66	179.94	5815.81	4874.09 S	12.70 W	4874.11	1.29
10461.00	89.82	179.88	5817.81	4965.06 S	12.55 W	4965.08	2.37
10553.00	89.93	179.25	5818.02	5057.06 S	11.85 W	5057.07	0.70
10645.00	90.31	178.76	5817.82	5149.05 S	10.26 W	5149.05	0.67
10737.00	90.13	182.11	5817.47	5241.03 S	10.95 W	5241.03	3.65
10828.00	89.79	180.32	5817.53	5332.01 S	12.88 W	5332.02	2.00
10920.00	89.99	179.77	5817.71	5424.01 S	12.96 W	5424.02	0.64
11011.00	90.42	179.66	5817.38	5515.00 S	12.50 W	5515.01	0.49
11103.00	90.60	178.89	5816.56	5606.99 S	11.34 W	5606.99	0.86
11194.00	89.99	180.07	5816.10	5697.99 S	10.51 W	5697.98	1.46
11286.00	88.01	181.72	5817.70	5789.95 S	11.95 W	5789.96	2.80
11378.00	87.96	181.84	5820.94	5881.85 S	14.81 W	5881.86	0.14
11469.00	88.21	181.86	5823.98	5972.75 S	17.74 W	5972.78	0.28
11562.00	89.32	181.57	5825.98	6065.69 S	20.52 W	6065.72	1.23
11653.00	89.76	181.46	5826.71	6156.65 S	22.93 W	6156.70	0.50
11744.00	90.20	180.01	5826.74	6247.64 S	24.10 W	6247.69	1.67
11836.00	90.42	179.56	5826.25	6339.64 S	23.75 W	6339.68	0.54
11927.00	90.87	179.76	5825.22	6430.63 S	23.21 W	6430.67	0.54
12019.00	90.49	179.29	5824.13	6522.62 S	22.45 W	6522.66	0.66
12110.00	90.74	179.40	5823.15	6613.61 S	21.41 W	6613.64	0.30
12202.00	90.83	179.04	5821.89	6705.59 S	20.16 W	6705.62	0.40
12294.00	89.81	179.65	5821.38	6797.58 S	19.11 W	6797.61	1.29
12386.00	89.97	179.32	5821.56	6889.58 S	18.28 W	6889.60	0.40
12477.00	89.52	180.25	5821.96	6980.58 S	17.94 W	6980.60	1.14
12568.00	89.67	180.10	5822.60	7071.58 S	18.21 W	7071.59	0.23
12660.00	90.13	179.75	5822.77	7163.57 S	18.09 W	7163.59	0.63
12751.00	90.23	179.01	5822.48	7254.57 S	17.11 W	7254.58	0.82
12842.00	91.08	178.74	5821.44	7345.54 S	15.32 W	7345.55	0.98
12934.00	91.79	180.35	5819.14	7437.51 S	14.59 W	7437.51	1.91
13026.00	91.57	181.05	5816.44	7529.46 S	15.72 W	7529.47	0.80
13118.00	91.35	180.64	5814.09	7621.42 S	17.07 W	7621.43	0.51
13209.00	90.84	181.68	5812.35	7712.38 S	18.91 W	7712.40	1.27
13301.00	89.92	181.63	5811.74	7804.34 S	21.57 W	7804.37	1.00
13392.00	88.49	182.36	5813.01	7895.28 S	24.74 W	7895.31	1.76
13484.00	88.74	182.38	5815.23	7987.17 S	28.54 W	7987.22	0.27
13575.00	88.56	181.37	5817.38	8078.10 S	31.52 W	8078.16	1.13
13666.00	88.26	180.74	5819.90	8169.04 S	33.19 W	8169.11	0.77
13758.00	88.95	180.64	5822.14	8261.01 S	34.30 W	8261.08	0.76
13778.00	89.07	180.69	5822.49	8281.01 S	34.53 W	8281.08	0.65
13825.00	89.07	180.69	5823.25	8328.00 S	35.10 W	8328.07	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 180.22 DEGREES (TRUE)
A TOTAL CORRECTION OF 7.46 DEG FROM MAGNETIC NORTH TO TRUE NORTH HAS BEEN APPLIED

HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.
HORIZONTAL DISPLACEMENT(CLOSURE) AT 13825.00 FEET
IS 8328.07 FEET ALONG 180.24 DEGREES (TRUE)

Tie onto surface at 0' MD
Final survey is a projection to the bit at TD